CMBE TWIN

Installation and operating instructions

GRUNDFOS

CMBE TWIN

English (GB)

Installation and operating instructions 4

Original installation and operating instructions

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1. General information

Appliances can be used by persons with reduced physical, sensory, or mental capabilities, as well as persons with a lack of experience and knowledge. This requires that they are given supervision or instruction concerning the use of the appliance in a safe way and that they understand the hazards involved. Cleaning and user maintenance shall not be carried out by children without supervision.

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.

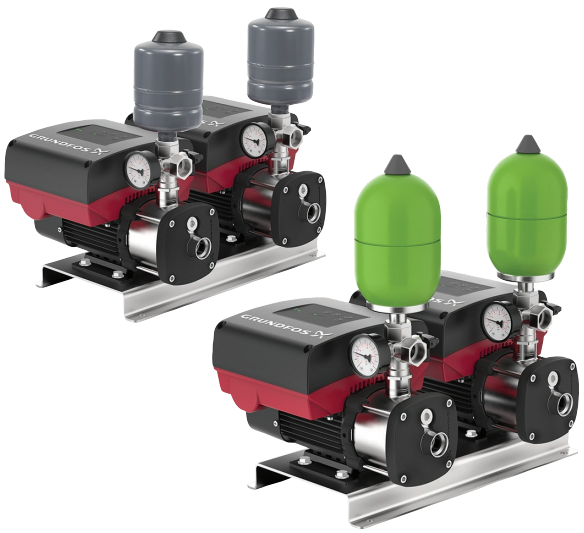
A blue or grey circle with a white graphical symbol indicates that an action must be taken.

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. Product introduction



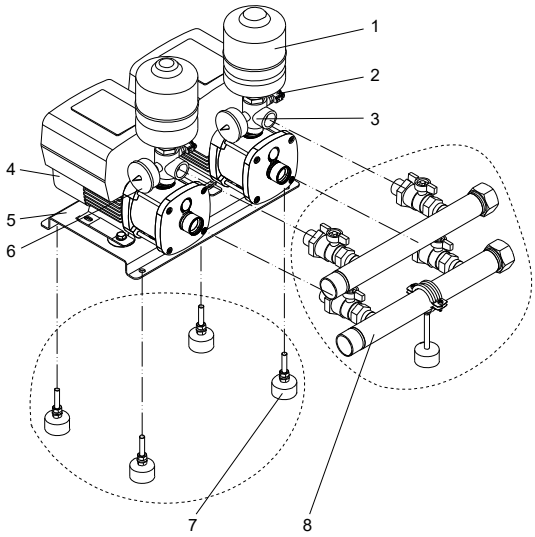
CMBE TWIN is a high-efficiency booster system consisting of two Grundfos CMBE boosters connected in parallel, suitable for clean water supply and pressure boosting in domestic and commercial applications.

Each CMBE booster includes a Grundfos CME booster with an integrated frequency drive, and it maintains a constant pressure in the pipe system.

CMBE TWIN is available with green or grey diaphragm tanks for clean water supply and pressure boosting.

Check local legislation to see if the supplied tanks are drinking-water approved.

The two CMBE boosters are mounted on a common base plate. Each booster is delivered complete with 5-way fittings, non-return valves, diaphragm tank, pressure sensor and pressure gauge.



CMBE TWIN booster with accessories

Pos.	Description
1	Diaphragm tank
2	Pressure sensor
3	5-way fitting with integrated non-return valve
4	CME pump
5	Base plate
6	Pressure gauge
7	Vibration dampers (accessory)
8	Inlet/outlet pipes with ball valves and unions (accessory)

2.1 Intended use

The product has been evaluated for use in indoor installations with:

- clean water
- drinking water.

This product has been evaluated for use with clean water only.

Only use the product according to the specifications stated in these installation and operating instructions.

Check local legislation to see if the supplied tanks are drinking water-approved.

The CMBE TWIN booster system keeps a constant pressure in variable-demand systems and is designed for pressure boosting of clean water in domestic and commercial applications.

The CMBE TWIN booster system is typically used for pressure boosting in larger applications in blocks of flats, hospitals, hotels, schools, and small industrial plants and businesses, agriculture and irrigation.

2.2 Pumped liquids

The product is suitable for pumping clean, thin, non-aggressive, non-toxic and non-explosive liquids without solid particles or fibres.

If the product has been used for pumping dirty liquids, such as pool water, it must be flushed with clean water immediately after use.

If the water contains sand, gravel or other debris, there is a risk of pump blockage and pump damage. Install a filter on the inlet side or apply a floating strainer to protect the pump.

2.3 Cybersecurity

The product must only be connected to protected network subnets with strict access control.

According to the standard EN 18031-1:2024, the RJ45 connector used for connecting to IP networks is considered an exposed network interface, along with the GENIbus TCP protocol used on it, which is considered an exposed service.

2.3.1 Network interfaces and services

In the factory default state, the product exposes the following network interfaces:

Interface	Description
RJ45	Wired Ethernet / IP connectivity

The following services are exposed by the product over its network interfaces in the factory default state.

Interface	Service	Description
RJ45	GENIpro TCP	It is used for connecting the product to a service tool on an engineering workstation. Pairing is required before communication can take place. The GENIpro TCP pairing state is persistent.

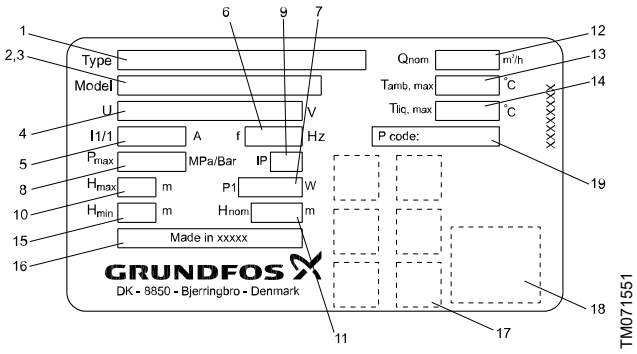
2.4 System sizing

The system in which the CME Booster is incorporated must be designed for the maximum pump pressure.

The pump is by default set to not stop until it reaches its maximum pressure.

2.5 Identification

2.5.1 Nameplate for CMBE TWIN



Example of nameplate for CMBE TWIN booster system

Pos.	Description
1	Pump type
2	Model code and product number
3	Material code
4	Supply voltage
5	Full-load current
6	Frequency
7	Power consumption
8	Max. operating pressure
9	Enclosure class
10	Max. head
11	Rated head
12	Rated flow rate
13	Max. ambient temperature
14	Max. liquid temperature
15	Min. height
16	Country of origin
17	Marks of approval
18	QR code
19	Factory code and production code (year and week)

3. Receiving the product

3.1 Transporting the product

Do not stack the product.

WARNING
Falling objects
Death or serious personal injury
- Secure the product during transport to prevent it from tilting or falling down.

CAUTION
Back injury
Minor or moderate personal injury
- Use lifting equipment.

CAUTION
Crushing of feet
Minor or moderate personal injury
- Wear safety shoes when moving the product.

3.2 Inspecting the product

Before installing the product, do the following:

1. Check that the product is as ordered.
   If the product is not as ordered, contact the supplier.
2. Check that no visible parts have been damaged.
   If any visible parts have been damaged, contact the transport company.

3.3 Scope of delivery

The box contains the following items:

- 1 Grundfos CMBE TWIN with two boosters mounted on a common baseplate with grey or green tanks.
  At delivery, the green tanks are not mounted.
- 1 quick guide
- 1 installation and operating instructions.

Optional items:

- vibration damper kit
- manifold kit.

4. Installation requirements

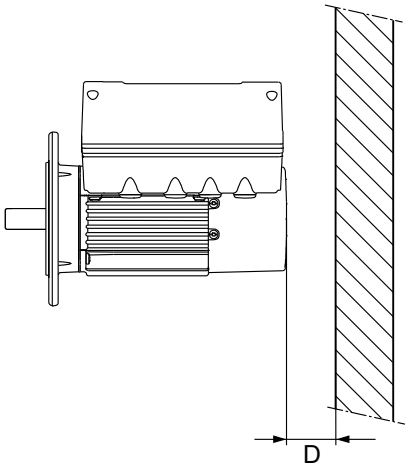
4.1 Minimum clearance

Recommended clearance around the product:

- 1 m on the front and on both sides of the product to ensure sufficient space for service and maintenance
- minimum 50 mm space at the back to ensure sufficient motor cooling.

4.2 Cooling the motor

- Install the motor allowing a distance of minimum 50 mm (D) between the end of the fan cover and the wall or another fixed object.



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- Position the product with sufficient space around.
- Make sure that the temperature of the cooling air does not exceed 50 °C.
- Keep cooling fins and fan blades clean.

4.3 Installing the product in moist surroundings

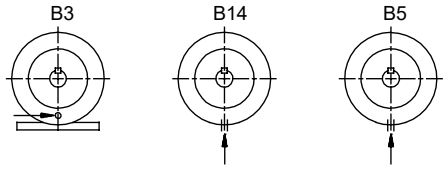
If you install the motor in moist surroundings or areas with high humidity, ensure that the bottom drain hole is open. As a result, the motor becomes self-venting, allowing water and humid air to escape.

4.3.1 Drain holes

The motor has a plugged drain hole on the drive side. The drain hole is placed 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 is lower than standard.



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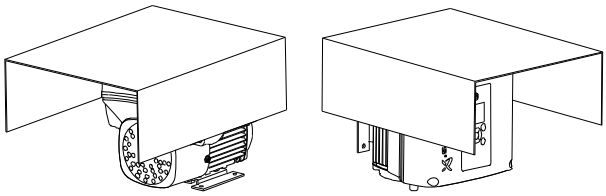
4.3.2 Installing the product outdoors or in areas with high humidity

If you install the product outdoors or in areas with high humidity, take the following action to avoid condensation on the electronic components.

- Provide the product with a suitable cover.

  The cover must be large enough to ensure that the product is not exposed to direct sunlight, rain or snow. Grundfos does not supply covers.

When fitting a cover to the product, observe the instructions for adequate cooling.



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- Open the drain holes in the product.
- Connect the product permanently to the mains supply and activate the built-in standstill heating function.

4.3.2.1 Installation altitude

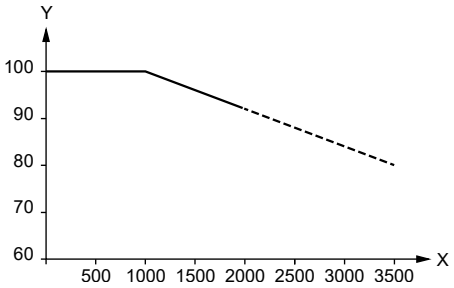
The installation altitude is the height above sea level of the installation site.

Products installed up to 1000 m above sea level can be loaded 100 %.

The motors can be installed up to 3500 m above sea level.

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

The motor output power (P2) in relation to the altitude above sea level is shown in the graph.



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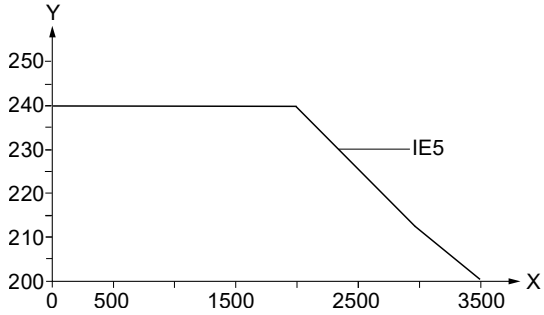
Pos.	Description
Y	P2 [%]
X	Altitude [m]

To maintain the galvanic isolation and ensure correct clearance according to EN60664-1:2007, adapt the supply voltage to the altitude.

The supply voltage for a single-phase motor in relation to the altitude is shown in the graph.



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Pos.	Description
1	Supply voltage
2	Altitude [m]

5. Mechanical installation

WARNING
Hot liquid
Death or serious personal injury
- To avoid leakage do not overtighten the pipe connections.

The product must be installed in a location with access control to prevent unauthorized access to the product.

5.1 Lifting the product

Observe local regulations concerning limits for manual lifting or handling. The weight of the product is stated on the nameplate.

CAUTION
Sharp element
Minor or moderate personal injury
- Wear personal protective equipment.

CAUTION
Crushing of feet
Minor or moderate personal injury
- Wear safety shoes when moving the product.
- Use lifting equipment.

CAUTION
Back injury
Minor or moderate personal injury
- Use lifting equipment.

Do not lift the product by the terminal box.

To protect components such as pressure gauge, sensor and tank, Grundfos recommends lifting the product in the same packing it was delivered in.

- Always lift the product by means of a forklift if the pump is fixed on a pallet.
- The product must remain in the packaging until installation.
- Mind the weight of the product. The weight is stated on the nameplate.
- Mind the unbalanced load when you lift the product. Most of the weight is on the motor side of the product.

5.2 Mounting the tanks

The green tanks are not mounted at delivery.
Follow the steps below to mount the tanks:

1. Apply drinking-water approved sealant tape to the thread of the tanks.
2. Screw the tanks on the pumps.
3. Check the system for leakages.
4. Check the precharge pressure.

Related information

5.3 Adjusting the diaphragm tank pressure

5.3 Adjusting the diaphragm tank pressure

1. Check the precharge pressure in all diaphragm tanks. The correct precharge pressure is 0.7 times the required outlet pressure (setpoint).

   Measure the precharge pressure while the system is pressureless.

2. Adjust the precharge pressure. Always use nitrogen gas to refill the tanks.

Related information

5.2 Mounting the tanks
9.1.3 Setting the pressure of the booster system
10. Servicing the product
10.4 Refilling the diaphragm tank

5.4 Positioning the product

1. Position the base plate on a plane and solid surface, for example a concrete floor or foundation.
2. We recommend that you use vibration dampers under the base plate.
3. If the base plate is not fitted with vibration dampers, the base plate must be bolted to the floor or foundation through the holes in the base plate.

5.5 Pipe system

We recommend that you use a manifold pipe dimension of 1" to 1½" to carry the maximum flow of both pumps with no additional pressure loss.

Do not twist the manifold and do not place weight on the pumps or manifold as this can damage the product.

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

We recommend that you use the following:

- Vibration dampers for mounting the base plate.
- Pipe supporting brackets. The pump is not built to withstand the weight of a pipe system.
- Flexible joints, flexible hoses and pipe hangers to reduce vibration noise in the pipe system.

We recommend that you install isolating valves on both the inlet and outlet side of the booster system.

1. Use thread sealing tape or similar to seal the pipe connections.
2. Connect pipes to the inlet and outlet on both pumps.
3. Install the pipes so that air pockets are avoided.
4. If the pump is installed above the liquid level, for example if you pump from a tank or reservoir, you must fit a foot valve in the inlet pipe.

6. Electrical connection

DANGER
Electric shock
Death or serious personal injury

- In case of an insulation fault, the fault current may be a DC or pulsating DC. Observe national legislation about requirements for and selection of Residual Current Device (RCD) when installing the product.

DANGER
Electric shock
Death or serious personal injury

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

DANGER
Electric shock
Death or serious personal injury

- It must be possible to lock the main switch in position 0. Type and requirements as specified in EN 60204-1, 5.3.2.

WARNING
Electric shock
Death or serious personal injury

- Check that the power plug delivered with the product is in compliance with local regulations.
- The protective earth of the power outlet must be connected to the protective earth of the product. The plug must therefore have the same PE connection system as the power outlet. If not, use a suitable adapter if allowed by local regulations.
- Provide protection against indirect contact in accordance with local regulations.
- Make sure all earth connections are established correctly before switching on the power supply.
- The user or the installer is responsible for correct earthing and protection according to local regulations.
- The installer is responsible for potential compensation.
- Work must be carried out according to IEC 60204-1:2016.

WARNING
Electric shock
Death or serious personal injury

- A supply disconnecting device made according to EN 60204-1 5.3.2 must be provided with means permitting it to be locked in the OFF (isolated) position. This device must also be installed in a position according to EN 60204-1, 5.3.4.

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

All electrical connections must be carried out by qualified persons.

6.1 Cable requirements

WARNING
Electric shock
Death or serious personal injury
- Comply with local regulations as to cable cross-sections.

6.2 Protection against electric shock, indirect contact

WARNING
Electric shock
Death or serious personal injury
- Connect the product to protective earth and provide protection against indirect contact in accordance with local regulations.

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

6.3 Protection against mains voltage transients

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

6.4 Motor protection

The product incorporates thermal protection against slow overloading and blocking. No external motor protection is required.

Model H, I: The product includes load- and speed- sensitive motor-overload protection.

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.

6.5 Residual-current circuit breakers

DANGER
Electric shock
Death or serious personal injury
- In case of an insulation fault, the fault current may be a DC or pulsating DC. Observe national legislation about requirements for and selection of Residual Current Device (RCD) when installing the product.

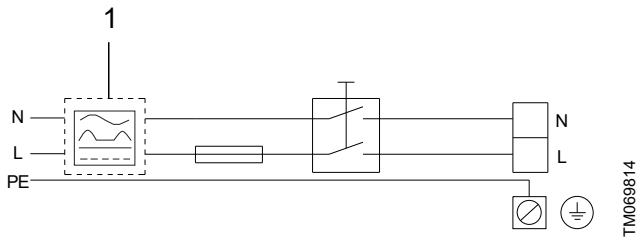
The residual-current circuit breaker must be marked.

Take into account the total leakage current of all the electrical equipment in the installation.

This product may cause a direct current in the protective-earth conductor.

Connection example for single-phase supply

The drawing shows an example of a mains-connected single-phase motor with a main switch, a backup fuse and a residual-current circuit breaker, type B.



Pos.	Description
1	Residual-current circuit breaker, type B
N	Neutral
L	Phase
PE	Protective earth

6.6 Connecting a power plug to the electrical installation

Relevant for products delivered with a power plug.

Check that the power plug delivered with the product is in compliance with local regulations.

Make sure that the electrical installation supports the rated current [A] of the product. See the product's nameplate.

DANGER
Electric shock
Death or serious personal injury

- Make sure that the product is connected only to a properly grounded, grounding-type receptacle (protective earthing).
- The protective earth of the power outlet must be connected to the protective earth of the product. The plug must therefore have the same PE connection system as the power outlet. If not, use a suitable adapter.

1. Switch off the power supply to the power socket.
2. Connect each plug to its own power socket.

6.7 Connecting a fuse box to the electrical installation

Relevant for products delivered without a power plug. This product variant is supplied with a 5 m cable and a fuse box.

All electrical connections must be carried out by a qualified electrician in accordance with local regulations.

DANGER
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.

1. Switch off the power supply.
2. Open the fuse box and find the wiring diagram.
3. Mount the fuse box on a wall or the like, so connection to the electrical installation can be performed safely.
4. Connect the cables from the electrical installation and from the pump to the fuse box according to the wiring diagram.
5. Close the fuse box, and switch on the power.

6.8 Wiring diagram

6.8.1 Standard functional module, FM 200

Inputs and outputs

The module has these connections:

- two analog inputs
- two digital inputs or one digital input and one open-collector output
- Grundfos Digital Sensor input and output
- two signal relay outputs
- GENIbus connection.

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

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

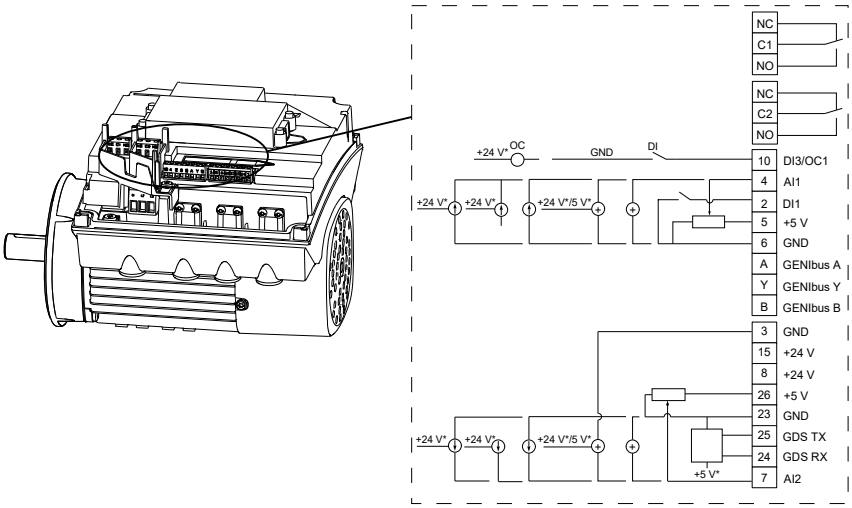
PELV: The output is galvanically separated from other circuits. Therefore, you can connect the supply voltage or protective extra-low voltage to the output as desired.

Connection terminals for the mains supply

Phases	Terminals
Single-phase	N, PE, L

Connection terminals for inputs and outputs

DANGER
Electric shock
Death or serious personal injury
- Make sure that the wires to be connected to the connection groups below are separated from each other by reinforced insulation in their entire lengths.



Terminal	Type	Function
NC	Normally closed contact	Signal relay 1. LIVE or PELV.
C1	Common	
NO	Normally open contact	
NC	Normally closed contact	Signal relay 2. PELV only.
C2	Common	
NO	Normally open contact	
10	DI3/OC1	Digital input/output, configurable. Open collector: Maximum 24 V resistive or inductive.
4	AI1	External sensor. Pressure sensor: Pressure signal, 0.5 to 3.5 V. Connect the white wire to this terminal.
2	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 2 and 6. Remove the jumper if digital input 1 is to be used as external start or stop or any other external function.
5	+5 V	Power supply to a potentiometer or sensor.
6	GND	Protective earth.
A	GENIbus, A	GENIbus, A (+).
Y	GENIbus, Y	GENIbus, Y (GND).
B	GENIbus, B	GENIbus, B (-).
3	GND	Protective earth.
15	+24 V	Power supply.
8	+24 V	Power supply.
26	+5 V	Power supply to a potentiometer or sensor. Pressure sensor: Voltage supply, +5 VDC, PELV. Connect the brown wire to this terminal.

Terminal	Type	Function
23	GND	Protective earth. Pressure sensor: GND, 0 V. Connect the green wire to this terminal.
25	GDS TX	Grundfos Digital Sensor output.
24	GDS RX	Grundfos Digital Sensor input.
7	AI2	External sensor. Pressure sensor: Temperature signal, 0.5 to 3.5 V. Connect the yellow wire to this terminal.

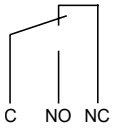
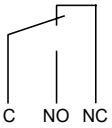
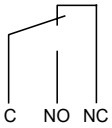
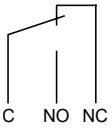
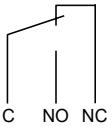
6.9 Signal relays

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 are shown in the table below.

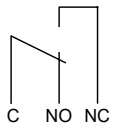
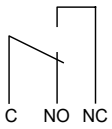
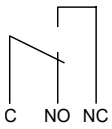
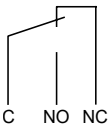
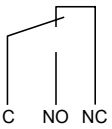
Grundfos Eye is off

The power is off.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					-

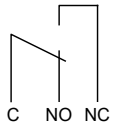
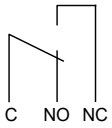
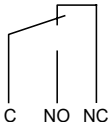
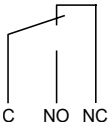
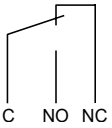
Grundfos Eye is rotating green

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

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

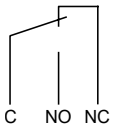
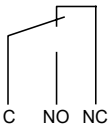
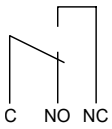
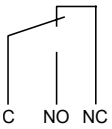
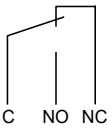
Grundfos Eye is rotating green

The pump runs in **Manual** mode.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					**Manual**

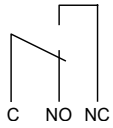
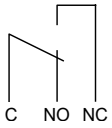
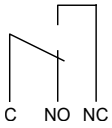
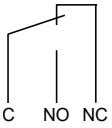
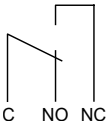
Grundfos Eye is permanently green

The pump is ready for operation but is not running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					**Stop**

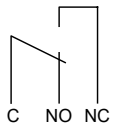
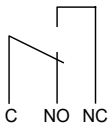
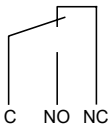
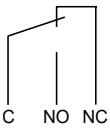
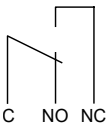
Grundfos Eye is rotating yellow

There is a warning, but the pump is running.

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

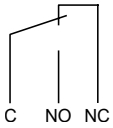
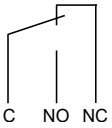
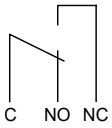
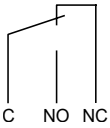
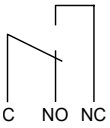
Grundfos Eye is rotating yellow

There is a warning, but the pump is running.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					**Manual**

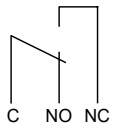
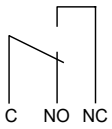
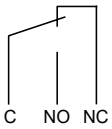
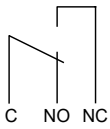
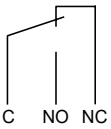
Grundfos Eye is permanently yellow

There is a warning, and the pump is stopped via a **Stop** command.

Operation	Pump running	Ready	Alarm	Warning	Operating mode
					**Stop**

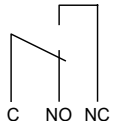
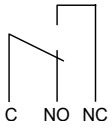
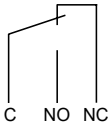
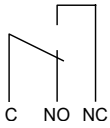
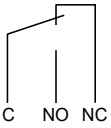
Grundfos Eye is rotating red

There is an alarm, but the pump is running.

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

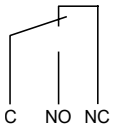
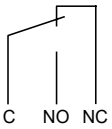
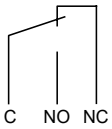
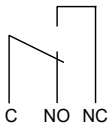
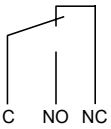
Grundfos Eye is rotating red

There is an 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**

7. Startup

WARNING
Hot liquid
Death or serious personal injury
- If the temperature is higher than 50 °C, use gloves and glasses when venting the pump to avoid risk of scalding.

WARNING
Biological hazard
Death or serious personal injury
- Flush the pump with clean water before first use.

Do not start the pump until it has been filled with liquid.

Do not start the booster system until all pumps have been properly primed.

After starting up the pump, check the system for leakages.

7.1 Flushing the system

DANGER
Contaminated drinking water
Death or serious personal injury
- Flush the system before starting it or after a standstill period.

Drinking water systems

Hygiene

Grundfos pressure booster systems are functionally tested by running water through the system. During the test, Grundfos continuously surveys the quality of the test water. Since it is not possible to completely drain and dry the system after the test, the system must be rinsed or flushed thoroughly before being taken into use in a drinking water sector due to risk of bacteria growth. This also applies if the system has been shut down for a long period of time. Rinsing and flushing must always be done in accordance with local regulations.

Contaminated drinking water endangers health.

7.2 Supplement to quick guide

These instructions are a supplement to the quick guide for CMBE and CMBE TWIN.

QR98388184

http://net.grundfos.com/qr/i/98388184

7.3 Starting up the booster system

1. Open all isolating valves.
2. Make sure that the water supply is sufficient on the inlet side of the pump.

   Venting may be necessary. This is done by carefully unscrewing the priming plug and letting out the air trapped inside the pump.

3. Switch on the power.
4. Open some water taps so that one or both pumps start. If they do not start, press the **Start/Stop** button on both pumps.
5. Let the booster system run for 30 seconds to let all remaining air out of the system.
6. The pumps are factory set, so the booster system pressure will stabilise at factory setpoint and Grundfos Eye will show a steady green light.

7. If the pressure is not stabilised, the booster system will stop and restart. If the booster system stops and restarts more than five times, turn off both pumps by pressing their **Start/Stop** button. Prime the pumps again. Start the system by pressing the **Start/Stop** button on both pumps.
8. Adjust the required setpoint pressure by using the **Up** or **Down** arrows on the operating panel. Choose one of the pumps for the setpoint setting. The pumps communicate, so it makes no difference which pump you use. Monitor the system pressure on the pressure gauge

   If you change the outlet pressure, you must adjust the precharge pressure in the diaphragm tank accordingly.

9. The booster system is now in automatic mode and ready for operation.

7.4 Priming and venting the product

Follow this procedure for each pump in the booster system:

1. Close the isolating valve on the outlet side.
2. Open the isolating valve on the inlet side.
3. Remove the priming plug.
4. Fill the pump with water until a steady stream of liquid runs out of the filling hole.
5. Let all air out of the system.
6. Fit and tighten the priming plug.

7.5 Shaft seal run-in

The shaft seal faces are lubricated by the pumped liquid. A slight leakage from the shaft seal of up to 10 ml per day or 8 to 10 drops per hour may occur. Under normal conditions, the leaking liquid will evaporate. As a result, no leakage will be detected.

When the pump is started for the first time, or when the shaft seal has been replaced, 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, that is, every time the operating conditions change, a new run-in period will be started.

Leaking liquid will drain through the drain holes in the motor flange.

Install the product in such a way that leakage cannot cause undesirable collateral damage.

8. Control functions

8.1 Cascade control

Cascade control ensures that the performance of the booster system is automatically adapted to the consumption by switching pumps on or off and by changing the speed of the pumps in operation. The system runs as energy efficiently as possible with a constant pressure and only the number of pumps required.

8.2 Constant pressure

The integrated speed controller keeps a constant pressure in the pipe system. A pressure sensor monitors changes in the water consumption and signals to the speed controller to adjust the motor speed up or down.

8.3 Pump alternation

Pump alternation ensures that the operating hours are distributed evenly on the pumps over time. The pumps alternate automatically, so that the system starts the available pump with the lowest number of running hours since the last time the power was switched off.

8.4 Multimaster function

If the master pump is switched off or stopped due to an alarm, the next pump will automatically take over the control of the system.

8.4.1 Master pump in systems with two or more outlet-pressure sensors

If two or more pumps in the system are configured with an outlet-pressure sensor, they can all function as master pumps.

As standard, the pump with the lowest number will be the master pump. The master pump is marked with number 1 from the factory.

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

8.5 Dry-running protection

Dry-running protection automatically stops the pump in case of dry running to prevent damage to the pump.

The dry-running protection functions differently during priming and operation.

8.6 Bus signal

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

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

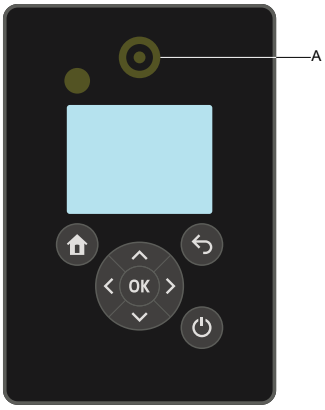
Contact Grundfos for further information.

If you use a bus signal, the local settings made via Grundfos GO or the HMI 300 or 301 operating panel will be overruled. In case the bus signal fails, the product will run with the local settings made via Grundfos GO or the HMI 300 or 301 operating panel.

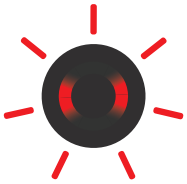
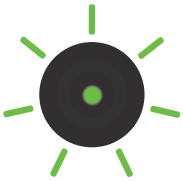
8.7 Fault and warning signals

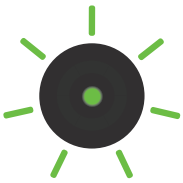
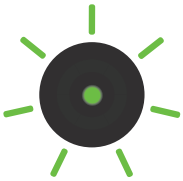
8.7.1 Grundfos Eye

The operating condition of the motor is indicated by Grundfos Eye (A) on the motor operating panel.



Grundfos Eye indicator light

Indicator light	Indication	Description
	No lights are on.	**Power off** The motor is not running.
	Two opposite green indicator lights are rotating.	**Power on** The motor is running. The indicator lights are rotating in the direction of rotation of the motor when seen from the non-drive end.
	Two opposite green indicator lights are permanently on.	**Power on** The motor is not running.
	One yellow indicator light is rotating.	**Warning** The motor is running. The indicator light is rotating in the direction of rotation of the motor when seen from the non-drive end.
	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.

Indicator light	Indication	Description
	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.

9. Setting the product

WARNING
Hot surface
Death or serious personal injury
- Touch only the buttons on the display. 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.

The setpoint must not be set higher than the pressure which the pump can deliver.

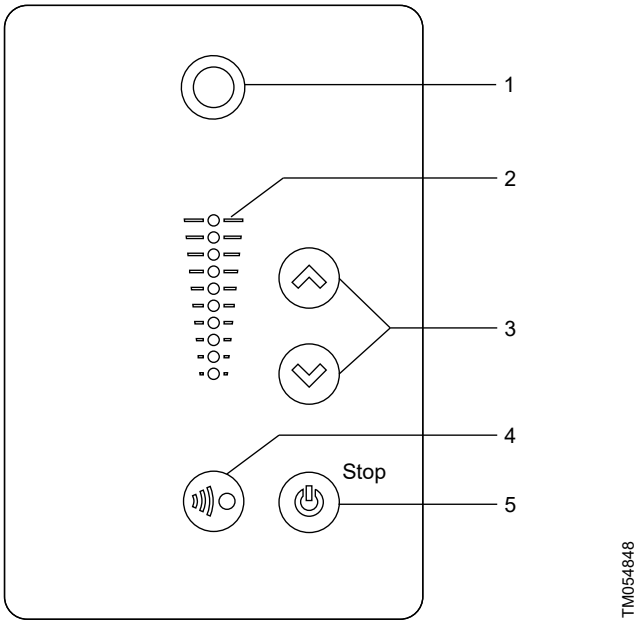
You can set the product by means of the following user interfaces:

- Operating panel on the product
- Grundfos GO.

If the power supply is switched off, the settings will be stored.

9.1 Setting by means of the operating panel

9.1.1 Standard operating panel



Pos.	Symbol	Description
1		**Grundfos Eye:** The indicator light shows the operating status of the product.
2	-	Light fields for indication of the setpoint
3		**Up**/**Down**: The buttons change the setpoint.
4		**Radio communication**: The button enables radio communication with the Grundfos GO and other products of the same type.
5		**Start/Stop**: Press the button to make the product ready for operation or to start and stop the product. **Start**: If you press the button when the product is stopped, the product starts if no other functions with higher priority have been enabled. **Stop**: If you press the button when the product is running, the product always stops. When you press the button, the stop icon appears at the bottom of the display.

9.1.2 Starting and stopping the booster system

1. Start each pump by pressing the **Start/Stop** button or by continuously pressing the **Up** button until the desired setpoint is indicated.

   Start/Stop: If you press the button when the product is stopped, the product starts if no other functions with higher priority have been enabled.

2. Stop each pump by using one of the following methods:
   - Press the **Start/Stop** button.
   - Continuously press the **Down** button until none of the light fields are on.
   - Use Grundfos GO.
   - Use the digital input if you have set it to **External stop**. Be aware of the priority of settings.

When the pump is stopped, the "Stop" text next to the button will be illuminated.
If you stop the pump by pressing the **Start/Stop** button, you must press the **Start/Stop** button to start the pump.
If you stop the pump by pressing the **Down** button, you must press the **Up** button to start the pump.

Related information

9.3 Priority of settings

9.1.3 Setting the pressure of the booster system

The booster system will maintain a certain pressure in the system.

1. Choose one of the pumps for the setpoint setting. The pumps communicate, so the setpoint can be set on any of the pumps in the system and applies to the complete booster system.
2. Adjust the setpoint pressure by pressing the **Up** and **Down** buttons on the operating panel.
3. Monitor the system pressure on the pressure gauge.

   If you change the outlet pressure, you must adjust the precharge pressure in the diaphragm tank accordingly.

Related information

5.3 Adjusting the diaphragm tank pressure

9.1.4 Setting the setpoint in constant parameter mode

The following applies for motors set to operate in **Const. other val.**

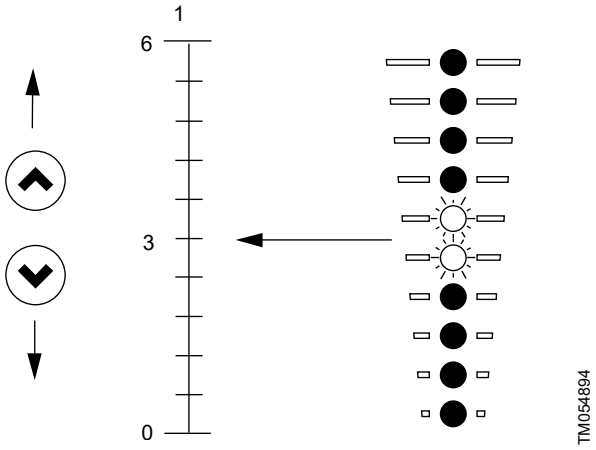
Set the desired setpoint by pressing the **Up** or **Down** buttons.

The green light fields on the operating panel indicate the setpoint set.

The following example applies to a pump or motor in an application where a pressure sensor gives a feedback to the pump or motor. The sensor has been set manually, and the pump or motor does not automatically register a connected sensor.

Light fields 5 and 6 are activated, indicating a desired setpoint of 3 bar with a sensor measuring range from 0 to 6 bar. The setting range is equal to the sensor measuring range.

Light fields 5 and 6 are activated, indicating a desired setpoint of 116 psi (8 bar) with a sensor measuring range from 0 to 232 psi (16 bar). The setting range is equal to the sensor measuring range.



9.1.5 Resetting alarms and warnings in products with a standard operating panel

You can reset a fault indication in one of the following ways:

- Briefly press the **Up** or **Down** button.
  This is not possible if the buttons have been locked.
  This does not change the setting of the motor.
- Switch off the power supply until the indicator lights are off.
- Switch the external start and stop input off, and then on again.
- Use the Grundfos GO.
- Use the digital input if you have set it to **Alarm resetting**.

9.2 Setting by means of Grundfos GO

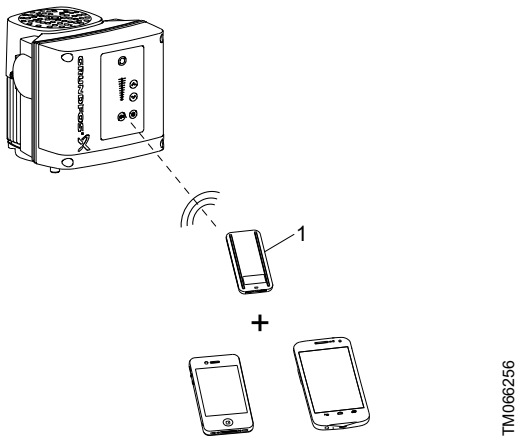
9.2.1 Grundfos GO

The product is designed for wireless radio communication with Grundfos GO.

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

Use Grundfos GO together with the following mobile interface:

Grundfos MI 301.



Pos.	Description
1	Grundfos MI 301 is a separate module enabling radio or infrared communication. Use the module together with an Android or iOS-based smart device via a Bluetooth connection.

To learn more about MI 301, use your smart device to scan the QR codes below:

Grundfos MI 301 Installation and operating instructions	Grundfos MI 301 Quick guide
QR_92555648	QR_98133720

9.2.2 Communication

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

On products fitted with an advanced 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 the Grundfos GO.
	Press the **Home** button to reject connection.

This product communicates via radio.

9.2.3 Radio communication

Radio communication can take place at distances up to 30 metres. The first time the Grundfos GO communicates with the product, you enable communication by pressing the **Radio communication** button or **OK** on the operating panel.

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

9.3 Priority of settings

With the 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 set the motor to maximum speed via the digital input, the motor operating panel or the Grundfos GO can only set the motor to **Manual** or **Stop**.
The priority of the settings is shown in the table below.

Priority	Start/stop button	Grundfos GO or operating panel	Digital input	Bus communication
1	**Stop**			
2		**Stop** [1]		
3		**Manual**		
4		**Maximum speed** [1]**/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**		

[1] **Stop** and **Maximum speed** settings made with the 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**, selected with the Grundfos GO or the operating panel.

Related information

9.1.2 Starting and stopping the booster system

10. Servicing the product

DANGER
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.

DANGER
Magnetic field
Death or serious personal injury
- Persons with pacemaker must not handle the motor or rotor.

WARNING
Pressurised system
Death or serious personal injury
- Depressurise the system before you start any work on the product. The pumped liquid may be scalding hot and under high pressure.
- Drain the system or close the isolating valves on either side of the pump.

WARNING
Biological hazard
Death or serious personal injury
- When servicing the product, only use Grundfos original spare parts.

Products in normal operation must be inspected once a year.
Do the following:
1. Inspect the tank.
2. Check the precharge pressure.

Related information
5.3 Adjusting the diaphragm tank pressure

10.1 Maintaining the product

The internal pump parts are maintenance-free.
The motor has maintenance-free, greased-for-life bearings.

10.2 Megging

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

10.3 Cleaning the motor

Keep motor cooling fins and fan blades clean to ensure adequate cooling of the motor and electronics.
You must keep the motor clean to ensure sufficient cooling of the motor. If the product is installed in dusty environments, clean and check the motor regularly. Take the enclosure class of the motor into account when cleaning.

10.4 Refilling the diaphragm tank

We recommend that you refill the tanks with nitrogen gas once a year.

Related information
5.3 Adjusting the diaphragm tank pressure

10.5 Further information on CMBE TWIN

See Grundfos Product Center for more information on CMBE TWIN, such as service kits and service instructions.

QR-CMBE_TWIN_IN_GPC

11. Taking the product out of operation

WARNING
Electric shock
Death or serious personal injury
- Switch off the power supply before you start any work on the product. Make sure that the power supply cannot be switched on accidentally.

WARNING
Pressurised system
Death or serious personal injury
- Depressurise the system before you start any work on the product. The pumped liquid may be scalding hot and under high pressure.
- Drain the system or close the isolating valves on either side of the pump.

11.1 Maintaining the product during standstill

11.1.1 Frost protection

If the product is not being used during periods of frost, it must be drained to avoid damage. Remove the filling and drain plugs. Do not refit the plugs until the product is put into operation again.

11.1.2 Standstill heating

Use this function to avoid condensation in humid environments.
When you set the function to **Active** and the product is in operating mode **Stop**, a low AC voltage is 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 product, including the electronic parts in the drive.

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

12. Fault finding the product

DANGER
Electric shock
Death or serious personal injury
- Switch off the power supply before you start any work on the product.
- Make sure that the power supply cannot be switched on accidentally.

WARNING
Pressurised system
Death or serious personal injury
- Depressurise the system before you start any work on the product. The pumped liquid may be scalding hot and under high pressure.
- Drain the system or close the isolating valves on either side of the pump.

WARNING
Biological hazard
Death or serious personal injury
- When servicing the product, only use Grundfos original spare parts.

Fault finding and fault correction must be carried out by qualified persons.

12.1 Pump is not running

Pump is not running.

No lights on Grundfos Eye.

TM063804

Cause	Remedy
Power supply failure.	1. Switch on the power supply. 2. Check cables and cable connections for defects and loose connections. 3. Check if the external motor protection has tripped.
Fuses blown.	1. Check cables and cable connections for defects. 2. Replace the fuses.

12.2 Pump is not running

Pump is not running.

Two opposite red indicator lights flashing simultaneously, which indicates an alarm. The motor is stopped.

TM053839

Cause	Remedy
Sensor is defective.	• Replace sensor.
The pump inlet pressure is too low.	• Check the inlet conditions of the pump.
The inlet pipe is partly blocked by impurities.	• Remove and clean the inlet pipe.
The non-return valve is blocked in closed position.	• Inspect, repair or replace the non-return valve if necessary.
There is air in the inlet pipe or pump.	• Vent the inlet pipe and the pump.
The inlet pressure switch is defective. [2]	• Replace the inlet pressure switch.

[2] Available as accessory for CMBE TWIN.

12.3 Pump performance is unstable

The pump performance is unstable. No lights on Grundfos Eye.

TM063804

Cause	Remedy
The pump inlet pressure is too low.	• Check the inlet conditions of the pump.
The inlet pipe is partly blocked by impurities.	• Remove and clean the inlet pipe.
Leakage in the inlet pipe.	• Remove and repair the inlet pipe.
Air in the inlet pipe or the pump.	1. Vent the inlet pipe or the pump. 2. Check the inlet conditions of the pump.

12.4 Pump runs backwards when switched off

The pump runs backwards when switched off. No lights on Grundfos Eye.

TM063804

Cause	Remedy
Leakage in the inlet pipe.	• Remove and repair the inlet pipe.
The non-return valve is defective.	• Remove and clean, repair or replace the valve.

13. Technical data

13.1 Operating conditions

Min./max. operating temperature	-20/+50 °C [3]
Min./max. storage temperature	-30/+60 °C
Liquid temperature	0-60 °C
Sound pressure level	≤ 55 dB(A) [4]
Start/stop frequency	Max. 100/h

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

[4] For CMBE TWIN, the sound pressure level may be higher.

Miscellaneous data

Enclosure class	Pump: IP55 Sensor: IP44
Insulation class	F

13.2 Maximum total head

Pump type	Max. head [m]
CMBE 1-44	44
CMBE 3-62	62
CMBE 3-93	93
CMBE 5-62	62
CMBE 10-54	54
CMBE TWIN 3-62	62
CMBE TWIN 3-93	93
CMBE TWIN 5-62	62

13.3 Pressure

	[bar]	[MPa]
Min. inlet pressure (relative) without pressure sensor	Observe local regulations.	
Min. inlet pressure with pressure sensor	Observe local regulations.	
Max. outlet pressure	10	1
Max. operating pressure	10	1

13.4 Electrical data

Supply voltage	1 × 200-240 V -10 % / +10 %, PE
Frequency	50/60 Hz -2 % / +2 %

13.5 Cable requirements

DANGER
Electric shock
Death or serious personal injury
- Comply with local regulations as to cable cross-sections.
- Use the recommended fuse size.

1 × 200-240 V

Power [kW]	Cross-section	
	[mm^2]	[AWG]
0.25 - 2.2	1.5 - 2.5	16-12

Conductor types
Stranded or solid copper conductors.

Conductor temperature ratings
Temperature rating for conductor insulation: 60 °C (140 °F).
Temperature rating for outer cable sheath: -30 °C to 60 °C (-22 to 140 °F).

13.6 Leakage currents for CMBE TWIN

Single-phase motors
The leakage currents are measured in accordance with EN 61800-5-1:2007.

Product	Earth leakage current (AC) [mA]
CMBE (one pump running)	< 3.5 mA
CMBE TWIN (two pumps running)	≥ 5 mA

13.7 Recommended size of fuse or circuit breaker

Recommended size of fuse or circuit breaker for single-phase motors.

Motor size [kW]	Minimum [A]	Maximum [A]
0.25 - 0.75	6	10
1.1 - 1.5	10	16

You can use standard as well as quick-blow or slow-blow fuses.

13.8 Inputs and outputs

Earth reference
All voltages refer to earth. All currents return to earth.

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 Vi equal to 0 VDC.
Internal pull-up to 5 VDC. Currentless for Vi greater than 5 VDC.
Certain low logic level: Vi less than 1.5 VDC.
Certain high logic level: Vi greater than 3.0 VDC.
Hysteresis: No.
Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.
Maximum cable length: 500 m.

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 mm^2 / 28-16 AWG.
Maximum cable length: 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 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: 0-3 % of full scale, maximum-point coverage.
Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.
Maximum cable length: 500 m, excluding potentiometer.
Potentiometer connected to +5 V, GND, any AI: Use maximum 10 kΩ.
Maximum cable length: 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: 0-4 % of full scale, maximum-point coverage.

Screened cable: 0.5 - 1.5 mm^2 / 28-16 AWG.
Maximum cable length: 500 m.

Pt100 or Pt1000 inputs (Pt)

Temperature range:

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

Measurement tolerance: ± 1.5 °C
Measurement resolution: less than 0.3 °C.
Automatic range detection (Pt100 or Pt1000): Yes.
Sensor fault alarm: Yes.
Screened cable: 0.5 - 1.5 mm^2 / 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 mm^2 / 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: 50 mADC, sourcing only.
- Overload protection: Yes.

+24 V

- Output voltage: 24 VDC -5 % to +5 %.
- Maximum current: 60 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 mm^2 / 28-12 AWG.
Maximum cable length: 500 m.

Bus input

Grundfos GENIbus protocol, RS-485.
Screened 3-core cable: 0.5 - 1.5 mm^2 / 28-16 AWG.
Maximum cable length: 500 m.

13.9 Accessories

The following are the communication interface modules intended for use with the product:

Protocol	Communication interface module
GENIbus	CIM 050
LonWorks (Single)	CIM 100
PROFIBUS DP	CIM 150
Modbus RTU	CIM 200
BACnet MS/TP	CIM 300
Modbus TCP, BACnet IP, PROFINET, GiC/GRM IP, EtherNet IP	CIM 500
LonWorks (Multi)	CIM 110

Installing a communication interface module not listed above might affect the compliance level of the product.

14. 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.
3. Dispose of the waste battery through the national collective schemes. If in doubt, contact your local Grundfos company.

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

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

15. Document quality feedback

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