CRE, CRIE, CRNE, SPKE, MTRE, CME

Installation and operating instructions, supplement
Functional descriptions

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GRUNDFOS

English (GB) Installation and operating instructions

Original installation and operating instructions.

CONTENTS

> **Warning**
> **Prior to installation, read these installation and operating instructions. Installation and operation must comply with local regulations and accepted codes of good practice.**

1. Symbols used in this document

> **Warning**
> **The surface of the product may be so hot that it may cause burns or personal injury.**

> Note
> **Notes or instructions that make the job easier and ensure safe operation.**

2. General information

These installation and operating instructions are a supplement to the installation and operating instructions for the corresponding E-pumps CRE, CRIE, CRNE, SPKE, MTRE and CME. For instructions not mentioned specifically in this manual, see the installation and operating instructions for the E-pumps:

TM05 6174 4612

http://net.grundfos.com/qr/i/98358864

3. User interfaces

> **Warning**
> **The product may be so hot that only the buttons should be touched to avoid burns.**

Use the following user interfaces to set the pump settings.
Control panels
• Standard control panel.
  See section *4. Standard control panel*.
• Advanced control panel.
  See section *5. Advanced control panel*.

Remote control
• Grundfos GO.
  See section *6. Grundfos GO*.

4. Standard control panel
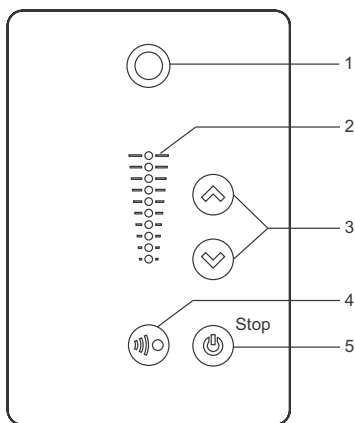
The pumps are fitted with this control panel as standard.

Fig. 1 Standard control panel

Pos.	Symbol	Description
1	◯	Grundfos Eye Shows the operating status of the pump. See section *10. Grundfos Eye* for further information.
2	-	Light fields for indication of setpoint.
3	⌄ ⌃	Changes the setpoint. Resets warnings and alarms when one of the buttons is briefly pressed.
4	))◯	Allows radio communication with Grundfos GO and other products of the same type. When you try to establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye on the pump will flash continuously. Press))◯ on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.
5	⏻	Makes the pump ready for operation/starts and stops the pump. **Start:** If you press the button when the pump is stopped, the pump will only start if no other functions with higher priority have been enabled. See section *9. Priority of settings*. **Stop:** If you press the button when the pump is running, the pump will always be stopped. When the pump is stopped via this button, the "Stop" text next to the button will illuminate.

4.1 Setpoint setting

Set the desired setpoint of the pump by pressing ⌃ or ⌄. The light fields on the control panel will indicate the setpoint set.

4.1.1 Pump in constant pressure control mode

The following example applies to a pump in an application where a pressure sensor gives a feedback to the pump. If the sensor is retrofitted to the pump, you must set it up manually as the pump does not automatically register a connected sensor. See section *7.5 Analog inputs*.

Figure 2 shows that the 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.
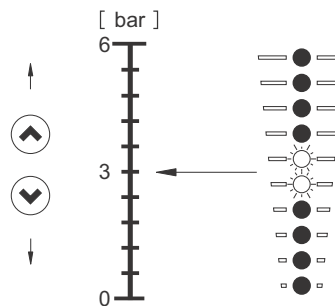
Fig. 2 Setpoint set to 3 bar, constant pressure control

4.1.2 Pump in constant-curve control mode

In constant-curve control mode, the pump performance will lie between the maximum and minimum curve of the pump. See fig. 3.
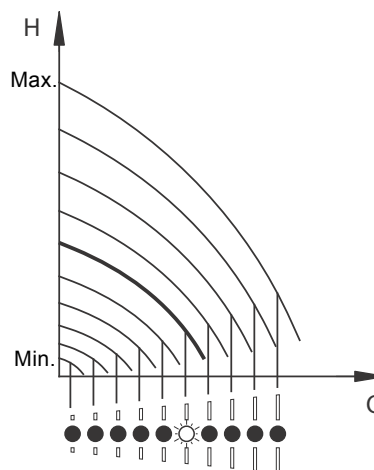
Fig. 3 Pump in constant-curve control mode

Setting to maximum curve:

• Press ⌃ continuously to change over to the maximum curve of the pump (top light field flashes). When the top light field is on, press ⌃ for 3 seconds until the light field starts flashing.

• To change back, press ⌄ continuously until the desired setpoint is indicated.

Example: Pump set to maximum curve.

Figure 4 shows that the top light field is flashing, indicating maximum curve.

Fig. 4 Maximum curve duty

3

Setting to minimum curve:

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

Example: Pump set to minimum curve.

Figure 5 shows that the bottom light field is flashing, indicating minimum curve.

Fig. 5 Minimum curve duty

4.1.3 Start/stop of pump

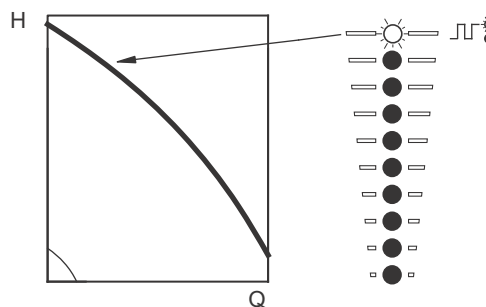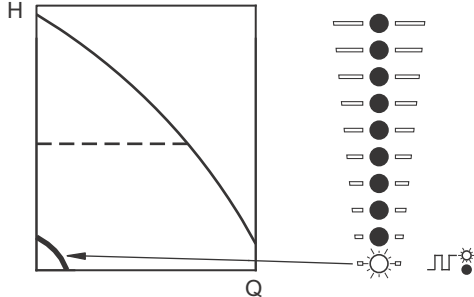| Note	*If you have stopped the pump by pressing ⊚ and the "Stop" text on the control panel is illuminated, you can only give it free to operation by pressing ⊚ again.* *If you have stopped the pump by pressing ⊻, you can restart it by pressing ⊼ or by using Grundfos GO.*

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

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

The pump can also be stopped with Grundfos GO or via a digital input set to "External stop". See section *9. Priority of settings*.

4.1.4 Resetting of fault indications

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

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

5. Advanced control panel

The pumps can be fitted with the advanced control panel as an option.
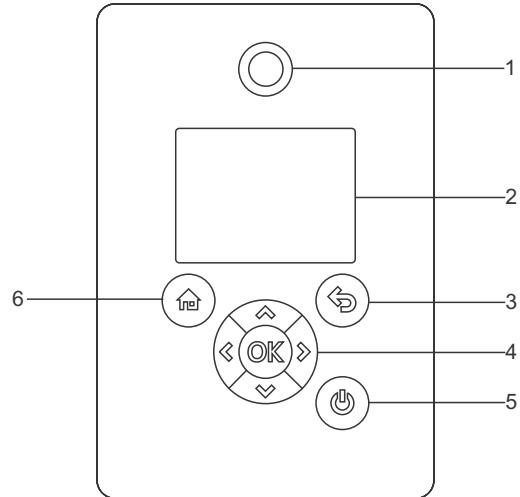
Fig. 6 Advanced control panel

Pos.	Symbol	Description
1	◯	Grundfos Eye Shows the operating status of the pump. See section *10. Grundfos Eye* for further information.
2	-	Graphical colour display.
3	↩	Goes one step back.
4	◁ ▷	Navigates between main menus, displays and digits. When the menu is changed, the display will always show the top display of the new menu.
	⌃ ⌄	Navigates between submenus. Changes value settings. **Note:** If you have disabled the possibility to make settings with the "Enable/disable settings" function, then you can enable it again temporarily by pressing these buttons simultaneously for at least 5 seconds. See section *7.29 Buttons on product (Enable/disable settings)*.
	OK	Saves changed values, resets alarms and expands the value field. Allows radio communication with Grundfos GO and other products of the same type. When you try to a establish radio communication between the pump and Grundfos GO or another pump, the green indicator light in Grundfos Eye on the pump will start flashing. A note also appears in the pump display stating that a wireless device wants to connect. Press OK on the pump control panel to allow radio communication with Grundfos GO and other products of the same type.

Pos.	Symbol	Description
5		Makes the pump ready for operation/starts and stops the pump. **Start:** If you press the button when the pump is stopped, the pump will only start if no other functions with higher priority have been enabled. See section *9. Priority of settings*. **Stop:** If you press the button when the pump is running, the pump will always be stopped. When you stop the pump via this button, the icon will appear in the bottom of the display.
6		Goes to the "Home" menu.

5.1 Home display
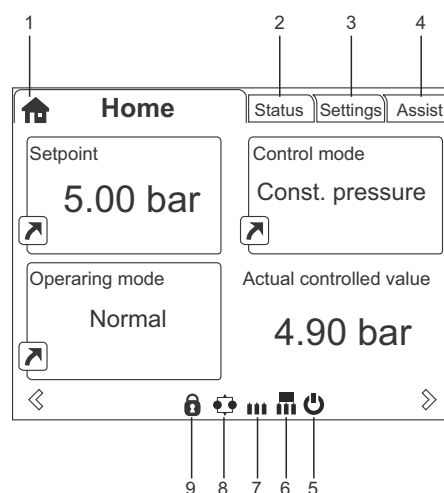
Fig. 7 Example of "**Home**" display

Pos.	Symbol	Description
1		"Home" This menu shows up to four user-defined parameters. You can select parameters shown as shortcut icon and when pressing OK you will go directly to the "Settings" display for the selected parameter.
2	-	"Status" This menu shows the status of the pump and system as well as warnings and alarms.
3	-	"Settings" This menu gives access to all setting parameters. You can make detailed settings of the pump in this menu. See section *7. Description of functions*.
4	-	"Assist" This menu enables assisted pump setup, provides a short description of the control modes and offers fault advice. See section *7.40 Assist*.
5		Indicates that the pump has been stopped via the button.
6		Indicates that the pump is functioning as master pump in a multipump system.
7		Indicates that the pump is functioning as slave pump in a multipump system.
8		Indicates that the pump is operating in a multipump system. See section *7.44 Multi-pump setup (Setup of multi-pump system)*.
9		Indicates that the possibility to make settings has been disabled for protective reasons. See section *7.29 Buttons on product (Enable/disable settings)*.

5.2 Startup guide

The pump incorporates a startup guide which is started at the first startup. See section *7.37 Run start-up guide.* After the startup guide, the main menus will appear in the display.

5.3 Menu overview for advanced control panel

5.3.1 Home

Home	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
	●	●	●

5.3.2 Status

Status	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
Operating status	●	●	●
Operating mode, from	●	●	●
Control mode	●	●	●
Pump performance	●	●	●
Actual controlled value	●	●	●
Resulting setpoint	●	●	●
Speed	●	●	●
Acc. flow and specific energy	●	●	●
Power and energy consumption	●	●	●
Measured values	●	●	●
Analog input 1	●	●	●
Analog input 2	●	●	●
Analog input 3	●	●[1]	●[1]
Pt100/1000 input 1	●	●[1]	●[1]
Pt100/1000 input 2	●	●[1]	●[1]
Analog output	●	●[1]	●[1]
Warning and alarm	●	●	●
Actual warning or alarm	●	●	●
Warning log	●	●	●
Alarm log	●	●	●
Operating log	●	●	●
Operating hours	●	●	●
Fitted modules	●	●	●
Date and time	●	●	●
Product identification	●	●	●
Motor bearing monitoring	●	●	●
Multi-pump system			●
System operating status			●
System performance			●
System input power and energy			●
Pump 1, multi-pump system			●
Pump 2, multi-pump system			●
Pump 3, multi-pump system			●
Pump 4, multi-pump system			●

[1] Only available if an advanced functional module (FM300) is fitted.

5.3.3 Settings

Settings	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Setpoint	●	●	●	*7.1 Setpoint*	12
Operating mode	●	●	●	*7.2 Operating mode*	12
Set manual speed	●	●	●	*7.3 Set manual speed*	12
Control mode	●	●	●	*7.4 Control mode*	12
Analog inputs	●	●	●	*7.5 Analog inputs*	16
Analog input 1, setup	●	●	●		
Analog input 2, setup	●	●	●		
Analog input 3, setup	●	●[1]	●[1]		
Pt100/1000 inputs	●	●[1]	●[1]	*7.6 Pt100/1000 inputs*	17
Pt100/1000 input 1, setup	●	●[1]	●[1]		
Pt100/1000 input 2, setup	●	●[1]	●[1]		
Digital inputs	●	●	●	*7.7 Digital inputs*	17
Digital input 1, setup	●	●	●		
Digital input 2, setup	●	●[1]	●[1]		
Digital inputs/outputs	●	●	●	*7.8 Digital inputs/outputs*	18
Digital input/output 3, setup	●	●	●		
Digital input/output 4, setup	●	●[1]	●[1]		
Relay outputs	●	●	●	*7.9 Signal relays 1 and 2 (Relay outputs)*	18
Relay output 1	●	●	●		
Relay output 2	●	●	●		
Analog output	●	●[1]	●[1]	*7.10 Analog output*	19
Output signal	●	●[1]	●[1]		
Function of analog output	●	●[1]	●[1]		
Controller settings	●	●	●	*7.11 Controller (Controller settings)*	20
Operating range	●	●	●	*7.12 Operating range*	21
Setpoint influence	●	●	●	*7.13 External setpoint function*	21
Ext. setpoint infl.	●	●	●	*7.13 External setpoint function*	21
Predefined setpoints	●	●[1]	●[1]	*7.14 Predefined setpoints*	23
Monitoring functions	●	●	●		
Motor bearing monitoring	●	●	●	*7.22 Motor bearing monitoring*	27
Motor bearing maintenance	●	●	●	*Bearings replaced (Motor bearing maintenance)*	28
Limit-exceeded function	●	●	●	*7.15 Limit-exceeded function*	24
LiqTec function	●	●	●	*7.16 LiqTec (LiqTec function)*	24
Special functions	●	●	●		
Low-flow stop function	●	●	●	*7.17 Stop function (Low-flow stop function)*	25
Pipe filling function	●	●	●	*7.18 Pipe filling function*	26
Pulse flowmeter setup	●	●	●	*7.19 Pulse flowmeter (Pulse flowmeter setup)*	27
Ramps	●	●	●	*7.20 Ramps*	27
Standstill heating	●	●	●	*7.21 Standstill heating*	27
Communication	●	●	●		
Pump number	●	●	●	*7.24 Number (Pump number)*	28
Enable/disable radio comm.	●	●	●	*7.25 Radio communication (Enable/disable radio comm.)*	28

[1] Only available if an advanced functional module (FM300) is fitted.

Settings	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
General settings	●	●	●		
Language	●	●	●	*7.26 Language*	28
Set date and time	●	●	●	*7.27 Date and time (Set date and time)*	28
Units	●	●	●	*7.28 Unit configuration (Units)*	28
Enable/disable settings	●	●	●	*7.29 Buttons on product (Enable/disable settings)*	29
Delete history	●	●	●	*7.30 Delete history*	29
Define Home display	●	●	●	*7.31 Define Home display*	29
Display settings	●	●	●	*7.32 Display settings*	29
Store actual settings	●	●	●	*7.33 Store settings (Store actual settings)*	29
Recall stored settings	●	●	●	*7.34 Recall settings (Recall stored settings)*	29
Run start-up guide	●	●	●	*7.37 Run start-up guide*	30

[1] Only available if an advanced functional module (FM300) is fitted.

5.3.4 Assist

| Assist	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Assisted pump setup	●	●	●	*7.41 Assisted pump setup*	30
Setup, analog input	●	●	●	*7.42 Setup, analog input*	31
Setting of date and time	●	●	●	*7.43 Setting of date and time*	31
Setup of multi-pump system	●	●	●	*7.44 Multi-pump setup (Setup of multi-pump system)*	31
Description of control mode	●	●	●	*7.45 Description of control mode*	33
Assisted fault advice	●	●	●	*7.46 Assisted fault advice*	33

6. Grundfos GO

The pump is designed for wireless radio or infrared communication with Grundfos GO.

Grundfos GO enables setting of functions and gives access to status overviews, technical product information and actual operating parameters.

Grundfos GO offers the following mobile interfaces (MI). See fig. 8.
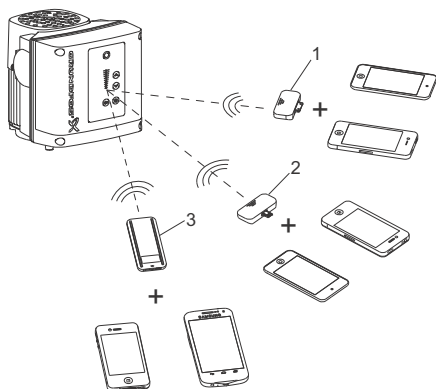
TM06 0744 0914

Fig. 8   Grundfos GO communicating with the pump via radio or infrared connection (IR)

Pos.	Description
1	Grundfos MI 202: Add-on module enabling radio or infrared communication. You can use MI 202 in conjunction with an Apple iPhone or iPod with 30-pin connector and iOS 5.0 or later, e.g. fourth generation iPhone or iPod.
2	Grundfos MI 204: Add-on module enabling radio or infrared communication. You can use MI 204 in conjunction with an Apple iPhone or iPod with Lightning connector, e.g. fifth generation iPhone or iPod. MI 204 is also available together with an Apple iPod touch and a cover.
3	Grundfos MI 301: Separate module enabling radio or infrared communication. You can use the module in conjunction with an Android or iOS-based smart device with Bluetooth connection.

6.1 Communication

When Grundfos GO initiates communication with the pump, the indicator light in the middle of Grundfos Eye will flash green. See section *10. Grundfos Eye*.

Furthermore, on pumps fitted with an advanced control panel a text will appear in the display saying that a wireless device is trying to establish connection. Press $\mathbb{OK}$ on the pump in order to establish connection with Grundfos GO or press 🏠 to reject connection.

Establish communication using one of these communication types:

• radio communication
• infrared communication.

6.1.1 Radio communication

Radio communication can take place at distances up to 30 metres. The first time Grundfos GO communicates with the pump, you must enable communication by pressing ⦾ or $\mathbb{OK}$ on the pump control panel. Later when communication takes place, the pump will be recognized by Grundfos GO and you can select the pump from the "List" menu.

6.1.2 Infrared communication

When communicating via infrared light, Grundfos GO must be pointed at the pump control panel.

6.2 Menu overview for Grundfos GO

Dashboard	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
	●	●	●

Status	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system
System mode			●[2]
Resulting setpoint	●	●	
Resulting system setpoint			●[2]
Actual controlled value	●	●	●[2]
Motor speed	●	●	
Power consumption	●	●	
Power cons., sys.			●[2]
Energy consumption	●	●	
Energy cons., sys.			●[2]
Acc. flow, specific energy	●	●	●[2]
Operating hours	●	●	
Operating hours, system			●[2]
Pt100/1000 input 1	●	●[1]	
Pt100/1000 input 2	●	●[1]	
Analog output	●	●[1]	
Analog input 1	●	●	
Analog input 2	●	●	
Analog input 3	●	●[1]	
Digital input 1	●	●	
Digital input 2	●	●[1]	
Digital in/output 3	●	●	
Digital in/output 4	●	●[1]	
Fitted modules	●	●	
Pump 1			●[2]
Pump 2			●[2]
Pump 3			●[2]
Pump 4			●[2]

[1] Only available if an advanced functional module (FM300) is fitted.

[2] Only available if Grundfos GO is connected to a multipump system.

Settings	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Setpoint	●	●	●	*7.1 Setpoint*	12
Operating mode	●	●	●	*7.2 Operating mode*	12
Control mode	●	●	●	*7.4 Control mode*	12
Pipe-filling function	●	●	●	*7.18 Pipe filling function*	26
Buttons on product	●	●		*7.29 Buttons on product (Enable/disable settings)*	29
LiqTec	●	●[1]		*7.16 LiqTec (LiqTec function)*	24
Stop function	●	●	●	*7.17 Stop function (Low-flow stop function)*	25
Controller	●	●	●	*7.11 Controller (Controller settings)*	20
Operating range	●	●	●	*7.12 Operating range*	21
Ramps	●	●		*7.20 Ramps*	27
Number	●	●		*7.24 Number (Pump number)*	28
Radio communication	●	●		*7.25 Radio communication (Enable/disable radio comm.)*	28

[1] Only available if an advanced functional module (FM300) is fitted.

Settings	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Analog input 1	●	●		*7.5 Analog inputs*	16
Analog input 2	●	●			
Analog input 3	●	●[1]			
Pt100/1000 input 1	●	●[1]		*7.6 Pt100/1000 inputs*	17
Pt100/1000 input 2	●	●[1]			
Digital input 1	●	●		*7.7 Digital inputs*	17
Digital input 2	●	●[1]			
Digital in/output 3	●	●		*7.8 Digital inputs/outputs*	18
Digital in/output 4	●	●[1]			
Pulse flowmeter	●	●		*7.19 Pulse flowmeter (Pulse flowmeter setup)*	27
Predefined setpoint	●	●	●	*7.14 Predefined setpoints*	23
Analog output	●	●[1]		*7.10 Analog output*	19
External setpoint funct.	●	●		*7.13 External setpoint function*	21
Signal relay 1	●	●		*7.9 Signal relays 1 and 2 (Relay outputs)*	18
Signal relay 2	●	●			
Limit 1 exceeded	●	●	●	*7.15 Limit-exceeded function*	24
Limit 2 exceeded	●	●	●		
Alternating operation, time			●[2]	*7.44 Multi-pump setup (Setup of multi-pump system)*	31
Time for pump changeover			●[1] + [2]		
Standstill heating	●	●		*7.21 Standstill heating*	27
Motor bearing monitoring	●	●		*7.22 Motor bearing monitoring*	27
Service	●	●		*7.23 Service*	28
Date and time	●	●[1]		*7.27 Date and time (Set date and time)*	28
Store settings	●	●		*7.33 Store settings (Store actual settings)*	29
Recall settings	●	●		*7.34 Recall settings (Recall stored settings)*	29
Undo	●	●	●	*7.34.1 Undo*	29
Pump name	●	●	●	*7.35 Pump name*	29
Connection code	●	●	●	*7.36 Connection code*	30
Unit configuration	●	●		*7.28 Unit configuration (Units)*	28

[1] Only available if an advanced functional module (FM300) is fitted.

[2] Only available if the Grundfos GO is connected to a multipump system.

Alarms and warnings	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Alarm log	●	●	●	*7.38 Alarm log*	30
Warning log	●	●	●	*7.39 Warning log*	30
"Reset alarm" button	●	●	●		

Assist	CRE, CRIE, CRNE, SPKE, MTRE	CME	Multipump system	Section	Page
Assisted pump setup	●	●		*7.41 Assisted pump setup*	30
Assisted fault advice	●	●	●	*7.46 Assisted fault advice*	33
Multi-pump setup	●	●	●	*7.44 Multi-pump setup (Setup of multi-pump system)*	31

7. Description of functions

7.1 Setpoint

Pump variant	Setpoint
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

You can set the setpoint for all control modes when you have selected the desired control mode. See section *7.4 Control mode*.

Factory setting

See section *16. Factory settings*.

7.2 Operating mode

Pump variant	Operating mode
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Possible operating modes:

- Normal
  The pump runs according to the selected control mode.
- Stop
  The pump stops.
- Min.
  You can use the minimum curve mode in periods in which a minimum flow is required. When operating according to the minimum curve, the pump is operating like an uncontrolled pump.
- Max.
  You can use the maximum curve mode in periods in which a maximum flow is required. When operating according to the maximum curve, the pump is operating like an uncontrolled pump.
- Manual
  The pump is operating at a manually set speed. In "Manual" the setpoint via bus is over-ruled. See section *7.3 Set manual speed*.

All operating modes are illustrated in fig. 9.

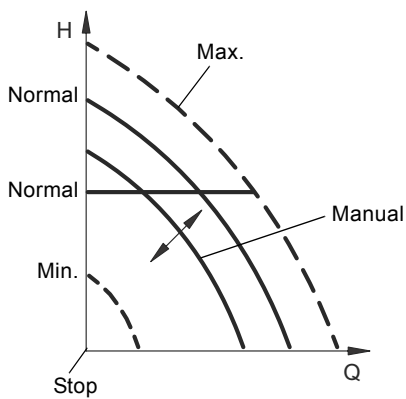**Fig. 9** Operating modes

Factory setting

See section *16. Factory settings*.

7.3 Set manual speed

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

You can set the pump speed in % of the maximum speed. When you have set the operating mode to "Manual", the pump will run at the set speed.

Factory setting

See section *16. Factory settings*.

7.4 Control mode

Pump variant	Control mode
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Possible control modes:

- Constant pressure (Const. pressure)
- Constant temperature (Const. temp.)
- Constant differential pressure (Con. diff. press.)
- Constant differential temperature (Con. diff. temp.)
- Constant flow rate (Const. flow rate)
- Constant level (Const. level)
- Constant other value (Const. other val.)
- Constant curve (Const. curve.)

Factory setting

See section *16. Factory settings*.

7.4.1 Constant pressure

Pump variant	Constant pressure
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

We recommend this control mode if the pump is to deliver a constant pressure, independently of the flow in the system. See fig. 10.
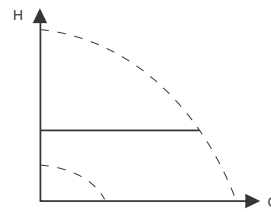

Fig. 10 Constant pressure

This control mode uses the factory mounted pressure sensor, if any, which measures the discharge pressure of the pump.

For pumps without a factory mounted sensor, you must connect a pressure sensor to one of the analog inputs of the pump. You can set up the pressure sensor in the "Assist" menu. See section *7.41 Assisted pump setup*.
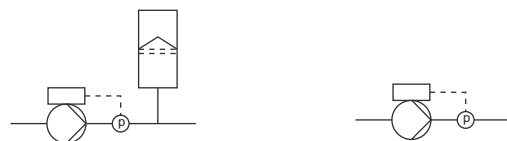
Examples

- One external pressure sensor.

Fig. 11 Constant pressure

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.4.2 Constant temperature

Pump variant	Constant temperature
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This control mode ensures a constant temperature. Constant temperature is a comfort control mode that can be used in domestic hot-water systems to control the flow to maintain a fixed temperature in the system. See fig. 12.
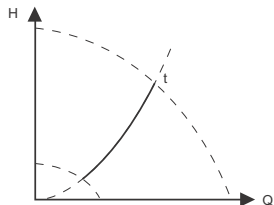

Fig. 12 Constant temperature

This control mode requires a temperature sensor placed at the location where the temperature is to be controlled as shown in the examples below:

Examples

Fig. 13 Constant temperature

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.4.3 Constant differential pressure

Pump variant	Constant differential pressure
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The pump maintains a constant differential pressure, independently of the flow in the system. See fig. 14.
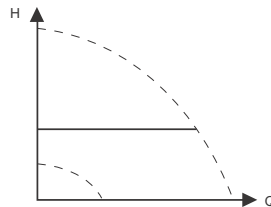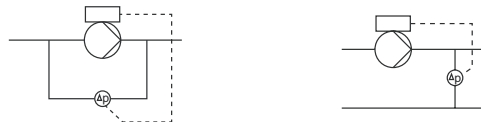

Fig. 14 Constant differential pressure

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

Examples

• One differential-pressure sensor.
  The pump uses the input from the sensor to control the differential pressure.
  You can set up the sensor manually or by using the "Assist" menu. See section *7.41 Assisted pump setup*.

• Two pressure sensors.
  Constant differential-pressure control is achievable with two individual pressure sensors. The pump uses the inputs from the two sensors and calculates the differential pressure. Both sensors must have the same unit and must be set up as feedback sensors. You can set up the sensors manually, sensor by sensor, or by using the "Assist" menu. See section *7.41 Assisted pump setup*.

Fig. 15 Constant differential pressure

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.4.4 Constant differential temperature

Pump variant	Constant differential temperature
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The pump maintains a constant differential temperature in the system and the pump performance is controlled according to this. See fig. 16.
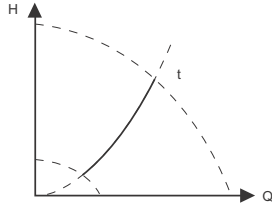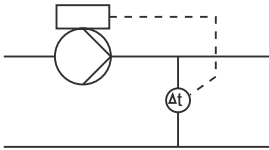

Fig. 16 Constant differential temperature

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

The setup of the sensor can be made in the "Assist" menu under "Assisted pump setup". See section *7.41 Assisted pump setup*.

Examples

• One differential-temperature sensor.
  The pump uses the input from the sensor to control the differential temperature.
  You can set up the sensor manually or by using the "Assist" menu. See section *7.41 Assisted pump setup*.

• Two temperature sensors.
  Constant differential-temperature control is achievable with two individual temperature sensors. The pump uses the input from the two sensors and calculates the differential temperature.
  Both sensors must have the same unit and must be set up as feedback sensors. You can do this manually, sensor by sensor, or by using the "Assist" menu. See section *7.41 Assisted pump setup*.
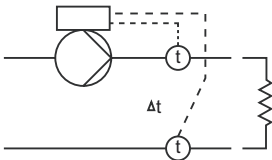

Fig. 17 Constant differential temperature

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.4.5 Constant flow rate

Pump variant	Constant flow rate
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The pump maintains a constant flow in the system, independently of the head. See fig. 18.
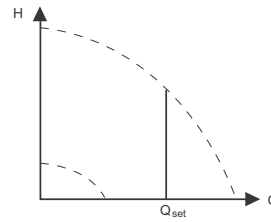

Fig. 18 Constant flow rate

This control mode requires a flow sensor as shown below:
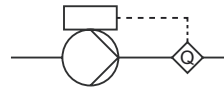
Example

Fig. 19 Constant flow rate

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.4.6 Constant level

Pump variant	Constant level
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The pump maintains a constant level, independently of the flow rate. See fig. 20.
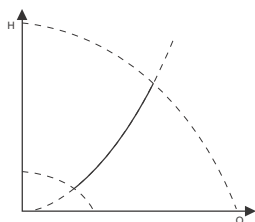

Fig. 20 Constant level

This control mode requires a level sensor.

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

• as an emptying function where the pump draws the liquid from a feed tank.
• as a filling function where the pump pumps the liquid into a storage tank.

See fig. 21.

The type of level control function depends on the setting of the built-in controller. See section *7.11 Controller (Controller settings)*.

Examples

• One level sensor.
  – emptying function (feed tank).
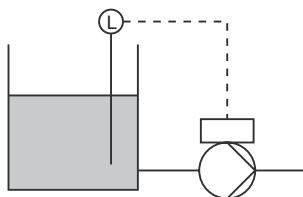
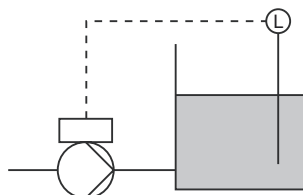

• One level sensor.
  – filling function (storage tank).

Fig. 21 Constant level

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.4.7 Constant other value

Pump variant	Constant other value
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Any other value is kept constant.

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

Factory setting

See section *16. Factory settings*.

7.4.8 Constant curve

Pump variant	Constant curve
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

You can set the pump to operate according to a constant curve, like an uncontrolled pump. See fig. 22.

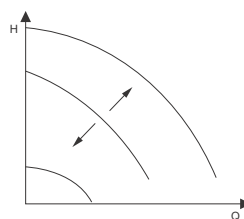The desired speed can be set in % of maximum speed in the range from 13 to 100 %.

Fig. 22 Constant curve

Controller settings

For recommended controller settings, see section *7.11 Controller (Controller settings)*.

Factory setting

See section *16. Factory settings*.

7.5 Analog inputs

Available inputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Analog input 1, setup (4)	●	●
Analog input 2, setup (7)	●	●
Analog input 3, setup (14)	-	●

* See section *13. Identification of functional module*.

In order to setup the analog input for a feedback sensor, we recommend that you do this via the "Assisted pump setup" menu. See section *7.41 Assisted pump setup*.

If you wish to set up an analog input for other purposes, you can do this manually.

You can setup the analog inputs via the "Setup, analog input" menu. See section *7.42 Setup, analog input*.

If you perform the manual setting via Grundfos GO, you need to enter the menu for the analog input under the "Settings" menu.

Function

The analog inputs can be set to these functions:

• Not active
• Feedback sensor
  Sensor used for the selected control mode.
• Ext. setpoint infl.
  See section *7.13 External setpoint function*
• Other function.

Measured parameter

Select one of the parameters listed below, i.e. the parameter to be measured in the system by the sensor connected to the actual analog input. See fig. 23.
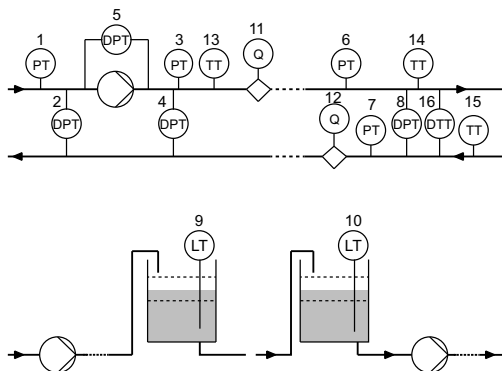

Fig. 23 Overview of sensor locations

TM06 2328 3914

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

Unit

Available measuring units:

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

Electrical signal

Select signal type:

• 0.5 - 3.5 V
• 0-5 V
• 0-10 V
• 0-20 mA
• 4-20 mA.

Sensor range, minimum value

Set the minimum value of the connected sensor.

Sensor range, maximum value

Set the maximum value of the connected sensor.

Factory setting

See section *16. Factory settings*.

7.6 Pt100/1000 inputs

Available inputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Pt100/1000 input 1, setup (17 and 18)	-	●
Pt100/1000 input 2, setup (18 and 19)	-	●

* See section *13. Identification of functional module*.

In order to setup the Pt100/1000 input for a feedback sensor, we recommend that you do this via the "Assisted pump setup" menu. See section *7.41 Assisted pump setup*.

If you wish to setup a Pt100/1000 input for other purposes, you can do this manually.

You can setup the analog inputs via the "Setup, analog input" menu. See section *7.42 Setup, analog input*.

If you perform the manual setting via Grundfos GO, you need to enter the menu for the Pt100/1000 input under the "Settings" menu.

Function

The Pt100/1000 inputs can be set to these functions:

• Not active
• Feedback sensor
  Sensor used for the selected control mode.
• Ext. setpoint infl.
  See section *7.13 External setpoint function*
• Other function.

Measured parameter

Select one of the parameters listed below, i.e. the parameter to be measured in the system by the PT100/1000 sensor connected to the actual PT100/1000 input. See fig. 24.
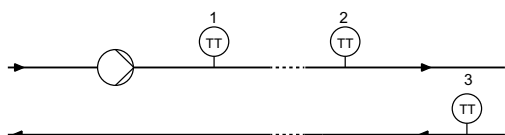

Fig. 24 Overview of PT100/1000 sensor locations

Parameter	Pos.
Liquid temp.	1
Temperature 1	2
Temperature 2	3
Ambient temp.	Not shown

Measuring range

-50 to 204 °C.

Factory setting

See section *16. Factory settings*.

7.7 Digital inputs

Pump variant	Digital inputs
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Available inputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Digital input 1, setup (2 and 6)	●	●
Digital input 2, setup (1 and 9)	-	●

* See section *13. Identification of functional module*.

To set up a digital input, make the settings below.

Function

Select one of these functions:

• Not active
  When set to "Not active", the input has no function.
• External stop
  When the input is deactivated (open circuit), the pump will stop.
• Min. (minimum speed)
  When the input is activated, the pump will run at the set minimum speed.
• Max. (maximum speed)
  When the input is activated, the pump will run at the set maximum speed.
• External fault
  When the input is activated, a timer will be started. If the input is activated for more than 5 seconds, the pump will be stopped and a fault will be indicated. This function depends on input from external equipment.
• Alarm resetting
  When the input is activated, a possible fault indication will be reset.
• Dry running
  When you have selected this function, lack of inlet pressure or water shortage can be detected.
  When lack of inlet pressure or water shortage (dry running) is detected, the pump will be stopped. The pump cannot restart as long as the input is activated.
  This requires the use of an accessory, such as these:
  – a pressure switch installed on the suction side of the pump
  – a float switch installed on the suction side of the pump.
• Accumulated flow
  When you have selected this function, the accumulated flow can be registered. This requires the use of a flowmeter which can give a feedback signal as a pulse per defined volume of water.
  See section *7.19 Pulse flowmeter (Pulse flowmeter setup)*.
• Predefined setpoint digit 1 (applies only to digital input 2)
  When digital inputs are set to predefined setpoint, the pump will operate according to a setpoint based on the combination of the activated digital inputs.
  See section *7.14 Predefined setpoints*.

The priority of the selected functions in relation to each other appears from section *9. Priority of settings*.

A stop command will always have the highest priority.

Factory setting

See section *16. Factory settings*.

7.8 Digital inputs/outputs

Pump variant	Digital inputs/outputs
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Available inputs/outputs depending on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Digital input/output 3, setup (6 and 10)	●	●
Digital input/output 4, setup (11 and 18)	-	●

*   See section *13. Identification of functional module*.

You can select if the interface must be used as input or output. The output is an open collector and you can connect it to e.g. an external relay or controller such as a PLC etc.
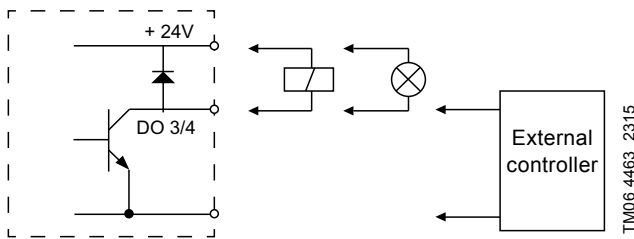
Fig. 25 Principle example of configurable digital inputs/outputs

To set up a digital input/output, make the settings below.

Mode

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

• Digital input

• Digital output.

Function

You can set the digital input/output 3 and 4 to these functions:

Possible functions, digital input/output 3

Function if input (See details in section *7.7 Digital inputs*)	Function if output (See details in section *7.9 Signal relays 1 and 2 (Relay outputs)*)
• Not active • External stop • Min. • Max. • External fault • Alarm resetting • Dry running • Accumulated flow • Predefined setpoint digit 2	• Not active • Ready • Alarm • Operation • Pump running • Warning • Limit 1 exceeded • Limit 2 exceeded

Possible functions, digital input/output 4

Function if input (See details in section *7.7 Digital inputs*)	Function if output (See details in section *7.9 Signal relays 1 and 2 (Relay outputs)*)
• Not active • External stop • Min. • Max. • External fault • Alarm resetting • Dry running • Accumulated flow • Predefined setpoint digit 3	• Not active • Ready • Alarm • Operation • Pump running • Warning • Limit 1 exceeded • Limit 2 exceeded

Factory setting

See section *16. Factory settings*.

7.9 Signal relays 1 and 2 (Relay outputs)

Pump variant	Signal relays 1 and 2 (Relay outputs)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The pump incorporates two signal relays for potential-free signalling. See section *11. Signal relays* for further information.

Function

You can configure the signal relays to be activated by one of the following incidents:

• Not active

• Ready
  The pump can be running or is ready to run and no alarms are present.

• Alarm
  There is an active alarm and the pump is stopped.

• Operating (Operation)
  "Operating" equals "Running" but the pump is still in operation when the pump is stopped due to low flow. See section *Low-flow detection* on page 25.

• Running (Pump running)
  The pump is running.

• Warning
  There is an active warning.

• Limit 1 exceeded
  When the "Limit 1 exceeded" function is activated, the signal relay is activated. See section *7.15 Limit-exceeded function*.

• Limit 2 exceeded
  When the "Limit 2 exceeded" function is activated, the signal relay is activated. See section *7.15 Limit-exceeded function*.

• External fan control (Control of external fan).
  When you select "External fan control", the relay is activated if the internal temperature of the motor electronics reach a preset limit value.

• Not active.

Factory setting

See section *16. Factory settings*.

7.10 Analog output

Pump variant	Analog output
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Whether the analog output is available or not, depends on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Analog output	-	●

*   See section *13. Identification of functional module*.

The analog output enables the reading of certain operating data to external control systems.

To set up the analog output, make the settings below.

Output signal

• 0-10 V

• 0-20 mA

• 4-20 mA.

Function of analog output

• Actual speed

Signal range [V, mA]	Actual speed [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

Reading will be a percentage of nominal speed.

• Actual value

Signal range [V, mA]	Actual value	
	$Sensor_{min}$	$Sensor_{max}$
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

Reading will be a percentage of the range between $sensor_{min}$ and $sensor_{max}$.

• Resulting setpoint

Signal range [V, mA]	Resulting setpoint [%]	
	0	100
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

Reading will be a percentage of the external setpoint range.

• Motor load

Signal range [V, mA]	Motor load [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

Reading is a percentage of the range between 0 and 200 % of the maximum permissible load at the actual speed.

• Motor current

Signal range [V, mA]	Motor current [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

Reading is a percentage of the range between 0 % and 200 % of the rated current (I_N).

• Limit 1 exceeded and Limit 2 exceeded

Signal range [V, mA]	Limit-exceeded function	
	Output not active	Output active
0-10 V	0 V	10 V
0-20 mA	0 mA	20 mA
4-20 mA	4 mA	20 mA

Limit-exceeded function is typically used for monitoring of secondary parameters in the system. If the limit is exceeded, an output, warning or alarm is activated.

• Flow rate

Signal range [V, mA]	Flow rate [%]		
	0	100	200
0-10 V	0 V	5 V	10 V
0-20 mA	0 mA	10 mA	20 mA
4-20 mA	4 mA	12 mA	20 mA

Reading is a percentage of the range between 0 and 200 % of the nominal flow (Q_{nom}).

Factory setting

See section *16. Factory settings*.

7.11 Controller (Controller settings)

Pump variant	Controller (Controller settings)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

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

- Set the gain (K_p) within the range from 0.1 to 20.
- Set the integral-action time (T_i) within the range from 0.1 to 3600 s.
  If you select 3600 s is, the controller will function as a P controller.

Furthermore, you can set the controller to inverse control.

This means that if you increase the setpoint, the speed will be reduced. In the case of inverse control, you must set the gain (K_p) within the range from -0.1 to -20.

Guidelines for setting of PI controller

The tables below show the recommended controller settings:

Constant differential pressure	K_p	T_i
	0.5	0.5
	0.5	L1 < 5 m: 0.5 L1 > 5 m: 3 L1 > 10 m: 5

L1 = Distance [m] between pump and sensor.

Constant temperature	K_p		T_i
	Heating system[1]	Cooling system[2]	
	0.5	-0.5	10 + 5L2
	0.5	-0.5	30 + 5L2

[1] In heating systems, an increase in pump performance will result in a rise in temperature at the sensor.

[2] In cooling systems, an increase in pump performance will result in a drop in temperature at the sensor.

L2 = Distance [m] between heat exchanger and sensor.

Constant differential temperature	K_p	T_i
	-0.5	10 + 5L2

L2 = Distance [m] between heat exchanger and sensor.

Constant flow rate	K_p	T_i
	0.5	0.5

Constant pressure	K_p	T_i
	0.5	0.5
	0.5	0.5

Constant level	K_p	T_i
	-2.5	100
	2.5	100

General rules of thumb

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

If the controller is hunting or unstable, dampen the system by reducing K_p or increasing T_i.

Factory setting

See section *16. Factory settings*.

7.12 Operating range

Pump variant	Operating range
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Set the operating range as follows:

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

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

The range between the user-set minimum and maximum speeds is the operating range. See fig. 26.
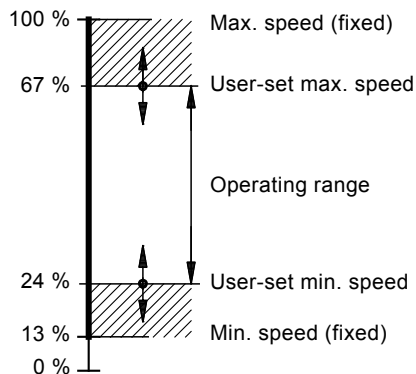

Fig. 26 Example of minimum and maximum settings

Factory setting

See section *16. Factory settings*.

7.13 External setpoint function

Pump variant	External setpoint function
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

You can influence the setpoint by an external signal, either via one of the analog inputs or, if an advanced functional module (FM300) is fitted, via one of the Pt100/1000 inputs.

Note	***Before you can enable the External setpoint function, you must set one of the analog inputs or Pt100/1000 inputs to External setpoint function.*** *See sections 7.5 Analog inputs and 7.6 Pt100/1000 inputs.*

Example with constant pressure with linear influence

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

At a sensor min of 0 bar, a setpoint of 2 bar and an external setpoint of 60 %, the actual setpoint is 0.60 x (2 - 0) + 0 = 1.2 bar. See fig. 27.
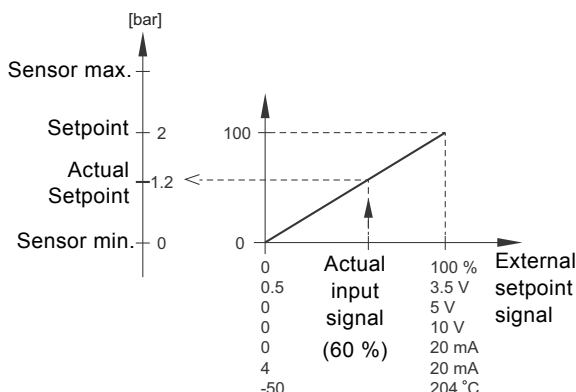
Fig. 27 Example of setpoint influence with sensor feed back

Example with constant curve with linear influence

Actual setpoint = actual input signal x (setpoint - user set min. speed) + user set min. speed.

At a "user set min. speed." of 25 %, and a setpoint of 85 % and an external setpoint of 60 %, the actual setpoint is 0.60 x (85 - 25) + 25 = 61 %. See fig. 28.
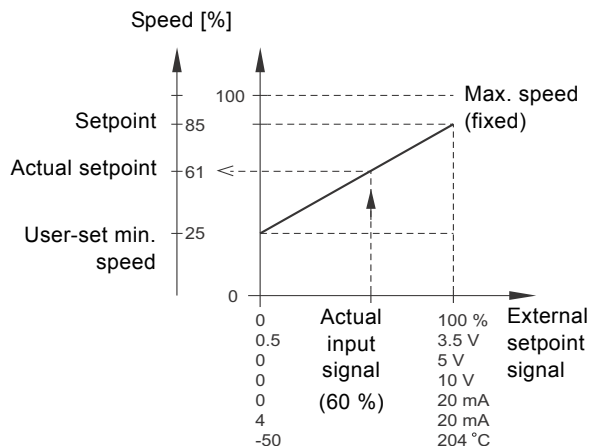
Fig. 28 Example of setpoint influence with constant curve

7.13.1 Setpoint influence functions

You can select these functions:

• Not active
When set to "Not active", the setpoint will not be influenced from any external function.

• Linear function
The setpoint is influenced linearly from 0 to 100 %. See fig. 29.
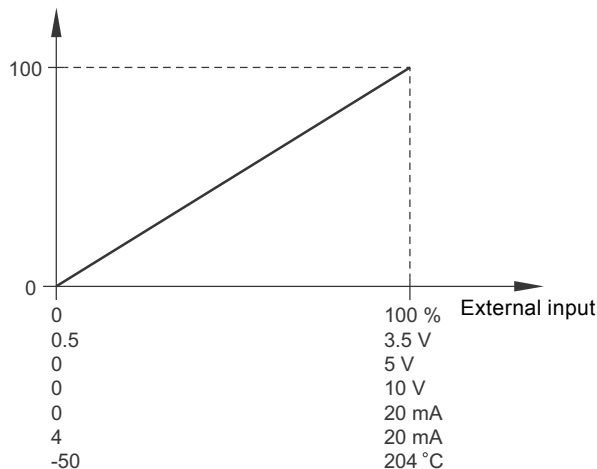
Fig. 29 Linear function

• Linear with Stop and Inverse with Min.
  – Inverse with Stop
    In the input signal range from 20 to 100 %, the setpoint is influenced linearly.
    If the input signal is below 10 %, the pump will change to operating mode "Stop".
    If the input signal is increased above 15 %, the operating mode will be changed back to "Normal".
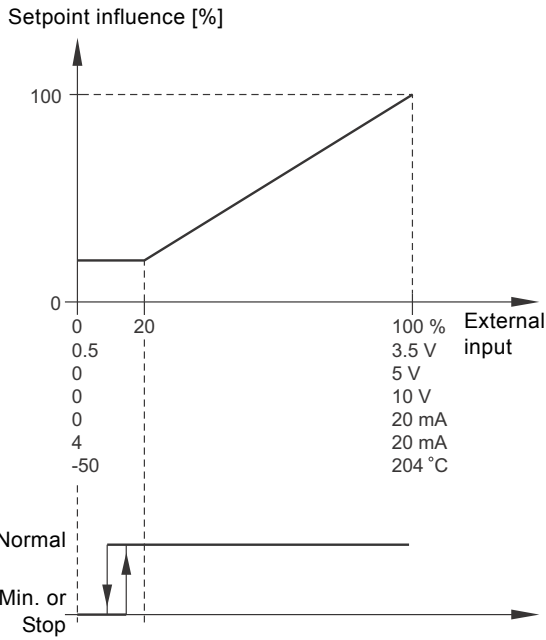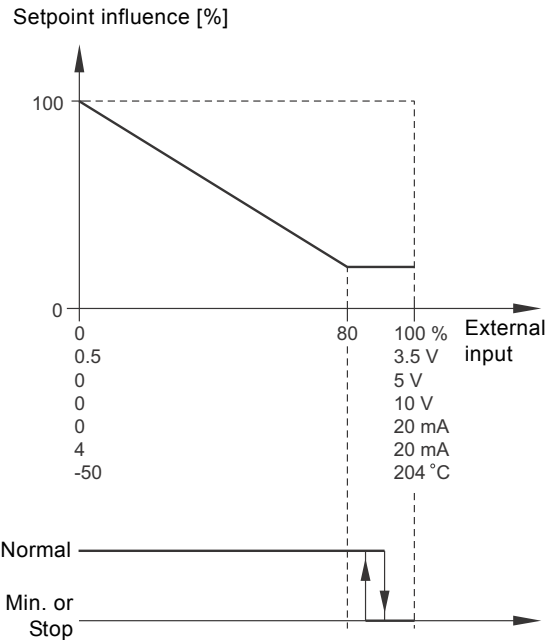   See fig. 30.
  – Inverse with Min.
    In the input signal range from 20 to 100 %, the setpoint is influenced linearly.
    If the input signal is below 10 %, the pump will change to operating mode "Min.".
    If the input signal is increased above 15 %, the operating mode will be changed back to "Normal".
    See fig. 30.

Fig. 30 Linear with Stop and Inverse with Min.

• Inverse function
  The setpoint is influenced inversely from 0 to 100 %.
  See fig. 31.
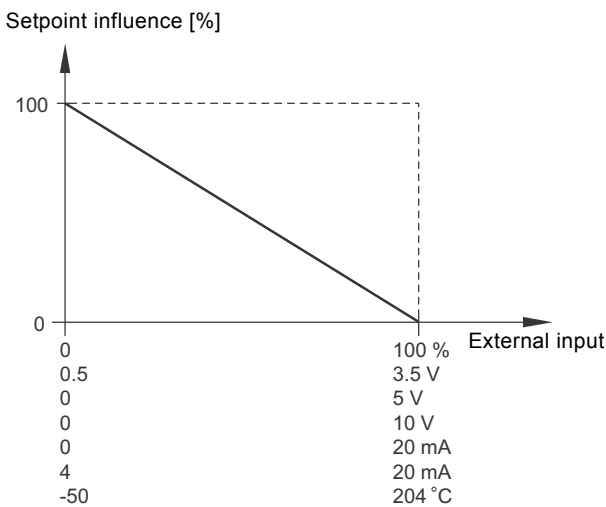
Fig. 31 Inverse function

• Inverse with Stop and Inverse with Min.
  – Inverse with Stop
    In the input signal range from 0 to 80 %, the setpoint is influenced inversely.
    If the input signal is above 90 %, the pump will change to operating mode "Stop".
    If the input signal is reduced below 85 %, the operating mode will be changed back to "Normal".
    See fig. 32.
  – Inverse with Min.
    In the input signal range from 0 to 80 %, the setpoint is influenced inversely.
    If the input signal is above 90 %, the pump will change to operating mode "Min.".
    If the input signal is reduced below 85 %, the operating mode will be changed back to "Normal".
    See fig. 32.

Fig. 32 Inverse with Stop and Inverse with Min.

• Influence table
  The setpoint is influenced by a curve made out of two to eight points. There will be a straight line between the points and a horizontal line before the first point and after the last point.
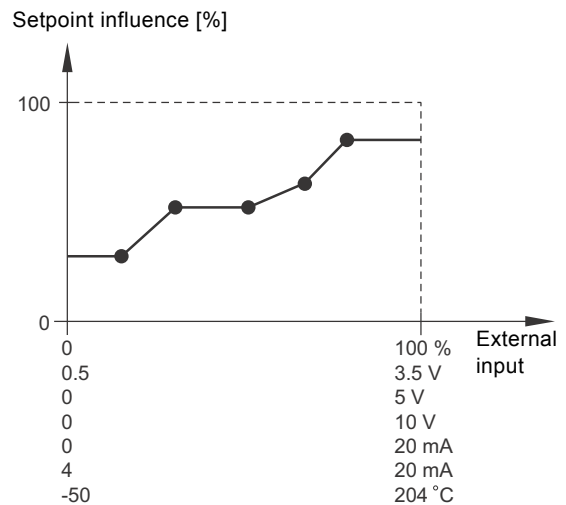
Fig. 33 Influence table (example with five points)

22

- Influence table with Stop at Min.
  The setpoint is influenced by a curve made out of two to eight points. There will be a straight line between the points and a horizontal line before the first point and after the last point.
  If the input signal is below 10 %, the pump will change to operating mode "Stop".
  If the input signal is increased above 15 %, the operating mode will be changed back to "Normal".
  See fig. 34.
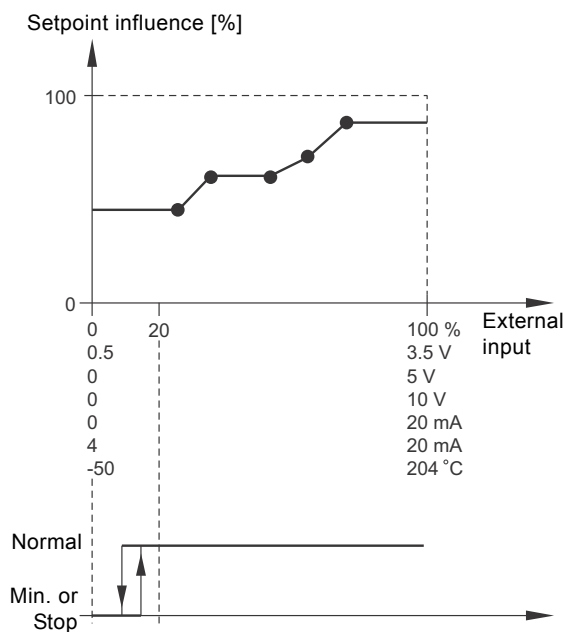
Fig. 34 Influence table with Stop at Min. (example with five points)

- Influence table with Stop at Max.
  The setpoint is influenced by a curve made out of two to eight points. There will be a straight line between the points and a horizontal line before the first point and after the last point.
  If the input signal is above 90 %, the pump will change to operating mode "Min.".
  If the input signal is reduced below 85 %, the operating mode will be changed back to "Normal".
  See fig. 35.
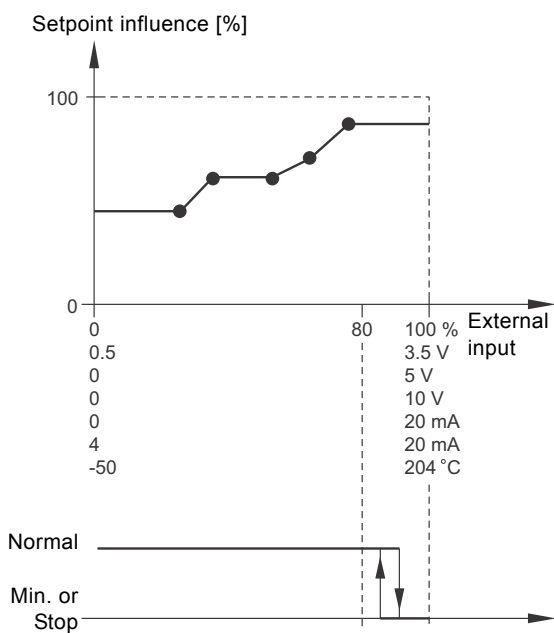
Fig. 35 Influence table with Stop at Max. (example with five points)

Factory setting

See section 16. Factory settings.

7.14 Predefined setpoints

Pump variant	Predefined setpoints
CME	-
CRE, CRIE, CRNE, SPKE, MTRE	●

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

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

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

0 = Open contact
1 = Closed contact

Example

Figure 36 shows how you can use the digital inputs to set up seven predefined setpoints. Digital input 2 is open and digital inputs 3 and 4 are closed. If you compare with the table above, you can see that "Predefined setpoint 6" is activated.
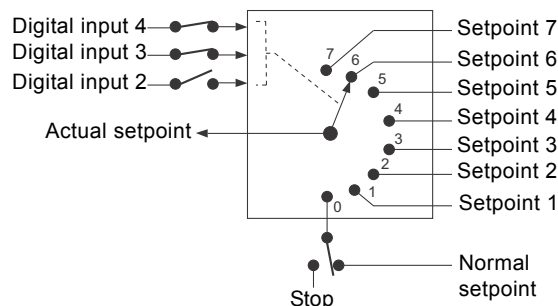
Fig. 36 Principle sketch showing how predefined setpoints function

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

Factory setting

See section 16. Factory settings.

7.15 Limit-exceeded function

Pump variant	Limit-exceeded function
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

The function requires setting of the following:

Measured

Here you set the measured parameter which is to be monitored by the "Limit-exceeded function".

Limit

Here you set the limit which activates the "Limit-exceeded function".

Hysteresis band

Here you set the hysteresis band.

Limit exceeded when

Here you can set if you want the "Limit-exceeded function" to activate when the selected parameter exceeds or drops below the set limit.

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

Action

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

- No action
  The pump remains in its current state. Use this setting if you only want to have a relay output when the limit is reached. See section *7.9 Signal relays 1 and 2 (Relay outputs)*.
- Warning/alarm
  A warning is raised.
- Stop
  The pump stops.
- Min.
  The pump reduces speed to minimum.
- Max.
  The pump increases speed to maximum.

Detection delay

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

Resetting delay

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

Example:

The "Limit-exceeded function" is to monitor the discharge pressure from a CRE pump. If the pressure is below 5 bar for more than 5 seconds, a warning must be given. If the discharge pressure is above 7 bar for more than 8 seconds, the limit exceeded warning must be reset.
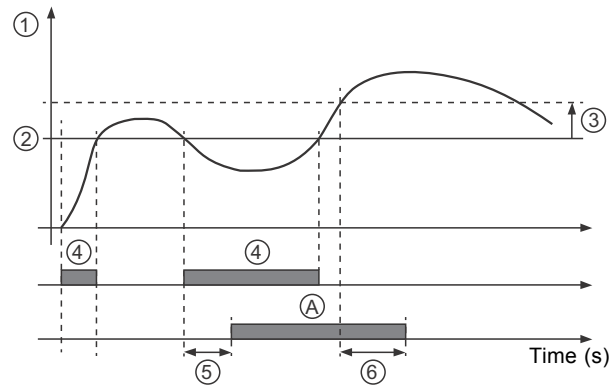
Fig. 37 Limit exceeded (example)

Pos.	Setting parameter	Setting
1	"Measured"	Discharge pressure
2	"Limit"	5 bar
3	"Hysteresis band"	2 bar
4	"Limit exceeded when"	Below limit
5	"Detection delay"	5 seconds
6	"Resetting delay"	8 seconds
A	"Limit exceeded function active"	-
-	"Action"	Warning

Factory setting

See section *16. Factory settings*.

7.16 LiqTec (LiqTec function)

Pump variant	LiqTec (LiqTec function)
CME	-
CRE, CRIE, CRNE, SPKE, MTRE	●

You can enable the function of the LiqTec sensors in this display. A LiqTec sensor protects the pump against dry running.

The function requires that a LiqTec sensor has been fitted and connected to the pump.

When you have enabled the LiqTec function, it will stop the pump if dry running occurs. Restart the pump manually if it has been stopped due to dry running.

Factory setting

See section *16. Factory settings*.

7.17 Stop function (Low-flow stop function)

Pump variant	Stop function (Low-flow stop function)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

You can set the low-flow stop function to these values:

• Not active
• Energy-optimal mode
• High-comfort mode
• "User-defined mode" (Customised operating mode).

When the stop function is active, the flow is monitored. If the flow becomes lower than the set minimum flow (Q_{min}), the pump will change from continuous operation at constant pressure to start/stop operation and finally be stopped if the flow reaches zero.

The advantages of enabling the low-flow stop function are the following:

• no unnecessary heating of the pumped liquid
• reduced wear of the shaft seals
• reduced noise from operation.

The disadvantages of enabling the low-flow stop function may be the following:

• The delivered pressure is not completely constant as it will fluctuate between the start and stop pressures.
• The frequent starts/stops of the pump may in some applications cause acoustic noise.

The impact of the above disadvantages very much depends on the setting selected for the stop function.

The "High-comfort mode" setting will minimise pressure fluctuations and acoustic noise.

If you select "Energy-optimal mode", the main priority will be to reduce the energy consumption as much as possible.

Possible settings of the stop function:

• Energy-optimal mode:
  The pump will automatically adjust the parameters for the stop function so that the energy consumption during the start/stop operation period is minimised.
  In this case, the stop function will use factory-set values of minimum flow (Q_{min1}) and other internal parameters. See fig. 38.

• High-comfort mode:
  The pump will automatically adjust the parameters for the stop function so that the disturbances during the start/stop operation period are minimised.
  In this case, the stop function will use factory-set values of minimum flow (Q_{min2}) and other internal parameters. See fig. 38.

• User-defined mode (Customised operating mode):
  The pump will use the parameters set for ΔH and Q_{min3} respectively for the stop function. See fig. 38.
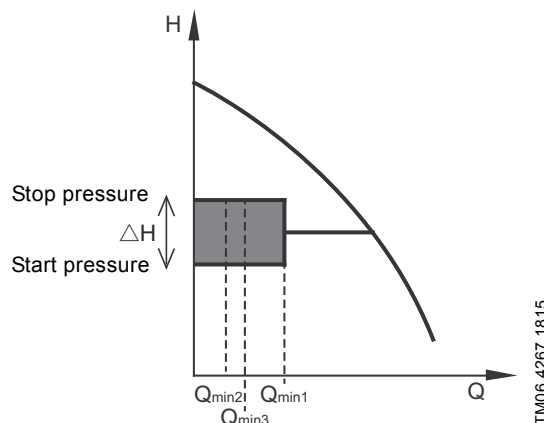
Fig. 38 Difference between start and stop pressures (ΔH) and minimum flow

In start/stop operation, the pressure will vary between the start and stop pressures. See fig. 38.

In "User-defined mode" (Customised operating mode), ΔH has been factory-set to 10 % of the actual setpoint. ΔH can be set within the range from 5 to 30 % of actual setpoint.

The pump will change to start/stop operation if the flow becomes lower than Q_{min}.

Q_{min} is set in % of the nominal flow of the pump (see pump nameplate).

In "User-defined mode" (Customised operating mode), Q_{min} has been factory-set to 10 % of nominal flow.

Factory setting

See section *16. Factory settings*.

Low-flow detection

Low flow can be detected in two ways:

1. A built-in low-flow detection function which is active if none of the digital inputs are set up for flow switch.
2. A flow switch connected to one of the digital inputs.

1. Low-flow detection function:
  The pump will check the flow regularly by reducing the speed for a short time. If there is no or only a small change in pressure, this means that there is low flow. The speed will be increased until the stop pressure (actual setpoint + 0.5 x ΔH) is reached and the pump will stop. When the pressure has fallen to the start pressure (actual setpoint - 0.5 x ΔH), the pump will restart.
  – If the flow is higher than the set minimum flow (Q_{min}), the pump will return to continuous operation at constant pressure.
  – If the flow is still lower than the set minimum flow (Q_{min}), the pump will continue in start/stop operation until the flow is higher than the set minimum flow (Q_{min}). When the flow is higher than the set minimum flow (Q_{min}), the pump will return to continuous operation.

2. Flow switch:
  When the digital input is activated for more than 5 seconds because there is low flow, the speed will be increased until the stop pressure (actual setpoint + 0.5 x ΔH) is reached, and the pump will stop. When the pressure has fallen to start pressure, the pump will restart. If there is still no flow, the pump will quickly reach the stop pressure and stop. If there is flow, the pump will continue operating according to the setpoint.

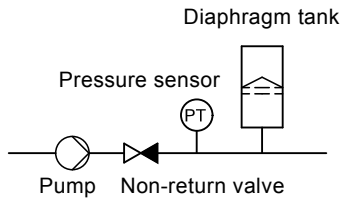**Operating conditions for the low-flow stop function**

You can only use the stop function if the system incorporates a pressure sensor, a non-return valve and a diaphragm tank.

| Caution | *Always install the non-return valve before the pressure sensor. See figs 39 and 40.* |
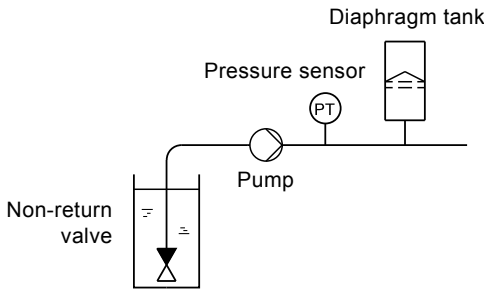
Fig. 39 Position of the non-return valve and pressure sensor in system with suction lift operation

Fig. 40 Position of the non-return valve and pressure sensor in system with a positive inlet pressure

Set minimum flow

Set the minimum flow (Q_{min}) in this display. This setting determines at which flow rate the system is to change from continuous operation at constant pressure to start/stop operation. The setting range is 5 to 30 % of rated flow.

Factory setting

See section *16. Factory settings*.

Diaphragm tank volume

The stop function requires a diaphragm tank of a certain minimum size. Set the size of the installed tank in this display.

In order to reduce the number of start/stops per hour or to reduce the ΔH, you can install a larger tank.

Install the tank immediately after the pump. The precharge pressure must be 0.7 x actual setpoint.

Recommended diaphragm tank size:

Rated flow rate of pump [m³/h]	Typical diaphragm tank size [litres]
0-6	8
7-24	18
25-40	50
41-70	120
71-100	180

Factory setting

See section *16. Factory settings*.

7.18 Pipe filling function

Pump variant	Pipe filling function
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This function is typically used in pressure-boosting applications and ensures a smooth startup of systems with for instance empty pipes.

Startup takes place in two phases. See fig. 41.

1. Filling phase
   The pipework is slowly filled with water. When the pressure sensor of the system detects that the pipework has been filled, phase two begins.
2. Pressure build-up phase
   The system pressure is increased until the setpoint is reached. The pressure build-up takes place over a pressure build-up time. If the setpoint is not reached within a given time, a warning or an alarm can be given, and the pumps can be stopped at the same time.
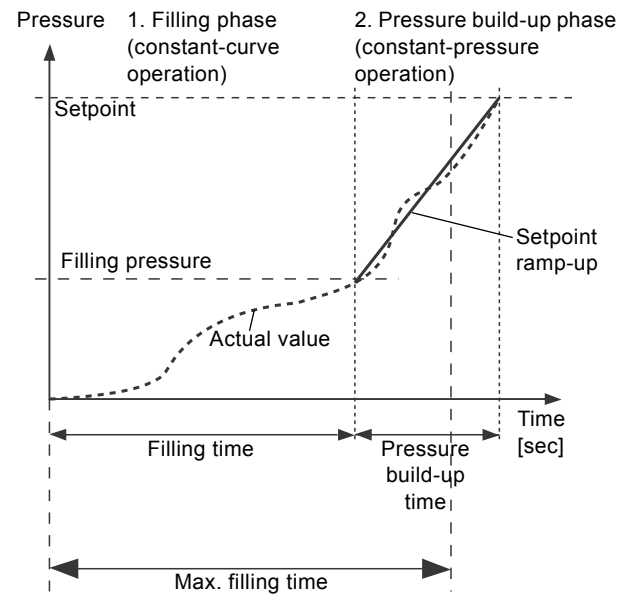
Fig. 41 Filling and pressure build-up phases

Setting range

- Filling speed
  Fixed speed of the pump during the filling phase.
- filling pressure
  The pressure that the pump must reach before the maximum filling time.
- "max. filling time"
  The time in which the pump must reach the filling pressure.
- "Max. time reaction"
  Reaction of the pump if the maximum filling time is exceeded:
  - warning
  - alarm (pump stops).
- "Pressure build-up time"
  Ramp time from when the filling pressure is reached until the setpoint is reached.

| Note | *When this function is activated, he function will always start when the pump has been in operating mode "Stop" and is changed to "Normal".* |

Factory setting

See section *16. Factory settings*.

7.19 Pulse flowmeter (Pulse flowmeter setup)

Pump variant	Pulse flowmeter (Pulse flowmeter setup)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

To enable a pulse flowmeter, set one of the digital-input functions to "Accumulated flow" and set the pumped volume per pulse. See section *7.7 Digital inputs*.

Factory setting

See section *16. Factory settings*.

7.20 Ramps

Pump variant	Ramps
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

You can set the following:
- acceleration time, 0.1 to 300 s
- deceleration time, 0.1 to 300 s.

The times apply to the acceleration from 0 rpm to maximum (fixed) speed and the deceleration from max. (fixed) to 0 rpm, respectively.

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

If the power supply is switched off, the deceleration of the pump will only depend on load and inertia.
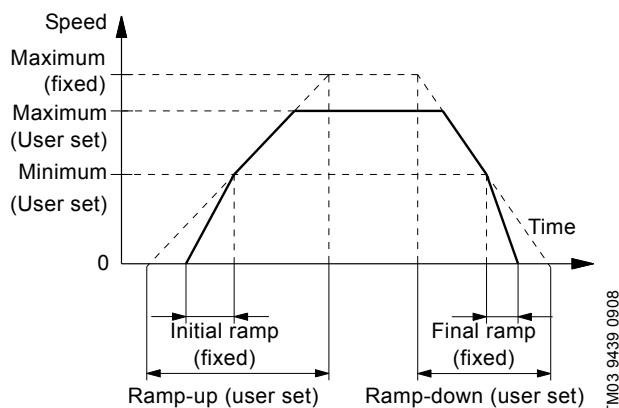
Fig. 42 Ramp-up and Ramp-down

Factory setting

See section *16. Factory settings*.

7.21 Standstill heating

Pump variant	Standstill heating
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

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

For further information, see the section concerning outdoor installation in the installation and operating instructions which you can access via the link below:

grundfos.com/E-pump1-manual

Factory setting

See section *16. Factory settings*.

7.22 Motor bearing monitoring

You can set the motor bearing monitoring function to these values:
- Active
- Not active.

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

Note	*The counter will continue counting even if the function is changed to "Not active", but a warning will not be given when it is time for replacement.* *When the function is changed to "Active" again, the accumulated mileage will again be used to calculate the replacement time.*

7.23 Service

Time to next service (Motor bearing service)

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

Displayable values:

• in 2 years
• in 1 year
• in 6 months
• in 3 months
• in 1 month
• in 1 week
• Now

Bearing replacements

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

Bearings replaced (Motor bearing maintenance)

When the bearing monitoring function is active, the controller will give a warning indication when the motor bearings are due to be replaced.

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

7.24 Number (Pump number)

Pump variant	Number (Pump number)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

Factory setting

See section *16. Factory settings*.

7.25 Radio communication (Enable/disable radio comm.)

Pump variant	Radio communication (Enable/disable radio comm.)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

> **Note** *IR communication will remain active.*

Factory setting

See section *16. Factory settings*.

7.26 Language

Pump variant	Language
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

In this menu you can select the desired language. A number of languages is available.

Factory setting

See section *16. Factory settings*.

7.27 Date and time (Set date and time)

Pump variant	Date and time (Set date and time)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The availability of this menu depends on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Date and time	-	●

*   See section *13. Identification of functional module*.

You can set date and time as well as how you want them to be viewed in the display:

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

Factory setting

See section *16. Factory settings*.

7.28 Unit configuration (Units)

Pump variant	Unit configuration (Units)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

In this menu, you can select between SI and US units. The setting can be applicable for all parameters or you can customise the setting for each individual parameter.

Factory setting

See section *16. Factory settings*.

7.29 Buttons on product (Enable/disable settings)

Pump variant	Buttons on product (Enable/disable settings)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

In this display, you can disable the possibility of making settings for protective reasons.

Grundfos GO

If you set the buttons to "Not active" the buttons on the standard control panel will be disabled. If you set the buttons to "Not active" on pumps fitted with an advanced control panel, see below.

Advanced control panel

If you have disabled the settings, you can still use the buttons to navigate through the menus but you cannot make changes in the "Settings" menu.

When you have disabled the possibility to make settings, the 🔒 symbol will appear in the display.

Note	*Advanced control panel:* *To unlock the pump and allow settings, press ⌄ and ⌃ simultaneously for at least 5 seconds.* *Standard control panel:* *The 🔘 button always remains active but you can only unlock all other buttons on the pump with the Grundfos GO.*

Factory setting

See section *16. Factory settings*.

7.30 Delete history

Pump variant	Delete history
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

In this menu, you can delete the following historic data:

• Delete operating log.
• Delete energy consumption.

7.31 Define Home display

Pump variant	Define Home display
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

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

Factory setting

See section *16. Factory settings*.

7.32 Display settings

Pump variant	Display settings
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

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

Factory setting

See section *16. Factory settings*.

7.33 Store settings (Store actual settings)

Pump variant	Store settings (Store actual settings)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Grundfos GO

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

Advanced control panel

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

7.34 Recall settings (Recall stored settings)

Pump variant	Recall settings (Recall stored settings)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

Grundfos GO

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

Advanced control panel

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

7.34.1 Undo

Pump variant	Undo
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in Grundfos GO.

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

7.35 Pump name

Pump variant	Pump name
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in Grundfos GO.

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

7.36 Connection code

Pump variant	Connection code
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in Grundfos GO.

You can setup a connection code to avoid having to press the connection button each time and to restrict remote access to the product.

Setting the code in the product using Grundfos GO

1. Connect Grundfos GO to the product.
2. In the product dashboard, select "Settings".
3. Choose "Connection code".
4. Enter the wanted code and press [OK].
   The code must be a character string (ASCII).
   You can always modify the code. The old code is not needed.

Setting the code in Grundfos GO

You can define a default connection code in Grundfos GO so that it automatically attempts to connect to the selected product via this code.

When you select a product with the same connection code in Grundfos GO, Grundfos GO automatically connects to the product and you do not have to press the connection button on the module.

Define the default code in Grundfos GO in this way:

1. In the main menu, under "General", select "Settings".
2. Choose "Remote".
3. Enter the connection code in the field "Preset connection code". The field now says "Connection code set".

You can always modify the default connection code by pressing [Delete] and entering a new one.

If Grundfos GO fails to connect and ask you to press the connection button on the product, it means that the product has no connection code or has a different connection code. In this case, you can only establish connection via the connection button.

Note	*After setting a connection code, you must switch off the product until the light in Grundfos Eye turns off before you can use the new connection code.*

7.37 Run start-up guide

Pump variant	Run start-up guide
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

The startup guide automatically starts when you start the pump for the first time.

You can always run the startup guide later via this menu.

The startup guide will guide you through the general settings of the pump.

- Language. See section *7.26 Language*.
- Select date format.*
  See section *7.27 Date and time (Set date and time)*.
- Set date.*
  See section *7.27 Date and time (Set date and time)*.
- Select time format.*
  See section *7.27 Date and time (Set date and time)*.
- Set time.*
  See section *7.27 Date and time (Set date and time)*.

- Setting of pump
  – Go to Home
  – Run with Constant curve/Run with Constant pressure.
    (See section *7.4 Control mode*.
  – Go to "Assisted pump setup".
    See section *7.41 Assisted pump setup*.
  – Return to factory settings.
* Applies only for pumps fitted with advanced functional module (FM 300). For further information, see section *13. Identification of functional module*.

7.38 Alarm log

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

7.39 Warning log

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

7.40 Assist

The menu consist of a number of different assist functions which are small guides that will take you through the steps needed to set up the pump.

7.41 Assisted pump setup

Pump variant	Assisted pump setup
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

The menu guides you through the following:

Setting of pump

- Selection of control mode. See page 12.
- Configuration of feedback sensors.
- Adjusting the setpoint. See page 12.
- Controller settings. See page 20.
- Summary of settings.

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

Grundfos GO

1. Open the "Assist" menu.
2. Select "Assisted pump setup".
3. Select control mode "Constant pressure" (Const. pressure).
4. Read the description for this control mode.
5. Select which analog input to use as sensor input.
6. Select sensor function according to where the sensor is installed in the system. See fig. 23 on page 16.
7. Select electrical input signal according to the sensor specifications.
8. Select measuring unit according to the sensor specifications.
9. Set the minimum and maximum sensor range values according to the sensor specifications.
10. Set the desired setpoint.
11. Set the controller settings K_p and T_i. See the recommendations in section *7.11 Controller (Controller settings)*.
12. Type the desired pump name.
13. Check the summary of settings and confirm them.

Advanced control panel

1. Open the "Assist" menu.
2. Select "Assisted pump setup".
3. Select control mode "Const. pressure".
4. Select which analog input to be used as sensor input.
5. Select the measured parameter which is to be controlled. See fig. 23 on page 16.
6. Select measuring unit according to the sensor specifications.
7. Set the minimum and maximum sensor range values according to the sensor specifications.
8. Select electrical input signal according to the sensor specifications.
9. Set the desired setpoint.
10. Set the controller settings K_p and T_i. See recommendations in section *7.11 Controller (Controller settings)*.
11. Check the summary of settings and confirm them by pressing [OK].

7.42 Setup, analog input

Pump variant	Setup, analog input
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

The menu guides you through the following:

Setup, analog input
- Analog inputs 1 to 3. See page 16.
- Pt100/1000 input 1 and 2. See page 17.
- Adjusting the setpoint. See page 12.
- Summary.

7.43 Setting of date and time

Pump variant	Setting of date and time
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

This menu is only available in the advanced control panel.

Whether this menu is available or not, depends on the functional module fitted in the pump:

Function (terminal)	FM 200* (standard)	FM 300* (advanced)
Setting of date and time	-	●

* See section *13. Identification of functional module*.

The "Setting of date and time" menu will guide you through the following:
- Select date format. See section *7.27 Date and time (Set date and time)*.
- Set date. See section *7.27 Date and time (Set date and time)*.
- Select time format. See section *7.27 Date and time (Set date and time)*.
- Set time. See section *7.27 Date and time (Set date and time)*.

7.44 Multi-pump setup (Setup of multi-pump system)

Pump variant	Multi-pump setup (Setup of multi-pump system)
CME	●
CRE, CRIE, CRNE, SPKE, MTRE	●

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

A multipump system is set up via a selected pump, i.e. the master pump (first selected pump).

If two pumps in the system are configured with a discharge-pressure sensor, they can all function as master pumps and take over the master pump function if the other should fail. This provides additional redundancy in the multipump system.

The multipump functions are described in the following sections.

7.44.1 Alternating operation

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

Each pump requires a non-return valve in series with the pump.

You can choose between two alternating operation modes:
- Alternating operation, time
  Change from one pump to the other is based on time.
- Alternating operation, energy
  Change from one pump to the other is based on energy consumption.

If the duty pump fails, the other pump will take over automatically.

7.44.2 Backup operation

Backup operation is possible with two pumps of same size and type connected in parallel. Each pump requires a non-return valve in series with the pump.

One pump is operating continuously. The backup pump is operated for a short time each day to prevent seizing up. If the duty pump stops due to a fault, the backup pump will start automatically.

7.44.3 Setting up a multipump system

You can setup a multipump system in the following ways:

• *Grundfos GO and wireless pump connection*
• *Grundfos GO and wired pump connection*
• *Advanced control panel and wireless pump connection*
• *Advanced control panel and wired pump connection*

See step-by-step descriptions below.

Grundfos GO and wireless pump connection
1. Power on both pumps.
2. Establish contact to one of the pumps with Grundfos GO.
3. Set up the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See section *7.41 Assisted pump setup*.
4. Assign a pump name to the pump using Grundfos GO. See section *7.35 Pump name*.
5. Disconnect Grundfos GO from the pump.
6. Establish contact to the other pump.
7. Set up the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See section *7.41 Assisted pump setup*.
8. Assign a pump name to the pump using Grundfos GO. See section *7.35 Pump name*.
9. Select the "Assist" menu and choose "Multi-pump setup".
10. Select the desired multipump function. See section *7.44.1 Alternating operation* and *7.44.2 Backup operation* above.
11. Press [>] to continue.
12. Set the time for pump changeover i.e. the time at which the alternation between the two pumps is to take place

> **Note** *This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300*

13. Press [>] to continue.
14. Select "Radio" as the communication method to be used between the two pumps.
15. Press [>] to continue.
16. Press "Select pump 2".
17. Select the additional pump from the list.

> **Note** *The [OK] or ⊚ button can be used to identify the additional pump*

18. Press [>] to continue.
19. Confirm the multipump setup by pressing [Send].
20. Press [Finish] in the appearing "Setup complete" dialog box.
21. Wait for the green indicator light in the middle of Grundfos Eye to light up.

The multipump system has now been setup.

Grundfos GO and wired pump connection
1. Connect the two pumps with each other with a 3-core screened cable between the GENIbus terminals A, Y, B.
2. Power on both pumps.
3. Establish contact to one of the pumps with the Grundfos GO.
4. Set up the needed analog and digital inputs via Grundfos GO according to the connected equipment and the required functionality. See section *7.41 Assisted pump setup*.
5. Assign a pump name to the pump using Grundfos GO. See section *7.35 Pump name*.
6. Assign pump number 1 to the pump. See section *7.24 Number (Pump number)*.
7. Disconnect Grundfos GO from the pump.
8. Establish contact to the other pump.
9. Via the Grundfos GO setup the needed analog and digital inputs according to the connected equipment and the required functionality. See section *7.41 Assisted pump setup*.
10. Assign a pump name to the pump using the Grundfos GO. See section *7.35 Pump name*.
11. Assign pump number 2 to the pump. See section *7.24 Number (Pump number)*.
12. Select the "Assist" menu and choose "Multi-pump setup".
13. Select the desired multipump function. See section *7.44.1 Alternating operation* and *7.44.2 Backup operation* above.
14. Press [>] to continue.
15. Set the time for pump changeover i.e. the time at which the alternation between the two pumps is to take place

> **Note** *This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300*

16. Press [>] to continue.
17. Select "BUS cable" as the communication method to be used between the two pumps.
18. Press [>] to continue.
19. Press "Select pump 2".
20. Select the additional pump from the list.

> **Note** *The [OK] or ⊚ button can be used to identify the additional pump.*

21. Press [>] to continue.
22. Confirm the multipump setup by pressing [Send].
23. Press [Finish] in the appearing "Setup complete" dialog box.
24. Wait for the green indicator light in the middle of Grundfos Eye to light up.

The multipump system has now been setup.

Advanced control panel and wireless pump connection

1. Power on both pumps.
2. On both pumps, set up the needed analog and digital inputs according to the connected equipment and the required functionality. See section *7.41 Assisted pump setup*.
3. Select the "Assist" menu on one of the pumps and choose "Setup of multi-pump system".
4. Press [>] to continue.
5. Select "Wireless" as the communication method to be used between the two pumps.
6. Press [>] to continue.
7. Select the desired multipump function. See section *7.44.1 Alternating operation* and *7.44.2 Backup operation* above.
8. Press [>] three times to continue.
9. Press [OK] to search for other pumps.
   The green indicator light in the middle of Grundfos Eye will flash on the other pumps.
10. Press the connect button on the pump which is to be added to the multipump system.
11. Press [>] to continue.
12. Set the time for pump changeover i.e. the time at which the alternation between the two pumps is to take place.

> | Note | ***This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300.*** |
> |---|---|

13. Press [>] to continue.
14. Confirm the multipump setup by pressing [OK].
    The multipump function icons will appear in the bottom of the control panels.

The multipump system has now been setup.

Advanced control panel and wired pump connection

1. Connect the two pumps with each other with a 3-core screened cable between the GENIbus terminals A, Y, B.
2. Set up the needed analog and digital inputs according to the connected equipment and the required functionality. See section *7.41 Assisted pump setup*.
3. Assign pump number 1 to the first pump. See section *7.24 Number (Pump number)*.
4. Assign pump number 2 to the other pump. See section *7.24 Number (Pump number)*.
5. Select the "Assist" menu on one of the pumps and choose "Setup of multi-pump system".
6. Press [>] to continue.
7. Select "Wired GENIbus" as the communication method to be used between the two pumps.
8. Press [>] twice to continue.
9. Select the desired multipump function. See section *7.44.1 Alternating operation* and *7.44.2 Backup operation* above.
10. Press [>] to continue.
11. Press [OK] to search for other pumps.
12. Select the additional pump from the list.
13. Press [>] to continue.
14. Set the time for pump changeover i.e. the time at which the alternation between the two pumps is to take place.

> | Note | ***This step applies only if you have selected "Alternating operation, time" and if the pumps are fitted with FM 300.*** |
> |---|---|

15. Press [>] to continue.
16. Confirm the multipump setup by pressing [OK].
    The multipump function icons will appear in the bottom of the control panels.

The multipump system has now been setup.

Disabling a multipump system via Grundfos GO

1. Select the "Assist" menu.
2. Select "Multi-pump setup".
3. Select "Disable".
4. Press [>] to continue.
5. Confirm the multipump setup by pressing [Send].
6. Press [Finish].

The multipump system has now been disabled.

Disabling a multipump system via advanced control panel

1. Select the "Assist" menu.
2. Select "Setup of multi-pump system".
3. Press [>] to continue.
4. Confirm "No multi-pump function" by pressing [OK].
5. Press [>] to continue.
6. Press [OK] to confirm.

The multipump system has now been disabled.

7.45 Description of control mode

This menu is only available in the advanced control panel.

This menu describes each of the possible control modes. See also section *7.4 Control mode*.

7.46 Assisted fault advice

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

8. Bus signal

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

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

Contact Grundfos for further information.

Note	*If you use a bus signal, the number of settings available via Grundfos GO will be reduced.*

9. Priority of settings

You can always set the pump to stop by pressing ⊚ on the pump control panel. When the pump is not in "Stop" mode, you can always set the pump to stop by continuously pressing ⊗. Furthermore, you can set the pump to maximum speed by continuously pressing ⊗. You can always set the pump to operation at maximum speed or to stop with Grundfos GO.

If two or more functions are enabled at the same time, the pump will operate according to the function with the highest priority.

Example: If, via the digital input, the pump has been set to maximum speed, the pump control panel or Grundfos GO can only set the pump to "Manual" or "Stop".

The priority of the settings appears from the table below:

Priority	Start/stop button	Grundfos GO or control panel on pump	Digital input	Bus communication
1	Stop			
2		Stop*		
3		Manual		
4		Max. speed*		
5			Stop	
6				Stop
7				Max. speed
8				Min. speed
9				Start
10			Max. speed	
11		Min. speed		
12			Min. speed	
13			Start	
14		Start		

*   If the bus communication is interrupted, the pump will resume its previous operating mode, for example "Stop", selected with Grundfos GO or on the pump control panel.

10. Grundfos Eye

The operating condition of the pump is indicated by Grundfos Eye on the control panel. See fig. 43, pos. A.
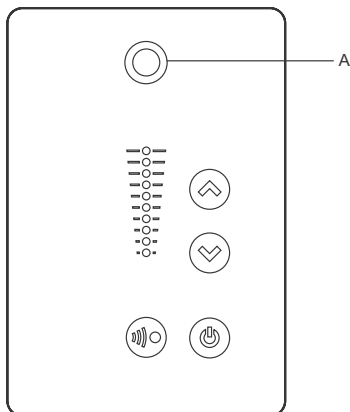
TM05 5993 4312

Fig. 43 Grundfos Eye

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

11. Signal relays

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

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

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

Description	Grundfos Eye	Contact position for signal relays when activated					Operating mode
		Operation	Pump running	Ready	Alarm	Warning	
Power off.	Off	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	-
Pump running in "Normal" mode.	Green, rotating	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Normal", "Min." or "Max."
Pump running in "Manual" mode.	Green, rotating	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Manual"
Pump in operating mode "Stop".	Green, steady	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Stop"
Warning, but the pump is running.	Yellow, rotating	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Normal", "Min." or "Max."
Warning, but the pump is running in "Manual" mode.	Yellow, rotating	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Manual"
Warning, but the pump was stopped via "Stop" command.	Yellow, steady	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Stop"
Alarm, but the pump is running.	Red, rotating	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Normal", "Min." or "Max."
Alarm, but the pump is running in "Manual" mode.	Red, rotating	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Manual"
Pump stopped due to an alarm.	Red, flashing	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Stop"
Pump stopped due to "Low-flow stop function"	Green, steady	C NO NC	C NO NC	C NO NC	C NO NC	C NO NC	"Normal"

12. Installation of communication interface module (CIM)

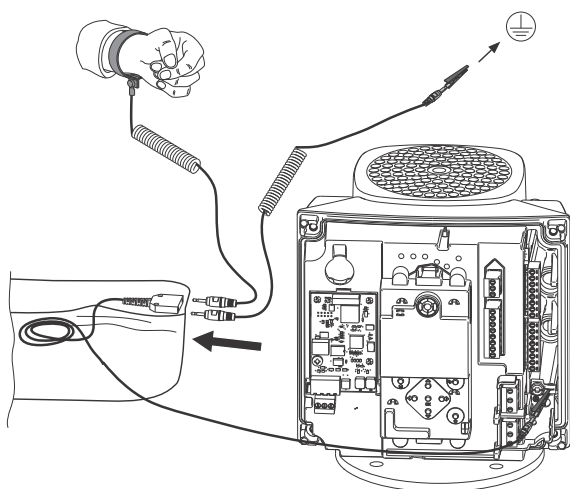| Caution	Always use an antistatic service kit when handling electronic components. This will prevent static electricity from damaging components. When unprotected, place the component on the antistatic cloth.

Fig. 44 Antistatic service kit

1. Disconnect the power supply to the pump.
2. Remove the terminal box cover by loosening the four screws (fig. 45, pos. A) and lifting the terminal box cover (fig. 45, pos. B).
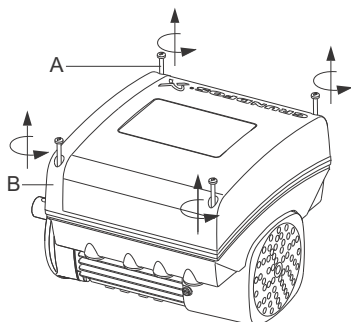

Fig. 45 Removing terminal box cover

3. Remove the CIM cover (fig. 46, pos. A) by pressing the locking tab (fig. 46, pos. B) and lifting the end of the cover (fig. 46, pos. C). Then lift the cover off the hooks (fig. 46, pos. D).
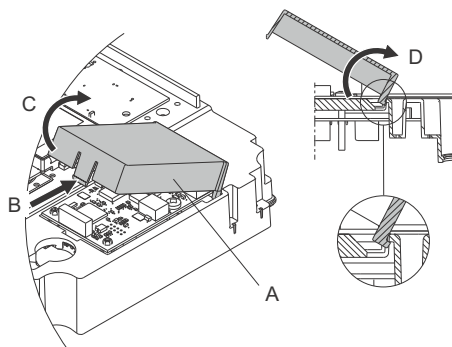

Fig. 46 Removing CIM cover

4. Remove the securing screw (fig. 47, pos. A).
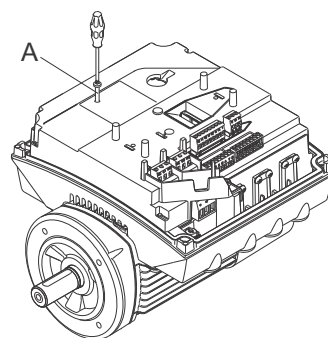
Fig. 47 Removing securing screw

5. Fit the CIM module by aligning it with the three plastic holders (fig. 48, pos. A) and the connecting plug (fig. 48, pos. B). Press home the module using your fingers.

Fig. 48 Align CIM module with plastic holders (pos. A) and connecting plug (pos. B)

6. Fit and tighten securing screw (fig. 47, pos. A) to a torque of 1.3 Nm.
7. Make the electrical connections to the CIM module as described in the instructions delivered with the module.
8. Connect the cable screens of the bus cables to earth via one of the earth clamps (fig. 49, pos. A).
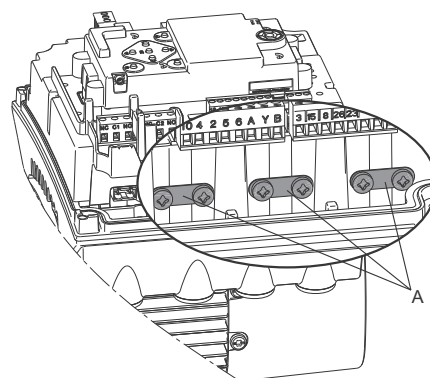
Fig. 49 Connecting cable screens to earth

37

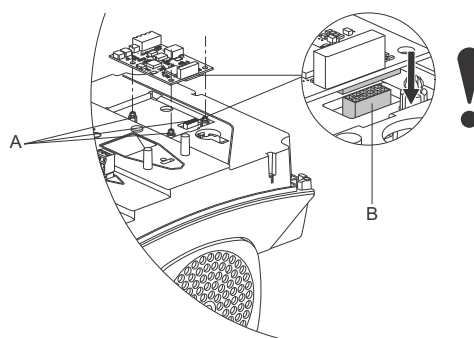9. Route the wires for the CIM module, see the example in fig. 50.
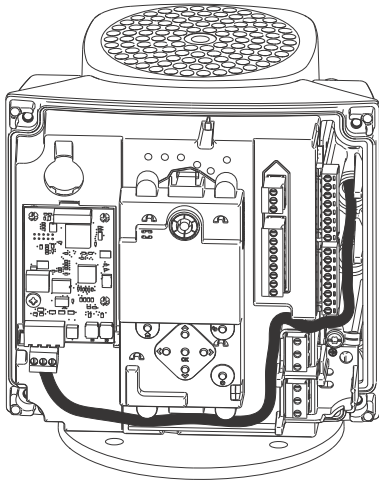
TM06 4085 1515

Fig. 50 Wire routing (example)

10. Fit the CIM cover.

11. If the CIM module is supplied with an FCC label, then place this on the terminal box. See fig. 51.

FCC
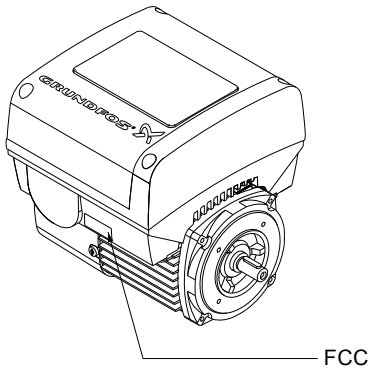
TM05 7028 0413

Fig. 51 Position of FCC label

12. Fit the terminal box cover (fig. 45, pos. B) and cross-tighten the four mounting screws (fig. 45, pos. A) to a torque of 6 Nm.

| Note | *Make sure that the terminal box cover is aligned with the control panel. See section 15. Changing the position of the control panel.* |

13. Identification of functional module

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

Grundfos GO

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

Pump display

For pumps fitted with the advanced control panel, you can identify the functional module in the "Fitted modules" menu under "Status".

Motor name plate

You can identify the fitted module on the motor nameplate. See fig. 52.
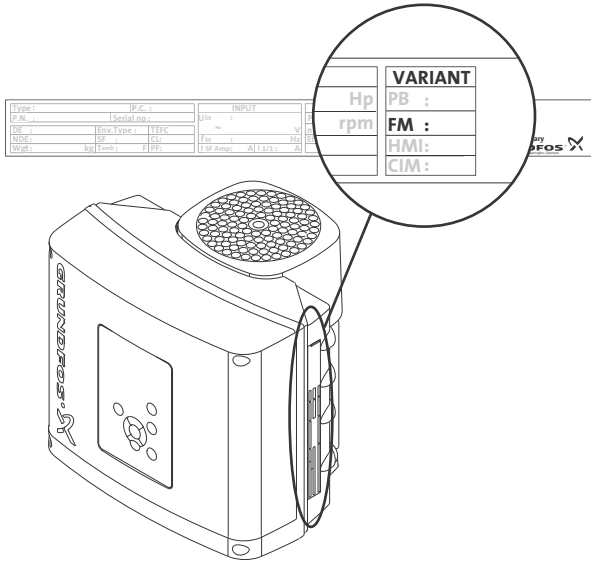
Fig. 52 Identification of functional module

Variant	Description
FM 200	Standard functional module
FM 300	Advanced functional module

14. Identification of control panel

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

Grundfos GO

You can identify the control panel in the "Fitted modules" menu under "Status".

Pump display

For pumps fitted with the advanced control panel, you can identify the control panel in the "Fitted modules" menu under "Status".

Motor name plate

You can identify the fitted control panel on the motor nameplate. See fig. 53.
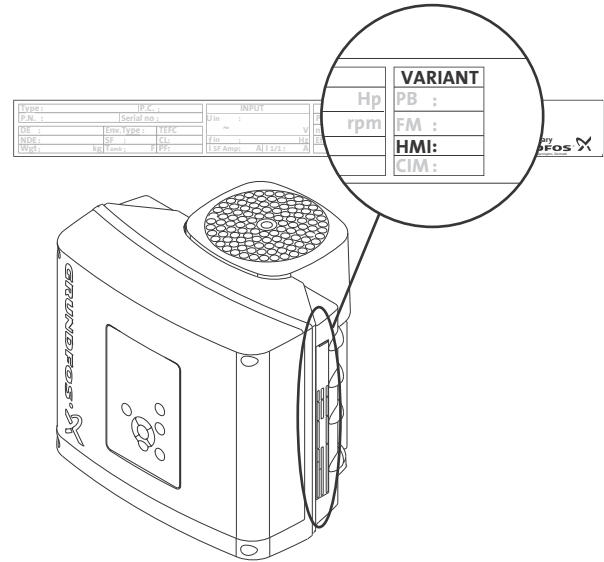
Fig. 53 Identification of control panel

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

15. Changing the position of the control panel

You can turn the control panel 180 °. Follow the instructions below.

1. Loosen the four screws (TX25) holding the terminal box cover.
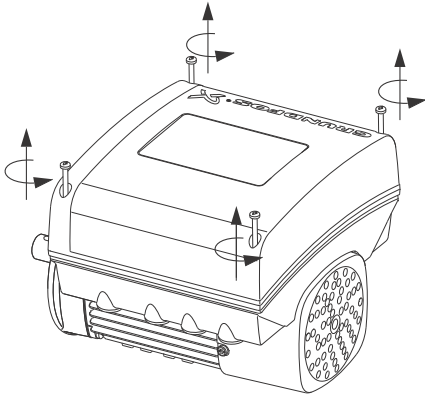
Fig. 54 Loosening the screws

2. Remove the terminal box cover.
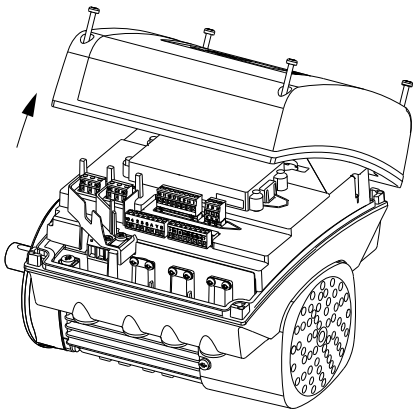
Fig. 55 Removing the terminal box cover

3. Press and hold in the two locking tabs (pos. A) while gently lifting the plastic cover (pos. B).
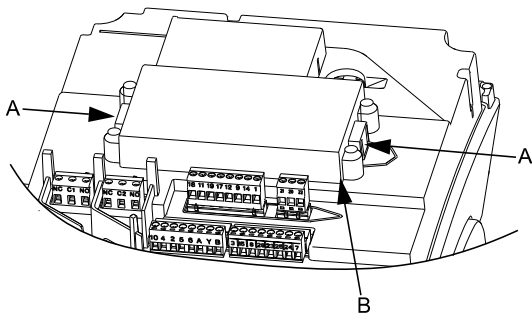
Fig. 56 Lifting the plastic cover

4. Turn the plastic cover 180 °.

Note	*Do not twist the cable more than 90 °.*
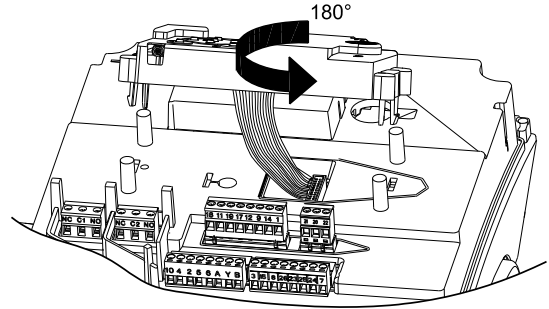
Fig. 57 Turning the plastic cover

5. Re-position the plastic cover correctly on the four rubber pins (pos. C). Make sure that the locking tabs (pos. A) are placed correctly.

Fig. 58 Re-positioning the plastic cover

6. Fit the terminal box cover, and make sure that it is also turned 180 ° so that the buttons on the control panel are aligned with the buttons on the plastic cover.
Tighten the four screws (TX25) with 5 Nm.

Fig. 59 Fitting the terminal box cover

16. Factory settings

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

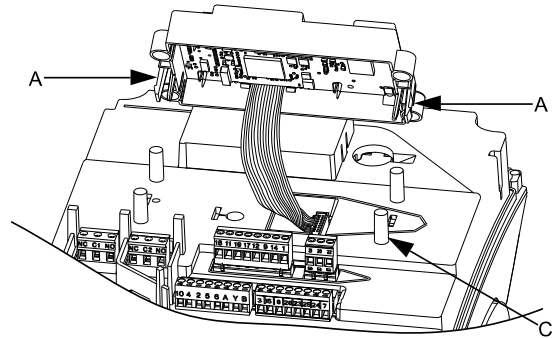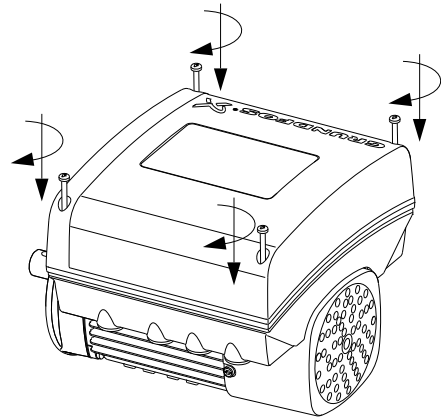| Settings	CRE, CRIE, CRNE, SPKE, MTRE			Function description
	With factory mounted sensor	Without factory mounted sensor	CME	
Setpoint	67 % of sensor range	67 % of sensor range	67 % of sensor range	Page 12
Operating mode	Normal	Normal	Normal	Page 12
Control mode	Constant pressure	Constant pressure	Constant pressure	Page 12
Pipe filling function	Not active	Not active	Not active	Page 26
Buttons on product	Active	Active	Active	Page 29
Stop function (Low-flow stop function)	Not active	Not active	Not active	Page 25
Controller (Controller settings)	●	●	●	Page 20
Ti	0.5	0.5	0.5	
Kp	0.5	0.5	0.5	
Operating range	13-100 %	13-100 %	13-100 %	Page 21
Ramps				Page 27
Ramp-up	1 second	1 second	1 second	
Ramp-down	3 second	3 second	3 second	
Number (Pump number)	-	-	-	Page 28
Radio communication	Active	Active	Active	Page 28
Analog input 1	4-20 mA	Not active	Not active	Page 16
Analog input 2	Not active	Not active	Not active	
Analog input 3	Not active	Not active	Not active	
Pt100/1000 input 1	Not active	Not active	Not active	Page 17
Pt100/1000 input 2	Not active	Not active	Not active	
Digital input 1	External stop	External stop	External stop	Page 17
Digital input 2	Not active	Not active	Not active	
Digital in/output 3	Not active	Not active	Not active	Page 18
Digital in/output 4	Not active	Not active	Not active	
Pulse flowmeter	❍	❍	❍	Page 27
Predefined setpoints	0 bar	0 %	0 %	Page 23
Analog output	Not active	Not active	Not active	Page 19
External setpoint function	Not active	Not active	Not active	Page 21
Signal relay 1	Not active	Not active	Not active	Page 18
Signal relay 2	Not active	Not active	Not active	
Limit 1 exceeded	Not active	Not active	Not active	Page 24
Limit 2 exceeded	Not active	Not active	Not active	
Standstill heating	Not active	Not active	Not active	Page 27
Motor bearing monitoring	Active	Active	Active	Page 27
Pump name	-	-	-	Page 29
Connection code	-	-	-	Page 30
Unit configuration	SI	SI	SI	Page 28

[1] Only available if you have fitted an advanced functional module (FM300).

17. Disposal

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

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

The waste battery should be disposed of through the national collective schemes. If in doubt, contact your local Grundfos company.

Subject to alterations.

Argentina
Bombas GRUNDFOS de Argentina S.A.
Ruta Panamericana km. 37.500 Centro
Industrial Garin
1619 Garín Pcia. de B.A.
Phone: +54-3327 414 444
Telefax: +54-3327 45 3190

Australia
GRUNDFOS Pumps Pty. Ltd.
P.O. Box 2040
Regency Park
South Australia 5942
Phone: +61-8-8461-4611
Telefax: +61-8-8340 0155

Austria
GRUNDFOS Pumpen Vertrieb Ges.m.b.H.
Grundfosstraße 2
A-5082 Grödig/Salzburg
Tel.: +43-6246-883-0
Telefax: +43-6246-883-30

Belgium
N.V. GRUNDFOS Bellux S.A.
Boomsesteenweg 81-83
B-2630 Aartselaar
Tél.: +32-3-870 7300
Télécopie: +32-3-870 7301

Belarus
Представительство ГРУНДФОС в
Минске
220125, Минск
ул. Шафарнянская, 11, оф. 56, БЦ
«Порт»
Тел.: +7 (375 17) 286 39 72/73
Факс: +7 (375 17) 286 39 71
E-mail: minsk@grundfos.com

Bosna and Herzegovina
GRUNDFOS Sarajevo
Zmaja od Bosne 7-7A,
BH-71000 Sarajevo
Phone: +387 33 592 480
Telefax: +387 33 590 465
www.ba.grundfos.com
e-mail: grundfos@bih.net.ba

Brazil
BOMBAS GRUNDFOS DO BRASIL
Av. Humberto de Alencar Castelo Branco,
630
CEP 09850 - 300
São Bernardo do Campo - SP
Phone: +55-11 4393 5533
Telefax: +55-11 4343 5015

Bulgaria
Grundfos Bulgaria EOOD
Slatina District
Iztochna Tangenta street no. 100
BG - 1592 Sofia
Tel. +359 2 49 22 200
Fax. +359 2 49 22 201
email: bulgaria@grundfos.bg

Canada
GRUNDFOS Canada Inc.
2941 Brighton Road
Oakville, Ontario
L6H 6C9
Phone: +1-905 829 9533
Telefax: +1-905 829 9512

China
GRUNDFOS Pumps (Shanghai) Co. Ltd.
10F The Hub, No. 33 Suhong Road
Minhang District
Shanghai 201106
PRC
Phone: +86 21 612 252 22
Telefax: +86 21 612 253 33

Croatia
GRUNDFOS CROATIA d.o.o.
Buzinski prilaz 38, Buzin
HR-10010 Zagreb
Phone: +385 1 6595 400
Telefax: +385 1 6595 499
www.hr.grundfos.com

Czech Republic
GRUNDFOS s.r.o.
Čajkovského 21
779 00 Olomouc
Phone: +420-585-716 111
Telefax: +420-585-716 299

Denmark
GRUNDFOS DK A/S
Martin Bachs Vej 3
DK-8850 Bjerringbro
Tlf.: +45-87 50 50 50
Telefax: +45-87 50 51 51
E-mail: info_GDK@grundfos.com
www.grundfos.com/DK

Estonia
GRUNDFOS Pumps Eesti OÜ
Peterburi tee 92G
11415 Tallinn
Tel: + 372 606 1690
Fax: + 372 606 1691

Finland
OY GRUNDFOS Pumput AB
Mestarintie 11
FIN-01730 Vantaa
Phone: +358-(0)207 889 900
Telefax: +358-(0)207 889 550

France
Pompes GRUNDFOS Distribution S.A.
Parc d'Activités de Chesnes
57, rue de Malacombe
F-38290 St. Quentin Fallavier (Lyon)
Tél.: +33-4 74 82 15 15
Télécopie: +33-4 74 94 10 51

Germany
GRUNDFOS GMBH
Schlüterstr. 33
40699 Erkrath
Tel.: +49-(0) 211 929 69-0
Telefax: +49-(0) 211 929 69-3799
e-mail: infoservice@grundfos.de
Service in Deutschland:
e-mail: kundendienst@grundfos.de

HILGE GmbH & Co. KG
Hilgestrasse 37-47
55292 Bodenheim/Rhein
Germany
Tel.: +49 6135 75-0
Telefax: +49 6135 1737
e-mail: hilge@hilge.de

Greece
GRUNDFOS Hellas A.E.B.E.
20th km. Athinon-Markopoulou Av.
P.O. Box 71
GR-19002 Peania
Phone: +0030-210-66 83 400
Telefax: +0030-210-66 46 273

Hong Kong
GRUNDFOS Pumps (Hong Kong) Ltd.
Unit 1, Ground floor
Siu Wai Industrial Centre
29-33 Wing Hong Street &
68 King Lam Street, Cheung Sha Wan
Kowloon
Phone: +852-27861706 / 27861741
Telefax: +852-27858664

Hungary
GRUNDFOS Hungária Kft.
Park u. 8
H-2045 Törökbálint,
Phone: +36-23 511 110
Telefax: +36-23 511 111

India
GRUNDFOS Pumps India Private Limited
118 Old Mahabalipuram Road
Thoraipakkam
Chennai 600 096
Phone: +91-44 2496 6800

Indonesia
PT. GRUNDFOS POMPA
Graha Intirub Lt. 2 & 3
Jln. Cililitan Besar No.454. Makasar,
Jakarta Timur
ID-Jakarta 13650
Phone: +62 21-469-51900
Telefax: +62 21-460 6910 / 460 6901

Ireland
GRUNDFOS (Ireland) Ltd.
Unit A, Merrywell Business Park
Ballymount Road Lower
Dublin 12
Phone: +353-1-4089 800
Telefax: +353-1-4089 830

Italy
GRUNDFOS Pompe Italia S.r.l.
Via Gran Sasso 4
I-20060 Truccazzano (Milano)
Tel.: +39-02-95838112
Telefax: +39-02-95309290 / 95838461

Japan
GRUNDFOS Pumps K.K.
Gotanda Metalion Bldg., 5F,
5-21-15, Higashi-gotanda
Shiagawa-ku, Tokyo
141-0022 Japan
Phone: +81 35 448 1391
Telefax: +81 35 448 9619

Korea
GRUNDFOS Pumps Korea Ltd.
6th Floor, Aju Building 679-5
Yeoksam-dong, Kangnam-ku, 135-916
Seoul, Korea
Phone: +82-2-5317 600
Telefax: +82-2-5633 725

Latvia
SIA GRUNDFOS Pumps Latvia
Deglava biznesa centrs
Augusta Deglava ielā 60, LV-1035, Rīga,
Tālr.: + 371 714 9640, 7 149 641
Fakss: + 371 914 9646

Lithuania
GRUNDFOS Pumps UAB
Smolensko g. 6
LT-03201 Vilnius
Tel: + 370 52 395 430
Fax: + 370 52 395 431

Malaysia
GRUNDFOS Pumps Sdn. Bhd.
7 Jalan Peguam U1/25
Glenmarie Industrial Park
40150 Shah Alam
Selangor
Phone: +60-3-5569 2922
Telefax: +60-3-5569 2866

Mexico
Bombas GRUNDFOS de México S.A. de
C.V.
Boulevard TLC No. 15
Parque Industrial Stiva Aeropuerto
Apodaca, N.L. 66600
Phone: +52-81-8144 4000
Telefax: +52-81-8144 4010

Netherlands
GRUNDFOS Netherlands
Veluwezoom 35
1326 AE Almere
Postbus 22015
1302 CA ALMERE
Tel.: +31-88-478 6336
Telefax: +31-88-478 6332
E-mail: info_gnl@grundfos.com

New Zealand
GRUNDFOS Pumps NZ Ltd.
17 Beatrice Tinsley Crescent
North Harbour Industrial Estate
Albany, Auckland
Phone: +64-9-415 3240
Telefax: +64-9-415 3250

Norway
GRUNDFOS Pumper A/S
Strømsveien 344
Postboks 235, Leirdal
N-1011 Oslo
Tlf.: +47-22 90 47 00
Telefax: +47-22 32 21 50

Poland
GRUNDFOS Pompy Sp. z o.o.
ul. Klonowa 23
Baranowo k. Poznania
PL-62-081 Przeźmierowo
Tel: (+48-61) 650 13 00
Fax: (+48-61) 650 13 50

Portugal
Bombas GRUNDFOS Portugal, S.A.
Rua Calvet de Magalhães, 241
Apartado 1079
P-2770-153 Paço de Arcos
Tel.: +351-21-440 76 00
Telefax: +351-21-440 76 90

Romania
GRUNDFOS Pompe România SRL
Bd. Biruintei, nr 103
Pantelimon county Ilfov
Phone: +40 21 200 4100
Telefax: +40 21 200 4101
E-mail: romania@grundfos.ro

Russia
ООО Грундфос Россия
109544, г. Москва, ул. Школьная, 39-41,
стр. 1
Тел. (+7) 495 564-88-00 (495) 737-30-00
Факс (+7) 495 564 88 11
E-mail grundfos.moscow@grundfos.com

Serbia
Grundfos Srbija d.o.o.
Omladinskih brigada 90b
11070 Novi Beograd
Phone: +381 11 2258 740
Telefax: +381 11 2281 769
www.rs.grundfos.com

Singapore
GRUNDFOS (Singapore) Pte. Ltd.
25 Jalan Tukang
Singapore 619264
Phone: +65-6681 9688
Telefax: +65-6681 9689

Slovakia
GRUNDFOS s.r.o.
Prievozská 4D
821 09 BRATISLAVA
Phona: +421 2 5020 1426
sk.grundfos.com

Slovenia
GRUNDFOS d.o.o.
Šlandrova 8b, SI-1231 Ljubljana-Črnuče
Phone: +386 31 718 808
Telefax: +386 (0)1 5680 619
E-mail: slovenia@grundfos.si

South Africa
GRUNDFOS (PTY) LTD
Corner Mountjoy and George Allen Roads
Wilbart Ext. 2
Bedfordview 2008
Phone: (+27) 11 579 4800
Fax: (+27) 11 455 6066
E-mail: lsmart@grundfos.com

Spain
Bombas GRUNDFOS España S.A.
Camino de la Fuentecilla, s/n
E-28110 Algete (Madrid)
Tel.: +34-91-848 8800
Telefax: +34-91-628 0465

Sweden
GRUNDFOS AB
Box 333 (Lunnagårdsgatan 6)
431 24 Mölndal
Tel.: +46 31 332 23 000
Telefax: +46 31 331 94 60

Switzerland
GRUNDFOS Pumpen AG
Bruggacherstrasse 10
CH-8117 Fällanden/ZH
Tel.: +41-44-806 8111
Telefax: +41-44-806 8115

Taiwan
GRUNDFOS Pumps (Taiwan) Ltd.
7 Floor, 219 Min-Chuan Road
Taichung, Taiwan, R.O.C.
Phone: +886-4-2305 0868
Telefax: +886-4-2305 0878

Thailand
GRUNDFOS (Thailand) Ltd.
92 Chaloem Phrakiat Rama 9 Road,
Dokmai, Pravej, Bangkok 10250
Phone: +66-2-725 8999
Telefax: +66-2-725 8998

Turkey
GRUNDFOS POMPA San. ve Tic. Ltd. Sti.
Gebze Organize Sanayi Bölgesi
Ihsan dede Caddesi,
2. yol 200. Sokak No. 204
41490 Gebze/ Kocaeli
Phone: +90 - 262-679 7979
Telefax: +90 - 262-679 7905
E-mail: satis@grundfos.com

Ukraine
Бізнес Центр Європа
Столичне шосе, 103
м. Київ, 03131, Україна
Телефон: (+38 044) 237 04 00
Факс.: (+38 044) 237 04 01
E-mail: ukraine@grundfos.com

United Arab Emirates
GRUNDFOS Gulf Distribution
P.O. Box 16768
Jebel Ali Free Zone
Dubai
Phone: +971 4 8815 166
Telefax: +971 4 8815 136

United Kingdom
GRUNDFOS Pumps Ltd.
Grovebury Road
Leighton Buzzard/Beds. LU7 4TL
Phone: +44-1525-850000
Telefax: +44-1525-850011

U.S.A.
GRUNDFOS Pumps Corporation
17100 West 118th Terrace
Olathe, Kansas 66061
Phone: +1-913-227-3400
Telefax: +1-913-227-3500

Uzbekistan
Grundfos Tashkent, Uzbekistan The Representative Office of Grundfos Kazakhstan in Uzbekistan
38a, Oybek street, Tashkent
Телефон: (+998) 71 150 3290 / 71 150 3291
Факс: (+998) 71 150 3292

Addresses Revised 10.03.2015

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www.grundfos.com

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