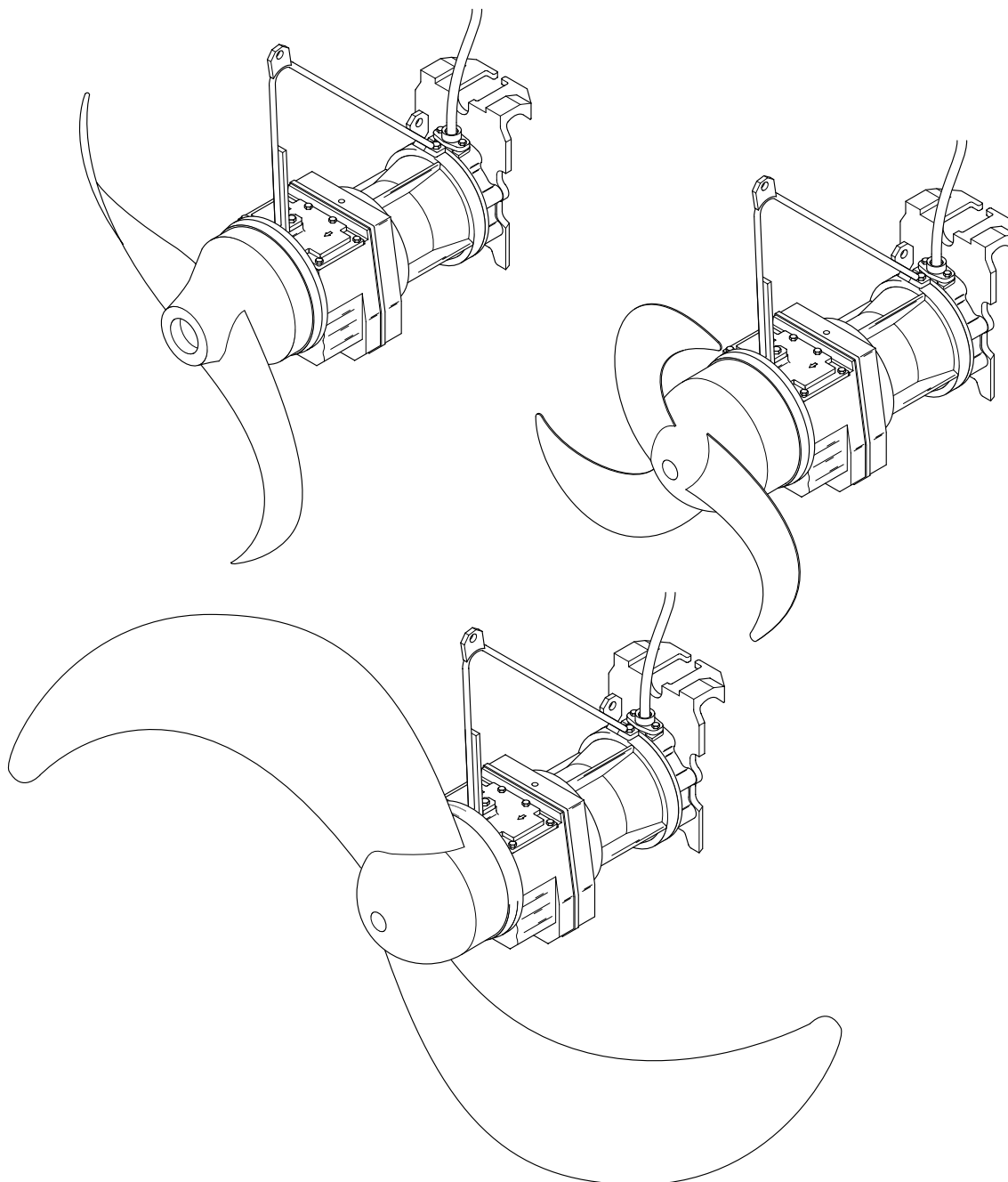


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## Flow booster type ABS SB 900 to 2500

---



## Installation and operating instructions (Translation from original instruction)

For ABS flow booster

SB 931 (50/60 Hz)	SB 1221 (50/60 Hz)	SB 1621 (50/60 Hz)	SB 1821 (50/60 Hz)
SB 932 (50/60 Hz)	SB 1222 (50/60 Hz)	SB 1622 (50/60 Hz)	SB 1822 (50/60 Hz)
SB 933 (50/60 Hz)	SB 1223 (50 Hz)	SB 1623 (50/60 Hz)	SB 1823 (50/60 Hz)
SB 934 (60 Hz)		SB 1624 (50 Hz)	SB 1824 (50/60 Hz)
		SB 1625 (50 Hz)	SB 1825 (50/60 Hz)
SB 2021 (50/60 Hz)	SB 2221 (50/60 Hz)	SB 2521 (50/60 Hz)	
SB 2022 (50/60 Hz)	SB 2222 (50/60 Hz)	SB 2522 (50/60 Hz)	
SB 2023 (50/60 Hz)	SB 2223 (50/60 Hz)	SB 2523 (50/60 Hz)	
SB 2024 (50/60 Hz)	SB 2224 (50/60 Hz)	SB 2524 (50/60 Hz)	
SB 2025 (50/60 Hz)	SB 2225 (60 Hz)	SB 2525 (50/60 Hz)	
SB 2026 (60 Hz)	SB 2226 (60 Hz)		

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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.*

Illustrations code; e.g. (3/2). The first digit refers to the figure no. and the second digit to the position in that figure.

## 1.2 Correct usage of the products

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 or 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 potential dangers. The contents of the installation and operating instructions and the safety hints 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** (in the following called Sulzer).

In the case of any faults arising, the units should immediately be taken out of use and secured. However, the maximum number of starts according to the motor datasheet may not be exceeded. The fault should be immediately rectified or, if necessary, contact your Sulzer service centre.

## 1.3 Application restrictions of the flow booster

The flow booster SB can be supplied both as standard versions and in explosion-proof execution (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)

**Limitations:** The ambient temperature range is 0 °C to + 40 °C (32 °F to 104 °F)  
Immersion depth maximum 20 m (65 ft)

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

**ATTENTION** *If cable length is less than 20 m / 65 ft the max. immersion depth reduces accordingly. In special cases an immersion depth greater than 20 m /65 ft is possible. In order to do this you need the written approval from the manufacturer Sulzer.*



Pumping of flammable or explosive liquids with these units is not allowed!



Only explosion-proof executions may be used in hazardous areas!

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

In hazardous areas care must be taken that during switching on and operation of the unit it is submerged or under water. Other types of operation e.g., snore operation or dry running are not allowed!

The temperature monitoring of the Ex-SB has to be carried out by bimetallic temperature limiters or thermistors according to DIN 44 082 connected to a suitable release device which is certified in accordance with EC directive 2014/34/EU.

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

**ATTENTION** *SB 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 the operation of Ex-SB:**

It must be ensured that the motor of the Ex-SB is always fully submerged during start-up and operation!

**For the operation of Ex-SB with frequency inverter:**

Motors must have direct thermal protection devices fitted. These consist of temperature sensors (PTC DIN 44082) embedded in the windings. These must be connected to a suitable release device which is certified in accordance with EC directive 2014/34/EU.

Machines designated as Ex machines may never, without exception, be operated using a mains frequency that is greater than the maximum of 50 Hz as indicated on the nameplate.

**ATTENTION** *Repair work on explosion-proof motors may only be carried out in authorized workshops by qualified personnel using original parts supplied by the manufacturer. Otherwise the Ex approvals are no longer valid. All Ex-relevant components and dimensions can be found in the modular workshop manual and the spare parts list.*

**ATTENTION** *After repair work in unauthorized workshops or by unqualified personnel the Ex approvals are no longer valid. After such repairs the unit must not be operated in hazardous areas. The Ex nameplate (see figure 4b, 4c) has then to be removed.*

**1.4 Application areas for flow booster**

Flow booster Type ABS SB 900 to 2500 is suitable for mixing, stirring and agitating in municipal treatment plants and in industry.

**1.5 Identification code SB**

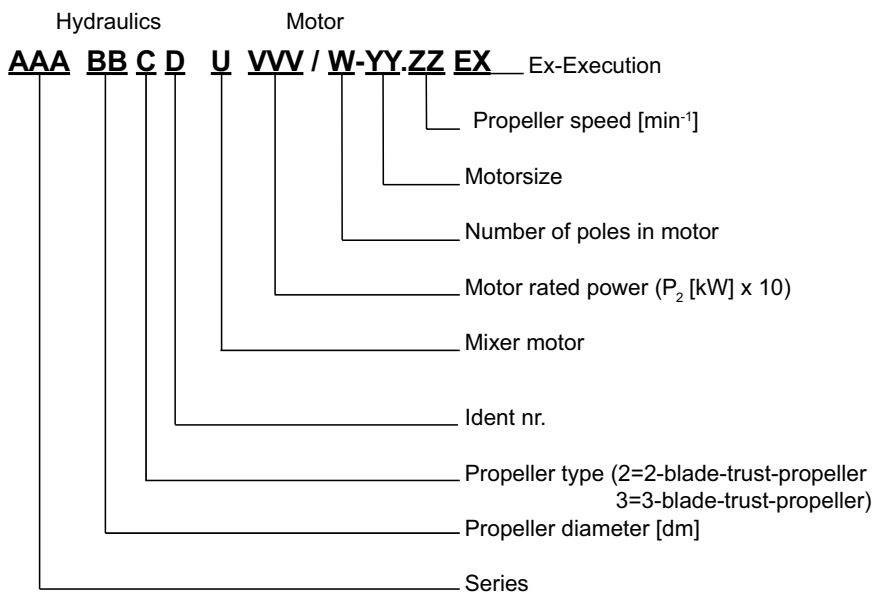


Figure 1 Identification code SB

0580-0003

## 1.6 Technical data

The maximum noise level of the units of this series is  $\leq 70$  dB(A). In some types of installation it is possible that the noise level of 70 dB(A) or the measured noise level will be exceeded.

**ATTENTION**      *The 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 [mm]	Speed [1/min]	Rated input power P <sub>1</sub> [kW]	Rated output power P <sub>2</sub> [kW]	Starting: Direct (DOL)	Starting: Star/Delta	Rated current at 400 V [A]	Starting current at 400 V [A]	Cable type	Total weight [kg]
SB 931	900	79	1.79	1.4	●		2.94	13.4	1	147
SB 932	900	102	3.71	3.0		●	6.50	26.3	2	147
SB 933	900	113	3.71	3.0		●	6.50	26.3	2	147
SB 1221	1200	79	3.71	3.0		●	6.50	26.3	2	131
SB 1222	1200	88	3.71	3.0		●	6.50	26.3	2	131
SB 1223	1200	102	5.15	4.0		●	9.00	41.0	2	131
SB 1621	1600	42	1.79	1.4	●		2.94	13.4	1	150
SB 1622	1600	48	1.79	1.4	●		2.94	13.4	1	150
SB 1623	1600	56	3.71	3.0		●	6.50	26.3	2	150
SB 1624	1600	63	3.71	3.0		●	6.50	26.3	2	150
SB 1625	1600	79	5.88	4.5		●	10.00	41.0	2	150
SB 1821	1800	38	1.79	1.4	●		2.94	13.4	1	153
SB 1822	1800	42	1.79	1.4	●		2.94	13.4	1	153
SB 1823	1800	48	3.71	3.0		●	6.50	26.3	2	153
SB 1824	1800	56	3.71	3.0		●	6.50	26.3	2	153
SB 1825	1800	63	5.15	4.0		●	9.00	41.0	2	153
SB 2021	2000	36	1.79	1.4	●		2.94	13.4	1	156
SB 2022	2000	42	3.71	3.0		●	6.50	26.3	2	156
SB 2023	2000	48	3.71	3.0		●	6.50	26.3	2	156
SB 2024	2000	56	5.15	4.0		●	9.00	41.0	2	156
SB 2025	2000	63	5.15	4.0		●	9.00	41.0	2	156
SB 2221	2200	36	1.79	1.4	●		2.94	13.4	1	160
SB 2222	2200	42	3.71	3.0		●	6.50	26.3	2	160
SB 2223	2200	48	3.71	3.0		●	6.50	26.3	2	160
SB 2224	2200	56	5.15	4.0		●	9.00	41.0	2	160
SB 2521	2500	36	3.71	3.0		●	6.50	26.3	2	168
SB 2522	2500	38	3.71	3.0		●	6.50	26.3	2	168
SB 2523	2500	42	3.71	3.0		●	6.50	26.3	2	168
SB 2524	2500	48	3.71	3.0		●	6.50	26.3	2	168
SB 2525	2500	56	5.88	4.5		●	10.0	41.0	2	168

Cable type: 1 = F7G x 1.5; 2 = F10G1.5

10 m cable with free cable ends supplied as standard.

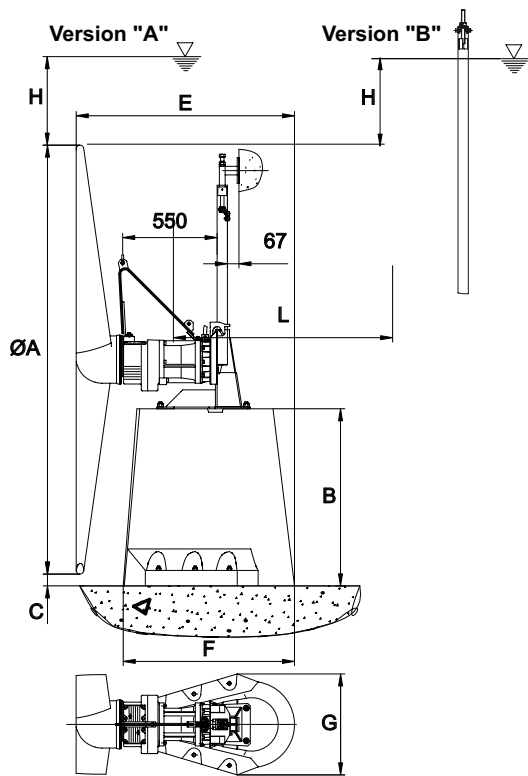
1.6.2 Technical data 60 Hz

Propeller			Motor 60 Hz							Weight
Flow booster type	Propeller diameter [mm]	Speed [1/min]	Rated input power P <sub>1</sub>	Rated output power P <sub>2</sub>	Starting: Direct (DOL)	Starting: Star/Delta	Rated current at 460 V	Starting current at 460 V	Cable type	Total weight
			[kW]	[kW]			[A]	[A]		[kg]
SB 931	900	96	2.04	1.6	●		2.93	11.8	1	147
SB 932	900	107	2.04	1.6	●		2.93	11.8	1	147
SB 933	900	124	4.29	3.5		●	6.50	26.3	2	147
SB 934	900	139	4.29	3.5		●	6.50	26.3	2	147
SB 1221	1200	96	4.29	3.5		●	6.50	26.3	2	131
SB 1222	1200	107	5.7	4.6		●	8.70	34.6	2	131
SB 1621	1600	45	2.04	1.6	●		2.93	11.8	1	150
SB 1622	1600	53	4.29	3.5		●	6.50	26.3	2	150
SB 1623	1600	59	4.29	3.5		●	6.50	26.3	2	150
SB 1821	1800	40	2.04	1.6	●		2.93	11.8	1	153
SB 1822	1800	45	2.04	1.6	●		2.93	11.8	1	153
SB 1823	1800	48	4.29	3.5		●	6.50	26.3	2	153
SB 1824	1800	53	4.29	3.5		●	6.50	26.3	2	153
SB 1825	1800	59	4.29	3.5		●	6.50	26.3	2	153
SB 2021	2000	35	2.04	1.6	●		2.93	11.8	1	156
SB 2022	2000	40	2.04	1.6	●		2.93	11.8	1	156
SB 2023	2000	45	4.29	3.5		●	6.50	26.3	2	156
SB 2024	2000	48	4.29	3.5		●	6.50	26.3	2	156
SB 2025	2000	53	4.29	3.5		●	6.50	26.3	2	156
SB 2026	2000	59	4.29	3.5		●	6.50	26.3	2	156
SB 2221	2200	35	2.04	1.6	●		2.93	11.8	1	160
SB 2222	2200	40	2.04	1.6	●		2.93	11.8	1	160
SB 2223	2200	45	4.29	3.5		●	6.50	26.3	2	160
SB 2224	2200	48	4.29	3.5		●	6.50	26.3	2	160
SB 2225	2200	53	4.29	3.5		●	6.50	26.3	2	160
SB 2226	2200	59	5.70	4.6		●	8.70	34.6	2	168
SB 2521	2500	35	2.04	1.6	●		2.93	11.8	1	168
SB 2522	2500	40	4.29	3.5		●	6.50	26.3	2	168
SB 2523	2500	45	4.29	3.5		●	6.50	26.3	2	168
SB 2524	2500	48	4.29	3.5		●	6.50	26.3	2	168
SB 2525	2500	53	5.70	4.6		●	8.70	41.0	2	168

Cable type: 1 = F7G x 1.5; 2 = F10G1.5

10 m cable with free cable ends supplied as standard.

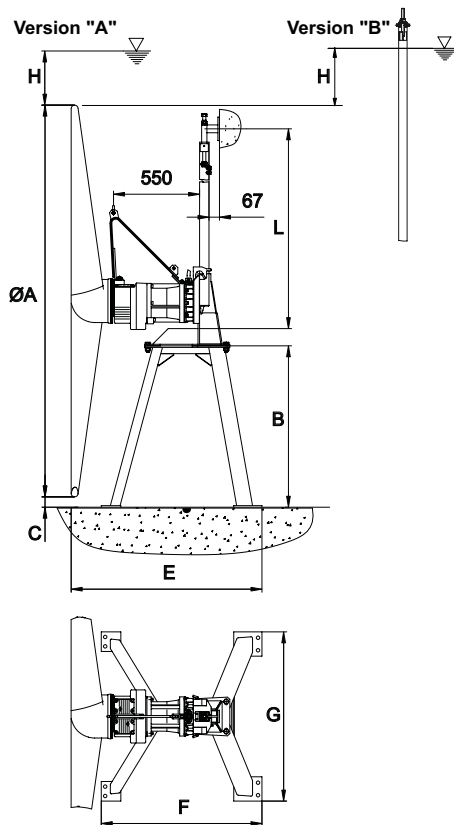
## 1.7 Dimensions



Concrete pedestal 400/780/1030 mm						
Ø A	B	C	H	E	F	G
900	400	226	500	1271	765	508
1200	400	76	650	1152	765	508
1600	780	256	900	1278	996	700
1800	780	156	1000	1278	996	700
2000	780	56	1100	1278	996	700
2200	1030	206	1200	1278	996	700
2500	1030	56	1350	1278	996	700

Concrete pedestal 2050 mm						
Ø A	B	C	H	E	F	G
900	2050	1876	500	1558	1080	855
1200	2050	1736	650	1440	1080	855
1600	2050	1526	900	1422	1080	855
1800	2050	1436	1000	1422	1080	855
2000	2050	1326	1100	1422	1080	855
2200	2050	1226	1200	1422	1080	855
2500	2050	1076	1350	1422	1080	855

Figure 2 Concrete pedestal





Steel pedestal 380/780/1030 mm						
Ø A	B	C	H	E	F	G
900	380	215	500	1255	750	400
1200	380	55	650	1136	750	400
1600	780	265	900	1197	952	975
1800	780	165	1000	1197	952	975
2000	780	65	1100	1197	952	975
2200	1030	205	1200	1219	1026	1080
2500	1030	55	1350	1219	1026	1080

Figure 3 Steel pedestal

## 1.8 Nameplate

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

									
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		∅ 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 ㉖			 ㉗						
<b>Sulzer Pump Solutions Ireland Ltd.</b> <b>Clonard Road, Wexford.</b> ① <b>Ireland.</b>									

0580-0011

Figure 4a Nameplates

### Legend

- |   |  |
|---|--|
| 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 Operating Mode                       |
| 12 Power (output) [flexible unit]       | 26 Sound level                                     |
| 13 Rotation speed [flexible unit]       | 27 Phase connection                                |
| 14 Impeller/Propeller ∅ [flexible unit] | 28 Protection method                               |

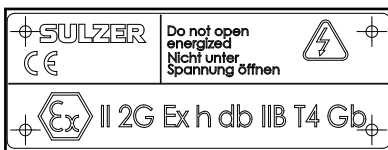


Figure 4b Nameplate ATEX

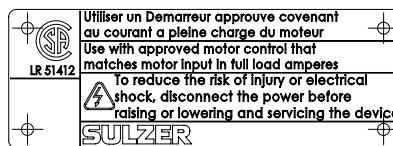
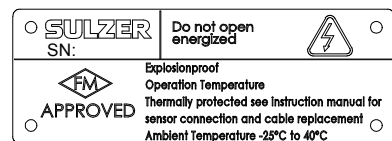


Figure 4c Nameplate CSA / FM



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

**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.

### 2.1 Personal protective equipment

Submersible electrical 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 unit must never be raised by the power cable.

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



Take note of the entire weight of the unit (*see nameplate Figure 4a*). The hoist and chain must be adequately dimensioned for the weight of the unit and must comply with the current valid safety regulations. Good technical practice must be observed.



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.

### 3.3 Transport securing devices

#### 3.3.1 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 pumps electrically.*

Prior to laying and connection of the power cable of the flow booster motor, particular attention is necessary during the storage or installation of units in locations which could fill with water. Please note that the cable ends, even where fitted with protective sleeves, should not 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!*

### 3.4 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.*

## 4 Product description

### 4.1 Description motor/motor monitoring system

#### Motor

- Three phase squirrel cage motor.
- Rated voltage: 400 V 3~, 50 Hz / 460 V 3~, 60 Hz.
- Insulation class F = 155 °C / 311 °F, protection type IP68.
- Starting: Direct or star/delta, depending on motor power.

#### Shaft sealing

- 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 high quality mechanical seal, which is independent of direction of rotation.

#### Motor monitoring

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

**Seal monitoring**

- The leakage sensor (DI) carries out the seal monitoring function and signals the ingress of moisture into the connection chamber and into the gearbox (option) by means of a special electronic device (option).

**Operation with frequency inverters**

- All flow boosters, when suitably selected, can be used with frequency inverters. **Observe the EMC-Directive and the installation and operating instructions of the inverter manufacturer!**

**4.2 Structural design**

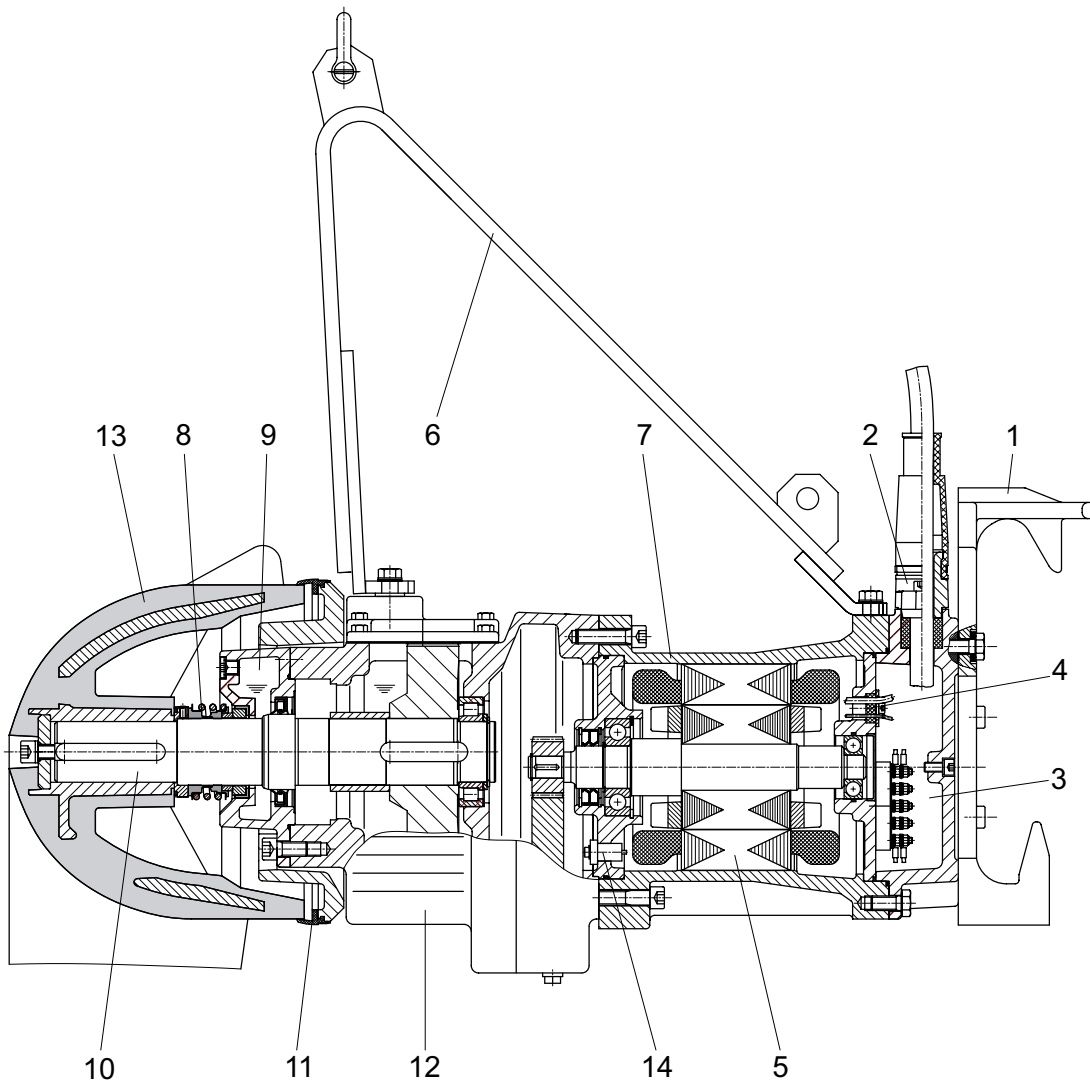


Figure 5 Cut-through picture SB

**Legend**

- |                             |                            |
|-----------------------------|----------------------------|
| 1 Bracket                   | 8 Mechanical seal          |
| 2 Cable inlet               | 9 Oil chamber              |
| 3 Connection chamber        | 10 Propeller shaft         |
| 4 Sealing to motor chamber  | 11 Solids-Deflection-Ring  |
| 5 Stator                    | 12 Gearbox                 |
| 6 Lifting hoop with shackle | 13 Propeller               |
| 7 Motor housing             | 14 Leakage sensor (Option) |

### 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 frequency inverters. 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.
- Speed/torque curves for motors driven by frequency inverters can be found in our product selection range.
- Explosion-proof motors must be equipped with thermistors (PTC temperature sensors).
- Machines designated as Ex machines may never, without exception, be operated using a mains frequency that is greater than the maximum of 50 Hz as indicated on the nameplate. 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.
- 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 with 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 25 Hz.
- The maximum frequency must be set so that the rated power of the motor is not exceeded.

Modern frequency inverters use higher wave frequencies and a steeper rise on the edge of the voltage wave. This means that motor losses and motor noise is reduced. Unfortunately these inverter output signals cause higher voltage spikes in the stator. Experience has shown that, depending on rated voltage and the length of the cable between the inverter and the motor, these voltage spikes can adversely affect the life of the motor. In order to avoid this, inverters of this type must be equipped with sinus filters when used in the critical zone (see Figure 6). The sinus filter chosen must be suitable for the inverter with regard to rated voltage, inverter wave frequency, rated current of the inverter and maximum inverter output frequency. Make sure that the rated voltage is supplied to the terminal board of the motor.

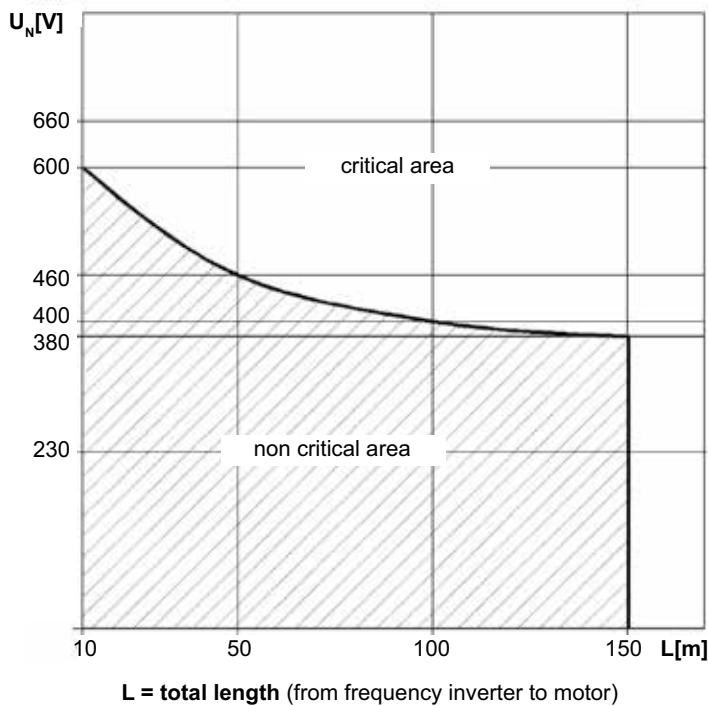


Figure 6 Critical/non-critical area

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## 5 Installation



The safety hints in the previous sections must be observed!

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 Types of installation

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 the guide tube and guide tube holder is firmly fixed to the structure. The coupling piece is already screwed onto the pedestal. The guide tube is prepared and made up 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 is simply necessary to screw the coupling piece and guide tube to the pedestal on site.

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

### 5.2 Fitting of the pedestal

**NOTE**                    *The fitting of the concrete and steel pedestal is explained in detail in the separate "Installation Instructions for Concrete and Steel Pedestal"*

### 5.3 Fitting of the lifting hoop

- Screw 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.**

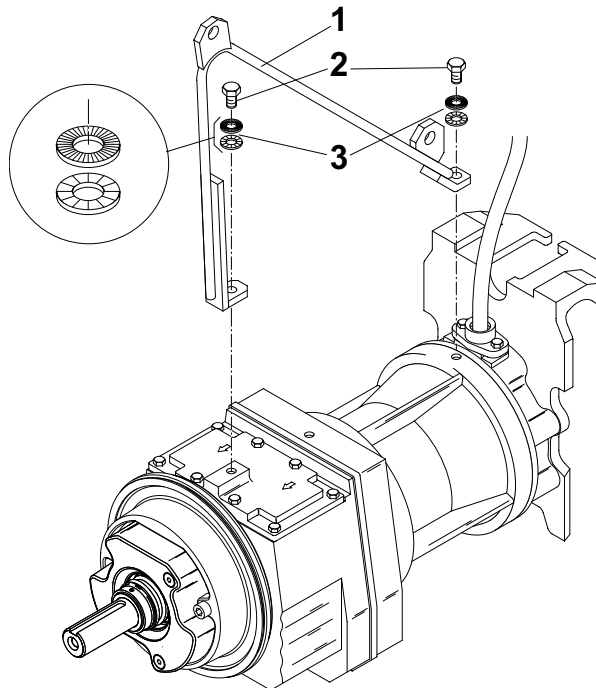


Figure 7 Fitting of lifting hoop

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

## 5.4 Check of the coupling system



The safety hints in the previous sections must be observed!

Lower the flow booster **without propeller** as per *Figure 8* into the **empty tank** using a suitable hoist. Couple it onto the coupling piece. Check that coupling and decoupling functions perfectly.

### NOTE

***A proper check of the coupling and decoupling system with the propeller fitted cannot be carried out in an empty tank as the floatation effect of the propeller is missing and it cannot reach the correct sloped position.***

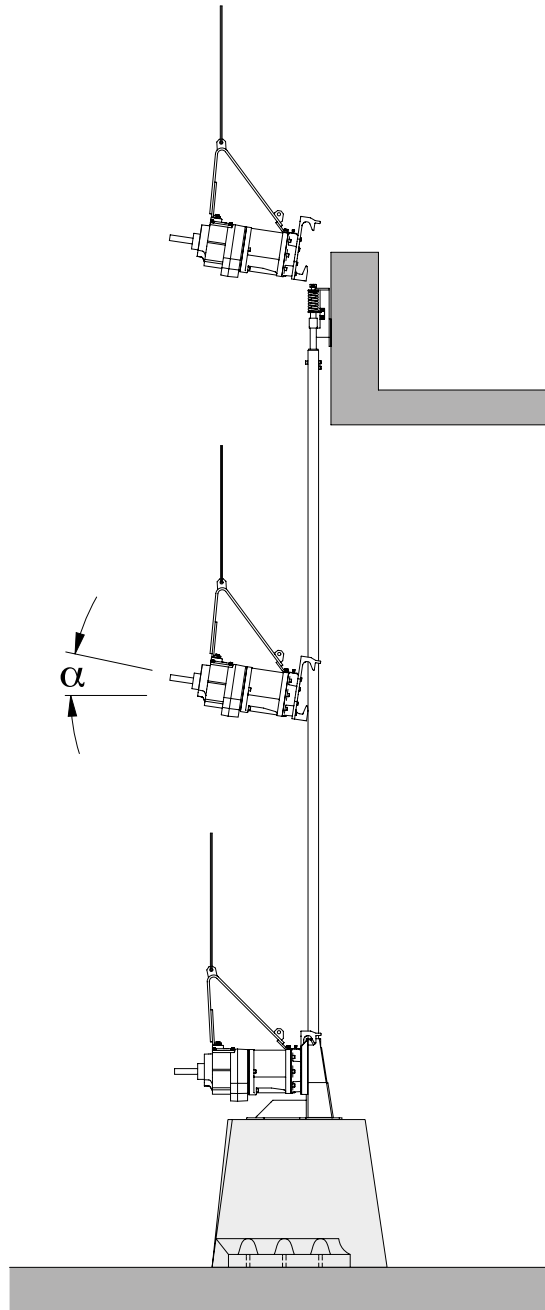


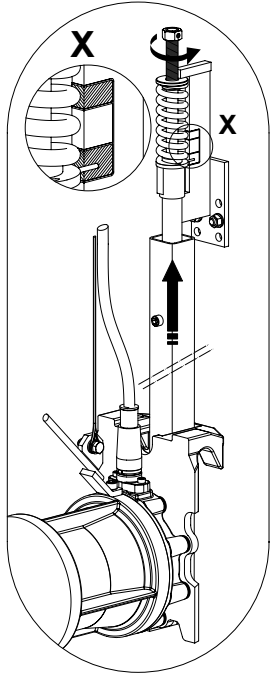
Figure 8 Check of the coupling system in empty tank

### ATTENTION

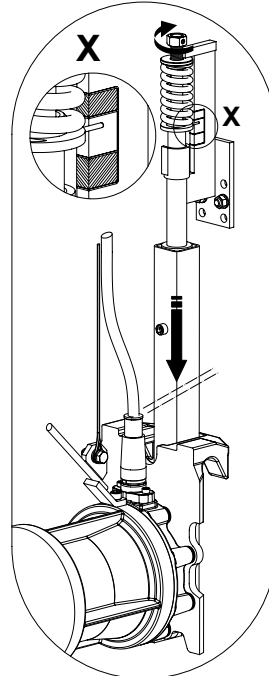
***When using a mechanical lifting tool (e.g. truck crane) or a tool with higher nominal load, special attention is required! Ensure that lifting power doesn't exceed 3000 N when flow booster gets stuck on guide tube!***

**Variant "A":**

- Lower the flow booster and let it couple itself. Turn the screw on the guide tube holder **clockwise** (guide tube is lowered) until the guide tube wedge at the lower end of the guide tube is fixed firmly in position with the bracket of the flow booster. Tighten the screw so far until the indication pin is inside the green marking of the tube holder (see figure 10).



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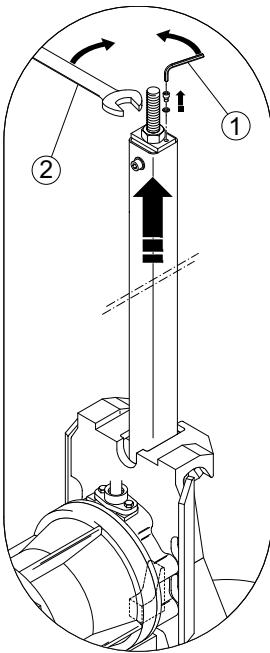
0580-0010

Figure 9 Unlocking of coupling system

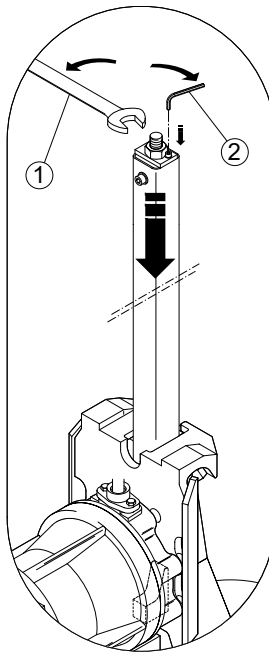
Figure 10 Locking of coupling system

**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.



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0580-0012

Figure 11 Unlocking of coupling system

Figure 12 Locking of coupling system

- Electrical connection of the flow booster is carried out as per *chapter 5.7 electrical connection*. Fasten motor power cable as per *chapter 5.6* and hang the power cable in the cable hook. Check direction of rotation as per *chapter 5.8*.



For safety reasons the direction of rotation check is carried out **without the propeller** as per *chapter 5.8* before fitting the propeller!

## 5.5 Fitting of the propeller

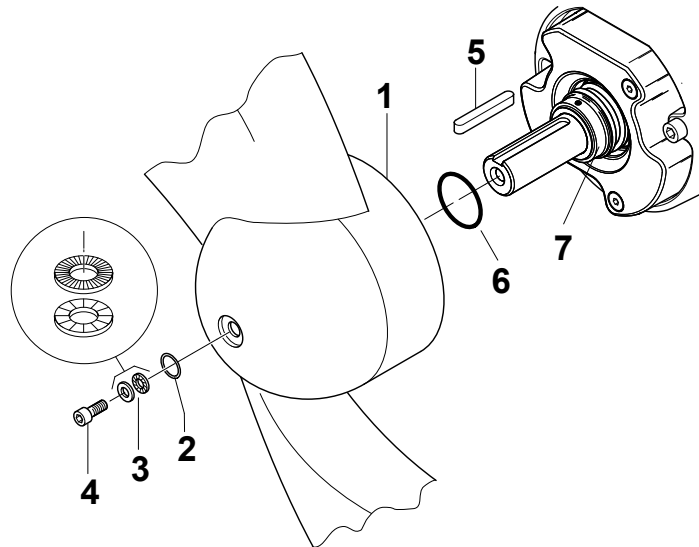


Figure 13 Fitting of the the propeller

### Legend

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

**NOTE**            *The key (13/5) 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 (13/6) and place into the groove of the fixing ring (13/7).
- Set propeller with keyway aligned to key and press on.
- First place Nord-Lock® securing washers (13/3), and then o-ring (13/2) on the socket head cap screw (13/4).
- Screw in the socket head cap screw (13/4) and tighten with **torque of 56 Nm**.

## 5.6 Fitting of the cable tensioning device

- Fix the steel cable to the eyelet of the lifting hoop with the aid of a screw, washers and nut (14/3). The plastic bushings (14/8) in the eyelet are already factory installed.
- Unscrew rope tensioning device (14/11) as far as possible and hang it in the cable hook (14/10) or other suitable device.
- Make a loop with the aid of a thimble and wire rope clamp (14/1). While doing so observe the defined length of the steel cable (no slacks).
- Tighten the steel cable carefully. SB must be coupled and locked.
- Then fix the power cable (in distance of abt. **50 cm**) to the steel cable as per *Figure 14* using the special adhesive tape (14/6) supplied.



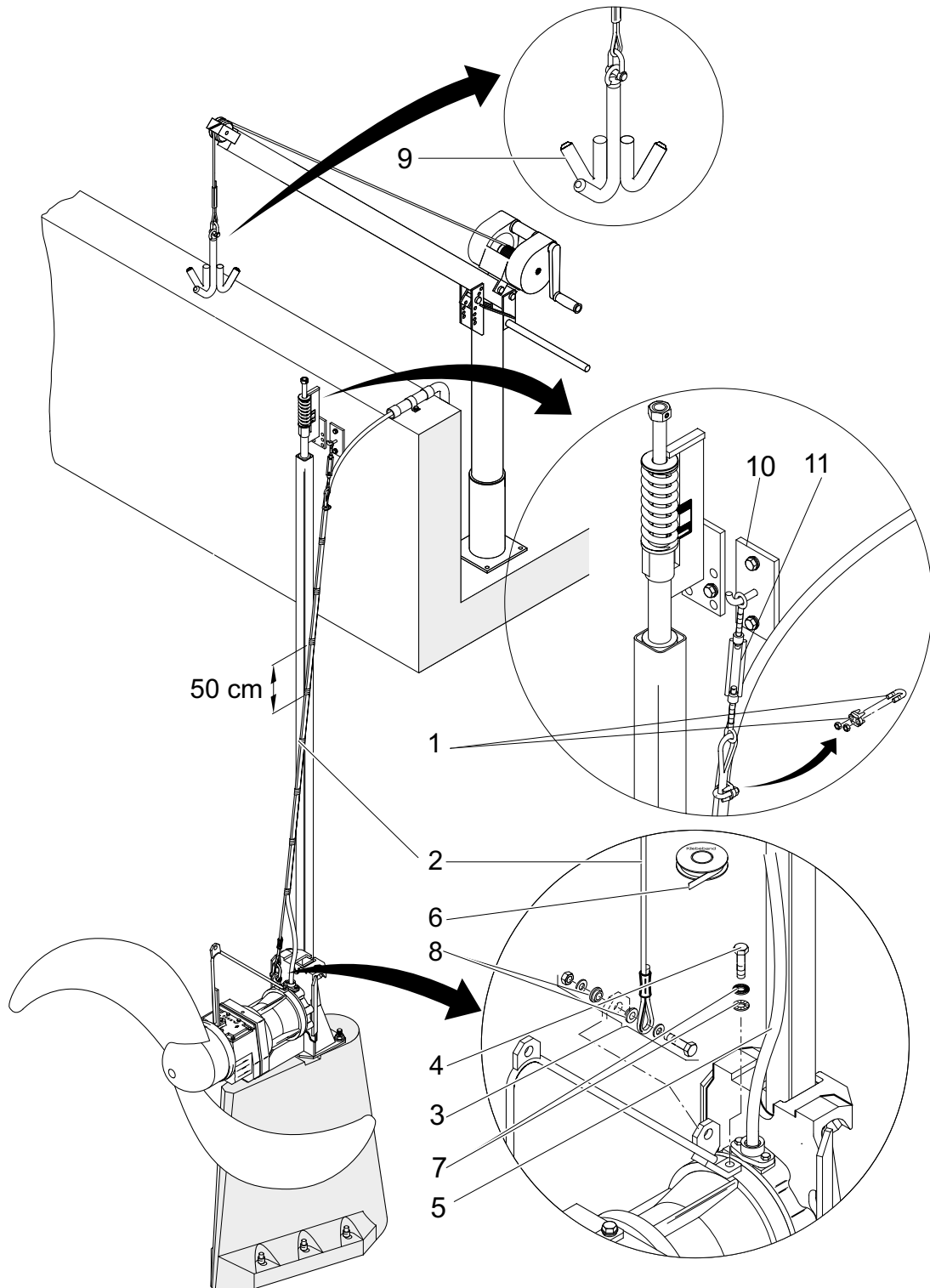


Figure 14 Fitting of cable tensioning device

### Legend

- |   |                       |    |                                |
|---|-----------------------|----|--------------------------------|
| 1 | Wire rope clamp       | 7  | Nord-Lock® securing washer     |
| 2 | Steel cable           | 8  | Plastic bushings               |
| 3 | Screw, washers, nut   | 9  | Hook (option)                  |
| 4 | Hexagonal screw       | 10 | Cable hook (option)            |
| 5 | Power lead            | 11 | Rope tensioning device         |
| 6 | Special adhesive tape | 12 | ABS liftung unit 5 kN (option) |

## 5.7 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 flow booster 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.

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 only method of starting allowed is that specified in chapter 1.6 Technical Data or on the nameplate. If you want to use other starting methods please consult the manufacturer.*

*In the case of flow boosters where a control panel is not supplied as standard they must only be operated with a motor protection switch with overload relay and thermal sensors connected.*

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

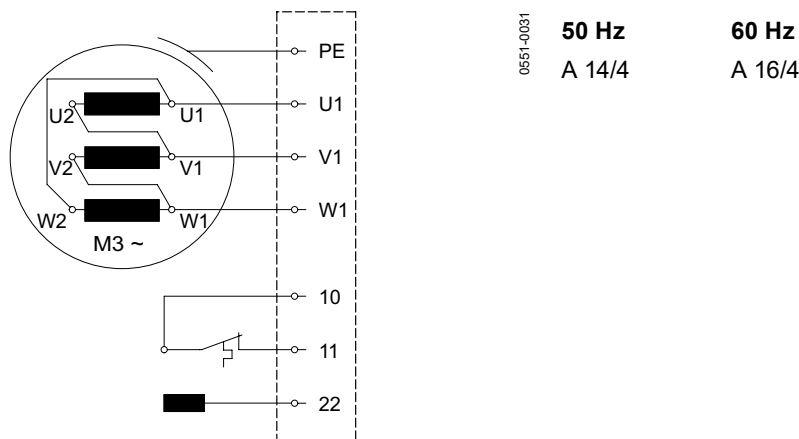
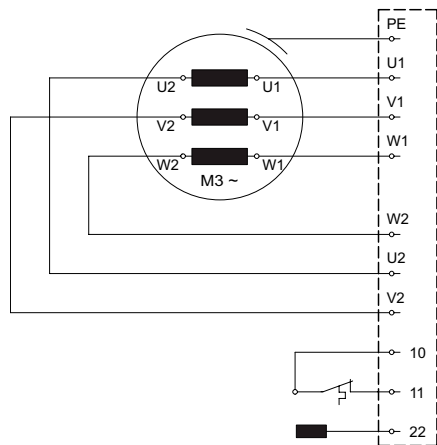


Figure 15 One power cable with integrated control leads



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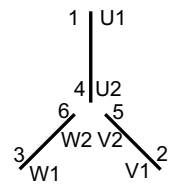
**50 Hz**  
A 30/4  
A 40/4  
A 45/4

**60 Hz**  
A 35/4  
A 46/4

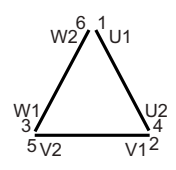
Figure 16 One power cable with integrated control leads

### 5.7.2 Lead designations

Direct starting in star				
	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				
	L1	L2	L3	-
North America	1; 6	2; 4	3; 5	-
Sulzer factory standard	U1; W2	V1; U2	W1; V2	-



0562-0033



0562-0034



The thermal monitoring circuit (F1) must be wired into the motor contactors in such a manner that a manual reset is required.

**ATTENTION** The temperature limiting switches may only be operated as specified by the manufacturer. (See following table).

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

### 5.7.3 Soft starter (option)

We recommend installation of a soft starter if:

- the units ( $\geq 3$  kW) shall be started in DOL.
- the units shall be operated in intermediate operation.

The soft starter, available as an option, is to be connected as per wiring diagram Figure 17 wiring diagrams with soft starter (option).

**ATTENTION** The units must be connected DOL when used with soft starters.

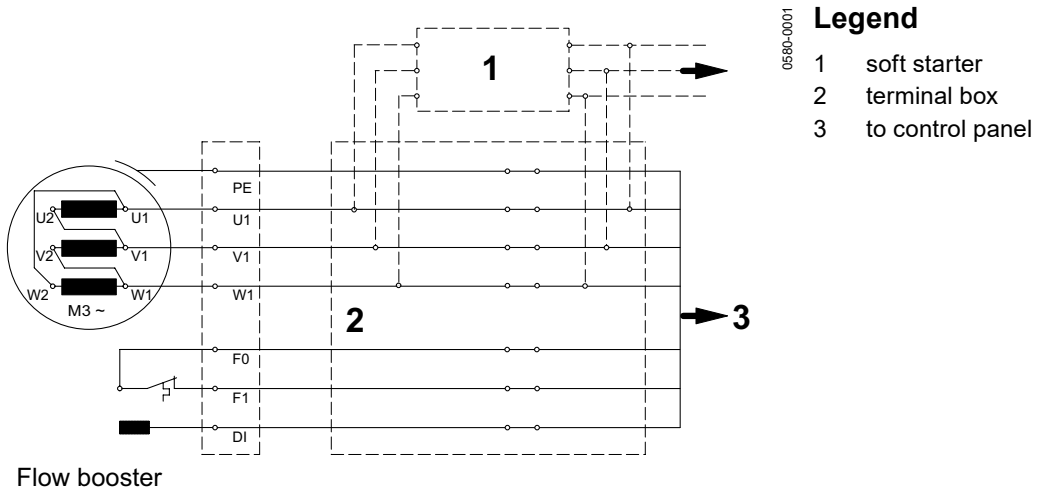


Figure 17 Wiring diagram with soft starter (option)

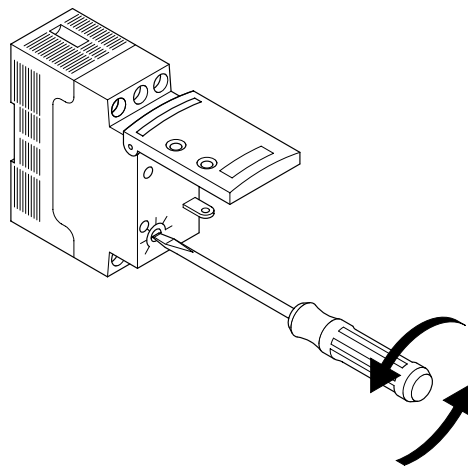


Figure 18 Testing and adjustment of soft starter

**Testing and adjustment of soft starter:**

**ATTENTION** For the first test adjust the potentiometer in position C.

For further information consult the installation and operating instructions of the soft start manufacturer. These are supplied with the unit.

**Test:**

- First test with **potentiometer setting “C”**.

**Setting:**

- Set to the **lowest possible starting torque** (within the adjustment range possible).
- Set to the **longest possible starting time** (within the adjustment range possible).

0551-0035

## 5.8 Checking direction of rotation

**ATTENTION** *The flow booster should only be run 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-** to rotate for a short period. When doing this the key should be secured with adhesive tape.

The direction of rotation of **propeller types Ø 1600 to Ø 2500** (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 types Ø 900 and Ø 1200** (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).

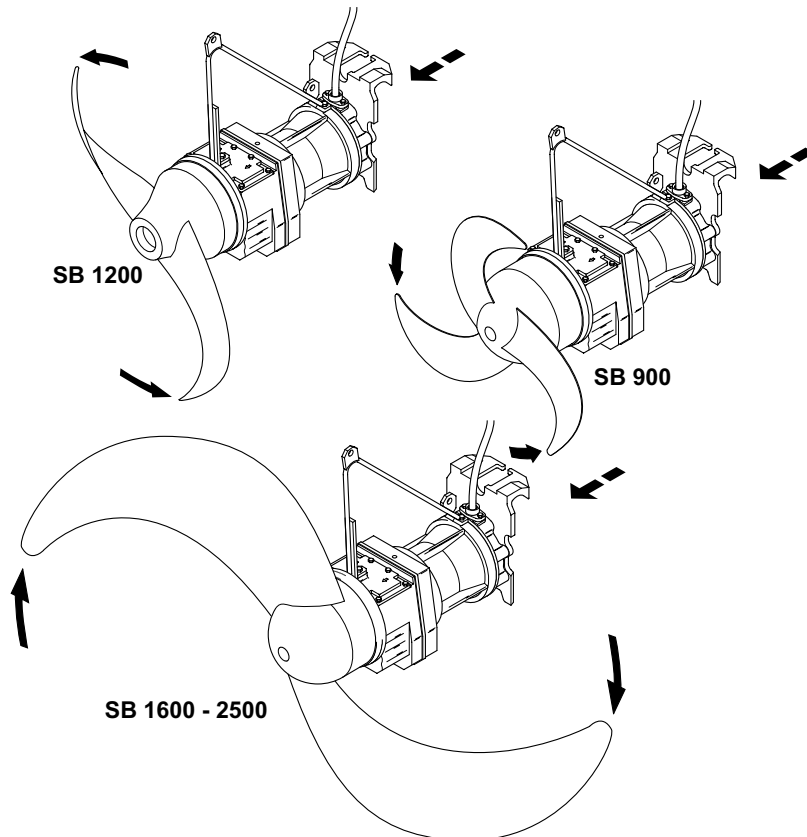


Figure 19 Checking direction of rotation

- After the direction of rotation check is carried out, fit propeller as per *chapter 5.5 fitting of the propeller*.

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

### 5.8.1 Changing direction of rotation



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

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

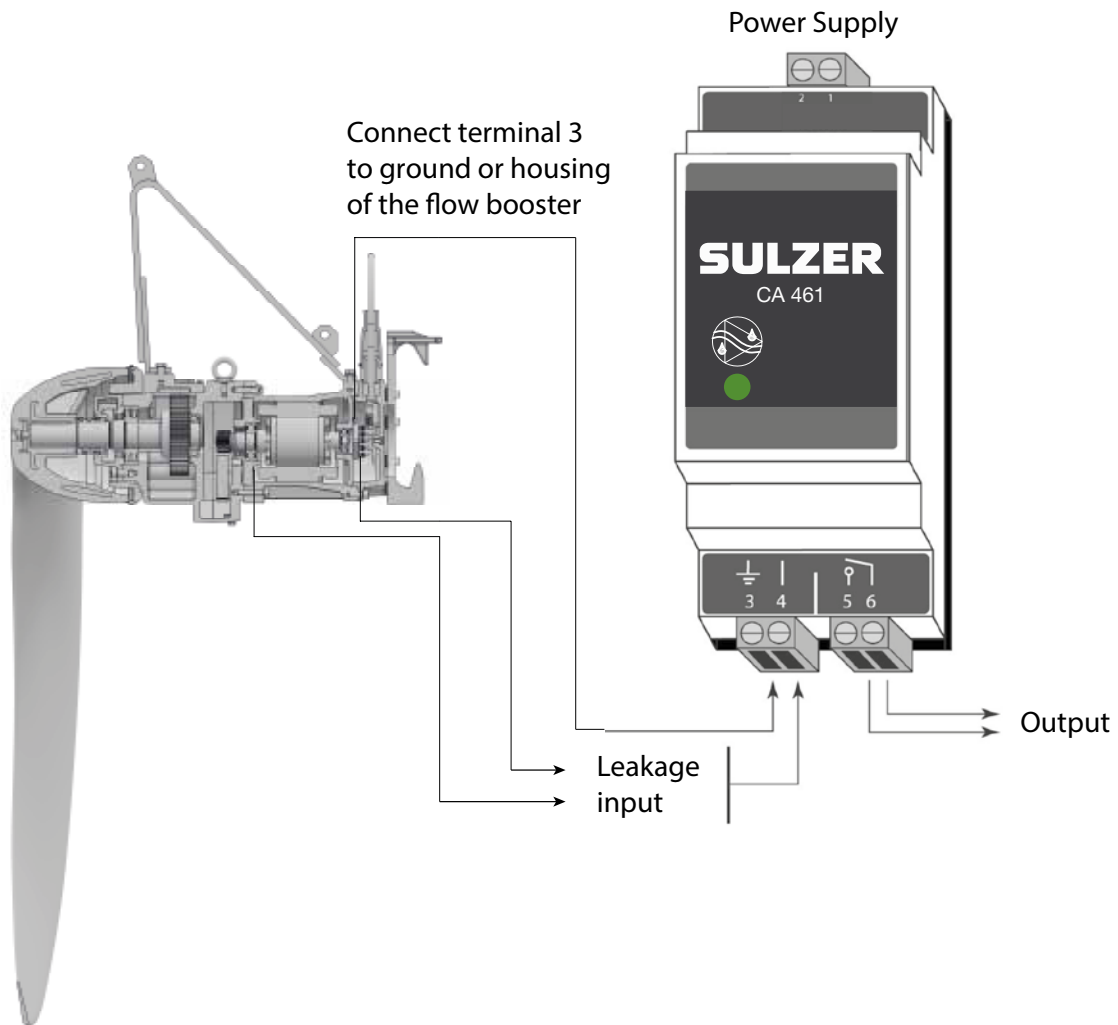
**NOTE** *The direction of rotation measuring device monitors the direction of rotation of the mains supply or that of an emergency generator.*

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

In order to integrate the seal monitor 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 leakage sensor (DI) 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.*



0562-0039

Figure 20 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



The safety hints in the previous sections must be observed!

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 current overload relay been set to the correct amperage?
- Has the motor power cable been correctly connected to the steel cable and tensioned so that it cannot swing about or get caught up in the propeller?(see *Figure 14 in chapter 5.6*)?
- Is the direction of rotation of the propeller correct?
- Has the minimum water cover over the propeller been observed (see “*D*” in *dimensions in chapter 1.7*)?
- Has the guide tube holder (variant “A”) been installed in a proper manner and has the dimension been kept within 125 to 133 mm in the position “unlocked” (see *figure 5 in the separate Installation Instructions of the concrete and steel pedestals SB 900-2500 respectively figure 9 of this Installation and Operating Instructions*)?

**NOTE** *If there are any obscurities especially if the indication of the spring load device is altering during operation, please contact your Sulzer service centre.*

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.

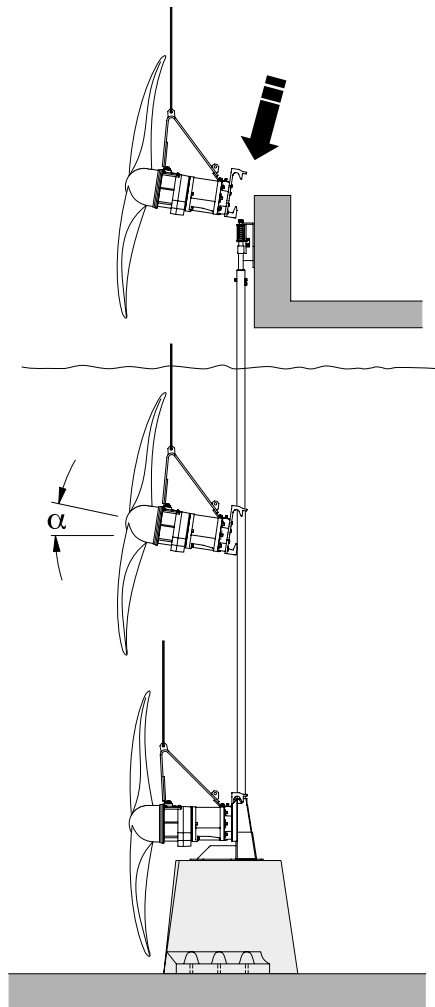


Figure 21 Lowering of the flow booster

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#### Variant "A":

- Lower the flow booster and allow to couple itself. Turn the screw on the tube holder **clockwise** (guide tube is lowered) until the guide tube wedge at the lower end of the guide tube is fixed firmly in position with the bracket of the flow booster. Tighten the screw so far until the indication pin is inside the green marking of the tube holder (see *figure 10*).
- Switch on the flow booster and check that the flow booster is running smoothly. Make sure that the position of the indication pin is always inside the green marking and should not move. After **one hour** running time it has to be checked again if the indication pin hasn't moved.

**ATTENTION**      *If the indication of the spring load device alters during operation the flow booster should not be operated. Please contact your Sulzer service centre.*

#### Variant "B":

- Allow the flow booster to couple itself. Turn the screw on the tube holder (see *Figure 12*) anti-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 ampere reading. If the amps fluctuate, the installation vibrates, the medium flow is uneven, or air flutes form the flow booster it should not be operated!*

**ATTENTION**      *During operation of the flow boosters 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 case of heavy fiber infestation, it is necessary to dispense with the lifting rope attached to the safety bar.*

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. In the case of critical conditions (high flow velocities) please contact your Sulzer service centre immediately.*

#### Uneven flow formation and vibrations can occur if:

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

**Check for correct coupling.** (See detailed notes in separate booklet "Maintenance Instructions for SB Flow Booster").

## 7 Maintenance

For maintenance instructions see detailed notes in the separate booklet "Maintenance Instructions for Flow Booster Type ABS XSB" in the appendix pages.

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

**NOTE**              *In the case of repair work, „Table 1“ from IEC 60079-1 may not be applied. In this case please contact Sulzer after sales service!*









