S pumps, ranges 72-74-78

S2, S3, S4, ST-55-520 kW

Installation and operating instructions

GRUNDFOS

S pumps, ranges 72-74-78

Original installation and operating instructions

Table of contents

1. General information

Read this document before installing the product. Installation and operation must comply with the 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, operating, safety 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.

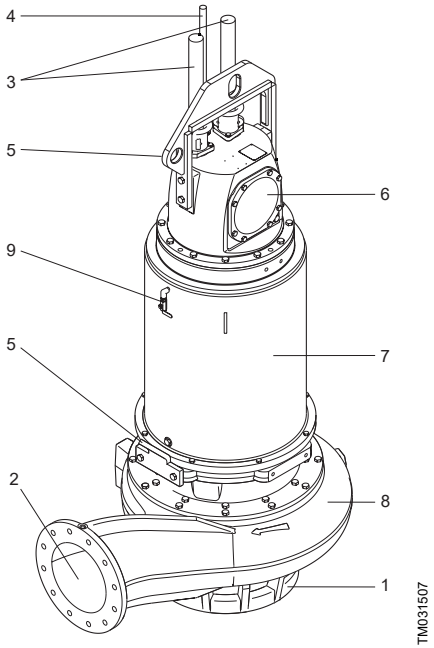
Tips and advice that make the work easier.

1.3 Target groups

These installation and operating instructions are intended for professional installers.

2. Product introduction

2.1 Product description



S pump, frame 72

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

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 ideal for transferring the following liquids:

- sewage
- wastewater.

2.4 Identification

2.4.1 Type key

All S pumps, ranges 72, 74 and 78, described in this manual 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: S2.90.250.2250.4.72S.C.496.G.N.D.513.Z

Code	Explanation	Designation
S	Sewage and wastewater pump	Pump type
ST	Multi-channel impeller pump installed in a column pipe	
2	2-channel impeller	Impeller type
3	3-channel impeller	
4	4-channel impeller	
90	Maximum solids size [mm]	Pump passage [mm]
250	Nominal diameter of the pump outlet	Pump outlet, S type [mm]
[ ]	Nominal diameter of the column pipe	Column diameter, ST type [mm]
2250	Output power, P2 P2 / 10	Output power [kW][1]
4	4-pole motor	Number of poles
6	6-pole motor	
8	8-pole motor	
10	10-pole motor	
12	12-pole motor	
14	14-pole motor	
72	Range 72	Pump range
74	Range 74	
78	Range 78	

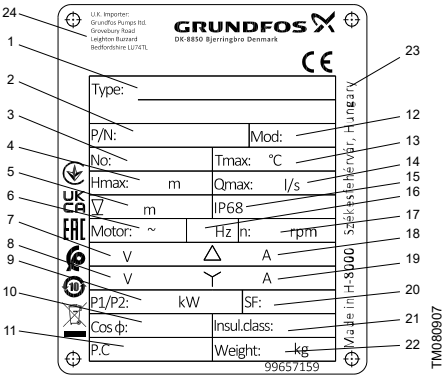
Code	Explanation	Designation
S	Super-high pressure	Pressure version
H	High pressure	
M	Middle pressure	
L	Low pressure	
E	Extra-low pressure	
F	Super-low pressure	
S	Submersible installation without cooling jacket	Installation
C	Submersible installation with cooling jacket	
D	Dry installation, vertical	
H	Dry installation, horizontal	
496	Impeller diameter (nominal)	Impeller diameter [mm]
G	Impeller, pump- and stator housing: cast iron	Material code for impeller, pump- and stator housing
Q	Impeller: stainless steel, DIN W.-Nr. 1.4408	
N	Non-explosion-proof version	Pump version
Ex	Pump with explosion-proof motor	
B	S pump with built-in SM 113 module.[2]	Sensor version
D	S pump without built-in SM 113 module	
5	50 Hz	Frequency [Hz]
6	60 Hz	

Code	Explanation	Designation
0H	3 x 400 V DOL	Voltage code and connection (50 Hz)
3	3 x 415 V DOL	
4	3 x 500 V DOL	
6	3 x 660 V DOL	
8	3 x 380-400 V DOL	
0B	3 x 400-415 V DOL	
0D	3 x 380-415 V DOL	
0G	3 x 380 V DOL	
0Q	3 x 690 V DOL	
1B	3 x 400-415/690 V Y/D	
1D	3 x 380-415/660-690 V Y/D	
1G	3 x 380-660 V Y/D	
1H	3 x 400/690 V Y/D	
13	3 x 415 V Y/D	
14	3 x 500 V Y/D	
18	3 x 380-400/660-690 V Y/D	
0H	3 x 460 V DOL	Voltage code and connection (60 Hz)
4	3 x 575-600 V DOL	
5	3 x 380 V DOL	
8	3 x 460-480 V DOL	
0R	3 x 480 V DOL	
0S	3 x 660 V DOL	
1H	3 x 380-660 V Y/D	
14	3 x 575-600 V Y/D	
15	3 x 380-660 V Y/D	
18	3 x 460-480 V Y/D	
58	3 x 575 V Y/D	
Z	Custom-built products	Customisation

[1] Standard range: 57-460 kW.
50 Hz DIN version: 90-520 kW.
60 Hz DIN version: 90-560 kW
Standard range: 168-617 hp.
60 Hz ANSI version: 140-750 hp

[2] PTC sensors are connected directly to IO 113 or other PTC relay.

2.4.2 Nameplate



Pump nameplate

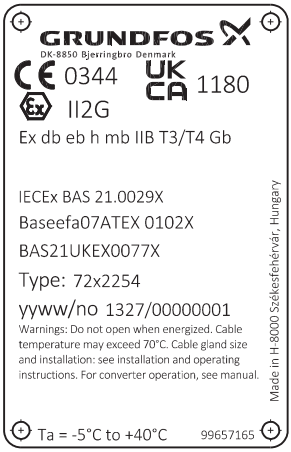
Pos.	Description
1	Type designation
2	Product number
3	Serial number
4	Maximum head [m]
5	Maximum installation depth [m]
6	Number of phases
7	Rated voltage, delta connection
8	Rated voltage, star connection
9	Rated power input / output [kW]
10	Cos φ, 1/1 load
11	Production code, year and week
12	Production number
13	Maximum liquid temperature [°C]
14	Maximum flow rate [l/s]
15	Enclosure class
16	Frequency [Hz]
17	Rated speed
18	Rated current, delta connection
19	Rated 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

The product ranges 74 and 78 are approved according to IEC 60079-0 and IEC 60079-1, certificate number is IECEx FMG 18.0009X.

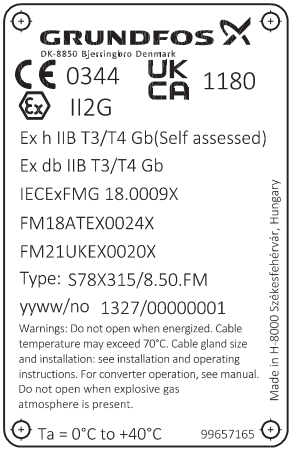
The product range 72 is approved according to IEC 60079-0 and IEC 60079-1, certificate number is IECEx BAS 21.0029X.

2.5.1 Ex approval plates



TM080581

Approval plate of range 72 explosion-proof pumps, T3 and T4 classification



TM080582

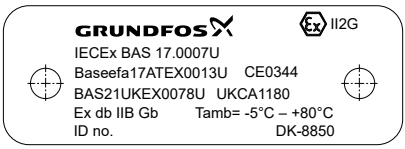
Approval plate of range 74 and 78 explosion-proof pumps

The approval plates provide the following details:

Ex	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 enclosure
IIB	Gas group (ethylene)
T3	Maximum surface temperature of the motor is 200 °C*.
T4	Maximum surface temperature of the motor is 135 °C.
Gb	Equipment protection level, zone 1

* For pumps operated by a frequency converter, the maximum surface temperature must not exceed T3 temperature class (200 °C).

2.5.2 Cable entry approval plate



Cable entry approval plate

The cable entry approval plate provides the following details:

Pos.	Description
	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)
T_{amb}	Ambient temperature
Gb	Equipment protection level, zone 1
ID no	Cable entry identification number (e.g. 36-1)
DK-8850	Country, postcode (Denmark, Bjerringbro)

2.6 Potentially explosive environments

In potentially explosive environments, use only Ex-approved pumps. S pumps are available with the following Ex approvals:

Range	Approval	
	ATEX/UKEX	IECEx
72	●	●
74-78	●	●

Ex pumps can be used in hazardous areas classified as Zone 1 or Zone 2.

Special conditions for safe use of explosion-proof pumps:

1. Make sure the moisture switches, water-in-oil (WIO) sensor and thermal switches are connected in 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 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 the 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. Use two independent stop level switches to avoid hazardous situations.
6. Dry-running is not allowed.
7. Make sure the permanently attached cables are mechanically protected and terminated in a suitable terminal board.
8. The sewage pumps have an ambient temperature range of -5 to +40 °C (S72) or 0-40 °C (S74-78) and a maximum operating temperature of 40 °C. The minimum ambient temperature for a pump with a WIO sensor is 0 °C.
9. If a WIO sensor is installed, the control unit must protect it against short circuit current. The maximum current from the control unit must be limited to 350 mA.
10. The maximum submersion depth is 20 m.
11. The customer must inform Grundfos if the pump has been exposed to any harmful external effects or aggressive substances.
12. Dry installed pumps often have a higher temperature at the cable entries than submerged ones. This may reduce the lifetime 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.
13. For the level monitoring system, it is a user responsibility to comply with the requirements of part 'b' of EN ISO 80079-37.
14. To prevent potential electrostatic discharges from the pumped liquid, make sure to comply with CLC/TR 60079-32-1.
15. The thermal protection of the stator windings is rated for a 150 °C cut-out temperature, ensuring the disconnection of the power supply. The power supply must be reset manually.
16. Thermal protectors inside the pump are critical to limit the surface temperature. Follow the electrical connection instructions to avoid hazardous situations. The thermal protection of the motor is ensured through a 150 °C thermistor or a 150 °C thermal switch per phase in the stator winding. The protection circuit is set to limit the stator temperature to 150 °C. In this arrangement, the temperature classification is T3.
17. The temperature class for the product is T4 (135 °C). T3 temperature class applies only when a frequency converter is used. The motor can be connected to a non-sinusoidal and/or variable frequency power supply with a maximum frequency of 60 Hz.
18. For painted pumps, minimise the risk of electrostatic discharge in the following way:
    - Earthing is mandatory.
    - In dry installations, keep safety distance between pumps and walking paths.
    - Use wet fabric for cleaning.
19. The WIO sensor must always be completely submerged in the oil if the power is on.

DANGER
Explosive environment
Death or serious personal injury
- Make sure the cable entries are not damaged to avoid sparks that may cause explosion.

Special conditions for safe use of WIO sensor:

1. The control unit must protect the sensor against short-circuit currents.
2. When installing the WIO sensor, make sure it is not exposed to mechanical impact.
3. The WIO sensor must not be used in oil with spontaneous ignition temperature below 225 °C.
4. The WIO sensor is approved according to EN 60079-0, EN 60079-7, EN 60079-18 and IEC 60079-0, IEC 60079-18, IEC 6 0079-7. In ATEX, UKEX and IECEx applications, the maximum current supplied to the sensor must be limited to 350 mA according to EN/IEC 60079-18 and 60079-0.
5. The WIO sensor must be used with a galvanically isolated circuit.

2.7 Applications

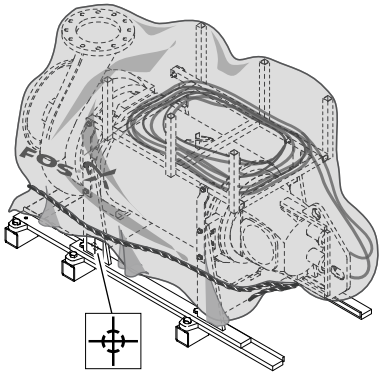
Depending on the installation type, the pumps can be used for submerged or dry, horizontal or vertical installation.

Maximum solids size: 90-145 mm, depending on the impeller type.

3. Receiving the product

3.1 Transporting the product

The pump is supplied from the factory on a steel transport stand in a horizontal position. The pump and stand are protected by a special cover.



Covered pump on a transport stand

Keep the transport stand in storage for later use.

Keep the cable end protectors in storage for later use.

3.2 Handling and lifting the product

S pumps weigh up to 8100 kg without accessories.

It is, therefore, crucial to use the right lifting equipment.

The pump weight is stated on the nameplate.

Always use CE marked or locally accepted 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 the marked lifting points or a forklift truck.

DANGER
Crushing hazard
Death or serious personal injury

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

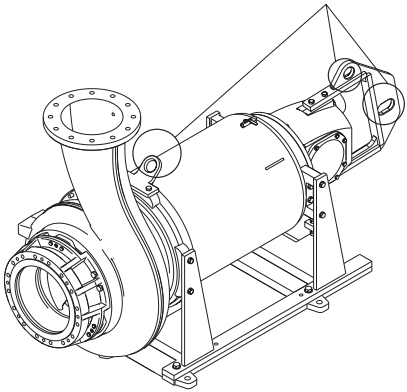
DANGER
Electric shock
Death or serious personal injury

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

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

If the pump is tilted more than 10° in any direction from its normal position (EN 809, 5.2.1.4), the pump may lose its stability.

3.2.1 Lifting points



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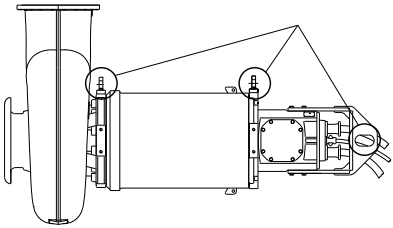
Lifting points on pump, range 72



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Lifting points on pumps, range 74 and 78

Always lift ST pumps by the lifting bracket to make sure the pump is balanced.

The design of the lifting bracket may differ from the one in the drawing. It does not affect the handling of the product.

Raising the pump to vertical position

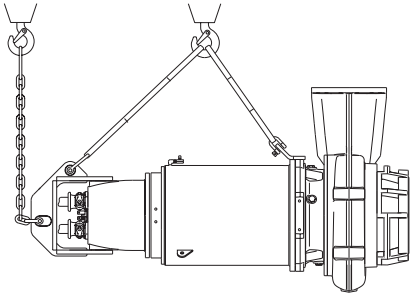
DANGER
Crushing hazard
Death or serious personal injury

- Make sure that the lifting bracket is tightened before lifting the pump.

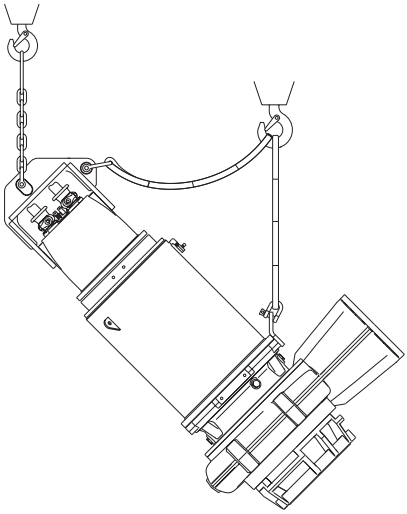
DANGER
Crushing hazard
Death or serious personal injury

- 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 when the pump is unbalanced.

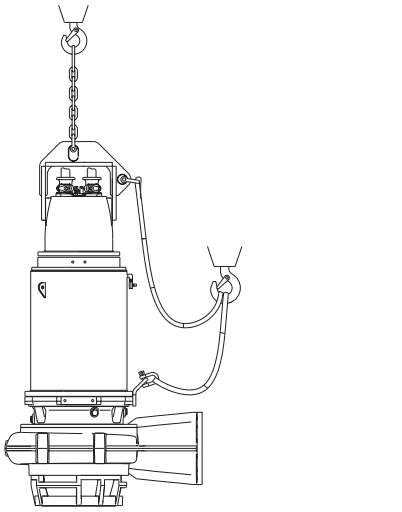
Carelessness during lifting or transport may cause personal injury or damage to the pump.



Raising the pump to vertical position, step 1



Raising the pump to vertical position, step 2



Raising the pump to vertical position, step 3

4. Installing the product

S pumps are designed for various installation types.

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	Base stand for vertical installation
H	Sewage pump with cooling jacket for dry horizontal installation	Base plate for horizontal installation
ST	Sewage pump without cooling jacket for installation in column pipe	Seat ring

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

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

Work in or near pits must comply with 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 potentially explosive.

DANGER
Crushing hazard
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 toxic and/or contagious substances. Therefore, all persons must wear appropriate personal protective equipment and clothing, and all work on and near the pump must comply with the hygiene regulations in force.

WARNING
Crushing hazard
Death or serious personal injury
- Make sure 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.

4.1 Mechanical installation

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

Observe all safety regulations at the installation site.

Prior to installation, check the oil level in the oil chamber.

DANGER
Electric shock
Death or serious personal injury
- Before installation, switch off the power supply and lock the main 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.

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 switch is locked in position 0.
- Make sure that the power supply cannot be switched on unintentionally.

Always use Grundfos accessories to ensure correct functioning.

If the installation has to be tested at a pressure higher than 1.3 times the maximum pump head, isolate the pump from the installation before the test to avoid damage to the pump.

4.2 Foundation

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

- The foundation and concrete must be adequate to support the weight of the pump, including accessories, the weight of the liquid passing through the pump and the forces generated by the pump.
- The mass of the concrete foundation must be a minimum of three to five times the mass of the supported equipment and must have sufficient rigidity to withstand the axial, transverse and torsional loadings generated by the pump.
- The foundation must be 15 cm wider than the base plate or base stand for pumps up to 350 kW and 25 cm wider for larger pumps.
- The concrete used in the foundation must have a minimum tensile strength of 250 N/cm^2 .
- Always use epoxy grout to fasten the pump base plate to the foundation.

Pull-out strengths for anchor bolts

Installation type H and D.

Dry installation	Bolts	Pull-out strength [kN]
DN 400	6 x M24	25
DN 500		
DN 600		
DN 800		

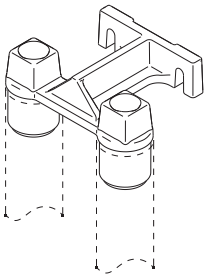
The pull-out strengths stated are without safety factor. The required safety factor may depend on the materials and the methods used for anchoring.

4.3 Mounting the product

4.3.1 Installation on auto coupling

Lowering the pump onto auto coupling

The pump can easily be pulled out of and lowered into the pit by the guide rails. The stop level is lower for installation type C than for installation type S. See fig. *Stop levels for auto-coupling installations*.



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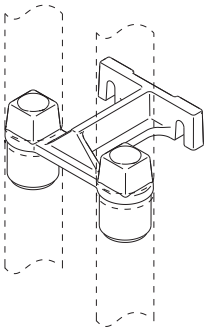
Upper guide-rail bracket



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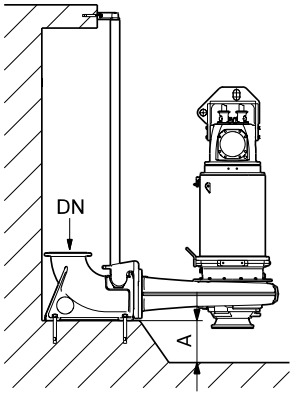
Intermediate guide-rail bracket

Correct plinth height for installation on auto coupling is important to obtain the best efficiency of the pump.



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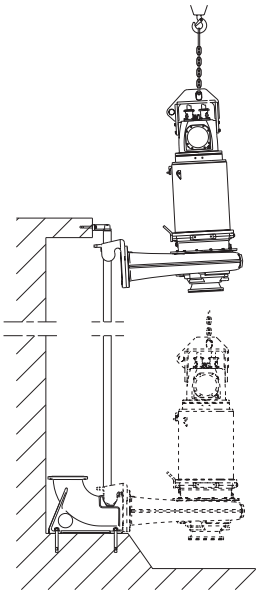
Auto-coupling base unit installation on a plinth

The minimum required plinth heights (A) for installation on auto coupling are indicated in the following table.

Pump type	Minimum plinth height (A) [mm]
Range 72	
S2.90.250.xxxx.x.x	375
S2.100.250.xxxx.x.x	375
S2.100.300.xxxx.x.x	400
S3.110.300.xxxx.x.x	400
S3.120.500.xxxx.x.x	425
S3.135.500.xxxx.x.x	425
S3.140.600.xxxx.x.x	425
Range 74	
S2.90.xx.xxx.xxxx.x.x	400
S2.100.xxx.xxx.xxxx.x.x	400
S3.110.xxx.xxx.xxxx.x.x	400
S3.120.xxx.xxx.xxxx.x.x	425
S3.135.xxx.xxx.xxxx.x.x	425
Range 78	
Pressure class E, L, M, H	425
Pressure class F	0

Required tilt angle when the pump is lowered onto the auto coupling: ± 5°.



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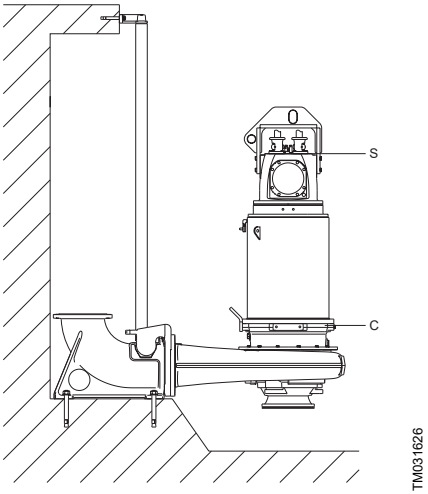
Lowering the pump onto an auto coupling

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 at the end of this section. To ensure adequate pull-out strength, weld the threaded bushings to the steel reinforcement in the concrete.

For auto-coupling installations, types S and C, the guide claw is mounted on the outlet flange from the factory.



Permanent installation in a pit, installation type S and C

Proceed as follows:

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. If the bottom of the pit is uneven, the auto-coupling base unit must be supported. Use a plumb line to establish the correct positioning. Fasten the auto coupling with expansion bolts.
3. Connect the outlet pipe in accordance with the generally accepted procedures. Avoid exposing the pipe to distortion or tension. Do not allow loads from the weight of the pipes to be carried by the auto coupling.
4. Fit the guide rails. An intermediate guide-rail bracket is required if guide rails are longer than 6 m. 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 debris from the pit before lowering the pump into it.
6. Before lowering the pump into the wet pit, check the cables for cuts or ruptures.
7. Slide the guide claw 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, the pump automatically connects.
8. Hang up the end of the chain on a suitable hook at the top of the pit. Make sure that the chain is straight but not strained.
9. Adjust the length of the power cable by coiling it up on a relief fitting to ensure that the cable is not damaged during operation. Fasten the relief fitting to a suitable hook at the top of the pit. Fix the cables at the top of the pit to avoid extra cable sliding into the pit. Make sure that the cables are not sharply bent or pinched. Make sure to have enough cable length to be able to make service on the pump.
10. Connect the power- and control cables.

Avoid pipe tension at flanges and bolts.

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

Pull-out strengths for anchor bolts

Auto-coupling base unit	Bolts	Pull-out strength [kN]
DN 250	4 x M24	30
DN 300	4 x M24	40
DN 500	6 x M30	40
DN 600	6 x M30	40
DN 800	6 x M30	20

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

Related information

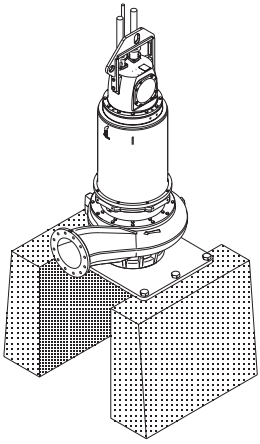
6.2.1 Start and stop levels for auto-coupling installations

4.3.2 Dry installation

Install pumps in dry installation permanently in a pump room.

The pump motor is enclosed and watertight and will not be damaged if the installation site is flooded with water.

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

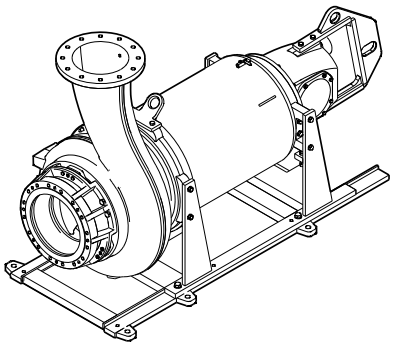


TM031629

Permanent vertical dry installation, installation type D

The dry-installed pumps are bolted to the inlet and outlet pipes by flange connections. See dimensions in product-specific drawings.

For horizontal, dry installations, type H, the pump is mounted on a base plate from the factory.



TM031498

Permanent horizontal dry installation, installation type H

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

Proceed as follows:

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 at the end of this section.
3. Check that the base plate or base stand is horizontal or vertical.
4. Fasten the pump to the base plate or base stand.

   To facilitate service on the pump, fit isolating valves on either side of the pump.
5. Fit the inlet and outlet pipes and isolating valves, if used, and ensure that the pump is not stressed by the pipes.
6. Adjust the length of the power 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 to be able to make service on the pump. Fasten the relief fitting to a suitable hook. Make sure that the cables are not sharply bent or pinched.
7. Connect the power- and control cables according to the wiring diagrams.

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.

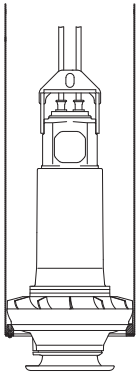
Make sure that the pipes are installed without the use of undue force. Do not allow loads from the weight of the pipes to be carried by the pump. Use loose flanges to ease the installation and to avoid pipe tension at flanges and bolts.

Do not use elastic elements or bellows in the pipes. Never use these elements to align the pipes.

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

4.3.3 Column pipe installation

For this installation type, pumps are installed permanently in a column pipe. Grundfos does not supply the column pipe. For column-pipe dimensions, see the pump-specific dimensional drawings.

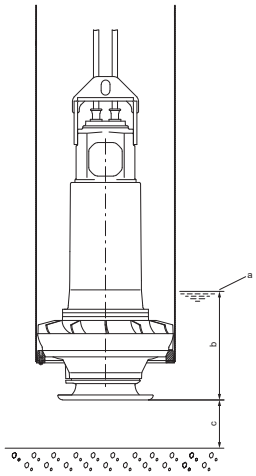


TM046899

Submerged installation in column pipe, installation type ST

Proceed as follows:

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, make sure the cables are not damaged.
4. Lower the pump into the column pipe by a certified chain secured to the lifting bracket. The pump lays on the conical surface of the seat ring. The friction between the conical surfaces prevents the pump from rotating. As an additional precaution, there are three guide pins on the seat ring which limit the possible rotation to a maximum of 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 to make service on the pump. Make sure that the cables are not sharply bent or pinched. Fix the cables and make sure there is no extra slack inside the column pipe. In case of long column pipes, it may be necessary to arrange cable support for the cables inside the column pipe. For further information, contact Grundfos.
7. Connect the power- and control cables.



TM046908

Column pipe installation, pump type ST

Pos.	Description
b	72 and 74: 900 mm
	78: 1100 mm
c	All: 400 mm

4.4 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 to comply 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.

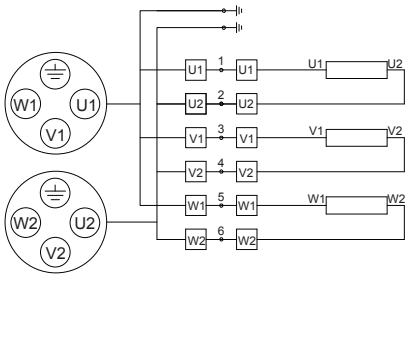
Connect pumps installed in hazardous locations to a control box with a motor protection relay with an IEC trip class 10.

The motor is effectively earthed through 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.

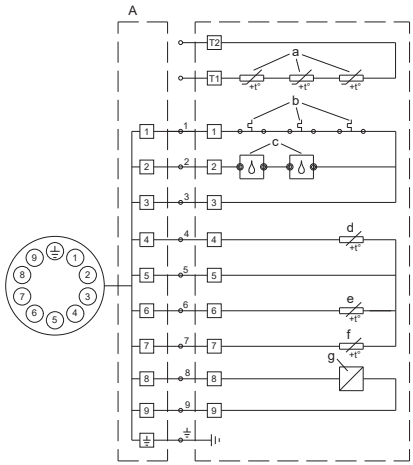
4.4.1 Wiring diagrams

Standard power cables



Wiring diagram for standard power cables

Sensor



Wiring diagram for sensors

Pos.	Description
A	Terminal board connection
a	Thermistors
b	Thermal switches
c	Moisture switches

Pos.	Description
d	Pt100 in upper bearing
e	Pt100 in stator
f	Pt100 in lower bearing
g	Oil indicator 4-20 mA

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

4.5 Frequency converter operation

If the motor is operated by a frequency converter, the temperature class of the 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 occur during the use of 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.
- The minimum 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 frequency allowed 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 can 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/µ 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 a 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 and 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, through conductors 4 to 9, or connected to the sensor board, sensor version B, and led out of the motor through 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

Suitable level controllers:

- LC 231: compact solution with certified motor protection for single- and dual-pump versions.
- LC 241: cabinet solution offering modularity and customisation for single- and dual-pump versions.

In the following description, "level switches" can be air bells, float switches or electrodes depending on the selected pump controller.

Depending on the security levels and the number of pumps, level switches can be used in the following settings:

- Dry run (optional)
- Stop
- Start pump 1 (single-pump version)
- Start pump 2 (dual-pump version)
- High level (optional).

Analog level transmitters can be used, and all levels can be customised. Level switches can be used with level transmitters, for dry-run protection and high-level alarm.

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

IO 113 is capable of the following as standard:

- protect the pump against overheating
- monitor the status of:
  - motor winding temperature
  - leakage through WIO sensor
  - moisture in the pump.
- measure the stator insulation resistance.
- stop the pump in case of alarm
- remotely monitor the pump through 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.

5.3.1 Galvanic separation

Double-insulated sensors for all measurements ensure electrical safety. Furthermore, a galvanic separation is incorporated inside the IO 113.

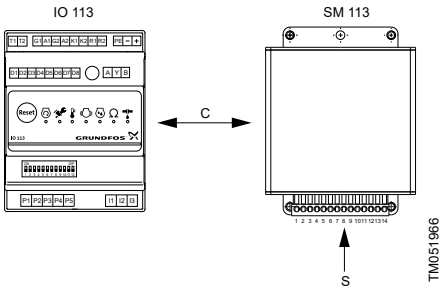
5.3.2 Measurement of insulation resistance

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

- Resistance above 10 megaohms is appropriate.
- Resistance between 10 and 1 megaohms 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 together with IO 113 with a communication module, product number 98097390. See the figure 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 **/ Pt1000 *** thermal sensors.

* Vibration sensor, water-in-oil (WIO) or water-in-air (WIA) sensor

** Maximum three Pt100 sensors

*** Maximum four Pt1000 sensors.

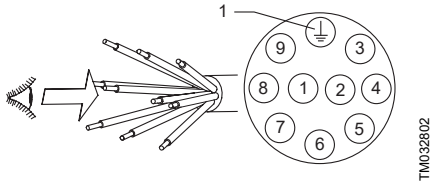
5.5 Switches and sensors

Do not let the pump run dry.

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

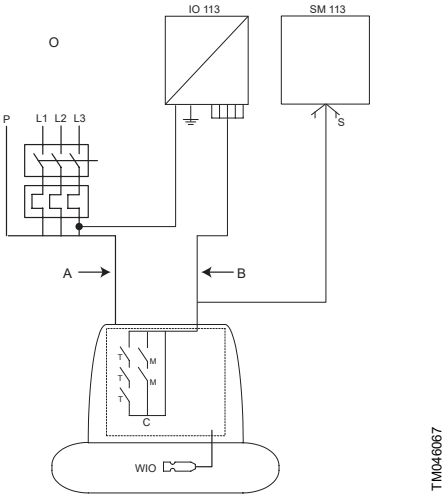
A pump includes the following switches and sensors:

- three thermal switches in the stator windings
- a moisture switch in the top cover
- a moisture switch in the stator housing
- three thermal protectors in the stator housing:
  - an analog Pt100 sensor in the stator winding
  - an analog Pt100 sensor in the upper bearing
  - an analog Pt100 sensor in the lower bearing
- an analog WIO sensor in the oil chamber.



Control cable

Pos.	Description
1	Yellow and green



Sensor connections, SM 113 outside the motor

Symbol	Description
O	Analog and digital outputs
A	Power side
B	Signal side
WIO	WIO sensor, "eb" and "mb" approval
C	"db" enclosure
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 enclosure
"eb"	WIO sensor protection by increased safety

5.5.1 Thermal switches

The thermal protection against overheating is ensured with bimetallic switches as standard or thermistors as optional. The three thermal switches are hardwired from the pump to the IO 113 or a similar controller. They 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 the IO 113, and the alarm relay opens.

The switching current for the thermal switch is 0,5 A at cos φ 0.6.

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

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

5.5.2 Moisture switch

The pumps have two moisture switches, one below the motor top cover and one in the stator housing. The moisture switches are irreversible and must be replaced if activated.

The moisture switches are hardwired from the pump to the 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 the IO 113, and the alarm relay opens.

The switching current on the moisture switch is 6 A.

5.5.3 Pt100

The pumps are equipped with Pt100 sensors in the stator windings, in the upper- and the lower bearing bracket.

Pt100 makes an analog measurement from 0-180 °C.

The value is measured by SM 113 and transferred to IO 113 through serial communication.

If the pump does not have an SM 113, hardwire the Pt100 sensors out of the pump and connect them to an external unit. If the pump has an SM 113, connect the Pt100 sensors to the SM 113. An external unit is not required.

The maximum alarm temperatures are indicated in the table below:

Pump range	Alarm temperatures		
	Winding temperature [°C]	Upper bearing [°C]	Lower bearing [°C]
72	150	120	100
74	150	120	120
78	150	120	120

5.5.4 WIO sensor

All Ex pumps must be factory-fitted with an internal 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 insufficient in the oil chamber.

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

The oil chamber is filled with oil acting as lubricant and 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.

Check the WIO sensor regularly.

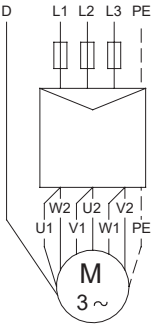
More detailed information can be found in the installation and operation instructions, 96591899, or in Grundfos Product Center at www.grundfos.com.

6. Starting up the product

The pump can be started either direct-on-line (DOL) or star-delta (Y/D). The selection of starting method depends on usage and main supply conditions.

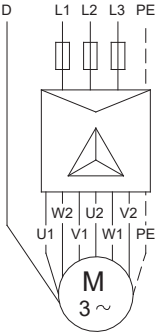
In case of star-delta starting, keep the switching transient time at a minimum to avoid high transient torques.

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



TM051638

Direct-on-line starting



TM051639

Star-delta starting

Pos.	Description
D	Control cable

Related information

4.4.1 Wiring diagrams

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 the pumped liquid during operation.

6.2 Level of pumped liquid

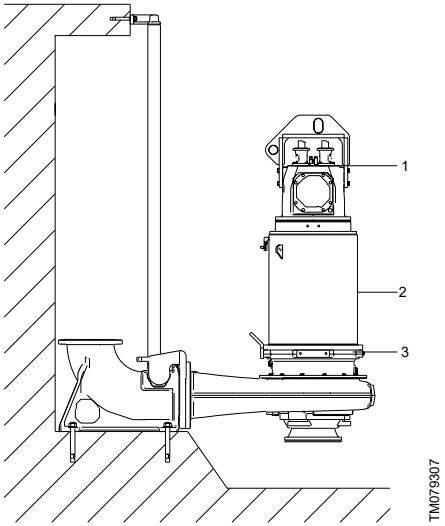
An Ex motor without a cooling jacket (installation types S and ST) must be completely submerged during operation.

Install an additional level switch to ensure that the pump is stopped in case 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:** For continuous operation, S1, the pump must always be covered by the pumped liquid to the top of the motor. See fig. *Liquid levels*.
- **Installation type C:** The pump housing must always be covered by the pumped liquid.

For installation type C, the vent valve must always be open.



Liquid levels

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

- **Installation types D and H:**

  During operation, the cooling jacket must be filled with the pumped liquid to ensure sufficient cooling. Before the first startup and after long standstill periods, the air must be ventilated from the cooling jacket through an air-vent valve.

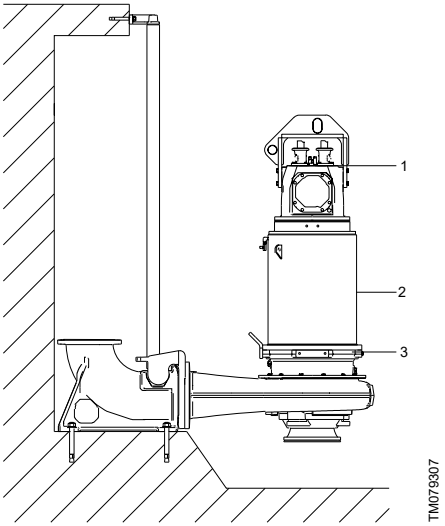
- **Installation type ST:** The liquid level must be at least 900-1100 mm above the pump inlet.

6.2.1 Start and stop levels for auto-coupling installations

The start and stop levels are specified during the design stage. Always check that the start and stop levels are functioning and possibly alter them when starting up the pump to ensure proper operation.

Stop levels

Set the stop level according to the figure below.



Stop levels for auto-coupling installations

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

Ex pumps without a cooling jacket must always be completely submerged.

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 increases towards the end of the working cycle. In pits with several different stop levels, such as in frequency-controlled installations, 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 inlet. The lowest level cannot always be predicted but must be confirmed through tests during startup.

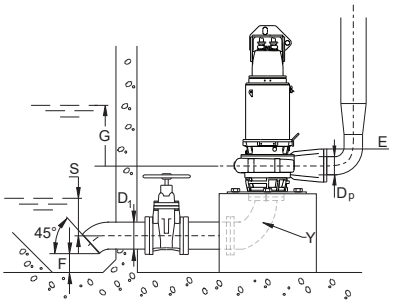
6.2.2 Start and stop levels for dry installations

Stop levels

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

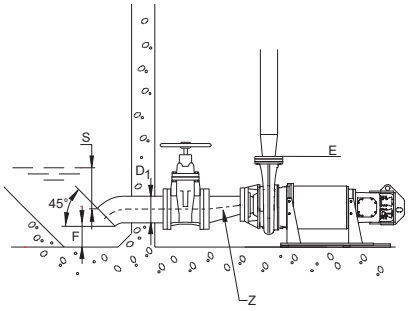
Start levels

In pits with dry-installed pumps, set the starting level above the pump housing to ensure that the cooling jacket is filled up before the pump starts. For vertical pumps, this height may be considerable and must be set with a margin.



Vertical, dry installation (D)

Horizontal pumps do not require special considerations for the start level if the inlet pipe is designed to prevent air pockets from forming.



Horizontal, dry installation (H)

Minimum stop level	$S = D_1$
Minimum distance between the bottom of the 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 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.

6.3 Checking the direction of rotation

Only start and run an unsubmerged pump 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 by 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 counterclockwise, the direction of rotation is correct.

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

Installation types D and H

Check the duty point to determine the direction of rotation.

6.4 Start up

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.
3. Check that the impeller can rotate freely.
4. Check the monitoring units, if used, are operating appropriately.
5. Open the isolating valves, if fitted.
6. **Pumps in installation types S and C:** Make sure that the pump is properly connected to the auto coupling.
7. Make sure that the pump is submerged in the liquid.
8. **Pumps in installation types D and H:** Make sure that there is liquid in the pit and the pump housing and cooling jacket are filled with water. Open the vent valve on the top of the cooling jacket before or during the startup until water comes out of the valve. Close the valve.

   Pumps in installation type C: The vent valve must always be open. Check the setting of the level switches.

   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 pump 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, establish the actual duty point as accurately as possible.

Always operate the pump in accordance with established routines with scheduled checks of the pump monitoring equipment and accessories. Make sure that the pump and equipment settings cannot be changed by unauthorised persons.

7. Handling and storing the product

7.1 Handling the product

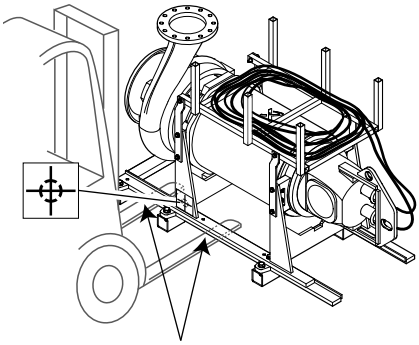
DANGER
Crushing hazard
Death or serious personal injury

- 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.

The pump is equipped with a label indicating the centre of gravity of the pump including installation and transport accessories. The position of the label varies depending on the pump type and the accessories.

TM046728

Symbol for the centre of gravity



TM033365

Transport stand with cable holders

7.2 Storing the product

Leave the cable end protectors and the control cables on the power until the electrical connection is made. The free cable ends must never be exposed to moisture or water.

Neglecting this may cause damage to the motor.

For long periods of storage (six months or longer), the pump must be protected against moisture and heat.

If the pump is being stored for more than two months, turn the impeller by hand at least every two months to prevent the seal faces of the lower mechanical shaft seal from seizing up.

Neglecting this may cause damage to the shaft seal when the pump is started.

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 pump.

After a long period of storage (six months or longer), inspect the pump before putting it into operation. Make sure that 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
Crushing hazard
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.

8.2 Maintenance schedule

Inspect pumps running normal operation once a year.

Check the following:

- **Power consumption**
- **WIO sensor**
- **Oil level and oil condition**
- **Cable entries** Make sure that 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 usually 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 a 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 can 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 or 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 the oil chamber	Perform the test when the oil chamber is empty.
4-10 mA	Normal operation	Perform the test when the oil chamber is full.
> 10 mA	Water in oil, possible leakage	Check the seals for possible leakage.

8.3 Oil check and change

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

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

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.

Low oil level may indicate that the upper mechanical shaft seal is defective. Contact an authorised service workshop for further maintenance 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 insufficient in the oil chamber.

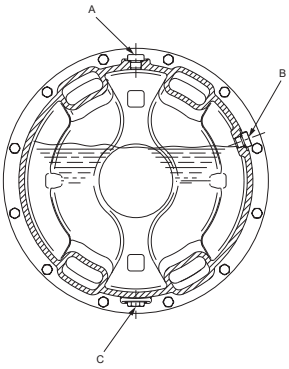
Range	Oil quantity		
	Installation type		
	S [litres]	C and D [litres]	ST [litres]
72	25	18.5	25
74	-	20	25
78	-	80	80

The oil in the oil chamber can be changed when the pump is either in a horizontal or vertical position. It is recommended, however; to carry out the oil change when the pump is in a horizontal position as it is much easier to drain all the used oil from the chamber.

Horizontal position

Proceed as follows:

1. Place the pump with the inspection screw A is pointing upwards.



TM031628

Pump with inspection screw A upwards

CAUTION
Pressurised system
Minor or moderate personal injury

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

2. Loosen and remove screw A.
3. Remove screw B and check the oil level.
4. Take an oil sample to inspect the condition of the oil. If the oil is greyish white, it contains water. In normal operation, a small leakage through the mechanical shaft seals is expected. If the water content in the oil is high, the shaft seal may be defective. Change the oil if it contains water. 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.

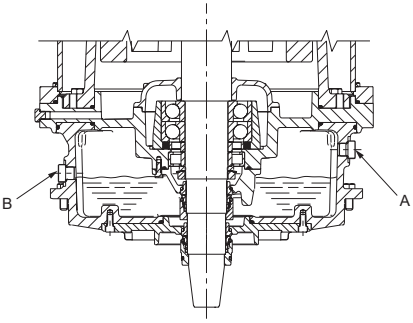
Used oil must be disposed of in accordance with local regulations.

7. 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 securely.

Vertical position

Proceed as follows:

1. Identify the screws A, B and C and their positions relative to each other. See fig. *Pump with inspection screw A upwards*.



TM046924

Correct oil level of vertical pump

2. Use screw B for indication of the oil level in the oil chamber. See fig. *Correct oil level of vertical pump*.
3. 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.
4. Pump out the oil using all the screw holes in turns to reach all sections of the interior of the oil chamber. Collect the drained oil in a clean container.
5. 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 securely.

8.4 Inspection and adjustment of the impeller clearance

The correct axial clearance is 0.7 mm ± 0.2 mm for S 72 and 1.3 mm ± 0.2 mm for S 74-78. Reset the clearance if it is 2.0 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

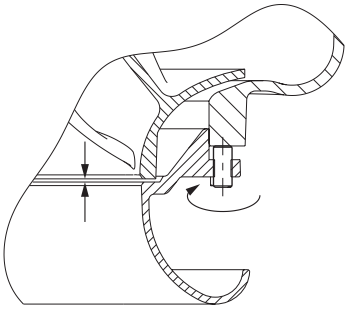
Submersible pumps have a separate, adjustable pump inlet cover which may be shaped as an inlet bell. Locate the six fastening screws of the inlet cover and the three set screws.

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, installation types S, C and ST*.

DANGER
Crushing hazard
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.

1. Loosen all fastening screws and set screws between the inlet cover and the pump housing.
2. Use a hammer to tap at the inlet cover and close the clearance.
3. Open the clearance to the specified value by turning the three set screws.
4. Check that the clearance is even around the perimeter of the inlet opening.
5. Tighten the fastening screws and check that the clearance is still even.
6. Turn the impeller by hand and check at several points.



Impeller clearance, installation types S, C and ST

8.4.2 Dry-installed pumps, installation types D and H

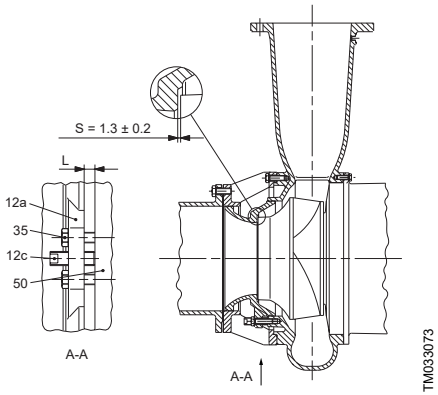
The impeller clearance can be inspected and set with the pump installed on the pump stand and connected to the pipes.

In these pumps, the inlet cover is located between the pump housing and the outer connection flange at the inlet side of the pump.

Depending on the construction, there are two ways to set the impeller clearance.

Method 1

Pump types
Ranges 72 and 74
S2.90.xxx.xxxx.x.xxx.
S2.100.xxx.xxxx.x.xxx.
S3.135.600.xxxx.x.xxx.
Range 78
S3.115.xxx.xxxx.x.xxx.
S3.130.xxx.xxxx.x.xxx.
S3.145.xxx.xxxx.x.xxx.
S4.135.xxx.xxxx.x.xxx.



Impeller clearance, installation types D and H, method 1

These pump types have threaded holes for the fastening screws (35) of the inlet cover (12a) in the pump housing (50). Set the impeller clearance as follows:

1. Loosen the three set screws (12c) and close the impeller clearance "S" by tightening the six fastening screws (35) diagonally to move the inlet cover evenly.

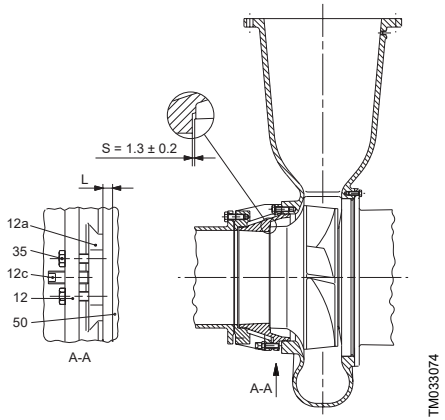
   Do not use undue force when tightening the fastening screws as this may damage the bearings. The movement is usually 1 to 3 mm.

2. Measure the distance "L" between the inlet cover and the pump housing at three points next to the set screws, using feeler gauges or calipers, then note the distance.

3. Loosen the fastening screws and draw back the inlet cover by 1.3 mm ± 0.2 mm using the three set screws (approximately one 150° turn with an M27 set screw) and the distance "L" as reference.
4. Tighten all fastening screws and check that the distance "L" at the three reference points is stable at the new value.

Method 2

Pump types
Ranges 72 and 74
S3.110.xxx.xxxx.x.xxx.
S3.120.xxx.xxxx.x.xxx.
S3.135.500.xxxx.x.xxx.



Impeller clearance, installation type D and H, method 2

These pump types have threaded holes in the inlet cover (12a) for the fastening screws (35). Set the impeller clearance as follows:

1. Loosen the six fastening screws (35) and close the impeller clearance "S" by tightening the three set screws (12c). Tighten the screws diagonally to move the inlet cover evenly.

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

2. Measure the distance "L" between the inlet cover and the 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 by 1.3 mm ± 0.2 mm using the six fastening screws (approximately one 270° turn of an M12 fastening screw) and the distance "L" as reference.
4. Tighten all set screws and check that the distance "L" at the three reference points is stable at the new value.

8.5 Pump cleaning and inspection

Clean the pumps regularly. Lift the pumps out of the wet pit and clean them on site. Hose down the pump externally with a high-pressure jet cleaner at a maximum of 100 bar. Remove caked dirt from the motor to ensure proper heat conductivity. A mild detergent approved for disposal into the sewage system may be used. The pumps may be scrubbed with a soft brush, if necessary.

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 power cables and cable entries are not damaged.
- Check that 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 after cleaning.

8.6 Power cables

Use manufacturer-approved and suitable cables only.

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:

Cable type	Cable size	Minimum bending radius [cm]
Power cables	4 x 70 mm^2	27
	4 x 95 mm^2	31
	4 x 120 mm^2	34
	4 x 150 mm^2	38
	4 x 185 mm^2	42
Control cable	10 x 1.5 mm^2	12
	18 x 1.5 mm^2	25

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.

If a pump is used for a toxic or contagious liquid, it is classified as contaminated.

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 safety instructions.

Fault	Cause	Remedy
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, 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 are 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 is tripped and the pump needs service. Contact an authorised service workshop.
	The impeller is jammed by impurities.	Clean the impeller as required.
	The motor-protective circuit breaker is set incorrectly.	Set the motor-protective circuit breaker as required.
	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 power cable is defective.	Contact an authorised service workshop.
	Fluctuating voltage.	Re-establish correct voltage supply. The permissible deviation is ± 10 %.
The pump runs but does not deliver the rated flow.	Wrong direction of rotation.	Interchange two phases in the power supply to the motor.
	The impeller is worn.	Adjust the impeller clearance. If the impeller must be replaced, contact an authorised service workshop.
	The impeller is loose.	Contact an authorised service workshop.

Fault	Cause	Remedy
	The pump or the pipes are clogged by impurities.	Clean the pump or the pipes as required.
	The pump is head too high.	Measure the differential pressure and compare the value with the pump curve. Remove the blockage in the outlet pipe.
	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 not properly 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 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.	Let the pump cool. Clean the pump.
	The level switch is out of adjustment or defective.	Clean or reset the level switch or replace it 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 service 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 pipe.
	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.
Low oil level.	The upper mechanical shaft seal is leaking.	Contact an authorised service workshop.

10. Technical data

10.1 Operating conditions

10.1.1 pH value

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

10.1.2 Liquid temperature

The permissible temperature is 0-40 °C.

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.

10.1.3 Ambient temperature

The permissible temperature is -5 to +40 °C for S 72 and 0 to +40 °C for S 74-78 pumps.

For explosion-proof pumps, the ambient temperature on the installation site must be between -5 and +40 °C for S 72, and 0 and +40 °C for S 74-78 pumps.

10.1.4 Density and viscosity of the pumped liquid

Density: 1000 kg/m^3.

Kinematic viscosity: 1 mm^2/s (1 cSt).

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

10.1.5 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

10.1.6 Installation depth

The maximum submersion depth is 20 m.

10.1.7 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
72	15
74 and 78	10

10.1.8 Enclosure class

IP68.

10.1.9 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 can exceed 70 dB(A).

10.1.10 Storage temperature

Storage temperature: -20 to +55 °C. Maximum 70 °C for short periods not exceeding 24 hours according to EN 60204-1.

10.2 Electrical data

Voltage tolerances for the motor and the motor protection devices:

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

10.3 Dimensions and weights

10.3.1 Dimensions

For pump dimensions, see the data booklet for each pump range at www.grundfos.com.

10.3.2 Weights

The weights stated include 10 m cables.

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

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

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

Pump type	Net weight [kg]			
Range 72	S	C	D	H
S2.90.250.2250.4.72S	1770	1950	1955	2250
S2.100.250.2250.4.72H	1760	1945	1955	2240
S2.100.250.1750.4.72H	1760	1945	1955	2240
S2.100.300.2250.4.72M	1840	2020	2010	2300
S2.100.300.1750.4.72M	1840	2020	2010	2300
S3.110.300.1800.6.72H	1965	2160	2150	2440
S3.110.300.1600.8.72H	1965	2165	2155	2445
S3.120.500.1800.6.72M	2335	2520	2360	2700
S3.120.500.1600.8.72M	2330	2530	2370	2700
S3.120.500.1250.8.72M	2330	2530	2370	2700
S3.135.500.1800.6.72L	2340	2525	2360	2700
S3.135.500.1600.8.72L	2335	2535	2375	2705
S3.135.500.1250.8.72L	2335	2535	2375	2705
S3.135.600.1600.8.72E	2710	2910	2690	3020
S3.135.600.1300.10.72E	2730	2930	2710	3040
S3.135.600.1100.10.72E	2720	2920	2700	3030
S3.135.600.900.10.72E	2710	2910	2690	3020
Range 74	S	C	D	H
S2.90.300.2500.4.74S		2800	2800	3000
S2.90.300.3150.4.74S		3500	3500	3700
S2.100.300.2500.4.74H		2800	2800	3000
S2.100.300.3150.4.74H		3500	3500	3700
S3.110.300.2000.6.74H		3000	3000	3200
S3.110.300.2500.6.74H		3100	3100	3400
S3.110.300.3150.6.74H		3900	3900	4100
S3.120.300.2000.6.74M		3300	3200	3400
S3.120.300.2500.6.74M		3500	3300	3500
S3.120.300.3150.6.74M		4300	4100	4300
S3.135.500.2000.6.74L		3300	3300	3500
S3.135.500.2500.6.74L		3500	3400	3700
S3.135.500.3150.6.74L		4200	4200	4400
S3.135.600.2000.8.74E		3900	3700	4000
S3.135.600.2500.8.74E		4600	4400	4700
Range 78	S	C	D	H
S3.115.500.3150.8.78H		5600	5500	6000
S3.115.500.3500.8.78H		6000	5800	6300
S3.115.500.4000.8.78H		6100	5900	6400
S3.115.500.4500.8.78H		6200	6000	6500
S3.115.500.5000.8.78H		6200	6100	6600
S3.115.500.5200.8.78H		6400	6200	6700
S3.130.500.2500.10.78M		5200	5100	5600
S3.130.500.3150.8.78M		5500	5400	5900
S3.130.500.3150.10.78M		5800	5600	6100
S3.130.500.3500.8.78M		5900	5800	6300
S3.130.500.3500.10.78M		6100	5900	6400
S3.130.500.4000.8.78M		6000	5900	6400
S3.130.500.4000.10.78M		6100	6000	6500
S3.130.500.4500.8.78M		6100	6000	6500
S3.130.500.5000.8.78M		6200	6100	6600
S3.130.500.5200.8.78M		6300	6200	6700
S3.145.500.1600.10.78L		5000	4900	5300
S3.145.500.2000.10.78L		5100	5000	5500
S3.145.500.2500.10.78L		5400	5300	5800
S3.145.500.3150.8.78L		5700	5600	6100
S3.145.500.3150.10.78L		5900	5800	6300
S3.145.500.3500.8.78L		6000	5900	6400
S3.145.500.3500.10.78L		6200	6100	6600
S3.145.500.4000.8.78L		6100	6000	6500
S3.145.500.5000.8.78L		6300	6200	6700
S3.145.500.5200.8.78L		6400	6300	6800
S4.135.600.1300.12.78E		5700	5700	6300
S4.135.600.1600.12.78E		5900	5900	6500
S4.135.600.2000.10.78E		5800	5800	6400
S4.135.600.2500.10.78E		6000	6000	6600

Pump type	Net weight [kg]		
S4.135.600.3150.8.78E	6300	6300	6900
S4.135.600.3150.10.78E	6600	6600	7100
S4.135.600.3500.8.78E	6700	6700	7300
S4.135.600.4000.8.78E	6800	6800	7300
S4.135.600.4500.8.78E	6900	6900	7500
S4.135.600.5000.8.78E	7000	7000	7500
S4.135.600.5200.8.78E	7100	7100	7700
S4.155.800.2500.10.78F	6600	6500	7200
S4.155.800.3150.10.78F	7100	7000	7700
S4.155.800.3500.10.78F	7400	7300	8000
S4.155.800.4000.10.78F	7500	7400	8100
S4.155.800.1600.12.78F	6500	6400	7100
S4.155.800.2000.12.78F	7100	7000	7700
S4.155.800.2500.12.78F	7300	7200	8000
S4.155.800.1100.14.78F	6300	6200	6900
S4.155.800.1300.14.78F	6500	6400	7100
S4.155.800.1600.14.78F	7000	6900	7600

ST pumps	Weight [kg]
Range 74	
ST3.135.1200.2000.8.74E	2800
ST3.135.1200.2500.8.74E	3400
Range 78	
ST4.135.1400.3150.8.78E	4700
ST4.135.1400.3500.8.78E	5000
ST4.135.1400.4000.8.78E	5100
ST4.135.1400.4500.8.78E	5200
ST4.135.1400.5000.8.78E	5300
ST4.135.1400.5200.8.78E	5400
ST4.135.1400.5200.8.78E	5400
ST4.135.1400.2000.10.78E	4200
ST4.135.1400.2500.10.78E	4400
ST4.135.1400.3150.10.78E	4900
ST4.135.1400.1300.12.78E	4100
ST4.135.1400.1600.12.78E	4300
ST4.155.1600.2500.10.78F	4700
ST4.155.1600.3150.10.78F	5200
ST4.155.1600.3500.10.78F	5500
ST4.155.1600.4000.10.78F	5500
ST4.155.1600.1600.12.78F	4600

ST pumps	Weight [kg]
ST4.155.1600.2000.12.78F	5200
ST4.155.1600.2500.12.78F	5400
ST4.155.1600.1100.14.78F	4400
ST4.155.1600.1300.14.78F	4600
ST4.155.1600.1600.14.78F	5100

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.

See also end-of-life information at www.grundfos.com/product-recycling.

The crossed-out wheelie 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.

China RoHS

1. China-ROHS-S-pumps-72-74-78

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴联苯醚 (PBDE)
泵壳	X	O	O	O	O	O
紧固件	X	O	O	O	O	O
管件	X	O	O	O	O	O
定子	X	O	O	O	O	O
转子	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制

O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 该规定的限量要求。

该产品环保使用期限为 10 年，标识如左图所示。
此环保期限只适用于产品在安装与使用说明书中所规定的条件下工作

产品中有害物质的名称及含量 (Names and Contents of the Hazardous Substances)

部件名称 (Part name)	有害物质（Hazardous Substances ）					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴联苯醚 (PBDE)
泵壳(Pump housing)	X	O	O	O	O	O
紧固件(Fasteners)	X	O	O	O	O	O
管件(Fittings)	X	O	O	O	O	O
定子（Stator）	X	O	O	O	O	O
转子（Rotor）	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制
(This table is prepared in accordance with the provisions of SJ/T 11364)

O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
(Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.)
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 该规定的限量要求。
(Indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.)

该产品环保使用期限为 10 年，标识如左图所示。
(The environmental protection use period for this product is 10 years as shown in the left image)
此环保期限只适用于产品在安装与使用说明书中所规定的条件下工作
(This environmental protection use period is only apply to product working under condition specified in Installation and Operation Manual)

Declaration of conformity

GB: EC/EU declaration of conformity

We, Grundfos, declare under our sole responsibility that the products S 72-74-78, to which the declaration below relates, are in conformity with the Council Directives listed below on the approximation of the laws of the EC/EU member states.

BG: Декларация за съответствие на ЕС/ЕО

Ние, фирма Grundfos, заявяваме с пълна отговорност, че продуктите S 72-74-78, за които се отнася настоящата декларация, отговарят на следните директиви на Съвета за уеднаквяване на правните разпоредби на държавите-членки на ЕС/ЕО.

CZ: Prohlášení o shodě EU

My firma Grundfos prohlašujeme na svou plnou odpovědnost, že výrobky S 72-74-78, na které se toto prohlášení vztahuje, jsou v souladu s níže uvedenými ustanoveními směrnice Rady pro sblížení právních předpisů členských států Evropského společenství.

DE: EG-/EU-Konformitätserklärung

Wir, Grundfos, erklären in alleiniger Verantwortung, dass die Produkte S 72-74-78, auf die sich diese Erklärung bezieht, mit den folgenden Richtlinien des Rates zur Angleichung der Rechtsvorschriften der EG-/EU-Mitgliedsstaaten übereinstimmen.

DK: EF-/EU-overensstemmelseserklæring

Vi, Grundfos, erklærer under ansvar at produkterne S 72-74-78 som erklæringen nedenfor omhandler, er i overensstemmelse med Rådets direktiver der er nævnt nedenfor, om indbyrdes tilnærmelse til EF-/EU-medlemsstaternes lovgivning.

EE: EÜ/ELi vastavusdeklaratsioon

Meie, Grundfos, kinnitame ja kanname ainuisikulist vastutust selle eest, et toode S 72-74-78, mille kohta all olev deklaratsioon käib, on kooskõlas Nõukogu Direktiividega, mis on nimetatud all pool vastavalt vastuvõetud õigusaktidele ühtlustamise kohta EÜ/EL liikmesriikides.

ES: Declaración de conformidad de la CE/UE

Grundfos declara, bajo su exclusiva responsabilidad, que los productos S 72-74-78 a los que hace referencia la siguiente declaración cumplen lo establecido por las siguientes Directivas del Consejo sobre la aproximación de las legislaciones de los Estados miembros de la CE/UE.

FI: EY-/EU-vaatimustenmukaisuusvakuutus

Grundfos vakuuttaa omalla vastuullaan, että tuotteet S 72-74-78, joita tämä vakuutus koskee, ovat EY-/EU:n jäsenvaltioiden lainsäädännön lähentämiseen tähtäävien Euroopan neuvoston direktiivien vaatimusten mukaisia seuraavasti.

FR: Déclaration de conformité CE/UE

Nous, Grundfos, déclarons sous notre seule responsabilité, que les produits S 72-74-78, auxquels se réfère cette déclaration, sont conformes aux Directives du Conseil concernant le rapprochement des législations des États membres CE/UE relatives aux normes énoncées ci-dessous.

GR: Δήλωση συμμόρφωσης ΕΚ/ΕΕ

Εμείς, η Grundfos, δηλώνουμε με αποκλειστικά δική μας ευθύνη ότι τα προϊόντα S 72-74-78, στα οποία αναφέρεται η παρακάτω δήλωση, συμμορφώνονται με τις παρακάτω Οδηγίες του Συμβουλίου περί προσέγγισης των νομοθεσιών των κρατών μελών της ΕΚ/ΕΕ.

HR: EC/EU deklaracija sukladnosti

Mi, Grundfos, izjavljujemo s punom odgovornošću da su proizvodi S 72-74-78, na koja se izjava odnosi u nastavku, u skladu s dolje navedenim direktivama Vijeća o usklađivanju zakona država članica EC/EU-a.

HU: EC/EU megfelelőségi nyilatkozat

Mi, a Grundfos vállalat, teljes felelősséggel kijelentjük, hogy a(z) S 72-74-78 termékek, amelyekre az alábbi nyilatkozat vonatkozik, megfelelnek az Európai Unió tagállamainak jogi irányelveit összehangoló tanács alábbi előírásainak.

IT: Dichiarazione di conformità CE/UE

Grundfos dichiara sotto la sua esclusiva responsabilità che i prodotti S 72-74-78, ai quale si riferisce questa dichiarazione, sono conformi alle seguenti direttive del Consiglio riguardanti il riavvicinamento delle legislazioni degli Stati membri CE/UE.

LT: EB/ES atitikties deklaracija

Mes, Grundfos, su visa atsakomybe pareiškiame, kad produktai S 72-74-78, kuriems skirta ši deklaracija, atitinka žemiau nurodytas Tarybos Direktyvas dėl EB/ES šalių narių įstatymų suderinimo.

LV: EK/ES atbilstības deklarācija

Sabiedrība Grundfos ar pilnu atbildību paziņo, ka produkti S 72-74-78, uz kuru attiecas tālāk redzamā deklarācija, atbilst tālāk norādītajām Padomes direktīvām par EK/ES dalībvalstu normatīvo aktu tuvināšanu.

NL: EG-/EU-conformiteitsverklaring

Wij, Grundfos, verklaren geheel onder eigen verantwoordelijkheid dat de producten S 72-74-78, waarop de onderstaande verklaring betrekking heeft, in overeenstemming zijn met de onderstaande Richtlijnen van de Raad inzake de onderlinge aanpassing van de wetgeving van de EG-/EU-lidstaten.

PL: Deklaracja zgodności WE/UE

My, Grundfos, oświadczamy z pełną odpowiedzialnością, że nasze produkty S 72-74-78, których deklaracja niniejsza dotyczy, są zgodne z następującymi dyrektywami Rady w sprawie zbliżenia przepisów prawnych państw członkowskich.

PT: Declaração de conformidade CE/UE

A Grundfos declara sob sua única responsabilidade que os produtos S 72-74-78, aos quais diz respeito a declaração abaixo, estão em conformidade com as Directivas do Conselho sobre a aproximação das legislações dos Estados Membros da CE/UE.

RO: Declaraţia de conformitate CE/UE

Noi Grundfos declarăm pe propria răspundere că produsele S 72-74-78, la care se referă această declaraţie, sunt în conformitate cu Directivele de Consiliu specificate mai jos privind armonizarea legilor statelor membre CE/UE.

RS: Deklaracija o usklađenosti EC/EU

Mi, kompanija Grundfos, izjavljujemo pod punom vlastitom odgovornošću da je proizvod S 72-74-78, na koji se odnosi deklaracija ispod, u skladu sa dole prikazanim direktivama Saveta za usklađivanje zakona država članica EC/EU.

RU: Декларация о соответствии нормам ЕЭС/ЕС

Мы, компания Grundfos, со всей ответственностью заявляем, что изделия S 72-74-78, к которым относится нижеприведённая декларация, соответствуют нижеприведённым Директивам Совета Евросоюза о тождественности законов стран-членов ЕЭС/ЕС.

SE: EG-/EU-försäkran om överensstämmelse

Vi, Grundfos, försäkrar under ansvar att produkterna S 72-74-78, som omfattas av nedanstående försäkran, är i överensstämmelse med de rådsdirektiv om inbördes närmande till EG-/EU-medlemsstaternas lagstiftning som listas nedan.

SI: Izjava o skladnosti ES/EU

V Grundfosu s polno odgovornostjo izjavljamo, da je izdelek S 72-74-78, na katerega se spodnja izjava nanaša, v skladu s spodnjimi direktivami Sveta o približevanju zakonodaje za izenačevanje pravnih predpisov držav članic ES/EU.

SK: EC/EU vyhlásenie o zhode

My, spoločnosť Grundfos, vyhlasujeme na svoju plnú zodpovednosť, že produkty S 72-74-78 na ktoré sa vyhlásenie uvedené nižšie vzťahuje, sú v súlade s ustanoveniami nižšie uvedených smerníc Rady pre zblíženie právnych predpisov členských štátov EC/EÚ.

TR: EC/AB uygunluk bildirgesi

Grundfos olarak, aşağıdaki bildirim konusu olan S 72-74-78 ürünlerinin, EC/AB Üye ülkelerinin direktiflerinin yakınlaştırılmasıyla ilgili durumun aşağıdaki Konsey Direktifleriyle uyumlu olduğunu ve bununla ilgili olarak tüm sorumluluğun bize ait olduğunu beyan ederiz.

UA: Декларація відповідності директивам ЕС/EU

Ми, компанія Grundfos, під нашу одноосібну відповідальність заявляємо, що вироби S 72-74-78, до яких відноситься нижченаведена декларація, відповідають директивам ЕС/EU, переліченим нижче, щодо тотожності законів країн-членів ЄС.

CN: 欧盟符合性声明

我们，格兰富，在我们的全权责任下声明，产品 S 72-74-78 系列，其制造和性能完全符合以下所列欧盟委员会指令。

NO: EFs/EUs samsvarsærklæring

Vi, Grundfos, erklærer under vårt eneansvar at produktene S 72-74-78 som denne erklæringen gjelder, er i samsvar med styrets direktiver om tilnærming av forordninger i EF-/EU-landene.

AR: إقرار مطابقة الاتحاد الأوروبي (EC/EU)

نقر نحن، جروندفوس، بمقتضى مسؤوليتنا الفردية بأن المنتجين S 72-74-78، اللذين يختص بهما الإقرار أدناه، يكونان مطابقين لتوجيهات المجلس المذكورة أدناه بشأن التقريب بين قوانين الدول أعضاء الاتحاد الأوروبي (EC/EU).

- Machinery Directive (2006/42/EC)

  Standards used: EN 809:1998 + A1:2009.
- EMC Directive (2014/30/EU)

  Standards used: EN 61326-1:2013, EN 61000-6-2:2005 and EN 61000-6- 3:2007 + A1:2011.

  Applies only to products equipped with a water-in-oil sensor, vibration sensor, or internal SM 113.
- RoHS Directives (2011/65/EU and 2015/863/EU)

  Standard used: EN IEC 63000:2018.
- ATEX directive (2014/34/EU)

  Applies only to products intended for use in potentially explosive environments,

  For Fr 72: II 2 G, Ex db eb h mb IIB T3 or T4 Gb.

  For Fr 74-78: II 2G Ex db IIB T3 or T4 Gb, and equipped with the separate ATEX approval plate and EU-type examination certificate.

  For Fr 74-78, the Ex h IIB T4 Gb marked approval is based on EN ISO 80079-36:2016, EN ISO 80079-37:2016.

  Non-electrical self-declaration made by Grundfos according to the above-listed standards is retained by FM Approvals Europe Ltd., No 2809, Dublin, Ireland, under reference number: PR451461.

  For further information, see below.

Range	Certificate No	Standards used
Fr 72	Baseefa 07ATEX0102X	EN IEC 60079-0:2018, EN 60079-1:2014, EN ISO 80079-36:2016, EN ISO 80079-37:2016
Fr 74-78	FM18ATEX 0024X	EN IEC 60079-0:2018, EN 60079-1:2014, EN 60529:1991 + A1:2000 + A2:2013

Notified body for EU-Type examination certificate:	Fr 72: SGS Fimko Oy. No 0598. Helsinki, Finland Fr 74-78: FM Approvals Europe Limited; No 2809. Dublin, Ireland
Notified body for production:	DEKRA Certification B.V. No 0344, Meaner 1051, 6825 MJ Arnhem, The Netherlands
Manufacturer:	Grundfos Holding A/S Poul Due Jensen Vej 7, Dk-8850 Bjerringbro, Denmark

This EC/EU declaration of conformity is only valid when published as part of the Grundfos installation and operating instructions (publication number 96604379).

Székesfehérvár, 15th of February 2023

Zoltán Lajtos

MUNI Solutions Value Stream Director

Grundfos Holding A/S

Poul Due Jensens Vej 7

8850 Bjerringbro, Denmark

Person authorised to compile technical file and empowered to sign the EC/EU declaration of conformity.

Declaration of conformity

UK declaration of conformity

We, Grundfos, declare under our sole responsibility that the products to which the declaration below relates, are in conformity with UK regulations, standards and specifications to which conformity is declared, as listed below:

Valid for Grundfos products:

S pumps, ranges 72, 74, 78

- Supply of Machinery (Safety) Regulations 2008
  Standards used: EN 809:1998 + A1:2009.
- Electromagnetic Compatibility Regulations 2016
  Standards used: EN 61326-1:2013, EN 61000-6-2:2005 and EN 61000-6-3:2007 + A1:2011.
  Applies only to products equipped with water-in-oil sensor, vibration sensor, or internal SM 113.
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2019
  Standard used: EN IEC 63000:2018.
- Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016
  Applies only to products intended for use in potentially explosive environments,
  For Fr 72: Ex II 2 G, Ex db eb h mb IIB T3 or T4 Gb.
  For Fr 74-78: Ex II 2G Ex db II B T3 or T4 Gb, and equipped with the separate UKEX approval plate and UK-type examination certificate.
  For Fr 74-78, the Ex h IIB T4 Gb marked approval is based on EN ISO 80079-36:2016, EN ISO 80079-37:2016 made by Grundfos.

For further information, see below.

Range	Certificate No	Standards used
Fr 72	BAS21UKEX0077X	EN IEC 60079-0: 2018, EN 60079-1: 2014, EN ISO 80079-36:2016, EN ISO 80079-37:2016
Fr 74-78	FM21UKEX0020X	EN IEC 60079-0:2018 + A11: 2013, EN 60079-1: 2014, EN 60529:1991 + A1:2000 + A2:2013

Approved body for UK-Type examination:	Fr 72: SGS Baseefa. No 1180. Buxton, United Kingdom. Fr 74-78: FM Approvals Ltd. No 1725, United Kingdom.
Approved body for production:	SGS Baseefa. No 1180. Buxton, UK.
Manufacturer:	Grundfos Holding A/S Poul Due Jensen Vej 7, Dk-8850 Bjerringbro, Denmark.

This UK declaration of conformity is only valid when accompanying Grundfos instructions.

UK Importer: Grundfos Pumps ltd. Grovebury Road, Leighton Buzzard, LU7 4TL.

Székesfehérvár, 14th of February 2023

Zoltán Lajtos
MUNI Solutions Value Stream Director
Grundfos Holding A/S
Poul Due Jensens Vej 7
8850 Bjerringbro, Denmark
Manufacturer and person empowered to sign the UK declaration of conformity.

10000334621

Declaration of conformity

GB: Moroccan declaration of conformity

We, Grundfos, declare under our sole responsibility that the products to which the declaration below relates, are in conformity with Moroccan laws, orders, standards and specifications to which conformity is declared, as listed below:

Valid for Grundfos products:

S-72-74-78

Law No 24-09, 2011 Safety of products and services and the following orders:

Order No 2573-14, 2015 Safety Requirements for Low Voltage Electrical Equipment

Standards used:NM EN 809 + A1:2015

Order No 2574-14, 2015 Electromagnetic Compatibility

Standards used:NM EN 61326-1:2016

This Moroccan declaration of conformity is only valid when accompanying Grundfos instructions.

FR: Déclaration de conformité marocaine

Nous, Grundfos, déclarons sous notre seule responsabilité que les produits auxquels se réfère cette déclaration, sont conformes aux lois, ordonnances, normes et spécifications marocaines pour lesquelles la conformité est déclarée, comme indiqué ci-dessous :

Valable pour les produits Grundfos :

S-72-74-78

Sécurité des produits et services, loi n° 24-09, 2011 et décrets suivants :

Exigences de sécurité pour les équipements électriques basse tension, ordonnance n° 2573-14, 2015

Normes utilisées : NM EN 809 + A1:2015

Compatibilité électromagnétique, ordonnance n° 2574-14, 2015

Normes utilisées : NM EN 61326-1:2016

Cette déclaration de conformité marocaine est uniquement valide lorsqu'elle accompagne la notice d'installation et de fonctionnement Grundfos.

AR: إقرار المطابقة المغربي

نحن، جروندفوس، نقر تحت مسؤوليتنا وحدنا بأن المنتجات التي يتعلق بها الإقرار أدناه، تتوافق مع القوانين والقرارات والمعايير والمواصفات المغربية التي تم إقرار المطابقة بشأنها، كما هو موضح أدناه:

سارٍ على منتجات جروندفوس:

S-72-74-78

قانون رقم 24-09، 2011 بشأن سلامة المنتجات والخدمات والقرارات التالية:

القرار رقم 2573-14، 2015 متطلبات السلامة للمعدات الكهربائية ذات الجهد المنخفض

المعايير المستخدمة:NM EN 809 + A1:2015

القرار رقم 2574-14، 2015 التوافق الكهرومغناطيسي

المعايير المستخدمة:NM EN 61326-1:2016

يكون إقرار المطابقة المغربي صالحًا فقط عند نشره كجزء من تعليمات جروندفوس.

Székesfehérvár, 15th February 2023

Zoltán Lajtos

MUNI Solutions Value Stream Director

Grundfos Holding A/S

Poul Due Jensens Vej 7

8850 Bjerringbro, Denmark

GB: Manufacturer and person empowered to sign the Moroccan declaration of conformity.

FR: Fabricant et personne habilitée à signer la Déclaration de conformité marocaine.

AR: الجهة المصنعة والشخص المفوض بتوقيع إقرار المطابقة المغربي.

10000268495

Declaration of conformity

GB: Ukrainian declaration of conformity

We, Grundfos, declare under our sole responsibility that the products to which the declaration below relates, are in conformity with Ukrainian resolutions, standards and specifications to which conformity is declared, as listed below:

Valid for Grundfos products:

S 72-74-78

Resolution No. 62, 2013 - Technical Regulations on Safety of Machines

Resolution No. 533, 2018 - Amendments to some provisions

Standards used: ДСТУ EN 809:2015

Resolution No. 1077, 2015 - Technical Regulations on Electromagnetic Compatibility

Resolution No. 533, 2018 - Amendments to some provisions

Standards used: ДСТУ EN 61326-1:2016, ДСТУ EN 61000-6-2:2015, ДСТУ EN 61000-6-2015/Зміна № 1:2015

Resolution No. 139, 2017 - Technical Regulations on Use of Certain Hazardous Substances in Electrical and Electronic Equipment

Standards used: ДСТУ EN IEC 63000:2020

Resolution No. 1055, 2016 - Technical regulation of the equipment and the protective systems intended for use in potentially explosive environments

Resolution No. 102, 2020 - Amendments to some resolutions of the Cabinet of Ministers of Ukraine

S 72

Standards used: ДСТУ EN IEC 60079-0:2019, ДСТУ EN 60079-1:2017,ДСТУ EN ISO 80079-36:2017, ДСТУ EN ISO 80079-37:2017

ATEX-approved product: S 72 Ex

ATEX certificate number: Baseefa07ATEX0102X

Name and address of Notified body (ATEX): SGS Fimko Oy. No 0598. Helsinki, Finland.

S 74-78

Standards used: ДСТУ EN IEC 60079-0:2019, ДСТУ EN 60079-1:2017, ДСТУ EN 60529:2014,

Based on self-assessment:ДСТУ EN ISO 80079-36:2017, ДСТУ EN ISO 80079-37:2017

Non-electrical self-declaration made by Grundfos according to the above-listed standards is retained by FM Approvals Europe Ltd., No 2809, Dublin, Ireland.

ATEX-approved product: S 74-78 Ex

ATEX certificate number: FM18ATEX0024X

Name and address of Notified body (ATEX): FM Approvals Europe Limited, No 2809. Dublin Ireland.

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This Ukrainian declaration of conformity is only valid when accompanying Grundfos instructions.

UA: Українська декларація відповідності

Ми, Grundfos, заявляємо про свою виключну відповідальність за те, що продукція, до якої відноситься ця декларація, відповідає вимогам українським постановам, стандартам та технічним умовам, щодо яких заявлена відповідність, як зазначено нижче:

Дійсно для продуктів Grundfos:

S 72-74-78

Постанова № 62 від 2013 р., Про затвердження Технічного регламенту безпеки машин

Постанова № 533 від 2018 р., Про внесення змін до деяких положень

Застосовані стандарти: ДСТУ EN 809:2015

Постанова № 1077 від 2015 р., Технічний регламент з електромагнітної сумісності обладнання

Постанова № 533 від 2018 р., Про внесення змін до деяких положень

Застосовані стандарти: ДСТУ EN EN 61326-1:2016, ДСТУ EN 61000-6-2:2015, ДСТУ EN 61000-6-2015/ Зміна № 1:2015

Постанова № 139 від 2017 р., Технічний регламент обмеження використання деяких небезпечних речовин в електричному та електронному обладнанні

Застосовані стандарти: ДСТУ EN IEC 63000:2020

Постанова № 1055 від 2016 р., Технічний регламент обладнання та захисних систем, призначених для використання в потенційно вибухонебезпечних середовищах

Постанова № 102 від 2020 р., Про внесення змін до деяких постанов Кабінету Міністрів України

S 72

Застосовані стандарти: ДСТУ EN IEC 60079-0:2019, ДСТУ EN 60079-1:2017,ДСТУ EN ISO 80079-36:2017, ДСТУ EN ISO 80079-37:2017

Продукт, схвалений ATEX: S 72 Ex

Номер сертифіката ATEX: Baseefa07ATEX0102X

Назва та адреса уповноваженого органу з сертифікації (ATEX): SGS Fimko Oy. No 0598. Helsinki, Finland.

S 74-78

Застосовані стандарти: ДСТУ EN IEC 60079-0:2019, ДСТУ EN 60079-1:2017, ДСТУ EN 60529:2014, ДСТУ EN ISO 80079-36:2017, ДСТУ EN ISO 80079-37:2017

На основі самооцінки: ДСТУ EN ISO 80079-36:2017, ДСТУ EN ISO 80079-37:2017

Самостійне декларування неелектричного обладнання, зроблене компанією Grundfos згідно з перерахованими вище стандартами, зберігається компанією FM Approvals Europe Ltd., № 2809, Дублін, Ірландія.

Продукт, схвалений ATEX: S 74-78 Ex

Номер сертифіката ATEX: FM18ATEX0024X

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Ця українська декларація відповідності дійсна лише за наявності інструкцій Grundfos.

Székesfehérvár, 06th of April 2023

Zoltán Lajtos
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10000418492

RUS

S, ST типоразмеры 72, 74, 78

Руководство по эксплуатации

Руководство по эксплуатации на данное изделие является составным и включает в себя несколько частей:
Часть 1: настоящее «Руководство по эксплуатации».
Часть 2: электронная часть «Паспорт. Руководство по монтажу и эксплуатации» размещенная на сайте компании Грундфос. Перейдите по ссылке, указанной в конце документа.
Часть 3: информация о сроке изготовления, размещенная на фирменной табличке изделия.

Сведения о сертификации:

Насосы типа S, ST типоразмеры 72, 74, 78 сертифицированы на соответствие требованиям Технических регламентов Таможенного союза: ТР ТС 004/2011 «О безопасности низковольтного оборудования»; ТР ТС 010/2011 «О безопасности машин и оборудования»; ТР ТС 020/2011 «Электромагнитная совместимость технических средств»; ТР ТС 012/2011 «О безопасности оборудования для работы во взрывоопасных средах».

KAZ

S, ST типоразмеры 72, 74, 78

Пайдалану бойынша нұсқаулық

Атаулы өнімге арналған пайдалану бойынша нұсқаулық құрамалы болып келеді және келесі бөлімдерден тұрады:
1 бөлім: атаулы «Пайдалану бойынша нұсқаулық»
2 бөлім: Грундфос компаниясының сайтында орналасқан электронды бөлім «Төлқұжат, Құрастыру және пайдалану бойынша нұсқаулық». Құжат соңында көрсетілген сілтеме арқылы өтіңіз.
3 бөлім: өнімнің фирмалық тақташасында орналасқан шығарылған уақыты жөніндегі мәлімет

Сертификаттау туралы ақпарат:

S, ST 72, 74, 78 өлшемдері типті сорғылары «Төмен вольтты жабдықтардың қауіпсіздігі туралы» (ТР ТС 004/2011), «Машиналар және жабдықтар қауіпсіздігі туралы» (ТР ТС 010/2011) «Техникалық заттардың электрлі магниттік сәйкестілігі» (ТР ТС 020/2011) Кеден Одағының техникалық регламенттерінің талаптарына сәйкес сертификатталды; «Жарылыс пайдалану үшін, қауіпсіздік жабдықтарды туралы» ТР ТС 012/2011.

KG

S, ST типоразмеры 72, 74, 78

Пайдалануу боюнча колдонмо

Аталган жабдууну пайдалануу боюнча колдонмо курамдык жана өзүнө бир нече бөлүкчөнү камтыйт:
1-Бөлүк: «Пайдалануу боюнча колдонмо»
2-Бөлүк: «Паспорт. Пайдалануу жана монтаж боюнча колдонмо» электрондук бөлүгү Грундфос компаниянын сайтында жайгашкан. Документтин аягында көрсөтүлгөн шилтемеге кайрылыңыз.
3-Бөлүк: жабдуунун фирмалык тактасында жайгашкан даярдоо мөөнөтү тууралуу маалымат.

Шайкештик жөнүндө декларация

S, ST өлчөмдөрү 72, 74, 78 түрүндөгү соргучтар Бажы Биримдиктин Техникалык регламенттин талаптарына ылайыктуу тастыкталган: ТР ТБ 004/2011 «Төмөн вольттук жабдууну коопсуздугу жөнүндө»; ТР ТБ 010/2011 «Жабдуу жана машиналардын коопсуздугу жөнүндө»; ТР ТБ 020/2011 «Техникалык каражаттардын электрмагниттик шайкештиги»; ТР ТБ 012/2011 «Жардыруу коркунучу жакын чөйрөгө колдонуу үчүн жеке коопсуздук жабдуулар».

ARM

S, ST типоразмеры 72, 74, 78

Շահագործման ձեռնարկ

Տվյալ սարքավորման շահագործման ձեռնարկը բաղկացած է մի քանի մասերից.
Մաս 1. սույն «Շահագործման ձեռնարկ»:
Մաս 2. էլեկտրոնային մաս. այն է՝ «Անձնագիր: Մոնտաժման և շահագործման ձեռնարկ» տեղադրված «Գրունդֆոս». Անցեք փաստաթղթի վերջում նշված հղումով.
Մաս 3. տեղեկություն արտադրման ամսաթվի վերաբերյալ՝ նշված սարքավորման պիտակի վրա:

Տեղեկություններ հավաստագրման մասին՝
S, ST ზომის 72, 74, 78 տիպի պոմպերը սերտիֆիկացված են համաձայն Մաքսային Միության տեխնիկական կանոնակարգի պահանջների՝ ТР ТС 004/2011 «Ցածրավոլտ սարքավորումների վերաբերյալ», ТР ТС 010/2011«Մեքենաների և սարքավորումների անվտանգության վերաբերյալ» ; ТР ТС 020/2011 «Տեխնիկական միջոցների էլեկտրամագնիսական համատեղելիության վերաբերյալ», ТР ТС 012/2011 «Անձնական անվտանգության սարքավորումներ օգտագործման պոտենցիալ պայթյունավտանգ միջավայրերին»:

http://net.grundfos.com/qr/i/98765568

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