# Hart Engineering Corporation

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11305-03

**PROJECT: 9950. - Veolia/Taunton WWTP Improvements Phase 2** **DATE: 05/30/2023**

**SUBMITTAL:** 11305-03 - Submersible Dewatering Sewage Pumps - O&M Manual
**REVISION:** 0
**STATUS:** Eng
**SPEC #:** 11305

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| Item | Revision | Description | Status | Date Sent | Date Returned |
|---|---|---|---|---|---|
| 11305-03 | 0 | Submersible Dewatering Sewage Pumps - O&M Manual | Eng | 05/30/2023 | |
| 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: 05/30/2023

# CITY OF TAUNTON

# WWTF PHASE 2 IMPROVEMENTS

# OPERATION AND MAINTENANCE MANUAL
# SUBMERSIBLE DEWATERING SEWAGE PUMPS
# SECTION 11305

# SULZER/ABS MODEL XFP 80C CB1.5 PE35/4

# TABLE OF CONTENTS

# SECTION 1

# GENERAL INFORMATION

# SULZER/ABS WET PIT SUBMERSIBLE PUMPS

Pump Nameplate Data
Manufacturer: Sulzer/ABS
Model: XFP 80C-CB1.5 PE35/4
Serial No.: 300849837; 300849838; 300849839; 300849840; 300849841; 300849842
Impeller Trim: 170mm (#5 impeller)
HP: 4.7
RPM: 1755
Voltage: 460
Phase: 3
Hz: 60
FLA: 6.2

Manufacturer Contact Information
Sulzer/ABS
108 Leigus Road, Suite 1180
Wallingford, CT 06492 USA
(203) 238-2700 (T)
(203) 238-0738 (F)

**FOR PARTS AND SERVICE CONTACT THE LOCAL SULZER/ABS SALES REPRESENTATIVE:**
Carlsen Systems, LLC
41 Crossroads Plaza
West Hartford, CT 06117
www.carlsensystems.com
info@carlsensystems.com
(203) 663-1314

# SECTION 2

# SCOPE OF SUPPLY

**SCOPE OF SUPPLY**

1. Submersible Pumps:
   - Six (6) Sulzer/ABS Model XFP 80C-CB1.5 PE35/4
   - Rated for 350 gpm @ 23.4 ft TDH
   - 4.7 HP, 1800 RPM, 460/3/60
   - Sulzer/ABS Contrablock system with semi-open impeller and stationary bottom plate
   - 3" discharge
   - 3" solids passing
   - 49' power/control cable
   - FM explosion proof rated
   - Factory Performance Testing
     - HI Grade Small Pumps < 10kW

   - Six (6) combination relay for seal failure and motor overtemperature protection
     - Relay requires 120 VAC power.

2. Accessories:
   - Six (6) guide rail assemblies including:
     - Base elbow
     - Slide bracket
     - Stainless steel upper guide rail bracket
     - 316SS 2" Sch. 40 guide rails

   - Six (6) 25 FT grab link pump lifting assemblies with stainless steel cable and chain

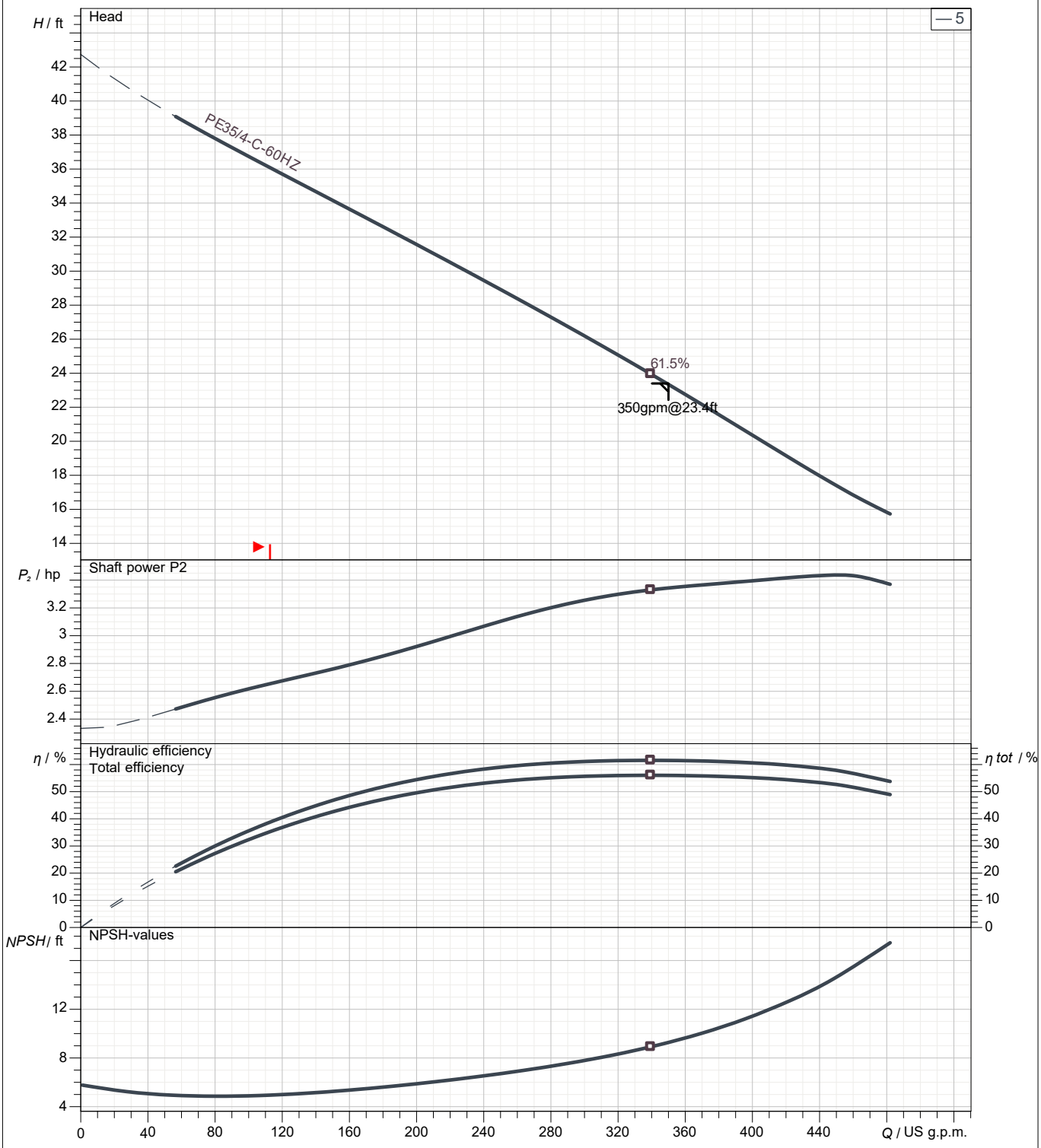
3. Spare Parts:
   - Six (6) Repair Kits
     - Includes upper and lower mechanical seals, bearings, o-rings, circlips and cable seals

# SECTION 3

# PERFORMANCE DATA

| Curve number | Pump performance curves | SULZER |
|---|---|---|
| Reference curve<br>XFP80C-CB 60HZ | **XFP 80C CB1 60HZ (wet pit)** | |

| | | | Discharge | Frequency |
|---|---|---|---|---|
| | | | DN80 | 60 Hz |
| Density | Viscosity | Test Standard | Rated speed | Date |
| 62.31 lb/ft³ | 1.077E-5 ft²/s | ISO 9906, HI 11.6/14.6≤10kW | 1755 rpm | 2022-04-21 |




Wet well installation with pedestal

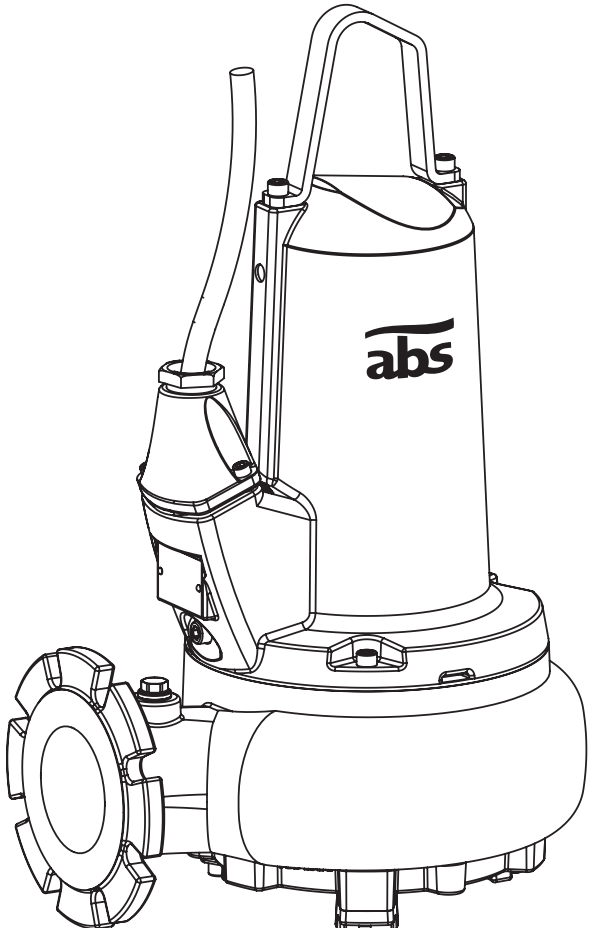
| Impeller size | N° of vanes | Impeller | Solid size | Revision |
|---|---|---|---|---|
| 6 11/16inch | 1 | Contrablock Plus impeller, 1 vane | 3 inch | |

# SECTION 4

# OPERATION AND MAINTENACE INSTRUCTIONS

We know how water works

# ABS submersible sewage pump XFP 80C - 150E



01/2010

GB **Installation, Operating and Maintenance Instructions**

www.absgroup.com

**ABS submersible sewage pump XFP**

80C-CB1 PE22/4-C-50
80C-CB1 PE29/4-C-50
80C-CB1 PE13/6-C-50
80E-CB1 PE70/2-E-50
80E-CB1 PE110/2-E-50
100C-CB1 PE22/4-C-50
100C-CB1 PE29/4-C-50
100C-CB1 PE13/6-C-50
100E-CB1 PE60/4-E-50
100E-CB1 PE90/4-E-50
150E-CB1 PE40/4-E-50
150E-CB1 PE60/4-E-50
150E-CB1 PE90/4-E-50
150E-CB1 PE30/6-E-50
80C-CB1 PE18/4W-C-60
80C-CB1 PE28/4W-C-60
80C-CB1 PE35/4-C-60
80C-CB1 PE20/6-C-60
80E-CB1 PE125/2-E-60
100C-CB1 PE18/4W-C-60
100C-CB1 PE28/4W-C-60
100C-CB1 PE35/4-C-60
100E-CB1 PE45/4-E-60
100E-CB1 PE75/4-E-60
100E-CB1 PE90/4-E-60
100E-CB1 PE105/4-E-60
150E-CB1 PE45/4-E-60
150E-CB1 PE75/4-E-60
150E-CB1 PE105/4-E-60

# Contents

## Symbols and notices used in this booklet:


Presence of dangerous voltage.


Non-compliance may result in personal injury.


Hot surface - danger of burn injury.


Danger of an explosion occurring.

***ATTENTION!*** Non-observance may result in damage to the unit or negatively affect its performance.

***NOTE:*** Important information for particular attention.

# 1 General

## 1.1 Application areas

The following guidelines must be observed when setting the lowest switch off point for XFP pumps:
- When switching on and operating the pump, the hydraulic section of dry installation pumps must always be filled with water.
- The minimum submergence allowed for specific pumps can be found on the dimension installation sheets available from your local ABS representative.

XFP pumps have been designed for economic and reliable pumping in commercial, industrial and municipal installations and are suitable for pumping of the following liquids:
- clear and wastewater, and for sewage containing solids and fibrous material
- faecal matter

In combination with the ABS automatic coupling system, the below ground level wet installation is a particularly economical and environmentally friendly solution. The pumps are also suitable for horizontal or vertical dry installation.

The regulations of DIN 1986 as well as local regulations should be observed when installing the pumps.

***ATTENTION!*** ***The maximum allowable temperature of the medium pumped is 40 °C***

## 1.2 Explosion-proof Approvals

Explosion-proof as standard, in accordance with international standards EExd II BT4, ATEX 94/9/EC and FM (60 Hz US).

### 1.2.1 Use of explosion-proof pumps in explosive zones.

1. Explosion-proof submersible pumps may only be operated with the thermal sensing system connected.
2. If ball type float switches are used, these must be connected to an intrinsically safe electrical circuit “Protection type EX (i)” in accordance with VDE 0165.
3. Dismantling and repair of submersible explosion-proof motors may only be carried out by approved personnel in specially approved work shops.
4. In the event that the pump is to be operated in explosive atmospheres using a variable speed drive, please contact your local ABS representative for technical advice regarding the various Approvals and Standards concerning thermal overload protection.

## 1.3 Technical data

Maximum noise level ≤ 70 dB. This may be exceeded in certain circumstances.

Detailed technical information is available in the technical data sheet ABS submersible sewage pump XFP 80C - 150E which can be downloaded from www.absgroup.com > Downloads.

### 1.3.1 Nameplates

XFP pumps are rated for use in hazardous locations (Ex) as standard, and are fitted with a standard nameplate containing technical data and a secondary nameplate to certify that the pump is Ex rated (examples below).
If an XFP pump is serviced or repaired in a workshop that is not Ex approved then it must no longer be used in hazardous locations and the Ex nameplate must be removed.

We recommend that you record the data from the standard nameplate on the pump in the corresponding form below, and maintain it as a source of reference for the ordering of spare parts, repeat orders and general queries.

Always state the pump type, item no. and serial no. in all communications.

Standard nameplate

| | | | | | |
|---|---|---|---|---|---|
| Typ | | | | | |
| Nr | | | Sn | | xx/xxxx |
| | $U_N$ | V | $I_N$ | A | Ph Hz |
| | P1: | | P2: | | n 1/min |
| Cos φ | | | NEMA | | IP68 |
| Qmax | | | Hmax | | ØImp |
| DN | | | Hmin | | Weight |
| | EN 12050-1 | | | | |

**Legend**

| | | |
|---|---|---|
| Typ | Pump type | |
| Nr | Item No. | |
| Sn | Serial No. | |
| xx/xxxx | Production date (Week/Year) | |
| $U_N$ | Rated voltage | V |
| $I_N$ | Rated current | A |
| Ph | Frequency | Hz |
| P1 | Rated input power | kW |
| P2 | Rated output power | kW |
| n | Speed | min-1 |
| Qmax | Max. Flow | m3/h |
| Hmax | Max. Head | m |
| Ø Imp. | Impeller diameter | mm |
| DN | Discharge diameter | mm |

Ex nameplate

| | | |
|---|---|---|
| | 0102 | II2G k Ex d IIB T4 |
| Do not open while energized<br>Nicht unter Spannung öffnen | | |

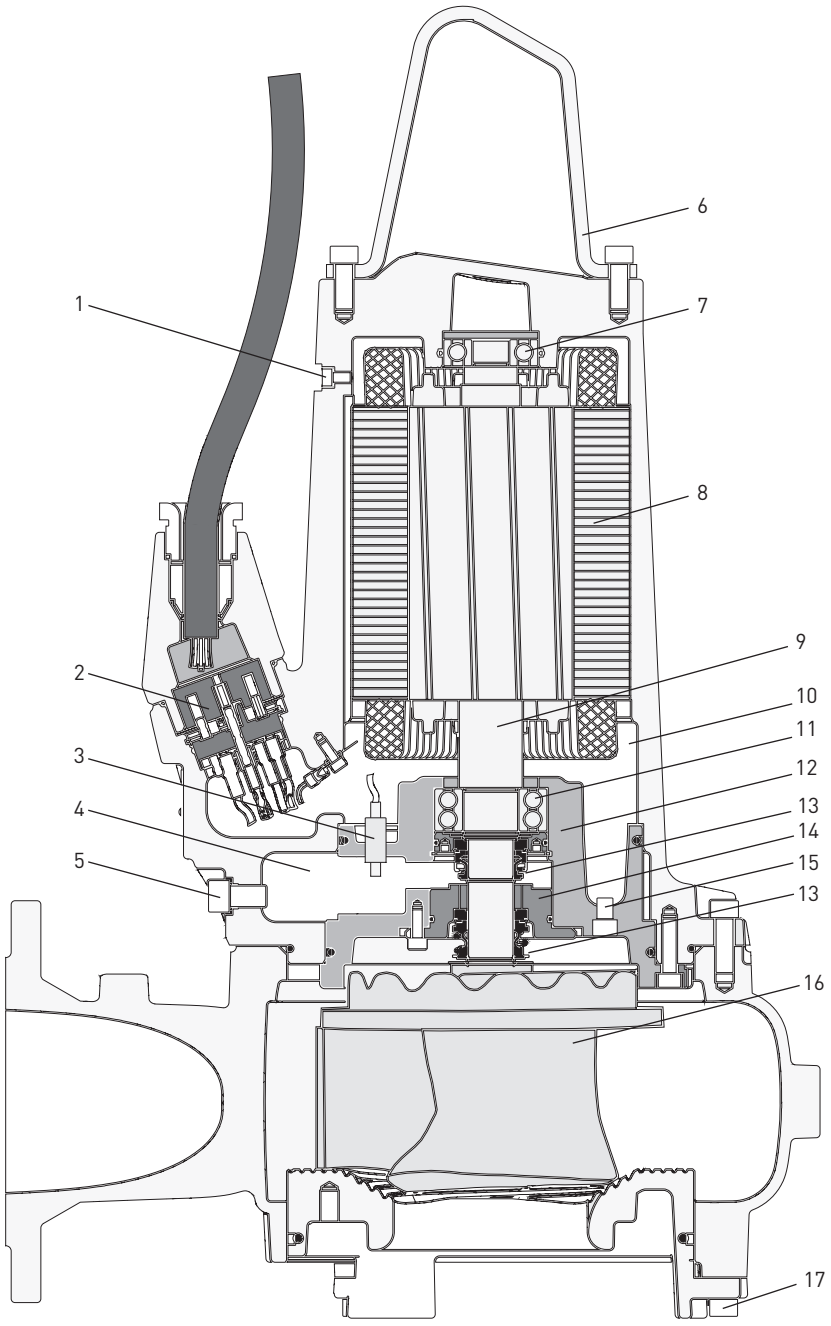
FM nameplate

| | | |
|---|---|---|
| | FM | EXPLOSION-PROOF |
| | | CL.I, DIV.1, GR.C+D |
| | APPROVED | Oper. Temp.: T3C |
| Do not open while energized<br>Nicht unter Spannung öffnen | | |

## 1.4 General design features

XFP is a submersible sewage and wastewater pump with a premium efficiency motor.

The water-pressure-tight, encapsulated, fully flood-proof motor and the pump section form a compact, robust, modular construction.




1 Pressure release screw
2 10-pole terminal block
3 Moisture sensor (Di)
4 Oil chamber
5 Oil chamber drain plug/ pressure test point
6 Stainless steel lifting hoop
7 Upper bearing - single row
8 Motor with thermal sensors
9 Stainless steel shaft
10 Motor chamber
11 Lower bearing - double row
12 Bearing housing
13 Mechanical seals
14 Seal holding plate
15 Motor chamber drain plug/pressure test point
16 Impeller - Contrablock version
17 Bottom plate adjustment screw

# 2 Safety

The general and specific health and safety guidelines are described in detail in the ABS Products Safety Instructions booklet. If anything is not clear or you have any questions as to safety make certain to contact the manufacturer ABS.

# 3 Transport and Storage

## 3.1 Transport

During transport, care should be taken that the pump is not dropped or thrown.
The pumps of the XFP series are fitted with a lifting hoop to which a chain and shackle may be attached for transport or for suspension of the pump.

The pump must be raised only by the lifting hoop and never by the power cable.

Take note of the entire weight of the pump. The hoist and chain must be adequately dimensioned for that weight and must comply with the current valid safety regulations.

All relevant safety regulations as well as general good technical practice must be complied with.

## 3.2 Storage

1. During long periods of storage the pump should be protected from moisture and extremes of cold or heat.
2. To prevent the mechanical seals from sticking it is recommended that occasionally the impeller is rotated by hand.
3. If the pump is being taken out of service the oil should be changed before storage.
4. After storage the pump should be inspected for damage, the oil level should be checked, and the impeller checked to ensure it rotates freely.

### 3.2.1 Moisture protection of motor connection cable

The motor connection cables are protected against the ingress of moisture along the cable by having the ends sealed at the factory with protective covers.

***ATTENTION!*** ***The ends of the cables should never be immersed in water as the protective covers only provide protection against water spray or similar and are not a water tight seal. The covers should only be removed immediately prior to connecting the pumps electrically.***

During storage or installation, prior to the laying and connection of the power cable, particular attention should be given to the prevention of water damage in locations which could flood.

***ATTENTION!*** ***If there is a possibility of water ingress then the cable should be secured so that the end is above the maximum possible flood level. Take care not to damage the cable or its insulation when doing this.***

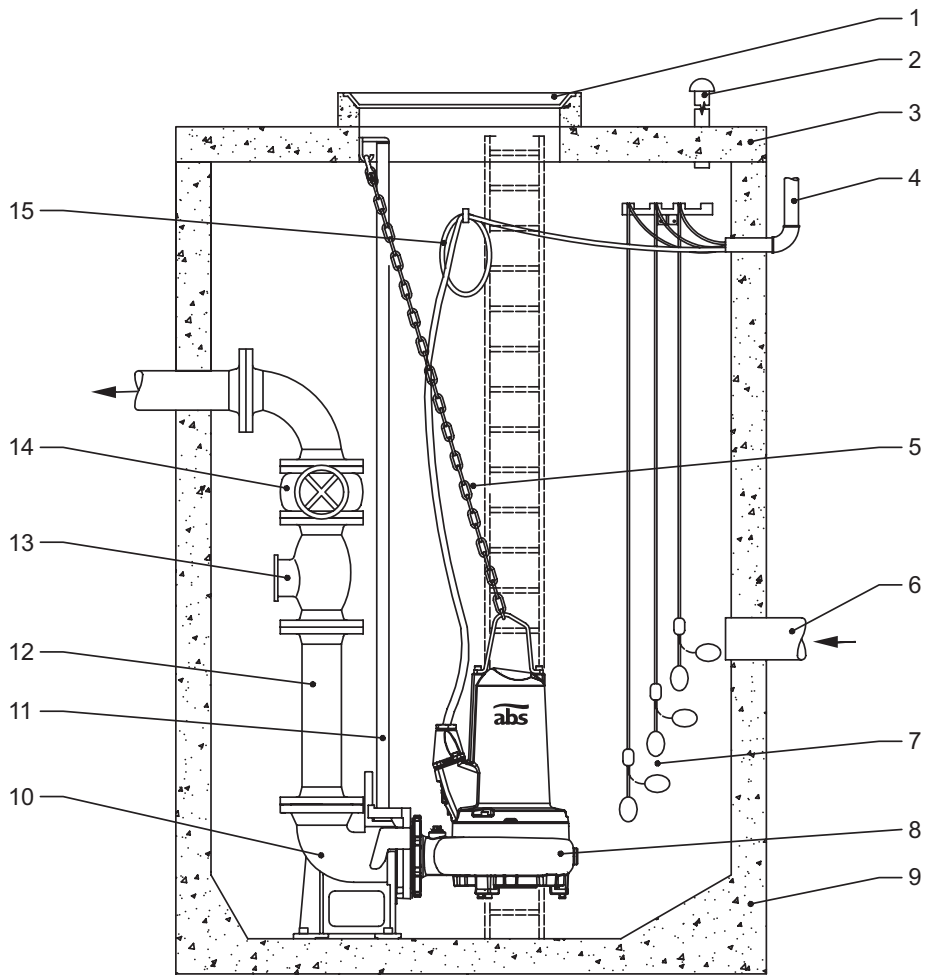
# 4 Mounting and Installation

The regulations covering the use of pumps in sewage applications, together with all regulations involving the use of explosion-proof motors, should be observed.The cable ducting to the control panel should be sealed off in a gas-tight manner by the use of a foaming material after the cable and control circuits have been pulled through. In particular the safety regulations covering work in enclosed areas in sewage plants should be observed together with general good technical practice.

For the XFP transportable version, arrange the cable run so that the cables will not be kinked or nipped. Connect the discharge pipe and cable (see section ”Electrical Connection”). Place the pump on a firm surface which will prevent it from overturning or burrowing down. The pump can also be bolted down to the base or suspended slightly by the lifting handle. Hoses, pipes and valves must be sized to suit the pump performance.

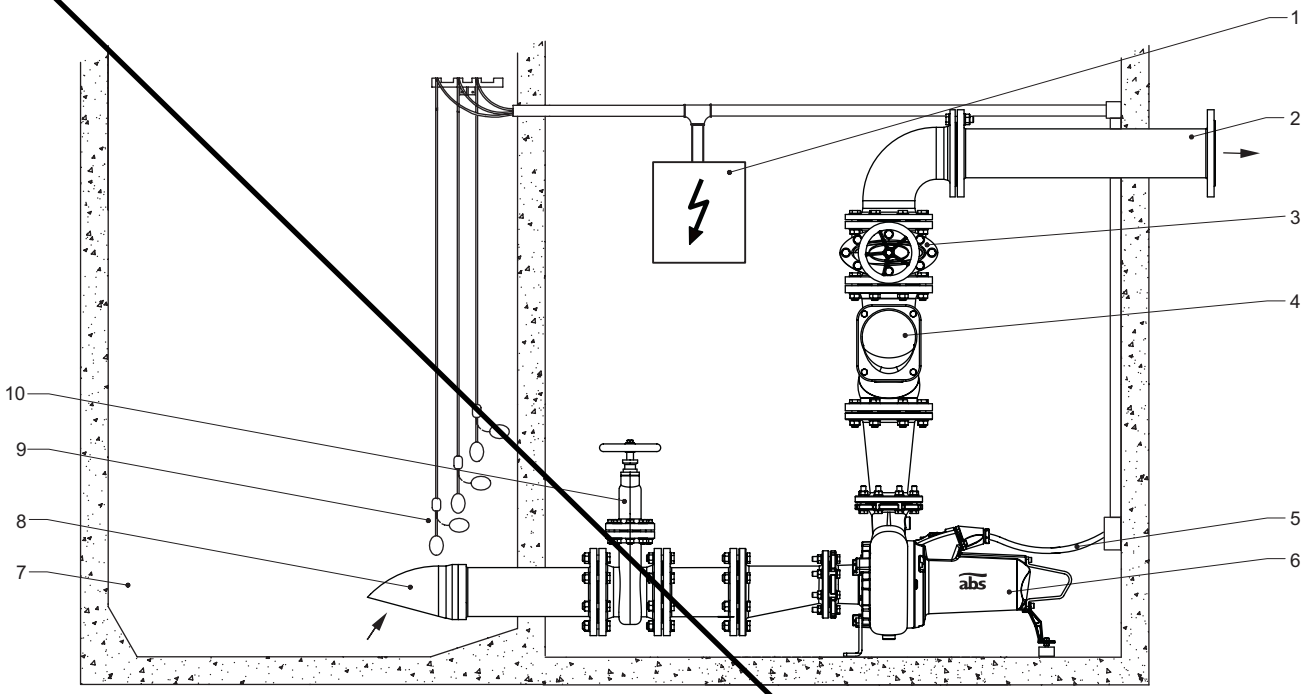
## 4.1 Installation examples

### 4.1.1 Submerged in concrete sump




| | | | | | |
|---|---|---|---|---|---|
| 1 | Sump cover | 6 | Inflow line | 11 | Guide rail |
| 2 | Venting line | 7 | Ball-type float switch | 12 | Discharge line |
| 3 | Sump cover | 8 | Submersible pump | 13 | Non-return valve |
| 4 | Sleeve for cable ducting to the control panel as well as for aeration and venting | 9 | Concrete sump | 14 | Gate valve |
| 5 | Chain | 10 | Pedestal | 15 | Power cable to motor |

### 4.1.2 Dry-installed




| | | | |
|---|---|---|---|
| 1 | Control panel | 6 | Pump |
| 2 | Discharge line | 7 | Collection sump |
| 3 | Gate valve | 8 | Inflow line |
| 4 | Non-return valve | 9 | Ball-type float switch |
| 5 | Power cable from motor to control panel | 10 | Gate valve |

Under continuous running conditions the pump motor housing can become very hot.
To avoid burn injury allow to cool down before handling.

## 4.2 Discharge Line

The discharge line must be installed in compliance with the relevant regulations.
DIN 1986/100 and EN 12056 applies in particular to the following:

- The discharge line should be fitted with a backwash loop (180° bend) located above the backwash level and should then flow by gravity into the collection line or sewer.
- The discharge line should not be connected to a down pipe.
- No other inflows or discharge lines should be connected to this discharge line.

***ATTENTION! The discharge line should be installed so that it is not affected by frost.***

# 5 Electrical Connection

Before commissioning, an expert should check that one of the necessary electrical protective devices is available. Earthing, neutral, earth leakage circuit breakers, etc. must comply with the regulations of the local electricity supply authority and a qualified person should check that these are in perfect order.

***ATTENTION!*** ***The power supply system on site must comply with VDE or other local regulations with regard to cross-sectional area and maximum voltage drop. The voltage stated on the nameplate of the pump must correspond to that of the mains.***

The power supply cable must be protected by an adequately dimensioned slow-blow fuse corresponding to the rated power of the pump.

The incoming power supply as well as the connection of the pump itself to the terminals on the control panel must comply with the circuit diagram of the control panel as well as the motor connection diagrams and must be carried out by a qualified person.

All relevant safety regulations as well as general good technical practice must be complied with.

***ATTENTION!*** ***For use in the open air, the following VDE regulations apply:***

Submersible pumps used outdoors must be fitted with a power cable of at least 10 metre length. Other regulations may apply in different countries.

The installation instructions for pumps intended to be used in outdoor fountains, garden ponds and similar places shall state that the pump is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30 mA.

***Please consult your electrician.***

## 5.1 Temperature monitoring

Thermal sensors in the stator windings protect the motor from overheating.

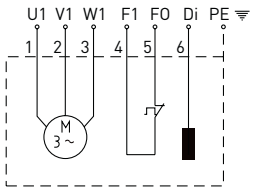
XFP motors are fitted with bimetallic thermal sensors in the stator as standard, or as an option with a PTC thermistor (in accordance with DIN 44082). PTC relays for use in control panels must also be in accordance with this standard.

## 5.2 Seal monitoring

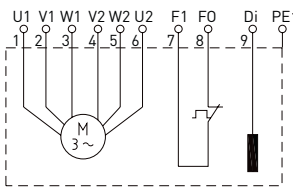
XFP pumps are supplied as standard with a moisture sensor (DI), to detect and alert to the ingress of water into the motor and oil chambers.

## 5.3 Wiring Diagrams

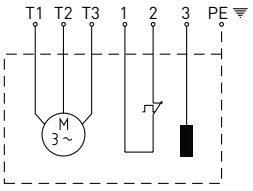
**PE 50 Hz:** 13/6, 22/4 29/4, 30/6



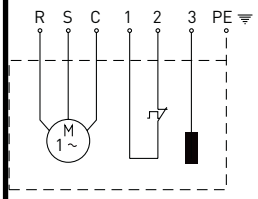

70/2, 110/2, 40/4, 60/4, 90/4, 30/6




**PE 60 Hz:** 100/2, 125/2, 35/4, 45/4, 28/4 75/4, 90/4, 105/4, 20/6, 35/6




18/4W, 28/4W




***Explosion-proof pumps may only be used in explosive zones with the thermal sensors connected (leads FO & F1).***

# 6 Commissioning

Before commissioning, the pump should be checked and a functional test carried out. Particular attention should be paid to the following:

- Have the electrical connections been carried out in accordance with regulations?
- Have the thermal sensors been connected?
- Is the seal monitoring device correctly installed?
- Is the motor overload switch correctly set?
- Does the pump sit correctly on the pedestal?
- Is the direction of rotation of the pump correct - even if run via an emergency generator?
- Are the switching ON and switching OFF levels set correctly?
- Are the level control switches functioning correctly?
- Are the required gate valves (where fitted) open?
- Do the non-return valves (where fitted) function easily?

## 6.1 Types of operation and frequency of starting

All pumps of the XFP series have been designed for continuous operation S1 when either submerged or dry-installed.

## 6.2 Checking direction of rotation

When three phase units are being commissioned for the first time, and also when used on a new site, the direction of rotation must be carefully checked by a qualified person.

When checking the direction of rotation, the pump should be secured in such a manner that no danger to personnel is caused by the rotating impeller or by the resulting air flow. Do not place your hand into the hydraulic system!

When checking the direction of rotation, or when starting the unit, pay attention to the **START REACTION**. This can be very powerful and cause the pump to jerk in the opposite direction to the direction of rotation.

***NOTE:***
***When viewed from above, the direction of rotation is correct if the impeller rotates in a clockwise manner.***


***NOTE:***
***The start reaction is anti-clockwise.***

***NOTE:*** ***If a number of pumps are connected to a single control panel then each unit must be individually checked.***

***NOTE:*** ***The mains supply to the control panel should have a clockwise rotation. If the leads are connected in accordance with the circuit diagram and lead designations, the direction of rotation will be correct.***

### 6.3 Changing direction of rotation

The direction of rotation should only be altered by a qualified person.

If the direction of rotation is incorrect then this is altered by changing over two phases of the power supply cable in the control panel. The direction of rotation should then be rechecked.

## 7 Maintenance

Before commencing any maintenance work the pump should be completely disconnected from the mains by a qualified person and care should be taken that it cannot be inadvertently switched back on.

When carrying out any repair or maintenance work, the safety regulations covering work in enclosed areas of sewage installations as well as good general technical pratices should be followed.

Under continuous running conditions the pump motor housing can become very hot. To prevent burn injury allow to cool down before handling.

***ATTENTION!*** ***The maintenance instructions given here are not designed for "do-it-yourself" repairs as special technical knowledge is required.***

**A maintenance contract with our works service department will guarantee you the best technical service under all circumstances.**

### 7.1 General maintenance instructions

ABS submersible pumps are reliable quality products, each being subjected to careful final inspection. Lubricated-for-life ball bearings, together with monitoring devices, ensure optimum pump reliability provided that the pump has been connected and operated in accordance with the operating instructions. However, should a malfunction occur, do not improvise, but ask your ABS Customer Service Department for assistance.
This applies particularly if the pump is continually switched off by the current overload in the control panel, by the thermal sensors of the thermo-control system, or by the seal monitoring system (DI).

Regular inspection and care is recommended to ensure a long service life. Service intervals vary for XFP pumps depending on installation and application. For recommended service interval details contact your local ABS Service Centre. A maintenance contract with our Service Department will guarantee the best technical service.

When carrying out repairs, only original spare parts supplied by the manufacturer should be used.
ABS warranty conditions are only valid provided that any repair work has been carried out in an ABS approved workshop and where original ABS spare parts have been used.

***ATTENTION!*** ***XFP pumps are rated for use in hazardous locations (Ex) as standard and feature a secondary Ex nameplate containing EX data. If an XFP pump is serviced or repaired in a workshop that is not Ex approved then it must no longer be used in hazardous locations and the Ex nameplate must be removed.***

## 7.2 Maintenance of Lifting Stations in accordance with EN 12056.

It is recommended that a lifting station is inspected monthly and its function checked.
In accordance with EN regulations, the lifting station should be maintained by a qualified person at the following intervals:

- in commercial premises - every three months.
- in apartment blocks - every six months.
- in a single family home - once a year.

In addition we recommend that a maintenance contract be taken out with a qualified company.

## 7.3 Oil filling and changing

The motor chamber and the oil chamber between the motor and the hydraulic section have been filled at manufacture.

An oil change is only necessary:

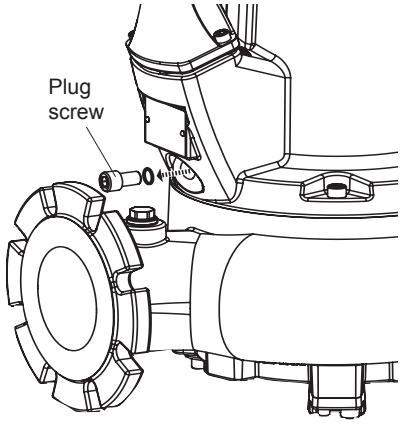
- at specified service intervals (for details contact your local ABS Service Centre).
- if the DI moisture sensor detects an ingress of water into the oil chamber or motor chamber.
- after repair work that requires draining of the oil.

### 7.3.1 Instructions on how to drain and fill the oil chamber

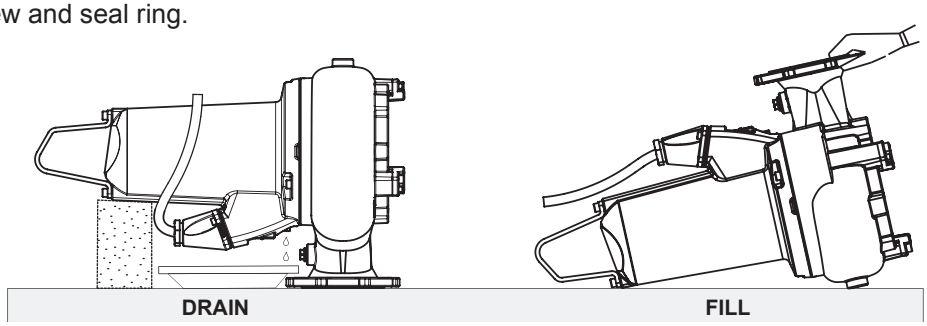
1. Loosen the plug screw enough to release any pressure that may have built-up, and re-tighten.

   ⚠ Before doing so, place a cloth over the plug screw to contain any possible spray of oil as the pump de-pressurises.

2. Place the pump in a horizontal position, sitting on its discharge flange, with the motor housing supported from underneath.
   **Note:** to prevent the pump from toppling over ensure it is supported to lie flat on the discharge flange.




3. Position an adequate container to receive the waste oil.
4. Remove the plug screw and seal ring from the drain hole.
5. After the oil is fully drained lay the pump flat, and rotate so that the drain hole is positioned to the top.
   **Note:** when in this position the pump must be held by hand, or supported at both sides, to prevent it from toppling over.
6. Select the required volume from the oil-fill quantities table and slowly fill with oil into the drain hole.
7. Refit the plug screw and seal ring.




For instructions on how to drain and refill the motor chamber, please refer to the XFP Workshop Manual. Download from: www.hands-online.cardo.net > Product Supply > Support > Catalogues/TDS.

***ATTENTION:*** *To adhere to the correct procedure, as outlined in the Workshop Manual, it is necessary that the motor chamber oil change is carried out in a workshop and not on site.*

### 7.3.2 Oil-fill quantities

| XFP | Motor Size | | Oil Fill (litres) |
|---|---|---|---|
| | 50Hz | 60Hz | Oil Chamber |
| PE 1 | PE30/2 | PE35/2 | 0.43 |
| | PE40/2 | PE46/2 | 0.43 |
| | | | |
| | PE15/4 | | 0.43 |
| | PE22/4 | | 0.43 |
| | PE29/4 | PE35/4 | 0.43 |
| | | | |
| | PE13/6 | | 0.43 |
| | | PE20/6 | 0.43 |
| | | | |
| PE 2 | PE55/2 | | 0.68 |
| | PE70/2 | | 0.68 |
| | PE110/2 | PE125/2 | 0.68 |
| | | | |
| | PE40/4 | PE45/4 | 0.68 |
| | PE60/4 | PE75/4 | 0.68 |
| | PE90/4 | PE105/4 | 0.68 |
| | | | |
| | PE30/6 | | 0.68 |
| | | PE35/6 | 0.68 |
| | | | |

**Volume ratio:** 86% oil : 14% air

**Specification:** White mineral VG8 FP153C

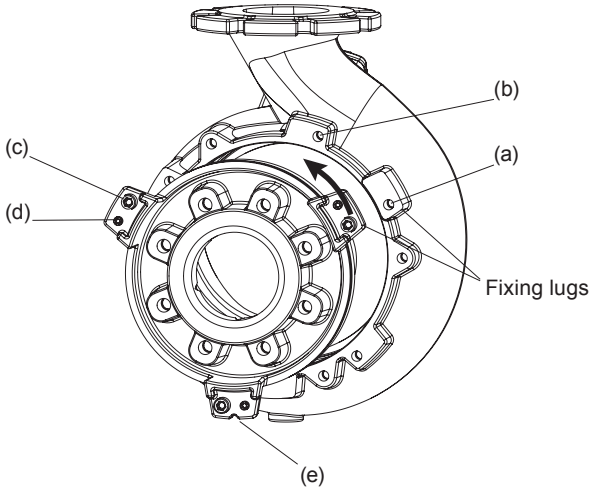
## 7.4 Bottom plate adjustment

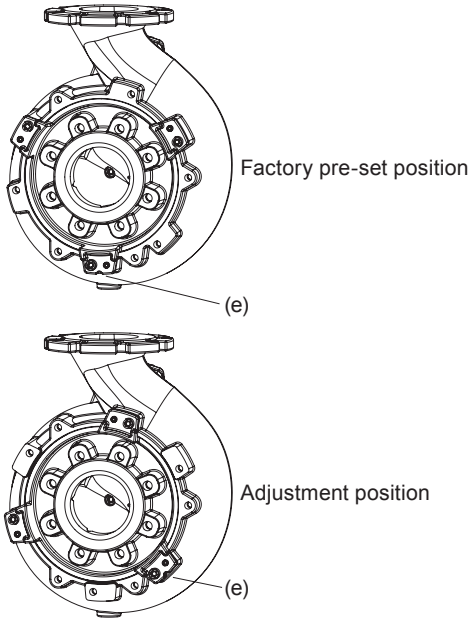
At manufacture, the bottom plate is fitted to the volute with the correct clearance gap set between the impeller and the bottom plate (for optimum performance max 0.2 mm).

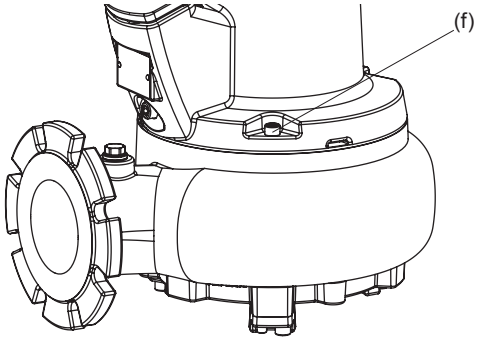
### 7.4.1 Instructions on how to adjust the bottom plate

To reset the clearance gap following wear:

1. Check the position of the alignment notch (e) in the fixing lug to determine if the bottom plate is in the factory pre-set position or if the clearance gap has been previously adjusted. If previously adjusted proceed to Step 4.
2. Remove the three screws (c) securing the bottom plate to the volute.
   **Note:** if, due to corrosion, the bottom plate does not release freely from the volute, DO NOT force it free by tightening the adjusting grub screws (d) against the fixing lugs on the volute as this could damage the lugs on the bottom plate beyond repair! In that case, first remove the volute from the motor housing by releasing the three securing screws (f) and then remove the bottom plate by tapping it free from inside the volute using a mallet and block of wood.
3. Rotate the bottom plate anti-clockwise through 45° from the pre-set position (a) to the secondary alignment position (b) and refit the securing screws.
4. Loosen the adjusting grub screws (d) and tighten the securing screws in the bottom plate evenly until the impeller will lightly, but freely, rub against the bottom plate when rotated by hand.
5. Tighten the grub screws fully to secure the bottom plate in position - DO NOT OVERTIGHTEN!.



## 7.5 Bearings and Mechanical Seals

XFP pumps are fitted with lubricated-for-life ball bearings, with a calculated life time of min 50,000 hours.
Shaft sealing is by means of double mechanical seals, SiC-SiC at the medium side, SiC-C at the motor.

For detailed instructions on how to remove and replace bearings or seals, please refer to the XFP Workshop Manual.

***ATTENTION:*** ***Once removed, bearings and seals must not be re-used, and must be replaced in an approved workshop with genuine ABS spare parts.***

## 7.6 Changing the power cable

To facilitate quick and easy changing or repair of the power cable, the connection between the cable and motor is by means of an integrated 10-pole terminal block. For detailed instructions please refer to the Workshop Manual.

To be carried out only by a qualified person, in strict adherence to relevant safety regulations.

## 7.7 Cleaning

If the pump is used for transportable applications, then in order to avoid deposits of dirt and encrustation it should be cleaned after each usage by pumping clear water. In the case of fixed installation, we recommend that the functioning of the automatic level control system be checked regularly. By switching the selection switch (switch setting “HAND”) the sump will be emptied. If deposits of dirt are visible on the floats then these should be cleaned. After cleaning, the pump should be rinsed out with clear water and a number of automatic pumping cycles carried out.

## 7.8 Venting of the volute

After lowering the pump into a sump full of water, an air lock may occur in the volute and cause pumping problems. To clear the air lock, raise the pump in the medium and then lower it again. If necessary, repeat this venting procedure.
We strongly recommend that dry-installed XFP pumps are vented back into the sump by means of the (drilled and tapped) hole provided in the volute.

# 8 Troubleshooting Guide

| Fault | Cause | Fix |
|---|---|---|
| Pump does not run | Moisture sensor shutdown. | Check for loose or damaged oil plug, or locate and replace faulty mechanical seal / damaged o-rings. Change oil.[1)] |
| | Level control override. | Check for float switch that is faulty or tangled and held in OFF position in sump. |
| | Impeller jammed. | Inspect and remove jammed object. |
| | Gate valve closed, non-return valve blocked. | Open gate valve, clean blockage from non-return valve. |
| Pump switching on/off intermittently | Temperature sensor shutdown. | Motor will restart automatically when pump cools down.<br>Check thermal relay settings in control panel.<br>Check for impeller blockage.<br>If none of above, a service inspection is required.[1)] |
| Low head or flow | Wrong direction of rotation. | Change rotation by interchanging two phases of the power supply cable. |
| | Gap too wide between impeller and bottom plate | Reduce gap (see page 13). |
| | Gate valve partially open. | Open valve fully. |
| Excessive noise or vibration | Defective bearing. | Replace bearing.[1)] |
| | Clogged impeller. | Remove and clean hydraulics. |
| | Wrong direction of rotation. | Change rotation by interchanging two phases of the power supply cable. |
| High voltage test failure | Water inside motor. | Replace stator.[1)] |
| | Stator insulation damaged. | Replace stator.[1)] |
| | Power cable or lead damaged. | Replace power cable.[1)] |
| Ohms test failure | Stator failure. | Repair/replace stator.[1)] |

Before commencing any inspection or repair work the pump should be completely disconnected from the mains by a qualified person and care should be taken that it cannot be inadvertently switched back on.

[1)] Pump must be taken to approved workshop.

## EC Declaration of Conformity

**Manufacturer:** ABS Production Wexford Ltd
**Address:** Clonard Road, Wexford, Ireland

**Name and address of the person authorised to compile the technical file to the authorities on request:**
Frank Ennenbach,
Director Product Safety and Regulations,
ABS Group
Roskildevägen 1,
Box 210,
S-210 22 Malmö,
Sweden.

**Declare under our sole responsibility that the products:** ABS submersible sewage pump XFP 80C - 151E

**To which this declaration relates are in conformity with the following standards or other normative documents:**

As defined by Machinery Directive 2006/42/EC, EMC-Directive 2004/108/EC, Low Voltage Directive 2006/95/EC, ATEX 94/9/EC, Construction Products 89/106/EC

II 2G k EEx d IIB T4

DIN EN 12050-1, EN 60335, EN 60079-0:2006, EN 60079-1:2007, EN 13463, EN ISO 12100-1, EN 809/A1, EN 60034, EN 61000-6, EN ISO 12100-2

1-01-2010

Sean Roche
**ABS Production Wexford Ltd.**

# SECTION 5

# PRODUCT SAFETY INSTRUCTIONS

# 1 Safety

## 1.1 General safety instructions

This document, **"Safety Instructions for Sulzer Products Type ABS"**, as well as the respective associated product-related **"Installation and Operating Instructions"** contain fundamental instructions that are to be complied with during transportation, installation, assembly, commissioning, operation, maintenance and repair. This also applies for additional product documentation such as, maintenance instructions, workshop manuals or nameplate.

Therefore the technician and the responsible specialist/operator must read this manual **"Safety Instructions for Sulzer Products Type ABS"** as well as the respective associated product-related **"Installation and Operating Instructions"** prior to transportation, installation, assembly, commissioning, operation, maintenance and repair, and these documents must be available at the site where the unit/system is operated.

### 1.1.1 Identification of safety instructions

Safety instructions that may cause hazards to persons if they are not complied with are identified with a general hazard symbol.

A warning related to electrical voltage is identified by this safety symbol.

This symbol indicates the danger of an explosion occurring.

***"ATTENTION": Appears at safety hints, the non-observance of which could damage the unit or affect its functioning.***

Symbols attached directly on the unit itself, i.e.

- direction of rotation arrow
- nameplate

must be carefully followed and must be maintained in a legible condition.

### 1.1.2 Qualifications of personnel and their training

The personnel for operation, maintenance, inspection and assembly must possess the required qualifications for the work. The area of responsibility, duties and supervision of personnel must be carefully checked by the user. If the personnel involved do not have the required knowledge, they must be trained or instructed. If necessary, this can be carried out on behalf of the operator of the unit by the manufacturer/ supplier. The operator must furthermore ensure that the personnel fully understand the contents of the **"Safety Instructions for Sulzer Products Type ABS"** as well as the product-related **"Installation and Operating Instructions"**.

### 1.1.3 Dangers due to non-observance of the Safety Instructions

The non-observance of the Safety Instructions can lead both to danger to personnel and also possible damage to the environment or the unit itself. Non-observance of the Safety Instructions can lead to the loss of any right to compensation.

In particular, non-observance can result in the following dangers:

- Failure of important functions of the unit/installation
- Danger to personnel by electrical, mechanical, thermal or chemical influences.
- Danger to the environment by leakage of dangerous substances.

### 1.1.4 Carrying out work in a safety conscious manner

The safety instructions quoted in this manual **"Safety Instructions for Sulzer Products Type ABS"** as well as the product-related **"Installation and Operating Instructions"**, the existent national regulations for prevention of accidents, as well as any operator's internal working, operation and safety instructions, are to be complied with.

### 1.1.5 Safety regulations for the owner/operator

- Devices provided as protection against accidental contact with moving parts (e.g. couplings) should not be removed while the unit is in operation.
- All dangers due to electrical energy must be avoided. For details consult the IEC/CENELEC Regulations or the regulations of your local Electricity Supply Company.

### 1.1.6 Safety regulations for maintenance, inspection and installation work

The operator must ensure that all maintenance, inspection and assembly work is performed by authorised and qualified specialists. The operator must also carefully study the **"Safety Instructions for Sulzer Products Type ABS"** as well as the product-related **"Installation and Operating Instructions"** manuals.

As a rule, work on the unit or system is only to be carried out when shut down. The procedures for shutting down the units or systems as described in the **"Safety Instructions for Sulzer Products Type ABS"** and in the product-related **"Installation and Operating Instructions"** must be complied with.

Units that are operated in media hazardous to health have to be decontaminated.

Care must be taken when unblocking a pump because the medium in the pump volute may have heated up to a level that could cause a serious burn injury, on contact or if expelled under pressure as liquid or steam.

All safety and protection equipment must be refitted and placed in operation immediately after completion of the work.

The points listed in the commissioning section of the product-related **“Installation and Operating Instructions”** are to be complied with prior to return to service.

### 1.1.7 Modifications and manufacture of spare parts without approval of the manufacturer

Modifications or changes to the unit may only be carried out after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer are essential for compliance with safety regulations. The use of other parts can annul any responsibility for the consequences resulting from that action

### 1.1.8 Inadmissible modes of operation

The operating safety of the delivered unit or system is only guaranteed for normal use as advised in the booklet **“Safety Instructions for Sulzer Products Type ABS”** (paragraph 2), proper use, and the corresponding sections of the product-related **“Installation and Operating Instructions”**. The specified limits are not to be exceeded or not reached under any circumstances.

**General regulations and standards not mentioned here are not overruled by these “Safety Instructions for Sulzer Products Type ABS”.**

## 2 Proper use and limitations of use

Sulzer units and systems are constructed in accordance with the current state of technology and recognised technical safety regulations. Nonetheless, hazards to life and limb as well as other material assets may occur in the case of improper use.

Sulzer units and systems may only be operated when they are in a technically perfect condition and in accordance with normal operation in awareness of safety and hazards in compliance with the **“Installation and Operating Instructions”!**

Any other (foreign) or additional use to that described is considered not to be normal use. The manufacturer/ supplier is not liable for any damage that results from this. The user alone bears the risk. In cases of doubt Sulzer must give approval for the planned operating method prior to use.

Sulzer units and systems are to be shut down immediately and secured in the event of malfunctions. The malfunction is to be cleared immediately. The Sulzer customer services department is to be informed if required.

Maximum noise level ≤ 70 dB. This may be exceeded in certain circumstances.

**The rules for prevention of accidents and the general rules of good technical practice must be observed!**

Sulzer units must not be installed in combustible or explosive media!

Only an explosion-protected version (Ex) of Sulzer units/products may be used in areas considered to have an explosion hazard! The electric control systems of Sulzer units must not be installed in areas considered to have an explosion hazard. Systems provided for this purpose require authorised certification.

In areas considered to have an explosion hazard it must be ensured that the pump section is filled with water (dry installation) or is flooded or submersed (wet installation) when the Ex pumps are switched on or operated in any other way. Ex mixers must be fully flooding accordingly. Other operating methods such as snore operation or dry running are not permitted.

**For operation in the open air the below points apply according to IEC/CENELEC:**

For application in the open air Sulzer units must be provided with a fixed supply cable of at least 10 m in length. Regulations may vary by country.

Sulzer units for installation in swimming pools, garden ponds or similar must be executed in protection class III (protective low voltage 24 V) according to European Standard 60335 part 2 - 48 where people can come in contact with the pumped media. In cases of doubt the planned operating mode must be authorised by Sulzer prior to use.

When using the Sulzer units in process or raw water non-toxic (physiologically safe) oil, lubricants or coolant should be used. In such cases please consult Sulzer.The corresponding regulations of the application countries must be observed!

## 3 Transportation and installation

The regulations of DIN 1986 as well as local regulations should be observed when installing the pumps.

Sulzer units may never by lifted by the motor connection cable. During transport the submersible pump should not be dropped or thrown.

The motor connection cables are protected against the ingress of moisture along the cable by having the ends sealed at manufacture with protective covers. These protective covers should only be removed immediately prior to connecting the pumps electrically. These protective covers only provide protection against water spray or similar (IP44) and are not a water-tight seal. The ends of the cables should not be immersed in water, otherwise moisture could

enter the connection chamber of the motor. If there is a possibility of water ingress then the cable should be secured so that the end is above the maximum possible flood level. Take care not to damage the cable or its insulation when doing this!

Observe the total weight of the Sulzer units and their attached components! (see nameplate for weight of base unit).

The Sulzer units are prepared for transportation by placing them on an adequately strong horizontal surface. Care should be taken that they cannot fall over.

The hoist must be adequately dimensioned for the total weight of the Sulzer units (including lifting chains or steel ropes, and all accessories which may be attached) and must comply with local valid safety regulations.

Transport safety securing devices (if present) are to be removed prior to installation or commissioning as advised in the product-related **"Installation and Operating Instructions".**

Do not stay or work in the swivel area of a suspended load!

The lifting hook height must take into consideration the entire height of the Sulzer units as well as the length of the lifting chain!

## 3.1 Electrical connection and commissioning

Prior to starting the unit a qualified person must ensure that one of the required electrical protective measures has been provided. Grounding, neutral line, *Earth-leakage circuit breaker etc. (*not recommended for HST™ Turbocompressor), must comply with the regulations of the local Power Supply Authority and must be checked by a qualified person to ensure that they are functioning correctly. The power supply systems (network configurations) of the power supply companies must be taken into consideration.

The system is to be protected by a suitable pre-fuse (appropriate to the rated current of the motor or turbocompressor as advised).

In pump stations/tanks potential bonding must be carried out in accordance with IEC 60364-4-41 (Regulations for installation of pipe lines, protective measures in power plants).

In all installations, the power supply to the pump must be via a residual current device (e.g. RCD, ELCB, RCBO etc.) with a rated residual operating current not exceeding 30 mA. For installations not having a fixed residual current device the pump must be plugged into the power supply through a portable version of the device.

Cable ducting to the control panel should be sealed off in a gas-tight manner by the use of a foaming material after the cable and control circuits have been pulled through. In particular the safety regulations covering work in enclosed areas in sewage plants should be observed, together with general good technical practice.

When checking the direction of rotation, the Sulzer units should be secured in such a manner that no danger to personnel is caused by the rotating impeller, by the resulting air flow, or parts that are ejected. **Do not put your hand into the hydraulic system.**

The direction of rotation should only be altered by a qualified person.

Observe the start reaction when switching on Sulzer units and when checking the direction of rotation. The **START REACTION** can take place with a considerable force! If a number of pumps are connected to a single control panel then each unit must be individually checked.

The current-carrying systems on site must comply with local regulations with regard to cross-sectional area and maximum voltage drop. The voltage stated on the rating plate must correspond to the existing mains voltage.

Electrical connection of Sulzer units and connection of the power supply line as well as the motor connection cable to the terminals on the control system is to be performed by a qualified electrician in accordance with the circuit diagram of the control system as well as the motor connection diagrams.

***ATTENTION: Only operate Sulzer units/products with thermal motor protection and connected temperature limiters.***

The regulations contained in the specific installation and operating instructions for installation and operation of explosion-protected (Ex) versions of Sulzer units must be observed.

The electrical control devices (control panel, junction boxes etc.) should be protected against dampness and be mounted in a flood-proof area.

In the case of the usage of uninterruptible power systems or reactive-power compensation equipment, ensure that the batteries or capacitors are sufficiently discharged before start-up or maintenance work. **Danger due to electrical shock!**

Do not operate the HST™ Turbocompressor before the inlet and outlet air connections are complete.

The HST™ Turbocompressor and it's piping must be shielded to prevent contact with hot surfaces. Contact with hot surfaces may cause injury.

Internal components of the HST™ Turbocompressor can contain high voltages when conected to line voltage. Contact with this voltage may cause serious bodilly injury or death.

HST™ Turbocompressor motor connection terminals U, V, W, DC voltage terminals and brake resistor terminals are under high voltage even when the turbocompressor is not running.

### 3.1.1 Special conditions for safe use of S-type, explosion-proof motors

The integral supply cable shall be suitably protected from mechanical damage and terminated within an appropriate termination facility.

Pump motors rated for use with 50/60 Hz sinusoidal supplies shall have the thermal protection devices connected in such a way that the machine is isolated from the supply in the event of the stator reaching 130 °C.

Pump motors rated for use with variable frequency or non-sinusoidal supplies shall have the thermal protection devices connected in such a way that the machine is isolated from the supply in the event of the stator reaching 100 °C for T4 classified machines, or 160 °C for T3 classified machines.

These motor units are not intended for user service or repair. Any operation that may affect the explosion protection characteristics should be referred to the manufacturer. The maximum permitted flamepath gaps are tighter than those specified in EN 50018.

## 3.2 Maintenance

Prior to starting with any maintenance work the Sulzer units should be completely disconnected from the mains by a qualified person and protected from being inadvertently switched back on.

Depending on the version of the switching station, the auxiliary equipment could be energised, even when the main switch is switched off.

After isolation of the HST™ Turbocompressor wait at least five minutes. The frequency converter contains high voltage in the capacitors.

Prior to maintenance, any units, which have been used in contaminated media, e.g. wastewater containing faeces, must always be cleaned and, if necessary, be thoroughly decontaminated. The specific regulations for hygiene of the respective application countries must be observed.

When carrying out any repair or maintenance work, the safety regulations covering the working in enclosed areas of sewage installations, as well as **“good technical practice“** must be observed!

Before removal of units in hazardous areas the sump and surrounding area must be adequately vented to avoid the danger of a spark causing an explosion!

**WARNING: Dangerous gases. Observe all accident prevention measures and regulations!** Please use a safety belt and a lifeline when getting into the sump and work together with supervisory staff. **Ensure adequate venting!**

Repair on explosion-proof motors may only be carried out by workshops or by authorised personnel. During repair work only original parts supplied by the manufacturer must be used!

Separate lifting accessories such as chains, shackles, steel cables and cable grips etc. must be subjected to a visual examination for wear, corrosion, chafing etc. at regular intervals (approximately every 3 months unless stipulated differently elsewhere in, for instance, a product-related maintenance instruction) and replaced as required! Installation accessories (especially for submersible motor agitators and submersible aerators) must be subjected to a visual examination for wear, corrosion, chafing etc. at regular intervals and replaced as required!

Changing the direction of rotation at control panels without changeover switch should only be carried out by a qualified person and for this reason this procedure is not allowed for cleaning hydraulics or propellers

The oil in the oil chambers/coolant chambers and gearboxes (if present) of the Sulzer units may be under pressure. Before opening the coolant or oil drain plug, always place a cloth over the plug, slacken it a little, then tighten in again!

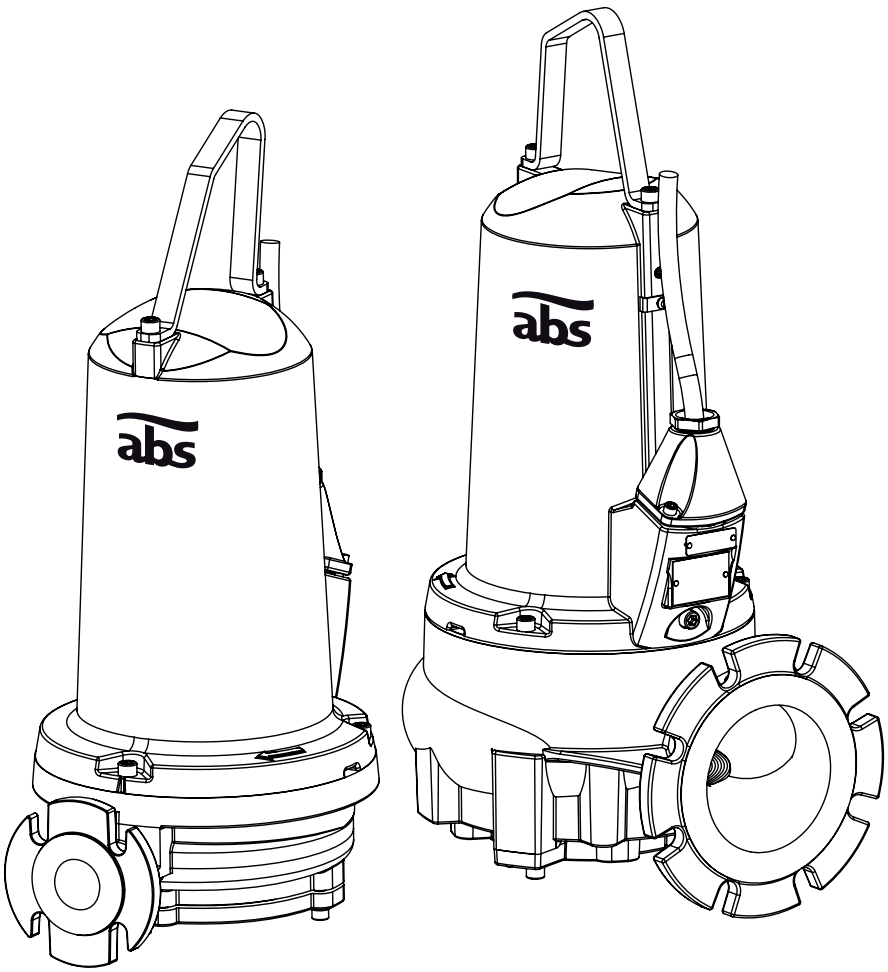
Comply with the regulations for handling coolants, oils and lubricants. These materials are to be disposed of in accordance with regulations!

# SECTION 6

# WORKSHOP MANUAL

# ABS submersible sewage pump XFP 80C - 150E

## ~~ABS Piranha submersible grinder pump PE 25/2C - 125/2E~~



08/2011

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## Workshop Manual

www.absgroup.com

## ABS submersible sewage pump XFP

### 50 Hz

80C-CB1 PE22/4-C-50
80C-CB1 PE29/4-C-50
80C-CB1 PE13/6-C-50
80C-VX PE15/4-C-50
80C-VX PE22/4-C-50
80C-VX PE29/4-C-50
81C-CB1 PE40/2-C-50
81C-VX PE30/2-C-50
81C-VX PE40/2-C-50
80E-CB1 PE70/2-E-50
80E-CB1 PE110/2-E-50
81E-VX PE55/2-C-50
81E-VX PE70/2-C-50
81E-VX PE110/2-C-50
100C-CB1 PE22/4-C-50
100C-CB1 PE29/4-C-50
100C-CB1 PE13/6-C-50
100C-VX PE15/4-C-50
100C-VX PE22/4-C-50
100C-VX PE29/4-C-50
100E-CB1 PE40/4-E-50
100E-CB1 PE60/4-E-50
100E-CB1 PE90/4-E-50
100E-VX PE40/4-E-50
100E-VX PE60/4-E-50
100E-VX PE90/4-E-50
100E-CP PE60/4-E-50
100E-CP PE90/4-E-50
150E-CB1 PE40/4-E-50
150E-CB1 PE60/4-E-50
150E-CB1 PE90/4-E-50
150E-CB1 PE30/6-E-50
151E-CB2 PE49/4-E-50
151E-CB2 PE60/4-E-50
151E-CB2 PE90/4-E-50

### 60 Hz

80C-CB1 PE28/4W-C-60
80C-CB1 PE28/4-C-60
80C-CB1 PE35/4-C-60
80C-CB1 PE20/6-C-60
80C-CB1 PE20/6W-C-60
80C-VX PE22/4-C-60
80C-VX PE35/4-C-60
80C-VX PE18/4W-C-60
80C-VX PE28/4W-C-60
80E-CB1 PE125/2-E-60
81E-VX PE80/2-E-60
81E-VX PE125/2-E-60
100C-CB1 PE28/4W-C-60
100C-CB1 PE28/4-C-60
100C-CB1 PE35/4-C-60
100C-CB1 PE20/6-C-60
100C-CB1 PE20/6W-C-60
100C-VX PE22/4-C-60
100C-VX PE28/4-C-60
100C-VX PE35/4-C-60
100C-VX PE18/4W-C-60
100C-VX PE28/4W-C-60
100E-CB1 PE45/4-E-60
100E-CB1 PE56/4-E-60
100E-CB1 PE75/4-E-60
100E-CB1 PE90/4-E-60
100E-CB1 PE105/4-E-60
100E-CB1 PE35/6-E-60
100E-VX PE45/4-E-60
100E-VX PE56/4-E-60
100E-VX PE75/4-E-60
100E-VX PE90/4-E-60
100E-VX PE105/4-E-60
150E-CB1 PE45/4-E-60
150E-CB1 PE56/4-E-60
150E-CB1 PE75/4-E-60
150E-CB1 PE90/4-E-60
150E-CB1 PE105/4-E-60
150E-CB1 PE35/6-E-60
151E-CB2 PE75/4-E-60
151E-CB2 PE90/4-E-60
151E-CB2 PE105/4-E-60
151E-CB2 PE35/6-E-60

## ABS Piranha submersible grinder pump

### 50 Hz

PE30/2-C-50
PE 55/2-E-50
PE70/2-E-50
PE90/2-E-50
PE110/2-E-50

### 60 Hz

PE25/2W-C-60
PE28/2-C-60
PE35/2-C-60
PE35/2W-C-60
PE45/2-C-60
PE45/2W-C-60
PE80/2-E-60
PE100/2-E-60
PE110/2-E-60
PE125/2-E-60

# Contents

# 1 Health and Safety Instructions

When carrying out any repair work the instructions in the “Safety Instructions for ABS Products” brochure and “Installation and Operating Instructions” must be observed.
Prior to starting with any maintenance work the ABS units must be completetly disconnected from the mains by a qualified person and protected from being inadvertently switched back on.

Prior to maintenance, any units that have been used in contaminated media, e.g wastewater containing faeces, must always be cleaned, and if necessary, thoroughly decontaminated. The specfic hygiene regulations of the respective application countries must be observed.

When carrying out any repair or maintenance work, the safety regulations covering working in enclosed areas of sewage installions, as well as “**good technical practice**”, must be observed!

WARNING: DANGEROUS GASES
Before removal of units in hazardous areas, the sump and surrounding area must be adequately vented to avoid the danger of an explosion caused by a spark.

Observe all accident prevention measures and regulations!
Please use a safety belt and a life line when getting into the sump and work together with supervisory staff.

Ensure adequate venting

***ATTENTION*** ***Repair on explosion-proof motors may only be carried out by workshops or persons authorised for this. During repair work only original parts supplied by the manufacturer must be used. Lifting equipment such as hoists, shackles, wire ropes and wire clamps etc. must undergo a visual examination at regular intervals (approx. every 3 months) for wear and corrosion and if necessary must be replaced. Installation accessories (in particular for mixers and aerators) must undergo a visual examination at regular intervals for wear and corrosion etc. and if necessary must be replaced.***

Changing the direction of rotation at control panels without a changeover switch should only be carried out by a qualified person and for this reason this procedure is not allowed for cleaning hydraulics or propellers.

The oil in the chambers of XFP and Piranha pumps may be under pressure. Before opening the oil drain plug, please always put a cloth over the oil filler screw, loosen it to release any pressure and screw it down again! The regulations covering oil and grease or cooling liquids must be observed, any waste oil, grease or cooling liquid should be correctly disposed of.

To avoid the possibility of injury from expelled objects when using a hydraulic press to assemble components that require compression fit, ensure that the placed components are squarely aligned beneath the hydraulic ram and are behind a protective screen.

# 2 General

## 2.1 Dimensions and Weights

***ATTENTION*** ***Note the entire weight (see nameplate) of the ABS unit. The dimensions of the unit can be found on the relevant dimensional sheet on the Downloads page of the ABS Group website or EPM (Electronic Product Manual). The hydraulic curves and impeller types can be found on the hydraulics curve sheet. The technical data and weight of the unit can be found on the nameplate.***

The ABS units are prepared for transportation by placing them on an adequately strong horizontal surface. Care should be taken that they cannot fall over. The hoist must be adequately dimensioned for the total weight of the ABS units, the lifting chain and shackle, and all accessories which may be

fitted, and must comply with the local valid safety regulations. Do not stay or work in the swivel area of a suspended load. The lifting hook height must take into consideration the height of the ABS units as well as the length of the lifting chain.

## 2.2 Tightening Torques

Stainless steel screws:

| | |
|---|---|
| M6 | 7 Nm |
| M8 | 17 Nm |
| M10 | 33 Nm |
| M12 | 56 Nm |

In the case of screwed connections using "**Nord-Lock"** securing washers
(e.g impeller fixing screw) the torque figures given above should be increased by 10%.

Cable Gland Nut 50 Nm

## 2.3 Equipment and Tools

The procedures outlined in this manual require the use of specified equipment and tools. Before proceeding with maintenance or repair work please ensure that your workshop is equipped with the following:

**Equipment:**

- Hydraulic press
- Hoist
- High voltage tester
- Pressure tester (compressed air)
- Hydraulic hand pump (for connection to stator extraction tool)

**Tools:**

- Bearing housing support fixture - for use when inserting bottom bearing.
- Bottom bearing press tool.
- Bottom bearing support fixture - for use when pressing shaft/upper bearing into bearing housing.
- Bearing pullers.
- Mechanical seal hand press tool.
- Shaft sleeve tool - to aid fitting of mechanical seal on shaft.
- Stator extraction tool.
- Stator pullers - fits to extraction tool.
- Stator alignment ring
- Stator press tool
- Motor housing support fixture - for use when pressing in stator.
- Terminal block hand-press tool.
- Pressure test tool.
- Transition piece extraction tool.
- Transition piece hand press tool.
- Impeller pullers - Piranha

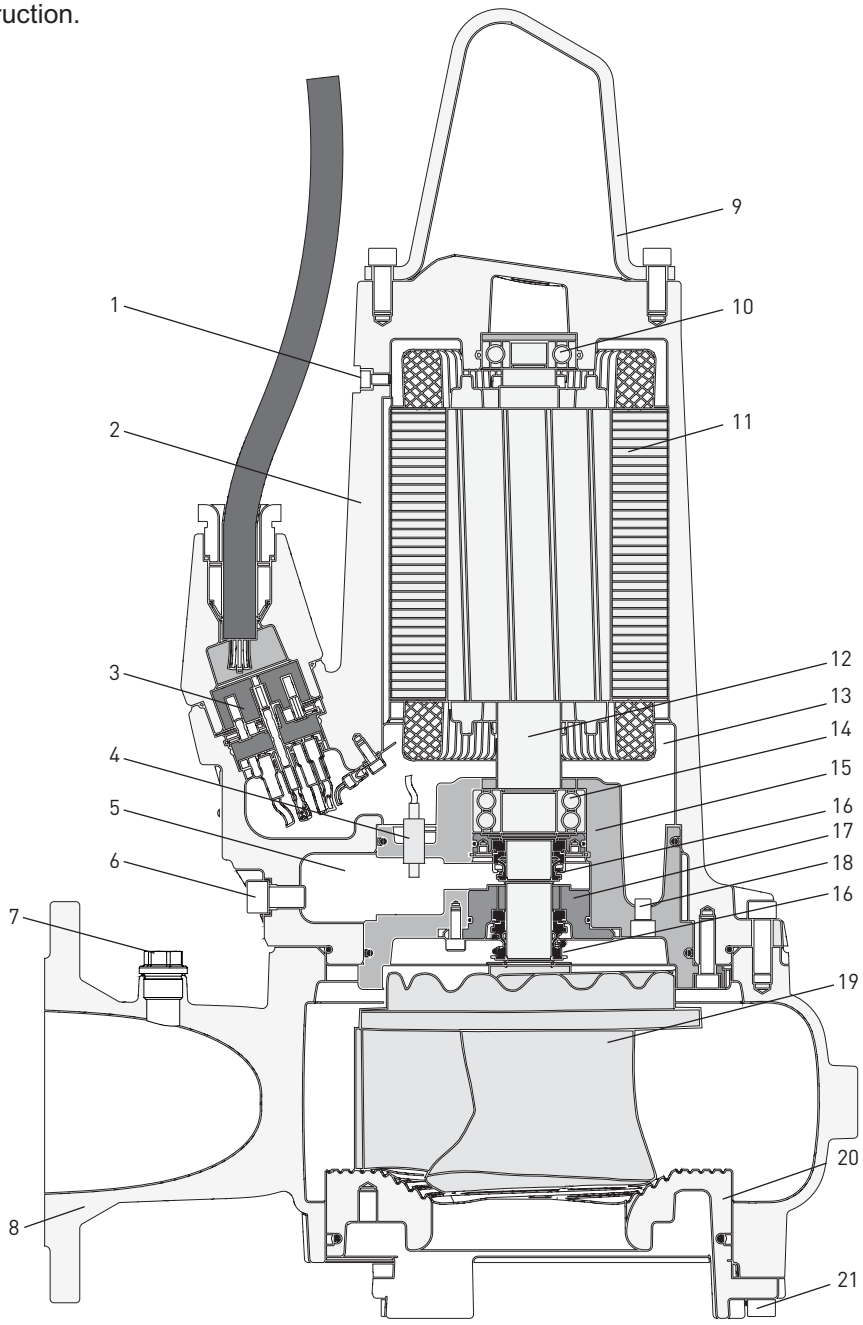
The above tools are specific to ABS pump maintenance and repair (except bearing pullers) and must be manufactured locally. Dimension drawings for that purpose can be found at the end of this booklet.

# 3 General design features

## 3.1 Design features XFP

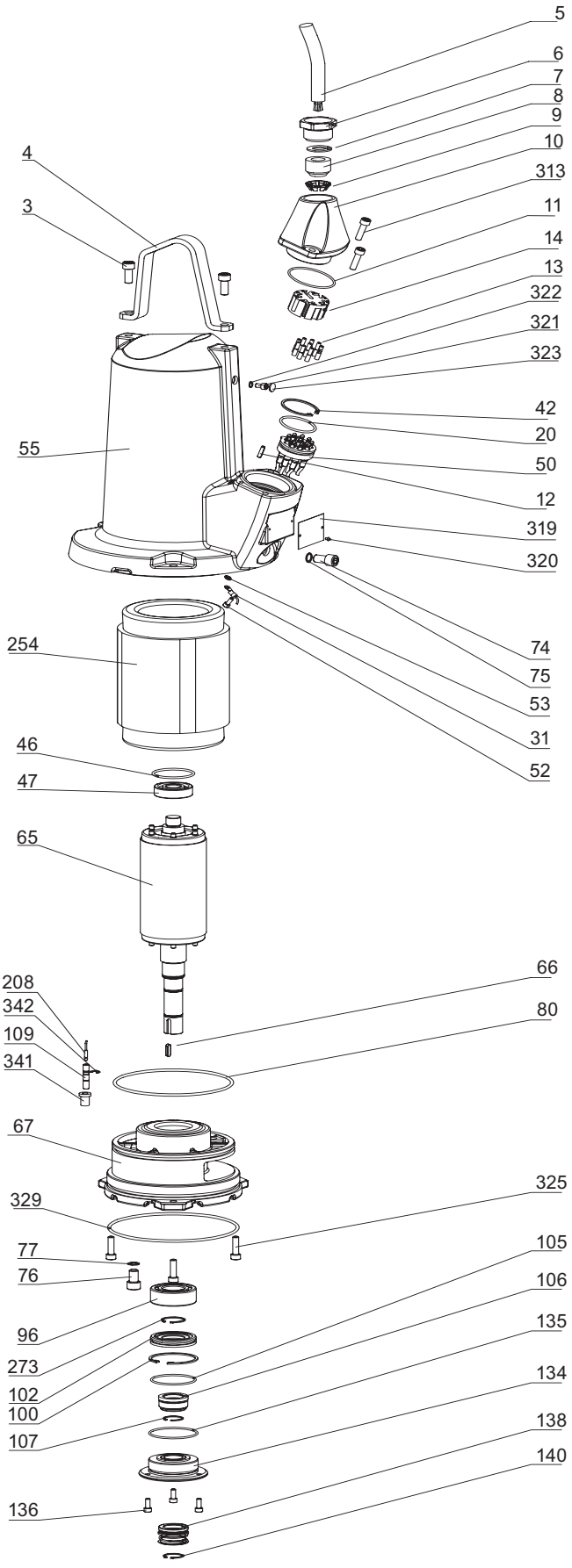
XFP is a submersible sewage and wastewater pump with a Premium Efficiency motor.

The water-pressure-tight, encapsulated, fully flood-proof motor and the pump section form a compact, robust, modular construction.




1 Pressure release screw
2 Motor housing
3 10-pole terminal block
4 Moisture sensor (DI)
5 Seal chamber
6 Seal chamber drain plug / pressure test point
7 Venting plug
8 Volute
9 Stainless steel lifting hoop
10 Upper bearing - single row
11 Motor with thermal sensors
12 Stainless steel shaft
13 Motor chamber
14 Lower bearing - double row
15 Bearing housing
16 Mechanical seals
17 Seal holding plate
18 Motor chamber drain plug / pressure test point
19 Impeller - Contrablock version
20 Bottom plate
21 Bottom plate adjustment screw

# 4 Motor Unit XFP



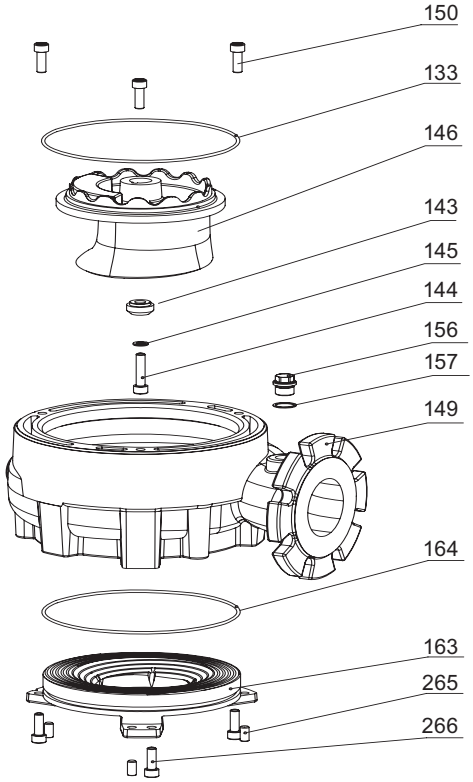

| Position | Description |
|---|---|
| 3 | Screw cyl. |
| 4 | Lifting hoop |
| 5 | Cable |
| 6 | Gland nut |
| 7 | Washer |
| 8 | Rubber grommit |
| 9 | Strain relief |
| 10 | Cable gland |
| 313 | Screw cyl. |
| 11 | O-ring |
| 12 | Connection support |
| 13 | Bullet connectors |
| 55 | Motor housing |
| 322 | Seal ring |
| 321 | Screw cyl. |
| 323 | Washer seal |
| 42 | Circlip |
| 20 | O-ring |
| 50 | Terminal block |
| 14 | Dowel pin |
| 319 | Nameplate |
| 320 | Pin (round head) |
| 74 | Screw cyl. |
| 75 | Seal ring |
| 53 | Washer (toothed) |
| 31 | Cable eyelet |
| 52 | Screw cyl. |
| 254 | Stator |
| 46 | O-ring |
| 47 | Bearing |
| 65 | Rotor shaft |
| 66 | Impeller key |
| 208 | Round plug |
| 342 | Circlip |
| 109 | DI probe |
| 341 | Seal DI probe |
| 80 | O-ring |
| 67 | Bearing housing |
| 329 | O-ring |
| 325 | Screw cyl. |
| 77 | Seal ring |
| 76 | Screw cyl. |
| 96 | Bearing |
| 273 | Circlip |
| 102 | Transition piece |
| 100 | Circlip |
| 105 | O-ring |
| 106 | Mechanical seal |
| 107 | Circlip |
| 135 | O-ring |
| 134 | Seal holding plate |
| 136 | Screw cyl. |
| 138 | Mechanical seal |
| 140 | Circlip |

# 5 Hydraulics XFP

## 5.1 Contrablock

### Position Description

| | |
|---|---|
| 150 | Screw cyl. |
| 133 | O-ring |
| 146 | Impeller |
| 143 | Impeller washer (XFP 80E only) |
| 145 | Lock washer |
| 144 | Screw cyl. |
| 156 | Screw plug |
| 157 | Washer |
| 149 | Volute |
| 164 | O-ring |
| 163 | Bottom plate |
| 265 | Grub screw |
| 266 | Screw cyl. |




### Removing Impeller.

Remove screws (150) to release volute (149) from motor housing (55).

Connect hoist to lifting hoop, lift motor housing assembly from volute and lay securely on its side on workbench.

Remove screw (144) and washer (145) from motor shaft.

Pull impeller from shaft by tightening jacking bolt against the shaft through the threaded impeller bore (see Fig 1).

**Note:** To protect the shaft bore threads from damage by the jacking bolt, place an adequately sized metal blank or washer at the opening of the shaft bore, against which the jacking bolt can be tightened. Otherwise the shaft bore may need to be re-tapped before the securing screw can be re-fitted.

**Note:** The jacking bolt procedure is not possible with XFP 80E. This impeller must be pushed off the shaft using two screwdrivers to apply leverage between the top of the impeller and the motor housing.

### Fitting Impeller.

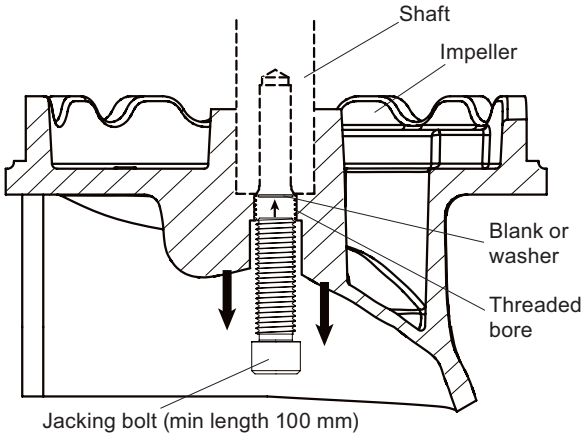
Remove impeller key (66) from shaft. Clean and refit.

Add grease to shaft.

Fit impeller to shaft, aligning with impeller key.

Fit washer (145) and screw (144).

**Note:** DO NOT use a hammer blow to force the impeller onto the shaft as the shock can damage the mechanical seals. If the fit is tight, pull the impeller onto the shaft using the securing screw (144).




XFP 80C, 100C = M12
XFP 81E, 100E, 150E & 151E = M14

Fig 1. Jacking bolt

## Refitting Volute and Bottom plate.

Remove screws (266) to release bottom plate (163) from volute.

Remove bottom plate and O-ring (164) from volute.
**Note:** If, due to corrosion, the bottom plate does not release freely from the volute, DO NOT force it free by tightening the adjusting grub screws (265) against the fixing lugs on the volute as this could damage the bottom plate lugs beyond repair!
In that case remove the bottom plate by tapping it free from inside the volute using a mallet and block of wood.

Inspect O-ring for damage and replace if necessary. Clean and lubricate, and fit to bottom plate.

Inspect O-ring (133) for damage and replace if necessary. Clean and lubricate, and fit to motor housing.

Refit volute to motor housing assembly. Align cable-entry housing with discharge outlet of volute and secure.

Fit bottom plate with fixing screws (266).
**Note:** At manufacture the clearance gap between the impeller and bottom plate is pre-set, and the bottom plate is fitted to the volute at position (a) with the alignment notch (e) positioned as shown (Fig 2). If, following wear, the gap needs to be adjusted, the bottom plate must be rotated anti-clockwise through 45° and fitted to the volute at position (b).

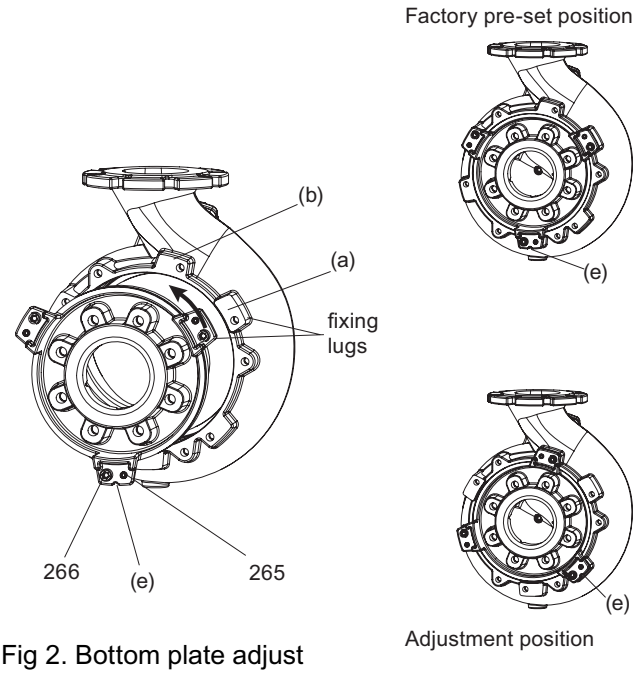



Fig 2. Bottom plate adjust

## Resetting clearance gap between impeller and bottom plate.

Loosen adjusting grub screws (265).

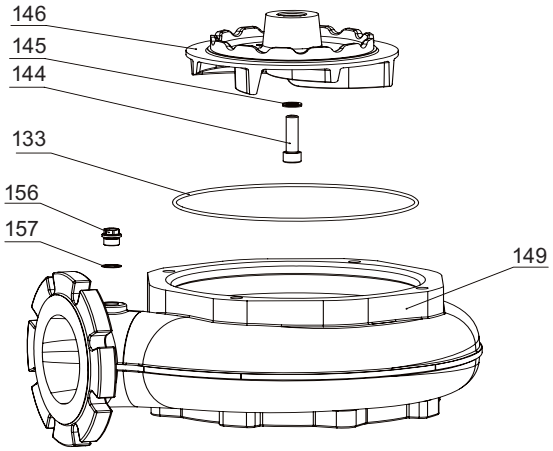
Tighten screws (266) evenly by the required amount until the gap between the impeller tip and the bottom plate measures 0.1 mm - 0.3 mm.
**Note:** for XFP-80E CB to reach performance the impeller tip when rotated may need to rub “very slightly” against the bottom plate.

Tighten the grub screws fully to secure the bottom plate in position (max. 33 Nm).

## 5.2 Vortex

## Position Description

| | |
|---|---|
| 146 | Impeller |
| 145 | Lock washer |
| 144 | Screw cyl. |
| 133 | O-ring |
| 156 | Screw plug |
| 157 | Washer |
| 149 | Volute |




## Removing Impeller.

Remove volute (149) from motor unit.
Remove screw (144).
Remove washer (145).
Remove Impeller (146) using impeller pullers.

## Fitting Impeller.

Add grease to the shaft.
Fit impeller to shaft.
Fit washer (145) and screw (144).
Fit volute (149) to motor unit

# 6 Mechanical Seals - Removal and Fitting

## 6.1 Lower seal (hydraulic side)

### Removal

Remove volute, bottom plate and impeller (see pages 9 and 10 for XFP, page 11 for Piranha).

**Note:** drain oil from oil chamber before removal of the mechanical seal (see page 19).

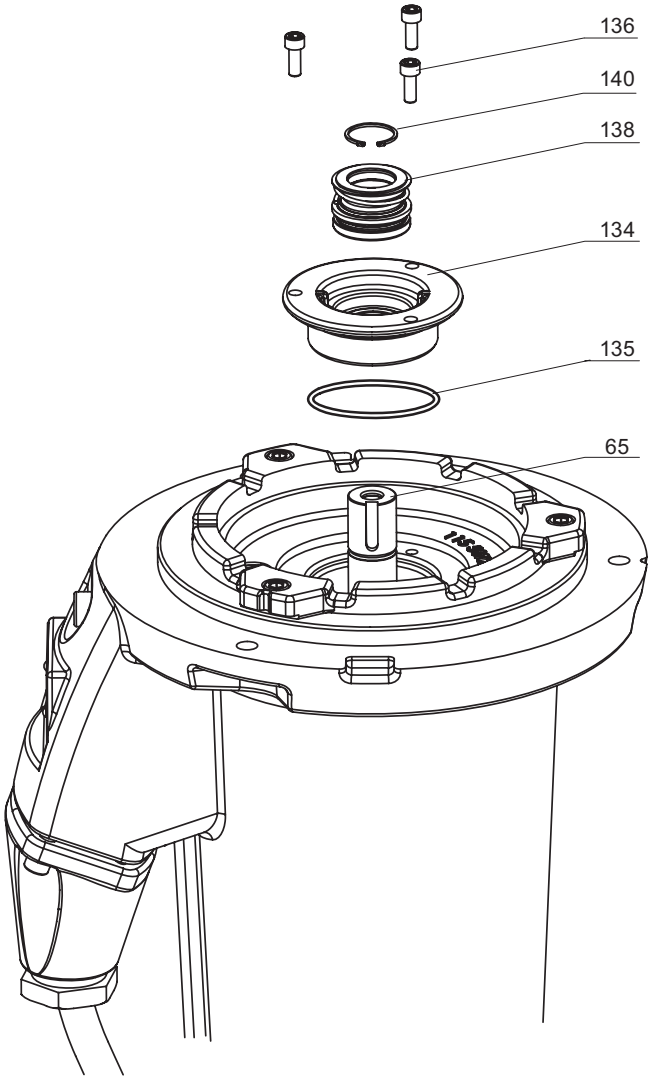
Remove circlip (140) and impeller key from shaft (65).

Using two screw drivers as levers, slide rotational section of seal (138) from shaft.

Remove screws (136) from seal holding plate (134).

Using two screwdrivers as levers, slide seal holding plate from shaft.

Push stationary section of seal (138) from seal holding plate using seal press hand tool (Sec 12.1).




### Fitting new seal

Inspect O-ring (135) for damage and if necessary replace.

Lubricate O-ring with oil and fit onto seal holding plate.

Spray P-80* lubricant into seal holding plate bore.

Fit stationary part of mechanical seal, with rubber boot sitting in bore and polished seal surface facing outwards.

Clean seal surface with paper towel and brush with oil.

Place assembly over shaft. Use seal press tool to 'click' into position.
**Note:** ensure first that working edge of press tool is clean so as not to contaminate or damage seal surface.

Secure with screws (136).

Fit shaft sleeve tool (Sec 12.2) over shaft.
**Note:** required to prevent damage to seal from circlip grooves on shaft.

Lubricate shaft and inside rubber bellow of rotating part of seal with P-80.

Place rotating part of seal over shaft, ensuring polished seal surface is facing inwards (to meet with same on stationary part).

Using seal press tool push seal over assembly sleeve tool until it 'clicks' into final position on shaft.

Slide seal washer over shaft.

Refit circlip (140) and use seal press tool to 'click' into position.

Refill oil chamber.

Refit impeller key.

Refit volute, impeller and bottom plate, and adjust if necessary (pages 9 and 10).

*P-80 is a temporary lubricant and will dry away, returning the lubricated parts to their original condition. It is designed only to aid assembly of rubber parts.
DO NOT use any other synthetic lubricant or oil where P-80 is specified as it will remain and prevent the correct functioning of the parts to which it is applied.

**Tip:** if not available, a soapy water solution can be used as a substitute.

⚠ ENSURE WORK AREA AND TOOLS ARE CLEAN

## 6.2 Upper seal (motor side)

### Removal

Remove volute, bottom plate and impeller (see pages 9 and 10 for XFP, page 11 for Piranha).

**Note:** drain oil from oil chamber and motor chamber before removal of the upper mechanical seal (see page 19).

Remove lower mechanical seal (page 13).

Remove circlip (100) - retaining transition piece (102).

Remove circlip (107) - retaining mechanical seal (106).

Attach extraction tool (Sec 12.3) to transition piece using two M5 threaded bolts and extract transition piece and seal from shaft (65).
**Note:** required tool, specific to this task.

Push stationary section of seal from transition piece using seal press hand tool (Sec 12.1).

### Fitting new seal

Lubricate and fit new O-ring (105) onto transition piece.
**Note:** as a result of unavoidable damage caused to the old O-ring during removal of the transition piece it **MUST NOT** be re-used.

Spray P-80* lubricant into transition piece bore.

Fit stationary part of mechanical seal, with rubber boot sitting in bore and polished seal surface facing outwards.

Clean seal surface with paper towel and brush with oil.

Place assembly over shaft. Use transition piece press tool (Sec 12.4) to 'click' into position.
**Note:** ensure first that working edge of press tool is clean so as not to contaminate or damage seal surface.

Secure into position with circlip (100).

Fit shaft sleeve tool (Sec 12.2) over shaft and lubricate shaft.
**Note:** required to prevent damage to seal from circlip grooves on shaft.

Lubricate shaft and inside rubber bellow of rotating part of seal with P-80.

Place rotating part of seal over shaft, ensuring polished seal surface is facing inwards (to meet with same on stationary part).

Use seal press tool and by hand push seal over assembly tool into final position.

Slide seal washer over shaft.

Refit circlip (107) and use seal press tool to 'click' into position.

Refit lower seal.

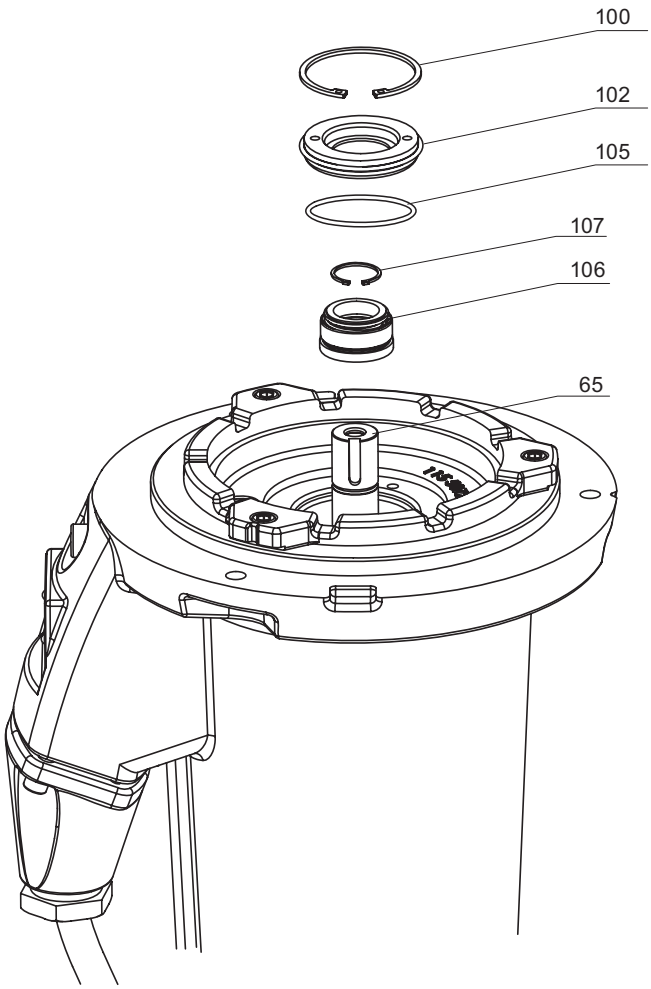
Refill oil chamber and motor chamber.

Refit impeller key.

Refit volute, impeller and bottom plate.

*P-80 is a temporary lubricant and will dry away, returning the lubricated parts to their original condition. It is designed only to aid assembly of rubber parts.
DO NOT use any other synthetic lubricant or oil where P-80 is specified as it will remain and prevent the correct functioning of the parts to which it is applied.

**Tip:** if not available, a soapy water solution can be used as a substitute.




ENSURE WORK AREA AND TOOLS ARE CLEAN

# 7 Bearings - Removal and Fitting

## Bearing assembly removal

Remove volute, bottom plate, impeller and mechanical seals (see pages 9, 10, 11, 12, 13 & 14).

**Note:** drain oil from oil chamber and motor chamber before removal of the mechanical seals (see page 19).

Remove screws (325) securing bearing housing to motor housing.

Loosen bearing housing (67) from motor housing by leverage with screwdrivers in slots under screw locations (a).

Unplug DI plug (208) from DI probe (109) in bearing housing.

Lift bearing housing assembly from motor housing, taking care not to damage stator windings as rotor shaft is withdrawn.

Remove O-ring (46) from motor housing bearing bore and inspect for damage.

### Bottom bearing removal:

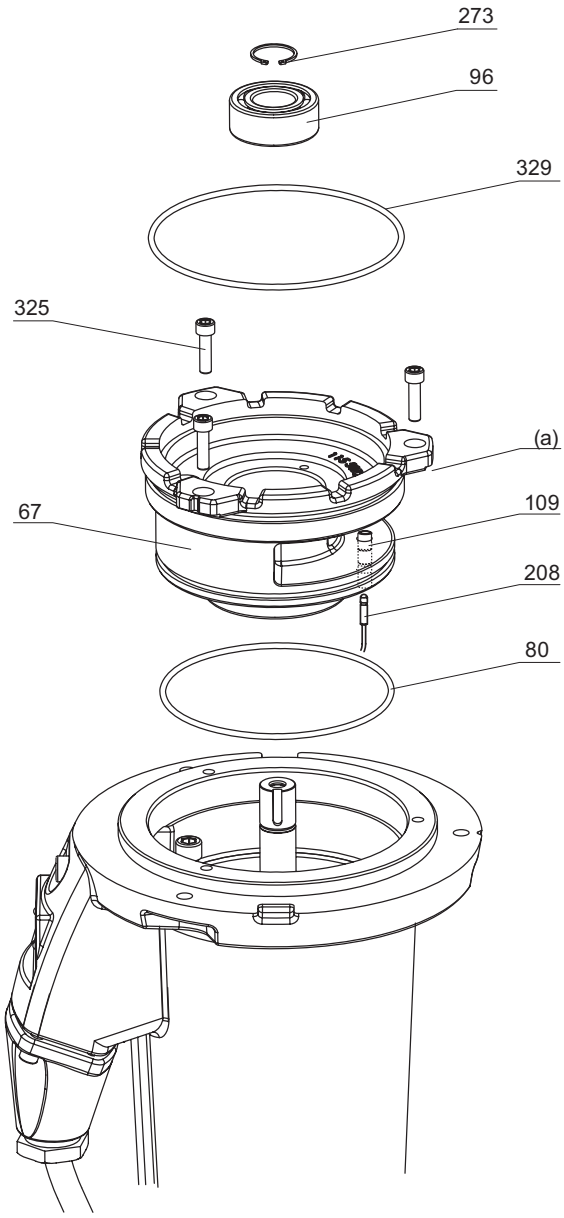
Remove circlip (273) to release rotor shaft.

Tap bearing from housing using bearing press tool (Sec 12.5).

### Upper bearing removal:

Secure rotor shaft in workbench vice.

Remove bearing using bearing pullers.




## Fitting

### Bottom bearing to bearing housing

After inspection for damage, clean and lubricate the bearing location area in the bearing housing, and the O-rings (80 & 329). Sit bearing housing in support fixture (sec 12.6) with underside facing upwards.

Fit bearing loosely in lower bore.

Sit bearing press tool on bearing.

Carefully position assembly directly under hydraulic press ram.

Press bearing into bearing housing.

### Upper bearing and bearing housing to shaft

Sit bearing housing over bottom bearing support fixture (Sec 12.7).

Lubricate shaft and insert into bearing housing.

Fit upper bearing on shaft.

Carefully position assembly directly under hydraulic press ram.

To align assembly, press slightly until contact and release.

Press again until shaft is fully home in both bearings.

Refit circlip (273).

Refit O-rings (80) and (329).

### Bearing assembly to motor housing

Lubricate and fit O-ring (46) to motor housing bearing bore.

Align DI probe in bearing housing with cable entry in motor housing and partially slide in shaft to allow reconnection of DI plug/cable.

Push assembly in fully and fit screws (325).

Gradually tighten screws, alternating equally between each, until bearing housing assembly is fully home and secured

Refit upper and lower mechanical seals.

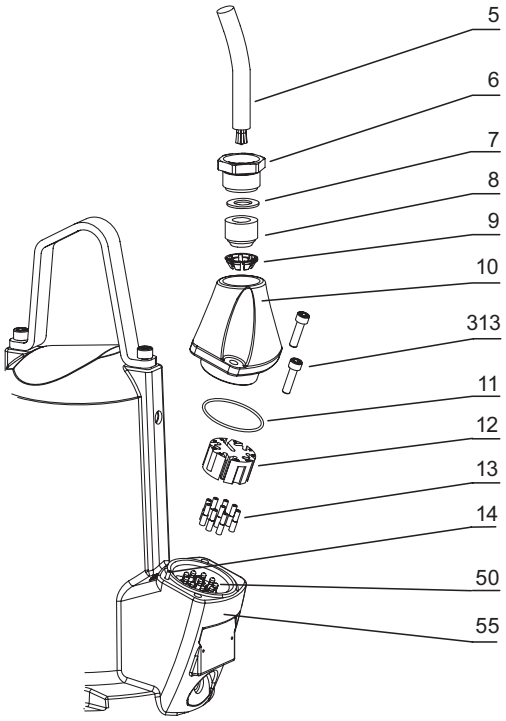
Refill oil chamber and motor chamber.

Refit volute, impeller and bottom plate.

# 8 Cable - Removal and Fitting

## Position Description

| | |
|---|---|
| 5 | Cable |
| 6 | Gland nut |
| 7 | Washer |
| 8 | Cable grommet |
| 9 | Strain relief |
| 10 | Cable gland. |
| 313 | Screw cyl |
| 11 | O-ring |
| 12 | Connection support |
| 13 | Female bullet connectors |
| 14 | Dowel pin |
| 50 | Terminal block |
| 55 | Terminal block housing |




## Protection

If the cable assembly is disconnected from the pump only to facilitate removal of the pump for servicimg, a plastic protective cap is provided to protect the internal components of the cable assembly from contamination or damage.

**Attention:** disconnect the cable from supply before removing cable assembly from pump.

## Replace cable assembly

Disconnect cable from supply.

Remove screws (313) and unplug cable gland (10).

Replace with new cable assembly.

Align with dowel pin (14) and secure with screws.

## Repair or replace cable

### Removal

Disconnect cable from supply.

Remove screws (313).

Remove cable gland (10) from housing (55).

Loosen gland nut (6) fully.

Pull connection support (12) from cable gland.

Remove bullet connectors (13) from slots in connection support and cut from lead ends.

Remove cable from cable gland.

Remove gland nut, cable washer (7) cable grommet (8) and strain relief (9) from cable for re-use.

### Fitting - 50 Hz cable

**Type:** S1BN8-F

**Sizes:** 7G1.5, 10G1.5, 10G2.5, 2x4G4+2x0.75

Fit in sequence, gland nut, cable washer, cable grommet and strain relief to new (or repaired) cable.

Insert cable into cable gland and pull through.

Strip lead ends and fit with bullet connectors (as specified Fig 3 and Fig 4).

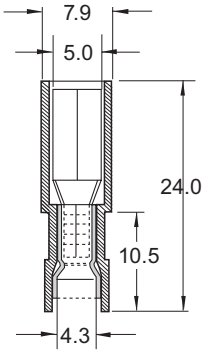
Identify lead ends to correspond to ID tags at supply end of cable and fit to connection support by pushing bullet connectors into corresponding slots as marked (Fig 5).

Fit connection support into cable gland, guided by alignment rib to ensure correct fit and orientation (Fig 5).

Pull back cable until connection support is fully recessed into cable gland, and hold in place.

Slide strain relief, cable grommet, cable washer and gland nut into position and tighten gland nut to secure cable.
**Note:** to ensure an adequate and secure seal apply Threadlock and tighten to the required 50 Nm.

Align cable assembly with dowel pin and secure to housing with screws (313).




**Outer sleeve:** Polyamide

**Inner sleeve:** Copper

**Max. electrical rating:** 300 V - 105 °C

**Section mm²/AWG:** 16-14

Fig 3. Bullet connector (dimensions mm)

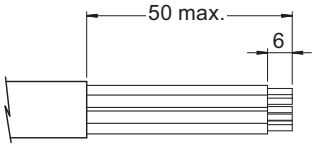



Fig 4. Lead end dimensions (mm)

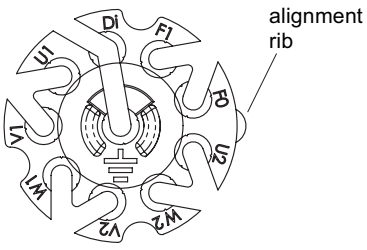



Fig 5. Lead ID on connection support

## Fitting - 60 Hz cable

**Type:** SOOW.
**Sizes (AWG):** 10/7, 12/7, 14/7

**Type:** AWM
**Size (AWG):** 8/4+16/3

Fit in sequence; gland nut, cable washer, cable grommet and strain relief to new (or repaired) cable.

Insert cable into cable gland and pull through.

Trim and strip leads as specified (Fig 7).
**Note:** AWG 8 and AWG 10 leads are joined to AWG 12 extension pieces using 6.6 - 10.5 mm² crimps.
**Note:** trim AWG 16 leads to the same length as the extended AWG 8.

Insulate crimp connections using heat shrink tube.

Fit lead ends with bullet connectors (as specified Fig 3).

Fit lead ends to connection support by pushing bullet connectors into corresponding slots as marked (Fig 5).

Fit connection support into cable gland, guided by alignment rib to ensure correct fit and orientation (Fig 5).

Pull back cable until connection support is fully recessed into cable gland, and hold in place.

Slide strain relief, cable grommet, cable washer and gland nut into position and tighten gland nut to secure cable.
**Note:** to ensure an adequate and secure seal apply Threadlock and tighten to the required 50 Nm.

Remove protective cap from housing.

Align cable assembly with dowel pin and secure to housing with screws (313).

## Fitting - EMC cable, 50 Hz and 60 Hz

**Sizes:** 10G2.5, 4G1.5+3Gx0.5

Fit in sequence, gland nut, cable washer, cable grommet and strain relief to new (or repaired) cable.

Insert cable into cable gland and pull through.

Strip lead ends and fit with bullet connectors (as specified Fig 3 and Fig 4).

Twist and fit sufficient amount of cable braid into the bullet connector with the earth lead. Trim and discard excess.
**Note:** for 4G1.5+3G0.5 EMC cable, to ensure a good connection and fit of the 0.5 leads; before crimping into the bullet connectors, crimp orange coded ferrules onto the ends of the 0.5 leads with the lead core protruding and doubled back on the outside (see Fig 6).

Identify lead ends to correspond to ID tags at supply end of cable and fit to connection support by pushing bullet connectors into corresponding slots as marked (Fig 5).

Fit connection support into cable gland, guided by alignment rib to ensure correct fit and orientation (Fig 5).

Pull back cable until connection support is fully recessed into cable gland, and hold in place.

Slide strain relief, cable grommet, cable washer and gland nut into position and tighten gland nut to secure cable.
**Note:** to ensure an adequate and secure seal apply Threadlock and tighten to the required 50 Nm.

Remove protective cap from housing.

Align cable assembly with dowel pin and secure to housing with screws (313).

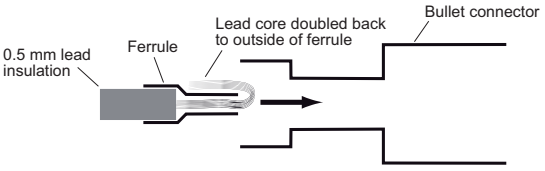
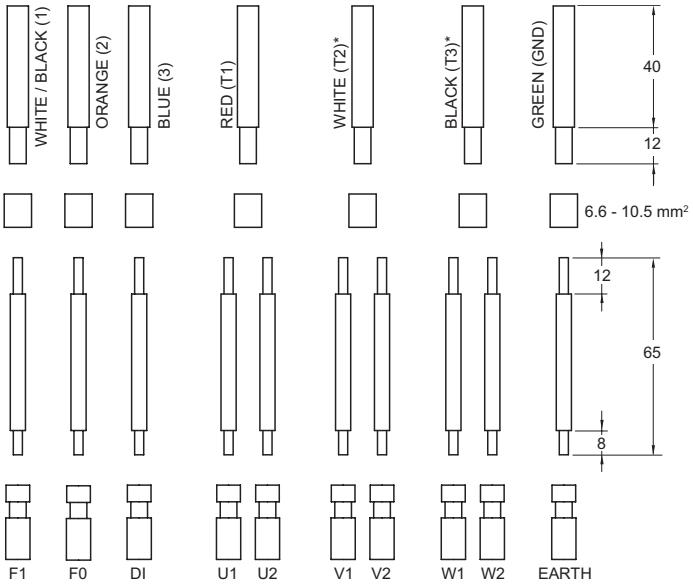


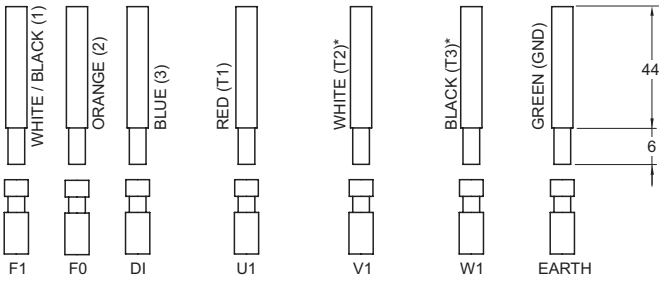

Fig 6. Ferrule fitting

### AWG 10/7 three phase




* For single phase motor RED (R) = U1/U2, WHITE (C) = W1/W2, BLACK (S) = V1/V2

### AWG 12/7 and 14/7 three phase




* For single phase AWG 12/7 motor RED (R) = U1, WHITE (C) = W1, BLACK (S) = V1

### AWG 8/4+16/3 three phase

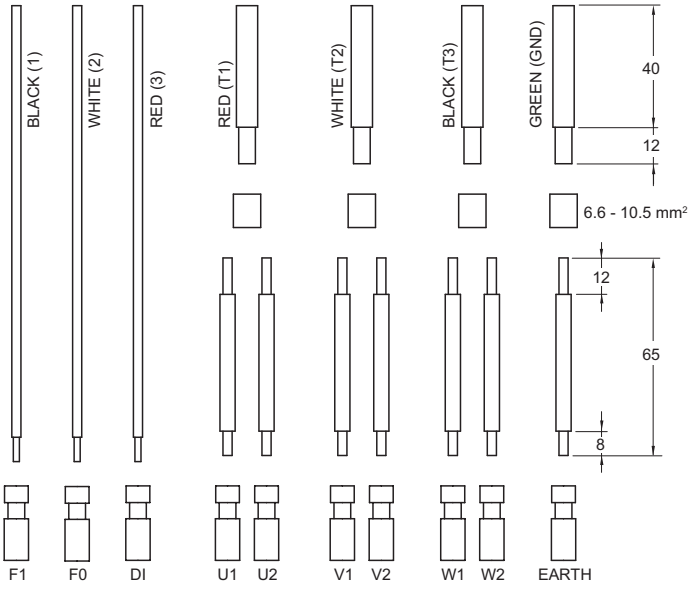
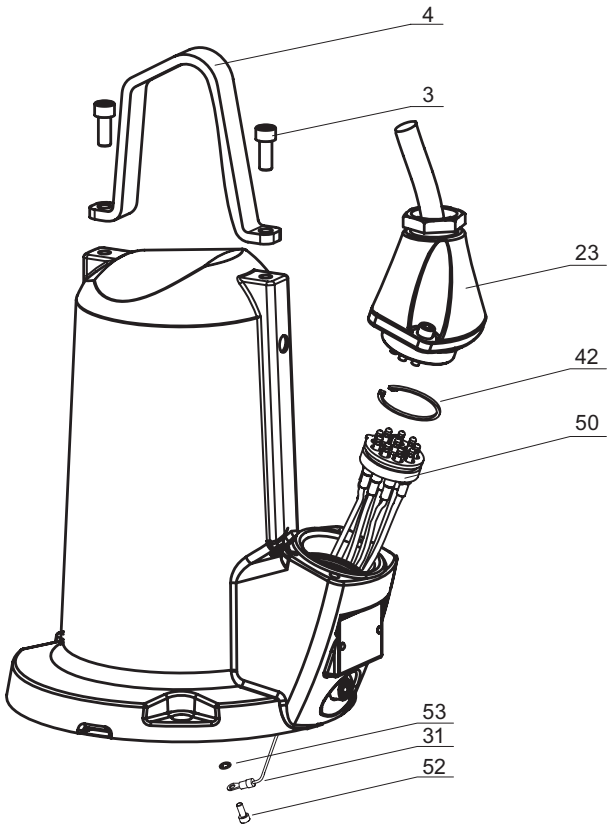



Fig 7. Lead end connections and dimensions (mm)

# 9 Stator - Removal and Fitting




## Removal

**Note:** the stator is held in by a compression fit only, so therefore it can only be removed by pulling it out by force.

Disconnect power cable from supply.

Remove volute, bottom plate, impeller and mechanical seals (see pages9, 10, 11, 12, 13 & 14).

**Note:** drain oil from oil chamber and motor chamber before removal of mechanical seals (see page 19).

Remove bearing housing assembly and rotor shaft from motor housing (page 15).

Disconnect screw (52), earth cable eyelet (31) and toothed washer (53) from motor housing.

Remove cable assembly (23) from motor housing (page 16).

Fit the plastic protective cap provided over the end of the cable assembly to cover and protect the internal components of the cable assembly while it is removed.

Remove circlip (42) and loosen terminal block (50) from motor housing.

Disconnect stator leads by pulling bullet connectors from terminal block, and remove terminal block completely from motor housing.
**Tip:** do not disconnect earth lead.

Fit stator extraction tool (Sec 12.8 & 12.9) to motor housing.

Apply tool pressure, while simultaneously heating the motor housing, until the stator begins to pull free.
**Note:** heat and pressure must be applied at the same time as it ensures that the stator releases as the motor housing expands, but before the stator itself expands.

## Fitting

**Note:** refitting of stator can only be done by means of a heavy press, insertion tools, and motor housing support fixture.
A pressure of up to 10 tons must be applied for largest size motor.
Motorhousing must be square when the stator is being pressed in.

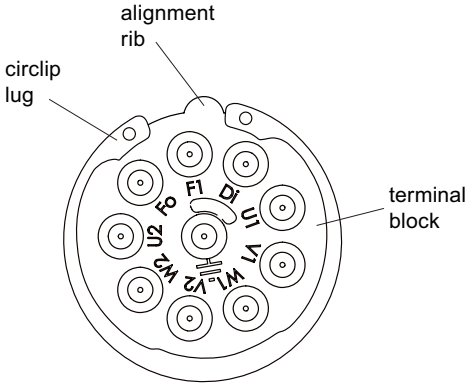



Fig 8. Terminal block and circlip fitting

Remove screws (3) and lifting hoop (4).

Sit motor housing in support fixture (Sec 12.10).
**Note:** due to weight of assembly, support fixture should be located so that it can slide into position beneath the hydraulic ram.

Check that O-ring (46) is correctly fitted in motor housing bearing bore.

Fit stator alignment ring (Sec 12.11) into motor housing.

Lower stator through alignment ring, leads to the top and facing cable-entry position.

Gather stator leads together with cable tie and tuck into stator core to avoid damage by the inserting tool.

Fit stator inserting tool (Sec 12.12) onto stator core, taking care not to damage windings.

Slide assembly squarely into position beneath hydraulic ram and press inserting tool until fully home.

Remove inserting tool and alignment ring.

Feed earth lead in through cable entry bore and reconnect to motor housing.

Feed stator leads out through cable entry bore, identify from ID tags and connect to corresponding pins as marked on terminal block.

Fit terminal block pins into terminal block hand press tool* (Sec 12.13).

Use hand press tool to push terminal block until it clicks into position in cable entry bore.
**Note:** align marking “TOP” on hand tool facing upwards towards top of motor housing.

Refit circlip (42) with lugs adjacent to terminals F0 and DI (Fig 8).
**Note:** to avoid risk of voltage arc do not position lugs adjacent to power supply terminals.

Refit screws (3) and lifting hoop (4).

In sequence, refit cable assembly, bearing housing and rotor shaft, and mechanical seals; refill oil chamber and motor chamber; refit impeller, volute and bottom plate (see corresponding pages).

**Note:** When reassembling stator and rotor, the air gap is set by the tolerances of the machined parts and is not changeable.

*The tolerance gap between the alignment rib on the terminal block and the corresponding channel in the cable entry bore is high. Use of the hand tool ensures they are centred correctly. This is necessary to avoid strain on the bullet connectors. It also prevents damage to the terminal block when pressing it into place.

If the tool is unavailable, a tube (ext. dia 50 mm; int. dia. 40 mm) can be used, provided force is carefully applied only to the outer rim of the terminal block. Care must also be taken that the alignment rib and channel are centred correctly (as above).

# 10 Oil Drain and Fill

## 10.1 Oil chamber

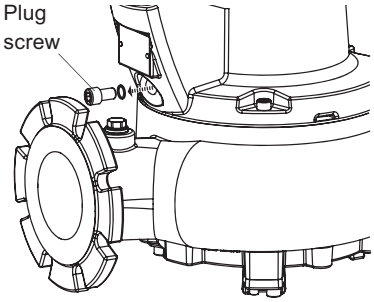
### Drain

Loosen plug screw (74) enough to release pressure (see Health and Safety Instructions page 4).

Place pump in horizontal position, sitting on discharge flange, with motor housing supported from underneath.
**Note:** to prevent the pump from toppling over ensure it is supported to lie flat on the discharge flange.

Position adequate container to receive waste oil.

Remove plug screw (74) and seal ring (75) from drain hole.

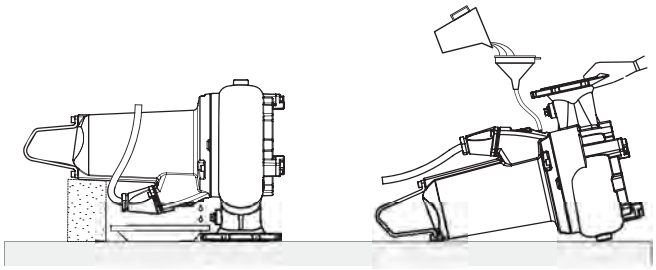



### Fill

After the oil is fully drained lay the pump flat, and rotate so that the drain hole is positioned to the top.
**Note:** when in this position the pump will not balance and must be held by hand, or supported at both sides, to prevent it from toppling over.

Select the required volume of oil from the oil-fill table (page 20) and slowly fill with oil into the drain hole.

Refit plug screw and seal ring.




## 10.2 Motor chamber

### Drain

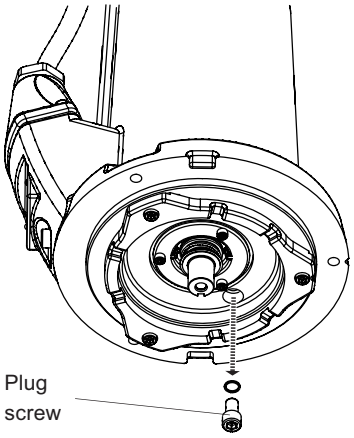
Remove volute, bottom plate and impeller (see pages 9, 10, 11 and 12).

Loosen plug screw (76) enough to release pressure (see Health and Safety Instructions page 4).

Using a hoist, suspend pump by the lifting hoop.

Position adequate container to receive waste oil.

Remove plug screw (76) and seal ring (77) from drain hole.




### Fill

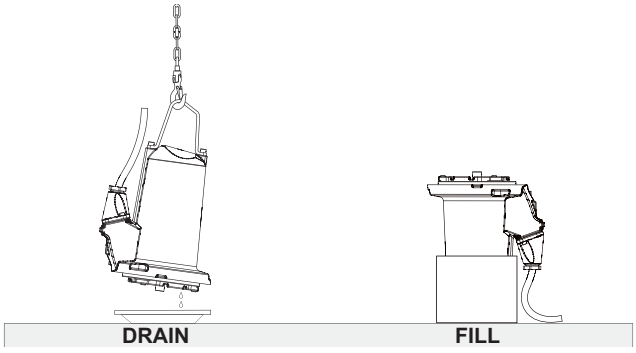
Remove lifting hoop and sit motor housing in support fixture (Sec 12.10) .

Select the required volume of oil from the oil-fill table and slowly fill with oil into the drain hole.

Refit plug screw and seal ring.

Refit impeller, volute and bottom plate (pages 9, 10, 11 and 12).

Refit lifting hoop.



## 10.3 Oil-fill quantities

| | Motor Size | | | | Oil Fill (litres) | |
|---|---|---|---|---|---|---|
| | 50Hz | | 60Hz | | Oil Chamber | Motor Hsg |
| | XFP | Piranha | XFP | Piranha | | |
| **XFP:** 80C & 100C<br><br>**Piranha:** DN 32 | PE22/4-C<br>PE29/4-C<br>PE13/6-C | PE30/2-C | PE28/4-C<br>PE35/4-C<br>PE18/4W-C<br>PE28/4W-C<br>PE20/6-C<br>PE20/6W-C | PE25/2-C<br>PE25/2W-C<br>PE28/2-C<br>PE35/2-C<br>PE35/2W-C<br>PE45/2-C<br>PE45/2W-C | 0.43 | 1.8 |
| **XFP:** 80E, 100E & 150E<br><br>**Piranha:** DN 50 | | PE55/2-E | | | 0.68 | 4.5 |
| | PE70/2-E | PE70/2-E | | PE80/2-E | 0.68 | 3.4 |
| | PE110/2-E | PE90/2-E<br>PE110/2-E | PE125/2-E | PE100/2-E<br>PE110/2-E<br>PE125/2-E | 0.68 | 4.5 |
| | PE40/4-E | | PE45/4-E | | 0.68 | 4.2 |
| | PE60/4-E | | PE75/4-E | | 0.68 | 2.95 |
| | PE90/4-E | | PE90/4-E<br>PE105/4-E | | 0.68 | 3.4 |
| | PE30/6-E | | PE35/6-E | | 0.68 | 3.9 |

**Volume ratio:** 86.1% oil : 13.9% air

**Specification:** White mineral VG8 FP153C

# 11 Test Procedures

## High voltage test

A high voltage test is recommended, if the pump has been repaired or reassembled, to detect any breakdown of insulation.

Link all power leads together and apply a high voltage between earth and power leads as follows:

| Motor | | Voltage | Trip Level | Duration |
|---|---|---|---|---|
| XFP | Piranha | (V) | (mA) | (sec) |
| 70/2, 22/4, 29/4, 40/4, 49/4, 56/4, 60/4, 35/4, 45/4, 75/4, 13/6, 20/6, 20/6W 30/6, 35/6, 18/4W, 28/4, 28/4W | 25/2, 28/2, 30/2, 35/2, 45/2, 55/2, 70/2, 80/2 | 1500 | 5 | 1 |
| 110/2, 125/2, 90/4, 105/4 | 90/2, 100/2, 110/2, 125/2 | 1500 | 10 | 1 |

## Earth check

An earth check is recommended if the pump has been repaired or reassembled. This involves checking the continuity between earth lead and the motorhousing (where earth lead is connected). This can be done with a resistance meter.

## Pressure test

This is performed to check sealing of the unit and is recommended if the pump has been repaired, and before reassembly of hydraulic parts . All pressure testing must be carried out without oil in the pump. Firstly drain the oil.

***NOTE:*** ***In order to prevent dislodging of the seals it is absolutely essential that the stated testing pressure limits are not exceeded.***

Oil chamber connection:
Remove pressure test screw (74) and seal ring (75) from motor housing. Screw pressure test tool (Sec 12.15), into test hole and apply pressure of ½ bar (7 psi). This process will check the sealing of the outer mechanical seal, and also the sealing between the oil chamber and motor chamber.

Motor chamber connection:
Remove pressure test screw (76) and seal ring (77) from bearing housing. Screw pressure test tool (Sec 12.15) into test hole and apply pressure of ½ bar (7 psi). This process will check the sealing of the motor chamber at cable entry, and also the sealing between the oil chamber and motor chamber.

Procedures:
The pressure test can be performed using any of the following procedures.

1. Connection to electrical pressure test equipment.
2. Lower into water. Leave motor submerged for a few minutes to allow trapped air to excape and observe any leaks which are indicated by a flow of bubbles.
   Raise pump from water and disconnect pressure from motorhousing first and then oil chamber.
3. The sealing between oil chamber and motorhousing (mechanical seal & DI probe) can be checked by applying pressure to the oil chamber as above and connecting a U-tube to the motor housing through the test hole to detect pressure difference in motorhousing. The U-tube should contain a small quantity of water in the bend, if it displaces then there is a leak from the oil chamber.

## Run test

A dry run test should be run to check the amps, voltage, and power drawn against rated data (see ABSEL or Technical Data Sheet for rated data).

# SECTION 7

# RECOMMENDED SPARE PARTS

# RECOMMENDED SPARE PARTS

We recommend that the Owner keep one (1) repair kit in stock. The repair kit includes bearings, mechanical seals and O-rings.

As of January 2023, the price for one (1) repair kit (part # 61705081) is $527.00

# SECTION 8

# MOISTURE AND OVERTEMP RELAYS

# ABS temperature and leakage relay CA 462

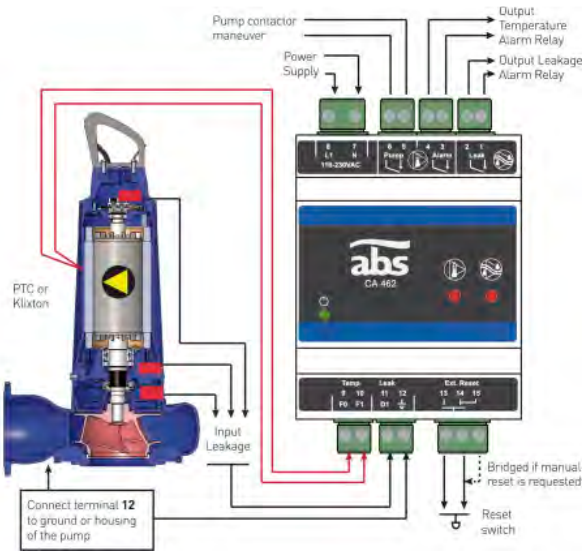
CA 462 is designed to spy and detect leakage and temperature in pumps and mixers.
The amplifier is housed in a norm enclosure fitted for DIN-rail mounting.
The unit is available in two executions, 24 VDC or 110-230 VAC supply.
To minimize the risk of false alarms the leakage failure has to be detected for time duration of approximately 10 seconds.
To simplify the mounting the unit is fitted with plug-in type of connectors.
The unit has separate alarm outputs for temperature and leakage.
CA 462 also has main contactor relay output energized depending on alarm/s with manual reset option.
Included in the kit is also a Xylem MiniCas adaptor.

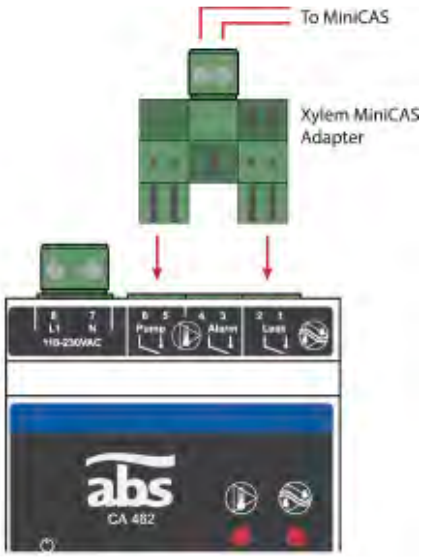

### Features

- Leakage monitoring with 10 sec alarm delay
- Temperature monitoring
- Relay output 250 VAC 3 Ampere
- Connection via plug in connectors
- DIN-rail mounted

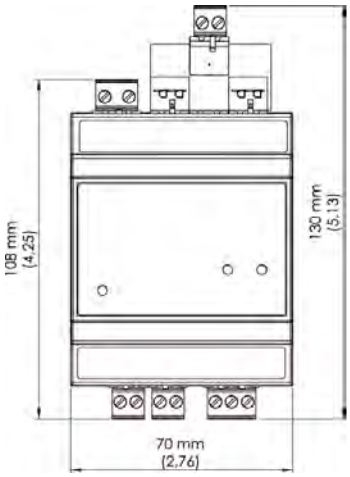
### Technical specifications

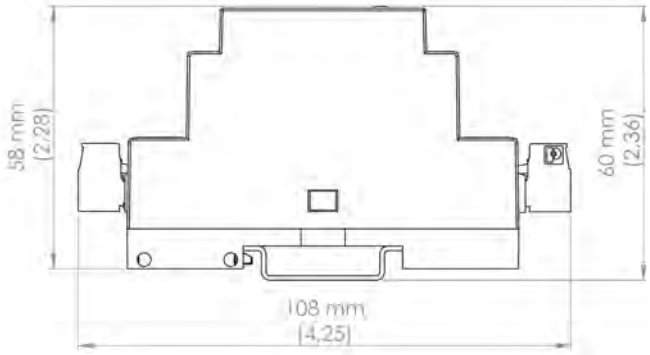
| | |
|---|---|
| Leakage detection threshold (+/-10%) | < 100 kohm |
| Temp. input threshold (+/-10%) | > 3.3 kohm (PTC / Klixon) |
| Leakage alarm delay | 10 seconds |
| Ambient operating temperature | -20 to +70 °C (-4 to +158 °F) |
| Ambient storage temperature | -30 to +80 °C (-22 to +176 °F) |
| Degree of protection | IP 20, NEMA: Type 1 |
| Housing material | PPO and PC |
| Mounting | DIN Rail 35 mm |
| Installation category | CAT II |
| Pollution degree | 2 |
| Flame rate | V0 (E45329) |
| Humidity | 0-95% RH non-condensing |
| Dimensions | H x W x D: 108 x 70 x 58 mm (4.25 x 2.76 x 2.28 in.) |
| Power supply | **16907006**: 110-230 VAC / **16907007**: 18-36 VDC SELV or Class 2 |
| Fuse | Max 10 A |
| Terminal wire size | Use copper (Cu) wire only. 0.2 - 2.5 $mm^2$ flexible core, stripped length 8 mm. |
| Terminal tightening torque | 0.56 - 0.79 Nm (5-7 lbs-in) |
| Power consumption | < 5 W |
| Max load alarm relays | 250 VAC 3 Ampere resistive load |
| Altitude | Max 2000 MASL or 6562 ft. AMSL |
| Max load output Pump blocking relay | 250 VAC 6 Ampere resistive load |



Dimensions




Alarm and relay function table:

| Leakage Led | Temp. Led | Pump Relay | Temp. Relay | Leakage Relay |
|---|---|---|---|---|
| Alarm | | Closed | Open | Closed |
| Alarm | Alarm | Open | Closed | Closed |
| | | Closed | Open | Open |
| | Alarm | Open | Closed | Open |

**Contacts 5 & 6 (motor overtemp): contacts are closed in a non-alarm state**
**Contacts 3 & 4 (motor overtemp): contacts are open in a non-alarm state**
**Contacts 1 & 2 (leakage): contacts are open in a non-alarm state**

# SECTION 9

# WARRANTY

SULZER

# Limited Product Warranty

**5 Year Pro-Rated | Municipal**

## XFP, AFP, AFL(X), VUP(X)* Permanent Type Installation

Manufacturer warrants the above referenced ABS brand equipment ("Products") to be free from defects in workmanship and materials as follows:

The warranty period shall be five (5) years from date of manufacturer provided startup, not to exceed 5 years 6 months from date of shipment. If authorized startup is not performed, the warranty shall be five (5) years from date of shipment. This warranty is contingent upon purchaser's or end user's payment of the applicable percentage of the list price (list price minus covered %) of the following parts in effect at time of replacement.

**Warranty Coverage**

| **Months** | 0 - 36 | 37 - 48 | 49 - 60 |
|---|---|---|---|
| **Percentage** | 100% Parts / 100% Labor | 75% Parts / 75% Labor | 50% Parts / 50% Labor |

When used in temporary/portable applications, the warranty period shall expire on the earliest of the below dates:

i) one (1) year from date of installation of the Products; or
ii) eighteen (18) months from date of shipment of the Products from Manufacturer.

Products or parts thereof that are replaced or repaired under warranty during the original warranty period, shall be covered under this warranty until the expiration of the original warranty period or ninety (90) days from the date of such replacement or repair, whichever is later. In any event, such extended warranty period shall not exceed ninety (90) days after the expiration of the original warranty period.

The warranties stated above are contingent upon start-up of the equipment on site by an authorized Manufacturer's representative, as verified by receipt of start-up reports completed and signed by an authorized Manufacturer's representative.
If during the warranty period, any Products fail to meet the requirements set out in this warranty, the purchaser or end user shall give written notification to Manufacturer stating the reasons therefor. Upon receipt of prior written authorization from Manufacturer, Products shall be transported to Manufacturer's authorized service center, prepaid, at purchaser or end-user's cost. Manufacturer's sole obligation shall be to repair, modify or replace Products or parts thereof, at Manufacturer's sole option. Products repaired under this warranty will be returned with freight prepaid. Products must be repaired by an authorized Manufacturer repair center for warranty coverage to be considered.

All protection features (such as moisture sensors, bearing monitors, and thermal overloads) incorporated in the Products must be connected and operable for warranty coverage. This warranty is valid only if Manufacturer supplied or authorized alarm monitoring components, cables and control components/panels are used.

This warranty shall not apply to any Products or parts thereof which have been (i) subjected to misuse, misapplication, accident, alteration, neglect, failure to act in a timely manner to address alarms/warnings, or physical damage; (ii) installed, operated, and/or maintained in a manner which is contrary to Manufacturer's written instructions as it pertains to installation, operation and maintenance of the Products, including but without limitation to being operated without being connected to monitoring devices supplied with specific products for protection; (iii) used in an application or for pumping liquids other than the use for which it is intended as specified in Manufacturer's product literature; (iv) damaged due to a defective power supply, improper electrical protection, faulty repair, ordinary wear and tear, corrosion, erosion or chemical attack, an act of God, an act of war or by an act of terrorism; (v) damaged resulting from the use of accessory equipment not sold by Manufacturer or not approved by Manufacturer for use in connection with Manufacturer's products; or (vi) repaired or altered without Manufacturer's written consent.

This warranty does not cover costs for standard and/or scheduled maintenance that is performed, nor does it cover Manufacturer's parts that, by virtue of their operation, require replacement through normal wear (aka: Wear Parts), unless a defect in material or workmanship is determined by Manufacturer. Wear Parts are defined as cutters, cutting plates, seals, bearings, impellers/propellers, diffusers, wear rings (stationary or rotating), volutes (when used in an abrasive environment), oil, grease, cooling fluids and/or any items deemed necessary to perform and meet the requirements of normal maintenance on all Manufacturer's equipment.

Manufacturer shall not be liable for any special, indirect, consequential, or punitive damages, or profit loss of any kind. Major components not manufactured by the Manufacturer are covered by the original manufacturer's warranty in lieu of this warranty. In addition to any other special, indirect or consequential damages referenced above, Manufacturer shall not be responsible for travel expenses, rented (replacement) equipment, pump removal fees, installation fees, outside contractors fees, or unauthorized repair shop expenses.

This warranty shall extend only to the initial end user.

**All other warranties, conditions and representation, expressed or implied by statue, common law or otherwise, in relation to the supply of the products including but not limited to the implied warranties or merchantability and fitness for a particular purpose are excluded to the extent permitted by law.**

*This warranty is applicable to Products supplied by Sulzer Pumps Solutions Inc. or Sulzer Pumps (Canada) Inc. for installation in the U.S.A. or Canada, unless specifically indicated otherwise in writing by Manufacturer.

DS-Z07-001 REV: 0 DATE: 08/17 Specifications Subject to Change Without Notice





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