Hart Engineering Corporation

SUBMITTAL:
11312-02

PROJECT: 9900. - Veolia/Taunton WWTF Phase 1 Improvements **DATE: 01/12/2023**

SUBMITTAL: 11312-02 - Primary Sludge Centrifugal Pumps - O&M Manual
REVISION: 0
STATUS: Eng
SPEC #: 11312

TO:
Enea Mushi
Veolia North America
125 S. 84th Street, Suite 175
Milwaukee, WI 53214
enea.mushi@veolia.com

FROM:
Nick George
Hart Engineering Corporation
800 Scenic View Drive
Cumberland, RI 02864
NGeorge@hartcompanies.com

Item	Revision	Description	Status	Date Sent	Date Returned
11312-02	0	Primary Sludge Centrifugal Pumps - O&M Manual	Eng	01/12/2023	
Notes:					

Additional Notes:

Status Codes
1-APP – No Exceptions Taken
2-ANR – Make Corrections Noted
3-R&R – Revise and Resubmit
4-REJ – Rejected
5-IPO – For Information Purposes Only
6-NRR – Not Required for Review
ENG – Submitted to Engineer

Sincerely,
Hart Engineering Corporation

_____ DATE: 01/12/2023

TRILLIUM FLOW TECHNOLOGIES™

ROTO-JET®
WEMCO®
WSP™

Operations & Maintenance Manual

TAUNTON, MA

CUSTOMER ORDER NUMBER: 9900.110
ORDER NUMBER: 86985

SECTION 11312: PRIMARY SLUDGE CENTRIFUGAL PUMPS
WEMCO TORQUE-FLOW PUMPS 4 X 11 MODEL CE
WEMCO SERIAL NUMBERS: 86985-1-1 THROUGH 86985-1-4
TAGS: PSP-2201, 2202, 2203, 2204

MANUFACTURER
TRILLIUM FLOW TECHNOLOGIES
2495 S. GOLDEN STATE BLVD
FRESNO, CA. 93706
TELEPHONE: (559) 442-4000
FAX: (559) 443-3098

LOCAL REPRESENTATIVE FOR PARTS AND SERVICE
WESCOR ASSOCIATES, INC.
686 SOUTH STREET
WRENTHAM, MA 02093
TELEPHONE: (508) 384-5921

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Table of Contents

Trillium Flow Technologies
2495 S Golden State Blvd.
Fresno, CA 93706

T 559 442 4000
F 559 442 3098
www.trilliumflow.com

Job Name: Taunton, MA
Purchase Order #: 9900.110
WEMCO Order #: 86985

If you have any questions with this order, please use the following contact list to reach the correct person.

Questions pertaining to:

Operation & Maintenance Manuals:	Nick Moore (559) 443-6444 Nicholas.Moore@trilliumflow.com
Delivery:	Konnie Lleces (559) 441-6401 Konnie.Lleces@trilliumflow.com
Problems with shipment: (missing items, wrong items, etc.)	Konnie Lleces (559) 441-6401 Konnie.Lleces@trilliumflow.com
Damaged or Malfunctioning Equipment:	Joris Simon (801) 530-7512 Joris.simon@trilliumflow.com
Start-up:	Joris Simon (801) 530-7512 Joris.simon@trilliumflow.com

Please have the purchase order and the WEMCO order number associated with your order when you call.

Trillium Pumps USA, Inc.
2494 S Golden State Blvd.
Fresno, CA 93706 USA
T +1 559 442 4000
F +1 559 442 3098
www.trilliumflow.com

START-UP CHECK LIST

Job No.:_____

Date: _____

IDENTIFICATION

User's Name: _____

Site Location: _____

Pump: Size _____ Model_____

Serial No. _____

Driver: Manufacturer _____ Type _____ HP _____

Serial No. _____

Drive: Manufacturer _____ Type _____ Size _____

Date of Start-Up: _____

I. PRE-START CHECK-OUT

- If any of the following check list items are answered "No" the customer should be advised that the unit should not be started until corrections are made.

A. Were units stored properly? Yes _____ No _____ (Refer to instruction manual)

B. Type of Foundation: Cast Base _____ Steel Base_____ Other _____

C. Does foundation appear rigid enough to maintain alignment? Yes _____ No _____

1. Sketch of foundation (isometric or cross-section)
2. Are the anchor bolts tight? Yes _____ No _____
3. Is unit grouted? Yes _____ No _____ Type of grout _____
4. Is grout sound (free of voids and cracks?) Yes _____ No _____
5. Is unit doweled to base plate? Yes _____ No _____ (Not required for small pumps)

D. Piping:

1. Is unit free from piping strains and bending moments being transmitted to the pump flanges from the piping? Yes _____ No _____

2. Is piping properly supported? Yes _____ No _____

3. Is piping free of scale, dirt and foreign matters? Yes _____ No _____

4. Check valve:

   a. Is it supplied? _____

   b. Mounting? Horizontal _____ Vertical _____

   c. How far from the pump discharge flange? _____

II. ALIGNMENT

- The pump and drive have been checked at the factory to determine that field alignment dimensionally can be made. It is mandatory that the unit is field aligned.

COUPLING OR V-BELT DRIVE:

- Generally a flexible coupling or V-belt drive is supplied with the pump and driver, which for short periods of time will accept some degree of misalignment.

 CAUTION

A flexible coupling never compensates for misalignment. In all cases a coupling must be in alignment for continuous operation. Where a non-flexible coupling is used, proper alignment is indispensable to the proper functioning of pump and driver.

ALIGNMENT PROCEDURE

- See Instruction book for the pump being aligned with coupling or V-belt drive. Coupling alignments should be made with dial indicator.

FINAL COUPLING ALIGNMENT READING

Parallel	T.I.R.
Angular	T.I.R.

Instruction book used_____

- Alignment performed by the customer/contractor is acceptable. Please attach Customer's alignment report.

III. PRE-START CHECKS

A. Check all connections to motor and starting device with wiring diagram.

B. Check impeller adjustment (Where applicable see instruction book).

C. Assure that the pump is full of liquid.

D. If pump is fitted with mechanical seal, bleed air from seal chamber (stuffing box). Fill chamber with liquid before rotating, with by hand or motor.

E. Check stuffing box adjustment, lubrication and piping.

1. Lubrication type:
    a. Internal
    b. By-pass
    c. External
    d. Grease
2. Filter lubricant to stuffing box. Yes _____ No _____

F. Turn rotating element by hand to assure that it rotates freely.

G. Check lubrication.

1. Pump: Type _____
2. Driver: Type _____

H. Check rotation. (Viewed from Driver) with coupling/V-belt drive disengaged.

CW ____ CCW_____

 CAUTION

Pump must operate in the direction indicated by the arrow on the pump casing; serious damage can result if the pump is operated with incorrect rotation. Always check rotation each time the motor leads have been disconnected.

IV. PRIMING

- If the pump is installed with a positive head on the suction, it can be primed by opening the suction valve and allowing the liquid to enter the casing. At the same time, open vent until all air is out of casing.
- If the pump is installed with a suction lift, priming must be done by other methods such as foot valves, ejectors or by manually filling the casing and suction line.

 CAUTION

Pump must be completely filled with liquid before starting. Never allow pump to run dry in the hope it will prime itself. Serious damage to the pump, packing or mechanical seal may result.

V. STARTING

A. Close drain valves and valve in discharge line. (See caution below for large motors.)

B. Open fully all valves in the suction line.

C. Turn on seal water to the stuffing box. (If pumped liquid is dirty or if leakage of air is to be prevented, these lines should be always left open.)

D. Prime the pump.

1. If the pump does not prime properly, or loses prime during start-up, it should be shut down and the condition corrected before the procedure is repeated.

2. For pumps moving high temperature liquids, open the war-up valve to circulate liquid for preheating. Close the valve after the pump is warmed up.

 CAUTION

1. The gate valve in the discharge line should always be closed when the pump is started. (Applicable to large motors being started across the line.)

2. The excessive current required by the motor to start under fill load will in time cause motor trouble. (Applicable to large motors being started across the line.)

3. On start-up with the discharge valve closed, pump must not be run against closed valve for more than 30 seconds.

E. Start the pump driver (turbines and engines require warming up, consult with the manufacturer's instructions).

F. When pump is operating at full speed, open the discharge valve slowly.

G. Adjust the liquid seal valves for packed stuffing box or mechanical seals to produce a pressure of 10-15psig above the pump discharge pressure.

- Oil lubricated tandem mechanical seals don't require outside flush water.

VI. OPERATING CHECKS

A. Check the pump and piping for leaks.

B. Check and record pressure gauge reading for future reference.

1. Suction _____PSIG.KPa

2. Discharge _____PSIS/KPa

C. Check and record flow _____USGPM

D. Check and record voltage, amperage per phase and kilowatts (of available).

1. Voltage _____/_____/_____Volts _____

2. Amperage _____/_____/_____Amps _____

E. Measure pump shaft speed: _____RPM

F. Check bearing lubrication.

1. Temperatures.

a. Pump: Inboard (Coupling end) _____ Degrees F.

Outboard _____ Degrees F.

b. Driver: Inboard (Coupling end) _____ Degrees F.

Outboard _____ Degrees F.

VII. SHUTDOWN

- When stopping pump always close the discharge valve first. (Applicable to large pumps.)
- Pump should never run for any length of time with both suction and discharge valves closed due to the danger of building up pressures and temperatures.

VIII. MAINTENANCE

- Have you instructed user's supervisory and maintenance personnel on the correct operation of this equipment? Yes _____ No _____
- Do maintenance personnel have instruction books for these specific units?

  Yes _____ No _____

IV. GENERAL COMMENTS

_____

_____

_____

_____

V. LIST OF ATTENDEES

_____

_____

_____

_____

_____

Name of Company performing start-up

_____

Authorized Signature Date

_____

Signature of Customer Date

TAB A

TAB A

SALES ORDER DESCRIPTION

SALES SHEET NUMBER: **8**□□□□ P/O □□□□□□□□

QTY	PART NUMBER	DESCRIPTION
□	4X11 CE PKG	4X11 CE

RPM: 12□0
CONDITIONS: □00 GPM @ 50 FT TDH

Clockwise rotation (CW)
Steel pump hardware
Oil lubricated bearings
Nitrile elastomers *
4x4 Case
Hi□h Chrome case (650+ BHN hardness)
No case vent & drain
Hi□h Chrome impeller (650+ BHN hardness)
Steel shaft
Steel impeller lockscrew

Seal Type: S□lit Mechanical Seal
Seal Manufacturer: Chesterton
Chesterton □□2 S□lit Mechanical Seal
416 SST shaft sleeve
Hi-Chrome Gland Housing Material/Backplate
Stainless steel gland

Trillium Supplied Motor: Trillium Supplied Motor
25HP 28□T 1800RPM Premium Efficiency
TEFC Horizontal motor
Horizontal Motor
4 Pole, 60 Hz
Premium Efficient Severe Duty
TEFC
460 V

Belt Drive Baseplate - Side Mount
Steel Baseplate
Trillium Standard Baseplate Design
Steel Baseplate Hardware
Fiberglass/Polyethylene Guards
Left Hand Side Mount Motor
Variable Speed Belts and Sheaves Stationary Control

Serial Numbers: 8□□□□-1-1 through 8□□□□-1-□

SPARE PARTS PROVIDED

Part Number	Description	Qty/Per	UM
802215	V-BELT 5□□-690	4.	EA
801196	SEAL, MECH CHST SPLIT SEAL	□.	EA
63936-1	SHAFT 11CE 1045 STL	1.	EA
63935□5□112	IMPELLER C□ 11□3□8" TRIM HCI 650 BHN	□.	EA
86958□E1	SPARE MOTOR BEARIN□S, 25 HP, 28□T	□.	EA

Part Number -- 726-A3□
11"CE,CEV BEARINGS-□SET

Part Number	Description	Qty/Per	UM
100214	BRG,BALL #5310	□.	EA
100215	BRG,BALL SGL ROW	□.	EA

THIRD-ANGLE PROJECTION

SIZE ⟨8⟩	E	F	FH	L	N	RB	RC	APPROXIMATE SHIPPING WT.
2 x 2 x 11	6	10	18 1/2	3 1/2	31 15/16	7 13/16	8 5/8	350 LBS.
3 x 3 x 11	5 1/2	10	18 1/2	4 5/8	32 15/16	7 7/8	8 5/8	370 LBS.
4 x 4 x 11	6 1/2	10 7/8	19 3/8	4 3/4	33 5/8	8 3/8	8 3/4	420 LBS.
6 x 6 x 11	6 1/2	10 7/8	19 3/8	5 3/4	35 5/8	9 3/8	9 3/4	445 LBS.

QTY	ITEM NO.	DESCRIPTION
1	1	CASE
1	2	IMPELLER
1	4	BEARING HOUSING
1	5	WEARPLATE
1	6	BACKPLATE
2	7	CAPS, BEARING HOUSING
1	9	SHAFT
1	10	LOCKSCREW, IMPELLER
1	11	SLEEVE, SHAFT
1SET	12	PACKING GLAND, SPLIT
1	13	LANTERN RING
1	15	BEARING, THRUST
1	16	BEARING, RADIAL
2	17	SEAL, OIL
1	20	SNAP RING, BEARING
1	21	SLINGER
1	22	GASKET, SLEEVE (O-RING)
2	23	GASKET, BEARING CAP
1	24	GASKET, CASE (O-RING)
5	28	PACKING RING
1	31	KEY, SHAFT
1	32	COLLET
1	78	KEY, SLEEVE DRIVE

NOTES:

1. DIMENSIONS ARE NOT FOR INSTALLATION PURPOSES UNLESS CERTIFIED.
2. PUMP AND ACCESSORIES ARE DESIGNED FOR CONTINUOUS DUTY.
3. WET END PARTS ARE ASSEMBLED IN THE AS CAST FORM. SUCTION AND DISCHARGE PIPING SHOULD BE FITTED TO THE PUMP FLANGES AFTER THE PUMP IS SET IN PLACE AND LEVELED. USE THICK NEOPRENE GASKETS OF 40 TO 60 DUROMETER (SHORE A).
4. ⟨4⟩ PUMP ROTATION IS VIEWED FROM SHAFT END.
5. SUCTION AND DISCHARGE FLANGES MATE WITH CLASS 150 ANSI FLANGES.
6. GAGE TAPS ARE NOT AVAILABLE DUE TO MATERIAL HARDNESS.
7. VENTS AND DRAINS CAN BE PROVIDED IF SPECIFIED.
8. ⟨8⟩ PUMP SIZE INDICATES: SUCTION DIA. X DISCHARGE DIA. X IMPELLER DIA.
9. DIMENSIONAL TOLERANCE IS ±1/16 UNLESS NOTED OTHERWISE.

REVISIONS NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE DWG. NO. 78145

DESCRIPTION

CHG

CUSTOMER

USER

SERIAL NO.

CUSTOMER ORDER NUMBER | EPS SALES SHEET NO.

DRAWN BY RF | DATE 11/27/19

CHECKED | DATE

APPROVED | DATE

TRILLIUM FLOW TECHNOLOGIES

WEMCO® ROTO-JET®

WEMCO® TORQUE-FLOW PUMP

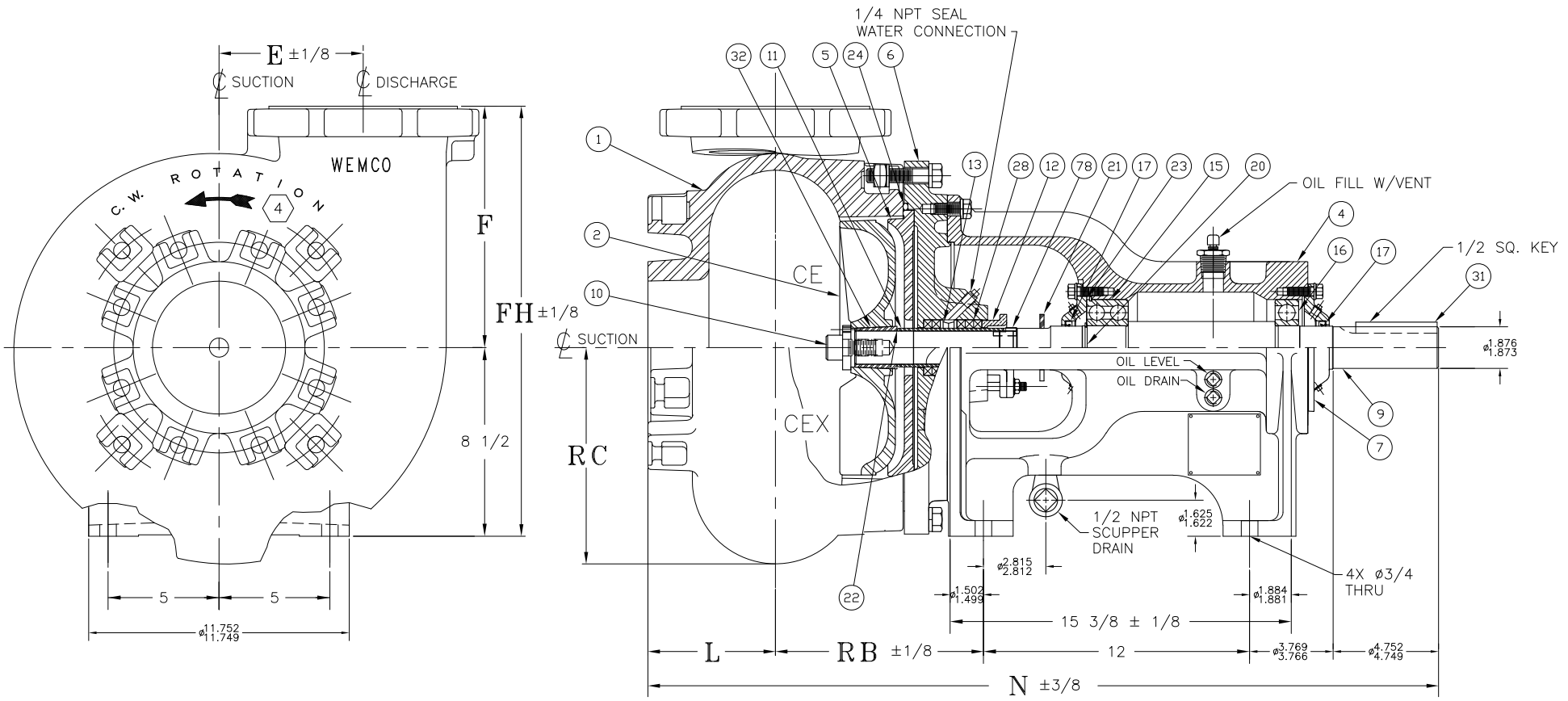
MODEL CE [redacted] 4 x 11, [redacted]

GENERAL ARRANGEMENT & ASSEMBLY

CAD NO. P10CE-D212 | SHEET 1 OF 2 | CODE NO. /

SCALE NONE | SIZE D | DWG NO. P10CE-D212 | REVISION

DRAWING NO. P10CE-D212



THIRD-ANGLE PROJECTION

DRAWING NO. P10CE-D212

TRILLIUM FLOW TECHNOLOGIES™

WEMCO® ROTO-JET®

CAD NO. P10CE-D212-1 | SHEET 2 OF 2

SCALE NONE | SIZE D | P10CE-D212 | REVISION

CHG

THIRD-ANGLE PROJECTION

PUMP SIZE ⑧	E	F	L	N	NX	MOTOR FRAMES	G	T	V	X	Z	CB	CC	CD	SHAFT CENTERS
2 x 2 x 11	6	10	3 1/2	32	42 5/8	182T–284T	25 3/4	5 1/4	5 3/8	17 1/2	20	10 1/4	47	45	18 3/8–23 3/4
						286T–365T	31	7 3/4	2 7/8	20	22 1/2	13	60	58	23 1/4–32
3 x 3 x 11	5 1/2	10	4 5/8	33	43 3/4	182T–284T	25 3/4	5 1/4	5 7/16	17 1/2	20	10 1/4	47	45	18 3/8–23 3/4
						286T–365T	31	7 3/4	2 15/16	20	22 1/2	13	60	58	23 1/4–32
4 x 4 x 11	6 1/2	10 7/8	4 3/4	33 5/8	44 3/8	182T–284T	25 3/4	5 1/4	5 15/16	17 1/2	20	10 1/4	47	45	18 3/8–23 3/4
						286T–365T	31	7 3/4	3 7/16	20	22 1/2	13	60	58	23 1/4–32
6 x 6 x 11	6 1/2	10 7/8	5 3/4	35 5/8	46 3/8	182T–284T	25 3/4	5 1/4	6 15/16	17 1/2	20	10 1/4	47	45	18 3/8–23 3/4
						286T–365T	31	7 3/4	4 7/16	20	22 1/2	13	60	58	23 1/4–32

NOTES:

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4. PUMP ROTATION IS CLOCKWISE VIEWED FROM SHAFT END.
5. SUCTION AND DISCHARGE FLANGES MATE WITH STANDARD CLASS 150 ANSI FLANGES.
6. GAGE TAPS ARE NOT AVAILABLE DUE TO MATERIAL HARDNESS.
7. VENTS AND DRAINS CAN BE PROVIDED IF SPECIFIED.
8. PUMP SIZE INDICATES: SUCTION DIA. X DISCHARGE DIA. X IMPELLER DIA.
9. DIMENSIONAL TOLERANCE IS ± 1/16 UNLESS NOTED OTHERWISE.

DRAWING NO. P10CE-D213

REVISIONS NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE DWG. NO.	DESCRIPTION
63313	

CHG

CUSTOMER

USER

SERIAL NO.

CUSTOMER ORDER NUMBER | EPS SALES SHEET NO.

DRAWN BY RF — DATE 11/27/19

CHECKED — DATE

APPROVED — DATE

TRILLIUM FLOW TECHNOLOGIES

WEMCO® ROTO-JET®

WEMCO TORQUE–FLOW PUMP

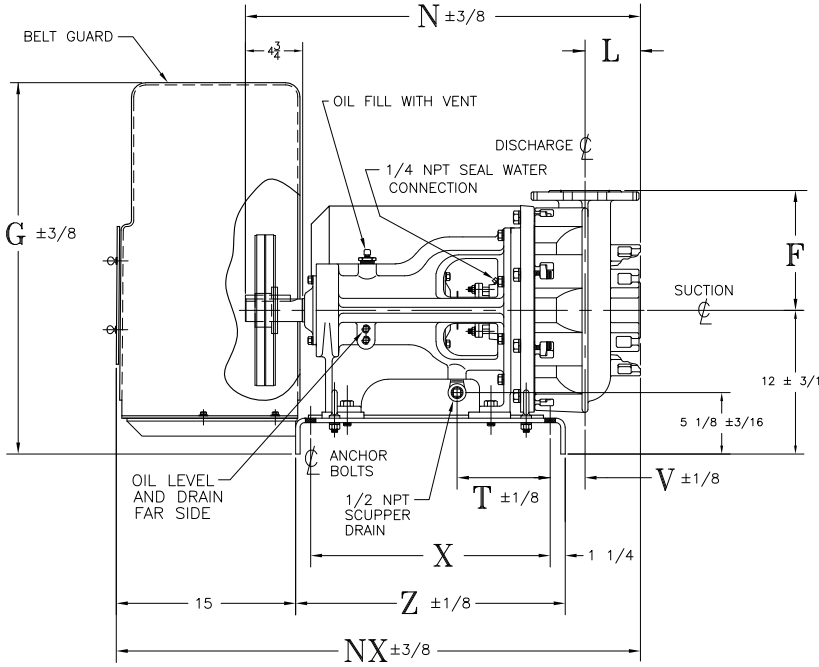
MODEL CE [redacted]

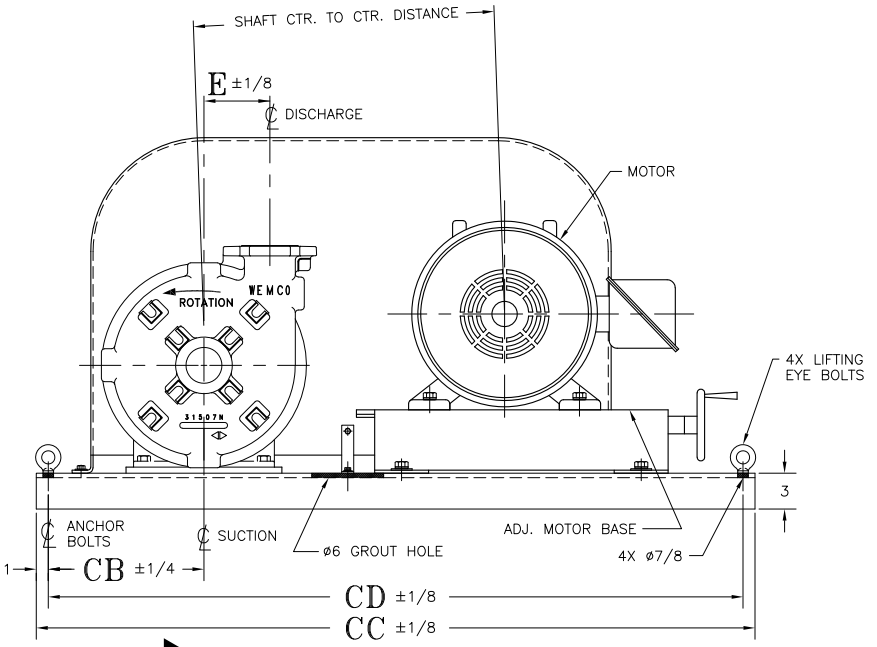
[redacted] 4 x 11, [redacted]

GENERAL ARRANGEMENT & ASSEMBLY

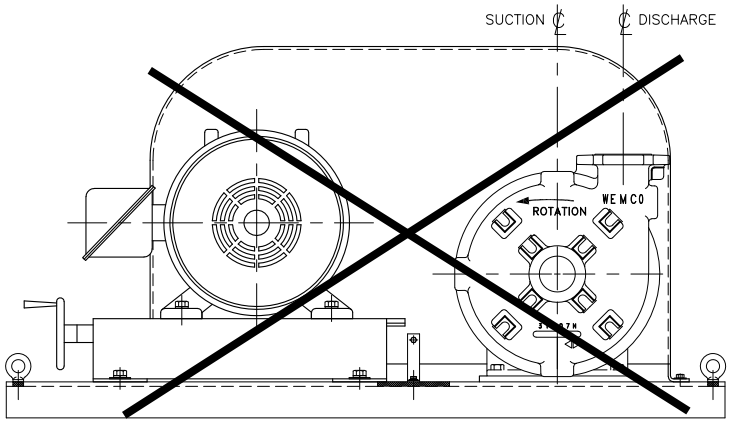
CAD NO. P10CE-D213 | SHEET 1 OF 2 | CODE NO. /

SCALE NONE | SIZE D | DWG NO. P10CE-D213 | REVISION





LEFT HAND ARRANGEMENT



~~RIGHT HAND ARRANGEMENT~~

DRAWING P10CE-D213

TRILLIUM FLOW TECHNOLOGIES™

WEMCO® ROTO-JET®

CAD NO. P10CE-D213-1 | SHEET 2 OF 2

SCALE NONE | SIZE D | P10CE-D213 | REVISION

CHG

Pump Performance Datasheet

Customer	: Wescor Associates Inc.	Quote number	: 1441511
Customer reference	:	Size	: 4x11 Model CE
Item number	: 001	Stages	: 1
Service	: Section 11312 Primary Sludge Pumps	Based on curve number	: 4x11CE_P10CE-D43
Quantity	: 4	Date last saved	: 21 Jul 2021 11:35 AM

Operating Conditions

Flow, rated	: 400 USgpm
Differential head / pressure, rated (requested)	: 50.0 ft
Differential head / pressure, rated (actual)	: 49.8 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed, rated	: 1240 rpm
Speed, maximum	: 1800 rpm
Speed, minimum	: 600 rpm
Efficiency	: 46.70 %
NPSH required / margin required	: - / 0.00 ft
Ns (imp. eye flow) / Nss (imp. eye flow)	: 1,802 / - US Units
MCSF	: 30.7 USgpm
Head maximum, rated speed	: 53.8 ft
Head rise to shutoff	: 7.64 %
Flow, best eff. point	: 755 USgpm
Flow ratio, rated / BEP	: 52.96 %
Speed ratio (rated / max)	: 68.89 %
Head ratio (rated speed / max speed)	: 45.19 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Acceptable

Liquid

Liquid type	: User defined
Additional liquid description	:
Solids diameter, max	: 4.00 in
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.000 / 1.000 SG
Viscosity, rated	: 1.00 cP
Vapor pressure, rated	: 0.00 psi.a

Material

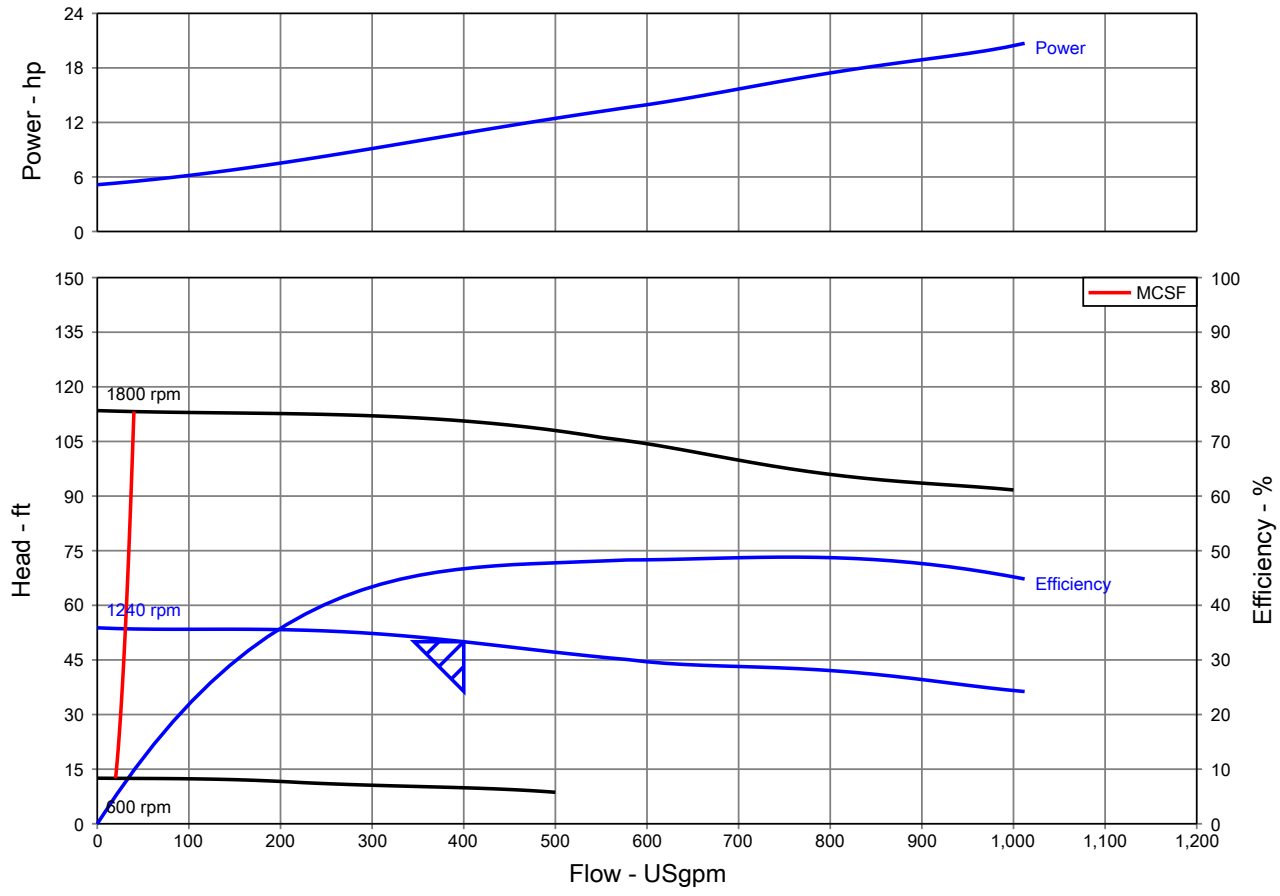
Material selected	: Standard

Pressure Data

Maximum working pressure	: 23.30 psi.g
Maximum allowable working pressure	: 85.00 psi.g
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: N/A

Driver & Power Data (@Max density)

Driver sizing specification	: Rated power
Margin over specification	: 0.08 %
Service factor	: 1.00
Power, hydraulic	: 5.05 hp
Power, rated	: 10.81 hp
Power, maximum, rated diameter	: 20.71 hp
Minimum recommended motor rating	: 15.00 hp / 11.19 kW



DISASSEMBLY PROCEDURE

WARNING

WHEN PERFORMING EQUIPMENT MAINTENANCE OR IF THE PUMP IS TO REMAIN OUT OF SERVICE FOR A PERIOD OF TIME, THE EQUIPMENT ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

A. DISASSEMBLY - BACK PULLOUT LEAVING CASE IN PLACE

1. De-energize the motor and lockout with key so that it cannot be started.

2. Close discharge and suction valve.

3. Disconnect all auxiliary piping and wiring.

4. Remove guard and separate coupling halves, or loosen motor base, and remove belts.

5. Block up the pump case or attach a slack-free sling from an overhead mount to the pump case to provide support. It is important to fully support the case so there is no strain on the suction and discharge flanges.

6. Remove all bolts attaching the bearing housing to back of case, and the bolts attaching bearing housing to base. Slide the bearing housing assembly back until the impeller can be reached.

7. Loosen the impeller bolt a few turns, but do not remove completely. The bolt will prevent the impeller from sliding off the shaft.

8. To remove impeller, insert two 5/8-11NC x 2" LG. bolts in threaded holes on bearing housing flange for jacking purpose. Holes are located 180° apart. Turn bolts evenly until pressure is exerted against backplate, wear plate and impeller, and impeller is loosened. Remove impeller bolt and slide impeller off the shaft collet.

9. Remove wearplate - it is clamped between case and bearing housing, so there are no fasteners to remove.

DISASSEMBLY PROCEDURE

B. PUMP WITH PACKING

After impeller and wear plate are removed, the stuffing box is accessible for disassembly.

1. Remove packing adjusting gland nuts and washers.
2. Remove packing gland halves.
3. Remove cap screws joining backplate-stuffing box housing to bearing housing.
4. Slide backplate - stuffing box, with packing, off pump shaft sleeve.
5. Remove packing and lantern ring from stuffing box.
6. Slide sleeve and O-ring gasket off shaft.

C. PUMP WITH MECHANICAL SEAL

1. Remove cap screws joining backplate-stuffing box to bearing housing.
2. Refer to seal manufacturer instructions before pulling backplate and seal off shaft and disassembling.

D. BEARING HOUSING

1. Drain oil from bearing housing.
2. Remove outboard and inboard bearing cover cap screws and remove bearing covers.
3. Push shaft out inboard end of bearing housing.
4. Press radial bearing off shaft; remove snap ring and press thrust bearing off shaft.

DISASSEMBLY PROCEDURE

E. REASSEMBLY

Reassemble pump in reverse order of disassembly, observing the applicable portions of the following precautions.

1. Discard all used gaskets and reassemble pump with new gaskets.

2. Apply oil to OD of both bearings to allow them to slide into bearing housing.

3. Exercise care in handling shaft sleeve. Dirt, scratches or burrs may cause early packing failure.

4. Exercise care in handling seal faces. Dirt, hairline scratches, or burrs may cause seal failure.

5. The stuffing box may be packed around the shaft sleeve before installing. Be sure the same packing-lantern ring sequence (2L3) is used as in the original. Slide sleeve and packed housing onto the shaft keeping the slot in bearing housing-end of the sleeve lined up with the drive key in the shaft.

6. Check through the water connection to be certain the lantern ring is located below this opening.

7. Tighten all bolts evenly and progressively to prevent damage to concentric fits and to accurate alignment. Degrease impeller bolt and apply Loctite 242 or Perma-Loc MM115 before installing.

8. Tap lightly on the sheave or coupling when mounting it on the shaft, as shock may put undue strain on the ball bearings.

9. Clean auxiliary piping before connecting to pump.

10. Do not run until proper oil is in bearing housing. See P10-D305 for lubrication instructions.

DISASSEMBLY PROCEDURE

Reference drawing P10CE-D212

WARNING

WHEN PERFORMING EQUIPMENT MAINTENANCE OR IF THE PUMP IS TO REMAIN OUT OF SERVICE FOR A PERIOD OF TIME, THE EQUIPMENT ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

ALL GUARDS AND PROTECTIVE DEVICES MUST BE INSTALLED BEFORE THE PUMP IS STARTED. CONTACT WITH UNGUARDED BELTS, SHEAVES, OR COUPLINGS COULD RESULT IN INJURY.

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

WARNING

PLEASE STUDY THESE INSTRUCTIONS CAREFULLY BEFORE PUTTING THE PUMP INTO SERVICE. ADHERENCE TO THESE INSTRUCTIONS IS NECESSARY FOR SATISFACTORY START-UP OF YOUR WEMCO PUMP. OPERATING PERSONNEL MUST READ AND UNDERSTAND THE START-UP AND OPERATING PARAGRAPHS.

I. INTRODUCTION

A. General Information

The WEMCO distribution network provides service wherever our pumps are sold. Should you require additional service information, do not hesitate to contact your local WEMCO representative.

B. Nameplate Data

Each pump has a nameplate affixed to it, with the pertinent data including the pump characteristics, model and serial number. When inquiring about parts or service, the above data should be supplied.

II. RECEIVING INSPECTION

Prior to signing any shipping documents, inspect the shipment for shortages or damages, and promptly report any to the carrier, noting damage on the freight bill of lading. MAKE ANY CLAIMS TO THE TRANSPORTATION COMPANY PROMPTLY.

Do not remove any tags. Instruction sheets on various components as well as the Operation and Maintenance Manual for the pump may be included in the shipment. DO NOT DISCARD!

III. UNLOADING

Care must be taken when unloading pumps.

INSTALLATION, OPERATION & MAINTENANCE
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WARNING

EQUIPMENT LIFTING DEVICES SUCH AS CHAIN, LIFTING EYES, HOOKS, ETC. MUST BE APPROVED BY LOCAL, STATE OR FEDERAL SAFETY CODES.

HOISTS AND CRANES MUST BE ADEQUATELY SIZED TO LIFT RATED LOADS.

FAILURE TO USE APPROVED LIFTING DEVICES MAY RESULT IN INJURY.

WHEN LIFTING THE PUMP IT IS IMPORTANT TO MAKE SURE THAT THE CHAIN AND CABLES ARE FASTENED RELIABLY TO THEIR RETAINING HOOKS.

When a horizontal pump is unloaded, it must be lifted at four equal points on the baseplate. When a vertical pump is unloaded, use lifting lugs on the motor mount. DO NOT LIFT BY MOTOR. Couplings, extended shafts and other accessories are normally shipped in separate containers to avoid damage.

IV. STORAGE INSTRUCTIONS

If the pump is not to be installed and operated immediately, store in a clean, dry place. WEMCO assumes the units will be placed in operation a few weeks after shipment, so no special protection is given the pump, drive or motor.

IF THE PUMP IS TO BE STORED MORE THAN TWO WEEKS:

A. Store pump in a clean, dry place free from vibration and extremes in temperature.

B. Protect all exposed, unpainted surfaces from rust.

C. Fully grease motor bearings initially, regrease every six months and rotate the shaft by hand every week.

D. Vents and drains on motors should be fully operable. Any drain plugs should be removed. Vertical motors should be stored in the vertical position.

E. On pumps with grease lubricated bearings, fully grease bearings initially and regrease every six months. On pumps with oil lubricated bearings, remove the vent on top of the bearing housing and fill the housing completely with a 20 weight non-detergent oil containing rust inhibitors. Replace the vent. ROTATE THE SHAFT 2 OR 3 REVOLUTIONS BY HAND EVERY WEEK.

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

Before starting, drain the oil to the recommended operating level, run for two minutes, drain all oil and refill with new oil to the proper level. BEFORE RUNNING, WATER MUST BE SUPPLIED TO THE PACKING OR SEAL CONNECTION. After prolonged storage, the bearing lubrication instructions in this Operation and Maintenance Manual must be followed.

F. Accessories such as drives, etc. should be protected in accordance with the accessory manufacturer's instructions.

Following these recommendations will help ensure that the pumps will operate without problems and give long, trouble free service.

V. INSTALLATION

A. Location of Pump

The pump should be placed as near the liquid source as possible, avoiding valves and elbows whenever possible.

B. Piping

Guidelines for piping are given in the "Hydraulic Institute Standards" and should be reviewed prior to pump installation. All piping should be supported independently of, and line up naturally with, the pump flanges. NEVER DRAW PIPING INTO PLACE BY USE OF FORCE AT THE FLANGED CONNECTION OF THE PUMP.

WEMCO recommends that flexible couplings or expansion joints be installed in the suction and discharge piping as near the pump as possible (to allow for temperature and pressure expansion) so that there will be no strain on the pump casing.

WARNING

SUCH STRAINS COULD RESULT IN STRUCTURAL FAILURE LEADING TO INJURY.

To obtain maximum available suction head, the suction line should be as direct and as short as possible, avoiding elbows. If elbows must be used, a long radius type is preferred. It is important to avoid any high point in a suction line in which air may accumulate and cause loss of prime. For the

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

same reason, it is important to have the suction line airtight when suction lift exists.

The suction pipe must be installed so that no air pockets can form, and the pipe must be level or slope upward to the pump intake. To prevent excessive losses, the suction piping must never be smaller in diameter than the pump suction, and preferably one pipe size larger. Eccentric reducers should be used on the suction side, with the flat side on top as shown in Figure 1. Use as few fittings as possible, and when elevating to any height, go vertically upward from the pump, then horizontally to the point of discharge.

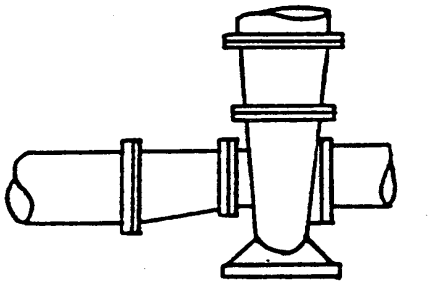

FIGURE 1
Recommended

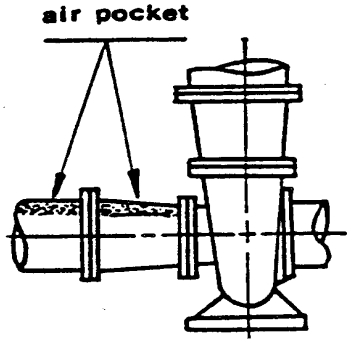

FIGURE 2
Not Recommended

Suction conditions such as liquid temperature, altitude above sea level and specific gravity should be compensated for by proper selection of the suction line.

The pump should not operate on a suction lift when pumping liquid with entrained air or gas. Check valves should not be used in the suction line and gate valves should be installed with the stem horizontal to prevent trapping air or gas. Suction valves must be fully open during operation.

C. Installation on Foundation

The pump and drive assembly should be placed on the foundation with the coupling halves disconnected. On belt drive units, the belts may remain on the sheaves. The alignment operation must be completed before the coupling is reassembled. The baseplate should be supported on metal wedges or blocks as illustrated in Figures 3 and 4. The support wedges or blocks should be placed close to the anchor bolts.

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

Adjust the metal wedges or blocks around the base edge until the base is level. Suction and discharge flanges should be checked by means of a level and coupling alignment should be checked with a straightedge. Corrections may be made for flange and coupling level or plumb by shims under the pump or motor.

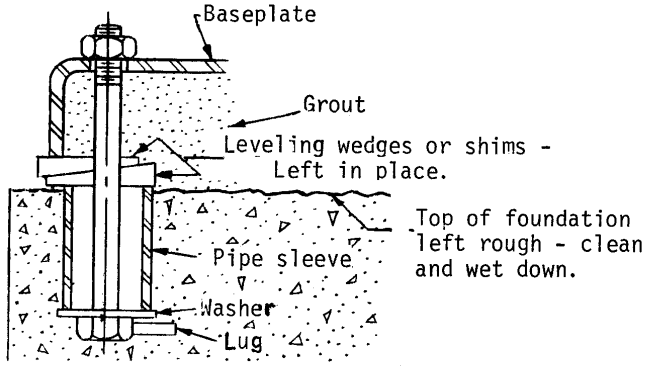

FIGURE 3
Typical Foundation Bolt Design

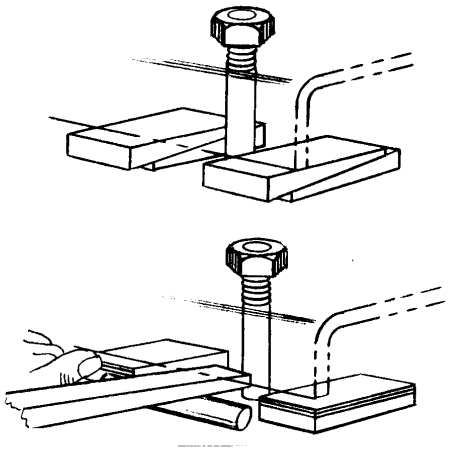

FIGURE 4
Method of Leveling

D. Grouting

Evenly adjust all anchor bolts, but not too firmly, after the first alignment has been completed. The baseplate can then be grouted to the foundation. All voids under the baseplate must be filled with grout. It is desirable to grout all wedges and blocks in place. Anchor bolts should not be fully tightened until the grout has hardened, approximately 48 hours after pouring.

E. Connection of Piping

The initial alignment of the pump and driver should be completed before the piping is connected to the pump. After the grout has thoroughly set and the anchor bolts have been tightened, connect the discharge and suction pipes to the pump flanges with gaskets in place and tighten firmly. Make sure the pipe flanges are parallel and in line so that no piping loads are transmitted to the pump.

WARNING

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

ALL PUMP MODELS ARE CONSTRUCTED OF BRITTLE MATERIALS AND GREAT CARE MUST BE USED IN CONNECTING THESE FLANGES. TIGHTEN EVENLY AND ADJUST TO A SNUG FIT. UNDER NO CIRCUMSTANCES SHOULD THE CASING BE SUBJECTED TO PIPING STRAINS. SUCH STRAINS COULD RESULT IN STRUCTURAL FAILURE LEADING TO INJURY.

F. Electric Motor Drive

If the pump driver is an electric motor, a motor starter with overload protection should be provided. The overload resets should be set according to local code. Refer to the motor nameplate. Direction of rotation of the pump impeller will be indicated on the pump drawing and arrows on the case. Make motor electrical connections accordingly. Changing any two leads on a three phase motor will change the direction of motor rotation.

WARNING

ALL ELECTRICAL CONNECTIONS AND WIRING ARE TO BE IN COMPLIANCE WITH LOCAL BUILDING AND SAFETY CODES.

DO NOT OPERATE EQUIPMENT WITH OPEN ELECTRICAL BOXES OR FITTINGS. CONCTACT WITH INCORRECTLY WIRED EQUIPMENT COULD RESULT IN INJURY.

WARNING

DO NOT OPERATE PUMP WITH BOTH SUCTION AND DISCHARGE VALVES CLOSED OR WITH SUCTION AND DISCHARGE CLOSED BY CLOGGING - THIS COULD CAUSE DAMAGE AND IS DANGEROUS. WEMCO PUMPS ARE TO BE USED FOR LIQUID SERVICE ONLY. EXCESSIVE PRESSURE CAN CAUSE MALFUNCTION LEADING TO INJURY.

AVOID ISOLATING THE PUMP COMPLETELY BY CLOSING BOTH THE SUCTION AND DISCHARGE VALVE AT THE SAME TIME IF THE PUMP CONTAINS A BIOLOGICALLY ACTIVE SLUDGE. DECOMPOSING SLUDGE WILL PRODUCE GAS AND IF THE GAS IS NOT VENTED OR OTHERWISE RELIEVED WITH AN

INSTALLATION, OPERATION & MAINTENANCE
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APPROVED RELIEF DEVICE, A PRESSURE BUILD-UP WILL OCCUR WHICH COULD RUPTURE THE PUMP AND/OR PIPING, CAUSING POSSIBLE INJURY AND/OR PROPERTY LOSS. REFER TO THE "WATER ENVIRONMENT FEDERATION MANUAL" OF PRACTICE SM-1 FOR MORE INFORMATION ON THIS HAZARD.

VI. OPERATION

A. Before Starting

The pump is ready to start when the following have been completed:

1. All construction debris has been removed from suction well.
2. Pump baseplate is grouted and bolted to the foundation.
3. Pump and driver are correctly aligned.
4. Bearings are adequately lubricated. Grease lube bearings are packed with grease at the factory, but oil lube bearings are shipped without oil. In all cases, refer to the Bearing Lubrication Instructions in this manual.
5. Pump has been checked for correct rotation as indicated by the WEMCO drawing and by arrows on the pump case.
6. All rotating parts are found to turn freely by hand.
7. Suction and discharge valves are open.
8. Pump is primed. If installed with suction lift, the pump may be primed by using an ejector or vacuum pump.
9. Seal water has been provided to packing box. See Packing or Mechanical Seal section of this manual.
10. All guards are installed.
11. An attempted start-up of the pump when operating in reverse could cause high shock loads to both the pump and its prime mover, and result in serious mechanical and electrical damage.

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

B. Start-up

1. After the unit is aligned, the bearings lubricated, the packing or seal flush lines connected and all flanges are tightened, the suction valve may be opened. After the seal chamber is filled with liquid, jog motor to check rotation. If the rotation is incorrect, reverse any two leads on a three phase motor and recheck rotation.

   A positive suction head should be provided, but if the liquid level is below the pump the pump must be primed before start-up.

   On start-up, an ammeter should be used on the motor to check for overload. If the unit is direct connected, the discharge valve may be throttled should the motor be overloaded. If it appears the system head is lower than rated, the impeller may be trimmed to meet the lower head (except Model C). After trimming, the impeller must be balanced before installing. If the unit is belt driven, the pump speed may be lowered to get the proper operating point.

   The discharge valve may be throttled to provide varying capacities, but the suction valve should remain fully open at all times during operation.

   If trouble is experienced upon initial or subsequent operation, refer to the Operating Problems section of this manual to diagnose and correct the defect.

WARNING

DO NOT OPERATE THE PUMP AGAINST A CLOSED DISCHARGE VALVE. DO NOT OPERATE THE PUMP UNLESS THE PUMP IS FILLED WITH LIQUID.

2. Make an additional check of alignment between the pump and driver after a few hours of operation. Repeat this check after one week of initial run.

WARNING

WHEN CHECKING ALIGNMENT, OR PERFORMING ANY WORK ON THE UNITS,

INSTALLATION, OPERATION & MAINTENANCE
GENERAL INSTRUCTIONS

ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

ALL GUARDS AND PROTECTIVE DEVICES MUST BE INSTALLED BEFORE THE PUMP IS STARTED. CONTACT WITH UNGUARDED BELTS, SHEAVES OR COUPLINGS COULD RESULT IN INJURY.

C. Shutdown

To shut the pump down, proceed as follows:

1. Disconnect the pump to the driver.

2. Close the suction and discharge valves and isolate any external service connections the pump may have.

3. If the pump is to remain out of service for a period of time longer than two weeks, the shaft must be rotated on a weekly basis to ensure positive coating on lubricated surfaces, thus retarding or preventing rust or oxidation.

WARNING

WHEN PERFORMING EQUIPMENT MAINTENANCE OR IF THE PUMP IS TO REMAIN OUT OF SERVICE FOR A PERIOD OF TIME, THE EQUIPMENT ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

D. Freezing Protection

If the pump is to be subjected to freezing temperatures it must be drained. If the case is not equipped with a drain plug, loosen the case bearing housing bolts and allow the case to drain. If a mechanical seal is involved, the seal chamber must be drained or seal damage may occur.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS
SINGLE MECHANICAL SEAL

I. Mechanical Seal Flush Requirements

Mechanical seals must be flushed with a clean liquid with lubricating quality at 120°F or less and 15 PSI over the maximum pump discharge pressure.

NOTE: The seal must be pressurized at all times to keep pumpage out of the seal, even if the pump is not running. Failure to flush the seal at all times will result in seal contamination and seal failure.

II. Mechanical Seal Flush Connections - Single Seal

Connect water piping to the packing box or seal plate connection.

NOTE: More than one connection may be provided. The flush water needs to be connected at only one location.

Flush water will flow into the stuffing box or seal plate and into the pump. A throttle bushing or lip seal may be used to regulate the flow into the stuffing box or seal plate.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS
BELT DRIVE ALIGNMENT

I. Belt Drive Alignment

The pump and driver, if supplied, were not aligned at the factory since the unit can shift during shipment. **Alignment must take place prior to the piping being connected to the pump**. The pump and driver shafts must be checked for angular and parallel alignment. **Both the pump and driver may have to be moved to obtain the proper alignment**. (Realignment is also necessary after the grout has hardened and the anchor bolts have been tightened.) The alignment must also be finally checked after the piping has been completed, and rechecked periodically. Inaccurate alignment results in vibration and excessive wear on bearings, shaft sleeves or mechanical seals.

II. Alignment Procedure

Shaft alignment can be checked by measuring the distance between the shafts at three or more locations. If the distances are equal the shafts are parallel.

A straightedge or a piece of string can be used to check the alignment of the sheaves on the shafts. If the sheaves are properly lined up the straightedge or string will touch each sheave at two points and both sheaves at four points simultaneously. Rotating each sheave a half a revolution will determine whether the sheave is wobbly or the drive shaft is bent. Correct any misalignment.

The sheaves should be mounted as close as possible to the pump and motor bearings. With the sheaves aligned, tighten the cap screws evenly and progressively. Apply the recommended torque to the cap screws as listed in Figure 1.

NOTE: There should be 1/8" to 1/4" gap between the mating part hub and the bushing flange. If the gap is closed the shaft is seriously undersized.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS
BELT DRIVE ALIGNMENT

Tapered Bushing	Size & Thread of Cap Screw	Torque (Ft.-Lbs.) NOTE: Use Torque Wrench	Wrench Length (Inches)	Wrench Pull (Lbs.)
QT	1/4 x 3/4	6	4	18
JA	No. 10 - 24	5	4	15
SH-SDS-SD	1/4 - 20	9	4	27
SK	5/16 - 18	15	6	30
SF	3/8 - 16	30	6	60
E	1/2 - 13	60	12	60
F	9/16 - 12	75	12	75
J	5/8 - 11	135	12	113
M	3/4 - 10	225	15	120
N	7/8 - 9	300	15	150
P	1 - 8	450	18	183
W	1-1/8 - 7	600	24	167
S	1-1/4 - 7	750	30	167

FIGURE 1
Sure Grip Bushings
Screw Tightening Information

Caution: The tightening force on the screws is multiplied many times by the wedging action of the tapered surface. If extreme tightening force is applied, or if a lubricant is used, bursting pressures will be created in the hub of the mating part.

WARNING

ALL GUARDS AND PROTECTIVE DEVICES MUST BE INSTALLED BEFORE THE PUMP IS STARTED. CONTACT WITH UNGUARDED BELTS, SHEAVES OR COUPLINGS COULD RESULT IN INJURY.

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS
BEARING LUBRICATION - OIL

I. Bearing Lubrication at Start-up

Oil lubricated ball bearings are SHIPPED WITHOUT OIL. Before starting the pump, fill the oil reservoir to the sight glass oil level mark with SAE 20 non-detergent oil containing rust inhibitors, such as Mobil DTE 25. Operate the pump for 2 minutes, then drain the oil from the reservoir and refill to the proper oil level with fresh oil. This will flush the bearing housing and remove any foreign matter that may have accumulated during shipment.

If a constant level oiler is used, fill the oil glass and insert it on the oiler base after the pump oil reservoir has been filled to the proper level.

II. Bearing Lubrication During Operation

Keep the bearing oil reservoir filled to the oil level line on the sight glass. Do not overfill. Check the oil level weekly. Use a recommended oil such as the type described above.

INSTALLATION, OPERATION & MAINTENANCE
TROUBLE SHOOTING – OIL BELT DRIVE MECHANICAL SEAL

I. OPERATING PROBLEMS

TROUBLE SHOOTING

A. NO LIQUID DELIVERED AT END DELIVERY POINT OR THROUGH FLOW METER	
Possible Causes	**Corrective Action**
1. Pump not primed.	1. Prime with vacuum or liquid.
2. Speed too low; check voltage and frequency.	2. Supply proper voltage and frequency. Increase speed by sheave change. Watch motor for overload.
3. Air leak in suction or around the seal.	3. Tighten all flange bolting. Supply liquid to the seal.
4. Discharge head too high.	4. Reduce head or increase pump speed by installing smaller pump sheave or larger motor sheave. Watch motor for overload.
5. Suction lift too high.	5. Lower pump or raise liquid level on suction side.
6. Suction or discharge line plugged.	6. Unplug line.
7. Wrong direction of rotation.	7. On 3-phase motor, reverse any 2 leads.
8. Suction or discharge valve closed.	8. Open valves.
9. Gas or vapor pocket in suction line.	9. Vent or release vapor.

WARNING

ANY SPEED INCREASE MEANS THE BRAKE HORSEPOWER INCREASES AS A CUBE OF THE SPEED, SO THE MOTOR POWER DRAW MUST BE MONITORED TO DISCOVER ANY MOTOR OVERLOAD.

B. NOT ENOUGH PRESSURE ON PRESSURE GAUGE	
Possible Causes	**Corrective Action**
1. Speed too low; check voltage and frequency.	1. Provide proper voltage and frequency. Increase speed by installing smaller pump sheave or larger motor sheave. Watch for motor overload.
2. Air or gas in liquid.	2. Vent case.
3. Air leak in suction or around the seal.	3. Tighten all flange bolting. Supply liquid to the seal.
4. Impeller diameter too small.	4. Increase speed, install smaller pump sheave. Do not overload motor.
5. Damaged impeller or casing.	5. Replace impeller or case.

INSTALLATION, OPERATION & MAINTENANCE
TROUBLE SHOOTING – OIL BELT DRIVE MECHANICAL SEAL

C. MOTOR RUNS HOT-OVER 170°F WITH THERMOMETER ON MOTOR HOUSING-DO NOT TOUCH	
Possible Causes	**Corrective Action**
1. Speed too high.	1. Lower pump speed. Install smaller motor sheave or larger pump sheave.
2. System head lower than rating, allowing pump to handle too much liquid.	2. Lower pump speed. Install smaller motor sheave or larger pump sheave. Fully open discharge valve.
3. Liquid heavier or more viscous than rating.	3. Install larger motor.
4. Impeller binding or rubbing.	4. Disassemble pump and remove bind.
5. Voltage and frequency lower than rating.	5. Supply proper voltage and frequency.
6. Defects in motor.	6. Take to motor repair shop.
7. Pump or motor bearing over-lubricated.	7. Decrease lubrication.

D. BEARING OVERHEAT - OVER 180°F WITH THERMOMETER - DO NOT TOUCH	
Possible Causes	**Corrective Action**
1. Oil level too low or too high.	1. Check oil sight glass and add or drain oil.
2. Improper or poor grade of oil.	2. Use SAE 20 non-detergent oil.
3. Dirt or water in bearings.	3. Replace bearings.
4. Misalignment.	4. Align pump and motor sheaves.

E. BEARINGS WEAR RAPIDLY - INDICATED BY NOISE, HEAT OR SEIZURE	
Possible Causes	**Corrective Action**
1. Misalignment.	1. Align pump and motor sheave.
2. Bent shaft.	2. Replace shaft.
3. Vibration.	3. Tighten bearing cap bolting or replace bearings.
4. Lack of lubrication.	4. Keep oil at proper level.
5. Bearing improperly installed.	5. Install new bearings in accord with WEMCO instructions.
6. Moisture in oil.	6. Replace oil and inspect bearing for rust. If rust is found, replace bearings.
7. Dirt in bearings.	7. Replace bearings.
8. Over-lubrication.	8. Keep oil at proper level.

F. NOT ENOUGH LIQUID DELIVERED THROUGH FLOW METER OR AT END DELIVERY POINT	
Possible Causes	**Corrective Action**
1. Air leaks in suction or around the seal.	1. Tighten all flange bolting. Supply water to the seal.
2. Speed too low. Check voltage and frequency.	2. Install smaller pump sheave. Supply proper voltage and frequency.
3. Suction lift too high.	3. Increase level on suction side or lower pump.
4. Suction or discharge line partially plugged.	4. Unplug.
5. Low NPSH.	5. Increase liquid on suction side of pump or lower pump.
6. Total system head too high.	6. Speed up pump. Do not overload motor.
7. Damaged impeller or casing.	7. Replace impeller or case.

INSTALLATION, OPERATION & MAINTENANCE
TROUBLE SHOOTING – OIL BELT DRIVE MECHANICAL SEAL

WARNING

ANY SPEED INCREASE MEANS THE BRAKE HORSEPOWER INCREASES AS THE CUBE OF THE SPEED, SO THE MOTOR POWER DRAW MUST BE MONITORED TO DISCOVER ANY MOTOR OVERLOAD.

G. PUMP WORKS FOR AWHILE, THEN LOSES SUCTION - INDICATED BY NO FLOW THROUGH FLOW METER OR AT END DELIVERY POINT	
Possible Causes	**Corrective Action**
1. Leaky suction line.	1. Tighten bolts on flanges.
2. Gas or vapor pocket in suction line.	2. Vent suction line.
3. Suction lift too high.	3. Lower pump or raise suction liquid level.
4. Air leaks in suction or seal chamber.	4. Tighten flange bolting and supply water to the seal.
5. End of suction line is uncovered.	5. Submerge end of line.

H. VIBRATION - INDICATED BY EXTREME SHAKING AND/OR NOISE	
Possible Causes	**Corrective Action**
1. Gas or vapor in the liquid.	1. Vent pump.
2. Available NPSH not sufficient.	2. Raise suction level or lower pump.
3. Inlet to suction is not sufficiently submerged.	3. Submerge line.
4. Misalignment of shafts.	4. Align sheave.
5. Worn or loose bearings.	5. Replace bearings. Tighten bearing cap bolts.
6. Impeller out of balance.	6. Balance impeller.
7. Shaft bent.	7. Replace shaft.
8. Impeller damaged and unbalanced.	8. Replace impeller.

Trillium Pumps USA SLC LLC (Seller)

LIMITED WARRANTY

COVERAGE: Seller warrants its products to be free from defects in materials and workmanship when operated under the normal conditions for which the products were designed.

WARRANTY PERIOD: This warranty covers a period of twelve (12) months from the date product was placed into service, or eighteen (18) months from the date of shipment, whichever occurs first.

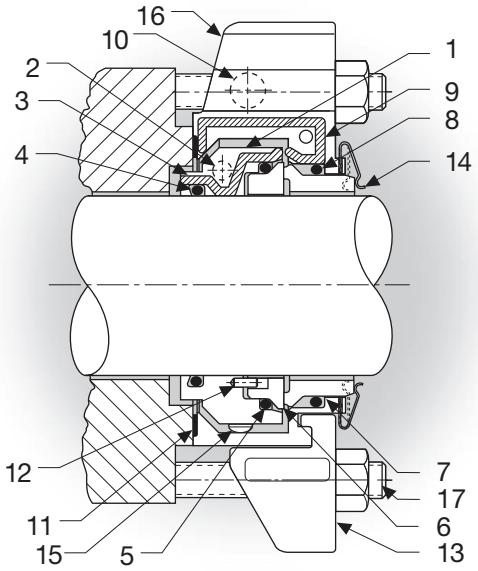
REMEDIES: If the product fails due to defective materials or workmanship within the warranty period, Trillium's sole obligation after verification of the defect, shall be, at its discretion, the repair or replacement of the product. **THIS PARAGRAPH PROVIDES THE EXCLUSIVE REMEDIES FOR ALL CLAIMS BASED ON FAILURE OF OR DEFECT IN A PRODUCT, WHETHER THE FAILURE OR DEFECT ARISES BEFORE, DURING, OR AFTER THE APPLICABLE WARRANTY PERIOD AND WHETHER A CLAIM, HOWEVER DESCRIBED, IS BASED ON CONTRACT, WARRANTY, INDEMNITY, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, AND IS SUBJECT TO ALL LIMITATIONS OF LIABILITY FOUND HERE OR ELSEWHERE IN THE TERMS AND CONDITIONS.**

OWNER'S OBLIGATIONS: Owner shall notify Seller of a defect within ten (10) days of its discovery. At the Owner's expense, the defect may be verified at Owner's site, at Seller's authorized facility, or by returning the product to Seller's factory.

EXCLUSIONS: This warranty does not apply to consumable items that are normally replaced during maintenance; and defects resulting from improper installation, operation, maintenance, storage, neglect, or accident. This warranty does not cover any expense for repairs or alterations performed outside Seller's factory without Seller's prior authorization. Equipment and accessories not manufactured by Seller are warranted only by the original manufacturer's warranty. Seller shall not be liable for costs of removal, transportation, or reinstallation of products. Seller shall not be liable for any consequential, special, incidental, or indirect damages or delays resulting from or related to defective products.

SELLER MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, AND DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, AND ANY IMPLIED WARRANTY THAT COULD ARISE FROM COURSE OF DEALING OR USAGE OF TRADE. SELLER ALSO DISCLAIMS ALL STATUTORY WARRANTIES.

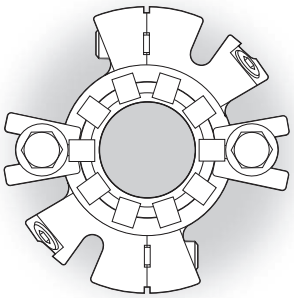
442 Split Mechanical Seal Technical Data



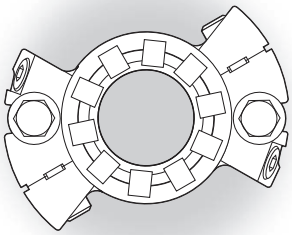
1. Rotary Holder
2. Socket Head Cap Screw
3. Holder Gasket
4. Shaft O-ring
5. Rotary O-ring
6. Rotary Face
7. Stationary Face
8. Stationary O-Ring
9. Gland Gasket
10. Socket Head Cap Screw
11. Stuffing Box Gasket
12. Anti-Rotation Pin
13. Bolt Tab
14. Spring
15. Centering Button
16. Gland
17. Stuffing Box Bolts

EQUIPMENT BOLT PATTERNS

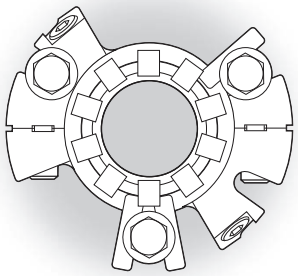
Shaft Sizes: 1.625" to 4.750" (40 mm to 120 mm)



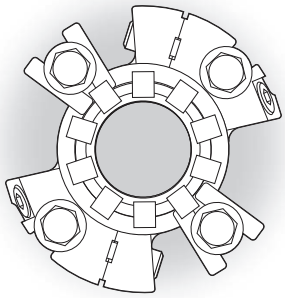
2 BOLTS



2 BOLTS

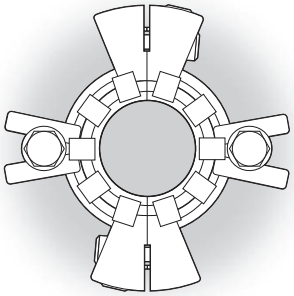


3 BOLTS

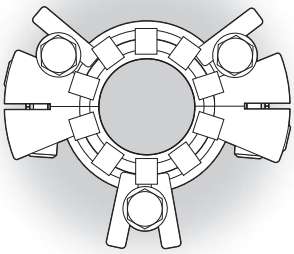


4 BOLTS

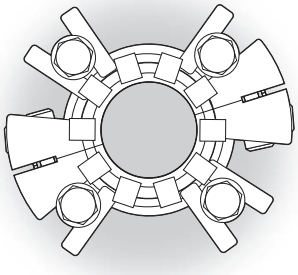
All Other Shaft Sizes



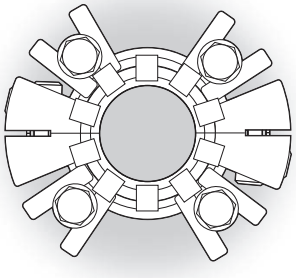
2 BOLTS



3 BOLTS



4 BOLTS



4 BOLTS

DIMENSIONAL DATA (INCH & METRIC)

SHAFT SIZE	M HOLDER ID FROM BOX		N INSTALLATION DIM		P NPT SIZE
	INCH	METRIC	INCH	METRIC	
1.250" to 1.500" (32 mm to 38 mm)	0.53	13,5	0.094	2,4	1/4"
1.625" to 4.750" (40 mm to 120 mm)	0.53	13,5	0.094	2,4	3/8"
4.875" to 7.750" (125 mm to 195 mm)	1.03	26,0	0.188	4,8	1/2"

KEY - Figures 1 & 2

- **A** – Shaft Size
- **B** – Max. Gland Dia.
- **C** – Min./Max. Stuffing Box Dia.
- **D** – Gland Length
- **E** – Min. Stuffing Box Depth
- **F** – Outboard Length Required
- **G** – Min. Bolt Circle by Bolt Size
- **H** – Min. Stuffing Box Face OD
- **L** – Gland Hub OD
- **M** – Holder ID from Box
- **N** – Installation Dimension
- **O** – Shaft O-ring Number
- **P** – NPT Size

DIMENSIONAL DATA (INCH)

A SHAFT SIZE	B GLAND OD	C STUFFING BOX BORE		D GLAND LENGTH	E SB DEPTH	F OB LENGTH	G BOLT CIRCLE BY BOLT SIZE					H SB FACE OD	L GLAND HUB OD	O SHAFT O-RING NO.
	MAX	MIN		MAX		MIN	3/8"	1/2"	MIN 5/8"	3/4"	7/8"	MIN	MAX	
1.250	4.94	1.86	2.10	1.48	0.17	1.78	3.20	3.33	3.45	-	-	2.35	2.79	-219
1.375	5.02	1.94	2.38	1.48	0.17	1.78	3.28	3.40	3.53	-	-	2.63	2.87	-221
1.500	5.14	2.06	2.50	1.48	0.17	1.78	3.40	3.53	3.65	-	-	2.75	2.99	-223
1.625	5.26	2.19	2.63	1.48	0.17	1.78	3.50	3.63	-	-	-	2.87	3.11	-224
1.750	5.39	2.31	2.75	1.48	0.17	1.78	3.63	3.75	-	-	-	3.00	3.23	-225
1.875	5.51	2.44	2.88	1.48	0.17	1.78	3.75	3.88	-	-	-	3.12	3.35	-226
2.000	5.64	2.56	3.00	1.48	0.17	1.78	3.94	4.06	-	-	-	3.25	3.48	-227
2.125	5.76	2.69	3.12	1.48	0.17	1.78	4.06	4.19	4.31	-	-	3.37	3.60	-228
2.250	5.88	2.81	3.25	1.48	0.17	1.78	4.19	4.31	4.44	-	-	3.50	3.73	-229
2.375	6.01	2.94	3.37	1.48	0.17	1.78	4.31	4.43	4.56	-	-	3.62	3.85	-230
2.500	6.13	3.06	3.75	1.48	0.17	1.78	4.57	4.70	4.82	-	-	4.00	4.23	-231
2.625	7.77	3.35	4.25	1.84	0.26	2.24	5.44	5.56	5.69	-	-	4.75	5.00	-232
2.750	7.77	3.35	4.25	1.84	0.26	2.24	5.44	5.56	5.69	-	-	4.75	5.00	-233
2.875	8.02	3.60	4.50	1.84	0.26	2.24	5.66	5.78	5.91	-	-	5.00	5.25	-234
3.000	8.02	3.60	4.50	1.84	0.26	2.24	5.66	5.78	5.91	-	-	5.00	5.25	-235
3.125	8.27	3.85	4.75	1.84	0.26	2.24	6.00	6.12	6.25	-	-	5.25	5.49	-236
3.250	8.27	3.85	4.75	1.84	0.26	2.24	6.00	6.12	6.25	-	-	5.25	5.49	-237
3.375	8.51	4.10	5.00	1.84	0.26	2.24	6.16	6.28	6.41	6.53	6.66	5.50	5.75	-238
3.500	8.51	4.10	5.00	1.84	0.26	2.24	6.16	6.28	6.41	6.53	6.66	5.50	5.75	-239
3.625	8.77	4.35	5.25	1.84	0.26	2.24	6.41	6.53	6.66	6.78	6.91	5.75	6.00	-240
3.750	8.77	4.35	5.25	1.84	0.26	2.24	6.41	6.53	6.66	6.78	6.91	5.75	6.00	-241
3.875	9.02	4.60	5.50	1.84	0.26	2.24	6.66	6.78	6.91	7.03	7.16	6.00	6.25	-242
4.000	9.02	4.60	5.50	1.84	0.26	2.24	6.66	6.78	6.91	7.03	7.16	6.00	6.25	-243
4.125	9.27	4.85	5.75	1.84	0.26	2.24	6.91	7.03	7.16	7.28	7.41	6.25	6.50	-244
4.250	9.27	4.85	5.75	1.84	0.26	2.24	6.91	7.03	7.16	7.28	7.41	6.25	6.50	-245
4.375	9.52	5.10	6.00	1.84	0.26	2.24	7.16	7.28	7.41	7.53	7.66	6.50	6.75	-246
4.500	9.52	5.10	6.00	1.84	0.26	2.24	7.16	7.28	7.41	7.53	7.66	6.50	6.75	-247
4.625	9.77	5.35	6.25	1.84	0.26	2.24	7.41	7.53	7.66	7.78	7.91	6.75	7.00	-248
4.750	9.77	5.35	6.25	1.84	0.26	2.24	7.41	7.53	7.66	7.78	7.91	6.75	7.00	-249
4.875	11.28	5.87	7.00	2.91	0.29	3.45	-	-	8.41	8.53	8.66	7.50	7.74	-353
5.000	11.28	5.99	7.00	2.91	0.29	3.45	-	-	8.41	8.53	8.66	7.50	7.74	-354
5.125	11.53	6.12	7.25	2.91	0.29	3.45	-	-	8.66	8.78	8.91	7.75	7.99	-355
5.250	11.53	6.24	7.25	2.91	0.29	3.45	-	-	8.66	8.78	8.91	7.75	7.99	-356
5.375	11.78	6.37	7.50	2.91	0.29	3.45	-	-	8.91	9.03	9.16	8.00	8.24	-357
5.500	11.78	6.49	7.50	2.91	0.29	3.45	-	-	8.91	9.03	9.16	8.00	8.24	-358
5.625	12.03	6.62	7.75	2.91	0.29	3.45	-	-	9.16	9.28	9.41	8.25	8.49	-359
5.750	12.03	6.74	7.75	2.91	0.29	3.45	-	-	9.16	9.28	9.41	8.25	8.49	-360
5.875	12.28	6.87	8.00	2.91	0.29	3.45	-	-	9.41	9.54	9.66	8.50	8.74	-361
6.000	12.28	6.99	8.00	2.91	0.29	3.45	-	-	9.41	9.54	9.66	8.50	8.74	-362
6.125	12.53	7.12	8.25	2.91	0.29	3.45	-	-	9.66	9.79	9.91	8.75	8.99	-362
6.250	12.53	7.24	8.25	2.91	0.29	3.45	-	-	9.66	9.79	9.91	8.75	8.99	-363
6.375	12.78	7.37	8.50	2.91	0.29	3.45	-	-	9.91	10.04	10.16	9.00	9.25	-363
6.500	12.78	7.49	8.50	2.91	0.29	3.45	-	-	9.91	10.04	10.16	9.00	9.25	-364
6.625	13.03	7.62	8.75	2.91	0.29	3.45	-	-	10.17	10.29	10.42	9.25	9.50	-364
6.750	13.03	7.74	8.75	2.91	0.29	3.45	-	-	10.17	10.29	10.42	9.25	9.50	-365
6.875	13.28	7.87	9.00	2.91	0.29	3.45	-	-	10.42	10.54	10.67	9.50	9.75	-365
7.000	13.28	7.99	9.00	2.91	0.29	3.45	-	-	10.42	10.54	10.67	9.50	9.75	-366
7.125	13.53	8.12	9.25	2.91	0.29	3.45	-	-	10.67	10.79	10.92	9.75	10.00	-366
7.250	13.53	8.24	9.25	2.91	0.29	3.45	-	-	10.67	10.79	10.92	9.75	10.00	-367
7.375	13.78	8.37	9.50	2.91	0.29	3.45	-	-	10.92	11.04	11.17	10.00	10.25	-367
7.500	13.78	8.49	9.50	2.91	0.29	3.45	-	-	10.92	11.04	11.17	10.00	10.25	-368
7.625	14.03	8.62	9.75	2.91	0.29	3.45	-	-	11.17	11.29	11.42	10.25	10.50	-368
7.750	14.03	8.74	9.75	2.91	0.29	3.45	-	-	11.17	11.29	11.42	10.25	10.50	-369

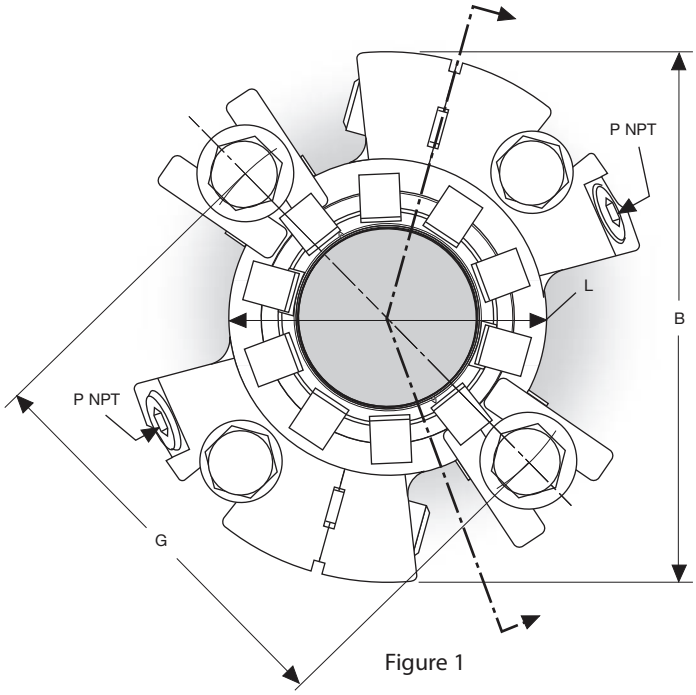


Figure 1

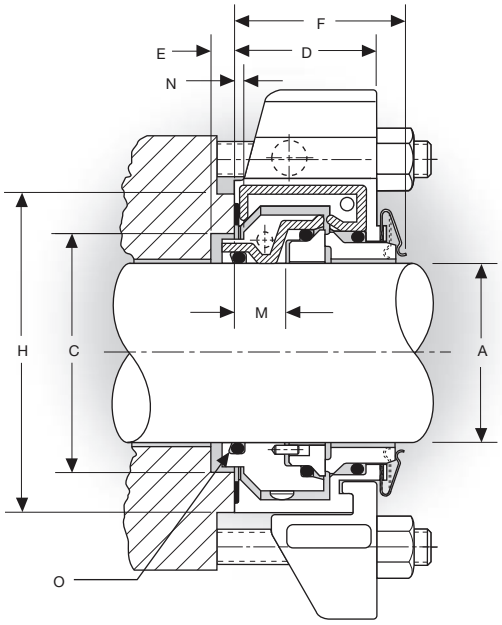


Figure 2

DIMENSIONAL DATA (METRIC)

A SHAFT SIZE	B GLAND OD	C STUFFING BOX BORE		D GLAND LENGTH	E SB DEPTH	F OB LENGTH	G BOLT CIRCLE BY BOLT SIZE								H SB FACE OD	L GLAND HUB OD	O SHAFT O-RING NO.
							MIN										
	MAX	MIN	MAX		MIN		8 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	22 mm	MIN	MAX	
32	125,5	47,2	53,3	37,6	4,3	45,2	79,8	81,8	83,8	85,8	87,8	-	-	-	59,9	70,9	-219
33	125,5	47,2	53,3	37,6	4,3	45,2	79,8	81,8	83,8	85,8	87,8	-	-	-	59,9	70,9	-220
35	127,4	49,3	60,5	37,6	4,3	45,2	81,8	83,8	85,8	87,8	89,8	-	-	-	66,8	72,8	-221
38	130,5	52,3	63,5	37,6	4,3	45,2	85,0	87,0	89,0	91,0	93,0	-	-	-	69,9	76,0	-223
40	133,6	55,6	66,8	37,6	4,3	45,2	87,4	89,4	91,4	93,4	95,4	-	-	-	73,2	79,0	-223
43	136,8	58,7	70,0	37,6	4,3	45,2	90,5	92,5	94,5	96,5	98,5	-	-	-	76,2	82,0	-224
45	136,8	58,7	70,0	37,6	4,3	45,2	90,5	92,5	94,5	96,5	98,5	-	-	-	76,2	82,0	-225
48	140,0	62,0	73,2	37,6	4,3	45,2	97,7	95,7	97,7	99,7	101,7	-	-	-	79,5	85,2	-226
50	143,2	65,0	76,2	37,6	4,3	45,2	98,4	100,4	102,4	104,4	106,4	-	-	-	82,6	88,4	-226
55	146,3	68,3	79,2	37,6	4,3	45,2	101,6	103,6	105,6	107,6	109,6	-	-	-	85,9	91,5	-228
60	152,6	74,7	85,6	37,6	4,3	45,2	107,8	109,8	111,8	113,8	115,8	-	-	-	92,2	97,9	-230
65	197,5	85,1	108,0	46,7	6,6	56,9	-	-	140,6	142,6	144,6	-	-	-	120,7	126,9	-231
70	197,5	85,1	108,0	46,7	6,6	56,9	-	-	140,6	142,6	144,6	-	-	-	120,7	126,9	-233
75	203,8	91,4	114,3	46,7	6,6	56,9	-	-	146,2	148,2	150,2	-	-	-	127,0	133,2	-234
80	210,2	97,8	120,7	46,7	6,6	56,9	-	-	154,8	156,8	158,8	160,8	-	-	133,4	139,5	-236
85	216,5	104,1	127,0	46,7	6,6	56,9	-	-	158,9	160,9	162,9	164,9	166,9	-	139,7	145,9	-237
90	216,5	104,1	127,0	46,7	6,6	56,9	-	-	158,9	160,9	162,9	164,9	166,9	-	139,7	145,9	-239
95	222,9	110,5	133,4	46,7	6,6	56,9	-	-	165,3	167,3	169,3	171,3	173,3	-	146,1	152,3	-241
100	229,2	116,8	139,7	46,7	6,6	56,9	-	-	171,6	173,6	175,6	177,6	179,6	-	152,4	158,6	-242
110	241,9	129,5	152,4	46,7	6,6	56,9	-	-	184,3	186,3	188,3	190,3	192,3	-	165,1	171,3	-245
115	241,9	129,5	152,4	46,7	6,6	56,9	-	-	184,3	186,3	188,3	190,3	192,3	-	165,1	171,3	-247
120	248,3	135,9	158,8	46,7	6,6	56,9	-	-	190,6	192,6	194,6	196,6	198,6	-	171,5	177,7	-248
125	286,4	150,1	177,8	73,9	7,4	87,6	-	-	-	-	-	214,5	216,5	218,5	190,5	196,5	-354
130	292,8	155,1	184,2	73,9	7,4	87,6	-	-	-	-	-	220,9	222,9	224,9	196,9	202,9	-355
135	299,1	160,1	190,5	73,9	7,4	87,6	-	-	-	-	-	227,3	229,3	231,3	203,2	209,3	-356
140	299,1	165,2	190,5	73,9	7,4	87,6	-	-	-	-	-	227,3	229,3	231,3	203,2	209,3	-358
145	305,5	170,2	196,9	73,9	7,4	87,6	-	-	-	-	-	233,7	235,7	237,7	209,6	215,7	-360
150	311,8	175,2	203,2	73,9	7,4	87,6	-	-	-	-	-	240,1	242,1	244,1	215,9	222,1	-361
155	318,2	180,1	209,6	73,9	7,4	87,6	-	-	-	-	-	246,4	248,4	250,4	222,3	228,4	-362
160	324,5	185,1	215,9	73,9	7,4	87,6	-	-	-	-	-	252,8	254,8	256,8	228,6	234,8	-363
165	324,5	190,1	215,9	73,9	7,4	87,6	-	-	-	-	-	259,2	261,2	263,2	228,6	234,8	-364
170	330,9	195,1	222,3	73,9	7,4	87,6	-	-	-	-	-	259,2	261,2	263,2	235,0	241,2	-364
175	337,2	200,2	228,6	73,9	7,4	87,6	-	-	-	-	-	265,6	267,6	269,6	241,3	247,6	-365
180	337,2	205,2	228,6	73,9	7,4	87,6	-	-	-	-	-	272,0	274,0	276,0	247,7	247,6	-366
185	343,6	210,2	235,0	73,9	7,4	87,6	-	-	-	-	-	272,0	274,0	276,0	247,7	254,0	-367
190	349,9	215,1	241,3	73,9	7,4	87,6	-	-	-	-	-	278,4	280,4	282,4	254,0	260,4	-368
195	356,3	220,1	247,7	73,9	7,4	87,6	-	-	-	-	-	284,8	286,8	288,8	260,4	266,8	-368

442 SPLIT MECHANICAL SEAL OPERATING PARAMETERS†

PRESSURE CAPABILITIES (INCH)

SIZE RANGE	HOLDER TYPE	SHAFT SPEED	FACE MATERIAL COMBINATION		
			CARBON/RSC Psig	RSC/RSC Psig	CARBON/CERAMIC Psig
1.250" to 2.500" (32 mm to 60 mm)	Standard Holder	1750	28" Hg to 300	28" Hg to 300	28" Hg to 300
	Standard Holder	3600	28" Hg to 300	❖ 28" Hg to 175	❖ 28" Hg to 100
	HP Holder	1750	300 to 450	300 to 450	❖ 300 to 350
	HP Holder	3600	300 to 450	*	*
2.625" to 4.750" (65 mm to 120 mm)	Standard Holder	1750	28" Hg to 200	28" Hg to 200	28" Hg to 200
	HP Holder	1750	200 to 250	200 to 250	*
4.875" to 7.750" (125 mm to 195 mm)	Standard Holder	875	28" Hg to 150	28" Hg to 150	28" Hg to 150
	HP Holder	875	150 to 200	150 to 200	150 to 200

PRESSURE CAPABILITIES (METRIC)

SIZE RANGE	HOLDER TYPE	SHAFT SPEED	FACE MATERIAL COMBINATION		
			CARBON/RSC bar g	RSC/RSC bar g	CARBON/CERAMIC bar g
32 mm to 60 mm (1.250" to 2.500")	Standard Holder	1750	710 mm Hg to 20	710 mm Hg to 20	710 mm Hg to 20
	Standard Holder	3600	710 mm Hg to 20	❖ 710 mm Hg to 12	❖ 710 mm Hg to 7
	HP Holder	1750	20 to 30	20 to 30	❖ 710 mm Hg to 24
	HP Holder	3600	20 to 30	*	*
65 mm to 120 mm (2.625" to 4.750")	Standard Holder	1750	710 mm Hg to 14	710 mm Hg to 14	710 mm Hg to 14
	HP Holder	1750	14 to 18	14 to 18	*
125 mm to 195 mm (4.875" to 7.750")	Standard Holder	875	710 mm Hg to 10	710 mm Hg to 10	710 mm Hg to 10
	HP Holder	875	10 to 14	10 to 14	10 to 14

TEMPERATURE

To 250 ºF (120 ºC)

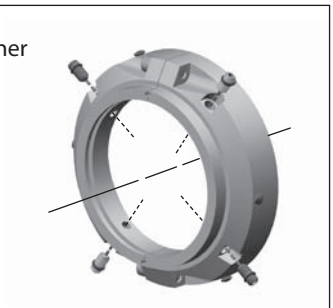
SPEED

To 4000 fpm (20 m/s)

RSC - Reaction bonded silicon carbide
❖ - Metrics limited by PV capabilities.
* - Standard holder handles all PV capabilities of the listed face combinations.
† - Consult Chesterton Engineering for applications exceeding published operating parameters and additional seal sizes.

OPTIONAL 442 HP HOLDER

The 442 HP Holder is required in higher pressure applications as listed in the *442 Split Mechanical Seal Operating Parameters* charts above.



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FORM NO. 073385 PART B

PRINTED IN USA 12/09

TB WOOD'S V-BELT STRUCTURE SELECTION

PART NUMBER	DESCRIPTION	QTY/PER	UM
05275	SHEAVE,5□ □ 11.3 □ 2□R	1.	EA
161759	SHEAVE,□VS-210-2 1-7/8" BORE	1.	EA
802215	V-BELT 5□X-690	2.	EA

PART NUMBER	DESCRIPTION	QTY/PER	UM
491435	BUSHING, SK 1-7/8 BORE	1.	EA

TB Wood's®
Altra Industrial Motion

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Email: mechanical@tbwoods.com
www.tbwoods.com

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Prepared By: Sarah Cleaver
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Email: sarah.cleaver@mail.weir
Drive Name: Taunton, MA **Date Created:** 10/4/2021, 11:39:27 AM **ID:** 324375-6

CAUTION: This solution is calculated exclusively using TB WOOD'S products. Substitution of alternate components and/or material may result in failure.

Showing entry speed, 2 x longer belt

Bill of Materials

	Description	Part Number	Quantity	Weight (lbs)
DR Sheave	JVS-210-2x1 7/8	JVS2102178	1	23
DN Sheave	5V11.3X2-SK	5V1132	1	16.4
Belt(s)	5VX690	5VX690	2	1.6
DN Bushing	SKx1 7/8	SK178	1	2.4
			5	43

Application Details @entry speed, 2 x longer belt

	Input	Actual	% Change	Comments
Service Factor	1.50	1.79	19.3%	
Input Power (HP)	25.0			NEMA Motor Specs. DO Apply (284T)
Design Power (HP)	37.5	44.9	19.7%	Overall width dR is 4.13 in.; Face width dN is 1.69
				Actual DriveR O.D. is 8.27 in.; Pitch is 7.92 in.
DR RPM	1770.0			
DR Shaft (in)	1.875			
Nominal DR torque (in·lb)		890		
Adjustment		1.44 turns		About 1 3/8 turns
				Actual DriveN O.D. is 11.30 in.
DN RPM	1240.0	1240.0	0.0%	
DN Shaft (in)	1.875			
Nominal DN torque (in·lb)		1271		
Speed Range		1062 - 1286		
Speed Ratio	1.43	1.43	0.0%	
Belt Speed (FPM)		3668		
Min. Arc of Contact		171.0°		
Center Distance (in)	20.5	19.33	-5.7%	Center distance adjustments allowances
		18.33	-5.2%	-1.0 adjustment for installation (in)
		20.53	6.2%	+1.2 adjustment for tensioning (in)
C.D. Range		19.11 - 20.17		
Belt Tension (per strand)				Dynamic hubloads generated
Deflection (in)		0.30		
Force (min lbs)		9.91	produces	525 lbs hubload
Force (max lbs)		14.45	produces	815 lbs hubload
Sonic Tension				
Minimum Frequency	69.49 Hz			
Maximum Frequency	85.11 Hz			

feedback@tbwoods.com

Narrow (Ultra-V) Sheaves

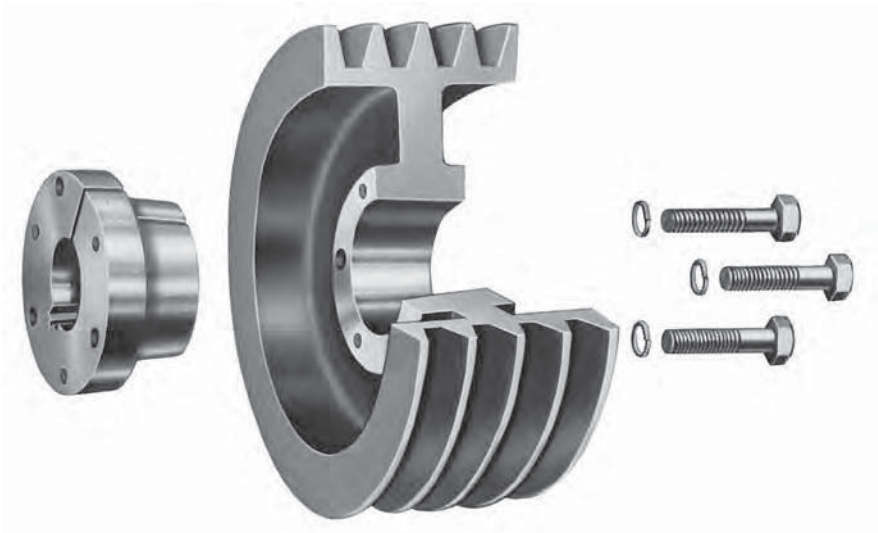
B1

- **Made-to-order available**
- **Are Easy to Install and Remove**
- **Bored to suit construction**

Sure-Grip® Narrow (Ultra-V) Sheave

Features

Wood's Ultra-V sheaves are constructed of fine grain, high tensile cast iron, and have been carefully engineered to assure maximum performance over a long life span. Behind each sheave is one of the most extensive engineering design and testing programs in the industry.



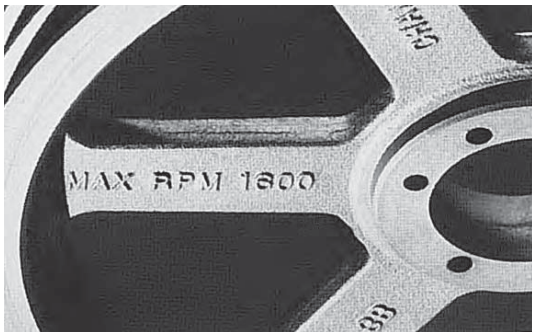
With the advent of higher V-belt ratings, Wood's engineers instituted additional careful test programs to ensure that each Wood's sheave would be capable of safely and dependably delivering the increased performance which was required by the new ratings. Wood's engineers, using a special strain gage test stand, subject sheaves to tension and compression stresses far in excess of those encountered in actual operation.

In another standard test procedure, Wood's sheaves are operated at extremely high speeds. Sheaves are selected from warehouse stocks and tested until they are burst by centrifugal force. Such destructive testing allows Wood's engineers to study the effects of construction and balance on sheave performance. The goal is to assure safe operation at normal speeds. Other continuing programs check product quality in the laboratory and on the manufacturing line.

For applications with special requirements, Wood's sheaves are also available on a made-to-order basis in either cast or ductile iron, and in Sure-Grip or bored-to-suit construction.

Wood's stock narrow sheaves are available with the convenient Sure-Grip QD type bushing. Easy to install and remove, these split, tapered bushings grip the shaft with the equivalent of a shrink fit. This tight holding power eliminates freezing and fretting corrosion between the shaft and the bore and assures quick removal and interchangeability when necessary.

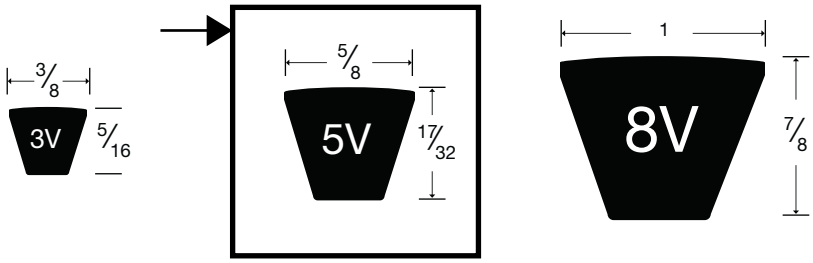
Stock sheaves are designed to carry the loads of all belts shown in this catalog and other similarly rated V-Belts. For special higher rated V-Belts, consult Wood's Engineering Department for recommendations.

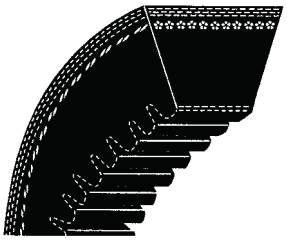


We cast or stamp the maximum safe operating speed, in rpm, on all sheaves we manufacture.

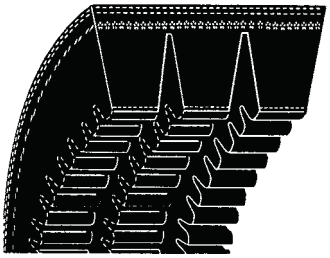
Features

The three cross sections of Wood's Narrow (Ultra-V) belts transmit more horsepower than the five sizes of the Classical (Conventional) V-belt. The narrower geometry of the belt results in cross sections that are up to 50% smaller than the Classical (Conventional) cross sections. This allows the use of smaller diameter sheaves resulting in more compact, lighter weight drives that can operate at higher speeds, reduce bearing loads, and shaft stresses. All Wood's Narrow (Ultra-V) belts are static conducting, and oil and heat resistant.

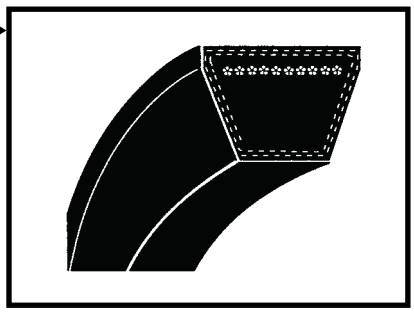




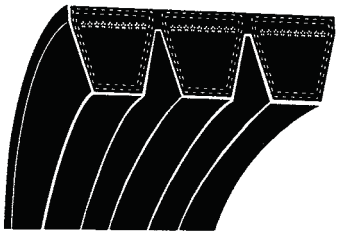
Narrow (Ultra-V) Cog V-belts . . . . a premium raw edge, cog construction at no extra cost. Up to 30% more horsepower capacity than wrapped belts. The molded cogs offer greater flexibility and better heat dissipation, especially important on drives using smaller diameter sheaves and short center distances. Stock in all 3V lengths, 5V and 8V lengths up to 200 inches.



Narrow (Ultra-V) Cog Banded V-belts . . . . all the same features of the individual Narrow (Ultra-V) Cog belt, but with the added benefit of multiple belts in a single belt. Should be considered for those problem drives where long center distance, vibration, pulsating or shock loads cause individual belts to whip, turn over, or jump out of sheave grooves. Stock in all 3V and 5V, 2 thru 5 ribs in lengths up to 200 inches.



Narrow (Ultra-V) V-belts . . . . wrapped construction of 5V and 8V belts over 200 inches long. Handles applications that require longer length belts or larger cross sections where flexibility and compactness are not as critical.

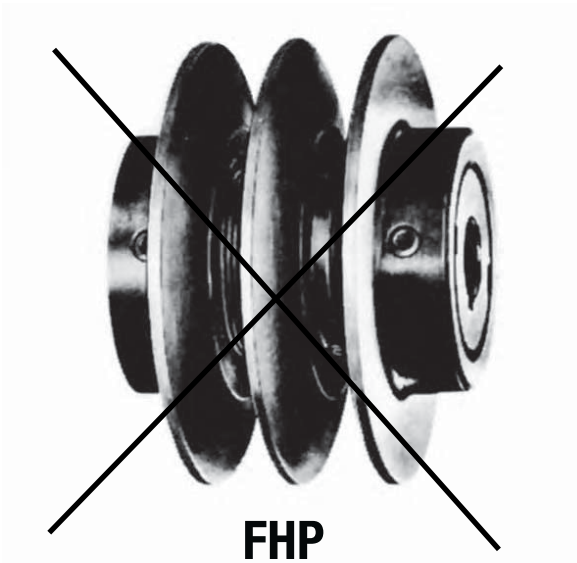


Narrow (Ultra-V) Banded V-belts . . . . wrapped construction of 5V belts over 200 inches and all 8V section belts. Can be used on those same problem drives as the Narrow (Ultra-V) Cog Banded belts. Stocked in 2 thru 5 ribs (5V section) and 3 thru 5 ribs (8V section).

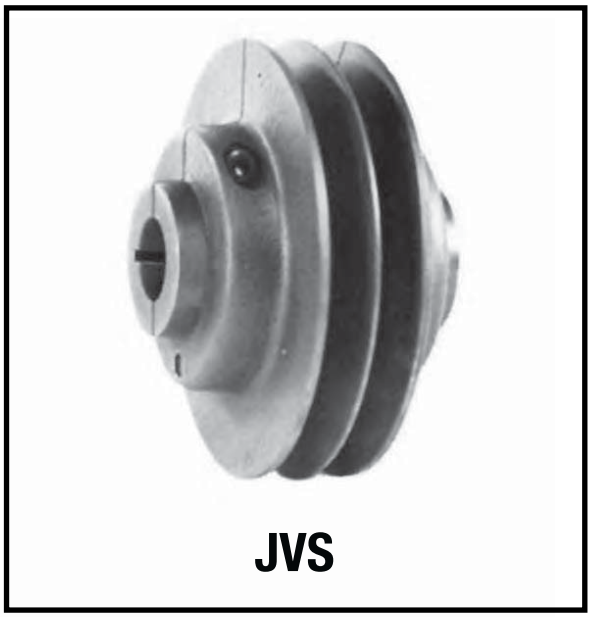
Warning: Do not mix raw edge cog and wrapped construction belts on the same drive.

V-Belt Adjustable Pitch Sheaves

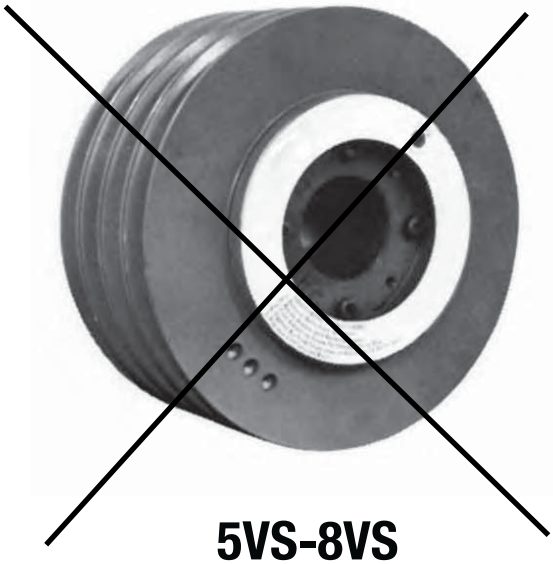
D2



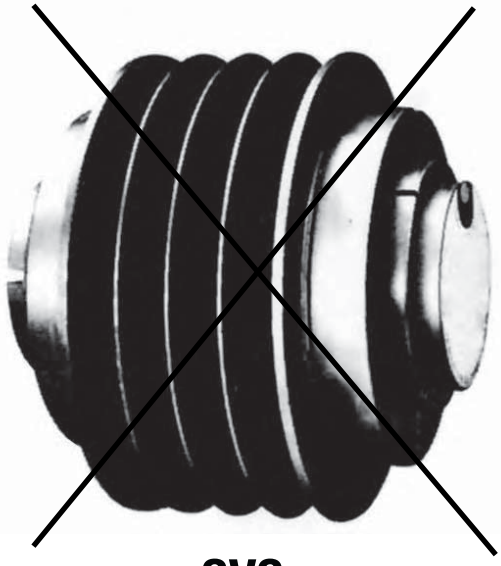
FHP



JVS



5VS-8VS

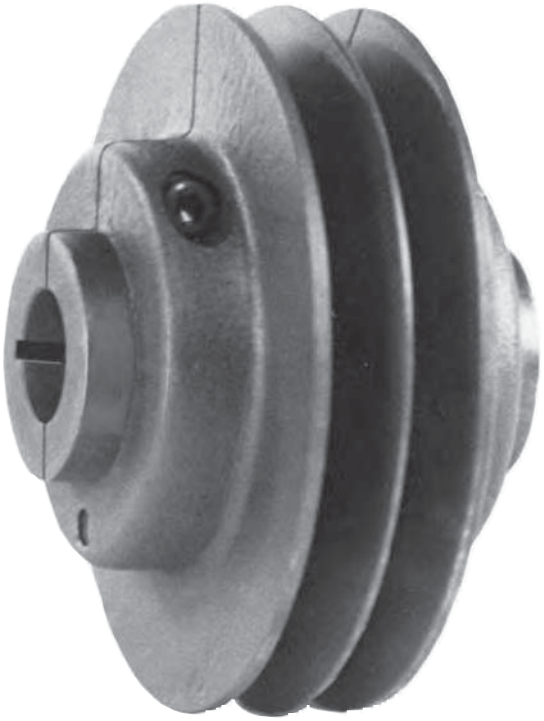


SVS

JVS Adjustable Speed Sheaves

Features

- **For A-B or 5V Belts**
- **Up to 40 HP @ 1750 rpm**
- **Needs No Lubrication**
- **Won't Freeze or Stick**
- **Wider Speed Range**

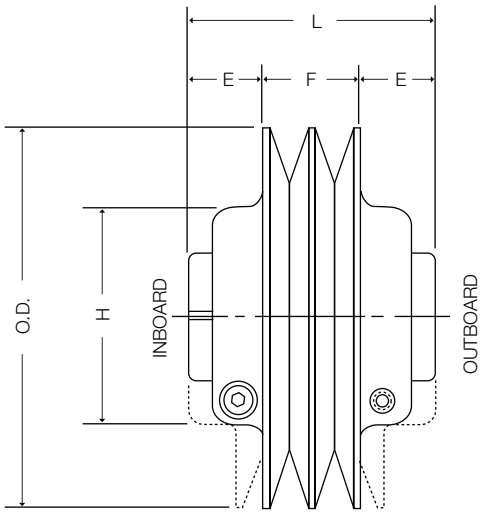


Wood's JVS stationary control, adjustable speed sheaves offer several significant advantages. This sheave is available in 6 sizes from 5.118 inches (130 mm) to 9.055 inches (230 mm) in diameter. It uses Classical A and B belts and Narrow 5V belts. Capacities range up to 40 hp at 1750 rpm. Its speed is infinitely variable, and because one screw controls both moveable flanges, accurate groove spacing is assured at all times. It uses a clamping collar design with no threads on either the sleeve or the flanges, so there is no chance of fretting corrosion and sticking. No lubrication is needed.

Dimensions

Product No.	Stock Bores	Max. Bore
JVS1302	1-1/8, 1-3/8	1.3750
JVS1502	1-1/8, 1-3/8, 1-5/8	1.6875
JVS1702	1-1/8, 1-3/8, 1-5/8	1.6875
JVS1902	1-3/8, 1-5/8, 1-7/8	2.4375
JVS2102	1-3/8, 1-5/8, 1-7/8, 2-1/8	2.4375
JVS2302	1-3/8, 1-5/8, 1-7/8, 2-1/8	2.4375

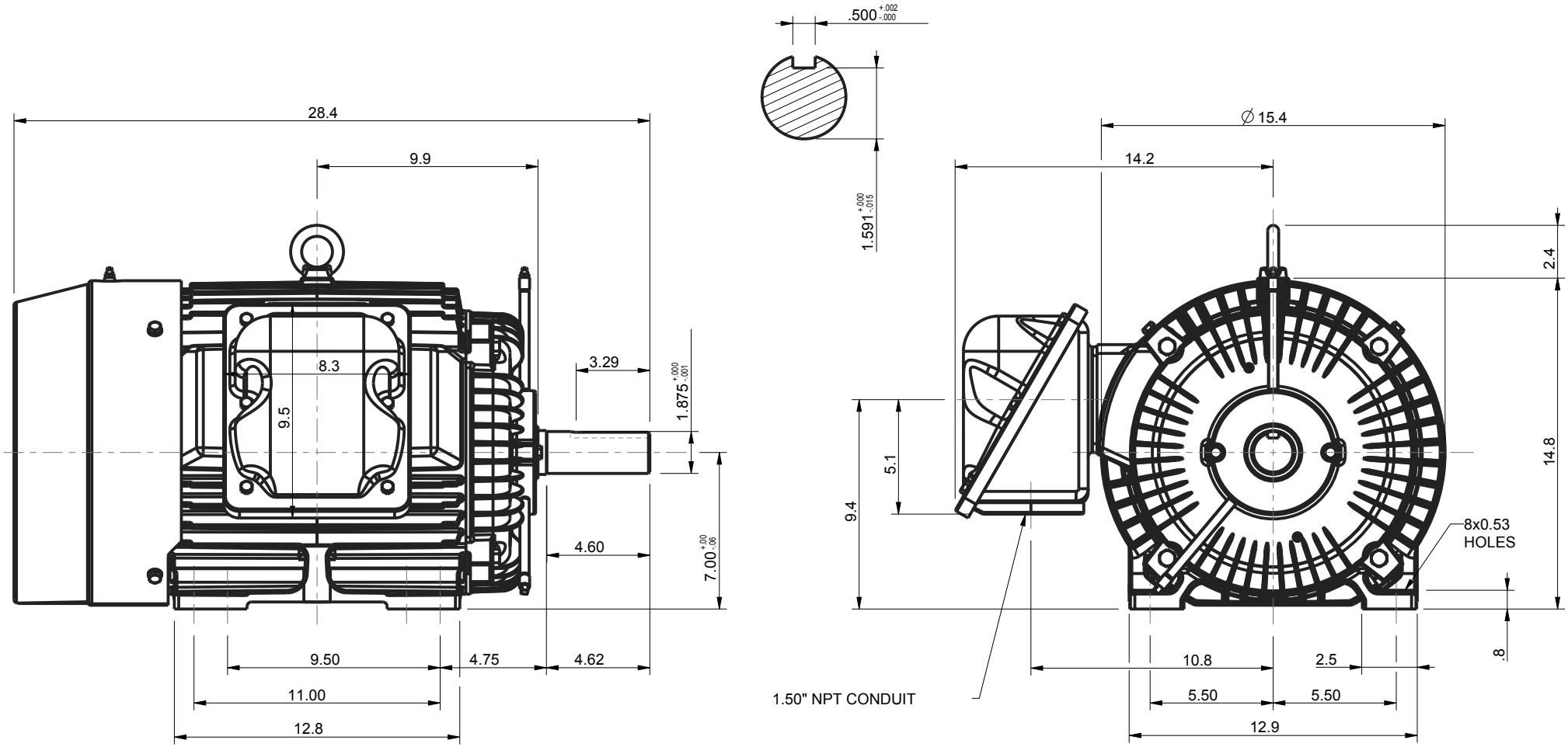
Product No. Example:
JVS1302 with 1-3/8" Bore = JVS1302138 (Product No.)



Product No.	PITCH DIA. RANGE			O.D.	DIMENSIONS						WT. (Lbs.)
	A Belts	B Belts	5V Belts		L	F		E		H	
						Min.	Max.	Min.	Max.		
JVS1302	3.86 - 4.58	4.22 - 5.14	-	5.12	3.77	1.73	2.27	.75	1.02	3.19	8.0
JVS1502	4.44 - 5.36	4.49 - 5.92	4.41 - 5.84 †	5.90	4.13	1.73	2.59	.77	1.20	3.62	11.0
JVS1702	5.13 - 6.15	5.5 - 5.28	5.2 - 6.63 †	6.69	4.13	1.73	2.59	.77	1.20	3.62	13.5
JVS1902	5.92 - 6.94	5.5 - 6.07	5.99 - 7.42	7.48	4.13	1.73	2.59	.77	1.20	5.09	20.0
JVS2102	6.71 - 7.73	5.5 - 6.87	6.78 - 8.21	8.27	4.13	1.73	2.59	.77	1.20	5.09	23.0
JVS2302	7.15 - 8.52	5.5 - 7.65	7.57 - 9.00	9.06	4.13	1.73	2.59	.77	1.20	5.09	26.0

Note: JVS sheaves use standard 2 Groove "B" or "5V" sheaves as companions.
† Recommended for use with Narrow Cog Belts only.

Note: One turn of the adjusting screw varies the pitch .2". Maximum to minimum adjustment requires seven turns.



UNITS: INCHES

ROTATION FROM NDE

X CCW ☐ CW

NOTES:

1. MAIN CONDUIT BOX MAY BE ROTATED IN 90° INCREMENTS
2. STANDARD PRODUCT USES BI-DIRECTIONAL FAN. OPPOSITE ROTATION AVAILABLE ONLY BY CONNECTION CHANGE.
3. KEY DIMENSIONS EQUAL 0.500"x 0.500"x 3.25" (MOTOR SUPPLIED WITH KEY)

☐ PRELIMINARY

X CERTIFIED

TOSHIBA

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TOSHIBA INTERNATIONAL CORPORATION

SEVERE DUTY EQP Cool SD

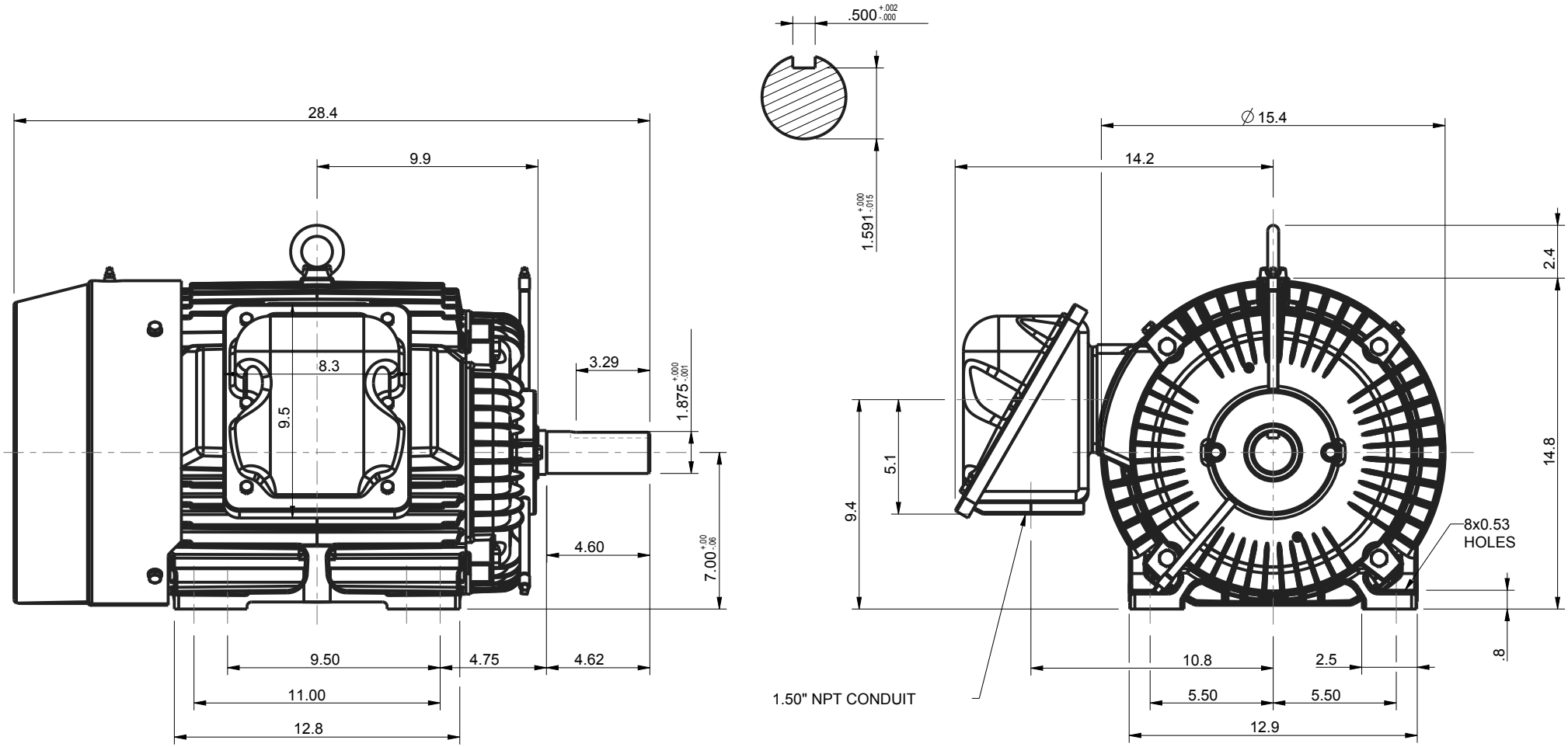
TOTALLY ENCLOSED FAN COOLED HORIZONTAL FOOT MOUNTED 3 PHASE INDUCTION MOTOR

284T-286T F1 ASSEMBLY

DRAWING #: MDSLV001-05

REV. DATE: 07/03/18 REV. #: 0 PER.: M. O'DOWD

REV. DESCRIP.:



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284T-286T F1 ASSEMBLY

DRAWING #: MDSLV001-05

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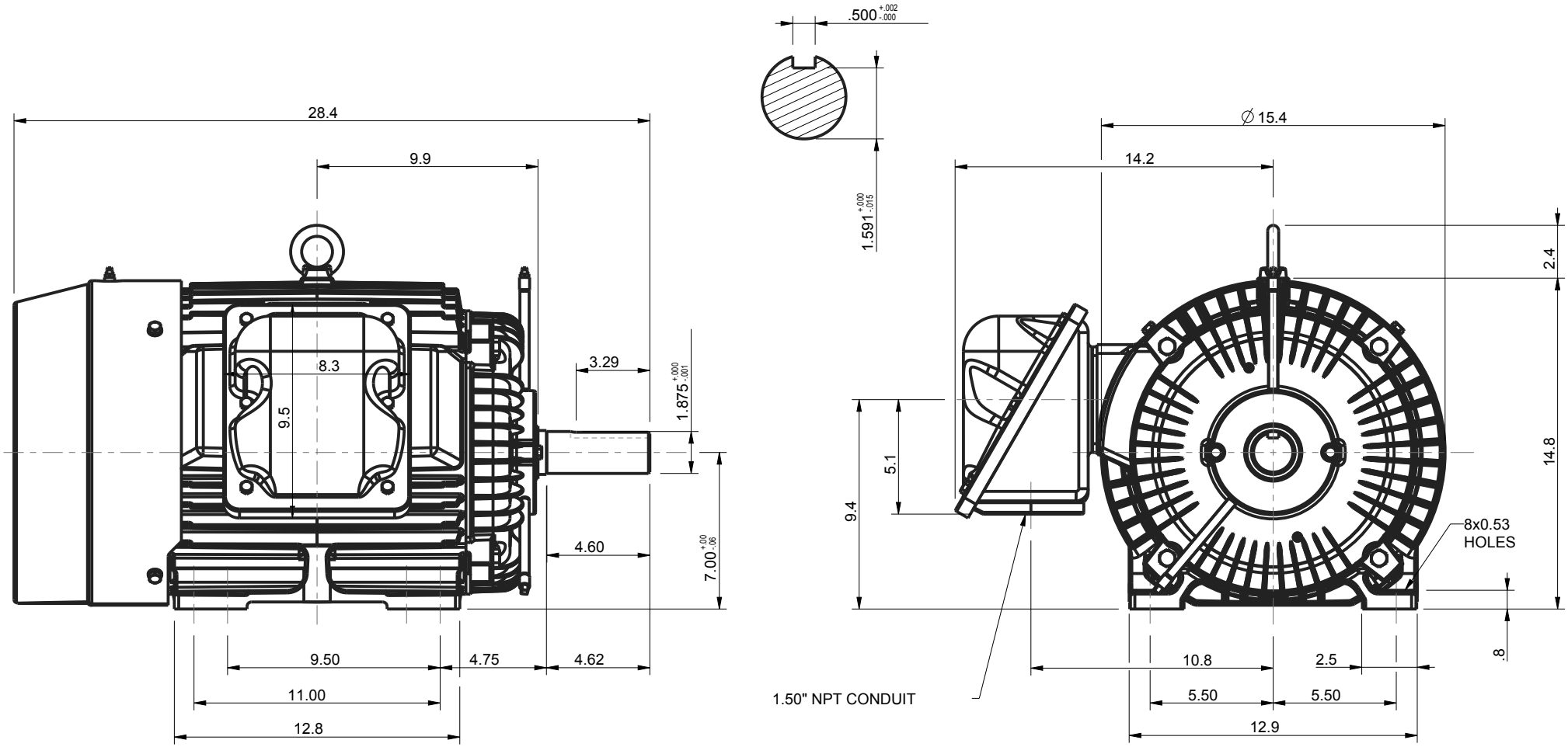

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TOSHIBA INTERNATIONAL CORPORATION

SEVERE DUTY EQP Cool SD

TOTALLY ENCLOSED FAN COOLED HORIZONTAL FOOT MOUNTED 3 PHASE INDUCTION MOTOR

284T-286T F1 ASSEMBLY

DRAWING #: MDSLV001-05

REV. DATE: 07/03/18 REV. #: 0 PER.: M. O'DOWD

REV. DESCRIP.:

Issued Date	12/18/2019	Transmit #	
Issued By	dschoeck	Issued Rev	

TOSHIBA

TYPICAL MOTOR PERFORMANCE DATA

Model: 0254SDSR41A-P

HP	kW	Pole	FL RPM	Frame	Voltage	Hz	Phase	FL Amps
25	18.5	4	1770	284T	230/460	60	3	62/31
Enclosure	**IP**	**Ins. Class**	**S.F.**	**Duty**	**NEMA Nom. Eff.**	**NEMA Design**	**kVA Code**	**Ambient (°C)**
TEFC	55	F	1.15	CONT	93.6	B	G	40 C

Load	HP	kW	Amperes	Efficiency (%)	Power Factor (%)
Full Load	25	18.6	31.0	93.8	83.5
¾ Load	18.75	14.0	23.8	93.1	80.5
½ Load	12.50	9.3	18.3	91.4	73.0
¼ Load	6.25	4.7	14.1	84.0	49.3
No Load			11.0		5.6
Locked Rotor			182		34.3

Torque				Rotor wk² Inertia
Full Load (lb-ft)	**Locked Rotor (% FLT)**	**Pull Up (% FLT)**	**Break Down (% FLT)**	**(lb-ft²)**
74.2	190	165	295	5.23

Safe Stall Time(s)		Sound Pressure dB(A) @ 1M	Bearings*		Approx. Motor Weight
Cold	**Hot**		**DE**	**NDE**	**(lbs)**
35	15	-	6310ZC3	6310ZC3	492

*Bearings are the only recommended spare part(s).

Motor Options:
Product Family:EQP Global SD
Mounting:Footed,Shaft:T Shaft
Winding Thermostats

Customer	
Customer PO	
Sales Order	
Project #	

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

Engineering	jhock	Doc. Written By	D. Suarez	Doc.# / Rev	MPCF-1119 / 1
Engr. Date	3/13/2014	Doc. Approved By	M. Campbell	Doc. Issued	9/20/2019

Issued Date	12/18/2019	Transmit #	
Issued By	dschoeck	Issued Rev	

TOSHIBA

SPEED TORQUE/CURRENT CURVE

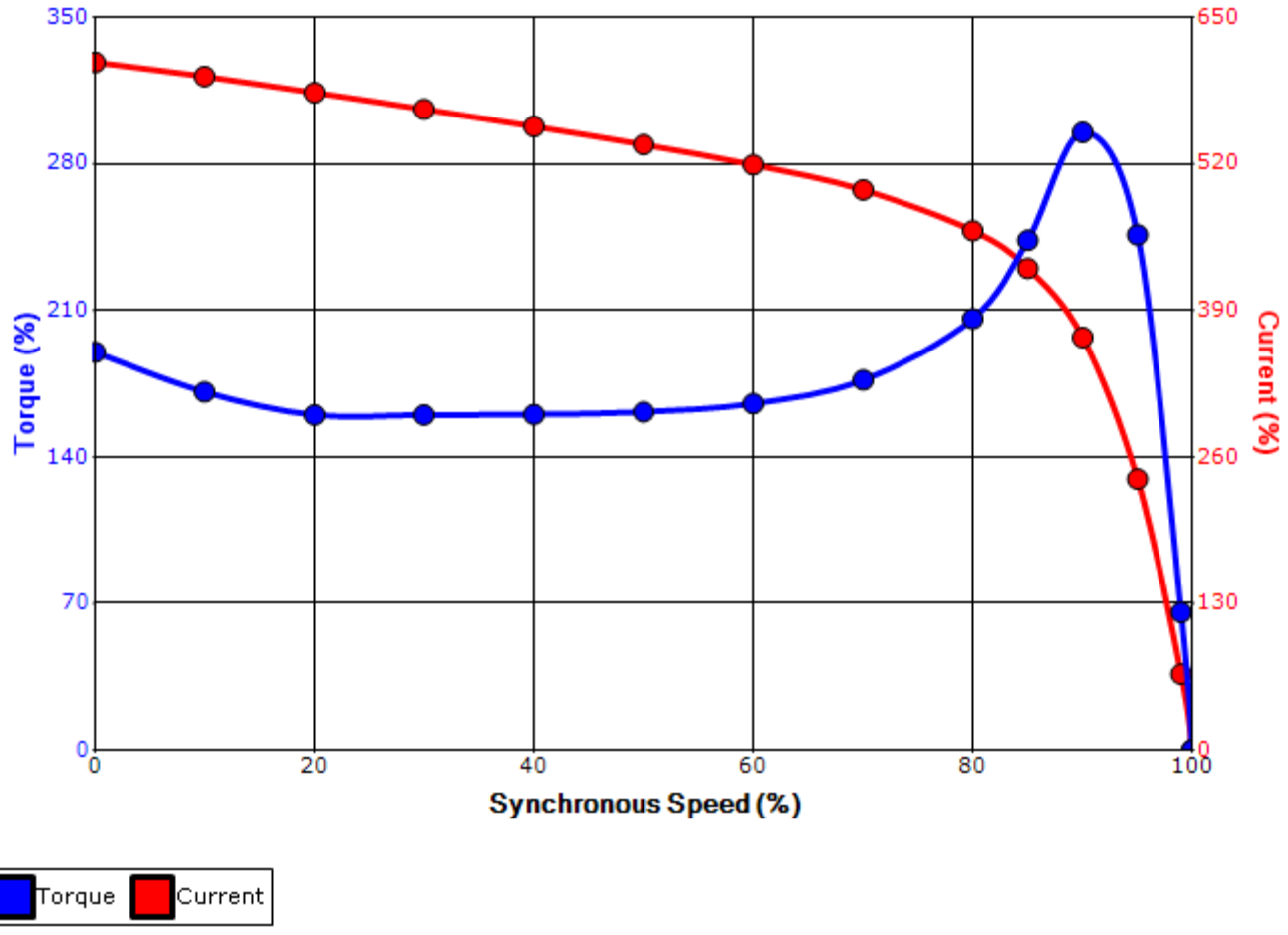
Model: 0254SDSR41A-P

HP	kW	Pole	FL RPM	Frame	Voltage	Hz	Phase	FL Amps
25	18.5	4	1770	284T	230/460	60	3	62/31

Enclosure	IP	Ins. Class	S.F.	Duty	NEMA Nom. Eff.	NEMA Design	kVA Code	Ambient (°C)
TEFC	55	F	1.15	CONT	93.6	B	G	40 C

Locked Rotor Amps	Rotor wk² Inertia (lb-ft²)	Torque			
		Full Load (lb-ft)	Locked Rotor (%)	Pull Up (%)	Break Down (%)
182	5.23	74.2	190	165	295

Design Values



Customer			wk² Load Inertia (lb-ft²)	-
Customer PO			Load Type	-
Sales Order			Voltage (%)	100
Project #			Accel. Time	-

Tag:

All characteristics are average expected values.

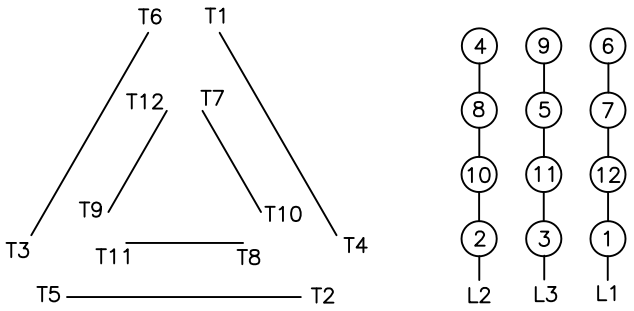
TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

Engineering	jhock	Doc. Written By	D. Suarez	Doc.# / Rev	MPCF-1121/1
Engr. Date	3/13/2014	Doc. Approved By	M. Campbell	Doc. Issued	9/20/2019

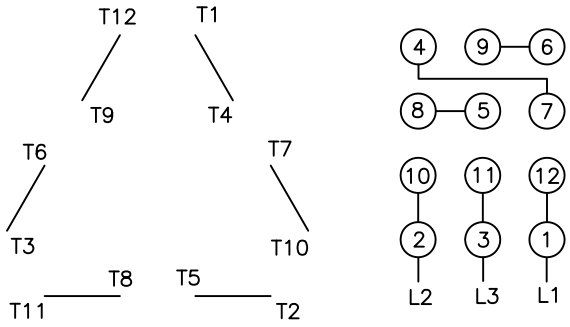
Motor Connection Diagrams
12 Leads

Across-the-Line Starting / Running Connections

Low Voltage Delta



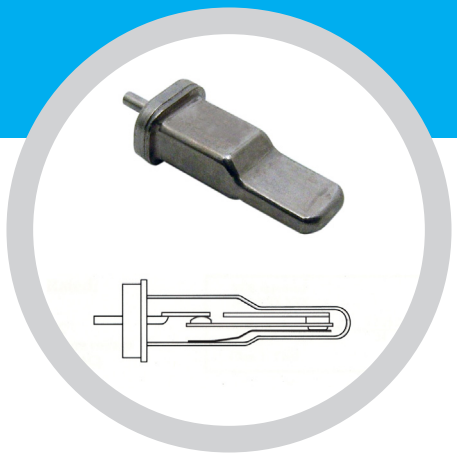
High Voltage Delta



Switch L1 and L2 to reverse rotation

Suitable for Wye–Delta Starting and Limited Part–Winding–Starting.
Please Contact Toshiba International for specific connections.

Sensata Technologies



KLIXON® | 7895 SERIES MOTOR THERMOSTATS

Hermetically Sealed On-Winding

CONSTRUCTION

The basic element in the on-winding motor thermostat is the Klixon® snap-acting disc. The electrical circuit consists of the pin, insulated from the case by the glass-to-metal seal, connected to the stationary contact through the disc to the case. In the 7895 thermostat, the metal case is electrically hot and requires some method of insulation from the motor windings. Several custom configurations of insulation and terminations are available at slight additional cost.

Features & Benefits

- Small size and shape permits close coupling to motor windings for increased protection
- Hermetically sealed enclosure
- Simple, rugged all-welded construction has one moving part for trouble-free service
- Klixon® snap action thermal disc assures positive make and break action controlled temperature differential aid vibration resistance

Klixon® 7895 on-winding motor thermostats are designed to protect hermetically-sealed compressor motors from excessive winding temperatures. A positive refrigerant seal combined with small tubular construction allows these thermostats to be installed directly in the motor windings for precise monitoring of winding tempertures. As a result, the compressor manufacturer can choose a thermostat that will allow the motor to be safely rated to its maximum capacity.

Installation

Maximum heat transfer from the motor windings to the thermostat is the key to optimum performance. In many cases, the total surface of the device can be utilized by inserting its entire length within the stator winding. Good performance is also achieved by lacing the protector to the top of the windings, making sure that the surface of the case is in close contact with the stator windings. The thermostat may be varnished dipped and baked with the entire assembly.

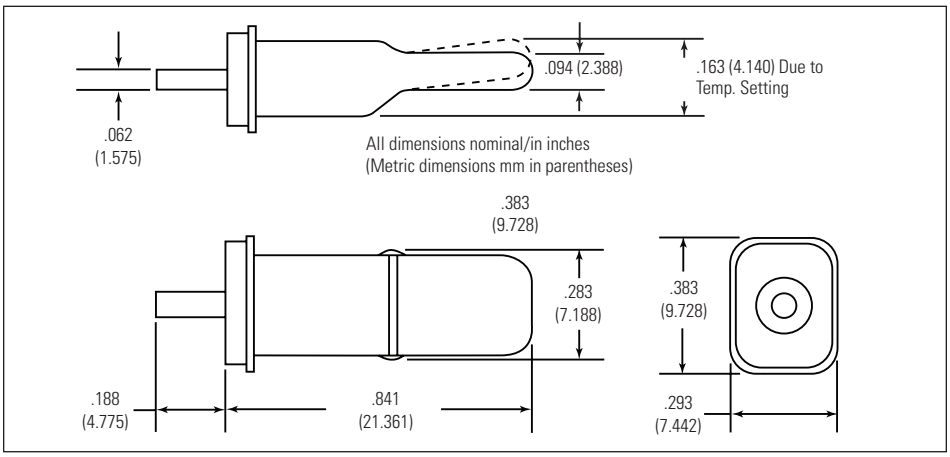
Pilot Circuit Operation

The 7895 thermostat is used as a pilot duty control to protect a motor from overheating in a running overload condition. When used alone, it cannot protect against locked rotor since its response time is not fast enough to follow the very rapid temperature rise of the windings. The Klixon 8347 and 8348 supplementary overloads with their quick response to locked rotor current, can be used to supplement the 7895 thermostat. These overload devices trip very quickly for the first several cycles, allowing enough time for the heat generated in the windings to reach the thermostat which then takes over as the controlling element. This combination is used to protect both single-phase and three-phase motors.

KLIXON® | 7895 SERIES MOTOR THERMOSTAT

Hermetically Sealed On-Winding

Dimensions



Coding System

7895 – XXX – 000

- Basic Part Number
- Electrical Characteristics Includes Temperature
- Physical Characteristics Including
  - Lead specifications
  - Insulating sleeving
  - Potting, etc.

Operating Temperatures
75°C to 135°C

Standard Tolerances
±5°C open, ±11°C close

Standard Differential
22°C nominal

Special Tolerances
±3°C open, ±5°C close

Special Differnetial
17°C nominal

Wire Lead Insulations

Dacron Mylar Dacron
600V – 105°C temperature rating – 18 AWG

Dacron Teflon Mylar Dacron
600V – 105°C temperature rating – 20 AWG

Teflon
300/600V – 200°C temperature rating – 22 AWG

Teflon
300V – 200°C temperature rating – 18 AWG

Insulation Sleeve Material

Mylar – .004" thick

Mylar over Teflon – .007" thick
(.004" Mylar/.003" Teflon)

Terminations

Female flag quick connect 1/4" open end terminal for #10 screw, #10 eyelet

UL and CSA Rated

125 VA, 24 VAC
345 VA, 110-600 VAC
(limited to the lead wire voltage rating if less than 600 VAC).

VDE approved
7895-XXX-XXX

2 (2)	1 (1)	5.2 (5.2)
250	380	24

Class 1, T200

Typical Custom Configurations

Engineering Test Samples

To order test samples please supply the following information:

1. Opening tempeerature
2. Temperature differential
3. Tolerances desired on opening and closing temperatures
4. Voltage
5. Lead type, size and length
6. Insulation required

Sensata Technologies

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Sensata Technologies

The World Depends on Sensors and Controls

Printed in U.S.A., June 23, 2009

Carboguard® 635 VOC

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	Cross-linked epoxy polymeric amine
Description	An all-purpose immersion-grade epoxy that has a variety of attributes including low-temperature cure, surface tolerance, fast recoat times, moisture tolerance during application and cure, and excellent corrosion protection. It has low VOC and low HAP's content for use in areas with restricted volatile emissions. Can be used direct to metal as a corrosion resistant primer or as an intermediate coating over other primers. Suitable for both maintenance and new construction projects due to its excellent surface wetting characteristics and quick cure for handling. May also be used for immersion in potable water, fresh or salt water (marine) exposures.
Features	• Low temperature cure (20°F) • Excellent corrosion protection • Excellent application characteristics • Fast recoat times • Moisture tolerance during application • Extended recoat window for atmospheric exposures (6 months for most topcoats) • Low VOC and low HAPs content • Certified by UL to meet the drinking water criteria of NSF/ANSI/CAN 600
Color	Black (0900), (Grey (C705), Red (0500). Other limited colors available on request. For Potable water use: Blue (0100), Beige (0200), Grey (0700), White (0800), Red (0500).
Gloss	Satin
Primer	Self-Priming
Dry Film Thickness	4 - 6 mils (102 - 152 microns) per coat DFT in excess of 8.0 mils per coat is not recommended.
Solids Content	By Volume 65% +/- 2%
Theoretical Coverage Rate	1043 ft²/gal at 1.0 mils (25.6 m²/l at 25 microns) 261 ft²/gal at 4.0 mils (6.4 m²/l at 100 microns) 174 ft²/gal at 6.0 mils (4.3 m²/l at 150 microns) Allow for loss in mixing and application.
VOC Value(s)	Per EPA Method 24: 2.05 lbs/gal (246 g/l) Thinner 236 E (12 oz/gal): 2.05 lbs/gal (246 g/l) Thinner 242 E (12 oz/gal): 2.05 lbs/gal (246 g/l) Thinner 76 (12 oz/gal): 2.50 lbs/gal (300 g/l) These are nominal values and may vary slightly with color. Product contains VOC-exempt t-butyl acetate. Check local regulations regarding product usage.
Dry Temp. Resistance	Continuous: 180°F (82°C) Non-Continuous: 220°F (104°C)
Approvals	**Potable Water Use Limitations @ 75°F (24°C):** Max DFT: 16 mils # Coats: 2 Rating: >40,000 gal (tank) , > 4" (valves) Final cure to water immersion: 7 days @ 75°F (24°C)

SELECTION & SPECIFICATION DATA

Limitations	Epoxies lose gloss, discolor and eventually chalk in sunlight exposure. Do not apply over latex coatings. For immersion projects use only factory made material in special colors. Consult Technical Service for specifics.

SUBSTRATES & SURFACE PREPARATION

General	Remove any oil or grease from surface to be coated with clean rags soaked in Carboline Thinner #2 or toluol.
Steel	Atmospheric Exposure: For optimal performance: Hand Tool or Power Tool clean in accordance with SSPC-SP 2, SSPC-SP 3, or SSPC-SP11 to produce a rust-scale free surface. For maximum performance: SSPC-SP 6 (or greater) with a 1½-3 mil (40-75 micron) blast profile. Immersion Service: Minimum near white metal cleanliness in accordance with SSPC-SP10.
Galvanized Steel	Galvanizing requires a roughened surface for optimum adhesion/performance of high build epoxies. Remove any contaminants per SSPC-SP1; ensure there are no chemical treatments that may interfere with adhesion; and abrade the surface to establish a suitable roughness (typically 1 mil). SSPC-SP16 or SSPC-SP7 are acceptable methods.
Concrete or CMU	Remove all loose, unsound concrete. Remove all oils or other non-compatible sealers or treatments. Do not apply coating unless the concrete has cured at least 28 days @ 70 F (21 C) and 50% relative humidity or equivalent. Consult Carboline Technical Service for more specific recommendations.
Stainless Steel	Surface profile should be a dense angular 1-3 mils and is best achieved through abrasive blasting in accordance with SSPC-SP16. Remove all contaminants that would interfere with the performance of stainless steel for the intended service such as, but not limited to, embedded iron or chlorides.

MIXING & THINNING

Mixing	Mix components separately, then combine and mix until homogenous.
Thinning	For atmospheric applications thin up to 10% by volume with Carboline Thinner 242E, 236E, or 76. Use up to 10% with Thinner 33 for brush and roller. If thinning is desired for potable water applications, Thinner 76 must be used.
Ratio	4:1 (Part A: Part B)
Pot Life	3 hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating becomes too viscous to use.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Spray Application (General)	This is a high solids coating and may require adjustments in spray techniques. Wet film thickness is easily and quickly achieved. The following spray equipment has been found suitable and is available from manufacturers. Hold gun 12-14 inches from the surface and at a right angle to the surface.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Conventional Spray	Pressure pot equipped with dual regulators, 3/8" I.D. minimum material hose, 0.070" I.D. fluid tip and appropriate air cap.
Airless Spray	Pump Ratio: 30:1 (min.) Volume Output: 2.5 gal/min (9.5 l/min) Material Hose: 3/8" I.D. min (905 mm) Tip Size: 0.017-0.021" (0.43-0.53 mm) Fluid Pressure: 2000-2500 psi (13.8-17.2 MPa) *PTFE packings are recommended and available from pump manufacturer.
Brush & Roller (General)	For applications over damp surfaces, brush and roller is the preferred method. Multiple coats may be required to obtain desired appearance, recommended dry film thickness, and adequate hiding. Avoid excessive re-brushing or re-rolling. For best results, tie-in within 10 minutes at 75°F (24°C). Use a short-nap synthetic roller cover with phenolic core.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	45°F (7°C)	20°F (-7°C)	20°F (-7°C)	0%
Maximum	90°F (32°C)	120°F (49°C)	100°F (38°C)	95%

Industry standards are for substrate temperatures to be above the dew point. Carboguard 635 is unique in that it can tolerate damp substrates. See Brush or Roller above. Special thinning and application techniques may be required above or below normal conditions.

CURING SCHEDULE

Surface Temp.	Dry to Handle	Dry to Topcoat Minimum	Dry to Topcoat Maximum	Dry to Touch
20°F (-7°C)	36 Hours	24 Hours	180 Days	4 Hours
35°F (2°C)	18 Hours	2 Hours	180 Days	2 Hours
50°F (10°C)	11 Hours	1 Hour	180 Days	1 Hour
75°F (24°C)	3 Hours	45 Minutes	180 Days	30 Minutes
90°F (32°C)	1.5 Hours	30 Minutes	180 Days	15 Minutes

These times are to be used as a guideline for non-immersion applications. The longer the first coat has to cure, particularly in sunlight exposure or elevated temps, the higher risk of inadequate adhesion. If those maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. Contact your local Carboline Representative for assistance/guidance.
The listed times in the chart above are based on a 4-6 mil (100-150 micron) dry film thickness per coat. Deviation from those thicknesses may compromise the performance and adhesive properties of the film. Higher film thickness, insufficient ventilation or cooler temperatures could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing will not affect performance but may cause discoloration and result in a surface haze. Any haze or blush must be removed by water washing before recoating. For force curing, contact Carboline Technical Service for specific requirements.
*Do not apply to substrates with ice or ice crystal formation. Dehumidify or raise the temperature to eliminate ice on the substrate.
This product will tolerate drops in temperature to 0°F (-17°C) during its cure and will continue to cure when the temperature rises. Follow "Cure for Service" guideline listed above to determine when the product is fully cured.
Cure for Potable Water Use: 7 day cure after final coat @ 75°F.

CURING SCHEDULE

Surface Temp.	Dry to Topcoat Minimum	Dry to Topcoat with Antifoulant Maximum	Dry to Topcoat with Itself
20°F (-7°C)	24 Hours	36 Hours	30 Days
35°F (2°C)	2 Hours	16 Hours	30 Days
50°F (10°C)	1 Hour	8 Hours	30 Days
75°F (24°C)	45 Minutes	4 Hours	30 Days
90°F (32°C)	30 Minutes	3 Hours	30 Days

The curing schedule above references curing times for immersion service when an antifoulant topcoat is used.
The optimum time to topcoat with an antifoulant is when the film is "touch-tacky." If the touch-tacky time has been exceeded, or if the film is "glossy," you can generally re-prime/refresh the first coat with a fresh coat of itself. High temps and/or sunlight exposure may shorten this recoat schedule.
Marine Use: Undocking time of 24 hours @75°F

CLEANUP & SAFETY

Cleanup	Use Thinner 2 or MEK. In case of spillage, absorb and dispose of in accordance with local applicable regulations.
Safety	Read and follow all caution statements on this product data sheet and on the SDS for this product. Wear protective clothing, gloves and use protective cream on face, hands and all exposed areas.
Ventilation	When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator.
Caution	This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workers should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

PACKAGING, HANDLING & STORAGE

Shelf Life	Part A: 24 months at 76°F (24°C) Part B: 24 months at 76°F (24°C) *Shelf Life: (actual stated shelf life) when kept at recommended storage conditions and in original unopened containers.
Storage Temperature & Humidity	40 -100°F (4°C-38°C) 0-95% Relative Humidity
Storage	Store Indoors. KEEP DRY
Shipping Weight (Approximate)	1 Gal Kit - 14 lbs (6.4 kg) 5 Gal Kit - 65 lbs (29.5 kg)
Flash Point (Setaflash)	Part A: 66°F (19°C) Part B: 80 °F (27°C) Mixed: 77°F (25°C)

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

Carboguard® 891 VOC

PRODUCT DATA SHEET

SELECTION & SPECIFICATION DATA

Generic Type	High solids polyamine-epoxy
Description	Ultra high solids epoxy that is designed as a liner for potable water, demineralized water, wastewater and many other services. It is widely used as a tank lining for steel and concrete tanks. Product is self-priming and is normally applied in two coats. Formulated for application at conventional builds (4 to 6 mils per coat) as well as high builds (10 mils per coat).
Features	• NSF/ANSI 61 compliant for use in potable water tanks, pipes, and valves.* • Meets the FDA requirements for 21CFR 175.300 for direct food contact • Meets the requirements of AWWA C210 • Ultra High solids; Low VOC and HAPs • Handles deionized water up to 150°F (66°C) • Ultra low VOC (67 g/l) • Good chemical resistance • Excellent thermal shock resistance • Good abrasion resistance *Contact Carboline Technical Service for approved dimensions. Valid when manufactured at a certified location.
Color	Light Grey (0700), White (0800), other limited colors available. All colors are unmatched
Finish	Semi-Gloss
Primer	Self-priming
Dry Film Thickness	4 - 10 mils (102 - 254 microns) per coat (5-13 wet mils thinned 10%) Can be applied 2 or 3 coats. Do not exceed 20 mils total DFT.
Solids Content	By Volume 86% +/- 2%
Theoretical Coverage Rate	1371 ft²/gal at 1.0 mils (33.7 m²/l at 25 microns) 343 ft²/gal at 4.0 mils (8.4 m²/l at 100 microns) 137 ft²/gal at 10.0 mils (3.4 m²/l at 250 microns) Allow for loss in mixing and application.
VOC Value(s)	As Supplied: 0.52 lbs./gal (62 g/l) Per EPA Method 24: 0.56 lbs/gal (67 g/l) Per EPA Method 24: 13 oz/gal. of Thinner 2: 1.18 lbs/gal (142 g/l) Per EPA Method 24: 13 oz/gal of Thinner 225 E: 0.56 lbs./gal (67 g/l) Per EPA Method 24: 13 oz/gal of Thinner 76: 1.14 lbs/gal (137g/l) These are nominal values and may vary slightly with color. Product contains VOC-exempt t-butyl acetate. Check local regulations regarding product usage.
Dry Temp. Resistance	Continuous: 250°F (121°C) Non-Continuous: 275°F (135°C) Some discoloration and loss of gloss is observed above 200°F (93°C).
Limitations	Epoxies may lose gloss, discolor and chalk when exposed to sunlight.

SELECTION & SPECIFICATION DATA

Wet Temp. Resistance	Handles deionized water immersion temperatures up to 150°F (66°C) Water immersion temperatures up to 180°F (82°C)

SUBSTRATES & SURFACE PREPARATION

General	Surfaces must be clean and dry. Employ adequate methods to remove dirt, dust, oil and all other contaminants that could interfere with adhesion of the coating.
Steel	**Immersion:** SSPC-SP10/NACE 2 **Non-immersion::** SSPC-SP6/NACE 3 **Surface Profile:** 2-3½ mils (50-88 microns)
Concrete or CMU	Immersion: Concrete must be cured 28 days at 75°F (24°C) Prepare surfaces in accordance with SSPC-SP13/NACE 6 or ICRI 03732 to obtain CSP 3 to 5 roughness. Attain a surface profile resembling extra coarse sandpaper. Eliminate leaks and infiltrations and remove standing water. Resurface areas with excessive cavities (bugholes) or exposed aggregate using a high-strength resurfacing product like Carboguard 510. Carboguard 510 may be used to patch bugholes and to resurface.

MIXING & THINNING

Mixing	Power mix separately, then combine and power mix. **DO NOT MIX PARTIAL KITS.** Requires short 15 min sweat-in time.
Thinning	Thinning will be required to properly atomize the mixed material. For potable water end uses thin up to 10% (13 oz/gal) with Thinner #2 or Thinner #225E (VOC exempt thinner). For all other usesThinner #76 may be used in addition to Thinners #2 and 225E.
Ratio	2:1 Ratio (A to B)
Pot Life	1¼ Hours at 75°F (24°C) 2 Hours at 60°F (15.5°C) Pot life ends when coating loses body and begins to sag. Pot life times will be less at higher temperatures.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Conventional Spray	Pressure pot equipped with dual regulators, 3/8” I.D. minimum material hose, 0.070” I.D. fluid tip and appropriate air cap. Adjust air pressure to approximately 50 psi at the gun and provide 10-20 lbs. of pot pressure.
Airless Spray	Pump Ratio: 30:1 (min.) GPM Output: 2.5 (min.) Material Hose: 3/8” I.D. (min.) Tip Size: 0.017”-0.021” Output PSI: 1500-2300 Filter Size: 60 mesh PTFE packings are recommended and available from the pump manufacturer.

APPLICATION EQUIPMENT GUIDELINES

Listed below are general equipment guidelines for the application of this product. Job site conditions may require modifications to these guidelines to achieve the desired results.

Brush & Roller (General) | Recommended for small areas and repairs only. Use a high quality brush, and apply a very light crisscross brush coat. Allow to dry for approximately 5 minutes. Then apply a heavy coat using a crisscross brush pattern. Normally, a film thickness of 2.5-3 mils (62- 75 microns) can be obtained per coat by this method.

Brush | Use a medium bristle brush.

Roller | Not recommended.

APPLICATION CONDITIONS

Condition	Material	Surface	Ambient	Humidity
Minimum	50°F (10°C)	50°F (10°C)	50°F (10°C)	0%
Maximum	90°F (32°C)	125°F (52°C)	110°F (43°C)	90%

This product simply requires the substrate temperature to be above the dew point. Condensation due to substrate temperatures below the dew point can cause flash rusting on prepared steel and interfere with proper adhesion to the substrate. Special application techniques may be required above or below normal application conditions.
Note: Prior to spray application, stripe brush all weld attachments and surface irregularities using Carboguard 891 VOC thinned 10% by volume with Thinner #225E.

CURING SCHEDULE

Surface Temp.	Dry to Recoat	Final Cure Immersion	Maximum Recoat Time
50°F (10°C)	36 Hours	14 Days	90 Days
60°F (16°C)	20 Hours	10 Days	60 Days
75°F (24°C)	10 Hours	7 Days	45 Days
90°F (32°C)	5 Hours	5 Days	21 Days

These times are based on a 4.0-6.0 mil (102-152 microns) dry film thickness. Higher film thickness, insufficient ventilation or cooler temperatures will require longer cure times and could result in solvent entrapment and premature failure. Excessive humidity or condensation on the surface during curing can interfere with the cure, can cause discoloration and may result in a surface haze. Any haze or blush must be removed by water washing before recoating. If the maximum recoat times have been exceeded, the surface must be abraded by sweep blasting or sanding prior to the application of additional coats. Food-grade exposures require force curing at 225°F for four hours. Raise temperature 30°F for every 30 minutes until temperature is reached. (Other curing temperatures in table below). METAL TEMPERATURE - CURING TIME 150°F/66°C - 12 Hrs 175°F/79°C - 10 Hrs 200°F/93°C - 6 Hrs 225°F/107°C - 4 Hrs

CLEANUP & SAFETY

Cleanup | Use Thinner #225E. In case of spillage, absorb and dispose of in accordance with local applicable regulations.

Safety | Read and follow all caution statements on this product data sheet and on the SDS for this product. Employ normal workmanlike safety precautions.

CLEANUP & SAFETY

Ventilation	When used as a tank lining or in enclosed areas, thorough air circulation must be used during and after application until the coating is cured. The ventilation system should be capable of preventing the solvent vapor concentration from reaching the lower explosion limit for the solvents used. User should test and monitor exposure levels to insure all personnel are below guidelines. If not sure or if not able to monitor levels, use MSHA/NIOSH approved supplied air respirator
Caution	This product contains flammable solvents. Keep away from sparks and open flames. All electrical equipment and installations should be made and grounded in accordance with the National Electric Code. In areas where explosion hazards exist, workmen should be required to use non-ferrous tools and wear conductive and non-sparking shoes.

TESTING / CERTIFICATION / LISTING

Potable Water Certifications	**Potable Water Use Limitations @ 75°F (24°C):** Max DFT: 20 mils (508 microns) # Coats: 2 to 3 Tank Rating: >50 gal (189.271 Liters) Pipe Rating: 15" or larger (38.1 cm) Valve Rating: 1.5" or larger (3.81 cm) Thinning: Thinner 2 or 225 E at 10% by volume 14 Day Cure Required before service Or: Max DFT: 20 mils (508 microns) # of Coats: 2 to 3 Tank Rating: >70,000 gal (264978.82 Liters) Pipe Rating: Not Rated Valve Rating: Not Rated Thinning: Thinner 2 or 225E at 10% by volume 7 Day Cure Required before service Approved Colors: 0700 (Light Grey), 0800 (White) Special Order Colors: 0100 (Light blue), 0900 (Black), 6120 (Blue), 0794 (Grey), 0200 (Tan)

PACKAGING, HANDLING & STORAGE

Shelf Life	Part A: Min. 12 months at 75°F (24°C) Part B: Min. 6 months at 75°F (24°C) *Shelf Life: When kept at recommended storage conditions and in original unopened containers.
Storage Temperature & Humidity	40° - 110°F (4°- 43°C) 0-100% Relative Humidity
Storage	Store Indoors.
Shipping Weight (Approximate)	1 Gallon Kit - 15 lbs (6.8 kg) 5 Gallon Kit - 75 lbs (34 kg)
Flash Point (Setaflash)	Part A: 24°F (-4.5°C) Part B: 41°F (5°C)

WARRANTY

To the best of our knowledge the technical data contained herein is true and accurate on the date of publication and is subject to change without prior notice. User must contact Carboline Company to verify correctness before specifying or ordering. No guarantee of accuracy is given or implied. We guarantee our products to conform to Carboline quality control. We assume no responsibility for coverage, performance, injuries or damages resulting from use. Carbolines sole obligation, if any, is to replace or refund the purchase price of the Carboline product(s) proven to be defective, at Carbolines option. Carboline shall not be liable for any loss or damage. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY CARBOLINE, EXPRESS OR IMPLIED, STATUTORY, BY OPERATION OF LAW, OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. All of the trademarks referenced above are the property of Carboline International Corporation unless otherwise indicated.

TAB B

TAB B

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SALES SHEET N□MBER□□□□□□□ □ P□O□□□□□□□□□

□T□	PART N□MBER	DESCRIPTION
2	6□□C□□	6□□ MODEL C□□ CHOP□□LO□

RPM□1165
CONDITIONS□110 □PM □ 39 □T TDH

Standard P□m□ Con□i□□ration
Steel □□m□ hard□are

Seal T□□e□S□lit Mechanical Seal
Seal Man□□act□rer□Chesterton
Chesterton □□2 S□lit Mechanical Seal

Trilli□m S□□□lied Motor
10 H□, L215TC 1800 r□m □remi□m e□□icient motor

TE□C Hori□ontal C□□ace
Direct Dri□e
C□□ace □oot Mo□nted Motor
□Pole, 60 H□
Premi□m E□□icient Se□ere D□t□
TE□C
□60 □
Steel base□late □
Direct Dri□e Base□late
Trilli□m Standard Base□late Desi□n
Steel Base□late Hard□are

Co□□lin□ □□ SP Standard

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Part N□mber	Descri□tion	□t□Per	□M
801196	SEAL,MECH CHST SPLIT SEAL	1.	EA

□ □□r□□□ □□ □□r□□□□□□□□□□□□□□□□

□ **B□R□□ □ □□□□R□□□ □□□ □□□□□□□□**

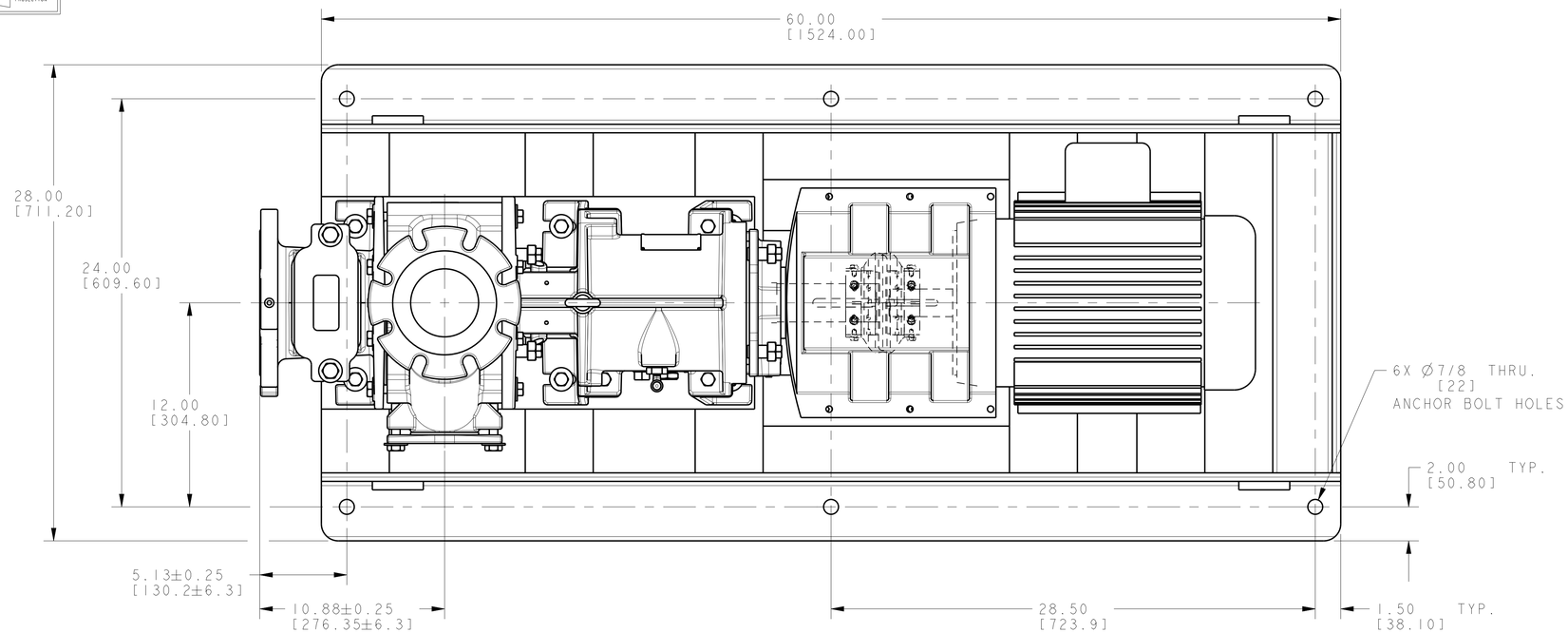
Part N□mber	Descri□tion	□t□Per	□M
701158□1	C□TTER BAR, 6□□ C□2□C□□	1.	EA

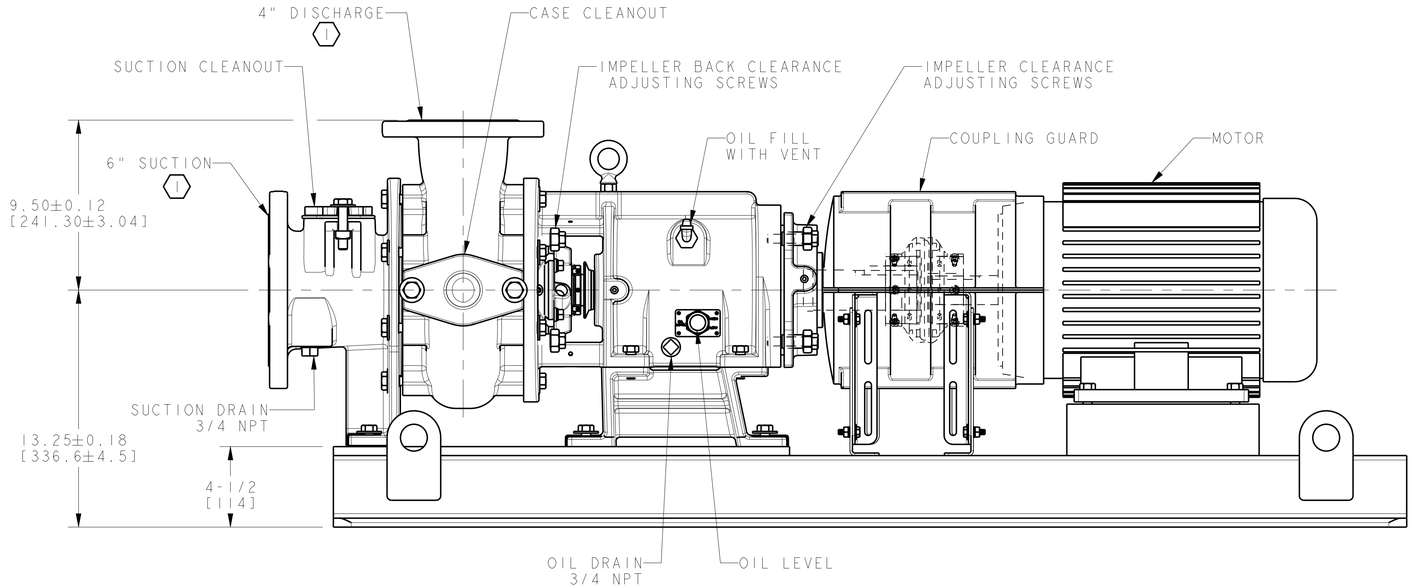
□ □□r□□□ □□ □□r□□□□□□□□□□□□□□□□□□

□ □□ □ □□□**M**□□□ □□□□□□□□□□□□□□□□□□□□

Part N□mber	Descri□tion	□t□Per	□M
702108□01□	IMPELLER INSTAL TOOL,6□□ C□2□□	1.	EA

□





NOTES:

1. SUCTION AND DISCHARGE FLANGES MATE WITH STD. 150 LB ANSI FLANGES
2. DIMENSIONS ARE NOT FOR INSTALLATION PURPOSES UNLESS CERTIFIED
3. IMPERIAL DIMENSIONS ARE DRIVING. SECONDARY DIMENSIONS [MM] ARE FOR REFERENCE.

REVISIONS

NO.	BY	DATE	CHK'D	ECN	DESCRIPTION
				-	

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE

DWG. NO.	DESCRIPTION

CODE NO. CHG 03/13/20

CUSTOMER	W M LYLES CO		
USER	CHINO RP-4 PRIMARY CLARIFIER		
SERIAL NO.	20DWI2670-02, -03		
CUSTOMER ORDER NUMBER	55-1187-04	EPS SALES SHEET NO.	DWI2670
DRAWN BY	DAYA	DATE	03-13-20
CHECKED	SHIVA	DATE	03-13-20
APPROVED	DEVIN H	DATE	03-13-20

TRILLIUM FLOW TECHNOLOGIES™

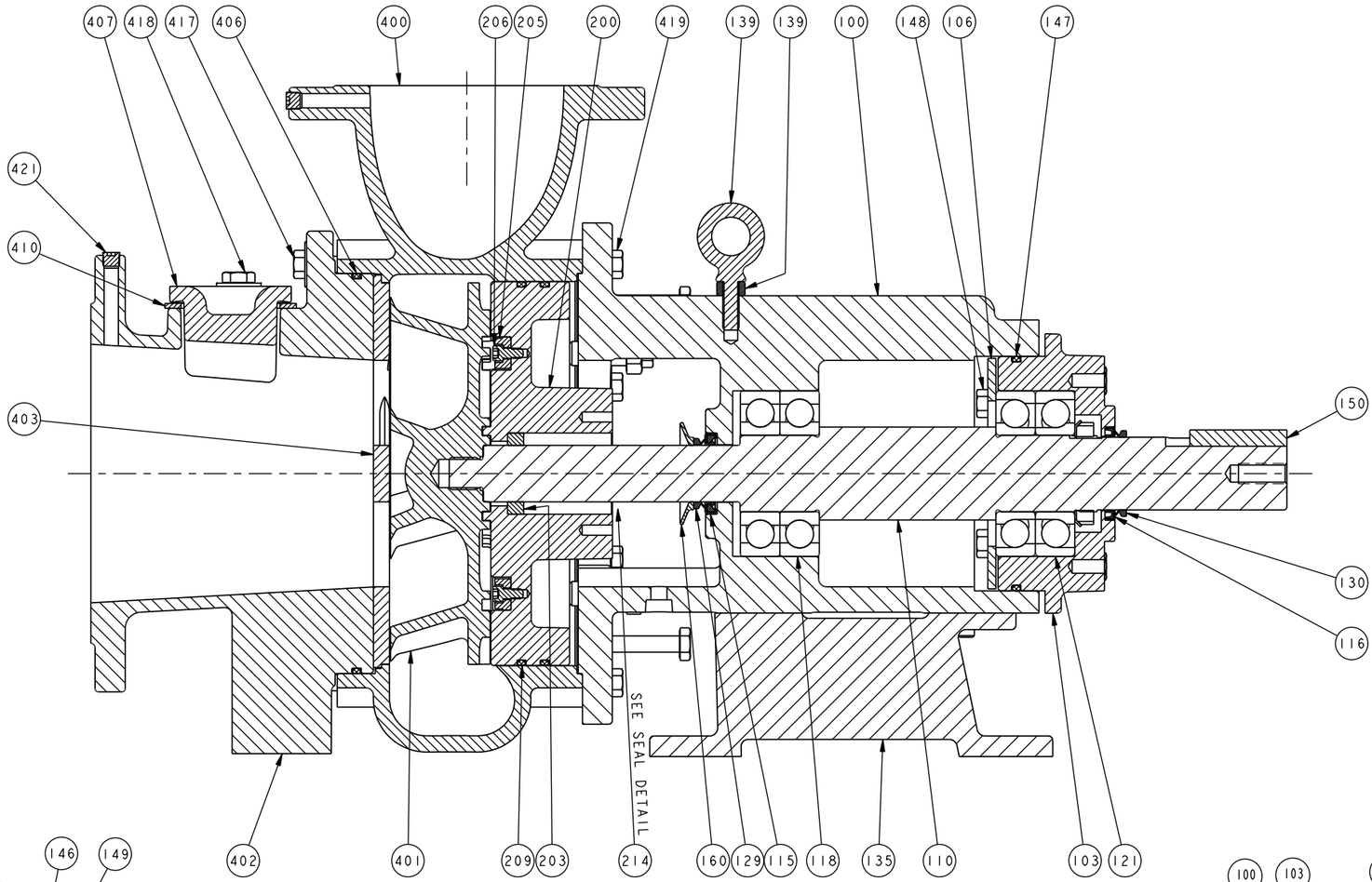
WEMCO® ROTO-JET®

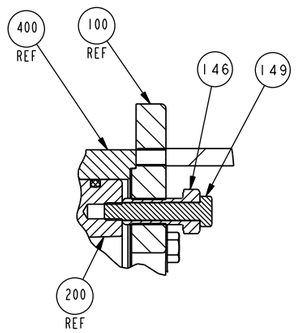
GENERAL ASSEMBLY, DIRECT CONNECT
6X4 CF2/CF4, 254TC MOTOR
CHOPPER PUMPS
WEMCO PUMPS

CAD NO. 709366-1 SHEET 1 OF 1

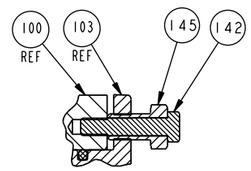
SCALE	SIZE	DWG NO.	REVISION
1/4	D	709366	0

DRAWING NO. 709366





PUMP END ADJUSTER BOLTS



DRIVE END ADJUSTER BOLTS

REVISIONS

NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION
X	X	X	X	X		X

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE

DWG. NO.	DESCRIPTION

CODE NO. 480/AQU 590 CHG 10/04/19

CUSTOMER			
USER			
SERIAL NO.			
CUSTOMER ORDER NUMBER		EPS SALES SHEET NO.	
DRAWN BY	JCH	DATE	12/08/06
CHECKED	eng	DATE	12/08/06
APPROVED	eng	DATE	12/08/06

TRILLIUM FLOW TECHNOLOGIES

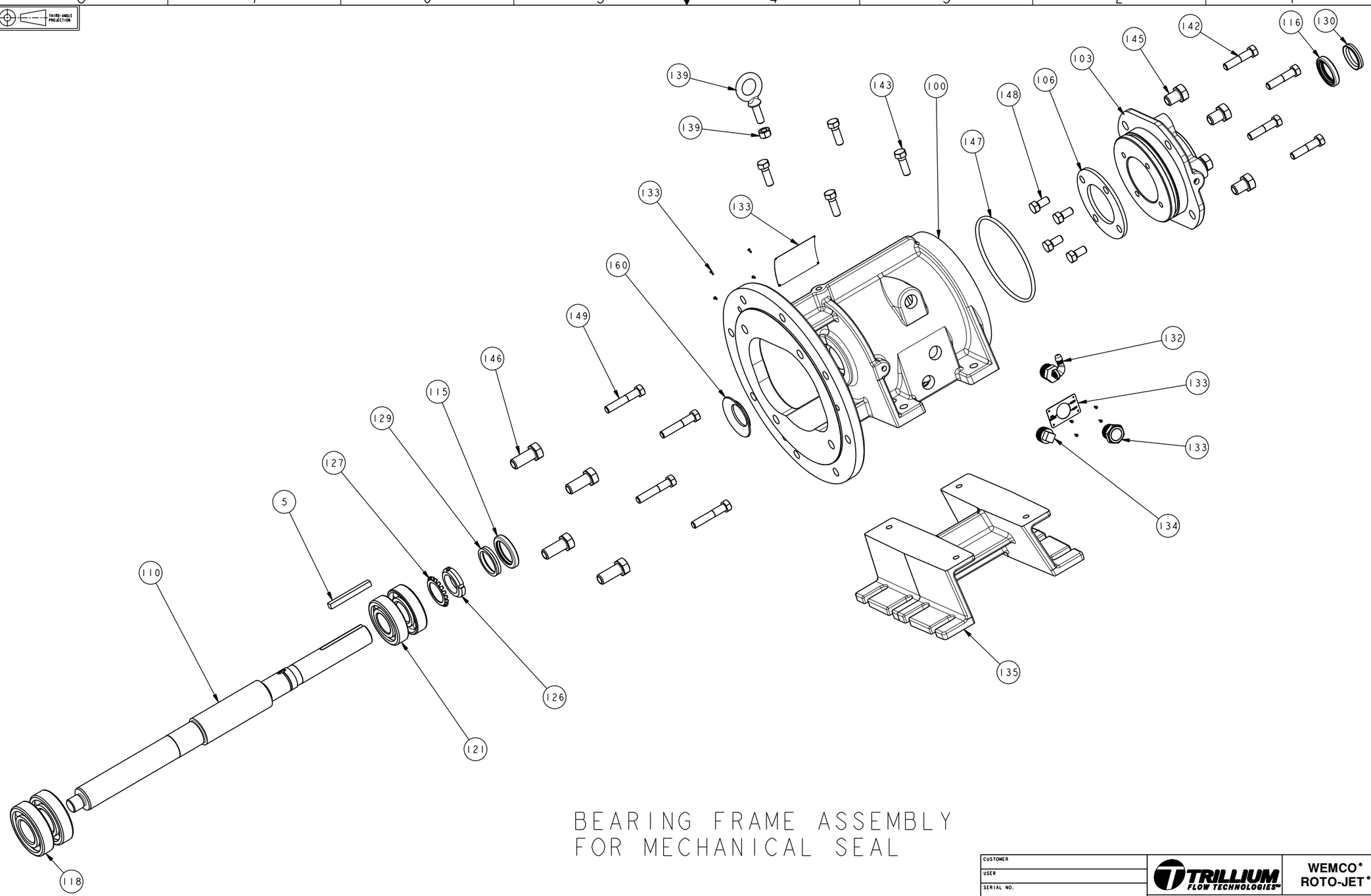
WEMCO• ROTO-JET•

BARE PUMP ASSY
6X3 THRU 10X8 HORIZ.
CHOPPER PUMPS
WEMCO CHOP-FLOW PUMPS

CAD NO. 702837-1 SHEET 1 OF 1

SCALE	SIZE	DWG NO.	REVISION
1/2	D	702837	1

DRAWING NO. 702837



BEARING FRAME ASSEMBLY FOR MECHANICAL SEAL

REVISIONS

NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION
-						

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE

DWG. NO.	DESCRIPTION

CODE NO. 480/AOU 590 CHG 10/07/19

CUSTOMER

USER

SERIAL NO.

CUSTOMER ORDER NUMBER	EPS SALES SHEET NO.

DRAWN BY	VJP	DATE 01-27-06
CHECKED	eng	DATE 01-27-06
APPROVED	eng	DATE 01-27-06

TRILLIUM FLOW TECHNOLOGIES™

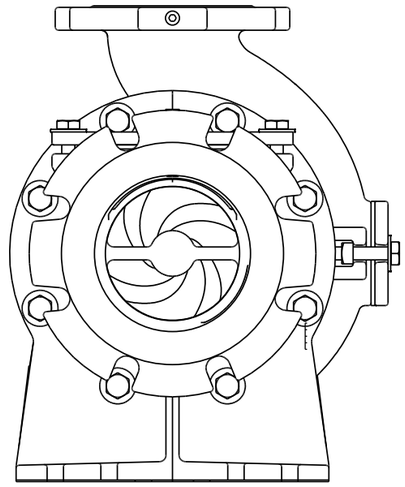
WEMCO• ROTO-JET•

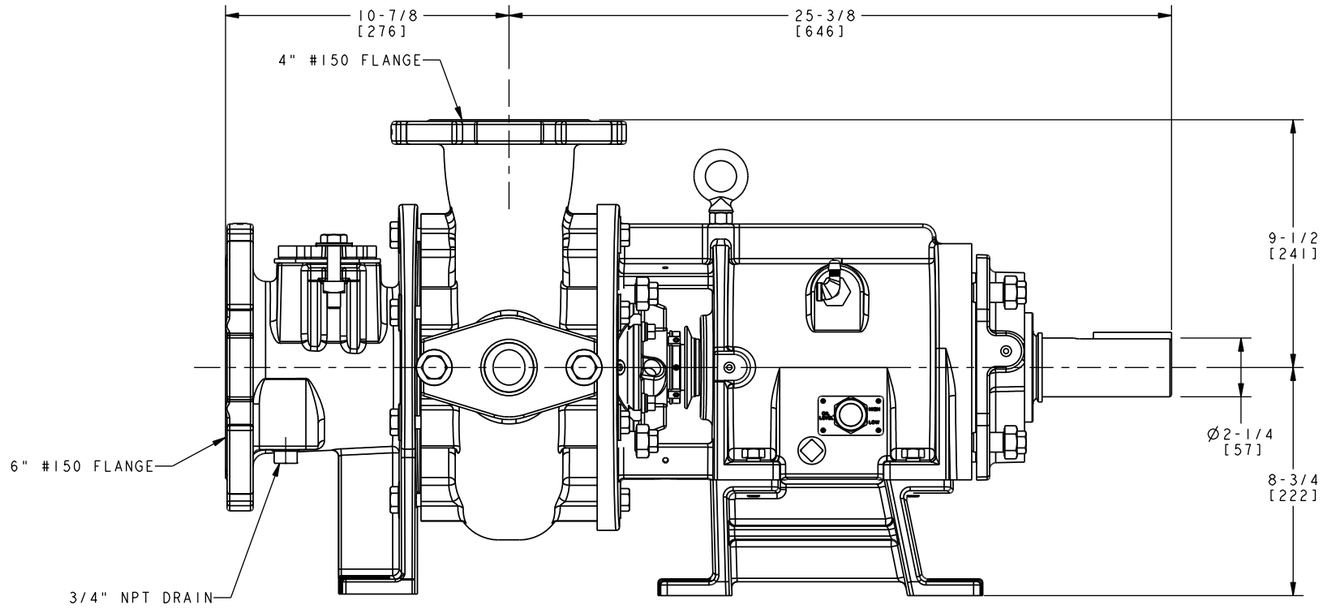
ASSEMBLY
BEARING FRAME
CHOP-FLOW PUMPS

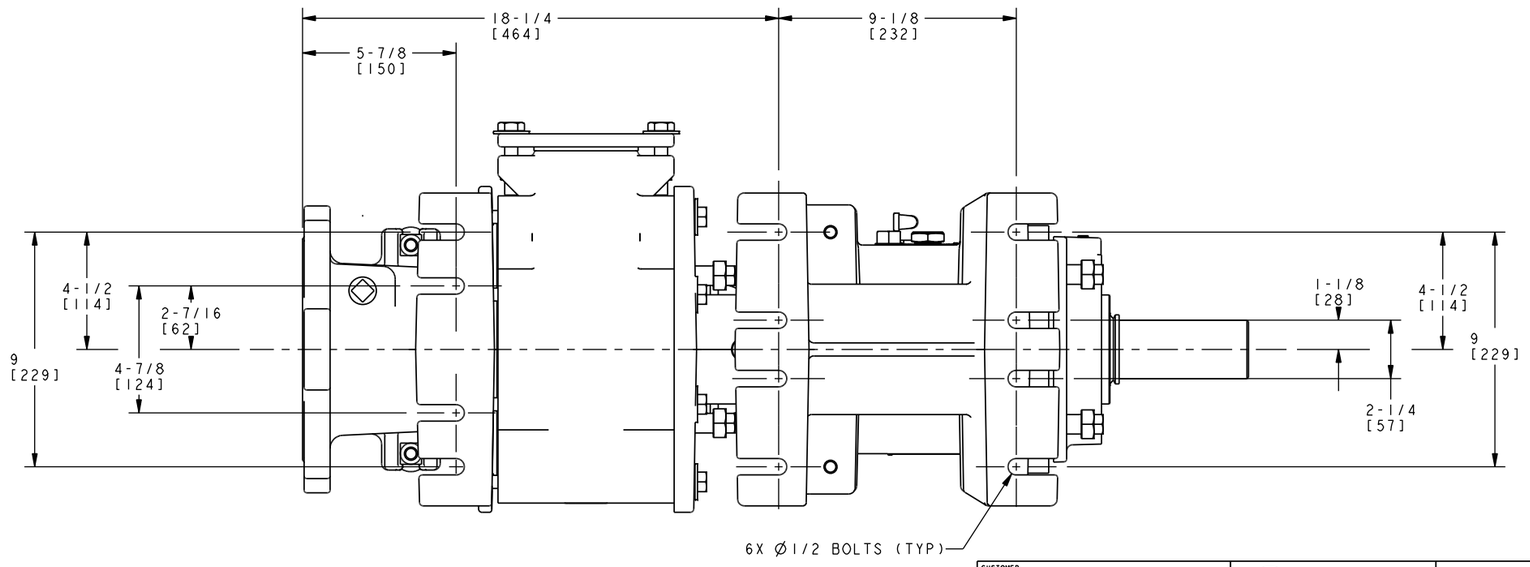
CAD NO. 702395-1 SHEET 1 OF 1

SCALE 1/1 SIZE D DWG NO. 702395 REVISION 0

DRAWING NO. 702395







NOTES:

1. IMPERIAL DIMENSIONS ARE DRIVING DIMENSIONS. SECONDARY [MM] ARE FOR REFERENCE.

REVISIONS

NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION
1	ENG	6/19	DAH			ADDED DUAL DIMENSIONING

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE

DWG. NO.	DESCRIPTION
CODE NO. /	CHG 03/09/06

CUSTOMER			
USER			
SERIAL NO.			
CUSTOMER ORDER NUMBER		EPS SALES SHEET NO.	
DRAWN BY	JCH	DATE	3/08/06
CHECKED	eng	DATE	3/08/06
APPROVED	eng	DATE	3/08/06

TRILLIUM FLOW TECHNOLOGIES

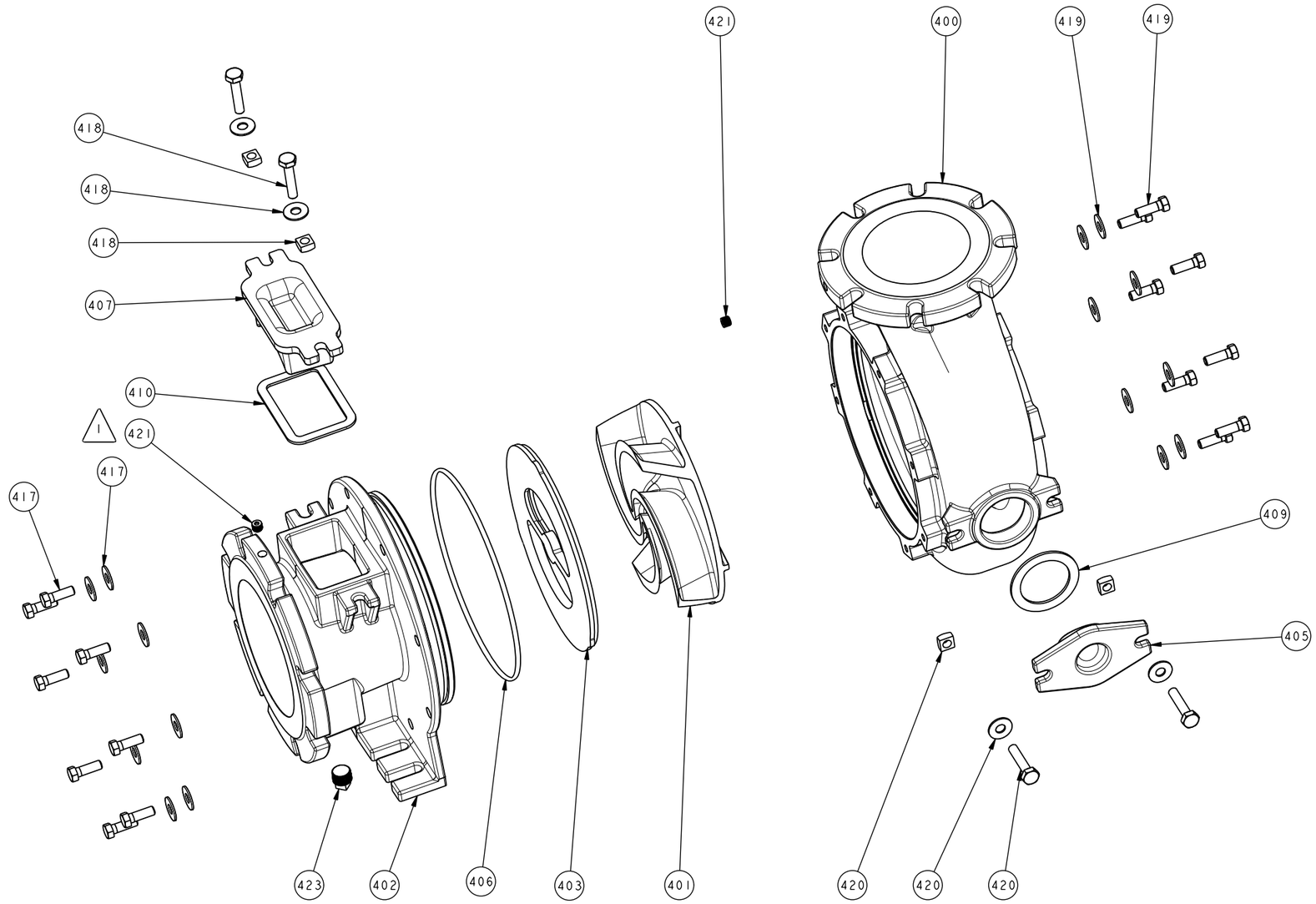
WEMCO• ROTO-JET•

OUTLINE DIMENSIONS
6 X 4 CF2/4 BELT DRIVE
CHOPPER PUMP
CHOP-FLOW PUMPS

CAD NO. 702426-1 | SHEET 1 OF 1

SCALE	SIZE	DWG NO.	REVISION
3/8	D	702426	1

DRAWING NO. 702426



WET END ASSEMBLY

REVISIONS

NO.	BY	DATE	CHK'D	LCL ECN	INT'L ECN	DESCRIPTION
1						

CERTIFIED FOR CONSTRUCTION

DATE

BY

REFERENCE

DWG. NO.	DESCRIPTION

CODE NO. 480/AOU 590 CHG 10/07/19

CUSTOMER

USER

SERIAL NO.

CUSTOMER ORDER NUMBER	EPS SALES SHEET NO.

TRILLIUM FLOW TECHNOLOGIES™

WEMCO® ROTO-JET®

ASSEMBLY
WET \END
CHOPPER PUMPS
WEMCO PUMPS

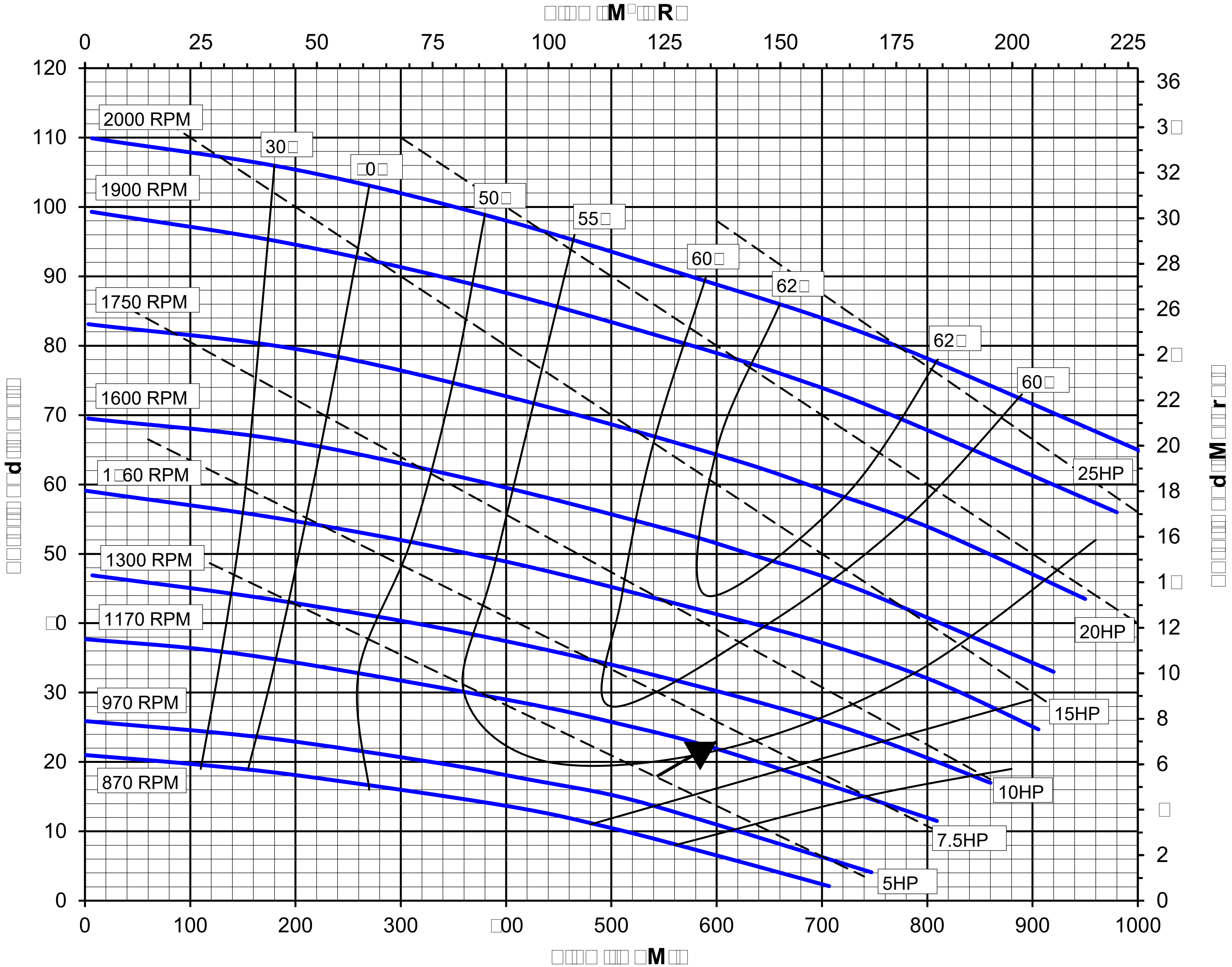
DRAWN BY	VJP	DATE 01-27-06
CHECKED	eng	DATE 01-27-06
APPROVED	eng	DATE 01-27-06

CAD NO. 702393-1 SHEET 1 OF 1

SCALE 5/16 SIZE D DWG NO. 702393 REVISION 1

DRAWING NO. 702393

WSP™ CHOP-FLOW



$$BHP = \frac{GPM \; x \; FT \; x \; SG}{3960 \; x \; Efficiency}$$

$$kW = \frac{M^3/hr \; x \; M \; x \; SG}{367 \; x \; Efficiency}$$

The brake horsepower and efficiency shown is for properly installed and lubricated packing. Pumps with mechanical seals will require additional horsepower and the factory may be contacted for these values.
Certified tests are performed using Hydraulic Institute acceptance grade 2B.

Pump Performance Datasheet

Customer	: Wescor Associates Inc.	Quote number	: 1441511
Customer reference	:	Size	: 6x4 CF3
Item number	: 002	Stages	: 1
Service	: Section 11315 Horizontal Chopper Pumps	Based on curve number	: CF1007
Quantity	: 2	Date last saved	: 24 Aug 2022 3:05 PM

Operating Conditions

Flow, rated	: 110 USgpm
Differential head / pressure, rated (requested)	: 39.0 ft
Differential head / pressure, rated (actual)	: 38.7 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed, rated	: 1165 rpm
Impeller diameter, rated	: 9.50 in
Impeller diameter, maximum	: 11.80 in
Impeller diameter, minimum	: 8.80 in
Efficiency	: 15.11 %
NPSH required / margin required	: - / 0.00 ft
Ns (imp. eye flow) / Nss (imp. eye flow)	: 1,672 / - US Units
MCSF	: 13.3 USgpm
Head, maximum, rated diameter	: 42.9 ft
Head rise to shutoff	: 10.01 %
Flow, best eff. point	: 534 USgpm
Flow ratio, rated / BEP	: 20.58 %
Diameter ratio (rated / max)	: 80.51 %
Head ratio (rated dia / max dia)	: 60.58 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Acceptable

Liquid

Liquid type	: User defined
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.000 / 1.000 SG
Viscosity, rated	: 1.00 cP
Vapor pressure, rated	: 0.00 psi.a

Material

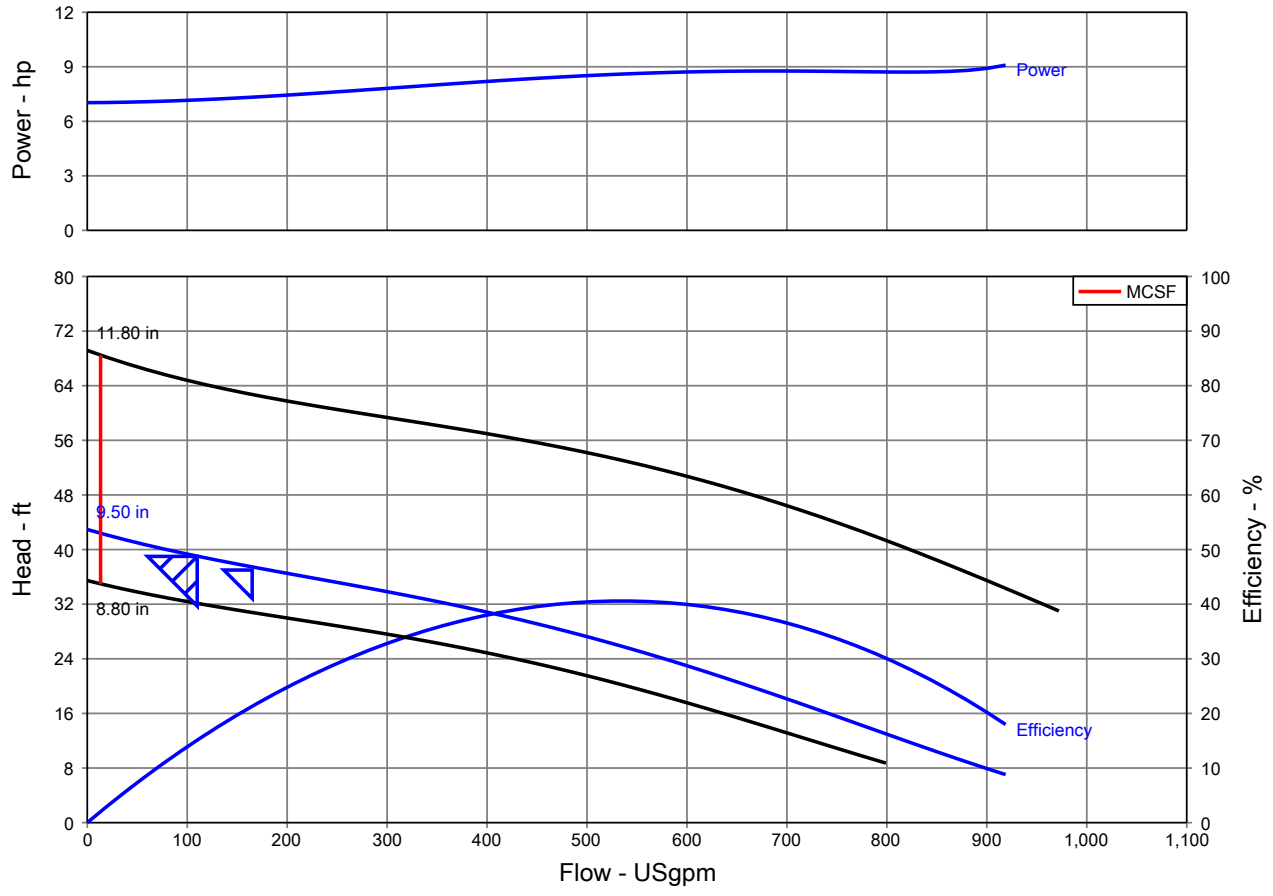
Material selected	: Standard

Pressure Data

Maximum working pressure	: 18.59 psi.g
Maximum allowable working pressure	: 100.0 psi.g
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: N/A

Driver & Power Data (@Max density)

Driver sizing specification	: Rated power
Margin over specification	: 0.08 %
Service factor	: 1.00
Power, hydraulic	: 1.08 hp
Power, rated	: 7.18 hp
Power, maximum, rated diameter	: 9.09 hp
Minimum recommended motor rating	: 7.50 hp / 5.59 kW

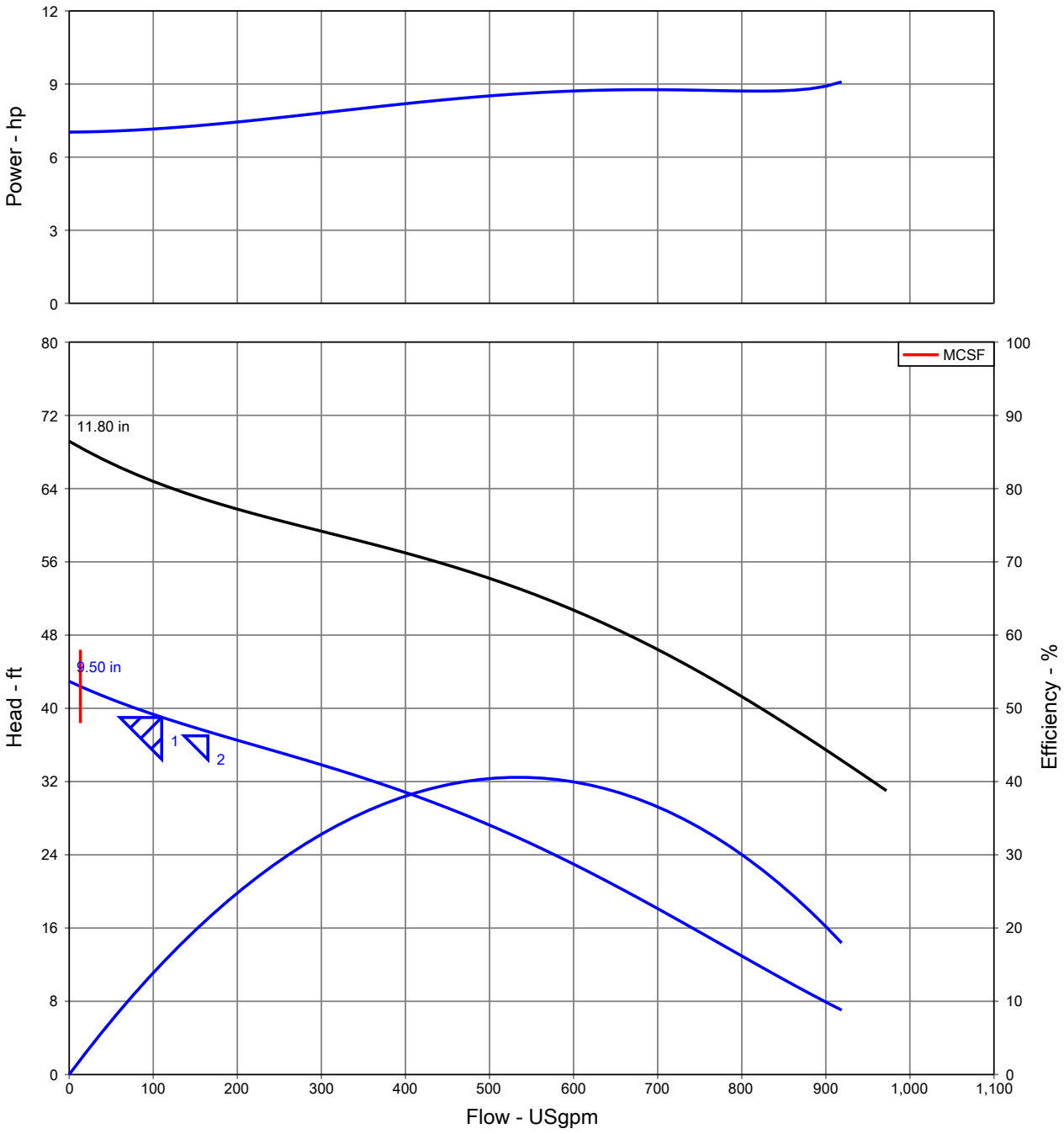


Multiple Conditions Datasheet

Customer	: Wescor Associates Inc.	Quantity	: 2	Size	: 6x4 CF3
Customer reference	:	Quote number	: 1441511	Stages	: 1
Item number	: 002	Date last saved	: 24 Aug 2022 3:05 PM	Speed, rated	: 1165 rpm
Service	: Section 11315 Horizontal Chopper Pumps				

Condition #		1	2	3	4	5	6	7	8
Description		-	-						
Temperature, max	deg F	68.00	68.00						
Fluid density, rated / max	SG	1.000 / 1.000	1.000 / 1.000						
Viscosity, rated	cP	1.00	1.00						
Primary condition		◉	○	○	○	○	○	○	○
Size		6x4 CF3							
Stages		1							
Impeller diameter, rated	in	9.50							
Flow, rated	USgpm	110	165						
Head, rated (requested)	ft	39.0	37.0						
Head, rated (actual)	ft	38.7	37.1						
Suction pressure, rated / max	psi.g	0.00 / 0.00	0.00 / 0.00						
NPSH available, rated	ft	Ample	Ample						
Speed, rated	rpm	1165	1165						
Selection status		Acceptable	Acceptable						
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]		1.00 / 1.00 / 1.00 / 1.00	1.00 / 1.00 / 1.00 / 1.00						
Efficiency	%	15.11	21.30						
NPSH required	ft	-	-						
Submergence	ft	-	-	-	-	-	-	-	-
Power, rated	hp	7.18	7.33						

Multiple Conditions Curve



Customer	: Wescor Associates Inc.	Size	: 6x4 CF3
Customer reference	:	Stages	: 1
Item number	: 002	Speed, rated	: 1165 rpm
Service	: Section 11315 Horizontal Chopper Pumps	Based on curve number	: CF1007
		Efficiency	: 15.11 %
Quantity	: 2	Power, rated	: 7.18 hp
Quote number	: 1441511	NPSH required	: -
Date last saved	: 24 Aug 2022 3:05 PM	Viscosity	: 1.00 cP
Flow, rated	: 110 USgpm	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Differential head / pressure, rated	: 39.0 ft	Submergence	
Fluid density, rated / max	: 1.000 / 1.000 SG		

DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

I. GENERAL INSTRUCTIONS

A. Disassembly

1. Disconnect power from the pump driver and lock out power supply.

> WARNING
>
> FAILURE TO DISCONNECT POWER SUPPLY AND LOCK OUT WITH AN APPROVED LOCKOUT DEVICE MAY RESULT IN INJURY.

2. Close pump suction and discharge valves, remove Suction spool drain plug (425), and disconnect seal water piping.
3. On direct-coupled units, attach lifting device to motor, remove coupling guard cover, and loosen the pump end coupling flange. Unbolt the coupling guard from the pump and remove the motor and guard from the pump. Note: The motor feet are not bolted to the pump base.
4. On belt-driven units, relieve the belt tension and remove the belts, belt guard and pump sheave.
5. Disconnect the suction and discharge piping from the pump. In a proper installation, the piping system should be self-supporting, but make sure that it is before removing the flange bolts.
6. Remove the fasteners attaching the pump to its base, and lift the pump from the stand using the eyebolt (139) on top of the bearing housing and an approved lifting system. Vertical unit should be lifted using two ½" eyebolts inserted into the bearing cap (103) on opposite sides.

> **WARNING**
>
> **EQUIPMENT LIFTING DEVICES SUCH AS CHAIN, LIFTING EYES, HOOKS, ETC. MUST BE APPROVED BY LOCAL, STATE, OR FEDERAL SAFETY CODES.**
>
> **HOISTS AND CRANES MUST BE ADEQUATELY SIZED TO LIFT RATED LOADS.**
>
> **FAILURE TO USE APPROVED LIFTING DEVICES MAY RESULT IN INJURY.**
>
> **WHEN LIFTING THE PUMP IT IS IMPORTANT TO MAKE SURE THAT THE CHAIN AND CABLES ARE FASTENED RELIABLY TO THEIR RETAINING HOOKS.**

B. Assembly

Re-installation of the assembled pump is the reverse of the above steps.

II. WET END DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

A. Disassembly

Follow instructions in Section I for removal of the pump from the base.

WARNING

DUE TO THE CHOPPING DESIGN PURPOSE OF THIS PUMP, SHARP EDGES WILL LIKELY BE PRESENT ON THE WET END PARTS. ALSO, DUE TO THE NATURE OF THE PROCESSES IN WHICH THESE PUMPS ARE APPLIED, BIOLOGICAL AND/OR CHEMICAL CONTAMINATION MAY BE PRESENT. WEAR GLOVES AND OTHER PROTECTIVE EQUIPMENT AS REQUIRED BY APPROVED CODES AND PROCEDURES RELATING TO THE MATERIAL BEING PUMPED.

FAILURE TO USE APPROVED PROTECTIVE EQUIPMENT MAY RESULT IN INJURY OR ILLNESS.

1. Remove the fasteners (418 and 420) holding the inspection covers (407 and 405) on the suction and volute, respectively, and remove the covers.
2. Remove the fasteners (417) attaching the suction spool (402) to the pump case (400), and slide the suction spool out of the volute register.
3. Slide the cutter bar out of the volute.

WARNING

USE CAUTION FOR THE SHARP EDGES ON THE CUTTER BAR AND IMPELLER.

4. Insert a wooden or metal bar into the discharge of the volute so that it rests between the vanes of the impeller. Using a strap or shaft wrench on the drive end of the shaft, loosen the shaft from the impeller (right-hand threads), and use the impeller installation tool (see Table 1.1 for correct size) to remove the impeller. Use of the impeller installation tool protects against the sharp edges of the impeller.

WARNING

USE CAUTION FOR THE SHARP EDGES.

5. Remove the fasteners (419) between the bearing frame and volute (400), and slide the volute off the bearing frame register.
6. Remove the fasteners (206) and the back cutter teeth (205) from the back plate. If they are to be replaced.

If the stuffing box and bearing frame are to be disassembled, proceed to Section III.

B. Assembly of Wet End.

1. Inspect all parts, new and used, to be sure they are free from burrs and thoroughly clean. Insure threads are not damaged and replace o-rings with new ones. Replace wear parts if clearance adjustment has reached maximum.
2. If the cutter teeth were removed for replacement. Clean the slots in the back plate (200) and install back cutter teeth (205) with fasteners (206) using Loctite 242. Torque to 7 Ft-lbs. Teeth should sit flat and securely on the bottom of the slots. The teeth are curved. They should be mounted so the curve is concentric with the back cover.
3. Place a new o-ring (209) on the back plate (200) register. Lube with o-ring lubricant or soapy water, and slide volute (400) over back plate onto register. Install and tighten fasteners (419). Torque to 45 Ft-lbs.
4. Check and clean threads in impeller bore and on shaft end. Impeller (401) should thread onto shaft (110) easily while using the impeller installation tool (see Table 1.1 for correct size). Apply lubricant to threads and screw impeller onto shaft until it reaches the shaft shoulder. DO NOT use the installation tool to torque the impeller as damage to the vanes could occur. Tighten by restraining the impeller with a bar through the volute discharge and using a shaft or strap wrench to apply torque to the drive end of the shaft. Torque impeller to: 6x3 pumps = 180 to 200 Ft-lbs, 6x4 & 8x6 pumps = 325 to 375 Ft-lbs, 10x8 &12x10 pumps = 700 to 800 Ft-lbs, 14x12 pumps = 1000 to 1100 Ft-lbs.
5. Slide the cutter bar plate into suction side of volute, aligning the tabs on the outside diameter with the slots in the volute bore. The cutter bar plate should rest on the tabs without contacting the impeller. If contact with the impeller occurs, move the rotating assembly back from the cutter bar plate using the adjuster screws (145) on the bearing cap (103) and backcover (200) until clearance is obtained.
6. Install a new o-ring (406) on the suction spool (402) and slide spool into volute. Install and tighten fasteners (417). Torque to 45 Ft-lbs. Impeller should still turn without contact with the cutter bar plate.
7. Adjust impeller front and back clearance per the instructions found in the Operation and Maintenance manual.
8. Install inspection covers (405 and 407) with new gaskets (409 and 410, respectively) and tighten fasteners (420 and 418).

Proceed to Section I B for re-installation of the pump.

III. STUFFING BOX DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

A. Disassembly – Standard Mechanical Seal

Follow instructions in Sections I & II for removal of pump and disassembly of wet end.

1. Remove gland drain and fill plugs (225) from the gland (202), and drain seal oil.
2. Remove gland fasteners (220), and stuffing box bolts (142).

3. Slide back plate (200) from shaft. Restrictor bushing (203) in bottom of stuffing box may be pressed out at this time, if it needs replacement.
4. Loosen shaft sleeve set screws (213), and pull sleeve (208) from shaft with rotating portion of the seal (214).
5. Slide gland (202) and v-ring (224) from shaft. The stationary seal face (214) and lip seal (223) may be removed from the gland carefully with a small screwdriver, if these parts are to be replaced.
6. The seal faces are fragile, and should be kept protected while removed from the pump, unless a new seal will be installed.

If the bearing frame is to be disassembled, proceed to Section IV.

B. Assembly- Standard Mechanical Seal

It is advisable to assemble the components in a clean environment so that no dirt or foreign items can contaminate the seal area. All o-rings, lip seals, and v-rings should be replaced with new parts. The mechanical seal should be inspected and replaced if leaky or worn.

1. Inspect all parts, new and used, to be sure they are free from burrs and thoroughly clean. Insure threads are not damaged. Shaft should be inspected for straightness and to ensure there is no surface damage to the seal mounting areas.
2. Install v-ring (224) onto shaft (110) with the lip facing the impeller end of shaft. Apply o-ring lubricant to the lip area.
3. Press the lip seal (223) into gland (202) with the numbers facing out. Press the stationary seal ring into other side of gland. If necessary, the rubber cup may be lubricated with soapy water.
4. Install new gland o-ring (211) onto gland (202) and slide gland assembly onto shaft (110), lip seal first, pushing it past the shaft sleeve shoulder on the shaft.
5. Slide the rotating part of the seal (214) onto the shaft sleeve, positioning the collar against the sleeve shoulder. Tighten the seal set screws.
6. Place o-ring (216) into groove inside shaft sleeve (208). Lube the o-ring and inside of sleeve and slide sleeve onto shaft (110), small end first, until the sleeve is firmly against the shoulder on the shaft. Tighten sleeve set screws (213).
7. If the restrictor bushing (203) was removed, press it back into the bottom of the stuffing box bore.
8. Slide the back plate onto the shaft, and align the tapped holes with the adjuster bolt locations, also making sure that the seal flush ports are in accessible orientation. Install stuffing box mounting bolts (142) through the adjusters, but do not tighten fully at this time.
9. Clean the seal faces with an alcohol wipe or other lint-free cloth. Slide the gland (202) forward and attach to the back plate with the gland fasteners (220), making sure the seal faces stay clean in the process. Tighten the fasteners evenly to 19 Ft-lbs.

10. Check shaft for free rotation. Install lower gland plug (225) and fill gland with oil using an eyedropper or pipette. Oil can be same SAE 20 non-detergent oil as in bearing frame, or as appropriate for pumpage contamination considerations (e.g.: food grade oil) in case of seal leak. Install upper plug.

Proceed to Section II B for assembly of the Wet End.

IV. BEARING FRAME DISASSEMBLY AND ASSEMBLY INSTRUCTIONS

C. Disassembly

Follow instructions in Sections I to III for removal of pump and disassembly of wet end and stuffing box.

1. Remove bearing frame drain plug (134) from the bearing frame (100), and drain oil.
2. Remove bearing cap fasteners (142), and slide rotating assembly out of rear of bearing frame.
3. Front lip seal (115) and v-ring (129) may be removed from bearing frame (100) if these are to be replaced.
4. Remove the bearing retainer bolts (148) and tap the bearing cap off the shaft using a plastic or rawhide hammer.
5. Rear lip seal (116) and v-ring (130) may be removed from bearing cap (103) if these are to be replaced.
7. Bend down the locking tab on the bearing lock washer (127) and remove the bearing lock nut (126).
8. Clean the shaft (110) carefully in the area immediately adjacent to the bearing stacks to eliminate contaminants that could cause scoring when the bearings are removed. Press off the bearings (121 and 118) using a hydraulic press. The bearing retainer (106) can be removed after the first set of bearings.

D. Assembly

It is advisable to assemble the components in a clean environment so that no dirt or foreign items can contaminate the bearing area. All o-rings, lip seals, and v-rings should be replaced with new parts. The bearings should be replaced if they were pressed off the shaft, regardless of appearance, to avoid failure from brinelling of the races during bearing removal.

1. Inspect all parts, new and used, to be sure they are free from burrs and thoroughly clean. Insure threads are not damaged. Shaft should be inspected for straightness and to ensure there is no surface damage to the seal or bearing mounting areas.
2. Heat the radial ball bearings (118) with a bearing heater to approximately 200 F, and slide onto impeller end of shaft (threaded) with the bearing ID numbers facing out. Bearings should sit firmly against the shaft shoulder.

3. Slide the bearing retainer (106) onto the shaft.
4. Heat the angular contact bearings (121) with a bearing heater to approximately 200 F, and slide onto drive end of shaft back-to-back (bearing numbers facing each other, or the thin sides of the outer races facing away from each other). Bearings should sit firmly against the shaft shoulder.
5. Install the bearing lock washer (127) and lock nut (126). When the bearings have cooled to less than 100 F, tighten lock nut. Torque lock nut to: 6x3, 6x4 & 8x6 pumps = 95 Ft-lbs., 10x8 &12x10 pumps = 130-140 Ft-lbs., 14x12 pumps = 140-150 Ft-lbs. Bend one tab of the lock washer into a corresponding slot in the lock nut.
6. Press the lip seal (116) into bearing cap until it seats at the bottom of the counterbore. Lightly lubricate the lip with oil or grease.
7. Install bearing cap over angular contact bearings. A little oil or grease in the bore may help assembly. Make sure that the bearings are not cocked as they go into the bore. Light tapping on the bearing cap with a plastic hammer may be required. Install and tighten the retainer fasteners (148) to 45 Ft-lbs.
8. Press the lip seal (115) into bearing frame (100) until it seats at the bottom of the counterbore. Lightly lubricate the lip with oil or grease.
9. Lubricate a new bearing cap o-ring (147) and install on the bearing cap (103). Slide the rotating assembly into the bearing frame (100), being careful not to damage the front lip seal (115). Install, but do not fully tighten the adjusters (145) and bearing cap bolts (142).
10. Install a new drive end v-ring (130) over the drive end of the shaft (110). Lightly lubricate the lip and slide it up against the bearing cap (103). Repeat for the pump end v-ring (129), sliding it up to the bearing frame (100).
11. Check for free shaft rotation. Replace the drain plug (134) and fill bearing frame with SAE 20 non-detergent oil to the center of the sight glass.

Proceed to Section III B for assembly of the stuffing box.

Table 1.1

Impeller Installation Tool	
Pump Size	**Part Number**
6X3 CF2/CF4	702106-01K
6X3 CF3/CF5	702107-01K
6X4 CF2/CF4	702108-01K
6X4 CF3	702109-01K
8X6 CF4	702112-01K
10X8 CF3	702110-01K
12X10 CF3	702113-01K
14X12 CF4	702111-01K

INSTALLATION, OPERATION AND MAINTENANCE GENERAL INSTRUCTIONS, ALL MODELS

WARNING

PLEASE STUDY THESE INSTRUCTIONS CAREFULLY BEFORE PUTTING THE PUMP INTO SERVICE. ADHERENCE TO THESE INSTRUCTIONS IS NECESSARY FOR SATISFACTORY START-UP OF YOUR WSP™ CHOP-FLOW PUMP. OPERATING PERSONNEL MUST READ AND UNDERSTAND THE START-UP AND OPERATION PROCEDURES.

I. INTRODUCTION

A. General Information

The WSP™ distribution network provides service wherever our pumps are sold. Should you require additional service information, do not hesitate to contact your local WSP™ representative.

B. Nameplate Data

Each pump has a nameplate affixed to it, with the pertinent data including pump characteristics, model and serial number. When inquiring about parts or service, the above data should be supplied.

II. RECEIVING INSPECTION

Prior to signing any shipping documents, inspect the shipment for shortages of damages, and promptly report any to the carrier, noting damage on the freight bill, receipt, and bill of lading. MAKE ANY CLAIMS TO THE TRANSPORTATION COMPANY PROMPTLY.

Do not remove any tags. Instruction sheets on various components as well as the Operation and Maintenance Manual for the pump may be included in the shipment. DO NOT DISCARD!

III. UNLOADING

Care must be taken when unloading pumps.

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

WARNING

EQUIPMENT LIFTING DEVICES SUCH AS CHAIN, LIFTING EYES, HOOKS, ETC. MUST BE APPROVED BY LOCAL, STATE, OR FEDERAL SAFETY CODES.

HOISTS AND CRANES MUST BE ADEQUATELY SIZED TO LIFT RATED LOADS.

FAILURE TO USE APPROVED LIFTING DEVICES MAY RESULT IN INJURY.

WHEN LIFTING THE PUMP IT IS IMPORTANT TO MAKE SURE THAT THE CHAIN AND CABLES ARE FASTENED RELIABLY TO THEIR RETAINING HOOKS.

When a horizontal pump is unloaded, it must be lifted at four equal points on the baseplate. Loose accessories are normally shipped in a separate container to avoid damage.

IV. STORAGE INSTRUCTIONS

If the pump is not to be installed and operated immediately, store in a clean, dry place. WSP™ assumes the units will be placed in operation a few weeks after shipment, so no special protection is given the pump, drive or motor.

IF THE PUMP IS TO BE STORED MORE THAN TWO WEEKS:

A. Store pump in a clean, dry place free from vibration and extremes in temperature.

B. Protect all exposed unpainted surfaces from rust.

C. Ensure that the pump is filled to the proper level with the recommended oil, and rotate the shaft by hand every week.

D. Vents and drains on motors should be fully operable. Any drain plugs should be removed.

E. On pumps with oil lubricated bearings, remove the vent on top of the bearing housing and fill the housing completely with oil. Replace the vent. Before starting, drain oil to the recommended operating level, run for two minutes, drain all oil and refill with new oil.

F. Accessories such as drives, etc. should be protected in accordance with the accessory manufacturer's instructions.

Following these recommendations will help ensure that the pumps will operate without problems and give long, trouble free service.

V. INSTALLATION

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

A. Location of Pump

The pump should be placed as near the liquid source as possible, avoiding elbows whenever possible.

B. Piping

Guidelines for piping are given in the "Hydraulic Institute Standards" and should be reviewed prior to pump installation. All piping should be supported independently, and line up naturally with the pump flanges. NEVER DRAW PIPING INTO PLACE BY USE OF FORCE AT THE FLANGED CONNECTIONS OF THE PUMP.

WSP™ recommends that flexible couplings or expansion joints be installed in the suction and discharge piping as near the pump as possible (to allow for temperature and pressure expansion) so that there will be no strain on the pump casing.

WARNING

SUCH STRAINS COULD RESULT IN STRUCTURAL FAILURE LEADING TO INJURY.

To obtain maximum available suction head, the suction line should be as direct and as short as possible, avoiding elbows. If elbows must be used, a long radius type is preferred. It is important to avoid any high point in a suction line in which air may accumulate and cause loss of prime. For the same reason, it is important to have the suction line airtight when suction lift exists.

The suction pipe must be installed so that no air pockets can form, and the pipe must be level or slope upward to the pump intake. To prevent excessive losses, the suction piping must never be smaller in diameter than the pump suction, and preferably one pipe size larger. Eccentric reducers should be used on the suction side, with the flat side on top as shown in Figure 1. Use as few fittings as possible, and when elevating to any height, go vertically upward from the pump, then horizontally to the point of discharge.

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

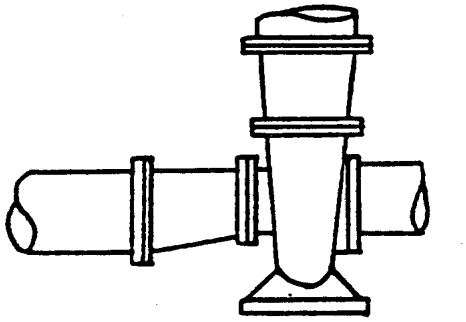


FIGURE 1
Recommended

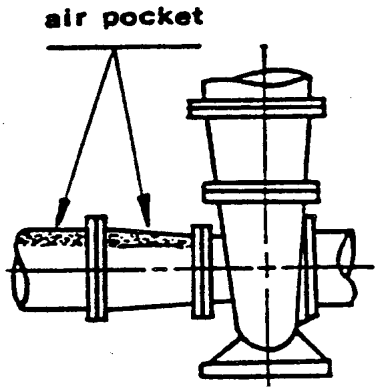


FIGURE 2
Not Recommended

Suction conditions such as liquid temperature, altitude above sea level and specific gravity should be compensated for by proper selection of the suction line.

The pump should not operate on a suction lift when pumping liquid with entrained air or gas. Check valves should not be used in the suction line and gate valves should be installed with the stem horizontal to prevent trapping air or gas. Suction valves must be fully open during operation.

C. Installation on Foundation

The pump and drive assembly should be placed on the foundation. The baseplate should be supported on metal wedges or metal blocks as illustrated in figures 3 and 4. The support wedges, or blocks, should be placed close to the anchor bolts.

Adjust the metal wedges, or blocks, around base edge until the base is level. Suction flanges and discharge flanges should be checked by means of a level. Corrections may be made for flange level or plumb by shims under the baseplate.

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

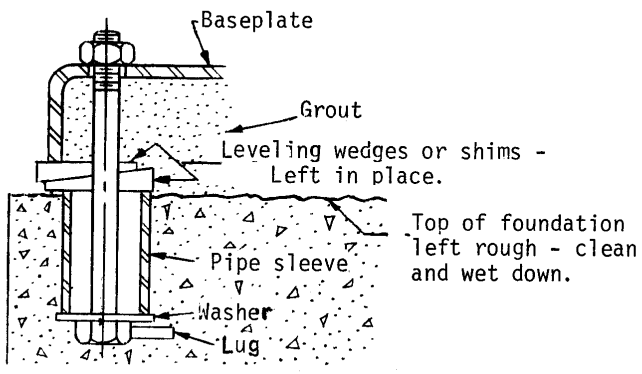


FIGURE 3
Typical Foundation Bolt Design

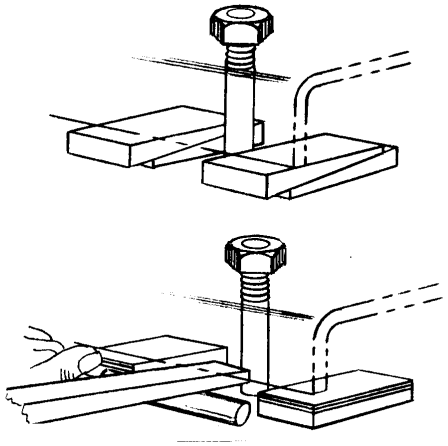


FIGURE 4
Method of Leveling

D. Grouting

Evenly adjust all anchor bolts, but not too firmly, after first alignment is completed. The baseplate can be grouted to the foundation; all voids under the baseplate must be filled with grout. It is desirable to grout all wedges and blocks in place. Anchor bolts should not be fully tightened until the grout has hardened, approximately 48 hours after pouring.

E. Connection of Piping

The initial alignment of the pump and driver should be checked before and after the piping is connected to the pump to be sure it has not been changed by the piping loads. After the grout has thoroughly set and anchor bolts have been tightened, connect the discharge and suction pipes to the pump flanges with gaskets in place, and tighten firmly. Make sure the pipe flanges are parallel and in line so that no piping loads are transmitted to the pump.

WARNING

CARE MUST BE USED IN CONNECTING THESE FLANGES. TIGHTEN EVENLY AND ADJUST TO A SNUG FIT. UNDER NO CIRCUMSTANCES SHOULD THE CASING BE SUBJECTED TO PIPING STRAINS. SUCH STRAINS COULD RESULT IN STRUCTURAL FAILURE LEADING TO INJURY.

F. Service Connections

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

Packing and mechanical seals (except those noted as “flushless”) must be flushed with 0.10 to 0.15 gpm of clean water at 120^0F or less and 10-20 psi over the maximum pump discharge pressure. WSP™ Chopper pumps are supplied with 1/4”NPT service connections in either side of the stuffing box for this purpose.

NOTE: The seal must be pressurized at all times to keep pumpage out of the seal, even if the pump is not running. Failure to flush the seal at all times will result in seal contamination and seal failure.

If a piping assembly is supplied with the pump it can be installed on the backplate as shown in the figure below. The user may also supply their own piping assembly that connects to the backplate to flush out the seal chamber.

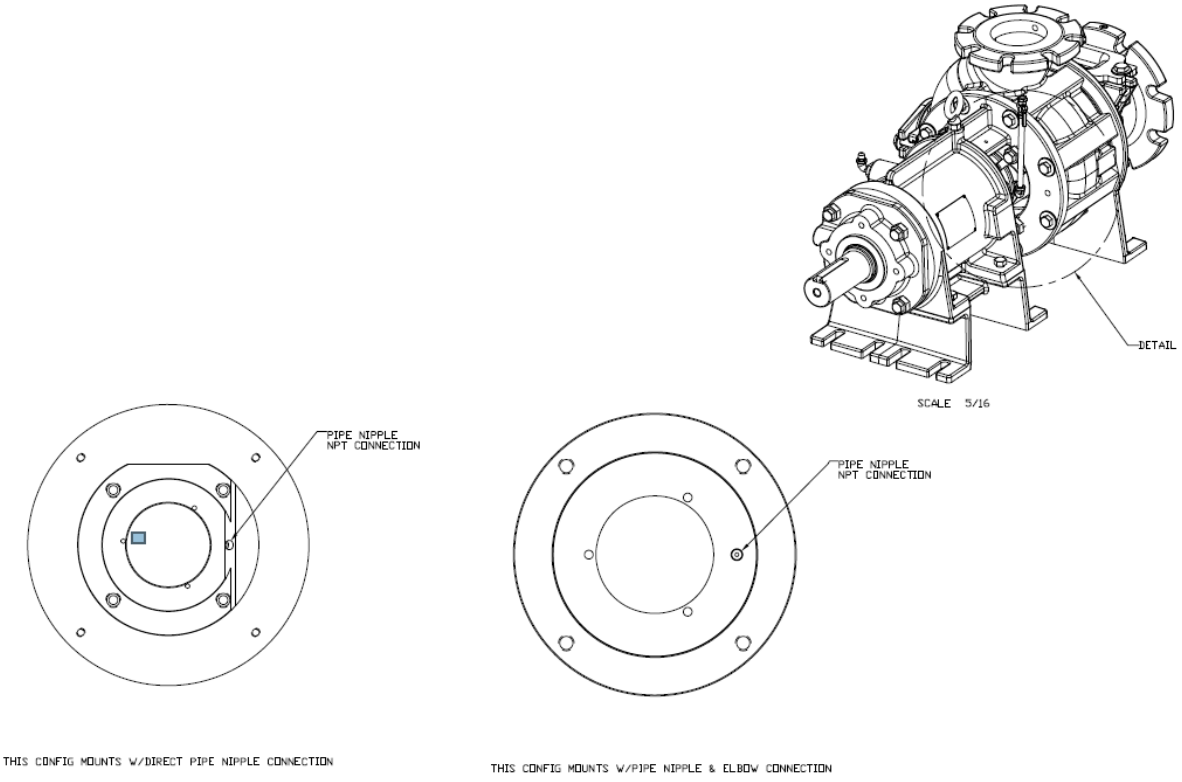


FIGURE 5

For some applications where the pumped product tends to crystallize or dehydrate, an additional flush port is available in the backplate forward of the stuffing box to prevent buildup behind the impeller.

G. Lubrication

Standard construction of the WSP™ Chopper pump is with oil lubricated bearings. Remove the pump bearing frame vent and fill to the center of the sight glass with

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

ISO grade 68 turbine oil. Avoid overfilling.

WARNING

ALL GUARDS AND PROTECTIVE DEVICES MUST BE INSTALLED BEFORE THE PUMP IS STARTED. CONTACT WITH UNGUARDED BELTS, OR COUPLINGS COULD RESULT IN INJURY.

H. ELECTRIC MOTOR DRIVE

If the pump driver is an electric motor, a motor starter with proper overload protection must be provided. Some materials, such as steel bars, may be too tough to chop, and could cause the pump to stall. Therefore, correct overload protection is critical to avoid damage to the motor. The overload resets should be set according to local code. Refer to motor nameplate. Direction of rotation of pump impeller must be clockwise when standing at the driver end facing pump. Make motor electrical connections accordingly. Changing any two leads on a three-phase motor will change direction of motor rotation.

WARNING

IMPROPER ROTATION CAN CAUSE SEVERE DAMAGE TO MOTOR AND PUMP.

WARNING

ALL ELECTRICAL CONNECTIONS AND WIRING ARE TO BE IN COMPLIANCE WITH LOCAL BUILDING AND SAFETY CODES.

DO NOT OPERATE EQUIPMENT WITH OPEN ELECTRICAL BOXES OR FITTINGS. CONTACT WITH INCORRECTLY WIRED EQUIPMENT COULD RESULT IN INJURY.

VI. OPERATION

A. BEFORE STARTING

The pump is ready to start when the following have been completed:

1. All construction debris has been removed from suction well.
2. Pump baseplate is grouted and bolted to the foundation.

INSTALLATION, OPERATION AND MAINTENANCE
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3. Pump and driver are correctly aligned.
4. Bearings are lubricated with oil. Refer to lubrication instructions in this manual.
5. All rotating parts are found to turn freely by hand.
6. Bump motor to check for rotation, which is clockwise when facing pump shaft.
7. Suction and discharge valves are OPEN.
8. Pump is primed. If installed with suction lift, the pump may be primed by using an ejector or vacuum pump.
9. Seal water has been provided to packing box or seal, if required. See appropriate "SERVICE CONNECTIONS" manual.
10. All guards are installed.

B. START-UP

1. Start pump and verify performance. If trouble is experienced upon initial or subsequent operation, refer to chart entitled "OPERATING TROUBLES" and correct defect.

WARNING

PROPER ROTATION MUST BE VERIFIED PRIOR TO OPERATION OF PUMP.

WARNING

WHEN CHECKING ALIGNMENT OR PERFORMING ANY WORK ON THE UNITS, ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

ALL GUARDS AND PROTECTIVE DEVICES MUST BE INSTALLED BEFORE THE PUMP IS STARTED. CONTACT WITH UNGUARDED BELTS, SHEAVES, OR COUPLINGS COULD RESULT IN INJURY.

2. When operating under normal circumstances, the WSP™ Chopper pump should be smooth and fairly quiet. However, when heavy debris are present, as may be the case during the initial startup and running period, the increased chopping action may result in intermittent higher vibration and noise. This should decrease as the debris is chopped and passed, and the system achieves equilibrium. Continued high vibration or cavitation noise, though, is cause for concern. Refer to the troubleshooting guide or the factory for

INSTALLATION, OPERATION AND MAINTENANCE
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assistance.

C. GENERAL OPERATING CONDITIONS

It is not recommended that the pump operate continuously to the left of lowest efficiency line or dotted line on performance curve (high discharge pressures with low flow), as abrasive wear is accelerated in this operating condition. For similar reasons, operation to the right of the curve area (high flow with low discharge pressure) is also not recommended. If either of these conditions exist, the pump life may be shortened, and changes should be made to better match the pump and system characteristics.

D. SHUTDOWN

To shut the pump down, proceed as follows:

1. Disconnect power to the driver.
2. Close the suction and discharge valves, and isolate any external service connections that the pump may have. For municipal sludge service or other applications where pressure could build within the pump while it is out of service, leave one valve open, or supply an appropriate pressure relief device.
3. If the pump is to remain out of service for a period of time longer than two weeks, the shaft must be rotated on a weekly basis, to ensure positive coating on lubricated faces, thus retarding or preventing rust or oxidation.

WARNING

WHEN PERFORMING EQUIPMENT MAINTENANCE OR IF THE PUMP IS TO REMAIN OUT OF SERVICE FOR A PERIOD OF TIME, THE EQUIPMENT ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

E. FREEZING PROTECTION

If the pump is to be subjected to freezing temperatures, it must be drained. Remove suction drain plug 425 to drain volute casing. The stuffing box must also be drained.

F. EMERGENCY INSTRUCTIONS

Shut down the pump according to Section VI.D above. Proceed as required to put another pump into service, then proceed to Section VII, Troubleshooting.

VII. OPERATING PROBLEMS

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

TROUBLE SHOOTING

A. NO LIQUID DELIVERED AT END DELIVERY POINT OR THROUGH FLOW METER	
Possible Causes	**Corrective Action**
1. Pump not primed.	1. Prime with vacuum or liquid.
2. Speed too low; check voltage and frequency.	2. Supply proper voltage and frequency. Increase pump speed. Watch motor for overload.
3. Air leak in suction or stuffing box.	3. Tighten all flange bolting. Supply liquid to stuffing box.
4. Discharge head too high.	4. Reduce head or increase pump speed. Watch motor for overload.
5. Suction lift too high.	5. Lower pump or raise liquid level on suction side.
6. Suction or discharge line plugged.	6. Unplug line.
7. Wrong direction of rotation.	7. On 3-phase motor, reverse any 2 leads.
8. Suction or discharge valve closed.	8. Open valves.
9. Gas or vapor pocket in suction line.	9. Vent or release vapor.
10. Liquid heavier or more viscous than rating.	10. Increase speed, but watch for motor overload.

WARNING

ANY SPEED INCREASE MEANS THE BRAKE HORSEPOWER INCREASES AS THE CUBE OF THE SPEED, SO THE MOTOR POWER DRAW MUST BE MONITORED TO DISCOVER ANY MOTOR OVERLOAD.

B. NOT ENOUGH PRESSURE ON PRESSURE GAUGE	
Possible Causes	**Corrective Action**
1. Speed too low; check voltage and frequency.	1. Provide proper voltage and frequency. Increase pump speed. Watch for motor overload.
2. Air or gas in liquid.	2. Vent case.
3. Air leak in suction or stuffing box.	3. Tighten all flange bolting. Supply liquid to stuffing box.
4. Impeller performance class too low.	4. Increase speed. Install higher performance impeller, do not overload motor.
5. Damaged impeller or casing.	5. Replace impeller or case.

C. MOTOR RUNS HOT - OVER 170°F WITH THERMOMETER ON MOTOR HOUSING - DO NOT TOUCH	
Possible Causes	**Corrective Action**

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

1. Speed too high.	1. Lower pump speed.
2. System head lower than rating, allowing pump to handle too much liquid.	2. Lower pump speed. Fully open discharge valve.
3. Liquid heavier or more viscous than rating.	3. Install larger motor.
4. Packing too tight.	4. Loosen packing gland. Be sure liquid is flowing into packing area.
5. Impeller binding or rubbing.	5. Disassemble pump and correct bind, or readjust clearances.
6. Voltage and frequency lower than rating.	6. Supply proper voltage and frequency.
7. Defects in motor.	7. Take to authorized motor repair shop.
8. Pump or motor bearing over-lubricated.	8. Decrease lubrication (Grease lube units only).

D. STUFFING BOX OVERHEATS – OVER 120°F WITH THERMOMETER ON HOUSING	
Possible Causes	**Corrective Action**
1. Packing too tight. Not enough leakage of flush liquid.	1. Loosen gland. Increase flush liquid pressure and flow.
2. Packing not sufficiently lubricated and cooled.	2. Be sure lantern ring is below flush opening.
3. Wrong grade of packing.	3. Use graphite impregnated acrylic packing.
4. Box not properly packed.	4. Pull packing and repack loosely.

E. BEARINGS OVERHEAT - OVER 180°F WITH THERMOMETER - DO NOT TOUCH	
Possible Causes	**Corrective Action**
1. Dirt or water in bearings.	1. Replace bearings.
2. Misalignment.	2. Align pump and motor sheave or coupling.
3. Over-greased.	3. Remove grease fitting and relieve.

F. BEARINGS WEAR RAPIDLY – INDICATED BY NOISE, HEAT, OR SEIZURE	
Possible Causes	**Corrective Action**
1. Misalignment	1. Align pump and motor sheave or coupling.
2. Bent shaft.	2. Replace shaft.
3. Vibration.	3. Tighten bearing cap bolting or replace bearings.
4. Lack of lubrication.	4. Grease at recommended intervals.
5. Bearing improperly installed.	5. Install new bearings in accord with WSP™ instructions.
6. Moisture in grease.	6. Inspect bearings for rust. If rust found, replace bearings.
7. Dirt in bearings.	7. Replace bearings.
8. Over-lubrication.	8. Relieve over-greasing.

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

G. NOT ENOUGH LIQUID DELIVERED THROUGH FLOW METER OR AT END DELIVERY POINT	
Possible Causes	**Corrective Action**
1. Air leaks in suction or stuffing box.	1. Tighten all flange bolting. Supply water to stuffing box.
2. Speed too low. Check voltage and frequency.	2. Install smaller pump sheave. Supply proper voltage and frequency.
3. Suction lift too high.	3. Increase level on suction side, or lower pump.
4. Suction or discharge line partially plugged.	4. Unplug.
5. Low NPSH.	5. Increase liquid level on suction side of pump, or lower pump.
6. Total system head too high.	6. Speed up pump. Do not overload motor.
7. Damaged impeller or casing.	7. Replace impellers or case.
8. Flow meter not properly calibrated.	8. Recalibrate flow meter.

WARNING

ANY SPEED INCREASE MEANS THE BRAKE HORSEPOWER INCREASES AS THE CUBE OF THE SPEED, SO THE MOTOR POWER DRAW MUST BE MONITORED TO DISCOVER ANY MOTOR OVERLOAD.

H. PUMP WORKS FOR AWHILE, THEN LOSES SUCTION - INDICATED BY NO FLOW THROUGH FLOW METER OR AT END DELIVERY POINT	
Possible Causes	**Corrective Action**
1. Leaky suction line.	1. Tighten bolts on flanges.
2. Gas or vapor pocket in suction line.	2. Vent suction line.
3. Suction lift too high.	3. Lower pump or raise suction liquid level.
4. Air or gas in liquid.	4. Vent case.
5. Air leaks in suction or at stuffing box.	5. Tighten flange bolting and supply water to stuffing box.
6. End of suction line uncovered.	6. Submerge end of line.

I. VIBRATION - INDICATED BY EXTREME CONTINUOUS SHAKING AND/OR NOISE	
Possible Causes	**Corrective Action**
1. Gas or vapor in the liquid.	1. Vent pump.
2. Available net positive suction head not sufficient.	2. Raise suction liquid level or lower pump.

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

3. Inlet to suction line not sufficiently submerged.	3. Submerge line.
4. Misalignment of coupling and shafts.	4. Align sheave or coupling.
5. Worn or loose bearings.	5. Replace bearings. Tighten bearing cap bolts.
6. Impeller out of balance.	6. Balance impeller.
7. Shaft bent.	7. Replace shaft.
8. Impeller damaged and unbalanced.	8. Replace impeller.

VIII. ROUTINE MAINTENANCE

A. Packing and Mechanical Seals:

Please see the addendum specific to the sealing arrangement of your pump.

B. Lubrication:

Oil lubricated bearings: Check the oil level monthly to make sure that the level is within the sight glass window. Refill as needed with ISO grade 68 turbine oil. Check a sample of the oil annually for water or other contaminants, or earlier if the oil appears cloudy or contaminated through the sight glass. If contaminants are present, drain the oil and refill with new oil. Run the pump for a few minutes and repeat the process to flush out remaining contaminants. If at any point during this check the bearings run rough or feel rough when turning by hand, the bearings should be replaced. Before putting the pump back into service, the source of the contamination should be identified and corrected.

C. Cutter Adjustments:

The patented design of the WSP™ Chopper pump allows for adjustment of the cutter clearances without loosening any pump mounting bolts or moving pump flanges or feet. The rotating assembly moves axially by turning the adjustment screws located on the drive end bearing cap, and controls the clearance between the impeller and cutter bar. The backplate and stuffing box is moved with another set of adjusting screws to control the back cutter and labyrinth clearances behind the impeller. Clearances should be checked and adjusted annually, or if cutting effectiveness seems to have decreased.

WARNING

WHEN CHECKING ALIGNMENT OR PERFORMING ANY WORK ON THE UNITS, ELECTRICAL SERVICE MUST BE LOCKED OUT WITH AN APPROVED LOCKOUT AND KEY. FAILURE TO LOCKOUT EQUIPMENT MAY RESULT IN INJURY.

1. After locking out power supply and disconnecting power, remove the coupling or

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

belt guards, so that the pump can be turned by hand. If pump does not turn freely, investigate and correct the cause.

2. The impeller-to-cutter bar clearance is adjusted first. Loosen the drive end bearing cap bolts (142) about ½ turn.

3. Turn the bearing cap adjusters (145) counterclockwise ½ to 1 turn at a time, keeping the turns of each adjuster even to avoid binding the bearing cap (103). Check that the shaft rotates between each round of adjustment.
4. When resistance to shaft rotation is felt due to the impeller contacting the cutter bar, turn each adjuster one flat clockwise and tighten the bearing cap bolts (142). Torque to 45 Ft-lbs.
5. The shaft should now turn freely, or with only slight contact of the impeller with the cutter bar. If it does not, loosen the bolts (142), turn the adjusters (145) one additional flat clockwise, and retighten the bolts. There should be approximately 0.010” clearance between the impeller and cutter bar. One flat of rotation of the adjusters is approximately 0.010” movement.
6. The backplate (200) is adjusted in a similar manner, after the above is complete. Loosen the backplate bolts (149) about ½ turn.
7. Turn the backplate adjusters (146) counterclockwise ½ to 1 turn at a time, keeping the turns of each adjuster even to avoid binding the backplate (200). Check that the shaft rotates between each round of adjustment.
8. When resistance to shaft rotation is felt due to the backplate contacting the back of the impeller, turn each adjuster (146) one flat clockwise and tighten the backplate bolts (149). Torque to 45 Ft-lbs.
9. The shaft should now turn freely, or with only slight contact of the impeller with the backplate. If it does not, loosen the bolts (149), turn the adjusters (146) one additional flat clockwise, and retighten the bolts. There should be approximately 0.010” clearance between the impeller and cutter bar. One flat of rotation of the adjusters is approximately 0.010” movement.
10. To inspect the impeller, cutter bar, and backplate; or to inspect and measure the clearances directly, isolate and drain the pump case, and remove the case inspection port (405).
11. If correct adjustment cannot be achieved, or if all adjustment of the screws is used up, the impeller, cutter bar, and/or backcover may need replacement.
12. When adjustment is complete, replace all covers, drain plugs, and guards before returning pump to service.

INSTALLATION, OPERATION AND MAINTENANCE
GENERAL INSTRUCTIONS, ALL MODELS

WARNING

ALL GUARDS AND PROTECTIVE DEVICES MUST BE INSTALLED BEFORE THE PUMP IS STARTED. CONTACT WITH UNGUARDED BELTS, SHEAVES, OR COUPLINGS COULD RESULT IN INJURY.

INSTALLATION, OPERATION AND MAINTENANCE MECHANICAL SEAL & LUBRICATION

WARNING

PLEASE STUDY THESE INSTRUCTIONS CAREFULLY BEFORE PUTTING THE PUMP INTO SERVICE. ADHERENCE TO THESE INSTRUCTIONS IS NECESSARY FOR SATISFACTORY START-UP OF YOUR WSP™ CHOP-FLOW PUMP. OPERATING PERSONNEL MUST READ AND UNDERSTAND THE START-UP AND OPERATION PROCEDURES.

I. PERIODIC MAINTENANCE OF MECHANICAL SEAL

Mechanical seals need cooling and lubrication at all times. The fluid being pumped in many applications can perform this function, but it is generally always best if clean seal flush water can be supplied from an external source. This is supplied to the stuffing box area through either of two NPT connections on the seal gland housing.

NOTE: For those services requiring an external seal flush, have the flushing liquid line interlocked with the motor so that the flush liquid starts before, or when, the motor starts, to avoid the possibility of the pump running without the necessary flushing liquid.

For extra protection of the seal, the WSP™ Chopper pump also incorporates an oil bath on the atmosphere side of the seal. This oil bath is contained between the mechanical seal and a lip seal, and provides additional heat transfer away from the seal, and protection from environmental contamination.

The seal is supplied with silicon carbide faces that should provide long and trouble-free life. Should seal leakage occur, however, simply cleaning the faces may remedy the situation:

1. Disconnect power to the driver, close suction and discharge valves, isolate external service connection to the stuffing box and drain pump by removing plug (425).
2. Remove the gland bolts (220), and slide the gland (214) back from the stuffing box.
3. Flush out and clean the visible seal area and the inside of the gland to remove contaminants.
4. Clean the seal faces with an alcohol wipe or similar. Inspect the faces for damage. If cracks or significant scoring is visible, the seal should be replaced.
5. If the faces still look smooth and clean, re-assemble the gland and tighten the fasteners.
6. Open the suction and discharge valves and check for leaks. If there are no leaks, remove the upper gland plug and fill the gland with clean oil using an eyedropper or pipette, and return the pump to service. If the leakage persists, the seal should be replaced. See the Assembly/Disassembly manual for instructions.

INSTALLATION, OPERATION AND MAINTENANCE
ALIGNMENT DIRECT CONNECTED UNITS

WARNING

PLEASE STUDY THESE INSTRUCTIONS CAREFULLY BEFORE PUTTING THE PUMP INTO SERVICE. ADHERENCE TO THESE INSTRUCTIONS IS NECESSARY FOR SATISFACTORY START-UP OF YOUR WSP™ CHOP-FLOW PUMP. OPERATING PERSONNEL MUST READ AND UNDERSTAND THE START-UP AND OPERATION PROCEDURES.

I. ALIGNMENT

The pump and driver, if supplied by WSP™, were aligned at the factory and should not require alignment on site. Direct connected drive configurations use C-Face motors with feet that are mounted directly to the pump via the coupling guard. Register fits between the coupling guard, pump and motor, establishes the correct shaft alignment.

The C-face motors are not mounted to the baseplate. They are supplied with adjustable feet that are positioned to support the weight of the motor on the baseplate.

SETTING THE ADJUSTABLE MOTOR SUPPORT FEET

1. After the baseplate has been grouted in place, the four adjustable feet should be loosened until they are not contacting the baseplate.
2. Turn the four feet down until they just contact the surface of the baseplate.
3. Tighten each foot one flat (1/6 turn). The feet will now support the weight of the motor without affecting shaft alignment.

Check shaft alignment before and after the piping is connected to the pump flanges. Inaccurate alignment results in vibration and excessive wear on pump components.

R□□□□RD□VIVA C□UPLING ST□ R□UCTU R□E □SELECTION □

Pa□rt Numb □r□-- 620-0148 □□

B□ASE □D□□STL 2□13-215TC □□D□VIVA

PART N□MBER	DESCRIPTION	□T□□PER	□M
8068□□	CPL□,□I□A V150 2.250/□.375	1.	EA

REXNORD

PRECISION. POWER. PERFORMANCE.

Rex Viva™

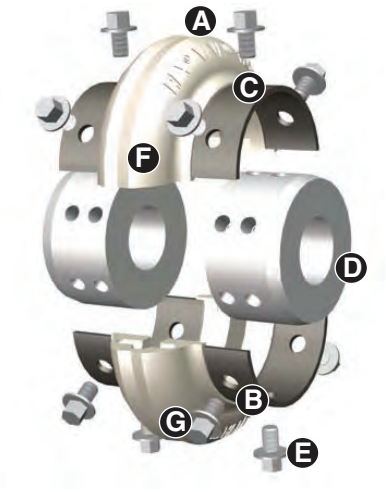
Elastomeric Couplings

Acoplamientos Elastoméricos

Accouplements à Élastomère

GB E F

Description



Rex Viva Close-Coupled Couplings
Acoplamientos estándar Rex Viva
Accouplement Rex Viva Standard

A - Two-piece flex element design allows for simple replacement without disturbing hubs or moving and realigning connected equipment.

B - Tough polyurethane material is bonded to a corrosion resistant coated shoe, eliminating the need for mechanical clamping hardware.

C - Adhesive coated high strength carbon steel shoe resists corrosion.

D - Easily aligned reversible hubs accomodate multiple shaft gaps. Hubs are available in rough bore, custom bore, or bushed designs. Optional hub materials are available.

E - High grade capscrews are provided with self locking nylon thread patches. Stainless steel capscrews are also available.

F - Torsionally soft polyurethane element cushions shock loads, accomodates unavoidable misalignment and is compatible with most environments.

G - “V” notch design directs stress concentration away from the bond area providing a uniform failure area for overload protection if required.

Descripción

A - El diseño de los elementos flexibles en dos mitades permite un recambio sencillo sin afectar a los núcleos, ni desplazar, ni realinear el equipo conectado.

B - El elemento de poliuretano está vulcanizado a una pieza en forma de teja, resistente a la corrosión, lo cual elimina la necesidad de mecanismo de fijación.

C - Teja de acero al carbono de gran resistencia con revestimiento resiste la corrosión.

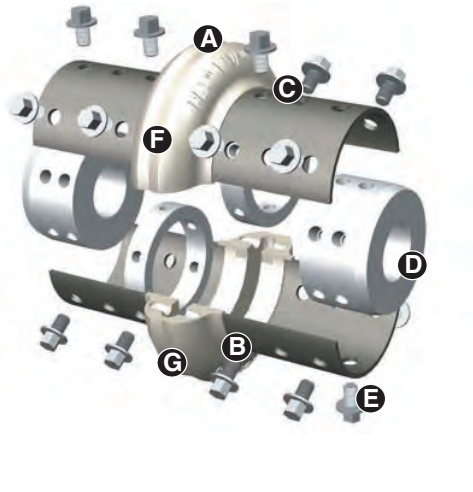
D - Los núcleos de acero son reversibles, de fácil alineación, y admiten múltiples distancias entre los árboles. Hay disponibles núcleos ciegos, con agujero acabado, o según diseño requerido. Hay disponibles otras opciones de material para los núcleos.

E - Los tornillos hexagonales, de alta calidad, van equipados con sistema de autobloqueo Nyloc. También hay disponibles tornillos hexagonales de acero inoxidable.

F - El elemento de poliuretano, flexible a la torsión, absorbe las cargas de choque, compensa la falta de alineación y es compatible con la mayor parte de los entornos.

G - El diseño de ranura en “V” aleja la concentración del esfuerzo, en el área de vulcanizado, proporcionando un área de fallo uniforme para protección contra sobrecarga en caso necesario.

Description



Rex Viva Spacer Couplings
Acoplamientos Rex Viva versión larga
Accouplement Rex Viva Version longue

A - La conception des éléments flexibles en deux pièces permet le remplacement simple sans déplacer les moyeux et/ou réalignement des équipements connectés.

B - L'élément en polyuréthanne est lié chimiquement à une coquille résistant à la corrosion, éliminant l'utilisation de liaison mécanique.

C - Les coquilles ont une protection adhésive assurant une bonne tenue à la corrosion.

D - Facilement alignables, les moyeux réversibles permettent de multiples combinaisons d'espaces entre les arbres. Les moyeux sont disponibles non-alésés, alésés ou pour douille universelle. Plusieurs matériaux sont disponibles.

E - Les vis de haute qualité sont autofreinées par Nyloc. Des vis en acier inoxydable sont également disponibles.

F - Souple en torsion, l'élément en polyuréthanne amorti les chocs, s'accommode des inévitables défauts d'alignements et est compatible avec la majorité des environnements.

G - La forme en “V” éloigne les concentrations de contraintes de la surface de liaison en créant une ligne de déchirement en cas de surcharges.

Description

Rex Viva is based on the design of its reputable predecessor, Rex Omega. Design upgrades allow Rex Viva to transmit greater torque with a smaller coupling that, in addition, can accept larger bores. Although they have similar configurations, their parts are not interchangeable.

Rex Viva is a non-lubricated, torsionally flexible coupling with no wearing parts. Its angular, axial and radial flexibility comes from its polyurethane membrane. It consists of only four components; two axially-split half flexible elements with capscrews and two hubs. All versions are field adjustable to meet ISO, DIN and ANSI shaft spacing specifications of up to 300 mm without the need of additional parts.

The Flexible Element
The unique two-piece, split-in-half flexible element allows replacement without disturbing the hubs or connected equipment. A half element consists of a polyurethane membrane chemically bonded to two formed steel shoes. It transmits torque in shear through the membrane. Patented stress relief notches found on the end of each membrane uniformly distribute shear stresses. The polyurethane is formulated to withstand cyclic fatigue, common environmental conditions, and industrial chemicals. Although not to be used as a torque limiting device, the membrane serves as a fuse disconnecting the equipment in case of lockup or severe overload conditions. The steel shoes are coated, not painted, for optimal resistance against oxidation and industrial chemicals. Paired half elements are supplied factory weight matched to ensure standard balance conform with ISO G16 and AGMA Class 8.

Upgrades
The 'V' notch on the polyurethane membrane channels stresses to provide a uniform center-line tear for overload protection.

Longer shoes for the smaller sizes reduce the need to oversize selections to meet required distance between shaft ends.

Increased material cross-sections derived from Finite Element Analysis minimize stresses during operation to the connected equipment.

*The **new VSX version** connects shafts with extra wide gaps (up to 300 mm) maintaining the basic four component design; two axially-split half flex elements and two hubs. No special hubs or sleeves are required.*

Descripción

El Rex Viva se basa en el diseño de su reputado predecesor, el Rex Omega. Las mejoras de diseño permiten al Rex Viva transmitir un mayor par de torsión con una talla más pequeña de acoplamiento, aceptando, además, diámetros de árboles más grandes.
A pesar de que tienen configuraciones similares, sus piezas no son intercambiables.
El Rex Viva es un acoplamiento flexible a la torsión, sin mantenimiento, y sin piezas desgastables. Su flexibilidad angular, axial y radial, proviene del elemento de poliuretano. Está formado por sólo cuatro elementos: dos mitades flexibles unidas sentido axial, con tornillos hexagonales, y dos núcleos. Todas las versiones pueden ajustarse para cumplir las especificaciones ISO, DIN y ANSI referentes al espaciado de los árboles, hasta 300mm, sin necesidad de piezas adicionales.

El Elemento Flexible
El exclusivo elemento flexible en dos mitades, permite el recambio sin afectar a los núcleos ni al equipo conectado. Una mitad consta de una semi cubierta de poliuretano, no reforzada, vulcanizada a dos tejas de acero perforadas. La transmisión del par motor se realiza por cizallamiento a través de la cubierta. Las ranuras, patentadas, para disipación del esfuerzo, realizadas en cada semicubierta, distribuyen de modo uniforme los esfuerzos de cizallamiento. El poliuretano se ha diseñado para soportar la fatiga cíclica, las circunstancias ambientales habituales y los productos químicos industriales. Aunque no debe utilizarse como dispositivo limitador del par de torsión, la cubierta, actúa a modo de fusible desconectando el equipo en caso de que se produzcan un bloqueo o una sobrecarga, graves. Las tejas de acero están revestidas, no pintadas, para ofrecer una resistencia óptima contra la oxidación y los productos químicos industriales. Las dos mitades se suministran emparejadas desde fábrica, con el peso igualado para garantizar el equilibrio en cumplimiento de las normas ISO G16 y AGMA Clase 8.

Mejoras
La ranura en 'V'en la cubierta de poliuretano canaliza los esfuerzos, con el fin de proporcionar una línea central de ruptura uniforme, para protección contra sobrecargas.

La mayor longitud de las tejas, paralas tallas más pequeñas, reduce la necesidad de aumentar las dimensiones de las selecciones, para cumplir las condiciones de distancia, necesaria entre los extremos de los árboles.

El aumento de las secciones transversales del material, derivado del análisis por elementos finitos, minimiza los esfuerzos que se transmiten al equipo conectado durante su funcionamiento.

*La **nueva versión VSX** conecta árboles con espacios intermedios de gran tamaño, hasta 300 mm., manteniendo*

Description

La conception du Rex Viva est basée sur celle de son prédécesseur, Rex Omega. Les améliorations de conception permettent au Rex Viva de transmettre un couple plus élevé dans un encombrement plus petit, ceci en autorisant de plus grands alésages. Bien qu'ils soient de conception similaire, leur pièces ne sont pas interchangeables.

Rex Viva est un accouplement flexible en torsion, non lubrifié sans pièce d'usure. Ses flexibilités angulaire, axiale et radiale proviennent de sa membrane en polyuréthanne. Il est composé de seulement quatre composants : deux demi éléments flexibles séparés axialement, des vis de fixation et deux moyeux. Toutes les versions sont réglables pour se conformer aux normes ISO, DIN et ANSI, des spécifications d'espacement des bouts d'arbres jusqu'à 300 mm sans utiliser de pièce supplémentaire.

L'élément Flexible
La conception originale en deux pièces symétriques de l'élément flexible permet son remplacement sans déplacement des machines connectées. Un demi élément consiste en une membrane de polyuréthanne non renforcée liée chimiquement à deux coquilles en acier, préformées et perforées. L'élément flexible transmet le couple par cisaillement à travers la membrane. Les formes en fossette brevetées de chaque bout de section de membrane répartissent uniformément les contraintes de cisaillement. Le polyuréthanne a été spécialement étudié pour résister à la fatigue cyclique, conditions d'environnement normales, et aux ambiances chimiques industrielles. Sans être utilisée comme un organe de limitation de couple, la membrane peut servir d'élément fusible déconnectant les équipements en cas de blocage ou de sérieuses conditions de surcharges. Les coquilles en acier sont protéges et non peintes, pour obtenir un résistance optimale contre l'oxydation et les produits chimiques industriels. Les demi éléments sont appairés en fonction de leur poids en usine pour assurer un équilibrage conforme aux normes ISO G16 et AGMA Classe 8.

Améliorations
La forme en 'V' de la membrane en polyuréthanne canalise les contraintes pour obtenir une ligne uniforme de déchirement pour la protection contre les surcharges.

Les petites tailles disposent de coquilles plus longues réduisant ainsi la nécessité de surdimensionner la sélection pour obtenir la distance entre bouts d'arbres souhaitée.

La section de matière accrue dérivée d'une Analyse par Elements Finis minimise les contraintes sur les machines connectées pendant le fonctionnement.

*La **nouvelle version VSX** connecte des arbres trés espacés (jusqu'à 300 mm) tout en conservant les quatre composants de base : deux demi éléments flexibles*

Description

Capscrews
Metric capscrews with self-locking Nyloc thread patches are in standard steel (stainless steel optional). They conform to precise engineering specifications and are supplied standard with flexible elements. They fasten radially for easy accessibility. Blind mounting of capscrews, therefore, is avoided. The capscrews generate a clamping force between the hub's outer diameter and the inner shoe surface.

Upgrades
Larger and more numerous fasteners enhance the robust base design.

Hubs
In standard steel, hubs are also available in stainless steel or with special surface treatment for particular corrosion resistance. They can be used interchangeably with V, VS and VSX (see below) versions for any given size.

Upgrades
A cylindrical hub, without a step for the smaller sizes, accepts larger bores. Two rows of radial holes grant more field spacing adjustability.

High Speed Rings
Machined from cold rolled steel, the rings are optional as reinforcement for the VS version.

Upgrades
Not required for any size of the VS version.

Descripción

el diseño básico de cuatro componentes: dos mitades flexibles unidas siguiendo el eje axial y dos núcleos. No son necesarios núcleos ni manguitos especiales.

Tornillos hexagonales
Los tornillos hexagonales métricos con sistema de autobloqueo Nyloc se suministran en acero estándar (acero inoxidable opcional). Cumplen especificaciones precisas y se suministran conjuntamente con los elementos flexibles. Su montaje radial facilita el acceso a los mismos y evita de ese modo el montaje a ciegas de los tornillos, generandose una fuerza de sujeción entre el diámetro exterior del núcleo y la superficie interior de las tejas.

Mejoras
Mayor número y tamaño de los tornillos, para mejorar, el ya de por si, robusto diseño básico.

Núcleos
En acero fundido convencional, se encuentran también disponibles en acero inoxidable o con tratamientos especiales de superficie para conseguir una resistencia específica a la corrosión. Pueden utilizarse de modo intercambiable con las versiones V, VS y VSX de culquier talla dada (ver más adelante).

Mejoras
Un núcleo cilíndrico, sin valonas para las tallas más pequeñas y que acepta diámetros interiores mayores. Dos hileras de orificios radiales proporcionan mayor posibilidad de ajuste in situ.

Anillos de alta velocidad
Fabricados de acero laminado en frío. Los anillos son opcionales como refuerzo para la versión VS.

Mejoras
No se necesitan para ningún tamaño de la versión VS.

Description

séparés axialement et deux moyeux. Il ne nécessite aucun manchon ni moyeux spécial.

Vis de Fixation
Les vis de fixation métriques en acier (acier inoxydable en option) sont étudiées pour être également utilisées avec des clefs en pouce. Elles se conforment à de précises spécifications techniques et sont livrées automatiquement avec les éléments flexibles. Leur montage radial offre une bonne accessibilité et évite ainsi leur montage en aveugle. Les vis de fixation créent une adhérence entre le diamètre extérieur des moyeux et la surface intérieure de la coquille. Elles sont autofreinées par Nyloc.

Améliorations
Un plus grand nombre de vis de dimension supérieure renforce la conception de base déjà robuste.

Moyeux
En fonte et en acier en standard, les moyeux sont également disponibles en acier inoxydable ou avec un traitement de surface spécial pour obtenir une résistance particulière à la corrosion. Ils peuvent être utilisés indifféremment sur les versions V, VS ou VSX (voir ci-dessous) pour quelques tailles données.

Améliorations
Un moyeu cylindrique sans épaulement pour les plus petites tailles accepte de plus grands alésages.
Deux rangées de trous radiaux autorisent une plus grande possibilité de d'ajustement de distance entre bouts d'arbres.

Anneaux de Survitesse
Usinés dans de l'acier roulé à froid, les anneaux pour renforcer l'accouplement sont facultatifs pour les versions VS.

Améliorations
Ne sont plus exigés pour la version VS.

Coding	Codificación	Codification

V	2	3 150	4	-	5	-	6 HCB	7	8 2.250(.500)/1.375

2

Version
No code: standard
S: spacer
SX: extented spacer

Versión
Sin código: estándar
S: separador
SX: separador extralargo

Version
Aucun : standard
S : longue
SX : Extra longue

3

Size
110, 125, 130, 150, 170, 190, 215, 245, 290, 365, 425, 460

Tamaño
110, 125, 130, 150, 170, 190, 215, 245, 290, 365, 425, 460

Taille
110, 125, 130, 150, 170, 190, 215, 245, 290, 365, 425, 460

4

Shoe and capscrew material
No code: standard

Material de tejas y tornillos
Sin código: estándar

Matière des coquilles et vis
Aucun : standard

5

High speed ring
(Only S and SX version)
No code: without ring
R: with high speed rings; Standard on SX version.

Anillo de alta velocidad
(Sólo versiones S y SX)
Sin código: sin anillo
R: con anillos de alta velocidad; estándar en la versión SX.

Anneau de haute vitesse
(Versions S et SX seulement)
Aucun : sans anneau
R : avec anneaux ; Standard sur la version SX.

6

Hub type
HRB: pilot bored
HCB: custom bored
HTL: bored for *Magic-Lock*® bushings

Tipo de núcleo
HRB: ciego
HCB: con agujero acabado específico
HTL: para casquillo Magic-Lock®

Type de moyeux
HRB : préalésés
HCB : alésages spécifiques
HTL : pour douille *Magic-Lock*®

7

Hub material
No code: standard
STL: steel
SS: stainless steel
X: other

Material del núcleo
Sin código: estándar
STL: acero
SS: acero inoxidable
X: otro

Matière des moyeux
Aucun : standard
STL : acier
SS : acier inoxydable
X : autre

8

Bores and keyways specifications
Without specification, keyways as per ISO R773.

Especificaciones de diámetros interiores y chaveteros
Sin especificación, chaveteros según ISO R773.

Spécification d'alésage et de clavetage
Sans spécification, clavetage selon ISO R773.

Example | **Ejemplo** | **Exemple**

V	S	125		-	R	-	HCB	ø28 mm H7 / ø30 mm H7

Rex Viva complete coupling, spacer version, size 125, capscrews, high speed ring, custom bored standard hubs to ø28mm H7 tolerance and ø30mm H7 tolerance with standard keyways as per ISO R773.

Acoplamiento completo Rex Viva, con separador, tamaño 125, tejas y tornillos de acero inoxidable, anillo de alta velocidad, núcleos con agujeros de ø28mm H7 de tolerancia y ø30mm H7 de tolerancia con chaveteros estándar según ISO R773.

Accouplement Rex Viva version longue, taille 125, à coquilles et vis en acier inoxydable, anneaux de haute vitesse, moyeux standard alésés ø28mm tolérance H7 et ø30mm tolérance H7 avec clavetages normalisés suivant ISO R773.

Magic-Lock® is a registered trademark of taper bushings completely interchangeable with Taper-Lock® bushings.
Taper-Lock® is a registered trademark of Reliance Electric Company.

Magic-Lock®es una marca registrada de casquillos cónicos completamente intercambiables con casquillos Taper-Lock®.
Taper-Lock® es una marca registrada de Reliance Electric Company.

Magic-Lock® est une marque enregistrée de douilles complètement interchangeables avec les douilles Taper-Lock®.
Taper-Lock® est une marque enregistrée par la société Reliance Electric Company.

V			
	Standard version	**Versión estándar**	**Version normale**
100 ▶ 460	**Size**	**Talla**	**Taille**
-			
HRB / HCB	**Hub type**	**Tipo de núcleo**	**Type de moyeux**
- / STL / SS / X	**Hub material**	**Material del núcleo**	**Matière des moyeux**

The user is responsible for the provision of safety guards and correct installation of all equipment.

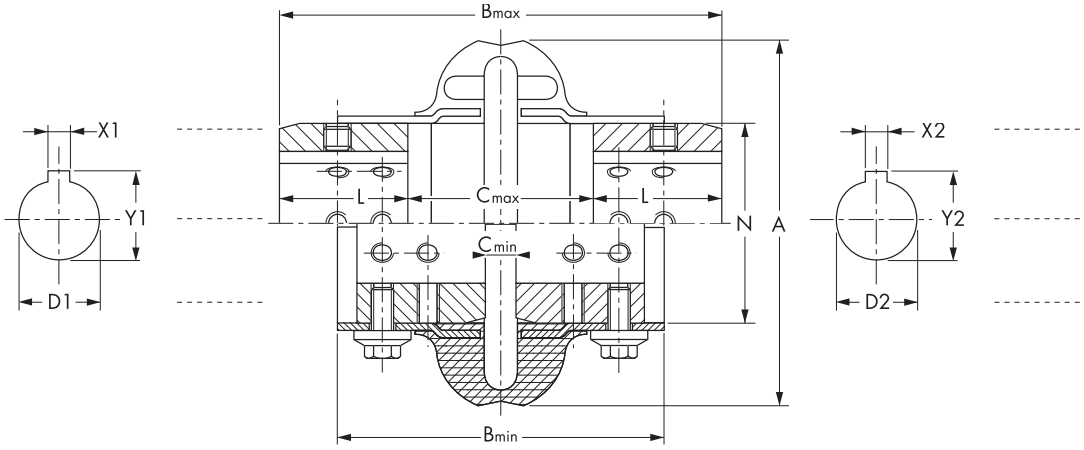
Certified dimensions available upon request.

El usuario es responsable de la provisión de dispositivos de seguridad y de la correcta instalación de todo el equipo.

Se proporcionarán las dimensiones certificadas si así se solicita.

Les dispositifs de protection doivent être prévus par l'utilisateur. Celui-ci est responsable de l'installation correcte de l'ensemble.

Dimensions définitives sur demande.



Remarks:
Unless specified on the order draft, couplings are delivered without boring.
(1) For speeds > nmax : consult factory.
(2) Maximum bores for keyways as per ISO R773.
(3) With maximum bore.

Notas:
A no ser que se 245 especifique en el 290 borrador de pedido, los acoplamientos se suministran sin agujeros acabados.
(1) Para velocidades > n máx: consulte a la fábrica.
(2) Diámetros interiores máximos para chaveteros según ISO R773.
(3) Para diámetro interior máximo.

Remarques :
Sans indication à la commande, les accouplements sont livrés non alésés.
(1) Pour des vitesses > nmax : nous consulter.
(2) Alésages maximum pour rainures suivant ISO R773.
(3) Pour alésage maximum.

Size **Tamaño** **Taille**	**T_N** (Nm) 9550.kW **min^{-1}**	**n_{max}** min^{-1} **(1)**	**D1** **D2** min.	**D1** **D2** max. **(2)**	**A**	**B** min.	**B** max.	**C** min.	**C** max.	**L**	**N**	**J** kgm² **(3)**	**m** kg **(3)**
110	62	5 400	10	38	110	97	132	9	55	38	60	0,00123	1,4
125	105	5 400	10	48	120	98	132	9	55	38	70	0,00202	1,7
~~**130**~~	~~164~~	~~5 100~~	~~11~~	~~55~~	~~130~~	~~97~~	~~136~~	~~7~~	~~55~~	~~41~~	~~80~~	~~0,00310~~	~~2,1~~
150	250	4 800	10	65	150	111	162	9	60	51	95	0,009	4,2
170	308	4 800	11	65	168	111	162	9	60	51	95	0,00931	4,3
190	412	4 600	19	75	190	116	164	7	60	52	117	0,0173	5,5
215	662	4 300	19	80	213	134	191	11	64	64	140	0,0303	9,6
245	938	4 100	19	95	245	137	202	7	73	65	171	0,076	14,4
290	1 412	3 900	27	110	290	153	241	8	94	73	215	0,192	24,9
365	3 200	3 600	35	127	365	200	311	20	131	90	235	0,373	42,0
425	5 580	2 000	35	155	425	247	361	19	133	114	286	1,180	85,0
460	6 270	2 000	48	165	460	267	380	19	132	124	302	1,720	93,0

Selection Procedure

1/ Choice of coupling type:
The choice is based on the type of application and the operating conditions.
The reference charts on page 13 and 14 can help with the choice of coupling type.
(Note: only use couplings with positive engagement for lifting motion!)

2/ Calculation of the nominal torque Ta (Nm) of the driven machine

$$Ta = \frac{9550 \times Pa}{n}$$

where: Pa = absorbed torque (kW) of the driven machine,
n = speed (min^{-1})

3/ Service factor determination SF
See table in each catalogue.
Service factor adders should be used if:
• the driven machine is an internal combustion engine where torque fluctuations of more than 20% may occur (see page 12),
• the operating speed approaches the critical speed (consult factory),
• the ambient temperature exceeds 60°C (consult factory).
• the number of starts per hour is more than 10 (consult factory).

4/ Calculation of the equivalent torque Teq (Nm)

$$Teq = Ta \times (SF + S_t) \quad *$$

where: Ta = torque (Nm) of the driven machine,
SF = service factor
S_t = Temperature service factor (see p.15)

5/ Select the coupling size so that:

$$TN \geq Teq$$

where: TN = nominal torque of the coupling (see dimensional drawings)

6/ Checking of the selection
The maximal peak torque:

$$Tmax \leq 2 \times TN$$

7/ Checking of the bores
Check when the shaft diameters are known, whether the corresponding bores are available.
If the coupling is to be bored and keywayed, the correct dimensions and tolerances should be advised.

Procedimiento de selección

1/ Elección del tipo de acoplamiento:
La elección se basa en el tipo de aplicación y en las condiciones de operación.
Las tablas de referencia en las páginas 13 y 14 pueden facilitar la elección del tipo de acoplamiento.
(Nota: ¡utilice sólo acoplamientos con clavamiento seguro para un movimiento de elevación!)

2/ Cálculo del par de torsión nominal Ta (Nm) de la máquina impulsada

donde: Pa = par de torsión absorbido (kW) de la máquina impulsada,
n = velocidad (min^{-1}).

3/ Determinación del factor de servicio SF
Véase la tabla en cada catálogo.
Deberían utilizarse factores de servicio adicionales si:
• la máquina impulsora es un motor decombustión interna en el que pueden ocurrir variaciones del par de torsión superiores al 20 %, ver la página 9.
• la velocidad de funcionamiento se acerca a la velocidad crítica, consúltenos.
• la temperatura ambiente supera los 60 °C, consultenos.
• el número de encendidos por hora es mayor de 10, consultenos.

4/ Cálculo del par de torsión corregido Teq (Nm)

donde: Ta = par de torsión (Nm) de la máquina impulsada,
SF = factor de servicio
St = factor de servicio de la temperatura (véase la p. 15)

5/ Seleccione el tamaño del acoplamiento de modo que:

donde: TN = par de torsión nominal del acoplamiento (véanse los dibujos acotados)

6/ Comprobación de la selección
El par de torsión máximo:

7/ Comprobación de los diámetros internos
Cuando se conozcan los diámetros de los árboles, compruebe si están disponibles los diámetros internos correspondientes.
Si el acoplamiento debe agujerearse y amortajar, deberían indicarse las dimensiones y tolerancias correctas.

Méthode de sélection

1/ Choix du type d'accouplement :
Celui-ci est déterminé par le genre d'application et par les conditions de fonctionnement.
Les tableaux synthétiques des pages 13 à 14 peuvent aider à ce choix.
(Remarque : employer uniquement un accouplement assurant une liaison positive sûre pour un mouvement de levage !)

2/ Calcul du couple nominal Ta(Nm) de la machine

où : Pa = puissance absorbée (kW) par la machine,
n = vitesse (min^{-1}).

3/ Choix du facteur de service SF
Voir tableau dans chaque catalogue.
Des facteurs de service complémentaires doivent être appliqués lorsque :
• la machine motrice est un moteur à combustion interne pouvant occasionner des variations de couple de plus de 20% (voir page 9),
• la vitesse de régime se rapproche sensiblement de la vitesse critique (nous consulter),
• la température ambiante dépasse 60°C (nous consulter).
• le nombre de démarrages par heure est supérieur à 10 (nous consulter).

4/ Calcul du couple équivalent Teq (Nm)

où : Ta = couple (Nm) de la machine entraînée,
SF = facteur de service
S_t = Facteur de service température (voir p.15)

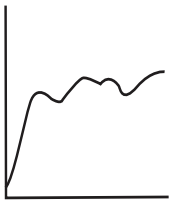
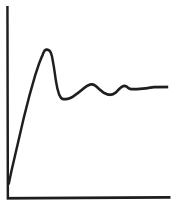
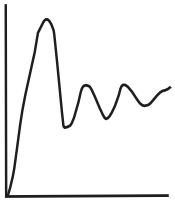
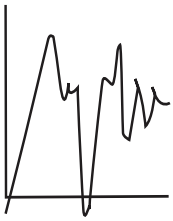
5/ Sélection de la taille de l'accouplement, de manière que :

où : TN = couple nominal de l'accouplement (voir plans d'encombrements).

6/ Vérification de la sélection
Couple de pointe maximum :

7/ Contrôle des alésages
Les diamètres des bouts d'arbre étant connus, contrôler que les alésages correspondants peuvent être réalisés.
Si les accouplements doivent être fournis alésés et rainurés, il y a lieu d'indiquer les cotes exactes et les tolérances désirées.

Selection | Selección | Sélection

	Load Classifications Clasificación de cargas *Classifications des charges*	Service Factors *Factores de servicio* *Facteur de Service* S_R
	Continous Service and running Loads vary only slightly *El servicio continuo y las cargas de funcionamiento varían sólo ligeramente* *Service continu et le fonctionnement en charge varie seulement légèrement*	1.0
	Torque loading varies during operation of equipment *Epar de carga varía durante el funcinamiento del equipo.* *Le couple varie pendant le fonctionnement*	1.5
	Torque varies during operation, frequent stop/start cycles are encountered *El par de torsión varía durante la operación, se encuentran numerosos ciclos de encendido y parada* *Le couple varie pendant le fonctionnement comportant des démarrage / freinage fréquents*	2.0
	For shock loading and substantial torque variations *Para carga de choque y variaciones importantes del par de torsión* *Pour des chocs en charge et des variations de couple importantes*	2.5
	For heavy shock loading or light reversing drives *Para fuerte carga de choque o ligeros impulsos de inversión* *Pour des chocs importants ou de légères inversion de sens de rotation*	3.0
	Reversing torque loads do not necessarly mean reversal of rotation. Depending on severity of torque reversal, such loads must be classified between “medium” and “extreme”. *La inversión de las cargas del par de torsión no significa necesariamente la inversión de la rotación.* *Dependiendo de la gravedad de la inversión del par de torsión, dichas cargas deben clasificarse entre “medias” y “extremas”* *Inversions de couple ne voulant pas forcement dire inversion de rotation.* *Cela dépend de la sévérité de l'inversion de couple, aussi les charges doivent être classées entre “moyenne” et “extrême”.*	Consult factory *Consúltenos* *Nous consulter*

* If the application is not listed in pages 14 and 15, use the factor S_R in place of SF.

* Si la aplicación no aparece listada en f las páginas 14 y 15, utilice el factor SR en lugar del SF.

* Si l’application n’est pas trouvée dans la liste des pages 14 et 15, remplacer SF par le facteur SR ci-dessus.

SF	Service Factor	Factor de servicio	Facteur de service
	AGITATORS	**AGITADORES**	**AGITATEURS**
1,5	Pure Liquids	Líquidos puros	Liquides purs
2,0	Variable density	Densidad variable	Densité variable
1,5	**ALTERNATOR**	**ALTERNADOR**	**ALTERNATEUR**
	BLOWERS	**SOPLANTES**	**MACHINES SOUFFLANTES**
1,0	Centrifugal	Centrífugos	Centrifuges
1,5	Lobe	De lóbulos	A lobes
1,5	Vane	De paletas	A pales
2,0	**BRIQUETTER MACHINES**	**BRIQUETEADORAS**	**MACHINES DE BRIQUETERIE**
1,0	**CAN FILLING MACHINES**	**RELLENADORAS DE LATAS**	**MACHINES DE MISE EN BOîTE**
2,0	**CANE KNIVES**	**CUCHILLAS PICADORAS DE CAÑA**	**COUPE BAMBOU**
2,0	**CAR DUMPERS**	**VUELCAVAGONES**	**COMPACTEUR**
2,0	**CAR PULLERS**	**TORNOS ARRASTRADORES DE VAGONES**	**VEHICULE DE REMORQUAGE**
2,0	**CLAY WORKING MACHINERY**	**MAQUINARIA PARA TRABAJAR ARCILLA**	**MACHINES DE TRAVAIL DE L'ARGILE**
	COMPRESSORS	**COMPRESORES**	**COMPRESSEURS**
1,0	Centrifugal	Centrífugos	Centrifuge
1,5	Lobe, Vane, Screws	De lóbulos, de paletas, con tornillos	A lobes, à pales, à vis
*	Reciprocating - Multi-Cylinder	De pistón - Policilíndrico	A piston, multicylindre
1,0	Axial	Axial	Axial
	CONVEYORS	**CINTAS TRANSPORTADORAS**	**CONVOYEURS**
1,5	Uniformly loaded or fed	De alimentación o carga uniforme	Chargé ou alimenté uniformément
3,0	Heavy duty - not uniformly fed	De alta resistencia - de carga no uniforme	Service lourd - alimenté non uniformément
2,0	**CRANES AND HOISTS**	**GRÚAS Y POLIPASTOS**	**LEVAGE**
3,0	**CRUSHERS**	**TRITURADORES**	**CONCASSEURS**
	DREDGES	**DRAGAS**	**DRAGAGE**
2,0	Cable Reels	Carretes de cables	Enrouleurs de câble
2,0	Conveyors	Cintas transportadoras	Convoyeurs
3,0	Cutter Head Drives	Excavadoras	Excavatrices
3,0	Jig Drives	Arrastre de plantillas	Entraînement de calibre
2,5	Maneuvering Winches	Tornos de maniobras	Treuils de manoeuvre
2,0	Pumps	Bombas	Pompes
2,0	Screen Drives	Arrastre de tamiz	Entraînement de cribles
2,0	Stackers	Apiladoras	Entasseurs
2,0	Utility Winches	Tornos utilitarios	Treuil utilitaire
	ELEVATORS	**ELEVADORES**	**ELEVATEURS**
2,5	Bucket	Con cubetas	A godets
2,5	Centrifugal Discharge	De descarga centrífuga	A déchargement centrifuge
2,5	Escalators	Rodantes	Escaliers roulants
2,0	Freight	Montacargas	Monte charge
2,5	Gravity Discharge	De descarga por gravedad	A déchargement par gravité
	EXTRUDERS	**EXTRUSORAS**	**EXTRUDEURS**
2,0	Plastic	Plástico	Matières plastiques
2,5	Metal	Metal	Matières métalliques
	FANS	**VENTILADORES**	**VENTILATEURS**
	Centrifugal	Centrífugos	Centrifuges
1,5	Forced Draft	Corriente forzada	Flux forcé
1,5	Induced Draft	Corriente inducida	Flux induit
	Axial	Axial	Axial
1,5	Forced Draft	Corriente forzada	Flux forcé
1,5	Induced Draft	Corriente inducida	Flux induit
2,0	Mine Ventilation	Ventilación de minas	Ventilation de mines
2,0	Cooling Towers	Torres de ventilación	Tour de réfrigération
1,0	Light Duty Blower & Fans	Ventiladores y soplantes para trabajos ligeros	Ventilateurs peu chargés
	FEEDERS	**ALIMENTADORES**	**ALIMENTATEURS**
1,5	Light Duty	Para trabajos ligeros	Service léger
2,5	Heavy Duty	Para trabajos pesados	Service lourd
	FOOD INDUSTRY	**INDUSTRIA ALIMENTICIA**	**INDUSTRIE ALIMENTAIRE**
2,0	Beet Slicer	Rebanadora de remolacha	Coupe betteraves
1,5	Cereal Cooker	Tostador de cereales	Four à céréales
2,0	Dough Mixer	Amasadora	Pétrins, mélangeurs
2,0	Meat Grinders	Picadoras de carne	Hachoirs à viande
1,0	Can Filling Machine	Rellenadora de latas	Machines de mise en boîte
1,5	Bottling	Embotellado	Machines à embouteiller
	GENERATORS	**GENERADORES**	**GENERATRICES**
1,0	Non-Welding	Excepto soldadura	Normales
3,0	Welding	Para soldadura	De soudure
2,5	**HAMMER MILLS**	**TRITURADORAS DE MARTILLOS**	**BROYEURS A MARTEAUX**
	LUMBER INDUSTRY	**INDUSTRIA MADERERA**	**INDUSTRIE DU BOIS**
2,0	Barkers - Drum Type	Descortezadoras - De tambor	Ecorceur type tambour
2,0	Edger Feed - Live Rolls	Alimentación de canteadora - Rodillos activos	Transporteurs à chaines
2,0	Log Haul - Incline	Arrastre de troncos - Plano inclinado	Transporteur de bûches - Incliné
2,0	Log Haul - Well Type	Arrastre de troncos - En pozo	Transporteur de bûches - Normal
2,0	Planer Feed Chains	Cadenas de alimentación de la cepilladora	Chaînes d'alimentation de raboteuse
2,0	Planer Tilting Hoist	Polipasto basculante de la cepilladora	Portique d'inclinaison de rabotage
1,5	Slab Conveyor	Cinta transportadora de costeros	Convoyeur de plaque
1,5	Sorting Table	Mesa de clasificación	Table de triage
2,0	Trimmer Feed	Alimentación de recortadora	Alimentation de machine à trancher
	MACHINE TOOLS	**MÁQUINAS HERRAMIENTA**	**MACHINES OUTIL**
2,0	Bending Roll	Rodillo plegador	Cintreuse, plieuse
1,5	Plate Planer	Cepilladora para chapas	Machine à planer
2,0	Punch Press - Gear Driven	Prensa punzonadora - Accionada por engranajes	Poinçonneuses
2,5	Tapping Machines	Fileteadoras	Machines à tarauder
	Other Machines Tools	Otras máquinas herramienta	Autres machines outil
1,5	Main Drives	Impulsores principales	Entraînement principal
1,5	Auxiliary Drives	Impulsores auxiliares	Entraînement auxiliaire
	METAL MILLS	**METALURGIA**	**METALLURGIE**
2,0	Draw - Bench - Carriage	Carro de máquina estiradora	Bancs à tréfiler - Chargement
2,0	Draw - Bench - Main Drive	Impulsor principal de máquina estiradora	Bancs à tréfiler - Entraînement principal
2,5	Forming Machines	Formadoras	Machine de formage
2,0	Slitters	Sierras longitudinales	Fendoir
	Table Conveyor	Mesa transportadora	Convoyeur
3,0	Non-Reversing	No reversible	Non réversible
4,5	Reversing	Reversible	Réversible
2,0	Wire Drawing & Flattening Machine	Trefiladora y aplanadora de cables	Machine à tréfiler & à laminer le fil
2,0	Wire Winding Machine	Enrolladora de alambre	Bobineuse de fil
	MILLS ROTARY TYPE	**MOLINOS DE TIPO ROTATORIO**	**BROYEURS ROTATIFS**
3,0	Ball	De bolas	A boulets
2,5	Cement Kilns	Hornos de cemento	Four à ciment
2,0	Dryers & Coolers	Secadores y enfriadores	Sécheurs & Refroidisseurs
2,5	Kilns	Hornos	Fours
2,0	Pebble	De cantos	A galets
3,0	Rod	De varillas	A barres
2,0	Tumbling Barrels	Tambores desarenadores	Tambour désableur
	MIXERS	**MEZCLADORAS**	**MELANGEURS**
2,0	Concrete Mixers	Hormigoneras	Bétonnières
2,0	Drum Type	Factor de servicio	Tambours
	OIL INDUSTRY	**INDUSTRIA PETROLERA**	**PETROCHIMIE**
1,5	Chillers	Refrigeradores	Réfrigérateurs
2,0	Oil Well Pumping	Bombeo de pozos petrolíferos	Pompe à puits de pétrole
2,0	Paraffin-Filter-Press	Prensa de filtro de parafina	Filtres-presses pour paraffine

SF	Service Factor	Factor de servicio	Facteur de service
2,5	Rotary Kilns	Hornos giratorios	Fours rotatifs
	PAPER MILLS	**FÁBRICAS DE PAPEL**	**PAPETERIE**
2,0	Barker Auxiliaries Hydraulic	Accesorios para descortezadoras, hidráulicos	Hydraulique auxiliaire d'écorcheur
2,0	Barker Mechanical	Descortezadora mecánica	Ecorcheur mécanique
3,0	Barking Drum (Spur Gear Only)	Tambor de descortezado (sólo engranaje recto)	Tambour écorcheur (Engrenage droit seulement)
2,0	Beater & Pulper	Batidor y desintegrador	Pulpeur
1,0	Bleacher	Blanqueadora	Blanchiment
2,5	Calenders	Calandria	Calandres
1,5	Converting Machines except Cutters	Máquinas conversoras excepto cortadoras	Machine de conversion sauf couteaux
2,0	Couch	Prensa manchón	Coucheuse
2,0	Cutters	Cortadoras	Couteaux
2,0	Cylinders	Cilindros	Cylindres
2,0	Dryers & Coolers	Secadoras y enfriadoras	Sécheurs & refroidisseurs
1,5	Felt Stretcher	Tensor de fieltro	Rouleaux presseurs
2,0	Felt Whipper	Dedos de arrastre de fieltro	Rouleaux entraîneurs
2,5	Log Haul	Transportador de troncos	Traîne grume
2,5	Presses	Prensas	Presses
2,0	Reel	Carrete	Dévidoir
2,5	Suction Roll	Rodillo de succión	Rouleaux aspirants
2,0	Washers and Thickeners	Arandelas y espesadoras	Laveurs et épaississeurs
2,0	Winders	Enrolladoras	Enrouleur
1,5	**PRINTING PRESSES**	**PRENSAS DE IMPRESIÓN**	**IMPRIMERIE**
2,0	**BARGE HAUL**	**REMOLQUE DE BARCAZAS**	**REMORQUEURS**
	PUMPS	**BOMBAS**	**POMPES**
	Centrifugal	Centrífugas	Centrifuges
1,0	General Duty (Liquid)	Para uso general (líquidos)	Usage général (Liquide)
*	Boiler Feed	Alimentación de calderas	Alimentaires
1,5	Slurry (Sewage etc.)	Fangos (alcantarillado, etc.)	Relevage d'eaux usées
2,0	Dredge	Drenaje	Drague
	Reciprocating	Aspirante e impelente	A pistons
*	Double Acting	De doble acción	Double effet
	Single Acting	De acción única	Simple effet
*	1 or 2 Cylinders	1 o 2 cilindros	1 ou 2 cylindres
*	3 or more Cylinders	3 o más cilindros	3 cylindres ou plus
1,5	Rotary - Gear, Lobe, Vane	Giratorias: mediante engranajes, lóbulos, paletas	A engrenage, à lobes, à pales
	RUBBER INDUSTRY	**INDUSTRIA DEL CAUCHO**	**INDUSTRIE DU CAOUTCHOUC**
3,0	Mixer - Banbury	Mezcladora - Banbury	Malaxeur
2,5	Rubber Calendar	Calandria de caucho	Calandre
2,5	Rubber Mill (2 or more)	Laminadora de caucho (2 o más)	Laminoirs
2,0	Sheeter	Resmadora	Massicot
2,5	Tire Building Machines	Máquinas para fabricación de neumáticos	Machines pour fabrications des pneumatiques
1,0	Tire & Tube Press Openers	Abridoras de prensa de neumáticos y cámaras	Ouverture des presses à pneumatiques
2,0	Strainers	Depuradoras	Raidisseurs
	SCREENS	**PANTALLAS**	**CRIBLES**
1,0	Air Washing	Lavado de aire	Filtre à air
1,5	Rotary - Stone or Gravel	Giratorias - piedra o gravilla	Rotatif - Pierres ou graviers
1,5	Traveling Water intake	Admisión de agua en movimiento	A circulation d'eau
2,5	Vibratory	Vibratoria	Vibreur
1,5	**SEWAGE DISPOSAL EQUIPMENT**	**EQUIPO DE DEPURACIÓN DE AGUAS RESIDUALES**	**EQUIPEMENT DE TRAITEMENT DES EAUX**
1,5	**SEWAGE TREATMENT PUMPS**	**BOMBAS DE TRATAMIENTO DE AGUAS RESIDUALES**	**POMPES DE TRAITEMENT DES EAUX**
	TEXTILE INDUSTRY	**INDUSTRIA TEXTIL**	**INDUSTRIE TEXTILE**
2,0	Calenders	Calandrias	Calandres
2,0	Card Machines	Máquinas de tarjetas	Cardeuses
2,0	Cloth - Finishing Machines (washers, pads, tenters, dryers, calenders, etc.)	Tela - Máquinas acabadoras (lavadoras, fulards, tensadoras, secadoras, calandrias, etc.)	Machines de finition de l'habillement (Machines à laver, sécheurs, calandres, etc.)
2,0	Dry Cans	Tambores secadores	Machines à cannettes
1,5	Dryers	Secadoras	Sécheurs
1,0	Dyeing Machinery	Teñidoras	Machines à teinter
2,0	Looms	Telares	Métier à tisser
1,5	Mangles	Calandradoras	Essoreuses à rouleaux
1,5	Nappers	Perchadoras	Molletoneuses
1,5	Soapers	Enjabonadoras	Savonneurs
2,0	Spinners	Hiladoras	Fileurs
2,0	Tenter - Frames	Rama tensadora - Marcos	Machine à mèches
2,0	Winders (other than Batchers)	Devanadoras (excepto enrolladoras-desenrolladoras)	Bobineuses
2,0	**WINDLASS**	**MOLINETE**	**TREUILS ET GUINDEAUX**
1,5	**WOODWORKING MACHINERY**	**MAQUINARIA PARA TRANSFORMACIÓN DE LA MADERA**	**MACHINE A BOIS**
	Note:	**Nota:**	**Nota :**
*	Consult supplier	Consulte con su proveedor	Consulter le fournisseur

Ambiant Temperature Temperatura ambiente Temperature Ambiante	Service Factor S_t* Factor de servicio S_t* Facteur de Service S_t*
50°< T° 66°	0,25
66°< T° 74°	0,5
74°< T° 82°	0,75
82°< T° 93°	1

* For relative humidity < 50%
for humidity relative > 50% consult us

In general, the Viva service factor adjustment for high temperature is in addition to the service factor considération for the driver and driven equipment.However, if high temperatures are typical for a specific application, maximum temperature consideration is incorporated into the "typical" service factor (e.g steel mill tables conveyors).

* Para una humedad relativa < 50 %
para una humedad relativa > 50 % consúltenos

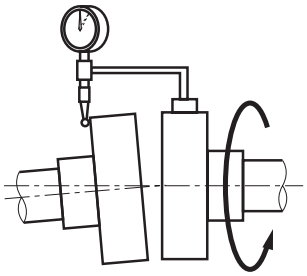
En general, el ajuste del factor de servicio Viva para altas temperaturas se añade a la consideración del factor de servicio para el equipamiento impulsado e impulsor. Sin embargo, si son típicas las temperaturas altas para una aplicación específica, la consideración de la temperatura máxima se incorpora en el factor de servicio "típico" (por ejemplo, mesas transportadoras en acerías).

* Pour humidité relative < 50%
au delà nous consulter

Cependant, si les temperatures sont typiques pour une application spécifique, la notion de temperature maximum est incorporée dans le facteur de service typique (par exemple convoyeurs de sidérurgie)

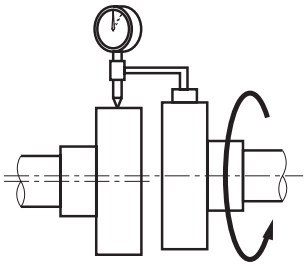
Alignment

Alignment significantly impacts the life cycle of transmission components. Shaft misalignment produces stress on the couplings and the engine and reduction gear box bearings and shafts, leading to damage. Moreover, the higher the rotational speed, the more stringent the alignment accuracy requirement.
In general, radial, angular, and in certain cases, axial misalignments occur simultaneously. For misalignments not to induce an unacceptable aggravated fault, alignment adjustment shall not be made based on the values given in the catalogue or technical manuals.



Angular Alignment
Use a sturdy means to attach a dial indicator to a shaft or hub and read off the opposite hub's flange as shown below.

With the indicator set to zero, check the shaft alignment by rotating the shaft and recording the maximum and minimum reading on the dial indicator. This values' difference should not exceed the published value (b-a) for each type of coupling.



Radial Alignment
Use a sturdy means to attach a dial indicator to a shaft or hub and read off the opposite hub's external referenced diameter as shown below.

With the indicator set to zero, check the shaft alignment by rotating the shaft and recording the maximum and minimum reading on the dial indicator. This values' difference should not exceed the published value Δr for each type of coupling.

Alineación

La alineación influye de manera significativa en el ciclo vital de los componentes de la transmisión. Una mala alineación de los árboles produce esfuerzos sobre los acoplamientos, el motor, y los rodamientos y árboles de la caja de cambios, lo cual se traduce en daños. Además, cuanto más alta sea la velocidad de giro, más estricta es la necesidad de precisión de la alineación.
En general, las malas alineaciones radiales, angulares y, en ciertos casos, axiales, se presentan a la vez. Para que la falta de alineación no provoque un fallo acumulado inaceptable, el ajuste de la alineación no deberá realizarse basándose en los valores máximos proporcionados en el catálogo o en los manuales técnicos.

Alineación angular
Utilice un medio resistente para unir un reloj comparador a un árbol o cubo,y lea en el reborde del núcleo opuesto, según se muestra en la figura.

Con el indicador en cero, compruebe la alineación de los árboles girando el árbol y anotando las lecturas máxima y mínima mostradas por el reloj comparador. La diferencia entre estos valores no debería superar el valor publicado (b-a) para cada tipo de acoplamiento.

Alineación radial
Utilice un medio resistente para unir un reloj comparador a un árbol o cubo, y lea el perímetro exterior, referenciado, del núcleo opuesto según se muestra en el esquema.
Con el indicador a cero, compruebe la alineación de los árboles girando el eje, y anotando las lecturas máxima y mínima en el reloj comparador. La diferencia entre estos valores no debería exceder el valor publicado Δr para cada tipo de acoplamiento.

Alignement

L'alignement joue un rôle prépondérant sur la durée de vie des éléments d'une transmission. Un mauvais alignement des arbres, produit un effort sur les accouplements et les roulements des arbres du moteur et du réducteur provoquant leur détérioration. De plus, l'accélération des vitesses de rotation augmente la précision nécessaire de l'alignement.
En général, les défauts d'alignements radiaux, angulaires et dans certains cas, axiaux surviennent simultanément. Afin que ceux-ci n'induisent pas un défaut total non acceptable, le réglage de l'alignement ne devra pas afficher les valeurs maximales données dans le catalogue ou les notices techniques.

Alignement Angulaire
Pour compenser un défaut d'alignement angulaire, fixer un comparateur solidement sur l'un des plateaux ou moyeux de sorte de le point de mesure soit effectué sur l'une des faces de l'autre plateaux ou moyeu.

Le comparateur réglé à zéro, faire tourner l'arbre supportant le comparateur et relever les valeurs minimale et maximale affichées. Dans un premier temps, la différence de ces valeurs ne doit pas excéder la valeur (b-a) indiquée pour chaque type d'accouplement.

Alignement Radial
Pour compenser un défaut d'alignement radial, fixer un comparateur solidement sur l'un des plateaux ou moyeux de sorte de le point de mesure soit effectué sur la circonférence de l'autre plateaux ou moyeu.

Le comparateur réglé à zéro, faire tourner l'arbre supportant le comparateur et relever les valeurs minimale et maximale affichées. Dans un premier temps, la différence de ces valeurs ne doit pas excéder la valeur Δr indiquée pour chaque type d'accouplement.

Alignment

Record each misalignment value, calculate the ratio of this value by the maximum indicated value. The sum of these ratios shall not exceed 1:

$$dr/\Delta r + d\alpha/\Delta\alpha \quad 1$$

where:
- dr = recorded radial misalignment value
- Δr = max. radial misalignment value
- $d\alpha$ = recorded angular misalignment value
- $\Delta\alpha$ = max. angular misalignment value

Correct alignment if this sum is greater than 1.

Alineación

Anote cada valor de falta de alineación y calcule la razón de este valor respecto al valor máximo indicado. La suma de estas razones no debería superar 1:

donde:
- dr = valor registrado de mala alineación radial
- Δr = máx. valor de mala alineación radial.
- $d\alpha$ = valor registrado de mala alineación angular
- $\Delta\alpha$ = máx. valor de mala alineación angular

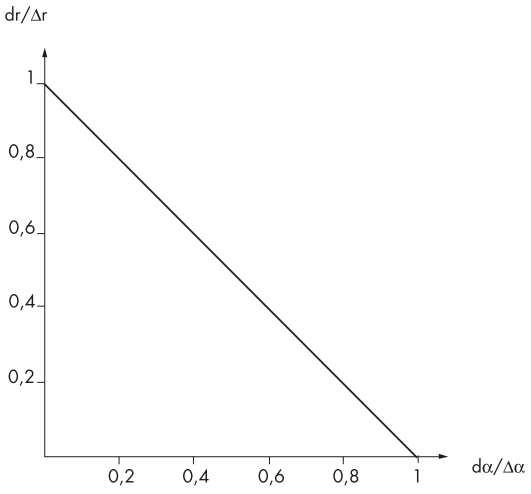
Rehaga la alineación si esta suma es superior a 1.

Alignement

Relever chaque valeur de désalignement, faire le rapport de cette valeur par la valeur maximum indiquée. La somme de ces rapports ne doit excéder 1, c'est à dire :

où :
- dr = valeur de désalignement radial relevée
- Δr = valeur de désalignement radial max.
- $d\alpha$ = valeur de désalignement angulaire relevée
- $\Delta\alpha$ = valeur de désalignement angulaire max.

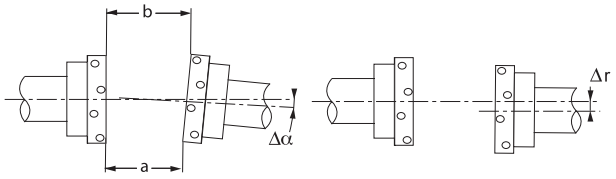
Affiner l'alignement si cette somme est supérieure à 1.



Size Tamaño Taille	110	125	130	150	170	190	215	245	290	365	425	460
(b - a) mm	4,2	4,9	5,5	6,1	6,6	6,1	7,3	8,9	11,2	8,2	9,9	9,4
[3] r mm	1,6	1,6	1,6	1,6	1,6	2,4	2,4	2,4	2,4	3,2	3,2	3,2

V110 - V170

V190 - V290



Installation

1 - Install and secure both hubs to the shaft using a half element using the capscrew hole pattern that best accomodates the shaft gap requirements.

2 - Rotate the shaft 180° and install the other half element side to side if the shaft cannot be rotated

3 - Check the capscrews for proper installation torque and you are done. Element replacement does not require moving the hubs or connected equipment.

Instalación

1 - Instale y fije bien ambos núcleos a los árboles utilizando una mitad, siguiendo el modelo de orificios para tornillos que mejor, se ajuste a los requisitos de distancia entre árboles.

2 - Rote el árbol 180° e instale la otra mitad restante al lado de la otra si el eje no puede rotar.

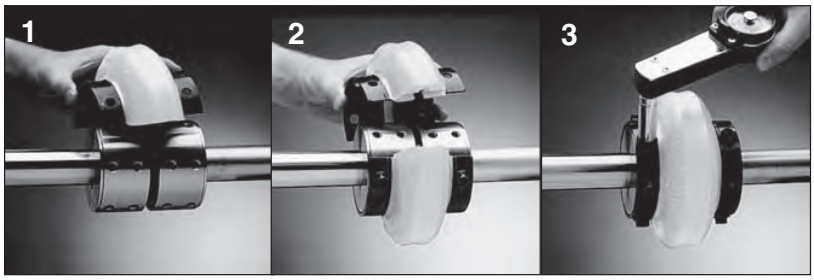
3 - Compruebe que los tornillos están apretados hasta el par de apriete necesario y eso es todo. El recambio de los elementos no necesita mover los núcleos ni el equipo conectado.

Montage

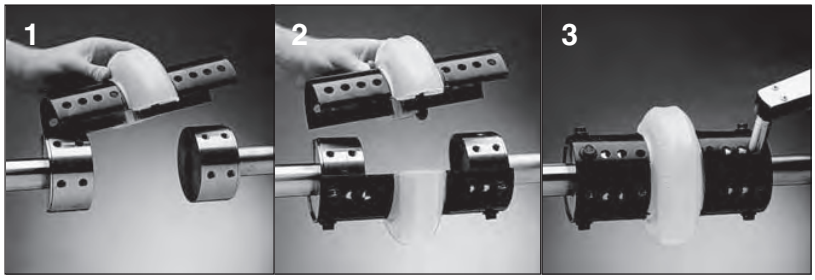
1 - Installer et bien fixer les deux moyeux sur l'arbre en utilisant un demi-elément élastique comme patron pour l'espace entre moyeux. Positionner le démi-élément du dessus en utilisant les trous des vis qui s'accomodent au mieux des conditions requises d'espace entre bout d'arbres

2 - Tourner l'arbre à 180° et installer l'autre demi-élément. Monter les demi-éléments côte à côte si l'arbre ne peut être tourné.

3 - Vérifier le couple de serrage des vis et c'est tout.
Le remplacement des éléments ne nécessite pas de déplacer les moyeux et/ou réaligner l'équipement connecté.



Rex Viva Close-Coupled Couplings - Acoplamientos Rex Viva estándar - Accouplement Rex Viva Standard



Rex Viva Spacer Couplings - Acoplamientos Rex Viva largos - Accouplement Rex Viva Version longue

See installation and maintenance instructions for additional information.

Consulte las instrucciones de instalación y mantenimiento para más información.

Voir la notice d'installation et de maintenance pour de plus amples informations.

Features and Benefits

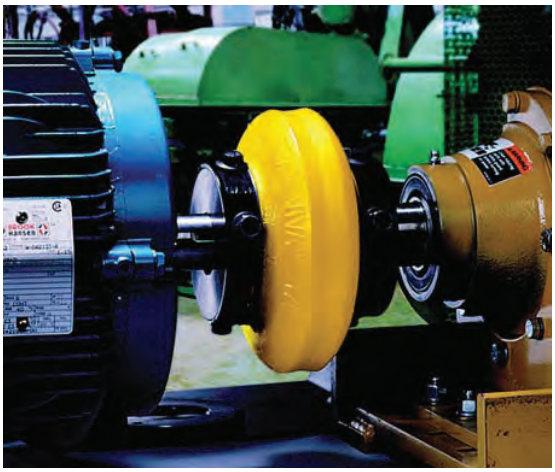
The new Rex Viva Coupling is a unique general purpose coupling ideal for use in industrial applications such as pumps, compressors, blowers, mixers and many other drive applications.

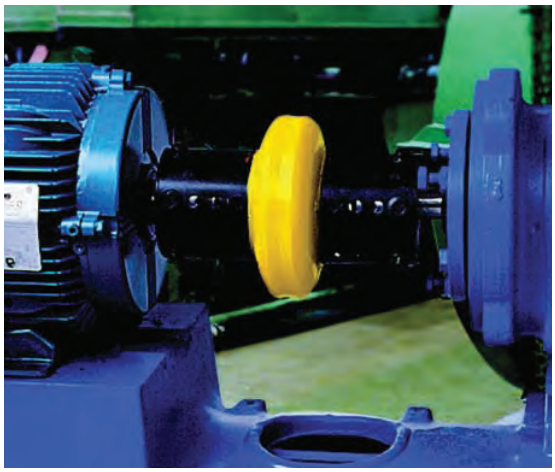
Características y beneficios

El nuevo acoplamiento Rex Viva es un acoplamiento exclusivo de uso general ideal para ser utilizado en aplicaciones industriales como bombas, compresores, soplantes, mezcladoras y muchas otras aplicaciones impulsoras.

Caractéristiques et avantages

Le nouvel accouplement Rex Viva est un accouplement à usage général idéal pour l'utilisation dans les applications industrielles comme les pompes, compresseurs, ventilateurs, mélangeurs et beaucoup d'autres





Feature	Benefit
• Split-in-half flex element design	• Easy replacement without moving the hubs or connected equipment.
• Radial bolting	• Capscrews are easily accessible in tight spaces.
• Special formulated polyurethane flex element	• Optimal tensile strength and fatigue resistance. • Excellent chemical and environmental aging resistance.
• Torsionally Soft	• No lubrication required. • Protects equipment by cushioning shock loads and dampening torsional vibration.
• High misalignment capacity	• Accommodates unavoidable misalignment with low reactionary forces.
• Visual inspection	• No need for coupling disassembly to inspect.
• Interchangeable hubs	• Close-coupled and spacer coupling hubs are identical allowing reduced inventories.

Característica	Beneficio
• Diseño del elemento flexible dividido en dos	• Fácil recambio sin mover los núcleos ni el equipamiento conectado.
• Pernos radiales	• Puede accederse fácilmente a los tornillos en espacios reducidos.
• Elemento flexible de poliuretano especialmente formulado	• Óptima resistencia a la tracción y a la fatiga. • Excelente resistencia al envejecimiento por factores químicos y ambientales.
• Flexible a la torsión	• No se necesita lubricación alguna. • Protege el equipo absorviendo las cargas de choque y la vibración de torsión.
• Alta capacidad de compensación de alineaciones	• Admite una mala alineación de cracter inevitable, con unas fuerzas de reacción bajas en los rodamientos de los árboles.
• Inspección visual	• No se necesita desmontar los acoplamientos para revisarlos.
• Núcleos intercambiables	• Los núcleos o cubos de los acoplamientos estándar y largos son idénticos, lo cual reduce el inventario.

Caractéristiques	Avantages
• Elément flexible en deux parties symétriques	• Remplacement facile sans déplacement des moyeux ou des équipements connectés.
• Montage radial des vis	• Les vis sont facilement accessibles dans les espaces réduits.
• Elément flexible en polyuréthanne formulé spécialement	• Résistance optimale à la traction et à la fatigue. • Excellente résistance chimique et au vieillissement.
• Souple en torsion	• Pas de lubrification. • Protège les équipements en absorbant les chocs et en amortissant les vibrations de torsion.
• Grande acceptation des défauts d'alignement	• S'accommode des inévitables défauts d'alignement avec des faibles forces de réaction.
• Inspection visuelle	• Démontage de l'accouplement non nécessaire pour l'inspection.
• Moyeux interchangeables	• Les moyeux pour accouplement version standard et version longue sont identiques, permettant ainsi des stocks réduits.

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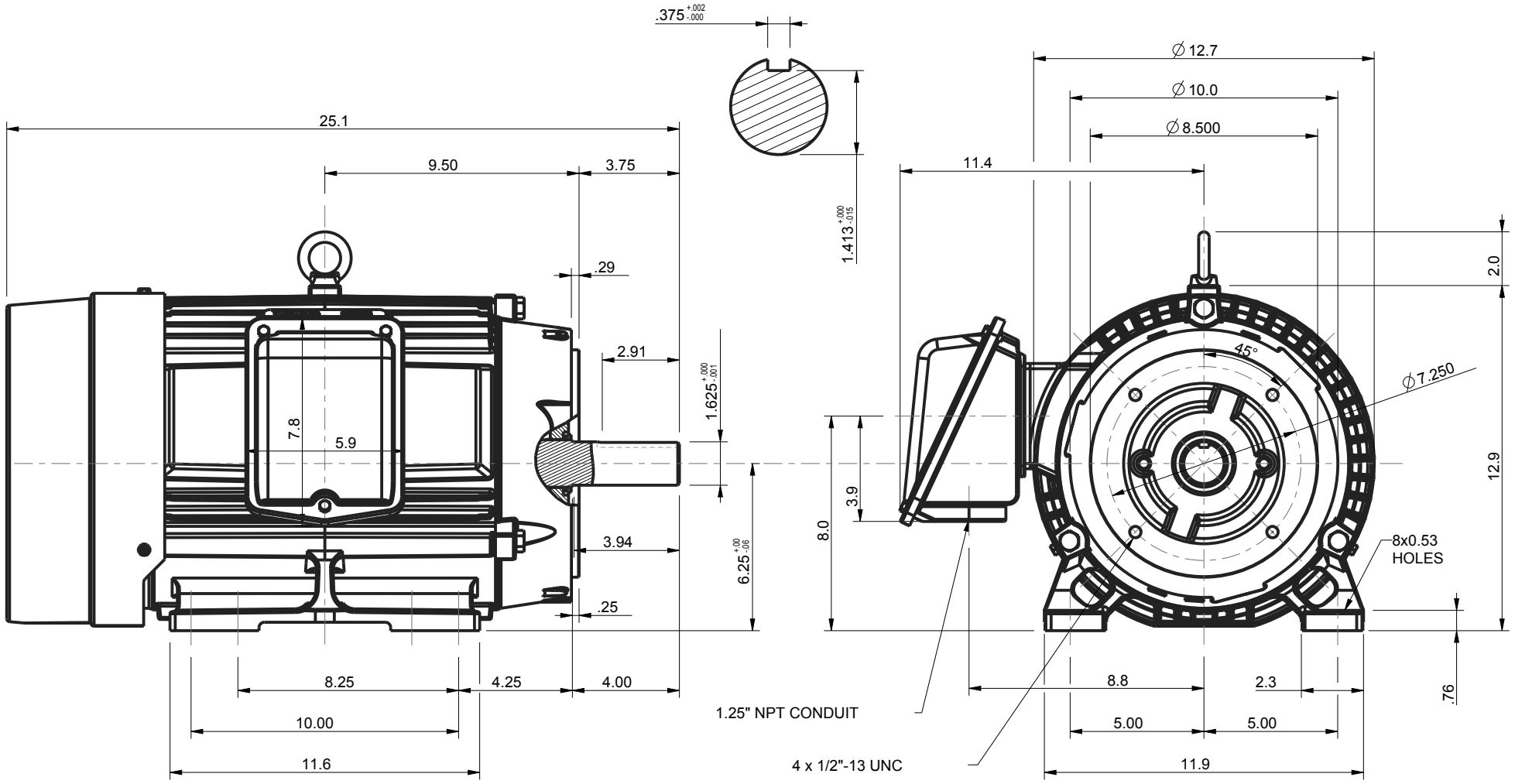


UNITS: INCHES

ROTATION FROM NDE

X CCW ☐ CW

NOTES:

1. MAIN CONDUIT BOX MAY BE ROTATED IN 90° INCREMENTS
2. STANDARD PRODUCT USES BI-DIRECTIONAL FAN. OPPOSITE ROTATION AVAILABLE ONLY BY CONNECTION CHANGE.
3. KEY DIMENSIONS EQUAL 0.375"x 0.375"x 2.88" (MOTOR SUPPLIED WITH KEY)

☐ PRELIMINARY

X CERTIFIED

TOSHIBA

www.toshiba.com/tic

TOSHIBA INTERNATIONAL CORPORATION

SEVERE DUTY EQP Global SD

TOTALLY ENCLOSED FAN COOLED FOOTED C-FACED 3 PHASE INDUCTION MOTOR

254TC-256TC F1 ASSEMBLY

DRAWING #: MDSLV003-04

REV. DATE: 06/29/18 REV. #: 1 PER.: M. O'DOWD

REV. DESCRIP.:

Issued Date	12/18/2019	Transmit #	
Issued By	dschoeck	Issued Rev	

TOSHIBA

TYPICAL MOTOR PERFORMANCE DATA

Model: 0106SDSR42A-P

HP	kW	Pole	FL RPM	Frame	Voltage	Hz	Phase	FL Amps
10	7.5	6	1170	256TC	230/460	60	3	27/13.4

Enclosure	IP	Ins. Class	S.F.	Duty	NEMA Nom. Eff.	NEMA Design	kVA Code	Ambient (°C)
TEFC	55	F	1.15	CONT	91	B	H	40 C

Load	HP	kW	Amperes	Efficiency (%)	Power Factor (%)
Full Load	10	7.5	13.4	91.3	79.9
¾ Load	7.50	5.6	10.5	91.0	75.9
½ Load	5.00	3.7	8.4	88.4	66.2
¼ Load	2.50	1.9	7.0	81.7	40.7
No Load			5.5		5.5
Locked Rotor			79.1		50.3

Torque				Rotor wk² Inertia
Full Load (lb-ft)	Locked Rotor (% FLT)	Pull Up (% FLT)	Break Down (% FLT)	(lb-ft²)
44.9	280	270	380	2.65

Safe Stall Time(s)		Sound Pressure dB(A) @ 1M	Bearings*		Approx. Motor Weight
Cold	Hot		DE	NDE	(lbs)
31	22	-	6309ZZC3	6309ZZC3	306

*Bearings are the only recommended spare part(s).

Motor Options:
Product Family:EQP Global SD CFace Footed
Mounting:C-Face Footed,Shaft:T Shaft

Customer	
Customer PO	
Sales Order	
Project #	

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

Engineering	jhock	Doc. Written By	D. Suarez	Doc.# / Rev	MPCF-1119 / 1
Engr. Date	3/6/2014	Doc. Approved By	M. Campbell	Doc. Issued	9/20/2019

Issued Date	12/18/2019	Transmit #	
Issued By	dschoeck	Issued Rev	

TOSHIBA

TYPICAL MOTOR PERFORMANCE DATA

Model: 0106SDSR42A-P

HP	kW	Pole	FL RPM	Frame	Voltage	Hz	Phase	FL Amps
10	7.5	6	960	256TC	190/380	50	3	32/16.0
Enclosure	**IP**	**Ins. Class**	**S.F.**	**Duty**	**NEMA Nom. Eff.**	**NEMA Design**	**kVA Code**	**Ambient (°C)**
TEFC	55	F	1.0	CONT	88.5	B	G	40 C

Load	HP	kW	Amperes	Efficiency (%)	Power Factor (%)
Full Load	10	7.5	16.0	90.8	77.5
¾ Load	7.50	5.6	12.1	91.5	73.4
½ Load	5.00	3.7	9.2	91.2	64.1
¼ Load	2.50	1.9	7.2	82.5	47.6
No Load			5.8		5.2
Locked Rotor			90		49.4

Torque				Rotor wk² Inertia
Full Load (lb-ft)	**Locked Rotor (% FLT)**	**Pull Up (% FLT)**	**Break Down (% FLT)**	**(lb-ft²)**
54.7	200	195	220	2.65

Safe Stall Time(s)		Sound Pressure dB(A) @ 1M	Bearings*		Approx. Motor Weight
Cold	**Hot**		**DE**	**NDE**	**(lbs)**
27	16	-	6309ZZC3	6309ZZC3	306

*Bearings are the only recommended spare part(s).

Motor Options:
Product Family:EQP Global SD CFace Footed
Mounting:C-Face Footed,Shaft:T Shaft

Customer	
Customer PO	
Sales Order	
Project #	

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

Engineering	jhock	Doc. Written By	D. Suarez	Doc.# / Rev	MPCF-1119 / 1
Engr. Date	4/9/2014	Doc. Approved By	M. Campbell	Doc. Issued	9/20/2019

Issued Date	12/18/2019	Transmit #	
Issued By	dschoeck	Issued Rev	

TOSHIBA

SPEED TORQUE/CURRENT CURVE

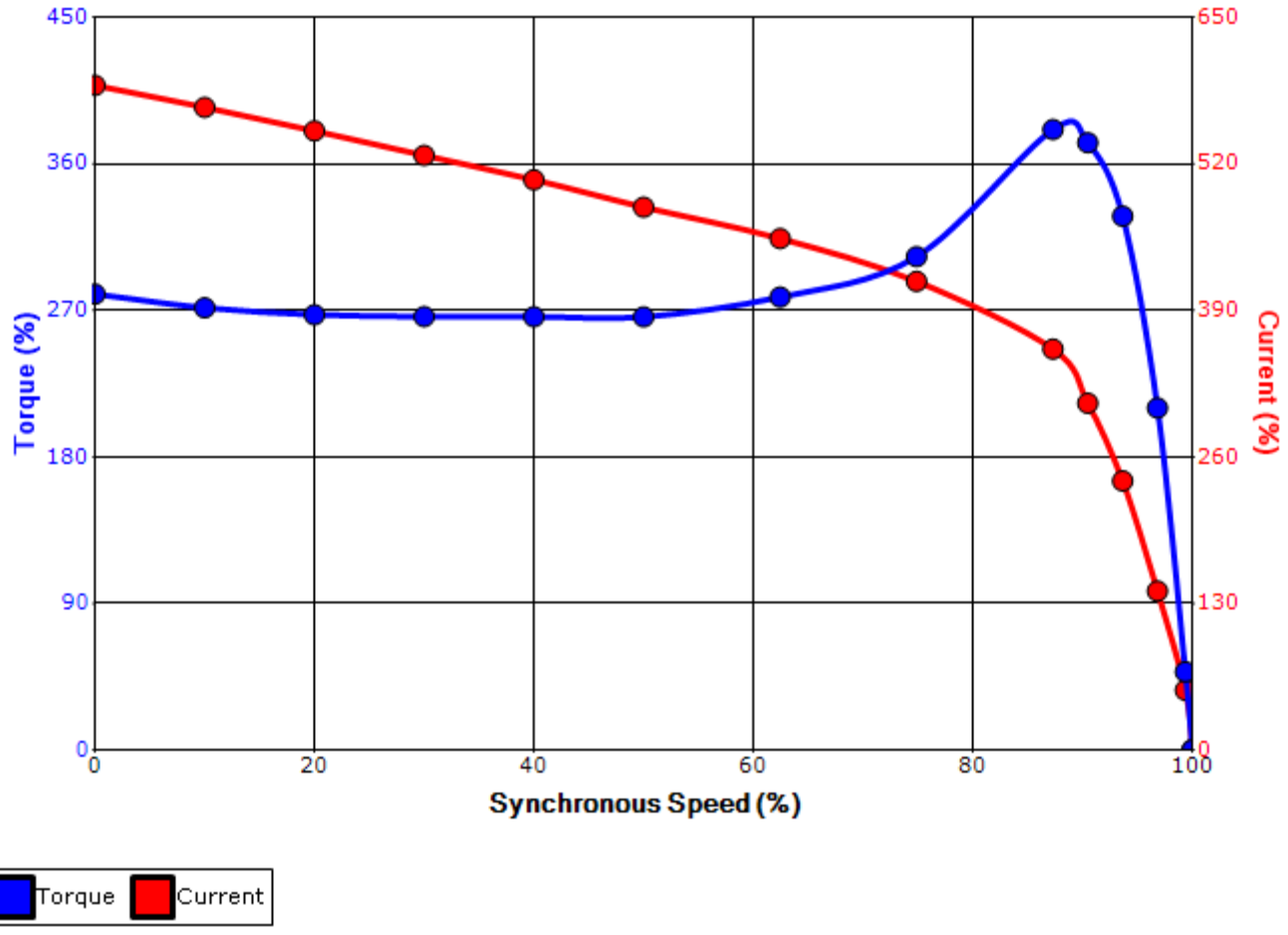
Model: 0106SDSR42A-P

HP	kW	Pole	FL RPM	Frame	Voltage	Hz	Phase	FL Amps
10	7.5	6	1170	256TC	230/460	60	3	27/13.4

Enclosure	IP	Ins. Class	S.F.	Duty	NEMA Nom. Eff.	NEMA Design	kVA Code	Ambient (°C)
TEFC	55	F	1.15	CONT	91	B	H	40 C

Locked Rotor Amps	Rotor wk² Inertia (lb-ft²)	Torque			
		Full Load (lb-ft)	Locked Rotor (%)	Pull Up (%)	Break Down (%)
79.1	2.65	44.9	280	270	380

Design Values



Customer			wk² Load Inertia (lb-ft²)	-
Customer PO			Load Type	-
Sales Order			Voltage (%)	100
Project #			Accel. Time	-

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

Engineering	jhock	Doc. Written By	D. Suarez	Doc.# / Rev	MPCF-1121/1
Engr. Date	3/6/2014	Doc. Approved By	M. Campbell	Doc. Issued	9/20/2019

Issued Date	12/18/2019	Transmit #	
Issued By	dschoeck	Issued Rev	

TOSHIBA

SPEED TORQUE/CURRENT CURVE

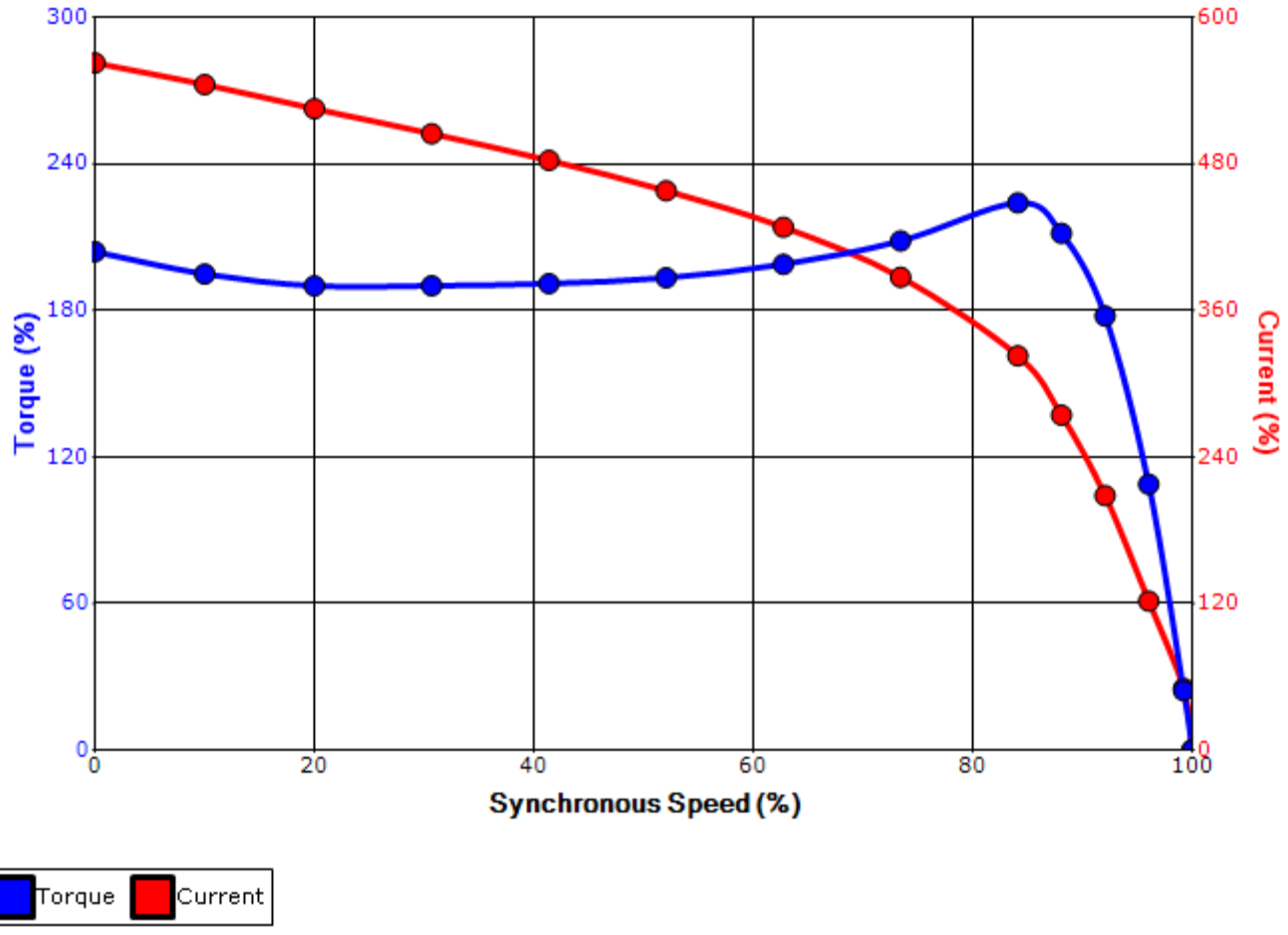
Model: 0106SDSR42A-P

HP	kW	Pole	FL RPM	Frame	Voltage	Hz	Phase	FL Amps
10	7.5	6	960	256TC	190/380	50	3	32/16.0

Enclosure	IP	Ins. Class	S.F.	Duty	NEMA Nom. Eff.	NEMA Design	kVA Code	Ambient (°C)
TEFC	55	F	1.0	CONT	88.5	B	G	40 C

Locked Rotor Amps	Rotor wk² Inertia (lb-ft²)	Torque			
		Full Load (lb-ft)	Locked Rotor (%)	Pull Up (%)	Break Down (%)
90	2.65	54.7	200	195	220

Design Values



Customer			wk² Load Inertia (lb-ft²)	-
Customer PO			Load Type	-
Sales Order			Voltage (%)	100
Project #			Accel. Time	-

Tag:

All characteristics are average expected values.

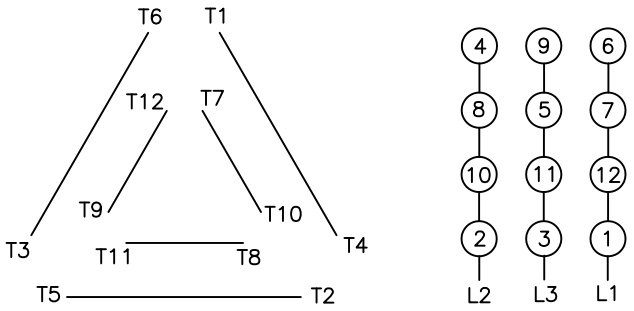
TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

Engineering	jhock	Doc. Written By	D. Suarez	Doc.# / Rev	MPCF-1121/1
Engr. Date	4/9/2014	Doc. Approved By	M. Campbell	Doc. Issued	9/20/2019

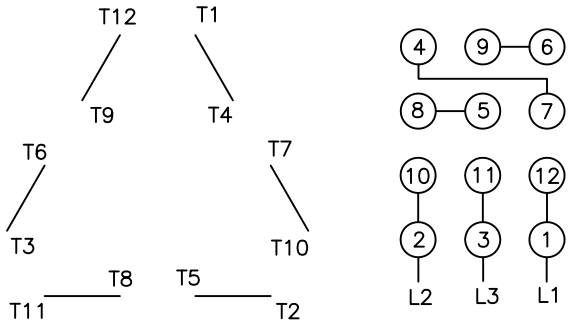
Motor Connection Diagrams
12 Leads

Across-the-Line Starting / Running Connections

Low Voltage Delta



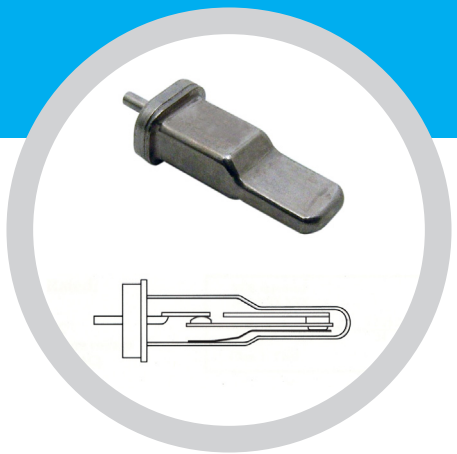
High Voltage Delta



Switch L1 and L2 to reverse rotation

Suitable for Wye–Delta Starting and Limited Part–Winding–Starting.
Please Contact Toshiba International for specific connections.

Sensata Technologies



KLIXON® | 7895 SERIES MOTOR THERMOSTATS

Hermetically Sealed On-Winding

CONSTRUCTION

The basic element in the on-winding motor thermostat is the Klixon® snap-acting disc. The electrical circuit consists of the pin, insulated from the case by the glass-to-metal seal, connected to the stationary contact through the disc to the case. In the 7895 thermostat, the metal case is electrically hot and requires some method of insulation from the motor windings. Several custom configurations of insulation and terminations are available at slight additional cost.

Features & Benefits

- Small size and shape permits close coupling to motor windings for increased protection
- Hermetically sealed enclosure
- Simple, rugged all-welded construction has one moving part for trouble-free service
- Klixon® snap action thermal disc assures positive make and break action controlled temperature differential aid vibration resistance

Klixon® 7895 on-winding motor thermostats are designed to protect hermetically-sealed compressor motors from excessive winding temperatures. A positive refrigerant seal combined with small tubular construction allows these thermostats to be installed directly in the motor windings for precise monitoring of winding tempertures. As a result, the compressor manufacturer can choose a thermostat that will allow the motor to be safely rated to its maximum capacity.

Installation

Maximum heat transfer from the motor windings to the thermostat is the key to optimum performance. In many cases, the total surface of the device can be utilized by inserting its entire length within the stator winding. Good performance is also achieved by lacing the protector to the top of the windings, making sure that the surface of the case is in close contact with the stator windings. The thermostat may be varnished dipped and baked with the entire assembly.

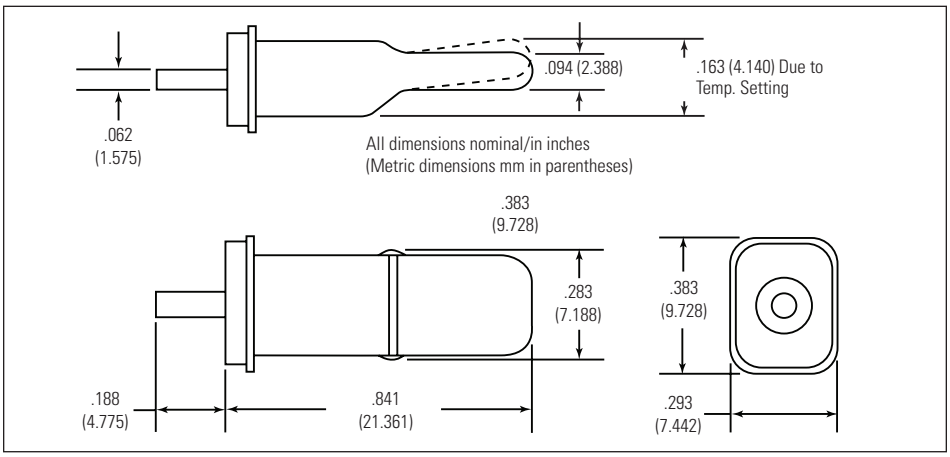
Pilot Circuit Operation

The 7895 thermostat is used as a pilot duty control to protect a motor from overheating in a running overload condition. When used alone, it cannot protect against locked rotor since its response time is not fast enough to follow the very rapid temperature rise of the windings. The Klixon 8347 and 8348 supplementary overloads with their quick response to locked rotor current, can be used to supplement the 7895 thermostat. These overload devices trip very quickly for the first several cycles, allowing enough time for the heat generated in the windings to reach the thermostat which then takes over as the controlling element. This combination is used to protect both single-phase and three-phase motors.

KLIXON® | 7895 SERIES MOTOR THERMOSTAT

Hermetically Sealed On-Winding

Dimensions



Coding System

7895 – XXX – 000

- Basic Part Number
- Electrical Characteristics Includes Temperature
- Physical Characteristics Including
  - Lead specifications
  - Insulating sleeving
  - Potting, etc.

Operating Temperatures
75°C to 135°C

Standard Tolerances
±5°C open, ±11°C close

Standard Differential
22°C nominal

Special Tolerances
±3°C open, ±5°C close

Special Differnetial
17°C nominal

Wire Lead Insulations

Dacron Mylar Dacron
600V – 105°C temperature rating – 18 AWG

Dacron Teflon Mylar Dacron
600V – 105°C temperature rating – 20 AWG

Teflon
300/600V – 200°C temperature rating – 22 AWG

Teflon
300V – 200°C temperature rating – 18 AWG

Insulation Sleeve Material

Mylar – .004" thick

Mylar over Teflon – .007" thick
(.004" Mylar/.003" Teflon)

Terminations

Female flag quick connect 1/4" open end terminal for #10 screw, #10 eyelet

UL and CSA Rated

125 VA, 24 VAC
345 VA, 110-600 VAC
(limited to the lead wire voltage rating if less than 600 VAC).

VDE approved
7895-XXX-XXX

2 (2)	1 (1)	5.2 (5.2)
250	380	24

Class 1, T200

Typical Custom Configurations

Engineering Test Samples

To order test samples please supply the following information:

1. Opening tempeerature
2. Temperature differential
3. Tolerances desired on opening and closing temperatures
4. Voltage
5. Lead type, size and length
6. Insulation required

Sensata Technologies

529 Pleasant Street
Attleboro, MA 02703-2964
U.S.A.
Phone 1-508-236-3800
www.sensata.com

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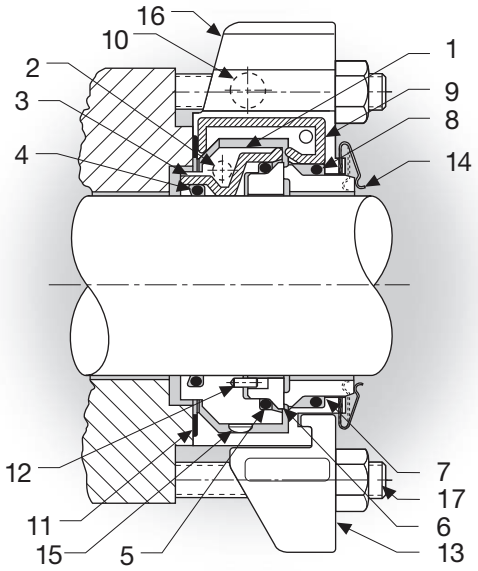
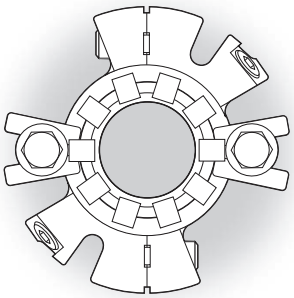
442 Split Mechanical Seal Technical Data



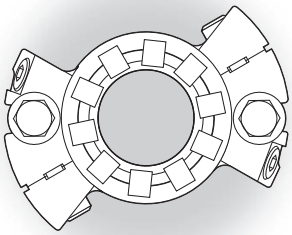
1. Rotary Holder
2. Socket Head Cap Screw
3. Holder Gasket
4. Shaft O-ring
5. Rotary O-ring
6. Rotary Face
7. Stationary Face
8. Stationary O-Ring
9. Gland Gasket
10. Socket Head Cap Screw
11. Stuffing Box Gasket
12. Anti-Rotation Pin
13. Bolt Tab
14. Spring
15. Centering Button
16. Gland
17. Stuffing Box Bolts

EQUIPMENT BOLT PATTERNS

Shaft Sizes: 1.625" to 4.750" (40 mm to 120 mm)



2 BOLTS



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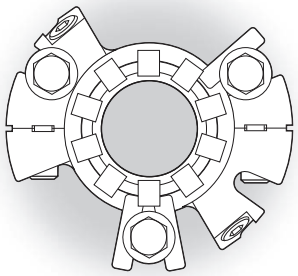
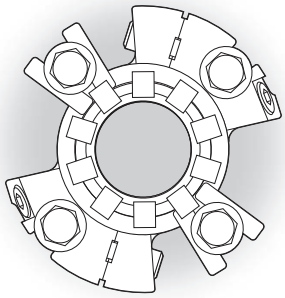
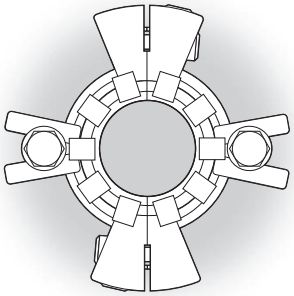


3 BOLTS

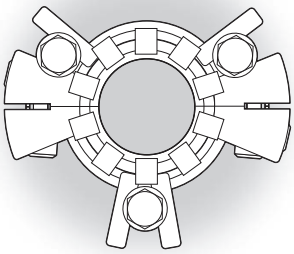


4 BOLTS

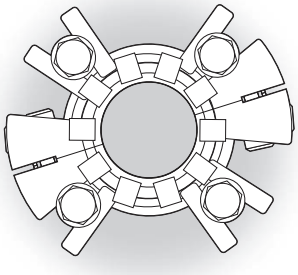
All Other Shaft Sizes



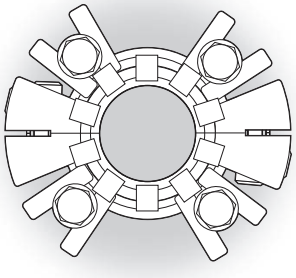
2 BOLTS



3 BOLTS



4 BOLTS



4 BOLTS

DIMENSIONAL DATA (INCH & METRIC)

SHAFT SIZE	M HOLDER ID FROM BOX		N INSTALLATION DIM		P NPT SIZE
	INCH	METRIC	INCH	METRIC	
1.250" to 1.500" (32 mm to 38 mm)	0.53	13,5	0.094	2,4	1/4"
1.625" to 4.750" (40 mm to 120 mm)	0.53	13,5	0.094	2,4	3/8"
4.875" to 7.750" (125 mm to 195 mm)	1.03	26,0	0.188	4,8	1/2"

KEY - Figures 1 & 2

- **A** – Shaft Size
- **B** – Max. Gland Dia.
- **C** – Min./Max. Stuffing Box Dia.
- **D** – Gland Length
- **E** – Min. Stuffing Box Depth
- **F** – Outboard Length Required
- **G** – Min. Bolt Circle by Bolt Size
- **H** – Min. Stuffing Box Face OD
- **L** – Gland Hub OD
- **M** – Holder ID from Box
- **N** – Installation Dimension
- **O** – Shaft O-ring Number
- **P** – NPT Size

DIMENSIONAL DATA (INCH)

A SHAFT SIZE	B GLAND OD	C STUFFING BOX BORE		D GLAND LENGTH	E SB DEPTH	F OB LENGTH	G BOLT CIRCLE BY BOLT SIZE					H SB FACE OD	L GLAND HUB OD	O SHAFT O-RING NO.
	MAX	MIN		MAX		MIN	3/8"	1/2"	MIN 5/8"	3/4"	7/8"	MIN	MAX	
1.250	4.94	1.86	2.10	1.48	0.17	1.78	3.20	3.33	3.45	-	-	2.35	2.79	-219
1.375	5.02	1.94	2.38	1.48	0.17	1.78	3.28	3.40	3.53	-	-	2.63	2.87	-221
1.500	5.14	2.06	2.50	1.48	0.17	1.78	3.40	3.53	3.65	-	-	2.75	2.99	-223
1.625	5.26	2.19	2.63	1.48	0.17	1.78	3.50	3.63	-	-	-	2.87	3.11	-224
1.750	5.39	2.31	2.75	1.48	0.17	1.78	3.63	3.75	-	-	-	3.00	3.23	-225
1.875	5.51	2.44	2.88	1.48	0.17	1.78	3.75	3.88	-	-	-	3.12	3.35	-226
2.000	5.64	2.56	3.00	1.48	0.17	1.78	3.94	4.06	-	-	-	3.25	3.48	-227
2.125	5.76	2.69	3.12	1.48	0.17	1.78	4.06	4.19	4.31	-	-	3.37	3.60	-228
2.250	5.88	2.81	3.25	1.48	0.17	1.78	4.19	4.31	4.44	-	-	3.50	3.73	-229
2.375	6.01	2.94	3.37	1.48	0.17	1.78	4.31	4.43	4.56	-	-	3.62	3.85	-230
2.500	6.13	3.06	3.75	1.48	0.17	1.78	4.57	4.70	4.82	-	-	4.00	4.23	-231
2.625	7.77	3.35	4.25	1.84	0.26	2.24	5.44	5.56	5.69	-	-	4.75	5.00	-232
2.750	7.77	3.35	4.25	1.84	0.26	2.24	5.44	5.56	5.69	-	-	4.75	5.00	-233
2.875	8.02	3.60	4.50	1.84	0.26	2.24	5.66	5.78	5.91	-	-	5.00	5.25	-234
3.000	8.02	3.60	4.50	1.84	0.26	2.24	5.66	5.78	5.91	-	-	5.00	5.25	-235
3.125	8.27	3.85	4.75	1.84	0.26	2.24	6.00	6.12	6.25	-	-	5.25	5.49	-236
3.250	8.27	3.85	4.75	1.84	0.26	2.24	6.00	6.12	6.25	-	-	5.25	5.49	-237
3.375	8.51	4.10	5.00	1.84	0.26	2.24	6.16	6.28	6.41	6.53	6.66	5.50	5.75	-238
3.500	8.51	4.10	5.00	1.84	0.26	2.24	6.16	6.28	6.41	6.53	6.66	5.50	5.75	-239
3.625	8.77	4.35	5.25	1.84	0.26	2.24	6.41	6.53	6.66	6.78	6.91	5.75	6.00	-240
3.750	8.77	4.35	5.25	1.84	0.26	2.24	6.41	6.53	6.66	6.78	6.91	5.75	6.00	-241
3.875	9.02	4.60	5.50	1.84	0.26	2.24	6.66	6.78	6.91	7.03	7.16	6.00	6.25	-242
4.000	9.02	4.60	5.50	1.84	0.26	2.24	6.66	6.78	6.91	7.03	7.16	6.00	6.25	-243
4.125	9.27	4.85	5.75	1.84	0.26	2.24	6.91	7.03	7.16	7.28	7.41	6.25	6.50	-244
4.250	9.27	4.85	5.75	1.84	0.26	2.24	6.91	7.03	7.16	7.28	7.41	6.25	6.50	-245
4.375	9.52	5.10	6.00	1.84	0.26	2.24	7.16	7.28	7.41	7.53	7.66	6.50	6.75	-246
4.500	9.52	5.10	6.00	1.84	0.26	2.24	7.16	7.28	7.41	7.53	7.66	6.50	6.75	-247
4.625	9.77	5.35	6.25	1.84	0.26	2.24	7.41	7.53	7.66	7.78	7.91	6.75	7.00	-248
4.750	9.77	5.35	6.25	1.84	0.26	2.24	7.41	7.53	7.66	7.78	7.91	6.75	7.00	-249
4.875	11.28	5.87	7.00	2.91	0.29	3.45	-	-	8.41	8.53	8.66	7.50	7.74	-353
5.000	11.28	5.99	7.00	2.91	0.29	3.45	-	-	8.41	8.53	8.66	7.50	7.74	-354
5.125	11.53	6.12	7.25	2.91	0.29	3.45	-	-	8.66	8.78	8.91	7.75	7.99	-355
5.250	11.53	6.24	7.25	2.91	0.29	3.45	-	-	8.66	8.78	8.91	7.75	7.99	-356
5.375	11.78	6.37	7.50	2.91	0.29	3.45	-	-	8.91	9.03	9.16	8.00	8.24	-357
5.500	11.78	6.49	7.50	2.91	0.29	3.45	-	-	8.91	9.03	9.16	8.00	8.24	-358
5.625	12.03	6.62	7.75	2.91	0.29	3.45	-	-	9.16	9.28	9.41	8.25	8.49	-359
5.750	12.03	6.74	7.75	2.91	0.29	3.45	-	-	9.16	9.28	9.41	8.25	8.49	-360
5.875	12.28	6.87	8.00	2.91	0.29	3.45	-	-	9.41	9.54	9.66	8.50	8.74	-361
6.000	12.28	6.99	8.00	2.91	0.29	3.45	-	-	9.41	9.54	9.66	8.50	8.74	-362
6.125	12.53	7.12	8.25	2.91	0.29	3.45	-	-	9.66	9.79	9.91	8.75	8.99	-362
6.250	12.53	7.24	8.25	2.91	0.29	3.45	-	-	9.66	9.79	9.91	8.75	8.99	-363
6.375	12.78	7.37	8.50	2.91	0.29	3.45	-	-	9.91	10.04	10.16	9.00	9.25	-363
6.500	12.78	7.49	8.50	2.91	0.29	3.45	-	-	9.91	10.04	10.16	9.00	9.25	-364
6.625	13.03	7.62	8.75	2.91	0.29	3.45	-	-	10.17	10.29	10.42	9.25	9.50	-364
6.750	13.03	7.74	8.75	2.91	0.29	3.45	-	-	10.17	10.29	10.42	9.25	9.50	-365
6.875	13.28	7.87	9.00	2.91	0.29	3.45	-	-	10.42	10.54	10.67	9.50	9.75	-365
7.000	13.28	7.99	9.00	2.91	0.29	3.45	-	-	10.42	10.54	10.67	9.50	9.75	-366
7.125	13.53	8.12	9.25	2.91	0.29	3.45	-	-	10.67	10.79	10.92	9.75	10.00	-366
7.250	13.53	8.24	9.25	2.91	0.29	3.45	-	-	10.67	10.79	10.92	9.75	10.00	-367
7.375	13.78	8.37	9.50	2.91	0.29	3.45	-	-	10.92	11.04	11.17	10.00	10.25	-367
7.500	13.78	8.49	9.50	2.91	0.29	3.45	-	-	10.92	11.04	11.17	10.00	10.25	-368
7.625	14.03	8.62	9.75	2.91	0.29	3.45	-	-	11.17	11.29	11.42	10.25	10.50	-368
7.750	14.03	8.74	9.75	2.91	0.29	3.45	-	-	11.17	11.29	11.42	10.25	10.50	-369

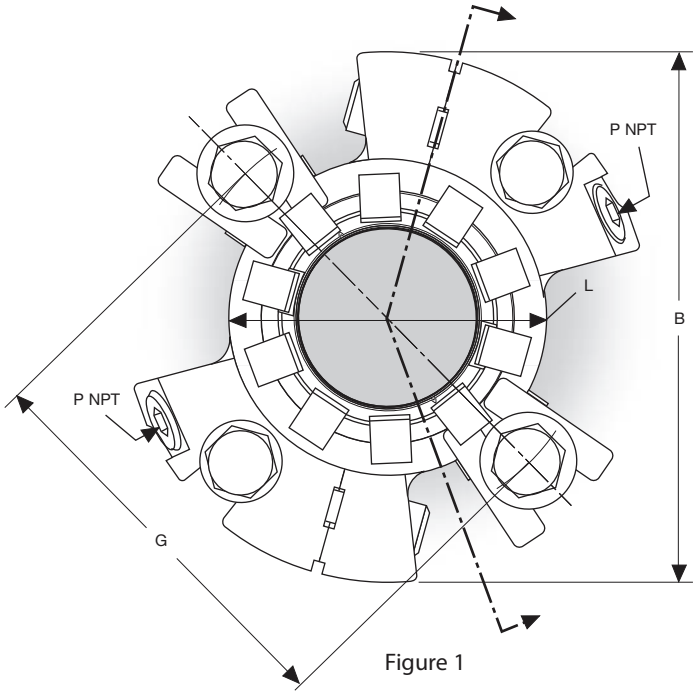


Figure 1

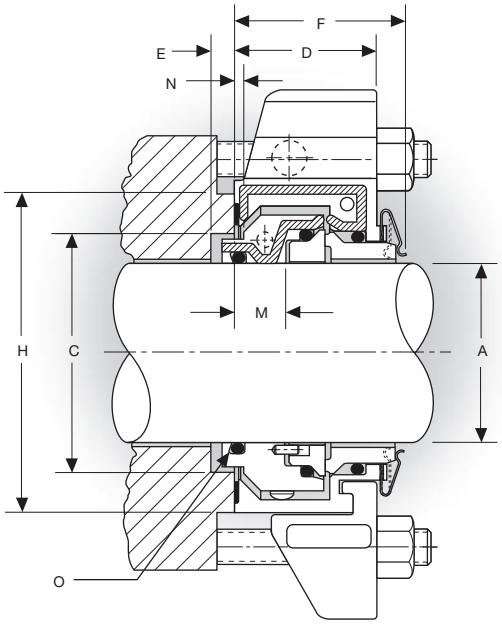


Figure 2

DIMENSIONAL DATA (METRIC)

A SHAFT SIZE	B GLAND OD	C STUFFING BOX BORE		D GLAND LENGTH	E SB DEPTH	F OB LENGTH	G BOLT CIRCLE BY BOLT SIZE								H SB FACE OD	L GLAND HUB OD	O SHAFT O-RING NO.
							MIN										
	MAX	MIN	MAX		MIN		8 mm	10 mm	12 mm	14 mm	16 mm	18 mm	20 mm	22 mm	MIN	MAX	
32	125,5	47,2	53,3	37,6	4,3	45,2	79,8	81,8	83,8	85,8	87,8	-	-	-	59,9	70,9	-219
33	125,5	47,2	53,3	37,6	4,3	45,2	79,8	81,8	83,8	85,8	87,8	-	-	-	59,9	70,9	-220
35	127,4	49,3	60,5	37,6	4,3	45,2	81,8	83,8	85,8	87,8	89,8	-	-	-	66,8	72,8	-221
38	130,5	52,3	63,5	37,6	4,3	45,2	85,0	87,0	89,0	91,0	93,0	-	-	-	69,9	76,0	-223
40	133,6	55,6	66,8	37,6	4,3	45,2	87,4	89,4	91,4	93,4	95,4	-	-	-	73,2	79,0	-223
43	136,8	58,7	70,0	37,6	4,3	45,2	90,5	92,5	94,5	96,5	98,5	-	-	-	76,2	82,0	-224
45	136,8	58,7	70,0	37,6	4,3	45,2	90,5	92,5	94,5	96,5	98,5	-	-	-	76,2	82,0	-225
48	140,0	62,0	73,2	37,6	4,3	45,2	97,7	95,7	97,7	99,7	101,7	-	-	-	79,5	85,2	-226
50	143,2	65,0	76,2	37,6	4,3	45,2	98,4	100,4	102,4	104,4	106,4	-	-	-	82,6	88,4	-226
55	146,3	68,3	79,2	37,6	4,3	45,2	101,6	103,6	105,6	107,6	109,6	-	-	-	85,9	91,5	-228
60	152,6	74,7	85,6	37,6	4,3	45,2	107,8	109,8	111,8	113,8	115,8	-	-	-	92,2	97,9	-230
65	197,5	85,1	108,0	46,7	6,6	56,9	-	-	140,6	142,6	144,6	-	-	-	120,7	126,9	-231
70	197,5	85,1	108,0	46,7	6,6	56,9	-	-	140,6	142,6	144,6	-	-	-	120,7	126,9	-233
75	203,8	91,4	114,3	46,7	6,6	56,9	-	-	146,2	148,2	150,2	-	-	-	127,0	133,2	-234
80	210,2	97,8	120,7	46,7	6,6	56,9	-	-	154,8	156,8	158,8	160,8	-	-	133,4	139,5	-236
85	216,5	104,1	127,0	46,7	6,6	56,9	-	-	158,9	160,9	162,9	164,9	166,9	-	139,7	145,9	-237
90	216,5	104,1	127,0	46,7	6,6	56,9	-	-	158,9	160,9	162,9	164,9	166,9	-	139,7	145,9	-239
95	222,9	110,5	133,4	46,7	6,6	56,9	-	-	165,3	167,3	169,3	171,3	173,3	-	146,1	152,3	-241
100	229,2	116,8	139,7	46,7	6,6	56,9	-	-	171,6	173,6	175,6	177,6	179,6	-	152,4	158,6	-242
110	241,9	129,5	152,4	46,7	6,6	56,9	-	-	184,3	186,3	188,3	190,3	192,3	-	165,1	171,3	-245
115	241,9	129,5	152,4	46,7	6,6	56,9	-	-	184,3	186,3	188,3	190,3	192,3	-	165,1	171,3	-247
120	248,3	135,9	158,8	46,7	6,6	56,9	-	-	190,6	192,6	194,6	196,6	198,6	-	171,5	177,7	-248
125	286,4	150,1	177,8	73,9	7,4	87,6	-	-	-	-	-	214,5	216,5	218,5	190,5	196,5	-354
130	292,8	155,1	184,2	73,9	7,4	87,6	-	-	-	-	-	220,9	222,9	224,9	196,9	202,9	-355
135	299,1	160,1	190,5	73,9	7,4	87,6	-	-	-	-	-	227,3	229,3	231,3	203,2	209,3	-356
140	299,1	165,2	190,5	73,9	7,4	87,6	-	-	-	-	-	227,3	229,3	231,3	203,2	209,3	-358
145	305,5	170,2	196,9	73,9	7,4	87,6	-	-	-	-	-	233,7	235,7	237,7	209,6	215,7	-360
150	311,8	175,2	203,2	73,9	7,4	87,6	-	-	-	-	-	240,1	242,1	244,1	215,9	222,1	-361
155	318,2	180,1	209,6	73,9	7,4	87,6	-	-	-	-	-	246,4	248,4	250,4	222,3	228,4	-362
160	324,5	185,1	215,9	73,9	7,4	87,6	-	-	-	-	-	252,8	254,8	256,8	228,6	234,8	-363
165	324,5	190,1	215,9	73,9	7,4	87,6	-	-	-	-	-	259,2	261,2	263,2	228,6	234,8	-364
170	330,9	195,1	222,3	73,9	7,4	87,6	-	-	-	-	-	259,2	261,2	263,2	235,0	241,2	-364
175	337,2	200,2	228,6	73,9	7,4	87,6	-	-	-	-	-	265,6	267,6	269,6	241,3	247,6	-365
180	337,2	205,2	228,6	73,9	7,4	87,6	-	-	-	-	-	272,0	274,0	276,0	247,7	247,6	-366
185	343,6	210,2	235,0	73,9	7,4	87,6	-	-	-	-	-	272,0	274,0	276,0	247,7	254,0	-367
190	349,9	215,1	241,3	73,9	7,4	87,6	-	-	-	-	-	278,4	280,4	282,4	254,0	260,4	-368
195	356,3	220,1	247,7	73,9	7,4	87,6	-	-	-	-	-	284,8	286,8	288,8	260,4	266,8	-368

442 SPLIT MECHANICAL SEAL OPERATING PARAMETERS†

PRESSURE CAPABILITIES (INCH)

SIZE RANGE	HOLDER TYPE	SHAFT SPEED	FACE MATERIAL COMBINATION		
			CARBON/RSC Psig	RSC/RSC Psig	CARBON/CERAMIC Psig
1.250" to 2.500" (32 mm to 60 mm)	Standard Holder	1750	28" Hg to 300	28" Hg to 300	28" Hg to 300
	Standard Holder	3600	28" Hg to 300	❖ 28" Hg to 175	❖ 28" Hg to 100
	HP Holder	1750	300 to 450	300 to 450	❖ 300 to 350
	HP Holder	3600	300 to 450	*	*
2.625" to 4.750" (65 mm to 120 mm)	Standard Holder	1750	28" Hg to 200	28" Hg to 200	28" Hg to 200
	HP Holder	1750	200 to 250	200 to 250	*
4.875" to 7.750" (125 mm to 195 mm)	Standard Holder	875	28" Hg to 150	28" Hg to 150	28" Hg to 150
	HP Holder	875	150 to 200	150 to 200	150 to 200

PRESSURE CAPABILITIES (METRIC)

SIZE RANGE	HOLDER TYPE	SHAFT SPEED	FACE MATERIAL COMBINATION		
			CARBON/RSC bar g	RSC/RSC bar g	CARBON/CERAMIC bar g
32 mm to 60 mm (1.250" to 2.500")	Standard Holder	1750	710 mm Hg to 20	710 mm Hg to 20	710 mm Hg to 20
	Standard Holder	3600	710 mm Hg to 20	❖ 710 mm Hg to 12	❖ 710 mm Hg to 7
	HP Holder	1750	20 to 30	20 to 30	❖ 710 mm Hg to 24
	HP Holder	3600	20 to 30	*	*
65 mm to 120 mm (2.625" to 4.750")	Standard Holder	1750	710 mm Hg to 14	710 mm Hg to 14	710 mm Hg to 14
	HP Holder	1750	14 to 18	14 to 18	*
125 mm to 195 mm (4.875" to 7.750")	Standard Holder	875	710 mm Hg to 10	710 mm Hg to 10	710 mm Hg to 10
	HP Holder	875	10 to 14	10 to 14	10 to 14

TEMPERATURE

To 250 ºF (120 ºC)

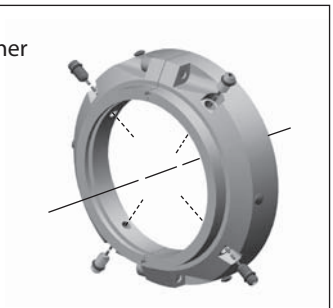
SPEED

To 4000 fpm (20 m/s)

RSC - Reaction bonded silicon carbide
❖ - Metrics limited by PV capabilities.
* - Standard holder handles all PV capabilities of the listed face combinations.
† - Consult Chesterton Engineering for applications exceeding published operating parameters and additional seal sizes.

OPTIONAL 442 HP HOLDER

The 442 HP Holder is required in higher pressure applications as listed in the *442 Split Mechanical Seal Operating Parameters* charts above.



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