Submersible aerator type ABS XTA 152 - XTA/XTAK 2400

Installation and operating instructions

www.sulzer.com
Installation and Operating Instructions (Translation of original instructions)

for submersible aerator

XTA 152 (50/60 Hz)  XTA 901 (50/60 Hz)  XTA 2400 (50/60 Hz)
XTA 302 (50/60 Hz)  XTA 1200 (50/60 Hz)
XTA 602 (50/60 Hz)  XTA 1800 (50/60 Hz)
XTAK 602 (50/60 Hz)  XTAK 1800 (50/60 Hz)
XTAK 901 (50/60 Hz)  XTAK 2400 (50/60 Hz)
XTAK 1200 (50/60 Hz)

Table of contents

1 General ................................................................................................................................................... 4
1.1 Introduction .............................................................................................................................................4
1.2 Correct usage of the products .................................................................................................................4
1.3 Application restrictions of the submersible aerators ................................................................................4
1.4 Application areas for the submersible aerators ......................................................................................5
1.5 Identification coding ................................................................................................................................5
1.6 Technical data .........................................................................................................................................5
1.6.1 Technical data 400 V/50 Hz ....................................................................................................................7
1.6.2 Technical data 460 V/60 Hz ....................................................................................................................7
1.7 Dimensions .............................................................................................................................................8
1.8 Nameplate...............................................................................................................................................9
2 Safety ................................................................................................................................................... 10
3 Transport and storage ........................................................................................................................10
3.1 Transport ............................................................................................................................................... 10
3.2 Transport securing devices ...................................................................................................................11
3.2.1 Motor connection cable moisture protection .........................................................................................11
3.3 Storage of the units ...............................................................................................................................11
4 Product description ............................................................................................................................12
4.1 Structural design ...................................................................................................................................12
4.2 Motor monitoring system .....................................................................................................................13
4.2.1 DI-electrode ...........................................................................................................................................13
4.2.2 Temperature monitoring of the stator ....................................................................................................13
4.2.3 Temperature monitoring of the bearings (option) ..................................................................................13
4.3 Temperature sensor indication ..............................................................................................................13
4.3.1 Temperature sensor bimetall .................................................................................................................13
4.3.2 Temperature sensor PTC ......................................................................................................................14

Sulzer reserves the right to alter specifications due to technical developments!
4.3.3 Temperature sensor PT 100 .......................................................... 14
4.4 Operation with frequency inverters .................................................. 15

5 Installation .......................................................................................... 16
5.1 Installation examples ........................................................................ 16
5.2 Installation of the Sulzer submersible aerator .................................... 17
5.2.1 Assembly of the channel extensions of the XTAK range ............... 18
5.3 Accessories ..................................................................................... 18
5.3.1 Hinged foot .................................................................................. 18
5.3.2 Air pipe ....................................................................................... 19
5.3.3 Silencer and weather cap .............................................................. 19
5.3.4 Lifting rope / hook eyelet ............................................................... 19
5.4 Tightening torque ........................................................................... 21
5.4.1 Fitting position of the Nord-Lock® securing washers .................... 21
5.5 Electrical connection ....................................................................... 22
5.5.1 Standard connection diagrams, mains voltage 380 - 420 V at 50 Hz/460 V at 60 Hz ........................................ 22
5.5.2 Lead designations ....................................................................... 24
5.5.3 Checking direction of rotation ...................................................... 24
5.5.4 Changing direction of rotation ..................................................... 25
5.5.5 Connection of the control circuit leads ........................................ 25
5.5.6 Connection of the seal monitoring unit to the control panel ......... 25

6 Commissioning ................................................................................ 26
6.1 Starting frequency of the motors ..................................................... 26

7 Maintenance ..................................................................................... 26
7.1 General maintenance hints ............................................................. 26
7.2 Maintenance hints if the submersible aerator is out of use for a considerable period ........................................... 27
7.2.1 Before installation ....................................................................... 27
7.2.2 After installation ......................................................................... 27
7.3 Lubricant changing .......................................................................... 28
7.3.1 Lubricant changing PE2 motor .................................................. 28
7.3.2 Oil quantities (litres) PE2 motor ................................................ 28
7.3.3 Lubricant changing PE3 - PE5 motor ......................................... 29
7.3.4 Oil quantities inspection chamber (litres) PE4, PE5 motor .......... 29
7.3.5 Oil quantities seal chamber (litres) PE3 - PE5 motor .................. 29
7.4 Removal of the submersible aerator ................................................ 30
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
The Sulzer products have been designed and built in accordance with the latest technology and taking into account the relevant safety regulations. However improper usage could cause a danger to life or limb of the user of a third party or cause damage or function impairment to the unit itself and other items of value.

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

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

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

1.3 Application restrictions of the submersible aerators
The submersible aerators are available in the standard version for 50 Hz and 60 Hz.

Limitations: The ambient temperature range is 0 °C to + 40 °C (32 °F to 104 °F)
Immersion depth is depending on the motor power, see chapter 1.6 technical data

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

Submersible aerators may not be used in explosion-protected areas.
1.4 Application areas for the submersible aerators
Sulzer submersible aerators are generally used to transfer air from the environment into clean water, wastewater and sewage.

1.5 Identification coding

<table>
<thead>
<tr>
<th>Hydraulics</th>
<th>Motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>XTA 901 CR PE 185 / 4</td>
<td></td>
</tr>
</tbody>
</table>

- Number of poled in motor
- Motor power \([P_2 \times 10 \text{ in kW}]\)
- Motor designation (e.g. PE)
- Material of the hydraulic parts
  - AR = 1.4301 (wear parts without hard-chrom plating)
  - CR = 1.4301 (wear parts hard-chrom plating)
  - HR = 1.4571 (wear parts hard-chrom plating only 901 - 2400)

- Range
- Series (XTAK = XTA with channel extension)

*Figure 1 Identification coding*

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

The maximum noise level of all submersible aerators of the XTA/XTAK series under operating conditions i.e. in fully submerged position, is always < 70db(A) (at 10 m / 33 ft distance). The use of a Sulzer silencer will reduce the noise level to 55 db(A) at 10 m / 33 ft distance.
The weights in the dimension sheets refer to a cable length of 10 m. In the case of cable lengths exceeding 10 m the additional weight must be determined and added using the following table.

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Weight, kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>3x6/6KON</td>
<td>0.4</td>
</tr>
<tr>
<td>3x10/10KON</td>
<td>0.7</td>
</tr>
<tr>
<td>3x16/16KON</td>
<td>1</td>
</tr>
<tr>
<td>3x6/6KON +3x1.5ST</td>
<td>0.6</td>
</tr>
<tr>
<td>3x25 +3G16/3</td>
<td>1.5</td>
</tr>
<tr>
<td>3x35 +3G16/3</td>
<td>1.9</td>
</tr>
<tr>
<td>3x50 +3G25/3</td>
<td>2.6</td>
</tr>
<tr>
<td>3x70 +3G35/3</td>
<td>3.6</td>
</tr>
<tr>
<td>3x95 +3G50/3</td>
<td>4.7</td>
</tr>
<tr>
<td>3x120 + 3G70/3</td>
<td>6</td>
</tr>
<tr>
<td>3x150 + 3G70/3</td>
<td>7.1</td>
</tr>
<tr>
<td>3x185 +3G95/3</td>
<td>8.8</td>
</tr>
<tr>
<td>3x240 +3G120/3</td>
<td>11</td>
</tr>
<tr>
<td>3x300 +3G150/3</td>
<td>13.5</td>
</tr>
<tr>
<td>1x185</td>
<td>2.2</td>
</tr>
<tr>
<td>1x240</td>
<td>2.7</td>
</tr>
<tr>
<td>1x300</td>
<td>3.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Weight kg/m</th>
<th>Weight kg/m</th>
<th>Weight, kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECWATER S1BN8-F</td>
<td>4 G 1.5</td>
<td>1.5</td>
<td>1.25</td>
</tr>
<tr>
<td>OZOFLEX (PLUS) H07RN8-F</td>
<td>4 G 25</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>4 G 35</td>
<td>1.9</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>4 G 50</td>
<td>2.6</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>4 G 70</td>
<td>3.7</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>4 G 95</td>
<td>4.7</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>4 G 120</td>
<td>5.9</td>
<td>6.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Weight kg/m</th>
<th>Weight kg/m</th>
<th>Weight, kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG 8-3</td>
<td>0.9</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>AWG 6-3</td>
<td>1.2</td>
<td>0.8</td>
<td>0.2</td>
</tr>
<tr>
<td>AWG 4-3</td>
<td>1.6</td>
<td>1.25</td>
<td>1.25</td>
</tr>
<tr>
<td>AWG 2-3</td>
<td>2.3</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>AWG 1-3</td>
<td>2.8</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>AWG 1/0-3</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>AWG 2/0-3</td>
<td>4.1</td>
<td>4.1</td>
<td>4.1</td>
</tr>
<tr>
<td>AWG 3/0-3</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>AWG 4/0-3</td>
<td>6.1</td>
<td>6.1</td>
<td>6.1</td>
</tr>
<tr>
<td>AWG 1/0</td>
<td>0.7</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>AWG 2/0</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>AWG 3/0</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>AWG 4/0</td>
<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>262 MCM</td>
<td>1.6</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>313 MCM</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>373 MCM</td>
<td>2.2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>444 MCM</td>
<td>2.6</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>535 MCM</td>
<td>3.1</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>646 MCM</td>
<td>3.6</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>SOOW</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>AWG 16/4</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>AWG 16/8</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>AWG 16/10</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>AWG 16/12</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Weight, kg/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>TECWATER S1BN8-F</td>
<td>1.6</td>
</tr>
<tr>
<td>OZOFLEX (PLUS) H07RN8-F</td>
<td>1.8</td>
</tr>
</tbody>
</table>
### 1.6.1 Technical data 400 V/50 Hz

<table>
<thead>
<tr>
<th>Hydraulics</th>
<th>Motor</th>
<th>Type of start</th>
<th>Rated motor power*</th>
<th>Rated current</th>
<th>Immersion depth max.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$P_1$ [kW]</td>
<td>$P_2$ [kW]</td>
<td>[A]</td>
<td>[m]</td>
</tr>
<tr>
<td>XTA 152</td>
<td>PE 40/4</td>
<td>• •</td>
<td>4.5</td>
<td>4.0</td>
<td>8.4</td>
<td>4.0</td>
</tr>
<tr>
<td>XTA 302</td>
<td>PE 60/4</td>
<td>• •</td>
<td>6.7</td>
<td>6.0</td>
<td>13.6</td>
<td>4.0</td>
</tr>
<tr>
<td>XTA 302</td>
<td>PE 90/4</td>
<td>• •</td>
<td>9.9</td>
<td>9.0</td>
<td>18.1</td>
<td>6.0</td>
</tr>
<tr>
<td>XTA/XTAK 602</td>
<td>PE 110/4</td>
<td>• •</td>
<td>12.0</td>
<td>11.0</td>
<td>21.2</td>
<td>3.0</td>
</tr>
<tr>
<td>XTA/XTAK 602</td>
<td>PE 160/4</td>
<td>• •</td>
<td>17.4</td>
<td>16.0</td>
<td>30.5</td>
<td>6.5</td>
</tr>
<tr>
<td>XTA/XTAK 901</td>
<td>PE 185/4</td>
<td>• •</td>
<td>20.0</td>
<td>18.5</td>
<td>35.2</td>
<td>4.5</td>
</tr>
<tr>
<td>XTA/XTAK 901</td>
<td>PE 220/4</td>
<td>• •</td>
<td>23.7</td>
<td>22.0</td>
<td>40.3</td>
<td>7.5</td>
</tr>
<tr>
<td>XTA/XTAK 1200</td>
<td>PE 220/4</td>
<td>• •</td>
<td>23.7</td>
<td>22.0</td>
<td>40.3</td>
<td>3.0</td>
</tr>
<tr>
<td>XTA/XTAK 1200</td>
<td>PE 300/4</td>
<td>• •</td>
<td>32.1</td>
<td>30.0</td>
<td>54.6</td>
<td>6.0</td>
</tr>
<tr>
<td>XTA/XTAK 1200</td>
<td>PE 370/4</td>
<td>• •</td>
<td>39.4</td>
<td>37.0</td>
<td>68.1</td>
<td>8.0</td>
</tr>
<tr>
<td>XTA/XTAK 1800</td>
<td>PE 370/4</td>
<td>• •</td>
<td>39.4</td>
<td>37.0</td>
<td>68.1</td>
<td>4.0</td>
</tr>
<tr>
<td>XTA/XTAK 1800</td>
<td>PE 450/4</td>
<td>• •</td>
<td>47.8</td>
<td>45.0</td>
<td>81.0</td>
<td>6.0</td>
</tr>
<tr>
<td>XTA/XTAK 1800</td>
<td>PE 550/4</td>
<td>• •</td>
<td>58.1</td>
<td>55.0</td>
<td>94.1</td>
<td>9.0</td>
</tr>
<tr>
<td>XTA/XTAK 2400</td>
<td>PE 550/4</td>
<td>• •</td>
<td>58.1</td>
<td>55.0</td>
<td>94.1</td>
<td>4.0</td>
</tr>
<tr>
<td>XTA/XTAK 2400</td>
<td>PE 750/4</td>
<td>• •</td>
<td>78.9</td>
<td>75.0</td>
<td>131.0</td>
<td>7.0</td>
</tr>
</tbody>
</table>

* $P_1$ = Power taken from mains; $P_2$ = power at motor shaft, 10 m / 33 ft cable with free cable ends are supplied as standard.

### 1.6.2 Technical data 460 V/60 Hz

<table>
<thead>
<tr>
<th>Hydraulics</th>
<th>Motor</th>
<th>Type of start</th>
<th>Rated motor power*</th>
<th>Rated current</th>
<th>Immersion depth max.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$P_1$ [kW]</td>
<td>$P_2$ [kW]</td>
<td>[A]</td>
<td>[m]</td>
</tr>
<tr>
<td>XTA 152</td>
<td>PE 45/4-60</td>
<td>• •</td>
<td>5.0</td>
<td>4.5</td>
<td>8.2</td>
<td>2.5</td>
</tr>
<tr>
<td>XTA 152</td>
<td>PE 75/4-60</td>
<td>• •</td>
<td>8.2</td>
<td>7.5</td>
<td>13.8</td>
<td>5.0</td>
</tr>
<tr>
<td>XTA 302</td>
<td>PE 105/4-60</td>
<td>• •</td>
<td>11.4</td>
<td>10.5</td>
<td>17.7</td>
<td>5.0</td>
</tr>
<tr>
<td>XTA 302</td>
<td>PE 130/4-60</td>
<td>• •</td>
<td>13.4</td>
<td>13.0</td>
<td>23.2</td>
<td>7.0</td>
</tr>
<tr>
<td>XTA/XTAK 602</td>
<td>PE 185/4-60</td>
<td>• •</td>
<td>19.8</td>
<td>18.5</td>
<td>32.3</td>
<td>4.5</td>
</tr>
<tr>
<td>XTA/XTAK 602</td>
<td>PE 210/4-60</td>
<td>• •</td>
<td>22.5</td>
<td>21.0</td>
<td>35.4</td>
<td>6.0</td>
</tr>
<tr>
<td>XTA/XTAK 901</td>
<td>PE 250/4-60</td>
<td>• •</td>
<td>26.7</td>
<td>25.0</td>
<td>38.3</td>
<td>3.5</td>
</tr>
<tr>
<td>XTA/XTAK 901</td>
<td>PE 350/4-60</td>
<td>• •</td>
<td>37</td>
<td>35.0</td>
<td>52.8</td>
<td>5.5</td>
</tr>
<tr>
<td>XTA/XTAK 1200</td>
<td>PE 350/4-60</td>
<td>• •</td>
<td>37</td>
<td>35.0</td>
<td>52.8</td>
<td>3.5</td>
</tr>
<tr>
<td>XTA/XTAK 1200</td>
<td>PE 430/4-60</td>
<td>• •</td>
<td>45.3</td>
<td>43.0</td>
<td>65.9</td>
<td>5.5</td>
</tr>
<tr>
<td>XTA/XTAK 1200</td>
<td>PE 520/4-60</td>
<td>• •</td>
<td>54.7</td>
<td>52.0</td>
<td>78.0</td>
<td>8.0</td>
</tr>
<tr>
<td>XTA/XTAK 1800</td>
<td>PE 520/4-60</td>
<td>• •</td>
<td>54.7</td>
<td>52.0</td>
<td>78.0</td>
<td>4.0</td>
</tr>
<tr>
<td>XTA/XTAK 1800</td>
<td>PE 630/4-60</td>
<td>• •</td>
<td>66.1</td>
<td>63.0</td>
<td>89.8</td>
<td>7.0</td>
</tr>
<tr>
<td>XTA/XTAK 2400</td>
<td>PE 630/4-60</td>
<td>• •</td>
<td>66.1</td>
<td>63.0</td>
<td>89.8</td>
<td>4.0</td>
</tr>
<tr>
<td>XTA/XTAK 2400</td>
<td>PE 860/4-60</td>
<td>• •</td>
<td>90.2</td>
<td>86.0</td>
<td>125.0</td>
<td>7.5</td>
</tr>
</tbody>
</table>

* $P_1$ = Power taken from mains; $P_2$ = power at motor shaft, 10 m / 33 ft cable with free cable ends are supplied as standard.
## 1.7 Dimensions

*Flanges according to DIN 1092-1, PN 16

![Figure 2 Dimensions](image)

<table>
<thead>
<tr>
<th>Type of aerator</th>
<th>Ø C (50 Hz)</th>
<th>D</th>
<th>Ø E₁ (XTA)</th>
<th>Ø E₂ (XTAK)</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>XTA 152 PE 40/4</td>
<td>500</td>
<td>DN 80</td>
<td>675</td>
<td>-</td>
<td>185</td>
<td>310</td>
<td>785</td>
</tr>
<tr>
<td>XTA 302 PE 60/4</td>
<td>690</td>
<td>DN 80</td>
<td>865</td>
<td>-</td>
<td>220</td>
<td>405</td>
<td>790</td>
</tr>
<tr>
<td>XTA 302 PE 90/4</td>
<td>690</td>
<td>DN 80</td>
<td>865</td>
<td>-</td>
<td>220</td>
<td>405</td>
<td>860</td>
</tr>
<tr>
<td>XTA/XTAK 602 PE 110/4</td>
<td>720</td>
<td>DN 100</td>
<td>940</td>
<td>3710</td>
<td>240</td>
<td>440</td>
<td>1325</td>
</tr>
<tr>
<td>XTA/XTAK 602 PE 160/4</td>
<td>720</td>
<td>DN 100</td>
<td>940</td>
<td>3710</td>
<td>240</td>
<td>440</td>
<td>1325</td>
</tr>
<tr>
<td>XTA/XTAK 901 PE 185/4</td>
<td>840</td>
<td>DN 125</td>
<td>1065</td>
<td>3845</td>
<td>250</td>
<td>510</td>
<td>1490</td>
</tr>
<tr>
<td>XTA/XTAK 901 PE 220/4</td>
<td>840</td>
<td>DN 125</td>
<td>1065</td>
<td>3845</td>
<td>250</td>
<td>510</td>
<td>1490</td>
</tr>
<tr>
<td>XTA/XTAK 1200 PE 220/4</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>3930</td>
<td>245</td>
<td>595</td>
<td>1495</td>
</tr>
<tr>
<td>XTA/XTAK 1200 PE 300/4</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>3930</td>
<td>245</td>
<td>595</td>
<td>1495</td>
</tr>
<tr>
<td>XTA/XTAK 1200 PE 370/4</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>3930</td>
<td>245</td>
<td>595</td>
<td>1575</td>
</tr>
<tr>
<td>XTA/XTAK 1800 PE 370/4</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>4135</td>
<td>245</td>
<td>595</td>
<td>1570</td>
</tr>
<tr>
<td>XTA/XTAK 1800 PE 450/4</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>4135</td>
<td>245</td>
<td>595</td>
<td>1570</td>
</tr>
<tr>
<td>XTA/XTAK 1800 PE 550/4</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>4135</td>
<td>245</td>
<td>595</td>
<td>1960</td>
</tr>
<tr>
<td>XTA/XTAK 2400 PE 550/4</td>
<td>1050</td>
<td>DN 150</td>
<td>1345</td>
<td>4025</td>
<td>270</td>
<td>650</td>
<td>1950</td>
</tr>
<tr>
<td>XTA/XTAK 2400 PE 750/4</td>
<td>1050</td>
<td>DN 150</td>
<td>1345</td>
<td>4025</td>
<td>270</td>
<td>650</td>
<td>1950</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of aerator</th>
<th>Ø C (60 Hz)</th>
<th>D</th>
<th>Ø E₁ (XTA)</th>
<th>Ø E₂ (XTAK)</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>XTA 152 PE 45/4-60</td>
<td>500</td>
<td>DN 80</td>
<td>675</td>
<td>-</td>
<td>185</td>
<td>310</td>
<td>785</td>
</tr>
<tr>
<td>XTA 152 PE 75/4-60</td>
<td>500</td>
<td>DN 80</td>
<td>675</td>
<td>-</td>
<td>185</td>
<td>310</td>
<td>785</td>
</tr>
<tr>
<td>XTA 302 PE 105/4-60</td>
<td>690</td>
<td>DN 80</td>
<td>865</td>
<td>-</td>
<td>220</td>
<td>405</td>
<td>860</td>
</tr>
<tr>
<td>XTA 302 PE 130/4-60</td>
<td>690</td>
<td>DN 80</td>
<td>865</td>
<td>-</td>
<td>220</td>
<td>405</td>
<td>1290</td>
</tr>
<tr>
<td>XTA/XTAK 602 PE 185/4-60</td>
<td>720</td>
<td>DN 100</td>
<td>940</td>
<td>3710</td>
<td>240</td>
<td>440</td>
<td>1325</td>
</tr>
<tr>
<td>XTA/XTAK 901 PE 250/4-60</td>
<td>720</td>
<td>DN 125</td>
<td>1065</td>
<td>3845</td>
<td>250</td>
<td>510</td>
<td>1490</td>
</tr>
<tr>
<td>XTA/XTAK 901 PE 350/4-60</td>
<td>840</td>
<td>DN 125</td>
<td>1065</td>
<td>3845</td>
<td>250</td>
<td>510</td>
<td>1490</td>
</tr>
<tr>
<td>XTA/XTAK 1200 PE 350/4-60</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>3930</td>
<td>245</td>
<td>595</td>
<td>1495</td>
</tr>
<tr>
<td>XTA/XTAK 1200 PE 430/4-60</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>3930</td>
<td>245</td>
<td>595</td>
<td>1575</td>
</tr>
<tr>
<td>XTA/XTAK 1200 PE 520/4-60</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>3930</td>
<td>245</td>
<td>595</td>
<td>1575</td>
</tr>
<tr>
<td>XTA/XTAK 1800 PE 520/4-60</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>4135</td>
<td>245</td>
<td>595</td>
<td>1575</td>
</tr>
<tr>
<td>XTA/XTAK 1800 PE 630/4-60</td>
<td>950</td>
<td>DN 150</td>
<td>1215</td>
<td>4135</td>
<td>245</td>
<td>595</td>
<td>1960</td>
</tr>
<tr>
<td>XTA/XTAK 2400 PE 630/4-60</td>
<td>1050</td>
<td>DN 150</td>
<td>1345</td>
<td>4025</td>
<td>266</td>
<td>650</td>
<td>1950</td>
</tr>
<tr>
<td>XTA/XTAK 2400 PE 860/4-60</td>
<td>1050</td>
<td>DN 150</td>
<td>1345</td>
<td>4025</td>
<td>266</td>
<td>650</td>
<td>1950</td>
</tr>
</tbody>
</table>
1.8 Nameplate

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

![Nameplate Diagram]

**Legend**

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

1. Type designation
2. Model number
3. Serial number
4. Manufacturing date (week/year)
5. Nominal voltage [V]
6. Nominal current [A]
7. Phase number
8. Frequency [Hz]
9. Nominal input power [kW]
10. Nominal output power [kW]
11. Performance factor (pf)
12. Rotating speed [1/min]
13. Weight (without attached parts) [kg]
14. Max. flow rate [m³/h]
15. Outlet diameter [mm]
16. Max. pumping height [m]
17. Min. pumping height [m]
18. Rotor diameter [mm]

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

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

2 Safety

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

3 Transport and storage

3.1 Transport

The unit must never be raised by the power cable.

The submersible aerator is packed at manufacture for vertical transport.

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

Take note of the entire weight of the unit, including accessories. The hoist and chain must be adequately dimensioned for the weight of the unit and must comply with the current valid safety regulations.
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!

3.2 Transport securing devices

3.2.1 Motor connection cable moisture protection

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

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

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

**ATTENTION** These protective covers only provide protection against water spray or similar and are not a water tight seal. The ends of the cables should not be immersed in water, otherwise moisture could enter the connection chamber of the motor.

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

3.3 Storage of the units

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

**NOTE** Sulzer units do not generally require any particular maintenance during storage. By rotating the shaft several times by hand, new lubricating oil, or depending on the version, a small amount of coolant (which also serves to cool or lubricate the mechanical seals) is applied to the sealing surfaces, thus ensuring perfect operation of the mechanical seals. The bearings supporting the motor shaft are maintenance-free.

In the case of extreme ambient temperatures below -20 °C / -4 °F (during transportation, storage or longer out of service periods), the coolant must be drained to prevent damage to the unit! In such cases, please contact your Sulzer dealer.
4 Product description

4.1 Structural design

Legend

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

4.2.1 DI-electrode
The DI-electrodes carry out the seal monitoring function, and by means of a special electronic device signal the ingress of moisture into the motor (for connection see chapter 5.5.6).

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

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

Switching temperature:
Upper bearing = 140 °C / 284 °F
Lower bearing = 130 °C / 269 °F

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

4.3.1 Temperature sensor bimetal

![Resistance vs Temperature](image)

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

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

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

**Application**: Option

**Function**: Temperature-dependent resistance (no switch) curve with stepwise behaviour

**Switching**: Cannot be installed direct into the control circuit. Evaluation of the signal must be carried out by suitable electronic equipment

![Figure 6 Curve showing principle of operation of thermistor](image)

4.3.3 Temperature sensor PT 100

**Application**: Option (not for Ex)

**Function**: Function temperature-dependent resistance (no switch). The linear curve allows continuous measurement and indication of the temperature

**Switching**: Cannot be installed direct into the control circuit. Evaluation of the signal must be carried out by suitable electronic equipment

![Figure 7 Curve showing principle of operation of PT 100](image)

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

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

The stator design and the insulation grade of the motors from Sulzer means that they are suitable for usage with frequency inverters. It is however essential that the following conditions are met:

- 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.
- The lowest frequency must be set so that an aeration still is ensured.
- The maximum frequency must be set so the rated power of the motor is not exceeded. Make sure that the rated current specified on the nameplate is not exceeded after starting the motor. The maximum number of starts according to the motor datasheet may not be exceeded.

Modern frequency inverters use higher wave frequencies and a steeper rise on the flanks 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 fig 8). 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 8 Critical / non critical area](figure.png)

\[ U_n[V] \]

<table>
<thead>
<tr>
<th>L[m]</th>
<th>UN[V]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>660</td>
</tr>
<tr>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td>100</td>
<td>460</td>
</tr>
<tr>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>100</td>
<td>380</td>
</tr>
<tr>
<td>230</td>
<td></td>
</tr>
</tbody>
</table>

\( L = \text{total length} \) (from frequency inverter to motor)

*Figure 8 Critical / non critical area*
5 Installation

The safety hints in the previous sections must be observed!

5.1 Installation examples

![Diagram of installation in open basin]

Legend

1 Hook eyelet
2 Silencer
3 Back-up wiring rope
4 Cable supporter
5 Electric cable
6 Sulzer submersible aerator
7 Wiring rope
8 Air pipe
Figure 10 Submersible aerator with floating device

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

5.2 Installation of the Sulzer submersible aerator

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

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

In pump stations/tanks 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).

NOTE When installing the submersible aerator of the XTA/XTAK series in the tank the Sulzer recommendations as to positioning of the unit should be observed!
5.2.1 Assembly of the channel extensions of the XTAK range

Fit the separate delivered channel extensions (Figure 11) and fix them with the washers and hex nuts.

Legend
1  Washer
2  Hex nut (to be secured with LOCTITE type 243)
3  Channel extension

Figure 11 Channel extension

**ATTENTION** Observe the tightening torques for stainless steel screws (see chapter 5.4)!

5.3 Accessories

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

5.3.1 Hinged foot

In order to cope with uneven floors and for the protection of sensitive tank cladding it is possible to equip the Sulzer submersible aerators with hinged feet (see Figure 12). These feet have rubberised plates, that are fitted with a swivel joint. The hinged feet are connected to the aerator by means of a threaded rod that is adjustable in height.
5.3.2 Air pipe

In order to provide the submerged submersible aerator with the necessary atmospheric air, it must be fitted with an air pipe (see Figure 13). This must be sufficiently long so that the end of this pipe always ends at 0.5 m/1.6 ft over the surface, even at the highest liquid level.

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

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

**ATTENTION** Observe the tightening torques for stainless steel screws (see chapter 5.4)!

5.3.3 Silencer and weather cap

The upper end of the air pipe should be fitted with a suitable protective cover so that no objects or birds can be sucked into the line. At the same time the free inflow of air should not be restricted. Sulzer can provide a weather proof cap (see Figure 15). This shaped piece with flange is fixed to the upper end of the air pipe with four or eight screws and a flat gasket.

If at the same time the suction noise of the submersible aerator is to reduced, then an adequately dimensioned silencer must be fitted. The silencer is fitted to the upper end of the air line in the same manner as the weather cap (see Figure 14).

5.3.4 Lifting rope / hook eyelet

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

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

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

---

Figure 16 Mounting suggestions with rope fixing

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

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

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

**ATTENTION**  
*Observe the tightening torques for stainless steel screws (see chapter 5.4)!*

![Figure 17 Rope fixing clamp, heavy version](image)

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

<table>
<thead>
<tr>
<th>Rope Ø d</th>
<th>Ø 8</th>
<th>Ø 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor 50 Hz/60 Hz</td>
<td>XTA 152</td>
<td>XTA 302</td>
</tr>
</tbody>
</table>
The Sulzer crane hook eyelet is used if the only fixing point for the wire rope attached to the aerator, which is available, is the air pipe itself. This could be the case in open tanks (without a load carrying bridge). In this case the submersible aerator is generally placed in position with the aid of a mobile crane.

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

The crane hook eyelet consists of a 2-piece pipe clamp, a swivel joint and an oval eyelet. The pipe clamp is mounted on the end of the air pipe so that it is positioned above the final water level. The swivel joint must be capable of swinging upwards when the air pipe is installed in a vertical manner. The crane hook eyelet must be orientated so that the final position of the oval eyelet lies on the axis of the submersible motor.

**ATTENTION** Observe the tightening torques for stainless steel screws (see chapter 5.4)!

After fitting of all accessory parts the cable or cables should be attached to the air pipe using suitable fixing clamps (see fig 16).

### 5.4 Tightening torque

<table>
<thead>
<tr>
<th>Thread</th>
<th>M6</th>
<th>M8</th>
<th>M10</th>
<th>M12</th>
<th>M16</th>
<th>M20</th>
<th>M24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque</td>
<td>7 Nm</td>
<td>17 Nm</td>
<td>33 Nm</td>
<td>56 Nm</td>
<td>136 Nm</td>
<td>267 Nm</td>
<td>460 Nm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PVC-flange screws</th>
<th>DN 80</th>
<th>DN 100</th>
<th>DN 125</th>
<th>DN 150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tightening torque in Nm</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>60</td>
</tr>
</tbody>
</table>

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

**ATTENTION** Ensure that the fitting position and tightening torque of the Nord-Lock® securing washer is correct as in Figure 19 and table for tightening torque!

![Figure 19 Correct fitting position of the Nord-Lock® securing washer](image)
5.5 Electrical connection

The safety hints in the previous sections must be observed!

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

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

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

![Diagram of a power cable with integrated control leads](image1)

**Figure 20 One power cable with integrated control leads**

![Diagram of two power cables, each with integrated control leads](image2)

**Figure 21 Two power cables, each with integrated control leads**
Figure 22 Two power cables and one control cable

Figure 23 Special versions: two power cables and one control cable - for optional motor monitoring features

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

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

5.5.2 Lead designations

<table>
<thead>
<tr>
<th></th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>Join</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct starting in star</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>T1 (U1)*</td>
<td>T2 (V1)*</td>
<td>T3 (W1)*</td>
<td></td>
</tr>
<tr>
<td>Sulzer/Factory Standard</td>
<td>U1</td>
<td>V1</td>
<td>W1</td>
<td>U2 &amp; V2 &amp; W2</td>
</tr>
<tr>
<td><strong>Direct starting in delta</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North America</td>
<td>T1 (U1)*</td>
<td>T2 (V1)*</td>
<td>T3 (W1)*</td>
<td></td>
</tr>
<tr>
<td>Sulzer/Factory Standard</td>
<td>U1; W2</td>
<td>V1; U2</td>
<td>W1; V2</td>
<td></td>
</tr>
</tbody>
</table>

*Optional labeling possible.
5.5.3 Checking direction of rotation

The safety hints in the previous sections must be observed!

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

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

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

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

ATTENTION

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

NOTE

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

ATTENTION

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

5.5.4 Changing direction of rotation

The safety hints in the previous sections must be observed!

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

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

NOTE

The direction of rotation measuring device monitors the direction of rotation of the mains supply or that of an emergency generator.
5.5.5 Connection of the control circuit leads

The safety hints in the previous sections must be observed!

![Figure 25 Designation of control circuit leads](image)

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

5.5.6 Connection of the seal monitoring unit to the control panel

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

**ATTENTION** If the DI-seal monitoring is activated the unit must be immediately taken out of service. Please contact your Sulzer Service Centre.

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

![Figure 26 Electronic amplifier with collective signalling](image)

**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
6  Commissioning

The safety hints in the previous sections must be observed!

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

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

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

6.1  Starting frequency of the motors

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

<table>
<thead>
<tr>
<th>Motor power</th>
<th>maximum starts per hour</th>
<th>at interval in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 11 kW</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>&gt; 11 kW</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

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

7  Maintenance

The safety hints in the previous sections must be observed!

7.1  General maintenance hints

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

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

**NOTE**  *In the case of repair work, „Table 1“ from IEC60079-1 may not be applied. In this case please contact Sulzer after sales service!*


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

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

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

**ATTENTION** The lifting tools such as chains and shackles should be visually checked at regular intervals (approx. every three months) for wear and corrosion. These parts should be replaced if required!

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.

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

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

#### 7.2.1 Before installation

The covers providing moisture protection for the cables (see section 3.2.1) should be only removed immediately before actual installation of the unit. After the removal of the transport securing devices and before connecting up the unit electrically the motor shaft should be rotated a number of times by turning the impeller or propeller by hand.

#### 7.2.2 After installation

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

The safety hints in the previous sections must be observed!

**ATTENTION** Only lubricants released by the manufacturer should be used!

7.3.1 Lubricant changing PE2 motor

![Legend]
1 Lubricant filling
2 Lubricant emptying

Figure 27 Oil filling and emptying

### Oil quantities (litres) PE2 motor

<table>
<thead>
<tr>
<th>Motor PE2</th>
<th>50 Hz</th>
<th>60 Hz</th>
<th>XTA 152/302</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE 40/4</td>
<td>PE 45/4-60</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>PE 60/4</td>
<td>PE 75/4-60</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>PE 90/4</td>
<td>PE 105/4-60</td>
<td>0.68</td>
<td></td>
</tr>
</tbody>
</table>
7.3.3 Lubricant changing PE3 - PE5 motor

Figure 28 Oil filling and emptying PE3 - PE5 motor

1 Oil emptying (to exhaust)
2 Oil filling seal chamber, motor should be in horizontal position! (quantities see 7.3.5)
3 Inspection hole seal chamber
4 Inspection hole engine bay
5 Oil filling inspection chamber (PE4, PE5), motor should be in horizontal position! (quantities see 7.3.4)

7.3.4 Oil quantities inspection chamber (litres) PE4, PE5 motor

<table>
<thead>
<tr>
<th>Motor</th>
<th>Capacity*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE4</td>
<td>0.6</td>
</tr>
<tr>
<td>PE5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

* Filling volumes in litres.

7.3.5 Oil quantities seal chamber (litres) PE3 - PE5 motor

<table>
<thead>
<tr>
<th>Motor PE3</th>
<th>PE</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 Hz</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>PE 110/4</td>
<td>PE 130/4-60</td>
<td></td>
</tr>
<tr>
<td>PE 160/4</td>
<td>PE 185/4-60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PE 210/4-60</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor PE4</th>
<th>PE</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>XTA 901/1200/1800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Hz</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>PE 185/4</td>
<td>PE 250/4-60</td>
<td></td>
</tr>
<tr>
<td>PE 220/4</td>
<td>PE 350/4-60</td>
<td></td>
</tr>
<tr>
<td>PE 300/4</td>
<td>PE 430/4-60</td>
<td></td>
</tr>
<tr>
<td>PE 370/4</td>
<td>PE 520/4-60</td>
<td></td>
</tr>
<tr>
<td>PE 450/4</td>
<td>8.5</td>
<td></td>
</tr>
</tbody>
</table>
### 7.4 Removal of the submersible aerator

The safety hints in the previous sections must be observed!

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

- Attach a suitable hoist fitting according to chapter 3.1 and 5.3.4 to the aerator.
- Lift the aerator out of the tank/basin using the suitable hoist.
- Place the aerator vertically on a firm surface and take care that it cannot topple over.