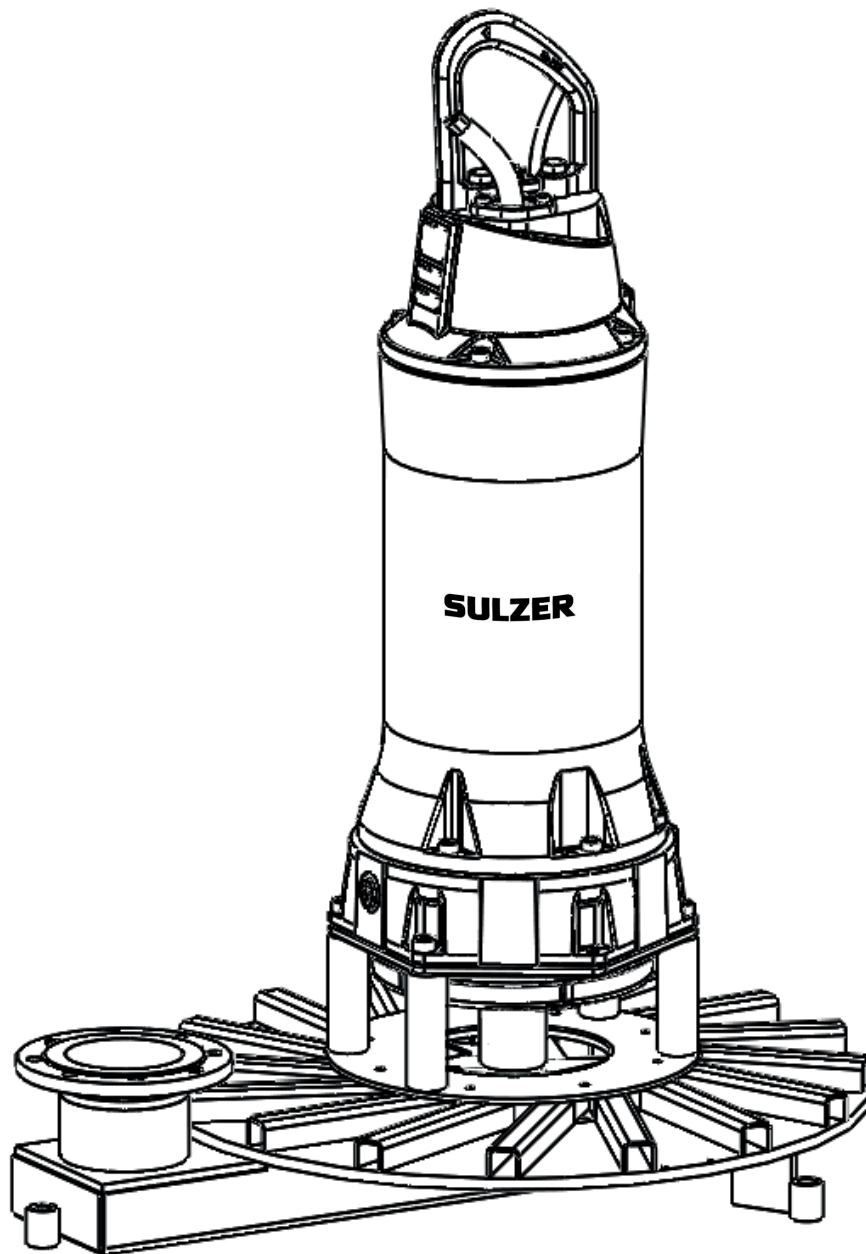

Submersible aerator type ABS XTA 152 - XTA/XTAK 2400



2502-0001

6006652-04 (12.2023)

en

Installation and operating instructions

Installation and Operating Instructions (Translation of original instructions)

for submersible aerator

XTA 152 (50/60 Hz) XTA 901 (50/60 Hz) XTA 2400 (50/60 Hz)

XTA 302 (50/60 Hz) XTA 1200 (50/60 Hz)

XTA 602 (50/60 Hz) XTA 1800 (50/60 Hz)

XTAK 602 (50/60 Hz) XTAK 1800 (50/60 Hz)

XTAK 901 (50/60 Hz) XTAK 2400 (50/60 Hz)

XTAK 1200 (50/60 Hz)

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Sulzer reserves the right to alter specifications due to technical developments !

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1 General

1.1 Introduction

These **Installation and Operating Instructions** and the separate booklet **Safety Instructions for Sulzer Products Type ABS** contain basic instructions and safety hints which must be observed during transport, installation and commissioning. For this reason it is essential that they are read by the installing technician as well as by relevant skilled operators or users. They should also be always available where the unit is installed.



Safety Instructions which might cause danger to life in case of non-observance have been specifically highlighted with the general danger symbol.



The presence of a dangerous voltage is identified with 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.*

NOTE *Used for important pieces of information.*

1.2 Correct usage of the products

The Sulzer products have been designed and built in accordance with the latest technology and taking into account the relevant safety regulations. However improper usage could cause a danger to life or limb of the user of a third party or cause damage or function impairment to the unit itself and other items of value.

The Sulzer units should only be used if they are in perfect technical condition taking into account all safety requirements and conscious of the need to avoid potentially dangers. The contents of the installation and operating instructions and the safety instructions must be applied! Any other usage (abnormal usage) or usage beyond that specified will be considered as non-compliance.

The manufacturer/supplier will not accept any responsibility for damage due to this. The risk is borne by the user. In case of doubt the entire scope of the planned application must be approved by **Sulzer Pump Solutions Ireland Ltd.**

In the case of any faults arising, the Sulzer units should immediately be taken out of use and secured. The fault should be immediately rectified, or if necessary, contact your Sulzer Service Centre.

1.3 Application restrictions of the submersible aerators

The submersible aerators are available in the standard version for 50 Hz and 60 Hz.

Limitations: The ambient temperature range is 0 °C to + 40 °C (32 °F to 104 °F)

Immersion depth is depending on the motor power, *see chapter 1.5 Technical Data*



Sulzer submersible aerators of the XTA / XTAK series may not be used in flammable or explosive liquids or zones!



Submersible aerators may not be used in explosion-protected areas.

1.4 Application areas for the submersible aerators

Sulzer submersible aerators are generally used to transfer air from the environment into clean water, wastewater and sewage.

1.5 Technical data

The electrical data of the Sulzer submersible aerators XTA / XTAK depend on the operating point for which they have been designed. Independent from the operating point the following table contains the technical data of the motor.

The maximum noise level of all submersible aerators of the XTA / XTAK series under operating conditions i.e. in fully submerged position, is always < 70db(A) (at 10 m / 33 ft distance). The use of a Sulzer silencer will reduce the noise level to 55 db(A) at 10 m / 33 ft distance.

The weights in the dimension sheets refer to a cable length of 10 m. In the case of cable lengths exceeding 10 m the additional weight must be determined and added using the following table.

	EMC-FC / STBC4N8-F			S1BN8-F / H07RN8-F / 07BN8-F			S1BN8-F / H07RN8-F / 07BN8-F		
	Cable type	Weight kg/m		Cable type	Weight kg/m		Cable type	Weight kg/m	Weight lb/1000ft
	3x6/6KON	0.4		2 x 4 G 4 + 2 x 0.75	0.6	G-GC	AWG 8-3	0.9	597
	3x10/10KON	0.7					AWG 6-3	1.2	764
	3x16/16KON	1.0		4 G 4	0.5		AWG 4-3	1.6	1070
	3x6/6KON + 3x1,5ST	0.6		4 G 6	0.5		AWG 2-3	2.3	1533
	3x25 + 3G16/3	1.5		4 G 10	0.8		AWG 1-3	2.8	1865
	3x35 + 3G16/3	1.9		4 G 16	1.3		AWG 1/0-3	3.5	2315
	3x50 + 3G25/3	2.6		4 G 25	1.8		AWG 2/0-3	4.1	2750
	3x70 + 3G35/3	3.6		4 G 35	2.3		AWG 3/0-3	5.0	3330
	3x95 + 3G50/3	4.7		4 G 50	3.0		AWG 4/0-3	6.1	4095
	3x120 + 3G70/3	6.0		4 G 70	4.2				
	3x150 + 3G70/3	7.1		4 G 95	5.5	Type W	AWG 1/0	0.7	480
	3x185 + 3G95/3	8.8		4 G 120	6.7		AWG 2/0	0.8	558
	3x240 + 3G120/3	11.0		7 G 1.5	0.5		AWG 3/0	1.1	742
	3x300 + 3G150/3	13.5		10 G 2.5	0.8		AWG 4/0	1.3	872
	1x185	2.2		4 G 1.5	0.2		250 MCM	1.7	1170
	1x240	2.7		8 G 1.5	0.4		300 MCM	1.9	1308
	1x300	3.4		10 G 1.5	0.5		350 MCM	2.3	1530
				12 G 1.5	0.5		400 MCM	2.5	1670
				1x150	1.8		500 MCM	3.1	2090
				1x185	2.2		646 MCM	3.6	2416
				1x300	3.4				
				1x400	4.1	SOOW	AWG 16/4	0.3	144
							AWG 16/8	0.4	222
							AWG 16/10	0.5	278
							AWG 16/12	0.5	305

1.5.1 Technical data 400 V/50 Hz

Hydraulics	Motor	Rated motor power*		Rated current (Mains voltage 380 - 420 V)	Immersion depth max.	Weight	
		P ₁ [kW]	P ₂ [kW]	[A]	[m]	XTA [kg]	XTAK [kg]
XTA 152	PE 40/4	4.5	4.0	8.4	4.0	130	-
XTA 302	PE 60/4	6.7	6.0	13.6	4.0	160	-
XTA 302	PE 90/4	9.9	9.0	18.1	6.0	180	-
XTA / XTAK 602	PE 110/4	12.0	11.0	21.2	3.0	320	380
XTA / XTAK 602	PE 160/4	17.4	16.0	30.5	6.5	340	400
XTA / XTAK 901	PE 185/4	20.0	18.5	36.9	4.5	306	361
XTA / XTAK 901	PE 220/4	23.7	22.0	42.5	7.5	306	361
XTA / XTAK 1200	PE 220/4	23.7	22.0	42.5	3.0	361	431
XTA / XTAK 1200	PE 300/4	32.1	30.0	58.5	6.0	371	441
XTA / XTAK 1200	PE 370/4	39.4	37.0	68.1	8.0	535	605
XTA / XTAK 1800	PE 370/4	39.4	37.0	68.1	4.0	540	615
XTA / XTAK 1800	PE 450/4	47.8	45.0	81.0	6.0	545	620
XTA / XTAK 1800	PE 550/4	58.1	55.0	94.1	9.0	790	865
XTA / XTAK 2400	PE 550/4	58.1	55.0	94.1	4.0	820	895
XTA / XTAK 2400	PE 750/4	78.9	75.0	131.0	7.0	835	910

*P₁ = Power taken from mains; P₂ = power at motor shaft, 10 m / 33 ft cable with free cable ends are supplied as standard.

1.5.2 Technical data 460 V/60 Hz

Hydraulics	Motor	Rated motor power*		Rated current	Immersion depth max.	Weight	
		P ₁ [kW]	P ₂ [kW]	[A]	[m]	XTA [kg]	XTAK [kg]
XTA 152	PE 45/4-60	5.0	4.5	8.2	2.5	130	-
XTA 152	PE 75/4-60	8.2	7.5	13.8	5.0	140	-
XTA 302	PE 105/4-60	11.4	10.5	17.7	5.0	180	-
XTA 302	PE 130/4-60	13.4	13.0	23.2	7.0	300	-
XTA / XTAK 602	PE 185/4-60	19.8	18.5	32.3	4.5	340	400
XTA / XTAK 602	PE 210/4-60	22.5	21.0	35.4	6.0	350	410
XTA / XTAK 901	PE 250/4-60	26.7	25.0	40.8	3.5	306	361
XTA / XTAK 901	PE 350/4-60	37.0	35.0	58.1	5.5	316	371
XTA / XTAK 1200	PE 350/4-60	37.0	35.0	58.1	3.5	371	441
XTA / XTAK 1200	PE 430/4-60	45.3	43.0	65.9	5.5	535	605
XTA / XTAK 1200	PE 520/4-60	54.7	52.0	78.0	8.0	540	615
XTA / XTAK 1800	PE 520/4-60	54.7	52.0	78.0	4.0	545	620
XTA / XTAK 1800	PE 630/4-60	66.1	63.0	89.8	7.0	790	865
XTA / XTAK 2400	PE 630/4-60	66.1	63.0	89.8	4.0	820	895
XTA / XTAK 2400	PE 860/4-60	90.2	86.0	125.0	7.5	835	910

*P₁ = Power taken from mains; P₂ = power at motor shaft, 10 m / 33 ft cable with free cable ends are supplied as standard.

1.6 Dimensions

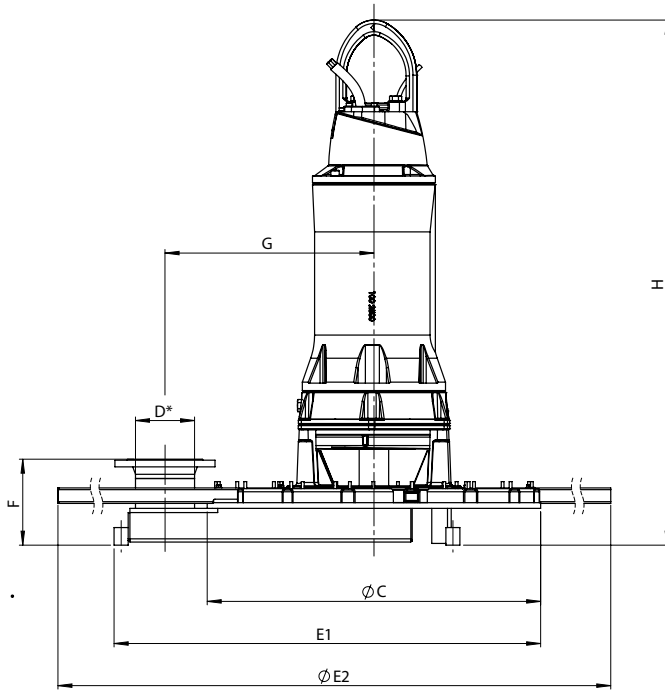
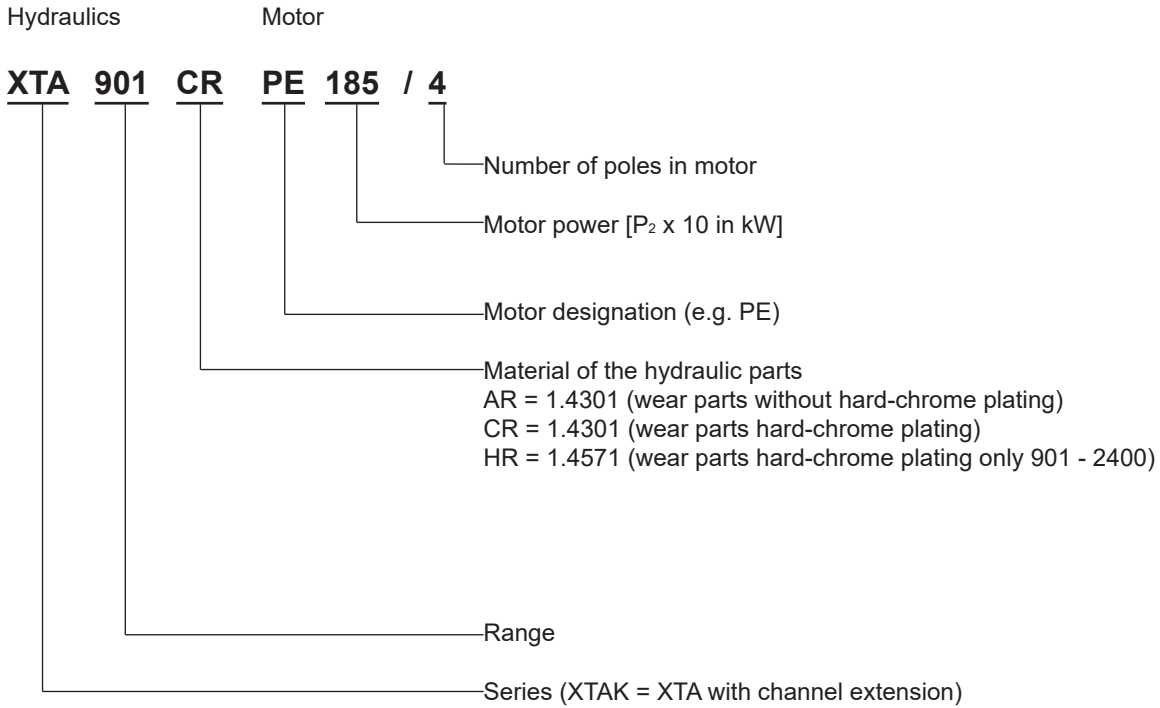


Figure 1 Dimensions

*Flanges according to DIN 1092-1, PN 16

Type of aerator		Ø C	D	E ₁ (XTA)	Ø E ₂ (XTAK)	F	G	H
50 Hz	XTA 152 PE 40/4	500	DN 80	675	-	185	310	785
	XTA 302 PE 60/4	690	DN 80	865	-	220	405	790
	XTA 302 PE 90/4	690	DN 80	865	-	220	405	860
	XTA / XTAK 602 PE 110/4	720	DN 100	940	3710	240	440	1325
	XTA / XTAK 602 PE 160/4	720	DN 100	940	3710	240	440	1325
	XTA / XTAK 901 PE 185/4	840	DN 125	1065	3845	250	510	1490
	XTA / XTAK 901 PE 220/4	840	DN 125	1065	3845	250	510	1490
	XTA / XTAK 1200 PE 220/4	950	DN 150	1215	3930	245	595	1495
	XTA / XTAK 1200 PE 300/4	950	DN 150	1215	3930	245	595	1495
	XTA / XTAK 1200 PE 370/4	950	DN 150	1215	3930	245	595	1575
	XTA / XTAK 1800 PE 370/4	950	DN 150	1215	4135	245	595	1570
	XTA / XTAK 1800 PE 450/4	950	DN 150	1215	4135	245	595	1570
	XTA / XTAK 1800 PE 550/4	950	DN 150	1215	4135	245	595	1960
	XTA / XTAK 2400 PE 550/4	1050	DN 150	1345	4025	270	650	1950
XTA / XTAK 2400 PE 750/4	1050	DN 150	1345	4025	270	650	1950	
60 Hz	XTA 152 PE 45/4-60	500	DN 80	675	-	185	310	785
	XTA 152 PE 75/4-60	500	DN 80	675	-	185	310	785
	XTA 302 PE 105/4-60	690	DN 80	865	-	220	405	860
	XTA 302 PE 130/4-60	690	DN 80	865	-	220	405	1290
	XTA / XTAK 602 PE 185/4-60	720	DN 100	940	3710	240	440	1325
	XTA / XTAK 602 PE 210/4-60	720	DN 100	940	3710	240	440	1325
	XTA / XTAK 901 PE 250/4-60	840	DN 125	1065	3845	250	510	1490
	XTA / XTAK 901 PE 350/4-60	840	DN 125	1065	3845	250	510	1490
	XTA / XTAK 1200 PE 350/4-60	950	DN 150	1215	3930	245	595	1495
	XTA / XTAK 1200 PE 430/4-60	950	DN 150	1215	3930	245	595	1575
	XTA / XTAK 1200 PE 520/4-60	950	DN 150	1215	3930	245	595	1575
	XTA / XTAK 1800 PE 520/4-60	950	DN 150	1215	4135	245	595	1570
	XTA / XTAK 1800 PE 630/4-60	950	DN 150	1215	4135	245	595	1960
	XTA / XTAK 2400 PE 630/4-60	1050	DN 150	1345	4025	266	650	1950
XTA / XTAK 2400 PE 860/4-60	1050	DN 150	1345	4025	266	650	1950	

1.7 Identification coding



0816-0002

Figure 2 Identification coding

1.8 Nameplate

It is recommended to enter the data of the unit supplied according to the original nameplate in figure 3.1 or figure 3.2 in order to be able to provide proof of data.

Type ②						⑤			
PN ③				SN ④		⑥			
U _N ⑦ V		3~ ②⑦ max. ∇ ⑧		I _N ⑨ A		⑩ Hz			
P _{1N} ⑪		P _{2N} ⑫		n ⑬		∅ ⑭			
T _A max. ⑮ °C			Nema Code ⑯			Hmin. ⑰			
DN ⑱		Q ⑲		H ⑳		Hmax. ㉑			
⑳		Weight ㉒		IP68 ㉓		㉔			
Motor Eff. Cl ㉕			<input type="checkbox"/> ← ㉖						
Sulzer Pump Solutions Ireland Ltd. Clonard Road, Wexford. Ireland. ①									

2500-0001

Figure 3.1 Nameplate PE550/4 - PE750/4 50 Hz, PE630/4 - PE860/4 60 Hz

Legend (Figure 3.1)

1 Address	15 Max. ambient temperature [flexible unit]
2 Type designation	16 Nema code (only at 60 Hz, e.g., H)
3 Article no.	17 Min. pumping height [flexible unit]
4 Serial number	18 Nominal width [flexible unit]
5 Order number	19 Pumping quantity [flexible unit]
6 Year of manufacture [month/year]	20 Pumping height [flexible unit]
7 Nominal voltage	21 Max. pumping height [flexible height]
8 Max. immersion depth [flexible unit]	22 Weight (without attached parts) [flexible unit]
9 Nominal current	23 Motor efficiency class
10 Frequency	24 Motor shaft direction of rotation
11 Power (consumption) [flexible unit]	25 Continuous operating mode
12 Power (output) [flexible unit]	26 Sound level
13 Rotation speed [flexible unit]	27 Phase connection
14 Impeller/Propeller \varnothing [flexible unit]	28 Protection method

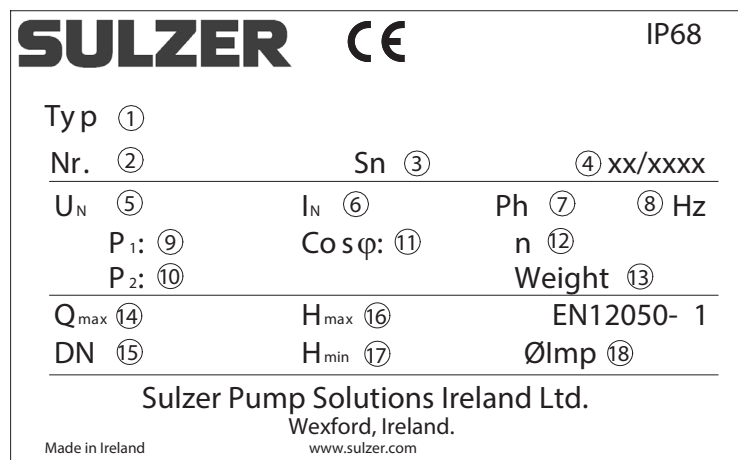


Figure 3.2 Nameplate PE40/4 - PE450/4 50 Hz, PE45/4 - PE520/4 60 Hz

Legend

1 Type designation	10 Nominal output power [kW]
2 Model number	11 Performance factor (pf)
3 Serial number	12 Rotating speed [1/min]
4 Manufacturing date (week/year)	13 Weight (without attached parts) [kg]
5 Nominal voltage [V]	14 Max. flow rate [m ³ /h]
6 Nominal current [A]	15 Outlet diameter [mm]
7 Phase number	16 Max. pumping height [m]
8 Frequency [Hz]	17 Min. pumping height [m]
9 Nominal input power [kW]	18 Rotor diameter [mm]

NOTE *In all communication please state type of the unit, item and serial number!*

NOTE *A nameplate with Ex marking refers only to the motor and not the entire unit!*

2 Safety

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

2.1 Personal protective equipment

Submersible electrical pumps can present mechanical, electrical, and biological hazards to personnel during installation, operation, and service. It is obligatory that appropriate personal protective equipment (PPE) is used. The minimum requirement is the wearing of safety glasses, footwear, and gloves. However, an on-site risk assessment should always be carried out to determine if additional equipment is required e.g. safety harness, breathing equipment etc.

3 Lifting

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

The duplicate nameplate provided must always be located and visible close to where the pump is installed (e.g. at the terminal boxes / control panel where the pump cables are connected).

NOTE! *Lifting equipment must be used if the total unit weight and attached accessories exceeds local manual lifting safety regulations.*

The total weight of the unit and accessories must be observed when specifying the safe working load of any lifting equipment! The lifting equipment, e.g. crane and chains, must have adequate lifting capacity. 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).

The end user assumes sole responsibility that lifting equipment is certified, in good condition, and inspected regularly by a competent person at intervals in accordance with local regulations. Worn or damaged lifting equipment must not be used and must be properly disposed of. Lifting equipment must also comply with the local safety rules and regulations

NOTE! *The guidelines for the safe use of chains, ropes and shackles supplied by Sulzer are outlined in the Lifting Equipment manual provided with the items and must be fully adhered to.*

4 Transport and storage

4.1 Transport



The unit must never be raised by the power cable.

The submersible aerator is packed at manufacture for vertical transport.

For transporting or installing and removing, the unit is equipped with a safety shackle that is designed for use with hoists. These connection points are dimensioned to support the aerator and accessories. If two connecting points are provided then both must be simultaneously connected to the lifting rope or chain.



The unit should be protected from rolling over!



The unit is prepared for transportation by placing it on an adequately strong, completely horizontal surface, taking care that it cannot topple over.



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 unit as well as the length of the lifting chain!

4.2 Transport securing devices

4.2.1 Motor connection cable moisture protection

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

ATTENTION *These protective covers should only be removed immediately prior to connecting the units electrically.*

Particular attention is necessary during storage or installation of units in locations which could fill with water prior to laying and connection of the power cable of the motor. Please note that the cable ends, even where fitted with protective sleeves, cannot be immersed in water.

ATTENTION These protective covers only provide protection against water spray or similar 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.

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

4.3 Storage of the units

ATTENTION The Sulzer products must be protected from weather influences such as UV from direct sunlight, high humidity, aggressive dust emissions, mechanical damage, frost etc. The Sulzer original packaging with the relevant transport securing devices (where used) ensures optimum protection of the unit. If the units are exposed to temperatures under 0 °C / 32 °F check that there is no water in the hydraulics, cooling system, or other spaces. In the case of heavy frosts, the units and cable should not be moved if possible. When storing under extreme conditions, e.g. in tropical or desert conditions, suitable additional protective steps should be taken. We would be glad to advise you further

NOTE Sulzer units do not generally require any particular maintenance during storage. By rotating the shaft several times by hand, new lubricating oil is applied to the sealing surfaces, thus ensuring perfect operation of the mechanical seals. The bearings supporting the motor shaft are maintenance-free.

5 Product description

5.1 Structural design

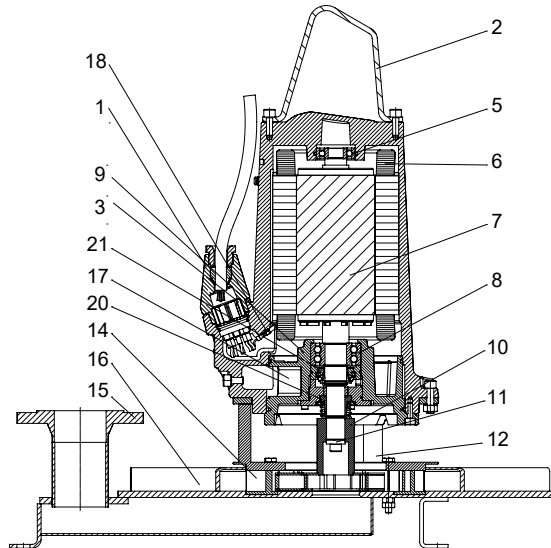


Figure 4.1 TXA/XTAK PE2 sectional drawing

2502-0016

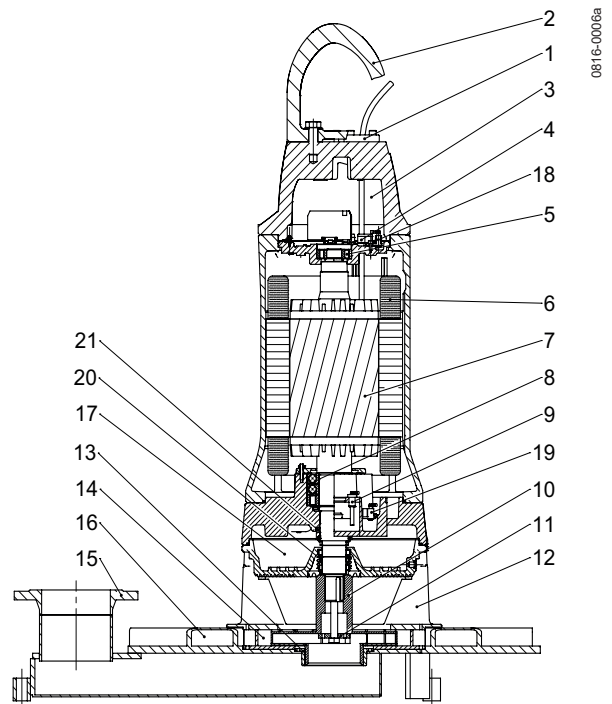


Figure 4.2 XTA / XTAK PE3-PE5 sectional drawing

0816-0008a

Legend (Figure 4.1 / 4.2)

- 1 Motor connection and control cable with cable insert
- 2 Safety shackle
- 3 Motor connection space
- 4 Cable feed-through
- 5 Upper motor shaft bearing
- 6 Motor winding
- 7 Motor shaft with rotor
- 8 Lower motor shaft bearing
- 9 Seal monitoring space
- 10 Runner
- 11 Flanged washer
- 12 Motor stand
- 13 Socket (up to XTA 901)
- 14 Channel ring
- 15 Air pipe flange
- 16 Stator ring
- 17 Seal chamber
- 18 Seal monitoring connection space (optional)
- 19 Motor compartment seal monitoring (optional)
- 20 Sliding ring seal (medium side)
- 21 Sliding ring seal (motor side)

5.2 Motor monitoring system

5.2.1 Leakage Sensor

The leakage sensors carry out the seal monitoring function, and by means of a special electronic device signal the ingress of moisture into the motor (for connection *see chapter 7.5*).

5.2.2 Temperature monitoring of the stator

Thermal limiters protect the stator from overheating in the case of asymmetric phase loading or voltage, continuous dry running, or excessive temperatures in the medium itself. The stator is equipped with three bimetallic thermal limiters (optional PTC, PT100) which are connected in series.

5.2.3 Temperature monitoring of the bearings (option)

In the case of existing bearing monitoring, a bimetal temperature limiter is built into the bearing flanges of the standard version. This enables premature switching off of the submersible motor (e.g., due to wear-related increase in bearings temperature).

Switching temperature:

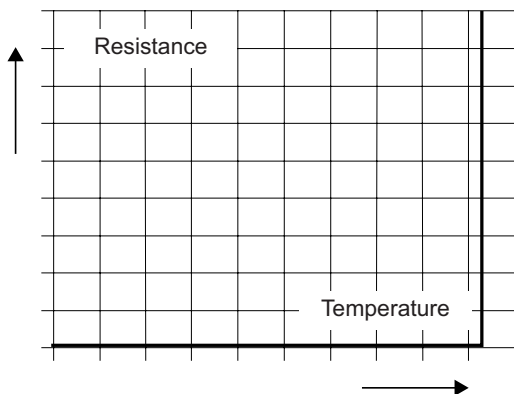
Upper bearing = 140 °C / 284 °F

Lower bearing = 130 °C / 269 °F

5.3 Temperature sensor indication

A continuous indication of the temperature in the stator and the bearings is not possible using bimetallic thermal limiters or thermistors. For this application it is necessary to fit thermal sensors of the type PT 100 with linear characteristics into the stator and bearing blocks. This type of resistor has a linear characteristic, i.e. the resistance rise is proportional to the temperature rise.

5.3.1 Temperature sensor bimetal



0562-0017

Application	Option
Function	Temperature switch using the bimetallic principle that opens at a rated temperature
Switching	Taking care not to exceed the allowable switching current, these can be fitted directly into the control circuit

Figure 5 Curve showing principle of operation of bimetallic temperature limiter

Operating voltage ...AC	100 V to 500 V ~
Rated voltage AC	250 V
Rated current AC $\cos \varphi = 1,0$	2.5 A
Rated current AC $\cos \varphi = 0,6$	1.6 A
Max. switching current at I_N	5.0 A

ATTENTION *The maximum switching ability of the thermal sensors is 5 A, the rated voltage 250 V. Explosion-proof motors which are connected to static frequency inverters must be fitted with thermistors. Activation must be by means of a thermistor protective relay device with PTB-Approval number.*

5.3.2 Temperature sensor PTC

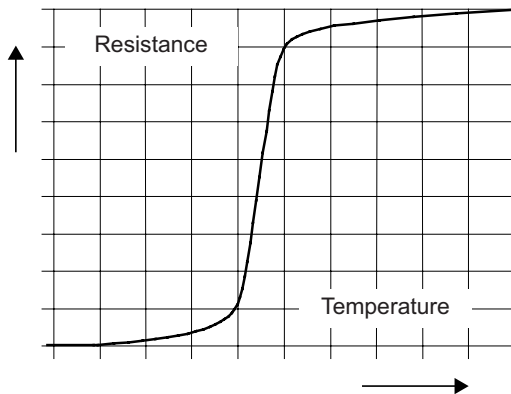


Figure 6 Curve showing principle of operation of thermistor

Application	Option
Function	Temperature-dependent resistance (no switch) curve with stepwise behaviour
Switching	Cannot be installed direct into the control circuit. Evaluation of the signal must be carried out by suitable electronic equipment

5.3.3 Temperature sensor PT 100

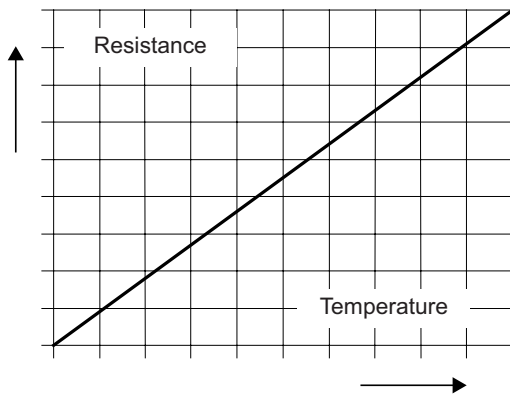


Figure 7 Curve showing principle of operation of PT 100

Application	Option (not for Ex)
Function	Function temperature-dependent resistance (no switch). The linear curve allows continuous measurement and indication of the temperature
Switching	Cannot be installed direct into the control circuit. Evaluation of the signal must be carried out by suitable electronic equipment

ATTENTION *Thermistors or PT 100 devices must never be directly connected into the control or power system. They must always be connected to a suitable evaluation device.*

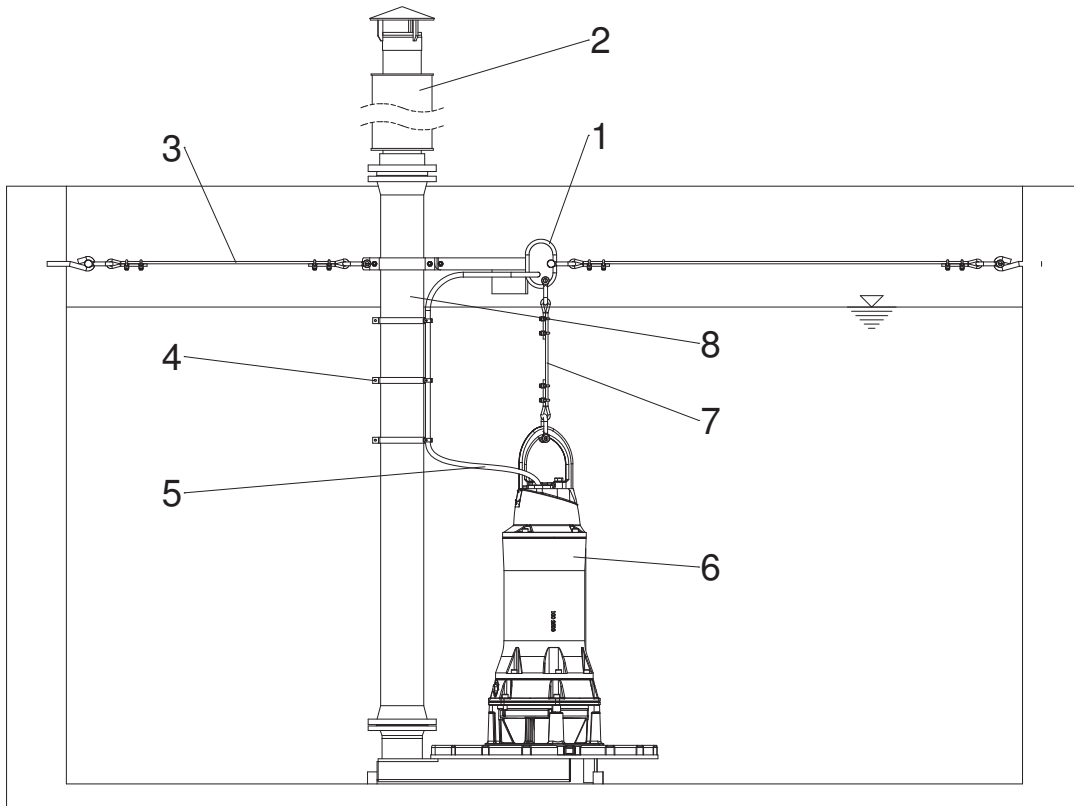
The thermal monitoring circuit must be wired into the motor contactors in such a manner that a manual reset is required.

6 Installation



The safety hints in the previous sections must be observed!

6.1 Installation examples



2502-0020

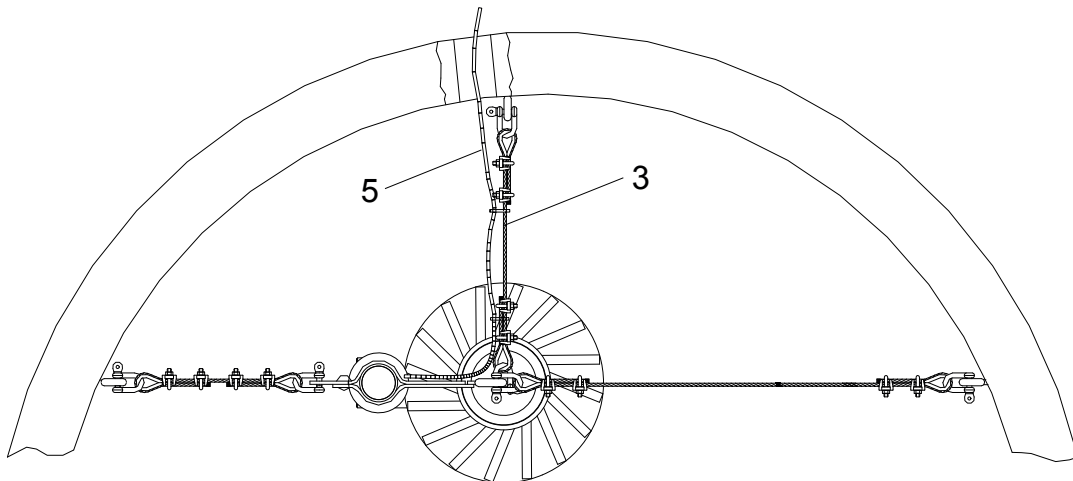


Figure 8 Installation in open basin

Legend

- | | | | |
|---|---------------------|---|----------------------------|
| 1 | Hook eyelet | 5 | Electric cable |
| 2 | Silencer | 6 | Sulzer submersible aerator |
| 3 | Back-up wiring rope | 7 | Wiring rope |
| 4 | Cable supporter | 8 | Air pipe |

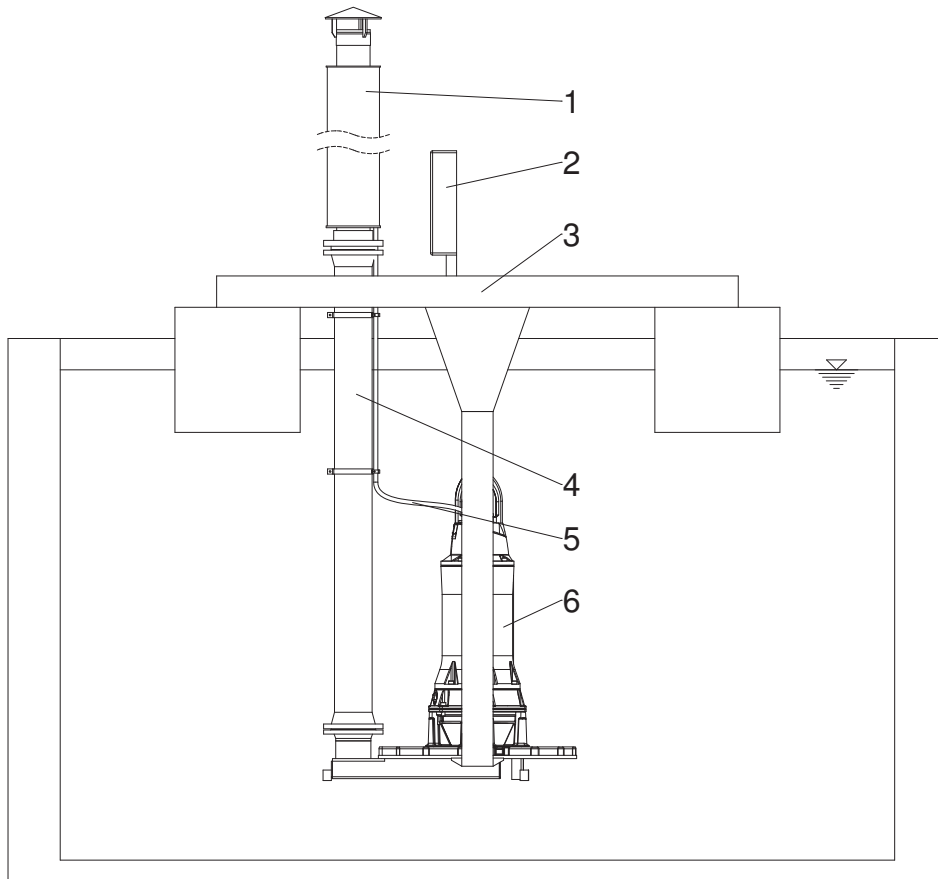


Figure 9 Submersible aerator with floating device

Legend

- | | |
|----------------------|------------------------------|
| 1 Silencer | 4 Air pipe |
| 2 Cable junction box | 5 Electric cable |
| 3 Floating raft | 6 Sulzer submersible aerator |

6.2 Installation of the Sulzer submersible aerator

The submersible aerators of the XTA series have been checked at the factory and are supplied fully assembled. In addition to that the separate channel extensions of the XTAK range have to be assembled at the user's site.

The assembly of the accessories takes place on site either on the tank floor of the empty tank or alongside the tank. The submersible aerator is brought to the installation or operating position with the aid of a suitable hoist.

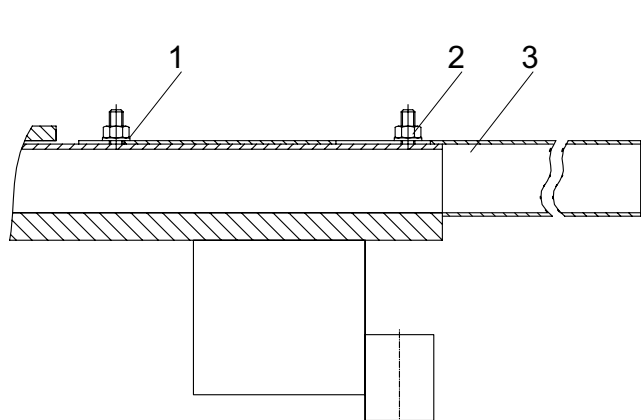
In pump stations/tanks, equipotential bonding must be carried out according to EN 60079-14:2014 [Ex] or IEC 60364-5-54 [non-Ex] (Regulations for the installation of pipelines, protective measures in high voltage systems).

NOTE

When installing the submersible aerator of the XTA / XTAK series in the tank the Sulzer recommendations as to positioning of the unit should be observed!

6.2.1 Assembly of the channel extensions of the XTAK range

Fit the separate delivered channel extensions (Figure 10) and fix them with the washers and hex nuts.



- 04-16-0013
- Legend**
- 1 Washer
 - 2 Hex nut (to be secured with LOCTITE type 243)
 - 3 Channel extension

Figure 10 Channel extension

ATTENTION Observe the tightening torques for stainless steel screws (see chapter 6.4)!

6.3 Accessories

HINT The accessories described below are not supplied as part of the standard execution and must be separately ordered.

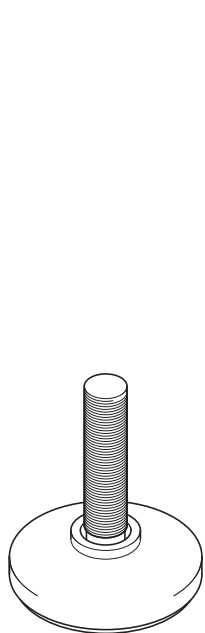


Figure 11 Hinged foot

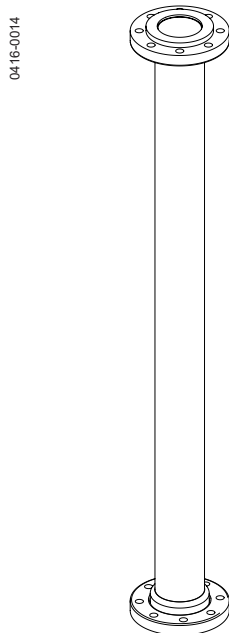


Figure 12 Air pipe

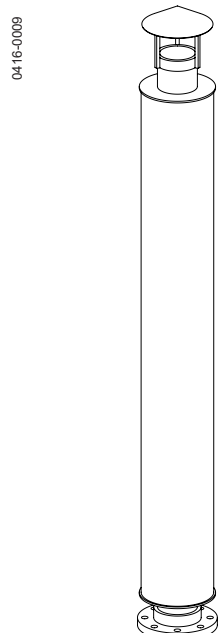


Figure 13 Silencer

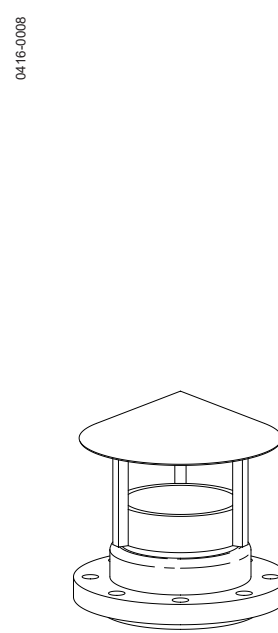


Figure 14 Weather cap

6.3.1 Hinged foot

In order to cope with uneven floors and for the protection of sensitive tank cladding it is possible to equip the Sulzer submersible aerators with hinged feet (see Figure 11). These feet have rubberised plates, that are fitted with a swivel joint. The hinged feet are connected to the aerator by means of a threaded rod that is adjustable in height.

6.3.2 Air pipe

In order to provide the submerged submersible aerator with the necessary atmospheric air, it must be fitted with an air pipe (see *Figure 12*). This must be sufficiently long so that the end of this pipe always ends at 0,5 m/1.6 ft over the surface, even at the highest liquid level.

Placed on the floor, air pipes consisting of several parts, must be pre-mounted to the intended total length. In that case the flange connections up to DN 100 inclusive are screwed down with four screws and one flat gasket each. Independent on the number of the flange holes, the flange connections bigger than DN 100 are provided with eight symmetrically arranged screws. The screw strength is up to DN 125 inclusive at M16. Beyond that M20 screws are used.

The screws should be inserted so that the nut points downwards when the pipe is in the installed position. Make certain to use washers under the nut. Screws of quality A2-70 (AISI 304) or better should be used. The screws should be tightened with the correct torque.

ATTENTION Observe the tightening torques for stainless steel screws (see chapter 6.4)!

6.3.3 Silencer and weather cap

The upper end of the air pipe should be fitted with a suitable protective cover so that no objects or birds can be sucked into the line. At the same time the free inflow of air should not be restricted. Sulzer can provide a weather proof cap (see *Figure 14*). This shaped piece with flange is fixed to the upper end of the air pipe with four or eight screws and a flat gasket.

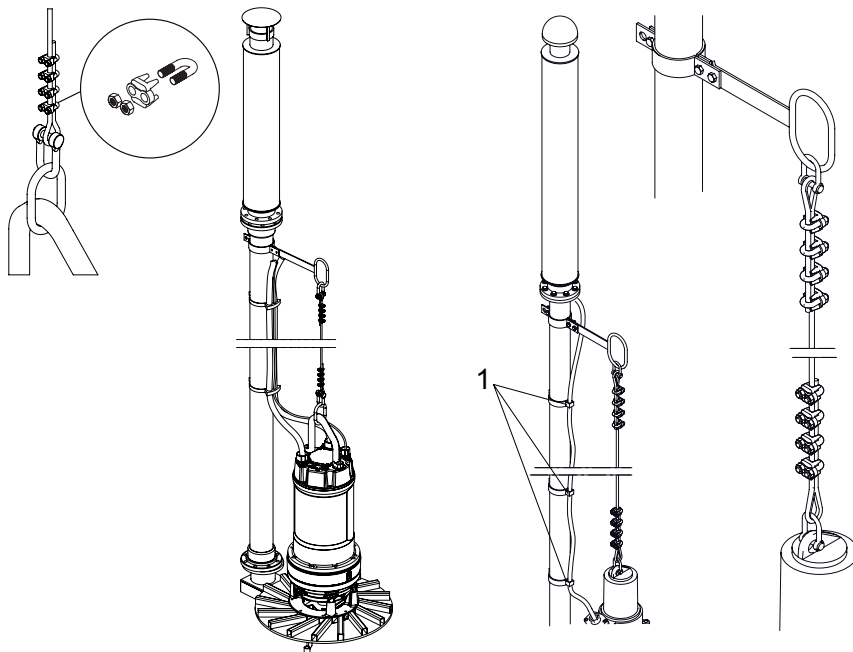
If at the same time the suction noise of the submersible aerator is to be reduced, then an adequately dimensioned silencer must be fitted. The silencer is fitted to the upper end of the air line in the same manner as the weather cap (see *Figure 13*).

6.3.4 Lifting rope / hook eyelet

A lifting device which is accessible from above the liquid surface must be fixed to the submersible aerator. Only by this means it is possible to lift the aerator out of a flooded basin.

All lifting elements must be adequately dimensioned for the application, with particular reference to the effects of fatigue or wear.

All lifting elements must be stainless steel of quality 1.4301 (AISI 304) or better.



1 = Cable fixing clamps

Figure 15 Mounting suggestions with rope fixing

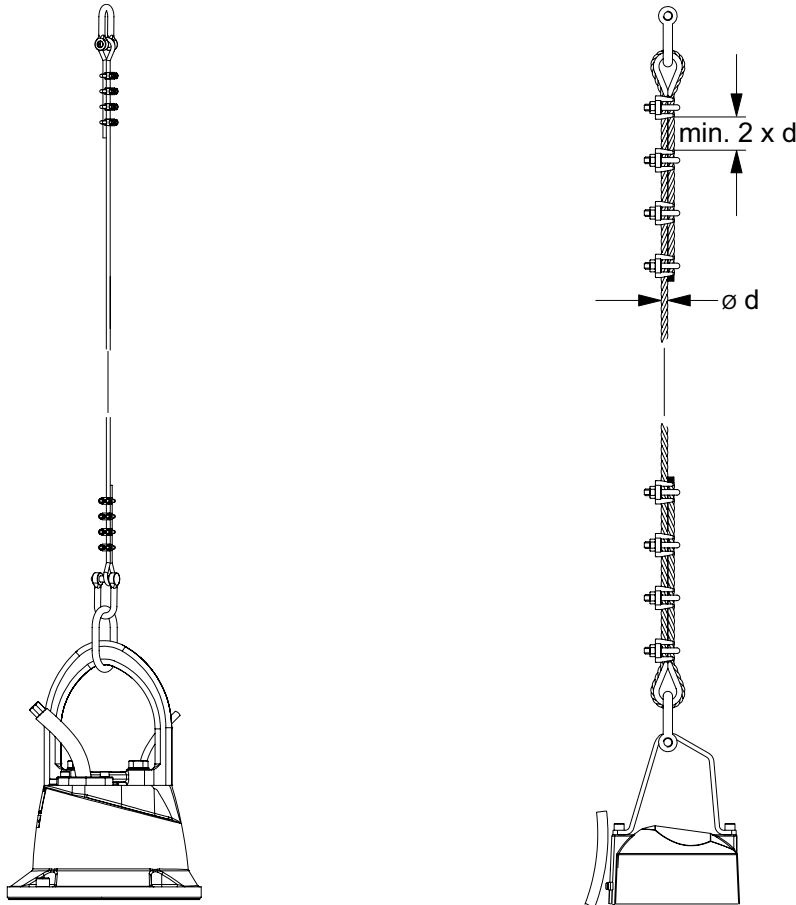
0416-0007

A wire rope is placed between the crane hook eyelet and the upper location points on the top of the motor. The material and dimensions of the wire rope should be such that a safety factor of five times the required strength is ensured. In addition the rope should exhibit no fraying or twists.

The fitting of thimbles or clamps to the rope ends should be carried out in a safe and proper manner.

The rope end is placed around the thimble. The loose rope end must have sufficient length to allow fitting of the required number of wire rope clamps (4 pcs.) at a suitable distance apart, which is at least twice the wire rope diameter. The loose wire rope end is placed parallel to the lifting portion and clamped by the first wire clamp immediately adjacent to the thimble. The semi-circular portion of the cable must be at the untensioned section of the wire rope.

ATTENTION **Observe the tightening torques for stainless steel screws (see chapter 6.4)!**



0416-0011

Figure 16 Rope fixing clamp, heavy version

ATTENTION **The u-type part of the rope stop must be fixed at the unloaded rope side! All shackle bolts have to be protected with a fixing wire against removing!**

Rope Ø d	Ø 8			Ø 10			
Motor 50 Hz/60 Hz	XTA 152	XTA 302	XTA 602	XTA / XTAK 901	XTA / XTAK 1200	XTA / XTAK 1800	XTA / XTAK 2400

The Sulzer crane hook eyelet is used if the only fixing point for the wire rope attached to the aerator, which is available, is the air pipe itself. This could be the case in open tanks (without a load carrying bridge). In this case the submersible aerator is generally placed in position with the aid of a mobile crane.

The crane hook eyelet is then fixed to the upper end of the air line. The oval eyelet serves simultaneously as a location for the hook of the mobile crane and as a connecting point for the lifting wire rope which is later to be fitted.

The crane hook eyelet consists of a 2-piece pipe clamp, a swivel joint and an oval eyelet. The pipe clamp is mounted on the end of the air pipe so that it is positioned above the final water level. The swivel joint must be

capable of swinging upwards when the air pipe is installed in a vertical manner. The crane hook eyelet must be orientated so that the final position of the oval eyelet lies on the axis of the submersible motor.

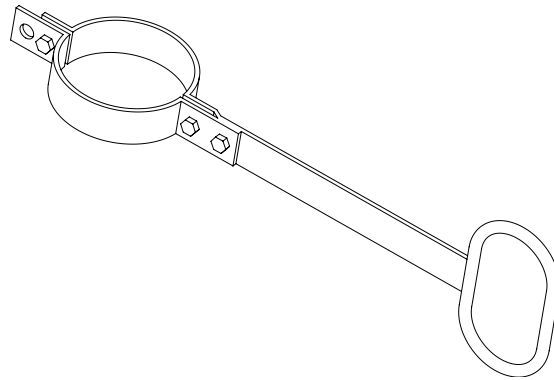


Figure 17 Crane hook eyelet

0416-0010

ATTENTION Observe the tightening torques for stainless steel screws (see chapter 6.4)!

After fitting of all accessory parts the cable or cables should be attached to the air pipe using suitable fixing clamps (see fig 15).

6.4 Tightening torque

Tightening torque for Sulzer stainless steel screws A4-70:							
Thread	M6	M8	M10	M12	M16	M20	M24
Tightening torque	7 Nm	17 Nm	33 Nm	56 Nm	136 Nm	267 Nm	460 Nm

PVC-flange screws	DN 80	DN 100	DN 125	DN 150
Tightening torque in Nm	40	45	50	60

6.4.1 Fitting position of the Nord-Lock® securing washers

ATTENTION Ensure that the fitting position and tightening torque of the Nord-Lock® securing washer is correct as in Figure 18 and table for tightening torque!

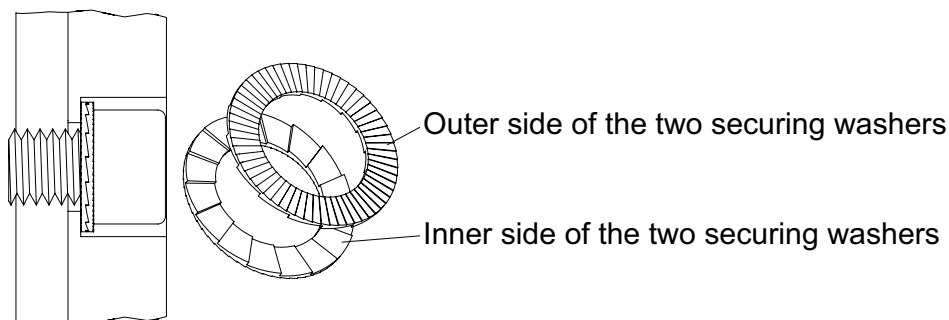


Figure 18 Correct fitting position of the Nord-Lock® securing washer

0562-0009

7 Electrical connection



The safety hints in the previous sections must be observed!

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 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 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.

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

ATTENTION Only operate submersible aerator with motor protection switch, connected temperature controller/limiter, and connected DI.

7.1 Standard connection diagrams, mains voltage 380 - 420 V at 50 Hz/460 V at 60 Hz

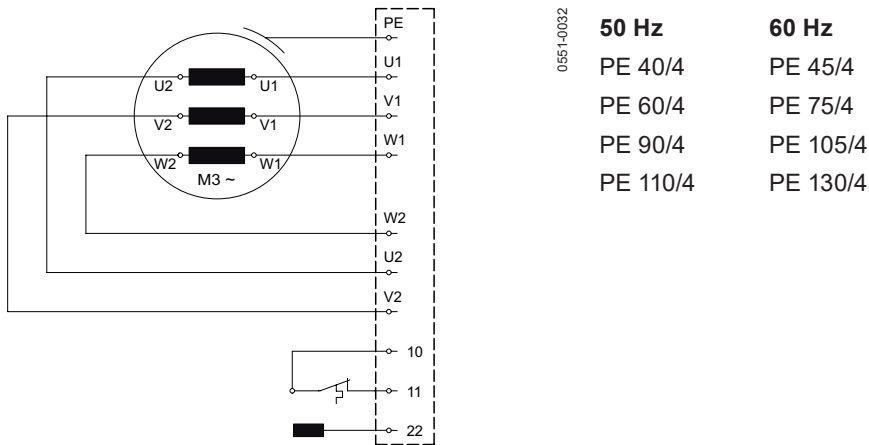


Figure 19 One power cable with integrated control leads

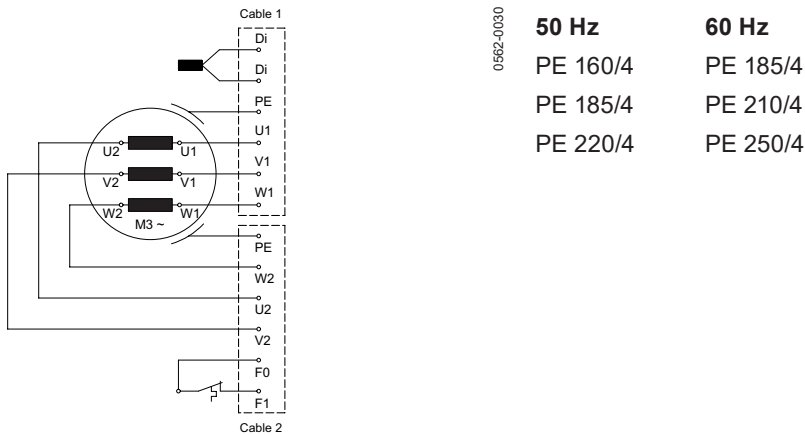
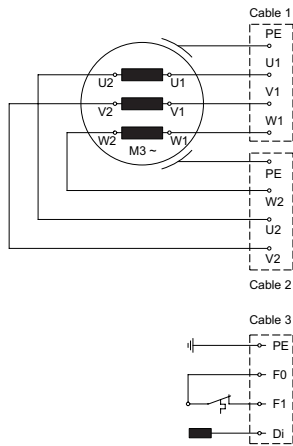


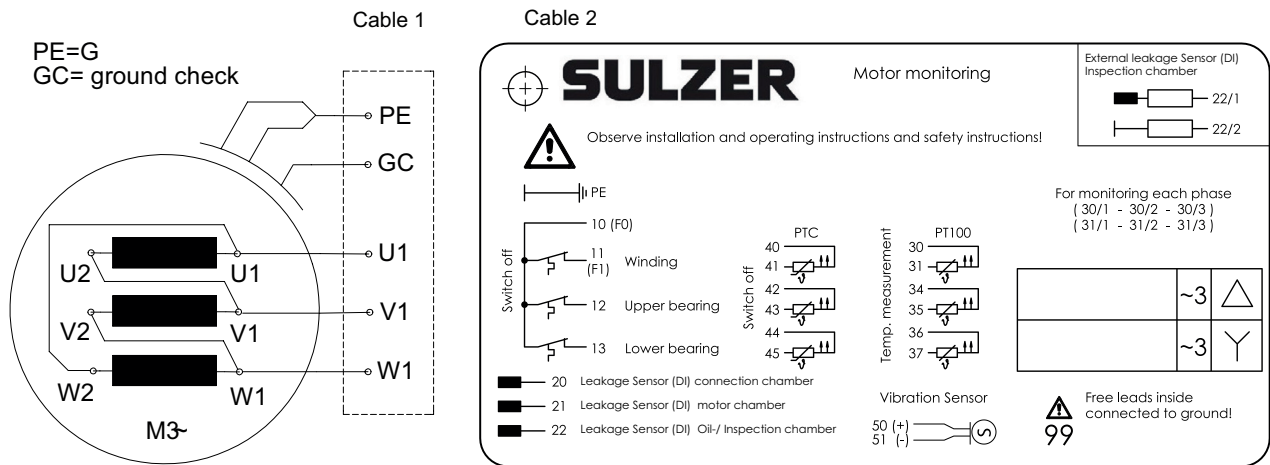
Figure 20 Two power cables, each with integrated control leads



0562-0031

50 Hz	60 Hz
PE 185/4	PE 210/4
PE 220/4	PE 250/4
PE 300/4	PE 350/4
PE 370/4	PE 430/4
PE 450/4	PE 520/4
PE 550/4	PE 630/4
PE 750/4	PE 860/4

Figure 21 Two power cables and one control cable



0562-0032

Figure 22 Special versions: two power cables and one control cable - for optional motor monitoring features

ATTENTION The cable leads are routed out of the motor. No switching takes place in the motor! Any switching required (use of bridges) must be carried out in the control panel.

NOTE Information on the type of starting can be obtained from the nameplate of the aerator.

7.2 Lead designations

Direct starting in star					
	L1	L2	L3	Join	
North America	T1 (U1)*	T2 (V1)*	T3 (W1)*		
Sulzer/Factory Standard	U1	V1	W1	U2 & V2 & W2	
Direct starting in delta					
	L1	L2	L3	-	
North America	T1 (U1)*	T2 (V1)*	T3 (W1)*	-	
Sulzer/Factory Standard	U1; W2	V1; U2	W1; V2	-	

*Optional labeling possible.

7.3 Operation with frequency inverters

The stator design and the insulation grade of the motors from Sulzer means that they are suitable for usage with VFD, according to IEC 60034-25:2022 / NEMA 61800-2:2005. It is however essential that the following conditions are met:

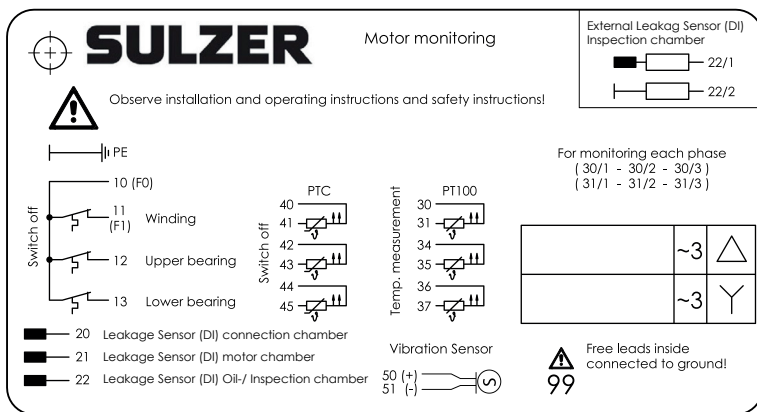
- The guidelines for EMC (electromagnetic compatibility) are complied with.
- **The lowest frequency must be set so that aeration is still ensured.**
- The maximum frequency must be set so the rated power of the motor is not exceeded. Make sure that the rated current specified on the nameplate is not exceeded after starting the motor. The maximum number of starts according to the motor datasheet may not be exceeded.

VFD's must be equipped with adequate filters when used in the critical zone. The filter chosen must be suitable for the VFD with regard to its rated voltage, wave frequency, rated current, and maximum output frequency. Ensure that the voltage characteristics (voltage peaks, dU/dt and rise time of the voltage spikes) at the motor terminal board are in accordance to IEC 60034-25:2022 / NEMA 61800-2:2005. This can be achieved using various types of VFD filters, depending on the specified voltage and cable length. Please contact your supplier for detailed information and the correct configuration.

7.4 Connection of the control circuit leads



The safety hints in the previous sections must be observed!



Control circuit leads for submersible aerators

- 10 = Common lead
- 11 = Stator upper
- 12 = Bearing upper
- 13 = Bearing lower
- 20 = Leakage Sensor-connection chamber
- 21 = Leakage Sensor-motor chamber
- 22 = Leakage Sensor-inspection chamber

= PE (green/yellow)

Figure 23 Designation of control circuit leads

NOTE The available connections can be obtained from the relevant connection diagram.

7.5 Connection of the seal monitoring unit to the control panel

The submersible aerators are supplied as standard with leakage sensor for seal monitoring. In order to integrate this seal monitoring function into the control panel of the pump it is necessary to fit a Sulzer DI-module and connect this in accordance with the circuit diagrams below.

ATTENTION If the leakage sensor is activated the unit must be immediately taken out of service. Please contact your Sulzer Service Centre.

NOTE Running the pump with the thermal and/or leakage sensors disconnected will invalidate related warranty claims.

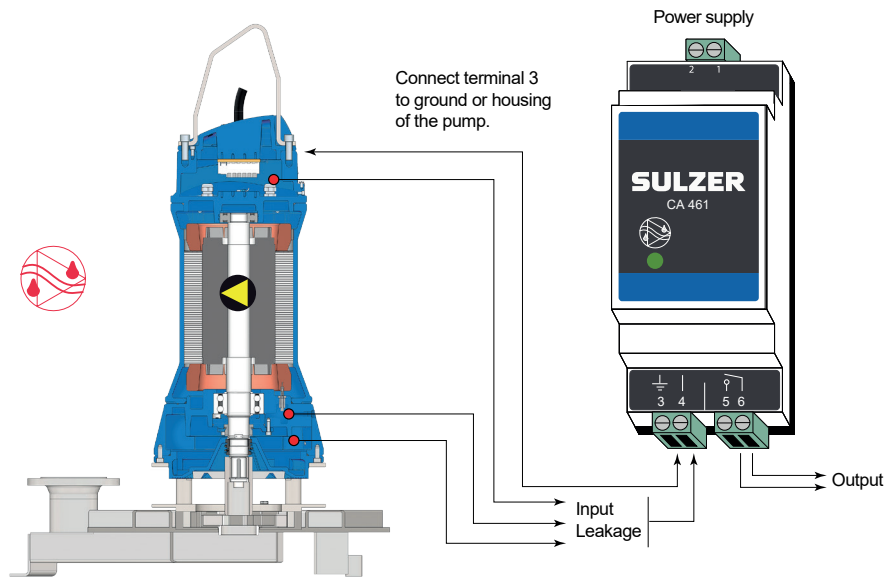


Figure 24 Electronic amplifier with collective signalling

Electronic amplifier for 50/60 Hz

110 - 230 V AC (CSA) (Part No.: 1 690 7010)

18 - 36 V DC (CSA) (Part No.: 1 690 7011)

ATTENTION *Maximum relay contact loading: 2 Ampere*

ATTENTION *It is very important to note that with the connection example above it is not possible to identify which sensor/alarm is being activated. As an alternative Sulzer highly recommends to use a separate CA 461 module for each sensor/input, to allow not only identification but also to prompt to the appropriate response to the alarm category/severity.*

Multiple-input leakage control modules are also available. Please consult with your local Sulzer representative.

8 Commissioning



The safety hints in the previous sections must be observed!

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

ATTENTION *When starting, or during every kind of operation, it must be ensured that the unit is fully flooded!*

- Has the electrical connection been made in accordance with current regulations?
- Have the thermal limiters/sensors been connected?
- Is the seal monitor installed?
- Is the motor protection switch correctly set?
- Have the power supply cables been correctly installed?
- Has the tank/basin been cleaned?
- Have the inflow and outflow channels to the tank been cleaned of all debris?
- Is the direction of rotation correct including when driven by an emergency generator?
- Has it been checked that there are no foreign objects in the hydraulics?
- Are the screens or sand traps necessary for correct operation of the plant in functional order?
- Has the air line been properly secured (wind loads)?

- Are the level controls functioning correctly?
- Are the required gate valves (where fitted) open?
- Do the non-return valves (where fitted) function easily?

8.1 Starting frequency of the motors

The allowable starting frequency per hour can be read from the table below (where not otherwise specified from the manufacturer)

Motor power	maximum starts per hour	at interval in minutes
4 ≥ 86 kW	15	4

ATTENTION *The allowable starting frequency for any starting devices should be obtained from the manufacturer of these devices.*

8.2 Checking direction of rotation



The safety hints in the previous sections must be observed!

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 unit 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!



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



When carrying out the direction of rotation check as well as when starting the unit pay attention to the **START REACTION**. This can be very powerful.

ATTENTION

The **direction of rotation** is correct if the impeller/propeller rotates in a **clockwise** manner when viewing down from the top of the placed unit

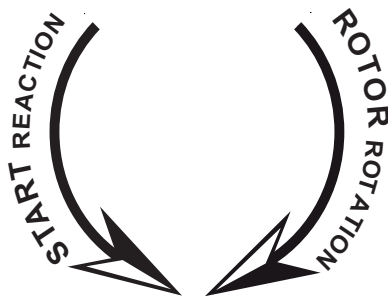


Figure 25 Rotor rotation

ATTENTION

The start reaction is **anti clockwise**

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

ATTENTION *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.*

8.3 Changing direction of rotation



The safety hints in the previous sections must be observed!



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.

NOTE *The direction of rotation measuring device monitors the direction of rotation of the mains supply or that of an emergency generator.*

9 Maintenance



The safety hints in the previous sections must be observed!

9.1 General maintenance hints



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

NOTE *The maintenance hints given here are not designed for “do-it-yourself” repairs as special technical knowledge is required.*

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

Sulzer submersible aerators are reliable quality products each being subjected to careful final inspection. Lubricated-for-life ball bearings together with monitoring devices ensure optimum aeration reliability provided that the unit has been connected and operated in accordance with the operating instructions.

Should, nevertheless, a malfunction occur, do not improvise but ask your Sulzer customer service department for assistance. This applies particularly if the aerator is continually switched off by the current overload in the control panel, by the thermal sensors/limiters of the thermo-control system, or by the seal monitoring system (DI).

The Sulzer service organisation would be pleased to advise you on any applications you may have and to assist you in solving your aerating problems.

NOTE *The Sulzer warranty conditions are only valid provided that any repair work has been carried out in Sulzer approved workshops and where original Sulzer spare parts have been used.*

9.2 Maintenance hints if the submersible aerator is out of use for a considerable period

NOTE *If the aerators have remained idle for more than 12 months then we recommend that you ask Sulzer or an approved distributor for advice.*

9.2.1 Before installation

The covers providing moisture protection for the cables (see section 4.2.1) should be only removed immediately before actual installation of the unit. After the removal of the transport securing devices and before connecting up the unit electrically the motor shaft should be rotated a number of times by turning the impeller or propeller by hand.

9.2.2 After installation

If, after installation of the submersible aerator, it remains out of use for prolonged periods, then we recommend that the unit be run for a maximum of one minute every three months in order to check both its functioning and availability.

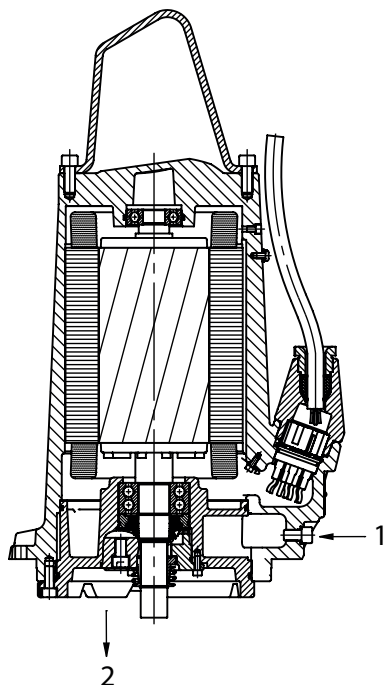
9.3 Lubricant changing



The safety hints in the previous sections must be observed!

ATTENTION Only lubricants released by the manufacturer should be used!

9.3.1 Lubricant changing PE2 motor



0582-0040

Legend

- 1. Lubricant filling
- 2. Lubricant emptying

Figure 26 Oil filling and emptying PE2 motor

9.3.2 Oil quantities (litres) PE2 motor

Motor PE2		XTA 152/302
50 Hz	60 Hz	
PE 40/4	PE 45/4-60	0.68
PE 60/4	PE 75/4-60	0.68
PE 90/4	PE 105/4-60	0.68

9.3.3 Lubricant changing PE3 - PE5 motor

PE3



Figure 27 Oil filling and emptying PE3 motor

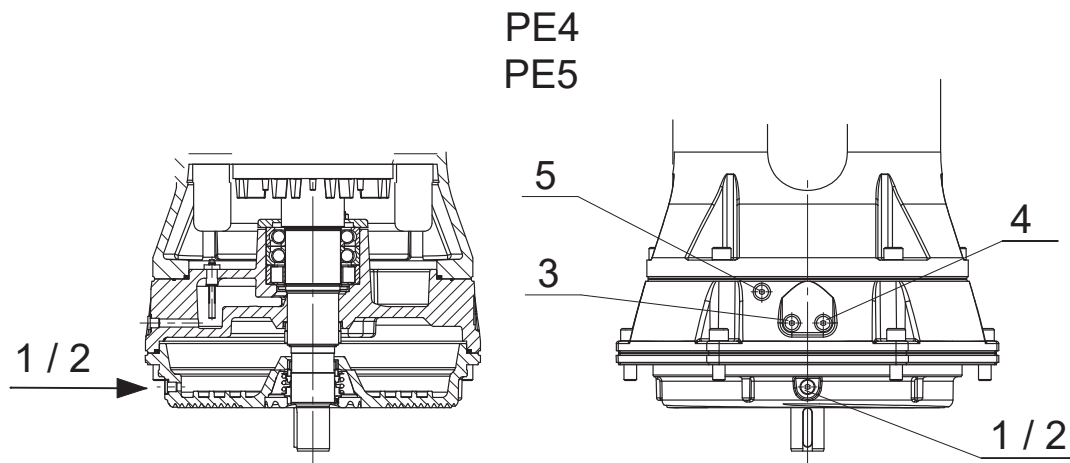


Figure 28 Oil filling and emptying PE4 and PE5 motor

- 1 Oil emptying (to exhaust)
- 2 Oil filling seal chamber, motor should be in horizontal position (quantities see 9.3.5).
- 3 Inspection hole seal chamber
- 4 Inspection hole engine bay
- 5 Oil filling inspection chamber, motor should be in horizontal position (quantities see 9.3.4).

9.3.4 Oil quantities inspection chamber (litres)

Motor	
PE3	0.42
PE4	0.6
PE5	1.5

9.3.5 Oil quantities seal chamber (litres)

Motor PE3		XTA 602/901/1200
50 Hz	60 Hz	
PE 110/4, PE 160/4	PE 130/4, PE 185/4, PE 210/4	8.0
PE 185/4, PE 220/4, PE 300/4	PE 250/4, PE 350/4	4.0

Motor PE4		XTA 1200/1800
50 Hz	60 Hz	
PE 370/4, PE 450/4	PE 430/4, PE 520/4	8.5

Motor PE5		XTA 1800/2400
50 Hz	60 Hz	
PE 550/4, PE 750/4	PE 630/4, PE 860/4	18.5

10 Removal of the submersible aerator



The safety hints in the previous sections must be observed!



Before removal of the unit the motor connection cables at the control panel should be completely disconnected by a qualified person from the mains and care should be taken that it cannot be inadvertently switched back on.

- Attach a suitable hoist fitting *according to chapter 3 and 6.3.4* to the aerator.
- Lift the aerator out of the tank/basin using the suitable hoist.
- Place the aerator vertically on a firm surface and take care that it cannot topple over.

