

TPE2 (D), TPE3 (D)

Installation and operating instructions



TPE2 (D), TPE3 (D)

English (US)

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Original installation and operating instructions

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1. General information



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

1.1 Hazard statements

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



DANGER

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



WARNING

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



CAUTION

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

The hazard statements are structured in the following way:

SIGNAL WORD



Description of the hazard

Consequence of ignoring the warning

- Action to avoid the hazard.

1.2 Notes

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



Observe these instructions for explosion-proof products.



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



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



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



Tips and advice that make the work easier.

2. Abbreviations and definitions

AI	Analog input
AL	Alarm, out of range at lower limit
AO	Analog output
AU	Alarm, out of range at upper limit
CIM	Communication interface module
Current sinking	The ability to draw current into the terminal and guide it towards ground in the internal circuitry.
Current sourcing	The ability to push current out of the terminal and into an external load which must return it to ground.
DI	Digital input
DO	Digital output
ELCB	Earth-leakage circuit breaker
FM	Functional module
GDS	Grundfos Digital Sensor Factory-fitted sensor in some Grundfos pumps
GENIbus	Proprietary Grundfos fieldbus standard
GFCI	Ground fault circuit interrupter USA and Canada
GND	Ground.
Grundfos Eye	Status indicator light
LIVE	Low voltage with the risk of electric shock if the terminals are touched
OC	Open collector: Configurable open-collector output
PE	Protective ground
PELV	Protective extra-low voltage A voltage that cannot exceed ELV under normal conditions and under single-fault conditions, except ground faults in other circuits.
RCD	Residual-current device
SELV	Safety extra-low voltage A voltage that cannot exceed ELV under normal conditions and under single-fault conditions, including ground faults in other circuits.
TPE2	Single-head pump without factory-fitted differential-pressure and temperature sensor
TPE2 D	Twin-head pump without factory-fitted differential-pressure and temperature sensor
TPE3	Single-head pump with factory-fitted differential-pressure and temperature sensor
TPE3 D	Twin-head pump with factory-fitted differential-pressure and temperature sensor

3. Product introduction

3.1 Related instructions

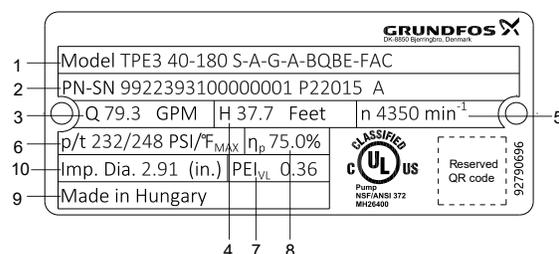


These installation and operating instructions apply to the Grundfos TPE2, TPE2 D and TPE3, TPE3 D pumps. The pumps are fitted with frequency-controlled permanent-magnet motors for single-phase or three-phase power supply connection. For instructions not mentioned specifically in this manual, see the installation and operating instructions for the standard pump.

Installation and operating instructions

Title	QR code	Publication number	Link
TP		96404999	http://net.grundfos.com/qr/i/96404999

3.2 Nameplate



Example of nameplate

Pos.	Description
1	Type designation
	Identification code
	99223981 Product number
	00000001 Serial number
2	P2 Production site code
	2015 Production year and week (YYWW)
	A Service model
3	Nominal flow rate
4	Nominal pump head
5	Rated pump speed
6	Pressure rating and maximum temperature
	Pump Energy Index (PEI)
7	PEI _{CL} : constant load
	PEI _{VL} : variable load
8	Hydraulic efficiency at best efficiency point
9	Country of origin
10	Actual impeller diameter

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3.3 Type key

Example TPE3 D 65-150 S-A-G-A-BQQE-GCB

Code	Explanation
	Pump range, electronically speed-controlled pump
TPE3	TPE2 = Without built-in sensor TPE3 = Built-in differential-pressure and temperature sensor
D	Twin-head pump
65	Nominal diameter of inlet and outlet ports [mm]
-150	Maximum head [decimeters (dm)]
S	S = Built-in differential-pressure and temperature sensor N = Without built-in sensor
	Code for pump version:
-A	A = Basic version X = Special version
	Code for pipe connection:
-G	G = ANSI flange
	Code for materials:
-A	A = Basic version I = Stainless steel CF8 (1.4308) pump housing and motor stool
-BQQE	Code for shaft seal including other plastic and rubber pump parts, except the neck ring. See section codes for shaft seal.
	Code for NEMA motors [hp (kW)]:
	C = 0.33 (0.25) D = 0.5 (0.37) E = 0.75 (0.55) F = 1 (0.75) G = 1.5 (1.1) H = 2 (1.5) I = 3 (2.2)
	Code for phase & voltage and other information:
C	A = 1 x 200-240 V B = 3 x 200-240 V C = 3 x 440-480 V D = 3 x 380-500 V Y = Out of DOE scope (department of energy)
	Code for speed variant [rpm]:
B	A = 1450-2200 B = 2900-4000 C = 4000-5900

3.3.1 Codes for shaft seal

Example BQBE

Code example	Description	Code explanation
B	Grundfos type designation	A: O-ring seal with fixed seal driver B: Rubber bellows seal D: O-ring seal, balanced G: Bellows seal with reduced seal faces R: O-ring seal with reduced seal faces
Q	Material of rotating face	A: Carbon, antimony-impregnated B: Carbon, resin-impregnated Q: Silicon carbide
B	Material of stationary seal	B: Carbon, resin-impregnated Q: Silicon carbide U: Tungsten carbide
E	Material of secondary seal	E: EPDM P: NBR rubber V: FKM F: FXM

4. General description

The pumps are fitted with frequency-controller permanent-magnet motors for single-phase or three-phase power supply connection.

4.1 Radio communication

This product incorporates a radio module for remote control which is a class 1 device and can be used anywhere in the EU member states without restrictions.

For use in USA and Canada, see appendix Radio communication. Some variants of the product and products sold in China and Korea have no radio module.

This product can communicate with the Grundfos GO and other products of the same type via the built-in radio module.

In some cases, an external antenna may be required.

Only Grundfos-approved external antennas may be connected to this product, and only by a Grundfos-approved installer.

4.2 Battery

DANGER

Intoxication or risk of chemical burn

Death or serious personal injury



- The battery can cause severe or fatal injuries in 2 hours or less if it is swallowed or placed inside any part of the body. In such an event, seek medical attention immediately.



- The replacement or servicing of batteries must be carried out by a qualified person.
- The battery contained within this product, whether new or used, is hazardous and is to be kept away from children.

Pumps with the advanced functional module, incorporate a Li-ion battery. The Li-ion battery complies with the Battery Directive (2006/66/EC). The battery does not contain mercury, lead and cadmium.

5. Receiving the product

5.1 Delivery and handling

The pump is delivered from the factory in a carton with a wooden bottom, specially designed for transport by fork-lift truck or a similar vehicle.

Related information

[10.11 Humidity](#)

5.2 Transporting the product

WARNING

Falling objects

Death or serious personal injury



- Secure the product during transporting to prevent it from tilting or falling down.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Wear safety shoes when moving the product.

5.3 Inspecting the product

Before you install the product, do the following:

1. Check that the product is as ordered.
2. Check that no visible parts have been damaged.

If parts are damaged or missing, contact your local Grundfos sales company.

5.4 Handling the product

Observe local regulations setting limits for manual lifting or handling. The motor weight is stated on the nameplate.

CAUTION

Back injury

Minor or moderate personal injury



- Use lifting equipment.

CAUTION

Crushing of feet

Minor or moderate personal injury

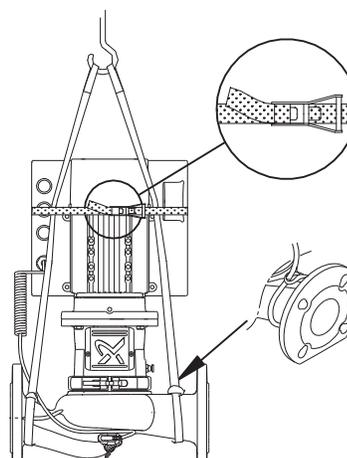


- Wear safety shoes and attach lifting equipment to the motor eyebolts when handling the product.

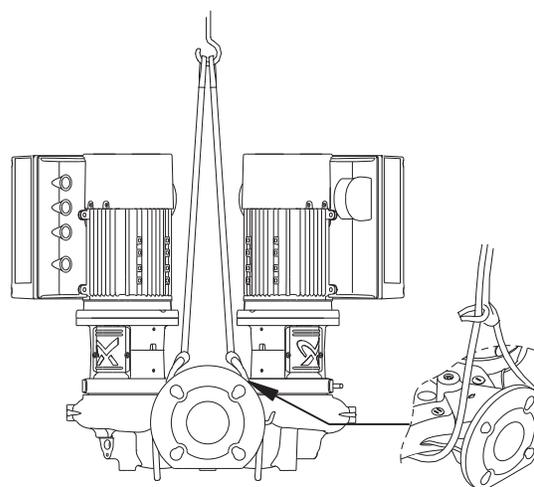


Do not lift the product by the terminal box.

Lift the pump by means of nylon straps.



TPE2, TPE3



TPE2 D, TPE3 D

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6. Applications

The pumps are designed to circulate hot or cold water in residential, institutional and industrial applications:

- heating systems
- district heating plants
- central heating systems for blocks of flats
- air-conditioning systems
- cooling systems.

In addition, the pumps are used for liquid transfer and water supply in for instance:

- washing systems
- domestic hot-water systems
- industrial systems in general.

To ensure optimum operation, the dimensioning range of the system must fall within the performance range of the pump.

6.1 Pumped liquids

WARNING

Contact with hazardous liquids

Death or serious personal injury



- If the pump is used for a liquid which is injurious to health, it will be classified as contaminated. In such cases, take proper precautions to avoid injury to health when operating or working on the pump.
- Wear personal protection equipment.

The pump is suitable for thin, clean, non-aggressive and non-flammable liquids, not containing solid particles or fibers that may attack the pump mechanically or chemically.

Examples:

- Central heating system water. The water must meet the requirements of accepted standards on water quality in heating systems.
- Cooling liquids.
- Domestic hot water.
- Industrial liquids.
- Softened water.

The pumping of liquids with a density and/or kinematic viscosity higher than that of water will have the following effects:

- a considerable pressure drop
- a drop in hydraulic performance
- a rise in power consumption.

The EPDM O-rings fitted as standard are primarily suitable for water.

If the water contains minerals, synthetic oils or chemicals or other liquids than water are pumped, choose the O-rings accordingly.

7. Mechanical installation



WARNING

Hot or cold surface

Death or serious personal injury



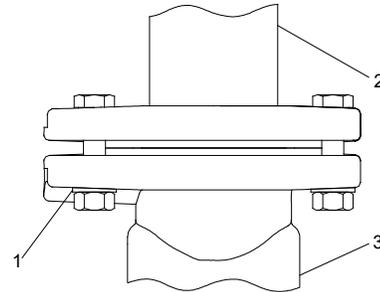
- Make sure that no one can accidentally come into contact with hot or cold surfaces.



In order to maintain the UL mark, additional requirements apply to the equipment. See Appendix on page Installation in the USA and Canada.

Install the pump in a dry well-ventilated, but frost-free position.

When installing pumps with oval bolt holes in the pump flange, use washers as shown in figure below.



Use of washers for oval bolt holes

Pos.	Description
1	Washer
2	Installation
3	Pump

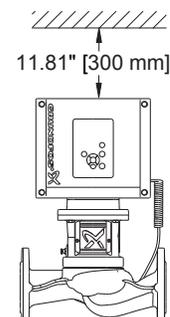
Arrows on the pump casing show the direction of flow of liquid through the pump.

You can install the pump in horizontal or vertical pipes.



The motor must never fall below the horizontal plane.

For inspection and removal of motor or pump head, a clearance of 11.81" (300 mm) is required above the motor.

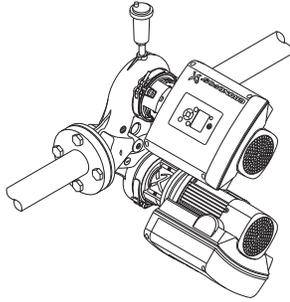


Required clearance above the motor

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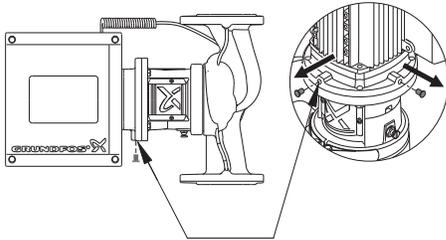
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Twin-head pumps installed in horizontal pipes must be fitted with an automatic air vent in the upper part of the pump casing. The automatic air vent is not supplied with the pump.



Automatic air vent

If the liquid temperature falls below the ambient temperature or the pump is installed outside, condensation may form in the motor during standstill. In this case, make sure that one of the drain holes in the motor flange is open and points downwards.



Drain hole in motor flange

If twin-head pumps are used for pumping liquids with a temperature below 32 °F (0 °C), condensed water may freeze and cause the coupling to get stuck. You can solve the problem by installing heating elements. Whenever possible, install the pump with motor shaft in horizontal position.

! Observe the conditions in section Operating conditions.

7.1 Pipes

Fit isolating valves on either side of the pump to avoid draining the system if the pump needs to be cleaned or repaired.

The pump is suitable for pipeline mounting, provided that the pipes are adequately supported on either side of the pump.

Single-head pumps are designed for pipeline mounting only.

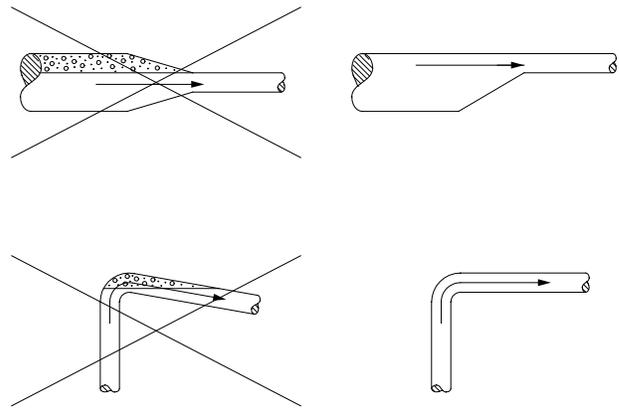
Twin-head pumps are prepared for installation on a mounting bracket or base plate.

When installing the pipes, make sure that the pump casing is not stressed by the pipes.

The inlet and outlet pipes must be of an adequate size, taking the pump inlet pressure into account.

To avoid sediment build-up, do not fit the pump at the lowest point of the system.

Install the pipes so that air locks are avoided, especially on the inlet side of the pump.



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Correct pipes on the inlet side of the pump

! The pump must not run against a closed outlet valve as this will cause an increase in temperature or formation of steam in the pump, which may cause damage to the pump.

If there is any risk of the pump running against a closed outlet valve, ensure a minimum liquid flow through the pump by connecting a bypass or a drain to the outlet pipe. The drain can for instance be connected to a tank. A minimum flow rate of 10 % of the flow rate at maximum efficiency is needed at all times.

Flow rate and head at maximum efficiency are stated on the pump nameplate.

7.2 Terminal box positions

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be accidentally switched on.

WARNING

Hazardous liquids

Death or serious personal injury



- If the pump is used for a liquid which is injurious to health, it will be classified as contaminated. In such case, take proper precautions to avoid injury to health when operating or working on the pump.
- Wear personal protection equipment.

WARNING

Falling objects

Death or serious personal injury



- If the pump head has been lifted partly or completely from the pump casing, pay special attention when fitting the pump head again.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Wear safety shoes.
- Pay special attention that the pump head does not fall down when loosening the clamp. See figure Clamp (A).

WARNING

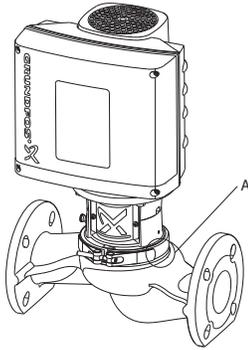
Pressurized system

Death or serious personal injury

- Pay special attention to escaping vapor when loosening the clamp. See figure Clamp (A).
- Wear personal protection equipment.

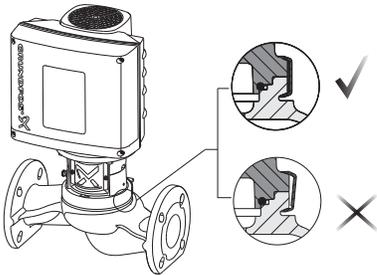
You can turn the terminal box to any position.
Change the terminal box position as follows:

1. Loosen the clamp securing the pump head to the casing.



Clamp (A)

2. Turn the pump head to the required position.
3. Check the following before you tighten the clamp:
 - The contact face of the pumping casing and that of the pump head must be in full contact.
 - The clamp must be positioned correctly in the flange recess of both the pump head and the pump casing.



Positioning of clamp ring

Torque: 5.9 lbf-ft (± 0.75) (8 Nm (± 1)).

7.3 Fitting of pump head

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be accidentally switched on.

WARNING

Falling objects

Death or serious personal injury



- If the pump head has been lifted partly or completely from the pump casing, pay special attention when fitting the pump head again.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Wear safety shoes.
- Pay special attention that the pump head does not fall down when loosening the clamp. See figure clamp (A).

WARNING

Pressurized system

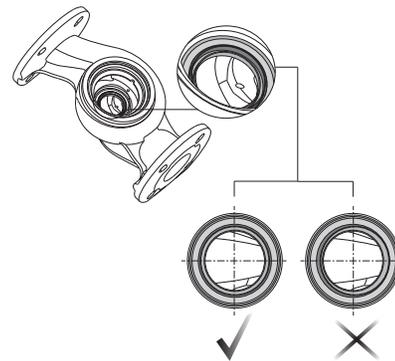
Death or serious personal injury



- Pay special attention to any escaping vapor when loosening the clamp. See figure clamp (A).
- Wear personal protection equipment.

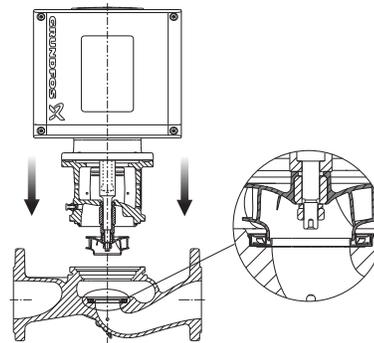
If for some reasons the pump head has been lifted from the pump casing, follow the following procedure in order to mount the pump head correctly:

1. Visually check that the neck ring is centered in the pump casing.



Centering of neck ring

2. Gently lower the pump head with rotor shaft and impeller into the pump casing.



Lowering of pump head

3. Check the following before you tighten the clamp:
 - The contact face of the pump casing and that of the pump head must be in full contact.
 - The clamp must be positioned correctly in the flange recess of both the pump head and the pump casing.

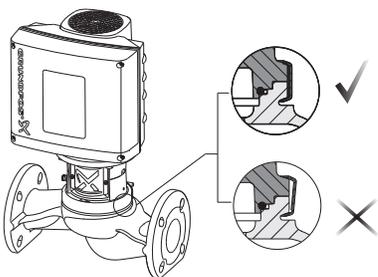
TM060721

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TM060723

Torque: 5.9 lbf-ft (± 0.75) (8 Nm (± 1)).



TM060724

Positioning of clamp ring

7.4 Base plate

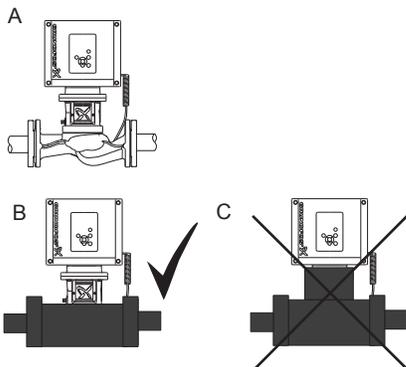
Twin-head pumps have tapped holes in the bottom of the pump casing. You can use the holes for mounting a base plate.

7.5 Insulation



Do not insulate the motor stool as this will trap any vapor escaping from the shaft seal, thus causing corrosion. Covering the motor stool with insulation will also make inspection and service difficult.

Follow the guidelines in figure below when insulating the pump.



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Insulation of TPE2, TPE3 pumps

Pos.	Description
A	Without insulation
B	Correct insulation
C	Incorrect insulation

7.6 Frost protection

Drain pumps which are not being used during periods of frost to avoid damage.

7.7 Cable entries

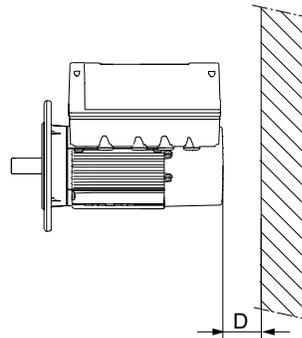
See the size of the cable entries in the section on other technical data.

Related information

[33. Other technical data](#)

7.8 Ensuring motor cooling

Leave at least 2.0" (50 mm) between the end of the fan cover and a wall or other fixed objects.



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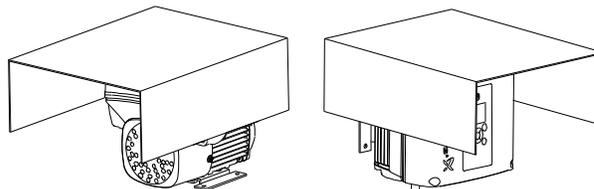
Minimum distance, *D*, from the motor to a wall or other fixed objects

Related information

[10.12 Motor cooling](#)

7.9 Outdoor installation

If you install the motor outdoors, provide the motor with a cover and open the drain holes to avoid condensation on the electronic components.



TM053496

Examples of covers, not supplied by Grundfos



When lifting a cover to the motor, observe the guidelines in section Ensuring motor cooling.

The cover must be sufficiently large to ensure that the motor is not exposed to direct sunlight, rain or snow. Grundfos does not supply covers. We therefore recommend that you have a cover built for the specific application. In areas with high humidity, we recommend that you connect the motor permanently to the power supply and activate the built-in standstill heating function. See section Standstill heating.



In order to maintain the UL mark, additional requirements apply to the equipment. See Appendix Installation in the USA and Canada.

Related information

[16.26 Standstill heating](#)

8. Electrical installation

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be accidentally switched on.

DANGER

Electric shock

Death or serious personal injury



- Check that the supply voltage and frequency correspond to the values stated on the nameplate.

If the power supply cable is damaged, it must be replaced by the manufacturer, the manufacturer's service partner or a similarly qualified person.

The user or the installer is responsible for the installation of correct grounding and protection according to local regulations. All operations must be carried out by a qualified electrician.

The product should be installed according to National Electrical Code (NEC) requirements.

8.1 Protection against electric shock, indirect contact

WARNING

Electric shock

Death or serious personal injury



- Connect the motor to ground and provide protection against indirect contact in accordance with local regulations.

Ground conductors must always have a yellow and green, PE, or yellow, green and blue, PEN, color marking.

8.1.1 Protection against mains voltage transients

The motor is protected against mains voltage transients in accordance with EN 61800-3.

8.1.2 Motor protection

The motor requires no external motor protection. The motor incorporates thermal protection against slow overloading and blocking.

8.2 Cable requirements

8.2.1 Cable cross-section

DANGER

Electric shock

Death or serious personal injury



- Always comply with local regulations as to cable cross-sections.

3 x 200-240 V

Power [hp (kW)]	Conductor type	Cross section	
		[mm ²]	[AWG]
3.0 (2.2)	Solide	2.5 - 10	14-8
	Toronné	2.5 - 10	14-8

8.2.2 Conductors

Type

Stranded or solid copper conductors.

Temperature rating

Temperature rating for conductor insulation: 140 °F (60 °C).

Temperature rating for outer cable sheath: 167 °F (75 °C).

8.3 Mains supply

DANGER

Electric shock

Death or serious personal injury



- Use the recommended fuse size. See section Supply voltage.

8.3.1 Three-phase supply voltage

Three-phase motors are available for the voltages below:

- 3 x 200-240 V - 10 %/+ 10 %, 60 Hz, PE.

The wires in the motor terminal box must be as short as possible.

Excepted from this is the separated grounding conductor which must be so long that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.

In order to avoid loose connections, ensure that the terminal block for L1, L2 and L3 is pressed home in its socket when the supply cable has been connected.

For feeder overcurrent protective device ratings, see section Supply voltage.



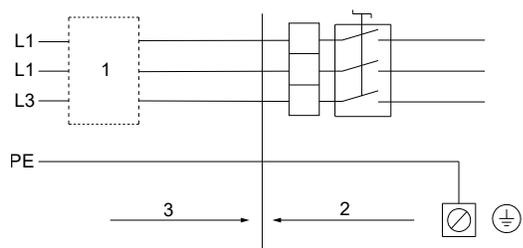
If you want to supply the motor through an IT network, make sure that you have a suitable motor variant. If you are in doubt, contact Grundfos.

Only the following motors can be supplied through an IT network:

- Motors with speed of 1450-2000/2200 rpm and up to 2.0 hp (1.5 kW)
- Motors with speed of 2900-4000 rpm or 4000-5900 rpm and up to 3.0 hp (2.2 kW).



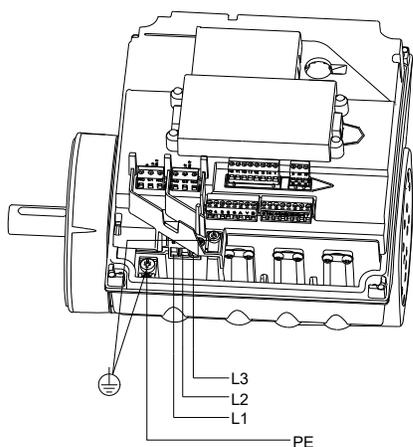
Corner grounding is not allowed for supply voltage above 3 x 240 V and 3 x 480 V, 60 Hz.



TM076350

Example of a mains-connected motor with feeder overcurrent protective device

Pos.	Description
1	FOPD
2	Breaker cabinet
3	Installation in building



TM053495

Power supply connection, three-phase motors

8.4 Additional protection

The total leakage current of all the electrical equipment in the installation must be taken into account. You can find the leakage current of the motor in sections Leakage current, AC.

The product can cause a direct current in the protective ground conductor.

Overvoltage and undervoltage protection

Overvoltage and undervoltage may occur in case of unstable power supply or a faulty installation. The motor is stopped if the motor falls outside the permissible voltage range. The motor restarts automatically when the voltage is again within the permissible voltage range. Therefore, no additional protection relay is required.



The motor is protected against transients from the power supply according to EN 61800-3. In areas with high lightning intensity, we recommend external lightning protection.

Overload protection

If the upper load limit is exceeded, the motor automatically compensates for this by reducing the speed and stops if the overload condition persists.

The motor remains stopped for a set period. After this period, the motor automatically attempts to restart. The overload protection prevents damage to the motor. Consequently, no additional motor protection is required.

Overtemperature protection

The electronic unit has a built-in temperature sensor as an additional protection. When the temperature rises above a certain level, the motor automatically compensates for this by reducing the speed and stops if the temperature keeps rising. The motor remains stopped for a set period. After this period, the motor automatically attempts to restart.

Protection against phase unbalance

Three-phase motors must be connected to a power supply with a quality corresponding to IEC 60146-1-1, class C, to ensure correct motor operation at phase unbalance. This also ensures long life of the components.

8.5 Connection terminals

The descriptions and terminal overviews in this section apply to both single-phase and three-phase motors.

For maximum tightening, see section Torques.

Related information

33.1 Torques

8.5.1 Connection terminals, advanced functional module, FM 310

Inputs and outputs

The module has these connections:

- three analog inputs
- one analog output
- two dedicated digital inputs
- two configurable digital inputs or open-collector outputs
- Grundfos Digital Sensor input and output
- two Pt100/1000 inputs
- two LiqTec sensor inputs
- two signal relay outputs
- GENIbus/Modbus connection
- two Safe Torque Off (STO) inputs
- Ethernet connection
- Bluetooth (BLE) connection.

Signal relay 1

LIVE: You can connect supply voltages up to 250 VAC to the output.

SELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or safety extra-low voltage to the output as desired.

Signal relay 2

SELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or safety extra-low voltage to the output as desired.

Connection terminals for inputs and outputs

WARNING

Electric shock

Death or serious personal injury



- Make sure that the wires to be connected to the relays below are separated from each other by reinforced insulation in their entire lengths.

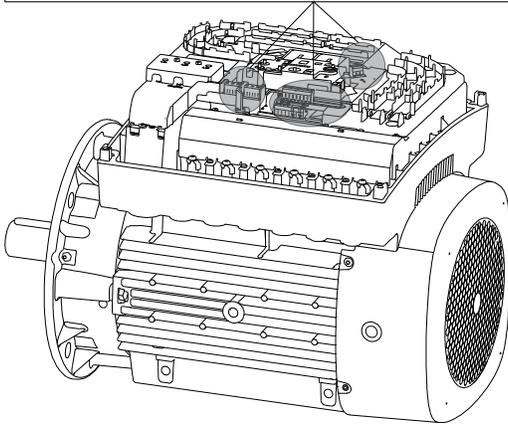
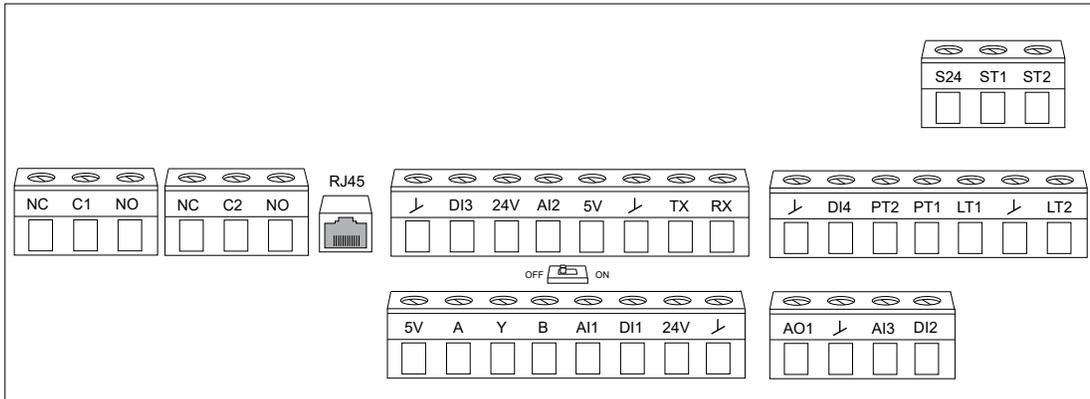
The inputs and outputs are internally separated from the power supply-conducting parts by reinforced insulation and galvanically separated from other circuits. All control terminals are supplied with safety extra-low voltage (SELV), ensuring protection against electric shock.

Cables for the relays must be double insulated or reinforced and rated at least 250V/2A.

The Ethernet cable must be rated at least Cat5e/Cat6 with screening.



The 250V contacts of the alarm relay (NC/C1/NO) on the functional modules FM310 must not be connected directly to the mains supply, but energized by an isolated power supply or transformer with galvanic isolation.



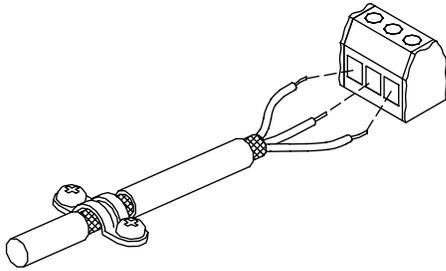
TM082862

Terminal	Type	Function
NC	Normally closed contact	Signal relay 1: LIVE or SELV
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2: SELV only
C2	Common	
NO	Normally open contact	
RJ45	Ethernet	Ethernet communication
GND	GND	Signal ground
DI3	DI3/OC1	Digital input/output, configurable Open collector: Maximum 24 V resistive or inductive
24V	+24 V	Power supply
AI2	AI2	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V.
5V	+5 V	Power supply to a potentiometer or sensor
GND	GND	Signal ground
TX	GDS TX	Grundfos Digital Sensor output
RX	GDS RX	Grundfos Digital Sensor input
GND	GND	Signal ground
DI4	DI4/OC2	Digital input/output, configurable Open collector: Maximum 24 V resistive or inductive
PT2	Pt100/1000 input 2	Pt100/1000 sensor input 2

Terminal	Type	Function
PT1	Pt100/1000 input 1	Pt100/1000 sensor input 1
LT1	LiqTec sensor input 1	LiqTec sensor input 1 White conductor
GND	GND	Signal ground Brown and black conductors
LT2	LiqTec sensor input 2	LiqTec sensor input 2 Blue conductor
5V	+5 V	Power supply to a potentiometer or sensor
A	GENIbus, A	GENIbus, A (+) / Modbus, D1 (+)
Y	GENIbus, Y	GENIbus, GND / Modbus, GND
B	GENIbus, B	GENIbus, B (-) / Modbus, D0 (-)
AI1	AI1	Analog input: <ul style="list-style-type: none"> • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V.
DI1	DI1	Digital input, configurable  Digital input 1 is factory-set to be start or stop input where an open circuit results in stop. A jumper has been factory-fitted between terminals DI1 and GND. Remove the jumper if digital input 1 is to be used as external start or stop or any other external function.
24V	+24 V	Power supply
GND	GND	Signal ground
AO1	AO	Analog output: <ul style="list-style-type: none"> • 0-20 mA or 4-20 mA • 0-10 V.
GND	GND	Signal ground
AI3	AI3	Analog input: <ul style="list-style-type: none"> • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V.
DI2	DI2	Digital input, configurable
S24	+24 V (STO)	Power supply to the Safe Torque Off inputs
ST1	STO1	Safe Torque Off - Input 1
ST2	STO2	Safe Torque Off - Input 2

8.6 Signal cables

- Use screened cables with a cross-sectional area of minimum 20 AWG (0.5 mm²) and maximum 16 AWG (1.5 mm²) for external on/off switch, digital inputs, setpoint and sensor signals.
- Connect the screens of the cable to frame at both ends with good connection. The screens must be as close as possible to the terminals.



Stripped cable with screen and wire connections

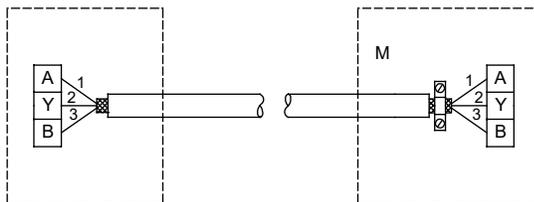
- Always tighten screws for frame connections whether a cable is fitted or not.
- The wires in the motor terminal box must be as short as possible.

8.7 Bus connection cable

8.7.1 New installations

For the bus connection, use a screened 3-core cable with a cross-sectional area of minimum 20 AWG (0.5 mm²) and maximum 16 AWG (1.5 mm²).

- If the motor is connected to a unit with a cable clamp which is identical to the one on the motor, connect the screen to this cable clamp.
- If the unit has no cable clamp as shown in figure below, leave the screen unconnected at his end.

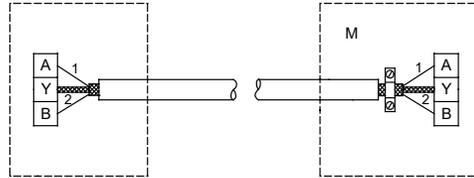


Connection with screened 3-core cable

Pos.	Description
M	Motor

8.7.2 Replacing a motor

- If you have used a screened 2-core cable in the existing installation, connect the cable as shown below.



Connection with screened 2-core cable

Pos.	Description
M	Motor

- If you have used a screened 3-core cable in the existing installation, follow the instructions in section New installation.

TM021325

TM078986

TM078987

9. Startup

9.1 Flushing the pipe system



Before starting up the pump for the first time, clean the pipe system thoroughly by flushing it and filling it with clean water.



Do not use the pump for flushing the pipe system. The warranty does not cover any damage caused by flushing the pipe system by means of the pump.

9.2 Priming the pump



Fill the pump with liquid and vent the pump before starting the pump. To ensure correct venting, the vent screw must point upwards.

Closed system or open systems where the liquid level is above the pump inlet

1. **WARNING**



Escaping hot or cold liquids

Death or serious personal injury

- Pay attention to the direction of the vent hole, and make sure that the escaping hot or cold liquid does not cause injury to persons or damage to the equipment.
- Wear personal protection equipment.

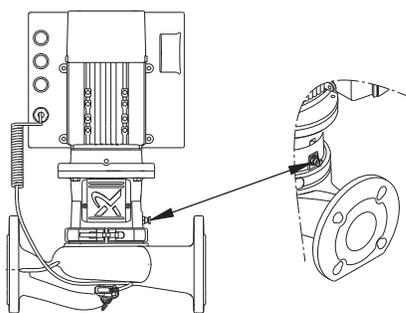
Close the outlet isolating valve and loosen the vent screw in the motor stool. See figure Position of vent screw.

2. Slowly open the isolating valve in the inlet pipe until a steady stream of liquid runs out of the vent hole.
3. Tighten the vent screw and completely open the isolating valve(s).

Open systems where the liquid level is below the pump inlet

Make sure that the inlet pipe and the pump is filled with liquid and vented before you start the pump.

1. Close the outlet isolating valve and open the isolating valve in the inlet pipe.
2. Loosen the vent screw.



TM057922

Position of vent screw

3. Remove the plug from one of the pump flanges, depending on the pump location.
4. Pour liquid through the priming port until the inlet pipe and the pump are filled with liquid.
5. Replace the plug and tighten securely.
6. Tighten the vent screw.

You can fill the inlet pipe with liquid and vent it before you connect it to the pump. You can also install a priming device before the pump.

9.3 Starting the pump

1. Before starting the pump, completely open the isolating valve on the inlet side of the pump and leave the outlet isolating valve almost closed.
2. Start the pump. See section User interfaces.
3. Vent the pump by loosening the vent screw in the motor stool until a steady stream of liquid runs out of the vent hole. See figure Position of vent screw.

WARNING

Escaping hot or cold liquids

Death or serious personal injury



- Pay attention to the direction of the vent hole, and make sure that the escaping hot or cold liquid does not cause injury to persons or damage to the equipment.
- Wear personal protection equipment.

4. When the pipe system has been filled with liquid, slowly open the outlet isolating valve until it is completely open.

Related information

11. [User interfaces](#)

9.4 Shaft seal run-in

The seal faces are lubricated by the pumped liquid, meaning that there may be a certain amount of leakage from the shaft seal.

When the pump is started up for the first time, or when a new shaft seal is installed, a certain run-in period is required before the leakage is reduced to an acceptable level. The time required for this depends on the operating conditions, i.e. every time the operating conditions change, a new run-in period will be started.

Under normal conditions, the leaking liquid will evaporate.

As a result, no leakage will be detected.

However, liquids such as kerosene will not evaporate.

The leakage may therefore be seen as a shaft seal failure.

10. Operating conditions

10.1 Maximum number of starts and stops

The number of starts and stops via the power supply must not exceed ten times per hour.



When switched on via the power supply, the product starts after approximately 5 seconds.

If a higher number of start and stops are required, use a digital input for external start and stop when starting and stopping the product or use the Safe Torque Off (STO) function.



When started via an external on and off switch, the product starts immediately.

10.2 Alternating operation of twin-head pumps

On twin-head pumps, the duty and backup pumps must be alternated on a regular basis, i.e. once a week, to ensure an even distribution of the operating hours on both pumps. The pumps alternate automatically. See section Multipump setup.

If twin-head pumps are used for pumping domestic hot water, the duty and backup pumps must be alternated on a regular basis, i.e. once a day, to avoid blocking of the backup pump due to deposits such as calcareous deposits. The pumps alternate automatically. See section Multipump setup.

Related information

[16.51 Multipump setup](#)

10.3 Liquid temperature

-13 °F (-25 °C) up to +248 °F (+120 °C).

The maximum liquid temperature depends on the shaft seal type and the pump type.

Depending on the cast-iron version and the pump application, the maximum liquid temperature may be limited by local regulations and laws.

The maximum liquid temperature is stated on the pump nameplate.



If the pump is used for liquids at high temperatures, the life of the shaft seal and the built-in Grundfos sensor may be reduced.

10.4 Ambient temperature

10.4.1 Ambient temperature

	During storage and transportation	During operation
Minimum	-22 °F (-30 °C)	32 °F (0 °C)
Maximum	140 °F (60 °C)	104 °F (+40 °C)

10.4.2 Ambient temperature during operation

	3 x 200-240 V
Minimum	-4 °F (-20 °C)
Maximum	104 °F (40 °C)

The motor can operate with the rated power output, P2, at 122 °F (50 °C), but continuous operation at higher temperatures reduces the expected product life. If the motor is to operate at ambient temperatures between 122 and 140 °F (50 and 60 °C), select an oversized motor. Contact Grundfos for further information.

10.5 Operating pressure or test pressure

The pressure test has been made with water containing anti-corrosive additives at a temperature of 68 °F (20 °C).

Operating pressure		Test pressure	
[bar]	[psi]	[bar]	[psi]
10.3	150	15.5	225

10.6 Inlet pressure

To ensure optimum and quiet pump operation, the inlet pressure, system pressure, must be adjusted correctly. See the table in Appendix.

For the calculation of specific inlet pressures, contact the local Grundfos company.

10.7 Electrical data

See sections Technical data, single-phase motors and Technical data, three-phase motors.

For specific motor data, see the motor nameplate.

10.8 Sound pressure level

See section Sound pressure level.

Related information

[33.2 Sound pressure level](#)

10.9 Environment

Non-aggressive and non-explosive atmosphere.

10.10 Installation altitude

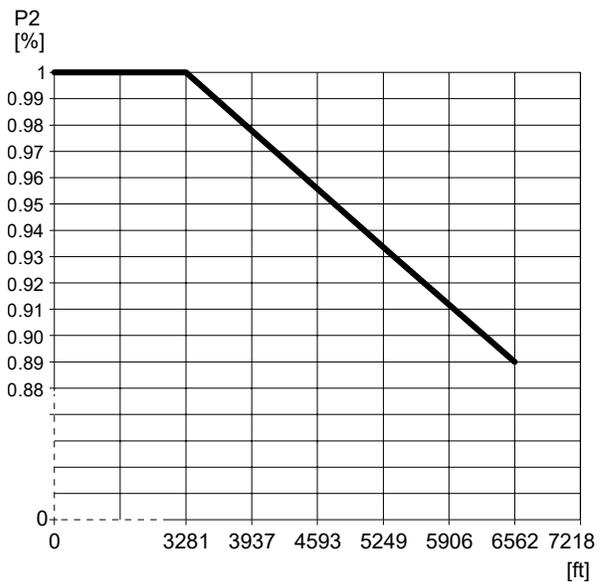
Installation altitude is the height above sea level of the installation site.

Motors installed up to 3281 ft (1000 m) above sea level can be loaded 100 %.

The motors can be installed up to 6560 ft (2000 m) above sea level.



Motors installed more than 3281 ft (1000 m) above sea level must not be fully loaded due to the low density and consequent low cooling effect of the air.



Motor output power in relation to altitude

TMD069374

10.11 Humidity

Maximum air humidity: 95 %.

If the air humidity is constantly high and above 85 %, one of the drain holes in the drive-end flange must be open.

See section Delivery.

Related information

[5.1 Delivery and handling](#)

10.12 Motor cooling

To ensure cooling of motor and electronics, observe the following:

- Position the motor in such a way that adequate cooling is ensured. See the section on ensuring motor cooling.
- The temperature of the cooling air must not exceed 122°F (50°C).
- Keep cooling fins and fan blades clean.

Related information

[7.8 Ensuring motor cooling](#)

11. User interfaces

WARNING



Hot surface

Death or serious personal injury

- Only touch the buttons on the display as the product may be very hot.

WARNING



Electric shock

Death or serious personal injury

- If the control panel is cracked or perforated, replace it immediately. Contact the nearest Grundfos sales company.

You can make pump settings by means of the following user interfaces:

Control panels

- Standard control panel. See section Standard control panel.
- Advanced control panel. See section Advanced control panel.

Remote controls

- Grundfos GO Remote. See section Grundfos GO.

If the power supply to the pump is switched off, the settings are stored.

Related information

[9.3 Starting the pump](#)

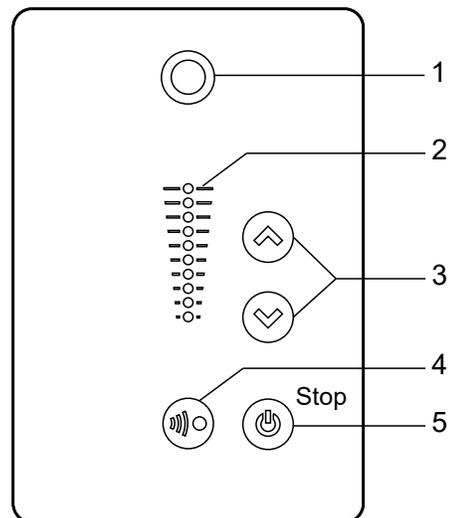
[12. Standard control panel](#)

[13. Advanced control panel](#)

[15. Grundfos GO](#)

12. Standard control panel

Pump variant	Fitted as standard	Option
TPE3, TPE3 D	-	•
TPE2, TPE2 D	-	•



TM054848

Standard control panel

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump. See section Grundfos Eye for further information.
2	-	Light fields for indication of setpoint.
3		Up and down. Changes the setpoint.
4		Allows radio communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye on the pump flashes continuously. Press on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.
5		Makes the pump ready for operation as well as starts and stops the pump. Start: If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. See section Priority of settings. Stop: If you press the button when the pump is running, the pump always stops. The "Stop" text next to the button is on.

Related information

[11. User interfaces](#)

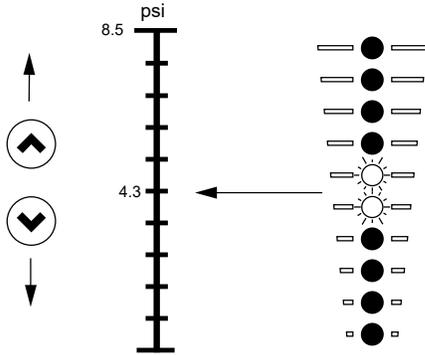
12.1 Setpoint setting

Set the desired setpoint of the pump by pressing \odot or \ominus . The light fields on the control panel will indicate the setpoint set.

12.1.1 Pump in differential-pressure control mode

The following example applies to a pump in an application where a pressure sensor gives a feedback to the pump. If you retrofit the sensor to the pump, set it up manually as the pump does not automatically register a connected sensor.

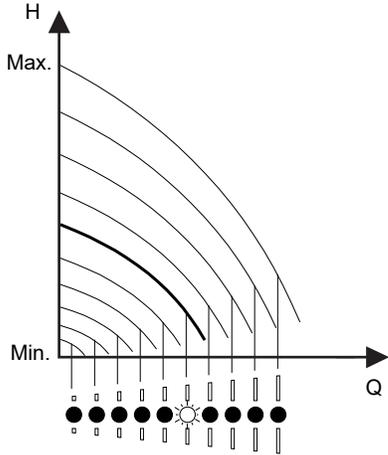
Figure below shows that the light fields 5 and 6 are activated, indicating a desired setpoint of 4.3 psi (3 m) with a sensor measuring range from 0 to 8.5 psi (0 to 6 m). The setting range is equal to the sensor measuring range.



Setpoint set to 4.3 psi (3 m), differential-pressure control

12.1.2 Pump in constant-curve control mode

In constant-curve control mode, the pump performance will lie between the maximum and minimum curve of the pump.



Pump in constant-curve control mode

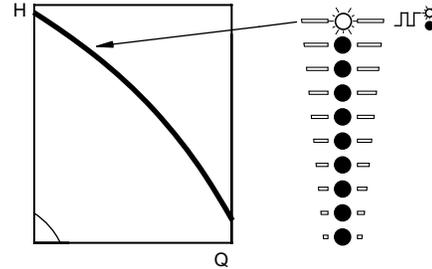
Setting to maximum curve:

- Press \odot continuously to change over to the maximum curve of the pump. The top light field flashes. When the top light field is on, press \odot for 3 seconds until the light field starts flashing.
- To change back, press \ominus continuously until the desired setpoint is indicated.

Example

Pump set to maximum curve.

Figure below shows that the top light field is flashing, indicating maximum curve.



Maximum curve duty

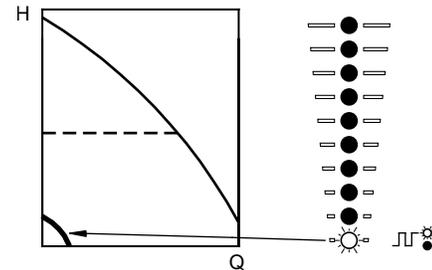
Setting to minimum curve:

- Press \ominus continuously to change over to the minimum curve of the pump. The bottom light field flashes. When the bottom light field is on, press \ominus for 3 seconds until the light field starts flashing.
- To change back, press \odot continuously until the desired setpoint is indicated.

Example

Pump set to minimum curve.

Figure below shows that the bottom light field is flashing, indicating minimum curve.



Minimum curve duty

TM061116

TM054895

TM054896

TM054897

12.1.3 Start and stop of pump



If you have stopped the pump by pressing and the Stop text on the control panel is on, you can only give it free to operation by pressing again.

If you have stopped the pump by pressing , you can restart it by pressing or by using Grundfos GO.

Start the pump by pressing or by continuously pressing until the desired setpoint is indicated.

Stop the pump by pressing . When the pump is stopped, the Stop text next to the button is on. You can also stop the pump by continuously pressing until none of the light fields are on.

You can also stop the pump with the Grundfos GO or via a digital input set to **External stop**. See section Priority of settings.

Related information

[19. Priority of settings](#)

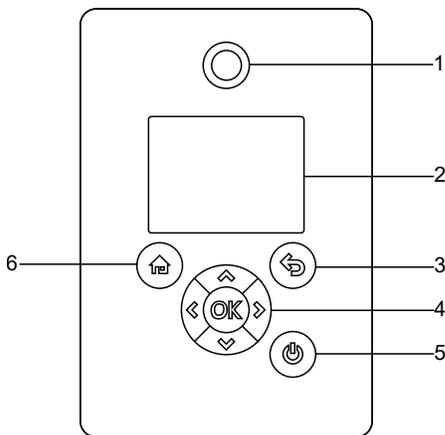
12.1.4 Resetting of fault indications

Reset a fault indication in one of the following ways:

- Via the digital input if it has been set to Alarm resetting.
- Briefly press or on the pump. This does not change the setting of the pump. You cannot reset a fault indication by pressing or if the buttons have been locked.
- Switch off the power supply until the indicator lights are off.
- Switch the external start-stop input off and on.
- With Grundfos GO.

13. Advanced control panel

Pump variant	Fitted as standard	Option
TPE3, TPE3 D	•	-
TPE2, TPE2 D	•	-



Advanced control panel

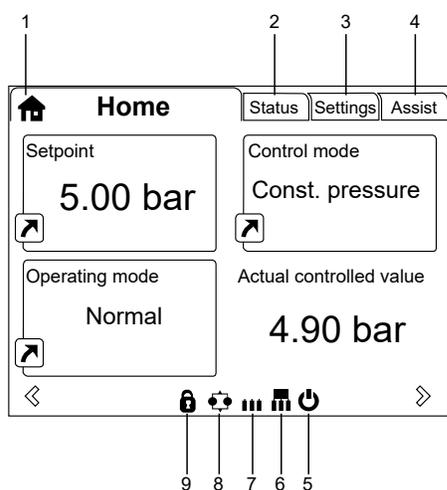
TM054849

Pos.	Symbol	Description
1		Grundfos Eye Shows the operating status of the pump. For further information, see section Grundfos Eye.
2	-	Graphical color display.
3		Goes one step back.
4		Navigates between main menus, displays and digits. When you change the menu, the display always shows the top display of the new menu.
		Navigates between submenus. Changes value settings. Note: If you have disabled the possibility to make settings with the Enable/disable settings function, then you can enable it again temporarily by pressing these buttons simultaneously for at least 5 seconds. See section "Buttons on product" (Enable/disable settings).
		Saves changed values, resets alarms and expands the value field. Enables radio communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye flashes. A note also appears in the pump display stating that a wireless device wants to connect to the pump. Press OK on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.
		Makes the pump ready for operation, and starts and stops the pump. Start: If you press the button when the pump is stopped, the pump only starts if no other functions with higher priority have been enabled. See section Priority of settings. Stop: If you press the button when the pump is running, the pump is always stopped. When you stop the pump via this button, the icon appears in the bottom of the display.
5		
6		Goes to the Home menu.

Related information

- [11. User interfaces](#)
- [16.35 Buttons on product \(Enable/disable settings\)](#)
- [19. Priority of settings](#)
- [20. Grundfos Eye](#)

14. Home display



TM064516

Example of Home display

Pos.	Symbol	Description
1		Home This menu shows up to four user-defined parameters. You can select parameters shown as shortcut icon  , and when pressing OK you go directly to the Settings display for the selected parameter.
2	-	Status This menu shows the status of the pump and system as well as warnings and alarms.
3	-	Settings This menu gives access to all setting parameters. You can make detailed settings of the pump in this menu. See section Description of functions.
4	-	Assist This menu enables assisted pump setup, provides a short description of the control modes and offers fault advice. See section Assist.
5		Indicates that the pump has been stopped via the  button.
6		Indicates that the pump is functioning as master pump in a multipump system.
7		Indicates that the pump is functioning as a slave pump in a multipump system.
8		Indicates that the pump is operating in a multipump system. See section "Multipump setup" (Setup of multi-pump system).
9		Indicates that the possibility to make settings has been disabled for protective reasons. See section "Buttons on product" (Enable/disable settings).

Related information

[16.1 Heat energy monitor](#)

[16.35 Buttons on product \(Enable/disable settings\)](#)

[16.47 Assist](#)

[16.51 Multipump setup](#)

14.1 Start-up guide

The pump incorporates a startup guide which is started at the first startup. See section Run start-up guide. After the startup guide, the main menus appear in the display.

Related information

[16.44 Run start-up guide](#)

14.2 Menu overview for advanced control panel

	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Home	•	•	•
Status	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Operating status	•	•	•
Operating mode, from	•	•	•
Power cons., sys.	•	•	•
Pump performance	•	•	•
Actual controlled value	•	•	•
Max. curve and duty point	•	-	•
Resulting setpoint	•	•	•
Liquid temp.	•	-	•
Speed	•	•	•
Acc. flow and specific energy	•	•	•
Power and energy consumption	•	•	•
Measured values	•	•	•
Analog input 1	•	•	•
Analog input 2	•	•	•
Analog input 3	•	•	•
Pt100/1000 input 1	•	•	•
Pt100/1000 input 2	•	•	•
Analog output	•	•	•
Warning and alarm	•	•	•
Actual warning or alarm	•	•	•
Warning log	•	•	•
Alarm log	•	•	•
Heat energy monitor	•	-	•
Heat power	•	-	•
Heat energy	•	-	•
Flow rate	•	-	•
Volume	•	-	•
Hours counter	•	-	•
Temperature 1	•	-	•
Temperature 2	•	-	•
Differential temp.	•	-	•
Operating log	•	•	•
Operating hours	•	•	•
Trend data	•	-	•
Module type	•	•	•
Date and time	•	•	•
Product identification	•	•	•
Motor bearing monitoring	•	•	•
Multi-pump system	-	-	•
System operating status	-	-	•
System performance	-	-	•
System input power and energy	-	-	•

Status	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Pump 1, multi-pump system	-	-	•
Pump 2, multi-pump system	-	-	•
Pump 3, multi-pump system	-	-	•
Pump 4, multi-pump system	-	-	•

Settings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Warning and alarm Setpoint	•	•	•
Operating mode	•	•	•
Set manual speed	•	•	•
Set user-defined speed	•	•	•
Control mode	•	•	•
FLOWLIMIT	•	-	•
Automatic Night Setback	•	-	•
Analog inputs	•	•	•
Analog input 1, setup	•	•	•
Analog input 2, setup	•	•	•
Analog input 3, setup	•	•	•
Grundfos Direct Sensor	•	-	•
Pt100/1000 inputs	•	•	•
Pt100/1000 input 1 , setup	•	•	•
Pt100/1000 input 2 , setup	•	•	•
Digital inputs	•	•	•
Digital input 1, setup	•	•	•
Digital input 2, setup	•	•	•
Digital inputs/outputs	•	•	•
Digital input/output 3, setup	•	•	•
Digital input/output 4, setup	•	•	•
Relay outputs	•	•	•
Relay output 1	•	•	•
Relay output 2	•	•	•
Analog output	•	•	•
Output signal	•	•	•
Function of analog output	•	•	•
Controller settings	•	•	•
Operating range	•	•	•
Setpoint influence	•	•	•
External setpoint function	•	•	•
Predefined setpoints	•	•	•
Temperature influence	•	-	•
Monitoring functions	•	•	•
Motor bearing monitoring	•	•	•
Motor bearing maintenance	•	•	•
Limit-exceeded function	•	•	•
Alarm handling			
Special functions	•	•	•
Pulse flow meter setup	•	•	•
Ramps	•	•	•

Settings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Standstill heating	•	•	•
Communication	•	•	•
Pump number	•	•	•
Enable/disable radio comm.	•	•	•
General settings	•	•	•
Language	•	•	•
Set date and time	•	•	•
Units	•	•	•
Enable/disable settings	•	•	•
Delete history	•	•	•
Define Home display	•	•	•
Display settings	•	•	•
Store actual settings	•	•	•
Recall stored settings	•	•	•
Run start-up guide	•	•	•

Assist	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Assisted pump setup	•	•	•
Setup, analog input	•	•	•
Setting of date and time	•	•	•
Setup of multi-pump system	•	•	•
Description of control mode	•	•	•
Assisted fault advice	•	•	•

15. Grundfos GO

CAUTION

Radiation

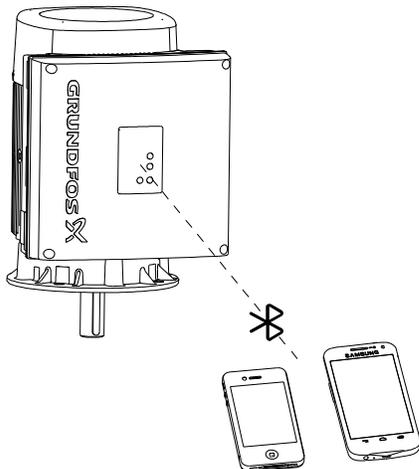
Minor or moderate personal injury



- Locate the product at a minimum distance of 8 inches (20 cm) from any body parts. Human tissue may be heated by RF energy.

The product is designed for wireless communication with Grundfos GO using Bluetooth (BLE).

Grundfos GO enables you to set functions and gives you access to status overviews, technical product information and current operating parameters.



TM082930

Related information

[11. User interfaces](#)

15.1 Communication

When Grundfos GO initiates communication with the product, the indicator light in the centre of Grundfos Eye flashes green.

On products fitted with the HMI 200 operating panel, you can enable communication by pressing the **Communication** button.

On products fitted with the HMI 300 operating panel, the display indicates that a wireless device is trying to connect to the product. Press **OK** on the operating panel to connect the product with Grundfos GO, or press the **Home** button to reject connection.

Symbol	Description
OK	Press OK on the operating panel to connect the product with Grundfos GO.
	Press the Home button to reject connection.

Related information

[20. Grundfos Eye](#)

15.1.1 Bluetooth communication

Bluetooth communication can take place at distances up to 32.8 ft (10 m). The first time Grundfos GO communicates with the product, you enable communication by pressing the **Communication** button or **OK** on the operating panel.

Later when communication takes place, the product is recognised by Grundfos GO, and you can select the product from the **List** menu.

15.2 Menu overview for Grundfos GO main menus

- Available.

	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Dashboard	•	•	•
View all metrics	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Pump and application	•	•	•
Actual controlled value	•	•	•
Acc. flow, specific energy	•	•	•
Energy consumption	•	•	•
Energy consumption, system	-	-	•
Power consumption	•	•	-
Power consumption, system	-	-	•
Motor bearing service	•	•	-
Resulting setpoint	•	•	-
Resulting system setpoint	-	-	•
Motor speed	•	•	
Pump 1	-	-	•
Pump 2	-	-	•
Pump 3	-	-	•
Pump 4	-	-	•
Operating Log	•	•	•
Operating hours	•	•	-
Operating hours, system	-	-	•
Motor current	•	•	-
Number of starts	•	•	-
Liquid temperature	•	-	-
Inputs/outputs	•	•	-
Analog input 1	•	•	-
Analog input 2	•	•	-
Analog input 3	•	•	-
Analog, Output	•	•	-
Pt100/1000 input 1	•	•	-
Pt100/1000 input 2	•	•	-
Digital input 1	•	•	-
Digital input 2	•	•	-
Digital input/output 3	•	•	-
Digital input/output 4	•	•	-
Monitored metrics	•	•	•
Ambient temperature	•	•	•
Differential pressure	•	•	•
Differential pressure, inlet/outlet	•	•	•
Differential temperature, external	•	•	•
External pressure 1	•	•	•
External pressure 2	•	•	•
Feed tank pressure	•	•	•
Flow rate	•	•	•
Pressure : inlet	•	•	•

View all metrics	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Pressure : outlet	•	•	•
Other parameter	•	•	•
Tank pressure, external	•	•	•
Temperature 1	•	•	•
Temperature 2	•	•	•
Fitted modules	•	•	-
Functional module	•	•	-
Power board	•	•	-
CIM module	•	•	-
Operating panel	•	•	-
Trend data	•	-	-
Heat energy monitor	•	-	-
Settings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Pump and application	•	•	•
Pump name	•	•	•
Control mode	•	•	•
FLOWLIMIT	•	-	-
Automatic night setback	•	-	-
Temperature influence	•	-	-
Operating mode	•	•	•
Setpoint	•	•	•
Set user-defined speed	•	•	•
Operating range	•	•	•
Controller	•	•	•
External setpoint funct.	•	•	
Predefined setpoint	•	•	•
Setting the proportional pressure	•	•	-
Liquid properties	•	-	-
Buttons on product	•	•	-
Service	•	•	-
Alternating operation, time	-	-	•
Sensor to be used	-	-	•
Time for pump changeover	-	-	•
Inputs/outputs	•	•	-
Analog input 1	•	•	-
Analog input 2	•	•	-
Analog input 3	•	•	-
Grundfos Direct Sensor	•	-	-
Analog output	•	•	-
Pt100/1000 input 1	•	•	-
Pt100/1000 input 2	•	•	-
Digital input 1	•	•	-
Digital input 2	•	•	-
Digital input/output 3	•	•	-
Digital input/output 4	•	•	-
Relay output 1	•	•	-
Relay output 2	•	•	-

Settings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Monitoring functions	•	•	-
Alarm handling	•	•	-
Limit 1 exceeded	•	•	•
Limit 2 exceeded	•	•	•
Limit 3 exceeded	•	•	•
Limit 4 exceeded	•	•	•
Motor bearing monitoring	•	•	-
Special functions	•	•	•
Pulse flow meter	•	•	-
Ramps	•	•	-
Standstill heating	•	•	-
Communication	•	•	-
Bluetooth communication ¹⁾	•	•	-
Radio communication	•	•	-
GENIbus Number	•	•	-
Connectivity and port settings ¹⁾	•	•	-
General	•	•	-
Connection code	•	•	-
Date and time	•	•	-
Firmware	•	•	-
Store settings	•	•	-
Recall settings	•	•	-
Undo	•	•	-
Unit configuration	•	•	-

¹⁾ Only available if an advanced functional module, type FM310 or FM311, is fitted.

Alarms and warnings	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Alarm log	•	•	•
Warning log	•	•	•

Setup	TPE3, TPE3 D	TPE2, TPE2 D	Multipump system
Assisted pump setup	•	•	-
Assisted fault advice	•	•	-
Application wizard	•	•	-
Multi-pump setup	•	•	•

16. Description of functions

16.1 Heat energy monitor

Pump variant	Heat energy monitor
TPE3, TPE3 D	•
TPE2, TPE2 D	-

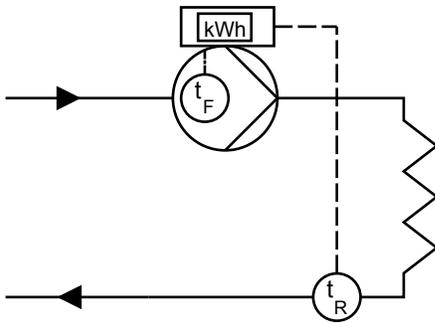
The heat energy monitor is a monitoring function that calculates the heat energy consumption within a system. The built-in flow estimation needed for the calculation has an inaccuracy of $\pm 10\%$ of the maximum flow in the area down to 10% flow and down to 12.5% of the maximum head. The calculations are based on water at a temperature of 68 °F (20 °C). Also, the temperature measurements needed for the calculation have some inaccuracy depending on the sensor type. Therefore, you cannot use the heat energy value for billing purposes. However, the value is perfect for optimization purposes in order to prevent excessive energy costs caused by system imbalances.

The heat energy monitor requires an additional temperature sensor installed in the flow pipe or return pipe depending on where the pump is installed.



Use the analog inputs and/or Pt100/1000 inputs for measuring the temperatures used for calculation by the heat energy monitor.

The used inputs must not be set to **Not active** and one of the measuring parameters must be set to **Temperature 2**.



Example: pump installed in the flow pipe and additional temperature sensor installed in the return pipe

Pos.	Description
t _F	Flow-pipe temperature
t _R	Return-pipe temperature

If the pumped liquid specific heat and density is different from water, other values can be entered to the pump via Grundfos GO in order to get a more precise heat energy.

Related information

[14. Home display](#)

16.2 Setpoint

Pump variant	Setpoint
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can set the setpoint for all control modes, except AUTOADAPT and FLOWADAPT, in this submenu when you have selected the desired control mode. See section Control mode.

Related information

[16.6 Control mode](#)

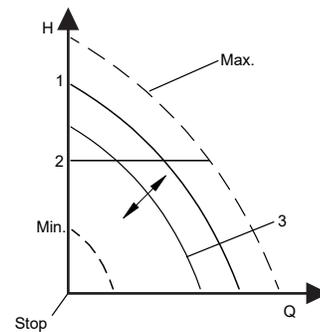
16.3 Operating mode

Pump variant	Operating mode
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Possible operating modes:

- **Normal**
The pump runs according to the selected control mode.
- **Stop**
The pump stops.
- **Min.**
Use the minimum-curve mode in periods in which a minimum flow is required. This operating mode is for instance suitable for manual night setback if you do not want to use the automatic night setback.
- **Max.**
Use the maximum-curve mode in periods in which a maximum flow is required. This operating mode is for instance suitable for systems with hot-water priority.
- **Manual**
The pump is operating at a manually set speed. In Manual the setpoint via bus is overruled.
- **User-defined speed**
The motor is operating at a speed set by the user. See section Set user-defined speed.

All operating modes are illustrated in the figure below.



Operating modes

Pos.	Description
1	Normal
2	Normal
3	Manual

Related information

[16.5 User-defined speed](#)

16.4 Set manual speed

Pump variant	Set manual speed
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in the advanced control panel. With Grundfos GO, you set the speed via the **Setpoint** menu.

You can set the pump speed in % of the maximum speed. When you have set the operating mode to **Manual**, the pump starts running at the set speed. The speed can then be changed manually via Grundfos GO or via the advanced control panel.

16.5 User-defined speed

Use this function to set the motor speed in percentage of the maximum speed. When you have set the operating mode to **User-defined speed**, the pump starts running at the set speed.

Related information

[16.3 Operating mode](#)

16.6 Control mode

Pump variant	Control mode
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Possible control modes:

- **AUTOADAPT**
- **FLOWADAPT**
- **Prop. press.** (proportional pressure)
- **Const. pressure** (constant pressure)
- **Const. temp.** (constant temperature)
- **Con. diff. press.** (constant differential pressure)
- **Con. diff. temp.** (constant differential temperature)
- **Const. flow rate** (constant flow rate)
- **Const. level** (constant level)
- **Const. other val.** (constant other value)
- **Const. curve** (constant curve).



Set the operating mode to **Normal** before you enable a control mode.

You can change the setpoint for all control modes, except AUTOADAPT and FLOWADAPT, in the **Setpoint** submenu under **Settings** when you have selected the desired control mode.

Related information

[16.2 Setpoint](#)

[16.44 Run start-up guide](#)

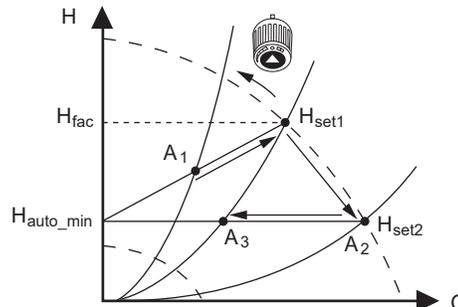
[16.52 Description of control mode](#)

16.6.1 AUTOADAPT

Pump variant	AUTOADAPT
TPE3, TPE3 D	•
TPE2, TPE2 D	-

The AUTOADAPT control mode continuously adapts the pump performance according to the actual system characteristic.

Manual setting of the setpoint is not possible.



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AUTOADAPT

When the AUTOADAPT control mode has been enabled, the pump will start with the factory setting, H_{fac} is equal to H_{set1} , and then adjust its performance to A_1 .

When the pump registers a lower head on the maximum curve, A_2 , the AUTOADAPT function automatically selects a correspondingly lower control curve, H_{set2} . If the valves in the system close, the pump will adjust its performance to A_3 .

A_1 :	Original duty point.
A_2 :	Lower registered head on the maximum curve.
A_3 :	New duty point after AUTOADAPT control.
H_{set1} :	Original setpoint setting.
H_{set2} :	New setpoint after AUTOADAPT control.
$H_{fac.}$:	Factory setting.
H_{auto_min} :	A fixed value of 5 ft (1.5 m).

The AUTOADAPT control mode is a form of proportional-pressure control where the control curves have a fixed origin, H_{auto_min} .

The AUTOADAPT control is developed specifically for heating systems and we do not recommend that you use it for air-conditioning and cooling systems.

16.6.2 FLOWADAPT

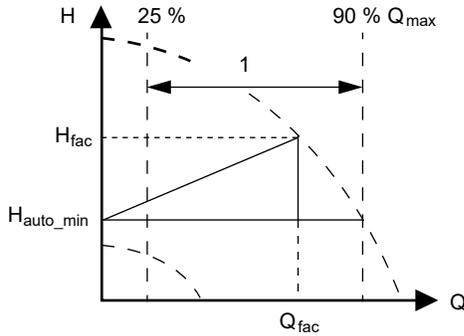
Pump variant	FLOWADAPT
TPE3, TPE3 D	•
TPE2, TPE2 D	-

When you select FLOWADAPT, the pump runs AUTOADAPT and ensures that the flow never exceeds the entered FLOWLIMIT value.

The setting range for FLOWLIMIT is 25 to 90 %, of the maximum flow rate of the pump.

The factory setting of the FLOWLIMIT is the flow where the AUTOADAPT factory setting meets the maximum curve.

Do not set the FLOWLIMIT lower than the sized duty point.



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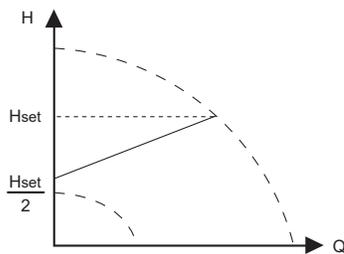
FLOWADAPT

Pos.	Description
1	Setting range

16.6.3 Proportional pressure

Pump variant	Proportional pressure
TPE3, TPE3 D	•
TPE2, TPE2 D	-

The pump head is reduced at decreasing water demand and increased at rising water demand.



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Proportional pressure

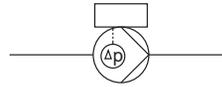
This control mode is especially suitable in systems with relatively large pressure losses in the distribution pipes. The head of the pump increases proportionally to the flow in the system to compensate for the large pressure losses in the distribution pipes.

The setpoint can be set with an accuracy of 0.33 ft (0.1 m). The head against a closed valve is half the setpoint.

For more information about settings, see section Proportional-pressure setup.

Example

- Factory-fitted differential-pressure sensor.



Proportional pressure

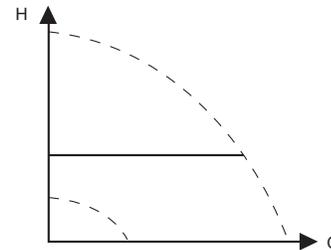
Related information

[16.7 Proportional-pressure setup](#)

16.6.4 Constant pressure

Pump variant	Constant pressure
TPE3, TPE3 D	•
TPE2, TPE2 D	•

We recommend this control mode if the pump is to deliver a constant pressure, independently of the flow in the system. The pump maintains a constant pressure independently of the flow rate.



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Constant pressure

This control mode requires an external pressure sensor as shown in the examples below. You can set the pressure sensor in the **Assist** menu. See section Assisted pump setup.

Examples

- One external pressure sensor.



Constant pressure

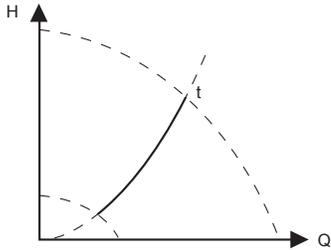
Related information

[16.48 Assisted pump setup](#)

16.6.5 Constant temperature

Pump variant	Constant temperature
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This control mode ensures a constant temperature. Constant temperature is a comfort control mode that you can use in domestic hot-water systems to control the flow to maintain a constant temperature in the system.

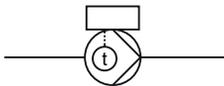


Constant temperature

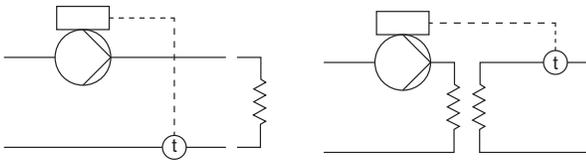
This control mode requires either an internal or external temperature sensor as shown in the examples below:

Examples

- Factory-fitted temperature sensor (only TPE3, TPE3 D).



- One external temperature sensor.

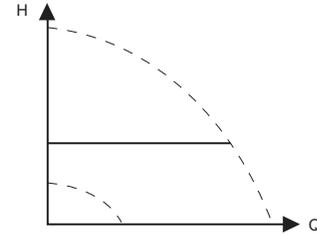


Constant temperature

16.6.6 Constant differential pressure

Pump variant	Constant differential pressure
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The pump maintains a constant differential pressure in the system and the pump performance is controlled according to this.

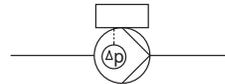


Constant differential pressure

This control mode requires either an internal or external differential-pressure sensor or two external pressure sensors as shown in the examples below:

Examples

- Factory-fitted differential-pressure sensor. Only TPE3, TPE3 D.



- One external differential-pressure sensor.

The pump uses the input from the sensor to control the differential pressure.

You can set sensor manually or by using the **Assist** menu. See section Assisted pump setup.



- Two external pressure sensors.

Constant differential-pressure control is achievable with two individual pressure sensors. The pump uses the inputs from the two sensors and calculates the differential pressure.

The sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the **Assist** menu. See section Assisted pump setup.

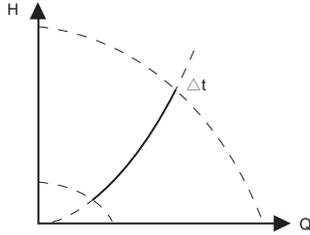
TM057900

TM057901

16.6.7 Constant differential temperature

Pump variant	Constant differential temperature
TPE3,TPE3 D	•
TPE2,TPE2 D	•

The pump maintains a constant differential temperature in the system and the pump performance is controlled according to this.



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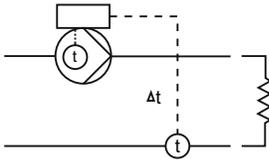
Constant differential temperature

This control mode requires either two temperature sensors or one external differential-temperature sensor. See the examples below. The temperature sensors can either be analog sensors connected to two of the analog inputs or two Pt100/Pt1000 sensors connected to the Pt100/1000 inputs, if these are available on the specific pump.

Set the sensor in the **Assist** menu under **Assisted pump setup**. See section Assisted pump setup.

Examples

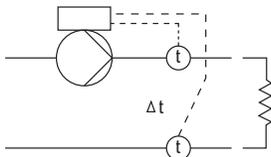
- Factory-fitted temperature sensor and an external temperature sensor. Only TPE3, TPE3 D.



- Two external temperature sensors.

Constant differential-temperature control is achievable with two temperature sensors. The pump uses the inputs from the two sensors and calculates the differential temperature.

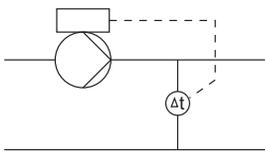
The sensors must have the same unit and must be set as feedback sensors. You can set the sensors manually, sensor by sensor, or by using the **Assist** menu. See section Assisted pump setup.



- One external differential-temperature sensor.

The pump uses the input from the sensor to control the differential temperature.

You can set the sensor manually or by using the **Assist** menu. See section Assisted pump setup.



Constant differential temperature

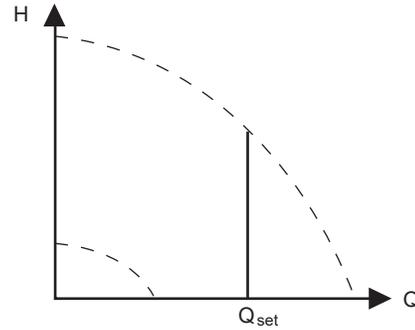
Related information

[16.48 Assisted pump setup](#)

16.6.8 Constant flow rate

Pump variant	Constant flow rate
TPE3,TPE3 D	•
TPE2,TPE2 D	•

The pump maintains a constant flow in the system, independently of the head.



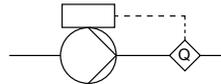
TM057955

Constant flow rate

This control mode requires an external flow sensor. See the example below.

Example

- One external flow sensor.

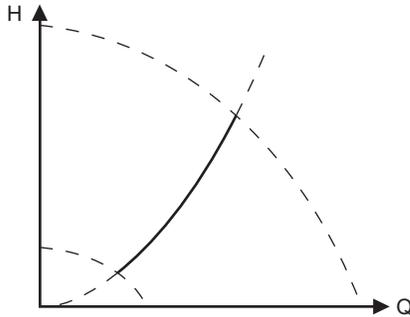


Constant flow rate

16.6.9 Constant level

Pump variant	Constant level
TPE3,TPE3 D	•
TPE2,TPE2 D	•

The pump maintains a constant level, independently of the flow rate.



Constant level

This control mode requires an external level sensor.

The pump can control the level in a tank in two ways:

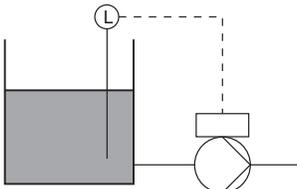
- As an emptying function where the pump draws the liquid from the tank.
- As a filling function where the pump pumps the liquid into the tank.

See the figure Constant level.

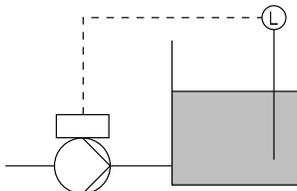
The type of level control function depends on the setting of the built-in controller. See the section on the controller (controller settings).

Examples

- One external level sensor.
 - emptying function.



- One external level sensor.
 - filling function.



TM057941

16.6.10 Constant other value

Pump variant	Constant other value
TPE3,TPE3 D	•
TPE2,TPE2 D	•

Any other value is kept constant.

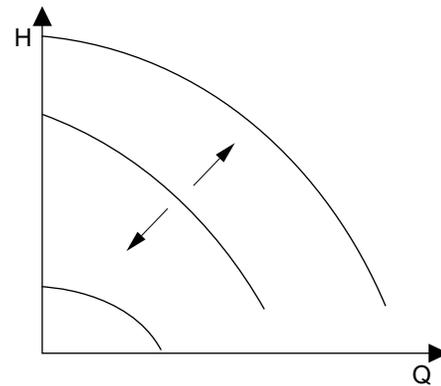
Use this control mode if you want to control a value which is not available in the **Control mode** menu. Connect a sensor measuring the controlled value to one of the analog inputs of the pump. The controlled value will be shown in percentage of sensor range.

16.6.11 Constant curve

Pump variant	Constant curve
TPE3,TPE3 D	•
TPE2,TPE2 D	•

You can set the pump to operate according to a constant curve, like an uncontrolled pump.

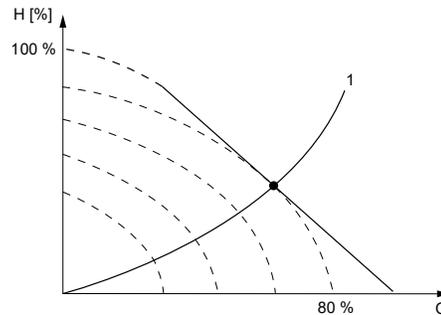
You can set the desired speed in % of maximum speed in the range from 13 to 100 %.



TM057957

Constant curve

Depending on the system characteristic and the duty point, the 100 % setting may be slightly smaller than the actual maximum curve of the pump even though the display shows 100 %. This is due to the power limitations built into the pump. The deviation varies according to pump type and pressure loss in the pipes.



TM060912

Power limitations influencing the maximum curve

Pos.	Description
1	Limited max. curve

Related information

[16.20 External setpoint function](#)

16.7 Proportional-pressure setup

Pump variant	Proportional-pressure setup
TPE3, TPE3 D	•
TPE2, TPE2 D	-

Control-curve function

You can set the curve either to quadratic or linear.

Zero-flow head

You can set this value in % of the setpoint. With a setting of 100 %, the control mode is equal to constant differential pressure.

Related information

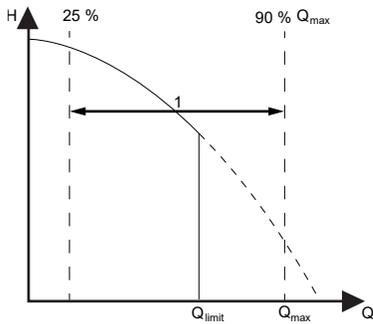
[16.6.3 Proportional pressure](#)

16.8 FLOWLIMIT

Pump variant	FLOWLIMIT
TPE3, TPE3 D	•
TPE2, TPE2 D	-

FLOWLIMIT

- Enable FLOWLIMIT function.
- Set FLOWLIMIT.



TM057908

FLOWLIMIT

Pos.	Description
1	Setting range

You can combine the FLOWLIMIT function with the following control modes:

- **Prop. press.**
- **Con. diff. press.**
- **Con. diff. temp.**
- **Const. temp.**
- **Const. curve.**

A flow-limiting function ensures that the flow never exceeds the entered FLOWLIMIT value.

The setting range for FLOWLIMIT is 25 to 90 % of the Q_{max} of the pump.

The factory setting of the FLOWLIMIT is the flow where the AUTOADAPT factory setting meets the maximum curve.

16.9 Automatic Night Setback

Pump variant	Automatic Night Setback
TPE3, TPE3 D	•
TPE2, TPE2 D	-

Once you have enabled automatic night setback, the pump automatically changes between normal duty and night setback, duty at low performance.

Changeover between normal duty and night setback depends on the flow-pipe temperature.

The pump automatically changes over to night setback when the built-in sensor registers a flow-pipe temperature drop of more than 18 to 27 °F (10 to 15 °C) within approximately two hours. The temperature drop must be at least 1.8 °F/min (0.1 °C/min).

Changeover to normal duty takes place without a time lag when the temperature has increased by approximately 18 °F (10 °C).

You cannot enable automatic night1 setback when the pump is in constant-curve mode.

16.10 Analog inputs

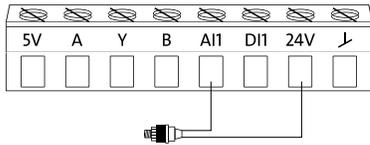
Pump variant	Analog inputs
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The inputs and outputs available depend on the functional module fitted in the motor.

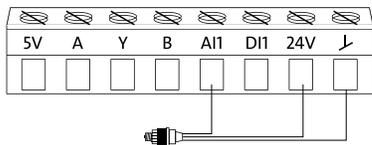
Functional module	Analog input 1 (Terminal AI1)	Analog input 2 (Terminal AI2)	Analog input 3 (Terminal AI3)
FM310	•	•	•

Wiring examples:

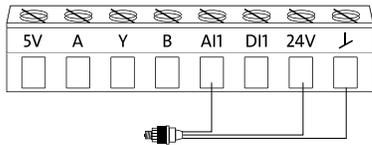
These connection scenarios are also valid for connection to analog input 2 and analog input 3.



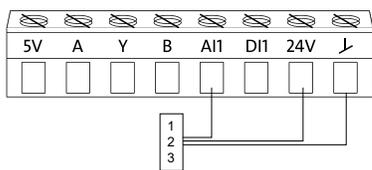
2-wire sensor, 0/4-20 mA



3-wire sensor, 0/4-20 mA



3-wire sensor, 0.5 - 3.5 V, 0-5 V, 0-10 V



Setpoint influence, 0.5 - 3.5 V, 0-5 V, 0-10 V; 0/4-20 mA

Pos.	Description
1	Potentiometer
2	PLC
3	External controller

To set the input, make the settings below:

Function

You can set the inputs to these functions:

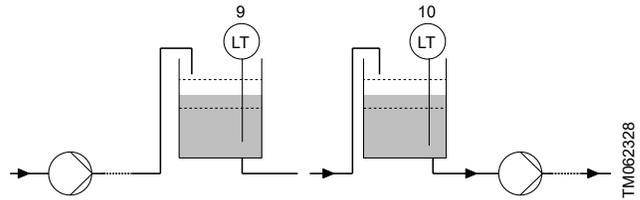
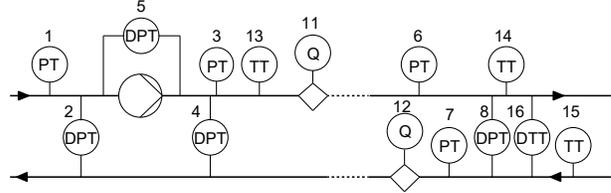
- **Not active**
- **Feedback sensor**

The sensor is used for the selected control mode.

- **Setpoint influence**
The input signal is used for influencing the setpoint.
- **Other function**
The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.



Pos.	Sensor function/measured parameter
1	Inlet pressure
2	Diff. press., inlet
3	Outlet pressure
4	Diff. press.,outlet
5	Diff. press.,pump
6	Press. 1, external
7	Press. 2, external
8	Diff. press., ext.
9	Storage tank level
10	Feed tank level
11	Pump flow
12	Flow, external
13	Liquid temp.
14	Temperature 1
15	Temperature 2
16	Differential temp.
Not shown	Ambient temp.
Not shown	Other parameter

Unit

Parameter	Available units
Pressure	bar, m, kPa, psi, ft
Level	cm, m, ft, in
Pump flow	m ³ /h, l/s, yd ³ /h, gpm
Liquid temperature	°C, °F
Other parameter	%

Electrical signal

Available signal types:

- 0.5 - 3.5 V

- 0-5 V
- 0-10 V
- 0-20 mA
- 4-20 mA.

Sensor range, minimum value

Set the minimum value of the connected sensor.

Sensor range, maximum value

Set the maximum value of the connected sensor.

Related information

- [16.20.1 Setpoint influence](#)
- [16.20 External setpoint function](#)
- [16.48 Assisted pump setup](#)
- [16.49 Setup, analog inputs](#)

16.10.1 Setting two sensors for differential measurement

Two analog sensors must be installed and connected electrically to measure a parameter at two different locations in a system.

The pressure, temperature and flow parameters can be used for differential measurement.

- Set the analog inputs according to the measured parameter:

Parameter	Sensor 1, measured parameter	Sensor 2, measured parameter
Pressure, option 1	Inlet pressure	Outlet pressure
Pressure, option 2	Press. 1, external	Press. 2, external
Flow	Pump flow	Flow, external
Temperature	Temperature 1	Temperature 2



If you want to use the **Con. diff. press.**, **Con. diff. temp.** or **Const. flow rate** control modes, you must configure both sensors as **Feedback sensor**.

16.11 Grundfos Direct Sensor

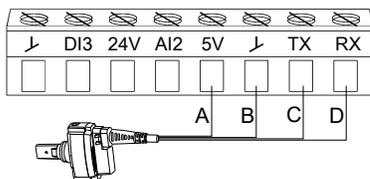
Pump variant	Grundfos Direct Sensor
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Grundfos Direct Sensor is a digital sensor that auto detects range and unit.

Grundfos Direct Sensor always has the capability to also measure the media temperature. The pump will automatically detect range and unit of the temperature sensor.

For information about the functions and measured parameters of each sensor, see the sections on the sensor, temperature and dry-running protection.

Wiring example:



TM086416

Designation	Color
A	Brown
B	Green
C	White
D	Yellow

Related information

[16.48 Assisted pump setup](#)

16.11.1 Sensor

Function

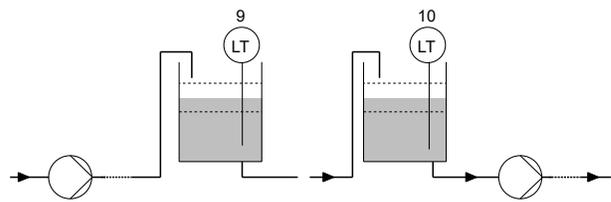
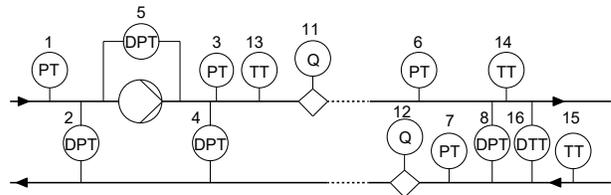
You can set the sensor to the following functions:

- **Not active**
- **Feedback sensor**
The sensor is used for the selected control mode.
- **Setpoint influence**
The input signal is used for influencing the setpoint.
- **Other function**
The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.

Note that the list will be reduced to match the installed sensor.



TM062328

Pos.	Sensor function/measured parameter
1	Inlet pressure
2	Diff. press., inlet
3	Outlet pressure
4	Diff. press.,outlet
5	Diff. press.,pump
6	Press. 1, external
7	Press. 2, external
8	Diff. press., ext.
9	Storage tank level
10	Feed tank level
11	Pump flow
12	Flow, external
13	Liquid temp.
14	Temperature 1
15	Temperature 2

Pos.	Sensor function/measured parameter
16	Differential temp.
Not shown	Ambient temp.
Not shown	Other parameter

16.11.2 Temperature

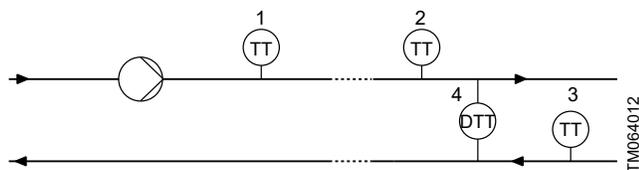
Function

You can set the sensor to the following functions:

- **Not active**
- **Feedback sensor**
The sensor is used for the selected control mode.
- **Setpoint influence**
The input signal is used for influencing the setpoint.
- **Other function**
The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.



Pos.	Sensor function/measured parameter
1	Liquid temp.
2	Temperature 1
3	Temperature 2
4	Differential temp.
Not shown	Ambient temp.

16.11.3 Dry-running protection

Use this function to set dry-running protection to **Enabled** or **Disabled**.

The function requires that a CPS sensor has been fitted in the pump head and connected to the pump. When you have enabled the dry-running protection function, it stops the pump if dry running occurs. Restart the pump manually if it has been stopped due to dry running.

Dry-running detection delay

You can set a detection delay to make sure that the pump is given a chance to start up and pump the air in the pump out before the dry-running protection function again detects dry running and stops the pump.



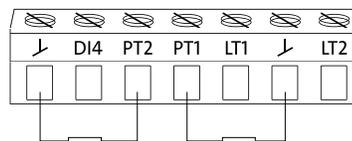
More than 10 seconds of dry running can damage the shaft seal and can reduce the lifetime of the product.

Range: 0-254 seconds.

16.12 Pt100/1000 inputs

Pump variant	Pt100/1000 inputs
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Wiring example:



Pt100/1000

To set the input, choose one of the below settings.

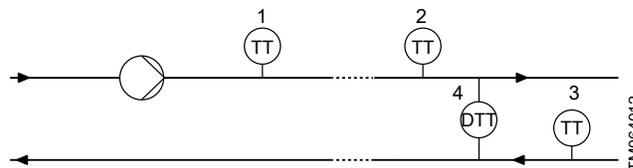
Function

You can set the inputs to these functions:

- **Not active**
- **Feedback sensor**
The sensor is used for the selected control mode.
- **Setpoint influence**
The input signal is used for influencing the setpoint.
- **Other function**
The sensor input is used for measurement or monitoring.

Measured parameter

Select one of the below parameters to be measured in the system by the sensor connected to the input.



Pos.	Sensor function/measured parameter
1	Liquid temp.
2	Temperature 1
3	Temperature 2
4	Differential temp.
Not shown	Ambient temp.

Measuring range

-58 to +399 °F (-50 to +204 °C).

Related information

- [16.20.1 Setpoint influence](#)
- [16.20 External setpoint function](#)
- [16.48 Assisted pump setup](#)
- [16.49 Setup, analog inputs](#)

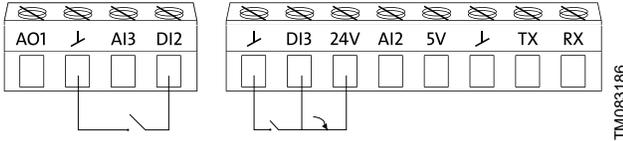
TM083189

TM064012

16.13 Digital inputs

Pump variant	Digital inputs
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Wiring example:



TM083186

Digital input

To set the input, make the settings below:

Function

Select one of these functions:

- **Not active**
When set to **Not active**, the input has no function.
- **External stop**
When the input is deactivated, open circuit, the pump stops.
- **Min.** (minimum speed)
When the input is activated, the pump runs at the set minimum speed.
- **Max.** (maximum speed)
When the input is activated, the pump runs at the set maximum speed.
- **User-defined speed**
When the input is activated, the motor runs at a speed set by the user.
- **External fault**
When the input is activated, a timer starts. If the input is activated for more than 5 seconds, the pump stops and a fault is indicated. This function depends on input from external equipment.
- **Alarm resetting**
When the input is activated, a possible fault indication is reset.
- **Dry running**
When this function has been selected, lack of inlet pressure or water shortage can be detected. When lack of inlet pressure or water shortage, dry running, is detected, the pump stops. The pump cannot restart as long as the input is activated. This requires the use of an accessory, such as these:
 - a pressure switch installed on the inlet side of the pump
 - a float switch installed on the inlet side of the pump.
- **Accumulated flow**
When this function has been selected, the accumulated flow can be registered. This requires the use of a flowmeter which can give a feedback signal as a pulse per defined flow of water. See section Pulse flowmeter setup.
- **Predefined setpoint digit 1**, applies only to digital input 2
When digital inputs are set to a predefined setpoint, the pump operates according to a setpoint based on the combination of the activated digital inputs. See section Predefined setpoints.
- **Activate output**
When the input is activated, the related digital output is activated. See Digital inputs/outputs. This is done without any changes to pump operation.
- **Local motor stop**

When the input is activated, the given pump in a multipump system stops without affecting the performance of the other pumps in the system.

The priority of the selected functions in relation to each other appears from section Priority of settings.

A stop command always has the highest priority.

Activation delay

Pump variant	Activation delay
TPE3, TPE3 D	-
TPE2, TPE2 D	•

Select the activation delay, T1.

It is the time between the digital signal and the activation of the selected function.

Range: 0 to 6000 seconds.

Duration timer mode

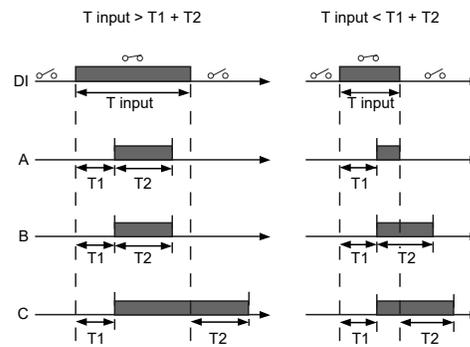
Select the mode. See figure Duration timer function of digital inputs.

- **Not active**
- active with interrupt, mode A
- active without interrupt, mode B
- active with after-run, mode C.

Select the duration time, T2.

It is the time which, together with the mode, determines how long the selected function is active.

Range: 0 to 15,000 seconds.



TM064949

Duration timer function of digital inputs

Pos.	Description
A	Mode C
B	Mode B
C	Mode A
DI	Digital input

Related information

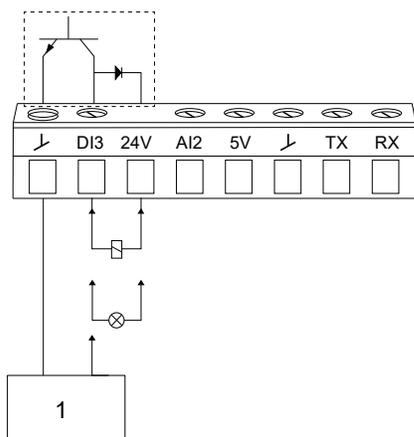
- [16.14 Digital inputs/outputs](#)
- [16.21 Predefined setpoints](#)
- [16.24 Pulse flowmeter setup](#)
- [16.24 Pulse flowmeter setup](#)
- [19. Priority of settings](#)

16.14 Digital inputs/outputs

Pump variant	Digital inputs/outputs
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can select whether the interface is to be used as an input or output. The output is an open collector. You can connect the open collector to, for example, an external relay or a controller such as a PLC.

Wiring example:



Digital output, open collector

Pos.	Description
1	External controller

Mode

You can set the digital input or output 3 and 4 to act as digital input or digital output:

- **Digital input**
- **Digital output.**

Function

You can set the digital input or output 3 and 4 to the functions mentioned below:

You can set the signal outputs to the following:

- Operation
- Pump running
- Ready
- Alarm
- Warning.

Functions if the digital input or output is set to input:

- **Not active**
- **Ext. stop**
- **Min.**
- **Max.**
- **User defined speed**
- **External fault**
- **Alarm resetting**
- **Dry running**
- **Accumulated flow**
- **Reverse rotation**
- **Predefined setpoint 2** (digital input/output 3)
- **Predefined setpoint 3** (digital input/output 4)
- **Local motor stop**

- **Activate output**

Functions if the digital input or output is set to output:

- **Not active**
- **Ready**
- **Alarm**
- **Operation**
- **Pump running**
- **Warning**
- **Limit 1 exceeded**
- **Limit 2 exceeded**
- **Limit 3 exceeded**
- **Limit 4 exceeded**
- **Digital input 1, state**
- **Digital input 2, state**
- **Digital input 3, state**
- **Digital input 4, state**

Related information

[16.13 Digital inputs](#)

[16.16 Signal relay \(Relay outputs\)](#)

16.15 Activation delay

Pump variant	Activation delay
TPE3, TPE3 D	-
TPE2, TPE2 D	•

Select the activation delay, T1.

It is the time between the digital signal and the activation of the selected function.

Range: 0 to 6000 seconds.

Duration timer mode

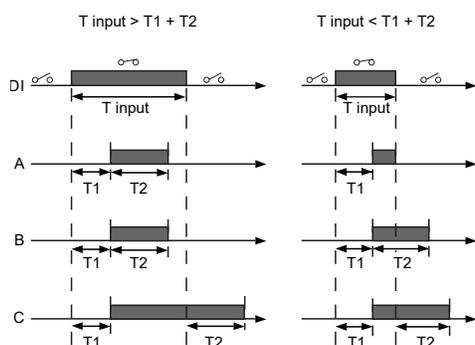
Select the mode.

- Not active
- active with interrupt, mode A
- active without interrupt, mode B
- active with after-run, mode C.

Select the duration time, T2.

It is the time which, together with the mode, determines how long the selected function is active.

Range: 0 to 15,000 seconds.



TM0649x9

Duration timer function of digital inputs

Pos.	Description
A	Mode C
B	Mode B
C	Mode A
DI	Digital input

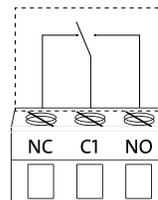
16.16 Signal relay (Relay outputs)

Pump variant	Signal relay
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The motor has two outputs for potential-free signals via two internal relays.

Functional module	Signal relay 1 (Terminals NC, C1, NO)	Signal relay 2 (Terminals NC, C2, NO)
FM310	•	•

Wiring example:



Relay output

Functions

You can configure the signal relays to be activated when the product changes to one of the following states:

- **Not active**
The relay has been deactivated.
- **Ready**
The motor may be running or is ready to run, and no alarms are active.
- **Alarm**
There is an active alarm, and the motor is stopped.
- **Operating (Operation)**
Operating equals **Running**, but the motor is still in operation when it is stopped, for example, by the **Stop function** or **Limit exceeded**.
- **Running (Pump running)**
The motor shaft is rotating.
- **Warning**
There is an active warning.
- **Limit 1 exceeded**
When you have set this function and the limit is exceeded, the signal relay is activated.
- **Limit 2 exceeded**
When you have set this function and the limit is exceeded, the signal relay is activated.
- **Limit 3 exceeded**
When you have set this function and the limit is exceeded, the signal relay is activated.
- **Limit 4 exceeded**
When you have set this function and the limit is exceeded, the signal relay is activated.
- **External fan control (Control of external fan)**
When you select this function, the relay is activated if the internal temperature of the motor electronics reaches a preset limit value. In this way the relay activates external cooling to add additional cooling to the motor.
- **Digital input 1, state**
Follow digital input 1. If digital input 1 is triggered, the digital output is also triggered.
- **Digital input 2, state**
Follow digital input 2. If digital input 2 is triggered, the digital output is also triggered.
- **Digital input 3, state**
Follow digital input 3. If digital input 3 is triggered, the digital output is also triggered.
- **Digital input 4, state**
Follow digital input 4. If digital input 4 is triggered, the digital output is also triggered.

Related information

[16.14 Digital inputs/outputs](#)

[16.23 Limit-exceeded function](#)

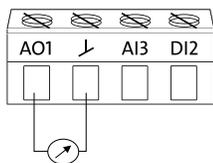
[21. Signal relays](#)

16.17 Analog output

Pump variant	Analog output
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The inputs and outputs available depend on the functional module fitted in the motor.

Wiring example:



TM083185

Analog output, 0/4-20 mA, 0-10 V

The analog output enables external control systems to read specific operating data.

To set the analog output, make the following settings.

Output signal

Possible signal types:

- 0-10 V
- 0-20 mA
- 4-20 mA.

Function of analog output

Actual speed		
0 %	100 %	200 %
0 V	10 V 5 V	10 V
0 mA	20 mA 10 mA	20 mA
4 mA	20 mA 12 mA	20 mA

Sensor value

Minimum	Maximum
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Resulting setpoint

0 %	100 %
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Motor load

0 %	100 %
0 V	10 V
0 mA	20 mA
4 mA	20 mA

Motor current		
0 %	100 %	200 %
0 V	5 V	10 V
0 mA	10 mA	20 mA
4 mA	12 mA	20 mA

Limit-exceeded function

Output not active	Output active
0 V	10 V
0 mA	20 mA
4 mA	20 mA

16.18 Controller (Controller settings)

Pump variant	Controller (Controller settings)
TPE3,TPE3 D	•
TPE2,TPE2 D	•

The pumps have a factory default setting of gain, K_p and integral time, T_i .

However, if the factory setting is not the optimum setting, you can change the gain and the integral time:

- Set the gain within the range from 0.1 to 20.
- Set the integral time within the range from 0.1 to 3600 s. If you select 3600 seconds, the controller functions as a P controller.

Furthermore, you can set the controller to inverse control.

This means that if the setpoint is increased, the speed is reduced. In the case of inverse control, set the gain within the range from -0.1 to -20.

Guidelines for setting of PI controller

The tables below show the recommended controller settings:

"Differential-pressure control"	K_p	T_i
	0.5	0.5
	0.5	0.5
	0.5	L1 < 16.4 ft (5 m): 0.5 L1 > 16.4 ft (5 m): 3 L1 > 32.8 ft (10 m): 5
	0.5	L1 < 16.4 ft (5 m): 0.5 L1 > 16.4 ft (5 m): 3 L1 > 32.8 ft (10 m): 5

L1 = Distance ft (m) between pump and sensor.

Constant temperature	K_p		T_i
	Heating system ²⁾	Cooling system ³⁾	
	0.5	-0.5	10 + 5L2
	0.5	-0.5	30 + 5L2

²⁾ In heating systems, an increase in pump performance results in a rise in temperature at the sensor.

³⁾ In cooling systems, an increase in pump performance results in a drop in temperature at the sensor.

L2: Distance in metres between the heat exchanger and the sensor.

Constant differential temperature	K_p	T_i
	-0.5	10 + 5L2
	-0.5	10 + 5L2

L2: Distance in metres between the heat exchanger and the sensor.

Constant flow rate	K_p	T_i
	0.5	0.5

Constant pressure	K_p	T_i
	0.5	0.5
	0.5	0.5

Constant level	K_p	T_i
	-10	0
	10	0

General rules of thumb:

If the controller is too slow-reacting, increase the gain.

If the controller is hunting or unstable, dampen the system by reducing the gain or increasing the integral time.

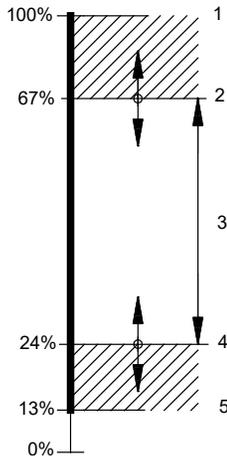
16.19 Operating range

Pump variant	Operating range
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Set the operating range as follows:

- Set the minimum speed within the range from fixed minimum speed to user-set maximum speed.
- Set the maximum speed within the range from user-set minimum speed to fixed maximum speed.

The range between the user-set minimum and maximum speeds is the operating range.



TM006785

Example of minimum and maximum settings

Speeds below 25 % may result in noise from the shaft seal.

Pos.	Description
1	Fixed maximum speed
2	User-set maximum speed
3	Operating range
4	User-set minimum speed
5	Fixed minimum speed

16.20 External setpoint function

Pump variant	External setpoint function
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can influence the setpoint by an external signal, either via one of the analog inputs or, if an advanced functional module is fitted, via one of the Pt100/1000 inputs.



Before you can enable the **External setpoint function**, you must set one of the analog inputs or Pt100/1000 inputs to **Setpoint influence**.

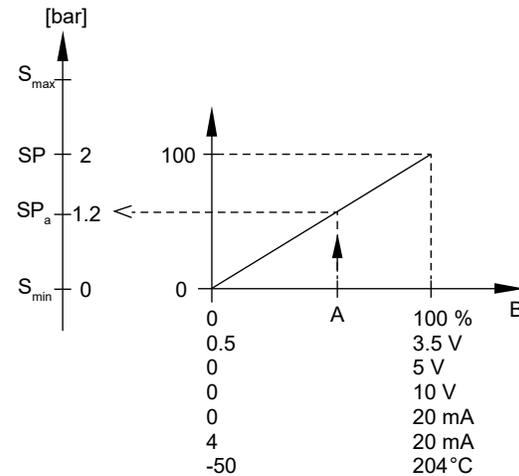
See section Analog inputs and Pt100/1000 inputs.

If more than one input has been set to **Setpoint influence**, the function selects the analog input with the lowest number, for example **Setting of pump**, and ignores the other inputs, for example **Analog input 3** or Pt100/1000 input 1.

Example with constant pressure with linear influence

Actual setpoint: actual input signal x (setpoint - sensor min.) + sensor min.

At a lower sensor value of 0 bar, a setpoint of 2 bar and an external setpoint of 60 %, the actual setpoint is $0.06 \times (2 - 0) + 0 = 1.2$ bar.



TM064165

Example of setpoint influence with sensor feedback

Pos.	Description
A	Actual input signal, 60 %
B	External setpoint signal
SP	Setpoint
S_{max}	Sensor max.
S_{min}	Sensor min.
SP_a	Actual setpoint

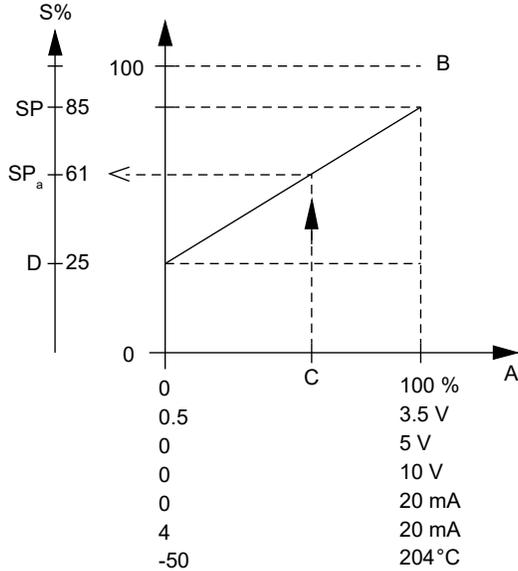
Example with constant curve with linear influence

Actual setpoint: actual input signal x (setpoint - user-set minimum speed) + user-set minimum speed.

At a user-set minimum speed of 25 %, a setpoint of 85 % and an external setpoint of 60 %, the actual setpoint is $0.60 \times (85-25) + 25 = 61 \%$.

In some cases, the maximum curve is limited to a lower speed. See figure below.

Example of setpoint influence with constant curve



TM064525

Pos.	Description
A	External setpoint signal
S%	Speed [%]
B	Fixed maximum speed
C	Actual input signal, 60 %
D	User-set min. speed
SP	Setpoint
SP _a	Actual setpoint

Related information

- [16.6.11 Constant curve](#)
- [16.10 Analog inputs](#)
- [16.12 Pt100/1000 inputs](#)

16.20.1 Setpoint influence

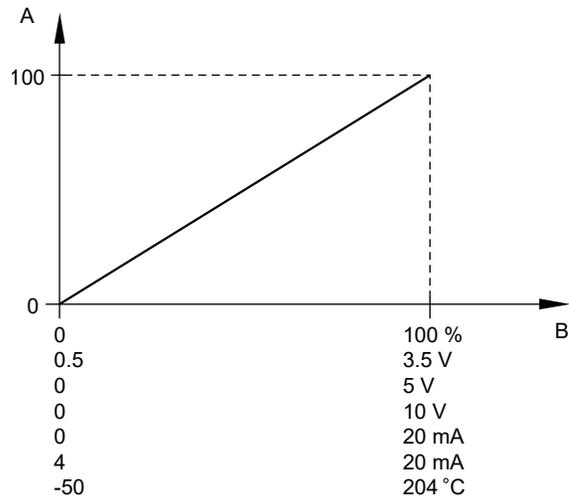
Pump variant	Setpoint influence
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The table below gives an overview of the types of setpoint influence and the availability depending on pump type.

Setpoint influence	Pump type	
	TPE3, TPE3 D	TPE2, TPE2 D
Not active	•	•
Linear function	•	•
Linear with Stop	•	•
Influence table	•	•

You can select these functions:

- **Not active**
When set to **Not active**, the setpoint is not influenced from any external function.
- **Linear function**
The setpoint is influenced linearly from 0 to 100 %.

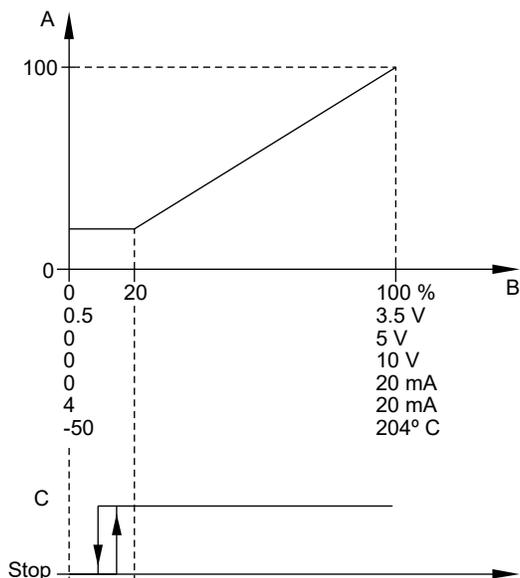


TM064166

Linear function

Pos.	Description
A	Setpoint influence [%]
B	External input

- **Linear with Stop**
 - In the input signal range from 20 to 100 %, the setpoint is influenced linearly. If the input signal is below 10 %, the pump changes to operating mode **Stop**. If the input signal is above 15 %, the operating mode is changed back to **Normal**.

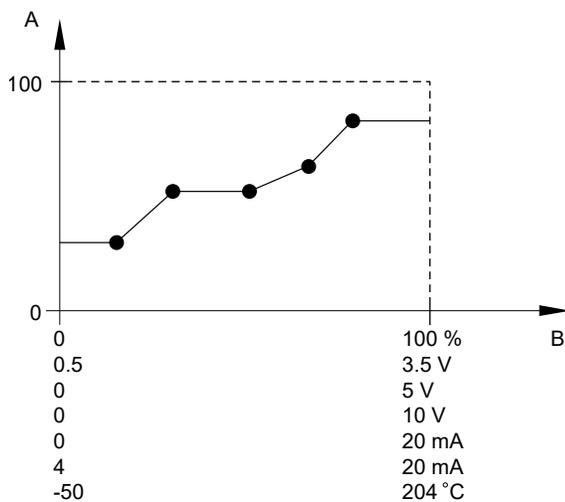


Linear with Stop

Pos.	Description
A	Setpoint influence [%]
B	External input
C	Normal

Influence table

The setpoint is influenced by a curve made out of two to eight points. There will be a straight line between the points and a horizontal line before the first point and after the last point.



Influence table, example with five points

Pos.	Description
A	Setpoint influence [%]
B	External input

Related information

- 16.10 Analog inputs
- 16.12 Pt100/1000 inputs

16.21 Predefined setpoints

Pump variant	Predefined setpoints
TPE3,TPE3 D	•
TPE2,TPE2 D	•

You can set and activate seven predefined setpoints by combining the input signals to digital inputs 2, 3 and 4 as shown in the table below.

Set the digital inputs 2, 3 and 4 to predefined setpoints if all seven predefined setpoints are to be used. You can also set one or two of the digital inputs to predefined setpoints but this will limit the number of predefined setpoints available.

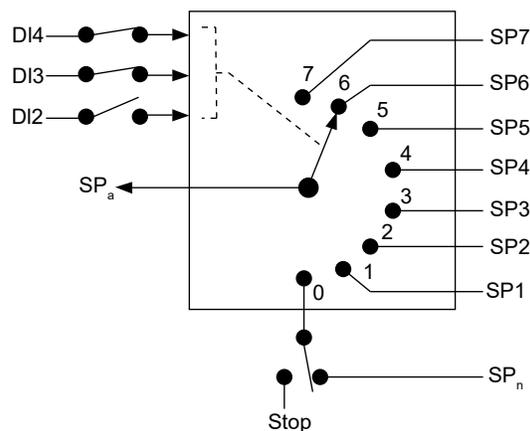
Digital inputs			Setpoint
2	3	4	
0	0	0	Normal setpoint or stop
1	0	0	Predefined setpoint 1
0	1	0	Predefined setpoint 2
1	1	0	Predefined setpoint 3
0	0	1	Predefined setpoint 4
1	0	1	Predefined setpoint 5
0	1	1	Predefined setpoint 6
1	1	1	Predefined setpoint 7

0: Open contact

1: Closed contact

Example

The figure below shows how you can use the digital inputs to set seven predefined setpoints. Digital input 2 is open and digital inputs 3 and 4 are closed. If you compare with the table above, you can see that Predefined setpoint 6 is activated.



Principle sketch showing how predefined setpoints function

Pos.	Description
SP	Setpoint
DI	Digital input
SP _a	Actual set point
SP _n	Normal set point

If all digital inputs are open, the pump either stops or runs at the normal setpoint. Set the desired action with Grundfos GO or with the advanced control panel.

Related information

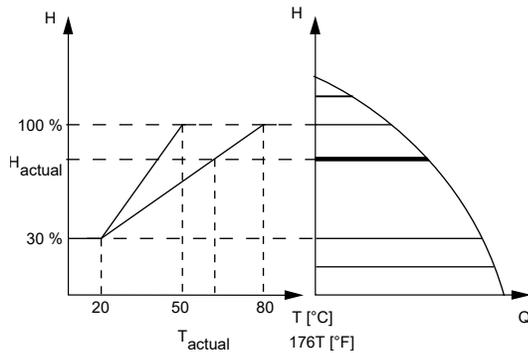
16.13 Digital inputs

16.22 Temperature influence

Pump variant	Temperature influence
TPE3,TPE3 D	•
TPE2,TPE2 D	-

When the function is enabled in proportional- or constant-pressure control mode, the setpoint for head is reduced according to the liquid temperature.

You can set the temperature influence to function at liquid temperatures below +176 °F or +122 °F (80 °C or 50 °C). These temperature limits are called T_{max} . The setpoint is reduced in relation to the head set which is equal to 100 % according to the characteristics below.



TM057911

Temperature influence

In the above example, T_{max} , which is equal to +176 °F (+80 °C), has been selected.

The actual liquid temperature, T_{actual} , causes the setpoint for head to be reduced from 100 % to H_{actual} .

The temperature influence function requires the following:

- proportional-pressure or constant-pressure control mode
- pump installed in flow pipe
- system with flow-pipe temperature control.

Temperature influence is suitable for the following systems:

- Systems with variable flows, for example two-pipe heating systems, in which the enabling of the temperature influence function ensures a further reduction of the pump performance in periods with small heating demands and consequently a reduced flow-pipe temperature.
- Systems with almost constant flows, for example one-pipe heating systems and underfloor heating systems, in which variable heating demands cannot be registered as changes in the head as is the case with two-pipe heating systems. In such systems, you can only adjust the pump performance by enabling the temperature influence function.

Selecting the maximum temperature

In systems with a dimensioned flow-pipe temperature of:

- up to and including +131 °F (+55 °C), select T_{max} equal to 50 °C,
- above +131 °F (+55 °C), select T_{max} equal to +176 °F (80 °C).

You cannot use the temperature influence function in air-conditioning and cooling systems.

16.23 Limit-exceeded function

Pump variant	Limit-exceeded function
TPE3,TPE3 D	•
TPE2,TPE2 D	•

This function can monitor a measured parameter or one of the internal values such as speed, motor load or motor current. If a set limit is reached, a selected action can take place. You can set two limit-exceeded functions meaning that you can monitor two parameters or two limits of the same parameter simultaneously.

The function requires setting of the following:

Measured

Here you set the measured parameter to be monitored.

Limit

Here you set the limit which activates the function.

Hysteresis band

Here you set the hysteresis band.

Limit exceeded when

Here you can set if you want the function to be activated when the selected parameter exceeds or drops below the set limit.

- **Above limit**
The function is activated if the measured parameter exceeds the set limit.
- **Below limit**
The function is activated if the measured parameter drops below the set limit.

Action

If the value exceeds a limit, you can define an action. You can select the following actions:

- **No action**
The pump remains in its current state. Use this setting if you only want to have a relay output when the limit is reached. See section Signal relay 1 and 2 (Relay outputs).
- **Warning/alarm**
There is a warning.
- **Stop**
The pump stops.
- **Min.**
The pump reduces speed to minimum.
- **Max.**
The pump increases speed to maximum.
- **User-defined speed**
The pumps run at a speed set by the user.
- **Alarm + Stop**
An alarm is given and the pump stops.
- **Alarm + Min.**
An alarm is given and the pump decreases speed to minimum.
- **Alarm + Max.**
An alarm is given and the pump increases speed to maximum.
- **Alarm + User-defined speed**
An alarm is given and the pump runs at a speed set by the user.

Detection delay

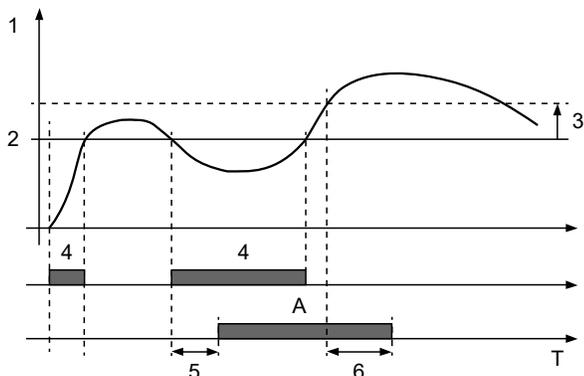
You can set a detection delay which ensures that the monitored parameter stays above or below a set limit in a set time before the function is activated.

Resetting delay

The resetting delay is the time from which the measured parameter differs from the set limit including the set hysteresis band and until the function is reset.

Example

The function is to monitor the outlet pressure of a pump. If the pressure is below 72.5 psi (5 bar) for more than 5 seconds, a warning must be given. If the outlet pressure is above 7 bar for more than 8 seconds, you must reset the warning.



Limit exceeded (example)

Pos.	Setting parameter	Setting
1	Measured	Outlet pressure
2	Limit	72.5 psi (5 bar)
3	Hysteresis band	29 psi (2 bar)
4	Limit exceeded when	Below limit
5	Detection delay	5 seconds
6	Resetting delay	8 seconds
A	Limit-exceeded function active	-
-	Action	Warning

Related information

[16.16 Signal relay \(Relay outputs\)](#)

16.24 Pulse flowmeter setup

Pump variant	Pulse flowmeter setup
TPE3,TPE3 D	•
TPE2,TPE2 D	•

You can connect an external pulse flowmeter to one of the digital inputs in order to register the actual and accumulated flows. Based on this, you can also calculate the specific energy.

To enable a pulse flowmeter, set one of the digital-inputs to **Accumulated flow** and set the pumped volume per pulse. See section Digital inputs.

Related information

[16.13 Digital inputs](#)

[16.13 Digital inputs](#)

16.25 Ramps

Pump variant	Ramps
TPE3 (D)	•
TPE2 (D)	•

The ramps determine how quickly the motor can accelerate and decelerate, during start/stop or setpoint changes.

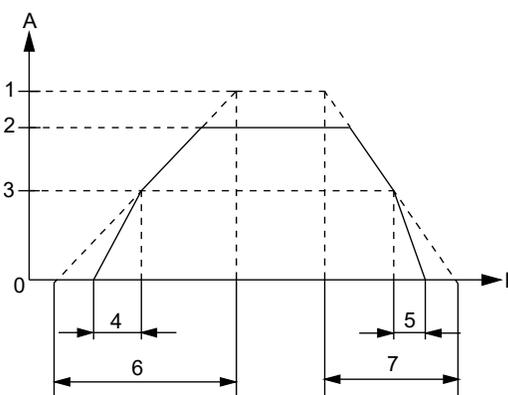
You can set the following:

- acceleration time, 0.1 to 300 seconds
- deceleration time, 0.1 to 300 seconds.

The times apply to the acceleration from 0 rpm to fixed maximum speed and the deceleration from fixed maximum speed to 0 rpm.

At short deceleration times, the deceleration of the motor may depend on load and inertia as there is no possibility of actively braking the motor.

If the power supply is switched off, the deceleration of the motor only depends on load and inertia.



Ramp-up and ramp-down

Pos.	Description
1	Rated
2	Maximum
3	Minimum
4	Initial ramp
5	Final ramp
6	Ramp-up
7	Ramp-down
A	Speed
B	Time

16.26 Standstill heating

Pump variant	Standstill heating
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can use this function to avoid condensation in humid environments. When you set the function to **Active** and the pump is in operating mode **Stop**, a low AC voltage will be applied to the motor windings. The voltage is not high enough to make the motor rotate but ensures that sufficient heat is generated to avoid condensation in the motor including the electronic parts in the drive.



Remember to remove the drain plugs and fit a cover over the motor.

For further information, see section Outdoor installation.

Related information

[7.9 Outdoor installation](#)

16.27 Alarm handling

Pump variant	Alarm handling
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This setting determines how the pump must react in case of a sensor failure.

Alarm or warning types:

The alarm handling determines how the pump must react in case of a sensor failure.

- **Warning**
A warning. There is no change in the operating mode.
- **Stop**
The pump stops.
- **Min.**
The pump reduces the speed to minimum.
- **Max.**
The pump increases the speed to maximum.
- **User defined speed**
The pump runs at the speed set by the user.

Affected inputs:

- **Analog input 1**
- **Analog input 2**
- **Analog input 3**
- **Grundfos Direct Sensor**
- **Pt100/1000 input 1**
- **Pt100/1000 input 2**
- **Liqtec input.**

16.28 Motor bearing monitoring

Pump variant	Motor bearing monitoring
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can set the motor bearing monitoring function to these values:

- **Active**
- **Not active**

When the function is set to **Active**, a counter in the controller will start counting the mileage of the bearings.

When the function is changed to **Active** again, the accumulated mileage is again used to calculate the replacement time.

16.29 Service

Pump variant	Service
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Motor bearing service

This display shows when to replace the motor bearings. The controller monitors the operating pattern of the motor and calculates the period between bearing replacements.

Displayable values:

- **in 2 years**
- **in 1 year**
- **in 6 months**
- **in 3 months**
- **in 1 month**
- **in 1 week**
- **Now!**

Bearing replacements

Indicates the number of bearing replacements that have been done during the lifetime of the motor.

Motor bearing maintenance

When the bearing monitoring function is active, the controller gives a warning when the motor bearings are to be replaced.

When you have replaced the motor bearings, confirm this action by pressing **Bearings replaced**.

16.30 Number (Pump number)

Pump variant	Number (Pump number)
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can allocate a unique number to the pump. This makes it possible to distinguish between pumps in connection with bus communication.

16.31 Radio communication (Enable/disable radio comm.)

Pump variant	Radio communication (Enable/disable radio comm.)
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can set the radio communication to either enabled or disabled. You can use this function in areas where radio communication is not allowed.

IR communication remains active.

16.32 Language

Pump variant	Language
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in the advanced control panel. In this menu you can select the desired language. A number of languages are available.

Related information

[16.44 Run start-up guide](#)

16.33 Date and time (Set date and time)

Pump variant	Date and time (Set date and time)
TPE3, TPE3 D	•
TPE2, TPE2 D	•

You can set date and time as well as how they are to be shown in the display:

- **Select date format:**
 YYYY-MM-DD
 DD-MM-YYYY
 MM-DD-YYYY.
- **Select time format:**
 HH:MM 24-hour clock
 HH:MM am/pm 12-hour clock.
- **Set date**
- **Set time.**

Related information

[16.44 Run start-up guide](#)

16.34 Unit configuration (Units)

Pump variant	Unit configuration
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

In this menu you can select between SI and US units. The setting can be made generally for all parameters or customized for each individual parameter.

16.35 Buttons on product (Enable/disable settings)

Pump variant	Buttons on product (Enable/disable settings)
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Use this function to disable the option to make settings for protective reasons.

- If you use Grundfos GO and set the buttons to **Not active**, the buttons on the HMI 200 or 201 operating panel are disabled, except the **Radio communication** button.
- If you disable the buttons on pumps fitted with the HMI 300 or 301 operating panel via **Enable/disable settings**, you can still use the buttons to navigate through the menus but you cannot make changes directly on these operating panels. A lock

symbol appears in the display. However, you can unlock the motor temporarily and allow settings by pressing the **Up** and **Down** buttons simultaneously for at least 5 seconds.

Related information

[13. Advanced control panel](#)

[14. Home display](#)

16.36 Delete history

Pump variant	Delete history
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

Use this function to delete the following historical data:

- **Delete operating log**
- **Delete energy consumption.**

16.37 Define Home display

Pump variant	Define Home display
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in the advanced control panel.

In this menu, you can set the **Home** display to show up to four user-set parameters.

16.38 Display settings

Pump variant	Display settings
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in the advanced control panel.

In this menu you can adjust the display brightness and set whether or not the display is to turn off if no buttons have been activated for a period of time.

16.39 Store settings (Store actual settings)

Pump variant	Store actual settings
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Grundfos GO

In this menu, you can store the actual settings for later use in the same pump or in other pumps of the same type.

Advanced control panel

In this menu, you can store the actual settings for later use in the same pump.

16.40 Recall settings (Recall stored settings)

Pump variant	Recall settings (Recall stored settings)
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Grundfos GO

In this menu, you can recall stored settings from a number of previously stored settings that the pump then uses.

Advanced control panel

In this menu, you can recall the last stored settings that the pump then uses.

16.41 Undo

Pump variant	Undo
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in Grundfos GO.

In this display, you can undo all settings that have been made with Grundfos GO in the current communication session. You cannot undo a **Recall stored settings** action.

16.42 Pump name

Pump variant	Pump name
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in Grundfos GO.

In this display, you can give the pump a name. In this way, you can easily identify the pump when connecting with Grundfos GO.

16.43 Connection code

Pump variant	Connection code
TPE3, TPE3 D	•
TPE2, TPE2 D	•

Use the connection code to enable automatic connection between Grundfos GO and the product. Thus, you do not need to press **OK** or the **Radio communication** button each time.

You can also use the connection code to restrict remote access to the product.

You can only set the connection code with Grundfos GO.

16.44 Run start-up guide

Pump variant	Run start-up guide
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and HMI 301 operating panels.

The startup guide automatically starts when you start the product for the first time. You can always run the startup guide later. The startup guide guides you through the general settings of the product.

To run the startup guide, go to **Settings > General settings > Run start-up guide**.

Related information

[14.1 Start-up guide](#)

[16.6 Control mode](#)

[16.32 Language](#)

[16.33 Date and time \(Set date and time\)](#)

[16.48 Assisted pump setup](#)

16.45 Alarm log

Pump variant	Alarm log
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu contains a list of logged alarms from the product. The log shows the name of the alarm, when the alarm occurred and when it was reset.

16.46 Warning log

Pump variant	Warning log
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu contains a list of logged warnings from the product. The log shows the name of the warning, when the warning occurred and when it was reset.

16.47 Assist

Pump variant	Assist
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The menu consist of functions which take you through the steps needed to set the pump.

Related information

[14. Home display](#)

16.48 Assisted pump setup

Pump variant	Assisted pump setup
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The menu guides you through the following:

Setting of pump

- Selection of control mode. See section Control mode.
- Configuration of feedback sensors.

- Adjusting the setpoint. See section Setpoint.
- Controller settings. See section Controller (Controller settings).
- Summary of settings.

Example of how to use the Assisted pump setup for setting up the pump to constant pressure:

Grundfos GO

1. Open the **Assist** menu.
2. Select **Assisted pump setup**.
3. Select the control mode Constant pressure.
4. Read the description of this control mode.
5. Select which analog input to use as sensor input.
6. Select sensor function according to where the sensor is installed in the system. See figure Overview of sensor locations in section Analog inputs.
7. Select electrical input signal according to the sensor specifications.
8. Select measuring unit according to the sensor specifications.
9. Set the minimum and maximum sensor values according to the sensor specifications.
10. Set the desired setpoint.
11. Set the controller settings K_p and T_i . See the recommendations in section Controller (Controller settings).
12. Type the pump name.
13. Check the summary of settings and confirm them.

Advanced control panel

1. Open the **Assist** menu.
2. Select **Assisted pump setup**.
3. Select the control mode **Const. pressure**.
4. Select which analog input to be used as sensor input.
5. Select the measured parameter to be controlled. See figure Overview of sensor locations in section Analog inputs.
6. Select measuring unit according to the sensor specifications.
7. Set the minimum and maximum sensor values according to the sensor specifications.
8. Select electrical input signal according to the sensor specifications.
9. Set the setpoint.
10. Set the controller settings K_p and T_i . See recommendations in section Controller (Controller settings).
11. Check the summary of settings and confirm them by pressing [OK].

Related information

- [16.6.4 Constant pressure](#)
- [16.6.7 Constant differential temperature](#)
- [16.10 Analog inputs](#)
- [16.11 Grundfos Direct Sensor](#)
- [16.12 Pt100/1000 inputs](#)
- [16.44 Run start-up guide](#)

16.49 Setup, analog inputs

Pump variant	Setup, analog input
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This function is only available in the HMI 300 and 301 operating panels.

- **Analog inputs**, follow on-screen instructions.
- **Pt100/1000 inputs**, follow on-screen instructions.

Related information

- [16.10 Analog inputs](#)
- [16.12 Pt100/1000 inputs](#)

16.50 Setting of date and time

Pump variant	Setting of date and time
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function is only available in the HMI 300 and 301 operating panels.

The inputs and outputs available depend on the functional module fitted in the motor.

This menu guides you through the following:

- **Select date format.**
- **Set date.**
- **Select time format.**
- **Set time.**

16.51 Multipump setup

Pump variant	Multipump setup
TPE3, TPE3 D	•
TPE2, TPE2 D	•

The function **Multi-pump function** enables the control of up to four motors connected in parallel without the use of external controllers. The pumps or motors in a system communicate with each other via the wireless GENIair connection or the wired GENI connection.

You can set a multipump system via the master motor, which is the first selected motor.

If several pumps or motors in the system have sensors, they can all function as the master and take over the master function if the other fails. This provides additional redundancy in the multimotor system.

You can choose between the following multimotor functions:

Alternating operation

Alternating operation functions as a duty and standby operating mode and is possible with two pumps or two motors of the same size and type connected in parallel. The main purpose of the function is to ensure an even amount of running hours and to ensure that the other pump or motor starts if the duty pump or motor stops due to an alarm.

You can choose between two alternating operating modes:

- **Alternating operation, time**
The change from one pump or motor to the other is based on time.
- **Alternating operation, energy**
The change from one pump or motor to the other is based on energy consumption.

If the duty pump or motor fails, the other pump or motor starts.

Backup operation

Backup operation is possible with two motors of the same size and type connected in parallel. One motor is operating continuously. The backup motor is operated for a short time each day to prevent seizing up. If the duty motor stops due to a fault, the backup motor starts.

Cascade operation

This function is available with up to 4 motors installed in parallel. The motors must be of the same size and if used with pumps, the pumps must be of the same model.

- The performance is adjusted to the demand through cutting pumps in or out and through parallel control of the pumps in operation.
- The controller maintains controlled value through continuous adjustment of the speed of the pumps.
- Pump changeover is automatic and depends on load, operating hours and fault detection.
- All pumps in operation run at the same speed.
- The number of pumps in operation also depends on the energy consumption of the pumps. If only one pump is required, two pumps will run at a lower speed if this results in a lower energy consumption.
- If several pumps or motors in the system have a sensor, they can all function as the master and take over the master function if the other fails.

Related information

[10.2 Alternating operation of twin-head pumps](#)

[14. Home display](#)

16.51.1 Alternating operation, time

The **Alternating operation, time** menu sets the interval of alternation between two pumps.

This setting is only available in alternating mode.

16.51.2 Time for pump changeover

The **Time for pump changeover** menu sets the time of day for pump changeover to take place.

This setting is only available in alternating operation.

16.51.3 Sensor to be used

This function defines the sensor to be used for controlling the pump system.

Select **Master pump sensor** if the sensor is placed in a way where it can measure the output from all the pumps in the system, for example in the manifold.

Select **Running pump sensor** if the sensor is placed on or across individual pumps. For example if the sensor is installed behind non-return valves, and if it is not able to measure the output from all pumps.

This setting is only available in alternating operation and cascade operation.

16.51.4 Ways to set a multipump system

You can set a multipump system in the following ways:

- Grundfos GO and wireless motor connection.
- Grundfos GO and wired motor connection.
- HMI 300 or HMI 301 operating panel and wireless motor connection.
- HMI 300 or HMI 301 operating panel and wired motor connection.

16.51.4.1 Setting a multipump system with Grundfos GO and a wireless motor connection

1. Power on both motors.
2. Establish contact to one of the motors with Grundfos GO.
3. Set the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality.
4. Assign a name to the motor using Grundfos GO.
5. Disconnect Grundfos GO from the motor.
6. Establish contact to the other motor.
7. Set the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality.
8. Assign a name to the motor using Grundfos GO.

9. Select the **Assist** menu and **Setup of multi-pump system**.

10. Select the desired multimotor function.

11. Press the **Right** button to continue.

12. Set the time at which the alternation between the two motors is to take place.



This step applies only if you have selected **Alternating operation, time** and if the motors are fitted with FM310 or FM311.

13. Press the **Right** button to continue.

14. Select **Radio** as the communication method to be used between the two motors.

15. Press the **Right** button to continue.

16. Select pump 2 (motor 2).

17. Select the pump from the list.



Use **OK** or the **Radio communication** button to identify the pump.

18. Press the **Right** button to continue.

19. Confirm the setting by pressing **Send**.

20. When you have finished the setup and the dialog box disappears, wait for the green indicator light in the middle of **Grundfos Eye** to light up.

16.51.4.2 Setting a multipump system with Grundfos GO and a wired motor connection

1. Connect the two motors with each other with a 3-core screened cable between the GENibus terminals A, Y, B.
2. Power on both motors.
3. Establish contact to one of the motors with Grundfos GO.
4. Set the required analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality.
5. Assign a name to the motor using Grundfos GO.
6. Assign motor number 1 to the motor.
7. Disconnect Grundfos GO from the motor.
8. Establish contact to the other motor.
9. Set the analog and digital inputs according to the connected equipment and the required functionality by means of Grundfos GO.
10. Assign a name to the motor using Grundfos GO.
11. Assign motor number 2 to the motor.
12. Select the **Assist** menu and **Setup of multi-pump system (multimotor setup)**.

13. Select the desired multimotor function.

14. Press the **Right** button to continue.

15. Set the time at which the alternation between the two motors is to take place.



This step applies only if you have selected **Alternating operation, time** and if the motors are fitted with FM310 or FM311.

16. Press the **Right** button to continue.

17. Select **Bus** as the communication method to be used between the two motors.

18. Press the **Right** button to continue.
19. Select pump 2 (motor 2).
20. Select the additional motor from the list.



Use **OK** or the **Radio communication** button to identify the pump.

21. Press the **Right** button to continue.
22. Confirm the setting by pressing **Send**.
23. When you have finished the setup and the dialog box disappears, wait for the green indicator light in the middle of **Grundfos Eye** to light up.

16.51.4.3 Setting a multipump system with the HMI 300 or HMI 301 operating panel and a wireless motor connection

1. Power on both motors.
2. On both motors, set the analog and digital inputs according to the connected equipment and the required functionality.
3. Select the **Assist** menu on one of the motors and **Setup of multi-pump system**.
4. Press the **Right** button to continue.
5. Select **Wireless** as the communication method to be used between the two motors.
6. Press the **Right** button to continue.
7. Select the desired multimotor function.
8. Press the **Right** button three times to continue.
9. Press **OK** to search for other motors.
The green indicator light in the middle of **Grundfos Eye** flashes on the other motors.
10. Press **OK** or the **Radio communication** button on the motor which is to be added to the multimotor system.
11. Press the **Right** button to continue.
12. Set **Time for pump changeover**.
This is the time at which the alternation between the two motors is to take place.



This step applies only if you have selected **Alternating operation, time** and if the motors are fitted with FM310 or FM311.

13. Press the **Right** button to continue.
 14. Press **OK** to confirm the setting.
The multipump function icons appear at the bottom of the operating panels.
- #### 16.51.4.4 Setting a multipump system with the HMI 300 or HMI 301 operating panel and a wired motor connection
1. Connect the two motors with each other with a 3-core screened cable between the GENIbus terminals A, Y, B.
 2. Set the needed analog and digital inputs according to the connected equipment and the required functionality.
 3. Assign motor number 1 to the first motor.
 4. Assign motor number 2 to the other motor.
 5. Select the **Assist** menu on one of the motors and **Setup of multi-pump system**.
 6. Press the **Right** button to continue.
 7. Select **Wired GENIbus** as the communication method to be used between the two motors.
 8. Press the **Right** button twice to continue.

9. Select the desired multimotor function.
10. Press the **Right** button to continue.
11. Press **OK** to search for other motors.
12. Select the additional motor from the list.
13. Press the **Right** button to continue.
14. Set **Time for pump changeover**.

This is the time at which the alternation between the two motors is to take place.



This step applies only if you have selected **Alternating operation, time** and if the motors are fitted with FM310 or FM311.

15. Press the **Right** button to continue.
16. Press **OK** to confirm the setting.
The multipump function icons appear at the bottom of the operating panels.

16.52 Description of control mode

Pump variant	Description of control mode
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu is only available in the advanced control panel. This menu describes each of the possible control modes. See also section Control mode.

Related information

[16.6 Control mode](#)

16.53 Assisted fault advice

Pump variant	Assisted fault advice
TPE3, TPE3 D	•
TPE2, TPE2 D	•

This menu gives guidance and corrective actions in case of pump failures.

17. Selecting control mode

System application

Recommended for most heating systems, especially in systems with relatively large pressure losses in the distribution pipes. See description under proportional pressure.

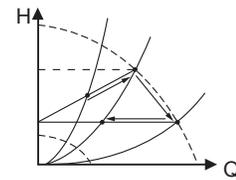
In replacement situations where the proportional-pressure duty point is unknown.

The duty point has to be within the AUTOADAPT operating range. During operation, the pump automatically adjusts to the actual system characteristic.

This setting ensures minimum energy consumption and low noise level from valves, which reduces operating costs and increases comfort.

Select this control mode

AUTOADAPT



The FLOWADAPT control mode is a combination of AUTOADAPT and FLOWLIMIT.

This control mode is suitable for systems where you want a maximum flow limit, FLOWLIMIT. The pump continuously monitors and adjusts the flow, thus ensuring that the selected FLOWLIMIT is not exceeded.

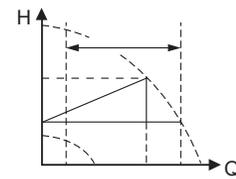
Main pumps in boiler applications where a steady flow through the boiler is required. No extra energy is used for pumping too much liquid into the system.

In systems with mixing loops, you can use the control mode to control the flow in each loop.

Benefits

- Enough water for all loops at peak load conditions if you have set each loop to the right maximum flow.
- The dimensioned flow for each zone, required heat energy, is determined by the flow from the pump.
You can set this value precisely in the FLOWADAPT control mode without the use of pump throttling valves.
- When the flow is set lower than the balancing valve setting, the pump ramps down instead of losing energy by pumping against a balancing valve.
- Cooling surfaces in air-conditioning systems can operate at high pressure and low flow.

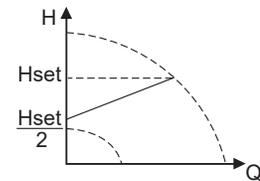
FLOWADAPT



In systems with relatively large pressure losses in the distribution pipes and in air-conditioning and cooling systems.

- Two-pipe heating systems with thermostatic valves and the following:
 - very long distribution pipes
 - strongly throttled pipe balancing valves
 - differential-pressure regulators
 - large pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching.
- Primary circuit pumps in systems with large pressure losses in the primary circuit.
- Air-conditioning systems with the following:
 - heat exchangers, fan coils
 - cooling ceilings
 - cooling surfaces.

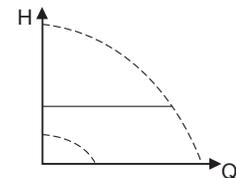
Proportional pressure



In systems with relatively small pressure losses in the distribution pipes.

- Two-pipe heating systems with thermostatic valves and the following:
 - sized for natural circulation
 - small pressure losses in those parts of the system through which the total quantity of water flows, for example boiler, heat exchanger and distribution pipe up to the first branching or modified to a high differential temperature between flow pipe and return pipe, for example district heating.
- Underfloor heating systems with thermostatic valves.
- One-pipe heating systems with thermostatic valves or pipe balancing valves.
- Primary circuit pumps in systems with small pressure losses in the primary circuit.

Constant differential pressure



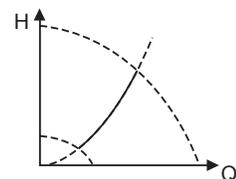
In systems with a fixed system characteristic.

Examples

- one-pipe heating systems
- boiler shunts
- systems with three-way valves
- domestic hot-water circulation.

You can use FLOWLIMIT with advantage to control the maximum circulation flow.

Constant temperature and constant differential temperature

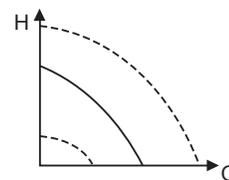


System application

If an external controller is installed, the pump is able to change from one constant curve to another, depending on the external signal.

You can also set the pump to operate according to the maximum or minimum curve, like an uncontrolled pump:

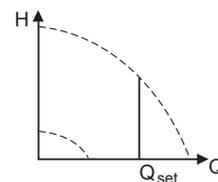
- Use the maximum-curve mode in periods in which a maximum flow is required. This operating mode is for instance suitable for hot-water priority.
- You can use the minimum-curve mode in periods in which a minimum flow is required. This operating mode is for instance suitable for manual night setback if you do not want automatic night setback.

Select this control mode**Constant curve**

In systems requiring a constant flow, independently of pressure drop.

Examples

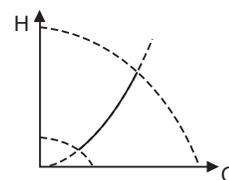
- chillers for air-conditioning
- heating surfaces
- cooling surfaces.

Constant flow rate

In systems requiring a constant tank level, independently of the flow rate.

Examples

- process water tanks
- boiler condensate tanks.

Constant level

In systems with pumps operating in parallel.

The multipump function enables the control of two to four single-head pumps connected in parallel and twin-head pumps without the use of external controllers. The pumps in a multipump system communicate with each other via the wireless GENIair connection or the wired GENI connection.

Assist menu
Multipump setup

18. Bus signal

The pump supports serial communication via an RS-485 input. The communication is carried out according to the Grundfos GENIbus protocol and enables connection to a other pumps as well as a building management system or another external control system.

Via a bus signal, you can remote-set pump operating parameters, such as setpoint and operating mode. At the same time, the pump can, via the bus, provide status information about important parameters, such as actual value of control parameter, input power and fault indications.

Contact Grundfos for further information.



If you use a bus signal, the number of settings available via Grundfos Go are reduced.

19. Priority of settings

With Grundfos GO, you can set the motor to operate at maximum speed or to stop.

If two or more functions are enabled at the same time, the motor operates according to the function with the highest priority.

If you have set the motor to maximum speed via the digital input, the motor operating panel or Grundfos GO can only set the motor to **Manual** or **Stop**.

The priority of the settings appears from the table below:

Priority	Start/stop button	Grundfos GO or operating panel on motor	Digital input	Bus communication
1	Stop			
2		Stop ⁴⁾		
3		Manual		
4		Maximum speed / User defined speed ⁴⁾		
5			Stop	
6			User defined speed	
7				Stop
8				Maximum speed / User defined speed
9				Minimum speed
10				Start
11			Maximum speed	
12		Minimum speed		
13			Minimum speed	
14			Start	
15		Start		

⁴⁾ **Stop** and **Maximum speed** settings made with Grundfos GO or on the motor operating panel can be overruled by another operating-mode command sent from a bus, for example **Start**. If the bus communication is interrupted, the motor resumes its previous operating mode, for example **Stop**, that was selected with Grundfos GO or the motor operating panel.

Related information

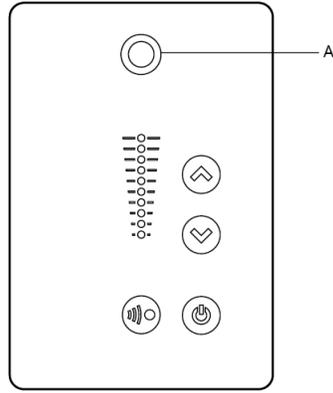
[12.1.3 Start and stop of pump](#)

[13. Advanced control panel](#)

[16.13 Digital inputs](#)

20. Grundfos Eye

The operating condition of the pump is indicated by Grundfos Eye on the control panel.



Grundfos Eye

TM055993

Grundfos Eye	Indication	Description
	No lights on.	The power is off. The pump is not running.
	The two opposite green indicator lights are rotating in the direction of rotation of the pump when seen from the non-drive end.	The power is on. The pump is running.
	The two opposite green indicator lights are permanently on.	The power is on. The pump is not running.
	One yellow indicator light is rotating in the direction of rotation of the motor when seen from the non-drive end.	Warning. The pump is running.
	One yellow indicator light is permanently on.	Warning. The pump has stopped.
	The two opposite red indicator lights are flashing simultaneously.	Alarm. The pump has stopped.
	The green indicator light in the middle flashes quickly four times. 	This is a feedback signal which the pump gives in order to ensure identification of itself.
	The green indicator light in the middle flashes continuously. 	Grundfos GO or another pump is trying to communicate with the pump. Press on the pump control panel to allow communication.
	The green indicator light in the middle is permanently on. 	Remote control with the Grundfos GO via radio. The pump is communicating with Grundfos GO via radio connection.
	The green indicator light in the middle flashes quickly while the Grundfos Go is exchanging data with the pump. It takes a few seconds. 	Remote control with Grundfos GO via infrared light. The pump is receiving data from Grundfos GO via infrared communication.

Related information

[13. Advanced control panel](#)

[15.1 Communication](#)

21. Signal relays

The pump has two outputs for potential-free signals via two internal relays.

You can set the signal outputs to **Operation**, **Pump running**, **Ready**, **Alarm** and **Warning**.

The functions of the two signal relays appear from the table below:

Description	Grundfos Eye	Contact position for signal relays when activated					Operating mode
		Operation	Pump running	Ready	Alarm	Warning	
The power is off.	 Off						-
The pump runs in Normal mode.	 Green, rotating						Normal, Min. or Max.
The pump runs in Manual mode.	 Green, rotating						Manual
The pump is in operating mode Stop .	 Green, steady						Stop
Warning, but the pump runs.	 Yellow, rotating						Normal, Min. or Max.
Warning, but the pump runs in Manual mode.	 Yellow, rotating						Manual
Warning, but the pump was stopped via Stop command.	 Yellow, steady						Stop
Alarm, but the pump runs.	 Red, rotating						Normal, Min. or Max.
Alarm, but the pump runs in Manual mode.	 Red, rotating						Manual
The pump has stopped due to an alarm.	 Red, flashing						Stop

Related information

[16.16 Signal relay \(Relay outputs\)](#)

22. Installing a communication interface module

WARNING

Electric shock

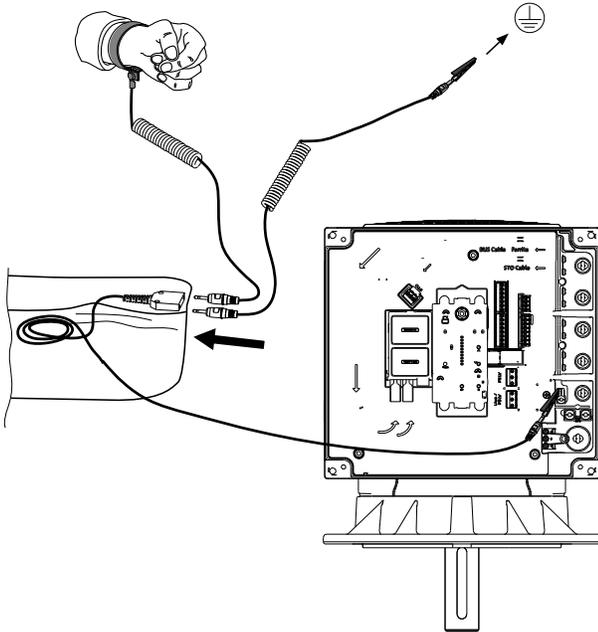
Death or serious personal injury



- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box. Make sure that the power supply cannot be switched on accidentally.



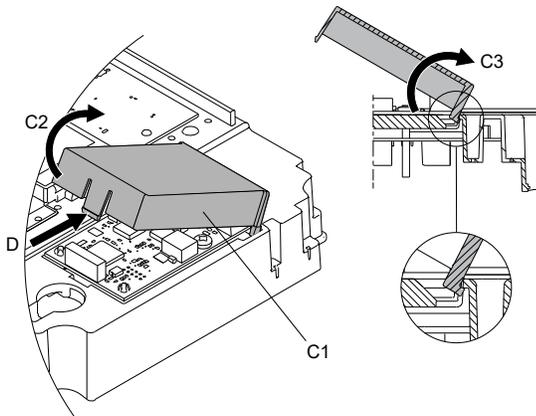
Use an antistatic service kit when handling electronic components. This prevents static electricity from damaging the components.



TM084038

Antistatic service kit

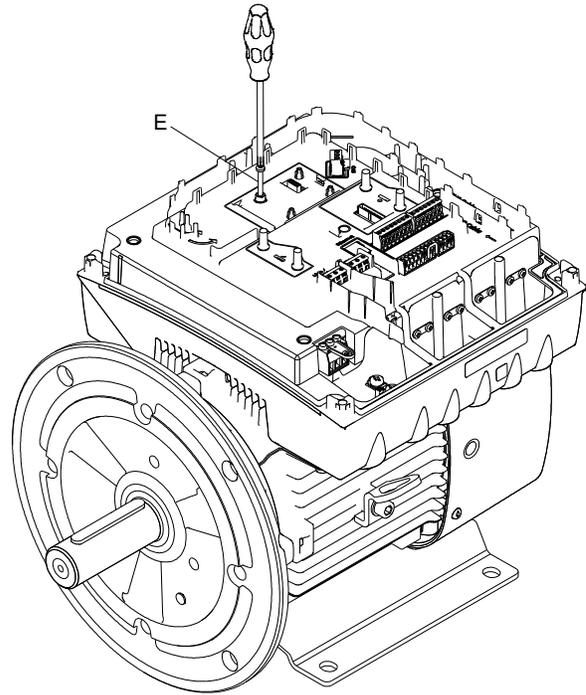
1. Loosen the four screws and remove the terminal box cover.
2. Remove the CIM (Communication Interface Module) cover (C1) by pressing the locking tab (D) and lifting the end of the cover (C2). Then lift the cover off the hooks (C3).



TM069905

Removing the CIM cover

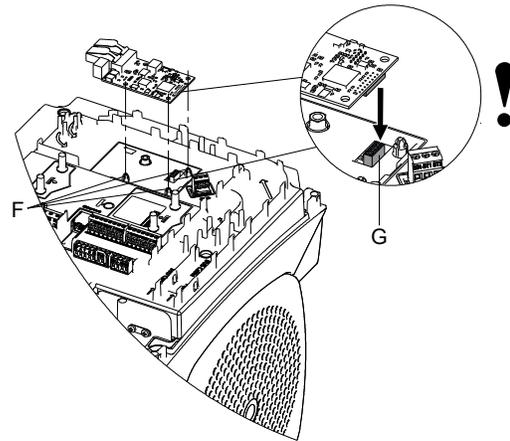
3. Remove the screw (E).



TM084039

Removing the securing screw

4. Fit the module by aligning it with the three plastic holders (F) and the connection plug (G). Press the module home, using your fingers.

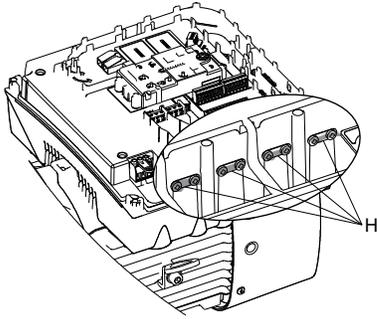


TM084040

Fitting the CIM module

5. Fit and tighten the screw (E) to 1 ft-lb (1.3 Nm).
6. Make the electrical connections to the module as described in the instructions supplied with the module.

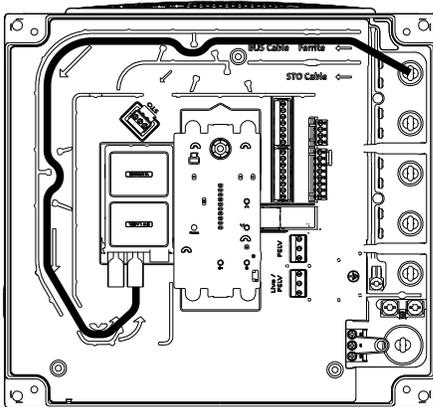
7. Connect the cable screens of the bus cables to ground via one of the earth clamps (H).



TM084041

Connecting the cable screens to ground

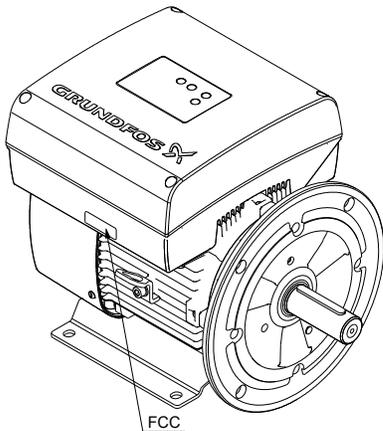
8. Route the wires for the module through one of the cable glands.



TM084042

Example of wire routing

9. Fit the CIM cover.
10. If the module is supplied with an FCC label, fix the label on the terminal box.



TM084101

FCC label

11. Fit the terminal cover and cross-tighten the four screws to 3.7 ft-lb (5 Nm).



Make sure that the terminal box cover is aligned with the orientation of the operating panel.

23. Identification of functional module

You can identify the module in one of the following ways:

Grundfos GO

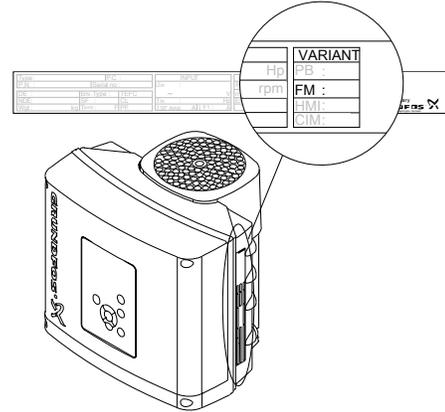
Select the **Module type** menu under **Status**.

Pump display

If the pump is fitted with the advanced control panel, select **Module type** menu under **Status**.

Motor nameplate

You can identify the fitted module on the motor nameplate.



TM061889

Identification of functional module

Variant	Description
FM 310	Advanced functional module

24. Identification of control panel

You can identify the module in one of the following ways:

Grundfos GO

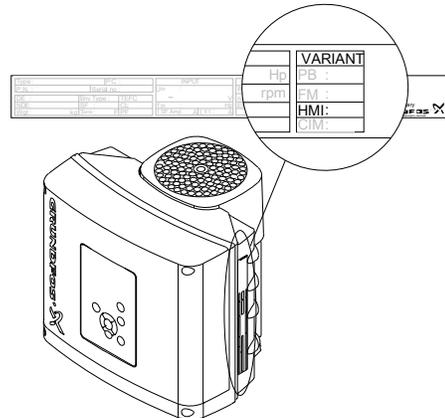
Select the **Module type** menu under **Status**.

Pump display

For pumps fitted with the advanced control panel, you can select the control panel in the **Module type** menu under **Status**.

Motor nameplate

You can identify the control panel on the motor nameplate.



TM064013

Identification of control panel

Variant	Description
HMI 200	Standard control panel
HMI 300	Advanced control panel

25. Changing the position of the control panel

WARNING

Electric shock

Death or serious personal injury



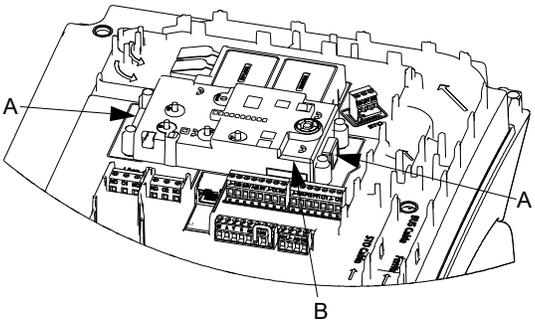
- Switch off the power supply to the product including the power supply for the signal relays. Wait at least 5 minutes before you make any connections in the terminal box.



Make sure that the terminal box cover is aligned with the orientation of the operating panel.

You can turn the operating panel 180°. Follow the instructions.

1. Loosen the four screws of the terminal box cover.
2. Remove the terminal box cover.
3. Press and hold in the two locking tabs (A) while gently lifting the plastic cover (B).



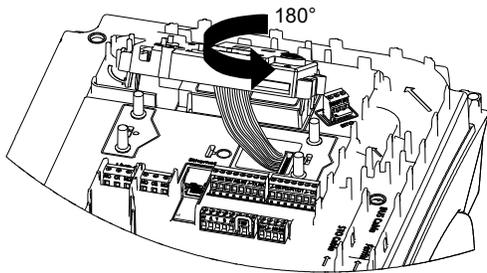
TM084034

Lifting the plastic cover

4. Turn the plastic cover 180°.



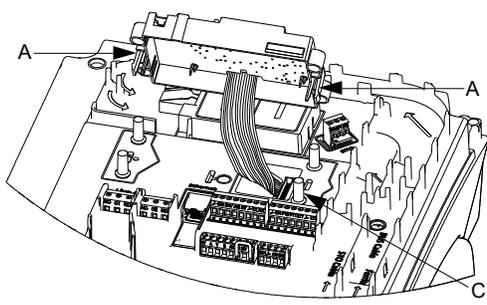
Do not twist the cable more than 90°.



TM084035

Turning the plastic cover

5. Position the plastic cover correctly over the four rubber pins (C). Make sure that the locking tabs (A) are placed correctly.



TM084036

Positioning the plastic cover

6. Tighten the four screws with 3.7 ft·lb (5 Nm).

26. Safe Torque Off (STO) function

Safe Torque Off (STO) is a safety function with the purpose to stop the motor from turning, without actively braking it. It follows the definition by EN61800-5-2.

For instructions on how to activate and operate the Safe Torque Off (STO) function, read these installation and operating instructions.



Safe Torque Off

Installation and operating instructions

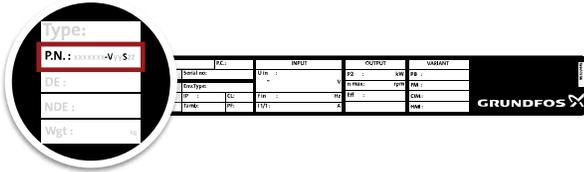
<http://net.grundfos.com/qr/i/92916582>

26.1 Identification of the Safe Torque Off (STO) function

The version of the Safe Torque Off (STO) function is marked on the nameplate, after the product version number.

The Safe Torque Off (STO) functionality is only available for MGE, MLE motors having an STO version number.

The Safe Torque Off (STO) version number is shown below as **Szz**, where **zz** marks the version. For product without STO the **zz** segment will be blank.



The Safe Torque Off (STO) safety function cannot be retrofitted to older motors.

QR92916582

TM084-339

27. Servicing the product

DANGER

Dimensional sketch

Death or serious personal injury



- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before starting any work on the motor. Make sure that the power supply cannot be accidentally switched on.

DANGER

Magnetic field

Death or serious personal injury



- Do not handle the motor or rotor if you have a pacemaker.

DANGER

Hazardous liquids

Death or serious personal injury



- If the pump is used for a liquid which is injurious to health, it will be classified as contaminated. In such cases, take proper precautions to avoid injury to health when operating or working on the pump.
- Wear personal protection equipment.

CAUTION

Hot or cold liquids

Minor or moderate personal injury



- Wear personal protection equipment.

27.1 Maintenance

27.1.1 Pump

The pump is maintenance-free.

If the pump is to be drained for a long period of inactivity, inject a few drops of silicone oil on the shaft between the motor stool and the coupling. This prevents the shaft seal faces from sticking.

Pumps with BQQE shaft seal must be operated minimum once every month in minimum 5 minutes to prevent the shaft seal faces from sticking.

27.1.2 Motor

If service is needed on the product, please contact Grundfos Service.

27.2 Service

If Grundfos is requested to service the pump, you must clean it before returning it. If you cannot clean the pump properly, then provide Grundfos with all relevant information about the pumped liquid.

If the above is not fulfilled, Grundfos can refuse to accept the pump for service.

Possible costs of returning the pump are to be paid by the customer.

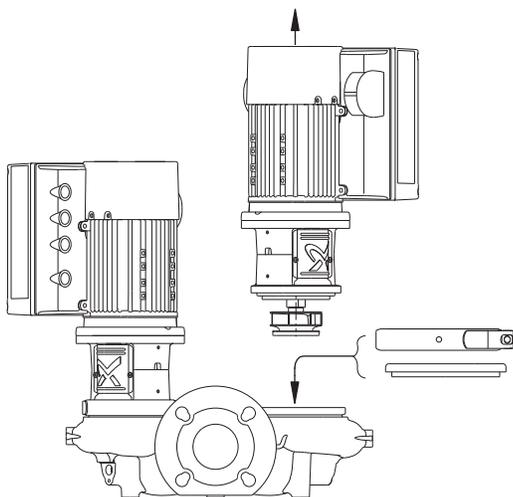
27.2.1 Integral shaft and coupling

TPE2 and TPE3 pumps have integral shaft and coupling. We recommend that you do not remove the motor.

If you have removed the motor, you must remove the motor stool in order to refit the motor correctly. Otherwise the shaft seal may be damaged.

27.2.2 Blanking flanges

For twin-head pumps, a blanking flange with a pump casing gasket is available.



TM057921

Fitting the blanking flange

If one pump requires service, fit the blanking flange to allow the other pump to continue operating.

28. Cleaning the product

WARNING

Electric shock

Death or serious personal injury



- Switch off the power supply to the motor and to the signal relays. Confirm that the terminal box cover is intact before spraying water on the product.

To avoid condensation in the motor, let the motor cool down before spraying it with cold water.

29. Fault finding

DANGER



Electric shock

Death or serious personal injury

- Switch off the power supply to the motor and to the signal relays. Wait at least 5 minutes before starting any work on the motor. Make sure that the power supply cannot be accidentally switched on.

DANGER



Magnetic field

Death or serious personal injury

- Do not handle the motor or rotor if you have a pacemaker.

WARNING



Hazardous liquids

Death or serious personal injury

- If the pump is used for a liquid which is injurious to health, it will be classified as contaminated. In such cases, take proper precautions to avoid injury to health when operating or working on the pump.
- Wear personal protection equipment.

CAUTION



Hot or cold liquids

Minor or moderate personal injury

- Wear personal protection equipment.

Fault	Cause and remedy
The motor does not run when started.	<ul style="list-style-type: none"> • Supply failure. • The fuses are blown. • The motor is defective.
Motor alarm when the power supply is switched on.	<ul style="list-style-type: none"> • Supply failure. • The cable connection is loose or faulty. • The motor winding is defective. • The pump is mechanically blocked.
Occasional motor alarm.	<ul style="list-style-type: none"> • The supply voltage is periodically too low or too high. • The differential pressure across pump is too low.
No motor alarm, but the pump does not run.	<ul style="list-style-type: none"> • Check the power supply. • Check fuses.
The pump performance is not constant.	<ul style="list-style-type: none"> • The pump inlet pressure is too low. • The inlet pipe or pump is partly blocked by impurities. • The pump draws in air.
The pump runs but delivers no water.	<ul style="list-style-type: none"> • The inlet pipe or pump is blocked by impurities. • The foot or check valve is blocked in closed position. • There is a leakage in the inlet pipe. • There is air in the inlet pipe or pump.
The pump runs backwards when switched off. *	<ul style="list-style-type: none"> • There is a leakage in the inlet pipe. • The foot or check valve is defective. • The foot or check valve is blocked in open or partly open position.
Leakage in shaft seal.	<ul style="list-style-type: none"> • The shaft seal is defective.
Noise.	<ul style="list-style-type: none"> • The pump is cavitating. • The pump does not rotate freely (frictional resistance) because of incorrect pump shaft position. • There is resonance in the installation. • There are foreign bodies in the pump.

* In twin-head pump installations, the backup pump often rotates slowly.

30. Megging



Megging of an installation incorporating MLE motors is not allowed, as the built-in electronics may be damaged.

31. Technical data

31.1 Technical data, three-phase motors



WARNING

Electric shock

Death or serious personal injury

- Use the recommended fuse size.

Supply voltage

- 3 × 200-240 V -10 % / +10 %, 60 Hz, PE

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

Recommended size of fuse

For recommended size of fuses see the tables below.

3 × 200-240 V

Motor size [HP]	Recommended [A]	Maximum [A]
3	13	35



For recommended size of fuses see the appendix concerning installation in the USA and Canada.

31.2 Leakage current, AC

- 3 × 200-240 V - 10 %/+ 10 %, 60 Hz, PE.

Speed [min ⁻¹]	Power [hp] ([kW])	Power supply voltage [V]	Leakage current [mA]
2900-4000	3.0 (2.2)	≤ 400	< 3.5
		> 400	< 5
4000-5900	3.0 (2.2)	≤ 400	< 3.5
		> 400	< 5

The leakage currents are measured without any load on the shaft and in accordance with EN 61800-5-1:2007.

32. Inputs and outputs

Signal reference

All voltages refer to signal ground (GND). All currents return to signal ground.

Absolute maximum voltage and current limits

Exceeding the following electrical limits may result in severely reduced operating reliability and motor life.

Relay 1:

- Maximum contact load: 250 VAC, 2 A or 30 VDC, 2 A.

Relay 2:

- Maximum contact load: 30 VDC, 2 A.

GENI terminals: -5.5 to +9.0 VDC or less than 25 mADC.

Other input and output terminals: -0.5 to +26 VDC or less than 15 mADC.

Digital inputs

Internal pull-up current greater than 10 mA at V_i equal to 0 VDC.

Internal pull-up to 5 VDC. Currentless for V_i greater than 5 VDC.

Input activated level: V_i less than 1.5 VDC.

Input deactivated level: V_i from 3.0 VDC to 24 VDC.

Hysteresis: No.

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 1640 ft (500 m).

Safe Torque Off (STO) terminals

S24:

24 V output voltage. Only for use with ST1 and ST2 inputs.

- Output voltage: 24 V -5 % to +5 %
- Maximum current: 50 mADC
- Overload protection: Yes.

ST1 and ST2:

- STO activated: V_{in} lower than 1.25 V
- STO deactivated: V_{in} greater than 21.6 V and lower than 25 V
- Input current greater than 10 mA at V_{in} equal to 24 V.

When the internal voltage source (connection S24) is used, the input voltage for ST1 and ST2 is within accepted limits.

When an external voltage source is used to drive the STO inputs, the following conditions must be met:

In operational state, the input voltage of ST1 and ST2 with reference to GND must be within:

- V_{min} : 21.6 V
- V_{max} : 25.0 V.

In the safe state, the input voltage of ST1 and ST2 with reference to GND must be as follows:

- V_{max} : 1.25 V.

In the operating state, the current flow into ST1 and ST2 must be within:

- Minimum contact current: 10 mA
- Maximum contact current: 25 mA.

Input source rating: SELV

Bus input (Ethernet)

Protocols TC/IP GENI, GDP.

Cable type, Standard CAT5, CAT5e or CAT6.

Open-collector digital outputs (OC)

Current-sinking capability: 75 mADC, no current sourcing.

Load types: Resistive and/or inductive.

Low-state output voltage at 75 mADC: Maximum 1.2 VDC.

Low-state output voltage at 10 mADC: Maximum 0.6 VDC.

Overcurrent protection: Yes.

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 1640 ft (500 m).

Analog inputs (AI)

Voltage signal ranges:

- 0.5 - 3.5 VDC, AL AU
- 0-5 VDC, AU
- 0-10 VDC, AU.

Voltage signal:

- Ri greater than 100 kΩ at 77 °F (25 °C).

Leak currents may occur at high operating temperatures. Keep the source impedance low.

Current signal ranges:

- 0-20 mADC, AU
- 4-20 mADC, AL AU.

Current signal: Ri is equal to 292 Ω.

Current overload protection: Yes. Change to voltage signal.

Measurement tolerance: +/- 2 % of full scale.

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 1640 ft (500 m), excluding potentiometer.

Potentiometer connected to +5 V, GND, any AI: Use maximum 10 kΩ.

Maximum cable length: 328 ft (100 m).

Analog output (AO)

Current sourcing capability only.

Voltage signal:

- Range: 0-10 VDC
- Minimum load between AO and GND: 1 kΩ
- Short-circuit protection: Yes.

Current signal:

- Ranges: 0-20 and 4-20 mADC
- Maximum load between AO and GND: 500 Ω
- Open-circuit protection: Yes.

Tolerance: +/- 4 % of full scale.

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 1640 ft (500 m).

Pt100 or Pt1000 inputs (Pt)

Temperature range:

- Minimum -50 °C (80 Ω/803 Ω). Minimum -58 °F (-50 °C) (80 Ω/803 Ω).
- Maximum 204 °C (177 Ω/1773 Ω). Maximum 399 °F (204 °C) (177 Ω/1773 Ω).

Measurement tolerance: +/- 1.5 °C.

Measurement tolerance: +/- 2.7 °F (1.5 °C).

Measurement resolution: less than 0.3 °C.

Measurement resolution: less than 0.54 °F (0.3 °C).

Automatic range detection (Pt100 or Pt1000): Yes.

Sensor fault alarm: Yes.

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Use Pt100 for short wires.

Use Pt1000 for long wires.

LiqTec sensor inputs

Use a Grundfos LiqTec sensor only.

Screened cable: 0.5 - 1.5 mm² / 28-16 AWG.

Grundfos Digital Sensor input and output (GDS)

Use Grundfos Digital Sensor only.

Power supplies, +5 V, +24 V

+5 V

- Output voltage: 5 VDC -5 % to +5 %
- Maximum current: 60 mADC, sourcing only
- Overload protection: Yes.

+24 V

- Output voltage: 24 VDC -5 % to +5 %
- Maximum current: 200 mADC, sourcing only
- Overload protection: Yes.

Digital outputs, relays

Potential-free changeover contacts.

Minimum contact load when in use: 5 VDC, 10 mA.

Screened cable: 0.5 - 2.5 mm² / 28-12 AWG.

Maximum cable length: 1640 ft (500 m).

Bus input

Grundfos GENIbus protocol, RS-485.

Grundfos Modbus protocol, RS-485.

Screened 3-core cable: 0.5 - 1.5 mm² / 28-16 AWG.

Maximum cable length: 1640 ft (500 m).

33. Other technical data

EMC (electromagnetic compatibility)

Standard used: EN 61800-3.

The table below shows the emission category of the motor.

C1 fulfils the requirements for residential areas.

Motor size [hp] ([kW])	Emission category	
	1450-2000 min ⁻¹	2900-4000 min ⁻¹ 4000-5900 min ⁻¹
3.0 (2.2)	C1	C1

Enclosure class

Standard: IP55 (IEC 34-5).

Optional: IP66 (IEC 34-5).

Insulation class

F (IEC 85).

Standby power consumption

5-10 W.

Cable entries

Motor size [hp] ([kW])	Number and size of cable entries
3.0 (2.2)	4 x M20

Related information

[7.7 Cable entries](#)

33.1 Torques

Terminal	Thread size	Max. torque [lbf-ft (Nm)]
L1, L2, L3, L, N	M4	1.73 (2.35)
NC, C1, C2, NO	M2.5	0.4 (0.5)
1 to 26 and A, Y, B	M2	0.4 (0.5)

Related information

[8.5 Connection terminals](#)

33.2 Sound pressure level

Pump type	Sound pressure level
	ISO 3743 [dB(A)]
TPE2/TPE3 80-180	64
TPE2/TPE3 100-180	64

Related information

[10.8 Sound pressure level](#)

34. Factory settings

- Function is enabled.
- Function is disabled.
- Function is not available.

Settings	TPE3, TPE3 D	TPE2, TPE2 D
Setpoint	Auto	67 %
Operating mode	Normal	Normal
Control mode	AUTOADAPT	Const. curve
Date and time	•	•
FLOWLIMIT	○	-
Automatic Night Setback	○	-
Temperature influence	○	-
Buttons on product	•	•
Controller		
T_i	1.0	0.5
K_p	8.0	0.5
Operating range		
Min.	25 %	25 %
Max.	100 %	100 %
Ramps	○	○
Ramp-up	1 second	1 second
Ramp-down	3 seconds	3 seconds
Sensor to be used	•	-
Single-head pump	Master pump sensor	Master pump sensor
Twin-head pump	Running pump sensor	Master pump sensor
Number (Pump number)	1	1
Radio communication	•	•
Analog input 1	○	○
Analog input 2	○	○
Analog input 3	○	○
Grundfos Direct Sensor	•	-
Grundfos differential pressure sensor	Feedback sensor	-
Grundfos temperature sensor ⁵⁾	○	
Pt100/1000 input 1	○/ Other function, liquid temperature ⁵⁾	○
Pt100/1000 input 2	○	○
Digital input 1	○	○
Digital input 2	○	○
Digital in/output 3	○	○
Digital in/output 4	○	○
Pulse flowmeter	○	○
Predefined setpoints	○	○
Analog output	○	○
External setpoint function	○	○
Signal relay 1	○	○
Signal relay 2	○	○
Limit 1 exceeded	○	○
Limit 2 exceeded	○	○

Settings	TPE3, TPE3 D	TPE2, TPE2 D
Limit 3 exceeded	<input type="radio"/>	<input type="radio"/>
Limit 4 exceeded	<input type="radio"/>	<input type="radio"/>
Standstill heating	<input type="radio"/>	<input type="radio"/>
Motor bearing monitoring	<input type="radio"/>	<input type="radio"/>
Pump name	Grundfos	Grundfos
Connection code	-	-
Unit configuration	SI	SI

⁵⁾ Some pumps are fitted with a Grundfos temperature sensor and some pumps are fitted with an external Pt100/1000 temperature sensor.

35. Disposing of the product

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

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



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

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

36. Document quality feedback

To provide feedback about this document, scan the QR code using your phone's camera or a QR code app.



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Appendix A

A.1. Appendix

US: Inlet pressure stated in bar relative pressure (pressure gauge value measured on the suction side of the pump)

CA: Pression d'entrée indiquée en bar de pression relative (valeur mesurée par le manomètre du côté aspiration de la pompe)

MX: Presión de succión en bares relativos (valor del manómetro en el lado de succión).

Pump type	p [psi (bar)]					
	68 °F (20 °C)	140 °F (60 °C)	194 °F (90 °C)	230 °F (110 °C)	248 °F (120 °C)	284 °F (140 °C)
TPE2 (D), TPE3 (D) 80-180	4.4 (0.3)	7.3 (0.5)	16 (1.1)	24.7 (1.7)	33.4 (2.3)	56.6 (3.9)
TPE2 (D), TPE3 (D) 100-180	1.5 (0.1)	4.4 (0.3)	11.6 (0.8)	21.8 (1.5)	30.5 (2.1)	53.7 (3.7)

Appendix B

B.1. Installation in the USA and Canada



To maintain the cURus approval, the additional information in this section must be followed.

Environmental enclosure ratings

The MGE, MLE Model J and K enclosure is approved for NEMA type 12 and is suitable for indoor use only.

For more information about ambient temperature during operation, see the sections on operating conditions and ambient temperature.

EMC statements for USA

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



MLE motors of the C2 emission category fulfill the limits of Class A.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

B.2. Radio communication

For the USA and Canada**CAUTION****Radiation**

Minor or moderate personal injury



- This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment must be installed and operated with a minimum distance of 8 inches (20 cm) between the radiator and your body.



This device complies with Part 15 of the FCC rules and RSS210 of the IC rules.



Changes or modifications made to this equipment not expressly approved by Grundfos may void the FCC authorization to operate this equipment.

Operation is subject to the following two conditions:

- This device may not cause interference.

- Consult the dealer or an experienced radio/TV technician for help.



MLE motors of the C1 emission category fulfill the limits of Class B.



MLE motors of the C3 emission category can only be used in industrial plants and public utilities in accordance with FCC § 15.103(b) and ICES 003 § 1.5.1(c). In other locations, MLE motors of the C1 or C2 emission category must be used.

Canadian Interference-Causing Equipment Standard

MLE Model J complies with the Canadian ICES-003 Class B specifications. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

L'appareil MLE Model J, est conforme à la norme NMB-003 du Canada pour le matériel de classe B. Cet appareil de classe B respecte toutes les exigences du règlement canadien s'appliquant au matériel brouilleur.

MLE Model K complies with the Canadian ICES-003 Class A specifications. This Class A device meets all the requirements of the Canadian interference-causing equipment regulations.

L'appareil MLE Model K, est conforme à la norme NMB-003 du Canada pour le matériel de classe A. Cet appareil de classe A respecte toutes les exigences du règlement canadien s'appliquant au matériel brouilleur.

Hot surface

The product might reach a surface temperature of 149 °F (65 °C), therefore pay attention when operating the product.

The following marking is found on the product:



TM084167

- This device must accept any interference, including interference that may cause undesired operation of the device.

Pour les États-Unis et le Canada**CAUTION****Radiation**

Blessures corporelles mineures à modérées



- Cet équipement est conforme aux limites d'exposition aux rayonnements définies par la FCC et l'ISDE pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimale de 20 cm (0,66 pi) entre le radiateur et votre corps.



Cet appareil est conforme à la section 15 de la réglementation FCC et à RSS210 de la réglementation IC.



Les changements ou modifications apportés à cet équipement qui ne sont pas expressément approuvés par Grundfos peuvent annuler l'autorisation de la FCC à utiliser cet équipement.

B.3. Identification numbers

For the USA

Grundfos Holding A/S

Contains FCC ID: OG3-RADIOM01-2G4

Contains FCC ID: OG3-RA2G4MSR.

For Canada

Grundfos Holding A/S

Model: RADIOMODULE 2G4

Contains IC: 10447A-RA2G4M01

B.4. Electrical connection

Installation altitude

For 480/277V grid systems: The maximum altitude is between 0 and 11480 ft (3500 m) above sea level.

For 480V (corner earthed) grid systems: The maximum altitude is between 0 and 6560 ft (2000 m) above sea level.

Conductors

See the sections on electrical installation and cable requirements.

Conductor temperature ratings

Model J: Use minimum 140 °F (60 °C) copper conductors.

Model K: Use 167 °F (75 °C) copper conductors only. The wire sizes for the supply mains must be sized for a wire size which is suitable for at least 125% of the rated input current of the motor drive units.

Recommended ring terminals



Ensure that the used ring terminals are UL certified.

The 480 V supply terminals are suitable for field wiring when used with stranded wires and specific listed crimp terminals manufactured by Tyco Electronics (E13288).

Cable cross-section		Part number/ Designation number	Manufacturer
[mm ²]	[AWG]		
16	6	130552	Tyco Electronics
10	8	160013	Tyco Electronics
6	10	130191	Tyco Electronics

Ethernet cable connection

The connection of Ethernet cables must be done by connecting the Ethernet cable screen to an earth clamp on the terminal box, to be in compliance with FCC and ISED requirements.

The recommended Ethernet cable types for earth clamp applications are SF/UTP, S/FTP or SF/FTP, where the cable screen consists of both a braided and a foil screen.

Torques

See the section on torques.

Line reactors

The maximum line reactor size in front of the drive must not exceed the following values:

Son fonctionnement est soumis aux deux conditions suivantes:

- Ce dispositif ne doit pas provoquer de brouillage préjudiciable.
- Il doit accepter tout brouillage reçu, y compris le brouillage pouvant entraîner un mauvais fonctionnement.

Contains IC: 10447A-RA2G4MSR.

Pour le Canada

Numéros d'identification:

Grundfos Holding A/S

Modèle: RADIOMODULE 2G4

Contient IC: 10447A-RA2G4M01

Contient IC: 10447A-RA2G4MSR.

Model J

P2		Maximum line reactor size [mH]
[kW]	[HP]	3500-4000 rpm 4000-5900 rpm
2.2	3	1.5
4	5	0.7
5.5	7.5	0.3
7.5	10	0.6
11	15	0.3

Model K

P2		Maximum line reactor size [mH]
[kW]	[HP]	3500-4000 rpm
11	15	-
15	20	0.2
18.5	25	0.2
22	30	0.2



Line reactors are often required for six-pulse variable speed drives. Please observe that the MGE, MLE utilize a small DC capacitor concept for lower harmonics and exceeding the maximum inductance may cause resonance between reactor and the MGE, MLE that will reduce the lifetime of the product.

Short-circuit current

Model J: If a short circuit occurs, the motor can be used on a mains supply delivering not more than 5000 RMS symmetrical amperes, 600 V maximum.

Model K: Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes, 480 V maximum when protected by RK1, J or T Class fuses, rated 80 A, 600 V.

Fuses

Model J: Fuses used for motor protection must be rated for minimum 500 V. Motors up to and including 10 hp (7.5 kW) require class K5 UL-listed fuses. Any UL-listed fuse can be used for motors of 15 hp (11 kW).

Model K: Fuses used for motor protection must be rated for minimum 600 V.



For fuse sizes, see the section on recommended size of fuses.

3 × 440-480 V, MLE Model K

Motor size [hp]	Recommended [A]	Maximum [A]	Fuse type
20	50	80	RK1, Class J or T UL listed fuse
25	60	80	RK1, Class J or T UL listed fuse
30	70	80	RK1, Class J or T UL listed fuse

3 x 200-240 V, MLE Model K

Motor size [hp]	Recommended [A]	Maximum [A]	Fuse type
10	70	80	RK1, Class J or T UL listed fuse
15	80	80	RK1, Class J or T UL listed fuse

Branch-circuit protection for MLE Model J

When the pump is protected by a circuit breaker, the circuit breaker must be rated for a minimum voltage of 500 V. The circuit breaker must be of the inverse-time type.

Branch circuit short-circuit protection

For the USA

Integral solid state short-circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes, or the equivalent.

For Canada

INTEGRAL SOLID STATE SHORT-CIRCUIT PROTECTION DOES NOT PROVIDE BRANCH CIRCUIT PROTECTION. BRANCH CIRCUIT PROTECTION MUST BE PROVIDED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE, PART I.

Overload protection

Degree of overload protection provided internally by the drive, in percent of full-load current: 102 %.

Limited consumer warranty

1. Limited consumer warranty

This Limited Warranty is provided for Consumer Products sold in the United States only and applies to Consumer Transactions as defined in and applicable under the Magnusson-Moss Warranty Act and any other applicable Federal and/or State laws. In case of non-Consumer Products, please refer to Grundfos' warranty terms defined in clause 10 of Grundfos US Terms and Conditions of Sale of Product and Services available at <https://www.grundfos.com/legal/grundfos-customer-terms/usa-grundfos-general-terms-for-sales-of-products-and-services>

This Limited Warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

New products manufactured by Grundfos are warranted to the original purchaser only and are to be free from defects in design, material and workmanship under normal use and service for no greater than a period of thirty (30) months from the date of manufacture which is set forth on the product's nameplate and on the product's packaging or the minimum period required by the applicable State law. For New Jersey, the applicable period is one year from the date of purchase.

The warranty period for replacement products, parts and components expires thirty (30) months from the original date of manufacture of the product originally purchased, unless a longer period is required under the applicable State law. For New Jersey, the warranty period for replacement products, parts and components expires one year from the original date of purchase of the product, not the date of replacement.

Products sold by Grundfos that are manufactured by others are not covered by this warranty.

Note that when purchasing a Grundfos product online, it is important to check the date of manufacture and the duration of the warranty with the seller as the product might no longer be covered under this Limited Warranty.

When a product is subject to this Limited Warranty a purchaser should contact the seller from which it purchased the product to make a claim.

If the seller of a product is no longer in business, the purchaser should contact a Grundfos Authorized Service Partner, which can be found at www.grundfos.com/us under > Support > Contact Service.

As part of making a claim, a purchaser shall return a defective product at the purchaser's cost, to the extent allowed by applicable law, along with proof of purchase and an explanation of the defect, date the defect occurred and circumstances surrounding the defect. For New Jersey there is no prohibition on returning a defective product at a purchaser's cost. If Grundfos is required by applicable State law to pay for the cost of shipment under applicable State law, then a purchaser should contact a Grundfos Authorized Service Partner to arrange for shipment. A purchaser also needs to promptly respond to Grundfos as to any inquiries regarding a warranty claim.

Grundfos' liability under this Limited Warranty to purchaser is limited to the repair or replacement of a product (at Grundfos' decision) that is the sole and exclusive remedy for purchaser to the extent permissible by applicable law. For New Jersey this limitation is permissible.

This warranty does not cover the following: ordinary wear and tear; use of a product for applications for which it is not intended; use of a product in an unsuitable environment; modifications, alterations or repair undertaken by anyone not acting with Grundfos' written authorization; failure to follow Grundfos' instructions, operations manuals, any other guidelines or good industry practice; use of faulty or inadequate ancillary equipment in combination with a product; application of spare or replacement parts not provided or authorized by Grundfos; accidental or intentional damage or misuse of a product.

The time period for making a claim under the implied warranty of merchantability and implied warranty of fitness are limited to the same time period as provided by this warranty to the extent permissible by applicable law. For residents of New Jersey, this limitation is permissible, but note that some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Grundfos shall not be liable for any incidental and consequential damages in connection with a product to the extent permissible by applicable law. For residents of New Jersey, this limitation is permissible, but note that some states do not allow limitations of incidental or consequential damages, so the above limitation may not apply to you.

2. Garantía limitada del consumidor

Esta garantía limitada se proporciona únicamente para los productos de consumo vendidos en los Estados Unidos y es aplicable a las transacciones de consumo tal y como se define en y resulta aplicable en virtud de la ley de Garantías Magnusson-Moss y cualquier otra legislación federal y/o estatal aplicable. Para el caso de productos que no sean de consumo, consulte los términos de la garantía de Grundfos definidos en la cláusula 10 de los términos y condiciones de venta de productos y servicios de Grundfos para los EE. UU., disponibles en <https://www.grundfos.com/legal/grundfos-customer-terms/usa-grundfos-general-terms-for-sales-of-products-and-services>.

Esta garantía limitada le confiere derechos legales específicos. Puede que también tenga otros derechos en virtud de su jurisdicción estatal.

Se garantiza únicamente al comprador original que los productos fabricados por Grundfos estarán libres de defectos de diseño, materiales y mano de obra en condiciones normales de uso y servicio durante un periodo no mayor a treinta (30) meses a partir de la fecha de fabricación que figura en la placa de datos del producto y en el empaque del mismo o el periodo mínimo exigido por la legislación estatal aplicable. Para Nueva Jersey, el periodo aplicable es de un año a partir de la fecha de compra.

El periodo de garantía para los productos, partes y componentes de repuesto vence a los treinta (30) meses contados a partir de la fecha de fabricación original del producto adquirido en primer lugar, a menos que la legislación estatal aplicable exija un periodo más largo. Para Nueva Jersey, el periodo de garantía de los productos, partes y componentes de repuesto vence un año contado a partir de la fecha original de compra del producto, no de la fecha de sustitución.

Los productos vendidos por Grundfos que sean producidos por otros fabricantes no están cubiertos por esta garantía.

Tenga en cuenta que, al comprar un producto Grundfos en línea, es importante revisar la fecha de fabricación y la duración de la garantía con el vendedor, ya que es posible que el producto ya no esté cubierto por esta garantía limitada.

Cuando un producto esté sujeto a esta garantía limitada, el comprador deberá ponerse en contacto con el vendedor al que haya comprado el producto para presentar una reclamación.

Si el vendedor de un producto ya no está en el negocio, el comprador debe ponerse en contacto con socio de servicio autorizado por Grundfos, que puede encontrar en la dirección www.grundfos.com/us, en la sección "Support" > "Contact Service".

Como parte de la presentación de una reclamación, el comprador deberá devolver el producto descompuesto a su costa, en la medida en la que lo permita la legislación aplicable, junto con el comprobante de compra y una explicación del defecto, la fecha en que este se haya producido y las circunstancias en torno al defecto. En Nueva Jersey no existe ninguna prohibición de devolver un producto descompuesto a costa del comprador. Si la legislación estatal aplicable obliga a Grundfos a hacerse cargo de los gastos de envío, el comprador deberá ponerse en contacto con un servicio técnico autorizado por Grundfos para organizar el envío. El comprador también debe responder con prontitud a Grundfos cualquier consulta relacionada con una reclamación de garantía.

La responsabilidad de Grundfos hacia el comprador en virtud de esta garantía limitada se limita a la reparación o sustitución de un producto (a decisión de Grundfos), que es el único y exclusivo remedio para el comprador en la medida permitida por la legislación aplicable. Para Nueva Jersey, esta limitación resulta permisible.

Esta garantía no cubre lo siguiente: el desgaste ordinario; el uso de un producto para aplicaciones para las que no está diseñado; el uso de un producto en un entorno inadecuado; las modificaciones, alteraciones o reparaciones realizadas por cualquier persona que no actúe con la autorización por escrito de Grundfos; el incumplimiento de las instrucciones, manuales de operación, cualquier otro lineamiento o las buenas prácticas industriales de Grundfos; el uso de equipos auxiliares descompuestos o inadecuados en combinación con un producto; el uso de repuestos o partes de sustitución no proporcionados ni autorizados por Grundfos; el daño accidental o deliberado o el uso indebido de un producto.

El periodo para presentar una reclamación en virtud de la garantía implícita de comerciabilidad y la garantía implícita de idoneidad se limita al mismo periodo previsto por esta garantía en la medida permitida por la legislación aplicable. Para los residentes de Nueva Jersey, esta limitación resulta permisible, si bien se debe tener en cuenta que algunos estados no permiten limitaciones en cuanto a la duración de una garantía implícita, por lo que la limitación anterior puede no resultar aplicable en su caso.

Grundfos no será responsable de ningún daño indirecto o consecuente en relación con un producto en la medida en la que lo permita la legislación aplicable. Para los residentes de Nueva Jersey, esta limitación resulta permisible, si bien debe tenerse en cuenta que algunos estados no permiten limitaciones en cuanto a daños indirectos o consecuentes, por lo que la limitación anterior puede no resultar aplicable en su caso.

Limited manufacturer's warranty

1. Limited manufacturer's warranty

This Limited Manufacturer's Warranty outlines applicable coverage and claims procedures for the pumps manufactured by Grundfos (the "Product").

This Limited Manufacturer's Warranty is provided for consumer products sold and used in Canada only and applies to consumer transactions as defined in the applicable provincial and territorial laws. In case of non-consumer products, please refer to Grundfos' warranty terms defined in clause 10 of Grundfos Canada Terms and Conditions of Sale of Product and Services available at: <https://www.grundfos.com/ca/legal/general-terms-and-conditions-of-sales-and-delivery>

This Limited Manufacturer's Warranty provides specific rights and limitations. Some of the limitations may not apply to you, and you may also have other rights that vary from province to province.

Scope of the Limited Manufacturer's Warranty

Subject to the following warranty terms and conditions, Grundfos Canada Inc. of 2941 Brighton Rd, Oakville, ON L6H 6C9, Canada ("Grundfos"), warrants to the original consumer (the "Purchaser") that the new Product manufactured by Grundfos is free from defects in design, material and workmanship under normal use and service for a period of twenty-four (24) months from the date of retail purchase but no greater than a period of thirty (30) months from the date of manufacture which is set forth on the Product's nameplate and on the Product's packaging (the "Warranty Period").

Note that when purchasing a Grundfos Product online, it is important to check the date of manufacture and the duration of the warranty with the seller as the Product might no longer be covered under this Limited Manufacturer's Warranty.

This Limited Manufacturer's Warranty applies exclusively to a new Grundfos Product sold and used in Canada. This Limited Manufacturer's Warranty does not apply to any Product sold "as is" or "sales final". This Limited Manufacturer's Warranty is not transferrable by the original Purchaser. Products sold by Grundfos that are manufactured by others are not covered by this warranty.

The sole and exclusive remedy under this Limited Manufacturer's Warranty is the repair or, at the discretion of Grundfos, the replacement of the Product, as set out below. Defects or damages are not covered by the Limited Manufacturer's Warranty if they are due to:

- ordinary wear and tear;
- use of the Product for an application for which it is not intended;
- installation of the Product in an environment not suitable for the Product;
- any modification, alteration or repair of the Product undertaken by the Purchaser or a third party (not acting on Grundfos' behalf);
- failure to follow Grundfos' instructions, including in the installation manual, operation manual, maintenance manual or service manual;
- installation, commissioning, operation (including the use of the Product or any Grundfos product outside its specifications) or maintenance of the Product other than in accordance with Grundfos installation manual, operation manual, maintenance manual or service manual or with good industry practice;
- use of faulty or inadequate ancillary equipment in combination with the Product;
- the application of spare parts of poor quality (excluding the application of any Grundfos original spare parts);
- accidental or intentional damage or misuse of the Products or services by the Purchaser or a third party (not acting on Grundfos' behalf); or
- the non-compliance of the Purchaser or of the Purchaser's own products with applicable law and regulation.

How to get service under the Limited Manufacturer's Warranty:

When a Product is subject to this Limited Manufacturer's Warranty, the Purchaser should contact the seller from which it purchased the Product to make a claim within 24 months from the date of retail purchase but no later than thirty (30) months from the date of manufacture which is set forth on the Product's nameplate and on the Product's packaging (the "Warranty Notification Period").

If the seller of a Product is no longer in business, the Purchaser should contact Grundfos Service at www.grundfos.com/us under **Support > Contact Service**.

To exercise the rights under this Limited Manufacturer's Warranty, the Purchaser shall return a defective Product at the Purchaser's cost, to the extent allowed by applicable law, along with proof of purchase and an explanation of the defect, date the defect occurred and circumstances surrounding the defect.

The Purchaser is responsible for any expenses for dismounting and mounting the Product and for any and costs related to removal, reinstallation, transportation, and insurance. If Grundfos is required by applicable provincial or territorial law to pay for the cost of transportation, then the Purchaser should contact Grundfos Service Partner to arrange for shipment. The Purchaser also needs to promptly respond to Grundfos as to any inquiries regarding a warranty claim.

Unless requested by Grundfos, the Product may not be disassembled prior to remedy. Any failure to comply herewith will render this Limited Manufacturer's Warranty void.

Grundfos will either arrange the repair of the defective Product under this Limited Manufacturer's Warranty or, at Grundfos' option, provide the Purchaser with a replacement of the defective Product. The replacement unit can be new or remanufactured.

To the extent permissible by applicable law, Grundfos shall not be liable for any incidental and consequential damages or losses of any kind whatsoever arising under, relating to or in connection with the Product, use of the Product or the inability to use the Product.

2. Garantie limitée du fabricant

Cette garantie limitée du fabricant décrit la couverture applicable et les procédures de réclamation pour les pompes fabriquées par Grundfos (ci-après le « Produit »).

Cette garantie limitée du fabricant est fournie pour les produits de consommation vendus et utilisés au Canada uniquement et s'applique aux transactions de consommateurs telles que définies dans les lois provinciales et territoriales applicables. Dans le cas de produits non destinés aux consommateurs, se référer aux conditions de garantie de Grundfos définies à l'article 10 des Conditions générales de vente des produits et services de Grundfos Canada, qui sont disponibles à l'adresse suivante : <https://www.grundfos.com/ca/fr/legal/general-terms-and-conditions-of-sales-and-delivery>

Cette garantie limitée du fabricant prévoit des droits et des limitations spécifiques. Certaines des limitations peuvent ne pas s'appliquer à vous, et vous pouvez également bénéficier d'autres droits qui varient d'une province à l'autre.

Champ d'application de la garantie limitée du fabricant

Sous réserve des conditions générales de garantie suivantes, Grundfos Canada Inc., dont le siège social est situé au 2941, Brighton Rd, Oakville, ON L6H 6C9, Canada (ci-après « Grundfos »), garantit au consommateur initial (ci-après « l'Acheteur ») que le nouveau Produit fabriqué par Grundfos est exempt de défauts de conception, de matériaux et de fabrication dans des conditions normales d'utilisation et d'entretien pendant une période de vingt-quatre (24) mois à compter de la date d'achat au détail, mais pas plus de trente (30) mois à compter de la date de fabrication indiquée sur la plaque signalétique et sur l'emballage du Produit (« Période de garantie »).

Lors de l'achat d'un Produit Grundfos en ligne, il est important de vérifier la date de fabrication et la durée de la garantie auprès du vendeur, car le Produit pourrait ne plus être couvert par cette garantie limitée du fabricant.

Cette garantie limitée du fabricant s'applique exclusivement à un Produit Grundfos neuf vendu et utilisé au Canada. Cette garantie limitée du fabricant ne s'applique pas aux Produits vendus « en l'état » ou « vente finale ». La présente garantie limitée du fabricant n'est pas transférable par l'Acheteur initial. Les produits vendus par Grundfos qui sont fabriqués par des tiers ne sont pas couverts par cette garantie.

Le seul et unique recours dans le cadre de cette garantie limitée du fabricant est la réparation ou, à la discrétion de Grundfos, le remplacement du Produit, comme indiqué ci-dessous. Les défauts ou dommages ne sont pas couverts par la garantie limitée du fabricant s'ils sont dus à :

- l'usure normale ;
- l'utilisation du Produit pour une application pour laquelle il n'est pas prévu ;
- l'installation du Produit dans un environnement non adapté au Produit ;
- toute modification, altération ou réparation du Produit entreprise par l'Acheteur ou un tiers (n'agissant pas pour le compte de Grundfos) ;
- la non-observation des instructions de Grundfos, y compris dans les notices d'installation, d'utilisation, de maintenance ou d'entretien ;
- l'installation, la mise en service, l'utilisation (y compris l'utilisation du Produit ou de tout produit Grundfos en dehors de ses spécifications) ou l'entretien du Produit autrement que conformément aux notices d'installation, d'utilisation, de maintenance ou d'entretien Grundfos ou aux bonnes pratiques de l'industrie ;
- l'utilisation d'un équipement auxiliaire défectueux ou inadéquat en combinaison avec le Produit ;
- l'utilisation de pièces de rechange de mauvaise qualité (à l'exclusion de l'utilisation de pièces de rechange d'origine Grundfos) ;
- tout dommage accidentel ou intentionnel ou toute mauvaise utilisation des Produits ou des services par l'Acheteur ou un tiers (n'agissant pas pour le compte de Grundfos) ; ou
- la non-conformité de l'Acheteur ou de ses propres produits aux lois et règlements applicables.

Procédure à suivre pour bénéficier d'un service dans le cadre de la garantie limitée du fabricant :

Lorsqu'un Produit est soumis à la présente garantie limitée du fabricant, l'Acheteur doit contacter le vendeur auprès duquel il a acheté le produit pour faire une réclamation dans les 24 mois suivant la date d'achat au détail, mais au plus tard trente (30) mois à compter de la date de fabrication indiquée sur la plaque signalétique du Produit et sur l'emballage du Produit (« Période de notification de garantie »).

Si le vendeur d'un Produit n'est plus en activité, l'Acheteur doit contacter le service Grundfos à l'adresse www.grundfos.com/us sous **Support > Contact Service**.

Pour exercer les droits prévus par la présente garantie limitée du fabricant, l'Acheteur doit renvoyer le Produit défectueux à ses frais, dans la mesure où la loi applicable le permet, accompagné de la preuve d'achat et d'une explication du défaut, de la date à laquelle le défaut s'est produit et des circonstances entourant le défaut.

L'Acheteur est responsable de tous les frais de démontage et de montage du Produit et de tous les frais liés à l'enlèvement, à la réinstallation, au transport et à l'assurance. Si Grundfos est tenu par la loi provinciale ou territoriale applicable de payer les frais de transport, l'Acheteur doit contacter le partenaire de service Grundfos pour organiser l'expédition. L'Acheteur doit également répondre rapidement à Grundfos pour toute demande concernant une réclamation au titre de la garantie.

Sauf demande de Grundfos, le Produit ne doit pas être démonté avant d'être remis en état. Tout manquement à ces dispositions entraînera l'annulation de la présente garantie limitée du fabricant.

Grundfos procédera à la réparation du Produit défectueux dans le cadre de cette garantie limitée du fabricant ou, à la convenance de Grundfos, fournira à l'Acheteur un produit de remplacement du Produit défectueux. L'unité de remplacement peut être neuve ou refabriquée.

Dans la mesure autorisée par la loi applicable, Grundfos ne sera pas responsable des dommages accessoires et indirects ou des pertes de quelque nature que ce soit découlant de, liés à ou en rapport avec le Produit, l'utilisation du Produit ou l'incapacité d'utiliser le Produit.

U.S.A.

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