

# S pumps, ranges 50-70

S1, S2, S3, ST, SV-7.5-155 kW, all languages

Installation and operating instructions





## S pumps, ranges 50-70

---

<b>English (GB)</b>	
Installation and operating instructions . . . . .	5
<b>Български (BG)</b>	
Упътване за монтаж и експлоатация . . . . .	44
<b>Čeština (CZ)</b>	
Montážní a provozní návod . . . . .	91
<b>Deutsch (DE)</b>	
Montage- und Betriebsanleitung . . . . .	134
<b>Dansk (DK)</b>	
Monterings- og driftsinstruktion . . . . .	182
<b>Eesti (EE)</b>	
Paigaldus- ja kasutusjuhend . . . . .	222
<b>Español (ES)</b>	
Instrucciones de instalación y funcionamiento . . . . .	262
<b>Suomi (FI)</b>	
Asennus- ja käyttöohjeet . . . . .	309
<b>Français (FR)</b>	
Notice d'installation et de fonctionnement . . . . .	348
<b>Ελληνικά (GR)</b>	
Οδηγίες εγκατάστασης και λειτουργίας . . . . .	394
<b>Hrvatski (HR)</b>	
Montažne i pogonske upute . . . . .	441
<b>Magyar (HU)</b>	
Telepítési és üzemeltetési utasítás . . . . .	480
<b>Italiano (IT)</b>	
Istruzioni di installazione e funzionamento . . . . .	526
<b>Lietuviškai (LT)</b>	
Įrengimo ir naudojimo instrukcija . . . . .	571
<b>Latviešu (LV)</b>	
Uzstādīšanas un ekspluatācijas instrukcija . . . . .	614
<b>Nederlands (NL)</b>	
Installatie- en bedieningsinstructies . . . . .	657
<b>Polski (PL)</b>	
Instrukcja montażu i eksploatacji . . . . .	702

<b>Português (PT)</b>	
Instruções de instalação e funcionamento . . . . .	747
<b>Română (RO)</b>	
Instrucțiuni de instalare și utilizare . . . . .	793
<b>Srpski (RS)</b>	
Uputstvo za instalaciju i rad . . . . .	836
<b>Svenska (SE)</b>	
Monterings- och driftsinstruktion . . . . .	877
<b>Slovensko (SI)</b>	
Navodila za montažo in obratovanje . . . . .	918
<b>Slovenčina (SK)</b>	
Návod na montáž a prevádzku . . . . .	957
<b>Türkçe (TR)</b>	
Montaj ve kullanım kılavuzu . . . . .	1000
<b>Українська (UA)</b>	
Інструкції з монтажу та експлуатації . . . . .	1043
<b>中文 (CN)</b>	
安装和使用说明书 . . . . .	1089
<b>Norsk (NO)</b>	
Installasjons- og driftsinstruksjoner . . . . .	1127
<b>(AR) العربية</b>	
تعليمات التركيب و التشغيل . . . . .	1166

## English (GB) Installation and operating instructions

### Original installation and operating instructions

#### Table of contents

<b>1. General information . . . . .</b>	<b>6</b>	10.2 Electrical data . . . . .	41
1.1 Hazard statements . . . . .	6	10.3 Dimensions and weights . . . . .	41
1.2 Notes . . . . .	6	<b>11. Disposing of the product . . . . .</b>	<b>43</b>
1.3 Target groups . . . . .	6		
<b>2. Product introduction . . . . .</b>	<b>7</b>		
2.1 Product description . . . . .	7		
2.2 Intended use . . . . .	7		
2.3 Pumped liquids . . . . .	7		
2.4 Identification. . . . .	7		
2.5 Approvals . . . . .	9		
2.6 Potentially explosive environments. . . . .	10		
2.7 Applications . . . . .	12		
<b>3. Receiving the product. . . . .</b>	<b>12</b>		
3.1 Lifting the pump . . . . .	12		
3.2 Raising the pump to vertical position. . . . .	14		
<b>4. Installing the product . . . . .</b>	<b>15</b>		
4.1 Mechanical installation . . . . .	15		
4.2 Electrical connection . . . . .	21		
4.3 Frequency converter operation . . . . .	23		
<b>5. Protection and control functions . . . . .</b>	<b>24</b>		
5.1 Motor protection devices . . . . .	24		
5.2 Pump controller . . . . .	24		
5.3 IO 113 . . . . .	25		
5.4 SM 113, optional . . . . .	25		
5.5 Switches and sensors . . . . .	26		
<b>6. Starting up the product . . . . .</b>	<b>29</b>		
6.1 Preparations for starting up. . . . .	29		
6.2 Checking the direction of rotation . . . . .	31		
6.3 Startup. . . . .	31		
<b>7. Handling and storing the product . . . . .</b>	<b>32</b>		
7.1 Storing the product . . . . .	32		
<b>8. Servicing and maintaining the product . . . . .</b>	<b>33</b>		
8.1 Safety instructions and requirements . . . . .	33		
8.2 Maintenance schedule . . . . .	33		
8.3 Oil check and change. . . . .	34		
8.4 Inspection and adjustment of the impeller clearance . . . . .	35		
8.5 Pump cleaning and inspection . . . . .	36		
8.6 Motor cables . . . . .	36		
8.7 Spare parts . . . . .	37		
8.8 Contaminated pumps and service . . . . .	37		
<b>9. Fault finding the product . . . . .</b>	<b>38</b>		
<b>10. Technical data . . . . .</b>	<b>40</b>		
10.1 Operating conditions . . . . .	40		

## 1. General information



Read this document before installing the product. Installation and operation must comply with local regulations and accepted codes of good practice.

### 1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



#### **DANGER**

Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.



#### **WARNING**

Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.



#### **CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:



#### **SIGNAL WORD**

##### **Description of the hazard**

Consequence of ignoring the warning

- Action to avoid the hazard.

### 1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



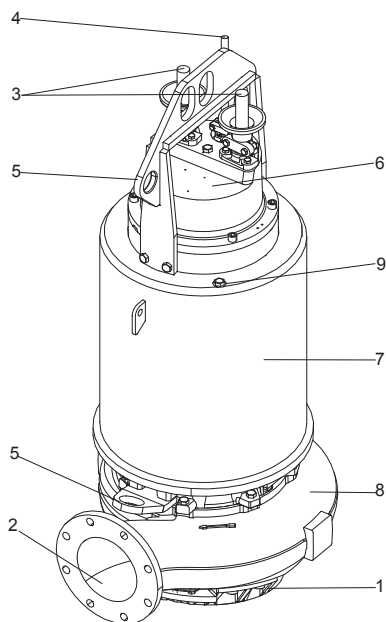
Tips and advice that make the work easier.

### 1.3 Target groups

These installation and operating instructions are intended for professional installers.

## 2. Product introduction

### 2.1 Product description



TM086075

S pump

Pos.	Description
1	Inlet
2	Outlet
3	Power supply cables
4	Control cable
5	Lifting bracket
6	Terminal box
7	Submersible motor
8	Pump
9	Air vent screw

### 2.2 Intended use

S pumps are designed for the pumping of sewage and wastewater in a wide range of municipal and industrial applications.

### 2.3 Pumped liquids

S pumps are designed for pumping sewage and wastewater in a wide range of municipal and industrial applications.



The pumps must not be used for pumping combustible, flammable or corrosive liquids.

### 2.4 Identification

#### 2.4.1 Type key

The S pumps are identified by the type designation stated in the order confirmation and other documentation supplied with the pump.

**Note:** The pump type described in this manual is not available in all variants.

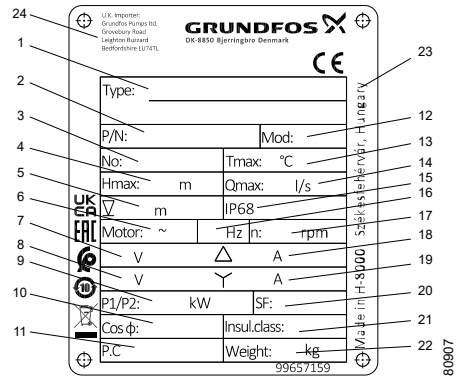
Example: S1.100.100.55.4.50M.S.205.G.N.D.511.Z

Code	Explanation	Designation
S	Grundfos sewage and wastewater pump	Pump type
ST	Multi-channel impeller pump installed in a column pipe	
1	Single-channel	Impeller type
2	Two-channel	
3	Three-channel	
V	SuperVortex	
100	Maximum solids size [mm]	Pump passage
100	Nominal outlet diameter [mm]	Pump outlet, S-type
	Nominal diameter of column pipe [mm]	Pump outlet, ST-type
55	P2 = Code number from type designation / 10	Output power [kW]
2	2-pole motor	Number of poles
4	4-pole motor	
6	6-pole motor	
8	8-pole motor	
10	10-pole motor	
12	12-pole motor	

Code	Explanation	Designation
50	Range 50	Pump range
54	Range 54	
58	Range 58	
62	Range 62	
66	Range 66	
70	Range 70	
S	Super-high	Pressure version
H	High	
M	Medium	
L	Low	
E	Extra-low	
F	Super-low	
S	Submersible installation without cooling jacket	Installation type
C	Submersible installation with cooling jacket	
D	Dry installation, vertical	
H	Dry installation, horizontal	
205	Impeller diameter [mm]	Impeller diameter (mean)
G	Cast iron impeller, pump- and stator housing	Material code for impeller, pump- and stator housing
Q	Stainless steel impeller, DIN W.-Nr. 1.4408	
S	Stainless steel impeller and pump housing, DIN W.-Nr. 1.4408	
R	Stainless steel impeller, pump- and stator housing, DIN W.-Nr. 1.4408	
N	Non-explosion-proof pump	Pump version
Ex	Pump with explosion-proof motor	
B	S pump with built-in SM 113 module. PTC sensors are connected directly to IO 113 or other PTC relay.	Sensor version
C	Not in use	
D	S pump without built-in SM 113 module.	Frequency [Hz]
5	50 Hz	
6	60 Hz	

Code	Explanation	Designation
11	3 x 400/690 V, Y/D (50 Hz only)	Voltage code and connection
	3 x 460 V, Y/D (60 Hz only)	
	3 x 415 V, Y/D (50 Hz only)	
13	3 x 415 V, Y/D (50 Hz only)	Customisation
15	3 x 380/660 V, Y/D (60 Hz only)	
GPA	Pumps only for Australia	Customisation
Z	Custom-built products	

## 2.4.2 Nameplate



Pump nameplate

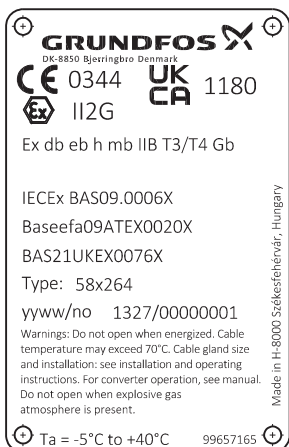
Pos.	Description
1	Type designation
2	Product number
3	Serial number
4	Maximum head [m]
5	Maximum installation depth [m]
6	Number of phases
7	Voltage, delta connection
8	Voltage, star connection
9	Rated power input / output [kW]
10	Cos φ, 1/1 load
11	Production code (YYWW)
12	Production number



Pos.	Description
13	Maximum liquid temperature [°C]
14	Maximum flow rate [l/s]
15	Ingress Protection class
16	Frequency [Hz]
17	Rated speed
18	Current, delta connection
19	Current, star connection
20	Safety factor
21	Insulation class
22	Net weight [kg]
23	Place of production
24	UK importer address for UK market

## 2.5 Approvals

### 2.5.1 Ex approval plate



TM080590

Approval plate of explosion-proof pumps, T3 and T4 classification

The approval plate provides the following details:

	The equipment conforms to harmonised European standard.
II	Equipment group (II = non-mining)
2	Equipment category (high protection)
G	Type of explosive atmosphere (gas)
CE	CE mark

UKCA	UKCA mark
0344	Number of quality assurance notified body
1180	Number of quality assurance notified body
Ex	Marking of explosion protection
db	Flameproof enclosure, Zone 1
eb	WIO sensor protection by increased safety
h	Constructional safety "c". Control of ignition sources "b" and Liquid immersion "k", according to EN ISO 80079-36:2016 and EN ISO 80079-37:2016
mb	WIO sensor protection by encapsulation
IIB	Gas group (ethylene)
T3	The maximum surface temperature of the motor is 200 °C*.
T4	The maximum surface temperature of the motor is 135 °C.
Gb	Equipment protection level, zone 1

\* For motors operated by a frequency converter, the maximum surface temperature T3 is 200 °C.

### 2.5.2 Ex certification and classification

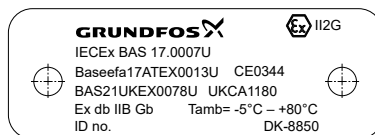
Direct drive, 50 or 60 Hz	Ex db eb h mb IIB T3/T4 Gb
---------------------------	----------------------------

IECEx standards: IEC 60079-0, IEC 60079-1, IEC 60079-18 and IEC 60079-7.

ATEX standards: EN IEC 60079-0, EN 60079-1, EN ISO 80079-36 and EN ISO 80079-37.

The certified pumps (Ex pumps) are supplied with an approval plate fixed in a visible place close to the nameplate.


### 2.5.3 Cable entry approval plate



TM080590

Cable entry approval plate

The cable entry approval plate provides the following details:

Pos.	Description
0344	Number of quality assurance notified body
	The equipment conforms to harmonised European standard.
II	Equipment group (II = non-mining)
2	Equipment category (high protection)
G	Type of explosive atmosphere (gas)
CE	CE mark
UKCA	UKCA mark
0344	Number of quality assurance notified body
1180	Number of quality assurance notified body
Ex	Marking of explosion protection
db	Flameproof, Zone 1
IIB	Gas group (Ethylene)
Gb	Equipment protection level, zone 1
T <sub>amb</sub>	Ambient temperature
ID no	Cable entry identification number
DK-8850	Country and postcode (Bjerringbro, Denmark)

## 2.6 Potentially explosive environments

Use the explosion-proof S pumps in potentially explosive environments. See section Ex approval plate.



The explosion classification of the pump is Ex II 2G, Ex db eb h mb IIB T3 or T4 Gb (-5 °C to +40 °C) with a WIO sensor.

The installation must be approved by the local authorities.

Special conditions for safe use:

1. Make sure the moisture and thermal switches are connected in two separate circuits and have separate alarm outputs (motor stop) in case of high humidity or high temperature in the motor.
2. Bolts used for replacement must be class A4-80 or A2-80 according to EN/ISO 3506-1.
3. The flame path gaps of the motor are specified by the manufacturer and are more narrow than the standard.

**WARNING:** In case of repairs, always use original service parts from the manufacturer to ensure the correct dimensions of the flame path gaps.

4. During operation, the cooling jacket, when fitted, must be filled with the pumped liquid.
5. The level of pumped liquid must be controlled by level switches connected to the motor control circuit. The minimum level depends on the installation type and is specified in this installation and operating instructions.
6. Make sure the permanently attached cables are suitably mechanically protected and terminated in a suitable terminal board.
7. The WIO sensor must always be completely submerged in the oil when the power is on.
8. If a WIO sensor is installed, the control unit must protect the WIO sensor against short circuit current. The maximum current from the control unit must be limited to 350 mA.
9. The customer must inform Grundfos if the pump has been exposed to any harmful external effects or aggressive substances.



**DANGER****Explosive environment**

Death or serious personal injury



- Make sure the cable entries are not damaged or cracked to avoid sparks and a potential explosion.

Additional conditions for safe use:

1. The pump must not run dry.
2. The sewage pumps have an ambient temperature range of -5 to +40 °C (air) or 0-40 °C (submerged in liquid) and a maximum operating temperature of 40 °C. The minimum ambient temperature for a pump with a WIO sensor is 0 °C.
3. The maximum submersion depth is 20 m.
4. Dry-installed pumps often have a higher temperature at the cable entries than submerged ones. This may reduce the lifespan of the Ex-protection equipment. According to EN/IEC 60079-14, it is a user-responsibility to regularly inspect the permanently attached cables and cable entries for any visual damage, cracks or embrittlement caused by rubber aging.
5. The IO 113 control unit must protect the sensor against short-circuit currents.
6. For painted pumps, minimise the risk of discharge in the following ways:
  - Earthing is mandatory.
  - In dry installations, keep a safe distance between the pumps and walking paths.
  - Use wet fabric for cleaning.
7. If a WIO sensor is fitted to the pump, the sensor must be connected to a control equipment. In case of an alarm signal from the sensor, the control equipment stops the pump.
8. The thermal protector in the stator windings has a rated cut-out temperature (150 °C) ensuring the disconnection of the power supply. The power supply must be reset manually.



Special conditions for safe use of WIO sensor:

1. The control unit must protect the sensor against short-circuit currents.
2. Install the WIO sensor so that it is not exposed to mechanical impact.
3. The WIO sensor must not be used in oil with auto-ignition temperature below 250 °C.
4. The WIO sensor is approved according to EN 60079-0, EN60079-7, EN60079-18, IEC60079-0, IEC60079-18, IEC 60079-7. In Ex applications, the maximum current supplied to the sensor must be limited to 350 mA according to EN/IEC 60079-18 and EN/IEC 60079-0.
5. The WIO sensor must only be used with a galvanically isolated circuit.

**Related information**[2.5.1 Ex approval plate](#)

## 2.7 Applications

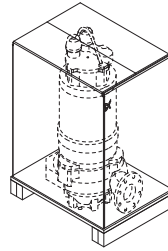
Depending on the installation type, the pumps can be used for submerged or dry, horizontal or vertical installation.

Maximum solids size: 80-145 mm depending on the impeller type.

Installation type	Description	Accessories
S	Sewage pump without cooling jacket for submerged installation on auto coupling	Auto coupling
C	Sewage pump with cooling jacket for submerged installation on auto coupling	Auto coupling
D	Sewage pump with cooling jacket for dry, vertical installation	Ranges 50, 54, 58 and 62: base stand for vertical installation
		Ranges 66 and 70: base plate or stand for vertical installation
H	Sewage pump with cooling jacket for dry, horizontal installation	Base stand or plate for horizontal installation.
ST	Sewage pump without cooling jacket for installation in column pipe	Seat ring

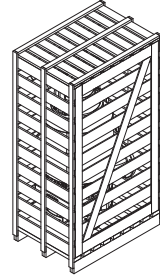
## 3. Receiving the product

S pumps are transported from the factory either in horizontal or vertical position. Range 50 is supplied on a wooden pallet and in a cardboard box. Ranges 54-70 are supplied on a wooden pallet and in a crate.



TM066073

*Transport method S pumps, range 50*



TM066068

*Transport method S pumps, range 54-70*

Dispose of pallets and other packaging material according to local waste disposal regulations.



Store the cable end protectors for later use.

### 3.1 Lifting the pump

Make sure to use the appropriate lifting equipment as S pumps can weigh up to 2375 kg without accessories.

The specific pump weight is stated on the nameplate. See sections Nameplate and Dimensions and weights.



Always use CE-marked lifting equipment.

#### **DANGER** Crushing hazard

Death or serious personal injury



- Always check the lifting bracket and chain for corrosion or wear before lifting.
- Always lift the pump by its lifting bracket or by a fork-lift truck.

**DANGER**  
**Crushing hazard**

Death or serious personal injury



- When lifting the pump, make sure the centre of gravity is between the forklift arms. The approximate centre of gravity is marked with a label attached to the transport stand.

**DANGER**  
**Electric shock**

Death or serious personal injury



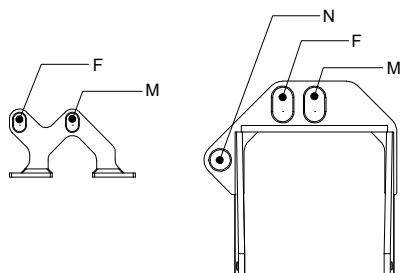
- **Never** lift the pump by the power supply cables.

Lifting the pump by the power supply cables may cause an electric short circuit and electric shock when the pump is connected to the mains. The cables and cable entries may be damaged, resulting in loss of water resistance and consequent severe damage to the motor.

If the pump is tilted more than 10° in any direction from its normal position (EN 809), the pump may lose its stability.

**Lifting points (top)**

S pumps are equipped with a lifting bracket with lifting points. Use the right lifting point to keep the pump balanced. See fig. Lifting points for installation types S, C and D\* and the table below for the correct lifting points.



TM047173

Lifting points for installation types S, C and D\*

Range 50 and 54	Range 58, 62, 66 and 70
-----------------	-------------------------

**Pos. Description**

F Front

M Middle

N Nose

Outlet flange size	Pump range					
	50	54	58	62	66	70
DN 80	Mid- dle	Mid- dle	-	-	-	-
DN 100	Mid- dle	Mid- dle	-	-	-	-
DN 125	Mid- dle	Mid- dle	Mid- dle	Mid- dle	-	-
DN 200	Front	Front	Front	Mid- dle	Mid- dle	Mid- dle
DN 250	-	Front	-	-	Mid- dle	Mid- dle
DN 300	-	-	Front	Mid- dle	Mid- dle	Mid- dle
DN 500	-	-	-	-	Nose	Front
DN 600	-	-	-	-	Nose	Front

\* The design of the lifting bracket may differ from the one in the drawing. This difference does not affect the handling of the product.



Always lift installation type ST pumps in the middle lifting point to make sure the pump is balanced.

**Related information**

[2.4.2 Nameplate](#)

[10.3 Dimensions and weights](#)

### 3.2 Raising the pump to vertical position



#### **DANGER**

#### **Crushing hazard**

Death or serious personal injury

- Make sure the lifting bracket or strap is tightened before lifting the pump.



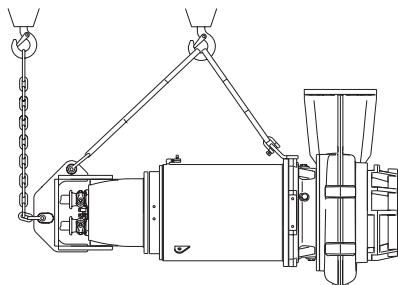
#### **DANGER**

#### **Crushing hazard**

Death or serious personal injury

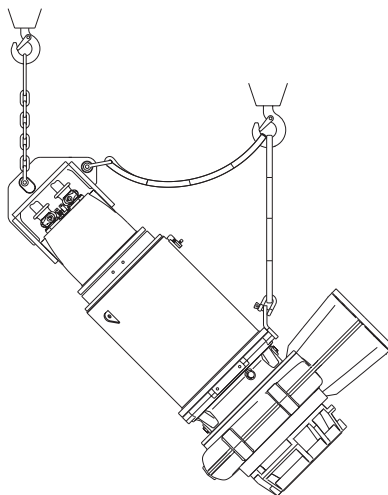
- Do not stand under or next to the pump when raising it to vertical position.
- Make sure the pump is raised carefully into vertical position to avoid the lifting chain slipping off the crane.

Carelessness during lifting or transport may cause personal injury or damage to the pump.



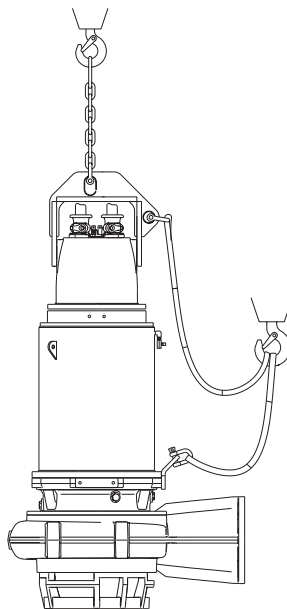
TM033034

*Lifting the pump to vertical position, step 1*



TM033035

*Lifting the pump to vertical position, step 2*



TM033036

*Lifting the pump to vertical position, step 3*

## 4. Installing the product

S pumps are designed for various installation types. See section Installation types.



Compliance with the standard IEC 60079-14 is a customer responsibility.



Pump installation in pits must be carried out by specially trained persons.

Work in or near pits must be carried out according to local regulations.

### **DANGER** Electric shock

Death or serious personal injury



- It must be possible to lock the main switch in position 0. Type and requirements as specified in EN 60204-1.



Persons must not work in the installation area when the atmosphere is explosive.

### **DANGER** Overhead load

Death or serious personal injury



- Never work under a pump when it is hanging from a crane.

For safety reasons, all work in pits must be supervised by a person outside the pit.

Pits for submersible sewage and wastewater pumps contain sewage and wastewater with toxic and/or contagious substances. Therefore, all persons involved must wear appropriate personal protective equipment and clothing. All work on and near the pump must be carried out according to the hygiene regulations.

### **DANGER** Crushing hazard

Death or serious personal injury



- Make sure that the rated capacity of the lifting equipment is adequate for the lifting work.

The rated capacity of the lifting equipment is stated on the equipment nameplate. The weight of the pump is stated on the pump nameplate.

### **CAUTION** Hot surface

Minor or moderate personal injury



- Do not touch the pump or cables during operation as the surface temperature may exceed 70 °C.

## Related information

### 4.1.1.1 Installation types

## 4.1 Mechanical installation

### **DANGER** Electric shock

Death or serious personal injury



- Before installation, switch off the power supply and lock the main power switch in position 0.
- Before working on the pump, switch off any external voltage connected to the pump.

### **DANGER** Crushing hazard

Death or serious personal injury



- During installation, always support the pump by lifting chains or place it in horizontal position to secure stability.

Fix the extra nameplate supplied with the pump at the installation site.

Comply with all safety regulations at the installation site.

### **CAUTION** Crushing hazard

Minor or moderate personal injury



- Do not put your hands or any tool into the pump inlet or outlet port after the pump is connected to the power supply, unless the main power switch is locked in the 0-position.
- Make sure that the power supply cannot be switched on unintentionally.

Prior to installation, check the oil level in the oil chamber. See section Oil check and change.



Always use Grundfos accessories to ensure correct functioning.



Isolate the pump from the installation when testing the pipeline at a pressure higher than 130 % of maximum head.

## Related information

### 8.3 Oil check and change

### 4.1.1 Mounting the product

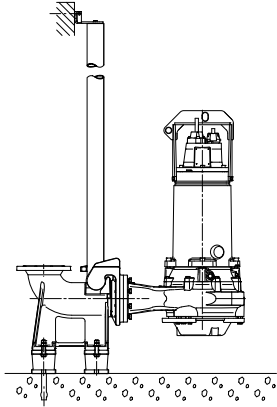
#### 4.1.1.1 Installation types



Both horizontal and vertical installations are permitted.

#### Installation types C and S

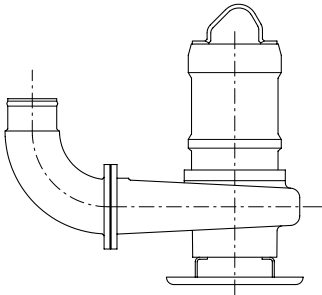
Submerged installation on auto coupling



*Permanent installation in pit*

#### Base stand installation

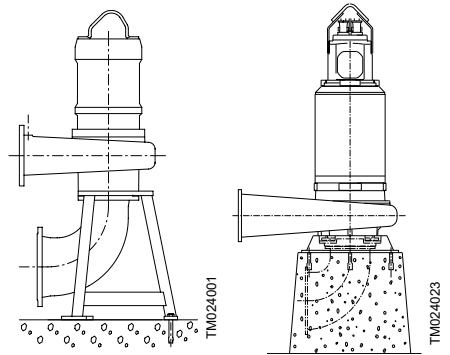
S pumps, ranges 50, 54 and 58, types S and C, can be temporarily installed on a base stand.



*Submerged installation on a base stand*

#### Installation type D

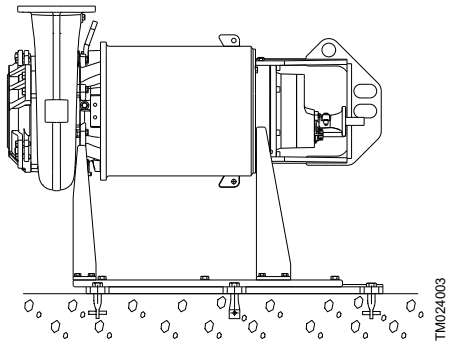
The pump is bolted to the inlet and outlet pipes by flange connections. Pumps with DN 500 or DN 600 flange are to be installed on a plinth (concrete foundation). See fig. Permanent vertical dry installation with base stand (left) and base plate on two concrete plinths (right).



*Permanent vertical dry installation with base stand (left) and base plate on two concrete plinths (right)*

#### Installation type H

Permanent horizontal dry installation.



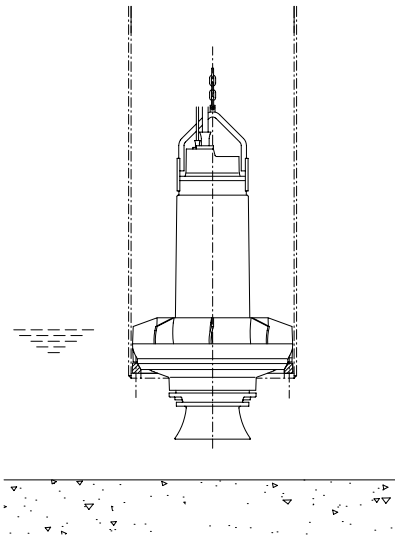
*Permanent horizontal dry installation*

The pump is bolted to the inlet and outlet pipes by flange connections.



**Installation type ST**

Installation in column pipe.

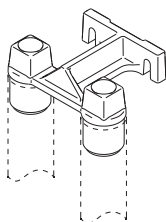


TM065921

*Submerged installation in column pipe*

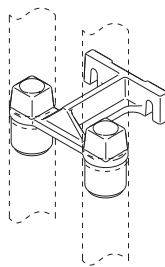
**4.1.1.2 Lowering the pump onto auto coupling**

The pump can be lowered into and pulled out of the pit by the guide rails. The stop level is lower for installation type C than for type S. See fig. Permanent installation in pit.



*Upper guide-rail bracket*

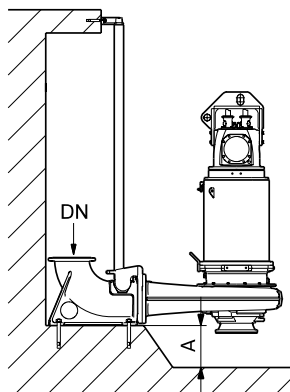
TM033066



TM033068

*Intermediate guide-rail bracket (guide rails longer than 6 m require intermediate guide-rail brackets)*

For installation on auto coupling, the correct plinth height is essential to obtain the best efficiency.



TM032018

*Auto-coupling base unit installation on a plinth*

The minimum required plinth heights (A) for installation on auto coupling are the following:

Pump type	Minimum plinth height (A) [mm]
<b>Range 50</b>	
S1.80.100.xxx	50
S1.80.200.xxx	200 / 0*
S1.100.100.xxx	50
S1.100.125.xxx	0
SV.80.80.xxx	0 / 50*
<b>Range 54</b>	
S1.80.100.xxx	50

Pump type	Minimum plinth height (A) [mm]
S1.100.125.xxx	0
S1.100.200.xxx	100 / 0*
S2.100.200.xxx	100 / 0*
S2.100.250.xxx	150 / 0*
SV.80.80.xxx**	0 / 50*
SV.80.80.xxx***	50 / 100*
<b>Range 58</b>	
S1.(x)xx.xxx.xxx	0
S2.xxx.xxx.xxx	150
SV.xx.xxx.xxx	0
<b>Range 62</b>	
S1.(x)xx.xxx.xxx	0
S2.100.200.400	150
S2.100.200.500	200
S2.100.300.xxx	150
S2.145.xxx.xxx	150
S3.xxx.xxx.xxx	100
<b>Range 66</b>	
S1.xxx.xxx.xxx	150
S2.xxx.xxx.xxx	150
S3.110.xxx.xxx	200
S3.120.300.xxx	400
S3.120.600.xxx	250
<b>Range 70</b>	
S1.xxx.xxx.xxx	150
S2.90.xxx.xxx	100
S2.100.xxx.xxx	150
S2.110.xxx.xxx	150
S2.120.250.500/600/800/1000	150
S2.120.250.1300/1600	200
S3.110.500.500	200
S3.110.500.650/800/1000/1300	250
S3.120.300.500	400
S3.120.300.650	350

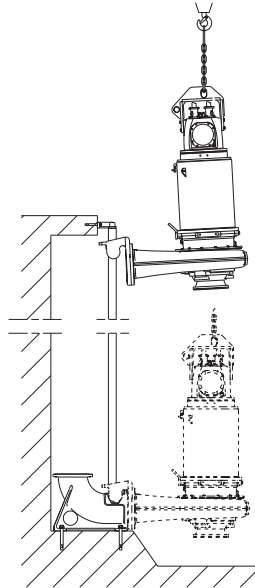
Pump type	Minimum plinth height (A) [mm]
S3.120.300.800/1000	400
S3.120.300.1300	450
S3.120.600.500/650	250
S3.120.600.1000/1300	300

\* Dimensions = material code Q and G / R and S.

\*\* Installation type P.

\*\*\* Installation type C.

Required tilt angle when the pump is lowered onto the auto coupling:  $\pm 5^\circ$ .



Lowering the pump onto an auto coupling

## Related information

### 4.1.1.1 Installation types

TM033067

#### 4.1.1.3 Submerged installation on auto coupling

Pumps for permanent installation can be installed on a stationary auto coupling and operated completely or partially submerged in the pumped liquid.

Before installing the auto-coupling base unit, ensure the quality and strength of the concrete foundation. See the pull-out strengths required for anchor bolts in the table below. Weld the threaded bushings to the steel reinforcement in the concrete to ensure adequate pull-out strength.

#### Pull-out strengths for anchor bolts

Auto-coupling base unit	Bolts	Pull-out strength [kN]
DN 100	4 x M16	5
DN 125/150 *		8
DN 200	4 x M24	16
DN 250		30
DN 300		40
DN 500	6 x M30	40
DN 600		40

\* Pump outlet DN 125 and base plate outlet DN 150.



For auto-coupling installations, types S and C, including DN 250 and above, the guide shoe is mounted on the outlet flange.

1. Drill mounting holes for the guide-rail bracket on the inside of the pit and fasten the guide-rail bracket with two anchor screws.
2. Place the auto-coupling base unit on the bottom of the pit. Use a plumb line to establish the correct position. Fasten the auto coupling with anchor bolts. If the bottom of the pit is uneven, support the auto-coupling base unit so that it is level when being fastened.
3. Connect the outlet pipe in accordance with the generally accepted procedures and without exposing the pipe to distortion or tension. Do not allow the auto coupling to carry loads from the weight of the pipes.
4. Fit the guide rails. An intermediate guide-rail bracket is required if guide rails are more than 6 m long. Place the guide rails on the auto coupling, then place the guide-rail bracket on the guide rails and fasten it to the pit wall. Tighten the anchor bolts.
5. Clean out the debris before lowering the pump into the pit.
6. Before lowering the pump into the pit, check the cables for cuts or ruptures.

7. Slide the guide shoe of the pump between the guide rails and lower the pump into the pit by a certified chain secured to the lifting bracket. When the pump reaches the auto-coupling base unit, it automatically connects.
8. Hang up the end of the chain on a suitable hook at the top of the pit, so the chain cannot come into contact with the pump.
9. Adjust the length of the motor cables, but make sure to have enough cable length for service. Make sure that the cables are not sharply bent or pinched. Fix the cables at the top of the pit.
10. Connect the motor cables and the sensor cable.



Avoid pipe tension at flanges and bolts.



The free end of the cables must not be submerged, as water may penetrate through the cables into the motor.



The pull-out strengths are stated without safety factor. The required safety factor may depend on the materials and the methods used for anchoring.

#### 4.1.2 Submerged installation, portable

1. Fit the ring stand to the pump inlet flange.
2. Fit a 90 ° elbow to the pump outlet port and connect the outlet pipe or hose. If a hose is used, make sure it does not buckle and the inside diameter matches the outlet port.
3. Lower the pump into the liquid by a chain secured to the lifting bracket of the pump. Place the pump on a plain, solid foundation. Make sure that the pump is hanging from the chain and not from the cables.
4. Hang up the end of the chain on a suitable hook at the top of the pit, so the chain cannot come into contact with the pump.
5. Adjust the length of the motor cables by coiling them up on a relief fitting to ensure the cables are not damaged during operation. Fasten the relief fitting to a suitable hook. Make sure that the cables are not sharply bent or pinched.
6. Connect the motor cables and the control cable, if any.

### 4.1.3 Dry installation

Install pumps in dry installation permanently in a pump room.

The pump motor is enclosed and watertight.



For vertical, dry installations, type D, install the pump on a permanent concrete foundation.



For horizontal, dry installations, type H, the pump is mounted on a base stand.

1. Mark and drill mounting holes in the concrete foundation.
2. Fit the base plate or base stand on the concrete with anchor bolts. Check the pull-out strengths required for bolts below.
3. Check that the base plate is horizontal or base stand is vertical.
4. Fasten the pump to the base plate or base stand. Fit isolating valves on either side of the pump.
5. Fit the inlet and outlet pipes and isolating valves, if used. Make sure the pump is not stressed by the pipes.
6. Adjust the length of the motor cables by coiling them up on a relief fitting to ensure that the cables are not damaged during operation. Make sure to have enough cable length for service. Fasten the relief fitting to a suitable hook. Make sure that the cables are not sharply bent or pinched.
7. Connect the motor cables and the control cable, if any.

In horizontal installations, use a reducer between the inlet pipe and the pump. The reducer must be eccentric and has to be installed the way its straight edge is pointing upwards. Therefore the accumulation of air in the inlet pipe and the risk of operation disturbance are eliminated.



Make sure that the pipes are installed without the use of undue force. Do not allow the pump to carry loads from the weight of the pipes. Use loose flanges to ease the installation and to avoid pipe tension at flanges and bolts.



Do not use elastic elements or bellows in the pipes.

The inlet and outlet pipes are bolted to the pump by flange connections.

#### Foundation

To ensure minimum vibration levels, all parts of the system must be sufficiently stiff and firmly anchored:

- The foundation and concrete must be strong enough to support the weight of the pump including accessories, the liquid passing through the pump and the forces generated by the pump.
- As a rule of thumb, the mass of the concrete foundation must be minimum three to five times the mass of the supported equipment and must have sufficient rigidity to withstand the axial, transverse and torsional loads generated by the pumps in operation.
- For pumps up to 350 kW, the foundation must be 15 cm wider than the base plate and 25 cm wider in case of larger pumps.
- The concrete used in the foundation must have a minimum tensile strength of 250 N/cm<sup>2</sup>.
- Always use epoxy grout to fasten the pump base plate to the foundation.

#### Pull-out strengths for anchor bolts

##### Installation type H

Range	Bolts	Pull-out strength [kN]
50-62	4 x M16	10
66-70	6 x M24	25

##### Installation type D

Dry installation	Bolts	Pull-out strength [kN]
DN 100	3 x M20	18
DN 150	6 x M20	18
DN 200		18
DN 250		25
DN 300	6 x M24	25
DN 500/400 *		25
DN 500		25

\* Base plate inlet DN 500 and pump inlet DN 400.

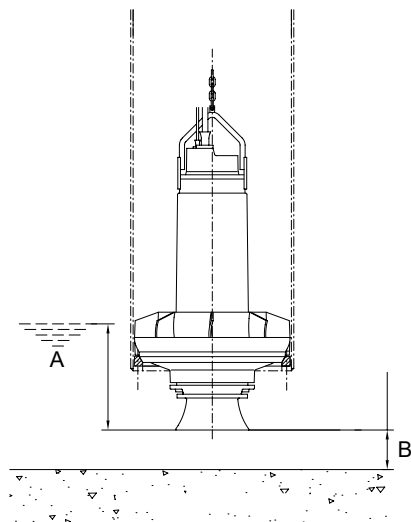


The pull-out strengths stated are without safety factor. The required safety factor may depend on the materials and the methods used for anchoring.

#### 4.1.4 Column pipe installation

Pumps for column pipe installation must be installed permanently. Grundfos does not supply column pipes, however; they are available on order. For the appropriate column pipes, see the pump specific dimensional drawings.

1. Fit the seat ring to the bottom of the column pipe.
2. Clean out debris from the pit.
3. Before lowering the pump into the column pipe, check the cables for cuts or ruptures.
4. Lower the pump into the column pipe by a certified chain secured to the lifting bracket. The pump rests on the conical surface of the seat ring. The friction between the conical surfaces prevents the pump from rotating. As an extra precaution, the three guide pins on the seat ring limit the possible rotation to maximum 60°.
5. Hang up the end of the chain above or at the top of the column pipe, so the chain cannot come into contact with the pump.
6. Adjust the length of the cables, but make sure to have enough cable length for service. Make sure that the cables are not sharply bent or pinched. Fix the cables to avoid extra slack inside the column pipe. In case of long column pipes, it may be necessary to arrange cable support. If necessary, contact Grundfos.
7. Connect the motor cables and the sensor cable.



TM022494

Column pipe installation, pump type ST

Pos.	Description
A	Min. 350 mm
B	Min. 150 mm

#### 4.2 Electrical connection

##### DANGER

##### Electric shock

Death or serious personal injury



- Before starting any work on the product, make sure that the power supply is switched off and that it cannot be switched on unintentionally.

Connect the pump to an external main switch ensuring all-pole disconnection with a contact separation according to EN 60204-1. It must be possible to lock the main switch in position 0. Type and requirements as specified in EN 60204-1.

The supply voltage and frequency are marked on the nameplate. Make sure that the motor is suitable for the power supply available at the installation site.



Carry out the electrical connection in accordance with local regulations.

The pump must be connected to a motor-protective circuit breaker.



Connect the pump to a control box with a motor protection relay with an IEC trip class 10 or 15.



Connect pumps installed in hazardous locations to a control box with a motor protection relay with an IEC trip class 10.

The motor is effectively earthed by the earth conductor of the power cables and the pipes. The motor top cover for Ex pumps is equipped with connections for external earthing or an equipotential bonding conductor.

##### DANGER

##### Short-circuit

Death or serious personal injury



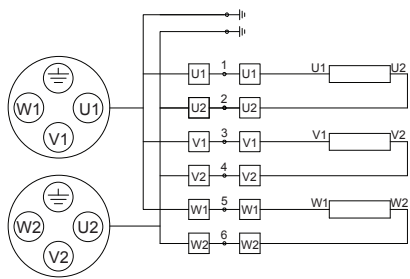
- For Ex models in dry-installation, version D and H, connect an external earthing.

### 4.2.1 Wiring diagram

#### Standard power cable



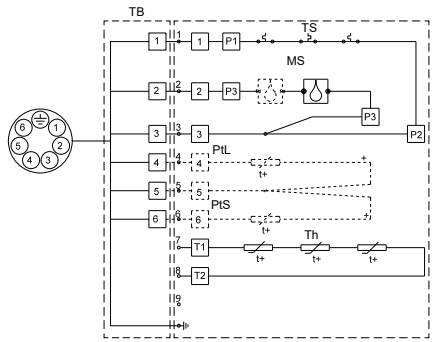
The wiring diagrams in custom-built products may differ from the standard. In this case, contact the nearest Grundfos company or authorised workshop.



TM055943

Wiring diagram for standard power cable

### 4.2.2 Sensors



TM051641

Wiring diagram for sensors

Pos.	Description
TB	Terminal board connection
PtS	Pt100 in stator
PtL	Pt100 in lower bearing
4	Thermal switches
TS	Thermistors
MS	Moisture switches Two moisture switches in Ex pumps

### 4.3 Frequency converter operation



If the motor is operated by a frequency converter, the temperature class of explosion-proof pumps must be T3.

In principle, all three-phase motors can be connected to a frequency converter.

However, frequency converter operation often exposes the motor insulation system to a heavier load and causes the motor to be more noisy than usual.

In this product range, only a negligible amount of bearing currents occurs during the use of a frequency converter.

For frequency converter operation, observe the following:

- The thermal protection of the motor must be connected.
- Peak voltage and  $dU/dt$  must be in accordance with the table below. The values stated are maximum values supplied to the motor terminals. The cable influence is not taken into account. See the frequency converter data sheet regarding the actual values and the cable influence on the peak voltage and  $dU/dt$ .
- switching frequency is 2 kHz. Variable switching frequency is accepted.
- If the pump is an Ex-approved pump, check if the Ex certificate of the specific pump allows the use of a frequency converter.
- Set the frequency converter  $U/f$  ratio according to the motor data.
- Local regulations or standards must be complied with.
- Before installing a frequency converter, calculate the lowest permissible frequency in the installation to avoid zero flow.
- Do not reduce the motor speed to less than 50 %.
- Keep the flow rate above 1 m/sec.
- Let the pump run at rated speed at least once a day to prevent sedimentation in the piping system.
- Do not exceed the frequency indicated on the nameplate as this may cause motor overload.
- Keep the power cable as short as possible. The peak voltage increases with the length of the power cable.
- Use input and output filters on the frequency converter.
- Use a screened power cable if there is a risk that electrical noise may disturb other electrical equipment.
- Set the frequency converter for constant-torque operation. Pulse width modulation should be used.

When operating the pump by a frequency converter, consider the following:

- The locked-rotor torque can be lower depending on the frequency converter type.
- The noise level may increase. See the installation and operating instructions for the selected frequency converter.

Maximum repetitive peak voltage [V]	Maximum $dU/dt$ $U_N$ 400 V [V/ $\mu$ sec.]
850	2000



Frequency converter use may reduce the lifespan of the bearings and the shaft seal, depending on operating mode and other circumstances.



Information about pump speed/torque curves, when operated by frequency converter, can be found on the Grundfos Product Center at <https://product-selection.grundfos.com>.

For more information about the frequency converter operation, see the data sheet and the installation and operating instructions for the selected frequency converter.

## 5. Protection and control functions

### 5.1 Motor protection devices

The motors have three thermal protectors connected in series and one moisture switch. Ex pumps have two moisture switches connected in series. Protectors and switches are connected in two separate circuits. The thermal protectors are reversible and the moisture switches are irreversible. The thermal protection circuit (conductors 1 and 3) and the moisture protection circuit (conductors 2 and 3) have separate outputs to enable separate alarms if the motor is overheated or affected by moisture.

All other sensor connections are either led out of the motor (sensor version D) by conductors 4 to 9, or connected to the sensor board (sensor version B) and led out of the motor by conductors 4 and 5.

### 5.2 Pump controller

The liquid level can be controlled by Grundfos LC 231 and LC 241 level controllers. The pumps are protected by thermal switches connected to the LC controller or a CU 100 control unit.

#### 5.2.1 LC level controllers

LC 231 and LC 241 controllers are for single- and dual-pump installations. The following LC level controllers are available:

- LC 231: single pumps up to 12 A or dual pumps up to 9.6 A (9 A and 7.6 A in US version). Starting method is Direct On-Line only. For both analog pressure transmitters and digital float switches.
- LC 241: single and dual pumps up to 72 A. Starting methods are Direct On-Line, Star Delta and Soft Starter for both analog pressure transmitters and digital float switches.

In the following description, "level switches" can be float switches or pressure sensors. Controllers for single-phase pumps incorporate capacitors. When using digital float switches, the LC controller can be connected up to five float switches:

One for common stop, and one for start each pump. Optionally, a digital float switch can be used for dry-run protection, and one for high-level alarm. If an analog pressure transmitter is used for level measurement, all levels can be set directly in the controller itself or by Grundfos GO Remote.

When installing the level switches, observe the following:

- To prevent air intake and vibrations, install the stop level switch, so the pump is stopped before the liquid level is lowered to the middle of the motor housing.
- Install the start level switch, so the pump is started at the required level. The pump must always be started before the liquid level reaches the bottom of the inlet pipe.

- Always install the high-level alarm switch about 10 cm above the start level switch. However, the alarm must always be given before the liquid level reaches the inlet pipe.

For further settings, see the installation and operating instructions for the selected level controller.

The pump must not run dry.

Install an additional level switch to ensure the pump is stopped in case the stop level switch is not operating.

The pump must be stopped when the liquid level reaches the upper edge of the clamp.

Float switches used in potentially explosive environments must be approved for this application. They must be connected to the Grundfos LC 231 or LC 241 level controller by an intrinsically safe barrier to ensure a safe circuit. In potentially explosive environments, the anti-seizing function must be disabled on pump controllers.



Do not install the pump controller in a potentially explosive atmosphere.



Level switches must comply with IEC/EC 50495, Annex D.



### 5.3 IO 113

IO 113 forms the interface between a Grundfos sewage and wastewater pump with analog and digital sensors, and a pump controller. The most important sensor data are indicated on the front panel.

One pump can be connected to an IO 113 module.

Together with the sensors, the IO 113 forms a galvanic separation between the motor voltage in the pump and the controller.

IO 113 is able to:

- protect the pump against overheating
- monitor the moisture in the pump
- measure the stator insulation resistance. See section Measurement of insulation resistance
- stop the pump in case of alarm
- remotely monitor the pump by RS-485 communication, Modbus or GENibus
- control the pump by a frequency converter.

Combined with SM 113, IO 113 can monitor the bearing temperature and rotor speed when the motor is switched off.

#### Related information

##### [5.3.2 Measurement of insulation resistance](#)

#### 5.3.1 Galvanic separation

Double-insulated sensors for all measurements of high voltage to ensure electrical safety. The IO 113 has a galvanic separation.

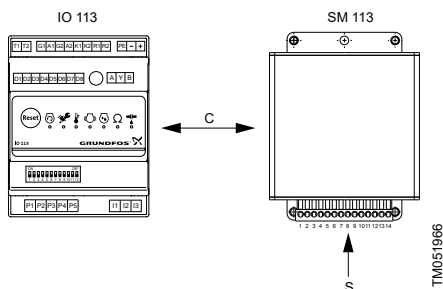
#### 5.3.2 Measurement of insulation resistance

IO 113 measures the insulation resistance between a stator winding and earth:

- Resistance above 10 megaohms is acceptable.
- Resistance between 10 and 1 megahms causes a warning.
- Resistance below 1 megaohm causes an alarm.

### 5.4 SM 113, optional

SM 113 is designed and used for the collection and transfer of additional sensor data. SM 113 works with IO 113 with a communication module, product number 98097390, as indicated below.



#### IO 113 and SM 113

Pos.	Description
C	Power line communication using Grundfos GENibus protocol
S	Sensor inputs

SM 113 can collect data from the following devices:

- current sensors, 4-20 mA \*
- Pt100 \*\* thermal sensors.

\* Vibration sensor (FPV).

\*\* Maximum three Pt100 sensors.

### 5.5 Switches and sensors

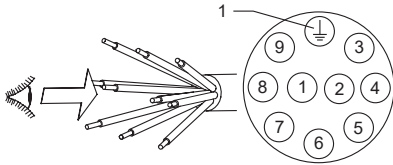


The pump must not run dry.

Install an additional level switch to ensure the pump is stopped in case the primary stop level switch is not operating.

The pump includes the following switches and sensors:

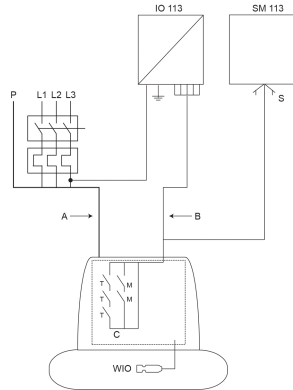
- three thermal switches or three thermal protectors in the stator windings
- moisture switches:
  - in range 50-70: one under the motor top cover
  - in Ex pumps, range 50-58 and 70: one under the motor top cover and one in the stator housing
  - in Ex pump, range 62: two under the motor top cover.
- one optional Pt100 sensor in the bearing or in the stator winding
- one analog and optional WIO sensor in the oil chamber.



TM032802

#### Sensor cable

Pos.	Description
1	Yellow and green



TM046067

Sensor connections, SM 113 outside the motor

#### Analogue and digital outputs

Symbol	Description
A	Power side
B	Signal side
C	"db" enclosure
WIO	"eb" and "mb" approval
T	Thermal switch
M	Moisture switch
P	Power input
S	Sensor input
SM 113	Sensor board
IO 113	IO 113 with internal alarm relay (250 VAC)
"db"	Flameproof enclosure of the motor section
"mb"	WIO sensor protection by encapsulation
"eb"	WIO sensor protection by increased safety

### 5.5.1 Thermal switches

The thermal protection against overheating is achieved with bimetallic switches as standard or thermistors as optional.

The three thermal switches that are hardwired from the pump to IO 113, or a similar controller, open if the stator windings become overheated. The thermal switches are reversible and close again when the motor is cooled down. This generates both a hardware and a software alarm in IO 113, and the alarm relay opens.

The switching current for the thermal switch is 0.5 A at  $\cos \varphi$  0.6.



The thermal protection of the explosion-proof pumps must not restart the pump automatically.



Install an automatic circuit breaker, which disconnects the power supply in case the thermal- or moisture switches are not operating.

### 5.5.2 Moisture switches

Non-explosion-proof pumps have one moisture switch fitted in the chamber.

Ranges 50-58 and 70 explosion-proof pumps have two moisture switches: one below the motor top cover and one in the stator housing.

Range 62 pumps have both moisture switches placed below the motor top cover.

The moisture switches are hardwired from the pump to IO 113, or a similar controller. They open if moisture is detected and break an electric circuit. This generates both a hardware and a software alarm in IO 113, and the alarm relay opens.

The switching current on the moisture switch is 6 A.

### 5.5.3 Pt100

The Pt100 temperature sensor is available as an accessory or as a Factory Product Variant (FPV).

The Pt100 sensor is primarily used for the monitoring of the bearing temperature, but it can also be used in the stator.

If the pump does not have an SM 113, remove the Pt100 sensor and connect it to an external unit. See fig. Sensor connections, SM 113 outside the motor. If the pump has an SM 113, connect the Pt100 sensor to it. No external unit is required.



For range 50-54 explosion-proof pumps, the temperature sensor is only available for monitoring the lower bearing temperature.



For range 58-70 explosion-proof pumps, the temperature sensor is available for monitoring both the lower and the upper bearing temperatures.

The maximum alarm temperatures are listed below:

Pump range	Alarm temperatures		
	Winding temperature [°C]	Upper bearing [°C]	Lower bearing [°C]
50-54	150	130	90
58-70	150	120	100

### Related information

#### [5.5 Switches and sensors](#)

### 5.5.4 Thermistors

Thermistors are available as an accessory or as an FPV.

The thermistors can be used as motor protection devices to monitor stator temperature instead of thermal switches and must be connected to the thermistor relay in the control cabinet.

### 5.5.5 Water-In-Oil sensor



The internal Water-In-Oil (WIO) sensor is only available for the explosion-proof pumps in the ranges 58, 62 and 70. The sensor must be fitted from the factory.



All Ex pumps must be equipped with an internal or external WIO sensor.



Lack of oil may cause overheating and damage to the mechanical shaft seals. The WIO sensor in the oil chamber trips the alarm if the oil quality or quantity is inadequate.



Do not use Shell Ondina X420 oil without emulsifier detergent in a pump fitted with a WIO sensor.

The WIO sensor is available as an accessory for all standard (non-explosion-proof) pumps with 5.5 to 155 kW motors. It can be factory fitted or installed after the pump is started up.

The oil chamber is filled with oil acting as a lubricant and a coolant for both mechanical seals. The WIO sensor measures the water content in the oil chamber:

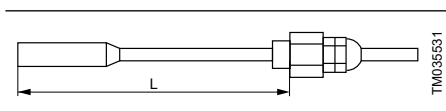
- 0-20 % water in the oil does not cause a reaction.
- Water content outside the measuring range causes a warning.
- Low oil level causes an alarm. The pump must not operate while this alarm is on.

The sensor consists of a plate capacitor that is immersed in the oil and measures the electronic circuit, emitting a 4-20 mA proportional current signal.

#### 5.5.5.1 Fitting an external WIO sensor

To fit the WIO sensor into the oil chamber, proceed as follows:

1. Remove the oil screw.
2. Push the sensor into the oil filling hole, so it becomes completely covered in oil, but does not touch the rotating parts. Recommended insertion depths for different pump types are indicated in the table below.
3. Screw the sensor bush into the thread of the oil screw.



Dimensions of a WIO sensor



For WIO sensor insertion, use the following holes:

- Vertical installation: Always use the lowest oil screw hole.
- Horizontal installation: Always use the inspection screw hole.



After the oil change, clean the WIO sensor with white spirit before reinsertion.

S pumps, range	Sensor insertion depth [mm]
50	80
54	90
58	100
62	100
66	100
70	100

More detailed information can be found in the installation and operation instructions, 96591899, or in Grundfos Product Center at [www.grundfos.com](http://www.grundfos.com).

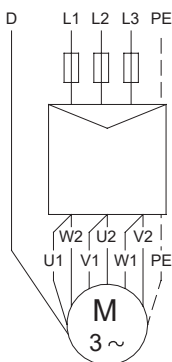
## 6. Starting up the product

Start up the pump by either direct-on-line (DOL) or star-delta (Y/D) starting. The starting method depends on usage and power supply conditions.

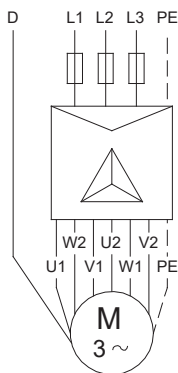
**!** If star-delta starting is used, keep the switching transient time to a minimum to avoid high transient torques.

Use a time relay with a switching time of maximum 50 minutes or according to the manufacturer's specifications.

See the wiring diagrams for direct-on-line and star-delta starting in figs Direct-on-line starting and Star-delta starting. See the wiring diagram for sensors in fig. Wiring diagram for sensors.



*Direct-on-line starting*



*Star-delta starting*

Pos.	Description
D	Control Cable

### Related information

#### 4.2.2 Sensors

### 6.1 Preparations for starting up

#### **DANGER** Rotating elements



Death or serious personal injury

- Before manual startup or changeover to automatic control, make sure that no persons are working on or near the pump.

Before the first startup and after a long standstill period, make sure the pump is vented and filled with the pumped liquid.



In dry installations with cooling jacket, the cooling jacket must always be filled with pumped liquid during operation.

TM051638

TM051639

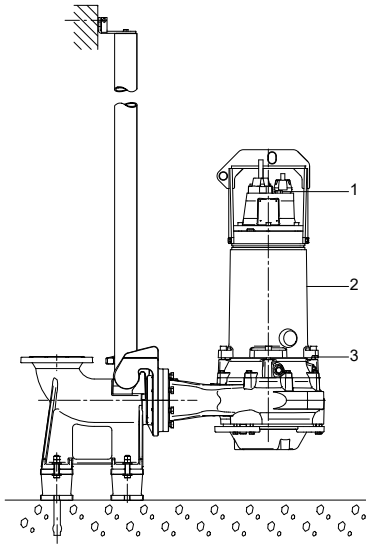
### 6.1.1 Start and stop levels for auto-coupling installation

To ensure appropriate operation, check if the start and stop levels function properly. If needed, alter them when starting up the pump.

#### Stop levels



Set the stop level according to the figure below.



Stop levels for auto-coupling installations

Pos.	Description
1	Installation type S (Ex pumps)
2	Installation type S (standard pumps)
3	Installation type C (standard and Ex pumps)



In case of an Ex pump, install an additional level sensor for the stop level.

Set the stop level, so the flow velocity in the pit increase. In pits with different stop levels, program the control sequence to pump down to the lowest stop level at least once a day to clean out the bottom of the pit.

The stop levels are determined by the motor submergence required to ensure cooling, prevent cavitation or avoid air being sucked into the pump. The lowest level must be confirmed through tests during startup.

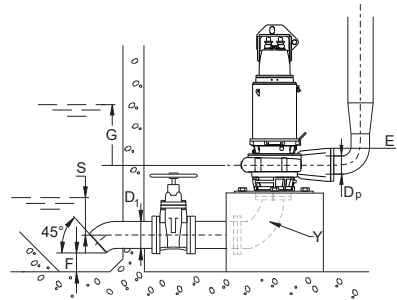
### 6.1.2 Start and stop levels for dry installation

#### Stop levels

The stop level setting for dry-installed pumps depends on the inlet height, shape and flow velocity. Set the stop level approximately one inlet diameter above the inlet. The final stop level must be confirmed through test runs during startup.

#### Start levels

In pits with dry-installed pumps, set the start level above the pump housing to ensure the cooling jacket is filled up before the pump starts operating. For vertical pumps, this height may be set with a margin according to the figure below.

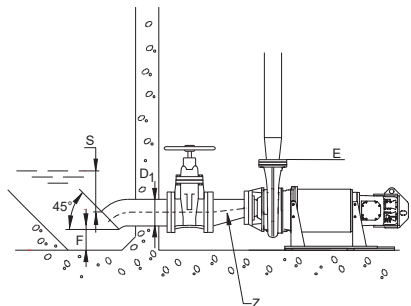


TM079253

TM058187

Vertical, dry installation (D)

Use an eccentric reducer between the inlet pipe and the pump in horizontal installations. The reducer must be installed so that the straight part faces upwards. This avoids air accumulation in the inlet pipe and disturbance of operation. See the figure below.



TM046901

Horizontal, dry installation (H)

Minimum stop level	$S = D_1$
Minimum distance between the bottom of pit and the lowest part of the inlet pipe	$F = 0.5 \times D_1$
Minimum start level	$G = D_p$
Minimum stop level for Ex pumps	E
Reduction elbow	Y
Eccentric reducer	Z



In case of an Ex pump, install an additional level sensor for the stop level. Pumps for dry installation must have a cooling jacket.

**S** is the minimum stop level. The minimum distance **S** above the inlet pipe is required to avoid the formation of vortices at the inlet pipe and to avoid air being sucked into the pump. Air in the pumped liquid may cause vibrations, cavitation and loss of pump performance.

**G** is the minimum start level of a dry-installed, vertical pump if no other actions are taken to ensure that the pump housing is filled with pumped liquid when the pump is started.

Other possible actions:

- Use a vacuum pump to suck liquid into the pump housing; this requires an isolating valve on the outlet side.
- Install a non-return valve in the outlet pipe after the first startup; this prevents the draining of the pump housing between running periods.

## 6.2 Checking the direction of rotation



Start and run an unsubmerged pump only for a few seconds to check the direction of rotation.

A label with an arrow on the pump housing indicates the correct direction of rotation. The direction of rotation is clockwise.



### **DANGER** Crushing hazard

Death or serious personal injury

- Do not touch the pump when starting it up.



Make sure that the bottom of the pit is clean before startup to avoid material or objects being sucked into the impeller.

## Installation types S, C and ST

Proceed as follows:

1. Lift the pump approximately 2-5 cm from the ground or base using the lifting chain and a crane.
2. Start and run the pump for a few seconds.
3. Observe the jerk of the pump. If the pump jerks counter-clockwise, the direction of rotation is correct.

In case the direction of rotation is wrong, interchange two phases in the power supply cable.

## Installation types D and H

Check the duty point to determine the direction of rotation.

## 6.3 Startup

Before installation and the first startup of the pump, check the condition of the cables to avoid short circuits.

Proceed as follows:

1. Lock the main switch in position 0.
2. Check the oil level in the oil chamber. See section Oil check and change.
3. Check if the impeller can rotate freely.
4. Check that the monitoring units, if used, are operating appropriately.
5. Open the isolation valves, if fitted.
6. **Pumps in installation types S and C:** Make sure the pump is properly connected to the auto coupling.
7. Make sure the pump is submerged in the pumped liquid.
8. **Pumps in installation types D and H:** Make sure the pit contains liquid, and the pump housing and cooling jacket are filled with water. Open the air vent screw on the top of the cooling jacket before or during the startup until water comes out. Then close the screw.
9. **Pumps in installation type ST:** Make sure that the pump is properly seated in the column pipe and secured against rotation.
9. Start the pump and check the operation for abnormal noise or vibrations.



In case of abnormal noise or vibrations, stop the pump immediately. Do not restart the pump until the cause of the fault is identified and eliminated.

10. After startup, set the duty point and check the operating conditions.

Always operate the pump in accordance with established routines and check the equipment and accessories regularly. Make sure the pump and equipment settings cannot be changed by unauthorised persons.

#### Related information

[2.1 Product description](#)

[8.3 Oil check and change](#)

## 7. Handling and storing the product

### DANGER

#### Crushing hazard

Death or serious personal injury



- Move the pump only by a forklift or a lifting crane.
- Before lifting the pump, make sure the centre of gravity is between the forklift arms.

### 7.1 Storing the product



Leave the cable end protectors and sensor cables on the power supply until making the electrical connection. Make sure the free cable ends are not exposed to moisture or water as it may cause damage to the motor.

During long periods of storage, protect the pump against moisture and heat.



If the pump is stored for long periods, turn the impeller by hand at least bi-monthly to prevent the seal faces of the lower mechanical shaft seal from seizing up.

If the impeller cannot be turned by hand, contact an authorised service workshop.



For dry-installed pumps, make sure the cooling jacket is empty before storing the product.

After a long period of storage, inspect the pump before putting it into operation. Make sure the impeller can rotate freely.

Pay attention to the condition of the shaft seals, O-rings and cable entries.



## 8. Servicing and maintaining the product

### 8.1 Safety instructions and requirements

#### DANGER

##### Pump can tilt

Death or serious personal injury



- During maintenance and service, including transport to service workshop, always support the pump by lifting chains or place it in horizontal position to secure stability.

#### DANGER

##### Electric shock

Death or serious personal injury



- Before starting work on the pump, make sure that the main switch is locked in position 0. Make sure that the power supply cannot be switched on unintentionally.

#### WARNING

##### Crushing hazard

Death or serious personal injury



- Make sure that all rotating parts have stopped moving.



Maintenance and service must be carried out by trained persons.



Compliance with the standards IEC 60079-17 and IEC 60079-19 is a customer responsibility.

Maintenance and service work on explosion-proof pumps must be carried out by Grundfos or an authorised service workshop.



In case of repairs, always use original service parts from the manufacturer to ensure the correct dimensions of the flame path gaps.

The bolts used in the motor must be class A4-80 or A2-80 according to EN/ISO 3506-1. VER 2.

A defective bearing may reduce the Ex safety.

#### WARNING

##### Chemical hazard

Death or serious personal injury



- Flush the pump thoroughly with clean water before carrying out maintenance and service. Rinse the pump parts after dismantling.



Service instructions and videos can be found in Grundfos Product Center at [www.grundfos.com](http://www.grundfos.com).

### 8.2 Maintenance schedule

Inspect pumps running normal operation once a year.

Check the following:

- **Power consumption**
- **Oil level and oil condition**
- **Cable entries** Make sure the cable entries are waterproof, the cables are not sharply bent or pinched, and the cable sheaths have no visual defects.
- **Impeller clearance**
- **Pump parts** Check the pump parts for possible wear. Replace defective parts.
- **Ball bearings** Check the shaft for noisy or heavy operation; turn the shaft by hand. Replace defective bearings. A general overhaul of the pump is required in case of defective bearings or poor motor function. This work must be carried out by an authorised service workshop. Bearings are lubricated for lifetime.
- **Vibration** If the pump is vibrating at an abnormal level, do not restart the pump until the cause of the fault is identified and eliminated.



Vibration may cause excessive temperature at dry-installed pumps.



The WIO sensor must also be checked during the oil change or at least once a year.

#### WIO sensor check

During the test, the WIO sensor must stay in place. If the sensor does not work correctly, it must be replaced.



Do not disassemble the sensor and do not remove it from the oil chamber.

To test the sensor, measure the current flowing through it and compare the values to the table below.

Value	Explanation	Measurement evaluation
0 mA	Cable break / Sensor fault	Change the WIO sensor.
3.8 mA	No oil in oil chamber	Do the test when the oil chamber is empty.
4-10 mA	Normal operation	Do the test when the oil chamber is full.
>10 mA	Water in oil, possible leak	Check the seals, possible water leak.

### Related information

#### 8.3 Oil check and change

#### 8.4 Inspection and adjustment of the impeller clearance

### 8.3 Oil check and change

The oil chamber is filled with oil acting as a lubricant and a coolant for both mechanical seals.



Check the oil in the oil chamber every 3000 operating hours or at least once a year, or if the shaft seal is changed.

Low oil level may indicate that the upper mechanical shaft seal is defective. Contact an authorised service workshop for further overhaul of the pump and repair, if required.

Lack of oil may cause overheating and damage to the mechanical shaft seals. The WIO sensor in the oil chamber trips the alarm if the oil quality or quantity is inadequate, or there is no oil in the oil chamber.

Oil auto-ignition temperature must be above 250 °C. Use any of the following:

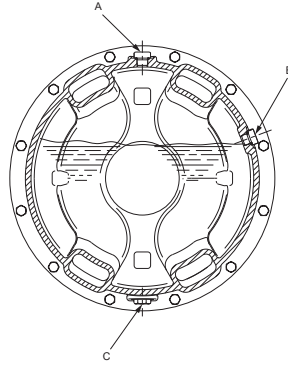
- Elf Performance Polytraffic 10W-40
- Total Rubia Polytraffic 10W-40
- Pennzoil SAE 10W-40.

The oil in the oil chamber can be changed while the pump is in either horizontal or vertical position. However; it is recommended to carry out the oil change while the pump is in a horizontal position. This way, it is easier to drain all the used oil out of the chamber.

### Horizontal position

Proceed as follows:

1. Place the pump in a position that inspection screw A is pointing upwards.



Pump with inspection screw A upwards

TM031628

### CAUTION Pressurised system

Minor or moderate personal injury



- The oil chamber may be under pressure. Loosen the screws carefully and do not remove them until the pressure has been fully relieved.

2. Loosen and remove screw A.
3. Remove screw B and check the oil level.
4. Inspect the oil coming out of the motor. If the colour is greyish white, the oil may contain water. If the oil contains water, the shaft seal is defective and must be replaced. Oil not containing water can be reused.
5. If the oil needs to be changed, place a clean container under the pump to collect all the drained-off oil.
6. Remove screw C and allow all the oil to drain from the chamber into the container. Emulsified oil must be changed and disposed of.



Used oil must be disposed of in accordance with local regulations.

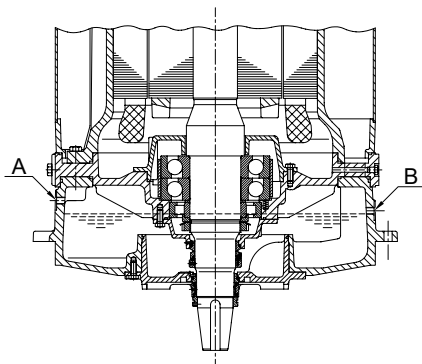
Range	Oil quantity	
	Installation type	
	S [litres]	C, D and H [litres]
50	2.6	1.9
54	3.5	2.5
58	4.6	3.8
62	9.0	7.1
66	12.5	9.2
70	12.4	9.0

- Replace the O-rings, refit screw C and tighten securely. Fill the oil chamber with oil to the correct level. Refit screws A and B and tighten them securely.

### Vertical position

Proceed as follows:

- Identify the screws A, B and C. See fig. Pump with inspection screw A upwards.



TM024005

### Oil level of a vertical pump

- Use screw B for indication of the oil level in the oil chamber. See fig. Oil level of a vertical pump.
- When the pump is vertical, the oil has to be pumped out of the oil chamber. Use a suction pump with a flexible suction hose that can be inserted deep into the oil chamber.
- Pump out the oil using all the screw holes in turns to reach all sections of the oil chamber. Collect the drained oil in a clean container.
- Replace the O-rings, refit screw C and tighten securely. Fill the oil chamber with oil to the correct level. Refit screws A and B and tighten them securely.

## 8.4 Inspection and adjustment of the impeller clearance



The impeller clearance must be set to  $0.7 \text{ mm} \pm 0.2 \text{ mm}$ . It must be checked at least 3 different points.

The correct axial clearance is  $0.7 \text{ mm} \pm 0.2 \text{ mm}$ . Reset the clearance if it is  $0.7 \text{ mm}$  or more. The method for resetting the clearance is different for submersible pumps, installation types S, C and ST, and for dry-installed pumps, installation types D and H.

### 8.4.1 Submersible pumps, installation types S, C and ST

Submersible pumps have a separate, adjustable pump inlet cover, which may be shaped as an inlet bell. Locate the six fastening screws of the inlet cover and the three set screws.

Use a feeler gauge to check the clearance between the impeller and the inlet cover all around the perimeter of the inlet opening. See fig. Impeller clearance adjustment.



Do not use force when tightening the fastening screws as this may damage the bearings. The movement is usually 1 to 3 mm.



#### DANGER

#### Overhead load

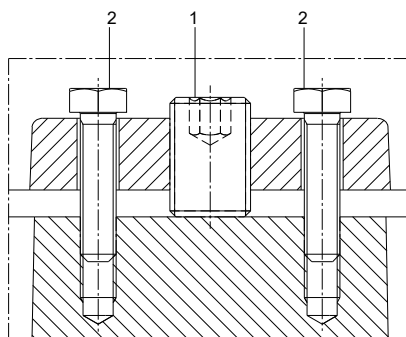
Death or serious personal injury

- Never work under a pump when it is hanging from a crane.



Before adjusting the clearance, clean the gap between the impeller and the inlet cover.

- Loosen the set screws by two full turns for each.
- Close the impeller clearance by lightly tightening the fastening screws diagonally until the impeller reaches the pump housing.
- Loosen the fastening screws to make a  $0.7 \text{ mm}$  gap under the heads of the fastening screws. See fig. Impeller clearance adjustment.
- Tighten the set screws tightly.
- Tighten the fastening screws diagonally.



TM051916

Impeller clearance adjustment

Pos.	Description
1	0.7
2	Set screw
3	Fastening screw
4	Fastening screw

#### 8.4.2 Dry-installed pumps, installation types D and H

Depending on the pump range, there are two ways to set the impeller clearance. Method 1 is for range 50-54 and method 2 is for range 58-70.

##### Method 1



Do not use undue force when tightening the fastening screws as this may damage the bearings. The movement is usually 1 to 3 mm.

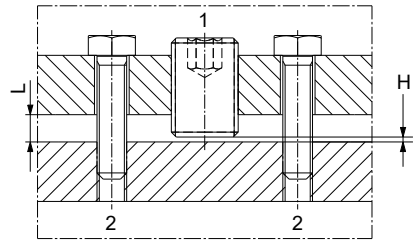
1. Loosen the set screws by two full turns for each.
2. Close the impeller clearance by lightly tightening the fastening screws diagonally until the impeller reaches the pump housing.
3. Loosen the fastening screws to make a 0.7 mm gap under the heads of the fastening screws. See fig. Impeller clearance adjustment.
4. Tighten the set screws tightly.
5. Tighten the fastening screws diagonally.

##### Method 2



Do not use undue force when tightening the fastening screws as this may damage the bearings. The movement is usually 1 to 3 mm.

1. Loosen the six fastening screws and close the impeller clearance by tightening the three set screws. Tighten the screws diagonally to move the inlet cover evenly.
2. Measure the distance "L" between the inlet cover and pump housing at three points next to the set screws, using feeler gauges or calipers, then note the distance.
3. Loosen the set screws and draw back the inlet cover between 0.5 and 0.9 mm using the six fastening screws (approximately one 270° turn of an M12 fastening screw) and the distance "L" as reference. See fig. Impeller clearance adjustment.
4. Tighten all set screws and check that the distance "L" at the three reference points is stable at the new value.



TM051915

Impeller clearance adjustment

Pos.	Description
1	Set screw
2	Fastening screw
H	0.5 - 0.9

#### Related information

##### 8.4.1 Submersible pumps, installation types S, C and ST

#### 8.5 Pump cleaning and inspection

Clean the pumps at regular intervals. In case of wet-installed pumps, lift the pumps out of the pit and clean them on site. Hose down the pump externally using a high-pressure jet cleaner at a maximum of 100 bars. Remove caked dirt from the motor to ensure proper heat conductivity. A mild detergent approved for disposal into the sewage system can be used. The pumps can be scrubbed, using a soft brush, if necessary.

Visual inspection of the pump must include the following:

- Search for cracks or other external damage.
- Check the lifting bracket and lifting chain for wear and corrosion.
- Make sure the motor cables are not damaged.
- Inspect visible parts of the cable entries for cracks.
- Check if the cables are firmly connected to the motor top cover.
- Check all visible screws for self-loosening and tighten, if necessary.

The pumps are fitted with a vent valve at the top of the cooling jacket. The valve may be removed and cleaned, if necessary. Clean the vent hole before refitting the valve.

#### 8.6 Motor cables

Use only suitable and manufacturer-approved cables.

### 8.6.1 Cable entries

Secure the cable entries to the motor top cover by tightening the screws evenly one by one until the cable entries are lying flat against the top cover.

The minimum bending radius for cables is indicated in the following table:

Range	Cable type	Cable size	Min. bending radius [cm]
50	Power cables	7 x 1.5 mm <sup>2</sup>	10
54		7 x 2.5 mm <sup>2</sup>	11
58		4 x 6.0 mm <sup>2</sup>	10
		4 x 6.0 mm <sup>2</sup>	10
62		4 x 10.0 mm <sup>2</sup>	14
		4 x 16.0 mm <sup>2</sup>	16
66		4 x 10.0 mm <sup>2</sup>	14
		4 x 16.0 mm <sup>2</sup>	16
		4 x 25.0 mm <sup>2</sup>	19
		4 x 25.0 mm <sup>2</sup>	19
70	4 x 35.0 mm <sup>2</sup>	21	
	4 x 50.0 mm <sup>2</sup>	25	
	4 x 70.0 mm <sup>2</sup>	28	
All	Control cables	7 x 1.5 mm <sup>2</sup>	10

### 8.7 Spare parts

Damaged motor parts must always be replaced by new and approved ones.

### 8.8 Contaminated pumps and service

#### CAUTION

#### Biological hazard

Minor or moderate personal injury

- Flush the pump thoroughly with clean water and rinse the pump parts after dismantling.



A pump is classified as contaminated if it is used for contagious or toxic liquid.

#### 8.8.1 Sending the pump to service

Before returning the product for service, contact Grundfos with details about the pumped liquid. Otherwise, Grundfos can deny servicing the product. Any application for service must include details about the pumped liquid.

## 9. Fault finding the product

Before diagnosing any fault, read and observe the section Safety instructions and requirements.

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
The pump does not start or it stops without visible cause.	No power supply.	Re-establish the power supply, start the pump manually and check contactor operation.
	Moisture in the stator housing or in the terminal box. The moisture switch interrupts the supply voltage.	Contact an authorised service workshop.
	The WIO sensor is not covered by oil. The sensor interrupts the supply voltage.	Contact an authorised service workshop.
The pump does not start or it stops. The control panel of the controller indicates that the motor-protective circuit breaker or protection equipment is tripped out.	Missing phase.	Re-establish all phases.
	The pump is overloaded.	Let the pump cool down for approximately 10 minutes and start it again. In case the pump starts now, the first stop was caused by a tripping thermal switch. If the fault occurs again, find the cause of the overload.
		Check the control panel fuses and switch them on in case they have tripped. Wait for approximately 10 minutes until the pump is cooled down, and start it again. In case the pump does not start, the overload relay has tripped and the pump needs service. Contact an authorised service workshop.
	The impeller is clogged by impurities.	Clean the impeller.
	The motor-protective circuit breaker is set incorrectly.	Set the motor-protective circuit breaker as required in relation to the rated current.
	The thermal switches are tripped out. Insufficient motor cooling.	Re-establish motor cooling.
	The moisture switch in the motor is tripped out.	Contact an authorised service workshop.
	A motor cable is defective.	Contact an authorised service workshop.
	Fluctuating voltage.	Re-establish correct voltage supply. The permissible deviation is $\pm 10\%$ .
	The pump runs but does not deliver the rated flow.	Wrong direction of rotation.
The impeller is loose or worn.		Tighten or replace the impeller.
The pump or the pipes are blocked by impurities.		Clean the pump or the pipes.

<b>Fault</b>	<b>Cause</b>	<b>Remedy</b>
	The pump head is too high.	Measure the differential pressure and compare the value with the pump performance curve. Remove the blockage in the outlet pipe. Contact Grundfos, if necessary.
	The valves are closed or blocked. The non-return valve is not operating.	Open, clean or replace the valves as required.
	There is air in the pump or the inlet pipe.	Vent the pump or the inlet pipe. Set a higher stop level in the pit.
	The pumped liquid is too dense.	Dilute the pumped liquid.
	The pump is improperly connected to the auto coupling.	Pump down the liquid level in the pit. Lift out the pump and relocate it on the auto coupling.
	There is leakage in the pipes.	Repair or replace the pipes.
	The pump pit flushing system is inadvertently activated.	Check the function of the flushing system and repair as required.
The pump starts but stops immediately.	A clogged pump causes the motor-protective circuit breaker to trip out.	Clean the pump.
	An overheated motor causes the thermal switches to trip out.	Allow the pump to cool. Clean the pump.
	The level switch is out of adjustment or defective.	Clean or reset the level switch or replace as required.
The pump is vibrating or emitting excessive noise.	The pump is partly clogged by impurities.	Clean the pump.
	Wrong direction of rotation.	Interchange two phases in the power supply to the motor.
	The pump is operating outside the specified operating range.	Re-establish proper operating conditions.
	The pump is defective.	Repair the pump or contact an authorised workshop, if necessary.
	The pump is improperly connected to the auto coupling.	Pump down the liquid level in the pit. Lift out the pump and relocate it on the auto coupling.
	The pump is cavitating.	Clean the inlet.
	The base stand, the auto coupling, the ring stand or the guide rails are installed incorrectly.	Install the components correctly.
The oil is watery or emulsified.	The lower mechanical shaft seal is leaking.	Contact an authorised service workshop.
The oil level is low.	The upper mechanical shaft seal is leaking.	Contact an authorised service workshop.

## Related information

### 8.1 Safety instructions and requirements

## 10. Technical data

### 10.1 Operating conditions

#### pH value

All pumps can be used for pumping liquids with a pH value between 4 and 10.

#### Liquid temperature

The allowed temperature is 0-40 °C.



In special situations, if the motor is not fully loaded, the temperature of the pumped liquid may be higher.

In this case, contact the nearest Grundfos company or service workshop.



Explosion-proof pumps must never pump liquids with a temperature higher than 40 °C.

#### Ambient temperature

The allowed ambient temperature is -5 °C to +40 °C.



In special situations, if the motor is not fully loaded, the ambient temperature may be higher than 40 °C.

In this case, contact the nearest Grundfos company or service workshop.



For explosion-proof pumps, the ambient temperature on the installation site must be in the range between -5 and +40 °C.

#### Density and viscosity of the pumped liquid

Density: 1000 kg/m<sup>3</sup>.

Kinematic viscosity: 1 mm<sup>2</sup>/s (1 cSt).



When pumping liquids with a density and/or a kinematic viscosity higher than the values stated above, use motors with higher outputs.

#### Flow velocity

Keep a minimum flow velocity to avoid sedimentations in the piping system.

Recommended velocities:

---

Vertical pipes: 0.7 m/s

---

Horizontal pipes: 1.0 m/s

---

#### Installation depth

The maximum submersion depth is 20 m.

#### Level of the pumped liquid



An Ex motor without a cooling jacket, installation types S and ST, must be completely submerged during operation.



Install an additional level switch to ensure the pump is stopped if the stop level switch is not operating.

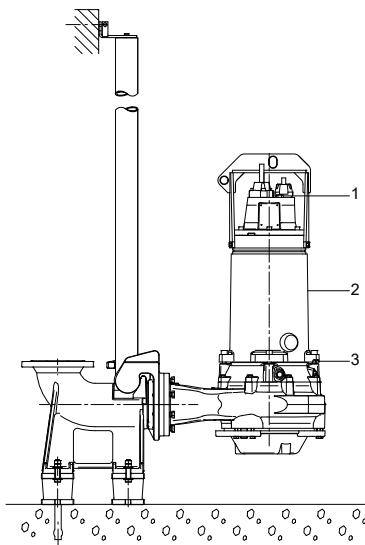
To avoid air being sucked into the pump and to ensure adequate cooling of the motor during operation, make sure to meet the following minimum requirements:

- **Installation type S:** Submerge the Ex pump to the top of the motor and the standard pump to the middle of the motor. See the figure below.



Installation type S pumps must always be completely submerged in the pumped liquid to be Ex protected.

- **Installation type C:** Submerge the pump to the top of the pump housing, so the liquid level is always above the pump housing.



Liquid level

Pos.	Description
1	Installation type S (Ex pumps)
2	Installation type S (standard pumps)
3	Installation type C (standard and Ex pumps)



- **Installation types D and H:** See section Dry installation.



For installation type D, air can be vented through an air-vent screw on top of the cooling jacket.

For installation type H, air venting is not necessary after the pump is filled with water.

- **Installation type ST:** For standard pumps, the liquid level must be at least 350 mm above the pump inlet. See fig. Submerged installation in column pipe.

### Operating mode

The pumps are designed for continuous operation with the maximum number of starts per hour stated in the table below:

S pump, range	Starts per hour
50	20
54	
58	
62	15
66	
70	

### Ingress Protection class

IP68, according to IEC 60529.

### Sound pressure level

#### CAUTION

#### Sound pressure level

Minor or moderate personal injury

- Use hearing protection when working nearby an installation in operation. Depending on the installation type, the sound pressure level of the pump may exceed 70 dB(A).



### Storage temperature

Storage temperature: -40 to +55 °C. Maximum 70 °C for short periods not exceeding 24 hours (EN 60204-1).

### Related information

[4.1.3 Dry installation](#)

[4.1.1.1 Installation types](#)

## 10.2 Electrical data

Voltage tolerances for the motor and the motor protection devices:

Component	Voltage	Tolerance
Motor	See the pump nameplate	± 10 %
Thermal switches	Maximum 240 V	± 10 %
Thermistors	2.5 - 7.5 V	-
Moisture switches	Maximum 240 V	-
Other sensors (optional)	Maximum 14 VDC	± 1 V
SM 113 (optional)	Maximum 14 VDC	± 1 V

## 10.3 Dimensions and weights

### Dimensions

For pump dimensions, see the data booklet for each pump range at [www.grundfos.com](http://www.grundfos.com).

### Weights



The weights stated include 10 m cables.



The weights of installation type S and C pumps include the weight of the guide shoe.

The weight of installation type H pumps includes the weight of the horizontal base stand.



The weights stated are netto weights including the accessories mounted from the factory.

Pump type	Maximum netto weight [kg]			
	S	C	D	H
<b>Range 50</b>				
SV.80.80.74.2.50H	170	190	-	200
SV.80.80.94.2.50H	170	-	-	-
SV.80.80.120.2.50H	170	190	-	200
S1.80.100.75.4.50S	180	190	-	210
S1.80.100.55.4.50H	180	190	-	210
S1.80.100.75.4.50H	180	190	-	210
S1.80.100.100.4.50H	200	220	-	240
S1.80.100.125.4.50H	200	220	-	240
S1.80.200.75.4.50E	320	350	-	320
S1.80.200.100.4.50E	350	390	-	350
S1.80.200.125.4.50E	350	390	-	350
S1.100.100.55.4.50M	170	190	-	200
S1.100.100.75.4.50M	170	190	-	200
S1.100.100.100.4.50M	190	210	-	230
S1.100.100.125.4.50M	190	210	-	230
S1.100.125.75.4.50L	220	240	-	260
S1.100.125.100.4.50L	250	270	-	290
S1.100.125.125.4.50L	250	270	-	290
<b>Range 54</b>	<b>S</b>	<b>C</b>	<b>D</b>	<b>H</b>
SV.80.80.150.2.54H	320	-	-	-
SV.80.80.210.2.54H	320	350	-	400
S1.80.100.135.4.54L	320	350	-	380
S1.80.100.170.4.54L	340	370	-	400
S1.100.125.135.4.54M	300	350	-	360
S1.100.125.170.4.54M	340	370	-	400
S1.100.200.135.4.54L	380	410	-	450
S1.100.200.170.4.54L	390	430	-	470
S2.100.200.135.4.54L	380	410	-	450
S2.100.200.170.4.54L	390	410	-	450
S2.100.250.135.4.54E	530	540	490	520
S2.100.250.170.4.54E	490	540	490	550
<b>Range 58</b>	<b>S</b>	<b>C</b>	<b>D</b>	<b>H</b>
ST2.80.125.290.258H	460	-	-	-
SV.80.125.290.2.58H	410	-	-	-
S1.80.125.220.4.58H	440	480	480	530
S1.80.125.260.4.58H	440	470	480	520
S1.100.125.220.4.58M	450	475	500	540

Pump type	Maximum netto weight [kg]			
	S	C	D	H
S1.100.125.260.4.58M	450	475	500	540
S2.100.200.220.4.58L	490	540	540	590
S2.100.200.260.4.58L	490	540	540	590
S2.100.300.160.6.58E	560	640	600	660
S2.100.300.220.6.58E	560	630	600	660
<b>Range 62</b>	<b>S</b>	<b>C</b>	<b>D</b>	<b>H</b>
ST3.120.1000.280.8.62E	780	-	-	-
S1.80.125.300.4.62H	600	660	720	720
S1.80.125.400.4.62H	600	660	720	720
S1.80.125.500.4.62H	620	680	740	740
S1.100.125.300.4.62M	600	660	720	720
S1.100.125.400.4.62M	600	660	720	720
S1.100.125.500.4.62M	620	680	720	740
S2.100.200.400.4.62L	640	700	770	770
S2.100.200.500.4.62L	660	730	790	790
S2.100.300.300.4.62E	760	840	760	840
S2.100.300.400.4.62E	760	840	760	840
S2.100.300.500.4.62E	780	860	780	830
S2.145.300.200.8.62E	820	900	900	900
S2.145.300.280.8.62E	820	900	860	900
S3.120.300.150.12.62F	820	900	860	900
<b>Range 66</b>	<b>S</b>	<b>C</b>	<b>D</b>	<b>H</b>
ST3.110.1000.220.10.66L	900	-	-	-
ST3.110.1000.350.10.66L	880	-	-	-
S1.100.200.650.4.66H	810	840	920	1040
S2.100.200.550.4.66M	750	855	855	1000
S2.100.200.650.4.66M	750	860	880	1000
S2.110.250.650.4.66L	890	1000	940	1050
S2.120.250.500.4.66H	1100	1130	1130	1200
S2.140.300.350.8.66M	870	990	965	1050
S3.110.500.220.10.66L	1440	1550	1400	1520
S3.110.500.350.10.66L	1420	1525	1380	1500
S3.110.500.500.8.66L	1480	1585	1440	1560
S3.120.300.500.8.66M	1000	1100	1100	1120
S3.120.600.350.10.66E	1655	1770	1650	1785
S3.120.600.500.8.66E	1720	1825	1720	1843
<b>Range 70</b>	<b>S</b>	<b>C</b>	<b>D</b>	<b>H</b>
S1.100.200.850.4.70H	1050	1195	1185	1320

Pump type	Maximum netto weight [kg]			
S2.90.200.1150.4.70S	1180	1320	1360	1500
S2.90.200.1600.4.70S	1350	1500	1535	1680
S2.100.200.1150.4.70H	1085	1225	1245	1390
S2.100.200.1600.4.70H	1275	1440	1425	1570
S2.110.200.850.4.70M	985	1125	1155	1300
S2.110.200.1150.4.70M	1090	1230	1250	1390
S2.110.200.1600.4.70M	1245	1405	1425	1570
S2.110.250.1000.6.70H	1295	1435	1405	1545
S2.110.250.1300.6.70H	1480	1640	1600	1745
S2.120.250.650.8.70H	1280	1415	1385	1520
S2.120.250.800.6.70H	1300	1440	1405	1540
S2.120.250.1600.4.70L	1380	1535	1480	1610
S3.110.500.650.8.70L	1745	1885	1735	1875
S3.110.500.800.6.70L	1765	1905	1755	1895
S3.110.500.1000.6.70L	1765	1910	1755	1870
S3.110.500.1300.6.70L	1945	2105	1955	2095
S3.120.300.650.8.70M	1375	1520	1430	1560
S3.120.300.800.6.70M	1280	1425	1335	1520
S3.120.300.1000.6.70M	1285	1425	1335	1460
S3.120.300.1300.6.70M	1575	1735	1645	1785
S3.120.600.650.8.70E	1995	2135	2020	2155
S3.120.600.1000.6.70E	2015	2155	2040	2175
S3.120.600.1300.6.70E	2195	3255	2235	2375

## 11. Disposing of the product

This product or parts of it must be disposed of in an environmentally sound way.

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.



The crossed-out wheeled bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local waste disposal authorities. The separate collection and recycling of such products will help protect the environment and human health.

See also end-of-life information at [www.grundfos.com/product-recycling](http://www.grundfos.com/product-recycling).

**Argentina**

Bombas GRUNDFOS de Argentina S.A.  
Ruta Panamericana km. 37.500/Industin  
1610 - Garin Pcia. de B.A.  
Tel.: +54-3327 414 444  
Fax: +54-3327 45 3190

**Australia**

GRUNDFOS Pumps Pty. Ltd.  
P.O. Box 2040  
Regency Park  
South Australia 5942  
Tel.: +61-8-8461-4611  
Fax: +61-8-8340-0155

**Austria**

GRUNDFOS Pumpen Vertrieb  
Ges.m.b.H.  
Grundfosstraße 2  
A-5082 Grödig/Salzburg  
Tel.: +43-6246-883-0  
Fax: +43-6246-883-30

**Belgium**

N.V. GRUNDFOS Bellux S.A.  
Boomssesteenweg 81-83  
B-2630 Aartselaar  
Tel.: +32-3-870 7300  
Fax: +32-3-870 7301

**Belarus**

Представительство ГРУНДФОС в  
Минске  
220125, Минск  
ул. Шафарнянская, 11, оф. 56, БЦ  
«Порт»  
Тел.: +375 17 397 397 3  
+375 17 397 397 4  
Факс: +375 17 397 397 1  
E-mail: minsk@grundfos.com

**Bosnia and Herzegovina**

GRUNDFOS Sarajevo  
Zmaja od Bosne 7-7A  
BiH-71000 Sarajevo  
Tel.: +387 33 592 480  
Fax: +387 33 590 465  
www.ba.grundfos.com  
E-mail: grundfos@bih.net.ba

**Brazil**

BOMBAS GRUNDFOS DO BRASIL  
Av. Humberto de Alencar Castelo  
Branco, 630  
CEP 09850 - 300  
São Bernardo do Campo - SP  
Tel.: +55-11 4393 5533  
Fax: +55-11 4343 5015

**Bulgaria**

Grundfos Bulgaria EOOD  
Slatina District  
Iztocna Tangenta street no. 100  
BG - 1592 Sofia  
Tel.: +359 2 49 22 200  
Fax: +359 2 49 22 201  
E-mail: bulgaria@grundfos.bg

**Canada**

GRUNDFOS Canada inc.  
2941 Brighton Road  
Oakville, Ontario  
L6H 6C9  
Tel.: +1-905 829 9533  
Fax: +1-905 829 9512

**China**

GRUNDFOS Pumps (Shanghai) Co. Ltd.  
10F The Hub, No. 33 Suhong Road  
Minhang District  
Shanghai 201106 PRC  
Tel.: +86 21 612 252 22  
Fax: +86 21 612 253 33

**Columbia**

GRUNDFOS Colombia S.A.S.  
Km 1.5 via Siberia-Cota Conj. Potrero  
Chico,  
Parque Empresarial Arcos de Cota Bod.  
1A.  
Cota, Cundinamarca  
Tel.: +57(1)-2913444  
Fax: +57(1)-8764586

**Croatia**

GRUNDFOS CROATIA d.o.o.  
Buzinski prilaz 38, Buzin  
HR-10010 Zagreb  
Tel.: +385 1 6595 400  
Fax: +385 1 6595 499  
www.hr.grundfos.com

**Czech Republic**

GRUNDFOS Sales Czechia and Slovakia  
s.r.o.  
Čajkovského 21  
779 00 Olomouc  
Tel.: +420-585-716 111

**Denmark**

GRUNDFOS DK A/S  
Martin Bachs Vej 3  
DK-8850 Bjerringbro  
Tel.: +45-87 50 50 50  
Fax: +45-87 50 51 51  
E-mail: info\_GDK@grundfos.com  
www.grundfos.com/DK

**Estonia**

GRUNDFOS Pumps Eesti OÜ  
Peterburi tee 92G  
11415 Tallinn  
Tel.: + 372 606 1690  
Fax: + 372 606 1691

**Finland**

OY GRUNDFOS Pumput AB  
Trukkikuja 1  
FI-01360 Vantaa  
Tel.: +358-(0) 207 889 500

**France**

Pompes GRUNDFOS Distribution S.A.  
Parc d'Activités de Chesnes  
57, rue de Malacombe  
F-38290 St. Quentin Fallavier (Lyon)  
Tel.: +33-4 74 82 15 15  
Fax: +33-4 74 94 10 51

**Germany**

GRUNDFOS GMBH  
Schlüterstr. 33  
40699 Erkrath  
Tel.: +49-(0) 211 929 69-0  
Fax: +49-(0) 211 929 69-3799  
E-mail: infoservice@grundfos.de  
Service in Deutschland:  
kundendienst@grundfos.de

**Greece**

GRUNDFOS Hellas A.E.B.E.  
20th km. Athinon-Markopoulou Av.  
P.O. Box 71  
GR-19002 Peania  
Tel.: +0030-210-66 83 400  
Fax: +0030-210-66 46 273

**Hong Kong**

GRUNDFOS Pumps (Hong Kong) Ltd.  
Unit 1, Ground floor, Siu Wai industrial  
Centre  
29-33 Wing Hong Street & 68 King Lam  
Street, Cheung Sha Wan  
Kowloon  
Tel.: +852-27861706 / 27861741  
Fax: +852-27858664

**Hungary**

GRUNDFOS Hungária Kft.  
Tópark u. 8  
H-2045 Törökbalint  
Tel.: +36-23 511 110  
Fax: +36-23 511 111

**India**

GRUNDFOS Pumps india Private Limited  
118 Old Mahabalipuram Road  
Thoraiakkam  
Chennai 600 097  
Tel.: +91-44 2496 6800

**Indonesia**

PT GRUNDFOS Pompa  
Graha intirub Lt. 2 & 3  
Jln. Ciliitan Besar No.454, Makasar,  
Jakarta Timur  
ID-Jakarta 13650  
Tel.: +62 21-469-51900  
Fax: +62 21-460 6910 / 460 6901

**Ireland**

GRUNDFOS (Ireland) Ltd.  
Unit A, Merrywell Business Park  
Ballymount Road Lower  
Dublin 12  
Tel.: +353-1-4089 800  
Fax: +353-1-4089 830

**Italy**

GRUNDFOS Pompe Italia S.r.l.  
Via Gran Sasso 4  
I-20060 Truccazzano (Milano)  
Tel.: +39-02-95838112  
Fax: +39-02-95309290 / 95838461

**Japan**

GRUNDFOS Pumps K.K.  
1-2-3, Shin-Miyakoda, Kita-ku  
Hamamatsu  
431-2103 Japan  
Tel.: +81 53 428 4760  
Fax: +81 53 428 5005

**Korea**

GRUNDFOS Pumps Korea Ltd.  
6th Floor, Aju Building 679-5  
Yeoksam-dong, Kangnam-ku, 135-916  
Seoul, Korea  
Tel.: +82-2-5317 600  
Fax: +82-2-5633 725

**Latvia**

SIA GRUNDFOS Pumps Latvia  
 Deglava biznesa centrs  
 Augusta Deglava ielā 60  
 LV-1035, Rīga,  
 Tel.: + 371 714 9640, 7 149 641  
 Fax: + 371 914 9646

**Lithuania**

GRUNDFOS Pumps UAB  
 Smolensko g. 6  
 LT-03201 Vilnius  
 Tel.: + 370 52 395 430  
 Fax: + 370 52 395 431

**Malaysia**

GRUNDFOS Pumps Sdn. Bhd.  
 7 Jalan Peguam U1/25  
 Glenmarie Industrial Park  
 40150 Shah Alam, Selangor  
 Tel.: +60-3-5569 2922  
 Fax: +60-3-5569 2866

**Mexico**

Bombas GRUNDFOS de México  
 S.A. de C.V.  
 Boulevard TLC No. 15  
 Parque industrial Stiva Aeropuerto  
 Apodaca, N.L. 66600  
 Tel.: +52-81-8144 4000  
 Fax: +52-81-8144 4010

**Netherlands**

GRUNDFOS Netherlands  
 Veluwezoom 35  
 1326 AE Almere  
 Postbus 22015  
 1302 CA ALMERE  
 Tel.: +31-88-478 6336  
 Fax: +31-88-478 6332  
 E-mail: info\_gnl@grundfos.com

**New Zealand**

GRUNDFOS Pumps NZ Ltd.  
 17 Beatrice Tinsley Crescent  
 North Harbour Industrial Estate  
 Albany, Auckland  
 Tel.: +64-9-415 3240  
 Fax: +64-9-415 3250

**Norway**

GRUNDFOS Pumper A/S  
 Strømsveien 344  
 Postboks 235, Leirdal  
 N-1011 Oslo  
 Tel.: +47-22 90 47 00  
 Fax: +47-22 32 21 50

**Poland**

GRUNDFOS Pompy Sp. z o.o.  
 ul. Klonowa 23  
 Baranowo k. Poznania  
 PL-62-081 Przeźmierowo  
 Tel.: (+48-61) 650 13 00  
 Fax: (+48-61) 650 13 50

**Portugal**

Bombas GRUNDFOS Portugal, S.A.  
 Rua Calvet de Magalhães, 241  
 Apartado 1079  
 P-2770-153 Paço de Arcos  
 Tel.: +351-21-440 76 00  
 Fax: +351-21-440 76 90

**Romania**

GRUNDFOS Pompe România SRL  
 S-PARK BUSINESS CENTER, Clădirea  
 A2, etaj 2  
 Str. Tipografilor, Nr. 11-15, Sector 1, Cod  
 013714  
 Bucuresti, Romania  
 Tel.: 004 021 2004 100  
 E-mail: romania@grundfos.ro

**Russia**

ООО Грундфос Россия  
 ул. Школьная, 39-41  
 Москва, RU-109544, Russia  
 Тел. (+7) 495 564-88-00 (495) 737-30-00  
 Факс (+7) 495 564 8811  
 E-mail grundfos.moscow@grundfos.com

**Serbia**

Grundfos Srbija d.o.o.  
 Omladinskih brigada 90b  
 11070 Novi Beograd  
 Tel.: +381 11 2258 740  
 Fax: +381 11 2281 769  
 www.rs.grundfos.com

**Singapore**

GRUNDFOS (Singapore) Pte. Ltd.  
 25 Jalan Tukang  
 Singapore 619264  
 Tel.: +65-6681 9688  
 Fax: +65-6681 9689

**Slovakia**

GRUNDFOS s.r.o.  
 Prievozská 4D 821 09 BRATISLAVA  
 Tel.: +421 2 5020 1426  
 sk.grundfos.com

**Slovenia**

GRUNDFOS LJUBLJANA, d.o.o.  
 Leskoškova 9e, 1122 Ljubljana  
 Tel.: +386 (0) 1 568 06 10  
 Fax: +386 (0)1 568 06 19  
 E-mail: tehnika-si@grundfos.com

**South Africa**

GRUNDFOS (PTY) LTD  
 16 Lascelles Drive, Meadowbrook Estate  
 1609 Germiston, Johannesburg  
 Tel.: (+27) 10 248 6000  
 Fax: (+27) 10 248 6002  
 E-mail: lgradidge@grundfos.com

**Spain**

Bombas GRUNDFOS España S.A.  
 Camino de la Fuentequilla, s/n  
 E-28110 Algete (Madrid)  
 Tel.: +34-91-848 8800  
 Fax: +34-91-628 0465

**Sweden**

GRUNDFOS AB  
 Box 333 (Lunnagårdsgatan 6)  
 431 24 Mölndal  
 Tel.: +46 31 332 23 000  
 Fax: +46 31 331 94 60

**Switzerland**

GRUNDFOS Pumpen AG  
 Bruggacherstrasse 10  
 CH-8117 Fällanden/ZH  
 Tel.: +41-44-806 8111  
 Fax: +41-44-806 8115

**Taiwan**

GRUNDFOS Pumps (Taiwan) Ltd.  
 7 Floor, 219 Min-Chuan Road  
 Taichung, Taiwan, R.O.C.  
 Tel.: +886-4-2305 0868  
 Fax: +886-4-2305 0878

**Thailand**

GRUNDFOS (Thailand) Ltd.  
 92 Chaloeem Phrakiat Rama 9 Road  
 Dokmai, Pravej, Bangkok 10250  
 Tel.: +66-2-725 8999  
 Fax: +66-2-725 8998

**Turkey**

GRUNDFOS POMPA San. ve Tic. Ltd.  
 Sti.  
 Gebze Organize Sanayi Bölgesi  
 Ihsan dede Caddesi  
 2. yol 200. Sokak No, 204  
 41490 Gebze/ Kocaeli  
 Tel.: +90 - 262-679 7979  
 Fax: +90 - 262-679 7905  
 E-mail: satis@grundfos.com

**Ukraine**

ТОВ "ГРУНДФОС УКРАЇНА"  
 Бізнес Центр Європа  
 Столицне шосе, 103  
 м. Київ, 03131, Україна  
 Tel.: (+38 044) 237 04 00  
 Fax: (+38 044) 237 04 01  
 E-mail: ukraine@grundfos.com

**United Arab Emirates**

GRUNDFOS Gulf Distribution  
 P.O. Box 16768  
 Jebel Ali Free Zone, Dubai  
 Tel.: +971 4 8815 166  
 Fax: +971 4 8815 136

**United Kingdom**

GRUNDFOS Pumps Ltd.  
 Grovebury Road  
 Leighton Buzzard/Beds. LU7 4TL  
 Tel.: +44-1525-850000  
 Fax: +44-1525-850011

**U.S.A.**

GRUNDFOS Water Utility Headquarters  
 856 Koomey Road  
 Brookshire, Texas 77423 USA

**Uzbekistan**

Grundfos Tashkent, Uzbekistan  
 The Representative Office of Grundfos  
 Kazakhstan in Uzbekistan  
 38a, Oybek street, Tashkent  
 Tel.: (+998) 71 150 3290 / 71 150 3291  
 Fax: (+998) 71 150 3292

<b>96838602 02.2022</b>
-------------------------

ECM: 1324057
--------------