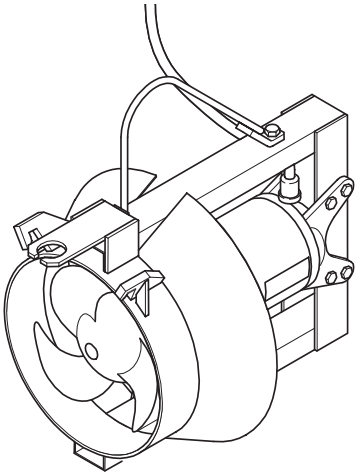
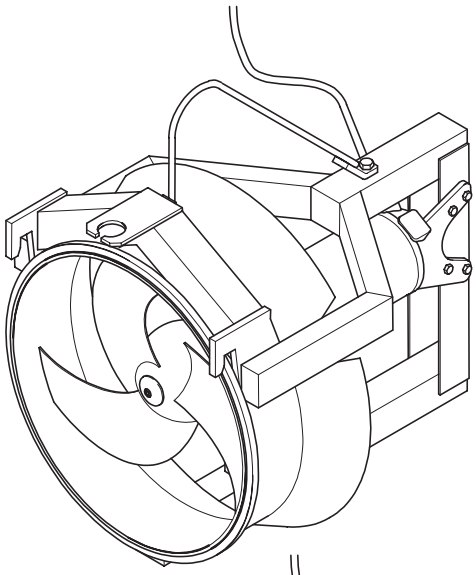
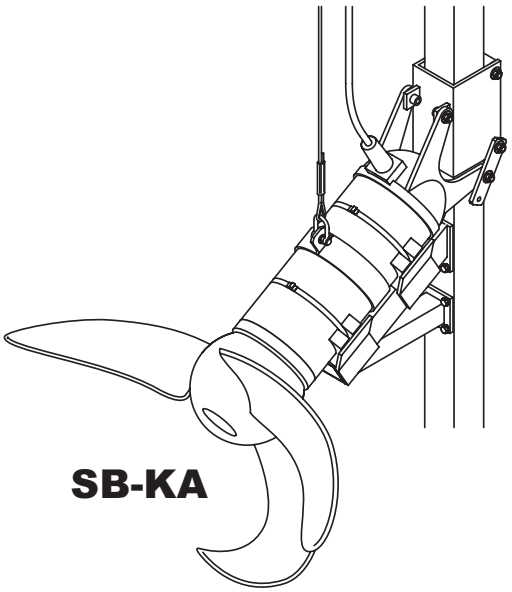
SULZER

Submersible Mixer Type ABS RW
Submersible Recirculation Pump Type ABS RCP
Flow Booster Type ABS SB-KA

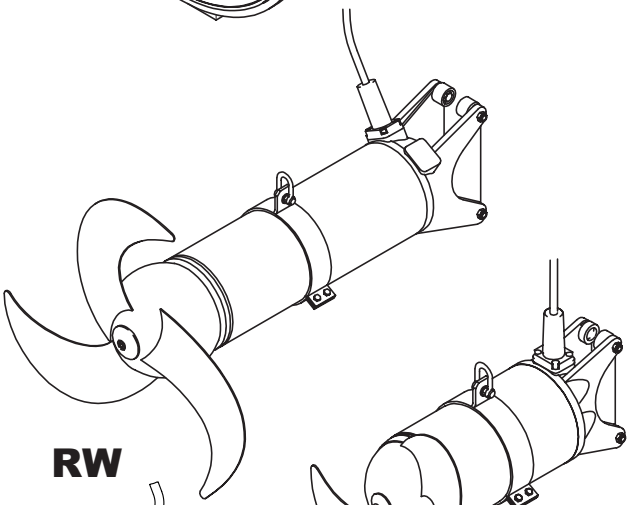


RCP

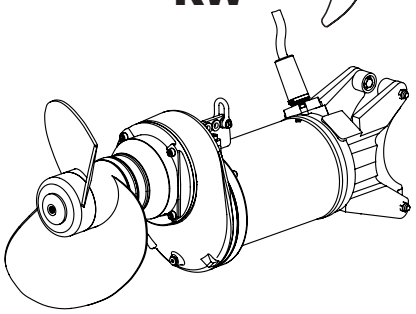




SB-KA



RW



6006183-04 (02.2024)

en

Installation and Operating Instructions

Translation from original instruction

www.sulzer.com

Installation and Operating Instructions

For submersible mixer,
submersible recirculation pumps and
flow booster SB-KA

RW 400	RW 650	RW 750	RW 900
RW 400 LW	RW 480	RW 550 DM	RW 650 LW
RCP 400	RCP 500	RCP 800	
SB 1236 KA	SB 1237 KA		

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

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Symbols and notices used in this booklet:



Presence of dangerous voltage.



Non-compliance may result in personal injury.



Danger of an explosion occurring.

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

NOTE: Important information for particular attention.

1 General

1.1 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.

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 of a third party or cause damage or function impairment to the unit itself and other items of value.

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

1.3 Application restrictions of RW/RCP/SB-KA

The RW/RCP can be supplied both as standard versions and in explosion-proof execution
ATEX II 2G Ex h db IIB T4 Gb (excluding RW 550) for 50 Hz according to the standards EN ISO 12100:2010, EN 809:1998 + A1:2009 + AC:2010, EN 60079-0:2012 + A11:2018, EN 60079-1:2014, EN ISO 80079-36, EN ISO 80079-37 or FM (NEC 500. Class I, Division 1. Group C&D. T3C) approval for 60 Hz (excluding RW 480 and RW 550).

SB-KA is supplied in standard version only.

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

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

ATTENTION! ***Immersion depth maximum 20 m / (65 ft)***

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. However, the maximum number of starts according to the motor datasheet may not be exceeded. In order to do this you need the written approval from the manufacturer Sulzer.***

The maximum noise level of the units of this series is ≤ 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.



These units must not be used in certain applications e.g. flammable, combustible, chemical, corrosive, or explosive liquids.



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

1.4 For the operation of Ex-RW / RCP:

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. dry running) are not allowed!

ATTENTION ***RW/RCP with Ex h db IIB T4 approval are not equipped with a leakage sensor (DI) in the seal chamber.***

ATTENTION ***RW 400/650/750/900 and RCP 400/500/800 with FM approval (NEC 500) can be equipped (as an option) with a special leakage sensor (DI) in the seal chamber. Due to the design this is not possible in RW 480, RW 550 and SB 1236/1237 KA.***

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

The temperature monitoring of the Ex-RW / RCP 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 and FM 3610.

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.***

1.4.1 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.

1.4.2 Operation of EX-RW/RCP with frequency inverter:

Machines designated as Ex machines may never, without exception, be operated using a mains frequency that is greater than the maximum of 50 Hz or 60 Hz as indicated on the nameplate.

In the event that the unit is to be operated in explosive atmospheres using a variable frequency drive, please contact your local Sulzer representative for technical advice regarding the various approvals and standards concerning thermal overload protection.

1.5 Application areas

1.5.1 Application areas RW

The ABS submersible mixers (RW 400 to 900) with a water pressure-tight encapsulated submersible motor are high-class quality products with the following range of applications, in municipal treatment plants, in industry and in agriculture:

- Mixing
- Stirring
- Agitation

LW - Version with special propeller for use in agriculture, DM - Version (Drilling Mud) with special propeller for drilling mud.

The submersible mixers RW 480 and RW 750 are used for mixing, stirring and agitating of viscous fluids containing solids in sewage treatment plants, industry, and agriculture. They are specifically designed for the major mixing functions during homogenization of sludge and coenzymes.

1.5.2 Application areas RCP

The ABS submersible recirculation pumps RCP (400 to 800) are fitted with water pressure tight encapsulated motors and are quality products suitable for use in the following areas:

- Pumping and recirculation of active sludge in treatment plants with nitrogen removal (nitrification/denitrification).
- Pumping of rain and surface water.

1.5.3 Application areas SB-KA

The SB-KA was developed to meet the specific requirements of those treatment processes in which the biomass is not freely floating in the wastewater as ”flakes”, but builds a ”biofilm” that is bound to the surface by biofilm carriers. One of the successful processes of this nature is the “Moving Bed™” process of the company AnoxKaldnes.

1.6 Identification code

E.g. RW4021-A30/8STD-230/50

	Hydraulics		***Motor***
RW	Series	A	Motor designation
40	Discharge size DN (cm) for RCP Propeller Ø (cm) for RW/SBKA	30	Motor power (P_2 [KW] x 10)
		8	Number of poles in motor
2	Propeller type*	STD	Approvals
1	Identity number	230	Voltage
		50	Frequency

*Propeller type: 1 = 2-blade special propeller for sludge and coenzymes (only without flow ring); 2 = 2-blade thrust propeller; 3 = 3-blade thrust propeller; 4 = 2-blade thrust propeller with flow ring; 5 = 3-blade thrust propeller with flow ring; 7 = 3- blade special propeller for biofilm carrier process

2 Technical data

2.1 Technical data RW 50 Hz

Propeller				Motor (50 Hz/400 V)												Installation		
Mixer type (With / Without Flow Ring)	**Propeller diameter**	**Speed / Gear Ratio**	**Version with flow ring**	**Motor type**	**Rated power input P_1**	**Rated power output P_2**	**Starting: Direct** (D.O.L)	**Starting: Star/Delta**	**Rated current at 400 V**	**Starting current at 400 V**	**Cable type**** (Ex and standard)	**Temperature monitoring**	**Seal monitoring**	**Ex h db IIB T4**	**Guide tube □ 60**	**Guide tube □ 100**	**Total weight** (with / without flow ring)
RW	[mm]	[1/min]			[kW]	[kW]			[A]	[A]							[kg]
4021 / 4041	400	702	○	A 30/8	4.2	3.0	●	-	9.3	40	1	●	●	○	●	○	92 / 106
4022 / 4042	400	702	○	A 30/8	4.2	3.0	●	-	9.3	40	1	●	●	○	●	○	92 / 106
4023 / 4043	400	702	○	A 30/8	4.2	3.0	●	-	9.3	40	1	●	●	○	●	○	92 / 106
4024 / 4044	400	702	○	A 30/8	4.2	3.0	●	-	9.3	40	1	●	●	○	●	○	92 / 106
4031 / 4051	400	680	○	A 40/8	5.6	4.0	-	●	10.9	40	2	●	●	○	●	○	92 / 106
4032 / 4052	400	680	○	A 40/8	5.6	4.0	-	●	10.9	40	2	●	●	○	●	○	92 / 106
4033 / 4053	400	680	○	A 40/8	5.6	4.0	-	●	10.9	40	2	●	●	○	●	○	92 / 106
4811	480	446/3.3	-	A 75/4	8.7	7.5	-	●	14.8	94	2	●	●	○	●	-	163 / -
4812	480	467/3.1	-	A 75/4	8.7	7.5	-	●	14.8	94	2	●	●	○	●	-	163 / -
4813	480	493/3.0	-	A 75/4	8.7	7.5	-	●	14.8	94	2	●	●	○	●	-	163 / -
4814	480	517/2.8	-	A 110/4	13.0	11.0	-	●	21.9	103	2	●	●	○	●	-	169 / -
4815	480	539/2.6	-	A 110/4	13.0	11.0	-	●	21.9	103	2	●	●	○	●	-	169 / -
6521 / 6541	580	470	○	A 50/12	7.1	5.0	-	●	18.2	52	2	●	●	○	-	●	150 / 168
6522 / 6542	580	470	○	A 50/12	7.1	5.0	-	●	18.2	52	2	●	●	○	-	●	150 / 168
6523 / 6543	650	470	○	A 50/12	7.1	5.0	-	●	18.2	52	2	●	●	○	-	●	150 / 168
6524 / 6544	650	470	○	A 50/12	7.1	5.0	-	●	18.2	52	2	●	●	○	-	●	150 / 168
6525 / 6545	650	470	○	A 50/12	7.1	5.0	-	●	18.2	52	2	●	●	○	-	●	150 / 168
6531 / 6551	650	462	○	A 75/12	10.3	7.5	-	●	24.5	54	3	●	●	○	-	●	180 / 198
6532 / 6552	650	462	○	A 75/12	10.3	7.5	-	●	24.5	54	3	●	●	○	-	●	180 / 198
6533 / 6553	650	470	○	A 100/12	13.3	10.0	-	●	31.9	91	4	●	●	○	-	●	200 / 218
7511	750	285/5	-	A 150/4	17.8	15.0	-	●	31.3	172	4	●	●	○	-	●	202 / -
9032 / 9052	900	238/6	○	A 110/4	13.2	11.0	-	●	22.1	114	2	●	●*	○	-	●	180 / 264
9033 / 9053	900	238/6	○	A 110/4	13.2	11.0	-	●	22.1	114	2	●	●*	○	-	●	180 / 264
9034 / 9054	900	238/6	○	A 110/4	13.2	11.0	-	●	22.1	114	2	●	●*	○	-	●	180 / 264
9035 / 9055	900	238/6	○	A 150/4	17.8	15.0	-	●	31.3	172	3	●	●*	○	-	●	185 / 269
9033 / 9053	900	285/5	○	A 150/4	17.8	15.0	-	●	31.3	172	3	●	●*	○	-	●	185 / 269
9034 / 9054	900	285/5	○	A 220/4	25.8	22.0	-	●	43.9	242	4	●	●*	○	-	●	210 / 294
9035 / 9055	900	285/5	○	A 220/4	25.8	22.0	-	●	43.9	242	4	●	●*	○	-	●	210 / 294

P_1 = Power input ; P_2 = Power output

● = Standard ; ○ = Option; ●* = Leakage sensor in connection chamber instead of seal chamber.

**Cable type: 10 m cable with free cable ends as standard: 1 = 1 x 7G 1.5 ; 2 = 1 x 10G 1.5 ; 3 = 1 x 10 G 2.5 ; 4 = 2 x 4G 4 + 2 x 0.75

NOTE ***Other voltages available on request.***

2.2 Technical data RW 60 Hz

Propeller				Motor (60 Hz/460 V)												Installation		
Mixer type (With / Without Flow Ring)	**Propeller diameter**	**Speed / Gear Ratio**	**Version with flow ring**	**Motor type**	**Rated power input P_1**	**Rated power output P_2**	**Starting: Direct** (D.O.L)	**Starting: Star/Delta**	**Rated current at 460 V**	**Starting current at 460 V**	**Cable type**** (Ex and standard)	**Temperature monitoring**	**Seal monitoring**	**FM (NEC 500)**	**Guide tube □ 60**	**Guide tube □ 100**	**Total weight** (with / without flow ring)
RW	[mm]	[1/min]			[kW]	[kW]			[A]	[A]							[kg]
4021 / 4041	400	858	○	A 35/8	4.6	3.5	●	-	8.7	38	1	●	●	○	●	○	92 / 106
4022 / 4042	400	858	○	A 35/8	4.6	3.5	●	-	8.7	38	1	●	●	○	●	○	92 / 106
4023 / 4043	400	858	○	A 35/8	4.6	3.5	●	-	8.7	38	1	●	●	○	●	○	92 / 106
4024 / 4044	400	841	○	A 46/8	6.0	4.6	-	●	10.3	38	2	●	●	○	●	○	92 / 106
4031 / 4051	400	841	○	A 46/8	6.0	4.6	-	●	10.3	38	2	●	●	○	●	○	92 / 106
4811	480	507/3.5	-	A 90/4	10.2	9.0	-	●	15.3	103	2	●	●	-	-	●	163 / -
4812	480	536/3.3	-	A 90/4	10.2	9.0	-	●	15.3	103	2	●	●	-	-	●	163 / -
4813	480	563/3.1	-	A 130/4	15.0	13.0	-	●	21.9	120	2	●	●	-	-	●	169 / -
6521 / 6541	580	571	○	A 60/12	8.0	6.0	-	●	17.5	50	2	●	●	○	-	●	150 / 168
6522 / 6542	580	571	○	A 60/12	8.0	6.0	-	●	17.5	50	2	●	●	○	-	●	150 / 168
6531 / 6551	650	567	○	A 90/12	11.5	9.0	-	●	23.9	52	2	●	●	○	-	●	180 / 198
6532 / 6552	650	567	○	A 90/12	11.5	9.0	-	●	23.9	52	2	●	●	○	-	●	180 / 198
6533 / 6553	650	567	○	A 90/12	11.5	9.0	-	●	23.9	52	2	●	●	○	-	●	180 / 198
6534 / 6554	650	569	○	A 120/12	15.3	12.0	-	●	31.4	88	3	●	●	○	-	●	200 / 218
6535 / 6555	650	569	○	A 120/12	15.3	12.0	-	●	31.4	88	3	●	●	○	-	●	200 / 218
7511	750	285/6	-	A 130/4	15.3	13.0	-	●	21.8	109	4	●	●	○	-	●	202 / -
9032 / 9052	900	238/7	○	A 130/4	15.3	13.0	-	●	21.8	109	2	●	●*	○	-	●	180 / 264
9033 / 9053	900	238/7	○	A 130/4	15.3	13.0	-	●	21.8	109	2	●	●*	○	-	●	180 / 264
9034 / 9054	900	238/7	○	A 130/4	15.3	13.0	-	●	21.8	109	2	●	●*	○	-	●	180 / 264
9035 / 9055	900	238/7	○	A 170/4	19.8	17.0	-	●	29.4	165	3	●	●*	○	-	●	185 / 269
9033 / 9053	900	285/6	○	A 170/4	19.8	17.0	-	●	29.4	165	3	●	●*	○	-	●	185 / 269
9034 / 9054	900	285/6	○	A 250/4	28.8	25.0	-	●	41.7	229	4	●	●*	○	-	●	210 / 294
9035 / 9055	900	285/6	○	A 250/4	28.8	25.0	-	●	41.7	229	4	●	●*	○	-	●	210 / 294

P_1 = Power input ; P_2 = Power output

● = Standard ; ○ = Option; ●* = Leakage sensor in connection chamber instead of seal chamber.

**Cable type: 10 m cable with free cable ends as standard: 1 = 1 x 7G 1.5 ; 2 = 1 x 10G 1.5 ; 3 = 1 x 10 G 2.5 ; 4 = 2 x 4G 4 + 2 x 0.75

2.3 Technical data RW- special executions

Mixer type	Propeller diameter	Speed	Motor type	Rated power input P_1	Rated power output P_2	Starting: Direct (D.O.L)	Starting: Star/Delta	Rated current	Starting current	Cable type** (Ex and standard)	Temperature monitoring	Seal monitoring	Ex h db IIB T4	Frequency	Guide tube □ 60	Guide tube □ 100	Total weight
	[mm]	[1/ min]		[kW]	[kW]			[A]	[A]					[Hz]			[kg]
RW 4033 LW	400	680	A 40/8	5.6	4.0		●	10.9/400 V	40/400 V	1	●	●	○	50	●	○	92
RW 6532 LW	650	462	A 75/12	10.3	7.5		●	24.5/400 V	54/400 V	2	●	●	○	50	-	●	180
RW 6533 LW	650	470	A 100/12	13.3	10.0		●	31.9/400 V	91/400 V	2	●	●	○	50	-	●	200
RW 5531 DM	550	470	A 100/12	13.3	10.0	●		31.9/400 V	91/400 V	2	●	●	○	50	-	●	205
RW 5531 DM	550	569	A 120/12	16.0	12.0	●		36.5/440-460 V	97/440-460 V	2	●	●	-	60	-	●	205
RW 5531 DM	550	569	A 120/12	15.3	12.0	●		20.9/690 V	65/690 V	2	●	●	-	60	-	●	205

LW - Version with special propeller for use in agriculture; DM - Version (Drilling Mud) with special propeller for drilling mud
P_1 = Power input ; P_2 = Power output; ● = Standard ; ○ = Option; **Cable type: 10 m cable with free cable ends as standard: 1 = 1x10G1.5; 2 = 3x6+3x6/3E+3x1.5

2.4 Technical data RCP 50 Hz

	Propeller				Motor (50 Hz/400 V)										
RCP hydraulics type	Propeller diameter	Propeller speed	H_{max}	Q_{max}	Motor type	Rated input power P_1	Rated motor power P_2	Starting: Star/Delta	Rated current at 400 V	Starting current at 400 V	Cable type** (Ex and standard)	Temperature monitoring	Seal monitoring	Ex h d IIB T4	Total weight (Complete unit)
	[mm]	[1/min]	[m]	[l/s]		[kW]	[kW]		[A]	[A]					[kg]
RCP 4022	394	680	1,13	165	A 40/8	5,6	4,0	●	10,9	40	2	●	●	●	118
RCP 4023	394	680	1,35	195	A 40/8	5,6	4,0	●	10,9	40	2	●	●	●	118
RCP 4024	394	680	1,49	215	A 40/8	5,6	4,0	●	10,9	40	2	●	●	●	118
RCP 4031	394	680	1,67	225	A 40/8	5,6	4,0	●	10,9	40	2	●	●	●	118
RCP 4032	394	680	1,40	245	A 40/8	5,6	4,0	●	10,9	40	2	●	●	●	118
RCP 4033	394	680	1,21	280	A 40/8	5,6	4,0	●	10,9	40	2	●	●	●	118
RCP 5031	492	470	1,08	390	A 50/12	7,1	5,0	●	18,2	52	2	●	●	●	215
RCP 5032	492	462	1,30	440	A 75/12	10,3	7,5	●	24,5	54	3	●	●	●	250
RCP 5033	492	462	1,38	500	A 75/12	10,3	7,5	●	24,5	54	3	●	●	●	250
RCP 5034	492	462	1,40	550	A 75/12	10,3	7,5	●	24,5	54	3	●	●	●	250
RCP 5035	492	470	1,45	585	A 100/12	13,3	10,0	●	31,9	91	4	●	●	●	255
RCP 5036	492	470	1,27	655	A 100/12	13,3	10,0	●	31,9	91	4	●	●	●	255
RCP 8031	792	296[1]	1,4	880	A 110/4	13,0	11,0	●	21,8	103	2	●	●*	●	280
RCP 8031	792	370[2]	1,4	1100	A 150/4	17,9	15,0	●	32,3	172	3	●	●*	●	285
RCP 8031	792	370[2]	1,8	1130	A 220/4	25,8	22,0	●	43,9	242	4	●	●*	●	315
RCP 8032	792	296[1]	0,9	970	A 110/4	13,0	11,0	●	21,8	103	2	●	●*	●	280
RCP 8032	792	296[1]	1,25	990	A 150/4	17,9	15,0	●	32,3	172	3	●	●*	●	285
RCP 8032	792	370[2]	1,0	1230	A 220/4	25,8	22,0	●	43,9	242	4	●	●*	●	315

P_1 = Power input ; P_2 = Power output; 1= Propeller speed with gear ratio i=5; 2= Propeller speed with gear ratio i=4
● = Standard ; ○ = Option; ●* = Leakage sensor in connection chamber instead of seal chamber.
**Cable type: 10 m cable with free cable ends as standard: 1 = 1 x 7G 1.5 ; 2 = 1 x 10G 1.5 ; 3 = 1 x 10 G 2.5 ; 4 = 2 x 4G 4 + 2 x 0.75

2.5 Technical data RCP 60 Hz

RCP hydraulics type	Propeller				Motor (60 Hz/460 V)										
	Propeller diameter	Propeller speed	H_{max}	Q_{max}	Motor type	Rated input power P_1	Rated motor power P_2	Starting: Star/Delta	Rated current at 460 V	Starting current at 460 V	Cable type** (Ex and standard)	Temperature monitoring	Seal monitoring	FM (NEC 500)	Total weight (Complete unit)
	[mm]	[1/min]	[m]	[l/s]		[kW]	[kW]		[A]	[A]					[kg]
RCP 4022	394	841	1,70	200	A 46/8	6,0	4,6	●	10,3	38	2	●	●	●	118
RCP 4023	394	841	1,85	245	A 46/8	6,0	4,6	●	10,3	38	2	●	●	●	118
RCP 4024	394	841	1,62	265	A 46/8	6,0	4,6	●	10,3	38	2	●	●	●	118
RCP 4031	394	841	1,36	275	A 46/8	6,0	4,6	●	10,3	38	2	●	●	●	118
RCP 5031	492	569	1,62	460	A 90/12	11,5	9,0	●	23,9	52	2	●	●	●	250
RCP 5032	492	569	1,52	515	A 120/12	15,3	12,0	●	31,4	88	3	●	●	●	255
RCP 5033	492	569	1,20	590	A 120/12	15,3	12,0	●	31,4	88	3	●	●	●	255
RCP 5034	492	569	1,14	640	A 120/12	15,3	12,0	●	31,4	88	3	●	●	●	255
RCP 8031	792	296[1]	1,44	900	A 130/4	14,9	13,0	●	21,9	127	2	●	●*	●	280
RCP 8031	792	356[2]	1,1	1080	A 130/4	14,9	13,0	●	21,9	127	2	●	●*	●	280
RCP 8031	792	356[2]	1,65	1080	A 170/4	19,8	17,0	●	29,4	165	4	●	●*	●	285
RCP 8032	792	296[1]	0,90	990	A 130/4	14,9	13,0	●	27,8	127	2	●	●*	●	280
RCP 8032	792	296[1]	1,3	1010	A 170/4	19,8	17,0	●	37,0	165	4	●	●*	●	285
RCP 8032	792	356[2]	0,97	1210	A 250/4	28,8	25,0	●	53,1	229	4	●	●*	●	315

P_1 = Power input ; P_2 = Power output; 1= Propeller speed with gear ratio i=6; 2= Propeller speed with gear ratio i=5
● = Standard ; ○ = Option; ●* = Leakage sensor in connection chamber instead of seal chamber.
**Cable type: 10 m cable with free cable ends as standard: 1 = 1 x 7G 1.5 ; 2 = 1 x 10G 1.5 ; 3 = 1 x 10 G 2.5 ; 4 = 2 x 4G 4 + 2 x 0.75

2.6 Technical data SB-KA

Flow booster type	Propeller		Motor											Weight
	Propeller diameter	Speed	Motor type	Rated input power P_1	Rated motor power P_2	Starting: Direct (D.O.L)	Starting: Star/Delta	Rated current at 400 V (50 Hz)/ 460 V (60 Hz)	Starting current 400 V (50 Hz)/ 460 V (60 Hz)	Cable type** (Ex and standard)	Temperature monitoring	Seal monitoring	Ex h dII BT4	Total weight
	[mm]	[1/min]		[kW]	[kW]			[A]	[A]					[kg]
SB 1236 KA	925	100[1]	A 30/8	4.2	3.0	●	-	9.3/400 V	37/400 V	1	●	●	-	176
SB 1237 KA	1080	100[1]	A 40/8	5.6	4.0	-	●	10.9/400 V	40/400 V	2	●	●	-	179
SB 1236 KA	925	100[2]	A 35/8	4.6	3.5	●	-	8.7/460 V	38/460 V	1	●	●	-	176
SB 1237 KA	1080	100[2]	A 46/8	6.0	4.6	-	●	10.3/460 V	38/460 V	2	●	●	-	179

P_1 = Power input ; P_2 = Power output; 1= Propeller speed with gear ratio i=7; 2= Propeller speed with gear ratio i=8
● = Standard ; ○ = Option; **Cable type: 10 m cable with free cable ends as standard: 1 = 1 x 7G 1.5 ; 2 = 1 x 10G 1.5

NOTE ***Other voltages available on request.***

2.7 Nameplate

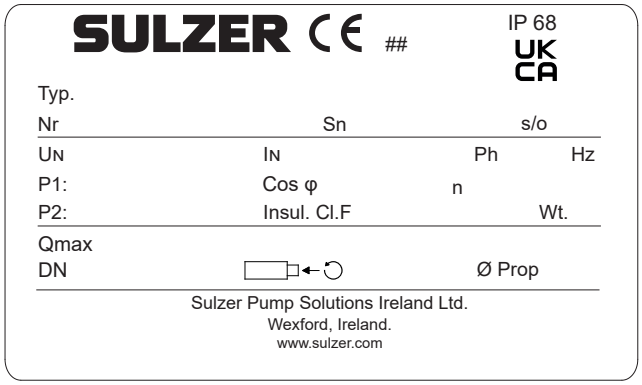


Figure 1 Standard Nameplate

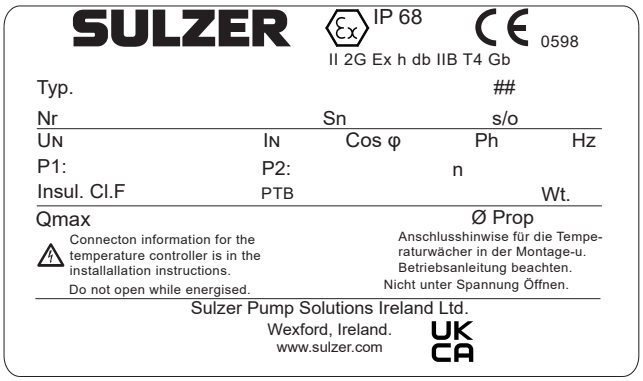


Figure 2 Ex Nameplate

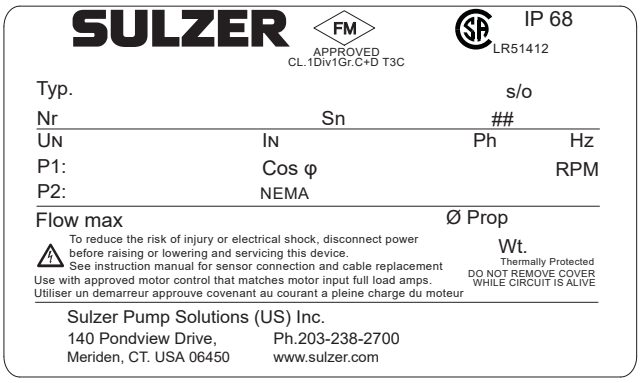


Figure 3 FM Nameplate

Legend

Typ.	Unit type	
Nr	Item no.	
s/o	Shop order no.	
Sn	Serial Number	
Cos φ	Power factor	pf
Un	Rated Voltage	V
In	Rated current	A
Ph	Number of phases	Hz
Hz	Frequency	Hz
Wt.	Weight	kg / lbs

P_1	Rated input power	kW
P_2	Rated output power	kW / hp
n / RPM	Speed [flexible unit]	
ø Prop	Propeller diameter [flexible unit]	
Nema	Nema Code	Class
Q / Flow max	Maximum Flow	
##	Production date (Week/Year)	
PTB	Notified Body certification code	
	Direction of rotation	

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

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

3 Dimensions and weights

NOTE ***The weights of the units can be obtained from the nameplate of the unit or from the table in section 2 Technical Data.***

3.1 Dimensions RW

Dimension	**RW 400 A30/40** (50 Hz) **A35/46** (60 Hz)	**RW 480 A75/110** (50 Hz) **A90/130** (60 Hz)	**RW 650 A50** (50 Hz) **A60** (60 Hz)	**RW 650 A75** (50 Hz) **A90** (60 Hz)	**RW 650 A100** (50 Hz) **A120** (60 Hz)	**RW 750 A150** (50 Hz) **A130** (60 Hz)	**RW 900 A110/150** (50 Hz) **A130/170** (60 Hz)	**RW 900 A220** (50 Hz) **A250** (60 Hz)
D_1	ø 400	ø 482	ø 650	ø 650	ø 650	ø 740	ø 900	ø 900
D_2	ø 560	-	ø 811	ø 811	ø 811	-	ø 1150	ø 1150
d_1	ø 222.5	226	ø 262.5	ø 262.5	ø 262.5	ø 222.5	ø 222.5	ø 222.5
H □ 60	264	-	-	-	-	-	-	-
H □ 100	306	306	305	305	305	306	306	306
h_1	700	500	900	900	900	750	1500	1500
L_1 □ 60	680	-	-	-	-	-	-	-
L_1 □ 100	715	1025	839	979	979	1068	1150	1250
L_2 □ 60	705	-	-	-	-		-	-
L_2 □ 100	740	-	878	1018	1018	-	1172	1272
l_1	793	1123	745	885	885	1166	1250	1350
l_2 □ 60	310	-	-	-	-		-	-
l_2 □ 100	310	410	410	540	540	-	-	-
X_1 □ 60	259	-	-	-	-		-	-
X_1 □ 100	279	401	372	452	452	449	470	500
X_2 □ 60	299	-	-	-	-		-	-
X_2 □ 100	319	-	372	452	452	-	460	570

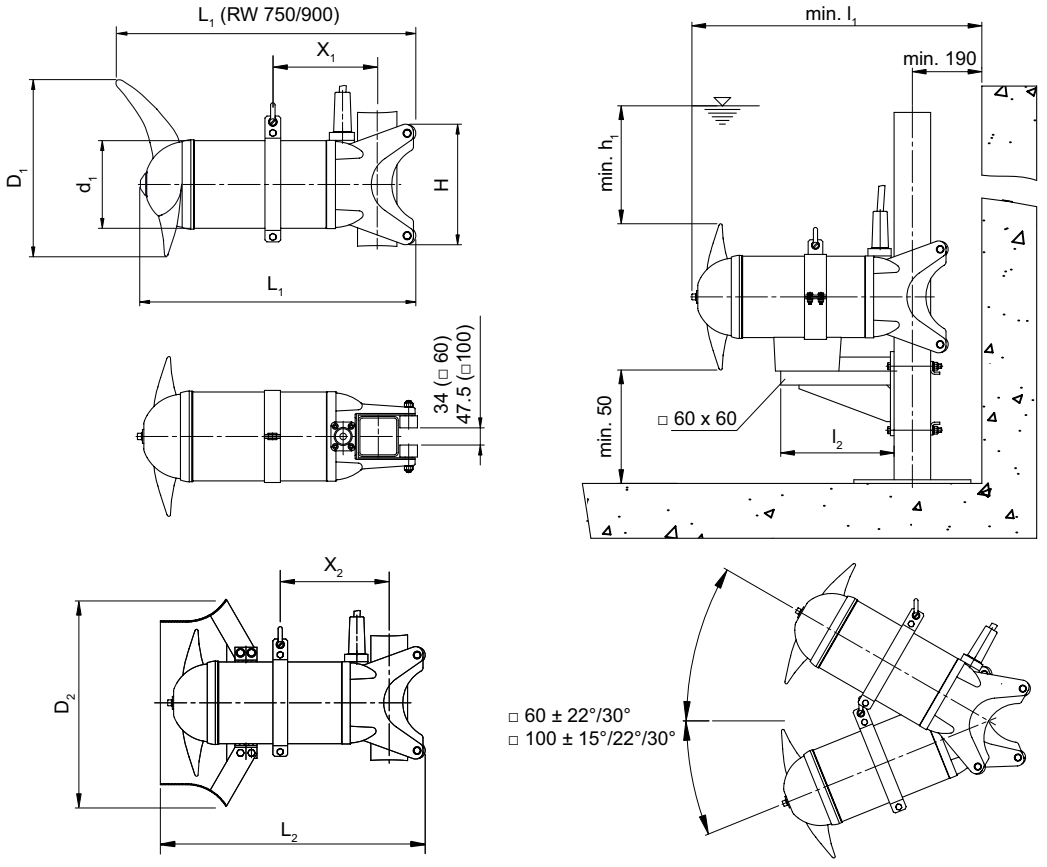


Figure 4 Dimensions RW

3.2 Dimensions RCP

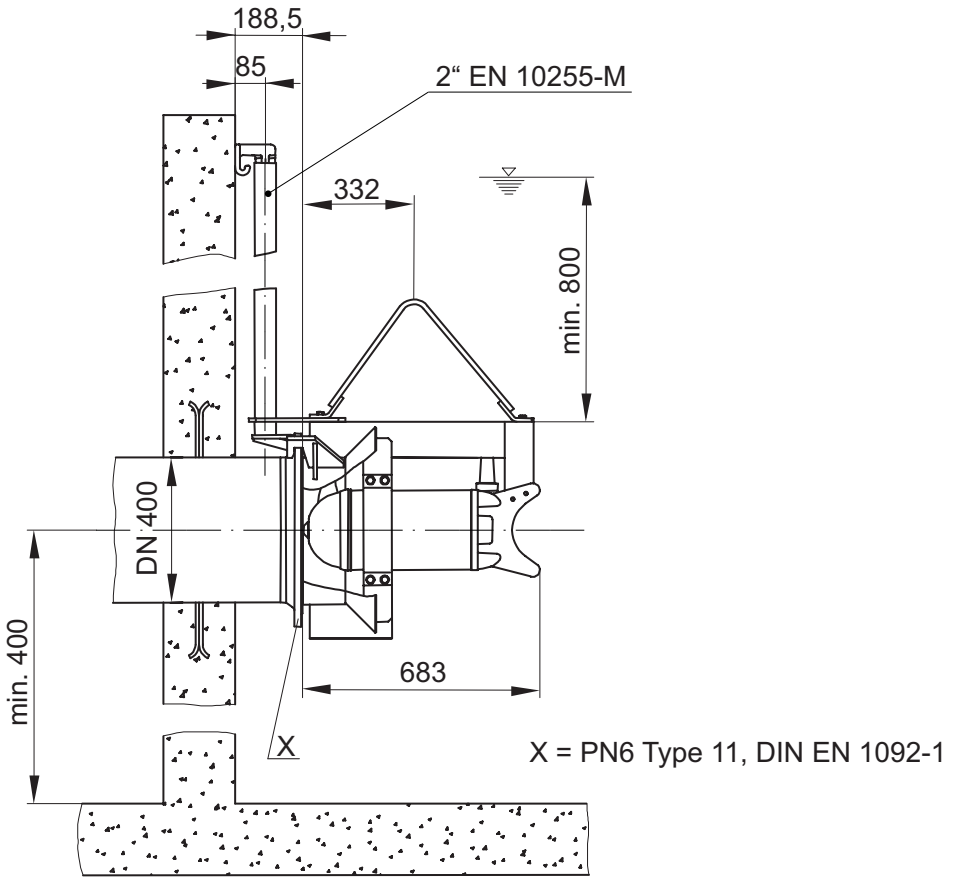


Figure 5 RCP 400

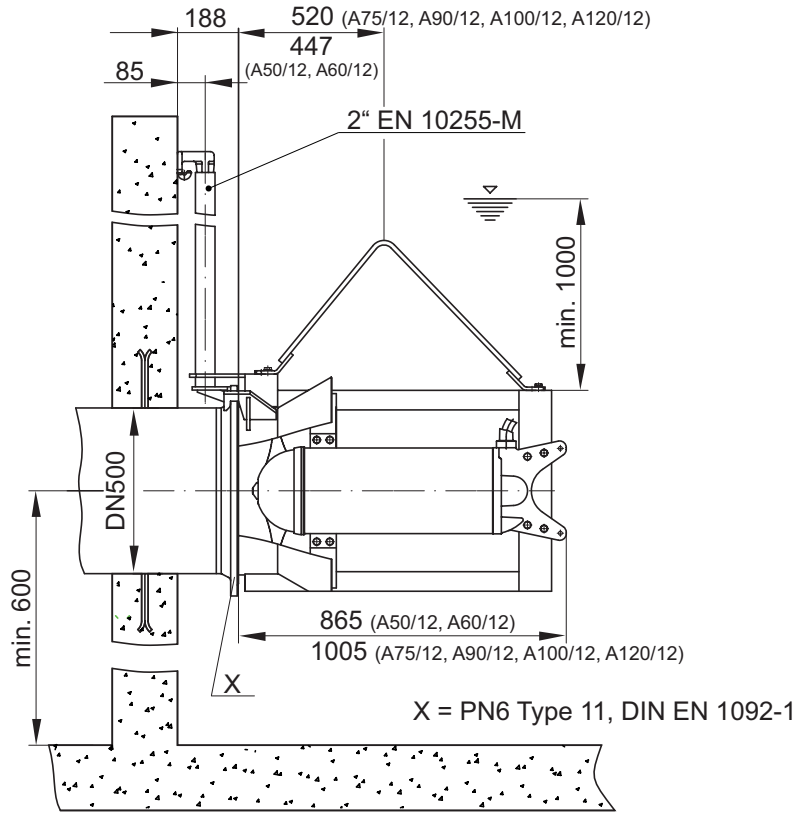


Figure 6 RCP 500

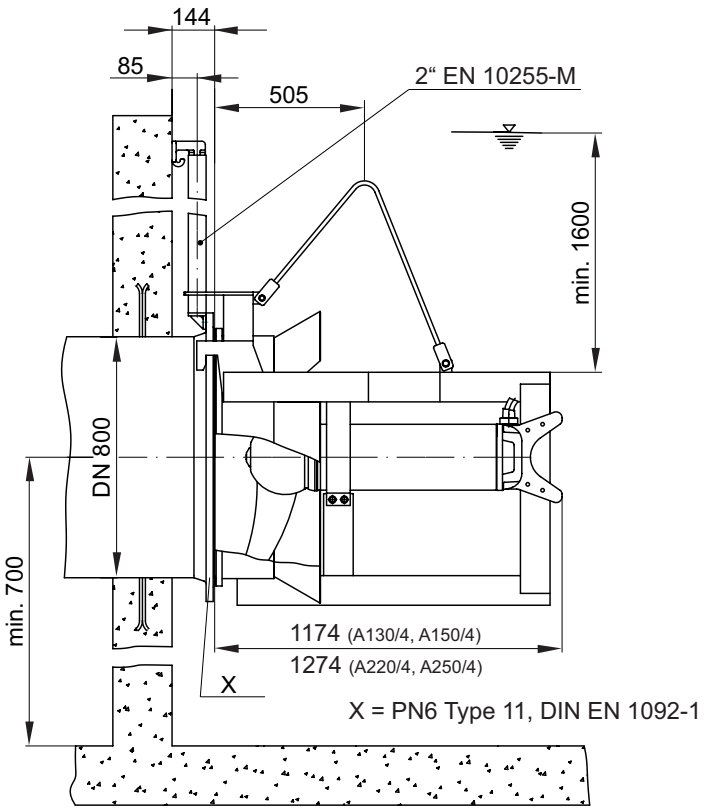
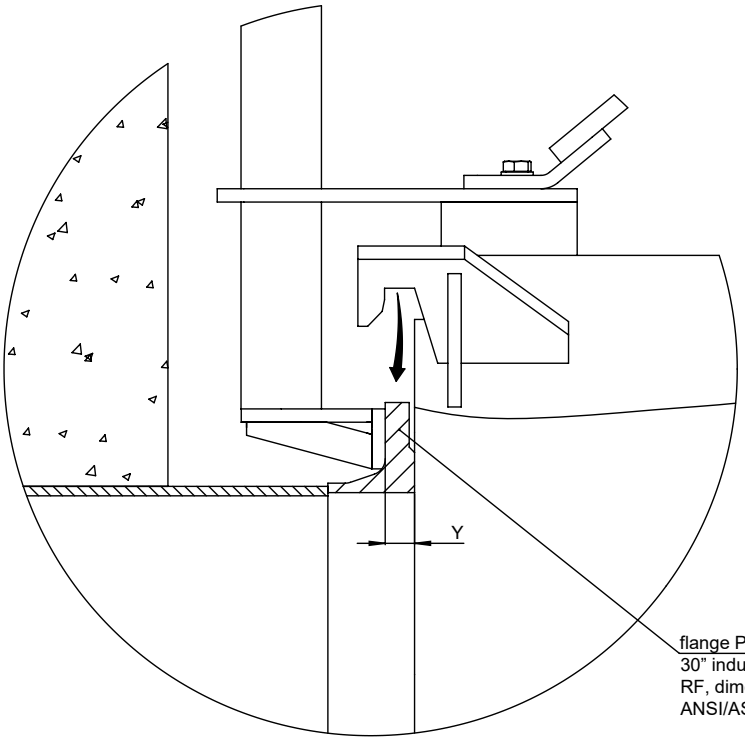


Figure 7 RCP 800

3.3 Flange dimension check



flange	dimension „ Y “
DN	(mm)
400	22 +0,5
500	24 +0,5
800	30 +0,5
NPS	(inch)
10“	1,19 +0,030
16“	1,44 +0,016
20“	1,69 +0,022
30“	2,25 +0,033

Figure 8 Flange dimensions

ATTENTION ***Before installing the recirculation pump, check the “Y” dimension of the flange. Make sure that the dimensions specified in the table are adhered to, otherwise the flange will need to be reworked.***

3.4 Dimensions SB-KA

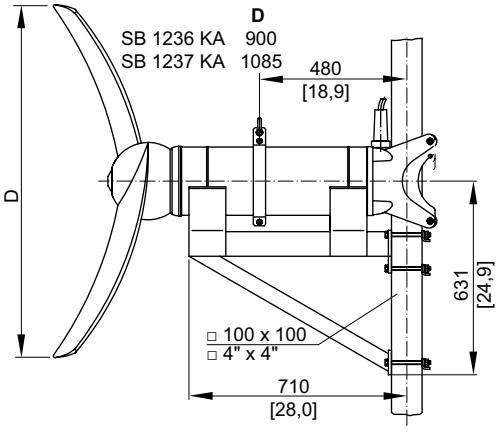


Figure 9 Bracket: Version for fixed angle 0°

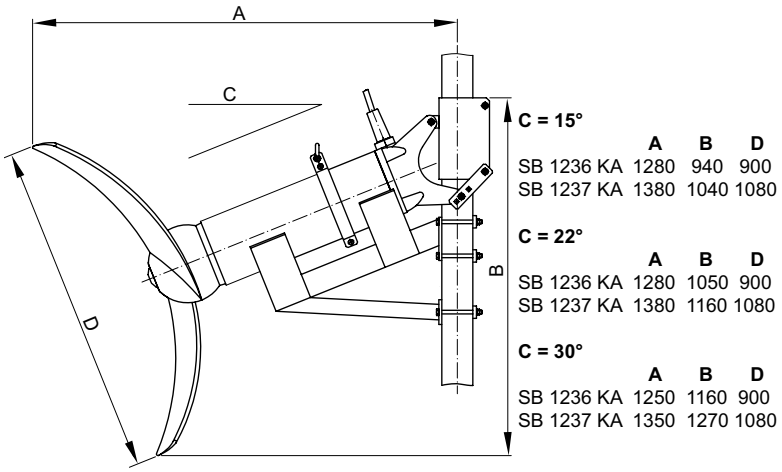


Figure 10 Bracket: Version for different angle adjustment

4 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.

4.1 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.

5 Lifting, transport and storage

5.1 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 unit is installed (e.g.at the terminal boxes / control panel where the 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.***

5.2 Transport



The unit must never be raised by the power cable.

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



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.

5.3 Transport securing devices

5.3.1 Motor connection cable moisture protection

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

ATTENTION ***The ends of the cables should never be immersed in water as the protective covers only provide protection against water spray or similar (IP44) and are not a water tight seal. The covers should only be removed immediately prior to connecting the pumps electrically.***

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

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!***

5.4 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 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.***

6 Product description

6.1 General description

- Hydraulically optimized propeller with high wear resistance.
- 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.
- Seal chamber filled with lubricating oil (oil change not necessary).

Motor

- Three phase squirrel cage motor.
- Rated voltage: 400 V 3~ 50 Hz / 460 V 3~ 60 Hz.
- Other voltages available on request.
- Insulation class F = 155 °C / 311 °F, Protection type IP68.
- Medium temperature for continuous operation: + 40 °C / 104 °F.

Motor monitoring

- All motors are fitted with temperature monitors, which 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 by means of a special electronic device (option).

Operation with frequency inverters

- All RW/RCP/SB-KA, when **suitably selected**, can be used with frequency inverters. **Observe the EMC-Directive and the installation and operating instructions of the inverter manufacturer!**

6.2 Structural design RW and SB-KA

6.2.1 RW 400 and RW 650

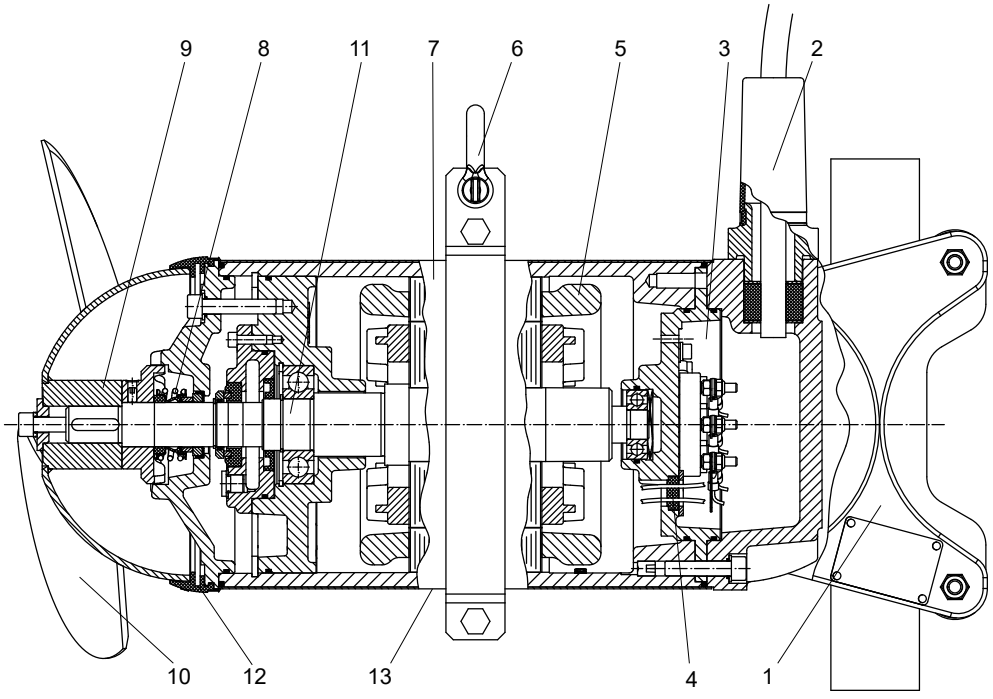


Figure 11 RW 400 and RW 650

Legend RW 400 and 650

1	Bracket	**6**	Bracket with shackle	**11**	Shaft unit with rotor and bearings
2	Cable inlet	**7**	Motor Housing	**12**	SD - ring
3	Connection chamber	**8**	Mechanical seal	**13**	Stainless steel covering (Option)
4	Sealing of the motor chamber	**9**	Propeller boss		
5	Stator	**10**	Propeller		

6.2.2 RW 480

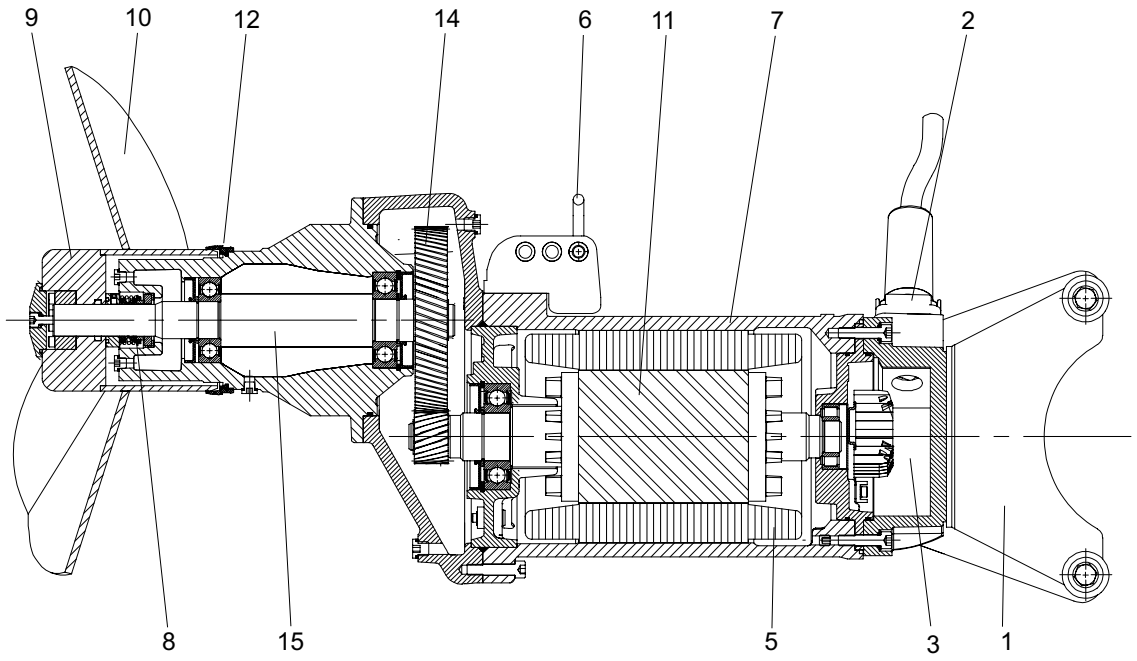
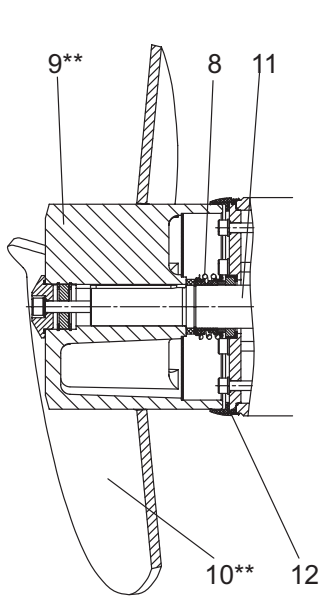


Figure 12 RW 480

6.2.3 RW 750, RW 900 and SB-KA



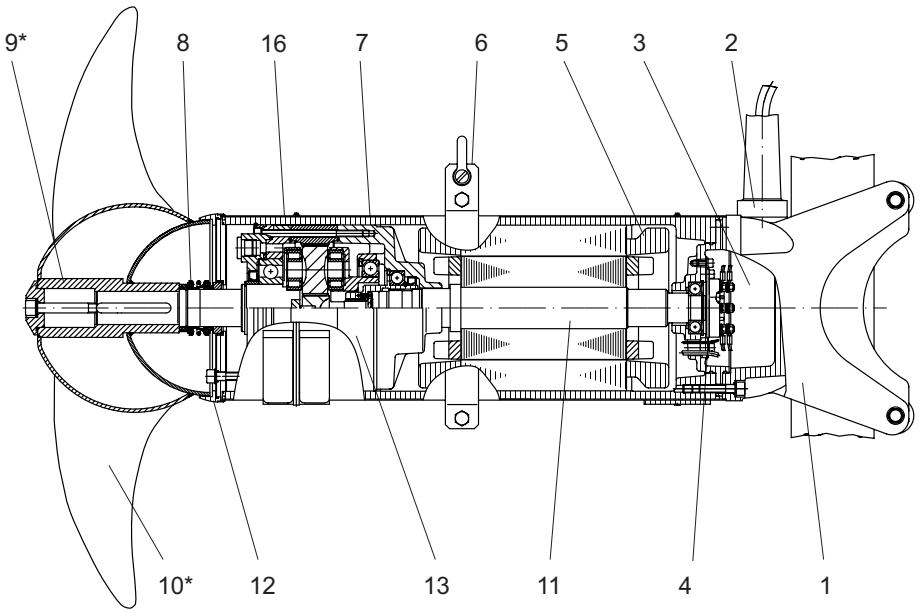


Figure 13 RW 750 *RW 900 and SB-KA*

Legend RW 480, RW 750, RW 900 and SB-KA

1	Bracket	**9**	Propeller boss	**** = RW 900 / SB-KA***
2	Cable inlet	**10**	Propeller	***** = RW 750***
3	Connection chamber	**11**	Shaft unit with rotor and bearings	
4	Sealing of the motor chamber	**12**	SD - ring	
5	Stator	**13**	Gearbox	
6	Bracket with shackle	**14**	Gear	
7	Motor Housing	**15**	Propeller Shaft	
8	Mechanical seal	**16**	Stainless steel covering (Option)	

6.3 Structural design RCP

6.3.1 Structural design RCP 400 and RCP 500

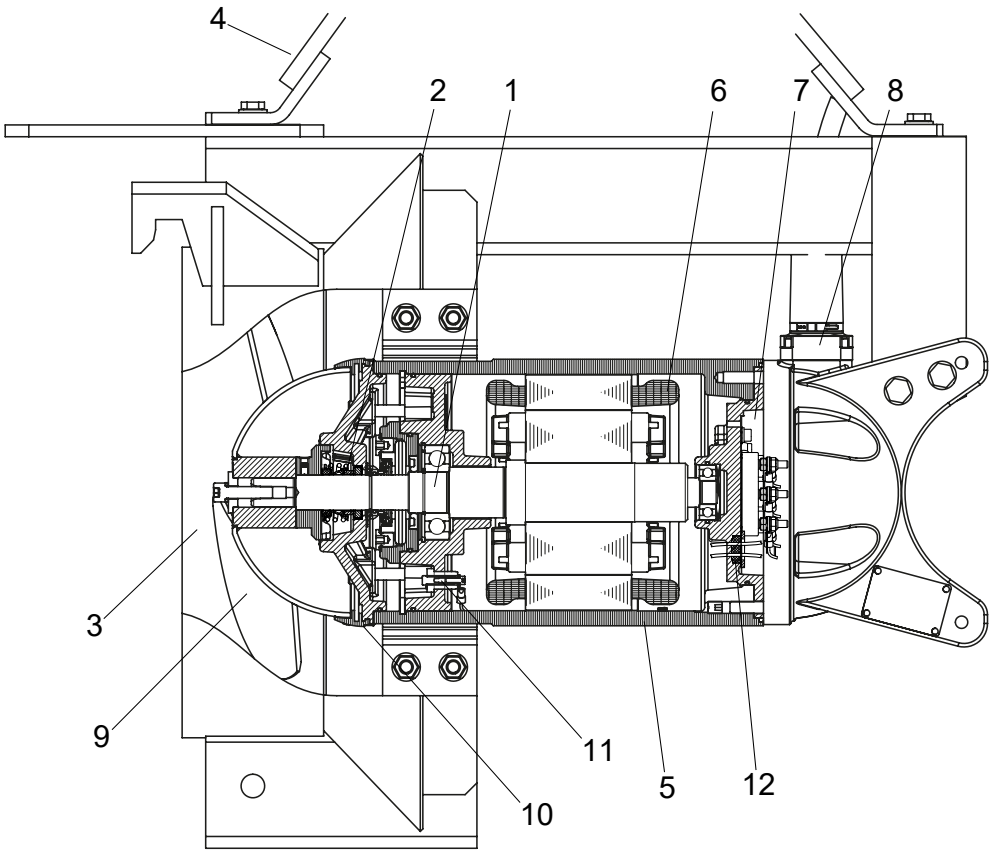


Figure 14 RCP 400 and RCP 500

Legend

1	Shaft unit with rotor and bearings	**7**	Connection chamber
2	Mechanical seal	**8**	Cable inlet
3	Inlet cone	**9**	Propeller
4	Lifting hook	**10**	SD - ring
5	Motor Housing	**11**	Leakage sensor (DI) (seal monitor)
6	Stator	**12**	Sealing of motor chamber

6.3.2 Structural design RCP 800

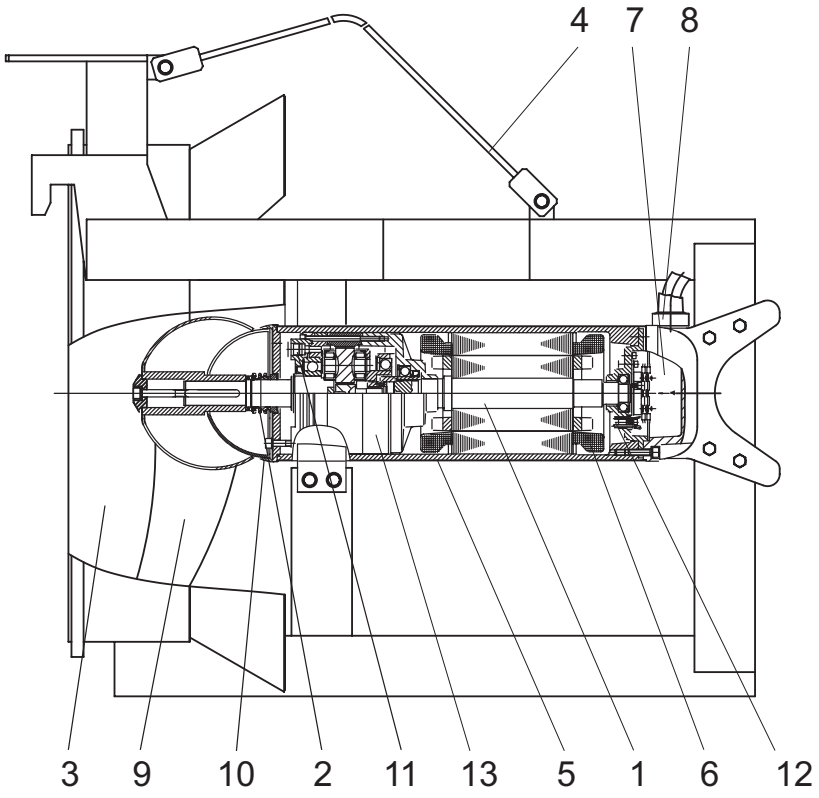


Figure 15 RCP 800

Legend

1	Shaft unit with rotor and bearings	**8**	Cable inlet
2	Mechanical seal	**9**	Propeller
3	Inlet cone	**10**	SD - ring
4	Lifting hook	**11**	Leakage sensor (DI) (seal monitor)
5	Motor Housing	**12**	Sealing of motor chamber
6	Stator	**13**	Gearbox
7	Connection chamber		

6.4 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.

7 Installation



The safety hints in the previous sections must be observed!

7.1 Equipotential Bonding

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

7.2 Installation RW and SB-KA



Care must be taken that the connection cables are positioned that they cannot be caught up in the propeller blades and that they are not subjected to tension.



The electrical connection is carried out in accordance with *section 7.9 Electrical connection*.

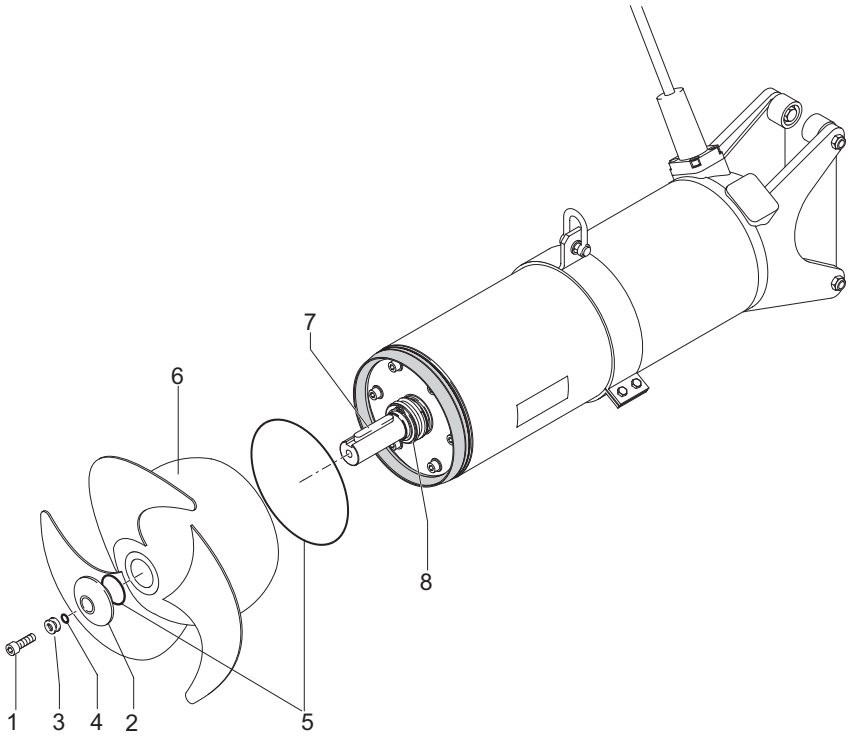
NOTE ***We recommend that Sulzer installation accessories be used for the installation of the RW mixer, RCP recirculation pumps and SB flow booster.***

7.3 Propeller assembly SB-KA

The propellers of the SB-KA are supplied separately and must be fitted on site in accordance with the instructions below.

ATTENTION ***Take care that the orientation of the lock washers is correct (Figure 18 Correct fitting position of the securing washers) and that the prescribed tightening torque is used!***

1. Lightly grease propeller boss and shaft end.
2. Push on propeller (6).
3. Fit O-ring (5).
4. Insert propeller washer (2).
5. Fit O-ring (4).
6. Fit lock washers (3) taking care that orientation is correct (*see Figure 18 Correct fitting position of the Nord-Lock® securing washers*).
7. Tighten socket head screw (1) with torque of 56 Nm.



Legend

1 Socket head screw
2 Propeller washer
3 Lock washers
4 O-ring
5 O-ring
6 Propeller
7 Key (already fitted at factory)
8 Seal (already fitted at factory)

Figure 17 Propeller assembly

7.4 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

7.4.1 Fitting position of the Nord-Lock® securing washers

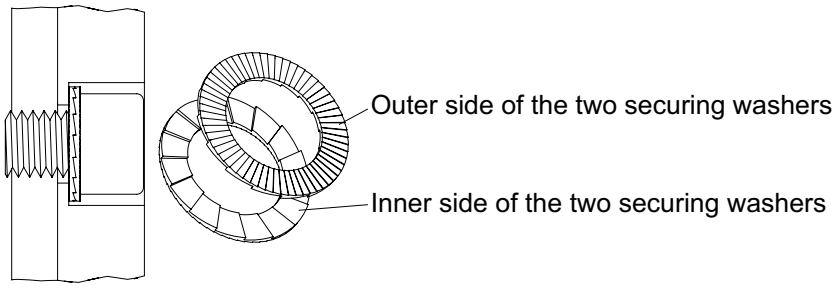


Figure 18 Correct fitting position of the Nord-Lock® securing washers

7.5 Installation examples RW and SB-KA

7.5.1 Installation example with existing accessories

We recommend that the closed bracket be used for this type of installation (*See Figure 26 Closed bracket*).

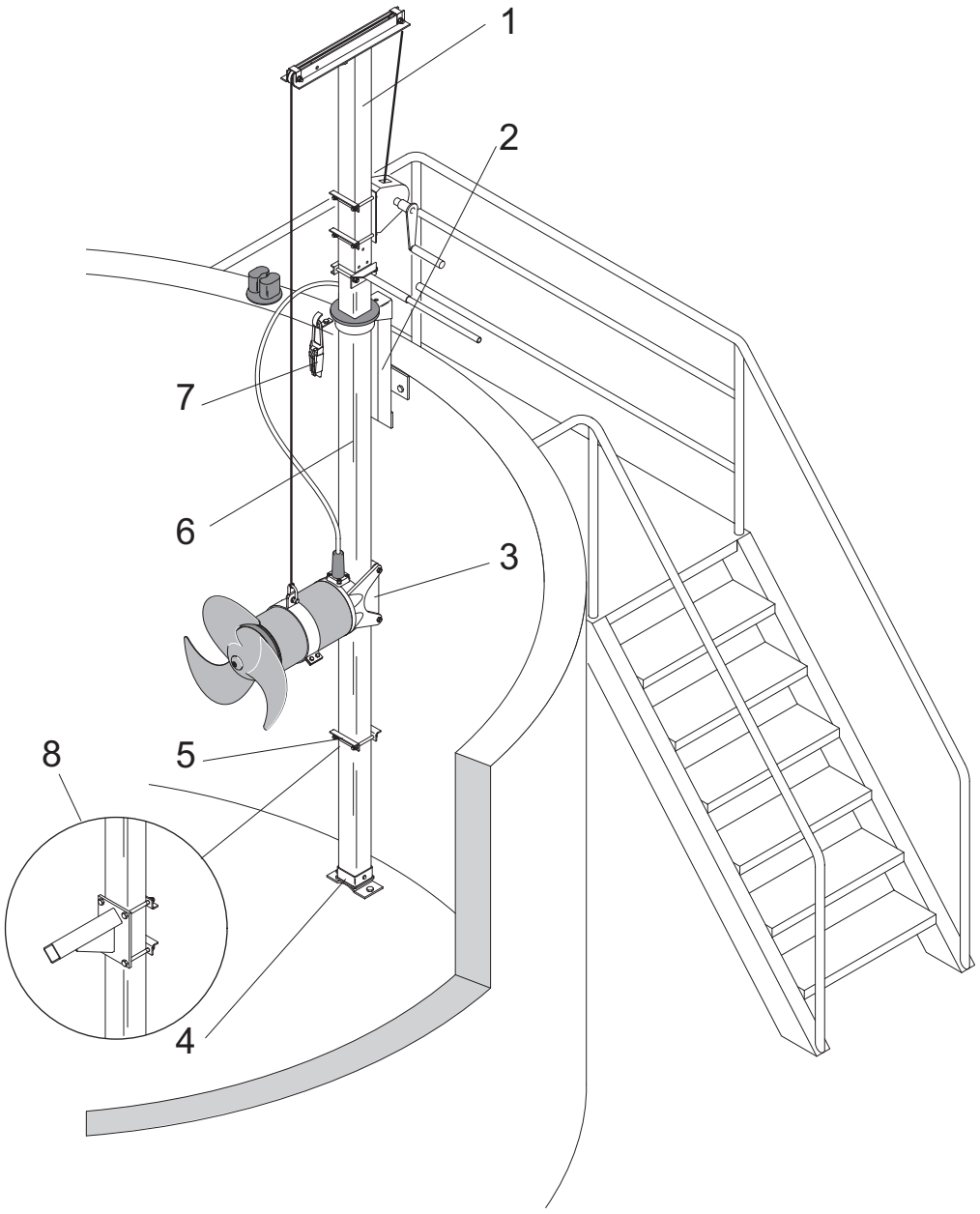


Figure 19 Installation example with exising accessories

Legend

1	Hoist with winch and rope	**5**	Safety stop clamp
2	Upper bracket with locking plate	**6**	Swivelling square guide tube
3	Closed bracket	**7**	Cable clamp with cable hook
4	Bottom plate	**8**	Stop for vibration damper (option)

7.5.2 Installation example with alternative fixing possibilities

We recommend that the open bracket be used for this type of installation (*See Figure 25 Open bracket*).

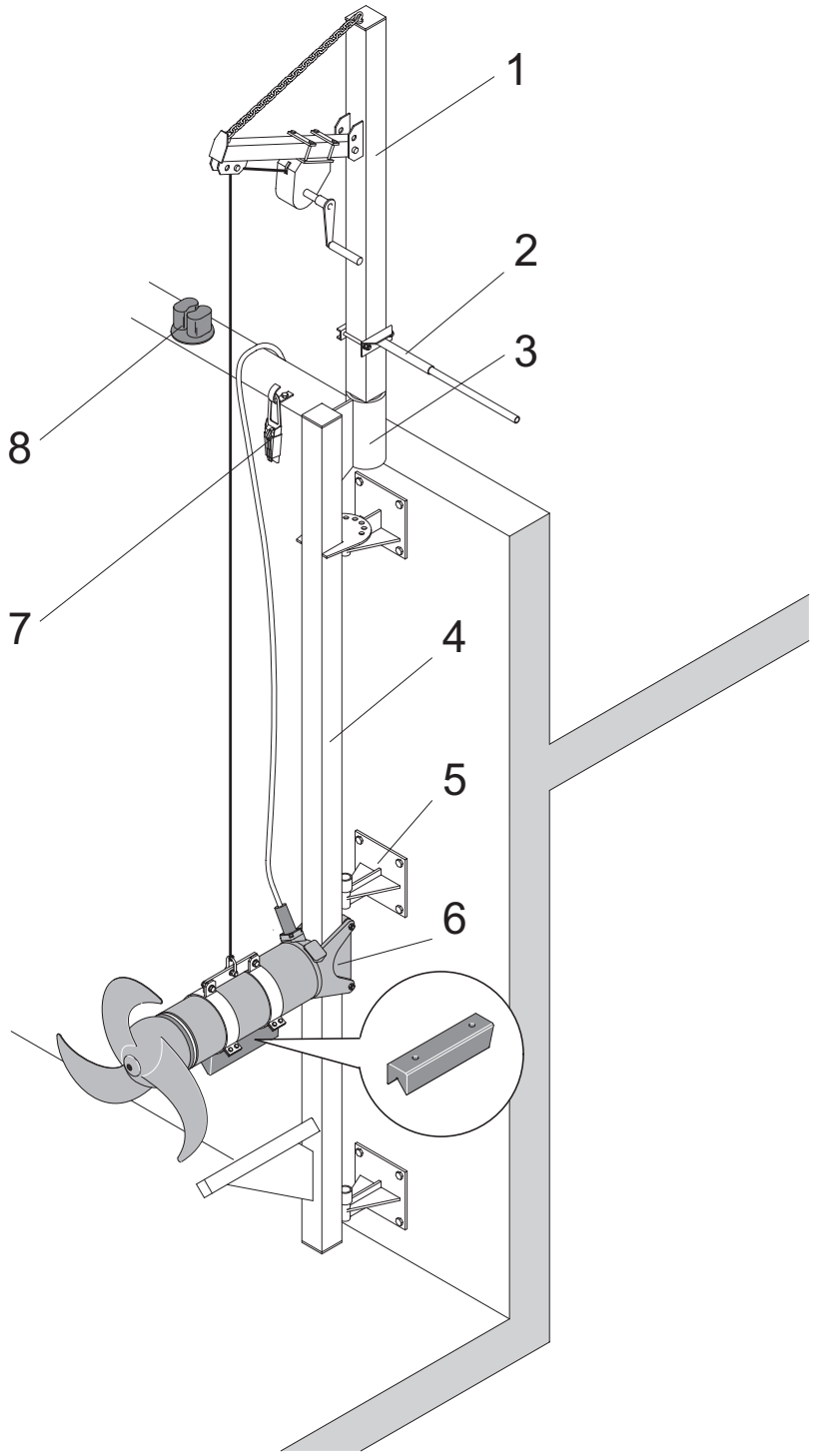


Figure 20 Installation example with alternative fixing possibilities

Legend

1	Transportable lifting unit	**5**	Swivelling wall mounted bracket
2	Swivel handle	**6**	Open bracket
3	Socket (fixed installed)	**7**	Cable clamp with cable hook
4	Swivelling square guide tube	**8**	Rope block

7.5.3 Installation example with fixed installation as flow booster

We recommend that the open bracket be used for this type of installation (*See Figure 25 Open bracket*).

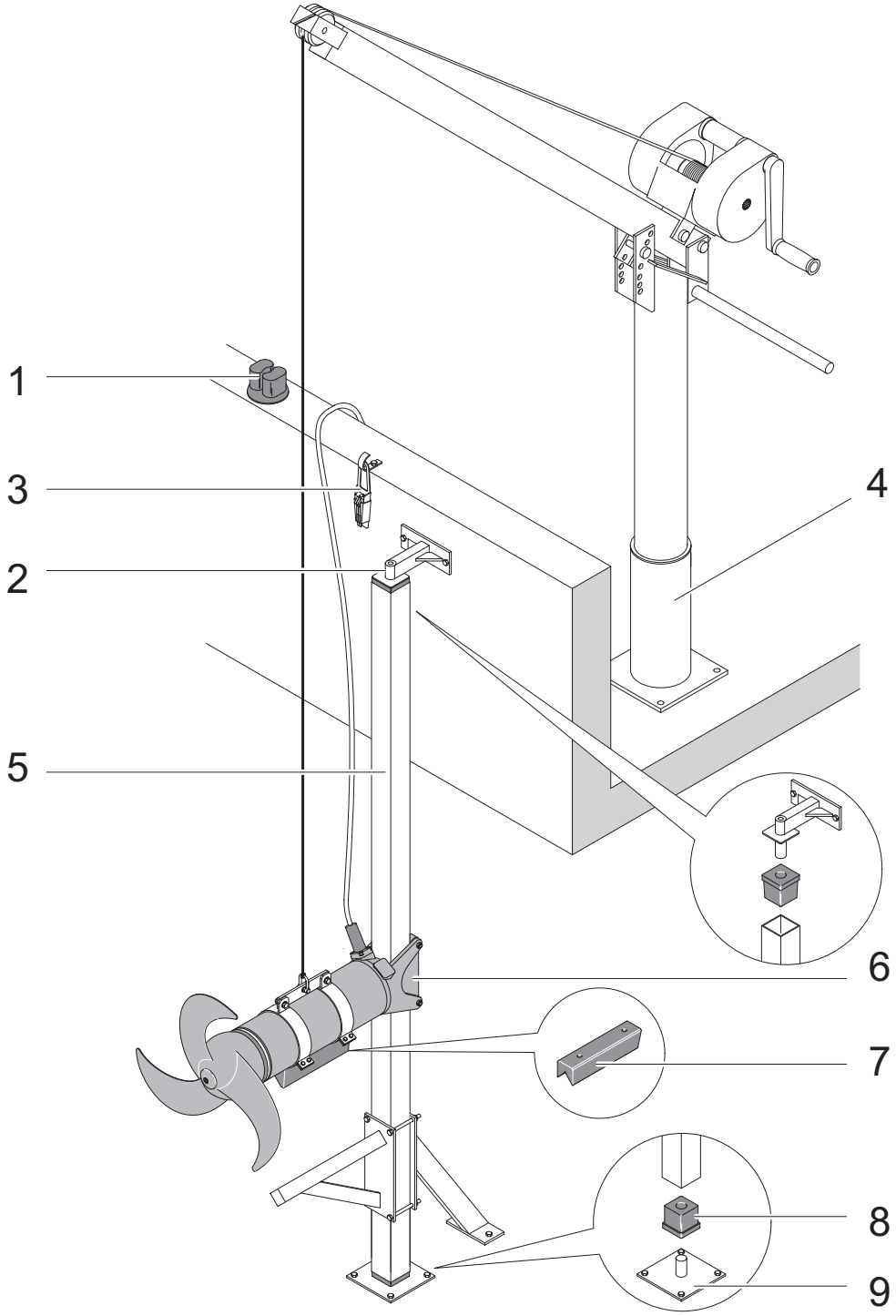


Figure 21 Installation example with fixed installation as flow booster

Legend

1	Rope block	**6**	Open bracket
2	Tube retainer	**7**	Vibration damper
3	Cable clamp with cable hook	**8**	Tube connector
4	Sulzer lifting unit 5 kN	**9**	Bottom plate
5	Square guide tube		

7.5.4 Installation example SB-KA

We recommend that the open bracket be used for this type of installation (*See Figure 24 Open bracket*).

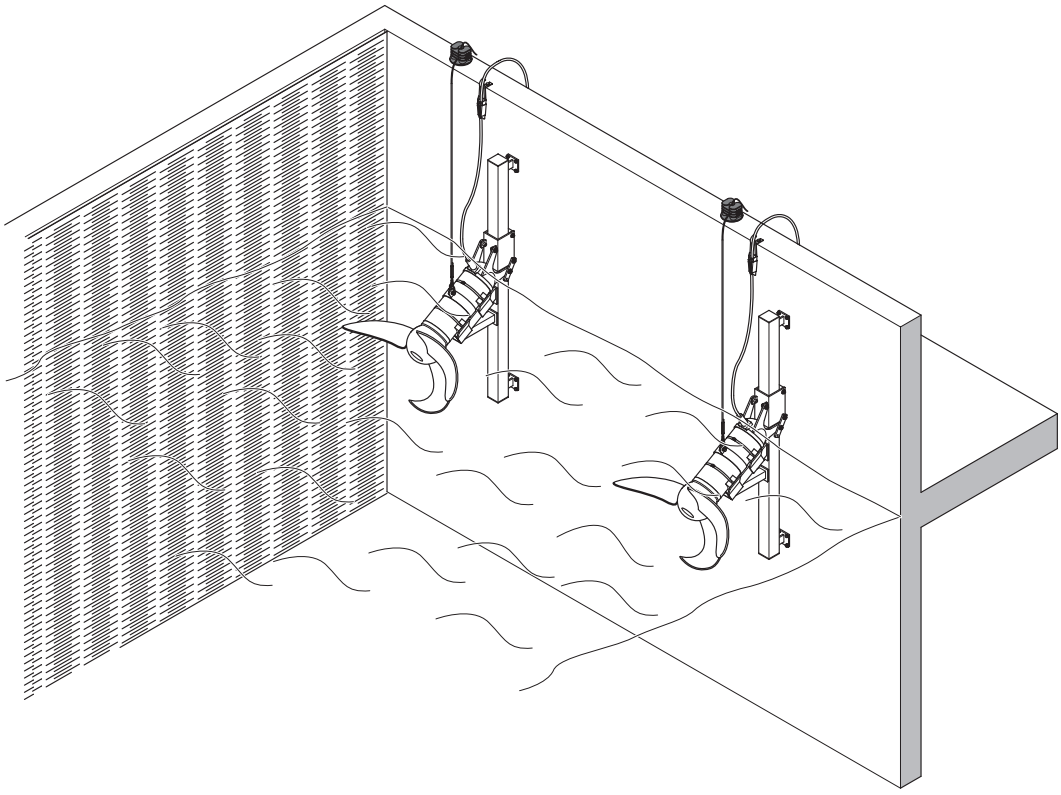


Figure 22 Installation example as flow booster for biofilm carriers.

7.5.5 Fixed installation with vibration damper

If the mixer is to be installed at a fixed point in the tank, then we recommend that the console with the vibration damper be used. In this case a further square tube must be used as a console at the guide tube. The vibration damper for the relevant mixer can be ordered, *see table below:*

Vibration damper listing

Mixer	Part no.
RW 400	6 162 0019
RW 480	6 162 0039
RW 650	6 162 0020 (A50/12, A 60/12). 6 162 0027 (A75/12, A 90/12, A100/12, A 120/12)
RW 750, RW 900 and SB-KA	Standard

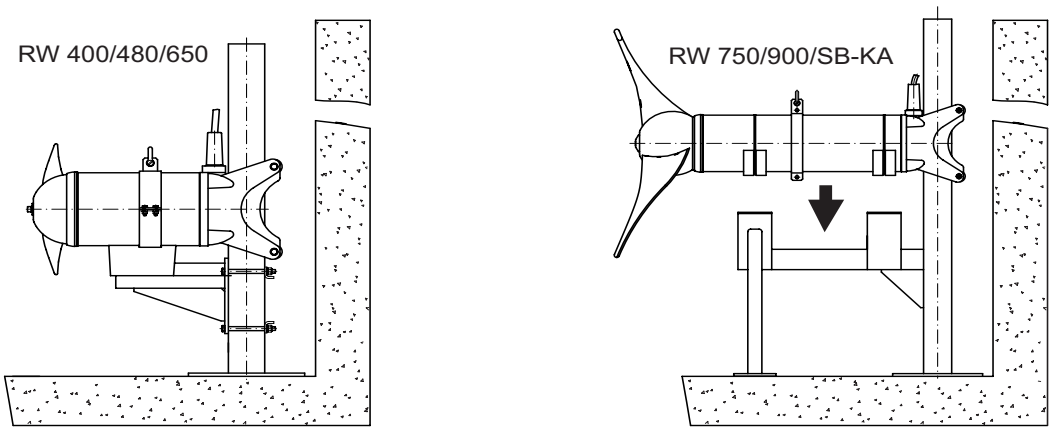


Figure 23 Fixed installation with vibration damper

7.6 Brackets RW

Brackets which can be swivelled vertically (only optional) are available for both open and closed models of the brackets for RW 400 and RW 650.

Vertical angle adjustment is not available for all versions of the RW 480, 550, 750 and 900.



Figure 24 Open bracket/closed bracket

7.6.1 Fitting of the open bracket with vertical swivelling (option)

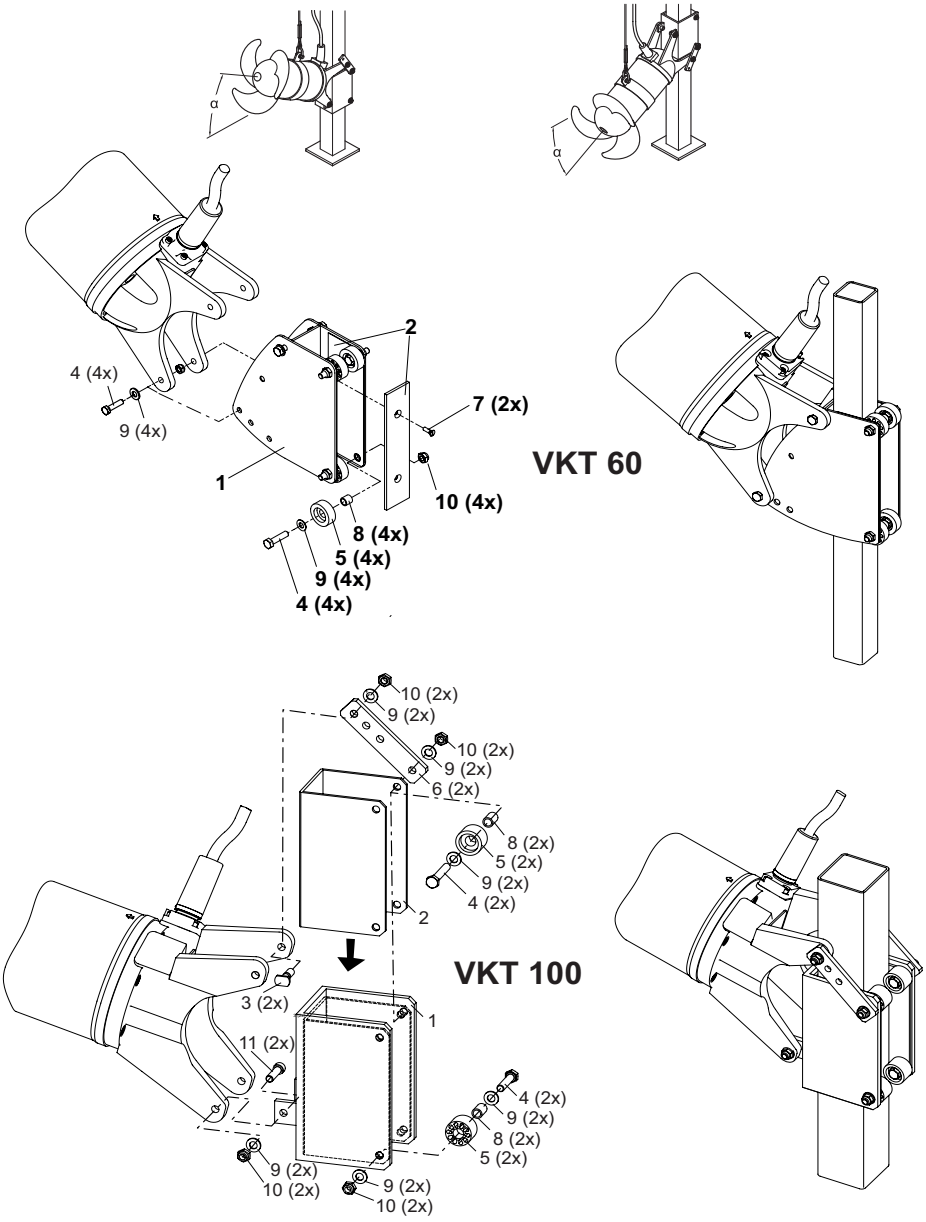


Figure 25 Open bracket with vertical swivelling

Legend (Open bracket with vertical swivelling)

1	Bracket	7	Flat head screw	13	Linch pin
2	Cladding	8	Tube		
3	Threaded inserts	9	Washer		
4	Hex bolts	10	Hex nut		
5	Roller	11	Socket head screw		
6	Strap	12	Hinge bolt		

7.6.2 Fitting of the closed bracket with vertical swivelling (option)

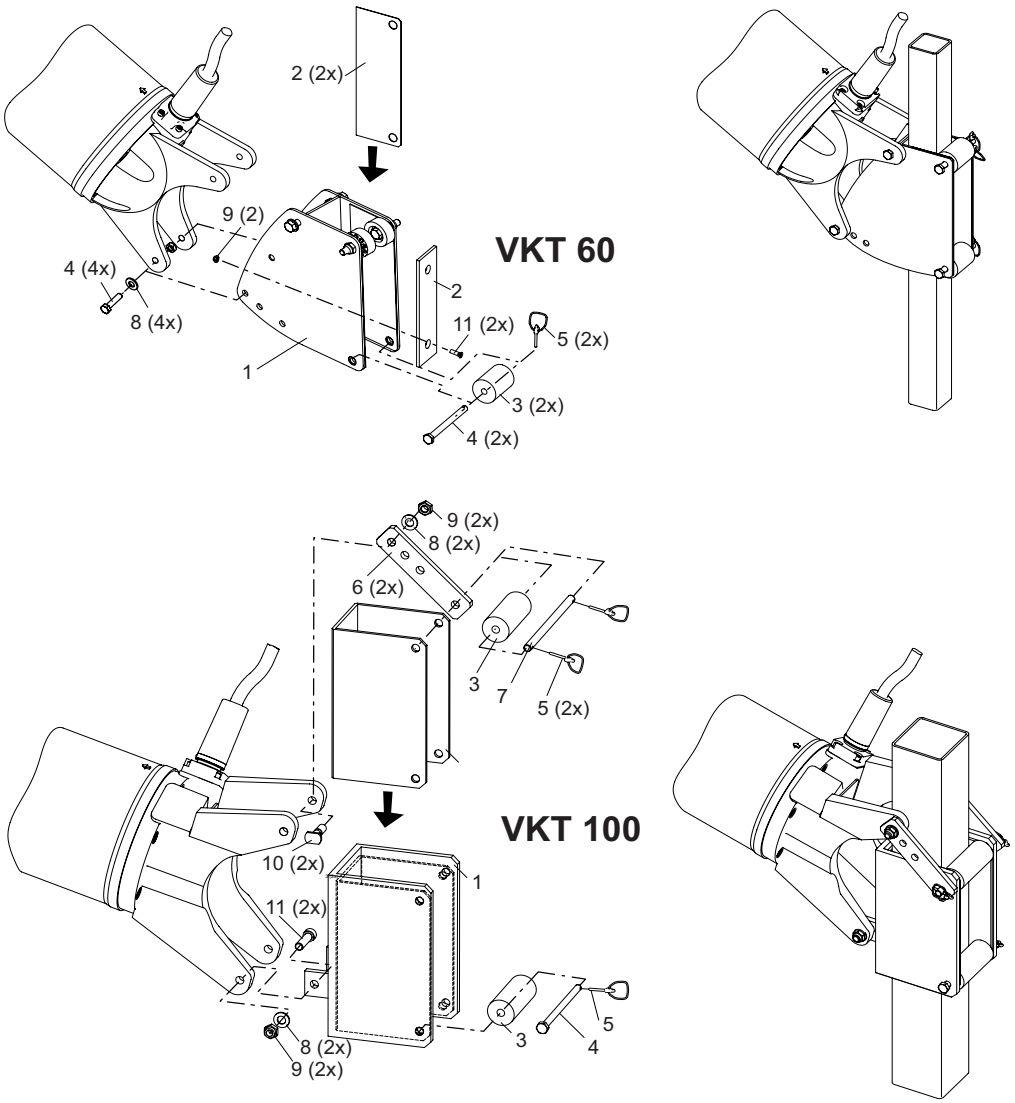


Figure 26 Closed bracket with vertical swivelling

Legend

1	Bracket	7	Bolt long
2	Cladding	8	Washer
3	Roller	9	Hex nut
4	Bolt short	10	Threaded insert
5	Linch pin	11	Socket head screw
6	Strap		

The mixer must be set up freely suspended with bracket fully mounted so that the bracket points vertically towards the ground *(See Figure 27)*. When doing this the clamp of the mixer should be moved until the desired slope of the mixer is achieved *(See Figure 27)*. This ensures that the mixer can slide up and down easily on the guide tube after it is fitted.

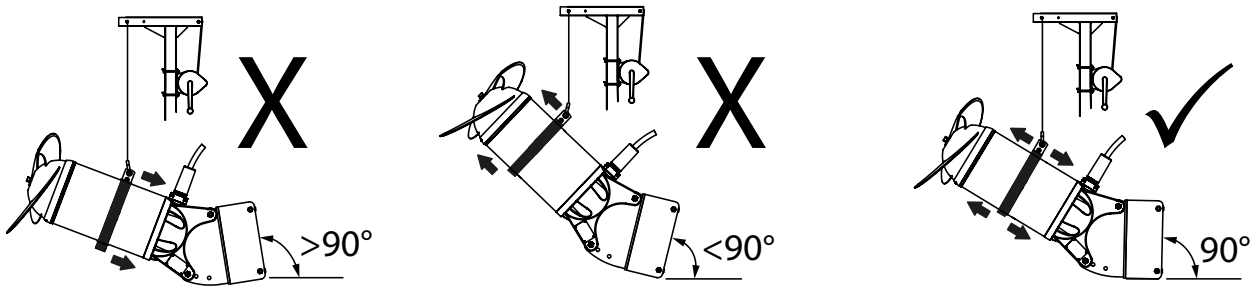


Figure 27 Setting up with fully mounted bracket

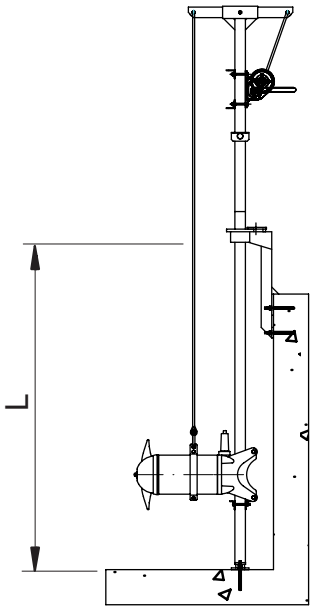
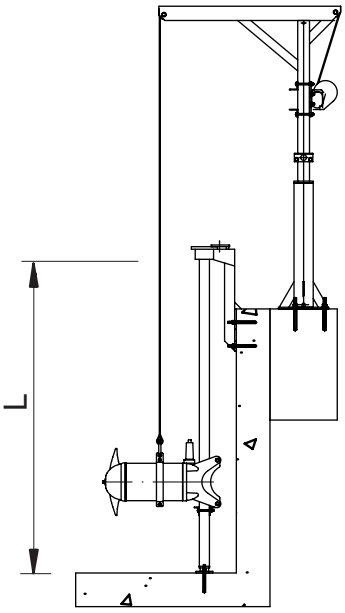
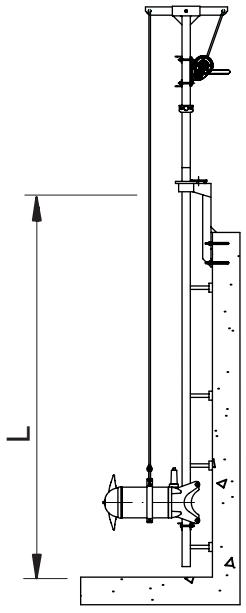
The default setting for all SB-KA with adjustable tilt bracket is α = 30°. In other settings (15° or 22°), the focus and the mount point changes need to be changed in the field.

ATTENTION ***Damage to bracket liner due to incorrect alignment setup will not be covered under warranty.***

7.7 Guide tube lengths (square tube) RW and SB-KA

The table below shows the maximum lengths of the guide tubes - based on the maximum allowable bending 1/300 th. of the length of the guide tubes. These values have been determined in clean water of density 1000 kg/m^3 for the maximum trust of the most powerful mixer/flow booster in each series.

Maximum guide tube length (L) for an installation with square guide tube

Mixer/ Flow booster	**with push in type lifting unit**	**with separate lifting unit**	**guide tube with additional wall fixing**
			
	Figure 28a	Figure 28b	Figure 28c
RW 400	□ 2“ x 3/16“. L ≤ 5 m	□ 2“ x 3/16“. L ≤ 5 m	□ 2“ x 3/16“. L ≤ 5 m
	□ 60 x 60 x 4. L ≤ 4 m	□ 60 x 60 x 4. L ≤ 5 m	□ 60 x 60 x 4. L ≤ 5 m
	□ 100 x 100 x 4. L ≤ 9 m	□ 100 x 100 x 4. L ≤ 10 m	□ 100 x 100 x 4. L ≤ 10 m
RW 480, RW 650	□ 100 x 100 x 4. L ≤ 5 m	□ 100 x 100 x 4. L ≤ 6 m	□ 100 x 100 x 4. L ≤ 6 m
	□ 100 x 100 x 6. L ≤ 6 m	□ 100 x 100 x 4. L ≤ 7 m	□ 100 x 100 x 4. L ≤ 6 m
	□ 100 x 100 x 8. L ≤ 7 m	□ 100 x 100 x 4. L ≤ 8 m	□ 100 x 100 x 4. L ≤ 6 m
RW 750, RW 900 ≤ 15 kW	□ 100 x 100 x 6. L ≤ 5 m	□ 100 x 100 x 6. L ≤ 6 m	□ 100 x 100 x 6. L ≤ 6 m
	□ 100 x 100 x 10. L ≤ 7 m	□ 100 x 100 x 10. L ≤ 7 m	□ 100 x 100 x 6. L ≤ 6 m
RW 900 and SB-KA > 15 kW		only with special installation!	

7.8 Installation RCP

7.8.1 Installation example with Sulzer lifting unit

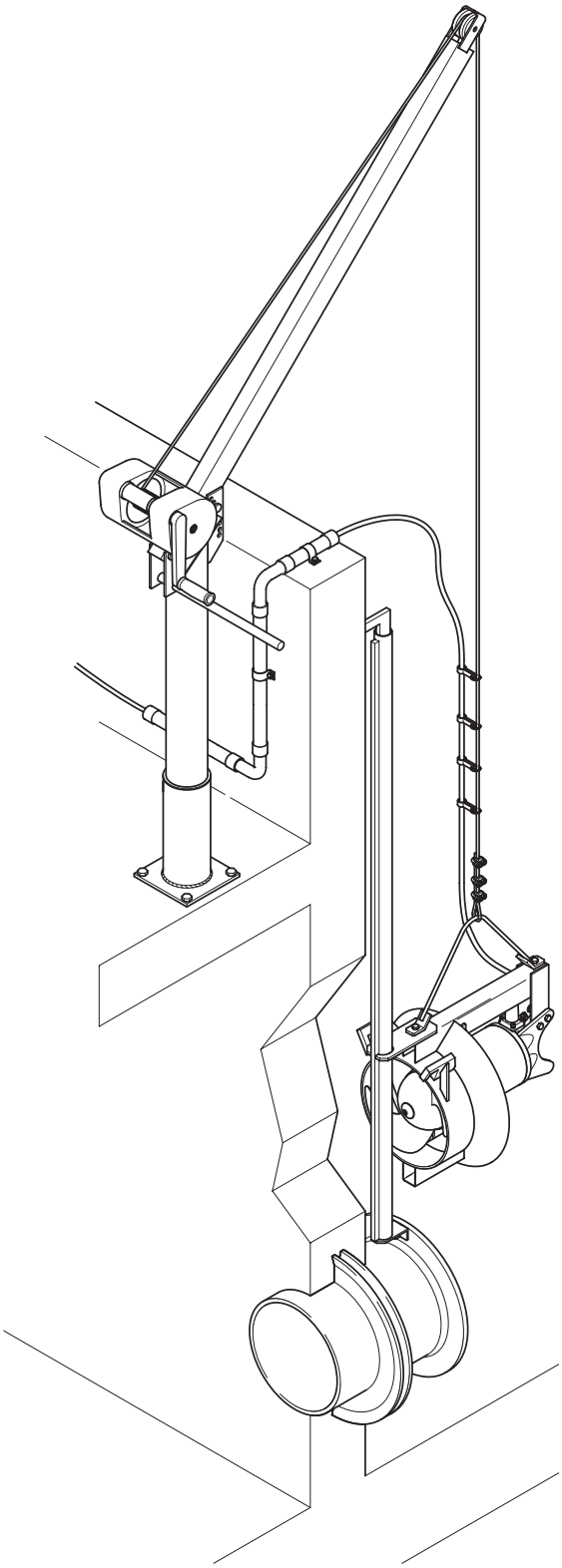


Figure 29 Installation example with Sulzer lifting unit 5 kN

7.8.2 Guide tube installation

The safety hints in the previous sections must be observed!

ATTENTION ***The discharge line and the required flange DIN EN 1092-1 PN6 should be installed on site before starting the installation of the guide tube. The DIN-flange should be installed so that none of the holes in the flange are on the axis line but are symmetrically on either side of it. Ensure that the DIN flange is securely fixed in the concrete.***

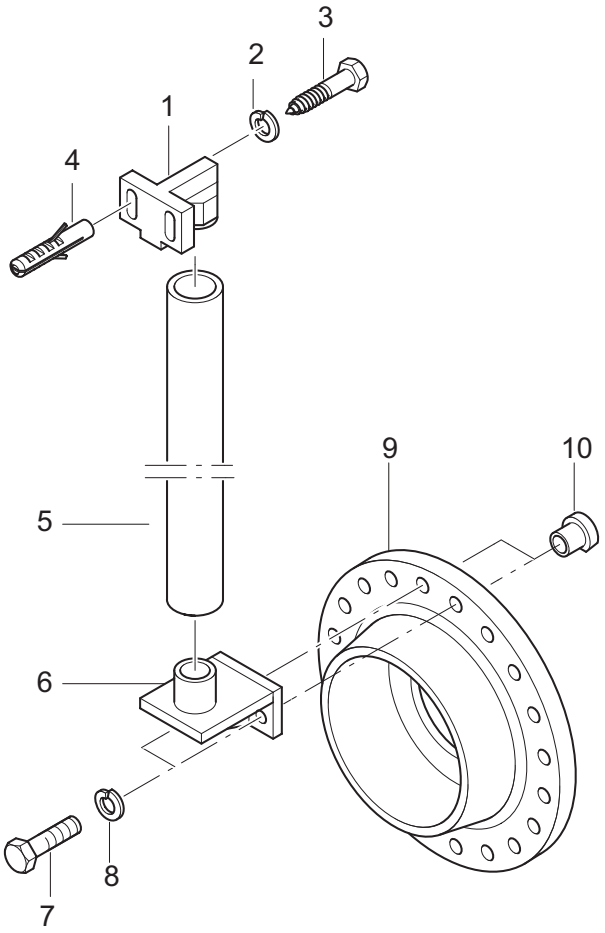


Figure 30 Guide tube installation

- Place bracket (6) on the DIN-flange (9) and fasten using hex nuts (7) together with spring washers (8) and the special nuts (10).

ATTENTION ***The flattened edge of the special nuts (10) must point towards the flange centre.***

- Position the tube retainer (1) vertically over the bracket (6). Mount with the aid of the wall plugs (4) but do not tighten yet!
- Place the guide tube (5) alongside the conical section of the bracket (6) and determine the required length. To do this measure the upper edge of the tube retainer (1).
- Cut the guide tube (5) to the required length and place it on the conical portion of the bracket (6).
- Press the tube retainer (1) into the guide tube (5), so that no vertical play remains. Now tighten the hex screws (3) using the spring washers.

7.8.3 Securing and positioning of the motor connection cables of the RCP

The safety hints in the previous sections must be observed!

NOTE ***The cable holders described here are not supplied as part of the standard execution of the RCP.***

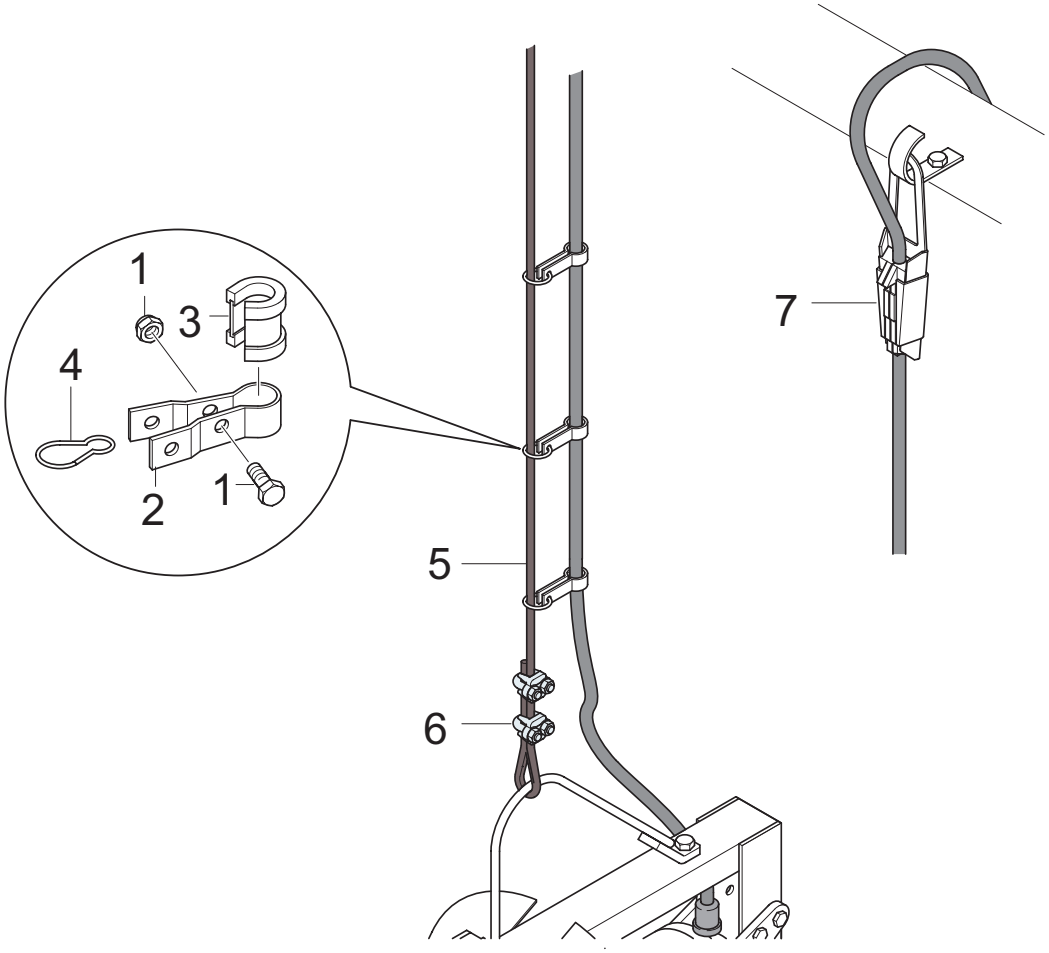


Figure 31 Securing and positioning of the motor connection cables of the RCP

- Place the cable holder (2) with rubber sleeve (3) on the connection cable close to the RCP itself and tighten using hex screw (1).
- Connect the snap hook (4) to the cable holder (2) and attach to the wire rope or chain.

Care must be taken that the connection cables are positioned that they cannot be caught up in the propeller blades and that they are not subjected to tension.

- Assemble all other cable holders in a similar manner. The spacing can be increased as the distance from the RCP increases.
- Hang the connection cable into the cable hook using the strain relief (7).

The electrical connection is carried out in accordance with *section 7.9 Electrical connection*.

7.8.4 Lowering of the RCP along the guide tube

The safety hints in the previous sections must be observed!

The RCP together with the guide piece is connected onto the guide tube and lowered along it until it automatically sits in it‘s final position (see Figure 23). When doing this, carefully feed the power cable downwards at the same time.

To ensure the RCP will tilt enough to lower correctly on the guide tube, the angle of the pump created by the lifting hook when suspended by the hoist has to be checked prior to lowering. For this purpose, begin lifting the pump from a horizontal surface and check that the rear end of the fixing support rises 2- to 4- cm from the floor before the front end begins to lift clear (see Figure 32).

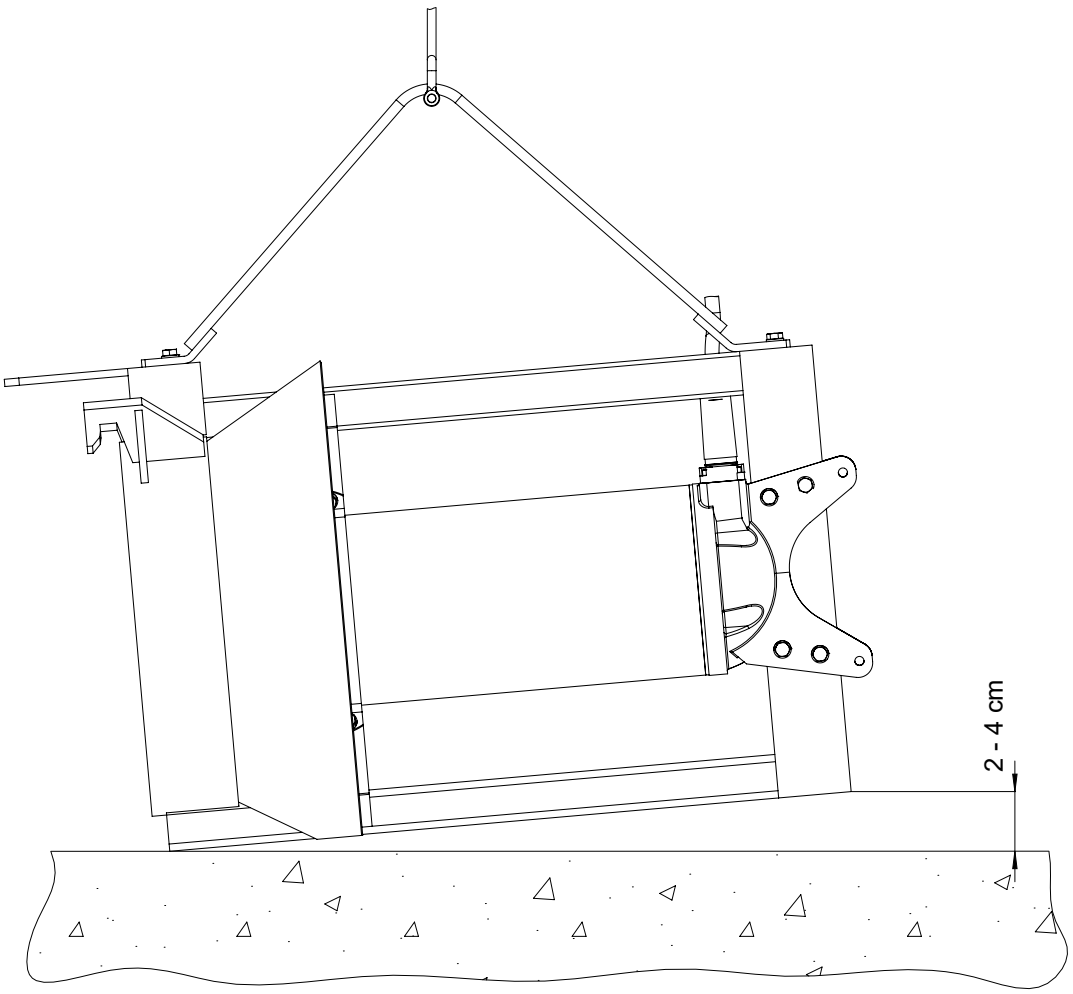
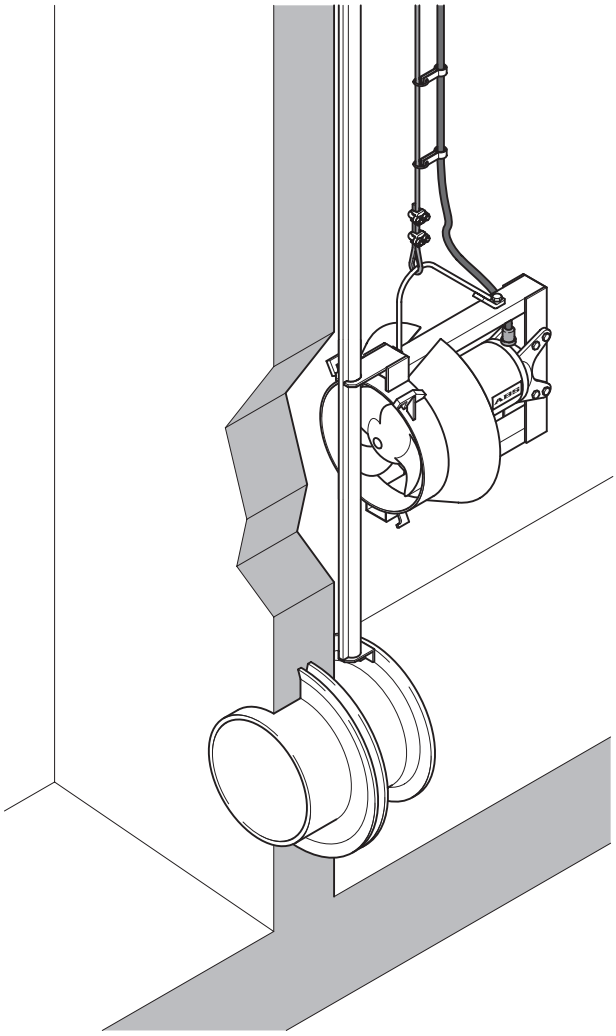


Figure 32 Checking installation angle of pump

ATTENTION ***The power cable should be connected to the wire rope or chain in such a manner that it cannot become entangled in the propeller and that it is not subjected to any tension.***

After lowering of the RCP the tension of the wire rope or the chain should be released.



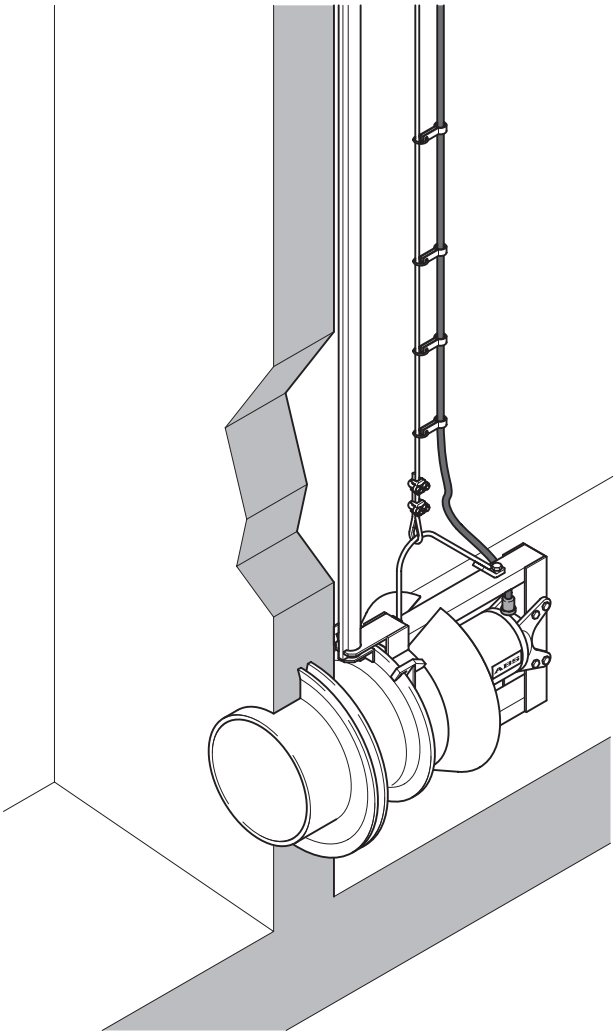


Figure 33 *RCP lowering* *RCP connected*

7.9 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 unit must correspond to that of the mains***

The incoming power supply as well as the connection of the unit 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.

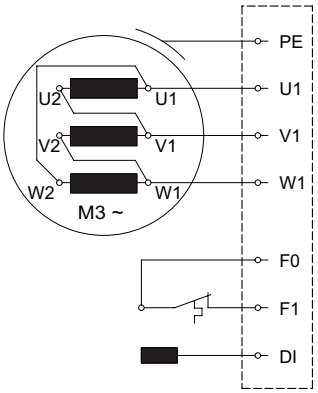
The power supply cable must be protected by an adequately dimensioned slow-blow fuse corresponding to the rated power of the unit.

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 2 Technical data or on the nameplate. If you want to use other starting methods please consult the manufacturer.***

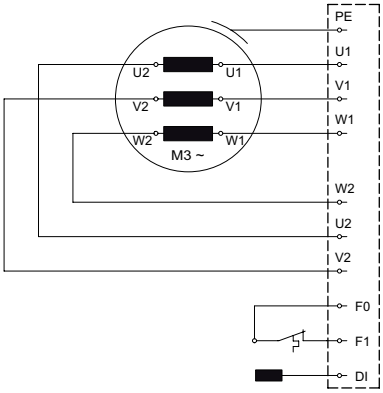
In the case where a control panel is not supplied as standard the unit must only be operated with a motor protection switch with overload relay and thermal sensors connected.

7.9.1 Standard connection diagrams. mains voltage 380 - 420 V at 50 Hz/460 V at 60 Hz



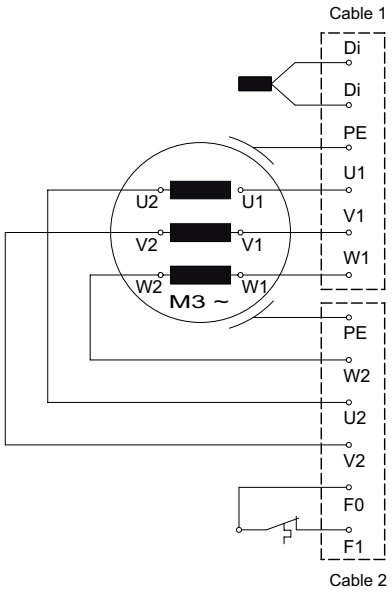
50 Hz	**60 Hz**
A 30/8	A 35/8

Figure 34 One power cable with integrated control leads (internal connection in the motor only for M or A-motor < 3 kW)



50 Hz	**60 Hz**
A 40/8	A 46/8
A 50/12	A 60/12
A 75/12	A 90/12
A 75/4	A 90/4
A 110/4	A 120/12
A 150/4	A 130/4
	A 170/4

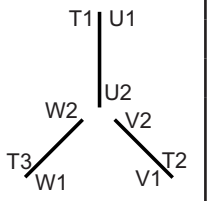
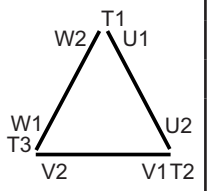
Figure 35 One power cable with integrated control leads



50 Hz	**60 Hz**
A 100/12	A 250/4
A 220/4	

Figure 36 Two power cables with integrated control leads

7.9.2 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	-	

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

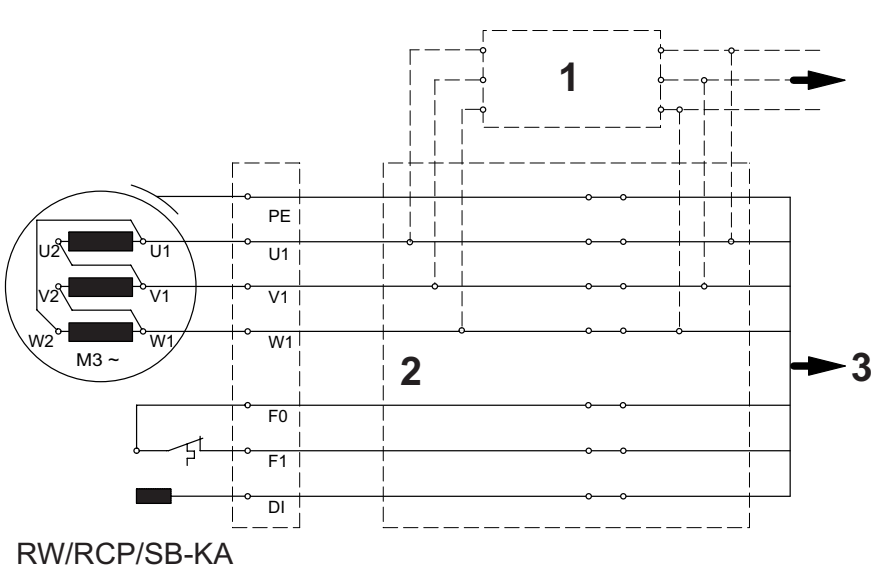
ATTENTION ***The temperature limiting switches may only be operated as specified by the manufacturer (See following table).***

Operating voltage**...AC**	**100 V to 500 V ~**
Rated voltage **AC**	**250 V**
Rated current **AC cos φ = 1.0**	**2.5 A**
Rated current **AC cos φ = 0.6**	**1.6 A**
Max. switching current at I_N	**5.0 A**

7.9.3 Soft starter (Option)

For units > 15 kW we recommend the use of soft starter.

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



Legend

1 soft starter
2 terminal box
3 to control panel

Figure 37 Wiring diagram with soft starter (option)

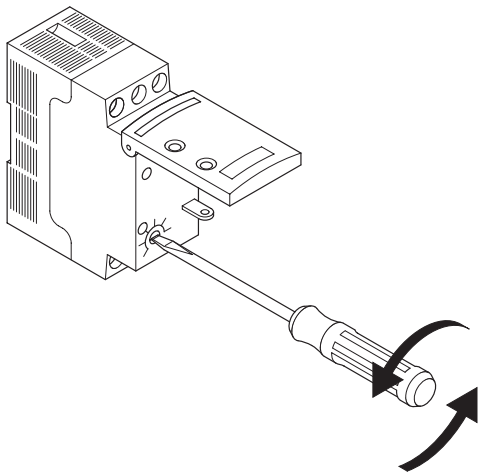


Figure 38 Testing and adjustment of soft starter

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).

7.9.4 Checking 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 (propeller rotation) is correct if the propeller when viewed from the rear over the motor housing rotates in a clockwise manner (*See arrow*). This applies to all versions of the RW, RCP and SB-KA!

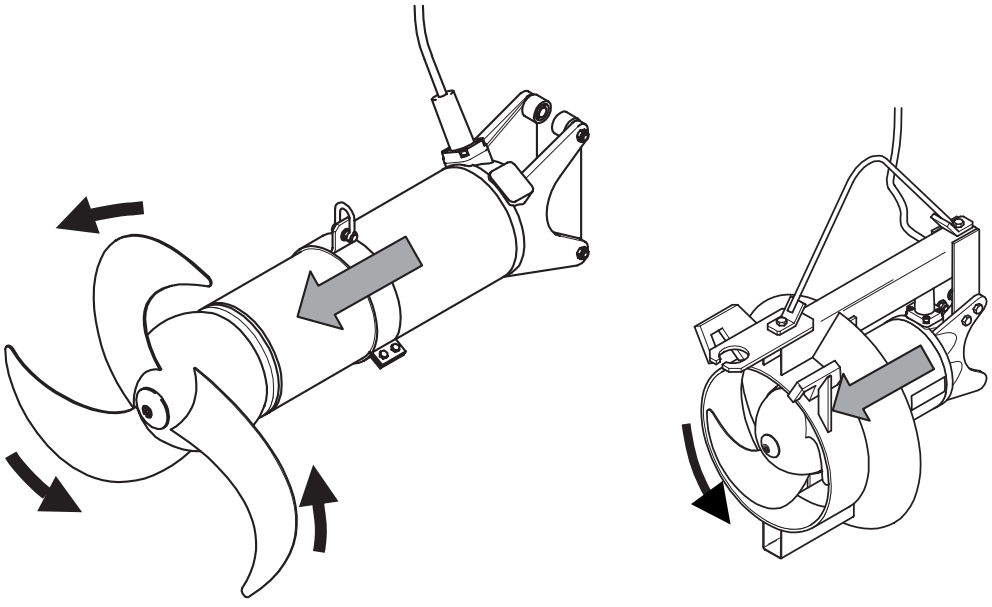


Figure 39 Checking direction of rotation

When checking the direction of rotation take care that no injury can be caused by the rotation of the propeller or the resulting airflow. Do not place a hand or other part of the body near the propeller or the hydraulics!

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

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

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

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.***

7.9.5 Changing direction of rotation

The safety hints in the previous sections must be observed!

Changing direction of rotation must only be carried out 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.***

7.9.6 Connection of the seal monitoring unit to the control panel

The standard versions of the units are fitted as standard with leakage sensors (DI), which monitor the state of the sealing. In order to integrate this seal monitoring function into the control panel of the unit it is necessary to fit a Sulzer DI module and connect this in accordance with the circuit diagram below.

ATTENTION ***If the DI is activated the unit must be immediately taken out of service. Please contact your Sulzer service centre.***

ATTENTION ***The Sulzer DI module must be located outside of the hazardous location.***

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

ATTENTION ***The leakage sensor (DI) in the seal chamber (60 Hz, Hazardous Location, North America only) must be connected to an intrinsically safe electrical circuit in accordance with FM (Factory Mutual) 3610.***

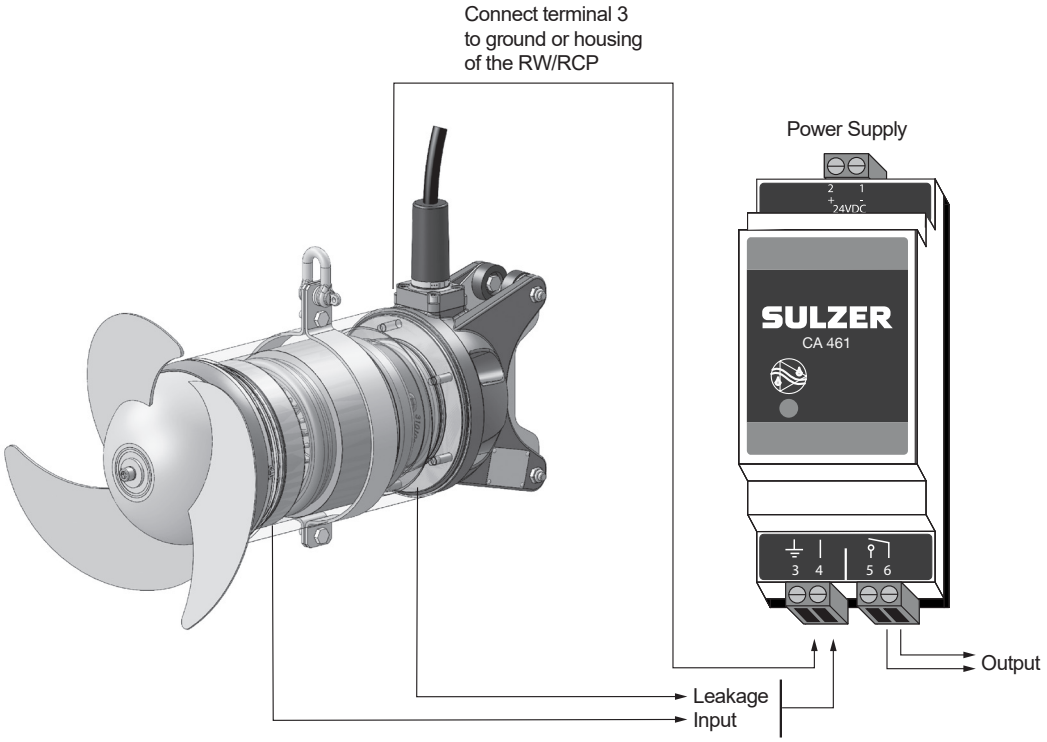


Figure 40 Electronic amplifier with collective signalling

Electronic amplifier for 50/60 Hz
110 - 230 V AC (CSA) (Part No.: 1 690 7010)
18 - 36 V DC (CSA) (Part No.: 1 690 7011)

ATTENTION ***Maximum relay contact loading: 2 Ampere***

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

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

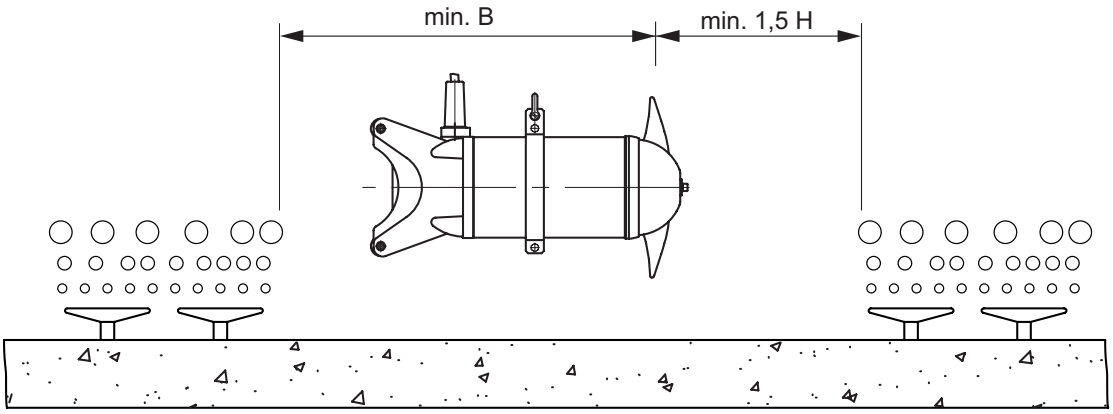
8 Commissioning

The safety hints in the previous sections must be observed!

Before commissioning, the 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?
- Have the thermal sensors/limiters been connected?
- Is the seal monitoring device (where fitted) correctly installed?
- Is the motor overload switch correctly set?
- Have the power and control circuit cables been correctly fitted?
- Has the motor connection cable been laid in such a manner that it cannot be caught up by the rotating body?
- Has the minimum submergence level been observed? *(See Section 3 Dimensions and weights).*

8.1 Types of operation



B = Tank width; H = Water depth

Figure 41 Installation example with aeration

ATTENTION ***The illustration is only an example. For the correct installation please contact Sulzer.***

ATTENTION ***Operation within the directly aerated area is not allowed!***

ATTENTION ***The units must work fully submerged in the fluid. During operation no air should be drawn in by the propeller. Ensure that there is a smooth medium flow. The unit should not vibrate heavily when in operation.***

Uneven flow formation and vibrations can occur if:

- Over active mixing in small tanks (only for RW and SB-KA).
- Prevention of free inflow or outflow in the area of the flow ring if fitted (only for RW). Changing the position or direction of the mixer may assist.
- Prevention of free inflow or outflow in the area of the guide cone (only for RCP).

9 Maintenance

The safety hints in the previous sections must be observed!

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

9.1 General maintenance hints

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

Servicing must only be carried out by qualified personnel.

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

Repair work on explosion-proof motors may only be carried out in approved workshops by approved personnel using original parts supplied by the manufacturer. Otherwise the Ex approvals no longer apply.

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

Should, nevertheless, a malfunction occur, do not improvise but ask your Sulzer customer service department for assistance.

This applies particularly if the unit is continually switched off by the current overload in the control panel, by the thermal sensors/limiters of the thermo-control system or by the seal monitoring system (DI).

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

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

ATTENTION ***Regular checks are highly recommended and other checks are prescribed regulations after specific intervals. This ensures a long life time and trouble-free operation of the units (see section 9.2 Maintenance RW, RCP and SB-KA).***

9.2 Maintenance RW, RCP and SB-KA



The safety hints in the previous sections must be observed!

Inspections carried through at regular intervals and preventive maintenance guarantee trouble-free operation. For this reason the complete unit should be cleaned thoroughly on a regular basis, maintained and inspected. For this purpose one has to take special care that all parts of the unit are in a good condition and that the operational security is guaranteed. The inspection period is determined by the type of usage of the units, but should however not exceed one year.

The maintenance and inspection work must be carried through corresponding to the subsequent inspection plan. The executed work must be documented in the attached inspection list. In case of non-observance the manufacturer's warranty does not apply!

9.2.1 Faults

In addition to the maintenance and inspection tasks described in section *9.5 Inspection and maintenance intervals* an urgent check of the unit and installation should be carried out if heavy vibrations develop or uneven flow patterns occur.

Possible causes:

- Minimum liquid coverage of the propeller is not present.
- Aeration in the propeller area.
- Wrong direction of rotation of the propeller.
- Propeller is damaged.
- Restriction to the free inflow or outflow in the area of the RW flow ring.
- Restriction to the free inflow or outflow in the area of the RCP inflow cone.
- Parts of the Installation, such as bracket or coupling parts have become defective or become loose.

In these cases the unit should be immediately switched off and inspected. If no fault can be found or the fault remains after it has apparently been corrected the unit should be left switched off. The same applies also where the current overload in the control panel regularly trips where the seal monitor or the temperature sensors in the stator are activated. We recommend that in such cases you contact the local Sulzer Service Centre.

9.3 Removal and fitting of propeller and oil change

78 Cylinder screw
79 Locking washer
102 Propeller washer
101 Propeller
76 Solids deflection ring
103 Clamp band
19 Propeller key

Removing propeller

• Remove screw (78)
• Remove locking washer (79)
• Remove washer (102)
• Carefully prise the propeller hub from the motor housing using two large screwdrivers at opposite sides. If necessary use 3- or 4-leg bearing pullers.

Refitting propeller

• Remove propeller key (19) from rotor shaft. Clean and refit.
• Lightly grease propeller hub and shaft end.
• Align keyways and fit propeller (101) to shaft.
• Fit washer (102).
• Fit locking washer (79)
• Lightly coat propeller bolt with Bondloc Nutlock and Seal, and use allen key to screw the bolt home. Verify the correct torque using a torque wrench set at 33 Nm
• Spin the propeller to ensure it freely rotates.

ATTENTION: If any difficulties are encountered when removing or refitting the propeller, please contact Sulzer Service.

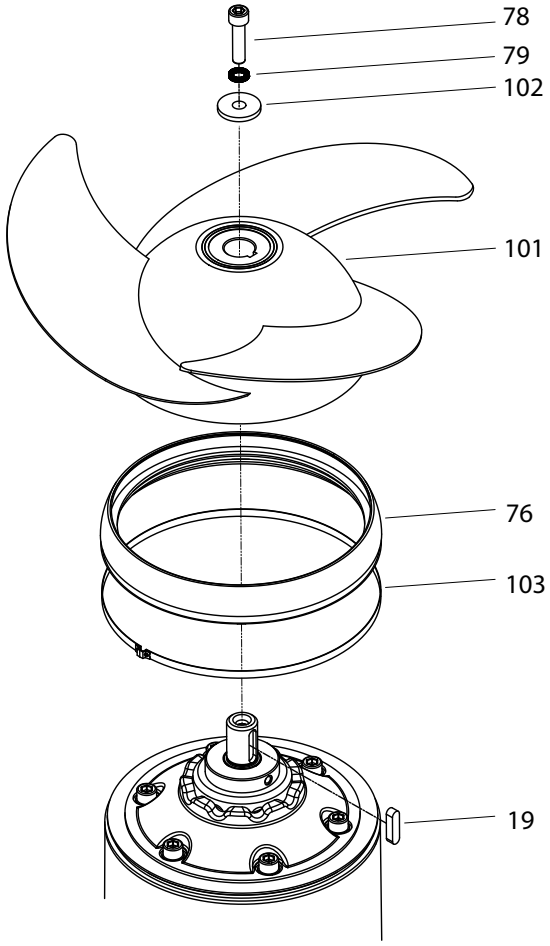


Figure 42 Propeller removal & refitting

Oil draining

• Remove propeller.
• Partially remove an upper plug screw (73) to release the oil pressure and allow venting.
• Remove lower plug screw (73), seal washer (74) and o-ring (55).
• Allow the oil to empty into a suitable container.

Oil filling

• Stand the mixer vertically with the shaft end facing upwards, taking care that it cannot topple over.
• Fill oil in through same hole as drained from.
• Retighten upper plug screw (73).
• Refit lower plug screw (73), seal washer (74) and o-ring (55).
• Refit propeller.

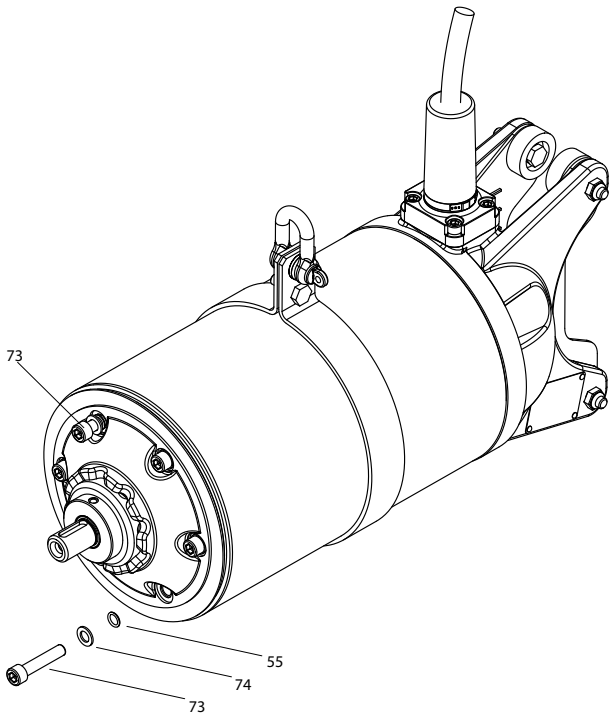


Figure 43 Oil draining & filling

9.4 Oil quantities (litres)

	Primary seal chamber	Secondary seal chamber *
RW 400 / RCP 400	0.80	0.04
RW 480	0.22	-
RW 550	0.55	0.04
RW 650 / RCP 500	1.20	0.04
RW 750, RW 900, RCP 800, SB-KA	0.5	-

* Version with second mechanical seal.

Specification: Hydraulic VG32 HLP-D. Part no.: 11030021.

ATTENTION ***For gearbox refill, contact Sulzer Service. The gearbox oil should only be refilled by a qualified technician.***

9.5 Inspection and maintenance intervals for RW/RCP and SB-KA

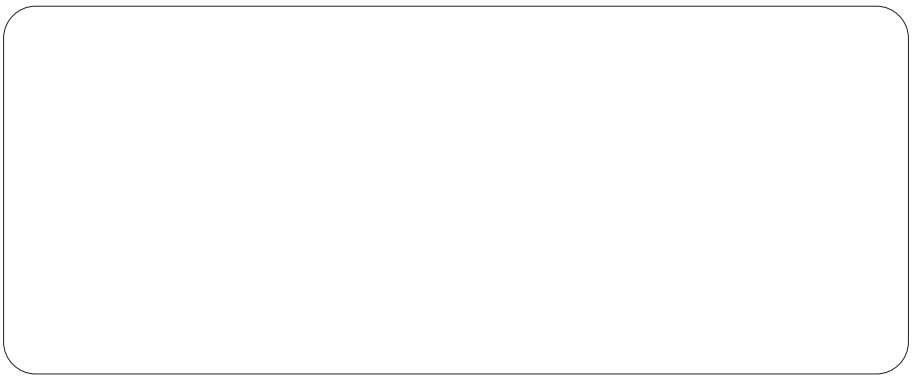


The safety hints in the previous sections must be observed!

Recommended service intervals at standard applications and operating conditions:

First inspection	No later than three months.
Basic inspection	Once a year.
Regular inpection	After each 8000 duty hours or every second year, whichever occurs first.
Basic Overhaul	After each 30000 duty hours or every sixth year, whichever occurs first.
Complete Overhaul	Depending on the condition of the unit's components (especially cables and hydraulic parts), a complete overhaul is recommended after 10 years.

NOTE ***At specific applications and operating conditions it may be recommended to increase or decrease the service interval accordingly. Please contact your local Sulzer Service representative for further advice.***



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