LC 231

Dual pump unit

Installation and operating instructions

GRUNDFOS

LC 231

Original installation and operating instructions

Table of contents

1. General information

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

1.1 Hazard statements

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

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

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

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

The hazard statements are structured in the following way:

SIGNAL WORD
Description of the hazard
Consequence of ignoring the warning
•   Action to avoid the hazard.

1.2 Notes

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

Observe these instructions for explosion-proof products.

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

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

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

Tips and advice that make the work easier.

2. Installing the product

2.1 Location

Install the product in a location that meets the following requirements:

- Place the product in a flood-safe place.
- Make sure that the ambient temperature is within the limits.
- Install the product as close as possible to the connected pumps, sensors, and accessories.
- The product must be protected from direct sunlight.
- The product must be easily accessible.
- Outdoor installation: the product must be installed in a protective shed or enclosure, class IP 54.
- Indoor installation:The product must be installed in a well-ventilated room to ensure cooling of its components.

2.2 Mechanical installation

2.2.1 Removing the front cover

The front cover must be removed to make any connections or to install the Communication Interface Module (CIM).

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

Place the front cover above the control unit, if possible. This way you do not need to remove the flat cable between the front cover and the control unit.

1. Loosen the screws.

2. Carefully separate the front cover from the back cover.
   Be careful not to damage the cable connecting the front cover and the back cover.

3. Place the front cover above the back cover on the support brackets.

4. To ensure that the front cover does not tilt, insert the two bottom screws into the open holes at the top of the back cover.

TM071322

Related information

2.2.2 Disconnecting the front cover

If you need to remove the front cover completely, you must remove the flat cable between the front cover and the back cover.

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

1. Loosen the screws.

2. Carefully separate the front cover from the back cover.

3. Pull out the flat cable that is connected to the circuit board. Do not remove the flat cable from the front cover.

TM071323
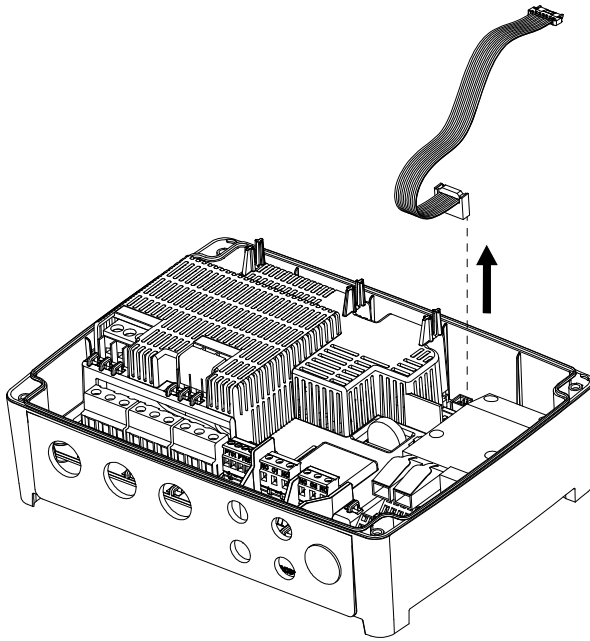
2.2.3 Installing the control unit

The product is designed to be mounted on a flat and vertical surface. The cable glands must face downwards.

1. Loosen the screws and remove the front cover.
   Be careful not to damage the cable between the front cover and the back cover.

2. Drill holes in the surface.

215 (8.5")
165 (6.5")
255 (10.0")
280 (11.0")
115 (4.5")

TM070121
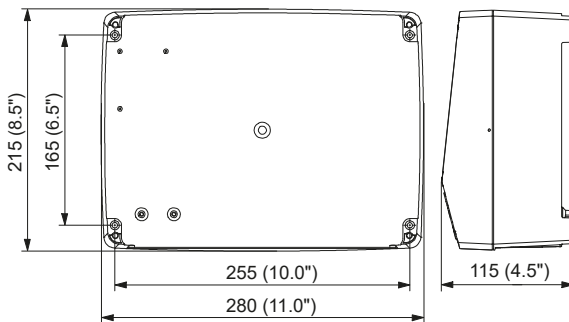
3. Insert wall plugs, if applicable.

4. Fit the four screws in the mounting holes and cross-tighten the screws.

   ! The mounting screws must have a minimum length of 32 mm (Ø 8.2 mm). If the wall is more than 3 mm uneven, insert rubber blocks between the surface and the control unit to even the surface. The box of the control unit must not be bent.

Related information

2.2.1 Removing the front cover

2.2.4 Installing a communication interface module

You can fit a communication interface module (CIM) in the control unit to enable communication with external systems. The module is optional and is not delivered with the product. See the installation and operating instruction for the module regarding electrical connections.

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

1. Loosen the screws and remove the front cover.
   Be careful not to damage the cable between the front cover and the back cover.

2. Push the module on to the three guide pins and into the socket. Press the module home, using your fingers.
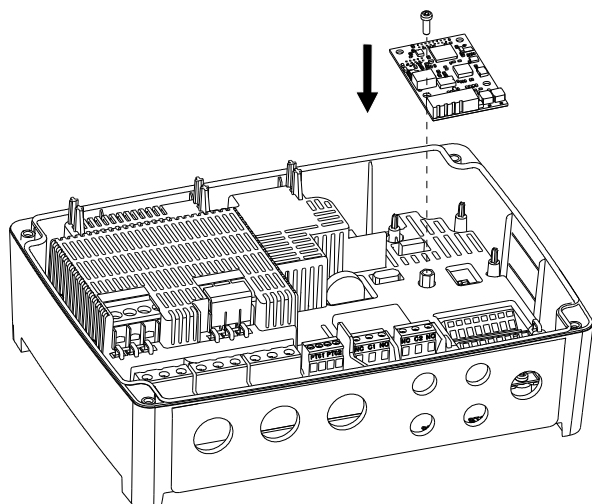
3. Fit the screw to lock the module.

4. Place the labels supplied with the module on the back of the front cover.

5. Make the electrical connections to the module as described in the instructions supplied with the module.

6. Route the wires for the module through one of the cable glands.
   For modules with LAN or antenna cables, you must order an additional cable gland M20.

7. Fit the cover and cross-tighten the mounting screws.

Related information

2.3 Electrical connection

2.3.1 Cable requirements

> ⚠ **WARNING**
> **Electric shock**
> Death or serious personal injury
> - The wires from the pump phases must be rated at 90 °C (194 °F).
> - The wires from the temperature sensor, if any, must be rated at 480 V and 70 °C (158 °F).

> 🛈 For the US market only, use flexible metal conduits (FMC) only.

> ❗ The wires from the temperature sensor, if any, must be shielded.

Cable cross sections

Type of cable	Stranded with ferrule		Solid	
Cross section	[mm^2]	[AWG]	[mm^2]	[AWG]
Contactor for the pump	1.5 - 2.5	16-14	1.5 - 4	16-12
Terminal block for the power supply	2.5 - 10	14-8	2.5 - 16	14-6

2.3.2 Protection of controller and supply cables

The controller and the power cables must be overload protected. Protection must be done by a pre-fuse:

- Melt type gL and gG
- Auto fuse of type C

See the rated current for this specific product on the product nameplate.

Related information

2.3.3 Connecting the pump supply and power supply

DANGER
Electric shock
Death or serious personal injury
- If national legislation requires a Residual-Current Device (RCD) or equivalent in the electrical installation, this must be of at least type A, due to the nature of the constant DC leakage current.

WARNING
Electric shock
Death or serious personal injury
- Switch off the power supply before making any electrical connections. Make sure that the power supply cannot be switched on accidentally.
- Remember to indicate where the main switch is located by placing a label or similar in the control unit.
- Make sure that the voltage between the phase and neutral does not exceed 250 VAC.
- Electrical connections must be carried out according to wiring diagrams.

The wires from the temperature sensor, if any, must be shielded.

The residual-current circuit breaker must be marked like this:

TM072098

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

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

2. Cut the power supply and pump supply cables as short as possible.

3. Before switching the power on, check all voltages with a multimeter and ensure that the voltage between neutral and each phase does not exceed 250 VAC.

4. Connect the power cables and pump cables according to the relevant electrical diagram, including the cables from the motor temperature and moisture sensor, if any. Tighten the terminal screws to the correct torque. See table.

   Note that all wires must be secured inside the cabinet using cable ties. All cable glands must be mounted and plugged even if they are not in use to ensure correct IP protection level.

   Remember to remove the jumper from the PTC terminal if you are connecting cables from the temperature sensor to the PTC terminal.

Terminal block	Torque [Nm]
Pump contactor	1.2
Power supply	1.2

TM070570
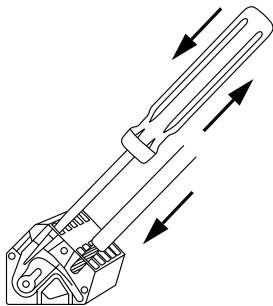
Connecting a wire to a terminal with spring clamps

5. Tie the pump phase cable(s) to the protection cover with cable ties.

Example:
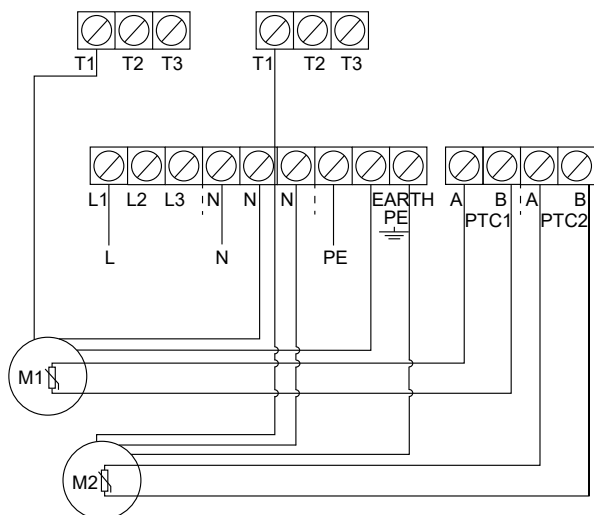
Single-phase connections for two pumps
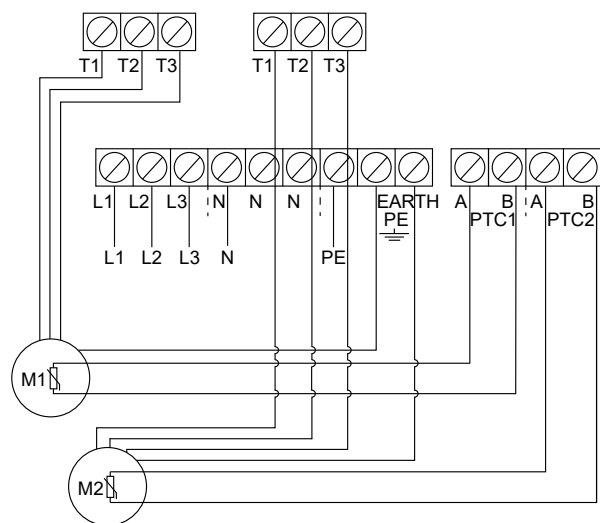
Three-phase connections for two pumps
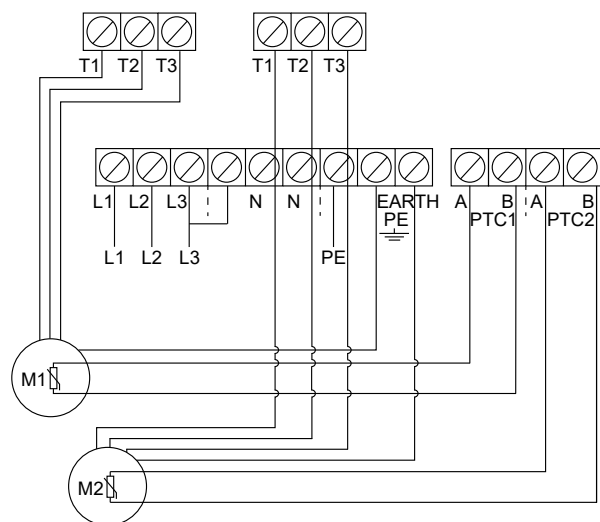
Three-phase connections for two pumps without neutral, for Norway only

Related information

2.3.4 Connecting a level sensor

You can either connect an analog level sensor, such as a pressure sensor, or a digital level sensor, such as a float switch.

1. Loosen the screws and remove the front cover.
   Be careful not to damage the cable between the front cover and the back cover.

2. Lead the wires through one of the cable glands.

3. Depending on the type of wire, take one of the following actions:
   - For a shielded wire, lead it through the cable clamp.

CIO1   GND
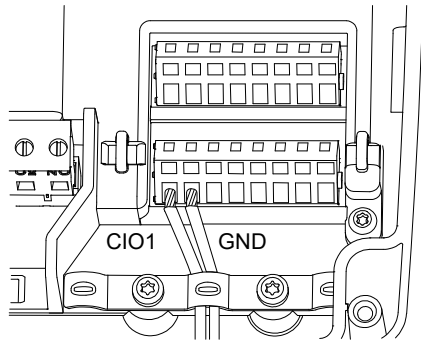
   - For a not shielded wire, attach it to the protection cover with a cable tie.

DIO1 GND DIO2 GND DI1 GND DI2 GND

CIO1 GND CIO2 GND 24V GND 24V GND
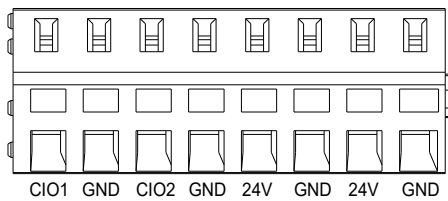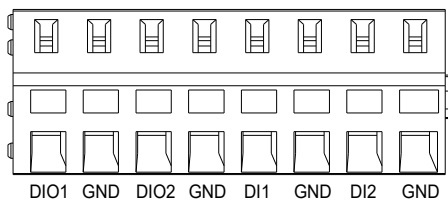
4. Depending on the type and function of the sensor, connect the wires to the following terminals. When using an analog sensor, level switches can be used to add redundance or security by adding an extra dry-run sensor or high-level sensor or both.

Sensor type	Sensor function	Terminals
Analog	All levels	CIO1 - GND - 24 V
Digital	Dry-running level	CIO2 - GND
	Stop level	DIO1 - GND
	Start level, pump 1	DIO2 - GND
	Start level, pump 2	DI1 - GND
	High level	DI2 - GND

Related information

2.3.5 Connecting an alarm device

You can connect an alarm device, such as a buzzer or a lamp, to the output relays **Alarm 1** and **Alarm 2**. The control unit triggers the alarm device when it detects an alarm or a warning. You can change the behaviour of the outputs with Grundfos GO Remote under **Relay output 1** and **Relay output 2**.

Default settings of the terminal blocks

Terminal block	Default function
Alarm 1	All alarms
Alarm 2	High level

1. Loosen the screws and remove the front cover.
   Be careful not to damage the cable between the front cover and the back cover.

2. Lead the wires through one of the cable glands.

3. Depending on the type of alarm device, connect the wires to the relevant terminals. Note that all wires must be secured inside the cabinet using cable ties.
   - **NO** (Normally Open) and **C** (Common)
   - **NC** (Normally Closed) and **C** (Common).

4. Tie the wires with cable ties.
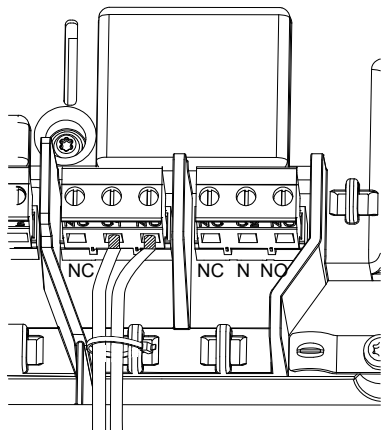
3. Starting up the product

3.1 Connecting to Grundfos GO Remote

1. Open Grundfos GO Remote on your device. Make sure that Bluetooth is enabled.
   Your device must be within reach of the product to establish Bluetooth connection.

2. Press the Bluetooth **CONNECT** button on Grundfos GO Remote.

3. Press the connect button on the operating panel. The blue LED above the connect button is flashing blue until your device is connected.
   Grundfos GO Remote is now loading the data for the product.

Related information

3.4 How to enable Bluetooth on the operating panel

3.5 How to disable Bluetooth on the operating panel

3.2 Startup wizard on Grundfos GO Remote

The product is designed for Bluetooth communication with Grundfos GO Remote.

Once you have connected your product to Grundfos GO Remote, a startup wizard appears. Follow the instructions to make your settings.

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

3.3 Startup wizard on the operating panel

The first time the control unit is switched on, a startup wizard will guide you through the basic settings. You can select the sensor type and sensor levels. For some products, you can also set the nominal pump current and number of phases.

If you have an analog sensor, select **S-1** and set the height of the different levels, from dry running to high level.

If you have a digital sensor, select **S-2** and enable or disable the dry-running level, the start level for pump 2, if available and the high level.

To change settings, use the **Up** and **Down** buttons on the operating panel.

Use the **OK** button to confirm each setting and navigate to the next setting.

For filling applications, you must use Grundfos GO Remote.

Units can only be changed with Grundfos GO Remote.

Designation	Description
S-1	Analog sensor
S-2	Digital sensor
-- A	Nominal current (see the nameplate of the pump)
1Ph	Single-phase
3Ph	Three-phase

Related information

6.1 Setting the application type with Grundfos GO Remote

6.23 Starting the startup wizard with the operating panel

3.4 How to enable Bluetooth on the operating panel

If the Bluetooth signal on the operating panel has been disabled for some reason, you are not able to connect with Grundfos GO Remote. You must enable Bluetooth first.

1. Press and hold the connect button on the operating panel for 15 seconds. Wait for the blue LED to light up.

2. Press the Bluetooth **CONNECT** button on Grundfos GO Remote.

3. Press the connect button on the operating panel. The blue LED above the connect button is flashing blue until your device is connected Grundfos GO Remote is now loading the data for the product.

Related information

3.1 Connecting to Grundfos GO Remote

3.5 How to disable Bluetooth on the operating panel

In some installation areas it is not allowed to have a Bluetooth signal enabled during operation. After installation, the Bluetooth signal must be disabled manually.

1. Press and hold the connect button on the operating panel for 15 seconds. Wait for the blue LED to switch off.
   Grundfos GO Remote is not connected to the product anymore.

Related information

3.1 Connecting to Grundfos GO Remote

3.6 Configuring the IO terminals using Grundfos GO Remote

The control unit is equipped with configurable input and output terminals. Using Grundfos GO Remote, you can configure the terminals for different functions, depending on the device connected to the terminals.

1. Go to **Settings** > **LC 231 IO terminals**.

2. Select the terminal you wish to configure and follow on-screen instructions.

> You can find the names of the terminals inside the control unit.

Related information

2.2.1 Removing the front cover

2.3.4 Connecting a level sensor

4.5 Terminals

8.7 Code 25 (Wrong configuration)

8.21 Code 191 (High water level)

8.22 Code 205 (Level switch inconsistency)

3.7 Testing the product

When you have made all the electrical installations and completed the startup wizard, you can test the system.

For emptying applications:

- Fill the pit with water and check that the pump starts automatically at the defined level.
- Test the dry-running function by starting the pump manually and wait while the pit with the pump is emptied. Check that the control unit indicates an alarm and stops the pump when the defined level is reached.
- Test the high-level function by stopping the pump manually and continue to fill the pit with water. Check that the control unit indicates an alarm when the defined level is reached. Set the pump to **Auto** and observe that the pump starts and stops when the stop level has been reached.

For filling applications:

- Start by draining the tank to be filled. When the tank is empty and the start level is reached, the pump must start. When the tank is full and the stop level is reached, the pump must stop.
- Test the high-level function by stopping the pump manually and continue to fill the tank without the pump with water. Check that the control unit indicates an alarm when the defined level is reached.
- Test the dry-running function by starting the pump manually and wait while the tank with the pump is emptied. Check that the control unit indicates an alarm and stops the pump when the defined level is reached. If the pump is placed in a well, this test may not be possible since the pump cannot empty the well. Alternatively, pull the dry-run level switch up to simulate a dry-run situation. The same can be done with a pressure level sensor.

4. Product introduction

4.1 Product description

The level-control unit switches the pump on and off according to the liquid level measured by float switches or a pressure sensor. When the start level is reached, the pump starts, and when the liquid level has been lowered to the stop level, the pump is stopped by the control unit. An alarm is indicated in case of for example high-water level in the tank or sensor failure.

Basic settings are configured via the operating panel and advanced settings are configured with Grundfos GO Remote. Furthermore, you can read important operating parameters with Grundfos GO Remote.

4.2 Intended use

The control unit is designed to control two pumps.

The product can be configured for two purposes: emptying a wastewater pit or filling a pit or tank. The product can be used for network pumping stations, main pumping stations, commercial buildings and municipal systems.

If the product is used in an explosive environment, follow local regulations. If required use additional equipment.

4.3 Features

The control unit features among others the following functions:

* support of up to two pumps
* manual and automatic control of the pump
* Bluetooth pairing with Grundfos GO Remote
* operating indication, such as power on and pump running
* alarm and warning indication, such as power phase missing and high-water level
* motor and phase failure protection
* setting of stop delays matching the actual operating conditions.
* automatic alternation of pumps.

4.4 Application types

You can choose between two application types:

* **Empty**
* **Fill**

You can set the application type with Grundfos GO Remote.

Empty
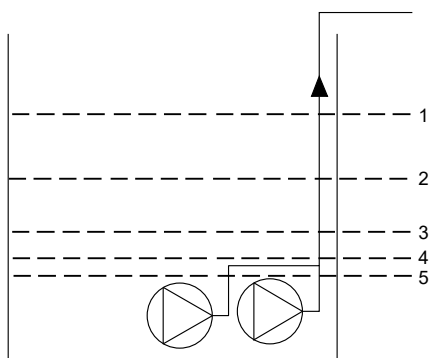
Pos.	Description
1	**High level**
2	**Start level P2**: start level for pump 2
3	**Start level P1**: start level for pump 1
4	**Stop level**
5	**Dry-running level**

The pump will start to empty the tank or pit when **Start level P1** is reached.

A second pump will start if the liquid level reaches **Start level P2**.

The pump stops when the liquid level is lowered to **Stop level**.

If the inflow of liquid exceeds the capacity of the installed pump, the level in the tank or pit will rise. Eventually, the **High level** sensor will register a high liquid level in the tank or pit. If set, the signal from the **High level** sensor can be used to activate an output relay which can then be used to indicate a visual or acoustic alarm or send a signal to a SCADA system.

If the pump is running and the liquid level in the tank or pit falls below the dry-running level, the dry-running protection will stop the pump to ensure that it is not damaged mechanically.

Fill
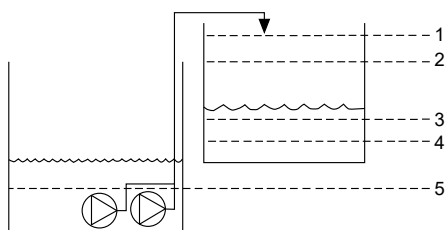
Designation	Description
1	**High level**
2	**Stop level**
3	**Start level P1**: start level for pump 1
4	**Start level P2**: start level for pump 2
5	**Dry-running level**

In the filling application, the pump is installed in a tank or well from where it pumps the liquid. The liquid is pumped into a second tank where the level sensors are installed.

The pump will start to fill the second tank when **Start level P1** is reached.

A second pump will start if the liquid level reaches **Start level P2**.

The pump stops when the liquid level reaches **Stop level**.

If the pump for some reason does not stop at **Stop level** and the liquid level keeps rising, the **High level** sensor will eventually register this. If set, the signal from the **High level** sensor can be used to activate a relay output which can then be used to indicate a visual or acoustic alarm or send a signal to a SCADA system via a communication interface.

If the pump is running and the liquid level in the tank falls below the dry-running level, the dry-running protection will stop the pump to ensure that it is not damaged.

Related information
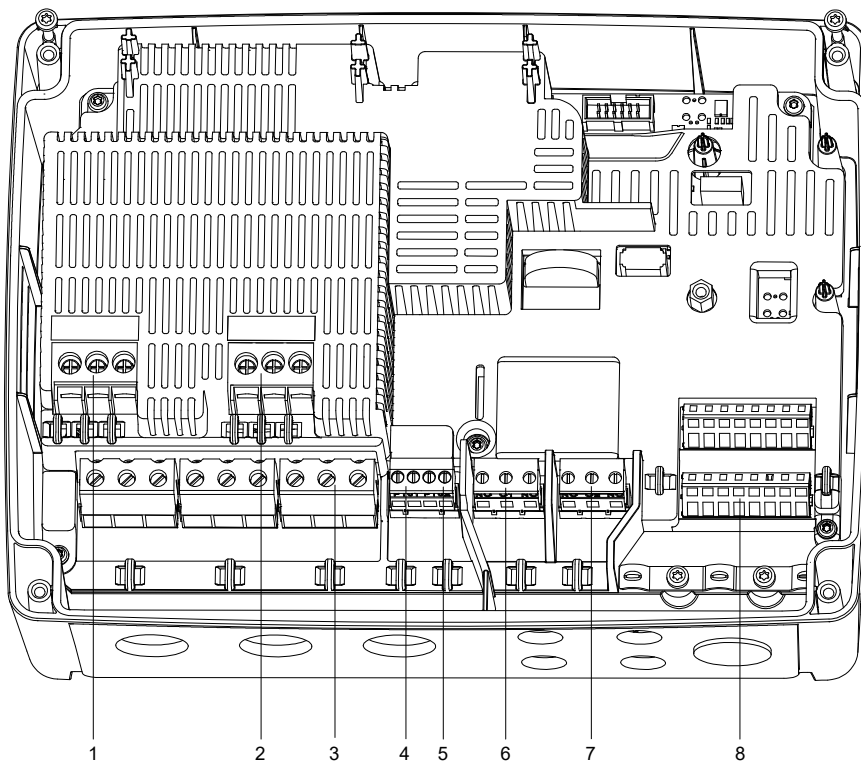
4.5 Terminals

Pos.	Description
1	Contactor for pump 1
2	Contactor for pump 2
3	Terminal block for the power supply
4	Terminal block for temperature and moisture-protection sensor for pump 1
5	Terminal block for temperature and moisture-protection sensor for pump 2
6	Alarm 1
7	Alarm 2
8	Analog and digital inputs and outputs.
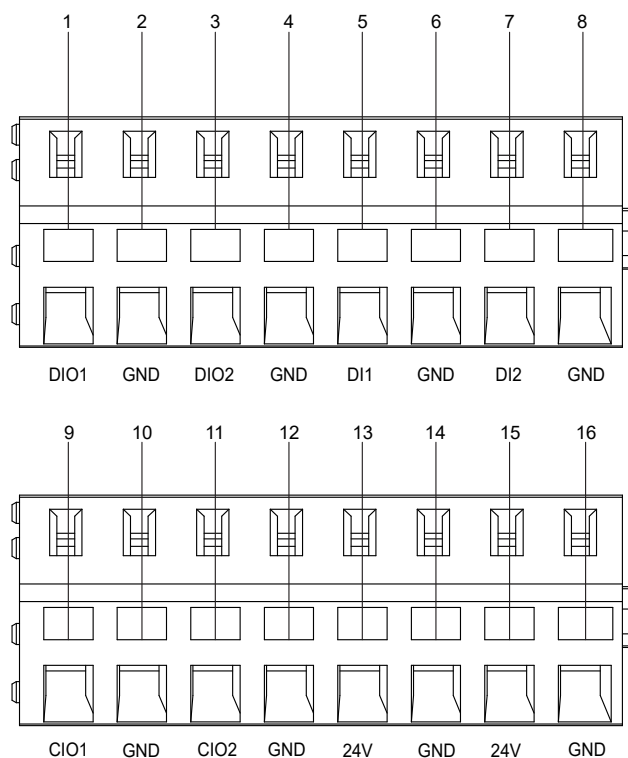
Connect to Grundfos GO Remote to see which options are available for the input and output terminals.

Pos.	Description
1	Digital input/output 1, configurable
2	GND
3	Digital input/output 2, configurable
4	GND
5	Digital input 1
6	GND
7	Digital input 2
8	GND
9	Configurable input/output 1
10	GND
11	Configurable input/output 2
12	GND
13	Supply voltage, 24 V, max. 250 mA
14	GND
15	Supply voltage, 24 V, max. 250 mA
16	GND

Related information

3.6 Configuring the IO terminals using Grundfos GO Remote

4.6 Identification

4.6.1 Nameplate
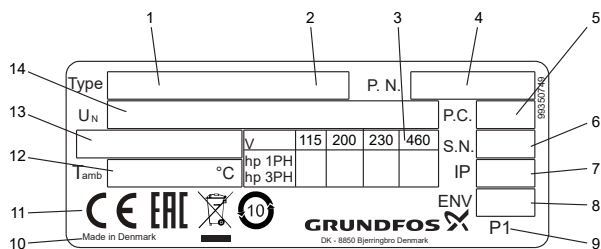
Pos.	Description
1	Product name
2	Model
3	Maximum motor power, hp
4	Version number and material number
5	Production code, year and week
6	Serial number
7	Enclosure class according to IEC
8	Enclosure class according to NEMA
9	Factory code
10	Production site
11	Markings and approvals
12	Minimum to maximum ambient temperature
13	Maximum current
14	Supply voltage

4.6.2 Type key

Example	LC 231	2x	1 - 7.5	DOL	PI
Pos.	1	2	3	4	5

Pos.	Description
1	Type: • LC 231: wall-mounted version
2	Number of pumps supported
3	Current range of pump [A]
4	Starting method: • DOL: direct-on-line
5	Panel type: • PI: Plastic, for indoor use

4.7 Supported communication interface modules and protocols

The following Grundfos communication interface modules can be added to the product.

Communication interface module	Protocol
CIM 050	GENIbus
CIM 150	PROFIBUS DP
CIM 200	Modbus RTU
CIM 260	3G/4G
CIM 270	GRM

Communication interface module	Protocol
CIM 280	Grundfos iSolution Cloud (GiC)
CIM 500	Modbus TCP
	PROFINET IO
	GRM IP

Related information

5. Control functions

5.1 Operating panel
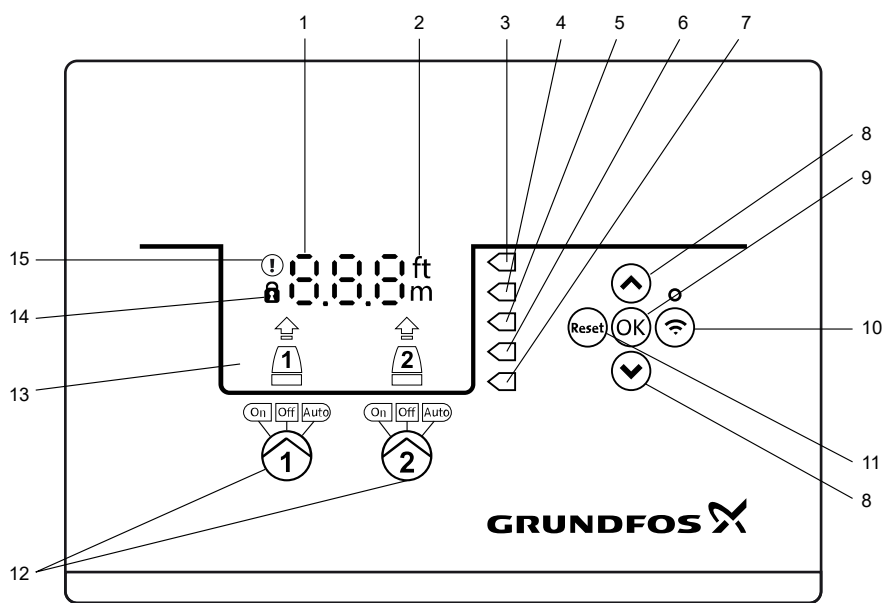
TM070082

Pos.	Symbol	Description
1	8.8.8	Display
2	ft m	Units
3	⬅	High level
4	⬅	Start level, pump 2
5	⬅	Start level, pump 1
6	⬅	Stop level, pump 1 and 2
7	⬅	Dry-running level
8	⌃ ⌄	**Up**/**Down** buttons: • Press these buttons to navigate between submenus or change the value settings.
9	OK	**OK** button: • Press this button to save changed values.
10	📶	Connect button: • Press this button to connect the control unit to Grundfos GO Remote via Bluetooth.
11	Reset	**Reset** button: • Press this button during startup to reset settings and start over or to reset an alarm or warning.

Pos.	Symbol	Description
12	On Off Auto	Operating mode for the pump: • On: The pump has been switched on manually. • Off: The pump has been switched off manually. • Auto: The pump is running automatically based on settings.
13	Display	The display shows the pump status.
14	🔒	Lock symbol: If the symbol is lit, the control unit is locked from making changes.
15	ⓘ	Alarm and warning symbol: Red: Alarm Yellow: Warning

The control unit enables manual setting and monitoring of the system.

6. Setting the product

! Make sure that all settings are entered according to the pump and system requirements to avoid malfunction.

6.1 Setting the application type with Grundfos GO Remote

1. Go to **Settings** > **Level control** > **Application type**.

2. Select the type.
   • **Empty**
   • **Fill**

Related information

6.2 Setting the sensor type

6.2.1 Setting the sensor type with Grundfos GO Remote

1. Go to **Settings** > **Level control** > **Sensor type**.

2. Select the type.
   • **Analog sensors**
   • **Digital sensors**

6.2.2 Setting the sensor type with the operating panel

1. Press and hold **OK** until **S-1** or **S-2** starts flashing.

2. Select the sensor type using the **Up** and **Down** buttons.
   • **S-1**: **Analog sensors**
   • **S-2**: **Digital sensors**.

3. Press **OK** to confirm the setting.

4. Continuously press **OK** to confirm all other settings and to exit the setup.

6.3 Setting the start level

6.3.1 Setting the start level with Grundfos GO Remote

The settings apply to analog sensors. For digital sensors, the setting is automatically activated.

1. Go to **Settings** > **Level Control** > **Start level P1**.

2. Set the start level for pump 1.

3. Go to **Settings** > **Level Control** > **Start level P2**.

4. Set the start level for pump 2.

6.3.2 Setting the start level with the operating panel

The settings apply to analog sensors. For digital sensors, the setting is automatically activated.

1. Press and hold **OK** until the display and dry running start flashing.

2. Continuously press **OK** until the indicator light for the start level for pump 1 starts flashing.
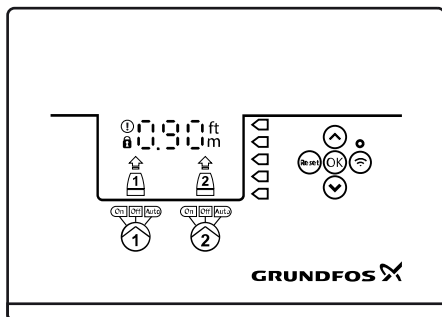
3. Set the start level for pump 1 by using the **Up** and **Down** buttons.

4. Press **OK**.
    The indicator light for the start level for pump 2 starts flashing.
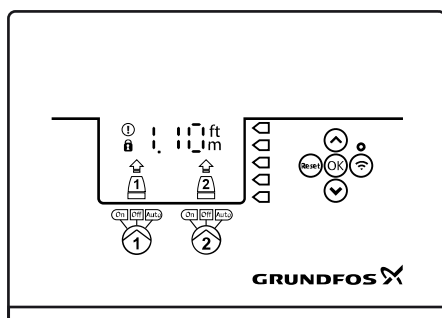
5. Set the start level for pump 2 by using the **Up** and **Down** buttons.

6. Continuously press **OK** until the display stops flashing.
    The settings have now been stored.

6.4 Setting the stop level

6.4.1 Setting the stop level with Grundfos GO Remote

The settings apply to analog sensors. For digital sensors, the setting is automatically activated.
The stop level is the same for pump 1 and pump 2.

1. Go to **Settings** > **Level control** > **Stop level**

2. Set the stop level.

> If you are using the same level for start and stop, remember to set a stop delay. This will prevent the pump from starting and stopping too frequently.

6.4.2 Setting the stop level with the operating panel

The settings apply to analog sensors. For digital sensors, the setting is automatically activated.
The stop level is the same for pump 1 and pump 2.

1. Press and hold **OK** until the display starts flashing.

2. Press **OK** once.
    The current stop level is indicated on the display.

3. Set the stop level using the **Up** and **Down** buttons.

4. Continuously press **OK** to confirm all other settings and to exit the setup.

> If you are using the same level for the start and stop level, remember to set a stop delay. This will prevent the pump from starting and stopping too frequently.

6.5 Setting the high level

6.5.1 Setting the high level with Grundfos GO Remote

For analog sensors:

1. Go to **Settings** > **Level control** > **High level**.
2. Set the high level.

For digital sensors:

1. Go to **Settings** > **LC 231 IO terminals**
2. Select which terminal to configure.

6.5.2 Setting the high level with the operating panel

 The settings apply to analog sensors

1. Press and hold **OK** until the display starts flashing.
2. Press **OK** four times. The current high level is indicated on the display.
3. Set the high level using the **Up** and **Down** button.

For digital sensors, enable or disable the setting.

1. Press **OK** once to complete the setting.

6.6 Stop delay

The stop delay is the time from when the stop level is reached until the pump stops. The stop delay prevents the pump from starting and stopping too frequently and reduces water hammer in long pipes.

6.6.1 Setting the stop delay with Grundfos GO Remote

1. Select **Settings** > **Level control** > **Stop delay** > **State**
2. Select **Stop delay time**.
3. Set the **Stop delay time**.

6.7 Power-on delay

With this function it is possible to delay the startup of the pump after the power supply has been switched on. The purpose is to avoid disturbing the main power network which could happen if several pumps start up immediately when the power supply is switched on.

6.7.1 Setting the power-on delay with Grundfos GO Remote

1. Go to **Settings** > **Power-on delay**.
2. Set the function to **Enabled**.
3. Set the time delay.

6.8 Dry-running protection

If the pump is running and the liquid level in the tank or pit becomes lower than the dry-running level, the dry-running protection will stop the pump to ensure that it is not damaged.
Dry-running protection is dependent on a feedback signal from a level sensor installed in the tank or pit.

6.8.1 Setting the dry-running level with Grundfos GO Remote

1. Go to **Settings** > **Level control** > **Dry-running level**.
2. Set the dry-running level.

> ❗ The dry-running level must be set to a value which ensures that the pump is not damaged due to dry-running. The specific level depends on the installed pump type. See the installation and operating instructions for the product.

6.8.2 Setting the dry-running level with the operating panel

1. Press and hold **OK** until the display starts flashing.
2. Set the dry-running level using the **Up** or **Down** button.
3. Continuously press **OK** to confirm all other settings and to exit the setup.

6.9 Using the same level switch for the start and stop level

1. Set one digital input to **Start pump 1** or **Stop**. All other digital inputs must be disabled.
2. Set a stop delay.
   This will prevent the pump from starting and stopping too frequently.

6.10 "Multipump settings"

The control unit enables start and stop of the two pumps alternately. The pump with the lowest number of running hours is always started first. The function ensures that the running hours of the pumps are the same.
It is possible to set a time delay before the next pump is started.

6.10.1 Setting "multipump settings" with Grundfos GO Remote

1. Go to **Settings** > **Multi pump settings**
2. Set **Inter pump delay**.
   This is the starting delay between the pumps ensuring that they do not start at the same time.
3. Set **Max number of running pumps**.
   This is the maximum number of pumps which are allowed to run at the same time.

6.11 "Antiseizing"

The **Antiseizing** function prevents a pump from choking or seizing up as a result of deposits buildup. **Antiseizing** is used in pits that have had no inlet flow for a long period. The **Antiseizing** function ensures that the pump starts as often as set in **Antiseizing** > **interval**. The pump will operate for the number of seconds indicated by the user.

6.11.1 Setting the "Anti-seizing" function with Grundfos GO Remote

1. Go to **Settings** > **Anti-seizing**.

2. Set the function to **Enabled**.

3. Set the time interval.

4. Set the operating time.

6.12 Signal-detection time

The signal-detection time is the minimum time a level has to be active before the control unit initiates an action, such as starting or stopping a pump.

6.12.1 Setting the signal-detection time with Grundfos GO Remote

1. Go to **Settings** > **Level control** > **Signal detection time**.

2. Set the signal-detection time.

6.13 Setting the maximum number of restarts with Grundfos GO Remote

If the pump is seized up as a result of deposits buildup, it will be stopped automatically due to overheating, provided that the motor protection has been set. When the motor has cooled down, the control unit will unsuccessfully try to restart the pump and this scenario will be repeated. In order to prevent this, it is possible to set a maximum number of restart attempts within a set interval.

1. Go to **Settings** > **Max number of restarts**.

2. Enable the function.

3. Set the interval within which the allowed number of restarts are to be counted.

4. Set the maximum number of pump restarts which are allowed during the set interval.

Related information

6.16.4 Setting the motor protection with Grundfos GO Remote

6.16.1 Overheat protection

6.16.2 Overload protection

8.3 Code 4 (Too many motor restarts)

6.14 Setting the service interval with Grundfos GO Remote

You can set a time in Grundfos GO Remote in order to get a reminder that the pump needs service when the time comes.

1. Go to **Settings** > **Service** > **State**

2. Select **Enable** and press **OK**.

3. Select the pump.

4. Enter the number of hours until next service and press **OK**.

6.15 Operating the product

6.15.1 Automatic operation

In automatic operating mode, the control unit starts and stops the pump based on the signals it receives from the connected level sensors and the corresponding level settings within the control unit.

Related information

4.4 Application types

6.15.2 Manual operation

6.15.2.1 Starting and stopping the pump manually with Grundfos GO Remote

1. Go to **Settings** > **Control, pump 1** or **Control, pump 2**.

2. Start the pump by selecting **On** and pressing **OK**.

3. Stop the pump by selecting **Off** and pressing **OK**.

Related information

6.15.2.3 Choosing what the pump must do after manual start

6.15.2.2 Starting and stopping the pump manually with the operating panel

1. To start a pump manually, press and hold the **Pump** button until the pump starts.
   The **On** indicator light is lit when the pump is operating in manual mode.

2. Stop the pump by pressing the **Pump** button.
   The **Off** indicator light is lit when the pump is stopped.

Related information

6.15.2.3 Choosing what the pump must do after manual start

The following can be configured:

- **Automatic return**
  Here you select if the pump must automatically return to a defined operating mode when the manual start ends.
- **Return to**
  Here you select whether the pump must return to automatic operating mode or stop when the manual start ends and **Automatic return** has been enabled.
- **Forced start time**
  Here you set the time period in which the pump must run in manual operating mode.

1. Go to **Settings** > **Manual start**.

2. Select **Automatic return** and choose one of the following options:
   - **Disabled**
   - **Enabled**.

3. Go one step back in the menu and select **Return to**.

4. Choose one of the following options:
   - **Auto**
   - **Off**.

5. Go one step back in the menu and select **Forced start time**.

6. Set the time period in which the pump must run in manual operating mode.

Related information

6.16 Motor protection

Make sure that all settings are entered according to the pump and system requirements to avoid malfunction.

6.16.1 Overheat protection

The control unit offers thermal protection for the connected motors. Two types of thermal-protection sensor can be connected to the control unit: a PTC sensor (analog) and a thermal switch (digital).

Under normal running conditions, the sensor will act as a short circuit, but when its temperature limit is reached, it will open and tell the control unit that the temperature is too high, and the pump is stopped. When the temperature has dropped to the sensor-trigger level, the pump will return to normal running conditions. It will not be possible to start the pump manually as long as the temperature is too high.

Related information

6.16.2 Overload protection

The pump is protected by internal software-based motor-protection.

Related information

6.16.3 Moisture protection

When a moisture sensor is installed in series with the temperature sensor, the control unit needs to know how to determine whether there is a high temperature or moisture in the pump. If the temperature is too high, normally the temperature sensor will go back to its normal stage when the temperature has dropped to its trigger level. If there is moisture in the pump, then the moisture sensor will keep the series connection open until the pump is opened and serviced.

To determine which sensor has been active, a **cool down time** must be entered. This is the time that will normally pass until the temperature has dropped enough for the temperature sensor to return to its normal stage. If the **cool down time** is exceeded, the control unit will assume that there is moisture in the pump, and it will send a moisture alarm.

Related information

6.16.4 Setting the motor protection with Grundfos GO Remote

You can set the current, temperature and moisture protection via a setup wizard.

1. Go to **Settings** > **Motor protection pump 1** or **Motor protection pump 2**.

2. Follow the on-screen wizard to set the following:
   - **Nominal pump current**
   - **Trip IEC class**
   - **Pump connection**
   - **Overheat protection**.

Related information

6.16.5 Trip class

The trip delay indicates the maximum period of time during which the overload condition is allowed to exist within a period of 0.1 - 30 seconds.
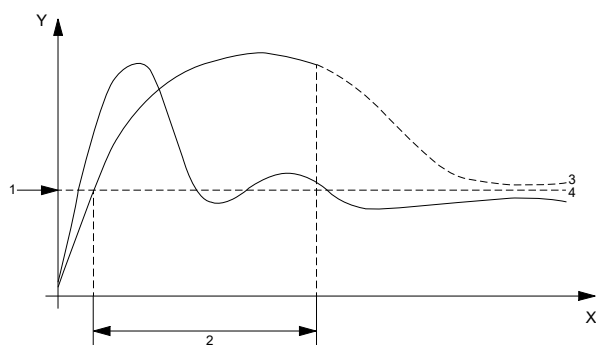
Curves for trip class "P

Pos.	Description
Y	Current
X	Time
1	Rated motor current
2	10-second trip delay
3	Curve with tripping
4	Curve without tripping

A pump is to cut out after 10 seconds because the rated current has been exceeded.

1. Select trip class.

2. Set the overload limit to 10 A. The rated motor current is stated on the nameplate.

See position 3, curve with tripping. LC 231 cuts out the pump because the pump startup time exceeds 10 seconds and the current exceeds 10 A.

See position 4, curve without tripping. During pump startup the starting current only briefly exceeds 10 A and the pump is not cut out.

Note that the curves are examples and cannot be used for readings.

IEC trip curves
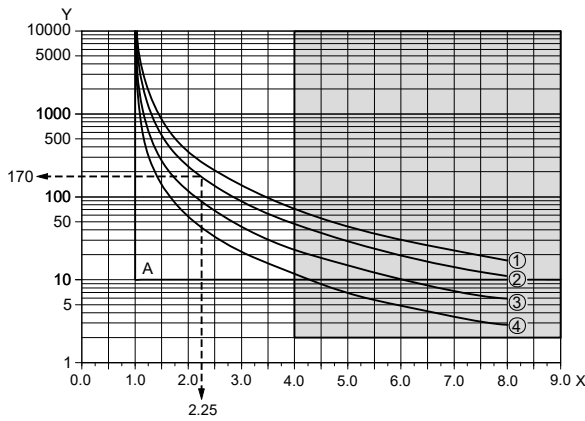
Pos.	Description
Y	Time [s]
X	x I_{rated}
A	Class "p"
1	Class 30
1	Class 20
3	Class 10
4	Class 5

Example:
1. Set the IEC trip class to class 20.
2. Set the overload limit to 10 A. The rated motor current is stated on the nameplate.

At a motor current of 22.5 A (10 x 2.25), a pump is to cut out after approx. 170 seconds. In addition to IEC trip curves, a fixed 4 x I_{rated} in 2 seconds is implemented to protect especially small motors from overheating (see grey area on drawing).

Contactor Current Protection (CCP)

In addition to the IEC trip class, a Contactor Current Protection (CCP) trip class is implemented to protect the internal contactors in the product from overheating.
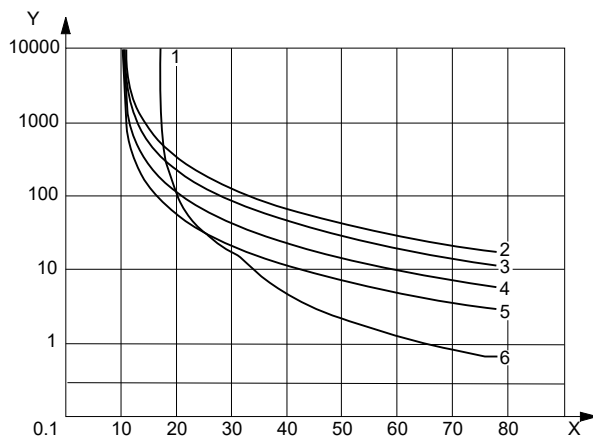
Pos.	Description
Y	Trip time [s]
X	Current [A]
1	CCP
2	Class 30
3	Class 20
4	Class 10
5	Class 5
6	CCP + Class 20

Full-load current is set to 10 [A] and trip class 20 is selected.

- Motor overload. When the motor is overloaded with 15 [A], it will take ~800 seconds to trip the motor protection when trip class 20 is selected.

- The pump is blocked. If the pump is blocked and the motor has a locked-rotor current specified to 65 [A], it will take approximately 1 second to trip the motor protection due to the contactor-current protection.

The contactor is worn out

LC 231 has a wear-out counter for the contactor(s) which are based on the actual current when the motor is switched off by the protection function.

When 90 % of the estimated wear-out for the contactor is reached, the warning code 220 appears on the operating panel. In Grundfos GO Remote, the warning **Contactor wear out** appears.

When 100 % of the estimated wear-out for the contactor is reached, the alarm code 220 **Contactor wear out** appears on the operating panel and the controller will not be able to start the pumps.

The pump is blocked

To prevent that the contactor gets worn out too fast if the pump is blocked, a maximum number of restarts are allowed by the controller. **Maximum number of blocked motor restart** can be set from 1 to 3 via Grundfos GO Remote. Tripped by the CCP-curve. The alarm code 51 **Blocked** appears on the operating panel. In Grundfos GO Remote, the alarm **Blocked** appears.

If the motor has reached the maximum numbers of restarts, 1 to 3 times, due to a blocked motor, it is possible to reset the failure up to 3 times manually. After that LC 231 will wait 24 hours before trying to restart the motor again. Alternatively, switch off the main power supply to LC 231 for a minimum of 30 seconds to clear the alarms.

A blockage alarm is typically triggered when the motor starts and in-rush current trips the motor. The maximum allowed blockage situations are limited to 6 times during a 24-hour period. If the **Maximum number of blocked motor restart** is set to 3, the control unit tries to restart the motor 3 times before a manual reset is needed. If it occurs 3 times again after the reset, the control unit has reached the maximum number of blockages.

Related information

6.17 Alarm reset

6.17.1 Resetting alarms and warnings manually with Grundfos GO Remote

1. Go to **Alarms and warnings**.

2. Press **Reset alarm**.
   All current alarms and warnings have been reset. However, if the fault causing the alarm or warning has not been removed, the alarm or warning will appear again.

3. If you want to delete all alarms and warnings from the history log, press **Show log** > **Reset alarm and warning logs**.

6.17.2 Setting the automatic alarm reset with Grundfos GO Remote

1. Go to **Settings** > **Automatic alarm reset**.

2. Select one of the following:

No automatic reset	The control unit does not reset any alarm or warning. You must do it manually.
All except pump critical	The control unit resets alarms and warnings unless the related fault can damage the pump.
All alarms	The control unit resets alarms and warnings, regardless of the fault.

6.17.3 Resetting alarms and warnings on the operating panel

You can manually reset alarms and warnings on the operating panel. However, if the fault causing the alarm or warning has not been removed, the alarm or warning will appear again.

1. Press **Reset** on the operating panel to reset the alarm or warning.

6.18 Setting the buzzer with Grundfos GO Remote

The internal buzzer is used to give an acoustic sound if there is a warning or an alarm.

1. Go to **Settings** > **Buzzer settings**.

2. Select when the buzzer is to be activated:
   - **All alarms**
   - **All alarms and warnings**.

6.19 Setting units for Grundfos GO Remote

Changing units as described here will only change the units shown in Grundfos GO Remote. It will not affect the units shown on the operating panel of products connected to Grundfos GO Remote.

1. Press the **Menu** button in the upper left corner of Grundfos GO Remote.
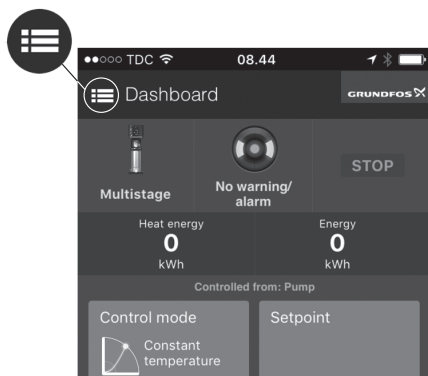
2. Go to **General** > **Settings** > **Products** > **Units**.

3. Select **US** or **Grundfos default units**.

6.20 Setting units for the operating panel with Grundfos GO Remote

Changing units as described below changes the units shown in the operating panel of the product connected to Grundfos GO Remote. It does not affect the units shown in Grundfos GO Remote.

1. Go to **Settings** > **Display units**.

2. Select the units to be used on the operating panel.
    • **SI Units**
    • **US Units**.

6.21 GENIbus

GENIbus, the Grundfos Electronics Network Intercommunications bus, is a fieldbus developed by Grundfos to meet the need for data transfer in all typical Grundfos motor or pump applications. Grundfos devices with GENIbus can be wired together in networks and integrated in automation systems. Each device on the network must have a unique GENIbus address. GENIbus is based on the RS485 hardware standard and typically operates at a baud rate of 9600 bits/s.

6.21.1 Setting the GENIbus address with Grundfos GO Remote

1. Go to **Settings** > **GENI bus address**.

2. Set the GENIbus address.
    The GENIbus address is a unique identifier for the product on the network.

6.22 Security

6.22.1 Locking the operating panel

The operating panel can only be locked with Grundfos GO Remote.

1. Go to **Settings** > **Security** > **Lock display**.

2. Enable the setting and press **Done**.

3. Select if you want to restrict access to **Settings only** or **Settings and operation**.

4. Press **Done**.

The lock symbol on the operating panel is now lit.

6.22.2 Unlocking the operating panel

The operating panel can only be unlocked with Grundfos GO Remote.

1. Go to **Settings** > **Security** > **Lock display**.

2. Disable the setting and press **Done**.

The lock symbol on the operating panel is switched off.

6.22.3 Locking Grundfos GO Remote

1. Go to **Settings** > **Security** > **Lock GO Remote**.

2. Enable the setting and press **Done**.

3. Enter a four digit PIN code and press **CONFIRM**.

A lock symbol indicates which menus are locked. To view or change settings, you must enter the PIN code.

6.22.4 Unlocking Grundfos GO Remote

1. Go to **Settings** > **Security**.

2. Enter the four digit PIN code.

3. Select **Lock GO Remote**.

4. Disable the setting and press **Done**.

All menus in Grundfos GO Remote are unlocked.

6.23 Starting the startup wizard with the operating panel

• Press and hold the **OK** button for 8 seconds until **S-1** or **S-2** starts flashing.

Related information

3.3 Startup wizard on the operating panel

7. Servicing the product

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

7.1 Updating the product software

New features and functions can be made available during the product's life cycle.

1. Contact Grundfos to get your product software updated.

7.2 Replacing the battery

> **CAUTION**
> **Fire and chemical leakage**
> Minor or moderate personal injury
> - Risk of explosion if the battery is replaced by an incorrect type.

To replace the battery, do the following:

1. Remove the front cover.

2. Gently grab around the battery without touching it too much.

3. Push the battery to the side to release it.

4. Pull the battery up.

5. Insert a new battery of the correct type.

Related information

9. Technical data

7.3 Replacing the CIM module

> **WARNING**
> **Electric shock**
> Death or serious personal injury
> - Switch off the power supply before making any electrical connections.
> - Make sure that the power supply cannot be switched on accidentally.

1. Switch off the power supply to the product and other components with external supply.

2. Write down the terminal connection of each wire to ensure correct re-connection.

3. Disconnect all wires connected to the CIM module.

4. Remove the screws that holds the module.

5. Remove the module from the control unit.

6. Fit the new module.

7. Connect all wires.

8. Fault finding the product

> **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.

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

8.1 Overview of alarm and warning codes

Code number	Description
Code 2	The power phase is missing.
Code 4	Too many motor restarts.
Code 9	The power-phase sequence is wrong.
Code 12	Service is needed.
Code 22	Moisture in motor of pump.
Code 25	Wrong configuration.
Code 26	Contactor is shorted.
Code 48	The motor is overloaded.
Code 51	The pump is blocked.
Code 57	Missing water in the application.
Code 69	The winding temperature is too high.
Code 72	Internal fault.
Code 76	Internal fault.
Code 84	The memory-storage media is faulty.
Code 85	Internal fault.
Code 117	The door is opened.
Code 159	Communication error CIMxxx.
Code 163	Internal fault.
Code 165	Signal fault.
Code 191	High water level.
Code 205	Level-switch inconsistency.
Code 220	Contactor wear out.
Code 229	Water on the floor.

8.2 Code 2 (Power phase missing)

- Alarm code 2 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Power phase missing** is displayed in Grundfos GO Remote.

Cause	One of the power supply phases is not connected.

Remedy	• Connect the phase.

Cause	The fuse is blown somewhere on the incoming power line.

Remedy	• Replace the fuse.

Related information

2.3.3 Connecting the pump supply and power supply

8.3 Code 4 (Too many motor restarts)

- Alarm code 4 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Too many motor restarts** is displayed in Grundfos GO Remote.

Cause	The pump has been blocked or partly blocked causing overload in the motor.

Remedy	• Remove the blockage from the pump.

Related information

6.13 Setting the maximum number of restarts with Grundfos GO Remote

8.4 Code 9 (Power phase sequence wrong)

- Alarm code 9 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Power phase sequence wrong** is displayed in Grundfos GO Remote.

Cause	The power supply phase is set incorrectly.

Remedy	• Interchange two phases.

Related information

2.3.3 Connecting the pump supply and power supply

8.5 Code 12 (Service needed)

- Warning code 12 is shown on the display if you press the **Up** or **Down** button.
- The warning symbol on the display turns yellow and the pump's operating mode is unchanged.
- Warning code **Service needed** is displayed in Grundfos GO Remote.

| Cause | The pump requires service based on time to next service countdown. |

| Remedy | • Contact Grundfos or an authorised service workshop. |
| | • In order for the product to determine the service time, you must have enabled the service countdown with Grundfos GO Remote: **Settings** > **Service** |

8.6 Code 22 (Moisture in motor of pump)

- Alarm code 22 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Moisture in motor of pump** is displayed in Grundfos GO Remote.

| Cause | Moisture is detected in the motor of the pump. |

| Remedy | • Service is needed on the pump. Contact Grundfos. |

8.7 Code 25 (Wrong configuration)

- Alarm code 25 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Wrong configuration** is displayed in Grundfos GO Remote.

| Cause | The level control is not configured correctly. |

| Remedy | • Check and adjust the level control configuration with Grundfos GO Remote. |

| Cause | The IO terminal is not configured correctly. |

| Remedy | • Select which IO terminal to change in Grundfos GO Remote and adjust the configuration. |

Related information

3.6 Configuring the IO terminals using Grundfos GO Remote

8.8 Code 26 (Contactor shorted)

- Alarm code 26 is shown on the display.
- The alarm symbol on the display turns red but the pump's operating mode is unchanged.
- Alarm code **Contactor shorted** is displayed in Grundfos GO Remote.

| Cause | The contactor melts due to motor overload and the pump is unable to stop. |

| Remedy | • Replace the control unit. |

8.9 Code 48 (Motor is overloaded)

- Alarm code 48 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Motor is overloaded** is displayed in Grundfos GO Remote.

| Cause | The pump is clogged.
The blockage causes the motor current to rise, which could damage the pump. |

| Remedy | • Remove the blockage. |
| | • Check the pit conditions to ensure blockage is not possible again. |

Related information

6.16.2 Overload protection

8.10 Code 51 (Blocked)

- Alarm code 51 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Blocked** is displayed in Grundfos GO Remote.

| Cause | The pump is blocked.
The pump cannot rotate due to a blockage. |

Remedy
- Dismantle the pump by removing the pump head, and remove any blockage or impurities preventing the pump from rotating.
- Check the water quality to eliminate the risk of lime precipitation.
  Before dismantling the pump, drain the system or close the isolating valves on either side of the pump. The pumped liquid may be scalding hot and under high pressure.

Related information

6.16.4 Setting the motor protection with Grundfos GO Remote

8.11 Code 57 (Missing water in the application)

- Alarm code 57 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Dry Run** is displayed in Grundfos GO Remote.

Cause   **Low water level in the pit and the pump stops due to the dry-running function.**

Remedy
- Check and configure the sensor for stop level.

8.12 Code 69 (Winding temperature too high)

- Alarm code 69 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Winding temperature too high** is displayed in Grundfos GO Remote.

Cause   **The pump is clogged, causing the pump to use more current and thereby overheat.**

Remedy
- Remove the blockage.

Cause   **The pump has run for too long.**

Remedy
- Allow the pump to cool down.
- Adjust the distance between start and stop levels.

Related information

6.16.1 Overheat protection

8.13 Code 72 (Internal fault)

- Alarm code 72 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Internal hardware fault** is displayed in Grundfos GO Remote.

Cause   **Fault in internal hardware.**

Remedy
- Contact Grundfos or an authorised service workshop.

8.14 Code 76 (Internal fault)

- Alarm code 76 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Drive unit communication fault** is displayed in Grundfos GO Remote.

Cause   **Internal communication fault.**

Remedy
- Contact Grundfos or an authorised service workshop.

8.15 Code 84 (Memory storage media faulty)

- Warning code 84 is shown on the display if you press the **Up** or **Down** button.
- The warning symbol on the display turns yellow and the pump's operating mode is unchanged.
- Warning code **Memory storage media faulty** is displayed in Grundfos GO Remote.

Cause   **An error in the internal memory has been detected.**

Remedy
- Replace the control unit.
- Contact Grundfos or an authorised service workshop.

8.16 Code 85 (Internal fault)

- Alarm code 85 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Drive unit memory fault** is displayed in Grundfos GO Remote.

Cause   **Internal memory fault.**

Remedy
- Contact Grundfos or an authorised service workshop.

8.17 Code 117 (Door opened)

- Warning code 117 is shown on the display if you press the **Up** or **Down** button.
- The warning symbol on the display turns yellow and the pump's operating mode is unchanged.
- Warning code **Door opened** is displayed in Grundfos GO Remote.

| Cause | The door to the control-unit room has been opened. |

| Remedy | • Check the room with the control unit. |

8.18 Code 159 (Communication error CIMxxx)

- Warning code 159 is shown on the display if you press the **Up** or **Down** button.
- The warning symbol on the display turns yellow and the pump's operating mode is unchanged.
- Warning code **Communication error CIMxxx** is displayed in Grundfos GO Remote.
- The CIM module is unable to communicate with the product.

| Cause | The CIM module is installed incorrectly. |

| Remedy | • Ensure that the module, including cables, is fitted correctly. |

| Cause | The CIM module is defective. |

| Remedy | • Contact Grundfos. |

Related information

2.2.4 Installing a communication interface module

8.19 Code 163 (Drive unit configuration fault)

- Alarm code 163 is shown on the display.
- The alarm symbol on the display turns red, but the pump's operating mode is unchanged.
- Alarm code **Drive unit configuration fault** is displayed in Grundfos GO Remote.

| Cause | The configuration of the motor-drive unit is incorrect. |

| Remedy | • Reconfigure the phase setting on the unit using Grundfos GO Remote. |

8.20 Code 165 (Signal fault)

- Alarm code 165 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Signal fault** is displayed in Grundfos GO Remote.

| Cause | The signal from the sensor is out of the configured range. |

| Remedy | • Go to **Settings** > **Level Control** in Grundfos GO Remote and ensure that the configured range corresponds to the physical application type.
 • Change the sensor, if needed. |

8.21 Code 191 (High water level)

- Alarm code 191 is shown on the display.
- The alarm symbol on the display turns red, but the pump's operating mode is unchanged.
- Alarm code **High water level** is displayed in Grundfos GO Remote.

| Cause | The defined start level did not start the pump. |

| Remedy | • Check and configure the sensor for start level. |

| Cause | The pump is not big enough to remove the water. |

| Remedy | • Contact Grundfos or an authorised service workshop. |

| Cause | The level sensor is defective and not reacting on level changes. |

| Remedy | • Check the functionality of the level sensor. |

Related information

3.6 Configuring the IO terminals using Grundfos GO Remote

8.22 Code 205 (Level switch inconsistency)

- Alarm code 205 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- Alarm code **Level switch inconsistency** is displayed in Grundfos GO Remote.

| Cause | A float switch could be defective or stuck. |

Remedy   •   Check the functionality of each float switch.

Related information

8.23 Code 220 (Contactor wear out)

- Warning code 220 is shown on the display if you press the **Up** or **Down** button.
- Alarm code 220 is shown on the display.
- The alarm symbol on the display turns red and the pump stops.
- The warning symbol on the display turns yellow and the pump's operating mode is unchanged.
- Alarm code or warning code **Contactor wear out** is displayed in Grundfos GO Remote.

Cause   **The contactor has reached its maximum number of operating cycles and is worn out.**
Alarm: The contactor is worn out and the pump cannot start.

Remedy   •   Replace LC 231. Contact Grundfos.

Cause   **The contactor is approaching its maximum number of operating cycles and must be replaced.**
Warning: The contactor is close to being worn out and the pump will be unable to start.

Remedy   •   Order a new LC 231 to avoid downtime. Contact Grundfos.

Related information

8.24 Code 229 (Water on floor)

- Warning code 229 is shown on the display if you press the **Up** or **Down** button.
- The warning symbol on the display turns yellow and the pump's operating mode is unchanged.
- Warning code **Water on floor** is displayed in Grundfos GO Remote.

Cause   **The sensor detects water on the floor.**

Remedy   •   Check for water leakage.

9. Technical data

Voltage
- 1 x 110-240 V +/-10%, PE
- 3 x 200-460 V +/-10%, PE.

Supported power supply lines:
- TN-S earthing system
- TN-C earthing system
- TN-C-S earthing system.

Frequency
50/60 Hz.

Maximum number of pump starts and stops per hour
250.

Maximum starting current
IEC: 78 A.
UL: 68 A.

Operating temperature and current

Model	Maximum current and temperature combination
IEC: 99369650 LC 231 2x 1-9 DOL PI	9 A and 40 °C (104 °F)
UL: 99369652 LC 231 2x 1-7.6 DOL PI	7.6 A and 40 °C (104 °F)

Storage temperature

Min. storage temperature	-30 °C (-22 °F)
Max. storage temperature	60 °C (140 °F)

Ambient temperature

Minimum	-20 °C (-4 °F)
Maximum	40 °C (104 °F)

Enclosure class
IP54 / NEMA 3R.

Mains input terminal
Current: See nameplate.
IEC stranded or solid 0.5 to 16 mm^2.
UL stranded or solid AWG 20 to 6.
Screw torque: 1.2 Nm.
Stripping length: 12 mm (0.47").

Pump output terminal
Current: See nameplate.
IEC stranded 0.75 to 2.5 mm^2.
IEC solid 1.0 to 4.0 mm^2.
UL stranded or solid AWG 18 to 12.
Screw torque: 1.2 Nm.

Alarm relay terminals
250 VAC nominal and 24 VDC nominal.
Nominal current 10 mA to 2 A AC/DC.
D300 pilot duty (auxiliary relay).
UL: solid AWG 28-12, stranded AWG 30-12.
IEC: solid or stranded 0.2 - 2.5 mm^2.
Stripping lenght: 7-8 mm (0.28"-0.31").
Screw torque: 0.5 Nm.

Relay output 1 and 2
Minimum contact load: 10 mA AC/DC.
Potential-free changeover contacts.
IEC: solid or stranded 0.2 - 2.5 mm^2.
UL: solid AWG 28-12, stranded AWG 30-12.
Stripping length: 7-8 mm (0.28"-0.31").
Screw torque: 0.5 Nm.

Digital input
IEC: solid or stranded 0.5 - 2.5 mm^2, flexible 0.25 - 1.5 mm^2.
UL: solid or stranded AWG 28-12.
Stripping length: 5-6 mm (0.19"-0.24").

Digital input mode	Low logic level below 1.8 V. High logic level higher than 2.7 V.

DIO terminals

Digital input mode	Low logic level below 1.8 V. High logic level higher than 2.7 V.
Digital output mode	Open collector. Current sink capability: maximum 75 mA, no sourcing. Overcurrent protected.

DIO terminals

Digital input mode	Low logic level below 1.8 V. High logic level higher than 2.7 V.
Digital output mode	Open collector. Current sink capability: maximum 75 mA, no sourcing. Overcurrent protected.

PTC
IEC: solid or stranded 0.2 - 2.5 mm^2.
UL: solid AWG 28-12, stranded AWG 30-12.
Stripping length 7-8 mm (0.28"-0.31").
Screw torque: 0.5 Nm.
Trip resistance: greater than 2.2 kΩ +/-5 %.
Automatic reset resistance: less than 1 kΩ +/-5 %.

Pt100 or Pt1000 inputs (Pt)
Use Pt100 for short wires.
Use Pt1000 for long wires.

Solid or stranded wire: AWG 28-12 or maximum 2.5 mm^2.

IEC: solid or stranded 0.5 - 2.5 mm^2, flexible 0.25 - 1.5 mm^2.

UL: solid or stranded AWG 28-12.

Stripping length: 5-6 mm (0.19"-0.24").

Power supplies, +24 V

Output voltage: 24 VDC - 10 % to + 10 %.

Maximum 250 mA on each terminal.

Weight

 See nameplate.

Altitude

Maximum 2000 m (6562 ft).

Pollution degree

Category 3.

Motor protection

Software class B.

Action type 2.

Back-up fuse

Maximum 35 A.

Measurement tolerances

24 V external ± 10 %.

Current measurement: ± 5 %.

Power measurement: ± 10 %.

Battery

Size CR2032.

Related information

2.3.2 Protection of controller and supply cables

7.2 Replacing the battery

10. 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.

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

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