

PROFIBUS and PROFINET for Grundfos MP 204

CIU 150 PROFIBUS DP

CIU 500 Ethernet for PROFINET IO

Functional profile and user manual



CONTENTS

	Page
1. Symbols used in this document	2
2. Introduction	3
2.1 About this functional profile	3
2.2 PROFIBUS DP-V0	3
2.3 PROFIBUS DP-V1	3
2.4 Assumptions	3
2.5 Definitions and abbreviations	3
3. System description	4
3.1 PROFIBUS DP (CIU 150)	4
3.2 PROFINET IO (CIU 500)	4
4. Specifications	5
4.1 General data of the CIU unit	5
4.2 CIM 150 PROFIBUS DP	5
4.3 CIM 500 PROFINET IO	5
5. PROFIBUS DP, CIM 150 setup	6
5.1 PROFIBUS bus topology	6
5.2 CIM 150 PROFIBUS module	6
5.3 Connecting the PROFIBUS	6
5.4 Setting the PROFIBUS address	7
5.5 Termination resistors	7
5.6 Status LEDs	7
5.7 Communication watchdog	7
5.8 Reaction to PLC "Stop button"	7
6. PROFINET IO, CIM 500 setup	8
6.1 Connecting the Ethernet cable	8
6.2 Setting the Industrial Ethernet protocol	8
6.3 Setting up the IP-addresses	8
6.4 Establish connection to the Webserver	9
6.5 Status LEDs	9
6.6 DATA and LINK LEDs	9
7. Detailed description of data modules	10
7.1 Data types	10
7.2 Control module (ControlModule, module 1)	10
7.3 Status module (StatusModule, module 4)	11
7.4 Alarm code module (AlarmCode, module 5)	13
7.5 Warning bits module (WarningBits, module 6)	14
7.6 Measurement data modules	15
7.7 Device identification (DeviceIdentification, module 52)	16
7.8 Alarm and warning simulation (EventSimulation, module 3)	17
8. Product simulation	18
8.1 CIU 150 Product Simulation	18
8.2 CIU 500 Product Simulation	18
9. Fault finding	19
9.1 CIU 150	19
9.2 CIU 500	19
10. Grundfos alarm and warning codes	20
11. PROFIBUS address	23

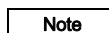
1. Symbols used in this document

**Warning**

If these safety instructions are not observed, it may result in personal injury.

**Caution**

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

**Note**

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

2. Introduction

2.1 About this functional profile

This functional profile describes these protocols for the Grundfos MP 204 motor protector:

- CIU 150 PROFIBUS DP
- CIU 500 PROFINET IO.

The data in this document are subject to change without prior notice. Grundfos cannot be held responsible for any problems caused directly or indirectly by using information in this functional profile.

2.2 PROFIBUS DP-V0

The PROFIBUS DP interface conforms to the PROFIBUS DP-V0 standard for cyclic data transmission.

The option of setting the PROFIBUS DP address via bus is not supported as the CIM 150 has two switches for setting the address.

2.3 PROFIBUS DP-V1

Only the diagnostic part and the extra three bytes of parameterisation data are supported. Acyclic data transmission is not supported.

2.4 Assumptions

This functional profile assumes that the reader is familiar with commissioning and programming of PROFIBUS and PROFINET devices.

2.5 Definitions and abbreviations

ARP	Address Resolution Protocol. Translates IP addresses to MAC addresses
Auto-MDIX	Ensures that both crossover cable types and non-crossover cable types can be used.
CAT5	Ethernet cable type: Has 4 twisted pairs of wires.
CAT5e	Enhanced CAT5 cable with better performance.
CAT6	Cable with very high performance.
CIM	Communication Interface Module.
CIU	Communication Interface Unit.
CRC	Cyclic Redundancy Check, a data error detection method.
DHCP	Dynamic Host Configuration Protocol. Used to configure network devices so that they can communicate on an IP network.
DNS	Domain Name System. Used to resolve host names to IP addresses.
Enumeration	List of values.
GENIbus	Proprietary Grundfos fieldbus standard.
GENIpro	Proprietary Grundfos fieldbus protocol
Grundfos GO	A Grundfos handheld remote control device for controlling Grundfos products via infrared or radio. Based on smart phone technology.
H	Pressure (Head).
HTTP	Hyper Text Transfer Protocol. The protocol commonly used to navigate the world wide web.
IANA	Internet Assigned Numbers Authority.
IP	Internet Protocol
LED	Light-Emitting Diode.

Local mode	The Grundfos product uses the setpoint and operating mode set with a handheld remote control (R100 or Grundfos GO Remote) or by the use of buttons on the pump.
MAC	Media Access Control. Unique network address for a piece of hardware.
MP 204	Grundfos Motor Protector
Ping	Packet InterNet Groper. A software utility that tests connectivity between two TCP/IP hosts.
Q	Flow.
R100	Grundfos handheld infrared remote control.
Remote mode	The Grundfos product uses the setpoint and operating mode set from PROFIBUS.
SELV	Separated or Safety Extra-Low Voltage.
SELV-E	Separated or Safety Extra-Low Voltage with Earth connection.
SMA	SubMiniature version A. Coaxial radio signal cable connection standard.
SMTP	Simple Mail Transfer Protocol
SNTP	Simple Network Time Protocol. Used for clocks synchronization between computer systems.
TCP	Transmission Control Protocol. Protocol suitable for Internet communication and Industrial Ethernet communication.
TCP/IP	Transmission Control Protocol/ Internet Protocol. Protocol suitable for Internet communication.
Transmission speed	Bits transferred per second, bits/s.
URL	Uniform Resource Locator. The address used to connect to a server.
UTC	Coordinated Universal Time, the primary time standard by which the world regulates clocks and time.
UTF-8	Unicode Transformation Format (character encoding).

3. System description

The system diagrams give an overview of how to connect the CIU 150 or CIU 500 to the Grundfos MP 204 that is to be connected to a PROFIBUS or PROFINET network.

CIU

The CIU unit is a box incorporating a power supply module and a CIM 150/500 module. It can either be mounted on a DIN rail or on a wall. See fig. 1 and fig. 2. The enclosure class is IP54.

3.1 PROFIBUS DP (CIU 150)

The CIU 150 offers a PROFIBUS DP connection to the MP 204.

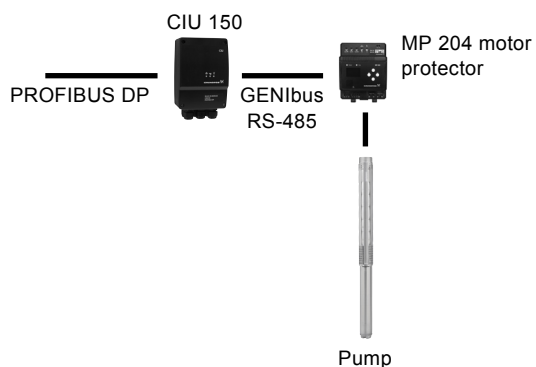


Fig. 1 Grundfos SP pump connected to an MP 204 which is then connected to PROFIBUS DP via a CIU 150

3.2 PROFINET IO (CIU 500)

The CIU 500 offers a PROFINET IO connection to the MP 204.

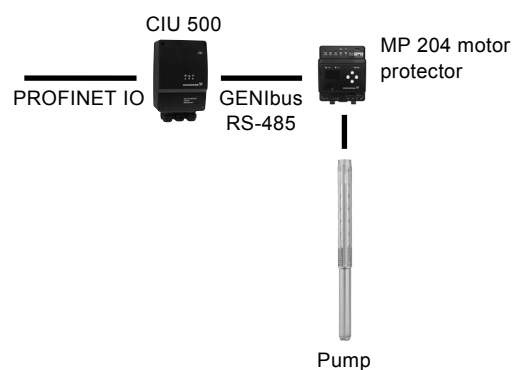


Fig. 2 Grundfos SP pump connected to an MP 204 which is then connected to PROFINET IO via a CIU 500

4. Specifications

4.1 General data of the CIU unit

General data	Description	Comments
Ambient humidity	30 % to 95 %	Relative, non-condensing.
Operating temperature	-20 °C to +45 °C	
Storage temperature	-25 °C to +70 °C	
GENIbus visual diagnostics	LED2	Will be in one of these states: Off, constantly green, flashing red, constantly red. See section 5.6 for PROFIBUS DP and section 6.5 for PROFINET IO.
Power supply (CIU)	24-240 V	Located in the CIU.
GENIbus connection type (CIU)	RS-485, 3-wire + screen	Conductors: A, B and Y.
CIU box enclosure class	IP54	
CIU box dimensions (H x W x D)	182 x 108 x 82 mm	

4.2 CIM 150 PROFIBUS DP

The table below provides an overview of the specifications for the Grundfos CIM 150 and CIU 150. For further details, please refer to the specific sections of this functional profile.

General data	Description	Comments
PROFIBUS implementation class	DP-V0	Intelligent pump profile.
PROFIBUS connector	Screw-type terminal	A, B, DGND, VP (+5 V).
PROFIBUS connection type	RS-485, two-wire	Conductors: A, B.
Maximum cable length	100 metres at 12 Mbits/s	Corresponds to 328 feet. See section 5.3.1 Data transmission rates and cable length .
Slave address	1-126	Set via rotary switches SW3 and SW4. See section 5.4 Setting the PROFIBUS address .
Line termination	On or off	Set via DIP switches SW1 and SW2. See section 5.5 Termination resistors . Auto detected
Recommended cable cross sectional copper area	0.20 - 0.25 mm ²	AWG24 or AWG23
Supported transmission speed	9.6 Kbits/s to 12 Mbits/s	Auto detected.
PROFIBUS visual diagnostics	LED1	Off, constantly green, flashing red, constantly red. See section 5.6 Status LEDs .
Maximum number of PROFIBUS devices at a physical network segment	32	Up to 125 devices if repeaters are used (physically segmented network).

4.3 CIM 500 PROFINET IO

The table below provides an overview of the specifications for the Grundfos CIM/CIU 500 Ethernet for PROFINET IO. For further details, please refer to the specific sections of this functional profile.

Modbus TCP specifications	Description	Comments
Application layer	DHCP, HTTP, Ping, FTP, SMTP, SNTP, PROFINET IO	Rotary switch in position 0.
Transport layer	TCP	
Internet layer	Internet protocol V4 (IPv4)	
Link layer	ARP, Media Access Control (Ethernet)	
Ethernet cable	Screened/unscreened, twisted-pair cables, CAT5, CAT5e or CAT6	Supports auto cable-crossover detecting (Auto-MDIX)
Maximum cable length	100 metres at 10/100 Mbits/s	Corresponds to 328 feet.
Transmission speed	10 Mbits/s, 100 Mbits/s	Auto-detected.
Industrial Ethernet protocols	PROFINET IO, Modbus TCP	Selected with rotary switch, section 6.2.

5. PROFIBUS DP, CIM 150 setup

5.1 PROFIBUS bus topology

The PROFIBUS-preferred bus topology is daisy chaining as illustrated in fig. 3. The end devices of a physical bus segment must be terminated (LT = Line Termination). Each device must have a unique physical address [1-126]. Up to 32 PROFIBUS devices can be connected to a bus segment, and by using a repeater another 32 devices can be connected. This can be repeated until the maximum number of addresses are used. Make sure that each device is connected to a proper earth potential.

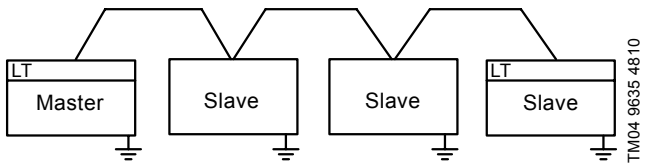


Fig. 3 Example of PROFIBUS bus segment with line termination

5.2 CIM 150 PROFIBUS module

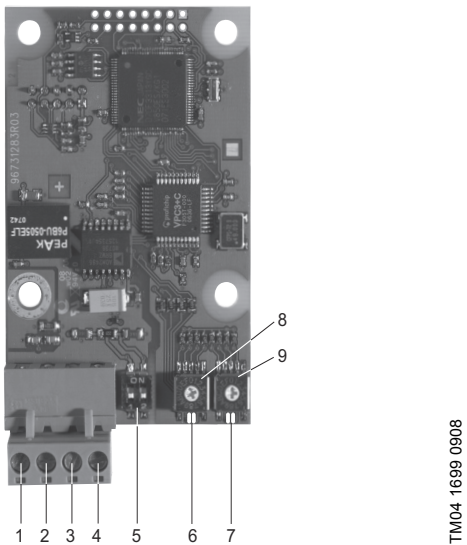


Fig. 4 CIM 150 PROFIBUS module

Pos.	Designation	Description
1	B (RxD/TxD-P)	PROFIBUS terminal B (positive data signal)
2	A (RxD/TxD-N)	PROFIBUS terminal A (negative data signal)
3	DGND	PROFIBUS terminal DGND (only for external termination)
4	VP	+5 VDC (only for external termination)
5	SW1/SW2	On/off switches for termination resistors
6	LED1	Red/green status LED for PROFIBUS communication
7	LED2	Red/green status LED for GENibus communication between the CIU 150 and the Grundfos product
8	SW3	Hex switch for setting the PROFIBUS address (four most significant bits)
9	SW4	Hex switch for setting the PROFIBUS address (four least significant bits)

Note The power supply (pos. 4, fig. 4) must only be used for external termination.

5.3 Connecting the PROFIBUS

5.3.1 Data transmission rates and cable length

Grundfos recommends to use a cable according to IEC 61158.

Example

Siemens, 6XV1 830-0EH10.

kbits/s	Maximum cable length
	[m/ft]
9.6	1200/4000
19.2	1200/4000
45.45	1200/4000
93.75	1000/3300
187.5	1000/3300
500	400/1300
1500	200/660
3000	100/330
6000	100/330
12000	100/330

Fitting the cable

See fig. 5.

1. Connect the red conductor(s) to terminal B (pos. 1).
2. Connect the green conductor(s) to terminal A (pos. 2).
3. Connect the cable screens to earth via the earth clamp (pos. 3).

Note For maximum safety and reliability, connect the cable screen to earth via the earth clamp, and make sure that all CIU 150 units are properly earthed via the mains supply earth wire.

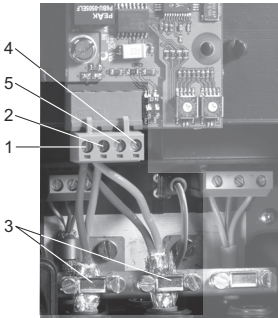


Fig. 5 Connecting the PROFIBUS

Pos.	Description
1	PROFIBUS terminal B
2	PROFIBUS terminal A
3	Earth clamp
4	+5 VDC
5	DGND

5.4 Setting the PROFIBUS address

The CIM 150 PROFIBUS module has two hexadecimal rotary switches for setting the PROFIBUS address. The two switches are used for setting the four most significant bits (SW3) and the four least significant bits (SW4), respectively. See fig. 6.

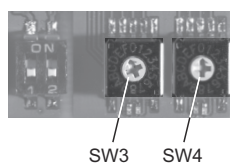


Fig. 6 Setting the PROFIBUS address

The table below shows examples of PROFIBUS address settings.

Note *The PROFIBUS address must be set decimally from 1 to 126. The address 126 is normally used for special purposes and should not be used.*

PROFIBUS address	SW3	SW4
8	0	8
20	1	4
31	1	F
126	7	E

A restart of the CIM/CIU 150 has to be performed for a PROFIBUS address change to take effect.

For complete overview of the PROFIBUS addresses, see section 11. [PROFIBUS address](#).

5.5 Termination resistors

The termination resistors are fitted on the CIM 150 PROFIBUS module. See fig. 7.

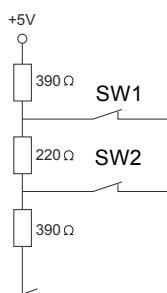


Fig. 7 Internal termination resistors

The CIM 150 has a DIP switch with two switches (SW1 and SW2) for cutting the termination resistors in and out. Figure 8 shows the DIP switches in cut-out state.

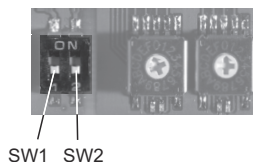


Fig. 8 Cutting termination resistors in and out

DIP switch settings

Status	SW1	SW2
Cut in	ON	ON
Cut out	OFF	OFF
Undefined state	ON	OFF
	OFF	ON

Note *To ensure stable and reliable communication, it is important that only the termination resistors of the first and last units in the PROFIBUS network are cut in.*

5.6 Status LEDs

The CIM 150 PROFIBUS module has two LEDs. See fig. 4.

- Red/green status LED (LED1) for PROFIBUS communication.
- Red/green status LED (LED2) for GENIbus communication between the CIU 150 and the connected Grundfos product.

LED1

Status	Description
Off.	The CIM 150 has been switched off.
Constantly green.	The CIM 150 is ready for PROFIBUS data transmission (Data Exchange State).
Constantly red.	CIM 150 module fault. The CIM 150 does not support the connected Grundfos product.
Flashing red.	Wrong or missing PROFIBUS configuration or no contact to the PROFIBUS master.

LED2

Status	Description
Off.	The CIM 150 is switched off.
Constantly green.	GENIbus communication between the CIM 150 and the Grundfos product is OK.
Constantly red.	The CIM 150 does not support the connected Grundfos product.
Flashing red.	No GENIbus communication between the CIM 150 and the Grundfos product.

Note *During start-up, there may be a delay of up to 5 seconds before the LED2 status is updated.*

5.7 Communication watchdog

The state of the PROFIBUS communication watchdog can be changed with a PROFIBUS commissioning tool, e.g. Siemens Simatic Manager. If the watchdog is enabled, all bits in the ControlModule (see section 7.2) are automatically set to "0" if the PROFIBUS communication is broken.

As a result, the Grundfos product will be set to local mode and then be operating according to the local operating mode, local setpoint and local control mode.

5.8 Reaction to PLC "Stop button"

If the PLC is stopped by the operator, all output registers will be set to "0".

As a result, the control bit RemoteAccessReq will be cleared, and the Grundfos product will be set to local mode and then be operating according to the local operating mode, local setpoint and local control mode.

6. PROFINET IO, CIM 500 setup

6.1 Connecting the Ethernet cable



Warning

The CIM 500 must only be connected to SELV or SELV-E circuits.

RJ45 plugs and Ethernet cable must be used. The cable shield must be connected to protective earth at both ends.

Note

It is important to connect cable shield to earth through earth clamp or to connect cable shield to earth in the connector.

The CIM 500 is designed for flexible network installation; the built-in two port switch makes it possible to daisy chain from product to product without the need of additional Ethernet switches. The last product in the chain is only connected to one of the Ethernet ports. Each Ethernet port has its own MAC address.

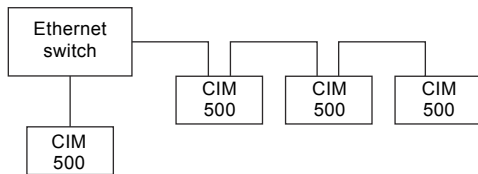


Fig. 9 Example of Industrial Ethernet network

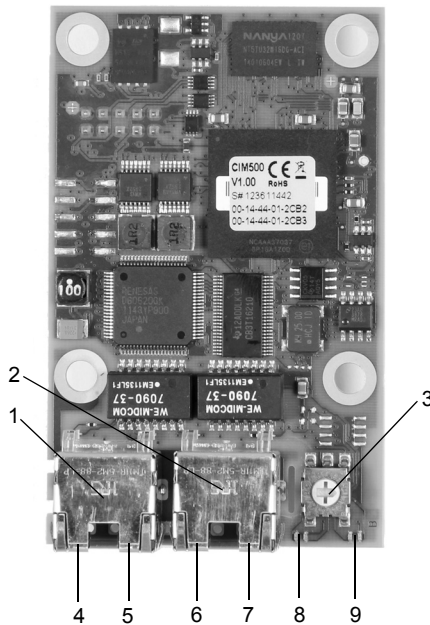


Fig. 10 Example of Ethernet connection (CIM 500)

Pos.	Description	Designation
1	Industrial Ethernet RJ45 Connector 1	ETH1
2	Industrial Ethernet RJ45 Connector 2	ETH2
3	Rotary switch for protocol selection	SW1
4	Data activity LED for Connector 1	DATA1
5	Link LED for Connector 1	LINK1
6	Data activity LED for Connector 2	DATA2
7	Link LED for Connector 2	LINK2
8	Green/red status LED for Ethernet communication	LED1
9	Green/red status LED for internal communication between module and pump.	LED2

6.2 Setting the Industrial Ethernet protocol

The CIM 500 Ethernet module has a rotary switch for selection of the Industrial Ethernet protocol. See fig. 11.

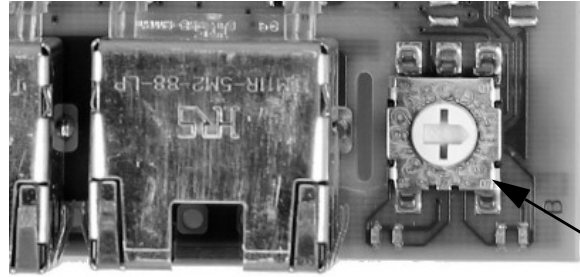


Fig. 11 Selecting the Industrial Ethernet protocol

Pos.	Description
0	PROFINET IO (Default from factory)
1	Modbus TCP
2..E	Reserved, LED1 will be permanently red to indicate an invalid configuration
F	Reset to factory default Note: The rotary switch has to be set in this position for 20 seconds before the CIM 500 resets to factory default. During this period LED1 will be flashing red and green at the same time to indicate that a reset will occur.

Note

Every change of the rotary switch, when the module is powered on, will cause the module to restart.

6.3 Setting up the IP-addresses

The CIM 500 Ethernet module is default set up to a fixed IP address. It is possible to change the IP address settings from the built in web server.

Default IP settings used by web server	IP address: 192.168.1.100 Subnet mask: 255.255.255.0 Gateway: 192.168.1.1
IP-settings for Modbus TCP	Must be setup by the Web server
Device name and IP settings for PROFINET IO	Static configuration from Web server or configuration from PROFINET IO configuration tool.

6.4 Establish connection to the Webserver

The CIM 500 module can be configured using the built-in Web server. To establish a connection from a PC to CIM 500 the following steps are required:

- Connect the PC and the CIM 500 module using an Ethernet cable
- Configure the PC Ethernet port to the same subnetwork as the CIM 500, e.g. 192.168.1.101, and the subnet mask to 255.255.255.0. See section [A.2 Web server configuration](#) on page 28.
- Open a standard Internet browser and type 192.168.1.100 in the URL field.
- Log in to the Web server using:

User	admin (default)
Password	Grundfos (default)

Note *User and password may have been changed from their factory default values.*



TM05 6436 4712

Fig. 12 CIM 500 connected to PC

Note *Both ETH1 and ETH2 can be used to establish a connection to the Web server.*

Note *The web server can be accessed while the selected Industrial Ethernet protocol is active.*

6.5 Status LEDs

The CIM 500 Ethernet module has two Status LEDs, (LED1 and LED2).

See fig. 10.

- Red/green status LED (LED1) for Ethernet communication
- Red/green status LED (LED2) for internal communication between the CIM 500 and the Grundfos product.

LED1

Status	Description
Off	The CIM 500 is switched off.
Flashing green	Wink function. LED will flash 10 times when activated from master.
Permanently green	The CIM 500 is ready for data transmission (data exchange state).
Flashing red (3 Hz, duty cycle 50 %)	Wrong or missing PROFINET IO configuration. See section 9.2.1 LED status .
Pulsing red (0.3 Hz, duty cycle 10 %)	Configured, but connection to master lost. See section 9.2.1 LED status .
Permanently red	Product not supported. See section 9.2.1 LED status .
Permanently red and green	Error in firmware download. See section 9.2.1 LED status .
Flashing red and green	After 20 seconds in this state, the CIM 500 factory settings are restored and the device is restarted.

LED2

Status	Description
Off	The CIM 500 is switched off.
Flashing red	No internal communication between the CIM 500 and the Grundfos product.
Permanently red	The CIM 500 does not support the Grundfos product connected.
Permanently green	Internal communication between the CIM 500 and the Grundfos product is OK.
Permanently red and green	Memory fault.

Note *During start-up, there is a delay of up to 5 seconds before LED1 and LED2 status is updated.*

6.6 DATA and LINK LEDs

The CIM 500 Ethernet module has two connectivity LEDs related to each RJ45 Connector. See fig. 10.

DATA1 and DATA2

These yellow LEDs indicate data traffic activity.

Status	Description
Yellow off	No data communication on RJ45 Connector.
Yellow flashing	Data communication ongoing on RJ45 Connector.
Steady yellow	Heavy network traffic on RJ45 connector.

LINK1 and LINK2

These green LEDs shows whether the ethernet cable is properly connected.

Status	Description
Green off	No Ethernet Link on RJ45 Connector
Green on	Ethernet Link on RJ45 Connector is OK

7. Detailed description of data modules

7.1 Data types

The Grundfos CIM 150/500 supports the following data types.

All data types, except for data type 10, comply with specification IEC 61158-6 standard data types for use in PROFIBUS/PROFINET profiles.

Data type	Description
1	Boolean
2	Integer 8
3	Integer 16
4	Integer 32
5	Unsigned 8
6	Unsigned 16
7	Unsigned 32
8	Floating point
9	Visible string
10	Non-standard

All multi-byte data types are transmitted with MSB (Most Significant Byte) first.

7.2 Control module (ControlModule, module 1)

The control module is a PROFIBUS/PROFINET output module used for the control of the MP 204. Its data type is 10, non-standard.

Byte	Bit	Name	Event trigger
1	0	ResetAlarm	Rising edge
	1	TestTrip	Rising edge
	2	ResetStartCounter	Rising edge
	3	ResetRestartCounter	Rising edge
	4	ResetOprTimeCounter	Rising edge
	5	ResetEnergyCounter	Rising edge
	6	ResetLogs	Rising edge
	7	-	-
	0	OnOff	State
	1-7	-	-

7.2.1 Explanation to event trigger

Rising edge

Control bits with a rising-edge event trigger behave like a command that is executed when a bit transition from "0" to "1" occurs. Each of them has a corresponding acknowledge bit in the StatusModule which is set when the command is executed and cleared when the control bit is written back to "0".

State

Control bits with a state event trigger behave like a "state" that is forced upon the MP 204. In the CIU 150, the "actual state" of the MP 204 as read from the StatusModule is continuously compared with the "requested" state in the ControlModule, and the CIU 150 writes the appropriate GENIbus command to the MP 204 to make the two states correspond to each other. Due to state restrictions or priorities, this might not always be possible (see explanation to the bit in question).

7.2.2 Explanation to control bits

ResetAlarm

Control bit that resets alarms and warnings. If the motor is not in operating mode "Started" and if no alarm conditions preventing starting are present, the MP 204 will restart the motor and reset a pending alarm indication, if any:

- Closes relay 1 (motor control relay) and opens relay 2 (signal relay).
- Updates the operating mode to "Started".
- The red "Trip" indicator light on the MP 204 is switched off (follows relay 2).

If an alarm condition is present, the operating mode "MotorProtectingTrip" will result (remain) instead.

This control bit has the same function as the [R] button on the MP 204.

TestTrip

Control bit that has the same function as the [T] button on the MP 204.

- Opens relay 1 (motor control relay) and closes relay 2 (signal relay).
- Updates the operating mode to "TestTrip".
- The red "Trip" indicator light on the MP 204 is switched on (follows relay 2).
- The MP 204 display shows "A18" (TestTrip alarm).

ResetStartCounter

Control bit that resets the NumberOfStartsTripCnt (module 41).

ResetRestartCounter

Control bit that resets the AutorestartsTripCnt (module 42).

ResetOprTimeCounter

Control bit that resets the operatingTimeTripCnt (module 39).

ResetEnergyCounter

Control bit that resets the EnergyTripCnt (module 36).

ResetLogs

Control bit that resets all maximum/minimum logs:

- LineVoltageMaxLog (module 45)
- LineVoltageMinLog (module 46)
- LineCurrentMaxLog (module 47)
- LineCurrentMinLog (module 48)
- StartsPerHourMaxLog (module 49).

OnOff

Control bit that switches the motor on and off.

With this bit the MP 204 operating mode can be switched between "Started (On)" and "ActuatorStop (Off)".

If the MP 204 operating mode is "MotorProtectionTrip" or "TestTrip", the OnOff control bit has no effect.

0: Actuator stop, motor switched off.

1: Start, motor switched on.

7.3 Status module (StatusModule, module 4)

The status module is a PROFIBUS/PROFINET input module used for reading status from the MP 204. Its data type is 10, non-standard.

Byte	Bit	Name
1	0	ResetAlarmAck
	1	TestTripAck
	2	ResetStartCounterAck
	3	ResetRestartCounterAck
	4	ResetOprTimeCounterAck
	5	ResetEnergyCounterAck
	6	ResetLogsAck
2	7	-
	0	Rotation
	1	ProtectionEnabled
	2	Ready
	3	Alarm
	4	PTCInput
3	5	PhaseSequence
	6-7	-
	OperatingMode [enumeration]	
	0: Started (On)	
4	1: MotorProtectionTrip	
	2: TestTrip	
	3: ActuatorStop (Off)	
	SystemMode [enumeration]	
	0: PowerUp	
	1: Operating	
	2: MP204Fault	

7.3.1 Explanation to status bits

ResetAlarmAck

Acknowledge bit belonging to the ResetAlarm control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

TestTripAck

Acknowledge bit belonging to the TestTrip control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

ResetStartCounterAck

Acknowledge bit belonging to the ResetStartCounter control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

ResetRestartCounterAck

Acknowledge bit belonging to the ResetRestartCounter control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

ResetOprTimeCounterAck

Acknowledge bit belonging to the ResetOprTimeCounter control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

ResetEnergyCounterAck

Acknowledge bit belonging to the ResetEnergyCounter control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

ResetLogsAck

Acknowledge bit belonging to the ResetLogs control bit. It will be set when the control bit is set and the command has been executed and will be cleared when the control bit is cleared.

Rotation

Status bit indicating that the motor is rotating (consuming power).

0: No rotation.

1: Rotation.

ProtectionEnabled

Status bit indicating whether the general protection function of the MP 204 is enabled (the MP 204 operates as a motor protector) or disabled (the MP 204 just operates as a monitor and start/stop actuator).

0: Protection disabled.

1: Protection enabled.

Ready

Status bit indicating that the MP 204 is started or ready to be started. During a test trip, the MP 204 will still be ready.

0: Not ready.

1: Ready.

Alarm

Status bit indicating that the motor has been switched off due to an alarm (operating mode equals "TestTrip" or "MotorProtectionTrip").

0: No alarm.

1: Alarm.

PTCInput

Status bit indicating the status of the PTC signal.

0: Closed.

1: Open (high-temperature alarm).

PhaseSequence

Status bit indicating the actual phase sequence.

0: Phase sequence is right: L1-L2-L3.

1: Phase sequence is left: L3-L2-L1.

OperatingMode

Status enumeration showing the MP 204 operating mode.

0: Started (On)

This is the normal mode when the motor is running without alarms (warnings may be present).
The R1 motor relay is closed, the R2 alarm relay is open and the red "Trip" indicator light on the MP 204 is off.

1: MotorProtectionTrip

The MP 204 has detected an alarm condition and has switched the motor off. Data module AlarmCode will contain the related code for the alarm condition. This code is also shown in the display.

The R1 motor relay is open, the R2 alarm relay is closed and the red "Trip" indicator light on the MP 204 is on.

2: TestTrip

This mode is the result of the TestTrip command or of pressing the [T] button. The alarm code "18" is shown in the display. The behaviour is equal to MotorProtectionTrip.

3: ActuatorStop (Off)

This mode is the result of the state control bit OnOff = 0. The motor will be switched off, and the MP 204 display will show "OFF".

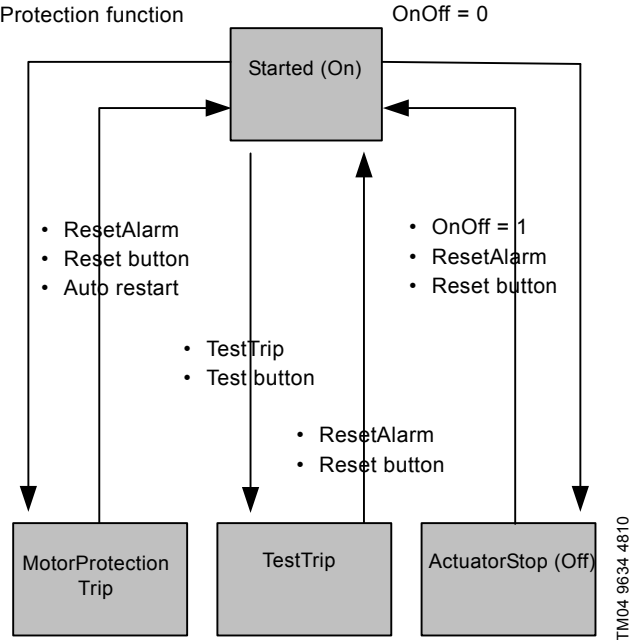


Fig. 13 Operating mode state event diagram

SystemMode

Status enumeration showing the MP 204 system mode.

0: PowerUp	In this mode, the MP 204 is powering up, and the "Power" indicator light will be flashing green. A power-on delay [1-254s] can be programmed with the R100 or Grundfos GO remote to prolong this period. After power-up, the MP 204 automatically enters the system mode "Operation".
1: Operation	The normal system mode.
2: MP204Fault	The MP 204 has a hardware fault. Power-off is required to attempt restarting. It may be necessary to replace the MP 204.

7.4 Alarm code module (AlarmCode, module 5)

In the AlarmCode module, the cause of a motor protection trip can be read in the form of an alarm code. The complete list of alarm codes supported by the MP 204 is shown below.

Note that a few of the alarm codes are warnings only (W).

They are included in the table for the sake of completeness.

They can never appear in the AlarmCode module, but only in the WarningBits module described in section [7.5 Warning bits module \(WarningBits, module 6\)](#).

The AlarmCode module has data type 5, unsigned 8.

Code	Alarm/warning description	A/W	Trip delay	3-phase	1-phase	Auto restart after alarm	Programmable limit
2	Missing phase	A	-	•	-	Condition + delay	Enabled
3	External alarm signal (PTC)	A	-	•	•	Condition + delay	E/D
4	Too many automatic restarts per 24 hours	A	-	•	•	Reset required	E/D + value
9	Phase sequence reversal	A	-	•	-	Condition + delay	Enabled
12	Service warning	W	-	•	•	-	Value
15	Communication alarm, main system	A	-	•	•	Condition + delay	Disabled
18	Test trip (control module TestTrip) not in alarm log	A	-	•	•	Reset required	-
20	Insulation resistance low	A + W	•	•	-	Condition + delay	E/D + value
21	Too many starts per hour	W	-	•	•	Condition	Enabled
26	Load continues even if motor relay R1 is off	W	-	•	•	Condition	Enabled
32	Overvoltage	A + W	•	•	•	Condition + delay	Value
40	Undervoltage	A + W	•	•	•	Condition + delay	Value
48	Overload (current too high)	A + W	IEC	•	•	Delay	Value
56	Underload (current too low)	A + W	•	•	•	Delay	Value
64	Overtemperature, Tempcon measurement	A + W	•	•	-	Condition + delay	E/D + value
71	Overtemperature, Pt100 measurement	A + W	•	•	•	Condition + delay	E/D + value
91	Signal fault, Tempcon sensor	W	•	•	•	-	E/D
111	Current asymmetry	A + W	•	•	-	Delay	Value
112	Cos(φ) too high	A + W	•	•	•	Delay	Value
113	Cos(φ) too low	A + W	•	•	•	Delay	Value
120	Auxiliary winding alarm	A	•	-	•	Delay	Enabled
123	Start capacitor, low	A + W	•	-	•	Delay	Value
124	Run capacitor, low	A + W	•	-	•	Delay	Value
175	Signal fault, Pt100 temperature sensor	W	•	•	•	-	E/D

7.4.1 Explanation to alarm code table

Text	Description
A/W	Alarm (A), warning (W) or alarm and warning (A + W).
Trip delay	Delay between the appearance of an alarm until the MP 204 switches the motor off. This delay, which is common to all the bullet-marked alarms, can be programmed with the R100 or Grundfos GO remote control. Alarms without Trip delay result in immediate reaction. Tripping due to overload is based on IEC standard trip curves.
1-phase/3-phase	Type of motor.
Auto restart	
• Condition	This means that the conditions for the alarm must have disappeared before a restart is possible.
• Delay	This means that restarting is delayed with the common restart delay which is programmable with the R100 or Grundfos GO remote control.
Programmable limit	
• Enabled	This protection is always enabled. It can only be disabled with a special programming tool.
• Disabled	This protection is always disabled. It can only be enabled with a special programming tool.
• E/D	Can be enabled/disabled with the R100 or Grundfos GO remote control.
• Value	Value of protection limit can be programmed with the R100 or Grundfos GO remote control.

7.5 Warning bits module (WarningBits, module 6)

The WarningBits module shows all actual warning conditions, one bit for each. Contrary to alarms, there can be many simultaneous warnings present. The complete list of warning bits and their equivalent codes are shown below.

The WarningBits module has data type 10, non-standard.

Byte	Bit	Bit name	Equivalent code	3-phase	1-phase	Programmable limit
1	0	Overvoltage	32	●	●	Value
	1	Undervoltage	40	●	●	Value
	2	Overload (current too high)	48	●	●	Value
	3	Underload (current too low)	56	●	●	Value
	4	Current asymmetry	111	●	-	Value
	5	-	-	-	-	-
2	0	Insulation resistance low	20	●	-	E/D + value
	1	Overtemperature, Tempcon measurement	64	●	-	E/D + value
	2	Overtemperature, Pt100 measurement	71	●	●	E/D + value
	3	-	-	-	-	-
	4	Cos(φ) too high	112	●	●	Value
	5	Cos(φ) too low	113	●	●	Value
	6	Too many starts per hour	21	●	●	Enabled
3	7	-	-	-	-	-
	0	Start capacitor, low	123	-	●	Value
	1	Run capacitor, low	124	-	●	Value
	2	-	-	-	-	-
	3	Signal fault, Tempcon sensor	91	●	-	E/D
	4	Signal fault, Pt100 temperature sensor	175	●	●	E/D
	5	Service warning	12	●	●	Enabled
	6	Load continues even if motor relay R1 is off	26	●	●	Enabled
	7	-	-	-	-	-

7.6 Measurement data modules

Module	Name	Data type	Unit	Description		Associated module(s)
				3-phase motor	1-phase motor	
7	PhaseVoltageL1	6	0.1 V	L1 phase voltage	Reference voltage (= 0)	-
8	PhaseVoltageL2	6	0.1 V	L2 phase voltage	Phase voltage	-
9	PhaseVoltageL3	6	0.1 V	L3 phase voltage	Auxiliary winding voltage	-
10	PhaseVoltageMean	6	0.1 V	Mean of phase voltages L1, L2 and L3	Phase voltage	For 1-phase motors, the max. and min. values are stored in LineVoltageMaxLog and LineVoltageMinLog.
11	LineVoltageL1L2	6	0.1 V	L1-L2 line voltage	-	For 3-phase motors, the max. and min. values are stored in LineVoltageMaxLog and LineVoltageMinLog.
12	LineVoltageL2L3	6	0.1 V	L2-L3 line voltage	-	
13	LineVoltageL3L1	6	0.1 V	L3-L1 line voltage	-	
14	LineVoltageMean	6	0.1 V	Mean of line voltages L1-L2, L2-L3 and L3-L1	-	
15	LineCurrentL1	6	0.1 A	L1 line current	Neutral current	-
16	LineCurrentL2	6	0.1 A	L2 line current	Mains winding current	-
17	LineCurrentL3	6	0.1 A	L3 line current	Auxiliary winding current	-
18	LineCurrentMean	6	0.1 A	Mean value of line currents L1, L2 and L3	Line current (= neutral current)	-
19	LineCurrentStart	6	0.1 A	Peak line current from the latest motor start	Peak line current from the latest motor start	-
20	MotorTemp1	6	0.01 K	Motor temperature measured by Tempcon	Motor temperature measured by Tempcon	-
21	MotorTemp2	6	0.01 K	Motor temperature measured by PT resistor	Motor temperature measured by PT resistor	-
22	LineCurrentAsym	6	0.01 %	Line current asymmetry	-	-
23	CapacitorStart	6	1 µF	-	Start capacitor value	-
24	CapacitorRun	6	1 µF	-	Run capacitor value	-
25	CapacitorStartRef	6	1 µF	-	Start capacitor reference value	-
26	CapacitorRunRef	6	1 µF	-	Run capacitor reference value	-
27	LineFrequency	6	0.1 Hz	Line frequency		-
28	VoltageAngleL1L2	5	1 °	Voltage angle L1-L2	-	-
29	VoltageAngleL1L3	5	1 °	Voltage angle L2-L3	-	-
30	CosPhiL1	5	0.01	L1 current phase angle cosine	-	-
31	CosPhiL1	5	0.01	L2 current phase angle cosine	-	-
32	CosPhiL1	5	0.01	L3 current phase angle cosine	-	-
33	CosPhi		0.01	Mean phase angle cosine (power factor)	Mean phase angle cosine (power factor)	-
34	Power	7	1 W	Power consumption	Power consumption	-
35	Energy	7	1 kWh	Energy consumption	Energy consumption	-
36	EnergyTripCnt	7	1 kWh	Energy consumption trip counter (resettable)	Energy consumption trip counter (resettable)	ResetEnergyCounter in control module (module 1)
37	OperatingTime	7	1 h	Operating time	Operating time	-
38	TotalPoweredTime	7	1 h	Total powered time	Total powered time	-
39	OperatingTimeTripCnt	7	1 h	Operating time trip counter (resettable)	Operating time trip counter (resettable)	ResetOprTimeCounter in control module (module 1)
40	NumberOfStarts	7	1	Number of starts counter	Number of starts counter	
41	NumberOfStartsTripCnt	7	1	Number of starts trip counter (resettable)	Number of starts trip counter (resettable)	ResetStartCounter in control module (module 1)
42	AutoRestartsTripCnt	7	1	Auto-restarts trip counter (resettable)	Auto-restarts trip counter (resettable)	ResetRestartCounter in control module (module 1)
43	InsulationResistance	6	10 kW	Insulation resistance	-	-
44	PhaseVoltageDistortion	6	0.01 %	Phase voltage distortion	Phase voltage distortion	-

Module	Name	Data type	Unit	Description		Associated module(s)
				3-phase motor	1-phase motor	
45	LineVoltageMaxLog	6	0.1 V	Logged maximum value of line voltage	Logged maximum value of line voltage	These values are stored until resetting with ResetLogs command in control module (module 1)
46	LineVoltageMinLog	6	0.1 V	Logged minimum value of line voltage	Logged minimum value of line voltage	-
47	LineCurrentMaxLog	6	0.1 A	Logged maximum value of line current	Logged maximum value of line current	-
48	LineCurrentMinLog	6	0.1 A	Logged minimum value of line current	Logged minimum value of line current	-
49	StartsPerHourMaxLog	5	1	Logged maximum value of starts per hour	Logged maximum value of starts per hour	-
50	StartsPerHour	5	1	Starts per hour (moving average)	Starts per hour (moving average)	Maximum value stored in StartsPerHourMaxLog
51	AutoRestartsPer24h	5	1	Auto restarts per hour (moving average)	Auto restarts per hour (moving average)	ResetLogs command in control module (module 1)

7.7 Device identification (DeviceIdentification, module 52)

The data type is 10, non-standard.

Byte	Name/description
	UnitFamily [enumeration] UnitType [enumeration]
1	1: UPE/MAGNA circulator pump
	2: E-pump, 1-phase/3-phase, based on MGE motor or CUE frequency converter
	7: MP 204 motor protector
	17: Hydro Multi-E model G and earlier models
	21: Hydro MPC/Control MPC, Hydro Multi-B
	25: CR Monitor
	26: Dedicated Controls
	30: Smart Digital Dosing, DDA
	39: Hydro Multi-E model H and later models
2	UnitType [enumeration] According to description above.
3	UnitVersion [enumeration] Used by Grundfos.
4	CIMSoftwareVersion [number]
5	CIMSoftwareRevision [number]
6	CIMModel [enumeration]

7.8 Alarm and warning simulation (EventSimulation, module 3)

This is a PROFIBUS/PROFINET output module used to activate the alarm and warning simulation function in the MP 204.

The data type is 10, non-standard.

The bits for simulation of warnings and alarms have the same interpretation as the bits in the WarningBits module. See section [7.5 Warning bits module \(WarningBits, module 6\)](#). Some extra bits are added for simulation of the alarms that cannot appear as warnings.

Byte	Name	Description	Event trigger
1	WarningSimBits1	Same bit interpretation as WarningBits byte 1	Value change
2	WarningSimBits2	Same bit interpretation as WarningBits byte 2	Value change
3	WarningSimBits3	Same bit interpretation as WarningBits byte 3	Value change
4	AlarmSimBits1	Same bit interpretation as WarningBits byte 1 with extra bits	Value change
5	AlarmSimBits2	Same bit interpretation as WarningBits byte 2 with extra bits	Value change
6	AlarmSimBits3	Same bit interpretation as WarningBits byte 3 with extra bits	Value change

Byte	Bit	Bit name	Equivalent code	Warning simulation	Alarm simulation
1				WarningSimBits1	AlarmSimBits1
	0	Overvoltage	32	•	•
	1	Undervoltage	40	•	•
	2	Overload (current too high)	48	•	•
	3	Underload (current too low)	56	•	•
	4	Current asymmetry	111	•	•
	5	Phase sequence reversal	9	-	•
	6	Missing phase	2	-	•
	7	Communication alarm, main system	15	-	•
				WarningSimBits2	AlarmSimBits2
2	0	Insulation resistance low	20	•	•
	1	Overtemperature, Tempcon measurement	64	•	•
	2	Overtemperature, Pt100 measurement	71	•	•
	3	External alarm signal (PTC)	3	-	•
	4	Cos(φ) too high	112	•	•
	5	Cos(φ) too low	113	•	•
	6	Too many starts per hour	21	•	•
	7	Too many automatic restarts per 24 hours	4	Cannot be simulated	
				WarningSimBits3	AlarmSimBits3
3	0	Start capacitor, low	123	•	•
	1	Run capacitor, low	124	•	•
	2	Auxiliary winding alarm	120	-	•
	3	Signal fault, Tempcon sensor	91	•	•
	4	Signal fault, Pt100 temperature sensor	175	•	•
	5	Service warning	12	Cannot be simulated	
	6	Load continues even if motor relay R1 is off	26	Cannot be simulated	
	7	-	-	-	-

The simulation of an alarm or a warning can be stopped as follows:

- Clear the simulation bit.
- Execute the ResetAlarm command.
- Press the [R] button on the MP 204.
- Switch the MP 204 off and on.

Example

To simulate a current asymmetry alarm, set AlarmSimBits1 (byte 4, bit 4) in the EventSimulation module to "1".

Example

To simulate a Pt100 sensor signal fault warning, set WarningSimBits3 (byte 3, bit 4) in the EventSimulation module to "1".

8. Product simulation

The CIU unit can be put in product simulation mode in which case it will generate life-like simulated values of all the PROFIBUS/PROFINET input data modules.

It will thus be possible to connect a PROFIBUS/PROFINET master to a CIU 150 / CIU 500 without this device being connected to a real pump in a real-life system. In an office environment, it can then be verified that communication works and data is being received and handled correctly by the PROFIBUS/PROFINET master application program (e.g. PLC program) before the equipment is installed under real-life conditions.

8.1 CIU 150 Product Simulation

Product simulation mode is entered when the hexadecimal address switch has one of the values shown in the table below:

Address setting (section 5.4)		Simulated product
SW3	SW4	
F	0	Pump profile
F	1	Booster system profile
F	2	CR Monitor profile
F	3	MP 204 motor protector profile
F	4	Digital Dosing DDA profile
F	5	Wastewater system profile

The effective address will be 15 (0x0F).

Only input modules are simulated. The data read has dummy values and no real product functionality is simulated.

8.2 CIU 500 Product Simulation

Product simulation mode is entered via the web server.

See section [A.4 PROFINET IO configuration](#) on page 29.

9. Fault finding

9.1 CIU 150

Faults in a CIU 150 PROFIBUS module can be detected by observing the status of the two communication LEDs. See the table below.

9.1.1 LED status

Fault (LED status)	Possible cause	Remedy
1. Both LEDs (LED1 and LED2) remain off when the power supply is connected.	a) The CIU 150 is defective.	Replace the CIU 150.
2. The LED for internal communication (LED2) is flashing red.	a) No internal communication between the CIU 150 and the MP 204.	- Check the cable connection between the CIU 150 and the MP 204. - Check that the individual conductors have been fitted correctly. - Check the power supply to the MP 204.
3. The LED for internal communication (LED2) is constantly red.	a) The CIU 150 does not support the connected MP 204.	Contact the nearest Grundfos company.
4. The PROFIBUS LED (LED1) is constantly red.	a) Fault in the CIU 150.	Contact the nearest Grundfos company.
5. The PROFIBUS LED (LED1) is flashing red.	a) Fault in the CIU 150 PROFIBUS configuration.	- Check that the PROFIBUS address (switches SW3 and SW4) has a valid value [1-126]. See section 5.4 Setting the PROFIBUS address. - Check that the GSD file used is correct. - Check that the PROFIBUS cable has been fitted correctly. - Check that the PROFIBUS termination is correct. See section 5.5 Termination resistors.

9.2 CIU 500

Faults in the CIU 500 can be detected by observing the status of the two communication LEDs. See the table below and section [4.3 CIM 500 PROFINET IO](#).

9.2.1 LED status

Fault (LED status)	Possible cause	Remedy
1. Both LEDs (LED1 and LED2) remain off when the power supply is connected	a) The CIU 500 is defective.	Replace the CIU 500.
2. The PROFINET IO LED (LED1) remains off.	a) The protocol selection switch (SW1) has been set in Modbus TCP position	Set the switch in position "0".
3. The LED for internal communication (LED2) is flashing red.	a) No internal communication between the CIU 500 and the Grundfos product.	- Check the cable connection between the Grundfos product and the CIU 500. - Check that the individual Conductors have been fitted correctly. - Check the power supply to the Grundfos product
4. The LED for internal communication (LED2) is permanently red.	a) The CIU 500 does not support the Grundfos product connected.	Contact the nearest Grundfos company.
5. The PROFINET IO LED (LED1) is permanently red.	a) Connected Grundfos product is not supported.	Contact the nearest Grundfos company.
	b) Illegal position of protocol switch. (SW1)	Check that the rotary switch SW1 is set to "0".
6. The PROFINET IO (LED1) is flashing red.	a) Fault in the CIU 500 PROFINET IO configuration.	- Check that the right GSDML file is used. - Check that PROFINET IO IP address configuration is correct. See section 6. PROFINET IO, CIM 500 setup. - Check device name in CIM 500 and PROFINET IO master.
7. The PROFINET IO (LED1) is pulsing red.	a) Connection to master lost.	- Check cables. - Check master is running.
8. LED1 is permanently red and green at the same time	a) Error in firmware download.	Use the web server to download the firmware again.
9. LED2 is permanently red and green at the same time	a) Memory fault.	Replace the CIU 500.

10. Grundfos alarm and warning codes

This is a complete list of alarm and warning codes for Grundfos products. For the codes supported by the MP 204, see section [7.5 Warning bits module \(WarningBits, module 6\)](#).

Code	Description	Code	Description	Code	Description
1	Leakage current	32	Overvoltage	72	Hardware fault, type 1
2	Missing phase	33	Soon time for service (general service information)	73	Hardware shutdown (HSD)
3	External fault signal	35	Gas in pump head, deaerating problem	74	Internal supply voltage too high
4	Too many restarts	36	Discharge valve leakage	75	Internal supply voltage too low
5	Regenerative braking	37	Suction valve leakage	76	Internal communication fault
6	Mains fault	38	Vent valve defective	77	Communication fault, twin-head pump
7	Too many hardware shutdowns	40	Undervoltage	78	Fault, speed plug
8	PWM switching frequency reduced	41	Undervoltage transient	79	Functional fault, add-on module
9	Phase sequence reversal	42	Cut-in fault (dV/dt)	80	Hardware fault, type 2
10	Communication fault, pump	45	Voltage asymmetry	81	Verification error, data area (RAM)
11	Water-in-oil fault (motor oil)	48	Overload	82	Verification error, code area (ROM, FLASH)
12	Time for service (general service information)	49	Overcurrent (i_line, i_dc, i_mo)	83	Verification error, FE parameter area (EEPROM)
13	Moisture alarm, analog	50	Motor protection function, general shutdown (MPF)	84	Memory access error
14	Electronic DC-link protection activated (ERP)	51	Blocked motor/pump	85	Verification error, BE parameter area (EEPROM)
15	Communication fault, main system (SCADA)	52	Motor slip high	88	Sensor fault
16	Other	53	Stalled motor	89	Signal fault, (feedback) sensor 1
17	Performance requirement cannot be met	54	Motor protection function, 3 sec. limit	90	Signal fault, speed sensor
18	Commanded alarm standby (trip)	55	Motor current protection activated (MCP)	91	Signal fault, temperature 1 sensor
19	Diaphragm break (dosing pump)	56	Underload	92	Calibration fault, (feedback) sensor
20	Insulation resistance low	57	Dry running	93	Signal fault, sensor 2
21	Too many starts per hour	58	Low flow	94	Limit exceeded, sensor 1
22	Moisture switch alarm, digital	59	No flow	95	Limit exceeded, sensor 2
23	Smart trim gap alarm	60	Low input power	96	Setpoint signal outside range
24	Vibration	64	Overtemperature	97	Signal fault, setpoint input
25	Setup conflict	65	Motor temperature 1 (t_m or t_mo or t_mo1)	98	Signal fault, input for setpoint influence
26	Load continues even if the motor has been switched off	66	Temperature, control electronics (t_e)	99	Signal fault, input for analog setpoint
27	External motor protector activated (e.g. MP 204)	67	Temperature too high, internal frequency converter module (t_m)	104	Software shutdown
28	Battery low	68	External temperature/ water temperature (t_w)	105	Electronic rectifier protection activated (ERP)
29	Turbine operation (impellers forced backwards)	69	Thermal relay 1 in motor (e.g. Klixon)	106	Electronic inverter protection activated (EIP)
30	Change bearings (specific service information)	70	Thermal relay 2 in motor (e.g. thermistor)	110	Skew load, electrical asymmetry
31	Change varistor(s) (specific service information)	71	Motor temperature 2 (Pt100, t_mo2)	111	Current asymmetry

Code	Description	Code	Description	Code	Description
112	Cos ϕ too high	167	Signal fault, analog input 3	195	Limit exceeded, sensor 6
113	Cos ϕ too low	168	Signal fault, pressure sensor	196	Operation with reduced efficiency
120	Auxiliary winding fault (single-phase motors)	169	Signal fault, flow sensor	197	Operation with reduced pressure
121	Auxiliary winding current too high (single-phase motors)	170	Signal fault, water-in-oil (WIO) sensor	198	Operation with increased power consumption
122	Auxiliary winding current too low (single-phase motors)	171	Signal fault, moisture sensor	199	Process out of range (monitoring/estimation/calculation/control)
123	Start capacitor, low (single-phase motors)	172	Signal fault, atmospheric pressure sensor	200	Application alarm
124	Run capacitor, low (single-phase motors)	173	Signal fault, rotor position sensor (Hall sensor)	201	External sensor input high
144	Motor temperature 3 (Pt100, t_mo3)	174	Signal fault, rotor origo sensor	202	External sensor input low
145	Bearing temperature high (Pt100), in general or top bearing	175	Signal fault, temperature 2 sensor (t_mo2)	203	Alarm on all pumps
146	Bearing temperature high (Pt100), middle bearing	176	Signal fault, temperature 3 sensor (t_mo3)	204	Inconsistency between sensors
147	Bearing temperature high (Pt100), bottom bearing	177	Signal fault, Smart trim gap sensor	205	Level float switch sequence inconsistency
148	Motor bearing temperature high (Pt100) in drive end (DE)	178	Signal fault, vibration sensor	206	Water shortage, level 1
149	Motor bearing temperature high (Pt100) in non-drive end (NDE)	179	Signal fault, bearing temperature sensor (Pt100), general or top bearing	207	Water leakage
152	Communication fault, add-on module	180	Signal fault, bearing temperature sensor (Pt100), middle bearing	208	Cavitation
153	Fault, analog output	181	Signal fault, PTC sensor (short-circuited)	209	Non-return valve fault
154	Communication fault, display	182	Signal fault, bearing temperature sensor (Pt100), bottom bearing	210	High pressure
155	Inrush fault	183	Signal fault, extra temperature sensor	211	Low pressure
156	Communication fault, internal frequency converter module	184	Signal fault, general-purpose sensor	212	Diaphragm tank precharge pressure out of range
157	Real-time clock out of order	185	Unknown sensor type	213	VFD not ready
158	Hardware circuit measurement fault	186	Signal fault, power meter sensor	214	Water shortage, level 2
159	CIM fault (Communication Interface Module)	187	Signal fault, energy meter	215	Soft pressure build-up timeout
160	GSM modem, SIM card fault	188	Signal fault, user-defined sensor	216	Pilot pump alarm
161	Sensor supply fault, 5 V	189	Signal fault, level sensor	217	Alarm, general-purpose sensor high
162	Sensor supply fault, 24 V	190	Limit exceeded, sensor 1 (e.g. alarm level in WW application)	218	Alarm, general-purpose sensor low
163	Measurement fault, motor protection	191	Limit exceeded, sensor 2 (e.g. high level in WW application)	219	Pressure relief not adequate
164	Signal fault, LiqTec sensor	192	Limit exceeded, sensor 3 (e.g. overflow level in WW application)	220	Fault, motor contactor feedback
165	Signal fault, analog input 1	193	Limit exceeded, sensor 4 (e.g. low level in WW/tank filling application)	221	Fault, mixer contactor feedback
166	Signal fault, analog input 2	194	Limit exceeded, sensor 5	222	Time for service, mixer

Code	Description	Code	Description	Code	Description
223	Maximum number of mixer starts per hour exceeded	232	Ethernet: Auto-disabled due to misuse	241	Motor phase failure
224	Pump fault (due to auxiliary component or general fault)	233	Ethernet: IP address conflict	242	Automatic motor model recognition failed
225	Communication fault, pump module	234	Back-up pump alarm	243	Motor relay has been forced (manually operated/commanded)
226	Communication fault, I/O module	235	Gas detected	244	Fault, On/Off/Auto switch
227	Combi event	236	Pump 1 fault	245	Pump continuous runtime too long
228	User-defined event	237	Pump 2 fault	246	User-defined relay has been forced (manually operated/commanded)
229	Water on floor	238	Pump 3 fault	247	Power-on notice (device/system has been switched off)
230	Network alarm	239	Pump 4 fault	248	Fault, battery/UPS
231	Ethernet: No IP address from DHCP server	240	Lubricate bearings (specific service information)		

11. PROFIBUS address

Decimal to hexadecimal conversion table for setting of the PROFIBUS address switches. See section [5.4 Setting the PROFIBUS address](#).

PROFIBUS address	SW3	SW4	PROFIBUS address	SW3	SW4	PROFIBUS address	SW3	SW4
1	0	1	46	2	E	91	5	B
2	0	2	47	2	F	92	5	C
3	0	3	48	3	0	93	5	D
4	0	4	49	3	1	94	5	E
5	0	5	50	3	2	95	5	F
6	0	6	51	3	3	96	6	0
7	0	7	52	3	4	97	6	1
8	0	8	53	3	5	98	6	2
9	0	9	54	3	6	99	6	3
10	0	A	55	3	7	100	6	4
11	0	B	56	3	8	101	6	5
12	0	C	57	3	9	102	6	6
13	0	D	58	3	A	103	6	7
14	0	E	59	3	B	104	6	8
15	0	F	60	3	C	105	6	9
16	1	0	61	3	D	106	6	A
17	1	1	62	3	E	107	6	B
18	1	2	63	3	F	108	6	C
19	1	3	64	4	0	109	6	D
20	1	4	65	4	1	110	6	E
21	1	5	66	4	2	111	6	F
22	1	6	67	4	3	112	7	0
23	1	7	68	4	4	113	7	1
24	1	8	69	4	5	114	7	2
25	1	9	70	4	6	115	7	3
26	1	A	71	4	7	116	7	4
27	1	B	72	4	8	117	7	5
28	1	C	73	4	9	118	7	6
29	1	D	74	4	A	119	7	7
30	1	E	75	4	B	120	7	8
31	1	F	76	4	C	121	7	9
32	2	0	77	4	D	122	7	A
33	2	1	78	4	E	123	7	B
34	2	2	79	4	F	124	7	C
35	2	3	80	5	0	125	7	D
36	2	4	81	5	1	126	7	E
37	2	5	82	5	2			
38	2	6	83	5	3			
39	2	7	84	5	4			
40	2	8	85	5	5			
41	2	9	86	5	6			
42	2	A	87	5	7			
43	2	B	88	5	8			
44	2	C	89	5	9			
45	2	D	90	5	A			

Subject to alterations.

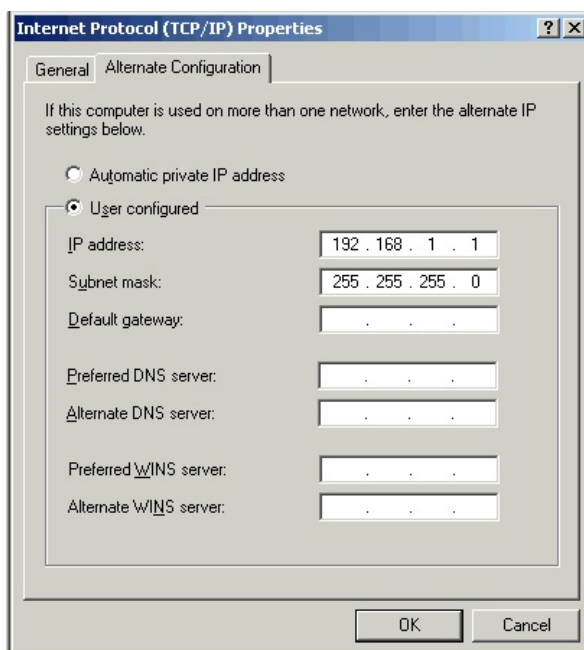
Appendix

The appendix describes the parts of the CIM 500 web server needed for the configuration of a PROFINET IO Ethernet connection. For other CIM 500 web server features, not specifically related to PROFINET IO, see the CIM 500 Installation & Operating instructions.

A.1 How to configure an IP address on your PC

For connecting a PC to the CIM 500 via Ethernet, the PC must be set up to use a fixed (static) IP address belonging to the same subnetwork as the CIM 500.

1. Open "Control Panel".
2. Enter "Network and Sharing Center".
3. Click [Change adapter settings].
4. Right-click and select "Properties" for Ethernet adapter. Typically "Local Area Connection".
5. Select properties for "Internet Protocol Version 4(TCP/IPv4)".
6. Select tab "Alternate Configuration".
7. Configure an IP address and subnet mask to be used by your PC. See fig. 14.



TM05 7422 0913

Fig. 14 Example from Windows XP

A.2 Web server configuration

The built-in web server is an easy and effective way to monitor the status of the CIM 500 module and configure the available functions and Industrial Ethernet protocols. The web server also makes it possible to update the firmware of the CIM module, and store/restore settings.

Before configuration

- Check that PC and CIM module are connected via an Ethernet cable.
- Check that the PC Ethernet port is set to the same network as the CIM module. For network configuration, see section [A.1 How to configure an IP address on your PC](#).

To establish a connection from a PC to CIM 500 the first time, the following steps are required:

1. Open a standard Internet browser and type 192.168.1.100 in the URL address field.
2. Log in to the Web server.

A.3 Login

Fig. 15 Login

User name	Enter user name. Default: admin.
Password	Enter password. Default: Grundfos.

Note

User name and password can be changed on the web server under "Grundfos Management"

A.4 PROFINET IO configuration

This web page is used to configure all the parameters relevant to the PROFINET IO protocol standard. All settings can also be configured from a standard PROFINET IO configuration tool, for instance Siemens Primary Setup Tool (PST). It is available on internet.

Fig. 16 Real Time Ethernet Protocol Configuration - PROFINET IO

Object	Description
Device Name	The PROFINET IO device name. It must be unique.
IP Address	The static IP address for CIM 500 on the PROFINET IO network.
Subnet mask	Configure the subnet mask for the CIM 500 module on the PROFINET IO network.
Gateway	Configure the default gateway for the PROFINET IO network.
Use DHCP	The CIM 500 module can be configured to automatically obtain the IP address from a DHCP server on the network.
Grundfos product simulation	The CIM 500 can be put in product simulation mode to generate realistic simulated values of all the PROFINET IO input data modules. It will thus be possible to connect a PROFINET IO master to a CIM 500 fitted in a CIU or E-box without installing this device in a real industrial process system. In an office environment, it can then be verified that communication works and data are received and handled correctly by the PROFINET IO master application program (e.g. PLC program) before installing the device. To enable product simulation, select a product type from the drop down list. Product simulation will be terminated by a module power cycle.

TM05 6063 4412

TM05 6065 4412

Argentina

Bombas GRUNDFOS de Argentina S.A.
Ruta Panamericana, ramal Campana
Centro Industrial Garín - Esq. Haendel y Mozart
AR-1619 Garín Pcia. de Buenos Aires
Pcia. de Buenos Aires
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.
Boomssesteenweg 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
Тел.: +7 (375 17) 286 39 72, 286 39 73
Факс: +7 (375 17) 286 39 71
E-mail: minsk@grundfos.com

Bosnia/Herzegovina

GRUNDFOS Sarajevo
Trg Heroja 16,
BiH-71000 Sarajevo
Phone: +387 33 713 290
Telefax: +387 33 659 079
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.
50/F Maxdo Center No. 8 XingYi Rd.
Hongqiao development Zone
Shanghai 200336
PRC
Phone: +86 21 612 252 22
Telefax: +86 21 612 253 33

Croatia

GRUNDFOS CROATIA d.o.o.
Cebini 37, Buzin
HR-10010 Zagreb
Phone: +385 1 6595 400
Telefax: +385 1 6595 499
www.grundfos.hr

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 Mahaballipuram Road
Thoraiakkam
Chennai 600 096
Phone: +91-44 2496 6800

Indonesia

PT GRUNDFOS Pompa
Jl. Rawa Sumur III, Blok III / CC-1
Kawasan Industri, Pulogadung
Jakarta 13930
Phone: +62-21-460 6909
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 Metalon 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 Москва, ул. Школьная 39
Тел. (+7) 495 737 30 00, 564 88 00
Факс (+7) 495 737 75 36, 564 88 11
E-mail grundfos.moscow@grundfos.com

Serbia

GRUNDFOS Predstavništvo Beograd
Dr. Milutina Ivkovića 2a/29
YU-11000 Beograd
Phone: +381 11 26 47 877 / 11 26 47 496
Telefax: +381 11 26 48 340

Singapore

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

Slovenia

GRUNDFOS d.o.o.
Šlandrova 8b, SI-1231 Ljubljana-Črnuče
Phone: +386 1 568 0610
Telefax: +386 1 568 0619
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 Fuenteccilla, s/n
E-28110 Algiete (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.: +41-1-806 8111
Telefax: +41-1-806 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 Chaloom Phrakiat Rama 9 Road,
Dokmai, Phavej, Bangkok 10250
Phone: +66-2-725 8999
Telefax: +66-2-725 8998

Turkey

GRUNDFOS POMPA San. ve Tic. Ltd. Sti.
Gebze Organize Sanayi Bölgesi
İhsan 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

ТОВ ГРУНДФОС УКРАЇНА
01010 Київ, Вул. Московська 86,
Тел.: (+38 044) 390 40 50
Факс.: (+38 044) 390 40 59
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

Представительство ГРУНДФОС в Ташкенте
700000 Ташкент ул.Усмана Носира 1-й тулик 5
Телефон: (3712) 55-68-15
Факс: (3712) 53-36-35

Revised 18.04.2013

97799171 0513
ECM: 1113692

The name Grundfos, the Grundfos logo, and **be think innovate** are registered trademarks owned by Grundfos Holding A/S or Grundfos A/S, Denmark. All rights reserved worldwide. © Copyright Grundfos Holding A/S