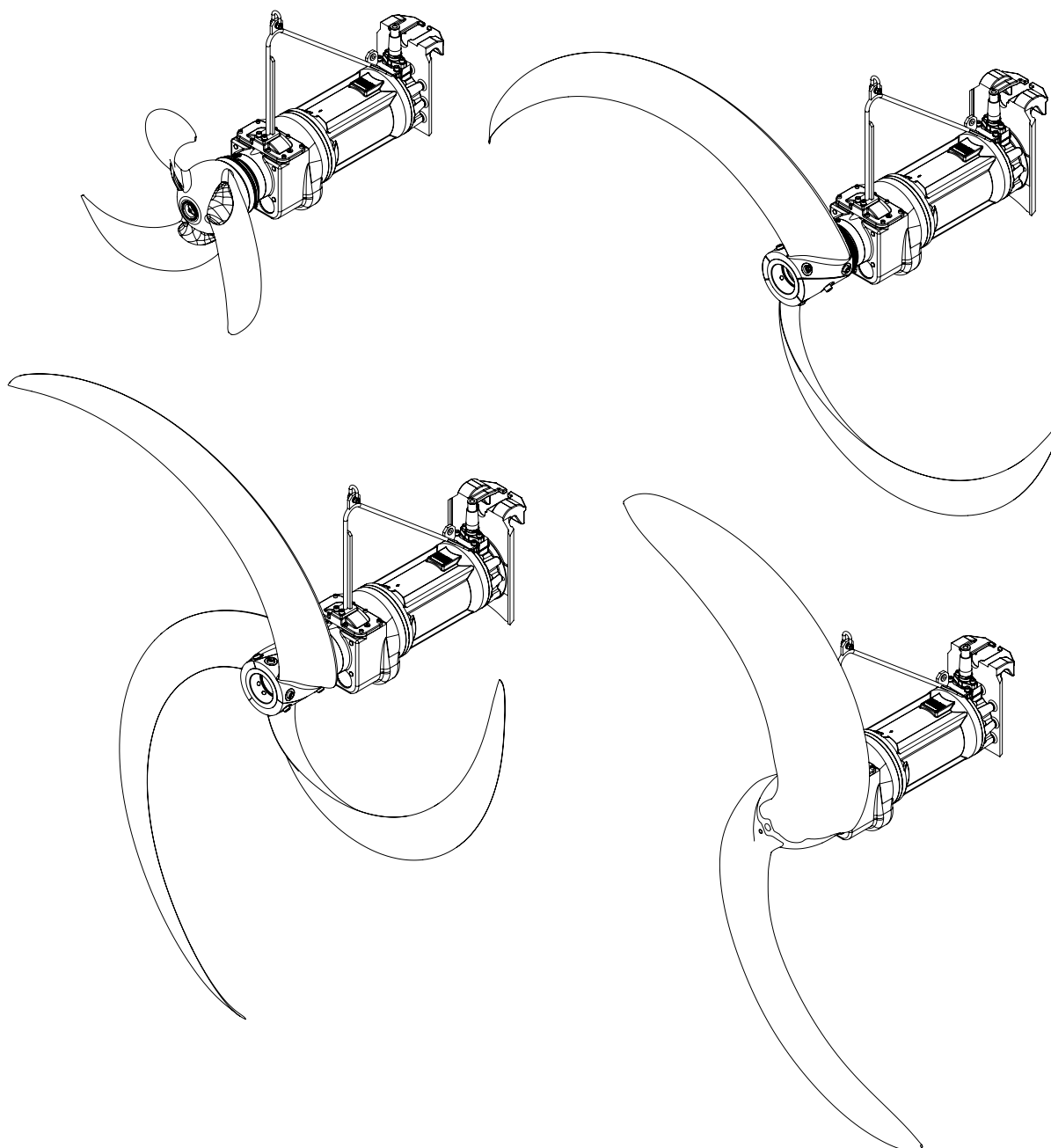


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## Flow booster type ABS XSB 900 - 2750

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0750-0001



## Installation and operating Instructions (Translation of original instruction)

for flow boosters type ABS XSB

### XSB 900 M

XSB 931 M	XSB 932 M	XSB 933 M	XSB 934 M
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### XSB 2500 M

XSB 1621 M	XSB 1821 M	XSB 2021 M	XSB 2221 M	XSB 2521 M
XSB 1622 M	XSB 1822 M	XSB 2022 M	XSB 2222 M	XSB 2522 M
XSB 1623 M	XSB 1823 M	XSB 2023 M	XSB 2223 M	XSB 2523 M
XSB 1624 M	XSB 1824 M	XSB 2024 M	XSB 2224 M	XSB 2524 M
XSB 1625 M	XSB 1825 M	XSB 2025 M		XSB 2525 M

### XSB 2750 LX

XSB 1431 LX	XSB 2231 LX	XSB 2531 LX	XSB 2731 LX
	XSB 2232 LX	XSB 2532 LX	XSB 2732 LX
	XSB 2233 LX	XSB 2533 LX	XSB 2733 LX

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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, erection, 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.



Situations which might result in danger of serious injury or death if the safety instructions are not observed have been specifically highlighted with the general danger symbol.



Warnings of an electric shock hazard are identified with this safety symbol.



This symbol warns of a potential explosion hazard.

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

**NOTE** *Used to draw attention to important information.*

References to figures, e.g. (3/2). The first digit refers to the figure number, the second digit to the item number in that figure.

## 1.2 Intended use

Sulzer products have been designed and built to state-of-the-art and in accordance with the relevant safety regulations. However improper use could cause a danger to life or limb of the user or third parties, or cause damage or functional impairment to the unit proper and other assets.

Sulzer products may only be used when they are in perfect technical condition, in accordance with the intended use and the safety regulations and in the manner described in the **installation and operating instructions!** Use in any other way does not constitute an intended use.

The manufacturer/supplier accepts no responsibility for any damage resulting from such use. The risk is borne by the user. In case of doubt, the intended application must be approved by **Sulzer Pump Solutions Ireland** ( in the following called Sulzer ), before use.

In the event of faults, the Sulzer products must be immediately switched off and secured. The fault must be remedied immediately. If necessary, contact Sulzer After-Sales Service.

## 1.3 Application limits of the flow boosters

The XSB flow boosters can be supplied both as standard versions and as explosion-proof versions (ATEX II 2G Ex h db IIB T4 Gb) for 50 Hz according to the standards (DIN EN 809:1998 + A1:2009 + AC:2010, EN ISO 80079-36, EN ISO 80079-37, EN 60079-0:2012 + A11:2018, EN 60079-1:2014, EN ISO 12100 : 2010).

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

Immersion depth max. 20 m (65 ft)

**ATTENTION** *Leakage of lubricants could result in pollution of the medium being pumped.*

**ATTENTION** *With cable lengths less than 20 m / 65 ft, the max. immersion depth is reduced accordingly. In special cases an immersion depth greater than 20 m / 65 ft is possible. However, the maximum number of starts according to the motor datasheet may not be exceeded. This requires the written approval of Sulzer.*



These products must not be used to pump inflammable or explosive liquids!



Only explosion-proof versions may be used in areas with a potential explosion hazard!

**For the operation of units as explosion-proof execution the following applies:**

In areas with a potential explosion hazard, care must be taken that the product is flooded or submerged when switching on and during operation. Other types of operation, e.g. snore operation or dry running, are not permitted!

The temperature of the Ex-proof flow boosters must be monitored with bimetallic temperature limiters or PTC thermistors to DIN 44 082 connected to a suitable release device certified in accordance with Directive 2014/34/EU.

**NOTE** *Ex protection method type c “Constructional Safety” and k “Liquid immersion” in accordance with EN ISO 80079-36, EN ISO 80079-37 are used.*

**ATTENTION** *XSB Flow boosters with ATEX II 2G Ex h db IIB T4 Gb approval is not equipped with a leakage sensor (DI) as an option in the gearbox oil chamber.*

**For operation of Ex-proof flow boosters:**

Ensure that the motor of the Ex-proof flow booster is always fully submerged during start-up and operation!  
 The motors must be protected by a device for direct temperature monitoring. This consists of temperature sensors installed in the winding (PTC thermistor to DIN 44 082) and a suitable release device function-tested in accordance with Directive 2014/34/EU and FM 3610.  
 Float switches, and any external seal monitoring (leakage sensor (DI), must be connected via an intrinsically safe electrical circuit, Protection Type EX (i), in accordance with IEC 60079-11 and FM 3610.  
 Machines designated as Ex-proof must never be operated on a mains frequency higher than the maximum of 50 Hz indicated on the rating plate.

**ATTENTION** *ATEX- and FM-rated units are approved for use in hazardous locations, and are fitted with a nameplate containing technical data and Ex certification. If an Ex rated unit is serviced or repaired in a workshop that is not Ex approved, it must no longer be used in hazardous locations. Where fitted, the Ex nameplate must be removed and replaced by a standard version. All Ex-relevant components and dimensions can be found in the workshop manual.*

**1.4 Fields of application of the flow boosters**

Flow booster type ABS XSB 900 - XSB 2750 are suitable for mixing, stirring and agitating in municipal sewage treatment plants and in industry.

**1.4.1 Special conditions for safe use**

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. Repairs on flameproof joints may only be performed in accordance with the manufacturer’s design specifications. Repair on the basis of the values in tables 2 and 3 of EN 60079-1 or annexes B and D of FM 3615 is not permitted.

**1.5 Identification code XSB**

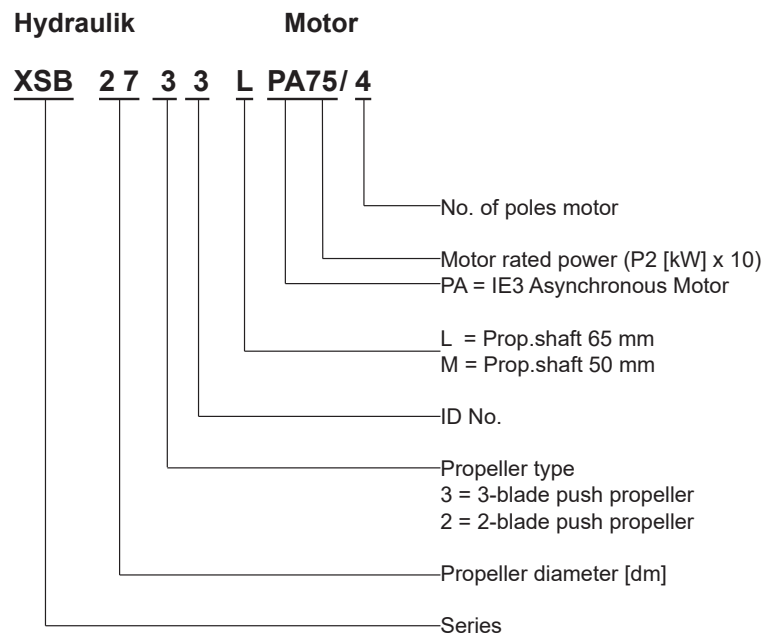


Figure 1 XSB Flow booster identification code

## 1.6 Technical data

The maximum sound pressure level of all products of the XSB Series is  $\leq 70$  dB(A). Depending on the installation, the maximum sound pressure level of 70 dB(A) or the measured sound pressure level may be exceeded.

**ATTENTION** *Maximum fluid temperature for continuous operation is 40 °C / 104 °F for a submerged unit.*

### 1.6.1 Technical data 50 Hz

Propeller			Motor 50 Hz							Weight
Flow booster type	Propeller diameter	Speed	Rated power consumption $P_1$	Rated power output $P_p$	Method of starting: Direct (D.O.L.)	Method of starting: Star/delta	Rated operating current at 400 V	Starting current at 400 V	Cable type	Total weight
	[mm]	[1/min]	[kW]	[kW]			[A]	[A]		[kg]
XSB 931 M	900	86	0.7	0.6	●		2.4	-	1	226
XSB 932 M	900	108	1.4	1.2	●		3.8	-	1	238
XSB 933 M	900	121	2.2	1.9	●		4.6	-	1	243
XSB 934 M	900	134	2.8	2.4	●		7.6	-	2	226
XSB 1431 LX	1400	86	5.8	5.0		●	12.5	-	3	278
XSB 1621 M	1600	47	0.9	0.7	●		2.4	-	1	300
XSB 1622 M	1600	54	1.5	1.3	●		3.8	-	1	305
XSB 1623 M	1600	61	2.3	2.0	●		4.6	-	1	310
XSB 1624 M	1600	68	3.3	2.8		●	7.6	-	2	305
XSB 1625 M	1600	87	5.3	4.6			12.5		3	300
XSB 1821 M	1800	42	1.0	0.8	●		2.4	-	1	305
XSB 1822 M	1800	47	1.4	1.2	●		3.8	-	1	300
XSB 1823 M	1800	53	1.7	1.5	●		3.8	-	1	300
XSB 1824 M	1800	61	3.1	2.7		●	7.6	-	2	305
XSB 1825 M	1800	64	3.8	3.3		●	8.4	-	2	305
XSB 2021 M	2000	39	1.3	1.1	●		3.8	-	1	305
XSB 2022 M	2000	47	1.9	1.6	●		4.6	-	1	310
XSB 2023 M	2000	53	2.4	2.1	●		4.6	-	1	310
XSB 2024 M	2000	60	3.6	3.1		●	7.6	-	2	305
XSB 2025 M	2000	64	4.2	3.6		●	8.4	-	2	305
XSB 2221 M	2200	39	1.3	1.1	●		3.8	-	1	305
XSB 2222 M	2200	47	1.9	1.6	●		4.6	-	1	310
XSB 2223 M	2200	53	2.8	2.4	●		4.6	-	1	310
XSB 2224 M	2200	61	4.5	3.9		●	11.4	-	2	300
XSB 2231 LX	2200	53	5.3	4.6		●	12.5	-	3	329
XSB 2232 LX	2200	57	6.3	5.5		●	14.9	-	3	344
XSB 2233 LX	2200	60	7.4	6.5		●	14.9	-	3	344
XSB 2521 M	2500	39	1.6	1.4	●		3.8		1	305
XSB 2522 M	2500	43	2.0	1.7	●		4.6		1	310
XSB 2523 M	2500	47	2.5	2.2	●		4.6		1	310

Propeller			Motor 50 Hz							Weight
Flow booster type	Propeller diameter	Speed	Rated power consumption $P_1$	Rated power output $P_p$	Method of starting: Direct (D.O.L.)	Method of starting: Star/delta	Rated operating current at 400 V	Starting current at 400 V	Cable type	Total weight
	[mm]	[1/min]	[kW]	[kW]			[A]	[A]		[kg]
XSB 2524 M	2500	53	3.5	3.0	●		7.6		2	305
XSB 2525 M	2500	57	4,3	3,7		●	11,4		2	300
XSB 2531 LX	2500	49	5,3	4,6		●	12,5	-	3	329
XSB 2532 LX	2500	53	6,4	5,6		●	14,9	-	3	344
XSB 2533 LX	2500	57	7,7	6,7		●	14,9	-	3	344
XSB 2731 LX	2750	49	5,5	4,8		●		-	3	315
XSB 2732 LX	2750	53	6,7	5,8		●		-	3	345
XSB 2733 LX	2750	57	8,0	7,0		●		-	3	345

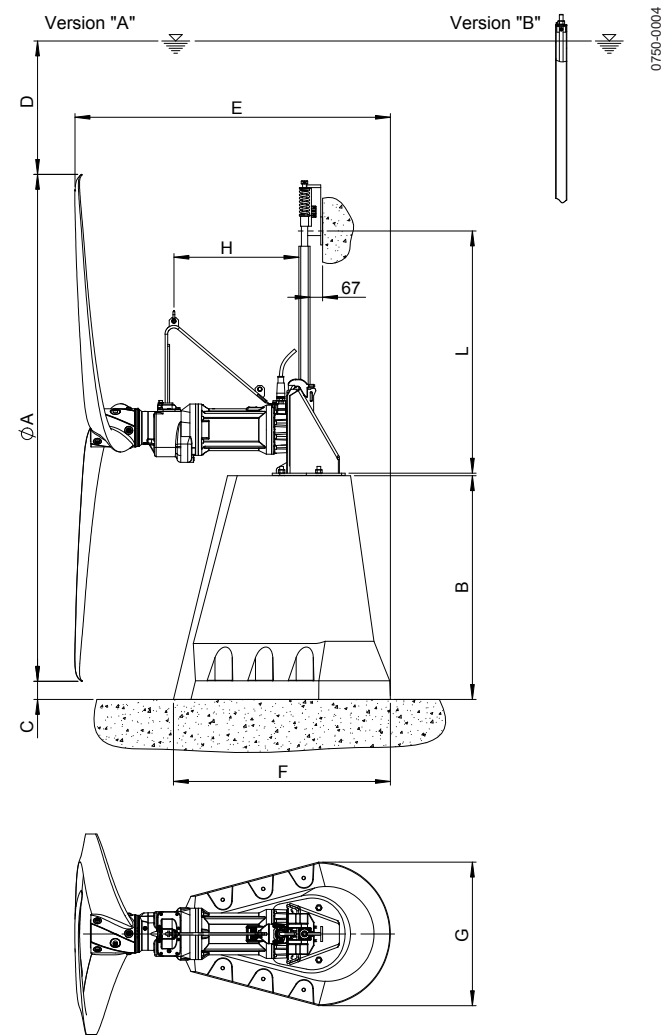
Cable type: 1 = 8G x 1.5. 2 = 10G x 1.5. 3 = 10G x 2.5. 10 m cable with free cable end are standard scope of supply

## 1.6.2 Technical data 60 Hz

Propeller			Motor 60 Hz							Weight
Flow booster type	Propeller diameter	Speed	Rated power consumption $P_1$	Rated power output $P_p$	Method of starting: Direct (D.O.L.)	Method of starting: Star/delta	Rated operating current at 480 V	Starting current at 480 V	Cable type	Total weight
	[mm]	[1/min]	[kW]	[kW]			[A]	[A]		[kg]
XSB 931 M	900	82		0.5	●		2.0	-	1	226
XSB 932 M	900	104		1.1	●		3.2	-	1	238
XSB 933 M	900	130		2.2	●		3.9	-	1	243
XSB 934 M	900	146		2.8	●		6.7	-	2	226
XSB 1431 LX	1400	82		4.3			11.1		2	278
XSB 2231 LX	2200	51		4.3		●	11.1	-	2	329
XSB 2232 LX	2200	56		5.1		●	11.1	-	2	329
XSB 2233 LX	2200	59		6.5		●	12.8	-	2	349
XSB 2531 LX	2500	46		4.0		●	12.5	-	2	329
XSB 2532 LX	2500	51		5.2		●	12.5	-	2	329
XSB 2533 LX	2500	56		6.3		●	14.9	-	2	349
XSB 2731 LX	2750	46		4.2		●	12.5	-	2	315
XSB 2732 LX	2750	51		5.5		●	14.9	-	2	320
XSB 2733 LX	2750	56		6.5		●	14.9	-	2	320

Cable type: 1 = 8G x 1.5. 2 = 10G x 1.5. 10 m cable with free cable end are standard scope of supply

1.7 Dimensions

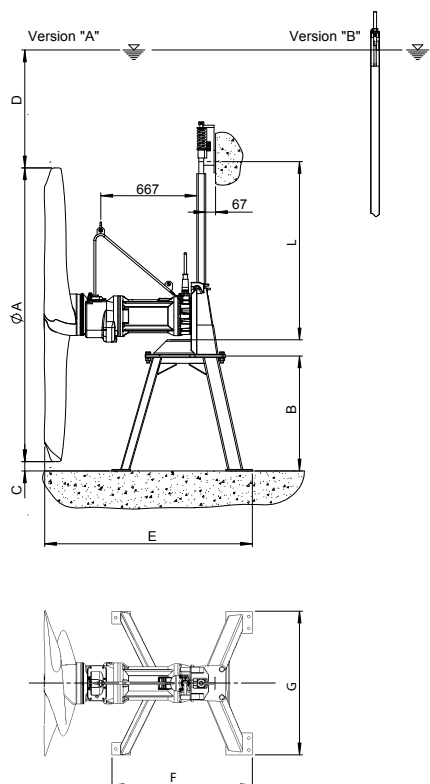


Dimensions concrete pedestal 400/780/1200 mm								
	$\varnothing A$	B	C	D	E	F	G	H
XSB 900M	900	400	234	500	1486	765	508	667
	900	780	611	500	1624	996	700	667
XSB 2500M	1600	780	264	900	1480	996	700	667
	1800	780	164	1000	1480	996	700	667
	2000	780	64	1100	1480	996	700	667
XSB 2750LX	1400	1200	757	750	1719	1164	769	686
	2200	1200	357	1200	1719	1164	769	686
	2500	1200	207	1350	1719	1164	769	686
	2750	1200	82	1500	1719	1164	769	686

Dimensions concrete pedestal 1030/2050 mm								
	$\varnothing A$	B	C	D	E	F	G	H
XSB 900M	900	1030	864	500	1624	996	700	667
	900	2050	1884	500	1773	1080	855	667
XSB 2500M	1600	1030	514	900	1480	996	700	667
	1800	1030	414	1000	1480	996	700	667
	2000	1030	314	1100	1480	996	700	667
	2200	1030	214	1200	1480	996	700	667
	2500	1030	64	1350	1480	996	700	667
	1600	2050	1534	900	1640	1080	855	667
	1800	2050	1434	1000	1640	1080	855	667
	2000	2050	1334	1100	1640	1080	855	667
	2200	2050	1234	1200	1640	1080	855	667
	2500	2050	1084	1350	1640	1080	855	667
	1400	2050	1607	1600	1689	1080	855	686
	2200	2050	1207	2050	1689	1080	855	686
XSB 2750LX	2500	2050	1057	2200	1689	1080	855	686
	2750	2050	932	2350	1689	1080	855	686

Figure 2 Concrete pedestal





		Dimensions steel pedestal 380/780 mm						
		Ø A	B	C	D	E	F	G
XSB 900M	900	380	210	500	1471	750	400	
	900	780	610	500	1551	952	975	
XSB 2500M	1600	780	260	900	1407	952	975	
	1800	780	160	1000	1407	952	975	
	2000	780	60	1100	1407	952	975	

Figure 3 steel pedestal

## 1.8 Nameplate

We recommend that you record the data from the original nameplate in *Figure 4* so that you can refer to the data at any time.




 <b>SULZER</b> 									
Type ②								⑤	
PN ③						SN ④		⑥	
U <sub>N</sub> ⑦ V		3~ ②⑦ max. ▽ ⑧		I <sub>N</sub> ⑨ A		⑩ Hz			
P <sub>1N</sub> ⑪		P <sub>2N</sub> ⑫		n ⑬		Ø ⑭			
T <sub>A</sub> 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				 ㉖					
<b>Sulzer Pump Solutions Ireland Ltd.</b> <b>Clonard Road, Wexford.</b> <b>Ireland.</b>									
①									

Figure 4 Nameplate

## Legend (Figure 4)

1	Address	15	Max. ambient temperature [flexible unit]
2	Type designation	16	Nema Code Letter (only at 60 Hz, e.g., H)
3	Art. 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 Operatin Mode
12	Power (output) [flexible unit]	26	Sound level
13	Rotation speed [flexible unit]	27	Phase connection
14	Impeller/Propeller ø [flexible unit]	28	Protection method

**NOTE** *Please state the type of unit, item number and serial number in all communications!*

**NOTE** *Additional country-specific nameplates possible.*

## 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 beforehand.

### 2.1 Personal protective equipment

These Sulzer units 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, transport and storage

### 3.1 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.*

## 3.2 Transport



The units must never be lifted at the motor power cable.

The units are fitted with a lifting hoop to which a chain can be fastened by means of shackles for transportation, installation or removal.



Secure the unit to prevent it from rolling away!



For transportation, the unit must be placed on an adequately strong, completely horizontal surface and secured to prevent it from tipping over. Do not stand or work in the swivel area of suspended loads!



The lifting hook height must take into consideration the total height of the unit and the length of the lifting chain!

## 3.3 Transport securing devices

### 3.3.1 Moisture protection of the motor power cable

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

**ATTENTION** *Remove these protective covers only immediately prior to connecting the unit electrically.*

Particularly when installing or storing the units in locations which could fill with water prior to laying and connection of the motor power cable, attention must be paid that the cable ends and protective covers cannot be immersed in water.

**ATTENTION** *These protective covers are only splash water-proof and are not water-tight. The ends of the motor power cables must therefore not be immersed in water, as otherwise moisture could enter the connection chamber of the motor. In such cases the ends of the motor power cable should be secured so that they are above the maximum possible flood level. Take care not to damage the cable or its insulation when doing this!*

## 3.4 Storage of the units

**ATTENTION** *The Sulzer products must be protected from weather influences such as UV radiation from direct sunlight, ozone, high humidity, aggressive dust emissions, mechanical damage, frost etc. The original Sulzer packaging with the relevant transport securing devices (where used) generally ensures optimum protection of the units. If the units are exposed to temperatures below 0 °C / 32 °F, ensure that there is no moisture or water in the hydraulic system, cooling system or other spaces. In the case of heavy frosts, the units and motor power cables should not be moved if possible. When storing under extreme conditions, e.g. in sub-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.*

## 4 Product description

### 4.1 Description of motor/motor monitoring system

#### Motor

- Three-phase squirrel cage motor.
- Operating voltage: 400 V 3~, 50 Hz / 480 V 3~, 60 Hz.
- Insulation class F = 155 °C / 311 °F, protection type IP68.
- Starting: Direct or star/delta, depending on the motor power.

## Shaft bearings

- The motor shaft is supported in lubricated-for-life, maintenance-free ball bearings.
- The shaft is sealed on the medium side by means of a silicone carbide slip ring seal, which is independent of the direction of rotation.

## Motor monitoring

- All motors are fitted with temperature monitors, which switch off the immersion motor in the case of excessive temperatures. The sensors must be correctly wired into the control panel.

## Seal monitoring

- The leakage sensor (DI) (in the connection chamber) in the gearbox and in the oil chamber perform the seal monitoring function and signal the ingress of moisture into the motor by means of a special electronic device (option: Sulzer DI module).

## Operation with frequency converters

- With the appropriate configuration, all flow boosters are suitable for operation with frequency converters. **The EMC Directive and the frequency converter manufacturer's installation and operating instructions must be observed!**

## 4.2 Structural design

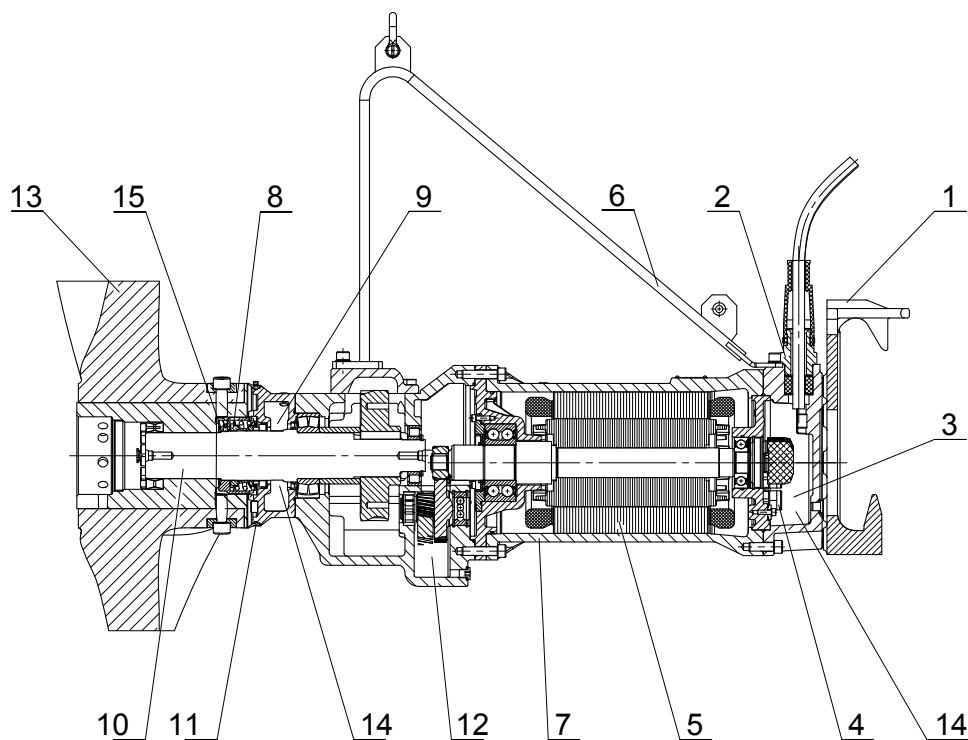


Figure 5 Cross-section of XSB

### Legend (Figure 5)

1	Bracket	9	Oil chamber
2	Cable inlet	10	Propeller shaft
3	Connection chamber	11	Solids deflection ring
4	Seal to motor chamber	12	Gearbox
5	Motor winding	13	Propeller
6	Lifting hoop with shackle	14	Leakage sensor (DI)
7	Motor housing	15	Support ring
8	Slip ring seal		

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### 4.3 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 when the motors are used with frequency inverters:

- The guidelines for EMC (electromagnetic compatibility) are complied with.
- Explosion-proof motors must be equipped with thermistors (PTC temperature sensors) if operated in hazardous areas (ATEX Zone 1 and 2).
- Machines designated as Ex machines may never, without exception, be operated using a mains frequency that is greater than the maximum of 50 or 60 Hz as indicated on the nameplate. Make sure that the rated current specified on the nameplate is not exceeded after starting the motors. The maximum number of starts according to the motor datasheet may not be exceeded.
- Machines that are not designated as Ex machines may only be operated using the mains frequency indicated on the nameplate. Greater frequencies can be used but only after consulting with and receiving permission from the Sulzer manufacturing plant.
- For operation of Ex-motors on frequency inverters special requirements in relation to the tripping times of the thermo control elements, must be observed.
- The lowest frequency must be set so that it is not falling below 30 Hz.
- The maximum frequency must be set so the rated power of the motor is not 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.

## 5 Installation



Oberserve the safety hints in the previous sections!

When carrying out any maintenance or repair work, the safety rules governing work in enclosed areas of sewage treatment or pumping plants as well as general rules of good technical practice must be observed.

### 5.1 Installation variants

The flow booster is supplied in two installations options, both available with the concrete and steel pedestal models.

#### Variant "A" (fixed installation)

In this installation variant the guide tube and guide tube holder is firmly fixed to the structure. The coupling piece is already bolted to the pedestal. The guide tube is prepared and assembled on site.

#### Variant "B" (Freestanding Installation)

In this type of installation the locking mechanism is integrated into the guide tube. The guide tube is manufactured off site to the correct length and fixed to the coupling piece. It simply necessary to screw the coupling piece and guide tube to the pedestal on site.

Where necessary, it is of course possible as an option to stabilize and fasten the **variant "B"** using additional bracing and brackets.

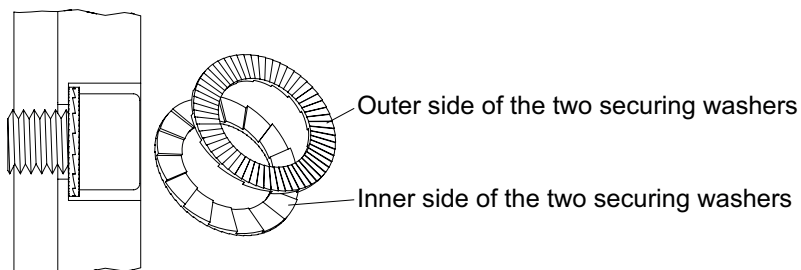
#### 5.1.1 Fitting of the pedestal

**NOTE** *The fitting of concrete and steels pedestal is described in detail in the separate "Installation Instructions for Concrete and Steel Pedestals".*

## 5.2 Tightening torque

Tightening torque for Sulzer stainless steel screws A4-70:							
Thread	M6	M8	M10	M12	M16	M20	M24
Tightening torque	6.9 Nm	17 Nm	33 Nm	56 Nm	136 Nm	267 Nm	460 Nm

### 5.2.1 Fitting position of the Nord-Lock® securing washers

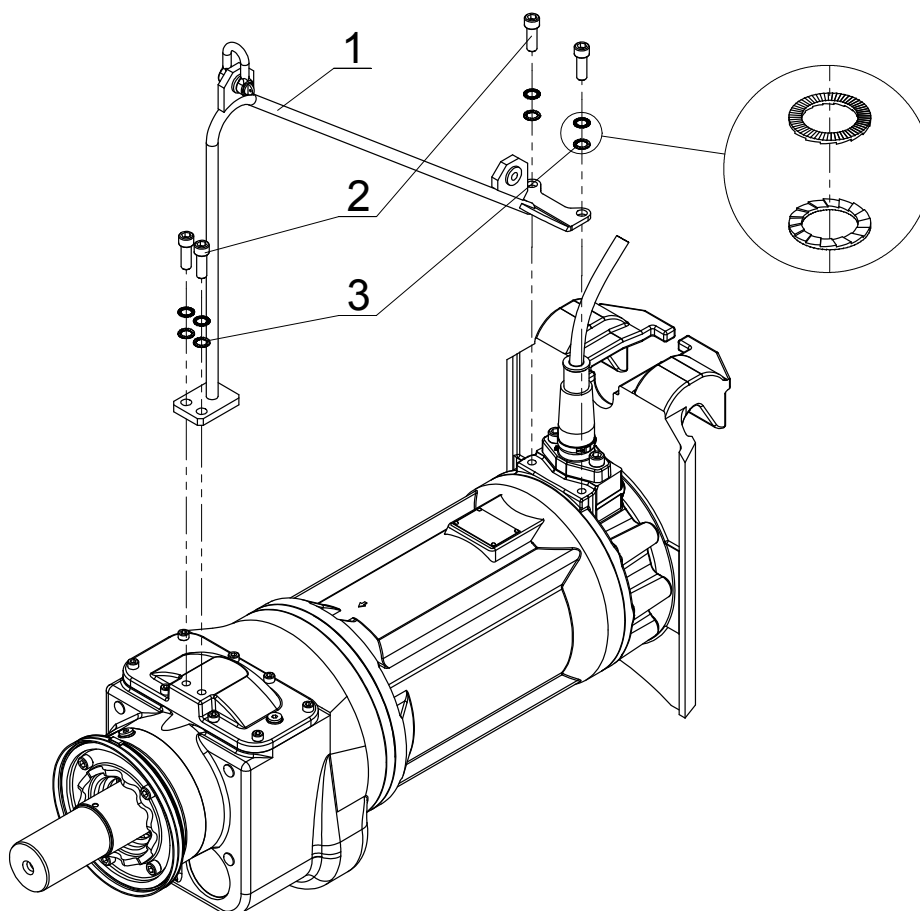


0562-0009

Figure 6 Correct fitting position of the Nord-Lock® securing washers

## 5.3 Fitting of the lifting hoop

- Fasten the lifting hoop (7/1) to the flow booster housing using screws (7/2) and Nord-Lock® securing washers (7/3). Tightening torque: 56 Nm.



0580-0007

Figure 7 Fitting of lifting hoop

**ATTENTION** Observe correct fitting position of the Nord-Lock® securing washers.

## 5.4 Checking the coupling system

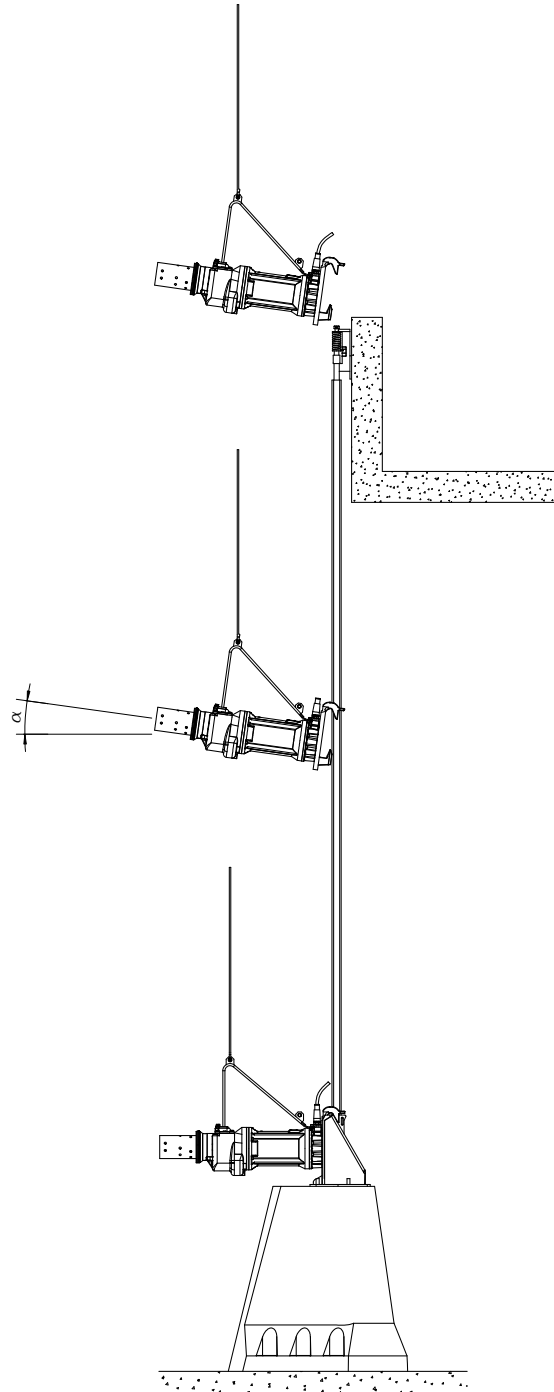


Observe the safety hints in the previous sections!

In order to check the coupling system, lower the XSB flow booster **without propeller** into the **empty tank** using a suitable hoist as *shown in Figure 8*. Only in this way can the proper engagement and disengagement be checked.

### NOTE

*A proper check of the engagement and disengagement system with the propeller fitted cannot be carried out in an empty tank as the floatation effect of the propeller is missing and the XSB flow booster cannot reach the correct inclined position.*



0750-0008

Figure 8 Checking the coupling system in the empty tank

**ATTENTION** Particular attention must be taken if a mechanical lifting tool (e.g. mobile crane) or a hoist with higher nominal lifting capacity is used. Ensure that the lifting force does not exceed 3000 N if the XSB flow booster gets stuck on the guide tube!

**Variant “A”:**

- Lower the flow booster and allow it to engage. Turn the screw on the tube holder in **clockwise direction** (guide tube is lowered) until the guide tube wedge at the lower end of the guide tube engages with the bracket of the flow booster. Tighten the screw until the indicator pin is inside the green marking of the spring tension indicator (see Figure 10).

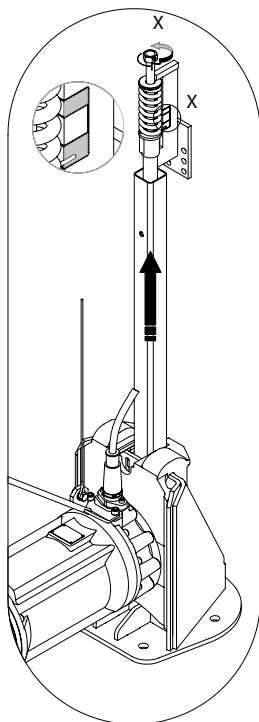


Figure 9 Disengagement of the coupling system

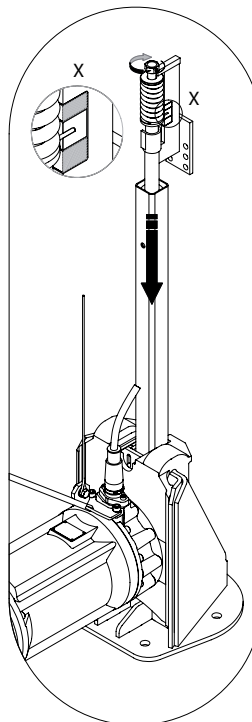


Figure 10 Engagement of the coupling system



### Variant "B":

- Lower unit and turn the screw on the top of the tube counter **clockwise** until the coupling system is locked. Tighten screw with **80 Nm** torque.

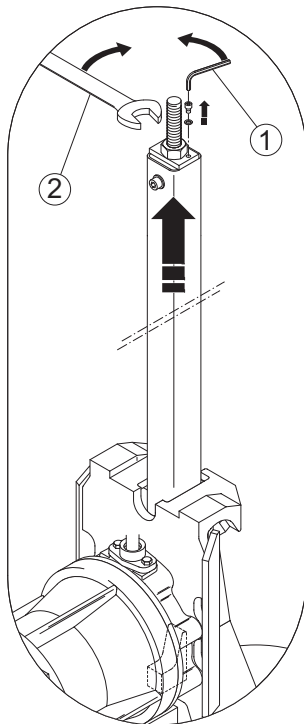


Figure 11 Unlocking of coupling system

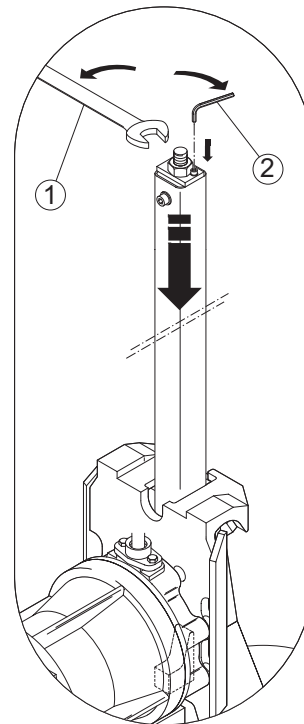


Figure 12 Locking of coupling system

- Connect the machine electrically as described in section 5.7 *Electrical connection*, relieve the motor power cable as described in section 5.6 and hang the motor power cable into the cable hook. Check the direction of rotation as described in section 5.8.



For safety reasons, the direction of rotation must be checked as described in section 5.8 - **without propeller blades** - i.e. before installation of the propeller blades!

## 5.5 Installation of the propeller blades

### 5.5.1 Installation of the propeller blades XSB 900 M; XSB 2500 M

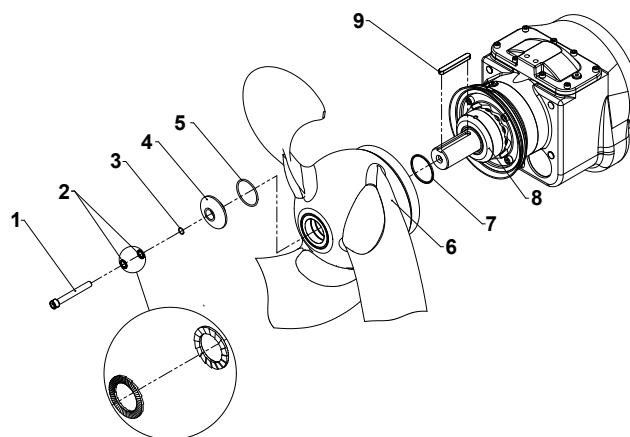


Figure 13 Fitting of the the propeller XSB 900 M

0750-0013a

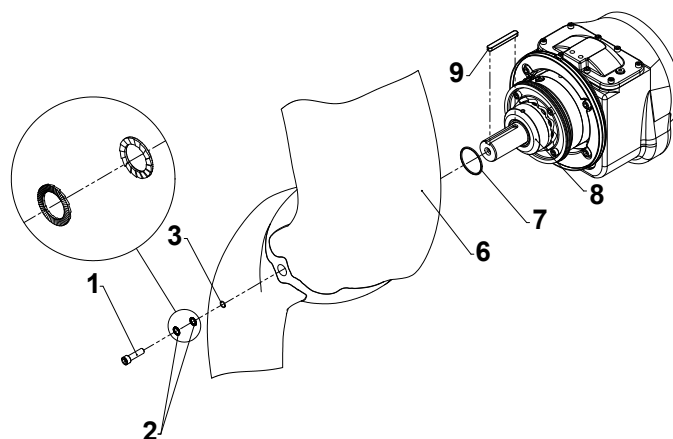


Figure 14 Fitting of the the propeller XSB 2500 M

### Legend

1 Socket head cap screw	3 O-Ring	5 O-Ring	7 O-Ring	9 Key
2 Nord-Lock® securing washers	4 Washer	6 Propeller	8 Fixing ring	

**NOTE**                    *The key (13+14/9) is already fitted in the factory.*

**ATTENTION**           *Observe correct fitting position of Nord-Lock® securing washers.*

- Lightly grease the propeller boss and shaft end.
- Lightly grease the o-ring (13+14/7) and place into the groove of the fixing ring (13+14/8).
- Set propeller with keyway aligned to key and press on.
- First place Nord-Lock® securing washers (13+14/2), and then O-ring (13+14/3) on the socket head cap screw (13+14/1).
- Screw in the socket head cap screw (13+14/1) and tighten with **torque of 56 Nm**.

### 5.5.2 Installation of the propeller blades XSB 2750 LX

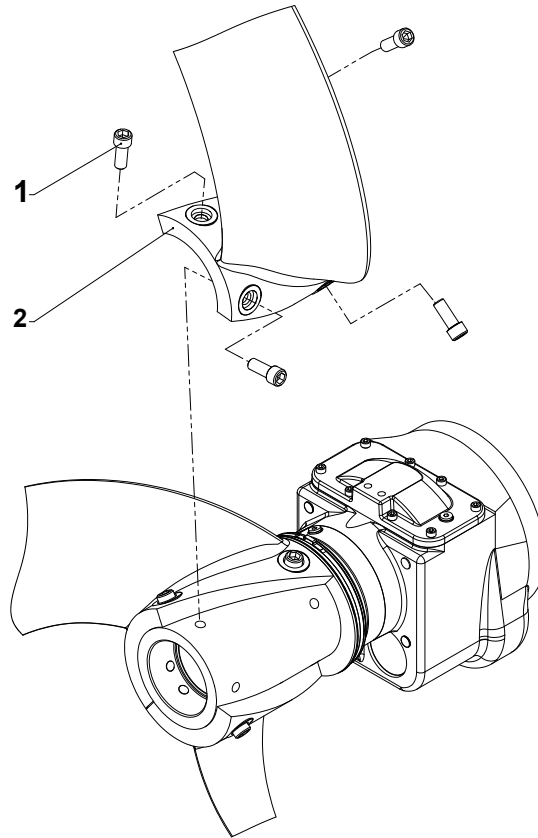


Figure 15 Fitting of the propeller XSB 2750 LX

#### Legend

- 1 Cylinder-head screw incl. thread lock
- 2 Propeller blade

**NOTE** *The propeller hub is already preassembled at manufacture. Remove the edge guard on the propeller blade tip only shortly before the flow booster is put into operation.*

**ATTENTION** *Observe the installation position of the propeller blades.*

- Position the propeller blade.
- Tighten the cylinder-head screws (15/1) finger-tight.
- Tighten cylinder-head screw (15/1) to a **torque of 150 Nm**.

### 5.6 Fitting of the cable tensioning device

- Fasten the stainless steel cable to the eyelet of the lifting hoop with the aid of a screw, washers and nut (16/3). The plastic bushings (16/8) in the eyelet are already installed at the factory.
- Unscrew rope tensioning device (16/11) as far as possible and hang it in the optional cable hook (16/10) or other suitable device.
- Make a loop with the aid of a thimble and wire rope clamp (16/1), observing the defined length of the stainless steel cable (no slack).
- Carefully tension the stainless steel rope with the XSB flow booster engaged and locked.
- Finally fasten the motor power cable to the stainless steel cable using the special adhesive tape supplied (16/6) at intervals of **approx. 50 cm** as shown in Figure 16.

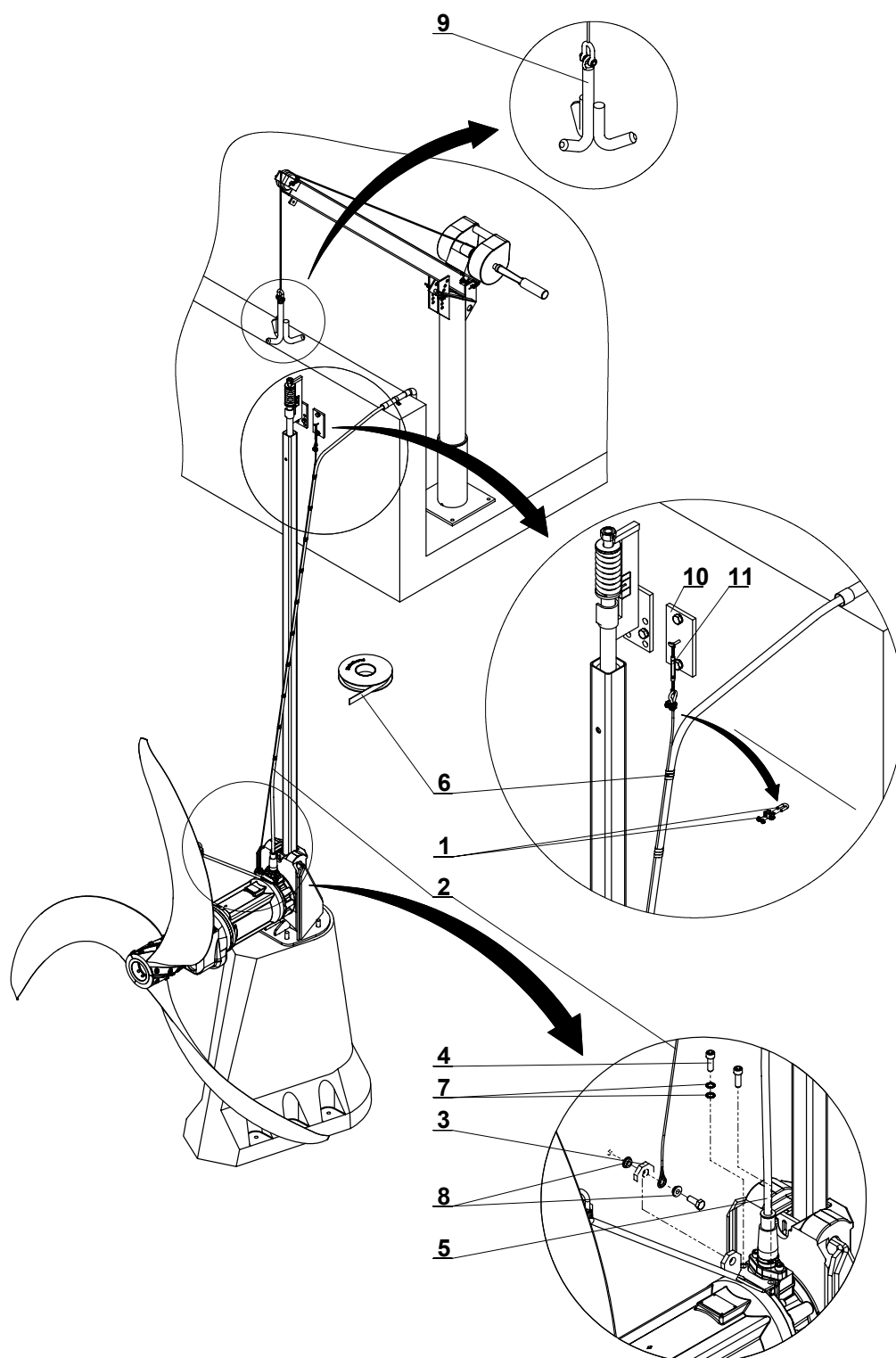


Figure 16 Fitting of cable tensioning device

### Legend

- |   |                       |    |                             |
|---|-----------------------|----|-----------------------------|
| 1 | Wire rope clamp       | 7  | Nord-Lock® securing washers |
| 2 | Stainless steel cable | 8  | Plastic bushing             |
| 3 | Screw, washers, nut   | 9  | Hook (option)               |
| 4 | Hexagon head screw    | 10 | Cable hook (option)         |
| 5 | Motor power cable     | 11 | Rope tensioning device      |
| 6 | Special adhesive tape | 12 | Sulzer hoist 5 kN (option)  |

## 5.7 Electrical connection



Observe the safety hints in the previous sections!

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 shown on the rating plate of the pump must correspond to that of the mains supply.*



The incoming power feeder and motor power cable must be connected to the terminals of the control panel as shown in the circuit diagram of the control panel and the motor connection diagrams by a qualified electrician.

The incoming power feeder must be protected by an adequately dimensioned slow-blow fuse corresponding to the rated power of the unit.

In pump stations/tanks potential bonding must be carried out in accordance with EN 60079-14:2014 [Ex] or IEC 60364-5-54 [non-Ex] (Regulations for the installation of pipe lines, protective measures in power plants).

In the case of units supplied with a standard control panel this must be protected from dampness and installed above flood level by means of a correctly fitted CEE earthed socket.

**ATTENTION** *The Sulzer flow booster may only be connected to the method of starting shown in the tables in section 1.6 Technical data or on the nameplate. Deviations from this must be approved by the manufacturer.*

*For flow boosters without standard switchgear: The flow booster may only be operated with motor protection switch and connected temperature monitors.*

### 5.7.1 Standard motor connection diagrams, mains voltage 380 - 420 V at 50 Hz/480 V, 60 Hz

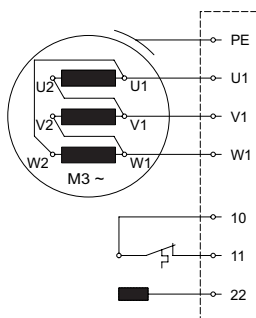


Figure 17 One motor power cable with integrated control leads

0551-0031

50 Hz	60 Hz
PA 10/6	PA 10/6
PA 12/4	PA 12/4
PA 19/4	PA 19/4
PA 25/4	PA 25/4

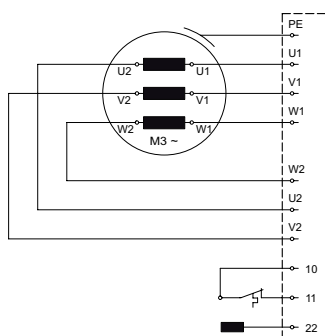


Figure 18 One motor power cable with integrated control leads

0551-0032

50 Hz	60 Hz
PA 35/4	PA 35/4
PA 40/4	PA 40/4
PA 45/4	PA 45/4
PA 55/4	PA 55/4
PA 75/4	PA 75/4

### 5.7.2 VFD connection diagrams, mains voltage 400 V / 690 V

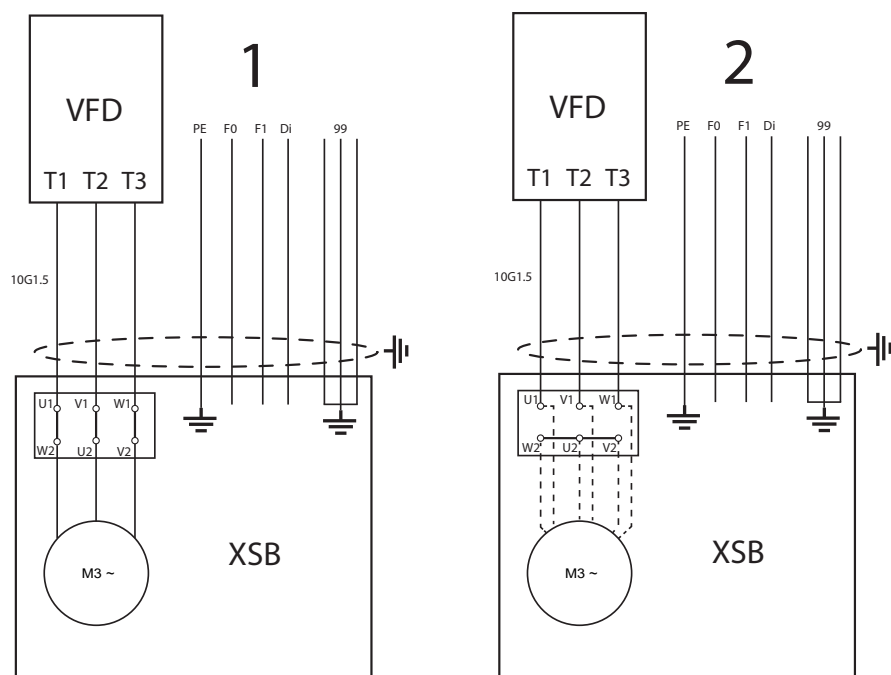


Figure 19 VFD connection diagrams

### 5.7.3 Connecting the EMC cable in the control cabinet

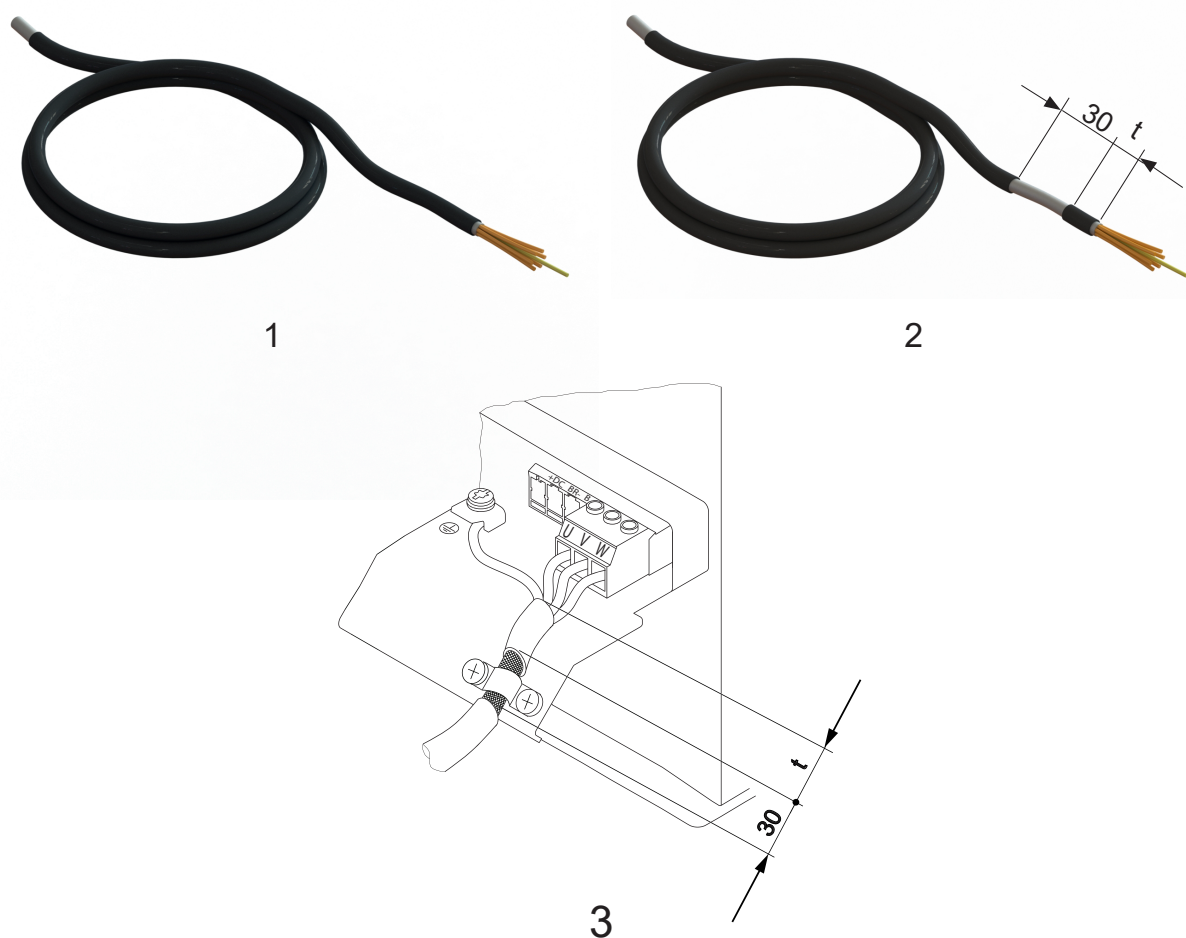


Figure 20 Connecting the EMC cable in the control cabinet

1. EMC cable in delivery condition. Cable is stripped!
2. Strip 30 mm from the EMC cable before connecting to the cable terminal board. Dimension „t“ corresponds to the approximate gap from the fastening clip to the cable terminal.
3. Connecting the EMC cable in the control cabinet.

#### 5.7.4 Operation by variable frequency drive (VFD)

- ATTENTION** *Before installing the VFD; for important instructions concerning the mounting and cooling of the unit, and PE cable sizing it is necessary to refer to the installation section of the VFD's operating instructions.*
- ATTENTION** *When operating at altitudes above 1000 m the VFD should be derated in accordance with the guidelines of the VFD supplier's Design Guide manual, which can be downloaded at the supplier homepage.*
- ATTENTION** *The mains supply in the control panel must have a clockwise sense of rotation. If the units are connected in accordance with the wiring diagram and the lead designations the direction of rotation will be correct.*

Observe the EMC-Directive and the installation and operating instructions of the VFD manufacturer!



The safety instructions for the variable frequency drive (VFD) have to be observed during installation or maintenance. The complete motor starter has to be disconnected from the incoming power supply all-pole. The specified waiting time until total discharge of the intermediate circuit must be observed. The function "safety stop" is not activated.



#### **Residual current protection device (RCD):**

For further information regarding the leakage current of the VFD, refer to the installation section of the VFD's operating instructions.

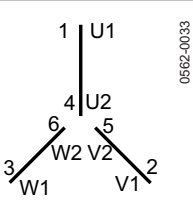
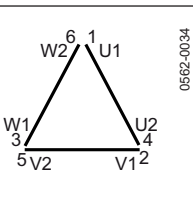
#### **Short circuit protection:**

From power side the VFD has to be protected against short circuit to avoid danger of electric risk and fire.



To comply with the EMC directives the use of shielded motor cables (up to 50 m cable category C1 according EN 61800-3) is highly recommended. Avoid pigtails. The connection of the shield should have the maximum contact area. Disconnections must be continued with the lowest possible HF impedance.

#### 5.7.5 Lead designations

Direct starting in star (Figure 16)					
	L1	L2	L3	Join	
North America	1	2	3	4 & 5 & 6	
Sulzer factory standard	U1	V1	W1	U2 & V2 & W2	
Direct starting in delta (Figure 17)					
	L1	L2	L3	-	
North America	1; 6	2; 4	3; 5	-	
Sulzer factory standard	U1; W2	V1; U2	W1; V2	-	

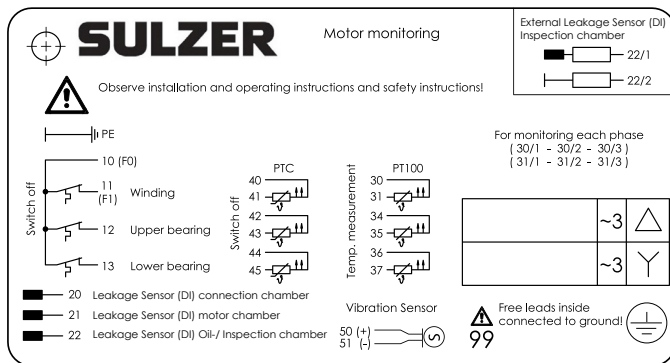


The monitoring circuit (F1) must be electrically interlocked with the motor contactors in such a manner that a manual reset is required.

- ATTENTION** *The temperature monitors may only be operated with the switching powers specified by the manufacturer. (See following table).*

Operating voltage... <b>AC</b>	<b>100 V to 500 V ~</b>
Rated voltage <b>AC</b>	<b>250 V</b>
Rated current <b>AC cos φ = 1.0</b>	<b>2.5 A</b>
Rated current <b>AC cos φ = 0.6</b>	<b>1.6 A</b>
Max. admissible switching current $I_N$	<b>5.0 A</b>

### 5.7.6 Connection of the control circuit leads



2500-0003

### Designation of control circuit leads

- 10 = Common lead
- 11 = Stator upper
- 12 = Bearing upper
- 13 = Bearing lower
- 20 = Leakage sensor (DI)-connection chamber
- 21 = Leakage sensor (DI)-motor chamber
- 22 = Leakage sensor (DI)-inspection chamber
- 99 = Free leads inside connected to ground

= PE (green/yellow)

Figure 21: Designation of control circuit leads

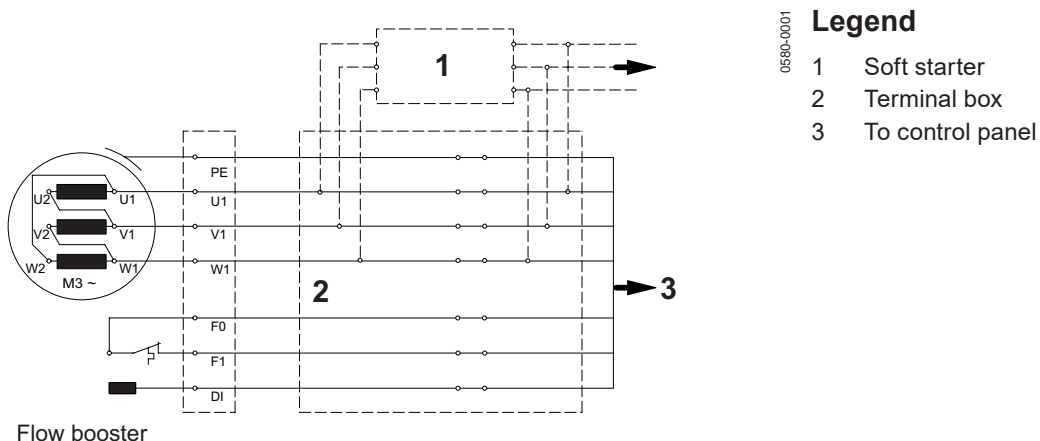
### 5.7.7 Soft starter (option)

We recommend installation of a soft starter if:

- The units ( $\geq 3$  kW) are to be operated in DOL starting mode.
- The units are to be operated in intermittent mode.

The soft starter available as an option must be connected as shown in Figure 20 Motor connection diagram with soft starter (option).

**ATTENTION** The units may only be connected in the prescribed DOL starting mode in combination with a soft starter.



0580-0001

### Legend

- 1 Soft starter
- 2 Terminal box
- 3 To control panel

Figure 22 Motor connection diagram with soft starter (option)



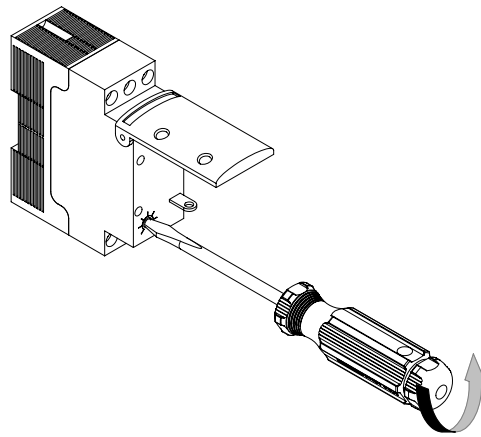


Figure 23 Testing and adjustment of the soft starter

#### Testing and adjustment of the soft starter:

**ATTENTION** For the first test, set the potentiometer to position C.

For further information consult the soft starter manufacturer's installation and operating instructions supplied with the unit.

#### Test:

- First test with potentiometer position „C“

#### Setting:

- Set to the **lowest possible starting moment** (within the setting range).
- Set to the **longest possible starting time** (within the possible starting range).

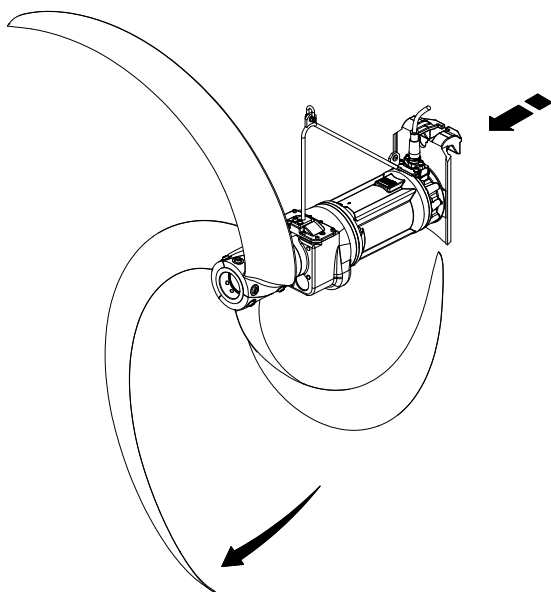
### 5.8 Checking direction of rotation

**ATTENTION** The flow booster may only be operated in the prescribed direction of rotation!

- When the 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.
- The direction of rotation is checked by allowing the flow booster **-without propeller or propeller blades!-** to rotate for a short period. When doing this the key should be secured with adhesive tape ( XSB 900 M, XSB 2500 M ).

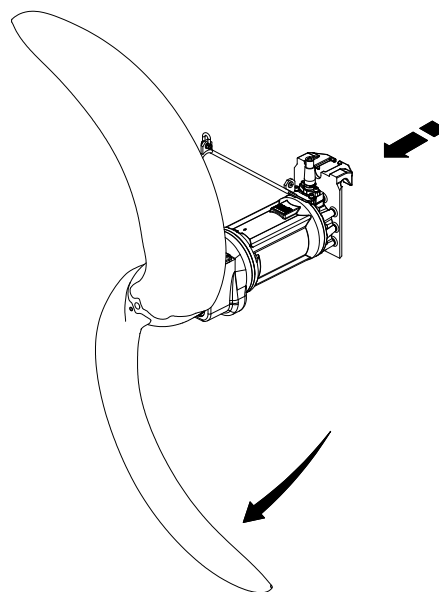
The direction of rotation of propeller types Ø 1400 to Ø 2750 (propeller-rotation) is correct if the propeller shaft viewed from the rear over the motor rotates **anti clockwise**, or if the propeller shaft rotates in the direction of the **direction of rotation arrow** (sticker on the gearbox cover).

The direction of rotation of propeller type Ø 900 (propeller-rotation) is correct if the propeller shaft viewed from the rear over the motor rotates **clockwise**, or if the propeller shaft rotates in the direction of the **direction of rotation arrow** (sticker on the gearbox cover).



0751-003

Figure 24 Checking direction of rotation XSB 2750



0751-003

Figure 25 Checking direction of rotation XSB 2500

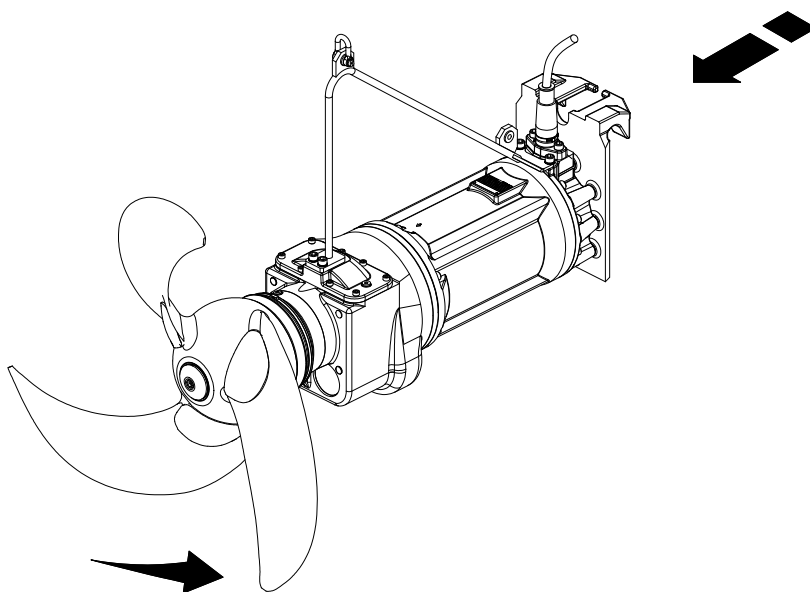


Figure 26 Checking direction of rotation XSB 900

- After checking the direction of rotation, install the propeller blades as described in section 5.5 *Installation of the propeller blades*.

**NOTE** *If several flow boosters are connected to a single control panel, each unit must be checked individually.*

#### 5.8.1 Changing the direction of rotation



The direction of rotation may only be altered by a qualified electrician.

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.*

## 5.9 Connection of the seal monitor to the control panel

In order to integrate the leakage sensor (DI) into the control panel of the flow booster, it is necessary to fit a Sulzer DI module and connect this in accordance with the circuit diagrams below.

**ATTENTION** *If the DI seal monitor is tripped, the unit must be immediately taken out of service. In this case please contact Sulzer After-Sales Service!*

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

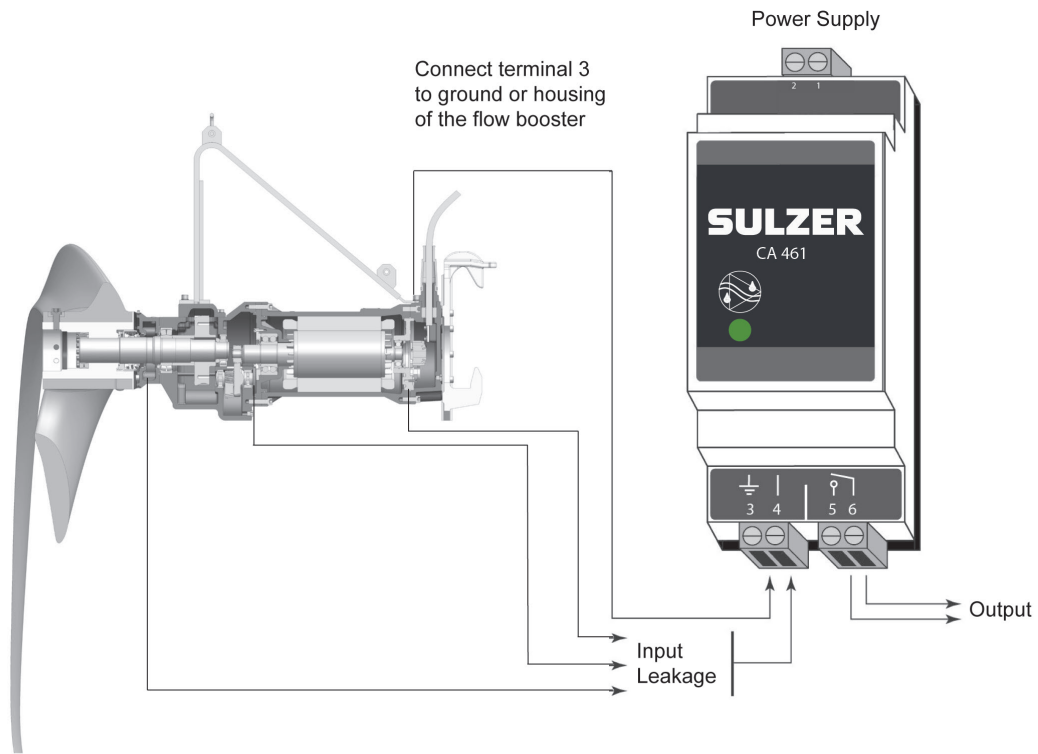


Figure 27 Amplifier with relay for group signal

### Electronic amplifier for 50/60 Hz

110 - 230 V AC (CSA). Part No.: 16907010.

18 - 36 V DC (CSA). Part No.: 16907011.

**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.

## 6 Commissioning



Observe the safety hints in the previous sections!

Before commissioning, the unit 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?
- Has the motor protection switch been set correctly?

- Has the motor power cable been correctly connected to the stainless steel cable and tensioned so that it cannot swing about or get caught up in the propeller? (see Figure 15, section 5.6).
- Is the direction of rotation of the propeller correct?
- Is the minimum overlap correct (see dimension „D“ Construction drawings in section 1.7).
- Has the guide tube holder (Variant „A“) been correctly installed and the **dimension 140 mm (L+M) or 160 mm (LX)** been observed in the „disengaged“ position? (See Figure 8+9 in the separate installation instructions for the concrete and steel pedestal XSB 900 - 2750 or Figure 9 of the se installation and operating instructions).

**NOTE** *If there is any uncertainty, especially if the indication of the spring preload changes during operation, please contact your Sulzer After-Sales Service.*

Lower the flow booster with propeller fitted into the filled tank. When lowering press the bracket downwards (see arrow) so that the guide tube piece slides over the guide tube.

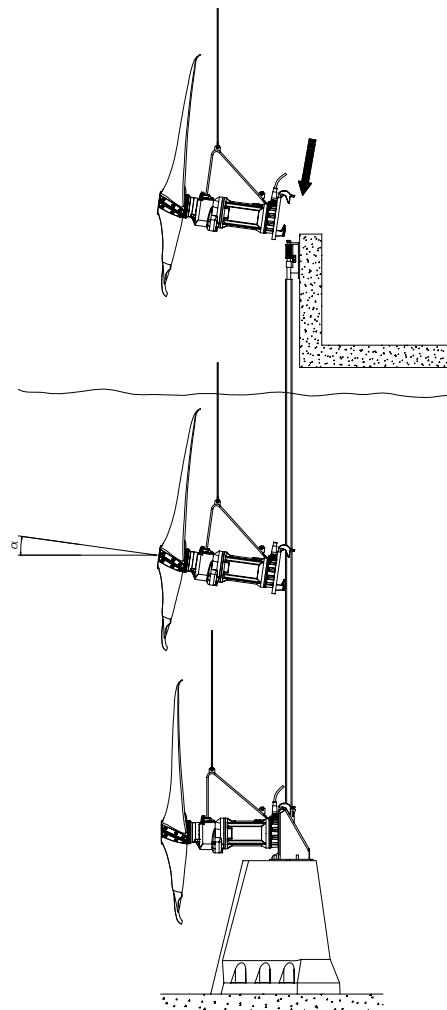


Figure 28 Lowering of the flow booster

#### Variant „A“:

- Lower the flow booster and allow it to engage. Turn the screw on the tube holder **in clockwise direction** (guide tube is lowered) until the guide tube wedge at the lower end of the guide tube engages with the bracket of the flow booster. Tighten the screw until the indicator pin is inside the green marking of the spring tension indicator (see Figure 10).
- Switch on the flow booster and check for smooth running. Make sure that the position of the indicator pin is always inside the green marking and should not move. After **1 hour** running time, check again whether the indicator pin has moved.

0750-0016

**ATTENTION**      *If the indication of the spring preload changes during operation, the flow booster should not be operated. Please contact your Sulzer After-Sales Service.*

**Variant “B”:**

- Allow the flow booster to couple itself. Turn the screw on the tube holder (see Figure 12) counter clockwise and tighten with a torque of **80 Nm**.
- Switch on the flow booster and check for smooth running. Turn the screw on the tube holder counter clockwise and tighten it with a torque of **80 Nm**. Lock it in position by means of a lock nut.
- After running for **one hour**, check again that the flow booster is running smoothly. Retighten with **80 Nm** torque and lock.

**Variant “A and B”**

**ATTENTION**      *Check the power consumption. If the motor current fluctuates, the installation vibrates, the medium flow is uneven or air flutes form, the flow booster should not be operated!*

**ATTENTION**      *During operation of the flow booster, no air should be drawn in at the propeller area (no flute formation should occur nor should any aeration systems be located within the critical area of the unit). In all cases ensure that the flow booster is located outside the direct influence area of the flow from the aeration system. In heavy infestations fiber is to dispense with the attached to the bail arm lifting rope.*

As aeration systems vary considerably in their behaviour, the correct distance specified by the aerator manufacturer must be maintained.

**ATTENTION**      *Flow boosters must only be operated fully submerged. During operation the propeller should not draw in any air. Check that the flow formation of the liquid is smooth. The flow booster should not vibrate. Observe the additional hints in the user manual “Flow booster”. In the case of critical conditions (high flow velocities) please contact your Sulzer After-Sales Service immediately.*

**Uneven flow formation and vibrations can occur in the event of:**

- Heavy mixing in a small tank.
- If the flow booster is not correctly engaged or locked in position.

**Check for correct engagement.** (See detailed notes in separate booklet “Maintenance instructions for Sulzer flow booster”).

## **7      Maintenance**

Maintenance instructions: see detailed notes in separate booklet “Maintenance instructions” in the appendix.

In particular, the advice regarding maintenance in *paragraph 3.2* of the separate booklet Safety Instructions for Sulzer Products Type ABS must be observed.

