

Hydro Multi-E

Installation and operating instructions



WATER QUALITY

Drinking Water System Component
NSF / ANSI 61
NSF / ANSI 372

Hydro Multi-E

English (US)

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English (US) Installation and operating instructions

Original installation and operating instructions

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1. General information



Read this document before you install the system. 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 gray circle with a white graphical symbol indicates that an action must be taken.



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



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



Tips and advice that make the work easier.

1.3 Target group

These installation and operating instructions are intended for professional installers and for the operators of the system.

We recommend that installation is carried out by skilled persons with technical qualifications required by the specific legislation in force.

2. System introduction

2.1 System description

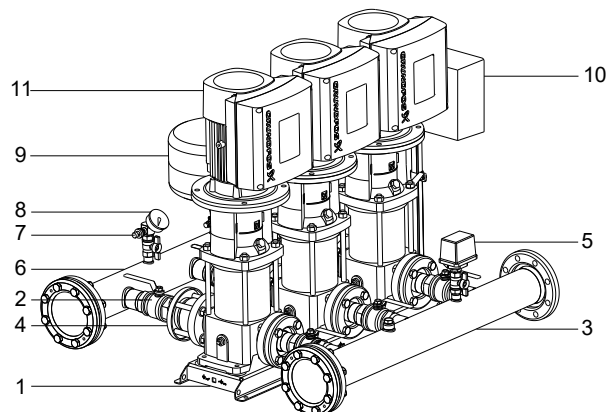
The system incorporates Grundfos CRE pumps with integrated frequency-controlled single- or three-phase MLE motors and a breaker cabinet.

The system adjusts its performance to the demand by cutting the required number of pumps in or out and through parallel control of the pumps in operation.

2.2 Intended use

The system is a range of factory-assembled systems ready for installation and operation.

The system maintains a constant pressure through continuous variable adjustment of the speed of the connected pumps.



TM074824

System with CRE, CRIE pumps

Pos.	Description
1	Base frame
2	Isolating valve
3	Inlet manifold
4	Check valve
5	Pressure switch
6	Outlet manifold
7	Outlet-pressure sensor
8	Pressure gauge
9	Diaphragm tank (optional)
10	Breaker cabinet
11	Pump
12	Support foot

The breaker cabinet incorporates a main switch and circuit breakers.

2.3 Applications

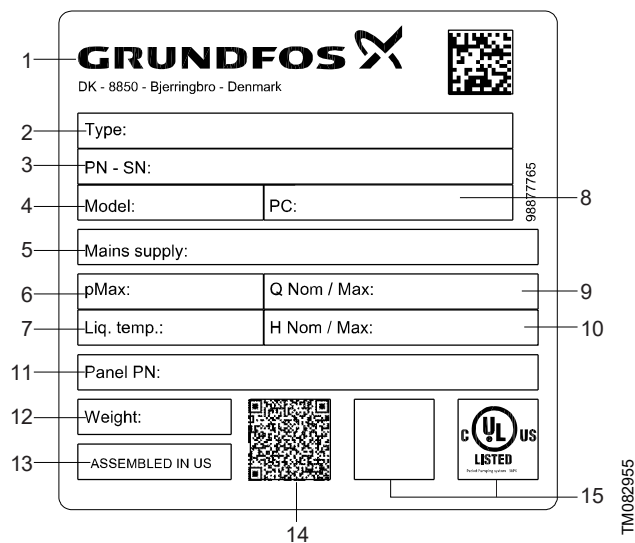
The system is designed for pressure boosting of clean water in places such as:

- hotels
- hospitals
- schools
- office buildings
- industry
- irrigation
- wash and clean
- apartment buildings
- blocks of flats.

2.4 Identification

2.4.1 Nameplate

The nameplate of the system is fitted on the base frame.



Nameplate example

Pos.	Description
1	Company address
2	Product type
3	Product number, Serial number
4	Model code
5	Mains supply
6	Max. operating pressure
7	Liquid temperature
8	Production code
9	Nominal flow rate and maximum flow rate
10	Nominal head and maximum head
11	Product number for control cabinet
12	Weight
13	Country of origin
14	QR code
15	Marks of approval

2.4.2 Type key

Example: Hydro Multi-E 2 CRIE 15-3 U7 A-A-A-A-ABC

Code	Explanation	Designation
Hydro Multi		System name
-E	E: All pumps with E-motor	System type
2		Number of main pumps
CRIE 15-3		Pump type
U7	U1: 3 × 380-415 V, N, PE, 50/60 Hz U2: 3 × 380-415 V, PE, 50/60 Hz U7: 1 × 200-240 V, PE, 50/60 Hz U8: 1 × 200-240 V, N, PE, 50/60 Hz UJ: 1 × 208-230 V, PE, 60Hz UK: 3 × 208-230 V, PE, 60Hz UL: 3 × 460-480 V, PE, 60Hz UX: Customized variant (special voltage rating)	Voltage code
A-	A: Systems with the breaker cabinet mounted on the system (right side) B: System with the wall-mounted breaker cabinet and 15 ft cable C: Systems with the breaker cabinet mounted on the system (left side) O: Other control panel UX: Customized variant	Design
A-	A: E	Starting method
A-	A: Stainless steel manifold and base frame(s), with standard valves B: Stainless steel manifold, base frame(s) and valves C: Galvanized steel manifold and base frame(s), with standard valves (for CME-A pumps) G: Galvanized steel manifold and base frame(s), with standard valves (for CRIE, CME-I pumps) H: Black painted carbon steel manifold and base frame, with standard valves I: Stainless steel manifold, black painted base frame(s), with standard valves J: Black painted mild steel manifold and base frame(s), with standard valves P: Stainless steel manifold, galvanized steel base frame, with standard valves X: Customized material combination	Material combination
A-	A: International range B: UK range C: Indian range E: Italian range F: French range G: Chinese range H: Korean range I: APAC range J: Australian range K: Brazil range N: Dutch range P: Polish range U: US range Z: UAE range	Product range
ABC	A: Standard hydraulic C: Outlet sensor on each pump D: Sensor as dry-running protection E: No dry-running protection F: Level switch for dry-running protection G: CIM module included K: No inlet manifold L: Check valve on the inlet side O: PN 25 pressure rating S: Customized variant T: Certificate U: Undersized motors X: More than three options	Options

2.4.3 Identification of the operating panel

You can identify the operating panel in one of the following ways:

Grundfos GO

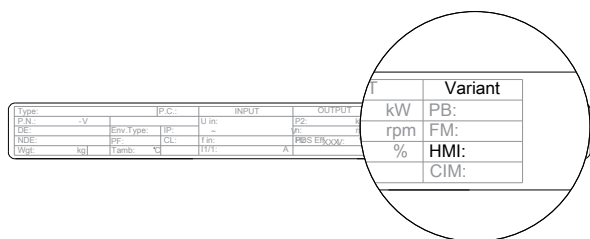
You can identify the operating panel in the **Fitted modules** menu under **Status**.

Motor display

For motors fitted with the HMI 300 or 301 operating panel, you can identify the operating panel in the **Fitted modules** menu under **Status**.

Motor nameplate

You can identify the operating panel with the data on the motor nameplate.



TM082852

Operating panel variants:

- HMI 200
- HMI 201 ¹⁾
- HMI 300
- HMI 301 ¹⁾

¹⁾ For motors without a radio module.

2.4.4 Identification of the functional module

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

Grundfos GO

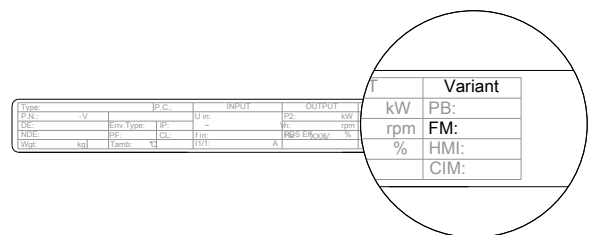
You can identify the functional module in the **Fitted modules** menu under **Status**.

Motor display

For motors fitted with the HMI 300 or 301 operating panel, you can identify the functional module in the **Fitted modules** menu under **Status**.

Motor nameplate

You can identify the fitted module with the data on the motor nameplate.



TM082851

Functional module variants:

- FM300
 - FM310
 - FM311 ²⁾
- ²⁾ Without Bluetooth (BLE).

3. Receiving the system

3.1 Transporting the system

Depending on the size, the system is supplied in a wooden cage, a closed wooden box, wrapped on a pallet or cardboard box designed for transport by a forklift truck or a similar vehicle.

3.2 Inspecting the system

Upon receipt of the system, do the following:

1. Make sure that the system and accessories correspond to the order and there are no missing parts.
2. Make sure that the packaging is intact.

3.3 Scope of delivery

The box contains the following:

- 1 Hydro Multi-E system
- installation and operating instructions for the system
- installation and operating instructions for the pump
- installation and operating instructions for the E-motor.

3.4 Handling and lifting the system

DANGER

Overhead load

Death or serious personal injury



- When lifting the system, do not use the eyebolts of the motors.
- Do not lift the system by the manifolds.
- Do not stand on the manifolds.

WARNING

Overhead load

Death or serious personal injury



- Do not stand under or close to the load that is lifted. Comply with local regulations.

WARNING

Crushing of feet

Death or serious personal injury



- Before you lift, make sure that the lifting equipment is capable of lifting this load, which is listed on the nameplate and on the packaging label.

CAUTION

Overhead load

Minor or moderate personal injury



- Use appropriate lifting equipment when placing the system.

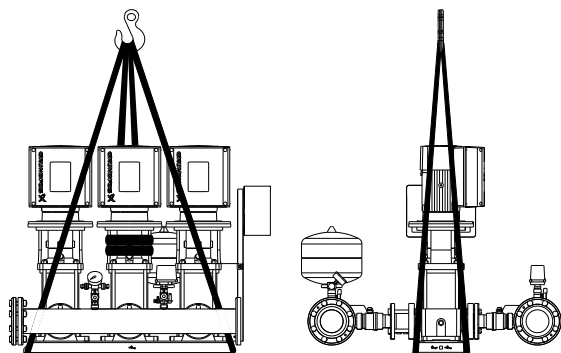


When lifting the system, the lifting point must always be above the center of gravity to ensure stability.

Systems with a base frame made of bent steel plate are designed with holes in the base frame for lifting.

- Use certified lifting gear suitable for the load. Each lifting strap must be at least 3 m long. Straps must be placed to ensure vertical pull to the system.
- Wind the safety strap around the pump head more than one time if there are no eyebolts or brackets on the pump.
- Keep the safety strap tight.
- Use shackles mounted in the holes for lifting the systems with a base frame made of bent steel plate.

! If the system is secured with transport straps, do not remove the straps until the system is installed.



TM085465

Lifting a system with a base frame made of bent steel plate

4. Installation requirements

4.1 Location

The system is only designed for indoor installation and must not be exposed to direct sunlight.

- Install the system in a well-ventilated room to ensure sufficient cooling of the control cabinet and pumps.
- Install the system with a one-meter (3 ft) clearance on all sides for inspection and removal.

4.2 Motor cooling

Observe the following to ensure adequate cooling of the motor and electronics.

- When installing the motor, make sure that the distance between the end of the fan cover and the wall or another fixed object is at least 50 mm (2 inches).
- Make sure that the ambient temperature must not exceed 40 °C.
- Keep cooling fins and fan blades clean.

5. Installing the system

WARNING

Crushing

Death or serious personal injury



- Use professional installation tools when moving or lifting the system or the components.
- Use safety equipment when mounting the base frame.
- Only trained persons can carry out the installation.

CAUTION

Overhead load

Minor or moderate personal injury



- Use appropriate lifting equipment when placing the system.

CAUTION

Crushing of feet

Minor or moderate personal injury



- Use safety equipment when installing the pipes and the tank.

CAUTION

Sharp element

Minor or moderate personal injury



- Wear safety gloves.

5.1 Mechanical installation

5.1.1 Foundation

Position the system on an even and solid surface, such as a concrete floor or foundation. If the system does not have vibration dampers, secure it to the floor or foundation with bolts.

5.1.2 Pipework

Arrows on the pump base show the direction of the water flow through the pump.

The pipes connected to the system must be of adequate size. Fit expansion joints in the inlet and outlet pipes to avoid resonance.

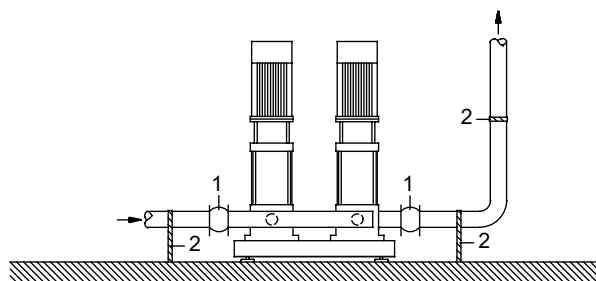
1. Connect the pipes to the manifolds of the system.

The manifold has a screw cap at one end. If this end is to be used, remove the screw cap, apply sealing compound to the other end of the manifold, and fit the screw cap. Fit a blanking flange with a gasket on flanged manifolds.

2. Fasten all screws and bolts before starting the pump.

If systems are installed in blocks of flats or the first consumer on the line is close to the system, we recommend that you fit expansion joints on the inlet and outlet pipes to prevent vibration from being transmitted through the pipes.

3. Fasten the pipes to parts of the building to ensure that the pipes cannot move or be twisted.



TM007748

Installation example with expansion joints and pipe supports

Pos.	Description
1	Expansion joint
2	Pipe support (and recommended location for isolating valve)

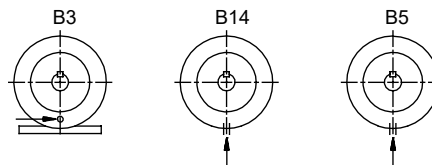
The expansion joints and pipe supports shown in above figure are not included in the standard system.

5.1.3 Drain holes

The motor has a plugged drain hole in the flange on the drive side. You can turn the flange 90° to both sides or 180°.

With the drain hole open, the motor becomes self-venting, allowing water and humid air to escape.

When you open the drain hole, the enclosure class of the motor will be lower than standard.



TM029037

5.2 Electrical connection

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply and make sure that the power supply cannot be accidentally switched on.
- Make sure that the wires to be connected to the connection groups are separated from each other by reinforced insulation along their entire lengths.

WARNING

Electric shock

Death or serious personal injury



- All electrical connections must be carried out by qualified persons and according to local regulations.

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 person with similar qualifications.

The user or the installer is responsible for the installation of correct earthing and protection according to local regulations.

Secure and install the system in a place permanently. Furthermore, connect the system permanently to the power supply.

Carry out the ground connection with duplicate conductors.

The system must be installed according to National Electrical Code (NEC) requirements.

5.2.1 Electrical supply system

DANGER

Electric shock

Death or serious personal injury



- Connect the system to protective earth and provide protection against indirect contact in accordance with local regulations.

Protective-earth conductors must have a yellow and green (PG) or yellow, green and blue (PEN) color marking.

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

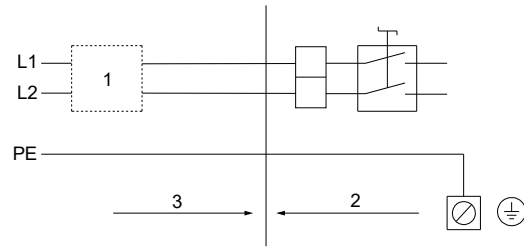


If you want to supply the system through an IT network, make sure that you have a suitable system variant. If you are in doubt, contact Grundfos.

The internal EMC filter remains connected, and subsequently no reduced leakage current variant is available.

The wires in the breaker cabinet must be as short as possible. However, the separate earth conductor is an exception. Its length must be long enough so that it is the last one to be disconnected in case the cable is inadvertently pulled out of the cable entry.

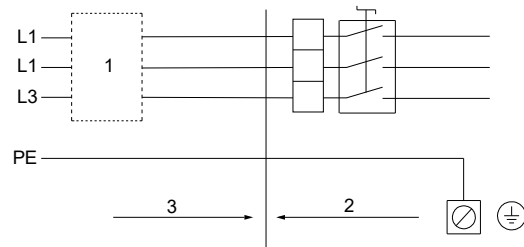
For the maximum feeder overcurrent protective device (FOPD) ratings, see section Supply voltage.



TM072016

Example of a mains-connected system with feeder overcurrent protective device (applies only for systems with single-phase motors)

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



TM076350

Example of a mains-connected system with feeder overcurrent protective device (applies only for systems with three-phase motors)

Pos.	Description
1	ELCB (GFCI) FOPD
2	Breaker cabinet
3	Installation in building

Related information

[13.2 Supply voltage](#)

5.2.2 Motor protection

All models (including H and I): The motor incorporates thermal protection against slow overloading and blocking. No external motor protection is required.

Model J: The product includes load and speed sensitive motor overload protection.

Model K: The product includes load and speed sensitive motor overload protection with thermal memory retention.

The motor is also protected against power supply voltage transients in accordance with EN 61800-3.

5.2.3 Insulation resistance



Do not measure the insulation resistance of motor windings or an installation incorporating motors with integrated frequency converters using high-voltage megging equipment, as this may damage the built-in electronics.

5.2.4 Additional protection

Systems with single-phase motors

If the system is connected to an electric installation where an earth leakage circuit breaker (ELCB) or ground fault circuit interrupter (GFCI) is used as additional protection, this circuit breaker or interrupter must be marked with the following symbol:

	ELCB (GFCI)	RDC Type A
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When an earth leakage circuit breaker or ground fault circuit interrupter is selected, the total leakage current of all the electrical equipment in the installation must be taken into account.

The leakage current of the system can be found in section Leakage current.



Systems with three-phase motors

If the system is connected to an electric installation where an earth leakage circuit breaker (ELCB) or ground fault circuit interrupter (GFCI) is used as additional protection, this circuit breaker or interrupter must have the following capabilities:

- It must be suitable for handling leakage currents and cutting-in with short pulse-shaped leakage.
- It must trip in the event of alternating fault currents and fault currents with DC content, such as pulsating DC and smooth DC fault currents.

You must use a type B earth leakage circuit breaker or a ground fault circuit interrupter for the system.

This circuit breaker or interrupter must be marked with the following symbols:

		ELCB (GFCI)	RDC Type B
---	---	----------------	------------

The leakage current of the system can be found in section Leakage current.

Protection against phase unbalance

Phase unbalance in the power supply must be minimized.

The three-phase motor must be connected to a power supply that meets the quality requirements specified in IEC 60146-1-1, class C. This also ensures long life of the components.

Related information

[13.3 Leakage current](#)

5.3 Functional modules

The functional modules are add-on boards that contain various types of input and output terminals for the user to connect different types of sensors, switches and relays.

The system can only contain one functional module at the time.

The following functional modules are available:

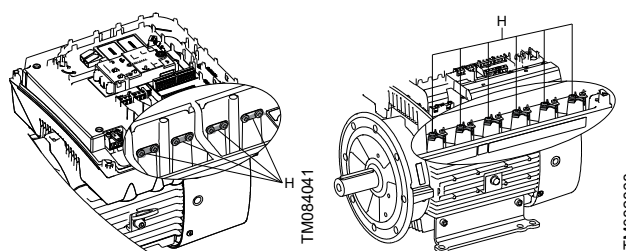
- FM300
 - FM310
 - FM311 ³⁾.
- ³⁾ Without Bluetooth (BLE).

The selection of module depends on the application and the required number of inputs and outputs.

Cable connections

The screen of signal cables and bus connection cables must be grounded via one of the earth clamps (H).

See the section on signal cables and bus connection cables.



Model J

Model K

Related information

[2.4.4 Identification of the functional module](#)

[5.5 Signal cables](#)

5.3.1 Functional module, FM300

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 connection.

Signal relay 1

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

PELV: The output is galvanically separated from other circuits.

Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

Signal relay 2

PELV: The output is galvanically separated from other circuits.

Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

Connection terminals for inputs and outputs

DANGER

Electric shock

Death or serious personal injury

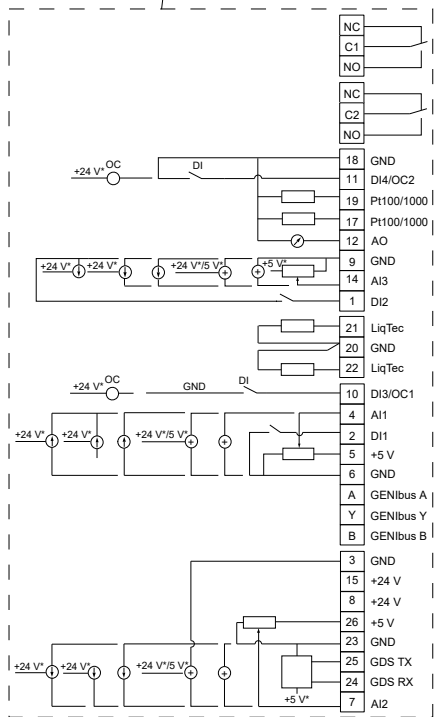
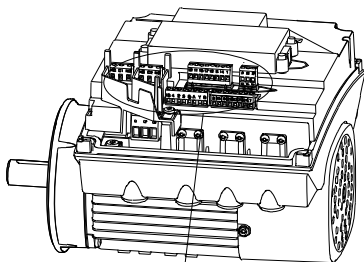


- Make sure that the wires to be connected to the relays below are separated from each other by reinforced insulation along their entire lengths.

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 by protective extra-low voltage (PELV), 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.



TMO53509

* If you use an external supply source, it must be connected to GND.

Terminal	Type	Function
NC	Normally closed contact	
C1	Common	Signal relay 1: LIVE or PELV
NO	Normally open contact	

Terminal	Type	Function
NC	Normally closed contact	
C2	Common	Signal relay 2: PELV only
NO	Normally open contact	
18	GND	Signal ground
11	DI4/OC2	Digital input/output, configurable Open collector: Maximum 24 V resistive or inductive
19	Pt100/1000 input 2	Pt100/1000 sensor input
17	Pt100/1000 input 1	Pt100/1000 sensor input
12	AO	Analog output: • 0-20 mA or 4-20 mA • 0-10 V.
9	GND	Signal ground
14	AI3	Analog input: • 0-20 mA or 4-20 mA • 0-10 V
1	DI2	Digital input, configurable
21	LiqTec sensor input 1	LiqTec sensor input (white conductor)
20	GND	Signal ground (brown and black conductors)
22	LiqTec sensor input 2	LiqTec sensor input (blue conductor)
10	DI3/OC1	Digital input/output, configurable Open collector: Maximum 24 V resistive or inductive
4	AI1	Analog input: • 0-20 mA or 4-20 mA • 0.5 - 3.5 V, 0-5 V or 0-10 V.
2	DI1	Digital input, configurable
5	+5 V	Supply to potentiometer and sensor
6	GND	Signal ground
A	GENIbus, A	GENIbus, A (+)
Y	GENIbus, Y	GENIbus, GND
B	GENIbus, B	GENIbus, B (-)
3	GND	Signal ground
15	+24 V	Supply
8	+24 V	Supply
26	+5 V	Supply to potentiometer and sensor



Digital input 1 is factory-set to be the start-stop input for the situation when an open circuit results in a stop. A jumper is factory-fitted between terminals 2 and 6. Remove the jumper if you want to use digital input 1 for external start-stop or any other external function.

Terminal	Type	Function
23	GND	Signal ground
25	GDS TX	Grundfos Digital Sensor output
24	GDS RX	Grundfos Digital Sensor input
		Analog input:
7	AI2	<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.

5.3.2 Functional module, FM310 and FM311

Inputs and outputs



The FM311 functional module does not include Bluetooth connection.

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 ⁴⁾.

4) FM311 is without Bluetooth.

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

DANGER

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 along their entire lengths.



Digital input 1 is factory-set to be the start-stop input when open circuit results in stop. A jumper is factory-fitted between terminals 2 and 6. Remove the jumper if digital input 1 is to be used as external start-stop or any other external function.

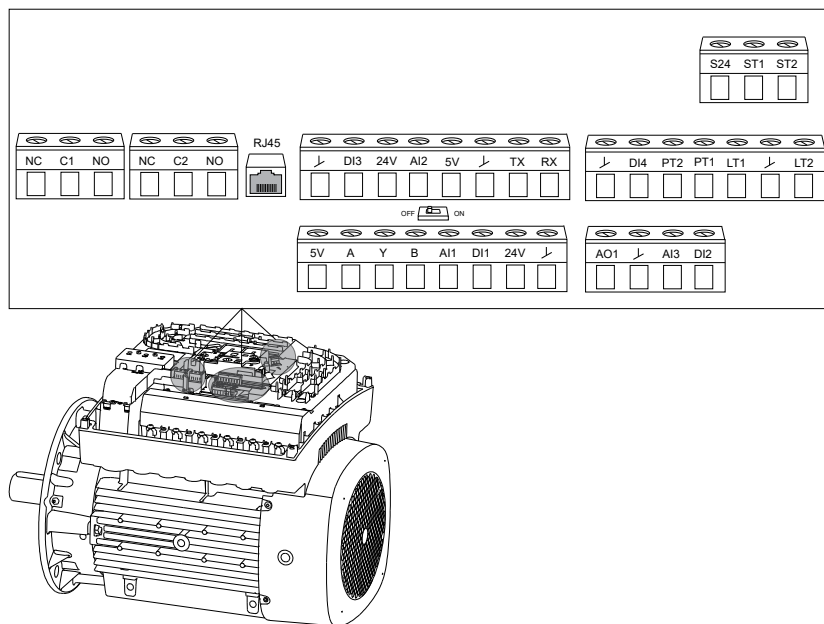
The inputs and outputs are internally separated from the power supply-conducting parts by reinforced insulation and galvanically separated from other circuits. All control terminals are supplied with safety extra-low voltage (SELV), ensuring protection against electric shock.

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 250 V contacts of the alarm relay (NC/C1/NO) on the functional modules FM310 and FM311 must not be connected directly to the mains supply, but energized by an isolated power supply or transformer with galvanic isolation.



Terminal	Type	Function
NC	Normally closed contact	Signal relay 1: LIVE or SELV
C1	Common	
NO	Normally open contact	

Terminal	Type	Function
NC	Normally closed contact	
C2	Common	Signal relay 2: SELV only
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
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: • 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-stop input for the situation when an open circuit results in a stop. A jumper is factory-fitted between terminals DI1 and GND. Remove the jumper if you want to use digital input 1 for external start-stop or any other external function.
24V	+24 V	Power supply
GND	GND	Signal ground
AO1	AO	Analog output: • 0-20 mA or 4-20 mA • 0-10 V.
GND	GND	Signal ground
AI3	AI3	Analog input: • 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

5.4 Signal relays

The motor 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.

Grundfos Eye is off

The power is off.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					-

Grundfos Eye is rotating green

The pump runs in **Normal** mode in open or closed loop.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Normal Min. or Max.

Grundfos Eye is rotating green

The pump runs in **Manual** mode.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Manual

Grundfos Eye is permanently green

The pump is ready for operation but is not running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Stop

Grundfos Eye is rotating yellow

Warning, but the pump is running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Normal Min. or Max.

Grundfos Eye is rotating yellow

Warning, but the pump is running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Manual

Grundfos Eye is permanently yellow

Warning, but the pump is stopped via a **Stop** command.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Stop

Grundfos Eye is rotating red

Alarm, but the pump is running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Normal Min. or Max.

Grundfos Eye is rotating red

Alarm, but the pump is running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Manual

Grundfos Eye is flashing red

The pump is stopped due to an alarm.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					Stop

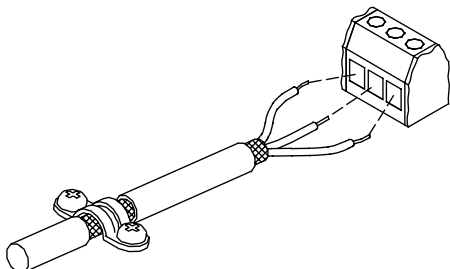
5.5 Signal cables

Use screened cables with a cross-sectional area from 0.5 mm² to 1.5 mm² for the external on/off switch, digital inputs, setpoint and sensor signals.

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

5.5.1 Connecting signal cables

1. Connect the screens of the cables to the frame securely at both ends. The screens must be as close as possible to the terminals.



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2. Connect the signal cables to the terminals.
3. Depending on the model, tighten one or two earth clamp screws.
Always tighten screws for frame connections, whether a cable is fitted or not.

5.6 Installing a communication interface module

Always install the CIM module in pump 1. If there is a need for redundant communication, an additional CIM module can be installed in pump 2.



When using multiple CIM modules, make sure to send the same command to both CIM modules at the same time to avoid conflicts between CIM modules.

See the installation and operating instructions of the pump for installation.

6. Startup

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply and wait at least five minutes before you make any connections in the breaker cabinet or control cabinet.
- Before the system is started up, make sure that the power supply is disconnected and cannot be accidentally switched on.
- Tighten the wire connections.

DANGER

Electric shock

Death or serious personal injury



- Connect the motor to protective earth and provide protection against indirect contact according to local regulations.
- Before the system is started up, make sure that there is no short-circuit.

WARNING

Contaminated drinking water

Death or serious personal injury



- Flush the system before starting it in compliance with local legislation.

WARNING

High temperature

Death or serious personal injury



- Before you operate, make sure that the system can handle the load specified on the nameplate.



CAUTION

Hot or cold surface

Minor or moderate personal injury



- Make sure that the escaping hot or cold liquid does not cause injury to persons or damage to the equipment.



CAUTION

High noise level

Minor or moderate personal injury

- Use ear protection.



CAUTION

Sharp element

Minor or moderate personal injury

- Wear safety gloves.

6.1 Hygiene

Grundfos systems are functionally tested and may therefore contain small amounts of residual water. Contaminated drinking water can endanger health, so before using the system, it must be rinsed or flushed thoroughly. This also applies if the system is not used for a longer period.


Rinsing and flushing must always be done in accordance with local regulations and practices.

6.2 Hydro Multi-E in system with positive inlet pressure

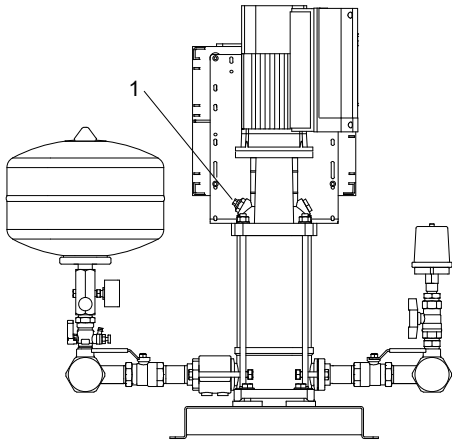
- ! Make sure that the the main switch and the circuit breakers are switched off.
- ! Do not start the pumps until they are filled with liquid.

After you complete the mechanical and electrical installation described in section Installing the system, proceed as follows:

1. Check that the system corresponds to the order and that no single parts are damaged.
2. Check that the precharge pressure in the diaphragm tank is 0.7 times the required outlet pressure (setpoint).

 Measure the precharge pressure while the system is pressureless.

3. Connect water and power supplies to the system.
4. Open all pump inlet and outlet valves.
5. Vent all pumps by means of the vent screws.



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Position of vent screws in systems with CRE pumps

Pos.	Description
1	Vent screw

6. Switch on the main switch.
7. Start pump 1 by pressing the start/stop button on the pump control panel.
8. Vent pump 1 using the vent screw.
9. Repeat steps 7 and 8 for the other pumps in the system.
10. Set the desired outlet pressure.

! If you change the outlet pressure, change the diaphragm tank precharge pressure accordingly.

11. Check that the pumps are cutting in and out, thus adjusting the performance to the demand.

The system is now in automatic mode and ready for operation. The standard settings can be changed using Grundfos Go, see sections Multi-pump function or Control functions.

Related information

- 5. [Installing the system](#)
- 7. [Control functions](#)
- 8. [Multi-pump function](#)

6.3 Hydro Multi-E in system without inlet pressure

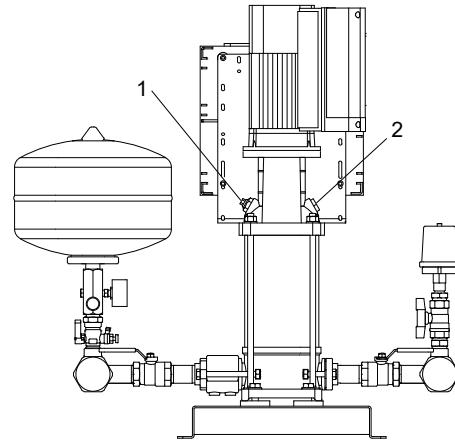
- ! Make sure that the main switch and the circuit breakers are switched off.
- ! Do not start the pumps until they are filled with liquid.
- ! Make sure that the dry-running protection device is appropriate for no or low inlet pressure.

After you complete the mechanical and electrical installation described in section Install, proceed as follows:

1. Check that the system corresponds to the order and that no single parts are damaged.
2. Check that the precharge pressure in the diaphragm tank is 0.7 times the required outlet pressure (setpoint).

! Measure the precharge pressure while the system is pressureless.

3. Connect water and power supplies to the system.
4. Open all pump inlet valves.
5. Close all pump outlet valves, and prime all pumps and the inlet pipe.



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Position of vent screw and filling screw

Pos.	Description
1	Vent screw
2	Filling screw

6. Switch on the main switch.
7. Start pump 1 by pressing the start/stop button on the pump control panel.
8. Vent pump 1 using the vent screw.
9. Slowly open the outlet valve approximately 50 %.
10. Repeat steps 7 to 9 for the other pumps in the system.
11. Slowly fully open all pump outlet valves.
12. Wait for a few minutes.
13. Set the desired outlet pressure.

! If you change the outlet pressure, change the diaphragm tank precharge pressure accordingly.

14. Check that the pumps are cutting in and out, thus adjusting the performance to the demand.

The system is now in automatic mode and ready for operation. The standard settings can be changed using Grundfos Go, see sections Multi-pump function or Control functions.

Related information

- 5. [Installing the system](#)
- 7. [Control functions](#)
- 8. [Multi-pump function](#)

7. Control functions

WARNING



Hot surface

Death or serious personal injury

- Touch only the buttons on the operating panel. The product may be very hot.

WARNING



Electric shock

Death or serious personal injury

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

You can change the settings by means of the following user interfaces:

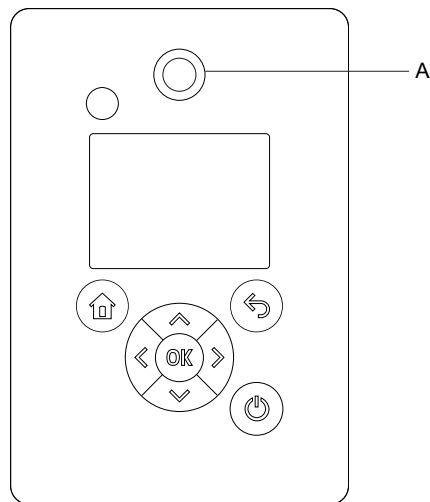
- HMI operating panel
- Grundfos GO
- Grundfos GO Link.

All settings are saved if the power supply is switched off.

For the control functions of user interfaces, see the installation and operating instructions of the pump.






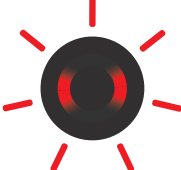
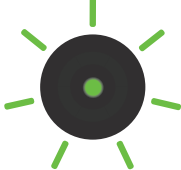
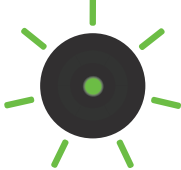


7.1 Grundfos Eye

Grundfos Eye is an indicator light on the operating panel. It indicates the operating condition of the motor.



Grundfos Eye indicator light (A)

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Indicator light	Indication	Description
	No lights are on.	Power off The motor is not running.
	Two opposite green indicator lights are rotating in the same direction as the motor when seen from the non-drive end.	Power on The motor is running.
	Two opposite green indicator lights are permanently on.	Power on The motor is not running.
	One yellow indicator light is rotating in the same direction as the motor when seen from the non-drive end.	Warning The motor is running with a warning.
	One yellow indicator light is permanently on.	Warning The motor has stopped.
	Two opposite red indicator lights are flashing simultaneously.	Alarm The motor has stopped.
	The green indicator light in the middle flashes quickly four times.	Grundfos Eye flashes four times when you press the Grundfos Eye symbol next to the motor name in Grundfos GO.
	The green indicator light in the middle is flashing continuously.	You have selected the motor in Grundfos GO, and the motor is ready to be connected.
	The green indicator light in the middle flashes quickly for a few seconds.	The motor is controlled by Grundfos GO or exchanging data with Grundfos GO.
	The green indicator light in the middle is permanently on.	The motor is connected to Grundfos GO.

8. Multi-pump function

Systems with two or more outlet-pressure sensors

If two or more pumps in the system are configured with an outlet-pressure sensor (standard option), they can all function as master pumps. Normally, the pump with the lowest number is the master pump. At the factory, the master pump is marked with number 1.

If master pump 1 is switched off or stopped due to an alarm, one of the other master pumps will automatically take control of the system.

9. Setting the system

You can set control functions via Grundfos GO, Grundfos GO Link or the operating panel. The system is delivered from factory in constant pressure control mode. The system can be used in different control modes, with an additional sensor that complies to the control mode.

- If only one function name is mentioned, it refers to both Grundfos GO and the operating panel.
- If a function name is mentioned in a parenthesis, it refers to a function on the operating panel.

Function	Menu or function available for the pump	Menu or function available for the system
Control mode		•
Setpoint		•
Operating mode		•
Set manual speed	•	
Set user-defined speed	•	
Set the proportional pressure		•
Analog inputs	•	
Grundfos Direct Sensor	•	
Pt100/1000 inputs	•	
Digital inputs	•	
Digital inputs/outputs	•	
Signal relay (Relay outputs)	•	
Analog output	•	
Operating range	•	
External setpoint function	•	•
Predefined setpoints		•
Limit-exceeded function	•	•
LiqTec (LiqTec function)	•	
Stop function (Low-flow stop function)		•
Stop at min. speed		•
Pipe filling function		•
Pulse flowmeter (Pulse flowmeter setup)	•	•
Ramps	•	
Direction of rotation	•	
Standstill heating	•	
Alarm handling	•	
Motor bearing monitoring	•	
Service intervals	•	
Communication	•	

Function	Menu or function available for the pump	Menu or function available for the system
Date and time (Set date and time)	•	
Unit configuration (Units)	•	
Buttons on product (Enable/disable settings)	•	
Delete history	•	
Define Home display	•	
Display settings	•	
Store settings (Store actual settings)	•	
Recall settings (Recall stored settings)	•	
Undo	•	
Pump name	•	
Connection code	•	
Run start-up guide	•	
Alarm log	•	•
Warning log	•	•
Assist	•	
Assisted pump setup	•	
Multi-pump function	•	•
Assisted fault advice	•	•

For detailed information on setting the system, see the installation and operating instructions of the pump.

9.1 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	Digital input	Bus communication
1	Stop			
2		Stop ⁵⁾		
3		Manual		
4		Maximum speed ⁵⁾ / User defined speed		
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		

⁵⁾ **Stop** and **Maximum speed** settings made with Grundfos GO or the 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 is selected with Grundfos GO or the operating panel.

10. Protective functions

Make sure that any protective function, for example dry-running protection or external start/stop that is detected via a digital input, is connected to and configured on all the pumps with an outlet-pressure sensor.

If an additional sensor is used, for example, a sensor with the limit-exceeded function or setpoint influence, this sensor must also be connected to all pumps with an outlet-pressure sensor. Alternatively, you can install an additional sensor for each pump with an outlet-pressure sensor.

10.1 Dry-running protection



The system must be protected against dry running.

Types of dry-running protection:

- A pressure switch or an inlet-pressure sensor is factory-fitted to the inlet manifold. See sections Pressure switch and Inlet pressure sensor.
- A level switch is factory-fitted to the inlet manifold, or fitted in a water tank after delivery. See section Level switch.

Related information

[10.1.1 Pressure switch](#)

[10.1.2 Level switch](#)

[10.1.3 Inlet-pressure sensor](#)

10.1.1 Pressure switch

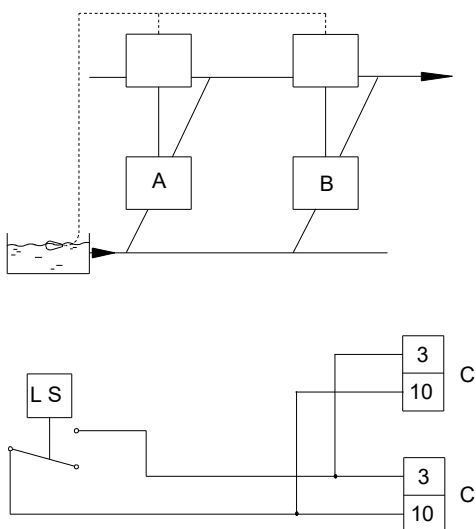
The system can be fitted with a pressure switch for dry-running protection. The pressure switch is fitted to the inlet manifold.

10.1.2 Level switch

If there is no inlet pressure, the system can be optionally fitted with a level switch, either from factory or after delivery. The level switch can, for instance, monitor the water level in a tank connected to the inlet manifold, or the inlet manifold itself. And the level switch must be connected to terminal 3 (or 23) and 10 in the master pumps. See section Functional modules.

Furthermore, the digital input must be configured with Grundfos GO to detect dry running.

The system starts up automatically if it is stopped due to dry running. It can be set to manual restart with Grundfos GO.



Level switch connected to each pump

Pos.	Description
A	Pump 1
B	Pump 2
C	3: GND (frame) 10: Digital input

Related information

[10.1.3 Inlet-pressure sensor](#)

10.1.3 Inlet-pressure sensor



The system with inlet sensors has Limit-exceeded (Low limit) configured for dry-running protection.

The system can be fitted with one or two inlet-pressure sensors, either from factory or after delivery. The sensor can monitor the pressure in the inlet manifold and must be connected to one of the analog input. See section Functional modules.

The analog input is configured with Grundfos GO or via the HMI 300 and 301 operating panels. The limit-exceeded function can be configured to detect dry running. From factory the system is set to start automatically if it is stopped due to dry running. It can be changed to manual restart with Grundfos GO or via the HMI 300 and 301 operating panels.

Related information

[5.3.1 Functional module, FM300](#)

[5.3.2 Functional module, FM310 and FM311](#)

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11. Servicing the system

DANGER

Electric shock

Death or serious personal injury



- Before you maintain the system, make sure that the power supply is disconnected and cannot be accidentally switched on.

WARNING

Contaminated drinking water

Death or serious personal injury



- Flush the system after a standstill period in compliance with local legislation.

WARNING

Overhead load

Death or serious personal injury



- Wear a safety helmet.

CAUTION

Overhead load

Minor or moderate personal injury



- Use appropriate tools and lifting equipment for maintenance.

11.1 Maintaining the system

11.1.1 Pumps

Pump bearings and shaft seals do not require maintenance.

If pumps are to be drained for a long period of inactivity, remove one of the coupling guards to apply a few drops of silicone oil on the shaft between the pump head and the coupling. This will prevent the shaft seal faces from sticking.

11.1.2 Motors

Keep motor cooling fins and fan blades clean to ensure sufficient cooling of the motor and electronics.

Motors above 10.0 Hp (7.5 kW) must be lubricated according to the recommended intervals and with correct type of bearing grease stated on the motor.

11.1.3 Breaker cabinet

The breaker cabinet does not require maintenance. Keep it clean and dry.

11.1.4 Service kits

See Grundfos Product Center at www.grundfos.com for service manuals.

11.2 Taking the system out of operation

DANGER

Electric shock

Death or serious personal injury



- Make sure that the power supply is disconnected and cannot be accidentally switched on.



Drain the system if you are not going to use it for a long time.

1. Switch off the main switch to take the system out of operation.
2. Switch off the corresponding motor protective circuit breaker and the automatic circuit breaker to take the individual pump out of operation.

11.2.1 Frost protection

If pumps are not used during periods of frost, they must be drained to avoid damage.

Drain the pump by loosening the vent screw in the pump head and removing the drain plug from the base.

Do not tighten the vent screw or refit the drain plug until the system is to be used again.

11.3 Startup the system after standstill

WARNING

Contaminated drinking water

Death or serious personal injury



- Flush the system after a standstill period in compliance with local legislation.

See section Startup for further instructions.

Related information

[6. Startup](#)

12. Fault finding

DANGER

Electric shock

Death or serious personal injury



- Switch off the power supply and wait at least five minutes before you make any connections in the breaker cabinet or control cabinet.
- Make sure that the power supply is disconnected and cannot be accidentally switched on.

12.1 The system does not run when started

The system does not run when started.

Cause	Remedy
The actual pressure is higher than or equal to the setpoint.	Wait until the pressure drops, or decrease the pressure on the outlet side of the system, and check if the system starts.
The power supply is disconnected.	Connect the power supply.
The circuit breakers have cut out.	Correct the fault and cut in the circuit breakers.
The internal motor protection is activated.	Contact Grundfos.
The circuit breaker is defective.	Replace the circuit breaker.
The motor is defective.	Repair or replace the motor.
Outlet-pressure sensor fault.	<ul style="list-style-type: none"> • Replace the outlet-pressure sensor. • Repair or replace the cable.
<ul style="list-style-type: none"> • The outlet-pressure sensor is defective. • The cable is broken or short-circuited. 	

12.2 The system starts but stops immediately afterwards

The system starts but stops immediately afterwards. The operating pressure is not reached.

Cause	Remedy
Dry running or no inlet pressure.	Check the water supply to the system. When the inlet pressure is re-established, the pumps will restart after 15 seconds.

12.3 The system stops and cannot restart

The system stops and cannot restart.

Cause	Remedy
Outlet-pressure sensor fault.	<ul style="list-style-type: none"> • Replace the outlet-pressure sensor. Outlet-pressure sensors with 0-20 mA or 4-20 mA output signals are monitored by the system. • Repair or replace the cable.
<ul style="list-style-type: none"> • The outlet-pressure sensor is defective. • The cable is broken or short-circuited. 	
Terminal box unit fault.	<ul style="list-style-type: none"> • Connect the power supply. • Replace the terminal box of pump 1. • Contact Grundfos.
<ul style="list-style-type: none"> • The power supply is disconnected on pump 1. • The terminal box is defective. 	

12.4 Unstable water supply from the system

The water supply from the system is unstable (only applies to very low consumption).

Cause	Remedy
The inlet pressure is too low.	Check the inlet pipe and possible inlet strainer.
The inlet pipe or pumps are partly blocked by impurities.	Clean the inlet pipe or pumps.
The pumps suck air.	Check the inlet pipe for leakages.
The outlet-pressure sensor is defective.	Replace the outlet-pressure sensor.

12.5 Pumps are running but deliver no water

Pumps are running but deliver no water.

Cause	Remedy
The inlet pipe or pumps are blocked by impurities.	Clean the inlet pipe or pumps.
The check valve is blocked in the closed position.	Clean the check valve. The check valve must move freely.
The inlet pipe is leaky.	Check the inlet pipe for leakages.
Air in the inlet pipe or pumps.	Vent the pumps. Check the inlet pipe for leakages.

12.6 The system cannot reach the setpoint

The system cannot reach the setpoint.

Cause	Remedy
The cable is broken or short-circuited (GENbus communication between pump 1 and pump 2 or 3).	Repair or replace the cable.
Pump 2 or 3 does not operate.	Connect the power supply to the pump and check the pump condition.

12.7 Leakage from a shaft seal

The shaft seal has leakage.

Cause	Remedy
The shaft seal is defective.	Replace the shaft seal.
The height adjustment of the pump shaft is inaccurate.	Re-adjust the shaft height.

12.8 There is noise when the pumps are operating

There is noise when the pumps are operating.

Cause	Remedy
The pumps are cavitating.	Clean the inlet pipe or pumps, and if necessary, the inlet strainer.
The pumps do not rotate freely (frictional resistance) due to inaccurate height of the pump shaft.	Re-adjust the shaft height. See the installation and operating instructions of the pump supplied with the system.

12.9 Very frequent starts and stops

The starts and stops of pumps are frequent.

Cause	Remedy
Wrong diaphragm tank precharge pressure.	Check the precharge pressure.
The difference between start and stop pressures is too small.	Increase the differential pressure setting on each pressure switch.



This situation only occurs in systems with emergency operation.

13. Technical data

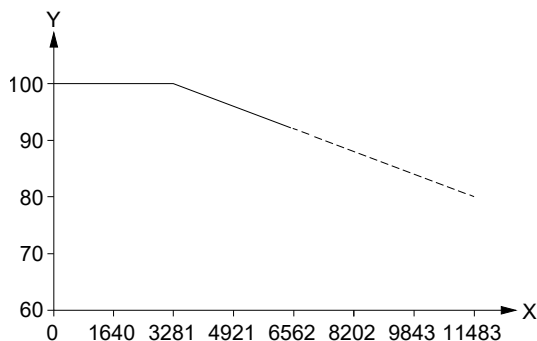
13.1 Operating conditions

13.1.1 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 11483 ft (3500 m) above sea level.



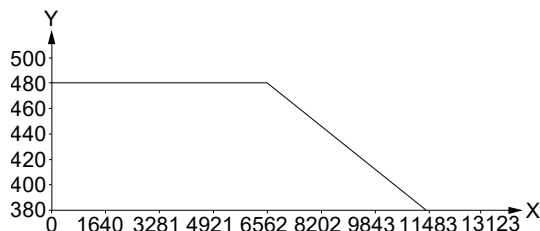
Motors installed over 3281 ft (1000 m) above sea level must not be fully loaded due to the low density and consequent low cooling effect of the air.



Motor output power in relation to altitude

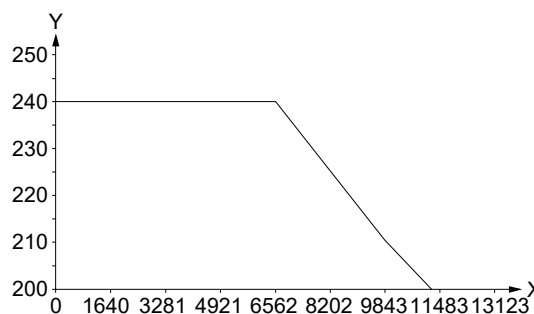
Pos.	Description
X	Altitude [ft]
Y	P2 [%]

In order to maintain the galvanic isolation and ensure correct clearance according to IEC 60664-1:2007, you must adapt the supply voltage to the altitude:



Supply voltage for three-phase motor in relation to altitude

Pos.	Description
X	Altitude [ft]
Y	Supply voltage [V]



Supply voltage for single-phase motor in relation to altitude

Pos.	Description
X	Altitude [ft]
Y	Supply voltage [V]

13.1.2 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)

13.1.3 Liquid temperature

System type	Liquid temperature (water)
Systems with CRE 3 and CRE 5	41-140 °F (5-60 °C)
Systems with CRE 10 and larger	41-180 °F (5-82 °C)

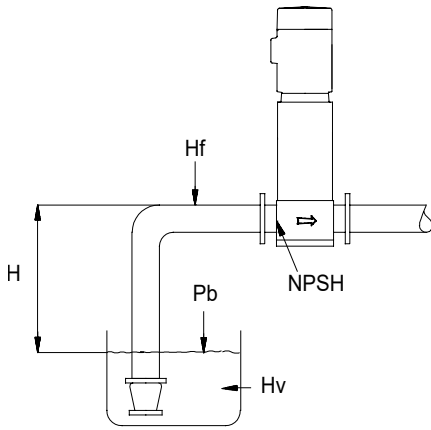
13.1.4 Humidity

Maximum 95 %.

13.1.5 Maximum operating pressure

See system nameplate.

13.1.6 Minimum inlet pressure



TM020118

Parameters for the calculation of minimum inlet pressure

The minimum inlet pressure "H" in meters of head required to avoid cavitation in the pumps can be calculated as follows.

H	$pb \times 10.2 - NPSH - Hf - Hv - Hs$
pb	Barometric pressure in bar. Barometric pressure can be set to 1 bar. In closed systems, p_b indicates the system pressure in bar.
NPSH	Net Positive Suction Head in meters of head The NPSH value can be read from the NPSH curve at the highest flow which the individual pump delivers.
Hf	Friction loss in the inlet manifold in meters of head at the highest flow which the individual pump delivers. Note: If a check valve is installed on the inlet side of the pump, the friction loss in the valve must be added. See the manufacturer's data.
Hv	Vapor pressure in meters of head
Hs	Safety margin of min. 0.5 meters of head

See Grundfos Product Center for more information.



In some regions, the system can be equipped with a low inlet manifold, which makes it more suitable for suction lift operation. Contact Grundfos for further information.

Check valve on the inlet side

For suction-lift operation, the check valve must be moved to the inlet side. This is often used in combination with a foot valve if the system is drawing water from a tank.

Example

pb	1 bar
Pump type	CRE 15, 50 Hz
Flow rate	15 m ³ /h
NPSH	1.2 meters of head
Hf	3 meters of head
Liquid temperature	+60 °C
Hv	2.1 meters of head
H	$pb \times 10.2 - NPSH - Hf - Hv - Hs$ [meters of head]
H	$1 \times 10.2 - 1.2 - 3.0 - 2.1 - 0.5 = 3.4$ meters of head

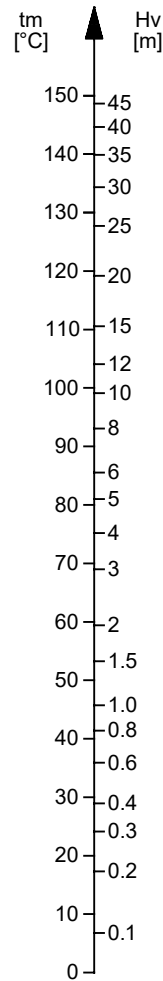
This means that each pump can operate with a maximum suction lift of 3.4 meters of head.

Pressure calculated in bar: $3.4 \times 0.0981 = 0.33$.

Pressure calculated in kPa: $3.4 \times 9.81 = 33.4$.



You need to convert the head in meters to feet.



TM003037

13.1.7 Maximum inlet pressure

The total of the actual inlet pressure and the pressure at which the pump is operating against a closed valve must always be lower than the maximum system pressure.

13.1.8 Minimum flow rate

Due to the risk of overheating, do not use the pumps at flow rates below 10 % of the rated flow rate of one pump.



The pumps must not run against a closed outlet valve.

13.1.9 Maximum starts and stops

Limit the system starts and stops via the power supply to 4 times per hour.

When the system is switched on via the power supply, it will start after approximately 5 seconds.

For more frequent starts and stops, use the external start-stop input.

When started via an external on/off switch, the system starts immediately.

13.1.10 Diaphragm tank

Set the diaphragm tank precharge pressure to 0.7 times the setpoint. Adjust the precharge pressure if the setpoint changes to ensure optimal operation.



Measure the precharge pressure while the system is pressureless.

We recommend that you use nitrogen gas for precharging.

13.2 Supply voltage

System with single-phase pumps

1 × 200-240 V ± 10 %, 50/60 Hz, PE.

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

Maximum feeder overcurrent protective device rating

Motor size [Hp (kW)]	Max. [A]	
	2 pumps	3 pumps
1.0 (0.75)	30	40
1.5 (1.1)	40	50
2.0 (1.5)	45	60

You can use both standard and quick-blow or slow-blow fuses.

System with three-phase pumps

3 × 200-240 V ± 10 %, 50/60 Hz, PE.

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

Maximum feeder overcurrent protective device rating

Motor size [Hp (kW)]	Max. [A]	
	2 pumps	3 pumps
1.5 (1.1)	25	30
2.0 (1.5)	25	35
3.0 (2.2)	35	45
5.0 (4)	50	70
7.5 (5.5)	80	100

3 × 440-480 V ± 10 %, 50/60 Hz, PE.

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

Maximum feeder overcurrent protective device rating

Motor size [Hp (kW)]	Max. [A]	
	2 pumps	3 pumps
1.0 (0.75)	15	15
1.5 (1.1)	15	20
2.0 (1.5)	15	20
3.0 (2.2)	15	20
5.0 (4)	25	35
7.5 (5.5)	40	50
10.0 (7.5)	45	60

You can use both standard and quick-blow or slow-blow fuses.

13.3 Leakage current

System with single-phase pumps

Motor size [hp (kW)]	Number of pumps in system	Leakage current [mA]
1- 2 (0.75 - 1.5)	2	< 7
	3	< 10.5
	4	< 14

The leakage currents are measured in accordance with IEC 61800-5-1:2007.

System with three-phase pumps

Motor size [hp (kW)]	Number of pumps in system	Leakage current [mA]
0.4 - 14.75 (0.37 - 11) (supply voltage below 400 V)	2	< 7
	3	< 10.5
	4	< 14
0.49 - 14.75 (0.37 - 11) (supply voltage over 400 V)	2	< 10
	3	< 15
	4	< 20

The leakage currents are measured in accordance with IEC 61800-5-1:2007.

13.4 Sound pressure level

See the installation and operating instructions of the pump.

The sound pressure level for a number of pumps can be calculated as follows:

$$L_{max} = L_{pump} + (n - 1) \times 3$$

L_{max}	Maximum sound pressure level
L_{pump}	Sound pressure level for one pump
n	Number of pumps

13.5 Other technical data

EMC (electromagnetic compatibility)

According to EN 61000-6-2:2005 and 61000-6-3:2007.

Residential areas, unlimited distribution, corresponding to CISPR 11, class B, group 1.

Industrial areas, unlimited distribution, corresponding to CISPR 11, class A, group 1.

See the installation and operating instructions of the pump.

Enclosure class

UL Type 3R rating.

Insulation class

F (IEC 85).

13.5.1 Torques

Torques for terminals

Terminal	Recommended torque [ft·lb]
L1, L2, L3	1.6
PE	4.4
NC, C1, C2, NO	0.4
DI1, DI2, DI3, DI4, AI1, AI2, AI3, AO1, PT1, PT2, LT1, LT2, GND, 24V, 5V, TX, RX, A, Y, B, S24, ST1, ST2	0.4

Torques for other parts

Part designation	Recommended torque [ft·lb]
Control box, upper part	4.8 - 5.2
Cover for power supply	0.7 - 1
Blind plugs:	
M20	0.7 - 1.1
½" NPT	5.9 - 7.4

13.6 Accessories

The following are the communication interface modules for use with the system.

Protocol	Communication interface module
GENIbus	CIM 50
LonWorks (Single)	CIM 100
LonWorks (Multi)	CIM 110
PROFIBUS DP	CIM 150
Modbus RTU	CIM 200 ⁶⁾
BACnet MS/TP	CIM 300
Modbus TCP, BACnet IP, PROFINET, GiC/GRM IP, EtherNet IP	CIM 500
Ethernet connection to Grundfos iSOLUTIONS Cloud (GiC)	CIM 550

⁶⁾ Soft CIM built-in motor with FM310 and FM311.

Installing a communication interface module that is not listed above might affect the compliance level of the system.

13.7 Factory settings

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

Settings




Setpoint	30 % of sensor range
Operating mode	Normal
Control mode	Constant pressure
Pipe filling function	○
Buttons on product	●
Stop function (Low-flow stop function)	●
Controller (Controller settings)	●
Ti	0.5
Kp	0.5
Operating range	25-100 %
Ramps	
Ramp-up	1 second
Ramp-down	3 seconds
Number (Pump number)	-
Radio communication	●
Analog input 1	4-20 mA
Analog input 2	○
Analog input 3	○ ⁷⁾
Pt100/1000 input 1	○
Pt100/1000 input 2	○
Digital input 1	External stop
Digital input 2	○
Digital input/output 3	Dry running ⁸⁾
Digital input/output 4	○
Pulse flowmeter	○
Predefined setpoints	○
Analog output	○
External setpoint function	○
Signal relay 1	Ready
Signal relay 2	Running
Limit 1 exceeded	○
Limit 2 exceeded	○
LiqTec function	○
Standstill heating	○
Motor bearing monitoring	●
Pump name	Hydro Multi-E

⁷⁾ Active if the inlet sensor is factory-fitted.

⁸⁾ Not active if the inlet sensor is factory-fitted.

14. Product manuals

You can find further product information about the system in the following documents. The documents are available in Grundfos Product Center on www.grundfos.com.

Title	Document type	QR code	Publication number
CR, CRI, CRN, CRT	Installation and operating instructions		98419736
CRE, CRIE, CRNE, CRKE, SPKE, MTRE, CME MLE Model J, K permanent-magnet motors	Installation and operating instructions		92898117
CRE, CRIE, CRNE, SPKE, MTRE, MTHE, CME	Installation and operating instructions		98566351

15. Disposal

15.1 Precautions for disposal

DANGER

Electric shock

Death or serious personal injury

- Before you dismantle the system, make sure that the power supply is disconnected and cannot be accidentally switch on.



WARNING

Crushing of feet

Death or serious personal injury

- Before you lift, make sure that the lifting equipment can lift this load, which is listed on the nameplate and on the packaging label.



WARNING

Hot surface

Death or serious personal injury

- Before you dismantle the system, make sure that the system cools down.



CAUTION

Overhead load

Minor or moderate personal injury

- Use safety equipment when dismantling the system.



CAUTION

Sharp element

Minor or moderate personal injury

- Wear safety gloves.



15.2 Disposing of the system

This system 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.

16. Document quality feedback

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



[Click here to submit your feedback](#)

Appendix A

A.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.

A.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.

Appendix B

B.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.

B.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.

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