Control MPC

Control of pumps for pressure boosting and circulation

50/60 Hz

1. Product introduction

Grundfos Control MPC is a complete control cabinet with a built-in CU 352 multi-pump control unit, main switch, contactors, IO 351 modules, cabling, etc.

The Control MPC is designed for the control and monitoring of up to six identical pumps connected in parallel. Control MPC is supplied with all necessary components and contains application-optimised software.

Applications

Grundfos Control MPC can be used for the control and monitoring of both booster and circulation systems such as:

- district heating systems
- heating systems
- air-conditioning systems
- district cooling systems
- industrial cooling systems
- booster systems
- industrial processes
- water supply systems.

Pumps

Control MPC is designed for systems with these pumps:

- CR(E), CRI(E), CRN(E)
- NB(E), NBG(E)
- NK(E), NKG(E)
- TP
- TPE Series 1000
- TPE Series 2000
- HS
- SP
- MAGNA, UPE Series 2000.

Note: The main pumps of the system must be of the same type and size.

Control MPC is available in five variants. For further information, see *Product range* on page 5 and *Overview of control variants* on page 9.

Control MPC-E

For systems with two to six identical electronically speed-controlled Grundfos pumps.

From 0.37 to 22 kW, Control MPC-E controls Grundfos pumps with integrated frequency converter, for instance CR(I)E, TPE and NKE.

Control MPC-EC

For systems with two to six identical mains-operated Grundfos pumps, each connected to a Grundfos CUE frequency converter.

This variant is available as standard for pumps of 30 to 75 kW and optionally for pumps below 30 kW.

Control MPC Series 2000

For systems with two to six identical Grundfos Series 2000 pumps (MAGNA, UPE and TPE(D) Series 2000).

Control MPC Series 2000 consists of a control cabinet, a built-in CU 352 multi-pump control unit and a main switch. It cannot be fitted with for instance IO 351B modules.

Control MPC-F

For systems with two to six identical mains-operated Grundfos pumps connected to a Grundfos CUE frequency converter.

Control MPC-S

For systems with two to six identical mains-operated Grundfos pumps.

Benefits

Perfect control and monitoring

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Fig. 1 CU 352

Control MPC offers perfect control and monitoring of the system and the individual pumps by means of the CU 352 multi-pump control unit.

The CU 352 features a wide range of languages and application-optimised software. It is possible to enter pump curve data to optimise the performance and reduce the energy consumption. Furthermore, a log function enables monitoring of the system over a period of time.

Reliability

The Control MPC is not an ordinary controller! It is a dedicated multi-pump controller designed, made and tested by Grundfos. You are thus guaranteed long-lasting technology that delivers optimum wire-to-water efficiency.

User-friendliness

Control MPC features a built-in start-up wizard in a wide range of languages that guides the installer through a series of steps until the system is correctly installed and commissioned. When the installation is complete, the large, user-friendly colour display will ensure that day-to-day operation is equally easy.

Flexibility

Control MPC is designed and built with a strong focus on flexibility.

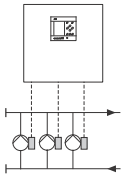
The components of the Control MPC can be combined in a number of ways. Even the software of the CU 352 is easily updated, meaning that we can build the perfect solution for you!

Custom-built solutions

If this data booklet does not provide you with a solution that meets your specific control needs, please see our catalogue for custom-built solutions or contact us.

2. Product data

Product range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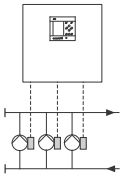
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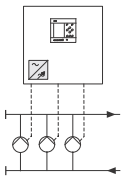
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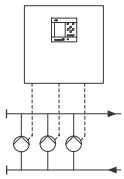
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Control variant	Control MPC-E/-EC	Control MPC Series 2000[4]	Control MPC-F	Control MPC-S
Number of pumps	2 - 6	2 - 6	2 - 6	2 - 6
Motor size [kW][1]	0.37 - 75	0.37 - 22	0.55 - 75	0.37 - 75
Frequency converter				
Integrated, one per pump [kW]	0.37 - 22 (E)	0.37 - 22	-	-
External Grundfos CUE [kW]	30 - 75 (EC)	-	0.55 - 75	-
Operating conditions				
Ambient temperature [°C]	0 to +40	0 to +50	0 to +40	0 to +40
Relative humidity [%]	95	95	95	95
Enclosure class (IP class)	54	54	54	54
Functions				
Constant-pressure control	●	●	●	● [2]
Proportional pressure	●	●	●	●
Automatic cascade control	●	●	●	●
Alternative setpoints	●	●	●	●
Redundant primary sensor (option)	●	●	●	●
Minimum changeover time	●	●	●	●
Number of starts per hour	●	●	●	●
Standby pumps	●	●	●	●
Forced pump changeover	●	●	●	●
Pump test run	●	●	●	●
Dry-running protection (option)	●	●	●	●
Stop function	●	●	●	● [3]
Password	●	●	●	●
Clock program	●	●	●	●
Pilot pump	●	●	●	●
Soft pressure build-up	●	●	●	●
Emergency run	●	●	●	●
Pump curve data	●	●	●	●
Flow estimation	●	●	●	●
Limit 1 and 2 exceeded	●	●	●	●
Pumps outside duty range	●	●	●	●
Specific energy calculation	● [5]	-	-	-
Log function	●	●	●	●
Reduced operation	●	●	●	●
Service contact information	●	●	●	●
Help texts	●	●	●	●
Communication				
Ethernet connection	●	●	●	●
External GENIbus connection (option)	❍	❍	❍	❍
Other bus protocols: Profibus, LONworks, Modbus, PLC via Grundfos CIU communication interface units	❍	❍	❍	❍

● Standard.

❍ Available.

- Not available.

1) On request, control variants for the control and monitoring of pumps with motors up to 315 kW are available.

2) The pressure will be almost constant between H_{set} and H_{stop}. For further information, see page 9.

3) Control MPC-S will have on/off control of all pumps. For further information, see page 9.

4) For further information about Control MPC Series 2000, see page 6.

5) Requires that a flowmeter has been installed and connected.

Control MPC Series 2000

Control MPC Series 2000 is a multi-pump controller designed for the control and monitoring of up to six GRUNDFOS MAGNA, UPE or TPE Series 2000 pumps. All pumps must be of the same type and size.

Control MPC Series 2000 is used for controlling circulator pumps in heating and air-conditioning applications.

Control MPC Series 2000 ensures optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- proportional differential pressure
- constant differential pressure.

By means of an external sensor, Control MPC Series 2000 can also ensure optimum adaptation of the performance to the demand by closed-loop control of these parameters:

- differential pressure (remote)
- flow rate
- temperature
- temperature difference.

Type key

Example	Control MPC	-E	2 x	4	E	*)	*)	*)	3 x 380-415 V, 50/60 Hz, PE

Type range

Subgroups
Pumps with integrated frequency converter (0.37 to 22 kW), one per pump: -E
Pumps with Grundfos CUE frequency converter (30 to 75 kW), one per pump: -EC
Series 2000 pumps: Series 2000
Pumps with external Grundfos CUE frequency converter, one common: -F
Mains-operated pumps (start/stop): -S

Number of pumps with frequency converter

Power [kW]

Starting method
E: Electronic soft starter (pumps with integrated frequency converter)
ESS: Electronic soft starter (pumps with external Grundfos CUE frequency converter)

Number of mains-operated pumps

Power [kW]

Starting method
DOL: Direct-on-line starting
SD: Star-delta starting

Supply voltage, frequency

*) Code for custom-built solution.

3. Construction

Control cabinet

The control cabinet comes in grey coated steel with all the necessary components, such as a CU 352 multi-pump control unit, main switch, contactors, IO 351 modules and cabling. If required, the control cabinet is fitted with a fan to lead away excess heat from for instance frequency converters.

Control cabinet variants

Control cabinets are for wall or floor mounting, depending on size.

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Fig. 2 Floor- and wall-mounted control cabinets

CU 352

The CU 352 multi-pump control unit of Control MPC is located in the door of the control cabinet.

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Fig. 3 CU 352

The CU 352 features a colour display, ten buttons and two indicator lights. The control panel enables manual setting and change of parameters such as setpoint.

The CU 352 has application-optimised software for adapting the system to the application in question.

IO 351

The IO 351 is a module for exchange of digital and analog signals between the CU 352 and the remaining electrical system via GENIbus. The IO 351 is available in the variants A and B.

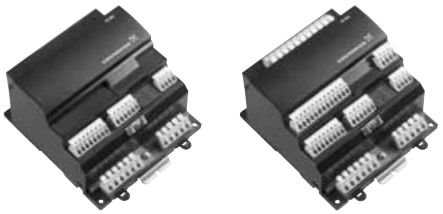

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Fig. 4 IO 351A and IO 351B

IO 351A

The IO 351A is used for one or three mains-operated Grundfos pumps.

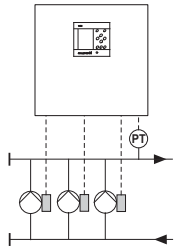
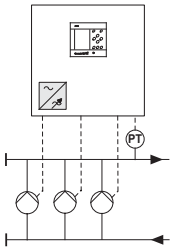
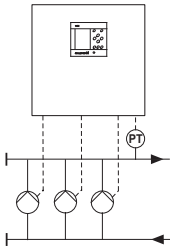
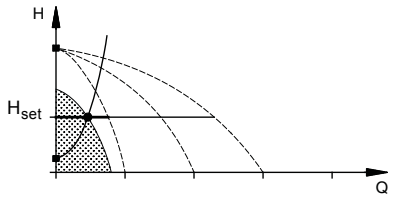
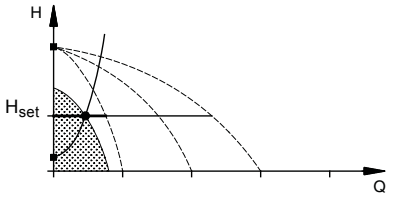
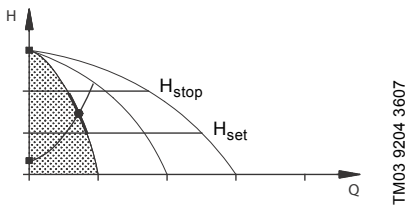
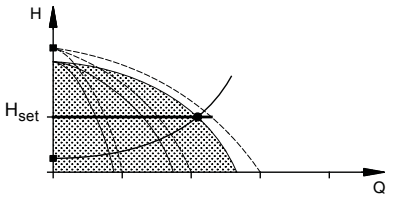
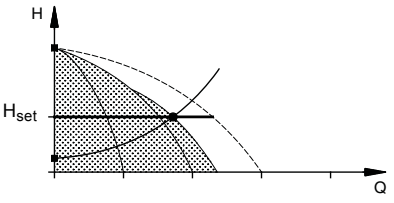
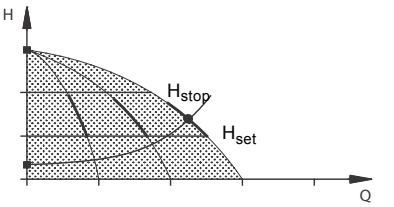
IO 351B

The IO 351B is used for one to six mains-operated Grundfos pumps and/or pumps controlled by external Grundfos CUE frequency converters. The module can also be used as an input-output module for communication with monitoring equipment or other external equipment.

4. Functions

Overview of control variants

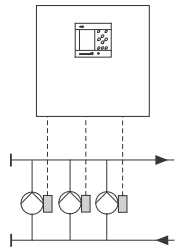
The examples below are based on booster systems.

Systems with speed-controlled pumps	Systems with pumps connected to one CUE frequency converter	Systems with mains-operated pumps
Control MPC-E/-EC	**Control MPC-F**	**Control MPC-S**
Control MPC with three E-pumps.  TM03 0993 0905	Control MPC with three pumps. One of the pumps is connected to a Grundfos CUE frequency converter in the control cabinet. The speed-controlled operation alternates between the pumps.  TM03 1265 1505	Control MPC with three mains-operated pumps.  TM03 0999 0905
One E-pump in operation.  TM00 7995 2296	One pump connected to a Grundfos CUE frequency converter in operation.  TM00 7995 2296	One mains-operated pump in operation.  TM03 9204 3607
Three E-pumps in operation.  TM00 7996 2296	One pump connected to a Grundfos CUE frequency converter and two mains-operated pumps in operation.  TM00 7998 2296	Three mains-operated pumps in operation.  TM03 9203 3607
• Control MPC-E/-EC maintains a constant pressure through continuous adjustment of the speed of the pumps. • The performance is adjusted to the demand through cutting in/out the required number of pumps and through parallel control of the pumps in operation. • Pump changeover is automatic and depends on load, operating hours and fault. • All pumps in operation will run at equal speed. • The number of pumps in operation also depends on the energy consumption of the pumps. If only one pump is required, two pumps will be running at a lower speed if this results in a lower energy consumption. This requires that the differential pressure of the pump is measured.	• Control MPC-F maintains a constant pressure through continuous adjustment of the speed of the pump connected to the Grundfos CUE frequency converter. The speed-controlled operation alternates between the pumps. • One pump connected to the Grundfos CUE frequency converter always starts first. If the pressure cannot be maintained by the pump, one or two mains-operated pumps will be cut in. • Pump changeover is automatic and depends on load, operating hours and fault.	• Control MPC-S maintains an almost constant pressure through cutting in/out the required number of pumps. • The operating range of the pumps will lie between H_{set} and H_{stop} (cut-out pressure). • Pump changeover is automatic and depends on load, operating hours and fault.

The example below is based on a circulation system.

Control MPC Series 2000

Control MPC with three E-pumps.



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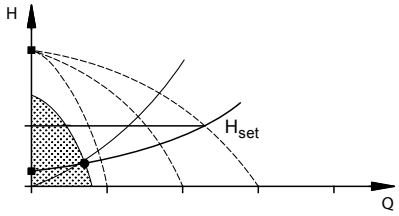
One E-pump in operation.



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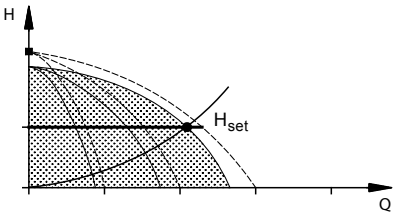
Three E-pumps in operation.



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- Control MPC Series 2000 maintains a constant pressure through adjustment of the speed of the pumps connected.
- The performance is adjusted to the demand through cutting in/out the required number of pumps and through parallel control of the pumps in operation.
- Pump changeover is automatic and depends on load, operating hours and fault.
- All pumps in operation will run at equal speed.
- The number of pumps in operation is also depending on the energy consumption of the pumps. If only one pump is required, the Control MPC will run with two pumps in operation at a lower speed if this result is in a lower energy consumption. This requires that the differential pressure of the pump is measured.

CU 352 control panel

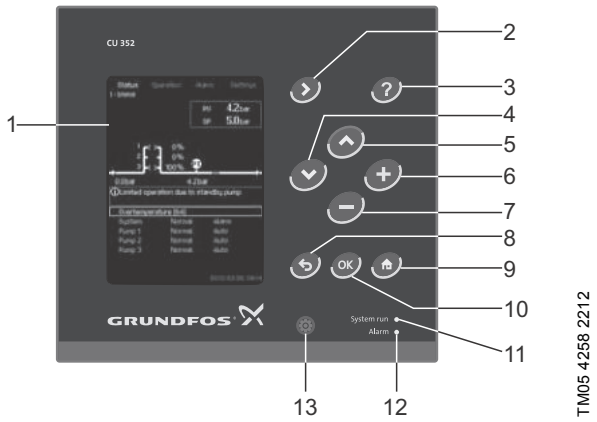

Fig. 5 CU 352 control panel

Key

Pos.	Description
1	Display
2	Arrow to the right
3	Help
4	Down
5	Up
6	Plus
7	Minus
8	Esc
9	Home
10	OK
11	Indicator light, operation (green)
12	Indicator light, fault (red)
13	Display brightness

Menu "Status"

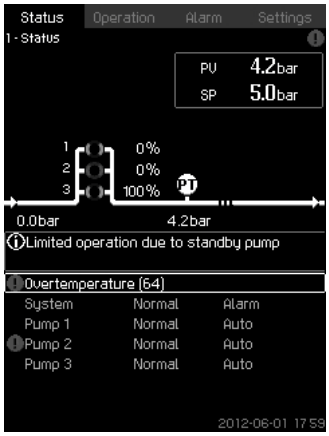

Fig. 6 Menu "Status"

Description

- Reading of process value (PV) of control parameter and selected setpoint (SP).
- Graphical illustration of system (upper display half).
- Indication if any incidents occur during operation (middle of display).
- Reading of performance of system and individual pumps (lower display half).
- Button (?) for further information.
- Active buttons are illuminated.

Menu "Operation"

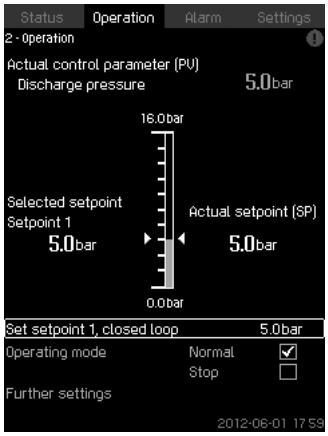

Fig. 7 Menu "Operation"

Description

- Setting of basic parameters, for instance setpoint, start/stop of system or individual pumps.
- Reading of selected setpoint and current setpoint.
- Button (?) for further information.
- Active buttons are illuminated.

Menu "Alarm"

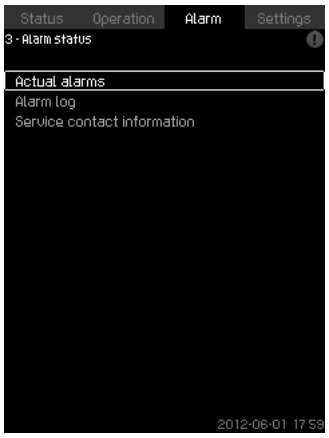

Fig. 8 Menu "Alarm"

Description

- Overview of current warnings and alarms in clear text with detailed information:
  - What the cause of the fault is.
  - What the remedy for the fault is.
  - Where the fault occurred: System, Pump no. 1…
  - When the fault occurred (time and date).
  - When the fault disappeared (time and date).
  - Whom to contact for service.
- Alarm log with up to 24 warnings and alarms.
- Button (?) for further information.
- Active buttons are illuminated.

Menu "Settings"

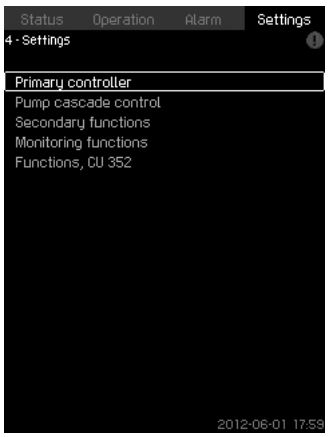

Fig. 9 Menu "Settings"

Description

- Various settings:
  - External setpoint influence
  - Redundant primary sensor
  - Standby pumps
  - Stop function
  - Proportional pressure
  - Display language
  - Ethernet, etc.
- Button (?) for further information.
- Active buttons are illuminated.

Systems with Control MPC

Control MPC is designed for the control of various pumps or pumping systems.

Some of the control parameters offered by the Control MPC are listed below:

- Differential pressure.
  See fig. 10.
- Flow-pipe temperature with one sensor.
  See fig. 11.
- Return-pipe temperature with one sensor.
  See fig. 12.
- Differential temperature with one sensor signal.
  See fig. 13.
- Flow rate.
  See fig. 14.
- Open loop (external controller).
  See fig. 15.

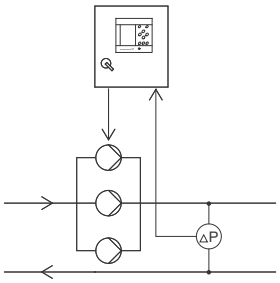

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Fig. 10 Differential pressure

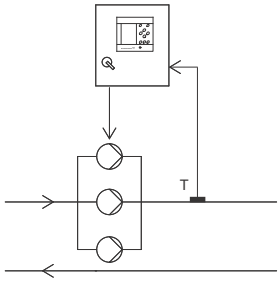

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Fig. 11 Flow-pipe temperature

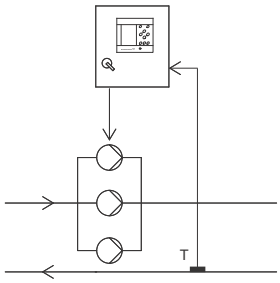

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Fig. 12 Return-pipe temperature

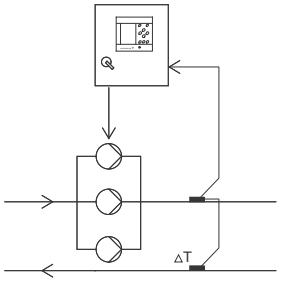

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Fig. 13 Differential temperature

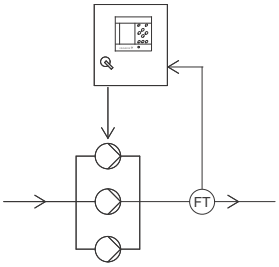

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Fig. 14 Flow rate

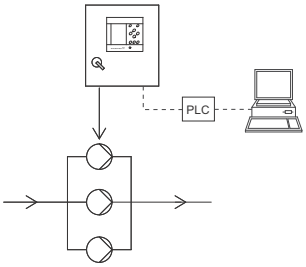

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Fig. 15 Open loop (external controller)

Description of selected functions

Constant-pressure control (E system)

Constant-pressure control ensures that the system delivers a constant pressure despite a change in consumption.

When taps are opened, water will be drawn from the diaphragm tank, if installed. The pressure will drop to a set cut-in pressure, and the first speed-controlled pump will start to operate. The speed of the pump in operation will be continuously increased to meet the demand. As the consumption rises, more pumps will cut in until the performance of the pumps in operation corresponds to the demand. During operation, the CU 352 will control the speed of each pump individually according to known pump curve data downloaded into the CU 352.

Furthermore, the CU 352 regularly estimates whether pumps are to be cut in or out to ensure best efficiency.

When the water consumption falls, pumps will be cut out one by one to maintain the set discharge pressure.

Display language

Fig. 16 Display language

Via the CU 352, you can select the language for the display.

Options:

- English
- German
- Danish
- Spanish
- Finnish
- French
- Greek
- Italian
- Dutch
- Polish
- Portuguese
- Russian
- Swedish
- Chinese
- Korean
- Japanese
- Czech
- Turkish
- Hungarian
- Bulgarian.

Pump curve data

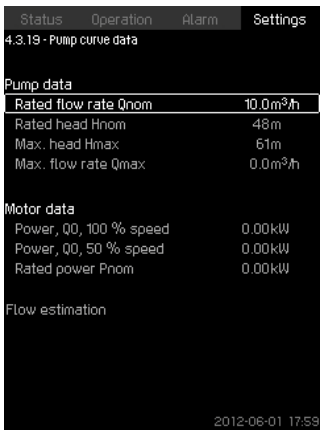


Fig. 17 Pump curve data

The Control MPC will help you minimise energy consumption and cut energy costs. By means of pump curve data stored from factory, the CU 352 will know exactly which and how many pumps to control. These pump curve data enables the CU 352 to optimise performance and minimise energy consumption.

Redundant primary sensor

A redundant sensor can be installed as backup for the primary sensor in order to increase reliability and prevent stop of operation. The redundant primary sensor is in the same reference point as the primary sensor.

Note: The redundant primary sensor is available as a factory-fitted option.

Automatic cascade control

Cascade control ensures that the performance of the system is automatically adapted to consumption by switching pumps on or off. The system thus runs as energy-efficiently as possible and with a limited number of pumps.

Alternative setpoints

This function makes it possible to set up to six setpoints as alternatives to the primary setpoint. The setpoints can be set for closed loop and open loop. The performance of the system can thus be adapted to other consumption patterns.

Example

An MPC booster system is used for irrigation of a hilly golf course.

Constant-pressure irrigation of golf course sections of different sizes and at different altitudes may require more than one setpoint.

For golf course sections at a higher altitude a higher discharge pressure is required.

Log function

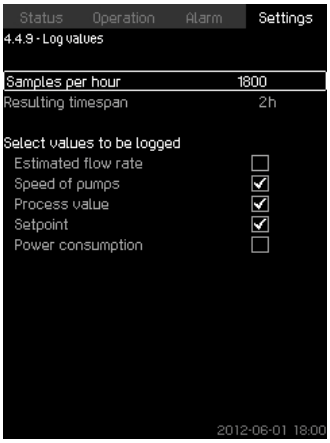


Fig. 18 Log values

The log function enables monitoring of selected parameters. The data can be presented in the display or exported as a .csv file via the built-in Ethernet connection.

Specific energy calculation

For MPC-E and -EC systems with a flowmeter connected, the CU 352 can calculate and show the specific energy used. It is shown as two values, the actual value and the average value.

Number of starts per hour

This function limits the number of pump starts and stops per hour. It reduces noise emission and improves the comfort of systems with mains-operated pumps.

Each time a pump starts or stops, the CU 352 will calculate when the next pump is allowed to start or stop in order not to exceed the permissible number of starts per hour.

This function always allows pumps to be started to meet the requirement, but pump stops will be delayed, if needed, in order not to exceed the permissible number of starts/stops per hour.

Standby pumps

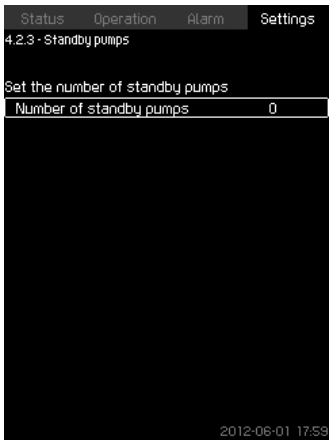


Fig. 19 Standby pumps

It is possible to let one or more pumps function as standby pumps. A system with for instance four pumps, one having the status of standby pump, will run like a system with three pumps, as the maximum number of pumps in operation is the total number of pumps minus the number of standby pumps.

If a pump is stopped due to a fault, the standby pump will be cut in. This function ensures that the system can maintain the rated performance even if one of the pumps is stopped due to a fault.

The status as standby pump alternates between all pumps of the same type, for instance electronically speed-controlled pumps.

Forced pump changeover

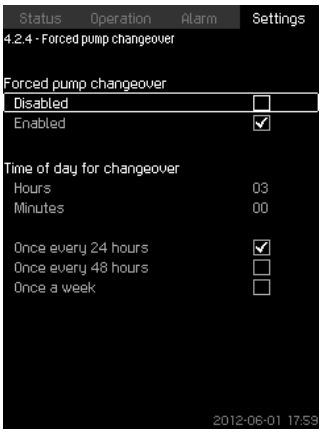


Fig. 20 Forced pump changeover

This function ensures that the pumps run for the same number of operating hours over time.

In certain applications, the required flow remains constant for long periods and does not require all pumps to run. In such situations, pump changeover does not take place naturally, and forced pump changeover may thus be required.

Once every 24 hours, the controller checks if any pump in operation has been running continuously for the last 24 hours.

If this is the case, the pump with the largest number of operating hours will be stopped and replaced by the pump with the lowest number of operating hours.

Pump test run

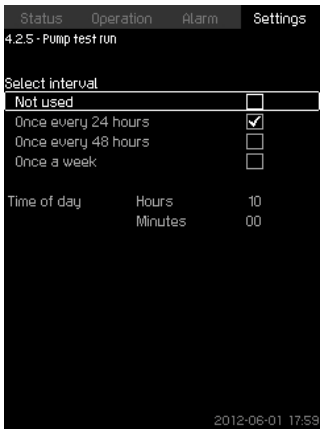


Fig. 21 Pump test run

This function is primarily used in connection with pumps that do not run every day.

Benefits:

- Pumps do not seize up during a long standstill due to deposits from the pumped liquid.
- The pumped liquid does not decay in the pump.
- Trapped air is removed from the pump.
- The pump starts automatically and runs for a short time.

Dry-running protection

This function is one of the most important ones, as dry running may damage bearings and shaft seals.

The inlet pressure of the system or the level in a tank, if any, on the inlet side is monitored. If the inlet pressure or the water level is too low, all pumps will be stopped.

Level switches, pressure switches or analog sensors signalling water shortage at a set level can be used. Furthermore, you can set the system to be reset and restarted manually or automatically after a situation with water shortage.

Stop function

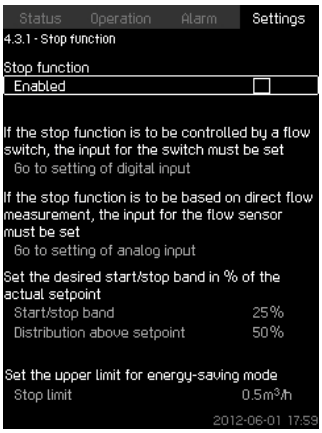


Fig. 22 Stop function

The stop function makes it possible to stop the last pump in operation if there is no or a very small consumption.

Purpose:

- to save energy.
- to prevent heating of shaft seal faces due to increased mechanical friction as a result of reduced cooling by the pumped liquid.
- to prevent heating of the pumped liquid.

This function is only used in booster systems with variable-speed pumps.

Note: Control MPC-S will have on/off control of all pumps.

When the stop function is enabled, the operation of the system will be continuously monitored to detect a low flow rate. When the CU 352 detects no or a low flow rate ($Q < Q_{min}$), it will change from normal constant-pressure operation to on/off control of the last pump in operation.

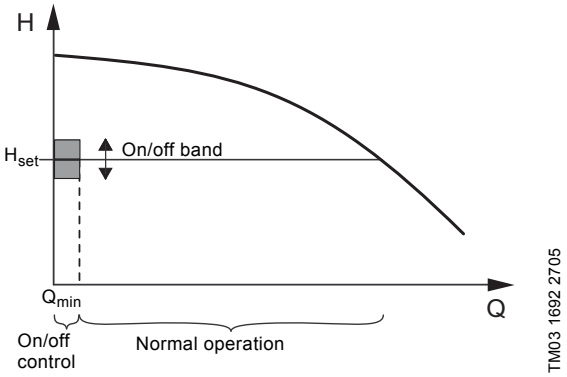


Fig. 23 On/off band

As long as the flow rate is lower than Q_{min}, the pump will run in on/off operation. If the flow rate is increased to above Q_{min}, the pumps will return to normal constant-pressure operation.

Via the CU 352 you can set the Control MPC to operate as energy-efficiently as possible or with the highest level of comfort.

When "Energy-saving mode" is enabled, the start/stop sequence will be higher than "Highest comfort level" during low flow.

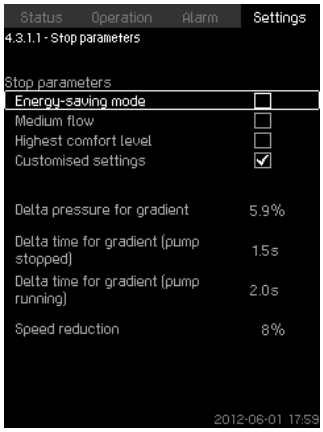


Fig. 24 Stop parameters

Four stop parameters can be selected:

- **Energy-saving mode (factory setting)**
  If you want the highest energy-saving mode possible.
- **Medium flow**
  If you want a compromise between the highest energy-saving mode and highest comfort level.
- **Highest comfort level**
  If you want the highest comfort level without too many pump starts/stops.
- **Customised settings**
  If you want to make your own settings.

Proportional pressure

This function can be used in applications with a large pipe system, for instance a village supplied with water from a pumping station or waterworks.

Purpose:

- to deliver the required water at all times
- to compensate for friction loss
- to keep energy consumption at a minimum
- to ensure the highest comfort level at tapping points, etc.
- to minimise water loss from leaks
- to reduce wear and tear on pipes.

In situations with high flow rates, the pressure loss in the pipe system is relatively high. In order to deliver a system pressure of 5 bar in such a situation, the discharge pressure of the system should be set to 6 bar if the pressure loss in the pipe system is 1 bar.

In a low-flow situation, the pressure loss in the pipe system may only be 0.2 bar. Here the system pressure would be 5.8 bar if the setpoint was fixed to 6 bar. That is 0.8 bar too high compared with the peak situation above.

To compensate for this excessive system pressure, the proportional-pressure function of the CU 352 automatically adapts the setpoint to the actual flow rate. The adaptation can be linear or square. Such an automatic adaptation offers you large energy savings and optimum comfort at tap point!

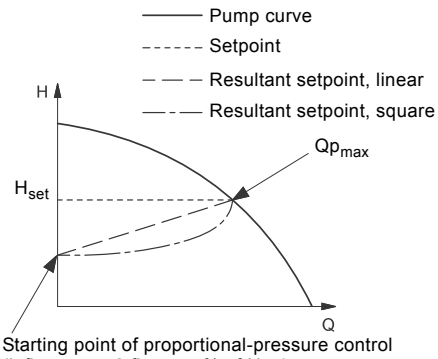


Fig. 25 Proportional-pressure control

Note: Qp_{max} is the expected maximum flow rate. It can either be set to the maximum flow the system can deliver at a determined setpoint, or a value can be entered manually based on a known or assessed maximum flow rate.

Example

Influence at 0 flow (Q0) = pressure loss in supply pipe x 100 / setpoint.

Influence at 0 flow (Q0) = 1 bar x 100 / 6 bar = 16.67 %.

Setpoint at Q_{min} with proportional-pressure control: 6 bar - (6 bar x 0.1667) = **5 bar**.

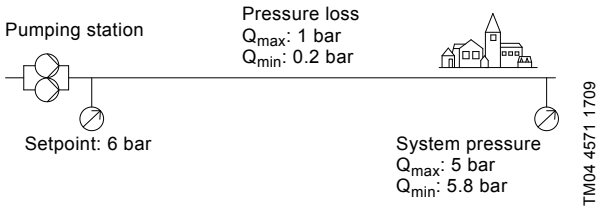


Fig. 26 Without proportional-pressure control

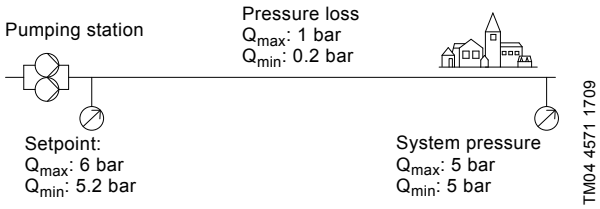


Fig. 27 With proportional-pressure control

Clock program

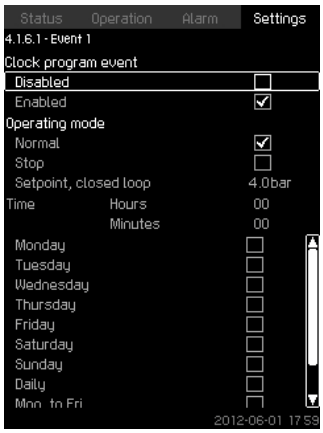


Fig. 28 Clock program

This function makes it possible to set up to ten events with specification of day and time for their activation/deactivation.

An example of application is sprinkling of golf courses at fixed times for the individual greens. The clock program can also be used for automatic night-time duty in circulation systems.

Setpoint ramp

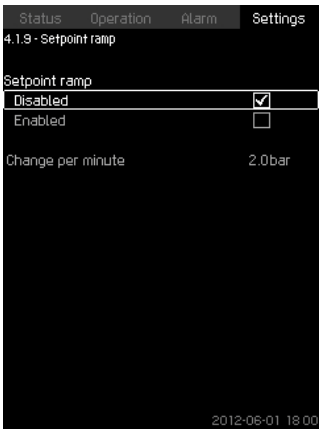


Fig. 29 Setpoint ramp

If this function is enabled, any setpoint change made via the controller, via clock program, when changing between alternative setpoints or via a SCADA system will be made gradually over time. In this way, smooth setpoint changes can be made, thus causing no discomfort to the user.

Pilot pump

The pilot pump will take over the operation from the main pumps in periods when the consumption is so small that the stop function of the main pumps is activated.

Purpose:

- to reduce the necessary size of the diaphragm tank
- to reduce the number of operating hours of the main pumps.

Soft pressure build-up

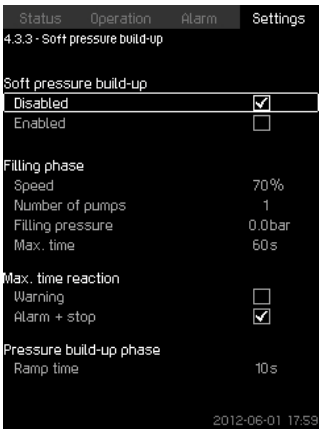


Fig. 30 Soft pressure build-up

This function ensures a soft start of systems with for instance empty pipework.

It has two phases:

1. The pipework is slowly filled with water.
2. When the pressure sensor of the system detects that the pipework has been filled with water, the pressure will be increased until it reaches the setpoint.
   See fig. 31.

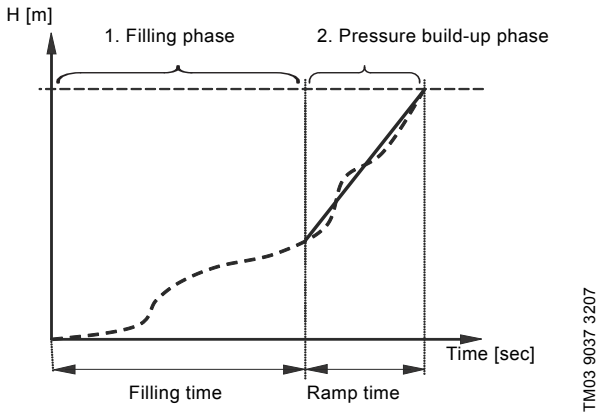


Fig. 31 Filling and pressure build-up phases

The function can be used for preventing water hammer in high-rise buildings with unstable power supply or in irrigation systems.

Emergency run

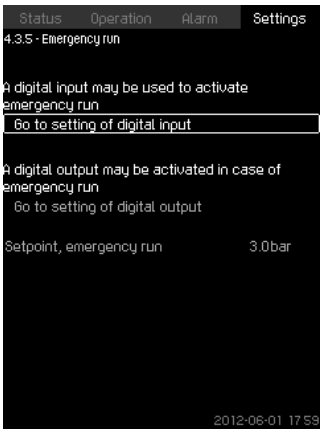


Fig. 32 Emergency run

This function is especially suited for important systems where the operation must not be interrupted. The function will keep all pumps running regardless of warnings or alarms. The pumps will run according to a setpoint set specifically for this function.

Reduced operation

This function makes it possible to reduce the operation of the system via a digital input. The function is used in applications where the mains power is sometimes switched to generator power. To avoid using more power than the generator can deliver, the system can be derated via a digital input.

Pumps outside duty range

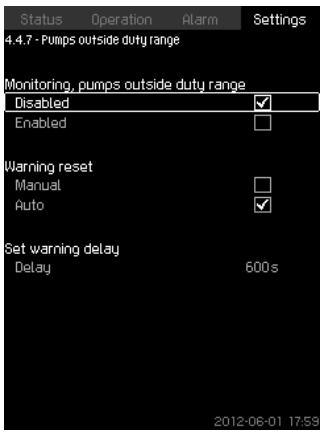


Fig. 33 Pumps outside duty range

This function will give a warning if the duty point of the pumps moves outside the defined range. For instance, if the inlet pressure becomes lower than a minimum permissible value, thus causing a risk of cavitation for some pump types.

Pressure relief

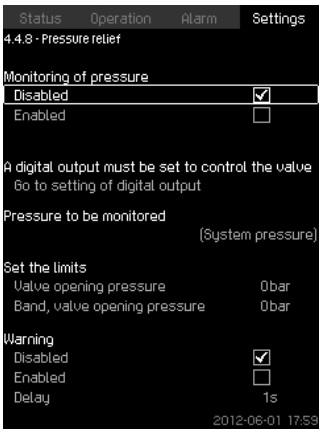


Fig. 34 Pressure relief

The purpose of this function is to reduce the pressure in the pipework by opening a solenoid valve if the pressure exceeds a set limit. If the pressure is not reduced within a given time, the solenoid valve will close, and a warning can be given.

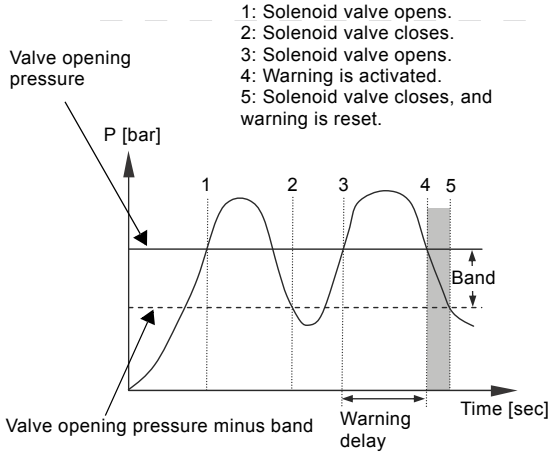


Fig. 35 Pressure relief

Example

The function can for instance be used in a pressure-holding system as shown in fig. 36.

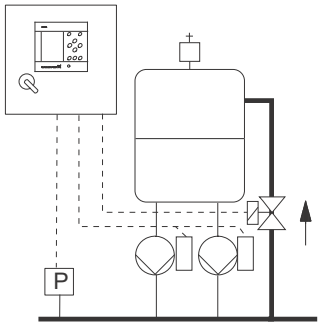


Fig. 36 Pressure-holding system

Pump stop attempt

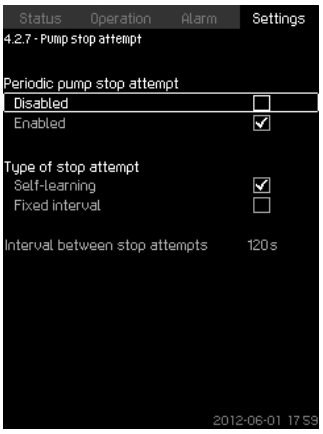


Fig. 37 Pump stop attempt

This function makes it possible to set automatic stop attempts of a pump when several pumps are running. The function ensures that the optimum number of pumps is always running, in terms of energy consumption. At the same time, the purpose is to avoid disturbances in connection with automatic stop of pumps.
Stop attempts can either take place with a fixed interval or by self-learning. If self-learning is selected, the interval between stop attempts under constant conditions will be doubled if repeated attempts to stop the pump fail.

Pump start and stop speed

The function controls the starting and stopping of pumps.

There are two options:

1. Calculated speed (recommended)

This function ensures that the optimum number of pumps is always running at a desired duty point, in terms of energy consumption. The CU 352 calculates the required number of pumps and their speed.

2. Fixed speed

The pumps are started and stopped at speeds set by the user.

Limit 1 and 2 exceeded

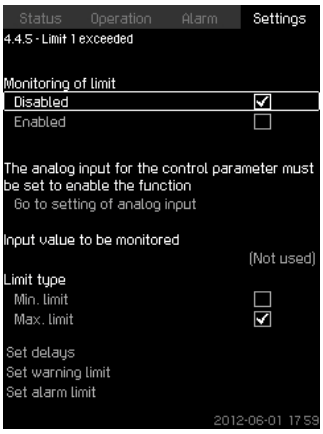


Fig. 38 Limit 1 and 2 exceeded

With this function, the CU 352 can monitor set limits of analog values. It will react if the values exceed the limits. Each limit can be set as a maximum or minimum value. For each of the monitored values, a warning limit and an alarm limit must be defined.

The function enables monitoring of two different locations in a pump system at the same time.

Example

The Control MPC controls the pumps according to the pressure measured at a consumer. The function is set to monitor the pressure at the consumer while the discharge pressure of the pumps is monitored at the same time. If the discharge pressure of the pumps exceeds the set maximum value, a warning and/or an alarm will be given, and the pumps are stopped. The purpose is to ensure that the discharge pressure of the pumps does not become critical.

Password

Fig. 39 Password

Passwords make it possible to limit the access to the menus "Operation" and "Settings" in the controller. If the access is limited, it will not be possible to view or set any parameter in the menus.

5. Installation

Mechanical installation

Location

Control MPC must be installed in a well-ventilated room to ensure sufficient cooling of the control cabinet and its components.

Note: Control MPC is not designed for outdoor installation and must not be exposed to direct sunlight.

Electrical installation

The electrical installation must be carried out by authorised personnel in accordance with local regulations.

- The electrical installation of the Control MPC must be carried out according to enclosure class IP54.
- Check that the supply voltage and frequency correspond to the values stated on the nameplate.
- Make sure that the conductor cross-section meets the specifications in the wiring diagram.

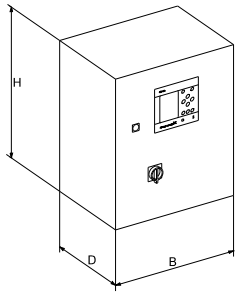
Note: The mains connection must be carried out according to the wiring diagram supplied with the product.

6. Technical data

Control MPC-E

Starting method of the motors:

- E (electronic soft start via internal frequency converter).



TM03 9749 4507

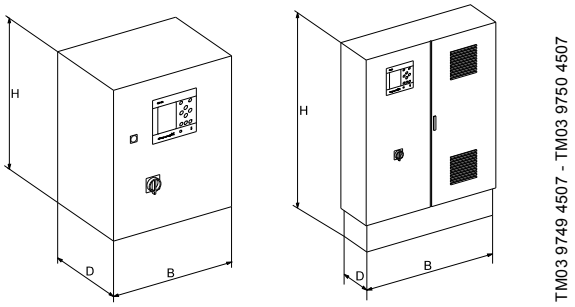
Dimensions and weight

Motor [kW]	Mounting of cabinet	Starting method	Mains supply						Control MPC for two pumps		Control MPC for three pumps		Control MPC for four pumps		Control MPC for five pumps		Control MPC for six pumps	
			3 x 400/230 V, 50 Hz, PE	3 x 400 V, 50 Hz, PE	3 x 380/220 V, 60 Hz, PE	3 x 380 V, 60 Hz, PE	3 x 380-415 V, 50/60 Hz, PE	3 x 380-415/220-240 V, 50/60 Hz, PE	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]
0.37	-	E						•	600/380/210	20	600/380/210	21	600/380/210	21	600/380/210	21	600/380/210	22
0.55	Wall	E						•	600/380/210	21	600/380/210	21	600/380/210	21	600/380/210	21	600/380/210	22
							•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
0.75	Wall	E						•	600/380/210	20	600/380/210	21	600/380/210	21	600/380/210	21	600/380/210	22
							•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
1.1	Wall	E						•	600/380/210	20	600/380/210	21	600/380/210	21	600/380/210	21	600/380/210	22
							•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
1.5	Wall	E					•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
2.2	Wall	E					•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
3	Wall	E					•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
4	Wall	E					•		600/380/210	23	600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36
5.5	Wall	E					•		600/380/210	24	600/380/210	24	600/380/210	25	600/380/210	26	600/600/210	36
7.5	Wall	E					•		600/380/210	24	600/380/210	25	600/380/210	25	600/600/210	36	600/600/210	37
11	Wall	E					•		600/380/210	24	600/380/210	25	600/600/210	36	600/600/210	37	760/760/300	60
15	Wall	E					•		600/380/210	24	600/600/210	36	760/760/300	59	760/760/300	60	760/760/300	61
18.5	Wall	E					•		600/380/210	25	600/600/210	36	760/760/300	59	760/760/300	60	1000/800/300	76
22	Wall	E					•		600/600/210	35	760/760/300	58	760/760/300	59	1000/800/300	75	1000/800/300	76

Control MPC-EC

Starting method of the motors:

- E (electronic soft start via internal frequency converter).



TM03 9749 4507 - TM03 9750 4507

Dimensions and weight

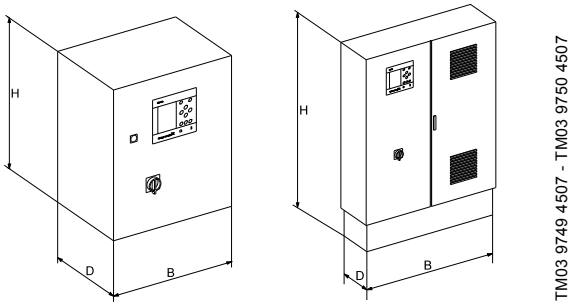
Motor [kW][1]	Mounting of cabinet	Starting method	Mains supply						Control MPC for two pumps		Control MPC for three pumps		Control MPC for four pumps		Control MPC for five pumps		Control MPC for six pumps	
			3 x 400/230 V, 50 Hz, PE	3 x 400 V, 50 Hz, PE	3 x 380/220 V, 60 Hz, PE	3 x 380 V, 60 Hz, PE	3 x 380-415 V, 50/60 Hz, PE	3 x 380-415/220-240 V, 50/60 Hz, PE	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]
30	Wall	E					•		1900/1200/600	293	2000/2400/600	535	2000/2400/500	542	2000/2400/500	585	2000/2400/500	614
37	Wall	E					•		2000/1200/600	298	2000/2400/600	532	2000/2400/500	560	2000/2400/500	597	2000/4800/600	105
45	Wall	E					•		2000/2400/600	536	2000/2400/600	583	2000/3600/600	838	2000/3600/600	883	2000/4800/600	1149
55	Wall	E					•		2000/2400/600	530	2000/2400/600	591	2000/3600/600	844	2000/3600/600	900	2000/4800/600	1144
75	Wall	E					•		2000/2400/600	579	2000/2400/600	645	2000/3600/600	929	2000/3600/600	995	2000/4800/600	1298

[1] Control MPC-EC of 0.37 and up to and including 22 kW is available as an option.

Control MPC-F

Starting method of the motors:

- DOL (direct-on-line starting)
- SD (star-delta starting).



TM03 9749 4507 - TM03 9750 4507

Dimensions and weight

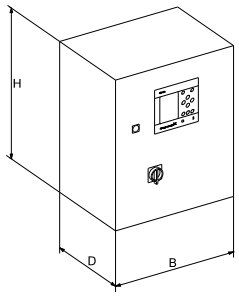
Motor [kW][1]	Mounting of cabinet	Starting method	Mains supply						Control MPC for two pumps		Control MPC for three pumps		Control MPC for four pumps		Control MPC for five pumps		Control MPC for six pumps	
			3 x 400/230 V, 50 Hz, PE	3 x 400 V, 50 Hz, PE	3 x 380/220 V, 60 Hz, PE	3 x 380 V, 60 Hz, PE	3 x 380-415 V, 50/60 Hz, PE	3 x 380-415/220-240 V, 50/60 Hz, PE	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]
0.55	Floor	DOL					●		1200/800/400	97	1200/800/400	99	1200/800/400	102	1200/800/400	103	1200/800/400	106
0.75	Floor	DOL					●		1200/800/400	97	1200/800/400	99	1200/800/400	102	1200/800/400	103	1200/800/400	106
1.1	Floor	DOL					●		1200/800/400	97	1200/800/400	99	1200/800/400	102	1200/800/400	103	1200/800/400	107
1.5	Floor	DOL					●		1200/800/400	97	1200/800/400	99	1200/800/400	102	1200/800/400	103	1200/800/400	107
2.2	Floor	DOL					●		1200/800/400	97	1200/800/400	99	1200/800/400	102	1200/800/400	103	1200/800/400	107
3	Floor	DOL					●		1200/800/400	97	1200/800/400	100	1200/800/400	102	1200/800/400	103	1200/800/400	107
4	Floor	DOL					●		1200/800/400	98	1200/800/400	100	1200/800/400	102	1200/800/400	103	1200/800/400	108
5.5	Floor	SD					●		1200/800/400	105	1200/800/400	107	1200/800/400	111	1200/800/400	115	1200/1000/400	139
7.5	Floor	SD					●		1200/800/400	105	1200/800/400	107	1200/800/400	111	1200/800/400	116	1200/1000/400	140
11	Floor	SD					●		1200/800/400	111	1200/800/400	114	1200/800/400	118	1200/1000/400	144	1200/1000/400	152
15	Floor	SD					●		1200/800/400	112	1200/1000/400	144	1200/1000/400	148	1200/1000/400	150	1200/1000/400	153
18.5	Floor	SD					●		1200/800/400	117	1200/1000/400	145	1200/1000/400	150	1800/1200/400	264	1800/1200/400	268
22	Floor	SD					●		1200/800/400	134	1800/1200/400	268	1800/1200/400	287	1800/1200/400	294	1800/1200/400	307
30	Floor	SD					●		1800/1200/400	264	1800/1200/400	284	1800/1200/400	293	1800/3600/500	665	1800/3600/500	679
37	Floor	SD					●		1800/2400/500	458	1800/2400/500	467	1800/3600/500	676	1800/3600/500	685	1800/3600/500	694
45	Floor	SD					●		1800/2400/500	473	1800/2400/500	489	1800/3600/500	688	1800/3600/500	696	1800/3600/500	708
55	Floor	SD					●		1800/2400/500	476	1800/2400/500	493	1800/3600/500	689	1800/3600/500	706	1800/3600/500	719
75	Floor	SD					●		1800/2400/500	499	1800/2400/500	515	1800/3600/500	717	1800/3600/500	751	1800/3600/500	794

[1] On request, Control MPC-F is available for the control and monitoring of pumps with motors up to 315 kW. Contact Grundfos for technical data of these control cabinets.

Control MPC Series 2000

Starting method of the motors:

- E (electronic soft start via internal frequency converter).



TM03 9749 4507

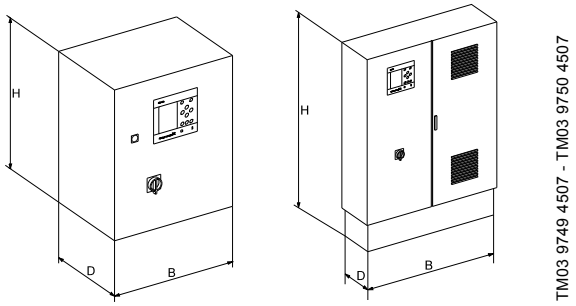
Dimensions and weight

Motor [kW]	Mounting of cabinet	Starting method	Mains supply	Control MPC for one to six pumps	
			1 x 100-240 V (± 10 %), 50/60 Hz, PE (Class 1)	H/W/D [mm]	Weight [kg]
All sizes	-	E	•	300/380/155	9.3

Control MPC-S

Starting method of the motors:

- DOL (direct-on-line starting)
- SD (star-delta starting).



TM03 9749 4507 - TM03 9750 4507

Dimensions and weight

Motor [kW]	Mounting of cabinet	Starting method	Mains supply						Control MPC for two pumps		Control MPC for three pumps		Control MPC for four pumps		Control MPC for five pumps		Control MPC for six pumps	
			3 x 400/230 V, 50 Hz, PE	3 x 400 V, 50 Hz, PE	3 x 380/220 V, 60 Hz, PE	3 x 380 V, 60 Hz, PE	3 x 380-415 V, 50/60 Hz, PE	3 x 380-415/220-240 V, 50/60 Hz, PE	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]	H/W/D [mm]	Weight [kg]
0.37	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
0.55	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
0.75	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
1.1	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
1.5	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
2.2	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
3	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
4	Wall	DOL					•		600/380/210	25	600/600/210	36	600/600/210	37	600/600/210	38	600/600/210	39
5.5	Wall	SD					•		600/600/350	40	760/760/300	59	760/760/300	62	760/760/300	64	1000/800/300	79
7.5	Wall	SD					•		600/600/350	40	760/760/300	59	760/760/300	62	760/760/300	64	1000/800/300	79
11	Wall	SD					•		600/600/350	40	760/760/300	59	760/760/300	63	760/760/300	65	-	-
	Floor								-	-	-	-	-	-	-	-	1200/800/300	117
15	Wall	SD					•		600/600/350	41	760/760/300	60	1000/800/300	79	-	-	-	-
	Floor								-	-	-	-	-	-	1200/800/300	116	1200/800/300	117
18.5	Wall	SD					•		760/760/300	59	760/760/300	61	-	-	-	-	-	-
	Floor								-	-	-	-	1200/800/300	116	1200/800/300	118	1800/1000/400	200
22	Wall	SD					•		760/760/300	59	1000/800/300	78	-	-	-	-	-	-
	Floor								-	-	-	-	1200/800/300	116	1800/1000/400	197	1800/1000/400	200
30	Wall	SD					•		1000/800/300	77	1000/800/300	81	-	-	-	-	-	-
	Floor								-	-	-	-	1800/800/400	172	1800/1200/400	252	1800/1600/400	289
37	Wall	SD					•		1000/800/300	86	-	-	-	-	-	-	-	-
	Floor								-	-	2800/1000/400	205	1800/1600/400	295	1800/1600/400	303	1800/1600/400	314
45	Floor	SD					•		1800/800/400	173	1800/1200/400	255	1800/1600/400	298	1800/1600/400	306	1800/1600/400	320
55	Floor	SD					•		1800/800/400	173	1800/1200/400	256	1800/1600/400	298	1800/1600/400	308	1800/1600/400	320
75	Floor	SD					•		1800/1200/400	253	1800/1200/400	263	1800/1600/400	310	1800/1600/400	333	1800/1600/400	373

7. Optional equipment

All optional equipment, if required, must be specified when ordering the Control MPC, as it must be fitted from factory prior to delivery.

Dry-running protection

We recommend dry-running protection for pumps connected to the Control MPC.

Description	Range [bar]	Product number
Dry-running protection by means of electrode relay (without electrodes and electrode cable)*)	-	96020079

*) Only one type of dry-running protection can be selected, as it must be connected to the same digital input of the CU 352. This also applies to level switches. For further information about the CU 352, see page 8.

Emergency operation switch

The emergency operation switch enables emergency operation if a fault occurs in the CU 352.

Note: The motor protection and the dry-running protection are not activated during emergency operation.

Note: Order one switch for each pump.

Description	Location	Product number
Grundfos pumps with integrated frequency converter	In control cabinet	96020100
Pumps with external frequency converter		96020099
Pumps for mains operation		96020098

Isolating switch

By means of an isolating switch fitted inside the control cabinet, the power supply to the pump can be switched off during repair, etc.

Note: This option only applies to Control MPC-F.

Note: Order one switch for each pump.

Description	Motor current/ starting method	Location	Product number
Isolating switch	≤ 16 A, DOL	In control cabinet	96020101
	> 16 A < 25 A, DOL		96020102
	> 25 A < 40 A, DOL		96020103
	> 40 A < 63 A, DOL		96020104
	> 63 A < 80 A, DOL		96020105
	> 80 A < 100 A, DOL		96020106
	> 100 A < 125 A, DOL		96020107
	> 125 A < 175 A, DOL		96020108
	≤ 16 A, Y/Δ		96020109
	> 16 A < 25 A, Y/Δ		96020110
	> 25 A < 40 A, Y/Δ		96020111
	> 40 A < 63 A, Y/Δ		96020112
	> 63 A < 80 A, Y/Δ		96020113
	> 80 A < 100 A, Y/Δ		96020114
	> 100 A < 125 A, Y/Δ		96020115
	> 125 A < 175 A, Y/Δ		96020116

Main switch for neutral conductor

The main switch with switching off of the neutral conductor is only used in connection with single-phase motors. This option is to be selected according to the local rules for the installation site. As standard, the main switch does not switch off the neutral conductor.

Description	Rated current of Control MPC [A]	Location	Product number
Main switch with switching off of the neutral conductor	40	In control cabinet	96020023
	100		96020022
	175		96020021
	250		96020020
	400		96020019
	630		96020018
	800		96020017
	1250		96020016
	1750		96020015
	2000		96020014
	2500		96020013

Operating light, system

TM04 4112 0709

Fig. 40 Operating light, system

The operating light is on when the system is in operation.

Description	Location	Product number
Operating light, system	In door of control cabinet	96020286

Operating light, pump

TM04 4112 0709

Fig. 41 Operating light, pump

The operating light is on when the relevant pump is in operation.

Note: Order one operating light for each pump.

Description	Operating light for	Location	Product number
Operating light, pump	Pump with integrated frequency converter	In door of control cabinet	96020330
	Pump with external frequency converter		96020329
	Pump in Control MPC-F systems		96020413
	Mains-operated pump		96020139

Example: For a Control MPC system consisting of one pump with integrated frequency converter and two mains-operated pumps, order one operating light No 96020330 and two operating lights No 96020139.

Fault light, system

TM04 3254 3908

Fig. 42 Fault light, system

The fault light is on if a fault occurs in the system.

Note: Phase failure causes no fault indication.

Description	Location	Product number
Fault light, system	In door of control cabinet	96020132

Fault light, pump

TM04 3254 3908

Fig. 43 Fault light, pump

The fault light is on if a fault occurs in the pump.

Note: Order one fault light for each pump.

Description	Fault indicator light for	Location	Product number
Fault light, pump	E-pump	In door of control cabinet	96020332
	External frequency converter		96020131
	Mains-operated pump		96020331
	MLE pump		96020133

Panel light and socket

The panel light is on when the door of the control cabinet is open.

Panel lights for 50 Hz are in accordance with EN 60529/10.91.

Note: The panel light and socket are to be connected to a separate power supply.

Description	Type	Location	Product number
Panel light	14 W, 240 V, 50 Hz, socket	In control cabinet	96020296
	14 W, 220-230 V, 50 Hz, socket		96020126
	14 W, 120 V, 60 Hz, socket		96020076

IO 351B interface

GrA0815

Fig. 44 IO 351B interface

This option features a factory-fitted and non-programmed IO 351B interface enabling exchange of nine additional digital inputs, seven additional digital outputs and two additional analog inputs.

Note: As standard, the CU 352 supports the installation of one IO 351B interface.

Description	Location	Product number
Input/output interface via the IO 351B	In control cabinet	96020259

Backup battery

TM02 7159 2703

The battery is connected to the CU 352 as a backup in case the power supply is interrupted.

Description	Location	Product number
Backup battery for CU 352 (7Ah)	In control cabinet	96020421

Ethernet

The Ethernet connection makes it possible to get unlimited access to the setting and monitoring of the Control MPC from a remote PC.

Setting and monitoring via an Ethernet connection thus correspond to local setting and monitoring via the CU 352 control panel.

Description	Product number
Ethernet	96020338

CIM communication interface modules

GrA6121

Fig. 45 Grundfos CIM communication interface module

The CIM modules enable communication of operating data, such as measured values and setpoints, between the Control MPC and a building management system.

Note: CIM modules must be fitted by authorised personnel.

The CIM module enables transfer of data such as:

- operating mode
- setpoint
- control mode
- warnings and alarms
- power/energy consumption.

We offer the following CIM modules:

Module	Fieldbus protocol	Product number
CIM 050	GENIbus	96020422
CIM 110	LONworks	96020415
CIM 150	Profibus DP	96020416
CIM 200	Modbus RTU	96020417
CIM 250	GSM	96020418
CIM 270	GRM	96020419
CIM 300	BACnet MS/TP	96020420

* Antenna not included. See below.

Antennae for CIM 250

Description	Product number
Antenna for roof	97631956
Antenna for desk	97631957

Output for pressure-relief function

This option is used in connection with pressure-holding systems only.

It features a fully cabled and configured digital output to the CU 352 via an IO 351B module.

Note: The IO 351B module is included in this option.

Description	Location	Product number
Output for pressure-relief function	In control cabinet	96020291

Transient voltage protection

The transient voltage protection protects the system against high-energy transients.

Description	Range	Product number
Transient voltage protection	3 x 400 V, N, PE, 50/60 Hz	96020181
	3 x 400 V, PE, 50/60 Hz	96020182

Lightning protection

The system can be protected against strokes of lightning. The lightning protection is in accordance with IEC 61024-1:1992-10, class B and C.

Note: Additional earthing facilities must be arranged by the customer at the installation site.

Description	Range	Product number
Lightning protection	3 x 400 V, N, PE, 50/60 Hz	96020125
	3 x 400 V, PE, 50/60 Hz	96020180

Phase-failure monitoring

The system should be protected against phase failure.

Note: A potential-free switch is available for external monitoring.

Description	Location	Product number
Phase-failure monitoring	In control cabinet	96020117

Beacon

The beacon is on in case of a system alarm.

Note: Phase failure causes no alarm indication.

Description	Location	Product number
Beacon	On top of control cabinet	96020176
	External[1)]	96020177

1) Cable is not included.

Potential-free contacts

Potential-free contacts to indicate that the pumps in the system are running or that an alarm is present.

Description	Location	Product number
Control MPC-E/-EC: < 7.5 kW, max. 250 V, NC 1 A, NO 2A	In control cabinet	96020412
Control MPC-E/-EC: > 11 kW, max. 250 V, NC 1 A, NO 2A		96020414
Control MPC-F: Max. 250 V, NC 1 A, NO 2 A		96020411
Control MPC-S: Max. 250 V, NC 1 A, NO 2 A		96020410

Audible alarm

The audible alarm sounds in case of a system alarm.

Note: Phase failure causes no alarm indication.

Description	Sound pressure level	Location	Product number
Audible alarm	80 dB(A)	In control cabinet	96020178
	100 dB(A)		96020179

Voltmeter

A voltmeter indicates the mains voltage between the mains phases and between the neutral conductor, N, and the mains phases.

Description	Location	Product number
Voltmeter, 500 V (two phases)	In door of control cabinet	96020118
Voltmeter, 500 V, with changeover switch (all phases)		96020119

Ammeter

An ammeter indicates the current of one phase per pump.

Note: Order one ammeter for each pump.

Description	Current [A]	Location	Product number
Ammeter	6	In door of control cabinet	96020120
	16		96020121
	25		96020284
	40		96020122
	100		96020123
	160		96020124
	250		96020285
	400		96020281

8. Accessories

Grundfos GO Remote

The Grundfos GO Remote is used for wireless infrared or radio communication with the pumps.

Various Grundfos GO Remote variants are available. The variants are described in the following.

MI 201

The MI 201 is a complete solution, consisting of an Apple iPod touch 4G and a Grundfos cover for infrared and radio communication with Grundfos pumps or systems.

TM05 3886 1712

Fig. 46 MI 201

Supplied with the product:

- Apple iPod touch 4G incl. accessories
- Grundfos MI 201 cover
- battery charger
- quick guide.

MI 202

The MI 202 is an add-on module with built-in infrared and radio communication. The MI 202 can be used in conjunction with Apple iPod Touch 4, iPhone 4 or later.

TM05 3887 1712

Fig. 47 MI 202

Supplied with the product:

- Grundfos MI 202
- quick guide.

MI 301

The MI 301 is a module with built-in infrared and radio communication. The MI 301 must be used in conjunction with an Android or iOS-based Smartphone with a Bluetooth connection. The MI 301 has rechargeable Li-ion battery and must be charged separately.

TM05 3890 1712

Fig. 48 MI 301

Supplied with the product:

- Grundfos MI 301
- battery charger
- quick guide.

Product numbers

Grundfos GO Remote variant	Product number
Grundfos MI 201	98140638
Grundfos MI 202	98046376
Grundfos MI 301	98046408

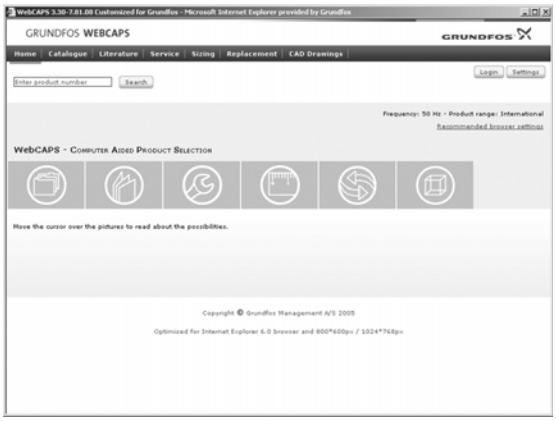
Supported units

Make	Model	Operating system	MI 201	MI 202	MI 301
Apple	iPod touch 4G	iOS 5.0 or later	•	•	•
	iPhone 4G, 4GS		-	•	•
HTC	Desire S	Android 2.3.3 or later	-	-	•
	Sensation	Android 2.3.4 or later	-	-	•
Samsung	Galaxy S II		-	-	•

Note: Similar Android and iOS-based devices may work as well, but are not supported by Grundfos.

9. Further product documentation

WebCAPS



WebCAPS is a **Web**-based **C**omputer **A**ided **P**roduct **S**election program available on www.grundfos.com.

WebCAPS contains detailed information on more than 220,000 Grundfos products in more than 30 languages.

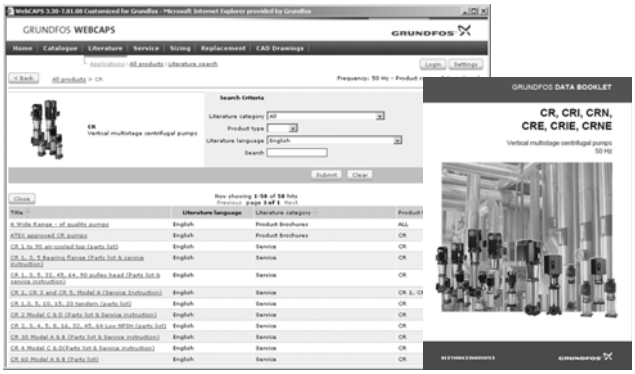
Information in WebCAPS is divided into six sections:

- Catalogue
- Literature
- Service
- Sizing
- Replacement
- CAD drawings.

Catalogue

Based on fields of application and pump types, this section contains the following:

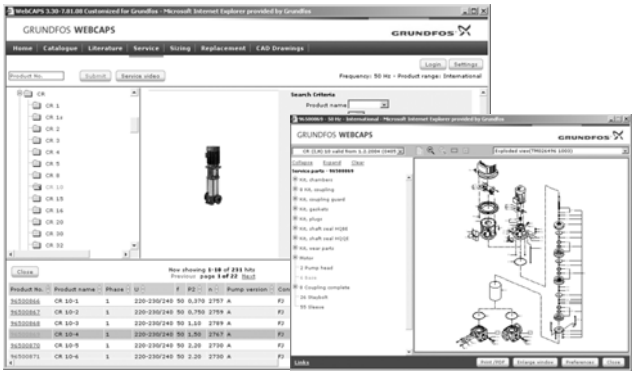
- technical data
- curves (QH, Eta, P1, P2, etc.) which can be adapted to the density and viscosity of the pumped liquid and show the number of pumps in operation
- product photos
- dimensional drawings
- wiring diagrams
- quotation texts, etc.



Literature

This section contains all the latest documents of a given pump, such as

- data booklets
- installation and operating instructions
- service documentation, such as Service kit catalogue and Service kit instructions
- quick guides
- product brochures.



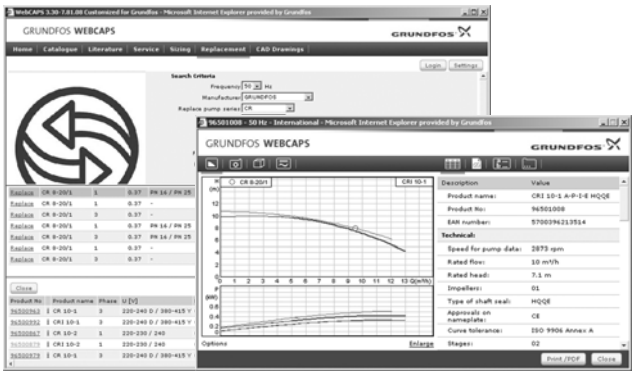
Service

This section contains an easy-to-use interactive service catalogue. Here you can find and identify service parts of both existing and discontinued Grundfos pumps.
Furthermore, the section contains service videos showing you how to replace service parts.

Sizing

This section is based on different fields of application and installation examples and gives easy step-by-step instructions in how to size a product:

- Select the most suitable and efficient pump for your installation.
- Carry out advanced calculations based on energy, consumption, payback periods, load profiles, life cycle costs, etc.
- Analyse your selected pump via the built-in life cycle cost tool.
- Determine the flow velocity in wastewater applications, etc.



Replacement

In this section you find a guide to selecting and comparing replacement data of an installed pump in order to replace the pump with a more efficient Grundfos pump.
The section contains replacement data of a wide range of pumps produced by other manufacturers than Grundfos.

Based on an easy step-by-step guide, you can compare Grundfos pumps with the one you have installed on your site. When you have specified the installed pump, the guide will suggest a number of Grundfos pumps which can improve both comfort and efficiency.

CAD drawings

In this section, it is possible to download 2-dimensional (2D) and 3-dimensional (3D) CAD drawings of most Grundfos pumps.

These formats are available in WebCAPS:

2-dimensional drawings:

- .dxf, wireframe drawings
- .dwg, wireframe drawings.

3-dimensional drawings:

- .dwg, wireframe drawings (without surfaces)
- .stp, solid drawings (with surfaces)
- .eprt, E-drawings.

WinCAPS

Fig. 49 WinCAPS CD-ROM

WinCAPS is a **Win**dows-based **C**omputer **A**ided **P**roduct **S**election program containing detailed information on more than 220,000 Grundfos products in more than 30 languages.

The program contains the same features and functions as WebCAPS, but is an ideal solution if no internet connection is available.

WinCAPS is available on CD-ROM and updated once a year.

GO CAPS

Mobile solution for professionals on the GO!

CAPS functionality on the mobile workplace.

Available on the App Store

BE > THINK > INNOVATE >

Being responsible is our foundation
Thinking ahead makes it possible
Innovation is the essence

96767523 0712
ECM: 1096805

GRUNDFOS A/S . DK-8850 Bjerringbro . Denmark
Telephone: +45 87 50 14 00
www.grundfos.com

GRUNDFOS