



GEA Mechanical Equipment US, Inc.
GEA Westfalia Separator Division
100 Fairway Court | Northvale, New Jersey | 07647

Operation and Maintenance Manual

Dewatering Decanter

Model: CF 7000

City of Taunton, MA – WWTF
Veolia Water North America - Northeast LLC
Taunton, MA USA

Rev. 0
September, 2022



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GEA Westfalia Separator Division
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Northvale, New Jersey 07647**

Contact Numbers:

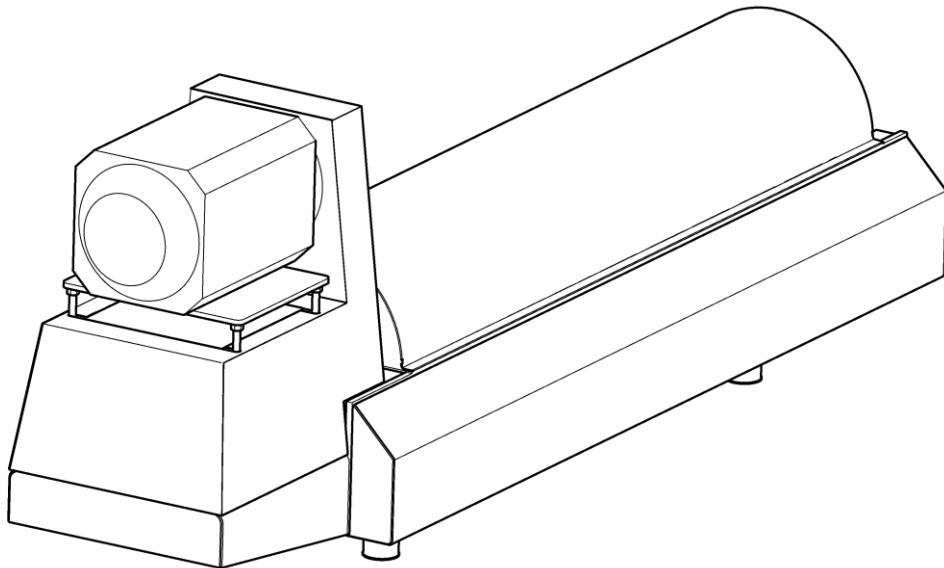
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Main Office Fax:	201-767-3901
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For future reference, it is recommended that the user have available important information concerning the system. Please make sure that the following information provided is as complete as possible. This information will assist with the ordering of replacement parts and will be requested during any inquires at the factory.

Machine Application:	Dewatering
Machine Purchaser:	Veolia Water N.A.
Purchaser Contract Number:	987533
Purchaser Equipment ID No.:	SSP-7301 SSP-7302
Contract Date:	30-June-2021
Installation Location:	Taunton, MA
Westfalia Separator Project Number:	2652395848
Centrifuge Model Number:	UCF 7000
Year of Construction	2021
Number of Machines Ordered:	2
Serial Number(s):	8012-663 8012-664
Mechanical Submittal Revision	0
Submittal Issue Date:	August 2021



Data sheet

Description: Clarifying decanter

Type: biosolids Decanter prime 7000

Machine-No.: 8012-663

Order-No.: 2451395848/002000

Material-No.: 99870531509

Version: 30.11.2021

ORIGINAL DOCUMENT

The authors are always grateful for remarks and suggestions for improving the documentation. Remarks and suggestions can be sent to:

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Preface to this datasheet

This datasheet contains the order-specific technical data for the centrifuge.



Non-compliance with this datasheet can not only result in danger for centrifuges, material and the environment but also endanger persons working on or in the vicinity of the centrifuge.

The technical data from this datasheet have sole validity!

Technical data in the centrifuge documentation which deviate from this are invalid.

- Keep the datasheet complete, close to the centrifuge and accessible to all those working on or with the centrifuge. It must be available to these people at all times!

Other applicable documents

The documents below apply in addition to this datasheet.

- Operating instructions for the centrifuge
- Dimensions sheet for the centrifuge
- Operating instructions for components made by other manufacturers

Abbreviations and symbols used

bar (g)	bar (g = pressure)
approx.	approximately (roughly)
dB (A)	decibels (A)
f	frequency
FU	frequency converter (Frequenzumrichter)
Hz	Hertz
I/O	switch on/off
kg/dm ³	kilogrammes per cubic decimetre
kW	kilowatts
l	litres
l/h	litres per hour
max.	maximum
min.	minimum
min	minute
rpm	revolutions per minute
mm/s RMS	millimetres per second, RMS (= Root Mean Square)
mW	milliwatts
m ³ /h	cubic metres per hour
sec	second
V	volts
°C	degrees Celsius
%	per cent
Y	star
Δ	delta

Centrifuge			
			Comments
Type	biosolids Decanter prime 7000		
Serial no.	8012-663		
Year of construction	see centrifuge nameplate		
Permitted bowl speed	rpm	3150 (FU F=63HZ)	
Permitted density of solids	kg/dm ³	1.6	max.
Permitted throughput	m ³ /h	--/ --	min. / max.
Permitted temperature of feed material	°C	5/60	min. / max.
Permitted operating speed range	rpm	1000-3150	min. / max.
Filling volume of bowl	l	557	approx.
Run-down time of the bowl	min	30	approx.
Permitted vibration velocity Limit value 1 Limit value 2	mm/s RMS	18/20	Query measuring point in supplying factory / note dimensions sheet.
Differential speed	rpm	1-14	
Decanter factor	%	105	
Ambient temperature	°C	5-40°	min. / max.
Warning "Bearing temperature, bowl"	°C	120	
Cutout "Bearing temperature, bowl"	°C	140	
Switching point "Feed closed"	%	90	
Switching point "Decanter off"	%	110	
Sound pressure level	dB (A)	87+/-2	DIN EN ISO 3746
Sound power level	mW	108/63,5	DIN EN ISO 3746

Process data			
			Comments
Intended use, feed material	INDUSTRIELLE KLÄRANLAGEN / IND		
Feed pressure	bar	0,3/2	min. / max.

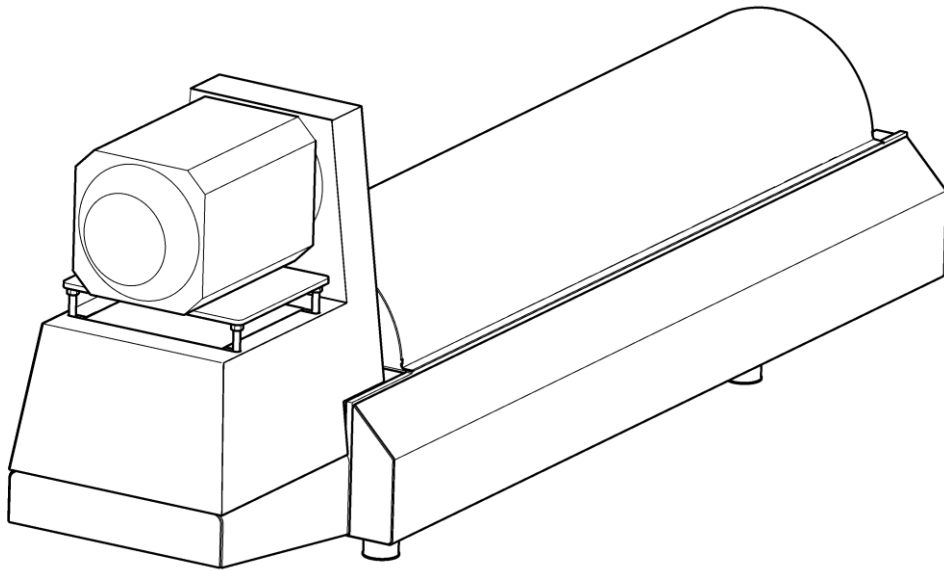


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gea.com



Data sheet

Description: Clarifying decanter

Type: biosolids Decanter prime 7000

Machine-No.: 8012-664

Order-No.: 2451395848/012000

Material-No.: 99870531510

Version: 30.11.2021

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**GEA Mechanical Equipment US, Inc.
GEA Westfalia Separator Division**

**MATERIAL AND WORKMANSHIP WARRANTY
City of Taunton, MA Wastewater Treatment Facility Solids Handling Improvements**

Seller warrants to Veolia Water North America – Northeast, LLC (the “Buyer”) and City of Taunton, Massachusetts (“Owner”) that the equipment purchased from Seller is free from defects in material and workmanship to the extent provided in Section 3.04 of Specification Section 11350, for the warranty period set forth therein and will satisfy the process performance requirements set forth in Section 2.02 of Specification Section 11350 (when tested in accordance with Specification Section 01680) provided that: (i) the equipment is installed in accordance with Seller’s specifications and instructions and is used and maintained normally and properly in accordance with Seller’s instructions as to maintenance and operation, as set forth in written operation and maintenance manuals and instruction sheets furnished by Seller; (ii) the equipment is used for processing sludge consistent with the feed characteristics set forth in Section 2.02 of Specification Section 11350; (iii) the equipment has not been changed without the prior written approval of Seller; and only OEM parts and lubricants that affect the operation of the equipment have been used unless otherwise agreed by Seller; (iv) Buyer or Owner gives prompt written notice to Seller before the end of the warranty period specifying all alleged defects in the equipment purchased; (v) Buyer and Owner preserves and turns over to Seller and permits reasonable inspection by Seller of all allegedly defective equipment, parts or items and access to the equipment to observe its startup, operation and maintenance; and (vi) that to the extent that the Acceptance Testing and putting the equipment to use do not occur within 180 calendar days from the date of the shipment of the equipment to site or storage except for a delay caused solely by Seller, the applicable warranty periods will be deemed to have commenced on the date which is 180 calendar days after shipment of the equipment to site or storage.

Seller shall be responsible for furnishing all labor and materials necessary for repairs and replacements for all system components and controls furnished by the Seller which are defective under the terms of the warranty during the respective warranty period.

This warranty shall not cover (i) any equipment furnished by Buyer, Owner or any third party (other than a subcontractor of Seller), (ii) any defects arising from corrosion, abrasion, use of unsuitable lubricants, operation outside of prescribed temperature ranges, or negligent attendance or faulty operation, (iii) ordinary wear and tear, or (iv) any defects caused by errors on the part of the Buyer or Owner in not providing suitable premises in which the equipment is to be located, adequate foundation works, or adequate protection against influences within or outside the premises which may affect the equipment or its operation. Notwithstanding the warranty set forth above, Seller shall not warrant any equipment, where the vendor of such equipment (other than Seller) is specified by Buyer or Owner, for a period longer than warranted by the vendor.

THE WARRANTY OF MATERIAL AND WORKMANSHIP AND THE SATISFACTION OF THE PROCESS PERFORMANCE REQUIREMENTS SET FORTH ABOVE ARE THE ONLY WARRANTIES MADE BY SELLER AND ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND SELLER DISCLAIMS ON BEHALF OF ITSELF, ITS AFFILIATES, SUBCONTRACTORS AND SUBSUPPLIERS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A SPECIFIC PURPOSE (OTHER THAN THE PURPOSE STATED IN THE OWNER’S SPECIFICATIONS SET FORTH IN THE ORDER), SUITABILITY OR PERFORMANCE. No other promise or affirmation of fact (including, but not limited to, statements regarding capacity or performance of the equipment) shall constitute a warranty of Seller or give rise to any liability or obligation on the part of Seller.

Seller’s obligation under this warranty and guarantee is strictly and exclusively limited to furnishing repairs or replacements for equipment or parts determined to be defective on inspection by an authorized representative of Seller. Notwithstanding this exclusive remedy, if it is ultimately determined that the remedy fails in its essential purpose, then any action which may be brought against Seller subject to the terms of the order will be limited to 100% of the order price for the purchased equipment for which the exclusive remedy has so failed. Similarly, Seller’s and its subcontractors’ and subsuppliers’ aggregate responsibility and liability, whether arising in contract or tort, including negligence and strict liability, under this Warranty shall not exceed the purchase price for the equipment purchased from Seller provided, however, that the limitation will not apply to any liability of Seller for direct damages claimed by third parties for such third parties’ personal injury or physical property damage for which Seller is liable to the extent caused by the negligent acts or omissions or willful misconduct of the Seller, for all of which matters Seller shall only be liable up to an amount of \$1,000,000 in the aggregate. Seller assumes no responsibility and shall have no liability for any repairs or replacements by Buyer or Owner without Seller’s prior written authorization.

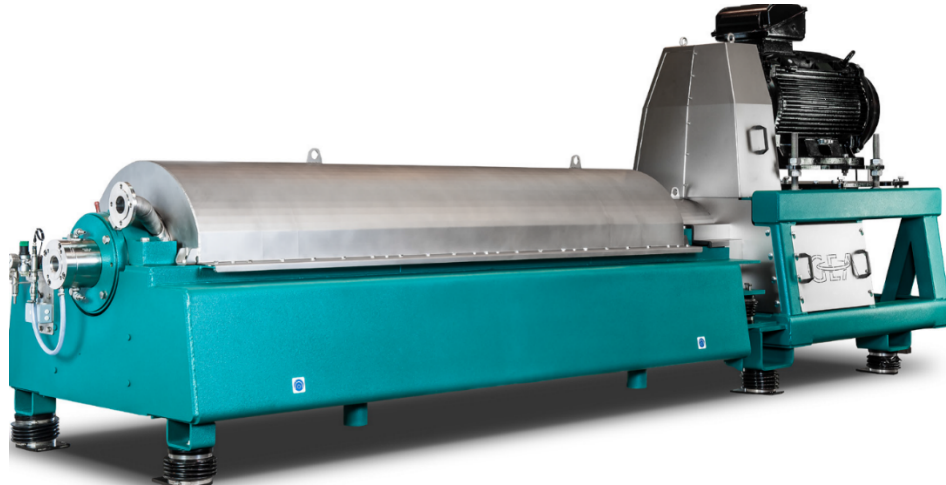
In no event shall Seller, its subcontractors or subsuppliers be liable in contract or in tort or under any other legal context or theory, including negligence and strict liability, for any loss of revenues or profits or loss under purchases or

**GEA Mechanical Equipment US, Inc.
GEA Westfalia Separator Division**

**MATERIAL AND WORKMANSHIP WARRANTY
City of Taunton, MA Wastewater Treatment Facility Solids Handling Improvements**

contracts made in reliance on the performance or non-performance of the purchased equipment, or for any special, punitive, exemplary, indirect, incidental or consequential damages of any kind or character, including, but not limited to, loss of use of facilities or equipment or plant downtime, whether suffered by Buyer, Owner or any third party, or for any loss or damage to the extent arising out of the negligence of Buyer or Owner, their respective employees or agents or any third party.

Customer: City of Taunton, MA WWTF
Model: CF 7000



Overview: Sludge Dewatering

Sludge Description:	Blend of Primary & WAS
Feed Concentration:	4.0%
Hydraulic Feed Rate:	200 GPM
Solids Loading Rate:	4,000 #/hr DS

Performance:

Dewatered Cake Solids:	25 - 30%
Recovery:	≥ 95%
Polymer Dose Rate:	15 - 25 #/DT

Mechanical & Electrical:

Bowl Diameter:	(640 mm) 25.2 in
Bowl Length:	(2683 mm) 105.6 in
Bowl Speed:	3,150
Operating G-Force:	3,550
Main Drive HP:	75
Scroll Drive HP:	50

EQUIPMENT STORAGE:**1) SHORT TERM STORAGE [≤ 30 days duration]**

- a) For short term storage prior to installation, the equipment should be stored indoors, in a dry location, in their original crates. Top cover should be maintained on any opened crates.

2) LONG TERM STORAGE INSTRUCTIONS [> 30 days duration – up to 1 year]

- a) For long term storage of the decanter equipment, the following is required:

i) General Requirements – Equipment in Original Shipping Crates:

- (1) Maintain equipment in the original shipping crates. Keep crates in a cool, dry location not exposed to weather elements.
- (2) Cover crates with tarps or other suitable cover to keep dust/debris off equipment. Ensure condensation does not build up on machine surface under the tarp.
- (3) Protective caps supplied with machine are to be maintained on machine ports. Seal all machine openings.
- (4) Control panel doors must be fully closed. Add desiccant to interior of panel to remove moisture.
- (5) Once per month: carry out visual inspection and perform the following to the equipment.
 - (a) Check all machine surfaces that are coated with corrosion / rust protection to ensure protective coating is maintained. Use Fuchs Lubricants Co type Decodyn GG, Chemsearch Rust Block, or equal. Remove old protective film and replace with new coating at least once per year.
 - (b) Check finish coat of machine painted surfaces. Apply touch up paint as needed.
 - (c) Check desiccant in panels. Replace as needed.
 - (d) Turn motor shafts ten revolutions and stop in a different position.

ii) During Installation; Prior to Start-Up:

- (1) In addition to the general requirements listed above, perform the following:
 - (a) Control panel doors are to be maintained closed. All Conduit connections are to be sealed [i.e. not open to atmosphere]. Insert silica-gel bags [desiccant] inside panels for moisture control.
 - (b) Add space heaters to control panels. The interior temperature should be maintained approximately 10°F above ambient.

iii) Prior to Start-Up for Regular Operation:

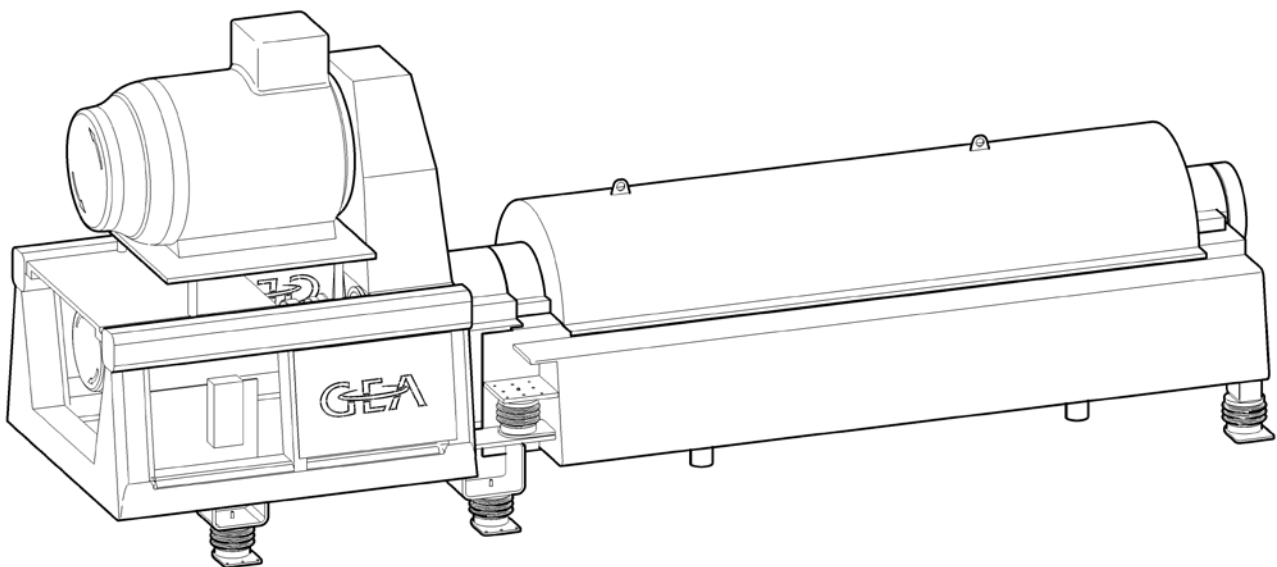
- (1) Complete installation of all piping, hoses, electrical connection, etc.
- (2) Check that gearbox and bearing are provided with their proper quantity and type of grease. Refer to the specific instructions in the lube and maintenance schedule and the installation guidelines.
- (3) Check vibration isolators for wear or damage. Replace worn parts as needed.
- (4) Check finish coat of machine. Apply touch up paint as needed
- (5) Replace PLC batteries, if needed.
- (6) NOTE: the work should be performed under the direct supervision of a certified GEA Westfalia Separator service technician.

Decommissioning Long Term Storage Guidelines

Designation: Decanter

Model: waterMaster CF 7000

No. 8419-9001-800 13 | Edition 16.01.2014



8419000

ORIGINAL INSTRUCTION MANUAL
Subject to modification!

The authors are always grateful for comments and suggestions for improving the documentation. These can be addressed to:



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13 Decommissioning

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13.1 Notes on long-time storage of the decanter and individual rotors

The decanter/rotor will get damaged if it is not operated for a prolonged period and inadequate preserving measures are taken. This also applies for the time before commissioning.

When the machine is shut down for longer than 12 months, special measures are required to avoid the machine getting damaged during standstill.

If this action is not taken, the roller bearings of the machine in particular will be damaged by corrosion and one-sided load. This bearing damage results in high consequential costs.

The required preserving measures should be monitored by GEA Westfalia Separator Service.

13.1.1 Decommissioning the decanter

For a long-term storage (standstill longer than one year), the decanter must be prepared as follows after shut-down:

- Clean hood and catcher.
- Dismantle all feed and discharge lines of the machine and seal the openings.
 - Product feed
 - Solids discharge
 - Liquid discharge
 - Flocculent feed
- Remove the coupling. Slacken and remove the flat belts.
- Drain the gear oil from the gearbox and the surge reservoir. Fill in preserving oil.
- Only in case of grease-lubricated bowl bearings
 - Pack the bowl bearings with grease.
- Only in case of oil-lubricated bowl bearings:
 - Fill 0.05 litres of preserving oil into the bowl bearings (WS Part-No. 6969-0005-010).
 - In the case of individual rotors, additionally seal all holes.
- Tighten the bowl lock screws and lock with nuts.

13.1.2 Painted parts

An intact paint coating provides adequate corrosion protection. For this reason, painted parts must be examined for damage or changes once a month.

Touch up the damage in accordance with the instructions of the paint manufacturer.

13.1.3 Unpainted areas and galvanised parts

Unpainted areas and galvanised parts must be treated as follows:

- Carefully clean the area or part.
- Spray on corrosion protection wax (WS Part-No. 6969-0022-010) Note the exception in the following diagram.

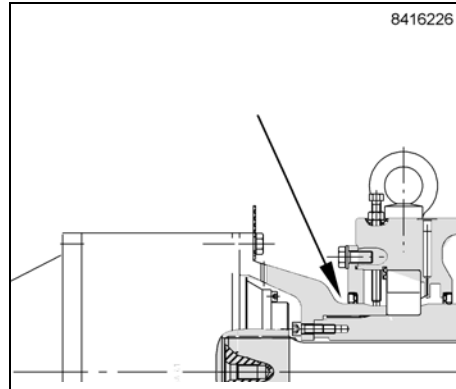


Fig. 111

- Treat this part of the hub with slushing oil (WS Part-No. 6969-0015-050).

- Check and, when necessary, touch up the corrosion protection once a month.

13.1.4 Gearbox / spare gearbox

The gearbox and spare gearboxes must be prepared as follows for long-term storage.

- Drain the lubricating oil completely, see chapter "Gear".
- Fill in 0.05 litre preserving oil (WS part no. 6969-0005-010) and close the gearbox.
- Carefully clean the gearboxes. Spray on corrosion protection wax (WS Part-No. 6969-0022-010) Check and, when necessary, touch up the corrosion protection once a month.

For the purpose of transporting the gearbox for inspection by the manufacturer, the gearbox must likewise be prepared as described above.

13.1.5 Drive motors

The drive motors must be prepared as follows for long-term storage.

- Option: Connect the space heaters for the motor winding. This is especially important in the case of high air humidity in the environment.
- Carefully clean the motor.
- Spray on anti-corrosive wax (see spare parts catalog).
- Check and, when necessary, touch up the corrosion protection once a month.

13.2 Maintenance schedule (machine shut-down for a prolonged period)

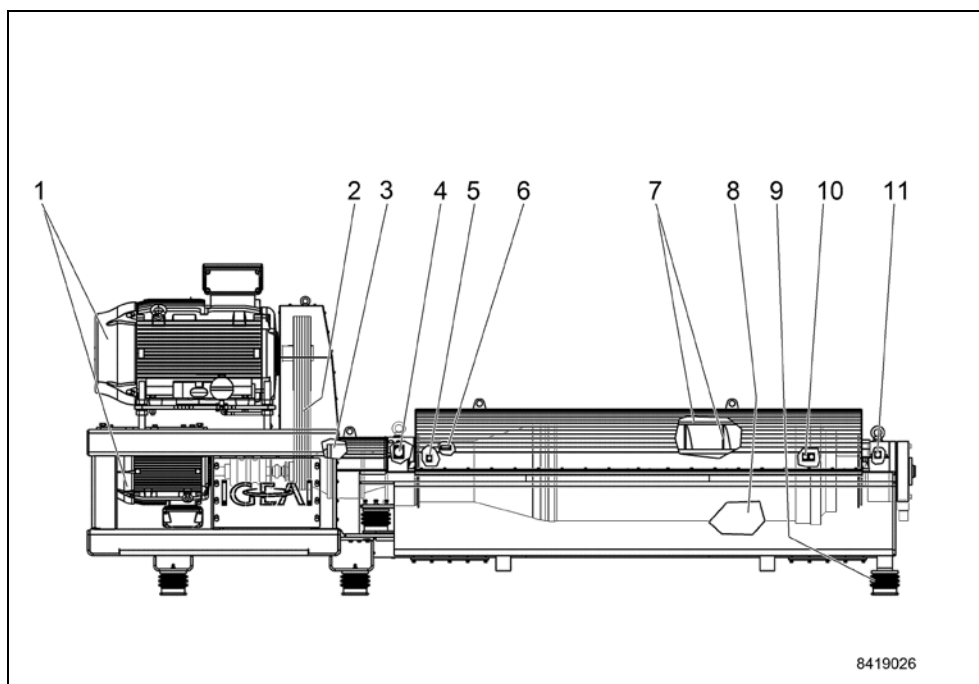


Fig. 112

Important: Machines decommissioned for longer than one year require regular maintenance to remain serviceable.

13.2.1 Maintenance work once a month			
Pos:	Machine part	Action	Operator
8	Decaners	<ul style="list-style-type: none"> ➤ Check paint finish. Touch up damage immediately. ➤ Check corrosion protection. If necessary, spray on corrosion protection wax (WS Part-No. 6969-0022-010) 	Tspec
7	Bowl	<ul style="list-style-type: none"> ➤ Rotate the bowl (minimum 10 revolutions) 	Tspec
3	Gearbox, input	<ul style="list-style-type: none"> ➤ Rotate the gearbox (minimum 10 revolutions) 	Tspec
1	Drive motors	<ul style="list-style-type: none"> ➤ Rotate the motor shaft (minimum 10 revolutions) 	Tspec

13.2.2 Maintenance work once a year			
Pos:	Machine part	Action	Operator
8	Decanter housing	<ul style="list-style-type: none"> ➤ Renew corrosion protection. ➤ Spray on corrosion protection wax (WS Part-No. 6969-0022-010) 	Tspec

13.2.3 Maintenance work before resuming operation			
Pos:	Machine part	Action	Operator
2	V-belts	➤ Mount belts.	Tspec
3	Gearbox	➤ Filling in new oil	Tspec
4 11	Bowl bearings	➤ Carry out "Pre-lubricate bowl bearings".	Tspec
6	Protective rings, clearers and bushes / Solids discharge	➤ Check wear and replace when necessary:	Tspec
7	Bowl and scroll	➤ Check for wear. ➤ When wear, damage or corrosion is detected on load-bearing bowl parts, contact Westfalia Separator Service.	Tspec
9	Vibration isolators / frame	➤ Check the vibration absorbers for any changes. Replace the vibration absorbers in the case of the following abnormal signs: <ul style="list-style-type: none"> • Cracks • Deformations • Discoloration Defective vibration absorbers may cause substantial follow-up damage.	Tspec
	Vibration isolators / drive		

Op = Operator / Skilled = Skilled worker / Tspec = Trained specialist

13.3 Disposing of the centrifuge

When the centrifuge has reached the end of its useful service life, the plant operator is responsible for proper and correct disposal.

It is recommended to commission a company specialized in the disposal of machines or to obtain information from GEA Westfalia Separator service.

- Observe the local disposal regulations.
- Be sure to adhere to applicable environmental protection legislation.
- Have electrical connections disconnected by qualified personnel, e.g. electricians.

IMPORTANT: Residual liquids in feed lines and utility lines can cause injury. Protective clothing must therefore be worn when dismantling lines.



WARNING

Danger of acid and alkali burns

After cleaning, hot lye and acid residues can still be in the centrifuge and the pipelines. When working on the centrifuge, contact with the lyes and acids can cause burns.

- Wear acid-resistant protective gear, e.g. protective goggles, protective gloves, protective overalls or protective suits.
- Take special care.
- Observe the standard operating procedures (SOPs) issued by the operator on handling acids and caustics as well as the local disposal regulations.
- Be sure to adhere to applicable environmental protection legislation.
- Drain residual liquids in feed lines and utility lines into suitable vessels and dispose of them properly.
- Observe regulations on product contact.

- Dismantle feed lines and utility lines, clean superficial impurities caused by lubricants or product with suitable media and dispose of separately.
- Dismantle all seals and non-metallic materials, clean them to remove lubricants and dispose of them separately or recycle.
- Separate and sort metal parts and recycle them.

13.3.1 Disposing of utilities

When the centrifuge is decommissioned, the gear oil must be drained and disposed of. The plant operator is responsible for the proper disposal of the utilities.

- Observe the local disposal regulations.
- Comply with applicable environmental protection legislation.
- Drain off gear oil into suitable vessels and dispose of it properly. See data sheet for oil quantity.

13.3.2 Disposing of cleaning fluids

Chemicals are used for the chemical cleaning process which are specified in the user information or a datasheet issued with the user information. They are dangerous and can cause injuries and environmental damage.



WARNING

Danger of acid and alkali burns

Danger of chemical burns when handling chemical cleaning fluids and danger of burns by hot water.

- Wear acid-resistant protective gear, e.g. protective goggles, protective gloves, protective overalls or protective suits.
- Take special care.
- Observe the standard operating procedures (SOPs) issued by the operator on handling acids and caustics as well as the local disposal regulations.
- Comply with applicable environmental protection legislation.
- Drain residual liquids in feed lines and utility lines into suitable vessels and dispose of them properly.
- Observe regulations on product contact.



We live our values-

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

GEA Mechanical Equipment

GEA Westfalia Separator Group GmbH
Werner-Habig-Str. 1, 59302 Oelde, Germany
Tel. +49 2522 77-0, Fax +49 2522 77-2488
www.gea.com

Abnahmeprüfzeugnis 3.1 nach EN 10204
Inspection certificate 3.1 according to EN 10204

Seite 1 von 1
Page 1 of 1

Unsere Auftrags-Nr.: **2 451 395 848 / 02** Typ: **GEA biosolids Decanter prime 7000**
Our Order No.:

Besteller: **GEA Mechanical Equipment US** Kunden Bestell-Nr.:
Purchaser: Customer's Order No.:

Empfänger: **Veolia Water North America - City of Taunton**
Receiver:

Prüfstandslauf mit Flüssigkeit
Test bay run with liquid

9010-9085-100

Masch.-Fabr.-Nr.: **8012-663** Trommel-Fabr.-Nr.: **8012-663**
Machine serial no.: Bowl serial no.:

Schnecken-Fabr.-Nr.: **8012-663**
Conveyor screw serial no.:

Motordaten
Motor

Hersteller: **WEG**
Manufacturer:

Motor-Nr.: **10 55 48 56 06**
Serial no.:

Motortyp: **W22 280S/M-04**
Motor model:

P = 55 kW

U = 460 V

n = 1789 min⁻¹

f = 60 Hz

Die Prüfung des Dekanters wurde mit Wasser durchgeführt.
The decanter was tested by feeding water.

Betriebsbedingungen: Zulauf: **30 m³/h**
Load conditions: Feed:

Trommeldrehzahl: **3150 min⁻¹**
Bowl speed:

Prüfdatum: **02. December 2021**
Test date:


Name des Prüfers: **M. Buetuen**
Name of tester:

Es wird bestätigt, dass die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht.
We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

GEA Westfalia Separator Group GmbH
Werner-Habig-Straße 1, 59302 Oelde, Deutschland
Acceptance / Abnahme


12 21
Stempelung
Stamp

12 January 2022
Datum
Date



Fred Baumann / OR

Abnahmebeauftragter des Herstellers
Manufacturer's authorized inspection representative

Vorlage: Template:	SP-AD-0097	Revision:	A	Seite: Page:	1	von of	1	SFT-2.2 Quality Management
erstellt: created:	21.04.2020 U. Heese	geprüft: reviewed:	21.04.2020 M. Spiekermann	genehmigt: approved:	21.04.2020 D. Schlingmeyer	59302 Oelde, Germany		

Abnahmeprüfzeugnis 3.1 nach EN 10204
Inspection certificate 3.1 according to EN 10204

Seite 1 von 1
Page 1 of 1

Unsere Auftrags-Nr.: **2 451 395 848 / 12** Typ: **GEA biosolids Decanter prime 7000**
Our Order No.:

Besteller: **GEA Mechanical Equipment US** Kunden Bestell-Nr.:
Purchaser: Customer's Order No.:

Empfänger: **Veolia Water North America - City of Taunton**
Receiver:

Prüfstandslauf mit Flüssigkeit
Test bay run with liquid

9010-9085-100

Masch.-Fabr.-Nr.: **8012-664** Trommel-Fabr.-Nr.: **8012-664**
Machine serial no.: Bowl serial no.:

Schnecken-Fabr.-Nr.: **8012-664**
Conveyor screw serial no.:

Motordaten
Motor

Hersteller: **WEG**
Manufacturer:

Motor-Nr.: **10 55 37 83 50**
Serial no.:

Motortyp: **W22 280S/M-04**
Motor model:

P = 55 kW

U = 460 V

n = 1789 min⁻¹

f = 60 Hz

Die Prüfung des Dekanters wurde mit Wasser durchgeführt.
The decanter was tested by feeding water.

Betriebsbedingungen: Zulauf: **30 m³/h** Trommeldrehzahl: **3150 min⁻¹**
Load conditions: Feed: Bowl speed:


Prüfdatum: **10. January 2022** Name des Prüfers: **J. Weidenfeller**
Test date: Name of tester:

Es wird bestätigt, dass die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht.
We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

GEA Westfalia Separator Group GmbH
Werner-Habig-Straße 1, 59302 Oelde, Deutschland
Acceptance / Abnahme

01  22
Stempelung
Stamp

12 January 2022
Datum
Date



Fred Baumann / OR
Abnahmebeauftragter des Herstellers
Manufacturer's authorized inspection representative

Vorlage: Template:	SP-AD-0097	Revision:	A	Seite: Page:	1 von of	1	SFT-2.2 Quality Management
erstellt: prepared:	21.04.2020 U. Heese	geprüft: checked:	21.04.2020 M. Spiekermann	genehmigt: approved:	21.04.2020 D. Schlingmeyer		59302 Oelde, Germany



GEA Centrifuge System
Dewatering Operations

January 2021

**For the following target audience: Operators, Electrical &
Instrumentation, and Maintenance Personnel**

Note: GEA Power-Point Presentations to be referenced and site demonstrations to be conducted in parallel to the below agenda topics.

1.0 OPERATIONS LESSON PLAN

NOTE: This section will include both classroom and hands-on training.

1.1 INTRODUCTION

- 1.1.1 Westfalia Separator History, Personnel, and Contact Information
- 1.1.2 Equipment & Process Specifications

1.2 SAFETY

- 1.2.1 Centrifuge – High Speed Piece of Rotating Equipment
- 1.2.2 Maintenance – Lockouts, Heavy Equipment to Lift
- 1.2.3 Electrical – High Voltage, Remote Starting, E-Stop Features
- 1.2.4 Follow OSHA, Plant Regulation
- 1.2.5 Use Common Sense

1.3 CENTRIFUGE FUNDAMENTALS

- 1.3.1 Centrifuge Components List
- 1.3.2 Rotating Assembly
 - 1.3.2.1 Cylindrical Section
 - 1.3.2.2 Conical Section
 - 1.3.2.3 Scroll
 - 1.3.2.4 Gear Box
- 1.3.3 Main Drive Motor Creates the “G” Force

1.4 CENTRIFUGE THEORY

- 1.4.1 Operating Principles
 - 1.4.1.1 Separates 2-3 different specific gravities
 - 1.4.1.2 Settling Pond
 - 1.4.1.3 Acceleration of Gravity
 - 1.4.1.4 Continuous Operation
- 1.4.2 Differential Speed (Scroll motor)
 - 1.4.2.1 Conveying the Solids
 - 1.4.2.2 Scroll Drive System
- 1.4.3 Ring Dams
 - 1.4.3.1 Pond Depth / Length of Beach
 - 1.4.3.2 Negative / Positive Beach

1.5 OPERATING THE MACHINE

- 1.5.1 Starting & Stopping
- 1.5.2 Functions
- 1.5.3 Security
- 1.5.4 Screen Displays
- 1.5.5 Process Data Collection
- 1.5.6 Vibration Monitoring
- 1.5.7 Alarm Conditions and Responses
- 1.5.8 Discuss Recommended Housekeeping Procedures
- 1.5.9 Troubleshooting Guide
 - 1.5.9.1 Is corrective maintenance or operating parameter adjustment required?



1.6 OPTIMIZING THE PROCESS

- 1.6.1 Effect of Torque
- 1.6.2 Type of Sludge
 - 1.6.2.1 Settling Characteristics
 - 1.6.2.2 Percent solids in the feed
- 1.6.3 Type of Polymer
 - 1.6.3.1 Concentration
 - 1.6.3.2 Induction Point

1.7 CONTROLLING THE PROCESS

- 1.7.1 Optimal Results
 - 1.7.1.1 Clean Centrate (% Recovery of Solids)
 - 1.7.1.2 Dewatered Cake (% Cake Dryness)
 - 1.7.1.3 Least Amount of Polymer (lbs/ton)
- 1.7.2 Automatic Control
 - 1.7.2.1 Constant Torque / Variable Differential
 - 1.7.2.2 Base Differential
 - 1.7.2.3 Control Begin
 - 1.7.2.4 Control Gradient
- 1.7.3 Manual Control
 - 1.7.3.1 Constant Differential / Variable Torque

1.8 TOUR OF THE CENTRIFUGE

- 1.8.1 The seminar convenes at the centrifuge for a review of the equipment and demonstration of the machine.
NOTE: It is suggested that the centrifuges be in operation at this time and be processing sludge.

1.9 QUESTION AND ANSWER PERIOD

- 1.9.1 Review and Discuss Topics of the Lesson

2.0 ELECTRICAL – INSTRUMENTATION LESSON PLAN

NOTE: This section will include both classroom and hands-on training.

1.1 INTRODUCTION

- 1.1.1 Introduction of Personnel
- 1.1.2 Westfalia Service Contact Information

1.2 CENTRIFUGE ELECTRICAL SAFETY

- 1.2.1 Emergency Stop Features
- 1.2.2 Alarm and Shutdown Sequences

1.3 CENTRIFUGE PANELS AND COMPONENTS OVERVIEW

- 1.3.1 Motor Control Panel Overview and Components
- 1.3.2 Local Control Panel Overview and Components
- 1.3.3 Operator Interface Unit



1.4 MOTOR CONTROL PANEL

- 1.4.1 Overview
- 1.4.2 Review VFD Parameters
- 1.4.3 Review Electrical Schematics
- 1.4.4 Common Faults and Troubleshooting

1.5 LOCAL CONTROL PANEL & OPERATOR INTERFACE

- 1.5.1 Overview
- 1.5.2 Review Torque Control Function and Parameters
- 1.5.3 Review Electrical Schematics / P&ID
- 1.5.4 Review Operator Interface Unit and Screens

1.6 VIBRATION MONITORING

- 1.6.1 Overview of Units
- 1.6.2 Review Vibration Setpoints
- 1.6.3 Review Electrical Schematics
- 1.6.4 Basic Troubleshooting Techniques

1.7 BEARING TEMPERATURE ELEMENTS

- 1.7.1 Overview of RTDs (Location and Type)
- 1.7.2 Review of Temperature Ranges
- 1.7.3 Review of Electrical Schematics
- 1.7.4 Review of Alarm Setpoints

• PLC COMPONENTS & PROGRAM

- 1.7.5 Overview
- 1.7.6 PLC Program Review & Discussion

1.8 HANDS-ON TRAINING

- 1.8.1 Walkthrough on Centrifuge Floor
- 1.8.2 Review of Motor Control Panel and Components
- 1.8.3 Review of Local Control Panel and Components
- 1.8.4 Review of Operator Interface Unit
- 1.8.5 Review of Centrifuge Instrumentation
- 1.8.6 Review of Troubleshooting Procedures
- 1.8.7 Review of Centrifuge Start-Up and Shut-Down
- 1.8.8 Centrifuge Safety Discussion
- 1.8.9 Question and Answer Period

NOTE: It is suggested that the centrifuges be in operation at this time and be processing sludge.

1.9 QUESTION AND ANSWER PERIOD

- 1.9.1 Review and Discuss Topics of the Lesson

3.0 MAINTENANCE LESSON PLAN

NOTE: This section will include both classroom and hands-on training.

3.1 INTRODUCTION



- 3.1.1 Introduction of Personnel
- 3.1.2 Westfalia Service Contact Information

3.2 SAFETY

- 3.2.1 Lockout Procedure
- 3.2.2 Tagout Procedure

3.3 MAINTENANCE PROCEDURES

- 3.3.1 General Maintenance Procedures
- 3.3.2 Preventative Maintenance Procedures and Intervals

3.4 TOUR & DISCUSSION OF CENTRIFUGE EQUIPMENT (Includes Items 3.5, 3.6, 3.7, 3.8)

- 3.4.1 The seminar convenes at the centrifuge for a review of the equipment and demonstration of machine

3.5 BELTS

- 3.5.1 Review Procedure for Inspections and Belt Testing
- 3.5.2 Removal of Centrifuge Inspection Cover
- 3.5.3 Removal of Belt Guards
- 3.5.4 Tension Belts
- 3.5.5 Install Belt Guards and Inspection Covers

3.6 LUBRICATION

- 3.6.1 Review Lubrication Procedures Chart
- 3.6.2 Discuss Lubrication Types
- 3.6.3 Discuss Appropriate Cleaning Practices and Intervals

3.7 ROTATING ASSEMBLY, SCROLL REMOVAL, AND INSPECTION

- 3.7.1 Review Procedures for Rotating Assembly Removal and Inspection
- 3.7.2 Review Procedures for Scroll Removal and Inspection
- 3.7.3 Remove Cover and Inspect Bowl

3.8 QUESTION AND ANSWER PERIOD

- 3.8.1 Review and Discuss Topics of the Lesson

GEA Dewatering Centrifuge Training



GEA North America

100 Fairway Court

Northvale, New Jersey 07647 USA

GEA North America Worldwide

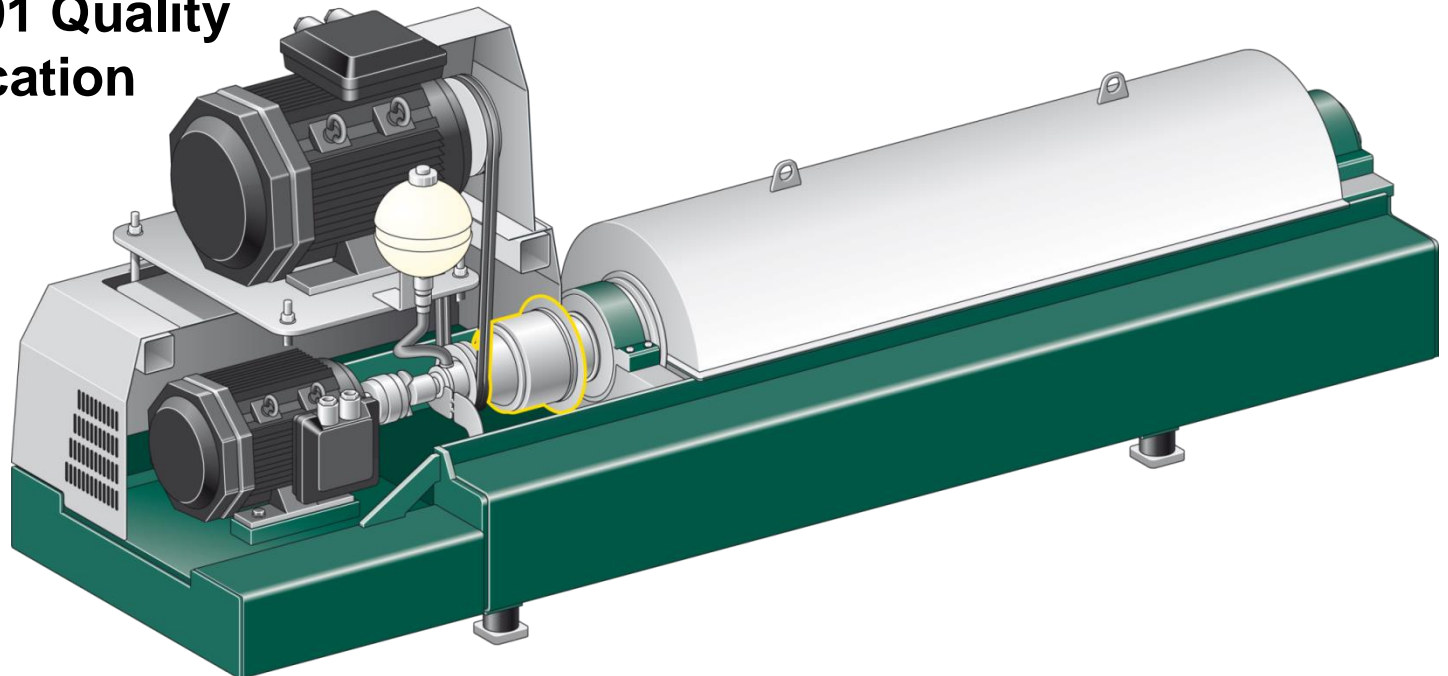
120 years Manufacturing Centrifuges

60 Years Manufacturing Decanter Centrifuges

Annual Centrifuge Sales of \$800 Million

Over 4,000 Employees

**ISO 9001 Quality
Certification**

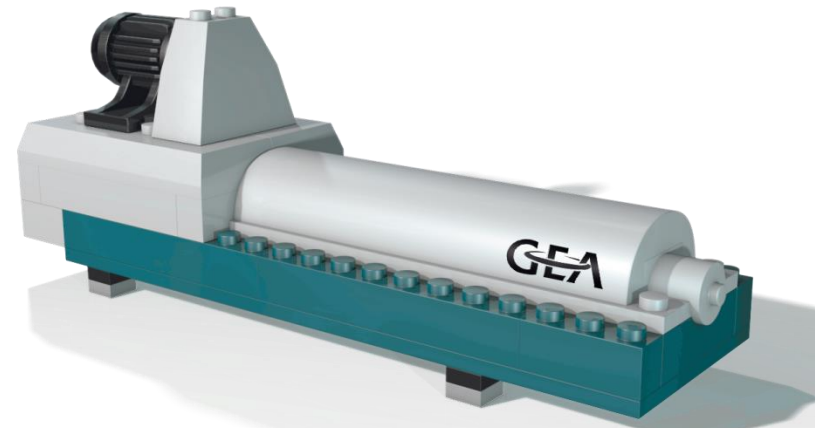


incorporated in the State of New York, 1950

Headquartered In Northvale, New Jersey

- **Serving North America For Over 60 Years**
- **Over 10,000 Centrifuges Installed in N. America**
- **ISO 9001 Quality Certification**

Sales	Six Regional Sales/Service Offices
Service	40+ Service Personnel
Parts	\$10,000,000 Inventory
Repair	Wholly owned, Full Service, Total Repair Capability, Scroll Exchange Program



We're Available 24/7



Contact: Mike Richmond, Northvale service manager

Telephone: 201-767-3900 (headquarters)
1-800-509-9299 (toll free number)

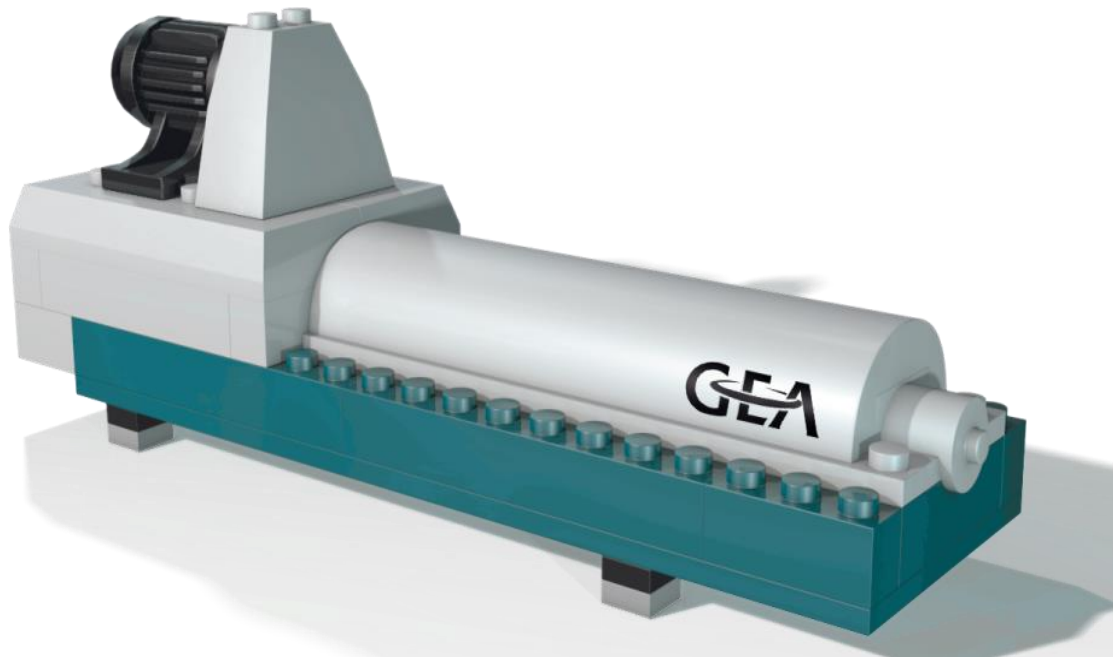
Hours: 8:30 – 5:00 EST
Monday - Friday

For after hours emergencies:

Telephone: 201-767-3900 and follow instructions

SAFETY

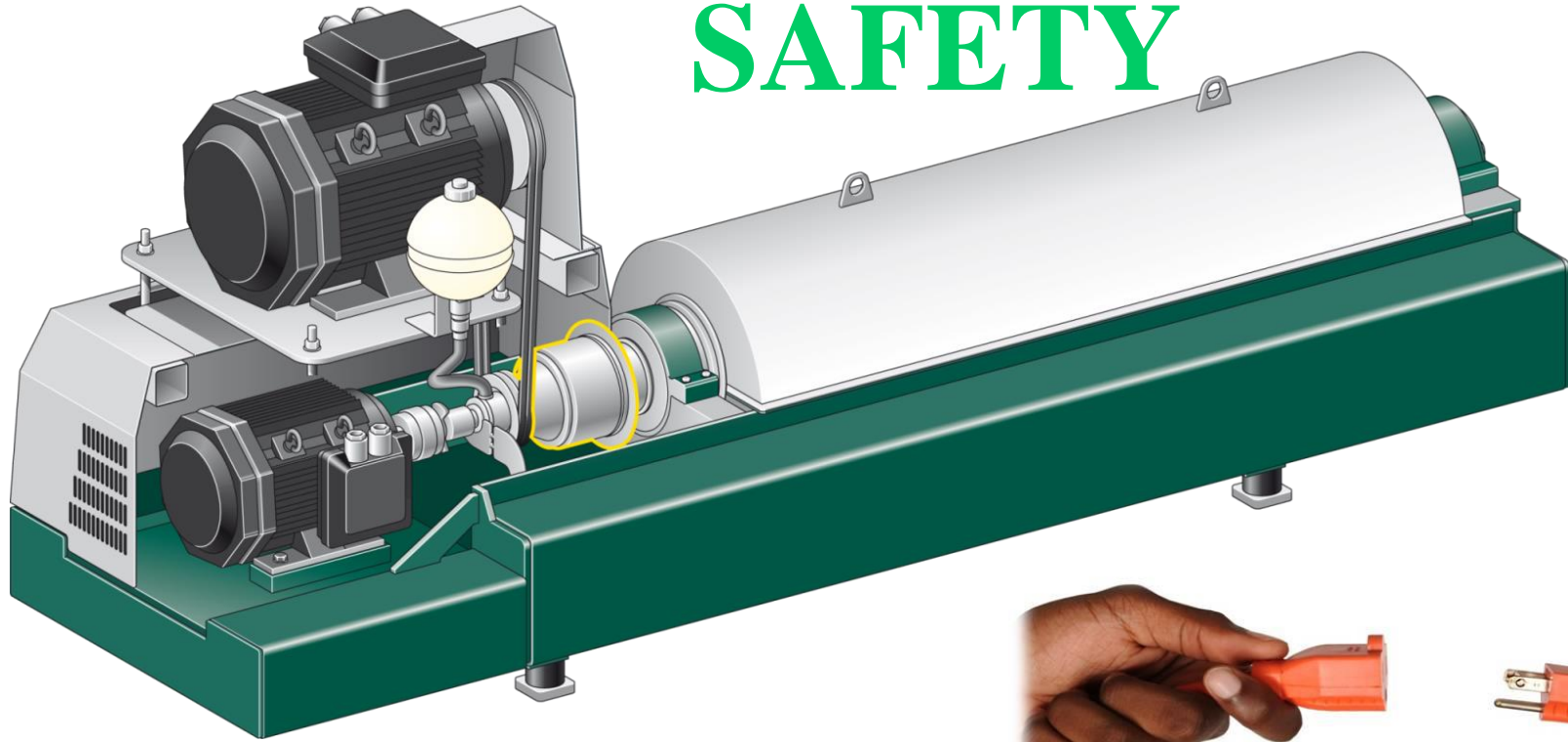
2



**The centrifuge
is a piece of
high speed
rotating
equipment -**

**Keep hands, body, and clothing away
from moving parts**

SAFETY



Never power-up the centrifuge with guards removed.

Always lockout and tag the power source before beginning work on the centrifuge or electrical panels.

Follow OSHA and plant regulations.

SAFETY

Be on the lookout for other potential hazards



Centrifuges may at times produce high noise levels.

Wear hearing protection in loud noise areas.

Follow OSHA and plant regulations.

SAFETY

**Be on the lookout
for tripping hazards**



**hoses, power cords, and other
obstructions on the floor can present
tripping hazards**

Follow OSHA and plant regulations.



SAFETY

**Be on the lookout
for slip and fall hazards**

**water leaks, oil leaks, and leaks of
polymer solution can create a
hazardous slippery surface.**

Follow OSHA and plant regulations.

SAFETY

Be on the lookout for other potential hazards

**spraying leaks can
cause eye injuries**



**Wear eye protection and protective
clothing when appropriate**

Follow OSHA and plant regulations.

The Centrifuge Mechanical Overview

Centrifuge fully assembled



MAIN COMPONENTS

The two main components of the centrifuge are the bowl and the scroll

The bowl is a hollow vessel having a cylindrical section and a conical section



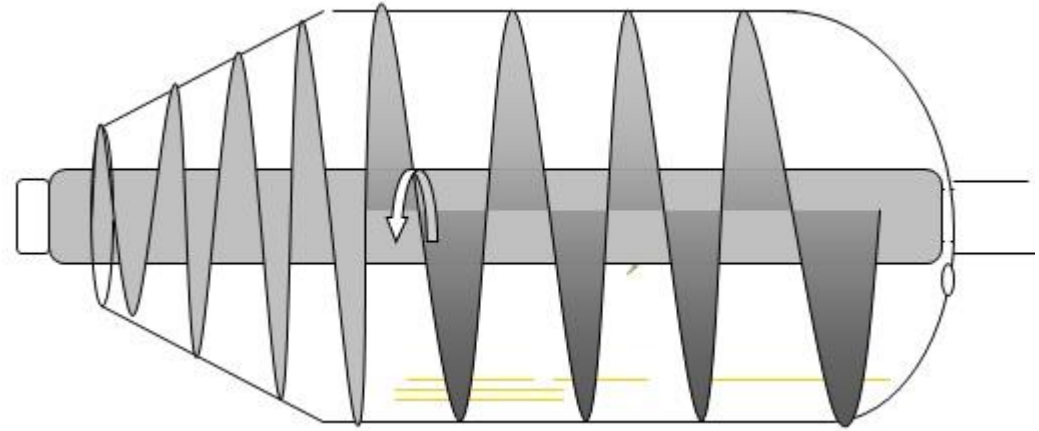
Wall thickness about 1 inch



Cone section

Cylinder section

The SCROLL is a screw conveyor that fits inside the BOWL

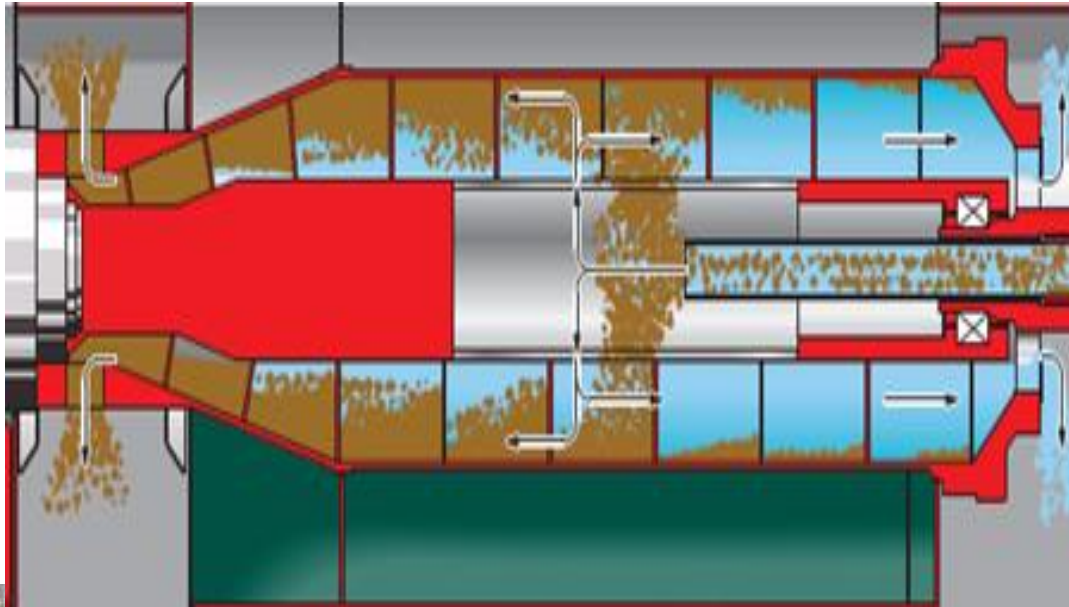


TYPICAL CC TYPE SCROLL



**In operation,
the scroll turns inside the bowl to convey dewatered cake toward the conical end
of the bowl
from which the cake discharges**

Clarified centrate drains out from ports at the liquid end of the bowl

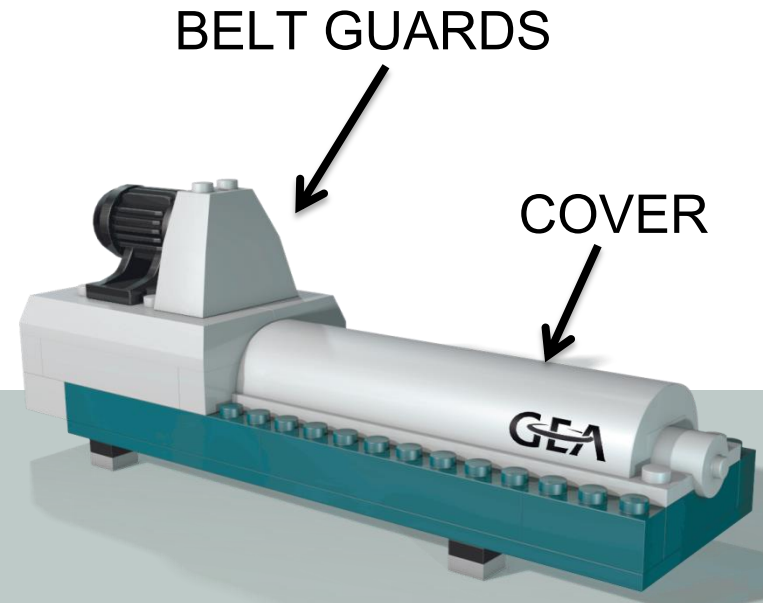


Other Hardware

frame, motors, chutes

Under the belt guards and covers

FRAME, BOWL MOTOR,
SCROLL MOTOR, GEARBOX,
ROTOR, SPLASH GUARDS



BOWL

MOTOR

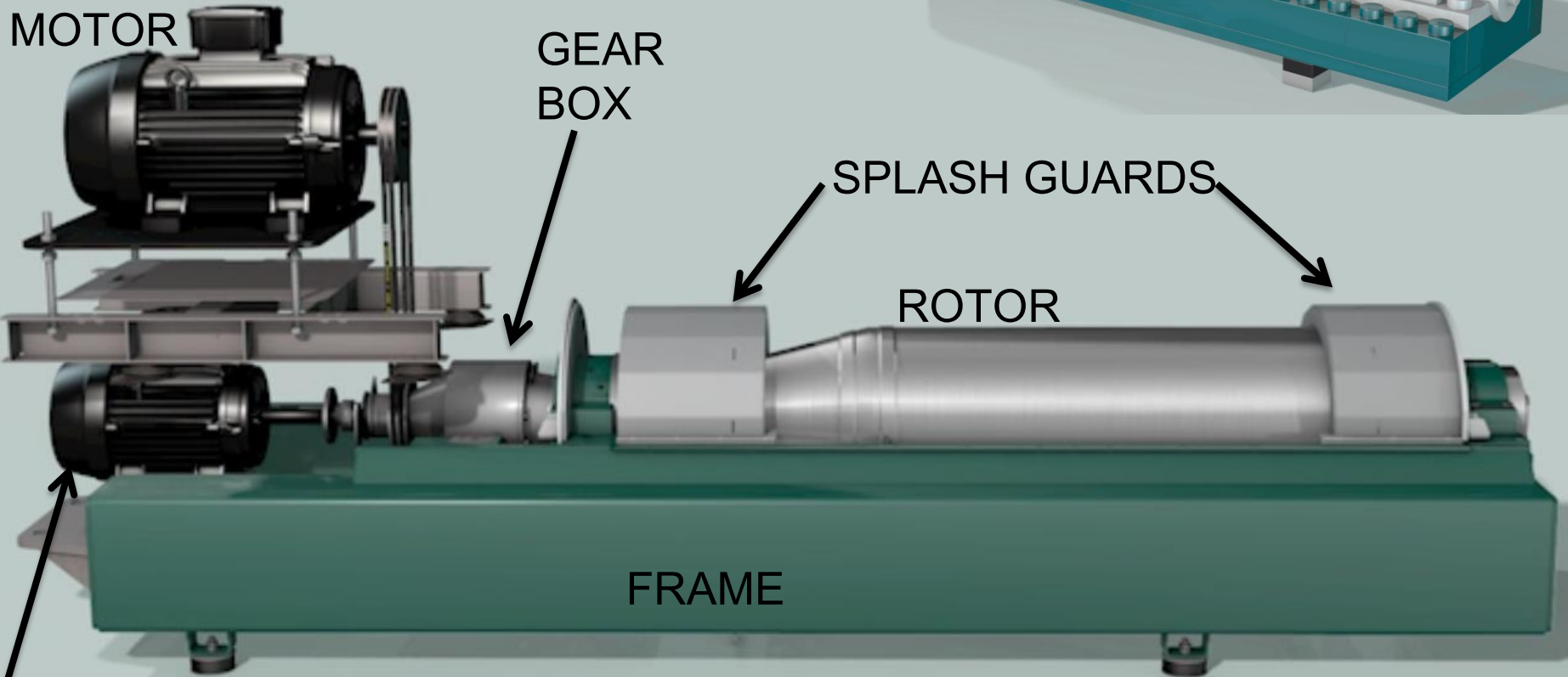
GEAR
BOX

SPLASH GUARDS

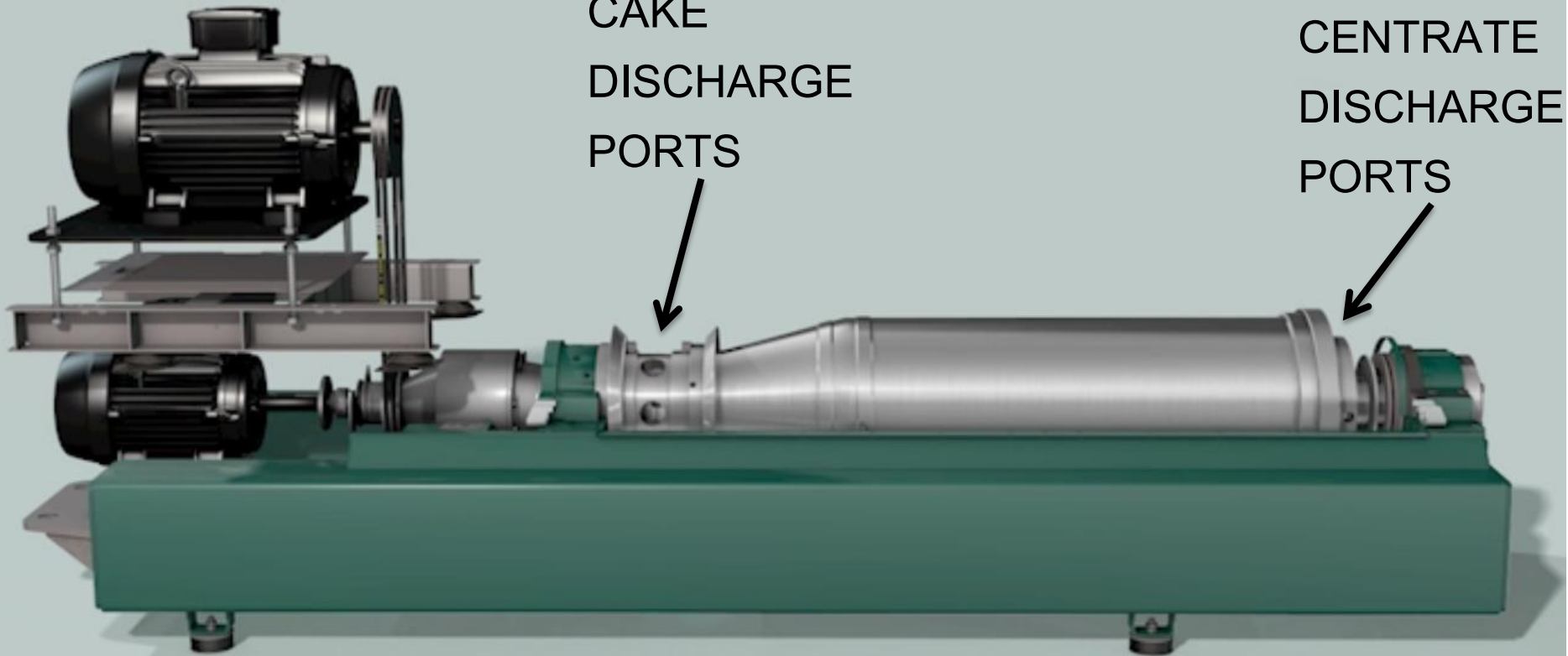
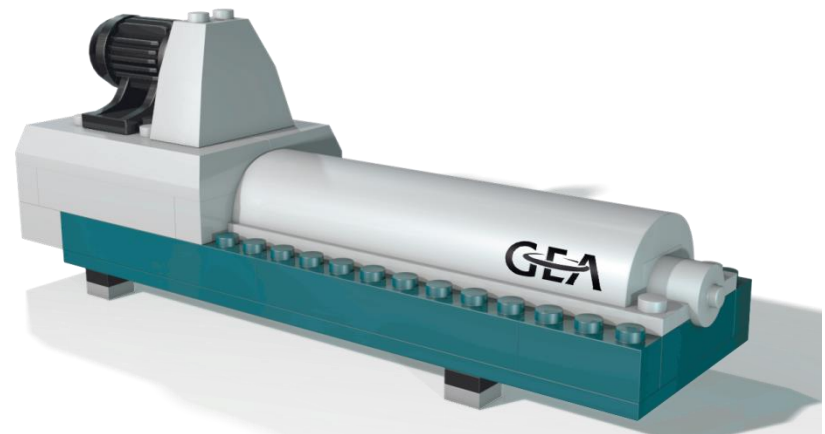
ROTOR

FRAME

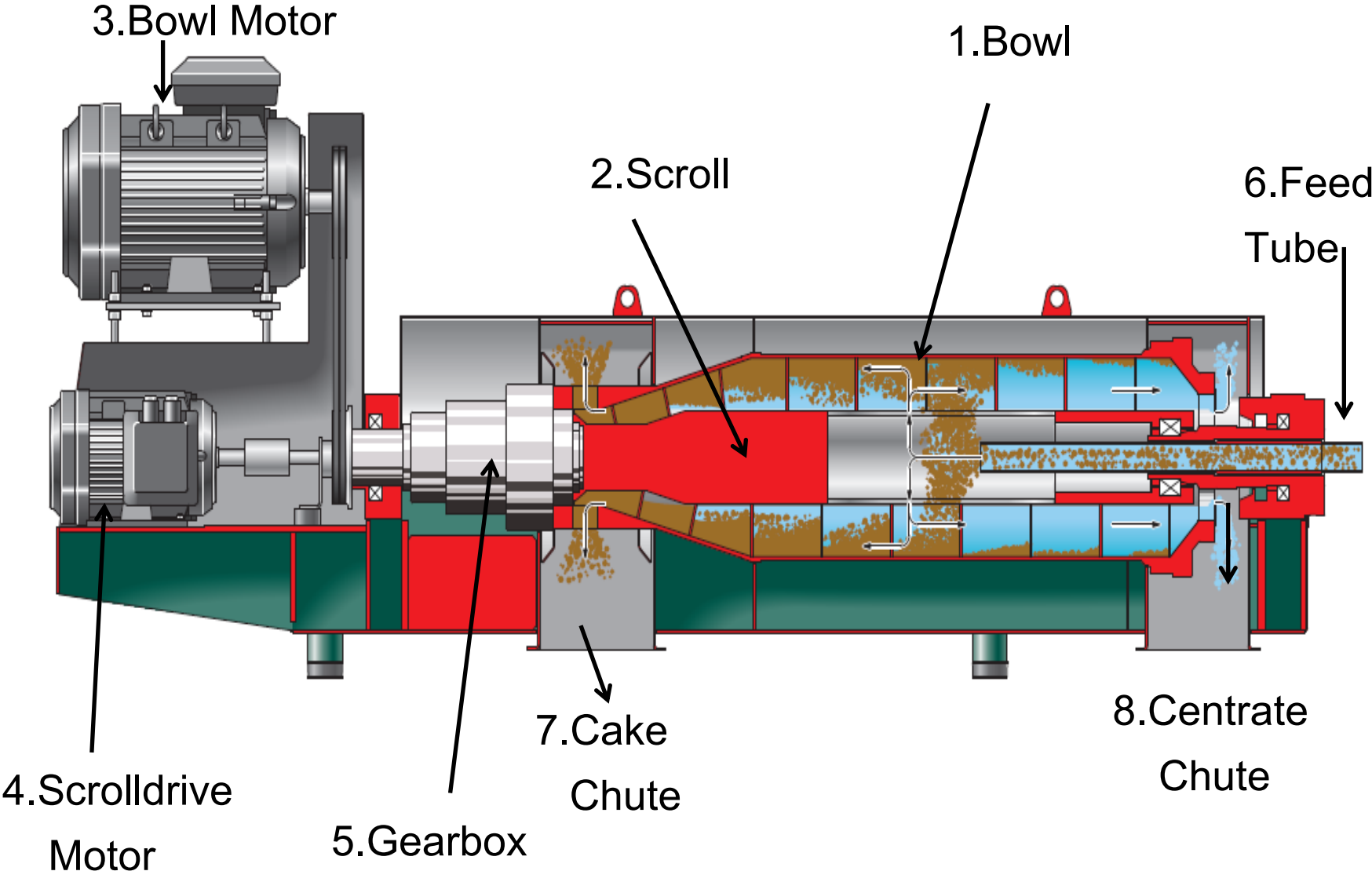
SCROLL MOTOR



UNDER THE SPLASH GUARDS:
CAKE DISCHARGE PORTS
CENTRATE WEIRS

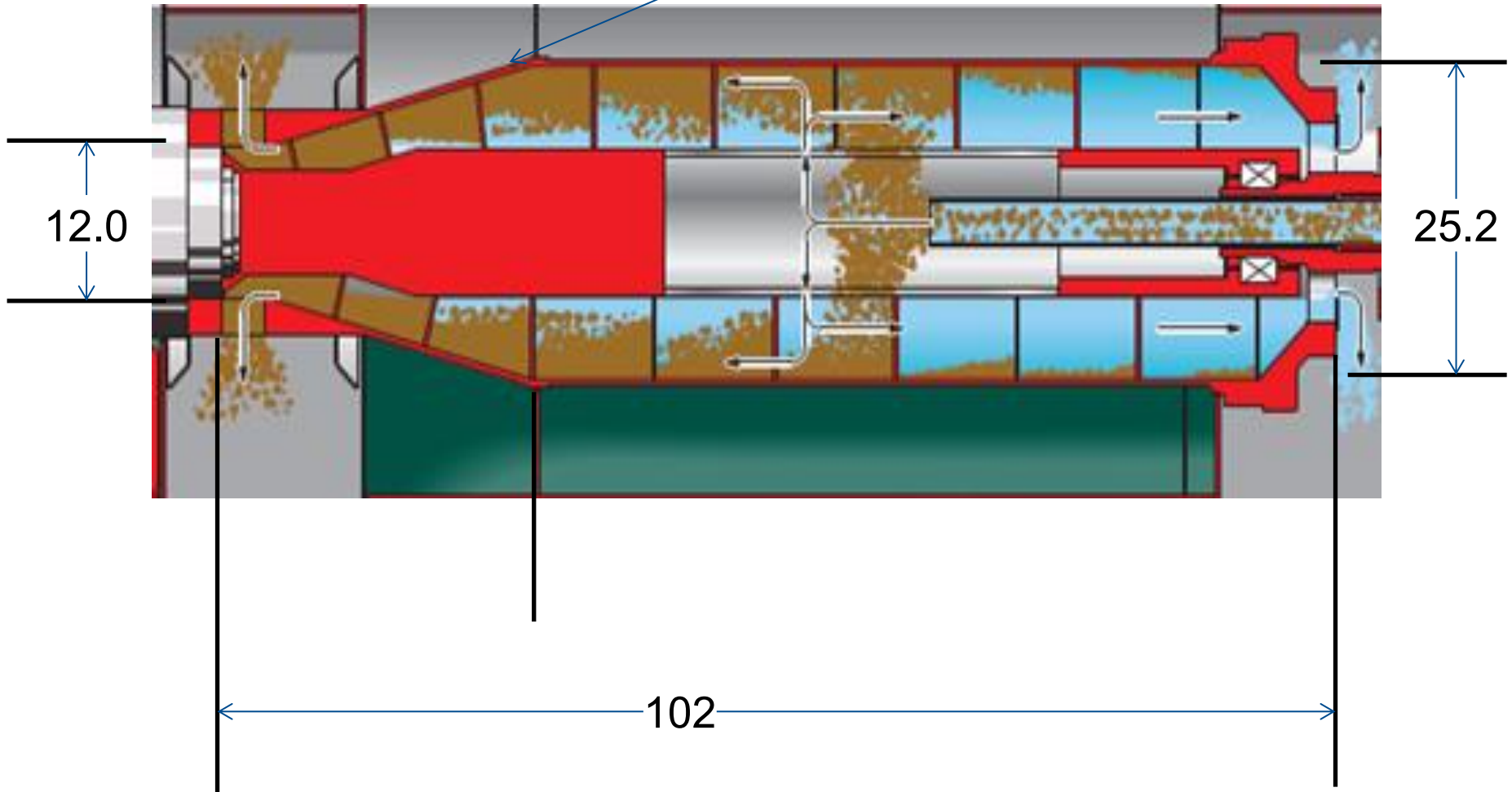


centrifuge components in cross section

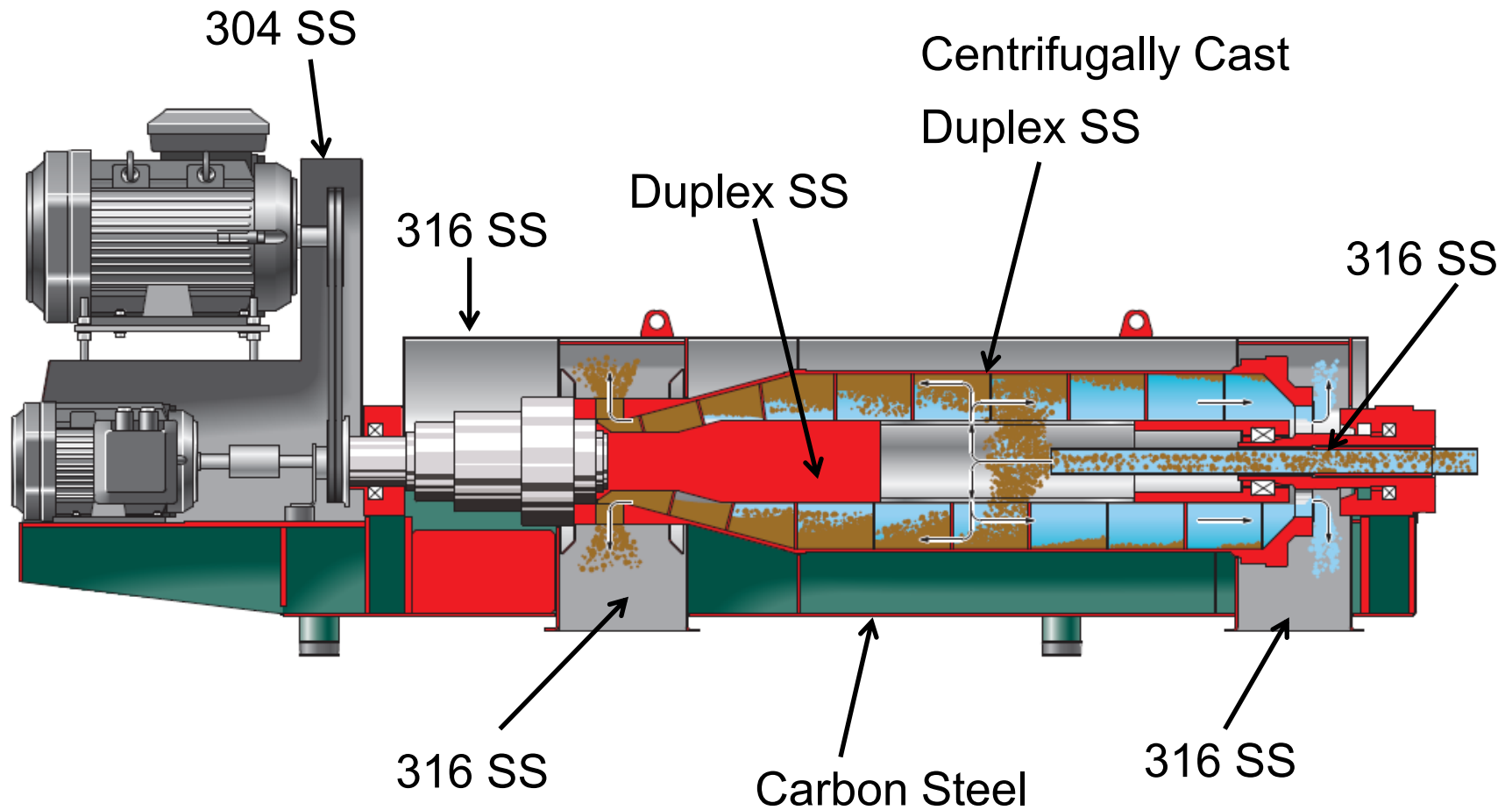


Bowl Geometry

8 degree for softening sludge

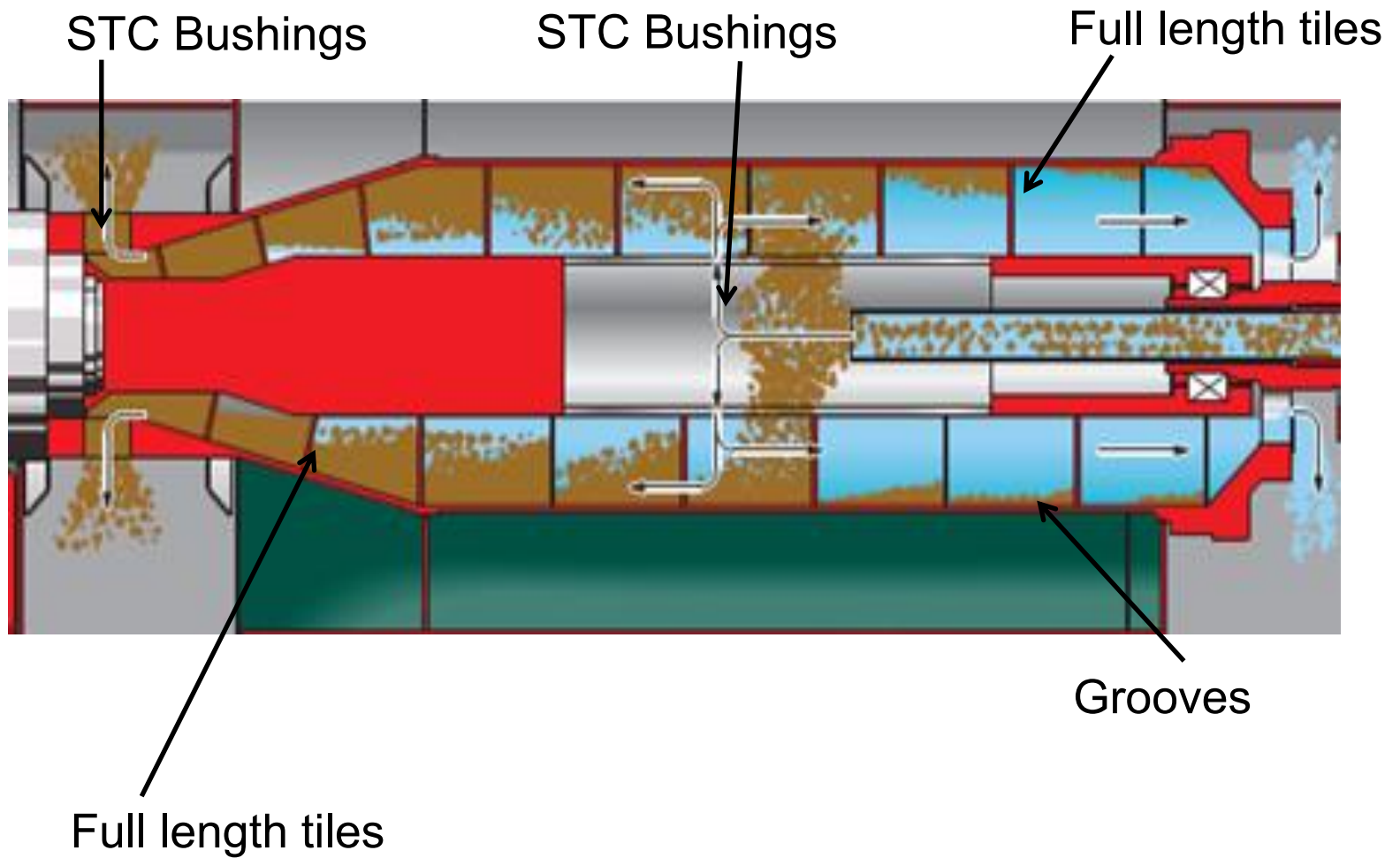


Materials of Construction: all wetted parts are made of stainless steel

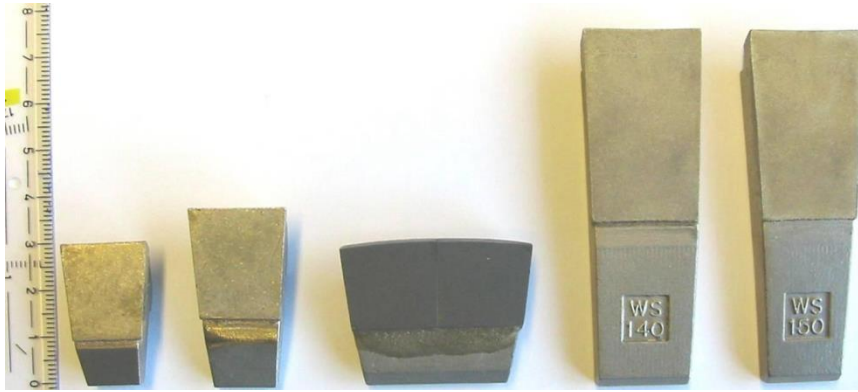


No fiberglass covers!

All parts that would be prone to abrasion are constructed of sintered tungsten carbide for long life

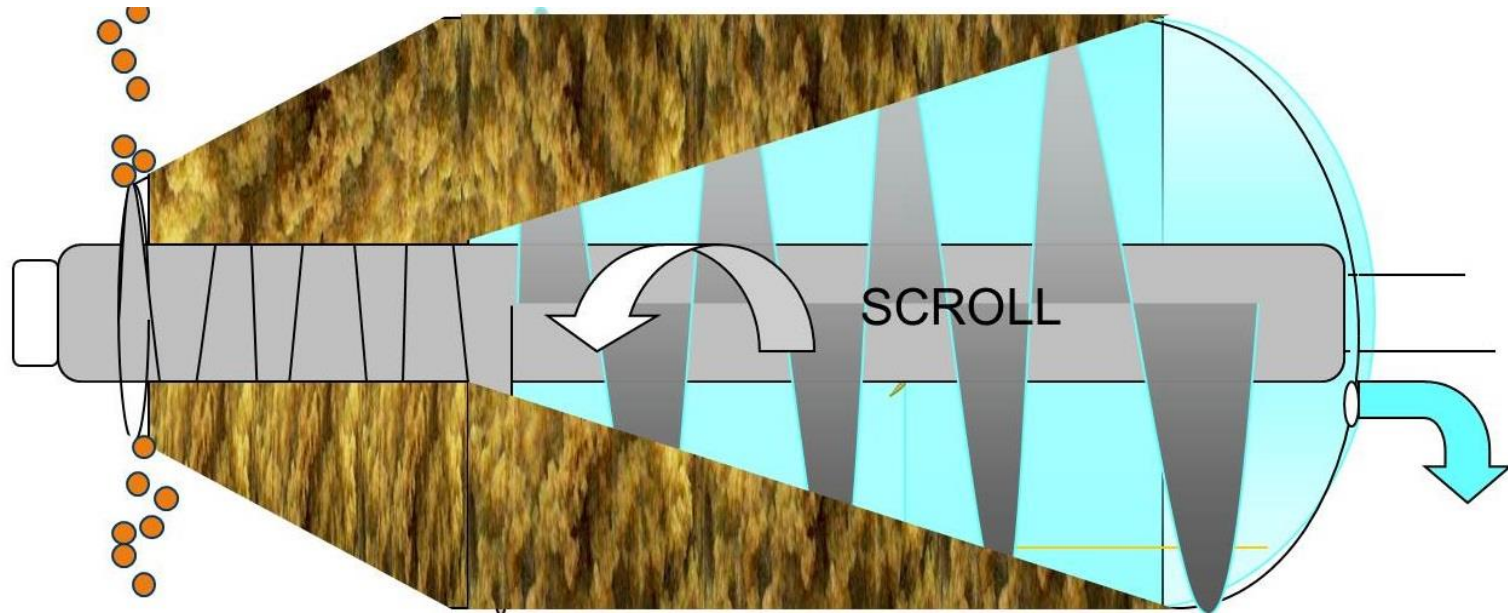


Sintered Tungsten Carbide Tiles on the tips of the scroll flights



2 mm³ wear loss (ASTM G65)
Full length Super-tiles

Operating Principles of **CENTRIFUGAL SEPARATION**

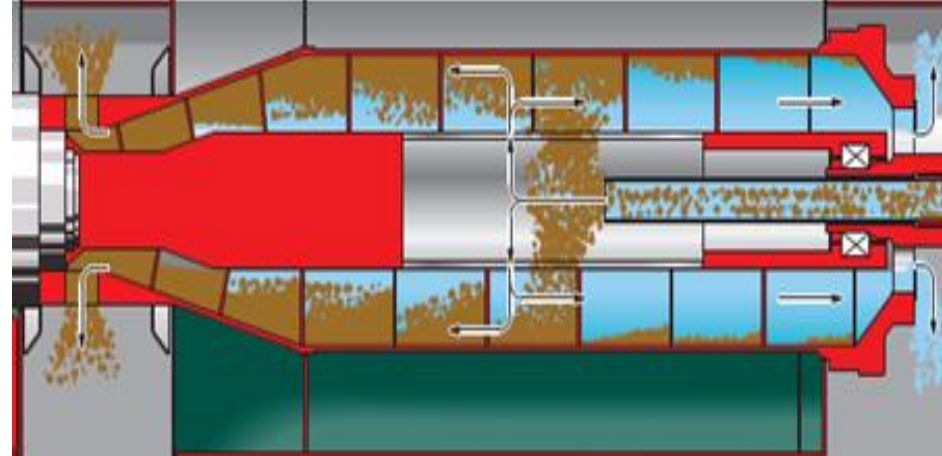
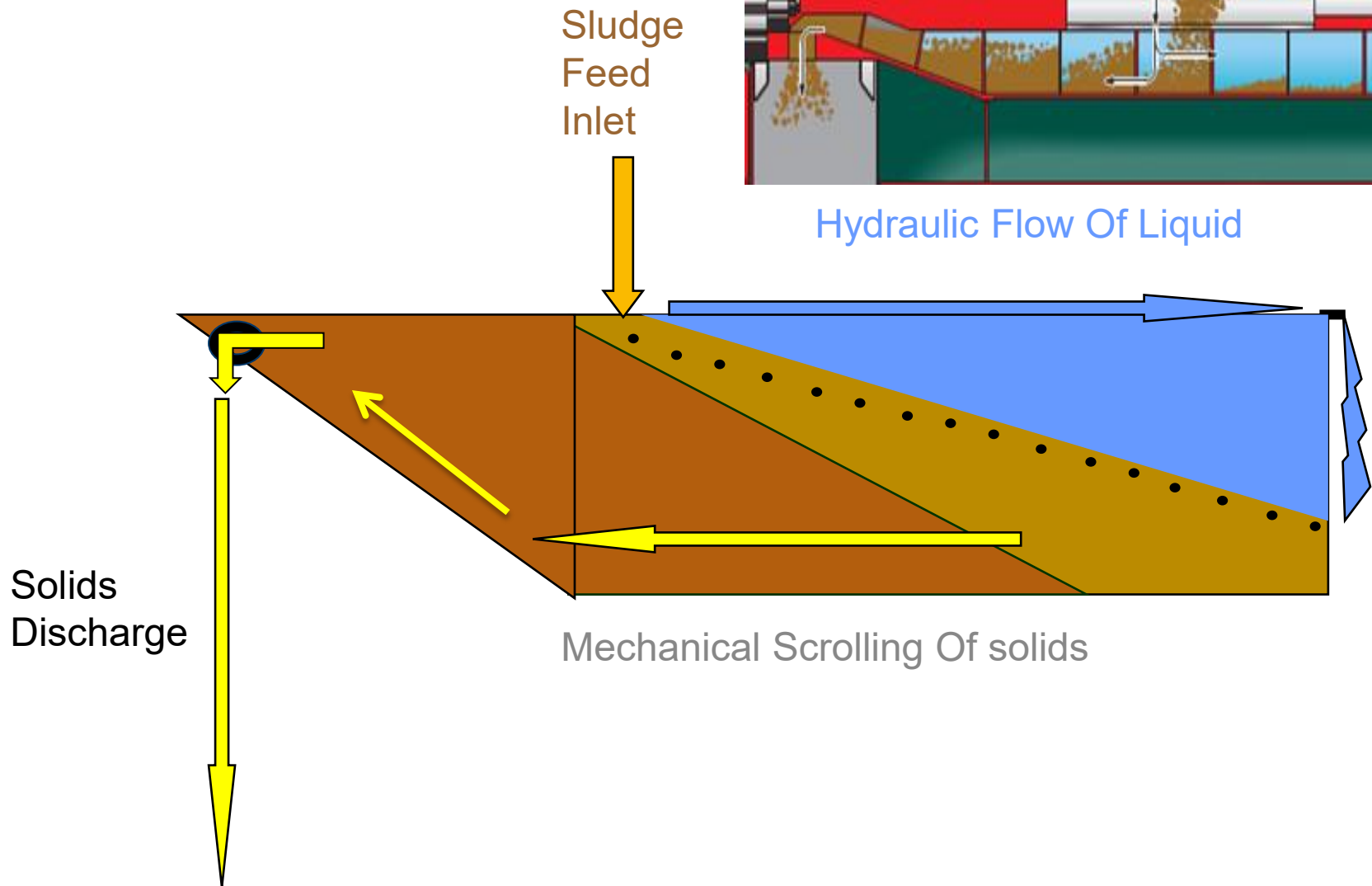


The primary functions of the dewatering centrifuge are:

Dewatering a continuous stream of solid particles.

Clarifying of a continuous stream of liquid.

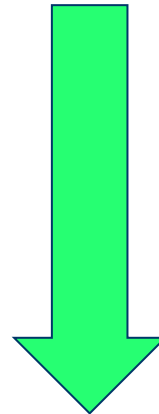
CLARIFIER ANALOGY



HOW CAN EFFECTIVE DEWATERING OCCUR IN SUCH A SMALL VOLUME ?

**Rapid sedimentation
results from multiplication
of G-force**

G-force Math



G-force increases with increasing Diameter and Bowl Speed

Calculation of Centrifugal Force

$$\text{"g" force} = \text{Bowl dia. (in.)} \times (\text{Bowl rpm})^2 \times 1.42 \times 10^{-5}$$

Increasing the bowl diameter increases the G-force

Increasing the bowl rotational speed also increases the "g" force

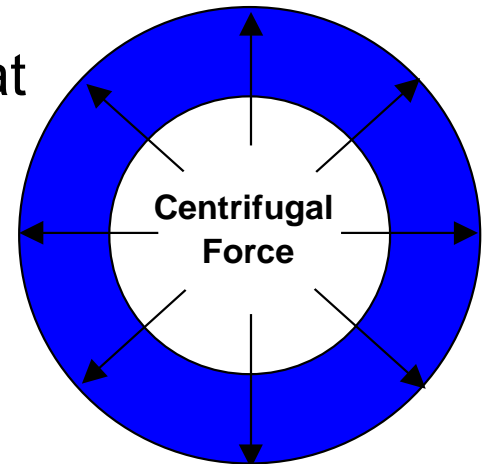
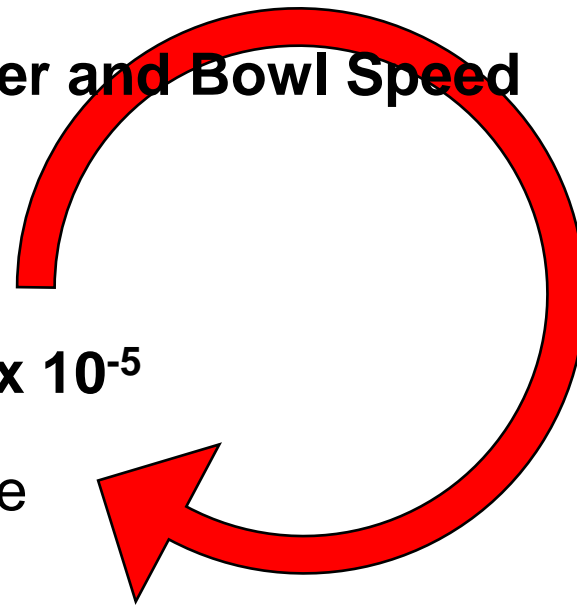
"g" force is a function of the square of the rpm so that doubling the bowl speed quadruples the "g" force.

CF 7000 @ 2940 rpm = 3250 XG

CF 7000 @ 2000 rpm = 1500 XG

CF 7000 @ 1500 rpm = 850 XG

The GEA centrifuge is designed to produce a G-force near 3000 XG





THE SLUDGE DEWATERING PROCESS



BACKGROUND

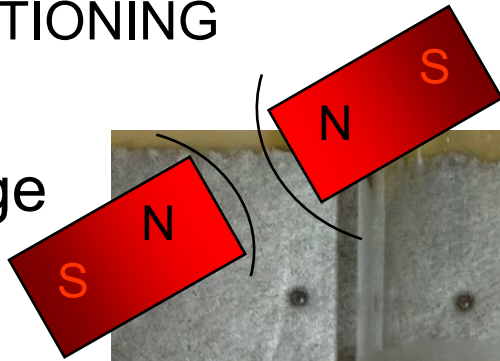
Gravity sedimentation causes sludge to concentrate until it reaches a point of hindered settling. For softening sludge that may be 15, 20, or 30%TS

Beyond the limit of hindered settling no further concentration occurs.

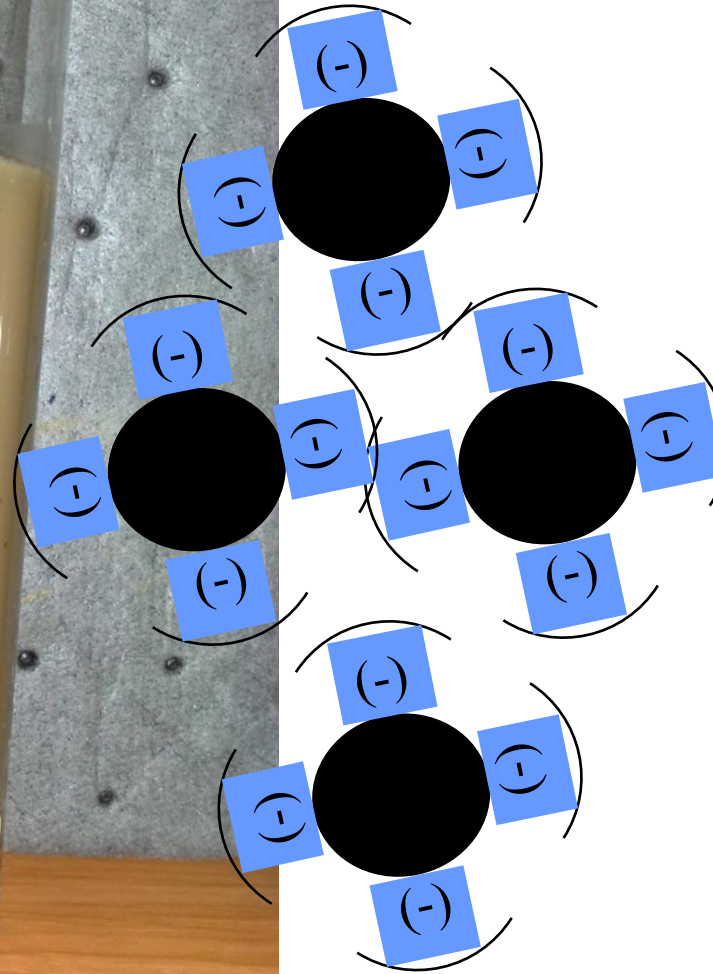


SOLIDS CONDITIONING

In nature sludge particles are surrounded by electrostatic charges



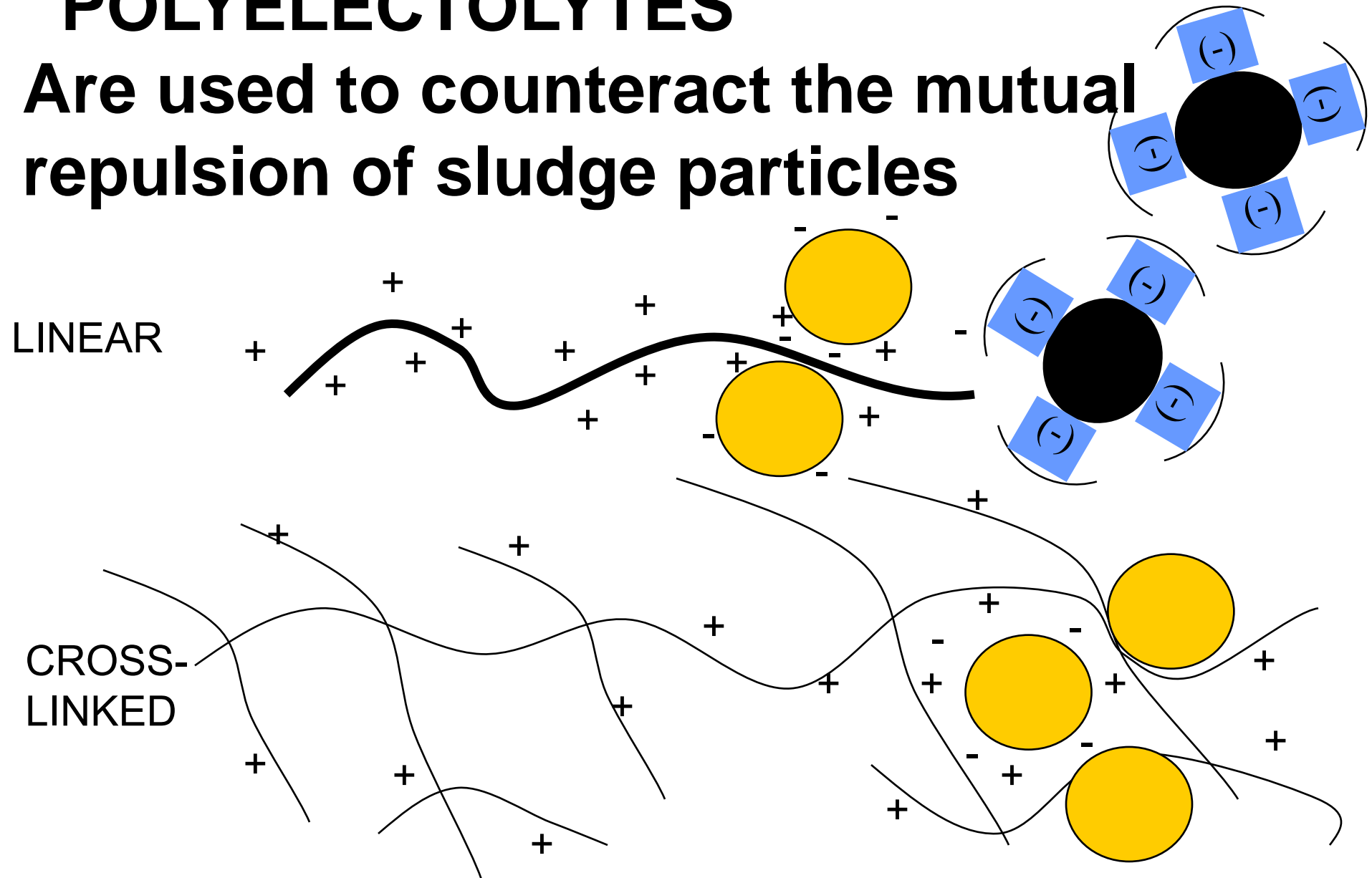
These cause a mutual repulsion between particles which maintains space between them and keeps them in stable aqueous suspension



POLYMER SELECTION

POLYELECTROLYTES

Are used to counteract the mutual repulsion of sludge particles



POLYMER SELECTION: JAR TEST

The addition of polymer to sludge flocculates the solids and expresses free water from the flocs



The formation of discrete shear-resistant flocs is necessary for effective dewatering.

DOSAGE CALCULATIONS

For Diluted Polymer
 Polymer Dosage =
 Active-lbs/ton

typical: 0.2 to 0.3%

Polymer solution
%-activity X
 Feed sludge X
 %TS

typical: 15% of feed gpm

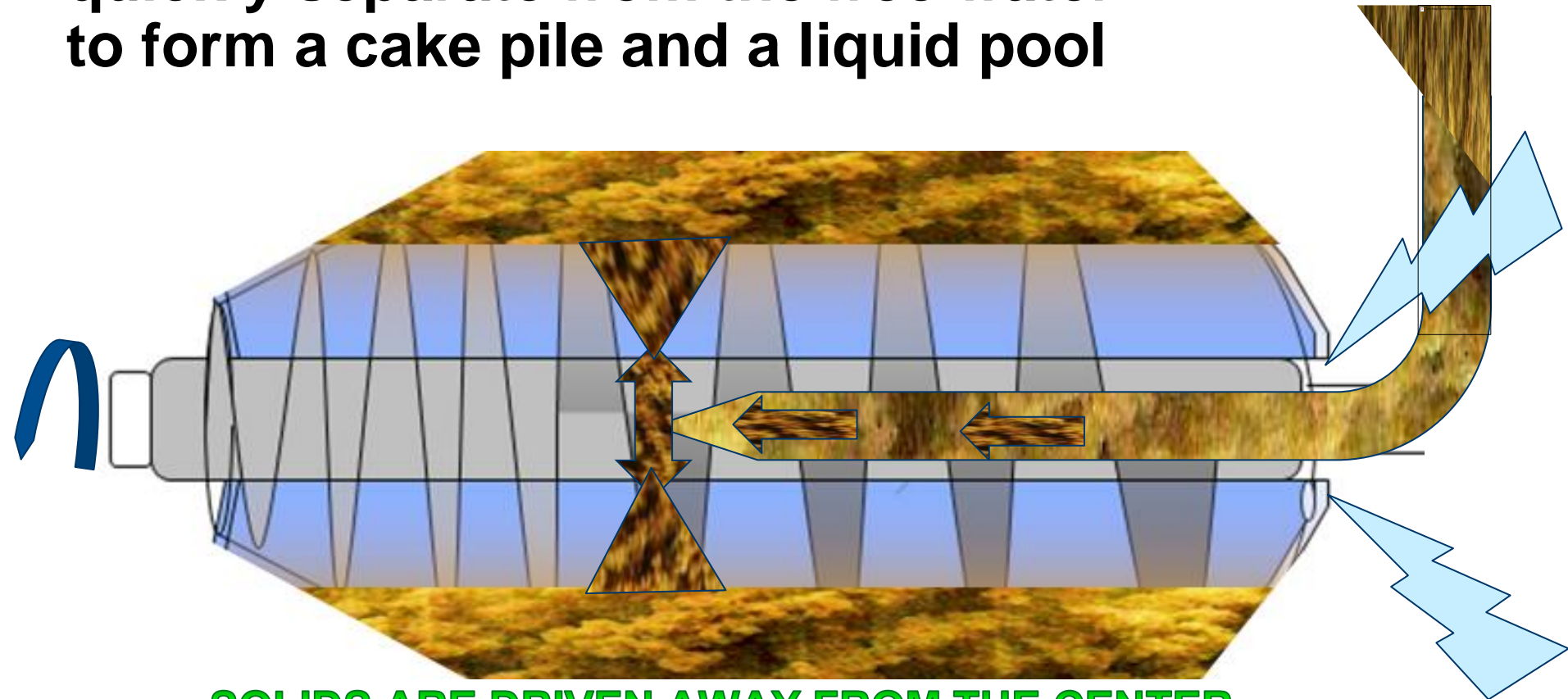
Polymer solution
flow gpm X 2000
 Feed sludge X SpGr
 flow gpm

Example:

$$\frac{0.3 \quad X \quad 10 \quad X \quad 2000}{20 \quad X \quad 70 \quad X \quad 1.197} = 3.6 \text{ Active-lbs/ton}$$

SOLIDS SEPARATION

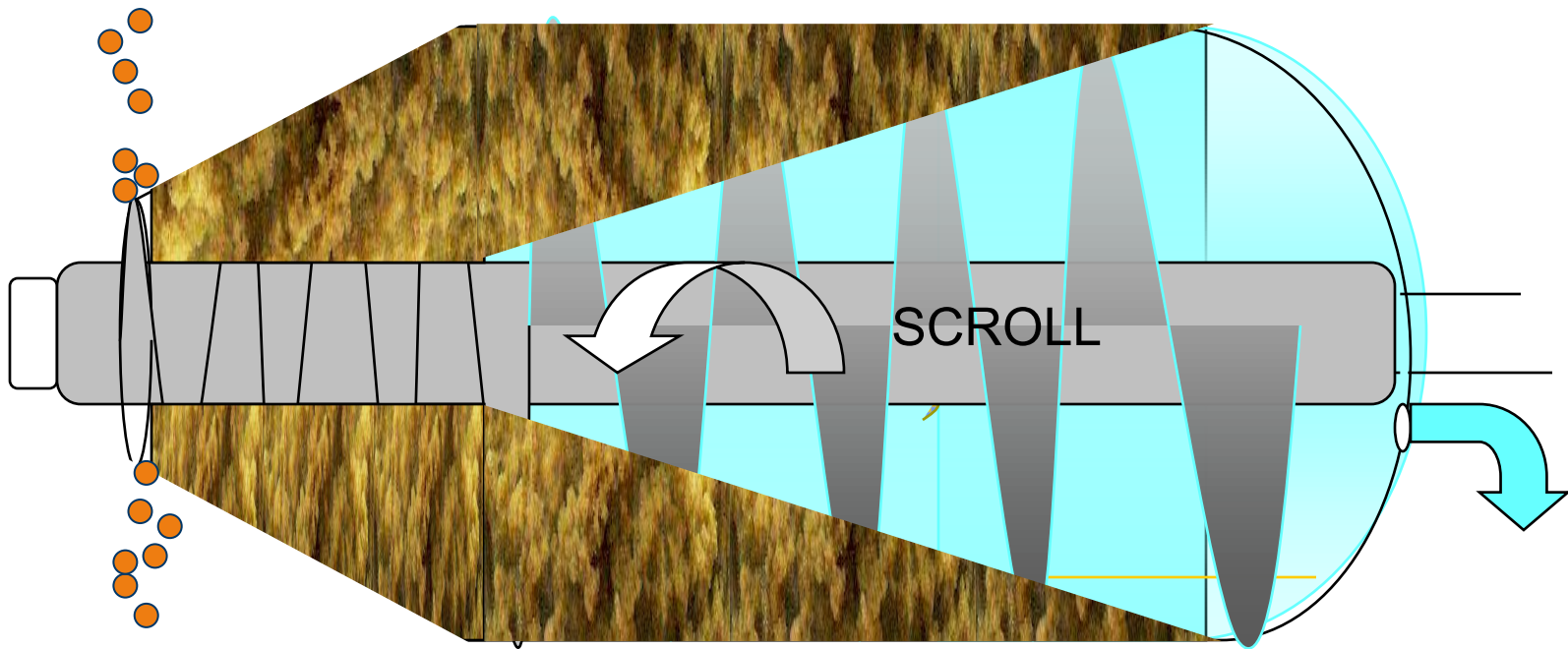
When the polymer/sludge mix enters the spinning centrifuge the flocculated solids quickly separate from the free water to form a cake pile and a liquid pool



SOLIDS ARE DRIVEN AWAY FROM THE CENTER OF ROTATION, OUT AGAINST THE BOWL WALL



The Scroll scrapes dewatered solids off the bowl wall and transports them toward the conical end of the centrifuge from which they discharge.



Solids are discharged as cake
Liquid is discharged as centrate

**Find the proper amount of
polymer addition
by observation of the cake
and the centrate**



Go to Animation

PROCESS OPTIMIZATION:

7

CONTROLLING

CAKE DRYNESS and

CENTRATE CLARITY

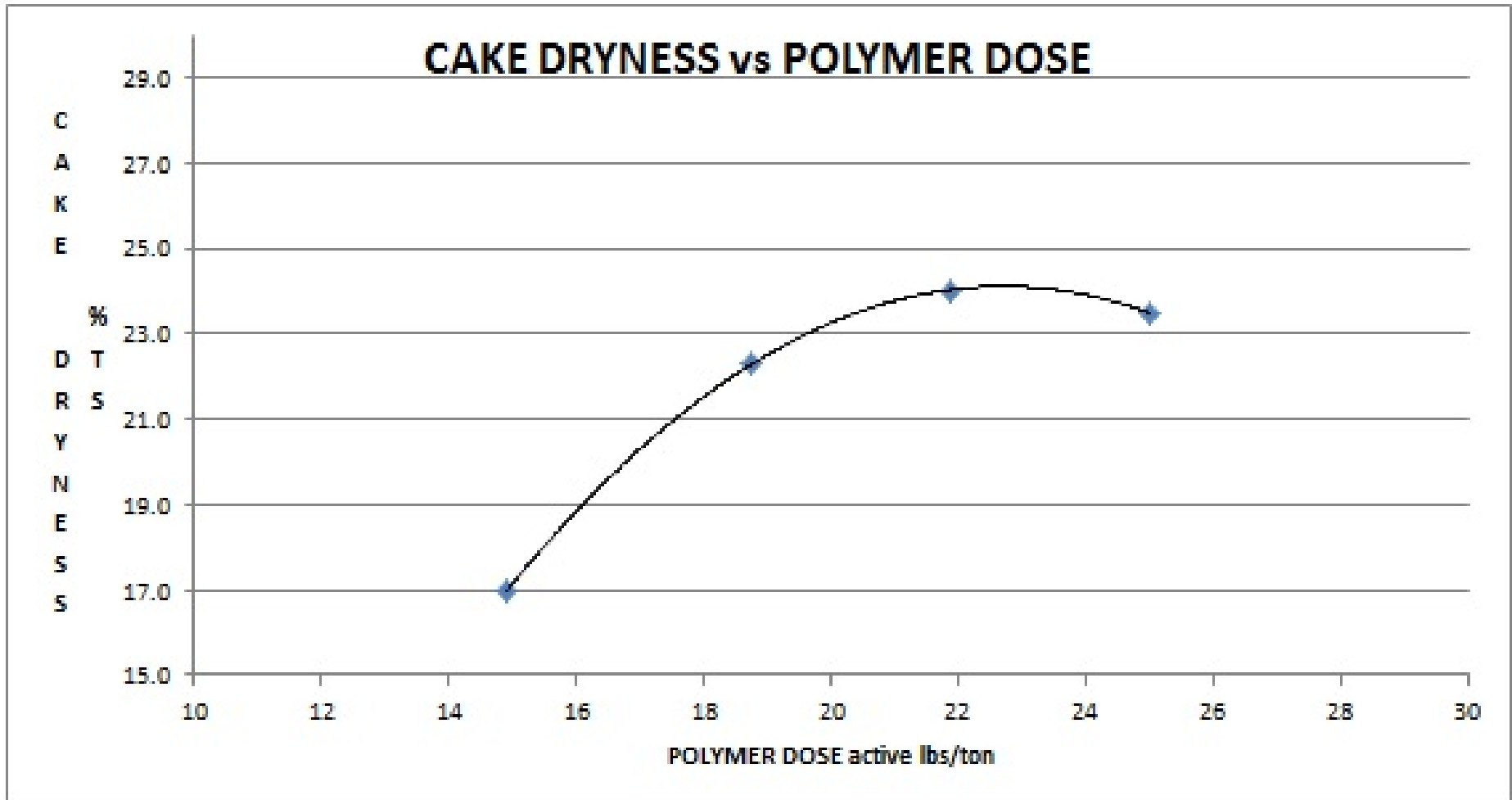
BY CONTROLLING

POLYMER DOSE and

SCROLLING TORQUE



Controlling Cake Dryness : OPTIMUM DOSAGE



Optimum
Dosage

is needed
for

Optimum
Dryness





Relationship:

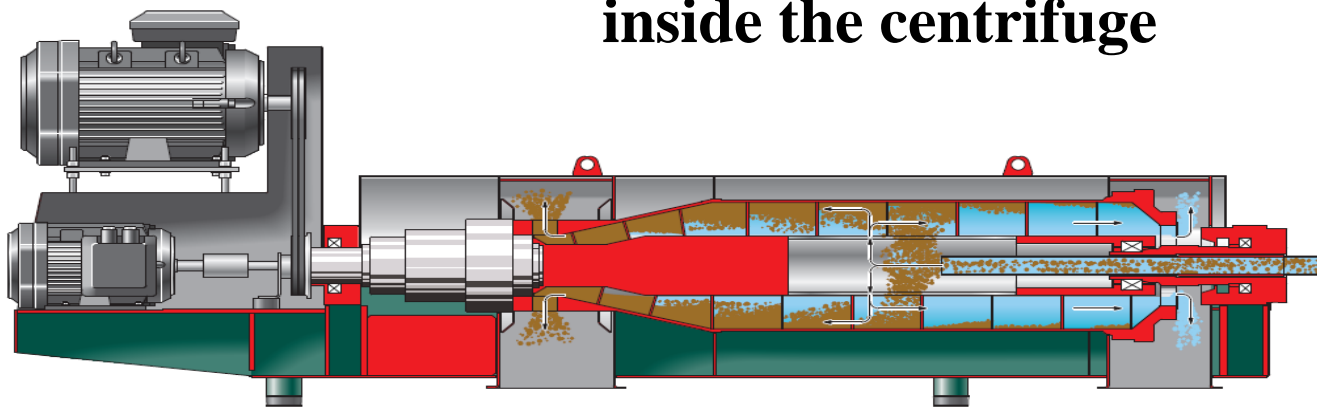
Scrolling Torque to Cake Dryness

The scroll is driven by an electric motor.

The amount of torque that must be exerted by that motor in order to turn the scroll is called the scrolling torque: 0 to 100%

The Scrolling torque is proportional to the dryness of the cake

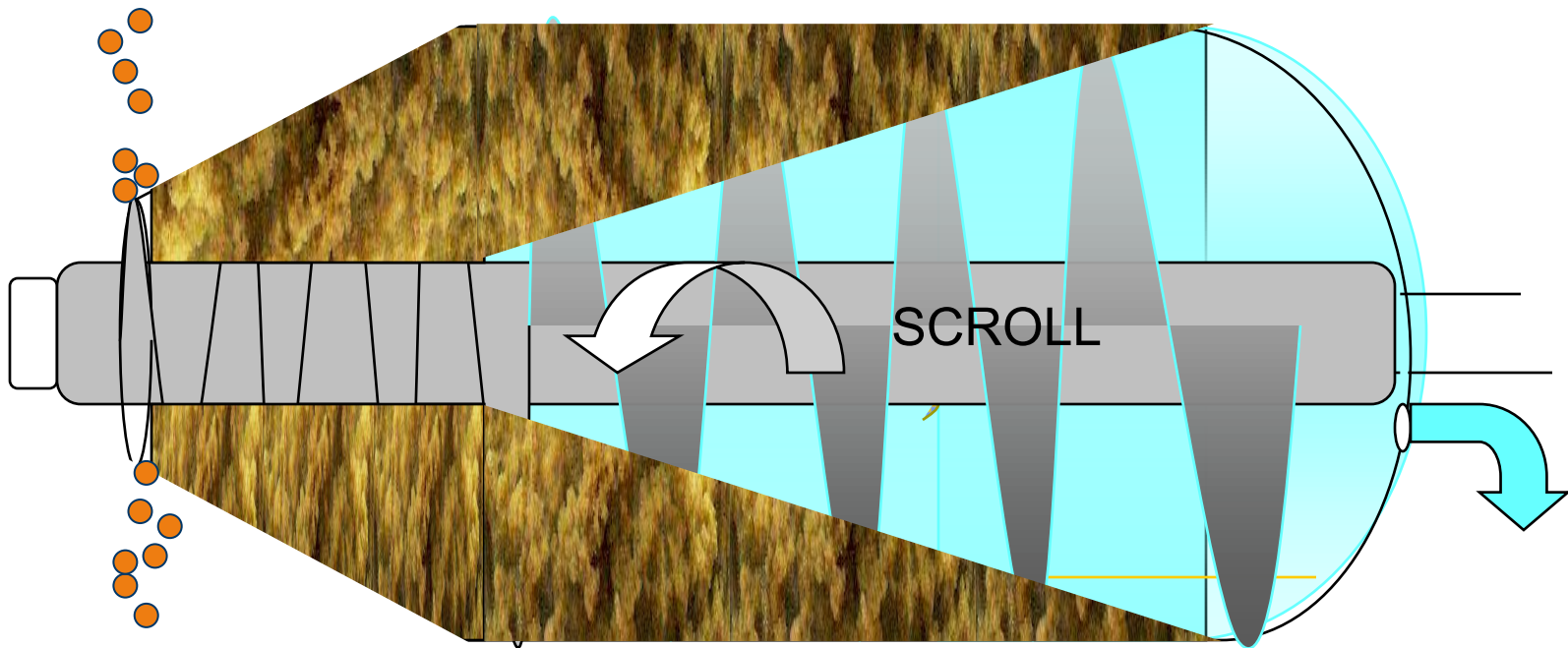
inside the centrifuge





RECALL THAT:

The Scroll scrapes dewatered solids off the bowl wall and transports them toward the conical end of the centrifuge from which they discharge.

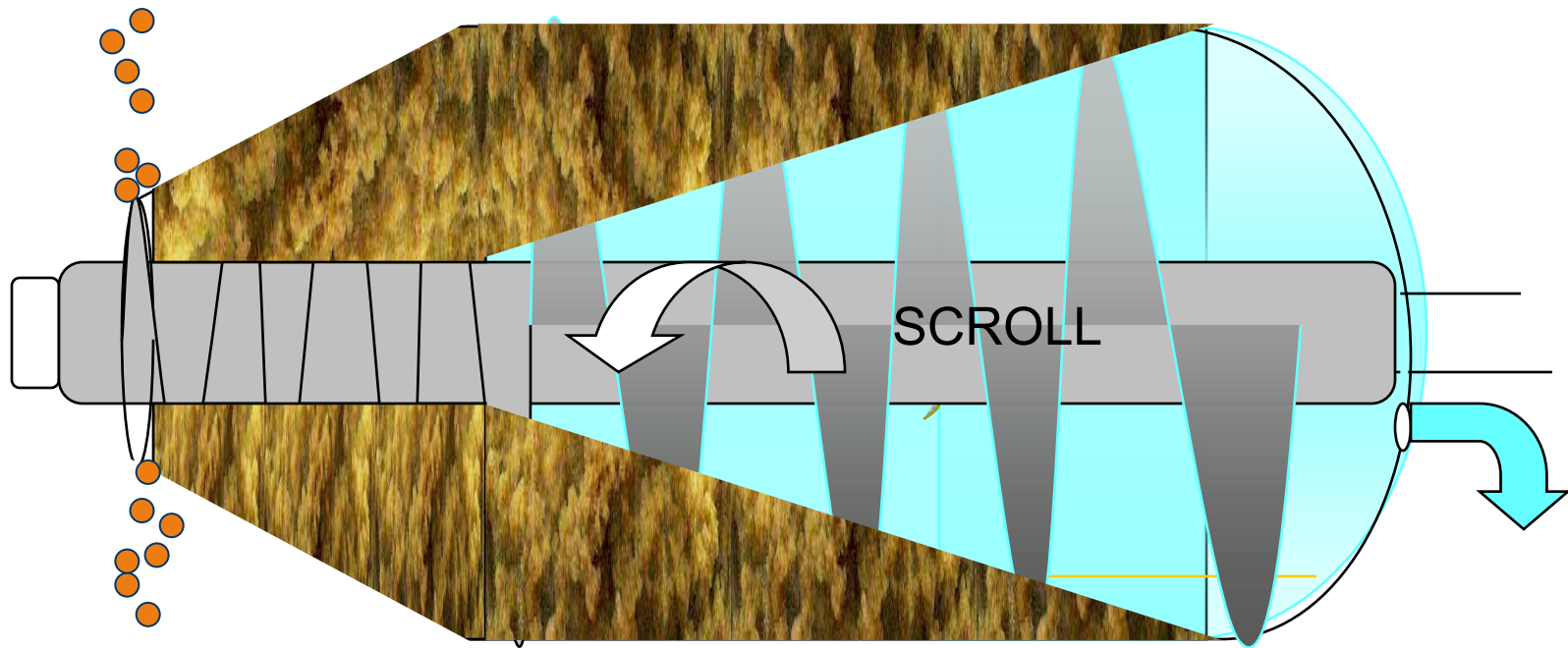


**Dry cake resists the action of the scroll more than does wet cake, therefore,
Higher scroll-motor torque reflects dryer cake in the centrifuge.**



SCROLL RPM DETERMINES CAKE PILE SIZE AND DRYNESS

The size of the cake pile that we maintain inside the centrifuge determines the residence time available for solids to dewater. Longer residence time increases cake dryness.



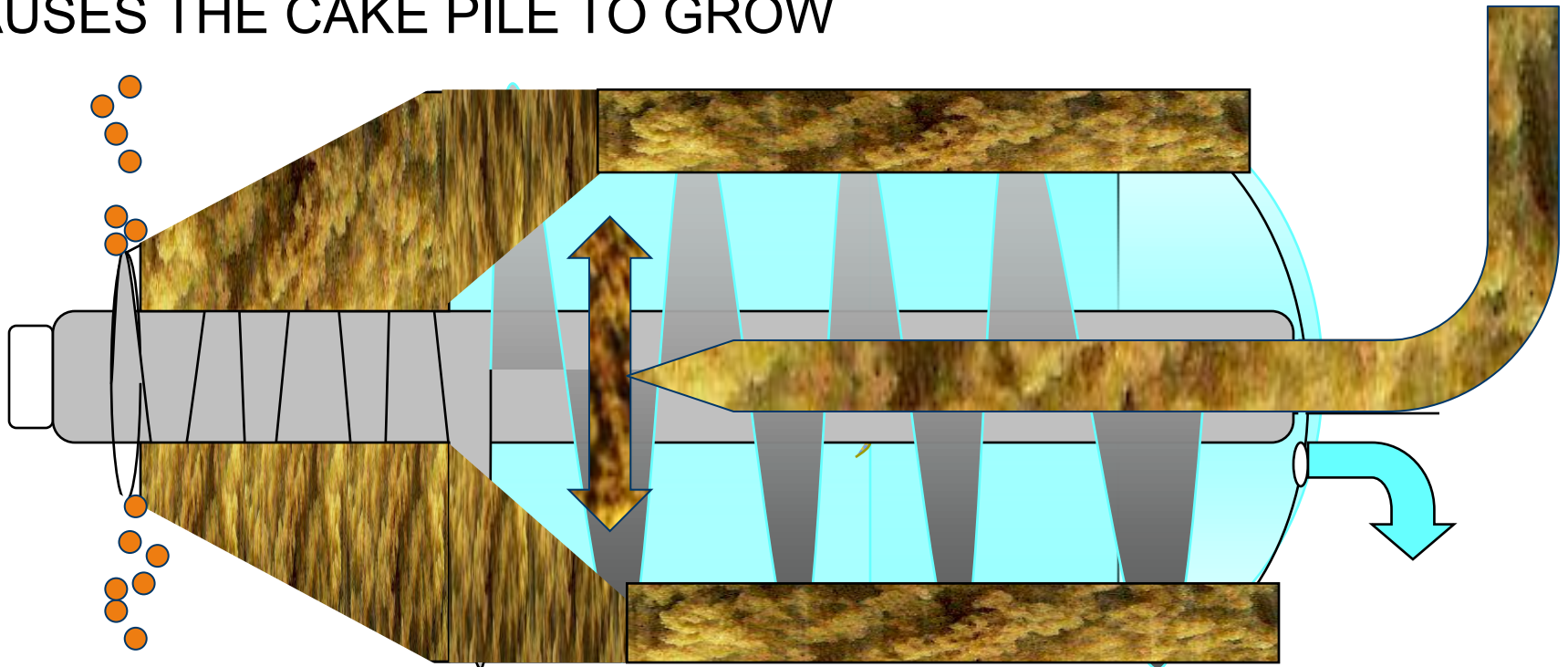
By varying the speed of the scroll, we push solids through the centrifuge faster or slower so that the size of the cake pile can be controlled.



FOR A CONSTANT SLUDGE FEED LOADING INTO THE CENTRIFUGE

CAKE WILL DEPOSIT INSIDE THE CENTRIFUGE AT A CONSTANT RATE

DISCHARGING CAKE SLOWER THAN THE DEPOSITION RATE CAUSES THE CAKE PILE TO GROW



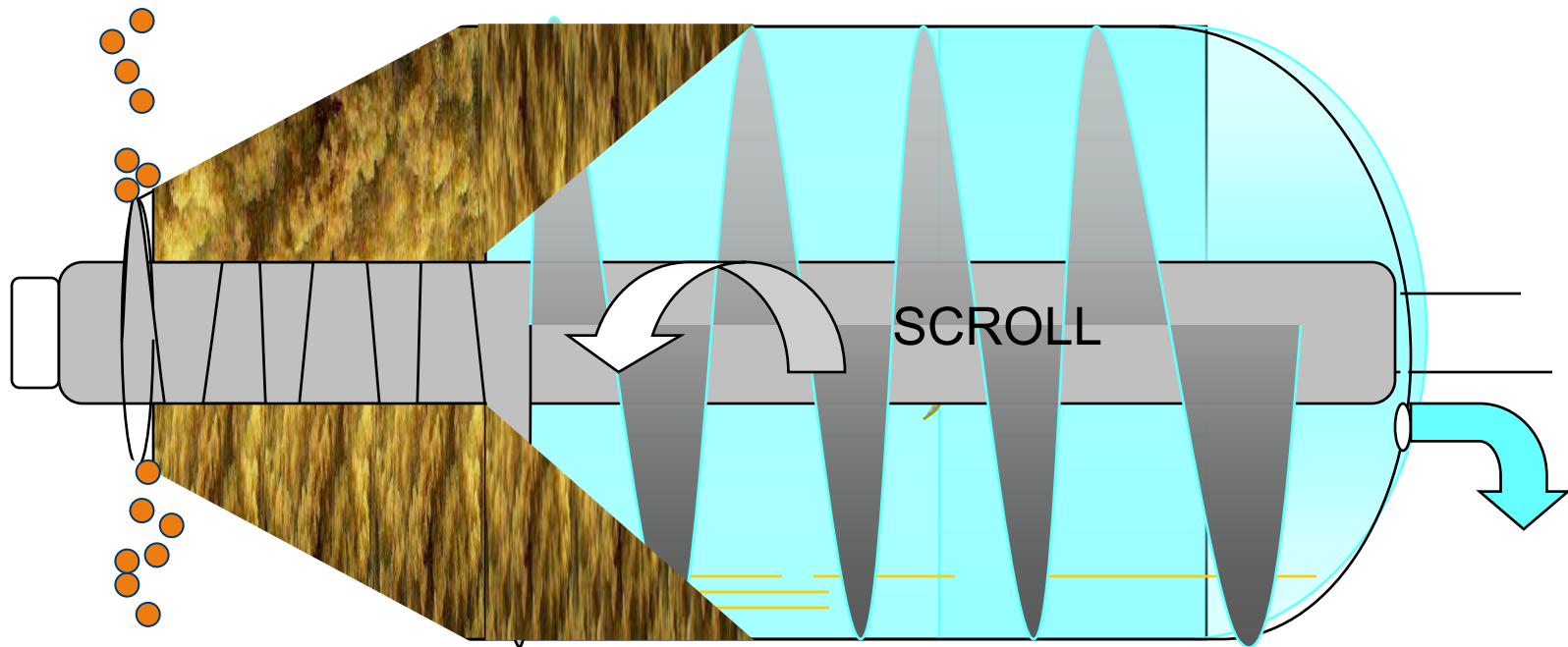
DISCHARGING CAKE FASTER THAN THE DEPOSITION RATE CAUSES THE CAKE PILE TO SHRINK

VARYING THE SCROLL RPM VARIES THE CAKE DISCHARGE RATE



Assuming that the optimum polymer dose has been added
WHEN THE CAKE PILE IS SMALL, THE TORQUE IS
USUALLY LOW AND THE CAKE IS WET

SMALL CAKE PILE: LOW SCROLLING TORQUE

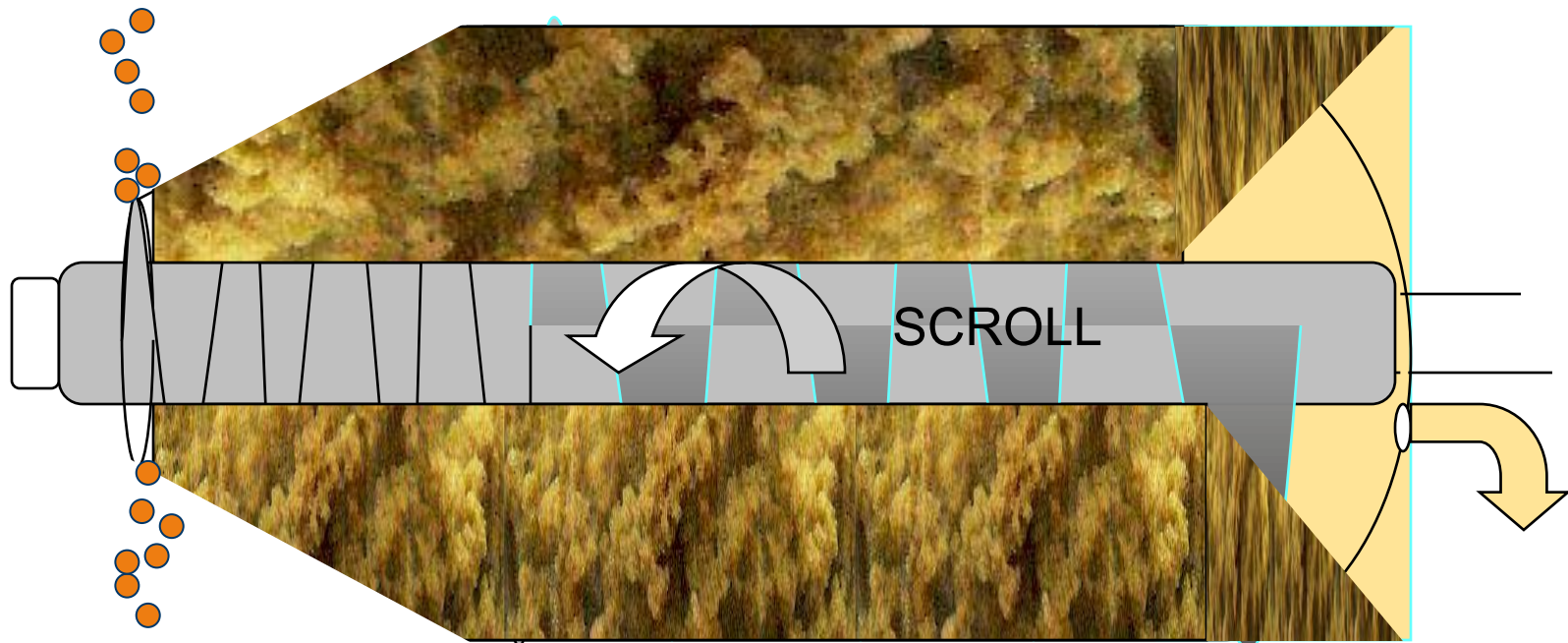


LOW TORQUE: CLEAN CENTRATE BUT WET CAKE



Assuming that the optimum polymer dose has been added
WHEN THE CAKE PILE IS VERY LARGE, THE TORQUE IS
USUALLY VERY HIGH AND THE CAKE IS VERY DRY

LARGE CAKE PILE: HIGH SCROLLING TORQUE

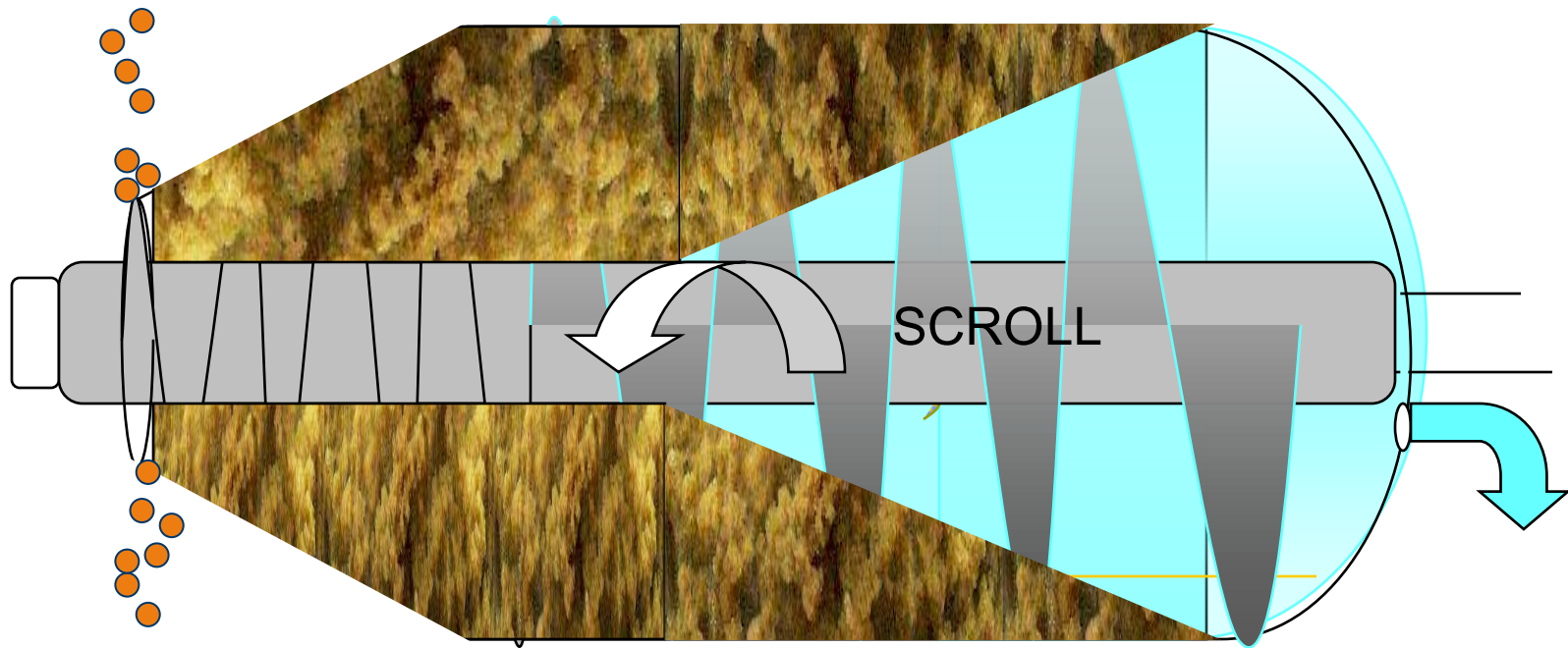


HIGH TORQUE: DRY CAKE BUT DARK CENTRATE



OPTIMUM CAKE PILE:

OPTIMUM SCROLLING TORQUE



OPTIMUM TORQUE:

CLEAN CENTRATE AND DRY CAKE



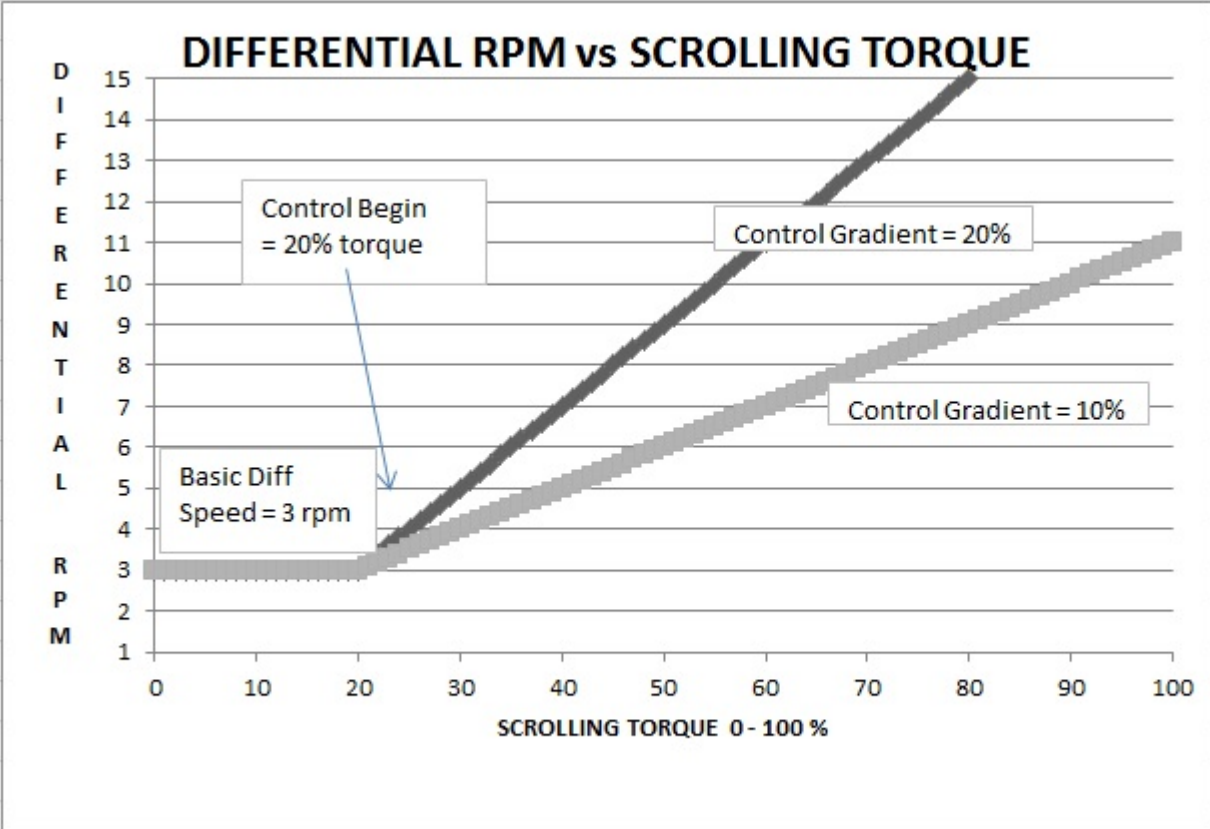
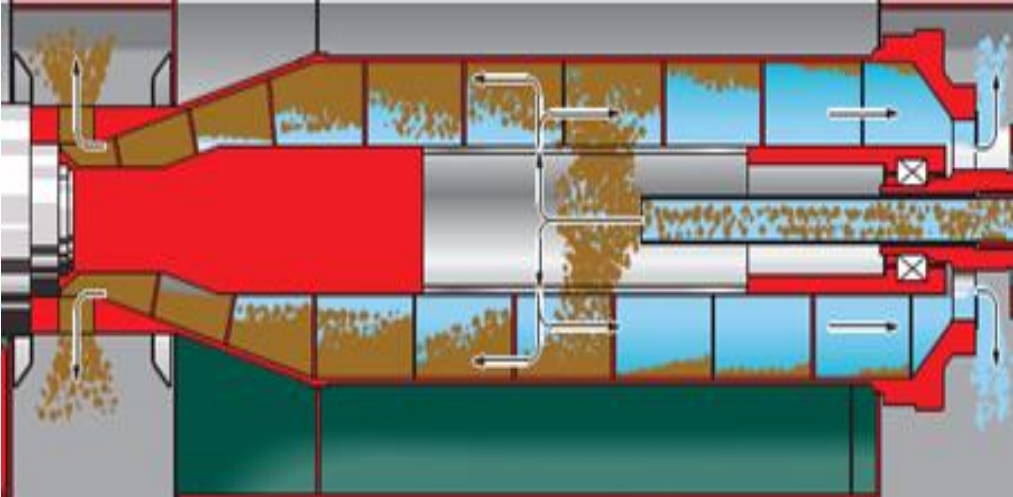
With that in mind we strive to operate at the highest torque achievable while maintaining a clean centrate. Depending on sludge quality this may be 30 to 65%.

For mechanical protection of the gearbox the torque should be maintained below 70%. An alarm will trigger at 80%.

This strategy yields the driest cake while keeping a high level of solids recovery.

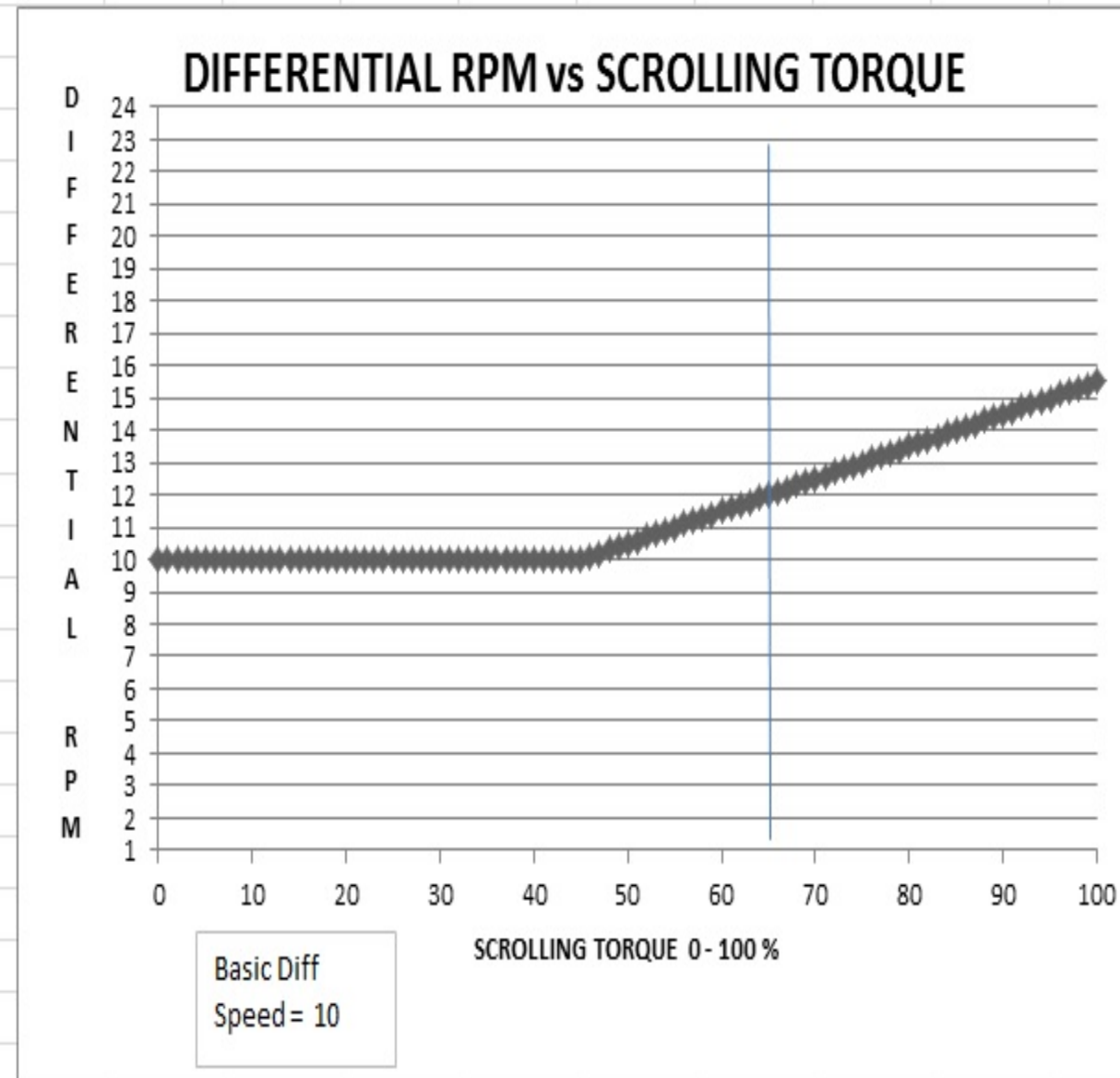
By trial and error the optimum torque level for operation will be found.

SJM Torque Control



Basic Diff =	3
Control Begin =	20
Gradient =	10

SJM Torque Control

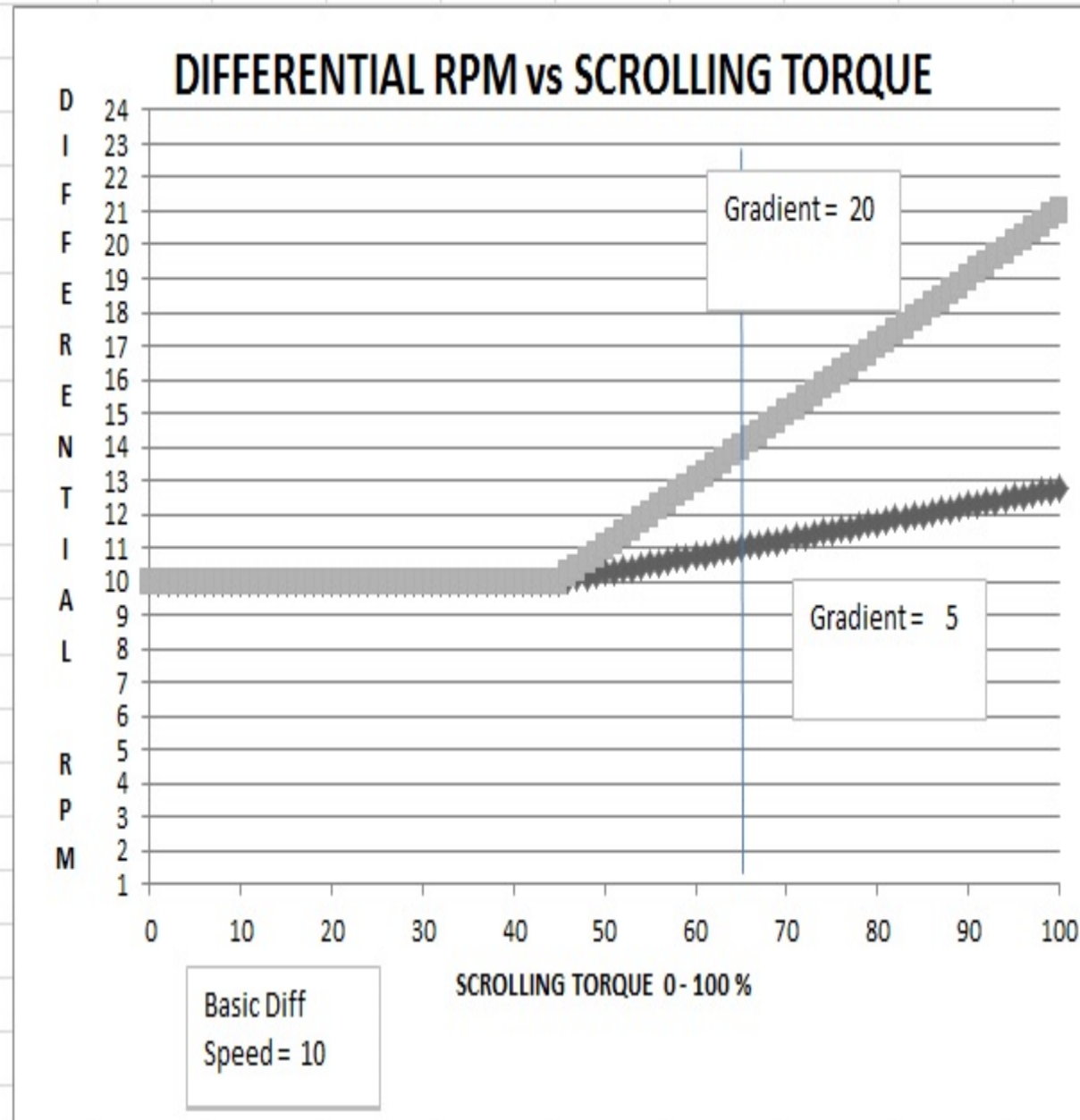


Basic Diff = 10

Control Begin = 45

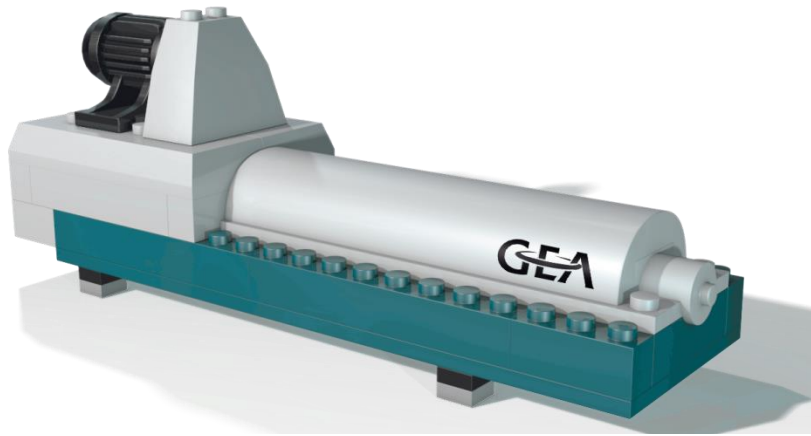
Gradient = 10

SJM Torque Control



Basic Diff =	10
Control Begin =	45
Gradient =	5

Basic Diff =	10
Control Begin =	45
Gradient =	20



What's different from the old units?

1. SJM scroll control
2. Alarm Reset procedure
3. Flying restart
4. Shutdown procedure

Sample Screen Shots – Project specific Screen Shots to be provided at a later date (under separate cover).

SAMPLE

01-MAIN SCREEN - /Hopewell_807834_9908_R0// (Display)

5:03:42 PM 9/11/2018 ACTIVE MODE: **DECANTER OFF** USER: **S**

ALL VALVE / DEVICES IN AUTO ALARM STATUS: **E-STOP**

START LOCKOUT TIME REMAIN (MIN)

DECANTER NOT READY FOR SLUDGE

CF 8000

* F MM/SEC

* F MM/SEC

HZ

A

BOWL OFF

SCROLL ON

POLYMER

SLUDGE

GRINDER

CENTRIFUGE FLUSH

CONVEYOR FLUSH

INCLINE SCREW CONV

CROSS SCREW CONV

SCROLL MODE: **TORQUE**

NNN TORQUE (%)

NN,N DIFF. SPEED (RPM)

NNNN BOWL SPEED (RPM)

PROCESS START PROCESS STOP

PROCESS CONTROL SCROLL CONTROL ALARM STATUS ALARM RESET FLUSH & SHUTDOWN SCREEN SELECT

02-ALARM HISTORY - /Hopewell_807834_9908_R0// (Display)

5:04:09 PM 9/11/2018 ACTIVE MODE: **CIP** USER: **S**

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: **E-STOP**

ALARM HISTORY

Alarm time	Acknowledge time	Message
* 9/11/2018 5:04:09 PM	5:04:09 PM 9/11/2018	ABCDE FGHIJK LMNOPQ RSTUV WXYZ ABCDE FGHIJK LMNOPQ RSTUV WXYZ

MAIN SCREEN ALARM STATUS ACK ALARM ALARM RESET SCREEN SELECT

03-ALARM LIST - /Hopewell_807834_9908_R0// (Display)

5:04:32 PM 9/11/2018 ACTIVE MODE: CIP USER: SSSSSSSSSSSSSSSSSSSSSSSSS

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

UNACKNOWLEDGED ALARMS

Alarm time	Device / Message
9/11/2018 5:04:32 PM	ABCDE FGHIJK LMNOPQ RSTUV WXYZ ABCDE FGHIJK LMNOPQ RSTUV WXYZ

ACTIVE ALARMS

Device / Message - Active Alarms
ABCDE FGHIJK LMNOPQ RSTUV WXYZ ABCDE FGHIJK LMNOPQ RSTUV WXYZ

MAIN SCREEN ALARM STATUS ACK ALARM ALARM RESET ALARM HISTORY SCREEN SELECT

05-MAINT MODE - /Hopewell_807834_9908_R0// (Display)

5:04:50 PM 9/11/2018 ACTIVE MODE: CIP USER: SSSSSSSSSSSSSSSSSSSSSSSSS

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

MAINTENANCE MODE

MAINTENANCE MODE	ON	OFF	MAINT MODE ON
SCROLL MOTOR	START	STOP	RUNNING
BOWL MOTOR	START	STOP	RUNNING
CENTRIFUGE HOURS	HOUR RESET	NNNNNNN	

MAIN SCREEN ALARM STATUS ALARM RESET GREASE INTERVAL START SCREEN SELECT

06-CIP PARAM - /Hopewell_807834_9908_R0// (Display)

5:05:06 PM 9/11/2018 ACTIVE MODE: CIP USER: SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

CLEAN IN PLACE (CIP)

NUMBER OF CIP CYCLES NNN

CIP CYCLES COMPLETED NNN

CIP START **CIP STOP**

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

07-CEN SPEEDS - /Hopewell_807834_9908_R0// (Display)

5:05:21 PM 9/11/2018 ACTIVE MODE: CIP USER: SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

CENTRIFUGE SPEEDS

ACTUAL

CENTRIFUGE DIFFERENTIAL SPEED (RPM) NN.N

CENTRIFUGE BOWL SPEED (RPM) NNNN

CENTRIFUGE GEAR INPUT SPEED (RPM) NNNNN

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

09-CEN CONFIG 1 - /Hopewell_807834_9908_R0// (Display)

5:05:37 PM 9/11/2018 ACTIVE MODE: **DECANTER OFF** USER: **XXXXXXXXXXXXXXXXXXXXXXXXXXXX**

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: **E-STOP**

CENTRIFUGE CONFIGURATION 1

PRIMARY (MAIN) GEAR FACTOR (IT)	NNNN.N	TORQUE SUPPRESSION (%)	NNN.N
SECONDARY GEAR FACTOR (IE) (Note: If none available, enter 1)	NNNN.N	DIFFERENTIAL SPEED CIP (RPM)	NN.N
DECANTER FACTOR (138.7 ON MACHINE CARD = 1.387 IN PLC)	NN.NN	CIP LOWER BWL SPEED LIMIT (RPM)	NNNN
RESTART INTERLOCK (RPM)	NNNN	CIP UPPER BWL SPEED LIMIT (RPM)	NNNN
BOWL SPEED NAMEPLATE (RPM)	NNNN	SCROLL VFD MIN FREQUENCY (HZ)	NNN
BOWL SPEED SETPOINT (RPM)	NNNN	SCROLL VFD MAX FREQUENCY (HZ)	NNN
CENTRIFUGE START-UP TIME (MIN)	NNN	DIFFERENTIAL SPEED MIN (RPM)	NN.N
		DIFFERENTIAL SPEED MAX (RPM)	NN.N

MAIN SCREEN ALARM STATUS ALARM RESET CENTRIFUGE CONFIG 2 SCREEN SELECT

10-CEN CONFIG 2 - /Hopewell_807834_9908_R0// (Display)

5:05:53 PM 9/11/2018 ACTIVE MODE: **CIP** USER: **XXXXXXXXXXXXXXXXXXXXXXXXXXXX**

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: **E-STOP**

CENTRIFUGE CONFIGURATION 2

GEAR TYPE

MACHINE CODE ENDS WITH -00
MACHINE CODE ENDS WITH -32
MACHINE CODE ENDS WITH -33
MACHINE CODE ENDS WITH -34
MACHINE CODE ENDS WITH -35
MACHINE CODE ENDS WITH -36

ONE GEAR
TWO GEAR
PLANETARY
DIFF GEAR
SUMMATION
SUM. W/ PULLEY

VIBRATION MONITOR TYPE: DISCRETE, ANALOG, BOTH

BEARING TEMP: DEG. C, DEG. F

MAIN SCREEN POLYMER FEED PID CONTROL ALARM STATUS ALARM RESET CENTRIFUGE CONFIG 1 SCREEN SELECT

11-CEN SETPOINTS - /Hopewell_807834_9908_RO// (Display)

5:06:09 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

CENTRIFUGE SETPOINTS 1

	SETPOINT	ACTUAL
BOWL SPEED SETPOINT (RPM)	NNNN	NNN
CENTRIFUGE START-UP TIME (MIN)	NNN	NNN
FLUSH WTR OFF DURING NORMAL SHT DOWN (RPM)	NNNN	NNNN
FLUSH WTR ON DURING START-UP (RPM)	NNNN	NNNN
FLUSH WTR ON DURING START-UP DURATION (MIN)	NNN	NNN
IDLE MODE FLUSH INTERVAL (MIN)	NNN	NNN
IDLE MODE FLUSH DURATION (SEC)	NNN	NNN
SCREW CONVEYOR 1 FWD CLEAR TIME (SEC)	NNN	NNN
SCREW CONVEYOR 2 FWD CLEAR TIME (SEC)	NNN	NNN

MAIN SCREEN ALARM STATUS ALARM RESET CENTRIFUGE SETPOINTS 2 SCREEN SELECT

12-CEN SETPOINTS 2 - /Hopewell_807834_9908_RO// (Display)

5:06:23 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

CENTRIFUGE SETPOINTS 2

	SETPOINT	ACTUAL
GRINDER PROCESS START DELAY TIME (SEC)	NNN	NNN
POLYMER PROCESS START DELAY TIME (SEC)	NNN	NNN
SLUDGE FEED PROCESS START DELAY TIME (SEC)	NNN	NNN
SLUDGE PUMP START-UP DURATION (SEC)	NNN	NNN
SLUDGE PUMP START-UP SPEED (%)	NNN	NNN
POLYMER PUMP START-UP DURATION (SEC)	NNN	NNN
POLYMER PUMP START-UP SPEED (%)	NNN	NNN

MAIN SCREEN ALARM STATUS ALARM RESET CENTRIFUGE SETPOINTS 1 SCREEN SELECT

13-SJM-TQA SCROLL CONTROL - /Hopewell_807834_9908_R0// (Display)

5:06:39 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

SCROLL CONTROL

TORQUE

Basic Differential Speed	NNN.N	Rpm	Differential Speed	NNN.N	Rpm
Control Begin	NNN.N	%	Torque	NNN.N	%
Control Gradient	NNN.N	%	Frequency	###	Hz

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

14-VALVE CONTROL - /Hopewell_807834_9908_R0// (Display)

5:06:52 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

VALVE CONTROL

	Status	Mode		Manual Control		
AIR-OIL SOLENOID VALVE	CLOSE	Auto	Manual	Open		Close
CENTRIFUGE FLUSH WATER VALVE	CLOSE	Auto	Manual	Open	Off	Close
CONVEYOR FLUSH VALVE	CLOSE	Auto	Manual	Open	Off	Close

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

17-PROCESS CONTROL - /Hopewell_807834_9908_R0// (Display)

5:07:53 PM 9/11/2018 ACTIVE MODE: CIP USER: SSSSSSSSSSSSSSSSSSSSSSSSS

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

	Status	Mode	Manual Control	Pump Speed
SLUDGE PUMP	OFF			
POLYMER PUMP	OFF			
GRINDER	OFF			

	SETPOINT		ACTUAL	
SLUDGE FEED FLOW RATE	NNN	GPM	NNN	GPM
POLYMER FLOW RATE	NNN.NN	GPH		

MAIN SCREEN POLYMER IN RATIO CONTROL ALARM STATUS ALARM RESET SCREEN SELECT

20-SCREEN SELECT - /Hopewell_807834_9908_R0// (Display)

5:08:21 PM 9/11/2018 ACTIVE MODE: CIP USER: SSSSSSSSSSSSSSSSSSSSSSSSS

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

SCREEN SELECT

PROCESS CONTROL	SCROLL CONTROL	CONVEYOR CONTROL	VALVE CONTROL	AUTO / MAN REM / LOCAL STATUS	GO TO CONFIG
CENTRIFUGE SPEEDS	FLUSH & SHUTDOWN PARAM	CIP PARAM	CENTRIFUGE SETPOINTS 1	CENTRIFUGE SETPOINTS 2	
CENTRIFUGE CONFIG 1	CENTRIFUGE CONFIG 2	SCROLL CONFIG	ANALOG SCALING	AIR OIL LUBE	
CENTRIFUGE ALARM SETPOINTS	ALARM STATUS	ALARM HISTORY	MAINT MODE	EQUIPMENT CONFIG	

MAIN SCREEN ALARM RESET LOG IN LOG OUT

21-AUTO-MANUAL STATUS - /Hopewell_807834_9908_R0// (Display)

5:08:41 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

AUTO-MANUAL / LOCAL-REMOTE STATUS

	Status	Mode
AIR-OIL SOLENOID VALVE	CLOSE	MANUAL
CENTRIFUGE FLUSH WATER VALVE	CLOSE	MANUAL
CONVEYOR FLUSH VALVE	CLOSE	AUTO
INCLINE SCREW CONEYOR	REV	
CROSS SCREW CONVEYOR	ON	
SLUDGE PUMP	OFF	
POLYMER PUMP	OFF	
GRINDER	OFF	

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

22-FLUSH AND SHUTDOWN PARAM - /Hopewell_807834_9908_R0// (Display)

5:08:54 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

FLUSH AND SHUTDOWN

SETPOINT

FLUSH WATER OFF TORQUE (%) NNN

PRODUCT CLEAR TIMER (MIN) NNN

FLUSH & SHUTDOWN FLUSH & SHUTDOWN ABORT

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

23-ANALOG SCALING - /Hopewell_807834_9908_R0// (Display)

5:09:08 PM 9/11/2018 ACTIVE MODE: CIP USER: sssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

ANALOG SCALING

SETPOINT FOR 20 MA

CENTRIFUGE VIBRATION (MM/SEC)	NN.N
CENTRIFUGE BOWL SPEED (RPM)	NNNNN
CENTRIFUGE GEAR INPUT SPEED (RPM)	NNNNN
BOWL VFD MOTOR CURRENT (A)	NNN.N
POLYMER FEED PUMP SCALED OUTPUT (Corresponding to 0-100% output)	NN.NN

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

29-SCROLL CONFIGURATION - /Hopewell_807834_9908_R0// (Display)

5:09:37 PM 9/11/2018 ACTIVE MODE: DECANter OFF USER: sssssssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

SCROLL CONFIGURATION

Scroll Control Type: Speed Torque Speed

Scroll Control Output: ymin % ymax % Scroll Delay Time 2-gear sec

Scroll Control During Start-up: Without With Without Scroll Control Value During Start-up %

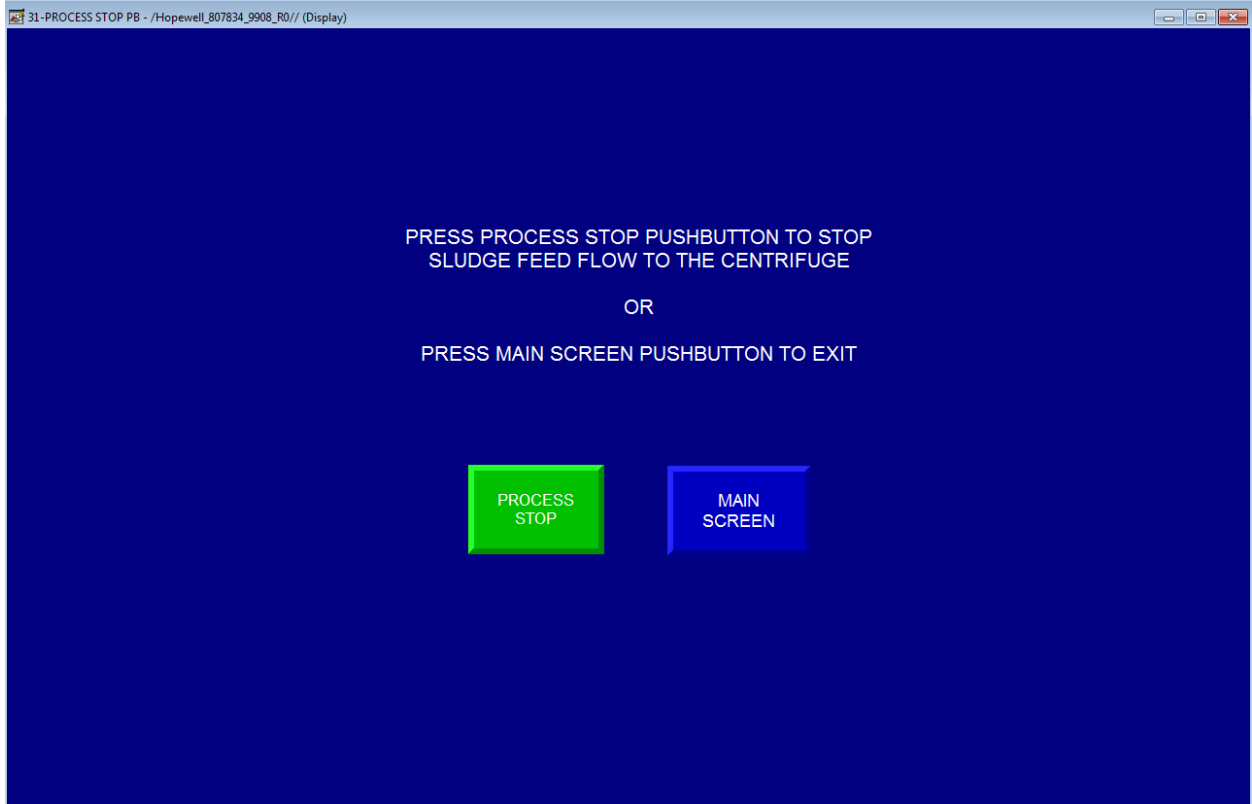
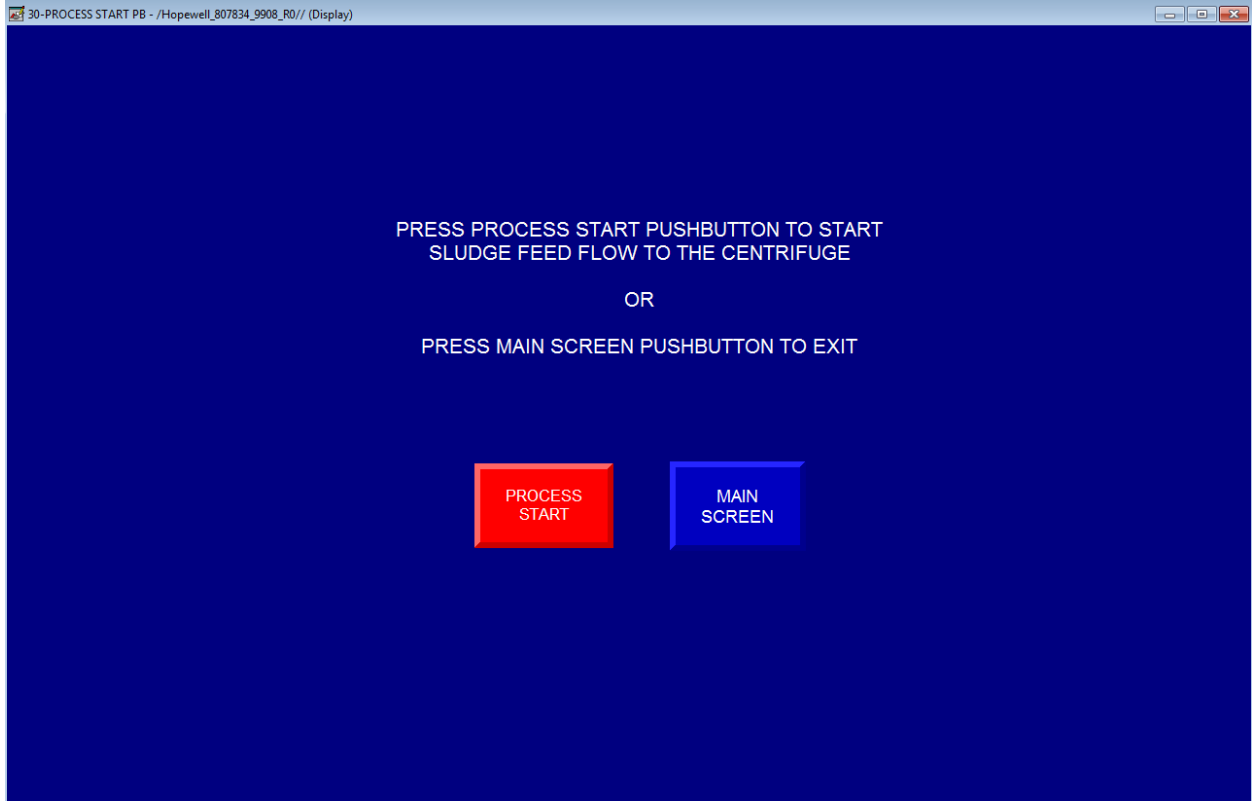
* Scroll Speed Limitation: Min Max No No

* No = There is no speed limitation, e.g. decanter series 20, 53, 466, 505, 63 and 75.

* Max = The gear input speed is always lower than the gear housing speed, e.g. decanter series 45 and 501, with secondary gear ratio = 3, and all decanter series 30. Scroll frequency limited to approx. 17-80 Hz.

* Min = The gear input speed is always higher than the gear housing speed, e.g. decanter series 45 and 501, with secondary gear ratio = 6. Scroll frequency limited to approx. 52-87 Hz.

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT



32-GO TO CONFIG - /Hopewell_807834_9908_R0// (Display)

5:10:24 PM 9/11/2018 ACTIVE MODE: MAINTENANCE MODE USER: SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS

ALL VALVE / DEVICES IN AUTO ALARM STATUS: IMMED SHUTDOWN

PRESS GOTO CONFIG PUSHBUTTON TO GO TO SYSTEM SET UP SCREEN

OR

PRESS SCREEN SELECT PUSHBUTTON TO EXIT

GOTO CONFIG SCREEN SELECT

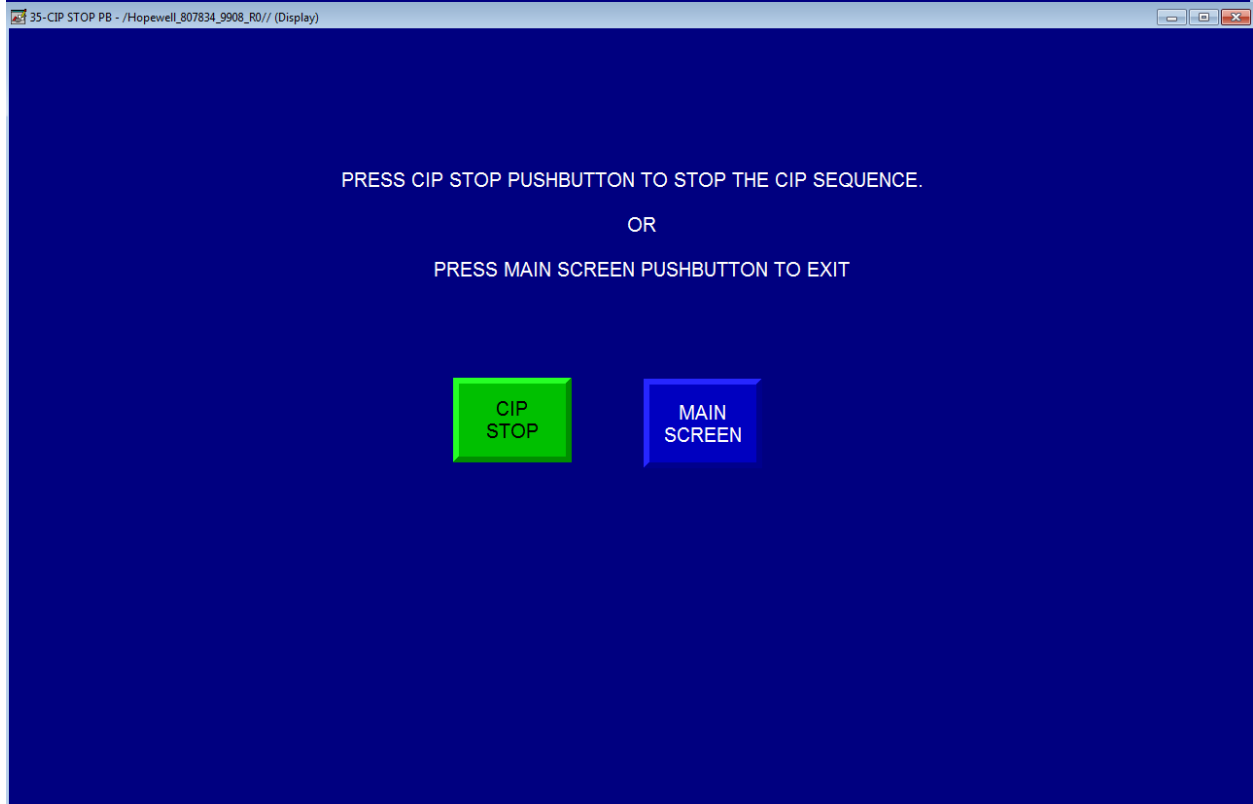
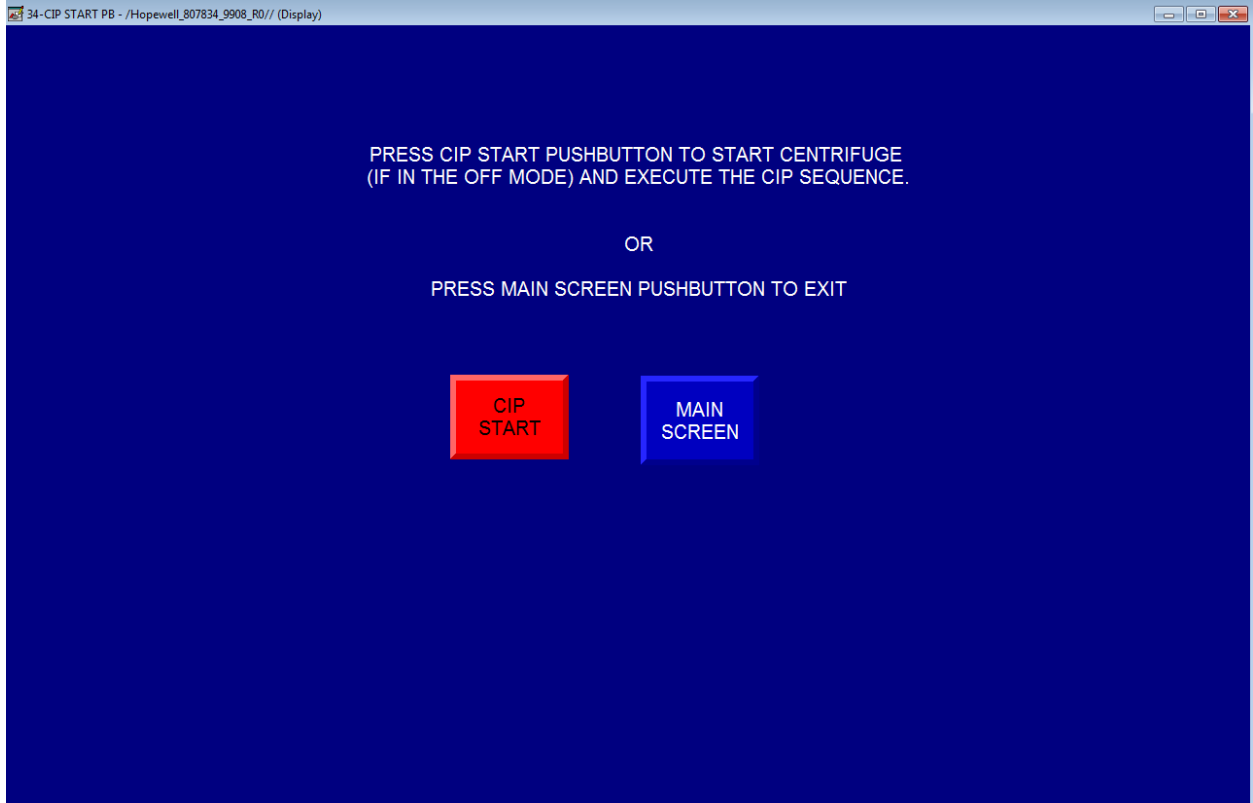
33-FLUSH SHUTDOWN START PB - /Hopewell_807834_9908_R0// (Display)

PRESS FLUSH & SHUTDOWN START PUSHBUTTON WHEN FINISHED PROCESSING. PROCESS WILL AUTOMATICALLY BE DISABLED, SCREW CONVEYOR WILL CONTINUE TO RUN FORWARD UNTIL TORQUE DROPS TO PRESET LEVEL. UPON COMPLETION OF FLUSH & SHUTDOWN CYCLE, CIP MODE WILL BE INITIATED AUTOMATICALLY.

OR

PRESS MAIN SCREEN PUSHBUTTON TO EXIT

FLUSH & SHUTDOWN MAIN SCREEN



36-FLUSH SHUTDOWN ABORT PB - /Hopewell_807834_9908_R0// (Display)

PRESS THE FLUSH & SHUTDOWN ABORT PUSHBUTTON TO ABORT
THE FLUSH & SHUTDOWN SEQUENCE AND RETURN TO IDLE MODE.

OR

PRESS MAIN SCREEN PUSHBUTTON TO EXIT

FLUSH & SHUTDOWN ABORT

MAIN SCREEN

41-AIR-OIL LUBE - /Hopewell_807834_9908_R0// (Display)

5:11:32 PM 9/11/2018 ACTIVE MODE: DECANter OFF USER: sssssssssssssssssssss

VALVE / DEVICE NOT IN AUTO / REMOTE ALARM STATUS: E-STOP

OIL - AIR LUBRICATION

	SETPOINT	ACTUAL
OIL PRE LUBE TIME (SEC)	NNNNN	NNNNN
OIL PULSE INTERVAL (PAUSE) - STARTING (SEC)	NNNNN	NNNNN
OIL PULSE DURATION (PULSE) - STARTING (SEC)	NNNNN	NNNNN
OIL PULSE INTERVAL (PAUSE) - RUNNING (SEC)	NNNNN	NNNNN
OIL PULSE DURATION (PULSE) - RUNNING (SEC)	NNNNN	NNNNN

PRE LUBE STOP

PRE LUBE START

MAIN SCREEN ALARM STATUS ALARM RESET SCREEN SELECT

**THIS CONCLUDES THE
CENTRIFUGE TRAINING
PRESENTATION THANK YOU
FOR YOUR ATTENTION!**



Liquids to Value
GEA Mechanical Equipment / GEA Westfalia Separator

Below is a summary of the Scope of Supply for the Taunton, MA Wastewater Treatment Plant project, GEA No. 2652395848:

Two (2) CF 7000 Centrifuge with 75 HP Bowl motor and 50 HP Scroll Motor

Two (2) Solids Divert Gate Valves

Two (2) Solids (Cake) discharge flexible connectors

Two (2) Centrate flexible connectors

Two (2) Centrifuge Main Control Panels including VFD's and PLC, UL rated

Two (2) Centrifuge Local Control Panels for Centrifuges including HMI, UL rated

One (1) Lot of Centrifuge Spare Parts

One (1) Lot of Centrifuge Special Tools

Three (3) Hard copies of O&M manuals – final version

Four (4) Hard Copies of Training Documentation – approved version

Two (2) Lot of GEA Technical services at the jobsite (10 days / 3 trips including T & E)

Two (2) Shop Test of Centrifuge including certificates

Two (2) Non-consecutive on-site maintenance trips

Two (2) Warranty, 12 months after acceptance

Two (2) Lot of shipping services for above items to jobsite.


REVISIONS			
No.	DESCRIPTION	DATE	APPROVED
0	RELEASED FOR APPROVAL	18/AUG/21	SBK
1	REVISED AS NOTED	08/SEP/21	PC
2	REMOVE GRINDER, ADD DIVERT GATE, REVISE CONTROLS	30/SEP/21	PC
3	MODIFIED DISCHARGE CONVEYORS	21/JUNE/22	PC
4	ADDED HARD-WIRED CONTROLS INTERFACE FOR SLUDGE FEED PUMPS, POLYMER FEED PUMPS AND CONVEYORS FOR INTERIM UNTIL SCADA INSTALLED	08/AUG/22	PC

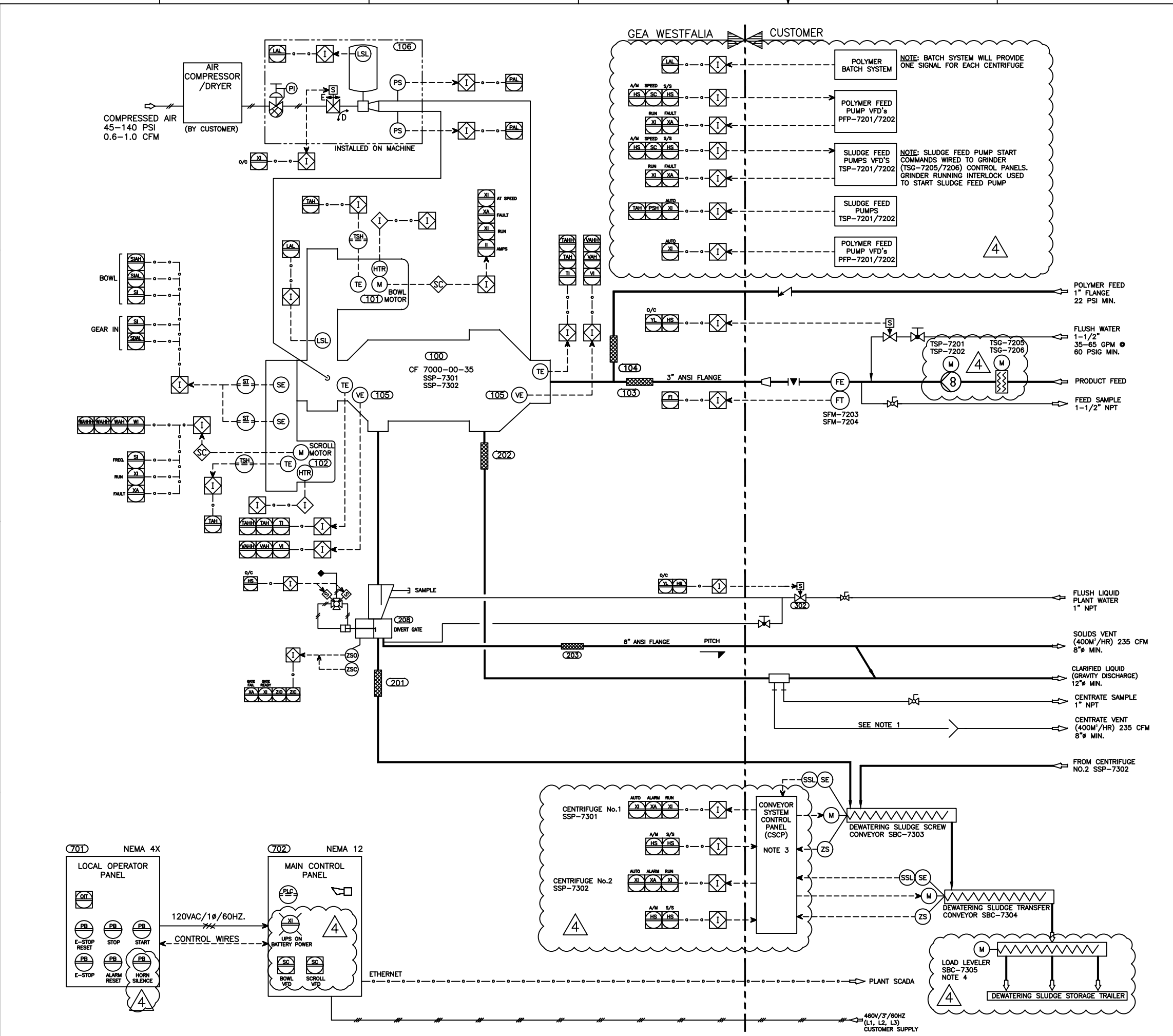
BILL OF MATERIALS					
SEQ. NO.	DESCRIPTION	SIZE	CONN. TYPE	ITEM NO.	QTY.
100	CF 7000-00-35 (S/N 8012-663)	-	-	9987-0531-509	1
	CF 7000-00-35 (S/N 8012-664)	-	-	9987-0531-510	1
101	MAIN MOTOR	75	-	WITH MACHINE	1
102	SCROLL MOTOR	50	-	WITH MACHINE	1
103	PRODUCT FEED FLEX	3"	FLANGE	WITH MACHINE	1
104	POLYMER FEED FLEX	1"	HOSE	WITH MACHINE	1
105	VIBRATION SENSOR	-	-	WITH MACHINE	2
106	DIL-AIR LUBRICATION	-	-	WITH MACHINE	1
201	SOLIDS DISCHARGE FLEX	-	FLANGE	9149-2832-123	1
202	CENTRATE DISCHARGE FLEX	-	FLANGE	9149-2832-094	1
203	SOLIDS VENT/DRAIN FLEX	8"	FERNCO	9149-2832-089	1
208	DIVERT GATE	-	FLANGE	9911-8826-900	1
701	LOCAL OPERATOR PANEL	-	-	9200-0516-TBD	1
702	MAIN CONTROL PANEL	-	-	9200-0516-TBD	1

DESCRIPTION	DRAWING NUMBER
LCP WIRING DIAGRAM	9149-5901-587
MCC WIRING DIAGRAM	9149-5901-587
FOUNDATION DETAIL	9149-4100-706
INSTALLATION PLAN	9149-4100-706
DESCRIPTION	DRAWING NUMBER

LIST OF REFERENCE DRAWINGS

- NOTES:
- CUSTOMER SUPPLIED VENT CONNECTIONS ARE TO BE LOCATED BETWEEN THE CENTRIFUGE AND FLOOR.
 - ALL FIELD PIPING, WIRING, AND INTERCONNECTIONS BY OTHERS.
 - BOTH CENTRIFUGES (SSP-7301/7302) WILL HAVE A HARD-WIRED CONTROLS INTERFACE FOR BOTH SCREW CONVEYORS (SBC-7303/7304) VIA THE CSCP.
 - THE LOAD LEVELER WILL BE CONTROLLED MANUALLY BY THE OPERATORS. SBC-7304 RUNNING INTERLOCK WILL BE USED AS RUN PERMISSIVE FOR THE LOAD LEVELER. THERE WILL BE POSSIBLE FUTURE CENTRIFUGE CONTROL INTERFACE VIA ETHERNET.

2652395848	987533	TAUNTON, MA	DEWATERING MIXED WAS	CF 7000	2
WESTFALIA NUMBER	CUSTOMER NUMBER	CUSTOMER	END USE	MACHINE	QTY
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Drawn:	AR	Date:	10/AUG/21	 Westfalia Separator Division Mechanical Equipment US, Inc. 100 FAIRWAY COURT, NORTHVALE, NEW JERSEY 07847	
Checked E.E.:	LM	Date:	18/AUG/21	PIPING & INSTRUMENTATION DIAGRAM CF 7000-00-35	
Checked M.E.:	PC	Date:	18/AUG/21	Size:	F.S.C.M. No.
Approved:	SBK	Date:	18/AUG/21	Deg. No.	9149-5700-909
Scale:		M/F: 9149-5700-917	QUOTE #:	Rev.	4
				Sheet:	1 OF 2



- 2-WAY SOLENOID VALVE N.O.
- 2-WAY SOLENOID VALVE N.C.
- CHECK VALVE
- 2-WAY HAND DIAPHRAGM VALVE
- GATE VALVE
- GLOBE VALVE
- MICROMETER VALVE
- 2-WAY HAND BALL VALVE
- 2-WAY AIR ACTUATED BALL VALVE
- 2-WAY AIR ACTUATED BALL VALVE
- CONSTANT PRESSURE VALVE
- 3-WAY BALL VALVE
- 2-WAY AIR DIAPHRAGM VALVE N.C.
- PRESSURE REGULATOR W/INDICATOR
- RELIEF VALVE
- ANGLE RELIEF VALVE
- NEEDLE VALVE
- 2-WAY AIR ACTUATOR CONTROL VALVE N.C.
- 2-WAY AIR ACTUATOR DIVERT VALVE N.C.
- 2-WAY BUTTERFLY HAND VALVE
- 2-WAY ANGLE BODY CONTROL VALVE N.C.
- 3-WAY AIR ACTUATOR DIVERT VALVE N.C.
- 2-WAY AIR ACTUATOR BUTTERFLY VALVE N.C.
- 2-WAY AIR ACTUATOR BUTTERFLY VALVE N.O.
- 2-WAY MANUAL FLOW VALVE
- 2-WAY AIR ACTUATOR VALVE N.C.
- 2-WAY AIR ACTUATOR VALVE N.O.
- PLUG VALVE

- 3-WAY SOLENOID VALVE
- PRESSURE REGULATOR W/INDICATOR & FILTER
- SAMPLE VALVE
- PRESSURE REGULATOR W/FILTER
- SIGHT GLASS
- PRESSURE REGULATOR
- WATER METERING VALVE
- MIXING NOZZLE INJECTOR
- Y-STRAINER
- FLEX CONNECTION
- FLOOR DRAIN
- VENT
- REDUCER
- STEAM TRAP
- TURBIDITY METER
- FLOW ORIFICE
- NITROGEN (N2)
- DATA LINK
- PNEUMATIC (AIR) SIGNAL
- AIR LINE
- 110V LINE
- ELECTRICAL LINE
- LOW VOLTAGE LINE 24VDC
- PRODUCT LINE
- ITEMS NOT SUPPLIED BY GEA WESTFALIA
- WIRE TO MAIN CONTROL PANEL
- INSTRUMENT AIR INLET 100 PSI (CLEAN/DRY)
- WIRE TO MOTOR CONTROL CENTER
- USE AS INDICATOR ONLY
- REFERS TO MAIN CONTROL PANEL TERMINAL BLOCK, NEUTRAL & GROUND NOT SHOWN

- FILTER
- FAN WITH MOTOR
- LIQUID RING COMPRESSOR
- COMPRESSOR VACUUM PUMP
- ECCENTRIC SCREW PUMP
- LIQUID PUMP, GENERAL
- DIAPHRAGM PUMP
- JET PUMP
- ROTARY PISTON PUMP
- SCREW PUMP
- GEAR PUMP
- POSITIVE DISPLACEMENT PUMP, GENERAL
- RECIPROCATING PISTON PUMP
- STEAM HEATER
- PLATE HEAT EXCHANGER
- HEAT EXCHANGER POSITIVE DISPLACEMENT PUMP, GENERAL
- MIXER
- SIEVE
- CENTRIFUGAL PUMP
- EXPANSION JOINT

- ANALYTICAL ELEMENT
- ANALYTICAL INSTRUMENT CONTROLLER
- ANALYTICAL INSTRUMENT TRANSMITTER
- DENSITY INDICATOR CONTROLLER
- VOLTAGE ALARM HIGH
- VOLTAGE INDICATOR
- VOLTAGE SWITCH HIGH
- FLOW ALARM HIGH
- FLOW ALARM LOW
- FLOW CONTROLLER
- FLOW ELEMENT
- FLOW INDICATOR
- FLOW INDICATOR CONTROLLER
- FLOW INDICATOR TRANSMITTER
- FLOWMETER
- FLOW ORIFICE
- FLOW QUANTITY ELEMENT
- FLOW QUANTITY TRANSMITTER
- FLOW SWITCH LOW
- FLOW TRANSMITTER
- FLOW INDICATOR ALARM LOW
- CURRENT ALARM HIGH
- CURRENT INDICATOR
- TIME INDICATOR
- TIME RECORDER
- HOUR COUNTER
- LEVEL ALARM HIGH
- LEVEL ALARM LOW
- LEVEL INDICATOR
- LEVEL SWITCH
- LEVEL SWITCH HIGH
- LEVEL SWITCH LOW
- LEVEL INDICATOR TRANSMITTER
- LEVEL TRANSMITTER
- MOTOR
- PRESSURE ALARM LOW
- PRESSURE DIFFERENTIAL INDICATOR

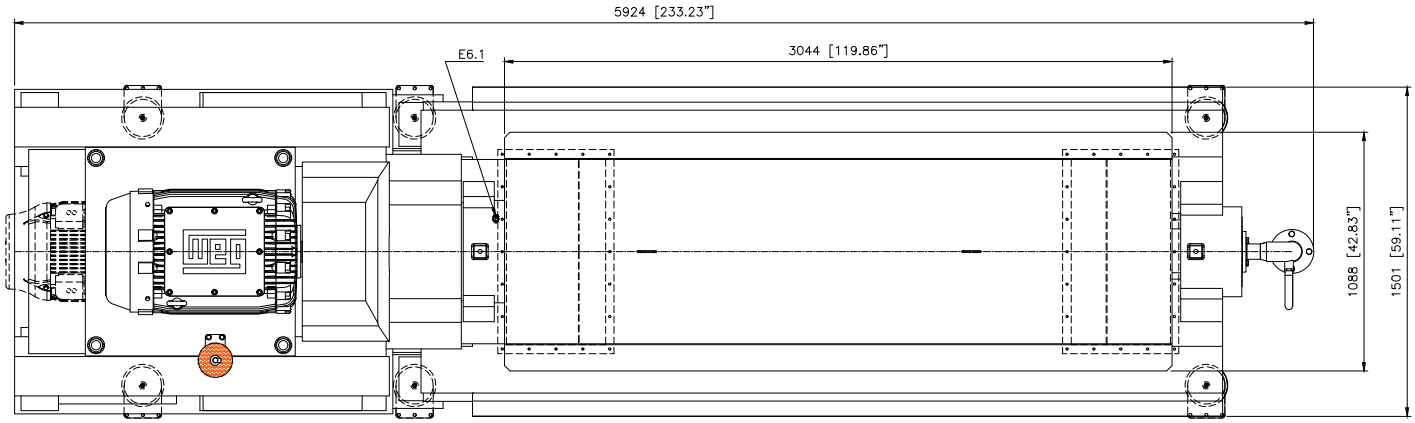
- PRESSURE DIFFERENTIAL SWITCH
- PRESSURE INDICATOR
- PRESSURE INDICATOR CONTROLLER
- PRESSURE INDICATOR TRANSMITTER
- PROGRAMMABLE LOGIC CONTROLLER
- PRESSURE SWITCH
- PRESSURE SWITCH HIGH
- PRESSURE SWITCH LOW
- PRESSURE TRANSMITTER
- CURRENT/PRESS. TRANSDUCER (I/P)
- SPEED FREQUENCY CONTROLLER
- SPEED FREQUENCY ELEMENT
- SPEED INDICATOR
- SPEED INDICATOR ALARM LOW
- SPEED FREQUENCY FINAL ELEMENT
- SPEED SENSOR ALARM LOW
- SPEED SENSOR HIGH HIGH
- SPEED SENSOR HIGH LOW
- TEMPERATURE ALARM HIGH HIGH
- TEMPERATURE ALARM HIGH
- TEMPERATURE ALARM LOW
- TEMPERATURE ELEMENT
- TEMPERATURE INDICATOR
- TEMPERATURE SWITCH HIGH
- TEMPERATURE TRANSMITTER
- VIBRATION ALARM HIGH
- VIBRATION ALARM HIGH HIGH
- VIBRATION ELEMENT
- VIBRATION SWITCH HIGH HIGH
- POSITION INDICATOR
- POSITION SWITCH 'OPEN'
- POSITION SWITCH 'CLOSE'
- LOCAL PANEL MTD
- LOCAL PANEL MTD (BEHIND)
- PLC-FIELD MOUNTED
- MOTOR HEATER INTERLOCK (PLC)
- PLC PANEL HMI

- 3-WAY DIVERT VALVE N.C. WITH SOLENOID
- AIR ACTUATED N.O. 4-WAY DIVERT VALVE
- AIR ACTUATED N.C. 4-WAY DIVERT VALVE
- AIR ACTUATED N.C. 2-WAY DIVERT VALVE WITH TRANSDUCER AMPERAGEL PRESSURE
- AIR ACTUATED N.C. 2-WAY SHUT OFF VALVE

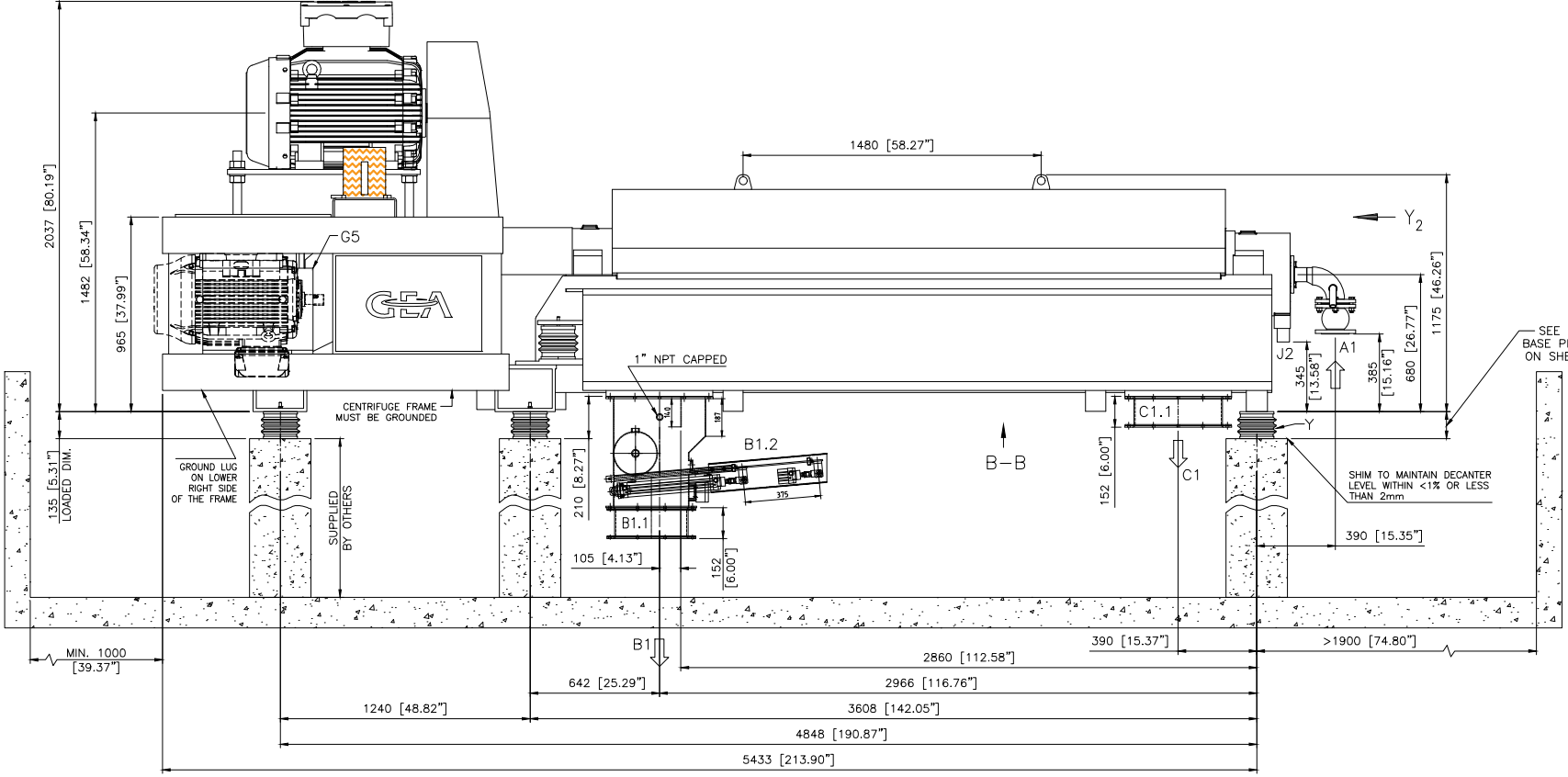
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Checked E.E.: LM	Date: 18/AUG/21			
Checked M.E.: PC	Date: 18/AUG/21	PIPING & INSTRUMENTATION DIAGRAM CF 7000-00-35		
Approved: SBK	Date: 18/AUG/21	Size: D	F.S.C.M. No. 9149-5700-909	Rev. 4
Scale:		M/F:	Sheet: 2 OF 2	

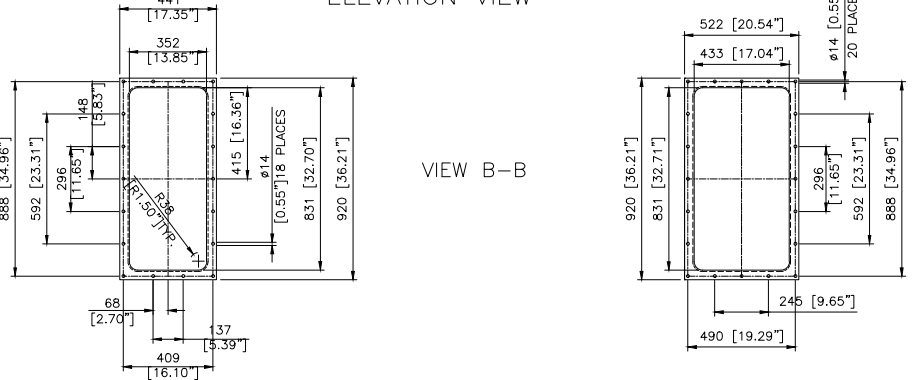
REVISIONS			
No.	DESCRIPTION	DATE	APPROVED
0	RELEASED FOR APPROVAL	18/AUG/21	SBK
1	ADDED DIVERT GATE	04/OCT/21	PC



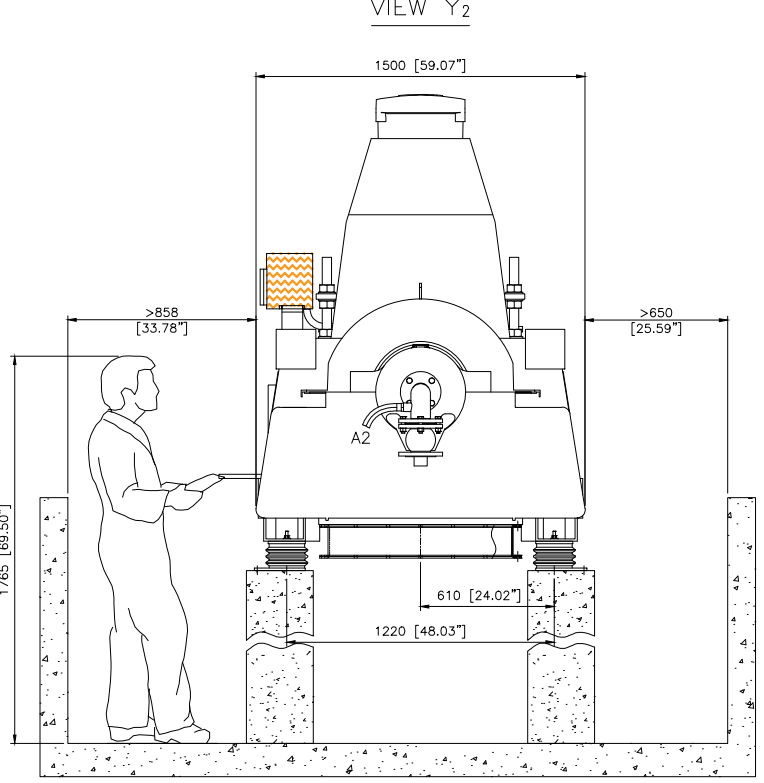
PLAN VIEW



ELEVATION VIEW



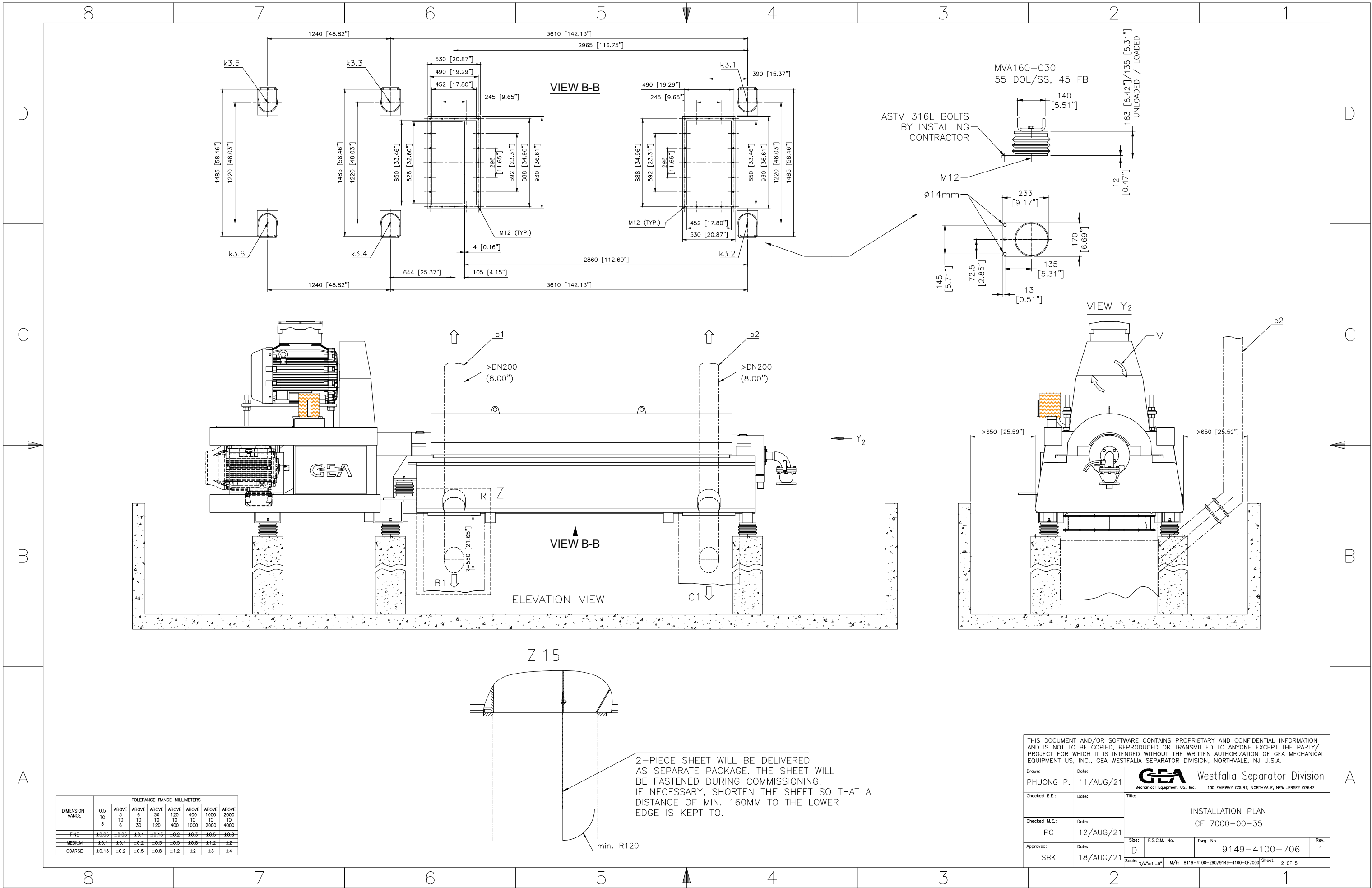
VIEW B-B



RIGHT VIEW

DIMENSION RANGE	TOLERANCE RANGE MILLIMETERS							
	0.5 TO 3	ABOVE 3 TO 6	ABOVE 6 TO 30	ABOVE 30 TO 120	ABOVE 120 TO 400	ABOVE 400 TO 1000	ABOVE 1000 TO 2000	ABOVE 2000 TO 4000
FINE	±0.05	±0.05	±0.1	±0.15	±0.2	±0.3	±0.5	±0.8
MEDIUM	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
COARSE	±0.15	±0.2	±0.5	±0.8	±1.2	±2	±3	±4

2652395848	987533	TAUNTON WASTEWATER TAUNTON, MA	DEWATERING MIXED WAS	CF 7000	2
WESTFALIA NUMBER	CUSTOMER NUMBER	CUSTOMER	END USE	MACHINE	QTY
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PC	12/AUG/21	D		9149-4100-706	1
Approved:	Date:	Scale:	M/F:	Sheet:	
SBK	18/AUG/21	3/4"=1'-0"	8419-4100-290/9146-4100-C7000	1 OF 5	

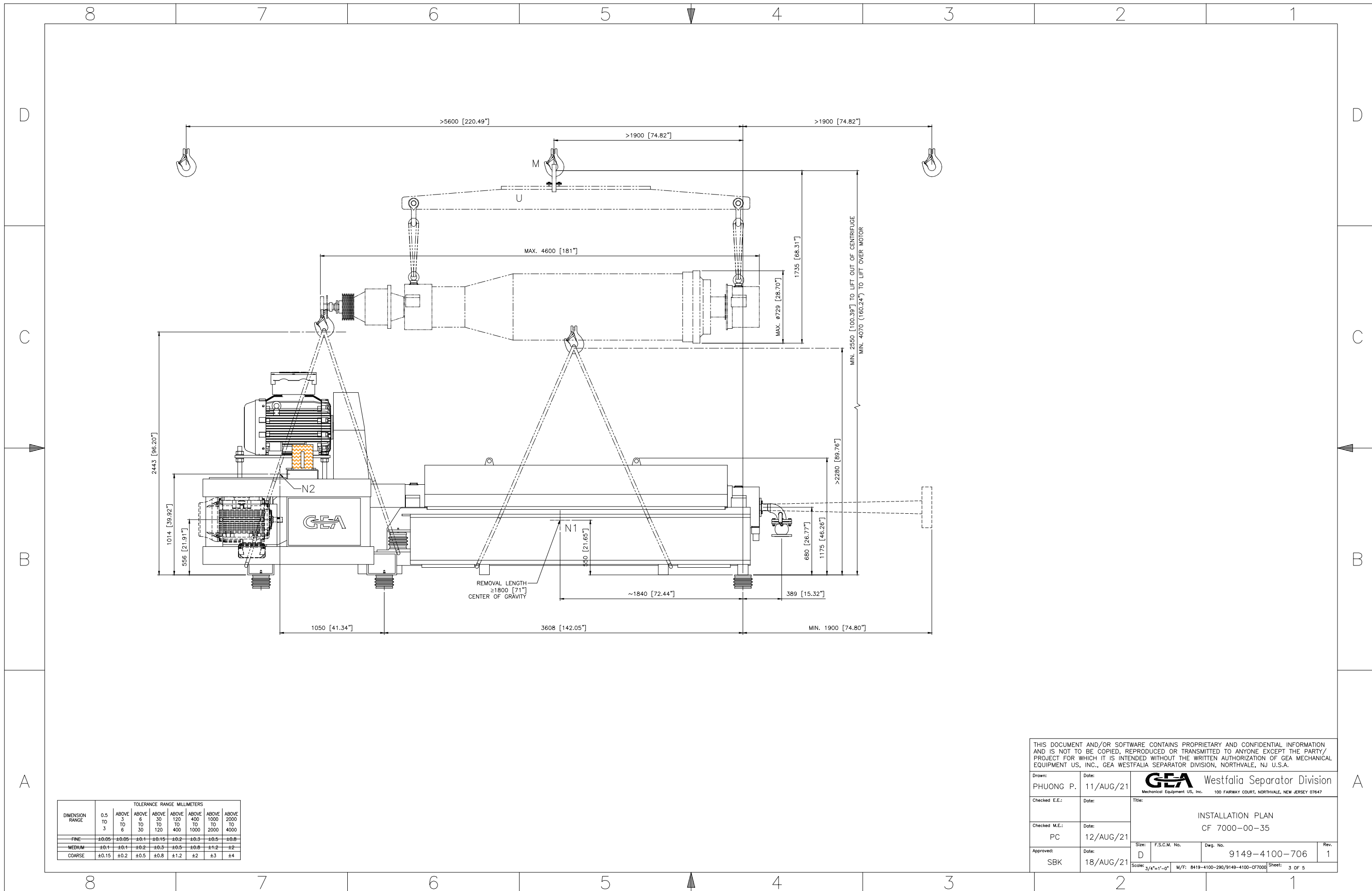


DIMENSION RANGE	TOLERANCE RANGE MILLIMETERS							
	0.5 TO 3	ABOVE 3 TO 6	ABOVE 6 TO 30	ABOVE 30 TO 120	ABOVE 120 TO 400	ABOVE 400 TO 1000	ABOVE 1000 TO 2000	ABOVE 2000 TO 4000
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MEDIUM	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
COARSE	±0.15	±0.2	±0.5	±0.8	±1.2	±2	±3	±4

2-PIECE SHEET WILL BE DELIVERED AS SEPARATE PACKAGE. THE SHEET WILL BE FASTENED DURING COMMISSIONING. IF NECESSARY, SHORTEN THE SHEET SO THAT A DISTANCE OF MIN. 160MM TO THE LOWER EDGE IS KEPT TO.

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PHUONG P.	11/AUG/21	
Checked E.E.:	Date:	Title: INSTALLATION PLAN CF 7000-00-35
Checked M.E.:	Date:	
PC	12/AUG/21	Size: F.S.C.M. No. Deg. No. Rev.
Approved:	Date:	D 9149-4100-706 1
SBK	18/AUG/21	Scale: 3/4"=1'-0" M/F: 8419-4100-290/9149-4100-CF7000 Sheet: 2 OF 5



DIMENSION RANGE	TOLERANCE RANGE MILLIMETERS							
	0.5 TO 3	ABOVE 3 TO 6	ABOVE 6 TO 30	ABOVE 30 TO 120	ABOVE 120 TO 400	ABOVE 400 TO 1000	ABOVE 1000 TO 2000	ABOVE 2000 TO 4000
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Checked M.E.:	Date: 12/AUG/21	Size: D <small>Scale: 3/4"=1'-0"</small>	F.S.C.M. No. 9149-4100-706 Deg. No. 1 <small>M/F: 8419-4100-290/9149-4100-CF7000</small>
Approved: SBK	Date: 18/AUG/21	Sheet: 3 OF 5	

NOTES AND HINTS FOR PLANNING THE INSTALLATION OF DECANTERS

THE FOLLOWING DOCUMENTATION HAS TO BE REFERRED TO:

- MACHINE DESCRIPTION AND OPERATION PRINCIPLES
- DESCRIPTION AND OPERATING PRINCIPLES OF SUPPLEMENTARY EQUIPMENT
- TERMINAL PLAN AND WIRING DIAGRAM FOR THE ELECTRICAL INSTALLATION

THE FOLLOWING REQUIREMENTS ARE MADE ON THE FEED AND DISCHARGE LINES AND SOLIDS DISCHARGE:

- FLEXIBLE TO AVOID THE TRANSMISSION OF VIBRATIONS
- CLOSED TO REDUCE NOISE DEVELOPMENT
- VALVES AND PUMPS MUST BE ADAPTED TO THE PRODUCT
- PROTECTED DEVICES ACCORDING TO EN 294 MUST AFFORD THE FOLLOWING PROTECTION:
 - CONTACT WITH THE ROTATING BOWL MUST BE EXCLUDED
 - OPERATING PERSONNEL MUST NOT BE ENDANGERED BY DISCHARGED PRODUCT. DANGERZONES MUST BE MADE INACCESSIBLE.
- THE FEED:
 - MUST HAVE A SHUT-OFF DEVICE SO AS TO BE ABLE TO INTERRUPT THE PRODUCT SUPPLY IN CASE OF OPERATING MALFUNCTIONS,
 - SHOULD ENABLE UNIFORM PRODUCT SUPPLY WITH A CONSTANT SOLIDS CONTENT
- DESIGN THE SOLIDS DISCHARGE TO PREVENT DAMMING
- DO NOT CONSTRICT THE DISCHARGE
- ENSURE ADEQUATE DE-AERATION OF THE SOLIDS CHUTE OR DOWNSTREAM SOLIDS TANK ETC.
- THE SOLIDS DISCHARGE MUST BE PROVIDED WITH A FLOW-DIVERTING DEVICE BECAUSE LIQUID DISCHARGES THROUGH THE SOLIDS OUTLET DURING START-UP, SHUT-DOWN AND FLUSHING.

- A1 : PRODUCT FEED, DN80 (3")
- A2 : POLYMER FEED DN25 (1")
- B1 : SOLIDS DISCHARGE
- B1.1 : SOLIDS DISCHARGE FLEX (9149-2832-123)
- B1.2 : SOLIDS DIVERT GATE (9911-8826-900)
- C1 : LIQUID DISCHARGE (PRESSURELESS)
(GRAVITY DISCHARGE OF CLARIFIED LIQUID)
- C1.1 : LIQUID DISCHARGE FLEX (9149-2832-094)
- G5 : OIL-AIR UNIT, COMPRESSED AIR FOR LUBRICATION, 3/8"
- J2 : LEAKAGE OF FEED TUBE GAP, PIPE Ø60.3 (2.38")
- K3.5/3.6 : DRIVE MOTOR SIDE
- K3.3/3.4 : DRIVE BELT SIDE
- K3.1/3.2 : FEET LIQUID SIDE
- M : ELECTRIC TROLLEY HOIST
MAX. CRANE LIFTING SPEED 10M/MIN.
MIN. LIFTING CAPACITY 4000 KG (8820 LBS) FOR FILLED BOWL (BOWL COMPLETE WITH SCROLL)
- N1 : CENTER OF GRAVITY - FRAME + BOWL + GEARBOX
- N2 : CENTER OF GRAVITY - BELT DRIVE + MOTORS
(FOR MAXIMUM MAIN MOTOR AND GEAR TYPE PGA 417)
- o1 : SOLIDS VENT
- o2 : LIQUIDS VENT
- R : PARTITION PLATE
- V : DIRECTION OF MOTOR ROTATION
- Y : VIBRATION ISOLATORS 135mm COMPRESSED/ 163mm NOT COMPRESSED
- U : LIFTING DEVICE

DEPENDING ON THE INSTALLATION HEIGHT OF THE DECANTER, A WORKING PLATFORM MUST BE INSTALLED FOR ASSEMBLY, OPERATION AND MAINTENANCE. THE LOCALLY VALID REGULATIONS MUST BE OBSERVED.

	WEIGHTS	
	kg	LBS
Centrifuge	6250	13750
Main Motor	670	1447
Gear Box	600	1320
Bowl Filling	825	1815
Total	8345	18398

1. The model CF7000 has 6 legs. For calculation of structural loads, the load is distributed evenly.
2. The loads are reported below the viscodampers
3. The dynamic loads are oscillating at a frequency equal to the bowl speed.
4. The resonance frequency of the entire centrifuge is in the range of 3-8Hz
5. The Bowl Filling is the weight of the product in a full bowl assuming a specific gravity of 1.5
6. A safety factor of 1.2 has been applied to the static load to allow for variations in machine designs and product buildup

WHEN RATING THE SUPPORTING CONSTRUCTION (FOUNDATION), THE LOADS AS SPECIFIED IN THE TABLE BELOW MUST BE TAKEN INTO ACCOUNT. FOR VIBRATORY SUBSTRUCTURES, WE RECOMMEND A RATING IN WHICH THE NATURAL FREQUENCIES OF THE SUBSTRUCTURE ARE AT LEAST 30 % ABOVE THE OPERATING SPEED OF THE DECANTER.

THE NATURAL FREQUENCIES OF THE SUPPORTING CONSTRUCTION AND THOSE OF THE ADJACENT COMPONENTS CONNECTED TO THE CONSTRUCTION MAY NOT BE NEAR TO THE DECANTER OPERATING SPEEDS IN CASE OF LOAD BY THE DECANTER.

SUBJECT TO MODIFICATION.


NOTES:

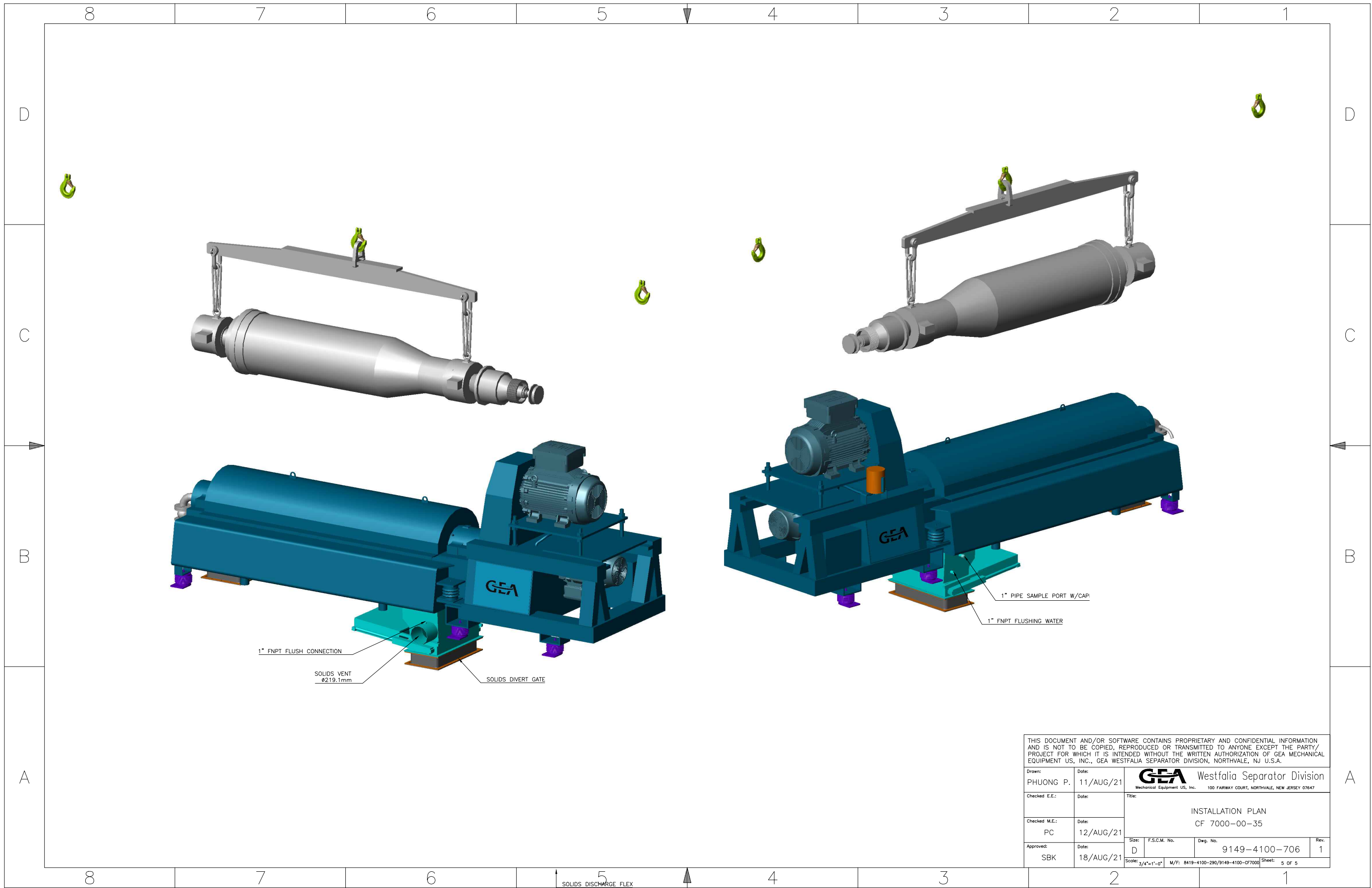
1. ALL CONNECTIONS MUST BE FLEXIBLE
2. FOR PROPER VENTING OF DISCHARGE HOPPERS REFER TO THE INSTALLATION MANUAL-IMPROPER VENTING CAN LEAD TO LEAKAGE PROBLEMS
3. FOR FURTHER INFORMATION PLEASE SEE INSTALLATION MANUAL

TABLE OF CALCULATION THE SUPPORTING FORCES				
RESONANCE FREQUENCY OF ENTIRE DECANTER: VISCO DAMPER 3-8HZ				
	STATIC LOAD F OF ENTIRE DECANTER (N)	MAX. STATIC LOAD (N) (VIBRATION ISOLATOR*)	VERTICAL DYNAMIC LOAD VIBRATION ISOLATOR	
			AT OPERATING SPEED (N)	WHEN CROSSING RESONANCE FREQUENCY (N)
K3.1; K3.2; K3.3 K3.1; K3.2; K3.3	F = M COMPLETE * 12²	16.67% * F	± 0.67% * F	± 1% * F
K3.1; K3.2; K3.3 K3.1; K3.2; K3.3	F = 8345 * 12=100140 N	16.67% * F= 0.1667 * 100140N=16693N	± 0.67% * F= 0.0067 * 100140=671N	1% * F= 0.01 * 100140=1001N

DIMENSION RANGE	TOLERANCE RANGE MILLIMETERS							
	0.5 TO 3	ABOVE 3 TO 6	ABOVE 6 TO 30	ABOVE 30 TO 120	ABOVE 120 TO 400	ABOVE 400 TO 1000	ABOVE 1000 TO 2000	ABOVE 2000 TO 4000
FINE	±0.05	±0.05	±0.1	±0.15	±0.2	±0.3	±0.5	±0.8
MEDIUM	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
COARSE	±0.15	±0.2	±0.5	±0.8	±1.2	±2	±3	±4

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Checked E.E.:	Date:	INSTALLATION PLAN CF 7000-00-35			
Checked M.E.:	Date:				
Approved: SBK	Date: 18/AUG/21	Size: D Scale: 3/4"=1'-0"	F.S.C.M. No. M/F: 8419-4100-290/9149-4100-CF7000	Dwg. No. 9149-4100-706	Rev. 1



1" FNPT FLUSH CONNECTION
 SOLIDS VENT #219.1mm
 SOLIDS DIVERT GATE

1" PIPE SAMPLE PORT W/CAP
 1" FNPT FLUSHING WATER

SOLIDS DISCHARGE FLEX

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The following video includes GEA's recommendations for proper installation of the Centrifuge:

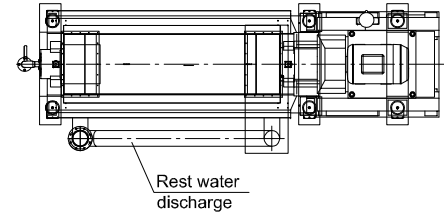
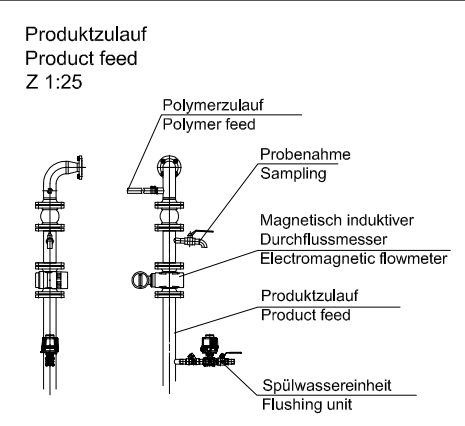
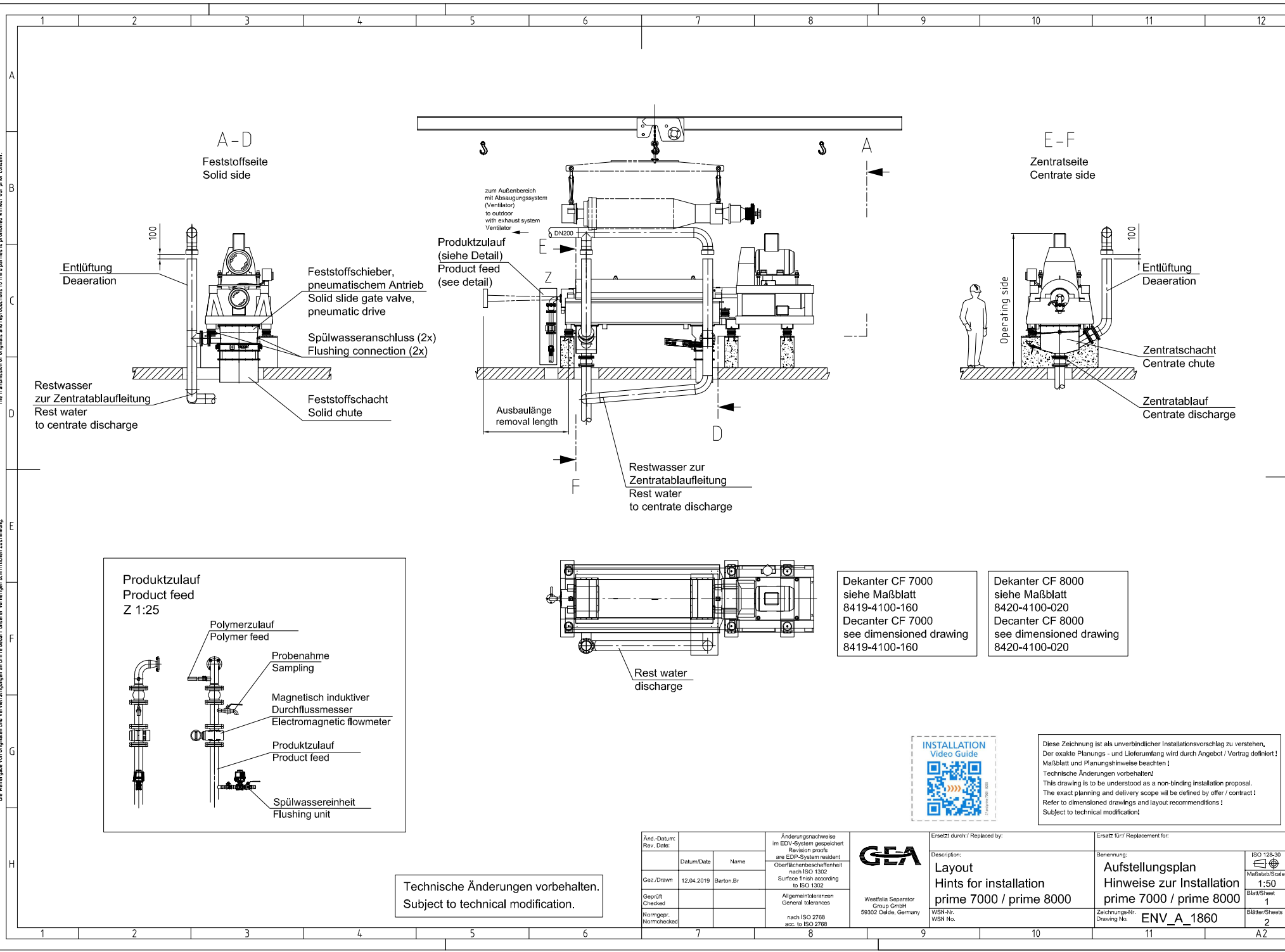
<http://video.gea.com/installation-of-gea-decanter-cf-1>

The following video includes GEA's recommendations for proper installation of the Centrifuge:

[Installation guide for 2-part decanter frames - GEA Videos](#)

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Dekanter CF 7000
siehe Maßblatt
8419-4100-160
Decanter CF 7000
see dimensioned drawing
8419-4100-160

Dekanter CF 8000
siehe Maßblatt
8420-4100-020
Decanter CF 8000
see dimensioned drawing
8420-4100-020



Diese Zeichnung ist als unverbindlicher Installationsvorschlag zu verstehen. Der exakte Planungs- und Lieferumfang wird durch Angebot / Vertrag definiert! Maßblatt und Planungshinweise beachten!
Technische Änderungen vorbehalten!
This drawing is to be understood as a non-binding installation proposal. The exact planning and delivery scope will be defined by offer / contract! Refer to dimensioned drawings and layout recommendations!
Subject to technical modification!

Technische Änderungen vorbehalten.
Subject to technical modification.

Änd.-Datum: Rev. Date: Datum/Date: 12.04.2019 Name: Barton.Br. Gez./Drawn: Geprüft/Checked: Normgepr./Normchecked:	Änderungsnachweise im EDV-System gespeichert Revision profile are EDP-System resident Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302 Allgemeine Toleranzen General tolerances nach ISO 2768 acc. to ISO 2768	 Westfalia Separator Group GmbH 59302 Oelde, Germany	Ersetzt durch/ Replaced by: Description: Layout Hints for installation prime 7000 / prime 8000	Ersetzt für/ Replacement for: Benennung: Aufstellungsplan Hinweise zur Installation prime 7000 / prime 8000	ISO 128-30 Maßstab/Scale 1:50 Blatt/Sheet 1 Blätter/Sheets 2
Zeichnungs-Nr. Drawing No. ENV_A_1860			Zeichnungs-Nr. Drawing No. ENV_A_1860		

Alternative Dekanteraufstellungen

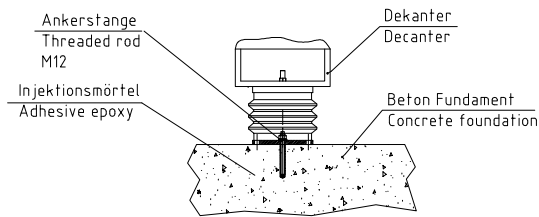
Alternative decanter set-ups

Kundenseitige Dekanteraufstellung auf einem Betonfundament

Decanter set-up by the customer at concrete foundation

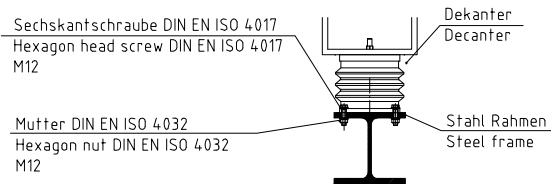
Vorschlag: Aufstellung mittels Ankerstangen
 z.B. Fa. HILTI Typ HIT-V_R (A4-70)
 und Injektionsmörtel Fa. HILTI Typ HIT-RE 500SD
 Einzelheiten zur Montage nach Montageanleitung Fa. HILTI

Proposal: Mounting by adhesive and epoxy anchor system HILTI
 For example threaded rods type HIT-V-R (A4-70) and
 adhesive epoxy type HIT-RE-500 SD
 Further information by HILTI



Kundenseitige Dekanteraufstellung auf einem Stahlrahmen

Decanter set-up by the customer at steel frame

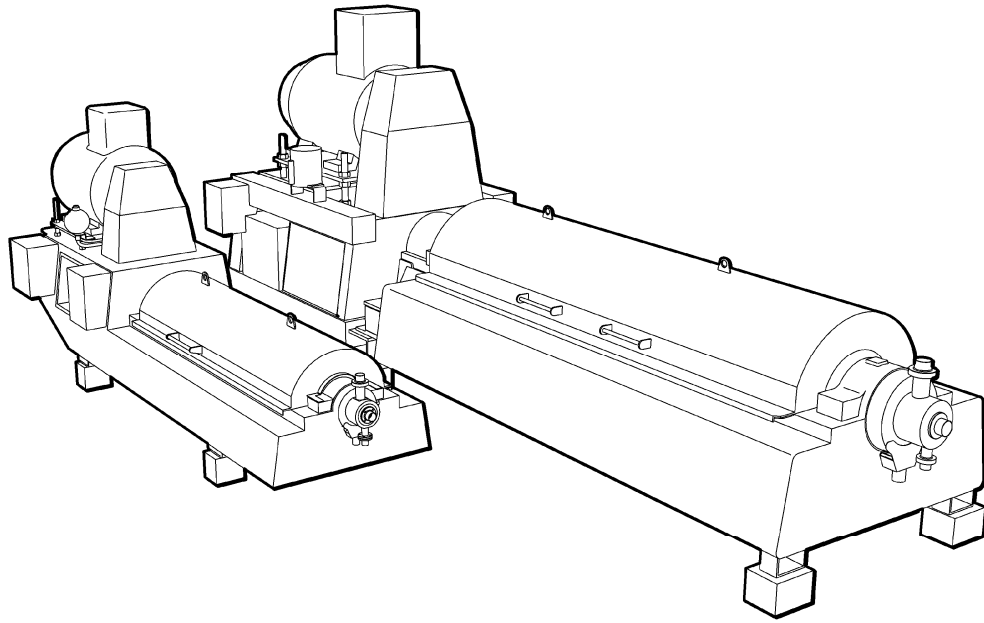


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Planning and installation guidelines

Designation: Decanter

Model: CF 3000 - 8000

No. 8690-9601-000
Edition 14.10.2019

ORIGINAL INSTRUCTION MANUAL
Contents subject to modification!

The authors are always grateful for remarks and suggestions for improving the documentation. These can be sent to:

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1 Transport and storage

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1.1 Safety during transport

When the centrifuge is transported with hoists and fork-lift trucks, hazards can occur. Risk of injury and material damage are a threat when unsuitable persons are deployed and unsuitable or damaged lifting gear is used.

Therefore, pay attention to the following points during transportation:

- Assign only qualified personnel with the task of transporting the centrifuge.
- Use approved and intact lifting gear and hoists for transportation.
- Use only suitable hoists with adequate lifting capacity.
- If applicable: Arrest the bowl with the aid of the bowl lock screws.
 - The bowl bearings will otherwise get damaged.
- Remove/loosen the coupling of the secondary motor.
 - Otherwise the motor shaft/gear shaft will be damaged.

1.2 Storage instructions for the decanter

Requirements for the storage room

The storage room must meet the following requirements:

- cool, 15 – 25 °C
- dry, approx. 65 % relative humidity (perspiration water formation must be prevented)
- dark (avoid direct sunlight and UV radiation)
- dust-free
- moderately ventilated
- free from aggressive media (e.g. salts, acids, lyes, solvents)

Painted parts

An intact paint coating provides adequate corrosion protection. For this reason, painted parts must be examined for damage or changes once a month.

Touch up the damage in accordance with the instructions of the paint manufacturer.

Unpainted areas and galvanised parts

Unpainted areas and galvanised parts must be treated as follows:

- Carefully clean the area or part.
- Spray-on anti-corrosive wax, see the lubrication and maintenance schedule.
- Check and, when necessary, touch up the corrosion protection once a month.

Gearbox / spare gearbox (oil-lubricated)

The gearbox and spare gearboxes must be prepared as follows for long-term storage.

- Drain lubricating oil completely, see chapter "maintenance / Draining gear oil".
- Fill 0.05 litres of corrosion inhibiting oil, see lubrication and maintenance schedule, close the gearbox.
- Carefully clean the gearboxes.
- Spray-on anti-corrosive wax, see the lubrication and maintenance schedule.
 - Check and, when necessary, touch up the corrosion protection once a month.

For the purpose of transporting the gearbox for inspection by the manufacturer, the gearbox must likewise be prepared as described above.

Drive motors

The drive motors must be prepared as follows for long-term storage.

- Option: Connect the space heaters for the motor winding. This is especially important in the case of high air humidity in the environment.
- Carefully clean the motor.
- Spray-on anti-corrosive wax, see the lubrication and maintenance schedule.
- Check and, when necessary, touch up the corrosion protection once a month.

1.3 Using load-suspension devices safely

The working load limit of the slings depends on the method of use. They may only be used for their intended purpose.

Unintended use may cause the slings to tear. There is risk to the life and limb of persons and of damage to property.

For the reduction of the working load limit in individual cases, see the manufacturer's specifications.

GEA Westfalia Separator recommends the use of round slings made of synthetic fibres.

Observe the points below when using load-suspension devices.

- Inspect slings for damage before each use.
- Do not use damaged or incomplete load-suspension devices and slings.
- Use slings only in the way approved by the manufacturer.
- Never load the slings beyond their maximum working load limit (WLL). The WLL specification is located on the sling label.
- Conduct regular training for slingers and individuals assigned to perform transport work.
- Use only the sling points specified in the documentation.
- Use only suitable fork-lift trucks and hoists with an adequate capacity.
- Pack and secure the load in accordance with the CTU (Cargo Transport Unit) transport guidelines before transporting it.
- Observe all regional regulations and laws governing transport and transport securing.

Lifting accessories for transporting the centrifuge

Ground conveyors and hoisting equipment for transporting the system to the centrifuge must be provided by the operating company.

Hoists (e.g. a crane) suitable for dismantling or installing heavy components must be provided by the operator.

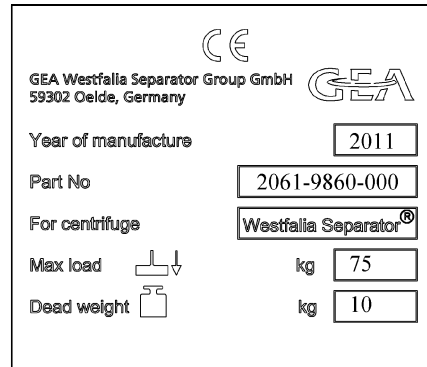
- Hood
- Bowl
- Drive
- etc.

Lifting accessories for repairing the centrifuge

Lifting equipment and slings required for dismantling or installing the bowl or scroll are available in the separate spare parts catalogue "Tools set". The tools set is not included in the standard scope of supply.

Use slings safely and observe the following points:

- Use only slings with a nameplate.



The nameplate on the sling shows the following data:

- CE mark
- Manufacturer
- Year of manufacture
- Part number
- Intended use
- maximum load
- inherent weight

Fig. 1 Example of a nameplate

- Use sling gear only as described in this instruction manual.
- Observe the permitted loading limit.
- Check the sling for visible damage before each use.
- Use only slings in perfect condition.
- Do not carry out repairs to slings.
- Send damaged slings to the manufacturer.
- Always screw in threaded rods as far as they will go.
- Tighten all nuts fully.
- Tighten all bolts fully.
- Do not walk under suspended loads.

1.3.1 Load fastening points for the hoist

The decanter is delivered optionally with lifting devices for the scroll and bowl.

The following table shows the load fastening point dimensions.

Due to the sharp edges at the load fastening points, the direct use of round slings or ropes is **not admissible**.

If the existing crane hook is too large, use a suitable means of fastening (e.g. an adequately dimensioned shackle).

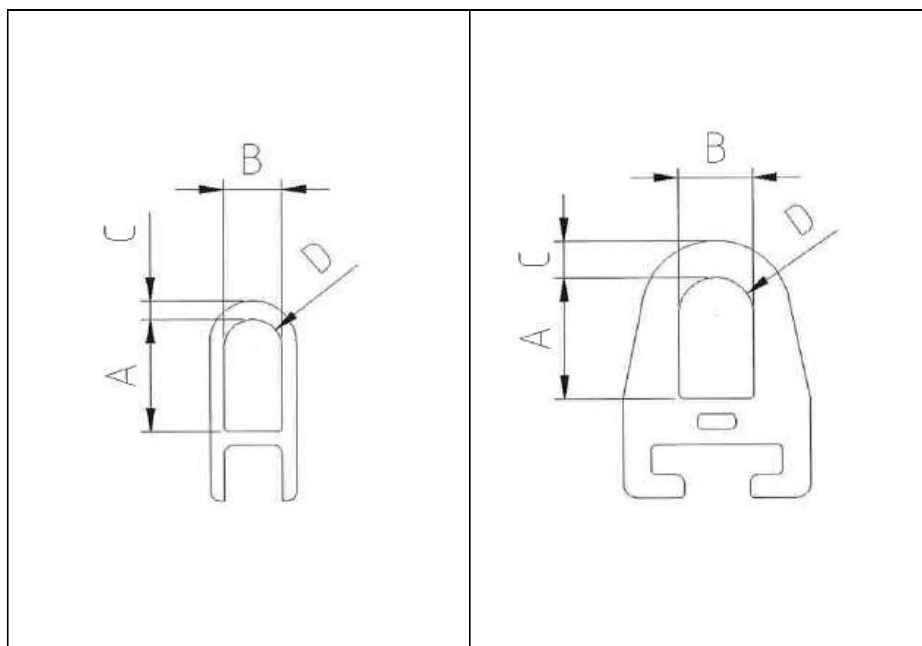


Fig. 2

Fig. 3

Decanter size	Scroll lifting device	Bowl lifting device
3000	Shackle with rope	Shackle with rope
4000 5000	A = 120 B = 60 C = 25 D = 30 T = 20	Shackle with rope
6000 7000	A = 120 B = 60 C = 25 D = 30 T = 20	A = 120 B = 60 C = 40 D = 30 T = 50
8000	A = 130 B = 80 C = 25 D = 40 T = 30	A = 130 B = 80 C = 40 D = 40 T = 60

1.4 Using lifting eye bolts or lifting eye nuts as load handling devices

Incorrect use of lifting eye bolts or lifting eye nuts during transport can lead to serious accidents, e.g. due to overload.



WARNING

Deformed lifting eye bolts or lifting eye nuts due to overload!

Danger to life and limb through falling loads when lifting eye bolts or lifting eye nuts break!

Observe the following points to avoid accidents:

- The pertinent standards and guidelines of the national associations in the country of origin on the operation of load handling devices in lifting mode
- Only trained specialists are authorized to mount lifting eye bolts or lifting eye nuts.

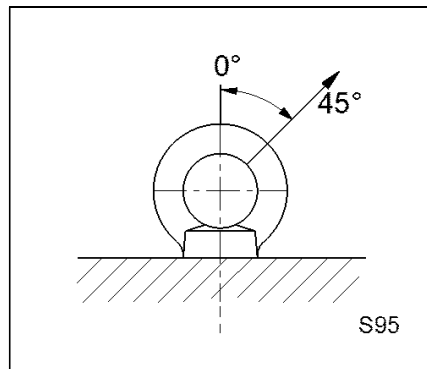


Fig. 4

- Mount lifting eye bolts or lifting eye nuts only as illustrated.
- Screw in lifting eye bolts or lifting eye nuts completely.
- Attach load handling devices as vertically as possible, e.g. chains.
 - Pull max. 45° diagonally.
 - Modes of assembly other than those shown are not admissible, e.g. lateral pull.

2 Assembly and installation

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2.1 Safety during assembly and installation

Pay attention to the following points during assembly and installation:

- Install the centrifuge at the installation site in accordance with the installation diagrams.
- For rating piping, refer to the specifications in the P&ID (Piping and Instrumentation Diagram) in the installation diagram and in the datasheets.
- Connect all feed and discharge lines flexibly to the centrifuge by means of U-shaped conduits or compensators.
 - Loading the pipelines through tensile force is not admissible.
 - All pipe joints are rated without taking into consideration tensile forces.
- Do not fit a shut-off device in the frame drain or connect it with closed piping.

Exception	A shut-off device is required to prevent harmful gases from escaping during maintenance work.
Required measure	Take appropriate action to ensure that the centrifuge only starts when such shut-off devices are completely open.

Fastening material

Unsuitable fastening material endangers the statics and operating safety of the centrifuge. This can lead to damage to the centrifuge.

- Use the specified fastening means. They are rated for machine frame and foundation.

2.2 Required documents for planning the installation

Careful planning of the installation is crucial in terms of service life, safety and operating readiness of the centrifuge.

The following documents are required:

- Order-specific dimensioned drawing
- Order-specific P&ID (Piping and Instrumentation Diagram)
- Order-specific equipment list
- Terminal and circuit diagram
- Decanter instruction manual
- Additional manuals (if applicable), e.g. for oil+air lubrication of the bowl bearings

2.3 Environmental requirements

Favourable ambient conditions are:

- The decanter is standing in a closed hall.
- The decanter is free-standing and well ventilated.
- The decanter has low dust exposure. The standard values in industrial environments are not exceeded.
- Uniform ambient temperatures prevail between min. 5 °C and max. 40 °C.

In the following cases GEA Westfalia Separator must be contacted for more precise clarification of the optimum installation.

Unfavourable ambient conditions are:

- The decanter is standing outdoors.
 - The decanter must be pre-heated to a temperature of +5 °C if there is a risk of frost.
- The decanter is installed at a poorly ventilated site. Bearings and gears are subjected to thermal strain.
- The decanter is exposed to large differences in temperature. Condensate water impairs lubrication of the bowl bearings.

NOTICE

Inadmissible ambient conditions are:

- Corrosive vapours or fumes damage the decanter.
 - In such cases, it is absolutely necessary to provide suction.
- Disturbing external vibrations.
 - Avoid disturbing external vibrations since they can endanger the operating safety of the decanter.
- Ambient temperatures below 5 °C prevail.
- Ambient temperatures above 40 °C are prevailing.

2.4 Allow for sufficient space for maintenance work.

When planning the installation of the centrifuge, ensure that the centrifuge is easily accessible from all sides.

Keep to the minimum clearances from walls of buildings or other machines so that the following points are assured.

- All machine parts must be readily accessible for maintenance and repair work.
- Sufficient space must be available for setting down large machine parts safely.
 - Protective hoods
 - Bowl
 - Drive motors

2.5 Requirements to be met by the load suspension devices

- Hoists and cranes must be adequately dimensioned for the weights of the machine components. Refer to the order-specific dimensioned drawing.
- A crane must be able to travel in two axes.
- If a monorail crane is used, there are two possibilities:
 - The crane runs in the rotor axis, refer to the order-related dimensioned drawing (preferred direction).
 - The crane runs at right angles to the rotor axis at the height of the centre of gravity of the rotor. (For the centre of gravity of the rotor, refer to the dimensioned drawing. This is useful only in exceptional cases, as the centre of gravity of the rotor may be displaced by adhering solids.)

2.6 Demands on the configuration of the installation

- Configure the installation so that backflows of product or utilities cannot occur.
- Ensure uniform feed rates. Recommendation: Mono pump
- Ensure uniform feed concentration. Recommendation: Agitator

2.7 Requirements to be met by feed and discharge lines

- Valves and pumps must be adapted to the product.
- Do not connect feed and discharge lines firmly to the centrifuge. Provide flexible connections.
- Contact with the rotating bowl must be excluded.
- Operating personnel must not be endangered by discharged product. Danger zones must be made inaccessible.
- The feed must be provided with a shut-off device so as to be able to interrupt the product supply in case of operating malfunctions.
- The feed system should enable uniform product supply with a constant solids content.

2.7.1 Rating of compensators

Compensators installed in the lines on the centrifuge must meet the following requirements:

Size	Motion absorption [mm]		Adjusting forces [N/mm]	
	axial	lateral	axial	lateral
Up to DN 15	± 6	± 3	50	50
DN 20 to DN 40	± 10	± 5	100	100
DN 50 to DN 100	± 10	± 5	100	200
DN 125 to DN 200	± 15	± 5	200	400

Materials

The material selection must take into consideration the following requirements:

- Corrosion-resistant
- Resistant against product specifications
 - Temperature
 - Acids
 - Lyes
 - Solvents
- Resistant against the specified environmental conditions
- Light-resistant when installed outdoors
- If applicable, suitable for use in the food and/or pharmaceutical sector

Pressure range for the compensators

- In the feed line: PN6
- In the discharge line centripetal pump and paring tube PN16

2.8 Configuration of the liquid chute

Open chute

Liquid chutes adapted optimally to the decanter can be procured from GEA Westfalia Separator.

Take into account the following points when building your own constructions:

- Provide a vent.
- Fit a compensator.
- Protect operating personnel. To do this:
 - Prevent contact with rotating parts.
 - Prevent danger through discharging product.
- Rate conveying equipment (e.g. pumps) to handle the throughput capacity of the decanter. In case of doubt, contact GEA Westfalia Separator.
- Fit a sampling cock (recommendation).

Paring tube

- Provide a vent.
- Fit a compensator.
- Liquid (product) must be discharged into a tank next to the decanter without pressure.
 - Vent the tank.
 - In the case of increased backpressure, the leakage at the paring tube will increase.

Centripetal pump

- Liquid (product) is discharged under pressure.
- Provide a compensator between the connections at the decanter and the discharging pipe.

2.9 Configuration of the solid chute

Solid chutes adapted optimally to the decanter can be procured from GEA Westfalia Separator.

Please take into account the following points when installing your self-made configurations:

- Design the solids discharge to prevent damming. Build-up of product can lead to heavy damage to the decanter. A malfunction in the solids discharge installations or solids bridging can cause build-up of solids in the decanter. If there is a build-up, the decanter must be switched off and the fault must be eliminated. To prevent build-up / switch off the decanter in due time
 - install solids probe.
 - install overflow.
 - plan sufficient volume.
- Ensure adequate venting of the solids chute and downstream solids tank. See also chapter "Assembly and installation/design of the venting system".
- Provide an elastic connection piece (e.g. compensator) when closed discharge is required.
- In the case of open discharge, provide a compensator with elastic connection to the decanter.
- When a closed solid discharge is necessary, e.g. in the case of a gastight design, only a round stainless steel compensator can be used due to the required tightness.
 - This results in a transition between the angular discharge at the housing of the centrifuge to round.
 - Select an adequately large nominal width.
 - Prevent bridging.
- Protect operating personnel. To do this:
 - Prevent contact with rotating parts.
 - Prevent danger through discharging product.
- Rate conveying equipment (e.g. pumps, conveyor belts or solid slides) to handle the throughput capacity of the decanter. In case of doubt, contact GEA Westfalia Separator.
- During start-up, run-down and flushing the decanter, liquid discharges through the solid discharge. A special discharge system must be provided for this. E.g.:
 - Slide gate valve
 - Residual water discharge at trough conveyor
 - etc.

- Install a two-piece metal sheet as an extension - (see sketch).
 - The metal sheet serves to avoid deposits of solids in the frame.
 - Metal sheets are supplied separately with the decanter.
 - If necessary, the sheet metal must be shortened to the extent that the minimum clearances to adjacent components shown below are adhered to (e.g. walls of chutes, trough conveyors).

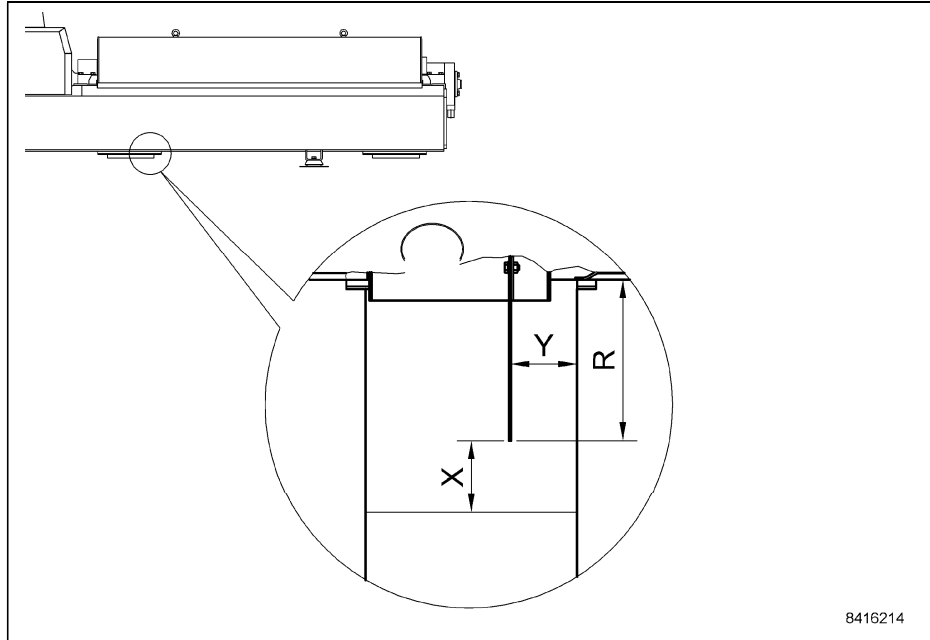


Fig. 5

Decanter size	X	Y	R
3000	min. 95 mm	min. 95 mm	Refer to the order-specific dimension sheet.
4000	min. 120 mm	min. 120 mm	
5000	min. 155 mm	min. 155 mm	
6000	min. 170 mm	min. 170 mm	
7000	min. 120 mm	min. 120 mm	
8000	min. 240 mm	min. 240 mm	

2.10 Seals between frame and discharge chute

(Seals are supplied with the decanter)

Option 1: Decaners with suspended catchers

(only for sizes 3000 to 6000)

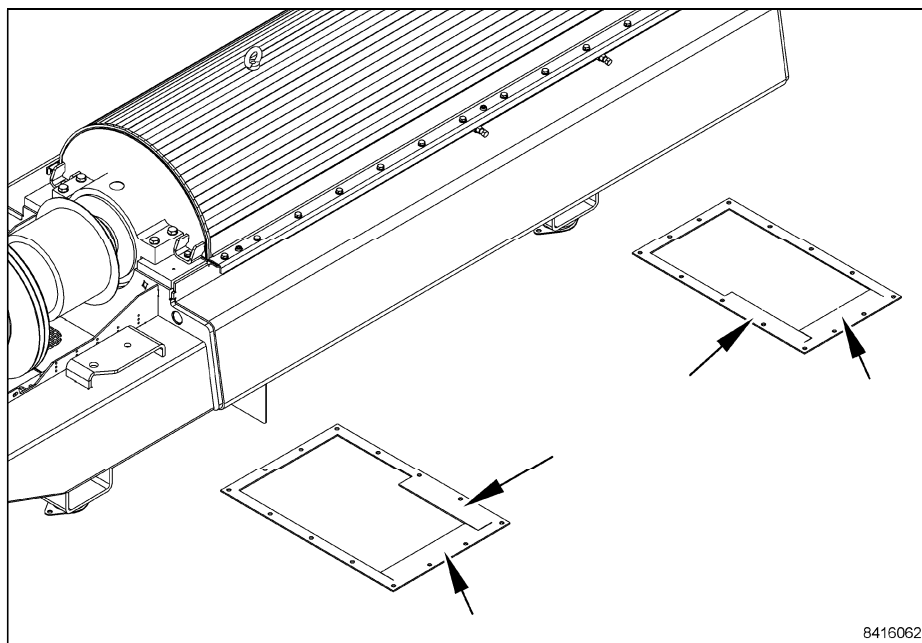


Fig. 6

The seals between the frame and discharge chute are not symmetrical.

IMPORTANT: The wide webs must be located at the marked positions. The shape of the seals influences the air flow in the decanter. Incorrect fitting leads to inadmissible product deposits.

Option 2: Decanter with one-piece catcher
(Sizes 3000 to 8000)

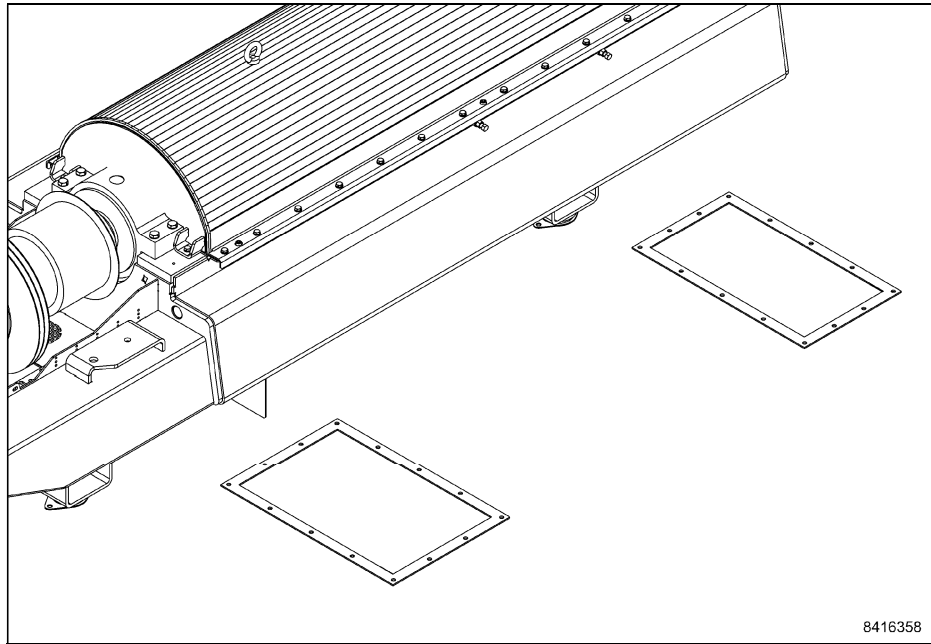


Fig. 7

2.11 Configuration of the vent

The correct venting of the liquid and solid catchers is essential for operating the decanter.

Inadequate venting leads to damage to the decanter (e.g. solid deposits in the housing) or backmixing of the separated phases.

For venting without additional ventilators, the maximum pipe length must not exceed 15 m. The specification applies to smooth tubes with a maximum of two pipe bends. The following table shows the necessary diameters for the vent pipes and the maximum air flows to be expected:

Decanter size		Liquid side	Solids side
3000	Connection	DN100	DN100
	Max. air flow [m ³ /h]	50	100
4000	Connection	DN150	DN150
	Max. air flow [m ³ /h]	150	150
5000	Connection	DN150	DN150
	Max. air flow [m ³ /h]	220	220
6000	Connection	DN150	DN200
	Max. air flow [m ³ /h]	300	300
7000	Connection	DN200	DN200
	Max. air flow [m ³ /h]	400	400
8000	Connection	DN200	DN200
	Max. air flow [m ³ /h]	400	400

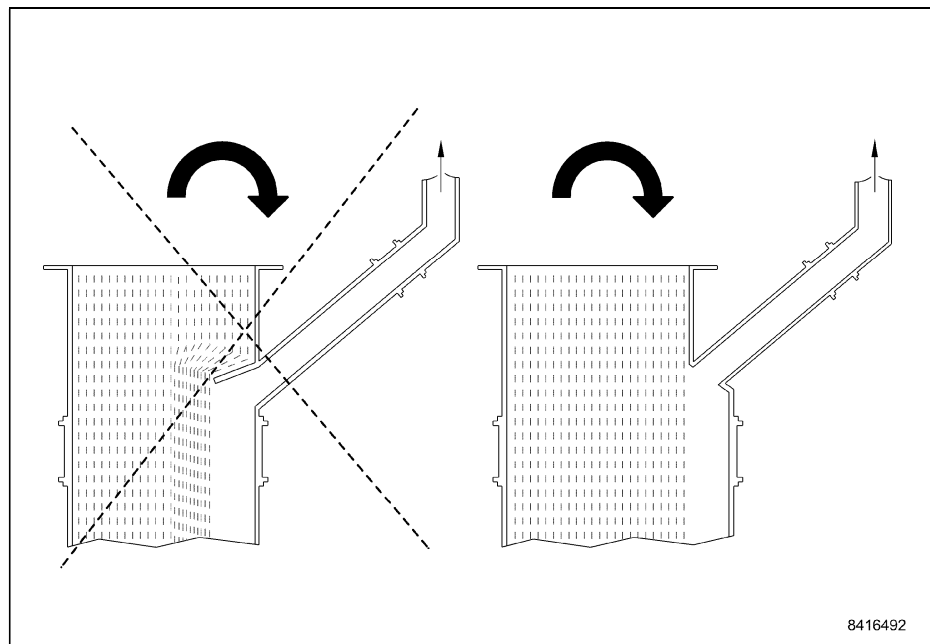


Fig. 8 Direction of rotation of bowl seen from the liquid side.

Please take into account the following points when installing your self-made configurations:

- The vent line must be laid on the right-hand side of the decanter (as seen from the supply side).
 - If this is not done, ejected solids from the rotating bowl may block the vent line.
- The connection point of the vent line must be laid as close as possible to the discharge chute of the decanter.
- The connection point must be laid so that no blockage occurs as a result of deposited or dammed solids.
 - Any connections for discharging blocked product out of the solids chute must be fitted below the vent point.
- Lay the vent line with a constant fall to prevent aerosol residues from the exhaust air from accumulating in the line (trap).
- The air stream in the vent contains solid particles, liquid or vapours. Since they can deposit or condensate in the vent line, we recommend providing inspection ports and cleaning possibilities.
- Vent the solid catcher and liquid catcher separately from one another.
- If several machines have to be vented together, contact GEA Westfalia Separator.
- If a gate valve is fitted in the chute on the solid side, the vent must be located above the gate valve.

IMPORTANT: Designs with centripetal pump must also have a vent fitted below the liquids chute. In doing so, make sure that the pipe supports on the cover also serve as the leakage and hood flushing water drains.

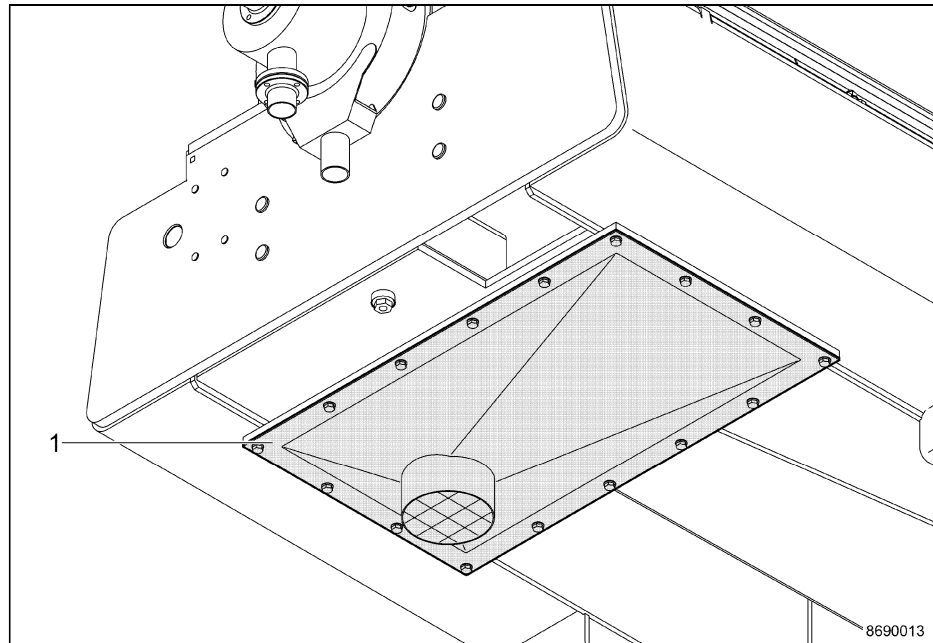


Fig. 9

If two liquid phases are freely discharged, the venting must be carried out as shown in the example below.

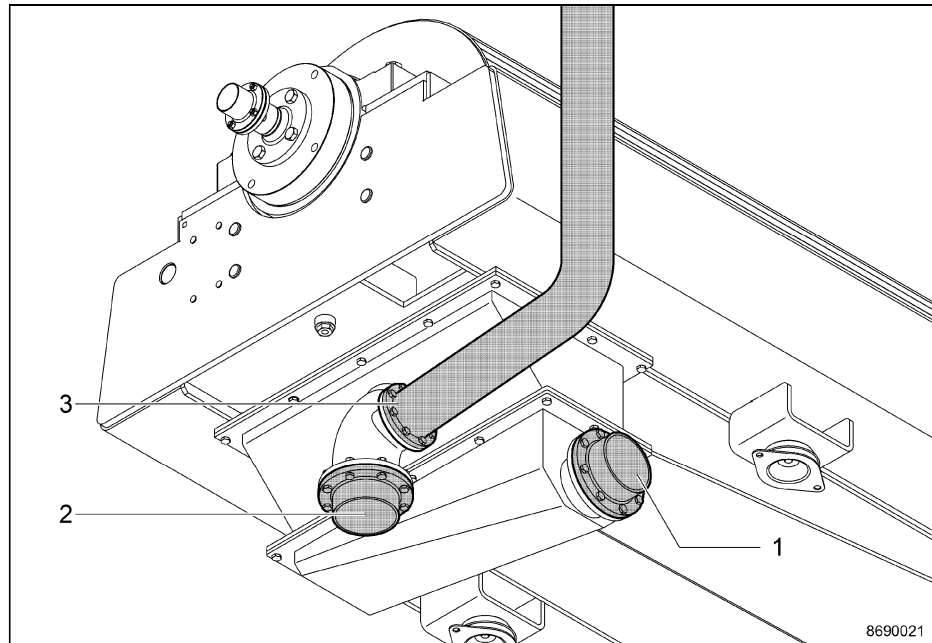


Fig. 10

- Pipe phase (1): no venting
- Regulating ring phase (2): venting required
- Venting pipe (3): not included in the scope of delivery

2.12 Overflow on the liquid side

(does not apply to designs with a rotating feed tube)

After the decanter shuts down, liquid escapes via the feed tube overflow on the liquid side. Up to 20 litres of liquid can escape, depending on the application and the size of the machine. This liquid must be collected and discharged.

In the case of open designs, the overflow can be connected to the chute on the liquid side via a flexible hose.

2.13 Flush connections

Flush connections must be taken into consideration in accordance with the order-specific dimensioned drawing.

The required water pressures and water volumes are specified in the P&ID.

Use only clean flush liquid for the hood flushing. Flush liquid already contaminated (e.g. from the centripetal pump discharge) soils the flush nozzles.

2.14 Hydrohermetic system

The feed pressure as specified in the decanter instruction manual must be adhered to for the hydrohermetic system.

The required pressure range and the required water volumes are specified in the P&ID.

In addition, free draining of the hydrohermetic system water must be ensured so that the water can drain without pressure.

If the hydrohermetic system is not used, the hydrohermetic system disc has to be removed and replaced with a different disc. This ensures that this space can be flushed properly.

2.15 Mechanical seal

Outer cooling: Ensure that cooling water is available, even in case of a power cut. The permitted max. pressure (see machine documentation) must not be exceeded, excessive pressure can lead to damage to the gaskets.

Inner cooling: If a medium is fed via the connection of the outer cooling (flushing liquid, flocculant, washing water for solids washing), the max. pressure (see machine documentation) must not be exceeded. Excessive pressure can lead to damage to the gaskets.

2.16 Compressed air connection

For models in the size range 3000 to 5000 an optional oil-air lubrication is available. The oil-air lubrication is included in the standard scope of delivery for the seize 6000 and larger.

The required air volumes and pressures are specified in the supplementary manual.

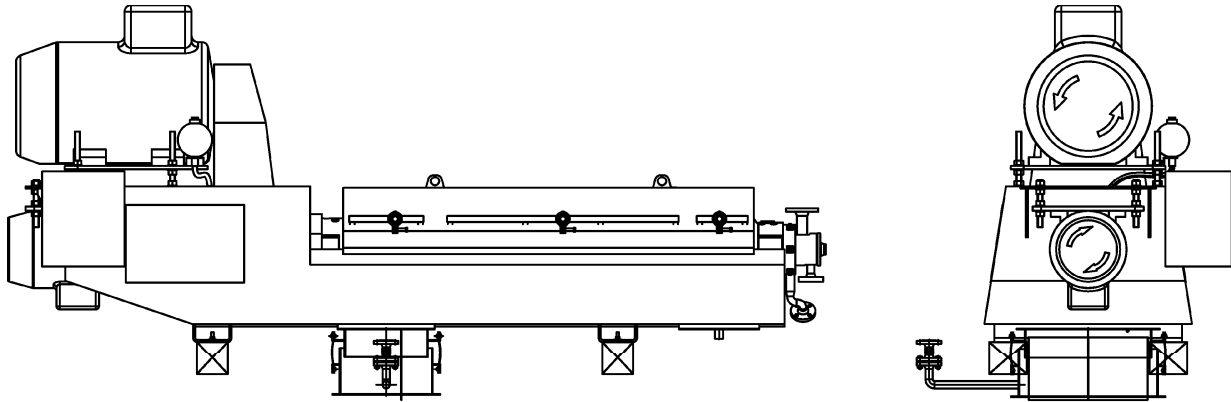
2.17 Inert gas connections

In the case of a decanter with inert gas blanketing, there is no venting of the discharge chutes on the liquid or solid side.

To displace air from the decanter, the latter is purged with inert gas (e.g. nitrogen).

A connection to the ventilation system must be created on the solid chute, or alternatively on the solid tank, for the discharge of the displaced air.

A piping configuration is shown below by way of example. Concrete dimensions are given in the order-specific dimensioned drawing.



8416056

Fig. 11

If an inert gas supply unit is included in the scope of delivery, refer to the corresponding user documentation.

2.18 Special aspects when operating in hot conditions

Steam must not pass through the decanter when it is at standstill. The steam would endanger the maintenance personnel and be an influential factor regarding corrosion in the decanter.

- Shut-off devices in the feed and discharge lines must be installed such that the shut-down decanters can be isolated.
- Vent lines must be planned and installed in such a way that the shut-off devices cannot be bypassed.
- The decanter may only be started when the shut-off devices are open.

2.19 Terminal box positions of the electrical components

The following illustrations show the places on the decanter where auxiliary electrical components (e.g. A vibration absorber) can be wired into the terminal box. The illustrations are a guide for planning the subsequent cable runs from the separate terminal boxes to the control cabinet.

IMPORTANT: Depending on the design and configuration, not all terminal boxes are actually present on the decanter.

Decanter sizes 3000 to 6000

The following table shows examples of the terminal box positions on decanter sizes 3000 to 6000. Actual dimensions can be found on the order-specific dimension sheet.

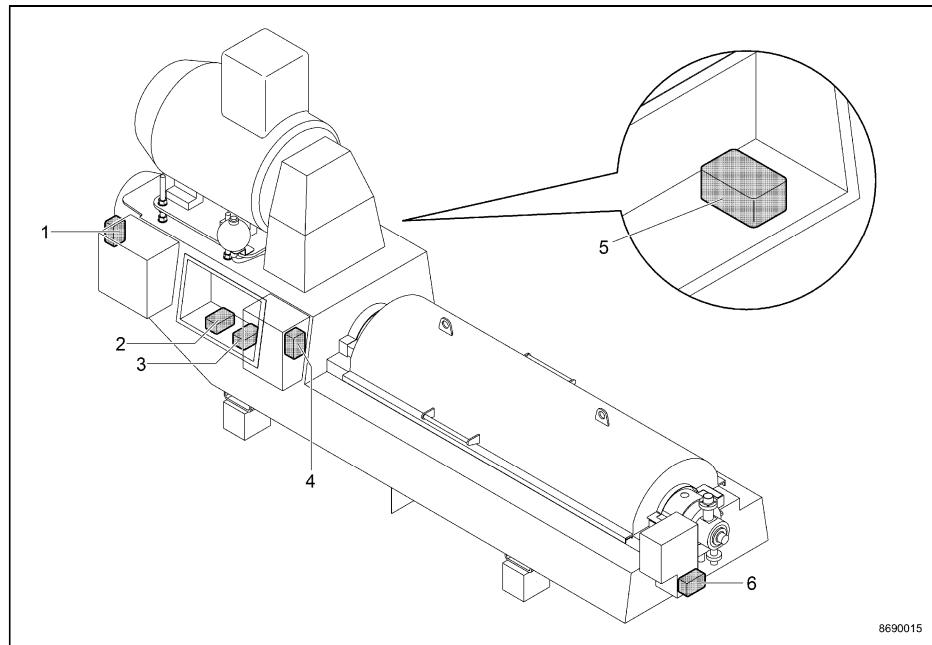


Fig. 12

Decanter sizes 7000 to 8000

The following table shows examples of the terminal box positions on decanter sizes 7000 to 8000. Actual dimensions can be found on the order-specific dimension sheet.

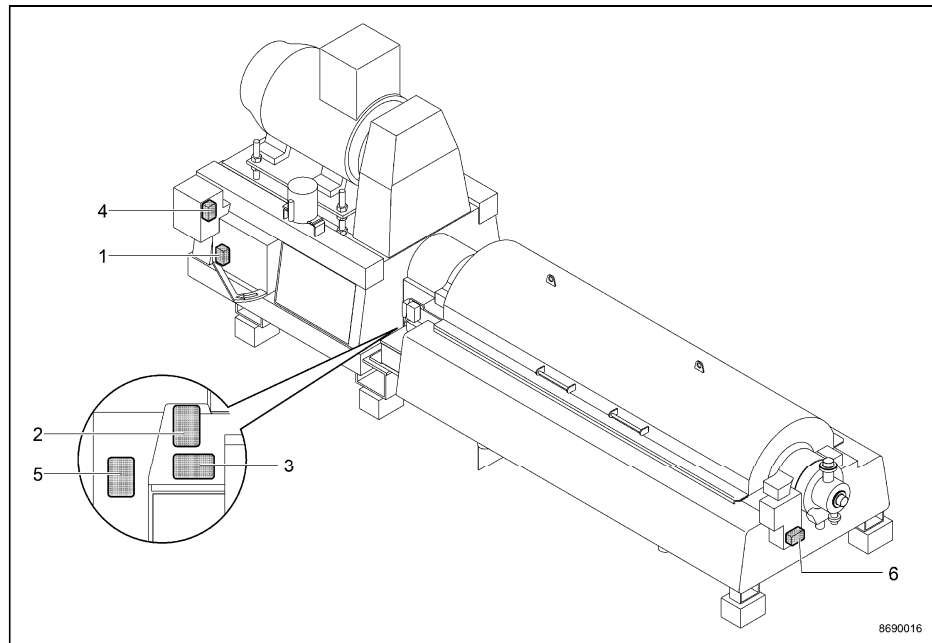


Fig. 13

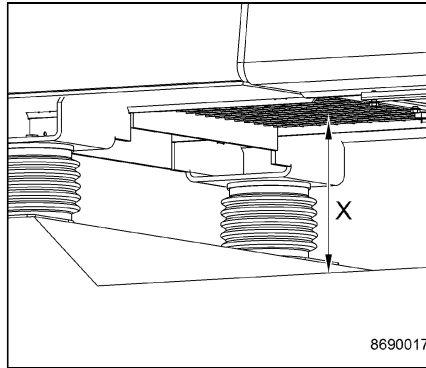
2.19.1 Terminal box designations and their functions

Item	Terminal box designation	Terminal box function
1	X9 (X48)	Terminal box – Oil/air unit complete
2	X7 (X47)	Terminal box – Speed sensor complete
3	X11	Terminal box – Vibration absorber complete
4	X42	Terminal box – Control unit (Varipond P)
5	X41	Terminal box – Temperature monitor complete (drive temperature measurement)
6	X44	Terminal box – Water pressure reducing valve complete (hydrohermetic system)
	X40	Terminal box – Cooling water supply (mechanical seal), Alternative
	X23	Actuator complete (Varipond E) alternative

2.20 Maintain sufficient space for ventilating the gearbox

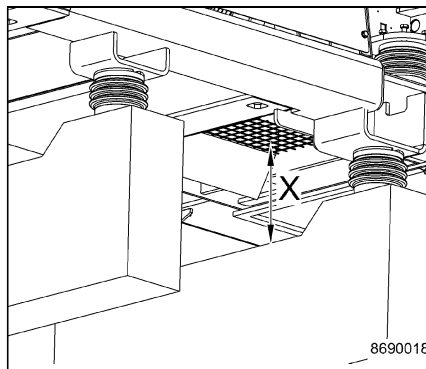
The following points should be considered when designing the foundation for the decanter and before assembly:

Space must be provided in the foundation on the drive side next to the solids chute, so that air can circulate for cooling the gearbox. A minimum clearance of 250 mm (X) must be maintained below the machine in the area of the protective grille.



View of sizes 3000 to 6000

Fig. 14



View of sizes 7000 to 8000

Fig. 15

2.21 Plan space requirements to drain the oil of the drum bearings

To drain the old oil of the drum bearings, the area below the oil drain plugs (1) each next to the solids and liquid discharge must be kept free at a height of at least 250 mm. This space is required for an oil collecting pan and as also to access the oil drain plug.

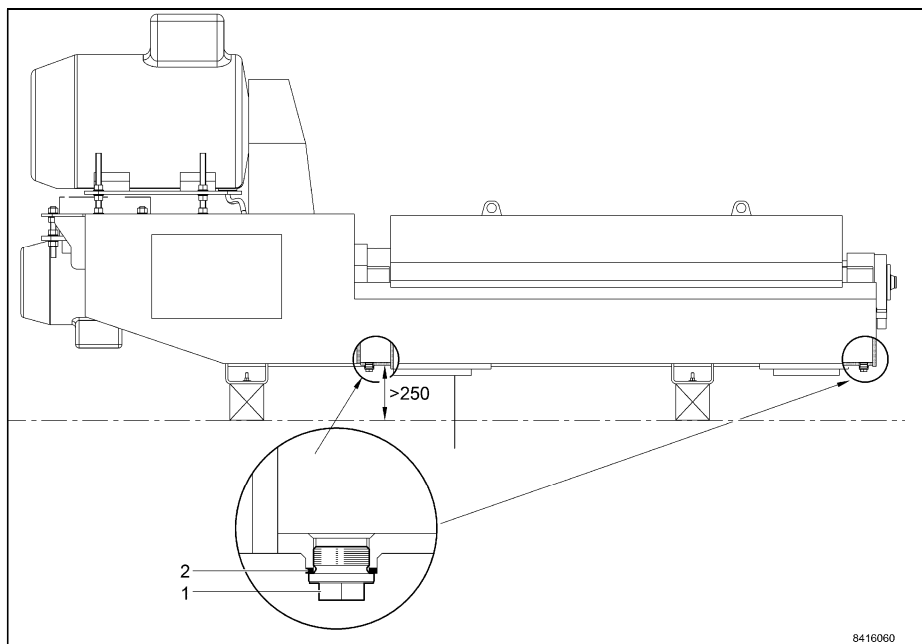


Fig. 16

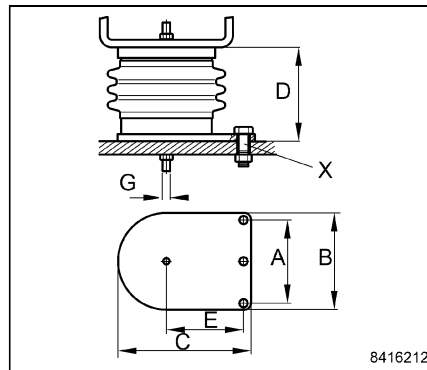
IMPORTANT: Check gasket (2) for damage and replace if necessary.

2.22 Viscosity damper

The viscosity damper can be fastened on the foundation or frame in two different ways.

- Via a centric screw.
This variant is suitable for steel frames.
- Via screws that are located at the side of the damper.
This variant is suitable for concrete foundations.

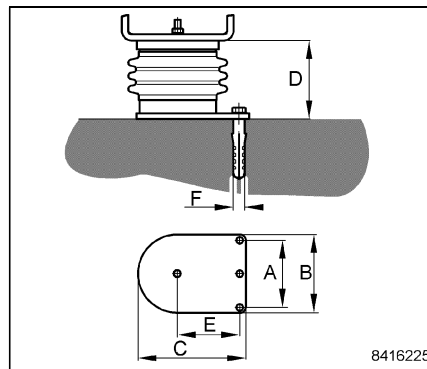
Connecting elements are not included in the supply schedule!



Fastening arrangement on a steel frame.

The lateral holes X can optionally be used.

Fig. 17



Fastening arrangement on a concrete foundation

Fig. 18

Main motor	A	B	C	E	F
depending on the design	The dimensions are given in the separate dimensioned drawing.				

2.23 Planning the frame/foundation

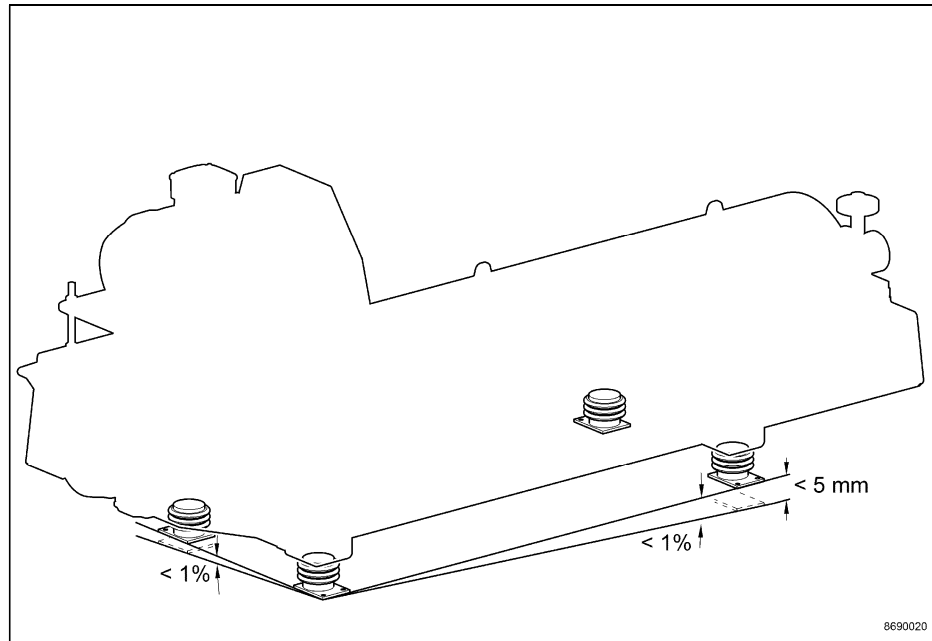


Fig. 19

- Comply with the building regulations of the country of operation.
- The foundation must correspond to the specifications. See load specifications and dimensions in the order-related dimension sheet.
- The foundation must be designed so that no vibrations are transferred from the environment to the centrifuge.
- The supporting points must be of rigid, solid design in the form of a concrete structure or steel structure. Individual points of support must not give way under load.
- The resonant frequency of the frame must be outside the installation frequencies (see order-related dimension sheet for details) of the centrifuge and the operating speed range of the centrifuge. The margin from the first resonant frequency of the lower part of the frame to the maximum operating speed must be at least 30%.
- A centrifuge must be installed as level as possible. The difference in height between the supporting points must be maximum 5 mm. Differences in height must be offset with shims at the supporting points.

2.24 Transporting the decanter

The decanter is checked in its completely assembled state. Depending on its size, the decanter is packed for shipping in one or several crates.

That notwithstanding, sets of tools or replacement and maintenance parts may be delivered in additional crates.

Decanter sizes 3000 and 4000 are delivered in one crate.

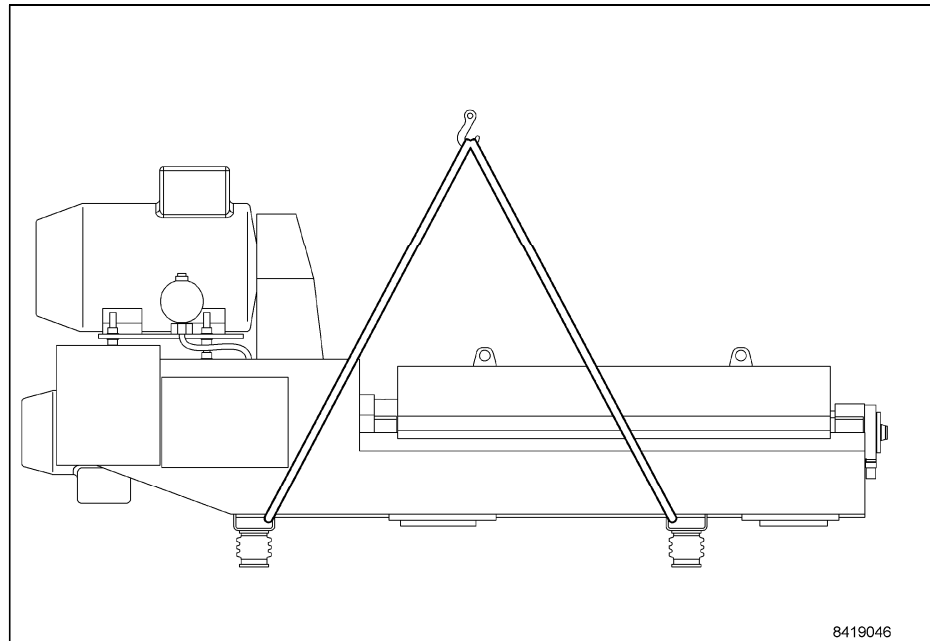


Fig. 20

Decanter sizes 5000 and 6000 are delivered in two crates. Note that the main motor is usually packed separately.

Decanter sizes 7000 and 8000 are packed and delivered in three crates.

- Drive frame with back drive motor (1)
 - The decanter frame with the top part of the catcher and installed bowl including the gearbox (2)
 - Main motor (3)
- Unpack the components in the given order.

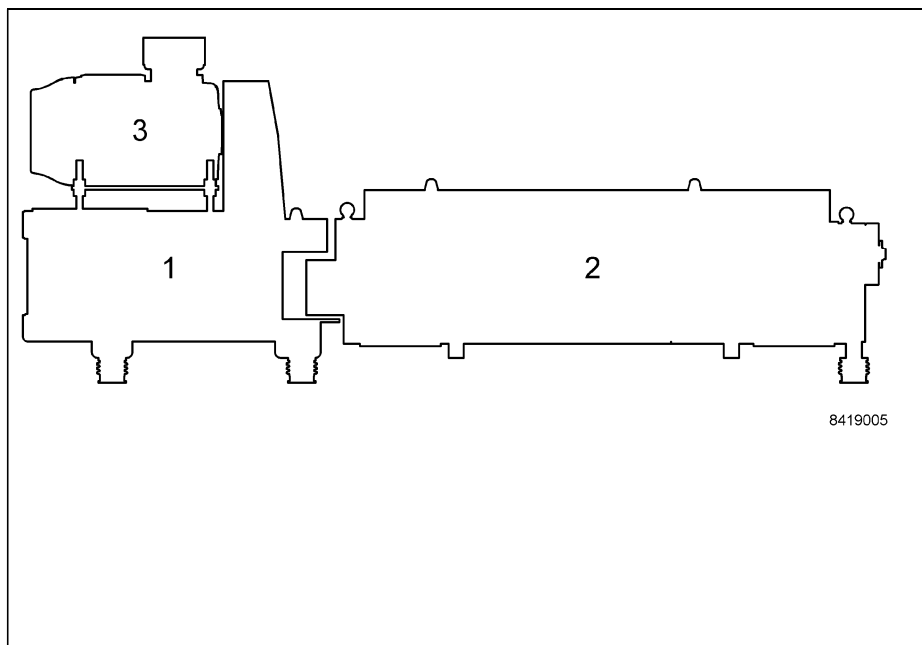


Fig. 21

Attaching hoists for decanters sizes 7000 and 8000

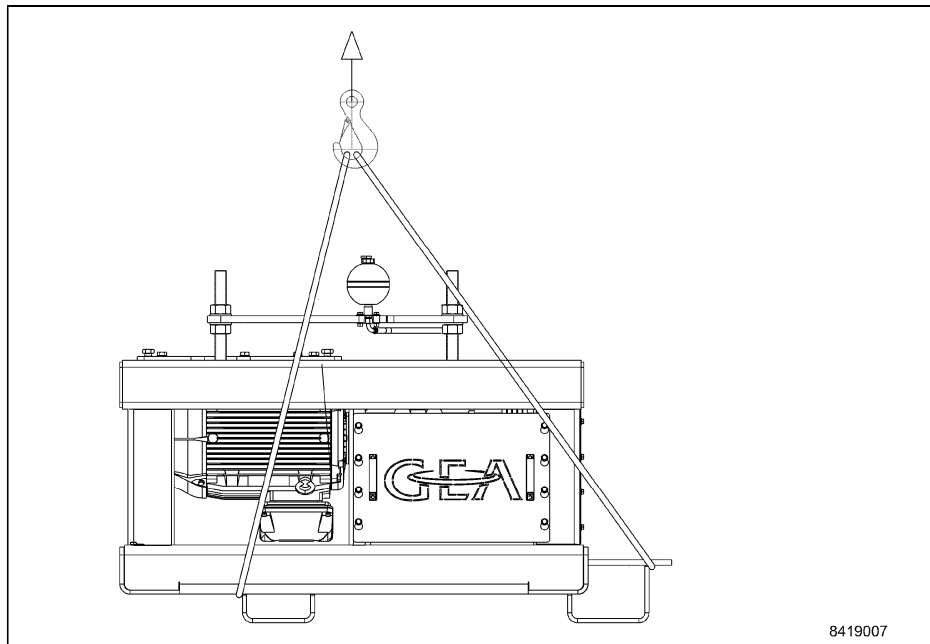


Fig. 22

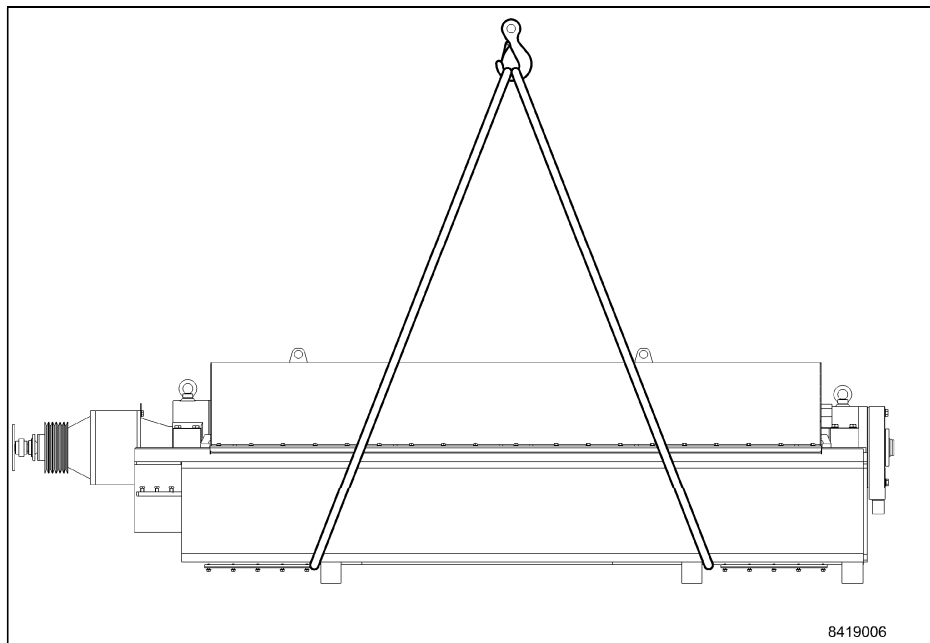
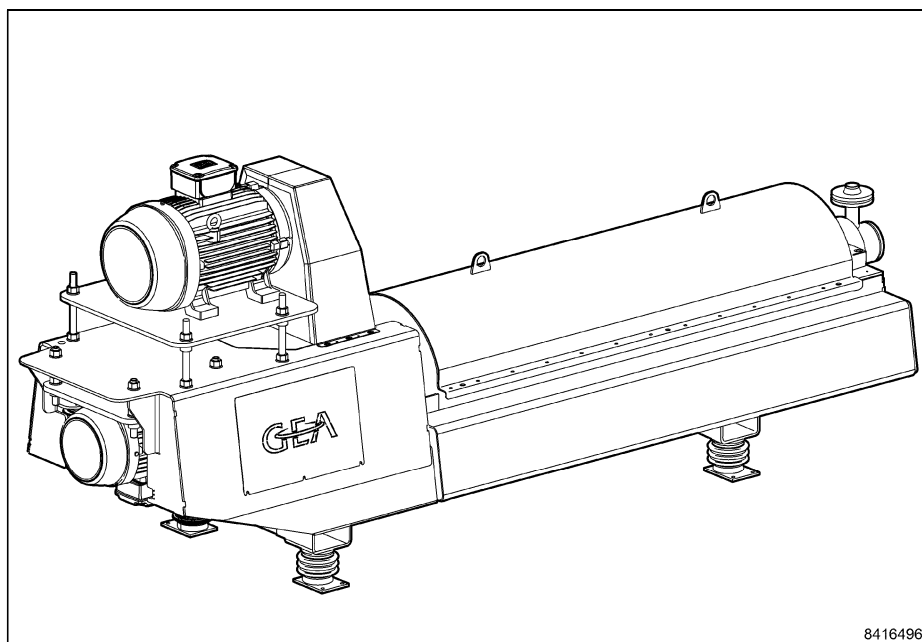


Fig. 23

2.25 Decanter installation and alignment

2.25.1 Installation and alignment of decanter sizes 3000 to 6000

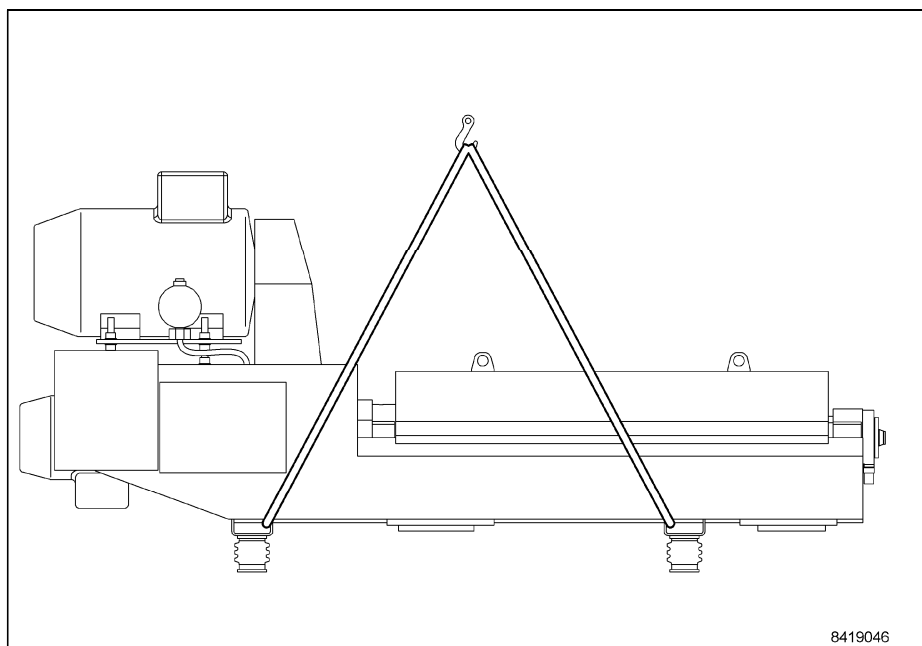
The installation of the small sizes 3000 to 6000 is somewhat different from that of sizes 7000 to 8000.

Decanter sizes 3000 to 6000

8416496

Fig. 24

IMPORTANT: The installation and alignment of the sizes 7000 to 8000 is described in the chapter: "Installation and alignment of series - 7000 to 8000 decanter sizes".



8419046

Fig. 25

- Suspend the decanter from hoist as illustrated (applies to complete decanter including rotor).
 - Required min. load capacity: Refer to the order-specific dimension sheet.
- Set up the decanter on a solid base and level the frame with the aid of a spirit level.
 - Differences in height at the points of support must be offset with shims.
 - See also chapter "Planning frame or foundation".

- Screw the frame feet to the base.
- If necessary, install the main motor, see chapter "Assembly and installation / Installing the main motor" in the decanter instruction manual.

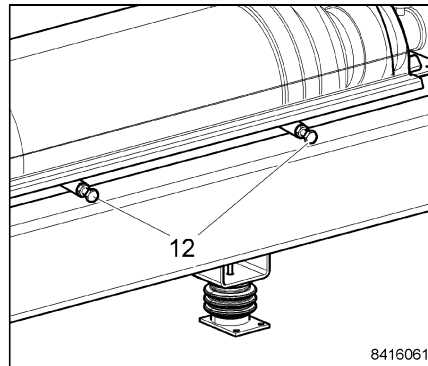


Fig. 26

- Remove the two bowl lock screws (12) and replace them with short screws.
 - The short screws are included in the scope of delivery.

Exception: The bowl lock screws on the bearing housings must be removed and replaced with short screws for the size 6000. Two screws each on the solid side and the liquid side.

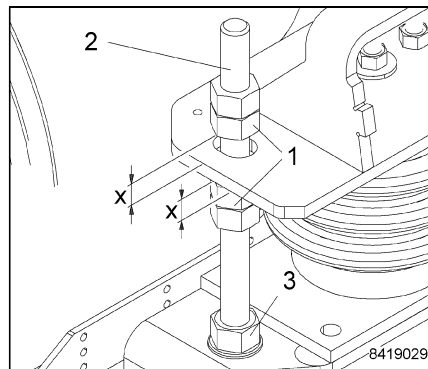


Fig. 27

- Loosen nuts (1) of the transportation securing device on the actuator by approx. 15 mm (X) and lock.
 - Carry out on all 4 threaded rods.
 - Threaded rods (2) must not have contact with the motor bracket foot.
 - If necessary, re-align the threaded rods in the frame.

2.25.2 Installation and alignment of decanter sizes 7000 to 8000



- The film for the erection of decanter sizes 7000 to 8000 can be found by following the QR Code

<http://video.gea.com/installation-guide-for-2-part-decanter-frames>

Fig. 28

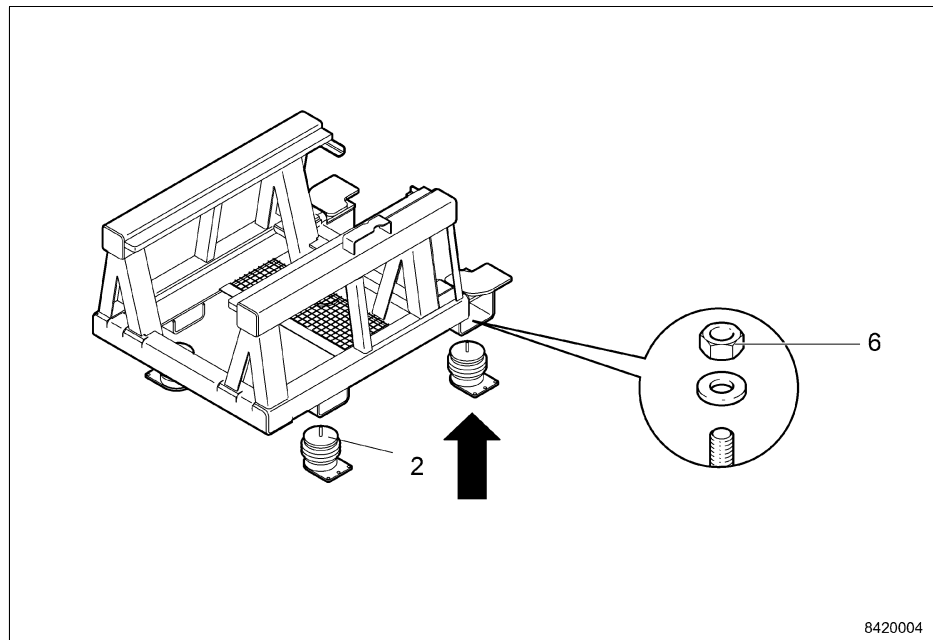
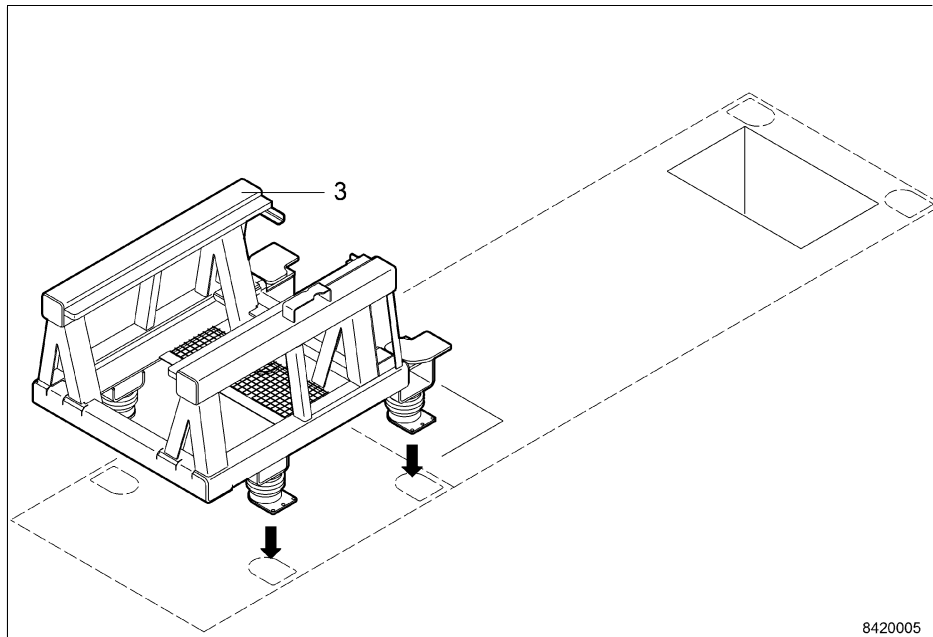


Fig. 29

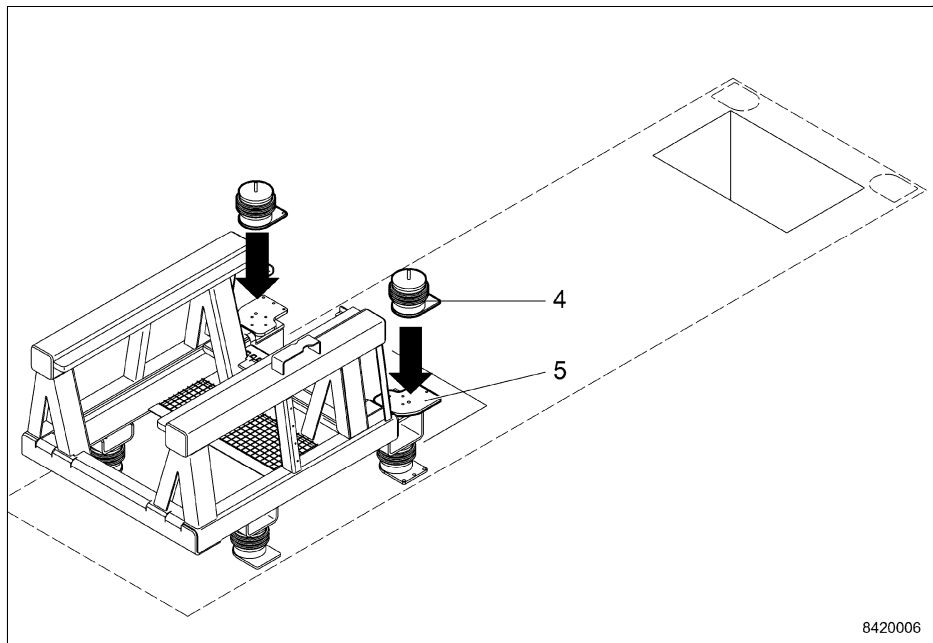
- Fasten viscosity dampers (2) to the drive frame.



8420005

Fig. 30

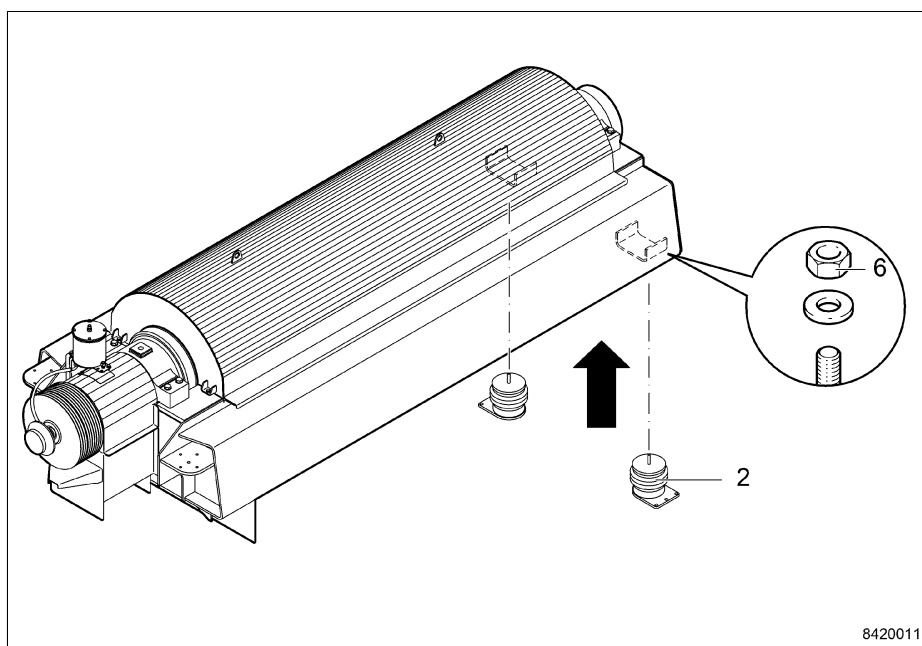
- Sketch the erection points on the foundation.
 - Refer to the order-specific dimension sheet.
 - Pay attention to cut-outs for solid and liquid discharge.
- Erect the drive frame but do not yet fasten it.



8420006

Fig. 31

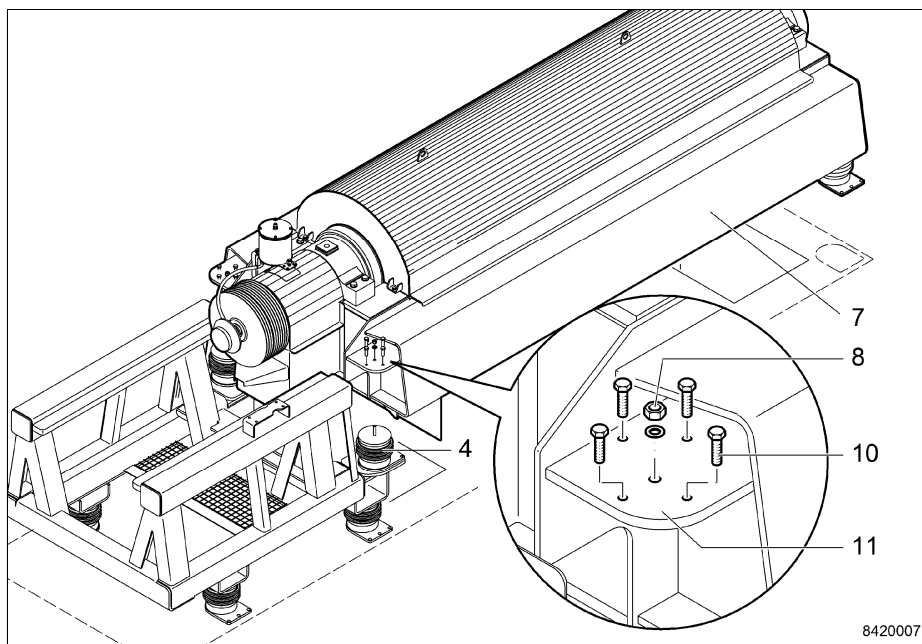
- Fasten viscosity dampers (4) to drive frame (5).



8420011

Fig. 32

- Fasten viscosity dampers (2) to the decanter frame.



8420007

Fig. 33

- Screw screws (10) into the plates (11) of the decanter frame (7).
- Place decanter frame (7) on the viscosity dampers (4).
- Fit washers and nuts (8). Do not tighten the nuts yet (8).

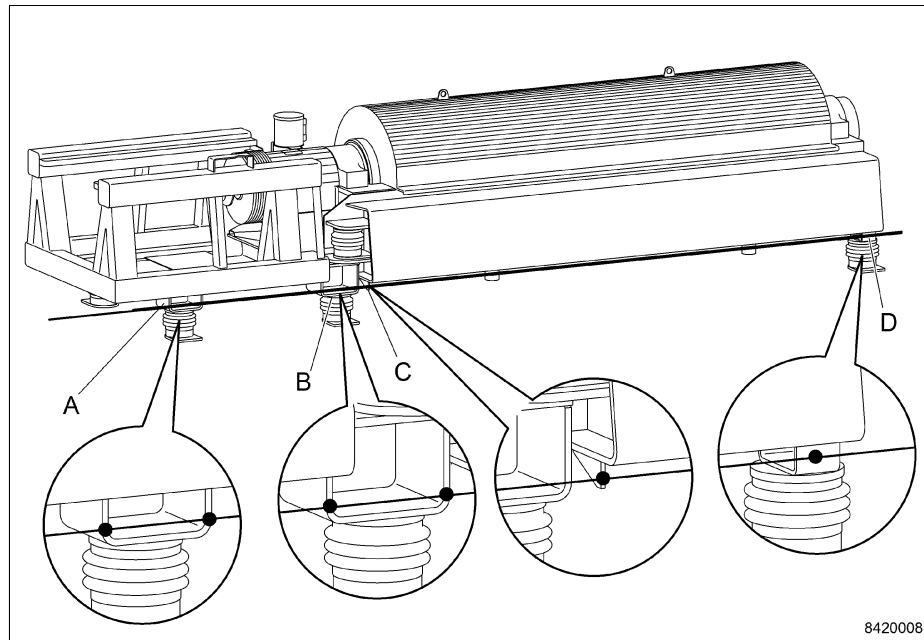


Fig. 34

Align the drive and decanter frame in the longitudinal axis.

- Align the drive and decanter frame so that both frames are in line with each other.
 - Attach a suitable cord at (A) and (D).
 - Align the frames until the points (A), (B), (C) and (D) rest against the taugt cord.
- Screw the viscosity dampers to the base.

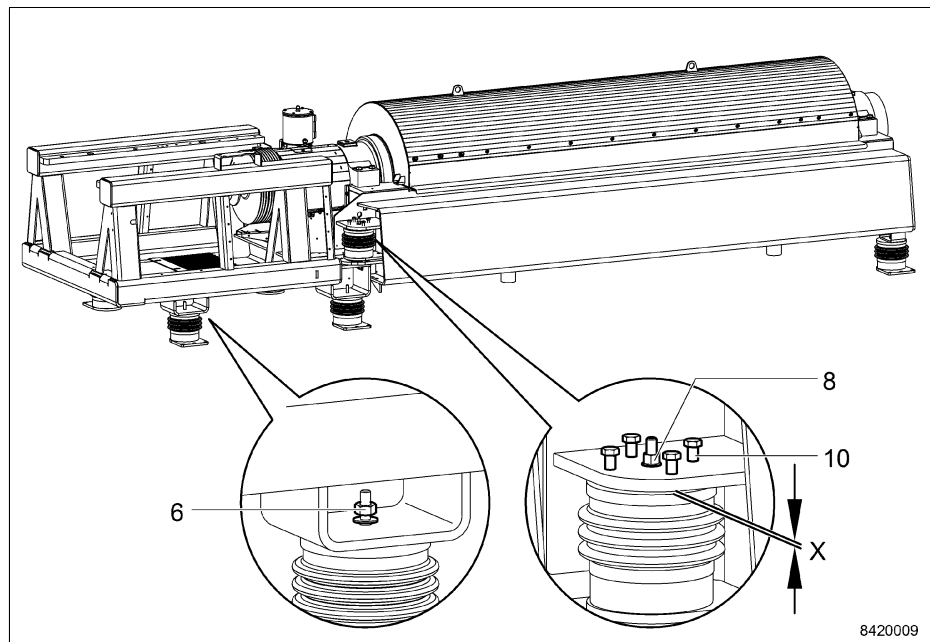


Fig. 35

Aligning the drive and decanter frame horizontally

- Use a suitable spirit level.
- The height of the decanter frame can be adjusted with the aid of screws (10).
 - The distance (X) must be identical on both sides.
- Tighten all nuts (6) and (8).

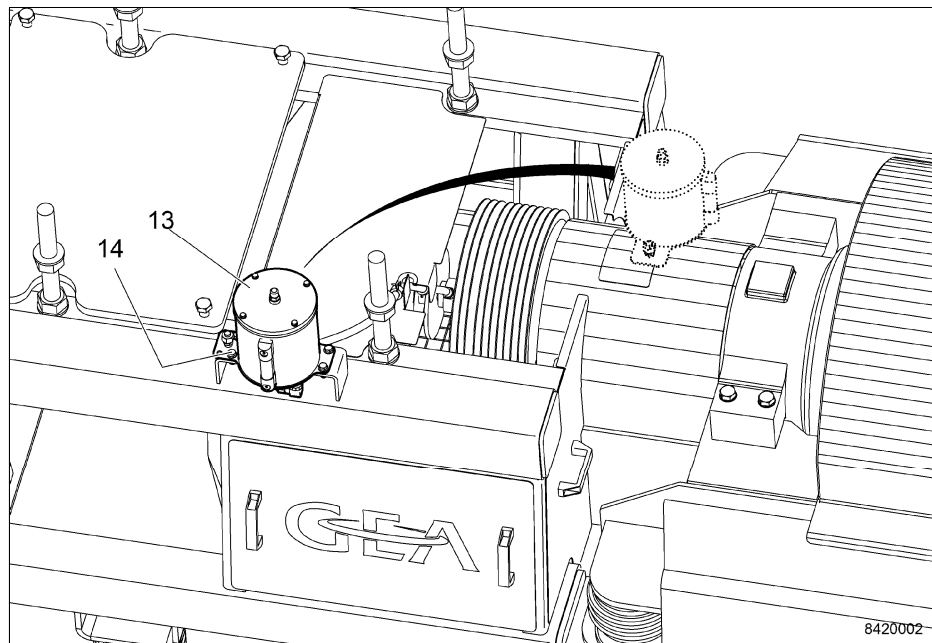
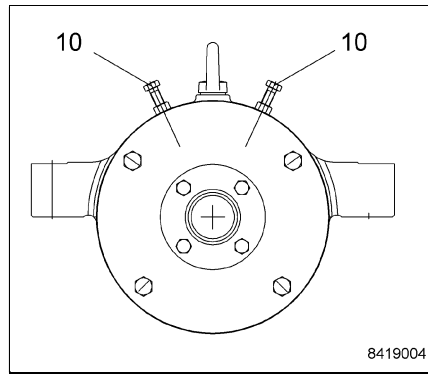


Fig. 36

- Move the oil vessel (13) from the decanter frame to the drive frame and fasten it. Remove the empty holder from the decanter frame.



➤ Undo all four bowl lock screws (10) and secure (solid side and liquid side).

Fig. 37

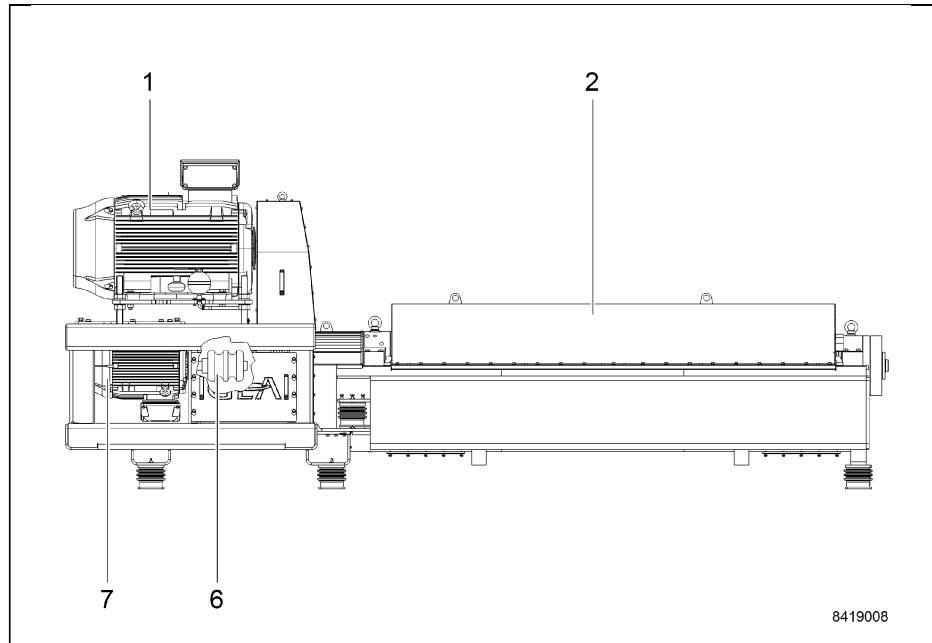


Fig. 38

➤ Fit main motor (1), see chapter "Servicing / fitting the main motor" in the decanter instruction manual.

2.26 Carry out voltage equalization

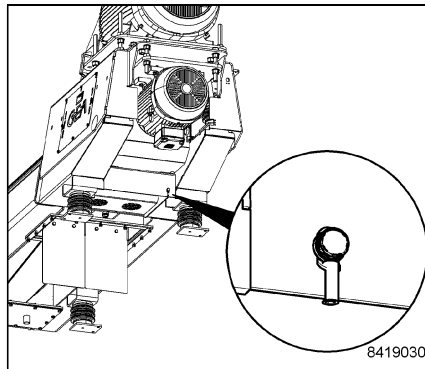


Fig. 39

- To ensure safe operation of the decanter, voltage equalisation **MUST** be carried out according to EN 60204-1.

Omitting voltage equalisation will have the following consequences:



Danger to life through electric voltage!

As soon as a live power line gets into contact with the machine housing, electric shock may occur.

- Measuring signals of monitoring devices can be distorted (e.g.: vibration monitoring, bearing temperature monitoring).
- Magnetism can give rise to bearing failure.

2.27 Decanter with supply cabinet

Optional, there is a supply cabinet for each decanter. It contains additional components such as the oil+air aggregate or the control unit for Varipond P, which are otherwise fitted at the decanter. The supply cabinet is used e.g. for sanitary installation or for extreme conditions.

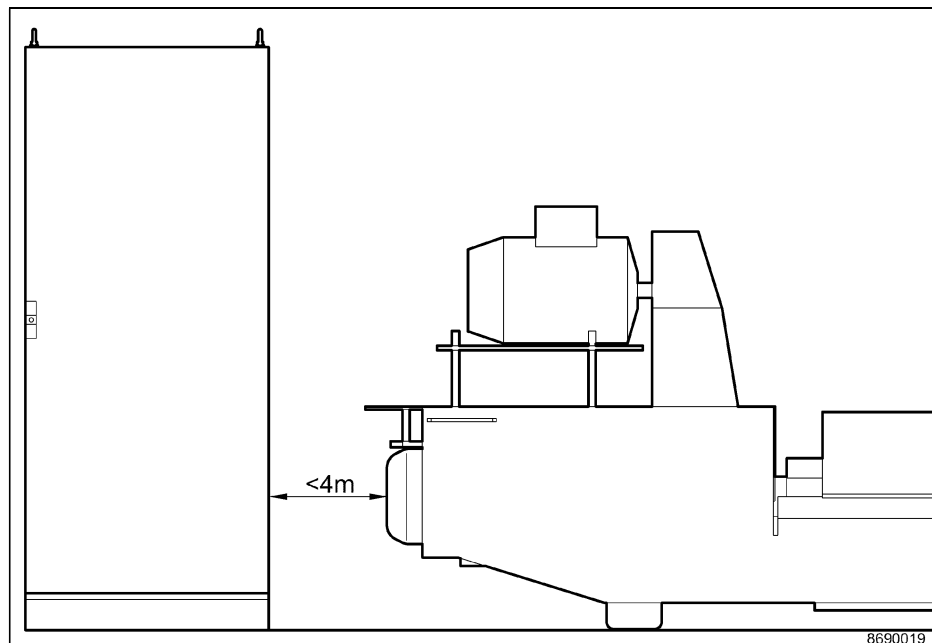


Fig. 40

Install the optionally available supply cabinet maximum 4 m away from the decanter.

NOTE: Larger distances would result in inadmissibly high pressure losses in the hoses of the oil-air lubrication.

3 Operation

3.1	Recommendations for chemical cleaning (CIP)	48
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3.1.2	P&ID with CIP return	48
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3.1.5	Recommended standard procedure	54
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3.1 Recommendations for chemical cleaning (CIP)

CIP (Cleaning In Place) refers to the chemical cleaning of equipment, plant parts and the decanter centrifuge in a cleaning cycle that does not require the disassembly of individual components.

Purpose of the cleaning:

- To create physically clean and chemically pure surfaces

Basic cleaning agents:

- Caustic for removing organic matter (including foam-reducing agents)
- Acid for removing inorganic substances (including foam-reducing agents)
- Drinking water for initial and final flushing
- Disinfecting agents (if required)

The cleaning agent must have a chlorine concentration of less than 200 ppm, because chlorine has a corrosive effect on stainless steel components. In order to prevent corrosion, only recommended cleaning agent may be used.

The efficiency of the cleaning process is dependent on:

- The type of cleaning agent used
- The concentration
- The temperature
- The cleaning time
- The flow rate of the cleaning agent

3.1.1 Recommended parameters

Cleaning solution type:

- Caustic: Sodium hydroxide (NaOH)
- Acid: Nitric acid (HNO₃); phosphoric acid (H₃PO₄)
- Disinfecting agents:
 - Peracetic acid (C₂H₄O₃)
 - Peroxyacetic acid (CH₃COOH)
 - Hypochlorous acid (HClO)
 - Hydrogen peroxide (H₂O₂)

Concentration:

- Caustic: max. 2 %
- Acid: max. 1 %
- Disinfecting agents: max. 0.1 % and max. 200 ppm chlorine concentration

Temperature:

- Caustic: max. 85°C
- Acid: max. 55°C
- Disinfecting agents: max. 20°C

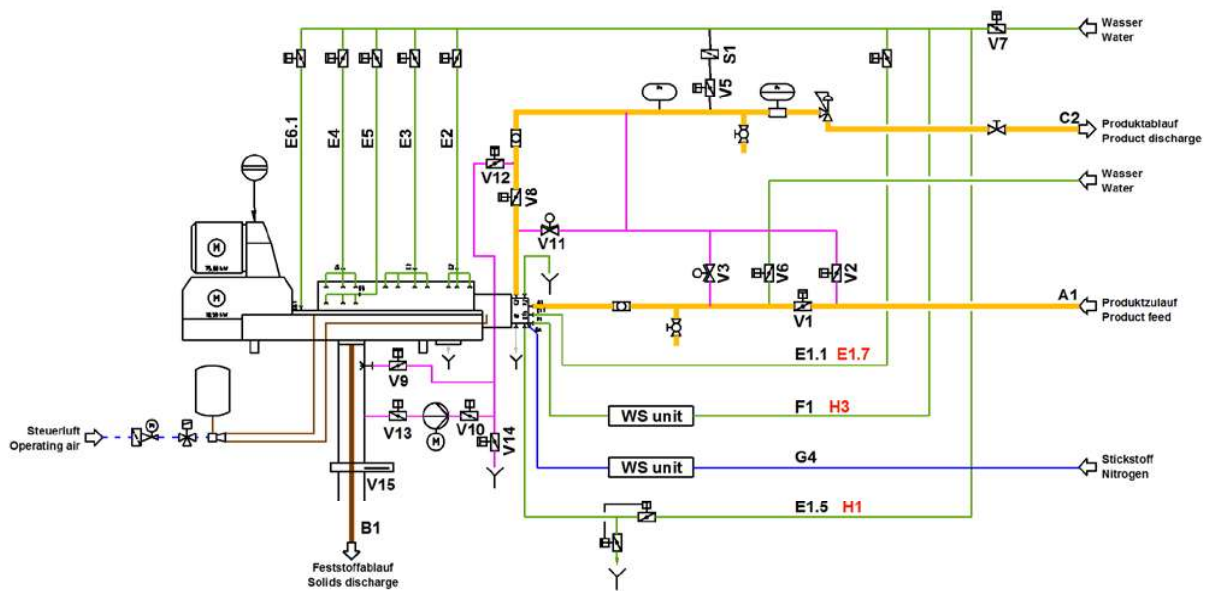
Duration

- see the recommended standard procedure

3.1.2 P&ID with CIP return

- During the cleaning process the product discharge valve V4 is set to 3 bar.
 - **Attention:** Higher discharge pressure can lead to mechanical failure of internal components.
- The valves V2, V3, V6, V7 and V11 must be designed accordingly if the production process requires leak-free valves.
- A shut-off valve can be optionally installed in discharge line C2 to avoid backflow when the decanter is at standstill.
- C2 Cleaning agent return flow
 - A1 Cleaning agent inlet
 - B1 Cleaning agent outlet

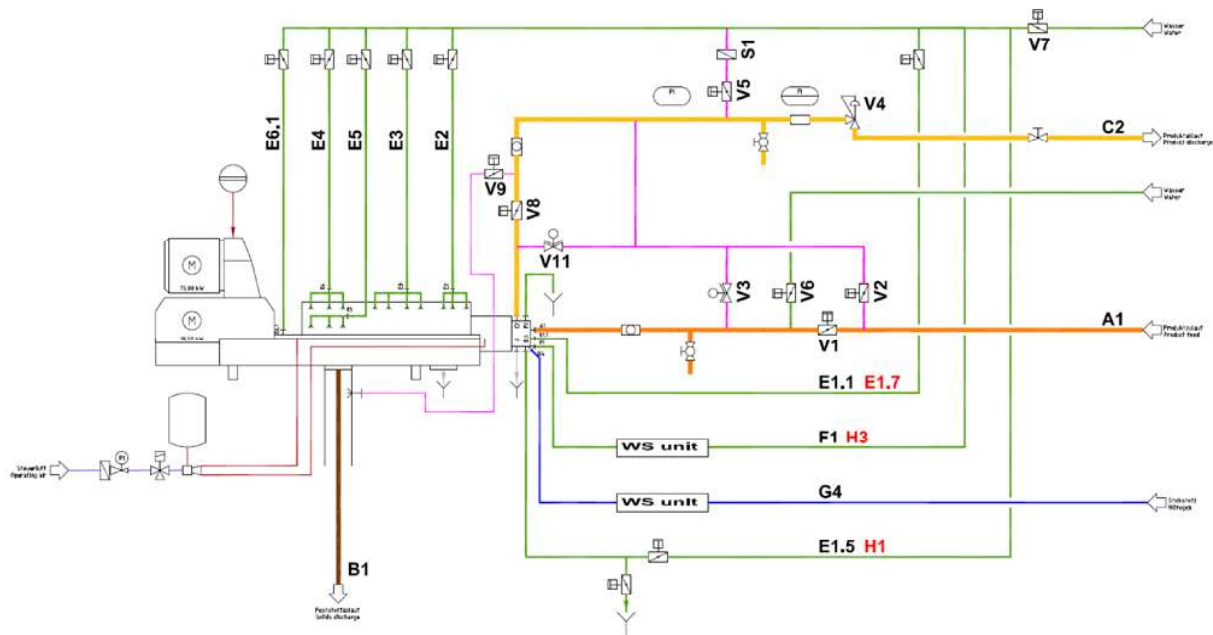
P&ID with CIP return



8416502

Fig. 41

P&ID without CIP return



8416498

Fig. 42

3.1.3 Identification of connections and components

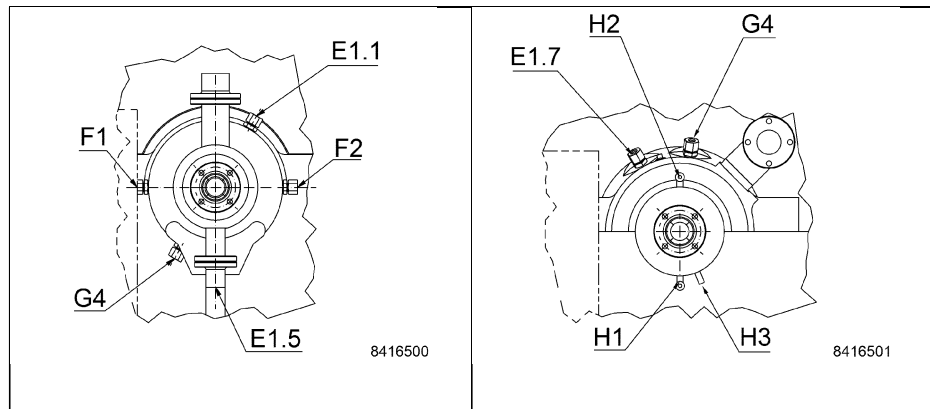


Fig. 43 Stationary feed tube

Fig. 44 Rotating feed tube

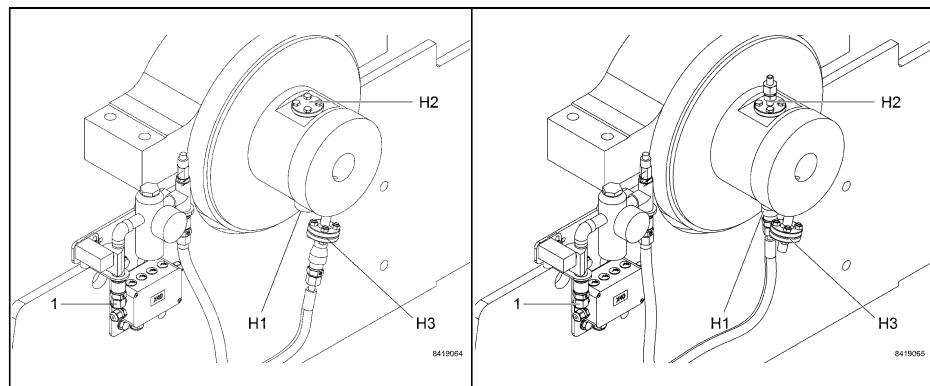


Fig. 45 Inner cooling

Fig. 46 Outer cooling

E1.1	Flushing connection feed tube gap bearing hub / feed tube
E1.5	Flushing connection scroll body
E1.7	Flushing connection gap discharge / bearing hub
E2	Flushing connection catch chamber liquid side
E3	Flushing connection bowl
E4	Flushing connection catch chamber solid side
E5	Flushing connection catch chamber solid side
E6.1	Flushing connection sealing catch chamber solid side
F1	Hydrohermetic inlet
F2	Hydrohermetic outlet
G4	Varipond gas connection
H1	Slide-ring packing Feed for outer cooling; venting and flushing with inner cooling
H2	Slide-ring packing Discharge for outer cooling; closed for inner cooling
H3	Slide-ring packing Inlet for inner cooling, flushing for outer cooling
S1	Strainer
V1	Inlet valve
V2	CIP bypass valve
V3	CIP inlet valve
V4	Product discharge control valve
V5	CIP inlet flush valves
V6	Water inlet valve
V7	Water inlet flush valves
V8	Product discharge valve
V9	CIP valve solid catcher
V10	Shut-off valve CIP pump
V11	CIP valve outlet
V12	CIP bypass valve solid catcher
V13	Shut-off valve CIP pump
V14	Shut-off valve channel
V15	Solid slide gate

3.1.4 Throughput

The max. permissible CIP inlet flow rate to the decanter at high bowl speed must be below the max. inlet flow rate during production.

During the CIP process, the cleaning solution drains through the liquid side and solid side.

The discharged amount of cleaning agent on the solid side depends on the throughput, bowl speed and weir diameter.

- High throughput results in more discharge from the solid side.
- Low bowl speed results in more discharge from the solid side.
- Small weir diameter results in more discharge from the solid side.

Max. CIP inlet flow rate at low bowl speed on the CIP valves V3 and V11		Decanter Size
2.5 m ³ /h	11 gpm	3000
3.5 m ³ /h	15 gpm	4000
4.5 m ³ /h	20 gpm	5000
7 m ³ /h	31 gpm	6000
10 m ³ /h	44 gpm	7000
14 m ³ /h	62 gpm	8000

- The CIP valves V3 and V11 must be set to limit the max. CIP inlet flow rate to the decanter.
- Product discharge valve V4 is set to 3 bar.

3.1.5 Recommended standard procedure

Important information

- Observe the product data sheets and the safety precautions of the manufacturer.
 - Caustic, acids, disinfectants
- The cleaning process can be adapted to the production process, for example:
 - Omission of the acid purification step (time sequence on "0")
 - Changing the cleaning period
 - Changing the cleaning temperature
- Before re-starting the system for the production:
 - Remove the CIP cleaning agent from all product and flushing lines
- In order to ensure the flushing functions, an adequate amount of available CIP medium corresponding to the installation must be provided.
- Discharge of the CIP media:

Discharge connections J1, J2, F2 and E1.5 must be designed to safely collect CIP medium and to prevent discharge into the operating environment. (i.e backflow preventers, piping sizes are not reduced, piping is enclosed). Warning labels are recommended to alert operators to the possibility of CIP medium leakage. Special attention is required when equipment is installed at higher levels and personnel have access below.

Standard procedure in tabular form:

	Action	Pe- riod [min]	Temp. [°C]	Requirements
	Production stop / CIP start			
A	Pre-flushing with water	10	20	Decanter operation at high bowl speed in "Flush" state Open indicated flushing valves via timer pulse/pause: E6.1, E5, E4, E3, E2, E 1.1, E1.5, E1.7, H3, H1, F1, G4
	Stop Decanter			Stop decanter with shutdown program to flush out product residues
B	Caustic cleaning	15	50	Decanter operation at high bowl speed in "CIP high speed" state Open indicated flushing valves via timer pulse/pause: E6.1, E5, E4, E3, E2, E 1.1, E1.5, E1.7, H3, H1, F1, G4
C	Caustic cleaning	20	50	Decanter operation at low bowl speed in "CIP low speed" state Open indicated flushing valves via timer pulse/pause: E5, E4, E3, E2, H3, H1 Flushing valves are closed below 1000 rpm bowl speed: E6.1, E1.1, F1, E1.5, E1.7
	Caustic cleaning	20	75	Decanter operation at low bowl speed in "CIP low speed" state Open indicated flushing valves via timer pulse/pause: E5, E4, E3, E2, H3, H1 Flushing valves are closed below 1000 rpm bowl speed: E6.1, E1.1, F1, E1.5, E1.7
	Flushing with water	5	75	Decanter operation at low bowl speed in "CIP low speed" state Open indicated flushing valves via timer pulse/pause: E5, E4, E3, E2, H3, H1 Flushing valves are closed below 1000 rpm bowl speed: E6.1, E1.1, F1, E1.5, E1.7
	Acid cleaning	10	55	Decanter operation at low bowl speed in "CIP low speed" state Open indicated flushing valves via timer pulse/pause: E5, E4, E3, E2, H3, H1 Flushing valves are closed below 1000 rpm bowl speed: E6.1, E1.1, F1, E1.5, E1.7
D	Acid cleaning	10	55	Decanter operation at high bowl speed in "CIP high speed" state Open indicated flushing valves via timer pulse/pause: E6.1, E5, E4, E3, E2, E 1.1, E1.5, E1.7, H3, H1, F1, G4
	Final flushing with water	5	20	Decanter operation at high bowl speed in "CIP high speed" state Open indicated flushing valves via timer pulse/pause: E6.1, E5, E4, E3, E2, E 1.1, E1.5, E1.7, H3, H1, F1, G4
E	Final flushing with water	5	20	Decanter operation at low bowl speed in "CIP low speed" state Open indicated flushing valves via timer pulse/pause: E5, E4, E3, E2, H3, H1 Flushing valves are closed below 1000 rpm bowl speed: E6.1, E1.1, F1, E1.5, E1.7
F	Optional: Disinfecting agents	5	20	Decanter operation at high bowl speed in "CIP high speed" state Open indicated flushing valves via timer pulse/pause: E6.1, E5, E4, E3, E2, E 1.1, E1.5, E1.7, H3, H1, F1, G4
G	Optional: Disinfecting agents	5	20	Decanter operation at low bowl speed in "CIP low speed" state Open indicated flushing valves via timer pulse/pause: E5, E4, E3, E2, H3, H1 Flushing valves are closed below 1000 rpm bowl speed: E6.1, E1.1, F1, E1.5, E1.7

Standard procedure in graphical form

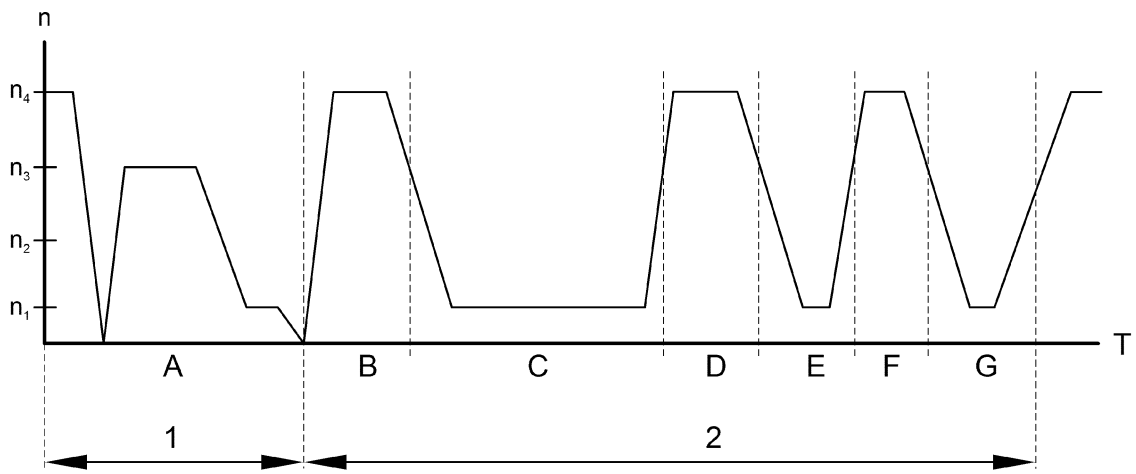


Fig. 47

8416497

Speed ranges

Speed range	Designation
n ₄	Operating speed, CIP high speed
n ₃	Bowl drive with FC: Upper flushing speed
n ₂	Speed at which the flush liquid supply is closed.
n ₁	Bowl drive with FC: Lower flushing speed, CIP low speed

Programs

Shutdown program	
1 A	Water 20 °C
CIP program	
2 B	Caustic 50 °C
2 C	Caustic 50 °C Caustic 75 °C Water 75 °C Acid 55 °C
2 D	Acid 55 °C Water 20 °C
2 E	Water 20 °C
2 F	Disinfection
2 G	Disinfection

Important: It must be ensured that at “CIP high bowl speed”, the CIP throughput supplied via A1 is discharged via return line C2 or outlet B1.

3.1.6 Valve positions

In the various states of “Flush”, “CIP high speed”, and “CIP low speed”, the valves in the piping around the decanter are switched as follows to obtain the desired flow directions.

P&ID with CIP return

State: Flush water after end of production “high speed”

Valve	Position
V1	closed
V2	closed
V3	closed
V4	open / 3bar
V5	closed
V6	open
V7	open
V8	open
V9	pulse / pause
V10	closed
V11	closed
V12	open
V13	closed
V14	closed
V15	open

State: CIP

“high speed”

Valve	Position
V1	open
V2	closed
V3	closed
V4	open / 3bar
V5	open
V6	closed
V7	closed
V8	open
V9	pulse / pause
V10	open
V11	closed
V12	closed, open after x sec
V13	open
V14	open, closed after x sec
V15	closed

State: CIP

“low speed”

Valve	Position
V1	closed
V2	open
V3	alternating V11 pulse / pause
V4	open / 3bar
V5	open
V6	closed
V7	closed
V8	closed
V9	pulse / pause
V10	open
V11	alternating V3 pulse / pause
V12	closed, open after x sec
V13	open
V14	open, closed after x sec
V15	closed

P&ID without CIP return

State: Flush water after end of production “high speed”

Valve	Position
V1	closed
V2	closed
V3	closed
V4	open / 3 bar
V5	closed
V6	open
V7	open
V8	open
V9	Pulse / pause
V11	closed

State: CIP

“high speed”

Valve	Position
V1	open
V2	closed
V3	closed
V4	open / 3 bar
V5	open
V6	closed
V7	closed
V8	open
V9	Pulse / pause
V11	closed

State: CIP

“low speed”

Valve	Position
V1	closed
V2	open
V3	Alternating V11 pulse / pause
V4	open / 3 bar
V5	open
V6	closed
V7	closed
V8	closed
V9	Pulse / pause
V11	Alternating V3 pulse / pause



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1. The CF 7000 is anchored to a structural steel frame or concrete pad (done by others) using $\frac{1}{2}$ " anchor bolts. Use two anchor bolts per leg, for a total of twelve (12) bolts per machine. Anchor Bolts are to be provided by installing contractor.

The recommended anchor system is given below:

Material: AISI 316 stainless steel

Hole Diameter: 9/16"

Bolt Size: $\frac{1}{2}$ "

**Embedment Depth:
(for concrete)** By installing contractor / structural engineer

**Anchor Material:
(for concrete)** Epoxy chemical anchor system per enclosed reference sheets

Refer to the CF-7000 Installation Plan, Drawing No. 9149-4100-706, for additional details.

A7

**Easy to Use—
A7 Saves You
Time and Money**



A7-28



A102

DESCRIPTION/SUGGESTED SPECIFICATIONS*

*Suggested Specifications see pages 23

Fast Dispensing, Fast Curing Acrylic Adhesive

The acrylic resin and hardening agent are completely mixed as they are simultaneously dispensed from the dual cartridge through a static mixing nozzle, directly into the anchor hole. A7 can be used with threaded rod or rebar (for fastening to hollow base materials, see page 43 and 46).



**How Can
An Adhesive
Anchor Save
You Money?**

- Incredibly fast dispensing and rod installation times
- Significantly faster curing times
- Easy to use (no-heating) even at freezing cold temperatures
- Requires less adhesive

ADVANTAGES

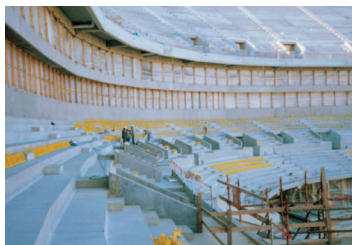
- All weather formula
- No drip, no sag, easy clean up
- Fast & easy dispensing, even 28 ounce cartridge can be hand dispensed
- Fast curing time, 35 minutes at 60°F
- Not mix ratio sensitive
- NSF 61 approved
- Rods are easier to insert into the hole with A7 compared with other adhesives
- Works in damp holes and underwater applications
- Requires less adhesive—can be used in 1/16" oversized or 1/8" oversized holes
- **One formula** for both hollow and solid base materials

Curing Times



BASE MATERIAL (F°/C°)	WORKING TIME	FULL CURE TIME
100°/ 38°	5 minutes	25 minutes
80°/ 27°	5.5 minutes	30 minutes
60°/ 16°	7 minutes	35 minutes
40°/ 4°	15 minutes	75 minutes
20°/ -7°	35 minutes	6 hours
0°/ -18°	4 hours	24 hours

APPLICATIONS



Stadium Seating

The fast dispensing, fast curing properties of A7 made it ideal for installing over 70,000 seats in this NFL football stadium and many others.



Roadway Doweling

A7 dispenses so quickly and rebar inserts so easily that contractors find installed costs are lower than many other products including grout for doweling.



Scaffolding Attachment

Fast curing adhesive in 28 ounce cartridges kept this project moving upwards without delays.

FEATURES



ANCHORAGE TO SOLID CONCRETE

Threaded Rod (Carbon or Stainless Steel) or Rebar supplied by contractor; rod does not need to be chisel pointed

A7 adhesive completely fills area between rod and hole creating a stress free, high load anchorage

Pre-drilled hole in concrete; see performance tables for suggested hole sizes

APPROVALS/LISTINGS

ICC Evaluation Service, Inc. – #ER-5560

City of Los Angeles – RR#25379

DOT Approvals

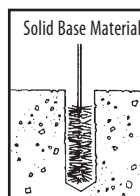
NSF Standard 61 Certified for Drinking Water Components



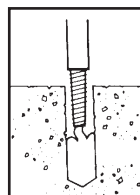
Certified to ANSI/NSF 61

For the most current approvals/listings visit: www.itw-redhead.com

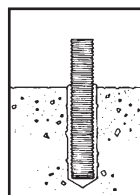
INSTALLATION STEPS



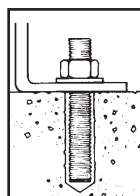
1. Drill 1/16" oversize diameter holes for 1/4"–1/2" diameter threaded rods and #3 rebar. Drill 1/8" oversize diameter holes for 5/8"–1-1/4" diameter threaded rods, #4 rebar, grout filled blocks and brick pinning. Clean out hole from bottom with forced air. Complete hole preparation with brush and repeat cleaning with forced air (leave no dust or slurry).



2. When starting new cartridge or new nozzle, dispense and discard enough adhesive until uniform light grey color is achieved. Insert the nozzle into the bottom of the hole and fill to 1/2 the hole depth.



3. Insert rod slowly by hand into the bottom of the hole with a slow twisting motion. This insures adhesive fills voids and crevices and uniformly coats the anchor rod.






4. See table for working times and curing times. After the suggested cure time is met, install and tighten fixture into place.



A100 Dispenser

A7-8 fl. oz. Ordering Information

PART NUMBER	DESCRIPTION	BOX QTY
 A7-8	Fits Hilti® P2000 dispensing tools 8 Fluid Ounce Cartridge A7	12
 A24	Mixing Nozzle for A7-8 Cartridge Nozzle diameter fits 3/8" to 5/8" holes (overall length of nozzle 6-3/8")	24
 A101	Heavy Duty Hand Dispenser for A7-8 Cartridge	1

Refer to page 49 for ordering information on brushes, hole plugs, and extension tubing for deep holes.

ESTIMATING TABLE

CLAMPING FORCE PROVIDED ON PAGES 26

A7 8 Fluid Ounce Cartridge		Number of Anchoring Installations per Cartridge* Using Threaded Rod with A7 Adhesive in Solid Concrete														
ROD In. (mm)	DRILL HOLE DIA. INCHES	EMBEDMENT DEPTH IN INCHES (mm)														
		1 (25.4)	2 (50.8)	3 (76.2)	4 (101.6)	5 (127.0)	6 (152.4)	7 (177.8)	8 (203.2)	9 (228.6)	10 (254.0)	11 (279.4)	12 (304.8)	13 (330.2)	14 (355.6)	15 (381.0)
1/4 (6.4)	5/16	259.5	129.7	86.5	64.9	51.9	43.2	37.1	32.4	28.8	25.9	23.6	21.6	20.0	18.5	17.3
3/8 (9.5)	7/16	150.2	75.1	50.1	37.6	30.0	25.0	21.5	18.8	16.7	15.0	13.7	12.5	11.6	10.7	10.0
1/2 (12.7)	9/16	108.1	54.1	36.0	27.0	21.6	18.0	15.4	13.5	12.0	10.8	9.8	9.0	8.3	7.7	7.2
5/8 (15.9)	11/16	77.6	38.8	25.9	19.4	15.5	12.9	11.1	9.7	8.6	7.8	7.1	6.5	6.0	5.5	5.2
	3/4	55.4	27.7	18.4	13.8	11.1	9.2	7.9	6.9	6.1	5.5	5.0	4.6	4.3	4.0	3.7
3/4 (19.1)	13/16	54.7	27.3	18.2	13.7	10.9	9.1	7.8	6.8	6.1	5.5	5.0	4.6	4.2	3.9	3.6
	7/8	43.6	21.8	14.6	10.9	8.8	7.3	6.3	5.5	4.9	4.4	4.0	3.6	3.4	3.1	2.9
7/8 (22.2)	15/16	52.5	26.2	17.5	13.1	10.5	8.7	7.5	6.6	5.8	5.2	4.8	4.4	4.0	3.7	3.5
	1	36.4	18.2	12.2	9.1	7.3	6.1	5.2	4.5	4.0	3.6	3.3	3.0	2.8	2.6	2.4
1 (25.4)	1-1/16	44.9	22.4	15.0	11.2	9.0	7.5	6.4	5.6	5.0	4.5	4.1	3.7	3.5	3.2	3.0
	1-1/8	34.4	17.2	12.0	8.6	7.5	6.0	5.0	4.3	3.7	3.3	3.0	2.7	2.5	2.3	2.1
1-1/4 (31.8)	1-5/16	28.7	14.4	9.6	7.2	5.7	4.8	4.1	3.6	3.2	2.9	2.6	2.4	2.2	2.1	1.9
	1-3/8	22.4	11.2	7.6	5.6	4.5	3.8	3.2	2.8	2.5	2.3	2.1	1.9	1.7	1.6	1.5

*The number of anchoring installations is based upon calculations of hole volumes using ANSI tolerance carbide tipped drill bits, the nominal areas of the reinforcing bars and the stress areas of the threaded rods. These estimates do not account for waste.

PERFORMANCE TABLE

A7 Acrylic Adhesive **Average Ultimate Tension and Shear Loads^{1,2,3} for Threaded Rod Installed in Solid Concrete**

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MAX. CLAMPING FORCE AFTER PROPER CURE Ft.-Lbs. (Nm)	EMBEDMENT IN CONCRETE In. (mm)	2000 PSI (13.8 MPa) CONCRETE		4000 PSI (27.6 MPa) CONCRETE	
				ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)	ULTIMATE TENSION Lbs. (kN)	ULTIMATE SHEAR Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	13 - 18 (17-24)	1-1/2 (38.1)	N/A	N/A	3,734 (16.6)	4,126 (18.3)
			3-3/8 (85.7)	5,852 (26.0)	5,220 (23.2)	10,977 (48.8)	5,220 (23.2)
			4-1/2 (114.3)	7,729 (34.4)	5,220 (23.2)	11,661 (51.9)	5,220 (23.2)
1/2 (12.7)	9/16 (14.3)	22 - 25 (29-33)	2 (50.8)	N/A	N/A	6,022 (26.8)	8,029 (35.7)
			4-1/2 (114.3)	10,798 (48.0)	8,029 (35.7)	17,162 (76.3)	8,029 (35.7)
			6 (152.4)	14,210 (63.2)	8,029 (35.7)	17,372 (77.3)	8,029 (35.7)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	55 - 80 (74-108)	2-1/2 (63.5)	N/A	N/A	7,330 (32.6)	11,256 (50.1)
			5-5/8 (142.9)	16,417 (73.0)	15,967 (71.0)	26,504 (117.9)	15,967 (71.0)
			7-1/2 (190.5)	18,747 (83.4)	15,967 (71.0)	29,381 (130.7)	15,967 (71.0)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	106 - 160 (143-216)	3 (76.2)	N/A	N/A	8,634 (38.4)	20,126 (89.5)
			6-3/4 (171.5)	18,618 (82.8)	20,126 (89.5)	29,727 (132.2)	20,126 (89.5)
			9 (228.6)	23,934 (106.5)	20,126 (89.5)	37,728 (167.8)	20,126 (89.5)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	185 - 250 (250-338)	3-1/2 (88.9)	N/A	N/A	13,650 (60.7)	20,920 (92.9)
			7-7/8 (200.0)	N/A	29,866 (132.9)	44,915 (199.8)	29,866 (132.9)
			10-1/2 (266.7)	36,881 (164.1)	29,866 (132.9)	48,321 (215.0)	29,866 (132.9)
1 (25.4)	1-1/16 (27.0) or 1-1/8 (28.6)	276 - 330 (374-447)	4 (101.6)	N/A	N/A	16,266 (72.2)	33,152 (147.5)
			9 (228.6)	32,215 (143.3)	N/A	48,209 (214.5)	37,538 (167.0)
			12 (304.8)	46,064 (204.9)	37,538 (167.0)	63,950 (284.5)	37,538 (167.0)
1-1/4 (31.8)	1-5/16 (33.3) or 1-3/8 (34.9)	370 - 660 (501-894)	5 (127.0)	N/A	N/A	21,838 (97.1)	33,152 (147.5)
			11-1/4 (285.8)	45,962 (204.5)	58,412 (259.8)	56,715 (252.3)	58,412 (259.8)
			15 (381.0)	62,208 (276.7)	58,412 (259.8)	84,385 (375.4)	58,412 (259.8)

1 Allowable working loads for the single installations under static loading should not exceed 25% capacity or the allowable load of the anchor rod.

2 Ultimate load values in 2000 and 4000 psi stone aggregate concrete. Ultimate loads are indicated for the embedment shown in the Embedment in Concrete column. Performance values are based on the use of high strength threaded rod (ASTM A193 Gr. B7). The use of lower strength rods will result in lower ultimate tension and shear loads.

3 Linear interpolation may be used for intermediate spacing and edge distances (see pages 28-29).

PERFORMANCE TABLE

A7 Acrylic Adhesive **Allowable Tension Loads¹ for Threaded Rod Installed in Solid Concrete**

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE TENSION LOAD BASED ON ADHESIVE BOND STRENGTH		ALLOWABLE TENSION LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	N/A	934 (4.2)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
		3-3/8 (85.7)	1,460 (6.5)	2,740 (12.2)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
		4-1/2 (114.3)	1,930 (8.6)	2,915 (13.0)	2,080 (9.3)	4,340 (19.3)	3,995 (17.8)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	N/A	1,505 (6.7)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
		4-1/2 (114.3)	2,700 (12.0)	4,290 (19.1)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
		6 (152.4)	3,550 (15.8)	4,340 (19.3)	3,730 (16.6)	7,780 (34.6)	7,155 (31.8)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	2-1/2 (63.5)	N/A	1,832 (8.2)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		5-5/8 (142.9)	4,100 (18.3)	6,625 (29.5)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
		7-1/2 (190.5)	4,685 (20.8)	7,345 (32.7)	5,870 (26.1)	12,230 (54.4)	11,250 (50.0)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	3 (76.2)	N/A	2,158 (9.6)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
		6-3/4 (171.5)	4,655 (20.7)	7,430 (33.1)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
		9 (228.6)	5,980 (26.6)	9,430 (42.0)	8,490 (37.8)	17,690 (78.7)	14,860 (66.1)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	3-1/2 (88.9)	N/A	3,413 (15.2)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
		7-7/8 (200.0)	N/A	11,230 (49.9)	11,600 (51.6)	25,510 (113.5)	20,835 (92.7)
		10-1/2 (266.7)	9,220 (41.0)	12,080 (53.7)	11,600 (51.6)	25,510 (113.5)	20,834 (92.7)
1 (25.4)	1-1/16 (27.0) or 1-1/8 (28.6)	4 (101.6)	N/A	4,067 (18.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
		9 (228.6)	8,050 (35.8)	12,050 (53.6)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
		12 (304.8)	11,515 (51.2)	15,985 (71.1)	15,180 (67.5)	31,620 (140.7)	26,560 (118.1)
1-1/4 (31.8)	1-5/16 (33.3) or 1-3/8 (34.9)	5 (127.0)	N/A	5,460 (24.3)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
		11-1/4 (285.8)	11,490 (51.1)	14,175 (63.1)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)
		15 (381.0)	15,550 (69.2)	21,095 (93.8)	23,800 (105.9)	49,580 (220.6)	34,670 (154.2)

1 Use lower value of either bond or steel strength for allowable tensile load.

PERFORMANCE TABLE

DRILL HOLE DIAMETERS
PROVIDED ON PAGES 22, 24 AND 25

A7 Acrylic Adhesive Allowable Shear Loads¹ for Threaded Rod Installed in Solid Concrete

THREADED ROD DIA. In. (mm)	DRILL HOLE DIAMETER In. (mm)	MIN. EMBEDMENT DEPTH In. (mm)	ALLOWABLE SHEAR LOAD BASED ON CONCRETE STRENGTH		ALLOWABLE SHEAR LOAD BASED ON STEEL STRENGTH		
			2000 PSI (13.8 MPa) CONCRETE Lbs. (kN)	4000 PSI (27.6 MPa) CONCRETE Lbs. (kN)	ASTM A307 (SAE 1018) Lbs. (kN)	ASTM A193 GR. B7 (SAE 4140) Lbs. (kN)	ASTM F593 AISI 304 SS Lbs. (kN)
3/8 (9.5)	7/16 (11.1)	1-1/2 (38.1)	N/A	1,031 (4.6)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
		3-3/8 (85.7)	1,305 (5.8)	1,305 (5.8)	1,040 (4.6)	2,170 (9.7)	1,995 (8.9)
1/2 (12.7)	9/16 (14.3)	2 (50.8)	N/A	2,005 (8.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
		4-1/2 (114.3)	2,005 (8.9)	2,005 (8.9)	1,870 (8.3)	3,895 (17.3)	3,585 (15.9)
5/8 (15.9)	11/16 (17.5) or 3/4 (19.1)	2-1/2 (63.5)	N/A	2,814 (12.5)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
		5-5/8 (142.9)	3,990 (17.8)	3,990 (17.8)	2,940 (13.1)	6,125 (27.2)	5,635 (25.1)
3/4 (19.1)	13/16 (20.6) or 7/8 (22.2)	3 (76.2)	N/A	5,030 (22.4)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
		6-3/4 (171.5)	5,030 (22.4)	5,030 (22.4)	4,250 (18.9)	8,855 (39.4)	7,440 (33.1)
7/8 (22.2)	15/16 (23.8) or 1 (25.4)	3-1/2 (88.9)	N/A	5,230 (23.3)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
		7-7/8 (200.0)	7,465 (33.2)	7,465 (33.2)	5,800 (25.8)	12,760 (56.8)	10,730 (47.7)
1 (25.4)	1-1/16 (27.0) or 1-1/8 (28.6)	4 (101.6)	N/A	8,288 (36.9)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
		9 (228.6)	9,385 (41.7)	9,385 (41.7)	7,590 (33.8)	15,810 (70.3)	13,285 (59.1)
1-1/4 (31.8)	1-5/16 (33.3) or 1-3/8 (34.9)	5 (127.0)	N/A	8,288 (36.9)	11,900 (52.9)	24,790 (100.3)	18,840 (83.8)
		11-1/4 (285.8)	14,600 (64.9)	14,600 (64.9)	11,900 (52.9)	24,790 (100.3)	18,840 (83.8)

¹ Use lower value of either concrete or steel strength for allowable shear load.

PERFORMANCE TABLE

A7 Acrylic Adhesive Recommended Edge Distance Requirements for Shear Loads Installed in Solid Concrete

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL EDGE DISTANCE In. (mm) 100% LOAD CAPACITY	INTERPOLATED EDGE DISTANCE In. (mm) (80% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (50% LOAD CAPACITY)	MINIMUM EDGE DISTANCE In. (mm) (10% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7)	4-3/16 (106.4)	3-7/16 (87.3)	2-5/16 (58.7)	13/16 (20.6)
1/2 (12.7)	4-1/2 (114.3)	5-5/8 (142.9)	4-5/8 (117.5)	3-1/8 (79.4)	1-1/8 (28.6)
5/8 (15.9)	5-5/8 (142.9)	7 (177.8)	5-3/4 (146.1)	3-1/8 (79.4)	1-3/8 (34.9)
3/4 (19.1)	6-3/4 (171.5)	8-7/16 (214.2)	6-15/16 (176.2)	4-5/8 (117.5)	1-5/8 (41.3)
1 (25.4)	9 (228.6)	11-1/4 (285.8)	9-1/4 (235.0)	6-1/4 (158.8)	2-1/4 (57.2)
1-1/4 (31.8)	11-1/4 (285.8)	14-1/16 (357.2)	11-5/8 (295.3)	7-7/8 (200.0)	2-7/8 (73.0)

Combined Tension and Shear Loading—for A7 Adhesive Anchors

Allowable loads for anchors under tension and shear loading at the same time (combined loading) will be lower than the allowable loads for anchors subjected to 100% tension or 100% shear. Use the following equation to evaluate anchors in combined loading conditions:

$$\left(\frac{N_a}{N_s}\right)^{5/3} + \left(\frac{V_a}{V_s}\right)^{5/3} \leq 1$$

N_a = Applied Service Tension Load

N_s = Allowable Tension Load

V_a = Applied Service Shear Load

V_s = Allowable Shear Load

PERFORMANCE TABLE

A7 Acrylic Adhesive Recommended Edge Distance Requirements for Tension Loads Installed in Solid Concrete

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL EDGE DISTANCE In. (mm) (100% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (90% LOAD CAPACITY)	INTERPOLATED EDGE DISTANCE In. (mm) (80% LOAD CAPACITY)	MINIMUM EDGE DISTANCE In. (mm) (70% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7) 4-1/2 (114.3)	2-1/2 (63.5) 3-3/8 (85.7)	1-15/16 (49.2) 2-5/8 (66.7)	1-3/8 (34.9) 1-7/8 (47.6)	13/16 (26.2) 1-1/8 (28.6)
1/2 (12.7)	4-1/2 (114.3) 6 (152.4)	3-3/8 (85.7) 4-1/2 (114.3)	2-5/8 (66.7) 3-1/2 (88.9)	1-7/8 (47.6) 2-1/2 (63.5)	1-1/8 (28.6) 1-1/2 (38.1)
5/8 (15.9)	5-5/8 (142.9) 7-1/2 (190.5)	4-3/16 (106.4) 5-5/8 (142.9)	3-1/4 (82.6) 4-3/8 (111.1)	2-5/16 (58.7) 3-1/8 (79.4)	1-3/8 (34.9) 1-7/8 (47.6)
3/4 (19.1)	6-3/4 (171.5) 9 (228.6)	5-1/16 (128.6) 6-3/4 (171.5)	3-15/16 (100.0) 5-1/4 (133.4)	2-13/16 (71.4) 3-3/4 (95.3)	1-5/8 (15.9) 2-1/4 (57.2)
1 (25.4)	9 (228.6) 12 (304.8)	6-3/4 (171.5) 9 (228.6)	5-1/4 (133.4) 7 (177.8)	3-3/4 (95.3) 5 (127.0)	2-1/4 (57.2) 3 (76.2)
1-1/4 (31.8)	11-1/4 (285.8) 15 (381.0)	8-7/16 (214.3) 11-1/4 (285.8)	6-9/16 (166.7) 8-3/4 (222.2)	4-3/4 (120.7) 6-1/4 (158.8)	2-7/8 (73.0) 3-3/4 (95.3)

PERFORMANCE TABLE

A7 Acrylic Adhesive Recommended Spacing Requirements for Tension Loads Installed in Concrete, Lightweight Concrete and Hollow Block

ANCHOR DIAMETER In. (mm)	EMBEDMENT DEPTH In. (mm)	CRITICAL SPACING In. (mm) (100% LOAD CAPACITY)	INTERPOLATED SPACING In. (mm) (90% LOAD CAPACITY)	MINIMUM SPACING In. (mm) (80% LOAD CAPACITY)
3/8 (9.5)	3-3/8 (85.7) 4-1/2 (114.3)	4-3/16 (106.4) 5-5/8 (142.9)	2-1/2 (63.5) 3-3/8 (85.7)	13/16 (20.6) 1-1/8 (28.6)
1/2 (12.7)	4-1/2 (114.3) 6 (152.4)	5-5/8 (142.9) 7-1/2 (190.5)	3-3/8 (85.7) 4-1/2 (114.3)	1-1/8 (28.6) 1-1/2 (38.1)
5/8 (15.9)	5-5/8 (142.9) 7-1/2 (190.5)	7 (177.8) 9-3/8 (238.1)	4-3/16 (106.4) 5-5/8 (142.9)	1-3/8 (34.9) 1-7/8 (47.6)
3/4 (19.1)	6-3/4 (171.5) 9 (228.6)	8-7/16 (214.3) 11-1/4 (285.8)	5 (127.0) 6-3/4 (171.5)	1-5/8 (41.3) 2-1/4 (57.2)
1 (25.4)	9 (228.6) 12 (304.8)	11-1/4 (285.8) 15 (381.0)	6-3/4 (171.5) 9 (228.6)	2-1/4 (57.2) 3 (76.2)
1-1/4 (31.8)	11-1/4 (285.8) 15 (381.0)	14-1/16 (357.2) 18-3/4 (476.3)	8-1/2 (215.9) 11-1/4 (285.8)	2-7/8 (73.0) 3-3/4 (95.5)

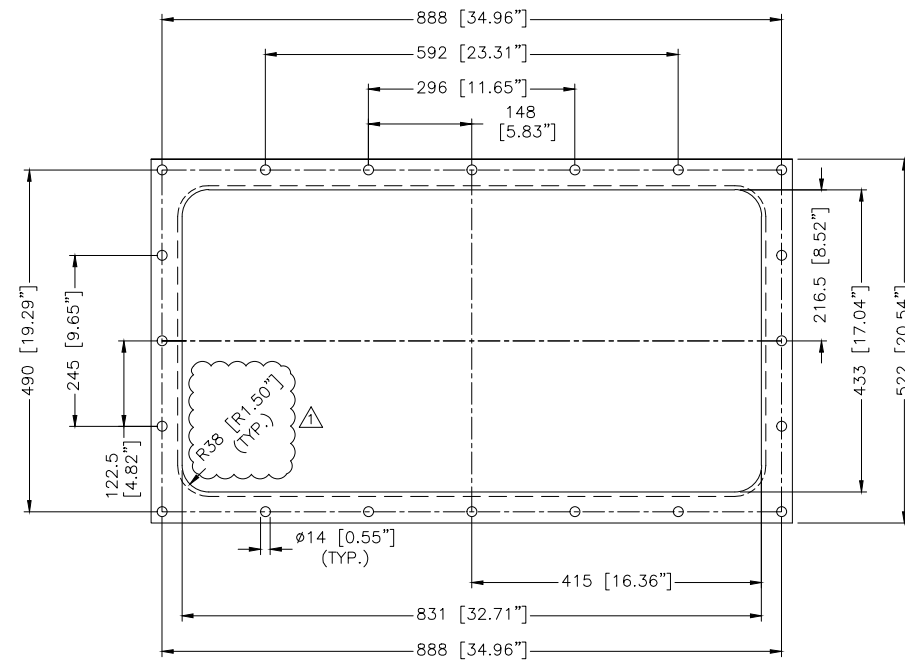
A7 Adhesive Edge/Spacing Distance Load Factor Summary for Installation of Threaded Rod and Reinforcing Bar^{1,2}

LOAD FACTOR	DISTANCE FROM EDGE OF CONCRETE
Critical Edge Distance—Tension	
100% Tension Load	→ 0.75 x Anchor Embedment
Minimum Edge Distance—Tension	
70% Tension Load	→ 0.25 x Anchor Embedment
Critical Edge Distance—Shear	
100% Shear Load	→ 1.25 x Anchor Embedment
Minimum Edge Distance—Shear	
10% Shear Load	→ 0.25 x Anchor Embedment
LOAD FACTOR	DISTANCE FROM ANOTHER ANCHOR
Critical Spacing—Tension	
100% Tension Load	→ 1.25 x Anchor Embedment
Minimum Spacing—Tension	
80% Tension Load	→ 0.25 x Anchor Embedment
Critical Spacing—Shear	
100% Shear Load	→ 1.25 x Anchor Embedment
Minimum Spacing—Shear	
25% Shear Load	→ 0.25 x Anchor Embedment

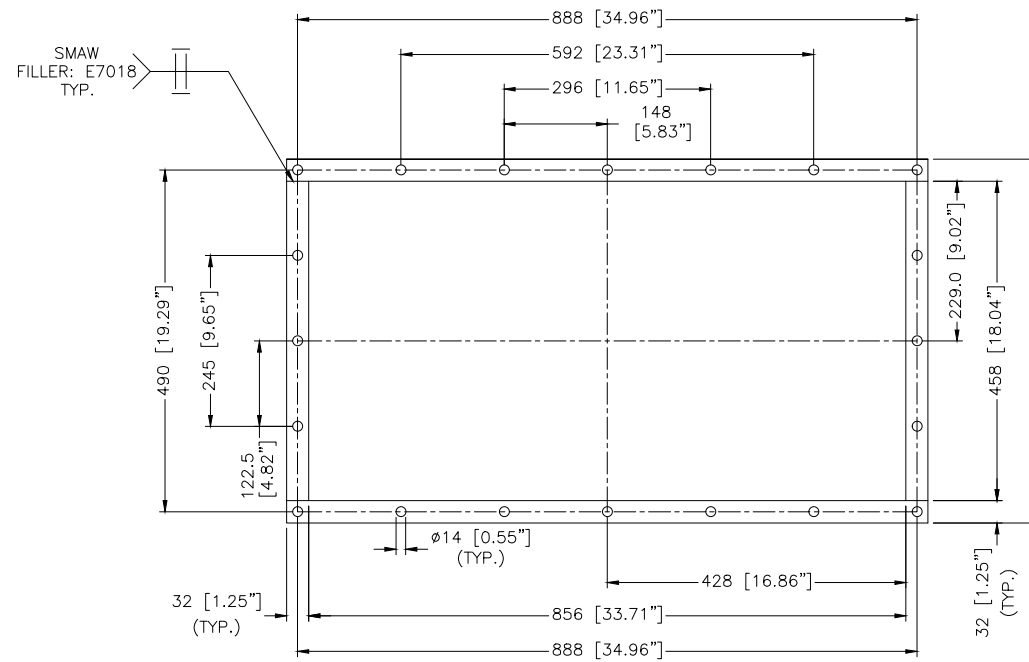
1 Use linear interpolation for load factors at edge distances or spacing distances between critical and minimum.

2 Anchors are affected by multiple combination of spacing and/or edge distance loading and direction of the loading. Use the product of tension and shear loading factors in design.

REVISIONS			
No.	DESCRIPTION	DATE	APPROVED
0	RELEASED FOR MANUFACTURE	14-JAN-13	SBK
1	REVISED RADIUS WAS R13 [R0.50"]	17/JUN/16	KMP

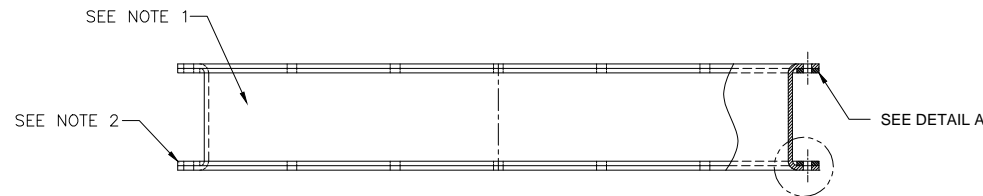


PLAN VIEW

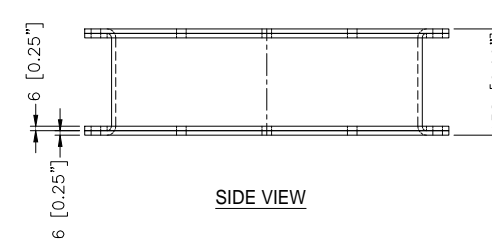


DETAIL A

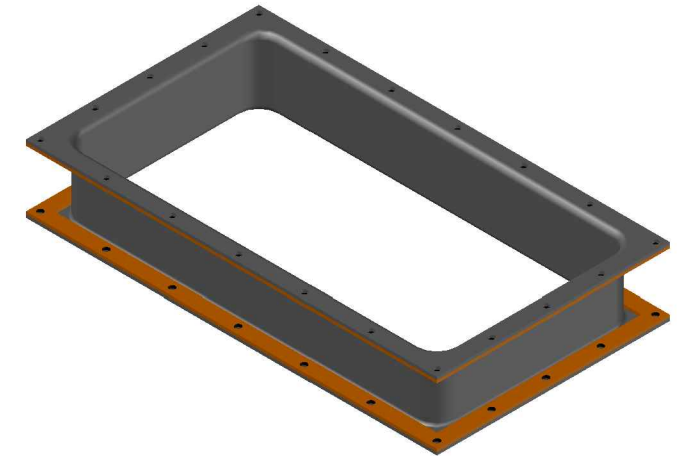
<2> REQUIRED
MATERIAL: 316 SS, 0.25" THK.
SEE NOTE 2



ELEVATION VIEW



SIDE VIEW




NOTES:

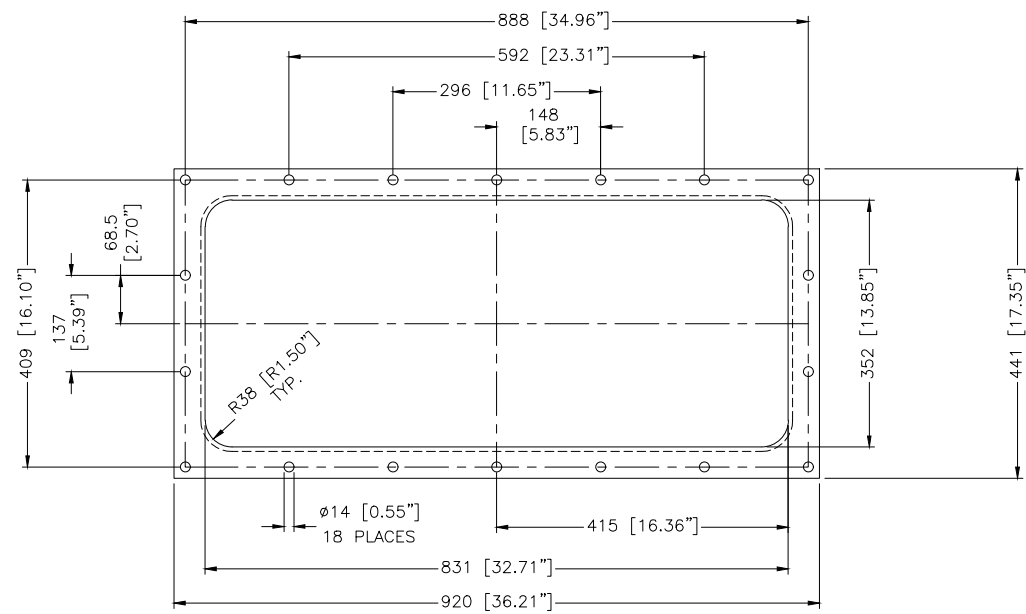
- MANUFACTURE USING FABRIC BLACK REINFORCED NEDPRENE, 0.25" THK. RUBBER PIECE DIMENSIONAL TOLERANCE: ±0.06".
- BACK-UP BARS REQUIRED 1.50"x0.25" THICK, FLATSTOCK MATERIAL: 316 SS, 0.25" THK. DIMENSIONAL TOLERANCE: ± 0.02"
- DIMENSIONS ARE INSTALLED DIMENSIONS.
- GRIND WELDS FLUSH.
- EXPANSION JOINT SUITABLE FOR USE AT PRESSURES OF ±2 PSIG.
- ALL DIMENSIONS ARE IN MM, [INCHES].

DIMENSION RANGE	TOLERANCE RANGE MILLIMETERS							
	0.5 TO 3	ABOVE 3 TO 6	ABOVE 6 TO 30	ABOVE 30 TO 120	ABOVE 120 TO 400	ABOVE 400 TO 1000	ABOVE 1000 TO 2000	ABOVE 2000 TO 4000
FINE	±0.05	±0.05	±0.1	±0.15	±0.2	±0.3	±0.5	±0.8
MEDIUM	±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
COARSE	±0.15	±0.2	±0.5	±0.8	±1.2	±2	±3	±4

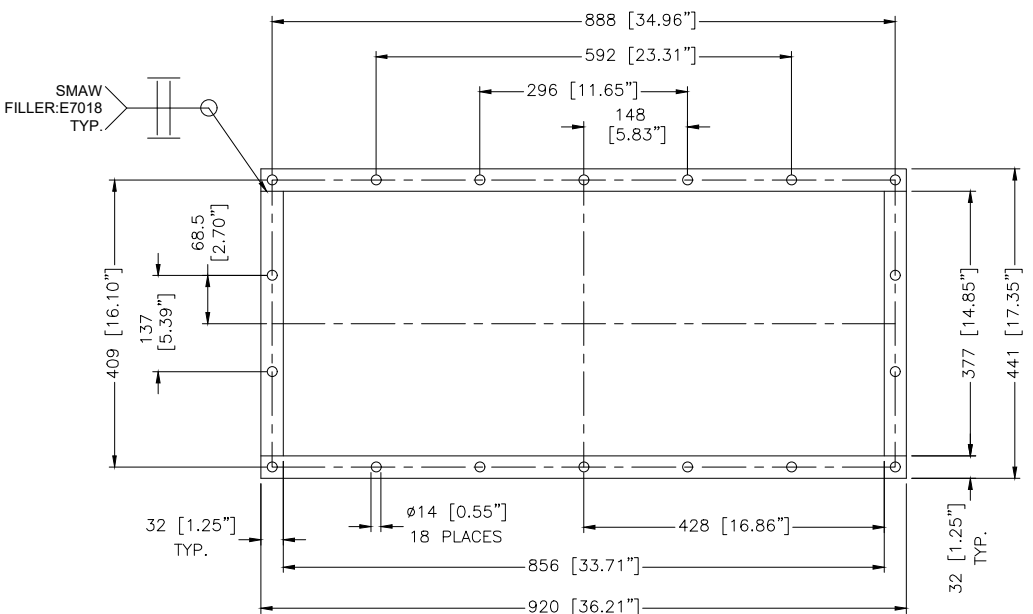
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Drawn: PHUONG P.	Date: 16-NOV-12	 Westfalia Separator Division Mechanical Equipment US, Inc. 100 FARWAY COURT, NORTHVALE, NEW JERSEY 07647	
Checked E.E.:	Date:	CENTRATE DISCHARGE FLEX CF 7000	
Checked M.E.:	Date: 14-JAN-13	Size: D	F.S.C.M. No. Dwg. No. 9149-2832-094 Scale: 1 : 5 M/F: 9149-2832-033 Sheet: 1
Approved: SBK	Date: 14-JAN-13	Rev. 1	

REVISIONS			
No.	DESCRIPTION	DATE	APPROVED
0	RELEASED FOR MANUFACTURE	05/OCT/21	PC

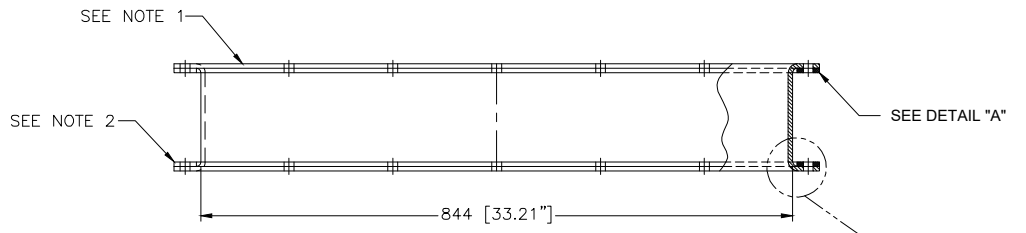


PLAN VIEW

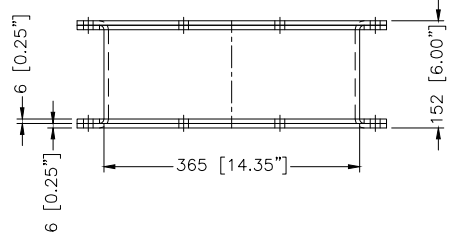


DETAIL "A"

(2) REQUIRED
MATERIAL: 316 SS, 0.25" THK.
SEE NOTE 2



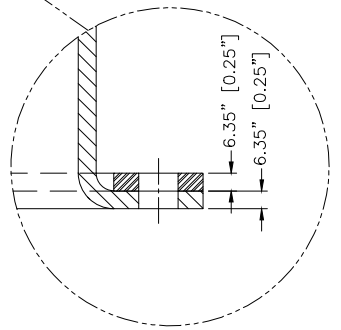
ELEVATION VIEW



SIDE VIEW

- NOTES:
1. MANUFACTURE USING FABRIC BLACK REINFORCED NEDPRENE, 0.25" THK. RUBBER PIECE DIMENSIONAL TOLERANCE: ±0.06".
 2. BACK-UP BARS REQUIRED 1.25"x0.25 THICK, FLATSTOCK MATERIAL: 316 SS, 0.25" THK.
 3. DIMENSIONS ARE INSTALLED DIMENSIONS.
 4. GRIND WELDS FLUSH.
 5. EXPANSION JOINT SUITABLE FOR USE AT PRESSURES OF ±2 PSIG.
 6. ALL DIMENSIONS ARE IN MM, [INCHES].
 7. FLEX FABRICATOR PROVIDE 18 PIECES M12x35mm LONG 316SS HEX HEAD BOLTS AND LOCK WASHERS.

DIMENSION RANGE	TOLERANCE RANGE INCHES							
	0.020 TO 0.118	ABOVE 0.118 TO 0.236	ABOVE 0.236 TO 1.181	ABOVE 1.181 TO 4.724	ABOVE 4.724 TO 15.750	ABOVE 15.750 TO 39.370	ABOVE 39.370 TO 78.740	ABOVE 78.740 TO 157.480
FINE	±0.002	±0.002	±0.004	±0.006	±0.008	±0.012	±0.020	±0.032
MEDIUM	±0.004	±0.004	±0.008	±0.012	±0.020	±0.032	±0.047	±0.079
COARSE	±0.006	±0.008	±0.020	±0.032	±0.047	±0.079	±0.118	±0.157



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Drawn: PHUONG P.	Date: 04/OCT/21	Westfalia Separator Division <small>Mechanical Equipment US, Inc. 100 FAIRWAY COURT, NORTHVALE, NEW JERSEY 07647</small>	
Checked E.E.:	Date:	Title: SOLIDS DISCHARGE FLEX CF 7000 DIVERT GATE FLEX	
Checked M.E.:	Date: 05/OCT/21	Size: D	Rev.:
Approved: PC	Date: 05/OCT/21	F.S.C.M. No.:	0
Scale: 1 : 5		M/F: 9149-2832-119	Sheet:



DATA SHEET

Nr.: 333044/2012 Rev1

Date: 18-NOV-2021

Three-phase Induction Motor - Squirrel Cage

Customer : GEA WESTFALIA SEPARATOR
 Product code : 12286805 - Ws-Mat-Nr.: 5390-7896-389
 Product line : W22 - NEMA PREMIUM EFFICIENCY

<p>Frame : 444/5T Output : 125 HP Frequency : 60 Hz Poles : 4 Rated speed : 1780 rpm Slip : 1.11 % Rated voltage : 460V Rated current : 139 A L. R. Amperes : 904 A II/In : 6.5 Code G No load current : 49.0 A Rated torque : 500 Nm Locked rotor torque : 200 % Breakdown torque : 250 % Design : B Insulation class : F Temperature rise : 80 K Locked rotor time : 27 s (hot) Service factor : 1.15 Duty cycle : S1 Ambient temperature : -20°C to +40°C Altitude : 1000 m.a.s.l</p>	<p>Enclosure : IP55 (TEFC) Mounting : B3L(E) Rotation : Both Approx. weight* : 721 kg Moment of inertia : 2.41 kgm² Sound Pressure Level : 73.0 dB(A) (global) Foundation loads - Max. traction : 7648 N - Max. compression : 14722 N</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>Load</th> <th>Power factor</th> <th>Efficiency (%)</th> </tr> </thead> <tbody> <tr> <td>100%</td> <td>0.85</td> <td>95.4</td> </tr> <tr> <td>75%</td> <td>0.82</td> <td>95.4</td> </tr> <tr> <td>50%</td> <td>0.74</td> <td>95.0</td> </tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th></th> <th>Bearing</th> <th>Quantity (lubricant)</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td>NU-319-C3</td> <td>45 g</td> </tr> <tr> <td>Rear</td> <td>6316-C3</td> <td>34 g</td> </tr> </tbody> </table> <p>Lubrication interval: 5000 h Grease - MOBIL POLYREX EM</p>	Load	Power factor	Efficiency (%)	100%	0.85	95.4	75%	0.82	95.4	50%	0.74	95.0		Bearing	Quantity (lubricant)	Front	NU-319-C3	45 g	Rear	6316-C3	34 g
Load	Power factor	Efficiency (%)																				
100%	0.85	95.4																				
75%	0.82	95.4																				
50%	0.74	95.0																				
	Bearing	Quantity (lubricant)																				
Front	NU-319-C3	45 g																				
Rear	6316-C3	34 g																				

Notes:
 Motor suitable to operate with VFD with constant torque:

- 30Hz 230VD 37kW 880rpm 123,6A 402Nm 80K
- 60Hz 460VD 55kW 1790rpm 90A 294Nm 80K ←

The figures given herewith are regarded as guaranteed values and applied to sinusoidal power supplied motors, within permissible tolerances under NEMA MG 1-12. Noise level with tolerance of +3 dB(A). (*) Weight value can be changed without previous notification.

Performed carlads	Checked marianel	Revision Nr.: 0 Date: 30-NOV-2012	Approved
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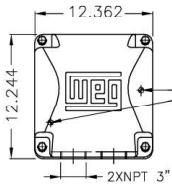
No reproduction of this drawing is allowed without written permission of WEG Motores

EIXO	
PADRÃO	X
OPCIONAL	
ESPECIAL	

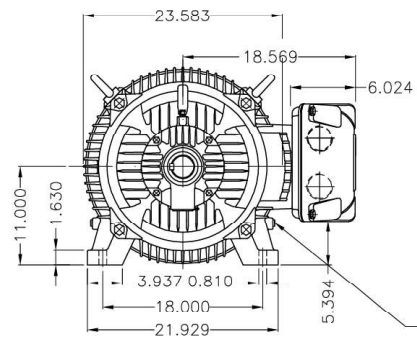
Dimensões em polegadas
Dimensions in inches

CERTIFIED WEG MOTORES
Certified document.
Not subject to changes.

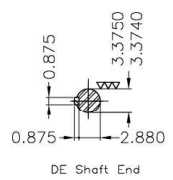
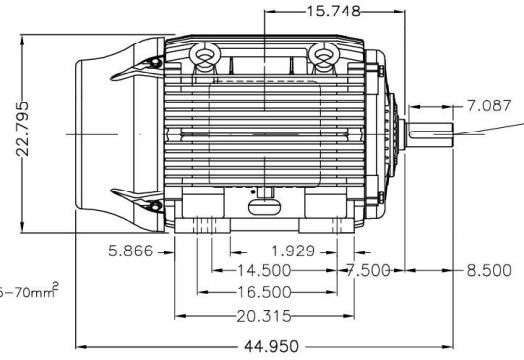
THIS IS AN UPDATED REVISION, THE PREVIOUS ONE MUST BE DISREGARDED.



Grounding for leads 35-70mm²



Grounding for leads 35-70mm²



Placa Informações Motor 01 / Motor Information plate
5390-7896-389
SUITABLE FOR VFD USE

- Balanceamento normal 1/2 chaveta / Standard balancing with half key
- Resistência de aquecimento 110 a 127 V / Space heaters 110 to 127 V
- Placa de bornes / Terminal block
- Proteção térmica desligamento - Termistor 155°C / Thermistors 155°C To trip
- Planicidade especial dos pés conforme IEEE841/API 541 / Special foot flatness according IEEE841/API 541
- Saída dos cabos voltada para a traseira / Cables outlet directed to NDE
- Dispositivo de travamento de eixo / Shaft locking device
- Rolamento dianteiro de rolos / DE roller bearing
- Plano de pintura 211P / Painting plan 211P
- Forma construtiva B3E / Mounting B3L(E)

GEA WESTFALIA SEPARATOR

50000068429	DOCUMENTO NOVO	CARLADS	PIRWUBSER	30.11.2012	00		
ECM	LDC	SUMMARY OF MODIFICATIONS	EXECUTED	CHECKED	RELEASED	DATE	VER
EXECUTED	CARLADS	THREE PHASE W22 MOTOR - NEMA PREMIUM EFF				10002034581	
CHECKED		FRAME 444/ST IP55					
RELEASED	PIRWUBSER					000	00
REL DT	30.11.2012	WMO	JARAGUA DO SUL	ENGENHARIA DE PRODUTO	SHEET	1	1



125 HP 04 Poles 60Hz

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RELEASED



DATA SHEET

Nr.: 110304/2013-A

Date: 09-JUL-2013

Three Phase Induction Motor - Squirrel Cage

Customer : GEA WESTFALIA SEPARATOR
 Product code : 12512303 - WS-Mat-Nr.: 5390-0885-039
 Product line : W22 - IE3 Premium Efficiency Multivoltage

Frame : 225S/M
 Output : 45 kW
 Frequency : 50 Hz
 Poles : 4
 Rated speed : 1475-1480-1480 rpm
 Slip : 1.67-1.33-1.33 %
 Rated voltage : 220-230-240/380/400/415V
 Rated current : 145-138-136/83.9/79.4/78.6 A
 L. R. Amperes : 1145-1091-1074/663/627/621 A
 LRC (p.u.) : 7.9
 No load current : 51.5-55.7-58.6/29.8/32.0/33.9 A
 Rated torque : 292-291-291 Nm
 Locked rotor torque : 250-280-310 %
 Breakdown torque : 270-320-330 %
 Design : N
 Insulation class : F
 Locked rotor time : 13-13-13 s (hot)
 Service factor : 1.00
 Duty cycle : S1
 Ambient temperature : -20°C to +40°C
 Altitude : 1000 m.a.s.l

Enclosure : IP55 (TEFC)
 Mounting : B8T
 Direct of rotation : Both
 Weight* : 420 kg
 Moment of inertia : 0.6903 kgm²
 Noise level : 63.0 dB(A) (global)
 Foundation loads
 Maximum traction : 8712 N
 Maximum compression : 12832 N

Load	Power factor	Efficiency (%)**
100%	0.86-0.85-0.84	94.8-94.8-94.8
75%	0.82-0.80-0.78	94.7-94.8-94.8
50%	0.77-0.70-0.67	94.3-94.2-94.0

	Bearing	Lubricant amount
Drive end	6314-ZZ-C3	-----
Non drive end	6314-ZZ-C3	-----

Lubrication interval: -----
 Polyrea Ester Oil WT/ENS

Notes:

Motor suitable to operate with VFD with constant torque:

10 Hz 46 VD 5,7 kW 280 rpm 105,2 A 195 Nm 80K
 87 Hz 400 VD 53,0 kW 2598 rpm 105,2 A 195 Nm 80K

10 Hz 67 VY 5,7 kW 280 rpm 70,0 A 195 Nm 80K
 60 Hz 400 VY 36,4 kW 1784 rpm 70,0 A 195 Nm 80K

60 Hz 460VY 36.4kW 1785rpm 61,2A 195Nm 80K ←

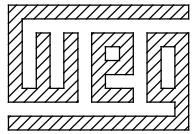
This revision replaces and cancels the previous one, which must be eliminated. The figures given herewith are regarded as guaranteed values and applied to sinusoidal power supplied motors, within permissible tolerances under IEC 60034-1. Noise level with tolerance of +3 dB(A). (*) Weight value can be changed without previous notification. (**) Efficiencies according to the indirect method of IEC 60034-2-1.

Performed by
cariane

Checked
deisej

Revision
Nr.: 5 Date: 06-JAN-2015

Approved



W22 Premium



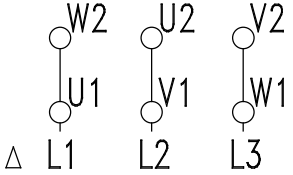
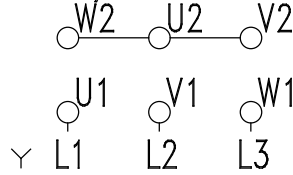
PART NUMBER:5390-0885-039



MOD.TE1BFOX0\$

IEC 60034-1

12512303

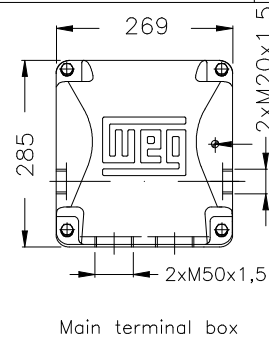
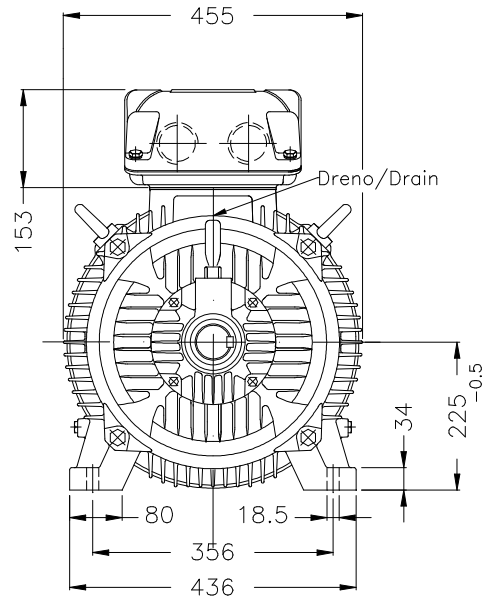
3 ~ 225S/M-04		IP55 INS CL.F ΔT 80 K S1			SF 1.00		AMB 40°C				
V		Hz	kW	RPM	A		PF	IE code	100%	75%	50%
220 Δ / 380 Y	50	45	1475	145 / 83.9	0.86	IE3	94.7	94.7	94.3		
230 Δ / 400 Y			1480	138 / 79.4						0.85	
240 Δ / 415 Y			1480	136 / 78.6						0.84	
- / 460 Y	60		1780	- / 69.9	0.85		95.0	94.5	93.6		
 → 6314-ZZ-C3  → 6314-ZZ-C3 POLYREA ESTER OIL WT/ENS								NEMA Eff 95% 60HP 460 V 60Hz 1780 RPM 69.9 A PF0.85 Des A Code J SF 1.15 CC029A Alt 1000 m.a.s.l. 424 kg			

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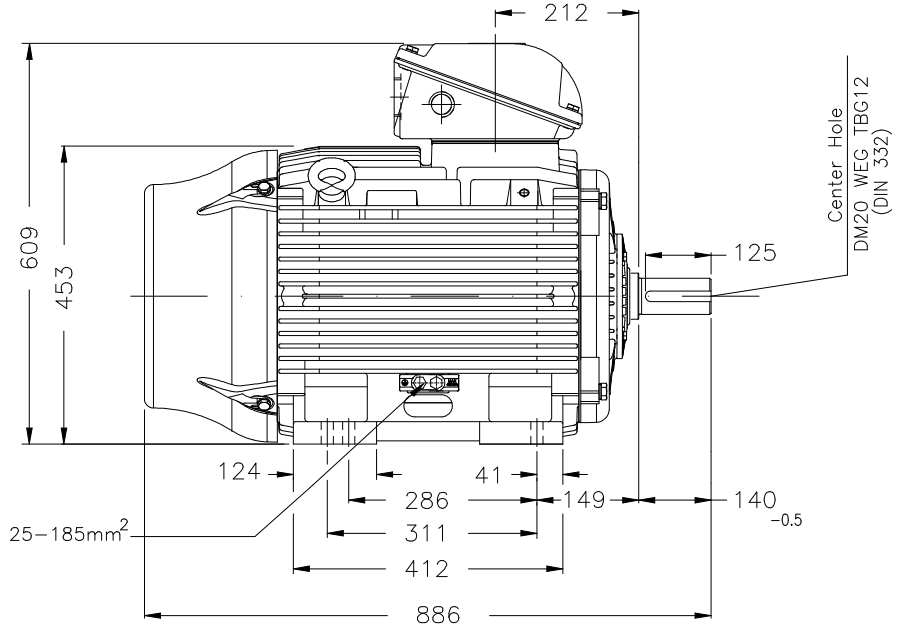
EIXO	
PADRÃO	X
OPCIONAL	
ESPECIAL	

Dimensões em mm
Dimensions in mm

THIS IS AN UPDATED REVISION, THE PREVIOUS ONE MUST BE DISREGARDED.

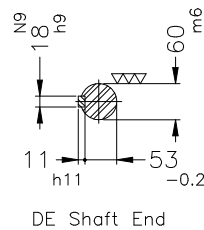


Grounding for leads 25-50mm²



Grounding for leads 25-185mm²

Placa Informações Motor 01 / Motor Information plate
SUITABLE FOR VFD USE



DE Shaft End

Tampas dianteira e traseira especiais / Special DE and N.D.E endshield						
Rolamentos dianteiro e traseiro de esferas ZZ-C3 com graxa WT/ENS / DE and NDE ZZ-C3 ball bearings with grease WT/ENS						
Anéis de fixação especiais dos rolamentos / DE and NDE special bearing caps						
Sem Graxeira / Without Grease fitting						
Resistência de aquecimento 110 a 127 V / Space heaters 110 to 127 V						
Planicidade especial dos pés conforme IEEEE841/API 541 / Special foot flatness according IEEEE841/API 541						
Plano de pintura 211P / Painting plan 211P						
Forma construtiva B8T / Mounting B8T						
GEA WESTFALIA SEPARATOR						
500001238440		ALT. CONFORME CLAIM 414454763	FRANCINES	CLEBERP	25.10.2016	06
500001050152		ALT. CONFORME CLAIM 413897727	DEISEL	ALISSON	18.06.2015	05
ECM	LOC	SUMMARY OF MODIFICATIONS	EXECUTED	CHECKED	RELEASED	DATE VER
EXECUTED	EDUARDOC1	THREE PHASE W22 MOTOR - PREMIUM EFF				
CHECKED		FRAME 225S/M IP55				
RELEASED	PATRICKL					
REL DT	17.07.2013	WMO	JARAGUA DO SUL	ENGENHARIA DE PRODUTO	SHEET	1 / 1

45 kW 04 Poles 50 Hz 412880532/01

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10002371970

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Manual geral de instalação, operação e manutenção de motores elétricos

Installation, operation and maintenance manual of electric motors

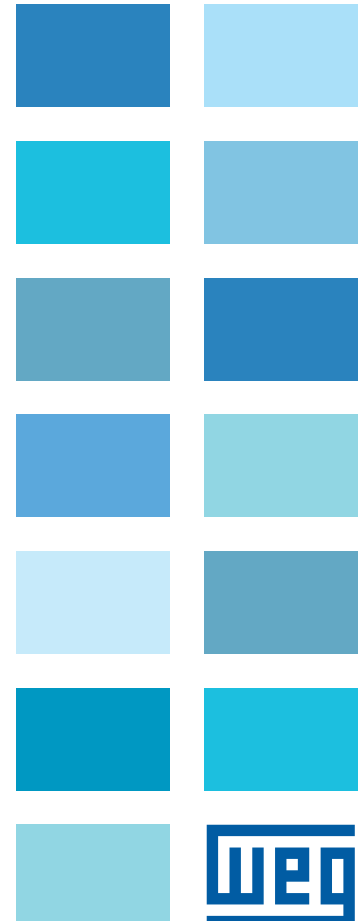
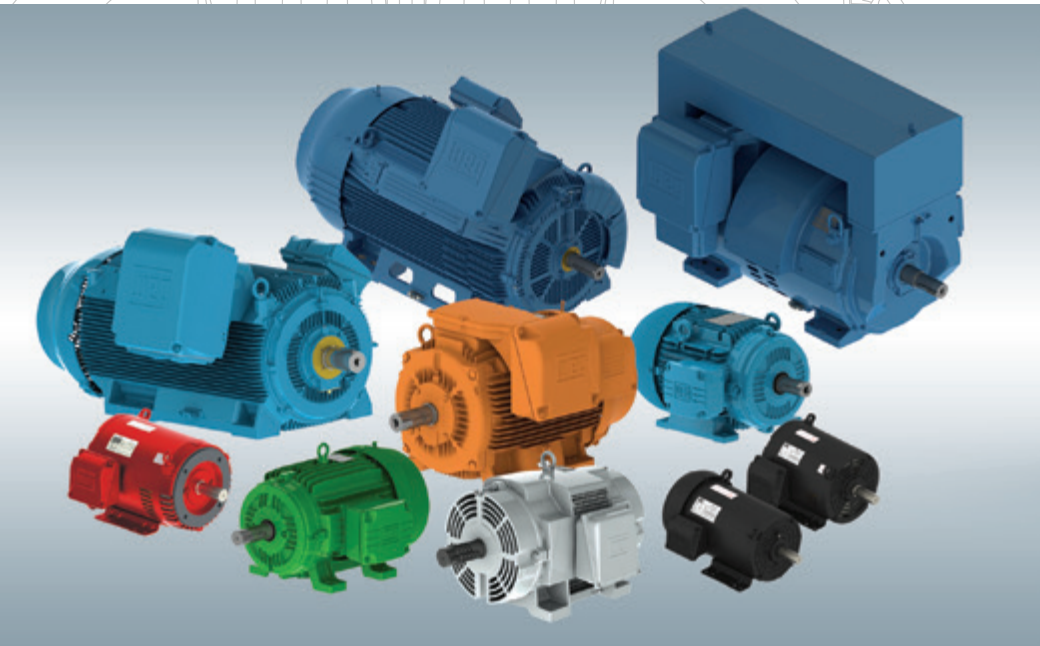
Manual general de instalación, operación y mantenimiento de motores eléctricos

Installations-, betriebs- und wartungsanleitung für elektrische motoren

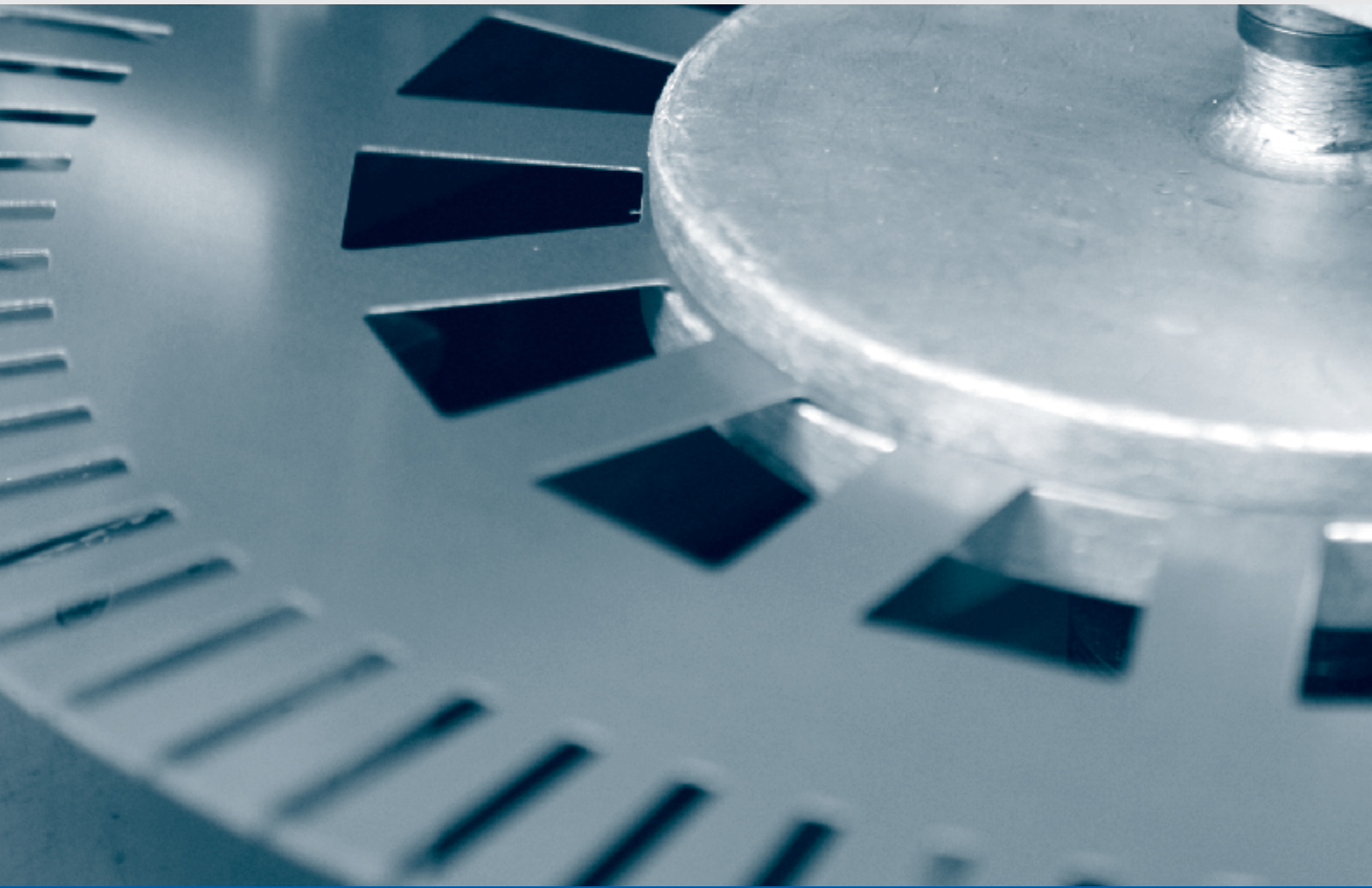
Manual de instalare, exploatare și întreținere a motoarelor electrice

Ръководство за монтаж, експлоатация и поддръжка на електродвигатели

Руководство по установке, эксплуатации и техническому обслуживанию электрических двигателей



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INSTALLATION, OPERATION AND MAINTENANCE MANUAL OF ELECTRIC MOTORS

This manual provides information about WEG induction motors fitted with squirrel cage, permanent magnet or hybrid rotors, low, medium and high voltage, in frame sizes IEC 56 to 630 and NEMA 42 to 9606/10.

The motor lines indicated below have additional information that can be checked in their respective manuals:

- Smoke Extraction Motors;
- Electromagnetic Brake Motors;
- Hazardous Area Motors.

These motors meet the following standards, if applicable:

- NBR 17094-1: Máquinas Elétricas Girantes - Motores de Indução - Parte 1: trifásicos.
- NBR 17094-2: Máquinas Elétricas Girantes - Motores de Indução - Parte 2: monofásicos.
- IEC 60034-1: Rotating Electrical Machines - Part 1: Rating and Performance.
- NEMA MG 1: Motors and Generators.
- CSA C 22.2 N°100: Motors and Generators.
- UL 1004-1: Rotating Electrical Machines - General Requirements.

If you have any questions regarding this manual please contact your local WEG branch, contact details can be found at www.weg.net.



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1. TERMINOLOGY

Balancing: the procedure by which the mass distribution of a rotor is checked and, if necessary, adjusted to ensure that the residual unbalance or the vibration of the journals and/or forces on the bearings at a frequency corresponding to service speed are within specified limits in International Standards.
[ISO 1925:2001, definition 4.1]

Balance quality grade: indicates the peak velocity amplitude of vibration, given in mm/s, of a rotor running free-in-space and it is the product of a specific unbalance and the angular velocity of the rotor at maximum operating speed.

Grounded Part: metallic part connected to the grounding system.

Live Part: conductor or conductive part intended to be energized in normal operation, including a neutral conductor.

Authorized personnel: employee who has formal approval of the company.

Qualified personnel: employee who meets the following conditions simultaneously:

- Receives training under the guidance and responsibility of a qualified and authorized professional;
- Works under the responsibility of a qualified and approved professional.

Note: *The qualification is only valid for the company that trained the employee in the conditions set out by the authorized and qualified professional responsible for training.*



2. INITIAL RECOMMENDATIONS



Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. Therefore, it is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Also the applicable procedures and relevant standards of the country where the machine will be installed must be considered.

Noncompliance with the recommended procedures in this manual and other references on the WEG website may cause severe personal injuries and/or substantial property damage and may void the product warranty.

For practical reasons, it is not possible to include in this Manual detailed information that covers all construction variables nor covering all possible assembly, operation or maintenance alternatives.

This Manual contains only the required information that allows qualified and trained personnel to carry out their services. The product images are shown for illustrative purpose only.

For *Smoke Extraction Motors*, please refer to the additional instruction manual 50026367 available on the website www.weg.net.

For brake motors, please refer to the information contained in WEG 50021973 brake motor manual available on the website www.weg.net.

For information about permissible radial and axial shaft loads, please check the product technical catalogue.



The user is responsible for the correct definition of the installation environment and application characteristics.



During the warranty period, all repair, overhaul and reclamation services must be carried out by WEG authorized Service Centers to maintain validity of the warranty.

2.1. WARNING SYMBOL



Warning about safety and warranty.

2.2. RECEIVING INSPECTION

All motors are tested during the manufacturing process.

The motor must be checked when received for any damage that may have occurred during the transportation.

All damages must be reported in writing to the transportation company, to the insurance company and to WEG. Failure to comply with such procedures will void the product warranty.

You must inspect the product:

- Check if nameplate data complies with the purchase order;
- Remove the shaft locking device (if any) and rotate the shaft by hand to ensure that it rotates freely;
- Check that the motor has not been exposed to excessive dust and moisture during the transportation.

Do not remove the protective grease from the shaft, or the plugs from the cable entries. These protections must remain in place until the installation has been completed.

2.3. NAMEPLATES

The nameplate contains information that describes the construction characteristics and the performance of the motor. Figure 2.1 and Figure 2.2 show nameplate layout examples.



Figure 2.1 - IEC motor nameplate

ENGLISH

MADE IN BRAZIL
12714027

HGF

NBR-17094-1

~	3 kW(HP-cv)	370(500)	CARC. FRAME	315C/D/E
MOTOR INDUCAO - GAIOLA INDUCT. MOTOR-SQUIRREL CAGE		FS SF	1.00	Hz 60
V	380	A	680	
RPM min ⁻¹	1784	I/P/N	6.8	F.P. P.F. 0.86
REG DUTY	S1	REND(%) NOM.EFF.	96.1	AMB. 40°C
ISOL INSL	F Δt 80 K	CAT DES	N	I.F.S. S.F.A.
	IP55	Alt	1000	m.a.n.m. m.a.s.l. 2161 kg

380 V

Δ L1 L2 L3

Y L1 L2 L3

Y L1 L2 L3

→ 6320-C3(51g) MOBIL POLYREX EM
→ 6316-C3(34g) 4500 h

12309946

HGF

VDE 0530
IEC 60034

~	3 kW	560	FRAME	355C/D/E
V	460	Hz	60	
A	841	SF	1.00	
min ⁻¹	1783	P.F.	0.87	
DUTY	S1	AMB.	40°C	
INS. CL.	F Δt 80 K		IP55	
Alt	1000 m.a.s.l.	WEIGHT	3114 kg	

460 V

Δ L1 L2 L3

Y L1 L2 L3

Y L1 L2 L3

Y-ONLY START / SOMENTE PARTIDA

→ 6322-C3(60g) MOBIL POLYREX EM
→ 6319-C3(45g) 4500 h

MADE IN BRAZIL
11437961

W22

Inverter Duty Motor
Severe Duty

MODEL:01018ET3E215T-W22

PH	3 HP(kW)	10(7.5)	FRAME	213/5T	RPM	1760		
V	208-230/	460	Hz	60	SF	1.25		
A	24.8/12.4	INS. CL.	F Δt 80 K	P.F.	0.83	DUTY	CONT.	
SFA	31/15.5	A ENCL.	TEFC	IP55	AMB.	40°C	ALT.	1000 m.a.s.l.
50Hz 1 OHP 380V 15.0A 1445 RPM SF 1.0		CODE	H	DES	B			

208-230 V(60Hz)

Δ L1 L2 L3

460 V(60Hz)

Δ L1 L2 L3

300 V(50Hz)

Δ L1 L2 L3

→ 6308-ZZ
→ 6207-ZZ

MOBIL POLYREX EM

MOD.TE1BFOXON 1182Lbs

USABLE AT 208V 27.4 A FOR USE ON VPWM VFD 1000:1VT, 20:1CT, 1.0SF,13.

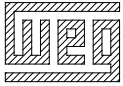


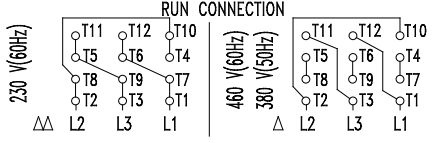
Class I, Div. 2, Gr. A, B, C & D - T3

Class I, Zone 2, IIC - T3

Class II, Div. 2, Gr. F and G - T4

CC029A

Figure 2.1 - IEC motor nameplate

MADE IN BRAZIL 11166657	 W22 NEMA Premium <small>CC029A</small>		 CE <small>FOR SAFE AREA</small>		 <small>Class I, Div. 2, Gr. A, B, C & D - T3 Class I, Zone 2, IIC - T3 Class II, Div 2, Gr. F and G - T4</small>			
	<i>Inverter Duty Motor Severe Duty</i>		MOD.TE1BFOXON		CAUTION: USE SUPPLY WIRES SUITABLE FOR 110°C			
	PH	3	HP(kW)	75(55)	FRAME	364/5T		
	V	208-230/460	Hz	60				
	A	186-168/84.1	SF	1.25				
	RPM	1775	SFA	210/105 A	INS. CL.	F	Δt	80 k
	NEMA NOM. EFF.	95.4 %		P.F.	0.86			
	CODE	G	DES	B	AMB.	40°C	DUTY	CONT.
	ENCL.	TEFC		IP55	WEIGHT	923	Lbs	
	USABLE AT 208V	186 A	50Hz	75HP 380V	103 A	1465 RPM	SF1.0	
					ALT.	1000	m.a.s.l.	



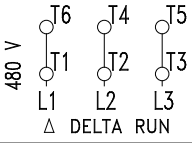
MADE IN BRAZIL 12774002	 HGF		 CE		LR 110298			
	PH	3	HP	700	FRAME	6806/7/8T		
	V	480	Hz	60				
	A	755	SF	1.00				
	RPM	1192	SFA		INS. CL.	F		
	NEMA NOM. EFF.	96.5 %		P.F.	0.85			
	CODE	G	DES		AMB.	40°C	DUTY	CONT.
	ENCL.	TEFC		TYPE	ET	WEIGHT	8339	Lbs
	Alt.	1000	m.a.s.l.					

Figure 2.2 - NEMA motor nameplate

3. SAFETY INSTRUCTIONS



The motor must be disconnected from the power supply and be completely stopped before conducting any installation or maintenance procedures. Additional measures should be taken to avoid accidental motor starting.



Professionals working with electrical installations, either in the assembly, operation or maintenance, should use proper tools and be instructed on the application of standards and safety requirements, including the use of Personal Protective Equipment (PPE) that must be carefully observed in order to reduce risk of personal injury during these services.



Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. It is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Always follow the safety, installation, maintenance and inspection instructions in accordance with the applicable standards in each country.

4. HANDLING AND TRANSPORT

Individually packaged motors should never be lifted by the shaft or by the packaging. They must be lifted only by means of the eyebolts, when supplied. Use always suitable lifting devices to lift the motor. Eyebolts on the frame are designed for lifting the machine weight only as indicated on the motor nameplate. Motors supplied on pallets must be lifted by the pallet base with lifting devices fully supporting the motor weight.

The package should never be dropped. Handle it carefully to avoid bearing damage.



Eyebolts provided on the frame are designed for lifting the machine only. Do not use these eyebolts for lifting the motor with coupled equipment such as bases, pulleys, pumps, reducers, etc..

Never use damaged, bent or cracked eyebolts. Always check the eyebolt condition before lifting the motor.

Eyebolts mounted on components, such as on end shields, forced ventilation kits, etc. must be used for lifting these components only. Do not use them for lifting the complete machine set.

Handle the motor carefully without sudden impacts to avoid bearing damage and prevent excessive mechanical stresses on the eyebolts resulting in its rupture.



To move or transport motors with cylindrical roller bearings or angular contact ball bearings, use always the shaft locking device provided with the motor.

All HGF motors, regardless of bearing type, must be transported with shaft locking device fitted.

Vertical mounted motors with oil-lubricated bearings must be transported in the vertical position. If necessary to move or transport the motor in the horizontal position, install the shaft locking device on both sides (drive end and non-drive end) of the motor.

4.1. LIFTING



Before lifting the motor ensure that all eyebolts are tightened properly and the eyebolt shoulders are in contact with the base to be lifted, as shown in Figure 4.1. Figure 4.2 shows an incorrect tightening of the eyebolt.

Ensure that lifting machine has the required lifting capacity for the weight indicated on the motor nameplate.



Figure 4.1 - Correct tightening of the eyebolt



Figure 4.2 - Incorrect tightening of the eyebolt



The center-of-gravity may change depending on motor design and accessories. During the lifting procedures the maximum allowed angle of inclination should never be exceeded as specified below.

4.1.1. Horizontal motors with one eyebolt

For horizontal motors fitted with only one eyebolt, the maximum allowed angle-of-inclination during the lifting process should not exceed 30° in relation to the vertical axis, as shown in Figure 4.3.

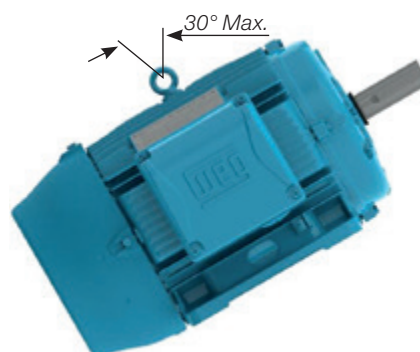


Figure 4.3 - Maximum allowed angle-of-inclination for motor with one eyebolt

4.1.2. Horizontal motor with two eyebolts

When motors are fitted with two or more eyebolts, all supplied eyebolts must be used simultaneously for the lifting procedure.

There are two possible eyebolt arrangements (vertical and inclined), as shown below:

- For motors with vertical lifting eyebolts, as shown in Figure 4.4, the maximum allowed lifting angle should not exceed 45° in relation to the vertical axis. We recommend to use a spreader beam for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface;



Figure 4.4 - Maximum resulting angle for motors with two or more lifting eyebolts

- For HGF, W40 and W50 motors, as shown in Figure 4.5, the maximum resulting angle should not exceed 30° in relation to the vertical axis;

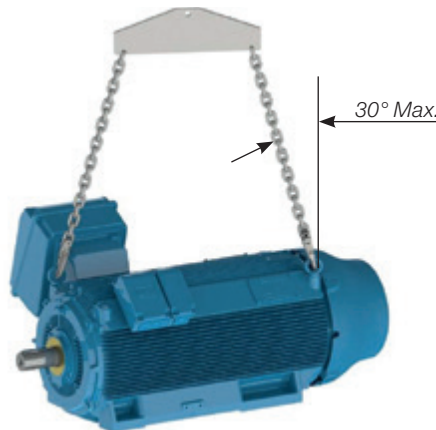


Figure 4.5 - Maximum resulting angle for horizontal HGF, W40 and W50 motors

- For motors fitted with inclined eyebolts, as shown in Figure 4.6, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 4.6 - Use of a spreader beam for lifting

4.1.3. Vertical motors

For vertical mounted motors, as shown in Figure 4.7, the use of a spreader beam is required for maintaining the lifting element (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 4.7 - Lifting of vertical mounted motors



Always use the eyebolts mounted on the top side of the motor, diametrically opposite, considering the mounting position. See Figure 4.8.



Figure 4.8 - Lifting of HGF and W50 motors.

4.1.3.1. Procedures to place W22 motors in the vertical position

For safety reasons during the transport, vertical mounted Motors are usually packed and supplied in horizontal position.

To place W22 motors fitted with eyebolts (see Figure 4.6), to the vertical position, proceed as follows:

1. Ensure that the eyebolts are tightened properly, as shown in Figure 4.1;
2. Remove the motor from the packaging, using the top mounted eyebolts, as shown in Figure 4.9;



Figure 4.9 - Removing the motor from the packaging

3. Install a second pair of eyebolts, as shown in Figure 4.10;



Figure 4.10 - Installation of the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts to start the motor rotation, as shown in Figure 4.11. This procedure must be carried out slowly and carefully.



Figure 4.11 - End result: motor placed in vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

4.1.3.2. Procedures to place HGF and W50 motors in the vertical position

HGF motors are fitted with eight lifting points: four at drive end and four at non-drive end. W50 motors are fitted with nine lifting points: four at drive end, one in the central part and four at non-drive end. The motors are usually transported in horizontal position, however for the installation they must be placed in the vertical position.

To place an these motors in the vertical position, proceed as follows:

1. Lift the motor by using the four lateral eyebolts and two hoists, see Figure 4.12;



Figure 4.12 - Lifting of HGF and W50 motors with two hoists

2. Lower the hoist fixed to motor drive end while lifting the hoist fixed to motor non-drive end until the motor reaches its equilibrium, see Figure 4.13;



Figure 4.13 - Placing HGF and W50 motors in vertical position

3. Remove the hoist hooks from the drive end eyebolts and rotate the motor 180° to fix the removed hooks into the two eyebolts at the motor non-drive end, see Figure 4.14;



Figure 4.14 - Lifting HGF and W50 motors by the eyebolts at the non-drive end

4. Fix the removed hoist hooks in the other two eyebolts at the non-drive end and lift the motor until the vertical position is reached, see Figure 4.15.



Figure 4.15 - HGF and W50 motors in the vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

4.2 Procedures to place W22 vertical mount motors in horizontal position

To place W22 vertical mount motor in horizontal position, proceed as follows:

1. Ensure that all eyebolts are tightened properly, as shown in Figure 4.1;
2. Install the first pair of eyebolts and lift the motor as shown in Figure 4.16;



Figure 4.16 - Install the first pair of eyebolts

3. Install the second pair of eyebolts, as shown in Figure 4.17;



Figure 4.17 - Install the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts for rotating the motor, as shown in Figure 4.18. This procedure must be carried out slowly and carefully;



Figure 4.18 - Motor is being rotated to horizontal position

5. Remove the first pair of eyebolts, as shown in Figure 4.19.



Figure 4.19 - Final result: motor placed in horizontal position

5. STORAGE

If the motor is not installed immediately, it must be stored in a dry and clean environment, with relative humidity not exceeding 60%, with an ambient temperature between 5 °C and 40 °C, without sudden temperature changes, free of dust, vibrations, gases or corrosive agents. The motor must be stored in horizontal position, unless specifically designed for vertical operation, without placing objects on it. Do not remove the protection grease from shaft end to prevent rust.

If the motor are fitted with space heaters, they must always be turned on during the storage period or when the installed motor is out of operation. Space heaters will prevent water condensation inside the motor and keep the winding insulation resistance within acceptable levels. Store the motor in such position that the condensed water can be easily drained. If fitted, remove pulleys or couplings from the shaft end (more information are given on item 6).



The space heaters should never be energized when the motor is in operation.

5.1. EXPOSED MACHINED SURFACES

All exposed machined surfaces (like shaft end and flange) are factory-protected with temporary rust inhibitor. A protective film must be reapplied periodically (at least every six months), or when it has been removed and/or damaged.

5.2. STORAGE

The stacking height of the motor packaging during the storage period should not exceed 5 m, always considering the criteria indicated in Table 5.1:

Table 5.1 - Max. recommended stacking height

Packaging type	Frame sizes	Maximum stacking quantity
Cardboard box	IEC 63 to 132 NEMA 143 to 215	Indicated on the top side of the cardboard box
Wood crate	IEC 63 to 315 NEMA 48 to 504/5	06
	IEC 355 NEMA 586/7 and 588/9	03
	W40 / W50 / HGF IEC 315 to 630 W40 / W50 / HGF NEMA 5000 to 9600	Indicated on the packaging

Notes:

- 1) Never stack larger packaging onto smaller packaging;
- 2) Align the packaging correctly (see Figure 5.1 and Figure 5.2);

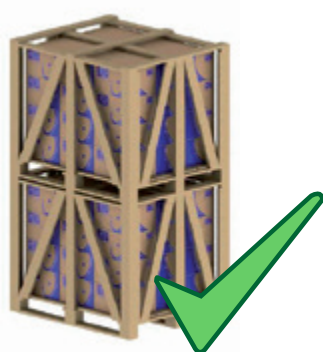


Figure 5.1 - Correct stacking

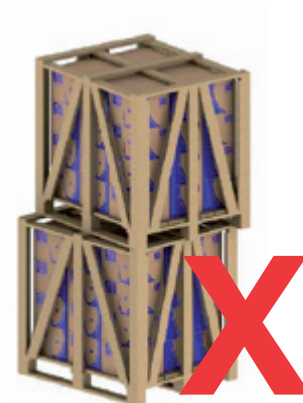


Figure 5.2 - Incorrect stacking

3) The feet of the crates above should always be supported by suitable wood battens (Figure 5.3) and never stand on the steel tape or without support (Figure 5.4);



Figure 5.3 - Correct stacking

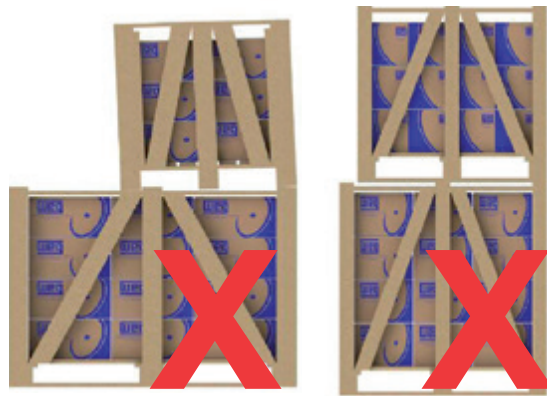


Figure 5.4 - Incorrect stacking

4) When stacking smaller crates onto longer crates, always ensure that suitable wooden supports are provided to withstand the weight (see Figure 5.5). This condition usually occurs with motor packaging above IEC 225S/M (NEMA 364/5T) frame sizes.

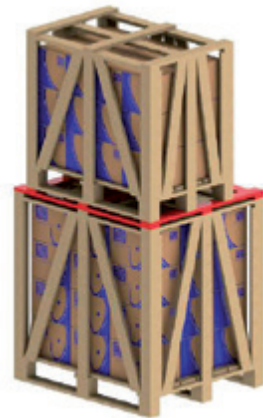


Figure 5.5 - Use of additional battens for stacking

5.3 BEARINGS

5.3.1 Grease lubricated bearings

We recommend rotating the motor shaft at least once a month (by hand, at least five revolutions, stopping the shaft at a different position from the original one). If the motor is fitted with shaft locking device, remove it before rotating the shaft and install it again before performing any handling procedure. Vertical motors may be stored in the vertical or in horizontal position. If motors with open bearings are stored longer than six months, the bearings must be relubricated according to item 8.2 before commissioning of the motor.

If the motor is stored for longer than 2 years, the bearings must be replaced or removed, washed, inspected and relubricated according to item 8.2.

5.3.2 Oil lubricated bearings

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the center of the sight glass.

During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced according to Item 8.2, before starting the operation. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to Item 8.2. The oil of vertical mounted motors is removed to prevent oils leaks during the transport. After receiving the motor the bearings must be lubricated.

5.3.3 Oil Mist lubricated bearings

The motor must be stored in horizontal position. Lubricate the bearings with ISO VG 68 mineral oil in the amount indicated in the Table 5.2 (this is also valid for bearings with equivalent dimensions). After filling with oil, rotate the shaft by hand, at least five revolutions)

During the storage period, remove the shaft locking device (if any) and rotate the shaft by hand every week, at least five revolutions, stopping it at a different position from the original one. Reinstall the shaft locking device every time the motor has to be moved. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to item 8.2.

Table 5.2 - Amount of oil per bearing

Bearing size	Amount of oil (ml)	Bearing size	Amount of oil (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

The oil must always be removed when the motor has to be handled. If the oil mist system is not operating after installation, fill the bearings with oil to prevent bearing rusting. During the storage period, rotate the shaft by hand, at least five revolutions, stopping it at a different position from the original one. Before starting the motor, all bearing protection oil must be drained from the bearing and the oil mist system must be switched ON.

5.3.4 Sleeve bearing

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the middle of the sight glass. During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, and at 30 rpm, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced, according to Item 8.2, before starting the operation.

If the motor is stored for a period longer than the oil change interval, or if it is not possible to rotate the motor shaft by hand, the oil must be drained and a corrosion protection and dehumidifiers must be applied.

5.4. INSULATION RESISTANCE

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

5.4.1. Insulation resistance measurement

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.



The insulation resistance must be measured in a safe environment.

The insulation resistance must be measured with a megohmmeter. The machine must be in cold state and disconnected from the power supply.



To prevent the risk of an electrical shock, ground the terminals before and after each measurement. Ground the capacitor (if any) to ensure that it is fully discharged before the measurement is taken.

It is recommended to insulate and test each phase separately. This procedure allows the comparison of the insulation resistance between each phase. During the test of one phase, the other phases must be grounded. The test of all phases simultaneously evaluates the insulation resistance to ground only but does not evaluate the insulation resistance between the phases.

The power supply cables, switches, capacitors and other external devices connected to the motor may considerably influence the insulation resistance measurement. Thus all external devices must be disconnected and grounded during the insulation resistance measurement.

Measure the insulation resistance one minute after the voltage has been applied to the winding. The applied voltage should be as shown in Table 5.3.

Table 5.3 - Voltage for the insulation resistance

Winding rated voltage (V)	Testing voltage for measuring the insulation resistance (V)
< 1000	500
1000 - 2500	500 - 1000
2501 - 5000	1000 - 2500
5001 - 12000	2500 - 5000
> 12000	5000 - 10000

The reading of the insulation resistance must be corrected to 40 °C as shown in the Table 5.4.

Table 5.4 - Correction factor for the insulation resistance corrected to 40 °C

Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C	Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C
10	0.125	30	0.500
11	0.134	31	0.536
12	0.144	32	0.574
13	0.154	33	0.616
14	0.165	34	0.660
15	0.177	35	0.707
16	0.189	36	0.758
17	0.203	37	0.812
18	0.218	38	0.871
19	0.233	39	0.933
20	0.250	40	1.000
21	0.268	41	1.072
22	0.287	42	1.149
23	0.308	43	1.231
24	0.330	44	1.320
25	0.354	45	1.414
26	0.379	46	1.516
27	0.406	47	1.625
28	0.435	48	1.741
29	0.467	49	1.866
30	0.500	50	2.000

The motor insulation condition must be evaluated by comparing the measured value with the values indicated in Table 5.5 (corrected to 40 °C):

Table 5.5 - Evaluation of the insulation system

Limit value for rated voltage up to 1.1 kV (MΩ)	Limit value for rated voltage above 1.1 kV (MΩ)	Situation
Up to 5	Up to 100	Dangerous. The motor can not be operated in this condition
5 to 100	100 to 500	Regular
100 to 500	Higher than 500	Good
Higher than 500	Higher than 1000	Excellent

The values indicated in the table should be considered only as reference values. It is advisable to log all measured values to provide a quick and easy overview on the machine insulation resistance.

If the insulation resistance is low, moisture may be present in the stator windings. In this case the motor should be removed and transported to a WEG authorized Service Center for proper evaluation and repair (This service is not covered by the warranty). To improve the insulation resistance through the drying process, see section 8.4.



6. INSTALLATION



The insulation resistance must be measured in a safe environment.

Check some aspects before proceeding with the installation:

1. Insulation resistance: must be within the acceptable limits. See item 5.4.
2. Bearings:
If the motor is installed without running immediately, proceed as described in item 5.3.
3. Operating conditions of the start capacitors: If single-phase motors are stored for a period of over two years, it is recommended to change the start capacitors before motor starting since they lose their operating characteristics.
4. Terminal box:
 - a. the inside of the terminal box must be clean and dry;
 - b. the contacts must be correctly connected and corrosion free. See 6.9 and 6.10;
 - c. the cable entries must be correctly sealed and the terminal box cover properly mounted in order to ensure the degree of protection indicated on the motor nameplate.
5. Cooling: the cooling fins, air inlet and outlet openings must be clean and unobstructed. The distance between the air inlet openings and the wall should not be shorter than $\frac{1}{4}$ (one quarter) of the diameter of the air inlet. Ensure sufficient space to perform the cleaning services. See item 7.
6. Coupling: remove the shaft locking device (where fitted) and the corrosion protection grease from the shaft end and flange just before installing the motor. See item 6.4.
7. Drain hole: the motor must always be positioned so the drain hole is at the lowest position (If there is any indication arrow on the drain, the drain must be so installed that the arrow points downwards).
Motors supplied with rubber drain plugs leave the factory in the closed position and must be opened periodically to allow the exit of condensed water. For environments with high water condensation levels and motor with degree of protection IP55, the drain plugs can be mounted in open position (see Figure 6.1). For motors with degree of protection IP56, IP65 or IP66, the drain plugs must remain at closed position (see Figure 6.1), being opened only during the motor maintenance procedures.
The drain system of motors with Oil Mist lubrication system must be connected to a specific collection system (see Figure 6.12).

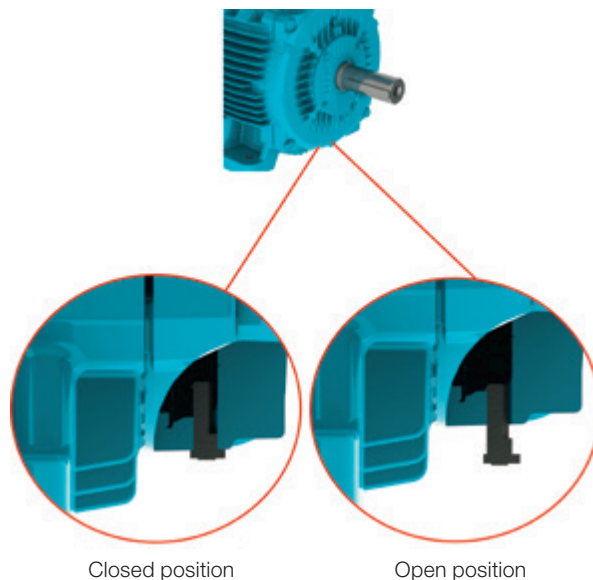


Figure 6.1 - Detail of the rubber drain plug mounted in closed and open position

8. Additional recommendations:

- a. Check the direction of motor rotation, starting the motor at no-load before coupling it to the load;
- b. Vertical mounted motors with shaft end down must be fitted with drip cover to protect them from liquids or solids that may drop onto the motors;
- c. Vertical mounted motors with shaft end up should be fitted with water slinger ring to prevent water ingress inside the motor.
- d. The fixing elements mounted in the threaded through holes in the motor enclosure (for example, the flange) must be properly sealed.



Remove or fix the shaft key before starting the motor.



Changes on the motor construction (features), such as installation of extended grease fittings or modification of the lubrication system, installation of accessories at alternative locations, etc., can be carried out only after prior written consent from WEG.

6.1. FOUNDATIONS

The foundation is the structure, structural element, natural or prepared base, designed to withstand the stresses produced by the installed equipment, ensuring safe and stable performance during operation. The foundation design should consider the adjacent structures to avoid the influences of other installed equipment and no vibration is transferred through the structure

The foundation must be flat and its selection and design must consider the following characteristics:

- a) The features of the machine to be installed on the foundation, the driven loads, application, maximum allowed deformations and vibration levels (for instance, motors with reduced vibration levels, foot flatness, flange concentricity, axial and radial loads, etc. lower than the values specified for standard motors).
- b) Adjacent buildings, conservation status, maximum applied load estimation, type of foundation and fixation and vibrations transmitted by these constructions.

If the motor is supplied with leveling/alignment bolts, this must be considered in the base design.



Please consider for the foundation dimensioning all stresses that are generated during the operation of the driven load.
The user is responsible for the foundation designing and construction.

The foundation stresses can be calculated by using the following equations (see Figure 6.2):

$$F_1 = 0,5 * g * m - (4 * T_b / A)$$

$$F_2 = 0,5 * g * m + (4 * T_b / A)$$

Where:

- F₁ and F₂ = lateral stresses (N);
- g = gravitational acceleration (9,8 m/s²);
- m = motor weight (kg);
- T_b = breakdown torque (Nm);
- A = distance between centerlines of mounting holes in feet or base of the machine (end view) (m).



The motors may be mounted on:

- Concrete bases: are most used for large-size motors (see Figure 6.2);
- Metallic bases: are generally used for small-size motors (see Figure 6.3).

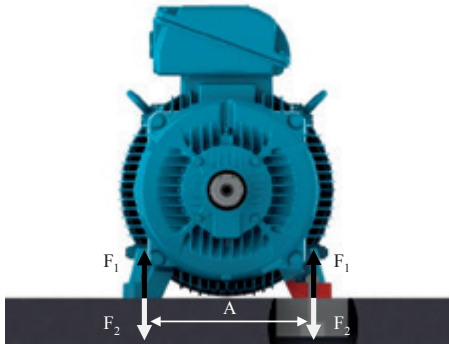


Figure 6.2 - Motor installed on concrete base



Figure 6.3 - Motor installed on metallic base

The metallic and concrete bases may be fitted with sliding system. These types of foundations are generally used where the power transmission is achieved by belts and pulleys. This power transmission system is easier to assemble/disassemble and allows the belt tension adjustment. Other important aspect of this foundation type is the location of the base locking screws that must be diagonally opposite. The rail nearest the drive pulley is placed in such a way that the positioning bolt is between the motor and the driven machine. The other rail must be placed with the bolt on the opposite side (diagonally opposite), as shown in Figure 6.4 .

To facilitate assembly, the bases may have the following features:

- Shoulders and/or recesses;
- Anchor bolts with loose plates;
- Bolts cast in the concrete;
- Leveling screws;
- Positioning screws;
- Steel & cast iron blocks, plates with flat surfaces.

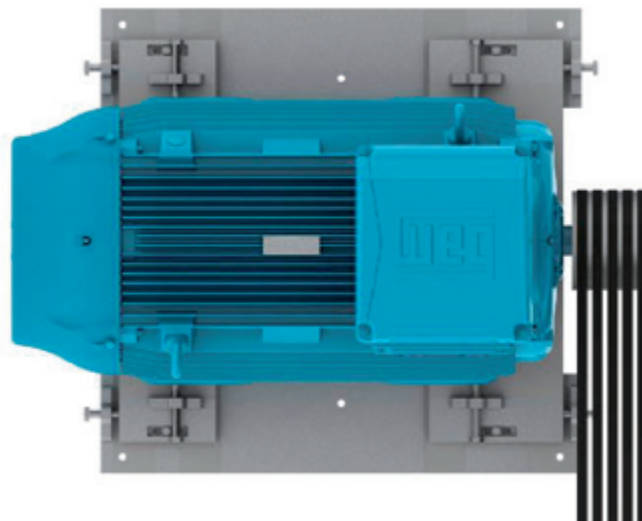



Figure 6.4 - Motor installed on sliding base

After completing the installation, it is recommended that all exposed machined surfaces are coated with suitable rust inhibitor.

6.2. MOTOR MOUNTING

 Footless motors supplied with transportation devices, according to Figure 6.5, must have their devices removed before starting the motor installation.

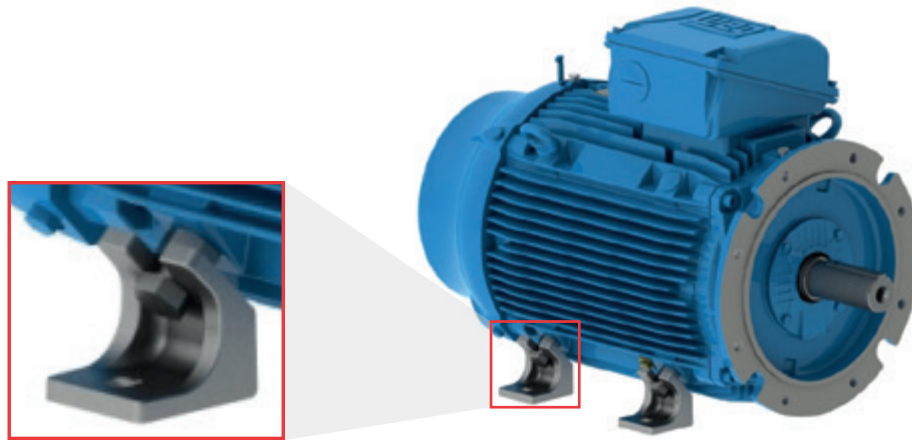


Figure 6.5 - Detail of the transportation devices for footless motors

6.2.1. Foot mounted motors

The drawings of the mounting hole dimensions for NEMA or IEC motors can be checked in the respective technical catalogue.

The motor must be correctly aligned and leveled with the driven machine. Incorrect alignment and leveling may result in bearing damage, generate excessive vibration and even shaft distortion/breakage.

For more details, see section 6.3 and 6.6. The thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. This thread engagement length should be evaluated in more severe applications and increased accordingly.

Figure 6.6 shows the mounting system of a foot mounted motor indicating the minimum required thread engagement length.

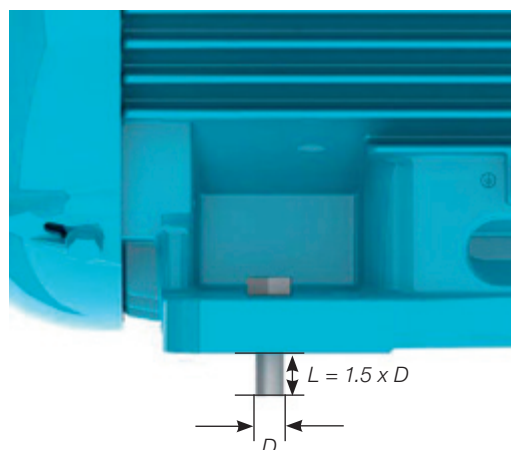


Figure 6.6 - Mounting system of a foot mounted motor


6.2.2. Flange mounted motors

The drawings of the flange mounting dimensions, IEC and NEMA flanges, can be checked in the technical catalogue.

The coupling of the driven equipment to the motor flange must be properly dimensioned to ensure the required concentricity of the assembly.

Depending on the flange type, the mounting can be performed from the motor to the driven equipment flange (flange FF (IEC) or D (NEMA)) or from the driven equipment flange to the motor (flange C (DIN or NEMA)).

For the mounting process from the driven equipment flange to the motor, you must consider the bolt length, flange thickness and the thread depth of the motor flange.

 If the motor flange has tapped through-holes, the length of the mounting bolts must not exceed the tapped through-hole length of the motor flange, thus preventing damage to the winding head.

For flange mounting the thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. In severe applications, longer thread engagement length may be required. In severe applications or if large motors are flange mounted, a foot or pad mounting may be required in addition to the flange mounting (Figure 6.7). The motor must never be supported on its cooling fins.

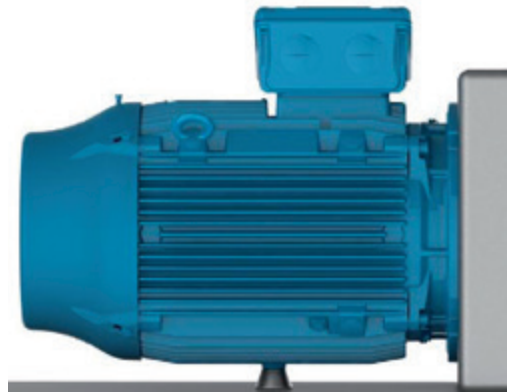


Figure 6.7 - Mounting method of flange mounted motors with frame base support

Note:

When liquid (for example oil) is likely to come into contact with the shaft seal, please contact your local WEG representative.

6.2.3. Pad mounted motors

Typically, this method of mounting is used in axial fans. The motor is fixed by tapped holes in the frame. The dimensions of these tapped holes can be checked in the respective product catalogue. The selection of the motor mounting rods/bolts must consider the dimensions of the fan case, the installation base and the thread depth in the motor frame.

The mounting rods and the fan case wall must be sufficiently stiff to prevent the transmission of excessive vibration to the machine set (motor & fan). Figure 6.8 shows the pad mounting system.

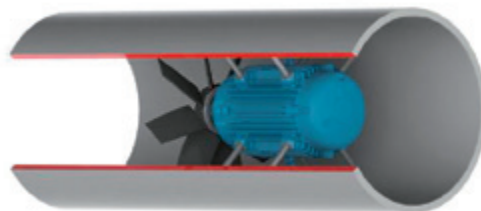


Figure 6.8 - Mounting of the motor inside the cooling duct

6.3. BALANCING

Unbalanced machines generate vibration which can result in damage to the motor. WEG motors are dynamically balanced with “half key” and without load (uncoupled). Special balancing quality level must be stated in the Purchase Order.



The transmission elements, such as pulleys, couplings, etc., must be balanced with “half key” before they are mounted on the motor shaft.

The balance quality grade meets the applicable standards for each product line.

The maximum balancing deviation must be recorded in the installation report.

6.4. COUPLINGS

Couplings are used to transmit the torque from the motor shaft to the shaft of the driven machine. The following aspects must be considered when couplings are installed:

- Use proper tools for coupling assembly & disassembly to avoid damages to the motor and bearings;
- Whenever possible, use flexible couplings, since they can absorb eventual residual misalignments during the machine operation;
- The maximum loads and speed limits informed in the coupling and motor manufacturer catalogues cannot be exceeded;
- Level and align the motor as specified in sections 6.5 and 6.6, respectively.



Remove or fix the shaft key firmly when the motor is operated without coupling in order to prevent accidents.

6.4.1. Direct coupling

Direct coupling is characterized when the Motor shaft is directly coupled to the shaft of the driven machine without transmission elements. Whenever possible, use direct coupling due to lower cost, less space required for installation and more safety against accidents.



Do not use roller bearings for direct coupling, unless sufficient radial load is expected.

6.4.2. Gearbox coupling

Gearbox coupling is typically used where speed reduction is required. Make sure that shafts are perfectly aligned and strictly parallel (in case of straight spur gears) and in the right meshing angle (in case of bevel and helical gears).

6.4.3. Pulley and belt coupling

Pulleys and belts are used when speed increase or reduction between motor shaft and driven load is required.



Excessive belt tension will damage the bearings and cause unexpected accidents such as breakage of the motor shaft.

6.4.4. Coupling of sleeve bearing motors



Motors designed with sleeve bearings must be operated with direct coupling to the driven machine or a gearbox. Pulley and belts can not be applied for sleeve bearing motors.

Motors designed with sleeve bearings have 3 (three) marks on the shaft end. The center mark is the indication of the magnetic center and the 2 (two) outside marks indicate the allowed limits of the rotor axial movement, as shown in Figure 6.9.

The motor must be so coupled that during operation the arrow on the frame is placed over the central mark indicating the rotor magnetic center. During start-up, or even during operation, the rotor may freely move between the two outside marks when the driven machine exerts an axial load on the motor shaft. However, under no circumstance, the motor can operate continuously with axial forces on the bearing.

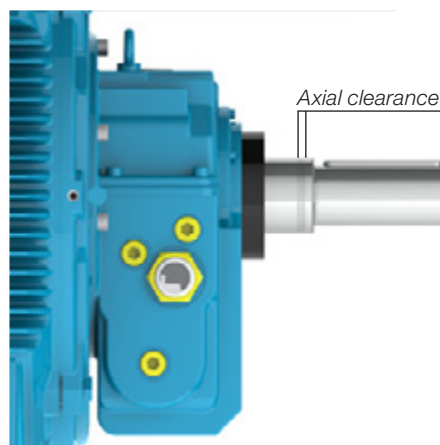


Figure 6.9 - Axial clearance of motor designed with sleeve bearing





For coupling evaluation consider the maximum axial bearing clearance as shown in Table 6.1. The axial clearance of the driven machine and coupling influence the maximum bearing clearance.

Table 6.1 - Clearance used for sleeve bearings

Bearing size	Total axial clearance (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 = 10
18	7,5 + 7,5 = 15

* For Motors in accordance with API 541, the total axial clearance is 12.7 mm

The sleeve bearings used by WEG were not designed to support axial load continuously. Under no circumstance must the motor be operated continuously at its axial clearance limits.

6.5. LEVELING

The motor must be leveled to correct any deviations in flatness arising from the manufacturing process and the material structure rearrangement. The leveling can be carried out by a leveling screw fixed on the motor foot or on the flange or by means of thin compensation shims. After the leveling process, the leveling height between the motor mounting base and the motor cannot exceed 0.1 mm.

If a metallic base is used to level the height of the motor shaft end and the shaft end of the driven machine, level only the metallic base relating to the concrete base.

Record the maximum leveling deviations in the installation report.

6.6. ALIGNMENT

The correct alignment between the motor and the driven machine is one of the most important variables that extends the useful service life of the motor. Incorrect coupling alignment generates high loads and vibrations reducing the useful life of the bearings and even resulting in shaft breakages. Figure 6.10 illustrates the misalignment between the motor and the driven machine.

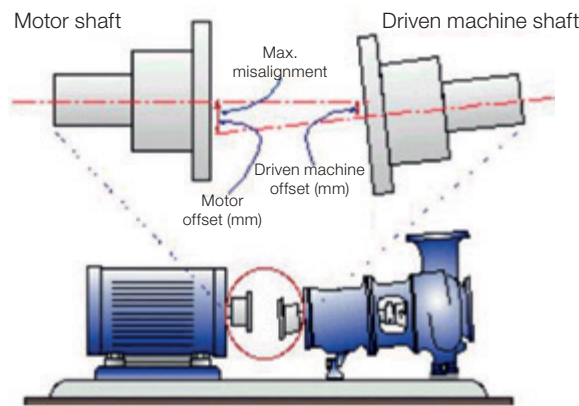


Figure 6.10 - Typical misalignment condition

Alignment procedures must be carried out using suitable tools and devices, such as dial gauge, laser alignment instruments, etc.. The motor shaft must be aligned axially and radially with the driven machine shaft.

The maximum allowed eccentricity for a complete shaft turn should not exceed 0.03 mm, when alignment is made with dial gauges, as shown in Figure 6.11. Ensure a gap between couplings to compensate the thermal expansion between the shafts as specified by the coupling manufacturer.

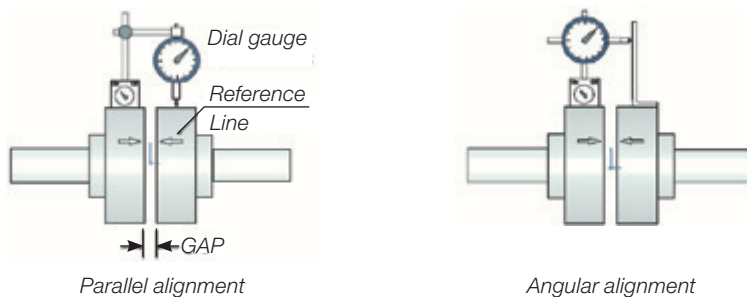


Figure 6.11 - Alignment with dial gauge

If alignment is made by a laser instrument, please consider the instructions and recommendations provided by the laser instrument manufacturer.

The alignment should be checked at ambient temperature with machine at operating temperature.



The coupling alignment must be checked periodically.

Pulley and belt couplings must be so aligned that the driver pulley center lies in the same plane of the driven pulley center and the motor shaft and the shaft of the driven machine are perfectly parallel.

After completing the alignment procedures, ensure that mounting devices do not change the motor and machine alignment and leveling resulting into machine damage during operation.

It is recommended to record the maximum alignment deviation in the Installation Report.

6.7. CONNECTION OF OIL LUBRICATED OR OIL MIST LUBRICATED MOTORS

When oil lubricated or oil mist lubricated motors are installed, connect the existing lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 6.12. The lubrication system must ensure continuous oil flow through the bearings as specified by the manufacturer of the installed lubrication system.

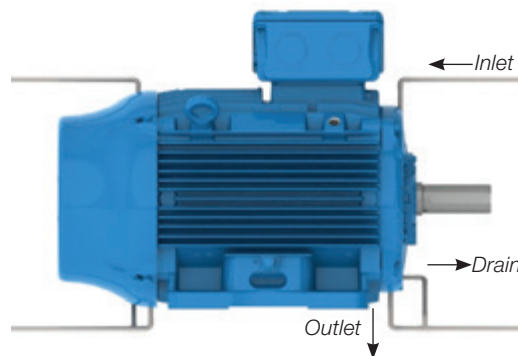


Figure 6.12 - Oil supply and drain system of oil lubricated or oil mist lubricated motors

6.8. CONNECTION OF THE COOLING WATER SYSTEM

When water cooled motors are installed, connect the water inlet and outlet tubes to ensure proper motor cooling. According to item 7.2, ensure correct cooling water flow rate and water temperature in the motor cooling system.

6.9. ELECTRICAL CONNECTION

Consider the rated motor current, service factor, starting current, environmental and installation conditions, maximum voltage drop, etc. to select appropriate power supply cables and switching and protection devices. All motors must be installed with overload protection systems. Three-phase motors should be fitted with phase fault protection systems.



Before connecting the motor, check if the power supply voltage and the frequency comply with the motor nameplate data. All wiring must be made according to the connection diagram on the motor nameplate. Please consider the connection diagrams in the Table 6.2 as reference value.

To prevent accidents, check if motor has been solidly grounded in accordance with the applicable standards.




Table 6.2 - Typical connection diagram for three-phase motors.

Configuration	Quantity of leads	Type of connection	Connection diagram															
Single speed	3	-																
	6	Δ - Y																
	9	YY - Y																
		$\Delta\Delta$ - Δ																
	12	$\Delta\Delta$ - YY - Δ - Y																
	Δ - PWS Part-winding start	<table border="0"> <tr> <td colspan="2" style="text-align: center;">PART-WINDING</td> <td colspan="2" style="text-align: center;">WYE-DELTA</td> </tr> <tr> <td style="text-align: center;">START</td> <td style="text-align: center;">RUN</td> <td style="text-align: center;">START</td> <td style="text-align: center;">RUN</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>L1 L2 L3</td> <td>L1 L2 L3</td> <td>L1 L2 L3</td> <td>L1 L2 L3</td> </tr> </table>	PART-WINDING		WYE-DELTA		START	RUN	START	RUN					L1 L2 L3	L1 L2 L3	L1 L2 L3	L1 L2 L3
PART-WINDING		WYE-DELTA																
START	RUN	START	RUN															
L1 L2 L3	L1 L2 L3	L1 L2 L3	L1 L2 L3															
Double speed Dahlander	6	YY - Y Variable Torque																
		Δ - YY Constant Torque																
		YY - Δ Constant Output																
	9	Δ - Y - YY																
Double speed Double winding	6	-																

Equivalent table for lead identification

Lead identification on the wiring diagram		1	2	3	4	5	6	7	8	9	10	11	12
Single speed	NEMA MG 1 Part 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
	JIS (JEC 2137) - up to 6 terminals	U	V	W	X	Y	Z						
	JIS (JEC 2137) - above 6 terminals	U1	V1	W1	U2	V2	W2	U5	V5	W5	U6	V6	W6
Double speed (Dahlander / Double winding)	NEMA MG 1 Part 2 ¹⁾	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	JIS (JEC 2137)	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

1) NEMA MG 1 Part 2 defines T1 to T12 for two or more winding, however WEG adopts 1U to 4W.

 **WARNING** - Local Standards have priority on the definition of the connection standards.

The connections presented below are a reference for the connection of the customer's power cables on low voltage motors with terminal block. The terminal blocks presented below are the standard for each product line, however variations may occur. It is recommended the use of terminals made of electrolytic copper or brass, similar to the terminals used on the motors cables.

W21 and W22

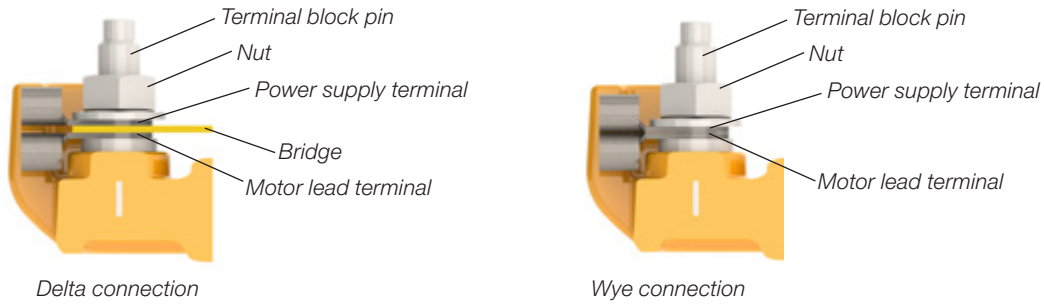


Figure 6.13 - Connection for W21 and W22 motors with terminal block

W50 and HGF

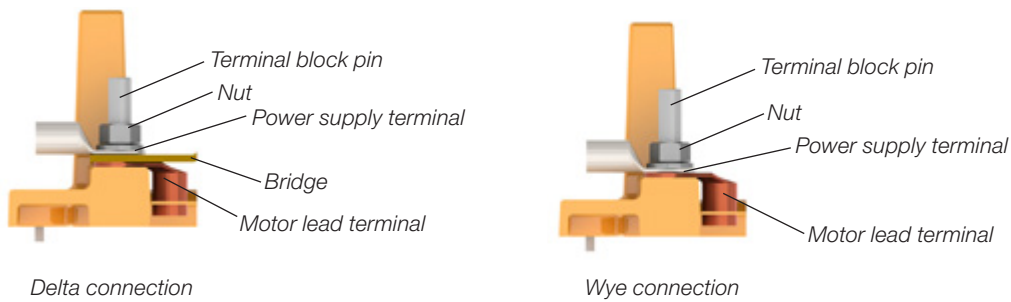


Figure 6.14 - Connection for W50 and HGF motors with terminal block

If motors are supplied without terminal blocks, insulate the cable terminals with suitable insulation material that meets the power supply voltage and the insulation class indicated on the motor nameplate.

Ensure correct tightening torque for the power cable and grounding connections as specified in Table 8.11

The clearance distance (see Figure 6.15) between non-insulated live parts with each other and between grounded parts must be as indicated in Table 6.3.

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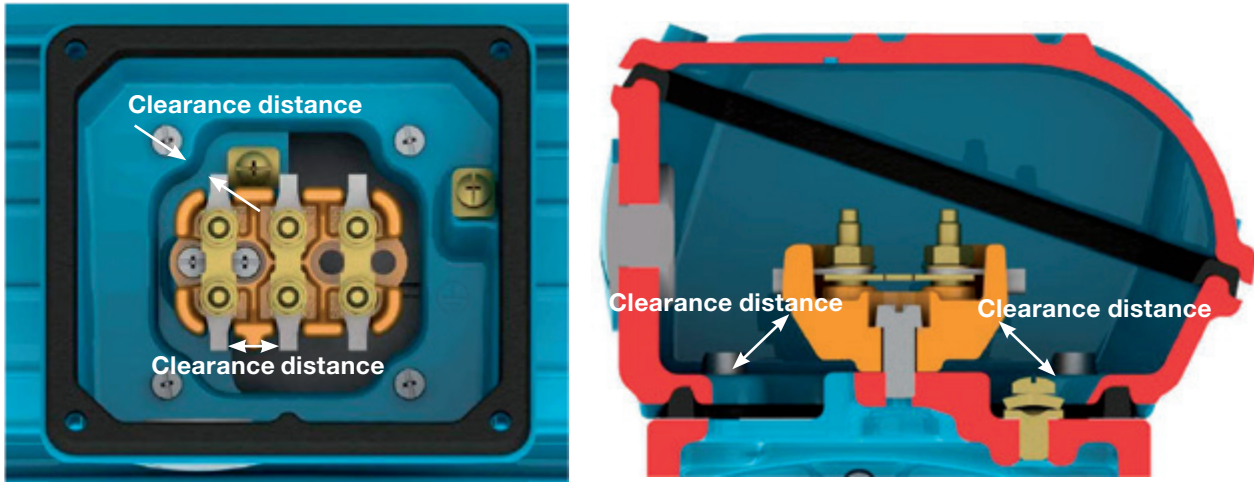





Figure 6.15 - Clearance distance representation

Table 6.3 - Minimum clearance distance (mm) x supply voltage

Voltage	Minimum clearance distance (mm)
$U \leq 440 \text{ V}$	4
$440 < U \leq 690 \text{ V}$	5.5
$690 < U \leq 1000 \text{ V}$	8
$1000 < U \leq 6900 \text{ V}$	45
$6900 < U \leq 11000 \text{ V}$	70
$11000 < U \leq 16500 \text{ V}$	105


 Even when the motor is off, dangerous voltages may be present inside the terminal box used for the space heater supply or winding energization when the winding is used as heating element. Motor capacitors will hold a charge even after the power has been cut off. Do not touch the capacitors and/or motor terminals, before discharging the capacitors completely.

 After the motor connection has been completed, ensure that no tool or foreign body has been left inside the terminal box.

 Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:

- unused cable inlet holes in the terminal boxes must be properly closed with blanking plugs;
- components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed.

The cable inlets used for power supply and control must be fitted with components (for example, cable-glands and conduits) that meet the applicable standards and regulations in each country.

 If the motor is fitted with accessories, such as brakes and forced cooling systems, these devices must be connected to the power supply according to the information provided on their nameplates and with special care as indicated above.

All protection devices, including overcurrent protection, must be set according to the rated machine conditions. These protection devices must protect the machine against short circuit, phase fault or locked rotor condition. The motor protection devices must be set according to the applicable standards.

Check the direction of rotation of the motor shaft. If there is no limitation for the use of unidirectional fans, the shaft rotation direction can be changed by reversing any two of the phase connections. For single-phase motor, check the connection diagram indicated on the motor nameplate.

6.10. CONNECTION OF THE THERMAL PROTECTION DEVICES

If the motor is supplied with temperature monitoring devices, such as, thermostat, thermistors, automatic thermal protectors, Pt-100 (RTD), etc., they must be connected to the corresponding control devices as specified on the accessory nameplates. The non-compliance with this procedure may void the product warranty and cause serious material damages.



Do not apply test voltage above 2.5 V on thermistors and current above 1 mA on RTDs (Pt-100) according to IEC 60751 standard.

Figure 6.16 and Figure 6.17 show the connection diagram of the bimetal thermal protector (thermostats) and thermistors, respectively.

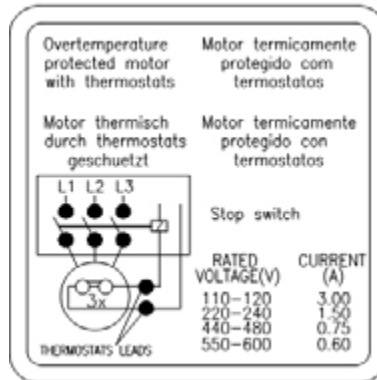


Figure 6.16 - Connection of the bimetal thermal protectors (thermostats)

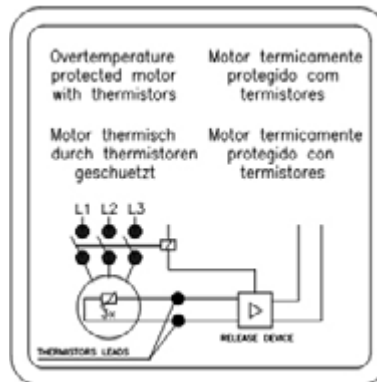


Figure 6.17 - Thermistor connection

The alarm temperature limits and thermal protection shutdowns can be defined according to the application; however these temperature limits can not exceed the values in Table 6.4.

Table 6.4 - Maximum activation temperature of the thermal protections

Component	Insulation class	Maximum temperature of the protection setting (°C)	
		Alarm	Tripping
Winding	B	-	130
	F	130	155
	H	155	180
Bearing	All	110	120

Notes:

- 1) The number and type of the installed protection devices are stated on the accessory nameplate of the motor.
- 2) If the motor is supplied with calibrated resistance, (for example, Pt-100), the motor protection system must be set according to the operating temperatures indicated in Table 6.4.

6.11. RESISTANCE TEMPERATURE DETECTORS (PT-100)

The thermocouples Pt-100 are made of materials, whose resistance depends on the temperature variation, intrinsic property of some materials (usually platinum, nickel or copper), calibrated resistance. Its operation is based on the principle that the electric resistance of a metallic conductor varies linearly with the temperature, thus allowing a continuous monitoring of the motor warm-up through the controller display ensuring a high level of precision and answer stability. These devices are widely used for measuring temperatures in various industry sectors.

In general these devices are used in installations where precise temperature control is required, for example, in installation for irregular or intermittent duty.

The same detector may be used for alarm and tripping purposes.

Table 6.5 and Figure 6.18 show the equivalence between the Pt-100 resistance and the temperature.

Table 6.5 - Equivalence between the Pt-100 resistance and the temperature

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840

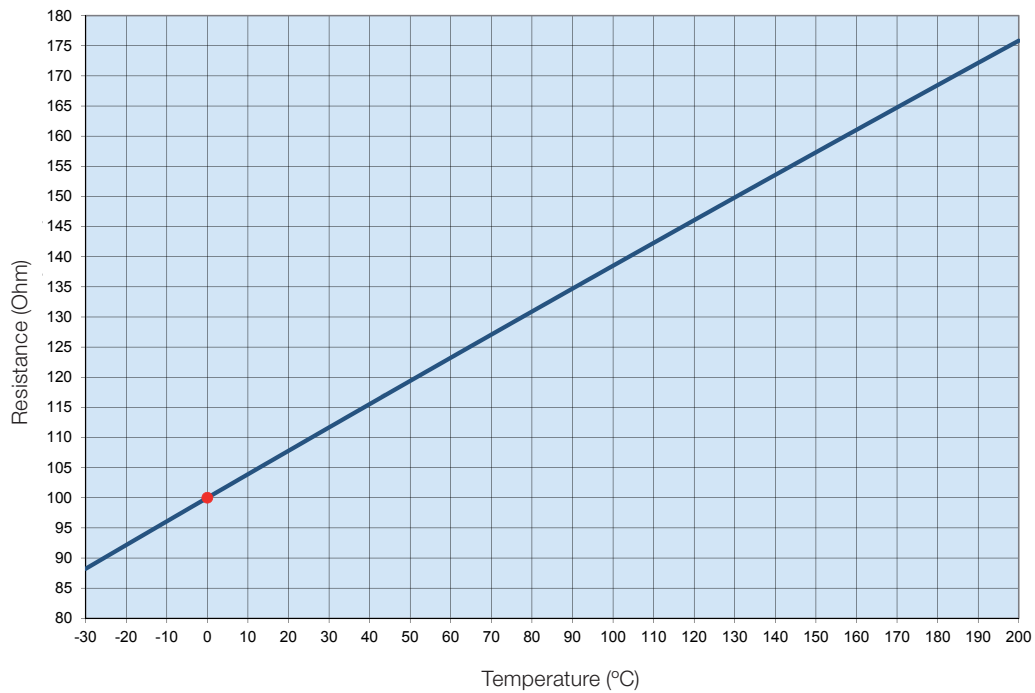


Figure 6.18 - Ohmic resistance of the Pt-100 x temperature

6.12. CONNECTION OF THE SPACE HEATERS

Before switching ON the space heaters, check if the space heaters connection have been made according to the connection diagram shown on the space heater nameplate. For motors supplied with dual voltage space heaters (110-127/220-240 V), see Figure 6.19.

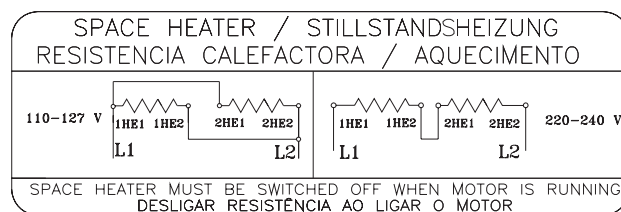


Figure 6.19 - Dual voltage space heater connection



The space heaters should never be energized when the motor is in operation.

6.13. STARTING METHODS

Whenever possible, the motor starting must be Direct On Line (DOL) at rated voltage. This is the most simple and feasible starting method. However, it must only be applied when the starting current does not affect the power supply. Please consider the local electric utility regulations when installing a motor.

High inrush current may result in:

- a) high voltage drop in the power supply line creating unacceptable line disturbance on the distribution system;
- b) requiring oversized protection system (cables and contactor) increasing the installation costs.

If DOL starting is not allowed due to the reasons mentioned above, an indirect starting method compatible with the load and motor voltage to reduce the starting current may be used.

If reduced voltage starters are used for starting, the motor starting torque will also be reduced.

Table 6.6 shows the possible indirect starting methods that can be used depending on the number of the motor leads.

Table 6.6 - Starting method x number of motor leads

Number of leads	Possible starting methods
3 leads	Autotransformer Soft-starter
6 leads	Star-Delta Autotransformer Soft-starter
9 leads	Series/Parallel Part winding Autotransformer Soft-starter
12 leads	Star-Delta Series/Parallel Part winding Autotransformer Soft-starter

Table 6.7 shows examples of possible indirect starting methods to be used according to the voltage indicated on the motor nameplate and the power supply voltage.

Table 6.7 - Starting methods x voltage

Nameplate voltage	Operating voltage	Star-delta	Autotransformer starting	Starting by series/parallel switch	Part-winding starting	Starting by Soft-starter
220/380 V	220 V	YES	YES	NO	NO	YES
	380 V	NO	YES	NO	NO	YES
220/440 V	220 V	NO	YES	YES	YES	YES
	440 V	NO	YES	NO	NO	YES
230/460 V	230 V	NO	YES	YES	YES	YES
	460 V	NO	YES	NO	NO	YES
380/660 V	380 V	YES	YES	NO	NO	YES
220/380/440 V	220 V	YES	YES	YES	YES	YES
	380 V	NO	YES	YES	YES	YES
	440 V	YES	YES	NO	NO	YES



The WQuattro line motors must be started direct on-line (DOL) or driven by a frequency inverter in scalar mode.

6.14. MOTORS DRIVEN BY FREQUENCY INVERTER



The operation with frequency inverter must be stated in the Purchase Order since this drive type may require some changes of the motor design.



Wmagnet Motors must only be driven by WEG frequency inverter.

The frequency inverter used to drive motors up to 690 V must be fitted with Pulse With Modulation (PWM) with vector control.

When a motor is driven by a frequency inverter at lower frequencies than the rated frequency, you must reduce the motor torque to prevent motor overheating. The torque reduction (derating torque) can be found in the item 6.4 of the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available on the site www.weg.net.

If the motor is operated above the rated frequency, please note:

- That the motor must be operated at constant output;
- That the motor can supply max. 95% of its rated output;
- Do not exceed the maximum speed and please consider:
 - max. operating frequency stated on the additional nameplate;
 - mechanical speed limitation of the motor.

Information on the selection of the power cables between the frequency inverter and the motor can be found in the item 6.4 of the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available at www.weg.net.

6.14.1. Use of dV/dt filter

6.14.1.1. Motor with enameled round wire

Motors designed for rated voltages up to 690 V, when driven by frequency inverter, do not require the use of dV/dT filters, provided that following criteria are considered.

Criteria for the selection of motors with round enameled wire when driven by frequency inverter				
Motor rated voltage ¹	Peak voltage at the motor terminals (max)	dV/dt inverter output (max)	Inverter Rise Time ² (min.)	MTBP ² Time between pulses (min)
V _{nom} < 460 V	≤ 1600 V	≤ 5200 V/μs	≥ 0,1 μs	≥ 6 μs
460 ≤ V _{nom} < 575 V	≤ 2000 V	≤ 6500 V/μs		
575 ≤ V _{nom} ≤ 1000 V	≤ 2400 V	≤ 7800 V/μs		

Notes:

1. For the application of dual voltage motors, example 380/660 V, consider the lower voltage (380 V).
2. Information supplied by the inverter manufacturer.

6.14.1.2. Motor with prewound coils

Motors with prewound coils (medium and high voltage motors regardless of frame sizes, and low voltage motors from IEC 500 / NEMA 800 frame on), designed for the use with frequency inverters, do not require the use of filters, provided they comply with the criteria in Table 6.8.

Table 6.8 - Criteria to be considered when using motor with prewound coils to be drive by frequency inverters

Motor rated voltage	Type of modulation	Turn to turn insulation (phase-phase)		Phase-ground insulation	
		Peak voltage at the motor terminals	dV/dt at the motor terminals	Peak voltage at the motor terminals	dV/dt at the motor terminals
690 < V _{nom} ≤ 4160 V	Sinusoidal	≤ 5900 V	≤ 500 V/μs	≤ 3400 V	≤ 500 V/μs
	PWM	≤ 9300 V	≤ 2700 V/μs	≤ 5400 V	≤ 2700 V/μs
4160 < V _{nom} ≤ 6600 V	Sinusoidal	≤ 9300 V	≤ 500 V/μs	≤ 5400 V	≤ 500 V/μs
	PWM	≤ 14000 V	≤ 1500 V/μs	≤ 8000 V	≤ 1500 V/μs

6.14.2. Bearing insulation

Only the motors in IEC frame size 400 (NEMA 680) and larger are supplied, as standard, with insulated bearing. If motor must be driven by frequency inverter, insulate the bearing according to Table 6.9.

Table 6.9 - Recommendation on the bearing insulation for inverter driven motors

Frame size	Recommendation
IEC 315 and 355 NEMA 445/7 to L5810/11	<ul style="list-style-type: none"> ■ Insulated bearing/end shield ■ Grounding between shaft and frame by grounding brush
IEC 400 and larger NEMA 680 and larger	<ul style="list-style-type: none"> ■ Insulated NDE bearing ■ Grounding between shaft and frame by grounding brush



When motors are supplied with shaft grounding system, monitor the grounding brush constantly during its operation and, when it reaches the end of its useful life, it must be replaced by another brush with the same specification.

6.14.3. Switching frequency

The minimum inverter switching frequency must not be lower than 2 kHz and should not exceed 5 kHz.



The non-compliance with the criteria and recommendations indicated in this manual may void the product warranty.

6.14.4. Mechanical speed limitation

Table 6.10 shows the maximum speeds allowed for motors driven by frequency inverter.

Table 6.10 - Maximum motor speed (in rpm)

Frame size		DE-bearing	Maximum speed for standard motors
IEC	NEMA		
63-90	143/5	6201	10400
		6202	
		6203	
		6204	
		6205	
100	-	6206	8800
112	182/4	6207	7600
		6307	6800
132	213/5	6308	6000
160	254/6	6309	5300
180	284/6	6311	4400
200	324/6	6312	4200
225-630	364/5-9610	6314	3600
		6315	3600
		6316	3200
		6319	3000
		6218	3600
		6220	3600
		6320	2200
		6322	1900
		6324	1800
		6328	1800
		6330	1800
		6224	1800
		6228	1800

Note:

To select the maximum allowed motor speed, consider the motor torque derating curve.

For more information on the application of frequency inverters, contact WEG or check the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available at www.weg.net.

7. COMMISSIONING

7.1. INITIAL START-UP

After finishing the installation procedures and before starting the motor for the first time or after a long period without operation, the following items must be checked:

- If the nameplate data (voltage, current, connection diagram, degree of protection, cooling system, service factor, etc.) meet the application requirements;
- If the machine set (motor + driven machine) has been mounted and aligned correctly;
- If the motor driving system ensures that the motor speed does not exceed the max. allowed speed indicated in Table 6.10;
- Measure the winding insulation resistance, making sure it complies with the specified values in item 5.4;
- Check the motor rotation direction;
- Inspect the motor terminal box for damage and ensure that it is clean and dry and all contacts are rust-free, the seals are in perfect operating conditions and all unused threaded holes are properly closed thus ensuring the degree of protection indicated on the motor nameplate;
- Check if the motor wiring connections, including grounding and auxiliary equipment connection, have been carried out properly and are in accordance with the recommendations in item 6.9;
- Check the operating conditions of the installed auxiliary devices (brake, encoder, thermal protection device, forced cooling system, etc.);
- Check bearing operating conditions. If the motors are stored and/or installed for more than two years without running, it is recommended to change the bearings, or to remove, wash, inspect and relubricate them before the motor is started. If the motor is stored and/or installed according to the recommendations described in item 5.3, lubricate the bearings as described in item 8.2. For the bearing condition evaluation, it is recommended to use of the vibration analysis techniques: Envelope Analysis or Demodulation Analysis.
- For roller bearing motors with oil lubrication, ensure:
 - The oil level should be in the center of the sight glass (see Figure 8.1 and 8.2);
 - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- When motors are fitted with sleeve bearings, ensure:
 - Correct oil level for the sleeve bearing. The oil level should be in the center of the sight glass (see Figure 8.3);
 - That the motor is not started or operated with axial or radial loads;
 - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- Inspect the capacitor operating condition, if any. If motors are installed for more than two years, but were never commissioned, it is recommended to change the start capacitors since they lose their operating characteristics;
- Ensure that the air inlet and outlet opening are not blocked. The minimum clearance to the nearest wall (L) should be at least $\frac{1}{4}$ of the fan cover diameter (D), see Figure 7.1. The intake air temperature must be at ambient temperature.

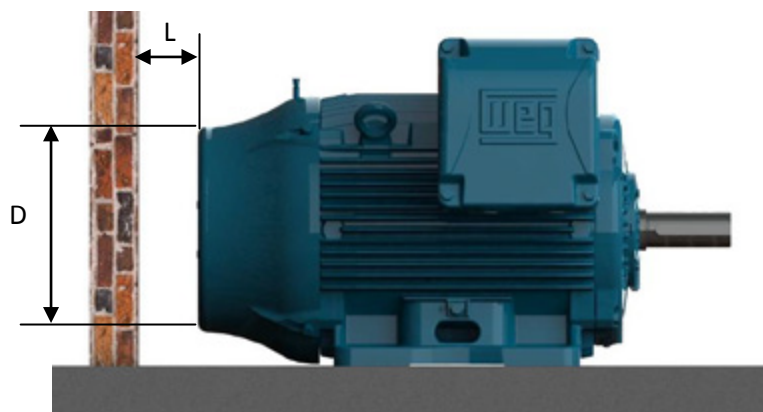


Figure 7.1- Minimum clearance to the wall

Please consider the minimum distances shown in the Table 7.1 as reference value;

Table 7.1 - Minimum distance between the fan cover and wall

Frame size		Distance between the fan cover and the wall (L)	
IEC	NEMA	mm	inches
63	-	25	0.96
71	-	26	1.02
80	-	30	1.18
90	143/5	33	1.30
100	-	36	1.43
112	182/4	41	1.61
132	213/5	50	1.98
160	254/6	65	2.56
180	284/6	68	2.66
200	324/6	78	3.08
225	364/5	85	3.35
250	404/5		
280	444/5	108	4.23
	445/7		
	447/9		
315	L447/9	122	4.80
	504/5		
	5006/7/8		
	5009/10/11		
355	586/7	136	5.35
	588/9		
	5807/8/9		
	5810/11/12		
400	6806/7/8	147	5.79
	6809/10/11		
450	7006/10	159	6.26
500	8006/10	171	6.73
560	8806/10	185	7.28
630	9606/10	200	7.87

- Ensure correct water flow rate and water temperature when water cooled motors are used. See item 7.2;
- Ensure that all rotating parts, such as pulleys, couplings, external fans, shaft, etc. are protected against accidental contact.

Other tests and inspections not included in the manual may be required, depending on the specific installation, application and/or motor characteristics.

After all previous inspections have been carried out, proceed as follows to start the motor:

- Start the motor on no-load (if possible) and check the motor direction of rotation. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions;
- Ensure the motor starts smoothly. If any abnormal operating condition is noticed, switch off the motor, check the assembly system and connections before the motor is started again;
- If excessive vibrations are noticed, check if the motor mounting bolts are well tightened or if the vibrations are not generated and transmitted from adjacent installed equipment. Check the motor vibration periodically and ensure that the vibration limits are as specified in item 7.2.1;
- Start the motor at rated load during a short time and compare the operating current with the rated current indicated on the nameplate;
- Continue to measure the following motor variables until thermal equilibrium is reached: current, voltage, bearing and motor frame temperature, vibration and noise levels;
- Record the measured current and voltage values on the Installation Report for future comparisons.

As induction motors have high inrush currents during start-up, the acceleration of high inertia load requires an extended starting time to reach full speed resulting in fast motor temperature rise. Successive starts within short intervals will result in winding temperature increases and can lead to physical insulation damage reducing the useful life of the insulation system. If the duty cycle S1 / CONT. is specified on the motor nameplate, this means that the motor has been designed for:

- Two successive starts: first start from cold condition, i. e., the motor windings are at room temperature and the second start immediately after the motor stops;
- One start from hot condition, i. e., the motor windings are at rated temperature.

The Troubleshooting Chart in section 10 provides a basic list of unusual cases that may occur during motor operation with the respective corrective actions.

7.2. OPERATING CONDITIONS

Unless otherwise stated in the Purchase Order, electric motors are designed and built to be operated at altitudes up to 1000 meters above sea level and in a temperature range from -20 °C to +40 °C. Any deviation from the normal condition of motor operation must be stated on the motor nameplate. Some components must be changed if the ambient temperature is different from the specified one. Please contact WEG to check the required special features.

For operating temperatures and altitudes differing from those above, the factors indicated in Table 7.2 must be applied to the nominal motor power rating in order to determine the derated available output ($P_{max} = P_{nom} \times$ correction factor).

Table 7.2 - Correction factors for altitude and ambient temperature

T (°C)	Altitude (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0.97	0.92	0.88
15						0.98	0.94	0.90	0.86
20					1.00	0.95	0.91	0.87	0.83
25				1.00	0.95	0.93	0.89	0.85	0.81
30			1.00	0.96	0.92	0.90	0.86	0.82	0.78
35		1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75
40	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71
45	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69
50	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67
55	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65
60	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62
65	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58
70	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53
75	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49
80	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44

Motors installed inside enclosures (cubicles) must be ensured an air renewal rate in the order of one cubic meter per second for each 100 kW installed power or fraction of installed power. Totally Enclosed Air Over motors - TEAO (fan and exhaust / smoke extraction) are supplied without cooling fan and the manufacturer of the driven machine is responsible for sufficient motor cooling. If no minimum required air speed between motor fins is indicated on the motor nameplate, ensure the air speed indicated in the table 7.3 is provided. The values shown in Table 7.3 are valid for 60 Hz motors. To obtain the minimum air speed for 50 Hz motors, multiply the values in the table by 0.83.

Table 7.3 - Minimum required air speed between motor fins (metres/second)

Frame		Poles			
IEC	NEMA	2	4	6	8
63 to 90	143/5	13	7	5	4
100 to 132	182/4 to 213/5	18	12	8	6
160 to 200	254/6 to 324/6	20	15	10	7
225 to 280	364/5 to 444/5	22	20	15	12
315 to 450	445/7 to 7008/9	25	25	20	15

The voltage and frequency variations may affect the performance characteristics and the electromagnetic compatibility of the motor. The power supply variations should not exceed the values specified in the applicable standards. Examples:

- ABNT NBR 17094 - Parts 1 and 2. The motor has been designed to supply the rated torque for a combined variation in voltage and frequency:
 - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
 - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods.

- IEC 60034-1. The motor has been designed to supply the rated torque for combined variation in voltage and frequency:
 - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
 - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods. For multivoltage motors (example 380-415/660 V), a ±5% voltage variation from the rated voltage is allowed.

- NEMA MG 1 Part 12. The motor has been designed to be operated in one of the following variations:
 - ±10% of the rated voltage, with rated frequency;
 - ±5% of the rated frequency, with rated voltage;
 - A combined variation in voltage and frequency of ±10%, provided the frequency variation does not exceed ±5%.

If the motor is cooled by ambient air, clean the air inlet and outlet openings and cooling fins at regular intervals to ensure a free airflow over the frame surface. The hot air should never be returned to the motor. The cooling air must be at room temperature limited to the temperature range indicated on the motor nameplate (if no room temperature is specified, please consider a temperature range between -20 °C and +40 °C).

Table 7.4 shows the minimum required water flow for water cooled motors considering the different frame sizes and the maximum allowed temperature rise of the cooling water after circulating through the motor. The inlet water temperature should not exceed 40 °C.

Table 7.4 - Minimum required water flow and the maximum allowed temperature rise of the cooling water after circulating through the motor

Frame size		Flow rate (litres/minute)	Maximum allowed water temperature rise (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5	15	6
	445/7		
	447/9		
315	504/5	16	6
355	586/7	25	6
	588/9		

Motors fitted with oil mist lubrication systems can be operated continuously for a maximum of one hour after the failure of the oil pumping system.

Considering the sun's heat increases the operating temperature, externally mounted motors should always be protected from direct sunlight exposure.

Each and every deviation from the normal operating condition (tripping of the thermal protection, noise and vibration level increase, temperature and current rise) should be investigated and corrected by WEG Authorized Service Centers.



Motors fitted with cylindrical roller bearings require a minimum radial load to ensure a normal operation. For information regarding the radial preload, please contact WEG.

7.2.1.Limits of vibration

The vibration severity is the maximum vibration value measured at all positions and in all directions as recommended in the standard IEC 60034-14. Table 7.5 specifies the limits of the maximum vibrations magnitudes according to standard IEC 60034-14 for shaft heights IEC 56 to 400, for vibrations grades A and B. The vibration severity limits in Table 7.5 are given as RMS values (Root Mean Square values or effective values) of the vibration speed in mm/s measured in free suspension condition.

Table 7.5 - Recommended limits for the vibration severity according to standard IEC 60034-14

Shaft height [mm]	56 ≤ H ≤ 132	132 ≤ H ≤ 280	H > 280
Vibration grade	Vibration severity on elastic base [mm/s RMS]		
A	1.6	2.2	2.8
B	0.7	1.1	1.8

Notes:

- 1 - The values in Table 7.5 are valid for measurements carried out with decoupled machines (without load) operated at rated voltage and frequency.
- 2 - The values in Table 7.5 are valid regardless of the direction of rotation of the machine.
- 3 - The values in Table 7.5 are not applicable to single-phase motors, three-phase motors powered by a single-phase system or to machines mounted in situ or coupled with inertia flywheels or to loads.

According to NEMA MG 1, the allowed vibration limit for standard motors is 0.15 in/s (peak vibration in in/s).

Note:

For the load operation condition, the use of the standard ISO 10816-3 is recommended for evaluating the motor vibration limits. In the load condition the motor vibration will be influenced by several factors, such as, type of the coupled load, condition of the motor fixation, alignment condition under load, structure or base vibration due to other equipments, etc..

8. MAINTENANCE

The purpose of the maintenance is to extend the useful life of the equipment. The non-compliance with one of these previous items can cause unexpected machine failures.

If motors with cylindrical roller or angular contact bearings are to be transported during the maintenance procedures, the shaft locking device must always be fitted. All HGF motors, regardless of the bearing type, must always be transported with the shaft locking device fitted.

All repairs, disassembly and assembly related services must be carried out only by qualified and well-trained personnel by using proper tools and techniques. Make sure that the machine has stopped and it is disconnected from the power supply, including the accessory devices (space heater, brake, etc.), before any servicing is undertaken.

The company does not assume any responsibility or liability for repair services or maintenance operations executed by non-authorized Service Centers or by non qualified service personnel. The company shall have no obligation or liability whatsoever to the buyer for any indirect, special, consequential or incidental loss or damage caused or arising from the company's proven negligence

8.1. GENERAL INSPECTION

The inspection intervals depend on the motor type, application and installation conditions. Proceed as follows during inspection:

- Visually inspect the motor and coupling. Check if abnormal noises, vibrations, excessive heating, wear signs, misalignment or damaged parts are noticed. Replace the damaged parts as required;
- Measure the insulation resistance according to the item 5.4;
- Clean the motor enclosure. Remove oil spills and dust accumulation from the motor frame surface to ensure a better heat transfer to the surrounding ambient;
- Check cooling fan condition and clean the air inlet & outlet openings to ensure a free air flow over the motor;
- Investigate the actual condition of the seals and replace them, if required;
- Drain the condensed water from inside the motor. After draining, reinstall the drain plugs to ensure the degree of protection as indicated on the motor nameplate. The motor must always be positioned so the drain hole is at the lowest position (see item 6);
- Check the connections of the power supply cables, ensuring the correct clearance distance between live and grounded parts, as specified in Table 6.3;
- Check if the tightening torque of the bolted connections and mounting bolts meets the tightening torque specified in Table 8.11;
- Check the status of the cable passages, the cable gland seals and the seals inside the terminal box and replace them, if required;
- Check the bearing operating conditions. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions, like motor temperature rise. Check the oil level, the lube oil condition and compare the workings hours with the informed life time;
- Record and file all changes performed on the motor.



Do not reuse damaged or worn parts. Damaged or worn parts must be replaced by parts supplied by the manufacturer and must be installed as if they were the original parts.

8.2. LUBRICATION

Proper lubrication plays a vital role in the motor performance. Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings. This information is available on the motor nameplate and the lubrication procedures must be carried out according to the type of lubricant (oil or grease).

When the motor is fitted with thermal protection devices for bearing temperature control, consider the operating temperature limits shown in Table 6.4.

The maximum operating temperature of motors used in special applications may differ from those shown in Table 6.4. The grease and oil disposal should be made in compliance with applicable laws in each country.



Please contact WEG when motors are to be installed in special environments or used for special applications.

8.2.1. Grease lubricated rolling bearings



Excess grease causes bearing overheating, resulting in bearing failure.

The lubrication intervals specified in Table 8.1, Table 8.2, Table 8.3, Table 8.4, Table 8.5, Table 8.6, Table 8.7 and Table 8.8 consider an absolute temperature on the bearing of 70 °C (up to frame size IEC 200 / NEMA 324/6) and 85 °C (for frame size IEC 225 / NEMA 364/5 and above), the motor running at rated speed, a motor mounted in horizontal position and greased with Mobil Polyrex EM grease. Any variation of the parameters listed above must be evaluated.

Table 8.1 - Lubrication intervals for ball bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)							
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)			
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
90	143/5	2	6205	4	-	-	20000	20000	25000	25000		
		4										
		6										
		8										
100	-	2	6206	5	-	-	20000	20000				
		4										
		6										
		8										
112	182/4	2	6207/ 6307	9	-	-	20000	20000				
		4										
		6										
		8										
132	213/5	2	6308	11	-	-	20000	18400				
		4					20000	20000				
		6										
		8										
160	254/6	2	6309	13	20000	20000	18100	15700				
		4					20000	20000				
		6										
		8										
180	284/6	2	6311	18	20000	20000	13700	11500				
		4					20000	20000				
		6										
		8										
200	324/6	2	6312	21	20000	20000	11900	9800				
		4					20000	20000				
		6										
		8										
225 250 280 315 355	364/5 404/5 444/5	2	6314	27	18000	14400	4500	3600	5000	4000		
		4					11600	9700	14000	12000		
		6										
		8										
	445/7 447/9	6316	34	14000	*Upon request	3500	*Upon request	4000	*Upon request			
								4	10400	8500	13000	10000
								6				
								8				
	L447/9 504/5 5008	6319	45	20000	20000	*Upon request						
						2	9000	7000	11000	8000		
						4						
						6						
5010/11 586/7 588/9	6322	60	20000	20000	13000	11000	16000	13000				
					4	17400	14000	20000	17000			
					6							
					8							
					7200	5100	9000	6000				
					10800	9200	13000	11000				
					15100	11800	19000	14000				

Table 8.2 - Lubrication intervals for cylindrical roller bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)						
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)		
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	
160	254/6	2	NU309	13	20000	19600	13300	9800	16000	12000	
		4				20000	20000	20000	20000	25000	25000
		6									
		8									
180	284/6	2	NU311	18	18400	12800	9200	6400	11000	8000	
		4			20000	20000	20000	19100	25000	25000	
		6									
		8									
200	324/6	2	NU312	21	15200	10200	7600	5100	9000	6000	
		4			20000	20000	20000	17200	25000	21000	
		6									
		8									
225 250 280 315 355	364/5 404/5 444/5	4	NU314	27	17800	14200	8900	7100	11000	9000	
		6			20000	20000	13100	11000	16000	13000	
		8					16900	15100	20000	19000	
	445/7 447/9	4	NU316	34	15200	12000	7600	6000	9000	7000	
		6			20000	19000	11600	9500	14000	12000	
		8				20000	15500	13800	19000	17000	
	L447/9 504/5	4	NU319	45	12000	9400	6000	4700	7000	5000	
		6			19600	15200	9800	7600	12000	9000	
		8			20000	20000	13700	12200	17000	15000	
	5008 5010/11 586/7 588/9	4	NU322	60	8800	6600	4400	3300	5000	4000	
		6			15600	11800	7800	5900	9000	7000	
		8			20000	20000	11500	10700	14000	13000	

Table 8.3 - Lubrication intervals for ball bearings - HGF line

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34	4500	4500
355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45	4500	4500
400L/A/B and 400 C/D/E	6806/7/8T and 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45	4500	4500
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60	4500	4500
		6 - 8	6328	93	4500	4500
			6322	60	4500	4500
500	8006/10	4	6330	104	4200	2800
			6324	72	4500	4500
		6 - 8	6330	104	4500	4500
			6324	72	4500	4500
560	8806/10	4 - 8	*Upon request			
630	9606/10	4 - 8				

ENGLISH

Table 8.4 - Lubrication intervals for cylindrical roller bearings - HGF line

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8 and 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B and 355C/D/E	5807/8/9 and 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B and 400C/D/E	6806/7/8 and 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8			4500	4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

Table 8.5 - Lubrication intervals for ball bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mountings Ball bearings	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6320	50		4500	6316	34		4500
	355 J/H	5809/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6322	60		4500	6319	45		4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	6218	24	3800	2500	6218	24	3800	1800
			4 - 8	6324	72	4500	4500	6319	45	4500	4500
	450 L/K and 450 J/H	7006/07 and 7008/09	2	6220	31	3000	2000	6220	31	3000	2000
			4	6328	93	4500	3300	6322	60	4500	4500
6 - 8	4500										
Vertical mountings Ball bearings	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6320	50	4200	3200	6316	34	4500	4500
			6 - 8			4500	4500				
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6322	60	3600	2700	6319	45	4500	3600
			6 - 8			4500	4500				4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	7218	24	2000	1300	6218	24	2000	1300
			4	7324	72	3200	2300	6319	45	4500	3600
			6			4500	4500				4500
	450 L/K and 450 J/H	7006/07 and 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
			4	7328	93	2400	1700	6322	60	4500	2700
			6			4100	3500				4500
8	4500	4500	4500	4500							

Table 8.6 - Lubrication intervals for cylindrical roller bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mountings Roller bearings	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500	4500
			6 - 8								
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45	4500	4500
			6 - 8								
	400 L/K and 400 J/H	6806/07 and 6808/09	4	NU324	72	2900	1800	6319	45	4500	4500
			6 - 8								
	450 L/K and 450 J/H	7006/07 and 7008/09	4	NU328	93	2000	1400	6322	60	4500	4500
			6								
8			4500								

Table 8.7 - Lubrication intervals for ball bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
			2 - 8	6311	18	20000	20000	6209	9	20000	20000
	180M/L	284/6	2 - 8	6311	18	20000	20000	6211	11	20000	20000
			2 - 8	6312	21	20000	20000	6211	11	20000	20000
	200M/L	324/6	2 - 8	6312	21	20000	20000	6211	11	20000	20000
			2 - 8	6314	27	18000	14400	6211	11	20000	20000
	225S/M	364/5	2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6314	27	18000	14400	6212	13	20000	20000
	250S/M	404/5	2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6316	34	20000	20000	6212	13	20000	20000
	280S/M	444/5	2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6319	45	20000	20000	6314	27	20000	20000
	280L	447/9	2	6314	27	18000	14400	6314	27	18000	14400
			4 - 8	6319	45	20000	20000	6314	27	20000	20000
	315G/F	5010/11	2	6314	27	4500	4500	6314	27	4500	4500
			4 - 8	6319	45	4500	4500	6314	27	4500	4500
355J/H	L5010/11	2	6218	24	2200	2200	6218	24	2200	2200	
		4 - 8	6224	43	4500	4500	6218	24	4500	4500	
400J/H	L5810/11	2	6220	31	2200	2200	6220	31	2200	2200	
		4 - 8	6228	52	4500	4500	6220	31	4500	4500	
450K/J	L6808/09	2	6220	31	2200	2200	6220	31	2200	2200	
		4 - 8	6228	52	4500	4500	6220	31	4500	4500	

Table 8.8 - Lubrication intervals for cylindrical roller bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Roller bearings	225S/M	364/5	4 - 8	NU314	27	20000	20000	6314	27	20000	20000
	250S/M	404/5	4 - 8	NU316	34	20000	20000	6314	27	20000	20000
	280S/M	444/5	4 - 8	NU319	45	20000	18800	6314	27	20000	20000
	280L	447/9	4 - 8	NU319	45	20000	18800	6314	27	20000	20000
	315G/F	5010/11	4 - 8	NU319	45	4500	4500	6314	27	4500	4500
	355J/H	L5010/11	4 - 8	NU224	43	4500	4500	6218	24	4500	4500
	400J/H	L5810/11	4 - 8	NU228	52	4500	3300	6220	31	4500	4500
	450K/J	L6808/09	4 - 8	NU228	52	4500	3300	6220	31	4500	4500

For each increment of 15 °C above the bearing temperature, the relubrication intervals given in the Table must be halved. The relubrication interval of motors designed by the manufacturer for mounting in horizontal position, but installed in vertical position (with WEG authorization), must be halved.

For special applications, such as: high and low temperatures, aggressive environments, driven by frequency inverter (VFD - frequency inverter), etc., please contact WEG about the required amount of grease and the relubrication intervals.

8.2.1.1. Motor without grease fitting

Motors without grease fittings must be lubricated in accordance with the existing Maintenance Plan. Motor disassembly must be carried out as specified in Item 8.3. If motors are fitted with shielded bearings (for example, ZZ, DDU, 2RS, VV), these bearings must be replaced at the end of the grease service life.

8.2.1.2. Motor with grease fitting

To lubricate the bearings with the motor stopped, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- Remove the grease outlet plug;
- Pump in approximately half of the total grease indicated on the motor nameplate and run the motor for about 1 (one) minute at rated speed;
- Switch-off the motor and pump in the remaining grease;
- Lower again the grease inlet protection and reinstall the grease outlet protection.

To grease the motor while running, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Pump the total grease indicated on the motor nameplate;
- Lower again the grease inlet protection.



For lubrication, use only manual grease gun.

If Motors are provided with a spring device for grease removal, the grease excess must be removed by pulling the rod and cleaning the spring until the spring does not remove more grease.

8.2.1.3. Compatibility of the Mobil Polyrex EM grease with other greases

The Mobil Polyrex EM grease has a polyurea thickener and a mineral oil and it is not compatible with other greases.

If you need another type of grease, contact WEG.

It is not recommended to mix different types of greases. In such a case, clean the bearings and lubrication channels before applying new grease.

The used grease must have in its formulation corrosion and oxidation inhibitors.

8.2.2. Oil lubricated bearings

To change the oil of oil lubricated motor proceed as follows:

- Switch-off the motor;
- Remove threaded oil drain plug;
- Open the valve and drain the oil;
- Close the drain valve again;
- Reinstall the threaded oil drain plug;
- Fill-up with the type and amount of oil as specified on the nameplate;
- Check oil level. The oil level is OK when the lubricant can be viewed approximately in the center of the sight glass;
- Reinstall oil inlet plug;
- Check for oil leaks and ensure that all not used threaded plugs are closed with plugs.

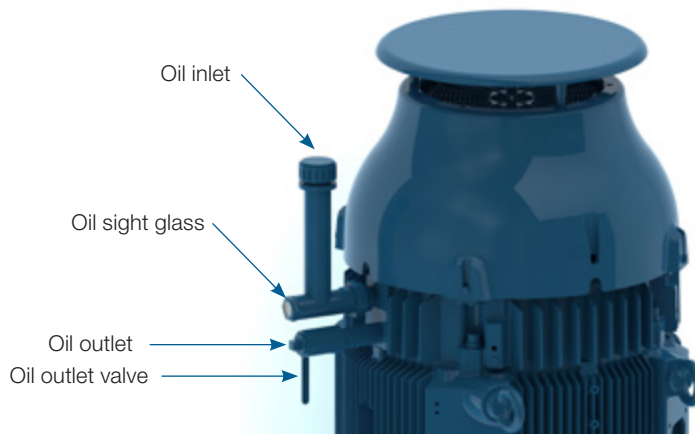


Figure 8.1 - Oil lubricated bearing - vertical mounting

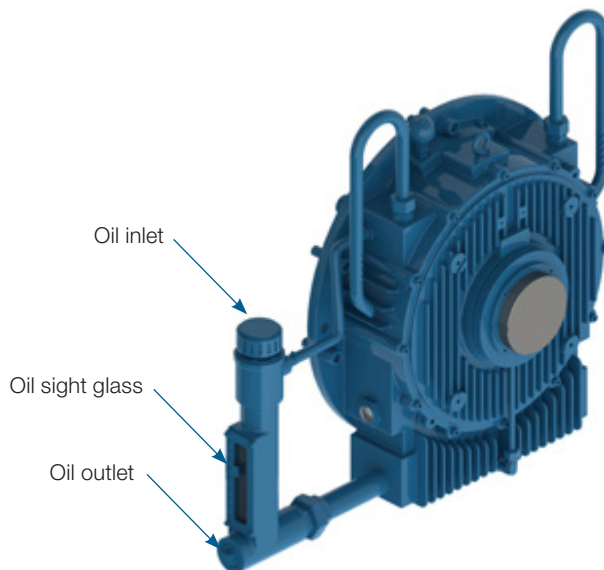


Figure 8.2 - Oil lubricated bearing - horizontal mounting

The bearing lubricating oil must be replaced as specified on the nameplate or whenever changes in the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and must be kept in the center of the sight glass. Please contact WEG, when oils with different viscosities should be used.

Note:

The HGF vertical mounted motors with high axial thrust are supplied with grease lubricated DE-bearings and with oil lubricated NDE-bearings. The DE-bearings must be lubricated according to recommendations in item 8.2.1. Table 8.9 specifies the oil type and the amount of oil required for this motor lubrication.

Table 8.9 - Oil properties for HGF vertical mounted motors with high axial thrust

Mounting - high axial thrust	Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
	IEC	NEMA						
	315L/A/B e 315C/D/E	5006/7/8T e 5009/10/11T	4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	ISO VG150 mineral oil with antifoam and antioxidant additives
	355L/A/B e 355C/D/E	5807/8/9T e 5810/11/12T	4 - 8	29320	26			
	400L/A/B e 400C/D/E	6806/7/8T e 6809/10/11T	4 - 8	29320	37			
	450	7006/10	4 - 8	29320	45			

8.2.3. Oil mist lubricated bearings

Check the service conditions of the seals and if replacement is required use only original components. Clean the seal components before assembly (bearing caps, end shields, etc.).

Apply joint sealant between the bearing caps and end shields. The joint sealant must be compatible with the used lubricating oil. Connect the oil lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 6.12.

8.2.4. Sleeve bearings

The lubricating oil of sleeve bearings must be changed at the intervals specified in Table 8.10. To replace the oil, proceed as follows:

- NDE-bearing: remove the protection plate from the fan cover;
- Drain the oil through the drain hole located at the bottom of the bearing (see Figure 8.3);
- Close the oil drain hole;
- Remove the oil inlet plug;
- Fill the sleeve bearing with the specified oil and with the amount of oil specified in;
- Check the oil level and ensure it is kept close to the center of the sight glass;
- Install the oil inlet plug;
- Check for oil leaks.

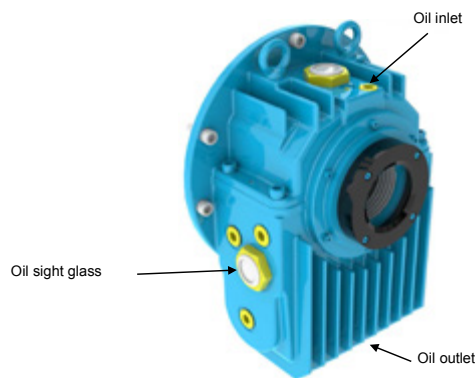


Figure 8.3 - Sleeve bearing

Table 8.10 - Oil properties for sleeve bearings

Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
IEC	NEMA						
315	5000	2	9-80	2.8	8000	FUCHS Renolin DTA 10	ISO VG32 mineral oil with antifoam and antioxidant additives
355	5800						
400	6800						
450	7000						
315	5000	4 - 8	9-90	2.8	8000	FUCHS Renolin DTA 15	ISO VG46 mineral oil with antifoam and antioxidant additives
355	5800		9-100				
400	6800		11-110	4.7			
450	7000		11-125				
500	8000						

The lubricating oil must be replaced as specified on the nameplate or whenever changes on the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and kept in the center of the sight glass.

Please contact WEG, when oils with different viscosities are to be used.

8.3. MOTOR ASSEMBLY AND DISASSEMBLY



All repair services on motors should be always performed by qualified personnel and in accordance with the applicable laws and regulations in each country. Always use proper tools and devices for motor disassembly and assembly.



Disassembly and assembly services can be carried out only after the motor has been disconnected from the power supply and is completely stopped.

Dangerous voltages may be present at the motor terminals inside the terminal box since capacitors can retain electrical charge for long periods of time even when they are not connected directly to a power source or when space heaters are connected to the motor or when the motor windings are used as space heaters. Dangerous voltages may be present at the motor terminals when they are driven by frequency inverter even when they are completely stopped.

Record the installation conditions such as terminal connection diagram, alignment / leveling conditions before starting the disassembly procedures. These records should be considered for later assembly.

Disassemble the motor carefully without causing scratches on machined surfaces or damaging the threads.

Assemble the motor on a flat surface ensuring a good support base. Footless motors must be fixed/locked on the base to prevent accidents.

Handle the motor carefully to not damage the insulated components such as windings, insulated rolling bearings, power cables etc..

Seal elements, such as joint seals and bearing seals should always be replaced when wear or damage is noticed.

Motors with degree of protection higher than IP55 are supplied with joint and screw seal Loctite 5923 (Henkel) Clean the components and apply a new coat of Loctite 5923 on the surfaces before assembly.

For the W50 and HGF motor lines provided with axial fans, the motor and the axial fan have different markings for indicating the direction of rotation for prevent incorrect assembly.

The axial fan must be assembled so that the indicative arrow for direction of rotation is always visible, viewing the non-drive end side. The marking indicated on the axial fan blade, CW for clockwise direction of rotation or CCW for counterclockwise direction of rotation, indicates the direction of rotation of the motor viewing the drive end side.

8.3.1. Terminal box

Proceed as follows to remove the terminal box cover and to disconnect/connect the power supply cables and the cables of the accessory devices:

- Ensure that during the screw removal the terminal box cover does not damage the components installed inside the terminal box;
- If the terminal box cover is fitted with lifting eyebolt, lift the terminal box cover always by its lift eyebolt;
- If motors are supplied with terminal blocks, ensure the correct tightening torque on the motor terminals as specified in Table 8.11;
- Ensure that the cables do not contact sharp edges;
- Ensure that the original IP degree of protection is not changed and is maintained as indicate on the motor nameplate. The power supply cables and the control cables must always be fitted with components (cable glands, conduits) that meet the applicable standards and regulations of each country;
- Ensure that the pressure relief device is in perfect operating condition, if provided. The seals in the terminal box must be in perfect condition for reuse and must be reinstalled correctly to ensure the specified degree of protection;
- Ensure the correct tightening torque for the securing bolts of the terminal box cover as specified in Table 8.11.

Table 8.11 - Tightening torque for the securing bolts [Nm]

Screw type and seal	M4	M5	M6	M8	M10	M12	M14	M16	M20
Hex bolt/hex socket bolt (rigid joint)	-	3,5 to 5	6 to 9	14 to 20	28 to 40	45 to 70	75 to 110	115 to 170	230 to 330
Combined slotted screw (rigid joint)	1,5 to 3	3 to 5	5 to 10	10 to 18	-	-	-	-	-
Hex bolt/hex socket bolt (flexible joint)	-	3 to 5	4 to 8	8 to 15	18 to 30	25 to 40	30 to 45	35 to 50	-
Combined slotted screw (flexible joint)	-	3 to 5	4 to 8	8 to 15	-	-	-	-	-
Terminal blocks	1 to 1,5	2 to 4 1)	4 to 6,5	6,5 to 9	10 to 18	15,5 to 30	-	30 to 50	50 to 75
Grounding terminals	1,5 to 3	3 to 5	5 to 10	10 to 18	28 to 40	45 to 70	-	115 to 170	-

Note: 1) For 12-pin terminal block, apply the minimum torque of 1.5 Nm and maximum torque of 2.5 Nm.

8.4. DRYING THE STATOR WINDING INSULATION

Dismantle the motor completely. Remove the end shields, the rotor with the shaft, the fan cover, the fan and the terminal box before the wound stator with the frame is transferred to the oven for the drying process. Place the wound stator in the oven heated to max. 120 °C for two hours. For larger motors a longer drying time may be required. After the drying process has been concluded, allow the stator to cool to room temperature. Measure the insulation resistance again as described in item 5.4. Repeat the stator drying process if the required insulation resistance does not meet the values specified in Table 5.3. If the insulation resistance does not improve despite several drying processes, evaluate the causes of the insulation resistance drop carefully and an eventual replacement of the motor winding may be required. If in doubt contact WEG.



To prevent electrical shock, discharge the motor terminals immediately before, and after each measurement. If the motor is equipped with capacitors, these must be discharged before beginning any repair.



8.5. SPARE PARTS

When ordering spare parts, always provide complete motor designation, indicating the motor type, the code number and the serial number, which are stated on the motor nameplate.

Spare parts must always be purchased from WEG authorized Service Centers. The use of non-original spare parts can cause motor failure, performance drop and void the product warranty.

The spare parts must be stored in a clean, dry and properly ventilated room, with relative air humidity not exceeding 60%, with ambient temperature between 5 °C and 40 °C, free of dust, vibrations, gases, corrosive smokes and at constant temperature. The spare parts must be stored in their normal mounting position without placing other components onto them.

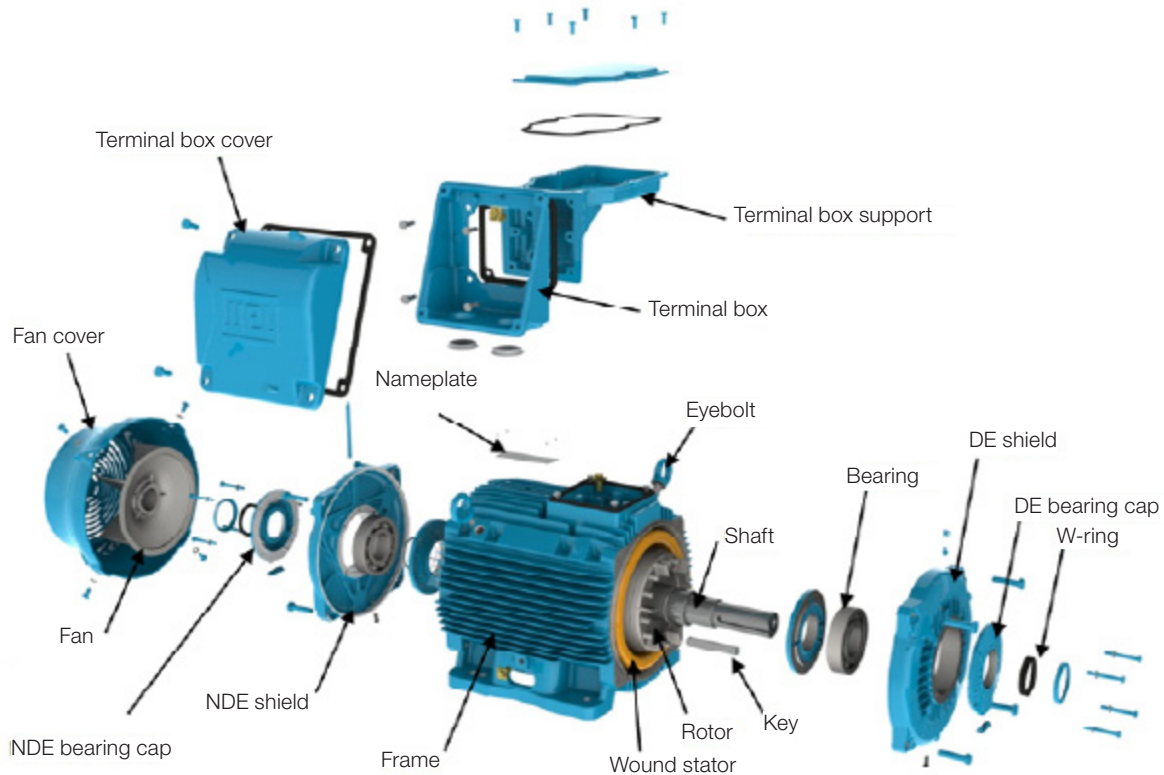


Figure 8.4 - Exploded view of the components of a W22 motor

9. ENVIRONMENTAL INFORMATION

9.1. PACKAGING

WEG electric motors are supplied in cardboard, plastic or wooden packaging. These materials can be recycled and must be disposed according to the applicable laws and regulations in each country. All wood used in the packaging of WEG motors come from the company reforestation program and is not submitted to any chemical conservation treatment.

9.2. PRODUCT

Electric motors consist mainly of ferrous metals (steel plates and cast iron), non ferrous metals (copper and aluminum) and plastic materials.

In general, electric motors have relatively long service live. However when they must be discarded, WEG recommends to dismantle the motor, sort the different materials and send them for recycling.

No-recyclable materials should be disposed of at industrial landfills according to the applicable environmental laws and regulations in each country, or co-processed in cement kilns or incinerated.

The recycling service providers, the disposal in industrial landfills, the waste co-processing or the incineration process must be properly authorized by the state environment agency to carry out these activities.



10. TROUBLESHOOTING CHART X SOLUTIONS

This troubleshooting chart provides a basic list of problems that may occur during motor operation, possible causes and recommended corrective actions. In case of doubts, please contact WEG Service Center.

Problem	Possible cause	Corrective action
Motor does not start, neither coupled nor decoupled	Power cables are interrupted	Check the control panel and the motor power supply cables
	Blown fuses	Replace blown fuses
	Wrong motor connection	Correct the motor connection according to connection diagram
	Locked rotor	Check motor shaft to ensure that it rotates freely
The motor starts at no-load, but fails when load is applied. It starts very slowly and does not reach the rated speed	Load torque is too high during start-up	Do not start the motor on load
	Too high voltage drop in the power cables	Check the installation dimensioning (transformer, cable cross section, relays, circuit breakers, etc.)
Abnormal/excessive noise	Defective transmission component or defective driven machine	Check the transmission force, the coupling and the alignment
	Misaligned / unlevelled base	Align / level the motor with the driven machine
	Unbalanced components or unbalanced driven machine	Balance the machine set again
	Different balancing methods used for motor and coupling balancing (halve key, full key)	Balance the motor again
	Wrong motor direction of rotation	Reverse the direction of rotation
	Loose bolts	Retighten the bolts
	Foundation resonance	Check the foundation design
	Damaged bearings	Replace the bearings
Motor overheating	Insufficient cooling	Clean air inlet and outlet and cooling fins
		Check the minimum required distance between the fan cover and nearest walls. See item 7
		Check air temperature at inlet
	Overload	Measure motor current, evaluate motor application and if required, reduce the load
	Number of starts per hour is too high or the load inertia moment is too high	Reduce the number of starts per hour
	Power supply voltage too high	Check the motor power supply voltage. Power supply voltage must not exceed the tolerance specified in item 7.2
	Power supply voltage too low	Check the motor power supply voltage and the voltage drop. Power supply voltage must not exceed the tolerance specified in item 7.2
	Interrupted power supply	Check the connection of the power cables
	Voltage unbalance at the motor terminals	Check for blown fuses, wrong commands, voltage unbalance in the power line, phase fault or interrupted power cables
	Direction of rotation is not compatible with the unidirectional fan	Check if the direction of rotation matches the rotation arrow indicated on end shield
Bearing overheating	Excessive grease/oil	Clean the bearing and lubricate it according to the provided recommendations
	Grease/oil aging	
	The used grease/oil does not matches the specified one	
	Lack of grease/oil	Lubricate the bearing according to the provided recommendations
	Excessive axial or radial forces due to the belt tension	Reduce the belt tension
Reduce the load applied to the motor		

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* European Union Importers



Centrifuge Bowl: Centrifugally cast Duplex stainless steel

Conveyor Scroll: Centrifugally cast Duplex stainless steel with plasma-fused tungsten carbide on end of scroll flights

Bowl Seals / Gaskets: Nitrile (Buna-N) rubber

Feed Tube: AISI 316 Stainless steel

Polymer Feed Line: Reinforced PVC tygon tubing

Feed Chamber: Stainless steel complete with sintered tungsten carbide bushing inserts

Solids Discharge Ports: Field-replaceable sintered tungsten carbide

Solids Catch Chamber: AISI 316 Stainless steel complete with field replaceable stainless steel wear liner

Solids Discharge: AISI 316 Stainless steel

Liquid Catch Chamber: AISI 316 Stainless steel

Liquid Discharge: AISI 316 Stainless steel

Stand: Painted carbon steel

Casing: 2-piece design consisting of AISI 316 stainless steel product contact. Carbon steel non-product contact.

Fasteners: AISI 316 Stainless steel

Flexible Connectors: Reinforced Neoprene

Liquid-end Bowl Bearing: Oil lubricated Cylindrical Roller Bearing

Solids-end Bowl Bearing: Oil Lubricated Grooved Ball Bearing

Scroll Bearing: Angular Contact Ball Bearing on Liquid End
Grooved Ball Bearing on Solids End

Conveyor Scroll: Plasma-fused tungsten carbide on end of scroll flights along the whole length of Conveyor.
[Fig. 1a]

Scroll Feed Ports: Sintered tungsten carbide insert bushings
[Fig. 1b]

Solids Discharge Ports: Field replaceable sintered tungsten carbide inserts
[Fig. 2]

Solids Catch Chamber: Field replaceable type stainless steel wear liner.
[Fig. 3]

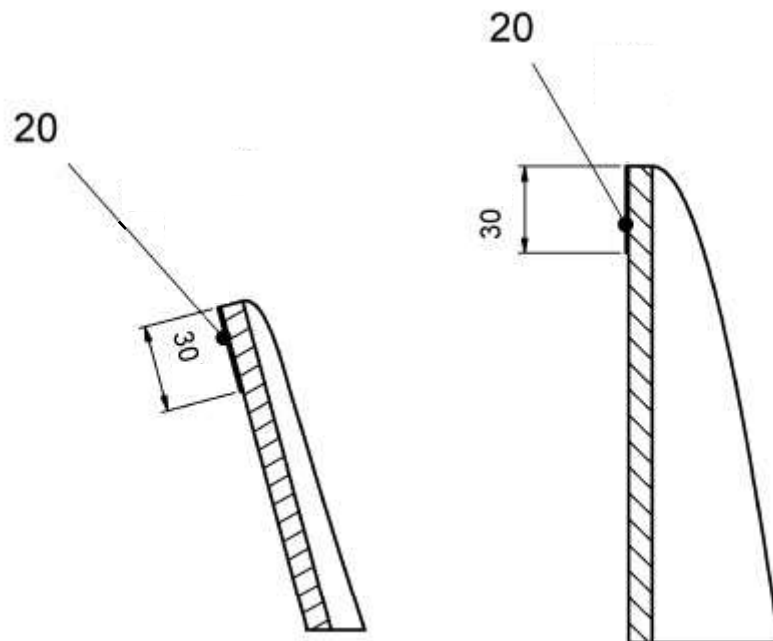


Figure 1a



UCF 7000 ABRASION PROTECTION FEATURES

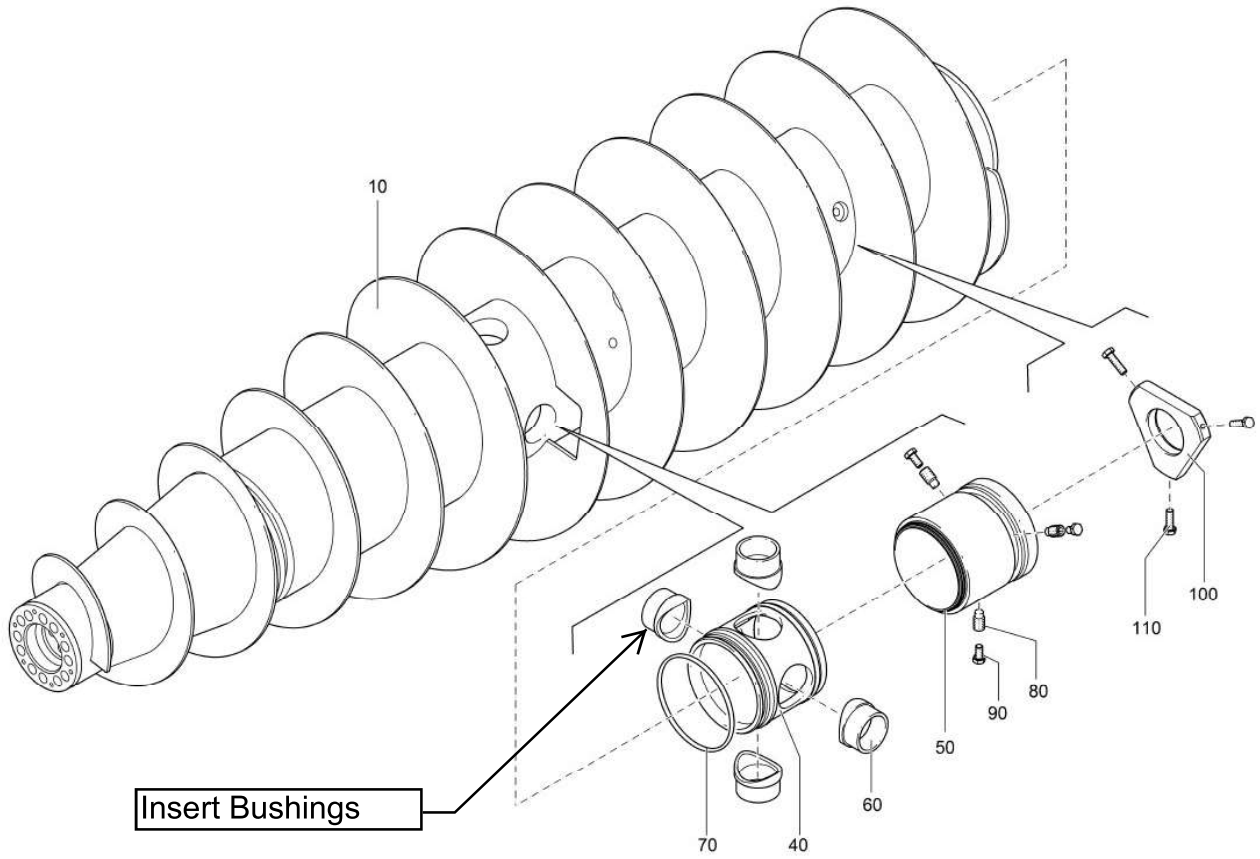


Figure 1b

Fig. 2 ~ Solids Discharge Abrasion Protection

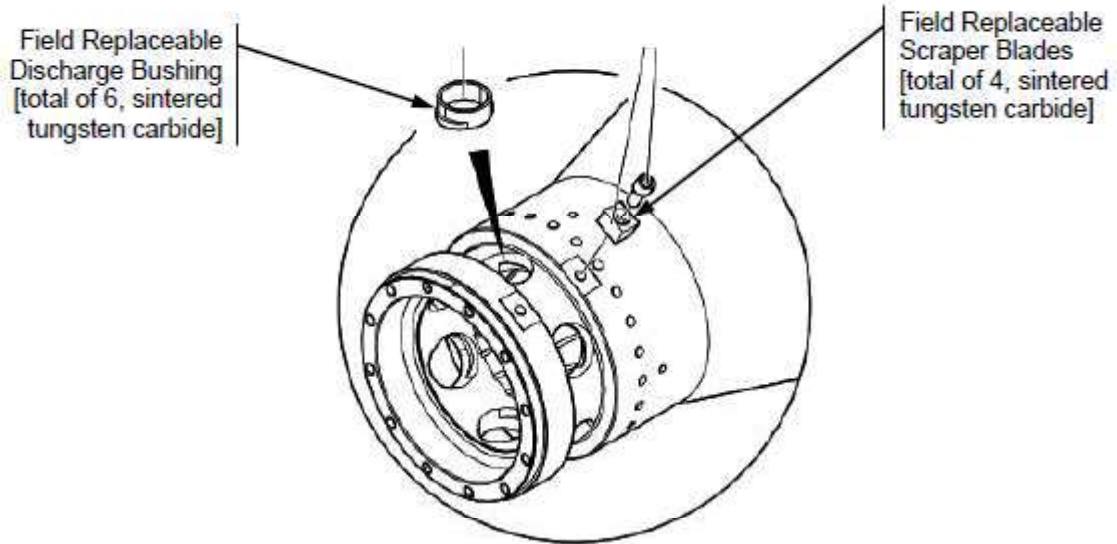
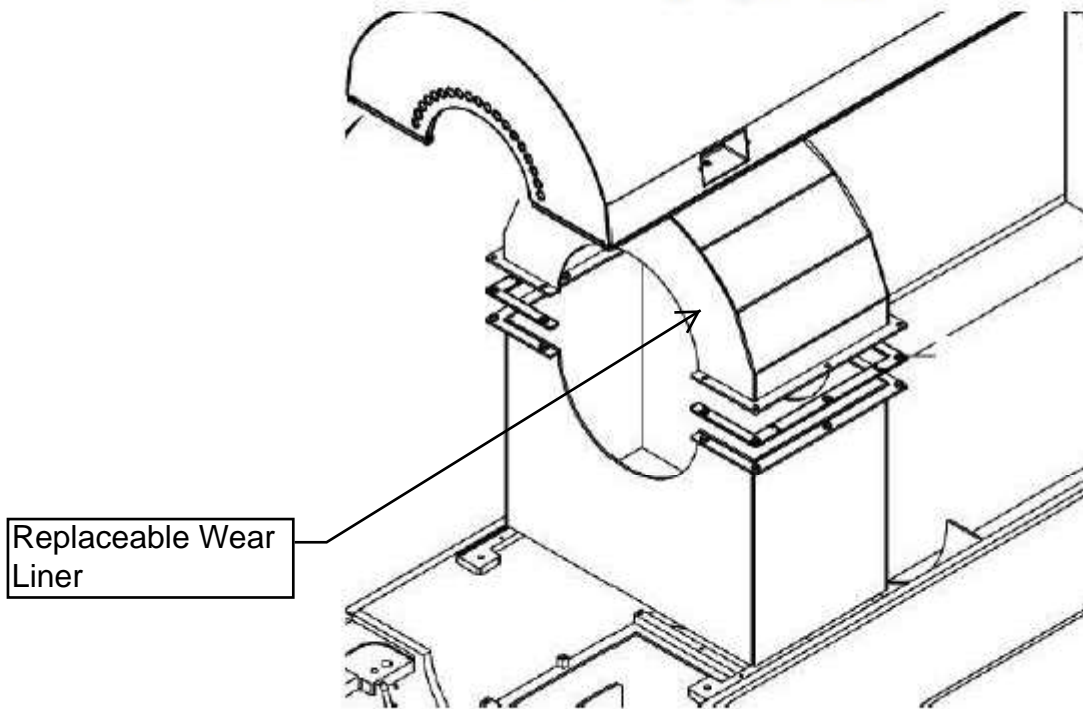
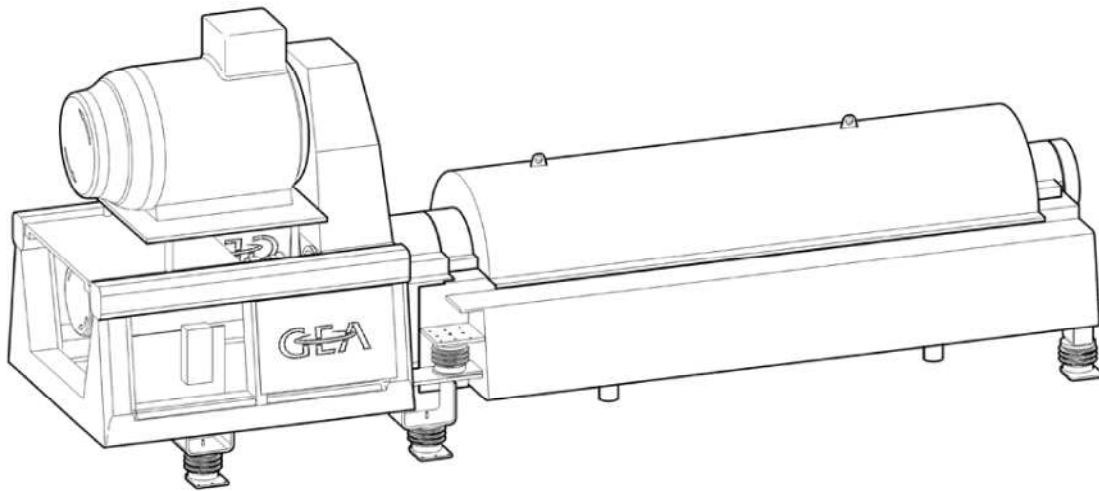


Fig. 3 ~ Solids Catch Chamber





8419000

Lifecycle calculation for ball and roller bearings

Decanter

CF 7000

No.: 8419-9054-001

Edition: 06.10.2017

1 General formula for calculating the bearing lifecycle according to DIN ISO 281

$$L_{10h} = \frac{1\,000\,000}{60 \cdot n} \left(\frac{C}{P} \right)^p$$

- L_{10h} = nominal bearing lifecycle, operating hours
 n = speed [min^{-1}]
 C = dynamic load rating [N]
 P = equivalent bearing load [N]
 p = exponent in equation for lifecycle determination
 - ball bearing $p = 3$
 - roller bearing $p = 10/3$

2 Results

The calculated nominal bearing lifetime is:

Bearing	Operating hours
Solids-side bowl bearing	207,183
Liquid-side bowl bearing	255,270
Solids-side scroll bearing	> 1,000,000
Liquid-side scroll bearing	687,896
Main motor (drive end)	329,333
Main motor (non-drive end)	> 1,000,000
Secondary motor (drive end)	> 1,000,000
Secondary motor (non-drive end)	> 1,000,000



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GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 index.

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TECHNICAL DOCUMENTATION

TECHNISCHE DOKUMENTATION

Decanter

EDITION / AUSGABE - 23.02.2022

CUSTOMER / KUNDE:	Veolia Water North America
WS-ORDER NO. / WS-BESTELL NR.:	2652395848
SERIES / SERIE:	8012-663 + 664
PROJECT / PROJEKT:	City of Taunton
MODEL / MODELL:	2 x Biosolids Decanter Prime 7000
REVISION / REVISION:	00

Die Verfasser freuen sich immer über Kommentare und Ratschläge diese Dokumentation betreffend. Sie können gesandt werden an

The authors are always for comments and suggestions for improving the documentation. They can be sent to

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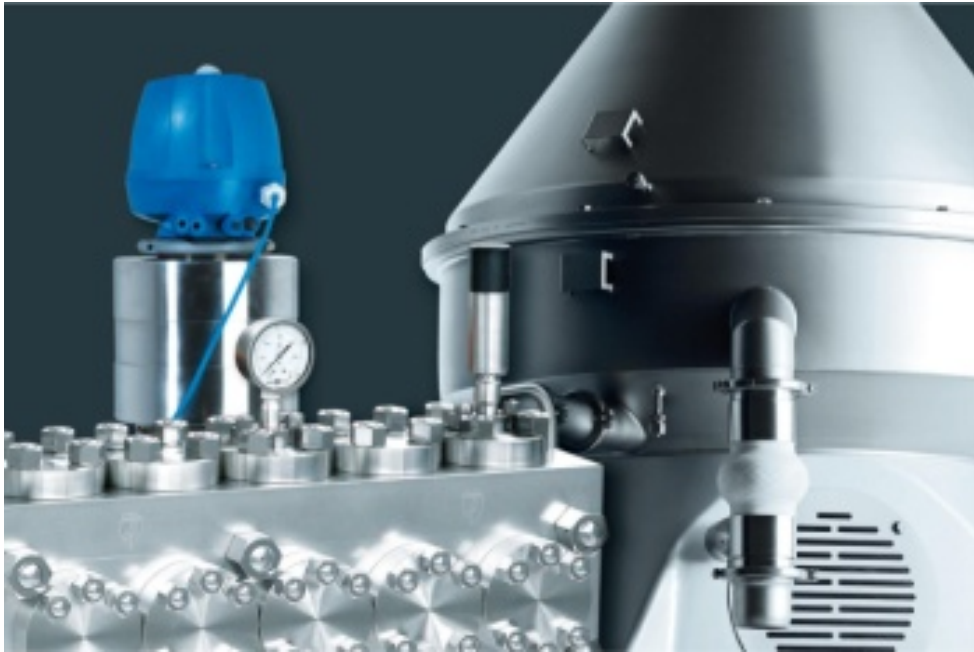
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8.1 2451395848_2000_12000

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Safety precautions for plants

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For your safety



- **Strictly adhere to instructions marked with this symbol.**
This avoids damage to the plant or plant components.



- **Take special care when carrying out operations marked with this symbol -**
otherwise danger to life.

Note:

- This symbol is not a safety precaution but rather a reference to information which help to better understand the plant components and the processes.

- **Observe the accident prevention regulations!**

The local safety and accident prevention regulations apply unconditionally to the operation of the plant. The plant operator must ensure compliance with these regulations.

- **Follow the instructions in the manual.**

Follow only the instructions given in this manual.
Repair and maintenance work that goes beyond the scope described in this manual may not be carried out.

1 Safety precautions

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1.1 Safety markings

The safety markings (adhesives and metal plates) are attached to all plants, on the hood and frame of the respective plant component in such a way that they are clearly visible.

All safety markings on the plant, control system and plant components must always be in perfect condition.

- Clean dirty safety markings.
- Replace damaged safety markings.

1.1.1 Safety markings and their meaning

The following safety markings must be attached to the monitoring system as adhesive labels:



Fig. 1

Be sure to adhere to the plant documentation!

- Every person who is assigned the task of installing, operating, maintaining and repairing the plant must have read and understood the documentation.
- The documentation must be complete kept near to the installation and be readily accessible to the operators. It must be available to the operators at all times!

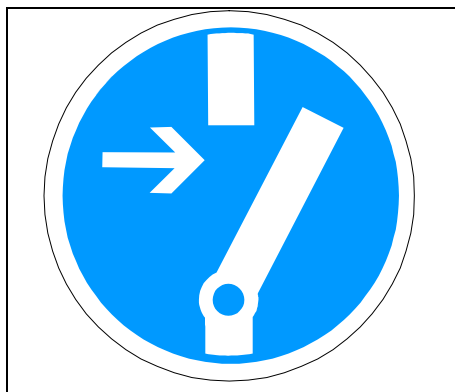


Fig. 2

Disconnect power prior to starting work!

Risk of injury due to electrical voltage and unintended start-up of the plant!

Before carrying out work on the plant and electrical plant components:

- Make sure the plant is at a standstill.
- Switch off all electrical appliances via the main switch,
- Lock the installation to prevent it from being accidentally switched on.

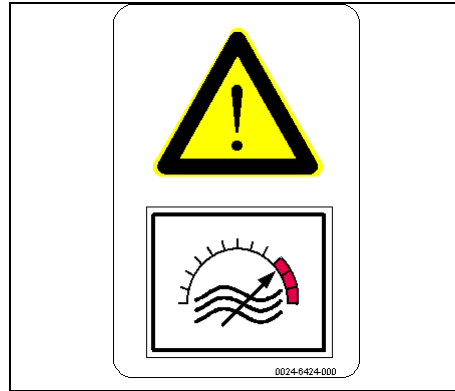


Fig. 3

Frequency converter operation!

- When setting the frequency converter, do not exceed the admissible speed (see nameplate)!

Note:

This adhesive plate is only used for frequency converter operation.



Fig. 4

Warning of extreme surface temperatures!

The surfaces of the plant components can be hot!

Note:

This adhesive plate is only used for hot operation.

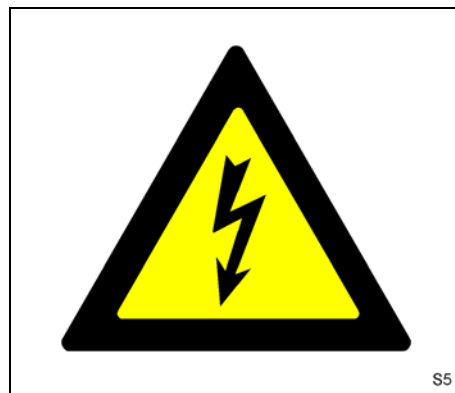


Fig. 5

Danger due to electrical current!

Non-compliance with the protective measures can result in serious damage to persons or property.

Before working on electrical components:

- Switch off all electrical appliances via the main switch,

CAUTION:

The parts marked in this way can carry voltage even when the main switch is off!

- Lock the installation to prevent it from being accidentally switched on.
- Take adequate preventive measures according to the national provisions (in Germany in accordance with the rules and regulations of the VDE (Verein Deutscher Elektriker / Association of German Electrical Engineers) or EVU (Europäische Vereinigung für Unfallforschung und Unfallanalyse / European Association for Accident Research and Analysis) institutions.
- The work may only be carried out by competent persons (qualified technical specialists).

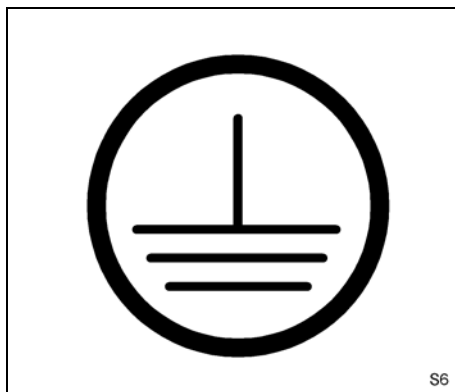


Fig. 6

Potential equalisation (protective-earth terminal)

The grounding protection is a measure which, in the case of a malfunction, leads off the touch voltage into the earth.

1.2 Performing work on a plant



Fig. 7

The plant works reliably, provided that it is operated and maintained in accordance with our operating instructions.

Special attention must be given to:

- assembly
- electrical installation
- before start-up
- start-up
- shut-down
- maintenance and repair

1.2.1 Demands on the operating and maintenance personnel

Operating, maintaining or repairing the plant requires specialized knowledge!



CAUTION!

Operating, maintenance or repair work by unqualified or unauthorized personnel can lead to operating, assembly and handling errors and severe damage to persons and property.

Westfalia Separator accepts no liability for damage caused by unqualified or unauthorized personnel!

For operation, maintenance and repair work, personnel may only be deployed who

- have reached a minimum age of 18 years.
- are demonstrably familiar with the state-of-the-art through briefings and training.
- are adequately qualified for performing the work and checking it.

Electrical work may only be carried out by an authorized electrician!

The operator of the plant

- is responsible for the necessary skills and knowledge of the personnel.
- is responsible for briefing and training the personnel.
- must be sure that the personnel have read and understood the manuals necessary to carry out their work.

Westfalia Separator offers a an extensive range of training and advanced training courses. You can obtain further information from Westfalia Separator or from one of the authorized representatives.

1.2.2 Spare part requirements



Fig. 8

- **Use only genuine spare parts from Westfalia Separator.**

The use of non-genuine parts leads to:

- safety risks,
- less durability and availability,
- increased service requirement.

If a safety risk occurs when using non-original spare parts, this may have legal consequences for the responsible persons. In such cases, Westfalia Separator accepts no liability or warranty claims.

1.2.3 Electrical installation

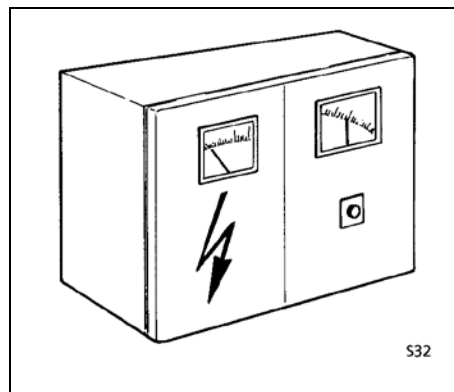


Fig. 9

- **Electrical work may only be carried out by an authorized electrician!**
 - The governing accident prevention regulations apply for the electrical appliances and installations.
 - Special attention must be paid to the installation guidelines of Westfalia Separator.
 - The frequency and voltage of the power supply must correspond to the machine specifications.
- Carry out voltage equalization.
 - Observe legal regulations; e.g. in the EU:
 - Low-voltage guideline 73/23/EWG
 - Electro-magnetic compatibility 89/336/EWG.
 - Guidelines of the classification societies.

1.2.4 Before start-up

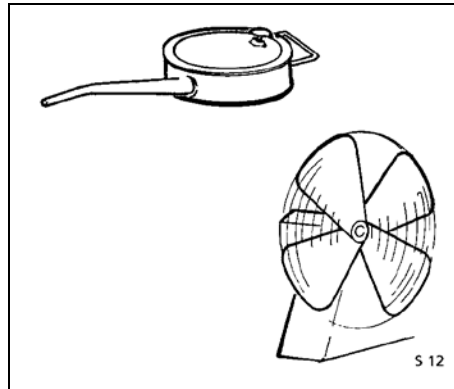


Fig. 10

- Check that the lubrication and cooling systems are serviceable.

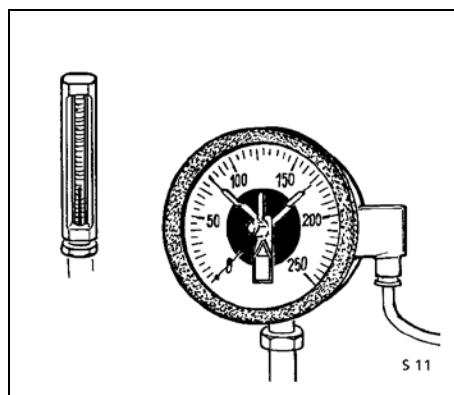


Fig. 11

- Check whether the supervisory equipment is operational and the correct limit values are adjusted.
- When hoods, concentrate collectors and vessels are pressurized, e.g. by
 - inert gas blanketing,
 - cooling,
 - steam sterilization etc.
 the pressures stated on the boiler plate must not be exceeded.

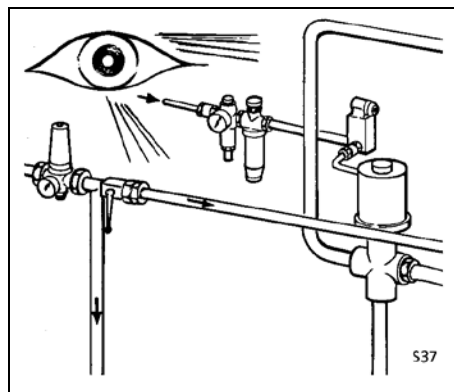


Fig. 12

- Check that the product lines are set to operation.
- Regularly check hoses for signs of ageing.
- Check sight glasses for mechanical damage.
- Damaged parts must be replaced immediately by new or reconditioned parts.

1.2.5 Start-up



Fig. 13

- Wear ear protection.

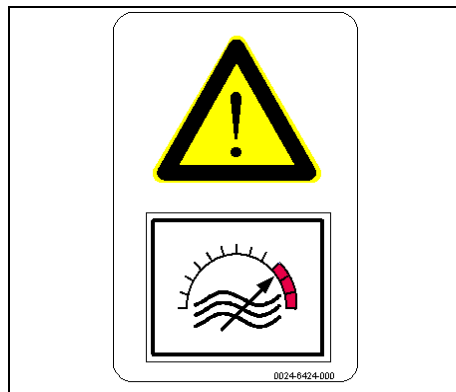


Fig. 14

In case of frequency converter operation:

- Do not under any circumstances manipulate the frequency converter to exceed the permissible speed (see nameplate).
- The plant may only be operated with an independent device for speed limiting.



Fig. 15

- Do not feed product which is categorised as explosive.
- Do not operate the equipment in explosion-hazarded areas.

Note:

This is except for plants equipped for operation in explosion-hazarded areas.

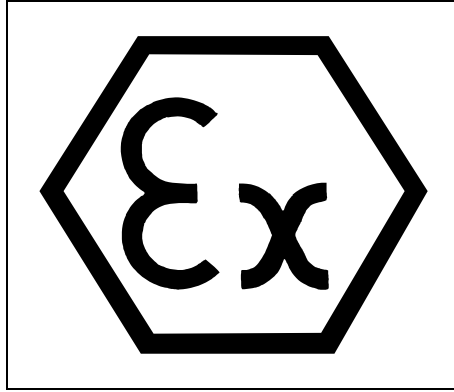


Fig. 16

- The plant may be fed with inflammable product only when being inert-gas blanketed.
- The oxygen level has to be kept below limit of inflammability by means of an appropriate inert gas.



Fig. 17

- When processing products harmful to persons, observe the pertinent safety regulations.
- Refer to the safety data sheet of the product.
- Wear protective clothing.

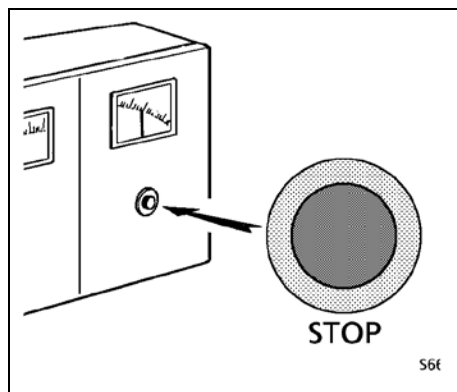


Fig. 18

Only in case of hot operation:

- Product-contacting parts such as
 - pipes and hoses,
 - components,
 - vessels
 reach temperatures over 80 °C (176 °F).

1.2.6 Shut-down and »Emergency-Off«



- For shut-down refer to the chapter "Operation".

Fig. 19

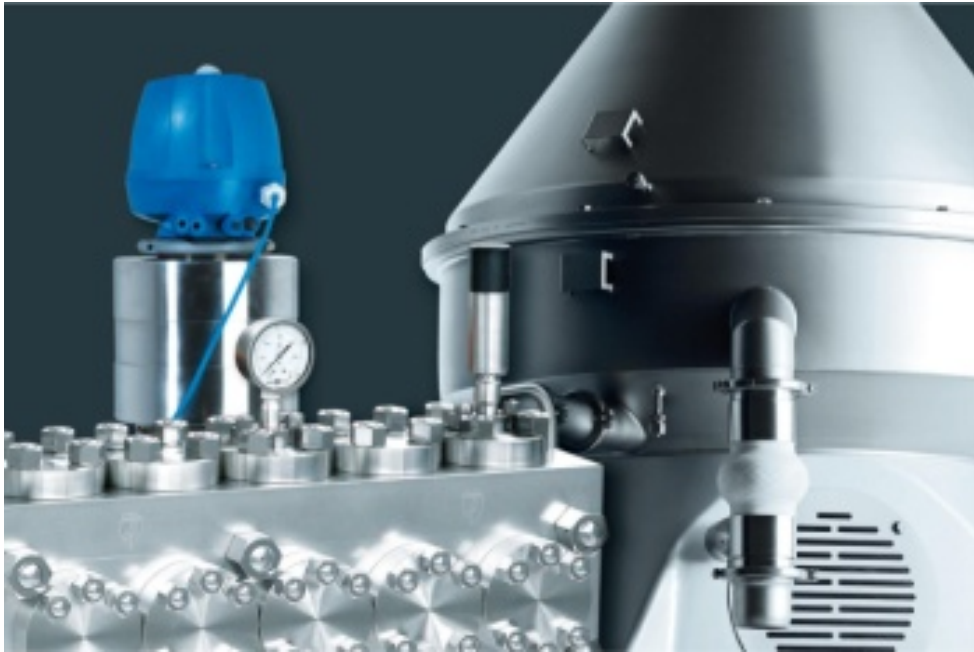
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Qualification of staff

Edition:

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Designation:

Qualification of staff

ORIGINAL INSTRUCTION
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Qualification of staff

Work on / with separators requires special skills.

- Provide staff with special training / instruction for the following tasks:
 - Operation,
 - Maintenance,
 - Repair.
- Clearly define responsibilities:
 - Work performed by authorised persons only.



Danger

Type and source of danger:

Storage, transportation, erection, operation and maintenance of the separator / system by insufficiently trained staff.

Possible consequences of failure to observe:

Incorrect operation, assembly and handling errors can cause serious damage, injury / death.

Measures to prevent the danger:

- Use Westfalia Separator service.
- Take advantage of training opportunities.
- Read/follow operating manuals / operating instructions.

Westfalia Separator offers a comprehensive range of training measures.



NOTE

The owner-operator is responsible for the training of staff.

Contact Westfalia Separator or your nearest representative for more information.

The owner-operator must select staff who, for example, fulfil the following requirements:

- Minimum requirement:
 - Read / understand the markings on the separator,
 - Read / understand user instructions.
- Further requirements and skills:
 - Basic general technical skills.
 - Content of the operating manual / operating instruction.
 - Measures for the prevention of accidents.
 - Planning and implementation of installation.
 - Securing of loads.
 - Planning and implementation of start-up.
 - Operation of the separator / system.
 - Cleaning of the separator / system.
 - Maintenance of the separator / system.
 - Repair of the separator / system.
 - Storage in case of extended periods of stoppage.

- Decommissioning of the separator / system.
- Disposal of operating material.
- Disposal of the separator / system.
- Other suitability:
 - Only assign tasks to dependable persons.
 - Minimum age of 18 years.
- Only employ persons undergoing training / apprenticeship under supervision.



NOTE

The required skills and knowledge depend on the tasks assigned.

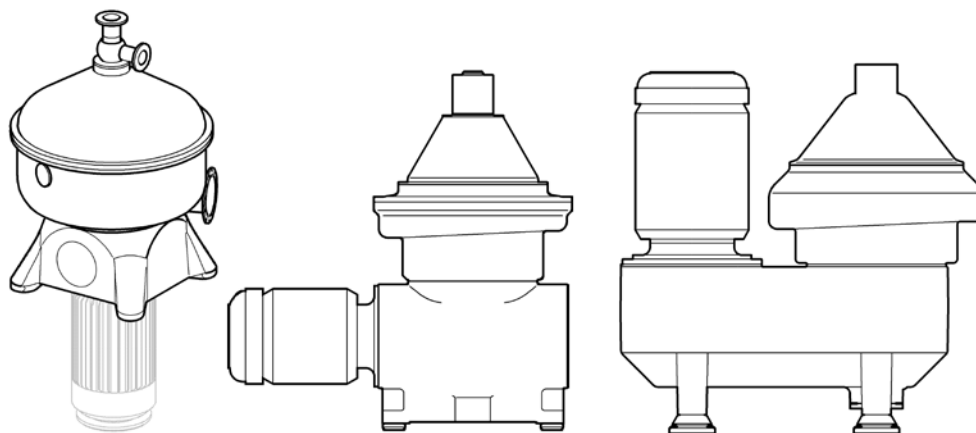
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Safety Precautions and User Information

Machine and Skid Components

No.: 9953-9001-010
Version: 19.10.2016

ORIGINAL INSTALLATION GUIDELINES

Contents subject to modification!

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1.1 Sphere of application

These *Safety precautions and User Information* are an important aid to

- avoid risks,
- reduce repair costs and downtimes and
- prolong the lifecycle of components.

The term “component” will be used in singular although this document is applicable to all components incorporated in the separators/plants.

To assure reliable information of the component, the safety precautions and user information must be read and understood before carrying out the following work:

- Installation
- Transport, storage
- maintenance work (cleaning and care, maintenance, servicing, repair) and
- Disposal

For questions that cannot be solved with the aid of this documentation, please check back with GEA Westfalia Separator Group.

1.2 Qualification of the personnel

Using these safety and user instructions and direct handling of the component require specialist qualification of the staff. For identifying the qualification level GEA Westfalia Separator Group uses the following standard terms:

1.2.1 Operating personnel

- **Qualified staff** have the necessary technical know-how and extensive experience enabling them to avoid the risks that can arise when handling electrical or mechanical components. Knowledge of English is required.
- **Trained staff** are instructed or supervised by qualified staff to enable them to avoid the risks that can arise when handling electrical or mechanical components.

When installing, operating and testing the equipment, the staff has to adhere to the safety rules applicable in the respective industry.

1.2.2 Service and repair personnel

Service and repair work require specialist knowledge and skills. Such work may be carried out only by competent persons in terms of specialist knowledge and skills. Documents in English are provided for this circle of persons. It is essential that this circle of persons has an adequate command of English.

1.3 Structure of the documentation



Risk due to non-observance of the documentation

There is a threat of serious injuries if the instructions in all documents are not followed.

- Refer to the instruction manuals for separators and/or start-up and shut-down instructions for skids.
- Pay attention to the safety precautions and user instructions in machine and skid documentation.
- Refer to the component manual.
- All safety precautions and warning instructions given in the documents have to be adhered to.
- Access to the documentation must always be assured at the deployment site.

The documentation for components normally consists of:

- Instruction manuals for separators and/or start-up and shut-down instructions for skids.
- Safety and user instructions on machine and plant documentation (this document).
- Reference to component manual and / or technical datasheet of the component.

1.4 Symbols used



This symbol gives information for better understanding the component and its functions.

- The direction arrow marks work and/or operating steps. Keep to the order shown from top to bottom.
- The bullet point marks lists.

1.5 Structure of the safety references

The centrifuge has been designed and built so that it functions and can be operated safely. Reference will be made in this manual to further potential risks by using warnings where appropriate.

A differentiation is made between hazards which result in damage to the centrifuge, plant components and environment and hazards which lead to possible or probable injury or loss of life.

Signal words and their meaning

DANGER

Denotes impending danger. If the preventive measures are not implemented, death or serious injury will be the consequence.

WARNING

Denotes a potentially dangerous situation. If the preventive measures are not implemented, death or serious injury may be the consequence.

CAUTION

Denotes a potentially dangerous situation. If the preventive measures are not implemented, minor injury may be the consequence.

NOTICE

Denotes a potentially damaging situation. If the preventive measures are not implemented, the centrifuge or something else in its vicinity can get damaged.

Danger signals

This is the danger signal. It warns of injury risks.

- Comply with all measures marked with the danger signal to avoid injury or death.

Structuring of the safety references according to the 5-point rule

1. **Danger signals as a warning of injury risks.**
2. **Signal words** signal the degree of risk.
3. **The type and source of the hazard** indicate from where the hazard originates.
4. **Explanation of the hazard** and **consequences in the case of non-compliance** describe the threat and the consequences of human error.
5. **Measures** give instructions to avoid the hazard.

**DANGER****Type and source of the hazard**

Explanation of the hazard and the consequences in the event of non-compliance.

- Measures to avert or minimise the hazard.

**WARNING****Type and source of the hazard**

Explanation of the hazard and the consequences in the event of non-compliance.

- Measures to avert or minimise the hazard.

**CAUTION****Type and source of the hazard**

Explanation of the hazard and the consequences in the event of non-compliance.

- Measures to avert or minimise the hazard.

NOTICE**Type and source of the hazard**

Explanation of the hazard and the consequences in the event of non-compliance.

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The machine or skid components have been designed state-of-the-art and in accordance with the recognised safety regulations. However, when using the component, risks may arise for the user or third party or the component or other assets might get impaired if it is

- operated by persons who have not been trained or briefed,
- not used for the intended application,
- not correctly repaired or maintained.

2.1 Intended use

The component is incorporated in machines and plants.

Precise details on the function of the component are found in the component manufacturer's manual.

The type of medium specified in the data sheet as well as the limit values for pressure and temperature of the medium as per the specification must be complied with at all times (see data sheet of the component manufacturer).

The specific values stated in the documents furnished with the component have to be observed and adhered to.

Usage in an explosion-hazarded zone is **not permitted**. The only exception: this is confirmed in the order or is in the *manual* or *data sheet* of the manufacturer.

2.2 Foreseeable use

A different usage or a usage which goes beyond the scope is not in compliance with the intended use. The operator of the machine/skid is exclusively liable for any damage resulting from such usage. This applies likewise for unauthorized modifications.

Non-intended use is the use of

- materials with excessively high temperature,
- materials with excessively high pressure,
- materials with smouldering, burning or sticky particles.
- highly explosive and pasty materials,
- materials that act chemically with the materials of the component.

Changing the process conditions, operating conditions and environmental conditions without the consent of the manufacturer are not in accordance with the intended use.



WARNING

Serious injury or death possible due to foreseeable misuse

Death or severe bodily injury to persons or damage to assets through disregarding mechanical, chemical and electrical risks.

- The specific values stated in the documents furnished with the component have to be observed and adhered to.

2.3 Residual risk

An element of risk will remain when using the components, even when strictly adhering to all safety rules and regulations.

All persons working with the component must be familiar with this residual risk and follow all instructions that prevent accidents or damage.



DANGER

Danger to life through electric voltage

When working on live leads, there is a risk of electric shock. An electric shock leads to serious injury or death.

- Work on electrical apparatus and/or on live component equipment must be performed by qualified staff only.
- Disconnect the power to electrical equipment if necessary.
- Secure against unintentional switching back on.
- Attach a warning sign that prohibits switching on.



WARNING

Serious injury due to non-use of personal protective gear

Fatal injuries due to non-use of personal protective gear!

- Make it compulsory for the maintenance personnel to wear personal protective gear.
- Depending on the specific circumstances, wear safety shoes, protective goggles, hearing protection etc.
- When surface temperatures of $> 50\text{ °C}$ or $< 0\text{ °C}$ ($> 122\text{ °F}$ or $< 32\text{ °F}$) prevail, wear temperature-resistant protective gloves when working on components.



WARNING

Serious injury as a result of uncoordinated work in the area of the component

There is a threat of serious crushing, cuts and grazes as a result of uncoordinated work in the area of the component.

- Be sure to work/move carefully in the area around the component.



WARNING

Serious eye and/or skin injuries due to discharge of the medium under high pressure

Risk of burns when handling materials with abrasive or corrosive properties.

- Wear protective goggles or mask with eye protection to offset the risk of medium spurting out.

2.4 Safety marking

The following markings (adhesive and metal plates) are fastened to the component or its accessories:



Warning of dangerous voltage

The sign is attached to the electric terminal box.
The terminal box may only be opened by a qualified electrician.

Nameplate

The nameplate contains specific component specifications.

All safety markings must always be in perfect condition.

- Clean dirty safety markings.
- Replace damaged safety markings.
- Note the safety marking.

2.5 Safety instructions for the personnel

Use only components that are in perfect technical condition in accordance with their intended use, paying attention to safety and hazard awareness and following the instructions in the documentation.

Eliminate all faults immediately, especially those that can negatively impact safety!

Clearly define and comply with competencies for activities relating to operation and maintenance. Only in this way can mistakes -- especially in risk situations - be avoided.

Do not fit the component until all protective and safety devices are fitted and operational. Do not remove them during operation.

In the event of functional faults or safety-relevant changes in the operating behaviour, shut down and secure the separator or skid. Have faults eliminated by qualified personnel immediately.

Discharge leakage from hazardous materials so that no risk arises for the operator or the environment.

Do not touch damaged, cracked and, in particular, live components.

2.6 Adjustments / commissioning

Through commissioning the component, the flow of medium can be changed or interrupted. Prior to commissioning, make sure that possible adjustments cannot result in risks for persons or environment.

Check for correct functioning after each adjustment.

Implement suitable measures to avoid the crushing of limbs by moving actuators.

2.7 Maintenance and servicing

When carrying out maintenance work, strictly adhere to all rules and regulations applicable for handling the component or the medium (e.g. protective clothing, no smoking).

Adhere to mandatory recurring tests and the intervals given in the documentation for such tests and inspections.

Regularly check cables and hose connections, particularly on moving parts, for damage and replace if necessary.

2.8 Special types of hazard

2.8.1 Electrical energy

Never carry out work on live parts!

Do not modify constructional features in a way that impairs safety. Do not reduce clearances and creepage distances through insulation.

Check the condition of cables on a regular basis and replace if necessary.

2.8.2 Oils, fats and other chemical substances

When handling oils, fats and other chemical substances, pay attention to and comply with the valid regulations and safety data sheets issued by the manufacturers of these substances regarding storage, handling, use and disposal!

First-aid measures after skin contact:

- Take off all contaminated pieces of clothing.
- Rinse off the skin thoroughly with water or take a shower.
- consult a doctor immediately.

First-aid measures after eye contact:

- Rinse out with plenty of water.
- consult a doctor immediately.

3 Description

3.1	Description and functional principles	16
3.2	Operating conditions.....	16

3.1 Description and functional principles

The detailed description and functional principle of the respective component are given in the corresponding component manual.

3.2 Operating conditions

The housing and sealing materials are selected to suit the operating conditions. The operating conditions have a major impact on the life of the component.

- Technical characteristics and the essential permissible limit values, especially for pressure and temperature of the medium, are given in the manufacturer's manual.
- Care must be taken that the component is only used where the rating criteria comply with the values stated on the nameplate. Proper and correct transport and storage is essential.
- Faults arising from moving elements must be prevented by taking appropriate measures.

4 Transport and storage

4.1	Transport	18
4.2	Storage	18

4.1 Transport

The following conditions must be observed:



WARNING

Danger through contact with substances hazardous to health

The component can come in contact with substances potentially harmful to health during operation.

- De-contaminate the component prior to packing and/or transport.

- Use hoists to transport components that are too heavy to move by hand.
- Screw eye bolts or lugs into the component, attach properly to the hoist and then transport the components.
- When using lifting straps, place them around the component, provide sharp-edge protection if required, and watch for proper weight distribution.
- Protect the component against outside force during transport (impacts, vibrations etc.).
- Protect the sealing surfaces of the connections against damage.
- Do not remove the corrosion protection layer.

4.2 Storage

Protect the component against external impacts and contamination.

- Keep the storage room dry and dust-free.
- Avoid condensate formation.
- Protect connection openings against dirt.

5 Assembly and installation

5.1	Measures to be taken prior to installation.....	20
5.2	Assembly	20
5.2.1	Fitting in the case of threaded connection.....	20
5.2.2	Fitting in the case of a flanged connection	20
5.3	Electrical connection.....	21
5.4	Pneumatic connection	21
5.5	Ex zone.....	21

- Refer to the *component manual* for specific information on the component.
- Before installation, read and follow the instructions in the chapter “Safety precautions”.
- Observe accident prevention regulations!

5.1 Measures to be taken prior to installation.



CAUTION

Injuries as a result of non-compliance with safety requirements

Transport and/or storage may result in damage to the packaging to the extent that the component no longer meets the safety requirements.

- Check for potential damage prior to fitting.
- Do not fit a damaged component.

Before fitting, pay attention to the following:

- Check the piping and component for absolute cleanliness.
- Remove the protective caps from the caps only just before fitting.
- Do not damage the sealing surfaces or threads.

5.2 Assembly

- Remove all the packaging parts directly before fitting.
- No dirt particles must be allowed to enter the component.
- When required, keep to the flow of direction shown on the component.

After fitting

- Perform a leakage and function test.
- Create the specified operating status.

5.2.1 Fitting in the case of threaded connection

- Use a suitable sealant.
- Lay the piping so that no flow of forces runs through the component.

5.2.2 Fitting in the case of a flanged connection

- Fit the specified screws. Use all flange bores provided.
- Fit suitable gaskets and center between flanges.
- Tighten the screws evenly and crosswise to avoid distortion. A pipe must under no circumstances be pulled against the component.
- Pay attention to correct seating of the gaskets.
- Tighten the screws with the specified torque.

5.3 Electrical connection

For components with electrical accessories.



DANGER

Danger to life through electric voltage

When working on live leads, there is a risk of electric shock. An electric shock leads to serious injury or death.

- Work on electrical apparatus and/or on live component equipment must be performed by qualified staff only.
- Disconnect the power to electrical equipment if necessary.
- Secure against unintentional switching back on.
- Attach a warning sign that prohibits switching on.
- Ground the component in accordance with the local regulations.
- Comply with the protective measures when connecting the component in accordance with the provisions of the responsible power company.

5.4 Pneumatic connection

Actuate only with conditioned compressed air. Install a compressed air control unit upstream if required.

5.5 Ex zone

Usage in an explosion-hazarded zone is not permitted. The only exception: this is confirmed in the order or is in the *manual* or *technical data sheet* of the manufacturer.

6 Repair

6.1	Cleaning and care.....	24
6.2	Maintenance	24
6.3	Repair	24

This chapter is divided into the sections cleaning and care, maintenance and repair.

- Before carrying out maintenance and repair, read and follow the instructions in the chapter “Safety precautions”.

6.1 Cleaning and care

NOTICE

Damage to the component due to a dirt layer coating

Blockage of function openings. Reduction of heat dissipation.

- Arrange for efficient covering of the component when carrying out dirty work near the separator or the plant (e.g. laying concrete, brickwork, painting, sand-blasting).
- Clean the component regularly.

NOTICE

Functional fault and damage to the component

There is a threat of damage to property due to improper cleaning.

- When cleaning with aqueous cleaning agents, pay attention to the type of protection of the electric components. In case of doubt, do not use it!
- Do not use aggressive detergents. The latter can attack metal and plastic surfaces as well hose connections.
- Never clean sensitive components with coarse brushes under strong mechanical pressure.
- Functional

6.2 Maintenance

- The maintenance intervals have to be re-determined (shortened) by the operator according to prevailing operating conditions.
- Check or maintain the component for safety reasons. Note the following minimum requirements:
 - Regular check of the outer condition of the component and the accessories.
 - Regular actuation so as not to impair the smoothness of action of all movable parts through excessively long standstill times.

6.3 Repair

NOTICE

Material damage due to mechanical stressing of the components

Tread load, stress through connected pipes, excessively high ambient temperature destroy the component.

- Fit without using force. Avoid stresses.
- No additional stress, e.g. tread load (use as unauthorized climbing aid).
- No welding and heat treatment.
- No tool machining (e.g. drilling).

7 Decommissioning

7.1 Machine disposal26

7.1 Machine disposal

When the machine has reached the end of its useful service life, the plant operator is responsible for proper and correct disposal.

It is recommended to commission a company specialized in the disposal of machines or to obtain information from GEA Westfalia Separator service.

- Observe the local disposal regulations.
- Be sure to adhere to applicable environmental protection legislation.
- Have electrical connections disconnected by qualified personnel, e.g. electricians.

IMPORTANT: Residual liquids in feed lines and utility lines can cause injury. Protective clothing must therefore be worn when dismantling lines.



Danger of acid and alkali burns

After cleaning, hot lye and acid residues can still be in the machine and the pipelines. When working on the machine, contact with the lyes and acids can cause burns.

- Wear acid-resistant safety gear, e.g. safety goggles, safety gloves, protective overalls or protective suits.
- Take special care.
- Observe the plant operator's SOPs on handling acids and lyes as well as local disposal regulations.
- Be sure to adhere to applicable environmental protection legislation.
- Drain residual liquids in feed lines and utility lines into suitable vessels and dispose of them properly.
- Observe regulations on product contact.
- Dismantle feed lines and utility lines, clean superficial impurities caused by lubricants or product with suitable media and dispose of separately.
- Dismantle all seals and non-metallic materials, clean them to remove lubricants and dispose of them separately or recycle.
- Separate and sort metal parts and recycle them.

8 Spare parts

8.1 Use only genuine spare parts28

8.1 Use only genuine spare parts.

All spare parts, wear parts and operating materials are originally packed by GEA Westfalia Separator.



The original packing is provided with the marking shown.

Fig. 1



WARNING

Danger due to defective spare parts

Non-original or unauthorized parts or supplies endanger the personnel working on the machine.

Non-genuine or non-approved spare parts or operating materials reduce the availability of the machine.

- Use only genuine spare parts from GEA Westfalia Separator to assure the operating safety and optimum availability of the machine.



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Excellence · Passion · Integrity · Responsibility · GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 index.

GEA Germany

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59302 Oelde, Germany

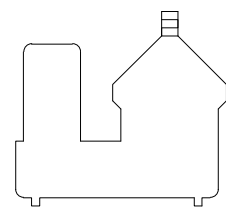
Tel +49 2522 77-0
Fax +49 2522 77-2950

info@gea.com
gea.com

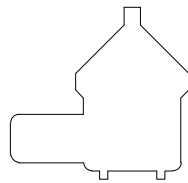
GRAFICAL SYMBOLS ACCORDING TO DIN ISO 10628-2 (DIN EN 62424)

GRAPHISCHE SYMBOLE IN ANLEHNUNG AN DIN ISO 10628-2 (DIN EN 62424)

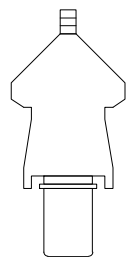
GEA EQUIPMENT



SEPARATOR
BELT DRIVE



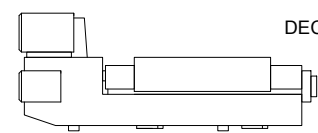
SEPARATOR
GEAR DRIVE



SEPARATOR
DIRECT DRIVE

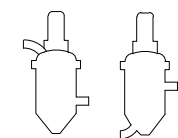


SEPARATOR
INTEGRATED DIRECT DRIVE

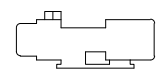


DECANTER

ROTARY BRUSH STRAINER
DREHBÜSTENSIEB



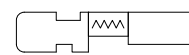
CYCLONE
ZYKLON



DEFOAMING PUMP
ENTSCÄUMUNGSPUMPE



FINISCHER
NACHWÄSCHER

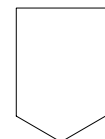


FLOUR MIXER
MEHLMISCHER

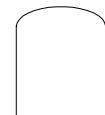
VESSELS / BEHÄLTER



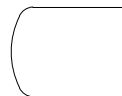
VESSEL BASIC SYMBOL
BEHÄLTER BASIS SYMBOL



CONICAL BOTTOM VESSEL
BEHÄLTER MIT KONISCHEM BODEN



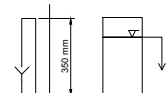
DOME ROOF VESSEL
BEHÄLTER MIT DOMDACH



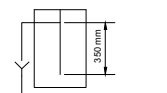
HORIZONTAL VESSEL
BEHÄLTER HORIZONTAL



BALANCE TANK
AUSGLEICHSBEHÄLTER



OPERATING WATER SIPHON
STEUERWASSERSIPHON



SETTLING VESSEL
ABSETZBEHÄLTER

HEATER AND COOLING EQUIPMENT

WÄRMEAUSTAUSCHER

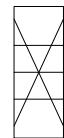
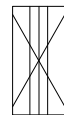


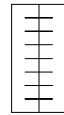
PLATE HEAT EXCHANGER
PLATTENWÄRMEAUSTAUSCHER



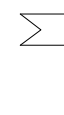
TUBE BUNDLE HEAT EXCHANGER
ROHRBÜNDELWÄRMEAUSTAUSCHER



WASSERKÜHLER
WATER COOLER



AIR COOLER
LUFTKÜHLER



STEAM / WATER COIL
DAMPF / WASSER ROHRSCHLANGE



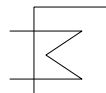
HEAT EXCHANGER
WÄRMEAUSTAUSCHER



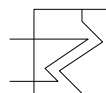
SPIRAL HEATER
SPIRALWÄRMETAUSCHER



TUBULAR PREHEATER
RÖHRENVORWÄRMER



TUBULAR PREHEATER
RÖHRENVORWÄRMER



ELECTRIC PREHEATER
ELEKTROVORWÄRMER

PUMPS / PUMPEN



PUMP (GENERAL)
PUMPE (GENEREL)



CENTRIFUGAL PUMP
KREISELPUMPE



DIAPHRAGM PUMP
MEMBRANPUMPE



ECCENTRIC SCREW PUMP
EXZENTERSCHNECKENPUMPE



PISTON PUMP
KOLBENPUMPE



DISPLACEMENT PUMP
VERDRÄNGUNGSPUMPE



VACUUM PUMP
VAKUUMPUMPE



STEAM JET INJECTOR
STRAHLPUMPE



GEAR PUMP
ZAHNRADPUMPE



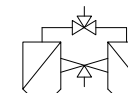
SCREW PUMP
SCHRAUBENSPINDEL PUMPE



GREASE PUMP
FETTSCHEMIEPUMPE

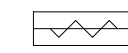
SEPARATION EQUIPMENT

ABSCHIEDER

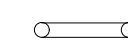


DOUBLE BASKET FILTER
DOPPELTER KORBFILTER

CONVEYING FÖRDERUNG



SCREW CONVEYOR
SCHNECKENFÖRDERER

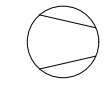


CONVEYOR BELT
FÖRDERBAND



CONVEYOR BELT
FÖRDERBAND

COMPRESSING VERDICHTER



COMPRESSOR
VERDICHTER



VENTILATOR
VENTILATOR

MOTOR / MOTOR



ELECTRIC MOTOR
ELEKTROMOTOR

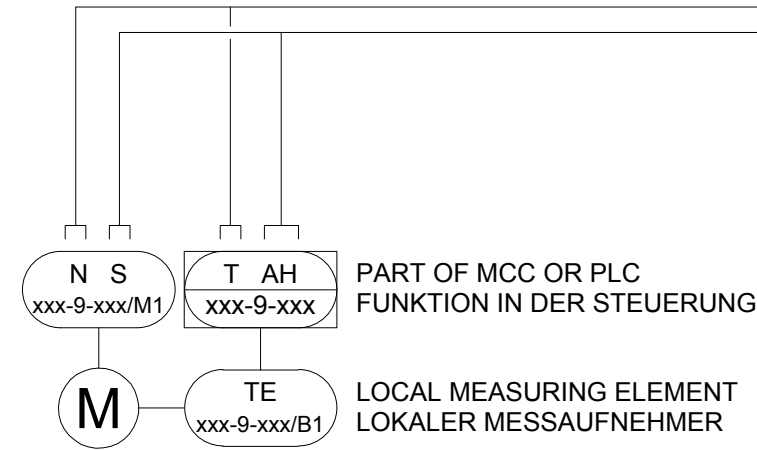
Processing functions for (N) actuators - motors Verarbeitungsfunktionen für (N) Aktoren - Motoren		
NS	On / Off An/ Aus	
NCN	FC normal overload FU Normal Overload	For small loads Bei geringen Belastungen
NCH	FC high overload FU High Overload	Preset Voreinstellung

H	Aktualisierung der Symbole Updating the symbols			04.05.2018	D. Bregenhorn
Revision	Revisionsbeschreibung Description of Revision			Rev.-Datum Rev.-Date	Rev.-Name Rev.-Name
gez. created	Datum Date	Name Name	 GEA Group D-59302 Oelde	Beschreibung Description	
letzte Änderung last modified	05.05.2015	2323VE		GRAPHICAL SYMBOLS 9901-8104-300	
	05.07.2017	BREG	Copyright reserved Wir reservieren alle Rechte an dieser Zeichnung Für diese Zeichnung behalten wir uns alle Rechte vor.	GRAPHISCHE SYMBOLE Blatt / Blätter Sheet / Sheets 1 / 7	
					Format Size A2

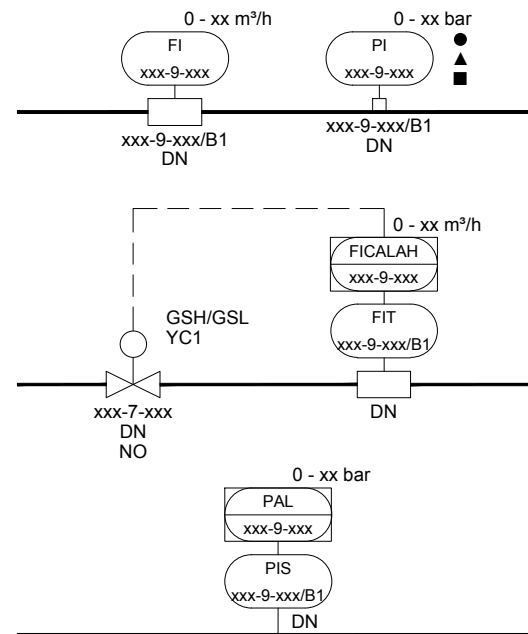
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SYMBOLS AND CODE LETTERS FOR MSR ACCORDING TO DIN EN 62424 - CATEGORY BILDZEICHEN UND KENNBUCHSTABEN FÜR MSR IN ANLEHNUNG AN DIN EN 62424 - KATEGORIE

Code letter / Kennbuchstabe	Application	Verwendung
A	Analysis	Analyse
B	Burner control, flame monitoring	Brennersteuerung, Flammenüberwachung
C	Freely usable	Frei verwendbar
D	Density	Dichte
E	Electrical voltage	Elektrische Spannung
F	Flow rate	Durchfluss
G	Distance, length, position	Abstand, Länge, Stellung
H	Manual input, manual intervention	Handeingabe, Handgriff
I	Electrical current	Elektrischer Strom
J	Electrical output	Elektrische Leistung
K	Time-based functions	Zeitbasierte Funktionen
L	Filling level	Füllstand
M	Humidity	Feuchte
N	Regulating member (motor)	Stellglied (Motor)
O	Optical measurement	Optische Messung
P	Pressure	Druck
Q	Quantity or number	Menge oder Anzahl
R	Radiation variables	Strahlungsgrößen
S	Speed, speed of rotation, frequency	Geschwindigkeit, Drehzahl, Frequenz
T	Temperature	Temperatur
U	Do not use	Nicht benutzen
V	Vibration, oscillation	Vibratin, Schwingung
W	Weight, mass	Gewicht, Masse
X	Other variables *1	Sonstige Größen *1
Y	Regulating member (valve)	Stellglied (Ventil)
Z	Freely usable	Frei verwendbar



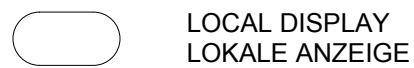
MEASURING AND CONTROL EXAMPLES
MESS - UND REGELUNGSBEISPIELE



PCE CATEGORY
PCE KATEGORIE

PCE PROCESSING (NEXT LETTER)
PCE VERARBEITUNGSFUNKTION (FOLGEBUCHSTABEN)

- A ANALYSIS
ANALYSE
- B BURNER CONTROL/ FLAME DETECTION
BRENNERSTEUERUNG/ FLAMMENÜBERWACHUNG
- D DENSITY
DICHTE
- E ELECTRICAL VOLTAGE
ELEKTRISCHE SPANNUNG
- F FLOW
DURCHFLUSS
- G DISTANCE, LENGHT, POSITION, STRETCHING
WEG, LÄNGE, POSITION, AUSDEHNUNG
- H MANUAL
MANUELL
- I CURRENT
ELEKTRISCHER STROM
- J POWER
LEISTUNG
- K TIME
ZEIT
- L LEVEL
NIVEAU
- M MOISTURE
FEUCHTIGKEIT
- N ACTUATOR (MOTOR)
STELLGLIED (MOTOR)
- O OPTICAL
OPTISCH
- P PRESSURE
DRUCK
- Q QUANTITY
MENGE, ZÄHLER
- R RADIATION QUANTITY
STRAHLUNGSMENGE
- S SPEED, rpm, FREQUENCY
GESCHWINDIGKEIT, rpm, FREQUENZ
- T TEMPERATURE
TEMPERATUR
- V VIBRATION
VIBRATION
- W WEIGHT, MASS
GEWICHT, MASSE
- Y ACTUATOR (VALVE)
STELLGLIED (VENTIL)



LOCAL DISPLAY
LOKALE ANZEIGE



RELEVANT TO GMP
GMP RELEVANT



CENTRAL CONTROL CENTER
ZENTRALER LEITSTAND



RELEVANT TO SAFETY
SICHERHEITSRELEVANT



LOCAL CONTROL PANEL
LOKALER STEUERSCHRANK



RELEVANT TO QUALITY
QUALITÄTSRELEVANT

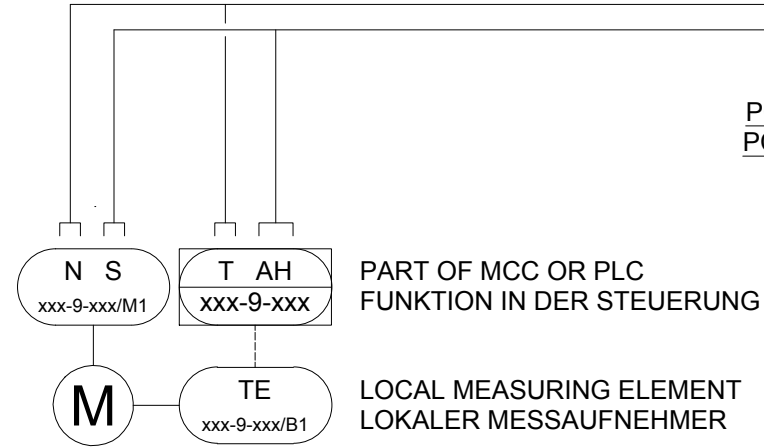
H	Aktualisierung der Symbole Updating the symbols	04.05.2018	D. Bregenhorn
Revision	Revisionsbeschreibung Description of Revision	Rev.-Datum Rev.-Date	Rev.-Name Rev.-Name
gez. created	Datum Date	Name Name	Beschreibung Description GRAPHICAL SYMBOLS
letzte Änderung last modified	05.05.2015	2323VE	
	26.03.2018	BREG	Beschreibung Description GRAPHISCHE SYMBOLE
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			Zeichnungs.-Nr. Drawing-No. 9901-8104-300
			Blatt / Blätter Sheet / Sheets 2 / 7
			Format Size A2

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SYMBOLS AND CODE LETTERS FOR MSR ACCORDING TO DIN EN 62424 - PROCESS

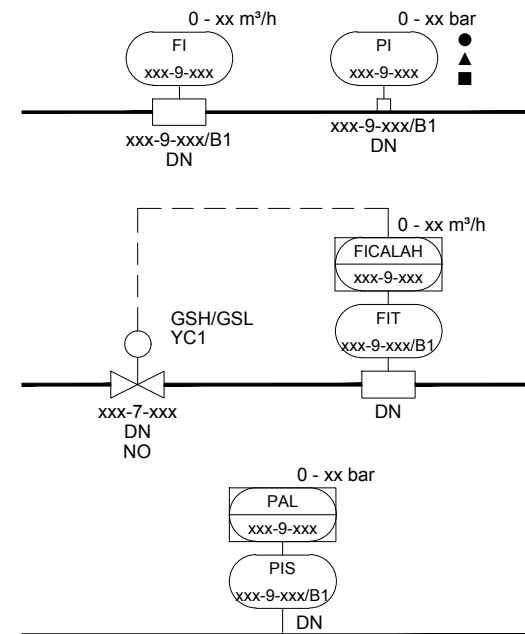
BILDZEICHEN UND KENNBUCHSTABEN FÜR MSR IN ANLEHNUNG AN DIN EN 62424 - PROZESS

Kennbuchstabe	Application	Verwendung
A	Alarm, message	Alarm, Meldung
B	Limit, restriction	Beschränkung, Eingrenzung
C	Control	Regelung
D	Difference	Differenz
E	Element	Element
F	Ratio	Verhältnis
G	Not applicable	Nicht anwendbar
H	Top limit value, on, open	oberer Grenzwert, an, offen
I	Analogue display	Analoganzeige
J	Not applicable	Nicht anwendbar
K	Not applicable	Nicht anwendbar
L	Bottom limit value, off, closed	unterer Grenzwert, aus, geschlossen
M	Not applicable	Nicht anwendbar
N	Not applicable	Nicht anwendbar
O	Local or PCS status display of binary signals	lokale oder PCS Statusanzeige von Binärsignalen
P	Not applicable	Nicht anwendbar
Q	Integral, sum	Integral, Summe
R	Recorded value	Aufgezeichneter Wert
S	Binary control function or switching function (not relevant to safety)	Binäre Steuerfunktionen oder Schaltfunktion (nicht sicherheitsrelevant)
T	Transmitter	Transmitter
U	Not applicable	Nicht anwendbar
V	Not applicable	Nicht anwendbar
W	Not applicable	Nicht anwendbar
X	*1	*1
Y	Calculating function	Rechnerfunktion
Z	Binary control function or switching function (relevant to safety)	Binäre Steuerfunktionen oder Schaltfunktion (sicherheitsrelevant)



MEASURING AND CONTROL EXAMPLES

MESS - UND REGELUNGSBEISPIELE



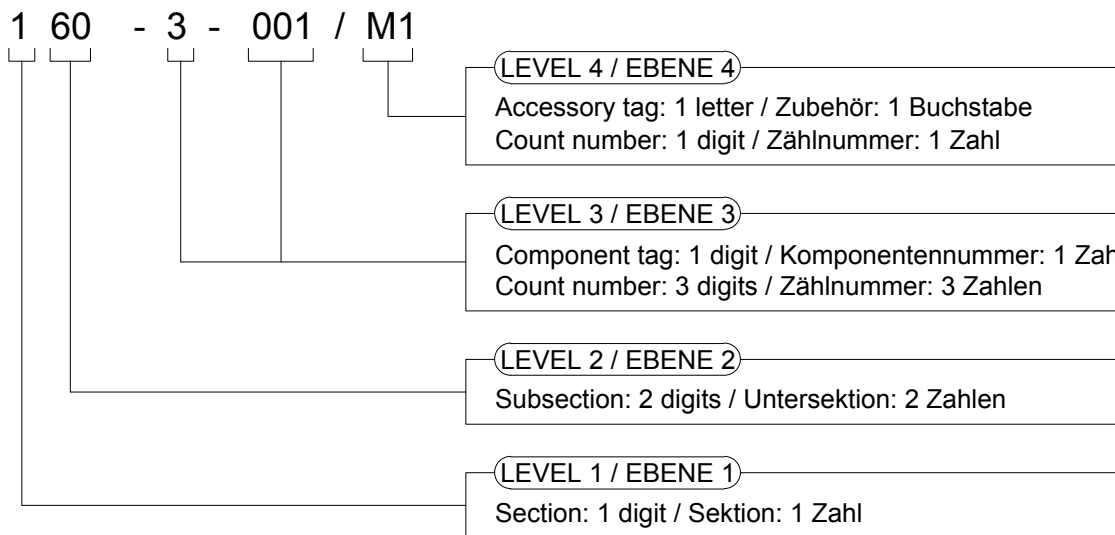
- A ALARM/ NOTIFICATION
ALARM/ MELDUNG
- B LIMITATION / DEFINING
BESCHRÄNKUNG/ EINGRENZUNG
- C CONTROLLER
REGLER
- D DIFFERENCE
DIFFERENZ
- E ELEMENT
ELEMENT
- F PROPORTION
PROPORTION
- H UPPER LIMIT/ ON/ OPEN
OBERER GRENZWERT/ AN/ OFFEN
- I INDICATION
ANZEIGE
- L LOWER LIMIT/ OFF / CLOSED
UNTERER GRENZWERT/ AUS/ GESCHLOSSEN
- O LOCAL OR PCS STATUS OF BINARY SIGNALS
LOKALE ODER PCS STATUSANZEIGE VON BINÄRSIGNALEN
- Q SUMMARY
SUMME
- R RECORDED VALUE
AUFGEZEICHNETER WERT
- S BINARY CONTROL FUNCTION OR SWITCHING FUNCTION
BINÄRE STEUERUNGSFUNKTION ODER SCHALTFUNKTION
- T TRANSMITTER
TRANSMITTER
- Y CALCULATOR FUNCTION
RECHENFUNKTION
- Z BINARY CONTROL FUNCTION OR SWITCHING FUNCTION
(RELEVANT SAFETY)
BINÄRE STEUERUNGSFUNKTION ODER SCHALTFUNKTION
(SICHERHEITSRELEVANT)

H	Aktualisierung der Symbole Updating the symbols	04.05.2018	D. Bregenhorn
Revision	Revisionsbeschreibung Description of Revision	Rev.-Datum Rev.-Date	Rev.-Name Rev.-Name
gez. created	Datum Date 05.05.2015 Name 2323VE	 GEA Group D-59302 Oelde Copyright reserved We reserve all rights on this drawing Für diese Zeichnung behalten wir uns alle Rechte vor.	
letzte Änderung last modified	26.03.2018 BREG		
Beschreibung Description GRAPHICAL SYMBOLS GRAPHISCHE SYMBOLE		Zeichnungs.-Nr. Drawing-No. 9901-8104-300	
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COMPONENT TAGGING KOMPONENTENBESCHREIBUNG

Example/ Beispiel: 1 60 - 3 - 001 / M1



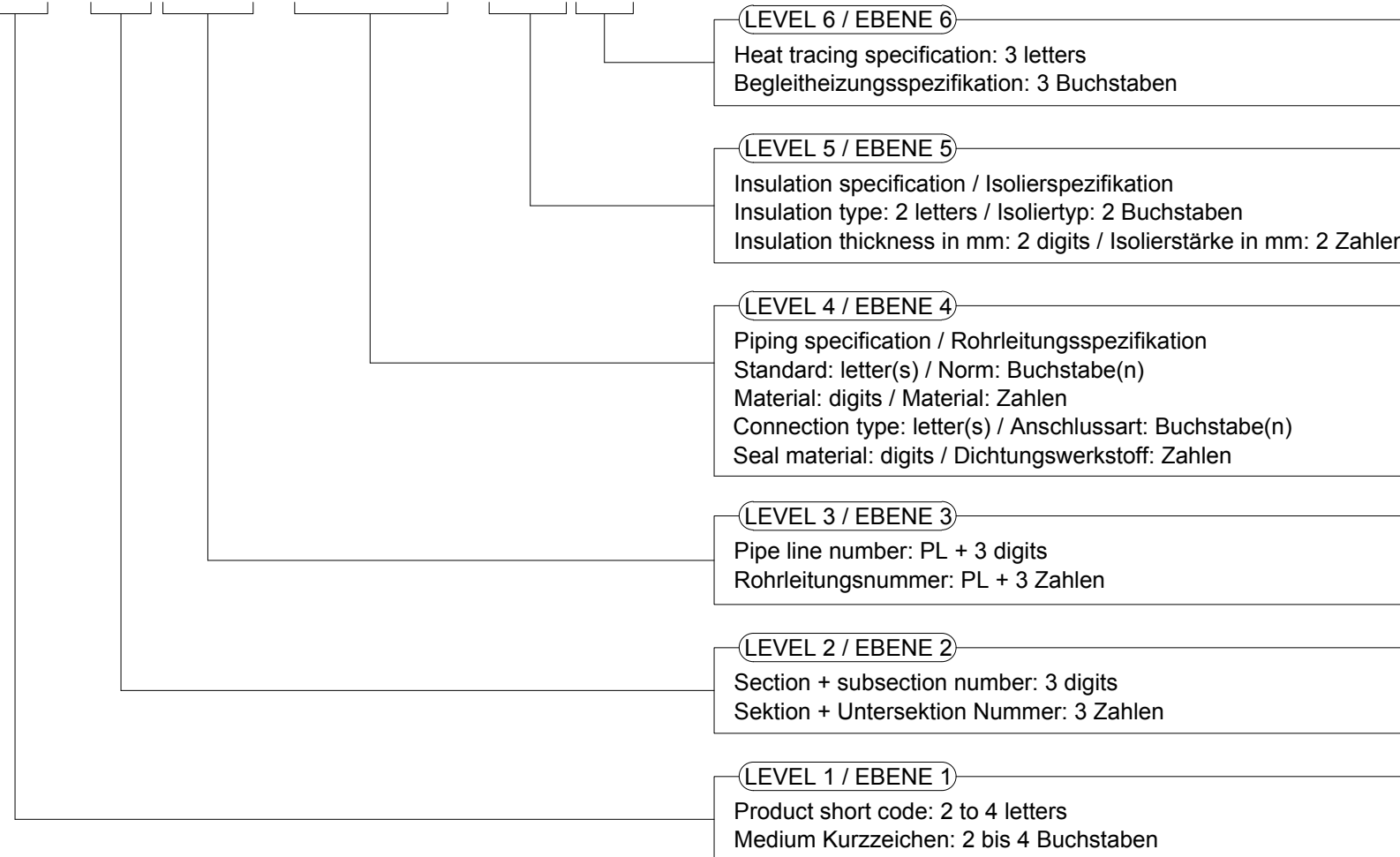
ACCESSORIEST LIST ANHÄNGE

LEVEL 4 / EBENE 4	
B1	MEASURING INSTRUMENTS MESSGERÄTE
M1	MOTOR MOTOR
L1	ILLUMINATION BELEUCHTUNG
GSH / GSL	LIMIT SWITCHES GRENZSCHALTER
YS1	PILOT VALVES - OPEN / CLOSE STEUERVENTILE - AUF / ZU
YC1	REGULATING VALVES STELLARMATUR GEREGLT
YD	DIRECT ACTUATED SOLEVOID VALVE DIREKT GESTEUERTES MAGNETVENTIL

PIPING DESCRIPTION ROHRLEITUNGSBESCHREIBUNG

Note: project-specific (large projects)
Hinweis: projektspezifisch (Großprojekte)

Example/ Beispiel: FAT - 160 PL004 - D4404S52 - WI40 HTe



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gez. created	Datum Date	Name Name	 GEA Group D-59302 Oelde Copyright reserved We reserve all rights on this drawing Für diese Zeichnung behalten wir uns alle Rechte vor.	Zeichnungs.-Nr. Drawing-No.	
letzte Änderung last modified	05.05.2015	2323VE		9901-8104-300	
	03.05.2018	BREG		Blatt / Blätter Sheet / Sheets 4 / 7	Format Size A2

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GRAFICAL SYMBOLS - PIPE FITTINGS, VALVES

GRAPHISCHE SYMBOLE - LEITUNGSFITTINGE, ARMATUREN

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	Valves symbols Symbole Armaturen	Actuator, manually operated Stellantrieb, handbetätigt	Actuator, manually operated (secured) Stellantrieb, handbetätigt (gesichert)	Actuator with rotating system, general Stellantrieb mit rotierendem System, allgemein	Actuator with slanted seat Stellantrieb mit schrägen Sitz	Actuator with electric motor Stellantrieb mit Elektromotor	Actuator with diaphragm Stellantrieb mit Membrane	Actuator with electromagnet Stellantrieb mit Elektromagnet	Actuator with piston Stellantrieb mit Kolben	Actuator with lift Stellantrieb mit Lift	Actuator with spring Stellantrieb mit Feder	Actuator with float Stellantrieb mit Schwimmer
GERADE	Shut-off fitting (general) Absperrarmatur (allgemein)											
	Gate valve Absperrschieber											
	Shut-off valve Absperrventil											
	Shut-off flap Absperrklappe											
	Stopcock Absperrhahn											
	Diaphragm valve Membranventil											
	Control valve Regelventil											
	Pinch valve Quetschventil											
ECK	Angle shut-off fitting Absperrarmatur in Eckform											
	Three-way shut-off fitting Dreiwegearmatur											
DREIWEG	Three-way shut-off valve Absperr-Dreiwegeventil											
	Three-way stopcock Dreiwegehahn											
	T - Shut-off valve T - Absperrventil											
	T - Diaphragm valve T - Membranventil											
	MULTI-PORT MULTI-PORT											

Valves with safety function
Armaturen mit Sicherheitsfunktionen

Safety valve
Sicherheitsventil

Safety valve
Sicherheitsventil

Needle valve
Nadelventil

Needle valve
Nadelventil

Non return fittings
Rückschlagarmaturen

Non return fitting
Rückschlagarmatur

Non return valve
Rückschlagventil

Non-return flap
Rückschlagklappe

Double check valve
Doppelrückschlagventil

PIPE FITTINGS
LEITUNGSFITTINGE

COMPENSATOR
KOMPENSATOR

HOSE
SCHLAUCH

DIRT STRAINER
SCHMUTZFÄNGER

RESTRICTION ORIFICE
BLENDE

SIGHT GLASS
SCHAUGLAS

SIGHT GLASS WITH LIGHT
SCHAUGLAS MIT BELEUCHTUNG

IN-LINE HOUSING
IN-LINE GEHÄUSE

PULSATION DAMPER
PULSATIONS DÄMPFER

STEAM TRAP
KONDENSATABSCHIEDER

FUNNEL
TRICHTER

SPRAY BALL
SPRÜHKOPF

TRAP
ABSCHIEDER

AIR FILTER
LUFTFILTER

OIL FILTER
ÖLFILTER

DIFFERENTIAL METERING PISTON
DOSIERKOLBEN

STRAINER
FILTER

DISTRIBUTER UNIT
VERTEILER

Pressure valves
Druckventile

Constant-pressure valve
Konstantdruckventil

Self acting back-pressure regulator
internal sensing
Selbsttätiges Druckminderventil

Pressure reducer with strainer
Druckminderventil mit Filter

Pressure reducer with strainer and oiler
Druckminderventil mit Filter und Öler

Maintenance unit
Wartungseinheit

Safety position
Sicherheitsposition

NO NORMALLY OPEN
FEDERÖFFNEND

NC NORMALLY CLOSED
FEDERSCHLIESSEND



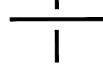
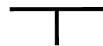





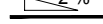


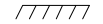

= INDIFFERENT

H	Aktualisierung der Symbole Updating the symbols	04.05.2018	D. Bregenhorn
Revision	Revisionsbeschreibung Description of Revision	Rev.-Datum Rev.-Date	Rev.-Name Rev.-Name
gez. created	Datum Date: 05.05.2015 Name Name: 2323VE	 GEA Group D-59302 Oelde	
letzte Änderung last modified	Datum Date: 26.04.2018 Name Name: BREG		
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		Zeichnungs.-Nr. Drawing-No. 9901-8104-300	
		Blatt / Blätter Sheet / Sheets 5 / 7	Format Size A2

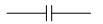
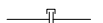
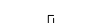





GRAFICAL SYMBOLS - PIPE, PIPE FITTINGS, LABELS, BREAK IDENTIFIERS

GRAPHISCHE SYMBOLE - ROHRLEITUNG, LEITUNGSFITTINGE, BESCHRIFTUNG, TRENNSTELLEN

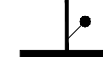








PIPE SYMBOLS ROHRLEITUNGSSYMBOLS

-  PROCESS MAIN PIPE
PROZESS HAUPTLEITUNG
-  SECONDARY PROCESS PIPE / UTILITIES PIPE
PROZESS NEBENLEITUNG
-  CROSSING OF PIPES
LEITUNGSKREUZUNGEN
-  CONNECTION OF PIPES
LEITUNGSANSCHLUSS
-  CONCENTRIC / EXCENTRIC REDUCER
KONZENTRISCHE / EXZENTRISCHE REDUZIERUNGEN
-  INSTRUMENT AIR / COMPRESSED AIR
INSTRUMENTENLUFT / DRUCKLUFT
-  NITROGEN
STICKSTOFF
-  INSTRUMENTATION SIGNAL
INSTRUMENTIERUNG SIGNAL
-  FLOW DIRECTION
FLUSSRICHTUNG
-  SLOPE INDICATOR
GEFÄLLE
-  LIMITS
GRENZEN
-  REFERENCE SYMBOL FOR LEVEL INDICATION
HÖHENANGABE
-  BOTTOM
BODEN
-  ISOLATION
ISOLIERUNG


PIPE FITTINGS LEITUNGSFITTINGE

-  FLANGE SET
FLANSCHPAAR
-  TRI CLAMP
TRI CLAMP
-  SCREW COUPLING
VERSCHRAUBUNG
-  BLIND FLANGE
BLINDFLANSCH
-  HOSE CONNECTION
SCHLAUCHVERBINDUNG
-  SLEEVE
MUFFE
-  CONNECTOR
STUTZEN
-  INJECTION NOZZEL
SPRITZDÜSE

BREAK IDENTIFIERS TRENNSTELLEN

-  CHANGE IN PIPE LINE ID NUMBER
LEITUNGSNUMMERNWECHSEL
-  CHANGE IN PIPING CLASS
ROHRKLASSENÄNDERUNG
-  SCOPE OF SUPPLY
LIEFERGRENZE
-  SCOPE OF SUPPLY
LIEFERGRENZE
-  L = GEA WS Supplied and controlled
GEA WS liefert und steuert
-  P = GEA WS supplied, Customer controlled
GEA WS liefert, Kunde steuert
-  C = Customer supplied, GEA WS controlled
Kunde liefert, GEA WS steuert
-  S = Customer supplied and controlled
Kunde liefert und steuert
-  W = --- (freely definable in project)
(im Projekt frei definierbar)

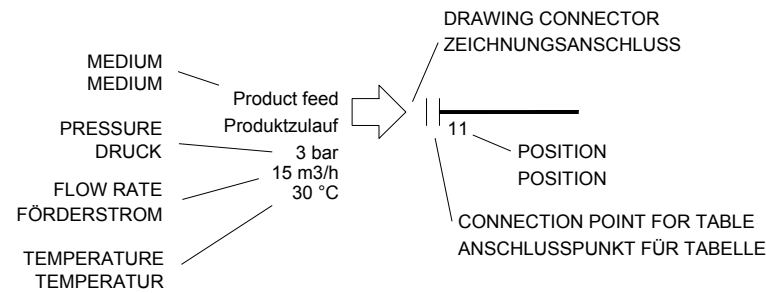
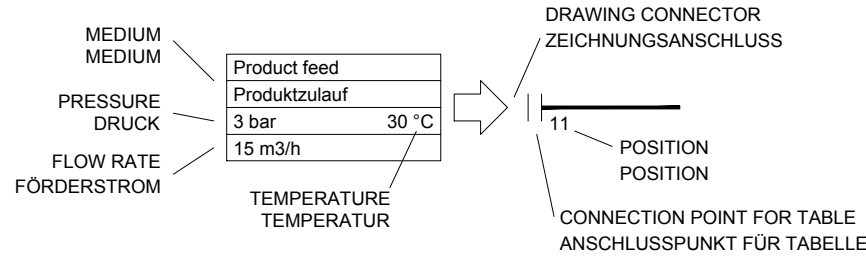
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Revision	Revisionsbeschreibung Description of Revision	Rev.-Datum Rev.-Date	Rev.-Name Rev.-Name
gez. created	Datum Date: 05.05.2015 Name Name: 2323VE	 GEA Group D-59302 Oelde Beschreibung Description: GRAPHICAL SYMBOLS GRAPHISCHE SYMBOLE	
letzte Änderung last modified	Datum Date: 30.01.2018 Name Name: BREG		
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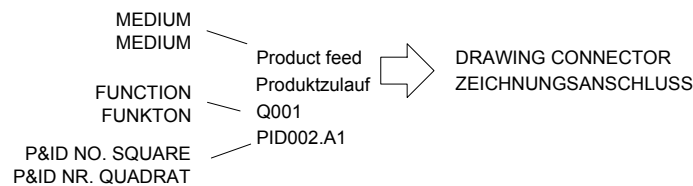
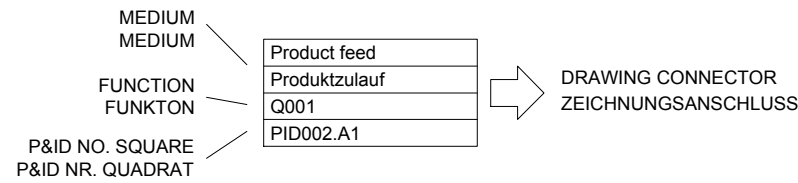
GRAFICAL SYMBOLS - MEDIUM CONSUMPTION, CROSS REFERENCE

GRAPHISCHE SYMBOLE - MEDIENVERBRAUCH, QUERVERWEIS

MEDIUM CONSUMPTION MEDIENVERBRAUCH



CROSS REFERENCE QUERVERWEIS



CONNECTION TABLE ANSCHLUSSTABELLE

CONNECTION TABLE / ANSCHLUSSTABELLE				
Pos.	Description / Benennung	DN / INCH	Execution	Ausführung
11	Product feed Produktzulauf	50	SHOULDERED CONNECTOR DIN 11864-BS-A-53x1.5-1.4404- H3	BUNDSTUTZEN
12	Discharge stand. milk Ablauf stand. Milch	65	SHOULDERED CONNECTOR DIN 11864-BS-A-70x2.0-1.4404- H3	BUNDSTUTZEN
13	Discharge surplus cream Ablauf Überschußrahm	40	SHOULDERED CONNECTOR DIN 11864-BS-A-41x1.5-1.4404- H3	BUNDSTUTZEN
14	CIP CIP	25	SHOULDERED CONNECTOR DIN 11864-BS-A-29x1.5-1.4404- H3	BUNDSTUTZEN
15	Cream to homogenizer Rahm zum Homogenisator	40	BLIND FERRULE DIN 11864-1-A-RA-DN40-1.4435	BLIND-BUNDSTUTZEN
16	Cream from homogenizer Rahm vom Homogenisator	50	BLIND FERRULE DIN 11864-1-A-RA-DN50-1.4435	BLIND-BUNDSTUTZEN
17	Raw milk feed Rohmilch Zulauf	50	SHOULDERED CONNECTOR DIN 11864-BS-A-53x1.5-1.4404- H3	BUNDSTUTZEN
18	Discharge skim milk Ablauf Magermilch	50	SHOULDERED CONNECTOR DIN 11864-BS-A-53x1.5-1.4404- H3	BUNDSTUTZEN
19	Discharge cream Ablauf Rahm	25	SHOULDERED CONNECTOR DIN 11864-BS-A-29x1.5-1.4404- H3	BUNDSTUTZEN

POSITION
POSITION

MEDIUM
MEDIUM

NOMINAL DIAMETER
NENNWEITE

TYPE OF CONNECTION
ANSCHLUSSESART

H	Aktualisierung der Symbole Updating the symbols			04.05.2018	D. Bregenhorn
Revision	Revisionsbeschreibung Description of Revision			Rev.-Datum Rev.-Date	Rev.-Name Rev.-Name
gez. created	Datum Date	Name Name	 GEA Group D-59302 Oelde	Beschreibung Description	
letzte Änderung last modified	27.03.2018	BREG		GRAPHICAL SYMBOLS GRAPHISCHE SYMBOLE	
				Zeichnungs.-Nr. Drawing-No.	
				9901-8104-300	
				Blatt / Blätter Sheet / Sheets	Format Size
				7 / 7	A2

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GEA Service

Ordering of replacement parts and other consumable items for centrifuge-specific GEA systems.

For all questions concerning technical support, the ordering of replacement parts or to request on-site support for your systems please contact your nearest GEA agent.

IF YOU DO NOT HAVE THE CONTACT DETAILS TO HAND, YOU CAN ACCESS THEM QUICKLY AND CONVENIENTLY AT:

gea.com/Service

If you do not have access to the internet please call our German head office in Oelde and ask for the contact details for your location:

Tel.:+49 2522 77 – 0

To speed up your request and to ensure that we deliver the right parts please include the following information:

- For model designation and serial number of the equipment please refer to the nameplate
- Number of parts required
- Part numbers and designations as per parts list
- Your enquiry / order number
- Preferred delivery date (from GEA works)
- Your company address
 - Your complete company name or customer number
 - Your invoice address (if it differs from the delivery address)
 - Your delivery address

THE GEA SERVICE PHILOSOPHY

Our integrated approach to service partnership ensures long-term business success – for our customers and for GEA.

We work alongside our customers as a partner and support you over the whole life cycle of your system as well as that of the particular equipment.

From tailored installation and commissioning to professional maintenance that guarantees a smooth production run, from proactive process improvement to continuing customer service

–we are always on the spot to maximise the safety, performance and reliability of our customers' systems.

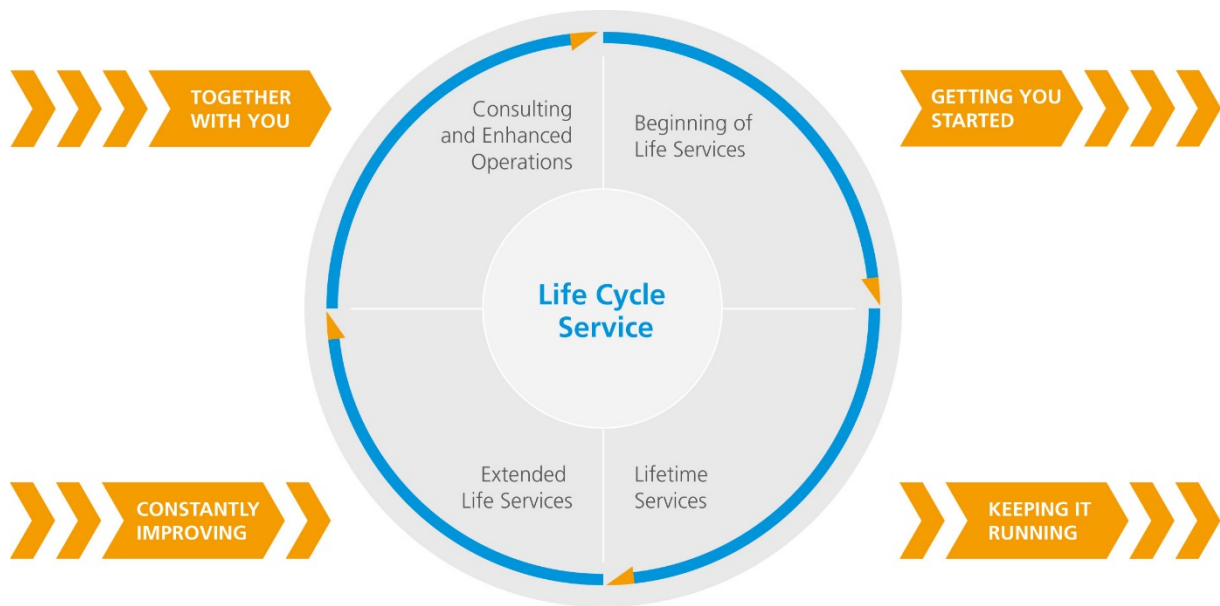


Fig. 1: GEA Service – Four levels for lasting success

The service products

FIELD SERVICE

Our customers expect that as a service provider, GEA will have the necessary expertise and experience to carry out all the maintenance measures needed for a specific machine or process. Service activities have to be supplied globally, regardless of which local market our customers are active in and where the value-added process takes place.

We are always close at hand and can provide you with advice and practical support within Germany, 24 hours a day, 365 days a year.

REPLACEMENT PARTS

Original GEA replacement parts provide reliability and protect your investment.

Our high quality replacement parts will keep your operation running with maximum efficiency. Original replacement parts are manufactured to the highest quality standards. Moreover, the advance identification of critical parts, short delivery periods and constant availability will ensure the safe and reliable operation of your plant.

We can give you the assurance of:

- Tested high standard of processing and delivery quality:
- The development of new machinery and hence the further development of spare parts
- Maximum operational security for your equipment
- Permanent and partly very long-term availability of parts
- Optimised logistics processes and locations of our logistics centres
- Short delivery periods

REPAIRS – CORRECTIVE MAINTENANCE

The GEA repair service is always close at hand.

We not only carry out repairs all over the world, but also optimisation measures individually tailored to your GEA equipment using state-of -the-art technology.

We can guarantee you:

- The same care, precision and responsibility as we exercise in the manufacture of GEA equipment
- Certification to DIN EN ISO 9001
- Original spare parts
- Attractive upgrade options
- Proven safety, quality and performance

RENTAL AND EXCHANGE COMPONENTS

GEA constantly endeavours to maintain the safety and availability of your systems at the highest possible level. To do this, we can offer rental bowls and a trade-in and part exchange service, so that downtimes can be reduced to the absolute minimum. In addition to bowls and screws, various other exchange components are available for centrifuges.

UPGRADES / MODERNISATION / OPTIMISATION

Our proactive service concept includes ongoing identification and introduction of possible optimisations of processes and systems.

Do your systems require an upgrade or modernisation as a result of market conditions or new regulations? We will support you on the path to energy savings, cost reductions, capacity adjustments and enhanced security. We will provide you with our expertise and latest innovations in order to implement precisely the optimisations that you require.

Our global consultancy and certification framework is part of the GEA service philosophy and will be of benefit to you all over the world..

We can guarantee you:

- A longer service life
- Lower capital expenditure compared to purchasing new equipment
- A reduction in production costs
- The maintenance of individual safety standards with qualified information on industrial safety with corresponding specialist machine safety audits.
- Reliability and optimal benefit-cost ratio

PREVENTIVE MAINTENANCE

Our GEA PerformancePlus service concept takes an intelligent and economic approach to ensuring plant availability and security.

The availability of historic and actual measurement data provides you and also GEA with a detailed insight into the status of the plant. This enables a forward-looking introduction of corrective, and in particular, planned measures.

We can guarantee:

- The planning of optimal service intervals
- Concise status information
- Minimum unplanned downtimes
- Enhanced plant security
- Optimised plant availability

PERFORMANCE AGREEMENTS

Even the best plant is worthless without the right service. GEA provides an approach for preventing expensive cost traps.

Our service packages, individually tailored to your requirements, place particular emphasis on plant availability, security and cost controls. Let the GEA experts take over the inspection, maintenance and status control of your plant.

Our service modules can be adapted to changes in production conditions in all life cycle phases without additional costs.

We can guarantee:

- A high level of plant availability
- A reduction in downtimes
- Optimised plant operation
- Maximum planning security
- Short response times

TRAINING

Our qualified staff will train your employees on site in one of our excellently equipped training centres.

GEA training modules are tailored to your individual requirements. Our experienced engineers offer comprehensive practical training, impart process expertise and raise awareness in your employees of plant status to ensure safe, professional plant operation from the outset.

We can guarantee:

- Optimal plant efficiency
- High availability and reliability
- Highly qualified personnel
- Awareness of plant status
- Motivation

USED MACHINES – FACTORY-REFURBISHED PLANT

Used GEA systems are efficient, reliable and are rapidly installed in situ where they still have many years of operation ahead of them.

Because the systems were manufactured by GEA, we have the technical expertise to guarantee their efficient and safe operation.

We can guarantee:

- Factory-refurbished systems
- Service for refurbished systems
- Shorter delivery periods than for new systems
- Excellent price-performance ratio
- The expertise of the manufacturer
- Safety, quality, performance and guarantee

SERVICE CONSULTANCY

Service consultancy is an essential stage in the optimisation and adaptation of operating processes. Even in this area we have set ourselves the goal of fulfilling the requirements of our clients with a market-leading service through the use of the latest technology – so that you can provide your customers with superb products. That is why we bring all the necessary tools and latest technical know-how together with our experience to bear on the problem analysis, assessments and complex solutions to problems, in order to jointly overcome the challenges.

Instrument air
Instrumentenluft
IA DN15 / 1/2"

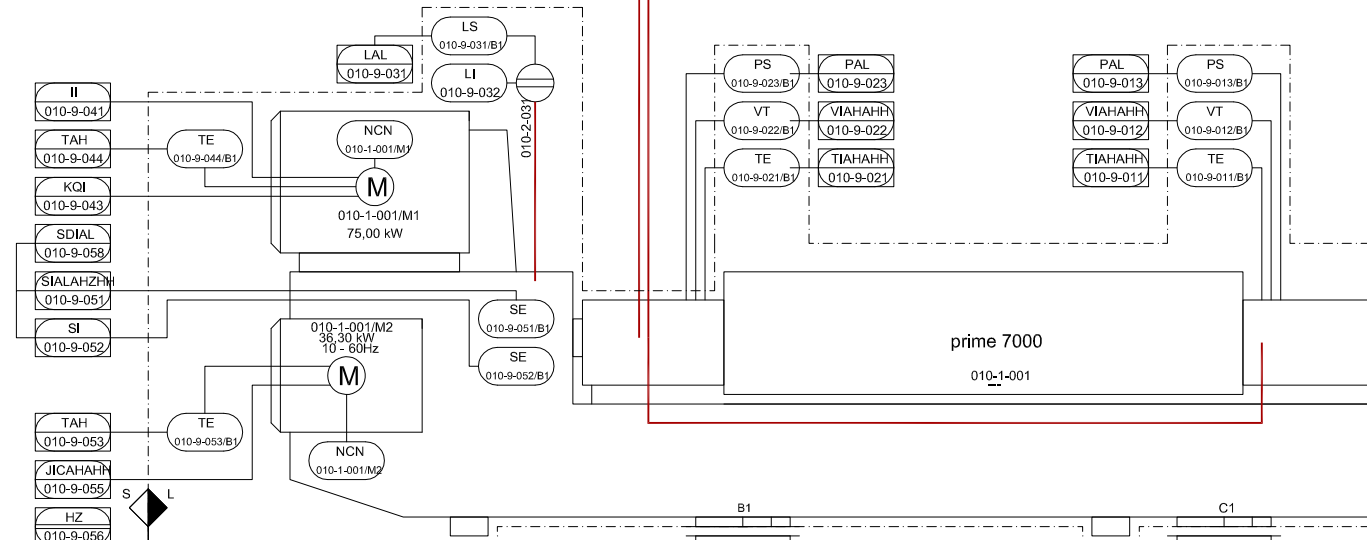
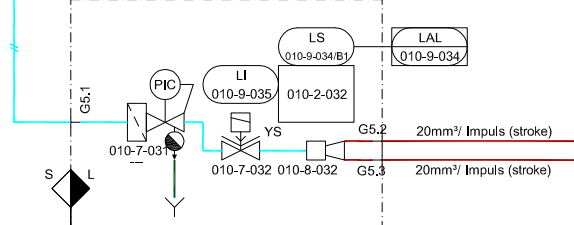
Die Luft muß Öl-, Staub- und Wasserfrei sein
 The air must be free of oil, dust and water
 Richtwerte für Instrumentenluft: ISO 8573-1, Klasse 3.4.3
 Guide values for instrument air: ISO 8573-1, class 3.4.3
 approx 750l/h at Standard conditions DIN 1343 (at 1,013bar and 0°C)
 approx 125l/h (at 5bar and 25°C)

Polymer
Polymer solution
PS DN25 / 1"

Product feed
Produktzulauf
P DN80 / 3"

Spülwasser
Flush water feed
W DN25 / 1"
 10-15m³/h for 5-10min
 water pressure approx. 3-4 bar

Öl-Luft-Schmierung
Oil-Air-Lubrication

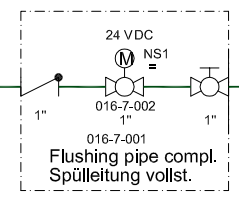


Deaeration solid side
Entlüftung
V DN200 / 8"
 400m³/h

Deaeration liquid side
Entlüftung
V DN200 / 8"
 400m³/h

Solid discharge
Feststoffaustrag
SOL

Centrate discharge
Zentrat
CD DN200 / 8"




- ... L Lieferumfang / Scope of Supply
- L = GEA WS liefert und steuert / GEA WS Supplied and controlled
- P = GEA WS liefert, Kunde steuert / GEA WS supplied, Customer controlled
- C = Kunde liefert, GEA WS steuert / Customer supplied, GEA WS controlled
- S = Kunde liefert und steuert / Customer supplied and controlled
- W = ... /
- ...

Diese Zeichnung ist als unverbindlicher Installationsvorschlag zu verstehen. der exakte Planungs - und Lieferumfang wird durch Angebot / Vertrag definiert !
 Maßblatt und Planungshinweise beachten !
 Technische Änderungen vorbehalten!

This drawing is to be understood as a non-binding installation proposal.
 The exact planning and delivery scope will be defined by offer / contract !
 Refer to dimensioned drawings and layout recommendations !
 Subject to technical modification!

Revision		Description of Revision		Rev.-Date	Rev.-Name
Client ---					
Location ---					
Country ---					
Revision proof is electronically stored				Copyright reserved. We reserve all rights on this drawing.	
CAD-Drawing				Last modified on 23.10.2018	
Created				Last modified by Barton.Br	
Date	Name	ENV_1_316323_18061_PID Installation diagram Decanter prime 7000			
22.10.2018	Barton.Br				
Checked					
Approved		D-59302 Oelde		Drawing-No. S1459316323-9905-PID001	
				Scale Sheet / Sheets Size	
				--- 01 01 A1	

Customer: ---	Project-/Order-No.: 316323 / 1459316323	GEA Westfalia Separator 
Location: ---, ---	Project-title: ENV_1_316323_18061_PID	
Devicelist Basic		

Project Comments: ---

Date: 24.10.2018

Dept.: 222000

**Report-
description :** Devicelist Basic
Decanter prime 7000

Type: Decanter prime 7000

Corr. Drawing: S1459316323-9905-PID001

Explanations:

Scope of Supply (A)

L = GEA WS supplied and controlled
 P = GEA WS supplied, Customer controlled
 C = Customer supplied, GEA WS controlled
 S = Customer supplied and controlled
 W = ---

Ext. Document No.: ---

Created Date: 22.10.2018 By: Barton.Br	Checked Date: By:	Approved Date: By:	Document No.: S1459316323-9905-DVL001	Revision:	Page 1 / 5
Copyright. © All rights reserved				Report ID=201706120943 / ENG	

Customer: ---	Project-/Order-No.: 316323 / 1459316323	GEA GEA Westfalia Separator
Location: ---, ---	Project-title: ENV_1_316323_18061_PID	
Devicelist Basic		

No. PID-Position	Description Drive Usage	Part-No	Manufacturer Type	Material Material Gasket	Function Device Nominal width	Nominal power	Remarks	A
010-1-001 PID001.1L	DECANTER Motor		GEA prime 7000	---	---	---	see machine documentation	L
010-1-001/M1 PID001.4E	MOTOR WITH CONTROLLED ACTUATION Main drive decanter 75kW			---	NCN	---		L
010-1-001/M2 PID001.4F	MOTOR WITH CONTROLLED ACTUATION Secondary drive decanter 36,3kW			---	NCN	---		L
010-2-031 PID001.5D	EQUALIZING TANK, COMPL. Gear oil			---				L
010-2-032 PID001.3C	OIL TANK 4,2L Main gear lubrication ca. 2,5l/1000h			---				L
010-7-031 PID001.3C	PRESSURE REDUCER WITH FILTER Oil-Air-Lubrication			---	---	---		L
010-7-032 PID001.3C	3/2-WAY SOLENOID VALVE Oil-Air-Lubrication			---		---		L
010-8-001 PID001.11F	COMPENSATOR Product feed		---	---	DN80			L
010-8-002 PID001.11E	HOSE Flocculent Feed	---		---	DN25			L
010-8-032 PID001.3C	DISTRIBUTOR UNIT Oil-Air-Lubrication			---		---		L

Created Date: 22.10.2018 By: Barton.Br	Checked Date: By:	Approved Date: By:	Document No.: S1459316323-9905-DVL001	Revision:	Page 2 / 5
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Customer: ---	Project-/Order-No.: 316323 / 1459316323	GEA GEA Westfalia Separator
Location: ---, ---	Project-title: ENV_1_316323_18061_PID	
Devicelist Basic		

No. PID-Position	Description Drive Usage	Part-No	Manufacturer Type	Material Material Gasket	Function Device Nominal width	Nominal power	Remarks	A
010-9-011/B1 PID001.9E	TEMPERATURE SENSOR Bearing temperature liquid side			---	TIAHAHH TE	---		L
010-9-012/B1 PID001.9E	VIBRATION MEASUREMENT WITH TRANSMITTER Vibration monitoring liquid side			---	VIAHAHH VT	---		L
010-9-013/B1 PID001.9D	PRESSURE SWITCH Oil-Air-Lubrication liquid side			---	PAL PS	---		L
010-9-021/B1 PID001.6E	TEMPERATURE SENSOR Bearing temperature solids side			---	TIAHAHH TE	---		L
010-9-022/B1 PID001.6E	VIBRATION MEASUREMENT WITH TRANSMITTER Vibration monitoring solid side			---	VIAHAHH VT	---		L
010-9-023/B1 PID001.6D	PRESSURE SWITCH Oil-Air-Lubrication solid side			---	PAL PS	---		L
010-9-031/B1 PID001.5D	LEVEL SWITCH Gear Oil			---	LAL LS	---		L
010-9-032/MP1	OPTICAL LEVELINDICATOR Gear oil			---	LI	---		L
010-9-034/B1 PID001.3C	LEVEL FLOATINGSWITCH Oil-Air-Lubrication			---	LAL LS	---		L
010-9-041/B	CURRENT MONITORING Main drive decanter		---	---	II ---	---		L

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Customer: ---	Project-/Order-No.: 316323 / 1459316323	GEA GEA Westfalia Separator
Location: ---, ---	Project-title: ENV_1_316323_18061_PID	
Devicelist Basic		

No. PID-Position	Description Drive Usage	Part-No	Manufacturer Type	Material Material Gasket	Function Device Nominal width	Nominal power	Remarks	A
010-9-043/B	HOUR COUNTER Decanter		---	---	KQI ---	---		L
010-9-044/B1 PID001.3E	TEMPERATURE SENSOR Main drive			---	TAH TE	---		L
010-9-051/B1 PID001.5F	SPEED SENSOR Bowl speed			---	SIALAHZHH SE	---		L
010-9-052/B1 PID001.5F	SPEED SENSOR Gear input			---	SI SE	---		L
010-9-053/B1 PID001.3F	TEMPERATURE SENSOR Secondary drive			---	TAH TE	---		L
010-9-055/B	TORQUE SENSOR Secondary drive		---	---	JICAHAAH ---	---		L
010-9-056/B	EMERGENCY STOP SWITCH Decanter		---	---	HZ ---	---		L
010-9-058/B	DIFFERENTIAL SPEED MONITORING Decanter		---	---	SDIAL ---	---		L
014-2-001 PID001.9G	CENTRATE CHUTE		---	---				S
014-8-001 PID001.9H	FLEXIBLE TRANSITING PIECE Centrate discharge	---		---	DN200			S
015-2-001 PID001.6G	SOLID CHUTE		---	---				S

Created Date: 22.10.2018 By: Barton.Br	Checked Date: By:	Approved Date: By:	Document No.: S1459316323-9905-DVL001	Revision:	Page 4 / 5
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Customer: ---	Project-/Order-No.: 316323 / 1459316323	GEA GEA Westfalia Separator
Location: ---, ---	Project-title: ENV_1_316323_18061_PID	
Devicelist Basic		

No. PID-Position	Description Drive Usage	Part-No	Manufacturer Type	Material Material Gasket	Function Device Nominal width	Nominal power	Remarks	A
015-8-001 PID001.6H	FLEXIBLE TRANSITING PIECE Solid discharge	---		---				S
016-7-001 PID001.15C	FLUSHING PIPE COMPL.	9911-8126-070	---	---	1"	---		S
016-7-002 PID001.14C	BALL VALVE, ELECTRIC ACTUATOR Flushing pipe compl.		---	---	1"	---		S
017-8-001 PID001.5G	FLEXIBLE TRANSITING PIECE Deaeration solid side		---	---	DN200			S
017-8-002 PID001.8G	FLEXIBLE TRANSITING PIECE Deaeration liquid side		---	---	DN200			S

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table for calculation the mass of decanter and the dimensions L1, L2, L4min., L5 and L6
Tabelle zur Berechnung der Dekantermasse und Angabe der Maße L1, L2, L4min., L5 and L6

gear box + secondary motor Getriebe + Sekundärmotor		total length Gesamtlänge		Center of gravity-rotor Schwerpunkt Rotor	main motor Hauptmotor	
gear type Getriebe Typ	m drive m Antrieb [kg]	dimension L1 Maß L1 [mm]	dimension L6 Maß L6 [mm]	dimension L5 Maß L5 [mm]	rated power [kW] Leistung [kW]	m motor [kg] m Motor [kg]
PGA 417	600	5674	3608	-	75 DOL / FF, 55 FB	670
				dimension L2 [mm] Maß L2 [mm]	dimension L4min. [mm] / Maß L4min. [mm]	
					L4.1	L4.2
					3880	3000

bowl volume / Füllvolumen der Trommel: 550 dm³
 example: weight of the bowl filling =
 filling volume * density = 550 dm³ * 1,5 kg/dm³ = 825 kg
 Beispiel: Gewicht der Trommelfüllung =
 Füllvolumen * Dichte = 550 dm³ * 1,5 kg/dm³ = 825 kg
 consider the product dependent density!
 produktabhängige Dichte beachten!

mass of belt drive compl without motors and gearbox /
 Masse Riemenantrieb vollst. ohne Motoren und Getriebe: 1600kg
 mass of frame complete and empty bowl /
 Masse Gestell vollst. und leere Trommel: 4650kg

mass of empty decanter without motors and gearbox: 1600kg + 4650kg = 6250 kg
 Masse leerer Dekanter ohne Motoren und ohne Getriebe: 1600kg + 4650kg = 6250 kg

example / Beispiel: m drive / Antrieb (PGA 417) => 600kg;
 m motor / Motor 90kw => 670kg;
 m bowl filling / Trommelfüllung => 825 kg

total mass of decanter m total = m frame + m motor + m drive + m bowl filling
 Gesamtgewicht m gesamt = m Gestell + m Motor + m Antrieb + m Trommelfüllung
 m total / m Gesamt = 6250kg + 670kg + 600kg + 825 kg = 8345kg

DOL = direct on line / Netzbetrieb
 FF = operation for frequency converter (VFD)
 Insulation class F to F
 Frequenzumformer Betrieb
 für Isolationsklasse F nach F
 FB = operation for frequency converter (VFD)
 Insulation class F to B
 Frequenzumformer Betrieb
 für Isolationsklasse F nach B
 motor weights can slightly differ
 Motoren-Gewichte können geringfügig abweichen

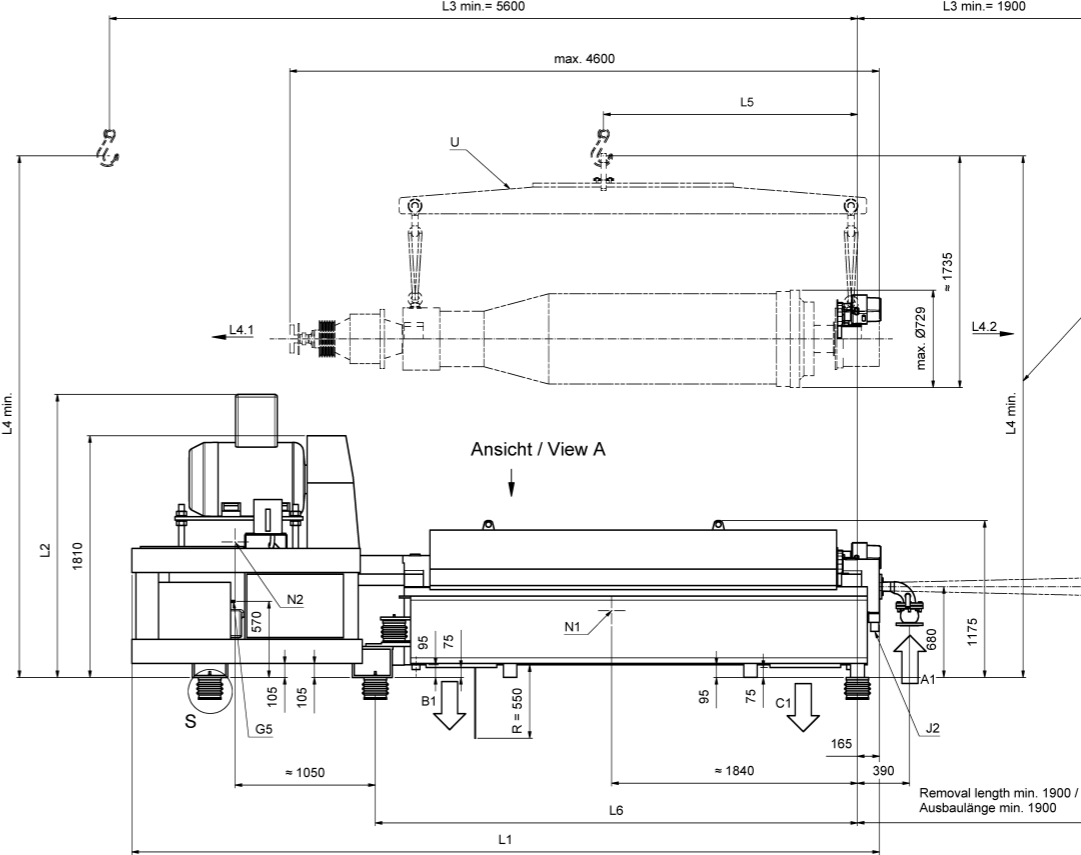
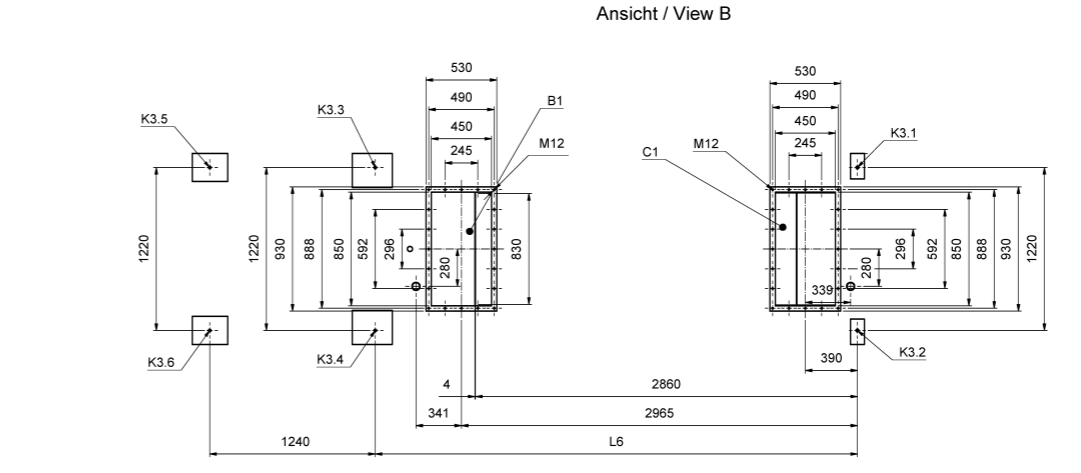
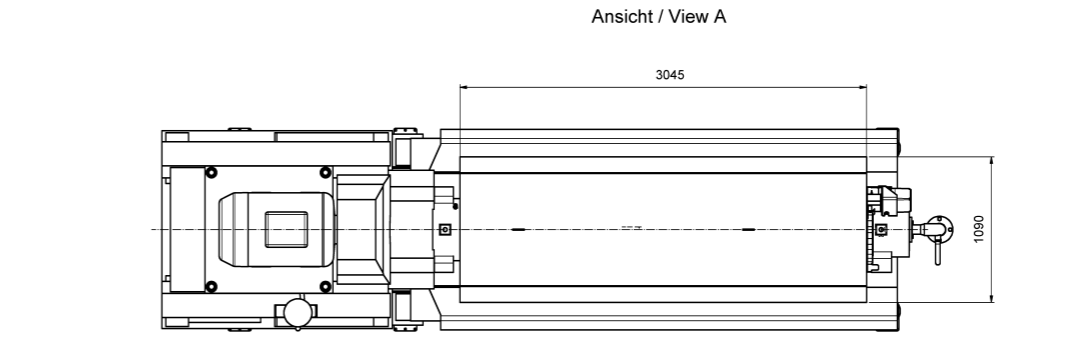
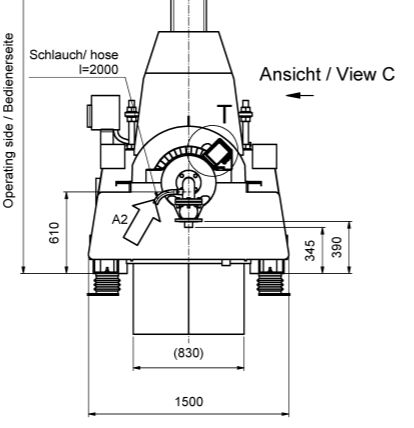
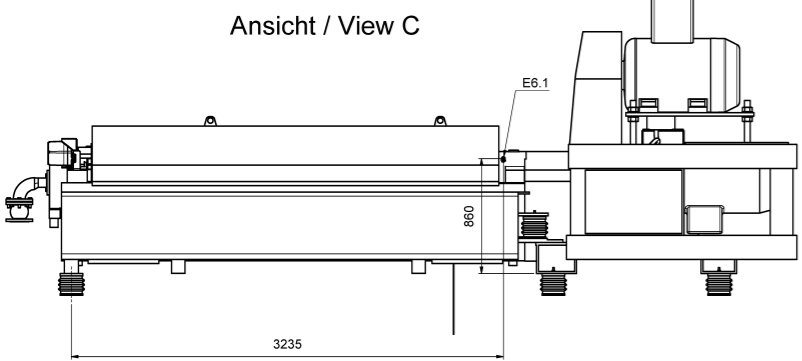
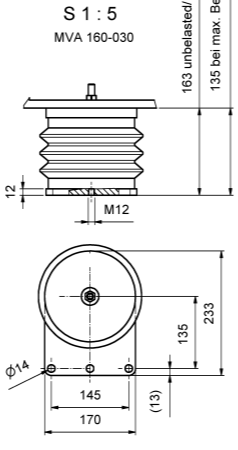
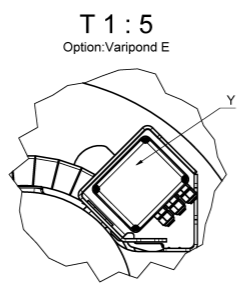
table for calculation loads
Tabelle zur Berechnung der Auflagekräfte

resonance frequency of entire decanter / Eigenfrequenz des Dekanters vollst.:
 visco damper / Viskosdämpfer 3Hz - 8Hz

feet Fuße	K3.1; K3.2; K3.3 K3.4; K3.5; K3.6	static load F of entire decanter (N) statische Belastung F des gesamten Dekanters (N)	max. static load (N) (vibration isolator ¹⁾) max. statische Last (N) (am Dämpfer ¹⁾)	vertical dynamic load vibration isolator vertikale dynamische Last am Dämpfer	
				at operating speed (N) bei Betriebsdrehzahl (N)	when crossing resonance frequency (N) Beim Durchfahren der Eigenfrequenz(N)
		F = m total * 12 ²⁾ F = m Gesamt * 12 ²⁾	16,67% * F	+ - 0,67% * F	+ - 1% * F
		F = 8345 * 12 = 100140N	16,67% * F = 0,1667 * 100140N = 16693N	+ - 0,67% * F = 0,0067 * 100140 = 671N	+ - 1% * F = 0,01 * 100140 = 1001N

¹⁾ note: all load values are for a single vibration isolator; the horizontal load on the vibration isolator is below 1000N
¹⁾ Bemerkung: alle Belastungen sind für einen Dämpfer; die horizontale Last am Dämpfer ist unter 1000N
²⁾ factor 12 includes gravity plus weight variation by design variation
²⁾ Faktor 12 beinhaltet Erdbeschleunigung plus Variation Gewicht durch Designvariation

- Notes: / Bemerkungen:
- All connections must be flexible / Alle Verbindungen müssen flexibel sein
 - For proper venting of discharge hoppers refer to the instruction manual - improper venting can lead to leakage problems / Siehe Betriebsanleitung für richtige Belüftung der Ablauftrichter - falsche Belüftung kann zu Leckageproblemen führen
 - Customer is responsible for the foundation / Der Kunde ist für das Fundament verantwortlich
 - For further information please see instruction manual / Für weitergehende Informationen beachten Sie bitte die Betriebsanleitung



- A1 : product feed, DN80 DIN2633
 option: 3in ASA
 A2 : Polymer feed DN 25/ 1in
 B1 : solid discharge
 C1 : liquid discharge (gravity discharge)
 E6.1 : flush connection sealing solid chatch chamber, pipe d=12
 G5 : oil-air unit, compressed air for lubrication, pipe d=12, see instruction manual
 J2 : leakage of feed tube gap, pipe d=60,3
 K3.5/3.6 : feed drive motor side
 K3.3/3.4 : feed drive belt side
 K3.1/3.2 : feet liquid side
 L3 : path to assembly space
 M : electric trolley hoist
 max. crane lifting speed 10m/min.
 min. lifting capacity 4000 kg for filled bowl (bowl compl. with scroll)
 N1 : center of gravity - frame + bowl + gearbox
 N2 : center of gravity - belt drive + motors
 R : length partition plate, see instruction manual
 U : lifting device
 V : direction of motor rotation
 Y : option: varipond E

- Subject to technical modifications.
- A1 : Produktzufuhr, DN80 DIN2633
 Option: 3in ASA
 A2 : Flockungsmittelzufuhr, DN25/ 1in
 B1 : Feststoffaustrag
 C1 : Flüssigkeitsaustrag (drucklos)
 E6.1 : Spülanschluß Abdichtung Fangkammer, Rohr d=12
 G5 : Öl-Luftaggregat, Druckluft für Schmierung, Rohr d=12
 siehe Betriebsanleitung
 J2 : Leckage Einlaufrohrspalt, Rohr d=60,3
 K3.5/3.6 : Füße Antrieb Motorseite
 K3.3/3.4 : Füße Riemenseite
 K3.1/3.2 : Füße Flüssigkeitsseite
 L3 : Verfahrweg zum Montageaum
 M : Elektro-Hebezeug mit Laufwerk
 max. Kran-Hubgeschwindigkeit 10m/min.
 Traglast min. 4000 kg für gefüllten Rotor (komplette Trommel mit Schnecke)
 N1 : Schwerpunkt - Gestell + Trommel + Getriebe
 N2 : Schwerpunkt Riemenantrieb + Motoren
 R : Länge Trennblech, siehe Betriebsanleitung
 U : Aushebevorrichtung
 V : Drehrichtung Motor
 Y : Option: Varipond E

Technische Änderungen vorbehalten.

not drawn to scale
 nicht maßstäblich gezeichnet

Master CF 7000

Ans. Datum Rev. Date	07.02.2022	Änderungsbegründung im ERP-System gespeichert	
Datum/Date	Name	Änderungsbegründung im ERP-System gespeichert	
08.12.2021	Sattler/Ja	nach ISO 1502 Surface finish specification to ISO 1302	
08.12.2021	Balapek/Ka	Allgemeinmerkmale General tolerances nach ISO 2768 MSD, to ISO 2768	
Normgeber Normenbezeichnung	Fabrik Nr.		



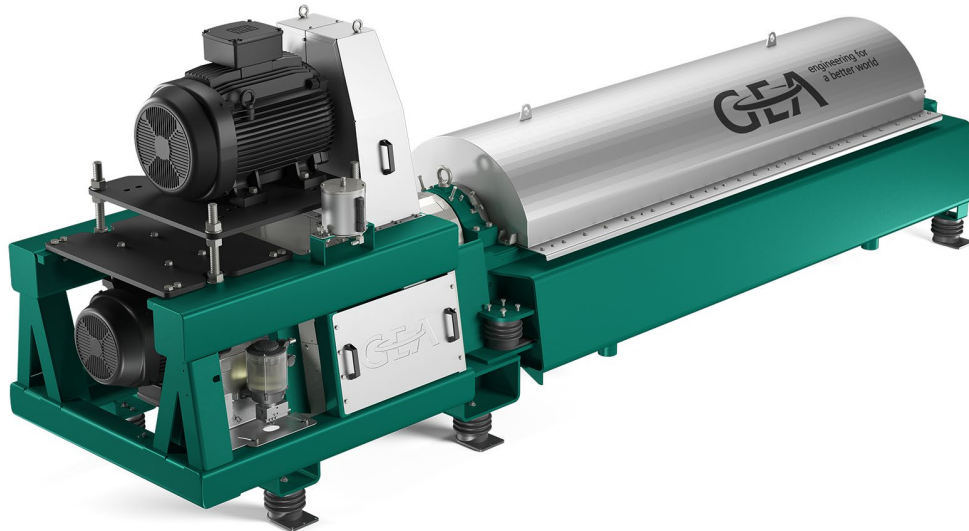
Erstellt/created by:	Erweitert/Revised by:	ISO 1502
Benennung:	Dimension	Maßblatt
Zeichnungs-Nr. Drawing No.	8419-4100-260	Blattanzahl Sheet count
		1

Abwärtstoleranzen für Längermasse in mm / Abwärts-tolerances in mm
 General tolerances in length for welded construction acc. to ISO ISO 1302

Tolerance class	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
mm	0,05	0,07	0,10	0,15	0,20	0,30	0,40	0,50	0,70	1,00	1,50	2,00	3,00	4,00	6,00	10,00	15,00	20,00	30,00	40,00	60,00	100,00	150,00	200,00

Abwärtstoleranzen für Querschnittsmasse in mm / Abwärts-tolerances in mm
 General tolerances in cross-section acc. to ISO ISO 1302

Tolerance class	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
mm	0,05	0,07	0,10	0,15	0,20	0,30	0,40	0,50	0,70	1,00	1,50	2,00	3,00	4,00	6,00	10,00	15,00	20,00	30,00	40,00	60,00	100,00	150,00	200,00



Lubrication and maintenance schedule

Decanter

GEA biosolids Decanter prime 7000

GEA sludge Decanter prime 7000

GEA manure Decanter prime 7000

No. 8419-3010-061

Edition 22.11.2021

Max. product temperature (°C) **95**
Lubricant gear **WS-0038**
Lubricant bowl bearing **WS-0036**
Lubricant scroll bearing (liquid side) **WS-0129**
Lubricant scroll bearing (solid) **WS-0129**
Other lubricants

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----------	---------------------------	----------

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1 Safety precautions

1.1 Important notes on maintenance

Regular maintenance of the centrifuge is crucial in terms of service life, safety and operating readiness.

Failure to carry out regular maintenance will result in increased wear, poorer product quality and higher energy consumption.

Increased wear reduces the stability of the components and can lead to severe damage to bowl and drive. This damage can in turn result in high risks for life and limb of the personnel as well as damage to property.

Observe the following points to avoid hazards:

- Observe the specified maintenance intervals.
When a service and maintenance contract is concluded with GEA Westfalia Separator Group, the maintenance work is optimally adapted to the production process. This can substantially lower maintenance costs.
- The maintenance intervals apply for standard applications. In the case of increased stress caused by special operating conditions, special products or hot operating conditions, shorten the service intervals in consultation with GEA Westfalia Separator Group service.
- If damage is detected during an inspection, replace the damaged elements immediately by original spare parts from GEA Westfalia Separator Group.
- If problems arise during maintenance work, consult GEA Westfalia Separator Group or take advantage of the training opportunities. See "Qualification of the personnel" and "Service and training".
- Following unusual events which may have a negative impact on safety, check the centrifuge immediately. Unusual events can be, for example, accidents or natural phenomena such as earthquakes, sand storms and flooding.

Use in explosion-hazarded zones

When operating the decanter in an explosion-hazarded zone, additional service and maintenance work is required which exceeds the scope described in this document.

The required operations are described in the corresponding manual for the ATEX decanter. For example, additional maintenance is required on the gear.

1.2 Application

This document applies for all persons who work with or on the centrifuge.

It is applicable for the plant operator as a basis for creating standard operating procedures for conduct at the workplace at the centrifuge.

1.3 Requirements to be met by spare parts and consumables

Spare parts, wear parts and consumables can cause damage to persons and property if they do not meet the requirements.

Original spare parts and consumables from GEA Westfalia Separator Group satisfy all pre-conditions for the operating safety of the centrifuge.

- Use only original spare parts.
- Use only original operating materials.
- Use the order-specific spare parts catalog supplied.
- See the chapter "Spare parts" for ordering spare parts and consumables.
- Keep to the limit values.

1.4 Target groups

The target groups for this documentation are all persons involved in installing, assembling, operating, maintaining and repairing the centrifuge.

What work may be carried out by what target group depends on the qualification of the personnel and on the type of work.

In the tables in the chapters **Troubleshooting** and **Maintenance** the responsible target group as well as the operation is specified.

1.4.1 Operator

Abbreviation: Op

The operator is employed by the customer and has been briefed in the following operations:

- Starting and shutting down the machine.
- Monitoring the machine and process (e.g. by means of indicators).
- Execution of easy re-lubrication and cleaning operations.

When given specific directions, the operator is able to carry out simple modifications to the process, e.g.:

- Adjusting temperatures, pressures and throughput capacities.
- Dosing additives.

1.4.2 Skilled worker

Abbreviation: Sworker

The skilled worker is normally employed by the customer and has been briefed in the following areas:

- Performing easy assembly work
- Performing routine maintenance work or servicing
- Limited settings and parametrization on the components and control system

The skilled worker has basic technical knowledge. The basic knowledge corresponds to a technical apprenticeship (mechanical or electrical).

The skilled worker is selected and deployed by the employer (plant operator).

GEA Westfalia Separator will carry out the briefing only in specific technical features that are part of the supply schedule and will indicate potential hazards.

This briefing is no substitute for an apprenticeship.

1.4.3 Trained specialist

Abbreviation: Tspec

The trained specialist normally belongs to the service team of GEA Westfalia Separator.

In exceptional cases, skilled workers employed by the customer can obtain a corresponding qualification and authorization by attending training courses held by GEA Westfalia Separator.

1.5 Service offers

1.5.1 Training and Services

GEA Westfalia Separator regularly holds training courses for customer employees.

Training content is aimed at the customer's operating and service staff who work with the machine. The operator must know how the machine functions.

Trained operators assure the operating safety of the machine.

Many different applications require competent process engineering know-how. Only adequately trained employees in service ensure a high quality standard. This requires ongoing further training.

The demands on the qualification of the service staff are growing increasingly. GEA Westfalia Separator consequently offers a qualification model and training concept.

For further information about the training of operating and service personnel as well as GEA services:

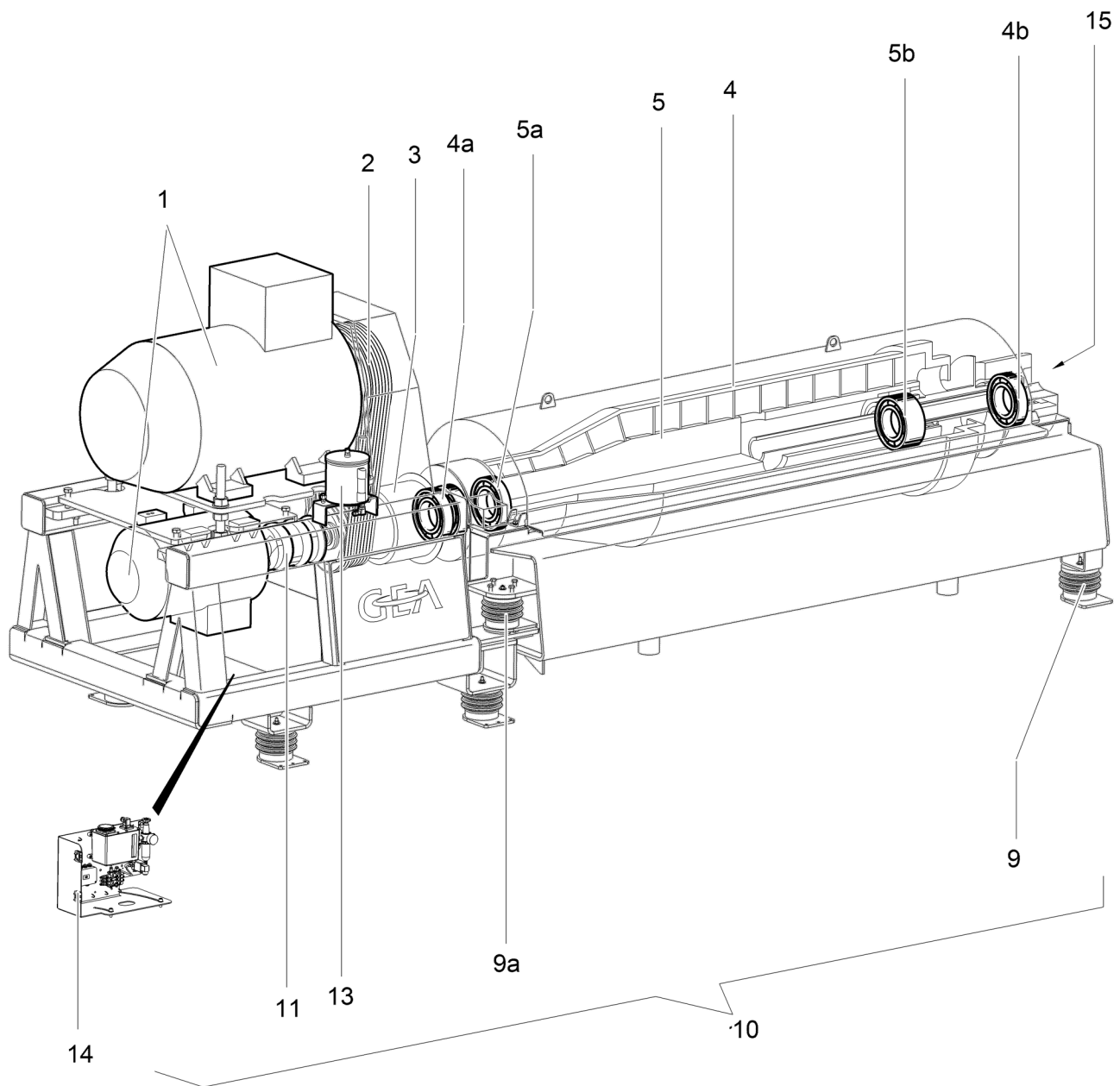
- Contact local GEA representatives or
- Visit the website gea.com/services.

1.6 Additional documentation

Request further information and technical documentation from the following places:

- Directly from GEA Westfalia Separator in Oelde.
- From the nearest representative of GEA Westfalia Separator.
- Per Internet under: www.gea.com/contact

2 Maintenance schedule



8420012

Fig. 1

2.1 After/during 1st Commissioning			
	Machine part	Action	Operator
2	Drive belt	<ul style="list-style-type: none"> ➤ The 1 time, check the belt tension after 0.5 - 1 operating hours. ➤ The 2 time, check the belt tension after 8 - 24 operating hours. Refer to the manual.	Skilled
10	Complete decanter	<ul style="list-style-type: none"> ➤ Check the installation for leakage. 	Skilled
13	Surge reservoir / gear lubrication	<ul style="list-style-type: none"> ➤ Check the oil level in the surge vessel. Lubricant: WS-0038	Op
14	Oil-air unit / bowl bearing lubrication	Lubricant: WS-0036 <ul style="list-style-type: none"> ➤ Check the oil level in the storage vessel. Oil consumption per 1000 operating hours with factory setting: - approx. 2.5 litres (sum for both bearing points)	Op
		<ul style="list-style-type: none"> ➤ Refer to the oil-air unit manual. ➤ Check air pressure. Setpoint at pressure reducer = 5 bar ➤ Check the lubrication pulse. <ul style="list-style-type: none"> - Settings in the decanter control - Oil flow 	Skilled

Op = Operator

|

Skilled = Skilled worker

|

Tspec = Trained specialist

2.2 After the first 500 operating hours			
	Machine part	Action	Operator
3	Gearbox	<ul style="list-style-type: none"> ➤ Fill in new oil. Lubricant: WS-0038 The gear type is engraved on the gearbox casing. 	Skilled
	PGA 411	Lubricant quantity: 5,0 litres	
	PGA 417	Lubricant quantity: 7,5 litres	

2.3 Daily			
	Machine part	Action	Operator
10	Complete decanter	<ul style="list-style-type: none"> ➤ Check running characteristics. ➤ Shut down the decanter when unusual noises or vibrations occur. 	Op
13	Surge reservoir / gear lubrication	<ul style="list-style-type: none"> ➤ Check the oil level in the surge vessel. Lubricant: WS-0038 	Op
14	Oil-air unit / bowl bearing lubrication	<ul style="list-style-type: none"> ➤ Check the oil level in the storage vessel. Lubricant: WS-0036 Refer to the oil-air unit manual. 	Op

Op = Operator

|

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|

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2.4 Monthly			
	Machine part	Action	Operator
4a	Bowl bearings / solids side	<ul style="list-style-type: none"> ➤ Empty the oil collecting vessel in the frame below the bowl bearing. Oil quantity per 1000 operating hours with factory setting: approx. 1.25 litres	Skilled
4b	Bowl bearings / liquid side	<ul style="list-style-type: none"> ➤ Empty the oil collecting vessel in the frame below the bowl bearing. Oil quantity per 1000 operating hours with factory setting: approx. 1.25 litres	Skilled
14	Oil-air unit / bowl bearing lubrication	<ul style="list-style-type: none"> ➤ Check the oil level in the storage vessel. ➤ Actuate the water trap at the compressed air pressure reducer. Clean the filter element when soiled. ➤ Check air pressure. ➤ Check lubrication pulse (audible). Lubricant: WS-0036 Refer to the oil-air unit manual.	Op
		<ul style="list-style-type: none"> ➤ Check the oil-air hoses for signs of change. 	Op
		<ul style="list-style-type: none"> ➤ Replace the oil-air hoses in the case of the following abnormal signs: <ul style="list-style-type: none"> - Cracks - Leakage - Discolouration - Kinks 	Sworker

2.5 Every 2000 operating hours, after 6 months at the latest			
	Machine part	Action	Operator
2	Drive belt	<ul style="list-style-type: none"> ➤ Check condition and belt tension. Refer to the decanter manual (chapter "Tensioning drive belts).	Skilled
3	Drive shafts / gearbox	<ul style="list-style-type: none"> ➤ Check for leakage. 	Skilled

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2.6 Every 4000 operating hours, after 12 months at the latest			
	Machine part	Action	Operator
3	Gearbox	➤ Fill in new oil. Lubricant: WS-0038 The gear type is engraved on the gearbox casing.	Skilled
	PGA 411	Lubricant quantity: 5,0 litres	
	PGA 417	Lubricant quantity: 7,5 litres	
3	Drive shafts / gear-box	When using the decanter in explosion-hazarded areas : ➤ Replace the service kit "Drive shaft, complete".	Tspec
9	Vibration isolators / frame	➤ Check the vibration absorbers for any changes. Replace the vibration absorbers in the case of the following abnormal signs: <ul style="list-style-type: none"> • Cracks • Deformations • Discoloration Defective vibration absorbers may cause substantial follow-up damage.	Skilled
9a	Vibration isolators / drive		
11	Coupling / drive	➤ Check the rubber elements for changes. Replace the rubber elements in the case of the following abnormal signs: <ul style="list-style-type: none"> • Cracks • Deformations • Discoloration 	Skilled
	Optional: Lifting devices / set of tools	➤ Carry out visual check for damage. ➤ Replace damaged tools immediately.	Skilled
	Optional: Vibration pickup	➤ Check vibration guard for proper functionality. The functional check is done by lowering the limit value temporarily while the machine is running.	Skilled

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2.7 Every 8000 operating hours, after 3 years at the latest			
	Machine part	Action	Operator
2	Drive belt	➤ Replace the drive belt. Refer to the operating instructions for the decanter.	Skilled
3	Driven shaft / gear-box	➤ Renew gaskets.	Tspec
3	Drive shafts / gear	When using the decanter in non-explosion-hazarded areas : ➤ Replace the service kit "Drive shaft, complete".	Tspec
4	Bowl	➤ Replace both bowl bearings and all gaskets.	Tspec
	Bowl bearings / solids side	➤ Apply a liberal amount of oil to the roller bearings before fitting.	
	Bowl bearings / liquid side	Lubricant: WS-0036	
5	Conveyor screw	➤ Replace both scroll bearings and all gaskets.	Tspec
	Scroll bearing / liquid side	➤ Pack the roller bearings with grease. Lubricant: WS-0129 Lubricant quantity: 600 g	
	Scroll bearing / solids side	➤ Pack the roller bearings with grease. Lubricant: WS-0129 Lubricant quantity: 200 g	
14	Oil-air unit / bowl bearing lubrication	➤ Replace the oil-air hoses.	Skilled

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2.8 Every 16000 operating hours, after 3 years at the latest			
	Machine part	Action	Operator
3	Gearbox	<p>When using the decanter in explosion-hazardred areas:</p> <ul style="list-style-type: none"> ➤ Have the gearbox inspected by GEA Westfalia Separator. Consulting is done by GEA WS service or GEA WS branches. <p>Other intervals may be necessary in the case of long standstill times or very tough operating or ambient conditions.</p> <ul style="list-style-type: none"> • Long standstill times are: longer than 6 months • Very tough operating or ambient conditions are, e.g. Hot operation, frequent torque peaks, frequent overload of the decanter. 	Skilled
9	Vibration isolators / frame	<ul style="list-style-type: none"> ➤ Replace vibration isolators. <p>Does not apply for versions with viscosity dampers. The viscosity dampers are recognisable by the bellows.</p>	Skilled
9a	Vibration isolators / drive		Skilled
11	Coupling / drive	<ul style="list-style-type: none"> ➤ Replace the rubber elements. 	Skilled

Op = Operator

|

Skilled = Skilled worker

|

Tspec = Trained specialist

2.9 Pay attention to the specifications of the manufacturer!			
	Machine part	Action	Operator
1	Drive motor	<ul style="list-style-type: none"> ➤ Re-lubricate / replace motor bearings. ➤ Information on this is given in the manual for the motor. ➤ Deviations, if any, are specified on a rating plate on the motor. ➤ Carry out re-lubrication preferably when the motor is rotating. 	Skilled

2.10 Product-dependent intervals			
	Machine part	Action	Operator
4	Bowl	<ul style="list-style-type: none"> ➤ Check bowl shell for wear. ➤ Check protective ring (optional) for wear. ➤ Check solids clearers and wearing bushes in the area of the discharge ports for wear. <p>Consult the technical service support of GEA Westfalia Separator in the event of wear, damage or corrosion to load-bearing bowl parts.</p>	Tspec
5	Conveyor screw	<ul style="list-style-type: none"> ➤ Check the wear to the scroll and wear liners. 	Tspec
10	Complete decanter	<ul style="list-style-type: none"> ➤ Check the decanter and the electrical components. ➤ Check the frame, catcher and product discharge for deposits. ➤ Eliminate caking. 	Tspec

Op = Operator

|

Skilled = Skilled worker

|

Tspec = Trained specialist

2.11 Lubricants

Selection of a suitable lubricant is essential for correct functioning of the decanter. Wear is minimised. The service life and operating safety of the decanter is increased.

For this reason, we recommend the lubricant be filled in at the factory. GEA Westfalia Separator Group carries out continuous quality checks only for this product.

Notes on storage: The possible storage time when stored carefully in dry rooms and with closed original containers is at least 24 months.

2.11.1 Table of Lubricants

	Designation	WS - Part-No /drum.	Manufacturer
WS-0036	High-performance lubricating oil with NSF-H1 approval	0015-0036-000 / 2.5 litres	GEA Westfalia Separator genuineparts
WS-0038	High-performance lubricating oil with NSF-H1 approval	0015-0038-000 / 2.5 litres	GEA Westfalia Separator genuineparts
WS-0129	High-pressure grease	0015-0129-010 / 0.4 kg Cartridge according to DIN 1284	GEA Westfalia Separator genuineparts
Assembly paste	Use for <ul style="list-style-type: none"> • Screwed connections • Toothing on the drive and driven shaft • All metallic joints 	0015-0104-080 / 500 g	GEA Westfalia Separator genuineparts

2.12 Preservatives

The centrifuge/bowl will get damaged if it is not operated for a prolonged period and inadequate preservation measures are taken. This also applies for the time before commissioning.

Refer to the instruction manual.

Designation	WS Part-No.	For the following parts use
Slushing oil	6969-0015-050	<ul style="list-style-type: none"> • Gear hub
Anti-corrosion wax	6969-0022-010	<ul style="list-style-type: none"> • Non-lacquered parts of the frame • Gear (outside) • Motors (outside)
Preserving oil	6969-0005-010	<ul style="list-style-type: none"> • Gear (inside) • Oil-lubricated bowl bearings

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Instruction manual

Decanter

GEA biosolids Decanter prime 7000

GEA sludge Decanter prime 7000

GEA manure Decanter prime 7000

No. 8419-9001-300

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ORIGINAL DOCUMENT

The authors are always grateful for remarks and suggestions for improving the documentation. Remarks and suggestions can be sent to:

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1.1 Application

This document applies for all persons who work with or on the centrifuge.

It is applicable for the plant operator as a basis for creating standard operating procedures for conduct at the workplace at the centrifuge.

1.2 Other applicable documents

- Centrifuge datasheet
- P&ID (Piping & Instrumentation Diagram)
- Dimensioned drawing
- Documents on control of the centrifuge, e.g. descriptions and settings.
- Instruction manuals of components of other manufacturers such as motors and valves.
- Further order-specific documents if relevant.

1.3 Structure of the safety references

The centrifuge has been designed and built so that it functions and can be operated safely. Reference will be made in this manual to further potential risks by using warnings where appropriate.

A differentiation is made between hazards which result in damage to the centrifuge, plant components and environment and hazards which lead to possible or probable injury or loss of life.

Signal words and their meaning

DANGER

Denotes impending danger. If the preventive measures are not implemented, death or serious injury will be the consequence.

WARNING

Denotes a potentially dangerous situation. If the preventive measures are not implemented, death or serious injury may be the consequence.

CAUTION

Denotes a potentially dangerous situation. If the preventive measures are not implemented, minor injury may be the consequence.

NOTICE

Denotes a potentially damaging situation. If the preventive measures are not implemented, the centrifuge or something else in its vicinity can get damaged.

Danger signals



This is the danger signal. It warns of injury risks.

- Comply with all measures marked with the danger signal to avoid injury or death.

Structuring of the safety references according to the 5-point rule

1. **Danger signals as a warning of injury risks.**
2. **Signal words** signal the degree of risk.
3. **The type and source of the hazard** indicate from where the hazard originates.
4. **Explanation of the hazard** and **consequences in the case of non-compliance** describe the threat and the consequences of human error.
5. **Measures** give instructions to avoid the hazard.



DANGER

Type and source of the hazard

Explanation of the hazard and the consequences in the event of non-compliance.

- Measures to avert or minimise the hazard.



WARNING

Type and source of the hazard

Explanation of the hazard and the consequences in the event of non-compliance.

- Measures to avert or minimise the hazard.



CAUTION

Type and source of the hazard

Explanation of the hazard and the consequences in the event of non-compliance.

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NOTICE

Type and source of the hazard

Explanation of the hazard and the consequences in the event of non-compliance.

1.4 Target groups

The target groups for this documentation are all persons involved in installing, assembling, operating, maintaining and repairing the centrifuge.

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- Starting and shutting down the machine.
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Abbreviation: Tspec

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Trained operators assure the operating safety of the machine.

Many different applications require competent process engineering know-how. Only adequately trained employees in service ensure a high quality standard. This requires ongoing further training.

The demands on the qualification of the service staff are growing increasingly. GEA Westfalia Separator consequently offers a qualification model and training concept.

For further information about the training of operating and service personnel as well as GEA services:

- Contact local GEA representatives or
- Visit the website gea.com/services.

2 Safety precautions

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2.1 Intended use

The centrifuge separates media with different densities by centrifugal force.

The centrifuge is intended exclusively for commercial operation. It is technically designed in compliance with the operating mode contractually agreed with the manufacturer and the specifications in the technical data of the centrifuge.

The centrifuge is suitable for the following applications:

- Separating liquid mixtures
- Separating solids from liquids
- To combine the tasks separating and solids removal

It must be noted that the solids to be discharged must always be sufficiently fluid to ensure a uniform solid discharge. In this connection, the rheological characteristics (deformation and flow behaviour) of the solids play an important role.

For information on process conditions, operating conditions, and environmental conditions, see:

- Centrifuge nameplate
- Data sheet

The following provisions must be met to ensure that the centrifuge is operated safely at all times.

- Use only original spare parts and original operating materials.
- Comply with limit values.
- Do not alter or upgrade the centrifuge.

For centrifuges outside hazardous areas, the following additional requirements apply:

- Do not feed product which is categorised as explosive.
- Do not deploy the centrifuge in zones classified as explosion hazardous.

2.2 Reasonably foreseeable misuse

This instruction manual contains information relating to intended use. Operation of the centrifuge that is not in conformity with the intended use is considered to be misuse.

Reasonably foreseeable misuse includes:

- Non-observance of this instruction manual
- Use of the centrifuge in areas where the legal basis does not comply with the manufacturer's declaration of conformity
- Use of non-original spare parts
- Use of non-permitted operating materials
- Exceeding the defined limit values
- Changing the process conditions, operating conditions and environmental conditions without the consent of the manufacturer.

Any misuse of the centrifuge can lead to severe damage to persons and property.

Operating modes that result in unbalance due to concentration of product and consequent caking are considered as not in conformity with the intended use. The plant operator is responsible for damage arising as a consequence of this non-conformance, The manufacturer is not liable.

2.3 Qualification of the personnel

Special knowledge and skills are required for working on and with centrifuges. The qualification of the personnel with this expertise is an important requirement for the operational reliability.

The requirements in respect of qualification levels are set out in the chapter "About this document / Target groups". They depend on the tasks assigned.

Faulty operation, assembly and handling errors can result in danger to life and limb as well as causing severe damage to property.

The plant operator must implement measures for the qualification of its personnel:

- Assign only reliable personnel to work on the centrifuge.
- Allow only authorized personnel to work on the centrifuge.
- Give special training and briefings to the personnel for the tasks assigned.
- Clearly define responsibilities.
- Make sure that the authorized persons have read and understood the **safety information** before beginning work.
- Make sure that the authorized persons have read and understood all sections of the **instruction manual** required for their work before beginning work.
- Give special briefings to persons who cannot read, and monitor their work.
- Persons still undergoing training may only be deployed under supervision.

2.4 Responsibility of the plant operator

The operation of a centrifuge is subject to rules and regulations for machine safety and occupational health and safety.

The order of the following rules and regulations is not a reflection of their priority. The list lays no claim to completeness.

- Regulations relating to safety and health (accident prevention regulations) based on Article 118a of the foundation treaty of the EEC, e.g. RL 89/655/EEC and follow-up versions or corresponding national regulations issued by the country of operation.
- Regular check of safety devices
- Compliance with the Machinery Directive 2006/42/EC or corresponding national regulations issued by the country of operation when working within the responsibility as manufacturer.
- Compliance with the German Equipment and Product Safety Act or corresponding national regulations issued by the country of operation when working within the responsibility as manufacturer.

The plant operator is responsible for complying with rules and regulations and the safety-conscious work of the assigned persons. These include the following measures:

- Ensuring that the statutory and other binding regulations on safety, accident prevention and health and safety protection are known and complied with.
- Only qualified and authorized personnel with technical understanding and fundamental technical knowledge and skills may be assigned to work on the centrifuge.
- Clearly define and notify responsibilities for tasks.
- Operate the centrifuge only in perfectly functional conditions in line with the intended use. For the intended use, refer to the section "**Intended use**".
- Before starting the machine, always check all safety devices.

- Have the centrifuge checked regularly by qualified persons for its operating safety. Have the centrifuge checked at least once a year in operational status and in accordance with the maintenance schedule.

2.5 Modifications to the centrifuge

Modifications to the centrifuge are prohibited. They represent an unintended use and endanger the operational reliability of the centrifuge. This may cause physical injury and damage to property.

- Clarify the planning and the measures for the modifications to the centrifuge with GEA Westfalia Separator.
 - If modifications to the centrifuge are necessary, e.g. due to new operational sequences or product changes, contact GEA Westfalia Separator.
 - Modifications or alterations to the centrifuge must be added to the documentation. The instruction manual, schedule for lubrication and maintenance, as well as the spare parts catalogue, must be adapted.

2.6 Requirements to be met by spare parts and consumables

Spare parts, wear parts and consumables can cause damage to persons and property if they do not meet the requirements.

Original spare parts and consumables from GEA Westfalia Separator Group satisfy all pre-conditions for the operating safety of the centrifuge.

- Use only original spare parts.
- Use only original operating materials.
- Use the order-specific spare parts catalog supplied.
- See the chapter "Spare parts" for ordering spare parts and consumables.
- Keep to the limit values.

2.7 Hazards through products and operating materials

Hazardous materials are all materials which, on physical contact, represent a hazard for the persons operating in the environment of the centrifuge.

Centrifuges which have been purpose-built for the operation with hazardous materials are marked with safety stickers.

Hazards resulting from the following product characteristics and operating materials are known from product observation.

- Hot products
- Cold products
- Hazardous, chemically critical products
- Hazardous, biologically critical products
- Detergent

3 Description

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3.1 Noise emissions

Noise emissions from the centrifuge are caused by rotating machine parts, sound-emitting surfaces and resonant plant components.

The intensity of the noise emissions depend on the type of construction of the centrifuge, the operating mode and the ambient conditions.

The operating personnel must observe the local standard operating procedures (SOPs) issued by the plant operator and wear personal protective gear, e.g. ear protection.

Refer to the datasheet for the sound pressure level and sound power level.

Factors that increase the noise level in the area of the centrifuge:

- Reverberating walls (e.g. glass, tiles, tank walls etc.),
- Installation in corners of rooms.
- Resonant platforms.
- Resonant fittings.
- Auxiliary equipment (e.g. pumps, valves etc.).

The following measures reduce the noise nuisance for the operators:

- Install the centrifuges in separate rooms.
- Line the walls with sound absorbing materials.
- Organise internal processes so that centrifuge rooms have to be entered as rarely as possible.
- Use personal noise protection.

3.2 Product hazards

In the case of products which have to be allocated to a specific hazard class, adhere to the corresponding local safety precautions when handling these products.

The local standard operating procedures must be observed and the required personal protective gear must be worn.

In the event of accidents, keep to the local rules of conduct when handling products of the respective hazard class and take appropriate first-aid measures when injury is involved.

Following accidents, notify in-house or local emergency services immediately so that appropriate action can be taken. The emergency services comprise, for example, fire brigade, paramedics, security and other emergency facilities.

3.3 Hazards caused by cleaning liquid

For CIP (cleaning-in-place), only chemicals may be used that have been recommended by GEA Westfalia Separator.

The cleaning media are acids and caustics which can cause severe personal injury when used without due care.

Cleaning may under certain circumstances be carried out at high temperatures. The surfaces of the centrifuge, especially the hood and pipes, get hot.

The local standard operating procedures must be observed and the required personal protective gear must be worn, such as:

- Face protection and protective goggles
- Protective suit
- Protective gloves
- Protective boots or safety shoes
- Apron

The prevailing local rules of conduct pertaining to handling acids and caustics with a view to preventing accidents must be complied with.

Carry out first-aid measures when injury is involved.

Following accidents, notify in-house or local emergency services immediately so that appropriate action can be taken. The emergency services comprise, for example, fire brigade, paramedics, security and other emergency facilities.

Chemicals and incorrect concentrations of chemicals not specified and approved by GEA Westfalia Separator can cause damage through corrosion.

Chloric cleaning agents attack stainless steel and can lead to corrosion.

The corrosion can occur both on bowl parts as well as on the hood and the concentrate collector.

Carry out regular checks for damage and wear on sight glasses in product lines through which CIP liquid is fed.

Inadequate flushing can also lead to chemical residues entering the product rendering it useless.

The bowl gaskets can swell as a result of inadequate flushing.

3.4 Hazards due to rotating machine parts

The centrifuge is equipped with a metal bowl rotating at high speed which represents a high hazard potential on account of the rotational energy.

If not handled properly, open, rotating machine parts can be a danger for life and limb of the operating and maintenance personnel.

The bowl must therefore be stationary before starting work on the centrifuge.

Checking bowl standstill should not be based on just one information source, e.g. speed indicator. It must always be backed up by at least one further checking option.

Observing the motor fan alone, for example, is not a reliable method of checking standstill. The motor or its fan can be at standstill while the bowl is still rotating.

The following options are available for checking standstill on centrifuges depending on the version:

- Electric speed indicator.
- Visual speed check of the drive motor.
- Noise check.
- Vibration check.

3.5 Personal protective equipment

To prevent any hazard to limb or life, the prescribed personal protective equipment must be worn when operating the centrifuge or carrying out maintenance work and repair work at the centrifuge.

The personal safety equipment conforms to:

- Locally applicable accident prevention regulations
- Instruction manual of the operator or employer
- Instructions in the safety information in this instruction manual

Anybody working with or at the centrifuge is responsible that the personal protective equipment is worn and that it is in proper condition.

- Replace damaged safety equipment with new equipment.
- Clean dirty safety equipment.



Fig. 1

Wear hearing protection

- Wear hearing protection when working in a loud environment.

The noise level in a plant can exceed 85dB(A).

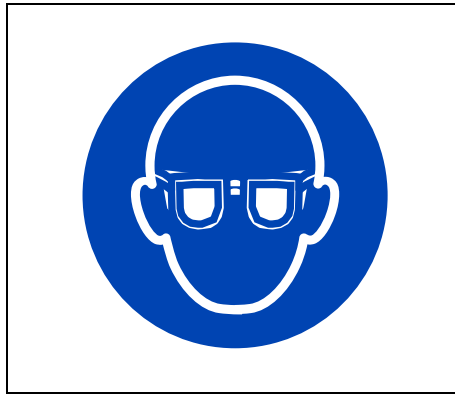


Fig. 2

Wear protective goggles

- Wear protective goggles when working on pipes and fittings.

Possible residues of caustic liquids in valves and pipes and piping systems not relieved from pressure.



Fig. 3

Wear protective gloves

- When working at hot or cold surfaces of centrifuges and pipelines, wear protective gloves.

Possible temperature ranges:
-10 to +80 °C and 14 to 176 °F.



Fig. 4

Wear breathing protection

In potentially explosive areas even inert gases are used as protective gas, e.g. nitrogen.

- When there is the risk of undercutting the permitted oxygen content of the air, wearing adequate breathing protection is mandatory (see operating instructions of the operator).

3.6 Meaning of the safety markings

Used safety markings are attached as adhesive sign to the centrifuge and/or the control cabinet.

It is important for all persons working with or on the centrifuge to be able to identify the meaning of all the symbols on the safety stickers.

In case of non-compliance with the safety markings, GEA Westfalia Separator accepts no liability for resulting damage.



Fig. 5

This safety marking means:

- **Refer to the machine documentation.**
- Any person who is assigned the task of installing, operating, maintaining and repairing the machine must have read and understood the documentation.
- The documentation must be complete, kept near to the machine and be readily accessible to operating personnel.

In case of non-compliance with the above, GEA Westfalia Separator accepts no liability for resulting damage.



Fig. 6

This safety marking means:

- **Disconnect machine from power supply.**
- Danger of injury from electrical voltage and unintentional start-up of the decanter.

Before working on the decanter and electrical plant components:

- Ensure that the decanter is at a standstill.
- Disconnect all electrically supplied equipment from the power supply using the main switch.
- Secure the plant against unintended restarting with locking devices.



Fig. 7

This safety marking means:

- **Work on rotating bowl is prohibited.**
- Do not loosen any part and do not carry out any maintenance or repair work on the decanter before the bowl has come to a standstill.

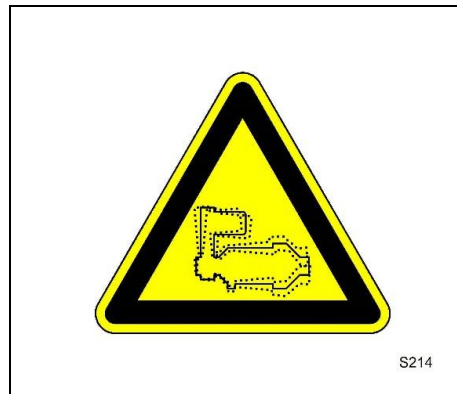


Fig. 8

This safety marking means:

- **Warning of unusual noises or vibrations.**
- Attention in the case of unusual noises or vibrations on the decanter.
- Follow the instructions in the instruction manual.
- Press EMERGENCY STOP.
- Bring persons into safety and leave the room.
- Do not enter the room again until the bowl has come to a standstill. Danger to life and limb through rotating machine parts!

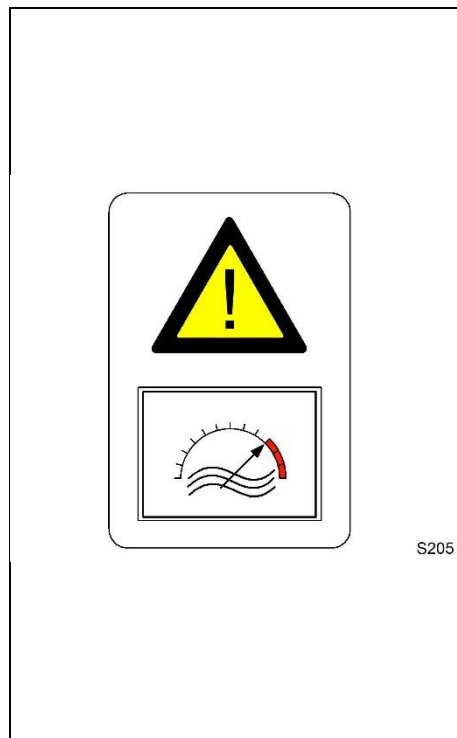


Fig. 9

This safety marking means:

- **Frequency converter operation.**
- When setting the frequency converter, do not exceed the admissible bowl speed (see type plate).
- Setting the parameters on the frequency converter may only be carried out by qualified specialists.
- When starting the machine after replacing drive parts, the bowl speed must be checked.
- The decanter may only be operated with an additional independent device for speed limiting. Risk of damage to the decanter.

This adhesive label is only used for frequency converter operation.



Fig. 10

This safety marking means:

- **Warning of hot or cold surfaces.**
- The surfaces of the decanter and plant components can be very hot or cold. Risk of injury!

This adhesive plate is used only for hot operation or extreme cold operation.

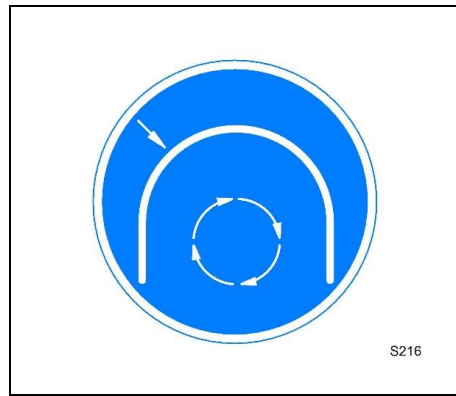


Fig. 11

- Operate the machine only with protective equipment in accordance with EN 294.

3.7 EMERGENCY STOP

EMERGENCY STOP restores functional safety in an emergency or hazardous situation. It ensures that processes are stopped and all moving parts are brought to a standstill as quickly as possible.

The centrifuge and all auxiliary equipment are not de-energised with the Emergency Stop. The functionality of all components is maintained even when the centrifuge is stationary. The voltage must be disconnected manually.

Shutdown **EMERGENCY STOP** can be initiated manually or is carried out automatically, if a vibration monitoring unit is available. EMERGENCY-STOP is triggered automatically when the centrifuge is vibrating and either vibration stage 2 is reached or after 5 minutes of vibration stage 1 status.

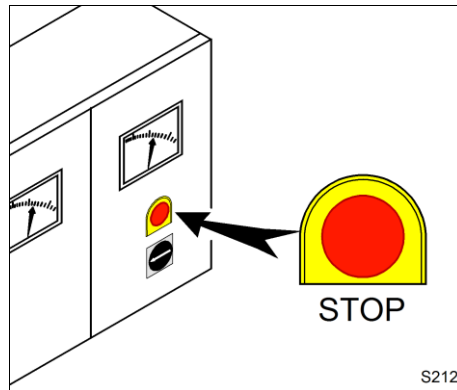


Fig. 12

EMERGENCY STOP button

- EMERGENCY STOP buttons are located on the control cabinet.
- Exact information on the position of the EMERGENCY STOP buttons can be found in the electrical documentation.
- The control cabinet is installed according to the specifications of the plant operator.
- The position of the EMERGENCY-STOP button is given in the SOP of the plant operator.

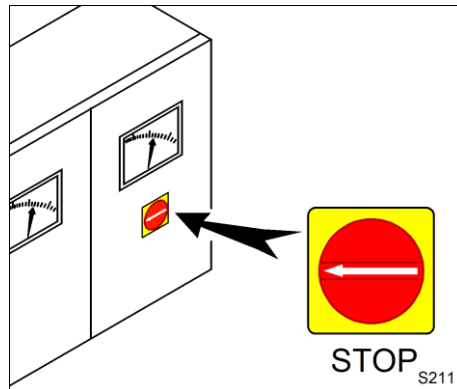


Fig. 13

Main switch

- Precise information on the position of the main switch on the cabinet is given in the electrical documentation.
- The control cabinet is installed according to the specifications of the plant operator.
- The position of the control cabinet with the main switch is given in the SOP of the plant operator.



3.8 Danger zones

Touch the centrifuge and the feed and discharge lines only when wearing protective gloves.

The surfaces reach temperatures of over 70 °C depending on the product processed and the operating speeds.

In normal operating mode, with mounted protective devices and functional supervisory equipment, there are no further danger areas on the centrifuge.

3.9 Nameplate

		GEA Westfalia Separator Group GmbH 59299 Oelde, Germany
Type	<input type="text"/>	
Year of manufacture	<input type="text"/>	Serial-No. <input type="text"/>
Max. permitted rated bowl speed in rpm		<input type="text"/>
Max. permitted density of product in kg/dm ³		<input type="text"/>
Heavy liquid, kg/dm ³	<input type="text"/>	Solids, kg/dm ³ <input type="text"/>
Min./max. Temperature of feed product in °C		<input type="text"/>
Min./max. Housing pressure range in bar		<input type="text"/>
Min./max. Throughput, m ³ /h		<input type="text"/>

3.10 Safety markings on the product

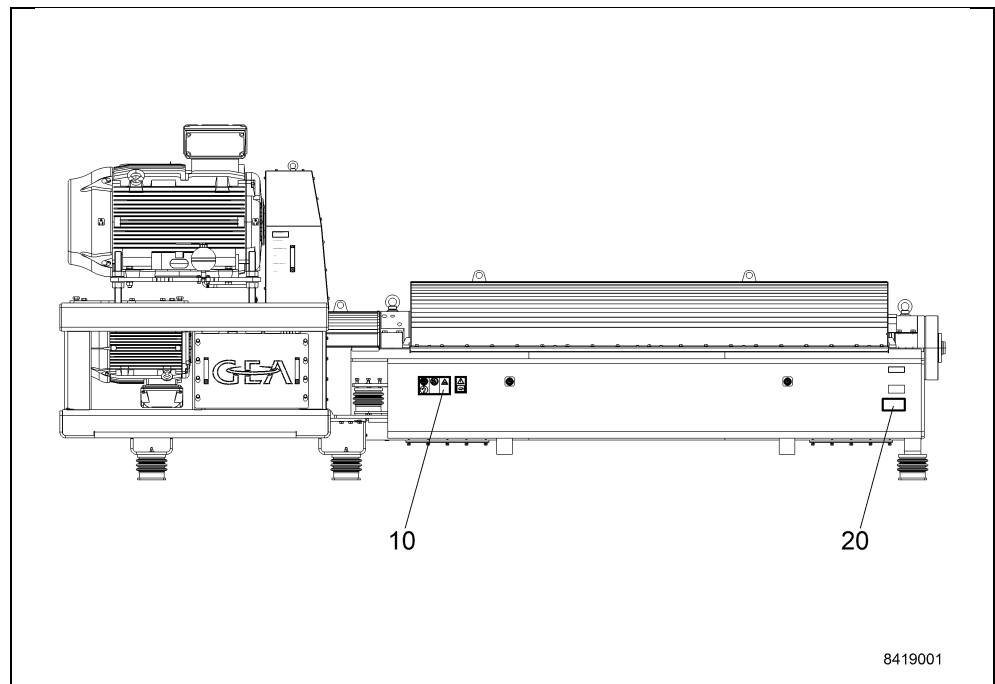
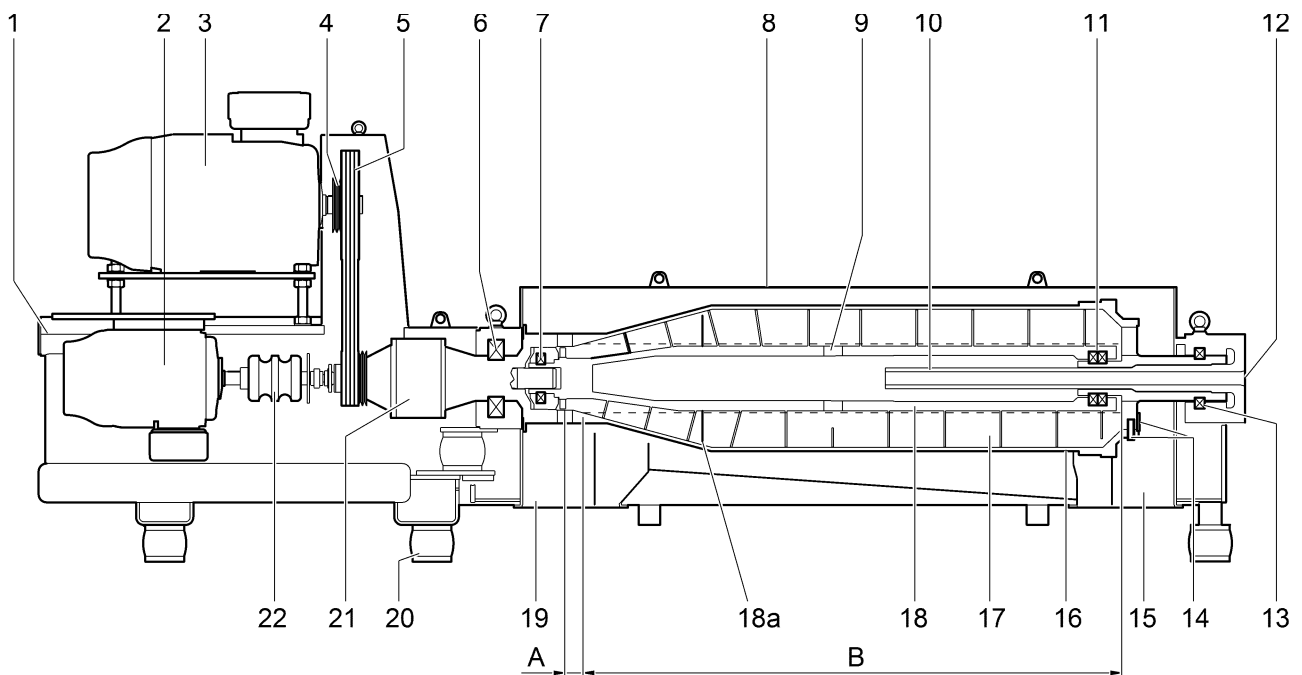


Fig. 14

10	<p>Safety markings Replace damaged safety markings immediately. Refer to the order-specific parts list.</p>
20	<p>Nameplate</p>

3.11 Total product



8419003

Fig. 15

- A Dewatering zone
- B Clarifying zone
- 1 Frame (drive)
- 2 Secondary motor
- 3 Main motor
- 4 Scroll drive (not fitted on every version)
- 5 Bowl drive
- 6 Bowl bearings (solids side)
- 7 Scroll bearings (solids side)
- 8 Frame (decanter)
- 9 Distributor
- 10 Feed tube
- 11 Scroll bearing (liquid side)
- 12 Feed
- 13 Bowl bearings (liquid side)
- 14 Depending on design: regulating tubes or regulating rings
- 15 Depending on design: Gravity discharge of the clarified light or heavy liquid phase
- 16 Bowl
- 17 Separation chamber
- 18 Scroll
- 18a Immersion disk
- 19 Solids discharge
- 20 Vibration absorbers
- 21 Gearbox
- 22 Coupling

3.12 Bowl

The bowl is of cylindrical-conical design. Clarification and separation of the liquid phases takes place in the cylindrical section of the bowl, dewatering of the separated solids takes place in the conical section of the bowl.

Existing or possible wear and corrosion protection:

- All bowl and scroll parts coming in contact with the product are made of stainless steel.
- Exchangeable wearing bushes in the solids ejection ports of the bowl.
- Hard-faced scroll flights for products with erosive properties (on special request).

The clarifying and dewatering efficiency can be changed and hence adapted to the respective process. The following possibilities are available:

Exchanging the regulating ring. This produces the following tendency:

Option 1: Version without immersion disk (for crystalline products)

- Large inner diameter of the regulating ring produces a long dewatering zone (= good dewatering efficiency) and a short clarifying zone (= less good clarifying efficiency).
- Small inner diameter of the regulating ring produces a short dewatering zone (= less good dewatering efficiency) and a long clarifying zone (= good clarifying efficiency).

Option 2: Version with immersion disk (for pasty products)

- Small inner diameter of the regulating ring produces a high filling level of the bowl (= good dewatering efficiency).
 - Large inner diameter of the regulating ring produces a lower filling level of the bowl (= less good dewatering efficiency).
-

Changing the differential speed range

This permits changing the layer thickness and dwell time of the solids in the dewatering zone. Tendency:

- High differential speeds produce a high residual moisture content with pasty solids.
- Low differential speeds produce a low residual moisture content but can lead to higher stressing of the scroll drive.

When processing crystalline solids, the opposite results are obtained.

Altering the bowl speed.

High bowl speeds generally improve the clarification and separation efficiency, but require higher drive power ratings. They can also make solids conveyance more difficult and increase material wear.

3.13 Frame

The frame consists of the decanter frame and the drive frame.

Decanter frame

The decanter frame consists of:

- a welded frame
- stainless steel catchers for the product discharges
- a bowl protective hood

Drive frame

The drive frame consists of:

- a welded frame
- the drive motors
- a guard

Vibration absorbers underneath the two frames largely prevent the transmission of vibrations.

3.14 Lubrication

Lubrication point	
Gearbox	The gearbox is filled with oil. The oil filling must be replaced regularly.
Bowl bearings	The bowl bearings are supplied with lubricant through an automatic oil-air lubrication system.
Scroll bearings	The scroll bearings are filled with oil. The oil filling must be replaced regularly.

The re-lubrication intervals and grease qualities are specified in the "Lubrication and maintenance schedule".

3.15 Drive

The decanter is driven by a three-phase AC motor.

Power transmission is via belts.

The belt pulleys are exchangeable so as to be able to alter the bowl and differential speeds.

The scroll is driven by a gear.

Option

The drive motor is controlled via a frequency converter. The bowl speed can be steplessly adjusted within certain ranges via the frequency converter.



DANGER

Danger to life through parts breaking at high speeds

If the decanter is operated at inadmissibly high speeds, machine parts can break and pose a high safety risk.



Fig. 16

- Never manipulate the frequency converter to exceed the permissible bowl speed (see nameplate).
- The machine may only be operated with an independent device for speed limitation.

Function:

The main motor drives the scroll and bowl at different speeds via drive belts and the gearbox.

The scroll drive power required for the control range is taken from the frequency-controlled secondary motor.

If the power consumption of this secondary motor rises above the maximum permissible value (due to increasing torque on the scroll), the controller increases the motor speed and hence the differential speed.

The differential speed increase accelerates the removal of the solids from the bowl. Reduction in the solids volume results in corresponding reduction of the torque at the scroll.

Consequently, the controller reacts to the decreasing torque by reducing the speed of the back drive motor.

If the torque does not drop despite the differential speed increase, the product feed is closed when "torque stage 1" is reached. If the torque continues to rise, the decanter is shut down on reaching "torque stage 2".

The back drive motor remains in operation for a preset time. This usually clears the solids out of the bowl. The machine can be re-started immediately after bowl standstill.

The minimum differential speed (and the position of the control range) depends on the gear and belt pulley ratios.

3.16 Motor control

Functions of the optional motor control for monitoring start-up and operation:

- Automatic start-up of the drive motors.
- Motor protection of the drive motors (PTC thermistor monitoring).
- Bowl and differential speed monitoring and indication during operation.
- Start-up time monitoring.
- Interlocking of the feed (solenoid valve or pump) during the start-up phase, so that the decanter can't be fed with product until the operating speed has been reached.
- Automatic differential speed increase in the case of excessively high scroll drive torque by increasing the speed of the back drive motor.
- Switching off the feed and shutting off the drive in case of faults
- Indication of the current consumption.
- Indication of the operating hours.
- Supply of flush liquid possible if the gear is overloaded and when the decanter is shut down.
- Monitoring of the gear lubrication.

If the decanter is correspondingly equipped, the following parameters and functions can additionally be monitored.

- Temperature of the bowl bearings.
- Vibrations of the decanter.
- Function of the automatic lubrication system for the bowl bearings.

3.17 Temperature monitoring of the bowl bearings (option)

Depending on the version and application, a PT 100 resistance feeler is fitted to each bearing point. By this means, mechanical damage is avoided or detected at an early stage.

In the case of oil-air lubrication of the bowl bearings, the temperature monitoring system is included in the standard scope of delivery.

Excessively high bearing temperatures can have the following causes:

- distortedly mounted roller bearings
- false roller bearings with insufficient bearing play
- overlubricated roller bearings

Optionally, the measured temperature can be displayed in the control. Threshold values for the bearing monitoring are programmed in the control. There is a preliminary alarm and a further alarm that results in shut down of the decanter.

3.18 Vibration monitoring of the decanter (option)

Depending on the version and application, the vibrations of the frame are monitored with a vibration recording device.

The signals are processed in the decanter control unit and, depending on the preset limit values, result in the triggering of an alarm or the shut-down of the decanter. By this means, mechanical damage is avoided or detected at an early stage.

Excessively high vibrations can have the following causes:

- Product deposits
- Worn roller bearings

Factory set limit values

For limit values see data sheet The data sheet is an integral part of the machine documentation.

3.19 Function of the decanter

The decanter is a horizontally mounted scroll centrifuge with cylindrical–conical solid wall bowl for the continuous separation of solids from suspensions.

The product to be processed (feedstock) enters the feed zone of the scroll via the centrally arranged feed tube, enters the separation chamber of the bowl through openings and is accelerated to operating speed.

The impact of the centrifugal force causes the solid particles to be deposited on the bowl wall in just a short time.

The scroll, which rotates at a higher speed than the bowl shell, continuously transports the ejected solids to the narrow end of the bowl.

In the dewatering zone, the solids are lifted from the fluid (due to the conical shape of the bowl) and freed of attached fluid via the centrifugal force.

The solids are ejected into the collection chamber of the housing at the end of the bowl.

The fluid flows between the scroll flights towards the cylindrical end of the bowl.

While passing through the clarifying zone the remaining impurities in the liquid are removed by centrifugal force and transported to the solids discharge.

The clarified liquid leaves the centrifugation chamber via an exchangeable regulating ring.

The liquid phase is discharged under pressure.

4 Technical data

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4.1 Ambient conditions

The decanter is generally designed for operation in closed halls. The dust exposure must not exceed the standard values in industrial environments.

If the decanter is operated in environments which deviate from the specified values, the design must be modified accordingly.

The order-specific permitted ambient temperatures and product temperatures are given in the data sheet supplied with the decanter in accordance with EN 12547.

Incomplete specimen of the data sheet according to EN 12547

Centrifuge			
			Remarks
Type			
Serial no.			
Permitted rated bowl speed	min ⁻¹		
Permitted density of solids	kg/dm ³		max.
Permitted throughput capacity	m ³ /h		min/max.
Permitted temperature of feed product	°C		min/max.
Permitted housing pressure range	bar (g)		min/max.
Permitted operating speed range	min ⁻¹		min/max.
Bowl filling volume	l		approx.
Deceleration time of the bowl	min		approx.
Permitted vibration velocity Limit value 1 Limit value 2	mm/s RMS		Inquire measuring point at manufacturer's plant / refer to the dimensioned drawing.
Differential speed	min ⁻¹		
Decanter factor	%		
Ambient temperature	°C		min/max.
Warning "Bowl bearing temperature"	°C		
Shut-down "Bowl bearing temperature"	°C		
Switching point "Feed closed"	%		
Switching point "Decanter off"	%		
Sound pressure level	dB (A)		DIN EN ISO 3746
Sound power level	mW		DIN EN ISO 3746
Explosion hazarded zone of centrifuge			
Ex-marking			RL 2014/34/EC
Inert gas blanketing necessary			Yes/ No
Process values			
Intended use, Feed product			
Feed pressure	bar		min/max.
Discharge pressure	bar		min/max.

4.2 Load on foundation

The load on the foundation depends on the type of drive and the motors used.

Note order-specific dimensioned drawing !

4.3 Motor data

Main motor

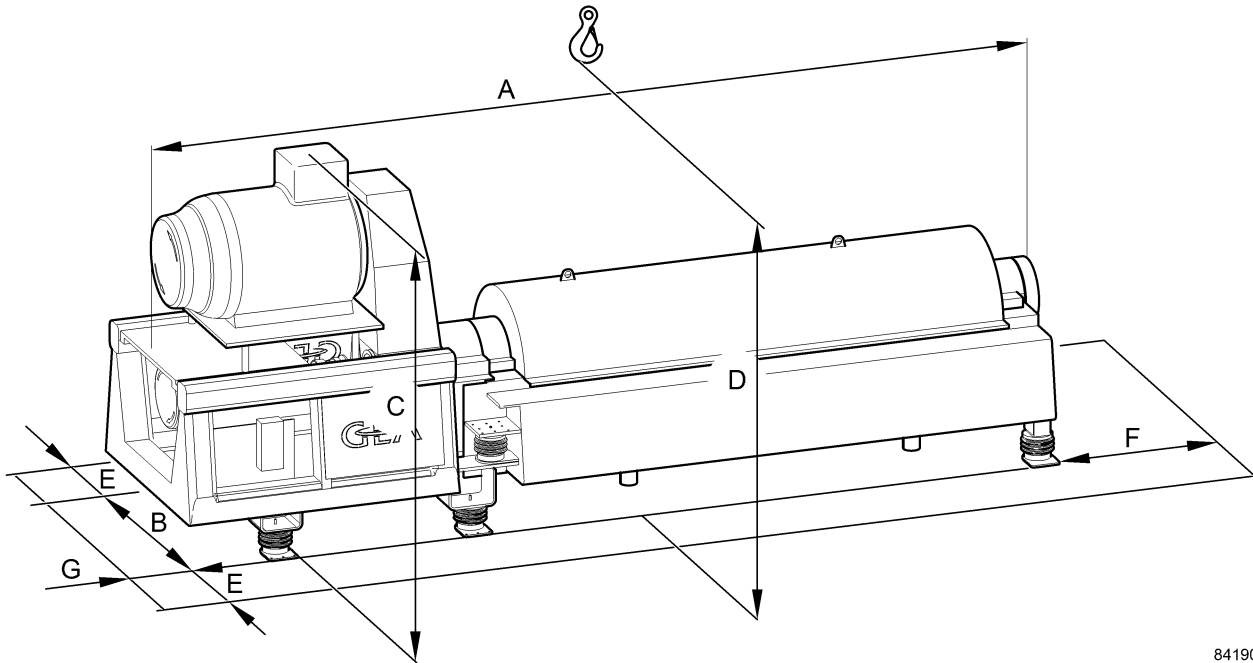
Type	Three-phase AC asynchronous motor
Capacity	depending on design: 75 kW – 250 kW
Speed	1500 min ⁻¹ (50 Hz) 1800 min ⁻¹ (60 Hz)
Enclosure	IP 55 / IP 56
Design	IMB3

Secondary motor

Type	Three-phase AC asynchronous motor	
Capacity	50 Hz	45 kW
	10-60 Hz	36 kW (60 Hz)
	10-87 Hz	52 kW (87 Hz)
Speed	50 Hz	1500 min ⁻¹
	60 Hz	1800 min ⁻¹
	87 Hz	2610 min ⁻¹
Enclosure	IP 55 / IP 56	
Design	IMB8	

4.4 Dimensioned drawing

For information only, do not use as a planning document!
Note order-specific dimensioned drawing!



8419080

Fig. 17

		CF 7000	CF 8000
A		5900	6350
B		1550	1675
C		2350	2550
D	[mm]	>4100	>4300
E		>500	>500
F		>2100	>2500
G		>700	>700

5 Transport and storage

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5.1 Safety during transport

When the centrifuge is transported with hoists and fork-lift trucks, hazards can occur. Risk of injury and material damage are a threat when unsuitable persons are deployed and unsuitable or damaged lifting gear is used.

Therefore, pay attention to the following points during transportation:

- Assign only qualified personnel with the task of transporting the centrifuge.
- Transport weights exceeding 15 kg using a hoist.
- Use approved and intact lifting gear and hoists for transportation.
- Use only suitable hoists with adequate lifting capacity.
- If available: Arrest the bowl with the aid of the bowl lock screws.
 - The bowl bearings will otherwise get damaged.
- If available: Remove/loosen the coupling of the secondary motor.
 - Otherwise the motor shaft/gear shaft will be damaged.

5.2 Storage instructions for the decanter

Requirements for the storage room

The storage room must meet the following requirements:

- cool, 15 – 25 °C
- dry, approx. 65 % relative humidity (perspiration water formation must be prevented)
- dark (avoid direct sunlight and UV radiation)
- dust-free
- moderately ventilated
- free from aggressive media (e.g. salts, acids, lyes, solvents)

Painted parts

An intact paint coating provides adequate corrosion protection. For this reason, painted parts must be examined for damage or changes once a month.

Touch up the damage in accordance with the instructions of the paint manufacturer.

Unpainted areas and galvanised parts

Unpainted areas and galvanised parts must be treated as follows:

- Carefully clean the area or part.
- Spray-on anti-corrosive wax, see the lubrication and maintenance schedule.
- Check and, when necessary, touch up the corrosion protection once a month.

Gearbox / spare gearbox (oil-lubricated)

The gearbox and spare gearboxes must be prepared as follows for long-term storage.

- Drain lubricating oil completely, see chapter "maintenance / Draining gear oil".
- Fill 0.05 litres of corrosion inhibiting oil, see lubrication and maintenance schedule, close the gearbox.
- Carefully clean the gearboxes.
- Spray-on anti-corrosive wax, see the lubrication and maintenance schedule.
 - Check and, when necessary, touch up the corrosion protection once a month.

For the purpose of transporting the gearbox for inspection by the manufacturer, the gearbox must likewise be prepared as described above.

Drive motors

The drive motors must be prepared as follows for long-term storage.

- Option: Connect the space heaters for the motor winding. This is especially important in the case of high air humidity in the environment.
- Carefully clean the motor.
- Spray-on anti-corrosive wax, see the lubrication and maintenance schedule.
- Check and, when necessary, touch up the corrosion protection once a month.

5.3 Using load-suspension devices safely

The working load limit of the slings depends on the method of use. They may only be used for their intended purpose.

Unintended use may cause the slings to tear. There is risk to the life and limb of persons and of damage to property.

For the reduction of the working load limit in individual cases, see the manufacturer's specifications.

GEA Westfalia Separator recommends the use of round slings made of synthetic fibres.

Observe the points below when using load-suspension devices:

- Inspect slings for damage before each use.
- Do not use damaged or incomplete load-suspension devices and slings.
- Use slings only in the way approved by the manufacturer.
- Never load the slings beyond their maximum working load limit (WLL). The WLL specification is located on the sling label.
- Conduct regular training for slingers and individuals assigned to perform transport work.
- Use only the sling points specified in the documentation.
- Use only suitable fork-lift trucks and hoists with an adequate capacity.
- Pack and secure the load in accordance with the CTU (Cargo Transport Unit) transport guidelines before transporting it.
- Observe all regional regulations and laws governing transport and transport securing.

Lifting accessories for transporting the centrifuge

Ground conveyors and hoisting equipment for transporting the system to the centrifuge must be provided by the operating company.

Hoists (e.g. a crane) suitable for dismantling or installing heavy components must be provided by the operator.

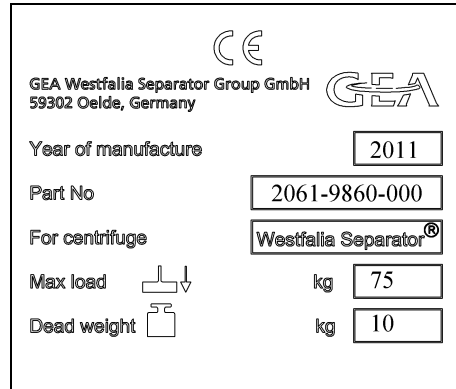
- Hood
- Bowl
- Actuator
- etc.

Lifting accessories for repairing the centrifuge

Lifting equipment and slings required for dismantling or installing the bowl or scroll are available in the separate spare parts catalogue "Tools set". The tools set is not included in the standard scope of supply.

Use slings safely and observe the following points:

- Use only slings with a nameplate.



The nameplate on the sling shows the following data:

- CE mark
- Manufacturer
- Year of manufacture
- Part number
- Intended use
- maximum load
- inherent weight

Fig. 18 Example of a nameplate

- Use sling gear only as described in this instruction manual.
- Observe the permitted loading limit.
- Check the sling for visible damage before each use.
- Use only slings in perfect condition.
- Do not carry out repairs to slings.
- Send damaged slings to the manufacturer.
- Always screw in threaded rods as far as they will go.
- Tighten all nuts fully.
- Tighten all bolts fully.
- Do not walk under suspended loads.

5.3.1 Declaration of conformity on load lifting attachments

Declaration of conformity on load lifting attachments

EC Declaration of Conformity

within the meaning of the EC Machinery Directive 2006/42/EG, Annex IIA

We hereby declare that the load lifting attachments supplied with the centrifuge

Type: Westfalia Separator load lifting attachment

complies with all pertinent stipulations of the EC Machinery Directive 2006/42/EC and follow-up guidelines.

The following harmonized standards were applied:

EN 12100 Safety of Machinery

The following national standards, guidelines and specifications were applied:

DIN EN 13155	Cranes - Non-fixed load lifting attachment
German Social Accident Insurance (DGUV) rule 1	General regulations
German Social Accident Insurance (DGUV) rule 100 - 500 K2.8	Operating load lifting attachments in hoist mode

The centrifuge instruction manual contains all necessary instructions on using load lifting attachments and shall be considered as their relevant manual.

This declaration is submitted as responsible for the following manufacturer / importer:

GEA Westfalia Separator Group GmbH
Werner-Habig-Str. 1
59302 Oelde, Germany

Duly authorized person for technical CE documentation:

GEA Westfalia Separator Group GmbH
Dirk Schlingmeyer
Werner-Habig-Str. 1
59302 Oelde, Germany

Date / Manufacturer's signature 07.03.2017

Managing Director: Tobias Dieckmann

5.3.2 Load fastening points for the hoist

The decanter is delivered optionally with lifting devices for the scroll and bowl.

The following table shows the load fastening point dimensions.

Due to the sharp edges at the load fastening points, the direct use of round slings or ropes is **not admissible**.

If the existing crane hook is too large, use a suitable means of fastening (e.g. an adequately dimensioned shackle).

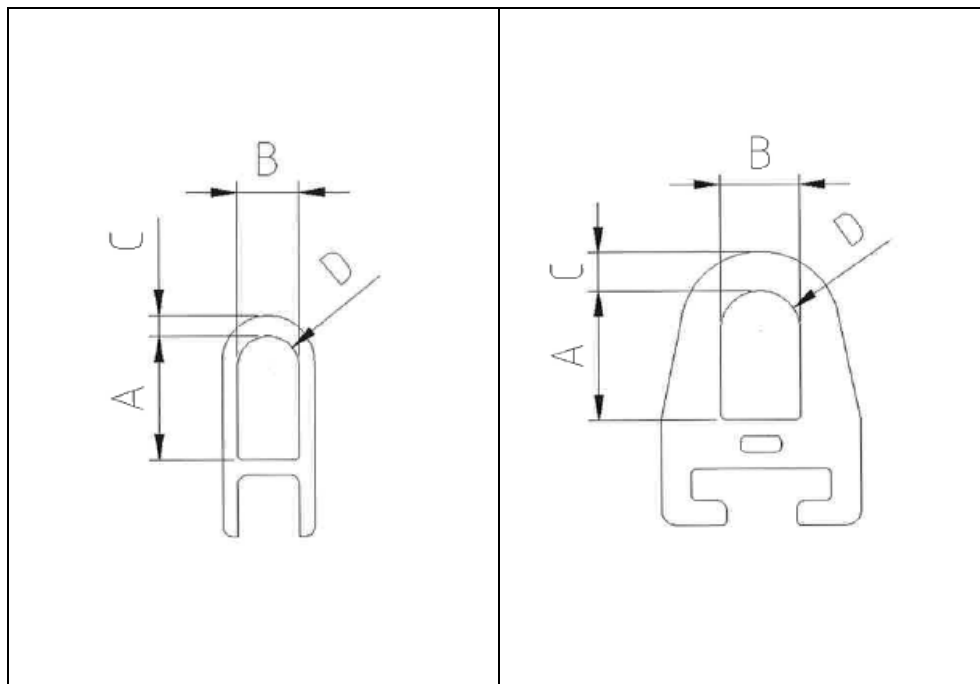


Fig. 19

Fig. 20

Decanter size	Scroll lifting device	Bowl lifting device
3000	Shackle with rope	Shackle with rope
4000 5000	A = 120 B = 60 C = 25 D = 30 T = 20	Shackle with rope
6000 7000	A = 120 B = 60 C = 25 D = 30 T = 20	A = 120 B = 60 C = 40 D = 30 T = 50
8000	A = 130 B = 80 C = 25 D = 40 T = 30	A = 130 B = 80 C = 40 D = 40 T = 60

5.4 Using lifting eye bolts or lifting eye nuts as load carrying equipment

Incorrect use of lifting eye bolts or lifting eye nuts during transport can lead to serious accidents, e.g. due to overload.



WARNING

Deformed lifting eye bolts or lifting eye nuts due to overload.

Danger to life and limb through falling loads when lifting eye bolts or lifting eye nuts break.

Observe the following points to avoid accidents:

- the pertinent standards and guidelines of the national associations in the country of origin on the operation of load-carrying equipment in lifting mode.
- Only trained specialists are authorized to mount lifting eye bolts or lifting eye nuts.

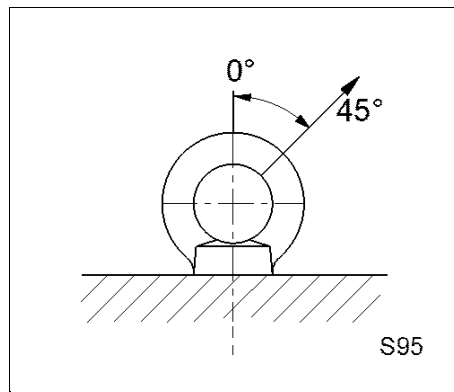


Fig. 21

- Mount lifting eye bolts or lifting eye nuts only as illustrated.
- Screw in lifting eye bolts or lifting eye nuts completely.
 - If this is not possible, screw the eye bolt or ring nut in by at least $1 \times d$ (= thread diameter).
- Attach load handling devices as vertically as possible, e.g. chains.
 - Pull max. 45° diagonally.
 - Modes of assembly other than those shown are not admissible, e.g. lateral pull.

5.5 Transporting the decanter

The decanter is delivered in three parts.

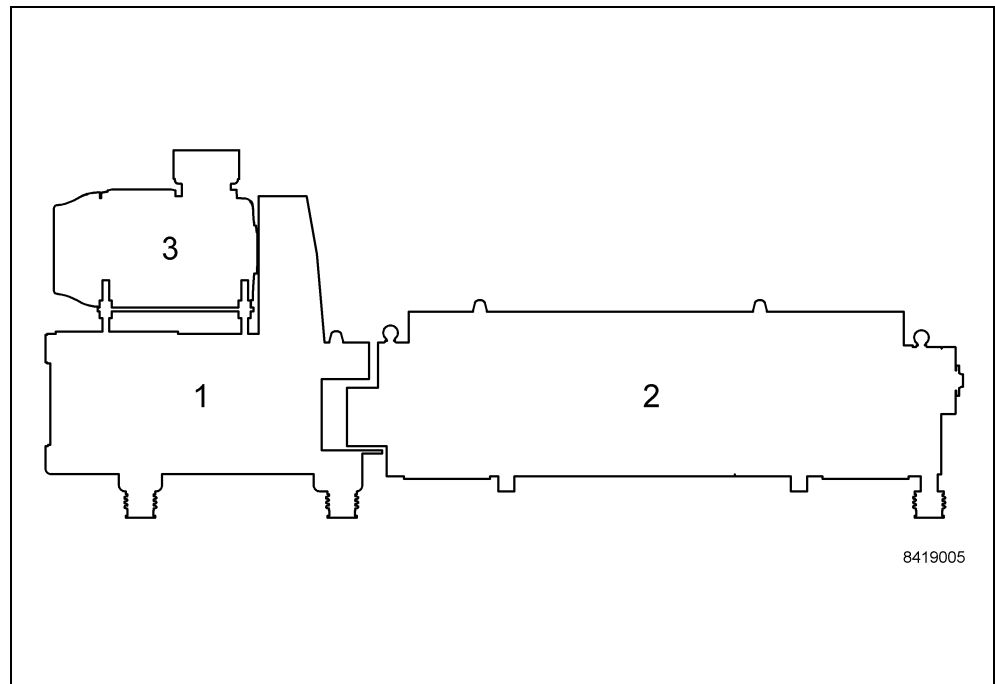


Fig. 22

- Drive frame with secondary motor (1)
 - Length: approx. 2200 mm
 - Required lifting capacity of the crane: min. 2100 kg
- Decanter frame with bowl and hood (2)
 - Length: approx. 4500 mm
 - Required lifting capacity of the crane: min. 5000 kg
- Main motor (3)
 - Length: dependent on the motor version (refer to order-specific dimension sheet!)
 - Required lifting capacity of the crane: dependent on the motor version (refer to order-specific dimension sheet!)

Attaching hoists

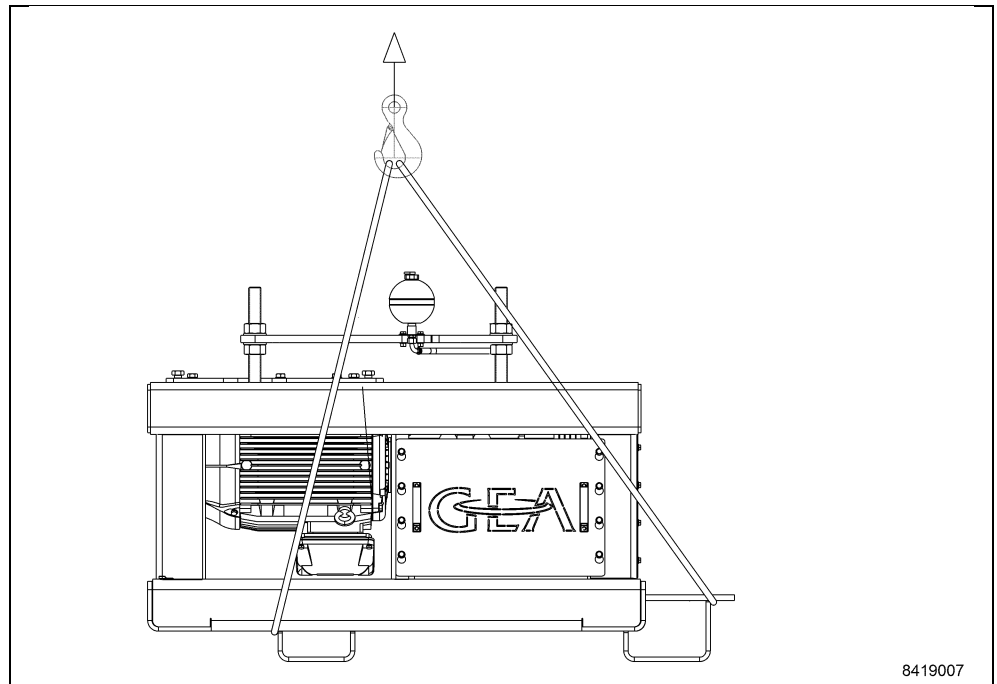


Fig. 23

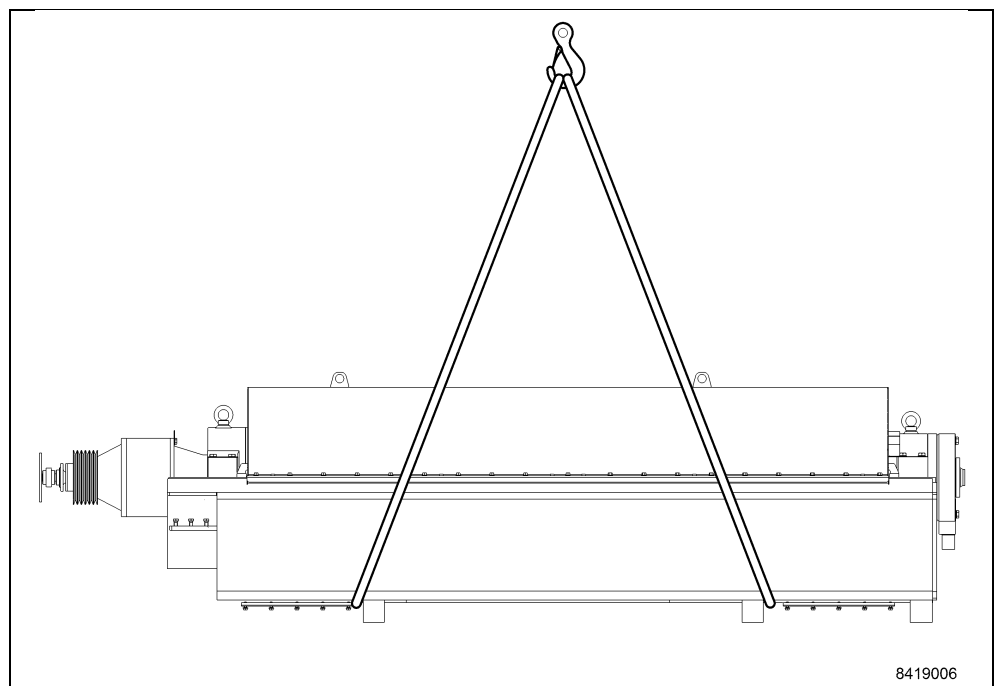


Fig. 24

6 Assembly and installation

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6.1 Safety during assembly and installation

Pay attention to the following points during assembly and installation:

- Install the centrifuge at the installation site in accordance with the installation diagrams.
- For rating piping, refer to the specifications in the P&ID (**P**iping and **I**nstrumentation **D**iagram) in the installation diagram and in the datasheets.
- Connect all feed and discharge lines flexibly to the centrifuge by means of U-shaped conduits or compensators.
 - Loading the pipelines through tensile force is not admissible.
 - All pipe joints are rated without taking into consideration tensile forces.
- Do not fit a shut-off device in the frame drain or connect it with closed piping.

Exception	A shut-off device is required to prevent harmful gases from escaping during maintenance work.
Required measure	Take appropriate action to ensure that the centrifuge only starts when such shut-off devices are completely open.

Fastening material

Unsuitable fastening material endangers the statics and operating safety of the centrifuge. This can lead to damage to the centrifuge.

- Use the specified fastening means. They are rated for machine frame and foundation.

6.2 Required documents for planning the installation

Careful planning of the installation is crucial in terms of service life, safety and operating readiness of the centrifuge.

The following documents are required:

- Order-specific dimensions sheet
- Order-specific P&ID (piping and instrumentation diagram)
- Order-specific equipment list
- Terminal and circuit diagram
- Decanter instruction manual
- Additional instruction manuals (if applicable), e.g. for oil+air lubrication of the bowl bearings

6.3 Environmental requirements

Favourable ambient conditions are:

- The decanter is standing in a closed hall.
- The decanter is free-standing and well ventilated.
- The decanter has low dust exposure. The standard values in industrial environments are not exceeded.
- Uniform ambient temperatures prevail between min. 5 °C and max. 40 °C.

In the following cases GEA Westfalia Separator must be contacted for more precise clarification of the optimum installation.

Unfavourable ambient conditions are:

- The decanter is standing outdoors.
 - The decanter must be pre-heated to a temperature of +5 °C if there is a risk of frost.
- The decanter is installed at a poorly ventilated site. Bearings and gears are subjected to thermal strain.
- The decanter is exposed to large differences in temperature. Condensate water impairs lubrication of the bowl bearings.

NOTICE

Inadmissible ambient conditions are:

- Corrosive vapours or fumes damage the decanter.
 - In such cases, it is absolutely necessary to provide suction.
- Disturbing external vibrations.
 - Avoid disturbing external vibrations since this can endanger the operating safety of the decanter.
- Ambient temperatures below 5 °C prevail.
- Ambient temperatures above 40 °C are prevailing.

6.4 Allow for sufficient space for maintenance work.

When planning the installation of the centrifuge, ensure that the centrifuge is easily accessible from all sides.

Keep to the minimum clearances from walls of buildings or other machines so that the following points are assured.

- All machine parts must be readily accessible for maintenance and repair work.
- Sufficient space must be available for setting down large machine parts safely.
 - Protective hoods
 - Bowl
 - Drive motors

6.5 Requirements to be met by the load suspension devices

- Hoists and cranes must be adequately dimensioned for the weights of the machine components. Refer to the order-specific dimensioned drawing.
- A crane must be able to travel in two axes.
- If a monorail crane is used, there are two possibilities:
 - The crane runs in the rotor axis, refer to the order-related dimensioned drawing (preferred direction).
 - The crane runs at right angles to the rotor axis at the height of the centre of gravity of the rotor. (For the centre of gravity of the rotor, refer to the dimensioned drawing. This is useful only in exceptional cases, as the centre of gravity of the rotor may be displaced by adhering solids.)

6.6 Demands on the configuration of the installation

- Configure the installation so that backflows of product or utilities cannot occur.
- Ensure uniform feed rates. Recommendation: Mono pump
- Ensure uniform feed concentration. Recommendation: Agitator

6.7 Requirements of feed and discharge lines

- Valves and pumps must be adapted to the product.
- Do not connect feed and discharge lines firmly to the centrifuge. Provide flexible connections (e.g. compensators).
- Contact with the rotating bowl must be excluded.
- Operating personnel must not be endangered by discharged product. Danger zones must be made inaccessible.
- The feed must be provided with a shut-off device so as to be able to interrupt the product supply in case of operating malfunctions.
- The feed line should enable uniform product supply with a constant solids content.

6.7.1 Rating of compensators

Compensators installed in the lines on the centrifuge must meet the following requirements:

Size	Motion absorption [mm]		Adjusting forces [N/mm]	
	axial	lateral	axial	lateral
Up to DN 15	± 6	± 3	50	50
DN 20 to DN 40	± 10	± 5	100	100
DN 50 to DN 100	± 10	± 5	100	200
DN 125 to DN 200	± 15	± 5	200	400

Materials

The material selection must take into consideration the following requirements:

- Corrosion-resistant
- Resistant against product specifications
 - Temperature
 - Acids
 - Lyes
 - Solvents
- Resistant against the specified environmental conditions
- Light-resistant when installed outdoors
- If applicable, suitable for use in the food and/or pharmaceutical sector

Pressure range for the compensators

- In the feed line: PN6
- In the discharge line centripetal pump and paring tube PN16

6.8 Configuration of the liquid chute

Open chute

Liquid chutes adapted optimally to the decanter can be procured from GEA Westfalia Separator.

Take into account the following points when building your own constructions:

- Provide a vent.
- Fit a compensator.
- Protect operating personnel. To do this:
 - Prevent contact with rotating parts.
 - Prevent danger through discharging product.
- Rate conveying equipment (e.g. pumps) to handle the throughput capacity of the decanter. In case of doubt, contact GEA Westfalia Separator.
- Fit a sampling cock (recommendation).

Paring tube

- Provide a vent.
- Fit a compensator.
- Liquid (product) must be discharged into a tank next to the decanter without pressure.
 - Vent the tank.
 - In the case of increased backpressure, the leakage at the paring tube will increase.

Centripetal pump

- Liquid (product) is discharged under pressure.
- Provide a compensator between the connections at the decanter and the discharging pipe.

6.9 Configuration of the solid chute

Solid chutes adapted optimally to the decanter can be procured from GEA Westfalia Separator.

Please take into account the following points when installing your self-made configurations:

- Design the solids discharge to prevent damming. Build-up of product can lead to heavy damage to the decanter. A malfunction in the solids discharge installations or solids bridging can cause build-up of solids in the decanter. If there is a build-up, the decanter must be switched off and the fault must be eliminated. To prevent build-up / switch off the decanter in due time
 - install solids probe.
 - install overflow.
 - plan sufficient volume.
- Ensure adequate venting of the solids chute and downstream solids tank. See also chapter "Assembly and installation/design of the venting system".
- Provide an elastic connection piece (e.g. compensator) when closed discharge is required.
- In the case of open discharge, provide a compensator with elastic connection to the decanter.
- When a closed solid discharge is necessary, e.g. in the case of a gastight design, only a round stainless steel compensator can be used due to the required tightness.
 - This results in a transition between the angular discharge at the housing of the centrifuge to round.
 - Select an adequately large nominal width.
 - Prevent bridging.
- Protect operating personnel. To do this:
 - Prevent contact with rotating parts.
 - Prevent danger through discharging product.
- Rate conveying equipment (e.g. pumps, conveyor belts or solid slides) to handle the throughput capacity of the decanter. In case of doubt, contact GEA Westfalia Separator.
- During start-up, run-down and flushing the decanter, liquid discharges through the solid discharge. A special discharge system must be provided for this. E.g.:
 - Slide gate valve
 - Residual water discharge at trough conveyor
 - etc.

- Install a two-piece metal sheet as an extension in the solid chute - (see sketch).
 - The metal sheet serves to avoid deposits of solids in the frame.
 - Metal sheets are supplied separately with the decanter.
 - If necessary, the sheet metal must be shortened to the extent that the minimum clearances to adjacent components shown below are adhered to (e.g. walls of chutes, trough conveyors).

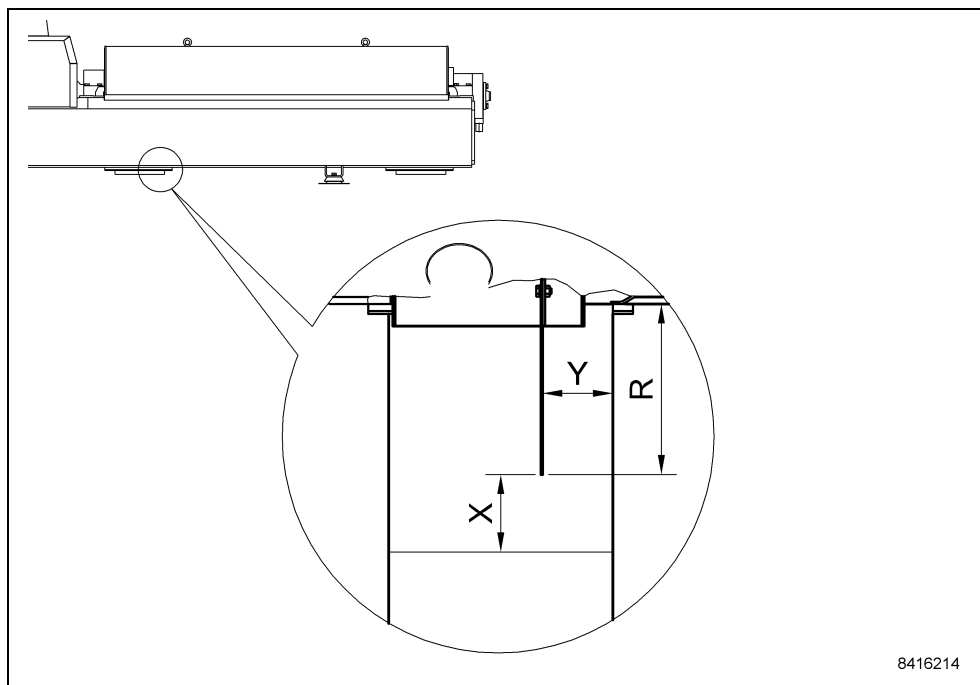


Fig. 25

Decanter size	X	Y	R
1000	min. 60 mm	min. 60 mm	Refer to the order-specific dimension sheet.
3000	min. 95 mm	min. 95 mm	
4000	min. 120 mm	min. 120 mm	
5000	min. 155 mm	min. 155 mm	
6000	min. 170 mm	min. 170 mm	
7000	min. 120 mm	min. 120 mm	
8000	min. 240 mm	min. 240 mm	

6.10 Seals between frame and discharge chute

(Seals are supplied with the decanter)

Option 1: Decanter with suspended catchers

(only for sizes 3000 to 6000)

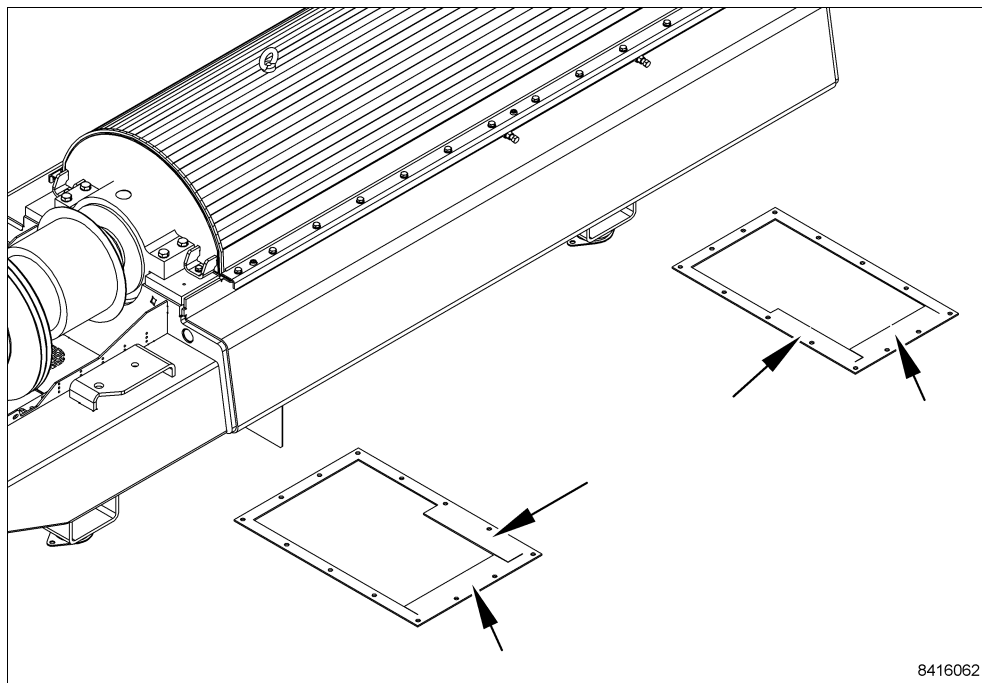


Fig. 26

The seals between the frame and discharge chute are not symmetrical.

IMPORTANT: The wide webs must be located at the marked positions. The shape of the seals influences the air flow in the decanter. Incorrect fitting leads to inadmissible product deposits.

Option 2: Decanter with single-piece catcher
(Sizes 1000 to 8000)

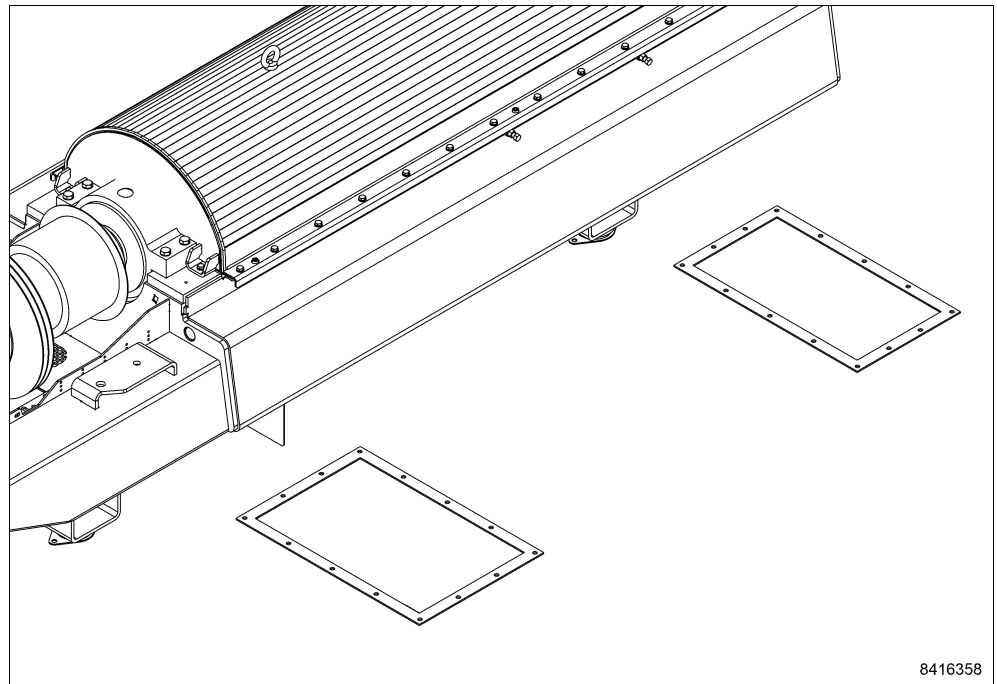


Fig. 27

6.11 Configuration of the vent

The correct venting of the liquid and solid catchers is essential for operating the decanter.

Inadequate venting leads to damage to the decanter (e.g. solid deposits in the housing) or backmixing of the separated phases.

For venting without additional ventilators, the maximum pipe length must not exceed 15 m. The specification applies to smooth tubes with a maximum of two pipe bends. The following table shows the necessary diameters for the vent pipes and the maximum air flows to be expected:

Decanter size		Liquid side	Solids side
1000	Connection	DN100	DN100
	Max. air flow [m ³ /h]	80	80
3000	Connection	DN100	DN100
	Max. air flow [m ³ /h]	50	100
4000	Connection	DN150	DN150
	Max. air flow [m ³ /h]	150	150
5000	Connection	DN150	DN150
	Max. air flow [m ³ /h]	220	220
6000	Connection	DN150	DN200
	Max. air flow [m ³ /h]	300	300
7000	Connection	DN200	DN200
	Max. air flow [m ³ /h]	400	400
8000	Connection	DN200	DN200
	Max. air flow [m ³ /h]	400	400

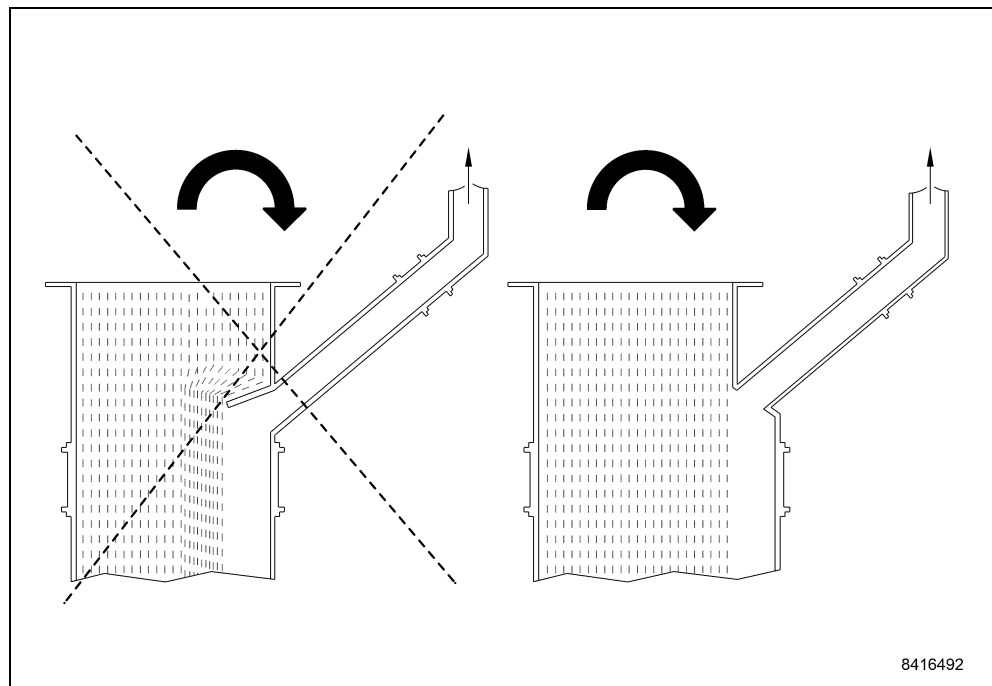


Fig. 28 Direction of rotation of bowl seen from the supply side.

If you are designing the drainage shafts yourself, take the following points into account:

- The vent line must be laid on the right-hand side of the decanter (as seen from the supply side).
If this is not done, ejected solids from the rotating bowl may block the vent line.
- The connection point of the vent line must be laid as close as possible to the discharge chute of the decanter.
- The connection point must be laid so that no blockage occurs as a result of deposited or dammed solids.
 - Any connections for discharging blocked product out of the solids chute must be fitted below the vent point.
- Lay the vent line with a constant fall to prevent aerosol residues from the exhaust air from accumulating in the line (trap).
- The air stream in the vent contains solid particles, liquid or vapours. Since they can deposit or condensate in the vent line, we recommend providing inspection ports and cleaning possibilities.
- Vent the solid catcher and liquid catcher separately from one another.
- If several machines have to be vented together, contact GEA Westfalia Separator.
- If a gate valve is fitted in the chute on the solid side, the vent must be located above the gate valve.

IMPORTANT: Designs with centripetal pump must also have a vent fitted below the liquids chute. In doing so, make sure that the pipe supports on the cover also serve as the leakage and hood flushing water drains.

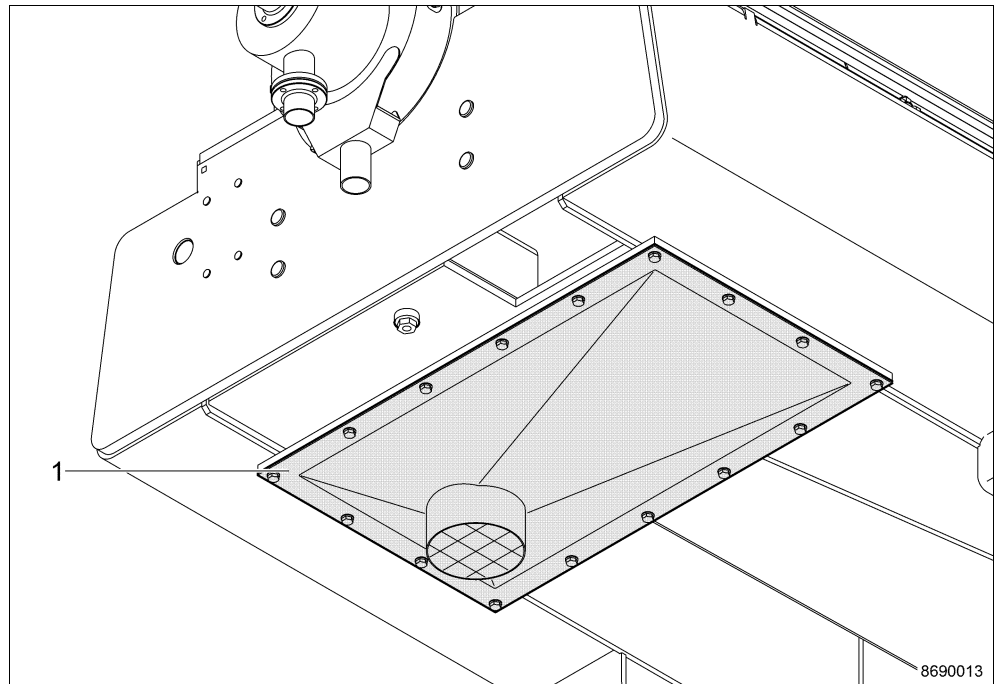


Fig. 29

If two liquid phases are freely discharged, the venting must be carried out as shown in the example below:

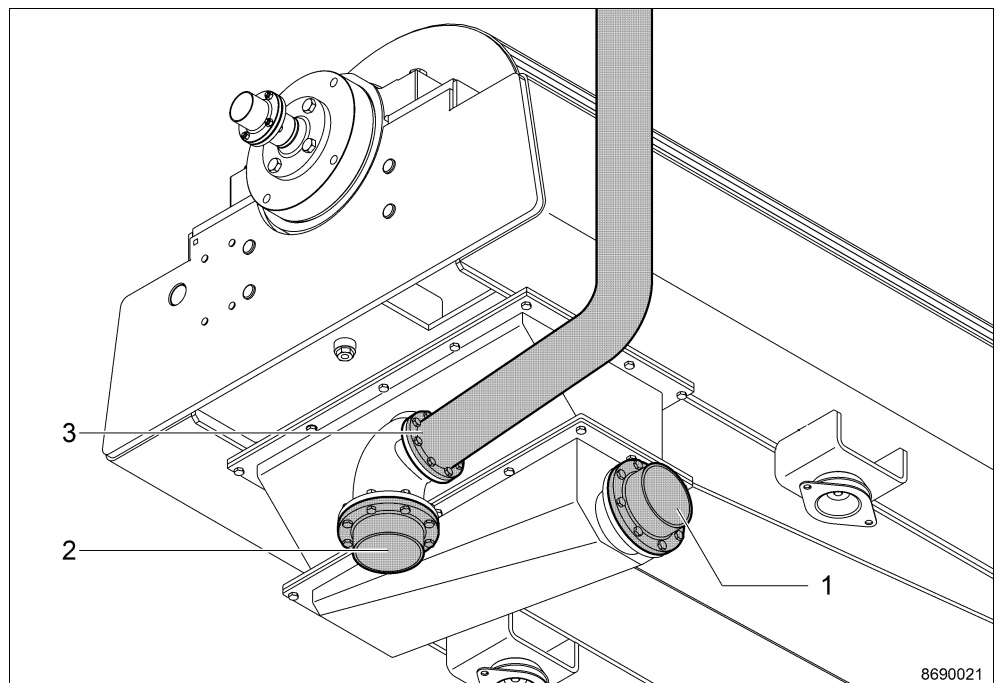


Fig. 30

- Tube phase (1): no venting
- Regulating disc phase (2): venting required
- Vent pipe (3): not included in scope of delivery

6.12 Overflow on the liquid side

(does not apply to designs with a rotating feed tube)

After the decanter shuts down, liquid escapes via the feed tube overflow on the liquid side. Up to 20 litres of liquid can escape, depending on the application and the size of the machine. This liquid must be collected and discharged.

In the case of open designs, the overflow can be connected to the chute on the liquid side via a flexible hose.

6.13 Flush connections

Flush connections must be taken into consideration in accordance with the order-specific dimensioned drawing.

The required water pressures and water volumes are specified in the P&ID.

Use only clean flush liquid for the hood flushing. Flush liquid already contaminated (e.g. from the centripetal pump discharge) soils the flush nozzles.

6.14 Hydrohermetic system

The feed pressure as specified in the decanter instruction manual must be adhered to according to the decanter instruction manual (see Settings chapter).

The required pressure range and the required water volumes are specified in the P&ID.

In addition, free draining of the hydrohermetic system water must be ensured so that the water can drain without pressure. For versions with blanketed inert gas, the draining medium (connection F2) must also be immersed.

If the hydrohermetic system is not used, the hydrohermetic system disc has to be removed and replaced with a different disc. This ensures that this space can be flushed properly.

6.15 Mechanical seal

Outer cooling: Ensure that cooling water is available, even in case of a power cut. The permitted max. pressure (see machine documentation) must not be exceeded, excessive pressure can lead to damage to the gaskets.

Inner cooling: If a medium is fed via the connection of the outer cooling (flushing liquid, flocculant, washing water for solids washing), the max. pressure (see machine documentation) must not be exceeded. Excessive pressure can lead to damage to the gaskets.

6.16 Compressed air connection

For models in the size range 1000 to 5000 an optional oil-air lubrication is available. The oil-air lubrication is included in the standard scope of delivery for the size 6000 and larger.

The required air volumes and pressures are specified in the supplementary manual.

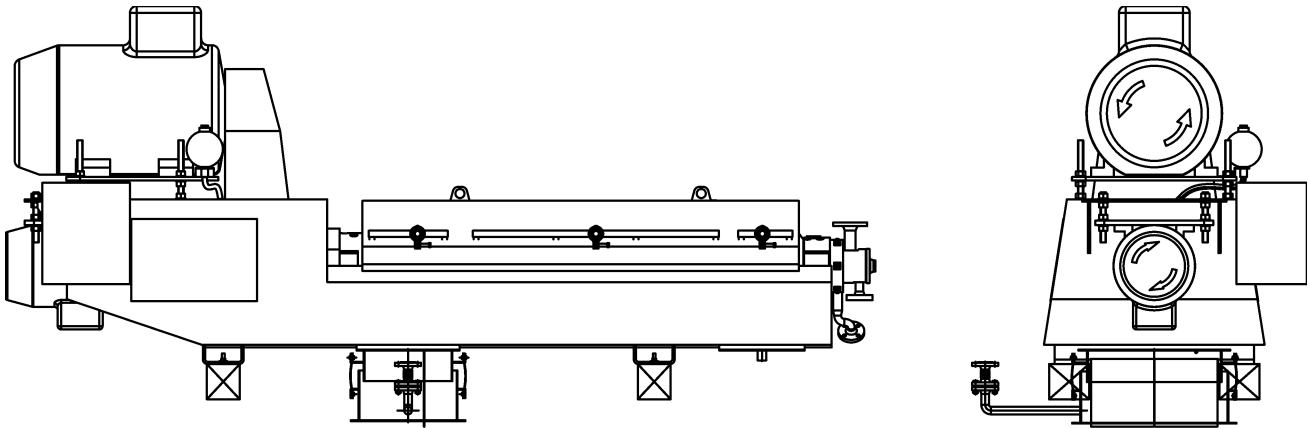
6.17 Inert gas connections

In the case of a decanter with inert gas blanketing, there is no venting of the discharge chutes on the liquid or solid side.

To displace air from the decanter, the latter is purged with inert gas (e.g. nitrogen).

A connection to the ventilation system must be created on the solid chute, or alternatively on the solid tank, for the discharge of the displaced air.

A piping configuration is shown below by way of example. Concrete dimensions are given in the order-specific dimensioned drawing.



8416056

Fig. 31

If an inert gas supply unit is included in the scope of delivery, refer to the corresponding user documentation.

6.18 Special aspects when operating in hot conditions

Steam must not pass through the decanter when it is at standstill. The steam would endanger the maintenance personnel and be an influential factor regarding corrosion in the decanter.

- Shut-off devices in the feed and discharge lines must be installed such that the shut-down decanters can be isolated.
- Vent lines must be planned and installed in such a way that the shut-off devices cannot be bypassed.
- The decanter may only be started when the shut-off devices are open.

6.19 Terminal box positions of the electrical components

The following illustrations show the places on the decanter where auxiliary electrical components (e.g. A vibration absorber) can be wired into the terminal box. The illustrations are a guide for planning the subsequent cable runs from the separate terminal boxes to the control cabinet.

NOTE: Depending on the design and configuration, not all terminal boxes are actually present on the decanter.

Decanter sizes 3000 to 6000

The following table shows examples of the terminal box positions on decanter sizes 3000 to 6000. Actual dimensions can be found on the order-specific dimension sheet.

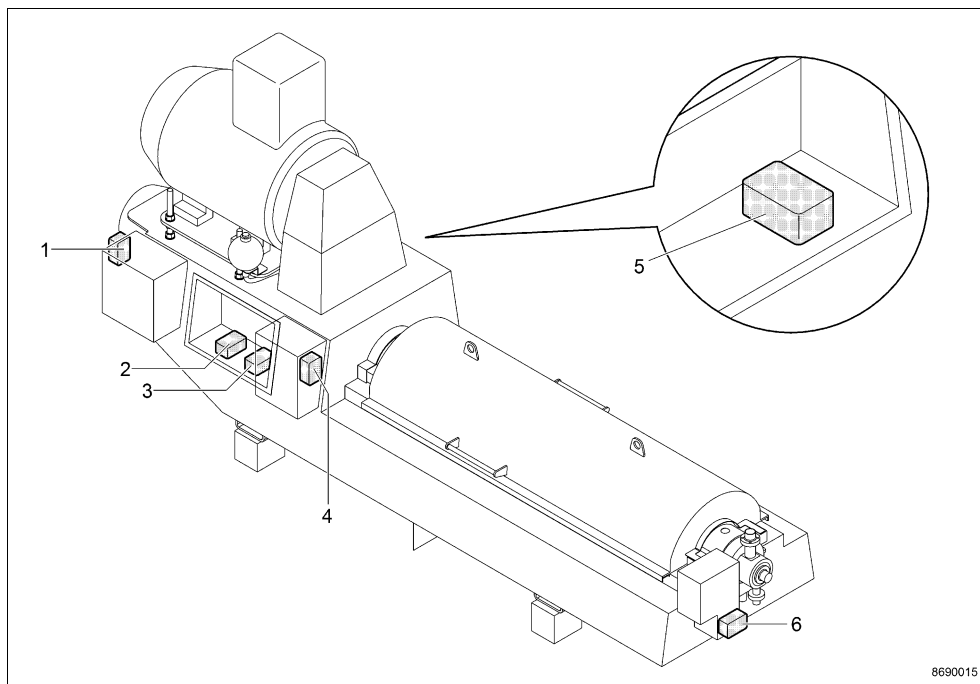


Fig. 32

Decanter sizes 7000 to 8000

The following table shows examples of the terminal box positions on decanter sizes 7000 to 8000. Actual dimensions can be found on the order-specific dimension sheet.

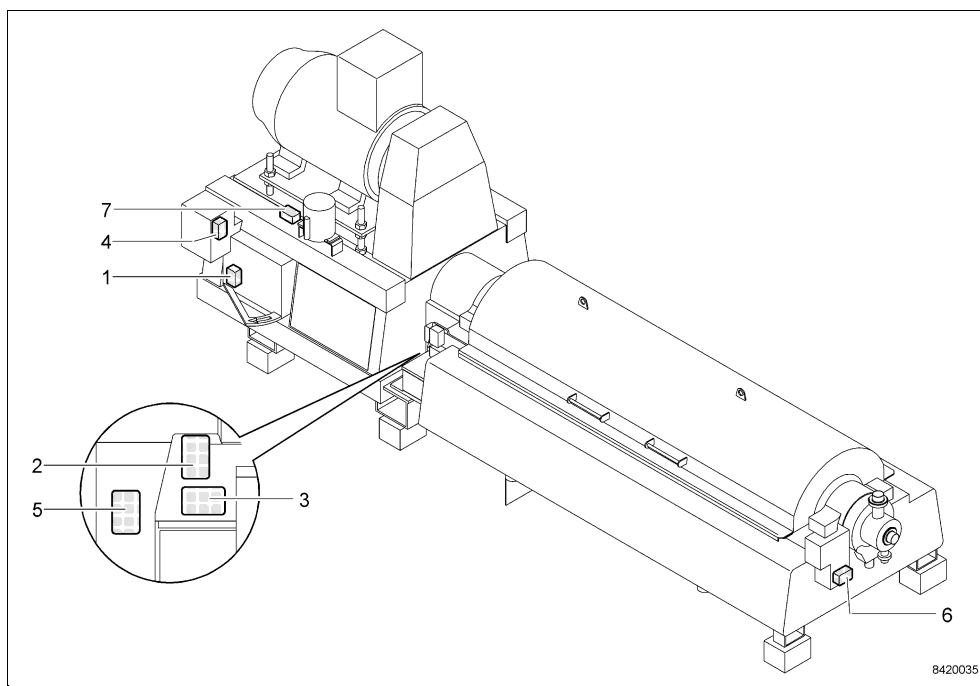


Fig. 33

6.19.1 Terminal box designations and their functions

Item	Terminal box designation	Terminal box function
1	X9 (X48)	Terminal box – Oil/air unit complete
2	X7 (X47)	Terminal box – Speed sensor complete
3	X11	Terminal box – Vibration absorber complete
4	X42	Terminal box – Control unit (Varipond P)
5	X41	Terminal box temperature sensor complete (measurement of gearbox temperature), oil, air unit complete and set of retrofitting parts (stick slip measurement)
6	X44	Terminal box – Water pressure reducing valve complete (hydrohermetic system)
	X40	Terminal box – Cooling water supply (mechanical seal), Alternative
	X23	Actuator complete (Varipond E) alternative
7	X53	Terminal box oil circulation lubrication system gearbox (optional)

6.20 Maintain sufficient space for ventilating the drive chamber

The following points should be considered when designing the foundation for the decanter and before assembly:

Space must be provided below the decanter in the foundation on the drive side next to the solids chute, so that air can circulate for cooling the gearbox. A minimum clearance of 250 mm (X) must be maintained below the machine in the area of the protective grille.

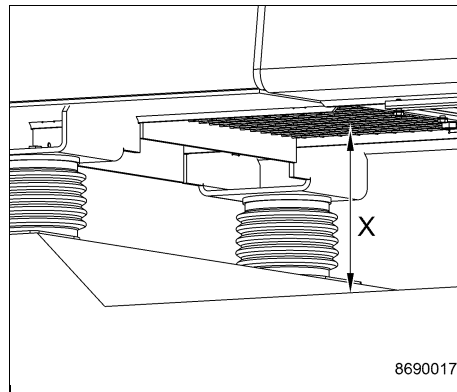


Fig. 34

View of sizes 1000 to 6000

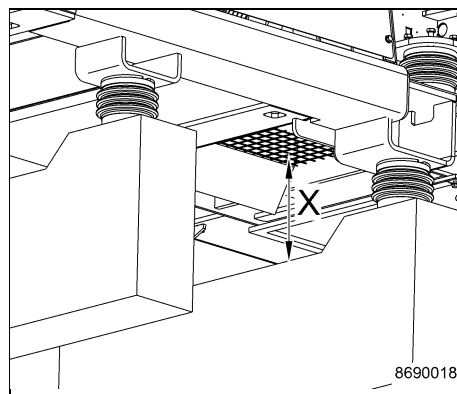


Fig. 35

View of sizes 7000 to 8000

6.21 Space requirements for draining the bowl bearing oil

To drain the spent oil from the bowl bearing, a minimum headroom of 250 mm must be kept free in the area underneath the oil drain plug (1) next to the solids and liquid discharge. This space is required for an oil collecting container and to provide access to the oil drain plug.

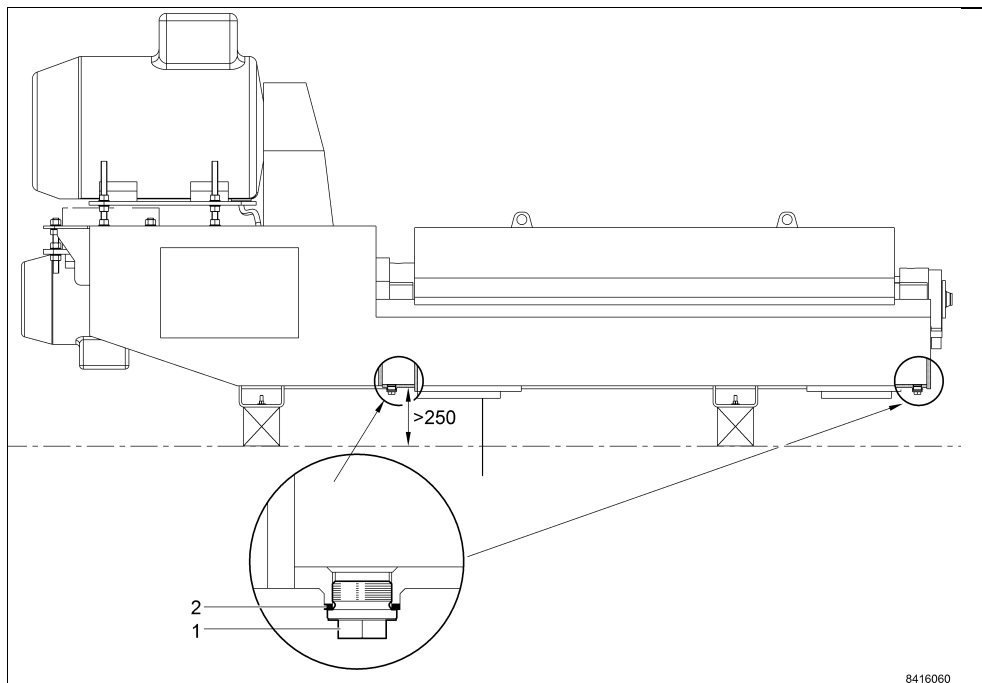


Fig. 36

IMPORTANT: Inspect gasket (2) for damage and replace if necessary.

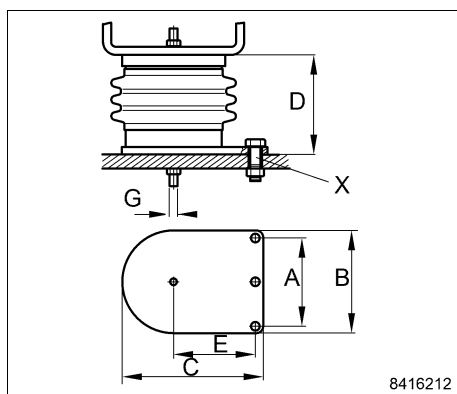
Alternatively, the two drain plugs in the frame can be removed and a hose pipe can be connected to discharge the used oil directly into a canister (hose pipe is not included in the scope of delivery of the centrifuge). The connection thread of the sleeve in the frame has a G1" female thread.

6.22 Viscosity damper

The viscosity damper can be fastened on the foundation or frame in two different ways.

- Via a centric screw.
This variant is suitable for steel frames.
- Via screws that are located at the side of the damper.
This variant is suitable for concrete foundations.

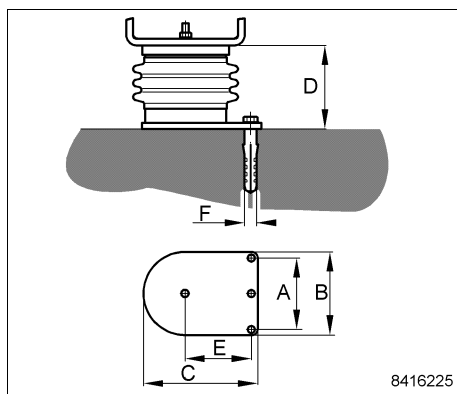
Connecting elements are not included in the supply schedule!



Fastening arrangement on a steel frame.

The lateral holes X can optionally be used.

Fig. 37



Fastening arrangement on a concrete foundation

Fig. 38

Main motor	A	B	C	E	F
depending on the design	The dimensions are given in the separate dimensioned drawing.				

6.23 Planning the frame/foundation

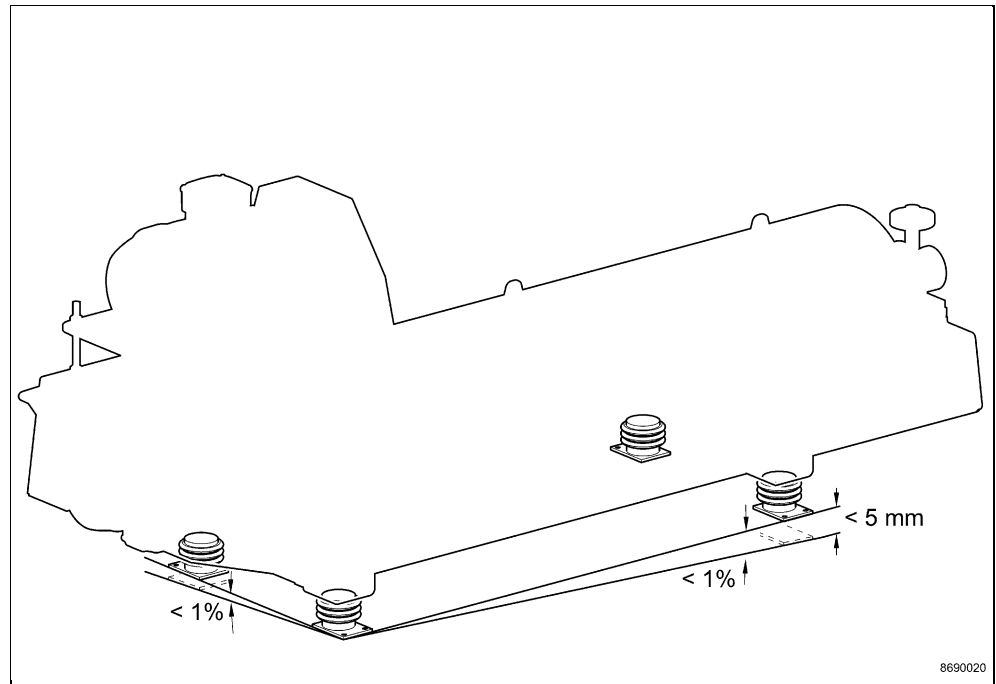


Fig. 39

- Comply with the building regulations of the country of operation.
- The foundation must correspond to the specifications. See load specifications and dimensions on the order-specific dimensional dimension sheet.
- The foundation must be designed so that no vibrations are transferred from the environment to the centrifuge.
- The supporting points must be of rigid, solid design in the form of a concrete structure or steel structure. Individual points of support must not give way under load.
- In order to minimise the introduction of vibrations of the centrifuge into the environment, the natural frequency of the frame must be outside the installation frequencies (details can be seen in the order-related dimension sheet) of the centrifuge and the operating speed range of the centrifuge. The margin from the first resonant frequency of the supporting frame to the maximum operating speed must be at least 30 %.
- A centrifuge must be installed as level as possible. The difference in height between the supporting points must be maximum 5 mm. Differences in height must be offset with shims at the supporting points.

6.24 Transporting the decanter

The decanter is checked in its completely assembled state. Depending on its size, the decanter is packed for shipping in one or several crates.

That notwithstanding, sets of tools or replacement and maintenance parts may be delivered in additional crates.

Decanter sizes 1000 to 4000 are delivered in one crate. For size 1000, the hydro pump unit as well as the oil-air cooler for the hydro pump unit are delivered in a separate crate.

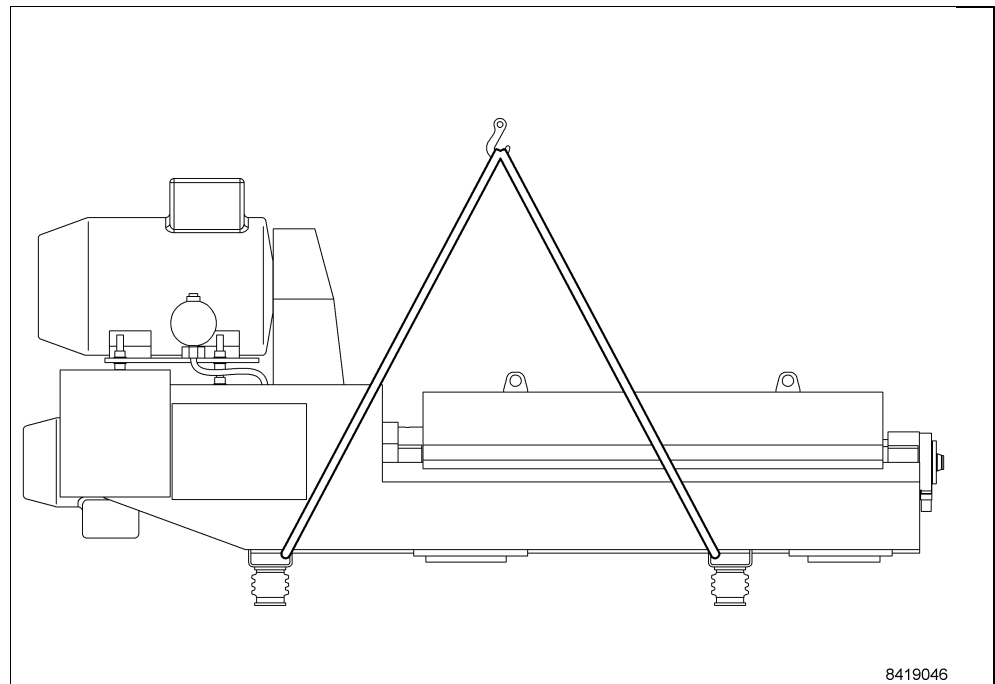


Fig. 40

Decanter sizes 5000 and 6000 are delivered in two crates. Note that the main motor is usually packed separately.

Decanter sizes 7000 and 8000 are packed and delivered in three crates.

- Drive frame with back drive motor (1)
 - The decanter frame with the top part of the catcher and installed bowl including the gearbox (2)
 - Main motor (3)
- Unpack the components in the given order.

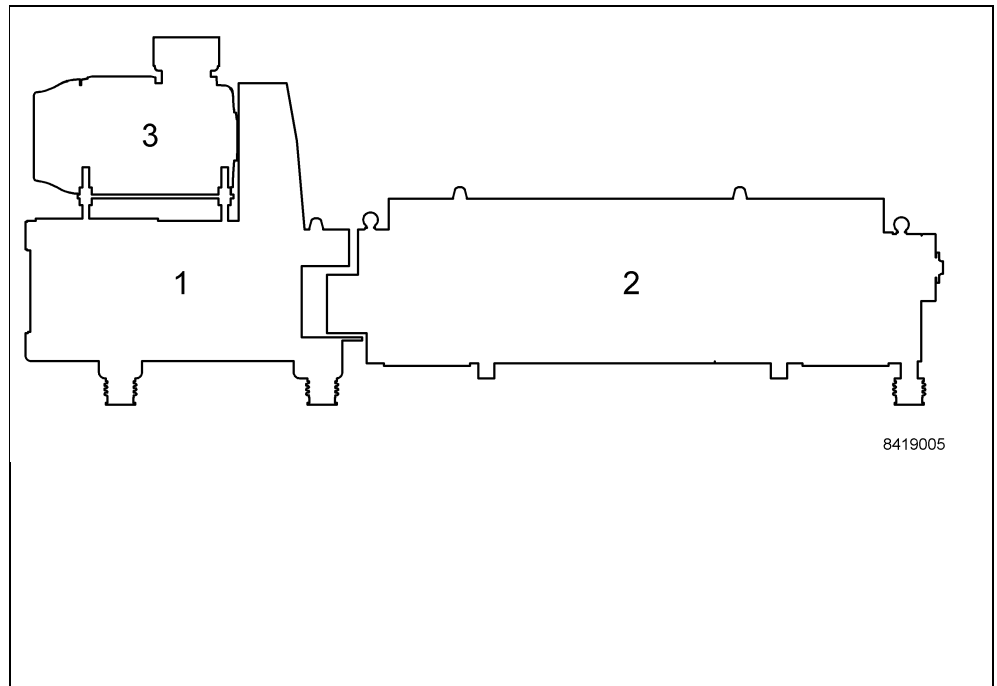


Fig. 41

Attaching hoists for decanters sizes 7000 and 8000

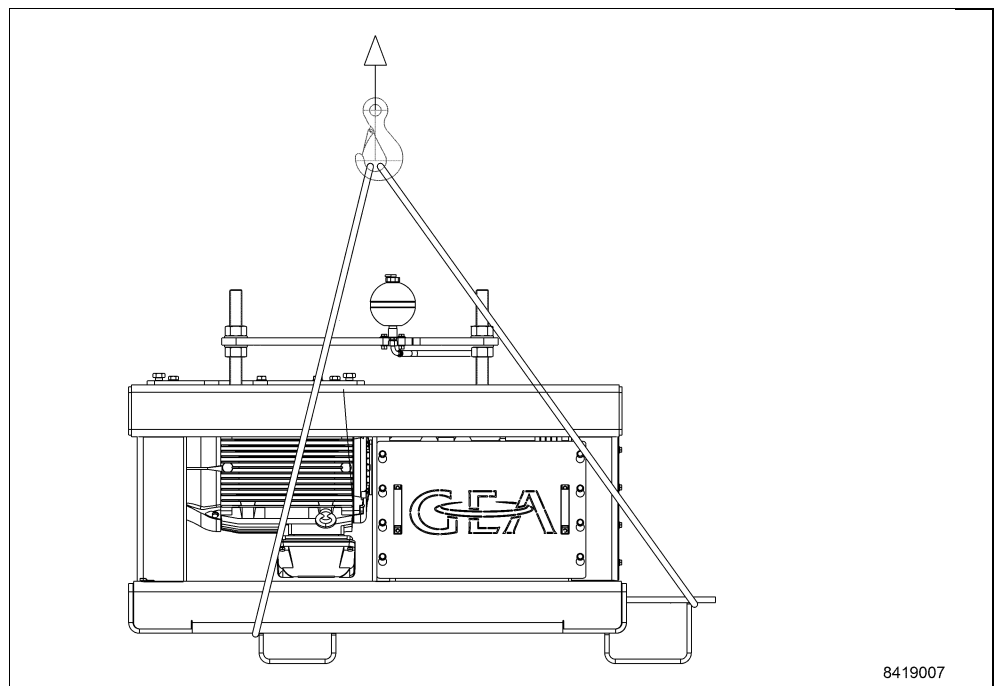


Fig. 42

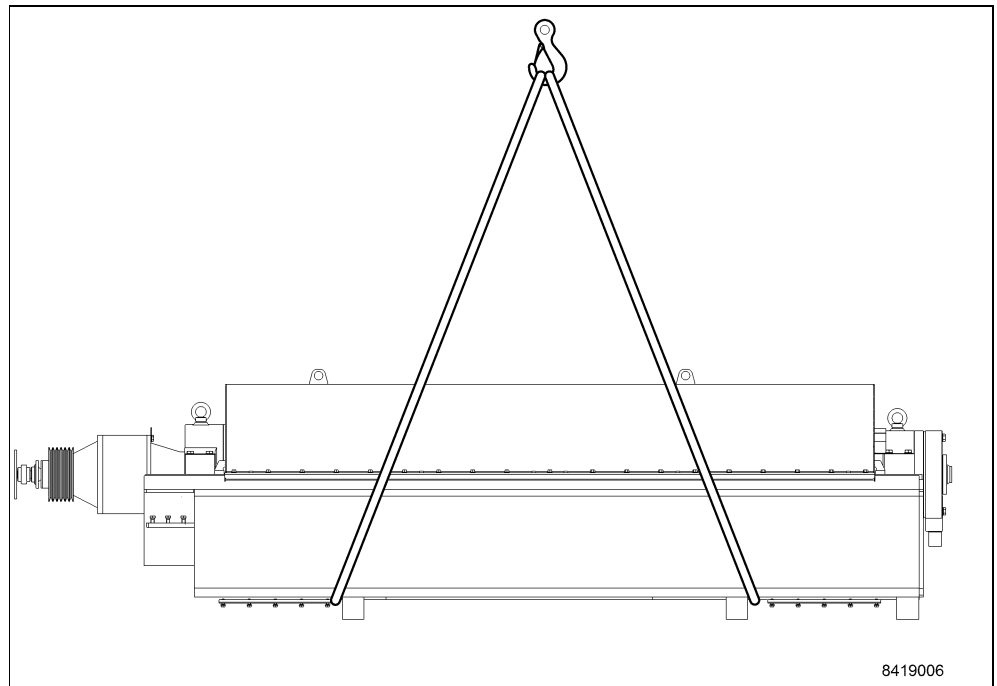


Fig. 43

6.25 Decanter installation and alignment

6.25.1 Installation and alignment of series CF 7000 to CF 8000 decanters



Fig. 44

- The film for the erection of decanters CF 7000 to CF 8000 can be found by following the QR Code.

<http://video.gea.com/installation-guide-for-2-part-decanter-frames>

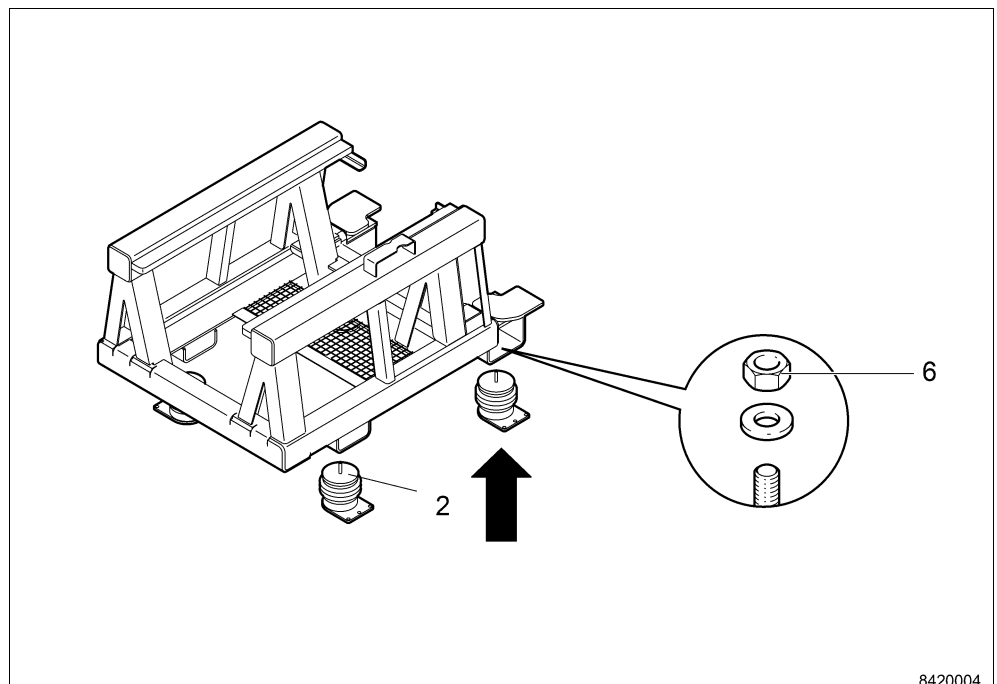


Fig. 45

- Fasten viscosity dampers (2) to the drive frame.

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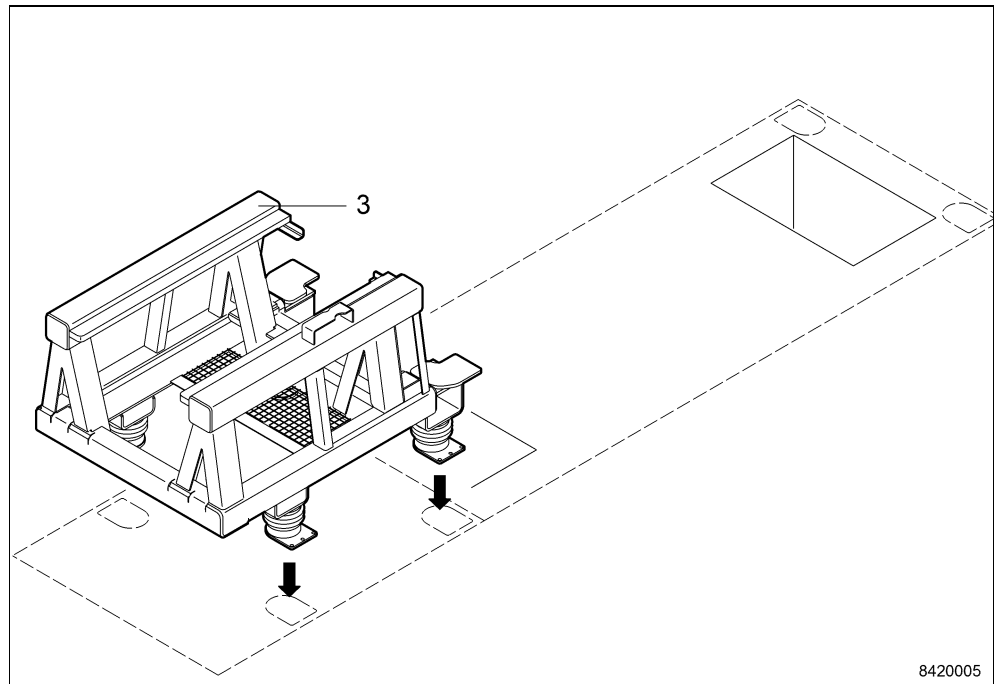


Fig. 46

- Sketch the erection points on the foundation.
 - Refer to the order-specific dimension sheet.
 - Pay attention to cut-outs for solid and liquid discharge.
- Erect the drive frame but do not yet fasten it.

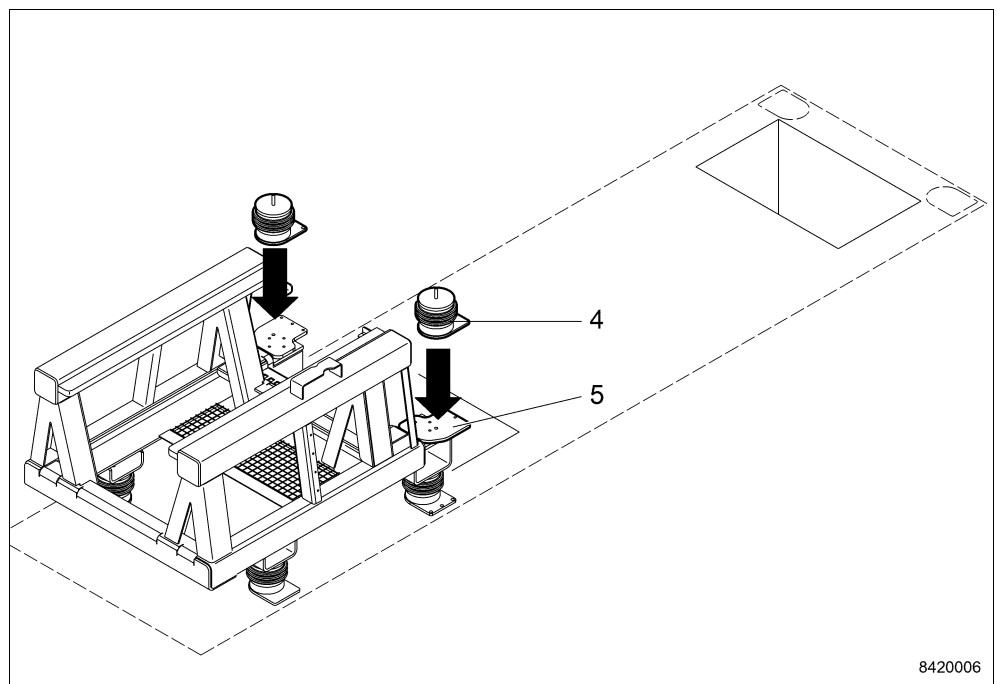


Fig. 47

- Fasten viscosity dampers (4) to drive frame (5).

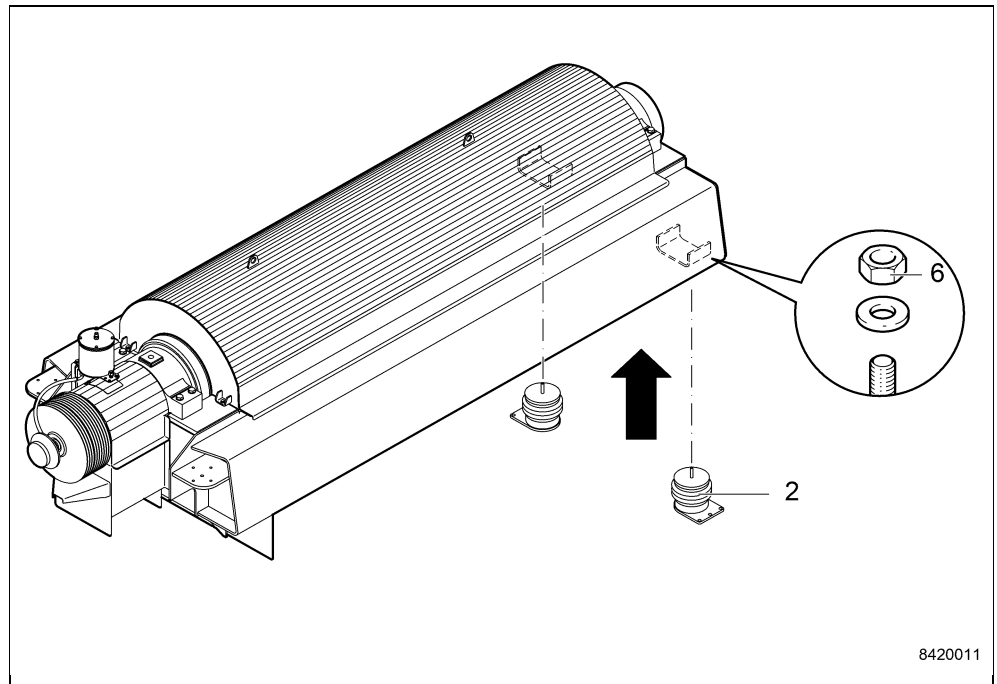


Fig. 48

- Fasten viscosity dampers (2) to the decanter frame.

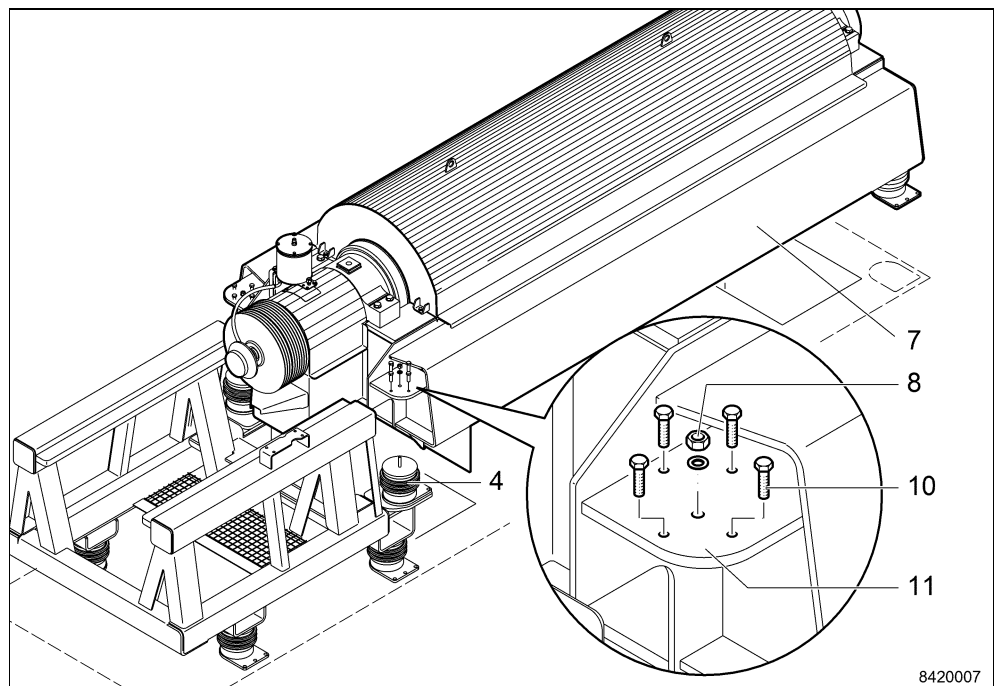


Fig. 49

- Screw screws (10) into the plates (11) of the decanter frame (7).
- Place decanter frame (7) on the viscosity dampers (4).
- Fit washers and nuts (8). Do not tighten the nuts yet (8).

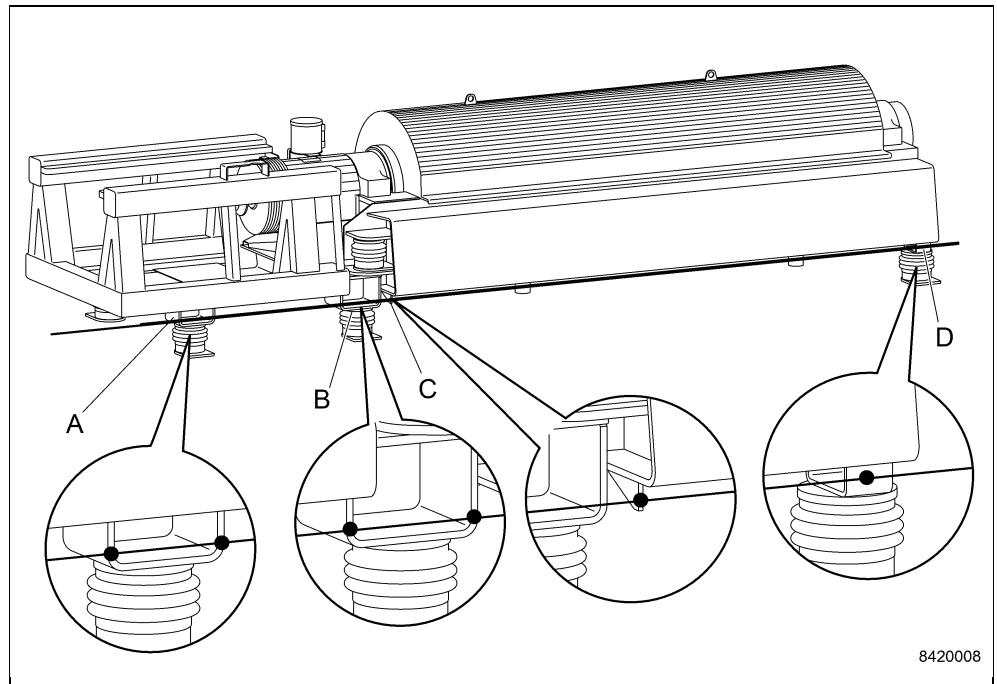


Fig. 50

Align the drive and decanter frame in the longitudinal axis.

- Align the drive and decanter frame so that both frames are in line with each other.
 - Attach a suitable cord at (A) and (D).
 - Align the frames until the points (A), (B), (C) and (D) rest against the taught cord.
- Screw the viscosity dampers to the base.

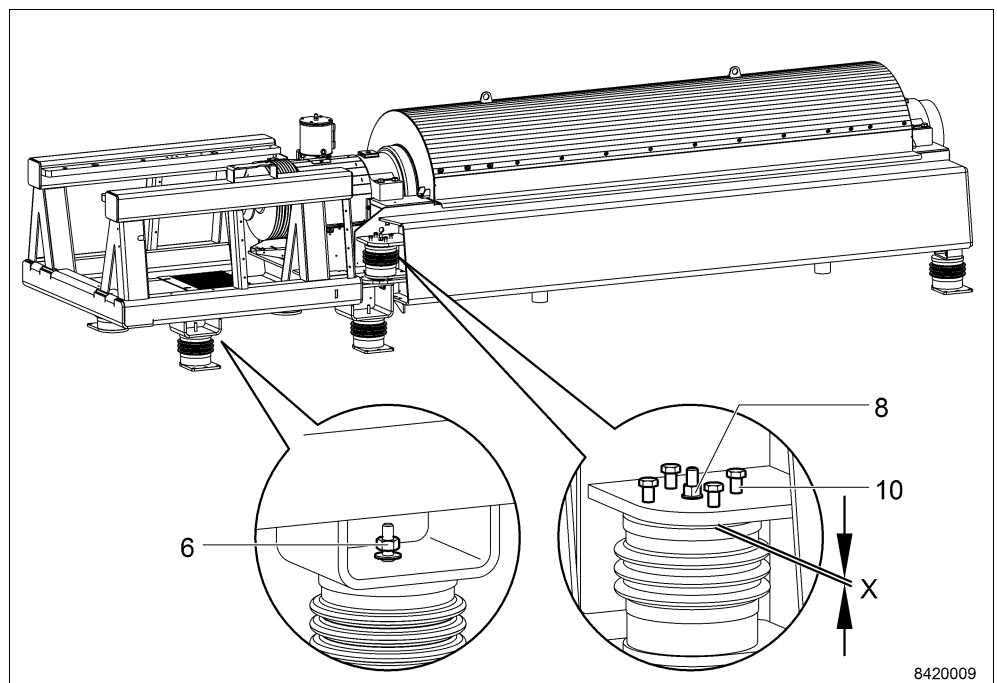


Fig. 51

Aligning the drive and decanter frame horizontally

- Use a suitable spirit level.
- The height of the decanter frame can be adjusted with the aid of screws (10).
 - The distance (X) must be identical on both sides.
- Tighten all nuts (6) and (8).

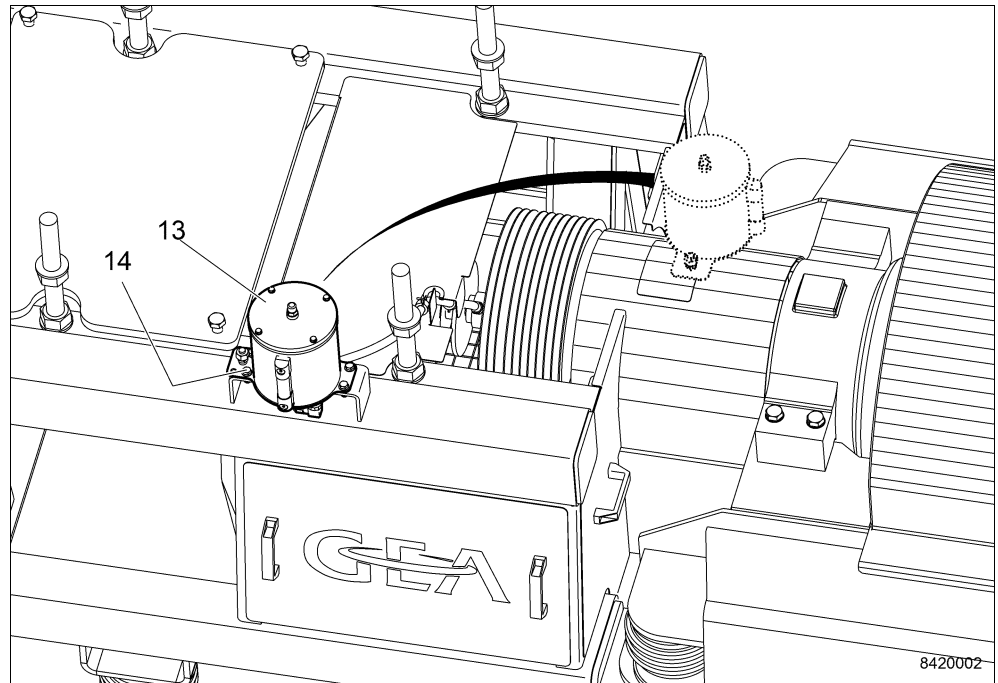


Fig. 52

- Move the oil vessel (13) from the decanter frame to the drive frame and fasten it. Remove the empty holder from the decanter frame.

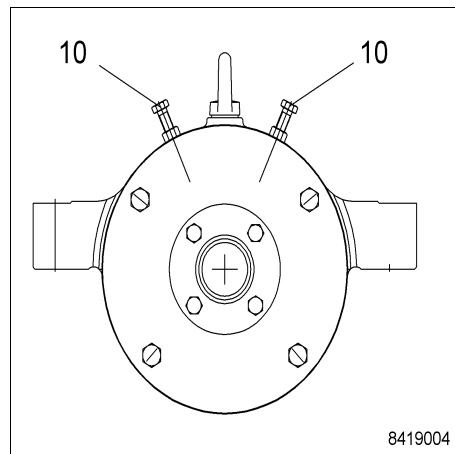


Fig. 53

- Undo all four bowl lock screws (10) and secure (solid side and liquid side).

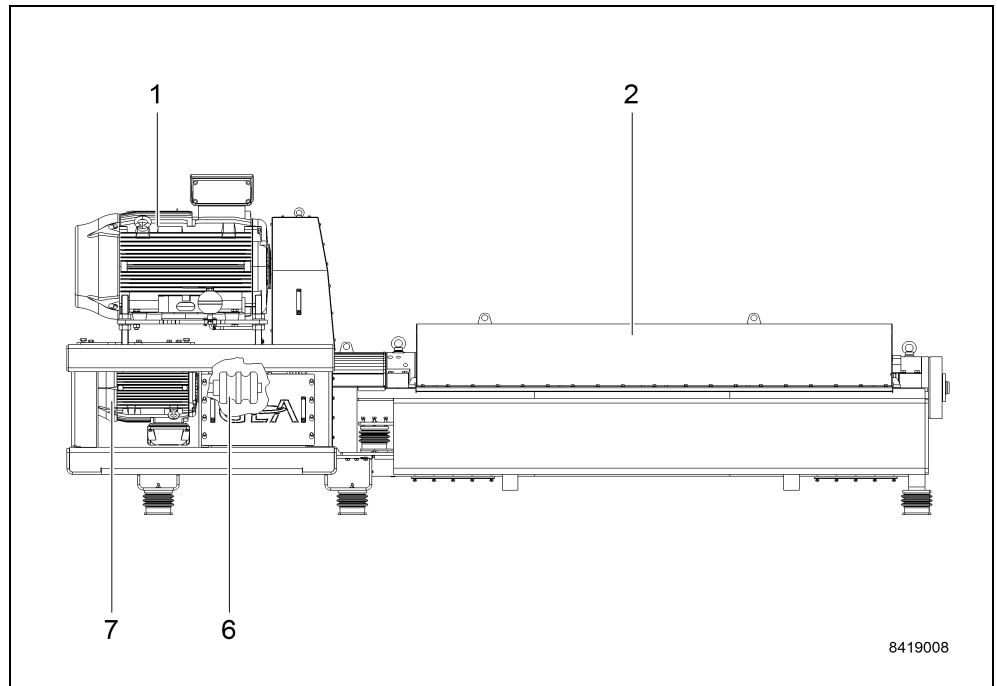


Fig. 54

- Fit main motor (1), see chapter "Servicing / fitting the main motor" in the decanter instruction manual.

6.26 Carry out voltage equalization

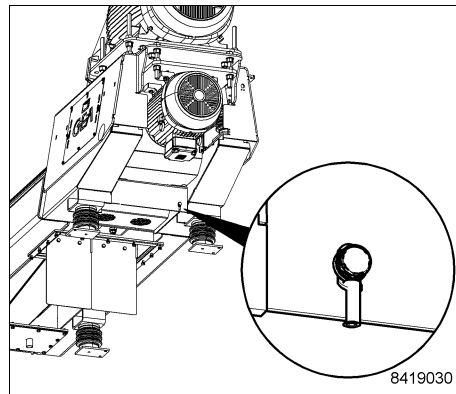


Fig. 55

- To ensure safe operation of the decanter, voltage equalisation **MUST** be carried out according to EN 60204-1.

Omitting voltage equalisation will have the following consequences:



Danger to life through electric voltage!

As soon as a live power line gets into contact with the machine housing, electric shock may occur.

- Measuring signals of monitoring devices can be distorted (e.g.: vibration monitoring, bearing temperature monitoring).
- Magnetism can give rise to bearing failure.

6.27 Decanter with supply cabinet

An optional supply cabinet is available for every decanter. It contains additional components such as the oil+air unit, or the control unit for Varipond P. The supply cabinet is used e.g. for sanitary applications or under extreme conditions.

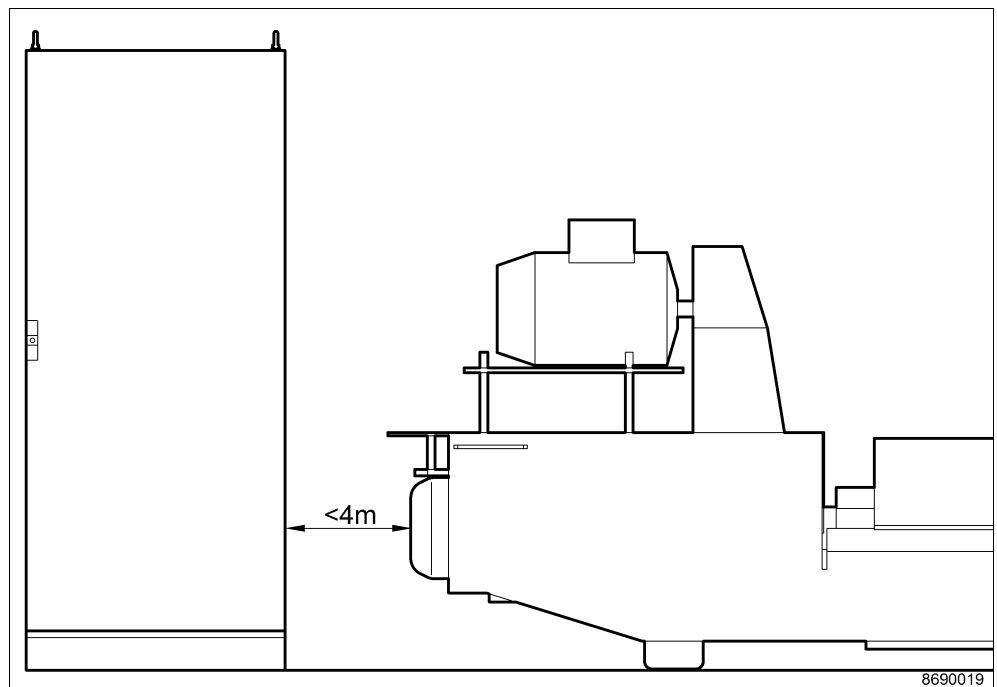


Fig. 56

The optional supply cabinet should be installed at a maximum distance of 4 m from the decanter.

NOTE: Larger distances would result in inadmissibly high pressure losses in the hoses of the oil-air lubrication.

6.28 Connecting three-phase AC motors

**DANGER**

Danger to life through electric voltage

Danger to life and limb through electric shock!

- The electrical connection of the three-phase a.c. motor may only be carried out by authorised specialists (e.g. electricians and high voltage electricians).
- The connections must be deenergised and secured against being energised again unintentionally.

Operation with frequency converter

- Never manipulate the frequency converter to exceed the permissible bowl speed (see nameplate).
- The machine may only be operated with an independent device for speed limitation.

Ceiling speed

- The ceiling speed is set to 5% above nominal speed.

Starting current

The required starting current with frequency converter corresponds roughly to the rated current.

In the case of controlled torque starting, 2 - 3 times the rated current is required as starting current.

Motor protection

If the motor is equipped with a PTC thermistor, it must be connected to the corresponding tripping device.

The measuring circuit line (between tripping device and motor) has to be laid separate from other lines.

6.29 Checking the direction of rotation of the motors

IMPORTANT! The direction of rotation must be checked without V-belts.

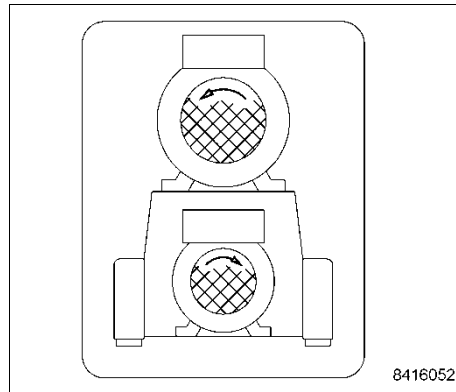


Fig. 57

- When looking at the fan, the primary motor must rotate counterclockwise.
- When looking at the fan, the secondary motor must rotate clockwise.

- The direction of rotation can be reversed by interchanging two lead-in wires in the motor control. Be sure to take into account the direction of rotation of auxiliary units.



DANGER

Danger to life through electric voltage!

Danger to life and limb through electric shock.

- The electrical connection of the three-phase AC motor may only be performed by authorized specialists, e.g. electricians and high voltage electricians.
- Power must be shut off to the connections and it must be ensured that it cannot be switched back on.

6.30 Connecting the control unit

Connecting the electrical system

- Comply with the local regulations for electrical systems and equipment.
- The frequency and voltage of the power supply must correspond to the circuit diagram.
- Install equipotential bonding.
- Observe statutory regulations, e.g. EC Directives in the EU.

Main switch on the control cabinet

Precise information on the position of the main switch on the control cabinet can be found on the circuit diagram.

The control cabinet is installed according to the specifications of the plant operator. The position of the control cabinet with the main switch must therefore be taken from the operating manual of the operating company.

Positioning the EMERGENCY STOP button

EMERGENCY STOP buttons are located on the control cabinet.

Precise information on the position of the EMERGENCY STOP buttons can be found on the circuit diagram.

The control cabinet is installed according to the specifications of the plant operator. The position of the EMERGENCY STOP switches must therefore be taken from the instruction manual of the plant operator.

Additional EMERGENCY STOP switches must be installed on site if the control cabinet is not installed in the direct machine environment.

Additional EMERGENCY STOP switches may be required in the plant in which the centrifuge is integrated. They must be installed based on the risk assessment of the plant operator. The EMERGENCY STOP function of the centrifuge must, if necessary, be integrated in a shut-down concept of the plant or of plant components.

6.31 Connecting the feed and discharge line assemblies

Checking the feed line installation

When product feed pipes have been installed by welding, it must be ensured that the inside of the pipes have been deburred and cleaned at the welds.

This work must be carried out by the executing persons or the assigned company after completion of the installation work and must also be documented.

NOTICE

Foreign bodies in the feed installation, e.g. metal fines from welding

If the above is not observed, metal fines can enter the bowl and damage gaskets and other bowl parts.

Downtime of the centrifuge and high repair costs would be the result. GEA Westfalia Separator accepts no liability for damage caused in this way.

- Check that all feed lines are clean and deburred.

If the pipes have already been installed and bolted tight, request an acceptance report from the equipment manufacturer confirming that the pipes were deburred, cleaned and tested upon completion of the installation work.

Feed and discharge line assemblies

- Install the feed and discharge lines flexibly to avoid the transfer of vibrations, e.g. by means of U-shaped conduits.
- Close the feed and discharge lines to reduce noise development.
- Valves and pumps must be adapted to the product.
- Install feed and discharge assemblies separately from the centrifuge.
- The feed line must be provided with a shut-off device so as to be able to interrupt the product supply in case of operating malfunctions.
- The feed line should enable uniform product supply with a constant solids content

7 Settings

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7.1 Changing speeds

The choice of belt pulleys depends on the product. If a change in speed is desired, please contact GEA Westfalia Separator.

7.2 Altering the bowl speed (frequency converter)

The main motor can also be fitted with an optional frequency converter. The bowl speed can then be infinitely adjusted within certain ranges via the frequency converter.



Danger to life due to excessively high bowl speeds



Fig. 58

- Never manipulate the frequency converter to exceed the permissible bowl speed (see nameplate).
- The machine may only be operated with an independent device for speed limitation.

The maximum frequency represents the maximum bowl speed attainable with the fitted pair of belt pulleys.

The bowl speed is proportional to the frequency of the primary motor.

Important: The differential speed also changes even though the frequency on the secondary frequency converter has not been changed.

7.3 Altering the differential speed (frequency converter)

The differential speed can be altered by reducing/increasing the frequency at the secondary frequency converter.

The maximum frequency represents the maximum differential speed attainable with the fitted pair of belt pulleys.

Four differential speed ranges are available.

- In the lowest differential speed range, the gear shaft is arrested with a torque arm.
- In the other differential speed ranges, the shaft of the gear is connected to the main motor via a V-belt drive.

7.4 Mounting and adjusting the speed sensors

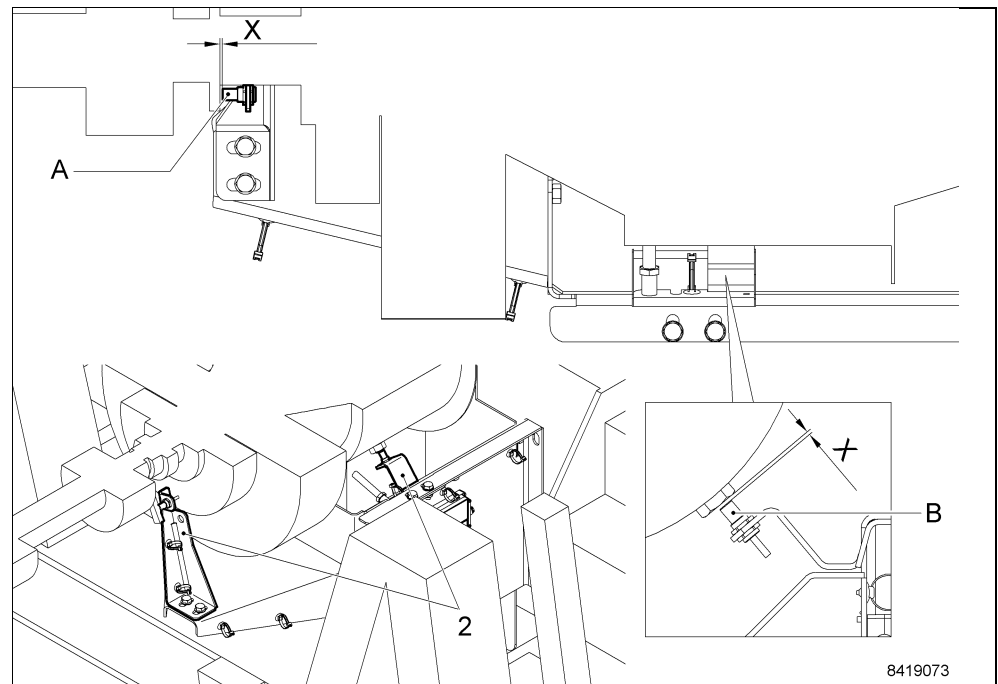


Fig. 59

- Fit holders (2) on the frame and in the lower part of the air chute.
 - Pulse **gear input (A)**
 - **Pulse** Exchangeable pulley **(B)**.
 - Pulse bowl (C)
- Align the holders for the speed sensors.
 - Required clearance $X = 2.5 - 3.5\text{mm}$ If the distance is too large, it could cause incorrect speed evaluations.

7.5 Adjust/check the gearbox temperature monitoring device.

Optionally, the gear temperature can be monitored by means of infrared measurement.

No adjustment work is required.

The protective tube (1) must be checked regularly for soiling.

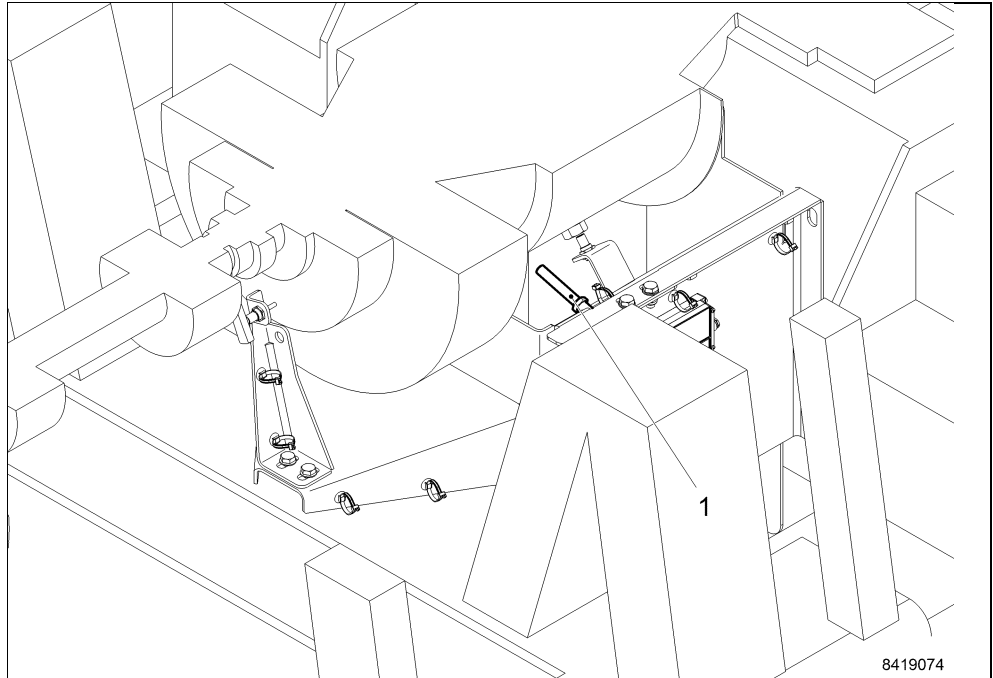


Fig. 60

7.6 Regulating ring

The regulating ring determines the overflow diameter of the bowl.

The overflow diameter can be altered by exchanging the regulating ring to adapt the machine to the respective process by varying the clarifying and drying efficiency.

7.6.1 Removing the regulating ring



Danger to life through high-speed rotating machine parts !

- Do not loosen any part of the machine before the decanter bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional switching-on.
- Do not start maintenance work until the components have cooled down to room temperature. Depending on the application and product temperature, the cooling phase can take up to 2 hours.

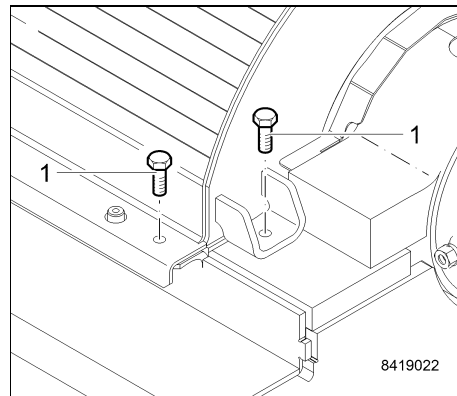


Fig. 61

- Unscrew screws 1. Remove protective hood.

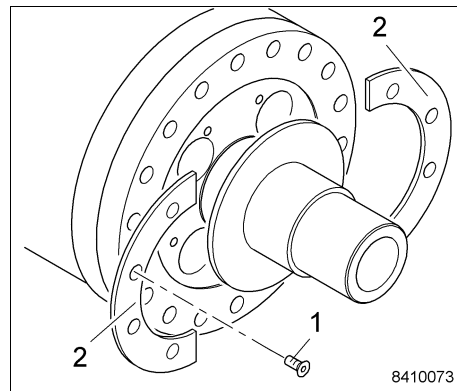


Fig. 62

- Unscrew screws 1.
- Remove regulating ring segments 2.

7.6.2 Fitting the regulating ring

➤ Clean all parts carefully. Replace worn or damaged parts immediately.

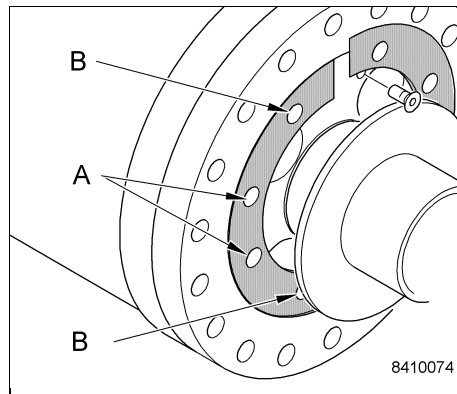


Fig. 63

- Mount the ring halves so that the joints are not located over an ejection port.
- Tighten first screws (A), then screws (B).

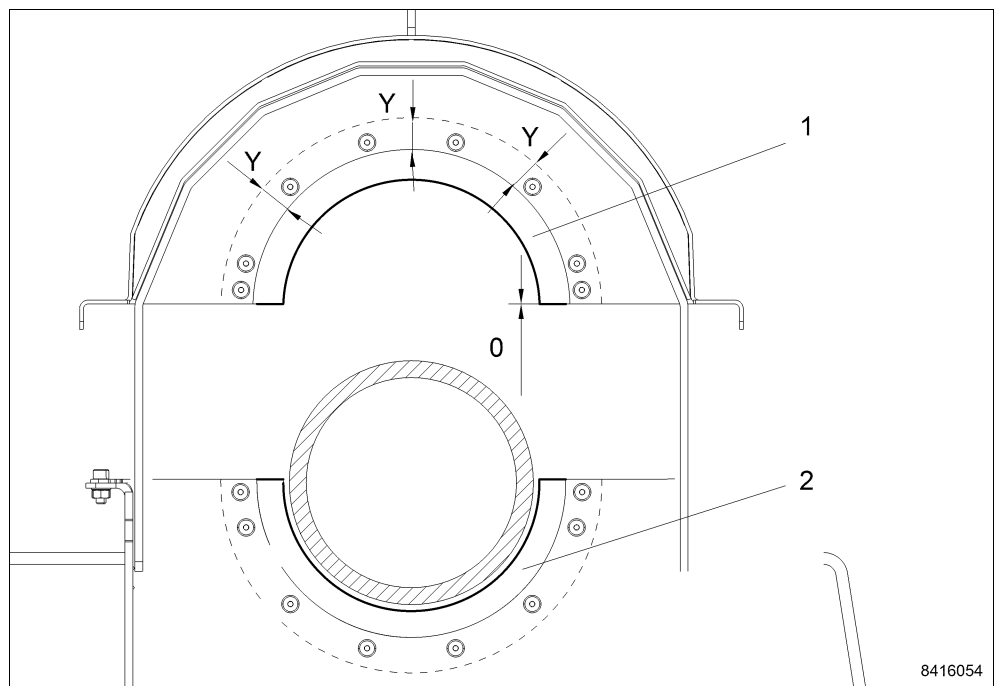


Fig. 64

- Check the seat and condition of the ring halves (1) and (2). Refer to chapter "Maintenance / Aligning ring halves".
- Mount the protective hood.

8 Commissioning

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8.1 Safety during commissioning

Initial commissioning

Commissioning of the centrifuge after erection and installation may only be carried out by specialists from GEA Westfalia Separator or authorized service partners.

Non-professional execution of commissioning by unsuitable personnel can lead to accidents with personal injury and property damage.

When commissioning, observe the following points:

- Assign only trained and authorized specialist with the task of commissioning.
- Only use water instead of the product during commissioning.
- Eliminate faults during commissioning immediately, e.g. leaky pipe joints.
- Check the function of all safety and protective devices, identify faults and eliminate them immediately.

Before every start-up

Operate the centrifuge after maintenance or repair work only when no defects are present which could endanger safe operation.

The plant operator is responsible for ensuring that necessary tests are carried out properly.

take care of the following points before starting the centrifuge:

- Check that all screwed connections are tight.
- Check the "0"-marks on the bowl parts.
 - The "0" marks must be aligned.
- Check oil filling of the gearbox, see chapter "venting the gearbox (without circulation lubrication) or filling in gear oil (with circulation lubrication).
- Check the direction of rotation of the centrifuge.
 - The direction of rotation must correspond to the direction of rotation arrow on the frame.
- Check connections, pressures and temperatures of the product, the operating materials and utilities.
- Eliminate all faults detected prior to starting.

8.2 Checking the starting time of the bowl

- The target values for starting time and operating speed are specified in the order-specific datasheet.
- Make sure that the bowl reaches the specified operating speed within the starting time.

8.3 Checking the run-down time of the bowl

The run-down time of the bowl is the maximum time span required from switching off the centrifuge to standstill of the bowl. It can be found in the datasheet.

The run-down time specified in the datasheet refers to the operating speed with free run-down and at atmospheric pressure. The operating speed is specified on the nameplate of the centrifuge

The filling level of the bowl and various process factors can influence the run-down time of the bowl.

8.4 Checking the direction of rotation of the bowl

The bowl must rotate clockwise when looked at from the feed side.

- Pay attention to the direction of rotation arrows on the drive motors.

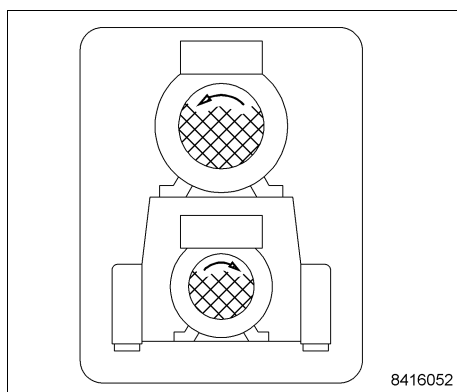


Fig. 65

- The motor fans must run in the direction of the arrows.
- If this is not the case, the electrical connection must be checked.



DANGER

Danger to life through electric voltage!

Danger to life and limb through electric shock.

- The electrical connection of the three-phase AC motor may only be performed by authorized specialists, e.g. electricians and high voltage electricians.
- Power must be shut off to the connections and it must be ensured that it cannot be switched back on.

8.5 Commissioning check list

Operator: Trained specialist

When must the check list be worked off:

- Before commissioning the centrifuge
- When re-starting after repairs and a long standstill period

Documents

Decanter instruction manual is available.	
Data sheet according to EN 12547 is available.	
Lubrication and maintenance schedule is available.	
Spare parts list is available.	
Instruction manuals for optional auxiliary equipment are available, e.g:	
- Decanter control / decanter monitoring	
- Automatic lubrication system	
P&ID is available.	
Order-specific dimensioned drawing is available.	

Centrifuge

Centrifuge has been installed and assembled to the specifications.	
Bowl is fitted and can be rotated by hand.	
Safety stickers are complete, attached properly, are clean and legible.	
Feed and discharge connections are fitted correctly and the screwed connections are tight.	
Frame drains are free.	
Lubricating oil is filled in as per lubrication schedule and oil level is correct.	
For circulation lubrication for the gearbox: The gearbox itself was filled with oil and is completely filled.	
Monitoring equipment is mounted connected electrically to the control system.	
Limit values for pressurized hoods, concentrate catchers and vessels are set correctly.	
Bowl locking screws are loosened and secured.	
Transport lock of the drive loosened and secured.	

Product paths

Feed lines are deburred and cleaned or acceptance report of the plumber.	
The product feed does not leak.	
The product corresponds to the specifications on the nameplate.	
Operating pressures prevail.	
Temperature is correct.	

Supply lines

Electrical connections for fittings are properly connected.	
Option: Air supply for oil+air lubrication is connected.	

Cooling and purging water

The purging water lines are connected and operational (special request).	
Option: The cooling water pipe to the mechanical seal is connected and operational.	
Option: The water pipe for the hydrohermetic seal is connected and operational.	
Option: The cooling water pipe to the oil circulation lubrication system is connected and operational.	

Control unit

Electrical connections have been executed professionally.	
Protective devices function, e. g. light barriers or switches on protective covers.	
EMERGENCY STOP and EMERGENCY OFF buttons are in the intended places and are functioning.	
Optional monitoring equipment is connected and functioning, e.g. <ul style="list-style-type: none"> - speed monitoring, - vibration monitoring, - temperature monitoring, - flow rate meter, - oil flow monitoring, - temperature displays - pressure displays. 	
The bowl speed is correctly set.	
Torque factor (decanter factor) is correctly set.	
Safety switching circuits and alarms have been tested and are functional.	

Electric motor

Transportation locking device has been removed (if fitted).	
Connection values on the motor nameplate match the specifications on the centrifuge nameplate and the connection values of the local power supply.	
Electrical connection has been executed professionally.	
Directions of rotation motors/bowl are correct.	

8.6 Carry out test run

IMPORTANT: Commissioning entails risks since hidden faults may not emerge until the decanter is started.

If the product is problematic, it is recommended to carry out the commissioning test run with water or an inert medium.

- Check that all speeds and limit values are adjusted correctly on the decanter control. Refer to the control unit instruction manual.
- Start the decanter, see chapter "Operation / Switching on the decanter".
- Feed water to the decanter.
- Check the installation for leaks.
- If unusual noises occur, shut down the decanter immediately.
- Let the decanter run for 30 minutes.
- Shut down the decanter.
- Option: Check tightness of oil circulation lubrication system of gearbox.

8.7 Preparing for re-starting

Before a prolonged shut-down of the centrifuge, various storage measures have been carried out. Machine parts have been dismantled and stored separately, e.g. the bowl.

Permanent corrosion protection for drive parts with the specified slushing oil can be guaranteed for a maximum of 1 year.

When the centrifuge is put back into operation after a long standstill period, the following operations and tests must be performed:

- remove packaging and covers.
- Strip down the bowl and check the bowl parts for corrosion damage. In case of doubt, have the bowl parts checked by service personnel from GEA Westfalia Separator.
- If the centrifuge has been in storage for longer than one year, carry out the steps specified in the maintenance schedule (machine out of operation for prolonged period).
- Check the shut-off devices for functionality and leakage.
- Re-connect the feed lines if they were disconnected before decommissioning.
- Open valves for product feed line and discharge lines.
- If appropriate, carry out a test run with water as described in the section "Performing a test run".
- Only in case of grease-lubricated bowl bearings:
 - Displace surplus grease out of the bearings with the aid of compressed air.
 - Perform this action when the machine is rotating slowly.
 - Too much grease in the bearings can lead to inadmissibly high bearing temperatures.

8.8 Start the centrifuge at operating state temperature

Centrifuges with three-phase AC motors which are controlled by a frequency converter can be re-started at all times. This does **not** apply for motors featuring controlled torque starting.

NOTICE

Heating on centrifuges with motors for controlled torque starting

A centrifuge with motor for controlled torque starting is started with a high current consumption. This can result in overheating of the coupling and the three-phase AC motor.

- Do not re-start centrifuges with motors for controlled torque starting at operating state temperature until after a cooling off time of 60 minutes.

9 **Operation**

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9.1 Safety during operation

Operating a centrifuge can involve risks when the operator does not operate the centrifuge correctly in accordance with its intended use.

The plant operator is responsible for ensuring that necessary checks are done carefully and suitable personnel are deployed.

- Follow the operating instructions.
- Operate centrifuges only when no defects are present which could endanger safe operation.
- Operate the centrifuge only for the intended purpose and in accordance with the agreed process conditions.
- Operate the centrifuge only at the bowl speed specified on the nameplate and in the datasheet.
- Use only qualified personnel, see chapter "Safety precautions / Qualification of the personnel".



Fig. 66

- Wear ear protection.

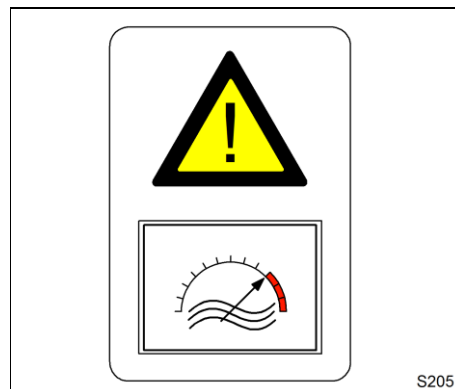


Fig. 67

In case of frequency converter operation:

- Never manipulate the frequency converter to exceed the permissible bowl speed (see nameplate).
- The machine may only be operated with an independent device for speed limitation.



Fig. 68

- Some plant components can get very hot.
 - In normal operating conditions, this applies, for example, to the bearing housing.
 - In hot operating conditions, this particularly applies to parts coming in contact with product (e.g. pipes and hoses, catchers).

If the hot surfaces are readily accessible, warning signs must be attached for the protection of personnel.

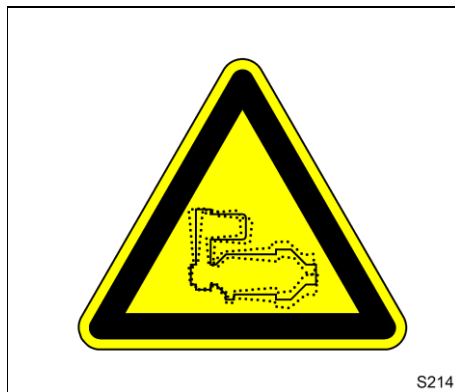


Fig. 69

- Shut down the centrifuge immediately when unusual noises, vibrations or overheating occur.
- Evacuate the room.

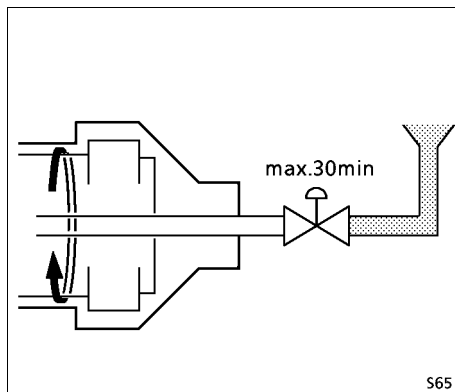


Fig. 70

- The bowl is not allowed to run without liquid supply for more than 30 minutes, as otherwise it would result in overheating of the bowl material.

9.2 What must be kept in mind when using third-party controls?

The decanter is normally operated with controls from Westfalia Separator. these control systems ensure safe operation and protect the decanter from damage due to overload.

This instruction manual assumes in the sections “Machine description” and “Operation” that the decanter control has been delivered by Westfalia Separator.

If the decanter control has not been delivered by GEA Westfalia Separator, a number of requirements must be met by the control system to guarantee at least an adequate standard of safety.

The following list is **not complete** since the complete working process including all relevant parameters and limits must be taken into account to ensure safe and optimum operation of the decanter.



DANGER

The maximum bowl speed must not be exceeded under any circumstances (see nameplate).

In the case of non-compliance, there is a risk of damage to persons and property.

NOTICE

The variable speed motor may only transfer the maximum admissible torque for the scroll drive.

This can in individual cases mean that the torque is significantly below the possible torque of the variable-speed motor.

- The control system must limit the effective torque of the variable-speed motor (secondary drive) as otherwise the scroll drive will get damaged.
- The admissible speed ranges must be observed.
- The admissible torque is project-specific and can be inquired from the responsible business line.

9.3 Immediate action in case of power outage

If the voltage is interrupted for more than one second during operation, “Emergency Stop” is activated:

All drives (such as the main motor) are switched off directly. Flush valves or valves of the oil-air lubrication remain active and can be controlled by the programme.

If the installation is not shut down automatically by the control, the operator must do the following:

- Close valve at product feed.
- Open the discharge to the sewer and all other discharge valves.
- Secure the plant against unintended restarting with locking devices.

9.4 Pre-lubricating bowl bearings

Only required in the case of decaners with oil+air lubrication of the bowl bearings.

- Whenever the bowl bearings or lubricating lines have been replaced, pre-lubrication of the bowl bearings must be triggered manually on the decanter control unit.
- Pre-lubrication is started via the corresponding menu item on the decanter control unit.
- The factory setting for pre-lubrication is 60 minutes.
- Pre-lubrication can be terminated at any time.
- The decanter doesn't start automatically after the pre-lubrication time has elapsed.

9.5 Switching on the decanter

- Switch on main switch of main control. Push the button "Decanter Start".
- Switch on auxiliary equipment, e.g.
 - metering pump for flocculent,
 - conveying equipment for liquid and solids (screw conveyors, conveyor belts etc.)

The auxiliary equipment must be electrically interlocked with the decanter so that these units are running when the decanter starts. The product feed must be cut off when one of these units fails.

- Wait for the starting time to elapse.

Make sure that the speed stated on the nameplate is reached within the specified start-up time and maintained during operation.



DANGER

Overspeed poses a high safety risk

- Shut down the decanter immediately when the max. admissible rated bowl speed is exceeded by more than 5 %.
 - The max. admissible bowl speed is specified on the decanter nameplate or the technical datasheet.
- Set control settings on the decanter monitoring unit
 - Basic differential speed
 - Control gradient
 - Control begin
- Open the product feed and adjust the desired throughput capacity.

9.6 Operation

The machine is monitored to a large extent by the decanter control unit.

The only parameter that can be changed during normal operation is the control begin.

- In the case of poor clarification results: Adjust the control begin downwards.
- In the case of poor solids drying results: Adjust the control begin upwards.

When faults occur (power failure, gear overload etc.), the product feed must be automatically cut off and the flush water line opened.

Operations to be carried out regularly:

- Keep to the “Lubrication and maintenance schedule”. The “Lubrication and maintenance schedule”, though a separate document, is part of the machine documentation.
- Repairing the scroll: If the wear is extensive, the scroll must be reconditioned or replaced. Excessive wear to the scroll is indicated by, for example:
 - frequent speed increases of the secondary drive
 - increased residual moisture in the discharged solids
- Check for wear. If the erosive effect of the product is unknown, we recommend checking for wear every 500 operating hours. Concentrate especially on:
 - Conveyor screw
 - Components in the solids discharge
 - Catch chamber.
- Inspection: We recommend having your decanter inspected by our specialists at regular intervals. These services help
 - to maintain the operating reliability and safety of your decanter and
 - undesirable production stoppages are avoided.

IMPORTANT! A deterioration in the processing efficiency of the decanter can also be caused by changes in the product.

9.6.1 Operation with vibration monitoring equipment

Vibration monitoring is a central component of the protection concept for the decanter.

This device determines the effective vibration speed (RMS in accordance with ISO 2372) and therefore enables an objective monitoring of the decanter vibration behaviour.

The vibration monitoring devices must be set in accordance with the data sheet. The data sheet is an integral part of the machine documentation.

9.7 Recommendations for cleaning after production

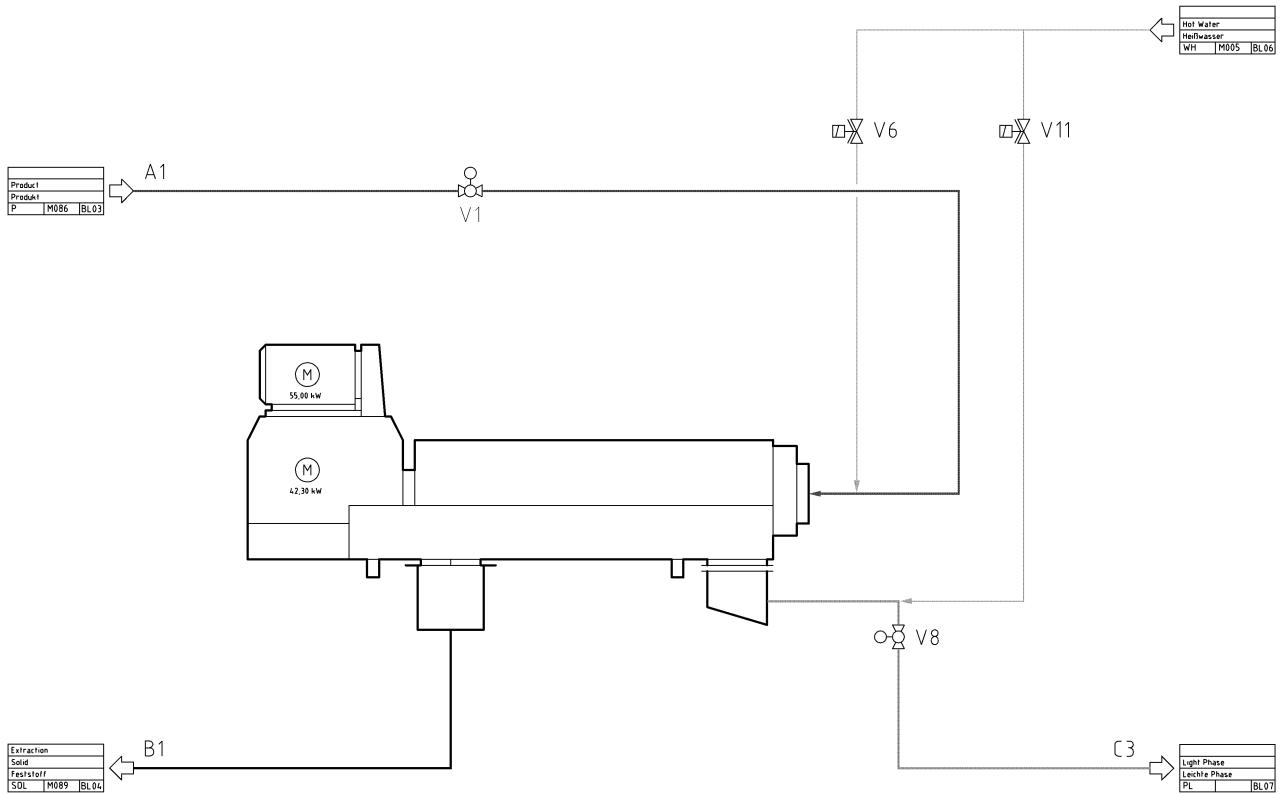
After production, product residues must be removed from the bowl with water. For this purpose, before each stop of the machine, it is advisable not only to flush to displace the product at bowl speed, but to perform a flush cycle at a lower bowl speed.

Purpose of the cleaning:

- Reduction of product residues in the bowl
- Reduction of vibrations due to dried product residues

9.7.1 Shut-down program – P&ID flow chart

P&ID shut-down program



8416506

Fig. 71

V1	Inlet valve
V6	Water inlet valve
V8	Product discharge valve
V11	CIP valve outlet

9.7.2 Throughput

The feed capacity of the centrifuge during production must be below the maximum permissible feed capacity of the centrifuge.

During the shut-down process, the cleaning solution drains through the liquid side and solid side.

The discharged amount of the solid side depends on the throughput, bowl speed and weir diameter.

- High throughput results in more discharge from the solid side.
- Low bowl speed results in more discharge from the solid side.
- Small weir diameter results in more discharge from the solid side.

The inlet flow rate at the upper flushing speed must be reduced for backflushing by centripetal pump or Varipond S.

Decanter size	Max.inlet flow rate at upper flushing speed for back-flushing	
1000	1.5 m ³ /h	7 gpm
3000	2.5 m ³ /h	11 gpm
4000	3.5 m ³ /h	15 gpm
5000	4.5 m ³ /h	20 gpm
6000	7 m ³ /h	31 gpm
7000	10 m ³ /h	44 gpm
8000	14 m ³ /h	62 gpm

9.7.3 Recommended standard procedure

Important information

- The cleaning process can be adapted to the production process, for example:
 - Changing the cleaning period
 - Change the number of flush intervals
- Make sure there is a sufficient amount of flushing medium to guarantee that flushing functions properly.

The entire cleaning (1) after production consists of flushing and shutdown program (A). The times and speeds are to be taken from the decanter settings (decanter setting values).

Flushing:

Flushing serves to displace residual product from the bowl at operating speed (n4).

- The inlet is closed (V1).
- The outlets are opened (V8).
- The flushing inlet valve is opened (V6).
- The time "flush feed" is serviced.
- After this, the flushing inlet valve is closed.

Shut-down program:

The shutdown program is used to flush the decanter bowl via a flush feed with liquid. This takes place at low speeds to achieve a more effective flushing effect.

- The flush liquid (V6) supply is opened. The drive is switched off, the speed drops.
- When the speed of the flushing inlet valve (n2) is reached the supply of flushing liquid (V6) is closed.
- The bowl drive stops.
- After this, the decanter is run again at the upper flushing speed (n3).
- Here, the supply of flushing liquid (V6) is opened.

(The amount of fluid supplied should be at least equal to the bowl volume.)

- After expiration of the upper flushing duration, the bowl drive stops.
- When the speed of the flushing inlet valve (n2) is reached the supply of flushing liquid (V6) is closed.
- The lower flushing speed (n1) is kept to improve the cleaning result for a lower flushing duration.
- The bowl drive stops.
- The cycle (Ax) is repeated depending on the product.

Standard procedure in graphical form

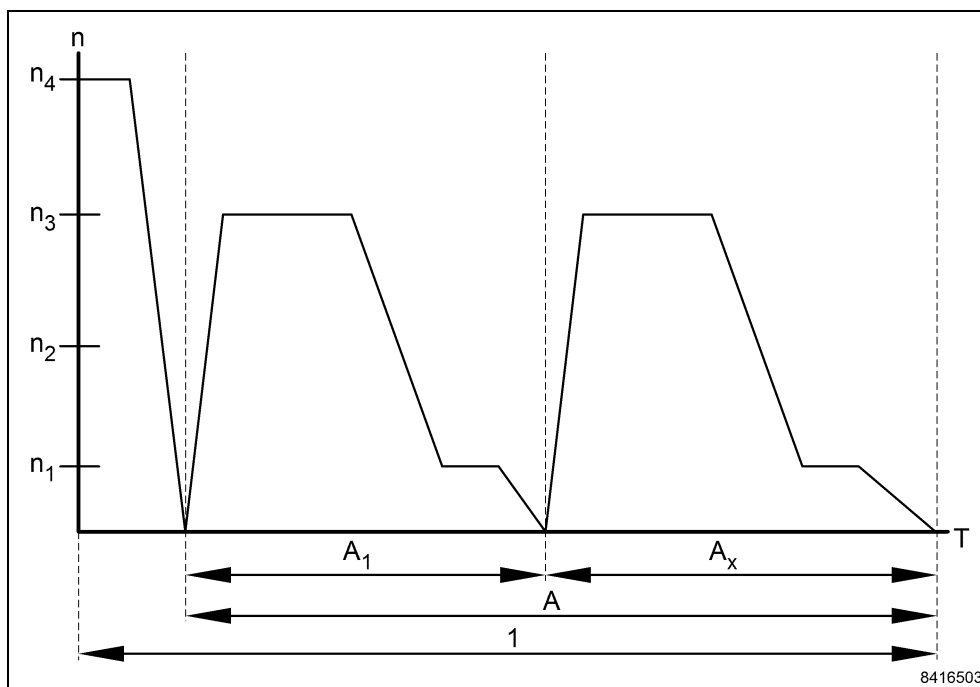


Fig. 72

Speed ranges

Speed range	Designation
n_4	Operating speed
n_3	Bowl drive with FC: Upper flushing speed
n_2	Speed at which the flush liquid supply is closed.
n_1	Bowl drive with FC: Lower flushing speed

Programs

Shutdown program	
1	Water 20 °C

9.7.4 Valve positions

In the various states of “flush”, “high speed”, and “low speed”, the valves in the piping around the decanter are switched as follows to obtain the desired flow directions.

P & ID flow chart

State: Flush water after end of production “high speed”

Valve	Position
V1	closed
V6	open
V8	open
V11	closed

State: closed

“high speed”

Valve	Position
V1	closed
V6	open
V8	open
V11	closed

State: closed

“low speed”

Valve	Position
V1	closed
V6	closed
V8	closed
V11	closed

State: Backflushing “high speed”

Valve	Position
V1	closed
V6	closed
V8	closed
V11	open

“low speed”

Valve	Position
V1	closed
V6	closed
V8	closed
V11	closed

9.7.5 Optional Varipond S - Flushing/Centripetal Pump Flushing

Graphically represented procedure of the

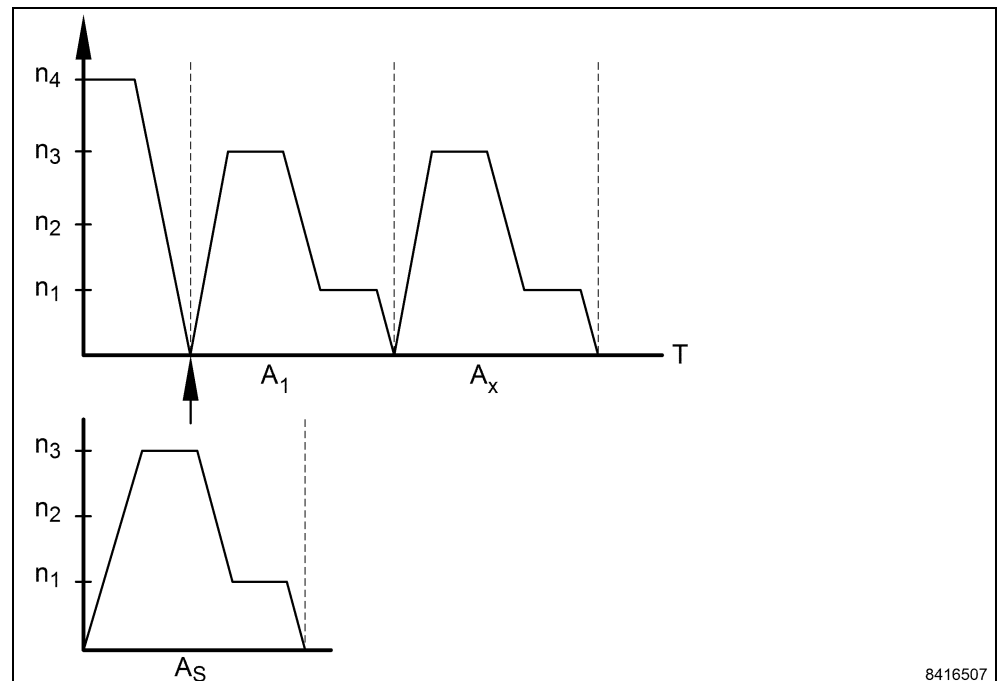


Fig. 73

Varipond S - Flushing/Centripetal Pump Flushing:

If Varipond S – flushing is present, it is not possible to flush a cycle (A_s) as part of the shutdown program via the inlet pipe, but via the Varipond S.

- The flush liquid (V6) supply is opened. The drive is switched off, the speed drops.
- When the speed of the flushing inlet valve (n_2) is reached, the supply of flushing liquid (V6) is closed.
- The bowl drive stops.
- After this, the decanter is run again at the upper flushing speed (n_3).
- Here, the supply of flushing liquid (V11) is opened.
(The amount of fluid supplied should be at least equal to the bowl volume.)
- After expiration of the upper flushing duration, the bowl drive stops.
- When the speed of the flushing inlet valve (n_2) is reached, the supply of flushing liquid (V11) is closed.
- The lower flushing speed (n_1) is kept to improve the cleaning result for a lower flushing duration.
- The bowl drive stops.
- The cycle (A_x) is repeated depending on the product.

9.8 Thorough cleaning

Thorough cleaning should be carried out to avoid infection as well as prior to long-term shut-downs.

- Clean the upper and lower parts of the catcher.
- Remove the scroll , see chapter “Removing the scroll”.
- Thoroughly clean the bowl and scroll with brushes using water or a suitable caustic solution.

NOTICE

Risk of corrosion: Make sure that no cleaning liquid enters the area of the drive shaft of the gear (toothing). The result would be rough running with high vibration values. The bowl would then have to be rebalanced.

When using a high-pressure cleaner:

- Remove the bowl and clean separately.
- Seal tapholes at the cylindrical end of the bowl with screws. This is necessary as otherwise the balancing weights will be flushed out through the holes.

9.9 Flush connections

A complete flushing device is optionally available. The version depends on the application.

If the flushing device is provided by the customer, pay attention to the following:

- Order-specific dimensioned drawing
- P&ID
- Flush liquid volume, pressure and flushing time are product-dependent.
- Adequate flushing is only possible when all flush connections are operational (depending on the application).

9.10 Temporary decommissioning

The decanter will get damaged if it is not operated for a prolonged period and inadequate preserving measures are taken.

When the machine is shut down for longer than 14 days, special measures are required to prevent the machine from getting damaged during standstill.

If this action is not taken, the roller bearings of the machine in particular will be damaged by corrosion and one-sided load. This bearing damage results in high consequential costs.

GEA Westfalia Separator urgently recommends accelerating the decanter to operating speed for 30 minutes every 14 days. Note:

- Chapter "Commissioning / Commissioning check list".
- If the decanter is operated for maximum 30 minutes, the addition of water or other flushing media is not required (for particular explosion concepts max. 15 minutes).
- Only for grease-lubricated bowl bearings: re-lubricate bowl bearings.
 - If the decanter is equipped with the optional "automatic grease lubrication", re-lubrication is carried out automatically.

If the decanter is shut down for a very long period, refer to the chapter "Decommissioning/Long-term storage".

9.11 Restarting

Whenever machine parts have been dismantled during maintenance or repair work, special care must be taken when re-starting the machine.

Skilled personnel must ensure the following:

- All parts are fitted correctly.
- The bowl lock screws have been removed and replaced by short screws.
- Transportation locking device of the drive has been released and secured.
- Sparking due to grinding of components is excluded.
- To check this, the bowl is rotated several times by hand. When even the slightest grinding noises occur, the cause must be investigated and eliminated.

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10.1 Safety when eliminating operating malfunctions

Faults during troubleshooting can endanger the operating safety of the centrifuge. This can lead to accidents with damage to persons and property.

- When troubleshooting, pay attention to and comply with the instructions in the chapter "Servicing / Safety during servicing".
- Determine the source of the fault and inform the responsible departments in the company if necessary. Carry out troubleshooting and fault elimination with care.
- When safety devices on the centrifuge/installation respond, stop operating the centrifuge/installation until the cause has been identified and remedied.
- Ensure that persons are not put at risk through the troubleshooting.
- Observe the local standard operating procedures (SOPs) at the workplace and wear the specified protective gear.
- Cordon off the working area and hang up a warning sign.
- Remove unauthorized persons from the cordoned-off working area.
- Before troubleshooting, all rotating parts of the centrifuge (drive, bowl) must be at a standstill.
- Prior to troubleshooting, switch off the main switches and secure against re-activation.
- Set down dismantled centrifuge parts only on level, anti-slip surfaces, e.g. rubber mat or wooden pallet.
- Secure dismantled centrifuge parts by suitable means to prevent them from overturning or rolling away, e.g. with wooden wedges or square timbers.
- Never weld the bowl, hood or solids catcher.
- Do not machine the bowl, hood and solid catcher.
- Do not climb onto or sit on the centrifuge or parts of the centrifuge.
- Before re-starting, ensure that there is no unbalance due to fouling. Open and clean the bowl prior to start-up.
- Bowls may be balanced only by authorized specialists and authorized workshops.
- After carrying out maintenance and repair work on centrifuges, reattach all protective devices and check the safety devices.

10.2 Trouble shooting

Fault	Possible cause	Measure	Operator
Start-up problems	Gap constriction due to deposits between bowl and catcher	<ul style="list-style-type: none"> ➤ Clean gaps. ➤ Only in the case of a one-piece catcher: Align the ring halves of plastic in the frame or replace them. 	Skilled
	Speed indicator faulty	<ul style="list-style-type: none"> ➤ Check speed sensor 	Skilled
	Only in case of grease-lubricated bowl bearings Bowl bearings overpacked with grease	<ul style="list-style-type: none"> ➤ Remove surplus grease 	Skilled
Bearing temperature too high	Insufficient lubricant	<ul style="list-style-type: none"> ➤ Check lubrication system 	Skilled
	Onsetting bearing damage	<ul style="list-style-type: none"> ➤ Replace roller bearings 	Tspec
	Only in case of grease-lubricated bowl bearings Bowl bearings overpacked with grease.	<ul style="list-style-type: none"> ➤ Use only the quantity of lubricant specified in the lubrication and maintenance schedule. <p>Excessive lubrication will bring about an unnecessary increase in bearing temperature.</p>	Skilled
Vibrations too high	One-sided product deposits	<ul style="list-style-type: none"> ➤ Carry out flushing program. ➤ Check scroll and clean if necessary. 	Skilled
	Bearing damage	<ul style="list-style-type: none"> ➤ Replace roller bearings 	Tspec
	Loose fits	<ul style="list-style-type: none"> ➤ Contact Westfalia Separator 	Tspec
	Product deposits that are grinding against rotating parts	<ul style="list-style-type: none"> ➤ Remove hood; check deposits in housing ➤ Only in the case of a one-piece catcher: Check the ring halves of plastic in the frame. 	Skilled

Op = Operator

|

Skilled = Skilled worker

|

Tspec = Trained specialist

11 Maintenance

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11.1 Safety during maintenance

Before all maintenance and servicing:

- Observe the safety precautions in chapter 2.
- Perform a controlled shut-down of the decanter via “decanter off”.



Fig. 74

- Disconnect all electrically supplied equipment from the power supply using the main switch.
- Secure the plant against unintended restarting with locking devices.



Fig. 75

- Wait for the bowl to come to a standstill.
 - Wait for the run-down time of the decanter bowl to elapse, approx. 30 minutes.
- Do not loosen any part of the machine before the decanter bowl has come to a standstill.



Fig. 76

- Do not start maintenance work until all machine parts have adequately cooled down.
 - The cooling time depends on the product processed and the machine size and can last several hours.
 - Check the surface temperature before starting work.

11.2 Regular checks

The centrifuge must be checked regularly to ensure operating safety.

The inspection intervals depend on the field of application and the level of stress and are documented in the instruction manual, see chapter "Maintenance / maintenance Schedule".

In addition, the centrifuge and its supervisory equipment must be checked on the following occasions:

- before initial start-up
- before start-up after a prolonged standstill

The following points should be particularly kept in mind.

- The scope and result of each check must be documented.
- Have the centrifuge assessed at least once a year by a qualified person.
- Have the centrifuge assessed in a dismantled state at least every three years by a qualified person.
- When processing corrosive or erosive products, implement shorter inspection intervals.
- Following unusual events which may have a negative impact on safety, have the centrifuge checked immediately. Unusual events are:
 - Modifications to the centrifuge
 - Accidents
 - Natural events, e.g, earth quakes, sand storm, flooding

11.2.1 Recurring checks on load suspension devices

Load suspension devices must be checked at regular intervals. The recurring check would be limited to a visual check after cleaning.

IMPORTANT: Cleaning agents may not attack the base material or conceal cracks or surface damage.

Pay special attention to the following points:

- Visible deformation of parts, e.g. chain links, threads, carrier bolts, eye bolts etc.
- Cuts, notches, cracks, upsetting deformation of contact surfaces.
- Wear in contact areas.
- Jamming of elements that normally move together.
- Excessive corrosion or discolouration through heat.
- Missing or illegible markings.

Every check or test must be documented and the document must be archived.

NOTE: Damaged or incomplete load suspension devices included in the set of tools must be sent to GEA Westfalia Separator for checking and repair.

11.3 Instructions on handling roller bearings

Roller bearings must be kept in their original packing; the packing may only be opened at the workplace and directly prior to fitting. Otherwise there is a risk that the bearings will become soiled and rust.

Cleanness during assembly

- Roller bearings must under all circumstances be protected from dirt and moisture as even the finest particles which enter the bearing will damage the bearing surfaces.
- The assembly site must therefore be free from dust and dry. It may not, for example, be in the vicinity of grinding machines. The use of compressed air must be avoided.
- Also pay attention to the cleanness of the shaft and the housing as well as all other parts.

Premature wear to bearings

If a roller bearing fails prematurely, this can have the following reasons:

- Local damage to the races; e.g., score marks, scratches or dents. Such damage occurs, for example, when the outer ring of a cylindrical roller bearing is mounted twisted with the roll barrels over the inner ring or when the pressing force is guided via the roll barrels.
- Insufficient lubricant
- Incorrect lubricant
- Lubricant change intervals too long

Damage becomes evident in the short-term by an increased running noise level. In the long-term it results in premature fatigue of the bearing surfaces.

11.4 Maintenance schedule

Refer to the order-specific "Lubrication and maintenance schedule" in the machine documentation.

11.5 Scroll

The scroll must be checked for wear at regular intervals.

In case of extensive wear to the scroll flights, the operating efficiency of the decanter is impaired. This can have the following impact:

- Only in the case of automatically adjustable differential speed: The differential speed is constantly increased.
- The discharged solids has a higher residual moisture.
- The vibration values of the decanter are increased.

11.5.1 Admissible wear to scroll

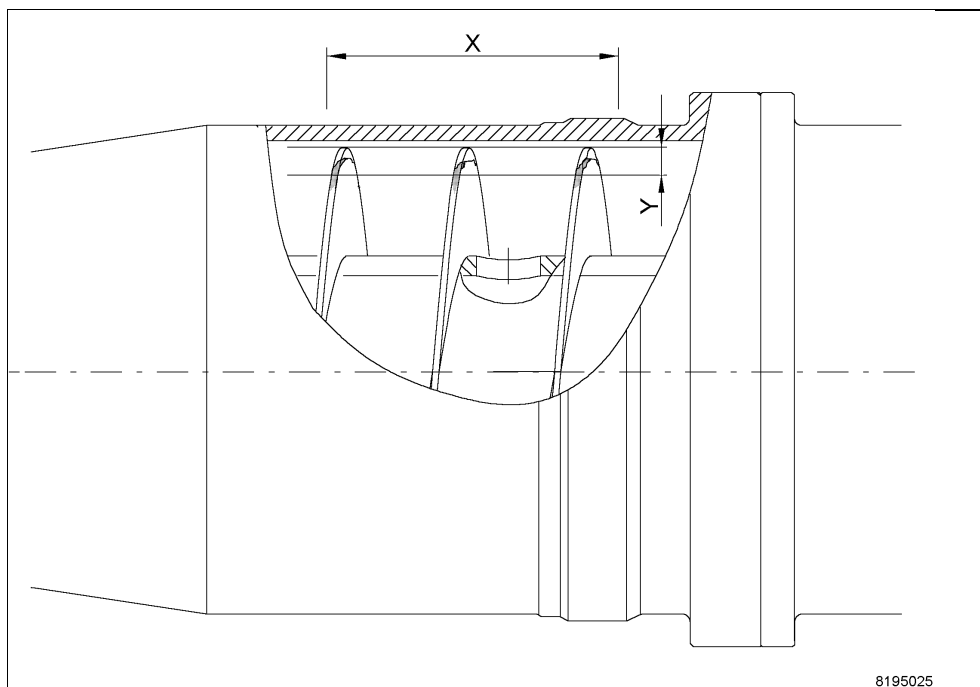


Fig. 77

As a rule, 2-3 flights in the product inlet zone are particularly prone to wear (»X«).

As much wear as possible must be allowed for this small area (»Y«).

The wear to the distributors should also be observed.

Inspection holes

Inspection holes enable checking of the scroll wear on most bowls.

The following wear check may only be carried out by service personnel of Westfalia Separator:

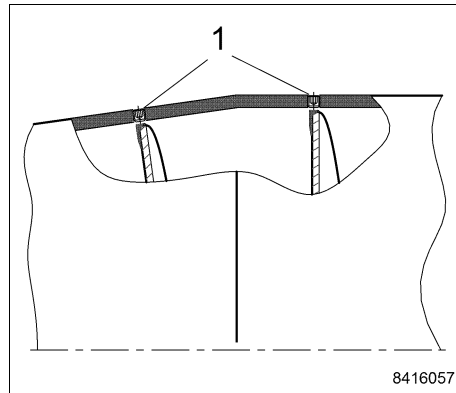


Fig. 78

- Unscrew threaded pins 1.
- Rotate the gear input shaft by hand until the scroll flight is in the area of the hole.
- Determine the wear with the aid of a depth gauge.

- Refit the threaded pins.
 - Screw in the threaded pins with Loctite type 245.

NOTICE

The thread has no collar

The threaded pins must be flush with the bowl outer diameter.

Threaded pins that are screwed in too far collide with the scroll and result in damage.

11.6 Scroll bearings

Pay attention to the following during maintenance work:

- Keep to the "Lubrication and maintenance schedule". The "Lubrication and maintenance schedule" is part of the machine documentation.
- Roller bearings with special tolerances are required for all bearing points. Use only those roller bearings specified in the parts list.
- Always use complete tools for the job they were designed for, see "Set of tools".
- Use only suitable hoists and load suspension devices.

11.6.1 Oil change (scroll bearing liquid side)

Optionally, the decanter is equipped with oil-filled scroll bearings. The oil filling of the liquid-side scroll bearings can be renewed with fitted bowl.



DANGER

Risk to life through high-speed rotating machine parts

There is a risk of serious injury from being pulled into the machine and from machine parts or product residues being ejected.

- Do not loosen any part of the machine before the bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional restart.
- Do not start maintenance work until the components have cooled down to room temperature. Depending on the application and product temperature, the cooling phase can take up to 2 hours.



CAUTION

There is a risk of injury through burning or scalding.

Hot machine parts and hot oil can cause burns.

- Carry out the oil change at operating state temperature; 40 – 50 °C are optimal. Check temperature. Do not start assembly too soon.
- Provide a suitable collecting receptacle. Refer to the maintenance schedule.

IMPORTANT:

- Use only suitable hoists and load suspension devices.
- Always use complete tools and use them only for the intended application, see separate spare parts catalog "Set of tools".

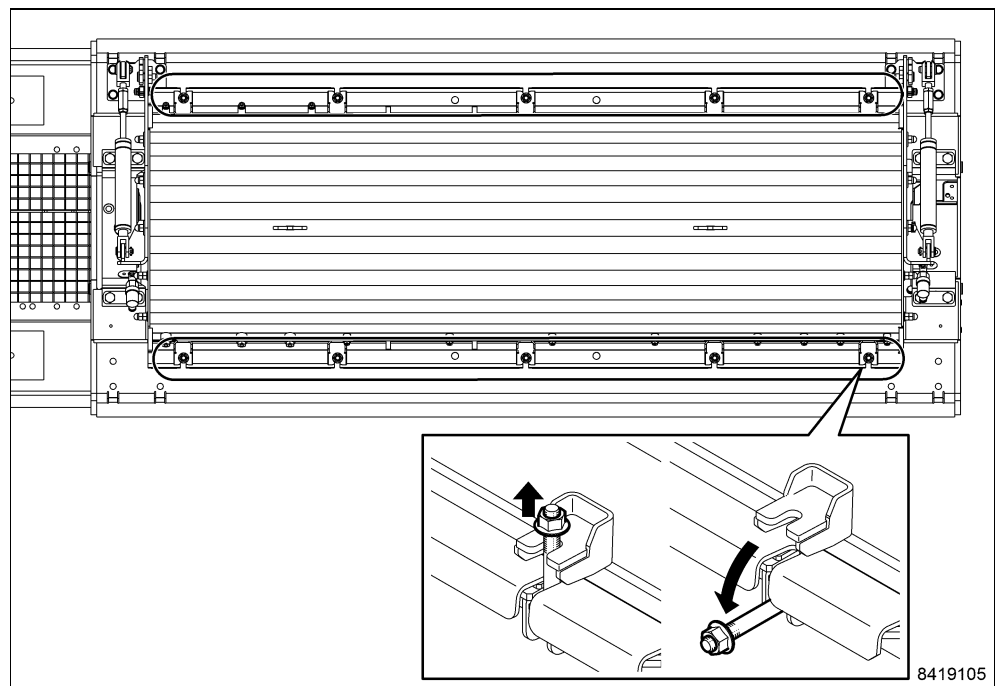


Fig. 79

- Undo the nuts.
- Pull down the bolts.
- Remove protective hood / open the hinged cover
- Rotate the bowl by hand until the screw plug becomes visible.

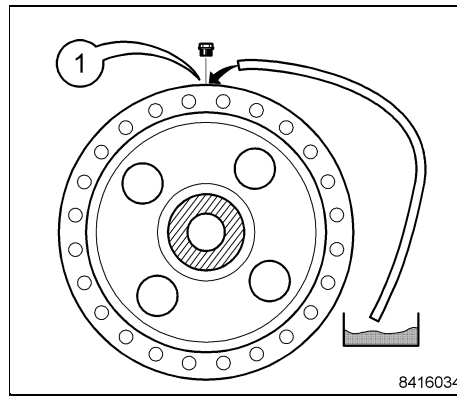


Fig. 80

- Unscrew plug (1) and connect the hose taken from the “set of tools”.
- Place a suitable collecting receptacle underneath to collect the oil. Rotate the bowl until the oil discharge opening (1) is at the bottom.

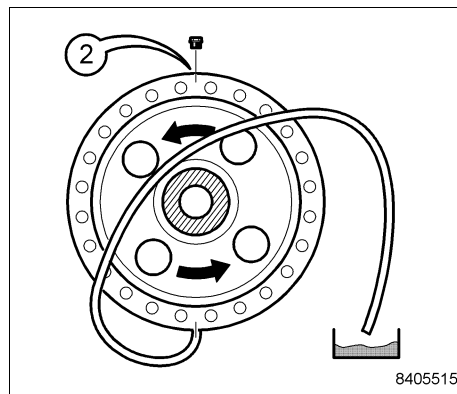


Fig. 81

- Remove plug (2). Drain the oil completely.
- Force any remaining oil residue out of the bearing using compressed air
 - Wear protective clothing and protective goggles.
 - The compressed air must be **free from dust and water**.

- Examine the discharged oil for impurities.
 - Product residues or water indicate defective sealing.
 - Metal shavings indicate a worn roller bearing.

Do not re-start the decanter until the cause of the impurities has been eliminated.

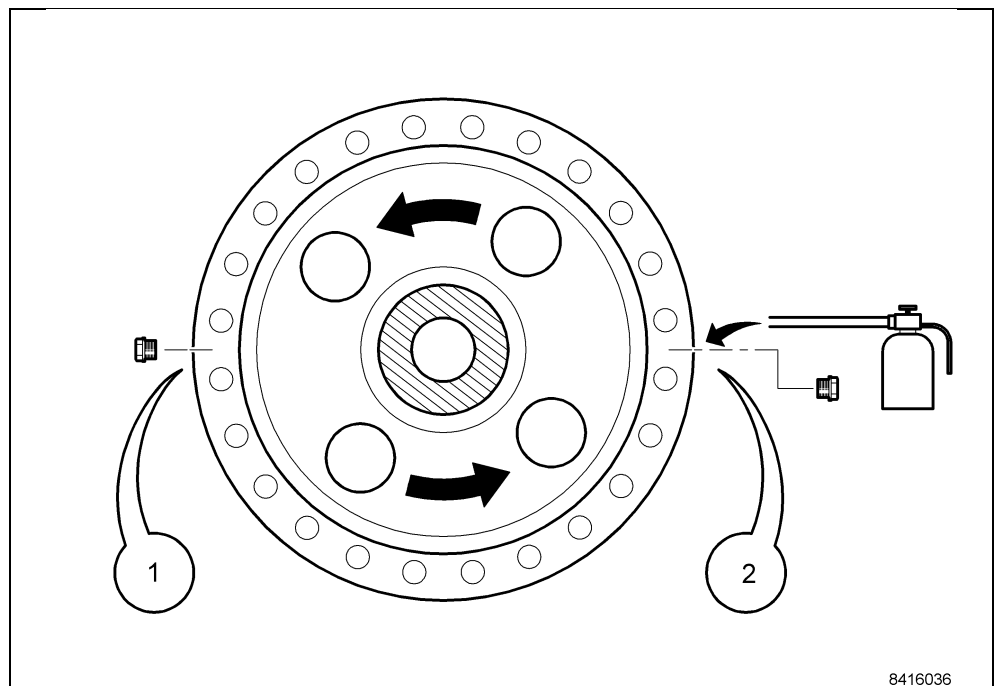


Fig. 82

- Rotate the bowl until the bores (1) and (2) are horizontal.
- Connect the filling tool.

- Heat the new oil to approx. 35 – 40 °C to facilitate filling.
- Fill in oil until oil discharges at the opposite opening.

Oil quantity and oil quality are specified in the "Lubrication and maintenance schedule".

- Seal both holes. Note:
 - Renew the gaskets during each assembly. Damaged gaskets can lead to oil leakage.
 - Grease the threads of the screw plugs with WS M- paste.
- For WS M paste, see "Lubrication and maintenance schedule - chapter lubricant table".

11.7 Bowl

Check the bowl for signs of wear at regular intervals. The inspection intervals are given in the "Lubrication and maintenance schedule". Pay special attention to the following:

- The longitudinal grooves or ribs must be visible in the conical area on the inside.
- Mechanical damage, e.g.:
 - grinding marks in the area near the catchers
 - cavitation in the area of the solids discharge ports
- Wearing bushes in the solids discharge ports

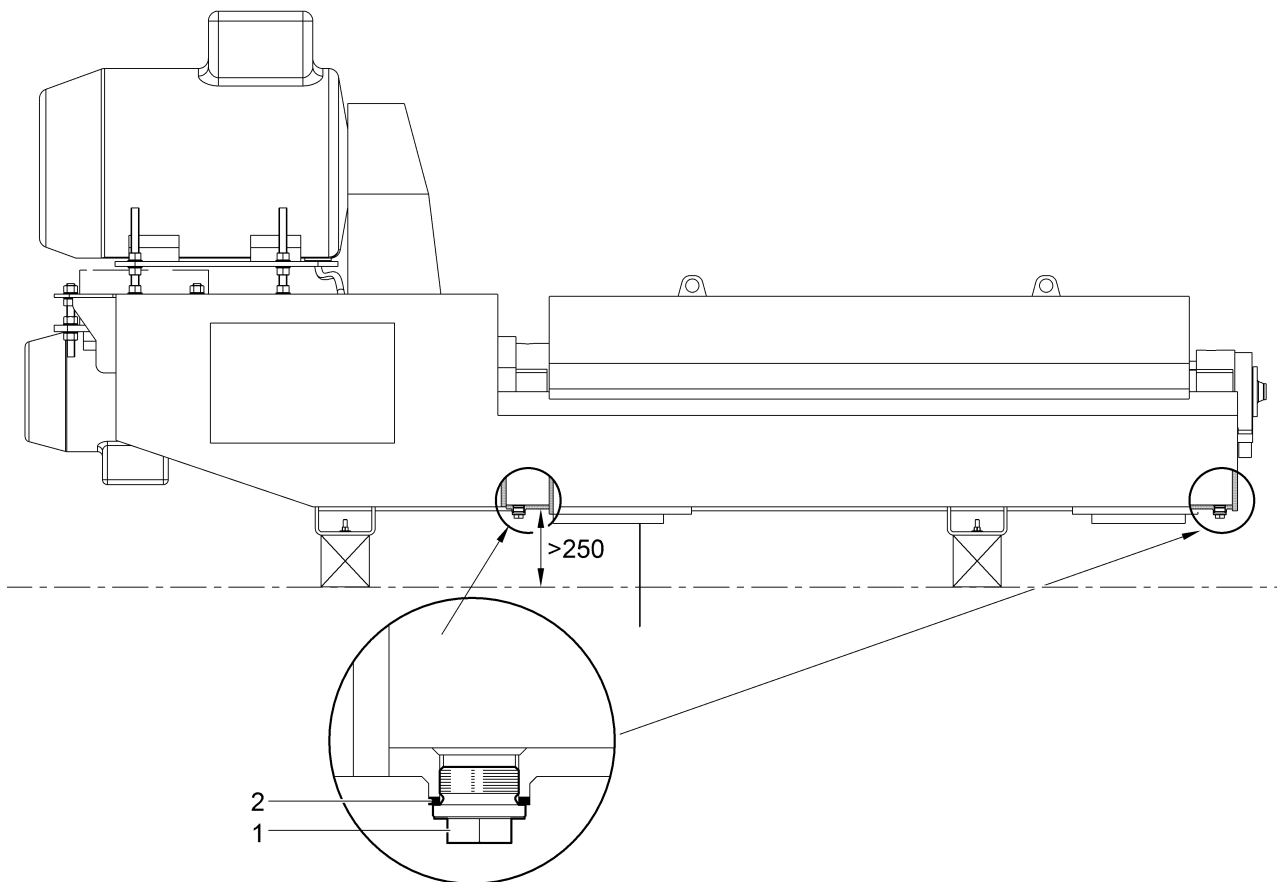
Replace damaged or worn parts immediately or inform GEA Westfalia Separator.

11.8 Bowl bearings

The bowl bearings are supplied with lubricant through an automatic oil-air lubrication system. Pay attention to the following during maintenance work:

- Separate manual on the oil-air lubrication unit.
- Keep to the "Lubrication and maintenance schedule". The "Lubrication and maintenance schedule" is part of the machine documentation.
- Used grease discharges downwards out of the bowl bearings. The grease is collected in catch chambers.
- Drain the spent oil regularly into a collecting vessel (when servicing the decanter at the latest).
- Clean the catch chambers regularly (when servicing the bearings at the latest).
- Roller bearings with special tolerances are required for all bearing points. Use only those roller bearings specified in the parts list.

11.8.1 Emptying the oil collecting chambers



8416060

Fig. 83



CAUTION

There is a risk of injury through burning or scalding.

Hot machine parts and hot oil can cause burns.

- Carry out the oil change at operating state temperature; 40 – 55 °C are optimal. Check temperature. Do not start assembly too soon.
- Provide a suitable collecting vessel. Keep to the lubrication and maintenance schedule. More than 2 litres of waste oil can discharge depending on the adjustments of the oil-air lubrication.
- Alternatively, the two drain plugs in the frame can be removed and a hose pipe can be connected to discharge the used oil directly into a canister (hose pipe is not included in the scope of delivery of the machine). The connection thread of the sleeve in the frame has a G1" female thread.
- Unscrew screw (1). Drain the oil.
- Inspect gasket (2) for damage and replace if necessary.
- Fit screw (1) with gasket (2) again.

11.9 Tensioning the drive belt

The drive belts must be checked regularly for location and condition.

The checking and changing intervals can be found in the lubrication and maintenance schedule.

Signs of inadequate belt tension or worn belts can be:

- increased noise from flapping belts.
- Major drop in speed under load (bowl or differential speed).

When replacing and tensioning the drive belts, bear in mind the following:

- Always replace the complete sets (bowl and scroll drive). This is the only way to ensure that the belts are identical in length. Identical length is a prerequisite for even tension and quiet running.
- Use only belts specified in the parts list. This is the only way to ensure that the belts meet the stringent requirements.
- Belt tension should also be checked on decanters which are supplied ready-assembled.
- Check belt tension after 0.5 - 1 operating hours. Use measuring device 0003-0534-000 for this purpose.

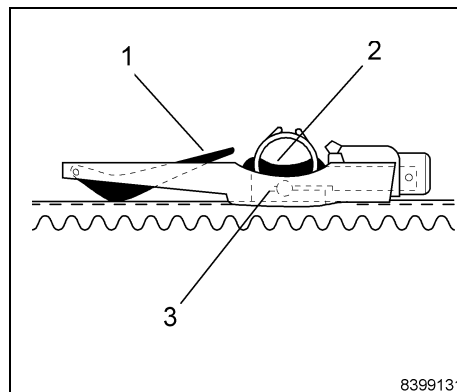


Fig. 84

The measuring device consists of:

- Display arm (1)
- Compression surface (2)
- Pressure spring (3)

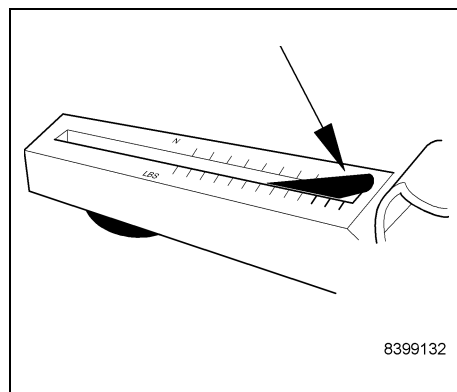


Fig. 85

- Push the display arm of the measuring device to the end of the scale.

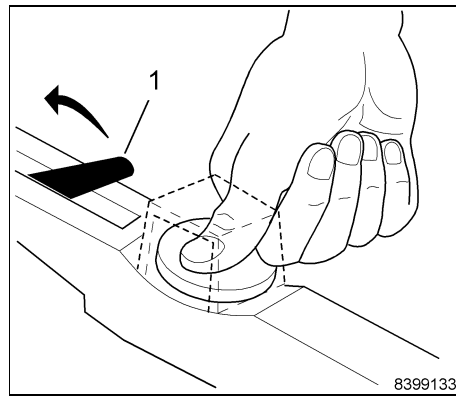


Fig. 86

- Put the measuring device centrally on one of the belts between the two belt pulleys.
- Slowly press a finger onto the compression surface. This will make the display arm move into the scale.
- As soon as a clear click is heard or felt, stop pressing.
- Carefully lift off the device without moving the display arm.

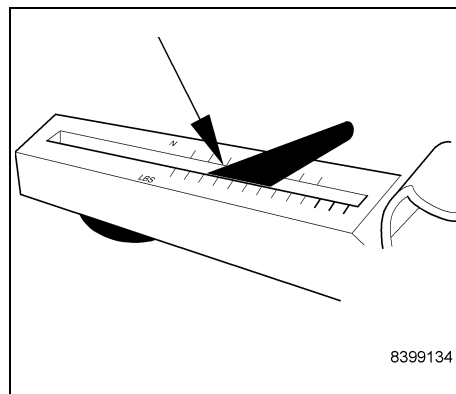


Fig. 87

- Read off the measured value at the intersection between the top edge of the display arm and the scale.
- The specified value for ideally-tensioned belts is
 - for new belts: 1000^{+100} N
 - for run-in belts: 800^{+100} N
- Depending on the measuring result, reduce or increase belt tension until it is within the desired range.

IMPORTANT:

Aligning the secondary motor - checking the gear

- After tensioning the belts, check the alignment of the back drive motor- gearbox, see chapter "installing the coupling".
- If necessary, re-align the secondary motor, see chapter "Fitting the secondary motor".
- Check the position of the speed initiators and realign if necessary, see chapter "setting and realigning speed initiators".

11.10 Gearbox

The gearbox is filled with oil. Oil quantity, oil quality and oil change intervals are specified in the "Lubrication and maintenance schedule".

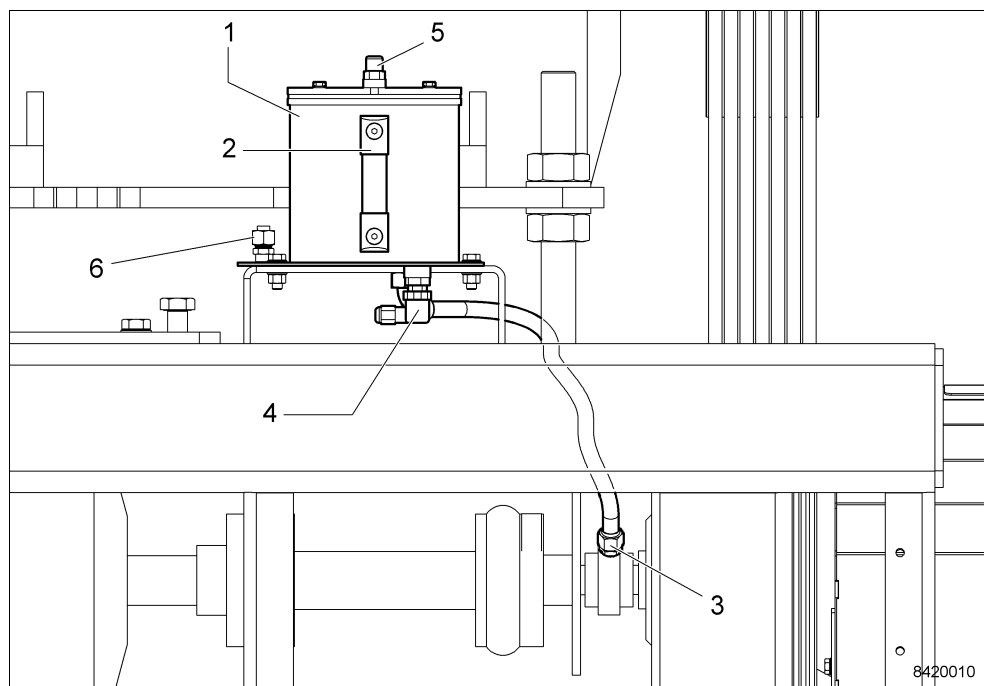


Fig. 88

- 1 Oil surge vessel
- 2 Sight glass
- 3 Rotary transmission leadthrough
- 4 Switch (switches the decanter off when oil drops below minimum)
- 5 Vent
- 6
 - Screw plug (for sealing the rotary leadthrough at (3).
 - Fastening point for the oil line.

Switch (4) monitors the oil level in oil surge vessel (1). The decanter is shut down when the oil level falls below the minimum.

IMPORTANT:

- Before restarting the decanter, the cause of the oil loss must be eliminated.
- Check radial packing rings and O-ring seals and replace if necessary.

11.10.1 Drain the gear oil.



DANGER!

Risk of death from machine parts rotating at high speed

There is a risk of serious injury due to being pulled into the machine and through ejection of machine parts or product residues.

- Do not loosen any part of the machine before the bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional switching-on.
- Do not start maintenance work until the components have cooled down. Depending on the application and product temperature, the cooling phase can take up to 2 hours.



CAUTION!

There is a risk of injury through burning or scalding.

Hot machine parts and hot oil can cause burns.

- Carry out the oil change at operating temperature; 40 –50° is optimal.
 - Check the temperature.
 - Do not start assembly too soon.
- Provide an appropriate oil collecting receptacle.
 - Keep to the lubrication and maintenance schedule.
- Open the protective hood, see chapter “Servicing / Removing the bowl”. Dismantle guards and covers as required.

NOTE: The hood does not have to be open to drain the gear oil.

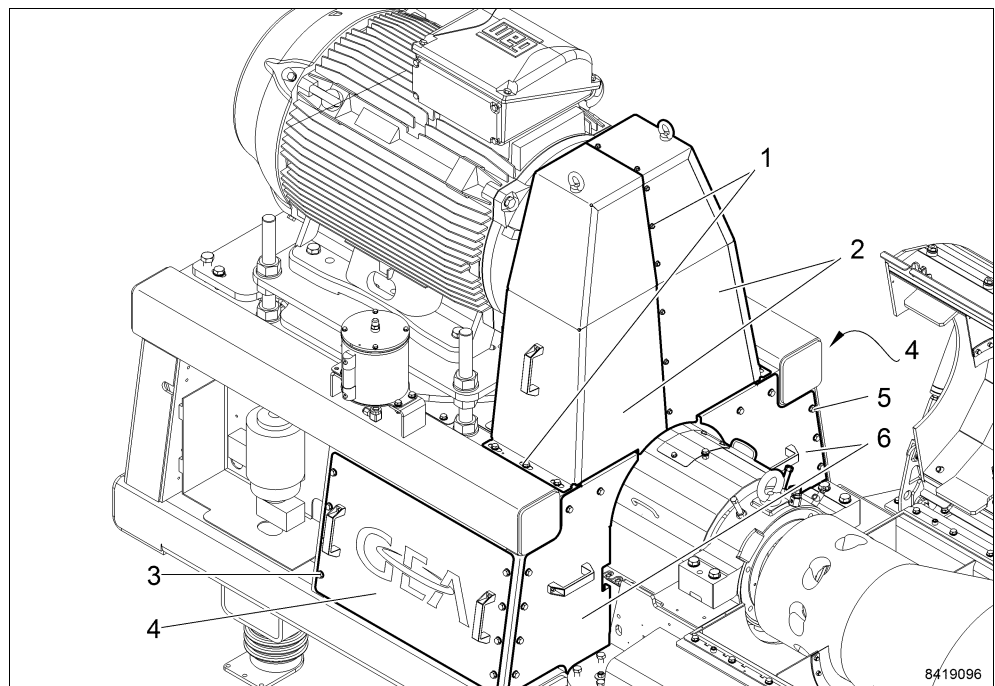


Fig. 89

- Undo the screws (1) and remove the protective hood (2).
- Undo the screws (3) and remove the large side cover (4).
- Undo the screws (5) and remove the guards (6).

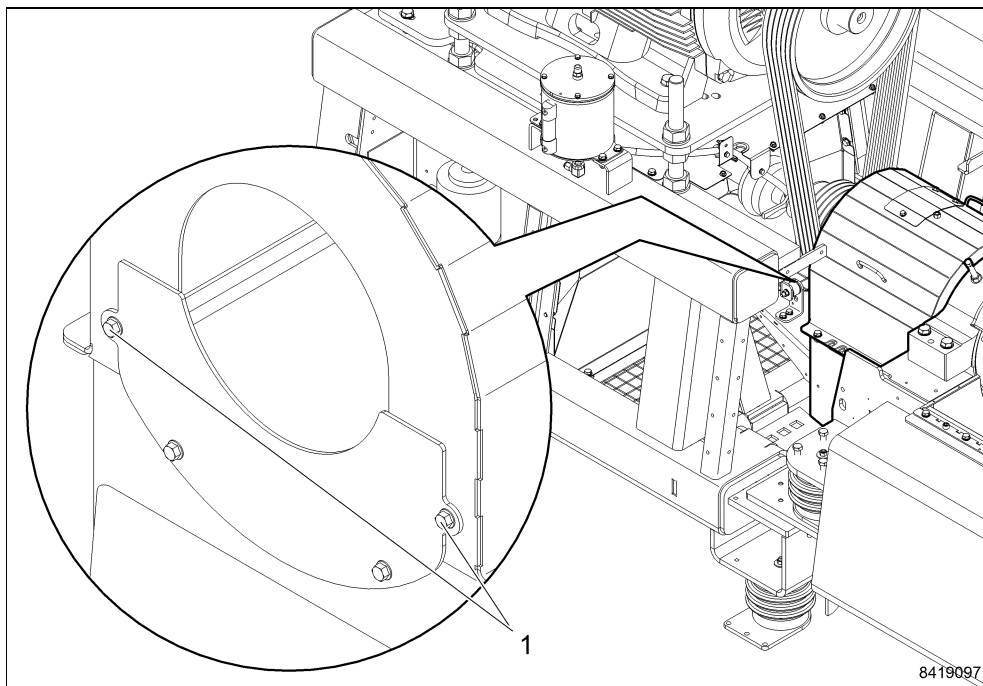


Fig. 90

➤ Undo the screws (1).

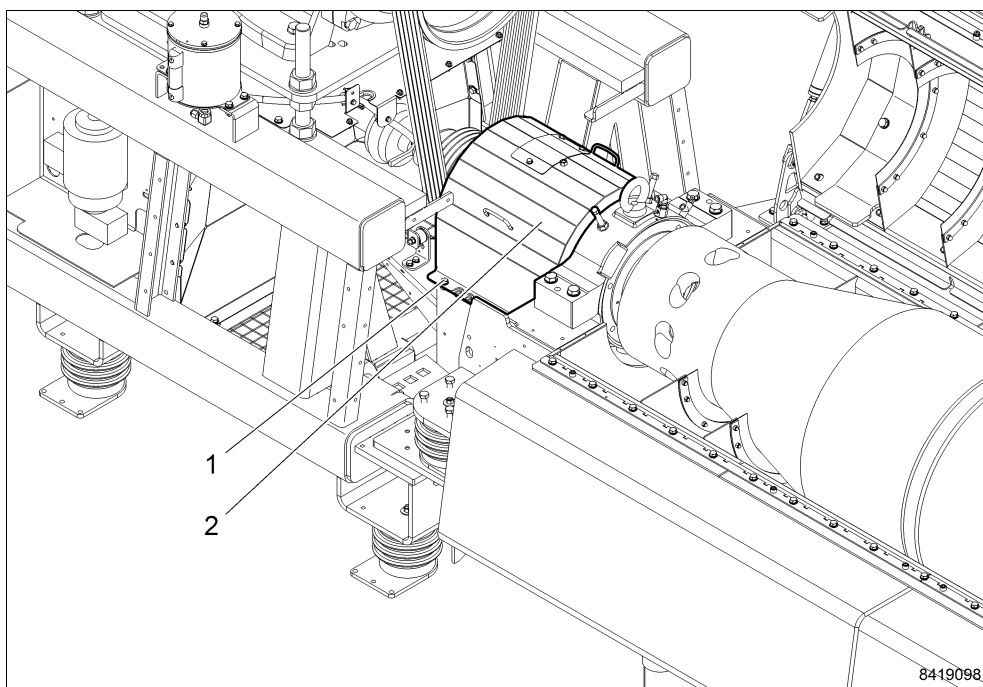


Fig. 91

➤ Undo the screws (1) and remove the top of the air vent (2).

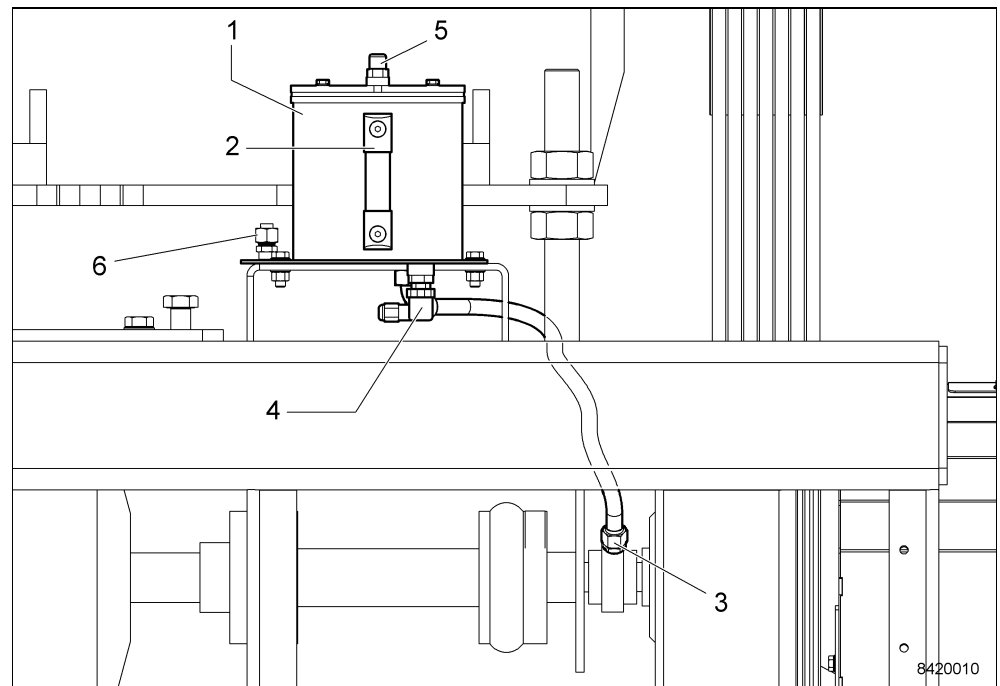


Fig. 92

- **Unscrew the oil line from the rotary leadthrough (3).**
 - Collect the oil.
 - Seal gearbox. Use the nuts (6) provided.
- If the oil in the vessel is not changed, fasten the oil line at (6).
- Remove the bowl if necessary and place it in a suitable device, see chapter "Servicing / Removing the bowl".

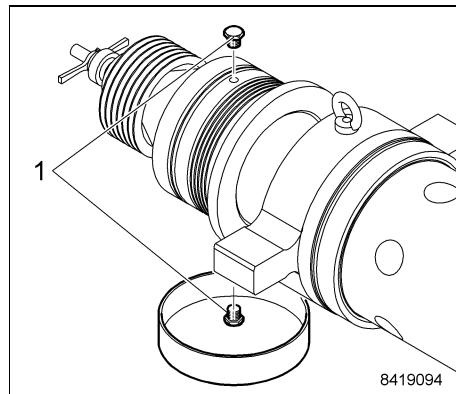


Fig. 93

- Ensure the oil discharge openings are in a vertical position

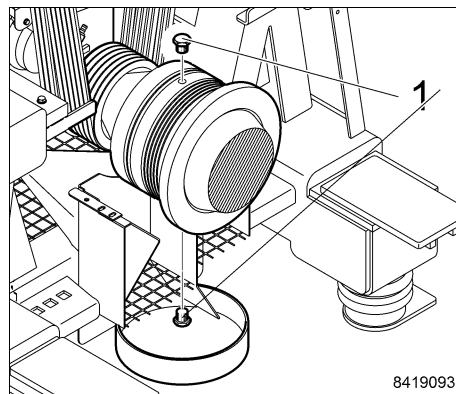


Fig. 94

- Place a suitable collecting receptacle underneath and unscrew the oil drain screws (1).
- Drain the oil from the gearbox.

11.10.2 Filling the gear oil

- If already dismantled: Fit the bowl, see chapter "Servicing / Fitting the bowl".
- Screw in the bottom oil drain screw.
 - Always use a new gasket.
 - The required torque is marked on the screw, e. g. 30 or 50 Nm.
- Fasten the oil line to the rotary leadthrough.
- Heat the new oil to approx. 35 – 40 °C to facilitate filling. The oil quality is specified in the "Lubrication and maintenance schedule".
- Fill the gearbox completely with oil.
 - Do not use a pump to speed up the filling procedure.
 - Do not use compressed air to speed up the filling procedure.
- Screw in the upper oil drain screw.
 - Always use a new gasket.
 - The required torque is marked on the screw, e. g. 30 or 50 Nm.
- Fill oil into the surge reservoir.
 - Option 1 (standard oil vessel) Fill in oil up to the middle of the surge reservoir.
 - Option 2 (integrated oil vessel) Fill in oil up to the middle of the sight glass.
 - Do not use compressed air to speed up the filling procedure.

IMPORTANT

Damage to the centrifuge

If too much oil is filled, the oil surge reservoir may overflow during operation.

- Bleed the oil line between the surge reservoir and the rotary leadthrough.
 - To do this, undo the oil line at the rotary leadthrough again and wait until oil discharges from the rotary leadthrough and the hose.
 - Then re-connect the oil line.
- Mount the guard and protective hood.

IMPORTANT:

Check that the gearbox does not leak by carrying out a test run lasting at least 30 minutes.

- Depending on how hot the oil is, the oil level visible in the tank will rise due to expansion of the lubricant. If the oil level drops noticeably at a constant temperature, it is an indication of oil loss.
 - If the oil level drops below the minimum, the warning device of the float switch is activated and the decanter is shut down.
 - After the test run the gearbox must be vented again.
- For venting the gearbox see chapter: "Maintenance / Venting the gearbox".

11.10.3 Vent gearbox (without circulation lubrication)

The gearbox must be deaerated after the test run to ensure that the gearbox is completely filled with oil.



DANGER

Life threatening danger because of quickly rotating machine parts

Danger of severe injuries caused by body parts being pulled into the machine or by the ejection of machine parts or product remnants.

- Do not remove any parts of the machine until the bowl is at a stand-still.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the unit against unintentional activation.
- Do not start maintenance work until the components have cooled down. Depending on the use and product temperature, the cooling time may last up to 2 hours.

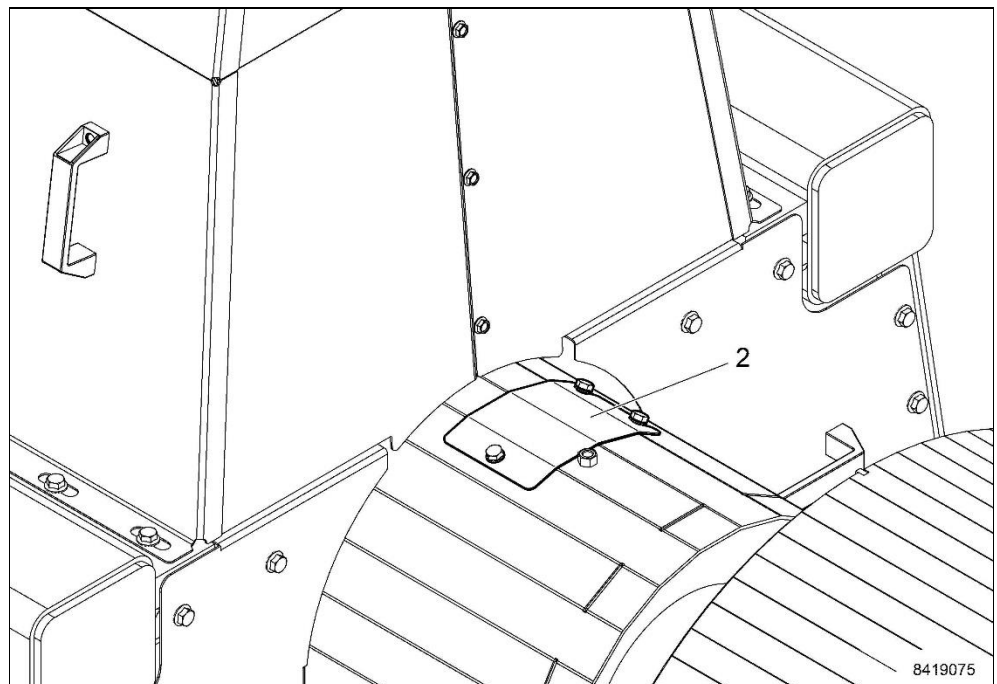


Fig. 95

Venting

- Remove cover (2).
- Rotate the gearbox so that one drain screw points upwards.
- Unscrew the oil drain screw at the top.
 - Oil then flows out of the oil surge reservoir into the gearbox.
 - **IMPORTANT:** This takes a few minutes. Wait until the oil level in the gearbox has risen to the taphole for the drain screw.
- Screw the oil drain screw back in.
 - Use a new gasket.
 - The required torque is marked on the screw, e. g. 30 or 50 Nm.
- Check the oil level in the oil surge reservoir.
 - If too much oil is filled in, the oil surge reservoir can overflow during operation.
- Mount cover (2).

11.11 Motor bearings

For lubricating the motor bearings, refer to the instructions of the motor manufacturer.

The following applies in the case of motors supplied by GEA Westfalia Separator:

- Deviations from the instruction manual of the motor manufacturer are specified on a motor rating plate.
- Lubricate preferably when the machine is running.

12 Repair

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12.1 Avoiding damage during maintenance

Safety and operating reliability of the centrifuge depend on maintenance work being carried out properly.

Maintenance work carried out incorrectly can result in damage to the centrifuge parts. This can result in personal injury and material damage when operating the centrifuge.

- Centrifuges may only be operated by persons who are qualified to carry out these tasks. These persons include, for example, trained experts from GEA Westfalia Separator and specialist personnel trained and authorised (certified) by GEA Westfalia Separator.
- Dismantled centrifuge parts must only be placed on an even, non-slip surface (e.g. a rubber mat or wooden pallet).
- Dismantled centrifuge parts must be secured by suitable means to prevent them from falling over or rolling away (e.g. with wooden wedges or squared timber).
- Never weld the bowl, hood or solids catcher.
- Do not machine the bowl, hood and solid catcher.
- Do not stand or sit on the centrifuge or attachments.
- Following maintenance and repair work on centrifuges, mount all protective devices again and check the safety equipment.

12.1.1 Special tools

The scope, type and number of the special tools are specified in the order-specific parts list. Commercially available tools are not supplied.

12.1.2 Standard tools

Commercially available standard tools are not included in the supply schedule. These include, for example, open-ended wrenches, ring spanners and screwdrivers. These must be provided by the customer.

12.2 Screw torques

The torques apply for the following conditions:

- Metric screws with coarse-pitch threads
 - Hex head screws as per DIN EN ISO 4014 / 4017
 - Hex socket screws to DIN EN ISO 4762
- Clearance holes to DIN EN 20273 (average)
- “Greased” state (total minimum coefficient of friction = 0.10)
- Torque wrench with scatter of $\pm 10\%$
- Material combinations:
 - Steel-steel
 - Stainless steel - stainless steel

IMPORTANT: Screws/bolts whose torque deviates from this table are marked with the relevant torque in the instruction manual.

12.2.1 Screw torques in Newton meters (Nm)

Strength class	8.8	10.9	12.9	A2-70 A4-70	A2-80 A4-80	Super Duplex 1.4501	Hastelloy 2.4819
Yield stress/yield strength in N/mm ²	640 660	940	1100	450 250	600	550	360
Parameter	Torque in Nm						
M 4	2.6	3.9	4.5	1.9	2.5	1.9	1.5
M 5	5.2	7.6	8.9	3.6	4.8	3.6	2.9
M 6	9.0	13.2	15.4	6.3	8.4	6.3	5.0
M 8	21.6	31.8	37.2	15.2	20.2	15.2	12.1
M 10	43.0	63.0	73.0	30.0	40.0	30.0	24.0
M 12	73.0	108.0	126.0	52.0	69.0	52.0	42.0
M 14	117.0	172.0	201.0	82.0	109.0	82.0	65.0
M 16	180.0	264.0	309.0	126.0	168.0	126.0	100.0
M 18	259.0	369.0	432.0	177.0			
M 20	363.0	517.0	605.0	248.0			
M 22	495.0	704.0	824.0	187.0			
M 24	625.0	890.0	1041.0	237.0			
M 30	1246.0	1795.0	2077.0	472.0			
M 36	2164.0	3082.0	3607.0				

Screws made of Super Duplex 1.4501 are treated like A4-70 screws while neglecting the higher yield stress.

In the case of screws larger than M 16, an individual drop in strength due to the degree of deformation of the screw raw material and the thread rolling procedure must be taken into account.

12.2.2 Screw tightening torques in inch-pound (inlb)

The following formula is used to convert the torques (M_a) from “Nm” to “inlb”:

$$M_{\text{inlb}} = M_{\text{Nm}} \times 8.85$$

Example:

M_{inlb} = Wanted (screw tightening torques in “inch-pound”)

M_{Nm} = 50 (screw tightening torques in “Newtonmeter”)

M_{inlb} = 50 Nm x 8.85

M_{inlb} = 442.5 inlb

12.3 Removing the bowl



DANGER

Life threatening danger because of quickly rotating machine parts.

- Do not loosen any part of the machine before the decanter bowl has come to a standstill.
 - Wait for the run-down time to elapse, approx. 30 minutes.
 - Start maintenance work 2 hours at the earliest after shutting down the decanter. Only then will all machine parts have cooled down so that there is no longer a danger of injury due to hot surfaces.
 - Only use the intended hoists and load handling means.
 - Use only complete tools for their intended use.
- Disconnect the feed lines.

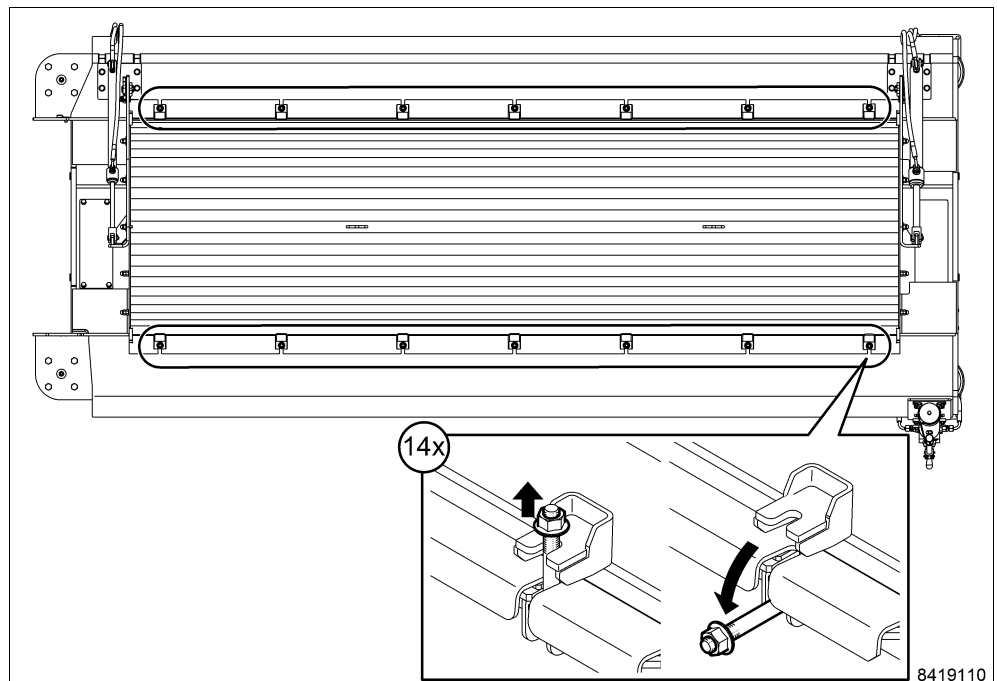


Fig. 96

- Undo the nuts.
- Pull down the bolts.

IMPORTANT: Do not completely unscrew the nuts, they should remain on the thread.

▼ Begin option

Option hinged cover

If hydraulic application is installed

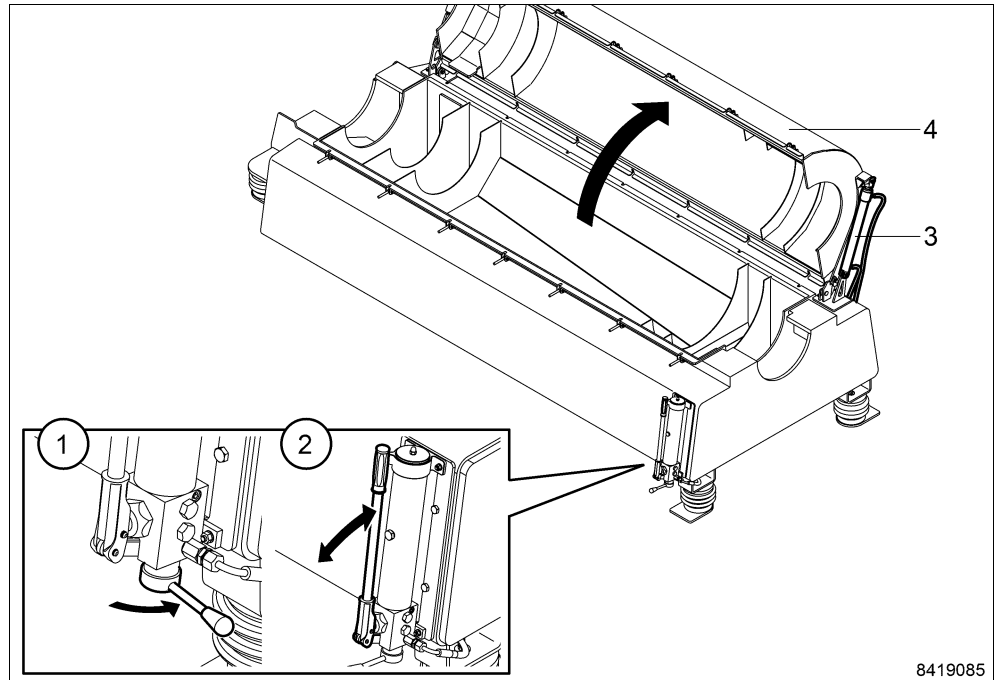


Fig. 97

- Place the lever (1) in the position as shown.
- The cylinder (3) is activated and the hood (4) is raised by pumping the handle (2).

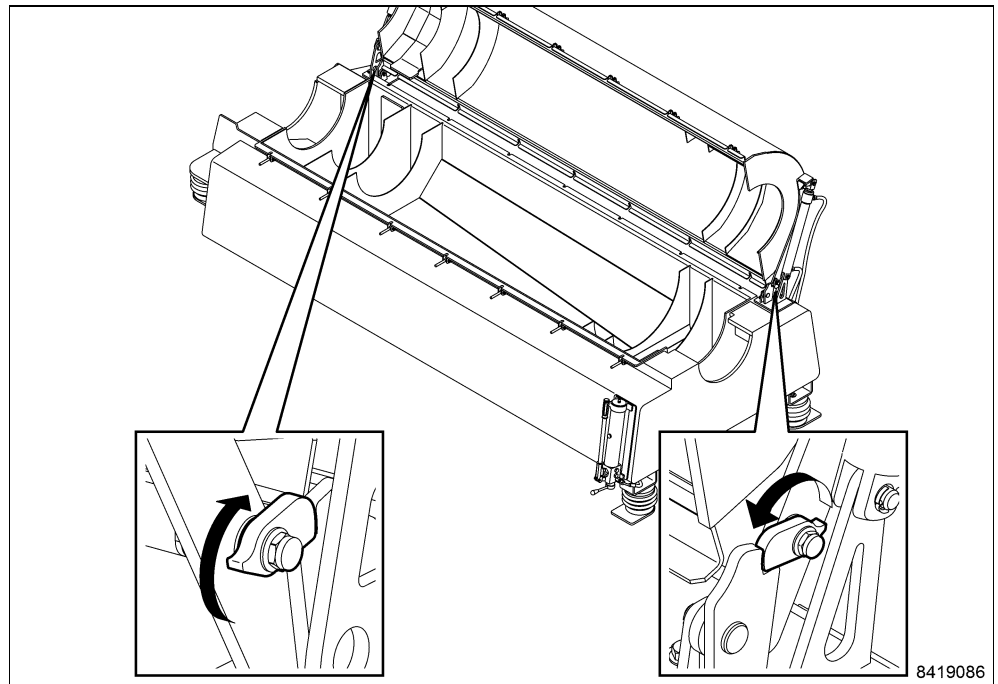


Fig. 98

- Continue pumping until the safety latch engages.

IMPORTANT: Check that the latches on both sides are engaged as shown. If necessary, adjust manually. This prevents the hood accidentally slamming shut.

▲ End option

Without installed hydraulic application



WARNING

Risk of injury from falling components

If a hydraulic application is not fitted or connected, there is a risk of serious injury from the hood accidentally falling shut.

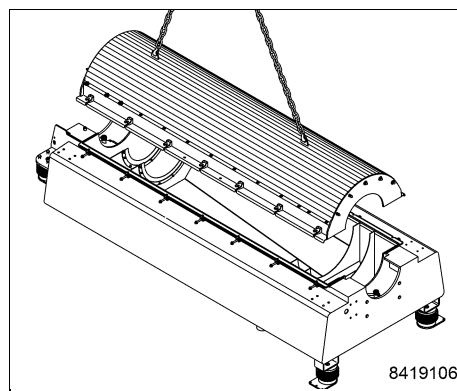


Fig. 99

- Remove the hood with a hoist.
- Only attach the lifting gear to the lugs provided

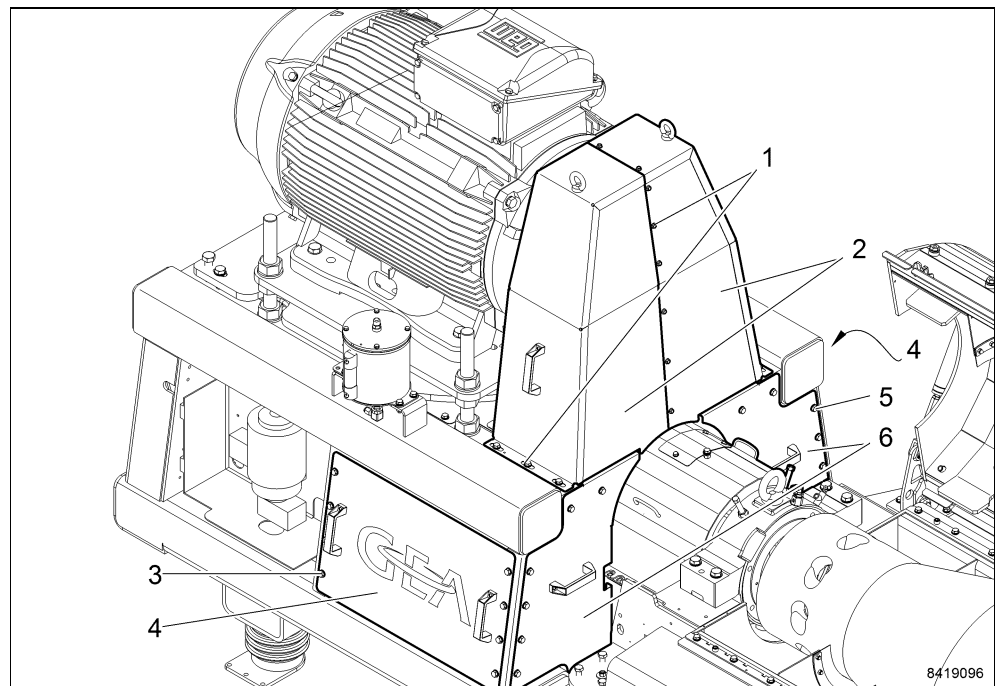


Fig. 100

- Undo the screws (1) and remove the protective hood (2).
- Undo the screws (3) and remove the large side cover (4).
- Undo the screws (5) and remove the guards (6).

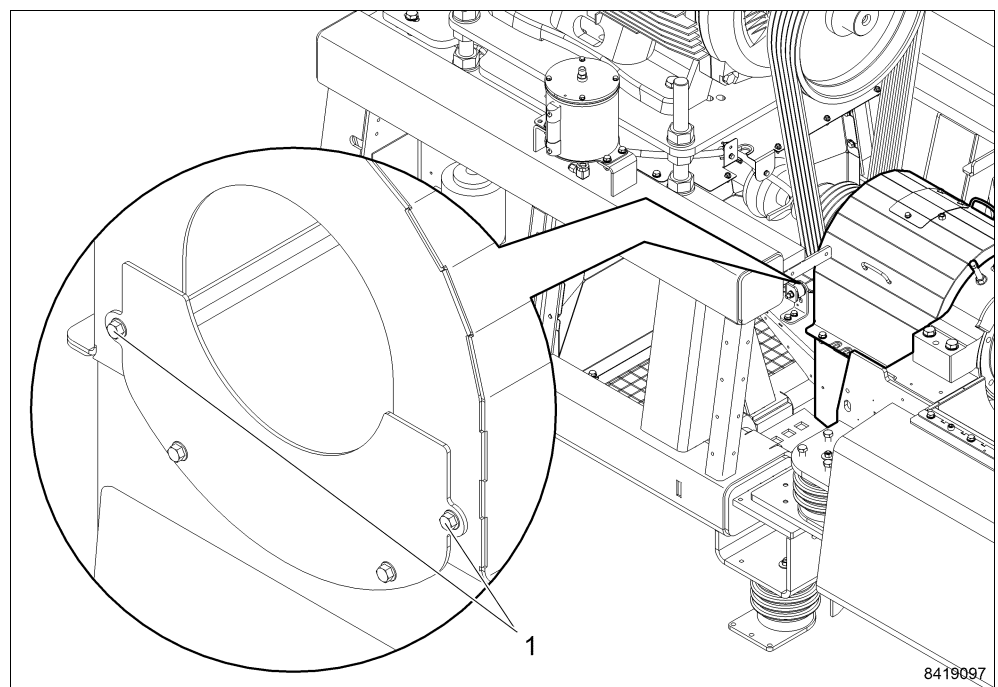


Fig. 101

- Unscrew the screws (1).

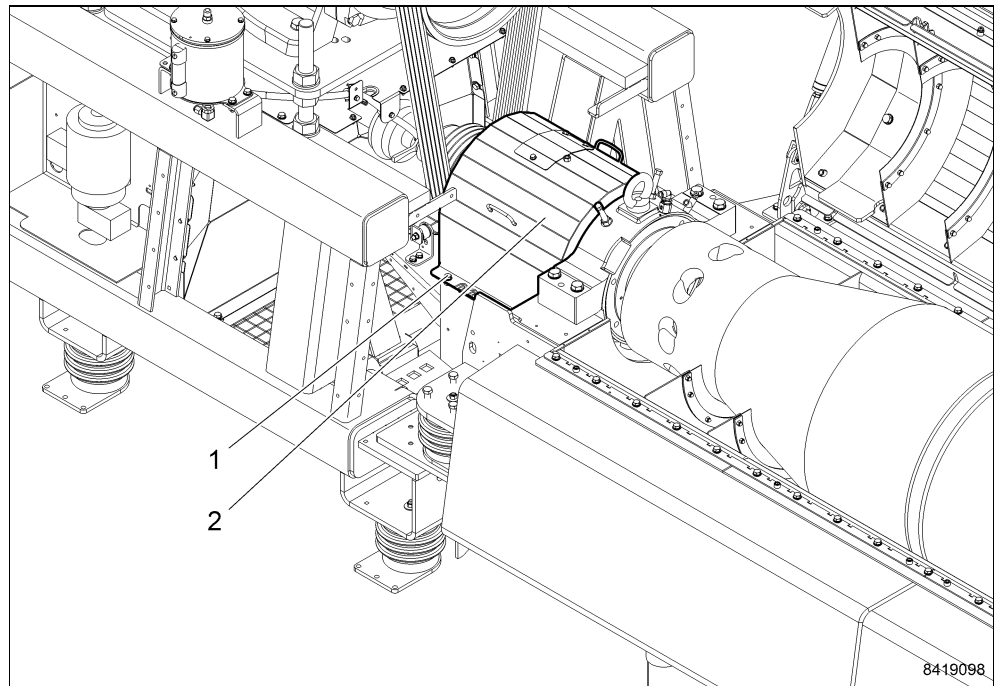


Fig. 102

- Undo the screws (1) and remove the top of the air vent (2).

Not fitted on every version.

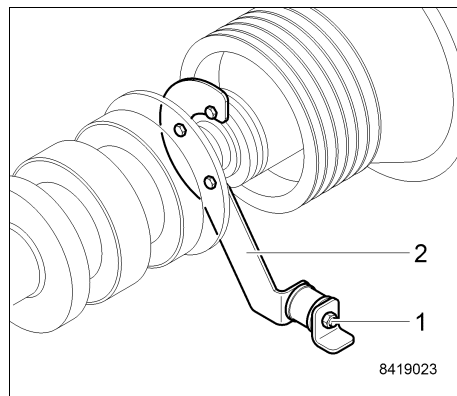


Fig. 103

- Loosen the torque arm (2); to do this, unscrew screw (1).

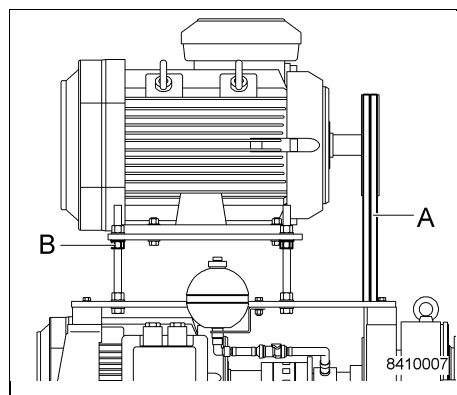


Fig. 104

- Remove the coupling, see chapter "Servicing/Removing the coupling".
- Slacken drive belt (A).
 - To do this, lower the motor by evenly adjusting nuts (B).
- Remove the drive belt.

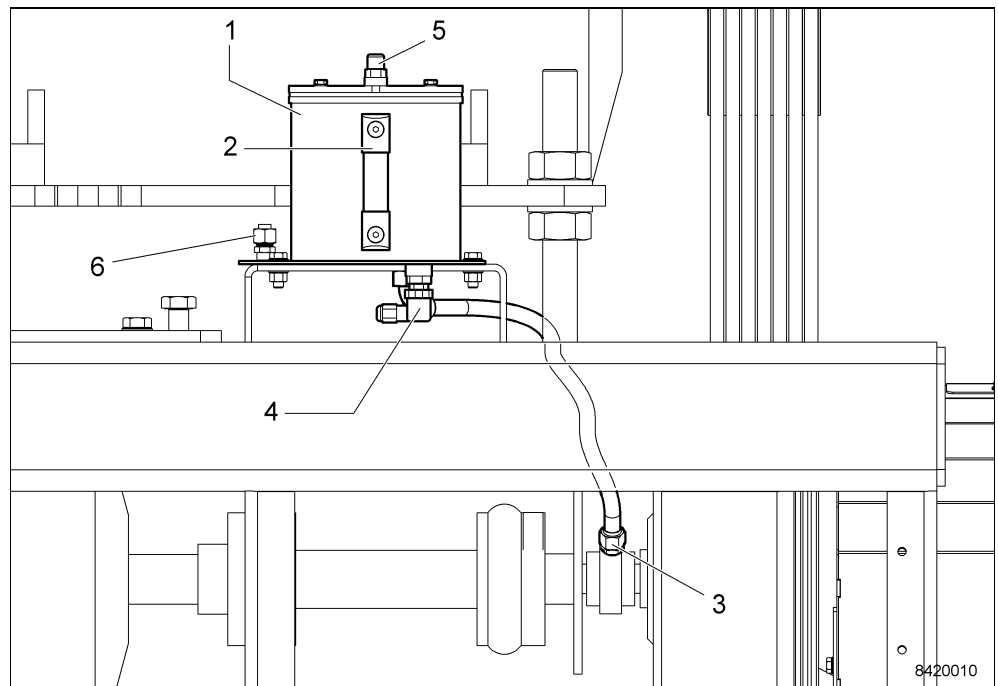


Fig. 105

- Unscrew the oil line from the rotary leadthrough (3).
 - Collect the oil.
 - Seal gearbox. Use the screw (6) provided.
- If the oil in the vessel is not changed, fasten the oil line at (6).
- Take out the bearing temperature feelers.
- Disconnect oil + air lubrication and pull the connector off the pressure switch.
- Remove the vibration pickup.
- Remove the hood flushing.

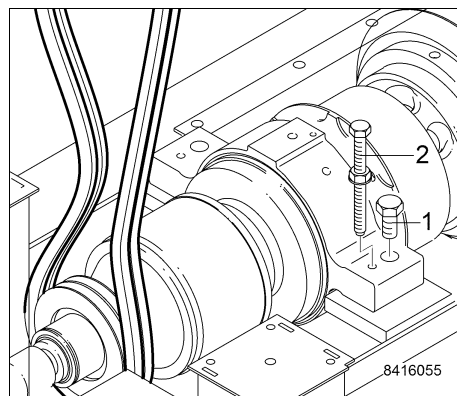


Fig. 106

- Remove the speed sensors with holder.
- Undo the fastening screws (1) on both bearing housings.
- Force off the bearing housing with the aid of screws (2).

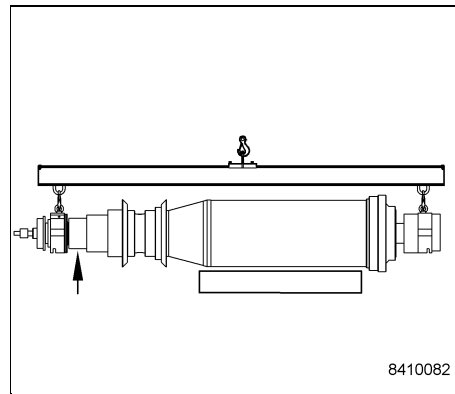


Fig. 107

- Carefully take the bowl out of the frame and place it on a suitable surface.

IMPORTANT: If the gear is exposed to large temperature fluctuations, the gaskets can get destroyed.

As the gear is completely filled with oil, overpressure may occur in the gear.

- **Countermeasure:** Fill the oil and add preservative oil, see also notes on long-term storage in the chapter "Long-term storage".

12.4 Installing the bowl

- Clean all parts carefully. Replace worn or damaged parts immediately.
- Lightly oil contact surfaces.
- To ensure perfect running of the bowl, all plane surfaces and centering rims must be smooth and clean.

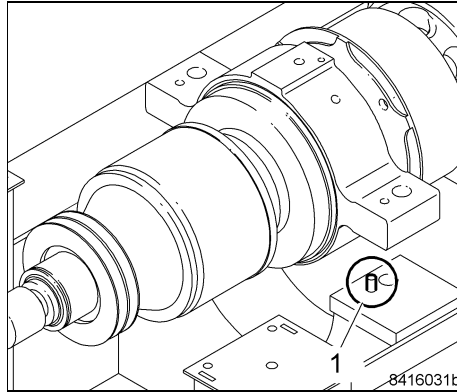


Fig. 108

- Place the complete bowl on the frame. Make sure that the arresting pins 1 are correctly registered in the two bearing housings.
- Mount the drive belt.

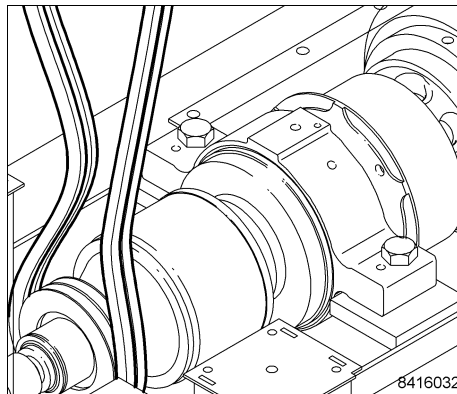


Fig. 109

- Secure both bearing housings.
- Fit and adjust the speed sensors, see section "Fitting the speed sensors".

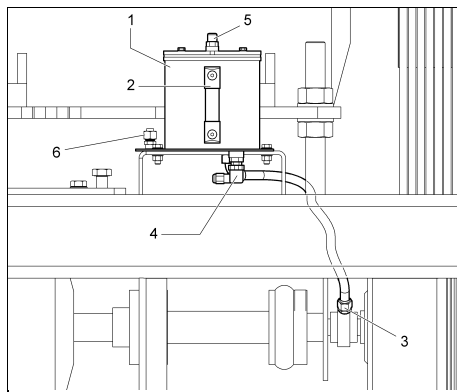


Fig. 110

- Unscrew the M16x1.5 plug from the rotary leadthrough (3).
- Connect the oil line to the rotary leadthrough (3).

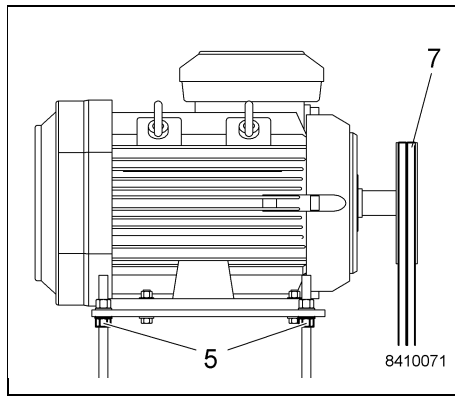


Fig. 111

- Mount drive belt (7).
- Tension the drive belt; to do this, adjust nuts (5) uniformly.
 - Check the belt tension, see section "Tensioning the drive belt".
- To install coupling, see chapter "Maintenance / Installing coupling"

Not installed on every version

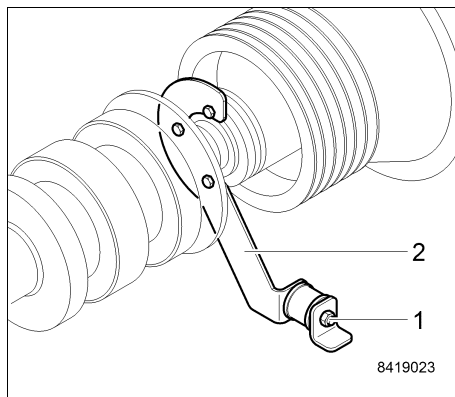


Fig. 112

- Fit torque arm (2).

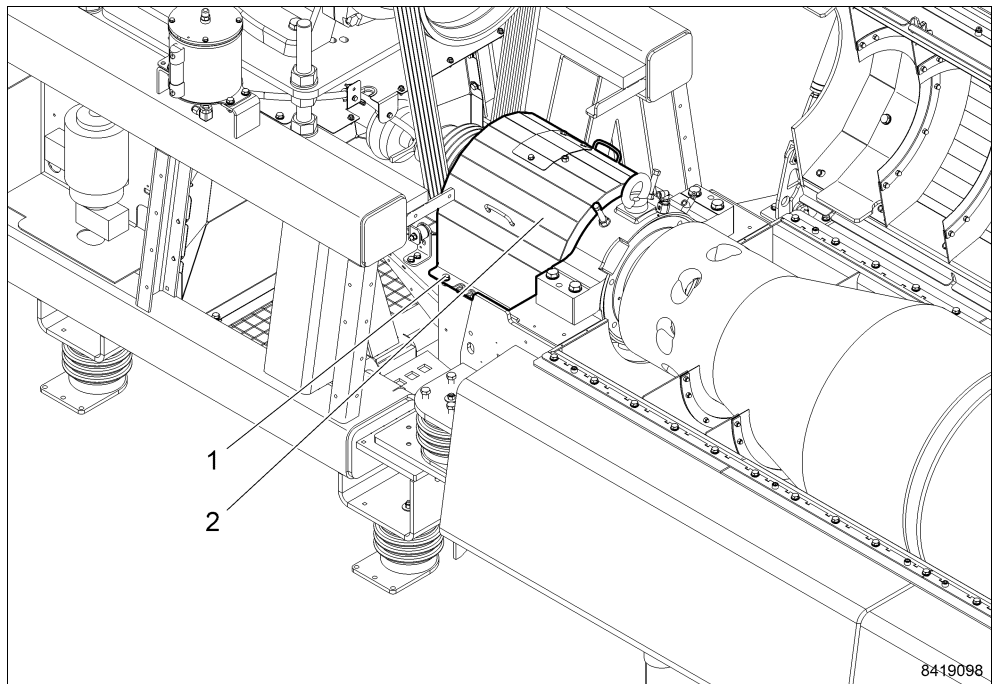


Fig. 113

- Fit the upper parts of the air vent (2) and tighten the screws (1).

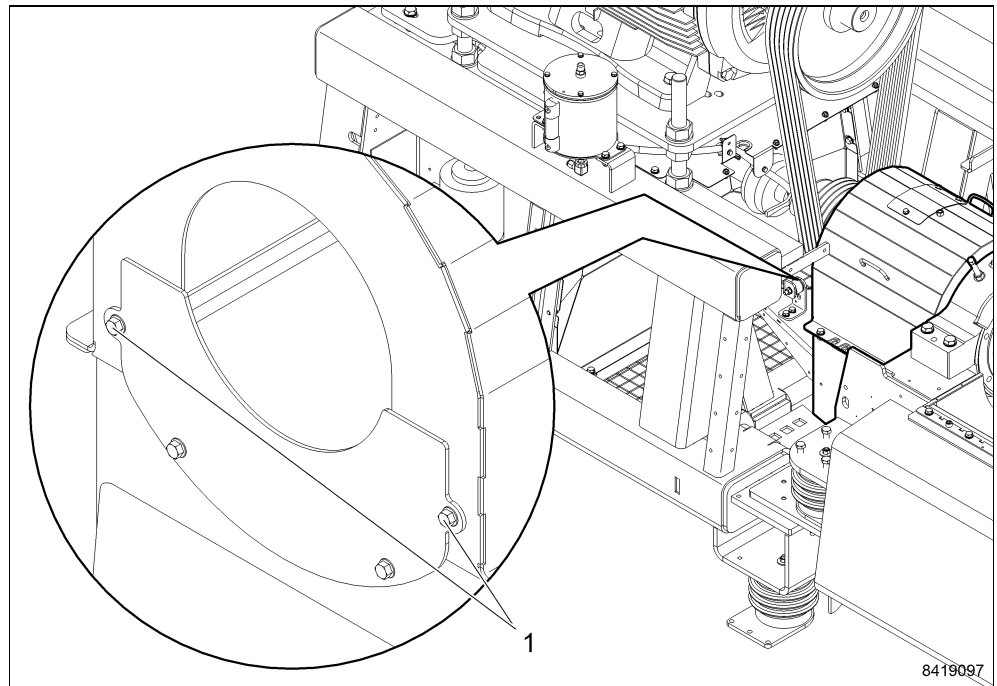


Fig. 114

- Tighten screws (1).

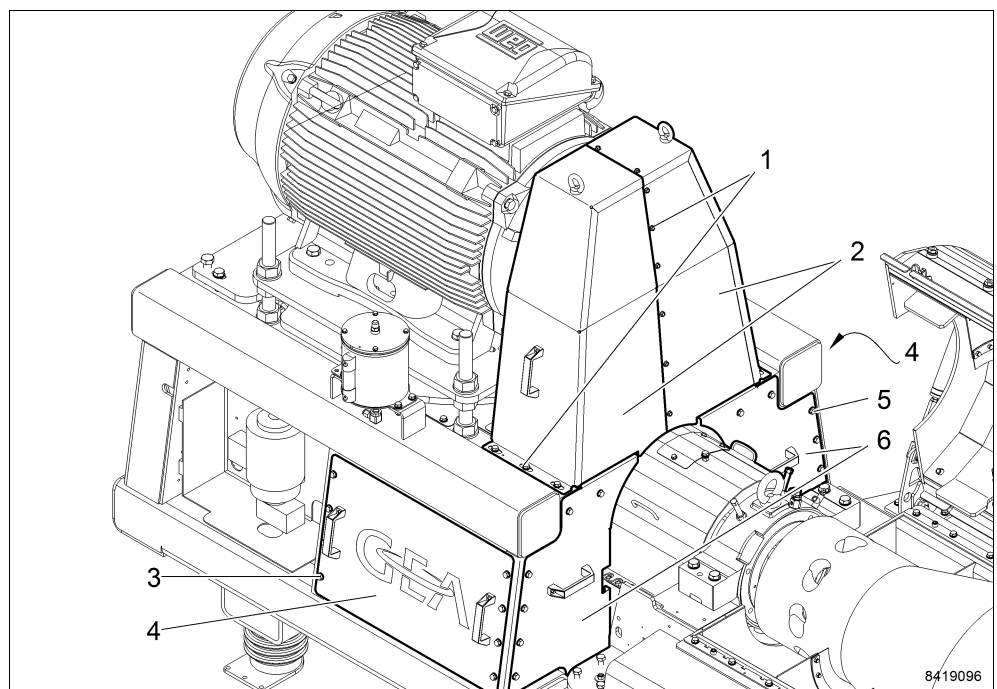


Fig. 115

- Fit the guards (6) and tighten the screws (5).
- Fit the large side cover (4) and tighten the screws (3).
- Attach the protective hoods (2) and tighten screws (1).

Without installed hydraulic application**WARNING****Risk of injury from falling components**

If a hydraulic application is not fitted or connected, there is a risk of serious injury from the hood accidentally falling shut.

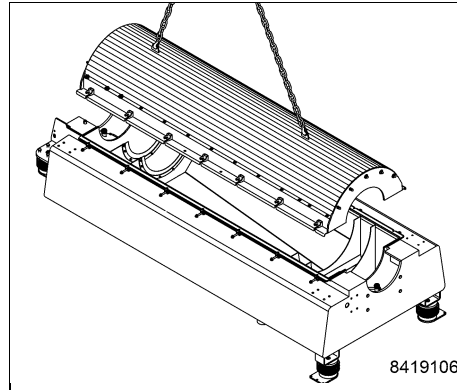


Fig. 116

- Attach the hood with a hoist.
- Only attach the lifting gear to the lugs provided

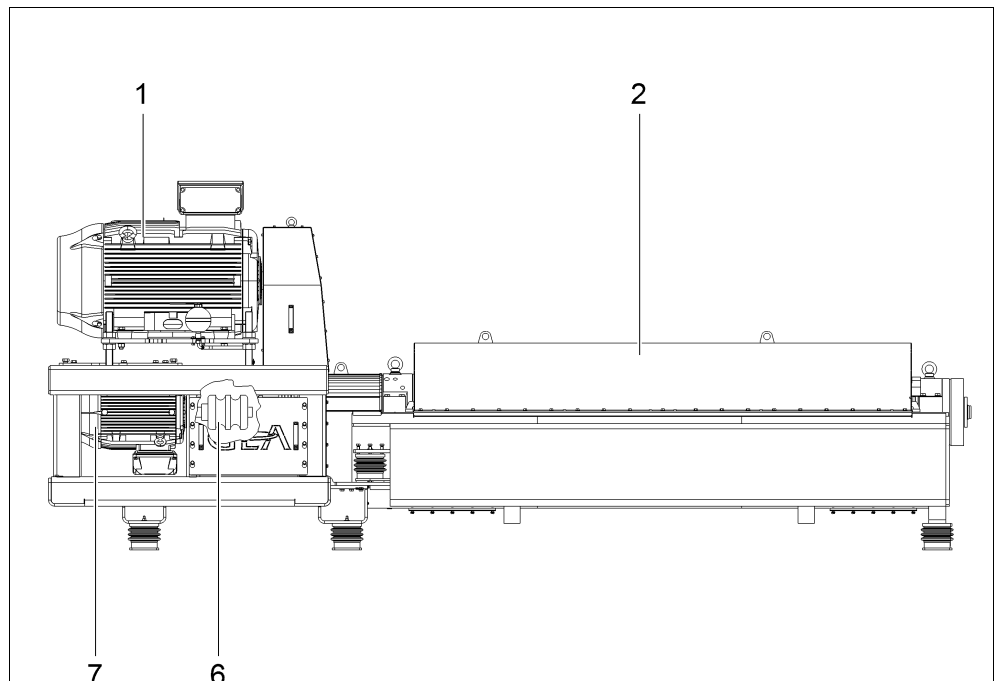
▼ Begin option
Option hinged cover**If hydraulic application is installed**

Fig. 117

- Undo the safety latches on both sides by turning in the direction of the arrow.

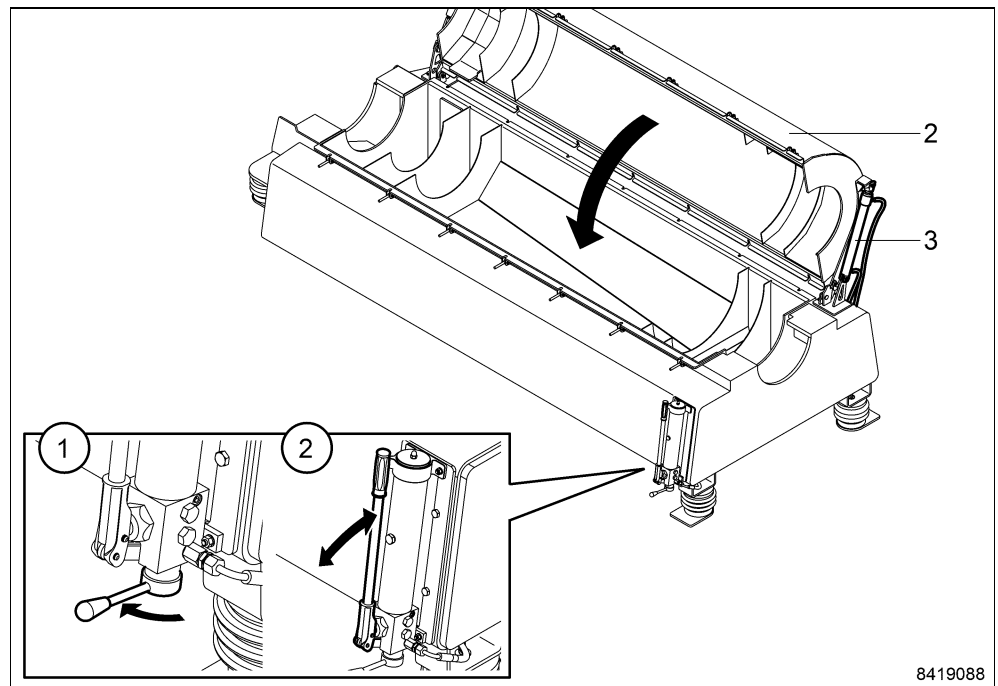


Fig. 118

- Place the lever (1) in the position as shown.
- The cylinder (3) is activated and the hood (4) is closed by pumping the handle (2).

▲ End option

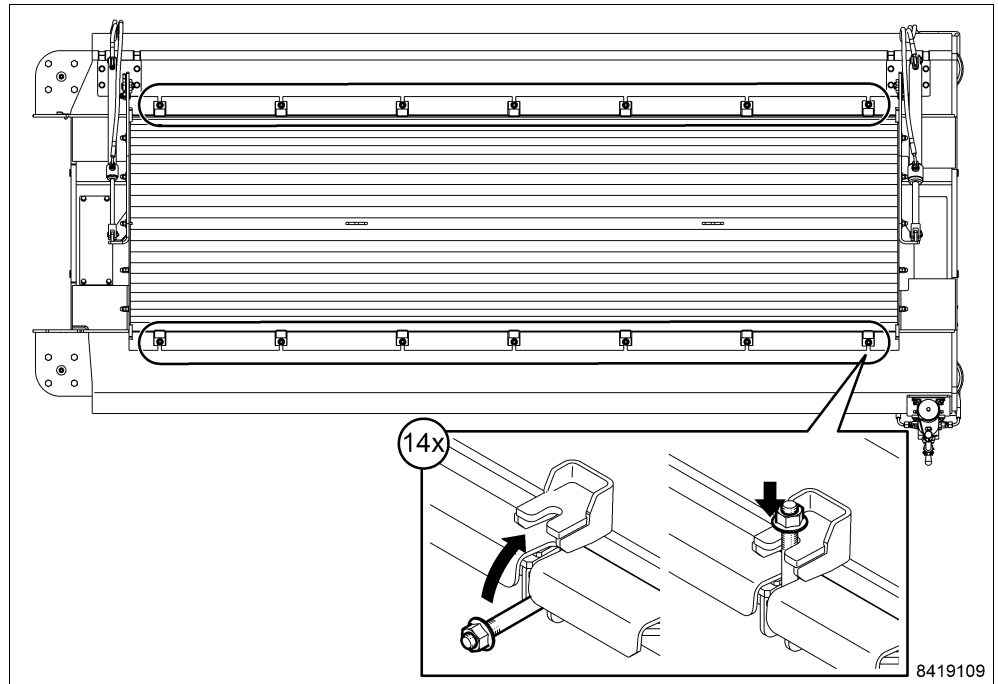


Fig. 119

- Pull down the bolts
- Tighten the nuts.
- Fasten the hood flushing.
- Mount the vibration pickup.
- Fasten the oil + air lubrication.
- Fit the bearing temperature feelers.

12.5 Aligning the ring halves (option)

Only on version with one-piece catcher.

The ring halves consist of plastic. The seat and condition must be checked regularly.

The ring halves can run in a little. Adjust the clearances rather too small than too large.

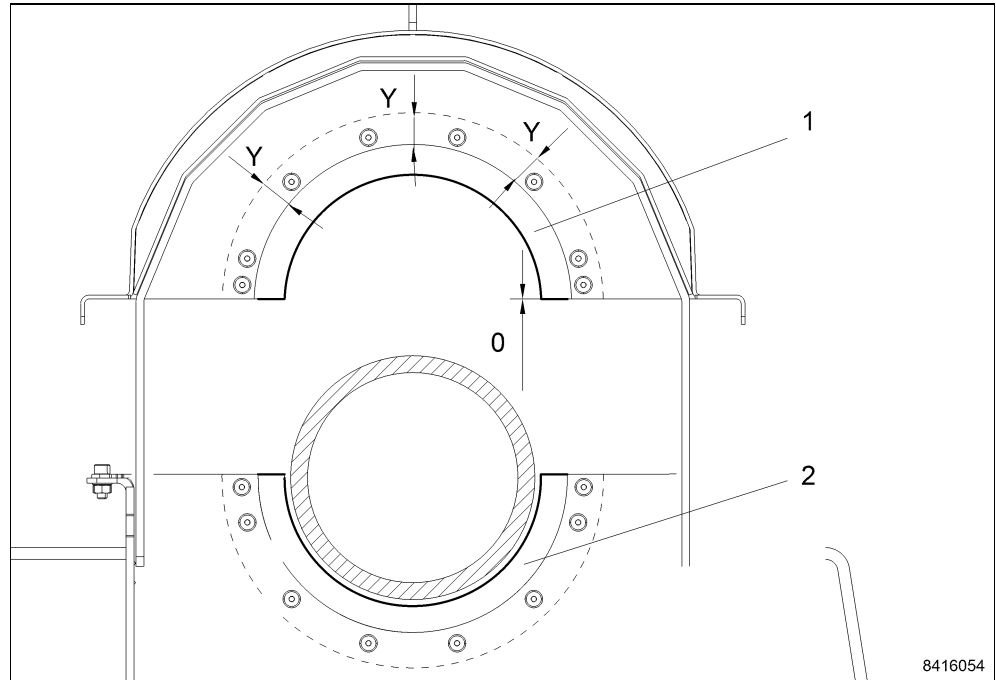


Fig. 120

- Slide the lower ring halves (2) to the bowl shell until the cams touch the bowl.
- Align the upper ring halves (1) with the wall of the catcher upper part.
 - Align dimension (Y) uniformly.
 - Tighten the screws loosely.
 - The ring halves can still be moved under pressure.
- Mount the hood and fasten to the housing with four screws.
- Check to see if the bowl can be turned by hand. If the bowl can be rotated by hand:
 - Remove the hood.
 - Move ring halves (1) slightly further outwards.
- As soon as the optimum fitting position has been found, raise the hood and tighten all screws firmly.
- Check again to see if the bowl can be turned by hand.
 - If the ring halves have too strong contact with the bowl, increased vibrations may occur during operation.
 - Re-align the ring halves if necessary.

12.6 Removing the scroll



DANGER

Danger to life through high-speed rotating machine parts !

There is a risk of serious injury due to being pulled into the machine and through ejection of machine parts or product residues.

- Do not loosen any part of the machine before the bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional switching-on.
- Do not start maintenance work until the components have cooled down to room temperature. Depending on the application and product temperature, the cooling phase can take up to 2 hours.

IMPORTANT:

- Use only suitable hoists and load suspension devices.
- Always use complete tools and use them only for the intended application, see separate spare parts catalog "Set of tools".

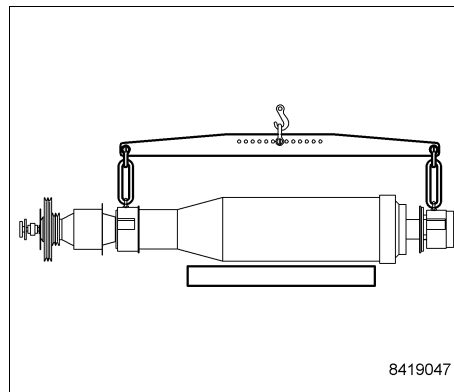


Fig. 121

- Remove the bowl, see chapter "Servicing / Removing the bowl".
- Set the bowl down and support it so that the bowl is stable with and without scroll.

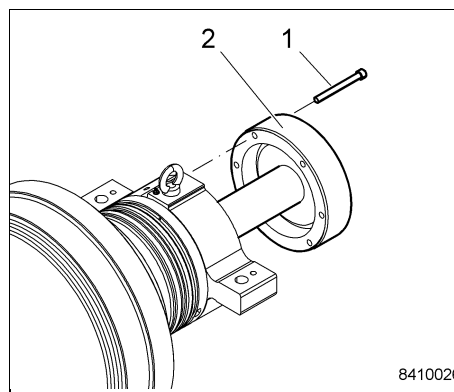


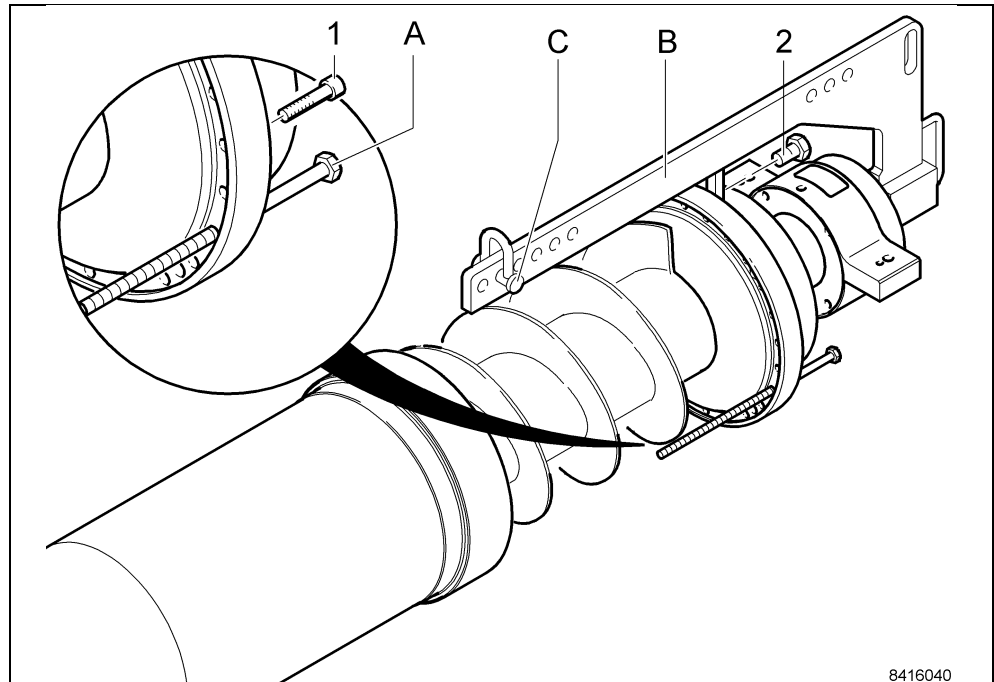
Fig. 122

- Unscrew screws (1).
- Force off and dismantle feed tube (2).

**WARNING****Danger of tipping when pulling the scroll out of the bowl**

When pulling the scroll out of the bowl, there is a danger that the scroll will topple over in the hoist.

- If the scroll cannot be pulled horizontally out of the bowl, alter load fastening point (C).
- **Remove** solids sticking to the scroll flights immediately when pulling out the scroll. **The hoist could otherwise be overloaded.**



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Fig. 123

- Mount hoist (B) and fasten to the bearing hub with screw (2). Tighten screw hand-tight.
- Unscrew screws (1).

NOTICE

Incorrect forcing off will damage the tool or other components.

Uneven forcing off can lead to a situation where individual puller screws are inadmissibly elongated due to overload or dismantling of the scroll is not possible.

- **Evenly force off scroll and bearing hub with 4 screws (A)** and carefully withdraw it from the bowl shell.
- Place the scroll on a suitable surface.
- Support the scroll and secure it from rolling away.
- Seal the tapholes in the bowl shell with screws. The balancing weights in the bowl could otherwise fall out.

12.7 Fitting the scroll

- Clean all parts carefully. Replace worn or damaged parts immediately.
- To ensure perfect running of the bowl, all plane surfaces and centering rims must be smooth and clean.
- Solid residuals in the bowl, flush liquid etc. may under no circumstances be allowed to get into the tothing (B) of the gear shaft.
- Grease drive shaft (A) and tothing (B) to avoid fretting corrosion.
 - Use WS M paste 104 (WS Part-No. 0015-0104-080).

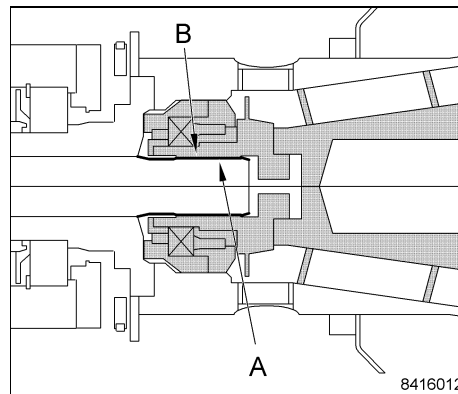


Fig. 124

- Introduce the scroll into the bowl and use slight pressure to slide the scroll in front of the drive shaft (A).
 - Pay attention to correct positioning of the tothing.
- Correct positioning of the tothing can be attained by rotating the scroll or gear input shaft so that the drive shaft (A) slides into the spline profile (B) of the gear.

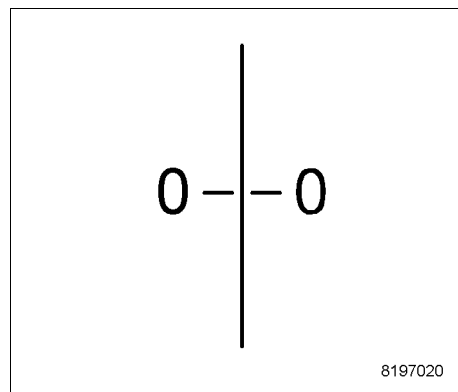


Fig. 125

- Align the "O" marks on the bowl shell and perforated disk by turning the perforated disk.

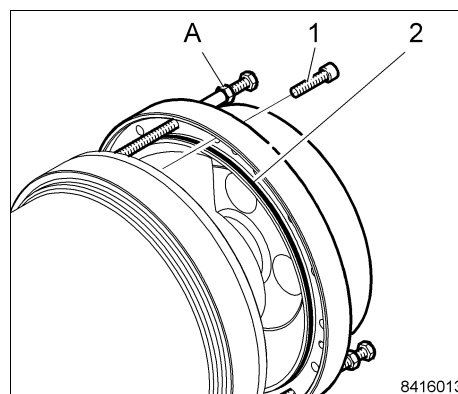


Fig. 126

- Check the position of gasket (2) in the perforated disk.
- Screw 4 hex head screws with distance tubes and nuts (A) into the bowl.
 - By turning nuts (A), force the scroll all the way into the bowl until the bearing hub is seated in the centering of the bowl shell.
- Tighten screws (1) evenly and cross-wise.

- Fit the feed tube.

- Fit the bowl, see chapter "Servicing / Fitting the bowl".

12.8 Gearbox service

- The gearboxes are maintained at the manufacturer's plant.
- Replacement gearboxes are supplied without an oil filling.

12.9 Dismantling the gear



Danger to life through high-speed rotating machine parts !

There is a risk of serious injury due to being pulled into the machine and through ejection of machine parts or product residues.

- Do not loosen any part of the machine before the bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional switching-on.
- Do not start maintenance work until the components have cooled down to room temperature. Depending on the application and product temperature, the cooling phase can take up to 2 hours.

IMPORTANT:

- Use only suitable hoists and load suspension devices.
- Always use complete tools and use them only for the intended application, see separate spare parts catalog "Set of tools".

Option:
Only on version with gear cooling:

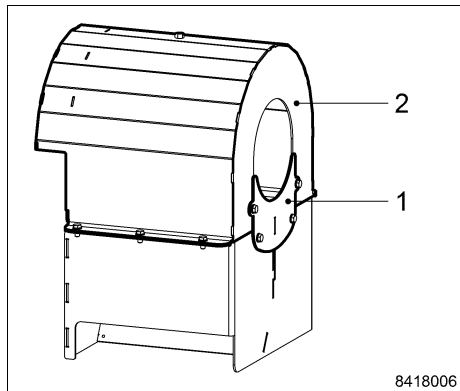


Fig. 127

- Remove cover plate (1).
- Remove upper part of air duct (2).

- Remove the coupling and torque arm / exchangeable pulley, see chapter "Servicing / Removing the bowl".

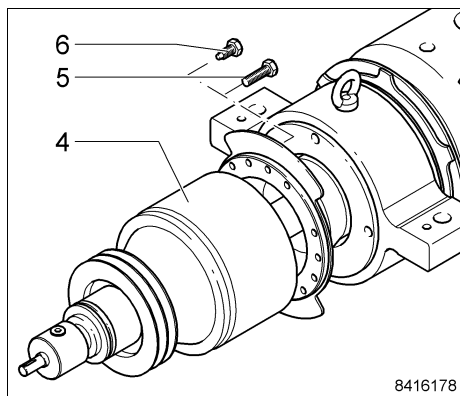


Fig. 128

- **Undo hex head screws (5).**
- Force gear (4) off the gear hub with screws (6).

12.10 Fitting the gearbox

- Clean all parts carefully. Replace worn or damaged parts immediately. Pay special attention to the condition of the gaskets.
- Use only complete tools for their intended use.
- Fill the gear with oil, see chapter "Filling in gear oil".

12.11 Gaskets

During all maintenance on the decanter:

- Use only gaskets that are in perfect condition!
- Replace worn or damaged gaskets immediately.
- Use only those sealing elements specified in the order-specific parts list.
- Use only genuine spare parts from GEA Westfalia Separator.

12.11.1 Radial packing rings

When fitting radial packing rings, pay attention to the following:

- Unsuitable radial packing rings cause damage to bearings.
- The radial packing rings for the scroll bearing assembly must be glued in.
 - Remove the grease from the seat for the radial packing ring using a suitable fluid.
 - Apply Loctite adhesive type 245 to the entire circumference of the shaft sealing ring.
- Do not use prohibited lubricants such as mounting paste or grease. These lubricants result in the formation of oil carbon which damages the radial packing rings within a very short space of time!

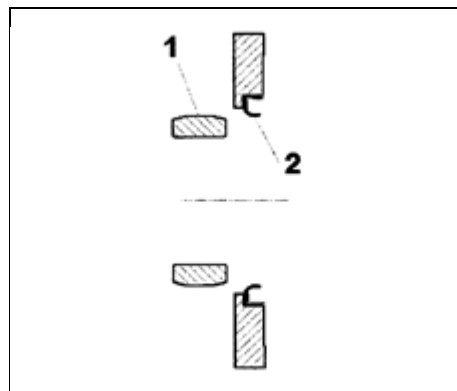


Fig. 129

- Apply a thin coat of lubricant only to the bearing surfaces (1) prior to assembly.
- Use the lubricant sparingly.
- Be sure to use the same lubricant that is used for roller bearing lubrication.
- Do not apply lubricant to the sealing lips of the radial packing rings.

12.12 Removing the main motor



DANGER

Danger to life through high-speed rotating machine parts !

- Do not loosen any part of the machine before the decanter bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional switching-on.
- Do not start maintenance work until the components have cooled down to room temperature. Depending on the application and product temperature, the cooling phase can take up to 2 hours.
- Use only complete tools for their intended use.

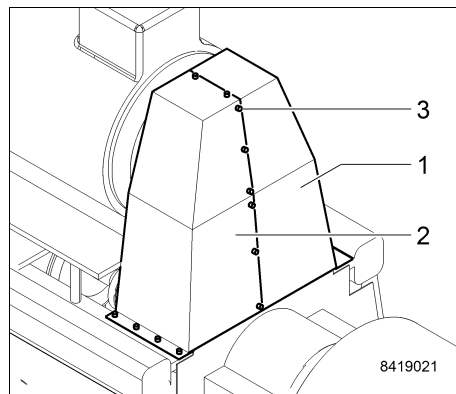


Fig. 130

- Unscrew screws 3.
- Remove guards 1 and 2.

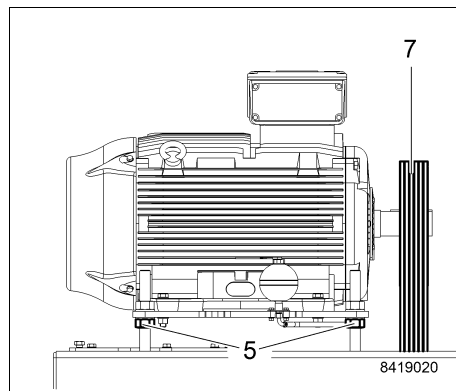


Fig. 131

- Lower the motor by evenly turning nuts 5.
- Remove drive belt 7.
- Unscrew the nuts.
- Remove the motor and motor bracket 8. Use eye bolts.
- Place the motor on a suitable base.

12.13 Removing the secondary motor



DANGER

Risk of death from machine parts rotating at high-speed

- Do not loosen any part of the machine before the decanter bowl has come to a standstill.
- Wait for the run-down time to elapse, approx. 30 minutes.
- Secure the machine against unintentional switching-on.
- Do not start maintenance work until the components have cooled down to room temperature. Depending on the application and product temperature, the cooling phase can take up to 2 hours.
- Remove the main motor, see chapter "Servicing/Removing the main motor".
- Remove the coupling, see chapter "Servicing / Removing the coupling".

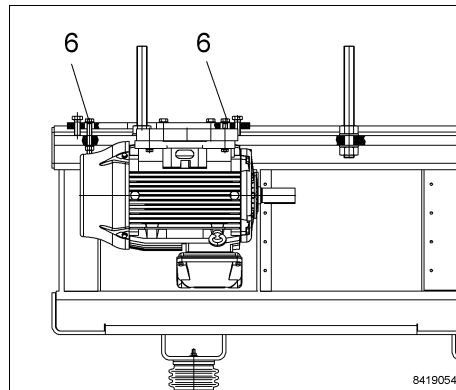


Fig. 132

- Unscrew screws 6.

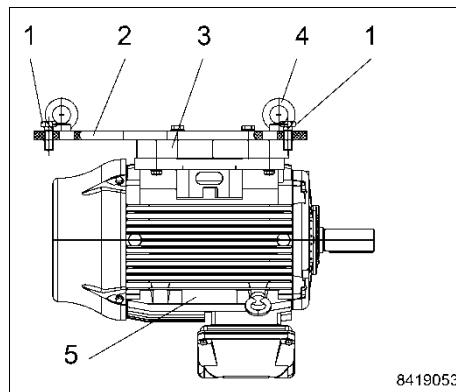


Fig. 133

- Fit eye bolts 4 (M24) to the motor bracket.
- Raise secondary motor (5) slightly and pull it out to the fan side.
- Place the secondary motor on a suitable surface.

12.14 Fitting the secondary motor

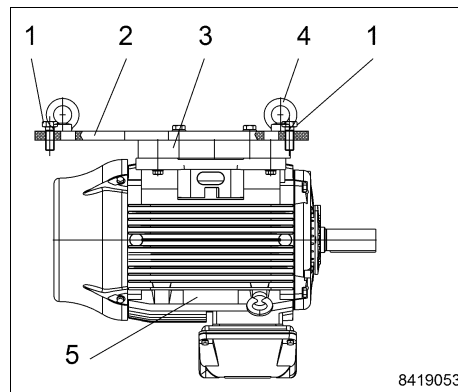


Fig. 134

- Place the secondary motor 5 on a suitable surface.
- Bolt motor bracket 2 to the spacers 3.
- Bolt the secondary motor to the spacers 3.
- Screw screws 1 loosely into the motor bracket. The screws serve later to align the motor.
- Fit eye bolts 4 (M24) to the motor bracket.

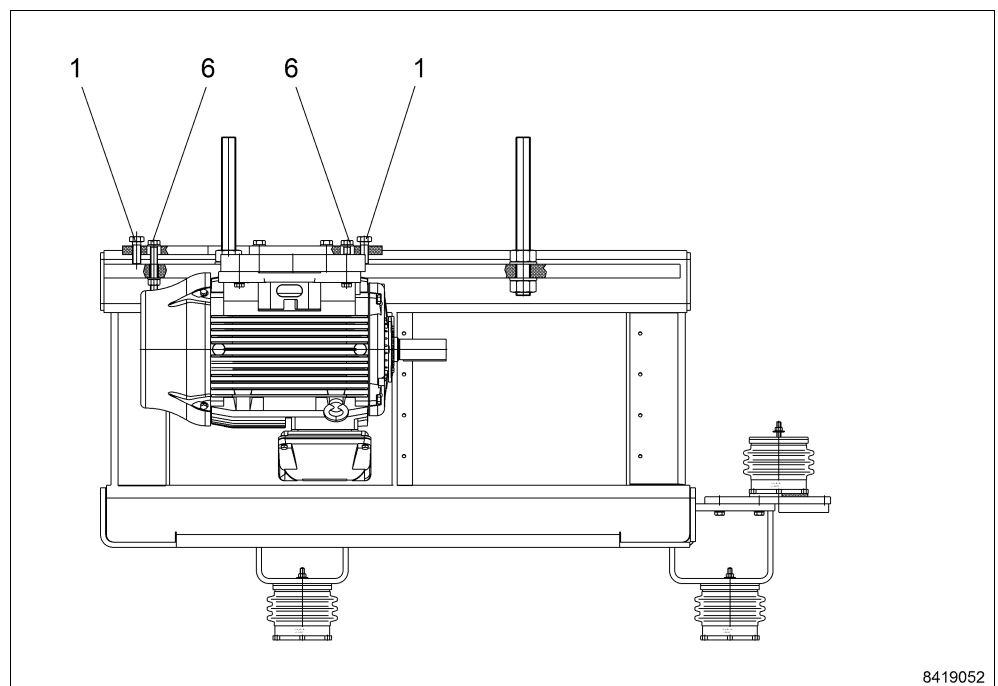


Fig. 135

- Hang the pre-assembled unit into a hoist and position in the drive frame.
- Fasten the secondary motor loosely in the drive frame with fastening screws 6. The motor must be aligned later.
- Remove the eye bolts.
- Fit the main motor, see chapter "Fitting the main motor".
- Tension the drive belt, see chapter "Re-tensioning drive belt".
- Fit and align the coupling, see chapter "Fitting the coupling". Align the secondary motor at the same time:
 - The height is altered with the aid of screws 1.
 - Fastening screws 6 allow lateral adjustment via slots.

12.15 Fitting the main motor

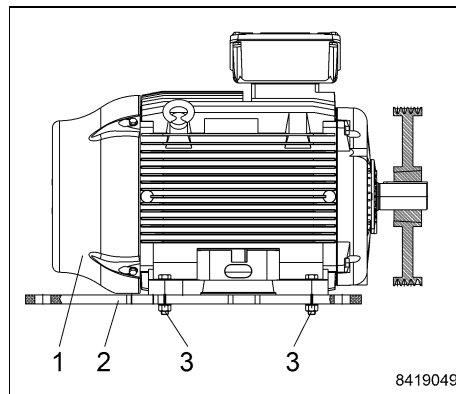


Fig. 1

- Fasten the motor 1 on the motor bracket with the aid of the screws 3.

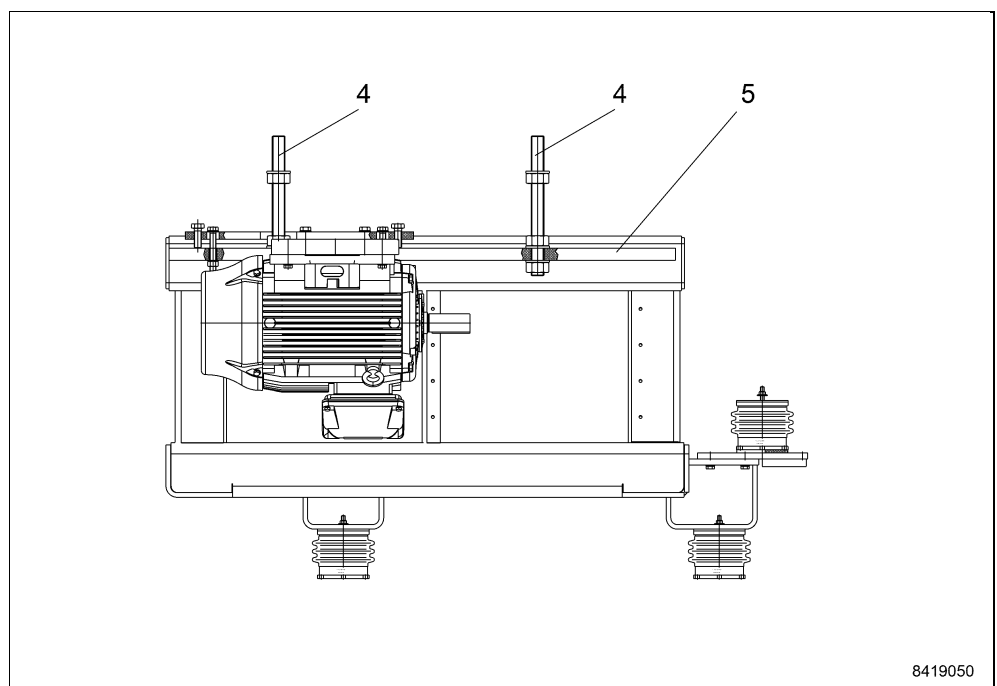


Fig. 2

- Fasten threaded rods 4 in the drive frame 5.

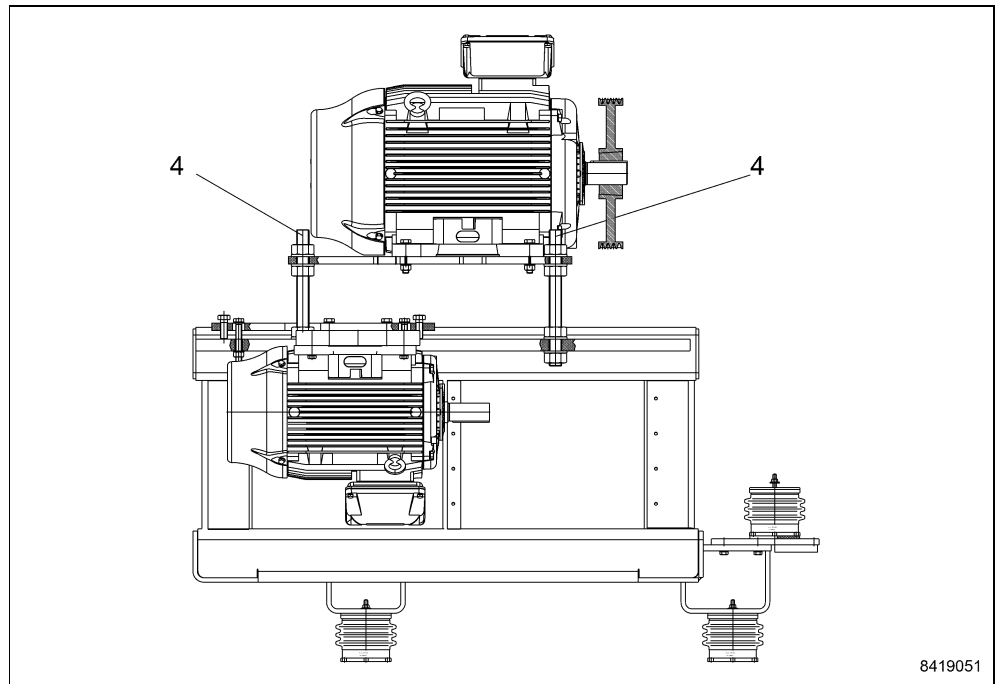


Fig. 3

- Position and fasten the main motor and motor bracket on the threaded rods.
- Align the belt pulleys.

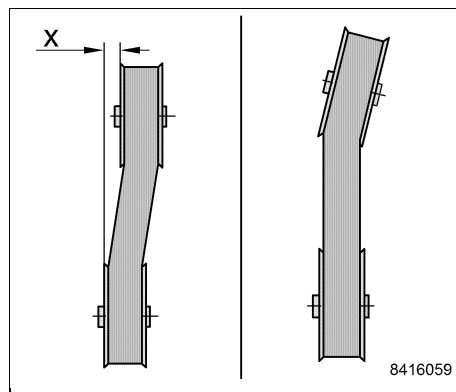


Fig. 4

- Check the belt pulleys for correct alignment.
 - Avoid the errors illustrated.
 - The deviation of the pulley alignment should not exceed $x = 3$ mm.
 - The larger the off-track running of the belts, the higher the wear.

- Mount and tension the drive belt, see chapter "Re-tensioning drive belt".
- Fit the coupling and align the secondary motor. See chapter "Fitting the coupling and secondary motor".

12.16 Removing the coupling.

Different couplings are used depending on the application.

Coupling type A

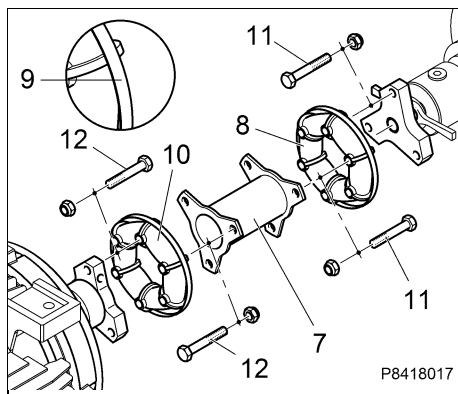


Fig. 5

- Pre-tension the coupling ring (10) with clip (9).
- Unscrew screws (12).
- Remove coupling ring (10).
- Pre-tension the coupling ring (8) with clip (9).
- Unscrew screws (11).
- Remove pipe (7) and coupling ring (8).

Coupling type B

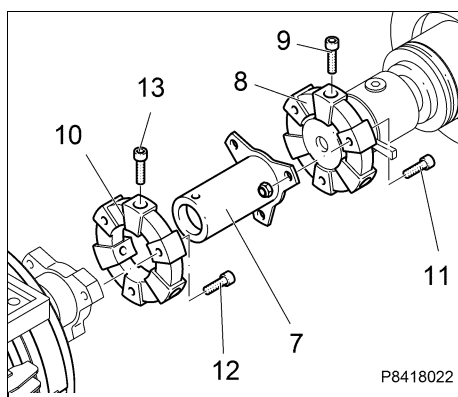
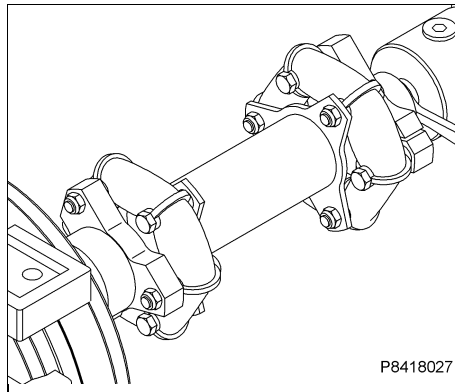


Fig. 6

- Unscrew screws (9) and (13).
- Unscrew screws (11) and (12).
- Remove coupling ring (10) and pipe (7).
- Remove coupling ring (8).

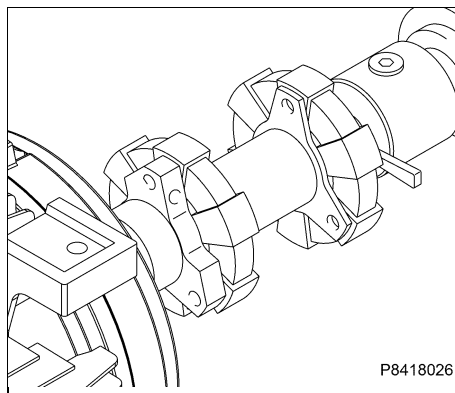
12.17 Fitting the coupling

Different couplings are used depending on the application.



Coupling type A

Fig. 7



Coupling type B

Fig. 8

12.17.1 Fitting the coupling (type A)

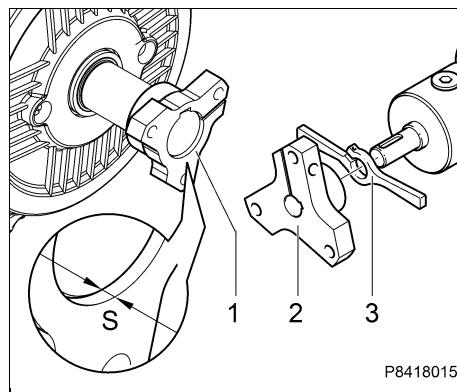


Fig. 9

- Slide disk (3) onto the gear shaft and arrest it.
- Slide gear-side coupling hub (2) onto the gear shaft as far as it will go and arrest it.
- Fasten the motor-side coupling hub (1) on the motor shaft.
 - The coupling half must be at least 2 mm (S) in front of the motor shaft.

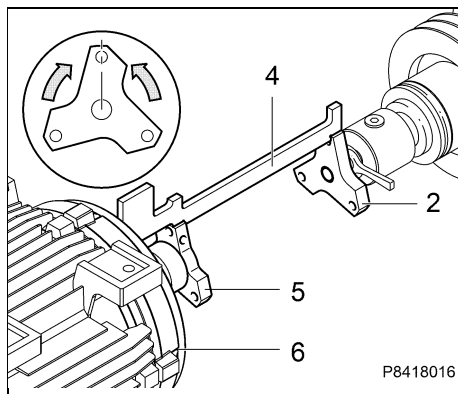


Fig. 10

- Turn the coupling hubs so that one of the tips respectively points upwards.
- Check the distance of the coupling hubs with the centering aid (4) and correct if necessary.
 - The centering aid must fit exactly between the coupling hubs.
 - Correct small deviations up to 0.5 mm by displacing the motor-side coupling hub (5).
 - Correct bigger deviations by displacing the secondary motor (6).
 - **IMPORTANT!** No not displace the gear-side coupling hub (2).

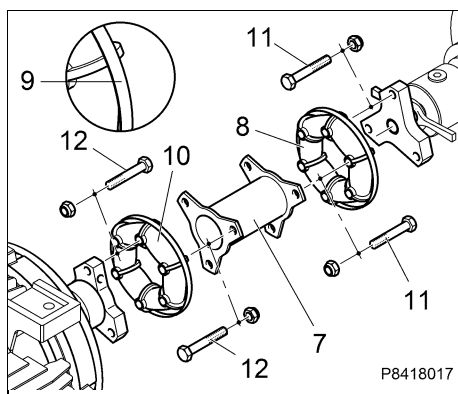


Fig. 11

- Remove the centering aid.
- Fit pipe (7), coupling ring (8) and clip (9).
- Pre-tension coupling ring (8) with clip (1) until screws (11) can be screwed in.
- Tighten screws (1) firmly.
- Remove the clamp (9).
- Pre-tension coupling ring (10) with clip (9) until screws (12) can be screwed in.
- Tighten screws (12) firmly.
- Remove the clamp (9).

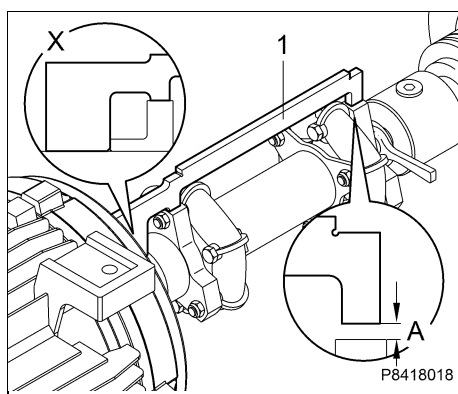


Fig. 12

- Mount the centering aid (1) on the motor shaft as shown in detail X.
- Align the motor so that the centering aid (1) is seated on both coupling hubs.
 - Adjust the height of the motor bracket if necessary.
 - The offset (A) must be smaller than 1 mm.

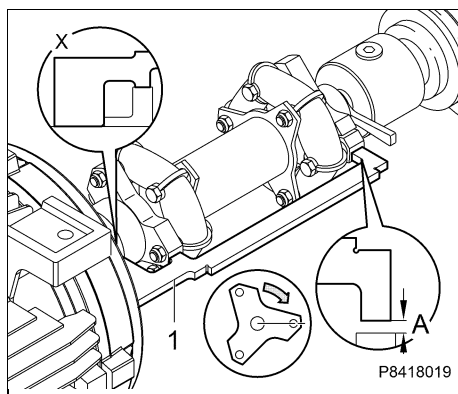


Fig. 13

- Turn the coupling through 90° so that one of the tips faces the side.
- Mount the centering aid (1) on the motor shaft as shown in detail X.
- Align the motor so that the centering aid (1) is seated on both coupling hubs.
 - The offset (A) must be smaller than 1 mm.
 - Displace the motor laterally if necessary.
- Tighten the screws of the motor and motor bracket.

12.17.2 Fitting the coupling (type B)

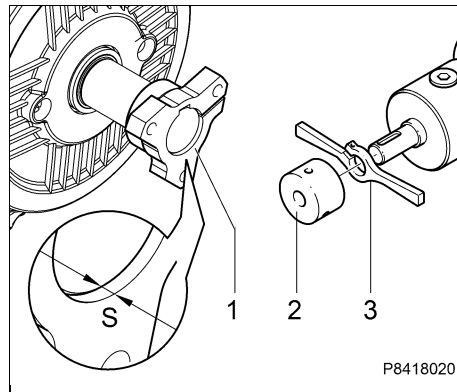


Fig. 14

- Slide pulse transmitter (3) onto the gear shaft as far as it will go and arrest it.
- Slide gear-side coupling hub (2) onto the gear shaft as far as it will go and arrest it.
- Fasten the motor-side coupling hub (4) on the motor shaft.
 - The coupling hub must be approx 2 mm (S) in front of the motor shaft.

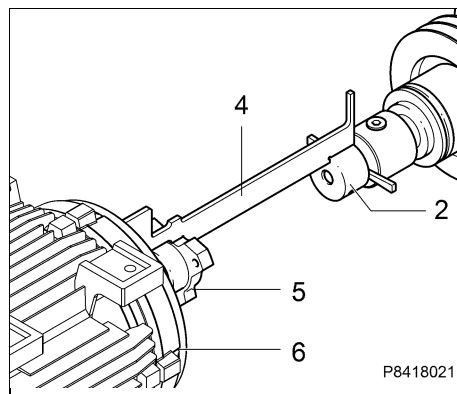


Fig. 15

- Check the distance of the coupling hubs with the centering aid (4) and correct if necessary.
 - The centering aid must fit exactly between the coupling hubs.
 - Correct small deviations up to 0.5 mm by displacing the motor-side coupling hub (5).
 - Correct bigger deviations by displacing the secondary motor (6).
 - **IMPORTANT:** Do not displace the gear-side coupling hub (2).

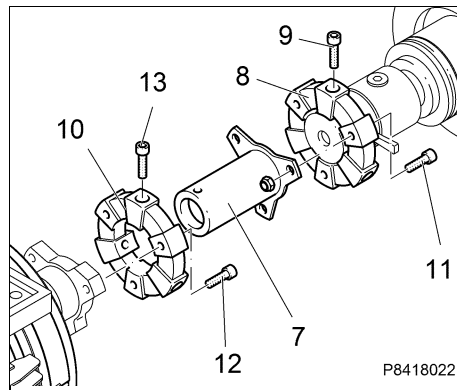


Fig. 16

- Remove the centering aid.
- Mount coupling ring (8) on the gear-side coupling hub. Screw in screws (9) loosely.
- Slip coupling ring (10) on pipe (7) and tighten screws (13) loosely.
- Fasten the pipe (7) with screws (11).
- Fasten coupling ring (10) to the motor-side coupling hub with screws (12).
- Tighten screws (9) and (13).

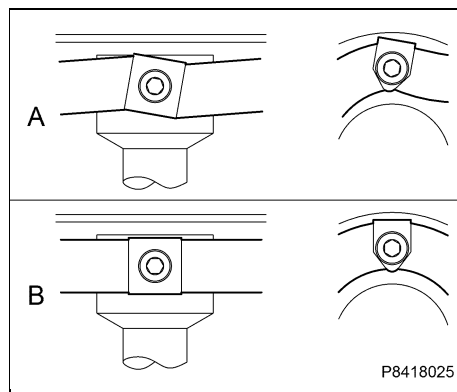


Fig. 17

IMPORTANT!

- The coupling rings must not be deformed through the screwing (example A).
- The rubber elements must retain their original form (example B).

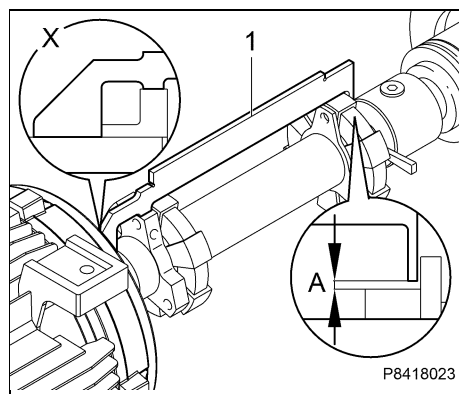


Fig. 18

- Mount the centering aid (1) on the motor shaft as shown in detail X.
- Align the motor so that the centering aid (1) is seated on both coupling hubs.
 - To do this, adjust the height of the motor bracket.
 - The height offset (A) must be smaller than 1 mm.

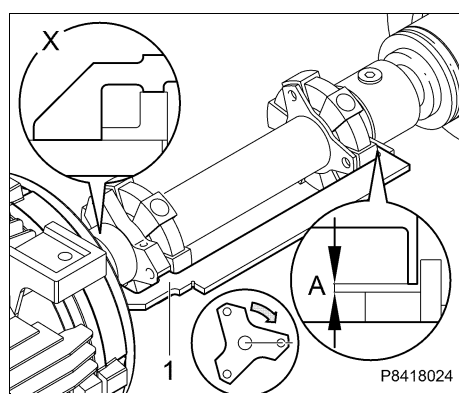


Fig. 19

- Turn the coupling hubs through 90° so that one of the tips respectively faces the side.
- Mount the centering aid (1) on the motor shaft as shown in detail X.
- Align the motor so that the centering aid (1) is seated on both coupling hubs.
 - To do this, displace the motor laterally.
 - The side offset (A) must be smaller than 1 mm.
- Tighten the screws of the motor and motor bracket.

12.18 Replacing belt pulleys

The design of the belt pulleys and drive belts depends on the motor power set and the drive concept.

The following variants can be installed:

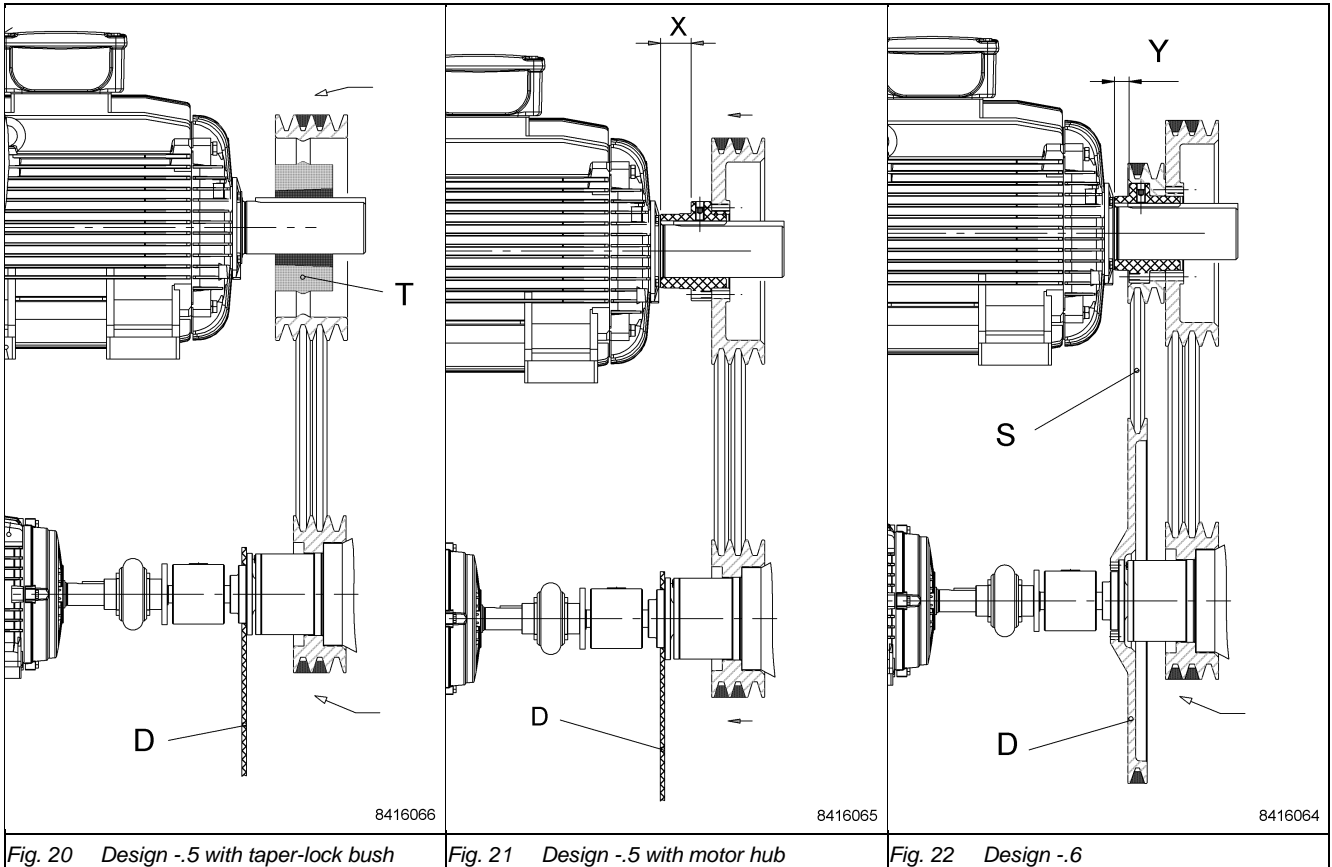


Fig. 20 Design -.5 with taper-lock bush

Fig. 21 Design -.5 with motor hub

Fig. 22 Design -.6

<p>Characteristics:</p> <ul style="list-style-type: none"> • 1 pair of belt pulleys • No belt drive for the worm • D = torque support • T = belt pulley with taper lock bush <p>Note:</p> <ul style="list-style-type: none"> • There may be more grooves present than belts. <ul style="list-style-type: none"> - Motor belt pulley: Arrange the belt in the middle - Decanter belt pulley: Arrange the belt on the motor side • Chapter "Replacing motor belt pulley (taper lock bush)" 	<p>Characteristics:</p> <ul style="list-style-type: none"> • 1 pair of belt pulleys • No belt drive for the worm • D = torque support • X = long offset of motor hub in the direction of the motor <p>Note:</p> <ul style="list-style-type: none"> • There may be more grooves present than belts. <ul style="list-style-type: none"> - Arrange the belt on the motor side 	<p>Characteristics:</p> <ul style="list-style-type: none"> • 2 pair of belt pulleys • S = worm drive • No torque support • X = short offset of motor hub in the direction of the motor <p>Note:</p> <ul style="list-style-type: none"> • There may be more grooves present than belts. <ul style="list-style-type: none"> - Arrange the belt on the motor side
---	---	---

NOTICE

Incorrect belts, incorrect belt numbers and incorrect belt positions can lead to damage on the gear.

For standardisation reasons, some grooves in the belt pulleys may remain free.

- The free grooves must not be fitted with extra belts!
- The number of belts per belt pulley and the position must be taken from the speed table (the speed table is not part of the standard customer documentation).
- Reset the original state following maintenance work.
 - The grooves used can be recognised through traces of use.
 - Unused grooves are painted completely.

12.19 Replacing the motor belt pulley (taper lock bush)

The following work may be performed only by a trained specialist (Tspec).

The size "3525" illustrated has 3 fastening holes (A) and 2 puller holes (B).

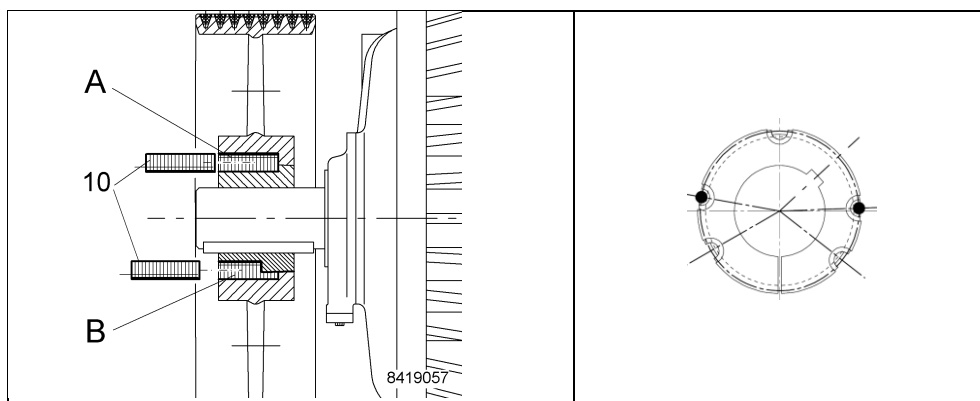


Fig. 23

Dismantling

- Hang the V-belt pulley into a hoist with the aid of a suitable rope.
 - **Attention:** Tension the rope only slightly to avoid damage to the motor bearing.
- Undo all three screws (A).
 - Remove two of the screws. Oil the screws liberally and screw into the puller holes (B).
- Tighten the screws alternately until the bush becomes dislodged from the hub and the pulley moves freely on the shaft.

Assembly

- Clean all unvarnished surfaces of the bush and pulley.
 - Ensure that the conical contact surfaces are clean and free from oil and dust.
 - Fit the pulley and bush into each other and align the holes.
- Apply a thin coat of oil to the screw thread. Screw the screws into the fastening holes (A).
- Clean the shaft. Slide the belt pulley onto the motor shaft and carefully align relative to the decanter belt pulley.
 - **IMPORTANT!** If the two belt pulleys are not exactly aligned, the machine will not run smoothly and the V-belts will wear prematurely.
- Tighten screws (10) alternately and evenly.
 - Required torque for screws $\frac{1}{2} \times 1\frac{1}{2} = 115$ Nm
 - Check the torque after 0.5 - 1 operating hours.
- Fill the puller holes with grease to prevent penetration of foreign bodies.

13 Decommissioning

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13.1 Notes on long-time storage of the centrifuge and individual rotors

The centrifuge/rotor will get damaged if it is not operated for a prolonged period and inadequate preserving measures are taken. This also applies for the time before commissioning.

When the machine is shut down for longer than 12 months, special measures are required to avoid the machine getting damaged during standstill.

If this action is not taken, the roller bearings of the machine in particular will be damaged by corrosion and one-sided load. This bearing damage results in high consequential costs.

The required preserving measures should be monitored by GEA Westfalia Separator Service.

13.1.1 Decommissioning the decanter

For a prolonged period of storage (standstill longer than one year), the decanter must be prepared as follows:

- Clean hood and catcher.
- Dismantle all feed and discharge lines on the machine and close the openings.
 - Product feed
 - Solids discharge
 - Fluid discharge
 - Flocculating agent feed
- Remove the coupling. Relax the drive belts and remove.
- Drain the gear oil from the gearbox and the surge reservoir. Fill in preserving oil.
- Option oil circulation lubrication system gearbox: Beforehand, drain gear oil from oil lubrication unit.
- Only in case of grease-lubricated bowl bearings
 - Fill the bowl completely with grease.
- Only in case of oil-lubricated bowl bearings:
 - Fill 0.05 litres of preserving oil into the bowl bearings (WS Part-No. 6969-0005-010).
 - In the case of individual rotors, additionally seal all holes.
- Tighten the bowl lock screws and lock with nuts.

13.1.2 Painted parts

An intact paint coating provides adequate corrosion protection. For this reason, painted parts must be examined for damage or changes once a month.

Touch up the damage in accordance with the instructions of the paint manufacturer.

13.1.3 Unpainted areas and galvanised parts

Unpainted areas and galvanised parts must be treated as follows:

- Carefully clean the area or part.
- Spray on corrosion protection wax (see lubrication and maintenance schedule). Note the exception in the following diagram.

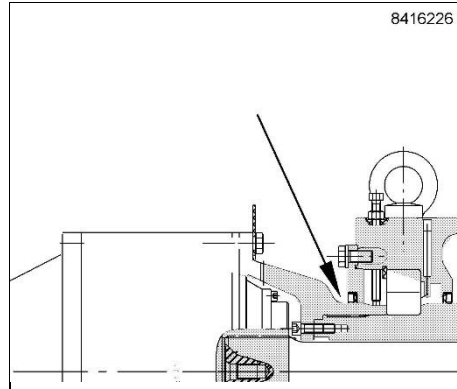


Fig. 24

- Treat this part of the hub with slushing oil (see lubrication and maintenance schedule).

- Check and, when necessary, touch up the corrosion protection once a month.

13.1.4 Gearbox / spare gearbox

The gearbox and spare gearboxes must be prepared as follows for long-term storage.

- Drain the lubricating oil completely, see chapter "Gear".
- Fill in 0.05 litre preserving oil (WS part no. 6969-0005-010) and close the gearbox.
- Carefully clean the gearboxes. Spray on corrosion protection wax (WS Part-No. 6969-0022-010) Check and, when necessary, touch up the corrosion protection once a month.

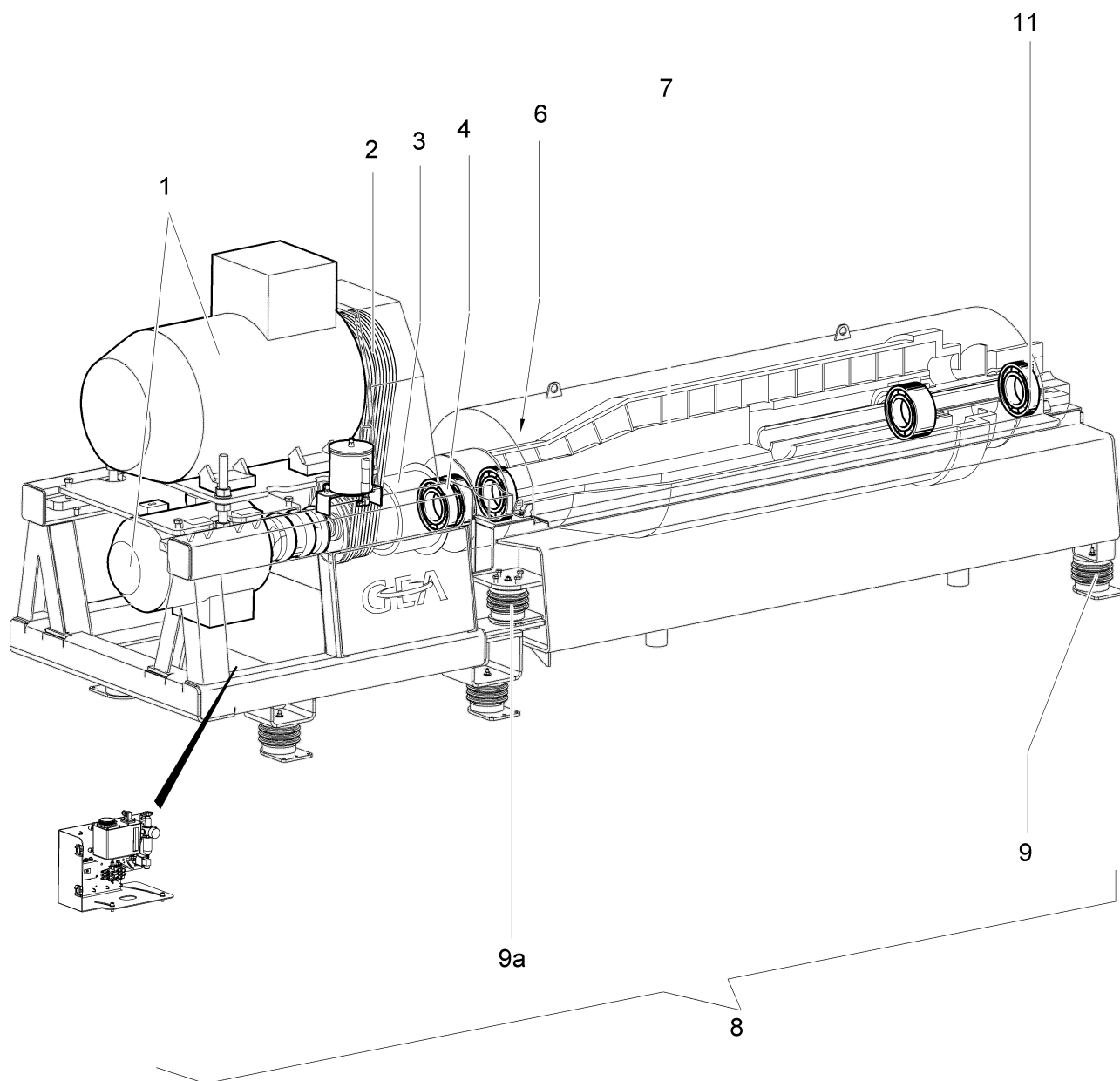
For the purpose of transporting the gearbox for inspection by the manufacturer, the gearbox must likewise be prepared as described above.

13.1.5 Drive motors

The drive motors must be prepared as follows for long-term storage.

- Option: Connect the space heaters for the motor winding. This is especially important in the case of high air humidity in the environment.
- Carefully clean the motor.
- Spray on corrosion protection wax.
- Check and, when necessary, touch up the corrosion protection once a month.

13.2 Maintenance schedule (machine shut-down for a prolonged period)



8420013

Fig. 25

Important: Machines decommissioned for longer than one year require regular maintenance to remain serviceable.

13.2.1 Maintenance work once a month			
Pos:	Machine part	Action	Operator
8	Decaners	<ul style="list-style-type: none"> ➤ Check paint finish. Touch up damage immediately. ➤ Check corrosion protection. If necessary, spray on corrosion protection wax (WS Part-No. 6969-0022-010) 	Tspec
7	Bowl	<ul style="list-style-type: none"> ➤ Rotate the bowl (minimum 10 revolutions) 	Tspec
3	Gearbox, input	<ul style="list-style-type: none"> ➤ Rotate the gearbox (minimum 10 revolutions) 	Tspec
1	Drive motors	<ul style="list-style-type: none"> ➤ Rotate the motor shaft (minimum 10 revolutions) 	Tspec

13.2.2 Maintenance work once a year			
Pos:	Machine part	Action	Operator
8	Decanter housing	<ul style="list-style-type: none"> ➤ Renew corrosion protection. ➤ Spray on corrosion protection wax (WS Part-No. 6969-0022-010) 	Tspec

13.2.3 Maintenance work before resuming operation			
Pos:	Machine part	Action	Operator
2	V-belts	<ul style="list-style-type: none"> ➤ Mount belts. 	Tspec
3	Gearbox	<ul style="list-style-type: none"> ➤ Filling in new oil 	Tspec
4 11	Bowl bearings	<ul style="list-style-type: none"> ➤ Carry out "Pre-lubricate bowl bearings". 	Tspec
6	Protective rings, clearers and bushes/ Solids discharge	<ul style="list-style-type: none"> ➤ Check wear and replace when necessary: 	Tspec
7	Bowl and scroll	<ul style="list-style-type: none"> ➤ Check for wear. ➤ When wear, damage or corrosion is detected on load-bearing bowl parts, contact Westfalia Separator Service. 	Tspec
9	Vibration isolators / frame Vibration isolators / drive	<ul style="list-style-type: none"> ➤ Check the vibration absorbers for any changes. Replace the vibration absorbers in the case of the following abnormal signs: <ul style="list-style-type: none"> • Cracks • Deformations • Discoloration Defective vibration absorbers may cause substantial follow-up damage. 	Tspec

Op = Operator

| Skilled = Skilled worker

| Tspec = Trained specialist

13.3 Disposing of the centrifuge

When the centrifuge has reached the end of its useful service life, the plant operator is responsible for proper and correct disposal.

It is recommended to commission a company specialized in the disposal of machines or to obtain information from GEA Westfalia Separator service.

- Observe applicable local disposal regulations.
- Comply with environmental protection legislation.
- Have electrical connections disconnected by qualified personnel, e.g. electricians and high voltage electrician.

IMPORTANT: Residual liquids in feed lines and utility lines can cause injury. Protective clothing must therefore be worn when dismantling lines.



WARNING

Danger of acid and alkali burns

After cleaning, hot caustic and acid residues can still be in the centrifuge and the pipelines. When working on the centrifuge, contact with the caustics and acids can cause burns.

- Wear acid-resistant safety gear, e.g. safety goggles, safety gloves, protective overalls or protective suits.
- Take special care.
- Observe the plant operator's SOPs on handling acids and caustic alkalis as well as local disposal regulations.
- Comply with environmental protection legislation.
- Drain residual liquids in feed lines and utility lines into suitable vessels and dispose of them properly.
- Observe regulations on product contact.

- Dismantle feed lines and utility lines, clean superficial impurities caused by lubricants or product with suitable media and dispose of separately.
- Dismantle all seals and non-metallic materials, clean them to remove lubricants and dispose of them separately or recycle.
- Separate and sort metal parts and recycle them.

13.3.1 Disposing of utilities

When the centrifuge is decommissioned, the gear oil must be drained and disposed of. The plant operator is responsible for the proper disposal of the utilities.

- Observe the local disposal regulations.
- Comply with applicable environmental protection legislation.
- Drain off gear oil into suitable vessels and dispose of it properly. See data sheet for oil quantity.

13.3.2 Disposing of cleaning fluids

Chemicals are used for the chemical cleaning process which are specified in the user information or a datasheet issued with the user information. They are dangerous and can cause injuries and environmental damage.



WARNING

Danger of acid and alkali burns

Danger of chemical burns when handling chemical cleaning fluids and danger of burns by hot water.

- Wear acid-resistant protective gear, e.g. protective goggles, protective gloves, protective overalls or protective suits.
- Take special care.
- Observe the standard operating procedures (SOPs) issued by the operator on handling acids and caustics as well as the local disposal regulations.
- Comply with applicable environmental protection legislation.
- Drain residual liquids in feed lines and utility lines into suitable vessels and dispose of them properly.
- Observe regulations on product contact.

14 Spare parts

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14.1 Use only genuine spare parts.

All spare parts, wear parts and operating materials are originally packed by GEA Westfalia Separator.



The original packing is provided with the marking shown.

Fig. 26



WARNING

Danger due to defective spare parts

Non-genuine or non-approved spare parts or operating materials reduce the availability of the centrifuge.

Non-genuine or non-approved spare parts or operating materials reduce the availability of the centrifuge.

- Use only genuine spare parts from GEA Westfalia Separator to assure the operating safety and optimum availability of the centrifuge.

14.2 Notes on ordering spare parts

A spare parts catalogue is part of the documentation of the centrifuge. It contains all spare parts, wear parts and operating materials.

Spare part kits are available for many machines which are customized to the maintenance intervals in the maintenance schedule of the centrifuge. E. g.:

- Set of spare parts for an operating time of 4000 hours.
- Set of spare parts for an operating time of 8000 hours.
- Set of spare parts for an operating time of 16000 hours.

Rapid and correct supply of spare parts can only be guaranteed if your order contains the following details:

- Centrifuge type: see nameplate
- Serial number: see nameplate
- Bowl serial number (can differ from the machine serial number, see spare parts catalog).
- Designation: see spare parts catalogue.
- Part number: see spare parts catalogue.

The part number is sometimes engraved on the individual parts.

Information required for ordering third-party components:

All specifications on the nameplate of the subcontractor, e. g. pump type and pump number.

14.3 Storing wear parts and operating materials

Pay attention to the following for storing wear parts and operating materials.

14.3.1 Gaskets and drive belts

Unfavourable storage conditions change the physical properties of rubber.

Possible causes:

- Shortened service life
- Completely unserviceable

If the following instructions are adhered to, it is possible that gaskets and drive belts will retain their properties for several years.

Requirements to be met by the storage room:

- Cool (+15 to max. +25 °C)
- Dry (less than 60 % relative air humidity)
- Dust-free (as possible)
- Dark, no direct solar radiation or bright artificial light (if necessary, paint the windows red or orange).
- Moderately ventilated, draft-free (if necessary wrap up the parts or pack them in antistatic foils or bags made of paper, polyethylene or polyamides).

Environmental requirements:

- Not in the vicinity of heat sources.
- Not together with solvents, fuels, lubricants, acids, disinfectants etc.

Method of storage:

- Stress-free, i.e. without tension, pressure or other deformation.
- Avoid different material compositions from coming in contact with one another.
- Avoid direct contact with metals (copper and manganese in particular have a negative impact on rubber products).

14.3.2 Roller bearings

Roller bearings must be kept in their original packing during storage; the packing may only be opened at the workplace and directly prior to fitting. Otherwise there is a risk that the bearings will become soiled and rust.

Larger bearings whose raceways have a relatively small thickness should be stored horizontally, not vertically and be supported around the entire circumference.

Before packing the roller bearings are immersed in slushing oil. This oil does not resinify or harden and is neutral towards all commercially available roller bearing greases. Roller bearings are reliably protected against external influences in their original packaging.

However, this protection is only effective for a prolonged period when the packed bearings are stored in a dry (relative air humidity 60%) and frost-free room.

No aggressive chemicals such as acids, ammonia or chloride of lime may be stored in the same room.

14.3.3 Lubricants

Always keep lubricant containers tightly closed and store them in closed rooms.

Avoid large temperature fluctuations as they cause respiration of the containers. As a result, moisture penetrates into the containers.

Clean the lubricant containers before opening them to prevent contaminants from getting into the lubricant. Even the smallest foreign matter in the lubricant can drastically reduce the life of the roller bearings.

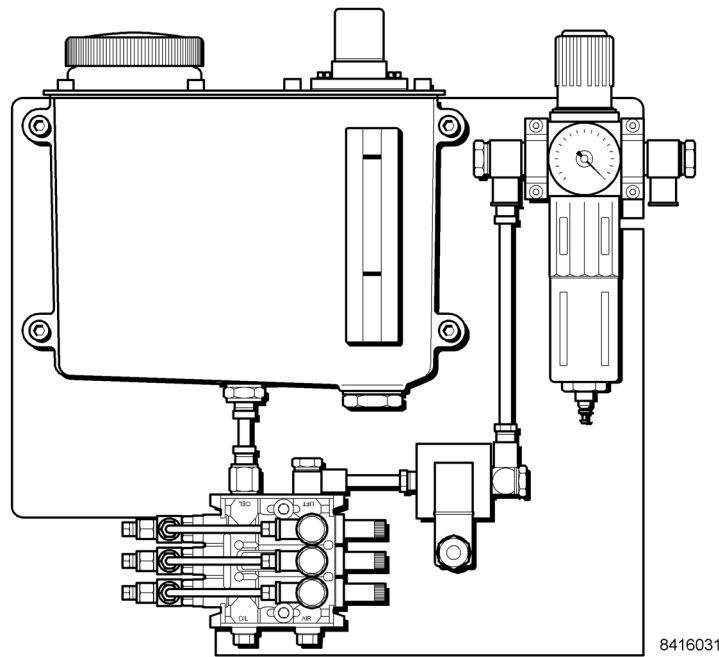


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8416031

Instruction manual

Designation: Lubricating device

Model: OLA 1303

No. 8175-9001-032
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ORIGINAL INSTRUCTION MANUAL
Contents subject to modification!

The authors are always grateful for remarks and suggestions
for improving the documentation. These can be sent to:

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1 Safety precautions

1.1 Intended use

The intended use is the lubrication of bowl bearings on centrifuges from GEA Westfalia Separator.

1.2 Reasonably foreseeable misuse

The manual contains instructions for the intended use. Any operation of the lubricating unit that does not fall under the intended use constitutes unintended use and is considered to be misuse.

Reasonably foreseeable misuses include:

- Use of unsuitable spare parts
- Use of impermissible operating materials
- Operation in incomplete assembly state:
 - The required supervisory equipment is not activated.
 - The required protective covers are not installed.
- The unit is operated by persons who have not received adequate training.
- Changing the process conditions, operating conditions and environmental conditions without the consent of the manufacturer.

Any misuse of the lubricating unit can lead to severe damage to persons and property.

1.1 Maintenance safety precautions

Unfavourable operating conditions may require shorter maintenance intervals. The factors listed below are unfavourable because they either attack the material of the unit directly or impair the lubrication system.

Timely maintenance of the unit and replacement of worn or damaged parts are essential for safe operation of the unit.

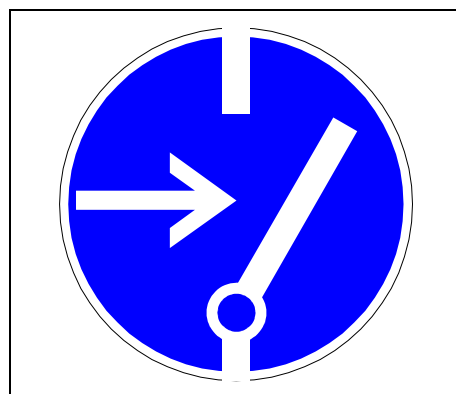


Fig. 1

Before all maintenance and servicing:

- Isolate all electrically supplied equipment from the power supply using the main switch.
- Secure the plant against unintended restarting with locking devices.
- The lubricating unit is pressurised during operation. It must therefore be depressurised before commencing with upgrades, modifications, repairs etc.



Fig. 2

- Collect dripping oil to prevent risk of slipping or infection of the product. Wait until the bowl has come to a standstill.
- When handling waste oils note:
 - Health risks depend on the chemical composition.
 - Dispose of waste oil in accordance with local regulations.

2 Description

2.1 Device description

The oil-air unit is a device for centrifuges for lubricating the bowl bearings with minimal quantities.

The finely dosed lubricant is distributed by an air flow in smears on the inner walls of the lubricating line and is transported to the lubricating point.

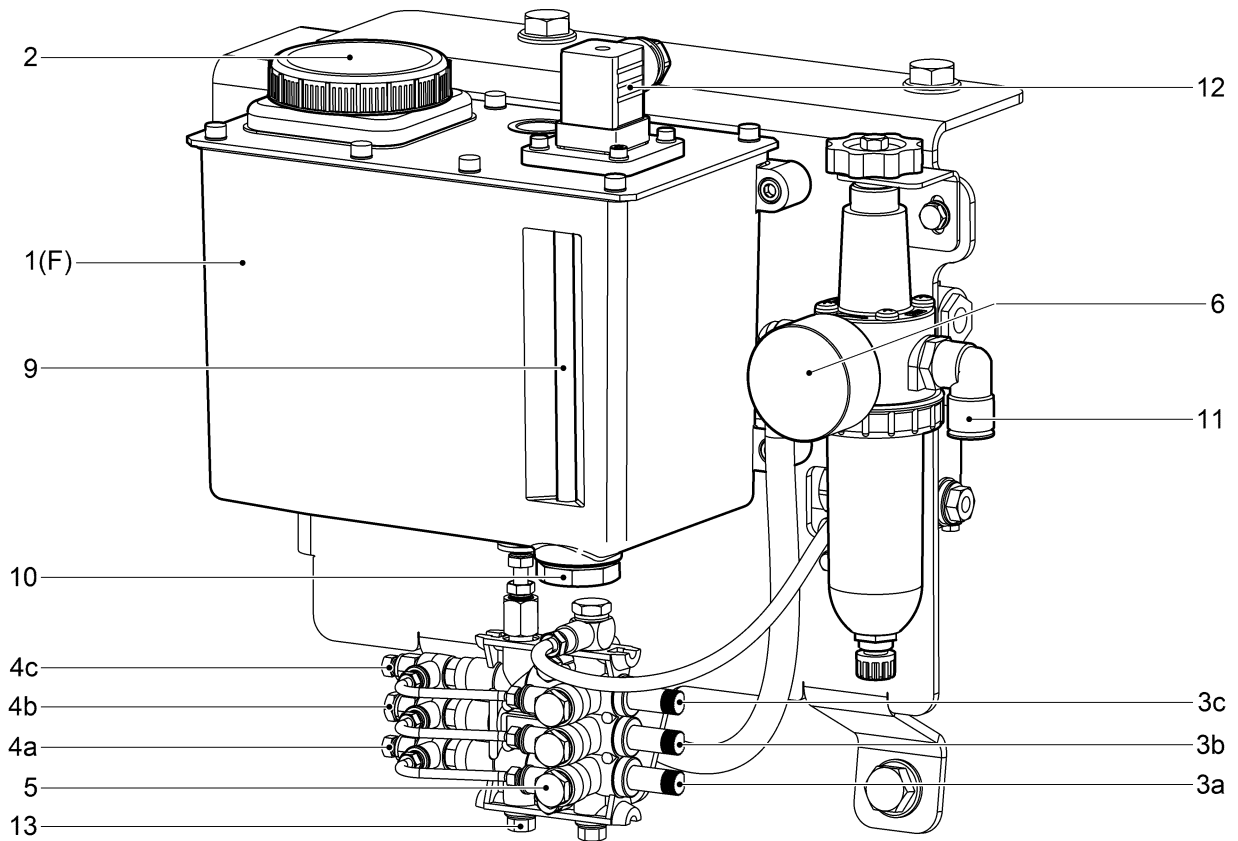
The bowl bearings are discontinuously supplied with lubricant in the form of fine droplets via a discharge nozzle.

The compact unit works in pulses; a lubrication cycle is followed by a pause.

Tasks of the machine control:

- Control of the pause and pulse times
- Monitoring of the filling level in the oil storage vessel
- Monitoring of the air pressure in the individual lubricating lines

By changing the pulse/pause time, the required lubricant quantity for each lubrication cell can be accurately dosed.

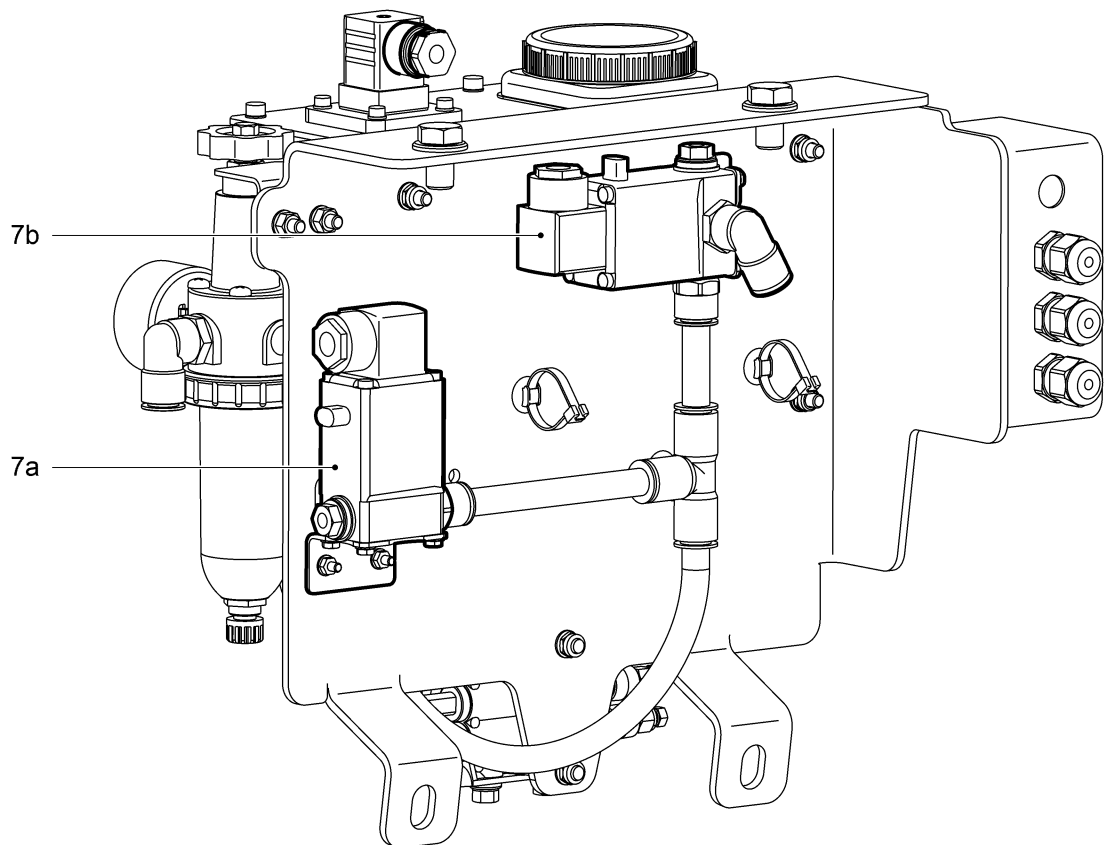


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Fig. 3

The oil + air unit (standard version) consists of the following assemblies:

- 1** Lubrication vessel with float switch (F)
- 2** Filler neck for filling the lubricant vessel
- 3a** Adjusting sleeve for the injection oiler, bowl bearing solid side
- 3b** Adjustment sleeve for the injection lubricator, unused (optional CF 8000 bowl bearing solid side)
- 3c** Adjusting sleeve for the injection oiler, bowl bearing liquid side
- 4a** Lubricating line connection, solid-side outlet
- 4b** Lubrication line connection, closed (optional CF 8000 outlet solid side)
- 4c** Lubricating line connection, fluid-side outlet
- 5** Oil + air injection oiler
- 6** Compressed air pressure reducer with pressure gauge and automatic water trap
- 9** Sight glass
- 10** Drain screw
- 11** Air supply connection, (line diameter 12 mm, compressed air to be provided by customer)
- 12** Filling level sensor
- 13** Vent screw



8418013

Fig. 4

The oil + air unit with bearing air cooling (optional) consists of the following assemblies:

- 1** Lubrication vessel with float switch (F)
- 2** Filler neck for filling the lubricant vessel
- 3a** Adjusting sleeve for the injection oiler, bowl bearing solid side
- 3b** Adjustment sleeve for the injection lubricator, unused (optional CF 8000 bowl bearing solid side)
- 3c** Adjusting sleeve for the injection oiler, bowl bearing liquid side
- 4a** Lubricating line connection, solid-side outlet
- 4b** Lubrication line connection, closed (optional CF 8000 outlet solid side)
- 4c** Lubricating line connection, fluid-side outlet
- 7a** Solenoid valve, oil + air injection lubricator
- 7b** Solenoid valve, bearing air cooling
- 5** Oil + air injection oiler
- 6** Compressed air pressure reducer with pressure gauge and automatic water trap
- 9** Sight glass
- 10** Drain screw
- 11** Air supply connection, (line diameter 12 mm, compressed air to be provided by customer)
- 12** Filling level sensor
- 13** Vent screw

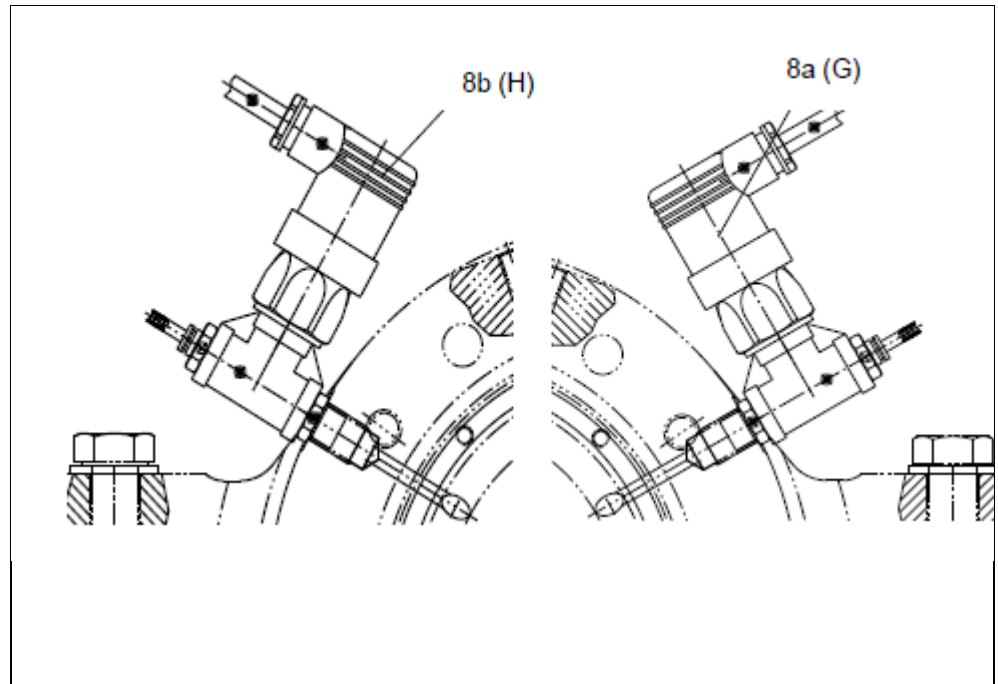


Fig. 5

- 8a** Pressure switch for minimum air pressure, inlet to solid-side lubricating point (H)
- 8b** Pressure switch for minimum air pressure, inlet to fluid-side lubricating point (G)

Optional CF 8000

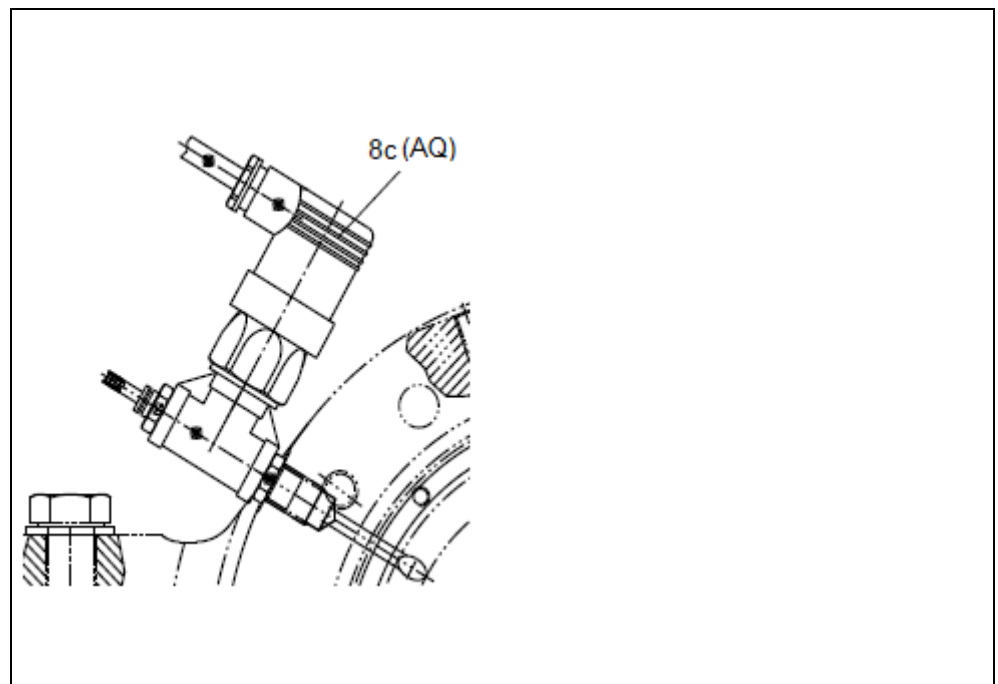


Fig. 6

- 8c** Pressure switch for minimum air pressure, Inlet to lubrication point solids side (AQ)

2.2 Installation

Installation of the electrical components:

- When installing electrical components, local and national guidelines must be complied with. The unit and individual components such as the tank must be taken into consideration when carrying out equipotential bonding.

Installation of the pneumatic components:

- Check use of the correct compressed air (see chapter "Compressed air").
- The lubricant vessel must be mounted horizontally so that the oil level in the tank is uniformly high and can be monitored.
- During installation and operation, refer to the instruction manuals of the centrifuges and the individual components.
- When equipped with bearing air cooling:
 - During commissioning, the lock screw must be replaced with the connection for the bearing air cooling (only on the version with lock screw in bearing housing).

This oil-air unit is not suitable for use in explosive zones.

2.3 Requirements to be met by the compressed air supply

Requirement	Values
Inlet pressure	Min. 0.5 MPa (corresponds to 5 bar)
	Max. 0.8 MPa (corresponds to 8 bar)
Based on the compressed air quality grades according to ISO 8573-1	
Particle content	Class 3
Max. particle size	5 µm
Max. particle content	5 mg/m ³
	Class 4
Pressure dew point	max. + 3°C
	Class 3
Oil concentration	max. 1 mg/m ³

3 Operation

3.1 Commissioning

- Fill the lubricant vessel through the filler neck (2) up to the maximum mark. Make sure that no dirt enters the oil storage tank during filling. The oil quality is specified in the "Lubrication and maintenance schedule".
- Deaerate pump:
 - Remove vent screw (13).

Important:

- Have a collecting vessel ready to collect the oil flowing out.
 - Actuate the pump via a maintenance switch in the control cabinet until the oil discharges from the vent screw free of bubbles.
 - Reinstall the vent screw.
 - After approx. 30 minutes, check the entire system again for trapped air and repeat the venting procedure if necessary.
 - Dispose of the collected oil in a proper manner. Do not recycle it into the system under any circumstances.

For version without oil lances:

- Pull the oil lines out of the connector of the pressure switch.

For version with oil lances:

- Pull the oil lances out of the bearing housing. In this way, the nozzle bore at the end of the oil lance can be checked.
- Select and press the "Oil-air lubrication pre-lubrication" button in the control cabinet.
 - Lubrication is started for 3600 seconds and then switches off automatically or immediately by repeatedly pressing the button. The decanter cannot be started during this time.
 - During this time the unit is switched with the pulse time of 10 seconds and the rest time of 15 seconds.
 - Using a sheet of paper, check several times whether the oil is being pumped to the lubrication points.
- Connect the oil lines or oil lances.

3.2 Adjustment

The oil-air unit starts up when the centrifuge is started.

Factory setting

- The oil + air lubrication is adjusted by GEA Westfalia Separator before shipping the centrifuge.
- The oil quantity is set.
- the cycle is set in the control system.

3.3 Bearing air cooling (optional)

Function "Activate liquid-side bearing cooling":

- Activation takes place when switching to the status "ready for operation".

Purpose: the solenoid valve of the bearing cooling is opened.

Function "Deactivate liquid-side bearing cooling".

- The deactivation takes place when switching to the statuses "Shut-down program" and "Run-down".

Purpose: the function "Activate liquid-side bearing cooling is terminated. The solenoid valve of the bearing cooling closes.

No alarms and messages are triggered.

3.4 Adjusting the oil quantity

The delivery volume per pulse is adjusted by means of the transparent adjusting sleeves (3a, 3b, 3c) of the injection oiler.

- Pull back the black locking ring.
- The delivery volume is reduced stepwise by turning the adjusting sleeve counter-clockwise (-).
 - It engages 4x per revolution (audibly and tangibly) so that intermediate settings are also possible.
- The maximum delivery volume is attained again by turning the adjusting sleeve clockwise (+) until it hits stop.
- Let the black locking ring click into place again.

Max. delivery volume / stroke	30 mm ³
1 full left revolution	25 mm ³
2 full left revolutions	20 mm ³ factory setting
3 full left revolutions	15 mm ³
4 full left revolutions	10 mm ³
5 full left revolutions	5 mm ³
Over 6 full left revolutions	3 mm ³

3.5 Adjusting the compressed air

At the factory, the air pressure at the compressed air pressure reducer (6) is set to 5 bar.

➤ The air pressure can be altered by turning the handwheel.

The system functions correctly with an air pressure of 5 – 8 bar.

3.6 Solenoid valve (oil + air injection lubricator)

The solenoid valve (7a) for the air supply is controlled via the machine control.

There are different settings between start phase and operation.

3.7 Adjusting the pressure switch (bearing housing)

The pressure switches for minimum air pressure 8a and 8b as well as 8c (optional) for lubricating pulse monitoring on the bearing housings have been set at the factory to 0.5 bar minimum switching value.

After adjustment, the adjusting screw was secured and sealed against twisting with lacquer.

3.8 Faults

Note:

- The system is insensitive if too much oil is lubricated in the bearing.
- The bearing temperatures normally rise by only 3° - 5°C.
- If the air pressure is too low, the machine is shut down since the lubricating points are then no longer adequately supplied with lubricant.
 - The switching signal comes directly from the pressure switches on the bearing housings.
- The setting for monitoring the pressure pulses/lubrication pulses is pre-set in the control at the factory:
 - Oil level in lubricant vessel below minimum
 - Mechanical damage to a component

3.9 Plant control and monitoring

If a machine control is delivered by GEA Westfalia Separator, control and monitoring of the operation of the oil-air unit is included in the scope of delivery. Corresponding notes and instructions are given in the manual for the machine control.

Plants without control:

In the case of machine controls ordered by the plant operator, the following must be taken into account for the control of the oil-air unit:

- The pulse and pause time is controlled:

The following is monitored:

- The lubrication pulse
 - The pressure switches (8) check at both (optional CF 8000 three) bearing points whether the minimum air pressure is achieved during the lubrication pulse and whether it subsequently decreases.
 - Faulty lubrication pulses are counted up.
 - Completed pulses are counted down but not below 0.
 - In the case of 5 faulty pulses, a warning and collective alarm are output as a message.
 - In the case of 10 faulty pulses, the machine is shut down.
- The filling level in the lubricant vessel
 - A warning signal is given first. If no oil has been topped up after 25000 seconds, the centrifuge is switched off.

4 Repair

4.1 Maintenance schedule

Oil-air lubricating units need little maintenance.



CAUTION

Repair work may only be carried out on a unit which has been de-energised beforehand by trained personnel.

Work on energised units can lead to personal injury.

The lubricating unit is pressurised during operation. It must therefore be de-pressurised before commencing with repairs.

Check regularly:		
Machine component	Action	Operator
Check entire lubricating unit	➤ for leakage	Operator
Oil lines	<ul style="list-style-type: none"> ➤ Carry out a visual inspection for leakage, paying particular attention to the connecting parts at the bearing points. The latter are exposed to the machine vibrations. ➤ Re-seal untight connections. 	Operator
Lubricant vessel	<ul style="list-style-type: none"> ➤ Fill in oil up to the maximum mark on the filling level indicator. • The required oil is specified in the order-specific "Lubrication and maintenance schedule" in the machine documentation. • To avoid mistakes, it is recommended to attach a label specifying the lubricant used to the lubricant vessel. • Holding capacity: max. 3 litres oil. 	Operator
Manual water separators, filters	<ul style="list-style-type: none"> • Check the manual water separators on the compressed air pressure reducer for water residue and contamination, <ul style="list-style-type: none"> ➤ and empty if necessary ➤ Clean filter. • Removing the filter: <ul style="list-style-type: none"> ➤ Loosen the screwed connections and remove the vessel. ➤ Loosen the fastening nut from the filter. ➤ Take out the filter, clean it and fit it again. ➤ Make sure that the gaskets are in perfect condition. 	Operator

Cleaning:

- As required, the compact unit can be cleaned with mild, material-compatible detergents (non-alkaline, no soap).
- Cables and hoses should remain connected if possible. Openings must be closed to prevent detergents from entering the inside.
- Given a normal operating mode and the use of the lubricants listed in the "Lubrication and maintenance schedule", cleaning of the interior is not necessary.
- If an incorrect or contaminated lubricant has been filled in by mistake, the inside of the lubricant vessel must be cleaned. For this purpose, consult GEA Westfalia Separator.

4.2 Long-term shut-down

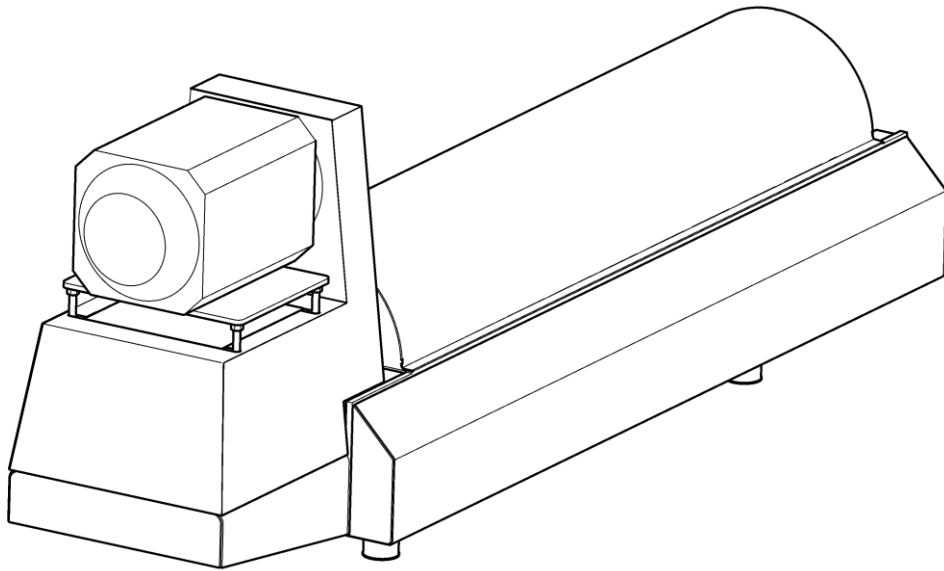
- Disconnect the power from the oil-air unit.
- Fill the lubricant vessel with oil to avoid corrosion.
- Store in a dry and dust-free environment.
 - The ambient temperatures must be between 10 – 60°C.

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Data sheet

Description: Clarifying decanter

Type: biosolids Decanter prime 7000

Machine-No.: 8012-663

Order-No.: 2451395848/002000

Material-No.: 99870531509

Version: 30.11.2021

ORIGINAL DOCUMENT

The authors are always grateful for remarks and suggestions for improving the documentation. Remarks and suggestions can be sent to:

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Preface to this datasheet

This datasheet contains the order-specific technical data for the centrifuge.



Non-compliance with this datasheet can not only result in danger for centrifuges, material and the environment but also endanger persons working on or in the vicinity of the centrifuge.

The technical data from this datasheet have sole validity!

Technical data in the centrifuge documentation which deviate from this are invalid.

- Keep the datasheet complete, close to the centrifuge and accessible to all those working on or with the centrifuge. It must be available to these people at all times!

Other applicable documents

The documents below apply in addition to this datasheet.

- Operating instructions for the centrifuge
- Dimensions sheet for the centrifuge
- Operating instructions for components made by other manufacturers

Abbreviations and symbols used

bar (g)	bar (g = pressure)
approx.	approximately (roughly)
dB (A)	decibels (A)
f	frequency
FU	frequency converter (Frequenzumrichter)
Hz	Hertz
I/O	switch on/off
kg/dm ³	kilogrammes per cubic decimetre
kW	kilowatts
l	litres
l/h	litres per hour
max.	maximum
min.	minimum
min	minute
rpm	revolutions per minute
mm/s RMS	millimetres per second, RMS (= Root Mean Square)
mW	milliwatts
m ³ /h	cubic metres per hour
sec	second
V	volts
°C	degrees Celsius
%	per cent
Y	star
Δ	delta

Centrifuge			
			Comments
Type	biosolids Decanter prime 7000		
Serial no.	8012-663		
Year of construction	see centrifuge nameplate		
Permitted bowl speed	rpm	3150 (FU F=63HZ)	
Permitted density of solids	kg/dm ³	1.6	max.
Permitted throughput	m ³ /h	--/ --	min. / max.
Permitted temperature of feed material	°C	5/60	min. / max.
Permitted operating speed range	rpm	1000-3150	min. / max.
Filling volume of bowl	l	557	approx.
Run-down time of the bowl	min	30	approx.
Permitted vibration velocity Limit value 1 Limit value 2	mm/s RMS	18/20	Query measuring point in supplying factory / note dimensions sheet.
Differential speed	rpm	1-14	
Decanter factor	%	105	
Ambient temperature	°C	5-40°	min. / max.
Warning "Bearing temperature, bowl"	°C	120	
Cutout "Bearing temperature, bowl"	°C	140	
Switching point "Feed closed"	%	90	
Switching point "Decanter off"	%	110	
Sound pressure level	dB (A)	87+/-2	DIN EN ISO 3746
Sound power level	mW	108/63,5	DIN EN ISO 3746

Process data			
			Comments
Intended use, feed material	INDUSTRIELLE KLÄRANLAGEN / IND		
Feed pressure	bar	0,3/2	min. / max.



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When spare parts are vital,
ours are available.

KEEPING IT
RUNNING



Spare Parts Catalog




Model
BIOSOLIDS DECANTER PRIME

Serial number of machine
8012-663

Edition
30.11.2021

Order number
2451395848_02

Serial number of bowl
8012-663

ETS	Ersatzteilschlüssel / Spare part code
	Teil oder Baugruppe lieferbar Part or assembly available
	Teil oder Baugruppe bedingt lieferbar. Rücksprache mit dem Herstellerwerk nehmen. Part or assembly available to a limited extent. Contact manufacturer.
	Teil oder Baugruppe in dieser Fertigungsstufe nicht lieferbar. Part or assembly not available in this manufacturing stage.

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Baugruppe / Component group

2451395848_02

KLAER-DEKANTER BIOSOLIDS DEKANTER
PRIME 7000
CLARIFYING DEKANTER

Typ / Model

BIOSOLIDS DEKANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

30.11.2021

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Baugruppe / Component group

2451395848

KLAER-DEKANTER BIOSOLIDS DECANTER
PRIME 7000
CLARIFYING DECANTER

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1100	8419-1100-110	1		GESTELL VOLLST. FRAME, COMPL. BASTIDOR, COMP.	✓	10
6600	8419-6600-110	1		TROMMEL VOLLST. BOWL, COMPL. TAMBOR, COMP.	?	17
6539	8419-6539-040	1		SCHNECKE VOLLST. SCROLL, COMPL. SINFÍN, COMP.	✓	35
3351	8419-3351-100	1		RIEMENANTRIEB VOLLST. BELT DRIVE, COMPL. ACCIONAMIENTO POR CORREA, COMP.	✓	42
2297	8419-2297-130	1		SCHLEUDERGUTZULEITUNG VOLLST. PRODUCT FEED LINE, COMPL. LÍNEA ALIMENTACIÓN PRODUCTO, COMP.	✓	66
3243	8419-3243-080	1		DREHZAHLINIATOR VOLLST. SPEED SENSOR, COMPL. INICIADOR DE VELOCIDAD, COMP.	✓	68
3292	8690-3292-000	1		TEMPERATURFUEHLER VOLLST. TEMPERATURE FEELER, CPL. SENSOR DE TEMPERATURA, COMP.	✓	70
3297	8419-3297-020	1		SCHWINGUNGS-AUFNEHMER VOLLST. VIBRATION PICK-UP, COMPL. CAPTADOR DE VIBRACIONES, COMP.	✓	72
3969	0021-3969-810	1		SATZ SCHMALKEILRIEMEN SET OF NARROW V-BELTS JUEGO DE CORREAS TRAPEZOIDALES ESTRECHAS	✓	
9900	8419-9900-030	1		SATZ WERKZEUGE SET OF TOOLS JUEGO DE HERRAMIENTAS	✓	74
9900	8657-9900-050	1		SATZ WERKZEUGE SET OF TOOLS JUEGO DE HERRAMIENTAS	✓	88
0038	0015-0038-000	1		SCHMIEROEL LUBRICATING OIL ACEITE LUBRICANTE	✓	

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BIOSOLIDS DECANTER PRIME 7000

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9001	8175-9001-032	1		BETRIEBSANLEITUNG EN INSTRUCTION MANUAL EN MANUAL DE INSTRUCCIONES EN	✓	
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1150	8419-4100-290	1		MASSBLATT		
	XP316323-9905-PID0 01	1		S1459316323-9905-PID001		
1180	8419-9056-030	1		DREHZAHLTABELLE SPEED TABLE		
	8419-9088-000	1		EINSTELLWERTE DEKANter SETTINGS DEKANter		
1190	8419-9088-000	1		EINSTELLWERTE DEKANter SETTINGS DEKANter		

Baugruppe / Component group

2451395848

KLAER-DEKANter BIOSOLIDS DEKANter
PRIME 7000
CLARIFYING DEKANter

Typ / Model

BIOSOLIDS DEKANter PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

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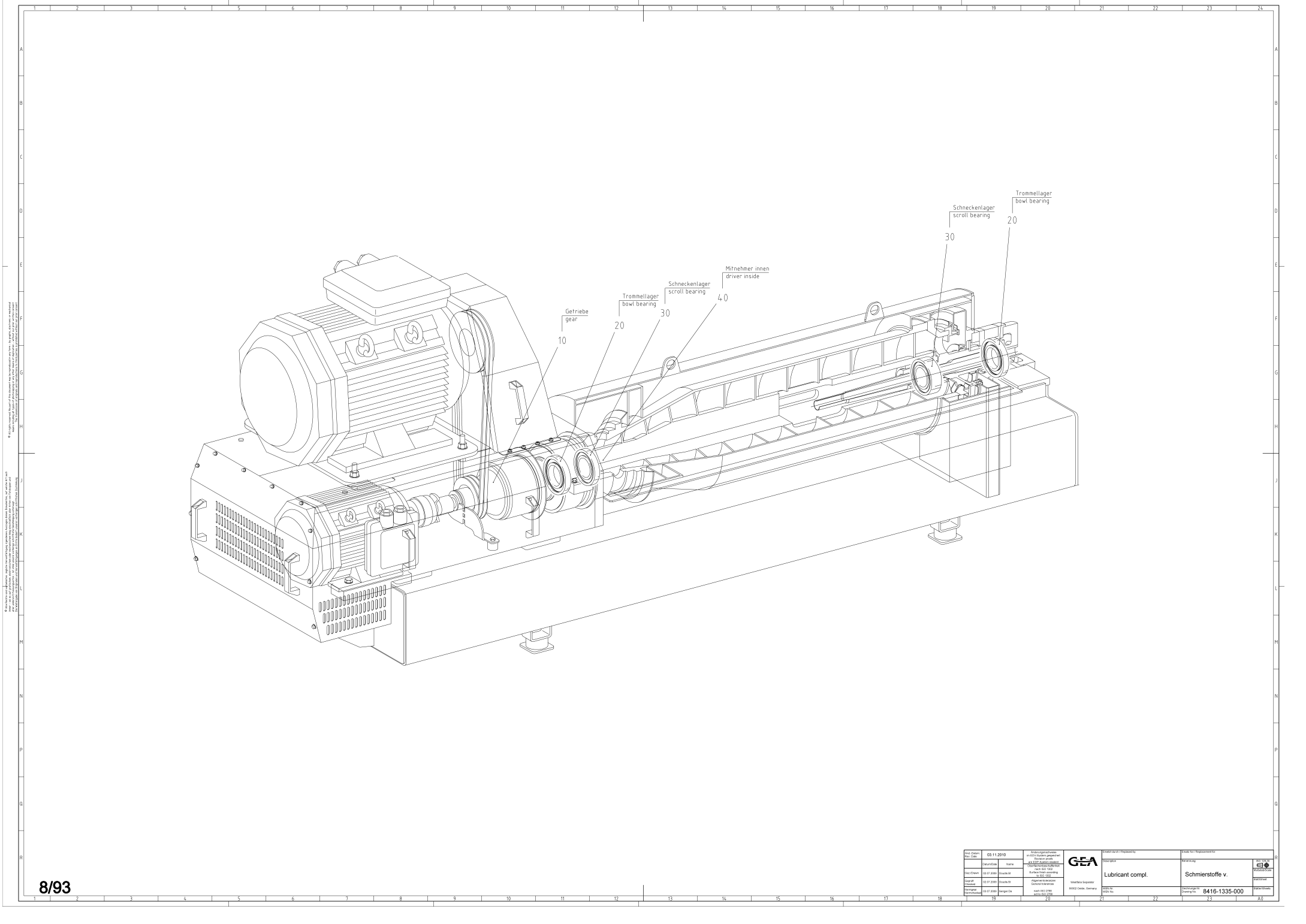
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30	0015-0129-010	3		WAEZLAGERFETT ROLLING BEARING GREASE GRASA PARA RODAMIENTOS	✓	
40	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

Baugruppe / Component group

8419-1335-040

SCHMIERSTOFFE VOLLST.
LUBRICANTS, COMPLETE

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

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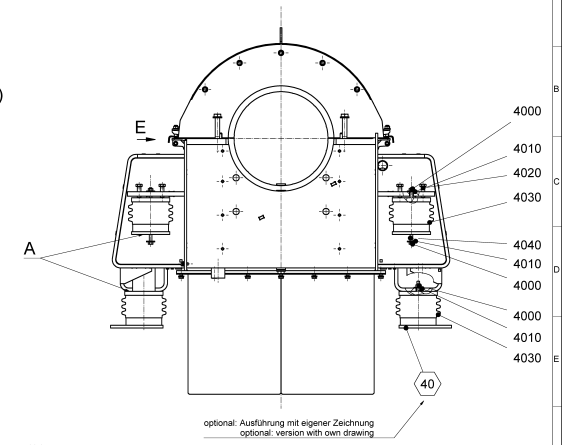
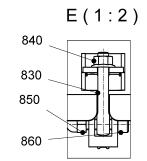
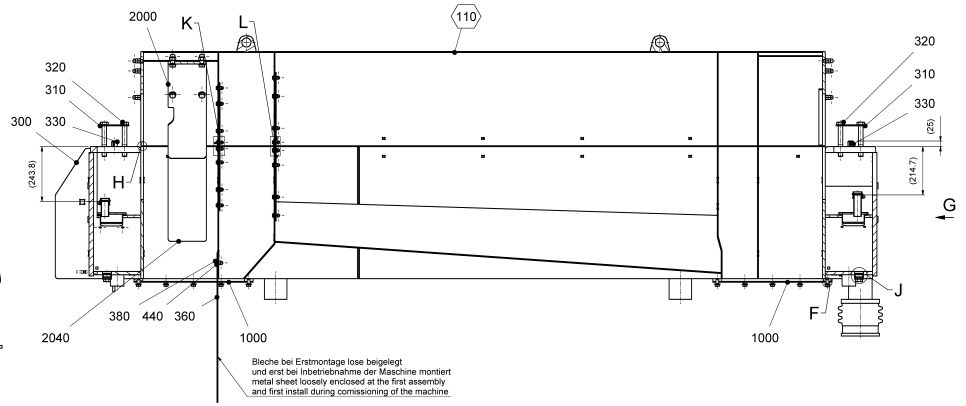
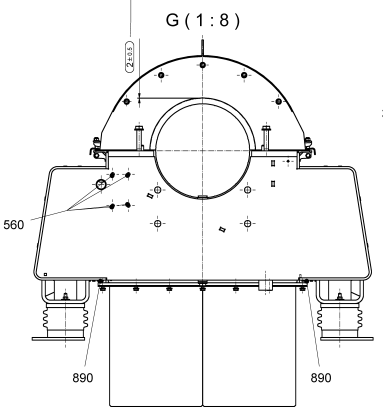
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beidseitig mit Führerlehre zu prüfen
to check with feeler gauge on both sides

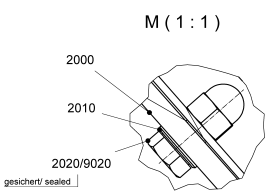
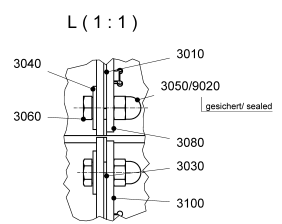
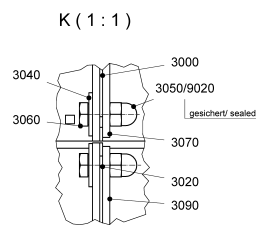
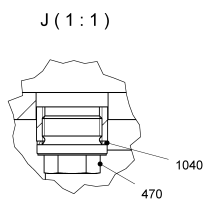
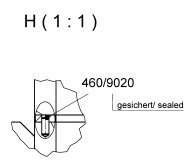
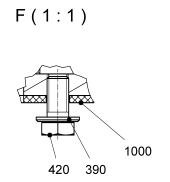
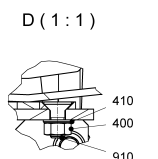
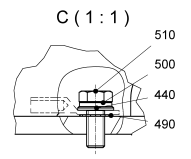
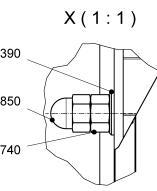
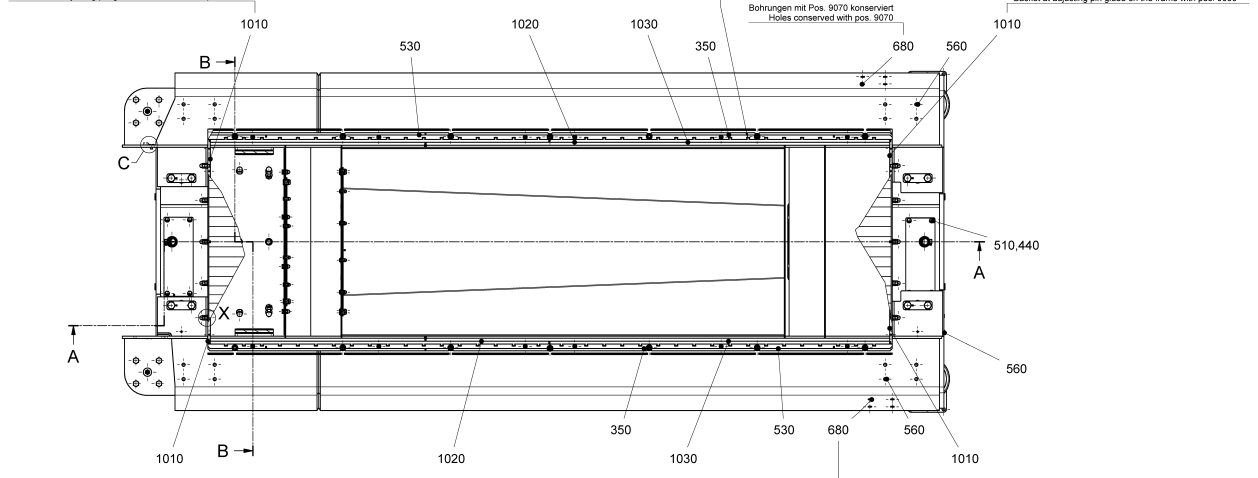


optional: Ausführung mit eigener Zeichnung
optional: version with own drawing

Dichtung im Passstift mit Pos. 9060 auf den Rahmen geklebt
Gasket at adjusting pin glued on the frame with pos. 9060

Jede vierte Schwalbenschwanzform mit Pos. 9060 auf den Rahmen geklebt
Every fourth dovetail key glued on the frame with pos. 9060

Dichtung im Passstift mit Pos. 9060 auf den Rahmen geklebt
Gasket at adjusting pin glued on the frame with pos. 9060



Bohrungen mit Pos. 9070 konserviert
Holes conserved with pos. 9070

A = Fläche mit Pos. 9030 gefettet
A = Surface with pos. 9030 greased

Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order siehe Maschinenkarte see machine card	Benennung name
1000-1990	(10)	Satz Dichtringe (Einzeileile dargestellt) Set of gaskets (single parts illustrated)
2000-2990	(20)	Satz Schleibscheibe (Einzeileile dargestellt) Set of wear liners (single parts illustrated)
3000-3990	(30)	Ringhälfen vollst. (Einzeileile dargestellt) Ring halves complete (single parts illustrated)
4000-4990	(40)	Dämpfer vollst. (Einzeileile dargestellt) Damper complete (single parts illustrated)
7000-7990	(70)	Satz Anschlussstelle 1 Haube (zeichnerisch nicht dargestellt) set of connection parts for hood (not illustrated)
	(100)	Satz Schilder (zeichnerisch nicht dargestellt) Set of signs (not illustrated)
	(110)	Fängeroberteil geschw. Upper part of catcher, welded

Rev. Datum Rev. Date	02.03.2021	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released
Rev. Datum Rev. Date	01.03.2020	Änderung Change	Änderung Change	GEA	Gezeichnet Drawn	Geprüft Checked	Freigegeben Released

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-1005-040	1		SATZ DICHRINGE F.GESTELL SET OF GASKETS FOR FRAME JUEGO DE JUNTAS PARA EL BASTIDOR	✓	
1000	8419-1004-000	2		SATZ DICHTUNGEN SET OF GASKETS JUEGO DE JUNTAS	✓	
1010	8419-1265-160	4		DICHTUNG GASKET JUNTA	✓	
1020	8419-1265-020	2		DICHTUNG GASKET JUNTA	✓	
1030	8419-1265-010	2		DICHTUNG GASKET JUNTA	✓	
1040	0007-1981-550	2		DICHRING GASKET JUNTA ANULAR	✓	
20	8419-1063-030	1		SATZ SCHLEISSBLECHE SET OF WEAR LINERS JUEGO DE CHAPAS PROTECTORAS	✓	
2000	8419-1062-060	1		SCHLEISSBLECH WEAR LINER CHAPA DE DESGASTE	✓	
2010	0026-1335-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2020	0019-7034-400	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
30	8419-1728-220	1		RINGHAELFTEN VOLLST. RING HALFS COMPL. SEMIANILLO, COMP.	✓	
3000	8419-1728-190	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	
3010	8419-1728-210	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	
3020	8419-1728-180	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	

Baugruppe / Component group

8419-1100-110

GESTELL VOLLST.
FRAME, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

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Ausgabe / Edition

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
3030	8419-1728-200	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	
3040	0013-0404-400	32		HUTMUTTER CAP NUT TUERCA CAPERUZA	✓	
3050	0026-0439-400	32		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
3060	0019-6903-400	32		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
3070	8419-1146-070	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
3080	8419-1146-050	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
3090	8419-1146-060	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
3100	8419-1146-040	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
40	8419-1780-020	1		DAEMPFER M.ANSCHLUSSTEILEN V. DAMPER WITH CONNECTING PARTS, CPL.	✓	
4000	0013-0280-400	6		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
4010	0026-2407-300	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
4020	0019-7039-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
4030	8690-1780-000	4		DAEMPFER VOLLST. DAMPER COMPL. AMORTIGUADOR COMP.	✓	
	0004-3346-810	4		FALTENBALG BELLOWS FUELLE	✓	

Baugruppe / Component group

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GESTELL VOLLST.
FRAME, COMPL.

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GESTELL VOLLST.
FRAME, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0018-3812-300	8		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
	6985-0605-050	4		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
4040	0019-6330-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
70	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
100	8690-4940-020	1		SATZ SCHILDER SET OF PLATES JUEGO DE RÓTULOS	✓	
	0024-6481-000	1		SCHILD PLATE RÓTULO	✓	
	0024-3595-000	1		SCHILD PLATE RÓTULO	✓	
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
	0024-6571-000	1		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
	0024-5380-000	1		SCHILD PLATE RÓTULO	✓	
	0026-1571-300	8		KERBNAGEL NOTCHED NAIL REMACHE ESTRIADO	✓	
	0024-6482-000	4		SCHILD PLATE RÓTULO	✓	
	0024-6424-000	1		SCHILD PLATE RÓTULO	✓	

Baugruppe / Component group

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GESTELL VOLLST.
FRAME, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0024-6572-000	4		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
	0024-6580-000	7		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
	0024-6423-000	1		SCHILD PLATE RÓTULO	✓	
	0024-3707-000	1		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
110	8419-1752-100	1		FAENGEROBERTEIL GESCHW. UPPER PART OF CATCHER, WELDED PARTE SUPERIOR DEL COLECTOR, SOLD.	✓	
300	8419-3473-160	1		RAHMEN GESCHW. FRAME, WELDED MARCO, SOLD.	✓	
310	8419-6453-520	4		BLECH SHEET METAL CHAPA	✓	
320	0019-6675-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
330	0026-2779-170	4		SPANNSTIFT SPRING DOWEL SLEEVE PASADOR DE SUJECIÓN	✓	
360	8419-1453-000	2		BLECH SHEET METAL CHAPA	✓	
380	0019-6933-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
390	0026-1371-400	54		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
400	0013-0278-400	12		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
410	0026-1345-400	12		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
420	0019-6968-400	40		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
440	0026-1348-400	13		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
460	0026-1589-400	8		ZYLINDERSTIFT CYLINDRICAL PIN PASADOR CILÍNDRICO	✓	
470	0019-1126-400	2		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
480	0019-8904-300	13		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
490	0026-5673-300	1		FAECHERSCHEIBE FAN-TYPE LOCK WASHER ARANDELA DENTADA	✓	
500	0026-1337-300	1		FEDERING SPRING RING ANILLO DE PRESIÓN	✓	
510	0019-6935-400	9		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
520	0019-8910-300	3		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
530	8419-1453-255	2		BLECH SHEET METAL CHAPA	✓	
560	0003-3870-800	20		STOPFEN PLUG TAPÓN	✓	
680	0003-0780-800	8		STOPFEN PLUG TAPÓN	✓	
740	0013-0280-400	10		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
830	0019-1931-400	14		AUGENSCHRAUBE EYEBOLT TORNILLO DE ARGOLLA	✓	

Baugruppe / Component group

8419-1100-110

GESTELL VOLLST.
FRAME, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

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GEA Westfalia Separator Group

Baugruppe / Component group

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GESTELL VOLLST.
FRAME, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
840	0013-0172-400	14		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
850	0013-0406-400	24		HUTMUTTER CAP NUT TUERCA CAPERUZA	✓	
860	0019-6169-400	14		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
890	0003-0586-800	2		STOPFEN PLUG TAPÓN	✓	
910	0019-9391-400	12		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	
9060	6960-0201-150	1		KLEBER ADHESIVE PEGAMENTO	✓	

Typ / Model

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Trommel-Nr. / Bowl s/n

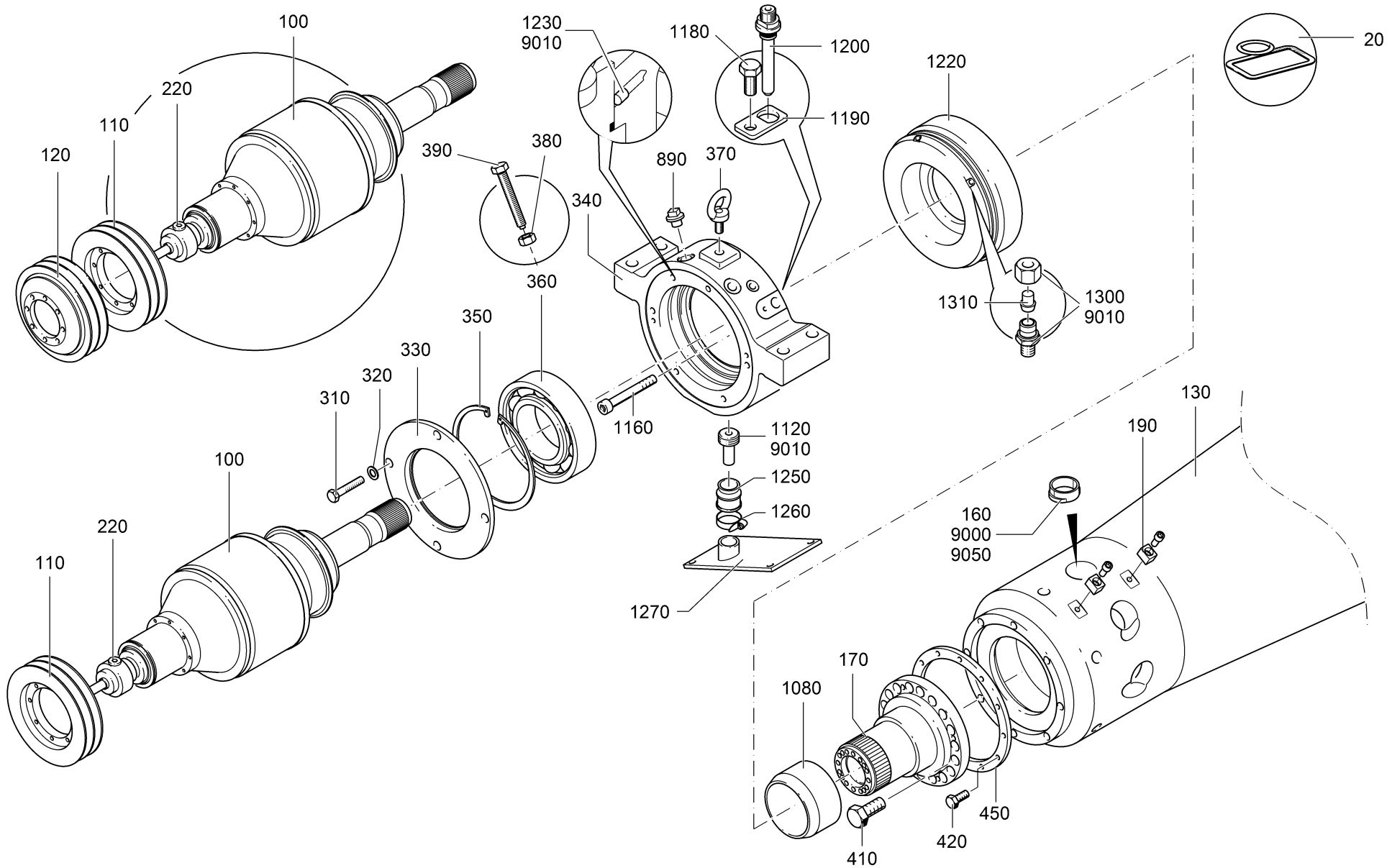
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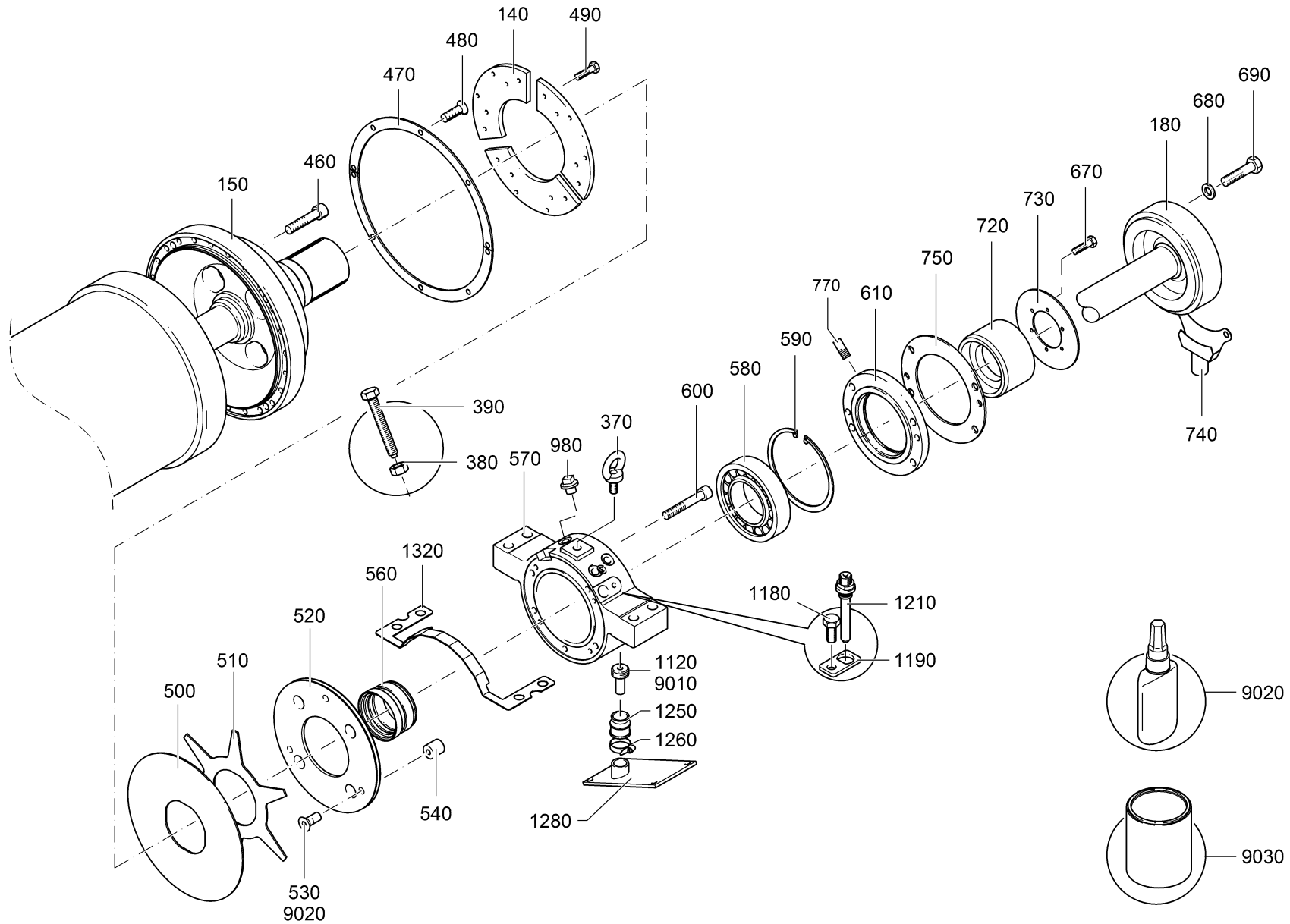
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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
20	8419-6007-160	1		SATZ DICHRINGE F.TROMMEL SET OF GASKETS FOR BOWL JUEGO ANILLOS ESTANQUEIDAD PARA TAMBOR	✓	26
100	8657-3210-060	1		PLANETENGETRIEBE VOLLST. PLANETARY GEAR, COMPLETE ENGRANAJE PLANETARIO, COMP.	?	28
110	8657-3352-010	1		KEILRIEMENSCHLEIBE V-BELT PULLEY POLEA PARA CORREA TRAPEZOIDAL	✓	
120	0000-0006-162	1		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	
130	8419-6601-130	1		TROMMELMANTEL BOWL SHELL CAMISA DEL TAMBOR	?	
	0019-6326-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
140	8419-6669-200	3		REGULIERPLATTE REGULATING PLATE PLACA REGULADORA	✓	
150	8419-6520-020	1		LAGERNABE VOLLST. BEARING HUB, COMPL. CUBO DE COJINETE, COMP.	✓	31
160	8418-6391-000	1		SATZ SCHLEISSBUCHSEN SET OF WEARING BUSHES JUEGO DE CASQUILLOS DE DESGASTE	✓	
170	8419-6602-010	1		TROMMELNABE VOLLST. BOWL HUB, COMPL. BUJE DEL TAMBOR, COMP.	?	
	0026-2778-140	2		ZYLINDERSTIFT CYLINDRICAL PIN PASADOR CILÍNDRICO	✓	
180	8419-2705-000	1		EINLAUFROHR GESCHW. INLET TUBE, WELDED TUBO DE ENTRADA, SOLD.	✓	
190	8419-6686-000	1		SATZ FLUEGEL SET OF SCRAPER BLADES JUEGO DE ALETAS	✓	33

Baugruppe / Component group

8419-6600-110

TROMMEL VOLLST.
BOWL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
220	8419-6269-100	1		SATZ GETRIEBEANSCHLUSSTEILE SET OF GEAR CONNECTION PARTS JUEGO DE PIEZAS DE CONEXIÓN DE ENGRANAJE	✓	
	0019-6112-400	1		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	8657-3278-040	1		IMPULSGEBER IMPULSE TRANSMITTER RELÉ DE IMPULSOS	✓	
	0019-6931-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
	8657-1145-000	1		HALTER HOLDER SOPORTE	✓	
	0019-6148-300	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	0019-7040-400	24		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
	8419-3358-080	1		GETRIEBENABE GEAR HUB GEAR HUB	✓	
	8419-3400-000	1		ANTRIEBSWELLE DRIVE SHAFT EJE DE ACCIONAMIENTO	✓	
	0019-6206-150	12		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	8690-6698-020	1		RING RING ANILLO	✓	
	0019-6106-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	0019-6119-400	1		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	8657-3310-000	1		VENTILATOR GESCHW. VENTILATOR, WELDED VENTILADOR, SOLD.	✓	

Baugruppe / Component group

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TROMMEL VOLLST.
BOWL, COMPL.

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Baugruppe / Component group

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TROMMEL VOLLST.
BOWL, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0019-6973-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
	8657-3338-000	4		DISTANZHUELSE SPACER SLEEVE CASQUILLO DE SEPARACIÓN	✓	
	8690-6431-030	2		AUSGLEICHSTUECK COMPENSATING PIECE PIEZA DE COMPENSACIÓN	✓	
	0019-6318-400	4		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	
310	0019-6607-400	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
320	0026-1335-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
330	8419-6375-000	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	
340	8419-6131-020	1		LAGERGEHAEUSE BEARING HOUSING ALOJAMIENTO DE COJINETE	✓	
350	0026-2431-170	1		SICHERUNGSRING SECURING RING ANILLO DE SEGURIDAD	✓	
360	0011-6334-870	1		RILLENKUGELLAGER GROOVED BALL BEARING RODAMIENTO RÍGIDO	✓	
370	0019-5387-050	2		RINGSCHRAUBE EYE BOLT ANILLA	✓	
380	0013-0282-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
390	0019-5220-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
410	0019-6664-400	22		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
420	0019-6938-400	12		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
450	8419-6592-160	1		RING RING ANILLO	✓	
460	0019-6206-400	44		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
470	8419-6757-020	4		SCHUTZRING GUARD RING ANILLO DE PROTECCIÓN	✓	
480	0019-9421-400	12		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
490	0019-6933-400	18		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
500	8419-6473-020	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
510	8419-6594-000	1		DRUCKRING PRESSURE RING ANILLO DE PRESIÓN	✓	
520	8419-6473-250	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
530	0019-9400-400	4		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
540	8419-6526-030	4		HUELSE SLEEVE CASQUILLO	✓	
560	8419-6526-140	1		HUELSE SLEEVE CASQUILLO	✓	

Baugruppe / Component group

8419-6600-110

TROMMEL VOLLST.
BOWL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
570	8419-6131-050	1		LAGERGEHAEUSE BEARING HOUSING ALOJAMIENTO DE COJINETE	✓	
30	0019-6335-400	1		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
40	0019-8923-400	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
50	0004-5283-780	1		DICHTUNG GASKET JUNTA	✓	
60	0019-6316-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	
580	0011-1036-880	1		ZYLINDERROLLENLAGER CYLINDRICAL ROLLER BEARING COJINETE DE RODILLOS CILÍNDRICOS	✓	
590	0026-0748-170	1		SICHERUNGSRING SECURING RING ANILLO DE SEGURIDAD	✓	
600	0019-6216-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
610	8419-6375-010	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	
670	0019-6522-300	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
680	0026-1358-300	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
690	0019-6677-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
720	8419-6526-020	1		HUELSE SLEEVE CASQUILLO	✓	

Baugruppe / Component group

8419-6600-110

TROMMEL VOLLST.
BOWL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
730	8419-6305-010	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
740	8419-6454-000	1		SCHUTZBLECH GESCHW. GUARD, WELDED CHAPA PROTECTORA, SOLD.	✓	
750	8419-6305-020	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
770	0019-6337-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
980	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
1080	8419-6526-000	1		HUELSE SLEEVE CASQUILLO	✓	
1120	8418-6707-020	2		STOPFEN PLUG TAPÓN	✓	
1160	0019-6228-400	6		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1180	0019-6901-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1190	8415-6453-100	2		BLECH SHEET METAL CHAPA	✓	
1200	8419-6471-010	1		ROHR PIPE TUBO	✓	
1210	8419-6471-020	1		ROHR PIPE TUBO	✓	
1220	8419-6378-000	1		LAGERDECKEL VOLLST. BEARING COVER, COMPL. TAPA DE COJINETE, COMP.	✓	
	8419-6375-100	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	

Baugruppe / Component group

8419-6600-110

TROMMEL VOLLST.
BOWL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

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Ausgabe / Edition

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GEA Westfalia Separator Group

Baugruppe / Component group

8419-6600-110

TROMMEL VOLLST.
BOWL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

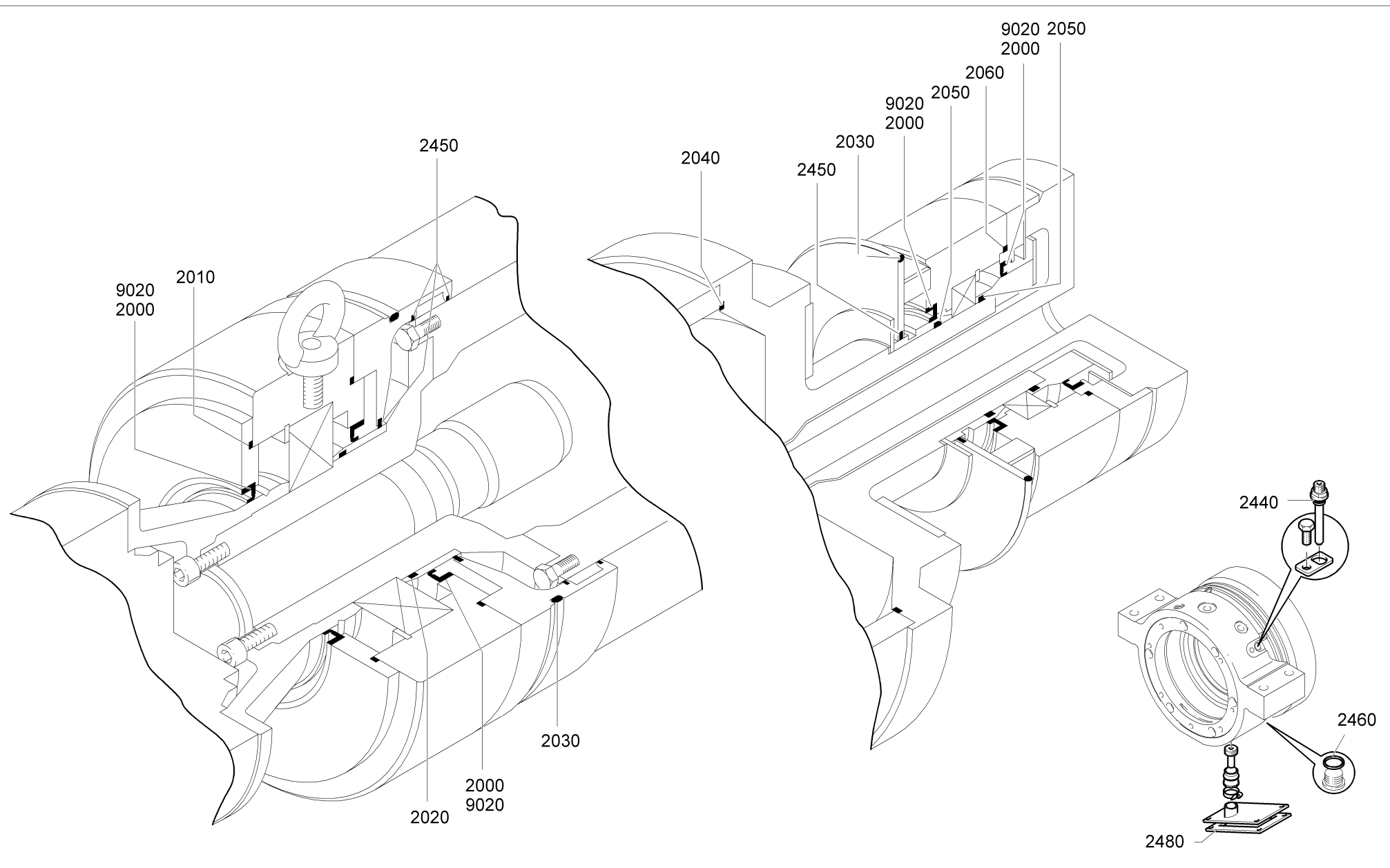
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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0019-6307-400	1		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
1230	0019-6307-400	1		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
1250	0004-3378-830	2		FALTENBALG BELLOWS FUELLE	✓	
1260	0018-5981-300	2		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
1270	8419-1061-010	1		DECKEL GESCHW. COVER, WELDED TAPA, SOLD.	✓	
1280	8418-1061-040	1		DECKEL GESCHW. COVER, WELDED TAPA, SOLD.	✓	
1300	0018-3537-400	1		VERSCHRAUBUNG SCREW COUPLING RACOR	✓	
1310	0018-3200-400	1		VERSCHLUSSKEGEL MALE CONNECTING NIPPLE CONO DE CIERRE	✓	
1320	8419-1453-020	1		BLECH SHEET METAL CHAPA	✓	
9000	6985-0605-200	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	



Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2000	0004-3223-850	4		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
2010	0007-2621-830	1		DICHTRING GASKET JUNTA ANULAR	✓	
2020	0007-1802-830	1		DICHTRING GASKET JUNTA ANULAR	✓	
2030	0007-2260-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
2040	0007-2966-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
2050	0007-2862-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
2060	0007-2571-830	1		DICHTRING GASKET JUNTA ANULAR	✓	
2440	0007-2508-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
2450	0004-1576-328	4.5	m	DICHTUNGSSCHNUR PACKING CORD CORDÓN DE JUNTA	✓	
2480	8418-1265-260	2		DICHTUNG GASKET JUNTA	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	

Baugruppe / Component group

8419-6007-160

SATZ DICHRINGE F. TROMMEL
SET OF GASKETS FOR BOWL

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

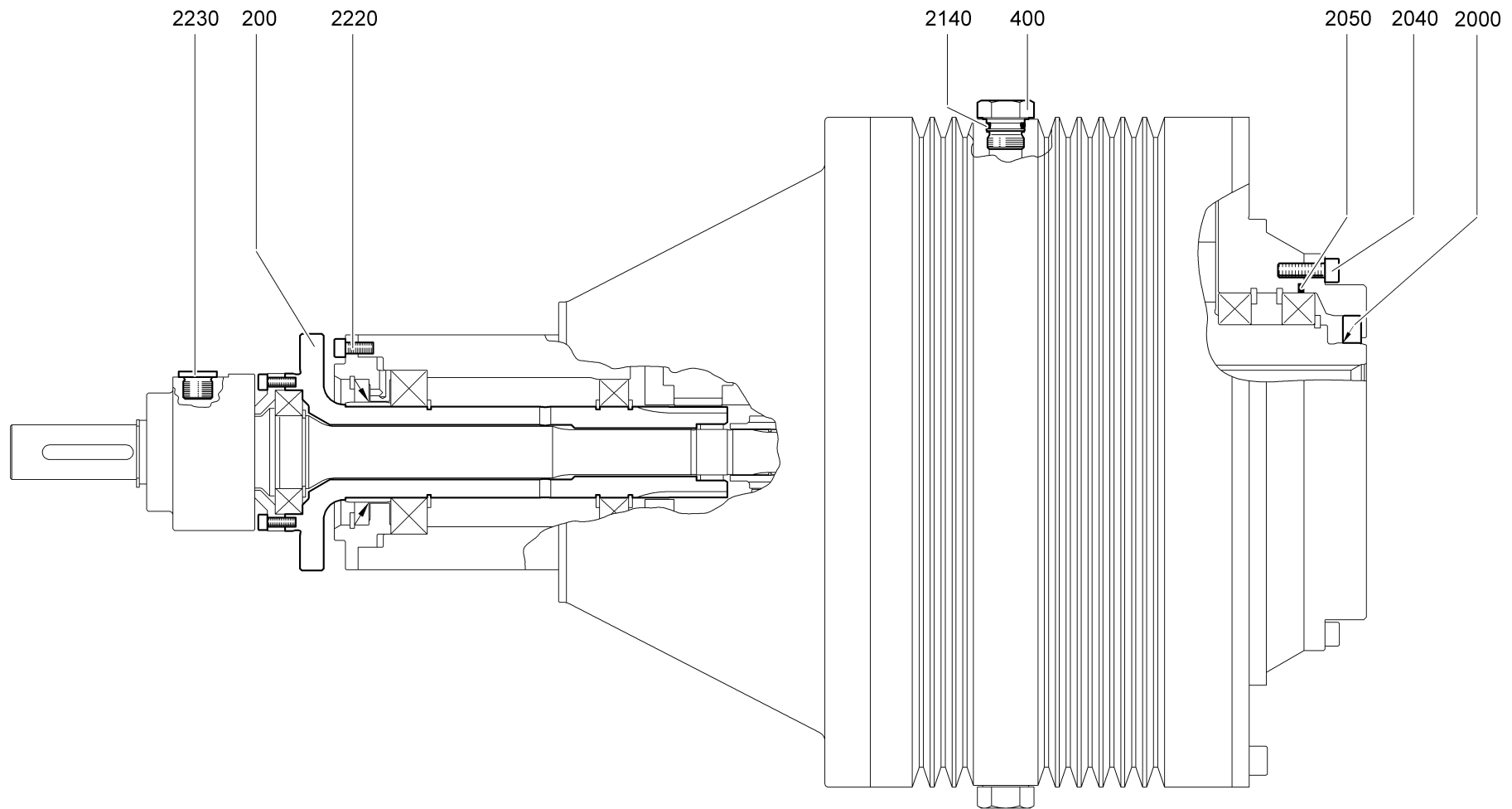
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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
200	8657-3415-050	1		WELLE VOLLST. SHAFT, COMPL. ÁRBOL, COMP.	?	
350	8657-3545-010	1		SONNENWELLE SUN-WHEEL SHAFT ENGRANAJE CENTRAL	?	
370	8657-3515-010	1		SATZ PLANETENBOLZEN SET OF PLANET BOLTS JUEGO DE EJES DEL ENGRANAJE PLANETARIO	?	
380	8657-3483-010	1		SATZ PLANETENRAD SET OF PLANET WHEELS JUEGO DE RUEDA PLANETARIA	?	
390	8657-3513-010	1		PLANETENFLANSCH PLANET FLANGE BRIDA DE ENGRANAJE PLANETARIO	?	
400	8654-3161-010	2		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
410	8657-3513-000	1		PLANETENFLANSCH PLANET FLANGE BRIDA DE ENGRANAJE PLANETARIO	?	
430	8657-3545-000	1		SONNENWELLE SUN-WHEEL SHAFT ENGRANAJE CENTRAL	?	
440	8657-3515-050	1		SATZ PLANETENBOLZEN SET OF PLANET BOLTS JUEGO DE EJES DEL ENGRANAJE PLANETARIO	?	
460	8657-3410-000	1		ABTRIEBWELLE DRIVEN SHAFT EJE DE SALIDA	?	
470	8657-3376-010	1		DECKEL COVER TAPA	?	
2000	0004-3332-830	1		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
2040	0019-6124-400	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
2050	0007-2825-830	1		DICHTRING GASKET JUNTA ANULAR	✓	

Baugruppe / Component group

8657-3210-060

PLANETENGETRIEBE VOLLST.
PLANETARY GEAR, COMPLETE

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2140	0007-2924-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
2220	0019-6106-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
2230	0019-8920-030	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	

Baugruppe / Component group

8657-3210-060

PLANETENGETRIEBE VOLLST.
PLANETARY GEAR, COMPLETE

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

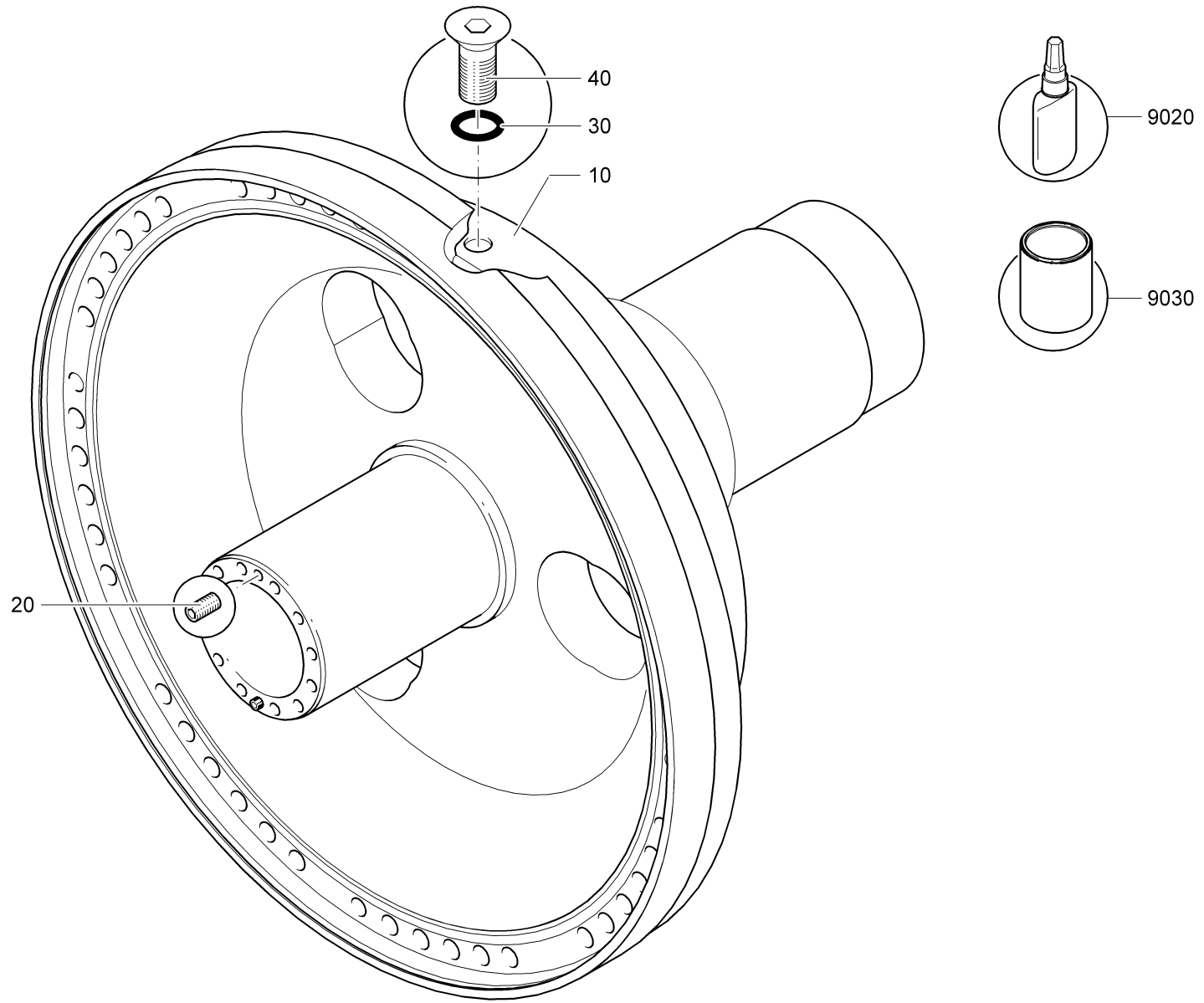
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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
20	0019-6335-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
30	0007-2926-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
40	0019-9410-400	2		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

Baugruppe / Component group

8419-6520-020

LAGERNABE VOLLST.
BEARING HUB, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

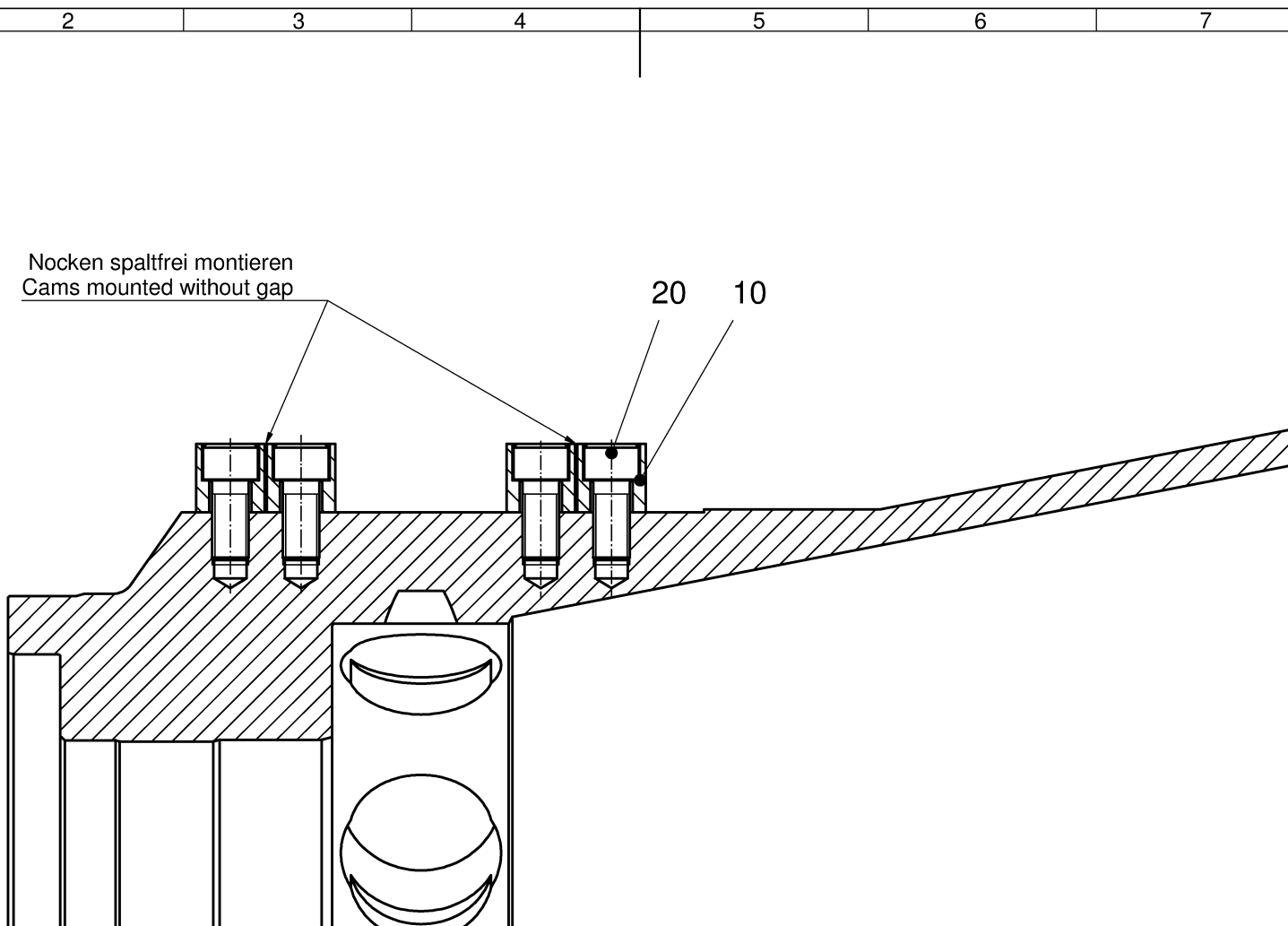
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Änd.-Datum: Rev. Date:		Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident	 Westfalia Separator Group GmbH 59302 Oelde, Germany	Ersetzt durch:/ Replaced by:	Ersatz für:/ Replacement for:	
	Datum/Date	Name		Description: Set of scraper blades	Benennung: Satz Flügel	ISO 128-30 Maßstab/Scale 1:2
Gez./Drawn	29.06.2017	Niemann.Cl	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302	WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No.	Blatt/Sheet 1
Geprüft Checked	29.06.2017	Zielke.Do	Allgemeintoleranzen General tolerances mK nach ISO 2768 acc. to ISO 2768	8419-6686-000	Blätter/Sheets 1	
Normgepr. Normchecked	03.07.2017	Deipenbrock.Br				

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8177-6465-040	8		NOCKEN CAM LEVA	✓	
20	0019-6200-400	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	

Baugruppe / Component group

8419-6686-000

SATZ FLUEGEL
SET OF SCRAPER BLADES

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

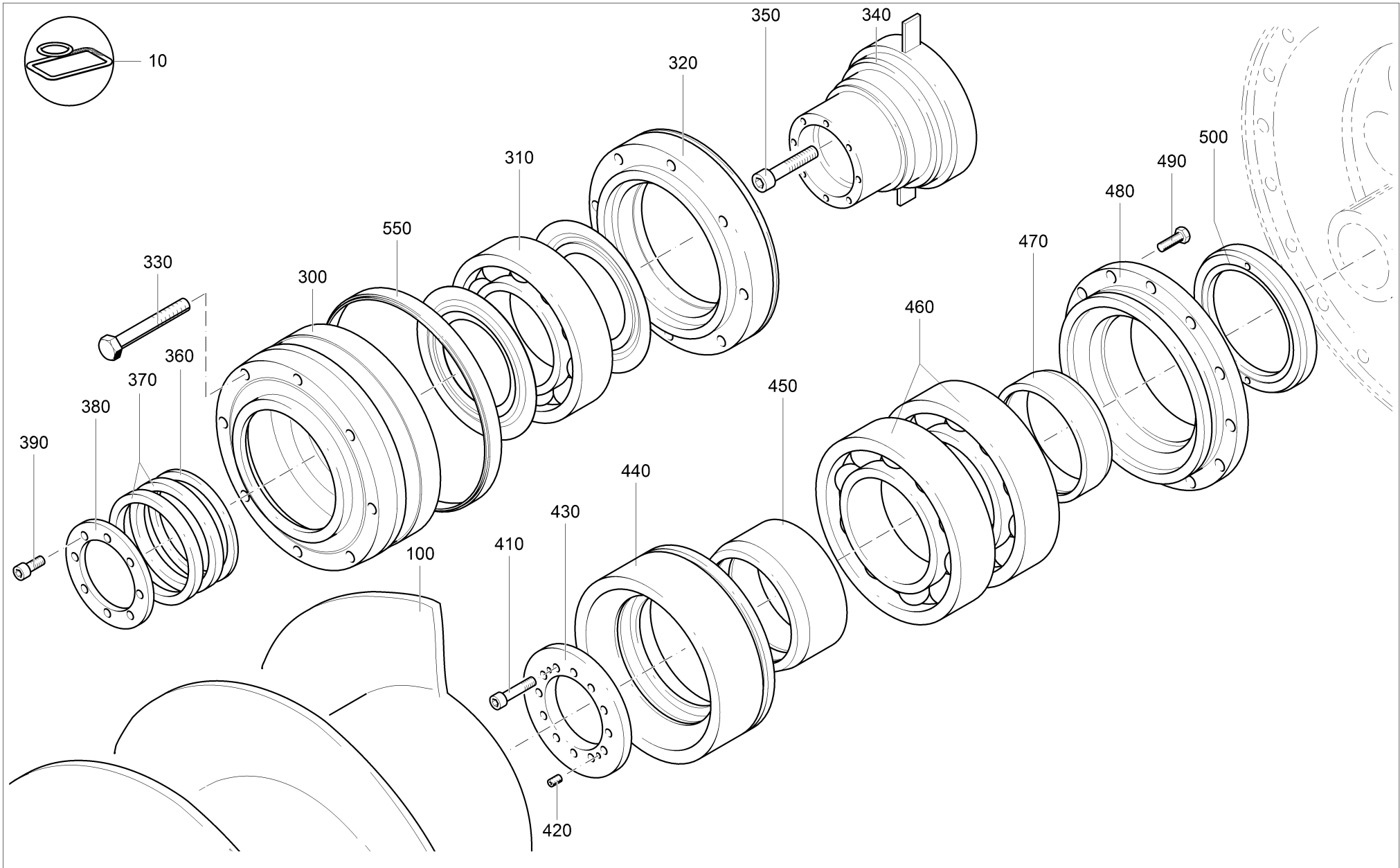
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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-6006-040	1		SATZ DICHRINGE F.SCHNECKE SET OF GASKETS FOR SCROLL JUEGO JUNTAS PARA EL SINFIN	✓	38
100	8419-6515-000	1		SCHNECKE GESCHW. SCROLL, WELDED SINFÍN, SOLD.	?	40
300	8419-6592-170	1		RING RING ANILLO	✓	
310	0011-6226-950	1		RILLENKUGELLAGER GROOVED BALL BEARING RODAMIENTO RÍGIDO	✓	
320	8419-6592-030	1		RING RING ANILLO	✓	
330	0019-6520-300	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
340	8419-6635-000	1		MITNEHMER VOLLST. DRIVER, COMPL. PIEZA DE ARRASTRE, COMP.	✓	
350	0019-6247-400	5		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
360	8419-6592-010	1		RING RING ANILLO	✓	
370	8419-6592-000	2		RING RING ANILLO	✓	
380	8419-6473-050	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
390	0019-6144-400	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
410	0019-6166-400	12		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
420	0019-6318-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	

Baugruppe / Component group

8419-6539-040

SCHNECKE VOLLST.
SCROLL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
430	8419-6592-020	1		RING RING ANILLO	✓	
440	8419-6592-050	1		RING RING ANILLO	✓	
450	8419-6592-070	1		RING RING ANILLO	✓	
460	0011-7228-970	2		SCHRAEGKUGELLAGER ANGULAR CONTACT BALL BEARING BOLAS DE CONTACTO ANGULAR	✓	
470	8419-6592-090	1		RING RING ANILLO	✓	
480	8419-6375-020	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	
490	0019-6971-400	12		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
500	8419-6592-110	1		RING RING ANILLO	✓	
550	0026-2805-300	1		TOLERANZRING SPACER RING ANILLO DE TOLERANCIA	✓	

Baugruppe / Component group

8419-6539-040

SCHNECKE VOLLST.
SCROLL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

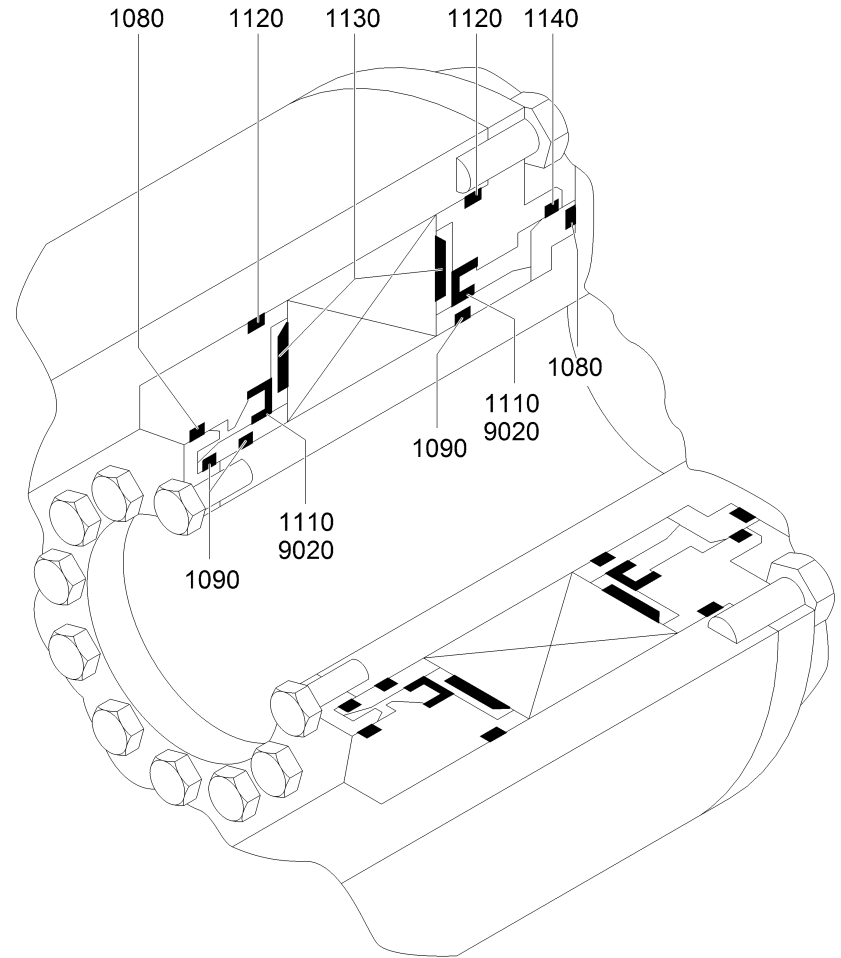
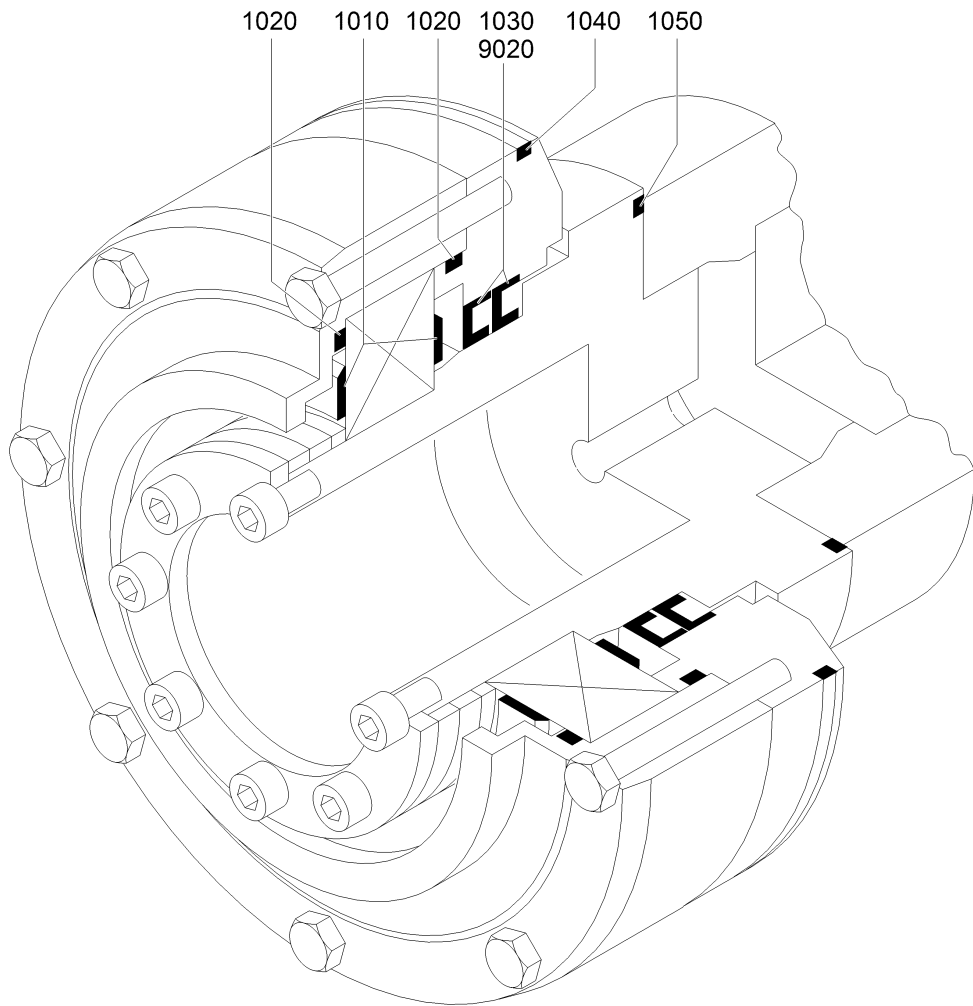
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GEA Westfalia Separator Group



Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1010	0004-1586-300	2		NILOS-DICHTRING NILOS GASKET ANILLO NILOS	✓	
1020	0007-2706-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
1030	0004-1582-850	2		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
1040	0007-2577-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
1050	0007-2864-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
1080	0007-2864-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
1090	0007-2940-750	3		DICHTRING GASKET JUNTA ANULAR	✓	
1110	0004-1583-850	2		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
1120	0007-3733-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
1130	0004-3334-300	2		NILOS-DICHTRING NILOS GASKET ANILLO NILOS	✓	
1140	0007-3619-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	

Baugruppe / Component group

8419-6006-040

SATZ DICHTRINGE F.SCHNECKE
SET OF GASKETS FOR SCROLL

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

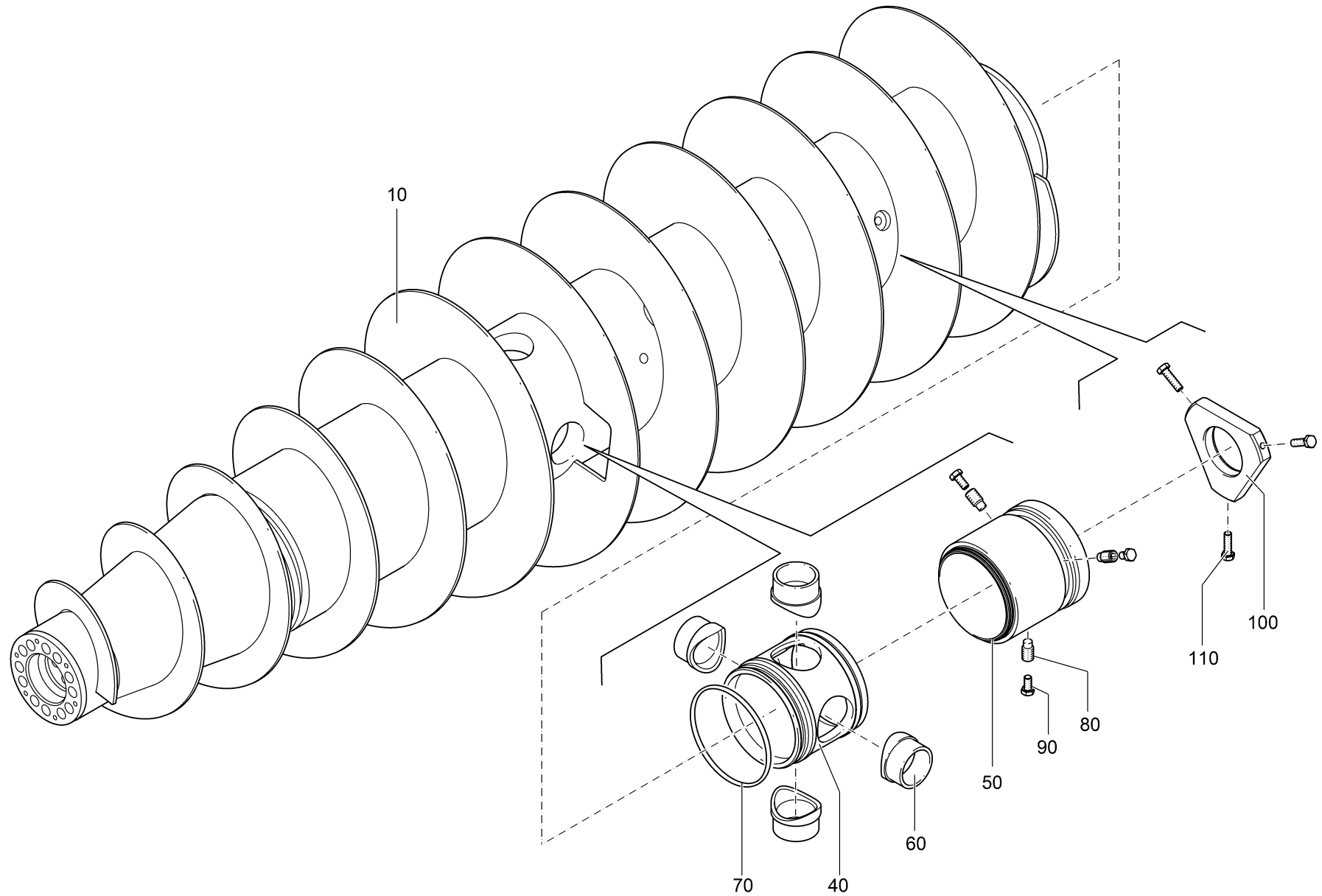
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Baugruppe / Component group

8419-6515-000

SCHNECKE GESCHW.
SCROLL, WELDED

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
30	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
40	8419-6621-000	1		VERTEILER DISTRIBUTOR DISTRIBUIDOR	v	
50	8419-6630-000	1		VERTEILERDECKEL DISTRIBUTOR COVER TAPA DEL DISTRIBUIDOR	v	
60	8418-6493-000	4		BUCHSE BUSHING CASQUILLO	v	
70	0007-2065-750	1		DICHTRING GASKET JUNTA ANULAR	v	
80	0019-6396-400	3		GEWINDESTIFT THREADED PIN PRISIONERO	v	
90	0019-7031-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
100	8419-6453-000	1		BLECH SHEET METAL CHAPA	v	
110	0019-6536-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

8012-663

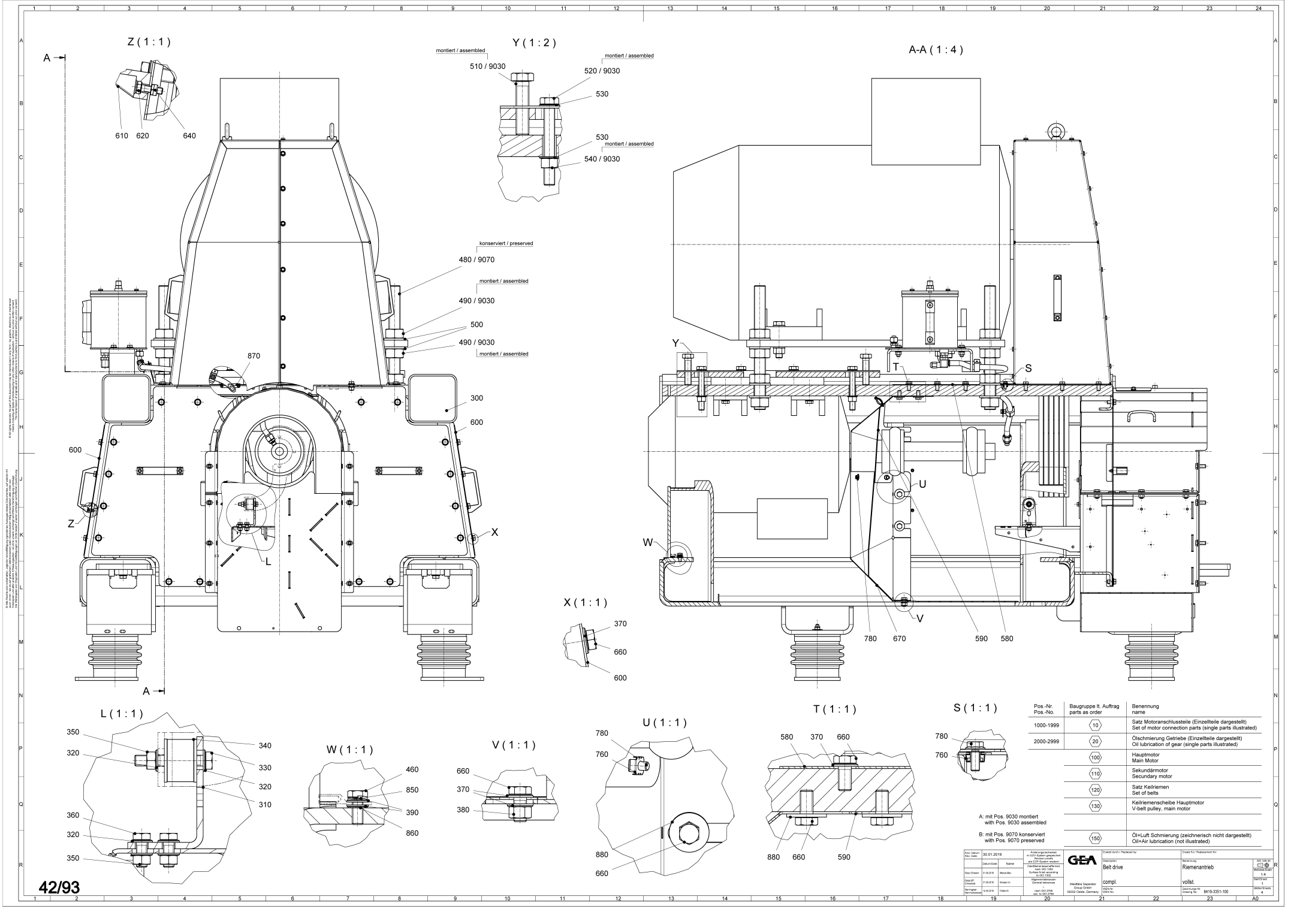
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GEA Westfalia Separator Group

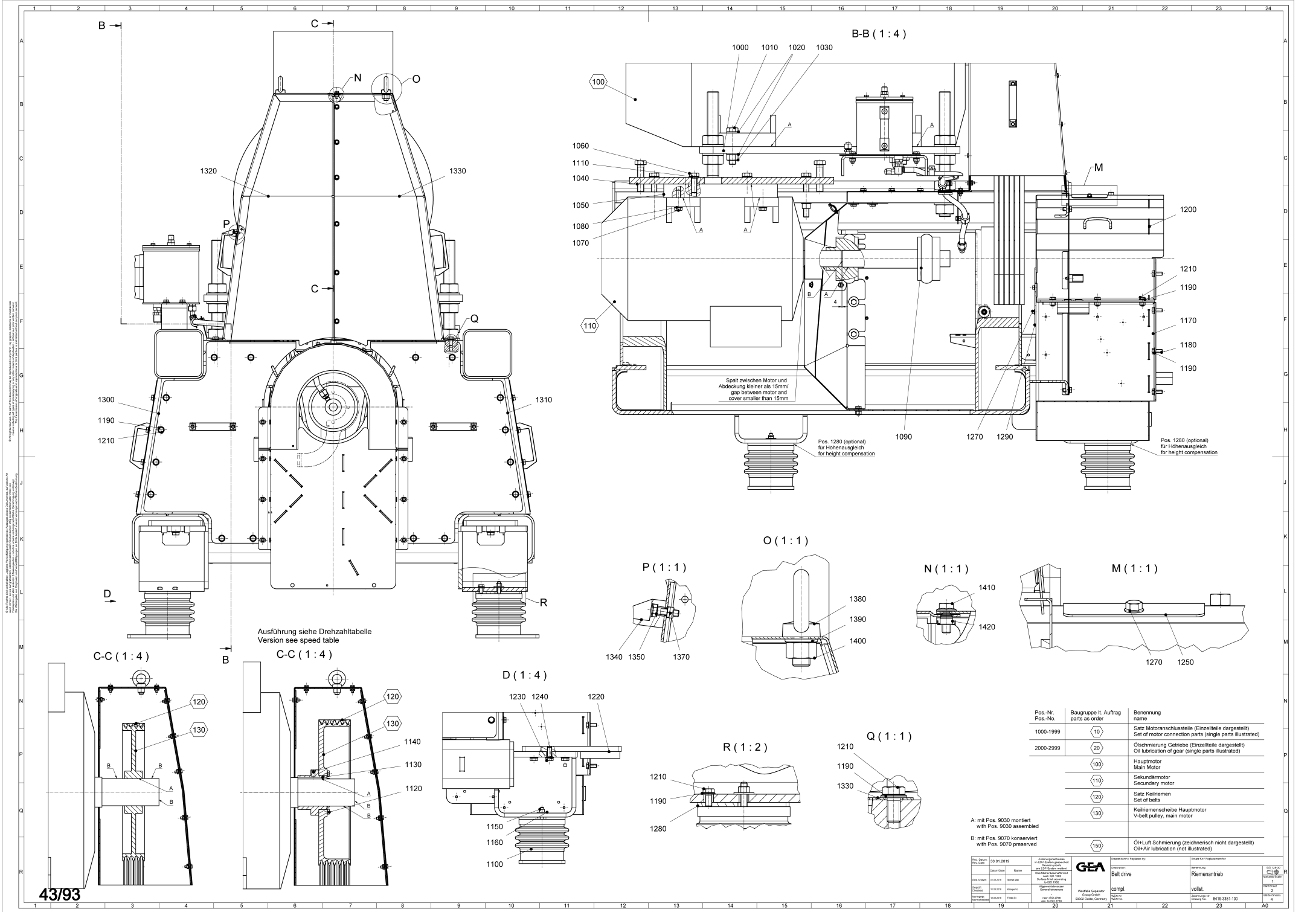


Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	(10)	Satz Motoranschlussteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	(20)	Ölchmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	(100)	Hauptmotor Main motor
	(110)	Sekundärmotor Secondary motor
	(120)	Satz Keilriemen Set of belts
	(130)	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	(150)	Öl+Luft Schmierung (zeichnensch nicht dargestellt) Oil+Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled

B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code Rev. Code	30 01 2019	Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019	GEA	Hersteller/Produzent Belt drive	Hersteller/Produzent Riemenantrieb
Doc. Name	30 01 2019	Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019	compi.	vollst.	
Doc. No.	30 01 2019	Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019	Werkstoff GEA/GEA	GEA/GEA	
Doc. No.	30 01 2019	Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019	Werkstoff GEA/GEA	GEA/GEA	
Doc. No.	30 01 2019	Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019 Änderungsbefehl no 1177 2019 02/2019	Werkstoff GEA/GEA	GEA/GEA	



Ausführung siehe Drehzahltafel
Version see speed table

Spalt zwischen Motor und Abdeckung kleiner als 15mm/
gap between motor and cover smaller than 15mm

Pos. 1280 (optional) für Höhenausgleich
for height compensation

Pos. 1280 (optional) für Höhenausgleich
for height compensation

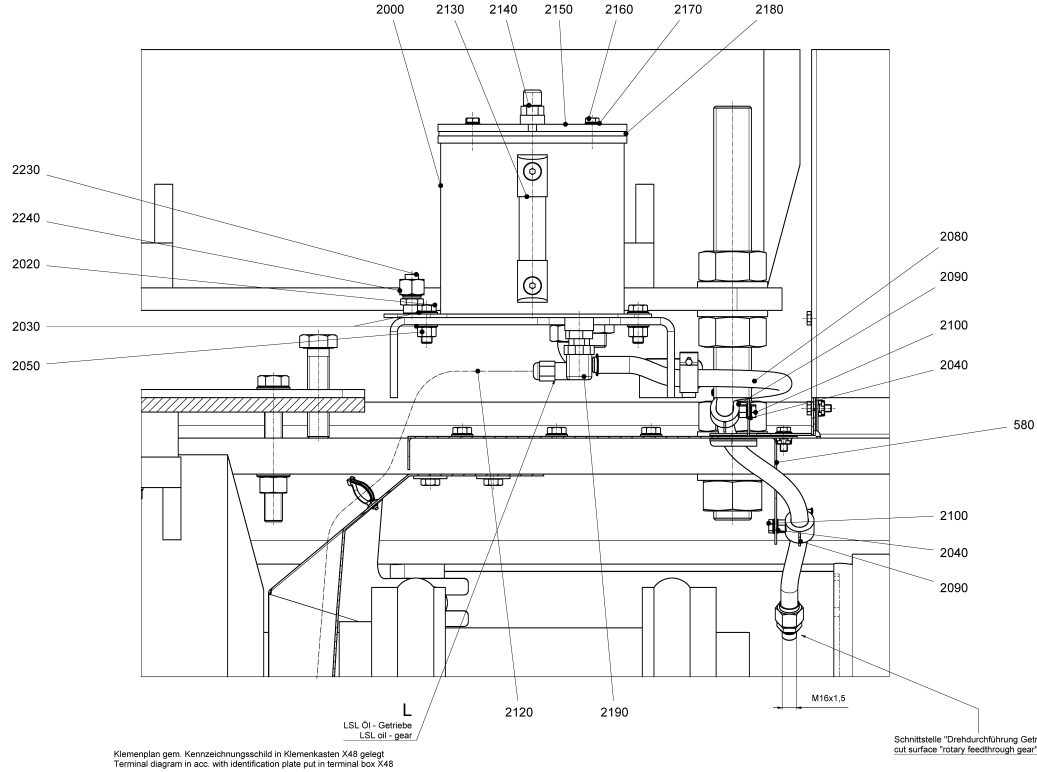
Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlussteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Ölschmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main Motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	150	Öl+Luft Schmierung (zeichnerisch nicht dargestellt) Oil+Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled

B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code Rev. Code	30 01 2019	Änderungshistorie Revision History	GEA	Hersteller Manufacturer	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00
Doc. Code	30 01 2019	Änderungshistorie	GEA	Hersteller	303 138 00

E-E (1 : 2)

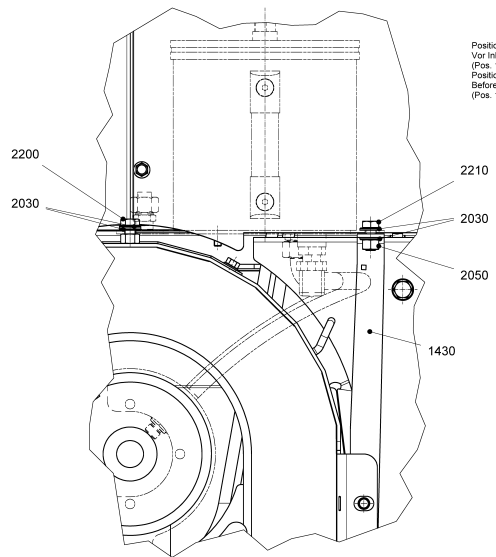


Klemmenplan gem. Kennzeichnungsschild in Klemmenkasten X48 gelegt
Terminal diagram in acc. with identification plate put in terminal box X48

Schnittstelle "Drehdurchführung Getriebe"
cut surface "rotary feedthrough gear"

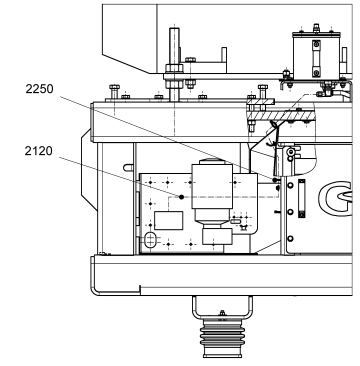
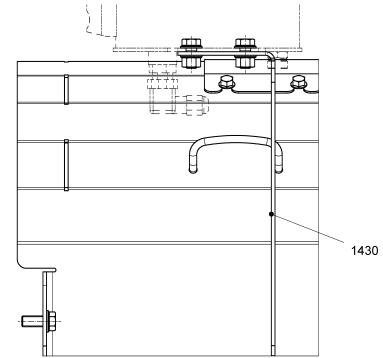
L
LSL Öl - Getriebe
LSL oil - gear

F (1 : 2)



Position des Ölbehälters nur für den Transport / Versand
Vor Inbetriebnahme muss der Ölbehälter an den Antriebsrahmen montiert werden - siehe Ansicht B-B
(Pos. 1430 demontieren)
Position of the oil tank for transport / shipping
Before commissioning the oil tank must be mounted on the drive frame - see view B-B
(Pos. 1430 dismount)

G (1 : 2)

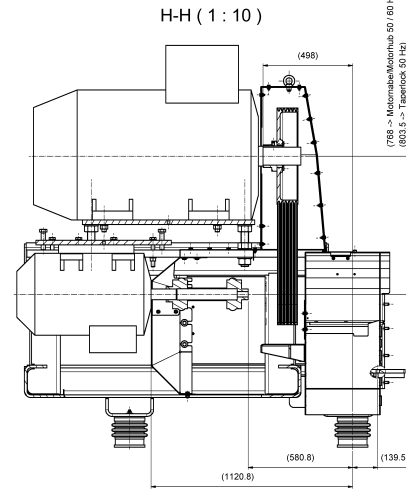
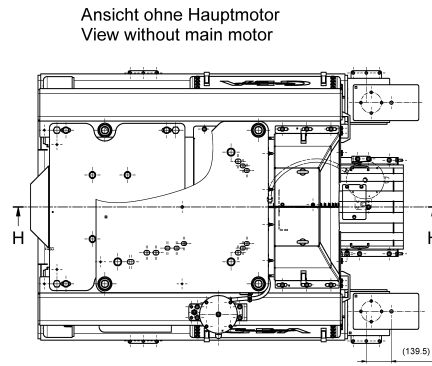


Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlussstelle (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Ölschmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	150	Öl+Luft Schmierung (zeichnerisch nicht dargestellt) Oil+Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled
B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

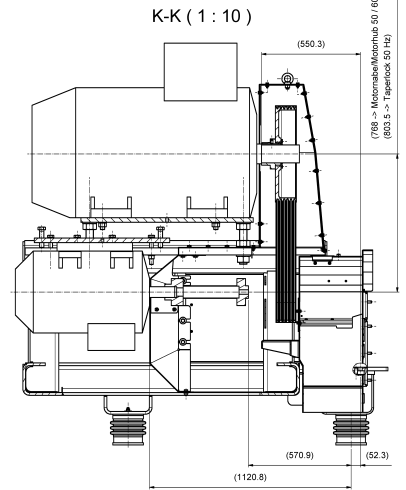
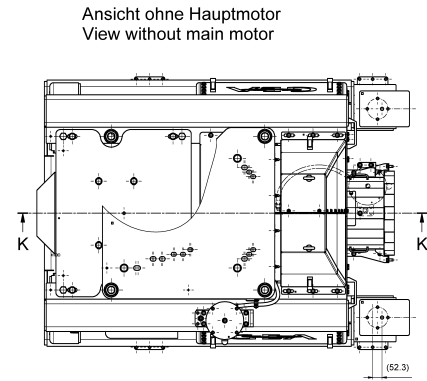
<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>	<p>Art. Code No. Code</p> <p>00 01 2019</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p> <p>06/01/2018</p>
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Getriebe / Gear PG. 417



(788 -> Motorhub/Motorhub 50 / 60 Hz, Tapenlock 60 Hz)
(803.5 -> Tapenlock 50 Hz)

Getriebe / Gear PG. 411



(788 -> Motorhub/Motorhub 50 / 60 Hz, Tapenlock 60 Hz)
(803.5 -> Tapenlock 50 Hz)

Doc. Code Rev. Code	50 01 2019 04/01/2019	Approved/checked by 1127 / 1127 Date 04/01/2019 Checked/checked by 1127 / 1127 Date 04/01/2019	GEA	Control sheet / Revision list	Drawn by / Prepared/checked by
Date / Date	21.08.2018	Drawn by	compi.	Belt drive	Riemenantrieb
Design / Zeichnung	21.08.2018	Drawn by	vollet.		
Manufacture / Herstellung	09.09.2018	Produced by	8419-3351-100		
			8419-3351-100		

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-3328-230	1		SATZ MOTORANSCHLUSSTEILE SET OF MOTOR CONNECTION PARTS JUEGO DE PIEZAS DE CONEXIÓN DEL MOTOR	✓	
1000	8419-3008-040	1		MOTORPLATTE MOTOR PLATE PLACA DEL MOTOR	✓	
1010	0019-6670-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1020	0026-1358-400	8		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1030	0013-0005-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1040	8419-3008-050	1		MOTORPLATTE MOTOR PLATE PLACA DEL MOTOR	✓	
1050	8419-3343-000	2		LEISTE METAL STRIP LISTÓN	✓	
1060	0019-7108-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1070	0019-7042-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1080	0026-1335-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1090	8657-3390-050	1		KUPPLUNG VOLLST. COUPLING, COMPL. EMBRAGUE, COMP.	✓	52
1100	8690-1780-000	4		DAEMPFER VOLLST. DAMPER COMPL. AMORTIGUADOR COMP.	✓	
	0026-1358-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1120	0000-0006-162	10		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

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GEA Westfalia Separator Group

Baugruppe / Component group

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RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
	0013-0280-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	v	
1160	0026-2407-300	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	v	
1170	8419-3752-040	1		LUFTSCHACHTUNTERTEIL GESCHW. LOWER PART OF VENTILATION DUCT WELDED	v	
1180	0019-6970-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
1190	0026-1371-400	40		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	v	
1200	8419-3752-050	1		LUFTSCHACHTOBERTEIL GESCHW. UPPER PART OF VENTILATION DUCT WELDED	v	
1210	0019-6968-400	32		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
1220	8419-3454-010	2		BLECH GESCHW. SHEET METAL, WELDED CHAPA SOLDADA	v	
1230	0019-7037-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
1240	0026-1335-400	8		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	v	
1250	8419-3376-100	1		DECKEL COVER TAPA	v	
1270	0019-1791-300	7		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1280	8690-1075-020	2		PLATTE PLATE PLACA	✓	
1290	8419-3376-090	1		DECKEL COVER TAPA	✓	
1300	8419-3376-060	1		DECKEL COVER TAPA	✓	
1310	8419-3376-070	1		DECKEL COVER TAPA	✓	
1320	8419-3381-040	1		SCHUTZKASTEN GESCHW. PROTECTIVE CASING, WELDED CAJA PROTECTORA, SOLD.	✓	
1330	8419-3381-030	1		SCHUTZKASTEN GESCHW. PROTECTIVE CASING, WELDED CAJA PROTECTORA, SOLD.	✓	
1340	0026-2678-840	4		GRIFF HANDLEGRIP EMPUÑADURA	✓	
1350	0019-6842-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1370	0013-0294-300	8		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1380	0019-5384-050	2		RINGSCHRAUBE EYE BOLT ANILLA	✓	
1390	0026-1335-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1400	0013-0282-400	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1410	0019-1754-300	11		SPERRZAHNSECHSKANTSCHRAUBE ELF-LOCKING HEX HEAD SCREW TORNILLO HEXAGONAL CON DIENTES BLOQUEO	✓	
1420	0013-0185-030	11		KAFIGMUTTER CAGE NUT TUERCA DE JAULA	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1430	8419-3205-000	1		STUETZE SUPPORT SOSTÉN	✓	
20	8690-3350-030	1		OELSCHMIERUNG GETRIEBE OIL LUBRICATION SYSTEM, GEAR LUBRICANTE DE ENGRANAJE	✓	54
100	5390-5893-339	1		DREHSTROMMOTOR THREE-PHASE AC MOTOR MOTOR TRIFÁSICO	✓	
110	5390-0885-039	1		DREHSTROMMOTOR THREE-PHASE AC MOTOR MOTOR TRIFÁSICO	✓	
120	0021-3969-810	1		SATZ SCHMALKEILRIEMEN SET OF NARROW V-BELTS JUEGO DE CORREAS TRAPEZOIDALES ESTRECHAS	✓	
130	0021-3940-210	1		RIEMENSCHIBE VOLLST. BELT PULLEY, COMPL. POLEA PARA CORREA, COMP.	✓	
150	8419-3409-130	1		OEL-LUFT-AGGREGAT VOLLST. OIL-AIR UNIT, COMPL. GRUPO DE ACEITE-AIRE, COMP.	✓	60
300	8419-3473-050	1		ANTRIEBSRAHMEN GESCHW. DRIVE FRAME, WELDED	✓	
310	8419-1145-000	1		HALTER HOLDER SOPORTE	✓	
320	0026-1348-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
330	0019-6931-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
340	0021-3147-750	1		RUNDLAGER RUBBER-METAL CUSHIONS AMORTIGUADOR	✓	
350	0013-0279-400	3		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
360	0019-6935-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
370	0026-1371-400	30		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
380	0013-0280-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
390	0026-1348-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
460	0019-6935-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
480	0019-8133-090	4		GEWINDEBOLZEN THREADED BOLT TORNILLO ROSCADO	✓	
490	0013-0191-150	16		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
500	0026-2626-300	16		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
510	0019-7188-300	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
520	0019-7121-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
530	0026-1358-400	8		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
540	0013-0005-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
580	8419-3376-200	1		DECKEL COVER TAPA	✓	
590	8419-3117-010	1		SCHUTZBLECH GESCHW. GUARD, WELDED CHAPA PROTECTORA, SOLD.	✓	
600	8419-3376-030	2		DECKEL COVER TAPA	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
610	0026-2678-840	4		GRIFF HANDLEGRIP EMPUÑADURA	✓	
620	0019-6842-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
640	0013-0294-300	8		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
660	0019-6968-400	36		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
670	8419-3117-000	1		SCHUTZBLECH GESCHW. GUARD, WELDED CHAPA PROTECTORA, SOLD.	✓	
760	0013-0185-030	8		KAFIGMUTTER CAGE NUT TUERCA DE JAULA	✓	
780	0019-1754-300	8		SPERRZAHNSECHSKANTSCHRAUBE ELF-LOCKING HEX HEAD SCREW TORNILLO HEXAGONAL CON DIENTES BLOQUEO	✓	
850	0026-1337-300	1		FEDERRING SPRING RING ANILLO DE PRESIÓN	✓	
860	0026-5673-300	1		FAECHERSCHEIBE FAN-TYPE LOCK WASHER ARANDELA DENTADA	✓	
870	0004-2051-768	0.2	m	DICHTUNGSPROFIL MOULDED GASKET PERFIL DE CIERRE HERMÉTICO	✓	
880	0026-2407-300	10		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

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Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

30.11.2021

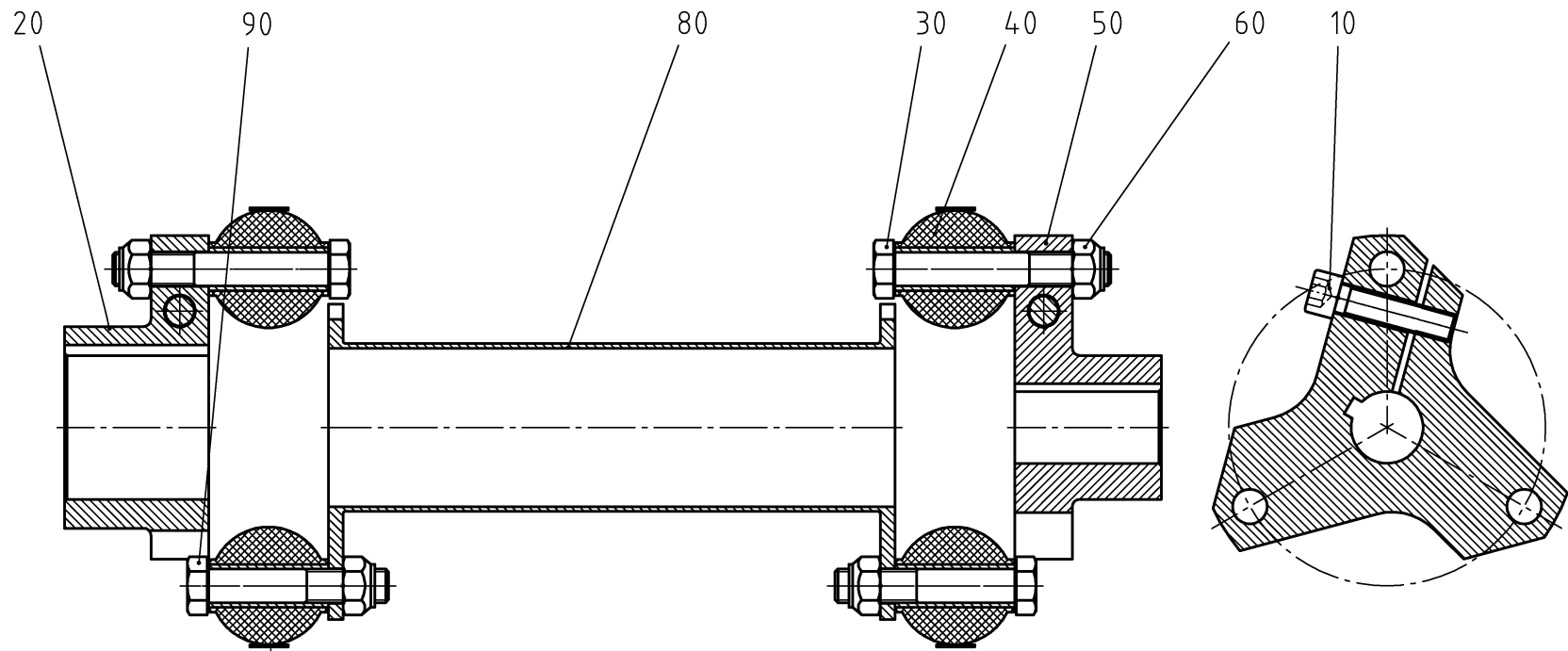
Seite/Page

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GEA Westfalia Separator Group

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Achtung! Kupplungsring steht unter Vorspannung. Stahlbandage erst nach Montage am Dekanter entfernen.
 Attention! Coupling ring is prestressed. Do not remove steel binding until assembled at decanter.

Bei Wartungsarbeiten Kupplungsring Pos. 40 mit Halter vollst. 8656-9932-000 zusammendrücken.
 For Maintenance, use holder compl 8656-9932-000 to prestress coupling ring pos. 40.

Änd.-Datum/ Rev. Date:	26.09.2014		Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302	GEA	Ersetzt durch/ Replaced by:		Ersatz für/ Replacement for:	
Gez./Drawn	Datum/Date	Name			Description:	Benennung:	ISO 128-30 Maßstab/Scale 1:2 Blatt/Sheet	
Geprüft Checked	14.02.2014	Neubauer.Ri	Allgemeintoleranzen General tolerances mK nach ISO 2768 acc. to ISO 2768	Westfalia Separator 59302 Oelde, Germany	Coupling compl.	Kupplung vollst.	Zeichnungs-Nr. Drawing No.	8657-3390-050
Normgepr. Normchecked	17.02.2014	Deipenbrock.Br			WSN-Nr. WSN No.			Blätter/Sheets 1

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0019-6169-400	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
20	8656-3388-000	1		KUPPLUNGSNABE CLUTCH HUB CUBO DEL EMBRAGUE	✓	
30	0019-6586-400	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
40	8656-3396-000	2		KUPPLUNGSRING CLUTCH RING ARO DE ACOPL.	✓	
50	8657-3388-030	1		KUPPLUNGSNABE CLUTCH HUB CUBO DEL EMBRAGUE	✓	
60	0013-0309-410	12		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
80	8657-3448-020	1		ROHR GESCHW. PIPE, WELDED TUBO, SOLD.	✓	
90	0019-6583-300	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	

Baugruppe / Component group

8657-3390-050

KUPPLUNG VOLLST.
COUPLING, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

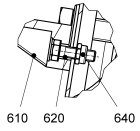
Ausgabe / Edition

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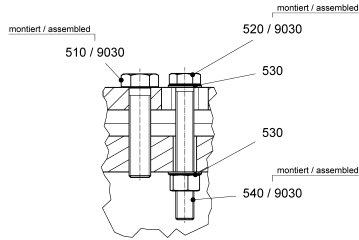
Seite/Page

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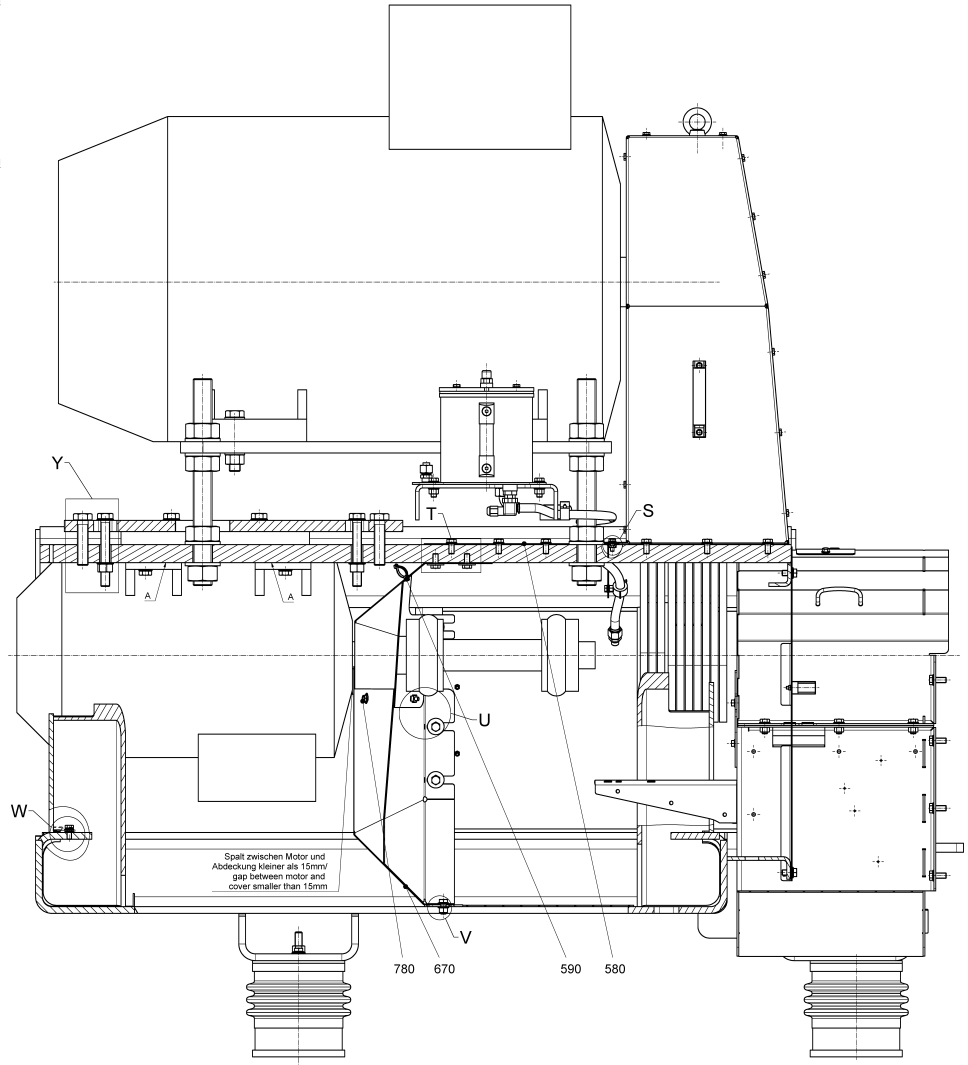
A → Z (1:1)



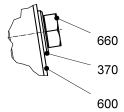
Y (1:2)



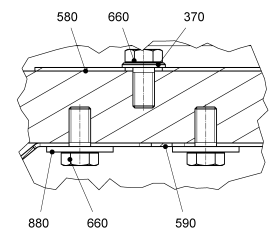
A-A (1:4)



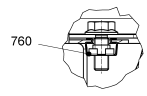
X (1:1)



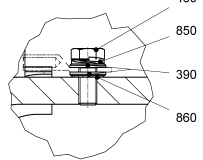
T (1:1)



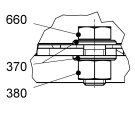
S (1:1)



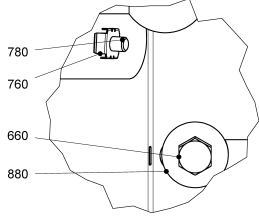
W (1:1)



V (1:1)



U (1:1)

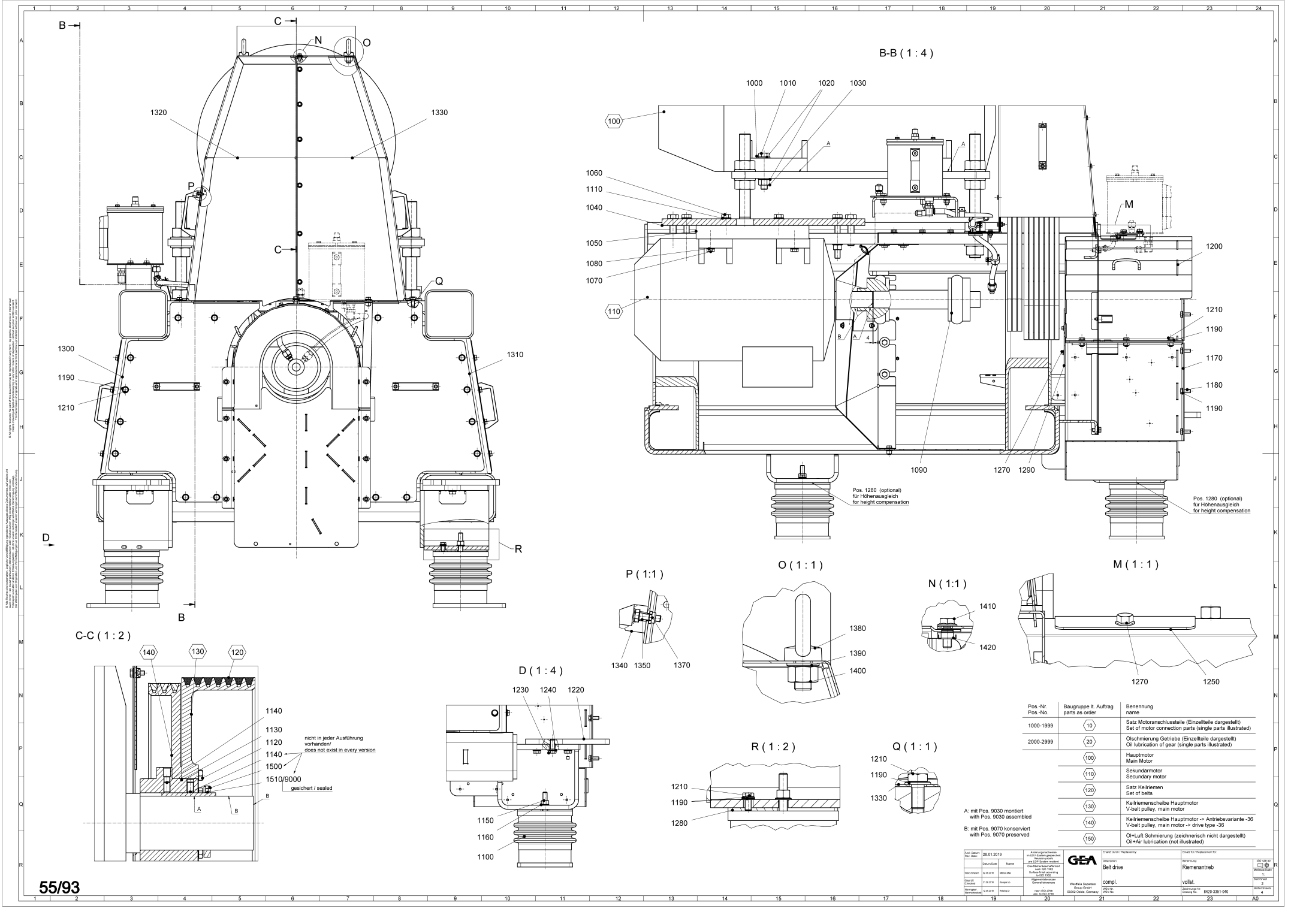


Spalt zwischen Motor und Abdeckung kleiner als 15mm/ gap between motor and cover smaller than 15mm

Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	(10)	Satz Motoranschlussteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	(20)	Ölschmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	(100)	Hauptmotor Main motor
	(110)	Sekundärmotor Secondary motor
	(120)	Satz Keilriemen Set of belts
	(130)	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	(140)	Keilriemenscheibe Hauptmotor -> Antriebsvariante -36 V-belt pulley, main motor -> drive type -36
	(150)	Öl-/Luft-Schmierung (zeichnerisch nicht dargestellt) Oil/Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled
B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code Rev. Code	25 01 2019	Änderungshistorie Revision History	GEA	Hersteller / Hersteller für Manufacturer / Manufacturer for	Beltdrive	Riemenantrieb	840-335-040
Doc. Name Rev. Name		Änderung Revision		Produkt / Produkt Product / Product	comp.	vollst.	
Doc. No. Rev. No.		Änderung Revision		Werk / Werk Plant / Plant			



B-B (1:4)

C-C (1:2)

D (1:4)

P (1:1)

O (1:1)

N (1:1)

M (1:1)

R (1:2)

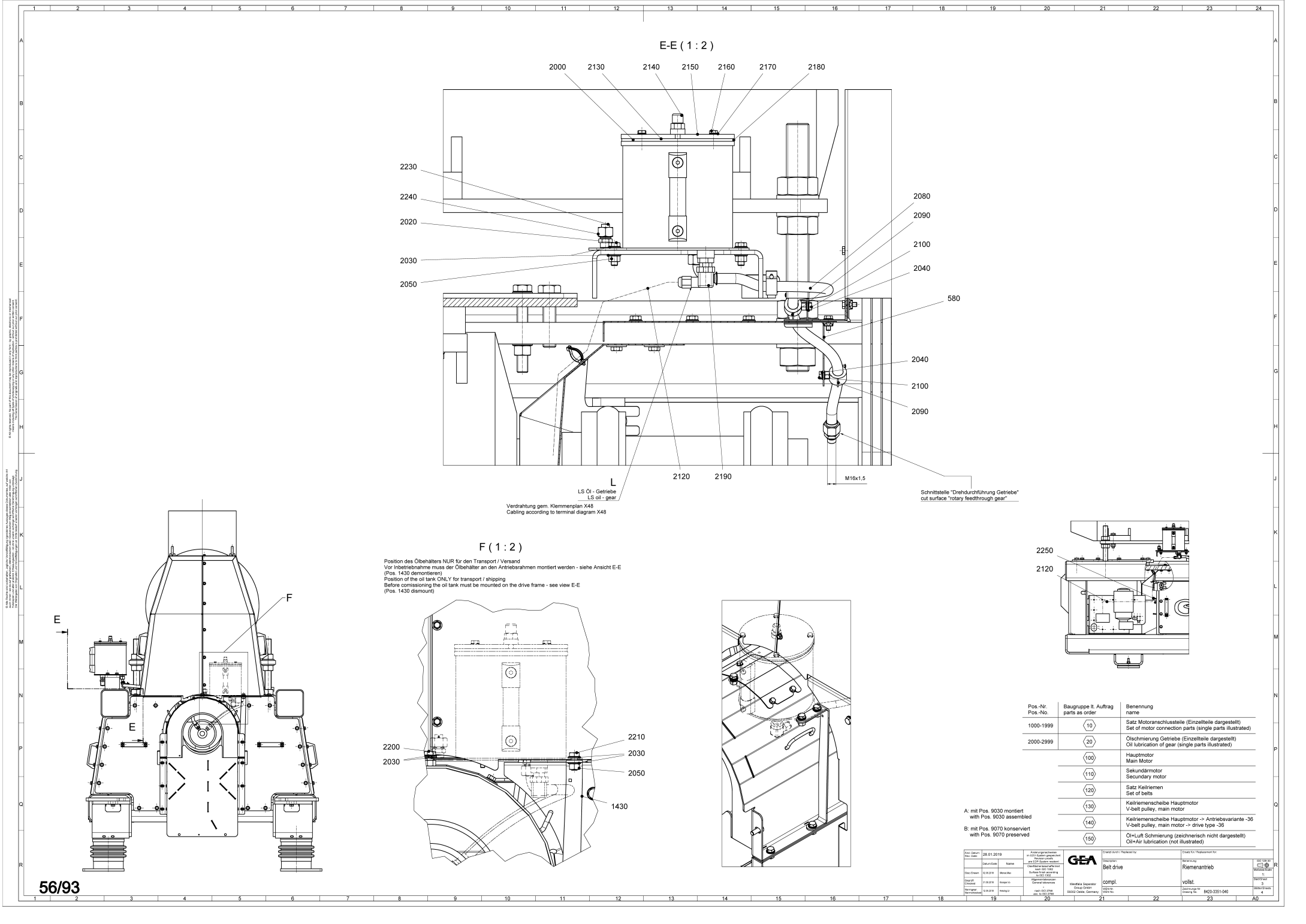
Q (1:1)

Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlusssteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Schmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main Motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	140	Keilriemenscheibe Hauptmotor -> Antriebsvariante -36 V-belt pulley, main motor -> drive type -36
	150	Öl-Luft Schmierung (zeichnerisch nicht dargestellt) Oil-Air lubrication (not illustrated)

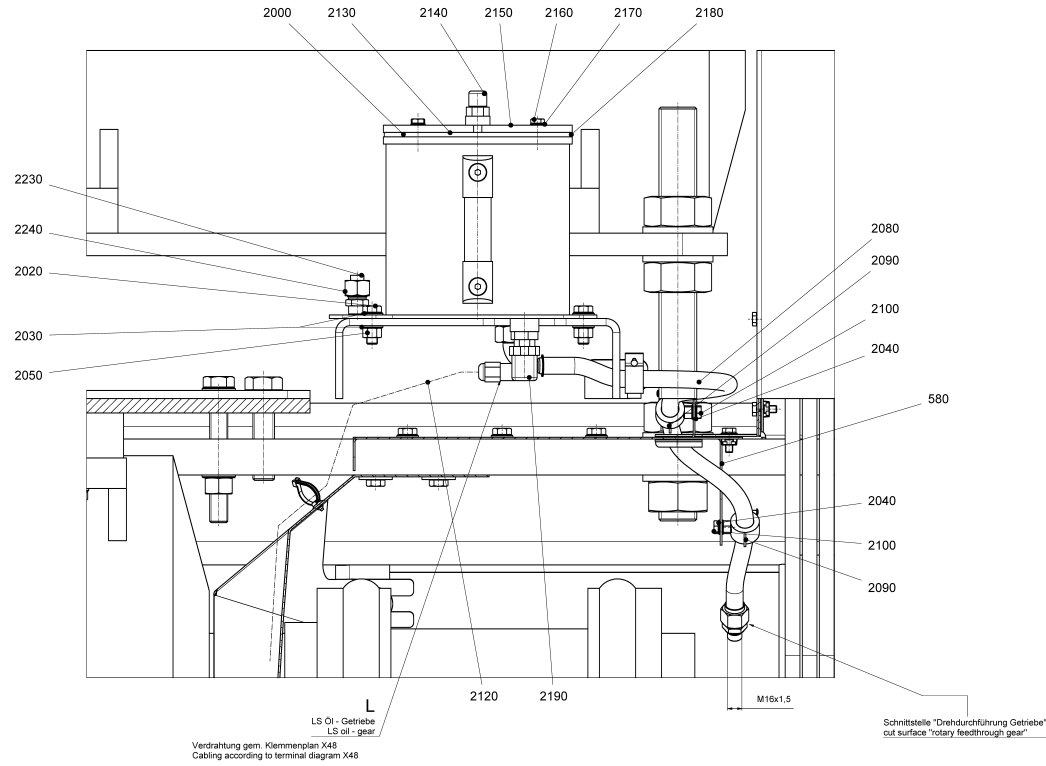
A: mit Pos. 9030 montiert
with Pos. 9030 assembled

B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code	28 01 2019	Änderungswahlzeichen no 1072 (nicht gezeichnet) P-01 (nicht gezeichnet) Übersichtsansicht - 01.01.2019	GEA	Hersteller Belt drive	Benennung Riemenantrieb	Doc. No. 8420-335-040
Doc. Code	28 01 2019	Änderungswahlzeichen no 1072 (nicht gezeichnet) P-01 (nicht gezeichnet) Übersichtsansicht - 01.01.2019	GEA	Hersteller Belt drive	Benennung Riemenantrieb	Doc. No. 8420-335-040
Doc. Code	28 01 2019	Änderungswahlzeichen no 1072 (nicht gezeichnet) P-01 (nicht gezeichnet) Übersichtsansicht - 01.01.2019	GEA	Hersteller Belt drive	Benennung Riemenantrieb	Doc. No. 8420-335-040



E-E (1:2)

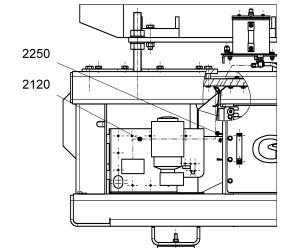
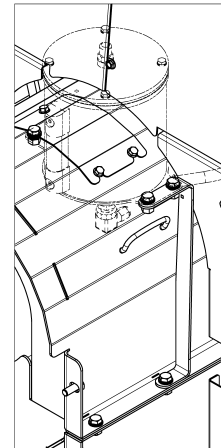
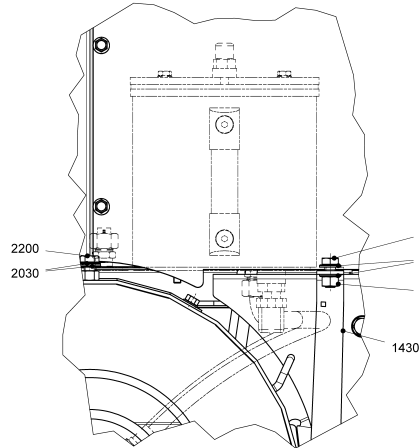


Verdrahtung gem. Klemmenplan X48
Cabling according to terminal diagram X48

Schnittstelle "Drehdurchführung Getriebe"
cut surface "rotary feedthrough gear"

F (1:2)

Position des Ölbehälters NUR für den Transport / Versand
Vor Inbetriebnahme muss der Ölbehälter an den Antriebsrahmen montiert werden - siehe Ansicht E-E (Pos. 1430 demontieren)
Position of the oil tank ONLY for transport / shipping
Before commissioning the oil tank must be mounted on the drive frame - see view E-E (Pos. 1430 dismount)



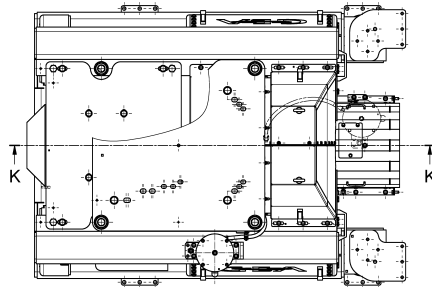
Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlusssteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Schmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main Motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	140	Keilriemenscheibe Hauptmotor -> Antriebsvariante -36 V-belt pulley, main motor -> drive type -36
	150	Öl-Luft Schmierung (zeichnerisch nicht dargestellt) Oil-Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled
B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

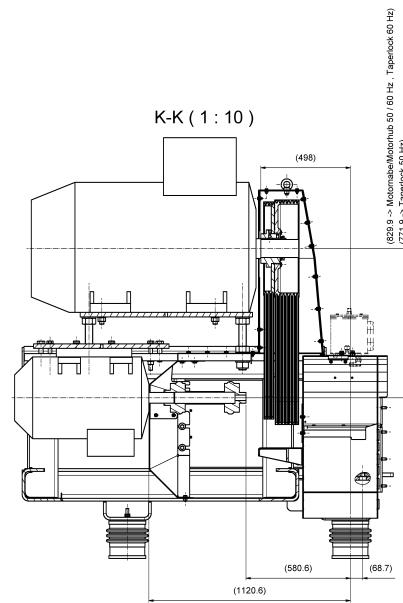
Rev. Datum Rev. Date	28.01.2019	Änderungsbegründung Reason for change	10122 2019010101	GEA	Gezeichnet Drawn	Belting	Geprüft Checked	Riemenantrieb	Rev. Datum Rev. Date	28.01.2019
Gezeichnet Drawn	03.09.2018	Belting	10122 2018090301	GEA	Geprüft Checked	Belting	vollst.	Rev. Datum Rev. Date	03.09.2018	
Belting	03.09.2018	Belting	10122 2018090301	GEA	Geprüft Checked	Belting	vollst.	Rev. Datum Rev. Date	03.09.2018	
Belting	03.09.2018	Belting	10122 2018090301	GEA	Geprüft Checked	Belting	vollst.	Rev. Datum Rev. Date	03.09.2018	

Getriebe / Gear PG. 417

Ansicht ohne Hauptmotor
View without main motor



K-K (1 : 10)



Rev. Datum Rev. Datum	28.01.2019	Änderungswachstums an 1172 400mm Drehmoment P400 1000mm P400 1000mm 1000mm 1000mm 1000mm 1000mm	GEA	Geometrische Ausführung nach DIN 152	8405-3351-040
Gezeichnet Gezeichnet	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Geprüft Geprüft	05.08.2018	05.08.2018	vollet.	Geometrische Ausführung nach DIN 152	8405-3351-040
Freigegeben Freigegeben	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Technische Zeichnung	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Geometrische Ausführung nach DIN 152	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Geometrische Ausführung nach DIN 152	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Geometrische Ausführung nach DIN 152	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Geometrische Ausführung nach DIN 152	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040
Geometrische Ausführung nach DIN 152	05.08.2018	05.08.2018	compi.	Geometrische Ausführung nach DIN 152	8405-3351-040

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2000	8419-3311-000	1		AUSGLEICHSBEHAELTER GESCHW. EQUALIZING BASIN, WELDED DEPÓSITO DE COMPENSACIÓN, SOLD.	✓	
2020	0019-6971-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2030	0026-1371-400	14		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2040	0026-1345-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2050	0013-0280-400	6		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
2080	8419-3769-010	1		SCHLAUCH VOLLST. HOSE, COMPL. MANGA, COMP.	✓	
10	0018-8474-030	1		VERSCHRAUBUNG SCREW COUPLING RACOR	✓	
20	0018-8473-030	1		STECKNIPPEL PLUG-IN NIPPLE BOQUILLA ENCHUFABLE	✓	
30	0018-8183-758	0.8	m	SCHLAUCH HOSE MANGUERA	✓	
40	0018-8551-030	1		STECKNIPPEL PLUG-IN NIPPLE BOQUILLA ENCHUFABLE	✓	
2090	0018-8349-030	3		ROHRSCHELLE PIPE CLIP ABRAZADERA DE TUBO	✓	
2100	0019-6898-300	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2120	0005-0422-068	3	m	KABEL CABLE CABLE	✓	
2130	0001-0755-040	1		OELSTANDSANZEIGER OIL GAUGE INDICADOR DEL NIVEL DE ACEITE	✓	

Baugruppe / Component group

8690-3350-030

OELSCHMIERUNG GETRIEBE
OIL LUBRICATION SYSTEM, GEAR

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2140	0018-6163-000	1		LUFTFILTER AIR FILTER FILTRO DE AIRE	✓	
2150	8419-3061-000	1		DECKEL COVER TAPA	✓	
2160	0019-6906-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2170	0026-1345-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2180	8419-1265-130	1		DICHTUNG GASKET JUNTA	✓	
2190	0005-1904-400	1		SCHWIMMERSCHALTER FLOAT SWITCH INTERRUPTOR DE FLOTADOR	✓	
2200	0019-6965-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2210	0019-6968-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2230	0018-8048-400	1		VERSCHLUSSKEGEL MALE CONNECTING NIPPLE CONO DE CIERRE	✓	
2240	0013-2002-400	1		UEBERWURFMUTTER COUPLING NUT TUERCA DE RACOR	✓	
2250	0005-4770-900	11		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	

Baugruppe / Component group

8690-3350-030

OELSCHMIERUNG GETRIEBE
OIL LUBRICATION SYSTEM, GEAR

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

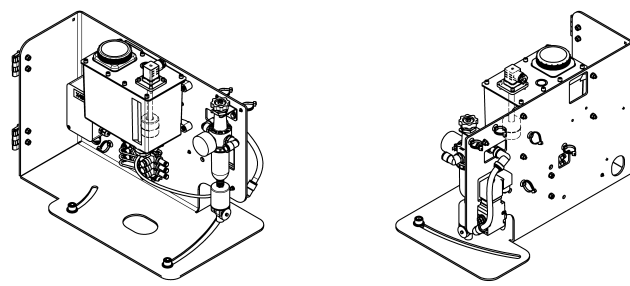
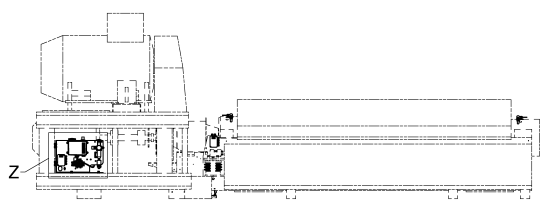
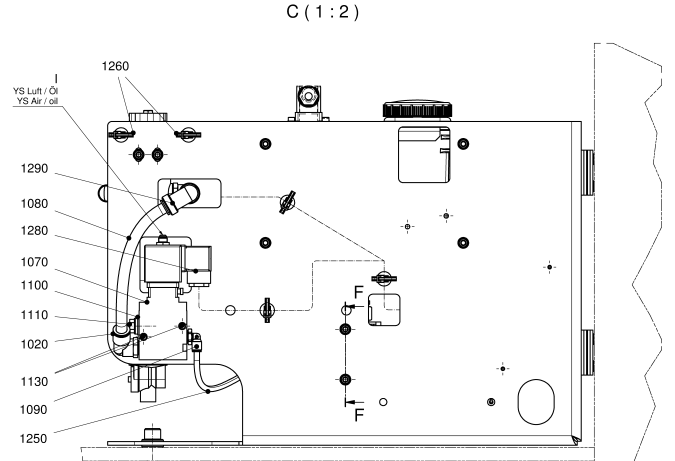
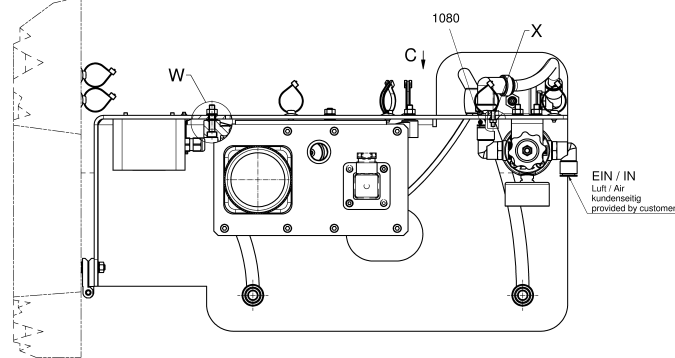
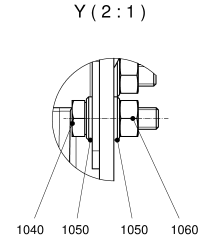
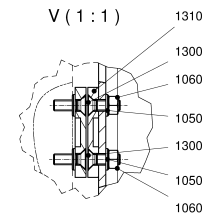
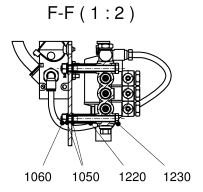
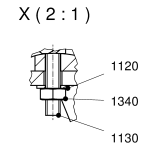
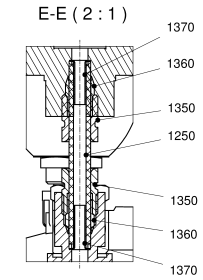
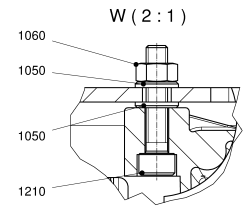
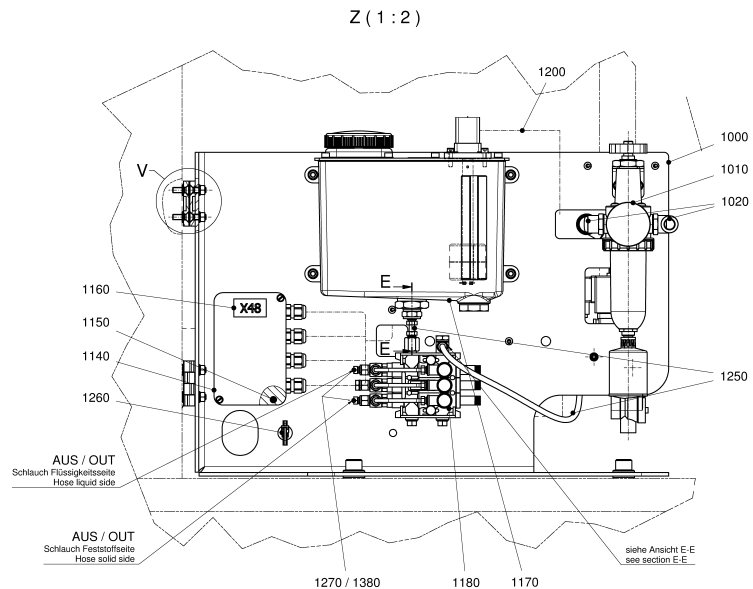
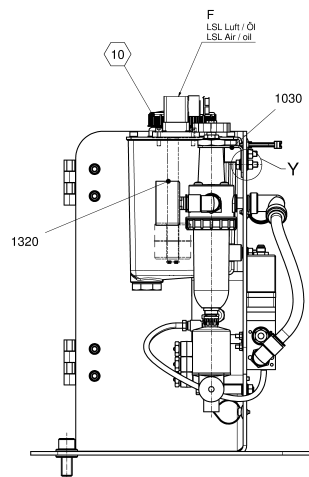
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Pos.-Nr. Benennung
 Pos.-No. Name
 1000-1990 Öl-Luft Aggregat montiert (Einzeltelle dargestellt)
 Oil-air unit mounted (single parts illustrated)

Alle Gewinde der Verrohrung mit Pos. 9010 eingedichtet
 All thread of piping sealed with Pos. 9010

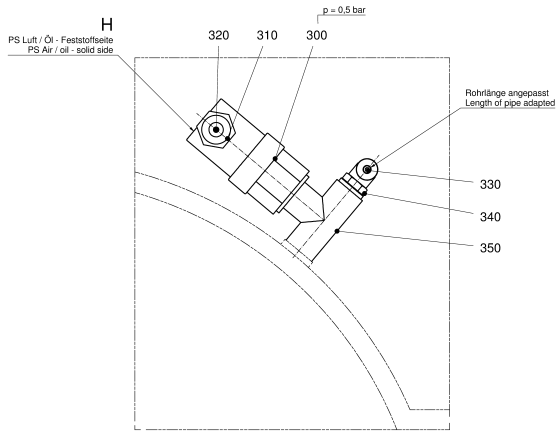
Teil-Nr. etikettiert
 Part-No. labelled

Pos. 480 (Kabelband) nicht dargestellt
 Pos. 480 (cable-tape) not illustrated

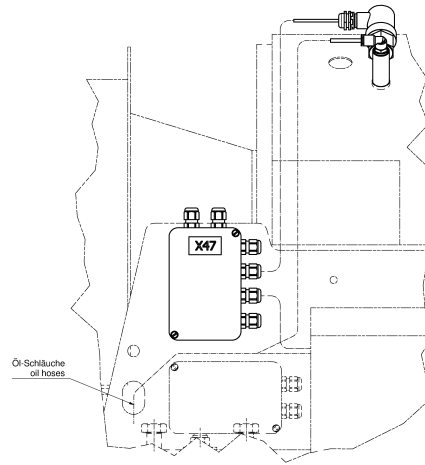
Klemmenplan gem. Kennzeichnungsschild in Klemmenkasten X48 gelegt
 Terminal diagram in acc. with identification plate put in terminal box X48

Best.-Nr. Part No.	Bezeichnung Name	Hersteller Manufacturer	Material Material	Stückzahl Quantity
1000-1990	Öl-Luft Aggregat montiert (Einzeltelle dargestellt) Oil-air unit mounted (single parts illustrated)	GEA	Alu Alu	1
9010	Alle Gewinde der Verrohrung mit Pos. 9010 eingedichtet All thread of piping sealed with Pos. 9010	GEA	Alu Alu	1
480	Kabelband Cable-tape	GEA	Alu Alu	1

A-A (1:1)

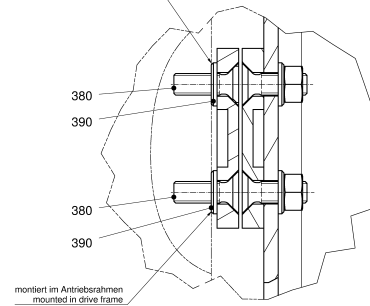


U (1:2)

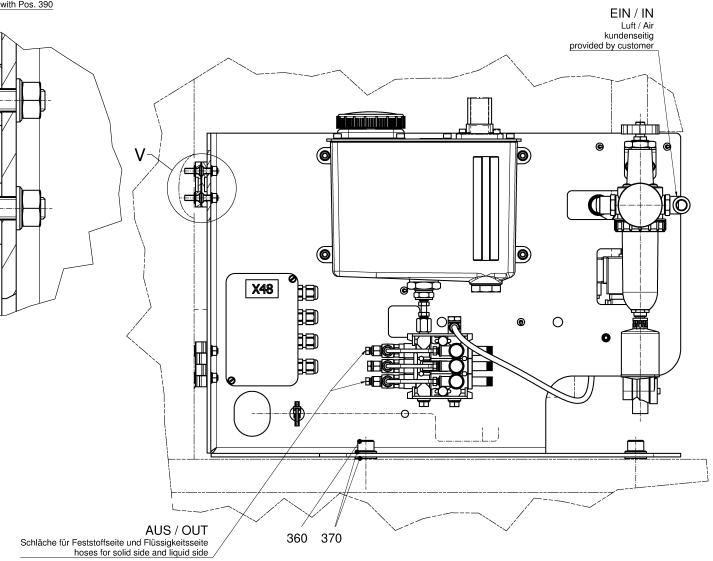


V (2:1)

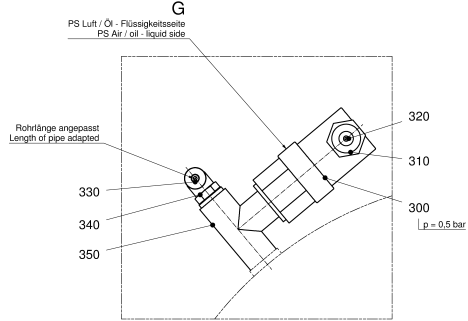
Bei Bedarf Position des Aggregates durch Pos. 390 ausgerichtet
in case of need the position of the complete unit can be aligned with Pos. 390



Z (1:2)



B-B (1:1)

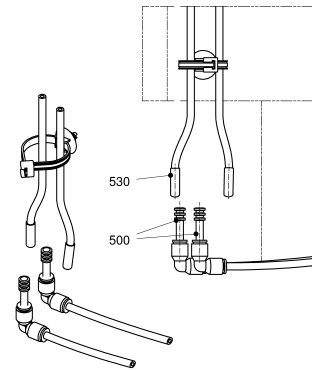


Bei der Installation beachten:

E-E (1:1)

Auslieferungszustand des Dekanters:
alle Schlauchleitungen sind durch
Kappen bzw. Stopfen verschlossen

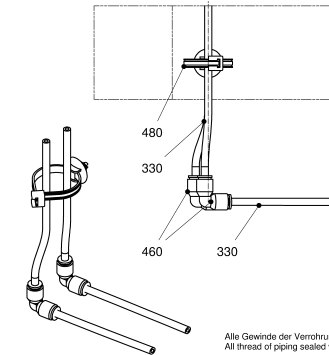
Delivery status of decanter:
all hoses are closed with caps and plugs



E-E (1:1)

Zur Inbetriebnahme des Dekanters:
alle Kappen bzw. Stopfen sind zu entfernen, anschließend
sind alle Schlauchleitungen mit den Winkelstücken zu verbinden

For operation status of decanter:
remove all caps and plugs, after it
connect all hoses with the elbow fittings

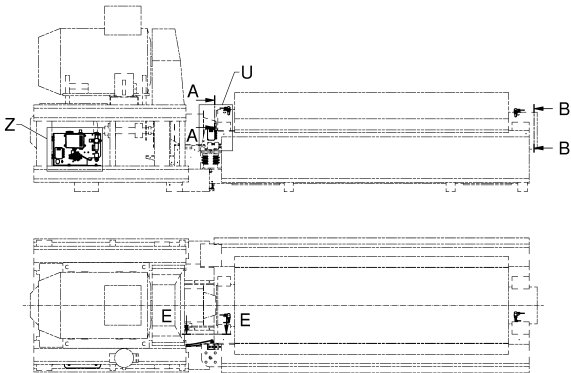


Alle Gewinde der Verrohrung mit Pos. 9010 eingedichtet
All thread of piping sealed with Pos. 9010

Teil-Nr. etikettiert
Part-No. labeled

Pos. 490 (Kabelband) nicht dargestellt
Pos. 490 (cable tape) not illustrated

Klemmenplan gem. Kennzeichnungsschild in Klemmenkasten X48 gefolgt
Terminal diagram in acc. with identification plate punt in terminal box X48



Pos.-Nr. Pos.-No.	Benennung name
1000-1990	Öl-Luft Aggregat montiert (Einzeileile dargestellt) Oil-air unit mounted (single parts illustrated)

<table border="1"> <tr> <td>Best.-Nr. Part No.</td> <td>Bezeichnung Description</td> <td>Material Material</td> <td>Maße Dimensions</td> </tr> <tr> <td>330</td> <td>Öl-Luft Aggregat</td> <td>Alu</td> <td>Ø 100 x 100 x 100</td> </tr> </table>	Best.-Nr. Part No.	Bezeichnung Description	Material Material	Maße Dimensions	330	Öl-Luft Aggregat	Alu	Ø 100 x 100 x 100	<table border="1"> <tr> <td>Best.-Nr. Part No.</td> <td>Bezeichnung Description</td> <td>Material Material</td> <td>Maße Dimensions</td> </tr> <tr> <td>480</td> <td>Öl-Luft Aggregat</td> <td>Alu</td> <td>Ø 100 x 100 x 100</td> </tr> </table>	Best.-Nr. Part No.	Bezeichnung Description	Material Material	Maße Dimensions	480	Öl-Luft Aggregat	Alu	Ø 100 x 100 x 100	<table border="1"> <tr> <td>Best.-Nr. Part No.</td> <td>Bezeichnung Description</td> <td>Material Material</td> <td>Maße Dimensions</td> </tr> <tr> <td>9010</td> <td>Öl-Luft Aggregat</td> <td>Alu</td> <td>Ø 100 x 100 x 100</td> </tr> </table>	Best.-Nr. Part No.	Bezeichnung Description	Material Material	Maße Dimensions	9010	Öl-Luft Aggregat	Alu	Ø 100 x 100 x 100
Best.-Nr. Part No.	Bezeichnung Description	Material Material	Maße Dimensions																							
330	Öl-Luft Aggregat	Alu	Ø 100 x 100 x 100																							
Best.-Nr. Part No.	Bezeichnung Description	Material Material	Maße Dimensions																							
480	Öl-Luft Aggregat	Alu	Ø 100 x 100 x 100																							
Best.-Nr. Part No.	Bezeichnung Description	Material Material	Maße Dimensions																							
9010	Öl-Luft Aggregat	Alu	Ø 100 x 100 x 100																							

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-3409-138	1		OEL-LUFT-AGGREGAT (MONTIERT) OIL-AIR UNIT (MOUNTED) GRUPO DE ACEITE-AIRE (MONTADO)	✓	
1000	8419-3145-040	1		HALTER GESCHW. HOLDER, WELDED SOPORTE, SOLD.	✓	
1010	0018-8290-560	1		DRUCKLUFT-DRUCKMINDERER COMPRESSED-AIR PRESSURE REDUCER REDUCTOR DE AIRE COMPRIMIDO	✓	
1020	0018-6750-860	3		WINKELEINSCHRAUBSTECKANSCHLUSS ANGULAR SCREW-IN CONNECTOR CONEXIÓN ENCHUFABLE DE CODO ROSCADO	✓	
1030	8690-3144-050	1		HALTER HOLDER SOPORTE	✓	
1040	0019-6842-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1050	0026-1382-400	20		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1060	0013-0276-400	12		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1070	0018-9503-300	1		DREIWEGE-MAGNETVENTIL THREE-WAY SOLENOID VALVE ELECTROVÁLVULA DE TRES VÍAS	✓	
1080	0018-1218-848	0.3	m	ROHR PIPE TUBO	✓	
1090	0018-3227-860	1		WINKELEINSCHRAUBSTECKANSCHLUSS ANGULAR SCREW-IN CONNECTOR CONEXIÓN ENCHUFABLE DE CODO ROSCADO	✓	
1100	0004-2754-400	1		USITRING USIT RING ANILLO USIT	✓	
1110	0019-8904-300	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
1120	0026-1362-300	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1130	0019-2226-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1140	0005-4147-280	1		KLEMMENKASTEN TERMINAL BOX CAJA DE BORNES	✓	
1150	0019-2222-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1160	0005-3666-510	1		KENNZEICHNUNGSSCHILD IDENTIFICATION PLATE PLACA DE IDENTIFICACIÓN	✓	
1170	8690-3171-000	1		BEHAELTER CONTAINER RECIPIENTE	✓	
1180	8690-3981-000	1		PUMPE PUMP BOMBA	✓	
1200	0005-0422-068	1.3	m	KABEL CABLE CABLE	✓	
1210	0019-6111-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1220	8416-3344-010	2		ROHR PIPE TUBO	✓	
1230	0019-6462-300	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1250	0018-8795-848	0.4	m	ROHR PIPE TUBO	✓	
1260	0005-4770-900	6		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	
1270	0018-8797-600	2		DOPPELKEGELRING DOUBLE-TAPERED RING ANILLO BICÓNICO	✓	
1280	0018-5118-050	1		GERAETESTECKDOSE APPLIANCE SOCKET CONECTOR HEMBRA	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1290	0018-1215-600	1		WINKELSTECKANSCHLUSS ANGULAR PLUG-TYPE CONNECTOR CONEXIÓN ENCHUFABLE ACODADA	✓	
1300	0019-2099-300	4		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
1310	0021-2645-400	2		SCHARNIER HINGE BISAGRA	✓	
1320	0005-1912-280	1		SCHWIMMERSCHALTER FLOAT SWITCH INTERRUPTOR DE FLOTADOR	✓	
1340	0013-0274-300	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1350	0018-8792-300	3		UEBERWURFSCHRAUBE CAP SCREW TORNILLO DE AJUSTE	✓	
1360	0018-8796-600	3		DOPPELKEGELRING DOUBLE-TAPERED RING ANILLO BICÓNICO	✓	
1370	0018-8794-600	3		HUELSE SLEEVE CASQUILLO	✓	
1380	0018-8793-300	2		UEBERWURFSCHRAUBE CAP SCREW TORNILLO DE AJUSTE	✓	
300	0005-4111-000	2		DRUCKSCHALTER PRESSURE SWITCH PRESOSTATO	✓	
310	0005-0202-900	2		VERSCHRAUBUNG SCREW COUPLING RACOR	✓	
320	0005-0422-068	12	m	KABEL CABLE CABLE	✓	
330	0018-6203-848	15	m	ROHR PIPE TUBO	✓	
340	0018-8980-600	2		WINKELEINSCHRAUBSTECKANSCHLUSS ANGULAR SCREW-IN CONNECTOR CONEXIÓN ENCHUFABLE DE CODO ROSCADO	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
350	0018-5039-400	2		T-STUECK T-PIECE PIEZA EN T	✓	
360	0019-6165-400	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
370	0026-1371-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
380	0019-2099-300	4		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
390	0026-1382-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
460	0018-8553-860	2		WINKELSTECKANSCHLUSS ANGULAR PLUG-TYPE CONNECTOR CONEXIÓN ENCHUFABLE ACODADA	✓	
480	0005-4770-900	16		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	
490	0005-1455-900	15		KABELBINDER CABLE TIE BRIDA	✓	
500	0018-8751-860	2		BLINDSTOPFEN BLIND PLUG TAPÓN CIEGO	✓	
530	0026-2727-890	2		KAPPE CAP CAPERUZA	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

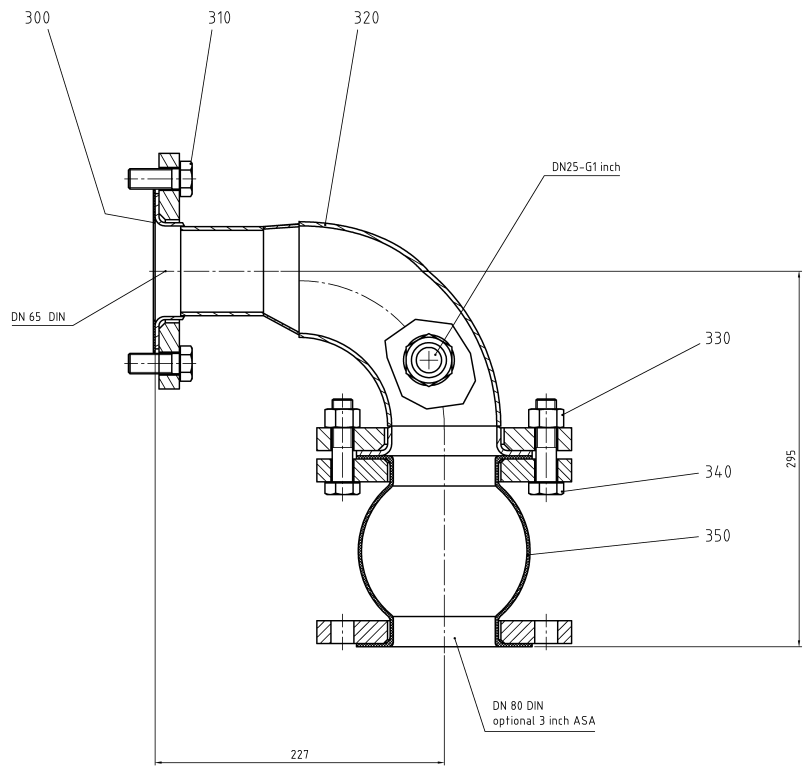
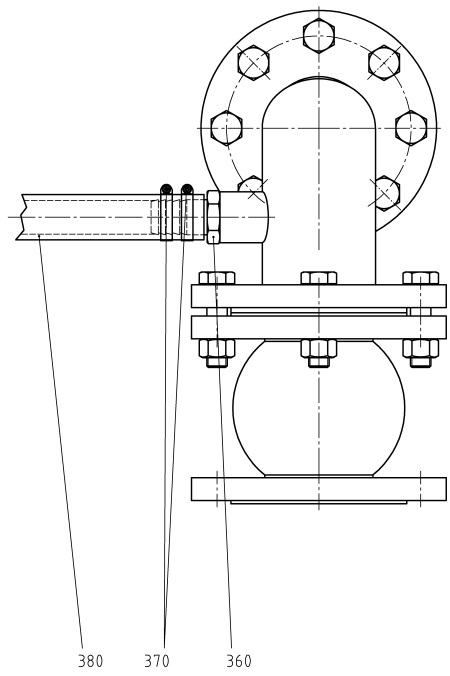
30.11.2021

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GEA Westfalia Separator Group

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Toleranzklasse		Nominalbereich in mm / Area of nominal dimensions in mm									
Toleranzklasse		über / over									
2	30	120	400	1000	2000	4000	8000	12000	16000	20000	
30	120	400	1000	2000	4000	8000	12000	16000	20000		
Größenklasse		Größenklasse in mm / Limit tolerances in mm									
B	h1	h2	h3	h4	h5	h6	h7	h8	h9	h10	h11

And.-Datum Rev. Date	Datum/Date	Name
09.11.2015	09.11.2015	Figgenr. Hr.
09.11.2015	09.11.2015	Figgenr. Hr.
13.11.2015	13.11.2015	Deuperrock.Br.

Änderungsinweise
 in EOP-System gespeichert
 alle EOP-Systeme registriert
 Oberfläche nach ISO 1302
 Surface finish according
 to ISO 1302
 Allgemeine Toleranzen
 General tolerances
 nach ISO 2768
 acc. to ISO 2768

GEA
 Hochtief Separator
 59402 Oerke, Germany
 1234567
 WSN No.

Erstellt durch/ Prepared by	Ersetzt für/ Replacement for
Product feed	Schleudergut-
line compl.	zuleitung vollst.
Zustimmungs- Drawing No. 8419-2297-120	150.130.30 Materialcode 1.2 Bau/Skiz 1

Baugruppe / Component group

8419-2297-130

SCHLEUDERGUTZULEITUNG VOLLST.
PRODUCT FEED LINE, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
300	0004-2232-780	1		DICHTUNG GASKET JUNTA	✓	
310	0019-7037-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
320	8419-2191-030	1		ANSCHLUSSSTUECK GESCHW. CONNECTING PIECE, WELDED PIEZA DE CONEXION, SOLD.	✓	
330	0013-0282-400	8		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
340	0019-6609-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
350	0018-6362-030	1		KOMPENSATOR COMPENSATOR COMPENSADOR	✓	
360	0018-7750-400	1		SCHLAUCHAUSLASS HOSE OUTLET BOQUILLA DE MANGUERA	✓	
370	0018-3814-310	2		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
380	0018-4422-828	2	m	SCHLAUCH HOSE MANGUERA	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

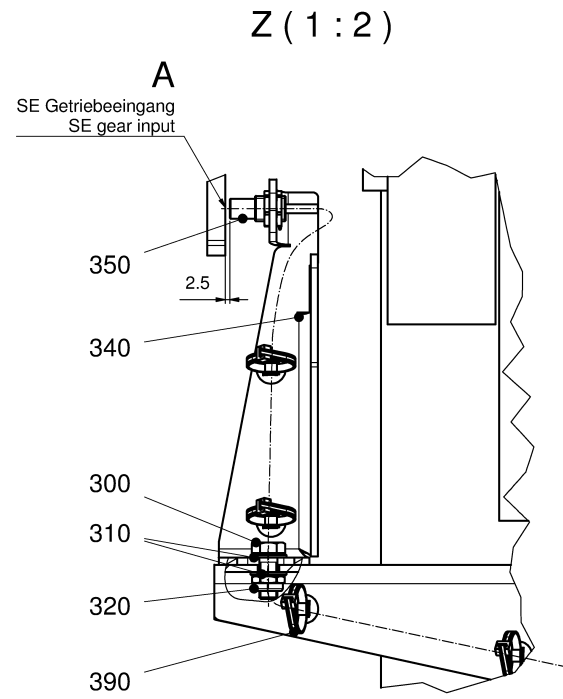
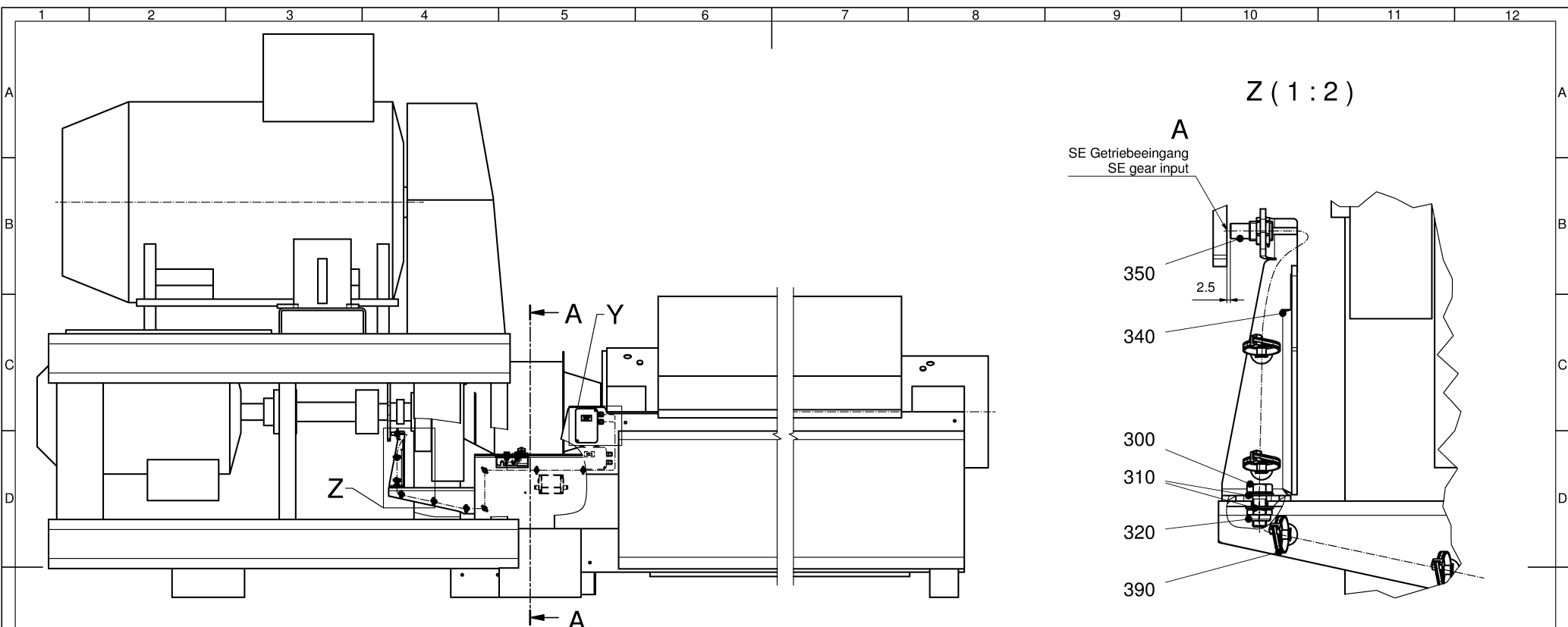
Ausgabe / Edition

30.11.2021

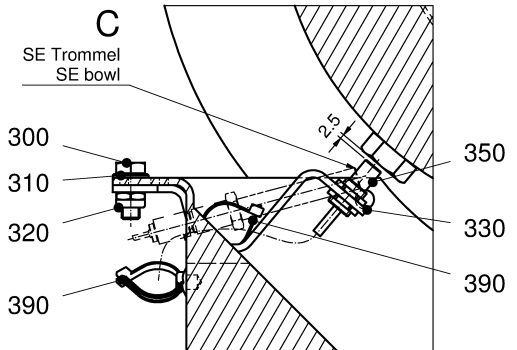
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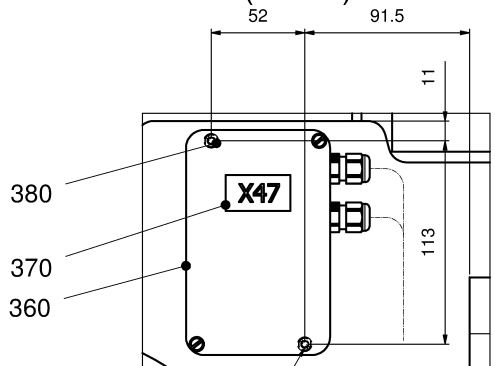
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A-A (1:2)



Y (1:2)



M4 bei Montage gebohrt
M4 drilled during assembly

Klemmenplan gemäß Kennzeichnungsschild in Klemmkasten X47 gelegt
Terminal diagram in acc. with identification plate put in the terminal box X47

Änd.-Datum: Rev. Date:	30.06.2015	Änderungsnachweise im EDV-System gespeichert are EDP-System resident
Gez./Drawn	02.06.2015 Klonias.Ve	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302
Gepr./H Checked	17.06.2015 Dritsch.Ch	Allgemeintoleranzen General tolerances
Normgepr. Normchecked	29.06.2015 Friebe.St	- nach ISO 2768 acc. to ISO 2768



Ersetzt durch / Replaced by:	Erstanz für / Replacement for:
Description: Speed sensor,	Benennung: Drehzahl-
compl.	initiator vollst.
WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No. 8419-3243-080

ISO 128-30 Maßstab/Scale 1:10 Blatt/Sheet 1 Blätter/Sheets 1
--

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
300	0019-6935-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
310	0026-1348-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
320	0013-0292-300	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
330	8419-3144-060	1		HALTER Prox Switch Holder SOPORTE	✓	
340	8419-3145-030	1		HALTER GESCHW. HOLDER, WELDED SOPORTE, SOLD.	✓	
350	0005-0868-050	2		NAEHERUNGSINITIATOR PROXIMITY SWITCH INICIADOR DE APROXIMACIÓN	✓	
360	0005-4147-280	1		KLEMMENKASTEN TERMINAL BOX CAJA DE BORNES	✓	
370	0005-3666-500	1		KENNZEICHNUNGSSCHILD IDENTIFICATION PLATE PLACA DE IDENTIFICACIÓN	✓	
380	0019-2222-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
390	0005-4770-900	10		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	

Baugruppe / Component group

8419-3243-080

DREHZAHLINIATOR VOLLST.
SPEED SENSOR, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

30.11.2021

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Für diese Baugruppe gibt es keine Zeichnung

No drawing is available for this assembly

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
320	0005-1226-070	2		WIDERSTANDSFUEHLER RESISTANCE FEELER SONDA DE RESISTENCIA	✓	

Baugruppe / Component group

8690-3292-000

TEMPERATURFUEHLER VOLLST.
TEMPERATURE FEELER, CPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

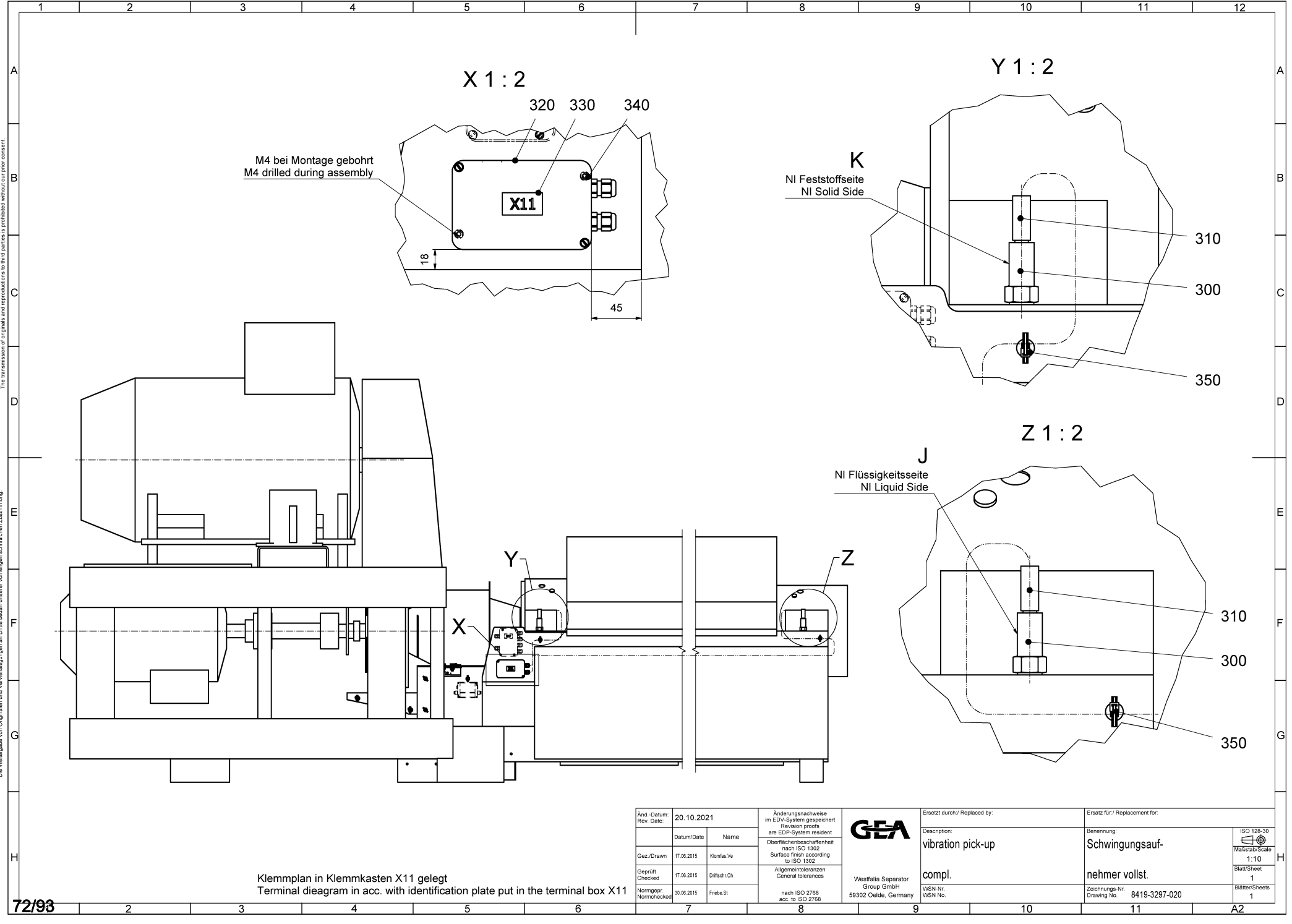
Ausgabe / Edition

30.11.2021

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Klemmplan in Klemmkasten X11 gelegt
 Terminal diagram in acc. with identification plate put in the terminal box X11

Änd.-Datum/ Rev. Date:	20.10.2021		Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident
Datum/Date	Name		
Gez./Drawn	17.06.2015	Klemfz.Ve	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302
Geprüft/ Checked	17.06.2015	Dritsch.Ch	Allgemeintoleranzen General tolerances
Normgepr. Normchecked	30.06.2015	Friebe.St	nach ISO 2768 acc. to ISO 2768

GEA
 Westfalia Separator
 Group GmbH
 59302 Oelde, Germany

Ersetzt durch / Replaced by:	Erstausführung / Replacement for:
Description: vibration pick-up	Benennung: Schwingungsauf- nehmer vollst.
compl. WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No. 8419-3297-020

ISO 128-30 Maßstab/Scale 1:10 Blatt/Sheet 1 Blätter/Sheets 1
--

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
300	0005-1848-020	2		SCHWINGUNGS-AUFNEHMER VIBRATION PICK-UP CAPTADOR DE VIBRACIONES	✓	
310	0005-1646-100	2		ANSCHLUSSKABEL CONNECTION CABLE CABLE DE CONEXIÓN	✓	
320	0005-4147-280	1		KLEMMENKASTEN TERMINAL BOX CAJA DE BORNES	✓	
330	0005-3666-080	1		KENNZEICHNUNGSSCHILD IDENTIFICATION PLATE PLACA DE IDENTIFICACIÓN	✓	
340	0019-2222-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
350	0005-4770-900	2		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	

Baugruppe / Component group

8419-3297-020

SCHWINGUNGS-AUFNEHMER VOLLST.
VIBRATION PICK-UP, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

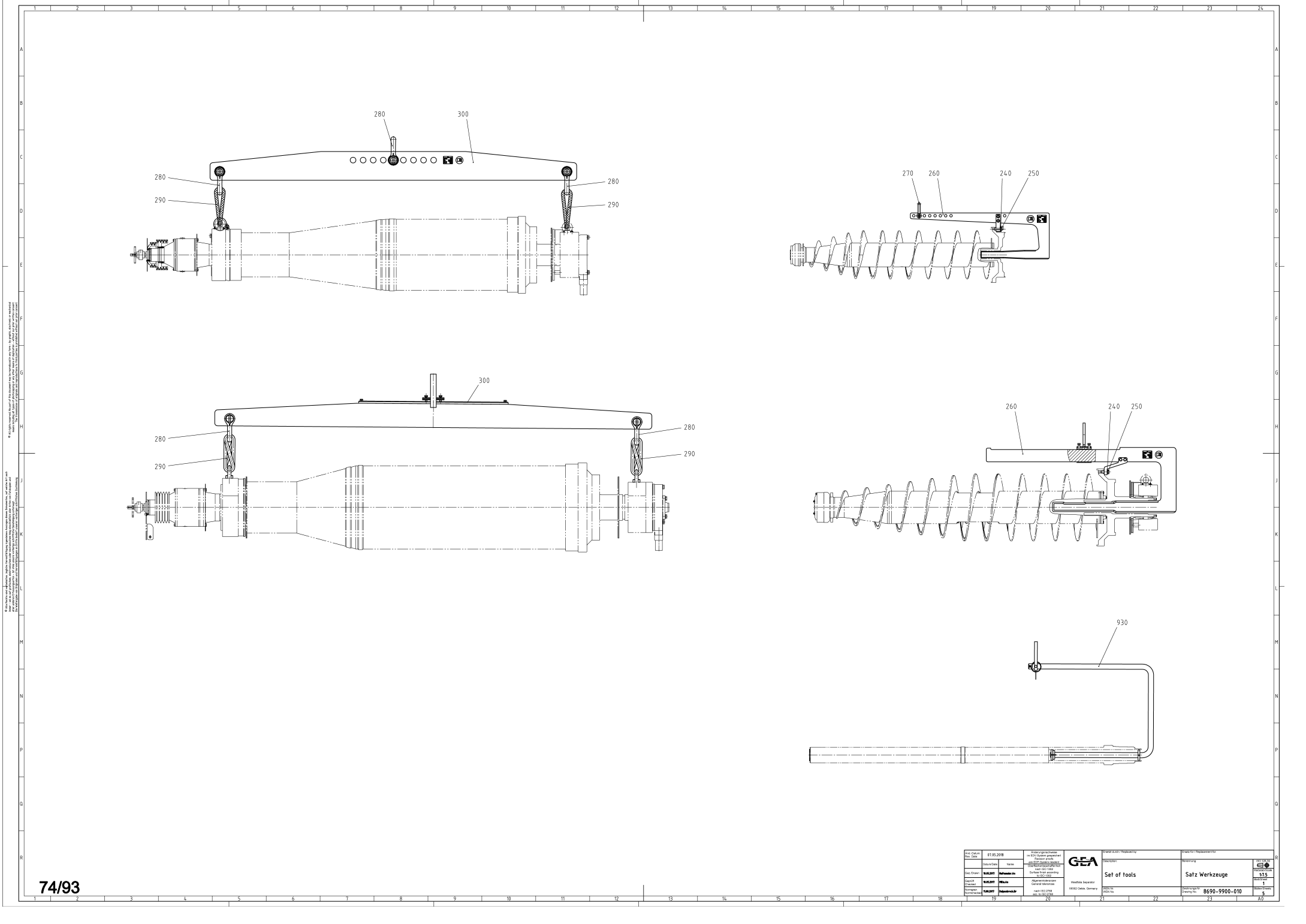
8012-663

Ausgabe / Edition

30.11.2021

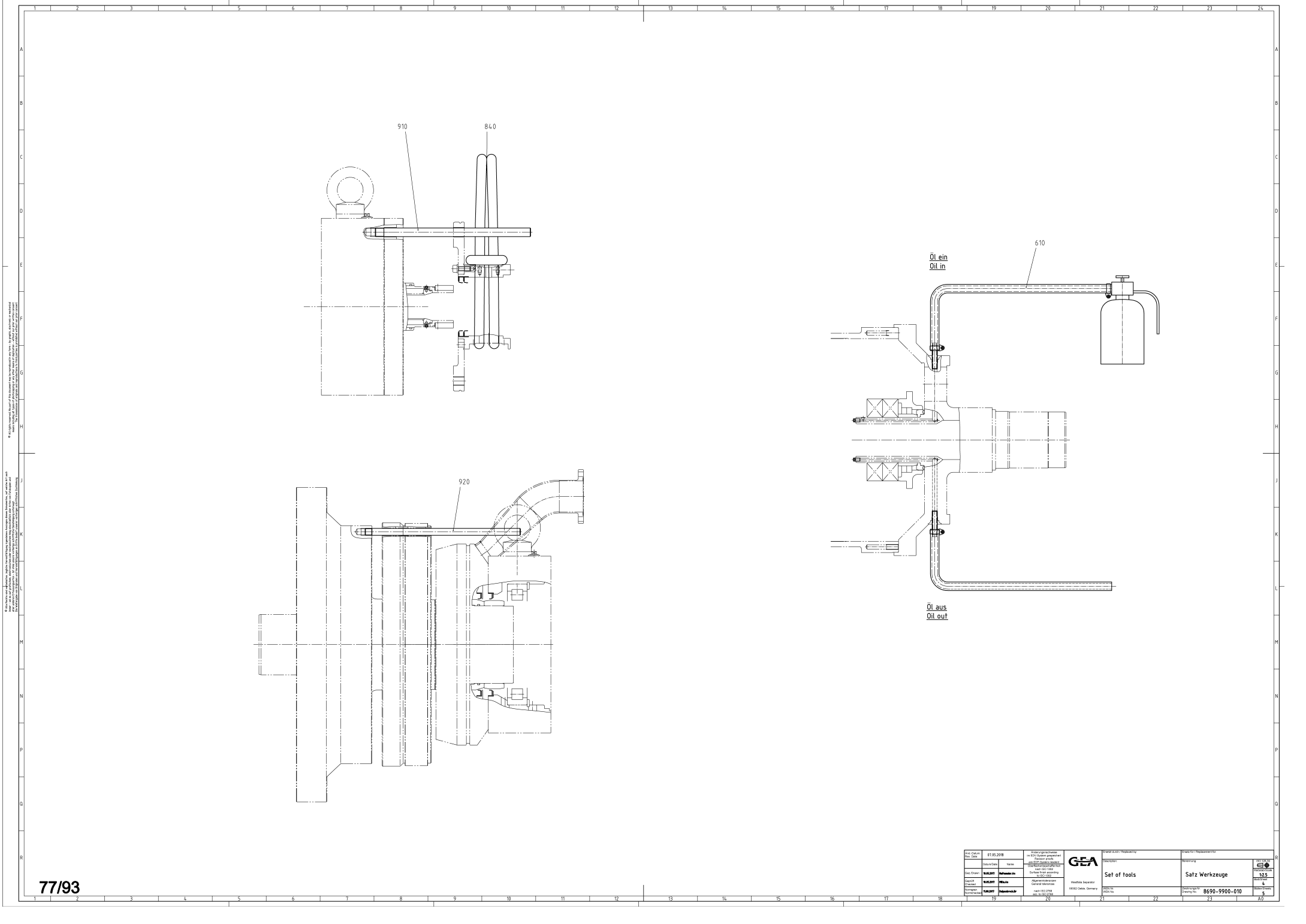
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Doc. Code: 8735 2118 Doc. Date: 2018-10-26	Actual description: 1x 8735 2118 Component (Part of 8735)	GEA	Project: 8690-9900-010	Date: 2018-10-26
Doc. Drawn: W. H. J. Doc. Checked: W. H. J. Doc. Approved: W. H. J.	Actual description: General Information 8690-9900-010 8690-9900-010		Manufacturer: GEA	Name: Set of tools
Part Name: Set of tools			Part No.: 8690-9900-010	
Part No.: 8690-9900-010			Part No.: 8690-9900-010	



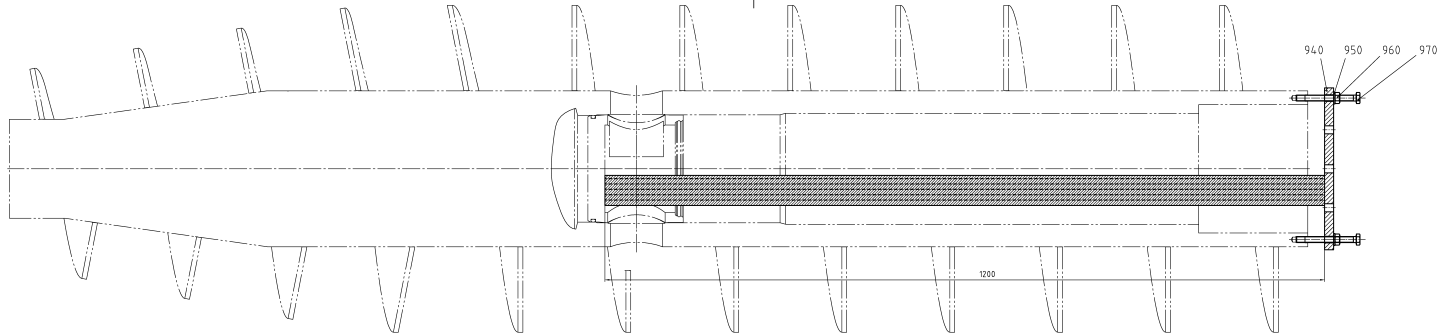
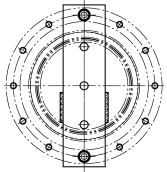
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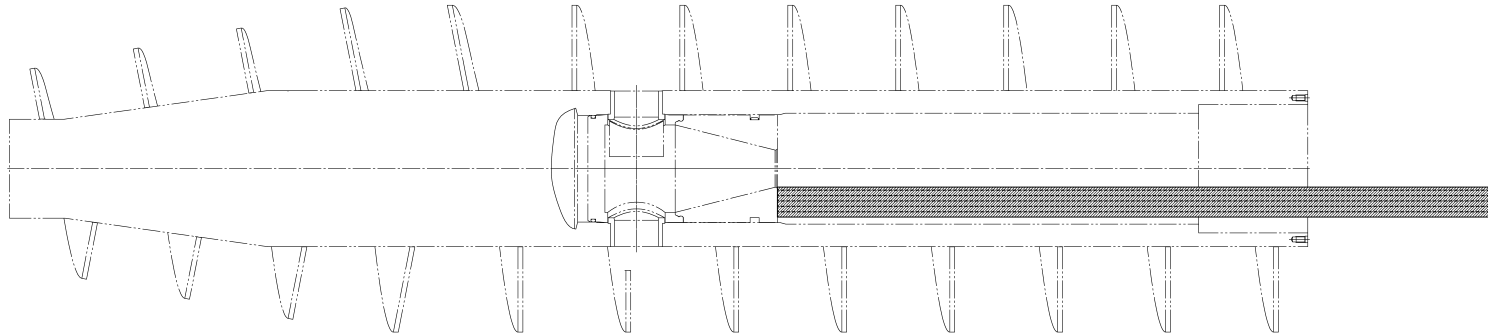
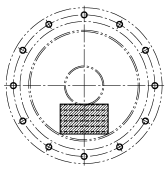
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Doc. Code: Rev. Date:	87.95.2018	Project description: 14 470 System components - 02/01/2018 - 02/01/2018		Project: Set of tools	Project: Satz Werkzeuge	
Doc. Owner: Doc. Code:	88.2017 88.2017	Doc. Name: Satzwerkzeuge - 02/01/2018 - 02/01/2018		Project: Set of tools	Project: Satz Werkzeuge	
Doc. Owner: Doc. Code:	88.2017 88.2017	Doc. Name: Satzwerkzeuge - 02/01/2018 - 02/01/2018	Project: Set of tools	Project: Satz Werkzeuge	Project: Satz Werkzeuge	Project: Satz Werkzeuge

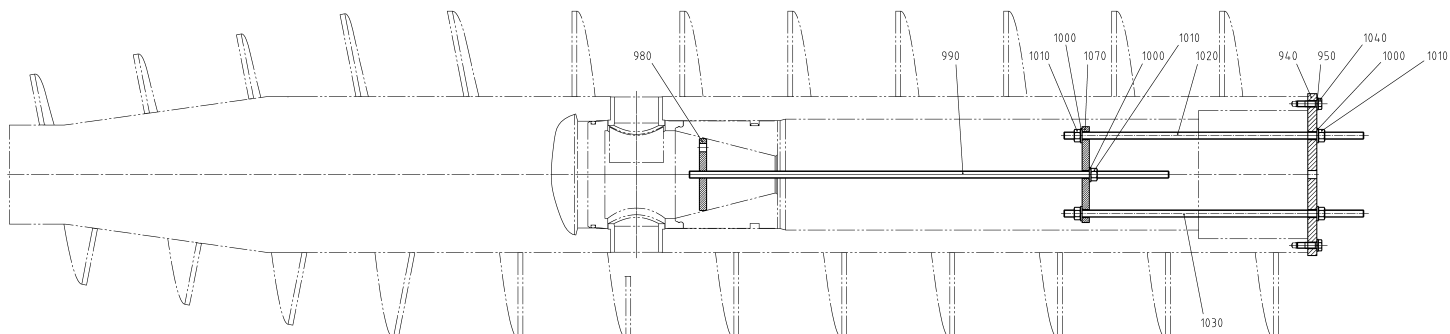
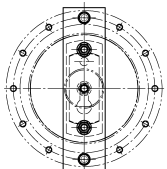
Montage Verteiler
Assembly distributor



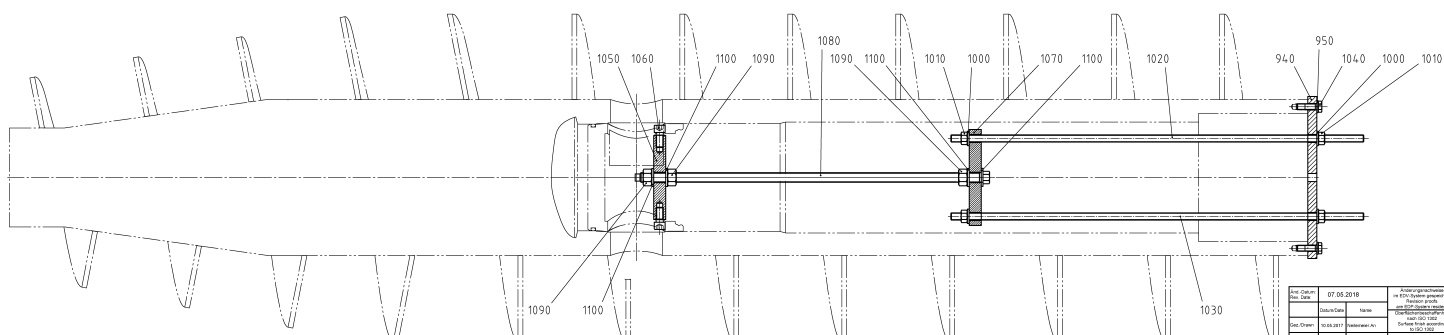
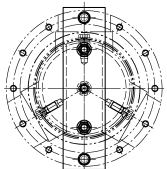
Montage Verteilerdeckel
Assembly distributor cover



Demontage Verteilerdeckel
Desassembly distributor cover



Demontage Verteiler
Desassembly distributor



Zeichnungs-Nr. 07.05.2018 Blatt-Nr. 1 von 5 Datum 07.05.2018 Entwurf 07.05.2018 Gezeichnet 07.05.2018 Geprüft 07.05.2018 Freigegeben 07.05.2018	Auftraggeber GEORG FOSTER Auftraggeber GEORG FOSTER Auftraggeber GEORG FOSTER Auftraggeber GEORG FOSTER	GEA GEORG FOSTER GEORG FOSTER GEORG FOSTER GEORG FOSTER GEORG FOSTER GEORG FOSTER GEORG FOSTER	Zeichnungs-Nr. 8690-9900-010 Blatt-Nr. 5 von 5 Datum 07.05.2018 Entwurf 07.05.2018 Gezeichnet 07.05.2018 Geprüft 07.05.2018 Freigegeben 07.05.2018
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Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0019-5199-150	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
20	0019-5190-150	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
30	0019-5238-150	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
40	0019-5238-150	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
50	0019-0365-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
60	0019-5238-150	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
70	8419-9868-040	1		HUELSE SLEEVE CASQUILLO	✓	
80	8419-9939-120	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
90	0019-6206-150	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
100	8420-9939-100	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
110	0026-1358-400	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
120	0013-0005-400	3		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
130	0019-1237-150	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
140	0019-7105-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
150	0019-6145-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
160	8419-9939-110	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
170	0019-5238-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
180	0013-0282-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
190	0026-1335-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
200	8419-9868-050	1		HUELSE SLEEVE CASQUILLO	✓	
210	0019-8118-178	1	m	GEWINDEBOLZEN THREADED BOLT TORNILLO ROSCADO	✓	
220	0019-7041-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
230	0019-8118-178	1	m	GEWINDEBOLZEN THREADED BOLT TORNILLO ROSCADO	✓	
240	8420-9939-140	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
250	0019-7106-150	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
260	8419-9910-010	1		AUSHEBEVORRICHTUNG VOLLST. LIFTING DEVICE CPL. DISPOSITIVO ELEVADOR, COMP.	✓	
270	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
280	0026-2781-030	2		SCHAEKEL SHACKLE GRILLETE	✓	

Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
290	6968-0950-380	2		RUNDSCHLINGE ROUND SLING ESLINGA REDONDA	✓	
300	8419-9910-000	1		AUSHEBEVORRICHTUNG VOLLST. LIFTING DEVICE CPL. DISPOSITIVO ELEVADOR, COMP.	✓	
310	0019-0365-150	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
320	0013-0005-400	1		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
330	8419-9939-160	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
340	0026-1358-400	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
350	8419-9939-150	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
360	8419-9868-060	1		HUELSE SLEEVE CASQUILLO	✓	
370	0013-0279-400	6		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
380	0019-5180-150	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
390	0026-1348-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
400	0019-7105-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
410	0019-0365-150	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
420	8419-9939-090	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
430	0019-5190-150	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
440	0019-5211-150	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
450	0013-0280-400	3		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
460	0026-1371-400	3		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
470	8419-9939-170	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
480	0019-5238-150	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
490	0000-0006-162	1		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	
500	0000-0006-162	1		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	
510	0013-0278-400	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
520	0026-1345-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
530	0019-8144-300	2		GEWINDEBOLZEN THREADED BOLT TORNILLO ROSCADO	✓	
540	8419-9868-020	3		HUELSE SLEEVE CASQUILLO	✓	
550	0026-1371-400	3		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
560	0013-0280-400	3		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	

Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
570	0019-0428-150	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
580	0019-5224-150	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
590	8419-9912-000	1		ADAPTER VOLLST. ADAPTOR, COMPLETE ADAPTADOR, COMP.	✓	
600	0003-0429-000	1		HOCHDRUCK-HANDHEBELPRESSE HIGH-PRESSURE HAND-LEVER PRESS PRENSA DE PALANCA DE ALTA PRESIÓN	✓	
	0003-0429-010	1		HOECHSTDRUCKSCHLAUCH MAXIMUM PRESSURE HOSE TUBO FLEXIBLE DE PRESIÓN MÁXIMA	✓	
610	8410-9979-010	1		FUELLVORRICHTUNG VOLLST. FILLING DEVICE, COMPL. DISPOSITIVO DE LLENADO, COMP.	✓	86
620	0013-0005-400	1		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
630	0026-1358-400	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
640	0000-0006-162	1		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	
650	0019-0365-150	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
660	8419-9868-000	1		HUELSE SLEEVE CASQUILLO	✓	
670	0019-5219-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
680	0019-5219-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
690	0019-5220-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	

Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
700	0019-8920-030	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
710	0018-8636-030	1		VERSCHLUSSSTUTZEN CLOSING CONNECTING PIECE MANGUITO DE CIERRE	✓	
720	0018-3200-400	1		VERSCHLUSSKEGEL MALE CONNECTING NIPPLE CONO DE CIERRE	✓	
730	0013-2001-400	1		UEBERWURFMUTTER COUPLING NUT TUERCA DE RACOR	✓	
740	0019-7039-150	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
750	0019-5250-150	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
760	0013-0280-400	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
770	0026-1371-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
780	8419-9939-100	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
790	8419-9939-130	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
800	0026-1358-400	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
810	0013-0005-400	1		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
820	0019-1237-150	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
830	8419-9939-140	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

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GEA Westfalia Separator Group

Baugruppe / Component group

8419-9900-030

SATZ WERKZEUGE
SET OF TOOLS

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
850	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
860	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
870	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
880	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
890	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
900	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
910	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
920	8174-9965-010	2		GEWINDESPINDEL THREADED SPINDLE HUSILLO ROSCADO	✓	
930	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

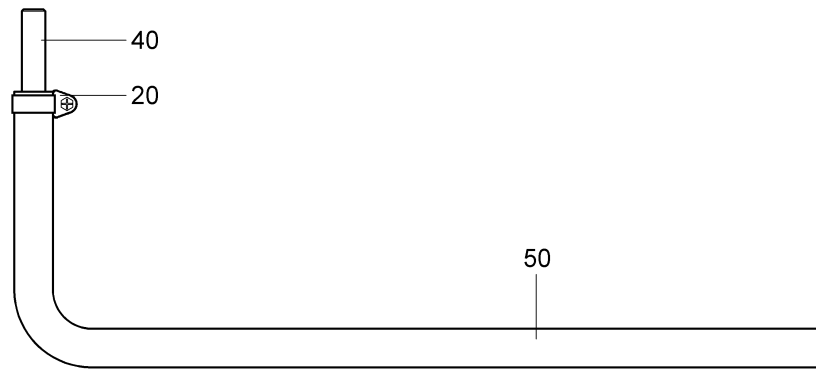
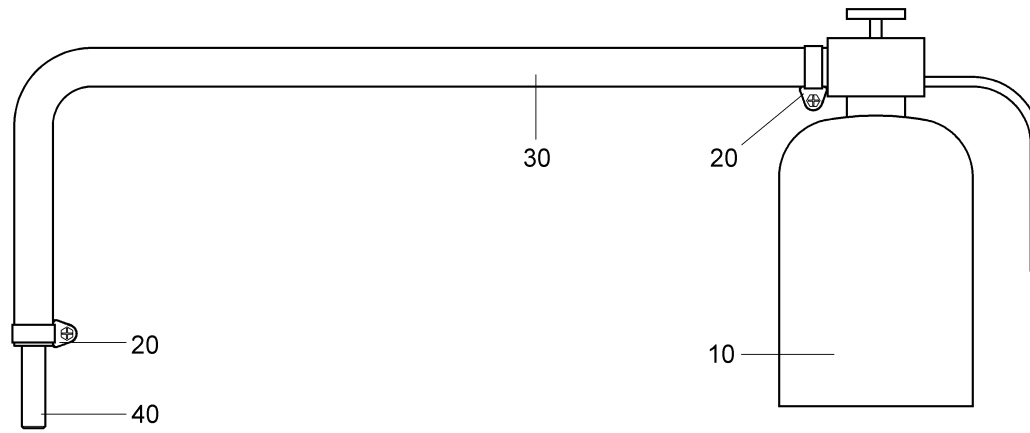
Ausgabe / Edition

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GEA Westfalia Separator Group



Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0003-0635-800	1		DRUCKSPRUEHGERAET PRESSURE SPRAY DEVICE PULVERIZADOR POR PRESIÓN	✓	
20	0018-3668-310	3		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
30	0018-4861-828	1.2	m	SCHLAUCH HOSE MANGUERA	✓	
40	8410-9916-000	2		GEWINDESTUECK THREADED PIECE PIEZA ROSCADA	✓	
50	0018-4861-828	1.2	m	SCHLAUCH HOSE MANGUERA	✓	

Baugruppe / Component group

8410-9979-010

FUELLVORRICHTUNG VOLLST.
FILLING DEVICE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

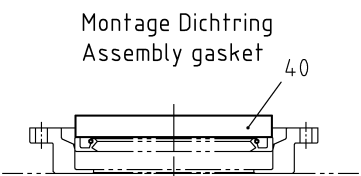
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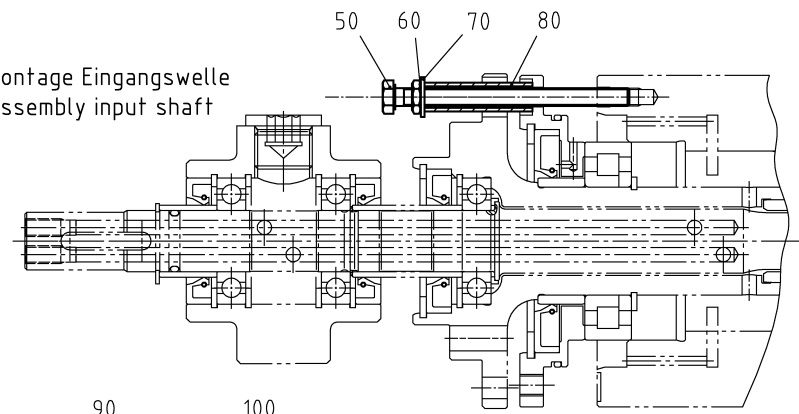
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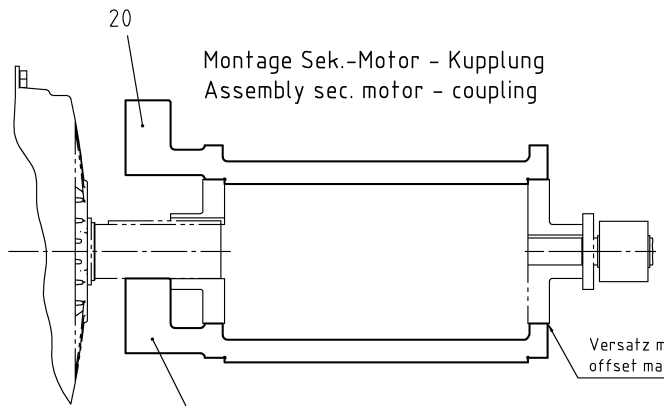
Montage Dichtring
Assembly gasket

40

Montage Eingangswelle
Assembly input shaft



50 60 70 80

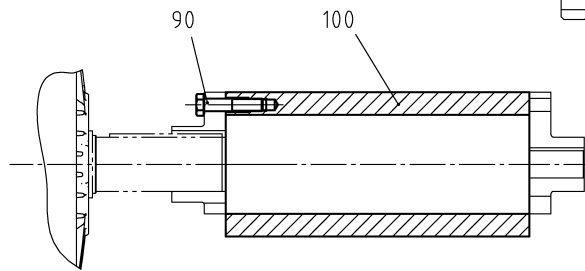


Montage Sek.-Motor - Kuplung
Assembly sec. motor - coupling

20

20

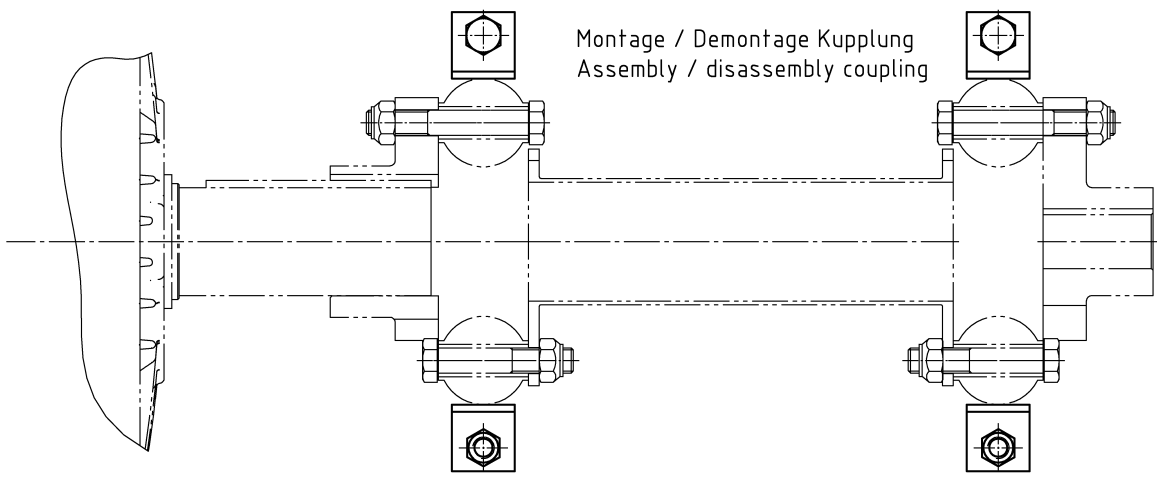
Versatz max. 0.5mm
offset max. 0.5mm



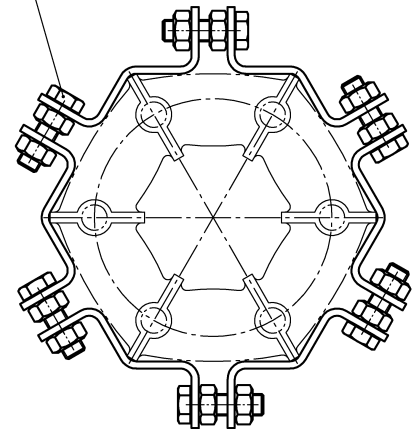
90

100

Montage / Demontage Kuplung
Assembly / disassembly coupling



30



Änd.-Datum: Rev. Date:	04.12.2015	Änderungsnachweise im EDP-System gespeichert Revision proofs are EDP-System resident		 Westfalia Separator 59302 Oelde, Germany	Ersetzt durch./ Replaced by:	Ersetzt für./ Replacement for:	
Datum/Date	Name	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302			Description:	Benennung:	ISO 128-30 
Gez./Drawn	05.02.2014	Neubauer.Ri	Allgemeintoleranzen General tolerances		Set of tools	Satz Werkzeuge	Maßstab/Scale
Geprüft Checked	05.02.2014	Neubauer.Ri	rK nach ISO 2768 acc. to ISO 2768				Blatt/Sheet
Normgepr. Normchecked	18.02.2014	Deipenrock.Br			WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No.	Blätter/Sheets
						8657-9900-030	

Baugruppe / Component group

8657-9900-050

SATZ WERKZEUGE
SET OF TOOLS

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
20	8657-9453-000	1		BLECH SHEET METAL CHAPA	✓	
30	8656-9932-000	2		HALTER VOLLST. HOLDER, COMPL. SOPORTE, COMP.	✓	90
40	8657-9473-010	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
50	0019-6854-300	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
60	0013-0276-400	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
70	0026-1382-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
80	0018-4787-400	2		ROHR PIPE TUBO	✓	
90	0019-6581-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
100	8657-9473-100	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

8012-663

Ausgabe / Edition

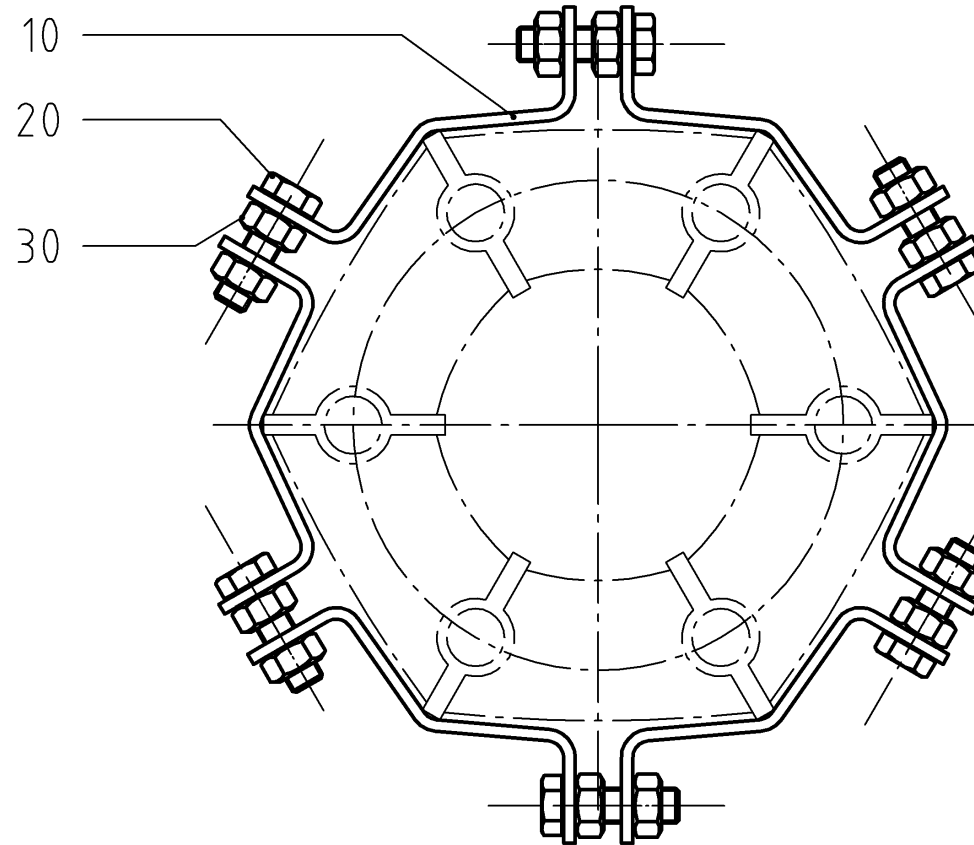
30.11.2021



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Änd.-Datum: Rev. Date:			 Westfalia Separator 59302 Oelde, Germany	Ersetzt durch:/ Replaced by:	Ersatz für:/ Replacement for:		
Datum/Date	Name	Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident		Description:	Benennung:	ISO 128-30 	
Gez./Drawn	25.04.2012	Neubauer.Ri		Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302	Holder compl.	Halter vollst.	Maßstab/Scale 1:2.5
Geprüft Checked	25.04.2012	Neubauer.Ri		Allgemeintoleranzen General tolerances mK	WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No. 8657-9932-000	Blatt/Sheet 1
Normgepr. Normchecked	26.04.2012	Sindermann.Co	nach ISO 2768 acc. to ISO 2768				

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8656-9931-000	12		HALTER HOLDER SOPORTE	✓	
20	0019-6972-150	12		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
30	0013-0280-400	24		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	

Baugruppe / Component group

8656-9932-000

HALTER VOLLST.
HOLDER, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

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Ausgabe / Edition

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Für diese Baugruppe gibt es keine Zeichnung

No drawing is available for this assembly

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0019-9421-400	12		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
20	0007-2966-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
30	0007-2924-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
40	0007-2926-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
50	0007-3619-750	1		DICHTRING GASKET JUNTA ANULAR	✓	

Baugruppe / Component group

9390-0015-515

SATZ ERSATZTEILE I
SET OF SPARE PARTS I

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-663

Trommel-Nr. / Bowl s/n

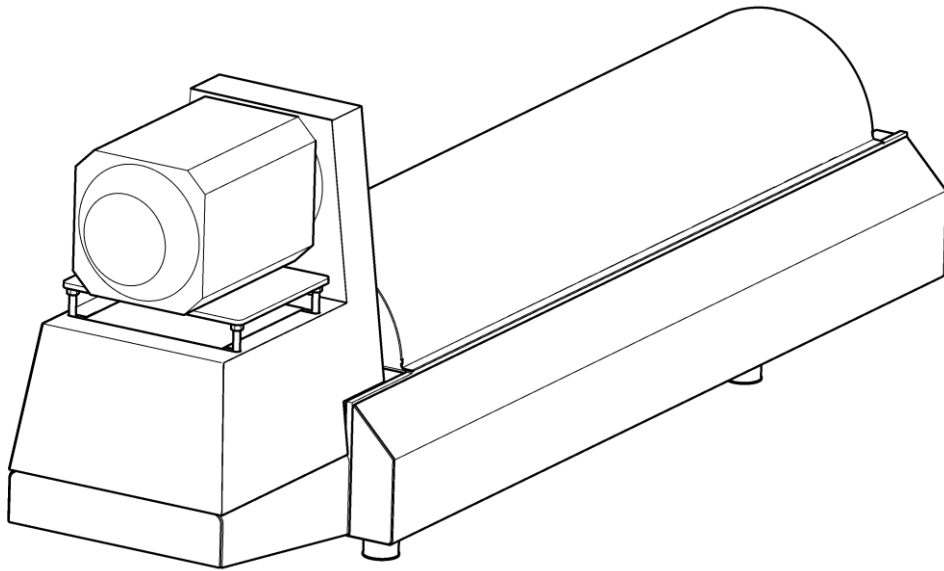
8012-663

Ausgabe / Edition

30.11.2021

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Data sheet

Description: Clarifying decanter

Type: biosolids Decanter prime 7000

Machine-No.: 8012-664

Order-No.: 2451395848/012000

Material-No.: 99870531510

Version: 30.11.2021

ORIGINAL DOCUMENT

The authors are always grateful for remarks and suggestions for improving the documentation. Remarks and suggestions can be sent to:

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Preface to this datasheet

This datasheet contains the order-specific technical data for the centrifuge.



Non-compliance with this datasheet can not only result in danger for centrifuges, material and the environment but also endanger persons working on or in the vicinity of the centrifuge.

The technical data from this datasheet have sole validity!

Technical data in the centrifuge documentation which deviate from this are invalid.

- Keep the datasheet complete, close to the centrifuge and accessible to all those working on or with the centrifuge. It must be available to these people at all times!

Other applicable documents

The documents below apply in addition to this datasheet.

- Operating instructions for the centrifuge
- Dimensions sheet for the centrifuge
- Operating instructions for components made by other manufacturers

Abbreviations and symbols used

bar (g)	bar (g = pressure)
approx.	approximately (roughly)
dB (A)	decibels (A)
f	frequency
FU	frequency converter (Frequenzumrichter)
Hz	Hertz
I/O	switch on/off
kg/dm ³	kilogrammes per cubic decimetre
kW	kilowatts
l	litres
l/h	litres per hour
max.	maximum
min.	minimum
min	minute
rpm	revolutions per minute
mm/s RMS	millimetres per second, RMS (= Root Mean Square)
mW	milliwatts
m ³ /h	cubic metres per hour
sec	second
V	volts
°C	degrees Celsius
%	per cent
Y	star
Δ	delta

Centrifuge			
			Comments
Type	biosolids Decanter prime 7000		
Serial no.	8012-664		
Year of construction	see centrifuge nameplate		
Permitted bowl speed	rpm	3150 (FU F=63HZ)	
Permitted density of solids	kg/dm ³	1.6	max.
Permitted throughput	m ³ /h	--/ --	min. / max.
Permitted temperature of feed material	°C	5/60	min. / max.
Permitted operating speed range	rpm	1000-3150	min. / max.
Filling volume of bowl	l	557	approx.
Run-down time of the bowl	min	30	approx.
Permitted vibration velocity Limit value 1 Limit value 2	mm/s RMS	18/20	Query measuring point in supplying factory / note dimensions sheet.
Differential speed	rpm	1-14	
Decanter factor	%	105	
Ambient temperature	°C	5-40°	min. / max.
Warning "Bearing temperature, bowl"	°C	120	
Cutout "Bearing temperature, bowl"	°C	140	
Switching point "Feed closed"	%	90	
Switching point "Decanter off"	%	110	
Sound pressure level	dB (A)	87+/-2	DIN EN ISO 3746
Sound power level	mW	108/63,5	DIN EN ISO 3746

Process data			
			Comments
Intended use, feed material	INDUSTRIELLE KLÄRANLAGEN / IND		
Feed pressure	bar	0,3/2	min. / max.



GEA Germany

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Fax +49 2522 77-2488

gea.com/contact
gea.com

When spare parts are vital,
ours are available.

KEEPING IT
RUNNING



Spare Parts Catalog




Model
BIOSOLIDS DECANTER PRIME

Serial number of machine
8012-664

Edition
30.11.2021

Order number
2451395848_12

Serial number of bowl
8012-664

ETS	Ersatzteilschlüssel / Spare part code
	Teil oder Baugruppe lieferbar Part or assembly available
	Teil oder Baugruppe bedingt lieferbar. Rücksprache mit dem Herstellerwerk nehmen. Part or assembly available to a limited extent. Contact manufacturer.
	Teil oder Baugruppe in dieser Fertigungsstufe nicht lieferbar. Part or assembly not available in this manufacturing stage.

GEA Germany

GEA Westfalia Separator Group GmbH

Werner-Habig-Str. 1, D 59302 Oelde
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www.gea.com

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	2451395848			KLAER-DEKANTER BIOSOLIDS DECANter PRIME 7000 CLARIFYING DECANter DECANTADOR CLARIFICADOR		5

Baugruppe / Component group

2451395848_12

KLAER-DEKANTER BIOSOLIDS DECANter
PRIME 7000
CLARIFYING DECANter

Typ / Model

BIOSOLIDS DECANter PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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Baugruppe / Component group

2451395848

KLAER-DEKANTER BIOSOLIDS DECANter
PRIME 7000
CLARIFYING DECANter

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	9987-0531-510			KLAER-DEKANTER BIOSOLIDS DECANter PRIME 7000 CLARIFYING DECANter DECANTADOR CLARIFICADOR		
1335	8419-1335-040	1		SCHMIERSTOFFE VOLLST. LUBRICANTS, COMPLETE ACEITES LUBRICANTES, COMP.	✓	8
1100	8419-1100-110	1		GESTELL VOLLST. FRAME, COMPL. BASTIDOR, COMP.	✓	10
6600	8419-6600-110	1		TROMMEL VOLLST. BOWL, COMPL. TAMBOR, COMP.	?	17
6539	8419-6539-040	1		SCHNECKE VOLLST. SCROLL, COMPL. SINFÍN, COMP.	✓	35
3351	8419-3351-100	1		RIEMENANTRIEB VOLLST. BELT DRIVE, COMPL. ACCIONAMIENTO POR CORREA, COMP.	✓	42
2297	8419-2297-130	1		SCHLEUDERGUTZULEITUNG VOLLST. PRODUCT FEED LINE, COMPL. LÍNEA ALIMENTACIÓN PRODUCTO, COMP.	✓	66
3243	8419-3243-080	1		DREHZAHLEINITIATOR VOLLST. SPEED SENSOR, COMPL. INICIADOR DE VELOCIDAD, COMP.	✓	68
3292	8690-3292-000	1		TEMPERATURFUEHLER VOLLST. TEMPERATURE FEELER, CPL. SENSOR DE TEMPERATURA, COMP.	✓	70
3297	8419-3297-020	1		SCHWINGUNGS-AUFNEHMER VOLLST. VIBRATION PICK-UP, COMPL. CAPTADOR DE VIBRACIONES, COMP.	✓	72
3969	0021-3969-810	1		SATZ SCHMALKEILRIEMEN SET OF NARROW V-BELTS JUEGO DE CORREAS TRAPEZOIDALES ESTRECHAS	✓	
0038	0015-0038-000	1		SCHMIEROEL LUBRICATING OIL ACEITE LUBRICANTE	✓	
0015	9390-0015-516	1		SATZ ERSATZTEILE I SET OF SPARE PARTS I JUEGO DE PIEZAS DE REPUESTO I	✓	74
9001	8419-9001-300	1		BETRIEBSANLEITUNG INSTRUCTION MANUAL MANUAL DE INSTRUCCIONES	✓	

Typ / Model

BIOSOLIDS DECANter PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

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Ausgabe / Edition

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
9001	8175-9001-032	1		BETRIEBSANLEITUNG EN INSTRUCTION MANUAL EN MANUAL DE INSTRUCCIONES EN	✓	
1130	8419-3010-061	1		SCHMIERPLAN EN LUBRICATION CHART ESQUEMA DE LUBRICACIÓN		
1150	8419-4100-290	1		MASSBLATT		
	XP316323-9905-PID0 01	1		S1459316323-9905-PID001		
1180	8419-9056-030	1		DREHZAHLTABELLE SPEED TABLE		
	8419-9088-000	1		EINSTELLWERTE DEKANTER SETTINGS DECANTER		
1190	8419-9088-000	1		EINSTELLWERTE DEKANTER SETTINGS DECANTER		

Baugruppe / Component group

2451395848

KLAER-DEKANTER BIOSOLIDS DECANTER
PRIME 7000
CLARIFYING DECANTER

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

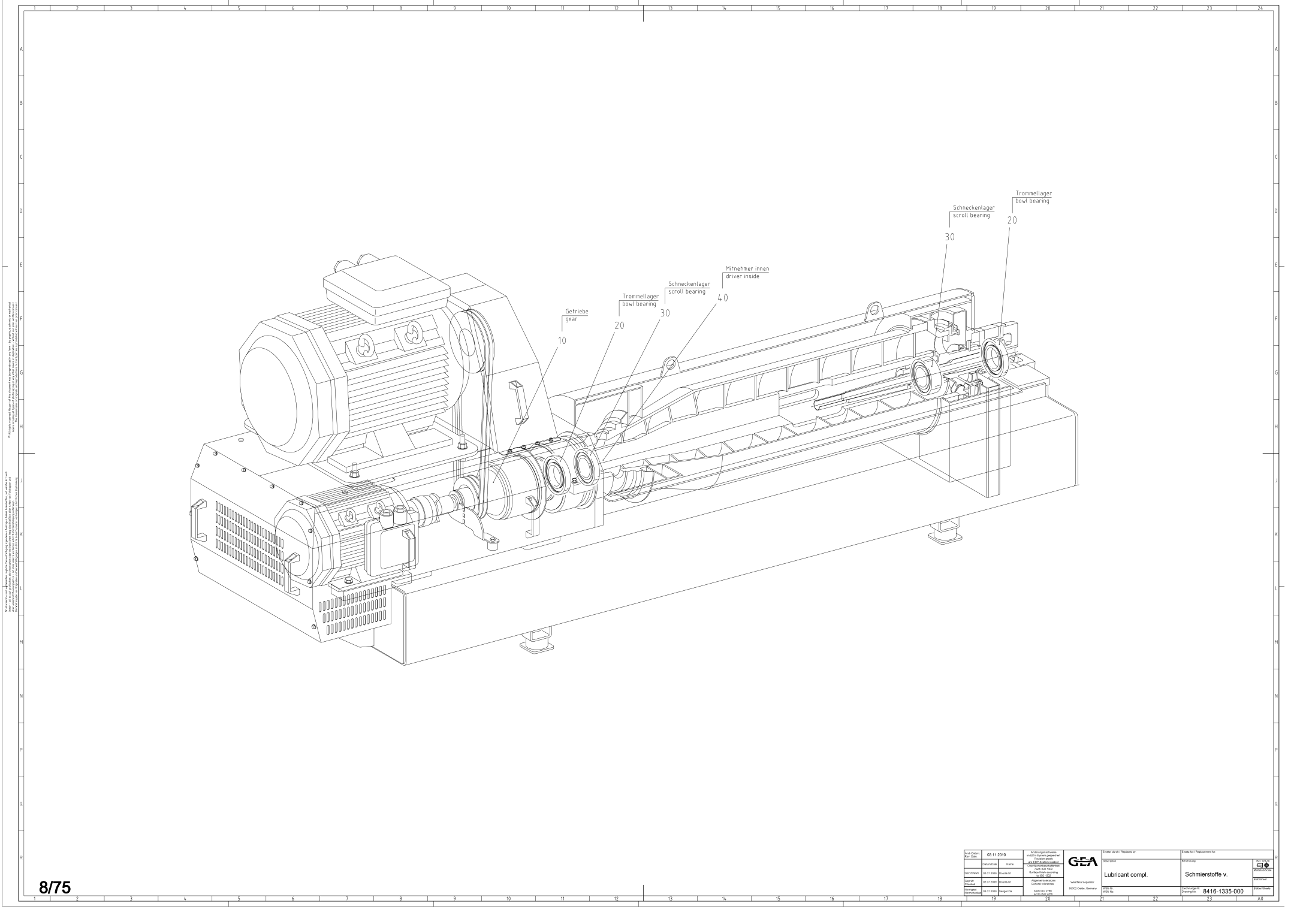
8012-664

Ausgabe / Edition

30.11.2021

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Rev. Code Rev. Date Description Date Author Checked Approved	03.11.2010 04.11.2010 05.11.2010 06.11.2010 07.11.2010 08.11.2010 09.11.2010	04.11.2010 05.11.2010 06.11.2010 07.11.2010 08.11.2010 09.11.2010 10.11.2010	GEA GEA Group AG 40878 Düsseldorf Germany	04.11.2010 05.11.2010 06.11.2010 07.11.2010 08.11.2010 09.11.2010 10.11.2010	04.11.2010 05.11.2010 06.11.2010 07.11.2010 08.11.2010 09.11.2010 10.11.2010
Lubricant compl.		Schmierstoffe v.		8416-1335-000	

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0015-0038-000	4		SCHMIEROEL LUBRICATING OIL ACEITE LUBRICANTE	✓	
20	0015-0036-000	1		SCHMIEROEL LUBRICATING OIL ACEITE LUBRICANTE	✓	
30	0015-0129-010	3		WAEZLAGERFETT ROLLING BEARING GREASE GRASA PARA RODAMIENTOS	✓	
40	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

Baugruppe / Component group

8419-1335-040

SCHMIERSTOFFE VOLLST.
LUBRICANTS, COMPLETE

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

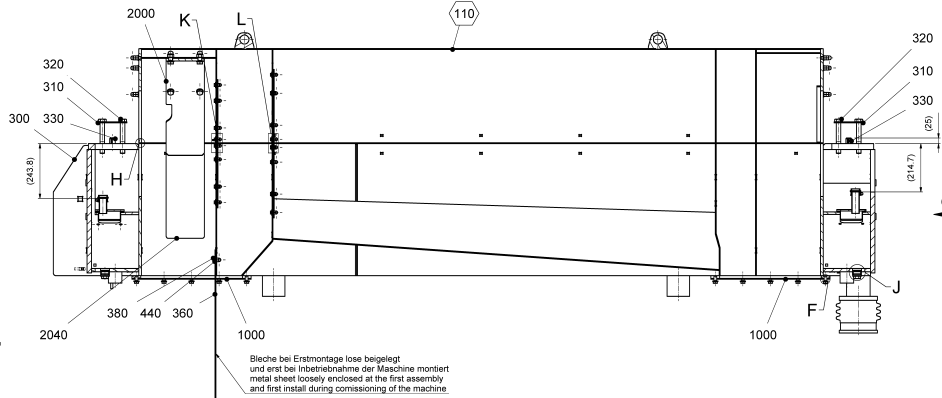
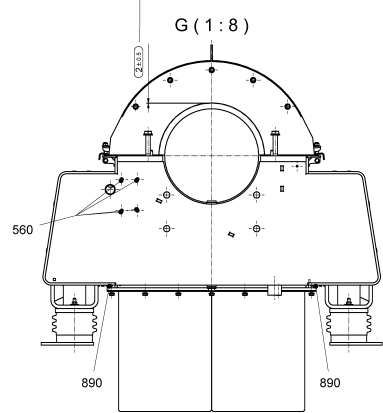
30.11.2021

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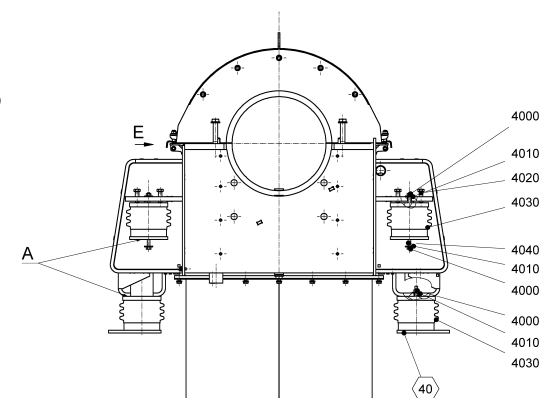
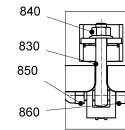
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A-A (1 : 8)

beidseitig mit Führerlehre zu prüfen
to check with feeler gauge on both sides



E (1 : 2)

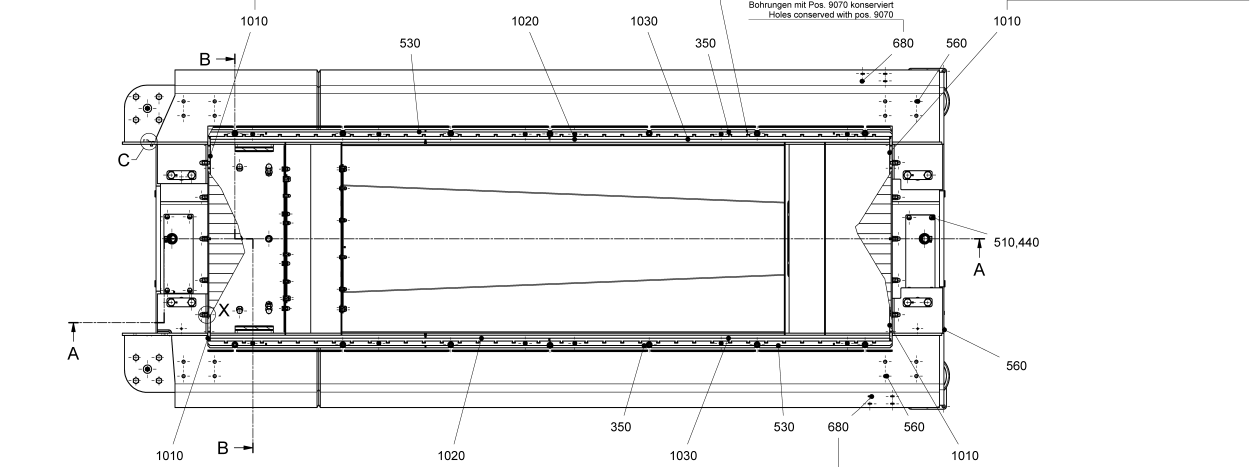


optional: Ausführung mit eigener Zeichnung
optional: version with own drawing

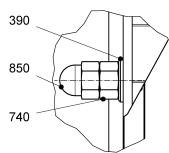
Dichtung im Passstift mit Pos. 9060 auf den Rahmen geklebt
Gasket at adjusting pin glued on the frame with pos. 9060

Jede vierte Schwelenschwanzform mit Pos. 9060 auf den Rahmen geklebt
Every forth dovetail key glued on the frame with pos. 9060

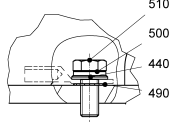
Dichtung im Passstift mit Pos. 9060 auf den Rahmen geklebt
Gasket at adjusting pin glued on the frame with pos. 9060



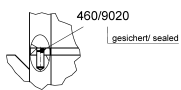
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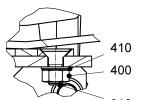
C (1 : 1)



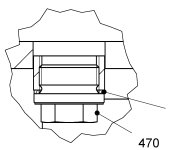
H (1 : 1)



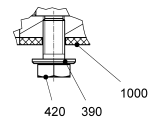
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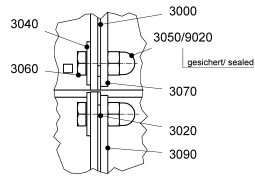
J (1 : 1)



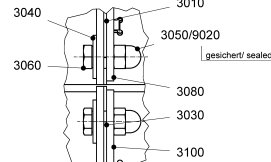
F (1 : 1)



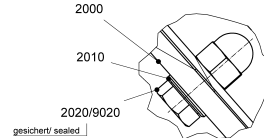
K (1 : 1)



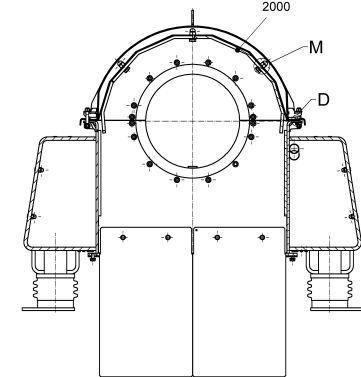
L (1 : 1)



M (1 : 1)



B-B (1 : 8)



A = Fläche mit Pos. 9030 gefettet
A = Surface with pos. 9030 greased

Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order siehe Maschinenkarte see machine card	Benennung name
1000-1990	(10)	Satz Dichtringe (Einzelteile dargestellt) Set of gaskets (single parts illustrated)
2000-2990	(20)	Satz Schleibscheibe (Einzelteile dargestellt) Set of wear liners (single parts illustrated)
3000-3990	(30)	Ringhälfen vollst. (Einzelteile dargestellt) Ring halves complete (single parts illustrated)
4000-4990	(40)	Dämpfer vollst. (Einzelteile dargestellt) Damper complete (single parts illustrated)
7000-7990	(70)	Satz Anschlussstange 1 Haube (zeichnerisch nicht dargestellt) set of connection parts for hood (not illustrated)
	(100)	Satz Schilder (zeichnerisch nicht dargestellt) Set of signs (not illustrated)
	(110)	Fängeroberteil geschw. Upper part of catcher, welded

Rev. Datum Rev. Date	02.03.2021	Antrag zur Nacharbeit Request for repair Kaufvertrag Purchase contract	GEA	Gezeichnet / Drawn by	Frankfurt / Frankfurt
Rev. Datum Rev. Date	01.03.2020	Erstellung Creation	GEA	Gezeichnet / Drawn by	Frankfurt / Frankfurt
Rev. Datum Rev. Date	01.03.2020	Erstellung Creation	GEA	Gezeichnet / Drawn by	Frankfurt / Frankfurt
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Rev. Datum Rev. Date	01.03.2020	Erstellung Creation	GEA	Gezeichnet / Drawn by	Frankfurt / Frankfurt

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-1005-040	1		SATZ DICHRINGE F.GESTELL SET OF GASKETS FOR FRAME JUEGO DE JUNTAS PARA EL BASTIDOR	✓	
1000	8419-1004-000	2		SATZ DICHTUNGEN SET OF GASKETS JUEGO DE JUNTAS	✓	
1010	8419-1265-160	4		DICHTUNG GASKET JUNTA	✓	
1020	8419-1265-020	2		DICHTUNG GASKET JUNTA	✓	
1030	8419-1265-010	2		DICHTUNG GASKET JUNTA	✓	
1040	0007-1981-550	2		DICHRING GASKET JUNTA ANULAR	✓	
20	8419-1063-030	1		SATZ SCHLEISSBLECHE SET OF WEAR LINERS JUEGO DE CHAPAS PROTECTORAS	✓	
2000	8419-1062-060	1		SCHLEISSBLECH WEAR LINER CHAPA DE DESGASTE	✓	
2010	0026-1335-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2020	0019-7034-400	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
30	8419-1728-220	1		RINGHAELFTEN VOLLST. RING HALFS COMPL. SEMIANILLO, COMP.	✓	
3000	8419-1728-190	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	
3010	8419-1728-210	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	
3020	8419-1728-180	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	

Baugruppe / Component group

8419-1100-110

GESTELL VOLLST.
FRAME, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
3030	8419-1728-200	1		RINGHAELFTE RING HALF MITAD DE ANILLO	✓	
3040	0013-0404-400	32		HUTMUTTER CAP NUT TUERCA CAPERUZA	✓	
3050	0026-0439-400	32		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
3060	0019-6903-400	32		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
3070	8419-1146-070	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
3080	8419-1146-050	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
3090	8419-1146-060	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
3100	8419-1146-040	1		GEGENHALTER HOLDER-UP CONTRASOPORTE	✓	
40	8419-1780-020	1		DAEMPFER M.ANSCHLUSSTEILEN V. DAMPER WITH CONNECTING PARTS, CPL.	✓	
4000	0013-0280-400	6		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
4010	0026-2407-300	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
4020	0019-7039-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
4030	8690-1780-000	4		DAEMPFER VOLLST. DAMPER COMPL. AMORTIGUADOR COMP.	✓	
	0004-3346-810	4		FALTENBALG BELLOWS FUELLE	✓	

Baugruppe / Component group

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GESTELL VOLLST.
FRAME, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

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Trommel-Nr. / Bowl s/n

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FRAME, COMPL.

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0018-3812-300	8		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
	6985-0605-050	4		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
4040	0019-6330-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
70	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
100	8690-4940-020	1		SATZ SCHILDER SET OF PLATES JUEGO DE RÓTULOS	✓	
	0024-6481-000	1		SCHILD PLATE RÓTULO	✓	
	0024-3595-000	1		SCHILD PLATE RÓTULO	✓	
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
	0024-6571-000	1		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
	0024-5380-000	1		SCHILD PLATE RÓTULO	✓	
	0026-1571-300	8		KERBNAGEL NOTCHED NAIL REMACHE ESTRIADO	✓	
	0024-6482-000	4		SCHILD PLATE RÓTULO	✓	
	0024-6424-000	1		SCHILD PLATE RÓTULO	✓	

Baugruppe / Component group

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GESTELL VOLLST.
FRAME, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0024-6572-000	4		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
	0024-6580-000	7		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
	0024-6423-000	1		SCHILD PLATE RÓTULO	✓	
	0024-3707-000	1		KLEBESCHILD ADHESIVE PLATE RÓTULO ADHESIVO	✓	
110	8419-1752-100	1		FAENGEROBERTEIL GESCHW. UPPER PART OF CATCHER, WELDED PARTE SUPERIOR DEL COLECTOR, SOLD.	✓	
300	8419-3473-160	1		RAHMEN GESCHW. FRAME, WELDED MARCO, SOLD.	✓	
310	8419-6453-520	4		BLECH SHEET METAL CHAPA	✓	
320	0019-6675-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
330	0026-2779-170	4		SPANNSTIFT SPRING DOWEL SLEEVE PASADOR DE SUJECIÓN	✓	
360	8419-1453-000	2		BLECH SHEET METAL CHAPA	✓	
380	0019-6933-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
390	0026-1371-400	54		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
400	0013-0278-400	12		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
410	0026-1345-400	12		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

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Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
420	0019-6968-400	40		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
440	0026-1348-400	13		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
460	0026-1589-400	8		ZYLINDERSTIFT CYLINDRICAL PIN PASADOR CILÍNDRICO	✓	
470	0019-1126-400	2		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
480	0019-8904-300	13		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
490	0026-5673-300	1		FAECHERSCHEIBE FAN-TYPE LOCK WASHER ARANDELA DENTADA	✓	
500	0026-1337-300	1		FEDERING SPRING RING ANILLO DE PRESIÓN	✓	
510	0019-6935-400	9		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
520	0019-8910-300	3		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
530	8419-1453-255	2		BLECH SHEET METAL CHAPA	✓	
560	0003-3870-800	20		STOPFEN PLUG TAPÓN	✓	
680	0003-0780-800	8		STOPFEN PLUG TAPÓN	✓	
740	0013-0280-400	10		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
830	0019-1931-400	14		AUGENSCHRAUBE EYEBOLT TORNILLO DE ARGOLLA	✓	

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GESTELL VOLLST.
FRAME, COMPL.

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
840	0013-0172-400	14		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
850	0013-0406-400	24		HUTMUTTER CAP NUT TUERCA CAPERUZA	✓	
860	0019-6169-400	14		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
890	0003-0586-800	2		STOPFEN PLUG TAPÓN	✓	
910	0019-9391-400	12		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	
9060	6960-0201-150	1		KLEBER ADHESIVE PEGAMENTO	✓	

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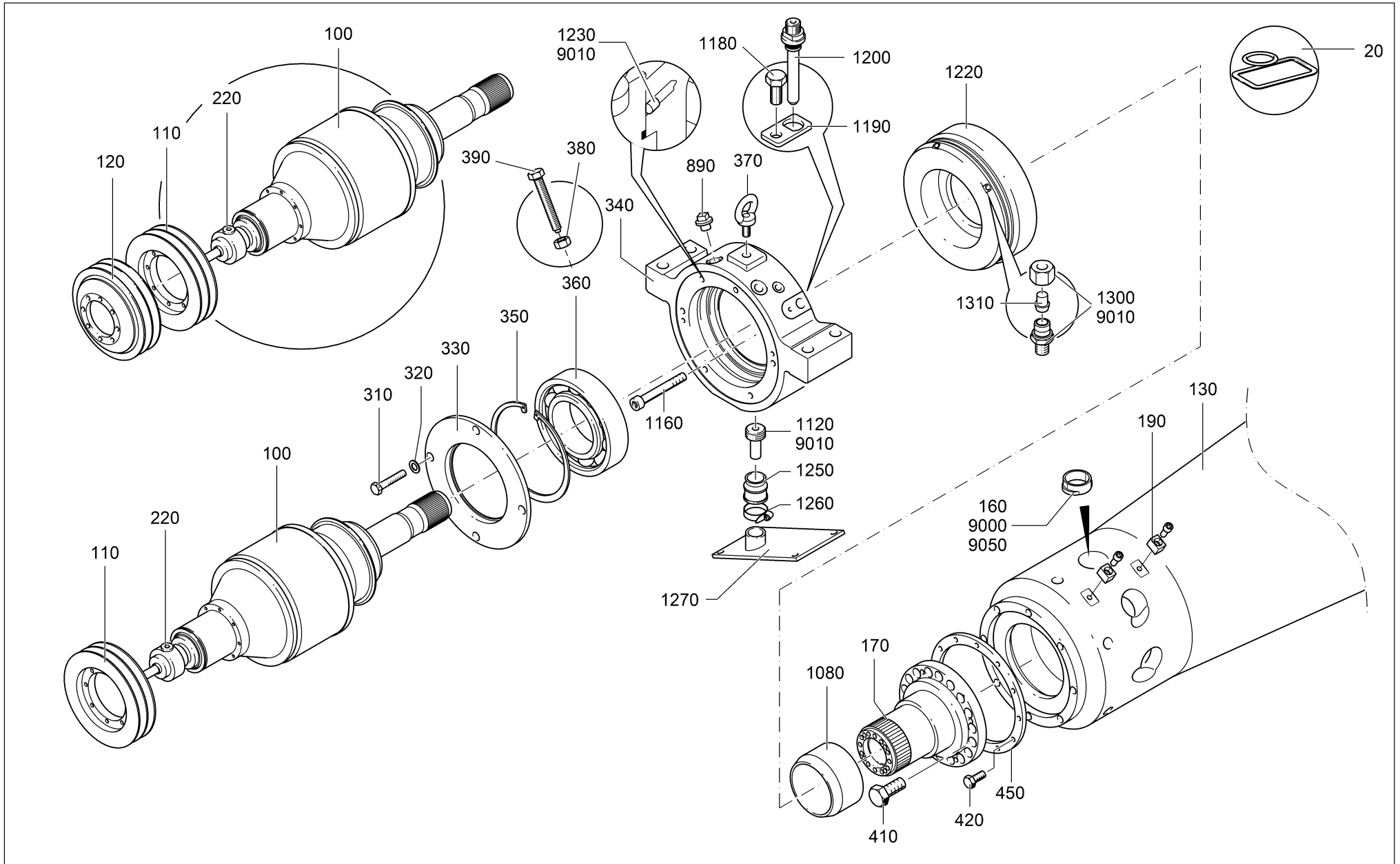
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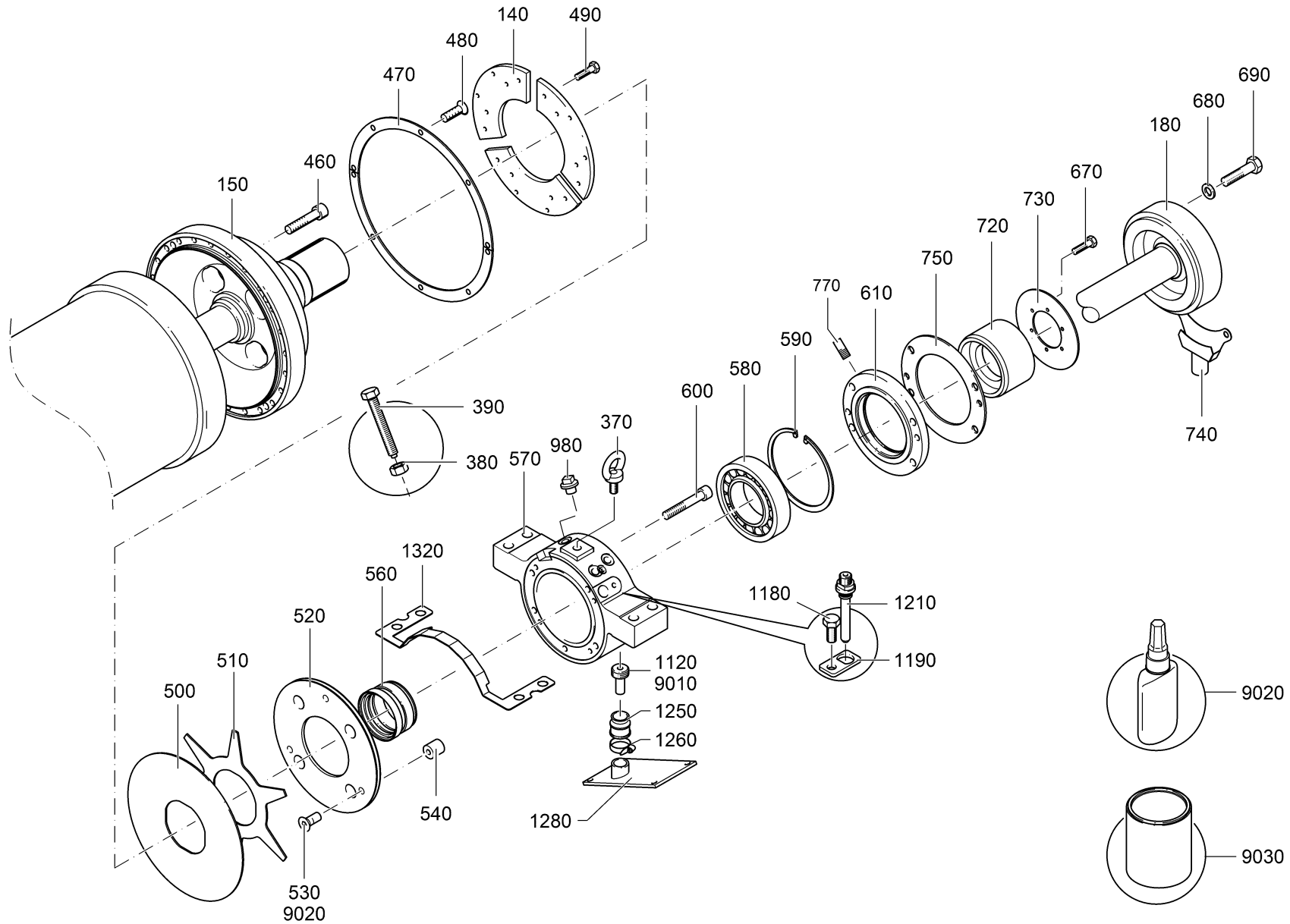
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20	8419-6007-160	1		SATZ DICHRINGE F.TROMMEL SET OF GASKETS FOR BOWL JUEGO ANILLOS ESTANQUEIDAD PARA TAMBOR	✓	26
100	8657-3210-060	1		PLANETENGETRIEBE VOLLST. PLANETARY GEAR, COMPLETE ENGRANAJE PLANETARIO, COMP.	?	28
110	8657-3352-010	1		KEILRIEMENSCHLEIBE V-BELT PULLEY POLEA PARA CORREA TRAPEZOIDAL	✓	
120	0000-0006-162	1		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	
130	8419-6601-130	1		TROMMELMANTEL BOWL SHELL CAMISA DEL TAMBOR	?	
	0019-6326-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
140	8419-6669-200	3		REGULIERPLATTE REGULATING PLATE PLACA REGULADORA	✓	
150	8419-6520-020	1		LAGERNABE VOLLST. BEARING HUB, COMPL. CUBO DE COJINETE, COMP.	✓	31
160	8418-6391-000	1		SATZ SCHLEISSBUCHSEN SET OF WEARING BUSHES JUEGO DE CASQUILLOS DE DESGASTE	✓	
170	8419-6602-010	1		TROMMELNABE VOLLST. BOWL HUB, COMPL. BUJE DEL TAMBOR, COMP.	?	
	0026-2778-140	2		ZYLINDERSTIFT CYLINDRICAL PIN PASADOR CILÍNDRICO	✓	
180	8419-2705-000	1		EINLAUFROHR GESCHW. INLET TUBE, WELDED TUBO DE ENTRADA, SOLD.	✓	
190	8419-6686-000	1		SATZ FLUEGEL SET OF SCRAPER BLADES JUEGO DE ALETAS	✓	33

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Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
220	8419-6269-100	1		SATZ GETRIEBEANSCHLUSSTEILE SET OF GEAR CONNECTION PARTS JUEGO DE PIEZAS DE CONEXIÓN DE ENGRANAJE	✓	
	0019-6112-400	1		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	8657-3278-040	1		IMPULSGEBER IMPULSE TRANSMITTER RELÉ DE IMPULSOS	✓	
	0019-6931-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
	8657-1145-000	1		HALTER HOLDER SOPORTE	✓	
	0019-6148-300	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	0019-7040-400	24		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
	8419-3358-080	1		GETRIEBENABE GEAR HUB GEAR HUB	✓	
	8419-3400-000	1		ANTRIEBSWELLE DRIVE SHAFT EJE DE ACCIONAMIENTO	✓	
	0019-6206-150	12		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	8690-6698-020	1		RING RING ANILLO	✓	
	0019-6106-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	0019-6119-400	1		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
	8657-3310-000	1		VENTILATOR GESCHW. VENTILATOR, WELDED VENTILADOR, SOLD.	✓	

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0019-6973-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
	8657-3338-000	4		DISTANZHUELSE SPACER SLEEVE CASQUILLO DE SEPARACIÓN	✓	
	8690-6431-030	2		AUSGLEICHSTUECK COMPENSATING PIECE PIEZA DE COMPENSACIÓN	✓	
	0019-6318-400	4		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	
310	0019-6607-400	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
320	0026-1335-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
330	8419-6375-000	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	
340	8419-6131-020	1		LAGERGEHAEUSE BEARING HOUSING ALOJAMIENTO DE COJINETE	✓	
350	0026-2431-170	1		SICHERUNGSRING SECURING RING ANILLO DE SEGURIDAD	✓	
360	0011-6334-870	1		RILLENKUGELLAGER GROOVED BALL BEARING RODAMIENTO RÍGIDO	✓	
370	0019-5387-050	2		RINGSCHRAUBE EYE BOLT ANILLA	✓	
380	0013-0282-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	

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Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
390	0019-5220-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
410	0019-6664-400	22		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
420	0019-6938-400	12		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
450	8419-6592-160	1		RING RING ANILLO	✓	
460	0019-6206-400	44		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
470	8419-6757-020	4		SCHUTZRING GUARD RING ANILLO DE PROTECCIÓN	✓	
480	0019-9421-400	12		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
490	0019-6933-400	18		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
500	8419-6473-020	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
510	8419-6594-000	1		DRUCKRING PRESSURE RING ANILLO DE PRESIÓN	✓	
520	8419-6473-250	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
530	0019-9400-400	4		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
540	8419-6526-030	4		HUELSE SLEEVE CASQUILLO	✓	
560	8419-6526-140	1		HUELSE SLEEVE CASQUILLO	✓	

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Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
570	8419-6131-050	1		LAGERGEHAEUSE BEARING HOUSING ALOJAMIENTO DE COJINETE	✓	
30	0019-6335-400	1		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
40	0019-8923-400	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
50	0004-5283-780	1		DICHTUNG GASKET JUNTA	✓	
60	0019-6316-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	
580	0011-1036-880	1		ZYLINDERROLLENLAGER CYLINDRICAL ROLLER BEARING COJINETE DE RODILLOS CILÍNDRICOS	✓	
590	0026-0748-170	1		SICHERUNGSRING SECURING RING ANILLO DE SEGURIDAD	✓	
600	0019-6216-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
610	8419-6375-010	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	
670	0019-6522-300	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
680	0026-1358-300	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
690	0019-6677-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
720	8419-6526-020	1		HUELSE SLEEVE CASQUILLO	✓	

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Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
730	8419-6305-010	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
740	8419-6454-000	1		SCHUTZBLECH GESCHW. GUARD, WELDED CHAPA PROTECTORA, SOLD.	✓	
750	8419-6305-020	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
770	0019-6337-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
980	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	✗	
1080	8419-6526-000	1		HUELSE SLEEVE CASQUILLO	✓	
1120	8418-6707-020	2		STOPFEN PLUG TAPÓN	✓	
1160	0019-6228-400	6		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1180	0019-6901-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1190	8415-6453-100	2		BLECH SHEET METAL CHAPA	✓	
1200	8419-6471-010	1		ROHR PIPE TUBO	✓	
1210	8419-6471-020	1		ROHR PIPE TUBO	✓	
1220	8419-6378-000	1		LAGERDECKEL VOLLST. BEARING COVER, COMPL. TAPA DE COJINETE, COMP.	✓	
	8419-6375-100	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0019-6307-400	1		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
1230	0019-6307-400	1		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
1250	0004-3378-830	2		FALTENBALG BELLOWS FUELLE	✓	
1260	0018-5981-300	2		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
1270	8419-1061-010	1		DECKEL GESCHW. COVER, WELDED TAPA, SOLD.	✓	
1280	8418-1061-040	1		DECKEL GESCHW. COVER, WELDED TAPA, SOLD.	✓	
1300	0018-3537-400	1		VERSCHRAUBUNG SCREW COUPLING RACOR	✓	
1310	0018-3200-400	1		VERSCHLUSSKEGEL MALE CONNECTING NIPPLE CONO DE CIERRE	✓	
1320	8419-1453-020	1		BLECH SHEET METAL CHAPA	✓	
9000	6985-0605-200	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

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8012-664

Trommel-Nr. / Bowl s/n

8012-664

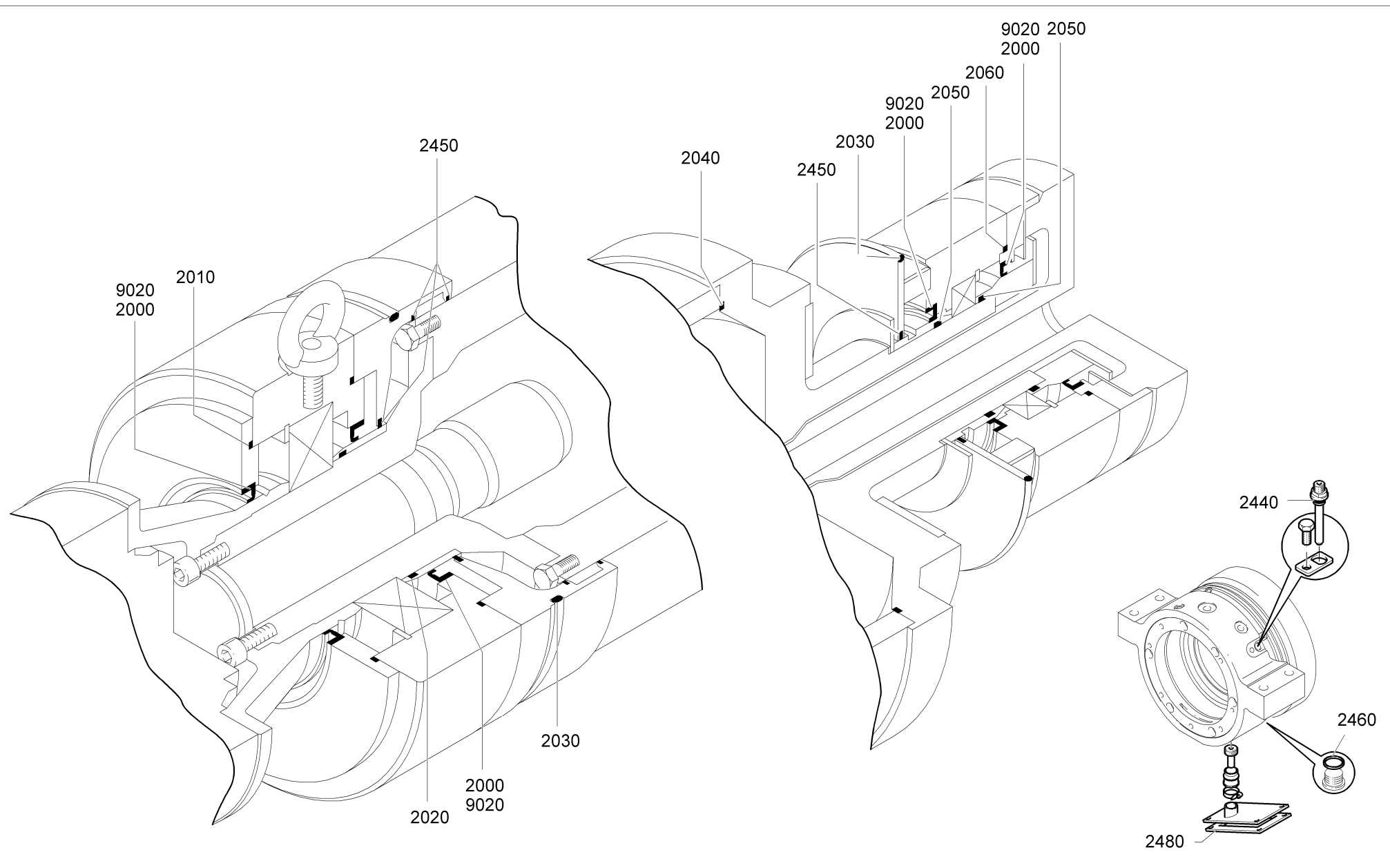
Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group



Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2000	0004-3223-850	4		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
2010	0007-2621-830	1		DICHTRING GASKET JUNTA ANULAR	✓	
2020	0007-1802-830	1		DICHTRING GASKET JUNTA ANULAR	✓	
2030	0007-2260-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
2040	0007-2966-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
2050	0007-2862-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
2060	0007-2571-830	1		DICHTRING GASKET JUNTA ANULAR	✓	
2440	0007-2508-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
2450	0004-1576-328	4.5	m	DICHTUNGSSCHNUR PACKING CORD CORDÓN DE JUNTA	✓	
2480	8418-1265-260	2		DICHTUNG GASKET JUNTA	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	

Baugruppe / Component group

8419-6007-160

SATZ DICHRINGE F. TROMMEL
SET OF GASKETS FOR BOWL

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

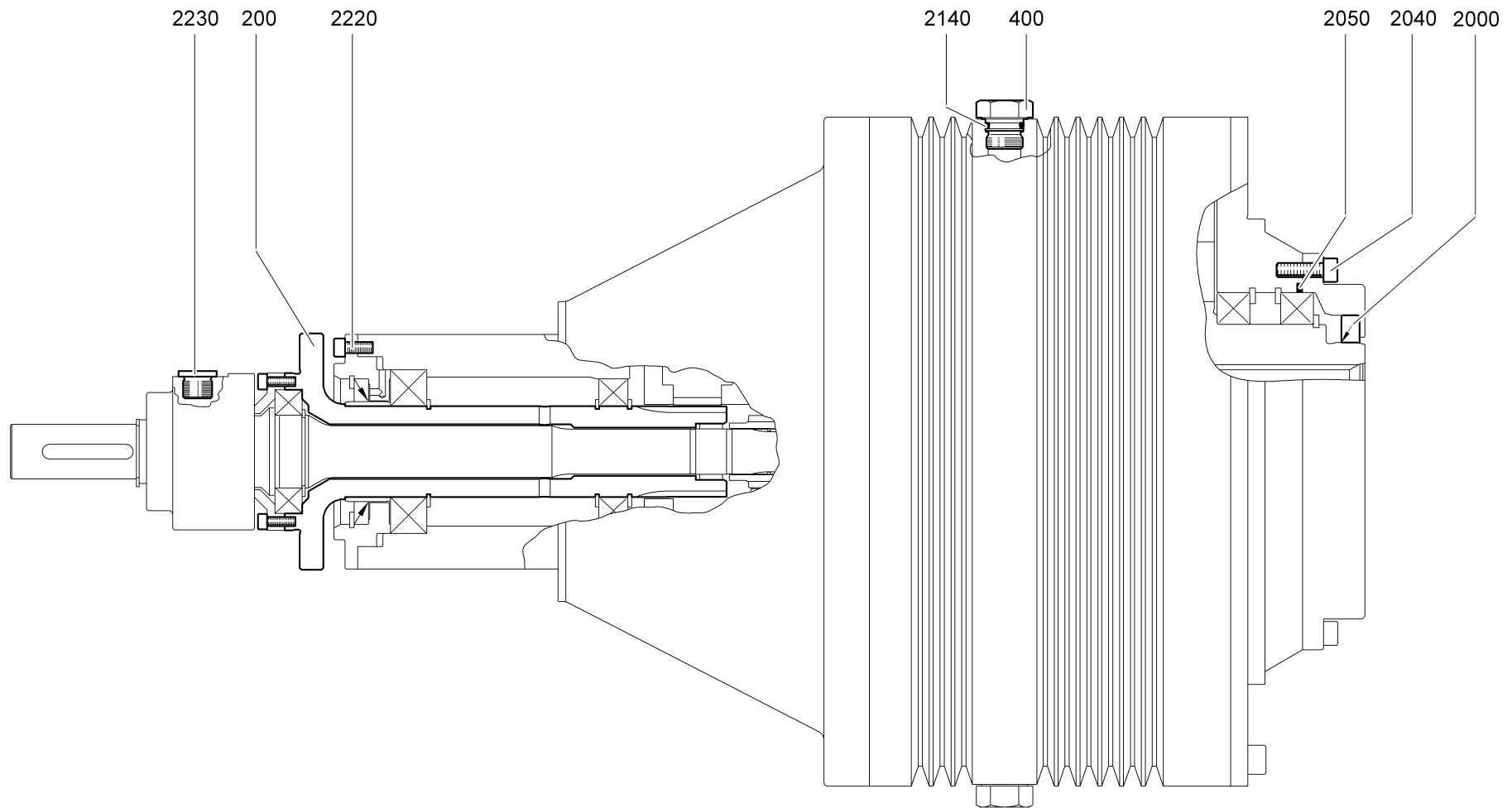
8012-664

Ausgabe / Edition

30.11.2021

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Rev. : 08.07.2021
 Datum: 20.02.2020

Zeichnungs-Nr.: 8657-4753-008

Blatt 1
 1 Blätter

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
200	8657-3415-050	1		WELLE VOLLST. SHAFT, COMPL. ÁRBOL, COMP.	?	
350	8657-3545-010	1		SONNENWELLE SUN-WHEEL SHAFT ENGRANAJE CENTRAL	?	
370	8657-3515-010	1		SATZ PLANETENBOLZEN SET OF PLANET BOLTS JUEGO DE EJES DEL ENGRANAJE PLANETARIO	?	
380	8657-3483-010	1		SATZ PLANETENRAD SET OF PLANET WHEELS JUEGO DE RUEDA PLANETARIA	?	
390	8657-3513-010	1		PLANETENFLANSCH PLANET FLANGE BRIDA DE ENGRANAJE PLANETARIO	?	
400	8654-3161-010	2		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
410	8657-3513-000	1		PLANETENFLANSCH PLANET FLANGE BRIDA DE ENGRANAJE PLANETARIO	?	
430	8657-3545-000	1		SONNENWELLE SUN-WHEEL SHAFT ENGRANAJE CENTRAL	?	
440	8657-3515-050	1		SATZ PLANETENBOLZEN SET OF PLANET BOLTS JUEGO DE EJES DEL ENGRANAJE PLANETARIO	?	
460	8657-3410-000	1		ABTRIEBWELLE DRIVEN SHAFT EJE DE SALIDA	?	
470	8657-3376-010	1		DECKEL COVER TAPA	?	
2000	0004-3332-830	1		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
2040	0019-6124-400	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
2050	0007-2825-830	1		DICHTRING GASKET JUNTA ANULAR	✓	

Baugruppe / Component group

8657-3210-060

PLANETENGETRIEBE VOLLST.
PLANETARY GEAR, COMPLETE

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2140	0007-2924-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
2220	0019-6106-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
2230	0019-8920-030	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	

Baugruppe / Component group

8657-3210-060

PLANETENGETRIEBE VOLLST.
PLANETARY GEAR, COMPLETE

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

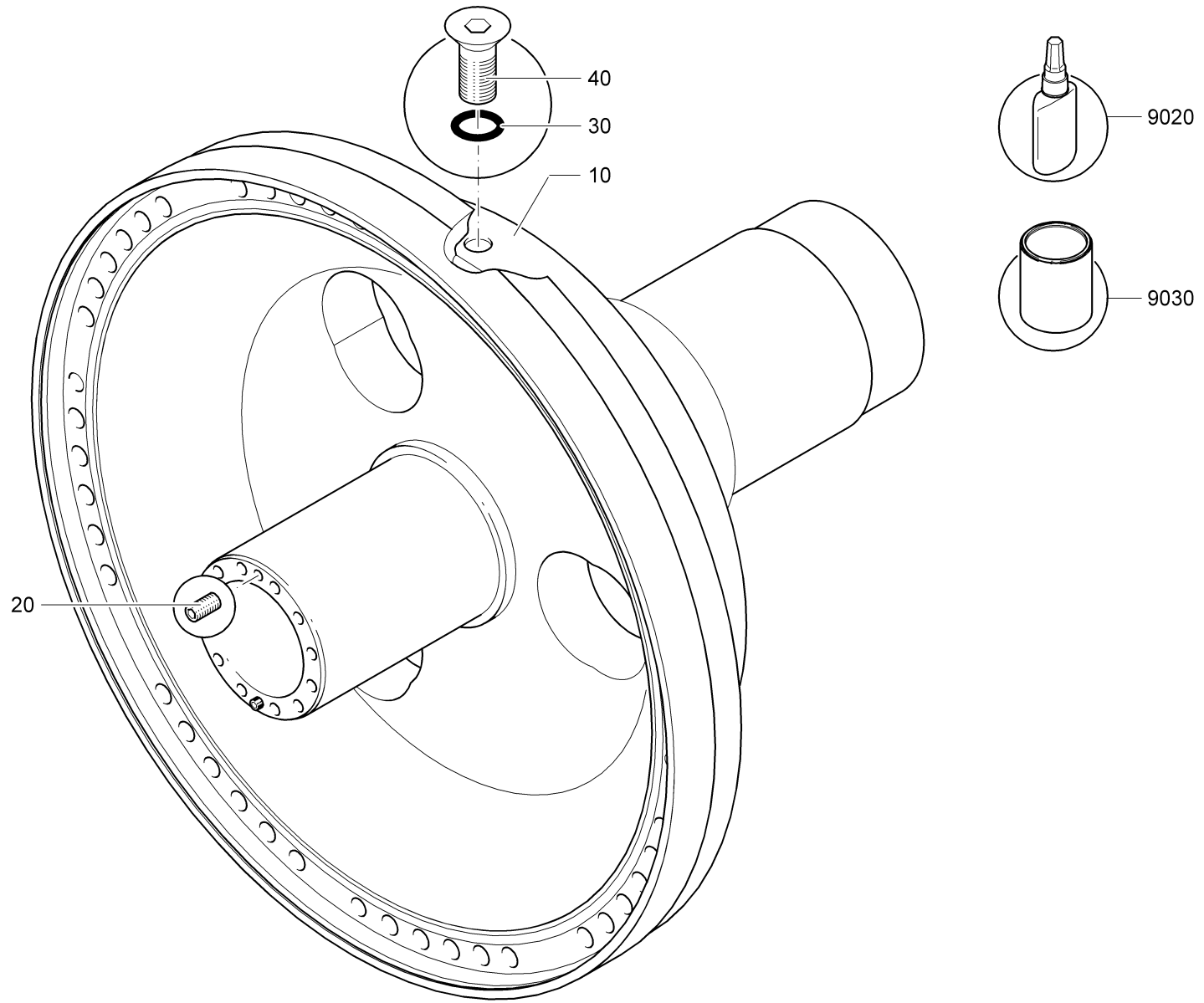
8012-664

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30.11.2021

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
20	0019-6335-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	
30	0007-2926-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
40	0019-9410-400	2		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

Baugruppe / Component group

8419-6520-020

LAGERNABE VOLLST.
BEARING HUB, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

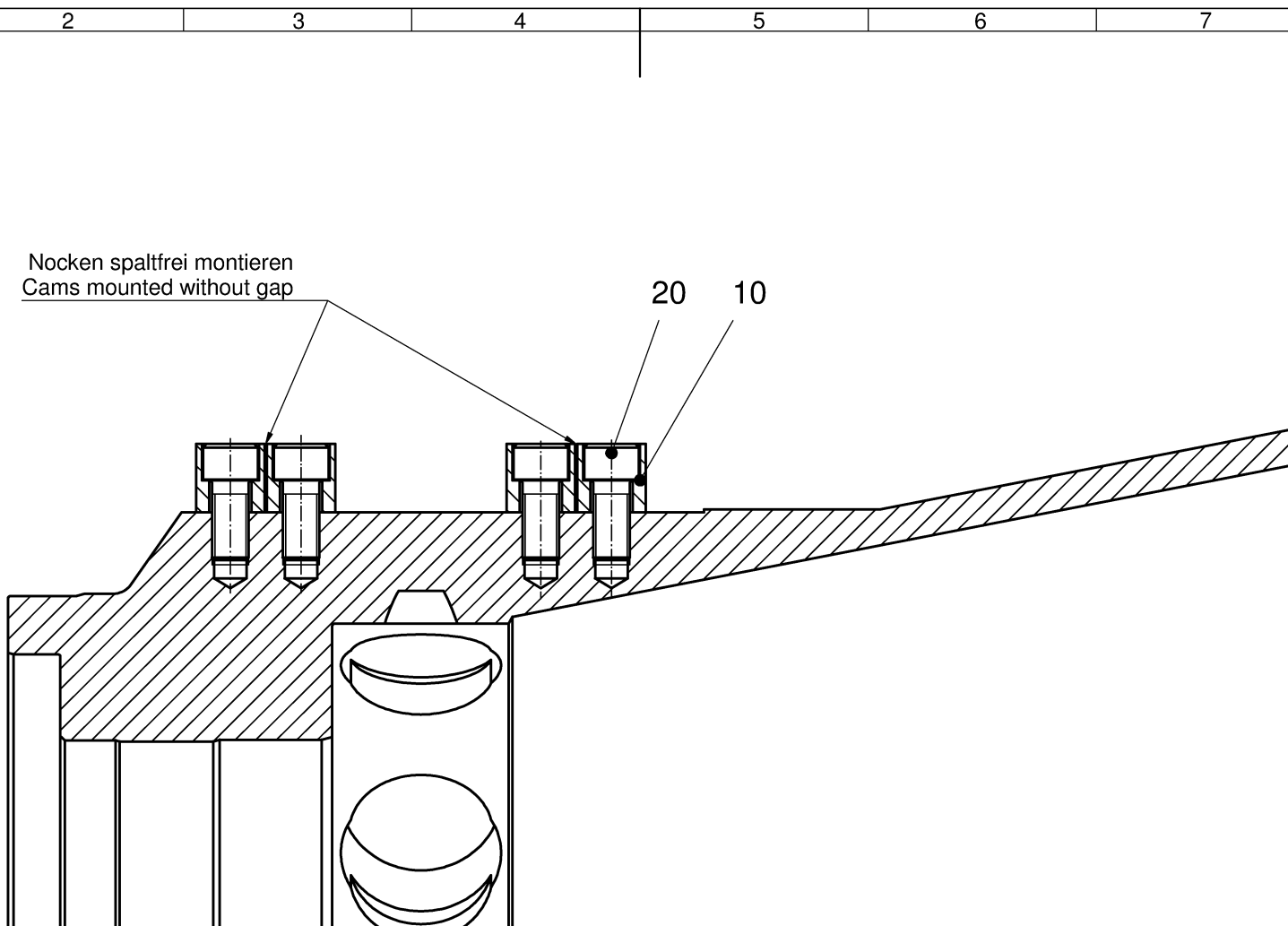
30.11.2021


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Änd.-Datum: Rev. Date:		Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident	 Westfalia Separator Group GmbH 59302 Oelde, Germany	Ersetzt durch:/ Replaced by:	Ersatz für:/ Replacement for:	
	Datum/Date	Name		Description: Set of scraper blades	Benennung: Satz Flügel	ISO 128-30 Maßstab/Scale 1:2
Gez./Drawn	29.06.2017	Niemann.Cl	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302	WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No.	Blatt/Sheet 1
Geprüft Checked	29.06.2017	Zielke.Do	Allgemeintoleranzen General tolerances mK nach ISO 2768 acc. to ISO 2768	8419-6686-000	Blätter/Sheets 1	
Normgepr. Normchecked	03.07.2017	Deipenbrock.Br				

Baugruppe / Component group

8419-6686-000

SATZ FLUEGEL
SET OF SCRAPER BLADES

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8177-6465-040	8		NOCKEN CAM LEVA	✓	
20	0019-6200-400	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

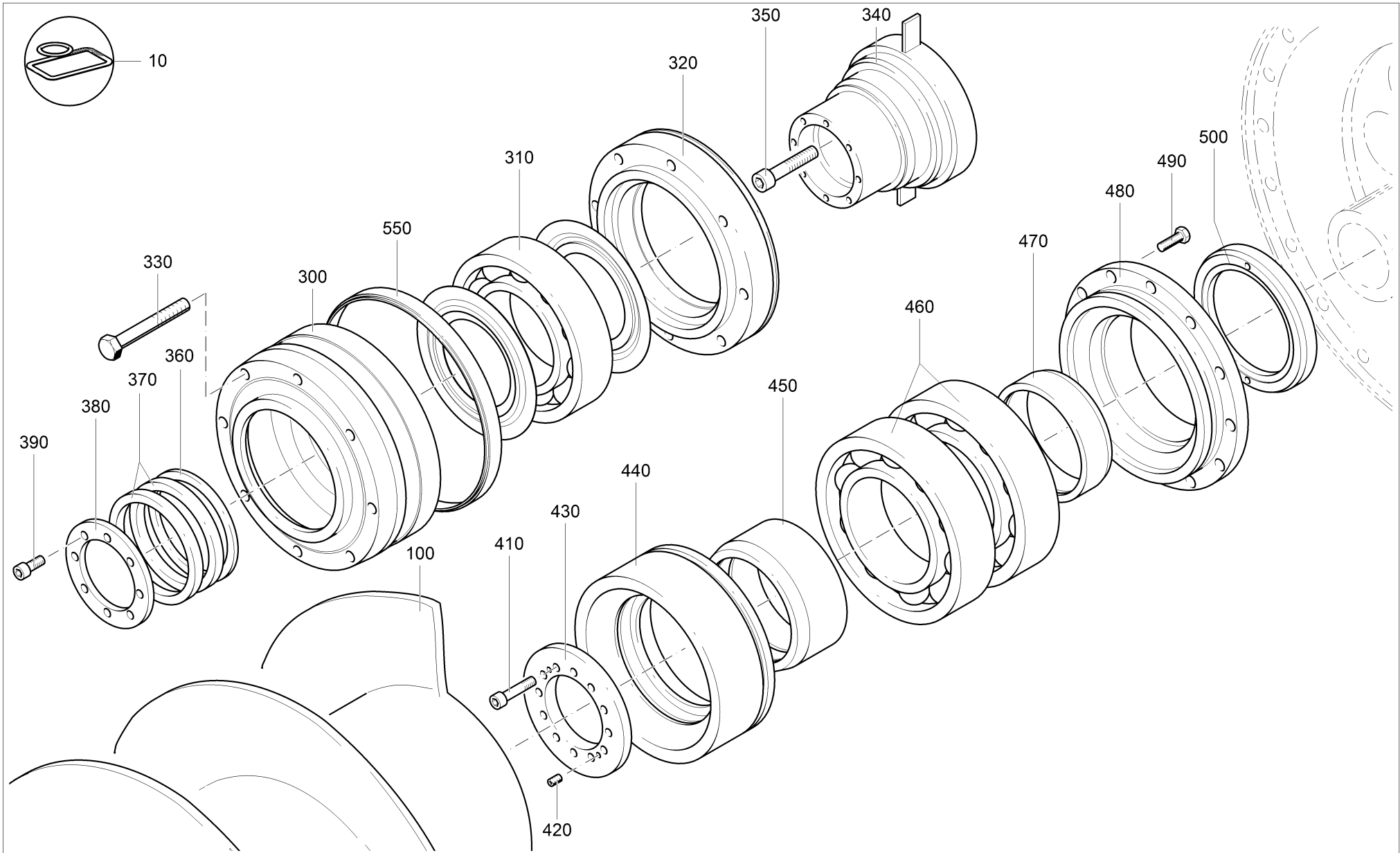
8012-664

Ausgabe / Edition

30.11.2021

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-6006-040	1		SATZ DICHRINGE F.SCHNECKE SET OF GASKETS FOR SCROLL JUEGO JUNTAS PARA EL SINFIN	✓	38
100	8419-6515-000	1		SCHNECKE GESCHW. SCROLL, WELDED SINFÍN, SOLD.	?	40
300	8419-6592-170	1		RING RING ANILLO	✓	
310	0011-6226-950	1		RILLENKUGELLAGER GROOVED BALL BEARING RODAMIENTO RÍGIDO	✓	
320	8419-6592-030	1		RING RING ANILLO	✓	
330	0019-6520-300	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
340	8419-6635-000	1		MITNEHMER VOLLST. DRIVER, COMPL. PIEZA DE ARRASTRE, COMP.	✓	
350	0019-6247-400	5		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
360	8419-6592-010	1		RING RING ANILLO	✓	
370	8419-6592-000	2		RING RING ANILLO	✓	
380	8419-6473-050	1		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
390	0019-6144-400	8		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
410	0019-6166-400	12		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
420	0019-6318-400	2		GEWINDESTIFT THREADED PIN PRISIONERO	✓	

Baugruppe / Component group

8419-6539-040

SCHNECKE VOLLST.
SCROLL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

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30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
430	8419-6592-020	1		RING RING ANILLO	✓	
440	8419-6592-050	1		RING RING ANILLO	✓	
450	8419-6592-070	1		RING RING ANILLO	✓	
460	0011-7228-970	2		SCHRAEGKUGELLAGER ANGULAR CONTACT BALL BEARING BOLAS DE CONTACTO ANGULAR	✓	
470	8419-6592-090	1		RING RING ANILLO	✓	
480	8419-6375-020	1		LAGERDECKEL BEARING COVER TAPA DE COJINETE	✓	
490	0019-6971-400	12		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
500	8419-6592-110	1		RING RING ANILLO	✓	
550	0026-2805-300	1		TOLERANZRING SPACER RING ANILLO DE TOLERANCIA	✓	

Baugruppe / Component group

8419-6539-040

SCHNECKE VOLLST.
SCROLL, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

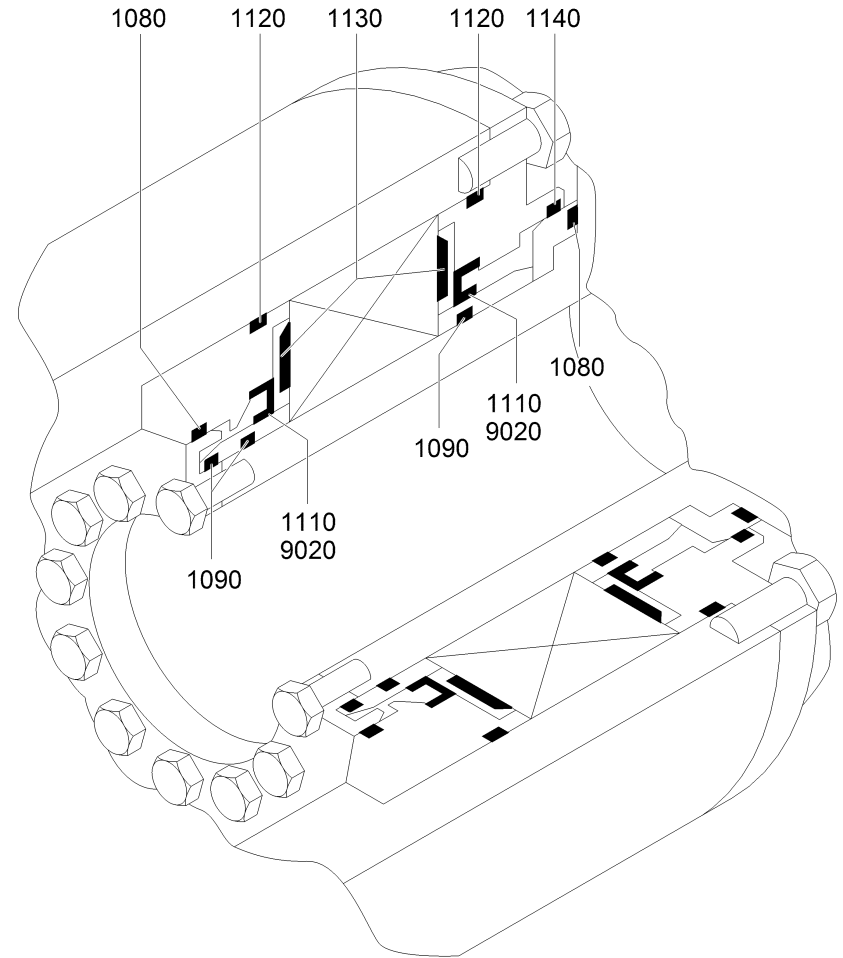
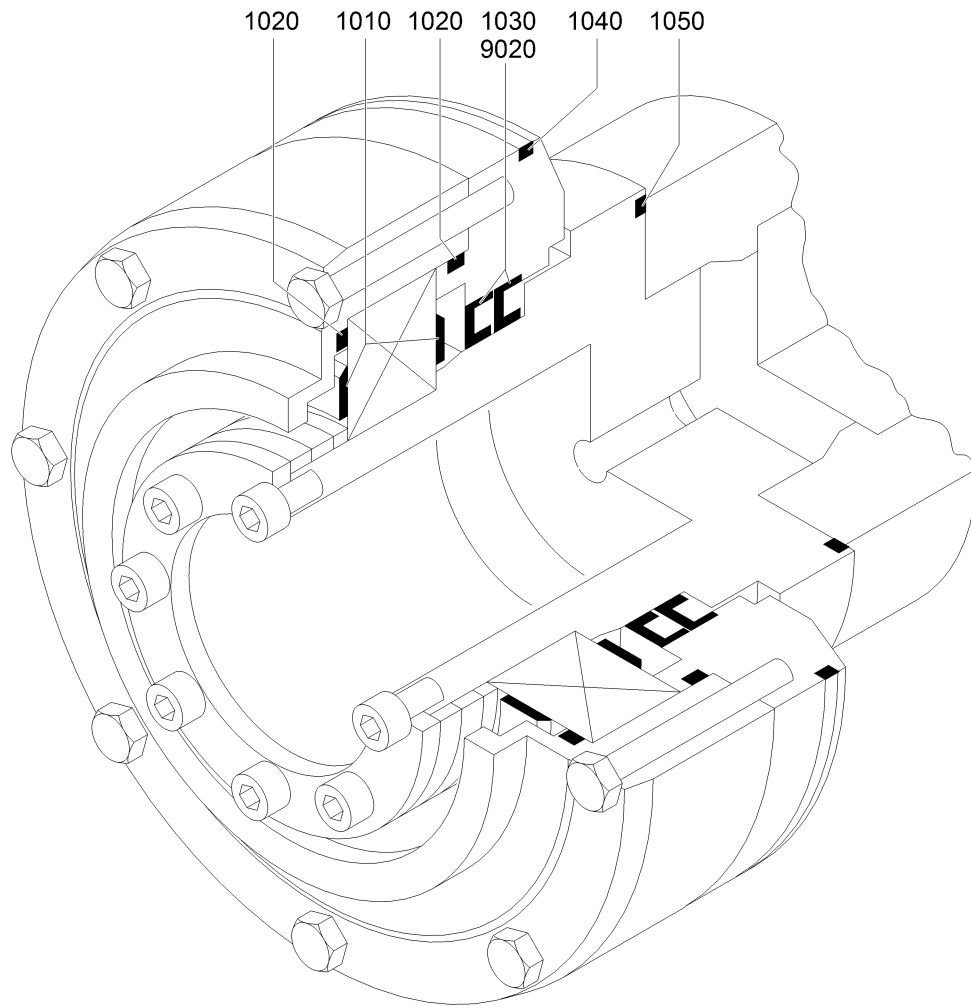
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30.11.2021

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GEA Westfalia Separator Group



Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1010	0004-1586-300	2		NILOS-DICHTRING NILOS GASKET ANILLO NILOS	✓	
1020	0007-2706-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
1030	0004-1582-850	2		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
1040	0007-2577-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
1050	0007-2864-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
1080	0007-2864-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
1090	0007-2940-750	3		DICHTRING GASKET JUNTA ANULAR	✓	
1110	0004-1583-850	2		WELLENDICHTRING SHAFT SEALING RING RETÉN PARA EJES	✓	
1120	0007-3733-750	2		DICHTRING GASKET JUNTA ANULAR	✓	
1130	0004-3334-300	2		NILOS-DICHTRING NILOS GASKET ANILLO NILOS	✓	
1140	0007-3619-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
9020	6985-0605-050	1		KLEBSTOFF LOCTITE LOCTITE GLUE ADHESIVO LOCTITE	✓	

Baugruppe / Component group

8419-6006-040

SATZ DICHTRINGE F.SCHNECKE
SET OF GASKETS FOR SCROLL

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

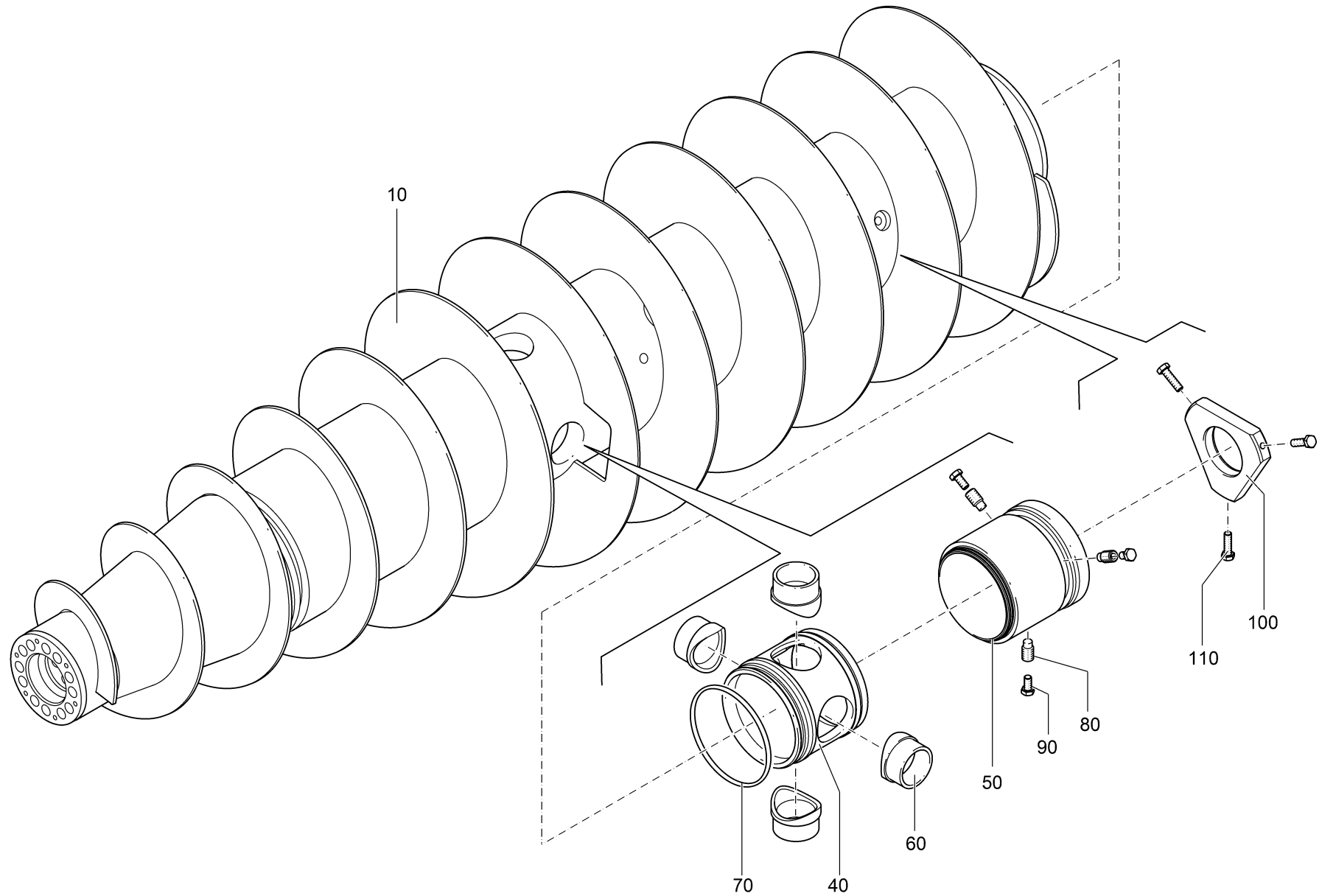
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GEA Westfalia Separator Group



Baugruppe / Component group

8419-6515-000

SCHNECKE GESCHW.
SCROLL, WELDED

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
30	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
40	8419-6621-000	1		VERTEILER DISTRIBUTOR DISTRIBUIDOR	v	
50	8419-6630-000	1		VERTEILERDECKEL DISTRIBUTOR COVER TAPA DEL DISTRIBUIDOR	v	
60	8418-6493-000	4		BUCHSE BUSHING CASQUILLO	v	
70	0007-2065-750	1		DICHTRING GASKET JUNTA ANULAR	v	
80	0019-6396-400	3		GEWINDESTIFT THREADED PIN PRISIONERO	v	
90	0019-7031-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
100	8419-6453-000	1		BLECH SHEET METAL CHAPA	v	
110	0019-6536-400	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

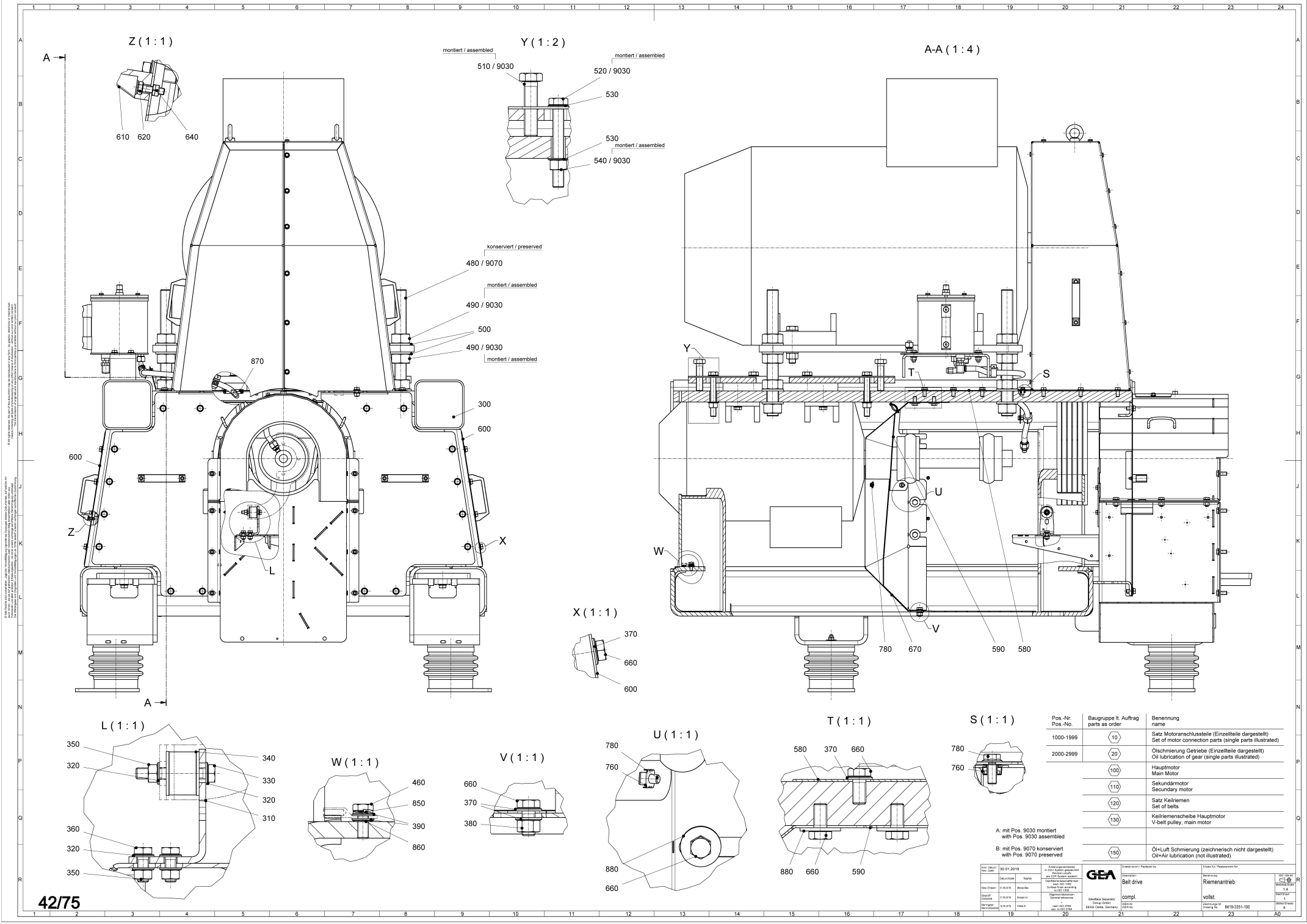
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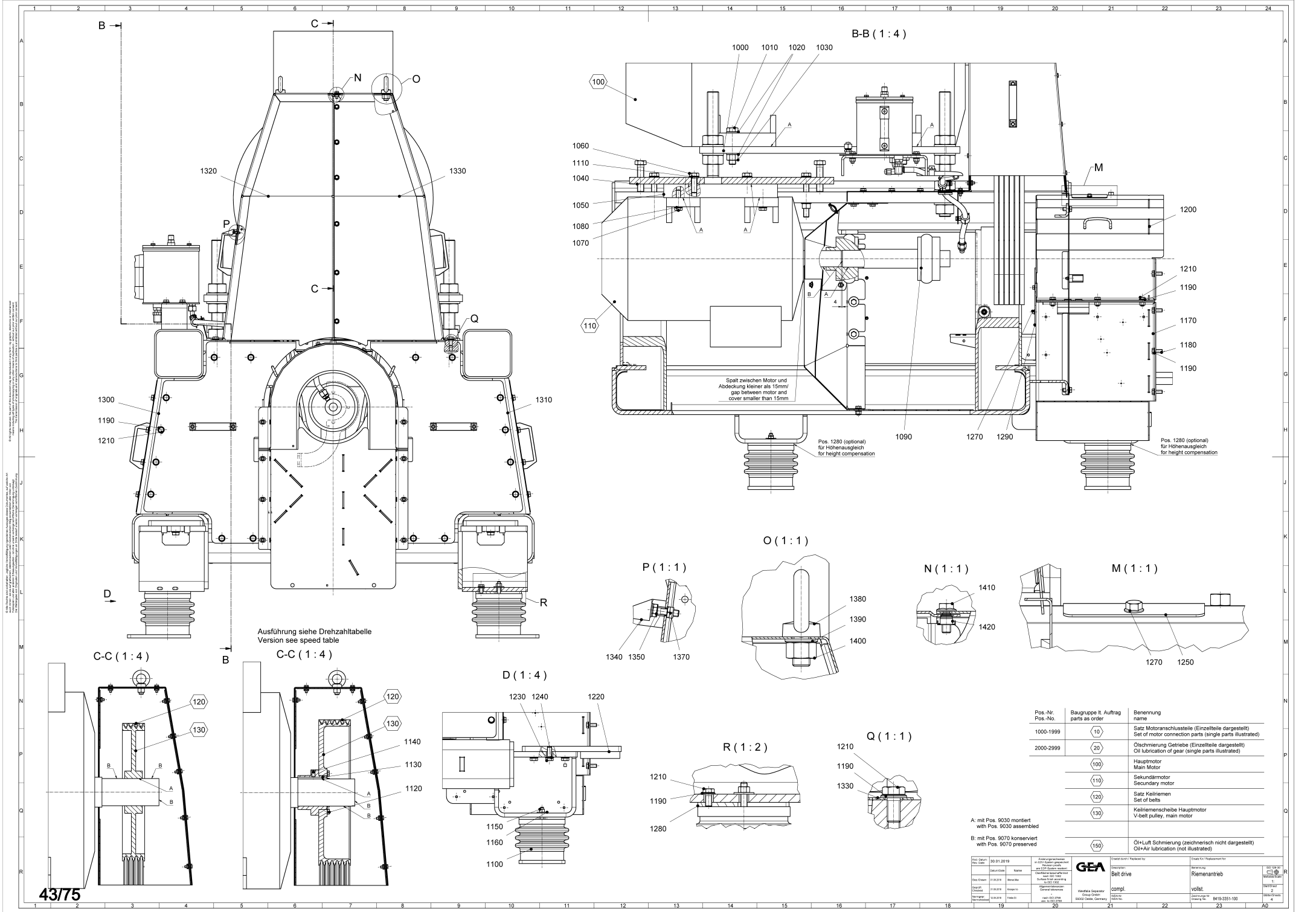
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Ausführung siehe Drehzahltafel
Version see speed table

Spalt zwischen Motor und Abdeckung kleiner als 15mm/
gap between motor and cover smaller than 15mm

Pos. 1280 (optional) für Höhenausgleich
for height compensation

Pos. 1280 (optional) für Höhenausgleich
for height compensation

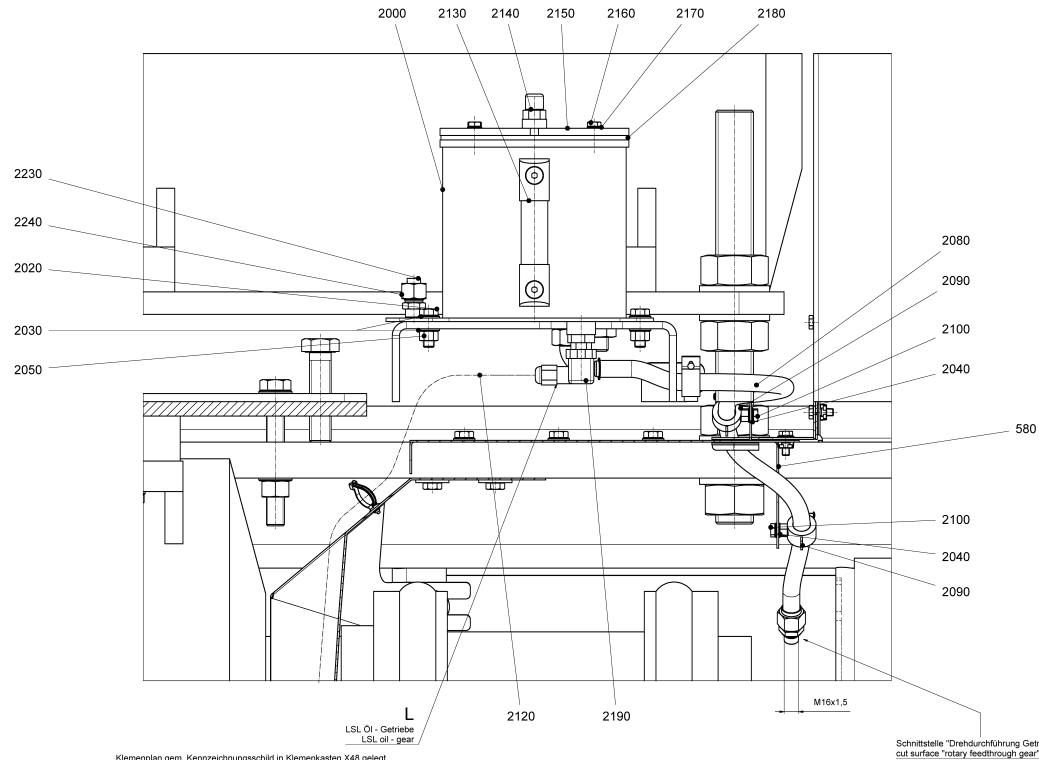
Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlussteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Ölschmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main Motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	150	Öl+Luft Schmierung (zeichnerisch nicht dargestellt) Oil+Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled

B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code Rev. Code	30 01 2019	Änderungshistorie in 1000er Schritten Änderungshistorie in 1000er Schritten Änderungshistorie in 1000er Schritten	GEA	Hersteller Belt drive	Benennung Riemenantrieb	303 138 00 00000000
Doc. Code Rev. Code	31/01/2019	Änderungshistorie in 1000er Schritten Änderungshistorie in 1000er Schritten	GEA	Hersteller Belt drive	Benennung Riemenantrieb	303 138 00 00000000
Doc. Code Rev. Code	31/01/2019	Änderungshistorie in 1000er Schritten Änderungshistorie in 1000er Schritten	GEA	Hersteller Belt drive	Benennung Riemenantrieb	303 138 00 00000000
Doc. Code Rev. Code	31/01/2019	Änderungshistorie in 1000er Schritten Änderungshistorie in 1000er Schritten	GEA	Hersteller Belt drive	Benennung Riemenantrieb	303 138 00 00000000

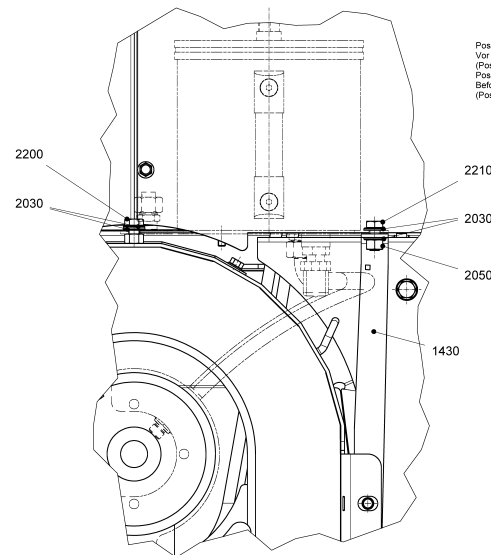
E-E (1 : 2)



Klemmenplan gem. Kennzeichnungsschild in Klemmenkasten X48 gelegt
Terminal diagram in acc. with identification plate put in terminal box X48

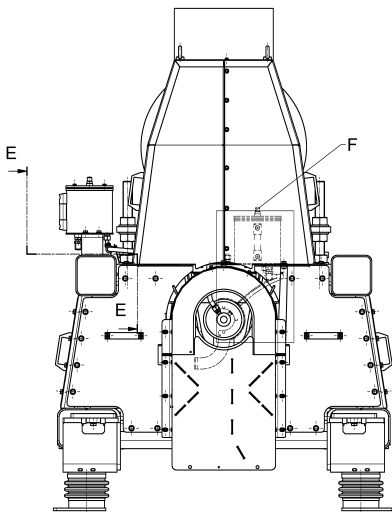
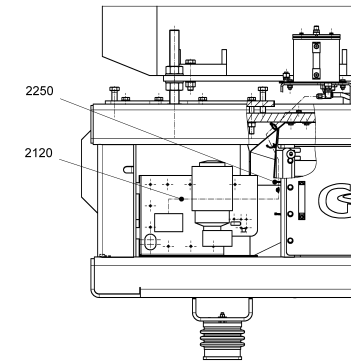
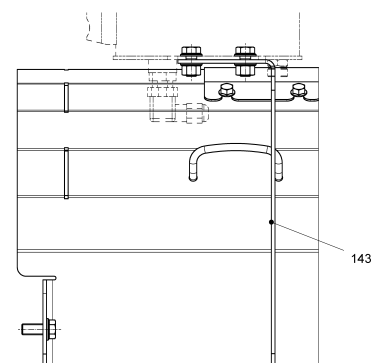
Schnittstelle "Drehdurchführung Getriebe"
cut surface "rotary feedthrough gear"

F (1 : 2)



Position des Ölbehälters nur für den Transport / Versand
Vor Inbetriebnahme muss der Ölbehälter an den Antriebsrahmen montiert werden - siehe Ansicht B-B
(Pos. 1430 demontieren)
Position of the oil tank for transport / shipping
Before commissioning the oil tank must be mounted on the drive frame - see view B-B
(Pos. 1430 dismount)

G (1 : 2)

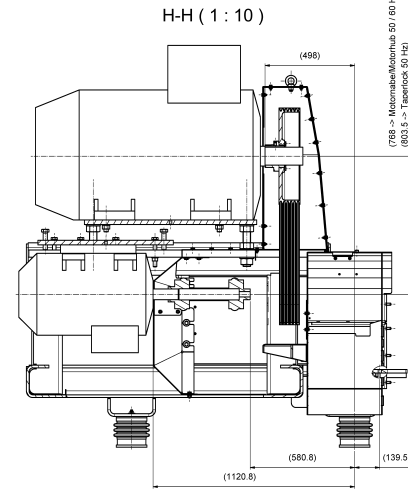
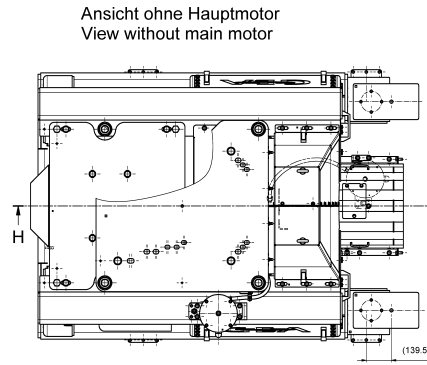


Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motorschlussstelle (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Ölschmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	150	Öl+Luft Schmierung (zeichnerisch nicht dargestellt) Oil+Air lubrication (not illustrated)

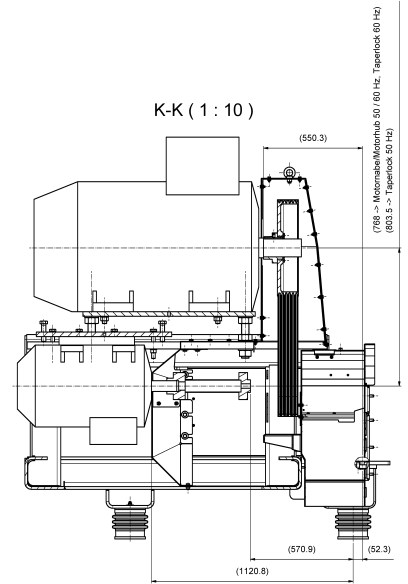
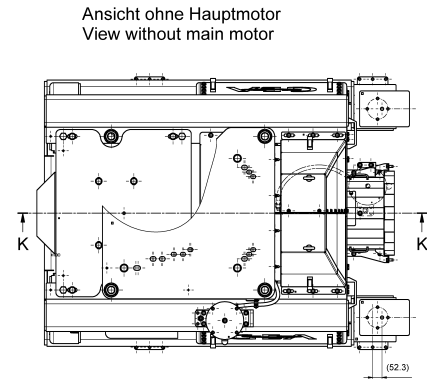
A: mit Pos. 9030 montiert
with Pos. 9030 assembled
B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Art. Code Part No.	50 01 2019	Artikelbeschreibung Part description	50 01 2019 Belt drive	Zeichnungs-Nr. Drawing No.	50 01 2019 Riemenantrieb
Hersteller Manufacturer	GEA	Hersteller Manufacturer	GEA	Hersteller Manufacturer	GEA
Produktions-Nr. Production No.		Produktions-Nr. Production No.		Produktions-Nr. Production No.	
Druck Printed	1/18/2019	Druck Printed	1/18/2019	Druck Printed	1/18/2019
Version Version	01	Version Version	01	Version Version	01
Skizze Sketch	1/18/2019	Skizze Sketch	1/18/2019	Skizze Sketch	1/18/2019
Zeichner Drawer		Zeichner Drawer		Zeichner Drawer	
Gezeichnet Drawn		Gezeichnet Drawn		Gezeichnet Drawn	
Geprüft Checked		Geprüft Checked		Geprüft Checked	
Freigegeben Released		Freigegeben Released		Freigegeben Released	
Technische Zeichnung Technical drawing		Technische Zeichnung Technical drawing		Technische Zeichnung Technical drawing	
Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer
Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer
Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer	Werkzeughersteller Tool manufacturer

Getriebe / Gear PG. 417



Getriebe / Gear PG. 411



Art. Code Gear Code	50 01 2019	Articolo principale Art. 5122 - Accessori Standard Art. 5123 - Accessori Art. 5124 - Accessori	GEA	Control system / Gearbox type	Belt drive	Riemenantrieb	833 118 02 100000000
Desc. Drive	5128 20 19	Descrizione Scheda Tecnica Accessori Standard Art. 5122 - Accessori Art. 5123 - Accessori Art. 5124 - Accessori		Compliance	compli.	vollst.	E-10 100000000 4 4
Desc. Gear	5128 20 19	Descrizione Scheda Tecnica Accessori Standard Art. 5122 - Accessori Art. 5123 - Accessori Art. 5124 - Accessori		Compliance	compli.	vollst.	8419-3351-100 100000000 4 4
Desc. Motor	5128 20 19	Descrizione Scheda Tecnica Accessori Standard Art. 5122 - Accessori Art. 5123 - Accessori Art. 5124 - Accessori		Compliance	compli.	vollst.	8419-3351-100 100000000 4 4
Desc. Motor	5128 20 19	Descrizione Scheda Tecnica Accessori Standard Art. 5122 - Accessori Art. 5123 - Accessori Art. 5124 - Accessori		Compliance	compli.	vollst.	8419-3351-100 100000000 4 4

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-3328-230	1		SATZ MOTORANSCHLUSSTEILE SET OF MOTOR CONNECTION PARTS JUEGO DE PIEZAS DE CONEXIÓN DEL MOTOR	✓	
1000	8419-3008-040	1		MOTORPLATTE MOTOR PLATE PLACA DEL MOTOR	✓	
1010	0019-6670-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1020	0026-1358-400	8		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1030	0013-0005-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1040	8419-3008-050	1		MOTORPLATTE MOTOR PLATE PLACA DEL MOTOR	✓	
1050	8419-3343-000	2		LEISTE METAL STRIP LISTÓN	✓	
1060	0019-7108-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1070	0019-7042-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1080	0026-1335-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1090	8657-3390-050	1		KUPPLUNG VOLLST. COUPLING, COMPL. EMBRAGUE, COMP.	✓	52
1100	8690-1780-000	4		DAEMPFER VOLLST. DAMPER COMPL. AMORTIGUADOR COMP.	✓	
	0026-1358-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1120	0000-0006-162	10		ENTFAELT NOT APPLICABLE SE SUPRIME	✗	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
	0000-0006-162	1		ENTFAELLT NOT APPLICABLE SE SUPRIME	x	
	0013-0280-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	v	
1160	0026-2407-300	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	v	
1170	8419-3752-040	1		LUFTSCHACHTUNTERTEIL GESCHW. LOWER PART OF VENTILATION DUCT WELDED	v	
1180	0019-6970-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
1190	0026-1371-400	40		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	v	
1200	8419-3752-050	1		LUFTSCHACHTOBERTEIL GESCHW. UPPER PART OF VENTILATION DUCT WELDED	v	
1210	0019-6968-400	32		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
1220	8419-3454-010	2		BLECH GESCHW. SHEET METAL, WELDED CHAPA SOLDADA	v	
1230	0019-7037-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	
1240	0026-1335-400	8		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	v	
1250	8419-3376-100	1		DECKEL COVER TAPA	v	
1270	0019-1791-300	7		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	v	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1280	8690-1075-020	2		PLATTE PLATE PLACA	✓	
1290	8419-3376-090	1		DECKEL COVER TAPA	✓	
1300	8419-3376-060	1		DECKEL COVER TAPA	✓	
1310	8419-3376-070	1		DECKEL COVER TAPA	✓	
1320	8419-3381-040	1		SCHUTZKASTEN GESCHW. PROTECTIVE CASING, WELDED CAJA PROTECTORA, SOLD.	✓	
1330	8419-3381-030	1		SCHUTZKASTEN GESCHW. PROTECTIVE CASING, WELDED CAJA PROTECTORA, SOLD.	✓	
1340	0026-2678-840	4		GRIFF HANDLEGRIP EMPUÑADURA	✓	
1350	0019-6842-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1370	0013-0294-300	8		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1380	0019-5384-050	2		RINGSCHRAUBE EYE BOLT ANILLA	✓	
1390	0026-1335-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1400	0013-0282-400	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1410	0019-1754-300	11		SPERRZAHNSECHSKANTSCHRAUBE ELF-LOCKING HEX HEAD SCREW TORNILLO HEXAGONAL CON DIENTES BLOQUEO	✓	
1420	0013-0185-030	11		KAFIGMUTTER CAGE NUT TUERCA DE JAULA	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1430	8419-3205-000	1		STUETZE SUPPORT SOSTÉN	✓	
20	8690-3350-030	1		OELSCHMIERUNG GETRIEBE OIL LUBRICATION SYSTEM, GEAR LUBRICANTE DE ENGRANAJE	✓	54
100	5390-5893-339	1		DREHSTROMMOTOR THREE-PHASE AC MOTOR MOTOR TRIFÁSICO	✓	
110	5390-0885-039	1		DREHSTROMMOTOR THREE-PHASE AC MOTOR MOTOR TRIFÁSICO	✓	
120	0021-3969-810	1		SATZ SCHMALKEILRIEMEN SET OF NARROW V-BELTS JUEGO DE CORREAS TRAPEZOIDALES ESTRECHAS	✓	
130	0021-3940-210	1		RIEMENSCHIBE VOLLST. BELT PULLEY, COMPL. POLEA PARA CORREA, COMP.	✓	
150	8419-3409-130	1		OEL-LUFT-AGGREGAT VOLLST. OIL-AIR UNIT, COMPL. GRUPO DE ACEITE-AIRE, COMP.	✓	60
300	8419-3473-050	1		ANTRIEBSRAHMEN GESCHW. DRIVE FRAME, WELDED	✓	
310	8419-1145-000	1		HALTER HOLDER SOPORTE	✓	
320	0026-1348-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
330	0019-6931-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
340	0021-3147-750	1		RUNDLAGER RUBBER-METAL CUSHIONS AMORTIGUADOR	✓	
350	0013-0279-400	3		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
360	0019-6935-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
370	0026-1371-400	30		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
380	0013-0280-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
390	0026-1348-400	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
460	0019-6935-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
480	0019-8133-090	4		GEWINDEBOLZEN THREADED BOLT TORNILLO ROSCADO	✓	
490	0013-0191-150	16		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
500	0026-2626-300	16		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
510	0019-7188-300	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
520	0019-7121-150	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
530	0026-1358-400	8		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
540	0013-0005-400	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
580	8419-3376-200	1		DECKEL COVER TAPA	✓	
590	8419-3117-010	1		SCHUTZBLECH GESCHW. GUARD, WELDED CHAPA PROTECTORA, SOLD.	✓	
600	8419-3376-030	2		DECKEL COVER TAPA	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
610	0026-2678-840	4		GRIFF HANDLEGRIP EMPUÑADURA	✓	
620	0019-6842-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
640	0013-0294-300	8		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
660	0019-6968-400	36		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
670	8419-3117-000	1		SCHUTZBLECH GESCHW. GUARD, WELDED CHAPA PROTECTORA, SOLD.	✓	
760	0013-0185-030	8		KAFIGMUTTER CAGE NUT TUERCA DE JAULA	✓	
780	0019-1754-300	8		SPERRZAHNSECHSKANTSCHRAUBE ELF-LOCKING HEX HEAD SCREW TORNILLO HEXAGONAL CON DIENTES BLOQUEO	✓	
850	0026-1337-300	1		FEDERRING SPRING RING ANILLO DE PRESIÓN	✓	
860	0026-5673-300	1		FAECHERSCHEIBE FAN-TYPE LOCK WASHER ARANDELA DENTADA	✓	
870	0004-2051-768	0.2	m	DICHTUNGSPROFIL MOULDED GASKET PERFIL DE CIERRE HERMÉTICO	✓	
880	0026-2407-300	10		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
9030	0015-0104-080	1		SCHMIERFETT LUBRICATING GREASE - TSCA Compliant GRASA LUBRICANTE	✓	

Baugruppe / Component group

8419-3351-100

RIEMENANTRIEB VOLLST.
BELT DRIVE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

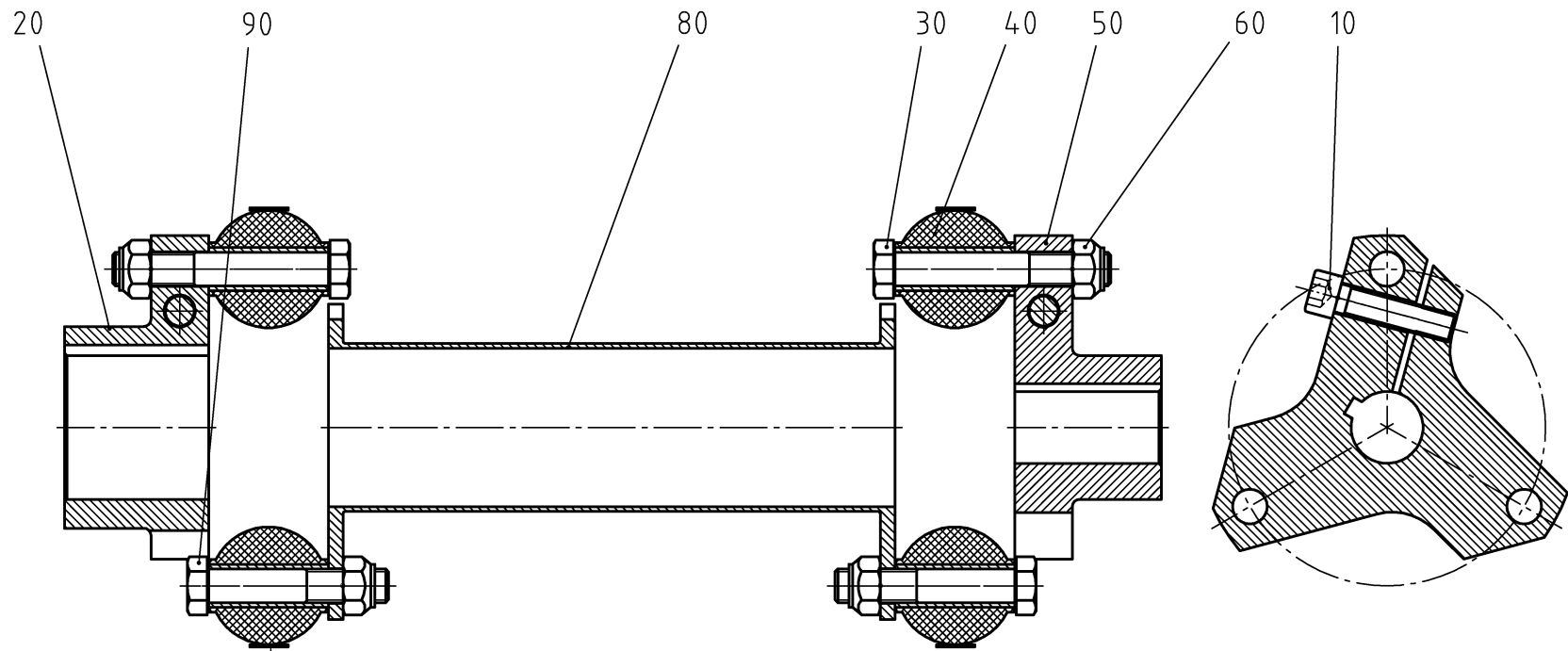
30.11.2021

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GEA Westfalia Separator Group

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Achtung! Kupplungsring steht unter Vorspannung. Stahlbandage erst nach Montage am Dekanter entfernen.
 Attention! Coupling ring is prestressed. Do not remove steel binding until assembled at decanter.

Bei Wartungsarbeiten Kupplungsring Pos. 40 mit Halter vollst. 8656-9932-000 zusammendrücken.
 For Maintenance, use holder compl 8656-9932-000 to prestress coupling ring pos. 40.

Änd.-Datum/ Rev. Date:	26.09.2014		Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302	GEA	Ersetzt durch/ Replaced by:		Ersatz für/ Replacement for:	
Gez./Drawn	Datum/Date	Name			Description:	Benennung:	ISO 128-30 Maßstab/Scale 1:2 Blatt/Sheet	
Geprüft Checked	14.02.2014	Neubauer.Ri	Allgemeintoleranzen General tolerances mK nach ISO 2768 acc. to ISO 2768	Westfalia Separator 59302 Oelde, Germany	Coupling compl.	Kupplung vollst.	Zeichnungs-Nr. Drawing No.	8657-3390-050
Normgepr. Normchecked	17.02.2014	Deipenbrock.Br			WSN-Nr. WSN No.			Blätter/Sheets 1

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0019-6169-400	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
20	8656-3388-000	1		KUPPLUNGSNABE CLUTCH HUB CUBO DEL EMBRAGUE	✓	
30	0019-6586-400	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
40	8656-3396-000	2		KUPPLUNGSRING CLUTCH RING ARO DE ACOPL.	✓	
50	8657-3388-030	1		KUPPLUNGSNABE CLUTCH HUB CUBO DEL EMBRAGUE	✓	
60	0013-0309-410	12		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
80	8657-3448-020	1		ROHR GESCHW. PIPE, WELDED TUBO, SOLD.	✓	
90	0019-6583-300	6		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	

Baugruppe / Component group

8657-3390-050

KUPPLUNG VOLLST.
COUPLING, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

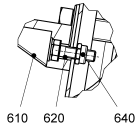
Ausgabe / Edition

30.11.2021

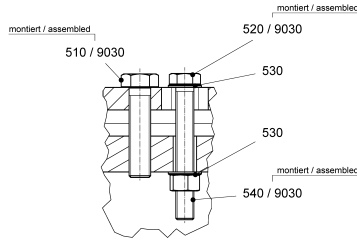
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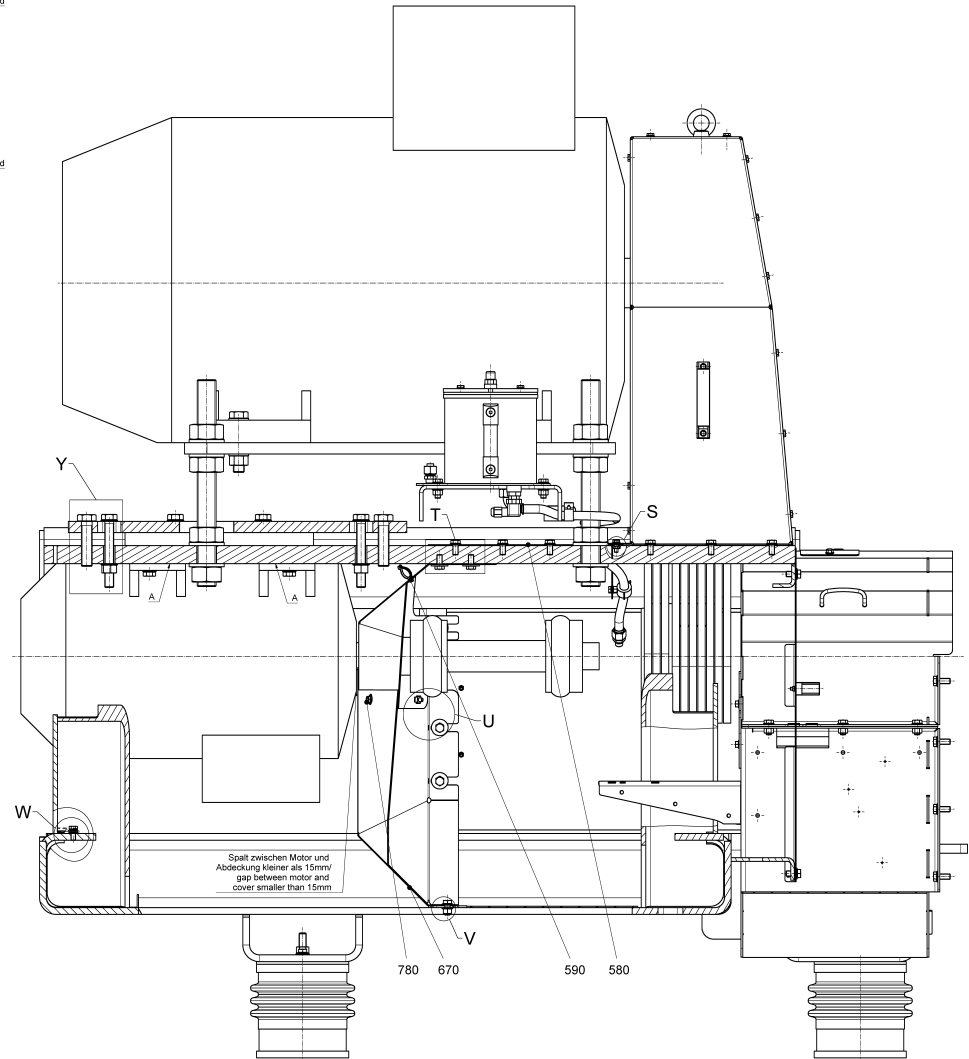
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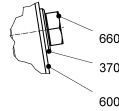
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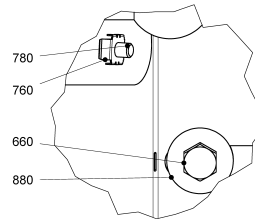
A-A (1:4)



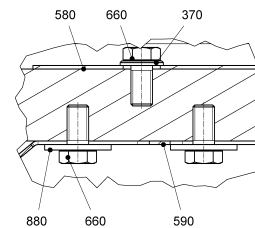
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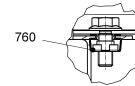
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T (1:1)



S (1:1)

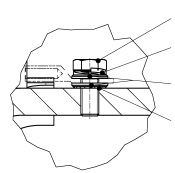


A →

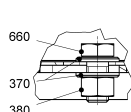
← Z

← A

W (1:1)



V (1:1)

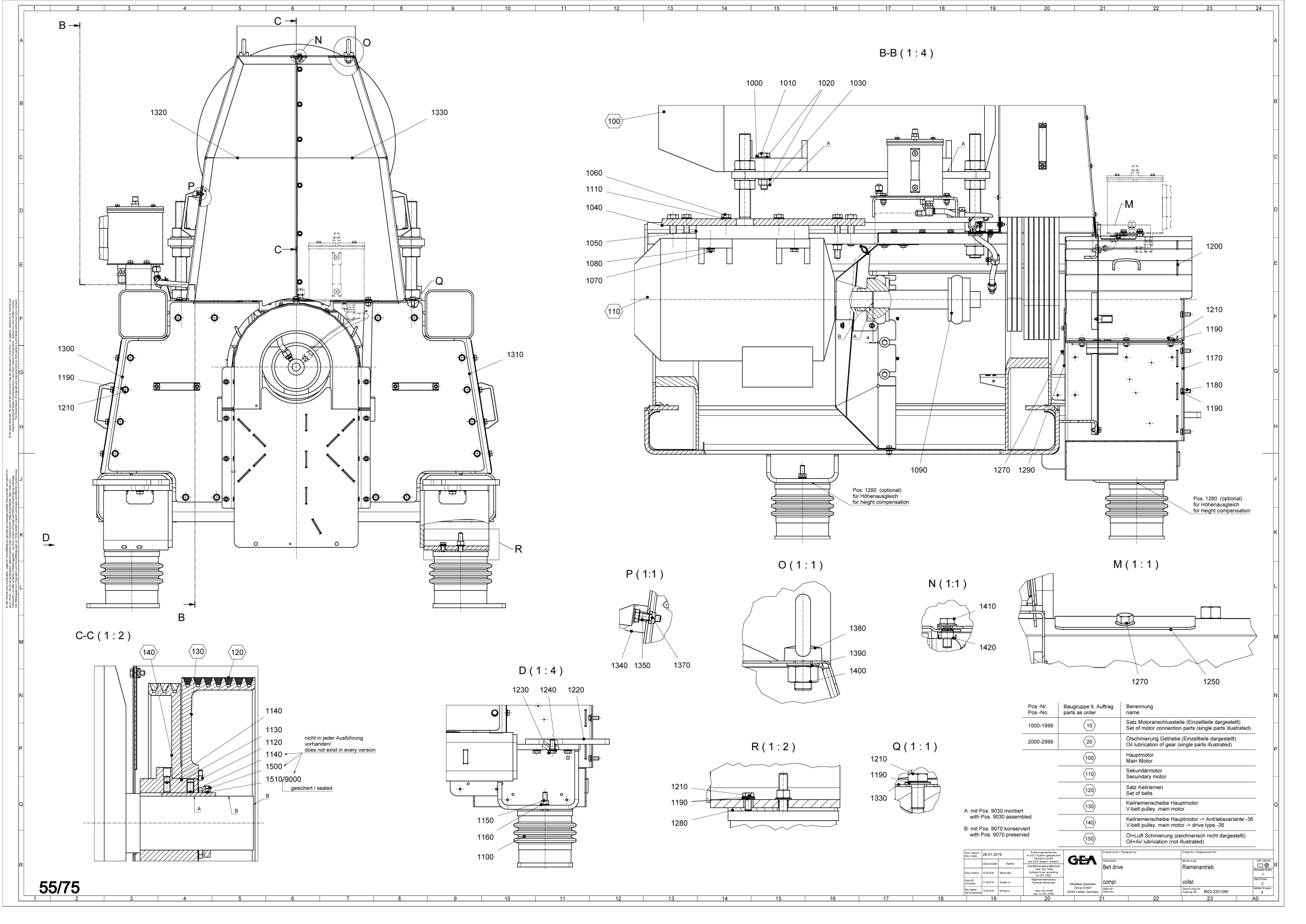


Spalt zwischen Motor und Abdeckung kleiner als 15mm! gap between motor and cover smaller than 15mm

Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	(10)	Satz Motoranschlussteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	(20)	Ölschmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	(100)	Hauptmotor Main motor
	(110)	Sekundärmotor Secondary motor
	(120)	Satz Keilriemen Set of belts
	(130)	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	(140)	Keilriemenscheibe Hauptmotor -> Antriebsvariante -36 V-belt pulley, main motor -> drive type -36
	(150)	Öl-/Luft-Schmierung (zeichnerisch nicht dargestellt) Oil/Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled
B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code Rev. Code	28 01 2019	Änderungshistorie no 102 2019 Änderung Änderungshistorie no 102 2019 Änderung	GEA	Hersteller Belt drive	Typen-Nr./Type designation Riemenantrieb	Teil-Nr./Part no. 840-335-040
Doc. Code Rev. Code	28 01 2019	Änderungshistorie no 102 2019 Änderung	GEA	Hersteller Belt drive	Typen-Nr./Type designation Riemenantrieb	Teil-Nr./Part no. 840-335-040
Doc. Code Rev. Code	28 01 2019	Änderungshistorie no 102 2019 Änderung	GEA	Hersteller Belt drive	Typen-Nr./Type designation Riemenantrieb	Teil-Nr./Part no. 840-335-040



B-B (1 : 4)

C-C (1 : 2)

D (1 : 4)

P (1 : 1)

O (1 : 1)

N (1 : 1)

M (1 : 1)

R (1 : 2)

Q (1 : 1)

nicht in jeder Ausführung vorhanden/
does not exist in every version

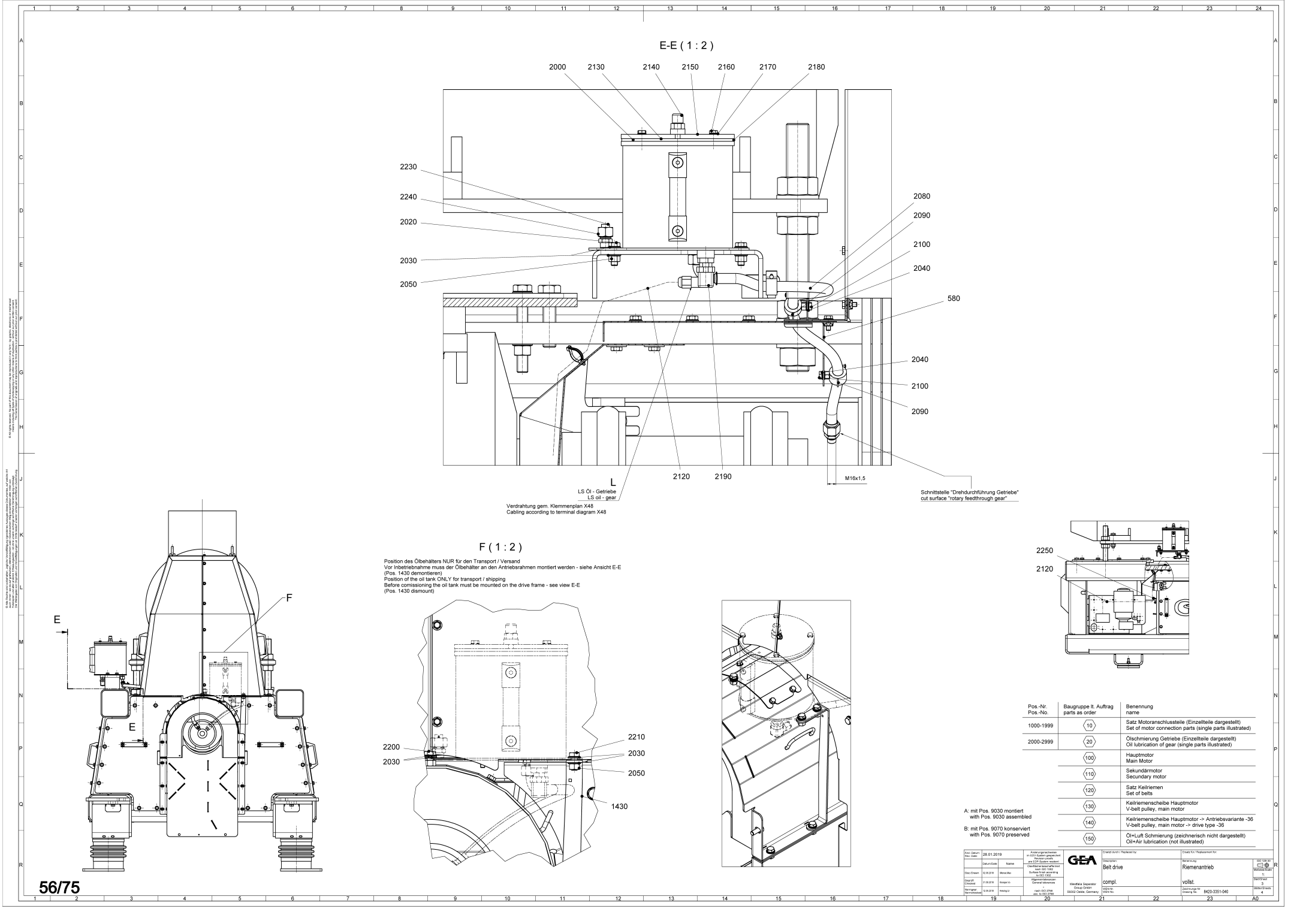
1510/9000
gesichert / sealed

Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlusssteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Schmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main Motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	140	Keilriemenscheibe Hauptmotor -> Antriebsvariante -36 V-belt pulley, main motor -> drive type -36
	150	Öl-Luft Schmierung (zeichnerisch nicht dargestellt) Oil-Air lubrication (not illustrated)

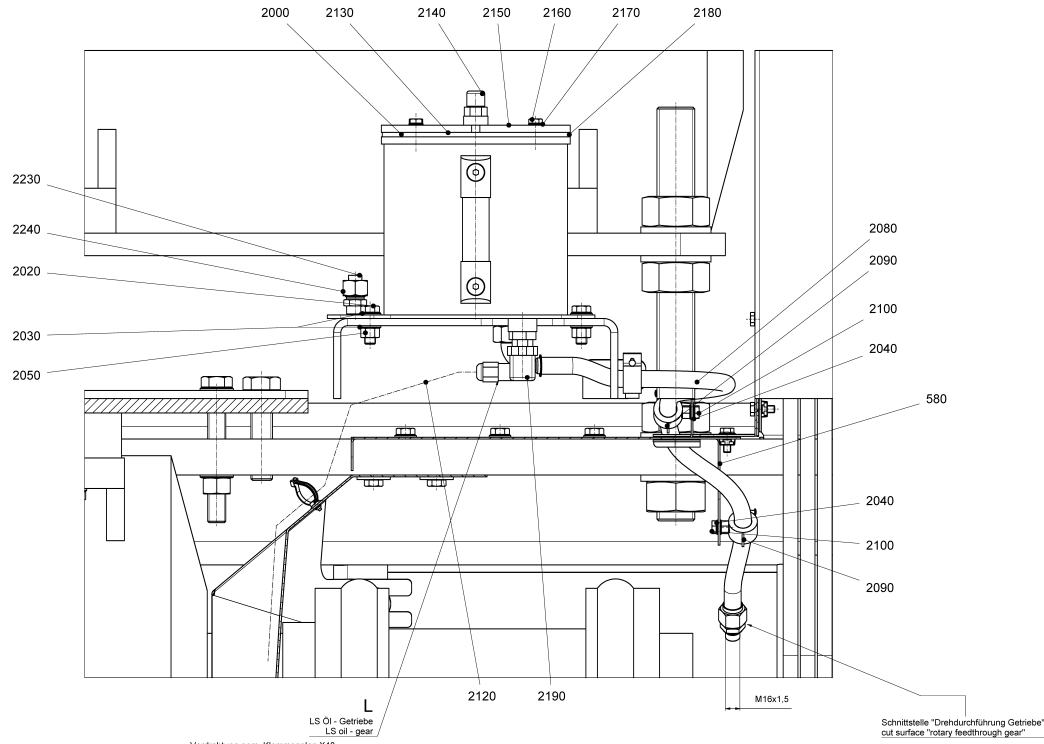
A: mit Pos. 9030 montiert
with Pos. 9030 assembled

B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

Doc. Code Rev. Code	28 01 2019	Änderungswahlzeichen in 10% Schritten Änderungswahlzeichen in 10% Schritten Änderungswahlzeichen in 10% Schritten	GEA	Hersteller Belt drive	Produkt-Nr. Riemenantrieb
Doc. Code Rev. Code	28 01 2019	Änderungswahlzeichen in 10% Schritten Änderungswahlzeichen in 10% Schritten Änderungswahlzeichen in 10% Schritten	GEA	Hersteller Belt drive	Produkt-Nr. Riemenantrieb
Doc. Code Rev. Code	28 01 2019	Änderungswahlzeichen in 10% Schritten Änderungswahlzeichen in 10% Schritten Änderungswahlzeichen in 10% Schritten	GEA	Hersteller Belt drive	Produkt-Nr. Riemenantrieb



E-E (1 : 2)



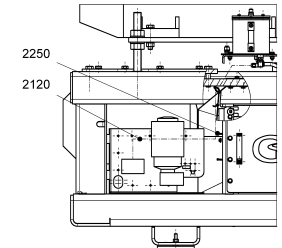
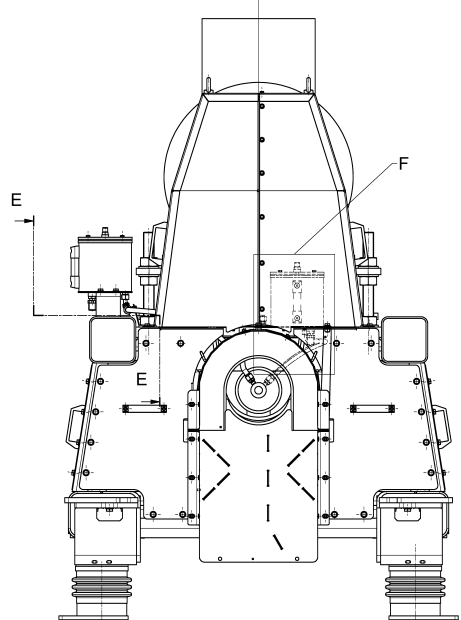
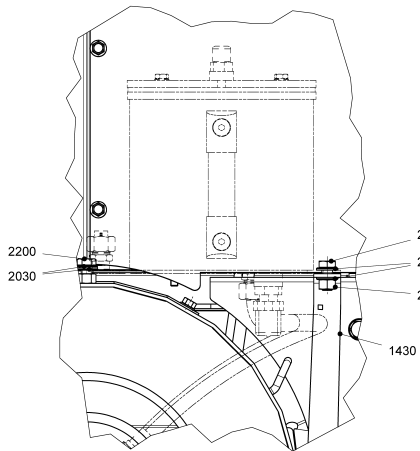
LS Öl - Getriebe
LS oil - gear

Verdrahtung gem. Klemmenplan X48
Cabling according to terminal diagram X48

Schnittstelle "Drehdurchführung Getriebe"
cut surface "rotary feedthrough gear"

F (1 : 2)

Position des Ölbehälters NUR für den Transport / Versand
Vor Inbetriebnahme muss der Ölbehälter an den Antriebsrahmen montiert werden - siehe Ansicht E-E (Pos. 1430 demontieren)
Position of the oil tank ONLY for transport / shipping
Before commissioning the oil tank must be mounted on the drive frame - see view E-E (Pos. 1430 dismount)



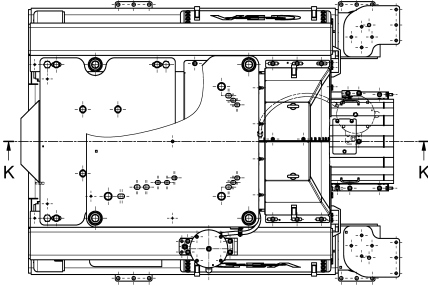
Pos.-Nr. Pos.-No.	Baugruppe lt. Auftrag parts as order	Benennung name
1000-1999	10	Satz Motoranschlusssteile (Einzelteile dargestellt) Set of motor connection parts (single parts illustrated)
2000-2999	20	Schmierung Getriebe (Einzelteile dargestellt) Oil lubrication of gear (single parts illustrated)
	100	Hauptmotor Main Motor
	110	Sekundärmotor Secondary motor
	120	Satz Keilriemen Set of belts
	130	Keilriemenscheibe Hauptmotor V-belt pulley, main motor
	140	Keilriemenscheibe Hauptmotor -> Antriebsvariante -36 V-belt pulley, main motor -> drive type -36
	150	Öl-Luft Schmierung (zeichnerisch nicht dargestellt) Oil-Air lubrication (not illustrated)

A: mit Pos. 9030 montiert
with Pos. 9030 assembled
B: mit Pos. 9070 konserviert
with Pos. 9070 preserved

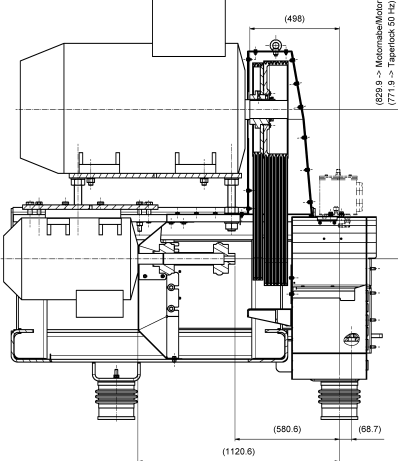
<p>56/75</p>	<p>28.01.2019</p>	<p>GEA</p>	<p>comp.</p>	<p>vollet</p>	<p>8450-335-040</p>
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Getriebe / Gear PG. 417

Ansicht ohne Hauptmotor
View without main motor



K-K (1 : 10)



(823.9 => Motorabst. 50 / 60 Hz ; Tapenloch 50 Hz)
(771.9 => Tapenloch 50 Hz)

Rev. Datum Rev. Datum 05.01.2019 05.01.2019	Beschreibung 8450-3351-040 8450-3351-040 8450-3351-040	GEA Antriebstechnik GEA Group Ltd. 8450-3351-040	Zeichnung Belt drive compl. vollst.	Zeichnung Nr. 8450-3351-040 8450-3351-040 8450-3351-040
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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2000	8419-3311-000	1		AUSGLEICHSBEHAELTER GESCHW. EQUALIZING BASIN, WELDED DEPÓSITO DE COMPENSACIÓN, SOLD.	✓	
2020	0019-6971-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2030	0026-1371-400	14		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2040	0026-1345-400	6		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2050	0013-0280-400	6		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
2080	8419-3769-010	1		SCHLAUCH VOLLST. HOSE, COMPL. MANGA, COMP.	✓	
10	0018-8474-030	1		VERSCHRAUBUNG SCREW COUPLING RACOR	✓	
20	0018-8473-030	1		STECKNIPPEL PLUG-IN NIPPLE BOQUILLA ENCHUFABLE	✓	
30	0018-8183-758	0.8	m	SCHLAUCH HOSE MANGUERA	✓	
40	0018-8551-030	1		STECKNIPPEL PLUG-IN NIPPLE BOQUILLA ENCHUFABLE	✓	
2090	0018-8349-030	3		ROHRSCHELLE PIPE CLIP ABRAZADERA DE TUBO	✓	
2100	0019-6898-300	3		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2120	0005-0422-068	3	m	KABEL CABLE CABLE	✓	
2130	0001-0755-040	1		OELSTANDSANZEIGER OIL GAUGE INDICADOR DEL NIVEL DE ACEITE	✓	

Baugruppe / Component group

8690-3350-030

OELSCHMIERUNG GETRIEBE
OIL LUBRICATION SYSTEM, GEAR

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
2140	0018-6163-000	1		LUFTFILTER AIR FILTER FILTRO DE AIRE	✓	
2150	8419-3061-000	1		DECKEL COVER TAPA	✓	
2160	0019-6906-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2170	0026-1345-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
2180	8419-1265-130	1		DICHTUNG GASKET JUNTA	✓	
2190	0005-1904-400	1		SCHWIMMERSCHALTER FLOAT SWITCH INTERRUPTOR DE FLOTADOR	✓	
2200	0019-6965-400	1		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2210	0019-6968-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
2230	0018-8048-400	1		VERSCHLUSSKEGEL MALE CONNECTING NIPPLE CONO DE CIERRE	✓	
2240	0013-2002-400	1		UEBERWURFMUTTER COUPLING NUT TUERCA DE RACOR	✓	
2250	0005-4770-900	11		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	

Baugruppe / Component group

8690-3350-030

OELSCHMIERUNG GETRIEBE
OIL LUBRICATION SYSTEM, GEAR

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

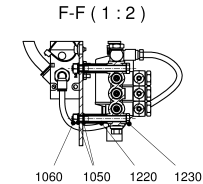
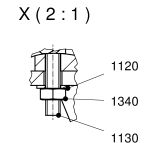
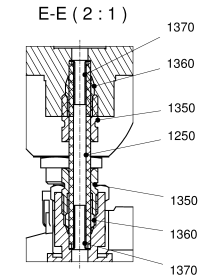
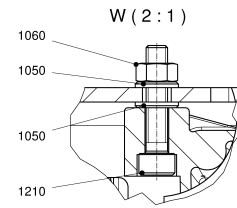
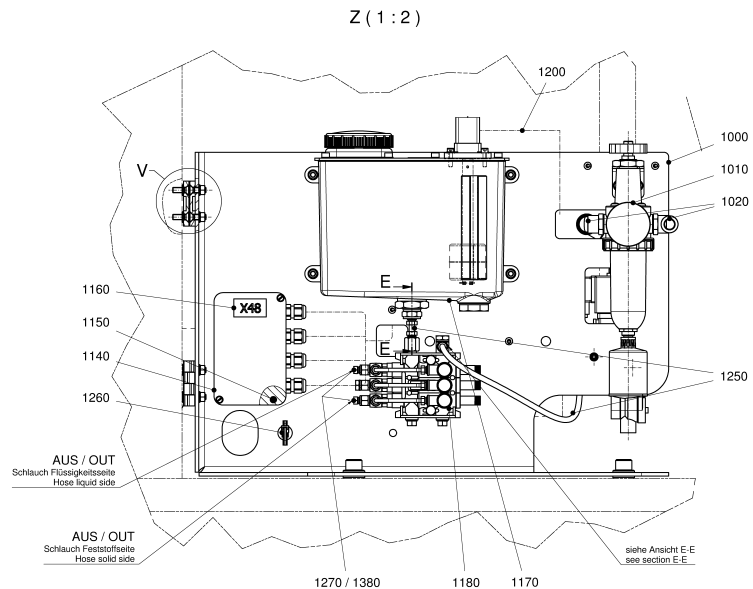
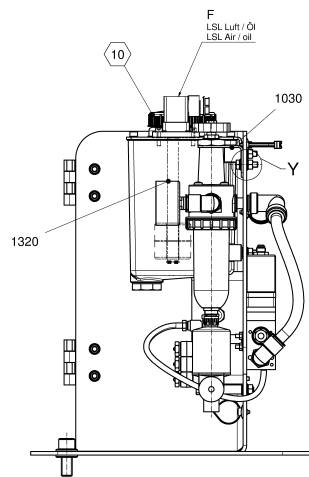
Ausgabe / Edition

30.11.2021

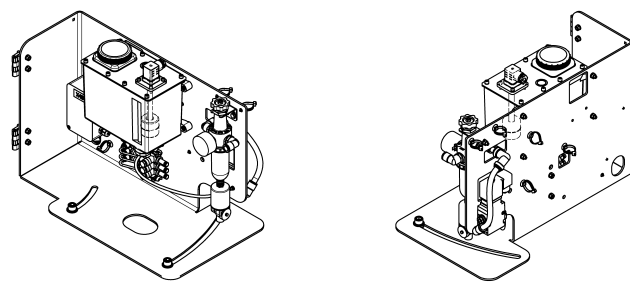
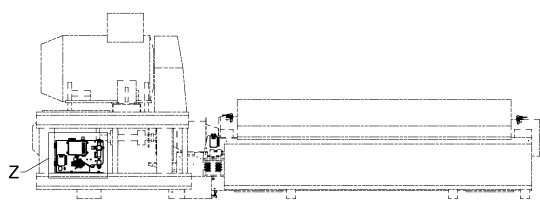
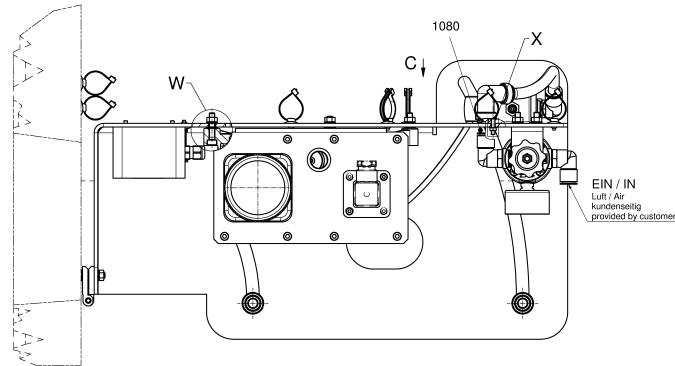
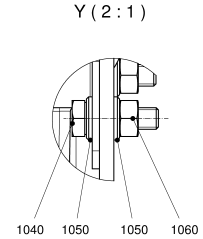
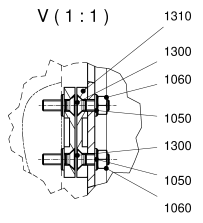
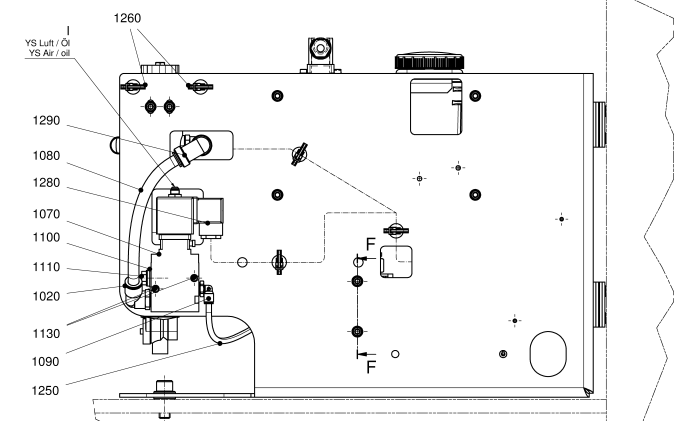
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GEA Westfalia Separator Group



C (1:2)



Pos.-Nr. Pos.-No.	Benennung name
1000-1990	Öl-Luft Aggregat montiert (Einzeltelle dargestellt) Oil-air unit mounted (single parts illustrated)

Alle Gewinde der Verrohrung mit Pos. 9010 eingedichtet
All thread of piping sealed with Pos. 9010

Teil-Nr. etikettiert
Part-No. labelled

Pos. 480 (Kabelband) nicht dargestellt
Pos. 480 (cable-tape) not illustrated

Klemmenplan gem. Kennzeichnungsschild in Klemmenkasten X48 gelegt
Terminal diagram in acc. with identification plate put in terminal box X48

Best.-Code Part-Code	Produktname Product name	Hersteller Manufacturer	Produkt-Nr. Product No.
00000000	Öl-Luft Aggregat	GEA	8415-3459-130
00000000	Öl-Luft Aggregat	GEA	8415-3459-130
00000000	Öl-Luft Aggregat	GEA	8415-3459-130
00000000	Öl-Luft Aggregat	GEA	8415-3459-130

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	8419-3409-138	1		OEL-LUFT-AGGREGAT (MONTIERT) OIL-AIR UNIT (MOUNTED) GRUPO DE ACEITE-AIRE (MONTADO)	✓	
1000	8419-3145-040	1		HALTER GESCHW. HOLDER, WELDED SOPORTE, SOLD.	✓	
1010	0018-8290-560	1		DRUCKLUFT-DRUCKMINDERER COMPRESSED-AIR PRESSURE REDUCER REDUCTOR DE AIRE COMPRIMIDO	✓	
1020	0018-6750-860	3		WINKELEINSCHRAUBSTECKANSCHLUSS ANGULAR SCREW-IN CONNECTOR CONEXIÓN ENCHUFABLE DE CODO ROSCADO	✓	
1030	8690-3144-050	1		HALTER HOLDER SOPORTE	✓	
1040	0019-6842-400	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1050	0026-1382-400	20		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
1060	0013-0276-400	12		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1070	0018-9503-300	1		DREIWEGE-MAGNETVENTIL THREE-WAY SOLENOID VALVE ELECTROVÁLVULA DE TRES VÍAS	✓	
1080	0018-1218-848	0.3	m	ROHR PIPE TUBO	✓	
1090	0018-3227-860	1		WINKELEINSCHRAUBSTECKANSCHLUSS ANGULAR SCREW-IN CONNECTOR CONEXIÓN ENCHUFABLE DE CODO ROSCADO	✓	
1100	0004-2754-400	1		USITRING USIT RING ANILLO USIT	✓	
1110	0019-8904-300	1		VERSCHLUSSSCHRAUBE SCREW PLUG TORNILLO DE TOPE	✓	
1120	0026-1362-300	2		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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GEA Westfalia Separator Group

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1130	0019-2226-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1140	0005-4147-280	1		KLEMMENKASTEN TERMINAL BOX CAJA DE BORNES	✓	
1150	0019-2222-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1160	0005-3666-510	1		KENNZEICHNUNGSSCHILD IDENTIFICATION PLATE PLACA DE IDENTIFICACIÓN	✓	
1170	8690-3171-000	1		BEHAELTER CONTAINER RECIPIENTE	✓	
1180	8690-3981-000	1		PUMPE PUMP BOMBA	✓	
1200	0005-0422-068	1.3	m	KABEL CABLE CABLE	✓	
1210	0019-6111-400	4		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
1220	8416-3344-010	2		ROHR PIPE TUBO	✓	
1230	0019-6462-300	2		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
1250	0018-8795-848	0.4	m	ROHR PIPE TUBO	✓	
1260	0005-4770-900	6		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	
1270	0018-8797-600	2		DOPPELKEGELRING DOUBLE-TAPERED RING ANILLO BICÓNICO	✓	
1280	0018-5118-050	1		GERAETESTECKDOSE APPLIANCE SOCKET CONECTOR HEMBRA	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
1290	0018-1215-600	1		WINKELSTECKANSCHLUSS ANGULAR PLUG-TYPE CONNECTOR CONEXIÓN ENCHUFABLE ACODADA	✓	
1300	0019-2099-300	4		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
1310	0021-2645-400	2		SCHARNIER HINGE BISAGRA	✓	
1320	0005-1912-280	1		SCHWIMMERSCHALTER FLOAT SWITCH INTERRUPTOR DE FLOTADOR	✓	
1340	0013-0274-300	2		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
1350	0018-8792-300	3		UEBERWURFSCHRAUBE CAP SCREW TORNILLO DE AJUSTE	✓	
1360	0018-8796-600	3		DOPPELKEGELRING DOUBLE-TAPERED RING ANILLO BICÓNICO	✓	
1370	0018-8794-600	3		HUELSE SLEEVE CASQUILLO	✓	
1380	0018-8793-300	2		UEBERWURFSCHRAUBE CAP SCREW TORNILLO DE AJUSTE	✓	
300	0005-4111-000	2		DRUCKSCHALTER PRESSURE SWITCH PRESOSTATO	✓	
310	0005-0202-900	2		VERSCHRAUBUNG SCREW COUPLING RACOR	✓	
320	0005-0422-068	12	m	KABEL CABLE CABLE	✓	
330	0018-6203-848	15	m	ROHR PIPE TUBO	✓	
340	0018-8980-600	2		WINKELEINSCHRAUBSTECKANSCHLUSS ANGULAR SCREW-IN CONNECTOR CONEXIÓN ENCHUFABLE DE CODO ROSCADO	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

Seite/Page

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Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
350	0018-5039-400	2		T-STUECK T-PIECE PIEZA EN T	✓	
360	0019-6165-400	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
370	0026-1371-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
380	0019-2099-300	4		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
390	0026-1382-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
460	0018-8553-860	2		WINKELSTECKANSCHLUSS ANGULAR PLUG-TYPE CONNECTOR CONEXIÓN ENCHUFABLE ACODADA	✓	
480	0005-4770-900	16		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	
490	0005-1455-900	15		KABELBINDER CABLE TIE BRIDA	✓	
500	0018-8751-860	2		BLINDSTOPFEN BLIND PLUG TAPÓN CIEGO	✓	
530	0026-2727-890	2		KAPPE CAP CAPERUZA	✓	
9010	6985-0606-500	1		DICHTUNGSMASSE SEALANT PASTA PARA JUNTAS	✓	

Baugruppe / Component group

8419-3409-130

OEL-LUFT-AGGREGAT VOLLST.
OIL-AIR UNIT, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

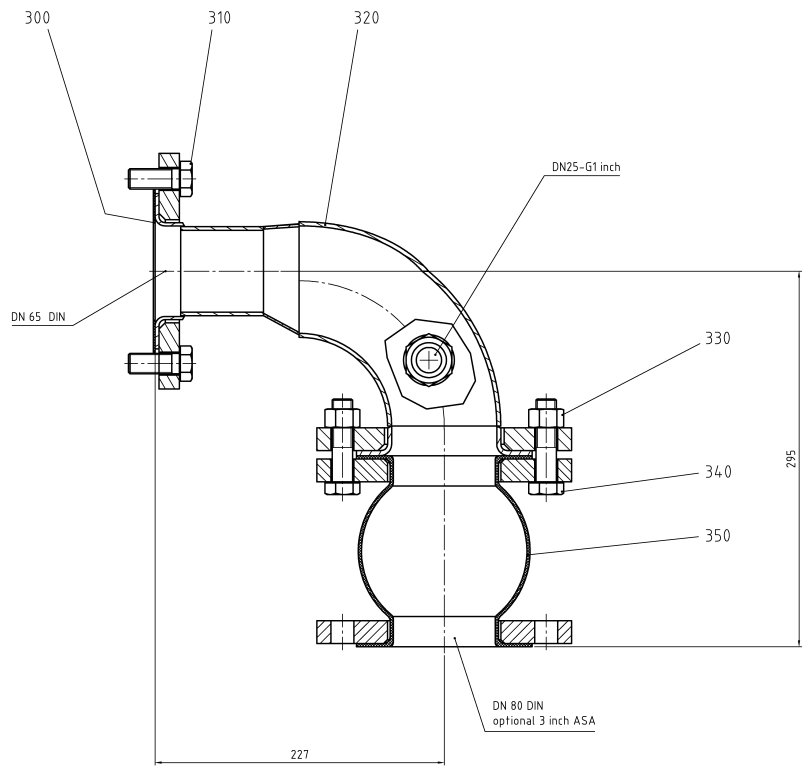
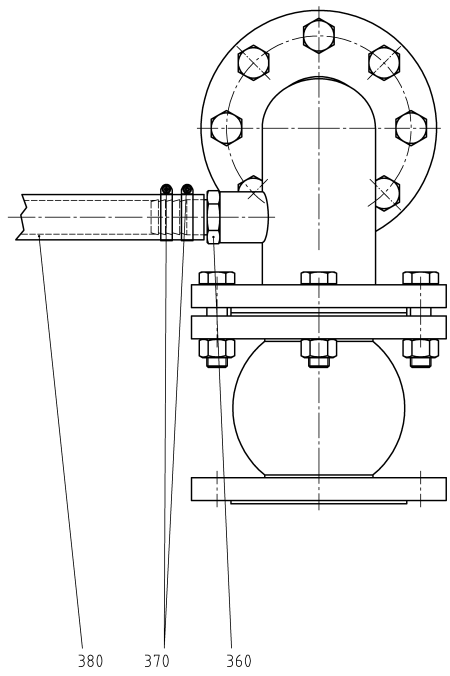
Ausgabe / Edition

30.11.2021

Seite/Page

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Toleranzklasse		Nominalbereich in mm / Area of nominal dimensions in mm									
Toleranzklasse		über / over									
2	30	120	400	1000	2000	4000	8000	12000	16000	20000	
30	120	400	1000	2000	4000	8000	12000	16000	20000		
Größenklasse		Größenklasse in mm / Limit tolerances in mm									
B	h1	h2	h3	h4	h5	h6	h7	h8	h9	h10	h11

And.-Datum Rev. Date	Datum/Date	Name
Gez./Drawn	09.11.2015	Figgenr. He
Geprüft/Checked	09.11.2015	Figgenr. He
Normen/Norm checked	13.11.2015	Deuperrock.Br

Änderungenhinweise
 in EOP-System gespeichert
 alle EOP-Systeme registriert
 Oberfläche nach ISO 1302
 Surface finish according to ISO 1302
 Allgemeine Toleranzen
 General tolerances
 nach ISO 2768
 acc. to ISO 2768

GEA
 Hochtief Separator
 59402 Oerke, Germany
 12345678
 WSN No.

Erstellt durch/ Prepared by	Ersatz für/ Replacement for
Designer: Product feed line compl.	Benennung: Schleudergut- zuleitung vollst.
Zustimmungs- Drawing No. 8419-2297-120	1503.130.30 Materialcode 1.2 Blatt/Sheet 1

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
300	0004-2232-780	1		DICHTUNG GASKET JUNTA	✓	
310	0019-7037-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
320	8419-2191-030	1		ANSCHLUSSSTUECK GESCHW. CONNECTING PIECE, WELDED PIEZA DE CONEXION, SOLD.	✓	
330	0013-0282-400	8		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
340	0019-6609-400	8		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
350	0018-6362-030	1		KOMPENSATOR COMPENSATOR COMPENSADOR	✓	
360	0018-7750-400	1		SCHLAUCHAUSLASS HOSE OUTLET BOQUILLA DE MANGUERA	✓	
370	0018-3814-310	2		SCHLAUCHSCHELLE HOSE CLIP ABRAZADERA DE MANGUERA	✓	
380	0018-4422-828	2	m	SCHLAUCH HOSE MANGUERA	✓	

Baugruppe / Component group

8419-2297-130

SCHLEUDERGUTZULEITUNG VOLLST.
PRODUCT FEED LINE, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

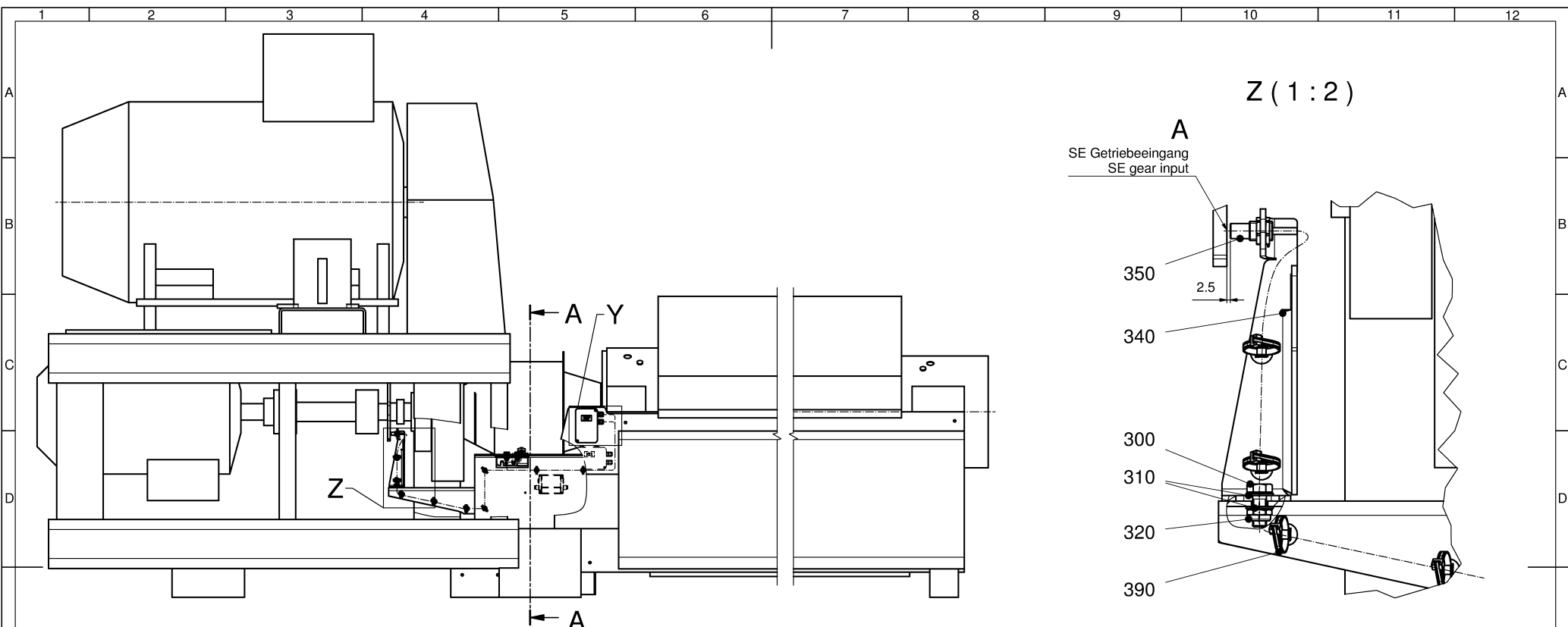
Ausgabe / Edition

30.11.2021

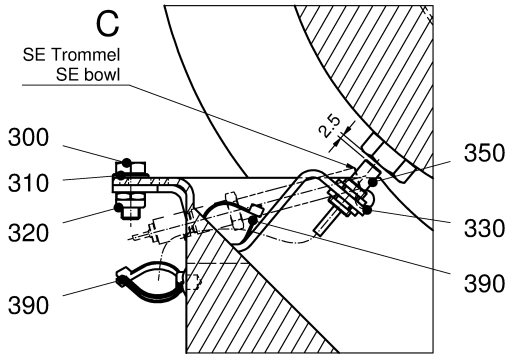
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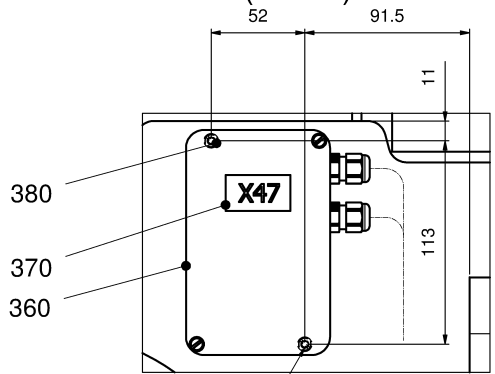
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A-A (1:2)

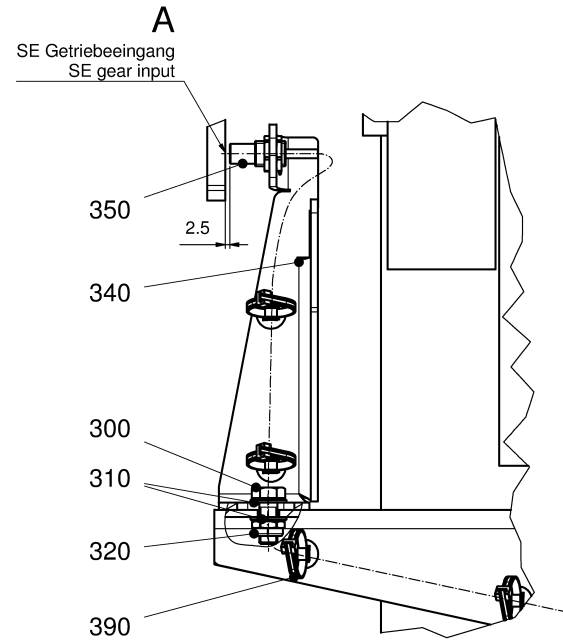


Y (1:2)



M4 bei Montage gebohrt
M4 drilled during assembly

Z (1:2)



Klemmenplan gemäß Kennzeichnungsschild in Klemmkasten X47 gelegt
Terminal diagram in acc. with identification plate put in the terminal box X47

Änd.-Datum: Rev. Date:	30.06.2015	Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident
Gez./Drawn	02.06.2015 Klonias.Ve	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302
Gepr./H Checked	17.06.2015 Dritsch.Ch	Allgemeintoleranzen General tolerances
Normgepr. Normchecked	29.06.2015 Friebe.St	- nach ISO 2768 acc. to ISO 2768



Ersetzt durch / Replaced by:	Erstausführung / First version:
Description: Speed sensor,	Benennung: Drehzahl-
compl.	initiator vollst.
WSN-Nr. WSN No.	Zeichnungs-Nr. Drawing No. 8419-3243-080

ISO 128-30 Maßstab/Scale 1:10 Blatt/Sheet 1 Blätter/Sheets 1
--

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
300	0019-6935-400	4		SECHSKANTSCHRAUBE HEX HEAD SCREW TORNILLO HEXAGONAL	✓	
310	0026-1348-400	4		SCHEIBE WASHER _ DISK ARANDELA _ DISCO	✓	
320	0013-0292-300	4		SECHSKANTMUTTER HEXAGON NUT TUERCA HEXAGONAL	✓	
330	8419-3144-060	1		HALTER Prox Switch Holder SOPORTE	✓	
340	8419-3145-030	1		HALTER GESCHW. HOLDER, WELDED SOPORTE, SOLD.	✓	
350	0005-0868-050	1		NAEHERUNGSINITIATOR PROXIMITY SWITCH INICIADOR DE APROXIMACIÓN	✓	
360	0005-4147-280	1		KLEMMENKASTEN TERMINAL BOX CAJA DE BORNES	✓	
370	0005-3666-500	1		KENNZEICHNUNGSSCHILD IDENTIFICATION PLATE PLACA DE IDENTIFICACIÓN	✓	
380	0019-2222-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
390	0005-4770-900	10		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	

Baugruppe / Component group

8419-3243-080

DREHZAHLINIATOR VOLLST.
SPEED SENSOR, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

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Für diese Baugruppe gibt es keine Zeichnung

No drawing is available for this assembly

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
320	0005-1226-070	2		WIDERSTANDSFUEHLER RESISTANCE FEELER SONDA DE RESISTENCIA	✓	

Baugruppe / Component group

8690-3292-000

TEMPERATURFUEHLER VOLLST.
TEMPERATURE FEELER, CPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

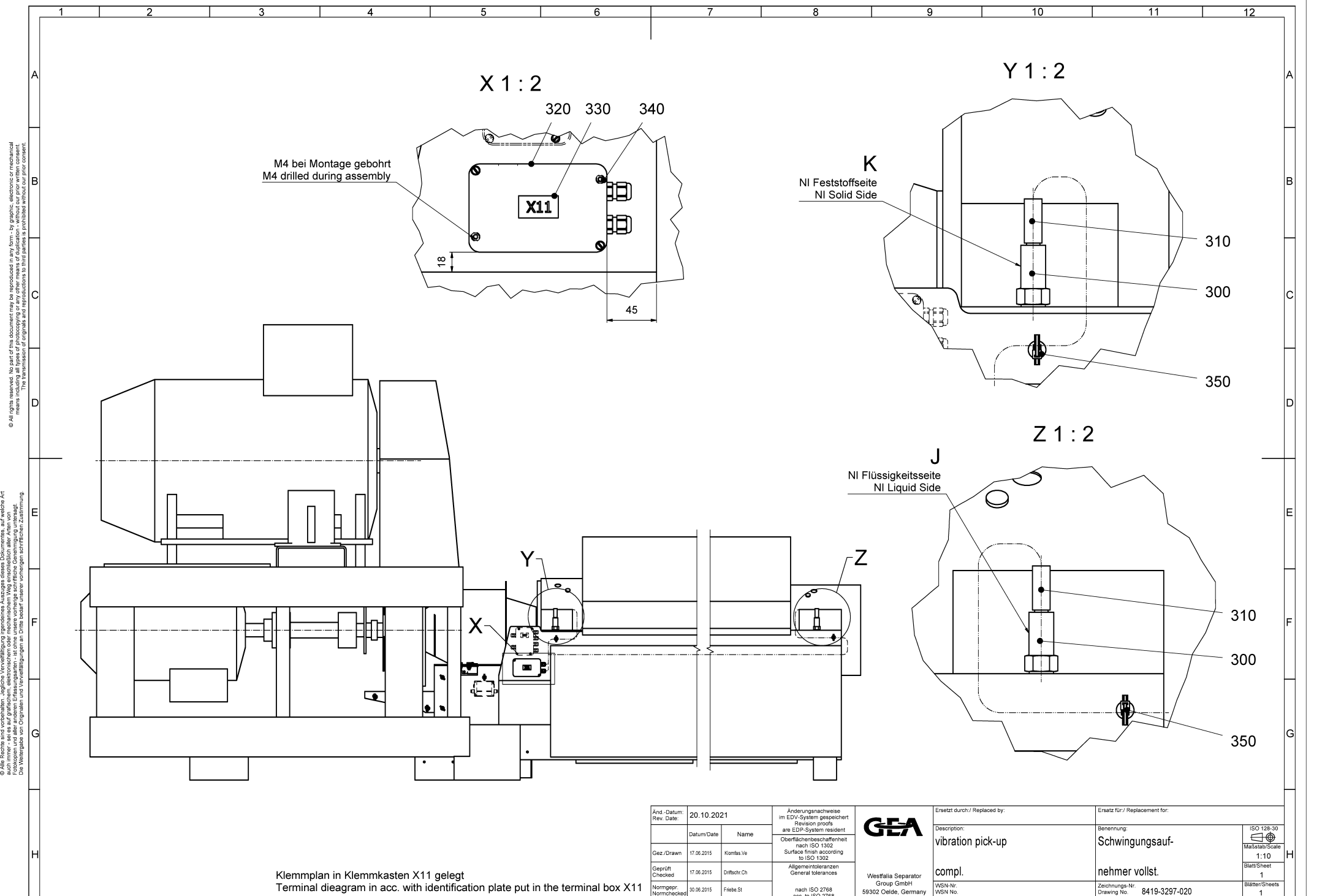
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72175

Terminal diagram in acc. with identification plate put in the terminal box X11

Änd.-Datum/ Rev. Date:	20.10.2021	Änderungsnachweise im EDV-System gespeichert Revision proofs are EDP-System resident		GEA	Ersetzt durch / Replaced by:	Ersetzt für / Replacement for:		ISO 128-30 Maßstab/Scale 1:10 Blatt/Sheet 1 Blätter/Sheets 1
Gez./Drawn	17.06.2015 Kloßas, Ve	Oberflächenbeschaffenheit nach ISO 1302 Surface finish according to ISO 1302			Description: vibration pick-up	Benennung: Schwingungsauf-	Zeichnungs-Nr. Drawing No. 8419-3297-020	
Geprüft/ Checked	17.06.2015 Drftsch, Ch	Allgemeintoleranzen General tolerances		Westfalia Separator Group GmbH 59302 Oelde, Germany	compl.	nehmer vollst.		
Normgepr. Normchecked	30.06.2015 Friebe, St	nach ISO 2768 acc. to ISO 2768						

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
300	0005-1848-020	2		SCHWINGUNGS-AUFNEHMER VIBRATION PICK-UP CAPTADOR DE VIBRACIONES	✓	
310	0005-1646-100	2		ANSCHLUSSKABEL CONNECTION CABLE CABLE DE CONEXIÓN	✓	
320	0005-4147-280	1		KLEMMENKASTEN TERMINAL BOX CAJA DE BORNES	✓	
330	0005-3666-080	1		KENNZEICHNUNGSSCHILD IDENTIFICATION PLATE PLACA DE IDENTIFICACIÓN	✓	
340	0019-2222-300	2		ZYLINDERSCHRAUBE CYLINDRICAL SCREW TORNILLO CILÍNDRICO	✓	
350	0005-4770-900	2		KABELBAND CABLE TAPE CINTA PARA CABLES	✓	

Baugruppe / Component group

8419-3297-020

SCHWINGUNGS-AUFNEHMER VOLLST.
VIBRATION PICK-UP, COMPL.

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

30.11.2021

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Für diese Baugruppe gibt es keine Zeichnung

No drawing is available for this assembly

Baugruppe / Component group

9390-0015-516

SATZ ERSATZTEILE I
SET OF SPARE PARTS I

Pos.	Teil-Nummer	M	ME	Benennung	ETS	Seite
Pos.	Part-No.	Qty.	Unit	Designation	ETS	Page
10	0019-9421-400	12		SENKSCHRAUBE COUNTERSUNK SCREW TORNILLO AVELLANADO	✓	
20	0007-2966-750	1		DICHTRING GASKET JUNTA ANULAR	✓	
30	0007-2924-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
40	0007-2926-830	2		DICHTRING GASKET JUNTA ANULAR	✓	
50	0007-3619-750	1		DICHTRING GASKET JUNTA ANULAR	✓	

Typ / Model

BIOSOLIDS DECANTER PRIME 7000

Maschinen-Nr. / Machine s/n

8012-664

Trommel-Nr. / Bowl s/n

8012-664

Ausgabe / Edition

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Type 6518

Type 6519

3/2, 5/2, 5/2 bistable and 5/3 way pneumatic solenoid valve

- Single or block mounting
- Suitable for outdoor and chemical atmospheres
- Suitable for low temperatures
- Explosion-proof versions
- Threaded or NAMUR flange connections

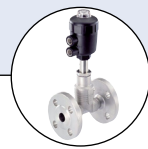
Type 6518/6519 can be combined with...

**Type 2508**

Cable plug

**Type 2513**Cable plug
(ATEX Cat. 3 GD)**Type 2510/11**

Cable plug ASI

**Type 2012**

Single seat valve

**Type 2030**

Diaphragm valve

The Type 6518 is a servo-assisted 3/2 way valve and the Type 6519 is a 5/2 or 5/3 way valve. Together, they form a product line. The valves can be used individually or in blocks. The valves work without a continuous air consumption and are used for the pneumatic control of double or single-acting actuators. A solenoid valve Type 6014 is used as a pilot. The use of high quality materials makes it possible to use these valves in the open air and under chemical atmospheres. The product line contains units with Ex-Approvals and NAMUR flange interface.

Content 6518/6519

Page

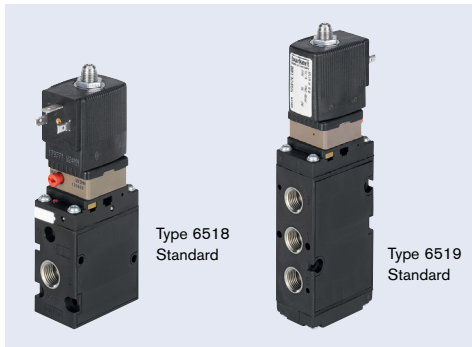
6518/6519 Standard temperature range

6518/6519	Standard	2
	Ex m	3
	Ex i	4
6519 NAMUR	Standard	5
	Ex m	6
	Ex i	7
Manifold assembly with MP07 pneumatic modules		8
Accessories		10
Dimensions		12

6519 with extended temperature range

6519	Standard	20
	Ex m	22
	Ex i	24
6519 NAMUR	Standard	26
	Ex m	28
	Ex i	30
Accessories		32
Dimensions		34

Type 6518/6519 Standard (with tag connector acc.to DIN EN 175301-803 Form A, without cable plug)



Type 6518 and the Type 6519 together form a product line. Both types can be mounted on a pneumatic module. The valve width of 32 mm allows high flow rates. A solenoid valve Type 6014 is used as a pilot. The valves can be used individually or in blocks.

Technical data		
Orifice	Type 6518 Type 6519	DN8 mm DN8 and 9 mm
Body material	Type 6518 Pilot and main valve Type 6519 Pilot valve Main valve	Polyamide, reinforced glass-fibre Polyamide, reinforced Polyamide (5/2 way), aluminium (5/3 way)
Threaded socket material		Brass (stainless steel on request)
Seal material	Type 6518 Type 6519	NBR and PUR NBR and PUR (5/2 way), NBR (5/3 way)
Medium		Neutral Medium, e.g. lubricated or non-lubricated compressed air
Compressed air quality		ISO 8573-1:2010, Class 7.4.4*
Medium temperature		-10 °C to +50 °C
Ambient temperature		-25 °C to +55 °C
Pneumatic connection	Supply port connection 1, 3, 5 Service port 2, 4	Thread G ¼, multi-station manifold (on request NPT ¼) Thread G ¼ (on request NPT ¼)
Operating voltages		24 V DC 24/ 110/ 230 V/ 50-60 Hz
Voltage tolerance		+10%
Duty cycle		100% continuous operation
Electrical connection		Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508
Type of protection		IP65 with cable plug
Installation		As required, preferably with actuator upright

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Power consumption		
Inrush AC [VA]	Hold (hot coil)	
	AC [VA/W]	DC [W]
11	6/2	2

Response times ¹⁾	
Opening	20 [ms]
Closing	40 [ms]

¹⁾ Measured at valve outlet at 6 bar and +20 °C acc. to ISO 12238.
Opening: Pressure rise 0 to 90%,
Closing: Pressure drop 100 to 10%

Ordering chart with manual override (without manual override on request)

Circuit function	Orifice [mm]	Seal material and body	Threaded port connection [inch]	Q _{nv} value air ¹⁾ [l/min]	Pressure range ²⁾ [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
Type 6518 Standard – Brass threaded socket, also threads 1 and 3 of multi-station manifold; without cable plug									
C 3/2 way servo-controlled solenoid valve, normally closed, with manual override	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	370	2	024/DC	132457
								024/50-60	132458
								110/50-60	132459
								230/50-60	132460
D 3/2 way servo-controlled solenoid valve, normally open, with manual override	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	370	2	024/DC	132461
								024/50-60	132462
								110/50-60	132463
								230/50-60	132464
Type 6519 Standard – Brass threaded socket, also threads 1, 3 and 5 of multi-station manifold; without cable plug									
H 5/2 way servo-controlled solenoid valve, with manual override	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	450	2	024/DC	132465
								024/50-60	132466
								110/50-60	132467
								230/50-60	132468
L 5/3 way solenoid valve, in middle position all ports locked, with manual override	9.0	NBR (Aluminium)	G ¼	1300	3-10	720	2	024/DC	132469
								024/50-60	132470
								110/50-60	132471
								230/50-60	132472
N 5/3 way valve, in middle position ports 2 and 4 open, with manual override	9.0	NBR (Aluminium)	G ¼	1300	3-10	720	2	024/DC	132473
								024/50-60	132474
								110/50-60	132475
								230/50-60	132476

1) Flow rate: Q_{nv} value air [l/min]: Measured at +20 °C, 6 bar pressure at valve inlet and 1 bar pressure difference
2) Pressure values [bar]: Overpressure with respect to atmospheric pressure

Type 6518/6519 Ex m (with moulded cable, 3 m long, junction box on request)

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.



The approval Ex m is achieved by the mounting of an approved push-over coil. The cable connection and the cable are non-detachable and sealed together with the valve. The valves can be used individually or in blocks.

Response times ¹⁾	
Opening	20 [ms]
Closing	50 [ms]

¹⁾ Measured at valve outlet at 6 bar and +20 °C acc. to ISO 12238.
 Öffnen: Pressure rise 0 to 90%
 Closing: Pressure drop 100 to 10%

Technical data		
Orifice	Type 6518 Type 6519	DN8 mm DN8 and 9 mm
Body material	Type 6518 - Pilot & main valve Type 6519 - Pilot valve Main valve	Polyamide, reinforced glass-fibre Polyamide, reinforced glass-fibre Polyamide (5/2 way), aluminium (5/3 way)
Threaded socket material		Brass (stainless steel on request)
Seal material	Type 6518 Type 6519	NBR and PUR NBR and PUR (5/2 way), NBR (5/3 way)
Medium		Neutral medium, e.g. lubricated or non-lubricated compressed air
Compressed air quality		ISO 8573-1:2010, Class 7.4.4*
Medium temperature		-10 °C to +50 °C
Ambient temperature		-25 °C to +50 °C
Pneumatic connection	Supply port connection 1, 3, 5 Service port 2, 4	Thread G ¼, multi-station manifold (on request NPT ¼) Thread G ¼ (on request NPT ¼)
Operating voltages		24/ 110/ 230 V/UC
Voltage tolerance		+10%
Duty cycle		100% continuous operation
Electrical connection		3 m cable, moulded junction box (without fuse)
Type of protection		IP65
Approvals	Coil	PTB 14 ATEX 2023 X / IECEx PTB 14.0049 X II 2G Ex mb IIC T5 Gb II 2D Ex mb IIIC T 100 °C Db EPS16 ATEX 1046 X / IECEx EPS 16.0021 X II 2G EX eb mb IIC T5 Gb II 2D EX mb tb IIIC T100 °C Db
Installation		As required, preferably with actuator upright

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

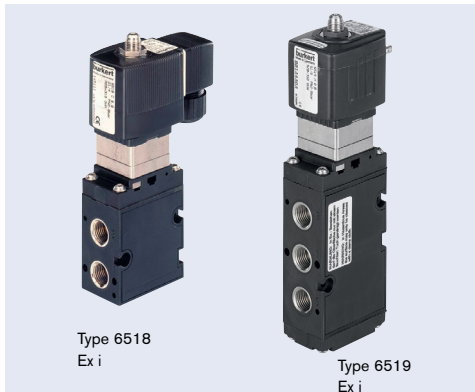
Ordering chart with manual override (without manual override on request)

Circuit function	Orifice [mm]	Seal material and body	Threaded port connection [inch]	C _{Nr} value Luft ¹⁾ [l/min]	Pressure range ²⁾ [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
Type 6518 Ex m – Brass threaded socket, also threads 1 and 3 of multi-station manifold; with moulded cable, 3 m long³⁾									
C 3/2 way servo-controlled solenoid valve, normally closed, with manual override	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	600	3	024/UC 110/UC 230/UC	278195 278200 278201
D 3/2 way servo-controlled, solenoid valve, normally open, with manual override	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	600	3	024/UC 110/UC 230/UC	278205 x x
Type 6519 Ex m – Brass threaded socket, also threads 1, 3 and 5 of multi-station manifold; with moulded cable, 3 m long⁴⁾									
H 5/2 way servo-controlled solenoid valve, with manual override	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	700	3	024/UC 110/UC 230/UC	278209 278212 278213
L 5/3 way solenoid valve, in middle position all ports locked, with manual override	9.0	NBR (Aluminium)	G ¼	1300	3-10	1.100	3	024/UC 110/UC 230/UC	278221 x x
N 5/3 way valve, in middle position ports 2 and 4 open, with manual override	9.0	NBR (Aluminium)	G ¼	1300	3-10	1.100	3	024/UC 110/UC 230/UC	278222 x x

¹⁾ Flow rate: Q_{Nr} value air [l/min]: Measured at +20 °C, 6 bar pressure at valve inlet and 1 bar pressure difference
²⁾ Pressure values [bar]: Overpressure with respect to atmospheric pressure
³⁾ Versions with junction box on request
⁴⁾ Circuit function H (5/2 way) as impulse version on request
 x = on request

Type 6518/6519 Ex i (with Tag connector acc. to DIN EN 175301-803 Form A, without cable plug)

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.



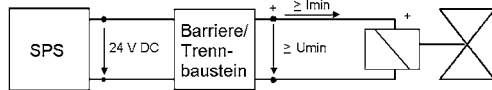
The intrinsically-safe Type 6518 Ex i and 6519 Ex i valves consist of an intrinsically-safe pilot control and a pneumatic amplifier. The diaphragm-controlled valve seats work with very low friction, ensuring reliable switching of the valve, even after long shutdown periods.

Response times ¹⁾	
Opening	75 [ms]
Closing	115 [ms]

¹⁾ Measured at valve outlet at 6 bar and +20 °C acc. to ISO 12238.
 Opening: Pressure rise 0 to 90%
 Closing: Pressure drop 100 to 10%

Note

These units may only be used in explosive atmospheres in the manner approved by the Federal Institute of Physics and Technology (PTB), i.e., the permissible maximum electrical values must be complied with. Suitable barriers and isolating modules are available for this.



The valve is intended for operation on 24 V DC outputs via the intermediate switching of a corresponding intrinsically-safe operating resource (isolating module or barrier).
 If required, request the "Recommended Barrier and Isolating Module" data sheet.

Technical data		
Orifice	Type 6518	DN8 mm
	Type 6519	DN8 and 9 mm
Body material	Pilot valve	Stainless steel 1.4305 or brass
	Main valve	Polyamide, reinforced glass-fibre
Threaded socket material	Brass (stainless steel on request)	
Seal material	FPM, NBR and PUR	
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air	
Compressed air quality	ISO 8573-1:2010, Class 7.4.4*	
Medium temperature	-10 °C to +50 °C	
Ambient temperature	-25 °C to +55 °C	
Pneumatic connection	Supply port connection 1, 3, 5	Thread G ¼, multi-station manifold (on request PT1/4)
	Service port 2, 4	Thread G ¼ (on request NPT ¼)
Duty cycle	100% continuous operation	
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508 (not in delivery, see accessories), check for correct polarity	
Type of protection	IP65 with cable plug	
Installation	As required, preferably with actuator upright	

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Electrical data - Coil AC10 Ex i

Approvals	PTB 01 ATEX 2101 / PTB IECEx10.0019 II 2G Ex ia IIC T6 Gb II 2G Ex ia IIC T80 °C Db		
Function values for Switching function valve¹⁾	at +20 °C	at +55 °C	
	Minimum switching current	29 mA	29 mA
	Nominal resistance coil	310 Ω	360 Ω
	Minimum terminal voltage	9.0 V	10.4 V
Conformity specifications	U _i	35 V	
	I _i	0.9 A	
	P _i	1.1 W	

¹⁾ With high resistance coil on request

Ordering chart for valves without manual override (with manual override and high resistance coil on request)

Circuit function	Orifice [mm]	Seal material and body	Threaded port connection [inch]	Q _{nn} value Luft ¹⁾ [l/min]	Pressure range ²⁾ [bar]	Weight [g]	Body material pilot valve	Material air control connector	Article no.
Type 6518 Ex i without cable plug									
<p>3/2 way servo-controlled solenoid valve, normally closed</p>	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	580	St. St. 1.4305	St. St.	145111
							Brass	Brass, nickel plated	144486
							Brass	Brass, nickel plated	147253
Type 6519 Ex i without cable plug									
<p>5/2 way servo-controlled solenoid valve</p>	8.0	NBR and PUR (Polyamide)	G ¼	1300	2-8	670	St. St. 1.4305	St. St.	144484
							Brass	Brass, nickel plated	144485
							Brass	Brass, nickel plated	147252

¹⁾ Flow rate: Q_{nn} value air [l/min]: Measured at +20 °C, 6 bar pressure at valve inlet and 1 bar pressure difference

²⁾ Pressure values [bar]: Overpressure with respect to atmospheric pressure

Type 6519 NAMUR Standard (with Tag connector acc. to DIN EN 175301-803 Form A, without cable plug)



The valve bodies of Type 6519 NAMUR are identical with the Ex m variants. The difference is in the coils, which are laid out and approved in different ways. By changing the coil on the valve body, it is possible to easily convert from Non-Ex operation to Ex operation (or vice versa). The coils are designed to be push-over and can be locked in 4 × 90° displaced positions and be positioned anywhere in-between.

Technical data	
Orifice	Type 6519 DN6 mm
Body material	Type 6519 Pilot and main valve Polyamide, reinforced glass-fibre
Threaded socket material	Brass (stainless steel on request)
Seal material	Type 6519 NBR and PUR
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air
Compressed air quality	ISO 8573-1:2010, Class 7.4.4*
Medium temperature	-10 °C to +50 °C
Ambient temperature	-25 °C to +55 °C
Pneumatic connection	Supply port connection 1, 3, 5 Thread G ¼, (on request NPT ¼) Service port 2, 4 NAMUR Flange
Operating voltages	24 V DC 24/ 110/ 230 V/ 50-60 Hz
Voltage tolerance	+10%
Duty cycle	100 % continuous operation
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508
Type of protection	IP65 with cable plug
Installation	As required, preferably with actuator upright

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Power consumption			Response times ¹⁾	
Inrush AC [VA]	Hold (hot coil) AC [VA/W]	DC [W]	Opening	Closing
11	6/2	2	20 [ms]	40 [ms]

¹⁾ Measured at valve outlet at 6 bar and +20 °C acc. to ISO 12238.
Opening: Pressure rise 0 to 90%,
Closing: Pressure drop 100 to 10%

Ordering chart with manual override (without manual override on request)

Circuit function	Orifice [mm]	Seal material and body	Material sockets ¹⁾	Threaded port connection [inch]	Q _{in} value Luft ²⁾ [l/min]	Pressure range ³⁾ [bar]	Weight [g]	Electrical nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
W 	6.0	NBR and PUR	Stainless steel	G ¼	900	2-8	460	2	024/DC	131425
									024/50-60	131426
									110/50-60	131427
									230/50-60	131428
W 	6.0	NBR and PUR	Brass, nickel plated	G ¼	900	2-8	460	2	024/DC	131421
									024/50-60	131422
									110/50-60	131423
									230/50-60	131424

¹⁾ When the connecting sockets are made of stainless steel, then the mounting screws are also made of stainless steel

²⁾ Flow rate: Q_{in} value air [l/min]: Measured at +20 °C, 6 bar pressure at valve inlet and 1 bar pressure difference

³⁾ Pressure values [bar]: Overpressure with respect to atmospheric pressure

All valves can be operated in circuit function C as well as in circuit function H. By replacing the adapter plate that comes with the valves, the change between the two circuit functions can be set up.

Type 6519 NAMUR Ex m (with moulded cable) or Ex me (with junction box)

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.



Type 6519 NAMUR Ex m

The valve made out of premium polyamide can be operated either as a 5/2 or a 3/2 way version through different mounting plates. The solenoid valve Type 6014 with a coil approved for use in hazardous areas is connected as a pilot. The NAMUR flange interface allows easy assembly on different pneumatic actuators on the spot.

The valve bodies are identical with the Type 6519 NAMUR standard version. The difference between the valves is in the coils, which are laid out and approved in different ways. By changing the coil on the valve body, it is possible to easily convert from Non-Ex operation to Ex operation (or vice versa). Coil versions with moulded cable are designed to be push-over and can be locked in 4 × 90° displaced positions and be positioned any where in-between.

Technical data	
Orifice	DN6 mm
Body material	Pilot and main valve Polyamide, reinforced glass-fibre
Threaded socket material	Brass (stainless steel on request)
Seal material	NBR and PUR
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air
Compressed air quality	ISO 8573-1:2010, Class 7.4.4*
Medium temperature	-10 °C to +50 °C
Ambient temperature	-25 °C to +50 °C
Pneumatic connection	Supply port connection 1, 3, 5 Service port 2, 4 Thread G ¼, (on request NPT ¼) NAMUR Flange
Operating voltages	24/ 110/ 230 V/UC
Voltage tolerance	+10 %
Duty cycle	100% continuous operation
Electrical connection	3 m cable, moulded junction box (without fuse)
Type of protection	IP65
Approvals	Coil PTB 14 ATEX 2023 X / IECEx PTB 14.0049 X II 2G Ex mb IIC T5 Gb II 2D Ex mb IIIC T 100 °C Db EPS16 ATEX 1046 X / IECEx EPS 16.0021 X II 2G EX eb mb IIC T5 Gb II 2D EX mb tb IIIC T100 °C Db
Installation	As required, preferably with actuator upright

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Response times ¹⁾	
Opening	20 [ms]
Closing	40 [ms]

¹⁾ Measured at valve outlet at 6 bar and +20 °C acc. to ISO 12238.

Opening: Pressure rise 0 to 90%,

Closing: Pressure drop 100 to 10 %

Ordering chart with manual override (without manual override on request)

Circuit function	Orifice [mm]	Seal material and body	Material sockets ¹⁾	Threaded port connection [inch]	Q _v value Luft ²⁾ [l/min]	Pressure range ³⁾ [bar]	Weight [g]	Electrical Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.	
W 	Version acc. to Ex m, with moulded 3 m-cable										
	6.0	NBR and PUR	Stainless steel	G ¼	900	2-8	650	3	024/UC	278231	
									110/UC	278234	
									230/UC	278237	
	or	6.0	NBR and PUR	Brass, nickel plated	G ¼	900	2-8	650	3	024/UC	278228
										110/UC	278235
230/UC										278239	
W 	Version acc. to Ex me, with junction box without fuse										
	6.0	NBR and PUR	Stainless steel	G ¼	900	2-8	690	3	024/UC	289407	
									230/UC	289415	
									024/UC	289406	
	5/2 or 3/2 way solenoid valve, with removable disk and manual override	6.0	NBR and PUR	Brass, nickel plated	G ¼	900	2-8	690	3	110/UC	289412
										230/UC	289414

¹⁾ When the connecting sockets are made of stainless steel, then the mounting screws are also made of stainless steel

²⁾ Flow rate: Q_v value air [l/min]: Measured at +20 °C, 6 bar pressure at valve inlet and 1 bar pressure difference

³⁾ Pressure values [bar]: Overpressure with respect to atmospheric pressure

All valves can be operated in circuit function C as well as in circuit function H. By replacing the adapter plate that comes with the valves, the change between the two circuit functions can be set up.

Type 6519 NAMUR Ex i (with Tag connector acc. to DIN EN 175301-803 Form A, without cable plug)

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.

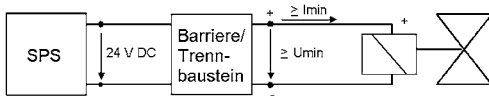


Type 6519 NAMUR Ex i

The Type 6519 NAMUR Ex i valve is used for the pneumatic control of double or single-acting actuators with a NAMUR adapter plate flange. The circuit function can easily be changed using an adapter plate. In the 3/2 way function, feedback of the exhaust air takes place in the spring area of the armature drive. The diaphragm-controlled valve seats work with very low friction, ensuring reliable switching of the valve even after long shutdown periods and at ambient temperatures below 0 °C. The valves work without a continuous air consumption.

Note

The units may only be used in explosive atmospheres in the manner approved by the Federal Institute of Physics and Technology (PTB), i.e., the permissible maximum electrical values must be complied with. Suitable barriers and isolating modules are available for this.



The valve is intended for operation on 24 V DC outputs via the intermediate switching of a corresponding intrinsically-safe operating resource (isolating module or barrier). If required, request the "Recommended Barrier and Isolating Module" data sheet.

Technical data	
Orifice	DN6 mm
Body material	Pilot valve: Stainless steel 1.4305 or brass Main valve: Polyamide, reinforced glass-fibre
Threaded socket material	Brass (stainless steel on request)
Seal material	FPM, NBR and PUR
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air
Compressed air quality	ISO 8573-1:2010, Class 7.4.4*
Medium temperature	-10 °C to +50 °C
Ambient temperature	-25 °C to +55 °C
Pneumatic connection	Supply port connection 1, 3, 5: Thread G 1/4, (on request NPT 1/4) Service port 2, 4: NAMUR Flange
Duty cycle	100% continuous operation
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508 (not in delivery, see accessories), check for correct polarity
Type of protection	IP65 with cable plug
Installation	As required, preferably with actuator upright

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Response times ¹⁾	[ms]	¹⁾ Measured at valve outlet at 6 bar and +20 °C acc. to ISO 12238.
Opening	75	Opening: Pressure rise 0 to 90%
Closing	115	Closing: Pressure drop 100 to 10%

Electrical data		
Approvals	PTB 01 ATEX 2101 / PTB IECEx10.0019 II 2G Ex ia IIC T6 Gb II 2G Ex ia IIIC T80 °C Db	
Function values for Switching function valve¹⁾	at +20 °C	at +55 °C
Minimum switching current	29 mA	29 mA
Nominal resistance coil	310 Ω	360 Ω
Minimum terminal voltage	9.0 V	10.4 V
Conformity specifications	Ui: 35 V Ii: 0.9 A Pi: 1.1 W	

¹⁾ With high resistance coil on request

Ordering chart for valves without manual override (with manual override and high resistance coil on request)

without cable plug

Circuit function	Orifice [mm]	Seal material and body	Threaded port connection [inch]	Q _{ln} value Luft ¹⁾ [l/min]	Pressure range ²⁾ [bar]	Weight [g]	Body material pilot valve	Material air control connector	Article no.
<p>W</p>	6.0	NBR and PUR (Polyamide)	G 1/4	900	2-8	670	St. St. 1.4305	St. St.	144482 ☒
							Brass	Brass, nickel plated	144483 ☒
<p>W</p> <p>5/2 or 3/2 way solenoid valve, with removable disk</p>	6.0	NBR and PUR (Polyamide)	G 1/4	900	2-8	670	Brass	Brass, nickel plated	147244 ☒

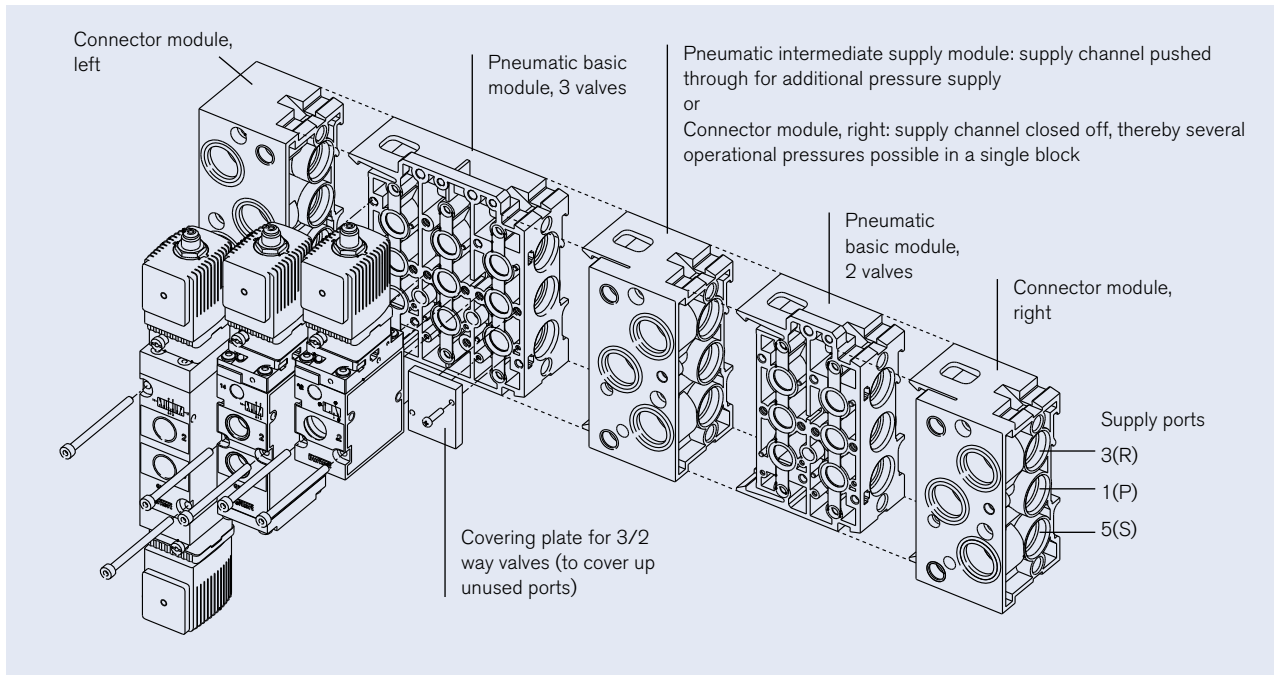
1) Flow rate: Q_{ln} value air [l/min]: Measured at +20 °C, 6 bar pressure at valve inlet and 1 bar pressure difference
2) Pressure values [bar]: Overpressure with respect to atmospheric pressure

All valves can be operated in circuit function C as well as in circuit function H. By replacing the adapter plate that comes with the valves, the change between the two circuit functions can be set up. All valves have mounting plates and tag connectors acc. to DIN EN 175301-803 Form A (previously DIN 43650) and are supplied without cable plug

Pneumatic modules Type MP07

Single modules or pre-mounted blocks are available.

Example of a complete valve block



Note when ordering complete valve blocks:

Please list the modules in the block assembly from right to left, as shown in the ordering example. Valves with NAMUR Flange, Ex i coil or Ex versions with junction boxes are not suitable for block mounting.

Ordering example for Type 6518 with Type MP07

No.	Unit	Article no.
1	Connector module right, G ½	635331
1	Pneumatic basic module, 2 valves	635319
1	Pneumatic basic module, 3 valves	635343
1	Connector module left, G ½	635324
5	Valves	132457

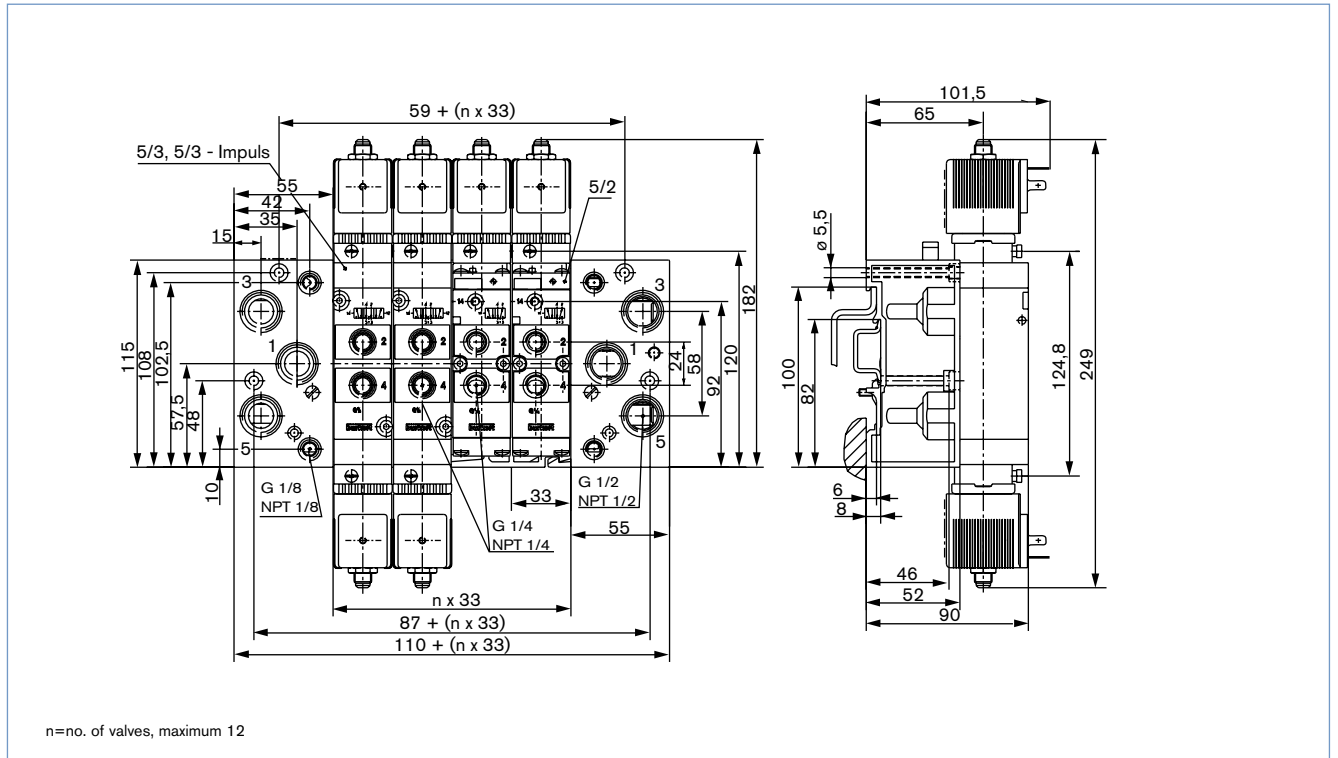
Ordering chart for Type MP07 pneumatic modules

Version	Article no.
Connector module right G ½	635331
Intermediate supply module	637505
Pneumatic basic module, 2 valves universal (for 3/2-, 5/2- and 5/3 way)	635319
Pneumatic basic module, 3 valves universal (for 3/2-, 5/2- and 5/3 way)	635343
Connector module left G ½	635324
Covering plate for 5/2- and 5/3 way (to cover unused valve positions)	635335
Covering plate for 3/2 way (to cover unused connections)	635337

Type MP07 pneumatic modules, *continued*

Dimensions for Type MP07 pneumatic modules [mm]

Manifold assembly either wall-mounted or standard mounting DIN rail 50022 or 50023

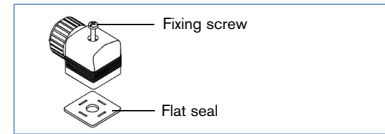


Valve assembly on pneumatic modules Type MP07 using the supplied M4 screws

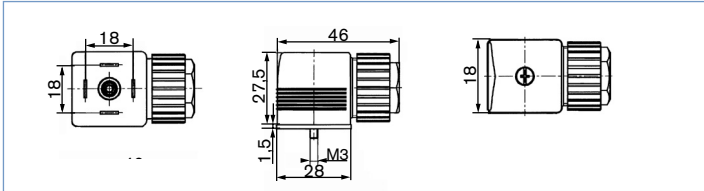
Accessories

Cable plug 2508 acc. to DIN EN 175301-803 Form A

The delivery of a cable plug includes the flat seal and the fixing screw. For other cable plug versions acc. to DIN EN 175301-803 Form A (previously DIN 43650) with integrated circuitry, see datasheet Type 2508.



Dimensions Type 2508 [mm]



Ordering chart

Cable plug 2508

Beschaltung	Voltage	Article no.
For standard version 6518/19		
Fixing screw in steel (galvanised and chrome-plated)		
without circuitry	0-250 V	008376
with LED	12-24 V	008360
with LED and varistor	12-24 V	008367
with LED and varistor	200-240 V	008369
For Ex i version 6519		
Fixing screw in stainless steel 1.4404 and blue compression gland nut		
without circuitry	0-250 V	438574
for further versions see datasheet 2508		

Cable plug Type 2513 acc. to DIN EN 175301-803, Form A

Meets the requirements of ATEX category 3 GD

		Cable length [mm]	Article no. [in mm]
		12000	260893
		5000	260892
		3000	260891
		300	260890

Ordering chart for further accessories

Accessories	Features	Article no.
Cap nut	Cap nut in stainless steel for additional protection of the exhaust air channel from the penetration of damp	649554
Blanking plug	G 1/8"	780141
	G 1/4"	780142
	G 1/2"	780144
Silencer	G 1/8"	005305
	G 1/4"	005064
	G 1/2"	005062
Labelling plate	64 pieces	635416



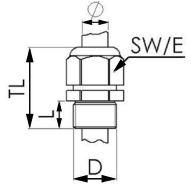


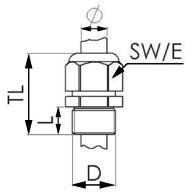
Semi-delay fuse for 6519 NAMUR Ex m

Voltage [V]	Max. current [mA]	Article no.
24 V	315 mA	153733
110 V	50 mA	153716
230 V	32 mA	153715


Accessories (continued)

Ex-Cable glands

(polyamide version included in delivery / surcharge applied for brass nickel plated version)

Photo	Description	Ex Approvals		Article no	Drawing										
		Certification	Identifica-tion												
	Brass, nickel-plated, 6-13 mm	PTB 04 ATEX 1112 X, IECEx PTB 13.0027X	II 2 G Ex e IIC Gb, II 2 D Ex tb IIIC Db IP68,	773278 	 <table border="1"> <tr><td>TL</td><td>29-37 mm</td></tr> <tr><td>L</td><td>6 mm</td></tr> <tr><td>D</td><td>20</td></tr> <tr><td>SW</td><td>24 mm</td></tr> <tr><td>E</td><td>27 mm</td></tr> </table>	TL	29-37 mm	L	6 mm	D	20	SW	24 mm	E	27 mm
TL	29-37 mm														
L	6 mm														
D	20														
SW	24 mm														
E	27 mm														
	Polyamide, 7-13 mm	PTB 13 ATEX 1015 X, IECEx PTB 13.0034X	II 2 G Ex e IIC Gb, II 2 D Ex tb IIIC Db IP68	773277 	 <table border="1"> <tr><td>TL</td><td>36-45 mm</td></tr> <tr><td>L</td><td>10 mm</td></tr> <tr><td>D</td><td>20</td></tr> <tr><td>SW</td><td>24 mm</td></tr> <tr><td>E</td><td>28 mm</td></tr> </table>	TL	36-45 mm	L	10 mm	D	20	SW	24 mm	E	28 mm
TL	36-45 mm														
L	10 mm														
D	20														
SW	24 mm														
E	28 mm														

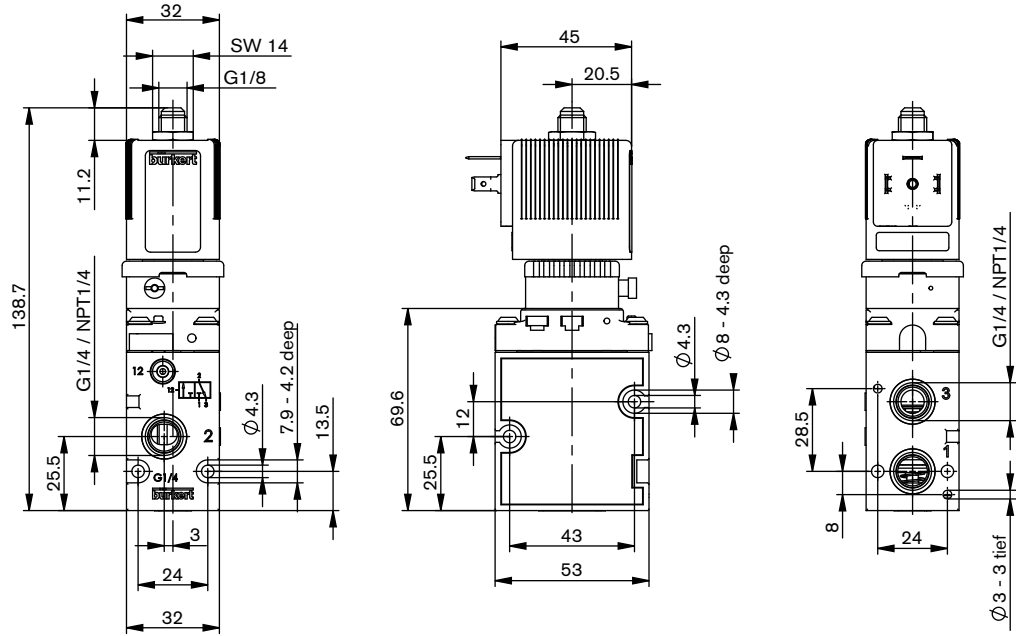
Special tool to turn the junction box (not included in delivery)

Photo	Description	Article no.
	Set SC02-AC10 Special wrench Service Manual	293488 

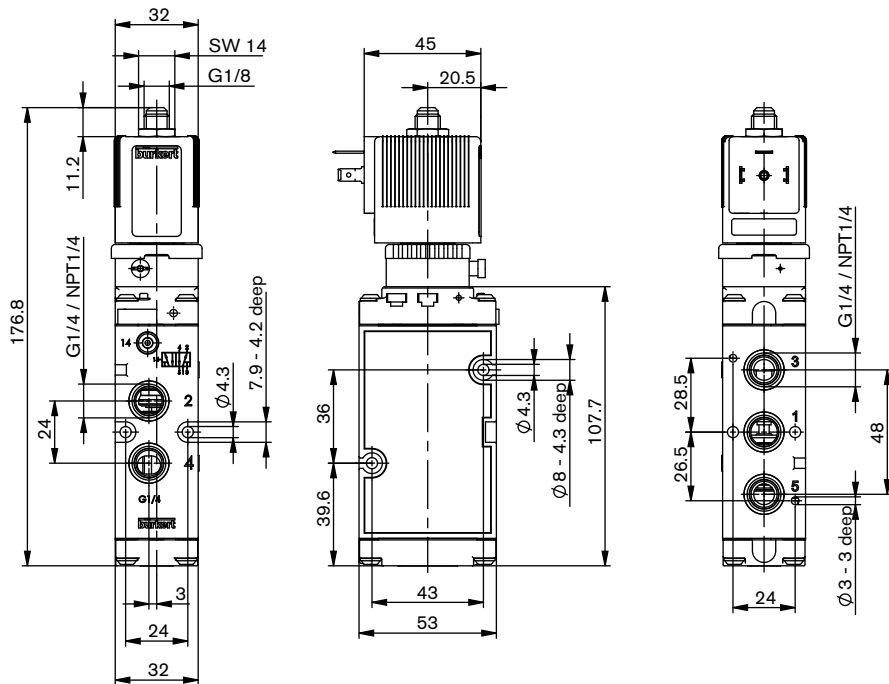
Dimensions [mm]

Standard versions

Type 6518
3/2 way valve, circuit function C and D



Type 6519
5/2 way valve, circuit function H

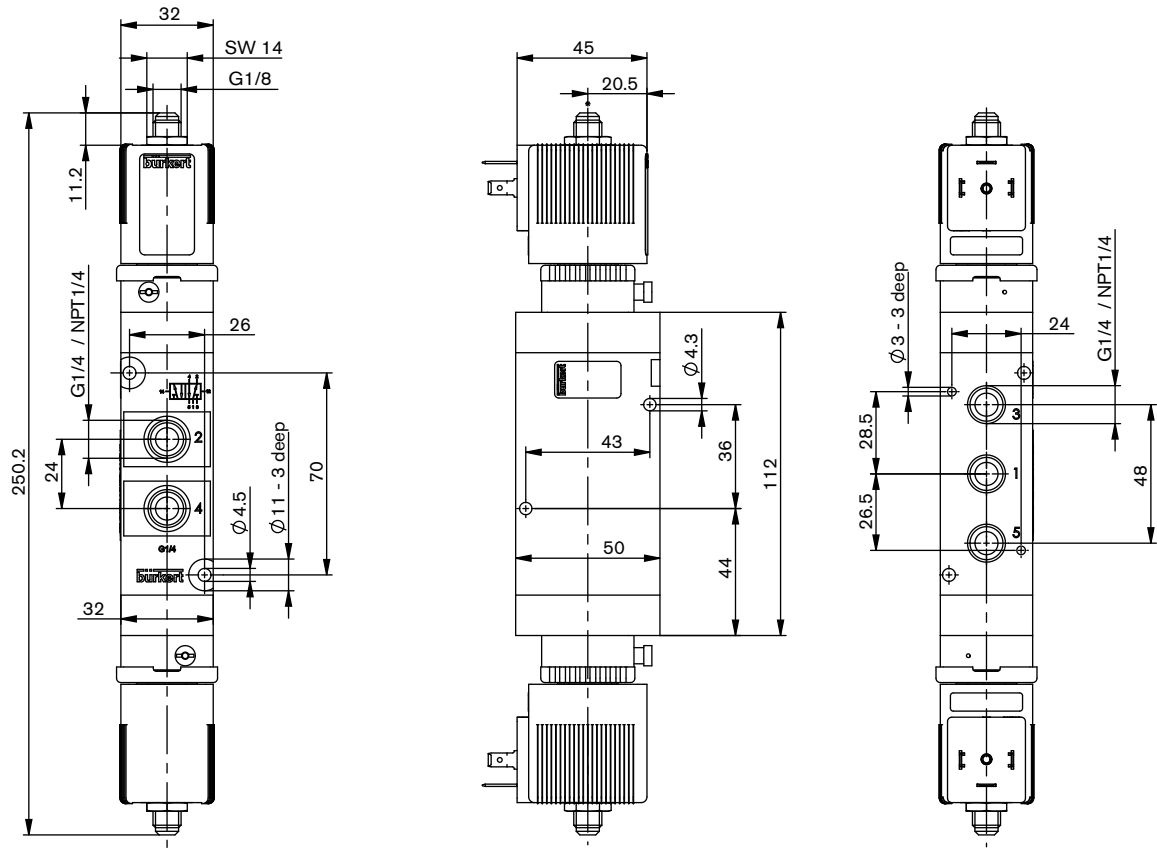


* Mounting length with 2 magnetic coils 249 mm

Dimensions [mm]

Standard versions

Type 6519
5/3 way valve, circuit function L and N

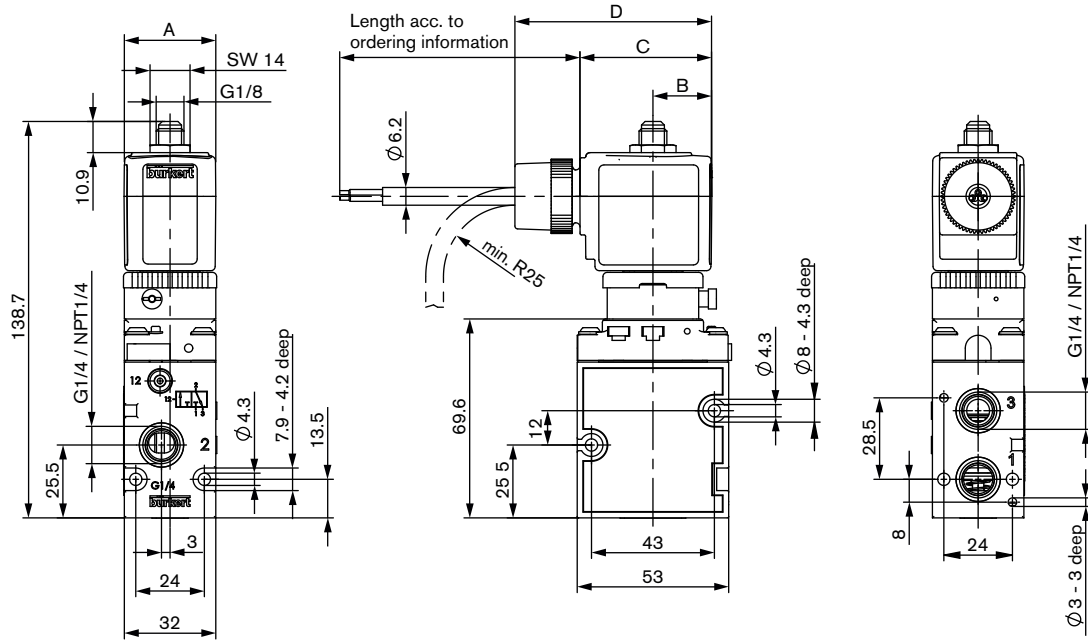


Dimensions [mm]

Ex m/me versions

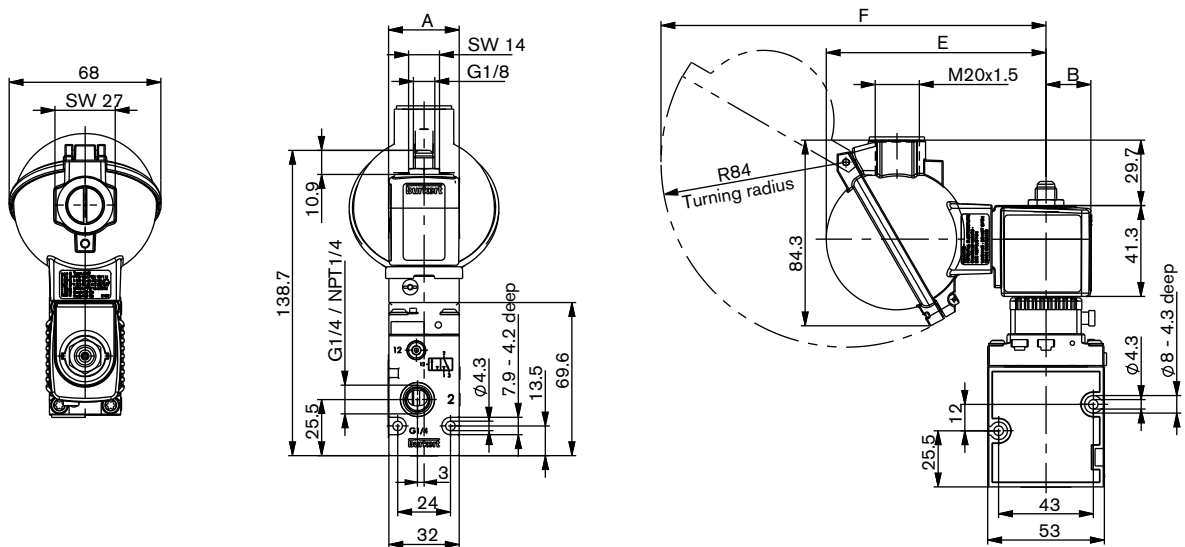
Type 6518
3/2 way valve, circuit function C and D

with moulded cable (3 m long) (Ex m)



Coil size	A	B	C	D	E	F
5	32	20.5	46	68.8	99.8	174.7
6	40	23.5	52	74.8	102.8	177.7

with junction box (Ex me)

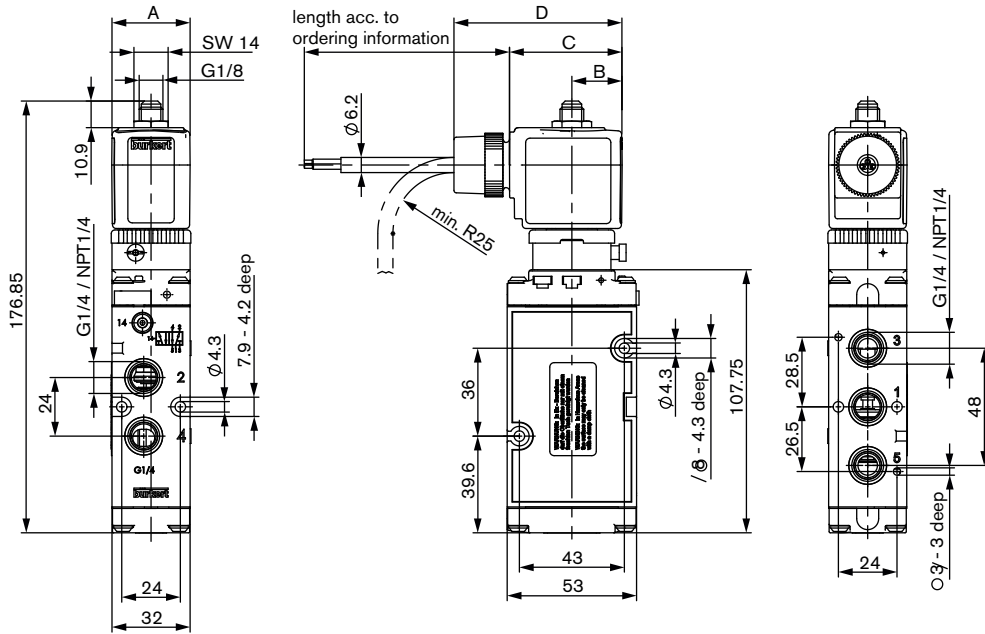


Dimensions [mm]

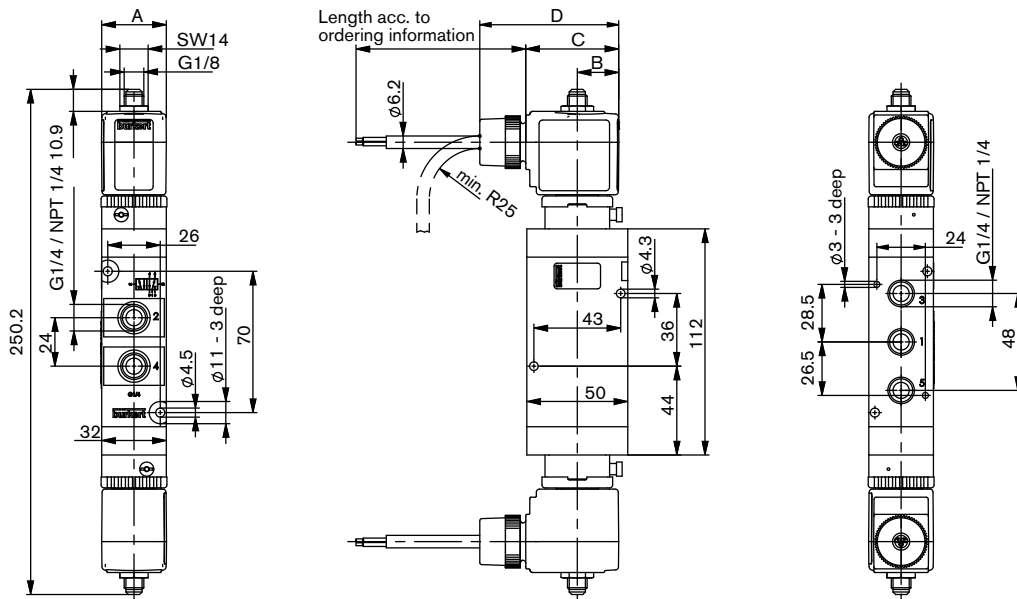
Ex m/me versions

Type 6519
5/2 way valve, circuit function H

with moulded cable (3 m long) (Ex m)



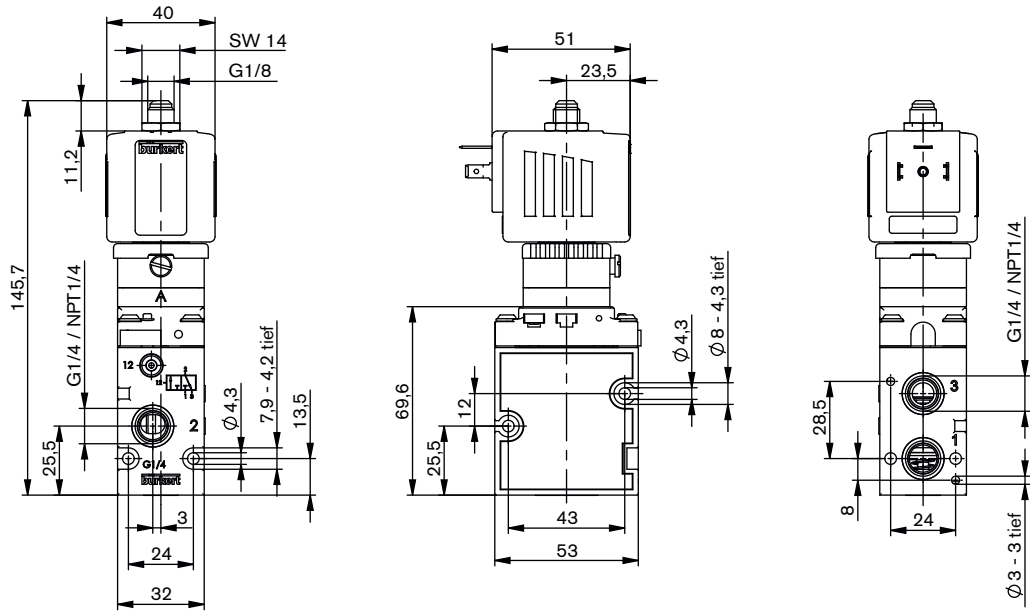
5/2 way valve, circuit function L and N



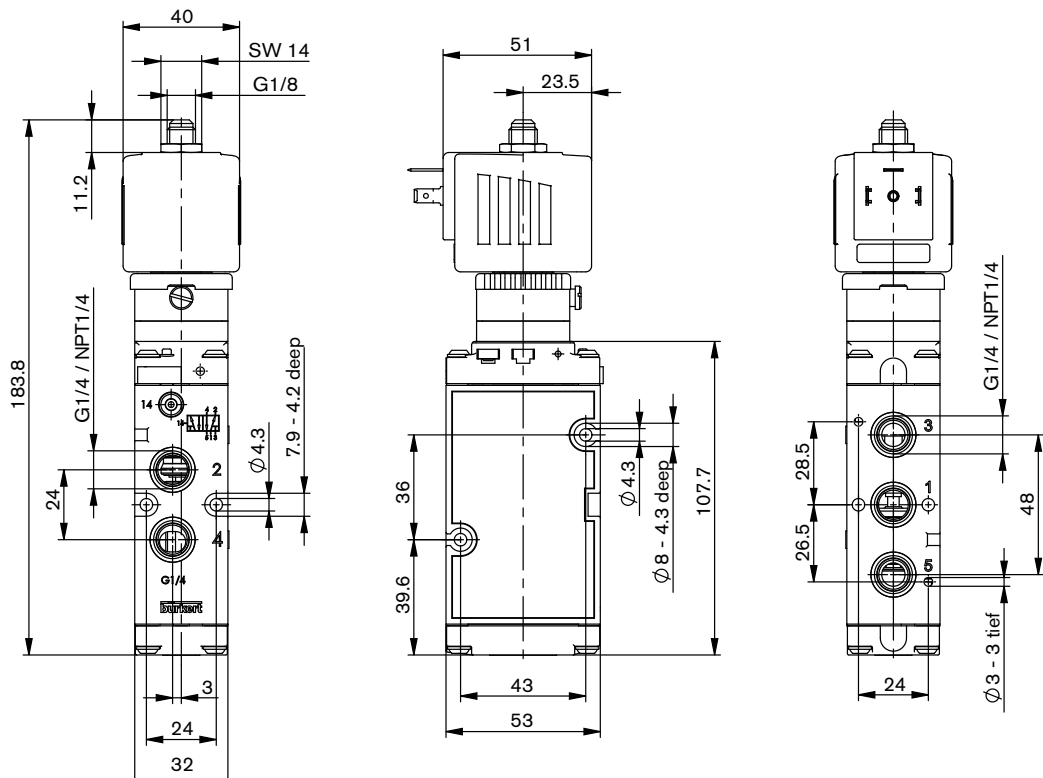
Dimensions [mm]

Ex i versions

Type 6518
3/2 way valve, circuit function C



Type 6519
5/2 way valve, circuit function H

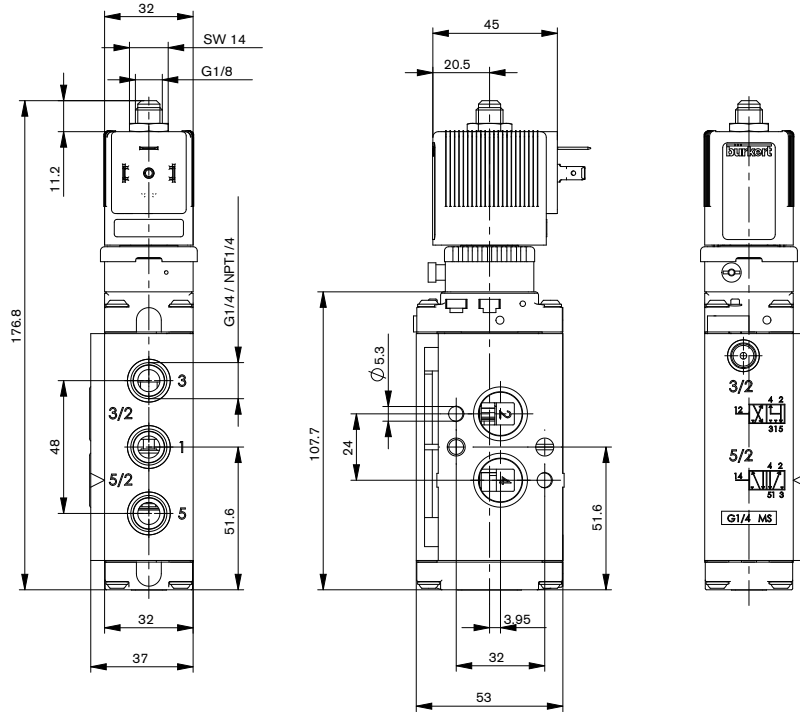


Dimensions [mm]

NAMUR Standard version

Type 6519

3/2 way valve, circuit function C or 5/2 way valve, circuit function H

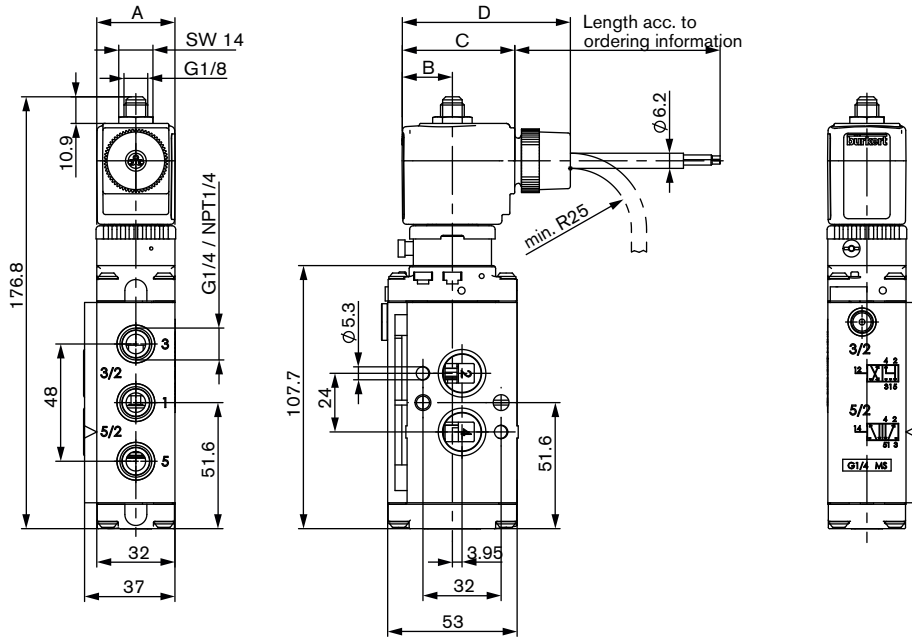


Dimensions [mm]

NAMUR Ex m/me version

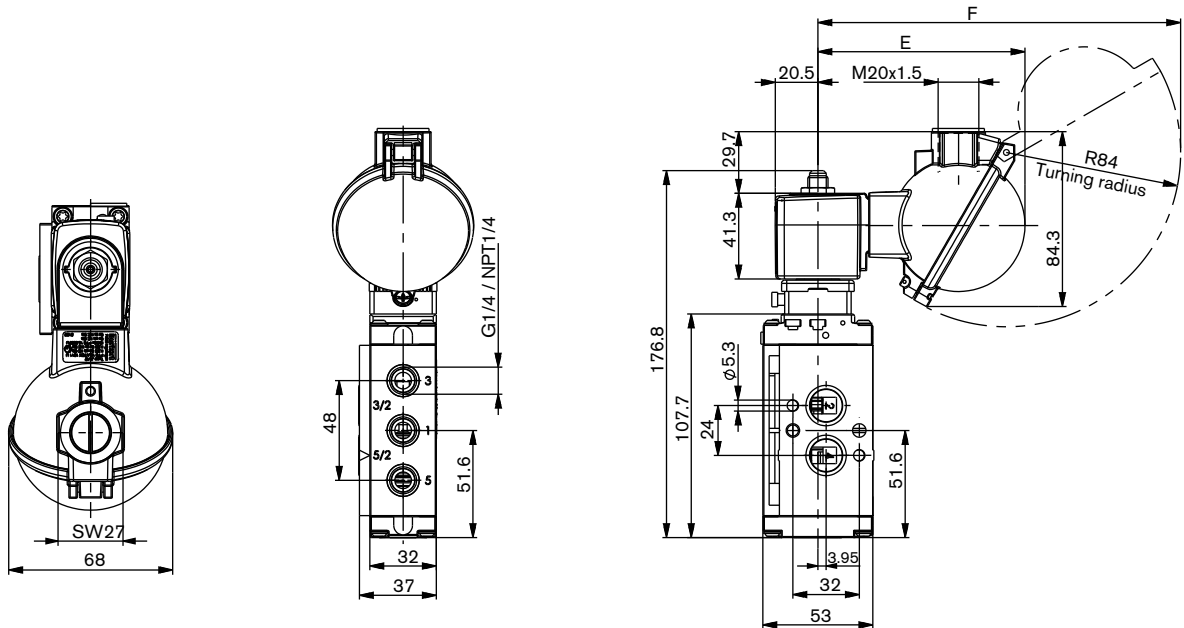
Type 6519
3/2 way valve, circuit function C or 5/2 way valve, circuit function H

with moulded cable (3 m long) (Ex m)



Coil size	A	B	C	D	E	F
5	32	20.5	46	68.8	99.8	174.7
6	40	23.5	52	74.8	102.8	177.7

with junction box (Ex me)

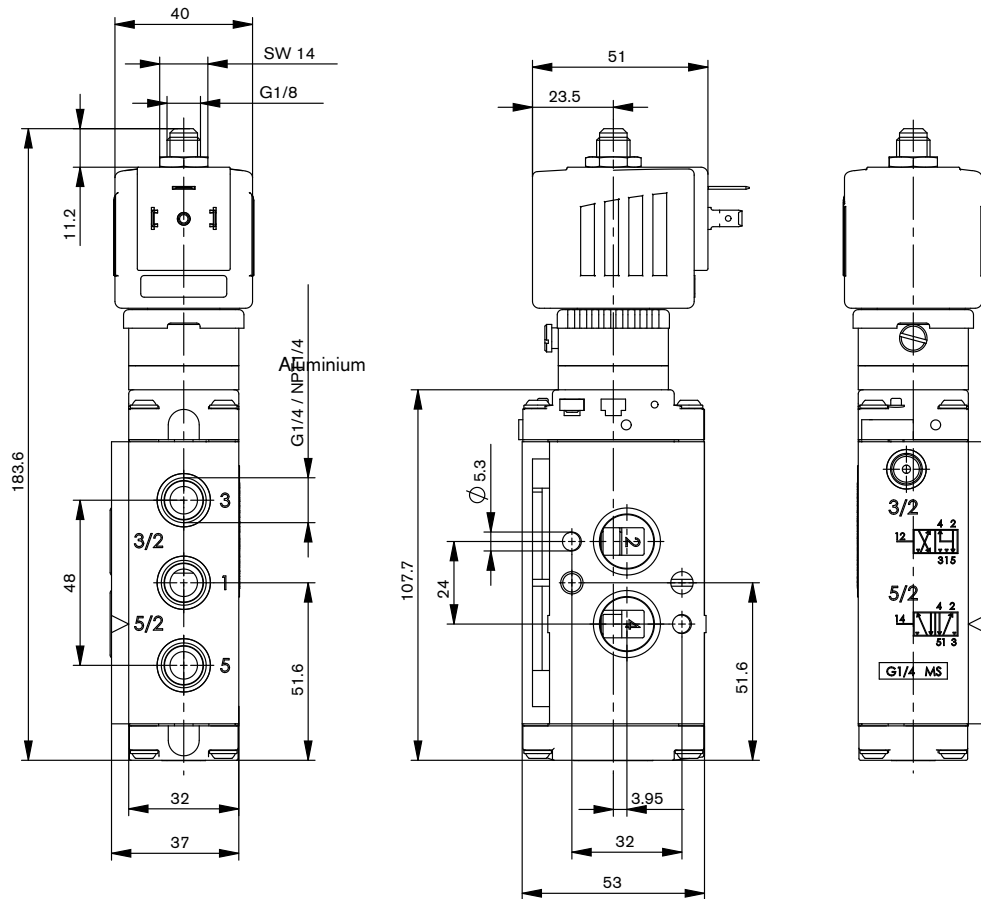


Dimensions [mm]

NAMUR Ex i version

Type 6519

3/2 way valve, circuit function C or 5/2 way valve, circuit function H



6519
for extended
temperature range

Type 6519 for extended standard temperature range

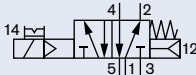
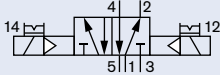
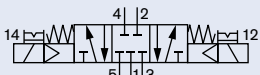
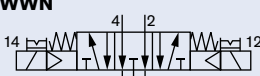


Technical data	Aluminium	Stainless steel				
Orifice	9	9				
Body material						
Pilot valve	Stainless steel	Stainless steel				
Main valve	Aluminium ematal coated	Stainless steel 1.4571				
Threaded socket material	in aluminium	in stainless steel				
Seal material	FPM, NBR	PU, NBR, FPM				
Medium	Neutral medium, eg lubricated or non-lubricated compressed air					
Compressed air quality	ISO 8573-1:2010, Class 7.2.4*					
Medium temperature	-30 °C to +80 °C	-30 °C to +80 °C				
Ambient temperature	-40 °C to +80 °C	-30 °C to +80 °C				
Pneumatic connection	Supply port connection 1, 3, 5 Thread G ¼, (on request NPT ¼) Service port 2, 4 Thread G ¼ (on request NPT ¼)					
Operating voltages	24 V DC 24/ 110/ 230 V/ 50-60 Hz					
Voltage tolerance	+10%					
Electr. power consumption	2 W					
Duty cycle	100% continuous operation					
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508					
Type of protection	IP65 with cable plug					
Installation	As required, preferably with actuator upright					
Response times	5/2	5/2-bi	5/3	3/2	5/2	5/2-bi
Opening [ms]	16	18	16	13	12	14
Closing [ms]	27	18	22	47	74	14

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Ordering chart for valves in aluminium with manual override (without manual override on request)

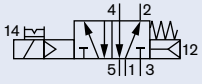




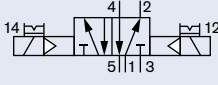




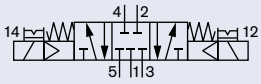




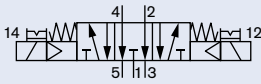




All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material and body	Threaded port connection [inch]	Q _{NV} -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
 5/2 WWH	9.0	FPM, NBR	G ¼"	1800	2.5-10	680	2	024/DC	231386
								024/50-60	231387
								110/50-60	231388
								230/50-60	231389
 5/2-bistable WWZ	9.0	FPM, NBR	G ¼"	2100	2.5-10	990	2	024/DC	231390
								024/50-60	231391
								110/50-60	231392
230/50-60	231393								
 5/3 WWL	9.0	FPM, NBR	G ¼"	1500	2.5-10	1060	2	024/DC	231394
								024/50-60	231395
								110/50-60	231396
230/50-60	231397								
 5/3 WWN	9.0	FPM, NBR	G ¼"	1500	2.5-10	1060	2	024/DC	231399
								024/50-60	231400
								110/50-60	231401
230/50-60	231402								

6519
for extended
temperature range

Ordering chart for valves in stainless steel with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	C_{N_2} -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
5/2 WWH 	8.0	PU, NBR	G 1/4"	1980	3-10	1370	2	024/DC	231403 
								024/50-60	231404 
								110/50-60	231405 
								230/50-60	231406 
5/2-bistable WWZ 	8.0	PU, NBR	G 1/4"	1920	3-10	1680	2	024/DC	231407 
								024/50-60	231408 
								110/50-60	231409 
								230/50-60	231410 
5/3 WWL 	8.0	PU, NBR	G 1/4"	1770	3-10	1680	2	024/DC	231411 
								024/50-60	231412 
								110/50-60	231413 
								230/50-60	231414 
5/3 WWN 	8.0	PU, NBR	G 1/4"	1770	3-10	1680	2	024/DC	231415 
								024/50-60	231416 
								110/50-60	231417 
								230/50-60	231418 

6519
for extended
temperature range



Type 6519 for extended Ex m temperature range

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.



Technical data	Aluminium	Stainless steel				
Orifice	9	9				
Body material						
Pilot valve	Stainless steel	Stainless steel				
Main valve	Aluminium ematal coated	Stainless steel 1.4571				
Threaded socket material	in aluminium	in stainless steel				
Seal material	FPM, NBR	PU, NBR, FPM				
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air					
Compressed air quality	ISO 8573-1:2010, Class 7.2.4*					
Medium temperature	-30 °C to +80 °C	-30 °C to +80 °C				
Ambient temperature	-40 °C to +60 °C	-30 °C to +60 °C				
Pneumatic connection	Supply port connection 1, 3, 5 Service port 2, 4					
Operating voltages	24 V DC 24/ 110/ 230 V/ 50-60 Hz					
Voltage tolerance	+10%					
Electr. power consumption	3 W					
Duty cycle	100% continuous operation					
Electrical connection	3 m cable, moulded junction box (without fuse) on request					
Type of protection	IP65					
Approvals						
Coil	PTB 14 ATEX 2023 X / IECEx PTB 14.0049 X II 2G Ex mb IIC T5 Gb II 2D Ex mb IIIC T 100 °C Db EPS16 ATEX 1046 X / IECEx EPS 16.0021 X II 2G EX eb mb IIC T5 Gb II 2D EX mb tb IIIC T100 °C Db					
Junction box						
Installation	As required, preferably with actuator upright					
Response times	5/2	5/2-bi	5/3	3/2	5/2	5/2-bi
Opening [ms]	16	18	16	13	12	14
Closing [ms]	27	18	22	47	74	14

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Ordering chart for valves in aluminium with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	C _N -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
Type 6519 Ex m - with moulded cable, 3 m long¹⁾									
5/2 WWH 	9.0	FPM, NBR	G 1/4"	1800	2.5-10	680	3	024/UC	278217
								110/UC	x
								230/UC	278220
5/2-bistable WWZ 	9.0	FPM, NBR	G 1/4"	2100	2.5-10	990	3	024/UC	278247
								110/UC	x
								230/UC	x
5/3 WWL 	9.0	FPM, NBR	G 1/4"	1500	2.5-10	1060	3	024/UC	x
								110/UC	x
								230/UC	x
5/3 WWN 	9.0	FPM, NBR	G 1/4"	1500	2.5-10	1060	3	024/UC	278223
								110/UC	x
								230/UC	x

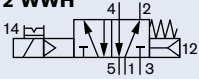

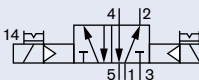

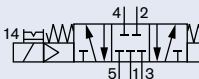
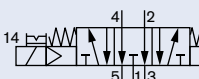
¹⁾ Junction box version on request

x = on request

6519
for extended
temperature range

Ordering chart for valves in stainless steel with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	C_{N_2} -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
Type 6519 Ex m - with moulded cable, 3 m long¹⁾									
5/2 WWH 	8.0	PU, NBR	G 1/4"	1980	3-10	1370	3	024/UC	x
								110/UC	x
								230/UC	278219 
5/2-bistable WWZ 	8.0	PU, NBR	G 1/4"	1920	3-10	1680	3	024/UC	278246 
								110/UC	x
								230/UC	x
5/3 WWL 	8.0	PU, NBR	G 1/4"	1770	3-10	1680	3	024/UC	x
								110/UC	x
								230/UC	x
5/3 WWN 	8.0	PU, NBR	G 1/4"	1770	3-10	1680	3	024/UC	x
								110/UC	x
								230/UC	x

¹⁾ Junction box version on request

x = on request

6519
for extended
temperature range

Type 6519 for extended Ex i temperature range

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.



Technical data	Aluminium	Stainless steel
Orifice Type 6519	9	9
Body material		
Pilot valve	Stainless steel	Stainless steel
Main valve	Aluminium ematal coated	Stainless steel 1.4571
Threaded socket material	in aluminium	in stainless steel
Seal material	FPM, NBR	PU, NBR, FPM
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air	
Compressed air quality	ISO 8573-1:2010, Class 7.2.4*	
Medium temperature	-30 °C to +80 °C	-30 °C to +80 °C
Ambient temperature	-40 °C to +75 °C	-30 °C to +75 °C
Pneumatic connection		
Supply port connection 1, 3, 5	Thread G 1/4, (on request NPT 1/4)	
Service port 2, 4	Thread G 1/4 (on request NPT 1/4)	
Voltage tolerance	+10%	
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508 (not in delivery, see accessories), check for correct polarity	
Type of protection	IP65 with cable plug	
Installation	As required, preferably with actuator upright	

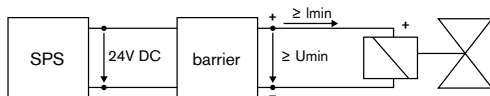
Response times	5/2	5/2-bi	5/3	3/2	5/2	5/2-bi
Opening [ms]	16	18	16	13	12	14
Closing [ms]	27	18	22	47	74	14

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Electrical data - coil AC10 Ex i		
Approvals	PTB 01 ATEX 2101 / PTB IECEx10.0019 II 2G Ex ia IIC T6 Gb II 2G Ex ia IIIC T80 °C Db	
Function values for Switching function valve¹⁾	at +20 °C	at +55 °C
Minimum switching current	29 mA	29 mA
Nominal resistance coil	310 Ω	360 Ω
Minimum terminal voltage	9.0 V	10.4 V
Conformity specifications		
U _i	35 V	
I _i	0.9 A	
P _i	1.1 W	

¹⁾ With high resistance coil on request

Note



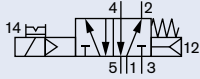


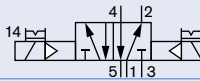


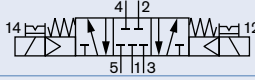





These units may only be used in explosive atmospheres in the manner approved by the Federal Institute of Physics and Technology (PTB), i.e., the permissible maximum electrical values must be complied with. Suitable barriers and isolating modules are available for this.

The valve is intended for operation on 24 V DC outputs via the intermediate switching of a corresponding intrinsically-safe operating resource (isolating module or barrier).

6519
for extended
temperature range

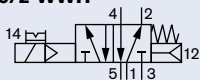


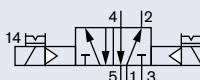


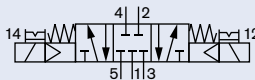


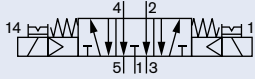


Ordering chart for valves in aluminium with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q _{min} -value air [l/min]	Pressure range [bar]	Weight [g]	Minimum switching current [mA]	Nominal resistance coil [Ohm]	Minimum terminal voltage [V]	Article no.
5/2 WWH 	9.0	FPM, NBR	G ¼"	1800	2.5-10	825	29	310	9	231452 
							23	481	11	231453 
5/2-bistable WWZ 	9.0	FPM, NBR	G ¼"	2100	2.5-10	1280	29	310	9	231454 
							23	481	11	231455 
5/3 WWL 	9.0	FPM, NBR	G ¼"	1500	2.5-10	1350	29	310	9	231456 
							23	481	11	231457 
5/3 WWN 	9.0	FPM, NBR	G ¼"	1500	2.5-10	1350	29	310	9	231458 
							23	481	11	231459 

Ordering chart for valves in stainless steel with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q _{min} -value air [l/min]	Pressure range [bar]	Weight [g]	Minimum switching current [mA]	Nominal resistance coil [Ohm]	Minimum terminal voltage [V]	Article no.
5/2 WWH 	8.0	PU, NBR	G ¼"	1980	3-10	1520	29	310	9	231460 
							23	481	11	231461 
5/2-bistable WWZ 	8.0	PU, NBR	G ¼"	1920	3-10	1970	29	310	9	231463 
							23	481	11	231464 
5/3 WWL 	8.0	PU, NBR	G ¼"	1770	3-10	1970	29	310	9	231465 
							23	481	11	231466 
5/3 WWN 	8.0	PU, NBR	G ¼"	1770	3-10	1970	29	310	9	231467 
							23	481	11	231468 

6519
for extended
temperature range



Type 6519 for extended NAMUR standard temperature range



Technical data	Aluminium	Stainless steel				
Orifice	6	6				
Body material						
Pilot valve	Stainless steel	Stainless steel				
Main valve	Aluminium ematal coated	Stainless steel 1.4571				
Threaded socket material	in aluminium	in stainless steel				
Seal material	FPM, NBR	PU, NBR, FPM				
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air					
Compressed air quality	ISO 8573-1:2010, Class 7.2.4*					
Medium temperature	-30 °C to +80 °C	-30 °C to +80 °C				
Ambient temperature	-40 °C to +80 °C	-30 °C to +80 °C				
Pneumatic connection	Supply port connection 1, 3, 5 Service port 2, 4					
Operating voltages	24 V DC 24/ 110/ 230 V/ 50-60 Hz					
Voltage tolerance	+10%					
Electr. power consumption	2 W					
Duty cycle	100% continuous operation					
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508					
Type of protection	IP65 with cable plug					
Installation	As required, preferably with actuator upright					
Response times	5/2	5/2-bi	5/3	3/2	5/2	5/2-bi
Opening [ms]	16	18	16	13	12	14
Closing [ms]	27	18	22	47	74	14

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Ordering chart for valves in aluminium with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q _{in} -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
3/2 WWC 	6.0	FPM, NBR	G 1/4"	780	3-10	540	2	024/DC	231469
								024/50-60	231470
								110/50-60	231471
								230/50-60	231472
5/2 WWH 	6.0	FPM, NBR	G 1/4"	800	3-10	540	2	024/DC	231473
								024/50-60	231474
								110/50-60	231475
								230/50-60	231476
5/2-bistable WWZ 	6.0	FPM, NBR	G 1/4"	900	3-10	540	2	024/DC	231477
								024/50-60	231478
								110/50-60	231479
								230/50-60	231480

6519
for extended
temperature range

Ordering chart for valves in stainless steel with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q_{N_2} -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
3/2 WWC 	6.0	PU, NBR	G 1/4"	1280	3-10	540	2	024/DC	231481
								024/50-60	231482
								110/50-60	231483
								230/50-60	231484
5/2 WWH 	6.0	PU, NBR	G 1/4"	1060	3-10	540	2	024/DC	231485
								024/50-60	231486
								110/50-60	231487
								230/50-60	231488
5/2-bistable WWZ 	6.0	PU, NBR	G 1/4"	1050	3-10	540	2	024/DC	231489
								024/50-60	231490
								110/50-60	231491
								230/50-60	231492

6519
for extended
temperature range



Type 6519 for extended NAMUR Ex m temperature range

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.



Technical data	Aluminium	Stainless steel				
Orifice	6	6				
Body material						
Pilot valve	Stainless steel	Stainless steel				
Main valve	Aluminium ematal coated	Stainless steel 1.4571				
Threaded socket material	in aluminium	in stainless steel				
Seal material	FPM, NBR	PU, NBR, FPM				
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air					
Compressed air quality	ISO 8573-1:2010, Class 7.2.4*					
Medium temperature	-30 °C to +80 °C	-30 °C to +80 °C				
Ambient temperature	-40 °C to +60 °C	-30 °C to +60 °C				
Pneumatic connection	Thread G ¼, (on request NPT ¼) NAMUR Flange					
Supply port connection 1, 3, 5						
Service port 2, 4						
Operating voltages	24 V DC 24/ 110/ 230 V/ 50-60 Hz					
Voltage tolerance	+10%					
Electr. power consumption	3 W					
Duty cycle	100% continuous operation					
Electrical connection	3 m cable, moulded junction box (without fuse) on request					
Type of protection	IP65					
Approvals						
Coil	PTB 14 ATEX 2023 X / IECEx PTB 14.0049 X II 2G Ex mb IIC T5 Gb II 2D Ex mb IIIC T 100 °C Db					
Junction box	EPS16 ATEX 1046 X / IECEx EPS 16.0021 X II 2G EX eb mb IIC T5 Gb II 2D EX mb tb IIIC T100 °C Db					
Installation	As required, preferably with actuator upright					
Response times	5/2	5/2-bi	5/3	3/2	5/2	5/2-bi
Opening [ms]	16	18	16	13	12	14
Closing [ms]	27	18	22	47	74	14

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Ordering chart for valves in aluminium with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q _N -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
Type 6519 Ex m - with moulded cable, 3 m long¹⁾									
3/2 WWC 	6.0	FPM, NBR	G ¼"	780	3-10	540	3	024/UC	x
								110/UC	x
								230/UC	x
5/2 WWH 	6.0	FPM, NBR	G ¼"	800	3-10	540	3	024/UC	278207
								110/UC	x
								230/UC	x
5/2-bistable WWZ 	6.0	FPM, NBR	G ¼"	900	3-10	540	3	024/UC	278242
								110/UC	x
								230/UC	x

¹⁾ Junction box version on request

x = on request

6519
for extended
temperature range

Ordering chart for valves in stainless steel with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q_{N_2} -value air [l/min]	Pressure range [bar]	Weight [g]	Nominal power [W]	Voltage/Frequency [V/Hz]	Article no.
Type 6519 Ex m - with moulded cable, 3 m long¹⁾									
3/2 WWC 	6.0	PU, NBR	G 1/4"	1280	3-10	960	3	024/UC	x
								110/UC	x
								230/UC	x
5/2 WWH 	6.0	PU, NBR	G 1/4"	1060	3-10	960	3	024/UC	x
								110/UC	x
								230/UC	x
5/2-bistable WWZ 	6.0	PU, NBR	G 1/4"	1050	3-10	1260	3	024/UC	x
								110/UC	x
								230/UC	x

¹⁾ Junction box version on request

x = on request

6519 for extended temperature range

Type 6519 for extended NAMUR Ex i temperature range

The maximum fluid temperature may never exceed the permissible temperature class (T4 135 °C, T5 100 °C, T6 85 °C) minus 5K.

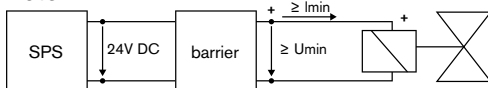


Technical data	Aluminium	Stainless steel				
Orifice Type 6519	6	6				
Body material						
Pilot valve	Stainless steel	Stainless steel				
Main valve	Aluminium ematal coated	Stainless steel 1.4571				
Threaded socket material	in aluminium	in stainless steel				
Seal material	FPM, NBR	PU, NBR, FPM				
Medium	Neutral medium, e.g. lubricated or non-lubricated compressed air					
Compressed air quality	ISO 8573-1:2010, Class 7.2.4*					
Medium temperature	-30 °C to +80 °C	-30 °C to +80 °C				
Ambient temperature	-40 °C to +75 °C	-30 °C to +75 °C				
Pneumatic connection	Supply port connection 1, 3, 5 Service port 2, 4					
	Thread G ¼, (on request NPT ¼) NAMUR Flange					
Voltage tolerance	+10%					
Electrical connection	Tag connector acc. to DIN EN 175301-803 (previously DIN 43650) Form A for cable plug Type 2508 (not in delivery, see accessories), check for correct polarity					
Type of protection	IP65 with cable plug					
Installation	As required, preferably with actuator upright					
Response times	5/2	5/2-bi	5/3	3/2	5/2	5/2-bi
Opening [ms]	16	18	16	13	12	14
Closing [ms]	27	18	22	47	74	14

* To prevent freezing of the expanded compressed air, the pressure dew point must be at least 10 K lower than the temperature of the medium.

Electrical data - coil AC10 Ex i		
Approvals	PTB 01 ATEX 2101 / PTB IECEx10.0019 II 2G Ex ia IIC T6 Gb II 2G Ex ia IIIC T80 °C Db	
Function values for Switching function valve*	at +20 °C	at +55 °C
Minimum switching current	29 mA	29 mA
Nominal resistance coil	310 Ohm	360 Ohm
Minimum terminal voltage	9.0 V	10.4 V
Conformity specifications		
U _i	35 V	
I _i	0.9 A	
P _i	1.1 W	

Note



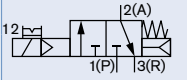
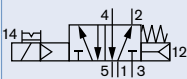
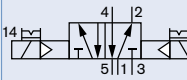
These units may only be used in explosive atmospheres in the manner approved by the Federal Institute of Physics and Technology (PTB), i.e., the permissible maximum electrical values must be complied with. Suitable barriers and isolating modules are available for this.

The valve is intended for operation on 24 V DC outputs via the intermediate switching of a corresponding intrinsically-safe operating resource (isolating module or barrier).

6519
for extended
temperature range

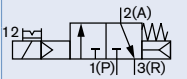
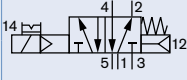
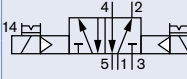
Ordering chart for valves in aluminium with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q_{Nn} -value air [l/min]	Pressure range [bar]	Weight [g]	Minimum switching current [mA]	Nominal resistance coil [Ohm]	Minimum terminal voltage[V]	Article no.
3/2 WWC 	6.0	FPM, NBR	G 1/4"	780	3-10	690	29	310	9	231520
							23	481	11	231521
5/2 WWH 	6.0	FPM, NBR	G 1/4"	800	3-10	690	29	310	9	231522
							23	481	11	231523
5/2 bistable WWZ 	6.0	FPM, NBR	G 1/4"	900	3-10	1140	29	310	9	231524
							23	481	11	231525

Ordering chart for valves in stainless steel with manual override (without manual override on request)

All products come with a standard stainless steel cap nut. This cap nut protects the exhaust channel from penetrating humidity.

Circuit function	Orifice [mm]	Seal material body	Threaded port connection [inch]	Q_{Nn} -value air [l/min]	Pressure range [bar]	Weight [g]	Minimum switching current [mA]	Nominal resistance coil [Ohm]	Minimum terminal voltage[V]	Article no.
3/2 WWC 	6.0	PU, NBR	G 1/4"	1280	3-10	1100	29	310	9	231526
							23	481	11	231527
5/2 WWH 	6.0	PU, NBR	G 1/4"	1060	3-10	1100	29	310	9	231528
							23	481	11	231529
5/2 bistable WWZ 	6.0	PU, NBR	G 1/4"	1050	3-10	1550	29	310	9	231530
							23	481	11	231531

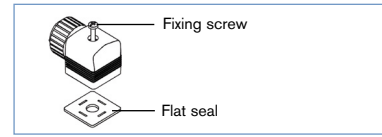
6519
for extended
temperature range

Accessories

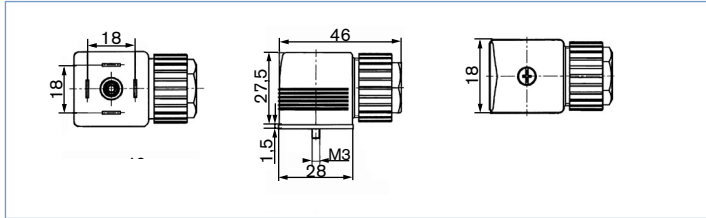
Cable plug 2508 acc. to DIN EN 175301-803 Form A

Included in delivery is a connector with flat seal and fixing screw.

For other cable plug versions acc. to DIN EN 175301-803 Form A (previously DIN 43650) with integrated circuitry, see datasheet Type 2508.



Dimensions Type 2508 [mm]


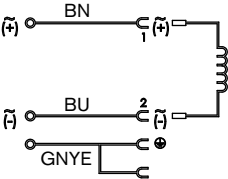


Ordering chart for cable plug 2508


Circuit	Voltage	Article no.
For standard version 6519 fixing screw in steel (galvanised and chrome-plated)		
without circuitry	0-250 V	008376
with LED	12-24 V	008360
with LED and varistor	12-24 V	008367
with LED and varistor	200-240 V	008369
For Ex i version 6519		
Fixing screw in stainless steel 1.4404 and blue compression gland nut		
without circuitry	0-250 V	438574
for further versions see datasheet 2508		

Cable plug Type 2513 acc. to DIN EN 175301-803, Form A

Meets the requirements of ATEX category 3 GD

		Cable length [mm]	Article no. [in mm]
		12000	260893
		5000	260892
		3000	260891
		300	260890

Ordering chart for further accessories

Accessories	Features	Article no.
Cap nut 	Cap nut in stainless steel for additional protection of the exhaust channel from penetrating humidity,	649554
Blanking plug	G ¼	780142
Silencer	G ¼	005064
Labelling plate	64 pieces	635416

Semi-delay fuse for 6519 NAMUR Ex m



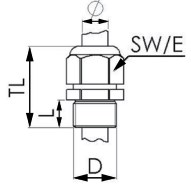


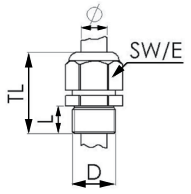
Voltage [V]	Max. current [mA]	Article no.
24 V	315 mA	153733
110 V	50 mA	153716
230 V	32 mA	153715

6519
for extended
temperature range

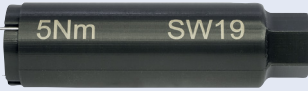

Accessories (continued)

Ex-Cable glands

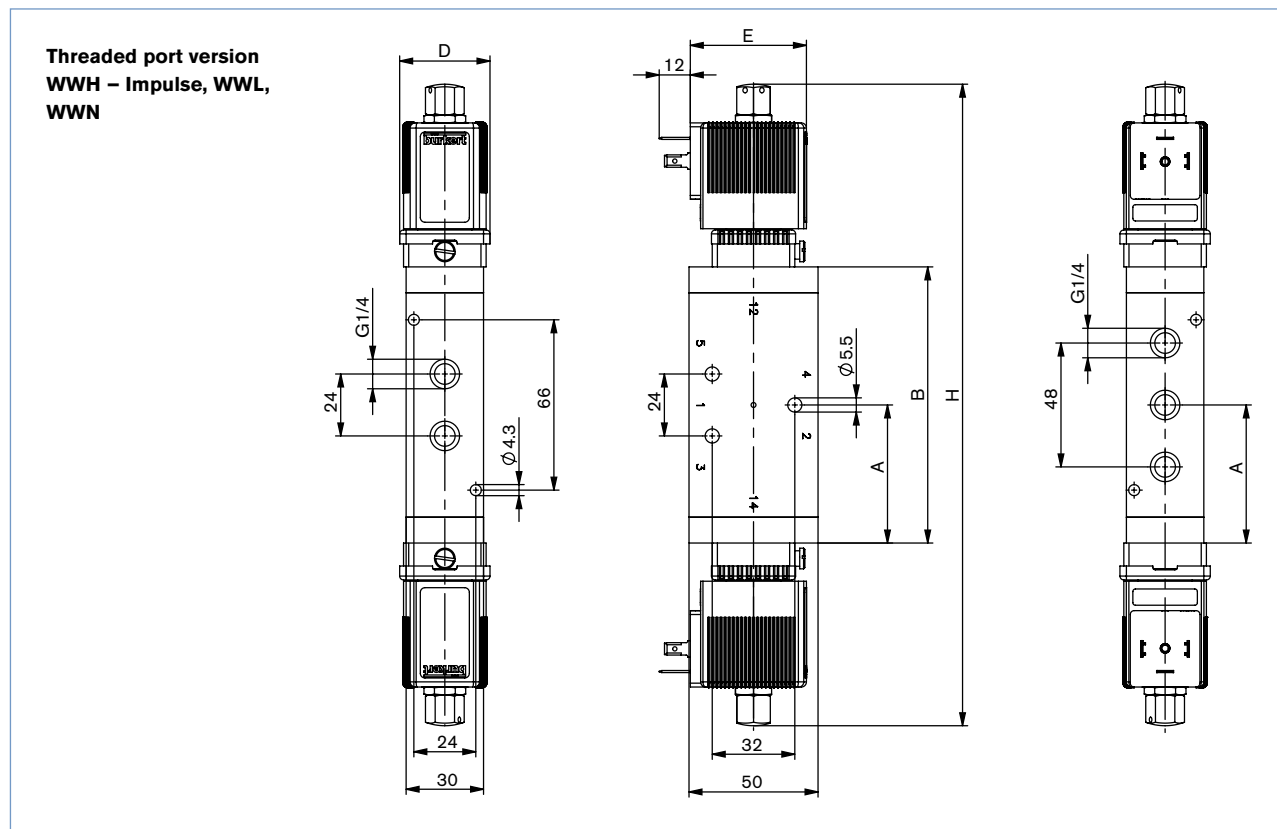
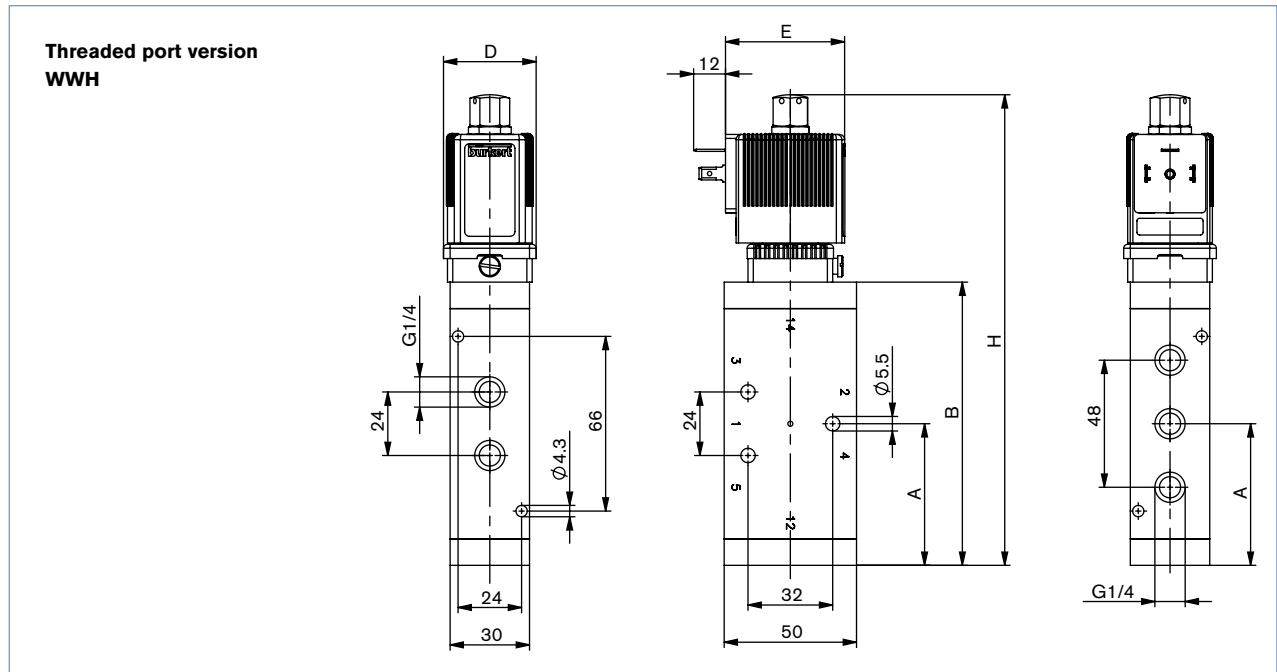
(polyamide version included in delivery / surcharge applied for brass nickel plated version)

Photo	Description	Ex Approvals		Article no	Drawing										
		Certification	Identifica- tion												
	Brass, nickel-plated, 6-13 mm	PTB 04 ATEX 1112 X, IECEx PTB 13.0027X	II 2 G Ex e IIC Gb, II 2 D Ex tb IIIC Db IP68,	773278 	 <table border="1"> <tr><td>TL</td><td>29-37 mm</td></tr> <tr><td>L</td><td>6 mm</td></tr> <tr><td>D</td><td>20</td></tr> <tr><td>SW</td><td>24 mm</td></tr> <tr><td>E</td><td>27 mm</td></tr> </table>	TL	29-37 mm	L	6 mm	D	20	SW	24 mm	E	27 mm
TL	29-37 mm														
L	6 mm														
D	20														
SW	24 mm														
E	27 mm														
	Polyamide, 7-13 mm	PTB 13 ATEX 1015 X, IECEx PTB 13.0034X	II 2 G Ex e IIC Gb, II 2 D Ex tb IIIC Db IP68	773277 	 <table border="1"> <tr><td>TL</td><td>36-45 mm</td></tr> <tr><td>L</td><td>10 mm</td></tr> <tr><td>D</td><td>20</td></tr> <tr><td>SW</td><td>24 mm</td></tr> <tr><td>E</td><td>28 mm</td></tr> </table>	TL	36-45 mm	L	10 mm	D	20	SW	24 mm	E	28 mm
TL	36-45 mm														
L	10 mm														
D	20														
SW	24 mm														
E	28 mm														

Special tool to turn the junction box (not included in delivery)

Photo	Description	Article no.
	Set SC02-AC10 Special wrench Service Manual	293488 

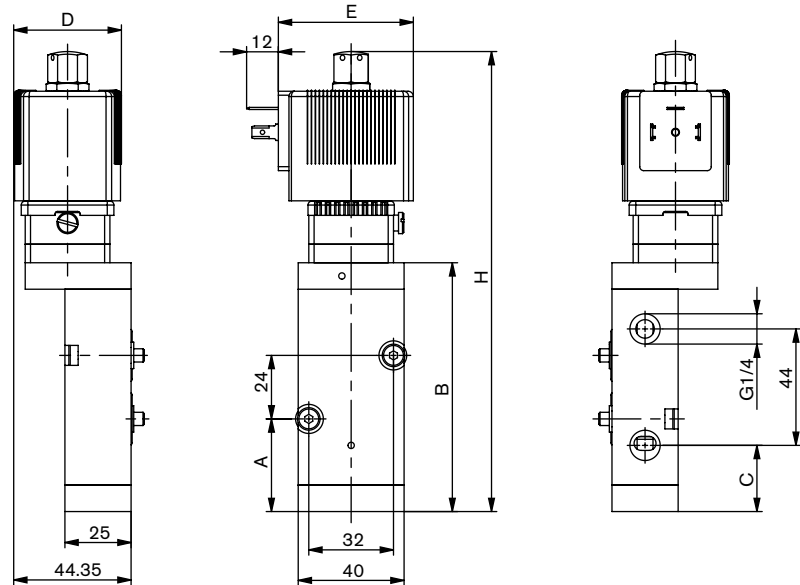
Dimensions [mm]



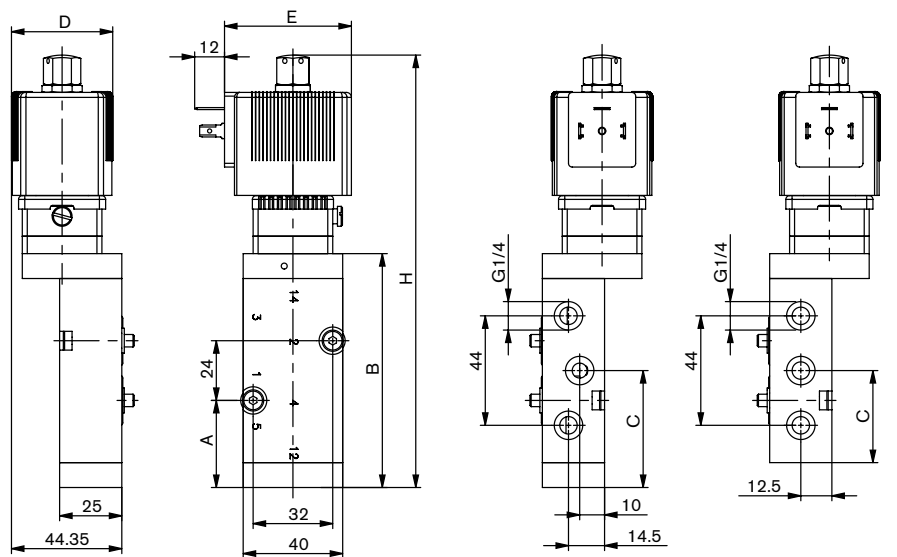
Version	Variants	A	B	D		E		H	
				Standard, Ex m	Ex i	Standard, Ex m	Ex i	Standard, Ex m	Ex i
WWH	Stainless steel	53.5	107	35	40.7	45	51	177.8	186.6
WWH	Aluminium	43.5	97	35	40.7	45	51	167.8	176.6
WWH – Impulse, WWL, WWN	Stainless steel	53.5	107	35	40.7	45	51	248.6	266.2
WWH – Impulse, WWL, WWN	Aluminium	53.5	107	35	40.7	45	51	148.6	266.2

Dimensions [mm]

NAMUR version
WWC



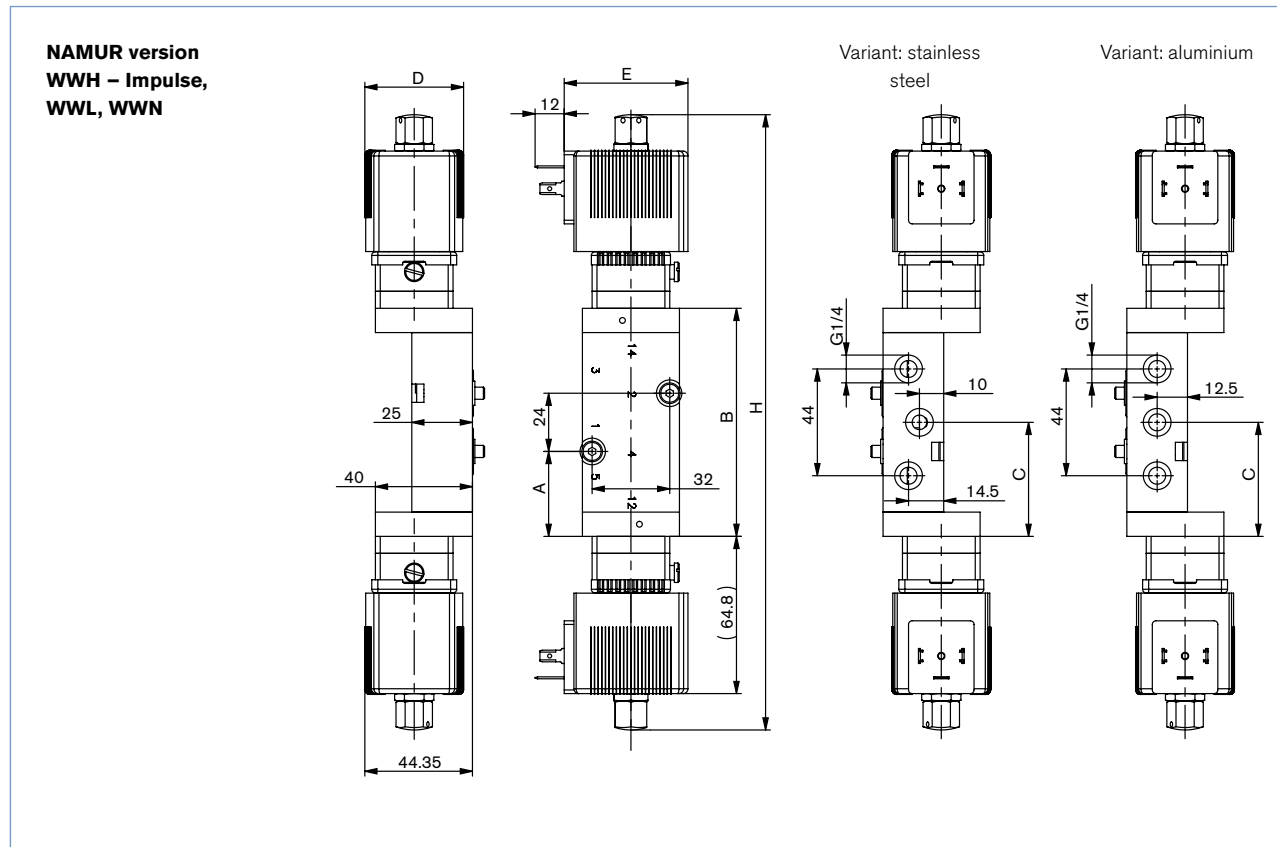
NAMUR version
WWH



Version	Variants	A	B	C	D		E		H	
					Standard	Ex m Ex i	Standard	Ex m Ex i	Standard	Ex m Ex i
WWC	Stainless steel	35	94	25	35	40.7	45	51	165	173.8
WWC	Aluminium	25	84	15	35	40.7	45	51	155	163.8
WWH	Stainless steel	35	94	47	35	40.7	45	51	165	173.8
WWH	Aluminium	25	84	37	35	40.7	45	51	155	163.8
WWH – Impulse, WWL, WWN	Stainless steel	35	94	47	35	40.7	45	51	236	253.6
WWH – Impulse, WWL, WWN	Aluminium	35	94	47	35	40.7	45	51	236	253.6

6519
for extended
temperature range

Dimensions [mm]

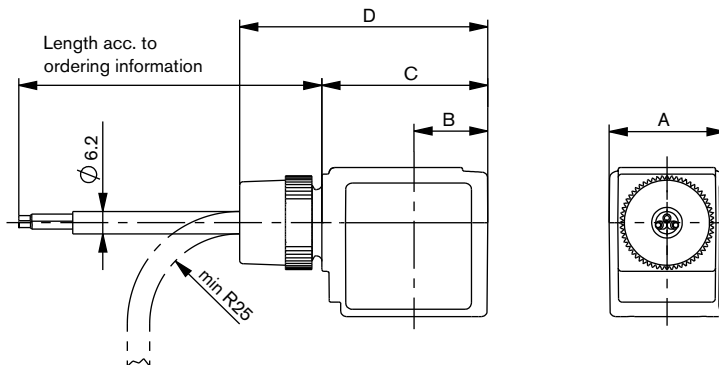


Version	Variants	A	B	C	D		E		H	
					Standard, Ex m	Ex i	Standard, Ex m	Ex i	Standard, Ex m	Ex i
WWC	Stainless steel	35	94	25	35	40.7	45	51	165	173.8
WWC	Aluminium	25	84	15	35	40.7	45	51	155	163.8
WWH	Stainless steel	35	94	47	35	40.7	45	51	165	173.8
WWH	Aluminium	25	84	37	35	40.7	45	51	155	163.8
WWH – Impulse, WWL, WWN	Stainless steel	35	94	47	35	40.7	45	51	236	253.6
WWH – Impulse, WWL, WWN	Aluminium	35	94	47	35	40.7	45	51	236	253.6

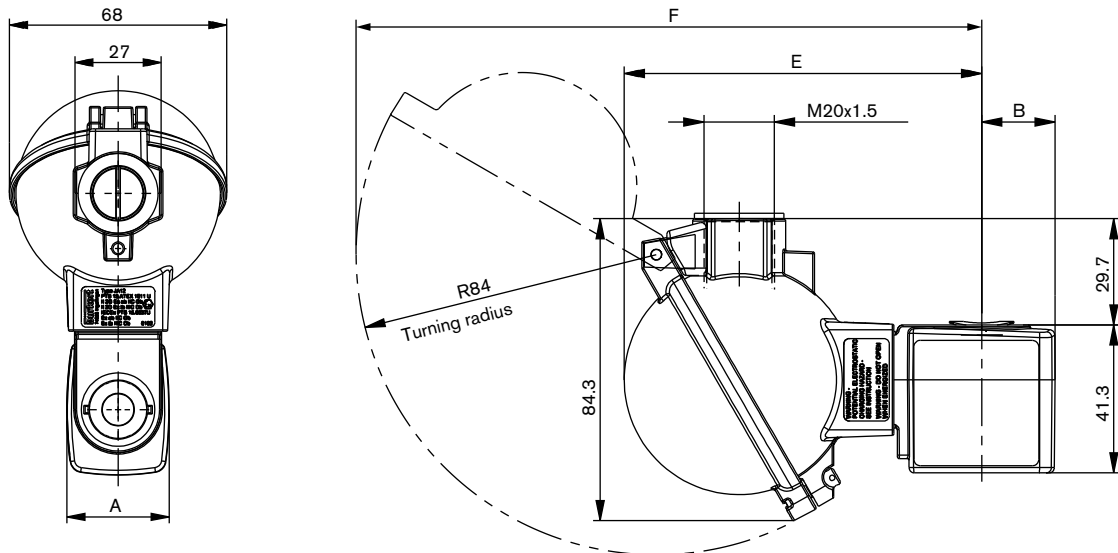
6519
for extended
temperature range

Dimensions - Atex Approvals [mm]

Cable coil



Junction box



Coil size	A	B	C	D	E	F
5	32	20.5	46	68.8	99.8	174.7
6	40	23.5	52	74.8	102.8	177.7

DTS 1000011067 EN Version: R Status: RL (released | freigegeben | valide) printed: 21.09.2018

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In case of special application conditions,
please consult for advice.

Subject to alterations
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1809/17_EU-en_00891764

Pressure switch hex 27

Changeover switch with silver or gold contacts

www.suco.de



- **Easily adjustable switching point.**
- **Factory adjustable hysteresis (except type 0140/0141) ¹⁾.**
- **High overpressure safety and long life even under harsh operating conditions.**
- **Ready-wired versions with your desired connectors (see p. 38).**
- **Deliverable with socket device or protective cap according to IP65.**

Technical data

Temperature stability for diaphragm / seal materials:	NBR	-40°C – +100°C
	EPDM	-30°C – +120°C
	FKM	-5°C – +120°C
	Silicone	-40°C – +120°C
	HNBR	-30°C – +120°C
Switching frequency:	200 / min.	
Mechanical life expectancy:	10 ⁶ cycles (life expectancy of diaphragm pressure switches only for pressures up to max. 50 bar)	
Pressure rise rate:	≤ 1 bar / ms	
Hysteresis (Only preset at factory):	adjustable average value 10-30% depending on type Type 0140/0141 not adjustable	
Vibration resistance:	10 g / 5 – 200 Hz sine-wave	
Shock resistance:	294 m / s ² ; 14 ms half-sine-wave	
Degree of protection:	IP65 with suitable connector installed terminals IP00	
Weight in grams:	0140 / 0141 0170 / 0171, 0180 / 0181, 0183, 0186, 0187, 0190 / 0191, 0196, 0197	approx. 100 g
	0184 / 0185, 0194 / 0195	approx. 130 g

¹⁾ Our pre-set switches are sealed with lacquer paint and the set pressure is embossed on the body.



Electrical values

Rated operating voltage U_e	Rated operational current I_e	Utilisation category ²
250 Volt AC 50 / 60 Hz	4 Ampere (2 Ampere) ¹	AC 12
250 Volt AC 50 / 60 Hz	1 Ampere	AC 14
24 Volt DC	4 / 2 Ampere (2 / 1 Ampere) ¹	DC 12 / DC 13
50 Volt DC	2 / 1 Ampere (1 / 0.5 Ampere) ¹	DC 12 / DC 13
75 Volt DC	1 / 0.5 Ampere (0.5 / 0.25 Ampere) ¹	DC 12 / DC 13
125 Volt DC	0.3 / 0.2 Ampere (0.2 / 0.1 Ampere) ¹	DC 12 / DC 13
250 Volt DC	0.25 / 0.2 Ampere (0.15 / 0.1 Ampere) ¹	DC 12 / DC 13
Rated insulation voltage U_i :	300 Volt	
Rated operating current I_{imp} :	2.5 kV (4 kV) ¹	
Rated thermal current I_{the} :	5 Ampere	
Switching overvoltage:	< 2.5 kV	
Rated frequency:	DC and 50 / 60 Hz	
Short circuit current rating of the device:	to 5 Ampere (to 3.5 Ampere) ¹	
Rated short-circuit current:	< 350 Ampere	
IP class of protection according to EN60529:1991+A1:1999:	IP65 with socket device	
Tightening torque of terminal screws:	< 0.35 Nm (concerns only type 0140 / 0141, 0184 / 0185, 0194 / 0195)	
Cable diameter:	0.5 – 1.5 mm ²	

¹⁾ Figures in brackets for series 0140 / 0141

²⁾ Explanations see page 9

CE marking

SUCO pressure switches rated with an operating limit of 250 V are covered by the Low Voltage Directive 73/23/EC.

An EC Declaration of Conformity has been issued for these pressure switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.

Degree of protection IPXX

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar (50 bar for stainless steel enclosures) must not be exceeded.

Switching performance and materials overview

Type	0140	0141	0170	0171	0180	0181	0183	0184	0185	0186	0187	0190	0191	0194	0195	0196	0197
24 V												■	■	■	■	■	■
42 V			■	■													
250 V	■	■			■	■	■	■	■	■	■						
50 mA												■	■	■	■	■	■
2 A	■	■															
4 A			■	■	■	■	■	■	■	■	■						
Gold contacts												■	■	■	■	■	■
Silver contacts	■	■	■	■	■	■	■	■	■	■	■						
Adjustable hysteresis			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Zinc-plated steel (CrVI-free)	■	■	■	■	■	■	■	■	■			■	■	■	■		
Stainless steel 1.4305										■	■					■	■
DIN-socket device								■	■					■	■		



- Socket device IP65 or rubber capped IP54 for increased protection
- Easy installation with mountable socket device
- Thread adapters for special threads

hex 27 accessories



Rubber protective cap

with two cable feeds for 1.7 to 2.3 mm diameter cable

When rubber cap attached IP54

Suitable for voltages up to 42 V



Socket device

Threaded connection Pg9 (Tightening range 6 - 9 mm)

When attached to socket device IP65

Suitable for voltages up to 250 V



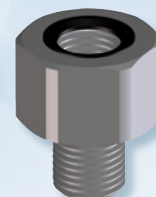
Socket device with indicator light

According to DIN EN 175301- 803-A (DIN 43650)

Threaded connection Pg9 (Tightening range 6 - 9 mm)

When attached to socket device IP65

Suitable for 24 V or 250 V



Thread adapter for special threads

from G1/4-DIN3852-E to R1/4 acc. to DIN 2999

including FKM seals

0170 / 0171

0180 / 0181

0183

0184 / 0185

0190 / 0191

0194 / 0195

0186 / 0187

0196 / 0197

Order number:

1-1-70-621-007

1-1-80-652-002

24 VDC: 1-1-84-652-011

1-1-00-420-009

250 VAC: 1-1-84-652-010

- Zinc-plated steel body (CrVI-free)
- With integrated changeover switch and silver contacts
- Overpressure safe up to 300 / 600 bar¹⁾
- Incl. polyamide cap, degree of protection IP65



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:			
-----------------------------	----------------------------	----------------------------------	--------	---------------	--	--	--

0140 Diaphragm pressure switch with screw terminals

300 ¹⁾	0.3 – 1.5	± 0.2	G 1/4	0140	457 03	X	003
			NPT 1/8	0140	457 04	X	300
			NPT 1/4	0140	457 09	X	305
			7/16-20 UNF	0140	457 20	X	310
			9/16-18 UNF	0140	457 21	X	315
	1 – 10	± 0.5	G 1/4	0140	458 03	X	006
			NPT 1/8	0140	458 04	X	301
			NPT 1/4	0140	458 09	X	306
			7/16-20 UNF	0140	458 20	X	311
			9/16-18 UNF	0140	458 21	X	316
	10 – 20	± 1.0	G 1/4	0140	459 03	X	009
			NPT 1/8	0140	459 04	X	302
			NPT 1/4	0140	459 09	X	307
			7/16-20 UNF	0140	459 20	X	312
			9/16-18 UNF	0140	459 21	X	317
	20 – 50	± 2.0	G 1/4	0140	461 03	X	012
			NPT 1/8	0140	461 04	X	303
			NPT 1/4	0140	461 09	X	308
			7/16-20 UNF	0140	461 20	X	313
			9/16-18 UNF	0140	461 21	X	318

0141 Piston pressure switch with screw terminals

600 ¹⁾	50 – 150	± 5.0	G 1/4	0141	460 03	X	003
			NPT 1/8	0141	460 04	X	304
			NPT 1/4	0141	460 09	X	309
			7/16-20 UNF	0141	460 20	X	314
			9/16-18 UNF	0141	460 21	X	319

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

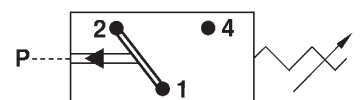
Order number: 014X - XXX XX - X-XXX

Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Protection class 2, protective insulation
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.

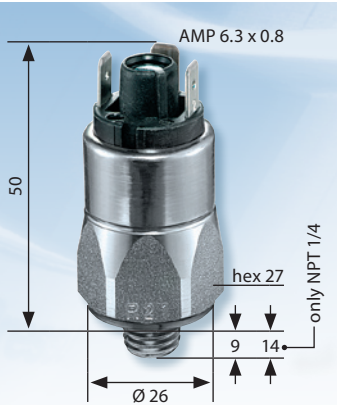


¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

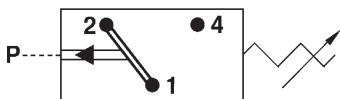


- Zinc-plated steel body (CrVI-free)
- With changeover switch and silver contacts
- Overpressure safe up to 100 / 300 / 600 bar ¹⁾
- Hysteresis adjustable at works

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
-----------------------------	----------------------------	----------------------------------	--------	---------------

0170 Diaphragm pressure switch with spade terminals

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0170	457 01	X	001
			M 12x1.5	0170	457 02	X	002
			G 1/4	0170	457 03	X	003
			NPT 1/8	0170	457 04	X	318
			NPT 1/4	0170	457 09	X	314
			7/16-20 UNF	0170	457 20	X	301
			9/16-18 UNF	0170	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0170	458 01	X	040
			M 12x1.5	0170	458 02	X	041
			G 1/4	0170	458 03	X	042
			NPT 1/8	0170	458 04	X	343
			NPT 1/4	0170	458 09	X	340
			7/16-20 UNF	0170	458 20	X	341
			9/16-18 UNF	0170	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0170	459 01	X	007
			M 12x1.5	0170	459 02	X	008
			G 1/4	0170	459 03	X	009
			NPT 1/8	0170	459 04	X	320
			NPT 1/4	0170	459 09	X	316
			7/16-20 UNF	0170	459 20	X	305
			9/16-18 UNF	0170	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0170	461 01	X	010
			M 12x1.5	0170	461 02	X	011
			G 1/4	0170	461 03	X	012
			NPT 1/8	0170	461 04	X	321
			NPT 1/4	0170	461 09	X	317
			7/16-20 UNF	0170	461 20	X	307
			9/16-18 UNF	0170	461 21	X	308

0171 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0171	460 01	X	001
			M 12x1.5	0171	460 02	X	002
			G 1/4	0171	460 03	X	003
			NPT 1/8	0171	460 04	X	304
			NPT 1/4	0171	460 09	X	303
			7/16-20 UNF	0171	460 20	X	301
			9/16-18 UNF	0171	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

Order number:	017X - XXX XX - X - XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With changeover switch and silver contacts
- Overpressure safe up to 100 / 300 / 600 bar ¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0180 Diaphragm pressure switch with spade terminals

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0180	457 01	X	001
			M 12x1.5	0180	457 02	X	002
			G 1/4	0180	457 03	X	003
			NPT 1/8	0180	457 04	X	318
			NPT 1/4	0180	457 09	X	314
			7/16-20 UNF	0180	457 20	X	301
			9/16-18 UNF	0180	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0180	458 01	X	040
			M 12x1.5	0180	458 02	X	041
			G 1/4	0180	458 03	X	042
			NPT 1/8	0180	458 04	X	343
			NPT 1/4	0180	458 09	X	340
			7/16-20 UNF	0180	458 20	X	341
			9/16-18 UNF	0180	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0180	459 01	X	007
			M 12x1.5	0180	459 02	X	008
			G 1/4	0180	459 03	X	009
			NPT 1/8	0180	459 04	X	320
			NPT 1/4	0180	459 09	X	311
			7/16-20 UNF	0180	459 20	X	305
			9/16-18 UNF	0180	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0180	461 01	X	010
			M 12x1.5	0180	461 02	X	011
			G 1/4	0180	461 03	X	012
			NPT 1/8	0180	461 04	X	321
			NPT 1/4	0180	461 09	X	312
			7/16-20 UNF	0180	461 20	X	307
			9/16-18 UNF	0180	461 21	X	308

0181 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0181	460 01	X	001
			M 12x1.5	0181	460 02	X	002
			G 1/4	0181	460 03	X	003
			NPT 1/8	0181	460 04	X	304
			NPT 1/4	0181	460 09	X	303
			7/16-20 UNF	0181	460 20	X	301
			9/16-18 UNF	0181	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

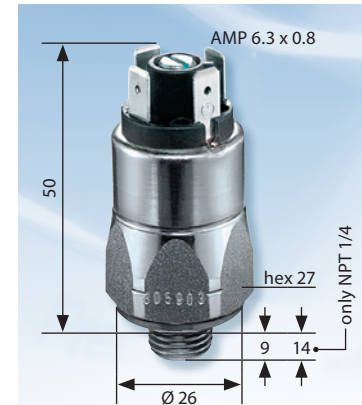
Temperature ranges of diaphragm / seal materials see page 26

Order number:	018X - XXX XX - X - XXX
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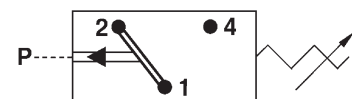
Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

With male thread



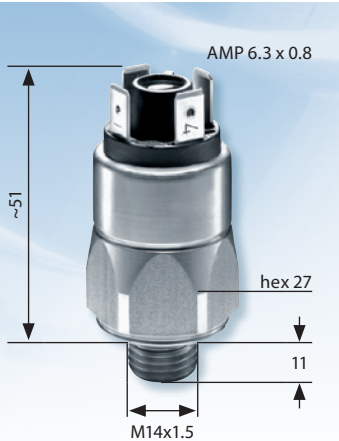
- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28



Thread similar ISO 6149-3
(Incl. O-ring for sealing)



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



- Zinc-plated steel body (CrVI-free)
- With changeover switch and silver contacts
- Overpressure safe up to 600 bar¹⁾, hysteresis adjustable at works
- Adjustment range: 100 – 400 bar
- Installation height only 62 mm

p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0183 Piston pressure switch with spade terminals

600 ¹⁾	100 – 300	± 10.0	M 14x1.5	0183	462	45	X	051
	200 – 400			0183	463	45	X	061

Seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of seal materials see page 26

Order number:	0183 - XXX 45 - X - XXX
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Accessories

Adapter From M 14 x 1.5 to G 1/4	Adapter From M 14 x 1.5 to M 12 x 1.5	Adapter From M 14 x 1.5 to NPT 1/8
<p>Order number: 1-1-83-420-006</p>	<p>Order number: 1-1-83-420-007</p>	<p>Order number: 1-1-83-420-008</p>

Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.



Accessories see page 28

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With socket device similar to DIN EN 175301 (DIN 43650)
- With changeover switch and silver contacts
- Overpressure safe up to 100 / 300 / 600 bar¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0184 Diaphragm pressure switch

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0184	457 01	X	001
			M 12x1.5	0184	457 02	X	002
			G 1/4	0184	457 03	X	003
			NPT 1/8	0184	457 04	X	318
			NPT 1/4	0184	457 09	X	314
			7/16-20 UNF	0184	457 20	X	301
9/16-18 UNF	0184	457 21	X	302			

	1 – 10	± 0.5	M 10x1 con.	0184	458 01	X	040
			M 12x1.5	0184	458 02	X	041
			G 1/4	0184	458 03	X	042
			NPT 1/8	0184	458 04	X	343
			NPT 1/4	0184	458 09	X	340
			7/16-20 UNF	0184	458 20	X	341
9/16-18 UNF	0184	458 21	X	342			

300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0184	459 01	X	007
			M 12x1.5	0184	459 02	X	008
			G 1/4	0184	459 03	X	009
			NPT 1/8	0184	459 04	X	320
			NPT 1/4	0184	459 09	X	311
			7/16-20 UNF	0184	459 20	X	305
9/16-18 UNF	0184	459 21	X	306			

	10 – 100	± 3.0 – 5.0	M 10x1 con.	0184	461 01	X	010
			M 12x1.5	0184	461 02	X	011
			G 1/4	0184	461 03	X	012
			NPT 1/8	0184	461 04	X	321
			NPT 1/4	0184	461 09	X	312
			7/16-20 UNF	0184	461 20	X	307
9/16-18 UNF	0184	461 21	X	308			

0185 Piston pressure switch

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0185	460 01	X	001
			M 12x1.5	0185	460 02	X	002
			G 1/4	0185	460 03	X	003
			NPT 1/8	0185	460 04	X	304
			NPT 1/4	0185	460 09	X	303
			7/16-20 UNF	0185	460 20	X	301
9/16-18 UNF	0185	460 21	X	302			

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

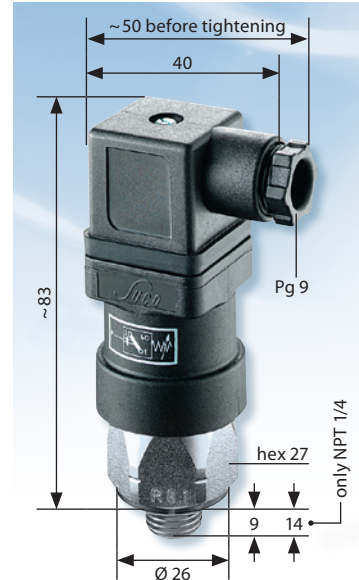
Temperature ranges of diaphragm / seal materials see page 26

Order number:	018X - XXX XX - X - XXX
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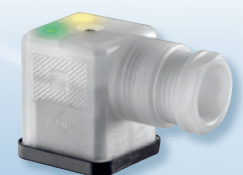
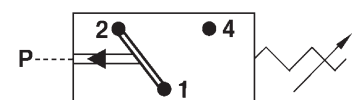
Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.

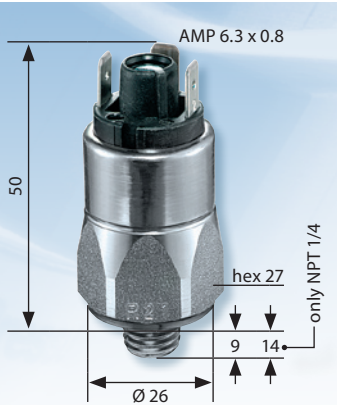


Accessories see page 28



- Zinc-plated steel body (CrVI-free), with spade terminals
- With changeover switch
- Max. voltage 24 V
- Overpressure safe up to 100/300/600 bar¹⁾
- Hysteresis adjustable at works

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0190 Diaphragm pressure switch with spade terminals

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0190	457 01	X	001
			M 12x1.5	0190	457 02	X	002
			G 1/4	0190	457 03	X	003
			NPT 1/8	0190	457 04	X	318
			NPT 1/4	0190	457 09	X	314
			7/16-20 UNF	0190	457 20	X	301
			9/16-18 UNF	0190	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0190	458 01	X	040
			M 12x1.5	0190	458 02	X	041
			G 1/4	0190	458 03	X	042
			NPT 1/8	0190	458 04	X	343
			NPT 1/4	0190	458 09	X	340
			7/16-20 UNF	0190	458 20	X	341
			9/16-18 UNF	0190	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0190	459 01	X	007
			M 12x1.5	0190	459 02	X	008
			G 1/4	0190	459 03	X	009
			NPT 1/8	0190	459 04	X	320
			NPT 1/4	0190	459 09	X	316
			7/16-20 UNF	0190	459 20	X	305
			9/16-18 UNF	0190	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0190	461 01	X	010
			M 12x1.5	0190	461 02	X	011
			G 1/4	0190	461 03	X	012
			NPT 1/8	0190	461 04	X	321
			NPT 1/4	0190	461 09	X	317
			7/16-20 UNF	0190	461 20	X	307
			9/16-18 UNF	0190	461 21	X	308

0191 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0191	460 01	X	001
			M 12x1.5	0191	460 02	X	002
			G 1/4	0191	460 03	X	003
			NPT 1/8	0191	460 04	X	304
			NPT 1/4	0191	460 09	X	303
			7/16-20 UNF	0191	460 20	X	301
			9/16-18 UNF	0191	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

Order number:	019X - XXX XX - X-XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With socket device similar to DIN EN 175301 (DIN 43650)
- With changeover switch
- Overpressure safe up to 100/300/600 bar¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0194 Diaphragm pressure switch

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0194	457 01	X	001
			M 12x1.5	0194	457 02	X	002
			G 1/4	0194	457 03	X	003
			NPT 1/8	0194	457 04	X	318
			NPT 1/4	0194	457 09	X	314
			7/16-20 UNF	0194	457 20	X	301
			9/16-18 UNF	0194	457 21	X	302

	1 – 10	± 0.5	M 10x1 con.	0194	458 01	X	040
			M 12x1.5	0194	458 02	X	041
			G 1/4	0194	458 03	X	042
			NPT 1/8	0194	458 04	X	343
			NPT 1/4	0194	458 09	X	340
			7/16-20 UNF	0194	458 20	X	341
			9/16-18 UNF	0194	458 21	X	342

300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0194	459 01	X	007
			M 12x1.5	0194	459 02	X	008
			G 1/4	0194	459 03	X	009
			NPT 1/8	0194	459 04	X	320
			NPT 1/4	0194	459 09	X	311
			7/16-20 UNF	0194	459 20	X	305
			9/16-18 UNF	0194	459 21	X	306

	10 – 100	± 3.0 – 5.0	M 10x1 con.	0194	461 01	X	010
			M 12x1.5	0194	461 02	X	011
			G 1/4	0194	461 03	X	012
			NPT 1/8	0194	461 04	X	321
			NPT 1/4	0194	461 09	X	312
			7/16-20 UNF	0194	461 20	X	307
			9/16-18 UNF	0194	461 21	X	308

0195 Piston pressure switch

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0195	460 01	X	001
			M 12x1.5	0195	460 02	X	002
			G 1/4	0195	460 03	X	003
			NPT 1/8	0195	460 04	X	304
			NPT 1/4	0195	460 09	X	303
			7/16-20 UNF	0195	460 20	X	301
			9/16-18 UNF	0195	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

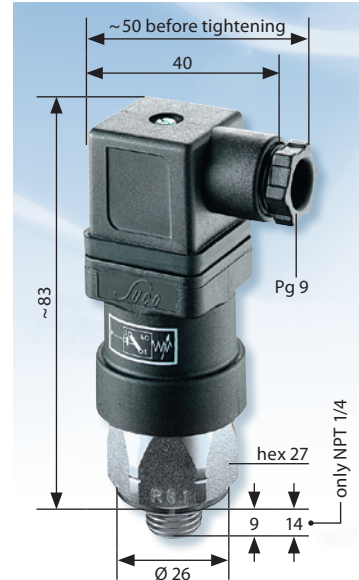
Temperature ranges of diaphragm / seal materials see page 26

Order number:	019X - XXX XX - X-XXX
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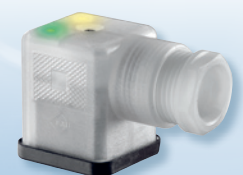
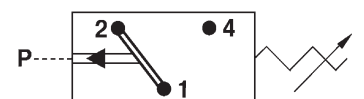
Piston pressure switches are only to a limited extent suitable for use with gases.
See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28



- Stainless steel (1.4305 / AISI 303) body
- With changeover switch and silver contacts
- Max. voltage 250 V
- Overpressure safe up to 300/600 bar¹⁾
- Hysteresis adjustable at works

With male thread



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0186 Diaphragm pressure switch with spade terminals

300 ¹⁾	0.5 – 5	± 0.2	G 1/4	0186	457 03	X	003
	1 – 10	± 0.5		0186	458 03	X	006
	10 – 50	± 3.0		0186	459 03	X	009
	10 – 100	± 3.0 – 5.0		0186	461 03	X	012

0187 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	G 1/4	0187	460 03	X	003
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Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water ²⁾ , Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

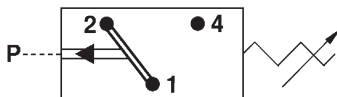
Temperature ranges of diaphragm / seal materials see page 26

²⁾ Not recommended for piston pressure switches.

Order number:	018X - XXX 03 - X-XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Stainless steel (1.4305 / AISI 303) body
- With changeover switch and gold contacts
- Max. voltage 24 V
- Overpressure safe up to 300/600 bar¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0196 Diaphragm pressure switch with spade terminals

300 ¹⁾	0.5 – 5	± 0.2	G 1/4	0196	457 03	X	003
	1 – 10	± 0.5		0196	458 03	X	006
	10 – 50	± 3.0		0196	459 03	X	009
	10 – 100	± 3.0 – 5.0		0196	461 03	X	012

0197 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	G 1/4	0197	460 03	X	003
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Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water ²⁾ , Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

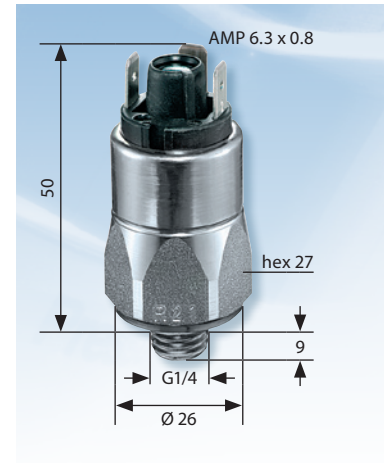
Temperature ranges of diaphragm / seal materials see page 26

²⁾ Not recommended for piston pressure switches.

Order number:	019X - XXX 03 - X-XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

With male thread



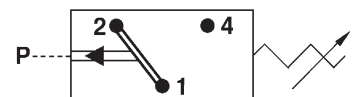
■ Our pressure switches are also available with factory pre-set switching points.

■ Ready-wired versions can be found starting on page 38 following.

■ We offer other body materials and connecting threads upon request.

■ Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.

■ For further technical data see page 26/27.



Accessories see page 28

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

Magnetic float switch, model FLS

EN

Schwimmer-Magnetschalter, Typ FLS

DE

CE



Stainless steel version
mounting thread

Plastic version
flange connection

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Prior to starting any work, read the operating instructions!

Keep for later use!

Vor Beginn aller Arbeiten Betriebsanleitung lesen!

Zum späteren Gebrauch aufbewahren!

Contents

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Declarations of conformity can be found online at www.wika.com.

1. General information

1. General information

EN

- The magnetic float switches described in the operating instructions have been designed and manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001.
- These operating instructions contain important information on handling the instrument. Working safely requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time. Pass the operating instructions on to the next operator or owner of the instrument.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The general terms and conditions contained in the sales documentation shall apply.
- Subject to technical modifications.
- Further information:
 - Internet address: www.wika.de / www.wika.com
 - Relevant data sheet: LM 30.01

Abbreviations, definitions

L-SP	Level switch point
T-SP	Temperature switch point
NO/NC	Normally open/normally closed
CO	Change-over

2. Design and function

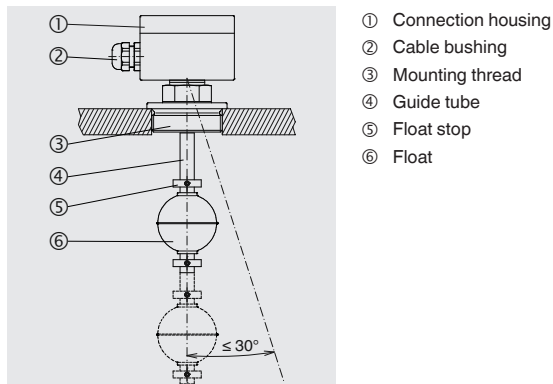
EN

2. Design and function

2.1 Functional description

Magnetic float switches work on the float principle with magnetic transmission. A reed contact integrated in the guide tube ④ is actuated through the magnetic field of a permanent magnet, when a preset switch point is reached. The permanent magnet is located within a float ⑥, which changes its height with the level of the medium it is monitoring. The switching status of the reed contact can be evaluated and processed by a connected control device.

The number and arrangement of floats is dependent on the number of the defined switch points, their contact function and also the distance between the the switch points.



2.2 Scope of delivery

Cross-check scope of delivery with delivery note.

3. Safety

3. Safety

3.1 Explanation of symbols

EN



DANGER!

... indicates a directly dangerous situation resulting in serious injury or death, if not avoided.



WARNING!

... indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.



CAUTION!

... indicates a potentially dangerous situation that can result in light injuries or damage to property or the environment, if not avoided.



Information

... points out useful tips, recommendations and information for efficient and trouble-free operation.

3.2 Intended use

Magnetic float switches are used exclusively for monitoring the levels of liquid media. The scope of application is defined by the technical performance limits and materials.

- The liquids must not have any large contamination or coarse particulates and must not have a tendency to crystallise. Ensure that the wetted materials of the magnetic float switch are sufficiently resistant to the medium being monitored. Not suitable for dispersions, abrasive liquids, highly viscous media and colours.
- This instrument is not permitted to be used in hazardous areas! Excluded are magnetic float switches which are marked as simple electrical equipment per EN 60079-11 section 5.7.

3. Safety

EN

- The operating conditions specified in the operating instructions must be observed.
- Do not operate the instrument in the direct vicinity of ferromagnetic environments (min. distance 50 mm).
- Do not operate the instrument in the immediate vicinity of strong electromagnetic fields or in the immediate vicinity of equipment that can be affected by magnetic fields (min. clearance 1 m).
- The magnetic float switches must not be exposed to heavy mechanical strain (impact, bending, vibration).
- The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of its technical specifications requires the instrument to be taken out of service immediately and inspected by an authorised WIKA service engineer.

The instrument has been designed and built solely for the intended use described here, and may only be used accordingly.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.



DANGER!

Work on vessels involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.).

3. Safety

3.3 Improper use

Improper use is defined as any application that exceeds the technical performance limits or is not compatible with the materials.

EN



WARNING!

Injuries through improper use

Improper use of the instrument can lead to hazardous situations and injuries.

- ▶ Refrain from unauthorised modifications to the instrument.
- ▶ Do not use the instrument within hazardous areas.

Any use beyond or different to the intended use is considered as improper use.

Do not use this instrument in safety or emergency stop devices.

3.4 Responsibility of the operator

The instrument is used in the industrial sector. The operator is therefore responsible for legal obligations regarding safety at work.

The safety instructions within these operating instructions, as well as the safety, accident prevention and environmental protection regulations for the application area must be maintained.

To ensure safe working on the instrument, the operating company must ensure the following:

- The operating personnel are regularly instructed in all topics regarding work safety, first aid and environmental protection and know the operating instructions and in particular, the safety instructions contained therein.
- The operating personnel have read the operating instructions and taken note of the safety instructions contained therein.
- The intended use for the application is complied with.
- Following testing, improper use of the instrument is excluded.

3. Safety

3.5 Personnel qualification



WARNING!

Risk of injury should qualification be insufficient

Improper handling can result in considerable injury and damage to equipment.

- ▶ The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.

Skilled personnel

Skilled personnel, authorised by the operator, are understood to be personnel who, based on their technical training, knowledge of measurement and control technology and on their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognising potential hazards.

3.6 Personal protective equipment

The personal protective equipment is designed to protect the skilled personnel from hazards that could impair their safety or health during work. When carrying out the various tasks on and with the instrument, the skilled personnel must wear personal protective equipment.

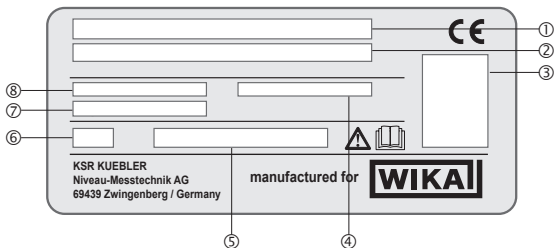
Follow the instructions displayed in the work area regarding personal protective equipment!

The requisite personal protective equipment must be provided by the operating company.

3. Safety

3.7 Labelling, safety marks

Product label (examples)



- ① Model, designation
- ② Instrument code
- ③ L1 ... Ln: Switch point specification in mm
- ④ Article number
- ⑤ Switching power
- ⑥ Ingress protection per IEC/EN 60529
- ⑦ Measuring point number
- ⑧ Serial number



Before mounting and commissioning the instrument, ensure you read the operating instructions!

4. Transport ... / 5. Commissioning, operation

EN

4. Transport, packaging and storage

4.1 Transport

Check the magnetic float switch for any damage that may have been caused by transport. Obvious damage must be reported immediately.



CAUTION!

With improper transport, a high level of damage to property can occur.

- ▶ Observe the symbols on the packaging
- ▶ Handle packed goods with care

4.2 Packaging and storage

Do not remove packaging until just before commissioning.

5. Commissioning, operation

- Observe all instructions given on the shipment packaging for removing the transportation safety devices.
- Remove the magnetic float switch carefully from the packaging!
- When unpacking, check all components for any external damage.

5.1 Mounting preparation



Functional check

Before mounting, the float switch can be connected as described in chapter 5.3 and the switch points can be operated manually.



WARNING!

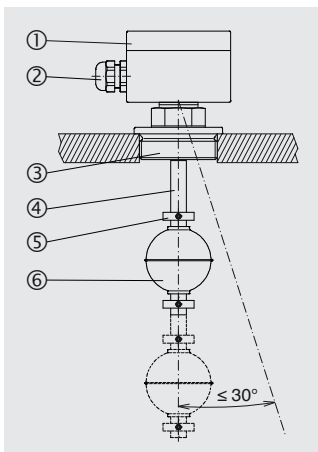
Ensure that the functional check does not start any unintended processes.

Ensure that the sealing faces of the vessel or magnetic float switch are clean and do not show any mechanical damage.

5. Commissioning, operation

5.2 Mounting

- Observe the torque values of screws specified in pipefitting work.
- In the selection of the mounting material (sealings, screws, washers and nuts), take the process conditions into account. The suitability of the sealing must be specified with regard to the medium and its vapours. In addition, ensure it has corresponding corrosion resistance.
- Mount the magnetic float switch either via mounting thread ③ or mounting flange (not illustrated).
- The guide tube ④ should not be inclined more than a maximum of 30° to the vertical.
- If the geometry of the float does not fit through the process connection, the float must be removed before mounting.
 - For this, before removal, mark the position of the float stops ⑤ with a waterproof pen
 - Mark the mounting position of the floats (e.g. "Up")
 - After the magnetic float switch has been mounted, the float should be re-attached within the inside of the tank (pay attention to the mounting position!).
 - Float stops ⑤ must then be re-attached at the marked points.
- The number of floats and also the position of the float stops are dependent upon the dimension and the number of switch points.



5. Commissioning, operation

5.3 Electrical connection

- The electrical connection must only be made by qualified skilled personnel.
- Connection details and switching functions are given on the connection diagram on the instrument and the connection terminals are appropriately marked (exception: Versions with only one normally closed or normally open contact).
- Seal the cable bushing ② at the connection housing ①.
- The mains connection lines to be provided must be dimensioned for maximum instrument current supply and comply with IEC 227 or IEC 245.

EN



WARNING!

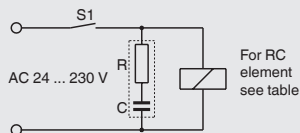
Electrical connection errors of the magnetic float switches can destroy the reed contacts. This can lead to a malfunction in the plant and thus lead to injury to personnel or damage to equipment.

- ▶ No direct operation in circuits with inductive loads.
- ▶ No direct operation in circuits with capacitive loads, e.g. PLC, PCS or cable lengths > 50 m.
- ▶ Do not exceed the permissible switching power.

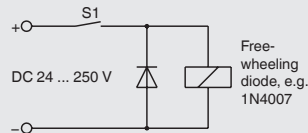
Connection with inductive load

With inductive loads, the magnetic float switches should be protected by connection to an RC element or a free-wheeling diode.

AC voltage



DC voltage



5. Commissioning, operation

Protective RC elements

Depending on the operating voltage, use RC elements exclusively in accordance with the table below. RC elements other than those specified here will lead to the destruction of the reed switch.

EN

RC elements for reed contacts 10 ... 40 VA

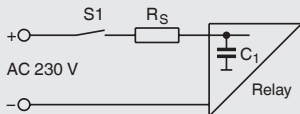
Voltage	Resistance	Capacitance	Type of RC element
AC 24 V	100 Ω	0.33 μF	A 3/24
AC 48 V	220 Ω	0.33 μF	A 3/48
AC 115 V	470 Ω	0.33 μF	A 3/115
AC 230 V	1,500 Ω	0.33 μF	A 3/230

RC elements for reed contacts 40 ... 100 VA

Voltage	Resistance	Capacitance	Type of RC element
AC 24 V	47 Ω	0.33 μF	B 3/24
AC 48 V	100 Ω	0.33 μF	B 3/48
AC 115 V	470 Ω	0.33 μF	B 3/115
AC 230 V	1,000 Ω	0.33 μF	B 3/230

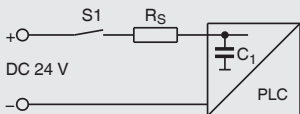
Connection with capacitive load

AC voltage current limitation
e.g. for electronic time relay



$R_S = 220 \Omega$ (for AC 230 V)
 $C_1 =$ internal capacitance

Current limitation, DC voltage
e.g. for PLC, PCS and cables > 50 m



$R_S = 22 \Omega$ (47 Ω for contacts ≤ 10 VA)
 $C_1 =$ internal capacitance

5. Commissioning, operation



To increase the service life of the contacts, we recommend operation with a contact protection relay.

Connection diagrams

EN

Colour coding per IEC 757

Number of switch points	PVC cable		Silicone cable		Connection housing	
	NO/NC	CO	NO/NC	CO	NO/NC	CO
1 L-SP	GY L1 BK	GY L1 BN L1 BK	GY L1 BK	GY L1 BN L1 BK	GY 1 L1 BN 2	GY 1 L1 BN 2 L1 BK 3
2 L-SP	BK L1 BK L1 BN L2 GY L2	YE L1 GN L1 BK L2 BU L2 PK L2 GY L2	BK L1 BK L1 BN L2 GY L2	YE L1 GN L1 BK L2 BU L2 RD L2 WH L2	BK 1 L1 BK 2 L1 BN 3 L2 GY 4 L2	YE 1 L1 GN 2 L1 BN 3 L2 GY 4 L2 RD 5 L2 WH 6 L2
3 L-SP	GN L1 BN L1 YE L2 GY L2 PK L3 BU L3	BU-RD L1 RD L1 WH L2 YE L2 GN L2 BN L2 BU L3 PK L3 GY L3	GN L1 BN L1 YE L2 GY L2 PK L3 BU L3	-	BN 1 L1 WH 2 L1 YE 3 L2 GN 4 L2 GY 5 L3 RD 6 L3	WH 1 L1 BK 2 L1 OG 3 L2 YE 4 L2 GN 5 L2 BN 6 L2 BU 7 L3 PK 8 L3 GY 9 L3
4 L-SP	RD L1 WH L1 GN L2 BN L2 YE L3 GY L3 PK L4 BU L4	GY-RD L1 BK L1 VT L2 BU-RD L2 RD L2 WH L3 YE L3 GN L3 BN L3 BU L4 PK L4 GY L4	-	-	RD 1 L1 WH 2 L1 GN 3 L2 BN 4 L2 YE 5 L3 GY 6 L3 PK 7 L4 BU 8 L4	WH 1 L1 BK 2 L1 OG 3 L2 YE 4 L2 GN 5 L2 BN 6 L2 BU 7 L3 PK 8 L3 GY 9 L3 RD 10 L4 VT 11 L4 CLEAR 12

5. Commissioning, operation



EN

Number of switch points	PVC cable		Connection housing	
	NO	NC	NO	NC
5 L-SP	BK	L1	RD 1	L1
	VI		WH 2	L1
	RD	L2	GN 3	L2
	WH		BN 4	L2
	GN	L3	YE 5	L3
	BN		GY 6	L3
	YE	L4	PK 7	L4
	GY		BU 8	L4
	PK	L5	VT 9	L5
	BU		CLEAR 10	L5
6 L-SP	GY-RD	L1	RD 1	L1
	BU-RD		WH 2	L1
	BK	L2	GN 3	L2
	VT		BN 4	L2
	RD	L3	YE 5	L3
	WH		GY 6	L3
	GN	L4	PK 7	L4
	BN		BU 8	L4
	YE	L5	VT 9	L5
	GY		CLEAR 10	L5
	PK	L6	BK 11	L6
	BU		OG 12	L6





















Number of switch points	PVC cable		Silicone cable		Connection housing	
	NO	CO	NO	CO	NO	CO
1 L-SP and 1 T-SP	BK	L1	BK	L1	BK 1	L1
	BK		BK		BK 2	
	BN	9	BN	9	BN 3	9
	GY		GY		GY 4	
1 L-SP and 2 T-SP	GN	L1	BN	L1	BN 1	L1
	BN		WH		WH 2	
	YE	9 _{55°C}	YE	9 _{55°C}	YE 3	9 _{55°C}
	GY		GN		GN 4	9 _{55°C}
	PK	9 _{75°C}	BU	9 _{75°C}	GY 5	9 _{75°C}
	BU		RD		RD 6	

5. Commissioning, operation

Connector pin assignment

Cube plug ASC4	Circular connector M12 x 1
	

EN

Number of switch points	Cube plug ASC4		Circular connector M12 x 1	
	NO/NC	CO	NO/NC	CO
1 L-SP	1  L1 2 	1  L1 3  L1 2 	BN 1  L1 WH 2 	WH 2  L1 BN 1  L1 BK 4 
2 L-SP	2  L1 1  L2 3 	-	BN 1  L1 WH 2  L1 BU 3  L2 BK 4 	-
1 L-SP and 1 T-SP	2  L1 1  L1 3 	-		

5. Commissioning, operation / 6. Faults

5.4 Commissioning

Switch on the voltage supply of the connected control device. Fill the vessel and check the switch points of the magnetic float switch for function.

EN



WARNING!

Ensure that the functional check does not start any unintended processes.

Always observe the mounting and operating instructions of accessories when commissioning them.

6. Faults



The following table contains the most frequent causes of faults and the necessary countermeasures.

Faults	Causes	Measures
Magnetic float switch cannot be mounted at the planned place on the vessel	Process connection of the magnetic float switch does not match the process connection of the vessel.	Modification of the vessel Return to the factory
	Process connection at the vessel defective	Rework the thread or replace the screwed coupling
	Mounting thread at the magnetic float switch defective	Return to the factory
No or undefined switching function	Electrical connection incorrect	See chapter 5.3 "Electrical connection". Check assignment with the aid of the connection diagram.
	Temperature contact defective	Return to the factory
	Reed contact defective	

6. Faults / 7. Maintenance and cleaning



CAUTION! Physical injuries and damage to property and the environment

If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.

- ▶ Ensure that there is no longer any pressure present and protect against being put into operation accidentally.
- ▶ Contact the manufacturer.
- ▶ If a return is needed, please follow the instructions given in chapter 8.2 "Return".

EN

7. Maintenance and cleaning

7.1 Maintenance

When used properly, the magnetic float switches work maintenance-free. They must be subjected to visual inspection within the context of regular maintenance, however, and included in the vessel pressure test.



DANGER!

Work on vessels involves the danger of intoxication and suffocation. No work is allowed to be carried out unless by taking suitable personal protective measures (e.g. respiratory protection apparatus, protective outfit etc.).

Repairs must only be carried out by the manufacturer.



Perfect functioning of the magnetic float switches can only be guaranteed when original accessories and spare parts are used.

7. Maintenance and cleaning

7.2 Cleaning

EN



CAUTION!

Physical injuries and damage to property and the environment

Improper cleaning may lead to physical injuries and damage to property and the environment. Residual media in the dismantled instrument can result in a risk to persons, the environment and equipment.

- ▶ Rinse or clean the removed instrument.
- ▶ Sufficient precautionary measures must be taken.

1. Prior to cleaning, properly disconnect the instrument from the process and the power supply.
2. Clean the instrument carefully with a moist cloth.
3. Electrical connections must not come into contact with moisture!



CAUTION!

Damage to property

Improper cleaning may lead to damage to the instrument!

- ▶ Do not use any aggressive cleaning agents.
- ▶ Do not use any pointed and hard objects for cleaning.

8. Dismounting, return and disposal

8. Dismounting, return and disposal



WARNING!

Physical injuries and damage to property and the environment through residual media

Residual media in the dismantled instrument can result in a risk to persons, the environment and equipment.

- ▶ Wash or clean the dismantled instrument, in order to protect persons and the environment from exposure to residual media.

EN

8.1 Dismounting

Only disconnect the measuring instrument once the system has been depressurised and the power disconnected!

8.2 Return

Wash or clean the dismantled magnetic float switch before returning it, in order to protect personnel and the environment from exposure to residual media.



Information on returns can be found under the heading "Service" on our local website.

8.3 Disposal

Incorrect disposal can put the environment at risk.

Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

9. Specifications

9. Specifications

EN

Model	Normally open, normally closed	Change-over
FLS-SE, FLS-SB	< AC 50 V; 100 VA; 1 A	< AC 50 V; 40 VA; 1 A
FLS-HE	< DC 75 V; 50 W; 0.5 A	< DC 75 V; 20 W; 0.5 A
FLS-SF, FLS-SA	max. AC 230 V; 100 VA; 1 A	max. AC 230 V; 40 VA; 1 A
FLS-PF, FLS-PA	max. DC 230 V; 50 W; 0.5 A	max. DC 230 V; 20 W; 0.5 A
FLS-HA		
FLS-ME	< AC 50 V; 10 VA; 0.5 A	< AC 50 V; 5 VA; 0.25 A
FLS-MB	< DC 75 V; 5 W; 0.25 A	< DC 75 V; 2.5 W; 0.15 A
FLS-HA3	max. AC 230 V; 50 VA; 1 A max. DC 230 V; 50 W; 0.5 A	max. AC 230 V; 50 VA; 1 A max. DC 230 V; 20 W; 0.5 A

Model FLS-X

Switching power when installed as simple apparatus per EN 60079-11 section 5.7:

max. AC/DC 36 V; 100 mA

Operating limits

- Operating temperature: $T = -196 \dots +350 \text{ }^{\circ}\text{C}$
- Operating pressure: $p = -1 \dots 40 \text{ bar}$

For further specifications see data sheet LM 30.01.

Inhalt

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Konformitätserklärungen finden Sie online unter www.wika.de.

1. Allgemeines

1. Allgemeines

- Die in der Betriebsanleitung beschriebenen Schwimmer-Magnetschalter werden nach dem aktuellen Stand der Technik konstruiert und gefertigt. Alle Komponenten unterliegen während der Fertigung strengen Qualitäts- und Umweltkriterien. Unsere Managementsysteme sind nach ISO 9001 zertifiziert.
- Diese Betriebsanleitung gibt wichtige Hinweise zum Umgang mit dem Gerät. Voraussetzung für sicheres Arbeiten ist die Einhaltung aller angegebenen Sicherheitshinweise und Handlungsanweisungen.
- Die für den Einsatzbereich des Gerätes geltenden örtlichen Unfallverhütungsvorschriften und allgemeinen Sicherheitsbestimmungen einhalten.
- Die Betriebsanleitung ist Produktbestandteil und muss in unmittelbarer Nähe des Gerätes für das Fachpersonal jederzeit zugänglich aufbewahrt werden. Betriebsanleitung an nachfolgende Benutzer oder Besitzer des Gerätes weitergeben.
- Das Fachpersonal muss die Betriebsanleitung vor Beginn aller Arbeiten sorgfältig durchgelesen und verstanden haben.
- Es gelten die allgemeinen Geschäftsbedingungen in den Verkaufsunterlagen.
- Technische Änderungen vorbehalten.
- Weitere Informationen:
 - Internet-Adresse: www.wika.de / www.wika.com
 - Zugehöriges Datenblatt: LM 30.01

Abkürzungen, Definitionen

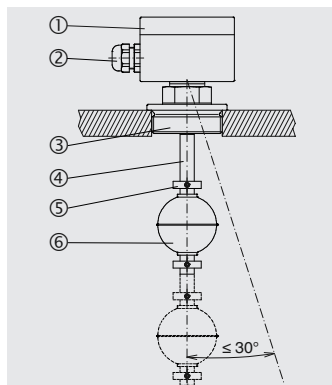
L-SP	Niveau-Schaltpunkt
T-SP	Temperatur-Schaltpunkt
NO/NC	Schließer/Öffner
CO	Umschalter

2. Aufbau und Funktion

2.1 Funktionsbeschreibung

Schwimmer-Magnetschalter arbeiten nach dem Schwimmerprinzip mit magnetischer Übertragung. Ein im Gleitrohr ④ eingebauter Reedkontakt wird durch das Magnetfeld eines Permanentmagneten bei Erreichen eines vorgegebenen Schaltpunktes betätigt. Der Permanentmagnet befindet sich in einem Schwimmer ⑥, der seine Höhenlage mit dem Flüssigkeitspegel des zu überwachenden Messstoffes verändert. Der Schaltzustand des Reedkontaktes kann durch eine nachgeschaltete Steuereinrichtung ausgewertet und weiterverarbeitet werden.

Die Anzahl und Anordnung der Schwimmer ist abhängig von der Anzahl der vorgegebenen Schaltpunkte, deren Kontaktfunktion sowie dem Abstand der Schaltpunkte.



- ① Anschlussgehäuse
- ② Kabeldurchführung
- ③ Einschraubgewinde
- ④ Gleitrohr
- ⑤ Schwimmeranschlag
- ⑥ Schwimmer

2.2 Lieferumfang

Lieferumfang mit dem Lieferschein abgleichen.

3. Sicherheit

3. Sicherheit

3.1 Symbolerklärung



GEFAHR!

... weist auf eine unmittelbar gefährliche Situation hin, die zum Tod oder zu schweren Verletzungen führt, wenn sie nicht gemieden wird.



WARNUNG!

... weist auf eine möglicherweise gefährliche Situation hin, die zum Tod oder zu schweren Verletzungen führen kann, wenn sie nicht gemieden wird.



VORSICHT!

... weist auf eine möglicherweise gefährliche Situation hin, die zu geringfügigen oder leichten Verletzungen bzw. Sach- und Umweltschäden führen kann, wenn sie nicht gemieden wird.



Information

... hebt nützliche Tipps und Empfehlungen sowie Informationen für einen effizienten und störungsfreien Betrieb hervor.

3.2 Bestimmungsgemäße Verwendung

Schwimmer-Magnetschalter dienen ausschließlich der Füllstandsüberwachung von flüssigen Messstoffen. Der Einsatzbereich ergibt sich aus den technischen Leistungsgrenzen und Werkstoffen.

- Die Flüssigkeiten dürfen keine starken Verschmutzungen oder Grobteile aufweisen und nicht zum Auskristallisieren neigen. Es ist sicherzustellen, dass die medienberührenden Werkstoffe des Schwimmer-Magnetschalters gegen den zu überwachenden Messstoff ausreichend beständig sind. Nicht geeignet für Dispersionen, abrasive Flüssigkeiten, hochviskose Medien und Farben.

3. Sicherheit

DE

- Dieses Gerät ist nicht für den Einsatz in explosionsgefährdeten Bereichen zugelassen! Ausgenommen sind Schwimmer-Magnetschalter, die als einfaches elektrisches Betriebsmittel gemäß EN 60079-11 Abschnitt 5.7 gekennzeichnet sind.
- Die in der Betriebsanleitung angegebenen Einsatzbedingungen sind einzuhalten.
- Gerät nicht in unmittelbarer Nähe von ferromagnetischer Umgebung (Abstand min. 50 mm) betreiben.
- Gerät nicht in unmittelbarer Nähe von starken elektromagnetischen Feldern bzw. in unmittelbarer Nähe von Einrichtungen betreiben, die durch Magnetfelder beeinflusst werden können (Abstand min. 1 m).
- Die Schwimmer-Magnetschalter dürfen keinen starken mechanischen Belastungen (Stoß, Verbiegen, Vibrationen) ausgesetzt werden.
- Die technischen Spezifikationen in dieser Betriebsanleitung sind einzuhalten. Eine unsachgemäße Handhabung oder ein Betreiben des Gerätes außerhalb der technischen Spezifikationen macht die sofortige Stilllegung und Überprüfung durch einen autorisierten WIKA-Servicemitarbeiter erforderlich.

Das Gerät ist ausschließlich für den hier beschriebenen bestimmungsgemäßen Verwendungszweck konzipiert und konstruiert und darf nur dementsprechend verwendet werden.

Ansprüche jeglicher Art aufgrund von nicht bestimmungsgemäßer Verwendung sind ausgeschlossen.



GEFAHR!

Beim Arbeiten an Behältern, besteht Vergiftungs- oder Erstickungsgefahr. Arbeiten dürfen nur unter Anwendung geeigneter Personenschutzmaßnahmen (z. B. Atemschutzgerät, Schutzkleidung o. Ä.) durchgeführt werden.

3. Sicherheit

3.3 Fehlgebrauch

Als Fehlgebrauch gilt jede Verwendung, die die technischen Leistungsgrenzen überschreitet oder mit den Werkstoffen unverträglich ist.



WARNUNG!

Verletzungen durch Fehlgebrauch

Fehlgebrauch des Gerätes kann zu gefährlichen Situationen und Verletzungen führen.

- ▶ Eigenmächtige Umbauten am Gerät unterlassen.
- ▶ Gerät nicht in explosionsgefährdeten Bereichen einsetzen.

Jede über die bestimmungsgemäße Verwendung hinausgehende oder andersartige Benutzung gilt als Fehlgebrauch.

Dieses Gerät nicht in Sicherheits- oder in Not-Aus-Einrichtungen benutzen.

3.4 Verantwortung des Betreibers

Das Gerät wird im gewerblichen Bereich eingesetzt. Der Betreiber unterliegt daher den gesetzlichen Pflichten zur Arbeitssicherheit.

Die Sicherheitshinweise dieser Betriebsanleitung, sowie die für den Einsatzbereich des Gerätes gültigen Sicherheits-, Unfallverhütungs- und Umweltschutzvorschriften einhalten.

Für ein sicheres Arbeiten am Gerät muss der Betreiber Folgendes sicherstellen:

- Bedienpersonal wird regelmäßig in allen zutreffenden Fragen von Arbeitssicherheit, Erste Hilfe und Umweltschutz unterwiesen.
- Bedienpersonal hat Betriebsanleitung gelesen und insbesondere die darin enthaltenen Sicherheitshinweise zur Kenntnis genommen.
- Die bestimmungsgemäße Verwendung für den Anwendungsfall wird eingehalten.
- Nach Prüfung ist ein Fehlgebrauch des Gerätes ausgeschlossen.

3.5 Personalqualifikation



WARNUNG!

Verletzungsgefahr bei unzureichender Qualifikation

Unsachgemäßer Umgang kann zu erheblichen Personen- und Sachschäden führen.

- ▶ Die in dieser Betriebsanleitung beschriebenen Tätigkeiten nur durch Fachpersonal nachfolgend beschriebener Qualifikation durchführen lassen.

DE

Fachpersonal

Das vom Betreiber autorisierte Fachpersonal ist aufgrund seiner fachlichen Ausbildung, seiner Kenntnisse der Mess- und Regelungs-technik und seiner Erfahrungen sowie Kenntnis der landesspezifischen Vorschriften, geltenden Normen und Richtlinien in der Lage, die beschriebenen Arbeiten auszuführen und mögliche Gefahren selbstständig zu erkennen.

3.6 Persönliche Schutzausrüstung

Die persönliche Schutzausrüstung dient dazu, das Fachpersonal gegen Gefahren zu schützen, die dessen Sicherheit oder Gesundheit bei der Arbeit beeinträchtigen könnten. Beim Ausführen der verschiedenen Arbeiten an und mit dem Gerät muss das Fachpersonal persönliche Schutzausrüstung tragen.

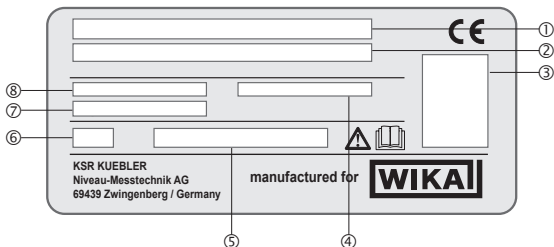
Im Arbeitsbereich angebrachte Hinweise zur persönlichen Schutzausrüstung befolgen!

Die erforderliche persönliche Schutzausrüstung muss vom Betreiber zur Verfügung gestellt werden.

3. Sicherheit

3.7 Beschilderung, Sicherheitskennzeichnungen

Typenschild (Beispiele)



DE

- ① Typ, Bezeichnung
- ② Gerätecodierung
- ③ L1 ... Ln: Schaltpunktangabe in mm
- ④ Artikelnummer
- ⑤ Schaltleistung
- ⑥ Schutzart nach IEC/EN 60529
- ⑦ Messstellenummer
- ⑧ Seriennummer



Vor Montage und Inbetriebnahme des Gerätes unbedingt die Betriebsanleitung lesen!

4. Transport, Verpackung und Lagerung

4.1 Transport

Schwimmer-Magnetschalter auf eventuell vorhandene Transportschäden untersuchen. Offensichtliche Schäden unverzüglich mitteilen.



VORSICHT!

Bei unsachgemäßem Transport können Sachschäden in erheblicher Höhe entstehen.

- ▶ Symbole auf der Verpackung beachten
- ▶ Packstücke vorsichtig behandeln

DE

4.2 Verpackung und Lagerung

Verpackung erst unmittelbar vor der Inbetriebnahme entfernen.

5. Inbetriebnahme, Betrieb

- Alle auf der Versandverpackung angegebenen Hinweise zum Entfernen der Transportsicherungen beachten.
- Den Schwimmer-Magnetschalter vorsichtig aus der Verpackung entnehmen!
- Beim Auspacken alle Teile auf äußerliche Beschädigungen überprüfen.

5.1 Montagevorbereitung



Funktionsprüfung

Vor der Montage kann der Schwimmerschalter wie unter Kapitel 5.3 beschrieben angeschlossen und die Schaltpunkte manuell betätigt werden.



WARNING!

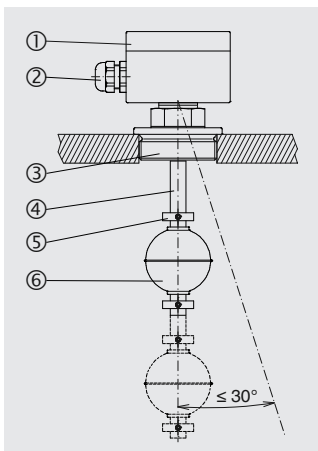
Sicherstellen, dass die Funktionsprüfung keine unbeabsichtigten Prozesse startet.

Sicherstellen, dass die Dichtflächen des Behälters bzw. des Schwimmer-Magnetschalters sauber sind und keine mechanische Beschädigung aufweisen.

5. Inbetriebnahme, Betrieb

5.2 Montage

- Die im Rohrleitungsbau vorgeschriebenen Drehmomentwerte der Schrauben einhalten.
- Bei der Auswahl des Montagematerials (Dichtungen, Schrauben, Unterlegscheiben und Muttern) die Prozessbedingungen beachten. Die Eignung der Dichtung muss hinsichtlich Messstoff und dessen Dämpfen gegeben sein. Zusätzlich ist auf entsprechende Korrosionsbeständigkeit zu achten.
- Schwimmer-Magnetschalter entweder über Einschraubgewinde ③ oder Montageflansch (nicht dargestellt) einbauen.
- Das Gleitrohr ④ darf maximal 30° zur Vertikalen geneigt sein.
- Passt die Geometrie des Schwimmers nicht durch den Prozessanschluss, muss der Schwimmer vor der Montage entfernt werden.
 - Dazu Position der Schwimmeranschläge ⑤ vor dem Abbauen mit einem wasserfesten Stift markieren
 - Einbaulage der Schwimmer kennzeichnen (z. B. „Oben“)
 - Nach der Montage des Schwimmer-Magnetschalters ist der Schwimmer im Inneren des Tanks wieder anzubauen (Einbaulage beachten!).
 - Schwimmeranschläge ⑤ sind anschließend an den markierten Stellen wieder zu befestigen.
- Die Anzahl der Schwimmer sowie die Position der Schwimmeranschläge sind vom Maß und der Anzahl der Schaltpunkte abhängig.



5.3 Elektrischer Anschluss

- Der elektrische Anschluss darf nur durch qualifiziertes Fachpersonal erfolgen.
- Die Belegung der Anschlüsse und die Schaltfunktionen sind auf dem Anschlussschema am Gerät angegeben und die Anschlussklemmen sind entsprechend gekennzeichnet (Ausnahme: Ausführungen mit nur einem Öffner- oder Schließerkontakt).
- Die Kabeldurchführung ② am Anschlussgehäuse ① abdichten.
- Die vorgesehenen Netzanschlussleitungen müssen für die größte Stromaufnahme des Gerätes bemessen sein und IEC 227 oder IEC 245 entsprechen.



WARNUNG!

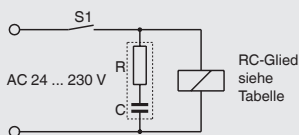
Fehler beim elektrischen Anschluss von Schwimmer-Magnetschaltern können die Reedkontakte zerstören. Dies kann zu einer Fehlfunktion der Anlage und dadurch zu Personen- oder Sachschäden führen.

- ▶ Kein direkter Betrieb an Schaltungen mit induktiver Last.
- ▶ Kein direkter Betrieb an Schaltungen mit kapazitiver Last, z. B. SPS, PLS oder Leitungslängen > 50 m.
- ▶ Kein Überschreiten der zulässigen Schaltleistung.

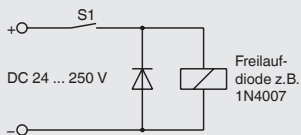
Anschluss bei induktiver Last

Bei induktiver Belastung sind die Schwimmer-Magnetschalter durch Beschaltung mit einem RC-Glied oder einer Freilaufdiode zu schützen.

Wechselspannung



Gleichspannung



5. Inbetriebnahme, Betrieb

RC-Glieder zur Schutzbeschaltung

RC-Glieder sind, je nach Betriebsspannung, ausschließlich entsprechend untenstehender Tabelle zu verwenden. Andere als die hier aufgeführten RC-Glieder führen zur Zerstörung des Reed-Schalters.

RC-Glieder für Reedkontakte 10 ... 40 VA

Spannung	Widerstand	Kapazität	RC-Glied-Typ
AC 24 V	100 Ω	0,33 μF	A 3/24
AC 48 V	220 Ω	0,33 μF	A 3/48
AC 115 V	470 Ω	0,33 μF	A 3/115
AC 230 V	1.500 Ω	0,33 μF	A 3/230

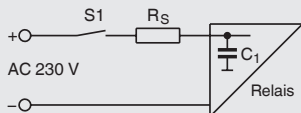
RC-Glieder für Reedkontakte 40 ... 100 VA

Spannung	Widerstand	Kapazität	RC-Glied-Typ
AC 24 V	47 Ω	0,33 μF	B 3/24
AC 48 V	100 Ω	0,33 μF	B 3/48
AC 115 V	470 Ω	0,33 μF	B 3/115
AC 230 V	1.000 Ω	0,33 μF	B 3/230

Anschluss bei kapazitiver Last

Strombegrenzung Wechselspannung

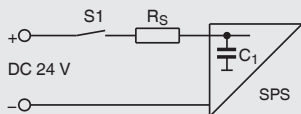
z. B. für elektronisches Zeitrelais



$R_S = 220 \Omega$ (für AC 230 V)
 $C_1 =$ innere Kapazität

Strombegrenzung Gleichspannung

z. B. für SPS, PLS und Leitungen > 50 m



$R_S = 22 \Omega$ (47 Ω für Kontakte ≤ 10 VA)
 $C_1 =$ innere Kapazität

5. Inbetriebnahme, Betrieb



Zur Erhöhung der Lebensdauer der Kontakte wird der Betrieb an einem Kontaktschutzrelais empfohlen.

Anschlussbilder

Farb-Kurzzeichen nach IEC 757

DE

Anzahl Schalt- punkte	PVC-Kabel		Silikonkabel		Anschlussgehäuse	
	NO/NC	CO	NO/NC	CO	NO/NC	CO
1 L-SP	GY L1 BK L1	GY L1 BN L1 BK L1	GY L1 BK L1	GY L1 BN L1 BK L1	GY 1 L1 BN 2 L1	GY 1 L1 BN 2 L1 BK 3 L1
2 L-SP	BK L1 BK L1 BN L2 GY L2	YE L1 GN L1 BK L1 BU L2 PK L2 GY L2	BK L1 BK L1 BN L2 GY L2	YE L1 GN L1 BK L1 BU L2 RD L2 WH L2	BK 1 L1 BK 2 L1 BN 3 L2 GY 4 L2	YE 1 L1 GN 2 L1 BN 3 L1 GY 4 L2 RD 5 L2 WH 6 L2
3 L-SP	GN L1 BN L1 YE L2 GY L2 PK L3 BU L3	BU-RD L1 RD L1 WH L1 YE L2 GN L2 BN L2 BU L3 PK L3 GY L3	GN L1 BN L1 YE L2 GY L2 PK L3 BU L3	-	BN 1 L1 WH 2 L1 YE 3 L2 GN 4 L2 GY 5 L3 RD 6 L3	WH 1 L1 BK 2 L1 OG 3 L1 YE 4 L2 GN 5 L2 BN 6 L2 BU 7 L3 PK 8 L3 GY 9 L3
4 L-SP	RD L1 WH L1 GN L2 BN L2 YE L3 GY L3 PK L4 BU L4	GY-RD L1 BK L1 VT L1 BU-RD L2 RD L2 WH L2 YE L3 GN L3 BN L3 BU L4 PK L4 GY L4	-	-	RD 1 L1 WH 2 L1 GN 3 L2 BN 4 L2 YE 5 L3 GY 6 L3 PK 7 L4 BU 8 L4	WH 1 L1 BK 2 L1 OG 3 L1 YE 4 L2 GN 5 L2 BN 6 L2 BU 7 L3 PK 8 L3 GY 9 L3 RD 10 L4 VT 11 L4 CLEAR 12 L4

5. Inbetriebnahme, Betrieb



DE

Anzahl Schaltpunkte	PVC-Kabel		Anschlussgehäuse	
	NO/NC		NO/NC	
5 L-SP	BK	L1	RD 1	L1
	VI	L1	WH 2	L1
	RD	L2	GN 3	L2
	WH	L2	BN 4	L2
	GN	L3	YE 5	L3
	BN	L3	GY 6	L3
	YE	L4	PK 7	L4
	GY	L4	BU 8	L4
	PK	L5	VT 9	L5
	BU	L5	CLEAR 10	L5
6 L-SP	GY-RD	L1	RD 1	L1
	BU-RD	L1	WH 2	L1
	BK	L2	GN 3	L2
	VT	L2	BN 4	L2
	RD	L3	YE 5	L3
	WH	L3	GY 6	L3
	GN	L4	PK 7	L4
	BN	L4	BU 8	L4
	YE	L5	VT 9	L5
	GY	L5	CLEAR 10	L5
	PK	L6	BK 11	L6
	BU	L6	OG 12	L6



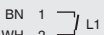

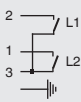


Anzahl Schaltpunkte	PVC-Kabel		Silikonkabel		Anschlussgehäuse	
	NO/NC	CO	NO/NC	CO	NO/NC	CO
1 L-SP und 1 T-SP	BK	L1	BK	L1	BK 1	L1
	BK	L1	BK	L1	BK 2	L1
	BN	9	BN	9	BN 3	9
	GY	9	GY	9	GY 4	9
1 L-SP und 2 T-SP	GN	L1	BN	L1	BN 1	L1
	BN	L1	WH	L1	WH 2	L1
	YE	9 ^{55°C}	YE	9 ^{55°C}	YE 3	9 ^{55°C}
	GY	9 ^{55°C}	GN	9 ^{55°C}	GN 4	9 ^{55°C}
	PK	9 ^{75°C}	BU	9 ^{75°C}	GY 5	9 ^{75°C}
	BU	9 ^{75°C}	RD	9 ^{75°C}	RD 6	9 ^{75°C}

5. Inbetriebnahme, Betrieb

Pinbelegung Stecker

Würfelstecker ASC4	Rundstecker M12 x 1
	

DE

Anzahl Schaltpunkte	Würfelstecker ASC4		Rundstecker M12 x 1	
	NO/NC	CO	NO/NC	CO
1 L-SP				
2 L-SP		-		-
1 L-SP und 1 T-SP		-	-	-

5. Inbetriebnahme, Betrieb / 6. Störungen

5.4 Inbetriebnahme

Spannungsversorgung der angeschlossenen Steuerungseinrichtung einschalten. Behälter füllen und die Schaltpunkte des Schwimmer-Magnetschalters auf Funktion prüfen.



WARNUNG!

Sicherstellen, dass die Funktionsprüfung keine unbeabsichtigten Prozesse startet.

DE

Zur Inbetriebnahme von Zubehör unbedingt die jeweilige Montage- und Betriebsanleitung beachten.

6. Störungen



In der folgenden Tabelle sind die häufigsten Fehlerursachen und erforderliche Gegenmaßnahmen aufgeführt.

Störungen	Ursachen	Maßnahmen
Schwimmer-Magnetschalter lässt sich nicht an der vorgesehenen Stelle am Behälter anbauen	Prozessanschluss des Schwimmer-Magnetschalters passt nicht zu dem Prozessanschluss des Behälters.	Umbau des Behälters Rücksendung ans Werk
	Prozessanschluss am Behälter defekt	Nacharbeiten des Gewindes oder Austauschen der Befestigungsmuffe
	Einschraubgewinde am Schwimmer-Magnetschalter defekt	Rücksendung ans Werk
Keine oder undefinierte Schaltfunktion	Elektrischer Anschluss falsch	Siehe Kapitel 5.3 „Elektrischer Anschluss“. Belegung mit Hilfe des Anschlussbildes prüfen.
	Temperaturkontakt defekt	Rücksendung ans Werk
	Reed-Kontakt defekt	

6. Störungen / 7. Wartung und Reinigung



VORSICHT!

Körperverletzungen, Sach- und Umweltschäden

Können Störungen mit Hilfe der aufgeführten Maßnahmen nicht beseitigt werden, Gerät unverzüglich außer Betrieb setzen.

- ▶ Sicherstellen, dass kein Druck mehr anliegt und gegen versehentliche Inbetriebnahme schützen.
- ▶ Kontakt mit dem Hersteller aufnehmen.
- ▶ Bei notwendiger Rücksendung die Hinweise unter Kapitel 8.2 „Rücksendung“ beachten.

DE

7. Wartung und Reinigung

7.1 Wartung

Die Schwimmer-Magnetschalter arbeiten bei bestimmungsgemäßem Gebrauch wartungsfrei. Sie sind jedoch im Rahmen der regelmäßigen Wartung einer Sichtkontrolle zu unterziehen und in die Druckprüfung des Behälters mit einzubeziehen.



GEFAHR!

Beim Arbeiten an Behältern besteht Vergiftungs- oder Erstickungsgefahr. Arbeiten dürfen nur unter Anwendung geeigneter Personenschutzmaßnahmen (z. B. Atemschutzgerät, Schutzkleidung o. Ä.) durchgeführt werden.

Reparaturen sind ausschließlich vom Hersteller durchzuführen.



Die Funktion der Schwimmer-Magnetschalter kann nur bei Verwendung von Originalzubehör und Ersatzteilen gewährleistet werden.

7.2 Reinigung



VORSICHT!

Körperverletzungen, Sach- und Umweltschäden

Eine unsachgemäße Reinigung führt zu Körperverletzungen, Sach- und Umweltschäden. Messstoffreste im ausgebauten Gerät können zur Gefährdung von Personen, Umwelt und Einrichtung führen.

- ▶ Ausgebautes Gerät spülen bzw. säubern.
- ▶ Ausreichende Vorsichtsmaßnahmen sind zu ergreifen.

1. Vor der Reinigung das Gerät ordnungsgemäß vom Prozess und der Stromversorgung trennen.
2. Das Gerät vorsichtig mit einem feuchten Tuch reinigen.
3. Elektrische Anschlüsse nicht mit Feuchtigkeit in Berührung bringen!



VORSICHT!

Sachbeschädigung

Eine unsachgemäße Reinigung führt zur Beschädigung des Gerätes!

- ▶ Keine aggressiven Reinigungsmittel verwenden.
- ▶ Keine harten und spitzen Gegenstände zur Reinigung verwenden.

8. Demontage, Rücksendung und Entsorgung



WARNUNG!

Körperverletzungen, Sach- und Umweltschäden durch Messstoffreste

Messstoffreste im ausgebauten Gerät können zur Gefährdung von Personen, Umwelt und Einrichtung führen.

- ▶ Ausgebautes Gerät spülen bzw. säubern, um Personen und Umwelt vor Gefährdung durch anhaftende Messstoffreste zu schützen.

DE

8.1 Demontage

Messgerät nur im drucklosen und spannungsfreiem Zustand demontieren!

8.2 Rücksendung

Ausgebauten Schwimmer-Magnetschalter vor der Rücksendung spülen bzw. säubern, um Mitarbeiter und Umwelt vor Gefährdung durch anhaftende Messstoffreste zu schützen.



Hinweise zur Rücksendung befinden sich in der Rubrik „Service“ auf unserer lokalen Internetseite.

8.3 Entsorgung

Durch falsche Entsorgung können Gefahren für die Umwelt entstehen. Gerätekomponenten und Verpackungsmaterialien entsprechend den landesspezifischen Abfallbehandlungs- und Entsorgungsvorschriften umweltgerecht entsorgen.

9. Technische Daten

9. Technische Daten

Typ	Schließer, Öffner	Umschalter
FLS-SE, FLS-SB	< AC 50 V; 100 VA; 1 A	< AC 50 V; 40 VA; 1 A
FLS-HE	< DC 75 V; 50 W; 0,5 A	< DC 75 V; 20 W; 0,5 A
FLS-SF, FLS-SA	max. AC 230 V; 100 VA; 1 A	max. AC 230 V; 40 VA; 1 A
FLS-PF, FLS-PA	max. DC 230 V; 50 W; 0,5 A	max. DC 230 V; 20 W; 0,5 A
FLS-HA		
FLS-ME	< AC 50 V; 10 VA; 0,5 A	< AC 50 V; 5 VA; 0,25 A
FLS-MB	< DC 75 V; 5 W; 0,25 A	< DC 75 V; 2,5 W; 0,15 A
FLS-HA3	max. AC 230 V; 50 VA; 1 A max. DC 230 V; 50 W; 0,5 A	max. AC 230 V; 50 VA; 1 A max. DC 230 V; 20 W; 0,5 A

Typ FLS-X

Schaltleistung bei Einbau als einfaches elektrisches Betriebsmittel nach EN 60079-11 Abschnitt 5.7:

max. AC/DC 36 V; 100 mA

Einsatzgrenzen

- Betriebstemperatur: $T = -196 \dots +350 \text{ }^{\circ}\text{C}$
- Betriebsdruck: $p = -1 \dots 40 \text{ bar}$

Weitere technische Daten siehe Datenblatt LM 30.01.

KSR Kuebler subsidiaries worldwide can be found online at www.ksr-kuebler.com.
WIKA subsidiaries worldwide can be found online at www.wika.com.

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www.wika.de

Float switch

For the process industry

Model FLS (models with Ex approval: 60, AL-ADF)

WIKA data sheet LM 30.01



for further approvals
see page 3

Applications

- Level measurement for almost all liquid media
- Pump and level control and monitoring of distinct filling levels
- Chemical, petrochemical industry, natural gas, offshore, shipbuilding, machine building, power generating equipment, power plants
- Process water and drinking water treatment, food and beverage industry

Special features

- Large range of application due to the simple, proven functional principle
- For harsh operating conditions, long service life
- Operating limits:
 - Operating temperature: $T = -196 \dots +350 \text{ }^\circ\text{C}$
 - Operating pressure: $P = \text{Vacuum up to 40 bar}$
 - Limit density: $\rho \geq 300 \text{ kg/m}^3$
- Wide variety of different electrical connections, process connections and materials
- Explosion-protected versions

Description

A float with a permanent magnet moves reliably along with the liquid level on a guide tube. Within the guide tube is fitted a reed contact (inert gas contact), which is energised, through the non-magnetic walls of the float and guide tube, by the approach of the float magnet. By using a magnet and reed contact the switching operation is non-contact, free from wear and needs no power supply. The contacts are potential-free. Float switches are also available with multiple switch points.



Fig. left: Stainless steel version, mounting thread, model FLS-S
Fig. right: Plastic version, flange connection, model FLS-P

The switching functions always refer to a rising liquid level: Normally open, normally closed or change-over contact.

Through the use of a float for a max. of 2 switch points a bistable switch behaviour can be achieved, meaning that the switching status also remains available, when the filling level continues to rise above or drop below the switch point.

The float switch is simple to mount and maintenance-free, so the costs of mounting, commissioning and operation are low.

Further special features

- Process connection, guide tube and float from stainless steel 1.4571, plastic or Buna
- Universal signal processing:
Connection direct to a PLC is possible, NAMUR connection, signal amplification / contact protection relays
- Works independently of foaming, conductivity, dielectricity, pressure, vacuum, temperature, vapours, condensation, bubble formation, boiling effects and vibrations
- Multiple functionality in a single instrument - up to 8 potential-free contacts
- Exact repeatability of the switch points
- Float switches qualify as simple apparatus in accordance with EN 60079-11 section 5.7 and can be installed in "zone 1" hazardous areas without certification, so long as the equipment is operated in a certified intrinsically safe circuit with a minimum explosion protection of Ex ib.

Options

- Customer-specific solutions
- Special versions for interface layer detection
 $\Delta\rho \geq 100 \text{ kg/m}^3$
- Process connection, guide tube and float from stainless steel 1.4435, 1.4539, titanium, Hastelloy (others on request)

Model overview









Model	Description	Materials								
		Stainless steel							Titanium 3.7035 (grade 2)	PVC / PP / PVDF
		1.4571 (316Ti)	1.4404 (316L)	1.4435 (316L)	1.4571 (316Ti) / PP	1.4571 (316Ti) / PA	1.4571 (316Ti) / Ms	1.4571 (316Ti) / Buna		
FLS-SE	Standard version, cable connection, safety extra-low voltage	x	x	x	x	x	x	x	x	
FLS-SF	Standard version, cable connection, low voltage	x	x	x	x	x	x	x	x	
FLS-SA	Standard version, connection housing or connector, low voltage	x	x	x	x	x	x	x	x	
FLS-SB	Standard version, connection housing or connector, safety extra-low voltage	x	x	x	x	x	x	x	x	
FLS-SBI (60)	Intrinsically safe, Ex i	x		x						
FLS-SAD FLS-SBD (AL-ADF)	Flameproof enclosure, Ex d	x		x						
FLS-ME	Miniature design, cable connection, safety extra-low voltage	x	x		x			x		
FLS-MB	Miniature design, connection housing or connector, safety extra-low voltage	x	x		x			x		
FLS-PF	Plastic version, cable connection, low voltage									x
FLS-PA	Plastic version, connection housing or connector, low voltage									x
FLS-HE	Pharmaceutical version, cable connection, safety extra-low voltage		x	x						
FLS-HA	Pharmaceutical version, connection housing, low voltage		x	x						
FLS-HA3	Sterile version (3-A), connection housing, low voltage		x	x						

Temperature range (process)




- Models FLS-SE, FLS-SF, FLS-HE -30 ... +150 °C
- Models FLS-SA, FLS-SB -196 ... +350 °C
- Models FLS-Sxl (60) -50 ... +180 °C
- Models FLS-SxD (AL-ADF) -10 ... +120 °C
- Models FLS-M -30 ... +150 °C
- Models FLS-P -10 ... +100 °C
- Models FLS-HA, FLS-HA3 -40 ... +200 °C

Approvals

■ Model FLS-S

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ Low voltage directive ■ RoHS directive ■ ATEX directive (option) Hazardous areas - Ex i Zone 0 II 1/2G Ex ia IIC T3 ... T6 Ga/Gb No. KEMA 01 ATEX1053 X Zone 21 II 2D Ex ib IIIC T80 °C Db - Ex d Zone 1 II 2G Ex d IIC T6 Gb No. TÜV 13 ATEX 7399 X Zone 21 II 2D Ex tb IIIC T80 °C Db	European Union
		
	IECEx (option) Hazardous areas - Ex d Zone 1 Ex d IIC T6 No. IECEx TUR 09.0002X Ex tD A21 IP65 T80 °C	International
	EAC <ul style="list-style-type: none"> ■ EMC directive and low voltage directive No. RU Д-DE.A301.B.00815 ■ Hazardous areas No. RU C-DE.ГБ08.B.01489 	Eurasian Economic Community
-	PESO Hazardous areas No. A/P/HQ/MH/104/3293 / P331149	India
	DNV GL <ul style="list-style-type: none"> ■ Ships, shipbuilding (e.g. offshore) ■ Hazardous areas No. TAA00000KZ 	International
	ABS <ul style="list-style-type: none"> ■ Ships, shipbuilding (e.g. offshore) No. 16-HG1591058-PDA ■ Hazardous areas No. 16-HG1591042-PDA / KEMA 01 ATEX 1053 X 	International
	Bureau Veritas Ships, shipbuilding No. 04264/H0 und 04568/G0	International
	Lloyd's Register Ships, shipbuilding (e.g. offshore) No. 07/20006 (E2)	International
-	DIBt Safety (e.g. electr. safety, overpressure, ...) Overflow control per German Water Resources Act (WHG) § 19 No. Z-65.11-482	Germany

■ Model FLS-H

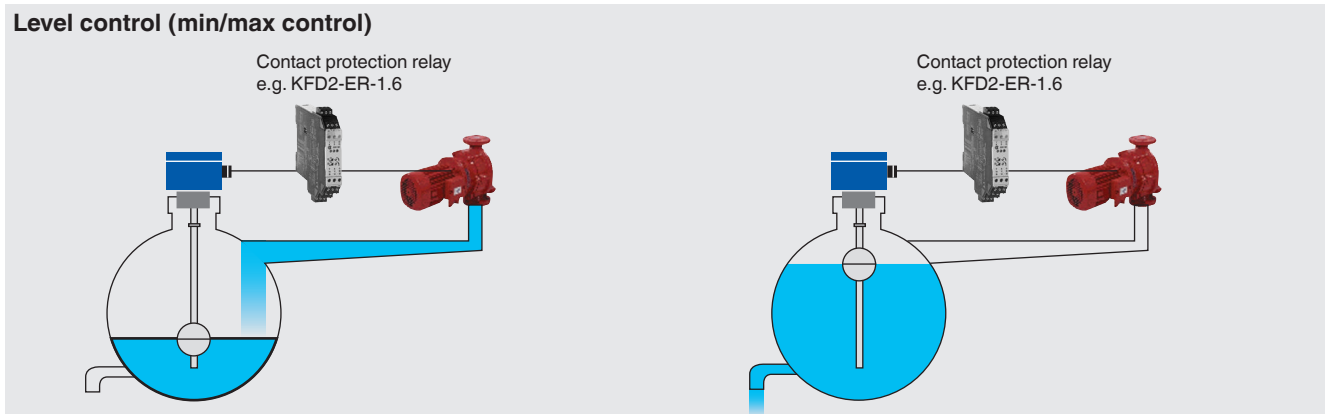
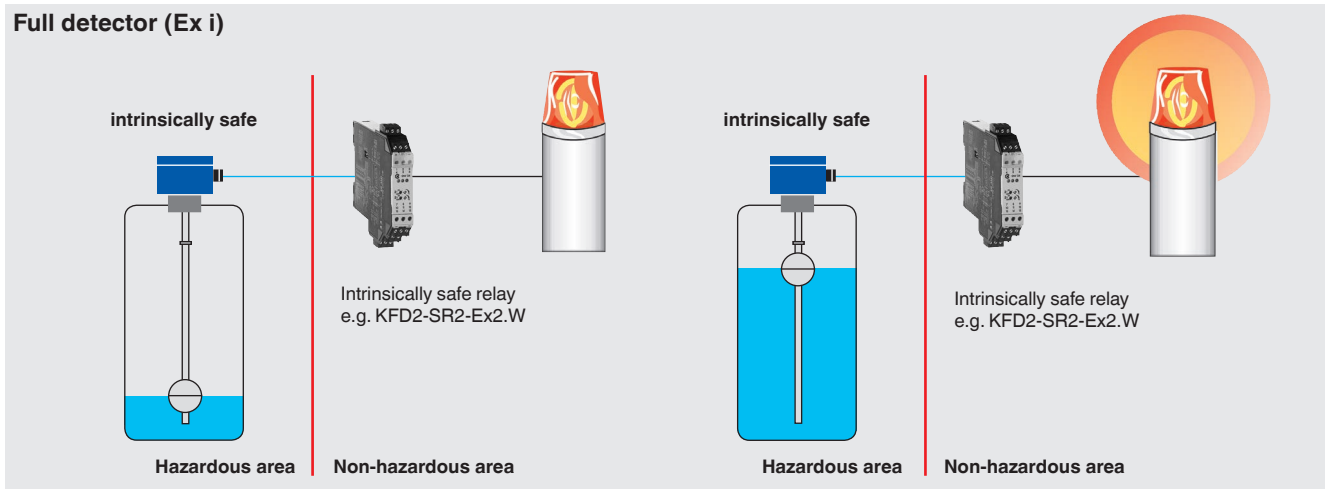
Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ Low voltage directive ■ RoHS directive 	European Union
	EAC EMC directive and low voltage directive No. RU Д-DE.A301.B.00815	Eurasian Economic Community
	3-A (only model FLS-HA3) Sanitary Standard No. 1698	USA

■ Model FLS-P

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ Low voltage directive ■ RoHS directive 	European Union
	EAC EMC directive and low voltage directive No. RU Д-DE.A301.B.00815	Eurasian Economic Community

Approvals and certificates, see website

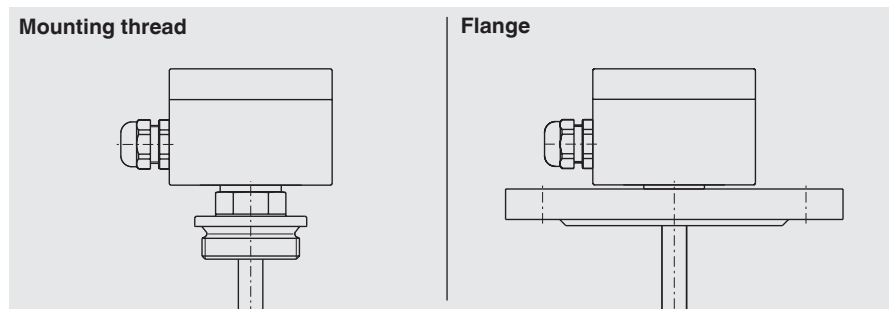
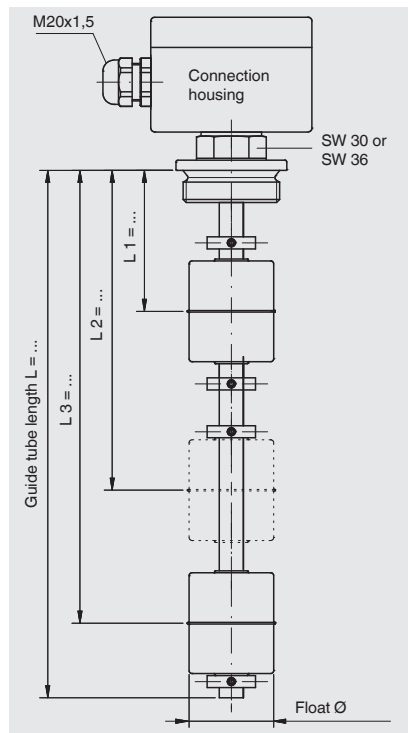
Application examples



Float switch, standard version with connection housing or connector

Models FLS-SA, FLS-SB

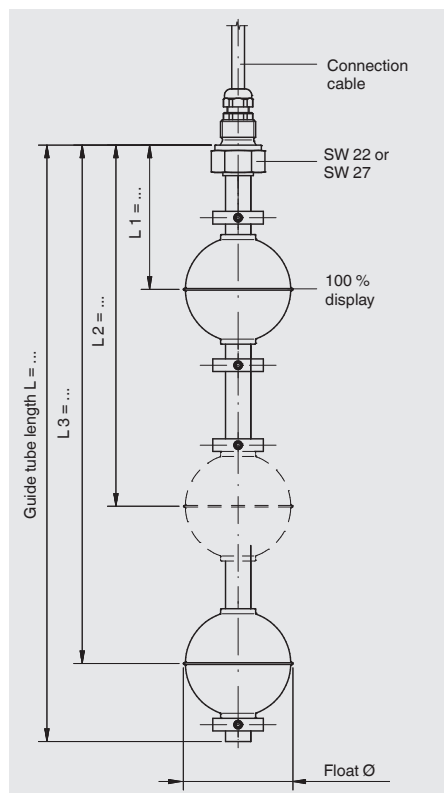
Process connection, guide tube and float from stainless steel 1.4571 (316Ti)



	Model FLS-SA, low voltage	Model FLS-SB, safety extra-low voltage
Electrical connection	<ul style="list-style-type: none"> ■ Connection housing Aluminium 64 x 58 x 34 mm, with 1 contact Aluminium 80 x 75 x 57 mm, 2 or more contacts ■ Coupler connector Option: Polypropylene, polyester, stainless steel 	
Process connection	<ul style="list-style-type: none"> ■ Mounting thread downwards G 1 1/2" or G 2" ■ Mounting flange - DIN DN 50 ... DN 200, PN 6 ... PN 100 - DIN EN 1092-1 DN 50 ... DN 200, PN 6 ... PN 100 - ANSI 2" ... 8", Class 150 ... 600 others on request 	
Guide tube diameter	12 mm / 14 mm / 18 mm	
Guide tube length L	≤ 3,000 mm for guide tube diameter 12 or 14 mm ≤ 6,000 mm for guide tube diameter 18 mm	
Float	Material: Stainless steel 1.4571 (option: Buna (NBR), titanium) Float diameter: 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	<ul style="list-style-type: none"> ■ Standard version: -30 ... +150 °C ■ High-temperature version: +150 ... +350 °C ■ Low-temperature version: -196 ... -30 °C Observe the temperature range of the float and the connection housing	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	6 x NO or NC, or 4 x SPDT	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power	<ul style="list-style-type: none"> ■ Normally open, normally closed AC ≤ 230 V; 100 VA; 1 A DC ≤ 230 V; 50 W; 0.5 A ■ Change-over AC ≤ 230 V; 40 VA; 1 A DC ≤ 230 V; 20 W; 0.5 A 	<ul style="list-style-type: none"> AC < 50 V; 100 VA; 1 A DC < 75 V; 50 W; 0.5 A AC < 50 V; 40 VA; 1 A DC < 75 V; 20 W; 0.5 A
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, standard version with cable connection Models FLS-SE, FLS-SF

Process connection, guide tube and float from stainless steel 1.4571 (316Ti)

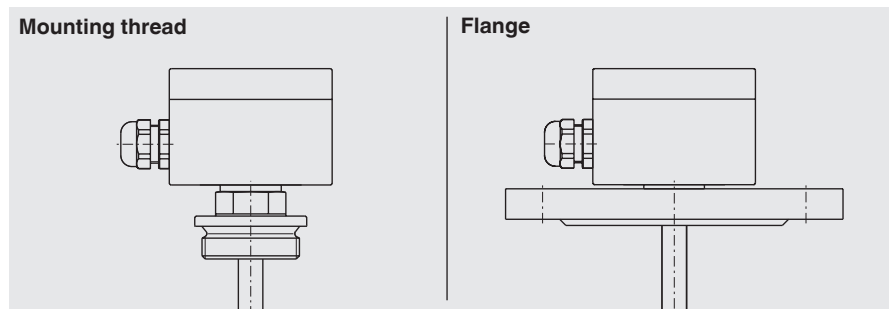
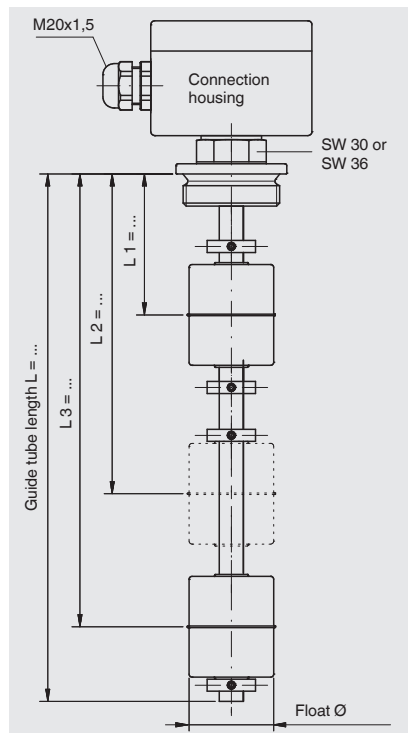


	Model FLS-SF, low voltage	Model FLS-SE, safety extra-low voltage
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR	
Process connection	Mounting thread upwards: G 3/8" or G 1/2" others on request	
Guide tube diameter	12 mm / 14 mm / 18 mm	
Guide tube length L	≤ 3,000 mm for guide tube diameter 12 or 14 mm ≤ 6,000 mm for guide tube diameter 18 mm	
Float	Material: Stainless steel 1.4571 (option: Buna (NBR), titanium) Float diameter: 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	PVC/PUR cable -10 ... +80 °C Silicone cable -30 ... +150 °C Observe the temperature range of the float	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	6 x NO or NC, or 4 x SPDT for PVC and PUR cable 5 x NO or NC, or 3 x SPDT for silicone cable	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power		
■ Normally open, normally closed	AC ≤ 230 V; 100 VA; 1 A DC ≤ 230 V; 50 W; 0.5 A	AC < 50 V; 100 VA; 1 A DC < 75 V; 50 W; 0.5 A
■ Change-over	AC ≤ 230 V; 40 VA; 1 A DC ≤ 230 V; 20 W; 0.5 A	AC < 50 V; 40 VA; 1 A DC < 75 V; 20 W; 0.5 A
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, explosion-protected version Ex i, intrinsically safe Model FLS-SBI (60)

KEMA 01 ATEX 1053 X (II 1/2G Ex ia IIC T3 ... T6 Ga/Gb or II 2D Ex ib IIIC T80 °C Db)

Process connection, guide tube and float from stainless steel 1.4571 (316Ti)



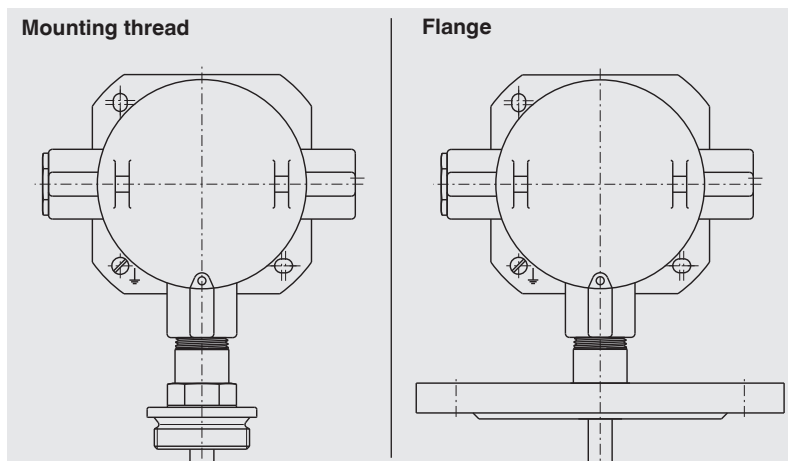
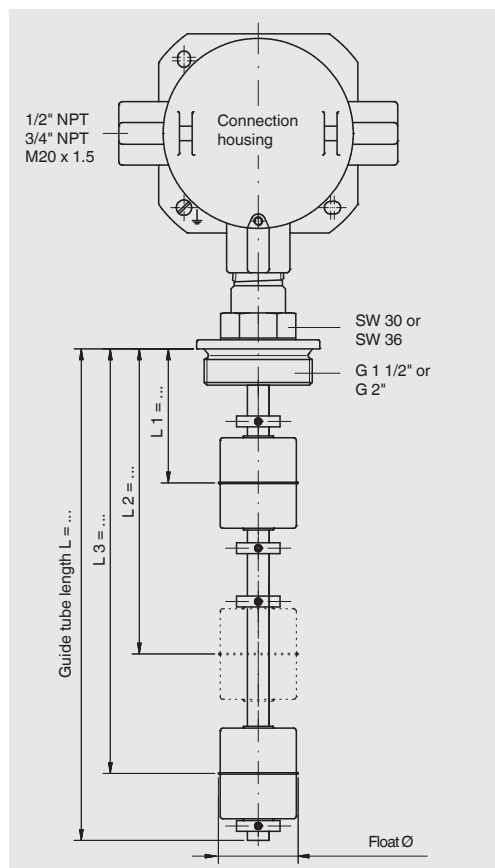
Model FLS-SBI																
Electrical connection	Connection housing: Aluminium Option: Polyester, stainless steel															
Process connection	<ul style="list-style-type: none"> ■ Mounting thread downwards G 1 1/2" or G 2" ■ Mounting flange <ul style="list-style-type: none"> - DIN DN 50 ... DN 200, PN 6 ... PN 100 - DIN EN 1092 DN 50 ... DN 200, PN 6 ... PN 100 - ANSI 2" ... 8", Class 150 ... 600 others on request															
Guide tube diameter	12 mm / 14 mm / 18 mm															
Guide tube length L	≤ 3,000 mm for guide tube diameter 12 or 14 mm ≤ 6,000 mm for guide tube diameter 18 mm															
Float	Material: Stainless steel 1.4571 (option: Buna (NBR), titanium) Float diameter: 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)															
Temperature class	<table border="0" style="width: 100%;"> <tr> <td></td> <td>T3</td> <td>T4</td> <td>T5</td> <td>T6</td> </tr> <tr> <td>■ Process temperature</td> <td>≤ 180 °C</td> <td>≤ 130 °C</td> <td>≤ 95 °C</td> <td>≤ 80 °C</td> </tr> <tr> <td>■ Ambient temperature</td> <td>≤ 60 °C</td> <td>≤ 60 °C</td> <td>≤ 60 °C</td> <td>≤ 60 °C</td> </tr> </table>		T3	T4	T5	T6	■ Process temperature	≤ 180 °C	≤ 130 °C	≤ 95 °C	≤ 80 °C	■ Ambient temperature	≤ 60 °C	≤ 60 °C	≤ 60 °C	≤ 60 °C
	T3	T4	T5	T6												
■ Process temperature	≤ 180 °C	≤ 130 °C	≤ 95 °C	≤ 80 °C												
■ Ambient temperature	≤ 60 °C	≤ 60 °C	≤ 60 °C	≤ 60 °C												
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level															
Max. number of contacts	6 x NO or NC, or 4 x SPDT for guide tube diameter 12, 14 or 18 mm															
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)															
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)															
Switching power	Only for connection to a certified intrinsically safe circuit with max. $U_i = 36\text{ V}$ $I_i = 100\text{ mA}$ $C_i = 0\text{ nF}$ $L_i = 0\text{ }\mu\text{H}$															
Mounting position	Vertical ±30°															
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)															

Float switch, explosion-protected version Ex d, flameproof enclosure

Models FLS-SAD, FLS-SBD (AL-ADF)

TÜV 13 ATEX 7399 X (II 2G Ex d IIC T6 Gb or II 2 D Ex tb IIIC T80 °C Db)

Process connection, guide tube and float from stainless steel 1.4571

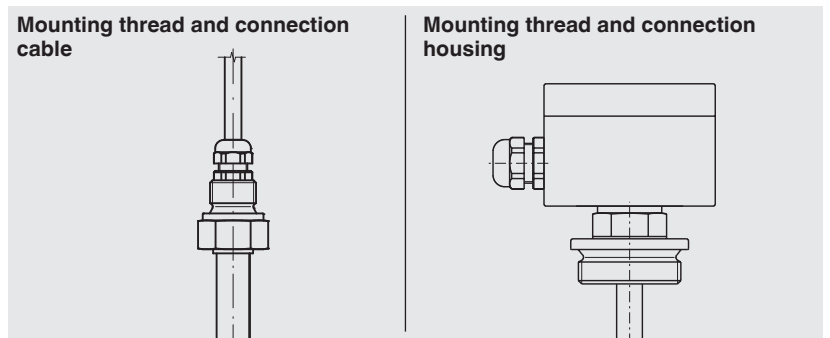
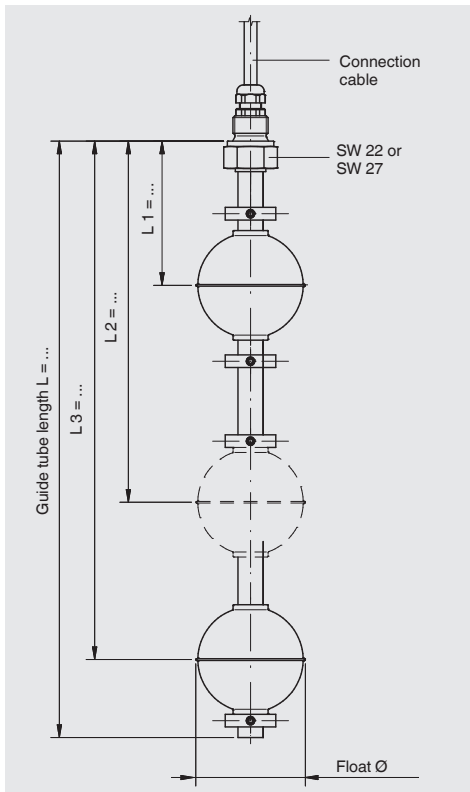


	Model FLS-SAD	Model FLS-SBD
Electrical connection	Connection housing: Aluminium Option: Stainless steel	
Process connection	<ul style="list-style-type: none"> ■ Mounting thread downwards G 1 1/2" or G 2" ■ Mounting flange - DIN DN 50 ... DN 350, PN 6 ... PN 40 - ANSI 2" ... 14", Class 150 ... 300 others on request 	
Guide tube diameter	12 mm / 14 mm	
Guide tube length L	≤ 4,000 mm for guide tube diameter 12 mm ≤ 6,000 mm for guide tube diameter 14 mm	
Float	Material: Stainless steel 1.4571 Float diameter: 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range ■ Process temperature	T4 ≤ 120 °C	T5 ≤ 95 °C
		T6 ≤ 80 °C
Switching function	Change-over SPDT - on rising level	
Max. number of contacts	4 x SPDT	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power	AC ≤ 230 V; 100 VA; 1.5 A DC ≤ 230 V; 60 W; 1.5 A	<ul style="list-style-type: none"> ■ With series resistance AC < 50 V; 40 VA; 150 mA DC < 75 V; 20 W; 150 mA ■ With NAMUR circuit per DIN EN 60947-5-6 AC < 50 V; 40 VA; 7 mA DC < 75 V; 20 W; 7 mA
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, miniature design

Models FLS-ME, FLS-MB

Process connection, guide tube 8 mm and float from stainless steel 1.4571 (316Ti)

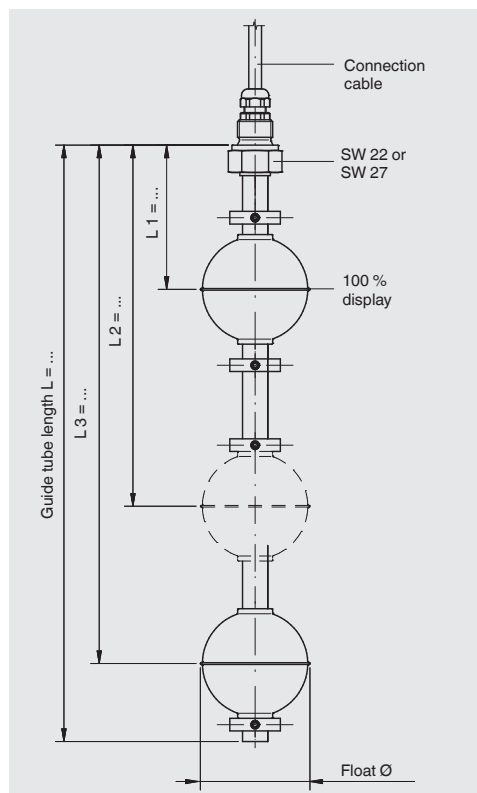


	Model FLS-ME	Model FLS-MB
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR	■ Connection housing: Aluminium 64 x 58 x 34 mm ■ Coupler connector
Process connection	Mounting thread upwards G 1/8" others on request	Mounting thread downwards G 3/4" or G 1" others on request
Guide tube diameter	8 mm	
Guide tube length L	≤ 500 mm	
Float	Material: Stainless steel 1.4571 (option: Buna (NBR), titanium, PP) Float diameter from 20 ... 35 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	PVC/PUR cable -10 ... +80 °C Silicone cable -30 ... +150 °C Observe the permissible temperature range of the float.	Buna (NBR), PP -10 ... +80 °C Stainless steel, titanium -30 ... +150 °C Observe the permissible temperature range of the float.
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	3 x NO or NC, or 1 x SPDT	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power	■ Normally open, normally closed AC < 50 V; 10 VA; 0.5 A DC < 75 V; 5 W; 0.25 A ■ Change-over AC < 50 V; 5 VA; 0.25 A DC < 75 V; 2.5 W; 0.15 A	
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, miniature design

Models FLS-MA, FLS-MF

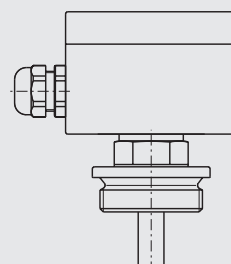
Process connection, guide tube 8 mm and float from stainless steel 1.4571 (316Ti)



Mounting thread and connection cable



Mounting thread and connection housing

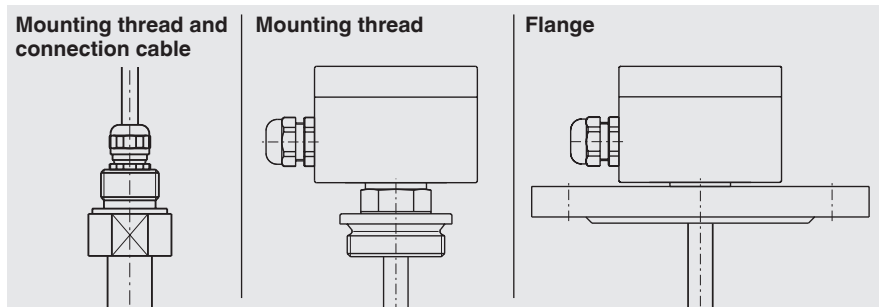
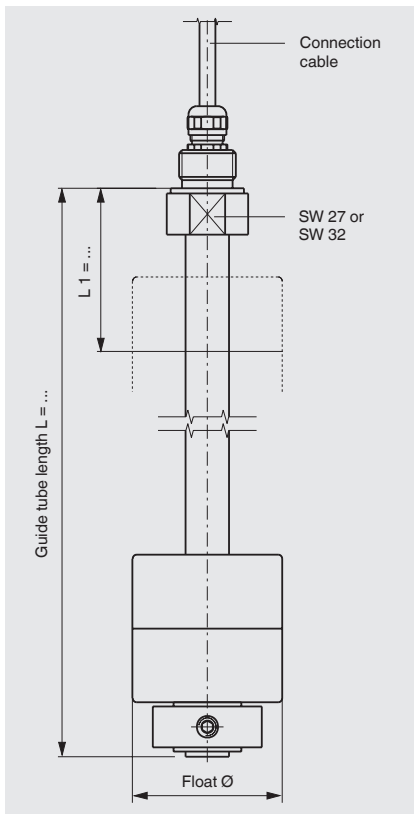


	Model FLS-MA	Model FLS-MF
Electrical connection	Connection cable ■ PVC ■ Silicone ■ PUR	■ Connection housing: Aluminium 64 x 58 x 34 mm ■ Coupler connector
Process connection	Mounting thread upwards G 1/8" others on request	Mounting thread downwards G 3/4" or G 1" others on request
Guide tube diameter	8 mm	
Guide tube length L	≤ 500 mm	
Float	Material: Stainless steel 1.4571 (option: Buna (NBR), titanium, PP) Float diameter from 20 ... 35 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	PVC/PUR cable -10 ... +80 °C Silicone cable -30 ... +150 °C Observe the permissible temperature range of the float.	Buna (NBR), PP -10 ... +80 °C Stainless steel, titanium -30 ... +150 °C Observe the permissible temperature range of the float.
Switching function	Alternatively normally open (NO) or normally closed (NC) - on rising level	
Max. number of contacts	3 x NO or NC	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power Normally open, normally closed	AC ≤ 230 V; 10 VA; 0.5 A DC ≤ 230 V; 5 W; 0.25 A	
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, plastic version

Models FLS-PA, FLS-PF

Process connection, guide tube and float from PVC, PP or PVDF

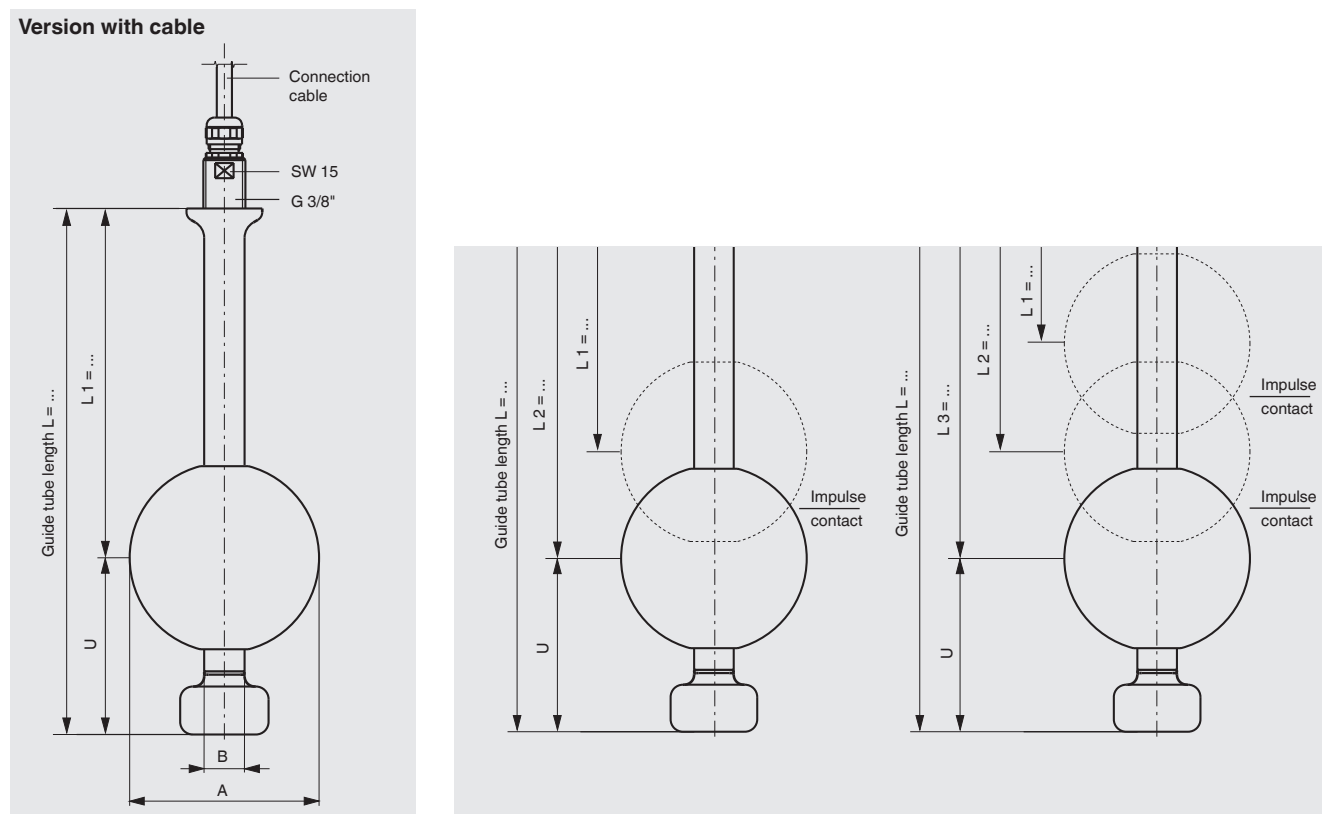


	Model FLS-PF	Model FLS-PA
Electrical connection	Connection cable ■ PVC ■ PUR	■ Connection housing polypropylene 80 x 82 x 55 mm ■ Connection housing polyester 80 x 75 x 55 mm ■ Coupler connector
Process connection	Mounting thread upwards G 3/8" others on request	Mounting thread downwards G 1 1/2" or G 2" Flange ■ DIN DN 50 ... DN 200, PN 6 ... PN 100 ■ DIN EN 1092-1 DN 50 ... DN 200, PN 6 ... PN 100 ■ ANSI 2" ... 8", Class 150 ... 600
Guide tube diameter	12 mm / 16 mm / 20 mm	
Guide tube length L	≤ 500 mm for guide tube diameter 12 mm ≤ 3,000 mm for guide tube diameter 16 mm ≤ 5,000 mm for guide tube diameter 20 mm	
Float	Material: PVC, PP or PVDF Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	For float material PVC 0 ... 60 °C For float material PP -10 ... +80 °C For float material PVDF -10 ... +100 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	6 x NO or NC, or 4 x SPDT	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power	■ Normally open, normally closed AC ≤ 230 V; 100 VA; 1 A DC ≤ 230 V; 50 W; 0.5 A ■ Change-over AC ≤ 230 V; 40 VA; 1 A DC ≤ 230 V; 20 W; 0.5 A	
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, pharmaceutical version

Models FLS-HA, FLS-HE

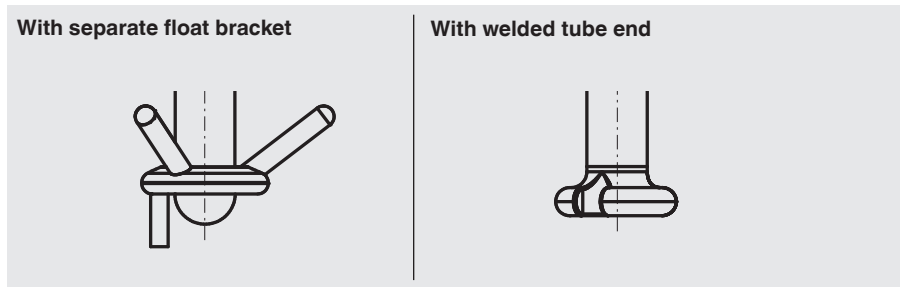
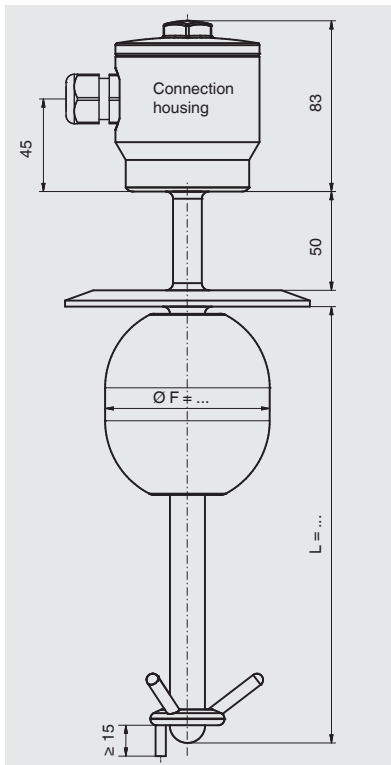
Process connection, guide tube and float from stainless steel



	Model FLS-HA	Model FLS-HE
Electrical connection	Connection housing: ■ Stainless steel	Connection cable ■ PVC ■ Silicone ■ PUR
Process connection	<ul style="list-style-type: none"> ■ Mounting thread upwards G 3/8" ■ Mounting flange per DIN or ANSI ■ Threaded connection per DIN 11851 ■ Clamp pipe connection per DIN 32676 ■ Ingold sanitary fitting others on request	
Guide tube diameter	17.2 mm (stainless steel 1.4435 or 1.4539, surface ground and polished)	
Guide tube length L	≤ 5,000 mm	
Float	Material: Stainless steel 1.4435 or 1.4539 Float diameter from 44 ... 120 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	PVC/PUR cable -10 ... +80 °C Silicone cable -30 ... +150 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	6 x NO or NC, or 4 x SPDT	6 x NO or NC, or 4 x SPDT for PVC and PUR cable 3 x NO or NC, or 2 x SPDT for silicone cable
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 20 mm (depending on the selection of the float and the contacts)	
Switching power	<ul style="list-style-type: none"> ■ Normally open, normally closed AC ≤ 230 V; 100 VA; 1 A DC ≤ 230 V; 50 W; 0.5 A ■ Change-over AC ≤ 230 V; 40 VA; 1 A DC ≤ 230 V; 20 W; 0.5 A 	
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

Float switch, sterile version (3-A) Model FLS-HA3

Process connection, guide tube and float from stainless steel

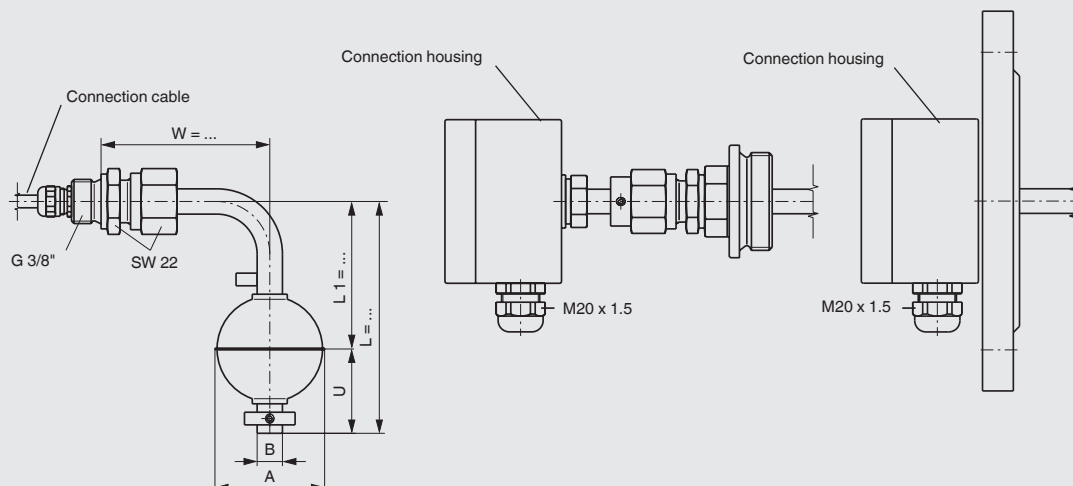


	Model FLS-HA3 with separate float bracket	Model FLS-HA3 with welded pipe connection
Electrical connection	Connection housing: stainless steel	
Process connection	<ul style="list-style-type: none"> ■ Clamp pipe connection ISO 2852, DN 32 ... DN 100 or 1.5" ... 4" ■ Clamp pipe connection DIN 32676, DN 32 ... DN 100 or 1.5" ... 4" ■ Aseptic mounting thread downwards DIN 11864-1, DN 32 ... DN 100 or 1.5" ... 4" ■ Aseptic liner DIN 11864-1, DN 32 ... DN 100 or 1.5" ... 4" ■ Aseptic flange connection DIN 11864-2 (DN 32 ... DN 50 or 1.5" ... 2" ■ Aseptic clamp connection DIN 11864-3, DN 32 ... DN 100 or 1.5" ... 4" ■ VARIVENT® (form F,N and G) ■ BioConnect® threaded connection, DN 32 ... DN 100 or 1.5" ... 2" ■ BioConnect® flange connection, DN 32 ... DN 100 or 1.5" ... 2" ■ BioConnect® clamp connection, DN 32 ... DN 100 or 1.5" ... 4" 	
Guide tube diameter	12 mm / 14 mm / 17.2 mm (stainless steel 1.4435 or 1.4539, surface ground or polished, $R_a < 0.8 \mu\text{m}$)	
Guide tube length L	$\leq 5,000 \text{ mm}$	
Float	Material: Stainless steel 1.4435 or 1.4539 Float diameter: 50 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	<ul style="list-style-type: none"> ■ Process temperature -40 ... +200 °C ■ Ambient temperature -40 ... +85 °C 	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	3 x NO or NC, or 3 x SPDT	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 50 mm (depending on the selection of the float and the contacts)	
Switching power	<ul style="list-style-type: none"> ■ Normally open, normally closed AC $\leq 230 \text{ V}$; 100 VA; 1 A DC $\leq 230 \text{ V}$; 50 W; 0.5 A ■ Change-over AC $\leq 230 \text{ V}$; 40 VA; 1 A DC $\leq 230 \text{ V}$; 20 W; 0.5 A 	
Mounting position	Vertical $\pm 30^\circ$	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

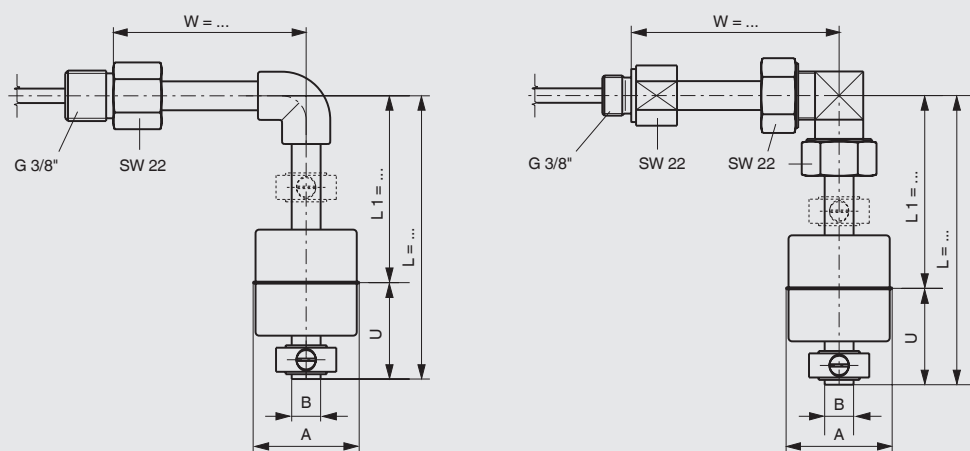
Options

Model	Angled version	Adjustable guide tube	ECTFE coating	Special flange from polyamide or brass	Food version
FLS-SE	x	x			x
FLS-SF	x	x			x
FLS-SA	x	x	x	x	x
FLS-SB	x	x	x	x	x
FLS-SBI (60)	x				
FLS-ME FLS-MF	x	x			
FLS-MA FLS-MB	x	x			
FLS-PF	x				
FLS-PA	x				

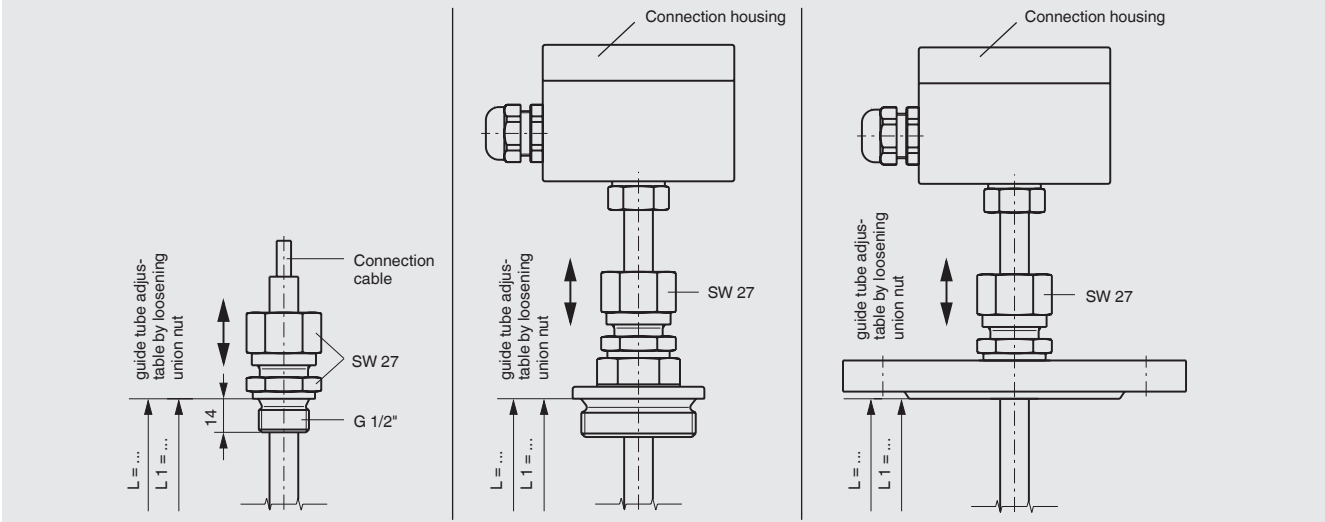
Angled version, material: Metal



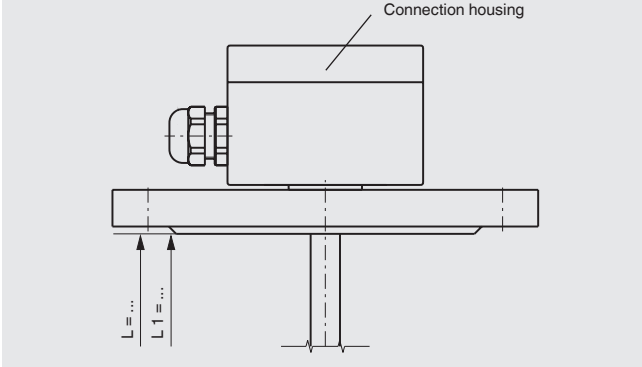
Angled version, material: Plastic



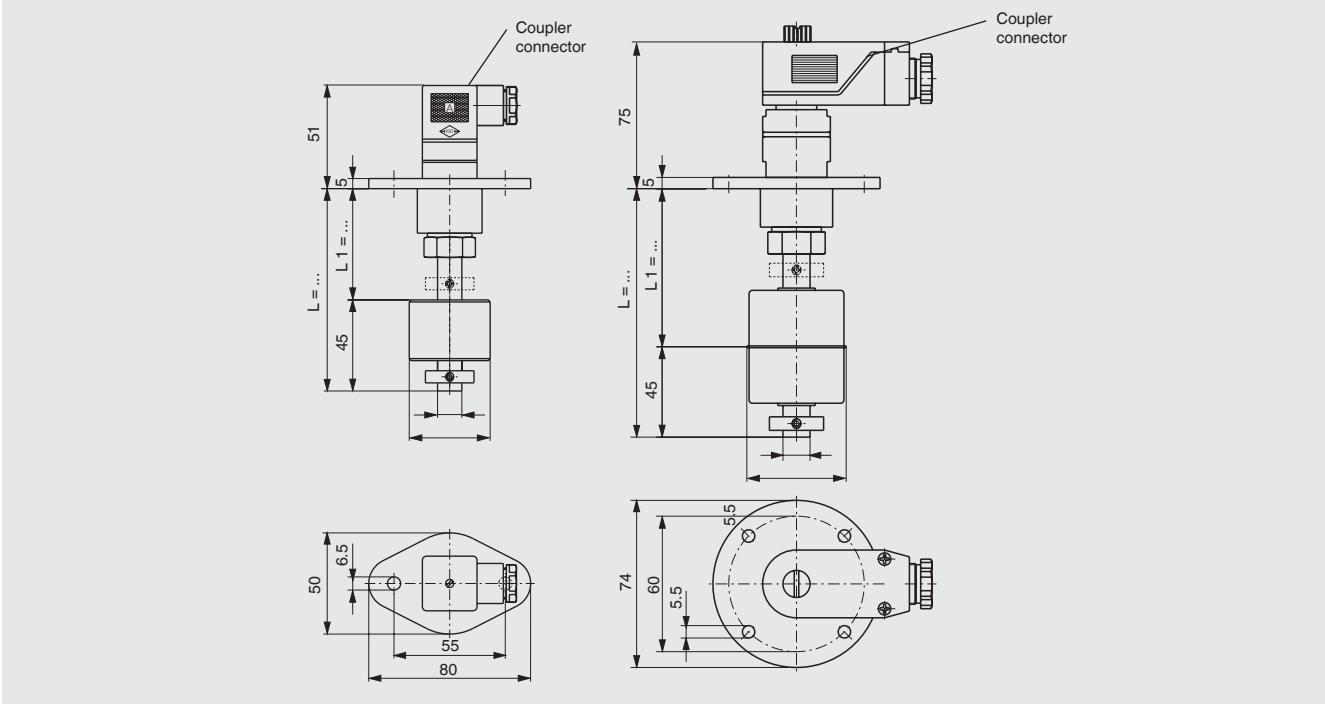
Version with adjustable guide tube



Version with ECTFE coating



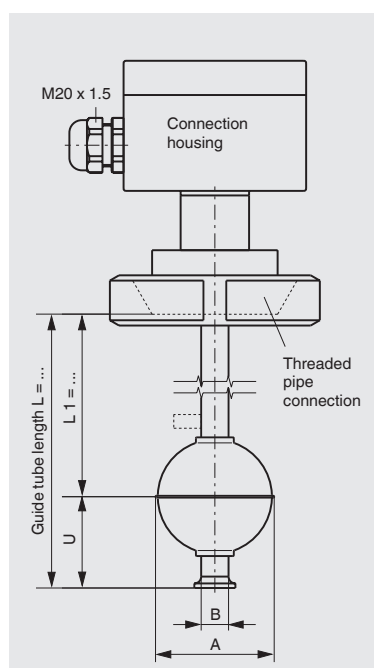
Special flange from polyamide or brass



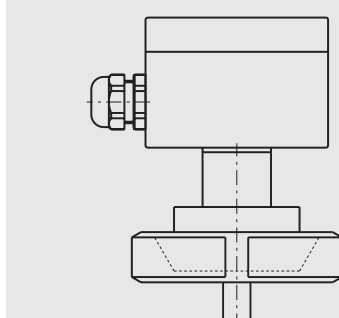
Food version for float switch

Model FLS-S

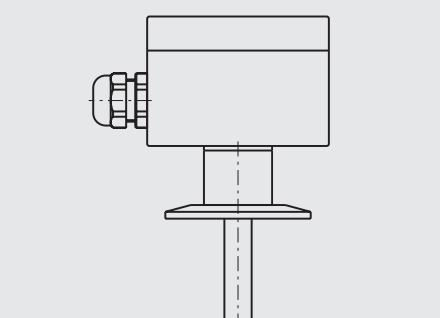
Process connection, guide tube and float from stainless steel



Threaded pipe connection per DIN 11851

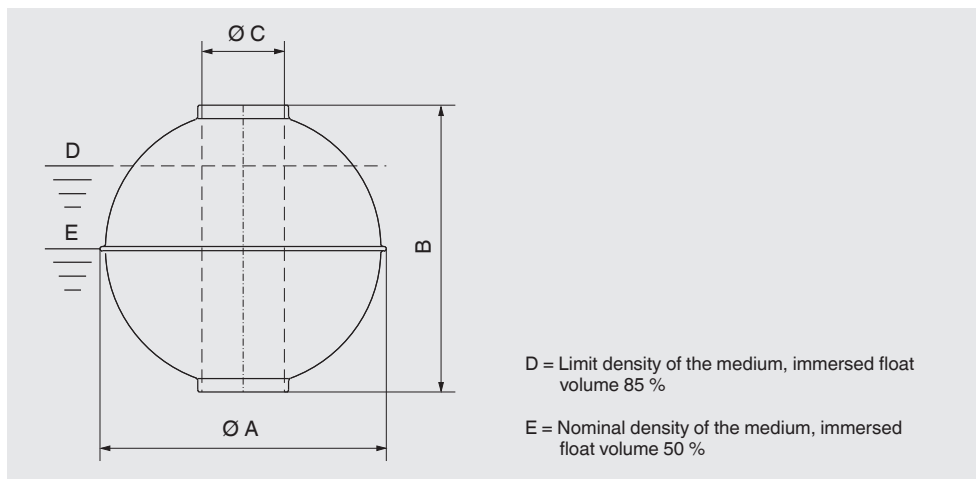


Clamp pipe connection per DIN 32676



	Threaded pipe connection	Clamp pipe connection
Electrical connection	Connection housing: <ul style="list-style-type: none"> ■ Aluminium 64 x 58 x 34 mm, with 1 contact ■ Aluminium 80 x 75 x 57 mm, 2 or more contacts Option: Polypropylene, polyester, stainless steel	
Process connection	Threaded pipe connection per DIN 11851, downwards DN 50 ... DN 150 others on request	Clamp pipe connection per DIN 32676, DN 25 ... DN 100 or 1" ... 4" others on request
Guide tube diameter	12 mm / 14 mm / 18 mm	
Guide tube length L	Guide tube diameter 12 mm / 14 mm: ≤ 3,000 mm Guide tube diameter 18 mm: ≤ 6,000 mm	
Float	Material stainless steel 1.4435 or 1.4404, option electropolished Float diameter from 44 ... 80 mm Float selection depending on guide tube diameter and process conditions (see page 17, 18, 19)	
Temperature range	-30 ... +150 °C	
Process temperature <ul style="list-style-type: none"> ■ Process temperature 	-30 ... +150 °C	
Switching function	Alternatively normally open (NO), normally closed (NC) or change-over (SPDT) contact - on rising level	
Max. number of contacts	3 x NO or NC, or 3 x SPDT	
Switch position	Dimensions L1, L2, L3 ... (from sealing face, starting from top)	
Distance between switch points	Minimum 50 mm (depending on the selection of the float and the contacts)	
Switching power	<ul style="list-style-type: none"> ■ Normally open, normally closed ■ Change-over AC ≤ 230 V; 100 VA; 1 A DC ≤ 230 V; 50 W; 0.5 A AC ≤ 230 V; 40 VA; 1 A DC ≤ 230 V; 20 W; 0.5 A	
Mounting position	Vertical ±30°	
Ingress protection	up to IP66 or IP68 per IEC/EN 60529 (depending on version)	

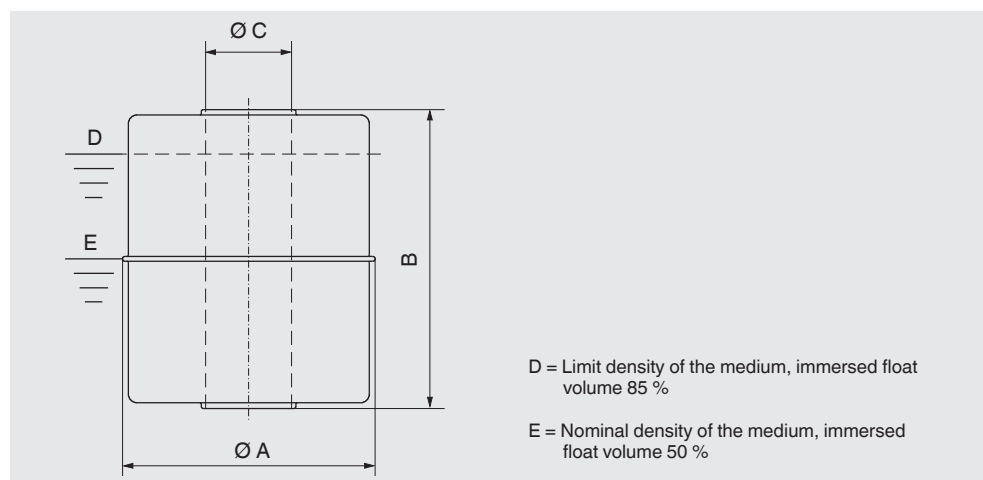
Spherical float



Material	Version	Suits guide tube Ø in mm	Ø A in mm	B in mm	Ø C in mm	Max. operating pressure in bar	Max. operating temp. in °C	Limit density 85 % in kg/m ³	Order no.
Stainless steel 1.4571	V29A/0.2	8	29	28	9	25	100	920	27355
	V52A	12	52	52	15	40	300	700	5462
	V62A	12	62	61	15	32	300	670	5511
	V83A	12	83	81	15	25	300	430	5485
	V80A	18	80	76	23	25	300	680	5478
	V98A	18	98	96	23	25	300	640	5489
	V105A	18	105	103	23	25	300	530	20652
	V120A	18	120	117	23	25	300	390	21721
Titanium 3.7035	T29A	8	29	28	9	30	100	700	5522
	T52A	12	52	52	15	25	300	720	5526
	T52A/1	12	52	52	15	80	300	1060	-
	T62A	12	62	62	15	25	300	520	5536
	T83A	12	83	81	15	25	300	350	5544
	T80A	18	80	76	23	25	300	665	112263
	T98A	18	98	96	23	25	300	495	-
	T105A	18	105	103	23	25	300	370	-
T120A	18	120	117	23	25	300	330	-	
Stainless steel 1.4571 ECTFE coated	VEC53A	12	53	53	14	25	Depending on medium	745	-
	VEC63A	12	63	62	14	25	Depending on medium	590	-
	VEC84A	12	84	82	14	25	Depending on medium	400	-
	VEC81A	18	81	77	22	25	Depending on medium	720	-
	VEC99A	18	99	97	22	25	Depending on medium	675	-
	VEC106A	18	106	104	22	25	Depending on medium	630	-
	VEC121A	18	121	118	22	25	Depending on medium	460	-

Note: The optimum float will be selected after a feasibility test carried out by WIKA.

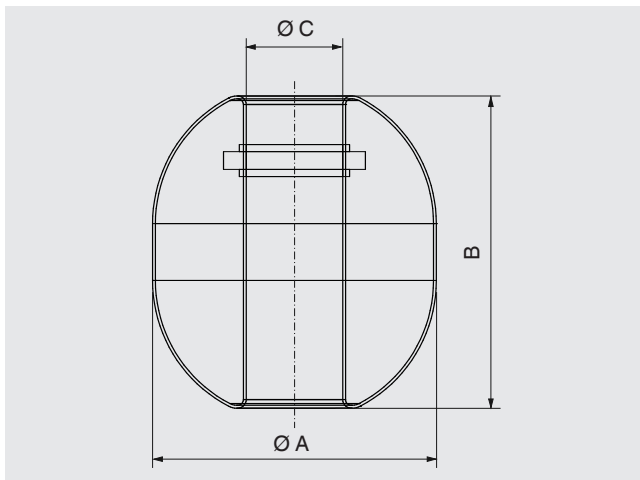
Cylindrical float



Material	Version	Suits guide tube Ø in mm	Ø A in mm	B in mm	Ø C in mm	Max. operating pressure in bar	Max. operating temp. in °C	Limit density 85 % in kg/m ³	Order no.
Stainless steel 1.4571	V27A	8	27	31	10	16	100	700	9679
	V44A	12	44	52	15	16	300	720	9681
Titanium 3.7035	T44A	12	44	52	15	16	300	720	9744
Buna (NBR)	B20A	8	20	20	9	3	80	940	9719
	B23A	8	23	25	9	3	80	800	9721
	B25A	8	25	14	9	3	80	790	9720
	B30A	8	30	45	13	3	80	680	34047
	B40A	12	40	30	15	3	80	580	9728
	B40A/120	12	40	120	15	3	80	410	-
	B50A	18	50	45	19	3	80	500	9725
PVC	P44A	12	44	44	14	3	60	650	33790
	P55A	16	55	54	22	3	60	800	-
	P55A/26	20	55	80	26	3	60	920	-
	P55A/70	16	55	70	22	3	60	670	-
	P80A	20	80	79	25	3	60	570	33796
Polypropylene	PP27A	8	27	29	9	3	80	755	15516
	PP35A	8	35	33	9	3	80	675	100347
	PP44A	12	44	44	14	3	80	480	15514
	PP55A	16	55	54	22	3	80	580	33792
	PP55A/26	20	55	80	26	3	80	670	-
	PP80A	20	80	79	25	3	80	430	33795
PVDF	PF44A	12	44	55	14	3	100	780	33791
	PF55A	16	55	69	22	3	100	820	116235
	PF55A/26	20	55	80	26	3	100	1,140	-
	PF80A	20	80	79	25	3	100	680	33797
Stainless steel 1.4571 E-CTFE coated	VEC45A	12	45	53	14	16	Depending on medium	780	-

Note: The optimum float will be selected after a feasibility test carried out by WIKA.

Hygienic float



Material	Model	Version	Suits guide tube Ø in mm	Ø A in mm	B in mm	Ø C in mm	Max. operating pressure in bar	Max. operating temp. in °C	Limit density 85 % in kg/m ³	Order no.
Stainless steel 1.4435	V80/88/A34/3A/35, axial	V80A	18	80	55	23	16	250	800	025755
	V50/55/17/A34/3A/35	V50A	12	50	55	16.8	16	250	1,100	026400
	V55/70/A34/3A/35 axial	V55A	12	55	70	17	16	250	900	124069

Note: The optimum float will be selected after a feasibility test carried out by WIKA.

Contact protection measures

The reed contacts should be protected against any voltage or current spikes that might occur.

Depending on the different load types different protective circuits are used.



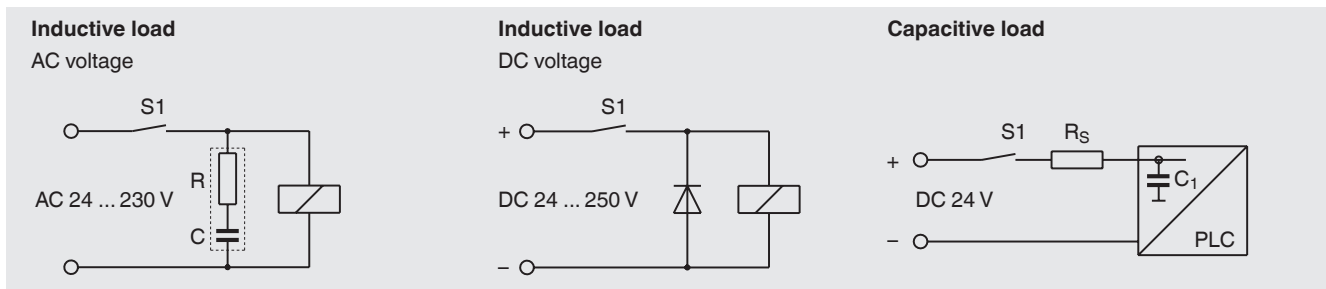
Model KFD2-ER-1.6



RC element

Contact protection relays	Contacts	Input	Power supply	Approval number	Order no.
KFD2-ER-1.6	1 x change-over AC 250 V, 2 A	2 x contacts	DC 20 ... 30 V	-	112941
KFD2-SR2-Ex2.W	2 x change-over AC 253 V, 2 A	2 x contacts	DC 20 ... 30 V	II 1 GD EEx ia IIC PTB 02 ATEX 2073	112944
KFA6-ER-1.6	1 x change-over AC 250 V, 2 A	2 x contacts	AC 230 V	-	112942
KFA6-SR2-Ex2.W	2 x change-over AC 253 V, 2 A	2 x contacts	AC 230 V	II 1 GD EEx ia IIC PTB 02 ATEX 2073	112943

RC element	Capacitance	Resistance	Voltage	Order no.
B3/115	0.33 μ F	470 Ohm	AC 115 V	110446
B3/230	0.33 μ F	1,000 Ohm	AC 230 V	110460



Ordering information

To order the described product the order number (if available) is sufficient.

Alternatively:

Model / Version / Electrical connection / Process connection / Guide tube diameter / Guide tube length L / Information about contact (switching function, number of switch points, switch position) / Process specifications (operating temperature and pressure, limit density) / Options

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The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.



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User manual

Vibration Guard

March 2014

Valid for the following GEA type numbers:

0005-1848-020



GEA Mechanical Equipment

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Safety

This apparatus has been designed and tested according to IEC publication 61010. "Safety Requirements for Electronic Measuring Apparatus" and complies with Safety Class III. This User Manual contains information, which should be followed by the user in order to ensure safe operation and maintain the Vibration Guard in a safe condition.

The following Vibration Guard type identification numbers describe the same device:



GEA-0005-1848-020 or
PCH1106/CHF8170



Warnings:

- If the Vibration Guard develops a fault, switch it off and secure it against unintended use
- Do **NOT** try to remove the cable gland (if applicable) from the enclosure (housing). Removing it might damage the Vibration Guard beyond repair
- Do **NOT** carry the Vibration Guard by its cable

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Congratulation

We congratulate you with your new Vibration Guard and thank you for choosing products from GEA Separator and PCH Engineering A/S.

1. Introduction

The Vibration Guard is a maintenance free device and can be used to monitor vibration parameters in applications with machines like pumps, blowers, ventilators, decanters, separators, centrifuges, mills and milling equipment.

A bearing damage often occurs due to undetected unbalance or misalignment of a machine. Hence the machine runs for a very long time period with a much too high vibration level. This is the most common reason for serious machine crashes and down time.

The Vibration Guard continuously keeps track of the vibration level of a machine at the point where it is fixed to that machine. The Vibration Guard continuously monitors the machine vibration level and gives a standard 4-20 mA DC output that is direct-proportional to this vibration level.

The fact that the machine is monitored 24 hours per day – and all year round – ensures that rapid developing catastrophic machine errors are detected in time.... errors that otherwise might be missed when measuring vibration at certain maintenance intervals only. When connected to a PLC or a CTS system the early warnings produced by the Vibration Guard allow protective action(s) while the fault is still under development, resulting in a considerable reduction of machine damages, machine down-time, accidents thus reducing the maintenance expenses.

2. Functionality

The vibration sensor consists of a vibration sensor as well as output electronics, which is embedded in a stainless steel housing. The Vibration Guard monitors mechanical vibrations according to **DIN/ISO 10816**. The Vibration Guard is configured to measure velocity (**mm/s**) and measures in true RMS.

The vibration sensor can be connected to a PLC or a machine monitoring system. When connected the measured vibration level is delivered to the PLC as a **4-20 mA** DC current signal, which is direct proportional to the Full Scale of the vibration level.

Alarms for individual vibration levels can be programmed in the PLC or CTS system, where also any preventive action can be initiated.

Connecting the vibration sensor to the PLC or CTS system only requires a single cable. The measuring and frequency range is pre-set by PCH, so the vibration sensor is ready for use at delivery.

3. Technical Data

Type

GEA type: 0005-1848-020
PCH Engineering type: PCH1106/CHF8170

Characteristics

Measuring parameter: Velocity (mm/s)
Measuring range: 0 - 50 mm/s
Measuring accuracy: $\pm 5 \%$
Measuring direction: Parallel to the length axis of the housing
Max. measuring range: $\pm 16 \text{ g}, \pm 10 \%$
Shock: 1000 g
Frequency range: 10 Hz - 1000 Hz, 18 db/oct (-3 dB, -60 dB/dec)
Detector type: True RMS
Averaging time: 3 seconds

Output

Output signal: 4-20 mA DC relative to 0-100 % of the measuring range
($R_{\text{load}} < 200 \text{ Ohm}$)

Connection

Power supply: +24 Volts DC, $\pm 10 \%$, max. 50 mA DC
Grounding: Ground (0 V) to chassis
Connector: Male M12/8-pole connector at the top of the device

Miscellaneous

Operating temperature: -20 °C to +70 °C (+ 95 °C with adaptor)
Housing material: Stainless steel type 1.4305
Ingress Protection: IP67
Weight: Approx. 110 grams
Dimensions: Cylinder $\varnothing 27 \text{ mm}$ with hexagonal clamp 27mm
Mounting: M8 threaded stud, Hex 25

Vibration Guard Type 0005-1848-020

4. Installation

The connection of a Vibration Guard to for example a PLC can be carried out by any skilled industrial electrician.

The Vibration Guard requires a power supply of +24 V DC.

The output signal can be used to form a contact threshold value in for example a PLC, or can be connected to a process visualization system.

Usage:

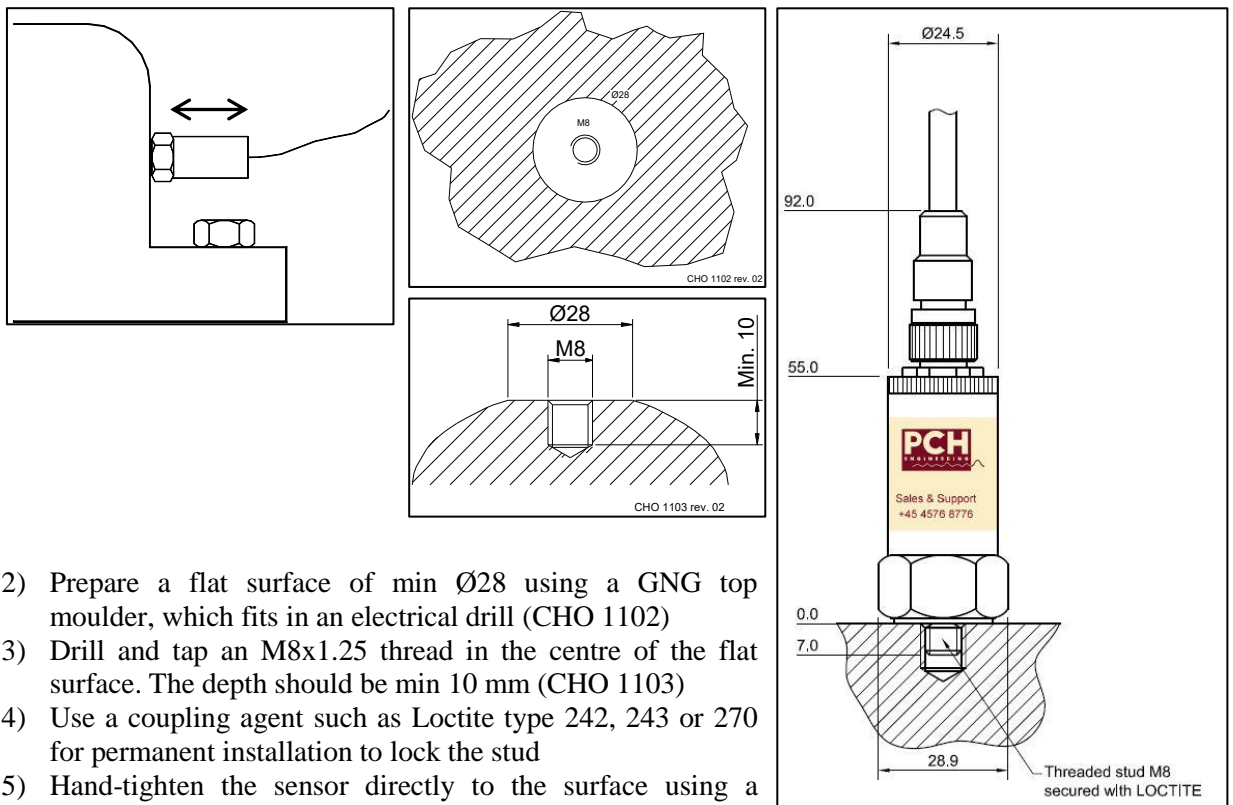
The Vibration Guard is designed for permanent monitoring of unbalance and misalignment problems on rotating machinery. The sensor measures in mm/s and gives an analogue output in mA relative to the full scale (FS) of the sensor.

The sensor is sensitive in only one direction, which is parallel to the length axis of the device.

Mounting

The Vibration Guard is mounted on the surface of the machine to be monitored by the integrated M8 stud at the bottom of the device.

- 1) To make the vibration measurement comply to an international standard such as ISO 10816-3, the sensor must be mounted on the bearing house (block) in the radial and horizontal direction



- 2) Prepare a flat surface of min $\text{Ø}28$ using a GNG top moulder, which fits in an electrical drill (CHO 1102)
- 3) Drill and tap an M8x1.25 thread in the centre of the flat surface. The depth should be min 10 mm (CHO 1103)
- 4) Use a coupling agent such as Loctite type 242, 243 or 270 for permanent installation to lock the stud
- 5) Hand-tighten the sensor directly to the surface using a torque of 3-6 Nm.

Vibration Guard Type 0005-1848-020

Connections:

The Vibration Guard is delivered with a standard 8-pole M12 connector.
The pin configuration of the connector is as follows:

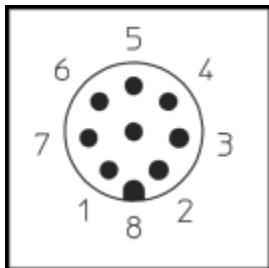
Pin	Cable colour	Function
1	Pink	+24 (+18 to +30) Volt DC (Main power)
2	Blue	0 VDC (Common GND)
3	Grey	4-20 mA (Analogue DC output)
4	Green	Not connected
5	Yellow	Not connected
6	White	Not connected
7	Brown	Not connected
8	Red	Not connected
Chassis	Braided shielding	Housing connected to GND



Note:

Shield should always be connected to the house of the sensor

M12/8-pole connector seen from the top:



5. Maintenance

The Vibration Guard is a maintenance free device.



Note:

To clean a Vibration Guard device please wipe its enclosure with a moisture cloth, if necessary, with a small amount of a mild detergent. The use of any strong/aggressive detergent might cause the fading of the labels on the enclosure, making them unreadable

In the unlikely event that you experience erroneous behaviour we strongly recommend you to contact your local GEA Separation office for a repair or exchange of the device.

Whenever you contact GEA Separator for a repair or exchange of the Vibration Guard device you are kindly requested to have the following information at hand:

- The type numbers of the vibration monitor: GEA 0005-1848-020 *and* PCH1106/CHF8170
- The serial number of the device, visible on a label at the side of the enclosure

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TÜV 10 ATEX 555793 X
IECEX TUN10.0002 X



Examples/Beispiele



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Prior to starting any work, read the operating instructions!
Keep for later use!

Vor Beginn aller Arbeiten Betriebsanleitung lesen!
Zum späteren Gebrauch aufbewahren!

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Declarations of conformity can be found online at www.wika.com.

1. General information

1. General information

- The instrument described in the operating instructions has been designed and manufactured using state-of-the-art technology. All components are subject to stringent quality and environmental criteria during production. Our management systems are certified to ISO 9001 and ISO 14001.
- These operating instructions contain important information on handling the instrument. Working safely requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the instrument's range of use.
- The operating instructions are part of the instrument and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time.
- Skilled personnel must have carefully read and understood the operating instructions, prior to beginning any work.
- The manufacturer's liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, assignment of insufficiently qualified skilled personnel or unauthorised modifications to the instrument.
- The general terms and conditions, contained in the sales documentation, shall apply.
- Subject to technical modifications.
- Further information:
 - Internet address: www.wika.de / www.wika.com
 - Application consultant: Tel.: (+49) 9372/132-0
Fax: (+49) 9372/132-406
E-Mail: info@wika.de

Explanation of symbols



WARNING!

... indicates a potentially dangerous situation that can result in serious injury or death, if not avoided.



CAUTION!

... indicates a potentially dangerous situation, which can result in light injuries or damage to equipment or the environment, if not avoided.



Information

... points out useful tips, recommendations and information for efficient and trouble-free operation.



WARNING!

... indicates a potentially dangerous situation in a potentially explosive atmosphere, resulting in serious injury or death, if not avoided.



WARNING!

... indicates a potentially dangerous situation, caused by hot surfaces or liquids, that can result in burns if not avoided.

GB

Abbreviations

RTD "Resistance Temperature **D**etector" = Resistance thermometers

TC "Thermocouple"

2. Safety



WARNING!

Before installation, commissioning and operation, ensure that the appropriate thermometer has been selected in terms of measuring range, design and specific measuring conditions.

Choose the thermowell with regard to the maximum pressure and temperature (e.g. rating chart in DIN 43772).

Non-observance can result in serious injury and/or damage to equipment.



Further important safety instructions can be found in the individual chapters of these operating instructions.

2.1 Intended use

These resistance thermometers and thermocouples are used for temperature measurement in industrial applications, in hazardous areas.

Resistance thermometers are used for measuring temperatures from $-200 \dots +600 \text{ }^{\circ}\text{C}$. For thermocouples, the possible measuring ranges range from $-200 \dots +1200 \text{ }^{\circ}\text{C}$. Thermometers of this design can be installed directly in the process as well as in thermowells. The thermowell designs can be selected as desired, but the operating process data (temperature, pressure, density and flow rate) must be taken into account.

2. Safety

The system operator is responsible for selecting the thermometer or thermowell, and for the selection of their materials, so as to guarantee their safe operation within the system or machine. When preparing a quote, WIKA can only give recommendations which are based on our experience in similar applications.

GB

The thermometer has been designed and built solely for the intended use described here and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of its technical specifications requires the instrument to be shut down immediately and inspected by an authorised WIKA service engineer.

If the instrument is transported from a cold into a warm environment, the formation of condensation may result in the instrument malfunctioning. Before putting it back into operation, wait for the instrument temperature and the room temperature to equalise.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

2.2 Personnel qualification



WARNING!

Risk of injury should qualification be insufficient!

Improper handling can result in considerable injury and damage to equipment.

- The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.
- Keep unqualified personnel away from hazardous areas.

Skilled personnel

Skilled personnel are understood to be personnel who, based on their technical training, knowledge of measurement and control technology and on their experience and knowledge of country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognising potential hazards.

Special operating conditions require further appropriate knowledge, e.g. of aggressive media.

2.3 Additional safety instructions for instruments per ATEX and IECEx



WARNING!

Non-observance of these instructions and their contents may result in the loss of explosion protection.



WARNING!

Follow the requirements of the 94/9/EC (ATEX) and IECEx directives. Follow the respective national regulations concerning Ex-usage (e.g. EN/IEC 60079-10 and EN/IEC 60079-14).

2.4 Special hazards



WARNING!

Observe the information given in the applicable type examination certificate and the relevant country-specific regulations for installation and use in potentially explosive atmospheres (e.g. EN/IEC 60079-14, NEC, CEC). Non-observance can result in serious injury and/or damage to equipment.

For additional important safety instructions for instruments with ATEX/IECEx approval, see chapter 2.3 "Additional safety instructions for instruments per ATEX and IECEx".



WARNING!

For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, and refrigeration plants, compressors, etc., in addition to all standard regulations, the appropriate existing codes or regulations must also be followed.



WARNING!

Protection from electrostatic discharge (ESD) required. The proper use of grounded work surfaces and personal wrist straps is required when working with exposed circuitry (printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.

To ensure safe working on the instrument, the operating company must ensure

- that suitable first-aid equipment is available and aid is provided whenever required.
- that the operating personnel are regularly instructed in all topics regarding work safety, first aid and environmental protection and know the operating instructions and, in particular, the safety instructions contained therein.



WARNING!

Residual media in dismantled instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

Do not use this instrument in safety or Emergency Stop devices. Incorrect use of the instrument can result in injury.

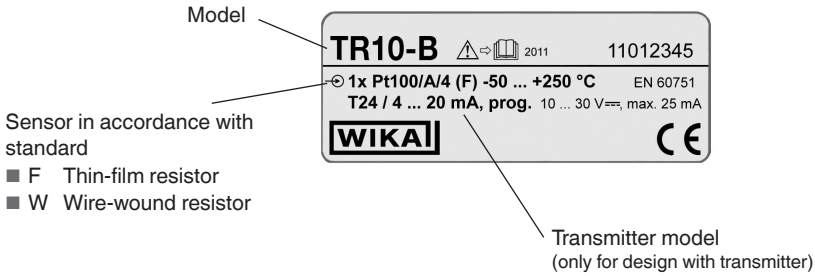
Should a failure occur, aggressive media with extremely high temperature and under high pressure or vacuum may be present at the instrument.

2. Safety

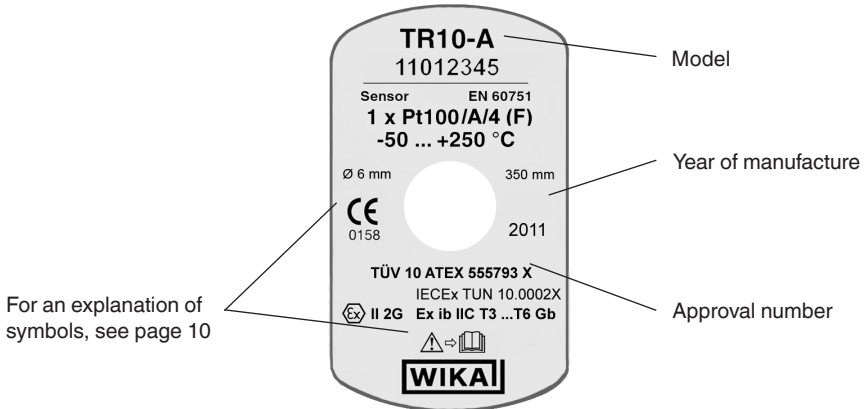
2.5 Labelling, safety marks

2.5.1 Product labels for resistance thermometers

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■ Product label for TR10-A measuring insert

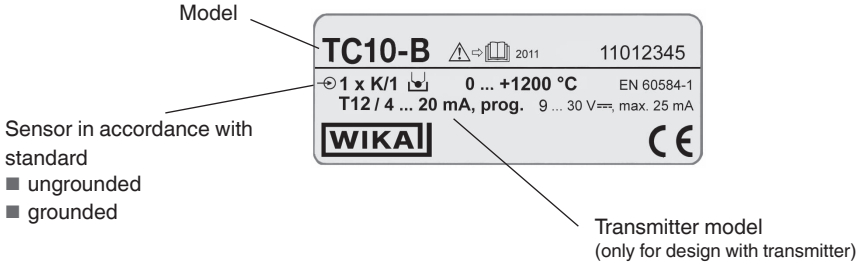


■ Additional data for Ex instruments



2. Safety

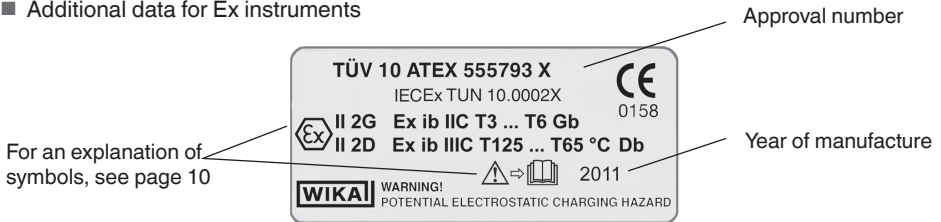
2.5.2 Product labels for thermocouples



■ Product label for measuring insert TC10-A



■ Additional data for Ex instruments



Legende:



■ ungrounded
welded insulated



■ grounded
welded to the sheath

2. Safety / 3. Specifications

Explanation of symbols



Before mounting and commissioning the instrument, ensure you read the operating instructions!

GB



CE, Communauté Européenne

Instruments bearing this mark comply with the relevant European directives.



ATEX European Explosion Protection Directive

(Atmosphère = AT, explosible = EX)

Instruments bearing this mark comply with the requirements of the European Directive 94/9/EC (ATEX) on explosion protection.

3. Specifications

3.1 Resistance thermometer

Sensor connection method

- 2-wire The lead resistance is recorded as an error in the measurement.
- 3-wire With a cable length longer than approx. 30 m, measuring errors can occur.
- 4-wire The internal lead resistance of the connecting wires is negligible.

Limiting error of the sensor per DIN EN 60751

- Class B
- Class A
- Class AA

The combination of a 2-wire connection with Class A / Class AA is not permissible, since the lead resistance of the measuring insert negates the higher sensor accuracy.

Basic values and limiting errors

Basic values and limiting errors for the platinum measurement resistances are laid down in DIN EN 60751.

The nominal value of Pt100 sensors is 100 Ω at 0 °C.

The temperature coefficient α can be stated simply to be between 0 °C and 100 °C with:

$$\alpha = 3.85 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$$

The relationship between temperature and electrical resistance is described by polynomials, which are also defined in DIN EN 60751. Moreover, this standard specifies the basic values in °C steps in tabular form.

3. Specifications

Class	Temperature range		Limiting error in °C
	Wire-wound (W)	Thin-film (F)	
B	-196 ... +600 °C	-50 ... +500 °C	$\pm(0.30 + 0.0050 t)$ ¹⁾
A	-100 ... +450 °C	-30 ... +300 °C	$\pm(0.15 + 0.0020 t)$ ¹⁾
AA	-50 ... +250 °C	0 ... 150 °C	$\pm(0.10 + 0.0017 t)$ ¹⁾

GB

1) | t | is the value of the temperature in °C irrespective of the sign.

Bold: standard version

Resistance values and limiting deviations at selected temperatures (Pt100)

Temperature in °C (ITS 90)	Resistance value in Ω		
	Class B	Class A	Class AA
-196	19,69 ... 20,80	-	-
-100	59,93 ... 60,58	60,11 ... 60,40	-
-50	80,09 ... 80,52	80,21 ... 80,41	80,23 ... 80,38
-30	88,04 ... 88,40	88,14 ... 88,30	88,16 ... 88,28
0	99,88 ... 100,12	99,94 ... 100,06	99,96 ... 100,04
20	107,64 ... 107,95	107,72 ... 107,87	107,74 ... 107,85
100	138,20 ... 138,81	138,37 ... 138,64	138,40 ... 138,61
150	156,93 ... 157,72	157,16 ... 157,49	157,91 ... 157,64
250	193,54 ... 194,66	193,86 ... 194,33	193,91 ... 194,29
300	211,41 ... 212,69	211,78 ... 212,32	-
450	263,31 ... 265,04	263,82 ... 264,53	-
500	280,04 ... 281,91	-	-
600	312,65 ... 314,77	-	-

This table represents the calibration process with predefined temperatures. This means if a temperature standard is available, the resistance value of the test piece must lie within the limits specified above.



For further information on accuracies and limits of use of resistance thermometers, see data sheet IN 00.17 (download available at www.wika.de).

3.2 Thermocouples

Sensor type

Model	Recommended max. operating temperature
K (NiCr-Ni)	1,200 °C
J (Fe-CuNi)	800 °C
E (NiCr-CuNi)	800 °C
T (Cu-CuNi)	400 °C
N (NiCrSi-NiSi)	1,200 °C
S (Pt10% Rh-Pt)	1,600 °C
R (Pt13% Rh-Pt)	1,600 °C
B (Pt30% Rh-Pt6%-Rh)	1,700 °C

3. Specifications

Potential measuring uncertainties due to ageing effects

Thermocouples are subject to ageing and change their temperature/thermal voltage characteristic. Type J thermocouples of (Fe-CuNi) age slightly due to oxidation of the pure metal leg. In types K and N thermocouples (NiCrSi-NiSi), high temperatures can result in substantial changes to the thermal voltage due to chrome depletion in the NiCr leg, leading to a lower thermal voltage.

GB

This effect is accelerated if there is a shortage of oxygen, since a complete oxide layer, which would protect it from further oxidation, cannot be formed on the surface of the thermocouple. The chromium in the alloy is oxidised, but not the nickel, giving rise to "green rot" that eventually destroys the thermocouple. When NiCr-Ni thermocouples that have been operating above 700 °C are cooled quickly, this cooling causes certain states in the crystal structure (**short-range order**) to freeze, which in type K thermocouples can result in a change of the thermal voltage of up to 0.8 mV (K effect).

In Type N thermocouple (NiCrSi-NiSi), it has been possible to reduce the **short-range-order effect** by alloying both legs with silicon. The effect is reversible and is largely eliminated again by annealing above 700 °C, followed by slow cooling. Thin sheathed thermocouples are particularly sensitive. Cooling in still air can even result in deviations of more than 1 K.

The application range of these thermometers is limited both by the permissible max. temperature of the thermocouple and by the max. temperature of the thermowell material.

Listed thermocouples are available both as single or duplex thermocouples. The thermocouple will be delivered with an insulated measuring point, unless explicitly specified otherwise.

Sensor limiting error

A cold junction temperature of 0 °C is taken as basis with the definition of the tolerance value of thermocouples. When using a compensating cable or thermocouple cable, an additional measuring error must be considered.

For limiting errors and further specifications see current WIKA data sheet or order documentation.

4. Design and function

4.1 Description

These thermometers (resistance thermometers and thermocouples) detect temperatures in processes.

Depending on their design, these thermometers are suitable for low, medium and high process requirements in hazardous areas.

GB

Insulated measuring point

The model TRxx or model TCxx thermometers consist of a welded tube, a mineral-insulated sheathed cable or ceramic-insulated thermal wires (in which the temperature sensor is located, embedded in a ceramic powder), a temperature-resistant sealing compound, cement compound or a thermal transfer paste.

Alternatives:

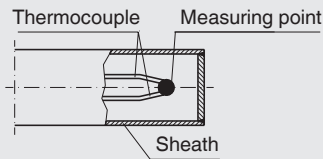
The measuring insert or the cable probe can also be provided in a tubular form. In this case, the sensor is located in a welded tube and embedded in a ceramic powder, heat-conducting paste or in a sealing compound suitable for this purpose.

The measuring insert for high-temperature thermocouples can also be assembled from thermal wires insulated with ceramic rods or ceramic beads. The ceramic tube is cemented into a metallic support tube using a temperature-resistant cement.

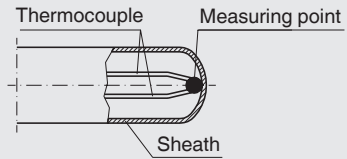
Thermocouples, non-insulated (grounded)

For special applications, for example surface temperature measurements, the sensors are in direct contact with the protective sleeve, or the measuring points of thermocouples are welded to the bottom (see chapter 7.1.1 "Special conditions of use (X conditions)").

Measuring point insulated (ungrounded)

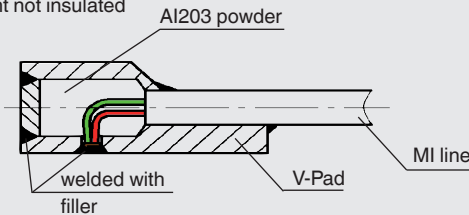


Measuring point not insulated (grounded)



V-Pad version, model TC59-V

Measuring point not insulated



4. Design and function

Vibration resistance

The thermometers have an impact- and vibration-resistant design. The vibration resistance of the basic model corresponds to DIN EN 60751 (up to 3 g), while for special designs higher loads are possible. The impact resistance of all versions complies with the requirements of EN 60751, with the exception of high-temperature thermocouples assembled from ceramic-insulated thermal wires.

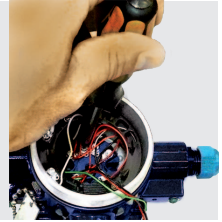
GB

Electrical connection

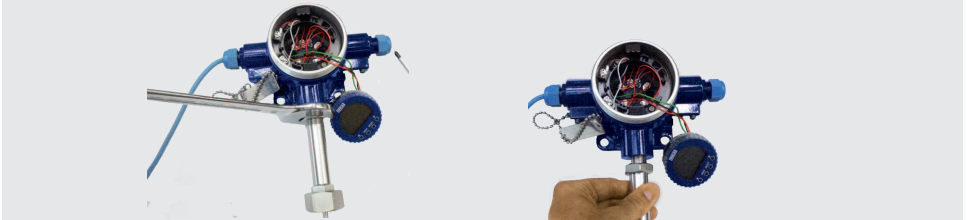
In terms of connection, the thermometer is equipped with a housing and a connector or bare wire ends. The housing design will contain the terminals or a certified transmitter. Optionally, separately-certified digital displays can be built into the housing.

4.2 Removal and installation of the measuring insert, models TR12-B, TC12-B

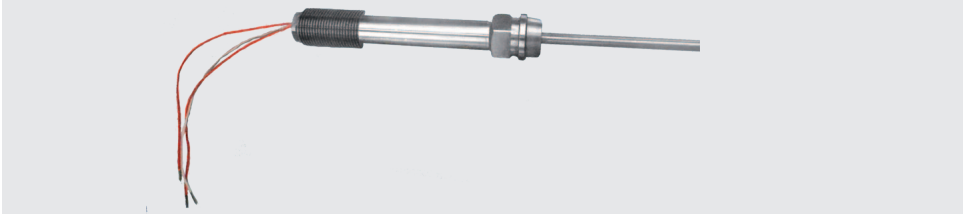
Before removing the measuring insert, fully disconnect the electrical connections to the terminal block or transmitter.



After that, the neck tube can be loosened and unscrewed from the head.

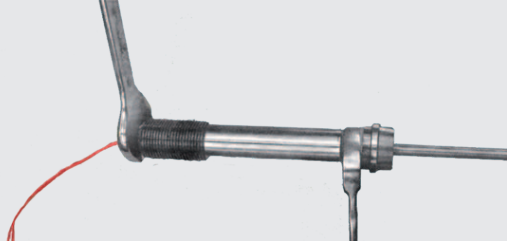


Removed measuring insert with neck tube:



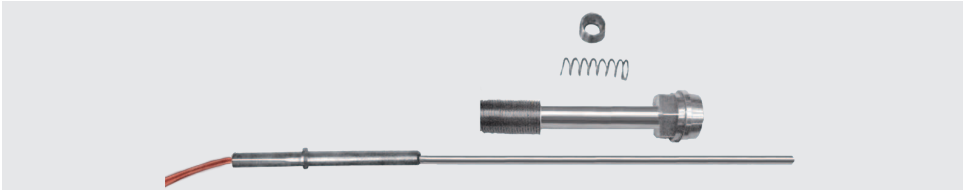
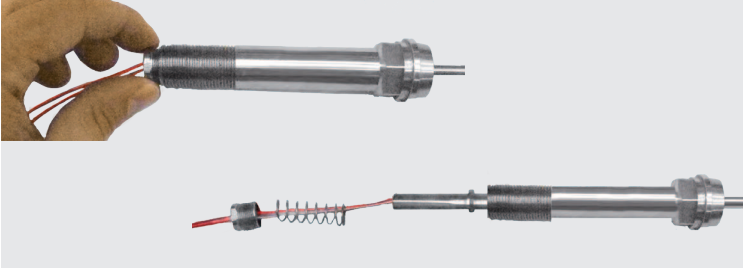
4. Design and function

To disconnect the measuring insert from the neck tube, loosen the M16 screw at the top end of the neck tube



GB

and unscrew it.



The installation of the measuring insert is carried out in the reverse order (clean the measuring insert prior to installation).

The hexagonal crimped tip of the measuring insert is guided by the screw-in of the hexagonal socket screw. Tightening torque of the screw: 12 ... 14 Nm

4.3 Scope of delivery

Cross-check scope of delivery with delivery note.

5. Transport, packaging and storage

5.1 Transport

Check instrument for any damage that may have been caused by transport.
Obvious damage must be reported immediately.

GB

5.2 Packaging

Do not remove packaging until just before mounting.
Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending for repair).

5.3 Storage

Permissible conditions at the place of storage:

- Storage temperature:
Instruments **without** built-in transmitter: -40 ... +85 °C
Instruments **with** built-in transmitter: see operating instructions of the transmitter in question
- Humidity: 35 ... 85 % relative humidity (no condensation)

Avoidance of exposure to the following factors:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it down hard)
- Soot, vapour, dust and corrosive gases

Store the instrument in its original packaging in a location that fulfils the conditions listed above. If the original packaging is not available, pack and store the instrument as described below:

1. Wrap the instrument in an antistatic plastic film.
2. Place the instrument, along with shock-absorbent material, in the packaging.
3. If stored for a prolonged period of time (more than 30 days), place a bag, containing a desiccant, inside the packaging.



WARNING!

Before storing the instrument (following operation), remove any residual media. This is of particular importance if the medium is hazardous to health, e.g. caustic, toxic, carcinogenic, radioactive, etc.

6. Commissioning, operation



WARNING!

When the thermometer is mounted, the temperature must not drop below the allowed operating temperature (environment, medium) or exceed it, even when taking convection and heat radiation into account!

6. Commissioning, operation



WARNING!

Thermometers must be earthed if dangerous voltages could be expected at the connection wires (caused, for example, by mechanical damage, electrostatic discharge or induction)!

6.1 Electrical connection



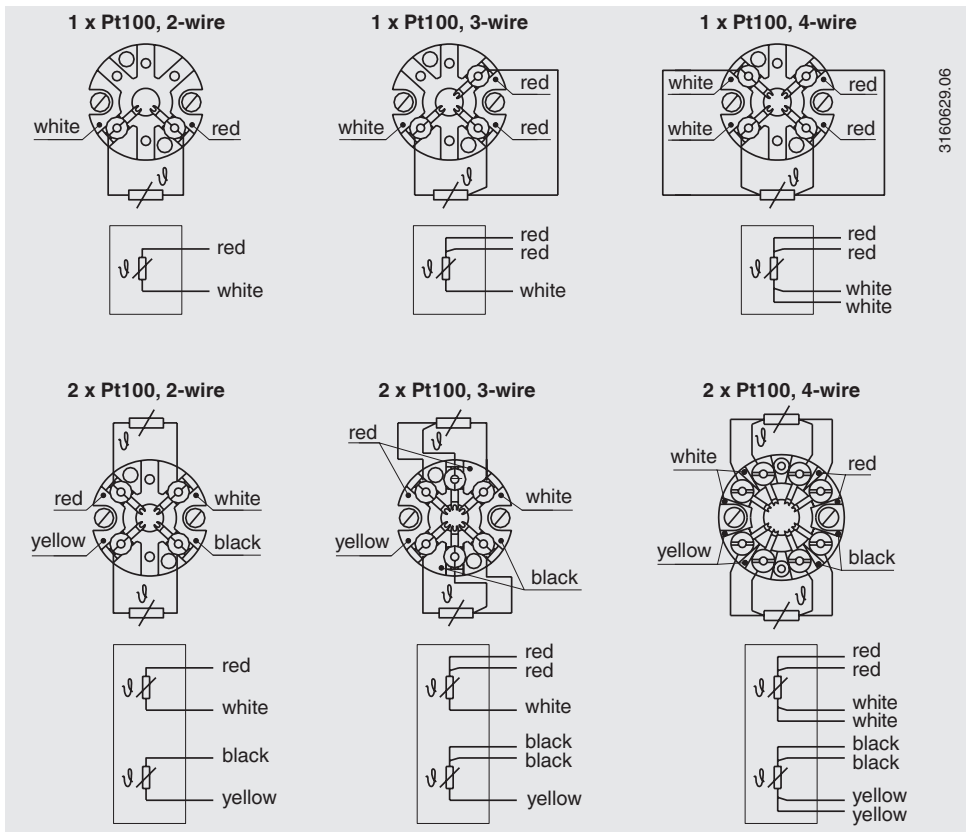
CAUTION!

- Damage to cables and wires, and to connection points, must be avoided
- Provide finely stranded conductor ends with end splices (cable assembly)
- Both the internal capacitance and inductance must be considered

For the electrical connections of thermometers (e.g. connection circuit diagrams, tolerance values, etc.), please refer to the appropriate data sheets. If head transmitters or digital displays have been built into the connection housing, these data sheets must also be given proper consideration.

6.2 Electrical connection of resistance thermometers

6.2.1 Resistance thermometer with terminal block

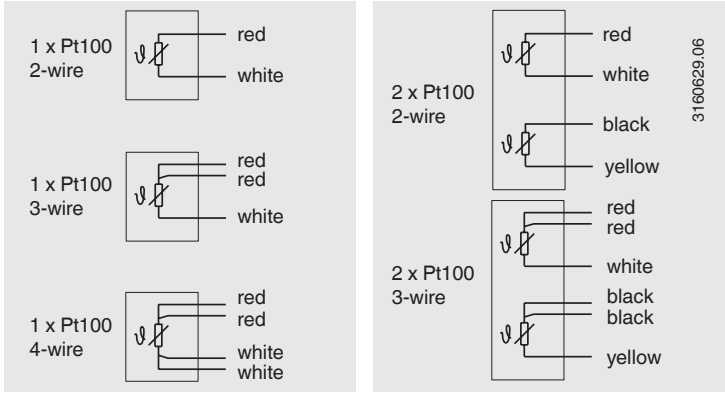


6. Commissioning, operation

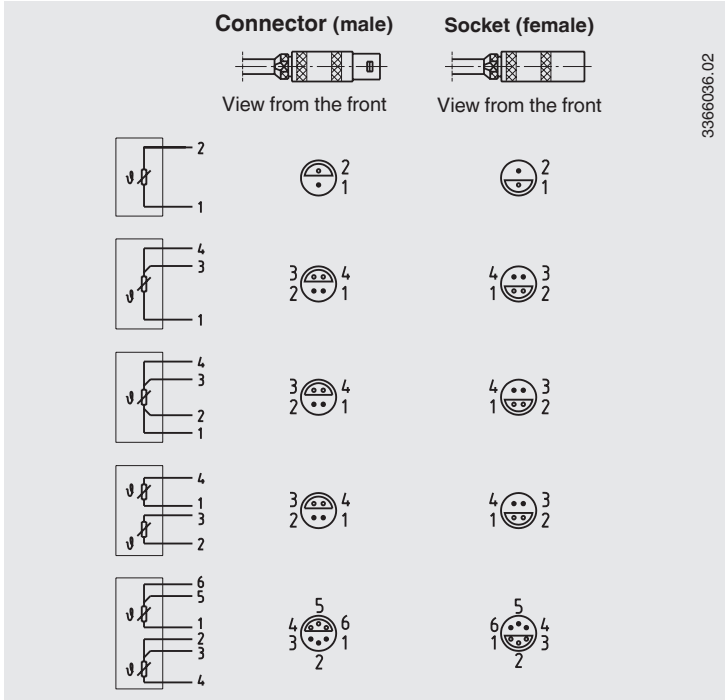
6.2.2 Resistance thermometer with cable or connector

Without connector

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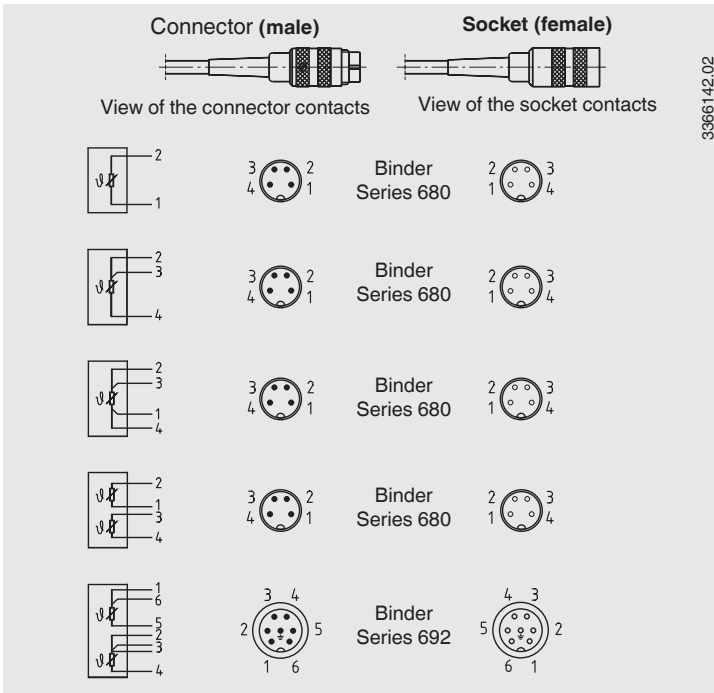


Lemosa connector



6. Commissioning, operation

Binder screw/plug-in connector

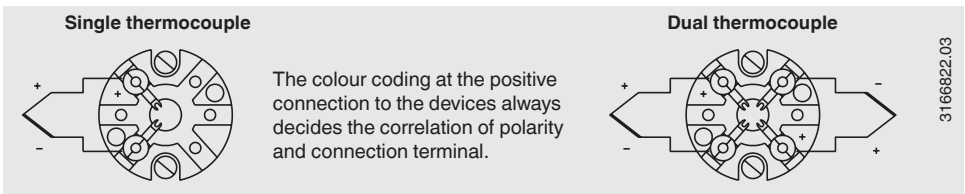


6.3 Electrical connection of thermocouples

Cable colour coding of thermocouples

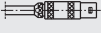


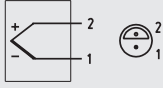
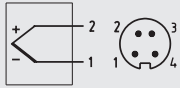
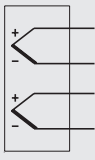
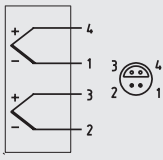
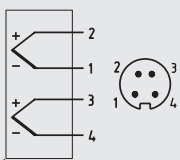
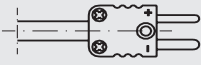
Sensor type	Standard	Positive	Negative
K	DIN EN 60584	green	white
J	DIN EN 60584	black	white
E	DIN EN 60584	violet	white
T	DIN EN 60584	brown	white
N	DIN EN 60584	pink	white

6.3.1 Thermocouples with terminal block



6. Commissioning, operation

6.3.2 Thermocouples with cable or connector

	Cable	Lemosa connector, male at the cable	Binder connector, male at the cable (screw/plug-in connection)
	For the marking of the cable ends, see table		
Single thermocouple			
Dual thermocouple			
Thermal connector	Plus and minus are marked. For dual thermocouples, two thermal connectors are used.		

6.4 Multipoint thermocouples (as per 8.4)

They are usually equipped with a housing in which transmitters or terminal blocks are mounted. The transmitters/digital displays are fastened mechanically (e.g. rail system in housing or holder in connection head) and installed in accordance with EN/IEC 60079-11 and EN/IEC 60079-14. Optionally, depending on design, the housings can be equipped with or without terminals (e.g. terminal blocks, etc.) in accordance with EN/IEC 60079-11 and EN/IEC 60079-14.

When using several transmitters/digital displays, the housing volume increases as a function of the "heat source", thus increasing the volume to be heated. This guarantees that the housing surface temperature does not increase significantly.



WARNING!

When using no terminals and line wiring, compliance with the installation regulations in accordance with EN/IEC 60079-11 and EN/IEC 60079-14 must be guaranteed.

6.5 Cable glands

In thermometers equipped with connection heads, the cable glands must be fully sealed in order to ensure that the necessary ingress protection is reached.

Requirements for meeting ingress protection

- Only use cable glands within their indicated clamping range (cable diameter suitable for the cable gland)
- Do not use the lower clamping area with very soft cable types
- Only use circular cross-section cables (if necessary, slightly oval in cross-section)
- Do not twist the cable

6. Commissioning, operation

- Repeated opening/closing is possible; however only if necessary, as it might have a detrimental effect on the protection class
- For cable with a pronounced cold-flow behaviour the screw connection must be fully tightened

6.6 Parallel threads

If the thermometer connecting head, extension neck, thermowell or process connection are connected with parallel threads (e.g. G ½, M20 x 1.5 ...), these threads must be secured using **seals** which prevent liquids from penetrating into the thermometer.

As standard, WIKA uses copper profile seals for the connection between the neck tube and the thermowell, and flat paper seals for the connection of the connection head and the extension neck or thermowell.

If the thermometer and the thermowell are already connected, the seals will already be mounted. The plant operator must check whether the seals are suitable for the operating conditions and must replace them, if necessary, with suitable seals.

For thermometers without a thermowell, and/or where these are delivered separately, the seals are not included and must be ordered separately.

Tighten the threads by hand when carrying out the final assembly on the plant. This will correspond to the delivery status of the premounted components. The final tightening torque should be applied using a spanner (half rotation).



The seals must be replaced after dismantling!



The seals can be ordered from WIKA, indicating the WIKA order number and/or the designation (see table).

WIKA Order No.	Designation	Suitable for threads
11349981	per DIN 7603 Form C 14 x 18 x 2 -CuFA	G ¼, M14 x 1.5
11349990	per DIN 7603 Form C 18 x 22 x 2 -CuFA	M18 x 1.5, G ¾
11350008	per DIN 7603 Form C 21 x 26 x 2 -CuFA	G ½, M20 x 1.5
11350016	per DIN 7603 Form C 27 x 32 x 2.5 -CuFA	G ¾, M27 x 2
11367416	per DIN 7603 Form C 20 x 24 x 2 -CuFA	M20 x 1.5
1248278	per DIN 7603 D21.2 x D25.9 x 1.5 -Al	G ½, M20 x 1.5
3153134	per DIN 7603 Form C D14.2 x D17.9 x 2 -StFA	G ¼, M14 x 1.5
3361485	per DIN 7603 Form C D33.3 x D38.9 x 2.5 -StFA	G 1

Legend:

CuFA = Copper, max. 45HB^a; filled with asbestos-free sealing material

Al = Aluminium Al99; F11, 32 to 45 HB^b

StFA = Soft iron, 80 to 95 HB^a; filled with asbestos-free sealing material

6.7 Tapered threads (NPT)

Connections with tapered threads (NPT) are self-sealing and normally must not be sealed. It should be checked whether it may be necessary to seal them additionally with PTFE tape or hemp. The threads must be lubricated with a suitable lubricant before fitting.

GB

Tighten the threads by hand when carrying out the final assembly on the plant. This will correspond to the delivery status of the premounted components. The final tightening and sealing must be made with a spanner (1.5 to 3 rotations).

7. Information on mounting and operation in hazardous areas (Europe)



WARNING!

In hazardous areas the use of a model TR10-A measuring insert without a suitable connection head (case) is not permissible!

Where required a suitable thermowell is to be used.

7.1 General information on explosion protection



The requirements of the 94/9/EC (ATEX) directive must be followed. Additionally the specifications of the respective national regulations concerning Ex usage apply.

- A) The responsibility for classification of zones lies with the plant operator and not the manufacturer/supplier of the equipment.
- B) The plant operator guarantees, and is solely responsible, that all thermometers in use are identifiable with respect to all safety-relevant characteristics. Damaged thermometers may not be used. Repairs may only be completed using original spare parts from the original supplier; otherwise the requirements of the approval are not fulfilled.
The manufacturer shall not be responsible for constructional modifications after delivery of the instruments.
- C) If a component of electrical equipment, on which the explosion protection depends, is repaired, then the electrical equipment may only be put back into use, after an authorised expert has stated that it corresponds to the fundamental characteristics of the requirements for explosion protection. In addition this expert must provide a certificate for this and provide the equipment with a test mark.
- D) Item C) shall not apply if the component was repaired by the manufacturer in accordance with the requirements and regulations.

7. Information on mounting, operation in hazardous areas (Europe)

- E) When using transmitters and digital displays, the following must be observed:
- The contents of these operating instructions and those of the transmitter.
 - The relevant regulations for installation and use of electrical systems.
 - The regulations and directives regarding explosion protection. Transmitters and digital displays must have their own approval.
- F) When ordering spare parts, the parts that are to be replaced must be specified exactly:
- Ignition protection type (here Ex i)
 - Approval No.
 - Order No.
 - Manufacturing No.
 - Order item

7.1.1 Special conditions of use (X conditions)

Versions with $\varnothing < 3$ mm or "non-insulated" versions are operationally non-compliant with section 6.3.12 of EN/IEC 60079-11. Therefore, from a safety-relevant point of view, these intrinsically safe circuits must be considered galvanically connected to the earth potential, which is why equipotential bonding must be secured for the entire installation of the intrinsically safe circuits. In addition, for the connection, separate conditions in accordance with EN/IEC 60079-14 must be observed.

Electrostatic discharges must be avoided in instruments, that due to their design, do not conform to the electrostatic requirements in accordance with EN/IEC 60079-0.

The transmitters and digital displays used must have their own EN/IEC approval. The installation conditions, electrical connected loads, temperature classes or maximum surface temperatures for use in potentially explosive dust atmospheres and permissible ambient temperatures can be seen from the relevant approvals and must be observed.

Thermal backflow from the process, that exceeds the permissible ambient temperature of the transmitter, must not be allowed to occur. It must be prevented by installing suitable heat insulation or a neck tube of suitable length.

If the wall thickness is below 1 mm, the instruments must not be subjected to ambient stresses that may have an adverse effect on the partition wall. Alternatively, a thermowell of suitable minimum wall thickness may be used.

When using a thermowell/neck tube, the overall instrument must be designed such that it allows installation in a way that results in a sufficiently tight gap (IP 67) or a flameproof gap (EN/IEC 60079-1) towards the less hazardous area.

When housings are used, they must either have their own suitable approval or comply with the minimum requirements. IP protection: at least IP 20 (at least IP 65 for dust), applies to all housings. However, light metal housings must be suitable in accordance with EN/IEC 60079-0 Section 8.1. In addition, non-metallic housings or powder-coated housings must meet the requirements of EN/IEC 60079-0 or have a suitable warning note.

7. Information on mounting, operation in hazardous areas (Europe)

Protective measures for applications that require EPL Ga or Gb:

Operational friction or impact between equipment parts made of light metals or their alloys (e.g. aluminium, magnesium, titanium or zirconium) with equipment parts made of iron/steel is not permitted. Operational friction or impact between two light metals is permitted.

GB

7.1.2 Ex marking

For applications without transmitter (digital displays) requiring instruments of equipment Group II (potentially explosive gas atmospheres), the following temperature class classification and ambient temperature ranges apply:

Table 1

Marking	Temperature class	Ambient temperature range (T_a)	Max. surface temperature (T_{max}) at the sensor or thermowell tip
II 1G Ex ia IIC T6 Ga II 1/2G Ex ib IIC T6 Ga/Gb	T6	(-50) ¹⁾ -40 ... +80 °C	T_M (temperature of the medium) + self-heating
II 1G Ex ia IIC T5 Ga II 1/2G Ex ib IIC T5 Ga/Gb	T5	(-50) ¹⁾ -40 ... +95 °C	For this, the special conditions (17) must be observed.
II 1G Ex iaD IIC T4 Ga II 1/2G Ex ib IIC T4 Ga/Gb II 1G Ex ia IIC T3 Ga II 1/2G Ex ib IIC T3 Ga/Gb	T4, T3	(-50) ¹⁾ -40 ... +100 °C	

1) The values in brackets apply to special designs. These sensors are manufactured using special sealing compounds. Moreover, they feature housings made of stainless steel and cable glands for low-temperature ranges

When there is a built-in transmitter and/or a digital display, the special conditions from the type examination certificate (see item 17) apply.

For applications requiring instruments of equipment Group II (potentially explosive dust atmospheres), the following surface temperatures and ambient temperature ranges apply:

Table 2

Marking	Power P_i	Ambient temperature range (T_a)	Max. surface temperature (T_{max}) at the sensor or thermowell tip
II 1D Ex ia IIIC T65 °C Da II 1/2D Ex ib IIIC T65 °C Da/Db	750 mW	(-50) ¹⁾ -40 ... +40 °C	T_M (temperature of the medium) + self-heating
II 1D Ex ia IIIC T95 °C Da II 1/2D Ex ib IIIC T95 °C Da/Db	650 mW	(-50) ¹⁾ -40 ... +70 °C	For this, the special conditions (17) must be observed.
II 1D Ex ia IIIC T125 °C Da II 1/2D Ex ib IIIC T125 °C Da/Db	550 mW	(-50) ¹⁾ -40 ... +100 °C	

1) The values in brackets apply to special designs. These sensors are manufactured using special sealing compounds. Moreover, they feature housings made of stainless steel and cable glands for low-temperature ranges.

When there is a built-in transmitter and/or a digital display, the special conditions from the type examination certificate (see item 17) apply.

Use in methane atmospheres

Owing to the higher minimum ignition energy of methane, the instruments can also be used where methane causes a potentially explosive atmosphere. The instrument can be optionally marked with IIC + CH₄.

For applications that require EPL Gb or Db, instruments with "ia" marking may also be used in measuring circuits of type "ib".

GB

7.2 Temperature class classification, ambient temperatures

The permissible ambient temperatures depend on the temperature class, the housings used and any transmitters and/or digital displays fitted as options.

When a thermometer is connected to a transmitter and/or a digital display, the lowest value of either the ambient temperature limits or the highest temperature class will apply. The lower temperature limit is -40 °C; and -50 °C for special designs.

Where there are neither transmitters nor digital displays mounted within the housing, there will also be no additional warming.

With a built-in transmitter (optionally with digital display), heating caused by the operation of the transmitter or digital display may occur.

For applications without transmitters (digital displays) that require Group II instruments (potentially explosive gas atmospheres), the following temperature class classification and ambient temperature ranges apply:

Temperature class	Ambient temperature range (Ta)
T6	(-50) -40 ... +80 °C
T5	(-50) -40 ... +95 °C
T4, T3	(-50) -40 ... +100 °C

See and observe the permissible ambient temperatures and surface temperatures for third-party products from the relevant approvals and/or data sheets.

Example

For instruments fitted with a DIH10 transmitter and digital display, for example, the following limit for temperature class classification applies:

Temperature class	Ambient temperature range (Ta)
T6	-40 ... +60 °C

For applications that require Group II instruments (potentially explosive dust atmospheres), the following surface temperatures and ambient temperature ranges apply:

Power Pi	Ambient temperature range (Ta)
750 mW	(-50) -40 ... +40 °C
650 mW	(-50) -40 ... +70 °C
550 mW	(-50) -40 ... +100 °C

See and observe the permissible ambient temperatures and surface temperatures for third-party products from the relevant approvals and/or data sheets.

7. Information on mounting, operation in hazardous areas (Europe)

The values in brackets apply to special designs. These sensors are manufactured using special sealing compounds. Moreover, they are equipped with connection heads made of stainless steel and cable glands for the low-temperature range.

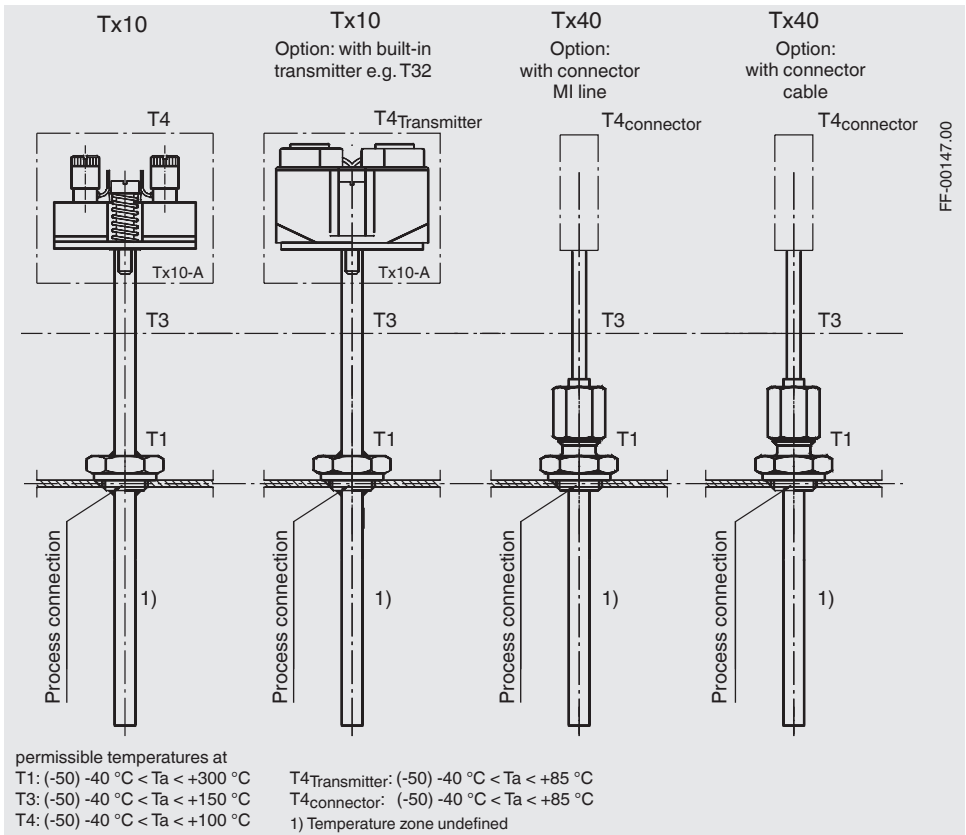
GB

These thermometers are suitable for temperature classes T6...T3 in accordance with the approval certificate. This applies to instruments without built-in transmitters and/or digital displays. Thermometers equipped with transmitters and/or digital displays are for use in temperature classes T6...T4 and are marked accordingly. Using equipment for applications which require a lower temperature class (e.g. T2) than the marked one is permissible. In doing so, it must be ensured that the maximum ambient temperature for safe operation of the instrument is not exceeded.

7.3 Temperature carry-over from the process

A heat backflow from the process that exceeds the operating temperature of the transmitter (digital display) or housing is not permissible and must be prevented by installing suitable heat insulation or a neck tube of suitable length.

7.3.1 Overview of the temperature zones



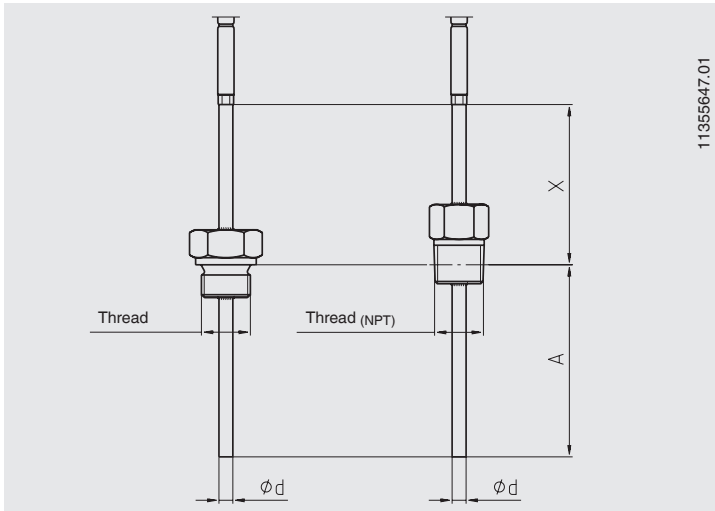
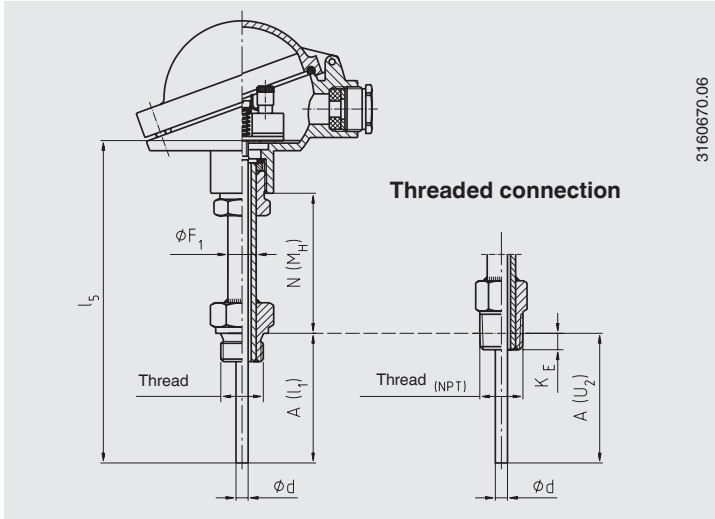
7. Information on mounting, operation in hazardous areas (Europe)

7.3.2 Increasing the separation of the connection components and hot surfaces

The neck distance (N) is defined as the distance between the lower edge of the connection head (or the housing) to the heat-emitting surface. The temperature to be expected at the lower edge of the connection head or housing is, at most, 100 °C. The conditions for built-in transmitters or displays must be observed. If required, the neck length must be increased accordingly.

GB

For thermometers fitted with a connection lead, the temperature at the interface with the connecting cable is restricted. The maximum is 150 °C. To ensure that the permissible temperature is not exceeded, the dimension X must be selected accordingly.



7. Information on mounting, operation in hazardous areas (Europe)

To help select the minimum neck length, the following standard values have been determined.

Maximum temperature of the medium	Recommendation for dimension N	Recommendation for dimension X
100 °C	-	-
135 °C	20 mm	20 mm
200 °C	50 mm	50 mm
>200 °C ≤ 450 °C	100 mm	100 mm

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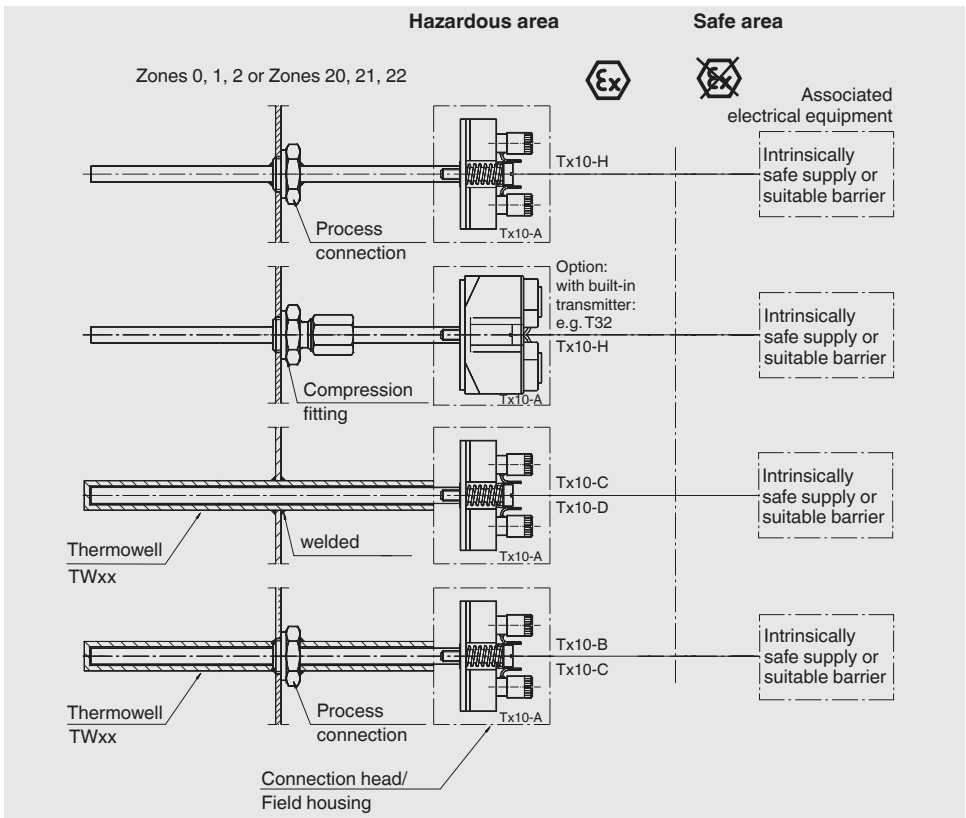


WARNING!

For reasons of work safety and saving of resources, hot surfaces should be protected against accidental touch and energy loss by means of insulation.

7.4 Mounting examples in hazardous areas

7.4.1 Possible installation methods with the marking II 1G Ex ia IIC T6 Ga or II 1D Ex ia IIIC T65 °C Da



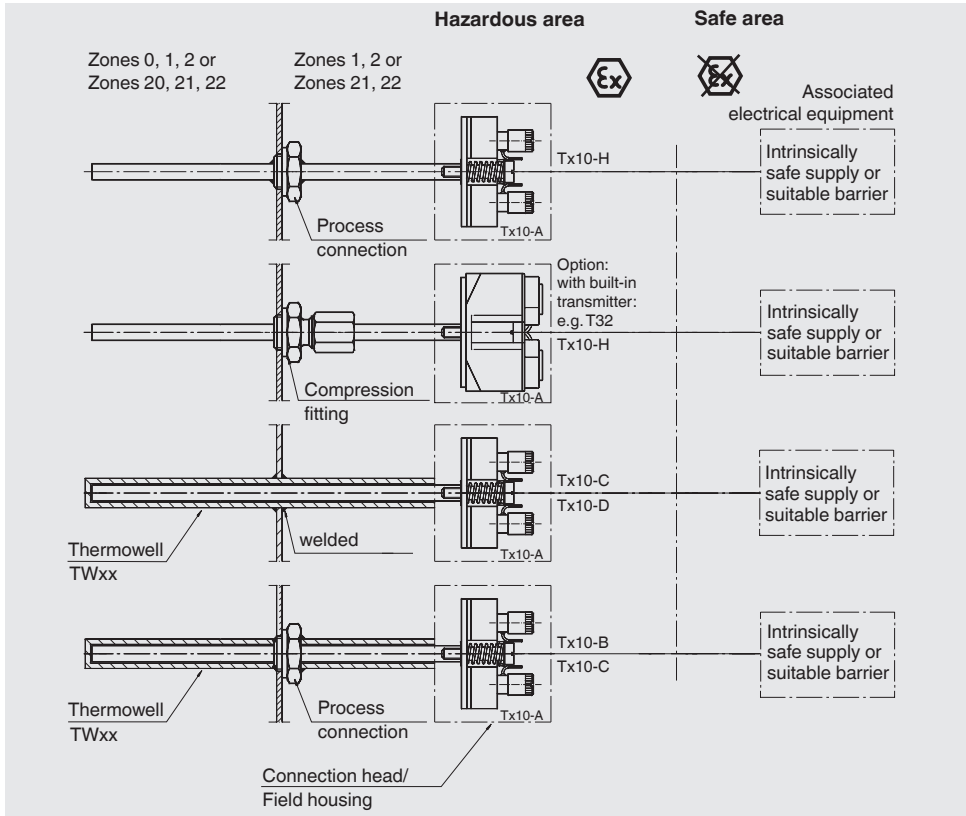
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7. Information on mounting, operation in hazardous areas (Europe)

The sensor together with housing or connection head is located in Zone 0 (Zone 20). An Ex ia type circuit must be used. Connection heads/cases made of aluminium are not permitted in zone 0. At this position, WIKA uses connection heads/cases made of stainless steel.

7.4.2 Possible installation methods with the marking II 1/2 Ex ib IIC T6 Ga/Gb or II 1/2 D Ex ib IIIC T65 °C Da/Db

GB



The sensor or thermowell tip protrudes into Zone 0. The housing or connection head is in Zone 1 (Zone 21) or Zone 2 (Zone 22). It is sufficient to use an Ex ib type circuit.

Zone separation is guaranteed if sufficiently-tight (IP 67) process connections are used.

Examples of suitable process connections include gas-tight standardised industrial flanges, threaded connections or pipe connections.

The welded parts, process connections, compression fittings, thermowells or housings used must be designed such that they withstand all influencing variables resulting from the process, such as temperature, flow forces, pressure, corrosion, vibration and impacts.

7.4.3 Partition wall for use in Zone 0 or Zone 1/2 or separation between hazardous area and non-hazardous area

If the wall thickness is less than 1 mm, the instrument must also be marked with an "X" or a safety instruction in accordance with 29.2 of EN/IEC 60079-0, with the special proviso that for safe use it must not be subjected to ambient stresses that may have an adverse effect on the partition wall. If the partition wall is continuously subjected to vibrations (e.g. vibrating membranes), its fatigue limit at the maximum amplitude must be stated in the documentation (see Section 4.2.5.2, EN/IEC 60079-26).

Alternatively, a thermowell of suitable minimum wall thickness may be used by the customer. When using a thermowell/neck tube, the overall instrument must be constructed such that it allows installation in a way that results in a sufficiently tight gap (IP 67) or a flame path (EN/IEC 60079-1) towards the less hazardous area.

8. Electrical connection values

8.1 Electrical data without built-in transmitter or digital display

For Group II instruments (potentially explosive gas atmospheres) *3, the following maximum connection values apply:

$$U_i = \text{DC } 30 \text{ V}$$

$$I_i = 550 \text{ mA}$$

$$P_i \text{ (at the sensor } ^*1) = 1.5 \text{ W}$$

For Group II instruments (potentially explosive dust atmospheres), the following maximum connection values apply:

$$U_i = \text{DC } 30 \text{ V}$$

$$I_i = 550 \text{ mA}$$

$$P_i \text{ (at the sensor } ^*2) = \text{For the values, see "Table 2" (column 2) on page 24}$$

*1 The permissible power to the sensor depends on the temperature of the medium T_M , the temperature class and the thermal resistance R_{th} , but shall not be more than 1.5 W.

For calculation examples, see chapter 9 "Calculation examples for self-heating at the sensor/thermowell tip".

*2 The permissible power to the sensor depends on the temperature of the medium T_M , the maximum allowed surface temperature and the thermal resistance R_{th} , but shall not be more than the values from "Table 2" (Column 2), see above.

*3 Use in methane atmospheres

Owing to the higher minimum ignition energy of methane, the instruments can also be used where methane causes a potentially explosive atmosphere. The instrument can be optionally marked with IIC + CH4.

The internal inductance (L_i) and capacitance (C_i) of standard measuring inserts in accordance with DIN 43735 are negligible. The values for cable probes and very long sheathed-cable/resistance thermometers can be seen from the rating plate and must be taken into account when connecting them to an intrinsically safe power supply.

8. Electrical connection values

Sensor circuit in Ex ia or ib, IIC intrinsic safety ignition protection

Only for connection to intrinsically safe circuits with the following maximum output values for Group II instruments (potentially explosive gas atmospheres):

$$U_o = \text{DC } 30 \text{ V}$$

$$I_o = 550 \text{ mA}$$

$$P_o = 1.5 \text{ W}$$

For Group II instruments (potentially explosive dust atmospheres), the following maximum output values apply to their connection to intrinsically safe circuits:

$$U_o = \text{DC } 30 \text{ V}$$

$$I_o = 550 \text{ mA}$$

P_o = For the values, see "Table 2" (Column 2) on page 24

8.2 Electrical data for built-in transmitters or digital displays

For the sensor circuit, the values mentioned in 8.1 apply.

Signal circuit in Ex ia or ib, IIC intrinsic safety ignition protection

U_i = depending on the transmitter/digital display

I_i = depending on the transmitter/digital display

P_i = in the housing: depending on the transmitter/digital display

C_i = depending on the transmitter/digital display

L_i = depending on the transmitter/digital display

The transmitters and digital displays used must have their own certification in accordance with EN/IEC. The installation conditions and electrical connection values can be seen from the relevant approvals and must be observed.

8.3 Electrical data with built-in transmitter in accordance with the FISCO model

The transmitters/digital displays used for the application range in accordance with the FISCO model are considered FISCO field units. The requirements in accordance with EN/IEC 60079-27, and the connection conditions of the approvals in accordance with FISCO, apply.

8.4 TC95/TR95 multipoint thermocouples

Assembly of multipoint thermocouples from individual sheathed cables

For the individual insulated sheathed cable, the values mentioned in 8.1 apply. For operationally grounded multipoint thermocouples, the sum of all the sensors must comply with the above-mentioned values. For applications in dust areas, the values from "Table 2" (Column 2) on page 24 must be observed.

GB

9. Calculation examples for self-heating at the sensor/thermowell tip

9. Calculation examples for self-heating at the sensor/thermowell tip

The self-heating at the sensor tip or thermowell tip depends upon the sensor type (TC/RTD), the probe diameter, the thermowell design and the power supplied to the sensor in the event of a failure. The table below shows the possible combinations. The table shows that when a failure occurs, thermocouples produce much less self-heating than resistance thermometers.

GB

Thermal resistance [R_{th} in K/W]

Sensor	Probe Ø in mm							
	2.0- <3.0	3.0- <6.0	6 - 8	3.0 - 6.0 ¹⁾	0.5- <1.5	1.5- <3.0	3.0- <6.0	6.0- 12.0
Sensor type	RTD	RTD	RTD	RTD	TC	TC	TC	TC
without thermowell	245	110	75	225	105	60	20	5
with multi-part thermowell (straight and tapered) (e.g. TW22, TW35, TW40, TW45, etc.)	135	60	37	-	-	-	11	2.5
with thermowell - machined from solid material (straight and tapered) (e.g. TW10, TW15, TW20, TW25, TW30, TW50, TW55, TW60, etc.)	50	22	16	-	-	-	4	1
Special thermowell – EN 14597	-	-	33	-	-	-	-	2.5
Tx55 (tubular holder)	-	110	75	225	-	-	20	5
Built into a blind bore (minimum wall thickness 5 mm)	50	22	16	45	22	13	4	1

1) surface-sensitive

When using multiple sensors and simultaneous operation, the sum of the individual powers must not exceed the value of the maximum permissible power. The maximum permissible power must be limited to 1.5 W maximum. This must be guaranteed by the plant operator.

9.1 Calculation example for RTD measuring point with thermowell

Use at the partition wall to Zone 0: Calculate the maximum permissible temperature T_{max} at the thermowell tip for the following combination:

RTD measuring insert Ø 6 mm with built-in model T32.1S head-mounted transmitter, fitted into a Design 3F multi-part thermowell. Power supply is, for example, via a Model KFD2-STC4-EX1 transducer power supply (WIKA article No. 2341268).

T_{max} is obtained by adding the temperature of the medium and the self-heating. The self-heating of the thermowell tip depends on the supplied power P_o of the transmitter and the thermal resistance R_{th} .

The following formula is used for the calculation: $T_{max} = P_o \times R_{th} + T_M$

T_{max} = Surface temperature (max. temperature at the thermowell tip)

P_o = from transmitter data sheet

R_{th} = Thermal resistance [K/W]

T_M = Temperature of the medium

Prerequisite is an ambient temperature T_{amb} of -20 ... +40 °C.

9. Calculation examples for self-heating at the sensor/thermowell tip

Example

Resistance thermometer RTD

Diameter: 6 mm

Temperature of the medium $T_M = 150\text{ °C}$

Supplied power: $P_O = 15.2\text{ mW}$

Temperature Class T3 (200 °C) must not be exceeded

Thermal resistance [R_{th} in K/W] from table = 37 K/W

Self-heating: $0.0152\text{ W} \times 37\text{ K/W} = 0.56\text{ K}$

$T_{max} = T_M + \text{self-heating: } 150\text{ °C} + 0.56\text{ °C} = 150.56\text{ °C}$

The result shows that in this case self-heating at the thermowell tip is negligible. As safety clearance for type-examined instruments (for T6 to T3), another 5 °C must be subtracted from the 200 °C; hence 195 °C would be permissible. This means that in this case temperature class T3 is not exceeded.

Additional information

Temperature class for T3 = 200 °C

Safety clearance for type-examined instruments (T6 to T3)*1 = 5 K

Safety clearance for type-examined instruments (T1 to T2)*1 = 10 K

*1 EN/IEC 60 079-0: 2009 Section 26.5.1

Simplified verification of intrinsic safety for the above-mentioned combination

Measuring insert	Head transmitter		Power supply
U _i : DC 30 V	U _o : DC 6.5 V	U _i : DC 30 V	U _o : DC 25.4 V
I _i : 550 mA	I _o : 9.3 mA	I _i : 130 mA	I _o : 88.2 mA
P _i (max) at the sensor: 1.5 W	P _o : 15.2 mW	P _i : 800 mW	P _o : 560 mW
C _i : negligible	C _o : 24 µF	C _i : 7.8 nF	C _o : 93 nF
L _i : negligible	L _o : 365 mH	L _i : 100 µH	L _o : 2.7 mH

Upon comparing the values, it is obvious that it is permissible to connect these units to one another. However, the operator must also take into account the values for inductance and capacitance of the electrical connection leads.

9.2 Calculation example for a sheathed cable with RTD sensor

Use at the partition wall to Zone 0: Calculate the maximum permissible temperature T_{max} at the probe tip for the following combination:

Resistance thermometer without thermowell (TR10-H) Ø 6 mm without transmitter, mounted by means of a compression fitting with stainless steel sealing ring. Power supply is, for example, via a model Z954 Zener barrier (WIKA Article No. 3247938), for example.

T_{max} is obtained by adding the temperature of the medium and the self-heating. The self-heating of the thermowell tip depends on the supplied power P_O of the Zener barrier and the thermal resistance R_{th} .

9. Calculation examples for self-heating at the sensor/thermowell tip

The following formula is used for the calculation: $T_{\max} = P_o \times R_{th} + T_M$

T_{\max} = Surface temperature (max. temperature at the probe tip)

P_o = from the Zener barrier data sheet

R_{th} = Thermal resistance [K/W]

T_M = Temperature of the medium

Prerequisite is an ambient temperature T_{amb} of -20 ... +40 °C.

Example

Resistance thermometer RTD

Diameter: 6 mm

Temperature of the medium $T_M = 150$ °C

Supplied power: $P_o = 1150$ mW

Temperature class T3 (200 °C) must not be exceeded

Thermal resistance [R_{th} in K/W] from table = 75 K/W

Self-heating: 1.15 W x 75 K/W = 86.25 K

$T_{\max} = T_M + \text{self-heating}$: 150 °C + 86.25 °C = 236.25 °C

The result shows, in this case, substantial self-heating at the probe tip.

As safety margin for type-examined instrument (for T6 to T3), an additional 5 °C must be subtracted from the 200 °C; hence 195 °C would be permissible. This means that in this case temperature class T3 is exceeded significantly and therefore not permissible. An additional thermowell could be used as a remedy.

Additional information

Temperature class for T3 = 200 °C

Safety margin for type-examined instruments (T6 to T3)*1 = 5 K

Safety clearance for type-examined instruments (T1 to T2)*1 = 10 K

*1 EN/IEC 60 079-0: 2009 Section 26.5.1

9.3 Calculation example for the above-mentioned resistance thermometer with thermowell

RTD measuring insert Ø 6 mm without transmitter, built into a 3F design multi-part thermowell .

Thermal resistance [R_{th} in K/W] from table = 37 K/W

Self-heating: 1.15 W x 37 K/W = 42.55 K

$T_{\max} = T_M + \text{self-heating}$: 150 °C + 42.55 °C = 192.55 °C

The result shows, in this case, substantial self-heating at the probe tip.

As safety margin for type-examined instrument (for T6 to T3), an additional 5 °C must be subtracted from the 200 °C; hence 195 °C would be permissible. This means that in this case temperature class T3 is not exceeded.

9. Calculation examples for ... / 10. Maintenance and cleaning

Simplified verification of intrinsic safety for the above-mentioned combination

Measuring insert	Zener barrier Z954		Display instrument (non-hazardous area)
U_i : DC 30 V	U_o : DC 9 V	U_m : AC 250 V	U_o : AC 230 V
I_i : 550 mA	I_o : 510 mA	I_i : nA	I_o : nA
P_i (max) at the sensor: 1.5 W	P_o : 1150 mW	P_i : nA	P_o : nA
C_i : negligible	C_o : 4.9 μ F	C_i : nA	C_o : nA
L_i : negligible	L_o : 0.12 mH	L_i : nA	L_o : nA

GB

Upon comparing the values, it is obvious that it is permissible to connect these units to one another. However, the operator must also take into account the values for inductance and capacitance of the electrical connection leads.

These calculations apply to the Z954 Zener barrier in connection with a resistance thermometer Pt100 in 3-channel mode without grounding, i.e., symmetrical operation of the resistance thermometer in 3-wire circuit on a display or evaluation instrument.



Electrical connection

For sensor connections, terminal, cable or connector assignments, see chapter 6.1 "Electrical connection".

10. Maintenance and cleaning

10.1 Maintenance

These thermometers are maintenance-free.

Repairs must only be carried out by the manufacturer.

10.2 Cleaning



CAUTION!

- Clean the instrument with a moist cloth. This applies in particular to thermometers with a housing made of plastic and cable probes with plastic-insulated connection lead, to ensure that any risk of electrostatic discharge is avoided.
- Electrical connections must not come into contact with moisture.
- Wash or clean the dismantled instrument before returning it, in order to protect staff and the environment from exposure to residual media.
- Residual media in dismantled instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.



For information on returning the instrument, see chapter 12.2 "Returns".

11. Faults

11. Faults

GB

Faults	Causes	Measures
No signal/ line break	Mechanical load too high or overtemperature	Replace probe or measuring insert with a suitable design
Erroneous measured values	Sensor drift caused by overtemperature	Replace probe or measuring insert with a suitable design
	Sensor drift caused by chemical attack	Use a design with thermowell
Erroneous measured values (too low)	Entry of moisture into cable or measuring insert	Replace probe or measuring insert with a suitable design
Erroneous measured values and response times too long	Wrong mounting geometry, for example mounting depth too deep or heat dissipation too high	Temperature-sensitive area of the sensor must be inside the medium, and surfaces must be isolated.
	Deposits on the sensor or thermowell	Remove deposits
Erroneous measured values (of thermocouples)	Parasitic voltages (thermal voltages, galvanic voltage) or wrong equalisation line	Use a suitable equalisation line
Measurement signal - "comes and goes"	Cable break in connecting cable or loose contact caused by mechanical overload	Replace probe or measuring insert with a suitable design, for example equipped with a strain relief or a thicker conductor cross-section
Corrosion	Composition of the medium not as expected or modified or wrong thermowell material selected	Analyse medium and then select a more-suitable material or replace thermowell regularly
Signal interference	Stray currents caused by electric fields or earth loops	Use screened connecting cables, increase in the distance to motors and power lines
	Earth circuits	Eliminate potentials, use galvanically isolated transmitter supply isolators or transmitters



CAUTION!

If deficiencies cannot be eliminated by means of the measures listed above, shut down the instrument immediately, and ensure that pressure and/or signal are no longer present, and secure the instrument from being put back into operation inadvertently. In this case, contact the manufacturer.

Should a return be necessary, please observe the information in chapter 12.2 "Returns".

12. Dismounting, return and disposal

**WARNING!**

Residual media in dismantled instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

GB

12.1 Dismounting

**WARNING!****Risk of burns!**

Let the instrument cool down sufficiently before dismantling it! When dismantling it, there is a risk that dangerously hot pressure media may escape.

Connections must only be opened when the instrument is depressurised and has cooled down.

The thermometer or the measuring insert can be removed from the thermowell. The thermowell itself should only be removed from the process once it is in a depressurised state. For thermometers without thermowell, the system must have been depressurised, cooled down and be free of hazardous materials.

12.2 Returns

**WARNING!**

Absolutely observe when shipping the instrument:

All instruments delivered to WIKA must be free from any kind of hazardous substances (acids, bases, solutions, etc.)

To return the instrument, use the original packaging or a suitable transport package.

To avoid damage:

1. Wrap the instrument in an antistatic plastic film.
2. Place the instrument, along with the shock-absorbing material, in the packaging.
Place shock-absorbent material evenly on all sides of the shipping box.
3. If possible, place a bag, containing a desiccant, inside the packaging.
4. Label the shipment as transport of a highly sensitive measuring instrument.



Information on returns can be found under the heading "Service" on our local website.

12.3 Disposal

Incorrect disposal may endanger the environment.

Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.



GB

EG-Konformitätserklärung

EC Declaration of Conformity

Dokument Nr.:

11570700.02

Document No.:

11570700.02

Wir erklären in alleiniger Verantwortung, dass die mit CE gekennzeichneten Produkte

We declare under our sole responsibility that the CE marked products

Typ:

TR... / TC...

Model:

TR... / TC...

Beschreibung:

Widerstandsthermometer, Thermoelemente

gemäß gültigem Datenblatt:

TE 60.XX; TE 65.XX

Description:

Resistance Thermometers, Thermocouples

according to the valid data sheet:

TE 60.XX; TE 65.XX

die grundlegenden Schutzanforderungen der folgenden Richtlinie(n) erfüllen:

94/9/EG (ATEX) ⁽¹⁾

are in conformity with the essential protection requirements of the directive(s)

94/9/EC (ATEX) ⁽¹⁾

Kennzeichnung:



II 1G Ex ia IIC T3, T4, T5, T6 Ga
II 1/2G Ex ib IIC T3, T4, T5, T6 Ga/Gb



II 1D Ex ia IIIC T65°C, T95°C, T125°C Da
II 1/2D Ex ib IIIC T65°C, T95°C, T125°C Da/Db

Die Geräte wurden entsprechend den folgenden Normen geprüft:

EN 60079-0:2009, EN 60079-11:2007
EN 60079-26:2007, EN 61241-11:2006

Marking:



II 1G Ex ia IIC T3, T4, T5, T6 Ga
II 1/2G Ex ib IIC T3, T4, T5, T6 Ga/Gb



II 1D Ex ia IIIC T65°C, T95°C, T125°C Da
II 1/2D Ex ib IIIC T65°C, T95°C, T125°C Da/Db

The devices have been tested according to the following standards:

EN 60079-0:2009, EN 60079-11:2007
EN 60079-26:2007, EN 61241-11:2006

(1) EG-Baumusterprüfbescheinigung TÜV 10 ATEX 555793 X von TÜV NORD CERT GmbH, D-45141 Essen (Reg.-Nr. 0044).

(1) EC type examination certificate TÜV 10 ATEX 555793 X of TÜV NORD CERT GmbH, D-45141 Essen (Reg. no. 0044).

Unterzeichnet für und im Namen von / Signed for and on behalf of

WIKAI Alexander Wiegand SE & Co. KG

Klingenberg, 2011-02-02

Geschäftsbereich / Company division: MP-TM

Qualitätsmanagement / Quality management: MP-TM

Jürgen Schüssler

Matthias Rau

Unterschrift, autorisiert durch das Unternehmen / Signature authorized by the company

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Konformitätserklärungen finden Sie online unter www.wika.de.

1. Allgemeines

- Das in der Betriebsanleitung beschriebene Gerät wird nach dem aktuellen Stand der Technik gefertigt. Alle Komponenten unterliegen während der Fertigung strengen Qualitäts- und Umweltkriterien. Unsere Managementsysteme sind nach ISO 9001 und ISO 14001 zertifiziert.
- Diese Betriebsanleitung gibt wichtige Hinweise zum Umgang mit dem Gerät. Voraussetzung für sicheres Arbeiten ist die Einhaltung aller angegebenen Sicherheitshinweise und Handlungsanweisungen.
- Die für den Einsatzbereich des Gerätes geltenden örtlichen Unfallverhütungsvorschriften und allgemeinen Sicherheitsbestimmungen einhalten.
- Die Betriebsanleitung ist Produktbestandteil und muss in unmittelbarer Nähe des Gerätes für das Fachpersonal jederzeit zugänglich aufbewahrt werden.
- Das Fachpersonal muss die Betriebsanleitung vor Beginn aller Arbeiten sorgfältig durchgelesen und verstanden haben.
- Die Haftung des Herstellers erlischt bei Schäden durch bestimmungswidrige Verwendung, Nichtbeachten dieser Betriebsanleitung, Einsatz ungenügend qualifizierten Fachpersonals sowie eigenmächtiger Veränderung am Gerät.
- Es gelten die allgemeinen Geschäftsbedingungen in den Verkaufsunterlagen.
- Technische Änderungen vorbehalten.
- Weitere Informationen:
 - Internet-Adresse: www.wika.de / www.wika.com
 - Anwendungsberater: Tel.: (+49) 9372/132-0
Fax: (+49) 9372/132-406
E-Mail: info@wika.de

Symbolerklärung



WARNUNG!

... weist auf eine möglicherweise gefährliche Situation hin, die zum Tod oder zu schweren Verletzungen führen kann, wenn sie nicht gemieden wird.



VORSICHT!

... weist auf eine möglicherweise gefährliche Situation hin, die zu geringfügigen oder leichten Verletzungen bzw. Sach- und Umweltschäden führen kann, wenn sie nicht gemieden wird.



Information

... hebt nützliche Tipps und Empfehlungen sowie Informationen für einen effizienten und störungsfreien Betrieb hervor.

1. Allgemeines / 2. Sicherheit



WARNUNG!

... weist auf eine möglicherweise gefährliche Situation im explosionsgefährdeten Bereich hin, die zum Tod oder zu schweren Verletzungen führt, wenn sie nicht gemieden wird.



WARNUNG!

... weist auf eine möglicherweise gefährliche Situation hin, die durch heiße Oberflächen oder Flüssigkeiten zu Verbrennungen führen kann, wenn sie nicht gemieden wird.

D

Abkürzungen

- RTD** englisch: "**R**esistance **t**emperature **d**etector";
Widerstandsthermometer
- TC** englisch: "**T**hermo**c**ouple";
Thermoelement

2. Sicherheit



WARNUNG!

Vor Montage, Inbetriebnahme und Betrieb sicherstellen, dass das richtige Thermometer hinsichtlich Messbereich, Ausführung und spezifischen Messbedingungen ausgewählt wurde.

Schutzrohr hinsichtlich Maximaldruck und -temperatur (z. B. Belastungsdiagramme in DIN 43772) auswählen.

Bei Nichtbeachten können schwere Körperverletzungen und/oder Sachschäden auftreten.



Weitere wichtige Sicherheitshinweise befinden sich in den einzelnen Kapiteln dieser Betriebsanleitung.

2.1 Bestimmungsgemäße Verwendung

Diese Widerstandsthermometer und Thermoelemente dienen zur Temperaturmessung in industriellen Anwendungen, in explosionsgefährdeten Bereichen.

Widerstandsthermometer werden zum Messen von Temperaturen von -200 ... +600 °C verwendet. Bei Thermoelementen reichen die möglichen Messbereiche von -200 ... +1200 °C. Thermometer dieser Bauform können sowohl direkt in den Prozess eingebaut werden, als auch in ein Schutzrohr. Die Bauformen der Schutzrohre sind beliebig auswählbar, jedoch sind die operativen Prozessdaten (Temperatur, Druck, Dichte und Strömungsgeschwindigkeit) zu berücksichtigen.

2. Sicherheit

Die Verantwortung für die Auswahl des Thermometers bzw. Schutzrohres, sowie für deren Werkstoffauswahl zur Gewährleistung einer sicheren Funktion in der Anlage bzw. Maschine obliegt dem Betreiber. WIKA kann während der Angebotserstellung lediglich Empfehlungen aussprechen, die sich an unseren Erfahrungen in ähnlichen Applikationen orientieren

Das Thermometer ist ausschließlich für den hier beschriebenen bestimmungsgemäßen Verwendungszweck konzipiert und konstruiert und darf nur dementsprechend verwendet werden.

D

Die technischen Spezifikationen in dieser Betriebsanleitung sind einzuhalten. Eine unsachgemäße Handhabung oder ein Betreiben des Gerätes außerhalb der technischen Spezifikationen macht die sofortige Stilllegung und Überprüfung durch einen autorisierten WIKA-Servicemitarbeiter erforderlich.

Wird das Gerät von einer kalten in eine warme Umgebung transportiert, so kann durch Kondensatbildung eine Störung der Gerätefunktion eintreten. Vor einer erneuten Inbetriebnahme die Angleichung der Gerätetemperatur an die Raumtemperatur abwarten.

Ansprüche jeglicher Art aufgrund von nicht bestimmungsgemäßer Verwendung sind ausgeschlossen.

2.2 Personalqualifikation



WARNUNG!

Verletzungsgefahr bei unzureichender Qualifikation!

Unsachgemäßer Umgang kann zu erheblichen Personen- und Sachschäden führen.

- Die in dieser Betriebsanleitung beschriebenen Tätigkeiten nur durch Fachpersonal nachfolgend beschriebener Qualifikation durchführen lassen.
- Unqualifiziertes Personal von den Gefahrenbereichen fernhalten.

Fachpersonal

Das Fachpersonal ist aufgrund seiner fachlichen Ausbildung, seiner Kenntnisse der Mess- und Regelungstechnik und seiner Erfahrungen sowie Kenntnis der landesspezifischen Vorschriften, geltenden Normen und Richtlinien in der Lage, die beschriebenen Arbeiten auszuführen und mögliche Gefahren selbstständig zu erkennen.

Spezielle Einsatzbedingungen verlangen weiteres entsprechendes Wissen, z. B. über aggressive Medien.

2.3 Zusätzliche Sicherheitshinweise für Geräte nach ATEX und IECEx



WARNUNG!

Die Nichtbeachtung dieser Inhalte und Anweisungen kann zum Verlust des Explosionsschutzes führen.



WARNUNG!

Anforderungen der Richtlinie 94/9/EG (ATEX) und IECEx beachten.
Jeweilige Landesvorschriften bezüglich Ex-Einsatz einhalten (z. B.: EN/IEC 60079-10 und EN/IEC 60079-14).

2.4 Besondere Gefahren



WARNUNG!

Die Angaben der geltenden Baumusterprüfbescheinigung sowie die jeweiligen landesspezifischen Vorschriften zur Installation und Einsatz in explosionsgefährdeten Bereichen (z. B. EN/IEC 60079-14, NEC, CEC) einhalten. Bei Nichtbeachten können schwere Körperverletzungen und/oder Sachschäden auftreten.

Weitere wichtige Sicherheitshinweise für Geräte mit ATEX-/IECEx-Zulassung siehe Kapitel 2.3 "Zusätzliche Sicherheitshinweise für Geräte nach ATEX und IECEx".



WARNUNG!

Bei gefährlichen Messstoffen wie z. B. Sauerstoff, Acetylen, brennbaren oder giftigen Stoffen, sowie bei Kälteanlagen, Kompressoren etc. müssen über die gesamten allgemeinen Regeln hinaus die einschlägigen Vorschriften beachtet werden.



WARNUNG!

Schutz vor elektrostatischer Entladung (ESD) erforderlich! Die ordnungsgemäße Verwendung geerdeter Arbeitsflächen und persönlicher Armbänder ist bei Arbeiten mit offenen Schaltkreisen (Leiterplatten) erforderlich, um die Beschädigung empfindlicher elektronischer Bauteile durch elektrostatische Entladung zu vermeiden.

Für ein sicheres Arbeiten am Gerät muss der Betreiber sicherstellen,

- dass eine entsprechende Erste-Hilfe-Ausrüstung vorhanden ist und bei Bedarf jederzeit Hilfe zur Stelle ist.
- dass das Bedienpersonal regelmäßig in allen zutreffenden Fragen von Arbeitssicherheit, Erste-Hilfe und Umweltschutz unterwiesen wird, sowie die Betriebsanleitung und insbesondere die darin enthaltenen Sicherheitshinweise kennt.



WARNUNG!

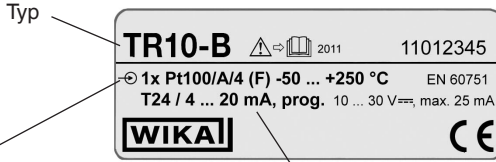
Messstoffreste in ausgebauten Geräten können zur Gefährdung von Personen, Umwelt und Einrichtung führen. Ausreichende Vorsichtsmaßnahmen ergreifen.

Dieses Gerät nicht in Sicherheits- oder in Not-Aus-Einrichtungen benutzen.
Fehlerhafte Anwendungen des Gerätes können zu Verletzungen führen.

Am Gerät können im Fehlerfall aggressive Medien mit extremer Temperatur und unter hohem Druck oder Vakuum anliegen.

2.5 Beschilderung, Sicherheitskennzeichnungen

2.5.1 Typenschilder für Widerstandsthermometer



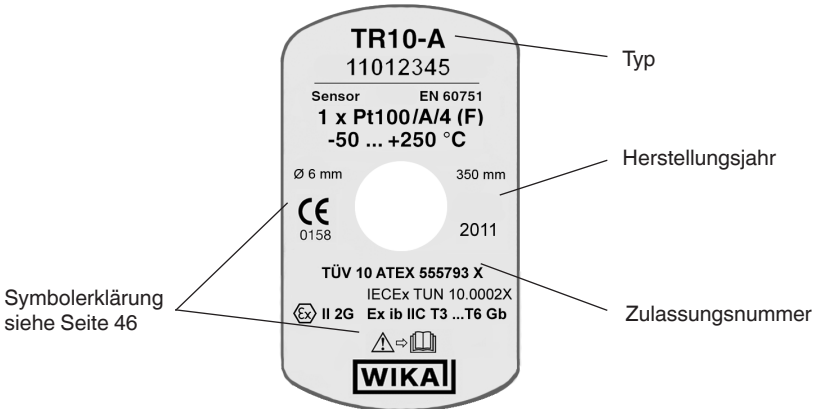
D

Sensor gemäß Norm

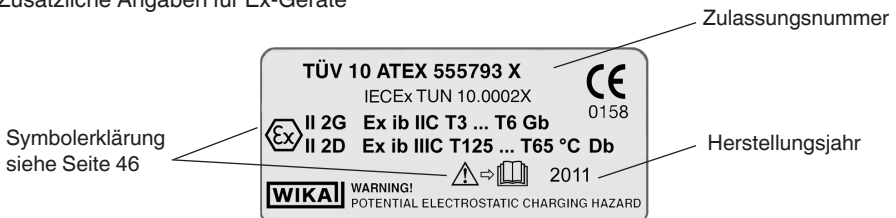
- F Dünnschicht-Messwiderstand
- W Drahtgewickelter Messwiderstand

Transmitter-Typ
(nur bei Ausführung mit Transmitter)

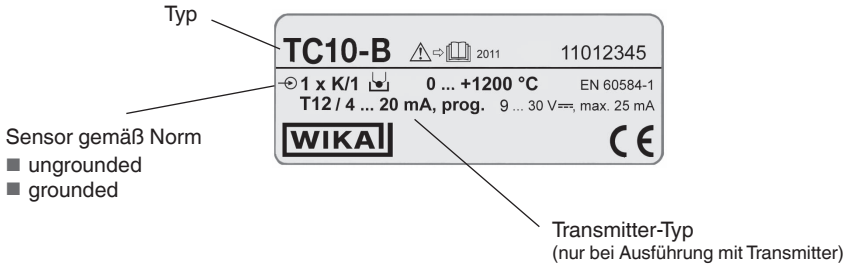
■ Typenschild für Messeinsatz TR10-A



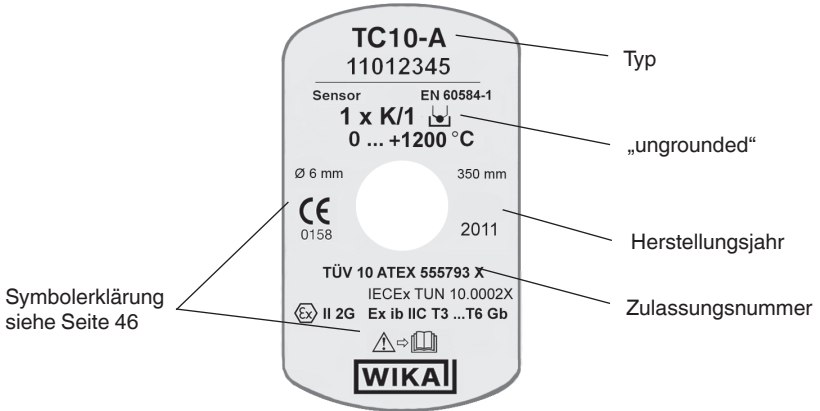
■ Zusätzliche Angaben für Ex-Geräte



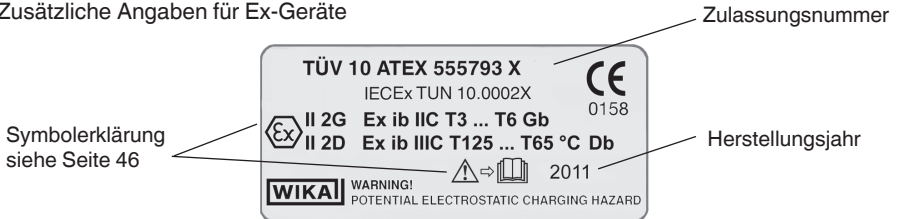
2.5.2 Typenschilder für Thermoelemente



■ Typenschild für Messeinsatz TC10-A



■ Zusätzliche Angaben für Ex-Geräte



Legende:



■ **ungrounded**
 isoliert verschweißt



■ **grounded**
 mit dem Mantel verschweißt (geerdet)

Symbolerklärung



Vor Montage und Inbetriebnahme des Gerätes unbedingt die Betriebsanleitung lesen!



CE, Communauté Européenne

Geräte mit dieser Kennzeichnung stimmen überein mit den zutreffenden europäischen Richtlinien.

D



ATEX Europäische Explosionsschutz-Richtlinie

(Atmosphäre = AT, explosible = EX)

Geräte mit dieser Kennzeichnung stimmen überein mit den Anforderungen der europäischen Richtlinie 94/9/EG (ATEX) zum Explosionsschutz.

3. Technische Daten

3.1 Widerstandsthermometer

Sensor-Schaltungsart

- 2-Leiter Der Leitungswiderstand geht als Fehler in die Messung ein.
- 3-Leiter Ab einer Kabellänge von ca. 30 m können Messabweichungen auftreten.
- 4-Leiter Der Innenleitungswiderstand der Anschlussdrähte kann vernachlässigt werden.

Grenzabweichung des Sensors nach DIN EN 60751

- Klasse B
- Klasse A
- Klasse AA

Die Kombinationen 2-Leiter-Schaltungsart und Klasse A oder Klasse AA sind nicht zulässig, da der Leitungswiderstand des Messeinsatzes der höheren Sensorgenaugigkeit entgegen wirkt.

Grundwerte und Grenzabweichungen

Grundwerte und Grenzabweichungen von Platin-Messwiderständen sind festgelegt in DIN EN 60751.

Der Nennwert von Pt100 Sensoren beträgt 100 Ω bei 0 °C.

Der Temperaturkoeffizient α kann zwischen 0 °C und 100 °C vereinfacht angegeben werden mit:

$$\alpha = 3,85 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$$

Der Zusammenhang zwischen der Temperatur und dem elektrischen Widerstand wird durch Polynome beschrieben, die ebenfalls in DIN EN 60751 definiert sind. Weiterhin legt diese Norm die Grundwerte in °C-Schritten tabellarisch fest.

3. Technische Daten

Klasse	Temperaturbereich		Grenzabweichung in °C
	Drahtgewickelt (W)	Dünnschicht (F)	
B	-196 ... +600 °C	-50 ... +500 °C	$\pm(0,30 + 0,0050 t)$ ¹⁾
A	-100 ... +450 °C	-30 ... +300 °C	$\pm(0,15 + 0,0020 t)$ ¹⁾
AA	-50 ... +250 °C	0 ... 150 °C	$\pm(0,10 + 0,0017 t)$ ¹⁾

1) |t| ist der Zahlenwert der Temperatur in °C ohne Berücksichtigung des Vorzeichens.

Fett gedruckt: Standardausführung

D

Widerstandswerte und Grenzabweichungen bei ausgewählten Temperaturen (Pt100)

Temperatur in °C (ITS 90)	Widerstandswert in Ω		
	Klasse B	Klasse A	Klasse AA
-196	19,69 ... 20,80	-	-
-100	59,93 ... 60,58	60,11 ... 60,40	-
-50	80,09 ... 80,52	80,21 ... 80,41	80,23 ... 80,38
-30	88,04 ... 88,40	88,14 ... 88,30	88,16 ... 88,28
0	99,88 ... 100,12	99,94 ... 100,06	99,96 ... 100,04
20	107,64 ... 107,95	107,72 ... 107,87	107,74 ... 107,85
100	138,20 ... 138,81	138,37 ... 138,64	138,40 ... 138,61
150	156,93 ... 157,72	157,16 ... 157,49	157,91 ... 157,64
250	193,54 ... 194,66	193,86 ... 194,33	193,91 ... 194,29
300	211,41 ... 212,69	211,78 ... 212,32	-
450	263,31 ... 265,04	263,82 ... 264,53	-
500	280,04 ... 281,91	-	-
600	312,65 ... 314,77	-	-

Diese Tabelle bildet den Kalibriervorgang an vordefinierten Temperaturen ab. D. h. wenn ein Temperaturnormal zur Verfügung steht, so sollte der Widerstandswert des Prüflings innerhalb der oben angegebenen Grenzen liegen.



Weitere Informationen zu Genauigkeiten und Einsatzgrenzen von Widerstandsthermometern siehe Datenblatt IN 00.17 (Download unter www.wika.de).

3.2 Thermoelemente

Sensortypen

Typ	Empfohlene max. Betriebstemperatur
K (NiCr-Ni)	1.200 °C
J (Fe-CuNi)	800 °C
E (NiCr-CuNi)	800 °C
T (Cu-CuNi)	400 °C
N (NiCrSi-NiSi)	1.200 °C
S (Pt10% Rh-Pt)	1.600 °C
R (Pt13% Rh-Pt)	1.600 °C
B (Pt30% Rh-Pt6%-Rh)	1.700 °C

3346267.11 04/2013 GB/D

Potenzielle Messunsicherheiten durch Alterungseffekte

Thermoelemente altern und verändern ihre Temperatur-Thermospannungskennlinie. Thermoelemente des Typs J (Fe-CuNi) altern gering, weil zunächst der Reinmetallschenkel oxidiert. Bei den Thermoelementen der Typen K und N (NiCrSi-NiSi) können bei hohen Temperaturen erhebliche Veränderungen der Thermospannung durch Chromverarmung im NiCr-Schenkel auftreten, was eine sinkende Thermospannung zur Folge hat.

D

Bei Sauerstoffmangel wird dieser Effekt noch beschleunigt, weil sich keine vollständigen Oxidhäute auf der Oberfläche des Thermoelementes ausbilden können, die einer weiteren Oxydation entgegenwirken. Es oxidiert das Chrom, nicht jedoch das Nickel. Dadurch entsteht die sogenannte „Grünfäule“, die das Thermoelement zerstört. Bei schnellem Abkühlen von NiCr-Ni-Thermoelementen, die oberhalb 700 °C betrieben wurden, kommt es während der Abkühlung zum Einfrieren bestimmter Zustände im Kristallgefüge (**Nahordnung**), was bei Typ-K-Elementen eine Thermospannungsänderung bis zu 0,8 mV zur Folge haben kann (K-Effekt).

Beim Thermoelement Typ N (NiCrSi-NiSi) hat man den **Nahordnungseffekt** durch Legieren beider Schenkel mit Silizium verringern können. Der Effekt ist reversibel und wird durch Glühen oberhalb 700 °C mit anschließender langsamer Abkühlung größtenteils wieder abgebaut. Dünne Mantelthermoelemente reagieren hier besonders empfindlich. Schon eine Abkühlung an ruhender Luft kann Abweichungen von mehr als 1 K zur Folge haben.

Die tatsächliche Gebrauchstemperatur des Thermometers wird begrenzt sowohl durch die maximal zulässige Einsatztemperatur des Thermoelementes, als auch durch die maximal zulässige Einsatztemperatur des Schutzrohrwerkstoffes.

Gelistete Typen sind als einfaches Thermopaar oder als doppeltes Thermopaar lieferbar. Das Thermoelement wird mit isolierter Messstelle geliefert, wenn nicht ausdrücklich anders spezifiziert wurde.

Grenzabweichung

Bei der Grenzabweichung von Thermopaaren ist eine Vergleichsstellentemperatur von 0 °C zugrunde gelegt. Bei Verwendung einer Ausgleichs- oder Thermoleitung muss eine zusätzliche Messabweichung berücksichtigt werden.

Grenzabweichungen und weitere technische Daten siehe entsprechendes WIKA-Datenblatt oder Bestellunterlagen.

4. Aufbau und Funktion

4.1 Beschreibung

Mit Hilfe dieser Thermometer (Widerstandsthermometer und Thermoelemente) werden Temperaturen in Prozessen erfasst.

Diese Thermometer eignen sich je nach Ausführung für niedrige, mittlere und hohe Prozessanforderungen, in explosionsgefährdeten Bereichen.

Messstelle isoliert

Das Thermometer Typ TRxx oder Typ TCxx besteht aus einem verschweißten Rohr, einer mineralisolierten Mantelleitung oder aus keramikisolierten Thermodrähten, worin sich der Temperatursensor befindet, der in einem Keramikpulver, einer temperaturbeständigen Vergussmasse, Zementmasse oder einer Wärmeleitpaste eingebettet ist.

Alternativen:

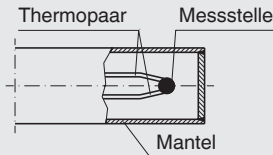
Der Aufbau des Messeinsatzes oder des Kabelfühlers kann auch in Rohrausführung durchgeführt werden. Der Sensor befindet sich dann in einem verschweißten Rohr, eingebettet in einem Keramikpulver, Wärmeleitpaste oder in einer dafür geeigneten, temperaturbeständigen Vergussmasse.

Der Aufbau des Messeinsatzes für Hochtemperaturthermoelemente kann auch mit Thermodrähten erfolgen, welche mit Keramikstäben oder Keramikperlen isoliert sind. Das Keramikrohr wird in ein metallisches Halterrohr mittels eines temperaturbeständigen Zementes eingekittet.

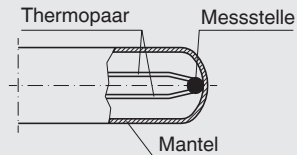
Thermoelemente, nicht isoliert (geerdet)

Für besondere Anwendungen z. B. Oberflächentemperaturmessungen, sind die Sensoren direkt mit der Schutzhülse kontaktiert, bzw. sind die Messstellen bei Thermoelementen mit dem Boden verschweißt (siehe Kapitel 7.1.1 „Besondere Bedingungen für die Verwendung (X-Conditions)“).

Messstelle isoliert (ungrounded)

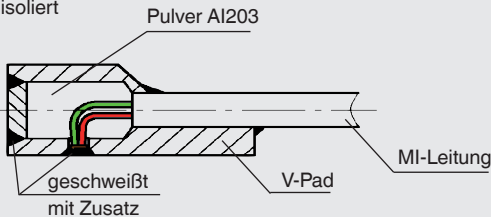


Messstelle nicht isoliert (grounded)



Variante V-Pad, Typ TC59-V

Messstelle nicht isoliert



4. Aufbau und Funktion

Vibrationsfestigkeit

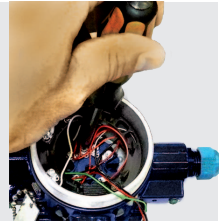
Die Thermometer sind stoß- und vibrationsfest aufgebaut, die Vibrationsfestigkeit der Standardversion entspricht der DIN EN 60751 (bis 3 g), Sonderausführungen sind auch höher belastbar. Die Stoßfestigkeit entspricht für alle Versionen den Anforderungen der EN 60751, ausgenommen für Hochtemperaturthermoelemente welche mit keramiskisolierten Thermodrähren aufgebaut sind.

Elektrischer Anschluss

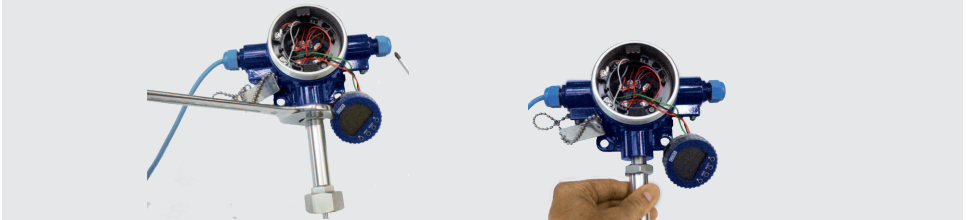
Anschlussseitig ist das Thermometer mit einem Gehäuse, einem Stecker oder freien Anschlussleitungen ausgerüstet. In der Gehäuseausführung befinden sich Anschlussklemmen oder bescheinigte Transmitter. Optional können in die Gehäuse separat bescheinigte Digitalanzeigen eingebaut sein.

4.2 Aus- und Einbau des Messeinsatzes, Typen TR12-B, TC12-B

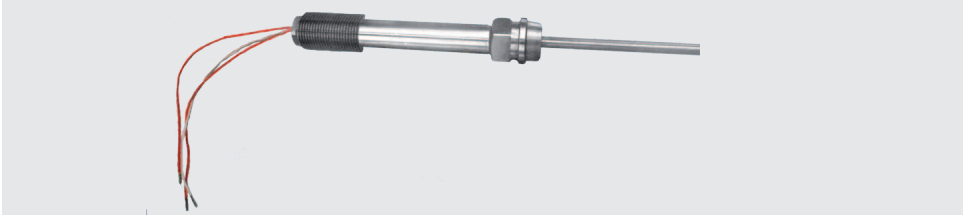
Vor dem Ausbau des Messeinsatzes die elektrischen Verbindungen zum Anschlusssockel oder Transmitter vollständig lösen.



Danach kann das Halsrohr vom Kopf gelöst und herausgeschraubt werden.



Ausgebauter Messeinsatz mit Halsrohr:

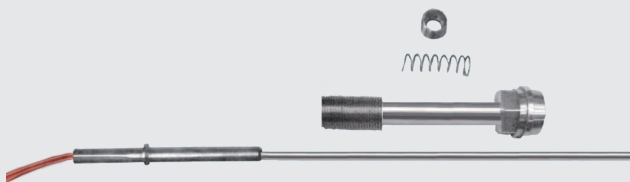


4. Aufbau und Funktion

Zum Ausbau des Messeinsatzes aus dem Halsrohr die M16-Schraube am oberen Ende des Halsrohres lösen



und herausrauben.



Der Einbau des Messeinsatzes wird in umgekehrter Reihenfolge vorgenommen (Messeinsatz vor der Montage reinigen). Das sechseckig gecrimpte Ende des Messeinsatzes wird beim Einschrauben der Innensechskantschraube geführt. Anzugsdrehmoment der Schraube: 12 ... 14 Nm

4.3 Lieferumfang

Lieferumfang mit dem Lieferschein abgleichen.

5. Transport, Verpackung und Lagerung

5.1 Transport

Gerät auf eventuell vorhandene Transportschäden untersuchen.
Offensichtliche Schäden unverzüglich mitteilen.

5.2 Verpackung

Verpackung erst unmittelbar vor der Montage entfernen.

Die Verpackung aufbewahren, denn diese bietet bei einem Transport einen optimalen Schutz (z. B. wechselnder Einbauort, Reparatursendung).

5.3 Lagerung

Zulässige Bedingungen am Lagerort:

- Lagertemperatur:
Geräte **ohne** eingebauten Transmitter: -40 ... +85 °C
Geräte **mit** eingebautem Transmitter: siehe Betriebsanleitung des entsprechenden Transmitters
- Feuchtigkeit: 35 ... 85 % relative Feuchte (keine Betauung)

Vermeidung folgender Einflüsse:

- Direktes Sonnenlicht oder Nähe zu heißen Gegenständen
- Mechanische Vibration, mechanischer Schock (hartes Aufstellen)
- Ruß, Dampf, Staub und korrosive Gase

Das Gerät in der Originalverpackung an einem Ort, der die oben gelisteten Bedingungen erfüllt, lagern. Wenn die Originalverpackung nicht vorhanden ist, dann das Gerät wie folgt verpacken und lagern:

1. Das Gerät in eine antistatische Plastikfolie einhüllen.
2. Das Gerät mit dem Dämmmaterial in der Verpackung platzieren.
3. Bei längerer Einlagerung (mehr als 30 Tage) einen Beutel mit Trocknungsmittel der Verpackung beilegen.



WARNUNG!

Vor der Einlagerung des Gerätes (nach Betrieb) alle anhaftenden Messstoffreste entfernen. Dies ist besonders wichtig, wenn der Messstoff gesundheitsgefährdend ist, wie z. B. ätzend, giftig, krebserregend, radioaktiv, usw.

6. Inbetriebnahme, Betrieb



WARNUNG!

Bei der Montage des Thermometers die zulässige Betriebstemperatur (Umgebung, Messstoff), auch unter Berücksichtigung von Konvektion und Wärmestrahlung nicht unter- oder überschreiten!

6. Inbetriebnahme, Betrieb



WARNUNG!

Thermometer müssen geerdet sein, wenn an den Anschlussdrähten mit gefährlichen Spannungen zu rechnen ist (hervorgerufen durch z. B. mechanische Beschädigung, elektrostatische Aufladung oder Induktion)!

6.1 Elektrischer Anschluss



VORSICHT!

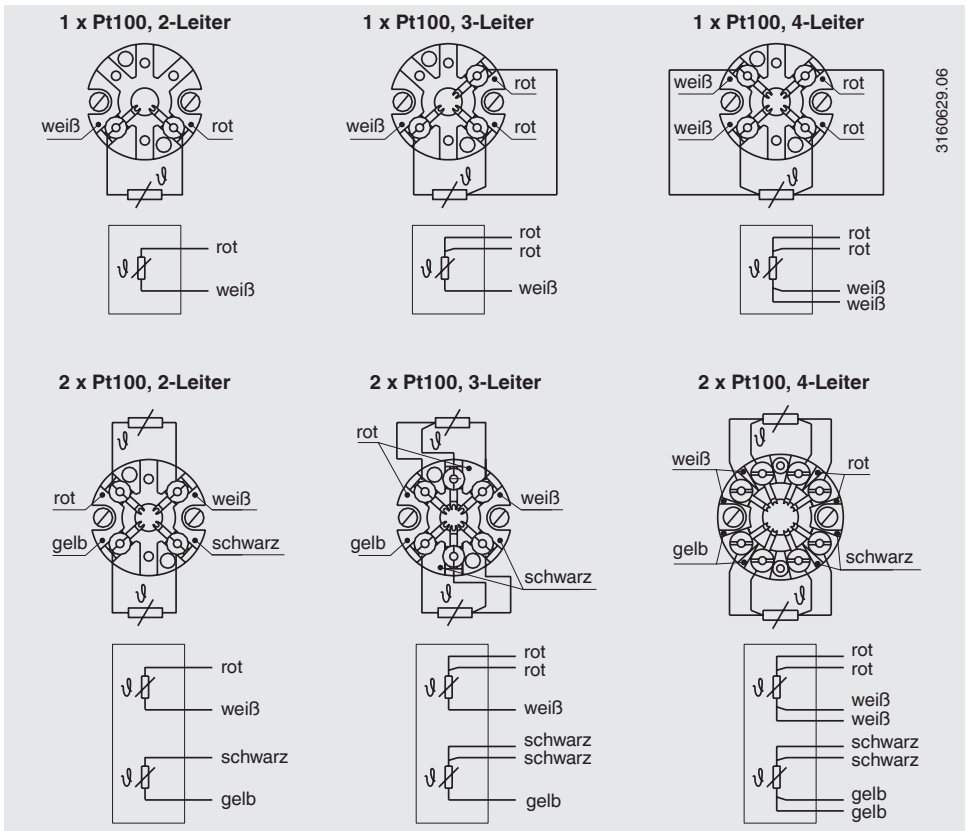
- Beschädigung an Kabeln und Leitungen, sowie Verbindungsstellen vermeiden
- Feindrähtige Leiterenden mit Aderendhülsen versehen (Kabelkonfektionierung)
- Innere wirksame Kapazität und Induktivität beachten

D

Die elektrischen Anschlüsse der Thermometer (z. B. Anschluss Schaltbilder, Grenzabweichungen etc.) sind den jeweiligen Datenblättern zu entnehmen. Falls Kopfransmitter oder Digitalanzeigen in die Anschlussgehäuse eingebaut sind, müssen auch diese Datenblätter berücksichtigt werden.

6.2 Elektrischer Anschluss von Widerstandsthermometern

6.2.1 Widerstandsthermometer mit Anschlusssockel



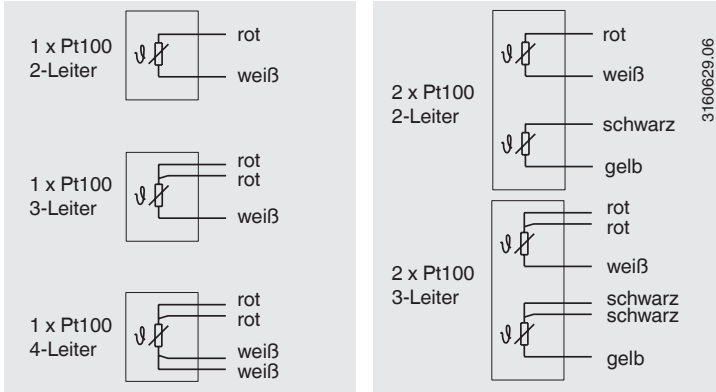
3345267.11 04/2013 GB/D

6. Inbetriebnahme, Betrieb

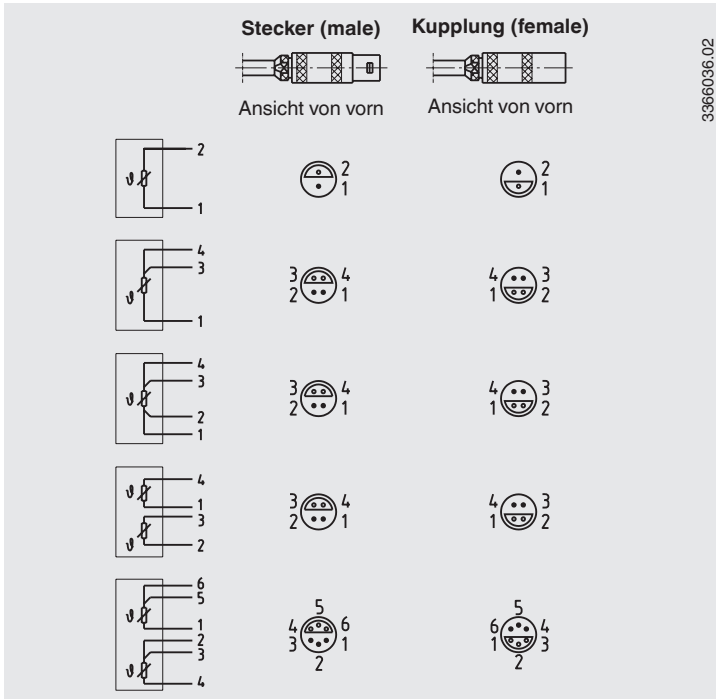
6.2.2 Widerstandsthermometer mit Kabel oder Stecker

Ohne Steckverbinder

D

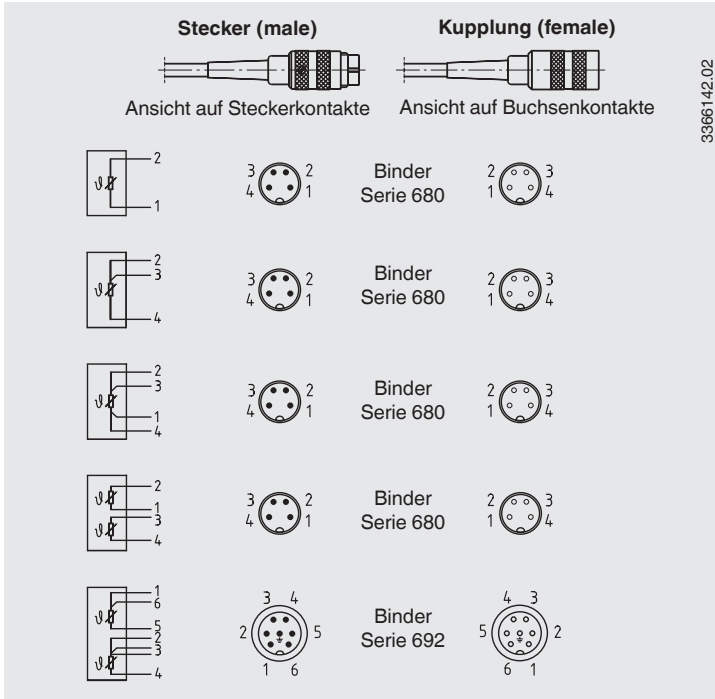


Lemosa Stecker



6. Inbetriebnahme, Betrieb

Schraub-Steck-Verbinder, Binder



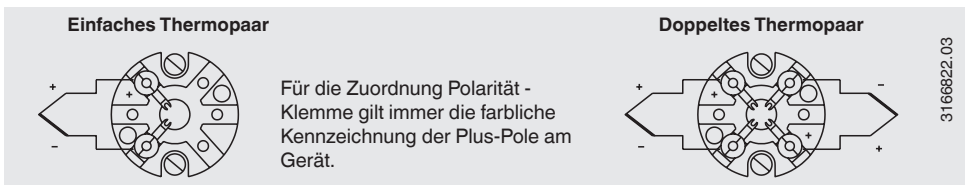
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6.3 Elektrischer Anschluss von Thermoelementen

Farbkennzeichnung der Kabel bei Thermoelementen

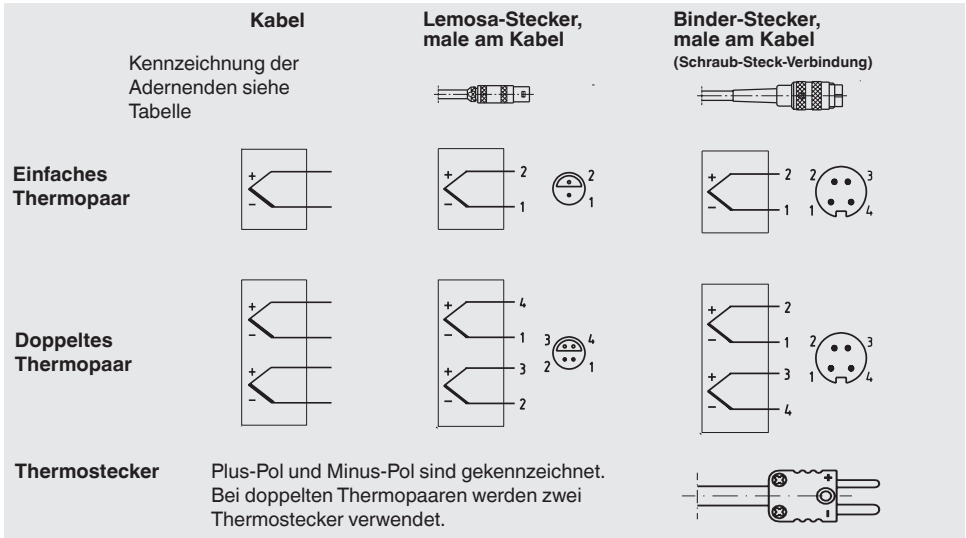
Sensortyp	Norm	Plus-Pol	Minus-Pol
K	DIN EN 60584	grün	weiß
J	DIN EN 60584	schwarz	weiß
E	DIN EN 60584	violett	weiß
T	DIN EN 60584	braun	weiß
N	DIN EN 60584	rosa	weiß

6.3.1 Thermoelemente mit Anschlusssockel



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6.3.2 Thermoelemente mit Kabel oder Stecker



6.4 Stufenelemente (nach 8.4)

Diese sind in der Regel mit einem Gehäuse ausgestattet, in welchem Transmitter oder Reihenklammern montiert sind.

Die Transmitter/Digitalanzeigen sind mechanisch befestigt (z. B. Schienensystem im Gehäuse oder Halterung im Anschlusskopf) und gemäß EN/IEC 60079-11 und EN/IEC 60079-14 installiert. Optional können die Gehäuse je nach Ausführung mit und ohne Anschlussklammern (z. B. Reihenklammern, Anschlusssockel etc.) nach EN/IEC 60079-11 und EN/IEC 60079-14 ausgestattet sein.

Bei Verwendung von mehreren Transmittern/Digitalanzeigen wächst das Gehäusevolumen angepasst an die „Wärmequelle“ und somit das zu erwärmende Volumen. Dadurch ist gewährleistet, dass es keine signifikante Erhöhung der Gehäuseoberflächentemperatur entsteht.



WARNING!

Bei Verwendung ohne Anschlussklammern und Leitungsverdrahtung Einhaltung der Installationsvorschriften nach EN/IEC 60079-11 und EN/IEC 60079-14 sicherstellen.

6.5 Kabelverschraubungen

Bei Thermometern mit Anschlusskopf muss die Abdichtung der Kabelverschraubung optimal erfolgen, damit die erforderliche Schutzart erreicht wird.

Voraussetzungen zur Erreichung der Schutzart

- Kabelverschraubung nur im angegebenen Klemmbereich (Kabeldurchmesser passend zur Kabelverschraubung) verwenden
- Bei Verwendung sehr weicher Kabeltypen nicht den unteren Klemmbereich verwenden
- Nur Rundkabel verwenden (ggf. leicht ovaler Querschnitt)

6. Inbetriebnahme, Betrieb

- Kabel nicht verdrehen
- Mehrmaliges Öffnen/Schließen möglich; hat ggf. jedoch negative Auswirkung auf die Schutzart
- Bei Kabel mit ausgeprägtem Kaltfließverhalten Verschraubung nachziehen

6.6 Zylindrische Gewinde

Wenn Thermometeranschlusskopf, Halsrohr, Schutzrohr oder Prozessanschluss mit zylindrischen Gewinden (z. B. G ½, M20 x 1,5 ...) verbunden werden, müssen diese Gewinde mit **Dichtungen** gegen den Eintritt von Flüssigkeiten in das Thermometer gesichert werden.

WIKA verwendet standardmäßig eine Kupfer-Profilichtung für die Verbindung Halsrohr zum Schutzrohr und eine Papier-Flachdichtung für die Verbindung Anschlusskopf zum Halsrohr oder Schutzrohr.

Bei Zusammenbauten von Thermometer und Schutzrohr sind diese Dichtungen bereits vormontiert. Es obliegt dem Betreiber der Anlage, die Eignung dieser Dichtung im Hinblick auf die Einsatzbedingungen zu überprüfen und ggfs. durch eine geeignete Dichtung zu ersetzen.

Bei Thermometern ohne Schutzrohr bzw. getrennter Lieferung liegen Dichtungen nicht bei und müssen vom Anwender getrennt bestellt werden.

Bei der Endmontage in die Anlage sind die Gewinde zunächst handfest anzuziehen. Das entspricht auch dem Auslieferungszustand bei vormontierten Zusammenbauten. Die Endfestigkeit muss mit einer halben Schraubenschlüssel-Umdrehung hergestellt werden.



Dichtungen sind nach einer Demontage zu ersetzen!



Dichtungen können unter Angabe der Gewinde mit WIKA Bestell-Nr. und/oder Bezeichnung (siehe Tabelle) bei WIKA bezogen werden.

WIKA Bestell-Nr.	Bezeichnung	Geeignet für Gewinde
11349981	nach DIN 7603 Form C 14 x 18 x 2 -CuFA	G ¼, M14 x 1,5
11349990	nach DIN 7603 Form C 18 x 22 x 2 -CuFA	M18 x 1,5, G ¾
11350008	nach DIN 7603 Form C 21 x 26 x 2 -CuFA	G ½, M20 x 1,5
11350016	nach DIN 7603 Form C 27 x 32 x 2,5 -CuFA	G ¾, M27 x 2
11367416	nach DIN 7603 Form C 20 x 24 x 2 -CuFA	M20 x 1,5
1248278	nach DIN 7603 D21,2 x D25,9 x 1,5 -Al	G ½, M20 x 1,5
3153134	nach DIN 7603 Form C D14,2 x D17,9 x 2 -StFA	G ¼, M14 x 1,5
3361485	nach DIN 7603 Form C D33,3 x D38,9 x 2,5 -StFA	G 1

Legende:

CuFA = Kupfer, max. 45HB^a; mit einer Füllung aus asbestfreiem Dichtungsmaterial

Al = Aluminium Al99; F11, 32 bis 45 HB^b

StFA = Weicheisen, 80 bis 95 HB^a; mit einer Füllung aus asbestfreiem Dichtungsmaterial

6.7 Konische Gewinde (NPT)

Verbindungen mit kegeligen Gewinden (NPT) sind selbstdichtend und müssen grundsätzlich nicht gesichert werden. Die Notwendigkeit einer zusätzlichen Dichtung mittels PTFE-Band oder Hanf ist jedoch zu prüfen. Die Gewinde sollten vor der Montage mit einem geeigneten Mittel geschmiert werden.

Bei der Endmontage in die Anlage sind die Gewinde zunächst handfest anzuziehen. Das entspricht auch dem Auslieferungszustand bei vormontierten Zusammenbauten. Die Endfestigkeit und Dichtheit muss mit einer 1,5 bis 3-fachen Schraubenschlüssel-Umdrehung hergestellt werden.

D

7. Hinweise zu Montage und Betrieb im explosionsgefährdeten Bereich (Europa)



WARNUNG!

Die Verwendung eines Messeinsatzes Typ TR10-A ohne geeigneten Anschlusskopf (Gehäuse) ist in explosionsgefährdeten Bereichen nicht zulässig! Gegebenenfalls ist ein geeignetes Schutzrohr zu verwenden.

7.1 Allgemeine Hinweise zum Explosionsschutz



Die Anforderungen der Richtlinie 94/9/EG (ATEX) sowie der IEC beachten. Zusätzlich gelten die Angaben der jeweiligen Landesvorschriften bezüglich des Einsatzes in explosionsgefährdeter Umgebung.

- A) Die Verantwortung über die Zoneneinteilung unterliegt dem Anlagenbetreiber und nicht dem Hersteller/Lieferanten der Betriebsmittel.
- B) Der Betreiber der Anlage stellt in eigener Verantwortung sicher, dass vollständige und im Einsatz befindliche Thermometer bezüglich aller sicherheitsrelevanten Merkmale identifizierbar sind. Beschädigte Thermometer dürfen nicht verwendet werden. Instandsetzungen (Reparaturen) dürfen nur von dafür autorisierten Personen durchgeführt werden. Reparaturen dürfen nur mit Originalersatzteilen des Ursprungslieferanten durchgeführt werden, da ansonsten die Anforderungen der Zulassung nicht erfüllt sind. Bauliche Veränderungen nach Auslieferung der Geräte obliegen nicht in der Verantwortung des Herstellers.
- C) Ist eine Komponente eines elektrischen Betriebsmittels, von dem der Explosionsschutz abhängt, instandgesetzt worden, so darf das elektrische Betriebsmittel erst wieder in Betrieb genommen werden, nachdem der Sachverständige festgestellt hat, dass es in den für den Explosionsschutz wesentlichen Merkmalen den Anforderungen entspricht. Außerdem muss der Sachverständige hierfür eine Bescheinigung erstellen und das Betriebsmittel mit einem Prüfzeichen versehen.
- D) Punkt C) gilt dann nicht, wenn die Komponente durch den Hersteller entsprechend den Anforderungen und Bestimmungen instandgesetzt wurde.

- E) Bei Einsatz von Transmittern und Digitalanzeigen ist zu beachten:
Der Inhalt dieser und der zum Transmitter oder Anzeige gehörenden Gebrauchsanweisung.
Die einschlägigen Bestimmungen für Errichtung und Betrieb elektrischer Anlagen.
Die Verordnungen und Richtlinien für den Explosionsschutz. Transmitter und Digitalanzeigen müssen eine eigene Zulassung besitzen.
- F) Bei Ersatzteilbestellung muss eine genaue Angabe über die Vorlieferung erfolgen:
- Zündschutzart (hier Ex i)
 - Zulassungs-Nr.
 - Auftrags-Nr.
 - Fertigungs-Nr.
 - Auftragsposition

7.1.1 Besondere Bedingungen für die Verwendung (X-Conditions)

Versionen mit $\varnothing < 3$ mm oder „nicht isolierte“ Versionen entsprechen betriebsbedingt nicht Abschnitt 6.3.12, EN/IEC 60079-11. Dadurch sind diese eigensicheren Stromkreise aus sicherheitstechnischer Sicht als mit dem Erdpotential galvanisch verbunden anzusehen und es muss im gesamten Verlauf der Errichtung der eigensicheren Stromkreise Potentialausgleich bestehen. Außerdem sind für den Anschluss gesonderte Bedingungen nach EN/IEC 60079-14 zu beachten.

An Geräten, die aufgrund Ihrer Bauart nicht den elektrostatischen Anforderungen nach EN/IEC 60079-0 entsprechen, müssen elektrostatische Aufladungen vermieden werden

Eingesetzte Transmitter/Digitalanzeigen müssen eine eigene Bescheinigung entsprechend EN/IEC besitzen. Es sind die Installationsbedingungen, die elektrischen Anschlussgrößen, die Temperaturklassen bzw. maximalen Oberflächentemperaturen bei Geräten zur Verwendung in explosionsfähigen Staubatmosphären und zulässigen Umgebungstemperaturen den entsprechenden Zulassungen zu entnehmen und einzuhalten.

Ein Wärmerückfluss aus dem Prozess welcher die zulässige Umgebungstemperatur des Transmitters, der Digitalanzeige oder des Gehäuses überschreitet, ist nicht zulässig und durch geeignete Wärmeisolierung oder ein entsprechend langes Halsrohr zu verhindern.

Falls die Wandstärke unter 1 mm liegt, dürfen die Geräte keinen Umgebungsbeanspruchungen ausgesetzt werden, die die Trennwand nachteilig beeinträchtigen können. Alternativ kann ein Schutzrohr mit entsprechender Mindestwandstärke eingesetzt werden.

Bei Verwendung eines Schutzrohres/Halsrohres muss das Gesamtgerät so konstruiert sein, dass ein Einbau in einer Art möglich ist, die zu einem genügend dichten Spalt (IP 67) oder einem flammendurchschlagsicheren Spalt (EN/IEC 60079-1) hin zum weniger gefährdeten Bereich führt.

Für die Verwendung von Gehäusen müssen diese entweder über eine entsprechende eigene Zulassung verfügen oder den minimalen Anforderungen entsprechen. IP-Schutz: mindestens IP 20 (mindestens IP 65 für Staub), gilt für alle Gehäuse. Leichtmetallgehäuse müssen jedoch entsprechend EN/IEC 60079-0 Abs. 8.1 geeignet sein. Zusätzlich müssen nicht metallische Gehäuse oder pulverbeschichtete Gehäuse den elektrostatischen Anforderungen EN/IEC 60079-0 entsprechen oder einen entsprechenden Warnhinweis besitzen.

7. Hinweise zu Montage, Betrieb im explosionsgefährdeten Bereich

Schutzmaßnahmen für Anwendungen die EPL Ga oder Da erfordern:

Betriebsbedingte Reibung oder Stöße zwischen Geräteteilen aus Leichtmetall oder deren Legierungen (z. B. Aluminium, Magnesium, Titanium oder Zirkonium) mit Geräteteilen aus Eisen/Stahl sind nicht zulässig. Betriebsbedingte Reibungen oder Stöße zwischen Leichtmetallen sind erlaubt.

7.1.2 Ex-Kennzeichnung

Für Anwendungen ohne Transmitter (Digitalanzeigen) die Geräte der Gerätegruppe II (explosionsfähige Gasatmosphären) erfordern gelten folgende Temperaturklasseneinteilung und Umgebungstemperaturbereiche:

D

Tabelle 1

Kennzeichnung	Temperaturklasse	Umgebungstemperaturbereich (T _a)	Max. Oberflächentemperatur (T _{max}) an der Fühler- oder Schutzrohrspitze
II 1G Ex ia IIC T6 Ga II 1/2G Ex ib IIC T6 Ga/Gb	T6	(-50) ¹⁾ -40 ... +80 °C	T _M (Mediumtemperatur) + Eigenerwärmung
II 1G Ex ia IIC T5 Ga II 1/2G Ex ib IIC T5 Ga/Gb	T5	(-50) ¹⁾ -40 ... +95 °C	Hierzu sind die besonderen Bedingungen (17) zu beachten.
II 1G Ex iaD IIC T4 Ga II 1/2G Ex ib IIC T4 Ga/Gb II 1G Ex ia IIC T3 Ga II 1/2G Ex ib IIC T3 Ga/Gb	T4, T3	(-50) ¹⁾ -40 ... +100 °C	

1) Die Werte in Klammern gelten für Sonderausführungen. Diese Fühler werden mit besonderen Vergussmassen gefertigt. Weiterhin werden sie mit Gehäusen aus CrNi-Stahl und mit Kabelverschraubungen für den Tieftemperaturbereich ausgestattet

Beim Einbau eines Transmitters und/oder einer Digitalanzeige gelten die besonderen Bedingungen aus der Baumusterprüfbescheinigung (siehe Punkt 17).

Für Anwendungen die Geräte der Gerätegruppe II (explosionsfähige Staubatmosphären) erfordern gelten folgende Oberflächentemperaturen und Umgebungstemperaturbereiche:

Tabelle 2

Kennzeichnung	Leistung P _i	Umgebungstemperaturbereich (T _a)	Max. Oberflächentemperatur (T _{max}) an der Fühler- oder Schutzrohrspitze
II 1D Ex ia IIIC T65 °C Da II 1/2D Ex ib IIIC T65 °C Da/Db	750 mW	(-50) ¹⁾ -40 ... +40 °C	T _M (Mediumtemperatur) + Eigenerwärmung
II 1D Ex ia IIIC T95 °C Da II 1/2D Ex ib IIIC T95 °C Da/Db	650 mW	(-50) ¹⁾ -40 ... +70 °C	Hierzu sind die besonderen Bedingungen (17) zu beachten.
II 1D Ex ia IIIC T125 °C Da II 1/2D Ex ib IIIC T125 °C Da/Db	550 mW	(-50) ¹⁾ -40 ... +100 °C	

1) Die Werte in Klammern gelten für Sonderausführungen. Diese Fühler werden mit besonderen Vergussmassen gefertigt. Weiterhin werden sie mit Gehäusen aus CrNi-Stahl und mit Kabelverschraubungen für den Tieftemperaturbereich ausgestattet

Beim Einbau eines Transmitters und/oder einer Digitalanzeige gelten die besonderen Bedingungen aus der Baumusterprüfbescheinigung (siehe Punkt 17).

Verwendung in Methan-Atmosphären

Aufgrund der höheren Mindestzündenergie von Methan können die Geräte auch in dadurch verursachte explosionsfähige Gasatmosphären eingesetzt werden. Das Gerät wird optional mit IIC + CH₄ gekennzeichnet.

Für Anwendungen, die EPL Gb oder Db erfordern, können die mit "ia" gekennzeichneten Geräte auch in Messstromkreisen des Typs "ib" eingesetzt werden.

7.2 Temperaturklasseneinteilung, Umgebungstemperaturen

Die zulässigen Umgebungstemperaturen richten sich nach der Temperaturklasse, den eingesetzten Gehäusen und dem optional eingebauten Transmitter und/oder der Digitalanzeige. Bei der Zusammenschaltung eines Thermometers mit einem Transmitter und/oder einer Digitalanzeige gelten der jeweils kleinste Wert der Umgebungstemperaturgrenzen und die Temperaturklasse mit der größten Ziffer. Die untere Temperaturgrenze beträgt -40 °C, für Sonderausführungen -50 °C.

Falls kein Transmitter oder keine Digitalanzeige im Gehäuse montiert ist, findet in diesem auch keine zusätzliche Erwärmung statt. Mit eingebautem Transmitter (optional mit Digitalanzeige) kann eine Erwärmung betriebsbedingt durch den Transmitter oder Digitalanzeige stattfinden.

Für Anwendungen ohne Transmitter (Digitalanzeigen) die Geräte der Gerätegruppe II (explosionsfähige Gasatmosphären) erfordern gelten folgende Temperaturklasseneinteilung und Umgebungstemperaturbereiche:

Temperaturklasse	Umgebungstemperaturbereich (Ta)
T6	(-50) -40 ... +80 °C
T5	(-50) -40 ... +95 °C
T4, T3	(-50) -40 ... +100 °C

Die zulässigen Umgebungstemperaturen und Oberflächentemperaturen von Fremdfabrikaten den jeweiligen Zulassungen und/oder Datenblättern entnehmen und beachten.

Beispiel

Für Geräte mit Transmitter und Digitalanzeige DIH10 gilt z. B. folgende Begrenzung der Temperaturklasseneinteilung:

Temperaturklasse	Umgebungstemperaturbereich (Ta)
T6	-40 ... +60 °C

Für Anwendungen die Geräte der Gerätegruppe II (explosionsfähige Staubatmosphären) erfordern gelten folgende Oberflächentemperaturen und Umgebungstemperaturbereiche:

Leistung Pi	Umgebungstemperaturbereich (Ta)
750 mW	(-50) -40 ... +40 °C
650 mW	(-50) -40 ... +70 °C
550 mW	(-50) -40 ... +100 °C

Die zulässigen Umgebungstemperaturen und Oberflächentemperaturen von Fremdfabrikaten den jeweiligen Zulassungen und/oder Datenblättern entnehmen und beachten.

7. Hinweise zu Montage, Betrieb im explosionsgefährdeten Bereich

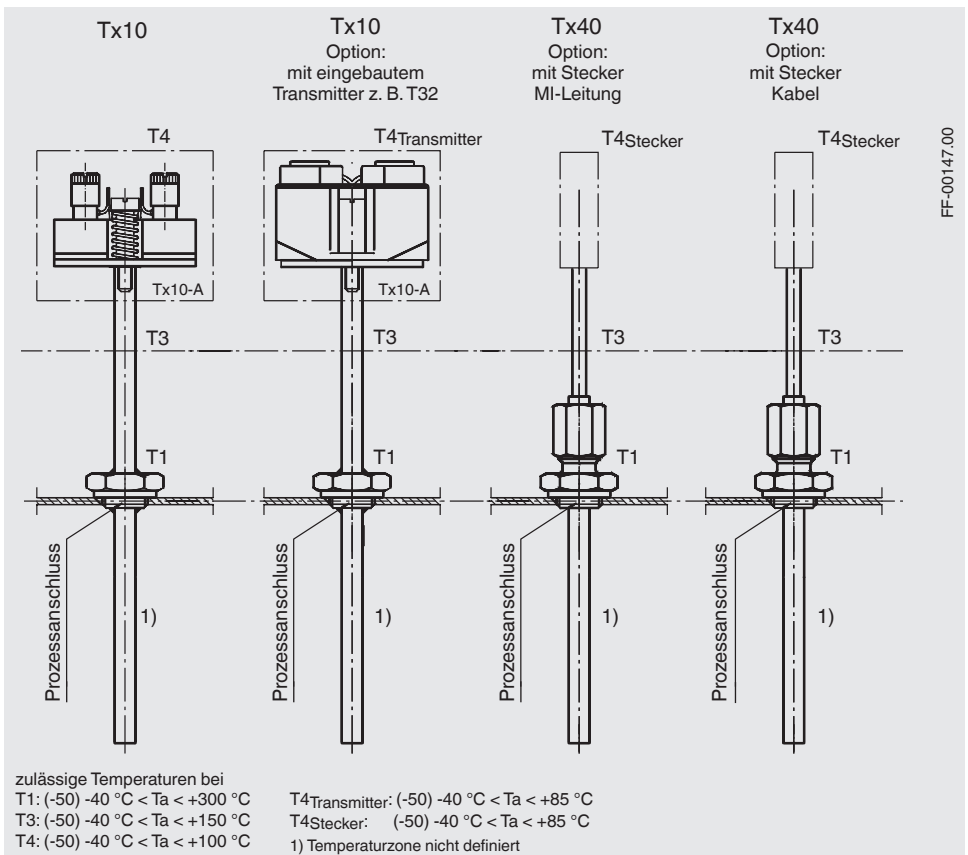
Die Werte in Klammern gelten für Sonderausführungen. Diese Fühler werden mit besonderen Vergussmassen gefertigt. Weiterhin werden sie mit Anschlussköpfen aus Edelstahl und mit Kabelverschraubungen für den Tieftemperaturbereich ausgestattet.

Diese Thermometer sind laut Zulassung geeignet für die Temperaturklassen T6...T3. Dies gilt für Geräte ohne eingebaute Transmitter und/oder Digitalanzeigen. Thermometer mit Transmitter und/oder Digitalanzeigen sind einsetzbar in den Temperaturklassen T6...T4 und sind entsprechend gekennzeichnet. Die Verwendung eines Betriebsmittels für Anwendungen, bei denen eine niedrigere Temperaturklasse (z. B. T2) als die gekennzeichnete gefordert ist, ist zulässig. Hierbei sicherstellen, dass die maximale Umgebungstemperatur für den sicheren Betrieb des Gerätes nicht überschritten wird.

7.3 Temperaturverschleppung aus dem Prozess

Ein Wärmerückfluss aus dem Prozess, welcher die Betriebstemperatur des Transmitters (Digitalanzeige) oder Gehäuses überschreitet, ist nicht zulässig und durch geeignete Wärmeisolierung oder ein entsprechend langes Halsrohr zu verhindern.

7.3.1 Übersicht der Temperaturzonen



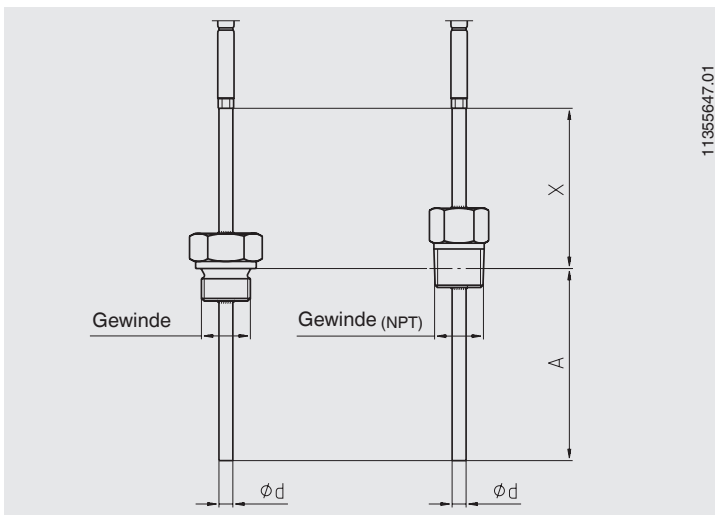
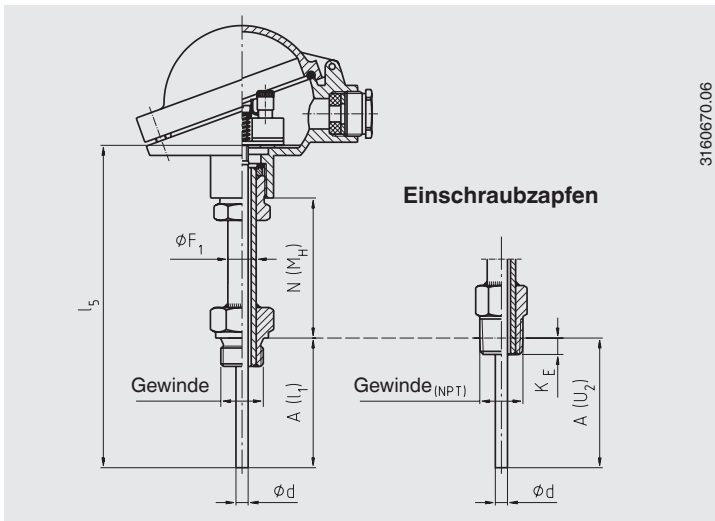
7. Hinweise zu Montage, Betrieb im explosionsgefährdeten Bereich

7.3.2 Erhöhung des Abstandes der Anschlusskomponenten zu heißen Oberflächen

Die Halslänge (N) ist als Abstand zwischen Unterkante Anschlusskopf oder Gehäuse zur wärmestrahlenden Oberfläche definiert. Die zu erwartende Temperatur an der Unterkante des Anschlusskopfes bzw. Gehäuses beträgt dabei maximal 100 °C. Die Bedingungen für eingebaute Transmitter oder Anzeigen sind zu berücksichtigen, gegebenenfalls ist die Halslänge entsprechend zu erhöhen.

Bei Thermometern mit Anschlussleitung wird die Temperatur an der Übergangsstelle zum Anschlusskabel eingeschränkt. Diese beträgt max. 150 °C. Durch Auswahl des Maßes X kann sichergestellt werden dass die zulässige Temperatur nicht überschritten wird.

D



7. Hinweise zu Montage, Betrieb im explosionsgefährdeten Bereich

Als Hilfestellung zur Auswahl der minimalen Halslänge wurden die folgenden Richtwerte ermittelt.

Maximale Mediumtemperatur	Empfehlung für Maß N	Empfehlung für Maß X
100 °C	-	-
135 °C	20 mm	20 mm
200 °C	50 mm	50 mm
>200 °C ≤ 450 °C	100 mm	100 mm

D

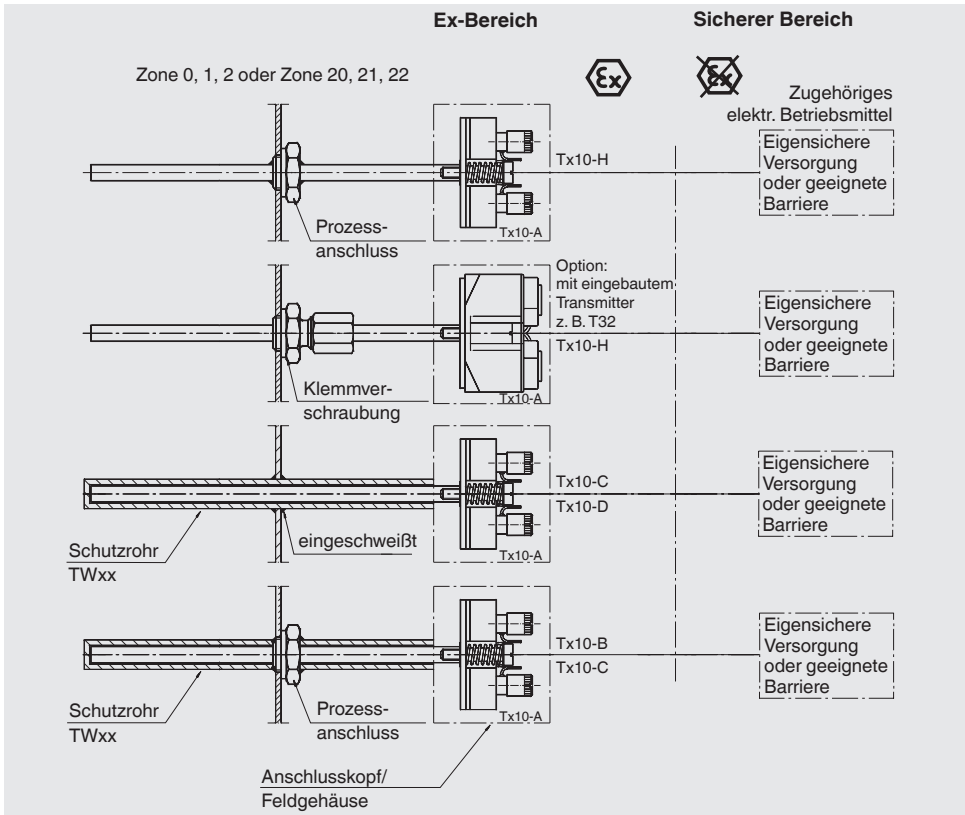


WARNUNG!

Auch aus Gründen der Arbeitssicherheit und der Ressourcenschonung sollten heiße Oberflächen durch eine Isolierung gegen Berührung und Energieverlust geschützt werden.

7.4 Montagebeispiele im explosionsgefährdeten Bereichen

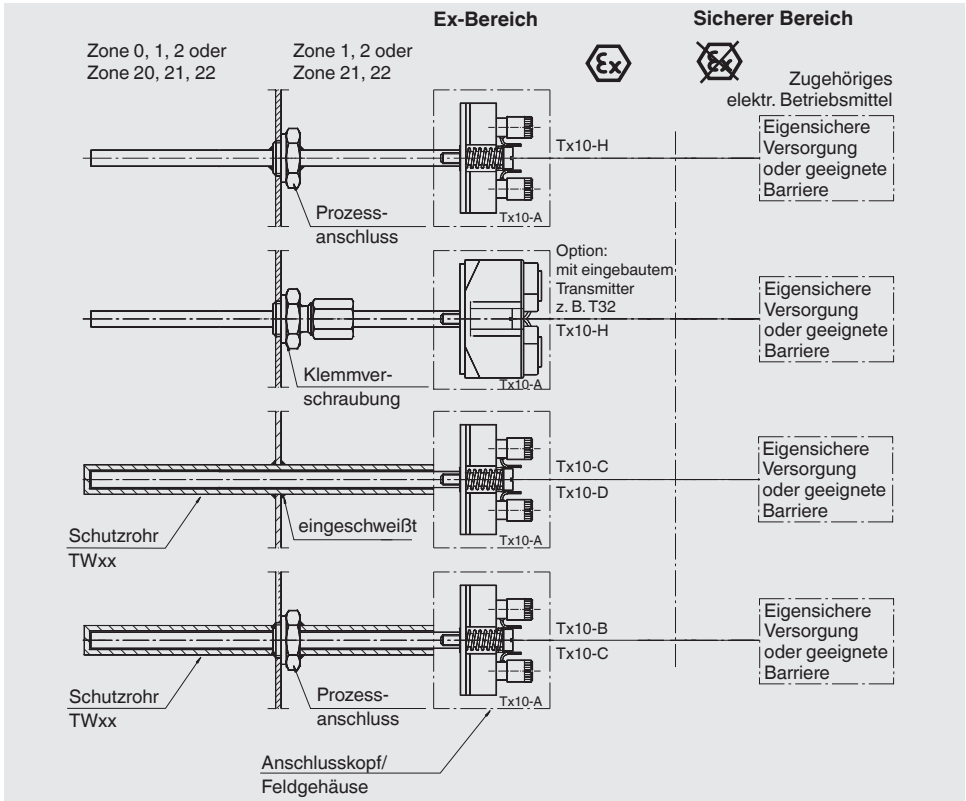
7.4.1 Mögliche Einbaumethoden mit der Markierung II 1G Ex ia IIC T6 Ga bzw. II 1D Ex ia IIIC T65 °C Da



7. Hinweise zu Montage, Betrieb im explosionsgefährdeten Bereich

Der Fühler samt Gehäuse oder Anschlusskopf befindet sich in Zone 0 (Zone 20). Es ist ein Stromkreis vom Typ Ex ia zu verwenden. Anschlussköpfe/Gehäuse aus Aluminium sind in Zone 0 nicht zulässig. WIKA verwendet an dieser Stelle Anschlussköpfe/Gehäuse aus CrNi-Stahl.

7.4.2 Mögliche Einbaumethoden mit Markierung II 1/2 Ex ib IIC T6 Ga/Gb bzw. II 1/2 D Ex ib IIIC T65 °C Da/Db



Die Fühler- oder Schutzrohrspitze ragt in Zone 0 hinein. Das Gehäuse oder Anschlusskopf befindet sich in Zone 1 (Zone 21) oder Zone 2 (Zone 22). Es ist ausreichend, einen Stromkreis vom Typ Ex ib zu verwenden.

Eine Zonentrennung ist gewährleistet wenn ausreichend dichte (IP 67) Prozessanschlüsse verwendet werden.

Geeignete Prozessanschlüsse sind beispielsweise gasdichte genormte Industrieflansche; Gewindeanschlüsse oder Rohranschlüsse.

Die benutzten Schweißteile, Prozessanschlüsse, Klemmverschraubungen, Schutzrohre oder Gehäuse müssen so ausgelegt sein, dass sie allen durch den Prozess entstehenden Einflüssen wie zum Beispiel Temperatur, Durchflusskräften, Druck, Korrosion, Schwingung und Stößen widerstehen.

7.4.3 Trennwände für die Anwendung in der Zone 0 oder Zone 1/2 oder Trennung zwischen Ex- und nicht Ex-Bereich

Falls die Wandstärke unter 1 mm liegt, dann muss das Gerät ebenfalls mit einem "X" oder einem Sicherheitshinweis nach 29.2 der EN/IEC 60079-0 gekennzeichnet werden, mit der speziellen Bedingung für den sicheren Gebrauch, dass es keinen Umgebungsbeanspruchungen ausgesetzt wird, die die Trennwand nachteilig beeinträchtigen können. Wenn die Trennwand ständig in Schwingungen versetzt wird (z. B. schwingende Membranen), muss die minimale Dauerschwingfestigkeit bei maximaler Amplitude in der Dokumentation angegeben werden (vgl. Abschnitt 4.2.5.2, EN/IEC 60079-26).

D

Alternativ kann vom Kunden ein Schutzrohr mit entsprechender Mindestwandstärke eingesetzt werden. Bei Verwendung eines Schutzrohres/Halsrohres muss das Gesamtgerät so konstruiert sein, dass ein Einbau in einer Art möglich ist, die zu einem genügend dichten Spalt (IP 67) oder einem flammendurchschlagsicheren Spalt (EN/IEC 60079-1) zwischen dem weniger gefährdeten Bereich führt und Zone 0 führt.

8. Elektrische Anschlusswerte

8.1 Elektrische Daten ohne eingebauten Transmitter oder Digitalanzeige

Für Geräte der Gerätegruppe II (explosionsfähige Gasatmosphären) *3 gelten die folgenden maximalen Anschlusswerte:

$$U_i = \text{DC } 30 \text{ V}$$

$$I_i = 550 \text{ mA}$$

$$P_i (\text{am Sensor } ^*1) = 1,5 \text{ W}$$

Für Geräte der Gerätegruppe II (explosionsfähige Staubatmosphären) gelten die folgenden maximalen Anschlusswerte:

$$U_i = \text{DC } 30 \text{ V}$$

$$I_i = 550 \text{ mA}$$

$$P_i (\text{am Sensor } ^*2) = \text{Werte siehe „Tabelle 2“ (Spalte 2) auf Seite 60}$$

*1 Die zulässige Leistung zum Sensor ist abhängig von der Mediumtemperatur T_M , der Temperaturklasse und des Wärmewiderstandes R_{th} , höchstens jedoch 1,5 W.

Berechnungsbeispiele siehe Kapitel „9. Berechnungsbeispiele für die Eigenerwärmung an der Fühler- / Schutzrohrspitze“.

*2 Die zulässige Leistung zum Sensor ist abhängig von der Mediumtemperatur T_M , der maximal zulässigen Oberflächentemperatur und des Wärmewiderstandes R_{th} , höchstens jedoch die Werte aus „Tabelle 2“ (Spalte 2) siehe oben

*3 Verwendung in Methan-Atmosphären

Aufgrund der höheren Mindestzündenergie von Methan können die Geräte auch in dadurch verursachte explosionsfähige Gasatmosphären eingesetzt werden. Das Gerät wird optional mit IIC + CH4 gekennzeichnet.

Die innere Induktivität (Li) und Kapazität (Ci) von Standardmesseinsätzen nach DIN 43735 sind vernachlässigbar klein. Die Werte für Kabelfühler und sehr langen Mantelthermoelementen/-widerstandsthermometern sind dem Typenschild zu entnehmen und beim Anschluss an eine eigensichere Spannungsversorgung zu berücksichtigen.

8. Elektrische Anschlusswerte

Sensorstromkreis in Zündschutzart Eigensicherheit Ex ia, oder ib, IIC

Nur zum Anschluss an eigensichere Stromkreise mit folgenden maximalen Ausgangswerten für Geräte der Gerätegruppe II (explosionsfähige Gasatmosphären):

$$U_o = DC 30 V$$

$$I_o = 550 mA$$

$$P_o = 1,5 W$$

Für Geräte der Gerätegruppe II (explosionsfähige Staubatmosphären) gelten bezüglich des Anschlusses an eigensichere Stromkreise die folgenden maximalen Ausgangswerte:

$$U_o = DC 30 V$$

$$I_o = 550 mA$$

$$P_o = \text{Werte siehe „Tabelle 2“ (Spalte 2) auf Seite 60}$$

D

8.2 Elektrische Daten mit eingebautem Transmitter oder Digitalanzeige

Für den Sensorstromkreis gelten die unter 8.1 genannten Werte.

Signalstromkreis in Zündschutzart Eigensicherheit Ex ia, oder ib, IIC

U_i = abhängig vom Transmitter/Digitalanzeige

I_i = abhängig vom Transmitter/Digitalanzeige

P_i = im Gehäuse: abhängig vom Transmitter/Digitalanzeige

C_i = abhängig vom Transmitter/Digitalanzeige

L_i = abhängig vom Transmitter/Digitalanzeige

Eingesetzte Transmitter/Digitalanzeigen müssen eine eigene Zertifizierung entsprechend EN/IEC besitzen. Es sind die Installationsbedingungen und elektrischen Anschlussgrößen den entsprechenden Zulassungen zu entnehmen und einzuhalten.

8.3 Elektrische Daten mit eingebautem Transmitter nach dem FISCO-Modell

Die eingesetzten Transmitter/Digitalanzeigen für den Einsatzbereich entsprechend dem FISCO-Modell gelten als FISCO Feldgeräte. Es gelten die Anforderungen nach EN/IEC 60079-27 und die Anschlussbedingungen der Zulassungen gemäß FISCO.

8.4 Stufenelemente (Multipoints) TC95/TR95

Stufenelementeaufbau aus einzelnen Mantelementen

Für das einzelne, isoliert aufgebaute Mantelement gelten die unter 8.1 genannten Werte. Für Stufenelemente, die betriebsbedingt geerdet sind, gelten für die Summen aller Sensoren die oben genannten Werte. Für die Anwendungen im Staubbereich sind die Werte der „Tabelle 2“ (Spalte 2) auf Seite 60 zu beachten.

9. Berechnungsbeispiele für die Eigenerwärmung an der Fühler-/ Schutzrohrspitze

Die Eigenerwärmung an der Fühler- bzw. Schutzrohrspitze hängt ab vom Sensortyp (TC/RTD), dem Fühlerdurchmesser, der Bauart des Schutzrohres und der im Fehlerfall zugeführten Leistung. Die nachstehende Tabelle zeigt die möglichen Kombinationen. Aus der Tabelle ist ersichtlich, dass Thermoelemente eine deutlich geringere Eigenerwärmung erzeugen als Widerstandsthermometer.

D

Wärmewiderstand [R_{th} in K/W]

Sensor	Fühlerdurchmesser in mm							
	2,0- <3,0	3,0- <6,0	6- 8	3,0 - 6,0 ¹⁾	0,5- <1,5	1,5- <3,0	3,0- <6,0	6,0- 12,0
Sensortyp	RTD	RTD	RTD	RTD	TC	TC	TC	TC
ohne Schutzrohr	245	110	75	225	105	60	20	5
mit Schutzrohr- mehrteilig (gerade und verjüngt) (z. B. TW22, TW35, TW40, TW45 usw.)	135	60	37	-	-	-	11	2,5
mit Schutzrohr -Vollmaterial (gerade und verjüngt) (z. B. TW10, TW15, TW20, TW25, TW30, TW50, TW55, TW60 usw.)	50	22	16	-	-	-	4	1
Sonder-SR – EN 14 597	-	-	33	-	-	-	-	2,5
Tx55 (Halterrohr)	-	110	75	225	-	-	20	5
Eingebaut in ein Sackloch (Mindestwandstärke 5 mm)	50	22	16	45	22	13	4	1

1) oberflächenempfindlich

Bei der Verwendung von Mehrfachsensoren und zeitgleichem Betrieb darf die Summe der Einzelleistungen den Wert der maximal zulässigen Leistung nicht überschreiten. Die höchstzulässige Leistung muss auf max. 1,5 W begrenzt werden. Dies muss durch den Betreiber der Anlage gewährleistet sein.

9.1 Beispielberechnung für Messstelle RTD mit Schutzrohr

Einsatz an der Trennwand zur Zone 0, gesucht wird die maximale mögliche Temperatur T_{max} an der Schutzrohrspitze für nachfolgende Kombination:

RTD-Messeinsatz Ø 6 mm mit eingebautem Kopftransmitter Typ T32.1S, eingebaut in ein mehrteiliges Schutzrohr Bauform 3F. Die Speisung erfolgt beispielsweise über ein Messumformerspeisegerät Typ KFD2-STC4-EX1 (WIKA-Artikel-Nr. 2341268)

T_{max} ergibt sich aus der Addition der Mediumtemperatur sowie der Eigenerwärmung. Die Eigenerwärmung der Schutzrohrspitze hängt ab von der zugeführten Leistung P_o des Transmitters und dem Wärmewiderstand R_{th}.

Die Berechnung erfolgt nach folgender Formel: T_{max} = P_o x R_{th} + T_M

T_{max} = Oberflächentemperatur (max. Temperatur an der Schutzrohrspitze)

P_o = aus dem Datenblatt des Transmitters

R_{th} = Wärmewiderstand [K/W]

T_M = Mediumtemperatur

Voraussetzung ist eine Umgebungstemperatur T_{amb} von -20 ... +40 °C.

Beispiel

Widerstandsthermometer RTD

Durchmesser: 6 mm

Mediumtemperatur: $T_M = 150\text{ °C}$

Zugeführte Leistung: $P_O = 15,2\text{ mW}$

Temperaturklasse T3 (200 °C) darf nicht überschritten werden

Wärmewiderstand $[R_{th}\text{ in K/W}]$ aus Tabelle = 37 K/W

Eigenerwärmung: $0,0152\text{ W} \times 37\text{ K/W} = 0,56\text{ K}$

$T_{max} = T_M + \text{Eigenerwärmung: } 150\text{ °C} + 0,56\text{ °C} = 150,56\text{ °C}$

Das Ergebnis zeigt dass in diesem Fall die Eigenerwärmung an der Schutzrohrspitze vernachlässigbar klein ist. Als Sicherheitsabstand für baumustergeprüfte Geräte (für T6 bis T3) müssen von den 200 °C noch 5 °C subtrahiert werden, es wären 195 °C zulässig. Somit wird in diesem Fall die Temperaturklasse T3 nicht überschritten.

Zusatzinformation

Temperaturklasse für T3 = 200 °C

Sicherheitsabstand für baumustergeprüfte Geräte (T6 bis T3)*1 = 5 K

Sicherheitsabstand für baumustergeprüfte Geräte (T1 bis T2)*1 = 10 K

*1 EN/IEC 60 079-0: 2009 Abs. 26.5.1

Vereinfachter Nachweis der Eigensicherheit für oben genannte Kombination

Messeinsatz	Kopftransmitter	Speisegerät
U _i : DC 30 V	U _O : DC 6,5 V	U _i : DC 30 V
I _i : 550 mA	I _O : 9,3 mA	I _i : 130 mA
P _i (max) am Sensor: 1,5 W	P _O : 15,2 mW	P _i : 800 mW
C _i : vernachlässigbar	C _O : 24 µF	C _i : 7,8 nF
L _i : vernachlässigbar	L _O : 365 mH	L _i : 100 µH
		U _O : DC 25,4 V
		I _O : 88,2 mA
		P _O : 560 mW
		C _O : 93 nF
		L _O : 2,7 mH

Durch den Vergleich der Werte ist ersichtlich dass die Zusammenschaltung dieser Geräte zulässig ist. Allerdings müssen durch den Betreiber die Werte für die Induktivität und der Kapazität der elektrischen Anschlussleitungen noch berücksichtigt werden.

9.2 Beispielberechnung für ein Mantelelement mit RTD-Sensor

Einsatz an der Trennwand zur Zone 0, gesucht wird die maximale mögliche Temperatur T_{max} an der Fühlerspitze für die nachfolgende Kombination:

Widerstandsthermometer ohne Schutzrohr (TR10-H) Ø 6 mm ohne Transmitter, montiert mittels Klemmverschraubung mit VA-Klemmring. Die Speisung erfolgt beispielsweise über eine Zenerbarriere z. B. Typ Z954 (WIKA-Artikel-Nr. 3247938)

T_{max} ergibt sich aus der Addition der Mediumtemperatur sowie der Eigenerwärmung. Die Eigenerwärmung der Fühlerspitze hängt ab von der zugeführten Leistung P_O der Zenerbarriere und dem Wärmewiderstand R_{th} .

9. Berechnungsbeispiele für die Eigenerwärmung an der ...

Die Berechnung erfolgt nach folgender Formel: $T_{\max} = P_o \times R_{th} + T_M$

T_{\max} = Oberflächentemperatur (max. Temperatur an der Fühlerspitze)

P_o = aus dem Datenblatt der Zenerbarriere

R_{th} = Wärmewiderstand [K/W]

T_M = Mediumtemperatur

Voraussetzung ist eine Umgebungstemperatur T_{amb} von -20 ... +40 °C.

Beispiel

Widerstandsthermometer RTD

Durchmesser: 6 mm

Mediumtemperatur: $T_M = 150$ °C

Zugeführte Leistung: $P_o = 1150$ mW

Temperaturklasse T3 (200 °C) darf nicht überschritten werden

Wärmewiderstand [R_{th} in K/W] aus Tabelle = 75 K/W

Eigenerwärmung: $1,15 \text{ W} \times 75 \text{ K/W} = 86,25 \text{ K}$

$T_{\max} = T_M + \text{Eigenerwärmung: } 150 \text{ °C} + 86,25 \text{ °C} = 236,25 \text{ °C}$

Ergebnis zeigt in diesem Fall eine deutliche Eigenerwärmung an der Fühlerspitze.

Als Sicherheitsabstand für baumustergeprüfte Geräte (für T6 bis T3) müssen von den 200 °C noch 5 °C subtrahiert werden, es wären 195 °C zulässig. Somit wird in diesem Fall die Temperaturklasse T3 deutlich überschritten und ist nicht zulässig. Als Abhilfe kann ein zusätzliches Schutzrohr verwendet werden.

Zusatzinformation

Temperaturklasse für T3 = 200 °C

Sicherheitsabstand f. baumustergeprüfte Geräte (T6 bis T3)*1 = 5 K

Sicherheitsabstand f. baumustergeprüfte Geräte (T1 bis T2)*1 = 10 K

*1 EN/IEC 60 079-0: 2009 Abs. 26.5.1

9.3 Beispielsberechnung für o. g. Widerstandsthermometer mit Schutzrohr

RTD Messeinsatz Ø 6 mm ohne Transmitter, eingebaut in ein mehrteiliges Schutzrohr Bauform 3F.

Wärmewiderstand [R_{th} in K/W] aus Tabelle = 37 K/W

Eigenerwärmung: $1,15 \text{ W} \times 37 \text{ K/W} = 42,55 \text{ K}$

$T_{\max} = T_M + \text{Eigenerwärmung: } 150 \text{ °C} + 42,55 \text{ °C} = 192,55 \text{ °C}$

Ergebnis zeigt in diesem Fall eine deutliche Eigenerwärmung an der Fühlerspitze.

Als Sicherheitsabstand für baumustergeprüfte Geräte (für T6 bis T3) müssen von den 200 °C noch 5 °C subtrahiert werden, es wären 195 °C zulässig. Somit wird in diesem Fall die Temperaturklasse T3 nicht überschritten.

9. Berechnungsbeispiele für ... / 10. Wartung und Reinigung

Vereinfachter Nachweis der Eigensicherheit für oben genannte Kombination

Messeinsatz	Zenerbarriere Z954	Anzeigegerät (Nicht-Ex)
U _i : DC 30 V	U _O : DC 9 V U _m : AC 250 V	U _O : AC 230 V
I _i : 550 mA	I _O : 510 mA I _i : nA	I _O : nA
P _i (max) am Sensor: 1,5 W	P _O : 1150 mW P _i : nA	P _O : nA
C _i : vernachlässigbar	C _O : 4,9 µF C _i : nA	C _O : nA
L _i : vernachlässigbar	L _O : 0,12 mH L _i : nA	L _O : nA

Durch den Vergleich der Werte ist ersichtlich dass die Zusammenschaltung dieser Geräte zulässig ist. Allerdings müssen durch den Betreiber die Werte für die Induktivität und der Kapazität der elektrischen Anschlussleitungen noch berücksichtigt werden.

Diese Berechnungen gelten für die Zenerbarriere Z954 in Verbindung mit einem Widerstandsthermometer Pt100 im 3-kanaligen Betrieb ohne Erdverbindung, d. h. symmetrischer Betrieb des Widerstandsthermometers in 3-Leiter Schaltung an einer Anzeige oder Auswerteeinheit.

D



Elektrischer Anschluss

Sensoranschlüsse, Klemmen-, Kabel- oder Steckerbelegungen siehe Kapitel 6.1 „Elektrischer Anschluss“.

10. Wartung und Reinigung

10.1 Wartung

Diese Thermometer sind wartungsfrei.

Reparaturen sind ausschließlich vom Hersteller durchzuführen.

10.2 Reinigung



VORSICHT!

- Das Gerät mit einem feuchten Tuch reinigen. Dies gilt insbesondere für Thermometer mit Gehäusen aus Kunststoff und Kabelfühler mit kunststoffisolierten Anschlussleitung um die Gefahr von elektrostatischen Aufladungen zu vermeiden.
- Elektrische Anschlüsse nicht mit Feuchtigkeit in Berührung bringen.
- Ausgebautes Gerät vor der Rücksendung spülen bzw. säubern, um Mitarbeiter und Umwelt vor Gefährdung durch anhaftende Messstoffreste zu schützen.
- Messstoffreste in ausgebauten Geräten können zur Gefährdung von Personen, Umwelt und Einrichtung führen. Ausreichende Vorsichtsmaßnahmen sind zu ergreifen.



Hinweise zur Rücksendung des Gerätes siehe Kapitel 12.2 „Rücksendung“.

11. Störungen

Störungen	Ursachen	Maßnahmen
Kein Signal / Leitungsbruch	zu hohe mechanische Belastung oder Übertemperatur	Fühler oder Messeinsatz durch eine geeignete Ausführung ersetzen
Fehlerhafte Messwerte	Sensordrift durch Übertemperatur	Fühler oder Messeinsatz durch eine geeignete Ausführung ersetzen
	Sensordrift durch chemischen Angriff	Ausführung mit Schutzrohr verwenden
Fehlerhafte Messwerte (zu gering)	Feuchtigkeitseintritt an Kabel oder Messeinsatz	Fühler oder Messeinsatz durch eine geeignete Ausführung ersetzen
Fehlerhafte Messwerte und zu lange Ansprechzeiten	Falsche Einbaugeometrie, z. B. zu geringe Einbautiefe oder zu hohe Wärmeableitung	Der Temperaturempfindliche Bereich des Sensors muss innerhalb des Mediums liegen, Oberflächenmessungen müssen isoliert sein
	Ablagerungen auf dem Sensor oder Schutzrohr	Ablagerungen entfernen
Fehlerhafte Messwerte (bei Thermoelementen)	Parasitäre Spannungen (Thermospannungen, galvanische Spannung) oder falsche Ausgleichsleitung	Geeigneten Ausgleichsleitung verwenden
Messsignal - „kommt und geht“	Leitungsbruch im Anschlusskabel oder Wackelkontakt durch mechanische Überbelastung	Fühler oder Messeinsatz durch eine geeignete Ausführung ersetzen z. B. mit Knickschutzfeder oder dickerem Leitungsquerschnitt
Korrosion	Zusammensetzung des Mediums nicht wie angenommen oder geändert oder falsches Schutzrohrmaterial gewählt	Medium analysieren und danach besser geeignetes Material wählen oder Schutzrohr regelmäßig erneuern
Signal gestört	Einstreuung durch elektrische Felder oder Erdschleifen	Geschirmte Anschlussleitungen verwenden, Abstand zu Motoren und leistungsführenden Leitungen erhöhen
	Erdschleifen	Potentialen beseitigen, galvanisch getrennte Speisetrenner oder Transmitter verwenden



VORSICHT!

Können Störungen mit Hilfe der oben aufgeführten Maßnahmen nicht beseitigt werden, ist das Gerät unverzüglich außer Betrieb zu setzen, sicherzustellen, dass kein Druck bzw. Signal mehr anliegt und gegen versehentliche Inbetriebnahme zu schützen. In diesem Falle Kontakt mit dem Hersteller aufnehmen.
Bei notwendiger Rücksendung die Hinweise siehe Kapitel 12.2 „Rücksendung“ beachten.

12. Demontage, Rücksendung und Entsorgung



WARNUNG!

Messstoffreste in ausgebauten Geräten können zur Gefährdung von Personen, Umwelt und Einrichtung führen. Ausreichende Vorsichtsmaßnahmen sind zu ergreifen.

12.1 Demontage



WARNUNG!

Verbrennungsgefahr!

Vor dem Ausbau das Gerät ausreichend abkühlen lassen! Beim Ausbau besteht Gefahr durch austretende, gefährlich heiße Messstoffe.

Alle Anschlüsse nur im drucklosen und abgekühlten Zustand öffnen.

Das Thermometer oder der Messeinsatz kann (falls vorhanden) aus dem Schutzrohr ausgebaut werden. Das Schutzrohr selbst nur im drucklosen Zustand aus dem Prozess entfernen. Bei Thermometern ohne Schutzrohr muss die Anlage drucklos, abgekühlt und frei von Gefahrstoffen sein.

12.2 Rücksendung



WARNUNG!

Beim Versand des Gerätes unbedingt beachten:

Alle an WIKA gelieferten Geräte müssen frei von Gefahrstoffen (Säuren, Laugen, Lösungen, etc.) sein.

Zur Rücksendung des Gerätes die Originalverpackung oder eine geeignete Transportverpackung verwenden.

Um Schäden zu vermeiden:

1. Das Gerät in eine antistatische Plastikfolie einhüllen.
2. Das Gerät mit dem Dämmmaterial in der Verpackung platzieren.
Zu allen Seiten der Transportverpackung gleichmäßig dämmen.
3. Wenn möglich einen Beutel mit Trocknungsmittel der Verpackung beifügen.
4. Sendung als Transport eines hochempfindlichen Messgerätes kennzeichnen.



Hinweise zur Rücksendung befinden sich in der Rubrik „Service“ auf unserer lokalen Internetseite.

12.3 Entsorgung

Durch falsche Entsorgung können Gefahren für die Umwelt entstehen.

Gerätekomponenten und Verpackungsmaterialien entsprechend den landesspezifischen Abfallbehandlungs- und Entsorgungsvorschriften umweltgerecht entsorgen.



EG-Konformitätserklärung

EC Declaration of Conformity

Dokument Nr.:

11570700.02

Document No.:

11570700.02

Wir erklären in alleiniger Verantwortung, dass die mit CE gekennzeichneten Produkte

We declare under our sole responsibility that the CE marked products

Typ:

TR... / TC...

Model:

TR... / TC...

Beschreibung:

Widerstandsthermometer, Thermoelemente

gemäß gültigem Datenblatt:

TE 60.XX; TE 65.XX

Description:

Resistance Thermometers, Thermocouples

according to the valid data sheet:

TE 60.XX; TE 65.XX

die grundlegenden Schutzanforderungen der folgenden Richtlinie(n) erfüllen:

94/9/EG (ATEX) ⁽¹⁾

are in conformity with the essential protection requirements of the directive(s)

94/9/EC (ATEX) ⁽¹⁾

Kennzeichnung:



II 1G Ex ia IIC T3, T4, T5, T6 Ga
II 1/2G Ex ib IIC T3, T4, T5, T6 Ga/Gb



II 1D Ex ia IIIC T65°C, T95°C, T125°C Da
II 1/2D Ex ib IIIC T65°C, T95°C, T125°C Da/Db

Marking:



II 1G Ex ia IIC T3, T4, T5, T6 Ga
II 1/2G Ex ib IIC T3, T4, T5, T6 Ga/Gb



II 1D Ex ia IIIC T65°C, T95°C, T125°C Da
II 1/2D Ex ib IIIC T65°C, T95°C, T125°C Da/Db

Die Geräte wurden entsprechend den folgenden Normen geprüft:

EN 60079-0:2009, EN 60079-11:2007
EN 60079-26:2007, EN 61241-11:2006

The devices have been tested according to the following standards:

EN 60079-0:2009, EN 60079-11:2007
EN 60079-26:2007, EN 61241-11:2006

(1) EG-Baumusterprüfbescheinigung TÜV 10 ATEX 555793 X von TÜV NORD CERT GmbH, D-45141 Essen (Reg.-Nr. 0044).

(1) EC type examination certificate TÜV 10 ATEX 555793 X of TÜV NORD CERT GmbH, D-45141 Essen (Reg. no. 0044).

Unterzeichnet für und im Namen von / Signed for and on behalf of

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Klingenberg, 2011-02-02

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OPERATING INSTRUCTIONS

I. General Part

Product: Solid-chute-gate valve
pneumatically operated
for decanters of the type
GEA Westfalia Separator

Type: FSS pn

Edition: 04/2020 /EN

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1. Warning and safety instructions

For your personal safety as well as for preventing material damages and injuries to persons, there are to be observed the warning and safety instructions being part of these operating instructions!

In the operating instructions, there can be used the following notice symbols, warning symbols and safety symbols:



This symbol marks a useful instruction and important information.



This symbol marks a possibly dangerous situation. The non-observance of this safety instruction can result in material damages



This symbol marks a possibly dangerous situation. The non-observance of this safety instruction can result in slight injuries or in medium grievous injuries.



This symbol marks a possibly dangerous situation because of electric current. The non-observance of this safety instruction can result in slight injuries or in medium grievous injuries.



This symbol marks a possibly dangerous situation. The non-observance of this safety instruction can result in the death or in extra grievous injuries.



This symbol marks a possibly dangerous situation because of electric current. The non-observance of this safety instruction can result in the death or in extra grievous injuries.



This symbol marks an imminent endangering. The non-observance of this safety instruction results in the death or in extra grievous injuries.



This symbol marks an imminent endangering because of electric current. The non-observance of this safety instruction results in the death or in extra grievous injuries.

Structure of the warning and safety instructions

The warning and safety instructions are separated from the other text by means of an upper and a lower line.



Kind and source of the danger
Measure for averting the danger, pictogram

NOTICE

**These operating instructions are part of the machine.
Keep the same during the total service life of the machine.
Transmit the operating instructions to the later owner or
operator!**

2. Qualification of the personnel

For preventing potentially fatal injuries and machine damages during the mounting, operation, maintenance and servicing work, there are to be observed the following points:



- only trained and instructed persons are allowed to execute work at the machine;
- these persons must be in respective intellectual and physical condition;
- for being able to execute all the respective work, the delivered operating instructions must always be available to these persons, they must have understood the same completely and they have to follow these documents consequently;
- during all the activities at and with the solid chute-gate valve, there are to be followed the relevant worker's protection rules and there are to be worn the personal protective outfits (safety helmet, gloves etc.).



**These operating instructions are to be read by your part!
They make it easier for you to become well acquainted with
the machine and to make use of its intended application!**

3. Type plate

The subsequent illustration shows the type plate of the solid-chute-gate valve:

 ASKANIA <u>MASCHINENBAU GmbH</u> 			
D-06526 SANGERHAUSEN Teichstraße 1			
Tel. 0 34 64 / 2 91 90 Fax 0 34 64 /29 19 18			
Typ	FSS pn	Inhalt	Liter
Nr.	399 / 200001	Baujahr	20xx
Masse	xx	kg	
Nennspannung	24	V / DC	Hz
Anschlußwert		kW	

The **identity number** of the solid-chute-gate valve is to be known on the type plate in the line “Nr.” by the number before the oblique. In the example: 399, that means that it concerns a solid-chute-gate valve for the decanter UCD 755 (see Appendices “technical specification”).

The six-digit number in the line „Nr.“ behind the oblique is the actual **fabrication number** of the solid-chute-gate valve, in the example: 200001.

In case of all further inquiries at the manufacturing enterprise Askania Maschinenbau GmbH, the identity number and the fabrication number should always be indicated.

4. Application to the intended purpose / description of the product

Application to the intended purpose:

The solid-chute-gate valve will be used when dewatering the sewage sludge from the domestic sewages by means of a decanter of the type GEA Westfalia Separator.

The solid-chute-gate valve will be mounted directly below the solids discharge chute of the decanter and has the function that the water, being obtained during the dewatering process when accelerating as well when decelerating the decanter and which must never come into the solids discharge line, will be withdrawn laterally through the drain pipe bracket.

The solid-chute-gate valve has been provided, according to its identity number, exclusively for the application at the respective type of decanter.

Another application or an application in addition to the above mentioned use is regarded as non-intended application!

If, because of non-intended application of the solid-chute-gate valve, because of non-observance of the instructions and information of these operating instructions, because of the employment of insufficiently qualified personnel, because of incorrectly executed maintenance, servicing and repair work, because of using the solid-chute-gate valve with non-functioning safety and protective devices as well as because of unauthorized modifications and alterations of the solid-chute-gate valve, there should be caused injuries to persons and material damages, these circumstances discharge the enterprise Askania Maschinenbau GmbH from any liability for damages as well as from the compensation for consequential damages.

Description of the product:

If the cylinders have been moved-out, the solid-chute-gate valve is opened and the solids can fall through the solid-chute-gate valve unimpeded.

If the cylinders have been moved-in, the cross section of the solid-chute-gate valve is closed. The arising liquid (flushing water, residual water from the decanter) impinges onto the slide plate and will be discharged through a laterally arranged pipe bracket.

At the case of the solid-chute gate valve has been mounted laterally a flush connection. The flushing of the solid-chute-gate valve supports the discharge of the product and the self-cleaning process if the solid-chute-gate valve has been closed.

The case and the slide plate of the solid-chute-gate valve are completely fabricated of stainless steel.

Inside the case, the slide plate has been equipped with a scraper of a special POM synthetic material (Murytal® C).

The guide of the solid-chute-gate valve is consisting of an ultrahigh molecular low-pressure polyethylene with very good mechanical and chemical properties.

The inside profile packing has been made of EPDM. The outlet of the slide plate out of the case has been sealed off by means of an outside profile packing of EPDM foam rubber.

In deviation from that, at the solid-chute-gate valve for the decanter type UCD 305 (identity number 429), the outlet of the slide plate out of the case has been sealed off on one side by means of a re-adjustable profile packing of polyethylene foam LD 70.

The solid-chute-gate valve will be actuated, by means of 2 pneumatic cylinders, through an electrically controlled way valve. One cylinder of the 2 pneumatic cylinders has been equipped with 2 signalling transmitters (reed contact) which acquire the end positions of the cylinders (solid-chute-gate valve open / closed).

The control of the solid-chute-gate valve incl. the flushing of the solid-chute-gate valve will be realized externally.

NOTICE

In case of normal dewatering operation of the decanter, the control has to guarantee that the solid-chute-gate valve will always be open for preventing an accumulation of the solids!

If the solid-chute-gate valve has been closed, the flushing process of the solid-chute-gate valve is to be occasioned through the control!

The main component units of the solid-chute-gate valve are the following:

- Chute of the gate valve (case of the solid chute-gate valve)
- Slide plate
- Drain pipe bracket
- Flushing connection
- Way valve
- Pneumatic cylinder with signalling transmitters
- Terminal box
- Optionally: protective covering for the slide plate

5. Technical data

Dimensions	see dimensional drawing in the appendices under point 15
Material frame, slide plate	stainless steel / see technical specification
Operating temperature	5 - 40 °C
Compressed air supply	prepared compressed air 6 bar to 10 bar
Way valve	Control voltage 24 V DC Power input 4,8 W Electric connection plug, ISO 6952, form B Compressed air connection G ¼" Oil content of the compressed air 0 - 5 mg/m³
Signalling transmitter	Type of contact Reed Operating voltage 10 - 30 V, AC / DC Switching current, max. 0,13 A, AC / DC
Degree of protection according to DIN EN 60529	IP65

6. Transport and storage

There are to be observed the Regulations of the Employer's Liability Insurance Association for safety and health during the work, BGV D6 „Cranes“, BGV D27 „Industrial trucks“, BGV D8 „Winches, lifting and pulling devices“ and VBG 9a „Load suspension devices in the hoisting appliance operation“!

When selecting the load suspension means and the fixing means, there is always to be paid attention to the weight of the solid-chute-gate valve according to the type plate!



When storing the solid-chute-gate valve, the same is to be protected against direct atmospheric influences such as frost, rain, high humidity of air and against contamination. The same should be stored, when possible, in a closed area.

7. Mounting instructions

The solid-chute-gate valve is to be fixed, by means of flange with rectangular seal, to the discharge chute of the decanter, by using the delivered fixing material.

In deviation from that, the solid-chute-gate valves for the decanter types UCA/UCC 450, 458 and UCA 501 (identity number 15/2, 181 and 234) will be fixed to the discharge chute of the decanter by clamping their fastening strips between the flange guides.

Your compressed air lines, your flushing water pipelines and your residual water pipelines are to be conducted to the solid-chute-gate valve and the same are to be connected to the solid-chute-gate valve.

The further chutes are also to be mounted under the solid-chute-gate valve for realizing a compact design.

See concerning that the dimensional drawing of the solid-chute-gate valve in the appendices under point 15.

Finally, all the screwed connections are to be checked again

NOTICE

**All the pipelines connected to the solid-chute-gate valve and the further chutes are to be fastened flexibly!
(Usage of hoses, rubber collars or compensators)**

8. Electric connection

ACHTUNG

The electric connection of the solid-chute-gate valve is only to be executed by part of authorized skilled personnel in accordance with the illustrations and the circuit diagrams!

The solid-chute-gate valve will be delivered as completely wired gate valve. The same is to be to be connected according to the connection diagram, being part of the appendices under point 15. The connection will be realized to the terminal box (see dimensional drawing in the appendices under point 15).

9. Initial putting into operation / putting into operation

Before the delivery, the solid-chute-gate valve has been submitted to a test run and leaves the manufacturing company only in technically perfect state.

Before the initial putting into operation is to be guaranteed:

- that the solid-chute-gate valve has been mounted completely with its connections,
- that all the screwed connections are blocked,
- that the electrical installation has been realized and that the same is reliable,
- that the mechanical and electrical safety devices of the system are functioning,
- that all the tools and auxiliary means of assembly have been removed from the solid-chute-gate valve,
- that the direction of movement of the slide plate, preset by the control, corresponds to the actual direction of movement.

There is to be paid attention to the „*Declaration of incorporation for incomplete machinery*“ in the appendices under point 15!

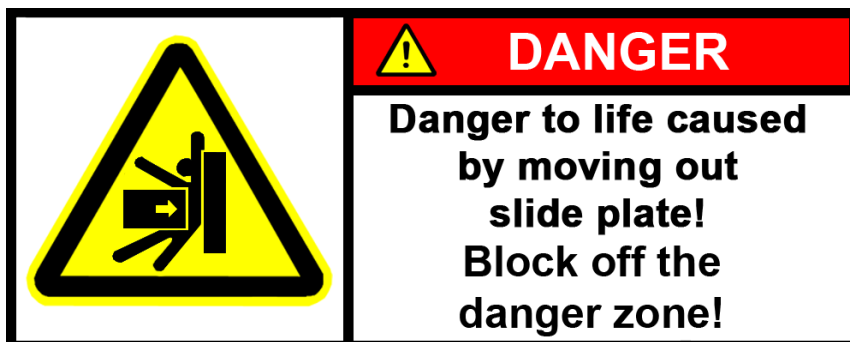
10. Residual risk

The solid-chute-gate valve has been designed and constructed in accordance with the relevant standards and safety regulations. The same incorporates state-of-the-art technology and offers a high degree of safety and reliability.

The solid-chute-gate valve can only be operated in a complete system being installed at the decanter with mounted charging and discharging devices such as charging and discharging chutes, pipelines or the like.

It must be impossible to reach into the chute of the gate valve within the movable slide plate!
For that will be necessary a compact design.

When opening the solid-chute-gate valve, the movement area of the piston rods of the cylinders and of the slide plate narrows dangerously between the decanter or other components of the system and the solid-chute-gate valve. When staying in this area, there can be caused extra grievous bodily harms resulting in death. In this connection is also to be paid attention to the fact that the movement of the slide plate will be arranged automatically through the control of the system.



You, as manufacturer and operator of the system, have to prevent these accidents by means of blockings-off or by means of protective gratings! The system is to be provided with respective safety and warning information signs. The local circumstances are to be observed and the personnel is to be instructed verifiably of the residual risk!

A complete covering of the slide plate and of the piston rods is available as option.

The enterprise Askania Maschinenbau GmbH recommends to order the solid-chute-gate valve together with this protective covering.

There remains a another residual hazard at the discharging opening of the solid-chute-gate valve if the same cannot be closed for technological reasons. When closing the solid-chute-gate valve exists acute danger of bruising when reaching into the discharging opening. When staying in this area, there can be caused extra grievous bodily harms resulting in death. In this connection is also to be paid attention to the fact that the movement of the slide plate will be arranged automatically through the control of the system.



Danger to life because of movable slide plate!

Never reach into the discharging chute!

Block off the danger zone!

Never remove protective coverings and blockings-off!

You, as manufacturer and operator of the system, have to prevent these accidents by means of blockings-off or by means of protective gratings! The system is to be provided with respective safety and warning information signs. The local circumstances are to be observed and the personnel is to be instructed verifiably of the residual risk!

11. Interruption of operation

Before every longer interruption of operation, the solid-chute-gate valve is to be flushed thoroughly (time to stop work, weekend). Only so will be guaranteed that in case of repeated putting into operation the function will not be impeded because of product having been dried up

12. Maintenance



During all the repair and maintenance work, the system including the compressed air supply is to be made dead through the main switch and to be protected against unintentional restarting by means of a locking device!



WARNING

During all the repair and maintenance work at the solid-chute-gate valve, the compressed air supply is to be interrupted mechanically (for example, hand-operated ball valve) and to be protected against unintentional restarting by means of a locking device!

The maintenance of the solid-chute-gate valve is limited to the monthly check of the pneumatic system as well as to the general cleaning process.

The slide plate is to be cleaned at regular intervals and in particular there are to be removed incrustations for obtaining a longer service life of the gaskets.

The operating media (e.g. gear oil) are to be collected in appropriate tanks and they are to be removed in accordance with the regulations (EC Directive 75/439/EEC)!

The used cleaning material is to be removed and to be deposited, because of the fire hazard, in specific places!

NOTICE

When having executed the maintenance work, dismantled protective sheathings and coverings are to be mounted again.

13. Spare and wear parts

Length	Denomination	Supplier
	Packing: Square profile 15 x 15 mm, Material: foam rubber - EPDM, Hardness: appr. 20° Shore A for identity number:	ASKANIA Maschinenbau GmbH
1,0 m	342	
1,2 m	349 ; 396 ; 534	
1,3 m	234 ; 644	
1,4 m	515 ; 536 ; 450	
1,5 m	15/2 ; 181 , 183	
1,6 m	225 ; 538 ; 628	
1,8 m	540	
1,9 m	227 ; 341 ; 530	
2,2 m	185	
2,6 m	399	
2,8 m	228	
	Packing: Square profile 20 x 10 mm, Material: polyethylene foam LD 70, Hardness: appr. 25° Shore A for identity number:	ASKANIA Maschinenbau GmbH
0,6 m	429	
	Pneumatic parts: see <i>Diagram of pneumatics, pneumatic parts for solid-chute-gate valve</i> in the appendix under point 15	AVENTICS GmbH

14. Dismounting and disposal

The dismounting of the solid-chute-gate valve can only be realized by part of a skilled personnel being authorized and qualified for this work, in compliance with the relevant worker's protection rules!

Therefore, before loosening the screwed connections, the solid-chute-gate valve is to be safeguarded.



In case of dismounting work, the system incl. compressed air supply is to be made dead through the main switch and to be protected against unintentional restarting by means of a locking device!

The solid-chute-gate valve is consisting of different kinds of materials, such as metal, synthetics, rubber. During the dismounting work, there are to be observed the legal obligations concerning the waste avoidance and the duly recycling.

NOTICE

Therefore, before the disposal, the above-specified materials are to be separated. Oils and materials, containing oil, are to be collected and kept in appropriate tanks. The disposal is to be realized by part of specialized enterprises being authorized and certified for this work!

15. Appendices

- Declaration of incorporation according to EC Machine Directive
- Dimensional drawing
- Diagram of pneumatics
- Terminal connection diagram
- Data sheet 5/2-way valve (AVENTICS GmbH)
- Data sheet Signalling transmitter - sensor (AVENTICS GmbH)
- Data sheet Pneumatic cylinder - profile cylinder (AVENTICS GmbH)

DATEI: ASKANIA-BA FSS-WS-DEKANTER_PN_EN.DOC

DRUCK: 24.04.2020 09:51

OPERATING INSTRUCTIONS

II. Technical Specification

Product: Solid-chute-gate valve
pneumatically operated
for decanters of the type
GEA Westfalia Separator



OPERATING INSTRUCTIONS

II. Technical Specification

Type	FSS pn
For decanters type	CF 7000
Identity number	530
Fabrication number	200600
Year of construction	2020
Dimensional drawing number	CF7000/1-1
Weight	130 kg
Control voltage way valve	24 V DC
Operating voltage signalling transmitter	10-30 V DC, 10-30 V AC
Terminal connection diagram	KP0011
Material	
Frame, slide plate	1.4571
guide bar and support plate	PE 1000 "S" [®] Green
scraper	Murinit [®] C White
Gasket	EPDM
an outside profile packing	Foam rubber - EPDM
Position of the drain pipe connection	right-side
Diameter of the drain pipe connection	219,1 mm
Lifting of the pneumatic cylinder	375 mm
With / without protective covering ordered	without



DECLARATION OF INCORPORATION FOR INCOMPLETE MACHINERY

in accordance with the EC Machine Directive 2006/42/EC, Annex II B

We hereby declare that the incomplete machine specified below, because of its design and type as well as because of the version delivered by us, corresponds to the relevant fundamental safety and health requirements specified in the EC Machine Directive.

Before the commissioning, the compliance with the stipulations of the EC Machine Directive must be ensured. The technical documentation is compiled in accordance with Annex VII B.

On a well-founded request of the national authority, the specific documents are to be transmitted in the following form: On paper. In case of a modification of the delivered incomplete machine, not coordinated with us, this declaration will not longer be valid.

Designation: Solid-chute-gate valve, pneumatically operated, for decanter design Westfalia Separator	Year of konstruktion: 2020
	fabrication number: 19xxxx 20xxxx

Type old	Type from 2019	Ident-No.
(U)CD 205 ⁽¹⁾		342
(U)CD 305 ⁽¹⁾		349
(U)CD 305 ⁽²⁾	pro 2000	429
(U)CD 345 ; (U)CD 346	pro 2500; pro 3000	396
(U)CD 345 ; (U)CD 346	pro 2500; pro 3000	396
(U)CF 405 ; (U)CF 406 ⁽³⁾		515
(U)CA 450 ; (U)CA 458 ⁽¹⁾		15/2
(U)CA 450 ; (U)CA 458 ⁽²⁾		181
(U)CC 450 ; (U)CC 458		234
(U)CA 501		234
(U)CF 465 ; (U)CF 466	(U)CT 466; pro 5000	450
(U)CA 505		183
(U)CB 505		225
(U)CD 535 ; (U)CD 536		341
	(U)CT 536; pro 6000	628
(U)CA 635		227
(U)CA 755		185
(U)CD 755		399
(U)CA 1036		228
CF 3000	prime 3000	534
CF 4000 ⁽⁴⁾	prime 4000	536
CF 5000	prime 5000	538
CF 6000	prime 6000	540
CF 7000	prime 7000	530
CF 8000	prime 8000	601

(¹) schmaler Fänger) (²) breiter Fänger) (³) Frame Design I) (⁴) Frame Design II / III)



Relevant EC Directives: **2006/42/EC (05.2006)** **EC Machine Directive,**
2004/108/EC (12.2004) **EMC Directive,**
2006/95/EC (12.2006) **Low Voltage Directive**

Applied harmonized Standards, in particular: **DIN EN ISO 12100-1 (04.2004), DIN EN ISO 12100-2 (04.2004),**
DIN EN 60204 (06.2007)

Remarks: The machine is delivered as incomplete machine since it was ordered without the necessary electric control and / or electronic monitoring devices.
The solid-chute-gate valve can only be operated in a complete system being installed at the decanter.
The series-connected and subsequently added charging and discharging devices (such as charging and discharging hoppers, pipelines, etc.) are not mounted and therefore they must be completed before the commissioning. The same are provided by third parties and connected to the machine.
Safety devices, such as blockings-off, protective gratings and the like for the protection against the moving components at the solid-chute gate valve (piston rod, slide plate) are to be completed by third parties before the commissioning. In this connection are to be followed the local conditions.

This declaration does not warrant any specific properties.
The safety instructions in the delivered documentation are to be observed.

This declaration is issued for the responsibility of the following manufacturer / importer: ASKANIA Maschinenbau GmbH
Teichstraße 1
D-06526 Sangerhausen

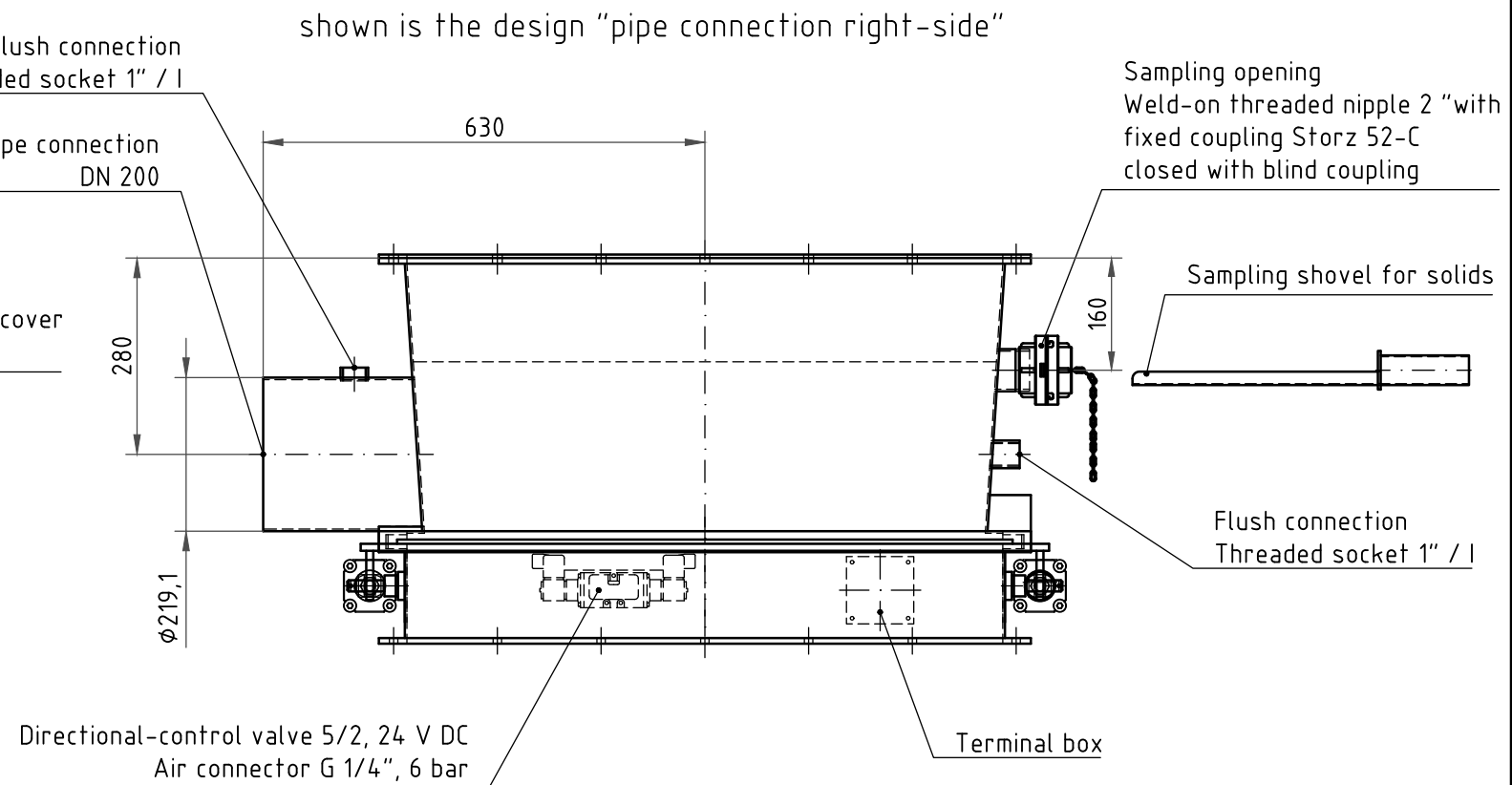
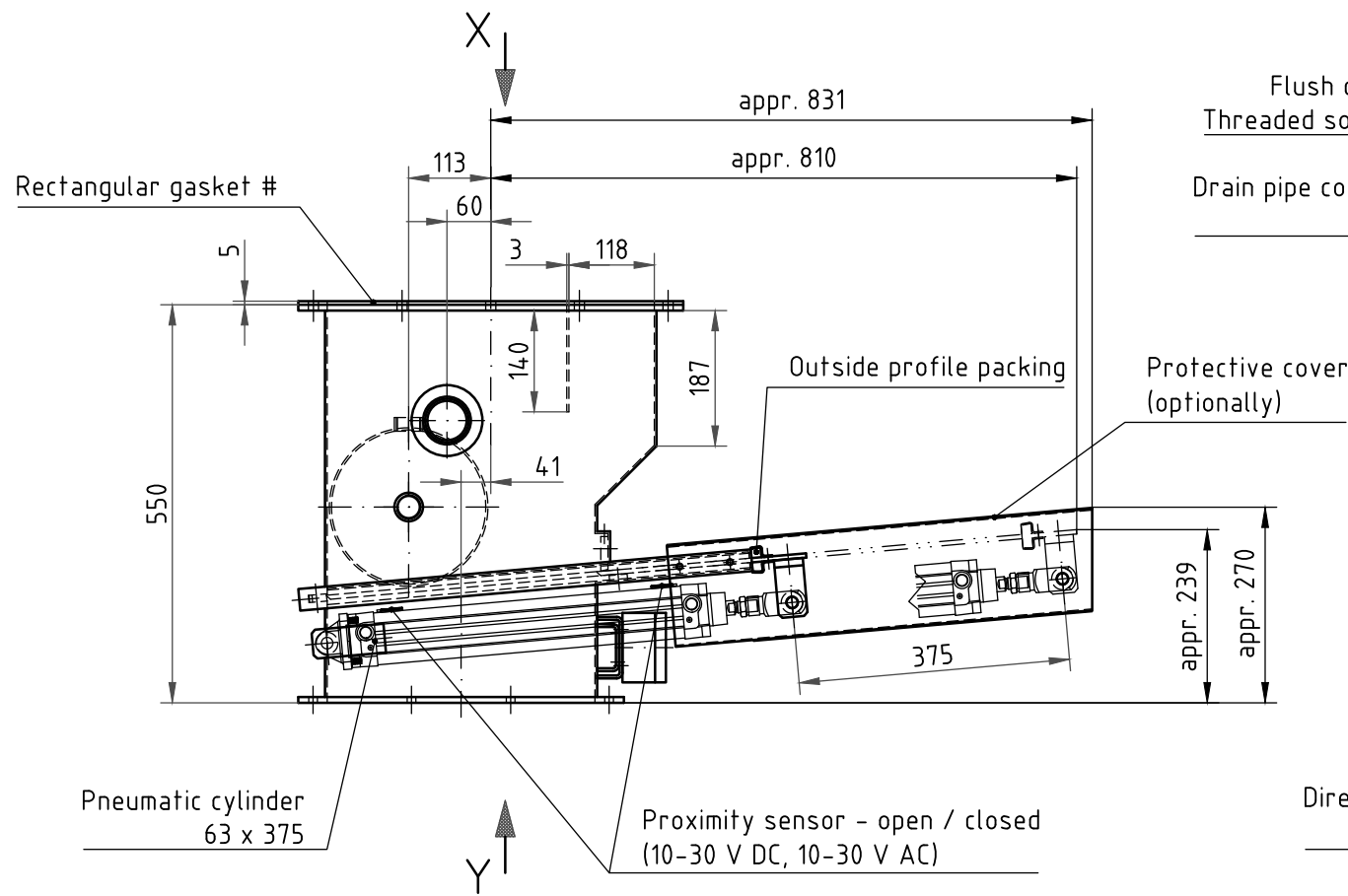
Authorized person for the technical CE documentation: ASKANIA Maschinenbau GmbH
Thomas Meye
Teichstraße 1
D-06526 Sangerhausen

Manufacturer's signature:

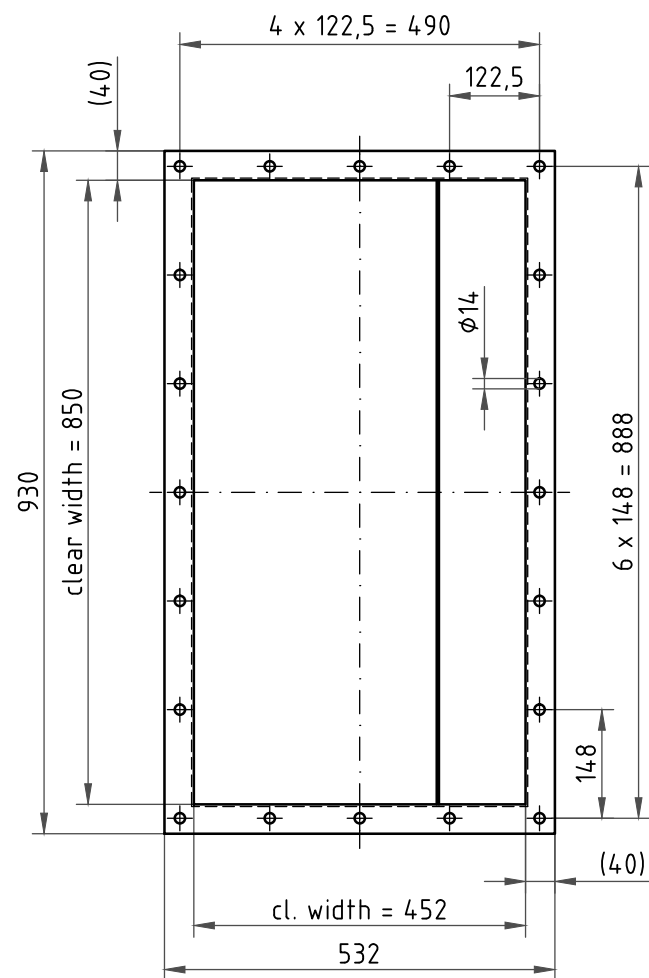
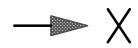
Sangerhausen, 03 February 2020

Place / Date of issue

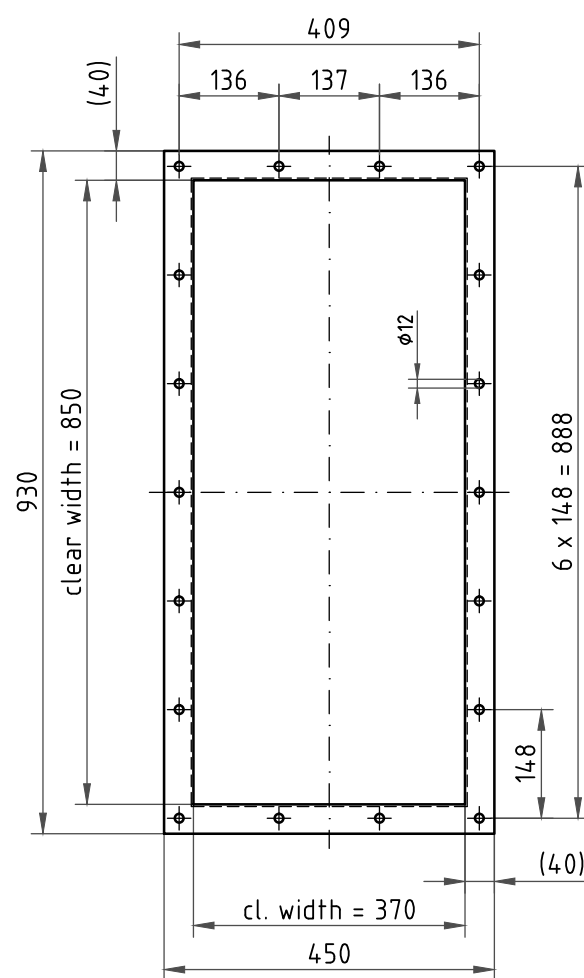
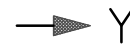
Thomas Meye, Managing Director



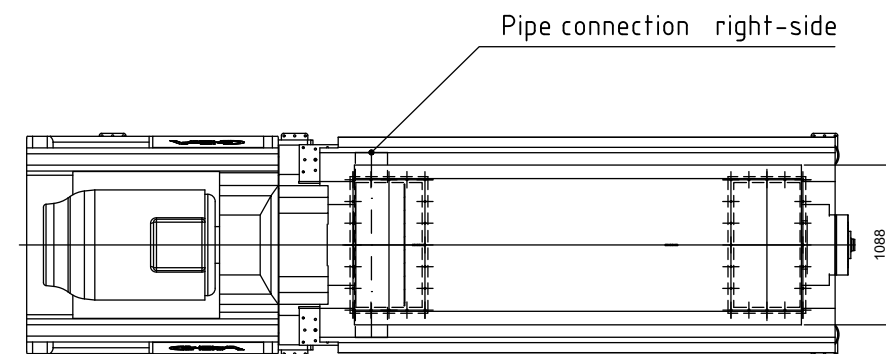
Flange from top



Flange from bottom



Top view of the decanter



Rubber gasket for the rectangular flange
Scope of supply Westfalia Separator

Special design
Marking: Ident.-no. 530 (S) / 211041

(Verwendungsbereich) Taunton Veolia Water US, USA KT 211041, WS-Auftr. 2.451.395.848		(Zul. Abw.) mittel	(Oberfl.)	Maßstab 1:10	(Gewicht) appr. 120 kg
				(Werkstoff, Halbzeug) 1.4301 (Rohteil-Nr) (Modell- oder Gesenk-Nr)	
		Datum 15.12.21	Name Cotte	(Benennung)	
		Bearb.		Solid-chute-gate valve, pneumatically operated for decanter centrifuge CF 7000	
		Gepr.			
		Norm			
				(Zeichnungsnummer)	Blatt 1
				ASKANIA Maschinenbau GmbH	Blätter 1
				Dimension sheet CF7000/1-1S / KT211041	
Zust.	Änderung	Datum	Name	Ursprung	Ersatz für: Ersatz durch:



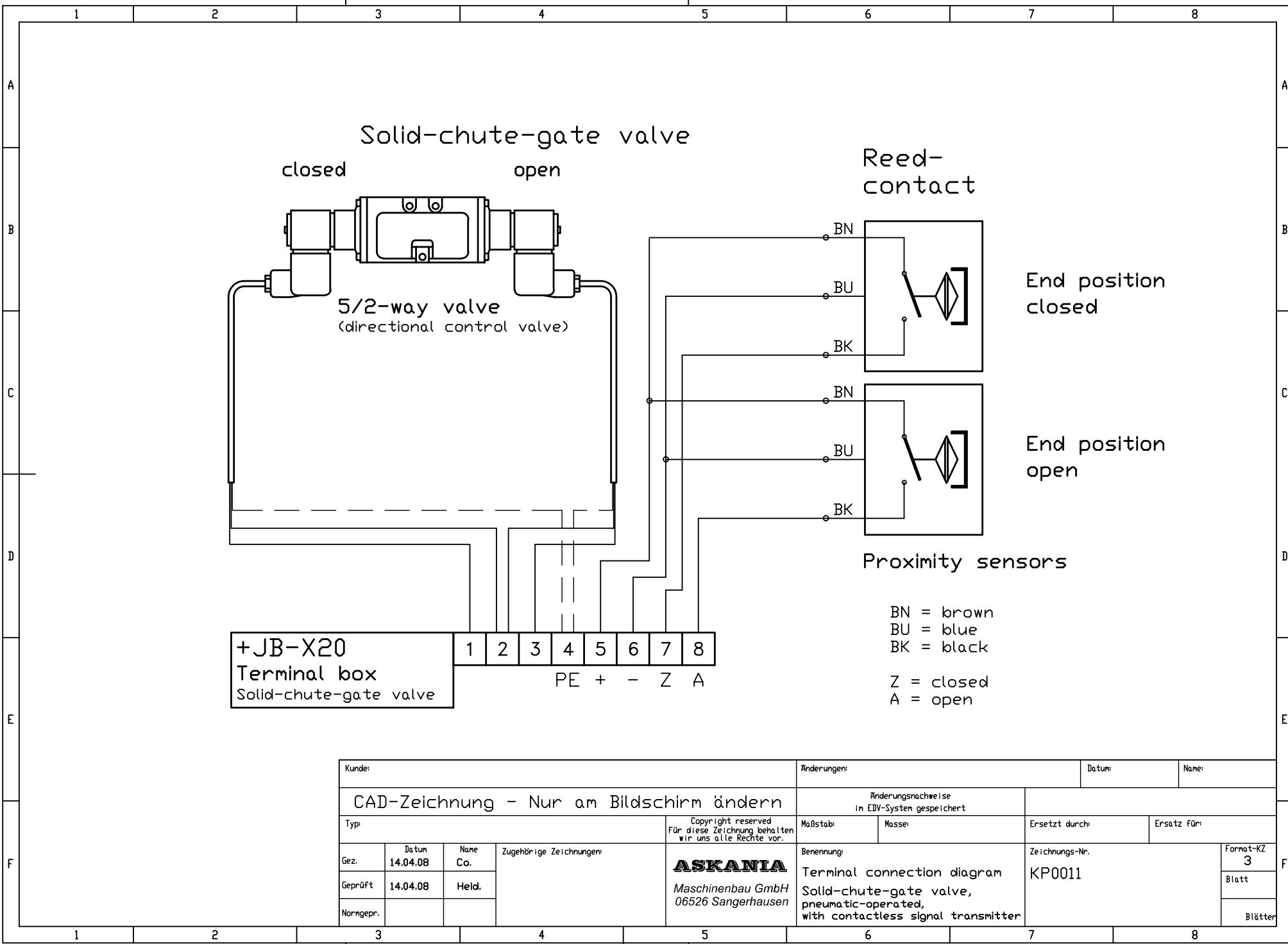
Diagram of pneumatics

Position	Quant	Name	Identity number																			
		Part No. Aventics GbmH	15I2	181	227	234	341	396	399	429	450	466	515	530	534	536	538	540	628	644		
1	2	Profile cylinder series PRA																				
		63 x 225	x																			
		0 822 123 022																				
		63 x 330		x		x																
		R 480 066 493																				
		63 x 455			x																	
		R 480 171 796																				
		63 x 355						x														
		R 480 151 180																				
		50 x 270							x													
		0 822 122 027																				
		80 x 455								x												
		R 480 060 940																				
		63 x 270									x											
		R 480 064 365																				
		63 x 375										x	x		x				x	x		
		R 480 063 425																				
80 x 538																						
R 480 620 019																						
63 x 320													x		x	x			x			
0 822 123 009																						
50 x 250														x								
0 822 122 008																						
3	2	Sensor Serie ST6 10 – 30 V DC / AC, IP 68	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
		0 830 100 629																				
		R 412 022 869*																				
4	1	5/2- way valve Serie CD 07 (G¼") 24 V DC, IP 65	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
		5 776 270 220																				
5	2	Clutch-box	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
		1 834 484 048																				
6	1	Silencer G¼"	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
		1 827 000 001																				
6a	1	Screw-in throttle with silencer G¼"	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
		0 821 201 103																				



Diagram of pneumatics

since 09/2017			Identity number																				
Pos	Quant	Name	15/2	181	227	234	341	396	399	429	450	466	515	530	534	536	538	540	628	644			
7	2	Fixing for tilting																					
		1 827 020 086	x	x	x	x	x			x	x	x	x	x		x	x	x	x	x			
		1 827 001 285							x							x							
		1 827 001 287								x													
8	2	Fork Heads																					
		1 822 122 004								x													
		1 822 122 005	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		
9	3	Screw caps, rectilinear G 1/4", LW 6	x	x	x	x	x		x		x	x	x	x		x		x	x	x			
		1 823 391 011 for way valve																					
9	3	Screw caps, rectilinear G 1/4", LW 6								x						x							
		1 823 391 003 for way valve																					
10	7	Screw caps, oblique G 1/4", LW 6																					
		1 823 391 003 for cylinder and way valve							x														
10	4	Screw caps. Oblique G 3/8", LW 6	x	x	x	x	x		x	x	x	x	x	x		x	x	x	x	x			
		1 823 391 040 for cylinder																					
11	2	T-nipple LW 6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
		1 823 391 119																					
12		Compressed air tubing Serie TU1-S 8 x 1,15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
		R 412 014 557																					



+JB-X20
Terminal box
Solid-chute-gate valve

1	2	3	4	5	6	7	8
PE	+	-	Z	A			

BN = brown
BU = blue
BK = black

Z = closed
A = open

Kunde:				Änderungen:			Datum:	Name:
CAD-Zeichnung - Nur am Bildschirm ändern				Änderungsnachweise in EDV-System gespeichert				
Typ:		Copyright reserved Für diese Zeichnung behalten wir uns alle Rechte vor.		Maßstab:	Masse:	Ersetzt durch:	Ersatz für:	
Gez.	Datum 14.04.08	Name Co.	Zugehörige Zeichnungen:	Benennung: Terminal connection diagram Solid-chute-gate valve, pneumatic-operated, with contactless signal transmitter		Zeichnungs-Nr. KP0011		
Geprüft	14.04.08	Held.				Format-KZ 3		
Norgepr.						Blatt		
				ASKANIA Maschinenbau GmbH 06526 Sangerhausen		Blätter		

Directional valves ▶ Electrically operated

5/2-directional valve, Series CD07

- ▶ Qn = 1200 l/min ▶ Pilot valve width: 30 mm ▶ pipe connection ▶ compressed air connection output: G 1/4
- ▶ Electr. connection: Plug, EN 175301-803, form A ▶ Manual override: with detent ▶ double solenoid



Version	Spool valve, zero overlap
Sealing principle	Soft sealing
Mounting on manifold strip	P-strip, PRS strip
Working pressure min./max.	See table below
Control pressure min./max.	2 bar / 10 bar
Ambient temperature min./max.	-25 °C / +50 °C
Medium temperature min./max.	-25 °C / +50 °C
Medium	Compressed air
Max. particle size	50 µm
Oil content of compressed air	0 mg/m³ - 1 mg/m³
Compressed air connection	according to ISO 228-1 with directional pilot air exhaust EN 175301-803:2006
Connector standard	EN 175301-803:2006
Degree of protection	See table below
With connection	Protected against polarity reversal
Compatibility index	13, 14
Duty cycle	100 %
Weight	See table below
Materials:	
Housing	Die cast zinc; Polyamide, fiber-glass reinforced
Seals	Acrylonitrile Butadiene Rubber

Technical Remarks

- The min. control pressure must be adhered to, since otherwise faulty switching and valve failure may result!
- The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C.
- The oil content of compressed air must remain constant during the life cycle.
- Use only the approved oils from AVENTICS, see chapter „Technical information“.
- ATEX optional: ATEX version can be produced by combining the basic valve without coil with an ATEX coil. ATEX ID: see ATEX coils catalog page.

Operational voltage			Voltage tolerance			Power consumption	Switch-on power		Holding power	
DC	AC 50 Hz	AC 60 Hz	DC	AC 50 Hz	AC 60 Hz	DC	AC 50 Hz	AC 60 Hz	AC 50 Hz	AC 60 Hz
						W	VA	VA	VA	VA
24 V	-	-	-10% / +10%	-	-	2.1	-	-	-	-
24 V	-	-	-20% / +30%	-	-	4.5	-	-	-	-
-	110 V	110 V	-	-20% / +10%	-10% / +20%	-	6.8	5.7	4.3	3.3
-	230 V	230 V	-	-20% / +10%	-10% / +20%	-	6.9	5.8	4.8	4.1
-	24 V	24 V	-	-20% / +10%	-10% / +20%	-	6.9	5.6	4.3	3.2

	MO	Compressed air connection					Operational voltage	Part No.
		Input	Output	Exhaust	Pilot connection	Pilot control exhaust		
							DC	
							24 V	5776270220
							24 V	5776272220
							-	5776275270
							-	5776275280
							-	5776275220

Part numbers marked in bold are available from the central warehouse in Germany, see the shopping basket for more detailed information
Pneumatics catalog, online PDF, as of 2014-10-30, ©AVENTICS S.a.r.l., subject to change

5/2-directional valve, Series CD07

- ▶ Qn = 1200 l/min ▶ Pilot valve width: 30 mm ▶ pipe connection ▶ compressed air connection output: G 1/4
 ▶ Electr. connection: Plug, EN 175301-803, form A ▶ Manual override: with detent ▶ double solenoid

	MO	Compressed air connection					Operational voltage	Part No.
		Input	Output	Exhaust	Pilot connection	Pilot control exhaust		
		G 1/4	G 1/4	G 1/4	-	M5	-	5776275302
		G 1/4	G 1/4	G 1/4	G 1/8	M5	24 V	5776280220 5776285270 5776285280
		G 1/4	G 1/4	G 1/4	G 1/8	M5	-	5776285302

Part No.	Operational voltage		Holding power		Switch-on power		Power consumption	Flow rate value			Working pressure min./max.	
	AC 50 Hz	AC 60 Hz	AC 50 Hz	AC 60 Hz	AC 50 Hz	AC 60 Hz		24 V DC	Qn	Qn 1▶2		Qn 2▶3
			[VA]	[VA]	[VA]	[VA]		[W]	[l/min]			[bar]
5776270220	-	-	-	-	-	-	2.1					
5776272220	-	-	-	-	-	-	4.5					
5776275270	110 V	110 V	4.3	3.3	6.8	5.7	-	1200	1200	1200	2 / 10	
5776275280	230 V	230 V	4.8	4.1	6.9	5.8	-					
5776275220	24 V	24 V	4.3	3.2	6.9	5.6	-					
5776275302	-	-	-	-	-	-	-	1200	1200	1200	2 / 10	
5776280220	-	-	-	-	-	-	2.1					
5776285270	110 V	110 V	4.3	3.3	6.8	5.7	-	1200	1200	1200	-0.95 / 10	
5776285280	230 V	230 V	4.8	4.1	6.9	5.8	-					
5776285302	-	-	-	-	-	-	-	1200	1200	1200	-0.95 / 10	

Part No.	Switch-on time		Switch-off time		Protection class	Weight	Note
	t_F		t_E				
	[ms]		[ms]				
5776270220							1)
5776272220							1); 4)
5776275270		21		21	IP65	0.75	1)
5776275280							1)
5776275220							1)
5776275302		-		-			1); 3); 5)
5776280220							
5776285270		21		21	IP65	0.75	2)
5776285280							
5776285302		-		-			2); 3); 5)

HHB = Manual override

1) Pilot: internal

2) Pilot: External

3) Basic valve without coil

4) Higher power consumption

5) ATEX optional

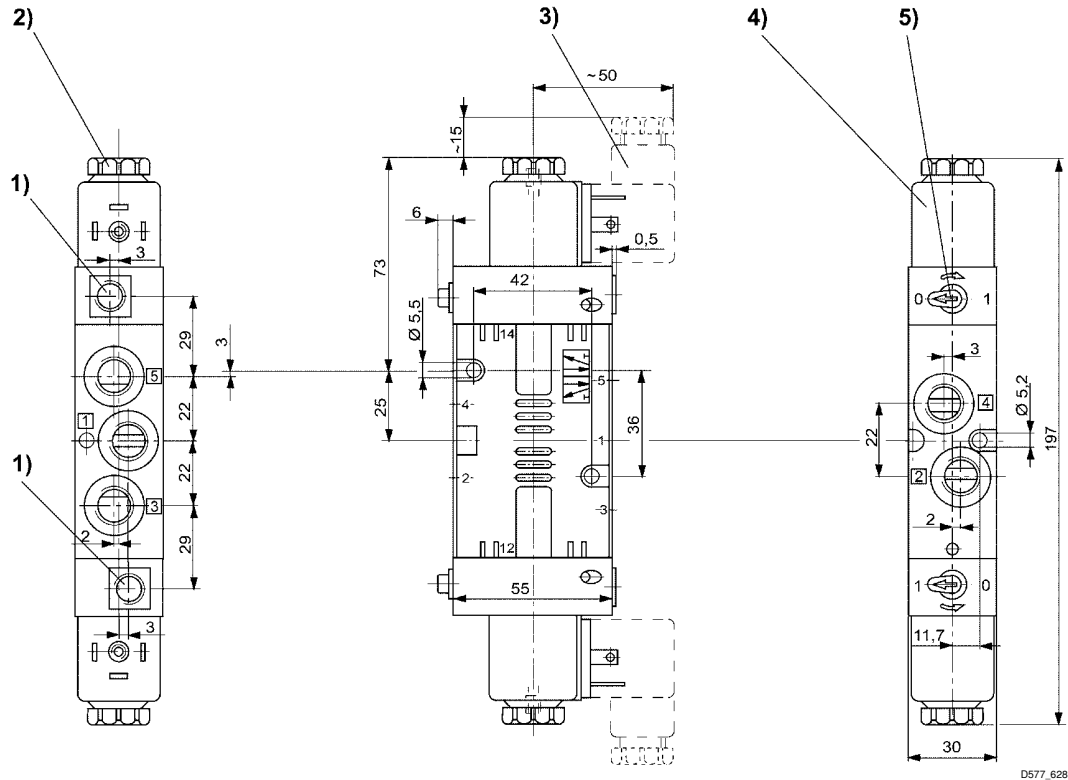
Nominal flow Qn at 6 bar and $\Delta p = 1$ bar

Directional valves ▶ Electrically operated

5/2-directional valve, Series CD07

- ▶ Qn = 1200 l/min ▶ Pilot valve width: 30 mm ▶ pipe connection ▶ compressed air connection output: G 1/4
- ▶ Electr. connection: Plug, EN 175301-803, form A ▶ Manual override: with detent ▶ double solenoid

Dimensions

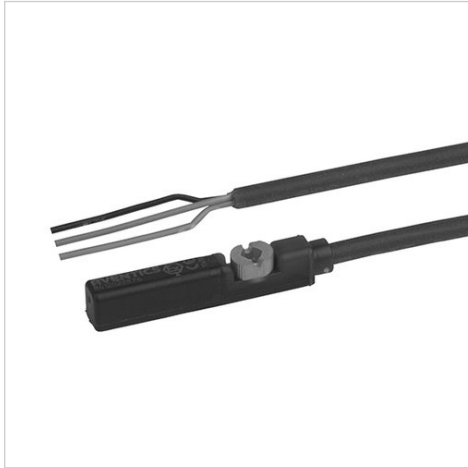


D577_628

- 1) only with separate pilot control G 1/8 2) after removal of cap M 5 internal thread M5 3) el. connector can
 4) coil can be plugged at 45° intervals 5) manual override










Sensor, Series ST6

- 6 mm T-slot
- with cable
- open cable ends, 2-pin, open cable ends, 3-pin



Certificates	CE declaration of conformity, cULus, RoHS
Ambient temperature min./max.	-30 ... 80 °C
Protection class	IP65, IP67, IP69K
Switching point precision mT	±0,1
Nominal current, actuated state	30 mA
Quiescent current (without load)	8 mA
Min./max. DC operating voltage	See table below
Min./max. AC operating voltage	See table below
Hysteresis	≥ 0,2 mT
Switching logic	NO (make contact)
LED status display	Yellow
Vibration resistance	10 - 55 Hz, 1 mm
Shock resistance	30 g / 11 ms

Technical data

Part No.		Type of contact	Cable length	Min./max. DC operating voltage	Min./max. AC operating voltage	Voltage drop U at I _{max}
R412022866		Reed	3 m	10 ... 230 V DC	10 ... 230 V AC	I*Rs
R412022869		Reed	3 m	10 ... 30 V DC	10 ... 30 V AC	I*Rs
R412022870		Reed	5 m	10 ... 30 V DC	10 ... 30 V AC	I*Rs
R412022871		Reed	10 m	10 ... 30 V DC	10 ... 30 V AC	I*Rs
R412022853		electronic PNP	3 m	10 ... 30 V DC	-	≤ 2,5 V
R412022855		electronic PNP	5 m	10 ... 30 V DC	-	≤ 2,5 V
R412022857		electronic PNP	10 m	10 ... 30 V DC	-	≤ 2,5 V
R412022849		electronic NPN	3 m	10 ... 30 V DC	-	≤ 2,5 V
R412022850		electronic NPN	5 m	10 ... 30 V DC	-	≤ 2,5 V

Part No.	DC switching current, max.	AC switching current, max.	Switching capacity
R412022866	0,13 A	0,13 A	Reed, 2-pin: max. 10 W, Reed, 3-pin: max. 6 W
R412022869	0,3 A	0,5 A	Reed, 2-pin: max. 10 W, Reed, 3-pin: max. 6 W
R412022870	0,3 A	0,5 A	Reed, 2-pin: max. 10 W, Reed, 3-pin: max. 6 W
R412022871	0,3 A	0,5 A	Reed, 2-pin: max. 10 W, Reed, 3-pin: max. 6 W
R412022853	0,13 A	-	-
R412022855	0,13 A	-	-
R412022857	0,13 A	-	-
R412022849	0,13 A	-	-
R412022850	0,13 A	-	-

Part No.	Max. switching frequency	Operating current, not switched	Operating current, switched
R412022866	0,4	-	-
R412022869	0,4	-	-

Part No.	Max. switching frequency	Operating current, not switched	Operating current, switched
R412022870	0,4	-	-
R412022871	0,4	-	-
R412022853	1,0	8 mA	30 mA
R412022855	1,0	8 mA	30 mA
R412022857	1,0	8 mA	30 mA
R412022849	1,0	8 mA	30 mA
R412022850	1,0	8 mA	30 mA

Part No.	Version	Fig.	
R412022866	Protected against polarity reversal	Fig. 1	1)
R412022869	Protected against polarity reversal	Fig. 2	2)
R412022870	Protected against polarity reversal	Fig. 2	2)
R412022871	Protected against polarity reversal	Fig. 2	2)
R412022853	short circuit resistant, Protected against polarity reversal	Fig. 2	2)
R412022855	short circuit resistant, Protected against polarity reversal	Fig. 2	2)
R412022857	short circuit resistant, Protected against polarity reversal	Fig. 2	2)
R412022849	short circuit resistant, Protected against polarity reversal	Fig. 2	2)
R412022850	short circuit resistant, Protected against polarity reversal	Fig. 2	2)

1) open cable ends, 2-pin

2) open cable ends, 3-pin

Technical information

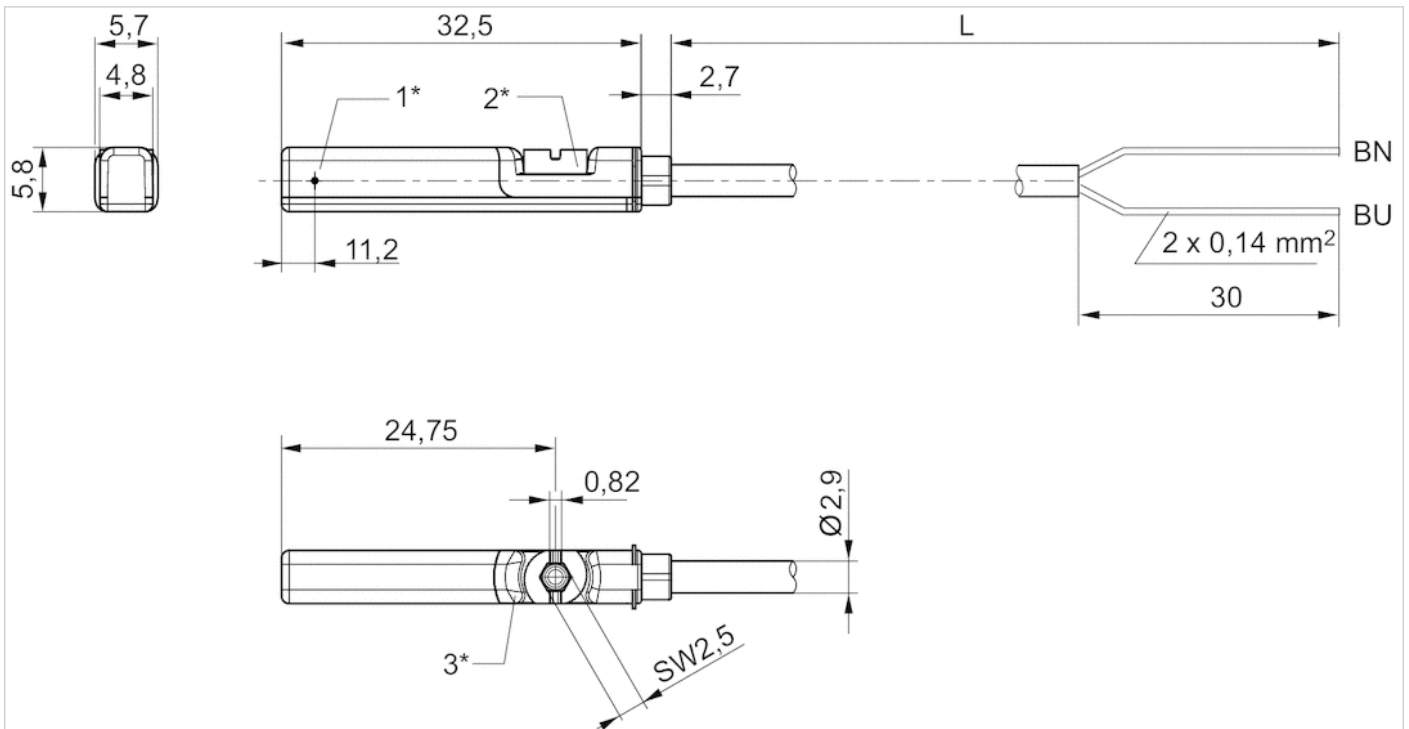
No cULus certification for 230 V variant.

Technical information

Material	
Housing	Polyamide
Cable sheath	Polyurethane
Locking screw	Stainless steel

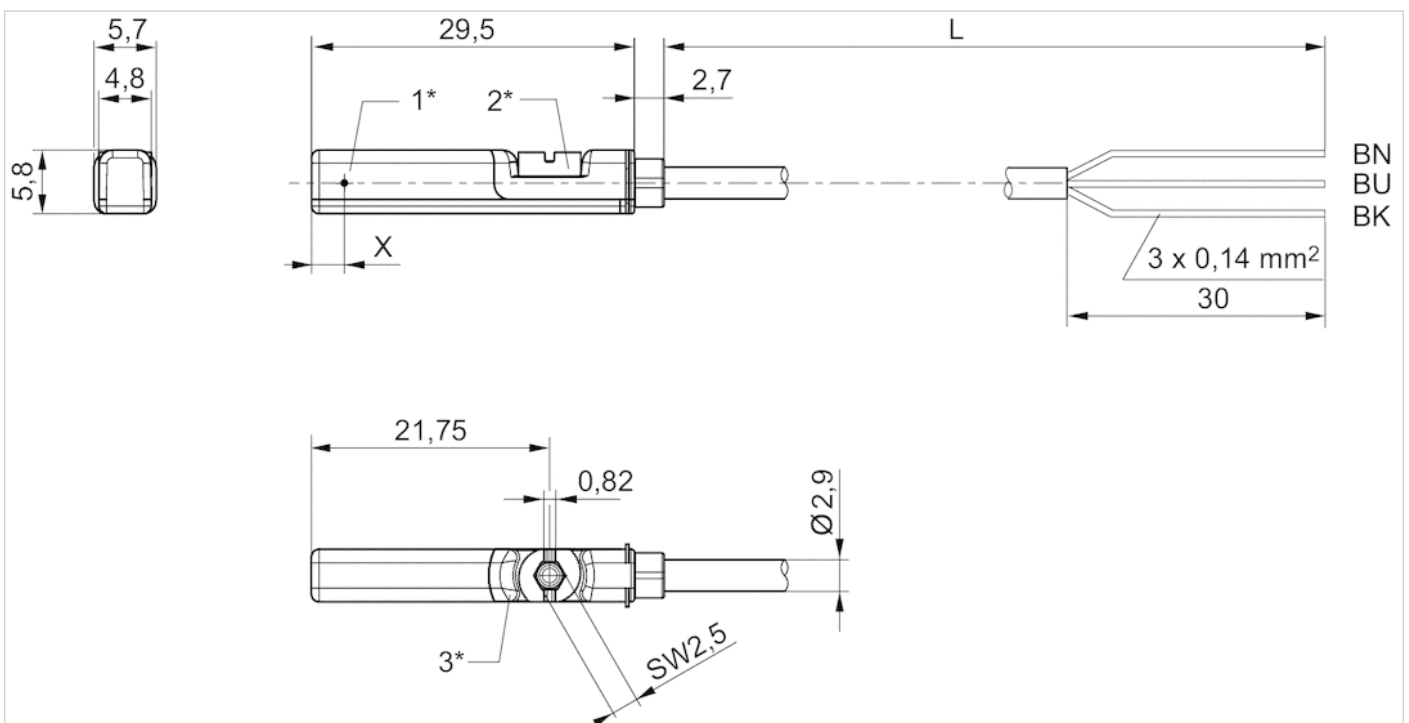
Dimensions

Fig. 1



1* = switching point 2* = locking screw 3* = LED window, transparent
 L = cable length
 BN=brown, BU=blue

Fig. 2



1* = switching point 2* = locking screw 3* = LED window, transparent
 L = cable length
 BN = brown, BK = black, BU = blue
 X = electronic: 11.6 mm

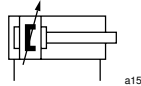
Piston rod cylinder ▶ Standard cylinders

Profile cylinder, ISO 15552, Series PRA

▶ Ø 32 - 125 mm ▶ Ports: G 1/8 - G 1/2 ▶ double-acting ▶ with magnetic piston ▶ cushioning: elastic, adjustable, pneumatically ▶ Piston rod: external thread ▶ ATEX optional



00134193



Standards	ISO 15552
Compressed air connection	internal thread
Working pressure min./max.	1.5 bar / 10 bar
Ambient temperature min./max.	-20 °C / +80 °C
Medium temperature min./max.	-20 °C / +80 °C
Medium	Compressed air
Max. particle size	50 µm
Oil content of compressed air	0 mg/m³ - 5 mg/m³
Pressure for determining piston forces	6,3 bar

Materials:

Cylinder tube	Aluminum, anodized
Piston rod	Stainless steel
Front cover	Die-cast aluminum
End cover	Die-cast aluminum
Seal	Polyurethane
Nut for piston rod	Steel, galvanized
Scraper	Polyurethane

Technical Remarks

- The pressure dew point must be at least 15 °C under ambient and medium temperature and may not exceed 3 °C.
- The oil content of compressed air must remain constant during the life cycle.
- Use only the approved oils from AVENTICS, see chapter „Technical information“.
- ATEX-certified cylinders can be generated in the Internet configurator.
- ATEX ID: II 2G c IIB T4 II 2D c IP65 T125°C X
- The operating temperature range for ATEX-certified cylinders is -20 °C to +50 °C.

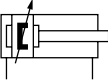
Piston Ø		[mm]	32	40	50	63	80
Retracting piston force		[N]	435	660	1035	1765	2855
Extracting piston force		[N]	505	790	1235	1960	3165
Cushioning length		[mm]	16.5	19	17	16.5	19.5
Cushioning energy		[J]	4.8	9	15	27	54
Weight	0 mm stroke	[kg]	0.5	0.65	1.06	1.42	2.37
	+10 mm stroke	[kg]	0.022	0.032	0.047	0.054	0.085
Stroke max.		[mm]	1600	1900	2100	2500	2800

Piston Ø		[mm]	100	125			
Retracting piston force		[N]	4635	7220			
Extracting piston force		[N]	4945	7725			
Cushioning length		[mm]	19.5	22			
Cushioning energy		[J]	88	140			
Weight	0 mm stroke	[kg]	3.51	6.72			
	+10 mm stroke	[kg]	0.1	0.15			
Stroke max.		[mm]	2800	2750			

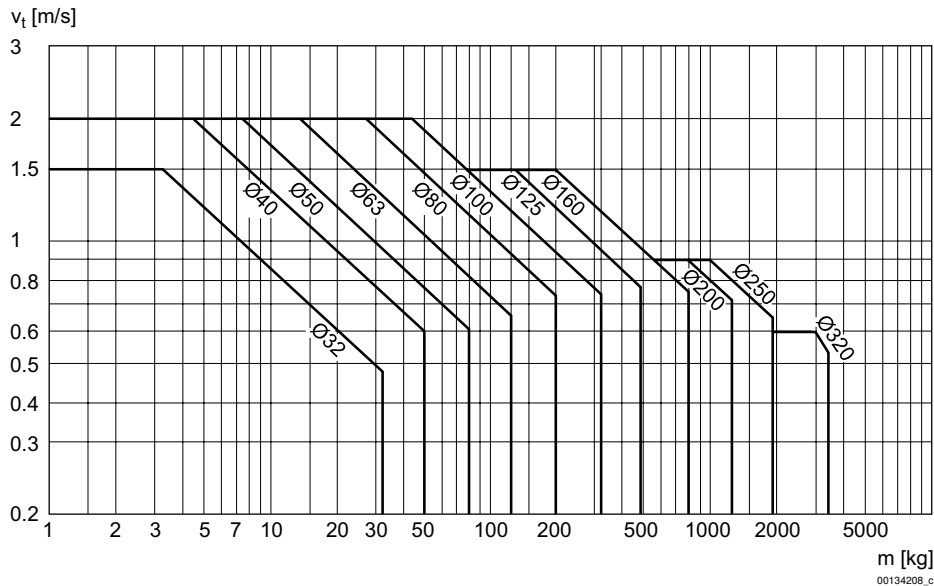
Piston rod cylinder ▶ Standard cylinders

Profile cylinder, ISO 15552, Series PRA

▶ Ø 32 - 125 mm ▶ Ports: G 1/8 - G 1/2 ▶ double-acting ▶ with magnetic piston ▶ cushioning: elastic, adjustable, pneumatically ▶ Piston rod: external thread ▶ ATEX optional

	Piston Ø Piston rod thread Ports Piston rod Ø	32 M10x1,25 G 1/8 12	40 M12x1,25 G 1/4 16	50 M16x1,5 G 1/4 20	63 M16x1,5 G 3/8 20	80 M20x1,5 G 3/8 25	
	Stroke 25	0822120001	0822121001	0822122001	0822123001	0822124001	
	50	0822120002	0822121002	0822122002	0822123002	0822124002	
	80	0822120003	0822121003	0822122003	0822123003	0822124003	
	100	0822120004	0822121004	0822122004	0822123004	0822124004	
	125	0822120005	0822121005	0822122005	0822123005	0822124005	
	160	0822120006	0822121006	0822122006	0822123006	0822124006	
	200	0822120007	0822121007	0822122007	0822123007	0822124007	
	250	0822120008	0822121008	0822122008	0822123008	0822124008	
	320	0822120009	0822121009	0822122009	0822123009	0822124009	
	400	0822120010	0822121010	0822122010	0822123010	0822124010	
	500	0822120011	0822121011	0822122011	0822123011	0822124011	
		Piston Ø Piston rod thread Ports Piston rod Ø	100 M20x1,5 G 1/2 25	125 M27x2 G 1/2 32			
	Stroke 25	0822125001	R480140491				
	50	0822125002	R480140455				
	80	0822125003	R480141371				
	100	0822125004	R480079499				
	125	0822125005	R480140083				
	160	0822125006	R480079809				
	200	0822125007	R480140833				
	250	0822125008	R480141106				
320	0822125009	R480140759					
400	0822125010	R480141373					
500	0822125011	R480141666					

Cushioning diagram



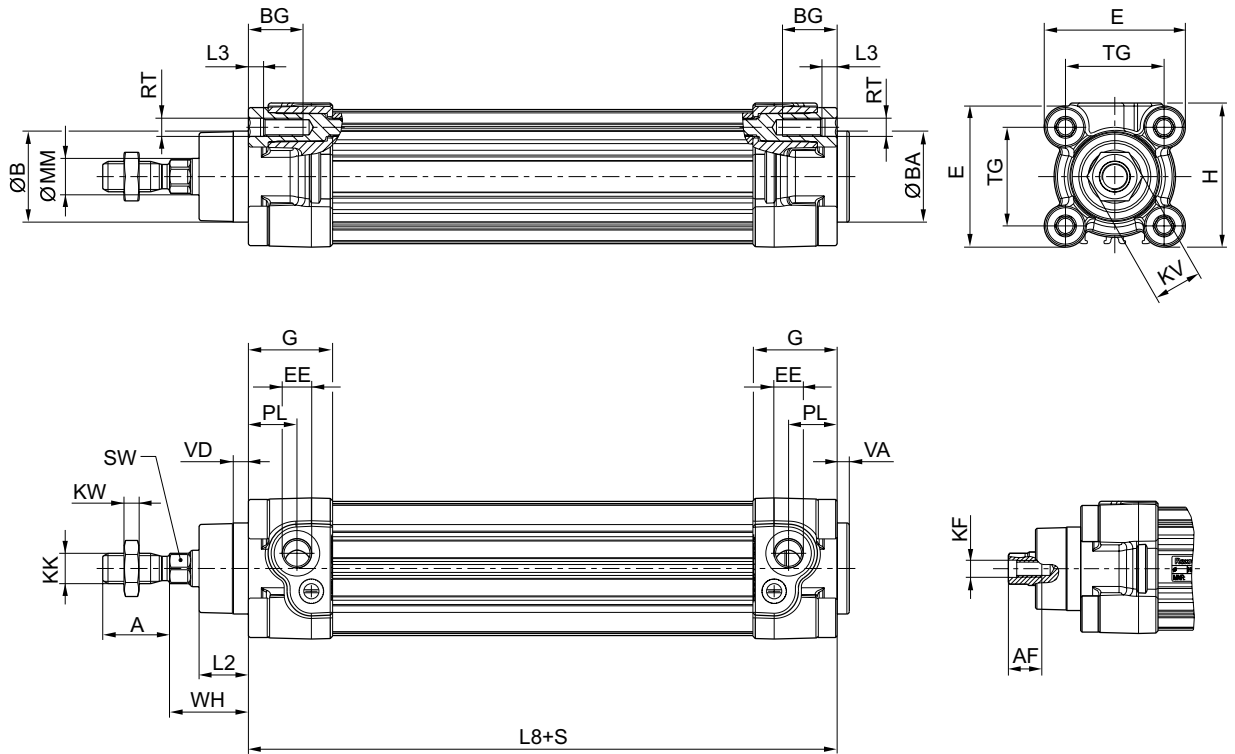
v = Piston velocity [m/s]
 m = Cushionable mass [kg]

Piston rod cylinder ▶ Standard cylinders

Profile cylinder, ISO 15552, Series PRA

▶ Ø 32 - 125 mm ▶ Ports: G 1/8 - G 1/2 ▶ double-acting ▶ with magnetic piston ▶ cushioning: elastic, adjustable, pneumatically ▶ Piston rod: external thread ▶ ATEX optional

Dimensions



00134208_a

S = stroke

Piston Ø	A -2	AF+1	ØB d11	ØBA d11	BG min.	E	EE	G	H	KF	KK
32	22	12	30	30	16	46.5	G 1/8	27.75	47.5	M6	M10x1,25
40	24	13.5	35	35	16	53	G 1/4	33.25	53	M8	M12x1,25
50	32	17	40	40	16	65	G 1/4	31	65	M10	M16x1,5
63	32	17	45	45	16	75	G 3/8	38.25	75	M10	M16x1,5
80	40	21	45	45	17	95	G 3/8	38.25	95	M12	M20x1,5
100	40	21	55	55	17	115	G 1/2	42.25	115	M12	M20x1,5
125	54	28	60	60	20	140	G 1/2	53.85	140	M16	M27x2

Piston Ø	KV	KW	ØMM f8	PL	L2	L3 ±0,5	L8	RT	SW	TG	VA -1	VD
32	16	5	12	16	16.25	4.5	94±0,4	M6	10	32,5±0,5	4	5
40	18	6	16	20	18.25	4.5	105±0,7	M6	13	38±0,5	4	5
50	24	8	20	19	25	4.5	106±0,7	M8	17	46,5±0,6	4	5
63	24	8	20	24	25	4.5	121±0,8	M8	17	56,5±0,7	4	5
80	30	10	25	23.5	33	0	128±0,8	M10	22	72±0,7	4	5
100	30	10	25	25	36	0	138±1	M10	22	89±0,7	4	5
125	41	13.5	32	33	45	0	160±1	M12	27	110±1,1	6	7

Piston Ø	WH											
32	26±1,4											
40	30±1,4											
50	37±1,4											
63	37±1,8											
80	46±1,8											
100	51±1,8											
125	65±2,2											

Manual geral de instalação, operação e manutenção de motores elétricos

Installation, operation and maintenance manual of electric motors

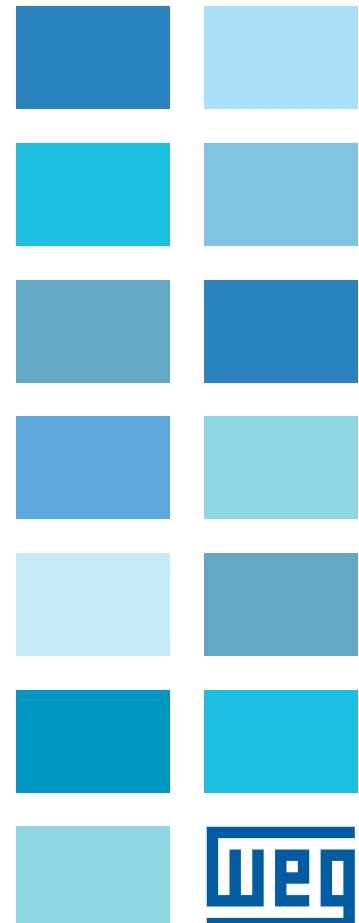
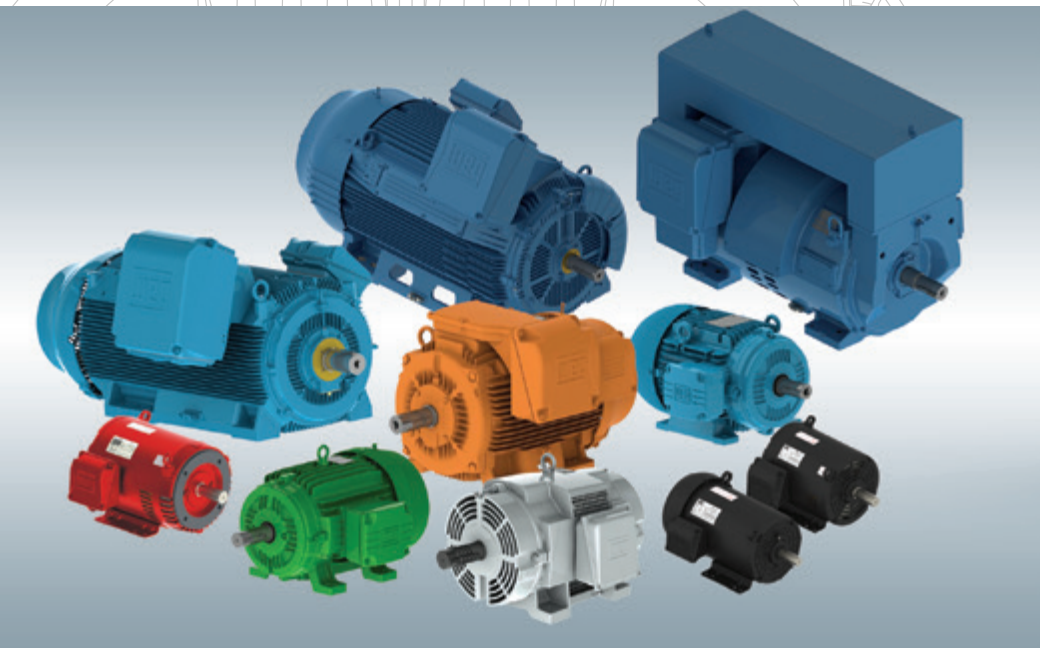
Manual general de instalación, operación y mantenimiento de motores eléctricos

Installations-, betriebs- und wartungsanleitung für elektrische motoren

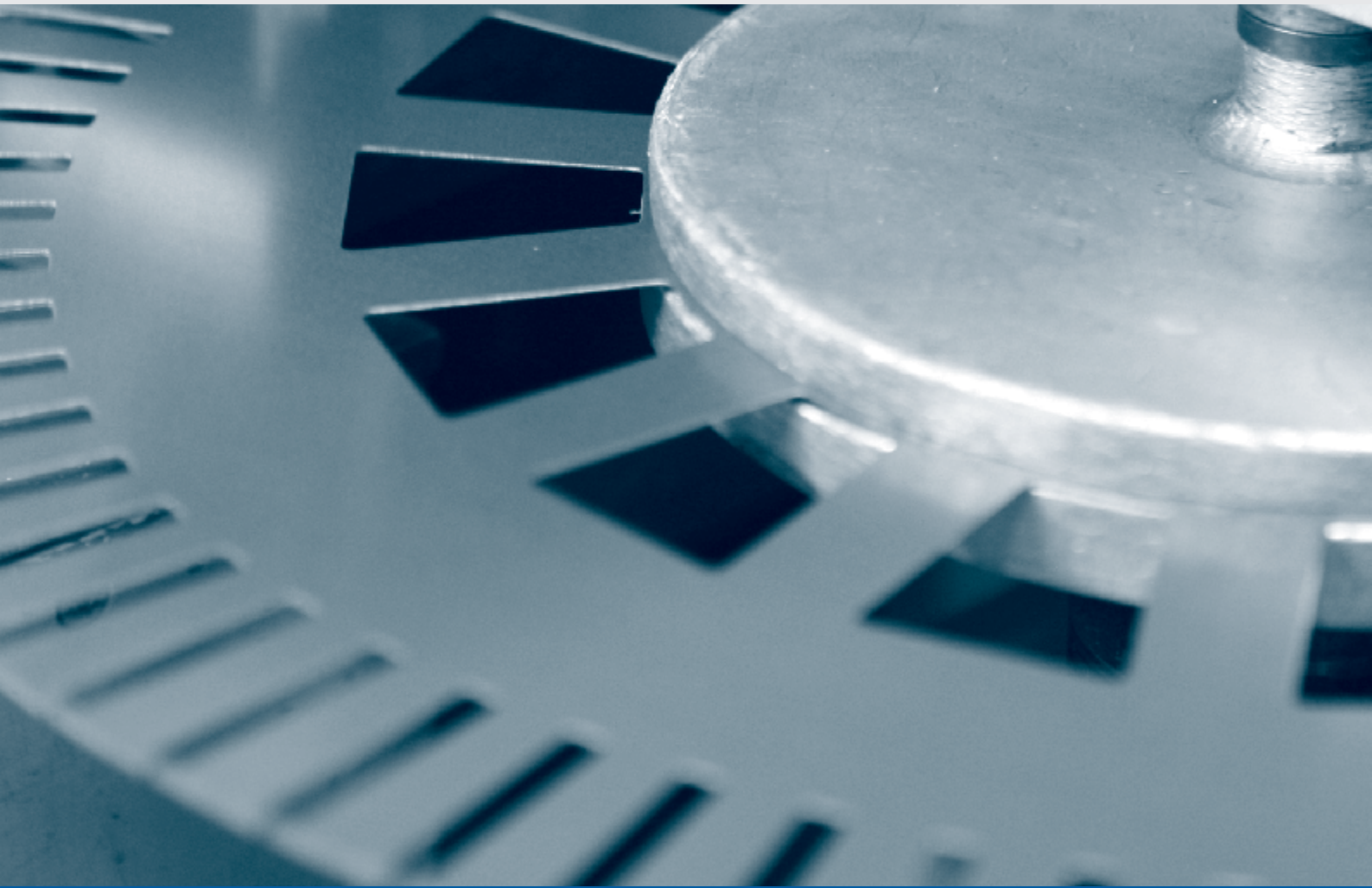
Manual de instalare, exploatare și întreținere a motoarelor electrice

Ръководство за монтаж, експлоатация и поддръжка на електродвигатели

Руководство по установке, эксплуатации и техническому обслуживанию электрических двигателей



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INSTALLATION, OPERATION AND MAINTENANCE MANUAL OF ELECTRIC MOTORS

This manual provides information about WEG induction motors fitted with squirrel cage, permanent magnet or hybrid rotors, low, medium and high voltage, in frame sizes IEC 56 to 630 and NEMA 42 to 9606/10.

The motor lines indicated below have additional information that can be checked in their respective manuals:

- Smoke Extraction Motors;
- Electromagnetic Brake Motors;
- Hazardous Area Motors.

These motors meet the following standards, if applicable:

- NBR 17094-1: Máquinas Elétricas Girantes - Motores de Indução - Parte 1: trifásicos.
- NBR 17094-2: Máquinas Elétricas Girantes - Motores de Indução - Parte 2: monofásicos.
- IEC 60034-1: Rotating Electrical Machines - Part 1: Rating and Performance.
- NEMA MG 1: Motors and Generators.
- CSA C 22.2 N°100: Motors and Generators.
- UL 1004-1: Rotating Electrical Machines - General Requirements.

If you have any questions regarding this manual please contact your local WEG branch, contact details can be found at www.weg.net.



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1. TERMINOLOGY

Balancing: the procedure by which the mass distribution of a rotor is checked and, if necessary, adjusted to ensure that the residual unbalance or the vibration of the journals and/or forces on the bearings at a frequency corresponding to service speed are within specified limits in International Standards.
[ISO 1925:2001, definition 4.1]

Balance quality grade: indicates the peak velocity amplitude of vibration, given in mm/s, of a rotor running free-in-space and it is the product of a specific unbalance and the angular velocity of the rotor at maximum operating speed.

Grounded Part: metallic part connected to the grounding system.

Live Part: conductor or conductive part intended to be energized in normal operation, including a neutral conductor.

Authorized personnel: employee who has formal approval of the company.

Qualified personnel: employee who meets the following conditions simultaneously:

- Receives training under the guidance and responsibility of a qualified and authorized professional;
- Works under the responsibility of a qualified and approved professional.

Note: *The qualification is only valid for the company that trained the employee in the conditions set out by the authorized and qualified professional responsible for training.*



2. INITIAL RECOMMENDATIONS



Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. Therefore, it is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Also the applicable procedures and relevant standards of the country where the machine will be installed must be considered.

Noncompliance with the recommended procedures in this manual and other references on the WEG website may cause severe personal injuries and/or substantial property damage and may void the product warranty.

For practical reasons, it is not possible to include in this Manual detailed information that covers all construction variables nor covering all possible assembly, operation or maintenance alternatives.

This Manual contains only the required information that allows qualified and trained personnel to carry out their services. The product images are shown for illustrative purpose only.

For *Smoke Extraction Motors*, please refer to the additional instruction manual 50026367 available on the website www.weg.net.

For brake motors, please refer to the information contained in WEG 50021973 brake motor manual available on the website www.weg.net.

For information about permissible radial and axial shaft loads, please check the product technical catalogue.



The user is responsible for the correct definition of the installation environment and application characteristics.



During the warranty period, all repair, overhaul and reclamation services must be carried out by WEG authorized Service Centers to maintain validity of the warranty.

2.1. WARNING SYMBOL



Warning about safety and warranty.

2.2. RECEIVING INSPECTION

All motors are tested during the manufacturing process.

The motor must be checked when received for any damage that may have occurred during the transportation.

All damages must be reported in writing to the transportation company, to the insurance company and to WEG. Failure to comply with such procedures will void the product warranty.

You must inspect the product:

- Check if nameplate data complies with the purchase order;
- Remove the shaft locking device (if any) and rotate the shaft by hand to ensure that it rotates freely;
- Check that the motor has not been exposed to excessive dust and moisture during the transportation.

Do not remove the protective grease from the shaft, or the plugs from the cable entries. These protections must remain in place until the installation has been completed.

2.3. NAMEPLATES

The nameplate contains information that describes the construction characteristics and the performance of the motor. Figure 2.1 and Figure 2.2 show nameplate layout examples.



Figure 2.1 - IEC motor nameplate

MADE IN BRAZIL
12714027

HGF

NBR-17094-1

~	3 kW(HP-cv)	370(500)	CARC. FRAME	315C/D/E
MOTOR INDUCAO - GAIOLA INDUCT. MOTOR-SQUIRREL CAGE		FS SF	1.00	Hz 60
V	380	A	680	
RPM min ⁻¹	1784	I/P/N	6.8	F.P. P.F. 0.86
REG DUTY	S1	REND(%) NOM.EFF.	96.1	AMB. 40°C
ISOL INSL	F Δt 80 K	CAT DES	N	I.F.S. S.F.A.
	IP55	Alt	1000	m.a.n.m. m.a.s.l. 2161 kg

380 V

Y

→ 6320-C3(51g)

→ 6316-C3(34g)

MOBIL POLYREX EM

4500 h

12309946

HGF

VDE 0530
IEC 60034

~	3 kW	560	FRAME	355C/D/E
V	460	Hz	60	
A	841	SF	1.00	
min ⁻¹	1783	P.F.	0.87	
DUTY	S1	AMB.	40°C	
INS. CL.	F	Δt	80 K	IP55
Alt	1000	m.a.s.l.	WEIGHT	3114 kg

460 V

Y

→ 6322-C3(60g)

→ 6319-C3(45g)

MOBIL POLYREX EM

4500 h

MADE IN BRAZIL

W22

*Inverter Duty Motor
Severe Duty*

MODEL:01018ET3E215T-W22

PH	3 HP(kW)	10(7.5)	FRAME	213/5T	RPM	1760		
V	208-230/	460	Hz	60	SF	1.25		
A	24.8/12.4	INS. CL.	F	Δt	80 K	P.F.	0.83	
SFA	31/15.5	A	ENCL.	TEFC	IP55	AMB.	40°C	
50Hz	1 OHP	380V	15.0A	1445RPM	SF	1.0	CODE	H
							DES	B

208-230 V(60Hz)

460 V(60Hz)

→ 6308-ZZ

→ 6207-ZZ

MOBIL POLYREX EM

MOD.TE1BFOXON | 182Lbs

USABLE AT 208V 27.4 A FOR USE ON VPWM VFD 1000:1VT, 20:1CT, 1.0SF, 13.

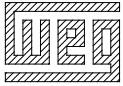



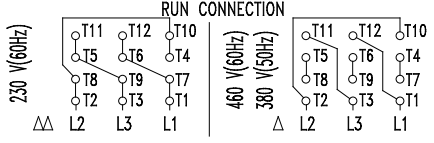
Class I, Div. 2, Gr. A, B, C & D - T3

Class I, Zone 2, IIC - T3

Class II, Div. 2, Gr. F and G - T4

CC029A

Figure 2.1 - IEC motor nameplate

MADE IN BRAZIL 11166657	 W22 NEMA Premium CC029A		 CE FOR SAFE AREA		MOD.TE1BFOXON		 Class I, Div. 2, Gr. A, B, C & D - T3 Class I, Zone 2, IIC - T3  Class II, Div 2, Gr. F and G - T4			
	Inverter Duty Motor Severe Duty						CAUTION: USE SUPPLY WIRES SUITABLE FOR 110°C			
	PH	3	HP(kW)	75(55)	FRAME	364/5T			RUN CONNECTION 	
	V	208-230/460		Hz	60					
	A	186-168/84.1		SF	1.25					
	RPM	1775		SFA	210/105 A		INS. CL.	F		Δt
	NEMA NOM. EFF.	95.4 %		P.F.	0.86					
	CODE	G	DES	B	AMB.	40°C		DUTY	CONT.	
	ENCL.	TEFC		IP55		WEIGHT	923 Lbs			
	USABLE AT 208V		186 A	50Hz	75HP	380V	103 A	1465 RPM	SF1.0	
						ALT.		1000 m.a.s.l.		



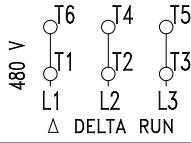

MADE IN BRAZIL 12774002	 HGF		 CE		LR 110298				
	PH	3	HP	700	FRAME	6806/7/8T			
	V	480		Hz	60				
	A	755		SF	1.00				
	RPM	1192		SFA			INS. CL.		F
	NEMA NOM. EFF.	96.5 %		P.F.	0.85				
	CODE	G	DES		AMB.	40°C		DUTY	CONT.
	ENCL.	TEFC		TYPE	ET		WEIGHT	8339 Lbs	
	Alt.	1000 m.a.s.l.							
							 → 6324-C3(72g) MOBIL POLYREX EM → 6319-C3(45g) 4500 h		

Figure 2.2 - NEMA motor nameplate

3. SAFETY INSTRUCTIONS



The motor must be disconnected from the power supply and be completely stopped before conducting any installation or maintenance procedures. Additional measures should be taken to avoid accidental motor starting.



Professionals working with electrical installations, either in the assembly, operation or maintenance, should use proper tools and be instructed on the application of standards and safety requirements, including the use of Personal Protective Equipment (PPE) that must be carefully observed in order to reduce risk of personal injury during these services.



Electric motors have energized circuits, exposed rotating parts and hot surfaces that may cause serious injury to people during normal operation. It is recommended that transportation, storage, installation, operation and maintenance services are always performed by qualified personnel.

Always follow the safety, installation, maintenance and inspection instructions in accordance with the applicable standards in each country.

4. HANDLING AND TRANSPORT

Individually packaged motors should never be lifted by the shaft or by the packaging. They must be lifted only by means of the eyebolts, when supplied. Use always suitable lifting devices to lift the motor. Eyebolts on the frame are designed for lifting the machine weight only as indicated on the motor nameplate. Motors supplied on pallets must be lifted by the pallet base with lifting devices fully supporting the motor weight.

The package should never be dropped. Handle it carefully to avoid bearing damage.



Eyebolts provided on the frame are designed for lifting the machine only. Do not use these eyebolts for lifting the motor with coupled equipment such as bases, pulleys, pumps, reducers, etc..

Never use damaged, bent or cracked eyebolts. Always check the eyebolt condition before lifting the motor.

Eyebolts mounted on components, such as on end shields, forced ventilation kits, etc. must be used for lifting these components only. Do not use them for lifting the complete machine set.

Handle the motor carefully without sudden impacts to avoid bearing damage and prevent excessive mechanical stresses on the eyebolts resulting in its rupture.



To move or transport motors with cylindrical roller bearings or angular contact ball bearings, use always the shaft locking device provided with the motor.

All HGF motors, regardless of bearing type, must be transported with shaft locking device fitted.

Vertical mounted motors with oil-lubricated bearings must be transported in the vertical position. If necessary to move or transport the motor in the horizontal position, install the shaft locking device on both sides (drive end and non-drive end) of the motor.

4.1. LIFTING



Before lifting the motor ensure that all eyebolts are tightened properly and the eyebolt shoulders are in contact with the base to be lifted, as shown in Figure 4.1. Figure 4.2 shows an incorrect tightening of the eyebolt.

Ensure that lifting machine has the required lifting capacity for the weight indicated on the motor nameplate.



Figure 4.1 - Correct tightening of the eyebolt



Figure 4.2 - Incorrect tightening of the eyebolt



The center-of-gravity may change depending on motor design and accessories. During the lifting procedures the maximum allowed angle of inclination should never be exceeded as specified below.

4.1.1. Horizontal motors with one eyebolt

For horizontal motors fitted with only one eyebolt, the maximum allowed angle-of-inclination during the lifting process should not exceed 30° in relation to the vertical axis, as shown in Figure 4.3.

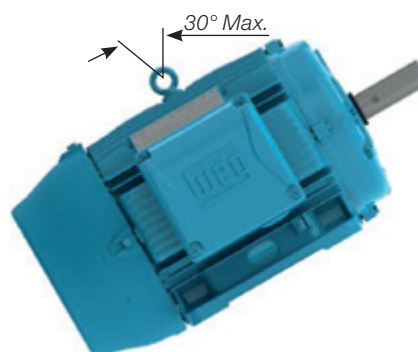


Figure 4.3 - Maximum allowed angle-of-inclination for motor with one eyebolt

4.1.2. Horizontal motor with two eyebolts

When motors are fitted with two or more eyebolts, all supplied eyebolts must be used simultaneously for the lifting procedure.

There are two possible eyebolt arrangements (vertical and inclined), as shown below:

- For motors with vertical lifting eyebolts, as shown in Figure 4.4, the maximum allowed lifting angle should not exceed 45° in relation to the vertical axis. We recommend to use a spreader beam for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface;



Figure 4.4 - Maximum resulting angle for motors with two or more lifting eyebolts

- For HGF, W40 and W50 motors, as shown in Figure 4.5, the maximum resulting angle should not exceed 30° in relation to the vertical axis;

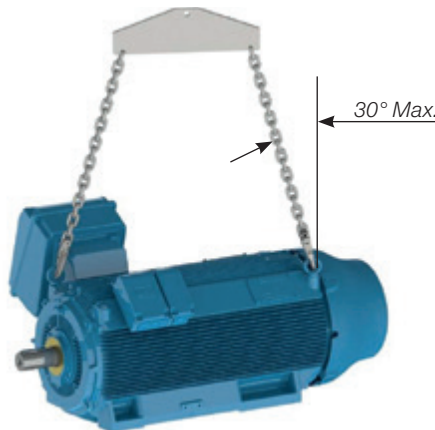


Figure 4.5 - Maximum resulting angle for horizontal HGF, W40 and W50 motors

- For motors fitted with inclined eyebolts, as shown in Figure 4.6, the use of a spreader beam is required for maintaining the lifting elements (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 4.6 - Use of a spreader beam for lifting

4.1.3. Vertical motors

For vertical mounted motors, as shown in Figure 4.7, the use of a spreader beam is required for maintaining the lifting element (chain or rope) in vertical position and thus preventing damage to the motor surface.



Figure 4.7 - Lifting of vertical mounted motors



Always use the eyebolts mounted on the top side of the motor, diametrically opposite, considering the mounting position. See Figure 4.8.



Figure 4.8 - Lifting of HGF and W50 motors.

4.1.3.1. Procedures to place W22 motors in the vertical position

For safety reasons during the transport, vertical mounted Motors are usually packed and supplied in horizontal position.

To place W22 motors fitted with eyebolts (see Figure 4.6), to the vertical position, proceed as follows:

1. Ensure that the eyebolts are tightened properly, as shown in Figure 4.1;
2. Remove the motor from the packaging, using the top mounted eyebolts, as shown in Figure 4.9;



Figure 4.9 - Removing the motor from the packaging

3. Install a second pair of eyebolts, as shown in Figure 4.10;



Figure 4.10 - Installation of the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts to start the motor rotation, as shown in Figure 4.11. This procedure must be carried out slowly and carefully.



Figure 4.11 - End result: motor placed in vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

4.1.3.2. Procedures to place HGF and W50 motors in the vertical position

HGF motors are fitted with eight lifting points: four at drive end and four at non-drive end. W50 motors are fitted with nine lifting points: four at drive end, one in the central part and four at non-drive end. The motors are usually transported in horizontal position, however for the installation they must be placed in the vertical position.

To place an these motors in the vertical position, proceed as follows:

1. Lift the motor by using the four lateral eyebolts and two hoists, see Figure 4.12;



Figure 4.12 - Lifting of HGF and W50 motors with two hoists

2. Lower the hoist fixed to motor drive end while lifting the hoist fixed to motor non-drive end until the motor reaches its equilibrium, see Figure 4.13;



Figure 4.13 - Placing HGF and W50 motors in vertical position

3. Remove the hoist hooks from the drive end eyebolts and rotate the motor 180° to fix the removed hooks into the two eyebolts at the motor non-drive end, see Figure 4.14;



Figure 4.14 - Lifting HGF and W50 motors by the eyebolts at the non-drive end

4. Fix the removed hoist hooks in the other two eyebolts at the non-drive end and lift the motor until the vertical position is reached, see Figure 4.15.



Figure 4.15 - HGF and W50 motors in the vertical position

These procedures will help you to move motors designed for vertical mounting. These procedures are also used to place the motor from the horizontal position into the vertical position and vertical to horizontal.

4.2 Procedures to place W22 vertical mount motors in horizontal position

To place W22 vertical mount motor in horizontal position, proceed as follows:

1. Ensure that all eyebolts are tightened properly, as shown in Figure 4.1;
2. Install the first pair of eyebolts and lift the motor as shown in Figure 4.16;



Figure 4.16 - Install the first pair of eyebolts

3. Install the second pair of eyebolts, as shown in Figure 4.17;



Figure 4.17 - Install the second pair of eyebolts

4. Reduce the load on the first pair of eyebolts for rotating the motor, as shown in Figure 4.18. This procedure must be carried out slowly and carefully;



Figure 4.18 - Motor is being rotated to horizontal position

5. Remove the first pair of eyebolts, as shown in Figure 4.19.



Figure 4.19 - Final result: motor placed in horizontal position

5. STORAGE

If the motor is not installed immediately, it must be stored in a dry and clean environment, with relative humidity not exceeding 60%, with an ambient temperature between 5 °C and 40 °C, without sudden temperature changes, free of dust, vibrations, gases or corrosive agents. The motor must be stored in horizontal position, unless specifically designed for vertical operation, without placing objects on it. Do not remove the protection grease from shaft end to prevent rust.

If the motor are fitted with space heaters, they must always be turned on during the storage period or when the installed motor is out of operation. Space heaters will prevent water condensation inside the motor and keep the winding insulation resistance within acceptable levels. Store the motor in such position that the condensed water can be easily drained. If fitted, remove pulleys or couplings from the shaft end (more information are given on item 6).



The space heaters should never be energized when the motor is in operation.

5.1. EXPOSED MACHINED SURFACES

All exposed machined surfaces (like shaft end and flange) are factory-protected with temporary rust inhibitor. A protective film must be reapplied periodically (at least every six months), or when it has been removed and/or damaged.

5.2. STORAGE

The stacking height of the motor packaging during the storage period should not exceed 5 m, always considering the criteria indicated in Table 5.1:

Table 5.1 - Max. recommended stacking height

Packaging type	Frame sizes	Maximum stacking quantity
Cardboard box	IEC 63 to 132 NEMA 143 to 215	Indicated on the top side of the cardboard box
Wood crate	IEC 63 to 315 NEMA 48 to 504/5	06
	IEC 355 NEMA 586/7 and 588/9	03
	W40 / W50 / HGF IEC 315 to 630 W40 / W50 / HGF NEMA 5000 to 9600	Indicated on the packaging

Notes:

- 1) Never stack larger packaging onto smaller packaging;
- 2) Align the packaging correctly (see Figure 5.1 and Figure 5.2);

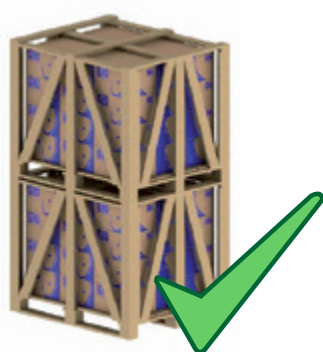


Figure 5.1 - Correct stacking

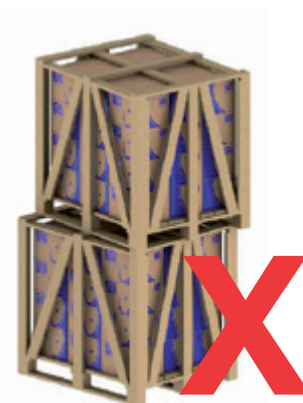


Figure 5.2 - Incorrect stacking

3) The feet of the crates above should always be supported by suitable wood battens (Figure 5.3) and never stand on the steel tape or without support (Figure 5.4);



Figure 5.3 - Correct stacking

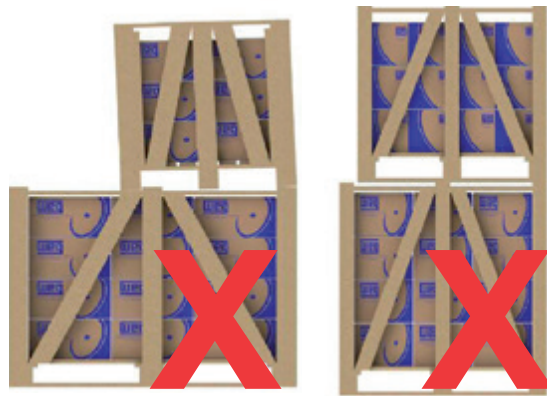


Figure 5.4 - Incorrect stacking

4) When stacking smaller crates onto longer crates, always ensure that suitable wooden supports are provided to withstand the weight (see Figure 5.5). This condition usually occurs with motor packaging above IEC 225S/M (NEMA 364/5T) frame sizes.

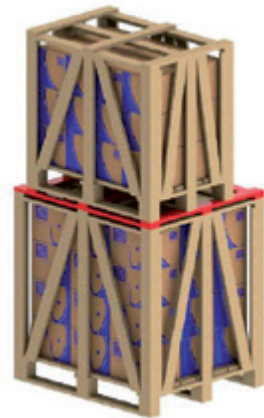


Figure 5.5 - Use of additional battens for stacking

5.3 BEARINGS

5.3.1 Grease lubricated bearings

We recommend rotating the motor shaft at least once a month (by hand, at least five revolutions, stopping the shaft at a different position from the original one). If the motor is fitted with shaft locking device, remove it before rotating the shaft and install it again before performing any handling procedure. Vertical motors may be stored in the vertical or in horizontal position. If motors with open bearings are stored longer than six months, the bearings must be relubricated according to item 8.2 before commissioning of the motor.

If the motor is stored for longer than 2 years, the bearings must be replaced or removed, washed, inspected and relubricated according to item 8.2.

5.3.2 Oil lubricated bearings

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the center of the sight glass.

During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced according to Item 8.2, before starting the operation. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to Item 8.2. The oil of vertical mounted motors is removed to prevent oils leaks during the transport. After receiving the motor the bearings must be lubricated.

5.3.3 Oil Mist lubricated bearings

The motor must be stored in horizontal position. Lubricate the bearings with ISO VG 68 mineral oil in the amount indicated in the Table 5.2 (this is also valid for bearings with equivalent dimensions). After filling with oil, rotate the shaft by hand, at least five revolutions)

During the storage period, remove the shaft locking device (if any) and rotate the shaft by hand every week, at least five revolutions, stopping it at a different position from the original one. Reinstall the shaft locking device every time the motor has to be moved. If the motor is stored for a period of over two years, the bearings must be replaced or removed, washed according to manufacturer instructions, checked and relubricated according to item 8.2.

Table 5.2 - Amount of oil per bearing

Bearing size	Amount of oil (ml)	Bearing size	Amount of oil (ml)
6201	15	6309	65
6202	15	6311	90
6203	15	6312	105
6204	25	6314	150
6205	25	6315	200
6206	35	6316	250
6207	35	6317	300
6208	40	6319	350
6209	40	6320	400
6211	45	6322	550
6212	50	6324	600
6307	45	6326	650
6308	55	6328	700

The oil must always be removed when the motor has to be handled. If the oil mist system is not operating after installation, fill the bearings with oil to prevent bearing rusting. During the storage period, rotate the shaft by hand, at least five revolutions, stopping it at a different position from the original one. Before starting the motor, all bearing protection oil must be drained from the bearing and the oil mist system must be switched ON.

5.3.4 Sleeve bearing

The motor must be stored in its original operating position and with oil in the bearings. Correct oil level must be ensured. It should be in the middle of the sight glass. During the storage period, remove the shaft locking device and rotate the shaft by hand every month, at least five revolutions, and at 30 rpm, thus achieving an even oil distribution inside the bearing and maintaining the bearing in good operating conditions. Reinstall the shaft locking device every time the motor has to be moved.

If the motor is stored for a period equal or longer than the oil change interval, the oil must be replaced, according to Item 8.2, before starting the operation.

If the motor is stored for a period longer than the oil change interval, or if it is not possible to rotate the motor shaft by hand, the oil must be drained and a corrosion protection and dehumidifiers must be applied.

5.4. INSULATION RESISTANCE

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.

5.4.1. Insulation resistance measurement

We recommend measuring the winding insulation resistance at regular intervals to follow-up and evaluate its electrical operating conditions. If any reduction in the insulation resistance values are recorded, the storage conditions should be evaluated and corrected, where necessary.



The insulation resistance must be measured in a safe environment.

The insulation resistance must be measured with a megohmmeter. The machine must be in cold state and disconnected from the power supply.



To prevent the risk of an electrical shock, ground the terminals before and after each measurement. Ground the capacitor (if any) to ensure that it is fully discharged before the measurement is taken.

It is recommended to insulate and test each phase separately. This procedure allows the comparison of the insulation resistance between each phase. During the test of one phase, the other phases must be grounded. The test of all phases simultaneously evaluates the insulation resistance to ground only but does not evaluate the insulation resistance between the phases.

The power supply cables, switches, capacitors and other external devices connected to the motor may considerably influence the insulation resistance measurement. Thus all external devices must be disconnected and grounded during the insulation resistance measurement.

Measure the insulation resistance one minute after the voltage has been applied to the winding. The applied voltage should be as shown in Table 5.3.

Table 5.3 - Voltage for the insulation resistance

Winding rated voltage (V)	Testing voltage for measuring the insulation resistance (V)
< 1000	500
1000 - 2500	500 - 1000
2501 - 5000	1000 - 2500
5001 - 12000	2500 - 5000
> 12000	5000 - 10000

The reading of the insulation resistance must be corrected to 40 °C as shown in the Table 5.4.

Table 5.4 - Correction factor for the insulation resistance corrected to 40 °C

Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C	Measuring temperature of the insulation resistance (°C)	Correction factor of the insulation resistance corrected to 40 °C
10	0.125	30	0.500
11	0.134	31	0.536
12	0.144	32	0.574
13	0.154	33	0.616
14	0.165	34	0.660
15	0.177	35	0.707
16	0.189	36	0.758
17	0.203	37	0.812
18	0.218	38	0.871
19	0.233	39	0.933
20	0.250	40	1.000
21	0.268	41	1.072
22	0.287	42	1.149
23	0.308	43	1.231
24	0.330	44	1.320
25	0.354	45	1.414
26	0.379	46	1.516
27	0.406	47	1.625
28	0.435	48	1.741
29	0.467	49	1.866
30	0.500	50	2.000

The motor insulation condition must be evaluated by comparing the measured value with the values indicated in Table 5.5 (corrected to 40 °C):

Table 5.5 - Evaluation of the insulation system

Limit value for rated voltage up to 1.1 kV (MΩ)	Limit value for rated voltage above 1.1 kV (MΩ)	Situation
Up to 5	Up to 100	Dangerous. The motor can not be operated in this condition
5 to 100	100 to 500	Regular
100 to 500	Higher than 500	Good
Higher than 500	Higher than 1000	Excellent

The values indicated in the table should be considered only as reference values. It is advisable to log all measured values to provide a quick and easy overview on the machine insulation resistance.

If the insulation resistance is low, moisture may be present in the stator windings. In this case the motor should be removed and transported to a WEG authorized Service Center for proper evaluation and repair (This service is not covered by the warranty). To improve the insulation resistance through the drying process, see section 8.4.



6. INSTALLATION



The insulation resistance must be measured in a safe environment.

Check some aspects before proceeding with the installation:

1. Insulation resistance: must be within the acceptable limits. See item 5.4.
2. Bearings:
If the motor is installed without running immediately, proceed as described in item 5.3.
3. Operating conditions of the start capacitors: If single-phase motors are stored for a period of over two years, it is recommended to change the start capacitors before motor starting since they lose their operating characteristics.
4. Terminal box:
 - a. the inside of the terminal box must be clean and dry;
 - b. the contacts must be correctly connected and corrosion free. See 6.9 and 6.10;
 - c. the cable entries must be correctly sealed and the terminal box cover properly mounted in order to ensure the degree of protection indicated on the motor nameplate.
5. Cooling: the cooling fins, air inlet and outlet openings must be clean and unobstructed. The distance between the air inlet openings and the wall should not be shorter than $\frac{1}{4}$ (one quarter) of the diameter of the air inlet. Ensure sufficient space to perform the cleaning services. See item 7.
6. Coupling: remove the shaft locking device (where fitted) and the corrosion protection grease from the shaft end and flange just before installing the motor. See item 6.4.
7. Drain hole: the motor must always be positioned so the drain hole is at the lowest position (If there is any indication arrow on the drain, the drain must be so installed that the arrow points downwards).
Motors supplied with rubber drain plugs leave the factory in the closed position and must be opened periodically to allow the exit of condensed water. For environments with high water condensation levels and motor with degree of protection IP55, the drain plugs can be mounted in open position (see Figure 6.1). For motors with degree of protection IP56, IP65 or IP66, the drain plugs must remain at closed position (see Figure 6.1), being opened only during the motor maintenance procedures.
The drain system of motors with Oil Mist lubrication system must be connected to a specific collection system (see Figure 6.12).

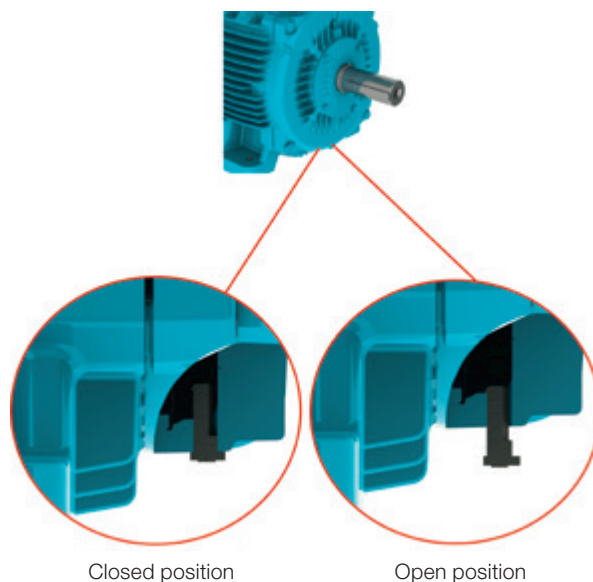


Figure 6.1 - Detail of the rubber drain plug mounted in closed and open position

8. Additional recommendations:

- a. Check the direction of motor rotation, starting the motor at no-load before coupling it to the load;
- b. Vertical mounted motors with shaft end down must be fitted with drip cover to protect them from liquids or solids that may drop onto the motors;
- c. Vertical mounted motors with shaft end up should be fitted with water slinger ring to prevent water ingress inside the motor.
- d. The fixing elements mounted in the threaded through holes in the motor enclosure (for example, the flange) must be properly sealed.



Remove or fix the shaft key before starting the motor.



Changes on the motor construction (features), such as installation of extended grease fittings or modification of the lubrication system, installation of accessories at alternative locations, etc., can be carried out only after prior written consent from WEG.

6.1. FOUNDATIONS

The foundation is the structure, structural element, natural or prepared base, designed to withstand the stresses produced by the installed equipment, ensuring safe and stable performance during operation. The foundation design should consider the adjacent structures to avoid the influences of other installed equipment and no vibration is transferred through the structure

The foundation must be flat and its selection and design must consider the following characteristics:

- a) The features of the machine to be installed on the foundation, the driven loads, application, maximum allowed deformations and vibration levels (for instance, motors with reduced vibration levels, foot flatness, flange concentricity, axial and radial loads, etc. lower than the values specified for standard motors).
- b) Adjacent buildings, conservation status, maximum applied load estimation, type of foundation and fixation and vibrations transmitted by these constructions.

If the motor is supplied with leveling/alignment bolts, this must be considered in the base design.



Please consider for the foundation dimensioning all stresses that are generated during the operation of the driven load.
The user is responsible for the foundation designing and construction.

The foundation stresses can be calculated by using the following equations (see Figure 6.2):

$$F_1 = 0,5 * g * m - (4 * T_b / A)$$

$$F_2 = 0,5 * g * m + (4 * T_b / A)$$

Where:

- F₁ and F₂ = lateral stresses (N);
- g = gravitational acceleration (9,8 m/s²);
- m = motor weight (kg);
- T_b = breakdown torque (Nm);
- A = distance between centerlines of mounting holes in feet or base of the machine (end view) (m).



The motors may be mounted on:

- Concrete bases: are most used for large-size motors (see Figure 6.2);
- Metallic bases: are generally used for small-size motors (see Figure 6.3).

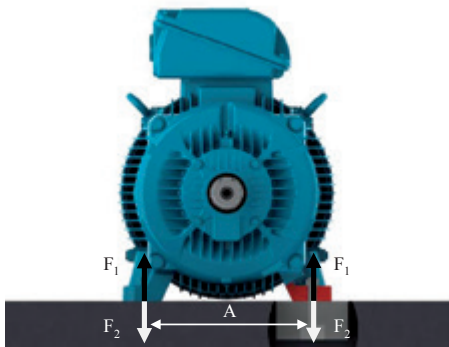


Figure 6.2 - Motor installed on concrete base



Figure 6.3 - Motor installed on metallic base

The metallic and concrete bases may be fitted with sliding system. These types of foundations are generally used where the power transmission is achieved by belts and pulleys. This power transmission system is easier to assemble/disassemble and allows the belt tension adjustment. Other important aspect of this foundation type is the location of the base locking screws that must be diagonally opposite. The rail nearest the drive pulley is placed in such a way that the positioning bolt is between the motor and the driven machine. The other rail must be placed with the bolt on the opposite side (diagonally opposite), as shown in Figure 6.4 .

To facilitate assembly, the bases may have the following features:

- Shoulders and/or recesses;
- Anchor bolts with loose plates;
- Bolts cast in the concrete;
- Leveling screws;
- Positioning screws;
- Steel & cast iron blocks, plates with flat surfaces.

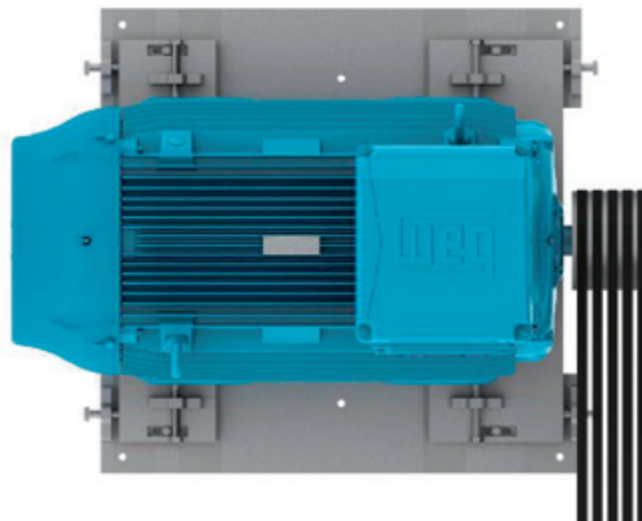


Figure 6.4 - Motor installed on sliding base

After completing the installation, it is recommended that all exposed machined surfaces are coated with suitable rust inhibitor.

6.2. MOTOR MOUNTING



Footless motors supplied with transportation devices, according to Figure 6.5, must have their devices removed before starting the motor installation.

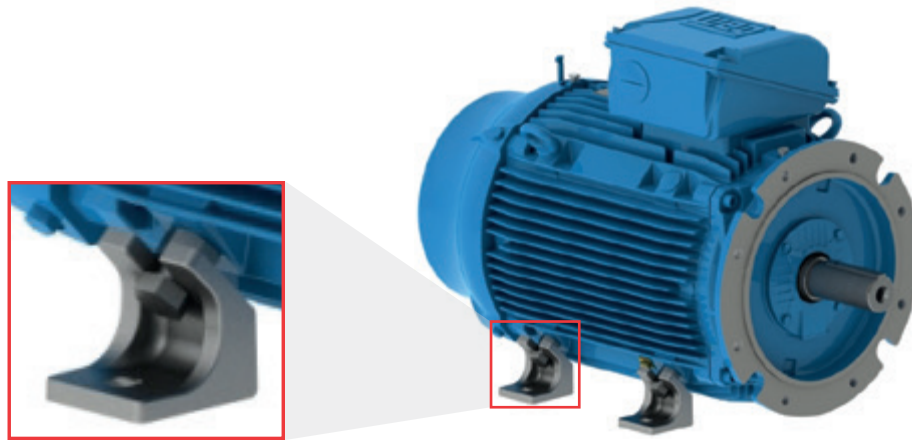


Figure 6.5 - Detail of the transportation devices for footless motors

6.2.1. Foot mounted motors

The drawings of the mounting hole dimensions for NEMA or IEC motors can be checked in the respective technical catalogue.

The motor must be correctly aligned and leveled with the driven machine. Incorrect alignment and leveling may result in bearing damage, generate excessive vibration and even shaft distortion/breakage.

For more details, see section 6.3 and 6.6. The thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. This thread engagement length should be evaluated in more severe applications and increased accordingly.

Figure 6.6 shows the mounting system of a foot mounted motor indicating the minimum required thread engagement length.

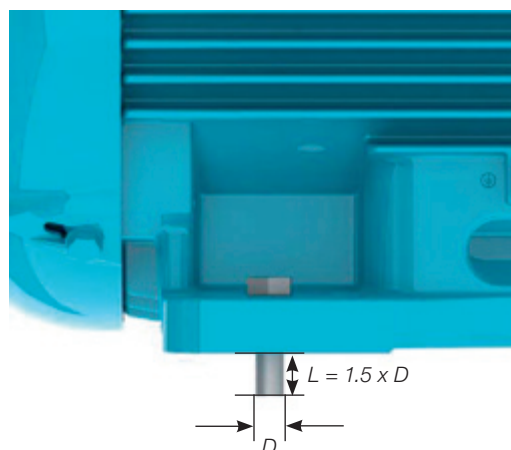


Figure 6.6 - Mounting system of a foot mounted motor

6.2.2. Flange mounted motors

The drawings of the flange mounting dimensions, IEC and NEMA flanges, can be checked in the technical catalogue.

The coupling of the driven equipment to the motor flange must be properly dimensioned to ensure the required concentricity of the assembly.

Depending on the flange type, the mounting can be performed from the motor to the driven equipment flange (flange FF (IEC) or D (NEMA)) or from the driven equipment flange to the motor (flange C (DIN or NEMA)).

For the mounting process from the driven equipment flange to the motor, you must consider the bolt length, flange thickness and the thread depth of the motor flange.



If the motor flange has tapped through-holes, the length of the mounting bolts must not exceed the tapped through-hole length of the motor flange, thus preventing damage to the winding head.

For flange mounting the thread engagement length of the mounting bolt should be at least 1.5 times the bolt diameter. In severe applications, longer thread engagement length may be required. In severe applications or if large motors are flange mounted, a foot or pad mounting may be required in addition to the flange mounting (Figure 6.7). The motor must never be supported on its cooling fins.

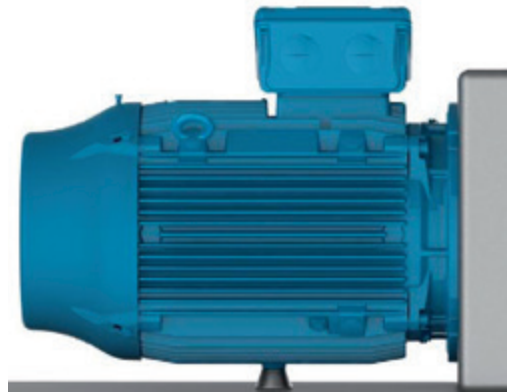


Figure 6.7 - Mounting method of flange mounted motors with frame base support

Note:

When liquid (for example oil) is likely to come into contact with the shaft seal, please contact your local WEG representative.

6.2.3. Pad mounted motors

Typically, this method of mounting is used in axial fans. The motor is fixed by tapped holes in the frame. The dimensions of these tapped holes can be checked in the respective product catalogue. The selection of the motor mounting rods/bolts must consider the dimensions of the fan case, the installation base and the thread depth in the motor frame.

The mounting rods and the fan case wall must be sufficiently stiff to prevent the transmission of excessive vibration to the machine set (motor & fan). Figure 6.8 shows the pad mounting system.

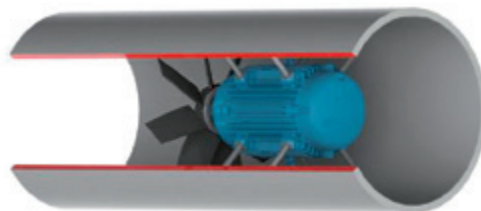


Figure 6.8 - Mounting of the motor inside the cooling duct

6.3. BALANCING

Unbalanced machines generate vibration which can result in damage to the motor. WEG motors are dynamically balanced with “half key” and without load (uncoupled). Special balancing quality level must be stated in the Purchase Order.



The transmission elements, such as pulleys, couplings, etc., must be balanced with “half key” before they are mounted on the motor shaft.

The balance quality grade meets the applicable standards for each product line.

The maximum balancing deviation must be recorded in the installation report.

6.4. COUPLINGS

Couplings are used to transmit the torque from the motor shaft to the shaft of the driven machine. The following aspects must be considered when couplings are installed:

- Use proper tools for coupling assembly & disassembly to avoid damages to the motor and bearings;
- Whenever possible, use flexible couplings, since they can absorb eventual residual misalignments during the machine operation;
- The maximum loads and speed limits informed in the coupling and motor manufacturer catalogues cannot be exceeded;
- Level and align the motor as specified in sections 6.5 and 6.6, respectively.



Remove or fix the shaft key firmly when the motor is operated without coupling in order to prevent accidents.

6.4.1. Direct coupling

Direct coupling is characterized when the Motor shaft is directly coupled to the shaft of the driven machine without transmission elements. Whenever possible, use direct coupling due to lower cost, less space required for installation and more safety against accidents.



Do not use roller bearings for direct coupling, unless sufficient radial load is expected.

6.4.2. Gearbox coupling

Gearbox coupling is typically used where speed reduction is required. Make sure that shafts are perfectly aligned and strictly parallel (in case of straight spur gears) and in the right meshing angle (in case of bevel and helical gears).

6.4.3. Pulley and belt coupling

Pulleys and belts are used when speed increase or reduction between motor shaft and driven load is required.



Excessive belt tension will damage the bearings and cause unexpected accidents such as breakage of the motor shaft.

6.4.4. Coupling of sleeve bearing motors



Motors designed with sleeve bearings must be operated with direct coupling to the driven machine or a gearbox. Pulley and belts can not be applied for sleeve bearing motors.

Motors designed with sleeve bearings have 3 (three) marks on the shaft end. The center mark is the indication of the magnetic center and the 2 (two) outside marks indicate the allowed limits of the rotor axial movement, as shown in Figure 6.9.

The motor must be so coupled that during operation the arrow on the frame is placed over the central mark indicating the rotor magnetic center. During start-up, or even during operation, the rotor may freely move between the two outside marks when the driven machine exerts an axial load on the motor shaft. However, under no circumstance, the motor can operate continuously with axial forces on the bearing.

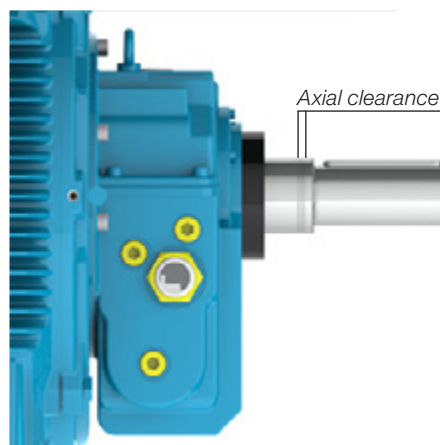


Figure 6.9 - Axial clearance of motor designed with sleeve bearing





For coupling evaluation consider the maximum axial bearing clearance as shown in Table 6.1. The axial clearance of the driven machine and coupling influence the maximum bearing clearance.

Table 6.1 - Clearance used for sleeve bearings

Bearing size	Total axial clearance (mm)
9*	3 + 3 = 6
11*	4 + 4 = 8
14*	5 + 5 = 10
18	7,5 + 7,5 = 15

* For Motors in accordance with API 541, the total axial clearance is 12.7 mm

The sleeve bearings used by WEG were not designed to support axial load continuously. Under no circumstance must the motor be operated continuously at its axial clearance limits.

6.5. LEVELING

The motor must be leveled to correct any deviations in flatness arising from the manufacturing process and the material structure rearrangement. The leveling can be carried out by a leveling screw fixed on the motor foot or on the flange or by means of thin compensation shims. After the leveling process, the leveling height between the motor mounting base and the motor cannot exceed 0.1 mm.

If a metallic base is used to level the height of the motor shaft end and the shaft end of the driven machine, level only the metallic base relating to the concrete base.

Record the maximum leveling deviations in the installation report.

6.6. ALIGNMENT

The correct alignment between the motor and the driven machine is one of the most important variables that extends the useful service life of the motor. Incorrect coupling alignment generates high loads and vibrations reducing the useful life of the bearings and even resulting in shaft breakages. Figure 6.10 illustrates the misalignment between the motor and the driven machine.

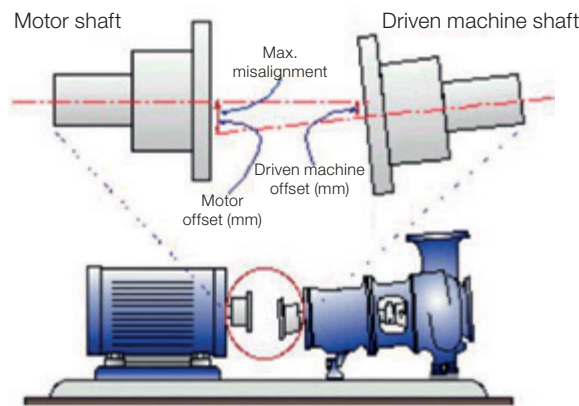


Figure 6.10 - Typical misalignment condition

Alignment procedures must be carried out using suitable tools and devices, such as dial gauge, laser alignment instruments, etc.. The motor shaft must be aligned axially and radially with the driven machine shaft.

The maximum allowed eccentricity for a complete shaft turn should not exceed 0.03 mm, when alignment is made with dial gauges, as shown in Figure 6.11. Ensure a gap between couplings to compensate the thermal expansion between the shafts as specified by the coupling manufacturer.

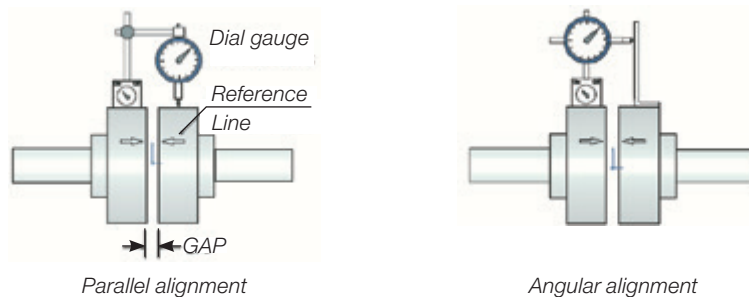


Figure 6.11 - Alignment with dial gauge

If alignment is made by a laser instrument, please consider the instructions and recommendations provided by the laser instrument manufacturer.

The alignment should be checked at ambient temperature with machine at operating temperature.



The coupling alignment must be checked periodically.

Pulley and belt couplings must be so aligned that the driver pulley center lies in the same plane of the driven pulley center and the motor shaft and the shaft of the driven machine are perfectly parallel.

After completing the alignment procedures, ensure that mounting devices do not change the motor and machine alignment and leveling resulting into machine damage during operation.

It is recommended to record the maximum alignment deviation in the Installation Report.

6.7. CONNECTION OF OIL LUBRICATED OR OIL MIST LUBRICATED MOTORS

When oil lubricated or oil mist lubricated motors are installed, connect the existing lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 6.12. The lubrication system must ensure continuous oil flow through the bearings as specified by the manufacturer of the installed lubrication system.

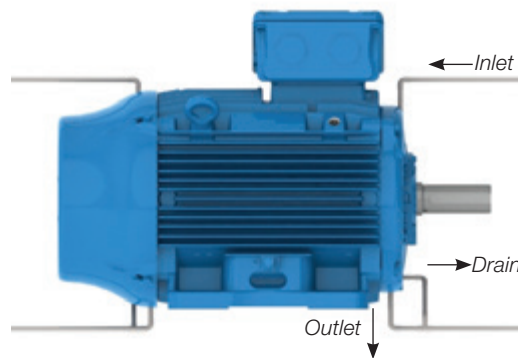


Figure 6.12 - Oil supply and drain system of oil lubricated or oil mist lubricated motors

6.8. CONNECTION OF THE COOLING WATER SYSTEM

When water cooled motors are installed, connect the water inlet and outlet tubes to ensure proper motor cooling. According to item 7.2, ensure correct cooling water flow rate and water temperature in the motor cooling system.

6.9. ELECTRICAL CONNECTION

Consider the rated motor current, service factor, starting current, environmental and installation conditions, maximum voltage drop, etc. to select appropriate power supply cables and switching and protection devices. All motors must be installed with overload protection systems. Three-phase motors should be fitted with phase fault protection systems.



Before connecting the motor, check if the power supply voltage and the frequency comply with the motor nameplate data. All wiring must be made according to the connection diagram on the motor nameplate. Please consider the connection diagrams in the Table 6.2 as reference value.

To prevent accidents, check if motor has been solidly grounded in accordance with the applicable standards.



Table 6.2 - Typical connection diagram for three-phase motors.

Configuration	Quantity of leads	Type of connection	Connection diagram															
Single speed	3	-																
	6	Δ - Y																
	9	YY - Y																
		$\Delta\Delta$ - Δ																
	12	$\Delta\Delta$ - YY - Δ - Y																
	Δ - PWS Part-winding start	<table border="0"> <tr> <td colspan="2" style="text-align: center;">PART-WINDING</td> <td colspan="2" style="text-align: center;">WYE-DELTA</td> </tr> <tr> <td style="text-align: center;">START</td> <td style="text-align: center;">RUN</td> <td style="text-align: center;">START</td> <td style="text-align: center;">RUN</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>L1 L2 L3</td> <td>L1 L2 L3</td> <td>L1 L2 L3</td> <td>L1 L2 L3</td> </tr> </table>	PART-WINDING		WYE-DELTA		START	RUN	START	RUN					L1 L2 L3	L1 L2 L3	L1 L2 L3	L1 L2 L3
PART-WINDING		WYE-DELTA																
START	RUN	START	RUN															
L1 L2 L3	L1 L2 L3	L1 L2 L3	L1 L2 L3															
Double speed Dahlander	6	YY - Y Variable Torque																
		Δ - YY Constant Torque																
		YY - Δ Constant Output																
	9	Δ - Y - YY																
Double speed Double winding	6	-																

Equivalent table for lead identification

Lead identification on the wiring diagram		1	2	3	4	5	6	7	8	9	10	11	12
Single speed	NEMA MG 1 Part 2	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
	IEC 60034-8	U1	V1	W1	U2	V2	W2	U3	V3	W3	U4	V4	W4
	JIS (JEC 2137) - up to 6 terminals	U	V	W	X	Y	Z						
	JIS (JEC 2137) - above 6 terminals	U1	V1	W1	U2	V2	W2	U5	V5	W5	U6	V6	W6
Double speed (Dahlander / Double winding)	NEMA MG 1 Part 2 ¹⁾	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	IEC 60034-8	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W
	JIS (JEC 2137)	1U	1V	1W	2U	2V	2W	3U	3V	3W	4U	4V	4W

1) NEMA MG 1 Part 2 defines T1 to T12 for two or more winding, however WEG adopts 1U to 4W.



WARNING - Local Standards have priority on the definition of the connection standards.

The connections presented below are a reference for the connection of the customer's power cables on low voltage motors with terminal block. The terminal blocks presented below are the standard for each product line, however variations may occur.

It is recommended the use of terminals made of electrolytic copper or brass, similar to the terminals used on the motors cables.

W21 and W22

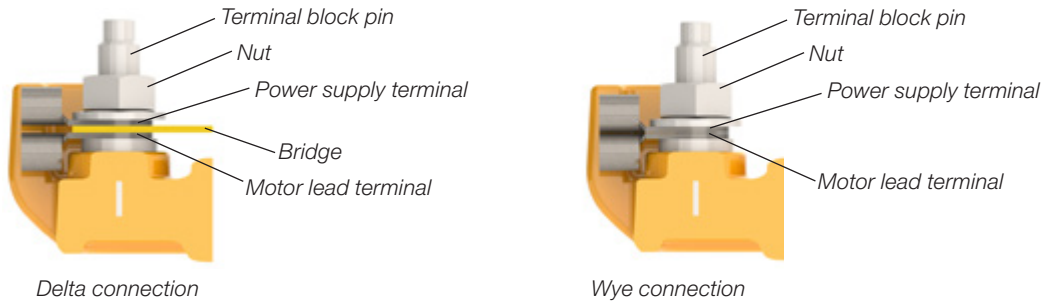


Figure 6.13 - Connection for W21 and W22 motors with terminal block

W50 and HGF

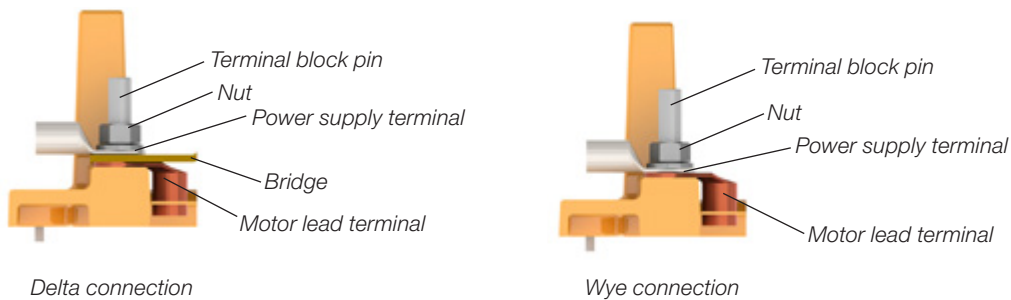


Figure 6.14 - Connection for W50 and HGF motors with terminal block

If motors are supplied without terminal blocks, insulate the cable terminals with suitable insulation material that meets the power supply voltage and the insulation class indicated on the motor nameplate.

Ensure correct tightening torque for the power cable and grounding connections as specified in Table 8.11

The clearance distance (see Figure 6.15) between non-insulated live parts with each other and between grounded parts must be as indicated in Table 6.3.

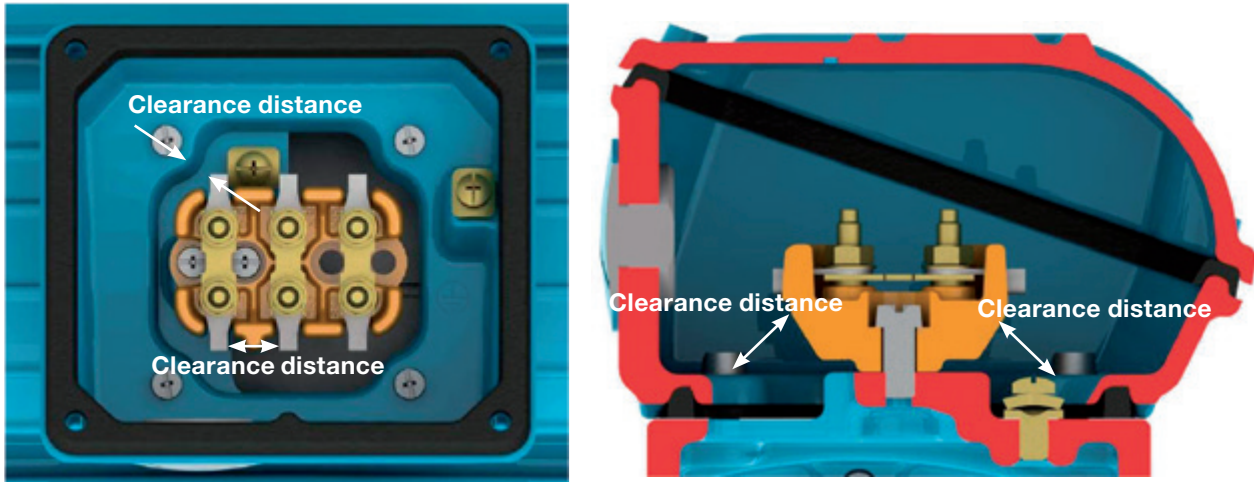


Figure 6.15 - Clearance distance representation

Table 6.3 - Minimum clearance distance (mm) x supply voltage

Voltage	Minimum clearance distance (mm)
$U \leq 440 \text{ V}$	4
$440 < U \leq 690 \text{ V}$	5.5
$690 < U \leq 1000 \text{ V}$	8
$1000 < U \leq 6900 \text{ V}$	45
$6900 < U \leq 11000 \text{ V}$	70
$11000 < U \leq 16500 \text{ V}$	105

Even when the motor is off, dangerous voltages may be present inside the terminal box used for the space heater supply or winding energization when the winding is used as heating element. Motor capacitors will hold a charge even after the power has been cut off. Do not touch the capacitors and/or motor terminals, before discharging the capacitors completely.

After the motor connection has been completed, ensure that no tool or foreign body has been left inside the terminal box.

Take the required measures in order to ensure the degree of protection indicated on the motor nameplate:

- unused cable inlet holes in the terminal boxes must be properly closed with blanking plugs;
- components supplied loose (for example, terminal boxes mounted separately) must be properly closed and sealed.

The cable inlets used for power supply and control must be fitted with components (for example, cable-glands and conduits) that meet the applicable standards and regulations in each country.

If the motor is fitted with accessories, such as brakes and forced cooling systems, these devices must be connected to the power supply according to the information provided on their nameplates and with special care as indicated above.

All protection devices, including overcurrent protection, must be set according to the rated machine conditions. These protection devices must protect the machine against short circuit, phase fault or locked rotor condition. The motor protection devices must be set according to the applicable standards.

Check the direction of rotation of the motor shaft. If there is no limitation for the use of unidirectional fans, the shaft rotation direction can be changed by reversing any two of the phase connections. For single-phase motor, check the connection diagram indicated on the motor nameplate.

6.10. CONNECTION OF THE THERMAL PROTECTION DEVICES

If the motor is supplied with temperature monitoring devices, such as, thermostat, thermistors, automatic thermal protectors, Pt-100 (RTD), etc., they must be connected to the corresponding control devices as specified on the accessory nameplates. The non-compliance with this procedure may void the product warranty and cause serious material damages.



Do not apply test voltage above 2.5 V on thermistors and current above 1 mA on RTDs (Pt-100) according to IEC 60751 standard.

Figure 6.16 and Figure 6.17 show the connection diagram of the bimetal thermal protector (thermostats) and thermistors, respectively.

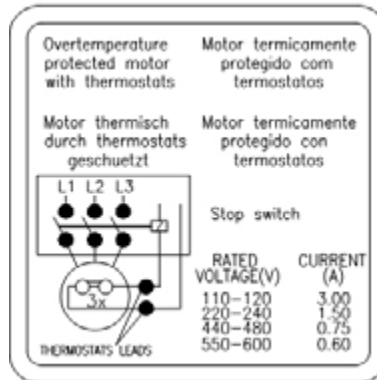


Figure 6.16 - Connection of the bimetal thermal protectors (thermostats)

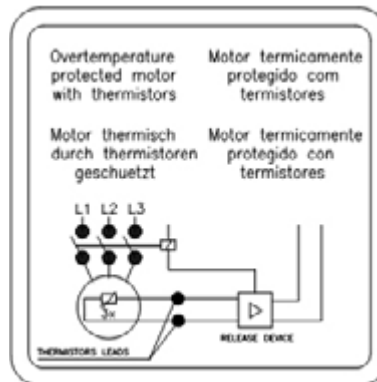


Figure 6.17 - Thermistor connection

The alarm temperature limits and thermal protection shutdowns can be defined according to the application; however these temperature limits can not exceed the values in Table 6.4.

Table 6.4 - Maximum activation temperature of the thermal protections

Component	Insulation class	Maximum temperature of the protection setting (°C)	
		Alarm	Tripping
Winding	B	-	130
	F	130	155
	H	155	180
Bearing	All	110	120

Notes:

- 1) The number and type of the installed protection devices are stated on the accessory nameplate of the motor.
- 2) If the motor is supplied with calibrated resistance, (for example, Pt-100), the motor protection system must be set according to the operating temperatures indicated in Table 6.4.

6.11. RESISTANCE TEMPERATURE DETECTORS (PT-100)

The thermocouples Pt-100 are made of materials, whose resistance depends on the temperature variation, intrinsic property of some materials (usually platinum, nickel or copper), calibrated resistance. Its operation is based on the principle that the electric resistance of a metallic conductor varies linearly with the temperature, thus allowing a continuous monitoring of the motor warm-up through the controller display ensuring a high level of precision and answer stability. These devices are widely used for measuring temperatures in various industry sectors.

In general these devices are used in installations where precise temperature control is required, for example, in installation for irregular or intermittent duty.

The same detector may be used for alarm and tripping purposes.

Table 6.5 and Figure 6.18 show the equivalence between the Pt-100 resistance and the temperature.

Table 6.5 - Equivalence between the Pt-100 resistance and the temperature

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-29	88.617	17	106.627	63	124.390	109	141.908	155	159.180
-28	89.011	18	107.016	64	124.774	110	142.286	156	159.553
-27	89.405	19	107.404	65	125.157	111	142.664	157	159.926
-26	89.799	20	107.793	66	125.540	112	143.042	158	160.298
-25	90.193	21	108.181	67	125.923	113	143.420	159	160.671
-24	90.587	22	108.570	68	126.306	114	143.797	160	161.043
-23	90.980	23	108.958	69	126.689	115	144.175	161	161.415
-22	91.374	24	109.346	70	127.072	116	144.552	162	161.787
-21	91.767	25	109.734	71	127.454	117	144.930	163	162.159
-20	92.160	26	110.122	72	127.837	118	145.307	164	162.531
-19	92.553	27	110.509	73	128.219	119	145.684	165	162.903
-18	92.946	28	110.897	74	128.602	120	146.061	166	163.274
-17	93.339	29	111.284	75	128.984	121	146.438	167	163.646
-16	93.732	30	111.672	76	129.366	122	146.814	168	164.017
-15	94.125	31	112.059	77	129.748	123	147.191	169	164.388
-14	94.517	32	112.446	78	130.130	124	147.567	170	164.760
-13	94.910	33	112.833	79	130.511	125	147.944	171	165.131
-12	95.302	34	113.220	80	130.893	126	148.320	172	165.501
-11	95.694	35	113.607	81	131.274	127	148.696	173	165.872
-10	96.086	36	113.994	82	131.656	128	149.072	174	166.243
-9	96.478	37	114.380	83	132.037	129	149.448	175	166.613
-8	96.870	38	114.767	84	132.418	130	149.824	176	166.984
-7	97.262	39	115.153	85	132.799	131	150.199	177	167.354
-6	97.653	40	115.539	86	133.180	132	150.575	178	167.724
-5	98.045	41	115.925	87	133.561	133	150.950	179	168.095
-4	98.436	42	116.311	88	133.941	134	151.326	180	168.465
-3	98.827	43	116.697	89	134.322	135	151.701	181	168.834
-2	99.218	44	117.083	90	134.702	136	152.076	182	169.204
-1	99.609	45	117.469	91	135.083	137	152.451	183	169.574
0	100.000	46	117.854	92	135.463	138	152.826	184	169.943
1	100.391	47	118.240	93	135.843	139	153.200	185	170.313
2	100.781	48	118.625	94	136.223	140	153.575	186	170.682
3	101.172	49	119.010	95	136.603	141	153.950	187	171.051
4	101.562	50	119.395	96	136.982	142	154.324	188	171.420
5	101.953	51	119.780	97	137.362	143	154.698	189	171.789
6	102.343	52	120.165	98	137.741	144	155.072	190	172.158
7	102.733	53	120.550	99	138.121	145	155.446	191	172.527
8	103.123	54	120.934	100	138.500	146	155.820	192	172.895
9	103.513	55	121.319	101	138.879	147	156.194	193	173.264
10	103.902	56	121.703	102	139.258	148	156.568	194	173.632
11	104.292	57	122.087	103	139.637	149	156.941	195	174.000
12	104.681	58	122.471	104	140.016	150	157.315	196	174.368
13	105.071	59	122.855	105	140.395	151	157.688	197	174.736
14	105.460	60	123.239	106	140.773	152	158.061	198	175.104
15	105.849	61	123.623	107	141.152	153	158.435	199	175.472
16	106.238	62	124.007	108	141.530	154	158.808	200	175.840

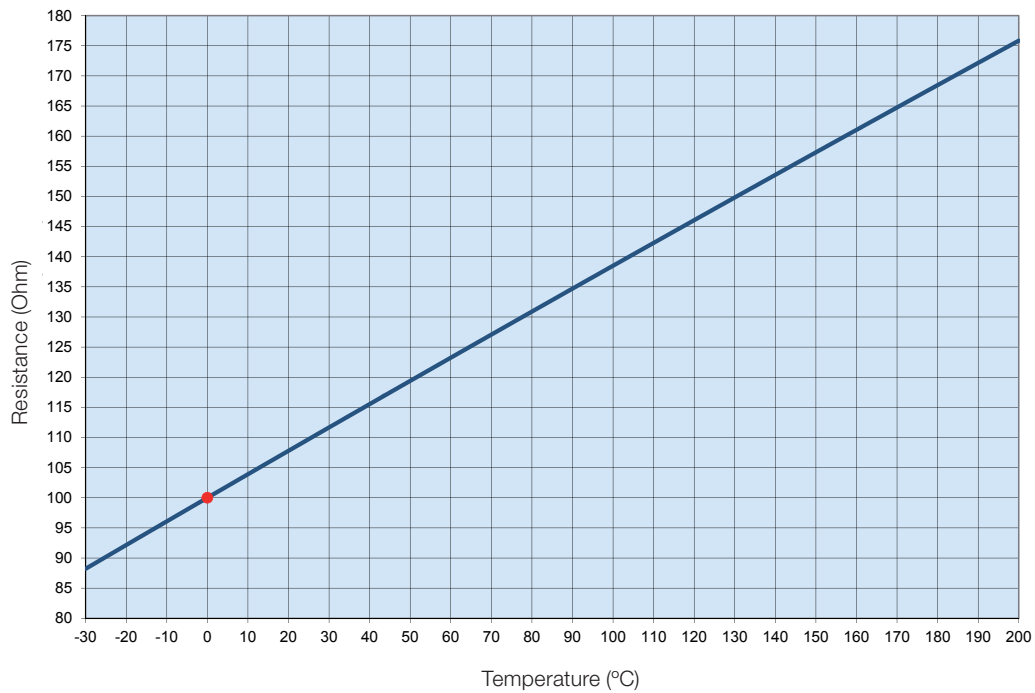


Figure 6.18 - Ohmic resistance of the Pt-100 x temperature

6.12. CONNECTION OF THE SPACE HEATERS

Before switching ON the space heaters, check if the space heaters connection have been made according to the connection diagram shown on the space heater nameplate. For motors supplied with dual voltage space heaters (110-127/220-240 V), see Figure 6.19.

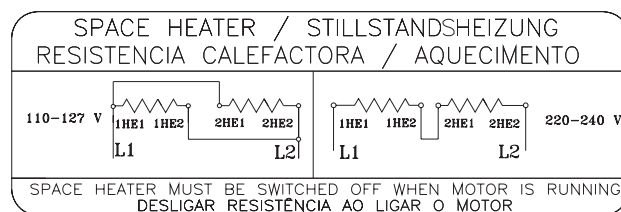


Figure 6.19 - Dual voltage space heater connection



The space heaters should never be energized when the motor is in operation.

6.13. STARTING METHODS

Whenever possible, the motor starting must be Direct On Line (DOL) at rated voltage. This is the most simple and feasible starting method. However, it must only be applied when the starting current does not affect the power supply. Please consider the local electric utility regulations when installing a motor.

High inrush current may result in:

- a) high voltage drop in the power supply line creating unacceptable line disturbance on the distribution system;
- b) requiring oversized protection system (cables and contactor) increasing the installation costs.

If DOL starting is not allowed due to the reasons mentioned above, an indirect starting method compatible with the load and motor voltage to reduce the starting current may be used.

If reduced voltage starters are used for starting, the motor starting torque will also be reduced.

Table 6.6 shows the possible indirect starting methods that can be used depending on the number of the motor leads.

Table 6.6 - Starting method x number of motor leads

Number of leads	Possible starting methods
3 leads	Autotransformer Soft-starter
6 leads	Star-Delta Autotransformer Soft-starter
9 leads	Series/Parallel Part winding Autotransformer Soft-starter
12 leads	Star-Delta Series/Parallel Part winding Autotransformer Soft-starter

Table 6.7 shows examples of possible indirect starting methods to be used according to the voltage indicated on the motor nameplate and the power supply voltage.

Table 6.7 - Starting methods x voltage

Nameplate voltage	Operating voltage	Star-delta	Autotransformer starting	Starting by series/parallel switch	Part-winding starting	Starting by Soft-starter
220/380 V	220 V	YES	YES	NO	NO	YES
	380 V	NO	YES	NO	NO	YES
220/440 V	220 V	NO	YES	YES	YES	YES
	440 V	NO	YES	NO	NO	YES
230/460 V	230 V	NO	YES	YES	YES	YES
	460 V	NO	YES	NO	NO	YES
380/660 V	380 V	YES	YES	NO	NO	YES
220/380/440 V	220 V	YES	YES	YES	YES	YES
	380 V	NO	YES	YES	YES	YES
	440 V	YES	YES	NO	NO	YES



The WQuattro line motors must be started direct on-line (DOL) or driven by a frequency inverter in scalar mode.

6.14. MOTORS DRIVEN BY FREQUENCY INVERTER



The operation with frequency inverter must be stated in the Purchase Order since this drive type may require some changes of the motor design.



Wmagnet Motors must only be driven by WEG frequency inverter.

The frequency inverter used to drive motors up to 690 V must be fitted with Pulse With Modulation (PWM) with vector control.

When a motor is driven by a frequency inverter at lower frequencies than the rated frequency, you must reduce the motor torque to prevent motor overheating. The torque reduction (derating torque) can be found in the item 6.4 of the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available on the site www.weg.net.

If the motor is operated above the rated frequency, please note:

- That the motor must be operated at constant output;
- That the motor can supply max. 95% of its rated output;
- Do not exceed the maximum speed and please consider:
 - max. operating frequency stated on the additional nameplate;
 - mechanical speed limitation of the motor.

Information on the selection of the power cables between the frequency inverter and the motor can be found in the item 6.4 of the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available at www.weg.net.

6.14.1. Use of dV/dt filter

6.14.1.1. Motor with enameled round wire

Motors designed for rated voltages up to 690 V, when driven by frequency inverter, do not require the use of dV/dT filters, provided that following criteria are considered.

Criteria for the selection of motors with round enameled wire when driven by frequency inverter				
Motor rated voltage ¹	Peak voltage at the motor terminals (max)	dV/dt inverter output (max)	Inverter Rise Time ² (min.)	MTBP ² Time between pulses (min)
$V_{nom} < 460 \text{ V}$	$\leq 1600 \text{ V}$	$\leq 5200 \text{ V}/\mu\text{s}$	$\geq 0,1 \mu\text{s}$	$\geq 6 \mu\text{s}$
$460 \leq V_{nom} < 575 \text{ V}$	$\leq 2000 \text{ V}$	$\leq 6500 \text{ V}/\mu\text{s}$		
$575 \leq V_{nom} \leq 1000 \text{ V}$	$\leq 2400 \text{ V}$	$\leq 7800 \text{ V}/\mu\text{s}$		

Notes:

1. For the application of dual voltage motors, example 380/660 V, consider the lower voltage (380 V).
2. Information supplied by the inverter manufacturer.

6.14.1.2. Motor with prewound coils

Motors with prewound coils (medium and high voltage motors regardless of frame sizes, and low voltage motors from IEC 500 / NEMA 800 frame on), designed for the use with frequency inverters, do not require the use of filters, provided they comply with the criteria in Table 6.8.

Table 6.8 - Criteria to be considered when using motor with prewound coils to be drive by frequency inverters

Motor rated voltage	Type of modulation	Turn to turn insulation (phase-phase)		Phase-ground insulation	
		Peak voltage at the motor terminals	dV/dt at the motor terminals	Peak voltage at the motor terminals	dV/dt at the motor terminals
$690 < V_{nom} \leq 4160 \text{ V}$	Sinusoidal	$\leq 5900 \text{ V}$	$\leq 500 \text{ V}/\mu\text{s}$	$\leq 3400 \text{ V}$	$\leq 500 \text{ V}/\mu\text{s}$
	PWM	$\leq 9300 \text{ V}$	$\leq 2700 \text{ V}/\mu\text{s}$	$\leq 5400 \text{ V}$	$\leq 2700 \text{ V}/\mu\text{s}$
$4160 < V_{nom} \leq 6600 \text{ V}$	Sinusoidal	$\leq 9300 \text{ V}$	$\leq 500 \text{ V}/\mu\text{s}$	$\leq 5400 \text{ V}$	$\leq 500 \text{ V}/\mu\text{s}$
	PWM	$\leq 14000 \text{ V}$	$\leq 1500 \text{ V}/\mu\text{s}$	$\leq 8000 \text{ V}$	$\leq 1500 \text{ V}/\mu\text{s}$

6.14.2. Bearing insulation

Only the motors in IEC frame size 400 (NEMA 680) and larger are supplied, as standard, with insulated bearing. If motor must be driven by frequency inverter, insulate the bearing according to Table 6.9.

Table 6.9 - Recommendation on the bearing insulation for inverter driven motors

Frame size	Recommendation
IEC 315 and 355 NEMA 445/7 to L5810/11	<ul style="list-style-type: none"> ■ Insulated bearing/end shield ■ Grounding between shaft and frame by grounding brush
IEC 400 and larger NEMA 680 and larger	<ul style="list-style-type: none"> ■ Insulated NDE bearing ■ Grounding between shaft and frame by grounding brush



When motors are supplied with shaft grounding system, monitor the grounding brush constantly during its operation and, when it reaches the end of its useful life, it must be replaced by another brush with the same specification.

6.14.3. Switching frequency

The minimum inverter switching frequency must not be lower than 2 kHz and should not exceed 5 kHz.



The non-compliance with the criteria and recommendations indicated in this manual may void the product warranty.

6.14.4. Mechanical speed limitation

Table 6.10 shows the maximum speeds allowed for motors driven by frequency inverter.

Table 6.10 - Maximum motor speed (in rpm)

Frame size		DE-bearing	Maximum speed for standard motors
IEC	NEMA		
63-90	143/5	6201 6202 6203 6204 6205	10400
100	-	6206	8800
112	182/4	6207 6307	7600 6800
132	213/5	6308	6000
160	254/6	6309	5300
180	284/6	6311	4400
200	324/6	6312	4200
225-630	364/5-9610	6314	3600
		6315	3600
		6316	3200
		6319	3000
		6218	3600
		6220	3600
		6320	2200
		6322	1900
		6324	1800
		6328	1800
		6330	1800
		6224	1800
		6228	1800

Note:

To select the maximum allowed motor speed, consider the motor torque derating curve.

For more information on the application of frequency inverters, contact WEG or check the “Technical Guidelines for Induction Motors driven by PWM Frequency inverters” available at www.weg.net.

7. COMMISSIONING

7.1. INITIAL START-UP

After finishing the installation procedures and before starting the motor for the first time or after a long period without operation, the following items must be checked:

- If the nameplate data (voltage, current, connection diagram, degree of protection, cooling system, service factor, etc.) meet the application requirements;
- If the machine set (motor + driven machine) has been mounted and aligned correctly;
- If the motor driving system ensures that the motor speed does not exceed the max. allowed speed indicated in Table 6.10;
- Measure the winding insulation resistance, making sure it complies with the specified values in item 5.4;
- Check the motor rotation direction;
- Inspect the motor terminal box for damage and ensure that it is clean and dry and all contacts are rust-free, the seals are in perfect operating conditions and all unused threaded holes are properly closed thus ensuring the degree of protection indicated on the motor nameplate;
- Check if the motor wiring connections, including grounding and auxiliary equipment connection, have been carried out properly and are in accordance with the recommendations in item 6.9;
- Check the operating conditions of the installed auxiliary devices (brake, encoder, thermal protection device, forced cooling system, etc.);
- Check bearing operating conditions. If the motors are stored and/or installed for more than two years without running, it is recommended to change the bearings, or to remove, wash, inspect and relubricate them before the motor is started. If the motor is stored and/or installed according to the recommendations described in item 5.3, lubricate the bearings as described in item 8.2. For the bearing condition evaluation, it is recommended to use of the vibration analysis techniques: Envelope Analysis or Demodulation Analysis.
- For roller bearing motors with oil lubrication, ensure:
 - The oil level should be in the center of the sight glass (see Figure 8.1 and 8.2);
 - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- When motors are fitted with sleeve bearings, ensure:
 - Correct oil level for the sleeve bearing. The oil level should be in the center of the sight glass (see Figure 8.3);
 - That the motor is not started or operated with axial or radial loads;
 - That if the motor is stored for a period equal or longer than the oil change interval, the oil must be changed before starting the motor.
- Inspect the capacitor operating condition, if any. If motors are installed for more than two years, but were never commissioned, it is recommended to change the start capacitors since they lose their operating characteristics;
- Ensure that the air inlet and outlet opening are not blocked. The minimum clearance to the nearest wall (L) should be at least $\frac{1}{4}$ of the fan cover diameter (D), see Figure 7.1. The intake air temperature must be at ambient temperature.

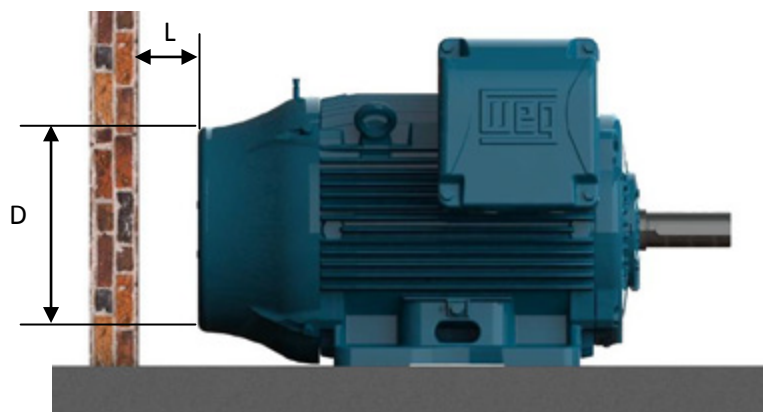


Figure 7.1- Minimum clearance to the wall

Please consider the minimum distances shown in the Table 7.1 as reference value;

Table 7.1 - Minimum distance between the fan cover and wall

Frame size		Distance between the fan cover and the wall (L)	
IEC	NEMA	mm	inches
63	-	25	0.96
71	-	26	1.02
80	-	30	1.18
90	143/5	33	1.30
100	-	36	1.43
112	182/4	41	1.61
132	213/5	50	1.98
160	254/6	65	2.56
180	284/6	68	2.66
200	324/6	78	3.08
225	364/5	85	3.35
250	404/5		
280	444/5	108	4.23
	445/7		
	447/9		
315	L447/9	122	4.80
	504/5		
	5006/7/8		
	5009/10/11		
355	586/7	136	5.35
	588/9		
	5807/8/9		
	5810/11/12		
400	6806/7/8	147	5.79
	6809/10/11		
450	7006/10	159	6.26
500	8006/10	171	6.73
560	8806/10	185	7.28
630	9606/10	200	7.87

- Ensure correct water flow rate and water temperature when water cooled motors are used. See item 7.2;
- Ensure that all rotating parts, such as pulleys, couplings, external fans, shaft, etc. are protected against accidental contact.

Other tests and inspections not included in the manual may be required, depending on the specific installation, application and/or motor characteristics.

After all previous inspections have been carried out, proceed as follows to start the motor:

- Start the motor on no-load (if possible) and check the motor direction of rotation. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions;
- Ensure the motor starts smoothly. If any abnormal operating condition is noticed, switch off the motor, check the assembly system and connections before the motor is started again;
- If excessive vibrations are noticed, check if the motor mounting bolts are well tightened or if the vibrations are not generated and transmitted from adjacent installed equipment. Check the motor vibration periodically and ensure that the vibration limits are as specified in item 7.2.1;
- Start the motor at rated load during a short time and compare the operating current with the rated current indicated on the nameplate;
- Continue to measure the following motor variables until thermal equilibrium is reached: current, voltage, bearing and motor frame temperature, vibration and noise levels;
- Record the measured current and voltage values on the Installation Report for future comparisons.

As induction motors have high inrush currents during start-up, the acceleration of high inertia load requires an extended starting time to reach full speed resulting in fast motor temperature rise. Successive starts within short intervals will result in winding temperature increases and can lead to physical insulation damage reducing the useful life of the insulation system. If the duty cycle S1 / CONT. is specified on the motor nameplate, this means that the motor has been designed for:

- Two successive starts: first start from cold condition, i. e., the motor windings are at room temperature and the second start immediately after the motor stops;
- One start from hot condition, i. e., the motor windings are at rated temperature.

The Troubleshooting Chart in section 10 provides a basic list of unusual cases that may occur during motor operation with the respective corrective actions.

7.2. OPERATING CONDITIONS

Unless otherwise stated in the Purchase Order, electric motors are designed and built to be operated at altitudes up to 1000 meters above sea level and in a temperature range from -20 °C to +40 °C. Any deviation from the normal condition of motor operation must be stated on the motor nameplate. Some components must be changed if the ambient temperature is different from the specified one. Please contact WEG to check the required special features.

For operating temperatures and altitudes differing from those above, the factors indicated in Table 7.2 must be applied to the nominal motor power rating in order to determine the derated available output ($P_{max} = P_{nom} \times$ correction factor).

Table 7.2 - Correction factors for altitude and ambient temperature

T (°C)	Altitude (m)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
10							0.97	0.92	0.88
15						0.98	0.94	0.90	0.86
20					1.00	0.95	0.91	0.87	0.83
25				1.00	0.95	0.93	0.89	0.85	0.81
30			1.00	0.96	0.92	0.90	0.86	0.82	0.78
35		1.00	0.95	0.93	0.90	0.88	0.84	0.80	0.75
40	1.00	0.97	0.94	0.90	0.86	0.82	0.80	0.76	0.71
45	0.95	0.92	0.90	0.88	0.85	0.81	0.78	0.74	0.69
50	0.92	0.90	0.87	0.85	0.82	0.80	0.77	0.72	0.67
55	0.88	0.85	0.83	0.81	0.78	0.76	0.73	0.70	0.65
60	0.83	0.82	0.80	0.77	0.75	0.73	0.70	0.67	0.62
65	0.79	0.76	0.74	0.72	0.70	0.68	0.66	0.62	0.58
70	0.74	0.71	0.69	0.67	0.66	0.64	0.62	0.58	0.53
75	0.70	0.68	0.66	0.64	0.62	0.60	0.58	0.53	0.49
80	0.65	0.64	0.62	0.60	0.58	0.56	0.55	0.48	0.44

Motors installed inside enclosures (cubicles) must be ensured an air renewal rate in the order of one cubic meter per second for each 100 kW installed power or fraction of installed power. Totally Enclosed Air Over motors - TEAO (fan and exhaust / smoke extraction) are supplied without cooling fan and the manufacturer of the driven machine is responsible for sufficient motor cooling. If no minimum required air speed between motor fins is indicated on the motor nameplate, ensure the air speed indicated in the table 7.3 is provided. The values shown in Table 7.3 are valid for 60 Hz motors. To obtain the minimum air speed for 50 Hz motors, multiply the values in the table by 0.83.

Table 7.3 - Minimum required air speed between motor fins (metres/second)

Frame		Poles			
IEC	NEMA	2	4	6	8
63 to 90	143/5	13	7	5	4
100 to 132	182/4 to 213/5	18	12	8	6
160 to 200	254/6 to 324/6	20	15	10	7
225 to 280	364/5 to 444/5	22	20	15	12
315 to 450	445/7 to 7008/9	25	25	20	15

The voltage and frequency variations may affect the performance characteristics and the electromagnetic compatibility of the motor. The power supply variations should not exceed the values specified in the applicable standards. Examples:

- ABNT NBR 17094 - Parts 1 and 2. The motor has been designed to supply the rated torque for a combined variation in voltage and frequency:
 - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
 - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods.

- IEC 60034-1. The motor has been designed to supply the rated torque for combined variation in voltage and frequency:
 - Zone A: ±5% of the rated voltage and ±2% of the rated frequency;
 - Zone B: ±10% of the rated voltage and +3% -5% of the rated frequency.

When operated continuously in Zone A or B, the motor may show performance variations and the operating temperature may increase considerably. These performance variations will be higher in Zone B. Thus it is not recommended to operate the motor in Zone B during extended periods. For multivoltage motors (example 380-415/660 V), a ±5% voltage variation from the rated voltage is allowed.

- NEMA MG 1 Part 12. The motor has been designed to be operated in one of the following variations:
 - ±10% of the rated voltage, with rated frequency;
 - ±5% of the rated frequency, with rated voltage;
 - A combined variation in voltage and frequency of ±10%, provided the frequency variation does not exceed ±5%.

If the motor is cooled by ambient air, clean the air inlet and outlet openings and cooling fins at regular intervals to ensure a free airflow over the frame surface. The hot air should never be returned to the motor. The cooling air must be at room temperature limited to the temperature range indicated on the motor nameplate (if no room temperature is specified, please consider a temperature range between -20 °C and +40 °C).

Table 7.4 shows the minimum required water flow for water cooled motors considering the different frame sizes and the maximum allowed temperature rise of the cooling water after circulating through the motor. The inlet water temperature should not exceed 40 °C.

Table 7.4 - Minimum required water flow and the maximum allowed temperature rise of the cooling water after circulating through the motor

Frame size		Flow rate (litres/minute)	Maximum allowed water temperature rise (°C)
IEC	NEMA		
180	284/6	12	5
200	324/6	12	5
225	364/5	12	5
250	404/5	12	5
280	444/5	15	6
	445/7		
	447/9		
315	504/5	16	6
355	586/7	25	6
	588/9		

Motors fitted with oil mist lubrication systems can be operated continuously for a maximum of one hour after the failure of the oil pumping system.

Considering the sun's heat increases the operating temperature, externally mounted motors should always be protected from direct sunlight exposure.

Each and every deviation from the normal operating condition (tripping of the thermal protection, noise and vibration level increase, temperature and current rise) should be investigated and corrected by WEG Authorized Service Centers.



Motors fitted with cylindrical roller bearings require a minimum radial load to ensure a normal operation. For information regarding the radial preload, please contact WEG.

7.2.1.Limits of vibration

The vibration severity is the maximum vibration value measured at all positions and in all directions as recommended in the standard IEC 60034-14. Table 7.5 specifies the limits of the maximum vibrations magnitudes according to standard IEC 60034-14 for shaft heights IEC 56 to 400, for vibrations grades A and B. The vibration severity limits in Table 7.5 are given as RMS values (Root Mean Square values or effective values) of the vibration speed in mm/s measured in free suspension condition.

Table 7.5 - Recommended limits for the vibration severity according to standard IEC 60034-14

Shaft height [mm]	56 ≤ H ≤ 132	132 ≤ H ≤ 280	H > 280
Vibration grade	Vibration severity on elastic base [mm/s RMS]		
A	1.6	2.2	2.8
B	0.7	1.1	1.8

Notes:

- 1 - The values in Table 7.5 are valid for measurements carried out with decoupled machines (without load) operated at rated voltage and frequency.
- 2 - The values in Table 7.5 are valid regardless of the direction of rotation of the machine.
- 3 - The values in Table 7.5 are not applicable to single-phase motors, three-phase motors powered by a single-phase system or to machines mounted in situ or coupled with inertia flywheels or to loads.

According to NEMA MG 1, the allowed vibration limit for standard motors is 0.15 in/s (peak vibration in in/s).

Note:

For the load operation condition, the use of the standard ISO 10816-3 is recommended for evaluating the motor vibration limits. In the load condition the motor vibration will be influenced by several factors, such as, type of the coupled load, condition of the motor fixation, alignment condition under load, structure or base vibration due to other equipments, etc..

8. MAINTENANCE

The purpose of the maintenance is to extend the useful life of the equipment. The non-compliance with one of these previous items can cause unexpected machine failures.

If motors with cylindrical roller or angular contact bearings are to be transported during the maintenance procedures, the shaft locking device must always be fitted. All HGF motors, regardless of the bearing type, must always be transported with the shaft locking device fitted.

All repairs, disassembly and assembly related services must be carried out only by qualified and well-trained personnel by using proper tools and techniques. Make sure that the machine has stopped and it is disconnected from the power supply, including the accessory devices (space heater, brake, etc.), before any servicing is undertaken.

The company does not assume any responsibility or liability for repair services or maintenance operations executed by non-authorized Service Centers or by non qualified service personnel. The company shall have no obligation or liability whatsoever to the buyer for any indirect, special, consequential or incidental loss or damage caused or arising from the company's proven negligence

8.1. GENERAL INSPECTION

The inspection intervals depend on the motor type, application and installation conditions. Proceed as follows during inspection:

- Visually inspect the motor and coupling. Check if abnormal noises, vibrations, excessive heating, wear signs, misalignment or damaged parts are noticed. Replace the damaged parts as required;
- Measure the insulation resistance according to the item 5.4;
- Clean the motor enclosure. Remove oil spills and dust accumulation from the motor frame surface to ensure a better heat transfer to the surrounding ambient;
- Check cooling fan condition and clean the air inlet & outlet openings to ensure a free air flow over the motor;
- Investigate the actual condition of the seals and replace them, if required;
- Drain the condensed water from inside the motor. After draining, reinstall the drain plugs to ensure the degree of protection as indicated on the motor nameplate. The motor must always be positioned so the drain hole is at the lowest position (see item 6);
- Check the connections of the power supply cables, ensuring the correct clearance distance between live and grounded parts, as specified in Table 6.3;
- Check if the tightening torque of the bolted connections and mounting bolts meets the tightening torque specified in Table 8.11;
- Check the status of the cable passages, the cable gland seals and the seals inside the terminal box and replace them, if required;
- Check the bearing operating conditions. Check for the presence of any abnormal noise, vibration or other abnormal operating conditions, like motor temperature rise. Check the oil level, the lube oil condition and compare the workings hours with the informed life time;
- Record and file all changes performed on the motor.



Do not reuse damaged or worn parts. Damaged or worn parts must be replaced by parts supplied by the manufacturer and must be installed as if they were the original parts.

8.2. LUBRICATION

Proper lubrication plays a vital role in the motor performance. Only use the grease or oil types, amounts and lubrication intervals recommended for the bearings. This information is available on the motor nameplate and the lubrication procedures must be carried out according to the type of lubricant (oil or grease).

When the motor is fitted with thermal protection devices for bearing temperature control, consider the operating temperature limits shown in Table 6.4.

The maximum operating temperature of motors used in special applications may differ from those shown in Table 6.4. The grease and oil disposal should be made in compliance with applicable laws in each country.



Please contact WEG when motors are to be installed in special environments or used for special applications.

8.2.1. Grease lubricated rolling bearings



Excess grease causes bearing overheating, resulting in bearing failure.

The lubrication intervals specified in Table 8.1, Table 8.2, Table 8.3, Table 8.4, Table 8.5, Table 8.6, Table 8.7 and Table 8.8 consider an absolute temperature on the bearing of 70 °C (up to frame size IEC 200 / NEMA 324/6) and 85 °C (for frame size IEC 225 / NEMA 364/5 and above), the motor running at rated speed, a motor mounted in horizontal position and greased with Mobil Polyrex EM grease. Any variation of the parameters listed above must be evaluated.

Table 8.1 - Lubrication intervals for ball bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)							
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)			
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
90	143/5	2	6205	4	-	-	20000	20000	25000	25000		
		4										
		6										
		8										
100	-	2	6206	5	-	-	20000	20000				
		4										
		6										
		8										
112	182/4	2	6207/ 6307	9	-	-	20000	20000				
		4										
		6										
		8										
132	213/5	2	6308	11	-	-	20000	18400				
		4					20000	20000				
		6										
		8										
160	254/6	2	6309	13	20000	20000	18100	15700				
		4					20000	20000				
		6										
		8										
180	284/6	2	6311	18	20000	20000	13700	11500				
		4					20000	20000				
		6										
		8										
200	324/6	2	6312	21	20000	20000	11900	9800				
		4					20000	20000				
		6										
		8										
225 250 280 315 355	364/5 404/5 444/5	2	6314	27	18000	14400	4500	3600	5000	4000		
		4					11600	9700	14000	12000		
		6					20000	20000	16400	14200	20000	17000
		8					19700	17300	24000	20000		
	445/7 447/9	L447/9	2	6316	34	14000	*Upon request	3500	*Upon request	4000	*Upon request	
			4					10400	8500	13000	10000	
			6									
			8									
	504/5 5008	5010/11 586/7 588/9	2	6319	45	20000	20000	*Upon request				
			4					9000	7000	11000	8000	
			6					13000	11000	16000	13000	
			8					17400	14000	20000	17000	
6	8	4	6322	60	20000	20000	7200	5100	9000	6000		
							6	10800	9200	13000	11000	
							8	15100	11800	19000	14000	

Table 8.2 - Lubrication intervals for cylindrical roller bearings

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)							
					ODP (Open Drip Proof)		W21 TEFC (Totally Enclosed Fan Cooled)		W22 TEFC (Totally Enclosed Fan Cooled)			
IEC	NEMA				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz		
160	254/6	2	NU309	13	20000	20000	19600	13300	9800	16000	12000	
		4					20000	20000	20000	20000	25000	25000
		6										
		8										
180	284/6	2	NU311	18	18400	12800	9200	6400	11000	8000		
		4			20000	20000	20000	19100	25000	25000		
		6										
		8										
200	324/6	2	NU312	21	15200	10200	7600	5100	9000	6000		
		4			20000	20000	20000	17200	25000	21000		
		6										
		8										
225 250 280 315 355	364/5 404/5 444/5	4	NU314	27	17800	14200	8900	7100	11000	9000		
		6			20000	20000	13100	11000	16000	13000		
		8					16900	15100	20000	19000		
	445/7 447/9	6	NU316	34	15200	12000	7600	6000	9000	7000		
					20000	19000	11600	9500	14000	12000		
						20000	15500	13800	19000	17000		
	L447/9 504/5	4	NU319	45	12000	9400	6000	4700	7000	5000		
					19600	15200	9800	7600	12000	9000		
						20000	20000	13700	12200	17000	15000	
	5008 5010/11 586/7 588/9	4	NU322	60	8800	6600	4400	3300	5000	4000		
					15600	11800	7800	5900	9000	7000		
						20000	20000	11500	10700	14000	13000	

Table 8.3 - Lubrication intervals for ball bearings - HGF line

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8T and 5009/10/11T	2	6314	27	3100	2100
		4 - 8	6320	50	4500	4500
			6316	34	4500	4500
355L/A/B and 355C/D/E	5807/8/9T and 5810/11/12T	2	6314	27	3100	2100
		4 - 8	6322	60	4500	4500
			6319	45	4500	4500
400L/A/B and 400 C/D/E	6806/7/8T and 6809/10/11T	2	6315	30	2700	1800
		4 - 8	6324	72	4500	4500
			6319	45	4500	4500
450	7006/10	2	6220	31	2500	1400
		4	6328	93	4500	3300
			6322	60	4500	4500
		6 - 8	6328	93	4500	4500
			6322	60	4500	4500
500	8006/10	4	6330	104	4200	2800
			6324	72	4500	4500
		6 - 8	6330	104	4500	4500
			6324	72	4500	4500
560	8806/10	4 - 8	*Upon request			
630	9606/10	4 - 8				

ENGLISH

Table 8.4 - Lubrication intervals for cylindrical roller bearings - HGF line

Frame		Poles	Bearing designation	Amount of grease (g)	Lubrication intervals (hours)	
IEC	NEMA				50 Hz	60 Hz
315L/A/B and 315C/D/E	5006/7/8 and 5009/10/11	4	NU320	50	4300	2900
		6 - 8			4500	4500
355L/A/B and 355C/D/E	5807/8/9 and 5810/11/12	4	NU322	60	3500	2200
		6 - 8			4500	4500
400L/A/B and 400C/D/E	6806/7/8 and 6809/10/11	4	NU324	72	2900	1800
		6 - 8			4500	4500
450	7006/10	4	NU328	93	2000	1400
		6			4500	3200
		8			4500	4500
500	8006/10	4	NU330	104	1700	1000
		6			4100	2900
		8			4500	4500
560	8806/10	4	NU228 + 6228	75	2600	1600
		6 - 8		106	4500	4500
630	9606/10	4	NU232 + 6232	92	1800	1000
		6		120	4300	3100
		8		140	4500	4500

Table 8.5 - Lubrication intervals for ball bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mountings Ball bearings	315 H/G	5009/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6320	50		4500	6316	34		4500
	355 J/H	5809/10	2	6314	27	4500	3500	6314	27	4500	3500
			4 - 8	6322	60		4500	6319	45		4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	6218	24	3800	2500	6218	24	3800	1800
			4 - 8	6324	72	4500	4500	6319	45	4500	4500
450 L/K and 450 J/H	7006/07 and 7008/09	2	6220	31	3000	2000	6220	31	3000	2000	
		4	6328	93	4500	3300	6322	60	4500	4500	
6 - 8	4500										
Vertical mountings Ball bearings	315 H/G	5009/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6320	50	4200	3200	6316	34	4500	4500
			6 - 8			4500	4500				
	355 J/H	5809/10	2	7314	27	2500	1700	6314	27	2500	1700
			4	6322	60	3600	2700	6319	45	4500	3600
			6 - 8			4500	4500				4500
	400 L/K and 400 J/H	6806/07 and 6808/09	2	7218	24	2000	1300	6218	24	2000	1300
			4	7324	72	3200	2300	6319	45	4500	3600
			6			4500	4500				4500
	450 L/K and 450 J/H	7006/07 and 7008/09	2	7220	31	1500	1000	6220	31	1500	1000
			4	7328	93	2400	1700	6322	60	4500	2700
			6			4100	3500				4500
8	4500	4500	4500	4500							

Table 8.6 - Lubrication intervals for cylindrical roller bearings - W50 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mountings Roller bearings	315 H/G	5009/10	4	NU320	50	4300	2900	6316	34	4500	4500
			6 - 8								
	355 J/H	5809/10	4	NU322	60	3500	2200	6319	45	4500	4500
			6 - 8								
	400 L/K and 400 J/H	6806/07 and 6808/09	4	NU324	72	2900	1800	6319	45	4500	4500
			6 - 8								
450 L/K and 450 J/H	7006/07 and 7008/09	4	NU328	93	2000	1400	6322	60	4500	4500	
		6									3200
		8									4500

Table 8.7 - Lubrication intervals for ball bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Ball bearings	160M/L	254/6	2 - 8	6309	13	20000	20000	6209	9	20000	20000
			2 - 8	6311	18	20000	20000	6209	9	20000	20000
	180M/L	284/6	2 - 8	6311	18	20000	20000	6211	11	20000	20000
			2 - 8	6312	21	20000	20000	6211	11	20000	20000
	200M/L	324/6	2 - 8	6312	21	20000	20000	6211	11	20000	20000
			2 - 8	6314	27	18000	14400	6211	11	20000	20000
	225S/M	364/5	2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6314	27	18000	14400	6212	13	20000	20000
	250S/M	404/5	2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6316	34	20000	20000	6212	13	20000	20000
	280S/M	444/5	2	6314	27	18000	14400	6212	13	20000	20000
			4 - 8	6319	45	20000	20000	6314	27	20000	20000
	280L	447/9	2	6314	27	18000	14400	6314	27	18000	14400
			4 - 8	6319	45	20000	20000	6314	27	20000	20000
	315G/F	5010/11	2	6314	27	4500	4500	6314	27	4500	4500
			4 - 8	6319	45	4500	4500	6314	27	4500	4500
355J/H	L5010/11	2	6218	24	2200	2200	6218	24	2200	2200	
		4 - 8	6224	43	4500	4500	6218	24	4500	4500	
400J/H	L5810/11	2	6220	31	2200	2200	6220	31	2200	2200	
		4 - 8	6228	52	4500	4500	6220	31	4500	4500	
450K/J	L6808/09	2	6220	31	2200	2200	6220	31	2200	2200	
		4 - 8	6228	52	4500	4500	6220	31	4500	4500	

Table 8.8 - Lubrication intervals for cylindrical roller bearings - W40 line

	Frame		Poles	DE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)	NDE Bearing	Amount of grease (g)	50 Hz (h)	60 Hz (h)
	IEC	NEMA									
Horizontal mounting Roller bearings	225S/M	364/5	4 - 8	NU314	27	20000	20000	6314	27	20000	20000
	250S/M	404/5	4 - 8	NU316	34	20000	20000	6314	27	20000	20000
	280S/M	444/5	4 - 8	NU319	45	20000	18800	6314	27	20000	20000
	280L	447/9	4 - 8	NU319	45	20000	18800	6314	27	20000	20000
	315G/F	5010/11	4 - 8	NU319	45	4500	4500	6314	27	4500	4500
	355J/H	L5010/11	4 - 8	NU224	43	4500	4500	6218	24	4500	4500
	400J/H	L5810/11	4 - 8	NU228	52	4500	3300	6220	31	4500	4500
	450K/J	L6808/09	4 - 8	NU228	52	4500	3300	6220	31	4500	4500

For each increment of 15 °C above the bearing temperature, the relubrication intervals given in the Table must be halved. The relubrication interval of motors designed by the manufacturer for mounting in horizontal position, but installed in vertical position (with WEG authorization), must be halved.

For special applications, such as: high and low temperatures, aggressive environments, driven by frequency inverter (VFD - frequency inverter), etc., please contact WEG about the required amount of grease and the relubrication intervals.

8.2.1.1. Motor without grease fitting

Motors without grease fittings must be lubricated in accordance with the existing Maintenance Plan. Motor disassembly must be carried out as specified in Item 8.3. If motors are fitted with shielded bearings (for example, ZZ, DDU, 2RS, VV), these bearings must be replaced at the end of the grease service life.

8.2.1.2. Motor with grease fitting

To lubricate the bearings with the motor stopped, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Lift grease inlet protection;
- Remove the grease outlet plug;
- Pump in approximately half of the total grease indicated on the motor nameplate and run the motor for about 1 (one) minute at rated speed;
- Switch-off the motor and pump in the remaining grease;
- Lower again the grease inlet protection and reinstall the grease outlet protection.

To grease the motor while running, proceed as follows:

- Before lubricating, clean the grease nipple and immediate vicinity thoroughly;
- Pump the total grease indicated on the motor nameplate;
- Lower again the grease inlet protection.



For lubrication, use only manual grease gun.

If Motors are provided with a spring device for grease removal, the grease excess must be removed by pulling the rod and cleaning the spring until the spring does not remove more grease.

8.2.1.3. Compatibility of the Mobil Polyrex EM grease with other greases

The Mobil Polyrex EM grease has a polyurea thickener and a mineral oil and it is not compatible with other greases.

If you need another type of grease, contact WEG.

It is not recommended to mix different types of greases. In such a case, clean the bearings and lubrication channels before applying new grease.

The used grease must have in its formulation corrosion and oxidation inhibitors.

8.2.2. Oil lubricated bearings

To change the oil of oil lubricated motor proceed as follows:

- Switch-off the motor;
- Remove threaded oil drain plug;
- Open the valve and drain the oil;
- Close the drain valve again;
- Reinstall the threaded oil drain plug;
- Fill-up with the type and amount of oil as specified on the nameplate;
- Check oil level. The oil level is OK when the lubricant can be viewed approximately in the center of the sight glass;
- Reinstall oil inlet plug;
- Check for oil leaks and ensure that all not used threaded plugs are closed with plugs.

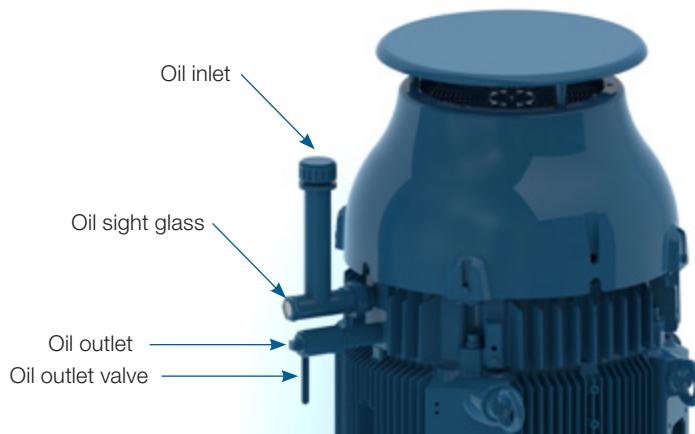


Figure 8.1 - Oil lubricated bearing - vertical mounting

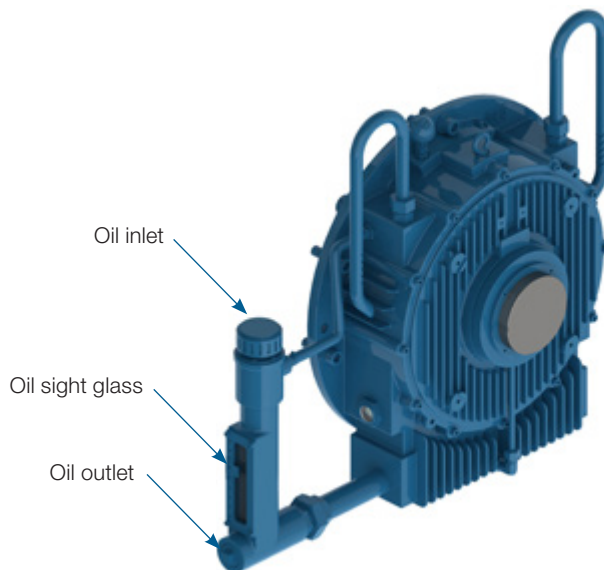


Figure 8.2 - Oil lubricated bearing - horizontal mounting

The bearing lubricating oil must be replaced as specified on the nameplate or whenever changes in the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and must be kept in the center of the sight glass. Please contact WEG, when oils with different viscosities should be used.

Note:

The HGF vertical mounted motors with high axial thrust are supplied with grease lubricated DE-bearings and with oil lubricated NDE-bearings. The DE-bearings must be lubricated according to recommendations in item 8.2.1. Table 8.9 specifies the oil type and the amount of oil required for this motor lubrication.

Table 8.9 - Oil properties for HGF vertical mounted motors with high axial thrust

Mounting - high axial thrust	Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
	IEC	NEMA						
	315L/A/B e 315C/D/E	5006/7/8T e 5009/10/11T	4 - 8	29320	20	8000	FUCHS Renolin DTA 40 / Mobil SHC 629	ISO VG150 mineral oil with antifoam and antioxidant additives
	355L/A/B e 355C/D/E	5807/8/9T e 5810/11/12T	4 - 8	29320	26			
	400L/A/B e 400C/D/E	6806/7/8T e 6809/10/11T	4 - 8	29320	37			
	450	7006/10	4 - 8	29320	45			

8.2.3. Oil mist lubricated bearings

Check the service conditions of the seals and if replacement is required use only original components. Clean the seal components before assembly (bearing caps, end shields, etc.).

Apply joint sealant between the bearing caps and end shields. The joint sealant must be compatible with the used lubricating oil. Connect the oil lubricant tubes (oil inlet and oil outlet tubes and motor drain tube), as shown in Figure 6.12.

8.2.4. Sleeve bearings

The lubricating oil of sleeve bearings must be changed at the intervals specified in Table 8.10. To replace the oil, proceed as follows:

- NDE-bearing: remove the protection plate from the fan cover;
- Drain the oil through the drain hole located at the bottom of the bearing (see Figure 8.3);
- Close the oil drain hole;
- Remove the oil inlet plug;
- Fill the sleeve bearing with the specified oil and with the amount of oil specified in;
- Check the oil level and ensure it is kept close to the center of the sight glass;
- Install the oil inlet plug;
- Check for oil leaks.

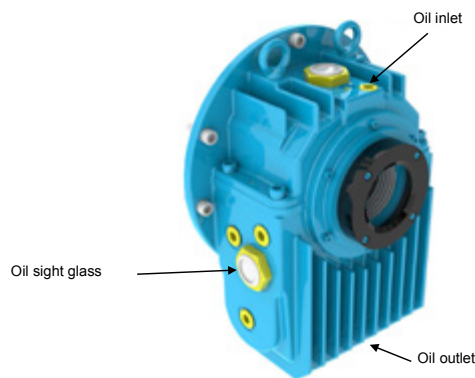


Figure 8.3 - Sleeve bearing

Table 8.10 - Oil properties for sleeve bearings

Frame		Poles	Bearing designation	Oil (liters)	Interval (h)	Lubricant	Lubricant specification
IEC	NEMA						
315	5000	2	9-80	2.8	8000	FUCHS Renolin DTA 10	ISO VG32 mineral oil with antifoam and antioxidant additives
355	5800						
400	6800						
450	7000						
315	5000	4 - 8	9-90	2.8	8000	FUCHS Renolin DTA 15	ISO VG46 mineral oil with antifoam and antioxidant additives
355	5800		9-100				
400	6800		11-110	4.7			
450	7000		11-125				
500	8000						

The lubricating oil must be replaced as specified on the nameplate or whenever changes on the oil properties are noticed. The oil viscosity and pH must be checked periodically. The oil level must be checked every day and kept in the center of the sight glass.

Please contact WEG, when oils with different viscosities are to be used.

8.3. MOTOR ASSEMBLY AND DISASSEMBLY



All repair services on motors should be always performed by qualified personnel and in accordance with the applicable laws and regulations in each country. Always use proper tools and devices for motor disassembly and assembly.



Disassembly and assembly services can be carried out only after the motor has been disconnected from the power supply and is completely stopped.

Dangerous voltages may be present at the motor terminals inside the terminal box since capacitors can retain electrical charge for long periods of time even when they are not connected directly to a power source or when space heaters are connected to the motor or when the motor windings are used as space heaters. Dangerous voltages may be present at the motor terminals when they are driven by frequency inverter even when they are completely stopped.

Record the installation conditions such as terminal connection diagram, alignment / leveling conditions before starting the disassembly procedures. These records should be considered for later assembly.

Disassemble the motor carefully without causing scratches on machined surfaces or damaging the threads.

Assemble the motor on a flat surface ensuring a good support base. Footless motors must be fixed/locked on the base to prevent accidents.

Handle the motor carefully to not damage the insulated components such as windings, insulated rolling bearings, power cables etc..

Seal elements, such as joint seals and bearing seals should always be replaced when wear or damage is noticed.

Motors with degree of protection higher than IP55 are supplied with joint and screw seal Loctite 5923 (Henkel) Clean the components and apply a new coat of Loctite 5923 on the surfaces before assembly.

For the W50 and HGF motor lines provided with axial fans, the motor and the axial fan have different markings for indicating the direction of rotation for prevent incorrect assembly.

The axial fan must be assembled so that the indicative arrow for direction of rotation is always visible, viewing the non-drive end side. The marking indicated on the axial fan blade, CW for clockwise direction of rotation or CCW for counterclockwise direction of rotation, indicates the direction of rotation of the motor viewing the drive end side.

8.3.1. Terminal box

Proceed as follows to remove the terminal box cover and to disconnect/connect the power supply cables and the cables of the accessory devices:

- Ensure that during the screw removal the terminal box cover does not damage the components installed inside the terminal box;
- If the terminal box cover is fitted with lifting eyebolt, lift the terminal box cover always by its lift eyebolt;
- If motors are supplied with terminal blocks, ensure the correct tightening torque on the motor terminals as specified in Table 8.11;
- Ensure that the cables do not contact sharp edges;
- Ensure that the original IP degree of protection is not changed and is maintained as indicate on the motor nameplate. The power supply cables and the control cables must always be fitted with components (cable glands, conduits) that meet the applicable standards and regulations of each country;
- Ensure that the pressure relief device is in perfect operating condition, if provided. The seals in the terminal box must be in perfect condition for reuse and must be reinstalled correctly to ensure the specified degree of protection;
- Ensure the correct tightening torque for the securing bolts of the terminal box cover as specified in Table 8.11.

Table 8.11 - Tightening torque for the securing bolts [Nm]

Screw type and seal	M4	M5	M6	M8	M10	M12	M14	M16	M20
Hex bolt/hex socket bolt (rigid joint)	-	3,5 to 5	6 to 9	14 to 20	28 to 40	45 to 70	75 to 110	115 to 170	230 to 330
Combined slotted screw (rigid joint)	1,5 to 3	3 to 5	5 to 10	10 to 18	-	-	-	-	-
Hex bolt/hex socket bolt (flexible joint)	-	3 to 5	4 to 8	8 to 15	18 to 30	25 to 40	30 to 45	35 to 50	-
Combined slotted screw (flexible joint)	-	3 to 5	4 to 8	8 to 15	-	-	-	-	-
Terminal blocks	1 to 1,5	2 to 4 1)	4 to 6,5	6,5 to 9	10 to 18	15,5 to 30	-	30 to 50	50 to 75
Grounding terminals	1,5 to 3	3 to 5	5 to 10	10 to 18	28 to 40	45 to 70	-	115 to 170	-

Note: 1) For 12-pin terminal block, apply the minimum torque of 1.5 Nm and maximum torque of 2.5 Nm.

8.4. DRYING THE STATOR WINDING INSULATION

Dismantle the motor completely. Remove the end shields, the rotor with the shaft, the fan cover, the fan and the terminal box before the wound stator with the frame is transferred to the oven for the drying process. Place the wound stator in the oven heated to max. 120 °C for two hours. For larger motors a longer drying time may be required. After the drying process has been concluded, allow the stator to cool to room temperature. Measure the insulation resistance again as described in item 5.4. Repeat the stator drying process if the required insulation resistance does not meet the values specified in Table 5.3. If the insulation resistance does not improve despite several drying processes, evaluate the causes of the insulation resistance drop carefully and an eventual replacement of the motor winding may be required. If in doubt contact WEG.



To prevent electrical shock, discharge the motor terminals immediately before, and after each measurement. If the motor is equipped with capacitors, these must be discharged before beginning any repair.



8.5. SPARE PARTS

When ordering spare parts, always provide complete motor designation, indicating the motor type, the code number and the serial number, which are stated on the motor nameplate.

Spare parts must always be purchased from WEG authorized Service Centers. The use of non-original spare parts can cause motor failure, performance drop and void the product warranty.

The spare parts must be stored in a clean, dry and properly ventilated room, with relative air humidity not exceeding 60%, with ambient temperature between 5 °C and 40 °C, free of dust, vibrations, gases, corrosive smokes and at constant temperature. The spare parts must be stored in their normal mounting position without placing other components onto them.

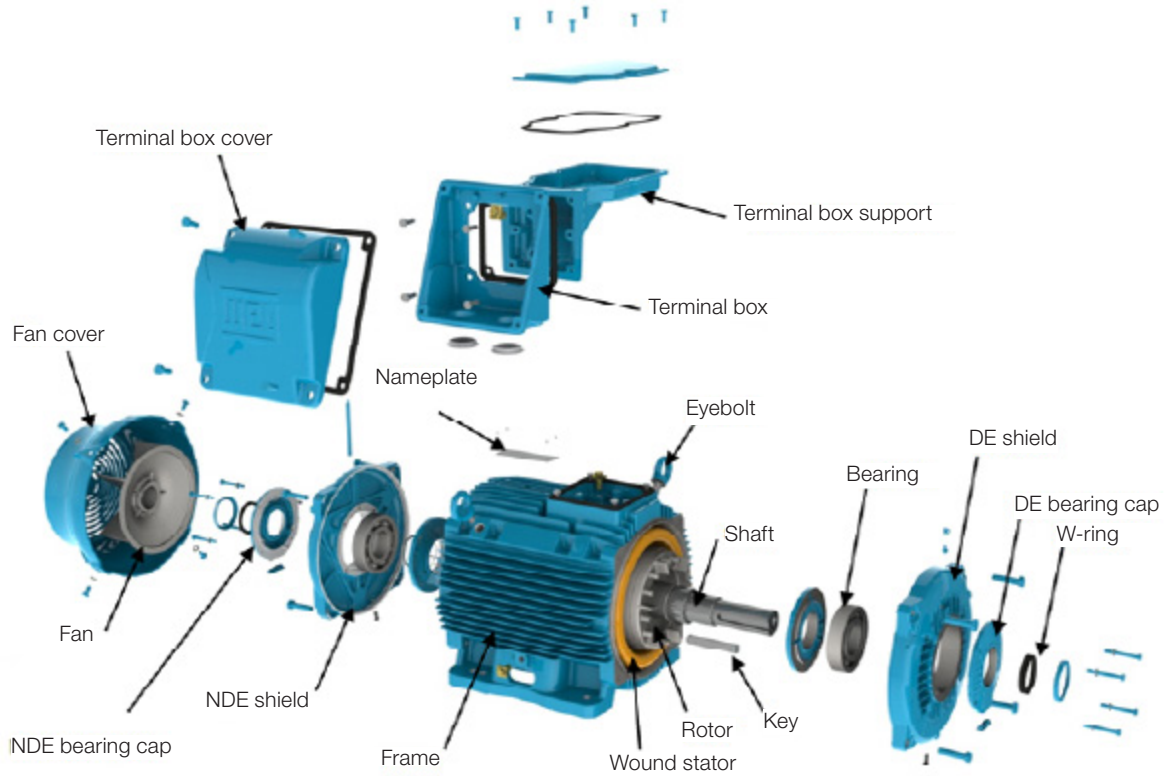


Figure 8.4 - Exploded view of the components of a W22 motor

ENGLISH

9. ENVIRONMENTAL INFORMATION

9.1. PACKAGING

WEG electric motors are supplied in cardboard, plastic or wooden packaging. These materials can be recycled and must be disposed according to the applicable laws and regulations in each country. All wood used in the packaging of WEG motors come from the company reforestation program and is not submitted to any chemical conservation treatment.

9.2. PRODUCT

Electric motors consist mainly of ferrous metals (steel plates and cast iron), non ferrous metals (copper and aluminum) and plastic materials.

In general, electric motors have relatively long service live. However when they must be discarded, WEG recommends to dismantle the motor, sort the different materials and send them for recycling.

No-recyclable materials should be disposed of at industrial landfills according to the applicable environmental laws and regulations in each country, or co-processed in cement kilns or incinerated.

The recycling service providers, the disposal in industrial landfills, the waste co-processing or the incineration process must be properly authorized by the state environment agency to carry out these activities.



10. TROUBLESHOOTING CHART X SOLUTIONS

This troubleshooting chart provides a basic list of problems that may occur during motor operation, possible causes and recommended corrective actions. In case of doubts, please contact WEG Service Center.

Problem	Possible cause	Corrective action
Motor does not start, neither coupled nor decoupled	Power cables are interrupted	Check the control panel and the motor power supply cables
	Blown fuses	Replace blown fuses
	Wrong motor connection	Correct the motor connection according to connection diagram
	Locked rotor	Check motor shaft to ensure that it rotates freely
The motor starts at no-load, but fails when load is applied. It starts very slowly and does not reach the rated speed	Load torque is too high during start-up	Do not start the motor on load
	Too high voltage drop in the power cables	Check the installation dimensioning (transformer, cable cross section, relays, circuit breakers, etc.)
Abnormal/excessive noise	Defective transmission component or defective driven machine	Check the transmission force, the coupling and the alignment
	Misaligned / unlevelled base	Align / level the motor with the driven machine
	Unbalanced components or unbalanced driven machine	Balance the machine set again
	Different balancing methods used for motor and coupling balancing (halve key, full key)	Balance the motor again
	Wrong motor direction of rotation	Reverse the direction of rotation
	Loose bolts	Retighten the bolts
	Foundation resonance	Check the foundation design
	Damaged bearings	Replace the bearings
Motor overheating	Insufficient cooling	Clean air inlet and outlet and cooling fins
		Check the minimum required distance between the fan cover and nearest walls. See item 7
		Check air temperature at inlet
	Overload	Measure motor current, evaluate motor application and if required, reduce the load
	Number of starts per hour is too high or the load inertia moment is too high	Reduce the number of starts per hour
	Power supply voltage too high	Check the motor power supply voltage. Power supply voltage must not exceed the tolerance specified in item 7.2
	Power supply voltage too low	Check the motor power supply voltage and the voltage drop. Power supply voltage must not exceed the tolerance specified in item 7.2
	Interrupted power supply	Check the connection of the power cables
	Voltage unbalance at the motor terminals	Check for blown fuses, wrong commands, voltage unbalance in the power line, phase fault or interrupted power cables
	Direction of rotation is not compatible with the unidirectional fan	Check if the direction of rotation matches the rotation arrow indicated on end shield
Bearing overheating	Excessive grease/oil	Clean the bearing and lubricate it according to the provided recommendations
	Grease/oil aging	
	The used grease/oil does not matches the specified one	
	Lack of grease/oil	Lubricate the bearing according to the provided recommendations
	Excessive axial or radial forces due to the belt tension	Reduce the belt tension
Reduce the load applied to the motor		

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* European Union Importers

Abnahmeprüfzeugnis 3.1 nach EN 10204
Inspection certificate 3.1 according to EN 10204

Seite 1 von 1
Page 1 of 1

Unsere Auftrags-Nr.: **2 451 395 848 / 02** Typ: **GEA biosolids Decanter prime 7000**
Our Order No.:

Besteller: **GEA Mechanical Equipment US** Kunden Bestell-Nr.:
Purchaser: Customer's Order No.:

Empfänger: **Veolia Water North America - City of Taunton**
Receiver:

Prüfstandslauf mit Flüssigkeit **9010-9085-100**
Test bay run with liquid

Masch.-Fabr.-Nr.: **8012-663** Trommel-Fabr.-Nr.: **8012-663**
Machine serial no.: Bowl serial no.:

Schnecken-Fabr.-Nr.: **8012-663**
Conveyor screw serial no.:

Motordaten Hersteller: **WEG**
Motor Manufacturer:

Motor-Nr.: **10 55 48 56 06** Motortyp: **W22 280S/M-04**
Serial no.: Motor model:

P = 55 kW U = 460 V n = 1789 min⁻¹ f = 60 Hz

Die Prüfung des Dekanters wurde mit Wasser durchgeführt.
The decanter was tested by feeding water.

Betriebsbedingungen: Zulauf: **30 m³/h** Trommeldrehzahl: **3150 min⁻¹**
Load conditions: Feed: Bowl speed:

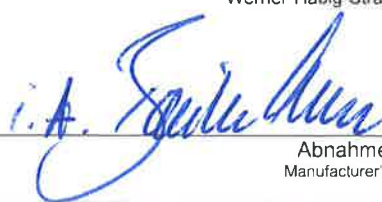
Prüfdatum **02. December 2021** Name des Prüfers: **M. Buetuen**
Test date: Name of tester:

Es wird bestätigt, dass die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht.
We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

GEA Westfalia Separator Group GmbH
Werner-Habig-Straße 1, 59302 Oelde, Deutschland
Acceptance / Abnahme

12  21
Stempelung
Stamp

12 January 2022
Datum
Date



Fred Baumann / OR
Abnahmebeauftragter des Herstellers
Manufacturer's authorized inspection representative

Vorlage: Template:	SP-AD-0097	Revision:	A	Seite: Page:	1	von of	1	SFT-2.2 Quality Management
erstellt: created:	21.04.2020 U. Heese	geprüft: reviewed:	21.04.2020 M. Spiekermann	genehmigt: approved:	21.04.2020 D. Schlingmeyer	59302 Oelde, Germany		

Abnahmeprüfzeugnis 3.1 nach EN 10204
Inspection certificate 3.1 according to EN 10204

Seite 1 von 1
Page 1 of 1

Unsere Auftrags-Nr.: **2 451 395 848 / 12** Typ: **GEA biosolids Decanter prime 7000**
Our Order No.:

Besteller: **GEA Mechanical Equipment US** Kunden Bestell-Nr.:
Purchaser: Customer's Order No.:

Empfänger: **Veolia Water North America - City of Taunton**
Receiver:

Prüfstandslauf mit Flüssigkeit
Test bay run with liquid

9010-9085-100

Masch.-Fabr.-Nr.: **8012-664** Trommel-Fabr.-Nr.: **8012-664**
Machine serial no.: Bowl serial no.:

Schnecken-Fabr.-Nr.: **8012-664**
Conveyor screw serial no.:

Motordaten
Motor

Hersteller: **WEG**
Manufacturer:

Motor-Nr.: **10 55 37 83 50**
Serial no.:

Motortyp: **W22 280S/M-04**
Motor model:

P = 55 kW

U = 460 V

n = 1789 min⁻¹

f = 60 Hz

Die Prüfung des Dekanters wurde mit Wasser durchgeführt.
The decanter was tested by feeding water.

Betriebsbedingungen: Zulauf: **30 m³/h** Trommeldrehzahl: **3150 min⁻¹**
Load conditions: Feed: Bowl speed:


Prüfdatum: **10. January 2022** Name des Prüfers: **J. Weidenfeller**
Test date: Name of tester:

Es wird bestätigt, dass die Lieferung geprüft wurde und den Vereinbarungen bei der Bestellannahme entspricht.
We hereby certify, that the material described above has been tested and complies with the terms of the order contract.

GEA Westfalia Separator Group GmbH
Werner-Habig-Straße 1, 59302 Oelde, Deutschland
Acceptance / Abnahme

01  22
Stempelung
Stamp

12 January 2022
Datum
Date



Fred Baumann / OR
Abnahmebeauftragter des Herstellers
Manufacturer's authorized inspection representative

Vorlage: Template:	SP-AD-0097	Revision:	A	Seite: Page:	1 von of	1	SFT-2.2 Quality Management
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Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA Group is a global engineering company with multi-billion euro sales and operations in more than 50 countries. Founded in 1881, the company is one of the largest providers of innovative equipment and process technology. GEA Group is listed in the STOXX® Europe 600 Index.

GEA Westfalia Separator Group GmbH

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The following are factory work instructions and paint material information used on all GEA Westfalia Separator Decanter Centrifuges.

The following documents are included:

- WSN 66 – 1000 – 25 Corrosion Protection
- WSN 66 – 0031 – 00 Coatings
- WSN 66 – 0002 – 00 SEEVENAX Primer
- WSN 66 – 0004 – 00 SEEVENAX Finish Coating



Corrosion protection

Decaners
Textured paint (DIN EN ISO 12944- 5: 2020-03/ C3)

WSN
66-1000-25

6 Sheets | Sheet 1

EN+DE

Standard paint:**Production plant Europe:**

No.	Decanter	Separator	Field of application	Category acc. ISO 12944-5	Coating system	WS- Norm
1	x		Indoor, solvent resistance	C3	Mank.Seevenax: Textured paint (Optional: Smooth paint)	WSN 66-1000-25
2	x		Outdoor, UV resistance	C3	Mank.Alexit: Textured paint	WSN 66-1000-26
3	x		Heavy Duty	C5	Hempel: Smooth paint	WSN 66-1000-30
4		x	Indoor, solvent resistance	C3	Mank.Seevenax: Textured paint	WSN 66-1200-00/-01; WSN 66-1300-05
5		x	Heavy Duty	C5	Hempel: Smooth paint	WSN 66-1200-00/-03; WSN 66-1300-07

Production plant India/China:

No.	Decanter	Separator	Field of application	Category acc. ISO 12944-5	Coating system	WS- Norm
6	x	x	Indoor, solvent resistance	C3	Akzo-Nobel: Textured paint	WSN 66-1000-35
7	x	x	Heavy Duty	C5	Akzo-Nobel: Smooth paint	WSN 66-1000-36

Paint variant 1. C3 textured paint (Mank.Seevenax) is described in this standard.

Application Area:

All project parts which require painting are painted in accordance with individual part drawings and the coating materials section. Specific drawing information or order text information may supplement the standard (e.g. surface)

Comparative paint system: DIN EN ISO 12944- 5/C3.05-EP (corrosivity category: C3; duration of protection: medium)

Observe general specifications in line with WSN66-1100-00.

Procedure:**- Machine whole part:**

- Depending on the storage, parts are machined before or after the application of the first layer.
 - ⇒ Apply temporary protection to machined surfaces if necessary
- Storage: must be protected from weather influences

Specialist Department Product Development - Customized Decaners

Worked:
19.10.20 C.Mumm

Checked:
19.10.20 V.Knospe

Standard Checked:
B.Wingenfeld

GEA Westfalia Separator Group GmbH
Data Management
59302 Oelde, Germany

- Pre-treatment painting:

- Preparation of surface irregularities
 - Surface preparation according to DIN EN ISO 12944
 - Degree of preparation P1 (ISO 8501-3)
- Blast-clean of individual parts (not applicable for parts machined on all sides)
 - Degree of preparation SA 2 ½ (ISO 8501-1)
 - max. roughness depth approx. 60µm (ISO surface roughness comparison pattern "G" segment 2, according to ISO 8503-1)
- Clean, degrease, apply phosphate conversion coating (phosphate conversion coating ISO 9717-Fe/Feph 0,2-0,6/T1)
- Apply filler and sand smooth, if necessary
 - Polyester filler Finalin/22 grey (WS mat. no. 6966-0292-040)
 - For castings, only fill coarse surface defects (bubbles, larger pores)
 - For welded parts, only fill coarse surface defects (very poor transitions between materials)
- Mask (cover and tape)
- Storage: must be protected from weather influences

- Painting:

Variant A:

Layer 1 is applied in one work step, followed by the machining and subsequent application of layers 2 and 3 in one work step.

Variant B:

First machining is completed, followed by the application of all layers in a one work step.

- **1 layer:**
 - Seevenax protective paint 112 (epoxy resin-based 2-component, WSN66-0033-00)
 - Thickness 80 µm dry layer
 - Variant A: colour RAL7037
 - Variant B: colour - suit to top coat
 - Treat small pores and small bubbles
- **2 layer:**
 - Seevenax protective paint 112 (epoxy resin-based 2-component, WSN66-0033-00)
 - Thickness 40 µm dry layer
 - Colour and RAL no. as per order
 - Treat small pores and small bubbles with paint roller
 - For metallic colours: use Seevenax top coat 110 (WSN66-00033-00) as mat finish instead
- **3 layer: (not applicable for smooth layer finish)**
 - Seevenax protective paint 112 (epoxy resin-based 2-component, WSN66-0033-00)
 - Coarse effect
 - Nozzle: 1.5 mm,
 - Air pressure 2.5-3 bar/material pressure 5bar
 - Necessary thickness to apply texture
 - Colour and RAL no. as per order
- **Requirements at special customer request:**

If stainless steel components are to be coated, they must be specified separately. The surfaces are lightly roughened and cleaned using ferrite-free abrasive by means of fine blasting. Dry film thickness DFT and total nominal film thickness NDFT are reduced by 50%.
- **Drying:**

After applying the final coat, the components are dried according to paint specifications.

- Post-processing:

- Remove masking
- Clean
- Preserve
- Storage: must be from protected weather influences

Final state:

- Total nominal dry film thickness NDFT with pre-treatment
 - **Nominal dry film thickness NDFT > 120 µm**

Documentation:

Depending on customer requirements, the tests and checks are recorded in a daily log as per WSN 66-1100-02.



SEEVENAX Universal Primer

Make: Mankiewicz

WSN

66-0002-00

4 Sheets

Sheet 3

6966-0295-000

SEEVENAX universal primer 7:1 (hazardous material)

1 Material description

SEEVENAX universal primer is a chromate-free two-component primer on an epoxy resin base. Through using selected corrosion inhibitors and the specially adapted epoxy resin - binding agent combination excellent anticorrosive and adhesive film properties are obtained on all types of metal including nonferrous heavy metals: aluminium, magnesium, sendzmir galvanised sheet metal and many plastics. Seevenax universal primer hardens to a firmly structured coating with excellent chemical and mechanical resistance. The surface is abrasion proof, elastic and resistant to knocks, impacts, chemicals and solvents.

SEEVENAX universal primer reliably and economically solves particularly difficult priming programs.

2 Fields of application

For all air- and -oven-drying paint systems that are exposed to extreme conditions.

For work pieces considered to be very difficult in terms of adhesion.

For objects exposed to water and steam for improved resistance, especially corrosion protection, tropicalisation as well as insensitivity to mechanical and chemical impact.

For objects which become very greasy and soiled during mechanical production. Since the firm structure prevents extreme oil fouling and soiling of the work pieces, cleaning is made much easier.

Separator frames

3 Colour

- green

4 Tinctorial power

- approx. 8 sq. meters(kg given a layer thickness of 30 im

5 Materials

Mother material	: SEEVENAX universal primer 7:1	6966-0295-000
Reaction component	: SEEVENAX hardner 125 oder 137	6966-0169-000
Thinner	: SEEVENAX thinner 71 oder 72	6966-0331-000

6 Preparation

SEEVENAX-universal primer is mixed with Seevenax hardener at a weight ratio of 7:1:

- 7 parts SEEVENAX universal primer
- 1 part SEEVENAX hardener

- Painting : 5-10% SEEVENAX thinner

- Compressed air spraying : 20-30% SEEVENAX thinner
 Spraying viscosity : approx 20 seconds

- Airless spraying : max. 20% SEEVENAX thinner
 Spraying viscosity : approx 30 minutes

- Pre-reaction time : approx 20 minutes

7 Potlife

- approx. 2 days

To adjust longer pottimes and for special applications additional hardener types are available (on special order)

8 Drying

During the drying phase, a room and object temperature of at least 15 - 20 °C is required.

- Air drying : fast to handling : approx. 2 hours
paintable : approx. 12 - 24 hours

- Heat and oven drying

after short heating,
e.g. 20 minutes at 30°C
or 10 minutes at 120°C.

9 Safety specifications

- SEEVENAX-universal primer

- SEEVENAX-hardener flash point over 21°C

- SEEVENAX-thinner hazard class A 11

10 Drum sizes

- SEEVENAX-universal primer: 10,5 kg, 21 kg net



A EXIT Top Coat

Fa. Mankiewicz

WSN

66-0031-00

8 Blätter | Blatt 7

1 Introduction and Characteristics

ALEXIT-Strukturlack Z420 is a special two-component polyurethane based finish. To suit individual requirements, ALEXIT-Strukturlack Z420 can be sprayed from very fine to coarse finish, thus reducing surface preparation to a minimum.

EN

The curing process, which can be accelerated by increased temperatures, forms a coating with excellent properties. The coating is flexible and resistant to rubbing, scratching and also resistant to solvents, chemicals, water, refrigerants, hydraulic oils and cleaners.

ALEXIT-Strukturlack Z420 offers fast and economic coating, especially for large areas.

2 Range of Application

ALEXIT-Strukturlack Z420 is used as decorative coat for filling- and packing machines, textile machines, machine tools, instruments, electrical appliances and measuring instruments.

3 Colours

ALEXIT-Strukturlack Z420 is available in all colour shades for industrial series production.

4 Pre-treatment of ground material

Perfect adhesion can be obtained on almost all metals and many plastic materials when applying ALEXIT Z420 structured paint only. In case of especially severe adhesion requirements, it is recommended to begin with an extra adhesive, anti-corrosion ground paint, e.g. CELEROL reactive ground, SEEVENAX ground paints or ALEXIT grounding compounds.

5 Coverage

4 to 6 qm/kg dependent on the desired structural effect.

6 Sicherheitstechnische Daten

ALEXIT-Strukturlack Z420) Flammpunkt über 21°C
VbF "nicht unterstellt"

ALEXIT-Zusatz 459) VbF A II

ALEXIT-Verdünner 62) VbF A II

7 Trade-Name

Basic Material:

ALEXIT-Strukturlack Z420

Hardener:

ALEXIT-Zusatz 459

Thinner:

ALEXIT-Verdünner 62

8 Mixing-Ratio

4 parts by weight of:

ALEXIT-Strukturlack Z420

1 part by weight of:

ALEXIT-Zusatz 459

9 Application

One layer coating
(coarse finish)

Compressed air spraying:

without thinner

Two layer Coating
(fine structure)

1. Application:

as primer, colour-giving intermediate coat or smooth texture

Compressed air spraying:

approx. 20-30% thinner

Efflux time (DIN 53 211):

not measurable

Intermediate drying:

approx. 15 minutes

2. Application:

effect-giving final coat

Compressed air spraying:

without thinner



A EXIT Top Coat

Fa. Mankiewicz

WSN

66-0031-00

8 Blätter

Blatt 8

Effect variations:	fine texture	coarse texture
Nozzle Size:	1,2-1,5 mm	1,5--2,0 mm
Pressure:	3,5-4,5 bar	1,0-3,0 bar
Distance:	up to 25 cm (if necessary add approx. 5% Thinner)	up to 50 cm
10 Pot Life	Room temperature:	approx. 5 hours/hardener 459
11 Drying	Room temperature:	dust free : 20 to 30 minutes handable : 4 to 5 hours hard dry : 12 to 18 hours
	Oven drying:	After approx. 30 minutes for solvent evaporation time, 30 minutes - 80°C or 10 minutes - 100°C
	12 Packages	ALEXIT-Strukturlack Z 420: 12kgs, 24 kgs net ALEXIT-Zusatz 459: 3 kgs, 6kgs net ALEXIT-Verdünner 62: 5kgs, 25kgs net

Statusschlüssel (STS):

1 = Gültiges Teil


2 = Ersatzteil

3 = Sonderteil

4 = Ungültiges Teil

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		Seevenax-Coating lacquer Make Mankiewicz		WSN	
				66-0004-00	
				4	Sheets
Line	Designation, size, perform		Material	Stk	Part number
1	Coating lacquer-Seevenax green beige (hazardous material)		RAL 1000	1	6966-0585-000
2	Coating lacquer-Seevenax sand yellow (hazardous material)		RAL 1002	1	6966-0585-010
3	Coating lacquer-Seevenax signal yellow (hazardous material)		RAL 1003	3	6966-0585-520
4	Coating lacquer-Seevenax golden yellow (hazardous material)		RAL 1004	1	6966-0585-020
5	Coating lacquer-Seevenax maize-yellow (hazardous material)		RAL 1006	1	6966-0585-030
6	Coating lacquer-Seevenax citron yellow (hazardous material)		RAL 1012	1	6966-0585-040
7	Coating lacquer-Seevenax pearl white (hazardous material)		RAL 1013	1	6966-0017-000
8	Coating lacquer-Seevenax ivory (hazardous material)		RAL 1014	1	6966-0585-050
9	Coating lacquer-Seevenax light ivory (hazardous material)		RAL 1015	1	6966-0585-060
10	Coating lacquer-Seevenax cadmium yellow (hazardous material)		RAL 1021	1	6966-0585-070
11	Coating lacquer-Seevenax yellow ochre (hazardous material)		RAL 1024	1	6966-0585-080
12	Coating lacquer-Seevenax melon yellow (hazardous material)		RAL 1028	1	6966-0585-480
13	Coating lacquer-Seevenax yellow orange (hazardous material)		RAL 2000	1	6966-0585-090
14	Coating lacquer-Seevenax light red orange (hazardous material)		RAL 2008	1	6966-0585-110
15	Coating lacquer-Seevenax flame red (hazardous material)		RAL 3000	1	6966-0585-120
16	Coating lacquer-Seevenax crimson (hazardous material)		RAL 3002	1	6966-0585-130
17	Coating lacquer-Seevenax oxide red (hazardous material)		RAL 3009	1	6966-0585-140
18	Coating lacquer-Seevenax reddish brown (hazardous material)		RAL 3016	3	6966-0016-000
19	Coating lacquer-Seevenax blue violet (hazardous material)		RAL 5000	3	6966-0585-530
20	Coating lacquer-Seevenax ultra marine blue (hazardous material)		RAL 5002	1	6966-0585-540
21	Coating lacquer-Seevenax brilliant blue (hazardous material)		RAL 5007	1	6966-0585-150
22	Coating lacquer-Seevenax azure (hazardous material)		RAL 5009	3	6966-0585-490
23	Coating lacquer-Seevenax enzian blue (hazardous material)		RAL 5010	1	6966-0585-160
24	Coating lacquer-Seevenax light blue (hazardous material)		RAL 5012	1	6966-0585-170
25	Coating lacquer-Seevenax sky blue (hazardous material)		RAL 5015	1	6966-0585-180
26	Coating lacquer-Seevenax traffic blue (hazardous material)		RAL 5017	3	6966-0585-510
27	Coating lacquer-Seevenax turquoise blue (hazardous material)		RAL 5018	1	6966-0585-190
28	Coating lacquer-Seevenax Capri blue (hazardous material)		RAL 5019	3	6966-0585-500
29	Coating lacquer-Seevenax patina green (hazardous material)		RAL 6000	1	6966-0585-220
30	Coating lacquer-Seevenax emerald green (hazardous material)		RAL 6001	1	6966-0585-230
31	Coating lacquer-Seevenax leaf green (hazardous material)		RAL 6002	1	6966-0585-240
32	Coating lacquer-Seevenax moss green (hazardous material)		RAL 6005	1	6966-0585-250
33	Coating lacquer-Seevenax grass green (hazardous material)		RAL 6010	1	6966-0585-260
34	Coating lacquer-Seevenax reseda (hazardous material)		RAL 6011	1	6966-0007-100
35	Coating lacquer-Seevenax reed green (hazardous material)		RAL 6013	1	6966-0585-100
36	Coating lacquer-Seevenax olive yellow (hazardous material)				6966-0585-270
37	Coating lacquer-Seevenax May green (hazardous material)				6966-0585-280
38	Coating lacquer-Seevenax yellow-green (hazardous material)				6966-0585-210
39	Coating lacquer-Seevenax pastel green (hazardous material)		RAL 6019	1	6966-0585-200
40	Coating lacquer-Seevenax pale-green (hazardous material)		RAL 6021	1	6966-0585-290
41	Coating lacquer-Seevenax opal green (hazardous material)		RAL 6026	1	6966-0585-550
42	Decklack-Seevenax light green (Gefahrgut)		RAL 6027	1	6966-0585-310

DECANTER COLOR

Westfalia Separator AG
Standardization
D-59302 Oelde

Worked:

07.01.2002

Mu

Checked:

07.01.2002

Schl

Standard Checked:

Po



Seevenax-Decklacke

WSN

66-0004-00

Fabr. Mankiewicz

4 Sheets Sheet 4

Zelle	Designation, size, perform		Material	CS	Part number
1	Coating lacquer-Seevenax squirrel grey (hazardous material)		RAL 7000	1	6966-0585-320
2	Coating lacquer-Seevenax silver grey (hazardous material)		RAL 7001	1	6966-0585-330
3	Coating lacquer-Seevenax olive green (hazardous material)		RAL 7002	1	6966-0585-340
4	Coating lacquer-Seevenax moss green (hazardous material)		RAL 7003	1	6966-0585-350
5	Coating lacquer-Seevenax mouse grey (hazardous material)		RAL 7005	1	6966-0585-360
6	Coating lacquer-Seevenax reseda green (hazardous material)		RAL 6011	1	6966-0007-110
7	Coating lacquer-Seevenax iron grey (hazardous material)		RAL 7011	1	6966-0176-040
8	Coating lacquer-Seevenax stone grey (hazardous material)		RAL 7030	1	6966-0585-370
9	Coating lacquer-Seevenax bluish grey (hazardous material)		RAL 7031	1	6966-0585-380
10	Coating lacquer-Seevenax pebble grey (hazardous material)		RAL 7032	1	6966-0585-300
11	Coating lacquer-Seevenax cement grey (hazardous material)		RAL 7033	1	6966-0585-390
12	Coating lacquer-Seevenax light grey (hazardous material)		RAL 7035	1	6966-0585-400
13	Coating lacquer-Seevenax platinum grey (hazardous material)		RAL 7036	1	6966-0585-410
14	Coating lacquer-Seevenax agate grey (hazardous material)		RAL 7038	1	6966-0585-420
15	Coating lacquer-Seevenax ochre brown (hazardous material)		RAL 8001	1	6966-0585-430
16	Coating lacquer-Seevenax clay brown (hazardous material)			1	6966-0585-440
17	Coating lacquer-Seevenax fawn brown (hazardous material)			1	6966-0585-450
18	Coating lacquer-Seevenax nut brown (hazardous material)		RAL 8011	1	6966-0585-460
19	Coating lacquer-Seevenax orange brown (hazardous material)		RAL 8023	1	6966-0585-470
20	Coating lacquer-Seevenax black (hazardous material)		RAL 9005	1	6965-0249-010
21	Coating lacquer-Seevenax white (hazardous material)		RAL 9010	1	6966-0292-010
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MOTOR COLOR

Westfalia Separator AG
Standardization
D-59302 Oelde

Worked:

07.01.2002

Mu

Checked:

07.01.2002

Schl

Standard Checked:

Po



Below are GEA's replies to SAR Engineering Shop Drawing Review Comments, Submittal No. 11350-002, RevA, Centrifuge Electrical, dated 11/4/21, for Taunton WWTF Upgrades – Phase 1A:

No.	Reference	Customer Comment	GEA Response	Date
1.		The listed FLA of 218.7 Amps appears to be high for a 75HP motor, a 50HP motor, and a (2) 3KA control power transformer. The FLA should be in the range of 197.5 Amps (96A x 1.25 + 65A + 12.5). Calculation appears to be based on a 75KW motor and 45KW motor, GEA's April 16, 2021 proposal states 75HP main drive and 50HP scroll drives are being provided. Coordinate with GEA mechanical to the actual drive system motors. All motors should NEMA motors with NEMA HP ratings.	Noted, the drawings have been updated to reflect a 55 kW / 75 HP bowl motor. Total panel FLA, bowl motor VFD fuses, and Main Circuit Breaker have been resized accordingly.	11/29/21
2.		Dwg. Sheet 5 – Terminal block L1125 indicated on sheet 11 appears to listed as a Spare on TB-1.	Noted, electrical drawings updated.	11/29/21
3.		Dwg. Sheet 5 – Terminal blocks 1433-1 and 1434 indicated on sheet 14 appears to listed as a Spare on TB-2.	Noted, electrical drawings updated.	11/29/21
4.		Dwg. Sheet 5 – Provide GND terminal blocks on TB-1 for connection into Lube System as indicated on sheet 12.	Noted, electrical drawings updated.	11/29/21
5.		Dwg. Sheet 12 – Confirm the need for motor space heaters, the motors are located indoors in a HVAC system heated area.	Confirmed that motor space heaters are optional and not required.	11/29/21
6.		Dwg. Sheet 12 – Drawing implies that the Lube Oil System compressor is provided by the owner, GEA's April 16, 2021 proposal indicates the lube oil mist system is being provided which would include the associated air compressor.	An Air Compressor is not included in the scope of the GEA proposal. This is also noted on the P&ID.	11/4/21



7.		Dwg. Sheets 16, 18, 20 – The Sludge Feed System, Sludge Flow Meter, and Polymer feed System interface will only be hard wired into the control panel for beginning interim period. After the interim period these signals will be available over the PLC to PLC data exchange with the SCADA system.	GEA will have a hardwired interface for all the ancillary equipment listed. The centrifuge PLC program will need to be updated when the SCADA system is fully functional.	11/29/21
8.		Dwg. Sheets 18 – The Sludge Feed Fault and Polymer feed fault will not be wired into the control panel, these signals will be available over the PLC to PLC data exchange with the SCADA system. That exchange will not be available for a beginning interim period unit the SCADA system is installed.	Noted, electrical drawings updated.	11/29/21



GEA Mechanical Equipment US, Inc.
GEA Westfalia Separator Division
100 Fairway Court | Northvale, New Jersey | 07647

Taunton, MA
Taunton, MA

CF Prime 7000
Decanter Centrifuge for Dewatering

GEA Westfalia Project No. 2652395848

SEQUENCE OF OPERATIONS

Rev. 3
08-August-2022

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1. CENTRIFUGE SEQUENCE

1.1. CENTRIFUGE START

A LOCAL/REMOTE selector switch is located on the centrifuge OIT (Operator Interface Terminal) mounted in the LOP (Local Operator Panel). In LOCAL mode, centrifuge control is only available at the centrifuge LOP with the exception that the Centrifuge STOP function is always available from either the LOP or SCADA. In REMOTE mode, the LOP transmits this signal to SCADA, and Centrifuge Start is only available from SCADA.

The Centrifuge control system verifies that no fault conditions exist, and maintenance mode is not active. The start-up sequence of the centrifuge is initiated by pushing the CENTRIFUGE START pushbutton at the LOP (LOCAL) or SCADA (REMOTE). The user may cancel the operation if the start button was pressed accidentally by pushing the CENTRIFUGE STOP pushbutton at the LOP (LOCAL or REMOTE) or SCADA (LOCAL or REMOTE).

Start Sequence:

- Centrifuge Feed Pump, Polymer system, and Screw Conveyors are not running.
- AIR-OIL Lubrication System is started
- Scroll motor is started at 50% differential speed.
 - Scroll motor run timer started (5 seconds)
 - Scroll motor run timer expires
- Diverter Gate is in the closed position, see Note 2 below
 - Diverter Gate Flush Valve is opened
- Bowl motor is started
 - Bowl motor startup timer is started (7.5 minutes – machine specific)
 - Bowl motor startup timer expires
 - Scroll motor ramps down to base differential
- Centrifuge up to speed with no faults
- Centrifuge is ready to process sludge
- Refer to **Process Sequence** for the process start sequence and ancillary operation.

Note 1: If there is no sludge fed to the Centrifuge for “X” amount of time, then “Standby” mode is active until sludge feed is started.

Note 2: The Diverter Gate will switch open when the centrifuge operating torque is established

1.2. CONTROLLED SHUTDOWN

A controlled shutdown will be initiated when the user presses the CENTRIFUGE STOP pushbutton at the LOP (LOCAL or REMOTE) or SCADA (LOCAL or REMOTE). It will also be triggered by some alarm shutdown conditions. See **Appendix A** for a list of alarm conditions that cause a shutdown.

- Refer also to **Flush & Shutdown Sequence** as the recommended method of shutting down the centrifuge.
- Feed Is Stopped
 - Refer to **Process Stop Sequence**
- Centrifuge bowl motor shuts off, allowing bowl to coast to a stop
- Flush Water Sequence
 - Centrifuge flush valve opens
 - Centrifuge flush valve closes when bowl speed is below FLUSH WATER OFF set-point (based on bowl RPM's)
- Diverter Gate
 - Torque falls below DIVERTER GATE CLOSE TORQUE set point
 - Diverter Gate operator settable clear timer expires
 - Diverter Gate confirmed closed
 - Diverter Gate Flush Valve opens

- Screw Conveyors
 - Run permissive removed from Screw Conveyors
 - Screw Conveyors operator settable clear timers expire
 - Screw Conveyors confirmed off
- Bowl speed drops below 25 rpm
 - Scroll Motor turned off
 - Diverter Gate Flush Valve closes
- AIR-OIL Lubrication System turned off

1.3. IMMEDIATE SHUTDOWN

An immediate shutdown is triggered by scroll motor alarms. See **Appendix A** for a list of all alarm conditions that cause an immediate shutdown

- Feed Is Stopped
 - Refer to **Process Stop Sequence**
- Centrifuge bowl motor shuts off, allowing bowl to coast to a stop
- Scroll motor shuts off
- Flush Water Sequence
 - Centrifuge flush valve opens
 - Centrifuge flush valve closes when bowl speed is below FLUSH WATER OFF set-point (based on bowl RPM's)
- Diverter Gate
 - Torque falls below DIVERTER GATE CLOSE TORQUE set point
 - Diverter Gate operator settable clear timer expires
 - Diverter Gate confirmed closed
 - Diverter Gate Flush Valve opens
- Screw Conveyors
 - Run permissive removed from Screw Conveyors
 - Screw Conveyors operator settable clear timers expire
 - Screw Conveyors confirmed off
- Bowl speed drops below 25 rpm
 - Diverter Gate Flush Valve closes
- AIR-OIL Lubrication System turned off

1.4. EMERGENCY SHUTDOWN - ALL EQUIPMENT OFF IMMEDIATELY

- The Emergency Shutdown is issued with the E-stop pushbutton at the LOP. All equipment associated with the system will be stopped/disabled, instantaneously, with no flush water.

2. CENTRIFUGE EQUIPMENT

2.1. BOWL MOTOR

The bowl motor will be started/stopped by the centrifuge PLC in the MCP.

Maintenance mode:

The bowl motor can be run by pressing the <START> button on the OIT maintenance screen when maintenance mode has been activated. Due to safety issues, the <START> button will only be active for 20 seconds. The Bowl Motor will stop when the <STOP> button is pressed, or the 20-second timer expires.

Automatic Operation:

The bowl motor will start when the scroll motor has been running for a preset time. It will run until the centrifuge <STOP> button has been pressed or one of the below interlocks is issued.

Interlocks:

The bowl motor will stop under these conditions:

- Controlled shutdown
- Immediate shutdown
- Emergency Stop

2.2. SCROLL MOTOR

The scroll motor will be started/stopped by the centrifuge PLC in the MCP.

Maintenance mode:

The Scroll Motor can be run by pressing the <START> button on the OIT maintenance screen, when maintenance mode has been activated. Due to safety issues, the <START> button will only be active for 20 seconds. The Scroll Motor will stop when the <STOP> button is pressed, or the 20-second timer expires.

Automatic Operation:

The scroll motor will start when the centrifuge is started. It will run until the centrifuge <STOP> button has been pressed and the bowl has coasted to a stop or one of the below interlocks is issued.

Interlocks:

The scroll motor will stop under these conditions:

- Immediate shutdown
- Emergency Stop

2.3. CENTRIFUGE FLUSH WATER VALVE

The flush water valve will be opened/closed by the centrifuge PLC in the MCP.

Manual Operation:

From the OIT, the flush water valve <OPEN> button will open the flush water valve and the <CLOSE> button will close the flush water valve.

Automatic Operation:

The flush water will open under several conditions:

- Centrifuge Shutdown (Controlled or Immediate) – the valve will open when a shutdown has been initiated and will remain on until the bowl speed drops below the FLUSH WATER OFF set-point (based on bowl speed).
- High Torque alarm – the valve will open for a set amount of time
- High Vibration alarm – the valve will open for a set amount of time
- Idle mode – When the centrifuge is running, and process is not active, the flush water valve will open for 5 minutes every 30 minutes.
- Refer also to the **Flush & Shutdown** and **CIP** Sequences

Interlocks:

The flush water valve will close when:

- Centrifuge Off
- Emergency Stop

2.4. AIR-OIL LUBRICATION SYSTEM

The air-oil lubrication system will be controlled by the centrifuge PLC in the MCP. Compressed air is controlled by a solenoid valve, which pulses open to feed oil droplets to the main bearings. There are pressure switches on each of the lubricating lines to monitor if oil has entered the bearing.

Manual Operation:

From the OIT, a lubrication cycle can be initiated by pressing the AIR-OIL Lubrication System <START> button. The air-oil solenoid valve can also be used to manually apply oil mist to the bearings.

Automatic:

The lube oil system will start when the centrifuge start button has been pressed. Oil is distributed to the bearings based on preset time intervals and durations. Refer to **Appendix C** for timer settings. It will continue to run until one of the below interlocks is issued.

Interlocks:

The lube oil system will stop when:

- Centrifuge Off

Note: The level of the oil reservoir must be checked on a regular basis.

3. PROCESS SEQUENCE

The ancillary equipment can be stopped and started as a group following a preset sequence by the PROCESS START and PROCESS STOP buttons on the OIT (LOCAL) or SCADA (REMOTE). The centrifuge must first be up to speed and Ready for Sludge before the start sequence is initiated. In addition, each piece of equipment may be manually started with the associated start button or open button. However, each piece of equipment will still have all process interlocks enforced.

The ancillary equipment includes:

- a) Thickened Sludge Grinders (TSG-7205/7206) (supplied by others)
- b) Polymer Feed Pumps (PFP-7201/7202) (supplied by others)
- c) Thickened Sludge Feed Pumps (TSP-7201/7202) (supplied by others)
- d) Diverter Gate (supplied by GEA NAM)
- e) Screw Conveyor 1 (SBC-7303) (supplied by others)
- f) Screw Conveyor 2 (SBC-7304) (supplied by others)
- g) Load Leveler Conveyor (SBC-7305) (supplied by others)

3.1. PROCESS START SEQUENCE

Centrifuge ancillary equipment can be started when the centrifuge is Ready for Sludge. The operator must first set the sludge feed rate and polymer dosing from the OIT. The PROCESS START button, on the OIT (LOCAL) or SCADA (REMOTE), is pressed to start all ancillary equipment in the proper sequence. The user must confirm the process start before the sequence is initiated.

- Centrifuge Ready for Sludge is indicated on the OIT
- Diverter Gate is closed
 - Diverter Gate Flush Valve is open
- Process Start sequence is initiated by the user from the OIT.
- After an operator adjustable preset time delay, the MCP transmits a start command to start the Polymer Feed Pump.
 - Polymer feed pump is confirmed on and running status transmitted to the MCP.
- After an operator adjustable preset time delay, the MCP transmits a start command to start the sludge feed pump. Note: The sludge feed pump start command is wired to the grinder control panel. The grinder running interlock is used to start the sludge feed pump.
 - Sludge feed pump is confirmed on and running status transmitted to the MCP.
- Screw Conveyors
 - Torque above DIVERTER GATE OPEN/CONVEYOR FORWARD TORQUE set point for preset time
 - Run forward command sent to Screw Conveyor 2
 - Screw Conveyor 2 confirmed running
 - Note: The screw conveyor 2 running interlock is used to start the load leveler conveyor.
 - Run forward command sent to Screw Conveyor 1
 - Screw Conveyor 1 confirmed running

- Diverter Gate
 - Open command sent to Diverter Gate
 - Diverter Gate confirmed open
 - Diverter Gate Flush Valve is Closed

3.2. PROCESS STOP SEQUENCE

Pressing the PROCESS STOP button on the OIT (LOCAL) or SCADA (REMOTE) will stop the ancillary equipment. All equipment will stop in the proper order. Refer also to **Flush & Shutdown Sequence** as the recommended sequence for process stopping.

- Sludge feed pump and polymer feed pump run command signals removed by MCP.
 - Sludge feed pump confirmed off
 - Polymer feed pump confirmed off
- Diverter Gate
 - Torque falls below DIVERTER GATE CLOSE/CONVEYOR REVERSE TORQUE set point for a preset time
 - Diverter gate commanded to close by MCP
 - Diverter Gate confirmed closed
 - Diverter Gate Flush Valve opens
- Screw Conveyors
 - Run permissive removed from Screw Conveyor 1
 - Screw Conveyor 1 operator settable clear timer expires
 - Screw Conveyor 1 confirmed off
 - Run permissive removed from Screw Conveyor 2
 - Screw Conveyor 2 operator settable clear timer expires
 - Screw Conveyor 2 confirmed off
 - Note: The screw conveyor 2 running interlock removed from load leveler conveyor.

4. PROCESS EQUIPMENT

4.1. THICKENED SLUDGE GRINDERS – TSG-7205/7206 (BY OTHERS)

The Sludge Grinders are each provided with a dedicated control panel.

Manual Operation:

There is no manual operation from the MCP. All manual operation will be performed by the operator locally.

Auto Operation:

The Sludge Grinder is powered-up and in Auto/Remote. The MCP sends a start command to start the sludge feed. This signal is actually wired to the sludge grinder panel. When the sludge grinder turns on, it will provide a run permissive to the sludge feed pump VFD.

3

Interlocks:

The Sludge Grinder will stop when:

- The centrifuge is not ready for sludge
- Sludge grinder not in Auto/Remote
- Emergency Stop

4.2. THICKENED SLUDGE FEED PUMPS – TSP-7201/7202 (BY OTHERS)

The MCP will provide relay outputs for the start/stop function of the Sludge Feed Pump VFD. The speed pump control will be performed by the MCP utilizing the sludge flow feedback signal from flow meter (SFM-7203/7204). The OIT will have an AUTO/MANUAL switch, ON/OFF pushbuttons, a sludge feed set point entry field, sludge pump manual speed setpoint, sludge speed feedback display and a sludge feed flow feedback display.

Manual Operation:

When the <ON> button is pressed, the Sludge Pump will start and run at the preset speed on the OIT. When the <OFF> button is pressed, the pump will stop.

Auto Operation:

The Sludge Feed Pump is started automatically when the sequence has been initiated and the sludge feed process start delay timer is completed. It will shut down when the process stop is active, normal shutdown, or any feed-off or shutdown alarms are active. Feed flow will be controlled by the centrifuge PLC utilizing the sludge feed flow signal in the MCP.

Interlocks:

The Sludge Feed Pump will stop when:

- The centrifuge is not ready for sludge
- Sludge pump not in Auto/Remote
- Sludge grinder is off
- Feed pump high discharge pressure
- Feed pump high temperature
- Emergency Stop

4.3. POLYMER FEED PUMPS – PFP-7201/7202 (BY OTHERS)

The MCP will provide relay outputs for the start/stop function of the Polymer Pump VFD. The speed pump control will be done by the centrifuge PLC, utilizing the ratio control logic compared against the sludge feed set point. The OIT will have an AUTO/MANUAL switch, ON/OFF pushbuttons, polymer feed, ratio set point entry field, and polymer feed pump manual speed setpoint .

Manual Operation:

When the <ON> button is pressed, the Polymer Pump will start and run at the preset speed on the OIT. When the <OFF> button is pressed, the pump will stop

Auto Operation:

The Polymer Pump is started automatically when the process start sequence has been initiated and the polymer feed process start delay timer is completed. It will shut down when the process stop is active, normal shutdown, or any feed-off or shutdown alarms are active.

Interlocks:

The Polymer Pump will stop when:

- The centrifuge is not ready for sludge
- Polymer Pump not in Auto/Remote
- Emergency Stop

4.4. DIVERTER GATE (BY GEA NAM)

The MCP will provide relay outputs for the open/close function of the Diverter Gate and open/close function of the Diverter Gate Flush Valve. The OIT will have an AUTO/MANUAL switch and OPEN/OFF/CLOSE pushbuttons for the Diverter Gate, and an AUTO/MANUAL switch and OPEN/CLOSE pushbuttons for the Diverter Gate Flush Valve.

Manual Operation:

When the <OPEN> button is pressed, the Diverter Gate will open. When the <CLOSE> button is pressed, the Diverter Gate will close.

Auto Operation:

When the centrifuge is started, the Diverter Gate is started automatically in the closed position. The Diverter Gate is opened automatically by the MCP when the torque is greater than the DIVERTER GATE OPEN/CONVEYOR FORWARD TORQUE setpoint for an

operator settable amount of time and Screw Conveyor 1 is confirmed running. When the process has stopped or on shutdown, the Diverter Gate will close when the torque falls below the DIVERTER GATE CLOSE/CONVEYOR REVERSE TORQUE set point for an operator settable amount of time or Screw Conveyor 1 has stopped running.

Interlocks:

The Diverter Gate will close when:

- The centrifuge is off
- Screw Conveyor 1 is off
- Emergency Stop

Note: The Diverter Gate Flush Valve will open when the Diverter Gate is closed and will close when the Diverter Gate is open, or the centrifuge is off.

4.5. SCREW CONVEYOR 1 – SBC-7303 ((BY OTHERS)

Each centrifuge MCP will provide relay outputs for the on/off function of Screw Conveyor 1. The OIT will have an AUTO/MANUAL switch and ON/OFF pushbuttons for Screw Conveyor 1.

Manual Operation:

When the <ON> button is pressed, Screw Conveyor 1 will run. When the <OFF> pushbutton is pressed, Screw Conveyor 1 will stop.

Auto Operation:

When the centrifuge is started, Screw Conveyor 1 is off. Screw Conveyor 1 is turned on automatically by the MCP when the torque is greater than the DIVERTER GATE OPEN/CONVEYOR FORWARD TORQUE setpoint for an operator settable amount of time and Screw Conveyor 2 is confirmed running. When the process has stopped or on shutdown, Screw Conveyor 1 will stop when the torque falls below the DIVERTER GATE CLOSE/CONVEYOR REVERSE TORQUE set point for an operator settable amount of time, the conveyor clear timer has expired, or Screw Conveyor 2 has stopped running.

Interlocks:

Screw Conveyor 1 will stop when:

- The centrifuge is off
- Screw Conveyor 1 not in Auto/Remote
- Screw Conveyor 2 is off
- Emergency Stop

4.6. SCREW CONVEYOR 2 – SBC-7304 ((BY OTHERS)

Each centrifuge MCP will provide relay outputs for the on/off function of Screw Conveyor 2. The OIT will have an AUTO/MANUAL switch and ON/OFF pushbuttons for Screw Conveyor 2.

Manual Operation:

When the <ON> button is pressed, Screw Conveyor 2 will run. When the <OFF> pushbutton is pressed, Screw Conveyor 2 will stop.

Auto Operation:

When the centrifuge is started, Screw Conveyor 2 is off. Screw Conveyor 2 is turned on automatically by the MCP when the torque is greater than the DIVERTER GATE OPEN/CONVEYOR FORWARD TORQUE setpoint for an operator settable amount of time. When the process has stopped or on shutdown, Screw Conveyor 2 will stop when the torque falls below the DIVERTER GATE CLOSE/CONVEYOR REVERSE TORQUE set point for an operator settable amount of time, and the conveyor clear timer has expired.

Interlocks:

Screw Conveyor 2 will stop when:

- The centrifuge is off
- Screw Conveyor 2 not in Auto/Remote
- Emergency Stop

4.7. LOAD LEVELER CONVEYOR – SBC-7305 (BY OTHERS)

The Load Leveler Conveyor will essentially be powered-up and controlled by the operator.

Manual Operation:

There is no manual operation from the MCP. All manual operation will be performed by the operator locally.

Auto Operation:

If the Load Leveler is powered-up, then whenever Screw Conveyor 2 turns on, it will provide a permissive to run the Load Leveler.

Interlocks:

Load Leveler Conveyor will stop when:

- Screw Conveyor 2 is off
- Emergency Stop

5. SCROLL CONTROL LOGIC

The Centrifuge control system is designed with a Scroll Control Module (SCM). This module allows the centrifuge to operate in SJM Torque Control Mode.

5.1. SJM Control Mode

When the SCM is in SJM control mode, the GEA proprietary control algorithm will compute the necessary differential speed to maintain the torque set point.

The following set points are used for SJM control:

- Control Begin
- Basic Differential Speed
- Control Gradient

Note: The scroll can be run at a fixed differential speed by setting the Control Gradient to 0%. This mode of operation is typically reserved for the Thickening application.

6. FLUSH & SHUTDOWN SEQUENCE

When the process sequence is completed, the Flush & Shutdown sequence is the desired method for stopping the system feed, initial cleaning of the centrifuge, and shutting down. The FSD can be activated at the OIT (LOCAL) or SCADA (REMOTE). Pressing the Flush & Shutdown Abort button, on the OIT (LOCAL) or SCADA (REMOTE), will stop the sequence. The sequence is as follows:

If the process sequence is completed and it is desired to shut down the centrifuge, the Flush & Shutdown sequence can be activated, without activating the Process Stop pushbutton. The sequence is as follows:

- Centrifuge currently running process
- Operator activates the Flush & Shutdown pushbutton on the OIT
- Sludge and Polymer feed are sequenced off as described above, under Process Stop Sequence.
- Scroll runs at a preset fixed speed
- Centrifuge Flush Water Valve is opened
- Diverter gate remains open and screw conveyors continue to run
- When torque drops below the DIVERTER GATE CLOSE/CONVEYOR REVERSE TORQUE set point, the Centrifuge Flush Water Valve will close, and a Product Clear timer will be initiated to allow removal of the remaining cake in the bowl.

- Product Clear operator settable clear timer expires
- Diverter Gate is closed
- Diverter Gate Flush Valve is opened
- Screw Conveyor 1 is turned off after the conveyor 1 clear timer has expired
- Screw Conveyor 2 is turned off after the conveyor 2 clear timer has expired
- The centrifuge will then automatically sequence into the CIP cleaning cycle described below

7. CLEAN IN PLACE (CIP) SEQUENCE

The centrifuge will execute a cleaning sequence, also known as Clean-In-Place (CIP), after the flush and shutdown sequence has been completed, or the operator initiates the CIP sequence by pressing the CIP Start pushbutton on the OIT. The sequence for one cycle is as follows:

- Number of CIP cycles is set to greater than zero (typically 3).
- The Flush & Shutdown sequence is completed or the CIP Start pushbutton is activated from the OIT.
- Scroll runs at the CIP scroll frequency setting (45 Hz, machine specific).
- Centrifuge bowl starts to decelerate to zero-speed.
- Centrifuge flush valve closes below the flush water off setting (450 rpm, machine specific).
- Bowl speed goes below the CIP low-speed setting (approx. 140 rpm, machine specific).
- Zero-speed timer is activated to ensure the centrifuge comes to a complete stop.
- Zero-speed timer expires, and bowl has come to a complete stop.
- Centrifuge bowl accelerates to the CIP high-speed setting (approx. 750 rpm, machine specific).
- Centrifuge flush valve opens above the flush water off setting (450 rpm, machine specific).
- CIP high-speed setting is reached, and the high-speed duration timer is activated for an operator adjustable duration time (approx. 300 sec., machine specific).
- CIP high-speed duration timer expires.
- The centrifuge bowl decelerates to the CIP low-speed setting (approx. 140 rpm, machine specific).
- Centrifuge flush valve closes below the flush water off setting (450 rpm, machine specific).
- CIP low-speed setting is reached, and the low-speed duration timer is activated for an operator adjustable duration time (approx. 300 sec., machine specific).
- CIP low speed duration timer expires.
- Zero-speed timer is activated.
- Centrifuge bowl decelerates to zero-speed.
- Zero-speed timer expires, and bowl has come to a complete stop.
- One CIP cycle has been completed. If CIP cycle count is set to greater than 1, the cycle will repeat itself. Note: For subsequent CIP cycles, the bowl speed will cycle as follows: zero speed→high speed→low speed→zero speed.
- Upon completion of the last CIP cycle, the centrifuge will coast down to a stop.

APPENDIX A – ALARM CONDITIONS AND SHUTDOWNS

Alarm condition	Alert	Feed Off	Controlled Shutdown	Immediate Shutdown	Emergency Shutdown
Bearing Temp - Liquids Side – Hi		✓			
Bearing Temp - Liquids Side – Hi - Hi			✓		
Bearing Temp - Solids Side – Hi		✓			
Bearing Temp - Solids Side - Hi - Hi			✓		
Bowl Speed Hi			✓		
Bowl Speed Low				✓	
Torque Hi		✓			
Torque Hi-Hi				✓	
Torque Hi-Hi-Hi				✓	
Gearbox Overload Alert	✓				
Gearbox Overload Shutdown				✓	
Vibration – Liquids Side - Hi		✓			
Vibration – Liquids Side - Hi – Hi			✓		
Vibration – Solids Side - Hi		✓			
Vibration – Solids Side - Hi – Hi			✓		
Differential Speed Low				✓	
Emergency Stop					✓
Centrifuge Fail to Start		✓			
Bowl Motor VFD Fault			✓		
Bowl Motor VFD Run Fault			✓		
Bowl Motor Winding Temp Hi			✓		
Scroll Motor VFD Fault				✓	
Scroll Motor Run Fault				✓	
Scroll Motor Winding Temp Hi				✓	
Air-Oil Pressure Low Alert - Liquids Side	✓				
Air-Oil Pressure Low Shutdown – Liquids Side			✓		
Air-Oil Pressure Low Alert - Solids Side	✓				
Air-Oil Pressure Low Shutdown – Solids Side			✓		
Air-Oil Reservoir Level Low			✓		
Gearbox Oil Level Low			✓		
Sludge Feed Flow Low		✓			
UPS Fault	✓				
UPS Low Battery	✓				
UPS On Battery/Control Power Loss	✓				
Polymer Pump VFD Fault		✓			
Polymer Pump VFD Run Fault		✓			
Sludge Pump VFD Fault		✓			
Sludge Pump VFD Run Fault		✓			
Sludge Feed Pump Discharge Press High		✓			
Sludge Feed Pump Temp High		✓			
Diverter Gate Fail to Open Fault		✓			
Diverter Gate Fail to Close Fault		✓			
Screw Conveyor 1 Run Fault		✓			
*Screw Conveyor 1 Common Alarm		✓			
Screw Conveyor 2 Run Fault		✓			

*Screw Conveyor 2 Common Alarm		✓			
Polymer Batch System Level Low		✓			

*The conveyor common alarm is comprised of the following:

- Motor overload
- Zero speed fault
- E-stop

APPENDIX B – ANALOG SCALING

Scaling methods: All analog values will be scaled from the raw data to their respective Engineering units.

ANALOG INPUTS			
DESCRIPTION	INPUT TYPE	RANGE (Eng. Units)	ALARM SET POINTS
Bowl Motor Amps	4-20 mA	0 ~ 150% FLA (141.3 A)	N/A
Solids Side Bearing Temp	RTD, PT 100	0 ~ 300°C	120°C = HI 140°C = HI-HI
Liquid Side Bearing Temp	RTD, PT 100	0 ~ 300°C	120°C = HI 1140°C = HI-HI
Solids Side Vibration (rms)	4-20 mA	0 ~ 50 mm/s	18 mm/s = HI 20 mm/s = HI-HI
Liquid Side Vibration (rms)	4-20 mA	0 ~ 50 mm/s	18 mm/s = HI 20 mm/s = HI-HI
Bowl Speed	4-20 mA	0 ~ 6000 rpm	3307 rpm = HI-HI
Gear Input Speed	4-20 mA	0 ~ 6000 rpm	N/A
Scroll Motor Torque	4-20 mA	0 ~ 150%	100% = HI 110% = HI-HI 120% = HI-HI-HI
Scroll Motor Frequency	4-20 mA	0 ~ 60 HZ	N/A
Sludge Feed Flow	4-20 mA	0 ~ TBD	N/A
Sludge Feed Pump VFD Speed	4-20 mA	0 ~ 100%	N/A

ANALOG OUTPUTS		
DESCRIPTION	OUTPUT TYPE	RANGE (Engineering Units)
Scroll Motor VFD Speed control	4-20 mA	0 ~ 100%
Bowl Motor VFD Speed control	4-20 mA	0 ~ 100%
Sludge Feed Pump Speed control	4-20 mA	0 ~ 100%
Polymer Feed Pump Speed control	4-20 mA	0 ~ 100%

APPENDIX C – TIMERS / COUNTERS AND SET POINTS

TORQUE CONTROL OPERATING SET-POINTS

These parameters are commonly modified to fine tune the process and are not password protected

- Scroll: SJM Torque Control
When in SJM Control, the Westfalia proprietary control algorithm will compute the necessary differential speed to obtain the torque set-point.
- SJM Control Begin
This is the starting value at which the SJM controller will begin controlling torque.
- SJM Basic Differential Speed
This is the lowest value the differential speed will be permitted to run, based upon process conditions.
- SJM Gradient
This will adjust the proportional size of the change when a correction is required to the SJM torque control.

PROCESS PARAMETERS

These are parameters that users change depending on the type of sludge being processed. Most parameters in this group are not password protected.

- Sludge Feed Flow rate
This is the flowrate at which the sludge feed control will achieve.
- Polymer Flow rate
This is the flowrate at which the Polymer Pump will achieve, note that this will automatically update with the Sludge Feed Flowrate through ratio control logic.
- CIP Cycles
This is number of cycles that will execute when the CIP Sequence is activated. Refer to Clean in Place (CIP) sequence for complete description of CIP cycles.
- Diverter Gate Open/Conveyor Forward Torque
This is the torque value at which the Screw Conveyors will run forward, and the diverter gate will open.
- Diverter Gate Open/Conveyor Forward Torque Delay Time
This is the time the torque must be above the set point before the Screw Conveyors will run forward, and the Diverter Gate will open.
- Diverter Gate Close/Conveyor Reverse Torque
This is the torque value at which the Screw Conveyors will stop (after an operator settable clear timer), and the diverter gate will close.
- Diverter Gate Close/Conveyor Reverse Torque Delay Time
This is the time the torque must be below the set point before the Screw Conveyors will stop and the Diverter Gate will close.
- Flush Water On RPM – Start-Up
This is the RPM value that will open the flush water valve during initial start-up. The flush water valve will be open for an operator settable amount of time. Once the time expires, the flush water valve will close.
- Flush Water On RPM – Shutdown
This is the RPM value that will open the flush water upon a controlled shutdown or during the CIP sequence.
- Flush Water Off RPM – Shutdown
This is the RPM value that will close the flush water upon a controlled shutdown or during the CIP sequence.

PROCESS TIMERS

These timers control the starting and stopping of the equipment and will not usually need modification once commissioning is complete. Most of these parameters are password protected.

- Centrifuge Start-Up Time
This is the time that the main bowl motor is given to ramp up to operating speed. If the bowl speed is within the operating limits when this timer expires, then the centrifuge is ready to process sludge. If the bowl speed is above or below operating limits when this timer expires, then an alarm is issued, and the controlled shutdown sequence is initiated.
- Flush Water – Start-Up
This is the time that the flush water valve will be open after the centrifuge reaches above the operator settable RPM during initial start-up. The default for this value is 0.
- Flush Water – Torque High
This is the time that the flush water cycle is active during a process shutdown sequence when triggered by a Torque High Alarm.
- Flush Water – Vibration High
This is the time that the flush water cycle is active during a process shutdown sequence when triggered by a Vibration High Alarm.
- Standby (Idle) Mode - Flush Interval
This is the time that centrifuge will remain in Standby mode before the flush water valve opens.
- Standby (Idle) Mode - Flush Duration
This is the time duration that valve will open during a Standby mode flush.
- Polymer Pump Start Delay Time
This is the time delay to start the Polymer Pump once the Process Sequence has begun.
- Polymer Pump Start-Up Duration
This is the duration that the Polymer Pump will be running at the fixed start-up speed once the Polymer Pump has started.
- Polymer Pump Start-Up Speed
This is the fixed speed at which the Polymer Pump will run during the start-up timer duration.
- Sludge Pump Start Delay Time
This is the time delay to start the Sludge Pump once the Process Sequence has begun.
- Sludge Pump Start-Up Duration
This is the duration that the Sludge Pump will be running at the fixed start-up speed once the Sludge Pump has started.
- Sludge Pump Start-Up Speed
This is the fixed speed at which the Sludge Pump will run during the start-up timer duration.
- Screw Conveyor Clear Time
This is the time that the Screw Conveyor will stay running after the torque has been below the Diverter Gate Close/Conveyor Reverse Torque set point for its preset amount of time. It should be set long enough to discharge all the remaining solids after sludge has stopped being fed to the centrifuge. Note that this clear timer is not utilized when running the Flush and Shutdown sequence.
- Product Clear Time
This is the time that the Screw Conveyors will stay running forward and the Diverter Gate remain open after the torque has been below the Diverter Gate Close/Conveyor Reverse Torque set point for its preset amount of time. It should be set long enough to discharge all the remaining solids being pushed by the newly introduced flush water during the Flush and Shutdown sequence. After this timer expires, the centrifuge will automatically transition into CIP.
- Air-Oil Starting Duration
This is the amount of time that the lube system will feed oil to the bearings during centrifuge start-up.
- Air-Oil Starting Interval
This is the amount of time that the lube system will pause in between lubrication cycles during centrifuge start-up.
- Air-Oil Running Duration
This is the amount of time that the lube system will feed oil to the bearings while the centrifuge is running.
- Air-Oil Running Interval

This is the amount of time that the lube system will pause in between lubrication cycles while the centrifuge is running.

MACHINE CONFIGURATION PARAMETERS

These parameters are set during commissioning and should not be modified except by qualified personnel.

- Decanter Factor
This is the gearbox factor to calculate machine torque.
- Primary Gear Factor
This is the gearbox ratio for the primary gear.
- Secondary Gear Factor
This is the gearbox ratio for the secondary gear.
- Minimum Scroll Frequency
This is the minimum frequency that the scroll VFD can operate.
- Maximum Scroll Frequency
This is the maximum frequency that the scroll VFD can operate.
- Minimum Differential Speed
This is the minimum differential speed that the centrifuge can operate at rated bowl speed.
- Maximum Differential Speed
This is the maximum differential speed that the centrifuge can operate at rated bowl speed.
- CIP Scroll Frequency
This is the fixed frequency speed that the centrifuge scroll motor will operate at during CIP.
- CIP Lower Bowl Speed Limit
This is the RPM the bowl will decelerate to during CIP.
- CIP Upper Bowl Speed Limit
This is the RPM the bowl will ramp up to during CIP.
- Torque Suppression Value
This value is used to determine the true zero point of the torque with no load on the machine.
- Bowl Nameplate Speed
This is the maximum bowl speed at which the centrifuge is designed to operate.
- Bowl Speed Set Point
This is the commanded bowl speed at which the centrifuge will operate.
- Restart Interlock
During a shutdown cycle, the centrifuge can be restarted when the bowl speed drops below this set-point without having to wait for the bowl to decelerate to zero speed.
- Bowl Speed High
This is the set-point of the bowl speed high alarm.
- Bowl Speed Low
This is the set-point of the bowl speed low alarm.
- Differential Speed Low
This is the set-point of the differential speed low alarm.
- Air-Oil Starting Duration
This is the amount of time that the lube system will feed oil to the bearings during centrifuge start-up.
- Air-Oil Starting Interval
This is the amount of time that the lube system will pause in between lubrication cycles during centrifuge start-up.
- Air-Oil Running Duration
This is the amount of time that the lube system will feed oil to the bearings while the centrifuge is running.
- Air-Oil Running Interval
This is the amount of time that the lube system will pause in between lubrication cycles while the centrifuge is running.
- Vibration High
This is the set-point of the vibration high alarm.
- Vibration High-High
This is the set-point of the vibration high-high alarm.
- Torque High

- This is the set-point of the torque high alarm.
- Torque High-High
This is the set-point of the torque high-high alarm.
- Torque High-High-High
This is the set-point of the torque high-high-high alarm
- Bearing Temperature High
This is the set-point of the bearing temperature high alarms.
- Bearing Temperature High-High
This is the set-point of the bearing temperature high-high alarms

APPENDIX D – PRESETS AND SECURITY SETUP

Description	Preset	Actual Values	Units	Range	Password
Scroll Operation					
Scroll Control	SJM				X
Control Begin	25		%	0-100	
Basic Differential Speed	7.0		Rpm	0-99.0	
Control Gradient	10		%	0-100	
Process Parameters					
Sludge Feed Flowrate	75		GPM	0-999	
Polymer Flowrate	15		%	0-100	
CIP Cycles	3		counts	0-20	
Diverter Gate Open Torque	15		%	0-100	
Diverter Gate Open Torque Delay Time	5		seconds	0-600	
Diverter Gate Close Torque	10		%	0-100	
Diverter Gate Close Torque Delay Time	5		seconds	0-600	
Flush Water RPM – Start-Up	1000		RPM	300-8000	
Flush Water On RPM – Shutdown	3000		RPM	300-8000	
Flush Water Off RPM – Shutdown	500		RPM	300-8000	
Process Timers					
Centrifuge Start-Up Time	450		seconds	1-1000	X
Flush Water – Start-Up	0		minutes	0-500	
Flush Water – Torque High	180		seconds	0-900	X
Flush Water – Vibration High	180		seconds	0-900	X
Standby Mode – Flush Interval	30		minutes	1-60	
Standby Mode – Flush Duration	300		seconds	1-300	
Polymer Pump Start Delay Time	5		seconds	0-300	
Polymer Pump Start-Up Duration	10		seconds	1-300	
Polymer Pump Start-Up Speed	50		%	1-100	
Sludge Pump Start Delay Time	10		seconds	0-300	
Sludge Pump Start-Up Duration	10		seconds	1-300	
Sludge Pump Start-Up Speed	50		%	1-100	
Screw Conveyor Clear Time	60		seconds	0-600	
Product Clear Time	600		seconds	0-9999	
Decanter Configuration					
Decanter Factor	1.05			-9999-9999	X
Primary Gear Factor (IT)	-577			-9999-9999	X
Secondary Gear Factor (IE)	-87.4			-9999-9999	X
Minimum Scroll Frequency	10		Hz	10-90	X
Maximum Scroll Frequency	60		Hz	10-90	X
Minimum Differential Speed	1		RPM	0-100	X
Maximum Differential Speed	14		RPM	0-100	X
CIP Scroll Frequency	45		HZ	10-87	X
CIP Lower (Low) Bowl Speed Limit	140		RPM	0-1000	X
CIP Upper (High) Bowl Speed Limit	750		RPM	300-6000	X
CIP Lower (Low) Bowl Speed flushing time	300		Seconds	0-1000	X
CIP Upper (High) Bowl Speed flushing time	300		Seconds	0-1000	X
CIP Zero Speed	50		Seconds	0-1000	X
Torque Suppression	10		%	0-99	X
Bowl Nameplate Speed	3150		RPM	0-8000	X
Bowl Speed Set Point	3150		RPM	0-8000	X
Restart Interlock	3000		RPM	25-8000	X
Bowl Speed High	3307		RPM	100-8000	X
Bowl Speed Low	95		%	0-110	X
Differential Speed Low	0.5		RPM	0-20	X
Air-Oil Starting Duration (Pulse)	10		seconds	10-999	X
Air-Oil Starting Interval (Pause)	15		seconds	0-999	X
Air-Oil Running Duration (Pulse)	10		seconds	10-999	X
Air-Oil Running Interval (Pause)	50		seconds	0-999	X

GEA Mechanical Equipment US, Inc / GEA Westfalia Separator Division

Centrifuge Sequence of Operation

Rev 3

Taunton, MA Centrifuge – UCF 646-00-35 (CF 7000)

08-Aug-2022

Vibration High	18		mm/s	1-50	X
Vibration High-High	20		mm/s	1-50	X
Torque High	100		%	0-150	X
Torque High-High	110		%	0-150	X
Torque High-High-High	120		%	0-150	X
Bearing Temperature High	120		C°	0-500	X
Bearing Temperature High-High	140		C°	0-500	X

TAUNTON, MA 2652.395.848 (CF-7000-00-35)

WASTEWATER TREATMENT FACILITY

CENTRIFUGE MAIN CONTROL PANELS & LOCAL OPERATOR PANELS

ELECTRICAL DRAWINGS # 9200-5901-587-10551

CENTRIFUGE #1 --- MCP SERIAL #10551-1A / LOP SERIAL #10551-1B

CENTRIFUGE #2 --- MCP SERIAL #10551-2A / LOP SERIAL # 10551-2B

LIST OF DRAWINGS 9200-5901-587-10551:

- SHT 0 - COVER SHEET
- SHT 1 - GENERAL NOTES AND LEGEND
- SHT 2 - BILL OF MATERIALS
- SHT 3 - SPARE SHEET
- SHT 4 - CENTRIFUGE MAIN CONTROL PANEL LAYOUT
- SHT 5 - TERMINAL BLOCK DETAILS
- SHT 6 - LOCAL OPERATOR PANEL & B/M
- SHT 7 - BOWL MOTOR VFD POWER DISTR. AND CONTROL
- SHT 8 - SCROLL MOTOR VFD POWER AND CONTROL
- SHT 9 - SPARE SHEET
- SHT 10 - SPARE SHEET
- SHT 11 - CONTROL PANEL 120VAC SCHEMATIC
- SHT 12 - CONTROL PANEL 120VAC SCHEMATIC
- SHT 13 - E-STOP RELAY
- SHT 14 - 24VDC POWER DISTRIBUTION
- SHT 15 - PLC RACK LAYOUT
- SHT 16 - PLC I/O
- SHT 17 - PLC I/O
- SHT 18 - PLC I/O
- SHT 19 - PLC I/O
- SHT 20 - PLC I/O
- SHT 21 - PLC I/O
- SHT 22 - RELAY CONTACTS TO CUSTOMER CONTROLS
- SHT 23 - SPARE SHEET
- SHT 24 - INTERCONNECT WIRING
- SHT 25 - COMMUNICATIONS NETWORK DIAGRAM

REVISION # 5

DATE: 26AUG2022

RELEASE HISTORY:

GEA APPROVAL:

<input type="checkbox"/>	RELEASED FOR SUBMITTAL APPROVAL REV: <u>0</u> DATE: <u>15OCT21</u>	APPROVED SIGNATURE: <u>L. Moreno / R. R.</u>
<input type="checkbox"/>	RELEASED FOR: REVISED PER SUBMITTAL COMMENTS REV: <u>1</u> DATE: <u>07DEC21</u>	APPROVED SIGNATURE: <u>L. Moreno / R. R.</u>
<input type="checkbox"/>	RELEASED FOR: REVISED MCP PART NUMBER REV: <u>2</u> DATE: <u>07JAN22</u>	APPROVED SIGNATURE: <u>L. Moreno / R. R.</u>
<input type="checkbox"/>	RELEASED FOR: FABRICATION REV: <u>3</u> DATE: <u>17FEB2022</u>	APPROVED SIGNATURE: <u>L. Moreno / R. R.</u>
<input type="checkbox"/>	RELEASED FOR: AS BUILT REV: <u>4</u> DATE: <u>18AUG22</u>	APPROVED SIGNATURE: <u>L. Moreno / R. R.</u>
<input checked="" type="checkbox"/>	RELEASED FOR: REVISED AS BUILT REV: <u>5</u> DATE: <u>26AUG22</u>	APPROVED SIGNATURE: <u>L. Moreno / R. R.</u>

GEA MECHANICAL EQUIPMENT US, INC.

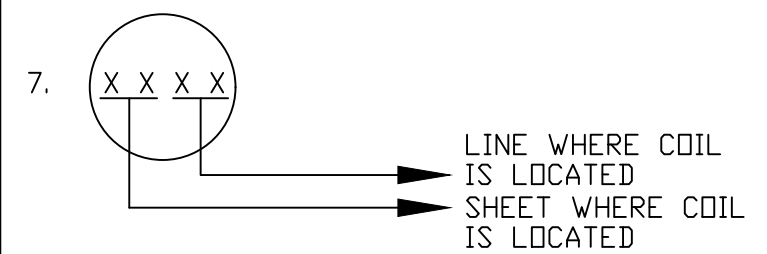
100 Fairway Court Northvale, NJ 07647

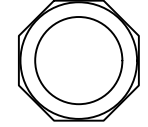


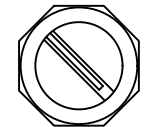
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NOTES:

WIRE DESIGNATIONS:

1. WIRE # **X X X X**
 → SEQUENTIAL LINE # ON DESIGNATED SHEET
 → SHEET #
2. WIRE # **I - X X X X**
 → PLC I/O PROGRAM DESIGNATION
 → DASH
 → PLC INPUT
3. WIRE # **O - X X X X**
 → PLC I/O PROGRAM DESIGNATION
 → DASH
 → PLC OUTPUT
4. L = 120 VAC HOT WIRE
 N = 120 VAC NEUTRAL WIRE
 LXXX = STARTING POINT OF WIRE (SHEET & LINE #)
 NXXX = STARTING POINT OF WIRE
5. **X T X**
 → PHASE DESIGNATION
 → MOTOR LEAD DESIGNATION
 → SEQUENTIAL DESIGNATION
6. **X L X**
 → PHASE DESIGNATION
 → POWER LEAD DESIGNATION
 → SEQUENTIAL DESIGNATION



8.  = PUSH BUTTON
-  = PILOT LIGHT
 X = LENS COLOR
-  = ILLUMINATED PUSH BUTTON
 X = LENS COLOR
-  = SELECTOR SWITCH

GENERAL NOTES:

1. 24VDC / 4-20 ma dc, 120VAC & 480VAC/575VAC WIRING MUST BE RUN SEPARATELY WITHIN THE CONTROL & MOTOR PANELS. PANEL FABRICATOR TO PROVIDE FOR ADEQUATE SEPARATION BETWEEN CONDUCTORS USING WIREWAY WHEREVER POSSIBLE, IN ORDER TO AVOID ELECTRICAL NOISE INTERFERENCE.
2. ONLY WHEN ABSOLUTELY NECESSARY, CROSS 120VAC & 24VDC WIRING AT 90° ANGLES. NEVER RUN 24VDC NEAR OR ACROSS 480 VAC WIRING !
3. PANEL FABRICATOR TO DETERMINE EXACT SIZE OF WIRING DUCTS TO ACCOMMODATE REQUIRED NUMBER OF CONDUCTORS.
4. WIRE MARKERS TO BE TUBULAR HEAT SHRINKABLE TYPE WITH PERMANENT MECHANICAL STAMPED CHARACTERS OR SELF LAMINATING WRAP AROUND TYPE. MARK BOTH ENDS OF WIRE.
5. ALL TERMINALS SHALL BE INSTALLED ON RAISED ANGLED BRACKETS.
6. ALL INTERNAL DEVICES LABELED WITH P-TOUCH OR EQUAL LABELS.

WIRE COLOR CODING:

600V INSULATED CONDUCTORS		
POWER		
	480/575VAC	120VAC
PHASE A	BROWN	BLACK
PHASE B	ORANGE	----
PHASE C	YELLOW	----
GROUND	GREEN	GREEN
NEUTRAL	WHITE	WHITE

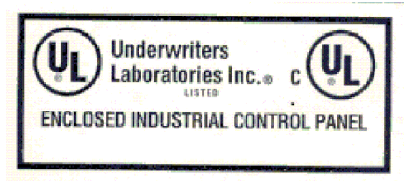
CONTROL WIRING, 300V INSULATED
 (THHN, THW OR MTW) UL-508A TABLE 28.1
 #16AWG = 10 AMPS MAX
 #14AWG = 15 AMPS MAX
 #12AWG = 20 AMPS MAX
 #10AWG = 30 AMPS MAX

120VAC (hot, line in)	BLACK
120VAC (control ckt's)	RED
NEUTRAL 120VAC	WHITE
DIRECT CURRENT	BLUE
DC COMMON	BLUE/WHT STRIPE
FOREIGN VOLTAGE	YELLOW
GROUNDING	GREEN
INTRINSICALLY SAFE	LIGHT BLUE

ma SIGNAL WIRING, #18AWG, TWISTED SHIELDED, 300V CONTROL CABLE (#OF PAIRS AS REQ'D), BELDEN OR EQUAL.

UL & STANDARD WARNING LABELS

UL LABEL TO BE APPLIED TO INTERIOR SURFACE OF PANELS UPON COMPLETION OF UL INSPECTION



PANEL FABRICATOR TO PROVIDE LABELS ON FRONT OF ENCLOSURES WHEN APPLICABLE

DANGER:
 The Main Disconnect does not de-energize all exposed voltages inside this enclosure when in the OFF position.
 A separate disconnect is mounted inside to provide power to the PLC and DC power supplies while Main Disconnect is OFF

DANGER:
 HAZARD OF ELECTRICAL SHOCK, BURN OR EXPLOSION
 • Never Operate Switch With Door Open.
 • Turn Off Switch Before Removing Or Installing Fuses Or Making Load Side Connections.
 • Always Use A Properly Rated Voltage Sensing Device At All Line And Load Side Fuse Clips To Confirm Switch Is Off.
 • Turn Off Power Supplying Switch Before Doing Any Other Work On Or Inside Switch.
 FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS WILL RESULT IN ELECTRICAL SHOCK, SEVERE PERSONAL INJURY OR DEATH.



PANEL FABRICATOR TO PROVIDE SCCR RATING LABEL ON VFD/MCC ENCLOSURE

INDUSTRIAL CONTROL PANEL
 GEA PANEL SERIAL #: 10551-1A / 1B
 CURRENT: FLA = 218.7 AMPS
 VOLTAGE: 460 VAC
 PHASE & FREQ: 3/60HZ
 SCCR: 65 KAIC
 WIRING DIAGRAM: #9200-5901-587-10551

PANEL SERIAL NUMBER LABEL



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REV.	BY	DATE	REVISION
5	AR	26AUG22	REVISED AS BUILT
4	ACI	18AUG22	AS BUILT
3	ACI	17FEB22	RELEASED FOR FABRICATION
2	AR	07JAN22	REVISED MCP PART NUMBER
1	AR	07DEC21	REVISED PER SUBMITTAL COMMENTS
0	RR	15OCT21	SUBMITTAL APPROVAL ISSUE

TERMINAL BLOCK LEGEND		
	MAIN CONTROL PANEL	
	LOCAL OPERATOR PANEL	
	CUSTOMER	
	X20 TERMINAL BLOCK	
	X47 TERMINAL BLOCK	
	X48 TERMINAL BLOCK	
	X11 TERMINAL BLOCK	
	EXTERNAL WIRING	

GEA MECHANICAL EQUIPMENT US, INC.
 WESTFALIA SEPARATOR DIV.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE GENERAL NOTES & LEGEND**

TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	1 OF 25	CF 7000	9200-5901-587-10551	5


CENTRIFUGE MAIN CONTROL PANEL BILL OF MATERIAL						
ITEM	TAG NO.	QTY.	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	GEA ITEM #
1	MCP	1	SAGINAW	SCE-84XM7824	NEMA 12, 2 DOOR, PAINTED CARBON STEEL, HEAVY DUTY ENCLOSURE, 84"x78.5"x24" DP UL Listed Type 3R, 12 FURNISHED WITH 10 GA. INTERIOR SUB-PANEL, 72"x72"	-----
2	PLC-1116	1	SAGINAW	SCE-76P76	PROCESSOR, COMPACT LOGIX, 2MB, ETHERNET----- POWER SUPPLY, 85-265V----- 24VDC, 16 PT., DIGITAL INPUT CARD----- 24VDC, 16 PT., DIGITAL OUTPUT MODULE----- 8 PT. ANALOG INPUT MODULE----- 8 PT. ANALOG OUTPUT MODULE----- END CAP RIGHT-----	9105-2760-420 9105-2760-010 9105-2760-090 9105-2760-130 9105-2760-040 9105-2760-050 9105-2760-070
3	MCB702	1	SQUARE D	JJL36200	CIRCUIT BREAKER, 3-POLE, 600VAC, 200 AMP, 65 kAIC	-----
4	PDB709	1	MARATHON	1433587	POWER BLOCK, 3-POLE, 1 LINE, 4 LOAD	-----
5	FU704	3	BUSSMAN	JJS-150	FUSE, 150 AMP, CLASS T, VERY FAST ACTING, 600V	-----
6	FU804	3	BUSSMAN	JJS-90	FUSE, 90 AMP, CLASS T, VERY FAST ACTING, 600V	-----
7	ITEM NUMBER	NOT USED				-----
8	ITEM NUMBER	NOT USED				-----
9	VFD704	1	ABB	ACS880-01-096A-5	ABB ACS880, VFD, NOMINAL RATED @96 AMPS, 480VAC	9105-2749-120
10	HMI-704	1	ABB	DPMP-01	ABB ACS880, KEYPAD MOUNTING KIT	9131-1329-390
11	MCR-1300	1	PILZ	PNDZ XV3.1P (777 520)	EMERGENCY STOP RELAY, PNDZ XV3.1P	-----
12	ITEM NUMBER	NOT USED				-----
13	TT1914	2	PHOENIX	MINI MCR-RTD-UI-NC	RTD/I, TEMPERATURE SIGNAL CONVERTER FOR RTD SENSORS	9105-0250-000
14	ITEM NUMBER	NOT USED				-----
15	LUG	2	PANDUIT	LAM2A350-12-6	GROUND LUG	-----
16	TB-1 & 2	120	ALLEN BRADLEY	1492-JD3 (OR EQUAL)	TWO LEVEL, 2 CIRCUIT, FEED THRU, 600V, 20A, #22-#12AWG	-----
17	LAMP1132A/B	2	SAGINAW	SCE-SLDF	LED STRIP LIGHT, AC/DC, 24VDC TO 265 VAC 14' LONG	-----
18	WIREWAY	A/R	PANDUIT	TYPE G SLOTTED	SLOTTED WIRE DUCT, RIGID, GREY VINYL W/COVER	-----
19	ITEM NUMBER	NOT USED				-----
20	SFP-1114	1	PHOENIX	2856702	TRANSIENT VOLTAGE SURGE SUPPRESSOR & EMI/RFI FILTER	-----
21	PS-1402	1	ALLEN BRADLEY	1606-XLS480E	24VDC POWER SUPPLY, 20 AMP, 480W, 120VAC INPUT	-----
22	CKT BKR'S	4	EATON (OR EQUAL)	FAZ-C1/1-NA-SP	CIRCUIT BREAKER, UL489, 1 POLE, 1 AMP, 'C' CURVE	-----
23	RELAYS	33	IDEC	RH3B-UL-DC24V	RELAY, 3PDT, 24VDC COIL, 10AMP CONTACTS	-----
24	ITEM NUMBER	NOT USED				-----
25	ITEM NUMBER	NOT USED				-----

CENTRIFUGE MAIN CONTROL PANEL BILL OF MATERIAL						
ITEM	TAG NO.	QTY.	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	GEA ITEM #
26	ITEM NUMBER	NOT USED				-----
27	SM-2002	2	PEPPERL & FUCHS	KF8-UFC-1.D	FREQUENCY CONVERTER	9105-0594-002
28	GND BAR	2	ILSCO	UGB2/0-414-6	GROUND BAR	-----
29	TX1101	1	SQUARE D	9070 T3000D1	CONTROL TRANSFORMER 480/120 VAC, 3KVA	-----
30	PLEXI	1	PANEL SHOP	CUSTOM	PLEXI-GLASS ARC FLASH DIVIDER	-----
31	FAN-1103L,R	4	RITTAL	3244.110	FILTER FAN, NEMA 12, 120VAC, 1.25A, 359 CFM	-----
32	ES-1404	1	HIRSCHMANN	943 824-002	SPIDER STX, 5 PORT, INDUSTRIAL ETHERNET SWITCH	-----
33	CAT 6	2	BELKIN	A3L980b10-S	CAT 6 PATCH CABLE, 10-FT., BLUE, RJ45 MALE/RJ45 MALE	-----
34	FB1100	1	ABB	E92/30CCS	FUSE HOLDER CLASS CC, 2POLE, WITH INDICATOR	-----
35	FU BLK	4	PHOENIX	UT 4-HEXILED 24-P/P - 3046540	Lever-type fuse terminal block, black, for 5 x 20 mm G fuse inserts, with LED for 24V	-----
36	TSH704	2	SIEMENS	3RN2010-1CW30	MOTOR THERMISTOR PROTECTION RELAY	9105-0447-000
37	DAP-1106	1	GRACE PORT	P-R2-F2RD	DATA ACCESS PORT, NEMA 4X W/RECEPTACLE, 5 AMP MAX	-----
38	PDB804	1	SCHNEIDER	9080LBA362101	POWER BLOCK, 3-POLE, 1 LINE, 1 LOAD, #14AWG-2/0	-----
39	LUG	4	BLACKBURN	ADR21-21	GROUND LUG, 2- BARRELL, 2-HOLE	-----
40	LR-704	1	TCI	KDRH3L	480V, 124A, 100HP, 3 Phase, Open, Input Line Inductor, Low Impedance, UL Listed	-----
41	LR-804	1	TCI	KDRF2L	480V, 65A, 50HP, 3 Phase, Open, Input Line Inductor, Low Impedance, UL Listed	-----
42	UPS-1108	1	EATON	9SX1500	TOWER UPS 1500VA/1350W, 120VAC, 50/60HZ	-----
43	PL-1113	1	ALLEN BRADLEY	800H-QRTH2A	PILOT LIGHT, AMBER, PUSH TO TEST, 12-130V AC/DC, NEMA 4X	-----
44	RCPT-1107	1	HUBBELL	HBL53CM61	RECEPTACLE, 5-20r NEMA	-----
45	FB1220	1	ABB	E92/30CCS	FUSE HOLDER CLASS CC, 2POLE, WITH INDICATOR	-----
46	TX1220	1	SQUARE D	9070 T3000D1	CONTROL TRANSFORMER 480/120 VAC, 3KVA	-----
47	ITEM NUMBER	NOT USED				-----
48	ITEM NUMBER	NOT USED				-----
49	ITEM NUMBER	NOT USED				-----
50	ITEM NUMBER	NOT USED				-----

NOTE: LOCAL OPERATOR PANEL BILL OF MATERIALS ITEMS 51 THRU 62 ARE CONTINUED ON SHT 6

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0	RR	15OCT21	SUBMITTAL APPROVAL ISSUE
REV.	BY	DATE	REVISION

TERMINAL BLOCK LEGEND ⊗ MAIN CONTROL PANEL ● LOCAL OPERATOR PANEL ▲ CUSTOMER ▽ X20 TERMINAL BLOCK △ X47 TERMINAL BLOCK □ X48 TERMINAL BLOCK ■ X11 TERMINAL BLOCK — EXTERNAL WIRING			 Westfalia Separator, Inc. Mechanical Separation Division 100 Fairway Court Northvale, NJ 07647	
Title CF7000 CENTRIFUGE BILL OF MATERIALS			TAUNTON, MA 2652.395.848	
Drawn	Approved	Date	Sheet	Machine Type
RR	LM	15OCT21	2 OF 25	CF 7000
			DWG. NO.	Rev.
			9200-5901-587-10551	5

.....SPARE SHEET.....

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REV.	BY	DATE	REVISION

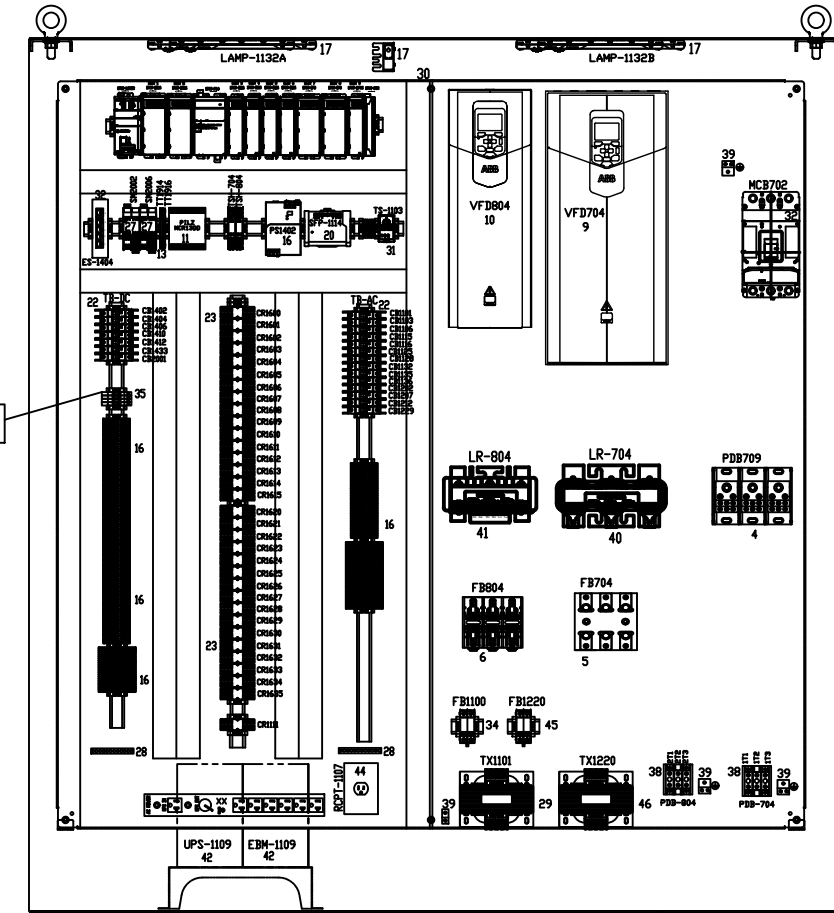
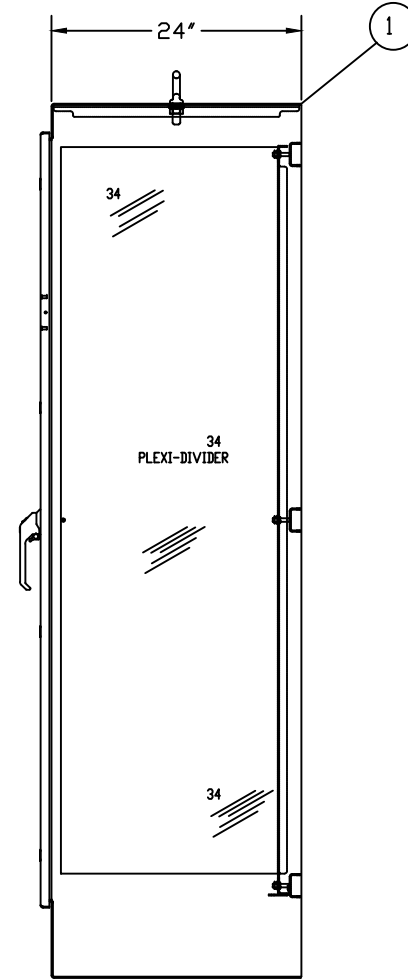
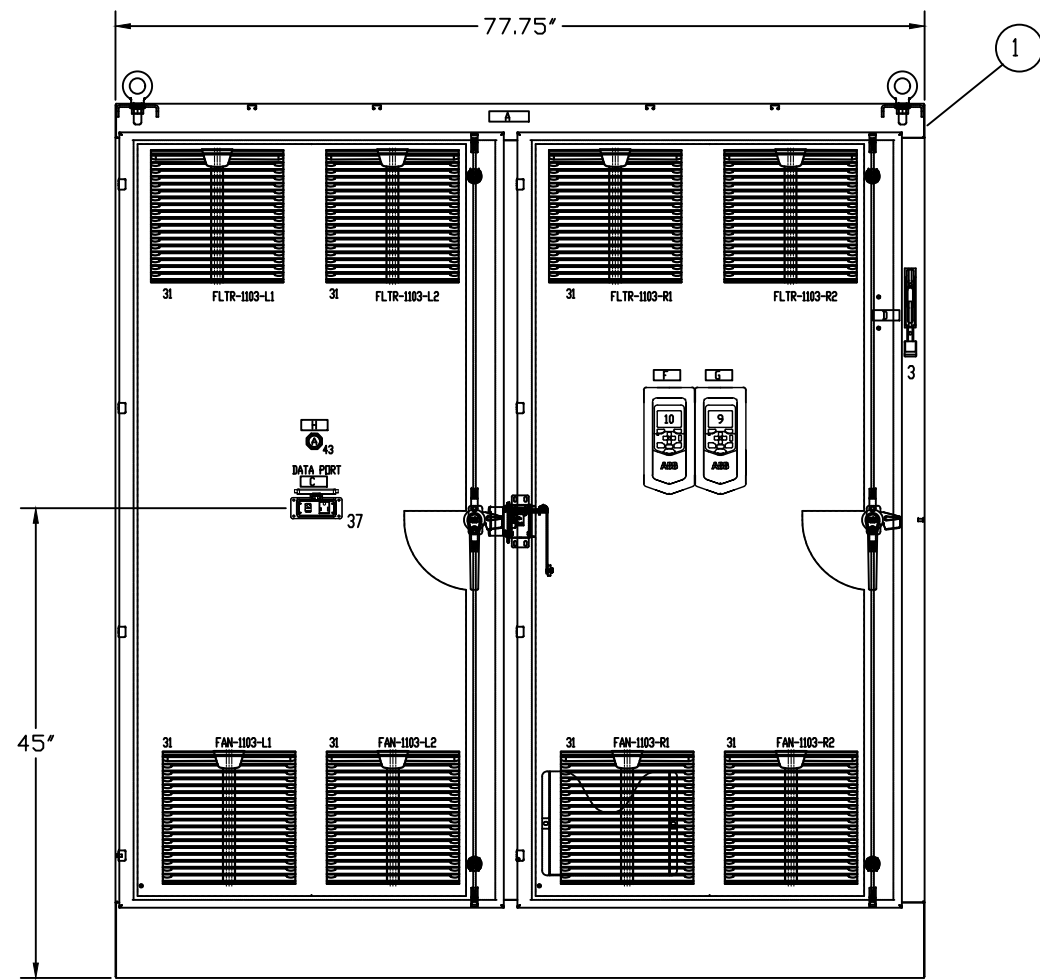
TERMINAL BLOCK LEGEND

- ⊗ MAIN CONTROL PANEL
- ⊙ LOCAL OPERATOR PANEL
- ▲ CUSTOMER
- ◆ X20 TERMINAL BLOCK
- △ X47 TERMINAL BLOCK
- X48 TERMINAL BLOCK
- X11 TERMINAL BLOCK
- EXTERNAL WIRING

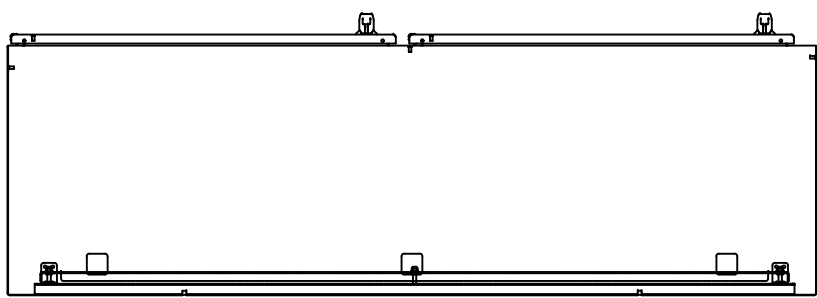
GEA Westfalia Separator, Inc.
 Mechanical Separation Division 100 Fairway Court Northvale, NJ 07647

Title
 CF7000 CENTRIFUGE
 SPARE SHEET
 TAUNTON, MA 2652.395.848

Draw	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	3 OF 25	CF 7000	9200-5901-587-10551	5



SUBPANEL LAYOUT



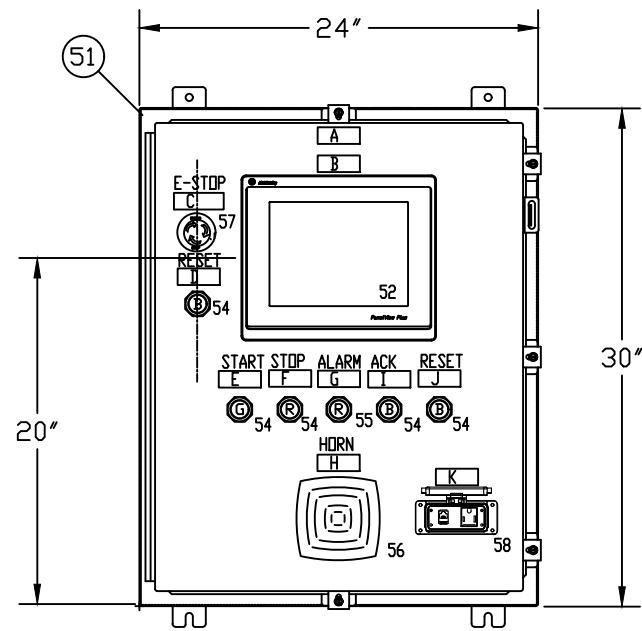
MAIN CONTROL PANEL
SAGINAW SCE-84XM7824
PAINTED CARBON STEEL
NEMA 12

CENTRIFUGE MAIN CONTROL PANEL ENGRAVING SCHEDULE							
NOTE: ALL NAMEPLATES TO BE GLUED TO PANEL							
ID NO.	QTY.	TYPE	SIZE	PLATE COLOR	LETTER COLOR	FIRST LINE \ SECONDD LINE, ETC.	REFERENCE TAG NO.
A	1	NP	2' x 5'	WHITE	BLACK	CF7000 DEWATERING CENTRIFUGE \ MAIN CONTROL PANEL \ S/N-10551-1A	MCP-1
A	1	NP	2' x 5'	WHITE	BLACK	CF7000 DEWATERING CENTRIFUGE \ MAIN CONTROL PANEL \ S/N-10551-2A	MCP-2
B	(NOT USED)						
C	1	NP	1' x 3'	WHITE	BLACK	DATA ACCESS PORT	DAP-1106
D	1	NP	1' x 3'	WHITE	BLACK	MAIN CIRCUIT BREAKER DISCONNECT	MCB-702
E	1	NP	1' x 3'	WHITE	RED	E-STOP PUSHBUTTON	PB-1300-1
F	1	NP	1' x 3'	WHITE	BLACK	SCROLL MOTOR VFD-804	HMI-804
G	1	NP	1' x 3'	WHITE	BLACK	BOWL MOTOR VFD-704	HMI-704
H	1	NP	1' x 3'	WHITE	BLACK	UPS ON BATTERY POWER	PL-1113

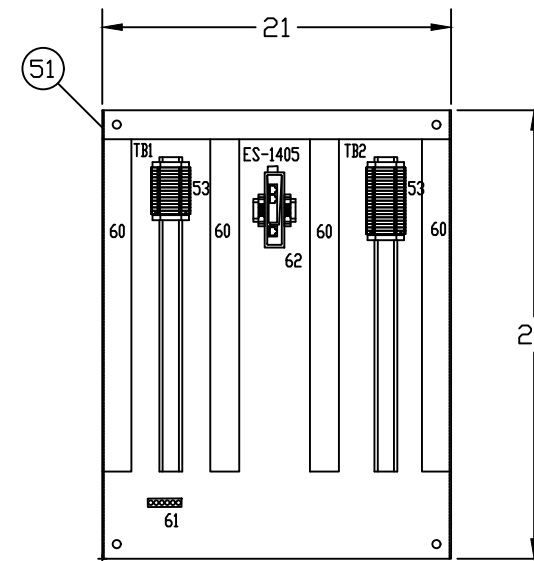
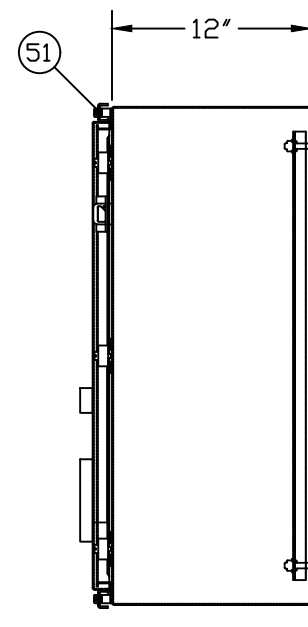
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TERMINAL BLOCK LEGEND ⊗ MAIN CONTROL PANEL ● LOCAL OPERATOR PANEL ▲ CUSTOMER ▼ X20 TERMINAL BLOCK △ X47 TERMINAL BLOCK □ X48 TERMINAL BLOCK ■ X11 TERMINAL BLOCK --- EXTERNAL WIRING			GEA MECHANICAL EQUIPMENT US, INC. 100 Fairway Court Northvale, NJ 07647 Title: CF7000 CENTRIFUGE MAIN CONTROL PANEL TAUNTON, MA 2652.395.848			
Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	4 OF 25	CF 7000	9200-5901-587-10551	5



CENTRIFUGE LOCAL CONTROL PANEL
SAGINAW MODEL # SCE-30H2412SSLP
NEMA 4X, 304 S.S.
(SCALE: 1"=1'-0")



INTERIOR MOUNTING PANEL
SAGINAW MODEL # SCE-30P24

TB-1
120VAC
TERMINAL BLOCK

1	L1125
2	L1128
3	1125
4	1126
5	N1102
6	N1102
7	N1102
8	N1102
9	SPARE
10	SPARE
11	SPARE
12	SPARE
13	SPARE
14	SPARE

TB-2
24VDC
TERMINAL BLOCK

1	1300-1
2	1300-S12
3	1300-42
4	1305-S33
5	1305-S34
6	1404(+24V)
7	DC COM
8	DC COM
9	+24VDC
10	+24VDC
11	+24VDC
12	+24VDC
13	I-314
14	I-315
15	I-414
16	I-415
17	SPARE
18	SPARE
19	SPARE
20	SPARE

TERMINAL BLOCKS TO
BE LABELLED WITH
WIRE NUMBERS

CENTRIFUGE LOCAL OPERATOR PANEL BILL OF MATERIAL

ITEM	TAG NO.	QTY.	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	GEA ITEM #
51	LDP -----	1 1 A/R	SAGINAW SAGINAW HOFFMAN (or equal)	SCE-30H2412SSLP SCE-30P24 A-HCII0E	NEMA 4X ENCLOSURE, 304SS, 30"Hx24"Wx12"D INTERIOR MOUNTING SUBPANEL PANEL CORROSION INHIBITING VAPOR CAPSULES	-----
52	OIT-1404	1	ALLEN BRADLEY	2711P-T10C22D9P	PANELVIEW PLUS 7, 10", PERFORMANCE, COLOR TOUCH, ETHERNET	9105-2759-270
53	TB-1&2	34	ALLEN BRADLEY	1492-J3 (OR EQUAL)	TERMINAL BLOCK, GRAY, SCREW TYPE, 600 V, #28-#12 AWG	-----
54	PB-1715 PB-1716 PB-1305 PB-1735 PB-1736	1 1 1 1 1	ALLEN BRADLEY ALLEN BRADLEY ALLEN BRADLEY ALLEN BRADLEY ALLEN BRADLEY	800H-AR1D1 800H-AR6D2 800H-AR2D1 800H-AR2D1 800H-AR2D1	MOMENTARY PUSHBUTTON, NEMA 4X GREEN, 1 N.O. CONTACT MOMENTARY PUSHBUTTON, NEMA 4X RED, 1 N.C. CONTACT MOMENTARY PUSHBUTTON, NEMA 4X BLACK, 1 N.O. CONTACT MOMENTARY PUSHBUTTON, NEMA 4X BLACK, 1 N.O. CONTACT MOMENTARY PUSHBUTTON, NEMA 4X BLACK, 1 N.O. CONTACT	-----
55	PL-1126	1	ALLEN BRADLEY	800H-QRTH2R	PILOT LIGHT, RED, PUSH TO TEST, 12-130V AC/DC, NEMA 4X	-----
56	AH-1125	1	EDWARDS	870P-N5	ALARM HORN, NEMA 4X, 120VAC	-----
57	PB-1300-1	1	ALLEN BRADLEY ALLEN BRADLEY	800H-FRXTQ24CA1 800H-W690	12-130V AC/DC, ILLUMINATED E-STOP P.B., RED, MUSHROOM HEAD E-STOP LEGEND PLATE, YELLOW	-----
58	DAP-1128	1	GRACE PORT	P-R2-F2RD	DATA ACCESS PORT, NEMA 4X W/RECEPTACLE, 5 AMP MAX	-----
59	cat 6e	2	BELKIN	A3L980b03-S	CAT 6 PATCH CABLE, RJ45 MALE/RJ45 MALE	-----
60	WIREWAY	A/R	PANDUIT	TYPE G SLOTTED	SLOTTED WIRE DUCT, RIGID, GREY VINYL W/COVER	-----
61	GND BAR	1	PANDUIT	UGB2/0-414-6	GROUND BAR	-----
62	ES-1405	1	HIRSCHMANN	94213200	5-PORT ETHERNET SWITCH, 24VDC	-----

CENTRIFUGE LOCAL OPERATOR PANEL ENGRAVING SCHEDULE

NOTE: ALL NAMEPLATES TO BE GLUED TO PANEL

ID NO.	QTY.	TYPE	SIZE	PLATE COLOR	LETTER COLOR	FIRST LINE \ SECOND LINE, ETC.	REFERENCE TAG NO.
A	1	NP	2' x 6'	BLACK	WHITE	CF7000 DEWATERING CENTRIFUGE \ LOCAL OPERATOR PANEL \ S/N 10551-1B	LDP-1
A	1	NP	2' x 6'	BLACK	WHITE	CF7000 DEWATERING CENTRIFUGE \ LOCAL OPERATOR PANEL \ S/N 10551-2B	LDP-2
B	1	NP	1' x 3'	BLACK	WHITE	OPERATOR INTERFACE	OIT1404
C	1	NP	1' x 3'	RED	WHITE	EMERGENCY STOP	PB-1300-1
D	1	NP	1' x 3'	BLACK	WHITE	EMERGENCY STOP RESET	PB-1305
E	1	NP	1' x 3'	BLACK	WHITE	CENTRIFUGE START	PB-1715
F	1	NP	1' x 3'	BLACK	WHITE	CENTRIFUGE STOP	PB-1716
G	1	NP	1' x 3'	BLACK	WHITE	COMMON ALARM	PL-1126
H	1	NP	1' x 3'	BLACK	WHITE	ALARM HORN	AH-1125
I	1	NP	1' x 3'	BLACK	WHITE	CENTRIFUGE ALARM ACKNOWLEDGE	PB-1735
J	1	NP	1' x 3'	BLACK	WHITE	CENTRIFUGE ALARM RESET	PB-1736
K	1	NP	1' x 3'	BLACK	WHITE	DATA ACCESS PORT	DAP-1128

NOTES:

- PROVIDE LAMINATED BLACK NAMEPLATE W/BEEVELED EDGES AND 1/2" WHITE LETTERS TO IDENTIFY EACH PANEL.
- PROVIDE LAMINATED BLACK NAMEPLATE WITH BEEVELED EDGES AND 1/4" LETTERS FOR EACH FRONT OF PANEL MOUNTED DEVICE.

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Sheet	Machine Type	DWG. NO.
6 OF 25	CF 7000	9200-5901-587-10551

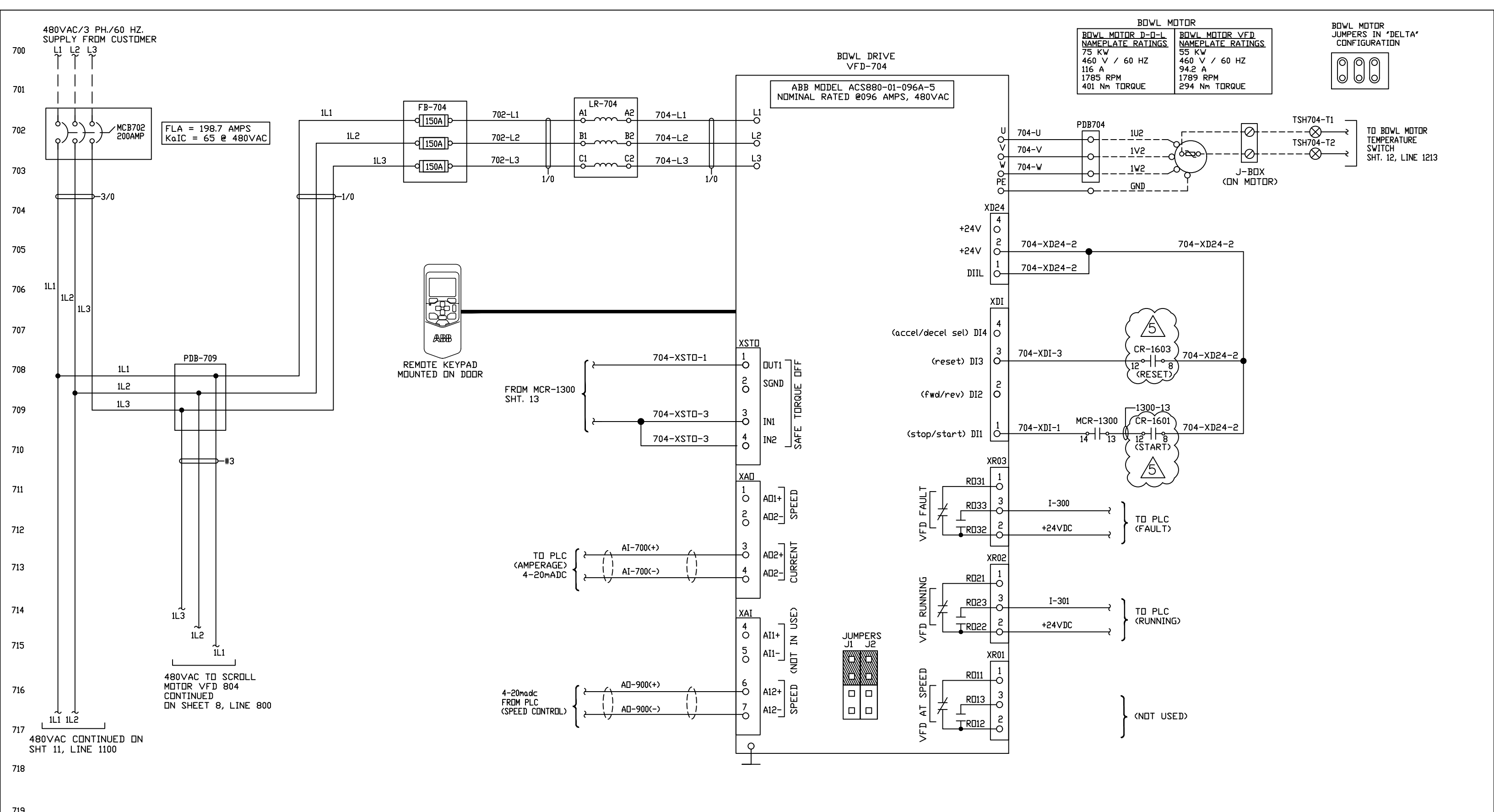
GEA Westfalia Separator, Inc.
Mechanical Separation Division 100 Fairway Court Northvale, NJ 07647

Title
CF7000 CENTRIFUGE
LOCAL OPERATOR PANEL

TAUNTON, MA 2652.395.848

Rev. 5

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- ⬤ X11 TERMINAL BLOCK
- EXTERNAL WIRING

Drawn	Approved	Date
RR	LM	15OCT21

GEA MECHANICAL EQUIPMENT US, INC.

100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE BOWL MOTOR VFD**

TAUNTON, MA 2652.395.848

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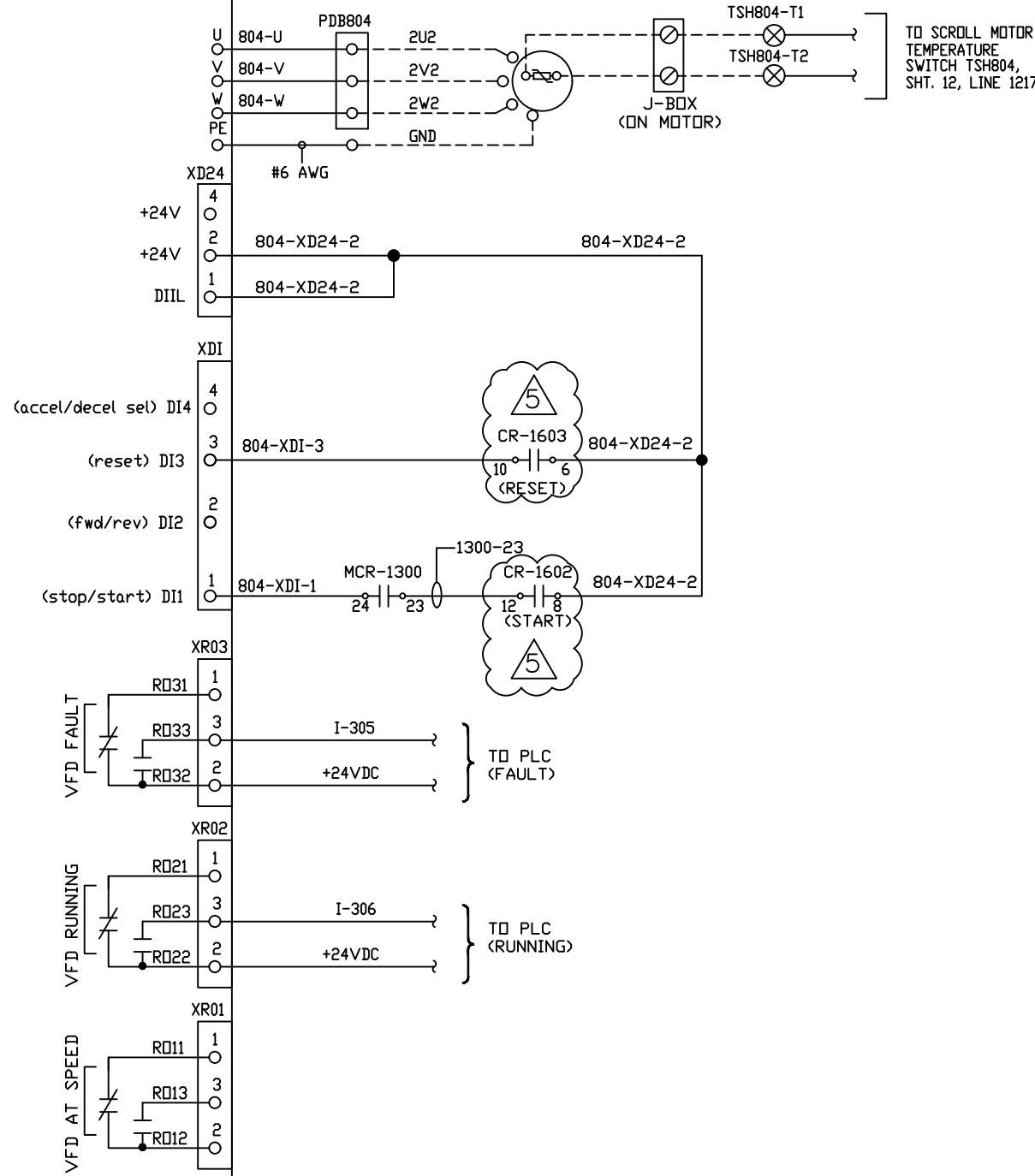
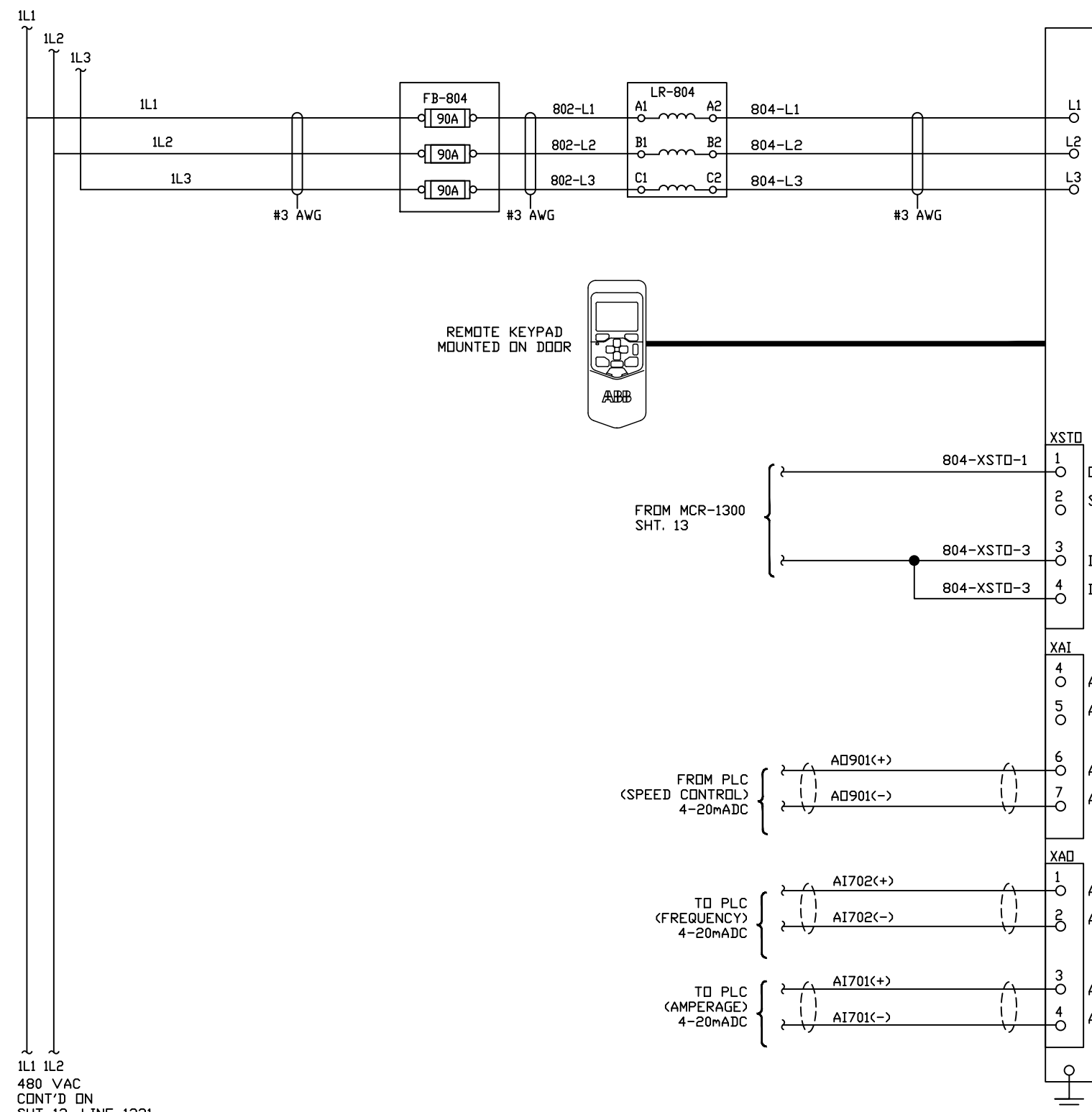
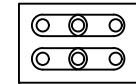
480 VAC CONTINUED
FROM SHEET 7, LINE 713

SCROLL DRIVE
VFD-804

ABB MODEL ACS880-01-065A-5
NOMINAL RATED @ 65 AMPS, 480V

SCROLL MOTOR	
SCROLL MOTOR D-0-L NAMEPLATE RATINGS	SCROLL MOTOR VFD NAMEPLATE RATINGS
45 KW	36.4 KW
400 V / 50 HZ	460 V / 60 HZ
79.4 AMPS	61.2 A
1480 RPM	1785 RPM
291 Nm TORQUE	195 Nm TORQUE

SCROLL MOTOR JUMPERS IN
"WYE" CONFIGURATION



1L1 1L2
480 VAC
CONT'D DN
SHT 12, LINE 1221

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□	X48 TERMINAL BLOCK	
■	X11 TERMINAL BLOCK	
---	EXTERNAL WIRING	

GEA MECHANICAL EQUIPMENT US, INC.
100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE SCROLL MOTOR VFD**

TAUNTON, MA 2652.395.848

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Drawn	Approved	Date
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 Westfalia Separator, Inc. Mechanical Separation Division 100 Fairway Court Northvale, NJ 07647		Title	
		CF7000 CENTRIFUGE SPARE SHEET	
TAUNTON, MA		2652.395.848	
Sheet	Machine Type	DWG. NO.	Rev.
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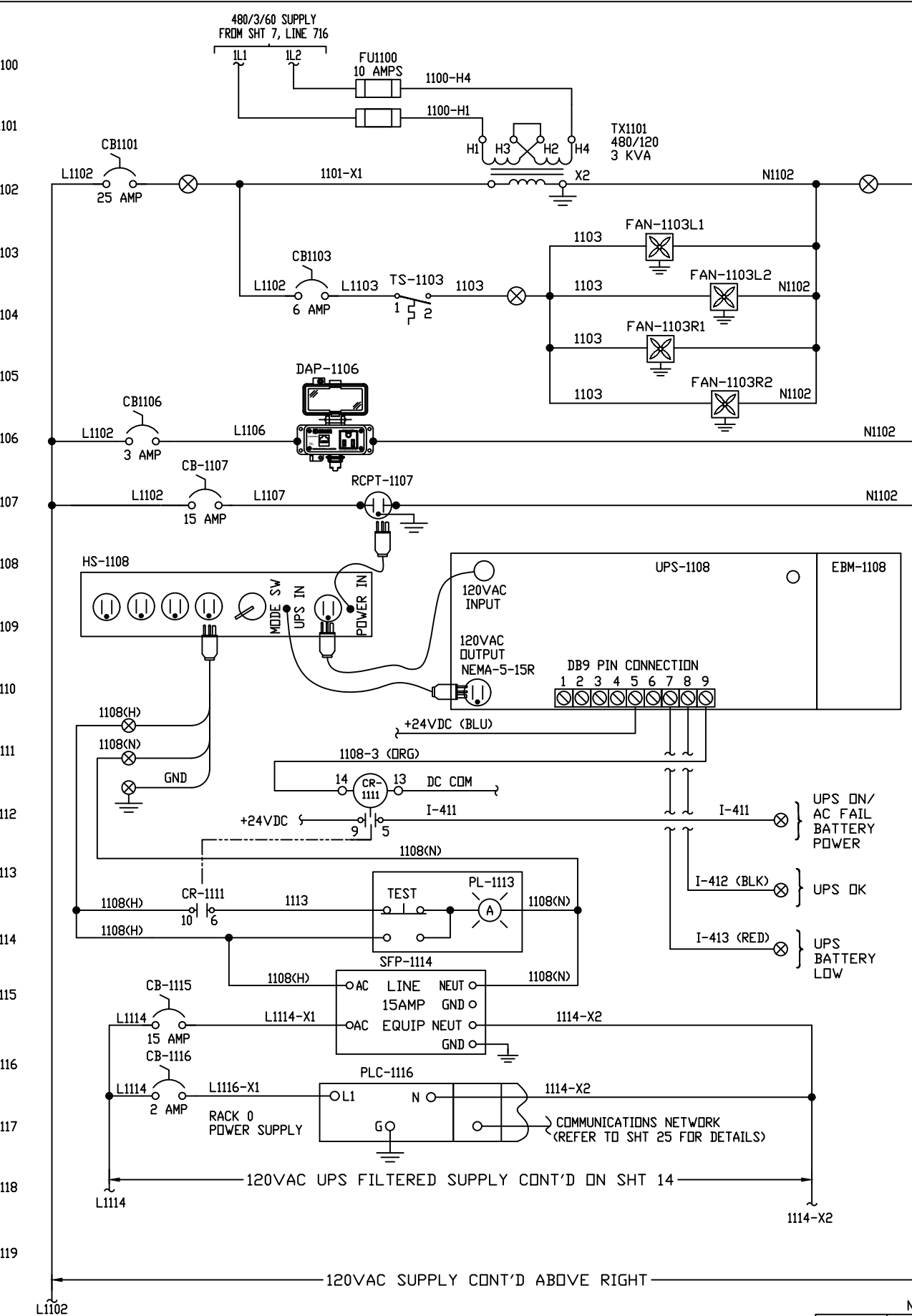
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 Mechanical Separation Division 100 Fairway Court Northvale, NJ 07647

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Sheet	Machine Type	DWG. NO.	Rev.
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MCC/VFD ENCLOSURE COOLING FANS

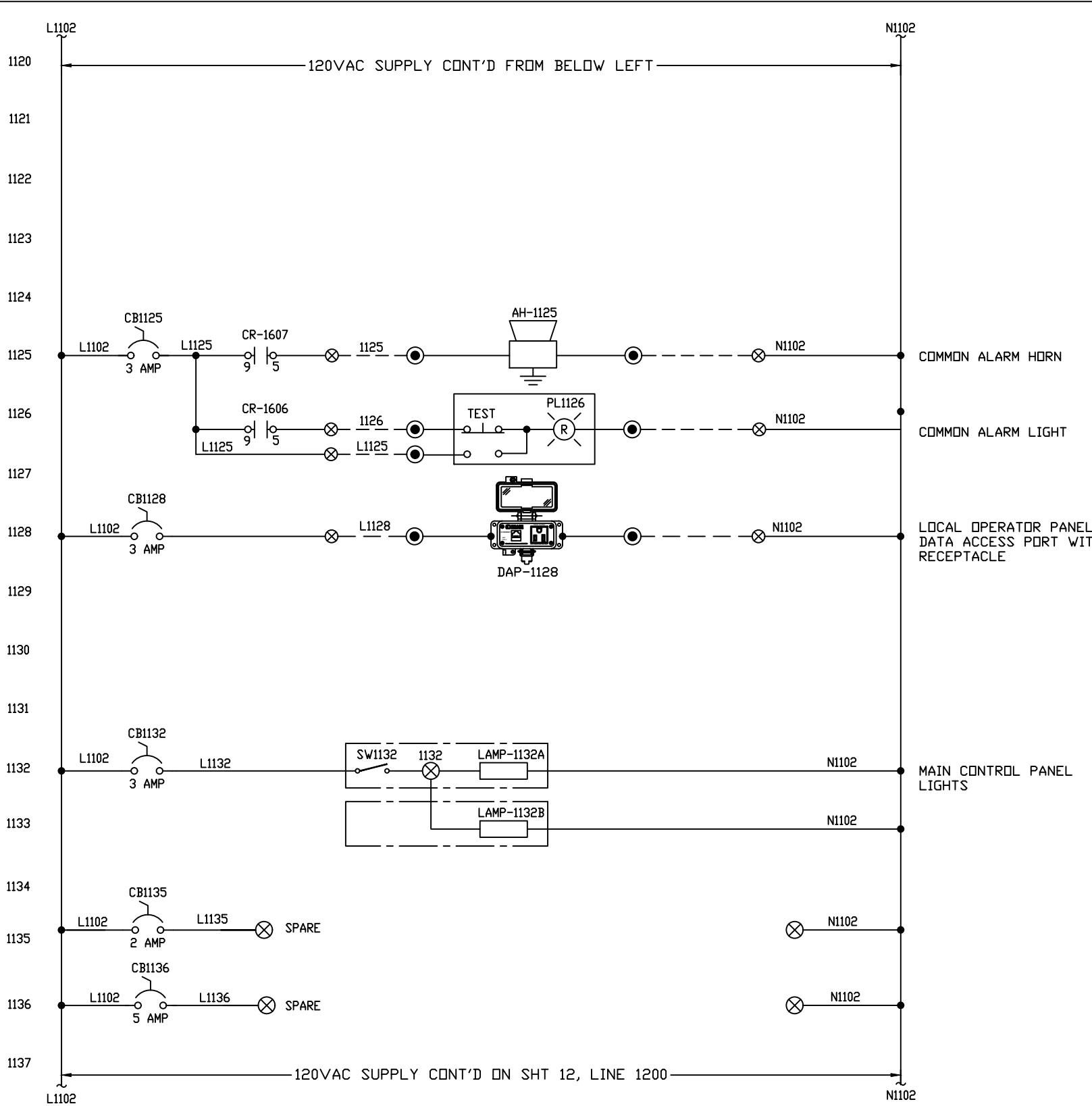
MAIN CONTROL PANEL DATA ACCESS PORT WITH RECEPTACLE
 LOCAL CONTROL PANEL UPS DEDICATED RECEPTACLE

UNINTERRUPTIBLE POWER SUPPLY W/ RELAY CARD 1500VA/1350W

UPS ON/AC FAIL BATTERY POWER INDICATING LIGHT

SURGE FILTER PROTECTOR TVSS - EMI/RFI

COMPACT LOGIX PLC POWER SUPPLY



COMMON ALARM HORN
 COMMON ALARM LIGHT
 LOCAL OPERATOR PANEL DATA ACCESS PORT WITH RECEPTACLE

MAIN CONTROL PANEL LIGHTS

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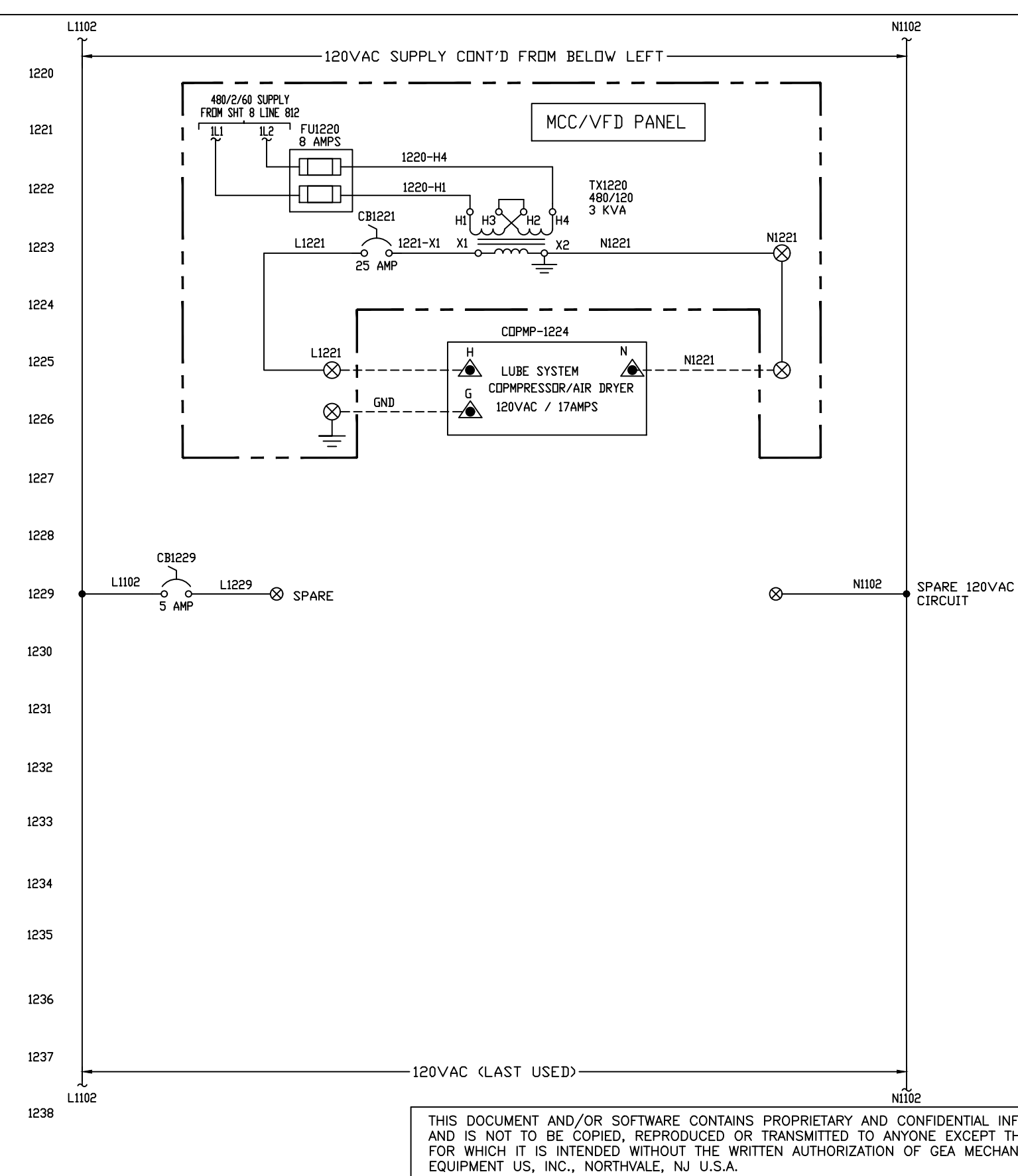
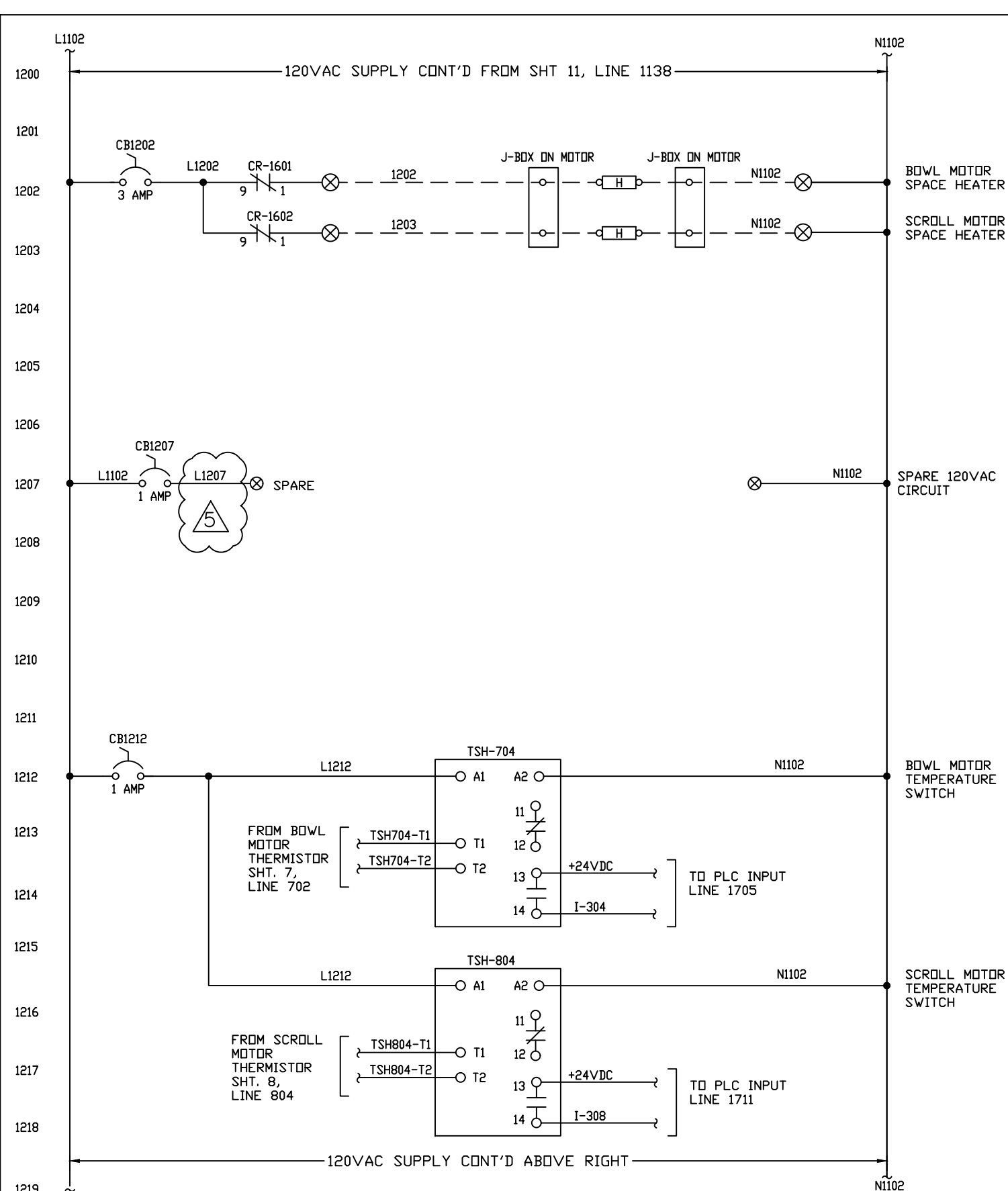
GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE 120VAC POWER DISTRIBUTION**

TAUNTON, MA 2652.395.848

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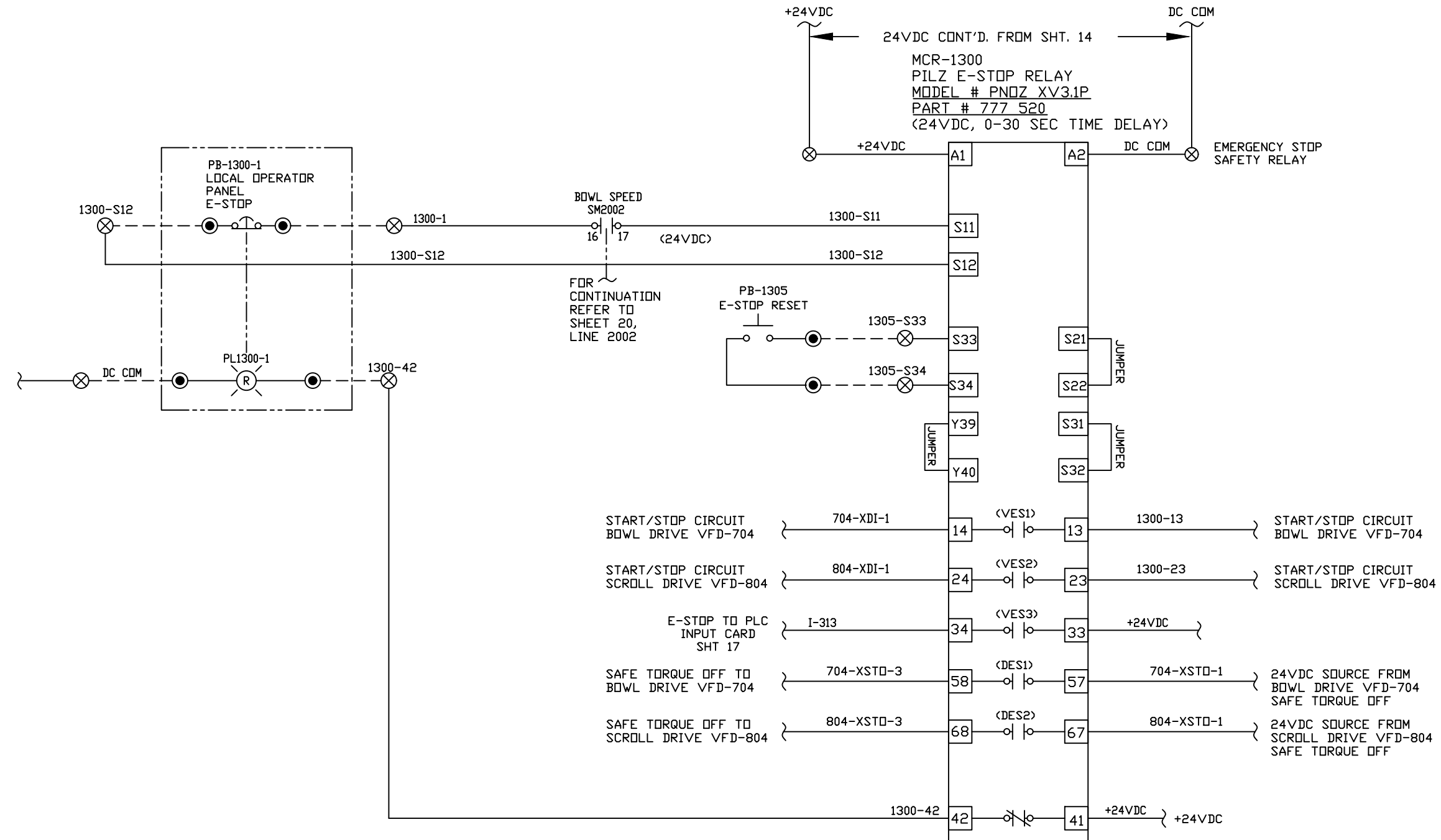
GEA MECHANICAL EQUIPMENT US, INC.
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Title: **CF7000 CENTRIFUGE
120VAC POWER DISTRIBUTION**

TAUNTON, MA 2652.395.848

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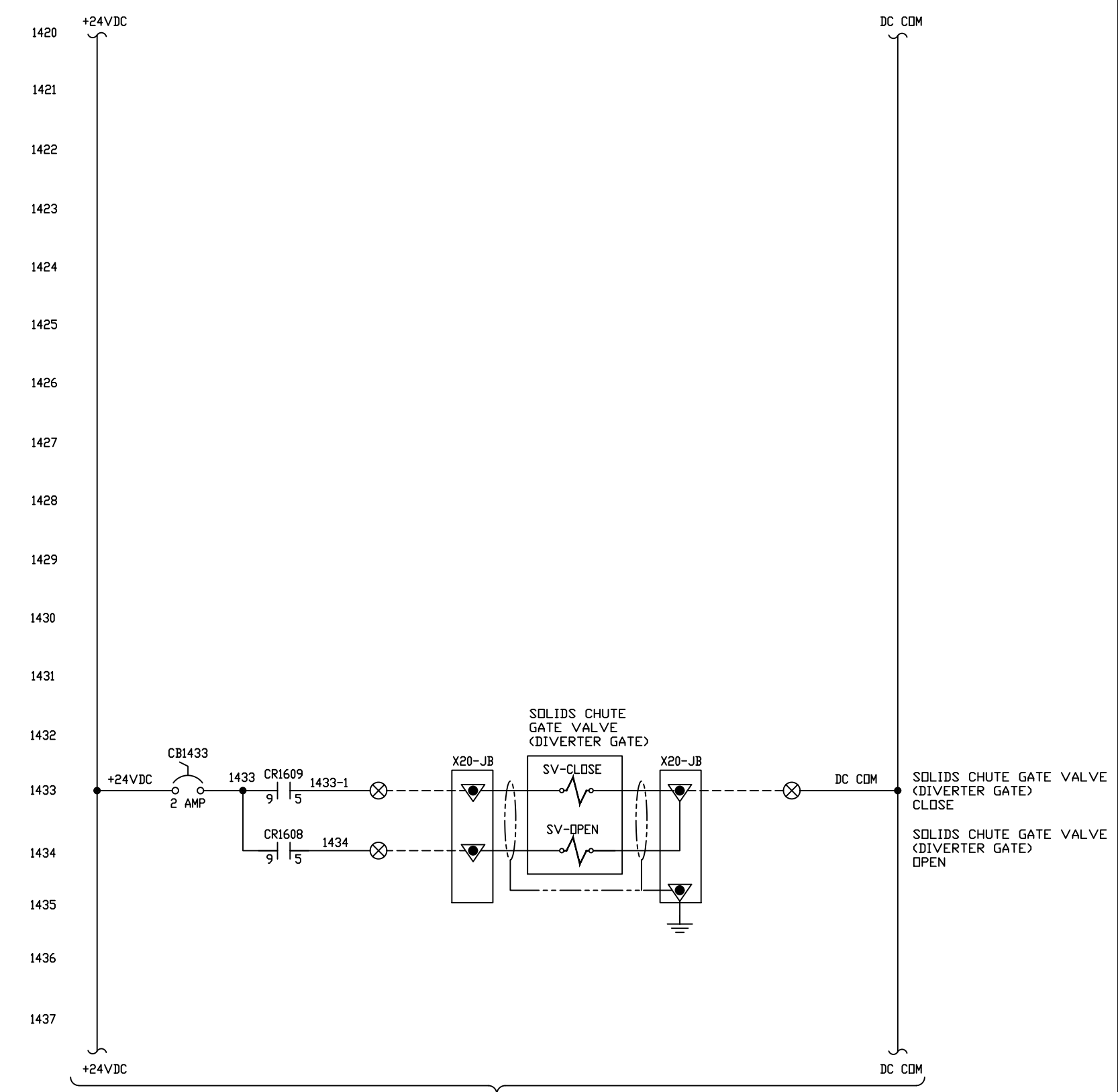
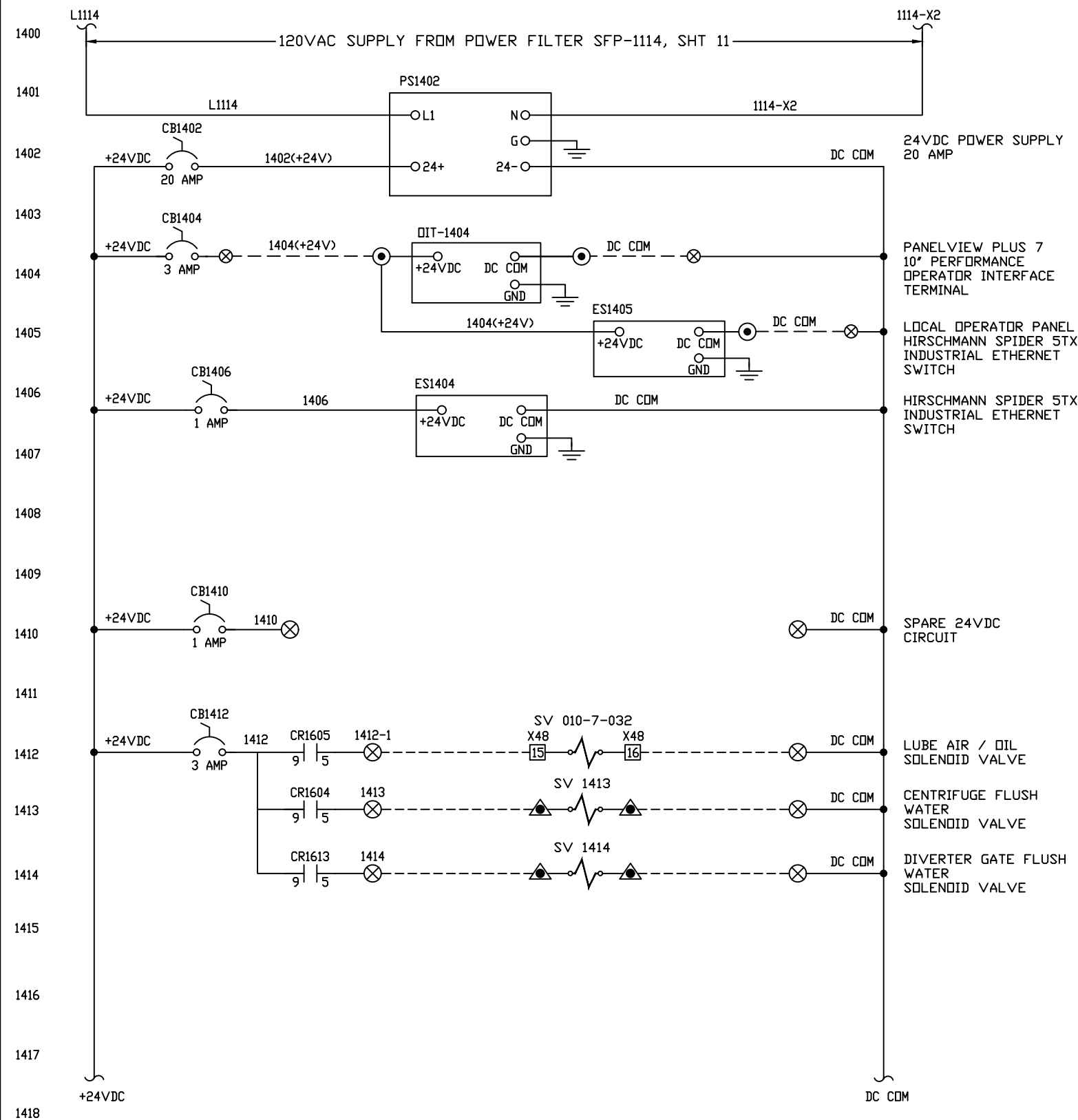
Drawn	Approved	Date
RR	LM	15OCT21

GEA MECHANICAL EQUIPMENT US, INC.
100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE E-STOP RELAY**

TAUNTON, MA 2652.395.848

Sheet	Machine Type	DWG. NO.	Rev.
13 OF 25	CF 7000	9200-5901-587-10551	5



CONT'D ON SHT 13, LINE 1300 & SHT 20, LINE 2000

REV.	BY	DATE	REVISION
5	AR	26AUG22	REVISED AS BUILT
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Drawn	Approved	Date
RR	LM	15OCT21

TERMINAL BLOCK LEGEND

- ⊗ MAIN CONTROL PANEL
- ⊙ LOCAL OPERATOR PANEL
- ▲ CUSTOMER
- ◊ X20 TERMINAL BLOCK
- △ X47 TERMINAL BLOCK
- X48 TERMINAL BLOCK
- X11 TERMINAL BLOCK
- EXTERNAL WIRING

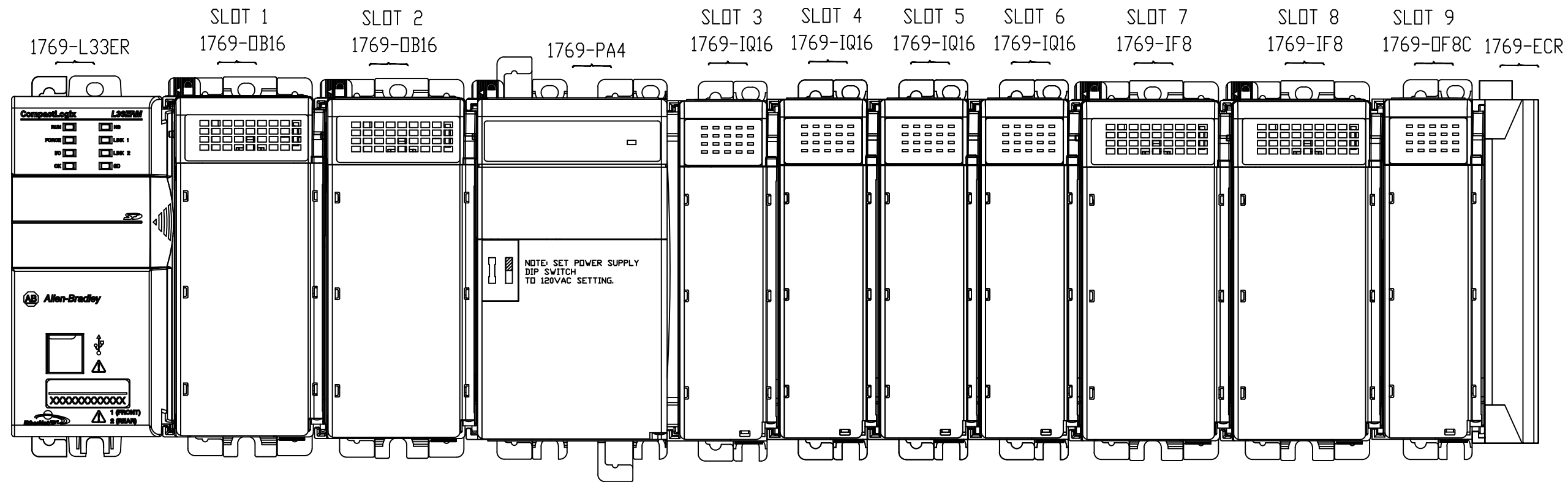
GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE 24VDC POWER DISTRIBUTION**

TAUNTON, MA 2652.395.848

Sheet	Machine Type	DWG. NO.	Rev.
14 OF 25	CF 7000	9200-5901-587-10551	5

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NOTE:
 THE MAXIMUM CONFIGURATION FOR THE FIRST BANK OF A COMPACTLOGIX CONTROLLER IS
 THE CONTROLLER AND THREE I/O MODULES TO THE LEFT OF THE POWER SUPPLY AND
 EIGHT I/O MODULES TO THE RIGHT OF THE POWER SUPPLY.

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0	RR	15OCT21	SUBMITTAL APPROVAL ISSUE
REV.	BY	DATE	REVISION

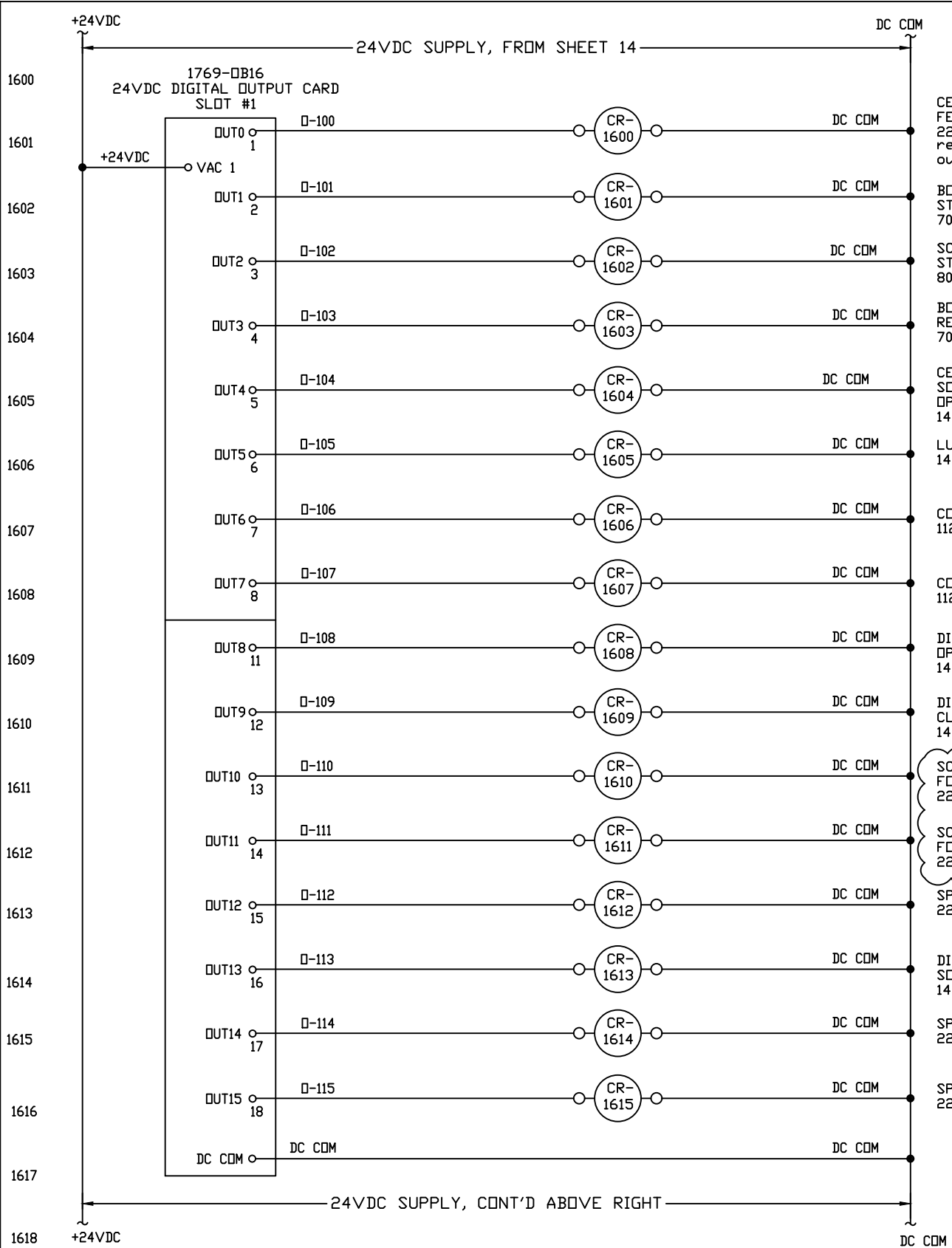
TERMINAL BLOCK LEGEND		
⊗	MAIN CONTROL PANEL	
⊙	LOCAL OPERATOR PANEL	
▲	CUSTOMER	
◆	X20 TERMINAL BLOCK	
△	X47 TERMINAL BLOCK	
□	X48 TERMINAL BLOCK	
■	X11 TERMINAL BLOCK	
----	EXTERNAL WIRING	

GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE
 COMPACT LOGIX
 PLC RACK LAYOUT**

TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	15 OF 25	CF 7000	9200-5901-587-10551	5



CENTRIFUGE READY FOR
FEED COMMAND
2200, 2200
reserved programmed spare
output - not used

BOWL MOTOR VFD
START COMMAND
709, 1202

SCROLL MOTOR VFD
START COMMAND
809, 1203

BOWL & SCROLL VFD
RESET COMMAND
706, 806

CENTRIFUGE FLUSH WATER
SOLENOID VALVE
OPEN COMMAND
1413

LUBE AIR/OIL SOLENOID VALVE
1412

COMMON ALARM LIGHT
1126

COMMON ALARM HORN
1125

DIVERTER GATE
OPEN COMMAND
1434

DIVERTER GATE
CLOSE COMMAND
1433

DIVERTER GATE FLUSH WATER
SOLENOID VALVE
1414

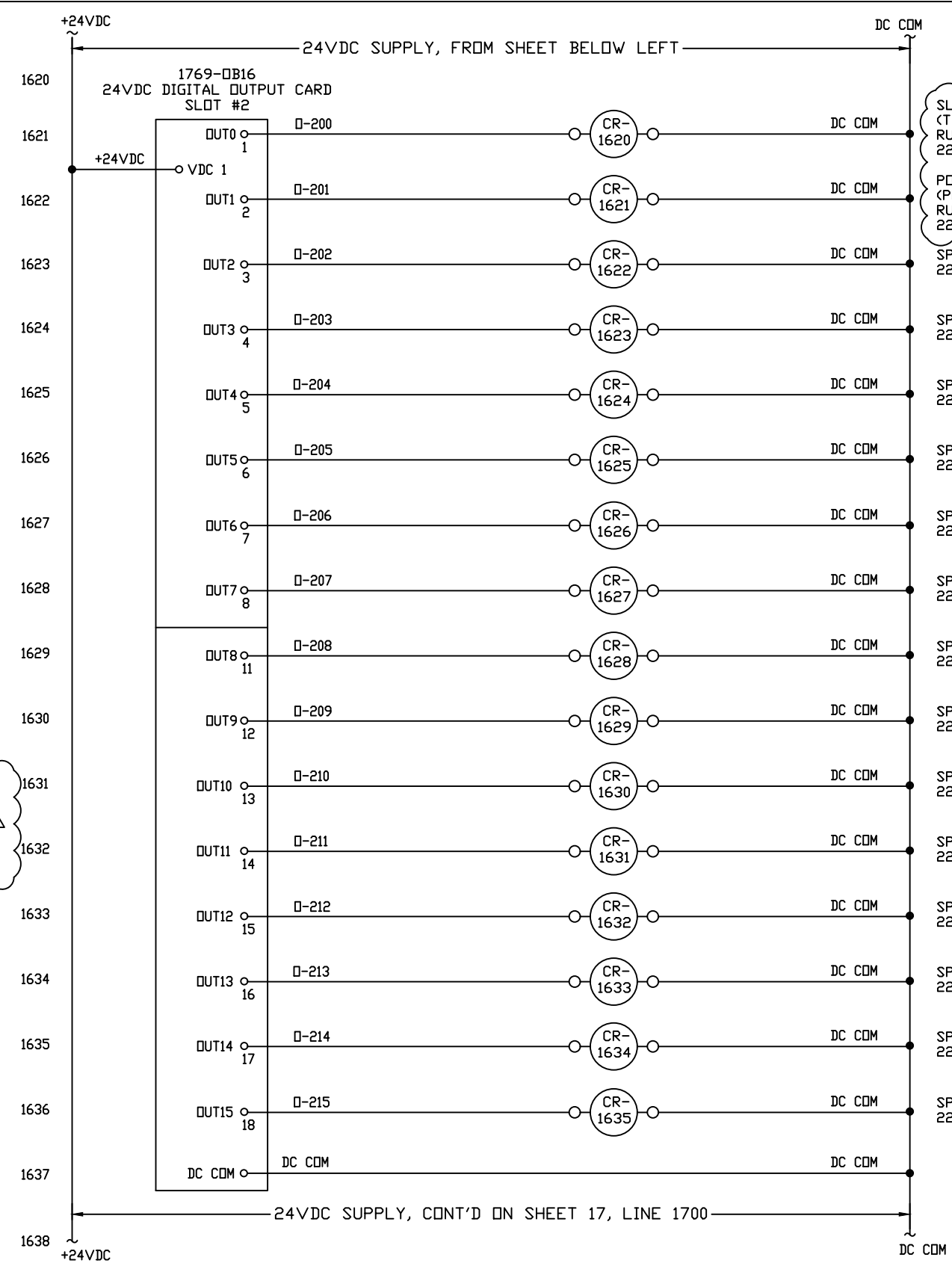
SCREW CONVEYOR 1 (SBC-7303)
FORWARD RUN COMMAND
2200, 2200

SCREW CONVEYOR 2 (SBC-7304)
FORWARD RUN COMMAND
2200, 2200

SPARE RELAY
2200, 2200

SPARE RELAY
2200, 2200

SPARE RELAY
2200, 2200



SLUDGE FEED PUMP
(TSP-7201/7202)
RUN COMMAND
2204, 2204

POLYMER SYSTEM
(PFP-7201/7202)
RUN COMMAND
2204, 2204

SPARE RELAY
2204, 2204

SPARE RELAY
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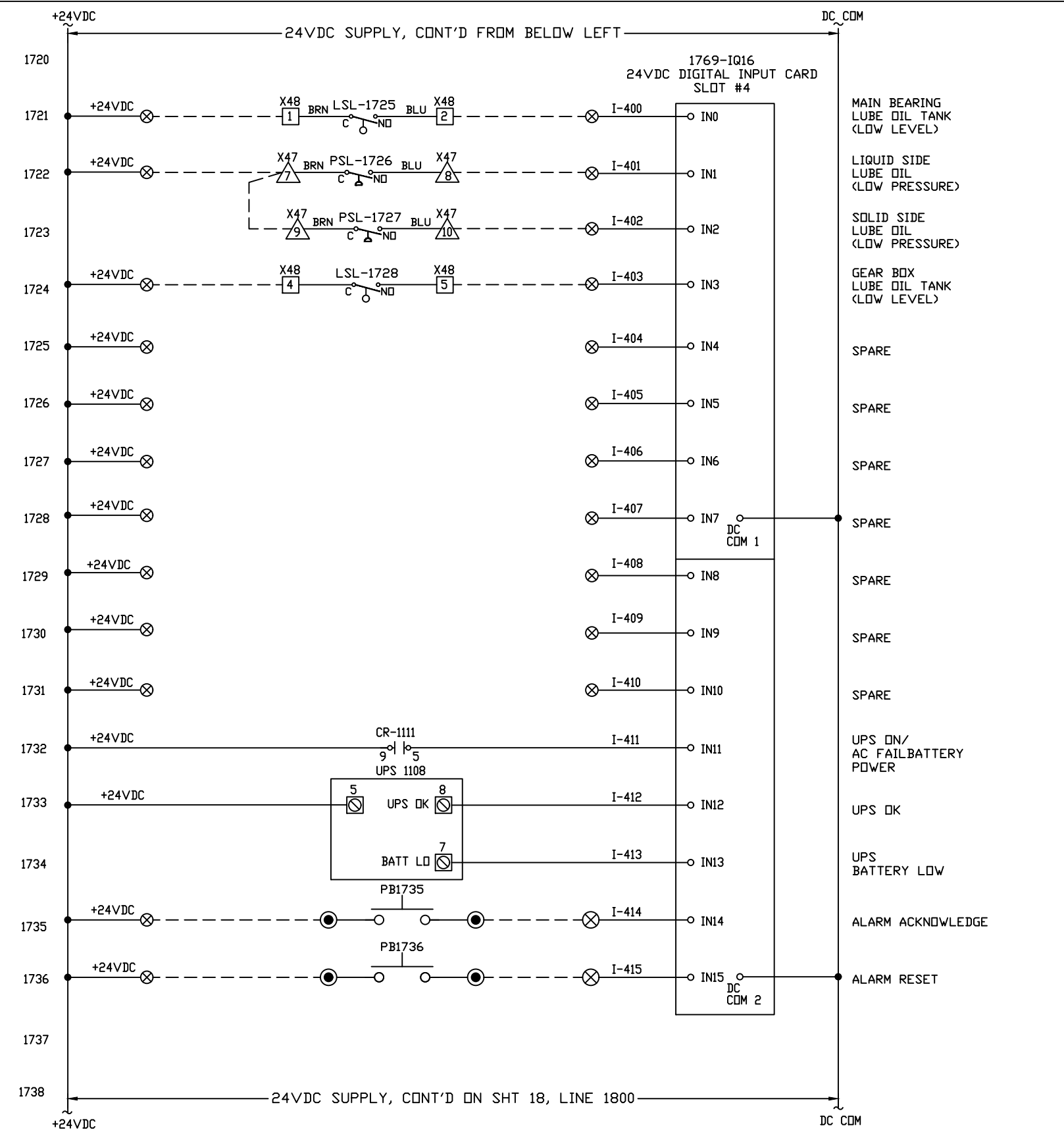
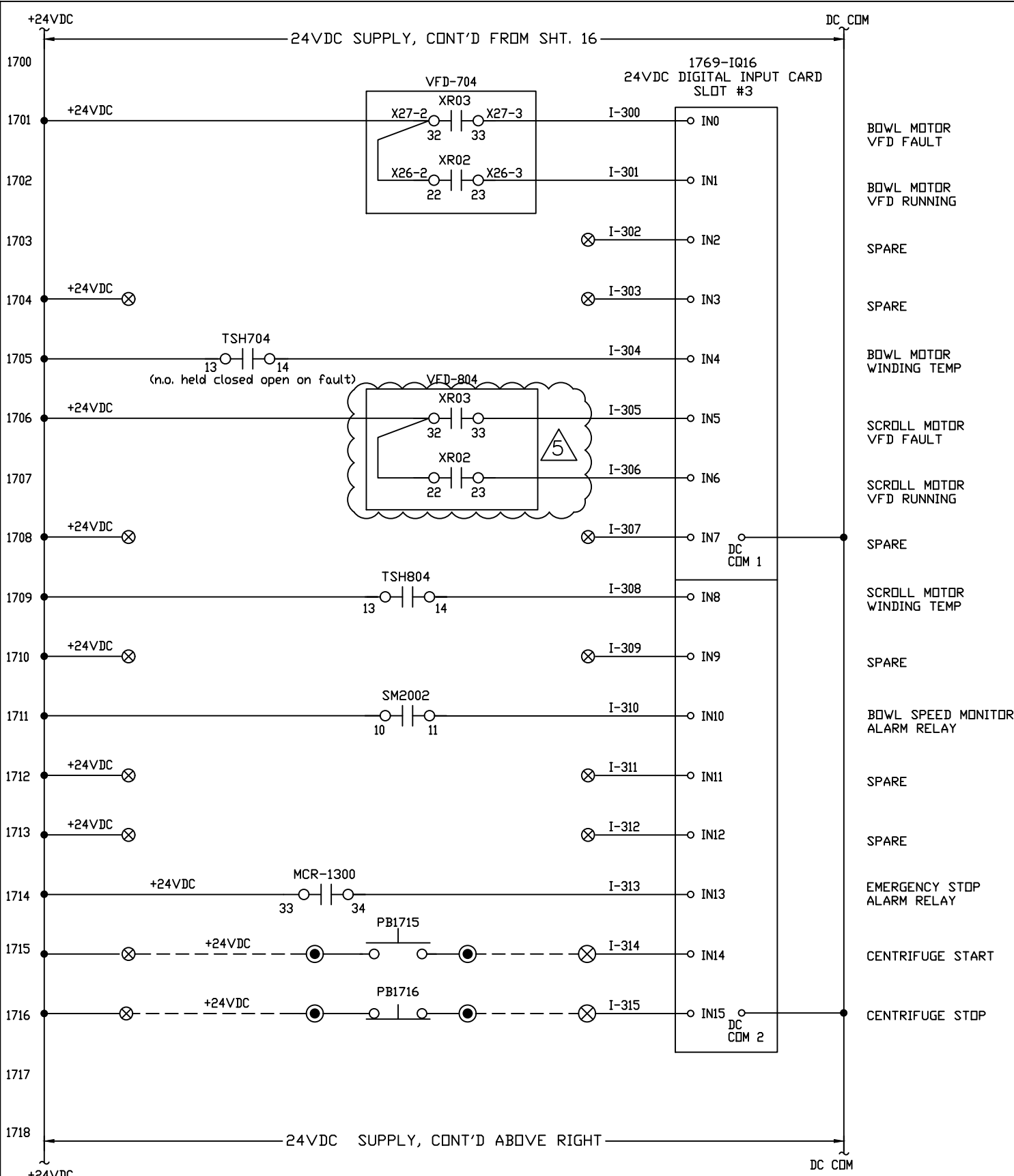
Drawn	Approved	Date
RR	LM	15OCT21

GEA MECHANICAL EQUIPMENT US, INC.
100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE
PLC SLOTS 1 & 2**

TAUNTON, MA 2652.395.848

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REV.	BY	DATE	REVISION
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Drawn	Approved	Date
RR	LM	15OCT21

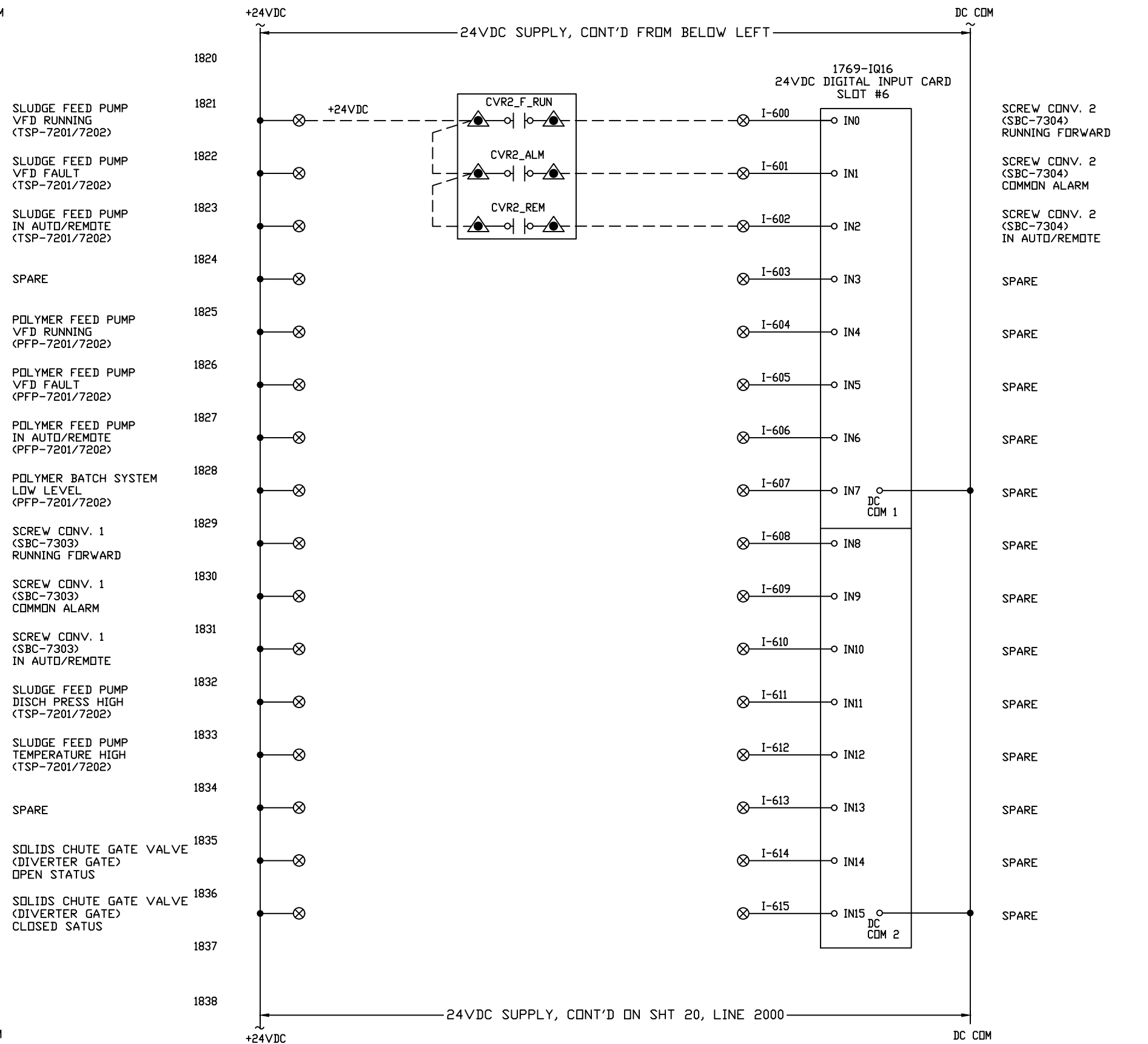
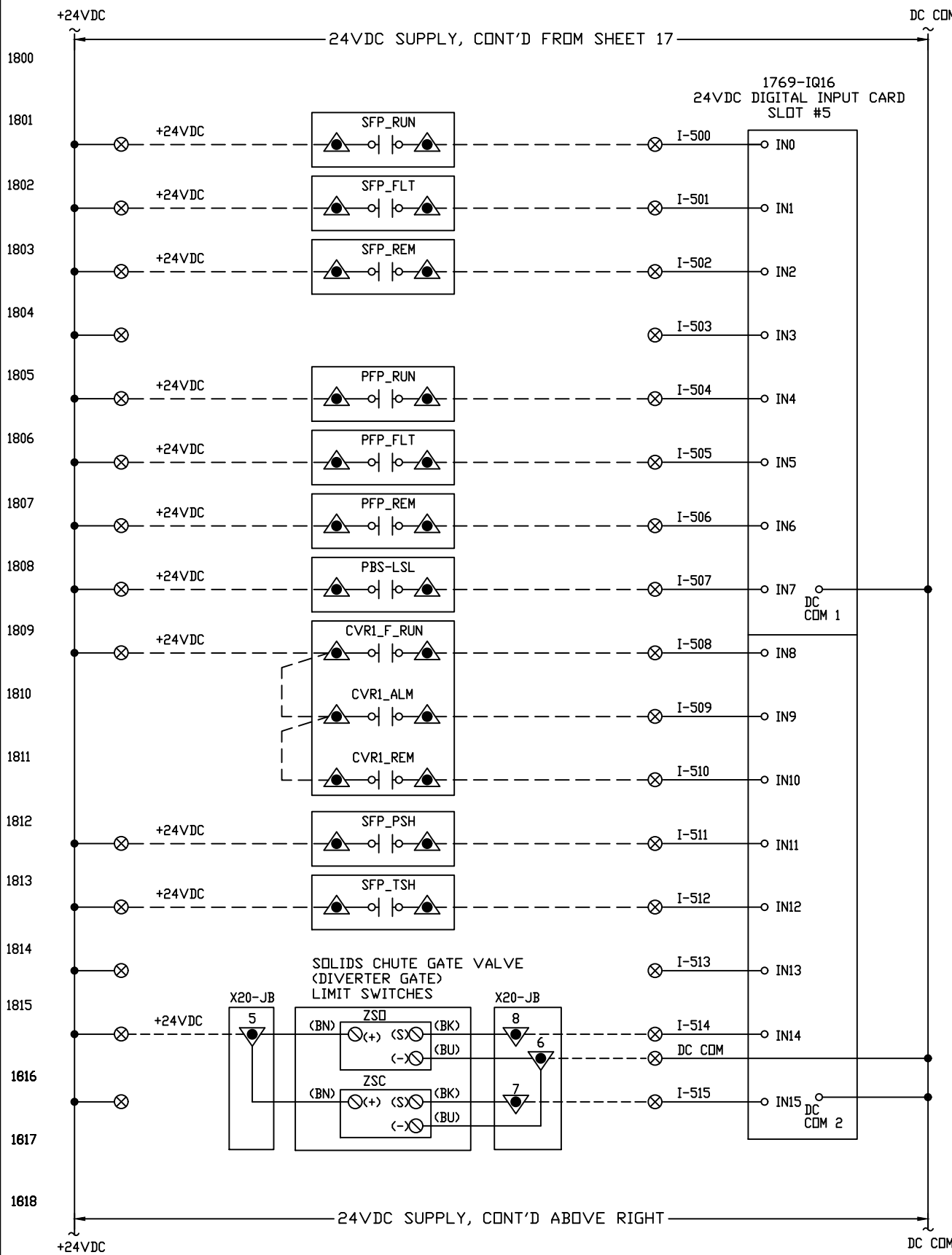
GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE PLC I/O**

TAUNTON, MA 2652.395.848

Sheet	Machine Type	DWG. NO.	Rev.
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TERMINAL BLOCK LEGEND

- ⊗ MAIN CONTROL PANEL
- ⊙ LOCAL OPERATOR PANEL
- ▲ CUSTOMER
- ◊ X20 TERMINAL BLOCK
- △ X47 TERMINAL BLOCK
- X48 TERMINAL BLOCK
- X11 TERMINAL BLOCK
- EXTERNAL WIRING

GEA MECHANICAL EQUIPMENT US, INC.
100 Fairway Court Northvale, NJ 07647

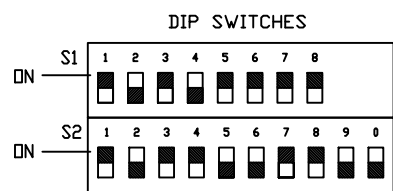
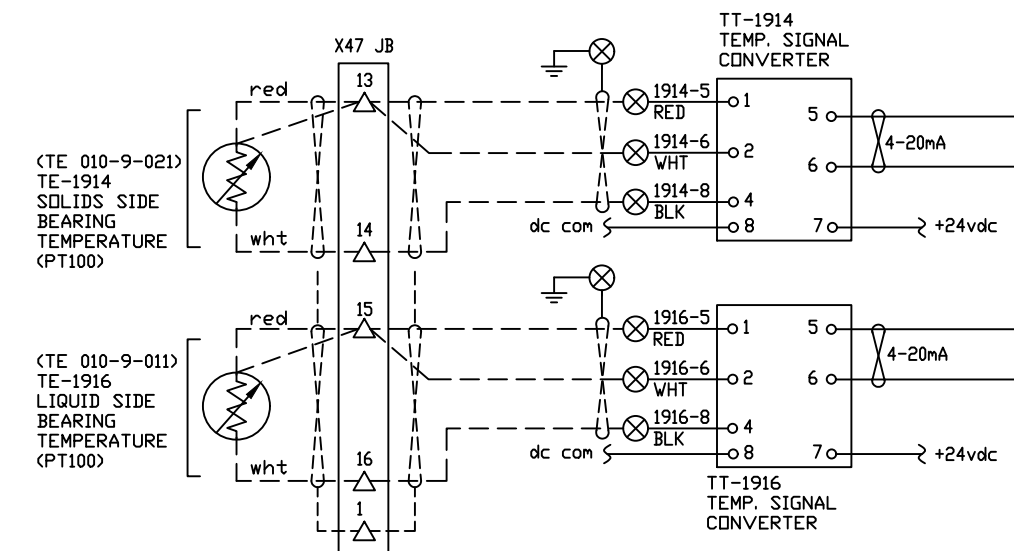
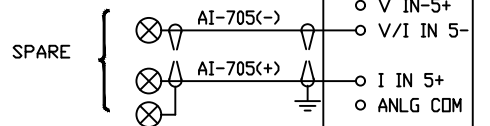
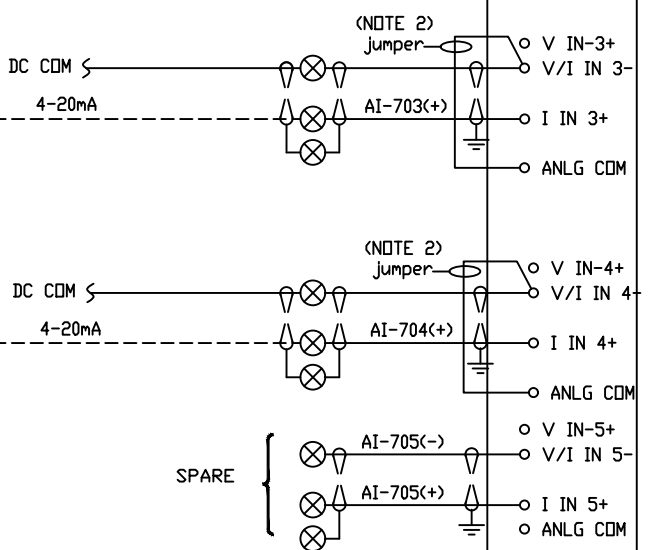
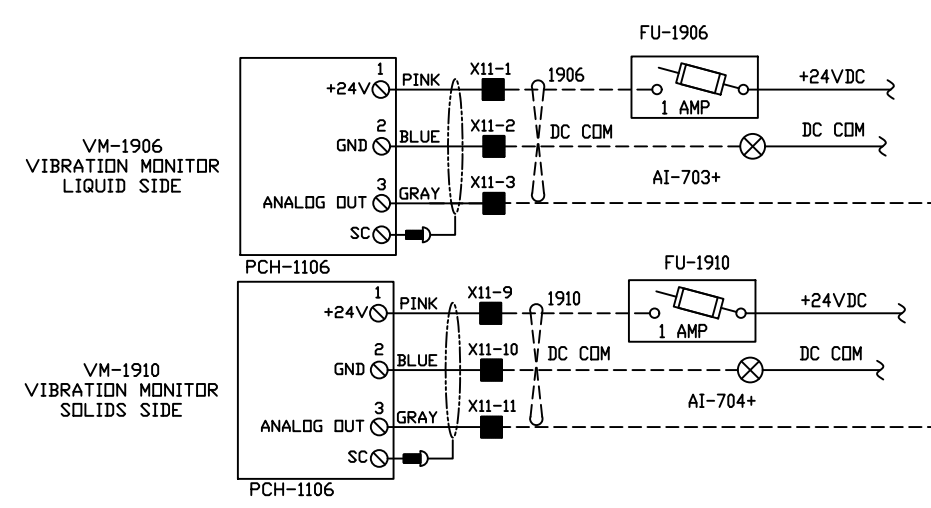
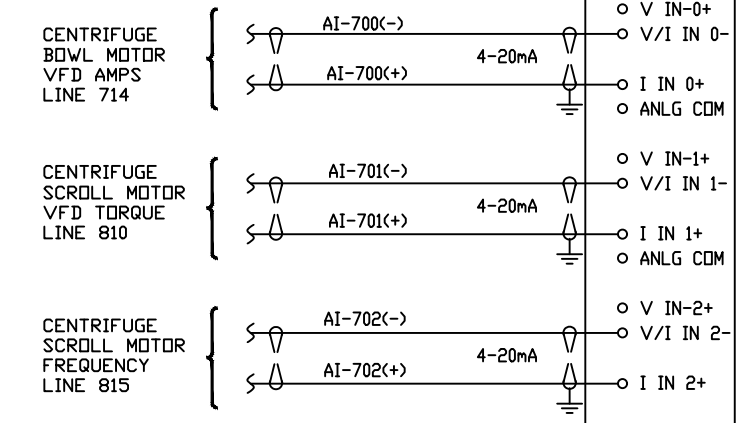
Title: **CF7000 CENTRIFUGE PLC I/O**

TAUNTON, MA 2652.395.848

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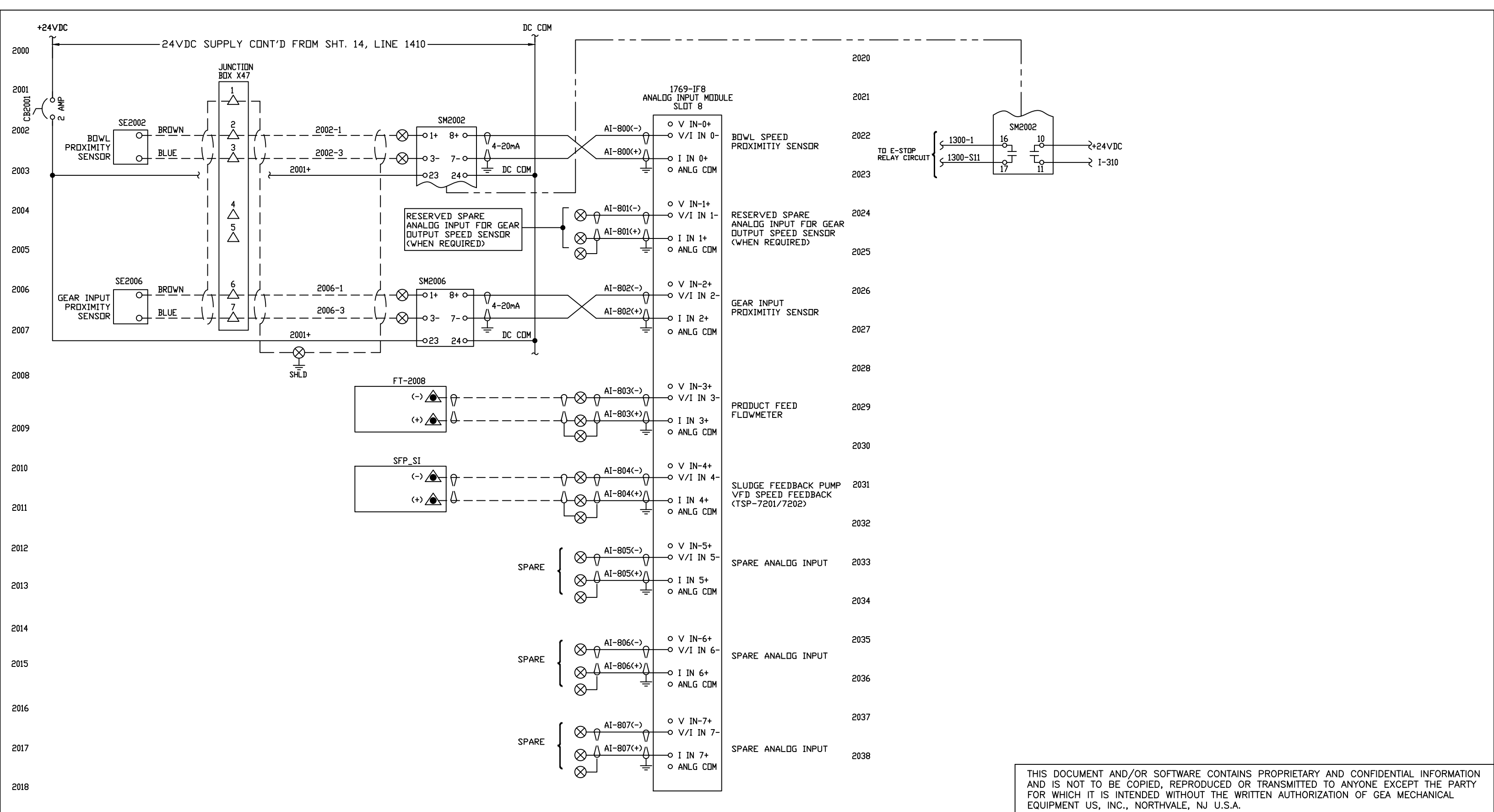
1769-IF8
ANALOG INPUT MODULE
SLOT 7



REV.	BY	DATE	REVISION
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<p>TERMINAL BLOCK LEGEND</p> <ul style="list-style-type: none"> ⊗ MAIN CONTROL PANEL ⊙ LOCAL OPERATOR PANEL ▲ CUSTOMER ◊ X20 TERMINAL BLOCK △ X47 TERMINAL BLOCK □ X48 TERMINAL BLOCK ■ X11 TERMINAL BLOCK --- EXTERNAL WIRING 			<p>GEA MECHANICAL EQUIPMENT US, INC. 100 Fairway Court Northvale, NJ 07647</p>			
<p>5 4 3 2 1 0</p>			<p>Title CF7000 CENTRIFUGE PLC I/O</p>			
<p>REV. BY DATE REVISION</p>			<p>TAUNTON, MA 2652.395.848</p>			
Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	19 OF 25	CF 7000	9200-5901-587-10551	5



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TERMINAL BLOCK LEGEND		
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◆	X20 TERMINAL BLOCK	
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□	X48 TERMINAL BLOCK	
■	X11 TERMINAL BLOCK	
---	EXTERNAL WIRING	

GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

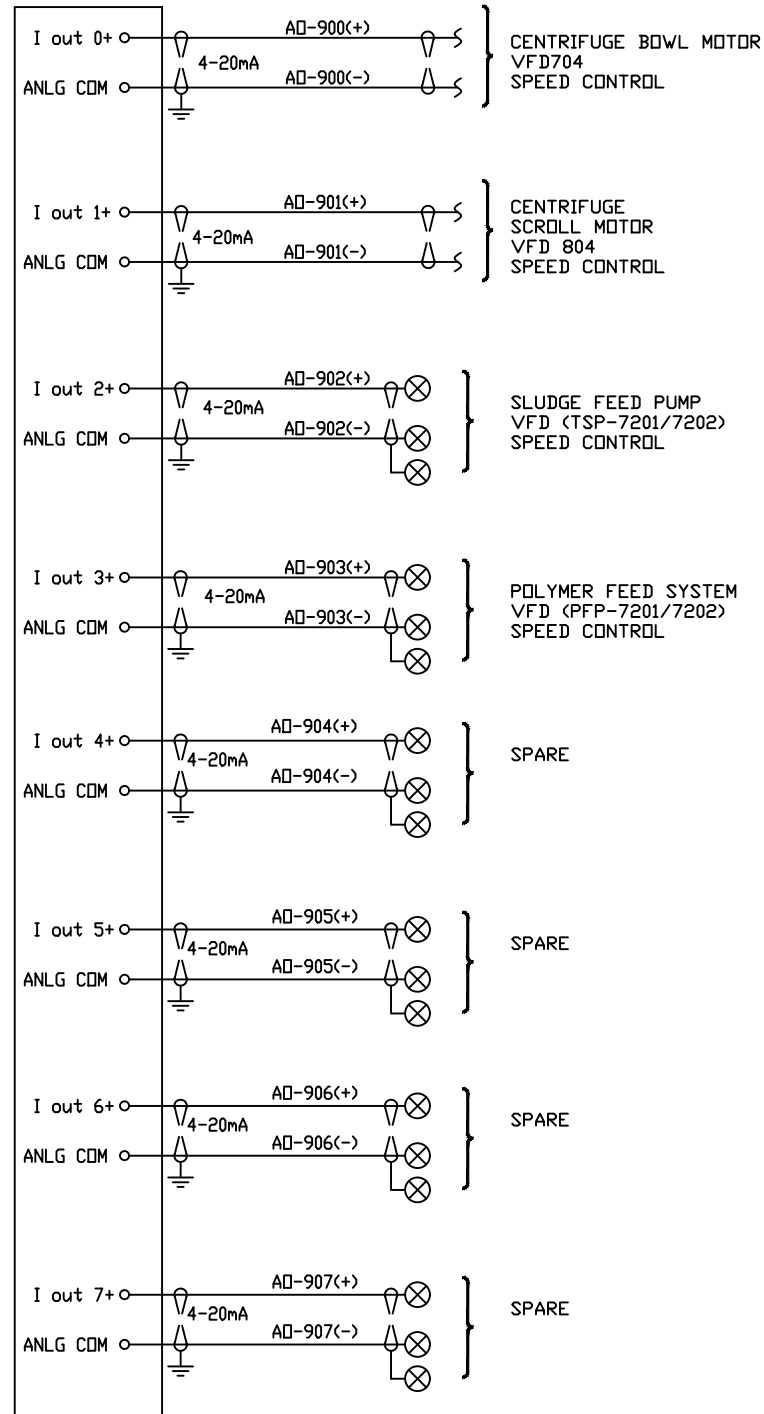
Title: **CF7000 CENTRIFUGE PLC I/O**

TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
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1769-DF8C
ISOLATED ANALOG OUTPUT MODULE
SLOT 9



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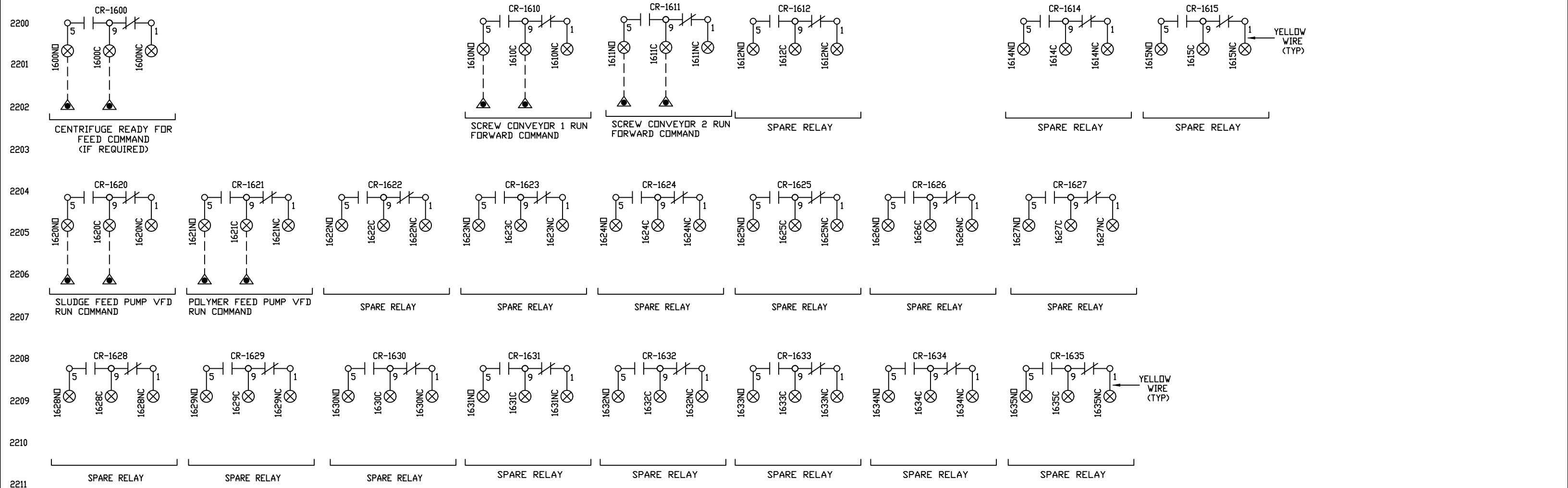
TERMINAL BLOCK LEGEND		
⊗	MAIN CONTROL PANEL	
⊙	LOCAL OPERATOR PANEL	
▲	CUSTOMER	
◊	X20 TERMINAL BLOCK	
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■	X11 TERMINAL BLOCK	
---	EXTERNAL WIRING	
Drawn	Approved	Date
RR	LM	15OCT21

GEA MECHANICAL EQUIPMENT US, INC.
100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE PLC I/O**

TAUNTON, MA 2652.395.848

Sheet	Machine Type	DWG. NO.	Rev.
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□	X48 TERMINAL BLOCK	
■	X11 TERMINAL BLOCK	
---	EXTERNAL WIRING	

GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE RELAY CONTACTS FOR CUSTOMER CONTROLS**
 TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	22 OF 25	CF 7000	9200-5901-587-10551	5

.....SPARE SHEET.....

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REV.	BY	DATE	REVISION

TERMINAL BLOCK LEGEND

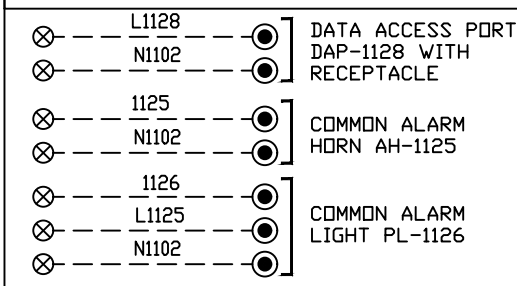
- ⊗ MAIN CONTROL PANEL
- ⊙ LOCAL OPERATOR PANEL
- ▲ CUSTOMER
- ◆ X20 TERMINAL BLOCK
- △ X47 TERMINAL BLOCK
- X48 TERMINAL BLOCK
- X11 TERMINAL BLOCK
- EXTERNAL WIRING

GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

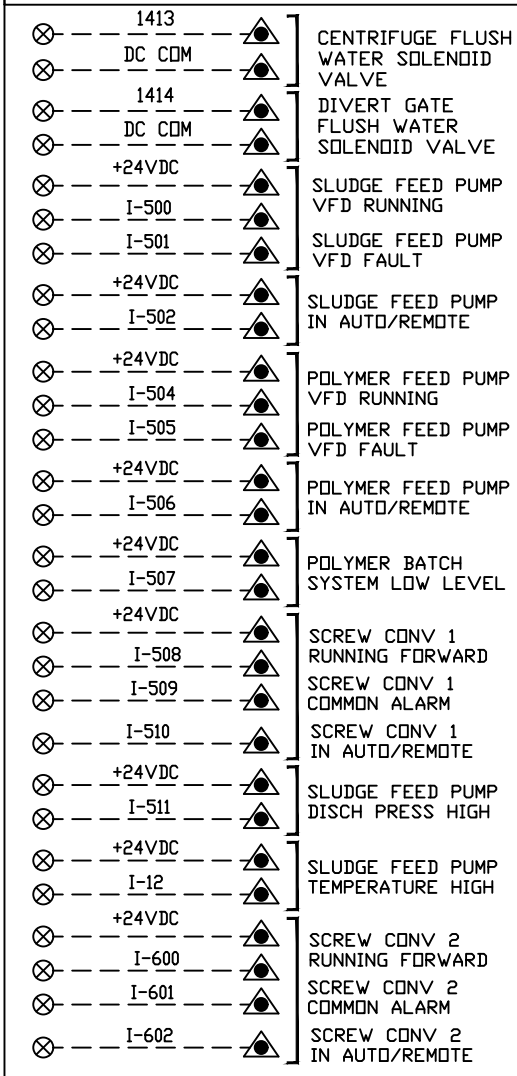
Title
 CF7000 CENTRIFUGE
 SPARE SHEET
 TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	23 OF 25	CF 7000	9200-5901-587-10551	5

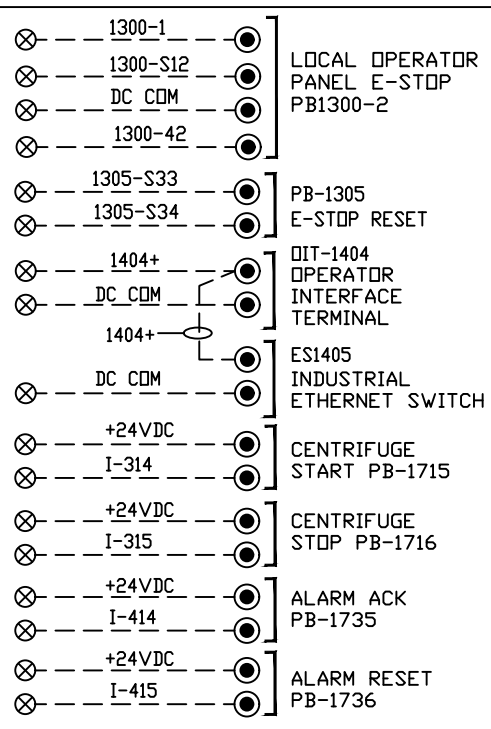
120VAC - MAIN CONTROL PANEL TO LOCAL OPERATOR PANEL (#12AWG, 600V, MINIMUM RATED)



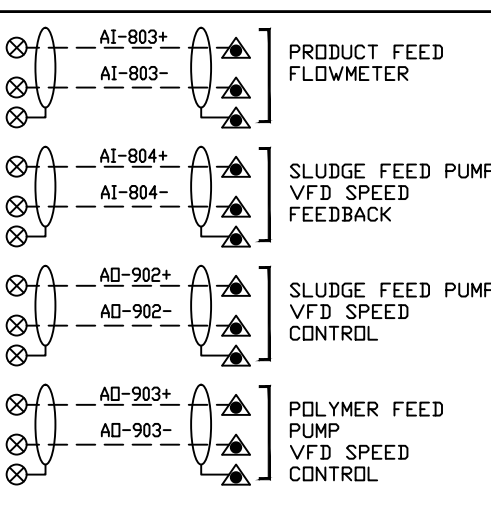
24VDC - MAIN CONTROL PANEL TO FIELD DEVICES (#14AWG, 600V, MINIMUM RATED)



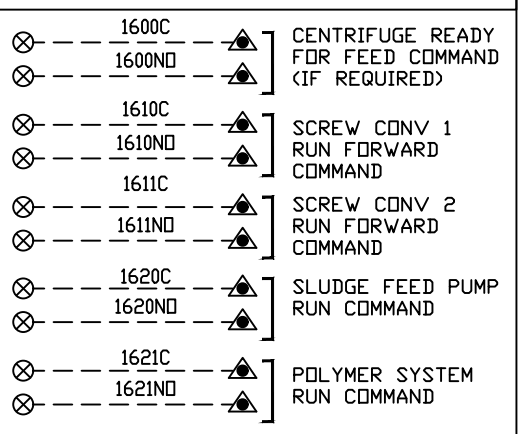
24VDC - CONTROL PANEL TO LOCAL OPERATOR PANEL (#16AWG, 600V, MINIMUM RATED)



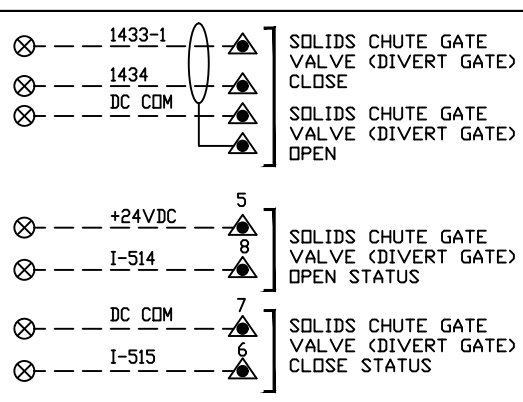
4-20 MADC - CONTROL PANEL TO JUNCTION BOX (#16AWG, 600V, T.S.P.)



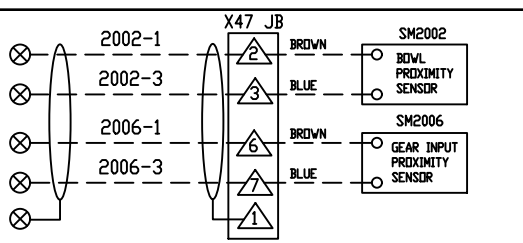
DRY CONTACT RELAY OUTPUTS CONTROL PANEL TO CUSTOMER (#16AWG, 600V, MINIMUM RATED)



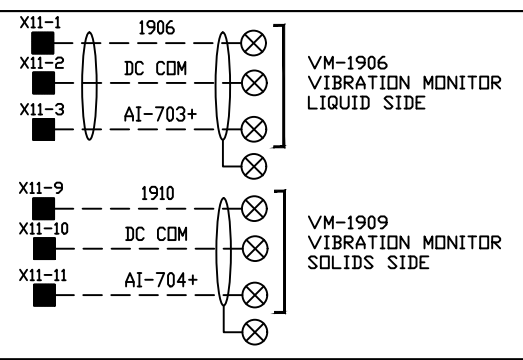
24VDC - CONTROL PANEL TO X20 JUNCTION BOX (#16AWG, 600V, MIN. RATED)



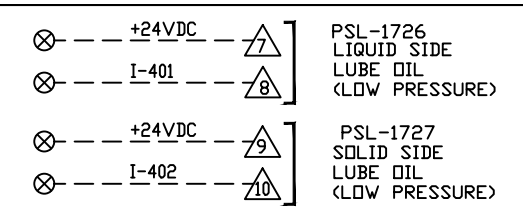
24VDC - CONTROL PANEL TO X47 JUNCTION BOX (#16AWG, 600V, T.S.P. MIN. RATED)



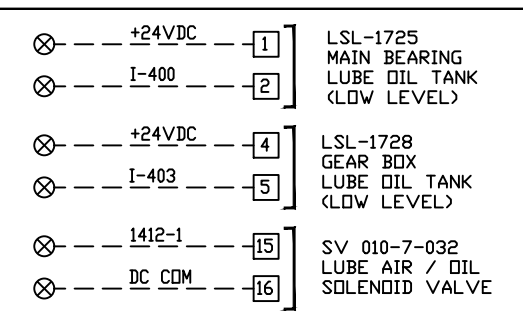
24VDC & 4-20MADC - CONTROL PANEL TO (X-II JB) VIBRATION MONITORS (#16AWG, SHLD'D 300V, MINIMUM RATED)



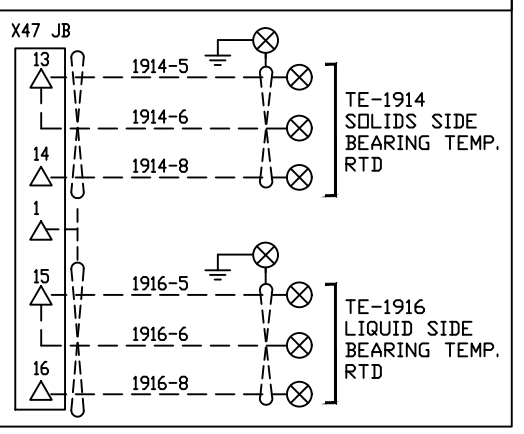
24VDC - CONTROL PANEL TO X47 JUNCTION BOX (#16AWG, 600V, MIN. RATED)



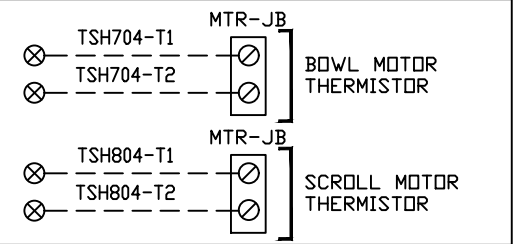
24VDC - CONTROL PANEL TO X48 JUNCTION BOX (#16AWG, 600V, MIN. RATED)



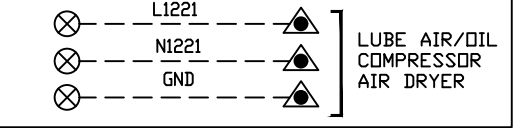
RTD'S - CONTROL PANEL TO FIELD X47 JUNCTION BOX #16 AWG TWISTED SHIELDED TRIAD



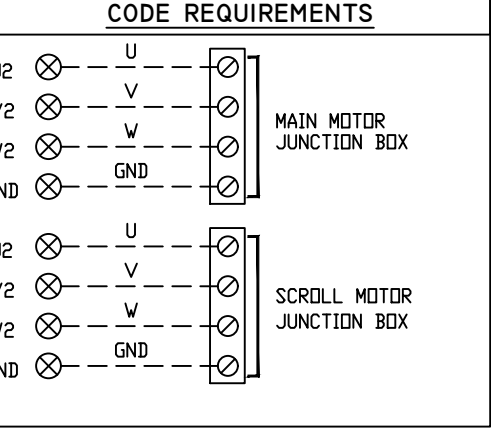
24VDC - CONTROL PANEL TO MOTOR JUNCTION BOXES (#16AWG, 600V, MINIMUM RATED)



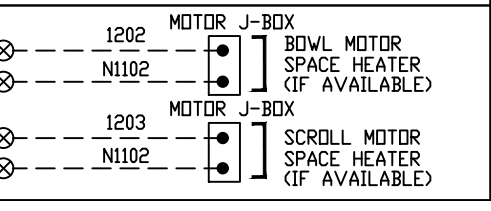
120VAC - MAIN CONTROL PANEL TO CUSTOMER FIELD DEVICES (#14AWG, 600V, MINIMUM RATED)



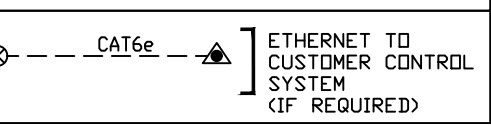
480 VAC - CENTRIFUGE PANEL TO MOTORS SIZE TO SUIT LOCAL ELECTRICAL CODE REQUIREMENTS



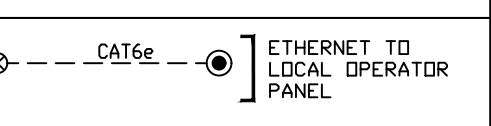
120VAC - CONTROL PANEL TO MOTOR JUNCTION BOXES (#16AWG, 600V, MINIMUM RATED)



CAT 6E ETHERNET MAIN CONTROL PANEL TO CUSTOMER



CAT 6E ETHERNET MAIN CONTROL PANEL TO LOCAL OPERATOR PANEL



NOTES:
 1. ALL WIRING ON THIS DRAWING IS SHOWN SCHEMATICALLY. CONTRACTOR TO DETERMINE SIZE, QUANTITY AND BEST POSSIBLE ROUTING OF CABLE AND CONDUITS TO SUIT FIELD CONDITIONS.
 2. DASHED LINES REPRESENT FIELD WIRING TO BE INSTALLED BY ELECTRICAL CONTRACTOR.
 3. CONTRACTOR TO RUN SEPARATE CONDUITS FOR 120VAC POWER, 480VAC POWER AND 24VDC/4-20ma SIGNAL WIRING AND MUST ADHERE TO ALL LOCAL & NATIONAL ELECTRICAL CODES.
 4. ALL RUNS DESIGNATED AS SHIELDED WIRING TO BE TWISTED, SHIELDED PAIRS OR TRIADS WITH 100% FOIL SHIELD AND DRAIN WIRE.
 5. FOR COMPLETE WIRING DIAGRAMS AND CONTROL PANEL LAYOUT'S REFER TO DWG'S '90-0112-A-01 THRU 26'.
 6. CONTRACTOR TO PROVIDE ADEQUATE SPARES IN ALL CONDUIT/CABLE RUNS.
 7. PLEASE REFER TO INSTALLATION DIAGRAM FOR EXACT LOCATION OF JUNCTION BOXES, AND RECOMMENDED LOCATION OF VIM (VIBRATION MONITOR).

REV.	BY	DATE	REVISION
5	AR	26AUG22	REVISED AS BUILT
4	ACI	18AUG22	AS BUILT
3	ACI	17FEB22	RELEASED FOR FABRICATION
2	AR	07JAN22	REVISED MCP PART NUMBER
1	AR	07DEC21	REVISED PER SUBMITTAL COMMENTS
0	RR	15OCT21	SUBMITTAL APPROVAL ISSUE

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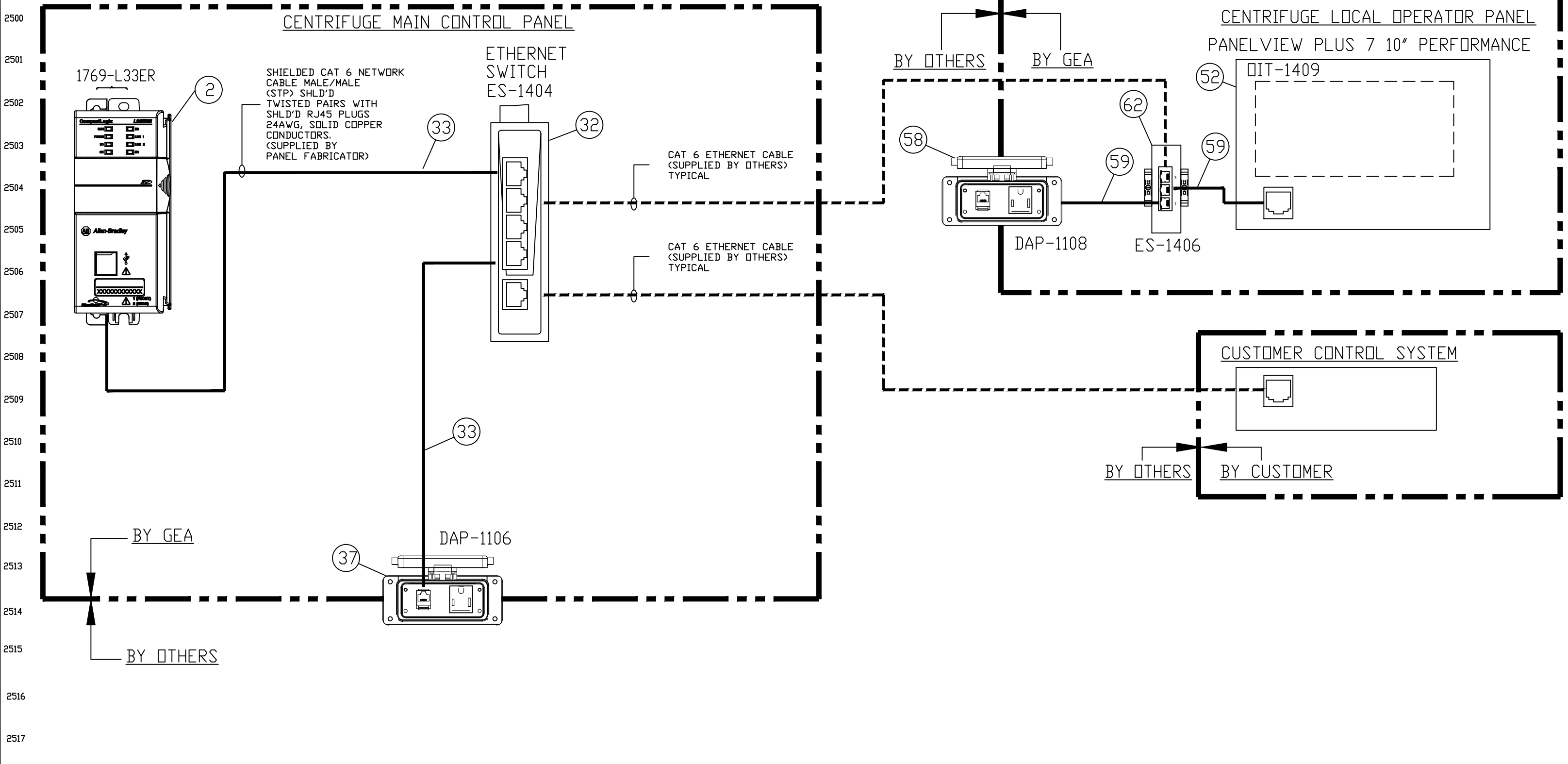
TERMINAL BLOCK LEGEND			
⊗	MAIN CONTROL PANEL	○	LOCAL OPERATOR PANEL
⊙	CUSTOMER	◊	X20 TERMINAL BLOCK
◊	X47 TERMINAL BLOCK	△	X48 TERMINAL BLOCK
■	X11 TERMINAL BLOCK	---	EXTERNAL WIRING

GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE ELECTRICAL INTERCONNECTION DIAGRAM**

TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	24 OF 25	CF 7000	9200-5901-587-10551	5



CEN 1 (NORTH CENTRIFUGE)
 PLC: PORT A2 (PRIVATE) 192.168.1.10, DIT 192.168.1.11, BDWL VFD 192.168.1.12, SCROLL VFD 192.168.1.13,
 SUBNET 255.255.255.0, GATEWAY 192.168.1.1

PORT A1 (PUBLIC) 172.30.167.177, SUBNET 255.255.255.0, GATEWAY 172.30.167.1, REDLION DSP 172.30.167.178,
 SUBNET 255.255.255.0, GATEWAY 172.30.167.1

CEN 2 (SOUTH CENTRIFUGE)
 PLC: PORT A2 (PRIVATE) 192.168.1.20, DIT 192.168.1.21, BDWL VFD 192.168.1.22, SCROLL VFD 192.168.1.23,
 SUBNET 255.255.255.0, GATEWAY 192.168.1.1

PORT A1 (PUBLIC) 172.30.167.179, SUBNET 255.255.255.0, GATEWAY 172.30.167.1, REDLION DSP 172.30.168.180,
 SUBNET 255.255.255.0, GATEWAY 172.30.167.1

REV.	BY	DATE	REVISION
5	AR	26AUG22	REVISED AS BUILT
4	ACI	18AUG22	AS BUILT
3	ACI	17FEB22	RELEASED FOR FABRICATION
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GEA MECHANICAL EQUIPMENT US, INC.
 100 Fairway Court Northvale, NJ 07647

Title: **CF7000 CENTRIFUGE ETHERNET NETWORK DIAGRAM**

TAUNTON, MA 2652.395.848

Drawn	Approved	Date	Sheet	Machine Type	DWG. NO.	Rev.
RR	LM	15OCT21	25 OF 25	CF 7000	9200-5901-587-10551	5

STAINLESS STEEL HEAVY DUTY FREE-STANDING ENCLOSURES FOR FLANGE-MOUNTED DISCONNECTS TWO-DOOR ENCLOSURES

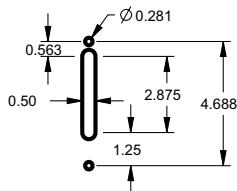
ENCLOSURE PRODUCT CODE S2						SUB-PANEL (P3)			
Catalog No.	Height (A)	Width (B)	Depth (C)	Industry Standard	List Price	Catalog No.	Panel Height (E)	Panel Width (F)	List Price
SCE-72XM5418SS	72.00	53.75	18.00	IS6	9,890.44	SCE-64P52**	60.00	48.00	Included
SCE-72XM6618SS	72.00	65.75	18.00	IS6	11,145.52	SCE-64P64**	60.00	60.00	Included
SCE-72XM7818SS	72.00	77.75	18.00	IS6	12,396.34	SCE-64P76**	60.00	72.00	Included
SCE-72XM7824SS	72.00	77.75	24.00	IS6	13,286.12	SCE-64P76**	60.00	72.00	Included
SCE-84XM7818SS	84.00	77.75	18.00	IS6	13,758.93	SCE-76P76**	72.00	72.00	Included
SCE-84XM7824SS	84.00	77.75	24.00	IS6	13,930.86	SCE-76P76**	72.00	72.00	Included
SCE-90XM7818SS	90.00	77.75	18.00	IS6	14,691.64	SCE-82P76**	78.00	72.00	Included
SCE-90XM7824SS	90.00	77.75	24.00	IS6	15,418.09	SCE-82P76**	78.00	72.00	Included

XM ENCLOSURES

* Add the letter U to the end of the part number for enclosures with a universal disconnect cutout.

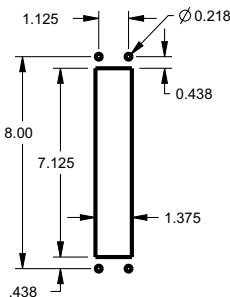
Standard Disconnect cutout provided

D 1



Universal Disconnect cutout

D 7



**Sub-panel included with enclosure.
Replacement panels can be ordered.
Prices found in the accessory section.



Stainless Steel Heavy Duty Free-Standing Enclosures For Flange-Mounted Disconnects

Application -

Designed to house electrical equipment and provide degree of protection from dirt, dust, oil and water and to house most standard type disconnects. For installation information, consult our Installation Manual at www.saginawcontrol.com.

Construction -

- 0.104" stainless steel Type 304.
- Seams continuously welded and ground smooth.
- Flange trough collar around all sides of door opening.
- Body stiffeners in large enclosures for extra rigidity.
- Heavy duty lifting eyes anchor into reinforced top.
- Removable center posts permit easy sub-panel installation.
- Stainless steel concealed hinges.
- Black zinc die cast coinproof/padlocking handle on main door with black zinc die cast padlocking handle on slave doors.
- 3-point latching mechanism.
- Black quarter turn latches as required.
- Panel supports.
- Large removable print pockets.
- Oil-resistant gasket.
- Removable sub-panels mount on collar studs.
- Master door is far right-hand door on all enclosures.
- Defeater on master door requires a screwdriver to open.
- Mechanical interlock activated by master door prevents slave doors from being opened first. Doors can be closed in any order.
- Ground stud on door and body.
- Provisions for light kit.

Disconnect switch (or circuit breaker) and operating mechanism are not furnished with enclosure.

Finish -

#4 brushed finish on all exterior surfaces. Sub-panels powder coated white.

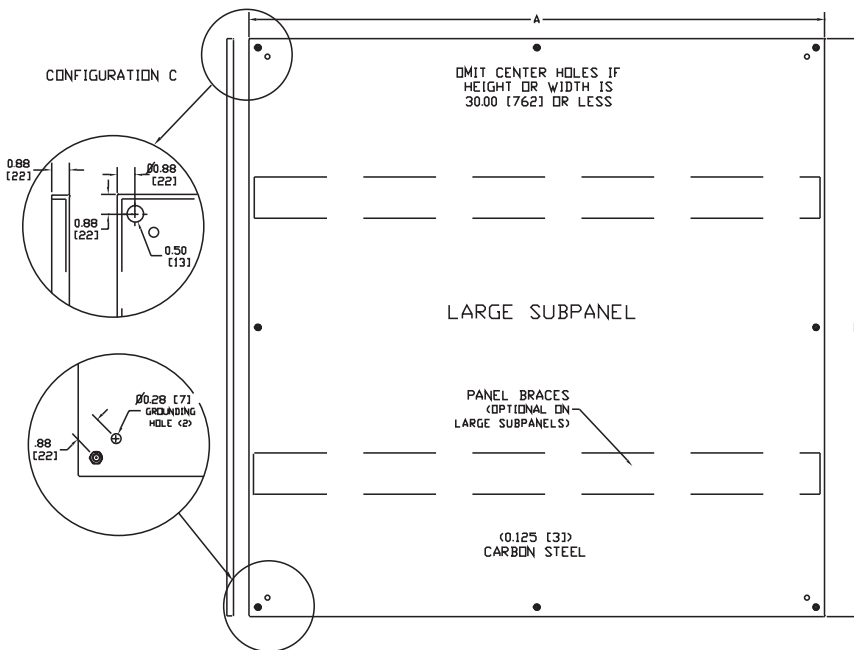
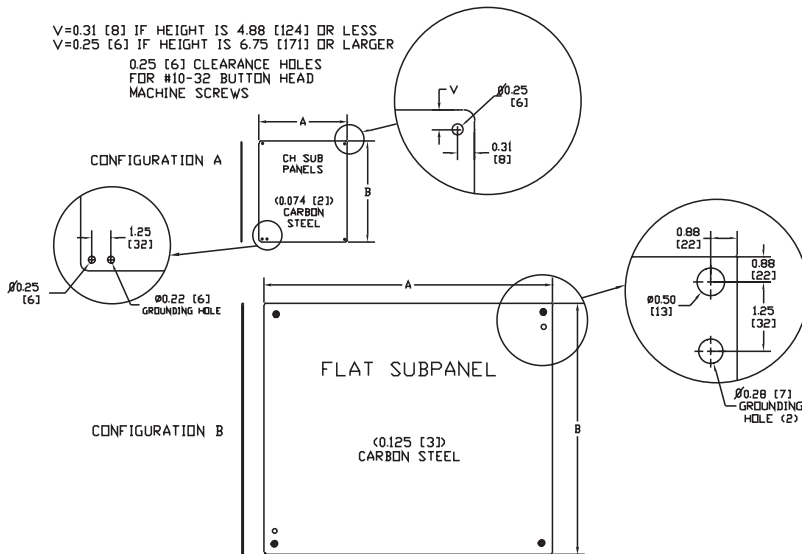
IS6 - Industry Standards -

NEMA Type 3R, 4, 4X, 12 & Type 13
UL Listed Type 3R, 4, 4X & 12
CSA Type 3R, 4, 4X & 12
IEC 60529 IP66

***Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. See the Special Instructions on the Industry Standards page in the Technical Information Section.

Catalog No.	Height (A)	Width (B)	Configuration	Edge Flanges	Product Code	List Price
SCE-64P52	60.00	48.00	C	Four	P3	334.21
SCE-64P64	60.00	60.00	C	Four	P3	362.06
SCE-64P76	60.00	72.00	C	Four	P3	425.36
SCE-72P60	68.00	56.00	C	Four	P3	394.98
SCE-72P72	68.00	68.00	C	Four	P3	470.93
SCE-72P30	69.00	27.00	C	Four	P3	210.15
SCE-72P36	69.00	33.00	C	Four	P3	225.33
SCE-76P37	72.00	33.75	C	Four	P3	250.65
SCE-76P76	72.00	72.00	C	Four	P3	498.78
SCE-82P37	78.00	33.75	C	Four	P3	278.51
SCE-82P76	78.00	72.00	C	Four	P3	501.32

V=0.31 [8] IF HEIGHT IS 4.88 [124] OR LESS
 V=0.25 [6] IF HEIGHT IS 6.75 [171] OR LARGER
 0.25 [6] CLEARANCE HOLES FOR #10-32 BUTTON HEAD MACHINE SCREWS



MOUNTING PANELS

SUB-PANELS

Construction -

Sub-panels are constructed from carbon steel. Size determines steel thickness.

Finish -

Powder coated white.

Options -

Configuration A - Add (SS) to the end of the sub-panel part number. (Example: SCE-12P10SS). Sub-panels are made of 316/316L stainless steel.

Configuration B & C - Add (SS) to the end of the sub-panel part number for 304 stainless steel (Example: SCE-30P30SS). Add (SS6) to the end of the sub-panel part number for 316/316L stainless steel (Example: SCE-30P30SS6).

Available within 10 working days if not in stock

CompactLogix™ 5370 L3 Programmable Automation Controllers



1769-L30ER, -L30ERM, -L30ER-NSE, -L33ER, -L33ERM, L36ERM, -L37ERM, -L38ERM

Features and Benefits

The CompactLogix 5370 L3 controllers deliver scalable, affordable control ideal for applications from small stand-alone equipment to high performance indexing tables, process skids, case packers and erectors, and packaging.

Machine builders and end users can take advantage of the cost-saving features of these controllers:

- Support for Integrated Motion on EtherNet/IP
- Support for Device Level Ring (DLR) network topologies
- Built-in energy storage eliminates the need for lithium batteries
- Support reuse of existing 1769 I/O
- Removable 1GB secure digital (SD) card improves data integrity
- Flexible memory options up to 3MB
- Added features for hazardous environments (NSE version)
- Support for Kinematics eliminates the need for additional robot controllers and software
- Open socket capability allows support for Modbus TCP as well as devices such as printers, barcode readers and servers

Reduce cost and time to market with CompactLogix 5370 L3 Programmable Automation Controllers.



Expanding on the scalability of the Logix family of controllers, the CompactLogix 5370 L3 programmable automation controllers (PAC) are designed to meet the growing need for a higher performance controller in a compact and affordable package.

As part of the Integrated Architecture system, the CompactLogix 5370 L3 controllers use the same programming software, network protocol, and information capabilities as all Logix controllers, providing a common development environment for all control disciplines.

Integrated Motion on EtherNet/IP

The CompactLogix 5370 L3 controller provides a strong motion solution for customers looking for performance and cost competitiveness.

- Supports up to 16 axes of integrated motion
- Together with the Kinetix 350, offers cost-effective, scalable motion solution

Network Capabilities

With dual Ethernet ports and an integrated Ethernet switch, these controllers now support Device Level Ring (DLR) network topologies, simplifying integration of components in your control system and reducing system cost:

- Provides resiliency from loss of one network connection
- Allows replacement of devices one at a time without stopping production
- Reduces the number of Ethernet switches in the control system

Features for Hazardous Environments





The No Stored Energy (NSE) version of the CompactLogix 5370 L3 offers additional features for hazardous environments found in industries such as mining and oil and gas.

- Allows safe transport of controller in and out of mining areas
- Powered down controller has less than 200uJ of residual energy stored in each component
- No consequences of arc or spark to cause an explosion in gaseous environment

CompactLogix 5370 L3 Controller Product Specifications



	1769-L30ER	1769-L30ERM	1769-L30ER-NSE	1769-L33ER	1769-L33ERM	1769-L36ERM	1769-L37ERM	1769-L38ERM	
User Memory	1 MB	1 MB	1 MB	2 MB	2 MB	3 MB	4 MB	5 MB	
Controller Tasks	32	32	32	32	32	32	32	32	
Programs per Task	100	100	100	100	100	100	100	100	
Integrated Motion	--	4 axis CIP motion position loop axis	--	--	8 axis CIP motion position loop axis	16 axis CIP motion position loop axis			
Package Size	55mm wide x 118mm high x 105mm deep								
Certifications	cULH (Class I Division 2), KCC / UL (UL 508), ULH (Class I & II, Division 2 and Class III, Divisions 1 & 2) / ATEX, CE, C-Tick, GOST-R and Marine								
Local Expansion Modules	8	8	8	16	16	30	30	30	
Local Expansion I/O Points (Max)	256	256	256	512	512	960	960	960	
Communication Module Additions	DeviceNet with 1769-SDN or 3rd party								
Flash Memory Card	Industrially rated and certified Secure Digital (SD) memory card (1 and 2 GB options); all controllers shipped with 1 GB card								
Servo Drives (Position Loop CIP)	--	4	--	--	8	16	16	16	
Ethernet I/O IP Nodes	16	16	16	32	32	48	48	48	
Virtual Axes	100	100	100	100	100	100	100	100	
Feedback only, Torque, Velocity, Vhz (max CIP Motion Drives)	--	16	--	--	32	48	48	48	
Axes/ms	--	2	--	--	2	2	2	2	
Kinematics Support	--	yes	--	--	yes	yes	yes	yes	
Software / Firmware	RSLogix 5000 V20 and RSLinx Classic V2.59 Firmware v20.1x or later						RSLogix 5000 V31 and RSLinx Classic V4.0 Firmware v31.x or later		
Conformally Coated Product Available	1769-L30ERK	1769-L30ERMK	no	1769-L33ERK	1769-L33ERMK	no	1769-L37ERMK	1769-L38ERMK	

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 EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
 ASIA PACIFIC: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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Publication 1769-PP010C-EN-E - November 2019 | Supersedes Publication 1769-PP010B-EN-E - January 2013

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Specifications

1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4 - Technical Specifications

Attribute	1769-PA2	1769-PB2	1769-PA4	1769-PB4
Input voltage range	85...265V AC	19.2...31.2V DC	85...132V AC or 170...265V AC, switch selectable	19.2...32V DC
Input frequency range	47...63 Hz	N/A	47...63 Hz	N/A
Power supply distance rating ⁽¹⁾	8 (8 I/O modules can be connected on either side of the power supply for a maximum of 16 modules.)			
Operating altitude	2000 m (6562 ft)			
Isolation voltage	265V (continuous), Reinforced Insulation Type (IEC Class 1 grounding required) Routine tested at 2596V DC for 1s, AC Power Input to System and AC Power Input to 24V DC User Power	75V (continuous), Reinforced Insulation Type (IEC Class 1 grounding required) Routine tested at 1697V DC for 1s, DC Power Input to System	265V (continuous), Reinforced Insulation Type (IEC Class 1 grounding required) Routine tested at 2596V DC for 1s, AC Power Input to System	75V (continuous), Reinforced Insulation Type (IEC Class 1 grounding required) Routine tested at 1697V DC for 1s, DC Power Input to System
Power consumption	100 VA @ 120V AC 130 VA @ 240V AC	50 VA @ 24V DC	200 VA @ 120V AC 240 VA @ 240V AC	100 VA @ 24V DC
Power dissipation	8 W @ 60 °C	7.5 W @ 60 °C	18 W @ 60 °C	14.5 W @ 60 °C
Current capacity at 5V	2.0 A	2.0 A	4.0 A	4.0 A
Current capacity at 24V	0.8 A	0.8 A	2.0 A	2.0 A
Inrush current, max	25 A @ 132V AC	30 A @ 31.2V DC	25 A @ 132V AC	30 A @ 31.2V DC
Fuse type	Wickmann 19195-3.15A Littelfuse 02183.15MXP	Wickmann 19193-6.3A Littelfuse 021706.3MXP	Wickmann 19195-3.15A Littelfuse 02183.15MXP	Wickmann 19193-6.3A Littelfuse 021706.3MXP
Dimensions (HxWxD), approx.	118 x 70 x 87 mm (4.65 x 2.76 x 3.43 in.) height including mounting tabs is 138 mm (5.43 in.)			
Shipping weight, approx	525 g (1.16 lb)		630 g (1.39 lb)	
Wiring category ⁽²⁾	1 on power ports	2 on power ports	1 on power ports	2 on power ports

1769 DC Digital Modules

Cat. No.	Inputs/Outputs	Voltage Category	Operating Voltage Range	Backplane Current	Power Supply Distance Rating
1769-IG16	16 inputs	5V DCTTL	4.5...5.5V DC	120 mA @ 5.1V	8
1769-IQ16	16 inputs	24V DC sink/source	10...30V DC @ 30 °C (86 °F) 10...26.4V DC @ 60 °C (140 °F)	115 mA @ 5.1V	8
1769-IQ16F	16 inputs, high speed	24V DC sink/source	10...30V DC @ 30 °C (86 °F) 10...26.4V DC @ 60 °C (140 °F)	100 mA @ 5.1V	8
1769-IQ32	32 inputs	24V DC sink/source	10...30V DC @ 30 °C (86 °F) 10...26.4V DC @ 60 °C (140 °F)	170 mA @ 5.1V	8
1769-IQ32T	32 inputs	24V DC sink/source	20.4...26.4V DC @ 60 °C (140 °F)	170 mA @ 5.1V	8
1769-IQ6XOW4	6 inputs 4 outputs	24V DC sink/source input AC/DC normally open relay contact outputs	10...30V DC @ 30 °C (86 °F) 10...26.4V DC @ 60 °C (140 °F)	105 mA @ 5.1V 50 mA @ 24V	8
1769-OB8	8 outputs	24V DC source	20.4...26.4V DC	145 mA @ 5.1V	8
1769-OB16	16 outputs	24V DC source	20.4...26.4V DC	200 mA @ 5.1V	8
1769-OB16P	16 outputs, protected	24V DC source	20.4...26.4V DC	160 mA @ 5.1V	8
1769-OB32	32 outputs	24V DC source	20.4...26.4V DC	300 mA @ 5.1V	6
1769-OB32T	32 outputs	24V DC source	10.2...26.4V DC	220 mA @ 5.1V	8
1769-OG16	16 outputs	5V DCTTL	4.5...5.5V DC	200 mA @ 5.1V	8
1769-OV16	16 outputs	24V DC sink	20.4...26.4V DC	200 mA @ 5.1V	8
1769-OV32T	32 outputs	24V DC sink	10.2...26.4V DC	300 mA @ 5.1V	8

1769 Contact Output Modules

Cat. No.	Inputs/Outputs	Operating Voltage Range	Backplane Current	Power Supply Distance Rating
1769-OW8	8 outputs	5...265V AC 5...125V DC	125 mA @ 5.1V 100 mA @ 24V	8
1769-OW8I	8 outputs, individually isolated	5...265V AC 5...125V DC	125 mA @ 5.1V 100 mA @ 24V	8
1769-OW16	16 outputs	5...265V AC 5...125V DC	205 mA @ 5.1V 180 mA @ 24V	8

1769-OB16

Compact solid state 24V DC source output module

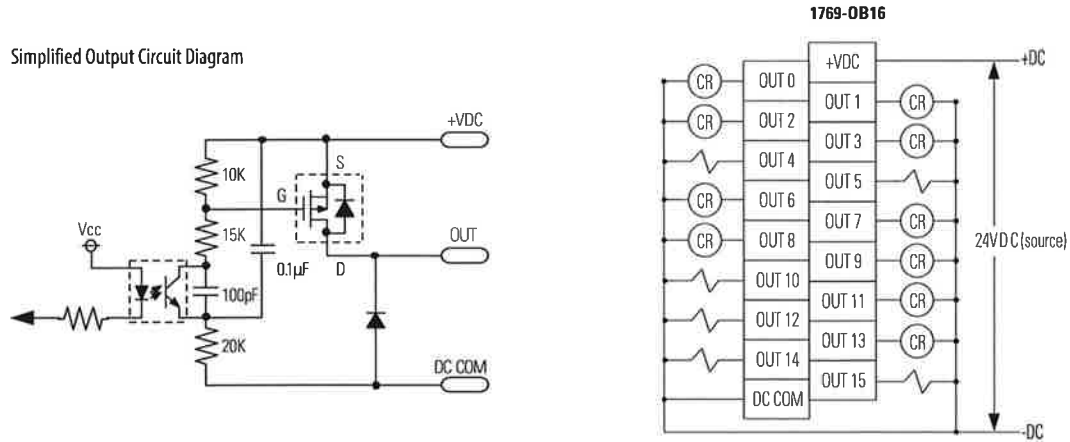


Table 57 - Technical Specifications - 1769-OB16

Attribute	1769-OB16
Outputs	16 (16 points/group)
Voltage category	24V DC source
Operating voltage range	20.4...26.4V DC
Output delay, on	0.1 ms
Output delay, off	1.0 ms
Current draw @ 5.1V	200 mA
Heat dissipation, max	2.11 W
Off-state leakage current, max ⁽¹⁾	1.0 mA @ 26.4V DC
On-state current, min	1.0 mA
On-state voltage drop, max	1.0V DC @ 1 A
Current per point, max	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)
Current per module, max	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)
Surge current ⁽²⁾	2.0 A for 10 ms, repeatable every 2 s
Isolation voltage	Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus 75V DC working voltage (IEC Class 2 reinforced insulation)
Weight, approx	280 g (0.61 lb)
Dimensions (HxWxD), approx	118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.) Height with mounting tabs 138 mm (5.43 in.)
Slot width	1
Module location	DIN rail or panel mount
Power supply	1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4
Power supply distance rating	8 modules

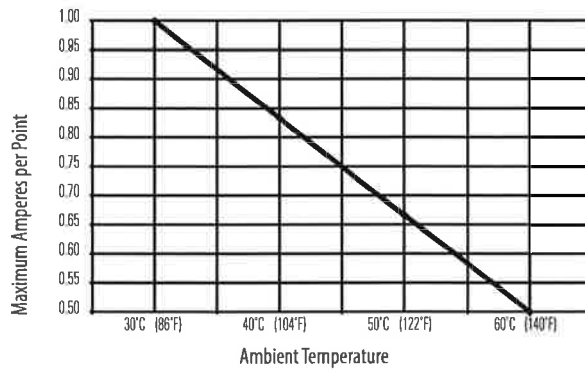
Table 57 - Technical Specifications - 1769-OB16

Attribute	1769-OB16
Terminal screw torque	0.68 N•m (6 lb•in)
Retaining screw torque	0.46 N•m (4.1 lb•in)
Wire size	(22...14 AWG) solid (22...16 AWG) stranded
Wire type	Cu-90 °C (194 °F)
Replacement terminal block	1769-RTBN18 (1 per kit)
Replacement door label	1769-RL1 (2 per kit)
Replacement door	1769-RD (2 per kit)
Vendor ID code	1
Product type code	7
Product code	71
Enclosure type rating	None (open style)

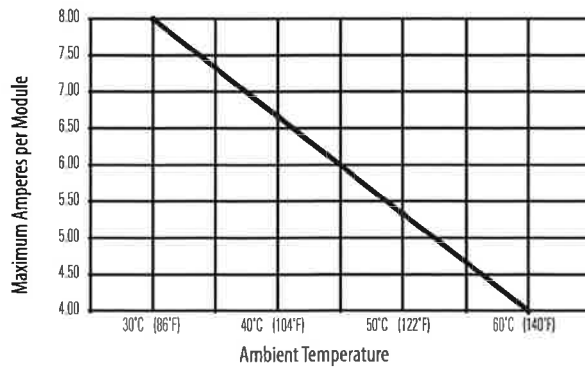
- (1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k Ω , 1/2 W resistor for transistor outputs, 24V DC operation.
- (2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

Temperature Derating - 1769-OB16

1769-OB16 Maximum Amperes per Point versus Temperature

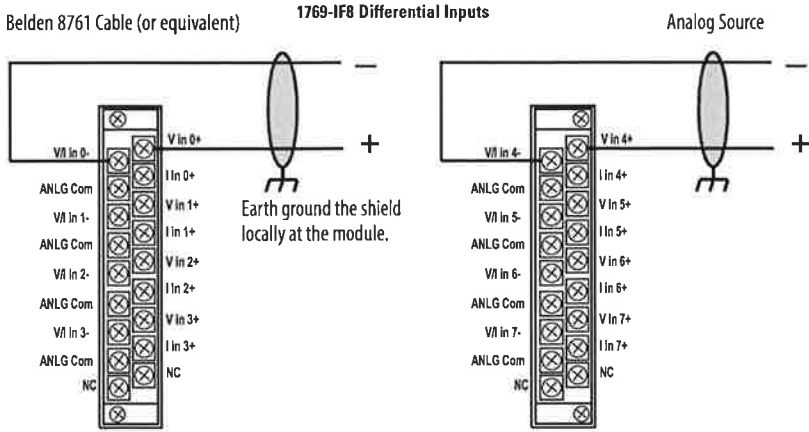


1769-OB16 Maximum Amperes per Module versus Temperature



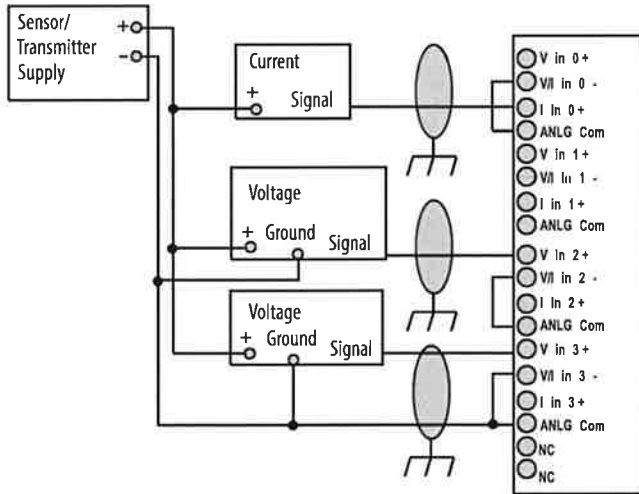
1769-IF8

Compact voltage/current analog input module



1769-IF8 Single-ended Sensor/Transmitter Inputs

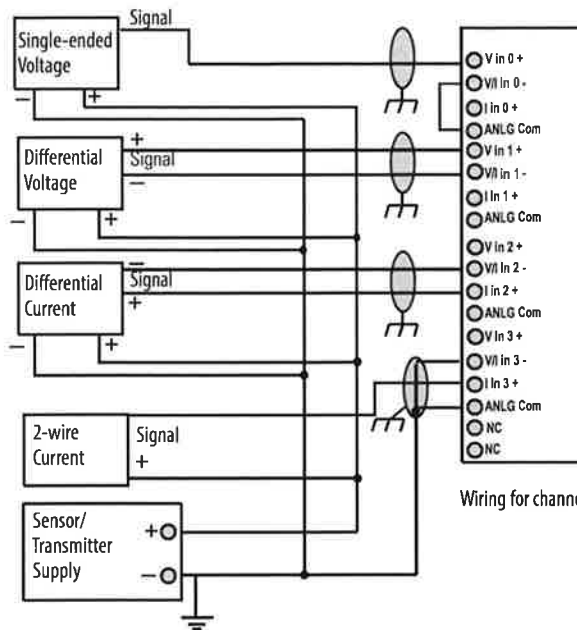
The sensor power supply must be rated Class 2.



Wiring for channels 4...7 are identical.

1769-IF8 Mixed Transmitter Inputs

The sensor power supply must be rated Class 2.



Wiring for channels 4-7 are identical.

Technical Specifications - 1769-IF8

Attribute	1769-IF8
Inputs	8 differential or single-ended
Input range	±10V 0...10V 0...5V 1...5V 0...20 mA 4...20 mA
Full scale range ⁽¹⁾	±10.5V -0.5...10.5V -0.5...5.25V 0.5...5.25V 0...21 mA 3.2...21 mA
Current draw @ 5.1V	120 mA
Current draw @ 24V	70 mA
Converter type	Delta Sigma
Heat dissipation, max	3.24 W
Resolution ⁽²⁾	16 bits (unipolar) 15 bits plus sign (bipolar)
Rated working voltage ⁽³⁾	30V AC/30V DC
Common mode voltage range ⁽⁴⁾	±10V DC max per channel
Common mode rejection	> 60 dB @ 50 and 60 Hz with the 10 Hz filter selected
Normal mode rejection ratio	-50 dB @ 50 and 60 Hz with the 10 Hz filter selected

Technical Specifications - 1769-IF8

Attribute	1769-IF8
Input impedance	Voltage: 220 k Ω Current: 250 Ω
Accuracy ⁽⁵⁾	Voltage: $\pm 0.2\%$ full scale @ 25 °C (77 °F) Current: $\pm 0.35\%$ full scale @ 25 °C (77 °F)
Accuracy drift with temperature	Voltage: $\pm 0.003\%$ per °C Current: $\pm 0.0045\%$ per °C
Nonlinearity	$\pm 0.03\%$
Repeatability ⁽⁶⁾	$\pm 0.03\%$
Module error	Voltage: $\pm 0.3\%$ Current: $\pm 0.5\%$
Overload at input terminals, max ⁽⁷⁾	Voltage: $\pm 30V$ DC continuous, 0.1 mA Current: ± 32 mA continuous, $\pm 7.6V$ DC
Isolation voltage	500V AC or 710V DC for 1 minute (qualification test), group to bus 30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)
Weight, approx	450 g (0.99 lb)
Dimensions (HxWxD), approx	118 x 52.5 x 87 mm (4.65 x 2.07 x 3.43 in.) Height with mounting tabs 138 mm (5.43 in.)
Slot width	1.5
Module location	DIN rail or panel mount
Power supply	1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4
Power supply distance rating	8 modules
Terminal screw torque	0.68 N•m (6 lb•in)
Retaining screw torque	0.46 N•m (4.1 lb•in)
Wire size	(22...14 AWG) solid (22...16 AWG) stranded
Wire type	Cu-90 °C (194 °F)
Replacement terminal block	1769-RTBN18 (1 per kit)
Replacement door label	1769-RL2 series B (2 per kit)
Replacement door	1769-RD (2 per kit)
Vendor ID code	1
Product type code	10
Product code	38
Enclosure type rating	None (open-style)

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within $\pm 10V$ DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

Select a CompactLogix System

Cat. No.	Inputs/Outputs	Range	Resolution	Backplane Current	Power Supply Distance Rating
1769-OF4VI	4 outputs, differential, individually isolated	±10V 0...10V 0...5V 1...5V	15 bits plus sign (bipolar)	145 mA @ 5.1V 75 mA @ 24V	8
1769-OF8C	8 outputs, single-ended	0...20 mA 4...20 mA	16 bits (unipolar)	140 mA @ 5.1V 145 mA @ 24V	8
1769-OF8V	8 outputs, single-ended	±10V 0...10V 0...5V 1...5V	16 bits plus sign (bipolar)	145 mA @ 5.1V 125 mA @ 24V	8

1769 Analog RTD and Thermocouple Modules

Cat. No.	Inputs/Outputs	Sensors Supported	Backplane Current	Power Supply Distance Rating
1769-IR6	6 RTD inputs	100, 200, 500, 1000 Ω Platinum 385 100, 200, 500, 1000 Ω Platinum 3916 120 Ω Nickel 618 120 Ω Nickel 672 10 Ω Nickel-iron 518 0...150 Ω 0...500 Ω 0...1000 Ω 0...3000 Ω	100 mA @ 5.1V 45 mA @ 24V	8
1769-IT6	6 thermocouple inputs	Thermocouple types B, C, E, J, K, N, R, S, T ±50V ±100V	100 mA @ 5.1V 45 mA @ 24V	8 ⁽¹⁾

(1) To reduce the effects of electrical noise, install the 1769-IT6 module at least two slots away from the AC power supplies.

1769 Communication and Specialty Modules

Cat. No.	Description	Backplane Current	Power Supply Distance Rating
1769-AENTR	The adapter connects 1769 I/O modules to a linear or DLR network and uses two copper network ports to connect to the network.	500 mA @ 5V	5
1769-ARM	Use a 1769-ARM address reserve module to reserve module slots. After creating an I/O configuration and user program, you can remove and replace any I/O module in the system with a 1769-ARM module once you inhibit the removed module in the Logix Designer application.	60 mA @ 5.1V	8
1769-ASCII	The 1769-ASCII module, a general purpose two-channel ASCII interface, provides a flexible network interface to a wide variety of RS-232, RS-485, and RS-422 ASCII devices. The module provides the communication connections to the ASCII device.	425 mA @ 5.1V	4
1769-BOOLEAN	Use the 1769-BOOLEAN module in applications that require repeatability, such as material handling and packaging, when there is a requirement to activate an output based on an input's transition. If the Boolean expression is true, the output is directed to the ON state. If the Boolean expression is false, the output channel is directed to the OFF state. There are four operators that you can configure as OR, AND, XOR, or none.	220 mA @ 5.1V	8

Specifications

1769-ECL, 1769-ECR - Technical Specifications

Attribute	1769-ECL	1769-ECR
Bus current draw, max	5 mA at 5V DC	
Operating altitude	2000 m (6562 ft)	
North American temp code	T3C	
IEC temp code	N/A	T4
Shipping weight, approx	130 g (0.286 lb)	
Enclosure type rating	None (open style)	

1769-ECL, 1769-ECR - Environmental Specifications

Attribute	1769-ECL	1769-ECR
Operating temperature IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0...60 °C (32...140 °F)	
Nonoperating temperature IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...85 °C (-40...185 °F)	
Relative humidity	5...95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz	
Operating shock IEC 60068-2-27 (Test Ea, Unpackaged Shock)	DIN rail mount: 20 g; Panel mount: 30 g	
Nonoperating shock IEC 60068-2-27 (Test Ea, Unpackaged Shock)	DIN rail mount: 30 g; Panel mount: 40 g	

1769-ECL, 1769-ECR - Environmental Specifications

Attribute	1769-ECL	1769-ECR
Emissions CISPR 11	Group 1, Class A	
ESD immunity IEC 61000-4-2	8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50%Pulse 100% AM at 900 MHz	

1769-ECL, 1769-ECR - Certifications⁽¹⁾

Certifications ⁽²⁾	1769-ECL	1769-ECR
c-UL-us	UL Listed for Class I, Division 2 Group A, B, C, D Hazardous Locations, certified for U.S. and Canada. See UL File E10314	
CE	European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions 	
C-Tick	Australian Radio Communications Act, compliant with: <ul style="list-style-type: none"> • AS/NZS CISPR 11; Industrial Emissions 	
Ex	N/A	European Union 94/9/EC ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (II 3 G Ex nA IIC T4 X) • EN 60079-0; General Requirements (Zone 2)

(1) When product is marked.

(2) See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

Product data sheet

Characteristics



JJL36200

PowerPact J-Frame breaker, thermal-magnetic,
200 A, 3P, 25 kA at 600 VAC



by Schneider Electric



Product availability: Stock - Normally stocked in distribution facility

Price*: 5432.00 USD



Main

Product or component type	Circuit breaker
Range of product	PowerPact J
Trip unit technology	Thermal-magnetic
Breaking capacity code	J

Complementary

Line Rated Current	200 A
Number of poles	3
Poles description	3P
Breaking capacity	100 KA 240 V AC 65 KA 480 V AC 25 KA 600 V AC 20 KA 250 V DC
[Ue] rated operational voltage	600 V AC 250 V DC
Continuous current rating	80 %
Mounting mode	Unit mount
Electrical connection	Lugs load Lugs line
AWG gauge	AWG 3/0...350 kcmil aluminium/copper
Magnetic hold current	1000 A
Magnetic tripping current	2000 A
Maximum Height	7.52 In (191.01 mm)
Maximum Width	4.12 In (104.65 mm)
Maximum Depth	5 In (127.00 mm)
Tightening torque	230.12 Lbf.In (26 N.m) 0.15...0.29 in ² (95...185 mm ²) AWG 3/0...350 kcmil)

Environment

Product certifications	IEC CSA UL Listed CE CCC
Ambient air temperature for operation	104 °F (40 °C)

Ordering and shipping details

Category	01115 - HG,HJ,JG,JJ UNIT MT BREAKER/SWITCH
Discount Schedule	DE2
GTIN	00785901461937
Package weight(Lbs)	4.8 Lb(US) (2.18 kg)
Returnability	Yes
Country of origin	MX

Offer Sustainability

Sustainable offer status	Green Premium product
REACH Regulation	REACH Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS Declaration
Environmental Disclosure	Product Environmental Profile
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.

Contractual warranty

Warranty	18 months
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Product data sheet

Characteristics

9422R2

Operating mechanism, flange mounted, variable depth, extra long operating rod, 9422 variable depth mechanism

Product availability : Stock - Normally stocked in distribution facility



Price* : 73.38 USD



Main

Range	9422T
Product	Disconnect Switch

Complementary

Handle Type	Ordered separately
-------------	--------------------

Ordering and shipping details

Category	21732 - 9422
Discount Schedule	CP1
GTIN	00785901479253
Package weight(Lbs)	1 lb(US) (0.45 kg)
Returnability	Yes
Country of origin	MX

Offer Sustainability

California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
REACH Regulation	REACH Declaration
EU RoHS Directive	Compliant EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration

* Price is "List Price" and may be subject to a trade discount – check with your local distributor or retailer for actual price.



Technical Characteristics

Type	T
Approvals	UL Recognized File: E52639 CCN WHTY2 - CSA Certified File: LR44199 Class: 4652 04
Catalog Reference Number	9420CT9701
For Use With	NEMA 1/3/3R/4(sheet steel)/12 enclosures
Handle Type	6 Inch

Shipping and Ordering

Category	21732 - Disconnect Switches, Flange Mounted
Discount Schedule	CP1
Article Number	785901739739
Package Quantity	1
Weight	2.8 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

marathon[™]
Special Products

Product Data Sheet

143X587 ←

Replace "x" with 1, 2, or 3 for number of poles

Power Terminal Block



380 Amps 600 Volts AC/DC

Wire Range

- Line: (1) 500 kcmil - #4 AWG
- Load: (1) 350 kcmil - #6 AWG and (3) #2 - #14 AWG

Electrical Ratings

- 380 Amps
- 600V per UL 1059 & CSA 22.2 No.158, class B & C requirements
- Short circuit current ratings (SCCR): See SCCR section below for specifications.
- CU7AL - 75°C connector terminal rating with copper or aluminum wire
- Factory & Field Wiring

Agency Compliance

- UR - UL Recognized Terminal Block, Evaluated to UL 1059, File No.XCFR2.E62806
- CSA - certified to C22.2 No. 158, File No. LR19766 (wire classes B & C only)
- CE compliant to IEC 60947-7-1

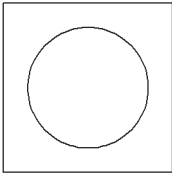
Material Information

- Insulator base:
 - Phenolic
 - Flammability rating of insulator base UL94V0
 - Insulator base temperature rating: -40°C to 150°C (UL RTI)
- Connector: aluminum, tin plated
- Terminal set screws: aluminum, tin plated
- Connector mounting screws: steel, zinc plated
- RoHS compliant

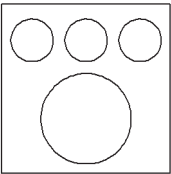
A Regal Brand

REGAL

Termination Specifications

Line Side	Wire Size (CU Stranded)	Torque	Wires / Terminal	Wire Class (UL) ¹
	500 kcmil	42.4 N·m (375 lbf·in)	1	B, C
	400 - 2	42.4 N·m (375 lbf·in)	1	B, C, G, H, I (DLO)
	4	42.4 N·m (375 lbf·in)	1	B, C

- Aluminum wire range: 500 kcmil - #4 AWG
- Wire strip length: 1 3/16in. (30mm)
- Terminal screw drive: 3/8 in.hex

Load Side	Terminal	Wire Size (CU Stranded)	Torque	Wires / Terminal	Wire Class (UL) ¹
	350 - 6	350 - 300	31.1 N·m (275 lbf·in)	1	B, C
		250 - 2	31.1 N·m (275 lbf·in)	1	B, C, G, H, I (DLO)
		4 - 6	31.1 N·m (275 lbf·in)	1	B, C
	2 - 14	2 AWG	5.7 N·m (50 lbf·in)	1	B, C
		4 - 6	5.1 N·m (45 lbf·in)	1	B, C, G, H, I (DLO)
		8	4.5 N·m (40 lbf·in)	1 - 2 ²	B, C, G, H, I (DLO)
		10	4 N·m (35 lbf·in)	1 - 2	B, C, I (DLO)
		12 - 14	4 N·m (35 lbf·in)	1 - 4	B, C
			1 - 2	I (DLO)	

- Solid copper wire range: 10 - 14
- Aluminum wire range: 2 - 8 AWG
- Wire strip length:
 - top row: 9/16in. (14mm)
 - bottom row: 3/4 in. (19mm)
- Terminal screw drive: 5/16 in. hex & slotted

¹ For information on copper stranded wire classes please reference:
<http://www.marathonsp.com/CatalogPDFs/Flexible-Stranded-Wire.pdf>

² Multiple wire rating applies to classes B, C, & I only

Short Circuit Current Ratings (SCCR)

- The suitable conductor ranges are limited to the table values only for achieving the SCCR in excess of the default rating of 10,000A.
- Other conductor combinations within the "Terminal Specifications" noted are suitable for achieving a SCCR of 10,000A (the default rating of terminal blocks).
- Enclosure size – Investigated with a minimum 16x12x6 enclosure. Use in smaller enclosures is subject to end use evaluation.

SCCR With Fuses

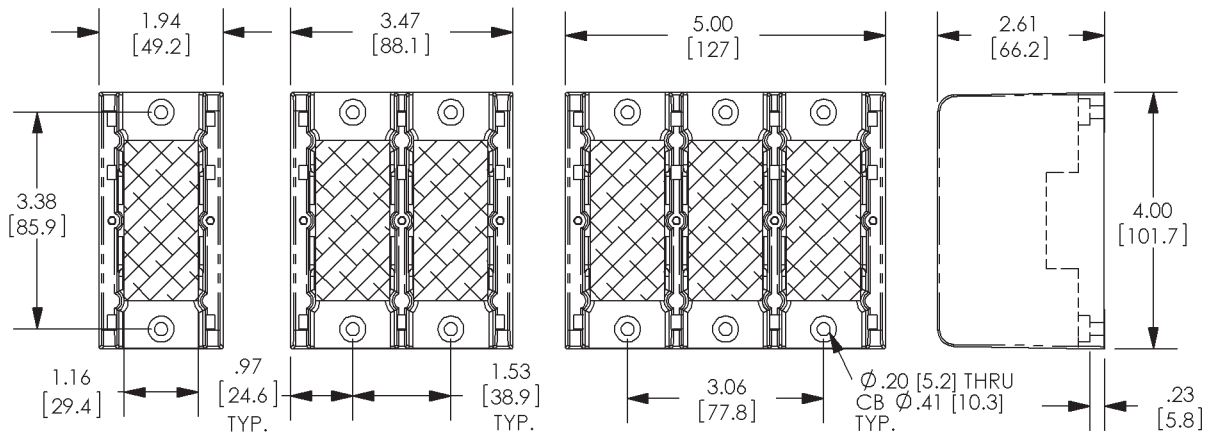
Wire Class	Suitable Conductors		Max Overcurrent Protection Fuse Required Amp Rating / Class						SCCR RMS Sym. Amps 600V. Max
	Line	Load	J	T	RK1	RK5	G	CC	
B, C	500 - 3/0	350 - 6	500	500	400	200	60	30	100,000
B, C	500 - 4	350 - 10	200	200	200	100	60	30	100,000
G, H, I	350 - 2	1 - 6	500	500	400	200	60	30	100,000
G, H, I	350 - 2	1 - 10	200	200	200	100	60	30	100,000
(*)	500 - 4	2 - 14	None						10,000

* Any wire class evaluated (see terminal specification section)

Installation & Accessories

- Mounting (Panel):
 - For use with #10 fastener.
 - Torque mounting fastener to 25-30 lbf·in (2.8 - 3.4 N·m).
- Covers:
 - Flat covers available upon request
 - Catalog Number: CH143x (replace "x" with number of poles)
 - Covers are clear polycarbonate
 - Accessory covers are not intended to provide insulation for electrical spacings.
- Marker Strip: white vinyl strip with mounting screws available.
- Printing options available, consult customer service for specifications.

Drawing



Specifications:

140/141/142/143/144/145 Series (Figures 1 & 2)

- Material UL Recognized, QMFZ2, 125°C, .06 Clear Protective Plastic
- Thread Cutting Screws Furnished Per Cover
- RoHS Compliant

132/133 Series (Figure 3)

- Snap on, Hinged Cover, Black Thermoplastic
- UL Recognized, QMFZ2, 125°C
- RoHS Compliant

135 Series (Figure 4)

- Snap on, Hinged Cover, Black Thermoplastic
- UL Recognized, QMFZ2, 125°C
- RoHS Compliant

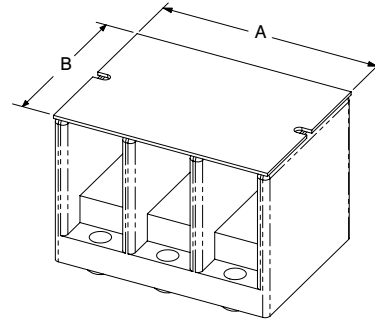


FIGURE 1

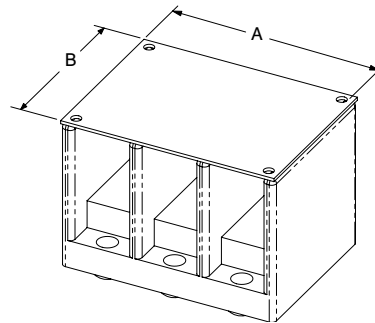


FIGURE 2

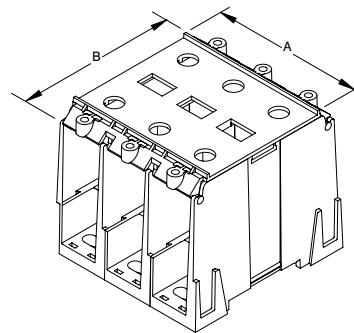


FIGURE 3
(Hinged Cover)

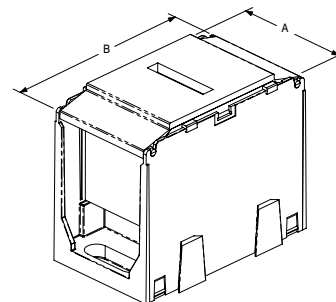


FIGURE 4
(Hinged Cover)

Dimensions (inches):

Catalog #	A	B	Figure #
CC1402	2.75	2.25	1
CC1403	4.00		
CC1411	0.77	2.40	2
CC1412	1.42		
CC1413	2.05		
CC1414	2.68		
CC1421	1.06		
CC1422	1.87	2.75	1
CC1423	2.68		
CC1431	1.78	3.38	1
CC1432	3.31		
CC1433	4.84		
CC1441	2.12	4.00	1
CC1442	4.00		
CC1443	5.87		
CC1451	2.87	4.50	1
CC1452	5.56		
CC1453	8.28		
CH1321	0.88	2.87	3
CH1322	1.69		
CH1323	2.50		
CH1331	1.93	3.89	3
CH1332	3.61		
CH1333	5.30		
CH1351 (one pole only)	3.35	5.65	4



LIMITRON™ 600V Class T



JJS – 600Vac, 1-800A, Fast-Acting Fuses



Description: Advanced protection Class T current-limiting, fast-acting fuses.

Catalog Symbol: JJS-(amp)

Ratings:

Volts – 600Vac

Amps – 1-800A

IR – 200kA Vac RMS Sym.

Agency Information:

CE, UL Listed, Std. 248-15, Class T, Guide JDDZ, File E4273

CSA Certified, C22.2 No. 248.15, Class 1422-02, File 53787

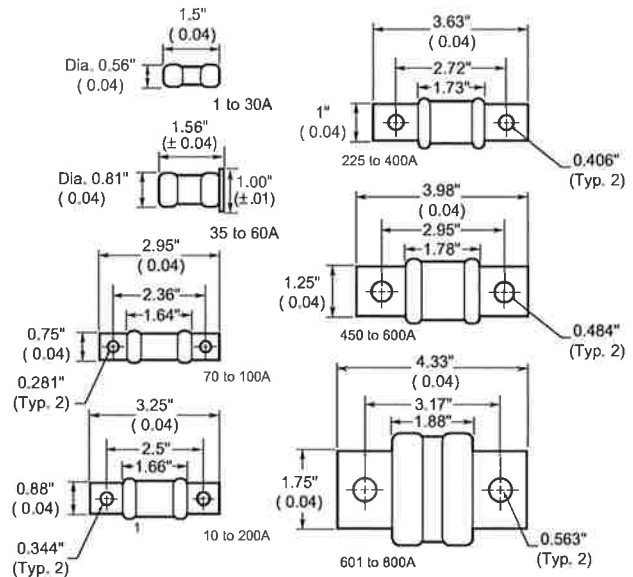
Catalog Numbers (amps)

JJS-1	JJS-45	JJS-200
JJS-2	JJS-50	JJS-225
JJS-3	JJS-60	JJS-250
JJS-6	JJS-70	JJS-300
JJS-10	JJS-80	JJS-350
JJS-15	JJS-90	JJS-400
JJS-20	JJS-100	JJS-450
JJS-25	JJS-110	JJS-500
JJS-30	JJS-125	JJS-600
JJS-35	JJS-150	JJS-800
JJS-40	JJS-175	

Carton Quantity and Weight

Amp Rating	Carton Qty.
1-30	10
35-60	10
70-100	5
110-200	1
225-400	1
450-600	1
800	1

Dimensions – in



Features:

- Small, space-saving fuses provide a high degree of current-limitation on short-circuits for excellent component protection
- Commonly applied in electric heat circuits, load center, disconnect switches, and meters
- The small size of the JJS Class T fuses permits installation in panelboards and control centers for system upgrading when existing circuit breakers cannot safely interrupt larger available short-circuit currents
- High speed response for semiconductor protection
- Available for printed circuit board applications

Recommended Fuse Blocks

Amps Rating	1-Pole	2-Pole	3-Pole
1-30	T60030-1_	T60030-2_	T60030-3_
35-60	T60060-1_	T60060-2_	T60060-3_
70-100	T60100-1_	T60100-2_	T60100-3_
110-200	T60200-1_		1B0089
225-400	T60400-1_		
450-600	T60600-1_		

For additional information on the 600 volt Class T fuse blocks, see Data Sheet # 1116.

Class T Fuseblocks

600 Volt, 1/2 to 600 Amps

T600



Catalog Symbol: T600
 Ampere Rating: 1/2 to 600 Amperes
 Voltage Rating: 600 Volts
 Agency Information:
 UL Listed, UL512, Guide IZLT, File E14853
 CSA Certified, C22.2 No. 39, Class 6225-01, File 47235
 Withstand Rating: 200,000A RMS Sym.
 For use with Class T fuses (Bussmann JJS and LPT).
 Materials: Glass Polyester, Phenolic on 600A
 UL Flammability: 94 VO

Class T Fuseblocks (600V) Catalog Data

Amps	Poles	Catalog Numbers		Figure Number	Max. Wire Size
		Screw	Box Lug		
1/2-30	1	T60030-1SR	T60030-1CR	1	SR #10CU, CR #2CU-AL
	2	T60030-2SR	T60030-2CR		
	3	T60030-3SR	T60030-3CR		
31-60	1	T60060-1SR	T60060-1CR	2	CR#2CU-AL SR #10CU
	2	T60060-2SR	T60060-2CR		
	3	T60060-3SR	T60060-3CR		
61-100	1	—	T60100-1C	3	2/0 CU-AL
	2	—	T60100-2C		
	3	—	T60100-3C		
101-200	1	—	T60200-1C	4	250kcmil CU-AL
	3	—	1B0089		
201-400	1	—	T60400-1C	5	600kcmil CU-AL
401-600	1	—	T60600-1C	6	(2) 600kcmil CU-AL

CE CE logo denotes compliance with European Union Low Voltage Directive (50-1000 VAC, 75-1500 VDC). Refer to Data Sheet #8002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

Dimensional Data

Figure 1. 1/2A to 30A All dimensions (± 0.016)

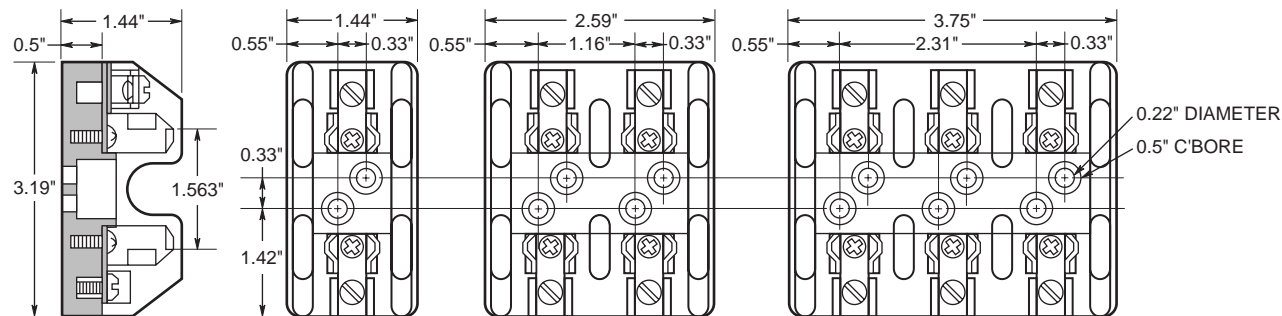
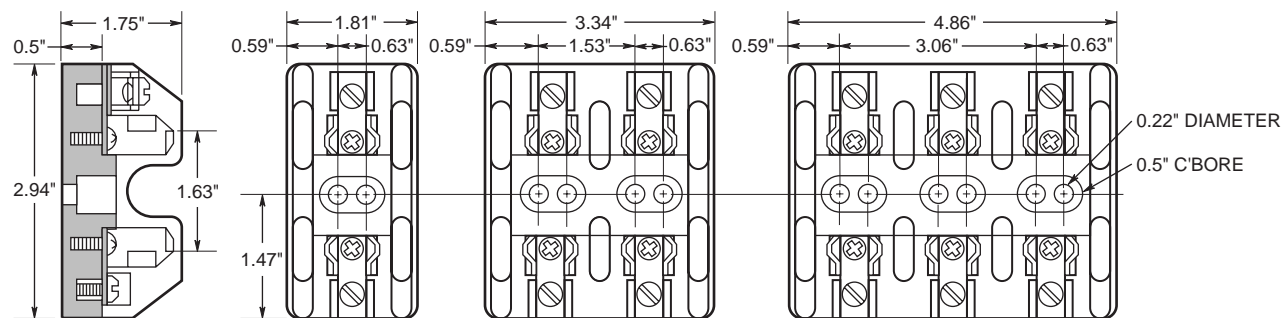


Figure 2. 31A to 60A



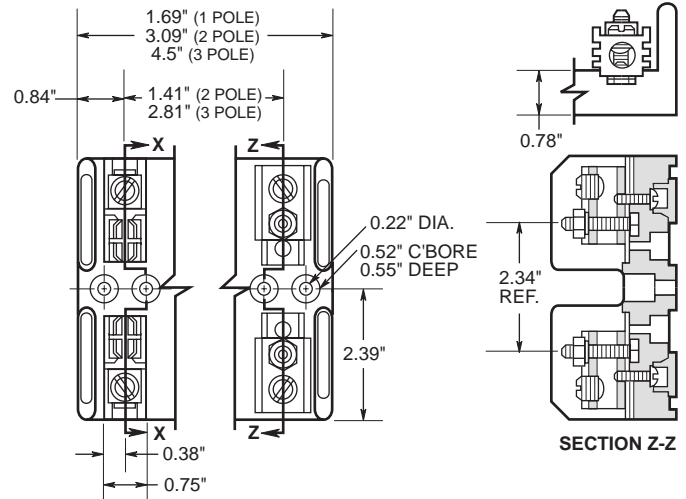
Class T Fuseblocks

600 Volt, 1/2 to 600 Amps

T600



Figure 3. 61A to 100A



All dimensions (± 0.016)

Figure 4. 101A to 200A

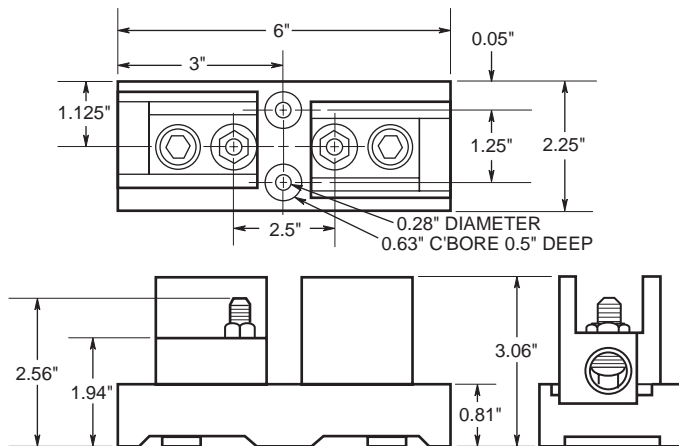


Figure 5. 201A to 400A

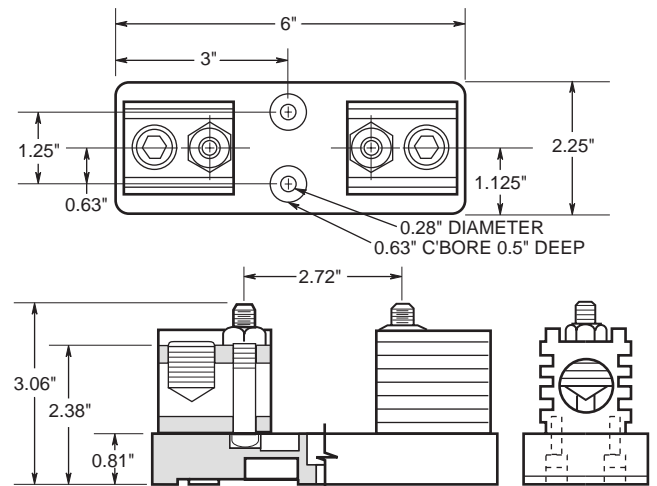
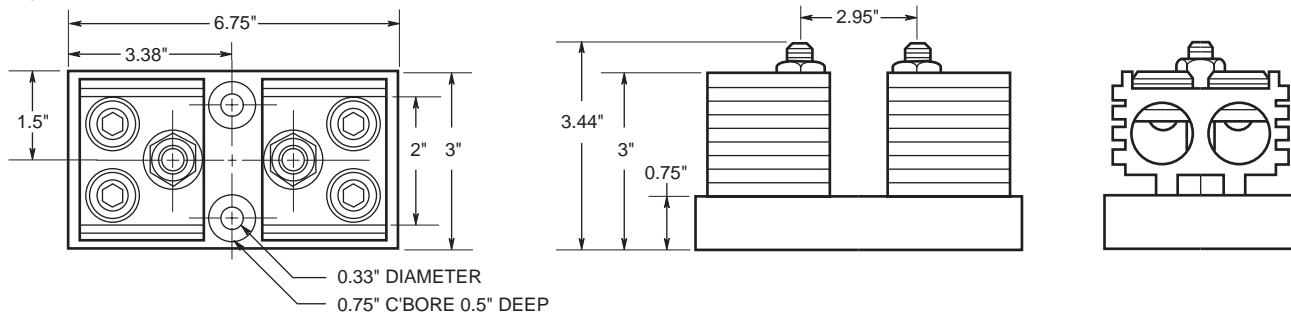


Figure 6. 401A to 600A



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Description: Advanced protection Class T current-limiting, fast-acting fuses.

Catalog Symbol: JJS-(amp)

Ratings:

- Volts — 600Vac
- Amps — 1-800A
- IR — 200kA Vac RMS Sym.

Agency Information:

CE, UL Listed, Std. 248-15, Class T, Guide JDDZ, File E4273
 CSA Certified, C22.2 No. 248.15, Class 1422-02, File 53787

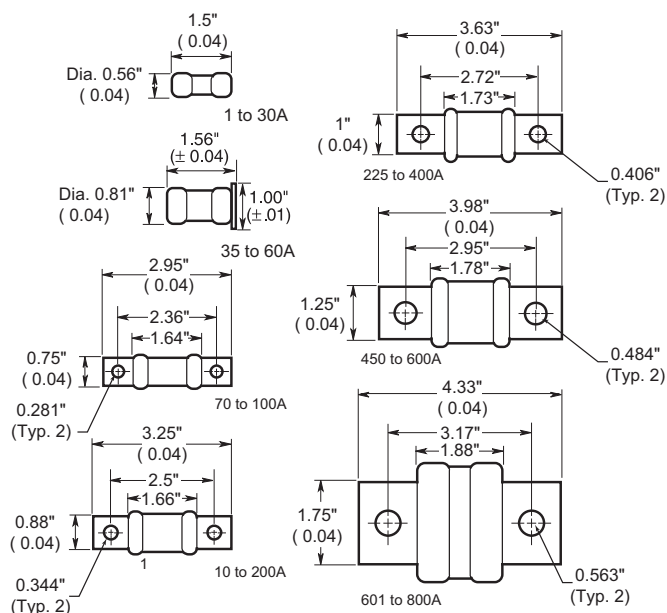
Catalog Numbers (amps)

JJS-1	JJS-45	JJS-200
JJS-2	JJS-50	JJS-225
JJS-3	JJS-60	JJS-250
JJS-6	JJS-70	JJS-300
JJS-10	JJS-80	JJS-350
JJS-15	JJS-90	JJS-400
JJS-20	JJS-100	JJS-450
JJS-25	JJS-110	JJS-500
JJS-30	JJS-125	JJS-600
JJS-35	JJS-150	JJS-800
JJS-40	JJS-175	

Carton Quantity and Weight

Amp Rating	Carton Qty.
1-30	10
35-60	10
70-100	5
110-200	1
225-400	1
450-600	1
800	1

Dimensions – in



Features:

- Small, space-saving fuses provide a high degree of current-limitation on short-circuits for excellent component protection
- Commonly applied in electric heat circuits, load center, disconnect switches, and meters
- The small size of the JJS Class T fuses permits installation in panelboards and control centers for system upgrading when existing circuit breakers cannot safely interrupt larger available short-circuit currents
- High speed response for semiconductor protection
- Available for printed circuit board applications

Recommended Fuse Blocks

Amps Rating	1-Pole	2-Pole	3-Pole
1-30	T60030-1_	T60030-2_	T60030-3_
35-60	T60060-1_	T60060-2_	T60060-3_
70-100	T60100-1_	T60100-2_	T60100-3_
110-200	T60200-1_		1B0089
225-400	T60400-1_		
450-600	T60600-1_		

For additional information on the 600 volt Class T fuse blocks, see Data Sheet # 1116.

Class T Fuseblocks

600 Volt, 1/2 to 600 Amps

T600



Catalog Symbol: T600
 Ampere Rating: 1/2 to 600 Amperes
 Voltage Rating: 600 Volts
 Agency Information:
 UL Listed, UL512, Guide IZLT, File E14853
 CSA Certified, C22.2 No. 39, Class 6225-01, File 47235
 Withstand Rating: 200,000A RMS Sym.
 For use with Class T fuses (Bussmann JJS and LPT).
 Materials: Glass Polyester, Phenolic on 600A
 UL Flammability: 94 VO

Class T Fuseblocks (600V) Catalog Data

Amps	Poles	Catalog Numbers		Figure Number	Max. Wire Size
		Screw	Box Lug		
1/2-30	1	T60030-1SR	T60030-1CR	1	SR #10CU, CR #2CU-AL
	2	T60030-2SR	T60030-2CR		
	3	T60030-3SR	T60030-3CR		
31-60	1	T60060-1SR	T60060-1CR	2	CR#2CU-AL SR #10CU
	2	T60060-2SR	T60060-2CR		
	3	T60060-3SR	T60060-3CR		
61-100	1	—	T60100-1C	3	2/0 CU-AL
	2	—	T60100-2C		
	3	—	T60100-3C		
101-200	1	—	T60200-1C	4	250kcmil CU-AL
	3	—	1B0089		
201-400	1	—	T60400-1C	5	600kcmil CU-AL
401-600	1	—	T60600-1C	6	(2) 600kcmil CU-AL

CE CE logo denotes compliance with European Union Low Voltage Directive (50-1000 VAC, 75-1500 VDC). Refer to Data Sheet #8002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

Dimensional Data

Figure 1. 1/2A to 30A All dimensions (± 0.016)

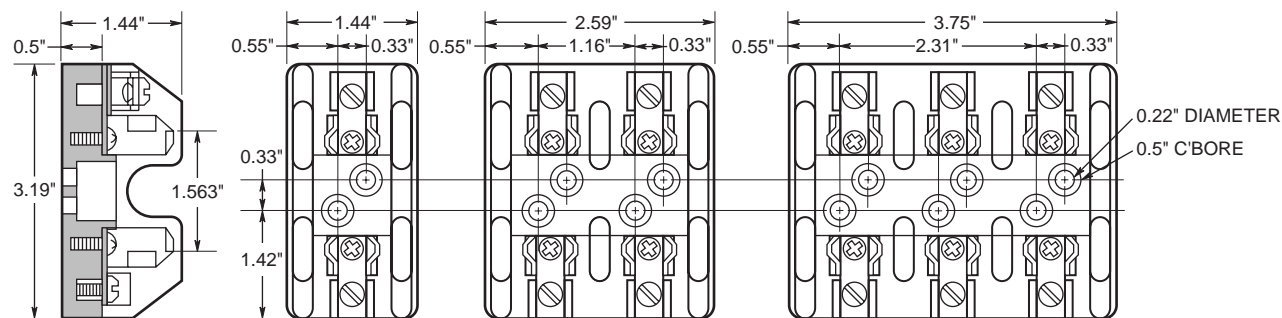
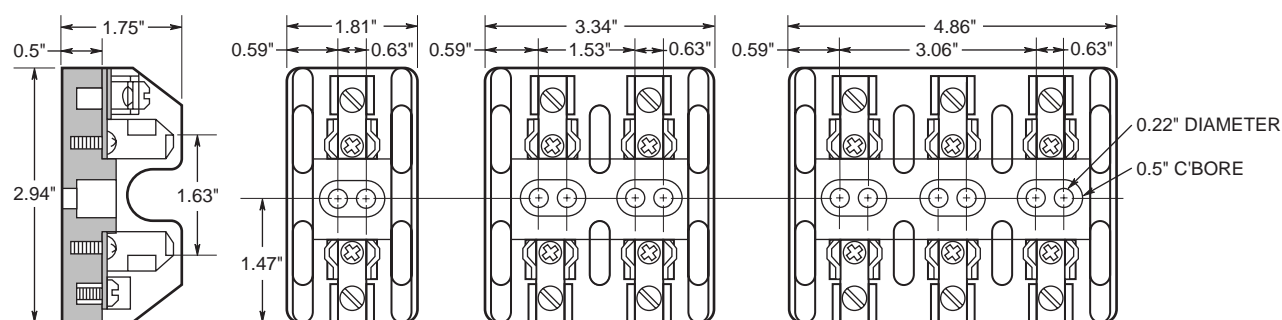


Figure 2. 31A to 60A



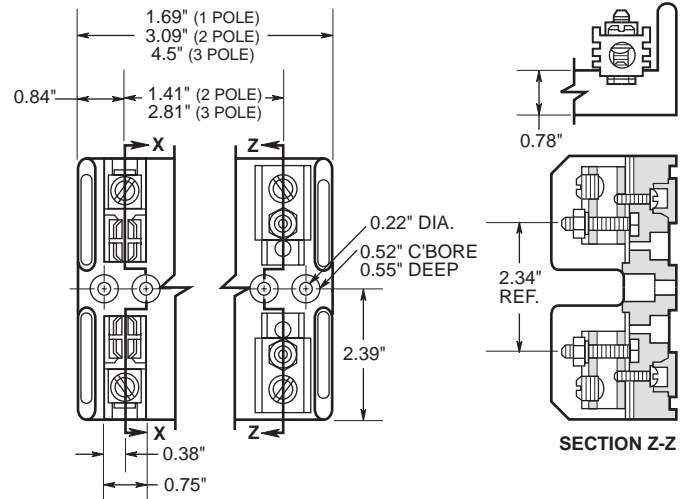
Class T Fuseblocks

600 Volt, 1/2 to 600 Amps

T600



Figure 3. 61A to 100A



All dimensions (± 0.016)

Figure 4. 101A to 200A

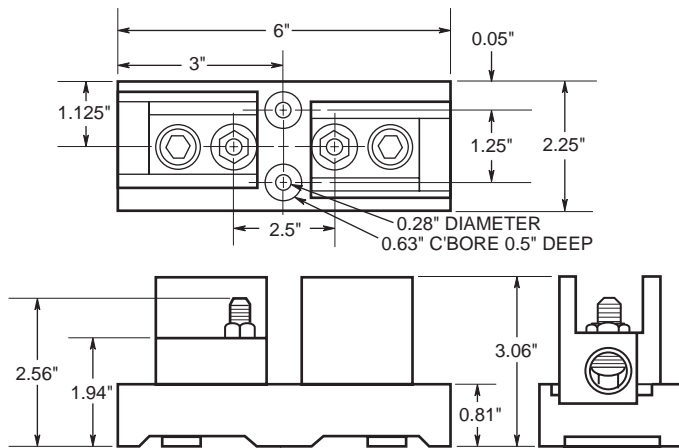


Figure 5. 201A to 400A

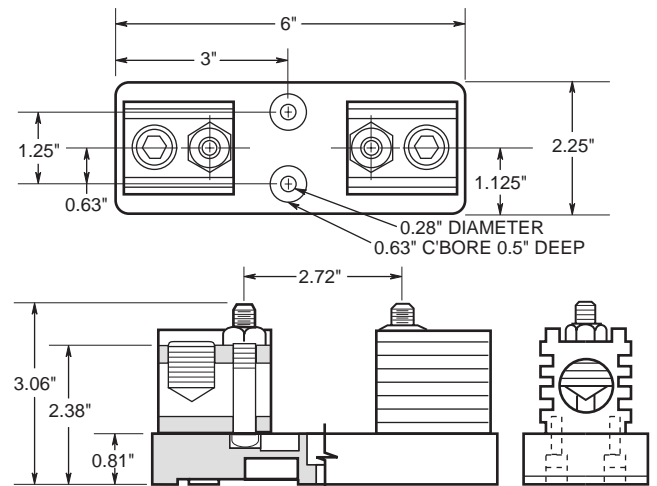
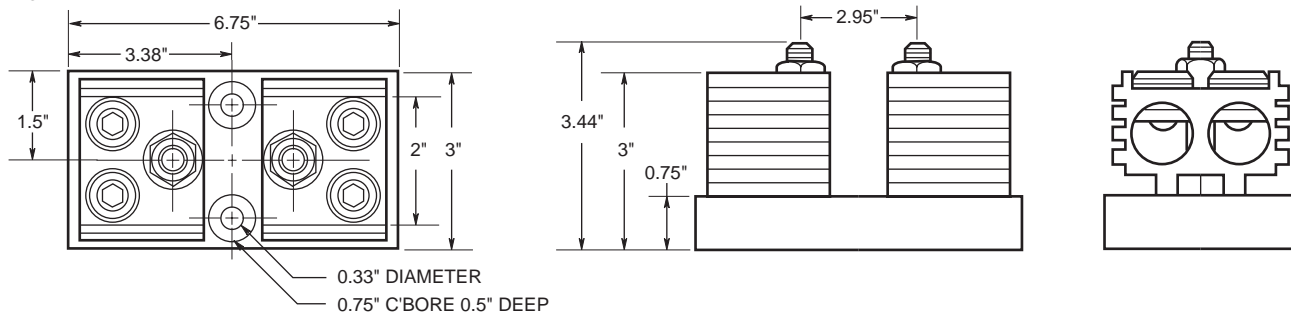


Figure 6. 401A to 600A



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ITEM NUMBER 7 NOT USED

ITEM NUMBER 8 NOT USED

ACS880-01-096A-5



ITEM 9

Products Drives Low voltage AC drives Industrial drives ACS880 single drives

General Information

Global Commercial Alias:	ACS880-01-096A-5
Product ID:	3AUA0000090441
ABB Type Designation:	ACS880-01-096A-5
Catalog Description:	IP21; 3 phase

Additional Information

ABB Type Designation:	ACS880-01-096A-5
Country of Origin:	Finland (FI)
Customs Tariff Number:	85044088
Enclosure Class:	IP21
Frequency (f):	50 / 60 (+/- 5%) Hz
Input Voltage (U _{in}):	380 ... 500 V
Invoice Description:	ACS880-01-096A-5 Pcont.max:55kW, lcont.max:91A
Made To Order:	Yes
Minimum Order Quantity:	1 piece
Mounting Type:	Wall-mounting
Number of Phases:	3
Order Multiple:	1 piece
Output Current, Heavy-Duty Use:	77 A
Output Current, Light-Overload Use:	91 A
Output Current, Normal Use:	96 A
Output Power, Heavy-Duty Use:	45 kW
Output Power, Light-Overload Use:	55 kW
Output Power, Normal Use:	55 kW
Product Main Type:	ACS880-01-096A-5
Product Name:	Frequency Converter
Product Series:	ACS880
Quote Only:	No
Selling Unit of Measure:	piece
Stocked At (Warehouses):	FIPSEEXPU SGRDC002EXPU CNIAB001EXPU SGIND002EXPU AUABB024EXPU



General Information

Product ID:	3AUA0000108878
ABB Type Designation:	DPMP-01 Panel flush mounting kit
EAN:	6438177304845
Catalog Description:	DPMP-01 Panel flush mounting kit; Control panel kit, Flush mounted IP55 for ACS-AP

Categories [\(Show All..\)](#)

Products » Drives » Drive options » User interface options
 Parts & Services » Drives » Low voltage AC drives » General purpose drives » ACS580-01 - Wall-mounted drive
 Parts & Services » Drives » Low voltage AC drives » Industrial drives » ACS880 multidrives » ACS880-207 - IGBT supply unit

Ordering

Country of Origin:	China (CN)
Customs Tariff Number:	85049099
EAN:	6438177304845
Invoice Description:	Control panel kit, Flush mounted IP55 for ACS-AP
Made To Order:	No
Minimum Order Quantity:	1 piece
Order Multiple:	1 piece
Quote Only:	No
Replaced Product ID (OLD):	3AUA0000108938
Selling Unit of Measure:	piece
Stocked At (Warehouses):	Central Stock Europe Central Stock Asia FIPSEEXPU SGRDC002EXPU CNIAB001EXPU SGIND002EXPU AUABB024EXPU

Container Information

Gross Volume:	0.95 dm ³
---------------	----------------------

Dimensions

Product Net Height:	165 mm
Product Net Length:	115 mm
Product Net Weight:	0.3 kg
Product Net Width:	0.4 mm

Additional Information

Product Main Type:	DPMP-01
Product Name:	Panel flush mounting kit

Where Used (as a spare part for "Products")

Identifier	Description	Qty	Unit Of Measure
293 Products Filter <input type="text"/>			
ACH580-01-017A-4	No Description Available	1	piece
ACH580-01-025A-4	No Description Available	1	piece
ACH580-01-02A6-4	No Description Available	1	piece
ACH580-01-032A-4	No Description Available	1	piece
ACH580-01-038A-4	No Description Available	1	piece
ACH580-01-03A3-4	No Description Available	1	piece
ACH580-01-045A-4	No Description Available	1	piece
ACH580-01-04A0-4	No Description Available	1	piece
ACH580-01-05A6-4	No Description Available	1	piece
ACH580-01-062A-4	No Description Available	1	piece
ACH580-01-073A-4	No Description Available	1	piece
ACH580-01-07A2-4	No Description Available	1	piece
ACH580-01-088A-4	No Description Available	1	piece
ACH580-01-09A4-4	No Description Available	1	piece
ACH580-01-106A-4	No Description Available	1	piece

**General Information**

Global Commercial Alias:	ACS880-01-065A-5
Product ID:	3AUA0000082214
ABB Type Designation:	ACS880-01-065A-5
Catalog Description:	IP21; 3 phase

Categories

Products » Drives » Low voltage AC drives » Industrial drives » ACS880 single drives

Ordering

Country of Origin:	Finland (FI)
Customs Tariff Number:	85044088
Invoice Description:	ACS880-01-065A-5 Pcont.max:37kW, lcont.max:62A
Made To Order:	Yes
Minimum Order Quantity:	1 piece
Order Multiple:	1 piece
Quote Only:	No
Selling Unit of Measure:	piece
Stocked At (Warehouses):	SGRDC002EXPU CNIAB001EXPU SGIND002EXPU AUABB024EXPU

Technical

Enclosure Class:	IP21
Frequency (f):	50 / 60 (+/- 5%) Hz
Input Voltage (U _{in}):	380 ... 500 V
Mounting Type:	Wall-mounting
Number of Phases:	3
Output Current, Heavy-Duty Use:	52 A
Output Current, Light-Overload Use:	62 A
Output Current, Normal Use:	65 A
Output Power, Heavy-Duty Use:	30 kW
Output Power, Light-Overload Use:	37 kW
Output Power, Normal Use:	37 kW

Additional Information

Product Main Type:	ACS880-01-065A-5
Product Name:	Frequency Converter

Classifications

Product Series:	ACS880
-----------------	--------



General Information

Product ID:	3AUA0000108878
ABB Type Designation:	DPMP-01 Panel flush mounting kit
EAN:	6438177304845
Catalog Description:	DPMP-01 Panel flush mounting kit; Control panel kit, Flush mounted IP55 for ACS-AP

Categories (Show All..)

Products » Drives » Drive options » User interface options

Parts & Services » Drives » Low voltage AC drives » General purpose drives » ACS580-01 - Wall-mounted drive

Parts & Services » Drives » Low voltage AC drives » Industrial drives » ACS880 multidrives » ACS880-207 - IGBT supply unit

Ordering

Country of Origin:	China (CN)
Customs Tariff Number:	85049099
EAN:	6438177304845
Invoice Description:	Control panel kit, Flush mounted IP55 for ACS-AP
Made To Order:	No
Minimum Order Quantity:	1 piece
Order Multiple:	1 piece
Quote Only:	No
Replaced Product ID (OLD):	3AUA0000108938
Selling Unit of Measure:	piece
Stocked At (Warehouses):	Central Stock Europe Central Stock Asia FIPSEEXPU SGRDC002EXPU CNIAB001EXPU SGIND002EXPU AUABB024EXPU

Container Information

Gross Volume:	0.95 dm ³
----------------------	----------------------

Dimensions

Product Net Height:	165 mm
Product Net Length:	115 mm
Product Net Weight:	0.3 kg
Product Net Width:	0.4 mm

Additional Information

Product Main Type:	DPMP-01
Product Name:	Panel flush mounting kit

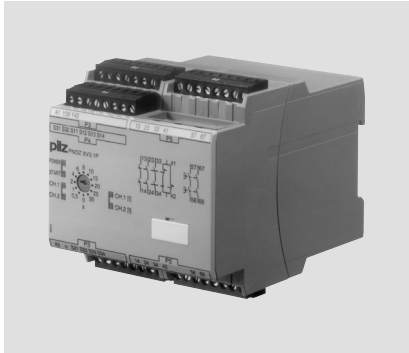
Where Used (as a spare part for "Products")

293 Products Filter

Identifier	Description	Qty	Unit Of Measure
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ACH580-01-025A-4	No Description Available	1	piece
ACH580-01-02A6-4	No Description Available	1	piece
ACH580-01-032A-4	No Description Available	1	piece
ACH580-01-038A-4	No Description Available	1	piece
ACH580-01-03A3-4	No Description Available	1	piece
ACH580-01-045A-4	No Description Available	1	piece
ACH580-01-04A0-4	No Description Available	1	piece
ACH580-01-05A6-4	No Description Available	1	piece
ACH580-01-062A-4	No Description Available	1	piece
ACH580-01-073A-4	No Description Available	1	piece
ACH580-01-07A2-4	No Description Available	1	piece
ACH580-01-088A-4	No Description Available	1	piece
ACH580-01-09A4-4	No Description Available	1	piece
ACH580-01-106A-4	No Description Available	1	piece




E-STOP relays, safety gate monitors

Up to PL e of EN ISO 13849-1 PNOZ XV3.1P



Safety relay for monitoring E-STOP pushbuttons and safety gates.

Approvals

PNOZ XV3.1P	
	◆
	◆
	◆

Unit features

- ▶ Positive-guided relay outputs:
 - 3 safety contacts (N/O), instantaneous
 - 2 safety contacts (N/O), delay-on de-energisation
 - 1 auxiliary contact (N/C), instantaneous
- ▶ Connection options for:
 - E-STOP pushbutton
 - Safety gate limit switch
 - Light barriers
 - Reset button
- ▶ Delay-on de-energisation, fixed or adjustable
- ▶ Delay time can be cancelled via reset button
- ▶ LED indicator for:
 - Switch status channel 1/2
 - Supply voltage
 - Reset circuit
- ▶ Plug-in connection terminals (either spring-loaded terminal or screw terminal)
- ▶ See order reference for unit types

Unit description

The safety relay meets the requirements of EN 60947-5-1, EN 60204-1 and VDE 0113-1 and may be used in applications with

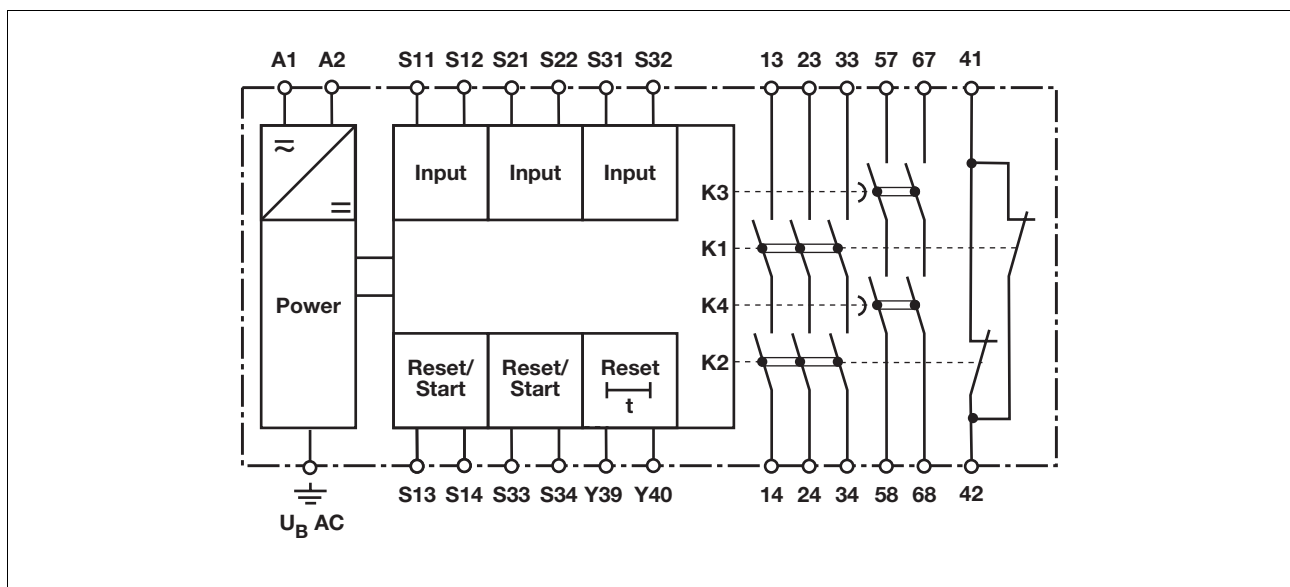
- ▶ E-STOP pushbuttons
- ▶ Safety gates
- ▶ Light beam devices

The max. category the safety contacts can achieve in accordance with EN 954-1 and EN ISO 13849-1 is stated in the technical details.

Safety features

- The relay meets the following safety requirements:
- ▶ The circuit is redundant with built-in self-monitoring.
 - ▶ The safety function remains effective in the case of a component failure.
 - ▶ The correct opening and closing of the safety function relays is tested automatically in each on-off cycle.
 - ▶ The transformer is short circuit-proof. An electronic fuse is used on a DC supply.

Block diagram

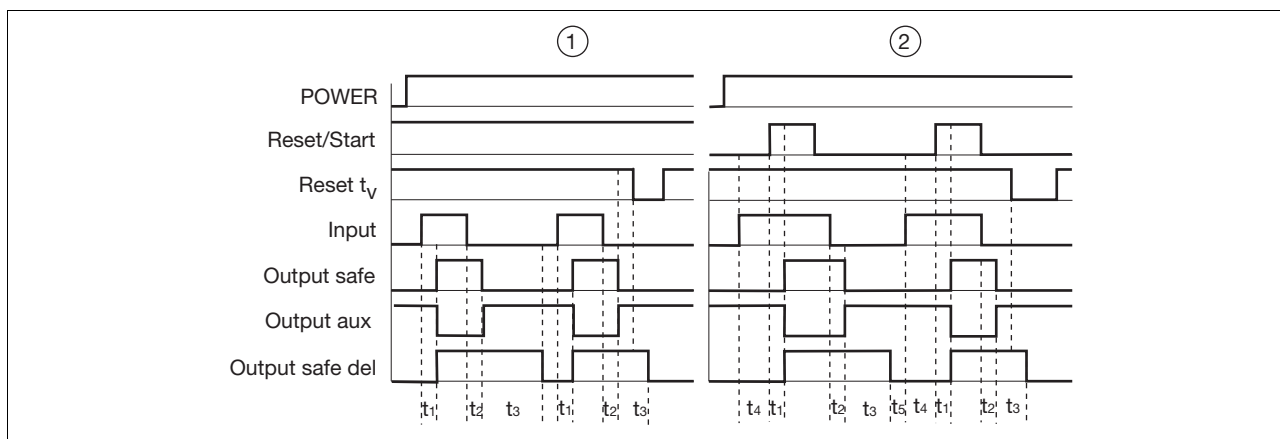


Up to PL e of EN ISO 13849-1 PNOZ XV3.1P

Function description

- ▶ Single-channel operation: no redundancy in the input circuit, earth faults in the reset circuit are detected.
- ▶ Dual-channel operation with detection of shorts across contacts: redundant input circuit, detects
 - earth faults in the reset and input circuit,
 - short circuits in the input circuit
- and, with a monitored reset, in the reset circuit too,
 - shorts between contacts in the input circuit.
- ▶ Dual-channel operation without detection of shorts across contacts: redundant input circuit, detects
 - earth faults in the reset and input circuit,
 - short circuits in the input circuit and, with a monitored reset, in the reset circuit too.
- ▶ Automatic start: Unit is active once the input circuit has been closed.
- ▶ Monitored reset: Unit is active once the input circuit is closed and once the reset circuit is closed after the waiting period has elapsed (see technical details).
- ▶ Increase in the number of available instantaneous safety contacts by connecting contact expansion modules or external contactors.

Timing diagram



Key

- ▶ Power: Supply voltage
- ▶ Reset/Start: Reset circuit S13-S14, S33-S34
- ▶ Input: Input circuits S11-S12, S21-S22, S31-S32
- ▶ Output safe: Safety contacts, instantaneous 13-14, 23-24, 33-34
- ▶ Output safe del: Safety contacts, delayed 57-58, 67-68
- ▶ Output aux: Auxiliary contacts 41-42
- ▶ ①: Automatic reset
- ▶ ②: Monitored reset
- ▶ t_1 : Switch-on delay
- ▶ t_2 : Delay-on de-energisation
- ▶ t_3 : Delay time
- ▶ t_4 : Waiting period
- ▶ t_5 : Recovery time

Wiring

Please note:

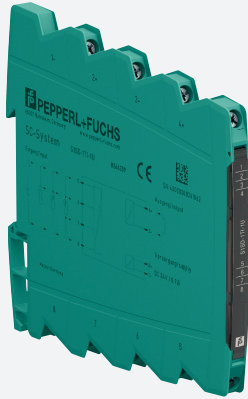
- ▶ Information given in the “Technical details” must be followed.
- ▶ Outputs 13-14, 23-24, 33-34 are instantaneous safety contacts, outputs 57-58, 67-68 are delay-on de-energisation safety contacts, output 41-42 is an instantaneous auxiliary contact (e.g. for display).
- ▶ To prevent contact welding, a fuse should be connected before the output contacts (see technical details).
- ▶ Calculation of the max. cable runs l_{max} in the input circuit:

$$l_{max} = \frac{R_{lmax}}{R_l / km}$$

R_{lmax} = max. overall cable resistance (see technical details)
 R_l / km = cable resistance/km

- ▶ Use copper wire that can withstand 60/75 °C.
- ▶ Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.

ITEM NUMBER 12 NOT USED



Temperature Converter

S1SD-1TI-1U

- 1-channel signal conditioner
- 24 V DC supply
- Thermocouple, RTD, potentiometer or mV input
- Input for PTC thermistor
- Current and voltage output
- Line fault (LFD) and sensor burnout detection
- Accuracy 0.1 %
- Connection via screw terminals



Function

This signal conditioner provides the galvanic isolation between field circuits and control circuits.

The device has an input for signals of the following field devices:

- resistance thermometers
- thermocouples
- PTC thermistors
- potentiometers
- voltage sources
- field device with its own characteristic

The device provides the following standard signals at the output:

- 0/2 mA ... 10 mA signal
- 0/4 mA ... 20 mA signal
- 0/1 V ... 5 V signal
- 0/2 V ... 10 V signal

This device has an integrated cold junction compensation. You can also implement external cold junction compensation.

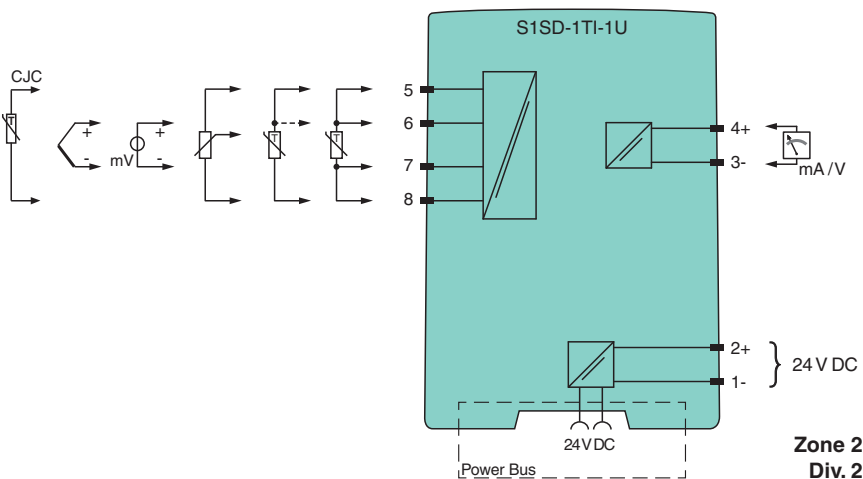
A fault is signalized by LEDs.

The device is easily configured by the use of DIP switches.

The Teach-In function can be used to teach in the potentiometer start value and end value.

The device can be powered via terminals or Power Bus.

Connection



Release date: 2020-06-16 Date of issue: 2020-06-16 Filename: 276400_eng.pdf

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

Pepperl+Fuchs Group
www.pepperl-fuchs.com

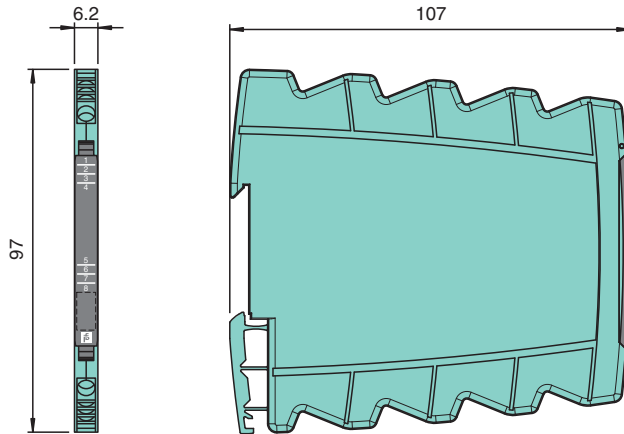
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com

Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com

Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

PEPPERL+FUCHS

Dimensions



Technical Data

General specifications	
Signal type	Analog input
Operation time	MTBF: 353 a acc. to SN 29500 stationary continuous operating, average ambient temperature 40 °C (104 °F)
Supply	
Connection	Power Bus or terminals 1-, 2+
Rated voltage	U_r 16.8 ... 31.2 V DC
Power dissipation	0.7 W
Power consumption	0.8 W
Interface	
Programming interface	programming socket
Input	
Connection side	field side
Connection	terminals 5, 6, 7, 8
PTC	type KT, KTY, ST
Measuring current	approx. 200 μ A
Types of measuring	2-, 3-, 4-wire connection
Lead resistance	\leq 100 Ω per line
Measurement loop monitoring	sensor breakage, lead breakage, short circuit
RTD	type Pt100, Pt200, Pt500, Pt1000 (EN 60751: 1995) type Ni100, Ni200, Ni500, Ni1000 (DIN 43760)
Measuring current	approx. 200 μ A
Types of measuring	2-, 3-, 4-wire connection
Lead resistance	max. 100 Ω per line
Measurement loop monitoring	sensor breakage, lead breakage, short circuit
Thermocouples	type B, E, J, K, N, S, T (IEC 584-1:1995) type L, U (DIN 43710:1985) type C, D (ASTM E988)
Cold junction compensation	external (Pt100) and internal, manually
Lead resistance	max. 10 k Ω
Measurement loop monitoring	sensor breakage, lead breakage
Resistor	
Measurement range	0 ... 5 k Ω
Potentiometer	0.2 ... 50 k Ω
Types of measuring	3-wire connection
Voltage	-100 ... 100 mV -1000 ... 1000 mV
Input resistance	\geq 1 M Ω

Release date: 2020-06-16 Date of issue: 2020-06-16 Filename: 276400_eng.pdf

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

 PEPPERL+FUCHS

Technical Data

Output	
Connection side	control side
Connection	terminals 3-, 4+
Analog voltage output	0/1 ... 5 V, 0/2 ... 10 V, load $\geq 2 \text{ k}\Omega$
Analog current output	0/2 ... 10 mA, 0/4 ... 20 mA, load $\leq 600 \Omega$
Ripple	$\leq 10 \text{ mV}_{\text{eff}}$
Fault signal	downscale or upscale
Transfer characteristics	
Accuracy	max. 0.1 % of full-scale value
Measuring time	$\leq 300 \text{ ms}$
Deviation	
RTD	$< 0.1 \text{ K}/0.05 \%$ of the measured value
Thermocouples	$< 0.3 \text{ K}/0.1 \%$ of the measured value
Voltage	$< 0.1 \%$ of the measured value
Potentiometer	$< 0.02 \%$ of the measured value
Influence of ambient temperature	$< 100 \text{ ppm/K}$ of full-scale value
Galvanic isolation	
Output/power supply	safe electrical isolation by reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300 \text{ V}_{\text{eff}}$ test voltage 3 kV, 50 Hz, 1 min
Input/Other circuits	safe electrical isolation by reinforced insulation according to IEC/EN 61010-1, rated insulation voltage $300 \text{ V}_{\text{eff}}$ test voltage 3 kV, 50 Hz, 1 min
Indicators/settings	
Control elements	DIP-switch keys
Configuration	via DIP switches via keys via software
Labeling	space for labeling at the front
Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2013 (industrial locations)
Conformity	
Degree of protection	IEC 60529:2001
Protection against electrical shock	EN 61010-1:2010
Ambient conditions	
Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Damaging gas	designed for operation in environmental conditions acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Degree of protection	IP20
Connection	screw terminals
Core cross-section	0.5 ... 2.5 mm ² (20 ... 14 AWG)
Mass	approx. 70 g
Dimensions	6.2 x 97 x 107 mm (0.24 x 3.82 x 4.21 inch), housing type S1
Mounting	on 35 mm DIN mounting rail acc. to EN 60715:2001
Data for application in connection with hazardous areas	
Certificate	DEMKO 16 ATEX 1750X
Marking	Ⓜ II 3G Ex nA IIC T4 Gc
Directive conformity	
Directive 2014/34/EU	EN 60079-0:2012+A11:2013, EN 60079-15:2010
International approvals	
UL approval	E106378
IECEX approval	IECEX UL 16.0116X
Approved for	Ex nA IIC T4 Gc

Release date: 2020-06-16 Date of issue: 2020-06-16 Filename: 276400_eng.pdf

Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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 PEPPERL+FUCHS

ITEM NUMBER 14 NOT USED

A. System Overview

B1. Cable Ties

B2. Cable Accessories

B3. Stainless Steel Ties

C1. Wiring Duct

C2. Surface Raceway

C3. Abrasion Protection

C4. Cable Management

D1. Terminals

D2. Power Connectors

D3. Grounding Connectors

E1. Labeling Systems

E2. Labels

E3. Pre-Printed & Write-On Markers

E4. Permanent Identification

E5. Lockout/Tagout & Safety Solutions

F. Index

UL LISTED **Two-Hole, Single Barrel Lug**

For Use with Stranded Aluminum or Copper Code Conductors

Type LAMB

- Made from high strength, extruded aluminum alloy to provide premium electrical and mechanical performance
- Tin-plated to inhibit corrosion
- Compact design saves space
- Wide wire range-taking capability minimizes inventory requirements
- Inspection window to visually assure full conductor insertion
- Plated steel or aluminum set screw provides high strength, durable electrical contact between conductor and connector
- LAMLB provided with dual set screws for premium clamping of conductor to connector for heavy duty applications
- UL Listed and CSA Certified for use up to 600 V and UL temperature rated 90°C
- Available with NEMA hole sizes and spacing

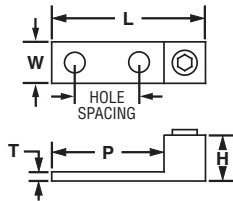


Figure 1

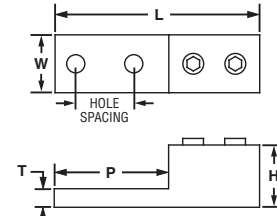


Figure 2

Part Number	Figure No.	Conductor Size Range	Stud Hole Size (In.)	Stud Hole Spacing (In.)	Hex Key Size (In.)	Figure Dimensions (In.)					Std. Pkg. Qty.
						L	W	H	T	P	
LAMB350-12-6Y	1	#6 AWG – 350 kcmil	1/2	1.75	5/16	4.19	1.13	1.28	0.28	3.05	6
LAMB600-12-3Y	1	#2 AWG – 600 kcmil	1/2	1.75	1/2	4.69	1.60	1.57	0.44	3.31	3
LAMLB1000-12-3*	2	500 – 1000 kcmil	1/2	1.75	1/2	6.19	1.63	1.88	0.56	3.44	3

The use of Panduit oxide inhibiting joint compound (CMP-100) is recommended for pad to pad and conductor connections. See page D2.155.

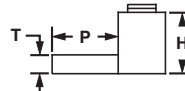
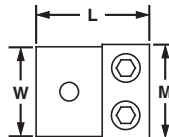
*UL Listed and CSA Certified.
uNEMA hole sizes and spacing.

UL LISTED **One-Hole, Two-Barrel Lug**

For Use with Stranded Aluminum or Copper Code Conductors

Type LAM2A

- Dual barrel provides termination of two conductors
- Made from high strength, extruded aluminum alloy to provide premium electrical and mechanical performance
- Tin-plated to inhibit corrosion
- Wide wire range-taking capability minimizes inventory requirements
- Inspection window to visually assure full conductor insertion
- Plated steel or aluminum set screw provides high strength, durable electrical contact between conductor and connector
- UL Listed and CSA Certified for use up to 600 V and UL temperature rated 90°C
- Available with NEMA hole sizes and spacing



Part Number	Conductor Size Range	Stud Hole Size (In.)	Hex Key Size (In.)	Figure Dimensions (In.)						Std. Pkg. Qty.
				L	W	H	T	P	M	
LAM2A1/0-14-6Y	#14 AWG – 1/0 AWG	1/4	**	1.47	1.13	0.78	0.19	0.85	1.13	6
LAM2A2/0-14-6Y	#14 AWG – 2/0 AWG	1/4	3/16	1.47	1.20	0.78	0.19	0.85	1.20	6
LAM2A250-38-6Y	#6 AWG – 250 kcmil	3/8	3/8	2.56	1.50	1.19	0.25	1.56	1.64	6
LAM2A350-12-6Y	#6 AWG – 350 kcmil	1/2	5/16	2.87	1.73	1.25	0.25	1.74	1.91	6
LAM2A600-12-6Y*	#2 AWG – 600 kcmil	1/2	3/8	3.19	2.00	1.56	0.44	1.81	2.38	6
LAM2A1000-58-6Y*	500 kcmil – 1000 kcmil	5/8	3/8	3.50	3.50	1.94	0.50	1.88	3.50	6

The use of Panduit oxide inhibiting joint compound (CMP-100) is recommended for pad to pad and conductor connections. See page D2.155.

*UL Listed and CSA Certified.

**Uses slotted head set screw.

ITEM 16 Bulletin 1492

Screw Connection Terminal Blocks

Multi-Circuit Feed-Through Blocks

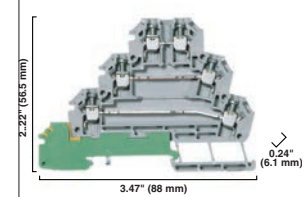
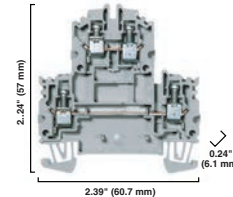
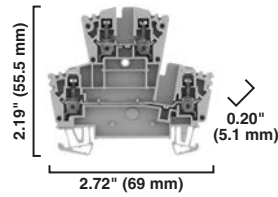


1492-JD3

1492-JD4

1492-JT3M

Dimensions are not intended to be used for manufacturing purposes.
Note: Height dimension is measured from top of rail to top of terminal block.



Specifications	Two-level, two-circuit feed-through terminal block				Two-level, two-circuit feed-through terminal block				Three-level, three-circuit terminal block with ground point		
Certifications		CSA	IEC	ATEX		CSA	IEC	ATEX		CSA	IEC
Voltage Rating	600V AC/DC	300V AC/DC	400V AC/DC	275V AC/DC	600V AC/DC	300V AC/DC	800V AC/DC	550V AC/DC	300V AC/DC		400V AC/DC
Maximum Current	20 A	10 A	24 A	21 A	35 A	30 A	32 A	28 A	10 A		24 A
Wire Range (Rated Cross Section)	#22...12 AWG	26...12 AWG	2.5 mm ²	2.5 mm ² (20...14 AWG)	#26...10 AWG		0.5...4 mm ²	4 mm ² (20...12 AWG)	#22...12 AWG	#26...10 AWG	0.5...2.5 mm ²
Wire Strip Length	0.39 in. (10 mm)				0.315 in. (8 mm)				0.28 in. (7 mm)		
Recommended Tightening Torque	4.5...7.1 lb•in (0.5...0.8 N•m)				4.5 lb•in (0.5 N•m)				4.4 lb•in (0.5 N•m)		
Density	59 pcs/ft (196 pcs/m)				49 pcs/ft (163 pcs/m)				49 pcs/ft (163 pcs/m)		
Housing Temperature Range	-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)		
Short-Circuit Current Rating	See page 12-42										

Terminal Blocks	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.	
Color:	Grey	1492-JD3	100	1492-JD4	100	1492-JT3M	50
	Red	1492-JD3-RE	100	1492-JD4-RE	100	—	—
	Blue	1492-JD3-B	100	1492-JD4-B	100	—	—
	Black	1492-JD3-BL	100	1492-JD4-BL	100	—	—
	Green	1492-JD3-G	100	1492-JD4-G	100	—	—
	Yellow	1492-JD3-Y	100	1492-JD4-Y	100	—	—
	Orange	1492-JD3-OR	100	1492-JD4-OR	100	—	—
	Brown	1492-JD3-BR	100	1492-JD4-BR	100	—	—
	White	1492-JD3-W	100	1492-JD4-W	100	—	—
Accessories	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.	
Mounting Rails:							
1 m Symmetrical DIN (Steel)	199-DR1	10	199-DR1	10	199-DR1	10	
1 m Symmetrical DIN (Aluminum)	1492-DR5	10	1492-DR5	10	1492-DR5	10	
1 m Hi-Rise Sym. DIN (Aluminum)	1492-DR6	2	1492-DR6	2	1492-DR6	2	
1 m Angled Hi-Rise Sym. DIN (Steel)	1492-DR7	2	1492-DR7	2	1492-DR7	2	
End Barrier	Grey	1492-EBJD3	20	1492-EBJD4	20	1492-EBJ3TM	20
	Blue	1492-EBJD3-B	20	1492-EBJD4-B	20	—	—
	Yellow	1492-EBJD3-Y	20	—	—	—	—
End Anchor and Retainers:							
Screwless End Retainer	1492-ERL35	20	—	—	—	—	
DIN Rail — Normal Duty	1492-EAJ35	100	—	—	—	—	
DIN Rail — Heavy Duty	1492-EAHJ35	50	1492-EAHJ35	50	1492-EAHJ35	50	
Jumpers:							
Center Jumper — 41-pole	—	—	‡	1492-CJLJ6-41	10	—	
Center Jumper — 10-pole	* 1492-CJJ5-10	20	‡	1492-CJLJ6-10	20	—	
Center Jumper — 4-pole	* 1492-CJJ5-4	50	‡	1492-CJLJ6-4	60	—	
Center Jumper — 3-pole	* 1492-CJJ5-3	50	‡	1492-CJLJ6-3	60	—	
Center Jumper — 2-pole	* 1492-CJJ5-2	50	‡	1492-CJLJ6-2	60	—	
Insulated Side Jumper — 50-Pole	—	—	—	—	—	1492-SJ6A-50	5
Insulated Side Jumper — 24-Pole	1492-SJ5A-24	50	—	—	—	—	—
Insulated Side Jumper — 10-Pole	1492-SJ5A-10	50	—	—	—	—	—
Screw Type Jumper Notching Tool	1492-T1	1	—	—	—	—	—
Other Accessories:							
Partition Plate	1492-PPJD3	20	1492-PPJD3	20	1492-PPJD3	20	
Test Plug Socket	1492-TPS23	20	—	—	—	—	
Test Plug	1492-TP23	20	—	—	—	—	
Snap-in marker cards	1492-M5X5 (200/card)	5	1492-M6X5 (200/card)	5	1492-M6X5 (200/card)	5	
Snap-in marker cards	1492-M5X8 (144/card)	5	1492-MR6X8 (120/card)	5	1492-MR6X8 (120/card)	5	

* Screw Center Jumpers, ‡ Plug-in Center Jumpers

Screw Connection Terminal Blocks

Short-Circuit Current Ratings

Fuse Ratings

Cat. No.	Wire Range Cu [AWG]		Overcurrent Protection Fuse Required Class/Max. Current Rating [A]						Maximum Voltage [V]	SCCR, RMS SYM [A]
	Line	Load	J	T	RK1	RK5	G	CC		
1492-J3	14...12	14...12	30	30	—	—	30	30	600	100,000
1492-J3P										
1492-JD3SS										
1492-JD3										
1492-JD3C										
1492-JG3TW										
1492-JDG3C										
1492-JG3	14...12	14...12	30	30	—	—	30	30	300	100,000
1492-J3F										
1492-J3TW										
1492-JC3										
1492-JDC3										
1492-JKD3										
1492-JD3FB										
1492-JD3F										
1492-JDG3FB										
1492-JD3PSSTP										
1492-JD3PTP										
1492-JDG3P										
1492-JDG3PSS										
1492-JDG3PSSTP										
1492-JDG3PTP										
1492-JDG3										
1492-JD3PSS										
1492-JD3P										
1492-J4	14...10	14...10	60	60	30	—	60	30	600	100,000
1492-JG4										
1492-JKD4										
1492-J4TW										
1492-J4Q										
1492-JG4TW										
1492-JG4Q										
1492-JKD4TW										
1492-JKD4Q										
1492-JKD4TP										
1492-JD4C										
1492-JD4										
1492-JKD4QTP										
1492-JKD4TWTP										
1492-JSD4	14...10	14...10	60	60	30	—	60	30	300	100,000
1492-JKD4										
1492-J4CTB										
1492-J6	14...8	14...8	100	100	60	30	60	30	600	100,000
1492-JG6										
1492-J10	14...6	14...6	100	100	60	30	60	30	600	100,000
1492-JG10										
1492-J16	14...4	14...4	100	100	60	30	60	30	600	100,000
1492-JG16										
1492-J16ND										
1492-J35	12...1/0	12...1/0	200	200	100	30	60	30	600	100,000
1492-JG35										
1492-J50	6...1/0	6...1/0	200	200	100	30	60	30	600	100,000
1492-JG50										
1492-J70	1/0...3/0	1/0...3/0	400	400	200	100	60	30	600	100,000
1492-JG70										
1492-J120	4...4/0	4...4/0	400	400	200	100	60	30	600	100,000
1492-JG120										



Screw Connection Terminal Blocks

Short-Circuit Current Ratings — Overcurrent Ratings

Overcurrent Ratings

Cat. No.	Wire Range Cu [AWG] (Line and Load)	Overcurrent Protection Device Required	Max. Current [A]	SCCR, RMS Sym A 480Y/277V	SCCR, RMS Sym. A 600Y/347V		
1492-J3	14...12	140M-D8E-__	16	65,000	30,000		
1492-JG3TW		140M-C2E-B10		65,000	30,000		
1492-J3P		140M-C2E-B16		65,000	30,000		
1492-J3		140M-C2E-B25		65,000	30,000		
1492-JD3		140M-C2E-B40		65,000	25,000		
1492-JD3C		140M-C2E-B63		65,000	*		
1492-JD3SS		140M-C2E-A__		65,000	30,000		
1492-JDG3C		140M-C2E-C10		65,000	*		
1492-JG3		140MC2E-C16		30,000	*		
1492-J4		14...10		140M-F8E-__	32	65,000	30,000
1492-JG4	140M-D8E-C10		65,000	30,000			
1492-J4TW	140M-D8E-C16		65,000	30,000			
1492-J4Q	140M-D8E-C20		65,000	*			
1492-JG4TW	140M-D8E-C25		30,000	*			
1492-JG4Q	140M-D8E-B__		65,000	30,000			
1492-JKD4TW	140M-C2E-B10		65,000	30,000			
1492-JKD4Q	140M-C2E-B16		65,000	30,000			
1492-JKD4TP	140M-C2E-B25		65,000	30,000			
1492-JD4C	140M-C2E-B40		65,000	25,000			
1492-JD4	140M-C2E-B63		65,000	*			
1492-JKD4QTP	140M-C2E-C10		65,000	*			
1492-JKD4TWTP	140M-C2E-C16		30,000	*			
	140M-C2E-A__		65,000	30,000			
1492-J6	14...8		140M-F8E-__	32		65,000	30,000
1492-JG6			140M-D8E-C10			65,000	30,000
		140M-D8E-C16	65,000		30,000		
		140M-D8E-C20	65,000		*		
		140M-D8E-C25	30,000		*		
		140M-D8E-B__	65,000		30,000		
		140M-C2E-B10	65,000		30,000		
		140M-C2E-B16	65,000		30,000		
		140M-C2E-B25	65,000		30,000		
		140M-C2E-B40	65,000		25,000		
		140M-C2E-B63	65,000		*		
		140M-C2E-C10	65,000		*		
		140M-C2E-C16	30,000		*		
			140M-C2E-A__		65,000	30,000	

* Bulletin 140M does not have ratings at this voltage.

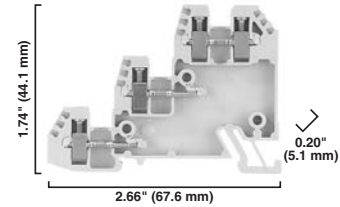
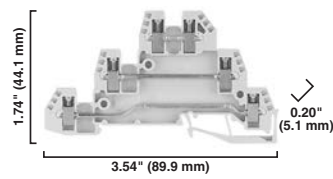
Screw Connection Terminal Blocks

Sensor Blocks



1492-WTS3...

Dimensions are not intended to be used for manufacturing purposes.
Note: Height dimension is measured from top of rail to top of terminal block.



Specifications	Three-circuit terminal block.			Three-level sensor block.		
Certifications		CSA	IEC		CSA	IEC
Voltage Rating	300V AC/DC		250V AC/DC	300V AC/DC		250V AC/DC
Maximum Current	10 A		24 A	10 A		24 A
Wire Range (Rated Cross Section)	#26...14 AWG		0.5...2.5mm ²	#26...14 AWG		0.5...2.5mm ²
Recommended Tightening Torque	4.2...4.6 lb•in (0.5 N•m)			4.2...4.6 lb•in (0.5 N•m)		
Density	60 pcs/ft (197 pcs/m)			60 pcs/ft (197 pcs/m)		
Housing Temperature Range	-40...+195 °F (-40...+90 °C)			-40...+195 °F (-40...+90 °C)		
Indicator Type WTF3/WTS3	No indicator			No indicator		
WTF3LP/WTS3LP	Red LED for PNP devices (10...50V)			Red LED for PNP devices (10...50V)		
WTF3LN/WTS3LN	Red LED for NPN devices (10...50V)			Red LED for NPN devices (10...50V)		
Leakage Current WTF3/WTS3	—			—		
WTF3LP/WTS3LP	2.69 mA @ 50V			2.69 mA @ 50V		
WTF3LN/WTS3LN	2.69 mA @ 50V			2.69 mA @ 50V		
Wire Strip Length	0.31 in. (8 mm)			0.31 in. (8 mm)		
Short-Circuit Current Rating	See page 12-42					

Terminal Blocks		Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.
Color:	Grey	1492-WTF3	50	1492-WTS3	50
	Blue	—	—	1492-WTS3-B	50
	Grey for PNP devices	1492-WTF3LP	50	1492-WTS3LP	50
	Grey for NPN devices	1492-WTF3LN	50	1492-WTS3LN	50
Accessories		Cat. No.	Pkg Qty.	Cat. No.	Pkg Qty.
Mounting Rails:					
1 m Symmetrical DIN (Steel)		199-DR1	10	199-DR1	10
1 m Symmetrical DIN (Aluminum)		1492-DR5	10	1492-DR5	10
1 m Hi-Rise Sym. DIN (Aluminum)		1492-DR6	2	1492-DR6	2
1 m Angled Hi-Rise Sym. DIN (Steel)		1492-DR7	2	1492-DR7	2
End Barrier		1492-EBTF3	50	1492-EBTS3	50
End Anchors and Retainers:					
Screwless End Retainer		1492-ERL35	20	1492-ERL35	20
DIN Rail — Normal Duty		1492-EAJ35	100	1492-EAJ35	100
DIN Rail — Heavy Duty		1492-EAHJ35	50	1492-EAHJ35	50
Jumpers:					
Center Jumper — 50-pole		1492-CJT5-50	5	1492-CJT5-50	5
Center Jumper — 10-pole		1492-CJT5-10	10	1492-CJT5-10	10
Center Jumper — 3-pole		1492-CJT5-3	10	1492-CJT5-3	10
Center Jumper — 2-pole		1492-CJT5-2	10	1492-CJT5-2	10
Center Jumper Link		1492-CJL5	10	1492-CJL5	10
Center Jumper Cover — Red		1492-CJCR5	10	1492-CJCR5	10
Center Jumper Cover — Blue		1492-CJCB5	10	1492-CJCB5	10
Side — 20-pole Insulated Red		1492-SJT5-20-R	10	1492-SJT5-20-R	10
Side — 20-pole Insulated Blue		1492-SJT5-20-B	10	1492-SJT5-20-B	10
Other Accessories:					
Partition Plate		1492-PPTS3	50	1492-PPTS3	50
Test Plug Adapter		1492-TA285	10	1492-TA285	10
Electrical Warning Plate	4-Pole	1492-EWP5-4	10	1492-EWP5-4	10
	1-Pole	1492-EWP5	10	1492-EWP5	10
Marking Systems:					
Snap-in Marker Card		1492-MS5X9 (80/card)	5	1492-MS5X9 (80/card)	5

Angled brackets - BG/SH - 1201099



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Angled brackets with M6 screw, for fixing DIN rails at an angle of 30°, height: 46 mm

Product Features

- The BG/S brackets can be used to fix DIN rails at a distance from the mounting surface
- 30° tilt angle

Key commercial data

Packing unit	1 pc
Minimum order quantity	10 pc
GTIN	 4 017918 017217
Weight per Piece (excluding packing)	49.9 GRM
Custom tariff number	73269098
Country of origin	Germany

Technical data

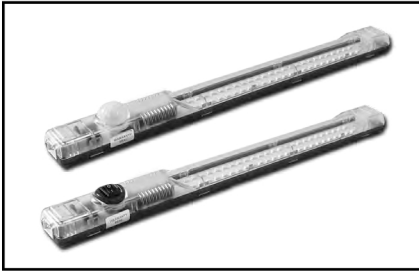
Dimensions

Height	46 mm
Length	84 mm
Width	20 mm

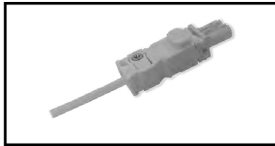
General

Material	Steel
Coating	Galvanized, passivated with a thick layer
Color	silver

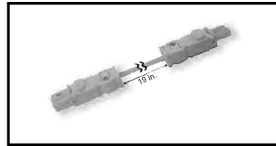
Catalog No.	Description	Height (A)	Width (B)	Depth (C)	Volt AC/DC	Hz	Product Code
SCE-SLMS	w/ Motion Sensor	13.80	1.38	1.25	24 - 265	50/60	P2
SCE-SLOF	w/ On/Off Switch	13.80	1.38	1.25	24 - 265	50/60	P2



Catalog No.	Description	Length	Product Code
SCE-SLCC	LED Strip Light Connection Cord	118 inch	P2
SCE-SLDCC	LED Strip Light Daisy Chain Cord	19 inch	P2



SCE-SLCC



SCE-SLDCC

GENERAL ACCESSORIES

LED Strip Light

Application -

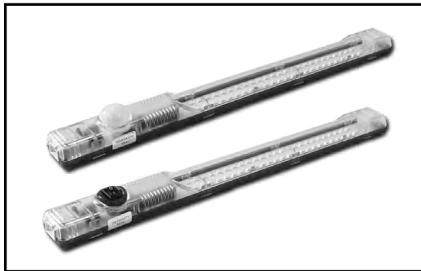
LED Strip Lights have a compact design to provide interior lighting for smaller enclosures.

Construction -

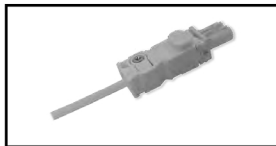
- Magnets provided for quick installation to any surface inside the enclosure, also provided with clips that can be mechanically fastened.
- Wire connector for direct power supply wiring.
- Feed in / Feed out Push Fit Connector on each end of fixture.
- Daisy chain multiple lights continuously up to 16 lights AC or 8 lights DC.
- Combined AC and DV voltage range in one light 24 VDC to 265 VAC 50/60 Hz.
- ON/OFF switch or motion sensor available.
- 6500K Cool White
- 400 Lumens

IS24 - Industry Standards -
UL Component Recognized

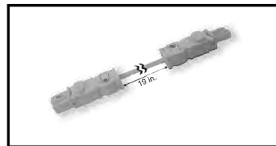
Catalog No.	Description	Height (A)	Width (B)	Depth (C)	Volt AC/DC	Hz	Product Code
SCE-SLMS	w/ Motion Sensor	13.80	1.38	1.25	24 - 265	50/60	P2
SCE-SLOF	w/ On/Off Switch	13.80	1.38	1.25	24 - 265	50/60	P2



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SCE-SLCC



SCE-SLDCC

GENERAL ACCESSORIES

LED Strip Light

Application -

LED Strip Lights have a compact design to provide interior lighting for smaller enclosures.

Construction -

- Magnets provided for quick installation to any surface inside the enclosure, also provided with clips that can be mechanically fastened.
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- 6500K Cool White
- 400 Lumens

IS24 - Industry Standards -
UL Component Recognized



Your Enclosure Source®

Saginaw Control & Engineering
95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
<http://www.saginawcontrol.com>

Part Information - SCE-LSA



→ SCE-LSA

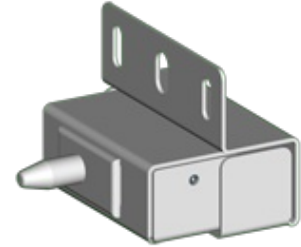
Application -

Designed to remote mount the light switch when space is limited.

Industry Standards - (IS24)
UL Component Recognized

Product Specifications -

Part Number: SCE-LSA
Description: Assembly, Light Switch
Height: 2.00"
Width: 2.68"
Depth: 1.00"
Price Code: P2
List Price: \$38.34
Catalog Page: 301
Est. Ship Weight: 1.00 lbs
MAX Amp: 10
MAX Volt AC: 277



[Download CAD Package](#)
[Add to Bill of Material](#)

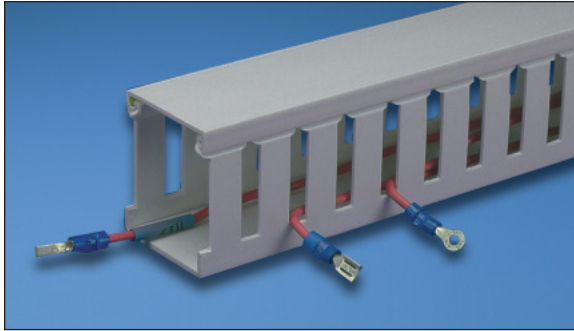
Installation Information -
[Light Switch Mounting Bracket](#)

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com

Overview

Wiring Duct *Control Panel*

PANDUCT® Type G ← Wide Slot Wiring Duct

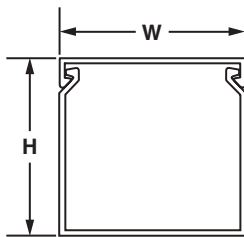


- Wide slot/finger design provides greater sidewall rigidity and can be used with a wide range of wire bundle sizes
- Made of rigid PVC
- UL Recognized continuous use temperature: 50°C (122°F)
- UL94 Flammability Rating of V-0
- Provided with mounting holes
- Conforms with NFPA 79-2002 section 14.3.1 requirement for flame retardant material

Control Panel



- nonmetallic, non-flame propagating CDS
- medium impact resistance
- 331 temperature classification
- cover removal without tools



Special Environment

Voice & Data

Tools & Accessories

Technical Info

Index

Part Number	Duct Size W x H		Cover Part Number	Duct Std. Ctn. Qty.	Cover Std. Ctn. Qty.	Length (ft)
	In.	mm				
G.5X.5LG6	.69 x .60	17.5 x 15.2	C.5LG6	120	120	6
G.5X1LG6	.69 x 1.06	17.5 x 26.9		120		
G.5X2LG6	.69 x 2.03	17.5 x 51.6		120		
G.5X4LG6	.69 x 4.10	17.5 x 104.1		60		
G.75X.75LG6	.93 x .82	23.6 x 20.8	C.75LG6	120	120	6
G.75X1LG6	.93 x 1.06	23.6 x 26.9		120		
G.75X1.5LG6	.93 x 1.57	23.6 x 39.9		120		
G.75X2LG6	.93 x 2.03	23.6 x 51.6		120		
G1X1LG6	1.26 x 1.12	32.0 x 28.4	C1LG6	120	120	6
G1X1.5LG6	1.26 x 1.62	32.0 x 41.1		120		
G1X2LG6	1.26 x 2.12	32.0 x 53.8		120		
G1X3LG6	1.26 x 3.12	32.0 x 79.2		120		
G1X4LG6	1.26 x 4.10	32.0 x 104.1		60		
G1.5X1LG6	1.75 x 1.12	44.5 x 28.4	C1.5LG6	120	120	6
G1.5X1.5LG6	1.75 x 1.62	44.5 x 41.1		120		
G1.5X2LG6	1.75 x 2.12	44.5 x 53.8		120		
G1.5X3LG6	1.75 x 3.12	44.5 x 79.2		120		
G1.5X4LG6	1.75 x 4.10	44.5 x 104.1		60		
G2X1LG6	2.25 x 1.12	57.2 x 28.4	C2LG6	120	120	6
G2X1.5LG6	2.25 x 1.62	57.2 x 41.1		120		
G2X2LG6	2.25 x 2.12	57.2 x 53.8		120		
G2X3LG6	2.25 x 3.12	57.2 x 79.2		60		
G2X4LG6	2.25 x 4.10	57.2 x 104.1		60		
G2X5LG6	2.25 x 5.10	57.2 x 129.5		60		
G2.5X3LG6	2.75 x 3.12	69.9 x 79.2	C2.5LG6	120	120	6
G3X1LG6	3.25 x 1.12	82.6 x 28.4	C3LG6	120	120	6
G3X2LG6	3.25 x 2.12	82.6 x 53.8		120		
G3X3LG6	3.25 x 3.12	82.6 x 79.2		60		
G3X4LG6	3.25 x 4.10	82.6 x 104.1		60		
G3X5LG6	3.25 x 5.10	82.6 x 129.5		60		
G4X1.5LG6	4.25 x 1.62	108.0 x 41.1	C4LG6	120	120	6
G4X2LG6	4.25 x 2.12	108.0 x 53.8		60		
G4X3LG6	4.25 x 3.12	108.0 x 79.2		60		
G4X4LG6	4.25 x 4.10	108.0 x 104.1		60		
G4X5LG6	4.25 x 5.10	108.0 x 129.5		60		
G6X4LG6	6.25 x 4.15	158.8 x 105.4	C6LG6	60	120	6

Part Number shown for LG (Light Gray). For other color availability see Color Selection Guide, [page F14](#).

Reference	Page(s)
Color Availability	F14
Adhesive Tape	E12, E13
Dimensions	F2
Wirefill Guide	F8
Material Specifications	F13
Tools & Accessories	D11, D12, Section E
Installation Tips	F15

ITEM NUMBER 19 NOT USED

EMC filter surge protection device - SFP 1-20/120AC - 2856702



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Device protection, according to type 3/class III, with network interference suppression filter to prevent high-frequency interference voltages, for 1-phase power supply networks with separate N and PE (3-conductor system: L1, N, PE), with remote indication contact.

Product Description

Device protection with interference filter

Why buy this product

- ✓ Can be installed in industrial environments
- ✓ Thermal monitoring of the protective circuit
- ✓ Combined protective circuit for absorbing transient surge voltages and high-frequency interference voltages
- ✓ Disconnection status signaled via floating remote indication contact
- ✓ Integrated power display switches off automatically when there is a malfunction due to overload.

RoHS

Key Commercial Data

Packing unit	1 STK
GTIN	 4 017918 952648
GTIN	4017918952648
Weight per Piece (excluding packing)	615.200 g
Custom tariff number	85363010
Country of origin	Germany

Technical data

Dimensions

Height	93 mm
Width	112 mm
Depth	79 mm

EMC filter surge protection device - SFP 1-20/120AC - 2856702

Technical data

Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	-25 °C ... 70 °C
Ambient temperature (storage/transport)	-25 °C ... 70 °C
Permissible humidity (operation)	5 % ... 95 %

General

IEC test classification	III
	T3
EN type	T3
Number of ports	Two
Mode of protection	L-N
	L-PE
	N-PE
Mounting type	DIN rail: 35 mm
Color	black
	silver
Housing material	Aluminum
Degree of pollution	2
Flammability rating according to UL 94	V-0
Type	Rail-mountable module, one-piece
Number of positions	2
Surge protection fault message	Optical, remote indicator contact
For country-specific use in	USA, CN, BR

Protective circuit

Nominal voltage U_N	120 V AC (TN)
	120 V AC (TT - only in use with RCD)
	120 V AC (IT)
Nominal frequency f_N	50 Hz (60 Hz)
Maximum continuous voltage U_C	150 V AC
Rated load current I_L	20 A (40 °C)
Residual current I_{PE}	≤ 0.6 mA
Nominal discharge current I_n (8/20) μ s	3 kA
Standby power consumption P_C	≤ 7.5 VA (at U_{REF})
	≤ 10 VA (at U_C)
Reference test voltage U_{REF}	132 V AC
Combination wave U_{OC}	6 kV (3 kA)
Voltage protection level U_p	≤ 0.45 kV

EMC filter surge protection device - SFP 1-20/120AC - 2856702

Technical data

Protective circuit

TOV behavior at U_T (L-N)	175 V AC (5 s / withstand mode)
	240 V AC (5 s / safe failure mode)
	208 V AC (120 min / safe failure mode)
TOV behavior at U_T (L-PE)	208 V AC (5 s / withstand mode)
	175 V AC (120 min / withstand mode)
	1332 V AC (200 ms / safe failure mode)
TOV behavior at U_T (N-PE)	1200 V AC (200 ms / safe failure mode)
Response time t_A	≤ 25 ns
Capacity (L-N)	1 μ F ± 10 %
	10 nF ± 10 % (X2-275 V)
Capacity (L-PE)	2.2 nF ± 20 % (Y2-250 V)
Capacity (L-PEN)	2.2 nF ± 20 % (Y2-250 V)
Max. required back-up fuse	20 A (MCB B/general purpose)
	16 A (IT - MCB B/general purpose)
Input attenuation aE, sym.	20 dB (≥ 100 kHz / 50 Ω)
Input attenuation aE, asym.	30 dB (≥ 1 MHz / 50 Ω)
Short-circuit current rating I_{SCCR}	5 kA AC (TN/TT)
	1 kA AC (IT)

Indicator/remote signaling

Switching function	PDT contact
Operating voltage	12 V AC ... 250 V AC
	250 V DC (250 mA DC)
Operating current	100 mA AC ... 1 A AC
	1 A DC (48 V DC)
Connection method	Pluggable screw connection
Conductor cross section flexible	0.14 mm ² ... 1.5 mm ²
Conductor cross section solid	0.14 mm ² ... 1.5 mm ²
Conductor cross section AWG	26 ... 16
Screw thread	M2
Tightening torque	0.25 Nm
Stripping length	7 mm

Connection data

Connection method	Screw terminal blocks
Conductor cross section flexible	2.5 mm ² ... 4 mm ²
Conductor cross section solid	2.5 mm ² ... 6 mm ²
Conductor cross section AWG	14 ... 10

EMC filter surge protection device - SFP 1-20/120AC - 2856702

Technical data

Connection data

Screw thread	M3
Tightening torque	0.5 Nm ... 0.6 Nm
	4.5 lb _f -in. ... 5.5 lb _f -in.
Stripping length	8 mm

UL specifications

SPD Type	2CA
Maximum continuous operating voltage MCOV (L-N)	150 V AC
Maximum continuous operating voltage MCOV (L-G)	150 V AC
Maximum continuous operating voltage MCOV (N-G)	150 V AC
Mode of protection	L-N
	L-G
	N-G
Power distribution system	1
Nominal frequency	50/60 Hz
Voltage protection rating VPR (L-N)	500 V
Voltage protection rating VPR (L-G)	500 V
Voltage protection rating VPR (N-G)	500 V
Nominal discharge current I _n	3 kA
Short-circuit current rating (SCCR)	5 kA

Protective circuit, filter

Discharge resistance	820 kΩ
----------------------	--------

Rockwell Automation

1606-XLS480E & 1606-XLS240EC 24V, 20A; Single Phase Input

1606-XLS480E ←

&

1606-XLS480EC

24V, 20A Single Phase Input

POWER SUPPLY

- Ultra-small size
- Extra-low inrush current
- Active power factor correction
- Wide range AC/DC input; auto select input
- Superior reserve power (can support 150% rated power for five seconds)
- Superior efficiency and temperature rating
- DC-OK and overload LED



1. GENERAL DESCRIPTION

The most outstanding features of this 1606-XLS power supply are the high efficiency and the small size, which are achieved by a synchronous rectification and further novel design details.





With short-term power capability of 150% and built-in large sized output capacitors, these features help start motors, charge capacitors and absorb reverse energy. A wide range input voltage design and a negligible low input inrush current make installation and usage simple. Diagnostics are easy due to the DC-ok relay, a green DC-ok and a red overload LED.

Unique quick-connect spring-clamp terminals allow a safe and fast installation. Many global approvals make this unit suitable for nearly every situation.

2. SPECIFICATION QUICK REFERENCE

Output voltage	DC 24V	
Adjustment range	24-28V	
Output current	20A	continuous, 24V
	30A	for typ. 4s, 24V
Output power	480W	continuous, 24V
	720W	for typ. 4s, 24V
Output ripple	< 100mVpp	20Hz to 20MHz
Input voltage	AC 100-240V	±15%
Line frequency	50-60Hz	±6%
AC Input current	4.56 / 2.48A	at 120 / 230Vac
Power factor	0.95 / 0.90	at 120 / 230Vac
AC Inrush current	typ. 9 / 7A peak	at 120 / 230Vac
DC Input voltage	DC 110-300V	-20%/+25%
DC Input current	4.7 / 1.7A	at 110 / 300Vdc
Efficiency	92.4 / 93.9%	at 120 / 230Vac
Losses	39.6 / 31.4W	at 120 / 230Vac
Temperature range	-25°C to +70°C	operational
Derating	12W/°C	+60 to +70°C
Hold-up time	typ. 32 / 51ms	at 120 / 230Vac
Dimensions	82x124x127mm	WxHxD

3. AGENCY APPROVALS

4. RELATED PRODUCTS

1606-XLB	Wall mount bracket
1606-XLSRED	Redundancy Module
1606-XLBUFFER	Buffer unit



Miniature circuit breaker (MCB), 1 A, 1p, characteristic: C

Part no. **FAZ-C1/1-NA** ←
 Catalog No. **102078**
 Alternate Catalog No. **FAZ-C1/1-NA**
 EL-Nummer (Norway) **1691567**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	1
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	10 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	1

Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	1.1
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		1
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No


Over voltage category			3
Pollution degree			2
Additional equipment possible			Yes
Width in number of modular spacings			1
Built-in depth		mm	70.5
Degree of protection (IP)			IP20
Ambient temperature during operating		°C	-25 - 75
Connectable conductor cross section multi-wired		mm ²	1 - 25
Connectable conductor cross section solid-core		mm ²	1 - 25

Approvals

Product Standards			IEC/EN 60947-2; EN 45545-2; IEC 61373; UL 489; CSA-C22.2 No. 5-09; CE marking
UL File No.			E235139
UL Category Control No.			DIVQ
CSA File No.			204453
CSA Class No.			1432-01
North America Certification			UL listed, CSA certified
Specially designed for North America			Yes, suitable as BCPD
Suitable for			Feeder circuits, branch circuits
Current Limiting Circuit-Breaker			Yes
Max. Voltage Rating			≤ 32 A
Degree of Protection			IEC: IP20, UL/CSA Type: -



Miniature circuit breaker (MCB), 2 A, 1p, characteristic: C

Part no. **FAZ-C2/1-NA** 
 Catalog No. **102080**
 Alternate Catalog No. **FAZ-C2/1-NA**
 EL-Nummer (Norway) **1691569**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	2
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	10 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	2

Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	1.4
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		2
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No



Miniature circuit breaker (MCB), 3 A, 1p, characteristic: C

Part no. **FAZ-C3/1-NA** ←
 Catalog No. **102081**
 Alternate Catalog No. **FAZ-C3/1-NA**
 EL-Nummer (Norway) **1691570**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	3
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	10 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	3

Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	1.2
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		3
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No



Miniature circuit breaker (MCB), 5 A, 1p, characteristic: C

Part no. **FAZ-C5/1-NA** ←
 Catalog No. **102083**
 Alternate Catalog No. **FAZ-C5/1-NA**
 EL-Nummer (Norway) **1691572**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	5
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	10 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	5

Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	1.9
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		5
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No



Miniature circuit breaker (MCB), 6 A, 1p, characteristic: C

Part no. FAZ-C6/1-NA
Catalog No. 102084
Alternate Catalog No. FAZ-C6/1-NA
EL-Nummer (Norway) 1691573



Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	6
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	10 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	6


Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	1.2
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		6
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No



Miniature circuit breaker (MCB), 15 A, 1p, characteristic: C

Part no. **FAZ-C15/1-NA** 
 Catalog No. **102089**
 Alternate Catalog No. **FAZ-C15/1-NA**
 EL-Nummer (Norway) **1691578**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	15
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	14 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	15


Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	1.9
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		15
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No



Miniature circuit breaker (MCB), 20 A, 1p, characteristic: C

Part no. **FAZ-C20/1-NA** 
 Catalog No. **102091**
 Alternate Catalog No. **FAZ-C20/1-NA**
 EL-Nummer (Norway) **1691580**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	20
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
	U_e	V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	14 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	20


Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	2.9
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		20
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No



Miniature circuit breaker (MCB), 25 A, 1p, characteristic: C

Part no. **FAZ-C25/1-NA** 
 Catalog No. **102092**
 Alternate Catalog No. **FAZ-C25/1-NA**
 EL-Nummer (Norway) **1691581**

Similar to illustration

Delivery program

Basic function			Miniature circuit-breakers
Number of poles			1 pole
Tripping characteristic			C
Application			Switchgear for export to North America (UL-listed)
Rated current	I_n	A	25
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Product range			FAZ-NA

Technical data

Electrical

Standards			UL 489, CSA C22.2 No. 5 IEC 60947-2
Rated operational voltage	U_e	V	
		V AC	277/480 Y
		V DC	60
Rated voltage according to IEC/EN 60947-2	U_n	V AC	254
Rated voltage according to UL	U_n	V AC	277
Rated switching capacity acc. to IEC/EN 60947-2	I_{cu}	kA	15
Breaking capacity according to UL		kA	14 (UL489)
Characteristic			B, C, D
Selectivity Class			3
lifespan			
Lifespan	Operations		> 20000
Direction of incoming supply			as required

Mechanical

Standard front dimension		mm	45
Enclosure height		mm	105
Mounting width per pole		mm	17.7
Mounting			IEC/EN 60715 top-hat rail
Degree of Protection			IP20, IP40 (when fitted)
Terminals top and bottom			Twin-purpose terminals
Terminal protection			Finger and back-of-hand proof to BGV A2
Tightening torque of fixing screws		N/m	max. 2.4 UL: #18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Mounting position			As required

Design verification as per IEC/EN 61439

Technical data for design verification			
Rated operational current for specified heat dissipation	I_n	A	25

Heat dissipation per pole, current-dependent	P _{vid}	W	0
Equipment heat dissipation, current-dependent	P _{vid}	W	3.1
Static heat dissipation, non-current-dependent	P _{vs}	W	0
Heat dissipation capacity	P _{diss}	W	0
Operating ambient temperature min.		°C	-25
Operating ambient temperature max.		°C	75
			linear, per +1 °C, results in a 0.5% reduction of current carrying capacity
IEC/EN 61439 design verification			
10.2 Strength of materials and parts			
10.2.2 Corrosion resistance			
			Meets the product standard's requirements.
10.2.3.1 Verification of thermal stability of enclosures			
			Meets the product standard's requirements.
10.2.3.2 Verification of resistance of insulating materials to normal heat			
			Meets the product standard's requirements.
10.2.3.3 Verification of resistance of insulating materials to abnormal heat and fire due to internal electric effects			
			Meets the product standard's requirements.
10.2.4 Resistance to ultra-violet (UV) radiation			
			Meets the product standard's requirements.
10.2.5 Lifting			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.6 Mechanical impact			
			Does not apply, since the entire switchgear needs to be evaluated.
10.2.7 Inscriptions			
			Meets the product standard's requirements.
10.3 Degree of protection of ASSEMBLIES			
			Does not apply, since the entire switchgear needs to be evaluated.
10.4 Clearances and creepage distances			
			Meets the product standard's requirements.
10.5 Protection against electric shock			
			Does not apply, since the entire switchgear needs to be evaluated.
10.6 Incorporation of switching devices and components			
			Does not apply, since the entire switchgear needs to be evaluated.
10.7 Internal electrical circuits and connections			
			Is the panel builder's responsibility.
10.8 Connections for external conductors			
			Is the panel builder's responsibility.
10.9 Insulation properties			
10.9.2 Power-frequency electric strength			
			Is the panel builder's responsibility.
10.9.3 Impulse withstand voltage			
			Is the panel builder's responsibility.
10.9.4 Testing of enclosures made of insulating material			
			Is the panel builder's responsibility.
10.10 Temperature rise			
			The panel builder is responsible for the temperature rise calculation. Eaton will provide heat dissipation data for the devices.
10.11 Short-circuit rating			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.12 Electromagnetic compatibility			
			Is the panel builder's responsibility. The specifications for the switchgear must be observed.
10.13 Mechanical function			
			The device meets the requirements, provided the information in the instruction leaflet (IL) is observed.

Technical data ETIM 7.0

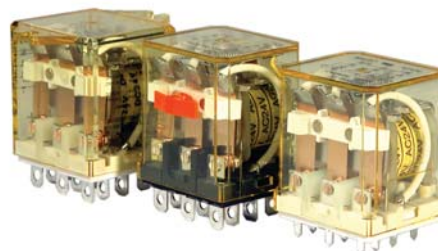
Circuit breakers and fuses (EG000020) / Miniature circuit breaker (MCB) (EC000042)			
Electric engineering, automation, process control engineering / Electrical installation, device / Miniature circuit breaker system (MCB) / Miniature circuit breaker (MCB) (ec1@ss10.0.1-27-14-19-01 [AAB905014])			
Release characteristic			C
Number of poles (total)			1
Number of protected poles			1
Rated current	A		25
Rated voltage	V		240
Rated insulation voltage U _i	V		440
Rated impulse withstand voltage U _{imp}	kV		4
Rated short-circuit breaking capacity I _{cn} EN 60898 at 230 V	kA		0
Rated short-circuit breaking capacity I _{cn} EN 60898 at 400 V	kA		0
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 230 V	kA		15
Rated short-circuit breaking capacity I _{cu} IEC 60947-2 at 400 V	kA		15
Voltage type			AC
Frequency	Hz		50 - 60
Current limiting class			3
Suitable for flush-mounted installation			No
Concurrently switching N-neutral			No

RH Series Compact Power Relays

ITEM 23

SPDT through 4PDT, 10A contacts
Compact power type relays

The RH series are miniature power relays with a large capacity. The RH relays feature 10A contact capacity as large as the RR series but in a miniature package. The compact size saves space.



Part Number Selection

Contact	Model	Part Number		Coil Voltage Code (Standard Stock in bold)
		Blade Terminal	PCB Terminal	
 SPDT	Basic	RH1B-U	RH1V2-U	
	With Indicator	RH1B-UL	—	AC6V, AC12V, AC24V , AC110V, AC120V , AC220V, AC240V DC6V, DC12V , DC24V , DC48V, DC110V
	With Check Button	RH1B-UC	—	
	With Indicator and Check Button	RH1B-ULC	—	
	Top Bracket Mounting	RH1B-UT	—	
	With Diode (DC coil only)	RH1B-UD	RH1V2-UD	DC6V, DC12V , DC24V , DC48V, DC110V
	With Indicator and Diode (DC coil only)	RH1B-ULD	—	DC12V , DC24V , DC48V, DC110V
 DPDT	Basic	RH2B-U	RH2V2-U	
	With Indicator	RH2B-UL	RH2V2-UL	AC6V, AC12V, AC24V , AC110-120V , AC220-240V
	With Check Button	RH2B-UC	—	DC6V, DC12V , DC24V , DC48V, DC100-110V
	With Indicator and Check Button	RH2B-ULC	—	
	Top Bracket Mounting	RH2B-UT	—	
	With Diode (DC coil only)	RH2B-UD	RH2V2-UD	DC6V, DC12V , DC24V , DC48V, DC100-110V
	With Indicator and Diode (DC coil only)	RH2B-ULD	—	
 3PDT	Basic	RH3B-U	RH3V2-U	
	With Indicator	RH3B-UL	RH3V2-UL	AC6V, AC12V, AC24V , AC110V, AC120V , AC220V, AC240V DC6V, DC12V , DC24V , DC48V, DC110V
	With Check Button	RH3B-UC	—	
	With Indicator and Check Button	RH3B-ULC	—	
	Top Bracket Mounting	RH3B-UT	—	
	With Diode (DC coil only)	RH3B-D*	RH3V2-D*	DC6V, DC12V, DC24V, DC48V, DC110V
	With Indicator and Diode (DC coil only)	RH3B-LD*	—	
 4PDT	Basic	RH4B-U	RH4V2-U	
	With Indicator	RH4B-UL	RH4V2-UL	AC6V, AC12V, AC24V , AC110V, AC120V , AC220V, AC240V DC6V, DC12V , DC24V , DC48V, DC110V
	With Check Button	RH4B-UC	—	
	With Indicator and Check Button	RH4B-ULC	—	
	Top Bracket Mounting	RH4B-UT	—	
	With Diode (DC coil only)	RH4B-UD	RH4V2-UD	DC6V, DC12V, DC24V, DC48V, DC110V
	With Indicator and Diode (DC coil only)	RH4B-LD*	—	

- 1. *Carries no UL recognition mark.
- 2. PCB terminal relays are designed to mount directly to a circuit board without any socket.

Ordering Information

When ordering, specify the Part No. and coil voltage code:

(example) **RH3B-U** **AC120V**
 Part No. Coil Voltage Code

Switches & Pilot Lights

Display Lights

Relays & Sockets

Timers

Terminal Blocks

Circuit Breakers

Sockets (for Blade Terminal Models)

Relays	Standard DIN Rail Mount ¹	Finger-safe DIN Rail Mount ¹	Through Panel Mount	PCB Mount
RH1B	SH1B-05	SH1B-05C	SH1B-51	SH1B-62
RH2B	SH2B-05	SH2B-05C	SH2B-51	SH2B-62
RH3B	SH3B-05	SH3B-05C	SH3B-51	SH3B-62
RH4B	SH4B-05	SH4B-05C	SH4B-51	SH4B-62











- DIN Rail mount socket comes with two horseshoe clips. Do not use unless you plan to insert pullover wire spring. Replacement horseshoe clip part number is Y778-011.

Hold Down Springs & Clips

Appearance	Item	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket
	Pullover Wire Spring	RH1B	SY2S-02F1 ²	SY4S-51F1
		RH2B	SY4S-02F1 ²	
		RH3B	SH3B-05F1 ²	
		RH4B	SH4B-02F1 ²	
	Leaf Spring (side latch)	RH1B, RH2B, RH3B, RH4B	SFA-202 ³	SFA-302 ³
	Leaf Spring (top latch)	RH1B, RH2B, RH3B, RH4B	SFA-101 ³	SFA-301 ³



- Must use horseshoe clip when mounting in DIN mount socket. Replacement horseshoe clip part number is Y778-011.
- Two required per relay.

AC Coil Ratings

Voltage (V)	Rated Current (mA) ±15% at 20°C								Coil Resistance (Ω) ±10% at 20°C				Operation Characteristics (against rated values at 20°C)		
	AC 50Hz				AC 60Hz				SPDT	DPDT	3PDT	4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT							
6	170	240	330	387	150	200	280	330	330	9.4	6.4	5.4	110%	80% maximum	30% minimum
12	86	121	165	196	75	100	140	165	165	39.3	25.3	21.2			
24	42	60.5	81	98	37	50	70	83	83	153	103	84.5			
110	9.6	—	18.1	21.6	8.4	—	15.5	18.2	18.2	—	2,200	1,800			
110-120	—	9.4-10.8	—	—	—	8.0-9.2	—	—	—	—	—	—			
120	8.6	—	16.4	19.5	7.5	—	14.2	16.5	16.5	—	10,800	7,360			
220	4.7	—	8.8	10.7	4.1	—	7.7	9.1	9.1	—	10,800	7,360			
220-240	—	4.7-5.4	—	—	—	4.0-4.6	—	—	—	18,820	—	—			
240	4.9	—	8.2	9.8	4.3	—	7.1	8.3	8.3	—	12,100	9,120			

DC Coil Ratings

Voltage (V)	Rated Current (mA) ±15% at 20°C				Coil Resistance (Ω) ±10% at 20°C				Operation Characteristics (against rated values at 20°C)		
	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
6	128	150	240	250	47	40	25	24	110%	80% maximum	10% minimum
12	64	75	120	125	188	160	100	96			
24	32	36.9	60	62	750	650	400	388			
48	18	18.5	30	31	2,660	2,600	1,600	1,550			
100-110	—	8.2-9.0	—	—	—	12,250	—	—			
110	8	—	12.8	15	13,800	—	8,600	7,340			



Standard coil voltages are in **BOLD**.

ITEM NUMBER 24 NOT USED

ITEM NUMBER 25 NOT USED

ITEM NUMBER 26 NOT USED

ITEM 27

Features

- 1-channel signal conditioner
- AC/DC wide range supply
- Dry contact or NAMUR inputs
- Input frequency 1 mHz ... 12 kHz
- Current output 0/4 mA ... 20 mA
- Relay and transistor output
- Start-up override
- Configurable by **PACTware™** or keypad
- Line fault detection (LFD)
- Up to SIL2 acc. to IEC 61508

Function

This signal conditioner is an universal frequency converter that changes a digital input (NAMUR sensor/mechanical contact) into a proportional free adjustable 0/4 mA ... 20 mA analog output and functions as a switch amplifier and a trip alarm.

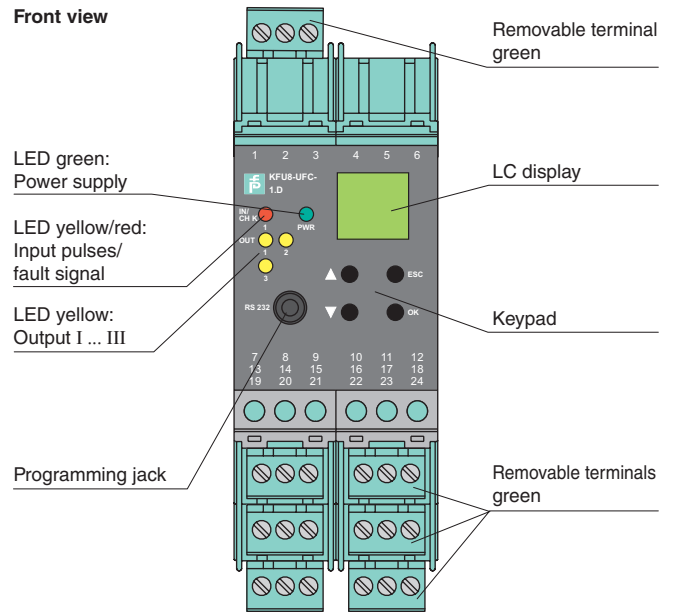
Also the functions of the switch outputs (2 relay outputs and 1 potential free transistor output) are easily adjustable [trip value display (min/max alarm), serially switched output, pulse divider output, error signal output].

The unit is easily programmed by the use of a keypad located on the front of the unit or with the **PACTware™** configuration software.

Line fault detection of the field circuit is indicated by a red LED.

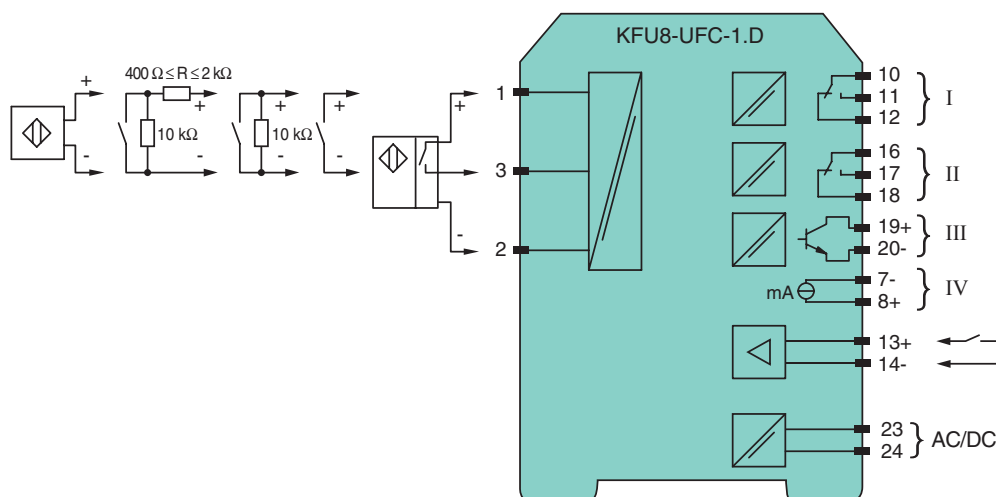
For additional information, refer to the manual and www.pepperl-fuchs.com.

Assembly



SIL2

Connection



Release date 2010-11-04 14:00 Date of issue 2010-11-16 188371_ENG.xml

General specifications	
Signal type	Digital input
Supply	
Connection	terminals 23, 24
Rated voltage	20 ... 90 V DC / 48 ... 253 V AC 50 ... 60 Hz
Power loss/power consumption	≤ 2 W ; 2.5 VA / 2.2 W ; 3 VA
Input	
Connection	Input I: 2-wire sensor: terminals 1+, 3- three wire sensor: terminals 1+, 2- and 3 input II: terminals 13+, 14- start-up override;
Input I	sensor acc. to EN 60947-5-6 (NAMUR) or mechanical contact
Open circuit voltage/short-circuit current	22 V / 40 mA
Input resistance	4.7 kΩ
Switching point/switching hysteresis	logic 1: > 2.5 mA ; logic 0: < 1.9 mA
Pulse duration	> 50 μs
Input frequency	0.001 ... 12000 Hz
Lead monitoring	breakage I ≤ 0.15 mA; short-circuit I > 4 mA
Input II	startup override: 1 ... 1000 s, adjustable in steps of 1 s
Active/Passive	I > 4 mA (for min. 100 ms) / I < 1.5 mA
Open circuit voltage/short-circuit current	18 V / 5 mA
Output	
Connection	output I: terminals 10, 11, 12 output II: terminals 16, 17, 18 output III: terminals 19+, 20- output IV: terminals 8+, 7-
Output I, II	signal, relay
Contact loading	250 V AC / 2 A / cos φ ≥ 0.7 ; 40 V DC / 2 A
Mechanical life	5 x 10 ⁷ switching cycles
Energized/De-energized delay	approx. 20 ms / approx. 20 ms
Output III	electronic output, passive
Contact loading	40 V DC
Signal level	1-signal: (L+) -2.5 V (50 mA, short-circuit/overload proof) 0-signal: blocked output (off-state current ≤ 10 μA)
Output IV	analog
Current range	0 ... 20 mA or 4 ... 20 mA
Open loop voltage	≤ 24 V DC
Load	≤ 650 Ω
Fault signal	downscale I ≤ 3.6 mA , upscale ≥ 21.5 mA (acc. NAMUR NE43)
Transfer characteristics	
Input I	
Measurement range	0.001 ... 12000 Hz
Resolution	0.1 % of the measurement value , ≥ 0.001 Hz
Accuracy	0.1 % of the measurement value , > 0.001 Hz
Measuring time	< 100 ms
Influence of ambient temperature	0.003 %/K (30 ppm)
Output I, II	
Response delay	≤ 200 ms
Output IV	
Resolution	< 10 μA
Accuracy	< 20 μA
Influence of ambient temperature	0.005 %/K (50 ppm)
Electrical isolation	
Input I/other circuits	safe galvanic isolation acc. to EN 50020, voltage peak value 375 V
Output I, II/other circuits	reinforced insulation according to IEC 61140, rated insulation voltage 300 V _{eff}
Mutual output I, II, III	reinforced insulation according to IEC 61140, rated insulation voltage 300 V _{eff}
Output III/power supply	reinforced insulation according to IEC 61140, rated insulation voltage 300 V _{eff}
Output III/IV	basic insulation according to IEC 62103, rated insulation voltage 50 V _{eff}
Output IV/power supply	reinforced insulation according to IEC 61140, rated insulation voltage 300 V _{eff}
Start-up override/power supply	reinforced insulation according to IEC 61140, rated insulation voltage 300 V _{eff}
Interface/power supply	reinforced insulation according to IEC 61140, rated insulation voltage 300 V _{eff}
Interface/output III	basic insulation according to IEC 62103, rated insulation voltage 50 V _{eff}
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Low voltage	

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Directive 2006/95/EC	EN 50178:1997
Conformity	
Insulation coordination	IEC 62103
Electrical isolation	IEC 62103
Electromagnetic compatibility	NE 21
Protection degree	IEC 60529
Protection against electric shock	IEC 61140
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Protection degree	IP20
Mass	300 g
Dimensions	40 x 119 x 115 mm (1.6 x 4.7 x 4.5 in) , housing type C3
General information	
Supplementary information	Statement of Conformity, Declaration of Conformity, Attestation of Conformity and instructions have to be observed where applicable. For information see www.pepperl-fuchs.com .

Accessories

PACT_{ware}™

Device-specific drivers (DTM)

Adapter K-ADP1

Programming adapter for parameterisation via the serial RS 232 interface of a PC/Notebook

For programming, please use the new version of adapter K-ADP1 (part no. 181953, connector length 14mm). When using the previous version K-ADP1 (connector length 18 mm) the plug is exposed by approx. 3 mm. The function is not affected.

Adapter K-ADP-USB

Programming adapter for parameterisation via the serial USB interface of a PC/Notebook

StructuredGround™ Universal Ground Bar System

PANDUIT®

SPECIFICATION SHEET

ITEM 28

specifications

Provide a field wiring terminal for the connection of an equipment grounding conductor in each control panel and enclosure. The terminal shall be UL 467 Listed or CSA 22.2 certified. The equipment grounding conductor shall have electrical continuity with the enclosure or sub-panel. The field wiring terminal may also provide multiple locations or ports for terminating equipment ground conductors from devices inside the panel or enclosure, functioning as the ground bar within the panel or enclosure. The ground bar shall provide a means to attach and to identify the main equipment grounding conductor.

PATENTED



technical information

Performance level:	UL 467 Listed and CSA 22.2 Certified for grounding and bonding an equipment grounding conductor up to 2/0 AWG; meets UL 508A requirements
Main:	Provides a location for the main equipment grounding conductor using a compression or mechanical connector
Wire ports:	Accept bare stripped copper wire from #14 to #4 AWG Accept wire ferrules from #14 AWG to #6 AWG Top of ground bar accepts ring terminals, compression connectors or mechanical connectors with a 1/4" stud hole size and maximum width of 0.55"
Materials:	Ground bars and bonding stand-offs precision machined from 110 electrolytic copper with a 99.9% copper content and then tin-plated for additional corrosion resistance
Packaging:	Each part is provided with all fasteners required for terminating wires and for each mounting option

key features and benefits

Flexible design	Works with all types of wire termination methods including stripped wire, ferrules, terminals, and compression or mechanical connectors; compatible with over 140 Panduit connectors
Multiple mounting options	In addition to surface mounting, two mounting stand-off options are available, one that bonds to the mounting surface and one that isolates from the mounting surface; both options provide additional finger wiring space in tight places
Unique geometry	The unique shape of the universal ground bar allows more surface contact between the wire connectors and the ground bar

applications

The patented StructuredGround™ Universal Ground Bar System (UGB) offers multiple termination methods and mounting options making it ideal for any control panel or enclosure application. The UGB enables the end user to choose the method in which to

terminate conductors with connectors of their choice or simply cut and strip the wires. The UGB system will help reduce the types of ground bars that a panel shop or distributor needs to keep in stock to meet the various applications and customer requirements.

Universal Ground Bar System

6-port ground bar:	UGB2/0-414-6
12-port ground bar:	UGB2/0-414-12
18-port ground bar:	UGB2/0-414-18
Isolation standoffs:	UGB-IN-SO
Bonding standoffs:	UGB-B-SO

Recommended Connectors for Main Equipment Ground Conductor, Maximum 2/0 AWG

Copper Mechanical with Anti-Rotation

#14 – 2/0 AWG: CLMAR2/0-14-Q

Two-Hole Copper Compression, 1/4" Stud Hole with 5/8" Spacing; #14 to 2/0 AWG

#14 – 10 AWG:	LCA10-14A-L
#8 AWG:	LCD8-14A-L
#6 AWG:	LCD6-14A-L
#4 AWG:	LCD4-14A-L
#2 AWG:	LCD2-14A-Q
#1 AWG:	LCD1-14A-E
1/0 AWG:	LCD1/0-14A-X
2/0 AWG:	LCD2/0-14A-X

One-Hole Copper Compression, 1/4" Stud Hole; #14 to 2/0 AWG

#14 – 10 AWG:	LCA10-14-L
#8 AWG:	LCAS8-14-L
#6 AWG:	LCAS6-14-L
#4 AWG:	LCAS4-14-L
#2 AWG:	LCAS2-14-Q
#1 AWG:	LCAS1-14-E
1/0 AWG:	LCAS1/0-14-X
2/0 AWG:	LCAS2/0-14-X

One and two-hole copper compression connectors available for both code and flex conductors, with narrow tongue and bent tongue configurations.

Recommended Connectors for Port Connections

Ring Terminals, 1/4" Stud Hole, Maximum Width of 0.55"; #22 to #4 AWG

Ring terminals available with vinyl, nylon, KYNAR®, high-temp, or heavy duty insulation or non-insulated.

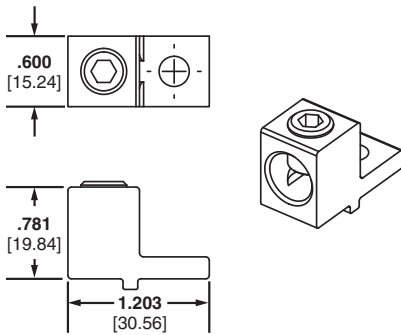
Compression Connectors, Maximum Width of 0.55"; up to #4 AWG Typical

Ferrules, Minimum Pin Depth of 12mm; #14 to #6 AWG

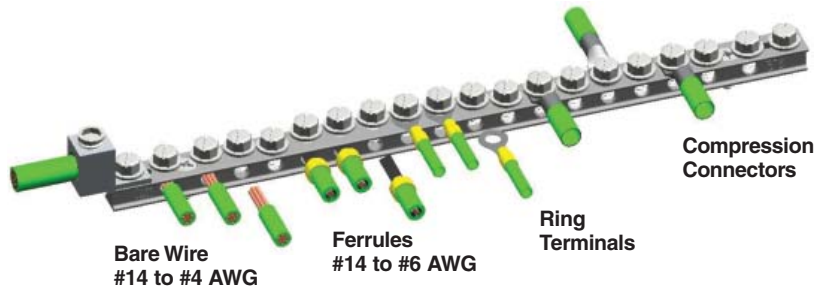
*KYNAR is a registered trademark of Atofina Chemicals, Inc.

StructuredGround™ Universal Ground Bar System

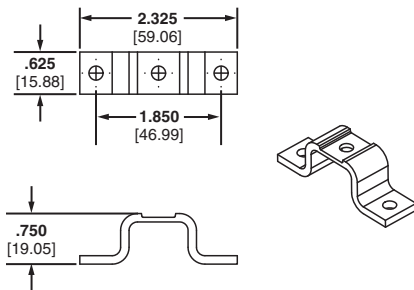
CLMAR2/0-14-Q: Tin-plated copper connector with copper connector with anti-rotational feature.



UGB2/0-414-18: 18-port UGB mounted directly to surface with the equipment grounding conductor terminated in an anti-rotational, copper mechanical connector.



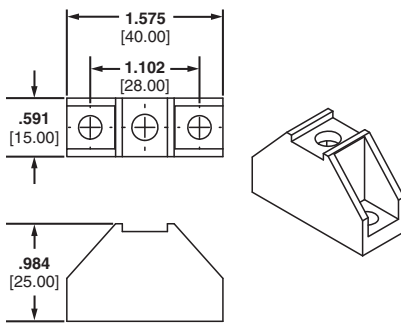
UGB-B-SO: Bonding stand-off.



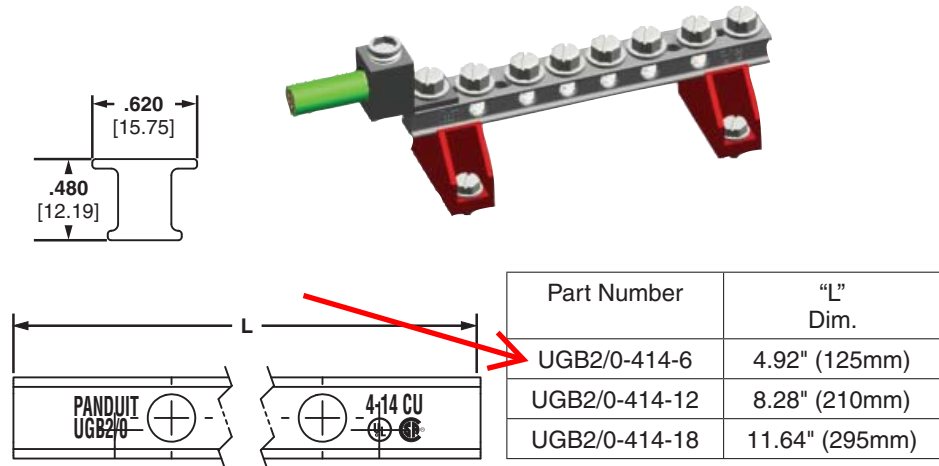
UGB2/0-414-12: 12-port UGB mounted on bonding stand-offs with the equipment grounding conductor terminated in a two-hole compression lug.



UGB-IN-SO: Isolation stand-off.



UGB2/0-414-6: 6-port UGB mounted on isolation stand-offs with the equipment grounding conductor terminated in an anti-rotational, copper mechanical connector.



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Phone: 61.3.9794.9020

For a copy of Panduit product warranties, log on to www.panduit.com/warranty

For more information

Visit us at www.panduit.com

Contact Customer Service by email: cs@panduit.com
or by phone: 800.777.3300

PANDUIT™

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GRSP01--SA-ENG
Replaces SA-GRSP08
9/2013



Technical Characteristics

Insulation Temperature	180 Degrees C
Application	Specifically designed to handle high inrush associated with contactors and relays for applications such as conveyor systems, paint lines, punch presses or overhead cranes
Approvals	UL Listed File Number: E61239 - CSA Certified File Number: LR37055 Guide: 184-N-90 - CE Marked
Catalog Reference Number	9070CT9901
Enclosure Type	Open
Winding Material	Copper
Secondary	120V or 115V or 110V
Type	T
Fuse Block	None
Depth	6.86 Inches
Phase	1-Phase
Mounting Type	Panel
Width	9.00 Inches
Rating	3000VA
Terminal Type	Screw Clamp
Temperature Rise	115 Degrees C
Height	8.46 Inches
Primary	240x480V or 230x460V or 220x440V

Shipping and Ordering

Category	16205 - Transformers, Industrial Control, 3000 - 5000 va, Type T
Discount Schedule	CP8
Article Number	785901876083
Package Quantity	1
Weight	59.81 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

Industrial Control Transformers

Catalog
August

05

Class 9070



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CUSTOM

PLEXI-GLASS ARC FLASH DIVIDER

TopTherm fan-and-filter units – SK 3244.110

created: 13.10.2021 on www.rittal.com/com-en



Product description

Protection category IP to IEC 60 529:	IP 54 with standard filter and additional fine filter mat: IP 55 with standard filter and hose-proof hood: IP 56
Protection category NEMA:	Type 12 with standard filter and additional fine filter mat: Type 12 with standard filter and hose-proof hood: Type 3, 3R, 4, 4X
Supply includes:	Complete unit ready to install, including filter mat
Note:	With the fan-and-filter unit 3237.XXX, electrical connection is made via two single wires (length approx. 300 mm) on the unit, for all other fan-and-filter units, a screwless spring terminal is used

Product description

Air throughput (unimpeded air flow):	At 50 Hz: 700 m ³ /h At 60 Hz: 770 m ³ /h
Air throughput with outlet filter including standard filter mat (quantity x order number, output 50/60 Hz):	1 x 3243200: 544/587 m ³ /h 2 x 3243200: 630/690 m ³ /h
Rated operating voltage:	115 V, 1~, 50 Hz/60 Hz
Dimensions:	Width: 323 mm Height: 323 mm
Required mounting	Width: 292 mm

cut-out:	Height: 292 mm
Build depth:	25 mm
Installation depth:	130.5 mm
Temperature range:	Bearing: -30 °C...+70 °C Operation (environment): -30 °C...+55 °C
Power consumption P_{el}:	At 50 Hz: 100 W At 60 Hz: 145 W
Rated current max.:	At 50 Hz: 0.9 A At 60 Hz: 1.25 A
Miniature circuit- breaker/fuse:	6 A
Service life at 50 Hz:	66000 h
Service life at 60 Hz:	62000 h
Noise level:	At 50 Hz: 65 dB(A) At 60 Hz: 66 dB(A)
Colour:	RAL 7035
Fan:	Diagonal, 1~ capacitor motor
eCl@ss 8.0/8.1:	27180716
Packs of:	1 pc(s).
Weight/pack:	4.3 kg
EAN:	4028177652187
Customs tariff number:	84145915
ETIM 7.0:	EC000320
ETIM 6.0:	EC000320
eCl@ss 8.0/8.1:	27180716
eCl@ss 6.0/6.1:	27180716
Product description:	SK fan and filter units TopTherm, 700/770 m ³ /h, 115 V, 1~, 50/60 Hz, WHD: 323 x 323 x 25 mm

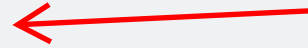
Approvals

Approvals:	Approval overview CCC exception letter CSA UL + C-UL - FTFA UR + C-UR
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Certificates:	EAC
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Declarations:	Declaration of conformity
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Outlet filter Standard – SK 3243.200



created: 13.10.2021 on www.rittal.com/com-en



Product description

Description:	For ventilation by convection, an outlet filter can be installed in the upper and lower sections of the enclosure.
Material:	ABS
Protection category IP to IEC 60 529:	IP 54 including filter mat IP 55 with standard filter and additional fine filter IP 56 with standard filter and hose-proof hood
Protection category NEMA:	NEMA 12
Supply includes:	Outlet filter Filter mat

Product description

Dimensions:	Width: 323 mm Height: 323 mm Depth: 25 mm
Required mounting cut-out:	Width: 292 mm Height: 292 mm
Colour:	RAL 7035
eCl@ss 8.0/8.1:	27180706
Packs of:	1 pc(s).

Weight/pack:	0.84 kg
EAN:	4028177652149
Customs tariff number:	39269097
ETIM 7.0:	EC002513
ETIM 6.0:	EC002513
eCl@ss 8.0/8.1:	27180706
eCl@ss 6.0/6.1:	27180706
Product description:	SK outlet filter, Standard, WHD: 323 x 323 x 25 mm
Approvals	
Approvals:	CSA UL + C-UL - FTTA UR + C-UR
Certificates:	EAC

PF 65000

Filter Fan

PFA 60000

Exhaust filter

- Installation size 6, air flow rate up to 297 CFM
- Three performance classes, cut-out compatible
- System of protection IP 54 and IP 55, NEMA type 12
- UL, cUL to NITW2 Category and CE approved, CSA pending



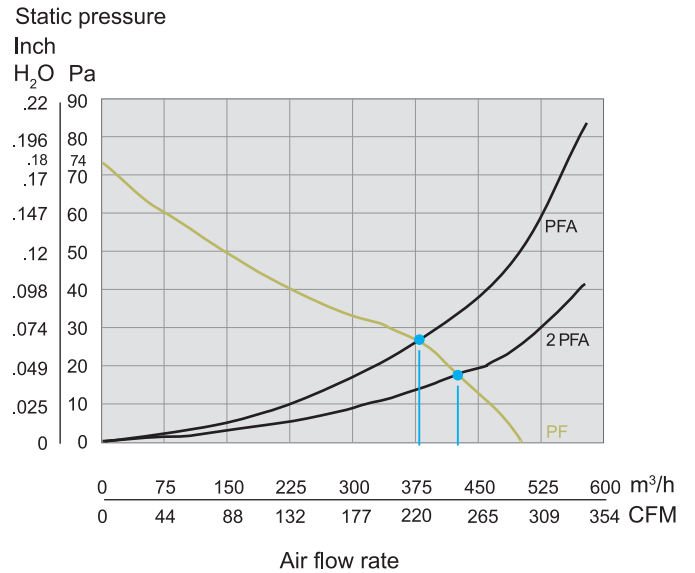
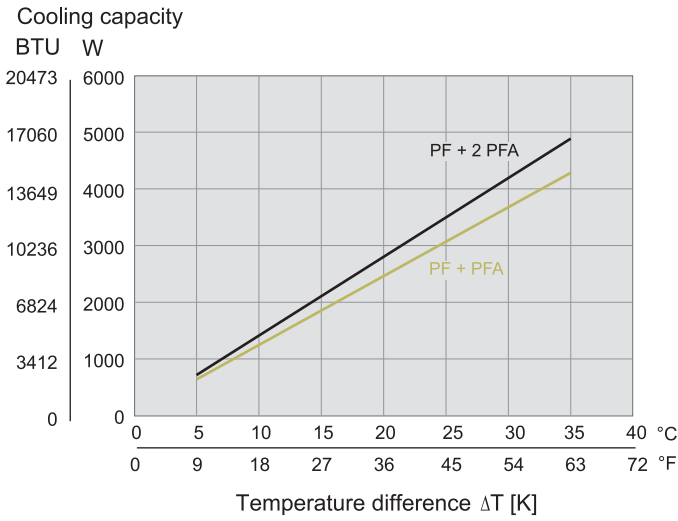
Data		PF 65000		Unit
Part number	RAL 9011 (Black Grill)	11665104050	11665154050	
	RAL 7035 (Lt. Gray Grill)	11665104055	11665154055	
		AC 50 Hz / 60 Hz		
Rated voltage ± 10 %		230	115	V
Unimpeded airflow (CFM2)		297 (505)		CFM (m ³ /h)
Air flow rate in combination (PF + PFA 60000) (CFM3)		230 (391)		
Power consumption		65 / 80	75 / 90	W
Current consumption		0.3 / 0.36	0.66 / 0.8	A
Noise level (according to EN ISO 3741)		54 / 52		dB(A)
Weight		7 (3.2)		lb (kg)
Type of connection		spring-type terminal		
Fuse (Recommended)		6		A
System of protection according to EN 60529 / UL 50	IP 55	NEMA Type 12 - fluted filter / IP55		
Filtration efficiency	IP 55	91		%
Filter mat quality class ¹	IP 55	G 4		
Duty cycle		100		%
Bearing type		ball bearing		
Service life L ₁₀ (+ 40 °C) ²		40000		h
Temperature range		+ 5 ... + 131 / - 15 ... + 55		°F / °C
Material Protection Rating		made of injection-molded thermoplastic, self-extinguishing, UL 94 VO, UV-resistant optional		

Accessories		Piece	Part number	Information on page
Exhaust filter PFA 60000	RAL 9011 (Black Grill)	1	11760004050	164
	RAL 7035 (Lt. Gray Grill)	1	11760004055	164
Thermostat FLZ 530° F		1	17121000010	174

¹ according to DIN EN 779

² fan failure is defined as being when the current and speed deviate or the operating noises are out of the ordinary

Cooling Capacity Performance Curves	Static Pressure Performance Curves
PF 65000 T12 / IP 55 (& UV option)	PF 65000 T12 / IP 55 (& UV option)

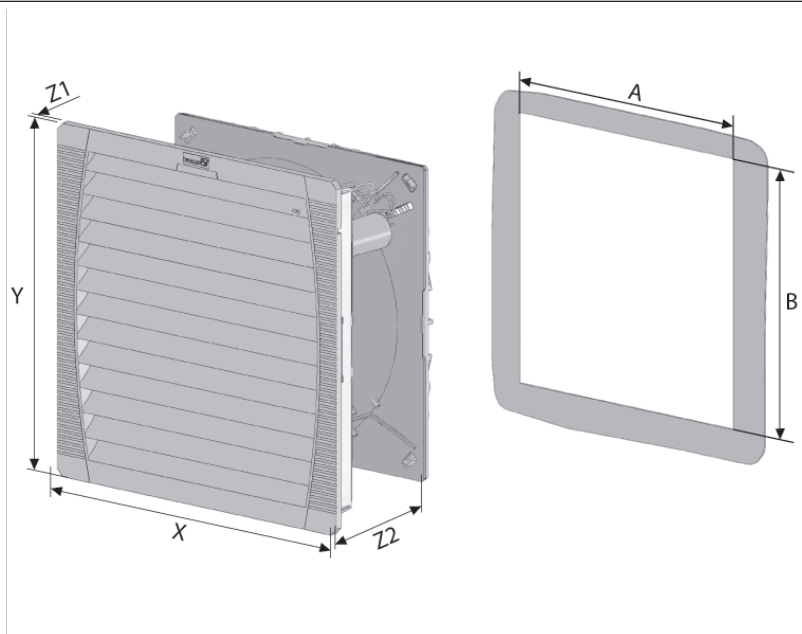


Dimensions

inches (mm)	PF 65000	PFA 60000
X	12.6 (320)	12.6 (320)
Y	12.6 (320)	12.6 (320)
Z1	.28 (7)	.28 (7)
Z2	5.91 (150)	1.54 (39)
A¹	11.46 (291) ²	11.46 (291) ²
B¹	11.46 (291) ²	11.46 (291) ²

¹ for material thicknesses up to .08" (2 mm)
+.039 (+1 mm) for thickness of material > .08" (2 mm) ≤ .19" (3 mm)

² add .039" (1 mm) for EMC version





Unmanaged DIN Rail Mount Switches



Entry-level Unmanaged Switches SPIDER Family



All ports are 10/100 Mbps. Now available with POE. The SPIDER family of switches provides users with an economical, yet highly reliable Ethernet switch. All copper/RJ45 ports are 10/100 auto-negotiating and auto-crossing – the SPIDERS will work with either patch or cross-over cables. The fiber ports are all 100 Mbps and available in multimode (MM) and singlemode (SM) with either SC or ST sockets. Unless specified, all switches are rated 0° C to +60° C, have a 24 VDC power input via pluggable terminal block and have an average MTBF exceeding 100 years.

ALL COPPER/RJ45 - SPIDER FAMILY / Entry-level Unmanaged Switches

Part No.	Order No.	Ports
SPIDER 3TX-TAP	943 899-001	3 x RJ45
SPIDER 5TX	943 824-002	5 x RJ45
SPIDER 5TX EEC	943 824-102	5 x RJ45
SPIDER II 8TX	943 957-001	8 x RJ45
SPIDER II 8TX EEC	943 958-001	8 x RJ45
NEW SPIDER II 8TX POE	942 008-001	8 x RJ45 and 4 X POE, with metal housing and 24 VDC input

COPPER/RJ45 and FIBER - SPIDER FAMILY / Entry-level Unmanaged Switches

Part No.	Order No.	Ports
SPIDER 4TX/1FX	943 221-001	4 x RJ45 and 1 x MM, SC
SPIDER 4TX/1FX EEC	943 221-101	4 x RJ45 and 1 x MM, SC
SPIDER 4TX/1FX-S EEC	943 914-001	4 x RJ45 and 1 x MM, ST
SPIDER 4TX/1FX SM EEC	943 880-001	4 x RJ45 and 1 x SM, SC
SPIDER 1TX/1FX	943 890-001	1 x RJ45 and 1 x MM, SC
SPIDER 1TX/1FX EEC	943 927-101	1 x RJ45 and 1 x MM, SC
SPIDER 1TX/1FX-SM	943 891-001	1 x RJ45 and 1 x MM, SC
SPIDER 1TX/1FX SM EEC	943 928-001	1 x RJ45 and 1 x SM, SC
SPIDER II 8TX/1FX EEC	943 958-111	8 x RJ45 and 1 x MM, SC
SPIDER II 8TX/1FX-ST EEC	943 958-121	8 x RJ45 and 1 x MM, ST
SPIDER II 8TX/2FX EEC	943 958-211	8 x RJ45 and 2 x MM, SC
SPIDER II 8TX/2FX-ST EEC	943 958-221	8 x RJ45 and 2 x MM, ST
SPIDER II 8TX/1FX-SM EEC	943 958-131	8 x RJ45 and 1 x SM, SC
SPIDER II 8TX/2FX-SM EEC	943 958-231	8 x RJ45 and 2 x SM, SC

FULL GIGABIT - SPIDER FAMILY / Entry-level Unmanaged Switches

Part No.	Order No.	Ports
SPIDER II Giga 5T EEC	943 962-002	5 x RJ45 (10/100/1000)
SPIDER II Giga 5T/2S EEC	943 963-002	5 x RJ45 (10/100/1000), and 2 x SFP Slot (1000)

NOTE: EEC stands for extended environmental conditions (-40° C to +70° C).

Feature-rich Unmanaged Switches

RS2 Switches

These switches offer advanced features such as redundant power inputs and most offer fault relay (triggerable by loss of power and/or port-link). Standard features include 10/100 auto-negotiating and auto-crossing (either patch or cross-over cables will work in the ports), a 0° C to +60° C operating range, a 24 VDC power input via pluggable terminal block and have an average MTBF exceeding 100 years. All of the multimode (MM) and singlemode (SM) fiber optic ports are 100 Mbps and are available in a variety of connector options.



Infrastructure Solutions

Network Cables

Organize and secure your network equipment

CAT5e Unshielded (UTP) Network Cables

Belkin CAT5e cables offer reliable, practical, Gigabit-Ethernet performance.

CAT5e Snagless Patch Cables

Feet	Black	Blue	Green	Red	White	Yellow	Gray
3	A3L791-03-BLK-S	A3L791-03-BLU-S	A3L791-03-GRN-S	A3L791-03-RED-S	A3L791-03-WHT-S	A3L791-03-YLW-S	A3L791-03-S
5	A3L791-05-BLK-S	A3L791-05-BLU-S	A3L791-05-GRN-S	A3L791-05-RED-S	A3L791-05-WHT-S	A3L791-05-YLW-S	A3L791-05-S
7	A3L791b07-BLK-S	A3L791b07-BLU-S	A3L791b07-GRN-S	A3L791b07-RED-S	A3L791-07-WHT-S	A3L791b07-YLW-S	A3L791b07-S
10	A3L791-10-BLK-S	A3L791-10-BLU-S	A3L791-10-GRN-S	A3L791-10-RED-S	A3L791-10-WHT-S	A3L791-10-YLW-S	A3L791b10-S
14	A3L791b14-BLK-S	A3L791b14-BLU-S	A3L791b14-GRN-S	A3L791b14-RED-S	A3L791-14-WHT-S	A3L791b14-YLW-S	A3L791b14-S
20	A3L791-20-BLK-S	A3L791-20-BLU-S	A3L791-20-GRN-S	A3L791-20-RED-S	A3L791-20-WHT-S	A3L791-20-YLW-S	A3L791-20-S
25	A3L791b25-BLK-S	A3L791b25-BLU-S	A3L791b25-GRN-S	A3L791b25-RED-S	A3L791-25-WHT-S	A3L791b25-YLW-S	A3L791b25-S
50	A3L791b50-BLK-S	A3L791b50-BLU-S	A3L791b50-GRN-S	A3L791b50-RED-S	A3L791-50-WHT-S	A3L791b50-YLW-S	A3L791b50-S

CAT6 Unshielded (UTP) Network Cables

Belkin CAT6 delivers higher performance and reliability than CAT5e by reducing packet loss and the need for retransmissions. Belkin CAT6 cables are tested to exceed the industry standard for throughput, offering headroom in your network for growth.

CAT6 Snagless Patch Cables

Feet	Black	Blue	Green	Red	White	Yellow	Gray
3	A3L980b03-BLK-S	A3L980b03-BLU-S	A3L980-03-GRN-S	A3L980-03-RED-S	A3L980-03-WHT-S	A3L980-03-YLW-S	A3L980b03-S
5	A3L980-05-BLK-S	A3L980-05-BLU-S	A3L980-05-GRN-S	A3L980-05-RED-S	A3L980-05-WHT-S	A3L980-05-YLW-S	A3L980-05-S
7	A3L980b07-BLK-S	A3L980b07-BLU-S	A3L980b07-GRN-S	A3L980b07-RED-S	A3L980-07-WHT-S	A3L980-07-YLW-S	A3L980b07-S
10	A3L980-10-BLK-S	A3L980-10-BLU-S	A3L980-10-GRN-S	A3L980-10-RED-S	A3L980-10-WHT-S	A3L980-10-YLW-S	A3L980-10-S
14	A3L980b14-BLK-S	A3L980b14-BLU-S	A3L980-14-GRN-S	A3L980b14-RED-S	A3L980-14-WHT-S	A3L980-14-YLW-S	A3L980b14-S
20	A3L980-20-BLK-S	A3L980-20-BLU-S	A3L980-20-GRN-S	A3L980-20-RED-S	A3L980-20-WHT-S	A3L980-20-YLW-S	A3L980-20-S
25	A3L980b25-BLK-S	A3L980b25-BLU-S	A3L980-25-GRN-S	A3L980b25-RED-S	A3L980-25-WHT-S	A3L980-25-YLW-S	A3L980b25-S
50	A3L980b50-BLK-S	A3L980b50-BLU-S	A3L980-50-GRN-S	A3L980-50-RED-S	A3L980-50-WHT-S	A3L980-50-YLW-S	A3L980b50-S

Component-Certified CAT6 Network Cables

Belkin component-certified CAT6 cables are built and tested to the highest-quality levels. Belkin component-certified CAT6 cables offer additional headroom and include test results in each bag.

Feet	Black	Blue	Red	White	Yellow	Gray
3	A3L9006-03-BLKS	A3L9006-03-BLUS	A3L9006-03-REDS	A3L9006-03-WHTS	A3L9006-03-YLWS	A3L9006-03-S
7	A3L9006-07-BLKS	A3L9006-07-BLUS	A3L9006-07-REDS	A3L9006-07-WHTS	A3L9006-07-YLWS	A3L9006-07-S
14	A3L9006-14-BLKS	A3L9006-14-BLUS	A3L9006-14-REDS	A3L9006-14-WHTS	A3L9006-14-YLWS	A3L9006-14-S
25	A3L9006-25-BLKS	A3L9006-25-BLUS	A3L9006-25-REDS	A3L9006-25-WHTS	A3L9006-25-YLWS	A3L9006-25-S

Don't see the color or length you need?
Belkin can manufacture virtually any cable type, length, or color.
Contact your sales team today to get pricing and lead times.

E90CC Series Fuseholders



E90CC Fuseholders



ABB is pleased to announce the release of the UL approved E90CC fuseholders with rejection.

Class CC fuses have limiting characteristics dedicated to terminal protection of components and apparatuses against short-term overloads and to protect motors against short-circuit. Maximum rated current of a Class CC fuse is 30A at a maximum rated voltage of 600V. The breaking capacity reaches 200 kA.

The limiting properties of the Class CC fuses are particularly appreciated in the North American market, allowing suitable protection of equipment with limited resistance to short circuit.

The use of Class CC fuses is continuously increasing in the American market, as the safety and reliability prescriptions of end users have become stricter and do not tolerate any permanent damage to motor starts.

Product range

The E90CC fuseholders are DIN rail mountable, available in 1, 1N, 2, 3, 3N and 4 pole versions and feature optional blown fuse indication.

Features

- UL Listed according to UL 4248-1 and 4248-4
- Rejection member to allow the insertion of Class CC fuses only
- Rated voltage: 600V AC/DC
- Rated current: 30A
- 1, 1N, 2, 3, 3N and 4 pole versions

Technical data		E91/30CC	E91/30CCs	E91N/30CC	E91N/30CCs	E92/30CC	E92/30CCs	E93/30CC	E93/30CCs	E93N/30CC	E93N/30CCs	E94/30CC	E94/30CCs
Number of poles		1	1	1+N	1+N	2	2	3	3	3+N	3+N	4	4
Fuse size	mm	10.4 x 38.1 Class CC											
Rated current	A	30											
Rated voltage	V	600 AC/DC											
Short circuit current	kA	200											
Rated frequency	Hz	60											
Tightening torque	in-lb	PZ2 18-22											
	Nm	PZ2 2-2.5											
Protection degree		IP20											
Terminal cross section	mm ²	25											
Wire range - solid copper conductors	AWG	16-10											
Wire range - stranded copper conductors	AWG	16-3											
Padlockable (when open)		Yes											
Sealable (when closed)		Yes											
Blown fuse indicator		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Approvals		UL 4248-1 and 4248-4											
Marking		cULus and CSA											

CC-TRON®

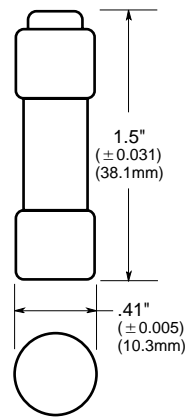
FNQ-R

Time-Delay Fuses

1 3/32" x 1 1/2", 600 Volt, 1/4 to 30 Amps



Dimensional Data



General Information:

- The Bussmann CC-TRON® (FNQ-R) was designed to meet the needs of control circuit transformer protection.
- Current-limitation protects down stream components against damaging thermal and magnetic effects of short-circuit currents.
- **High inrush time-delay.** Control circuit transformers can experience inrush currents up to 85 times their full-load current rating. FNQ-R fuses can be sized according to NEC and UL requirements and still allow the high inrush currents, with significantly more time-delay than the UL minimum value of 12 seconds at 200% for Class CC fuses.
- Melamine tube. Nickel-plated brass endcaps.

Catalog Symbol: FNQ-R

Time-Delay

Application: Circuit Transformer Protection

Ampere Rating: 1/4 to 30A

Voltage Rating: 600Vac (or less)†

Interrupting Rating: 200,000A RMS Sym. (UL)

Agency Information:

UL Listed, Std. 248-4, Class CC, Guide JDDZ, File E4273

CSA Certified, Class CC CSA, Class 1422-01,

File 53787-HRC-MISC

†12-30A is 300Vdc and 10k AIR.

Maximum Acceptable Rating of Overcurrent Device*

Rated Primary Current (Amperes)	Maximum Rating of Overcurrent Protective Device Expressed As A Percent of Transformer Primary Current Rating
Less than 2A	500**
2A to less than 9A	167
9A or more	125

*UL 508A Table 42.1.

**300% for other than motor control applications.

CE CE logo denotes compliance with European Union Low Voltage Directive (50-1000Vac, 75-1500Vdc). Refer to Data Sheet: 8002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

Electrical Ratings (Catalog Symbol and Amperes)

FNQ-R-1/4	FNQ-R-1 3/10	FNQ-R-3 2/10	FNQ-R-8
FNQ-R-3/10	FNQ-R-1 1/10	FNQ-R-3 1/2	FNQ-R-9
FNQ-R-4/10	FNQ-R-1 1/2	FNQ-R-4	FNQ-R-10
FNQ-R-1/2	FNQ-R-1 9/10	FNQ-R-4 1/2	FNQ-R-12
FNQ-R-5/10	FNQ-R-1 8/10	FNQ-R-5	FNQ-R-15
FNQ-R-3/4	FNQ-R-2	FNQ-R-5 9/10	FNQ-R-17 1/2
FNQ-R-9/10	FNQ-R-2 1/4	FNQ-R-6	FNQ-R-20
FNQ-R-1	FNQ-R-2 1/2	FNQ-R-6 1/4	FNQ-R-25
FNQ-R-1 1/8	FNQ-R-2 9/10	FNQ-R-7	FNQ-R-30
FNQ-R-1 1/4	FNQ-R-3	FNQ-R-7 1/2	—

Carton Quantity and Weight

Ampere Ratings	Carton Qty.	Weight*	
		Lbs.	Kg.
1/4-30	10	.200	.091

*Weight per carton

Fuse modular terminal block - UT 4-HESILED 24-P/P - 3046540




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Lever-type fuse terminal block, black, for 5 x 20 mm G fuse inserts, with LED for 24 V DC



Key Commercial Data

Packing unit	50 pc
GTIN	 4 046356 148092
GTIN	4046356148092

Technical data

General

Number of levels	1
Number of connections	2
Nominal cross section	4 mm ²
Color	black
Insulating material	PA
Flammability rating according to UL 94	V0
Maximum power dissipation for nominal condition	1.6 W
Fuse	G / 5 x 20
Fuse type	Glass / ceramics / ...
Rated surge voltage	4 kV
Degree of pollution	3
Overvoltage category	III
Insulating material group	I
Maximum power dissipation	max. 1.6 W (with single arrangement of the fuse terminal block in the event of overload)
	max. 1.6 W (With interconnected arrangement of several fuse terminal blocks in the event of overload)

Fuse modular terminal block - UT 4-HESILED 24-P/P - 3046540

Technical data

General

	max. 4 W (with single arrangement of the fuse terminal block in the event of a short-circuit)
	max. 2.5 W (With interconnected arrangement of several fuse terminal blocks in the event of a short-circuit)
Maximum current with single arrangement	6.3 A
LED voltage range	12 V AC/DC ... 30 V AC/DC
Current LED	6.3 A
LED current range	0.31 mA ... 0.95 mA
Switching capacity (UL 1077)	6.3 A
Connection in acc. with standard	IEC 60947-7-3
Maximum load current	6.3 A (the current is determined by the fuse used)
Nominal current I_N	6.3 A
Nominal voltage U_N	24 V
Open side panel	No
Number of positions	1
Relative insulation material temperature index (Elec., UL 746 B)	130 °C
Temperature index of insulation material (DIN EN 60216-1 (VDE 0304-21))	125 °C
Static insulating material application in cold	-60 °C
Surface flammability NFPA 130 (ASTM E 162)	passed
Specific optical density of smoke NFPA 130 (ASTM E 662)	passed
Smoke gas toxicity NFPA 130 (SMP 800C)	passed
Calorimetric heat release NFPA 130 (ASTM E 1354)	27,5 MJ/kg
Fire protection for rail vehicles (DIN EN 45545-2) R22	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R23	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R24	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R26	HL 1 - HL 3

Dimensions

Width	6.2 mm
Length	57.8 mm
Height NS 35/7,5	73 mm
Height NS 35/15	80.5 mm

Ambient conditions

Ambient temperature (operation)	-60 °C ... 85 °C
Ambient temperature (storage/transport)	-25 °C ... 55 °C (For a short time, not exceeding 24 h, -60 to +70 °C)
Permissible humidity (storage/transport)	30 % ... 70 %
Ambient temperature (assembly)	-5 °C ... 70 °C
Ambient temperature (actuation)	-5 °C ... 70 °C

Connection data

Conductor cross section solid min.	0.14 mm ²
------------------------------------	----------------------

Fuse modular terminal block - UT 4-HESILED 24-P/P - 3046540

Technical data

Connection data

Conductor cross section solid max.	6 mm ²
Conductor cross section flexible min.	0.14 mm ²
Conductor cross section flexible max.	6 mm ²
Conductor cross section AWG min.	26
Conductor cross section AWG max.	10
Conductor cross section flexible, with ferrule without plastic sleeve min.	0.14 mm ²
Conductor cross section flexible, with ferrule without plastic sleeve max.	4 mm ²
Conductor cross section flexible, with ferrule with plastic sleeve min.	0.14 mm ²
Conductor cross section flexible, with ferrule with plastic sleeve max.	4 mm ²
2 conductors with same cross section, solid min.	0.14 mm ²
2 conductors with same cross section, solid max.	1.5 mm ²
2 conductors with same cross section, stranded min.	0.14 mm ²
2 conductors with same cross section, stranded max.	1.5 mm ²
Two conductors with the same cross section stranded, with ferrule and without plastic sleeve, minimum	0.14 mm ²
Two conductors with the same cross section stranded, with ferrule and without plastic sleeve, maximum	1.5 mm ²
Two conductors with the same cross section, flexible, with TWIN ferrules, with plastic sleeve, minimum	0.5 mm ²
Two conductors with the same cross section, flexible, with TWIN ferrules, with plastic sleeve, maximum	2.5 mm ²
Connection method	Screw connection
Stripping length	9 mm
Internal cylindrical gage	A4
Screw thread	M3
Tightening torque, min	0.6 Nm
Tightening torque max	0.8 Nm

Standards and Regulations

Connection in acc. with standard	IEC 60947-7-3
Flammability rating according to UL 94	V0

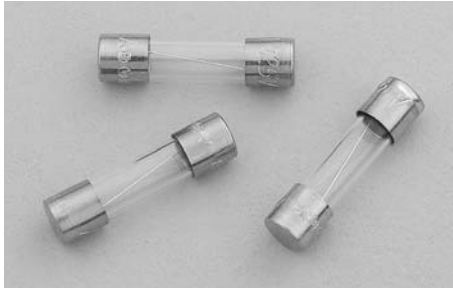
Environmental Product Compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

Drawings

GMA

5 mm x 20 mm Fast-acting glass tube fuses



Agency information

- UL Listed, Guide JDYX, File E19180, 63mA-6A
- UL Recognized, Guide JDYX2, File E19180, 7-15A
- CSA Certified, Class 1422-01, File 53787, 63mA-6A
- PSE Approval, 1A-15A

Ordering

- Specify packaging, product, and option code
- Ratings above 6.3A have a 0.8 mm diameter lead
- With TR2 packaging code, lead wire length is 19.05 mm

Product features

- Fast-acting, low breaking capacity
- Optional axial leads available
- 5 x 20mm physical size
- Glass tube, silver-plated (63mA-315mA) and nickel-plated (500mA-15A) brass endcap construction
- Designed to UL/CSA 248-14

Electrical Characteristics		
Rated Current	% of Amp Rating	Opening Time
63mA - 15A	100%	None
	135%	60 minutes maximum
	200%	2 minutes maximum

Product Code	Amp Rating	Voltage Rating Vac	Interrupting Rating (amps)*		Typical DC Cold Resistance (Ω)**	Typical Pre-Arc I ² t Vac†	Maximum Voltage Drop (mV)‡
			250Vac	125Vac			
			GMA-63-R	63mA			
GMA-100-R	100mA	250	35	10,000	7.840	0.0001	4300
GMA-125-R	125mA	250	35	10,000	4.895	0.0024	2600
GMA-200-R	200mA	250	35	10,000	2.500	0.001	3400
GMA-250-R	250mA	250	35	10,000	1.735	0.018	2200
GMA-300-R	300mA	250	35	10,000	0.906	0.019	470
GMA-315-R	315mA	250	35	10,000	0.839	0.019	450
GMA-500-R	500mA	250	35	10,000	0.454	0.15	230
GMA-600-R	600mA	250	35	10,000	0.256	0.32	200
GMA-750-R	750mA	250	35	10,000	0.186	0.47	200
GMA-800-R	800mA	250	35	10,000	0.170	0.70	180
GMA-1-R	1	250	35	10,000	0.163	0.48	300
GMA-1.25-R	1.25	250	100	10,000	0.122	0.84	290
GMA-1.5-R	1.5	250	100	10,000	0.090	1.6	270
GMA-1.6-R	1.6	250	100	10,000	0.080	2.0	260
GMA-2-R	2	250	100	10,000	0.066	3.1	250
GMA-2.5-R	2.5	250	100	10,000	0.046	4.9	240
GMA-3-R	3	250	100	10,000	0.039	8.8	215
GMA-3.15-R	3.15	125	-	10,000	0.036	9.7	210
GMA-3.5-R	3.5	125	-	10,000	0.030	13	210
GMA-4-R	4	125	-	10,000	0.026	19	205
GMA-5-R	5	125	-	10,000	0.021	29	200
GMA-6-R	6	125	-	10,000	0.017	45	180
GMA-7-R	7	125	-	200	0.012	150	110
GMA-8-R	8	125	-	200	0.009	280	110
GMA-10-R	10	125	-	200	0.006	280	110
GMA-15-R	15	125	-	150	0.004	950	100

* Interrupting ratings: Interrupting ratings for 63mA - 6A were measured at 70% - 80% power factor on AC. The interrupting ratings for 7A - 15A were measured at 100% power factor on AC.

** DC Cold Resistance (Measured at <10% of rated current)

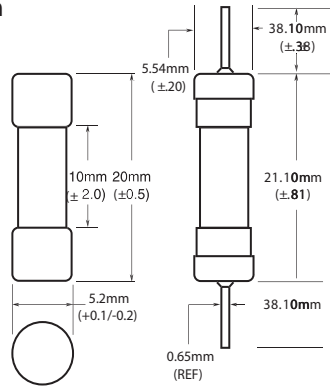
† Typical Pre-Arching I²t (I²t was measured at listed interrupting rating and rated voltage)

‡ Maximum Voltage drop (Voltage drop was measured at 20°C ambient temperature at rated current)

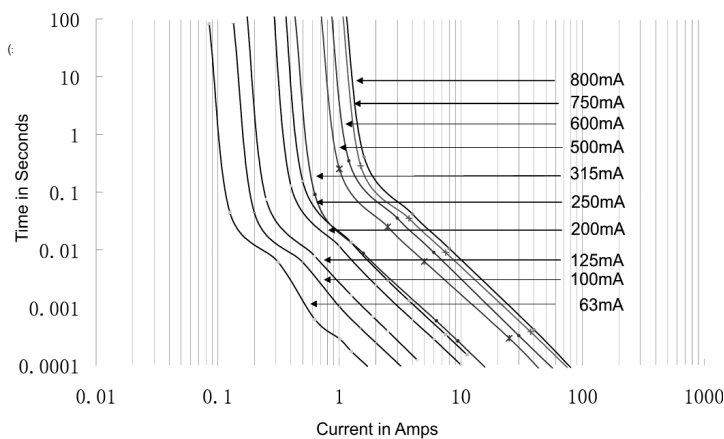


Powering Business Worldwide

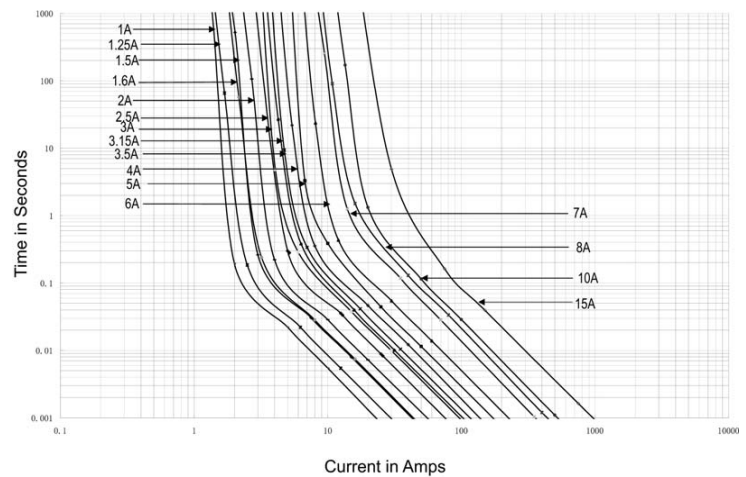
Dimensions - mm



Time-Current Curve – GMA-R 63mA-800mA



Time-Current Curve – GMA-R 1-15A



Packaging Code	
Packaging Code	Description
BK	100 fuses packed into a cardboard carton
BK1	1000 fuses packed into a poly bag
TR2	1500 fuses packed into tape on a reel (19.05mm lead wire length)

Option Code	
Option Code	Description
V	Axial leads - copper tinned wire with nickel-plated brass overcaps

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

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Thermistor motor protection relay Compact evaluation unit 17.5 mm enclosure Screw terminal 1 NO contact, 1 NC contact US = 24 V-240 V AC/DC Auto RESET suitable for bimetallic switch 2 LEDs (Ready/Tripped) galvanic isolation



Figure similar

Product brand name	SIRIUS
Product category	SIRIUS 3RN2 thermistor motor protection
Product designation	Thermistor motor protection relay
Design of the product	Compact evaluation unit, suitable for bimetallic switch
Product type designation	3RN2

General technical data	
Display version LED	Yes
Power loss [W] for rated value of the current	
• at AC in hot operating state	0.9 W
• at DC in hot operating state	0.9 W
Insulation voltage	
• for overvoltage category III according to IEC 60664	
— with degree of pollution 3 rated value	300 V
Degree of pollution	3
Surge voltage resistance rated value	4 kV
Protection class IP	IP20

Shock resistance	
<ul style="list-style-type: none"> • acc. to IEC 60068-2-27 	11g / 15 ms
Vibration resistance	
<ul style="list-style-type: none"> • acc. to IEC 60068-2-6 	10 ... 55 Hz: 0.35 mm
Mechanical service life (switching cycles)	
<ul style="list-style-type: none"> • typical 	10 000 000
Electrical endurance (switching cycles)	
<ul style="list-style-type: none"> • at AC-15 at 230 V typical 	100 000
Thermal current of the switching element with contacts maximum	5 A
Reference code acc. to DIN 40719 extended according to IEC 204-2 acc. to IEC 750	K
Reference code acc. to DIN EN 81346-2	K
Reference code acc. to DIN EN 61346-2	K

Control circuit/ Control

Type of voltage of the control supply voltage	AC/DC
Control supply voltage at AC	
<ul style="list-style-type: none"> • at 50 Hz rated value 	24 ... 240 V
<ul style="list-style-type: none"> • at 60 Hz rated value 	24 ... 240 V
Control supply voltage at DC	
<ul style="list-style-type: none"> • rated value 	24 ... 240 V
Operating range factor control supply voltage rated value at DC	
<ul style="list-style-type: none"> • initial value 	0.85
<ul style="list-style-type: none"> • Full-scale value 	1.1
Operating range factor control supply voltage rated value at AC at 50 Hz	
<ul style="list-style-type: none"> • initial value 	0.85
<ul style="list-style-type: none"> • Full-scale value 	1.1
Operating range factor control supply voltage rated value at AC at 60 Hz	
<ul style="list-style-type: none"> • initial value 	0.85
<ul style="list-style-type: none"> • Full-scale value 	1.1
Inrush current peak	
<ul style="list-style-type: none"> • at 24 V 	0.3 A
<ul style="list-style-type: none"> • at 240 V 	8 A
Duration of inrush current peak	
<ul style="list-style-type: none"> • at 24 V 	0.15 ms
<ul style="list-style-type: none"> • at 240 V 	0.15 ms

Measuring circuit

Buffering time in the event of power failure minimum	40 ms
---	-------

Precision

Relative metering precision	9 %
Auxiliary circuit	
Material of switching contacts	AgSnO ₂
Number of NC contacts for auxiliary contacts	1
Number of NO contacts for auxiliary contacts	1
Number of CO contacts	
• for auxiliary contacts	0
Operating current of auxiliary contacts at DC-13	
• at 24 V	1 A
• at 125 V	0.2 A
• at 250 V	0.1 A
Main circuit	
Operating frequency rated value	50 ... 60 Hz
Outputs	
Ampacity of the output relay at AC-15	
• at 250 V at 50/60 Hz	3 A
Ampacity of the output relay at DC-13	
• at 24 V	1 A
• at 125 V	0.2 A
Continuous current of the DIAZED fuse link of the output relay	6 A
Electromagnetic compatibility	
Conducted interference	
• due to burst acc. to IEC 61000-4-4	2 kV (power ports) / 1 kV (signal ports)
• due to conductor-earth surge acc. to IEC 61000-4-5	2 kV (line to ground)
• due to conductor-conductor surge acc. to IEC 61000-4-5	1 kV (line to line)
Electrostatic discharge acc. to IEC 61000-4-2	6 kV contact discharge / 8 kV air discharge
Galvanic isolation	
Design of the electrical isolation	galvanic
Galvanic isolation	
• between entrance and outlet	Yes
• between the outputs	Yes
• between the voltage supply and other circuits	Yes
Connections/Terminals	
Product function	
• removable terminal for auxiliary and control circuit	Yes
Type of electrical connection	screw-type terminals
Type of connectable conductor cross-sections	

<ul style="list-style-type: none"> • solid • finely stranded with core end processing • at AWG conductors solid 	<p>1x (0.5 ... 4.0 mm²), 2x (0.5 ... 2.5 mm²)</p> <p>1x (0.5 ... 4 mm²), 2x (0.5 ... 1.5 mm²)</p> <p>1x (20 ... 12), 2x (20 ... 14)</p>
Connectable conductor cross-section <ul style="list-style-type: none"> • solid • finely stranded with core end processing 	<p>0.5 ... 4 mm²</p> <p>0.5 ... 4 mm²</p>
AWG number as coded connectable conductor cross section <ul style="list-style-type: none"> • solid • stranded 	<p>20 ... 12</p> <p>20 ... 12</p>
Tightening torque <ul style="list-style-type: none"> • with screw-type terminals 	<p>0.6 ... 0.8 N·m</p>

Installation/ mounting/ dimensions

Mounting position	any
Mounting type	screw and snap-on mounting onto 35 mm standard mounting rail
Height	100 mm
Width	17.5 mm
Depth	90 mm
Required spacing	
<ul style="list-style-type: none"> • with side-by-side mounting <ul style="list-style-type: none"> — forwards — Backwards — upwards — downwards — at the side • for grounded parts <ul style="list-style-type: none"> — forwards — Backwards — upwards — at the side — downwards • for live parts <ul style="list-style-type: none"> — forwards — Backwards — upwards — downwards — at the side 	<p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p> <p>0 mm</p>

Ambient conditions

Installation altitude at height above sea level	
<ul style="list-style-type: none"> • maximum 	2 000 m
Ambient temperature	

Part Number: P-R2-F2R0

Panel Interface Connector with Category 5e RJ45; Panel Mount Housing; UL Type 4X; Simplex Outlet; No Circuit Breaker

<https://shop.graceport.com/products/p-r2-f2r0>



Product Specifications






Description Detail	
Panel Interface Connector that typically mounts to the outside of a control panel housing. These programming ports eliminate the need to open the panel door and improve safety and compliance to NFPA 70e. We offer 15,000+ combinations of components and outlets.	
Component Details	
Component Code	R2
Component Quantity	1
Component Description	Category 5e RJ45
Component Type	Bulkhead
Gender Front	RJ45 Female
Gender Back	RJ45 Female
Electrical Specifications	
Power Type	Domestic Simplex Outlet
Power VAC	120
Power AMPs	15
SCCR Rating	10kA

Mechanical Specifications	
Enclosure Rating	IP65
Housing Size	F Size Housing
UL Type	Type 4X
Latch	Type 304 Stainless Steel
Cover	Polycarbonate, UV rated

Geometric Data	
Width	4.45 in
Height	1.72 in
Depth	1.60 in

Commercial Data	
Country of Origin	US
Schedule B Code	8537.10.9090
UPC Code	842864101581

Approval Certifications

Logo	Approval	Additional Text	Certificate Name	
	UL Underwriters Laboratories Inc.	Outlets UL Recognized for 15A	E207344	
	CSA Canadian Standards Association	Outlets Rated for 5A Max for Computer Use Only	File # LR110845	
RoHS	RoHS Restriction of Hazardous Substances		GP0022-0916-B-RH	
	CE European Conformity		GP0009-0217-A-CE	



Product availability : Stock - Normally stocked in distribution facility



Price* : 25.70 USD



Main

Range of product	9080LB
Product or component type	Power Distribution Block
[In] rated current	175 A for copper cable(s) 135 A for aluminium cable(s)

Complementary

System Voltage	600 V AC/DC
Mounting support	Surface mount
Number of poles	3
Number of terminals	1 line 1 load
Number of cables	2 cable(s) AWG 14...AWG 2/0 (copper or aluminium) for line 1 cable(s) AWG 14...AWG 2/0 (copper or aluminium) for load
Electrical connection	Tin plated aluminium lugs
[Ics] rated service breaking capacity	Up to 65 kA per UL 508 A
Ambient air temperature for operation	-40...302 °F
Material	Phenolic block
Connections - terminals	Lug 40 lbf.in for AWG 8 (copper or aluminium) line Lug 35 lbf.in for AWG 12...AWG 10 (copper or aluminium) line Lug 35 lbf.in for AWG 14 (copper) line Lug 40 lbf.in for AWG 8 (copper or aluminium) load Lug 35 lbf.in for AWG 12...AWG 10 (copper or aluminium) load Lug 35 lbf.in for AWG 14 (copper) load Lug 120 lbf.in for AWG 6...AWG 2/0 (copper or aluminium) line Lug 120 lbf.in for AWG 6...AWG 2/0 (copper or aluminium) load
Wire stripping length	0.5 in line connection 0.5 in load connection
Height	2.88 in
Width	1.94 in

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

Depth	1.78 in
Product compatibility	9080LB23

Environment

Product certifications	CE CSA file 70361 class 6228 01 UL recognized E60616 CCN XCFR2
------------------------	--

Ordering and shipping details

Category	21711 - 9080 LB
Discount Schedule	CP1
GTIN	00785901097440
Nbr. of units in pkg.	4
Package weight(Lbs)	0.47000000000000003
Returnability	Y
Country of origin	US

Offer Sustainability

RoHS (date code: YYWW)	Compliant - since 0620 - Schneider Electric declaration of conformity Schneider Electric declaration of conformity
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Contractual warranty

Warranty period	18 months
-----------------	-----------

Product data sheet

Characteristics

9080LB23



Power Distribution Block Covers for 9080LBA362 or 9080LBC362 blocks

Product availability : Stock - Normally stocked in distribution facility



Price* : 15.80 USD



Main

Range of product	9080LB
Product or component type	Cover
Fixing mode	Screwed
Quantity per set	Set of 5

Complementary

Height	2.75 in
Width	2.69 in
Depth	0.06 in

Ordering and shipping details

Category	21711 - 9080 LB
Discount Schedule	CP1
GTIN	00785901139317
Nbr. of units in pkg.	5
Package weight(Lbs)	0.02
Returnability	Y
Country of origin	US

Offer Sustainability

RoHS (date code: YYWW)	Compliant - since 0620 - Schneider Electric declaration of conformity Schneider Electric declaration of conformity
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Contractual warranty

Warranty period	18 months
-----------------	-----------



Dual-Rated
T&B Catalog Number:

ADR21-21



UPC Number:
Status:
Description:

78378661009
 Active

Type ADR-ALCUL Two-Conductor, One-Hole Mount for Conductor Range Max 2/0 Str., Min 14 AWG

Features

Easy Installation - no special tools required.

General

Style	ALCUL Two-Conductor, One-Hole Mount
Material	Aluminum
Plating	Tin-Plated
Conductor Range (AL or CU) Maximum	2/0 Str.
Conductor Range (AL or CU) Minimum	14 AWG

Dimension Information

Length (inches)	1 15/32
Width (inches)	1 1/4
Height (inches)	25/32
D (inches)	27/64
E (inches)	1/4
F (inches)	3/16
G (inches)	27/32
I (inches)	21/32

Packaging

T&B Inner Pack	12
Package in Units	120
T&B Sold in UOM	Each
T&B Weight Per UOM	6.5 lbs. per 100

Notes

UL 486B tested, AL9CU rated

Certifications

RoHS Compliance	Yes
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Certifications



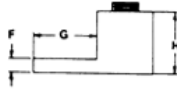
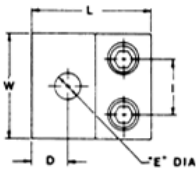
File Nbr:
 E9809

For further technical assistance, please contact us...

Thomas & Betts - USA
 8155 T&B Blvd.
 Memphis, TN 38125
 www.tnb.com

T&B Technical Support
 MS 3B-50
 8155 T&B Blvd.
 Memphis, TN 38125

Hours: 7AM - 6PM CDT
 Monday-Friday
 Phone: (888) 862-3289
 Fax: (901) 252-1321
 Email:techsupport@tnb.com





PRODUCT INFORMATION

SKU: KDRH3L. Categories: Input, Line Reactor, KDR.

SPECIFICATIONS



KDRH3L

KDR, 480V, 150A, 100HP, 3 Phase, Open, Input Line Inductor, Low Impedance, UL Listed

Rated Voltage	480
Hertz (Hz)	50/60
Horsepower (HP)	100
Phase	3
Amps	150
Impedance Value	3% Low Z
UL	UL Listed
Enclosure Type	Open
Watts Loss	225
Country of Origin	US
RoHS Indicator	Compliant
Dimensions	Height: 7 in Width: 11 in Depth: 7 in
Weight	40 lbs

Contact TCI for more information or to place an order:
800-824-8282 | sales@transcoil.com | transcoil.com



PRODUCT INFORMATION



SKU: KDRF2L. Categories: Input, Line Reactor, KDR.

SPECIFICATIONS



KDRF2L

KDR, 480V, 65A, 50HP, 3 Phase, Open, Input Line Inductor, Low Impedance, UL Listed

Rated Voltage	480
Hertz (Hz)	50/60
Horsepower (HP)	50
Phase	3
Amps	65
Impedance Value	Low Z
UL	UL Listed
Enclosure Type	Open
Watts Loss	114
Country of Origin	US
RoHS Indicator	Compliant
Dimensions	Height: 7 in Width: 9 in Depth: 6 in
Weight	25 lbs

Contact TCI for more information or to place an order:
800-824-8282 | sales@transcoil.com | transcoil.com



Eaton 9SX (700-3000 VA) UPS

The Eaton 9SX network UPS boasts an easy-to-read LCD display, double conversion topology and an internal static bypass, all in a convenient tower form. Compatible with Eaton's network connectivity cards and Intelligent Power Management (IPM) software, this UPS is a vital piece of any physical or virtualized IT environment.




[Technical Specs](#) [Features](#) [Documentation](#) [Options](#) [Service & Support](#)

Eaton 9SX - Technical Specifications

Product Snapshot

Power Rating	700-3000 VA
Voltage	120, 208V
Frequency	50/60HZ
Topology	Double conversion
Configuration	Tower

UPS Models

Part Number	Power Rating (VA/Watts)	Input Plug	Output Receptacles	Canadian List Price
9SX North American tower models: 120V, 50/60 Hz				
9SX700	700 / 630	5-15P	(6) 5-15R	\$1,400
9SX1000	1000 / 900	5-15P	(6) 5-15R	\$1,759
 9SX1500	1500 / 1350	5-15P	(6) 5-15R	\$2,444
9SX2000	1960 / 1770	5-20P	(6) 5-20R, (1) L5-20R	\$3,143
9SX3000	3000 / 2700	L5-30P	(4) 5-20R, (1) L5-30R	\$5,131
9SX3000HW	3000 / 2700	Hardwired	Hardwired	\$5,131
9SX Global tower models: 208V, 50/60 Hz				
9SX1000G	1000 / 900	C14	(6) C13	\$1,759
9SX1500G	1500 / 1350	C14	(6) C13	\$2,444
9SX2000G	2000 / 1800	C14 / L6-20P	(8) C13	\$3,143
9SX3000G	3000 / 2700	C20 / L6-20P	(8) C13, (1) C19	\$5,131
9SX3000GL	3000 / 2700	C20 / L6-20P	(2) 6-20R, (2) L6-20R, (1) L6-30R	\$5,131

Eaton 9SX - Features

- Reduces total cost of ownership thanks to a 0.9 power factor and highly efficient energy usage.
- Eaton's advanced LCD menu displays alarm history, energy logs, unit serial numbers and firmware versions making first-time issue resolution easy.
- Provides up to 28 percent more wattage compared to traditional UPSs, which allows for more connected devices.
- Increases battery service life by 50 percent with ABM technology.
- Compatible with IPM software and Eaton connectivity cards make it possible to monitor and manage UPSs and connect devices remotely.
- Add up to 4 external hot-swappable battery modules for increased battery runtime.
- Easy integration within Virtual environment (VMware, HyperV, RedHat, Citrix)

Eaton 9SX - Documentation

Product Literature -

 Eaton 9SX UPS brochure English (US)	31-Oct-2019	550 kB
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Manual(s) -

 Eaton 9SX UPS installation and user manual English	23-Oct-2018	9901 kB
Eaton 9SX UPS installation and user manual	23-Oct-2018	10132 kB



9SXEBM48



Eaton 9SX extended battery module (EBM).
9.9"Hx6.3"Wx15.1"D, 52.9 lb. Used with, 9SX1500
9SX1500G
List price \$935

*** List Prices are not a reflection of the actual product Street Price. Check with your Eaton reseller or partner to get actual pricing**

Contact me about this product (/content/eaton/us/en-us/support/backup-power-ups-surge-it-power-distribution/contact-me-pq.html/content/eaton/us/en-us/catalog/backup-power-ups-surge-it-power-distribution/eaton-9sx-ups.SKUID.9SXEBM48)

[View StorageReview.com review](https://www.storagereview.com/eaton_9sx3000_ups_review)
(https://www.storagereview.com/eaton_9sx3000_ups_review)



Need product support?

Contact me

Phone: (800) 356-5737 (_tel_ 1-800-356-5737)

Or visit our tech support knowledge base (<http://pqcustomersupport.eaton.com/>)

Specifications

GENERAL SPECIFICATIONS

PRODUCT NAME

Eaton 9SX extended battery module (EBM)

CATALOG NUMBER

9SXEBM48

UPC

743172091055

PRODUCT LENGTH/DEPTH

15.1 IN

PRODUCT HEIGHT

9.9 IN

ENVIRONMENTAL

TEMPERATURE RANGE

0° to 40°C (32° to 104°F)

ADDITIONAL SPECIFICATIONS

FORM FACTOR

Tower

CONSTRUCTION TYPE

Free standing model

PACKAGE CONTENTS

EHBPL1500R-PDU1U ←

List Pricing

Canadian List Price	\$516
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General

Style Number	58115
Part Number	EHBPL1500R-PDU1U
Product Code	50005
Availability	Top Sellers 0-2 week lead time
U Height	1
MIB	N/A

Physical

Dimensions (H x W x D, inches)	Box: 2.76 x 7.48 x 18.7 Unit: 2.1 x 17.3 x 3.8
Mounting Style	Horizontal
Form factor	2U

Input

Max kW	1.44
Plug	(1) NEMA 5-15P
	
Cable Length (ft)	3'
Voltage	1-Phase 110-125
Current	12A
Current Monitoring	None
Phase	Single Phase

Output

Outlets

CUSTOM

F-UPS STAND 17 x 7 x 4

UPS STAND, ALUMINUM

17"H x 7"W x 4"H

PILOT LIGHT DEVICES

TYPE 4/13 METAL (800T)

TYPE 4/4X/13 PLASTIC (800H)

STANDARD TYPE

PUSH-TO-TEST

STANDARD TYPE

PUSH-TO-TEST

TYPE	COLOR	800T-QH2R	800T-QTH2R	800H-QRH2R	800H-QRTH2R
<ul style="list-style-type: none"> UNIVERSAL LED 12-130V AC/DC 	●	800T-QH2R	800T-QTH2R	800H-QRH2R	800H-QRTH2R
	●	800T-QH2G	800T-QTH2G	800H-QRH2G	800H-QRTH2G
	●	800T-QH2A	800T-QTH2A	800H-QRH2A	800H-QRTH2A
<ul style="list-style-type: none"> TRANSFORMER LED 120V AC, 50/60 HZ 	●	800T-PH16R	800T-PTH16R	800H-PRH16R	800H-PRTH16R
	●	800T-PH16G	800T-PTH16G	800H-PRH16G	800H-PRTH16G
	●	800T-PH16A	800T-PTH16A	800H-PRH16A	800H-PRTH16A



For a full product offering, please refer to the Industrial Controls catalog or contact your local Rockwell Automation sales office or Allen-Bradley distributor. You can also visit our website at: www.ab.com/components.

EMERGENCY-STOP & PULL

2-POSITION PUSH-PULL AND PUSH-PULL/TWIST RELEASE, NON-ILLUMINATED

TYPE 4/13 METAL (800T)

TYPE 4/4X/13 PLASTIC (800H) RED PUSH- PULL/ TWIST RELEASE

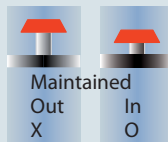
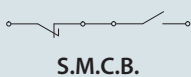
CONTACT CONFIGURATION

OPERATOR POSITION

RED PUSH-PULL

RED PUSH-PULL

RED PUSH-PULL/ TWIST RELEASE



800TC-FXLE6D4S



800T-FX6D4



800T-FXT6D4




800H-FRXT6D4

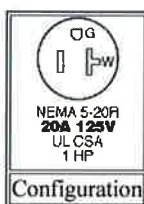
→ HBL53CM61 -- Straight Blade Receptacle



HBL53CM61

Single version of #HBL53CM62 duplex yellow receptacle .

Product Specifications	
Product Type	Straight Blade Receptacles
Rating	20A 125V, 2p3w
Blade Type	Straight Blade
Receptacle Type	Corrosion Resistant
Receptacle Style	Single
Color	 Yellow
Poles and Wires	2 Pole, 3 Wire Grounding
Approvals	UL
UPC Number	78358580832
Weight in LBs	0.2
Link to Drawing Library	Click here for Library
Link to PDF Catalog	Click here for Catalog



Wallplates Single Receptacle Wallplates

HUBBELL



Features

- Ideal for highly corrosive environments
- Non-magnetic
- Protective plastic film helps to prevent scratches and damage
- 1-Single 1.40 in. (35.6) Diameter Opening



Ordering Information

Description	Catalog Number	UPC
1-Gang, 1-Single Receptacle Opening, 1.40" (35.6) Dia. Hole	 SS7	883778201103

Listings

UL Listed
CSA Certified

Specifications

Plate Material	Stainless steel 302/304
Plate Type	Wall Plate
Plate Openings	Single Receptacle
Mounting Screws	302/304 SS, Slotted Head
Appearance	Horizontal brushed finish

Online Resources

[eCatalog](#)

Dimensions in Inches (mm)

Hubbell Wiring Device-Kellems • Hubbell Incorporated (Delaware) • 40 Waterview Drive • Shelton, CT 06484

Phone (800) 288-6000 • Fax (800) 255-1031 • Specifications subject to change without notice.



**SINGLE-GANG BOXES
DIE CAST ALUMINUM**



Applications

- For use in branch circuit wiring in wet, damp, or dry locations
- May be used as a weatherproof junction box, or as a housing for receptacles, switches, and GFCI's

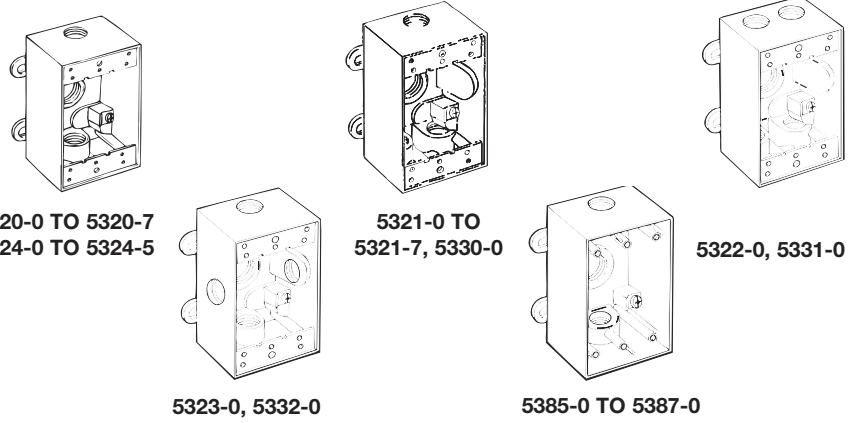
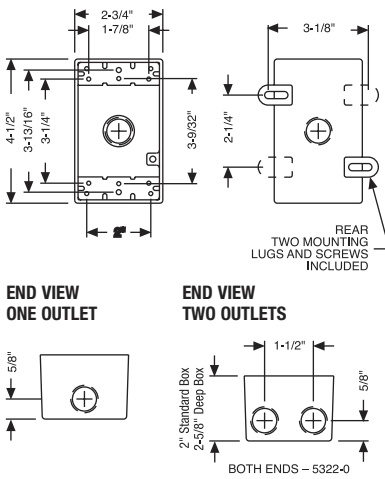
Product Features

- Reinforced connector outlets
- State-of-the-art powder coat finish
- Eight box mounting options with detachable lugs provided
- Two closure plugs included
- Ground screw installed
- Multi-lingual instructions in each package

Compliances

- - Standard 514A
- - C22.2 No. 18
- NEMA 3R Rated

SINGLE-GANG BOXES: GENERAL DIMENSIONS



ORDERING INFORMATION - DIMENSIONS

2" DEEP, WITH LUGS - THREE THREADED OUTLETS - 4-1/2" x 2-3/4"						
CATALOG NUMBER	CUBIC IN.	DESCRIPTION		PKG. TYPE	STD. PKG.	UPC BAR CODE
		COLOR	OUTLETS			
5320-0	17.5	Gray	3-1/2"	Shrink	20	■■■■■
5320-1	17.5	White	3-1/2"	Shrink	20	■■■■■
5320-2	17.5	Bronze	3-1/2"	Shrink	20	■■■■■
5320-5	17.5	Gray	3-1/2"	Carded	6	■■■■■
5320-6	17.5	White	3-1/2"	Carded	6	■■■■■
5320-7	17.5	Bronze	3-1/2"	Carded	6	■■■■■
5324-0	17.0	Gray	3-3/4"	Shrink	20	■■■■■
5324-5	17.0	Gray	3-3/4"	Carded	6	■■■■■

2" DEEP, WITH LUGS - FOUR THREADED OUTLETS - 4-1/2" x 2-3/4"						
CATALOG NUMBER	CUBIC IN.	DESCRIPTION		PKG. TYPE	STD. PKG.	UPC BAR CODE
		COLOR	OUTLETS			
5321-0	17.0	Gray	4-1/2"	Shrink	20	■■■■■
5321-1	17.0	White	4-1/2"	Shrink	20	■■■■■
5321-2	17.0	Bronze	4-1/2"	Shrink	20	■■■■■
5321-5	17.0	Gray	4-1/2"	Carded	6	■■■■■
5321-6	17.0	White	4-1/2"	Carded	6	■■■■■
5321-7	17.0	Bronze	4-1/2"	Carded	6	■■■■■
5330-0	16.5	Gray	4-3/4"	Shrink	20	■■■■■

2" DEEP, WITH LUGS - FIVE THREADED OUTLETS - 4-1/2" x 2-3/4"						
CATALOG NUMBER	CUBIC IN.	DESCRIPTION		PKG. TYPE	STD. PKG.	UPC BAR CODE
		COLOR	OUTLETS			
5322-0	16.5	Gray	5-1/2"	Shrink	20	■■■■■
5331-0	16.0	Gray	5-3/4"	Shrink	20	■■■■■
5323-0	17.0	Gray	5-1/2"	Shrink	20	■■■■■
5332-0	16.5	Gray	5-3/4"	Shrink	20	■■■■■

2-5/8" DEEP, WITH LUGS - THREE THREADED OUTLETS - 4-1/2" x 2-3/4"						
CATALOG NUMBER	CUBIC IN.	DESCRIPTION		PKG. TYPE	STD. PKG.	UPC BAR CODE
		COLOR	OUTLETS			
5385-0	21.3	Gray	3-1/2"	Shrink	15	■■■■■
5386-0	21.3	Gray	3-3/4"	Shrink	15	■■■■■
5387-0	21.3	Gray	3-1"	Shrink	15	■■■■■



WEATHERPROOF BOXES,
COVERS AND LIGHTING

E90CC Series Fuseholders



E90CC Fuseholders



ABB is pleased to announce the release of the UL approved E90CC fuseholders with rejection.

Class CC fuses have limiting characteristics dedicated to terminal protection of components and apparatuses against short-term overloads and to protect motors against short-circuit. Maximum rated current of a Class CC fuse is 30A at a maximum rated voltage of 600V. The breaking capacity reaches 200 kA.

The limiting properties of the Class CC fuses are particularly appreciated in the North American market, allowing suitable protection of equipment with limited resistance to short circuit. The use of Class CC fuses is continuously increasing in the American market, as the safety and reliability prescriptions of end users have become stricter and do not tolerate any permanent damage to motor starts.

Product range

The E90CC fuseholders are DIN rail mountable, available in 1, 1N, 2, 3, 3N and 4 pole versions and feature optional blown fuse indication.

Features

- UL Listed according to UL 4248-1 and 4248-4
- Rejection member to allow the insertion of Class CC fuses only
- Rated voltage: 600V AC/DC
- Rated current: 30A
- 1, 1N, 2, 3, 3N and 4 pole versions



Technical data		E91/30CC	E91/30CCs	E91N/30CC	E91N/30CCs	E92/30CC	E92/30CCs	E93/30CC	E93/30CCs	E93N/30CC	E93N/30CCs	E94/30CC	E94/30CCs
Number of poles		1	1	1+N	1+N	2	2	3	3	3+N	3+N	4	4
Fuse size	mm	10.4 x 38.1 Class CC											
Rated current	A	30											
Rated voltage	V	600 AC/DC											
Short circuit current	kA	200											
Rated frequency	Hz	60											
Tightening torque	in-lb	PZ2 18-22											
	Nm	PZ2 2-2.5											
Protection degree		IP20											
Terminal cross section	mm ²	25											
Wire range - solid copper conductors	AWG	16-10											
Wire range - stranded copper conductors	AWG	16-3											
Padlockable (when open)		Yes											
Sealable (when closed)		Yes											
Blown fuse indicator		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Approvals		UL 4248-1 and 4248-4											
Marking		cULus and CSA											

CC-TRON®

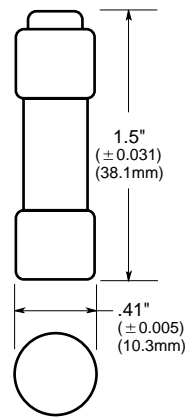
FNQ-R

Time-Delay Fuses

1 3/32" x 1 1/2", 600 Volt, 1/4 to 30 Amps



Dimensional Data



General Information:

- The Bussmann CC-TRON® (FNQ-R) was designed to meet the needs of control circuit transformer protection.
- Current-limitation protects down stream components against damaging thermal and magnetic effects of short-circuit currents.
- **High inrush time-delay.** Control circuit transformers can experience inrush currents up to 85 times their full-load current rating. FNQ-R fuses can be sized according to NEC and UL requirements and still allow the high inrush currents, with significantly more time-delay than the UL minimum value of 12 seconds at 200% for Class CC fuses.
- Melamine tube. Nickel-plated brass endcaps.

Catalog Symbol: FNQ-R

Time-Delay

Application: Circuit Transformer Protection

Ampere Rating: 1/4 to 30A

Voltage Rating: 600Vac (or less)†

Interrupting Rating: 200,000A RMS Sym. (UL)

Agency Information:

UL Listed, Std. 248-4, Class CC, Guide JDDZ, File E4273

CSA Certified, Class CC CSA, Class 1422-01,

File 53787-HRC-MISC

†12-30A is 300Vdc and 10k AIR.

Maximum Acceptable Rating of Overcurrent Device*

Rated Primary Current (Amperes)	Maximum Rating of Overcurrent Protective Device Expressed As A Percent of Transformer Primary Current Rating
Less than 2A	500**
2A to less than 9A	167
9A or more	125

*UL 508A Table 42.1.

**300% for other than motor control applications.

CE CE logo denotes compliance with European Union Low Voltage Directive (50-1000Vac, 75-1500Vdc). Refer to Data Sheet: 8002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

Electrical Ratings (Catalog Symbol and Amperes)

FNQ-R-1/4	FNQ-R-1 3/10	FNQ-R-3 2/10	FNQ-R-8
FNQ-R-3/10	FNQ-R-1 1/10	FNQ-R-3 1/2	FNQ-R-9
FNQ-R-4/10	FNQ-R-1 1/2	FNQ-R-4	FNQ-R-10
FNQ-R-1/2	FNQ-R-1 9/10	FNQ-R-4 1/2	FNQ-R-12
FNQ-R-5/10	FNQ-R-1 8/10	FNQ-R-5	FNQ-R-15
FNQ-R-3/4	FNQ-R-2	FNQ-R-5 8/10	FNQ-R-17 1/2
FNQ-R-8/10	FNQ-R-2 1/4	FNQ-R-6	FNQ-R-20
FNQ-R-1	FNQ-R-2 1/2	FNQ-R-6 1/4	FNQ-R-25
FNQ-R-1 1/8	FNQ-R-2 9/10	FNQ-R-7	FNQ-R-30
FNQ-R-1 1/4	FNQ-R-3	FNQ-R-7 1/2	—

Carton Quantity and Weight

Ampere Ratings	Carton Qty.	Weight*	
		Lbs.	Kg.
1/4-30	10	.200	.091

*Weight per carton



Technical Characteristics

Insulation Temperature	180 Degrees C
Application	Specifically designed to handle high inrush associated with contactors and relays for applications such as conveyor systems, paint lines, punch presses or overhead cranes
Approvals	UL Listed File Number: E61239 - CSA Certified File Number: LR37055 Guide: 184-N-90 - CE Marked
Catalog Reference Number	9070CT9901
Enclosure Type	Open
Winding Material	Copper
Secondary	120V or 115V or 110V
Type	T
Fuse Block	None
Depth	6.86 Inches
Phase	1-Phase
Mounting Type	Panel
Width	9.00 Inches
Rating	3000VA
Terminal Type	Screw Clamp
Temperature Rise	115 Degrees C
Height	8.46 Inches
Primary	240x480V or 230x460V or 220x440V

Shipping and Ordering

Category	16205 - Transformers, Industrial Control, 3000 - 5000 va, Type T
Discount Schedule	CP8
Article Number	785901876083
Package Quantity	1
Weight	59.81 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

Industrial Control Transformers

Catalog
August

05

Class 9070



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ITEM NUMBER 47 NOT USED

ITEM NUMBER 48 NOT USED

ITEM NUMBER 49 NOT USED

ITEM NUMBER 50 NOT USED