

PROFIBUS and PROFINET for wastewater pumping-systems

CIM 150 / CIU 152 for PROFIBUS DP

CIM 500 / CIU 502 Ethernet for PROFINET IO

Functional profile and user manual



English (GB) Functional profile and user manual

Original functional profile and user manual.

This functional profile describes Grundfos PROFINET and PROFIBUS for wastewater pumping-systems.

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1. General information

1.1 Hazard statements

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



DANGER

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



WARNING

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



CAUTION

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

The hazard statements are structured in the following way:



SIGNAL WORD

Description of hazard

Consequence of ignoring the warning.
- Action to avoid the hazard.

1.2 Notes

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



Observe these instructions for explosion-proof products.



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



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



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



Tips and advice that make the work easier.



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

2. Introduction

2.1 About this functional profile

This functional profile describes the following modules and units:

- CIM 150 PROFIBUS DP
- CIM 500 ethernet for PROFINET IO
- CIU 152 PROFIBUS DP
- CIU 502 ethernet for PROFINET IO

This functional profile applies to the following Grundfos products:

- Grundfos Dedicated Controls (CU 361 and CU 362)
- Grundfos DP, EF, SL1, SLV and SEG AUTO_{ADAPT} wastewater pumps.
- Grundfos wastewater level-control system LC 231, LC 241.

In the following, the supported products are referred to as "wastewater system".

The two supported controllers CU 361 and CU 362 are referred to as CU 36X.

The two supported controllers LC 231 and LC 241 are referred to as LC 2X1.

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 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 with four twisted pairs of wires.
CAT5e	Enhanced CAT5 cable with better performance.
CAT6	Ethernet cable compatible with CAT5 and CAT5e and with very high performance.
CIM	Communication Interface Module.
CIU	Communication Interface Unit.
CRC	Cyclic Redundancy Check. A data error detection method.
CU 36X	Grundfos Control Unit for Dedicated Controls (CU 361 and CU 362).
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 Remote	A Grundfos application designed to control Grundfos products via infrared or radio communication. Available for iOS and Android devices.

HTTP	Hyper Text Transfer Protocol. The protocol commonly used to navigate the world wide web.
IANA	Internet Assigned Numbers Authority.
IP	Internet Protocol.
LC 231	Grundfos wastewater level-controller for one or two pumps also supporting some basic IO signals. It is a box for wall mounting.
LC 241	Grundfos wastewater level-control system. Consists of a control cabinet with CU 241 control unit, IO 242 pump module for connection of one or two pumps and some basic IO signals and an optional IO 241 module for extra IO signals.
LED	Light-Emitting Diode.
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 the connectivity between two TCP/IP hosts.
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 synchronisation between computer systems.
TCP	Transmission Control Protocol. Protocol for internet communication and Industrial Ethernet communication.
TCP/IP	Transmission Control Protocol/Internet Protocol. Protocol 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.
VPN	Virtual Private Network. A network using the internet to connect nodes. These systems use encryption and other security mechanisms to ensure that only authorised users can access the network and that the data cannot be intercepted.

3. System description

The system diagrams provide an overview for the different technologies of how to use the CIM module or CIU unit for connecting wastewater pumps to a PROFIBUS or PROFINET network.

CIM solution, Dedicated Controls (CU 36X)

The Grundfos Dedicated Controls CU 36X control unit can be connected to up to six Grundfos wastewater pumps. It offers status information as well as control and monitoring of a wastewater pit via a user-friendly operating panel with display. CIM 150/500 is an add-on communication module that you install in the CU 36X, using a 10-pin connection. This enables communication with a PLC, SCADA system, etc.

CIM solution, Level Control LC 2X1

The controller can be connected to one or two Grundfos wastewater pumps. It offers status information as well as control and monitoring of a wastewater pit. From the operating panel, basic status of the pit and the pumps are visible, and basic installation settings can be made. Detailed information is available via Grundfos GO Remote which is also used for more advanced installation settings. This is not shown in the pictures and is not discussed further in this manual.

CIU solution, AUTO_{ADAPT} wastewater pumps

The CIU XX2 unit constitutes a communication interface to a system consisting of up to four Grundfos DP, EF, SL1, SLV or SEG AUTO_{ADAPT} wastewater pumps installed in one or more pump pits. The pumps connect to the CIU XX2 running communication over a separate pair of wires.

Each pump has an integrated pressure sensor that enables it to monitor and control the water level in the pump pit according to a common reference level and an intermittent operation scheme. By monitoring the water level, the pump will obtain enough information to know when to start and stop pumping.

The CIU XX2 unit is not involved in the control of the water level, starting and stopping of pumps, but merely provides the interface necessary for the following:

- Configuration of the pump parameters required for the level control.
- Online monitoring of pit and pump values.
- Individual (manual) control of each pump (forced start and stop and pump-down).
- Obtaining of measured and logged data that is valuable for pump service and pit optimisation.

The CIU XX2 can communicate with Grundfos GO Remote. This is not shown in the pictures and is not discussed further in this manual.

3.1 PROFIBUS DP, CIM 150

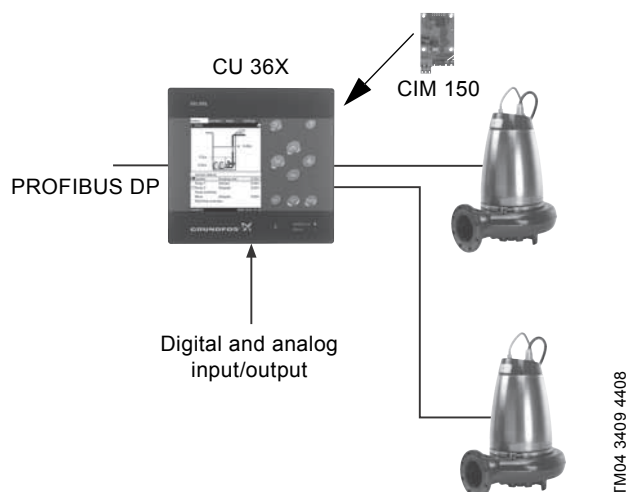


Fig. 1 CIM 150 solution for Dedicated Controls. Up to six pumps can be connected to CU 36X

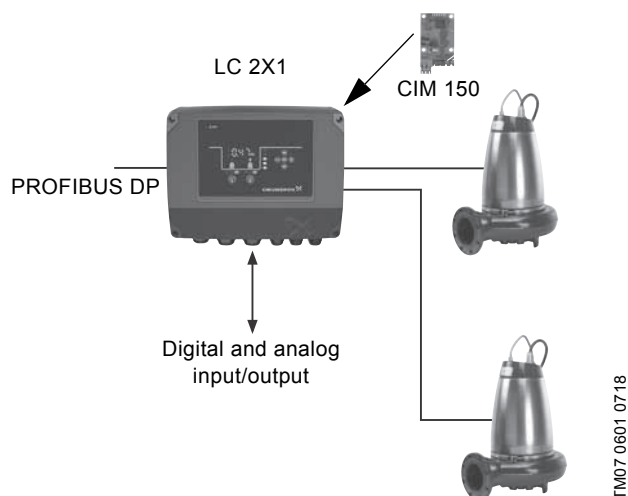


Fig. 2 CIM 150 solution for LC 2X1. Up to two pumps can be connected

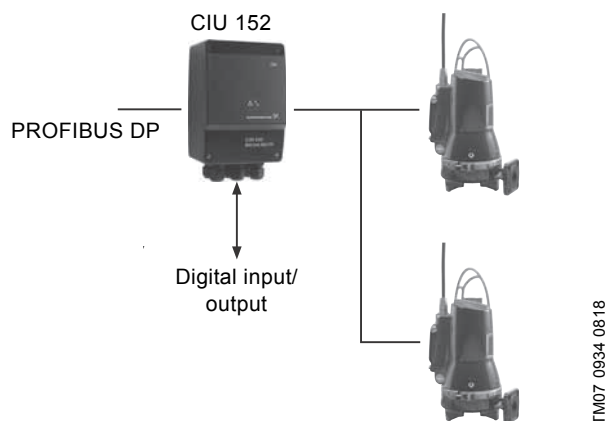


Fig. 3 CIU 152 solution for Grundfos DP, EF, SL1, SLV and SEG AUTO_{ADAPT} pumps

3.2 PROFINET IO, CIM 500

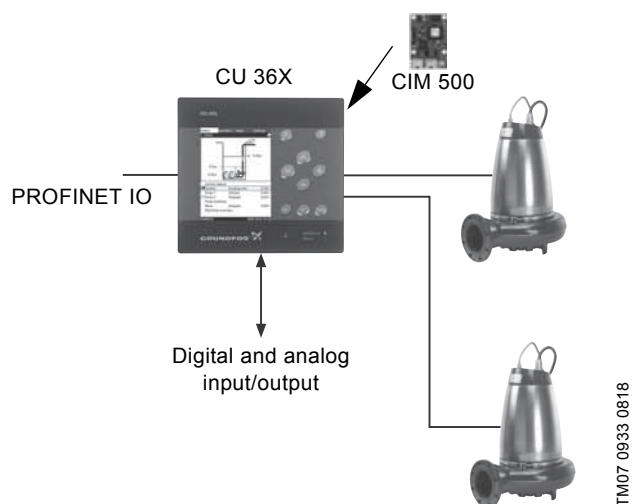


Fig. 4 CIM 500 solution for Dedicated Controls. Up to six pumps can be connected to CU 36X

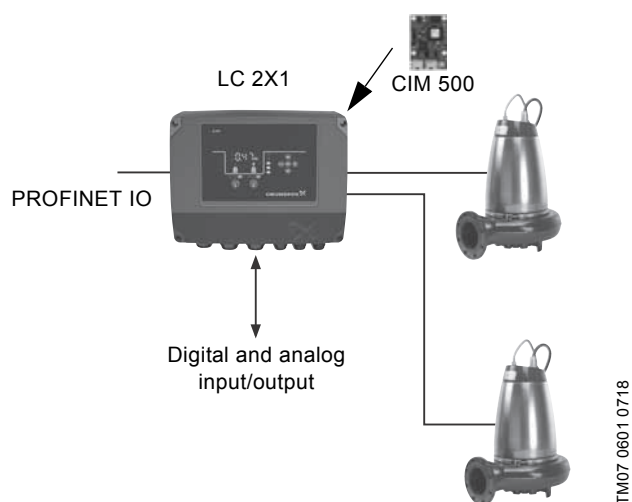


Fig. 5 CIM 500 solution for LC 2X1. Up to two pumps can be connected

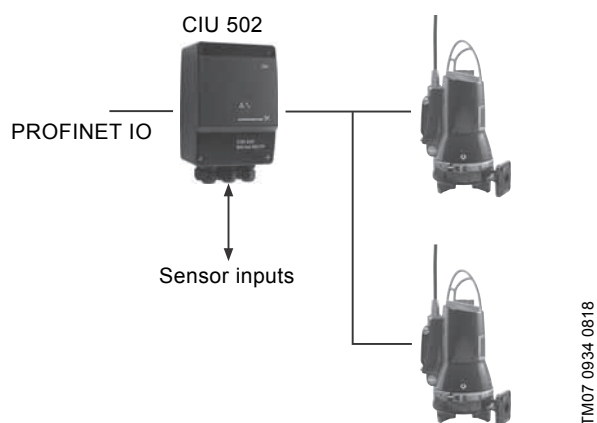


Fig. 6 CIU 502 solution for Grundfos DP, EF, SL1, SLV and SEG AUTO_{ADAPT} pumps

4. Specifications

4.1 CIM module

General data	Description	Comments
Ambient humidity	30-95 %	Relative, non-condensing.
Operating temperature	-20 to +45 °C	
Storage temperature	-25 to +70 °C	
GENIbus visual diagnostics	LED2	The LED will be in one of these states: Off, permanently green, flashing red, permanently red. See section 5.6 Status LEDs for PROFIBUS DP and section 6.5 Status LEDs 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 Grundfos CIM 150 and CIU 152. For further details, refer to the specific sections of this functional profile.

PROFIBUS DP specifications	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-section	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, permanently green, flashing red, permanently red. See section 5.6 Status LEDs .
Maximum number of PROFIBUS devices at a physical network segment	32	Using repeater, you can increase the number to 125 devices. Physically segmented network.

4.3 CIM 500 PROFINET IO

The table below provides an overview of the specifications for Grundfos CIM 500 and CIU 502 ethernet for PROFINET IO. For further details, refer to the specific sections of this functional profile.

PROFINET IO 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	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. See section 6.2 Setting the Industrial Ethernet protocol .

5. PROFIBUS DP, CIM 150 setup

5.1 PROFIBUS bus topology

The PROFIBUS-preferred bus topology is daisy chaining as illustrated in fig. 7. 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.

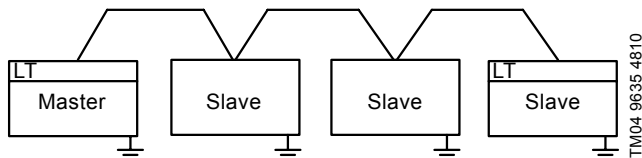


Fig. 7 Example of PROFIBUS bus segment with line termination

5.2 CIM 150 PROFIBUS module

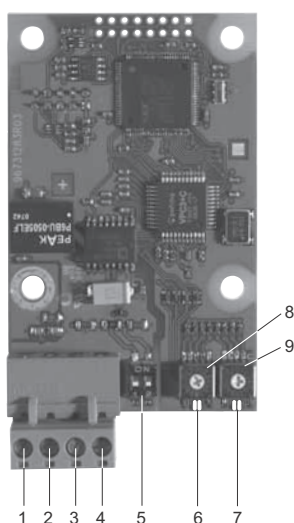


Fig. 8 CIM 150 PROFIBUS module

Pos.	Designation	Description
1	B (Rx/D/TxD-P)	PROFIBUS terminal B, positive data signal
2	A (Rx/D/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 and off switches for termination resistors
6	LED1	Red and green status LED for PROFIBUS communication
7	LED2	Red and green status LED for GENibus communication between CIM 150 and the wastewater system
8	SW3	Hexadecimal rotary switch for setting the PROFIBUS address, four most significant bits,
9	SW4	Hexadecimal rotary switch for setting the PROFIBUS address, four least significant bits



The power supply, pos. 4, fig. 8, must only be used for external termination.

5.3 Connecting the PROFIBUS

5.3.1 Data transmission rates and cable length

We recommend using 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. 9.

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).



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.

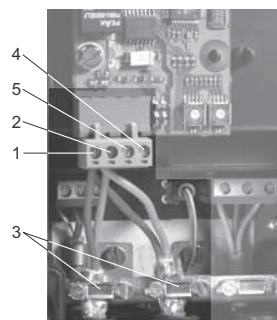


Fig. 9 Connecting the PROFIBUS

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

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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. 10.

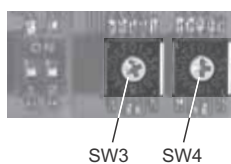


Fig. 10 Setting the PROFIBUS address

The table below shows examples of PROFIBUS address settings.



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

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

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

For a complete overview of the PROFIBUS addresses, see section 10. [PROFIBUS address](#).

5.5 Termination resistors

The termination resistors are fitted on the CIM 150 PROFIBUS module. See fig. 11.

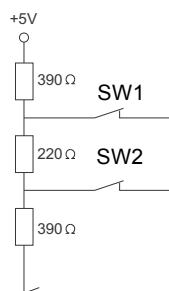


Fig. 11 Internal termination resistors

CIM 150 has a DIP switch with two switches, SW1 and SW2 for cutting the termination resistors in and out. Figure 12 shows the DIP switches in cut-out state.

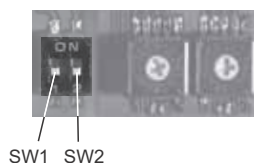


Fig. 12 Cutting termination resistors in and out

DIP switch settings

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



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. 8.

- Red and green status LED, LED1, for PROFIBUS communication.
- Red and green status LED, LED2, for GENibus communication between CIM 150 and the connected wastewater system.

LED1

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

LED2

Status	Description
Off.	CIM 150 is switched off.
Permanently green.	GENibus communication between CIM 150 and the wastewater system is OK.
Permanently red.	CIM 150 does not support the connected wastewater system.
Flashing red.	No GENibus communication between CIM 150 and the wastewater system.



During startup, 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, for example Siemens Simatic Manager. If the watchdog is enabled, all bits in the PROFIBUS output modules are automatically set to "0" if the PROFIBUS communication is broken.

As a result, the E-pump 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 wastewater system will be set to local mode.

6. PROFINET IO, CIM 500 setup

6.1 Connecting the ethernet cable



WARNING

Electric shock

Death or serious personal injury

- Connect CIM 500 only to SELV or SELV-E circuits.

Use RJ45 plugs and ethernet cable. Connect the cable shield to protective earth at both ends.



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

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.

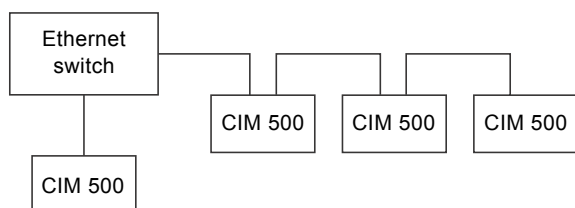


Fig. 13 Example of Industrial Ethernet network

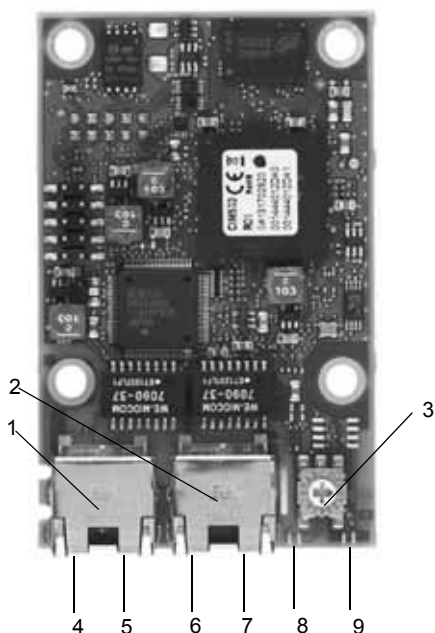


Fig. 14 Example of ethernet connection, CIM 500

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 and red status LED for ethernet communication	LED 1
9	Green and red status LED for internal communication between the module and the pump.	LED 2

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. 15.

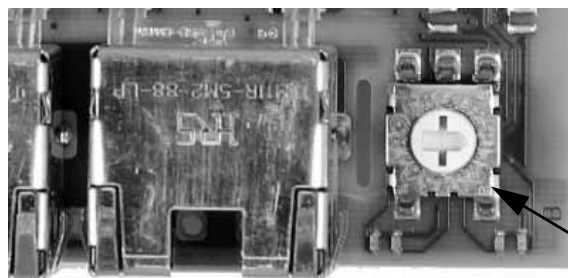


Fig. 15 Selecting the Industrial Ethernet protocol

Pos.	Description
0	PROFINET IO (default)
1	Modbus TCP
2	BACnet IP
3	EtherNet/IP
4	GRM IP. Requires a contract with Grundfos.
5.E	Reserved, LED1 will be permanently red to indicate an invalid configuration
F	Reset to factory default Note: The rotary switch must be set in this position for 20 seconds before CIM 500 resets to factory default. During this period LED1 flashes red and green at the same time to indicate that a reset will occur.



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

6.3 Setting the IP addresses

The CIM 500 ethernet module is default set to a fixed IP address. It is possible to change the IP address settings from the built in webserver.

Default IP settings used by the webserver	IP address: 192.168.1.100 Subnet mask: 255.255.255.0 Gateway: 192.168.1.1
IP settings for Modbus TCP	Make the settings via the webserver
Device name and IP settings for PROFINET IO	Static configuration from the webserver or configuration from the PROFINET IO configuration tool.

6.4 Establish connection to the webserver

You can configure CIM 500 using the built-in webserver. To establish a connection from a PC to CIM 500 the following steps are required:

- Connect the PC and CIM 500 using an ethernet cable.
- Configure the PC ethernet port to the same subnetwork as CIM 500, for example 192.168.1.101, and the subnet mask to 255.255.255.0. See section [A.2 Webserver configuration](#) on page 51.
- Open a standard internet browser and type 192.168.1.100 in the URL field.
- Log in to the webserver using the following:

User name	admin (default)
Password	Grundfos (default)



User name and password may have been changed from their default values.



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Fig. 16 CIM 500 connected to a PC



You can use both ETH1 and ETH2 to establish a connection to the webserver.



You can access the webserver 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. 14.

- Red and green status LED, LED1, for ethernet communication
- Red and green status LED, LED2, for internal communication between CIM 500 and the Grundfos product.

LED1

Status	Description
Off	CIM 500 is switched off.
Flashing green	Wink function. LED flashes 10 times when activated from the master.
Permanently green	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 the connection to the master is 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 the 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	CIM 500 is switched off.
Flashing red	No internal communication between CIM 500 and the Grundfos product.
Permanently red	CIM 500 does not support the Grundfos product connected.
Permanently green	Internal communication between CIM 500 and the Grundfos product is OK.
Permanently red and green	Memory fault.



During startup, 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. 14.

DATA1 and DATA2

These yellow LEDs indicate data traffic activity.

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

LINK1 and LINK2

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

Status	Description
Green off	No ethernet link on the RJ45 connector
Green on	Ethernet link on the RJ45 connector is OK

7. Detailed description of data modules

7.1 Data types

Grundfos CIM 150 and CIM 500 support 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

7.1.1 Explanation to event trigger

When a PROFIBUS/PROFINET master writes an output module, the write action is triggered by a specific event.

This can work in three ways:

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 PitStatus (module 43) or PumpControlAck (module 44) 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 wastewater system. CIM 150 and CIM 500 will attempt to make the wastewater system operate according to the "requested" state.

Value change

Control bits/bytes with a value-change event trigger behave like a command that is executed when the bit/byte changes its value. CIM 150 and CIM 500 will attempt to make the wastewater system operate according to the "requested" value. The change is reflected in a bit/byte value in a corresponding input module.

7.1.2 Overview of the data modules

The table below shows how the PROFIBUS/PROFINET data modules are organised in this manual.

Module type	Section	Modules
Control (output modules)	7.2 Control of wastewater pit	1
	7.3 Control of wastewater pumps	2-7
	7.4 Setting of real-time clock	8
	7.5 Setting of analog outputs	9-11
	7.6 Level control settings	12-40
	7.7 Setting of pump index	41
	7.8 Pit measurement data modules, input modules	43-110
Status (input modules)	7.9 Pump measurement data modules	111-141
	7.10 User-defined counters	144-147
	7.11 Dedicated Controls (CU 36X), alarms and warnings	49-52, 57-59, 117-118
	7.12 Level Control (LC 2X1), alarms and warnings	49-52, 57-59, 117-118
	7.13 AUTO_{ADAPT} system (CIU XX2), alarms and warnings	49-50, 53-54, 57-59, 119-120
	7.14 Device identification (DeviceIdentification, module 142)	142

7.2 Control of wastewater pit

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

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
1	Pit Control	5	Bit	Output module for the control of the wastewater pit. An acknowledge bit to each command can be found in input module PitStatus (module 43).				
				Bit Name and description Event trigger				
				RemoteAccessReq The module is used to enable the writing to output modules. 0: Writing to output modules disabled. Control from bus (remote) is not possible. 1: Writing to output modules enabled. Control from bus (remote) is possible.	State	•	•	•
				ResetAlarm The module is used as remote, manual alarm acknowledgement. The command is acknowledged by the ResetAlarmAck bit.	Rising edge	•	•	•
				AutoPit The module is used to release an interlocked pit. The actual operating mode of the pit can be read from PitOperatingMode (module 45). The command is acknowledged by the AutoPitAck bit.	Rising edge	•	-	-
				InterlockPit The system will be interlocked and the wastewater system will stop pumping. The command is acknowledged by the InterlockPitAck bit.	Rising edge	•	-	-
				CustomRelayPulse The module will generate a toggle pulse at the CU 36X user-defined relay once it has been set to "bus-controlled". It must be set with the Grundfos PC Tool WW Controls. The command is acknowledged by the CustomRelayPulseAck bit.	Rising edge	•	-	-
				CustomRelayOnOff The module can be used to control the CU 36X user-defined relay once it has been set to "bus-controlled". It must be set with the Grundfos PC Tool WW Controls.	State	•	-	-
				6-7 RESERVED	-	-	-	-

7.3 Control of wastewater pumps

A pump control module is available for each of the possible wastewater pumps.

Module	Name	Data type	Unit	Description						
2	Pump1Control	6	Enum	Output module for the control of pump 1.						
				SetPump1OperatingMode [Enumeration] AUTO _{ADAPT} : The actual operating mode of the pump can be read from PumpOperatingMode (module 112). Dedicated Controls and Level Control (LC 2X1): PumpControlSource (module 114) and PumpPumpingMode (module 115) show how the pump operates.						
				Byte 1 (data type 5)	Value	Name	Event trigger	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}	LC 2X1
								Single pit	Multi-pit	
				0	Auto	Value change	•	•	•	•
			1	ForcedStart	•		•	•	•	
			2	ForcedStop	•		•	•	•	
			3-255	-	-	-	-	-	-	
			Bits	Byte 2 (data type 5)	Bit	Name	Event trigger	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}	LC 2X1
									Single pit	Multi-pit
0	Pump1ResetAlarm	Rising edge		-	•	•	-			
1	Pump1PumpDown	Rising edge		-	•	•	-			
2-7	-	-		-	-	-	-			
3	Pump2Control	6	Enum/ bits	Output module for the control of pump 2. See above.	•	•	•	•		
4	Pump3Control	6	Enum/ bits	Output module for the control of pump 3. See above.	•	•	•	-		
5	Pump4Control	6	Enum/ bits	Output module for the control of pump 4. See above.	•	•	•	-		
6	Pump5Control	6	Enum/ bits	Output module for the control of pump 5. See above.	•	-	-	-		
7	Pump6Control	6	Enum/ bits	Output module for the control of pump 6. See above.	•	-	-	-		

7.4 Setting of real-time clock

Triggered by value change. Can also be set via the CU 36X "Settings" menu.

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
8	SetRealTimeClock	7	Unix time	Output module used for setting the internal real-time clock (RTC) in Unix Time format, seconds since 1 January 1970. Example Date: 14-09-2011, 10:30:00. Unix Time: 1316014200 (4E70C878hex).	•	-	-	-

7.5 Setting of analog outputs

Before a bus-controlled analog output can be used, the CU 36X must be configured for this purpose. This can only be done with the Grundfos PC Tool WW Controls.

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
9	SetAnalogOutput1	6	0.01 %	Output module used for the control of Analog output 1.	•	-	-	-
10	SetAnalogOutput2	6	0.01 %	Output module used for the control of Analog output 2.	•	-	-	-
11	SetAnalogOutput3	6	0.01 %	Output module used for the control of Analog output 3.	•	-	-	-

7.6 Level control settings

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
12	SetOverflowLevel	6	0.01 m	Sets the overflow level. The actual level can be read from OverflowLevel (module 61). Can also be set via CU 36X.	●	-	-	-
13	SetHighLevel	6	0.01 m	Sets the high level. The actual level can be read from HighLevel (module 62). CU 36X: can be set via the display. LC 2X1: can be set via Grundfos GO Remote or the operating panel.	●	-	-	●
14	SetAlarmLevel	6	0.01 m	Sets the alarm level. The actual level can be read from AlarmLevel (module 63). It can also be set via CU 36X.	●	-	-	-
15	SetDryRunningLevel	6	0.01 m	Sets the dry-running level. The actual level can be read from DryRunningLevel (module 64). CU 36X: can be set via the display. LC 2X1: can be set via Grundfos GO Remote or the operating panel.	●	-	-	●
16	SetFoamDrainLevel	6	0.01 m	Sets the foam-draining level. The actual level can be read from FoamDrainLevel (module 65). It can also be set via CU 36X.	●	-	-	-
17	SetSinglePitStopLevel	5	0.01 m	Sets the pit stop level in AUTO _{ADAPT} wastewater systems. The actual level can be read from SinglePitStopLevel (module 66). It can also be set with Grundfos GO Remote in service mode. Note: The factory-set value should not be changed, except in very special cases.	-	●	-	-
18	SetSinglePitStartLevel	5	0.01 m	Sets the pit start level in AUTO _{ADAPT} wastewater systems. The actual level can be read from SinglePitStartLevel (module 67). It can also be set with Grundfos GO Remote.	-	●	-	-
19	SetSinglePitStartBand	5	0.01 m	Sets the pit start band in AUTO _{ADAPT} wastewater systems. The actual band can be read from SinglePitStartBand (module 68). It can also be set with Grundfos GO Remote in service mode. Note: The factory-set value should not be changed, except in very special cases.	-	●	-	-
20	SetSinglePitHighLevel	5	0.01 m	Sets the high level in AUTO _{ADAPT} wastewater systems. The actual level can be read from SinglePitHighLevel (module 69). It can also be set with Grundfos GO Remote.	-	●	-	-
21	SetStartLevelP1	6	0.01 m	Sets the pump start and stop levels in Dedicated Controls and LC 2X1 systems or AUTO _{ADAPT} wastewater systems operating in multi-pit mode. The actual levels can be read from the corresponding modules 70 to 81. Dedicated Controls: These levels can also be set via CU 36X. LC 2X1: These levels can also be set via Grundfos GO Remote or the operating panel. AUTO _{ADAPT} : These levels cannot be set with Grundfos GO Remote.	●	-	●	●
22	SetStopLevelP1	6	0.01 m		●	-	●	●
23	SetStartLevelP2	6	0.01 m		●	-	●	●
24	SetStopLevelP2	6	0.01 m		●	-	●	-
25	SetStartLevelP3	6	0.01 m		●	-	●	-
26	SetStopLevelP3	6	0.01 m		●	-	●	-
27	SetStartLevelP4	6	0.01 m		●	-	●	-
28	SetStopLevelP4	6	0.01 m		●	-	●	-
29	SetStartLevelP5	6	0.01 m		●	-	-	-
30	SetStopLevelP5	6	0.01 m		●	-	-	-
31	SetStartLevelP6	6	0.01 m		●	-	-	-
32	SetStopLevelP6	6	0.01 m		●	-	-	-

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
33	SetMultiPitStartBandP1	5	0.01 m		-	-	•	-
34	SetMultiPitHighLevelP1	5	0.01 m	Sets the pump start band and pump high-level alarm limit in AUTO _{ADAPT} wastewater systems operating in multi-pit mode. The actual values can be read from the corresponding modules 82 to 89.	-	-	•	-
35	SetMultiPitStartBandP2	5	0.01 m		-	-	•	-
36	SetMultiPitHighLevelP2	5	0.01 m		-	-	•	-
37	SetMultiPitStartBandP3	5	0.01 m		-	-	•	-
38	SetMultiPitHighLevelP3	5	0.01 m	These values cannot be set with Grundfos GO Remote.	-	-	•	-
39	SetMultiPitStartBandP4	5	0.01 m		-	-	•	-
40	SetMultiPitHighLevelP4	5	0.01 m		-	-	•	-

7.7 Setting of pump index

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
41	SetPumpIndex	5	Enum	Pump index This output module selects from which pump the measured data (modules 111 to 141) is to be read. Permissible range is [1; highest pump number]. Its actual value can be read from PumpIndex (module 111).	•	•	•	•

7.8 Pit measurement data modules, input modules

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1	
						Single pit	Multi-pit		
43	PitStatus	5	Bit	Status bits related to output module PitControl (module 1). The bits that are acknowledge bits will be set when the associated control bit is set and the command has been executed. It will be cleared when the control bit is cleared.					
				Bit	Name and description				
				0	ActRemoteAccess Indicates whether writing to output modules is enabled. 0: Writing to output modules disabled. Control from bus (remote) is not possible. 1: Writing to output modules enabled. Control from bus (remote) is possible.	•	•	•	•
				1	ResetAlarmAck Acknowledge bit to ResetAlarm control bit.	•	•	•	•
				2	AutoPitAck Acknowledge bit to AutoPit control bit.	•	-	-	-
				3	InterlockPitAck Acknowledge bit to InterlockPit control bit.	•	-	-	-
				4	CustomRelayPulseAck Acknowledge bit to CustomRelayPulse control bit.	•	-	-	-
				5	PitMode Pit mode of AUTO _{ADAPT} wastewater system. 0: Single-pit mode 1: Multi-pit mode.	-	•	•	-
				6-7	RESERVED			-	-
				44	PumpControlAck	6	Bit	Acknowledge bits related to commands in the pump control output modules Pump#Control (modules 2 to 7). A bit will be set when the associated control bit is set and the command has been executed. It will be cleared when the control bit is cleared.	
Byte 1 bit	Name and description								
0	Pump1ResetAlarmAck	-	•					•	-
1	Pump1PumpDownAck	-	•					•	-
2	Pump2ResetAlarmAck	-	•					•	-
3	Pump2PumpDownAck	-	•					•	-
4	Pump3ResetAlarmAck	-	•					•	-
5	Pump3PumpDownAck	-	•					•	-
6	Pump4ResetAlarmAck	-	•					•	-
7	Pump4PumpDownAck	-	•					•	-
Byte 2 bit	Name and description								
0-7	RESERVED								

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
45	PitOperatingMode	5	Enum	Operating mode of pit				
				Value Description				
				0 Standby	•	•	-	•
				1 Startup delay	•	•	-	•
				2 Pumping (level control)	•	•	-	•
				3 Stop delay	•	-	-	•
				4 Pumping max.	•	-	-	•
				5 Stopped (level control)	•	•	-	•
				6 Foam draining	•	-	-	-
				7 Daily emptying	•	-	-	-
				8 Pump anti-seizing	•	-	-	•
				9 Manuel control, all enabled pumps in manual control	•	•	-	•
				10 Interlock control	•	-	-	-
				11 Mains-supply fault	•	•	-	-
				12 Level-sensor fault	•	-	-	•
				13 All enabled pumps in alarm	•	•	-	•
				14 All pumps out of operation	•	•	-	•
				15 Service mode, alarms suppressed	•	-	-	-
46	FloatSwitchStatus	5	Bits	Status of float switches				
				Bit Name and description				
				0 FloatSwitch1Status 0: Off 1: On (float switch up).	•	-	-	•
				1 FloatSwitch2Status 0: Off 1: On (float switch up).	•	-	-	•
				2 FloatSwitch3Status 0: Off 1: On (float switch up).	•	-	-	•
				3 FloatSwitch4Status 0: Off 1: On (float switch up).	•	-	-	•
				4 FloatSwitch5Status 0: Off 1: On (float switch up).	•	-	-	•
47	IOLogicOutput	5	Bits	5 ExtraOverflowSwitchStatus 0: Off 1: On (float switch up).	•	-	-	-
				Eight logic outputs from the I/O logic function (user-defined functions). These outputs are to be set via CU 36X.	•	-	-	-
48	DigitalInputs	5	Bits	Status of digital inputs				
				Bit Name and description				
				0 DigitalInput1 0: Not active 1: High-level alarm.	-	•	•	-
49	AlarmCode	5	Enum	1 DigitalInput2 0: Not active 1: General alarm.	-	•	•	-
50	WarningCode	5	Enum		•	•	•	•
51	DCLCPitAlarmBits	10	Bits		•	-	-	•
52	DCLCPitWarningBits	10	Bits		•	-	-	•
53	AAPitAlarmBits	6	Bits		-	•	•	-
54	AAPitWarningBits	6	Bits		-	•	•	-

See sections [7.11.4 Dedicated Controls \(CU 36X\)](#), [alarm and warning bits](#) and [7.13.4 AUTO_{ADAPT} systems \(CIU XX2\)](#), [alarm and warning bits](#).

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
55	PitPumpsPresent	5	Bits	One bit for each pump. The bit is set if the pump is present.				
				Bit Name and description				
				0 Pump1Present	•	•	•	•
				1 Pump2Present	•	•	•	•
				2 Pump3Present	•	•	•	-
				3 Pump4Present	•	•	•	-
				4 Pump5Present	•	-	-	-
				5 Pump6Present	•	-	-	-
56	PitPumpsRunning	5	Bits	One bit for each pump. The bit is set if the pump is running.				
				Bit Name and description				
				0 Pump1Running	•	•	•	•
				1 Pump2Running	•	•	•	•
				2 Pump3Running	•	•	•	-
				3 Pump4Running	•	•	•	-
				4 Pump5Running	•	-	-	-
				5 Pump6Running	•	-	-	-
57	PitPumpsCommFault	5	Bits	One bit for each pump. The bit is set if the pump has a communication fault.				
				Bit Name and description				
				0 Pump1CommFault	•	•	•	•
				1 Pump2CommFault	•	•	•	•
				2 Pump3CommFault	•	•	•	-
				3 Pump4CommFault	•	•	•	-
				4 Pump5CommFault	•	-	-	-
				5 Pump6CommFault	•	-	-	-
58	PitPumpsAlarm	5	Bits	One bit for each pump. The bit is set if the pump has an alarm.				
				Bit Name and description				
				0 Pump1Alarm	•	•	•	•
				1 Pump2Alarm	•	•	•	•
				2 Pump3Alarm	•	•	•	-
				3 Pump4Alarm	•	•	•	-
				4 Pump5Alarm	•	-	-	-
				5 Pump6Alarm	•	-	-	-
59	PitPumpsWarning	5	Bits	One bit for each pump. The bit is set if the pump has a warning.				
				Bit Name and description				
				0 Pump1Warning	•	-	-	•
				1 Pump2Warning	•	-	-	•
				2 Pump3Warning	•	-	-	-
				3 Pump4Warning	•	-	-	-
				4 Pump5Warning	•	-	-	-
				5 Pump6Warning	•	-	-	-
				6 MixerWarning	•	-	-	-

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
60	PitPumpsDisabled	5	Bits	One bit for each pump. The bit is set if the pump is disabled.				
				Bit Name and description				
				0 Pump1Disabled	●	-	-	-
				1 Pump2Disabled	●	-	-	-
				2 Pump3Disabled	●	-	-	-
				3 Pump4Disabled	●	-	-	-
				4 Pump5Disabled	●	-	-	-
				5 Pump6Disabled	●	-	-	-
				6 MixerDisabled	●	-	-	-
61	OverflowLevel	6	0.01 m	Actual overflow level. It can be set with SetOverflowLevel (module 12).	●	-	-	-
62	HighLevel	6	0.01 m	Actual high level. It can be set with SetHighLevel (module 13).	●	-	-	●
63	AlarmLevel	6	0.01 m	Actual alarm level. It can be set with SetAlarmLevel (module 14).	●	-	-	-
64	DryRunningLevel	6	0.01 m	Actual dry-running level. It can be set with SetDryRunningLevel (module 15).	●	-	-	●
65	FoamDrainLevel	6	0.01 m	Actual foam-draining level. It can be set with SetFoamDrainLevel (module 16).	●	-	-	-
66	SinglePitStopLevel	5	0.01 m	Actual, common pump-control settings for AUTO _{ADAPT} wastewater systems operating in single-pit mode. They can be set with the corresponding output modules 17 to 20.	-	●	-	-
67	SinglePitStartLevel	5	0.01 m		-	●	-	-
68	SinglePitStartBand	5	0.01 m		-	●	-	-
69	SinglePitHighLevel	5	0.01 m		-	●	-	-
70	StartLevelP1	6	0.01 m	Actual pump start and stop levels in Dedicated Controls systems or AUTO _{ADAPT} wastewater systems operating in multi-pit mode. They can be set with the corresponding output modules 21 to 32.	●	-	●	●
71	StopLevelP1	6	0.01 m		●	-	●	●
72	StartLevelP2	6	0.01 m		●	-	●	●
73	StopLevelP2	6	0.01 m		●	-	●	-
74	StartLevelP3	6	0.01 m		●	-	●	-
75	StopLevelP3	6	0.01 m		●	-	●	-
76	StartLevelP4	6	0.01 m		●	-	●	-
77	StopLevelP4	6	0.01 m		●	-	●	-
78	StartLevelP5	6	0.01 m		●	-	-	-
79	StopLevelP5	6	0.01 m		●	-	-	-
80	StartLevelP6	6	0.01 m		●	-	-	-
81	StopLevelP6	6	0.01 m		●	-	-	-
82	MultiPitStartBandP1	5	0.01 m	Actual pump-start band and pump high-level alarm limit in AUTO _{ADAPT} wastewater systems operating in multi-pit mode. The actual values can be set with the corresponding output modules 33 to 40.	-	-	●	-
83	MultiPitHighLevelP1	5	0.01 m		-	-	●	-
84	MultiPitStartBandP2	5	0.01 m		-	-	●	-
85	MultiPitHighLevelP2	5	0.01 m		-	-	●	-
86	MultiPitStartBandP3	5	0.01 m		-	-	●	-
87	MultiPitHighLevelP3	5	0.01 m		-	-	●	-
88	MultiPitStartBandP4	5	0.01 m		-	-	●	-
89	MultiPitHighLevelP4	5	0.01 m		-	-	●	-
90	PitWaterLevel	6	0.01 m	Sensor-measured water level in the pit. It requires a level sensor for Dedicated Controls.	●	●	-	●
91	PitSwitchWaterLevel	6	Enum	Float-switch-detected water level in the pit. Requires one or more float switches. Range: 0 to 5.	●	-	-	-
92	PitDepth	6	0.01 m	Depth of the pit.	●	-	-	-
93	ActualFlowIn	6	0.1 l/s	Actual water flow into the pit.	●	-	-	-
94	AverageFlowIn	6	0.1 l/s	Average water flow into the pit.	●	-	-	-

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
95	ActualFlowOut	6	0.1 l/s	Actual water flow out of the pit.	●	-	-	-
96	AverageFlowOut	6	0.1 l/s	Average water flow out of the pit.	●	-	-	-
97	SpecificEnergy	6	Wh/m ³	Specific energy consumption.	●	-	-	-
98	OverflowVolume	6	0.1 m ³	Overflow volume.	●	-	-	-
99	OverflowTime	6	1 min.	Time with overflow condition.	●	-	-	-
100	OverflowCounter	6	-	Counter of overflow occurrences.	●	-	-	-
101	Power	7	1 W	Total power consumption of wastewater pit.	●	●	●*	●
102	Energy	7	0.1 kWh	Total energy consumption of wastewater pit.	●	●	●*	●
103	RunTime	7	1 min.	Running time, at least one pump has been running.	●	●	●*	●
104	Volume	7	0.1 m ³	Totally pumped volume of wastewater pit.	●	-	-	-
105	AnalogInput1	6	0.10 %	Value of analog input 1 measurement.	●	-	-	●
106	AnalogInput2	6	0.10 %	Value of analog input 2 measurement.	●	-	-	●
107	AnalogInput3	6	0.10 %	Value of analog input 3 measurement.	●	-	-	●
108	MixerStartsPerHour	6	/h	Number of mixer starts per hour.	●	-	-	-
109	MixerRuntime	7	1 min.	Total running time of mixer.	●	-	-	-
110	MixerStartCounter	7	-	Total number of mixer starts.	●	-	-	-
148	PitOutletPressure	6	0.001 bar	Outlet pressure at the pit	●	-	-	-
149	AnalogInput4	6	0.10 %	Value of analog input 4 measurement	-	-	-	●
150	AnalogInput5	6	0.10 %	Value of analog input 5 measurement	-	-	-	●

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
151	UserDigitalInputs	6	Bits	Status of user digital inputs	-	-	-	●
				Byte 1				
				Bit				
				Description				
				0	LC 231: DI 1 LC 241: DI 1 (IO 242 pump module)	-	-	●
				1	LC 231: DI 2 LC 241: DI 2 (IO 242 pump module)	-	-	●
				2	LC 231: DIO 3 as DI LC 241: DI 3 (IO 242 pump module)	-	-	●
				3	LC 231: DIO 4 as DI LC 241: DI 4 (IO 242 pump module)	-	-	●
				4	LC 231: CIO 1 as DI LC 241: ADI as DI (IO 242 pump module)	-	-	●
				5	LC 231: CIO 2 as DI LC 241: DIO 1 as DI (IO 241 Ext IO module)	-	-	●
				6	LC 231: - LC 241: DIO 2 as DI (IO 241 Ext IO module)	-	-	●
				7	LC 231: - LC 241: DI 3 (IO 241 external IO module)	-	-	●
				Byte 2				
				Bit				
				Description				
				0	LC 231: - LC 241: DI 4 (IO 241 Ext IO module)	-	-	●
				1	LC 231: - LC 241: CIO 1 as DI (IO 241 external IO module)	-	-	●
				2	LC 231: - LC 241: CIO 2 as DI (IO 241 external IO module)	-	-	●
				3	LC 231: - LC 241: CIO 3 as DI (IO 241 external IO module)	-	-	●
				4	LC 231: - LC 241: CIO 4 as DI (IO 241 external IO module)	-	-	●
				5-7	Not in use	-	-	-

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
152	UserDigitalOutputs	6	Bits	Status of user digital outputs	-	-	-	●
				Byte 1				
				Bit				
				Description				
				0	LC 231: Rel 1 LC 241: Rel 1 (IO 242 pump module)	-	-	●
				1	LC 231: Rel 2 LC 241: Rel 2 (IO 242 pump module)	-	-	●
				2	LC 231: DIO 3 as DO LC 241: DIO 1 as DO (IO 241 external IO module)	-	-	●
				3	LC 231: DIO 4 as DO LC 241: DIO 2 as DO (IO 241 external IO module)	-	-	●
				4	LC 231: CIO 1 as DO LC 241: CIO 1 as DO (IO 241 external IO module)	-	-	●
				5	LC 231: CIO 2 as DO LC 241: CIO 2 as DO (IO 241 external IO module)	-	-	●
				6	LC 231: - LC 241: CIO 3 as DO (IO 241 external IO module)	-	-	●
				7	LC 231: - LC 241: CIO 4 as DO (IO 241 external IO module)	-	-	●
				Byte 2				
				Bit				
				Description				
				0	LC 231: - LC 241: Rel 1 (IO 241 external IO module)	-	-	●
				1	LC 231: - LC 241: Rel 2 (IO 241 external IO module)	-	-	●
				2-7	Not in use	-	-	-

* For AUTO_{ADAPT} wastewater systems operating in multi-pit mode, this value is the sum of the values from all pits.

7.9 Pump measurement data modules

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
111	PumpIndex	5	Enum	Actual pump index. It selects from which pump the measured data (modules 111 to 141) is to be read. It can be set via SetPumpIndex (module 41).	•	•	•	•
112	PumpOperatingMode	5	Enum	Operating mode of AUTO _{ADAPT} pump. 0: Auto (power-on default) 1: Forced start 2: Forced stop.	-	•	•	-
113	PumpConnectionType	5	Enum	Pump connection type. CU 36X: 0: CU 36X relay 1: IO 351 relay 2: CU 36X + frequency converter (VFD) 3: IO 351 + frequency converter (VFD). LC 2X1: 0: pump connected to wall-mounted controller or not present. 1: Pump connected via pump module.	•	-	-	•
114	PumpControlSource	5	Enum	Pump control source. 0: Auto, level control 1: Switch 2: Display 3: Remote-controlled/fieldbus.	•	-	-	•
115	PumpPumpingMode	5	Enum	Pumping mode of pump. 0: Running 1: Stopped 2: Disabled 3: Not present.	•	-	-	•
116	PumpAuxDevices	10	-	Presence and status of auxiliary electronic devices.	•	-	-	-
				Byte 1: IO 113 status [enum] 0: Not present 1: Present and working OK 2: Present, but faulty 3: Present, but no communication.				
				Byte 2: MP 204 status [enum] 0: Not present 1: Present and working OK 2: Present, but faulty 3: Present, but no communication.				
117	DCLCPumpAlarmBits	10	Bits	See sections 7.11 Dedicated Controls (CU 36X) , alarms and warnings , 7.12 Level Control (LC 2X1) , alarms and warnings and 7.13 AUTO_{ADAPT} system (CIU XX2) , alarms and warnings .	•	-	-	•
118	DCLCPumpWarningBits	10	Bits		•	-	-	•
119	AAPumpAlarmBits	6	Bits		-	•	•	-
120	AAPumpWarningBits	6	Bits		-	•	•	-
121	PumpLatestRunTime	6	1 s	The latest run time for the pump.	•	-	-	•
122	PumpStartsPerHour	6	/h	Number of pump starts per hour.	•	-	-	•
123	PumpFlow	6	0.1 l/s	Current pump flow.	•	-	-	-
124	PumpLatestFlow	6	0.1 l/s	Measured flow the last time the pump was running.	•	-	-	-
125	PumpCurrent	6	0.1 A	Pump current consumption.	•	•	•	•
126	PumpLatestCurrent	6	0.1 A	Pump current consumption last time the pump was running.	•	•	•	-
127	PumpInsulation	6	10 kW	Motor-winding insulation.	•	-	-	-
128	PumpWaterInOil	6	0.01 %	Water in motor oil.	•	-	-	-
129	PumpMotorTemp1	6	1 °C	Motor-winding temperature 1.	•	•	•	-

Module	Name	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
						Single pit	Multi-pit	
130	PumpMotorTemp2	6	1 °C	Motor-winding temperature 2.	•	•	•	-
131	PumpCosPhi	6	0.01	Pump cos(ϕ), power factor.	•	•	•	-
132	PumpFrequency	6	0.01 Hz	Pump frequency.	•	•	•	-
133	PumpVoltage	6	0.1 V	Pump voltage.	•	•	•	-
134	PumpVFDMode	5	Enum	Mode of pump frequency converter (VFD). 0: VFD not controlled 1: - 2: Stopped 3: Reverse start 4: Start flushing 5: Normal 6: Run flushing.	•	-	-	-
135	PumpCurrentAsym	5	0.10 %	Pump current asymmetry.	•	-	-	-
136	PumpRunTime	7	1 min.	Pump running time.	•	•	•	•
137	PumpTimeToService	7	1 min.	Time to next pump service.	•	-	-	•
138	PumpNumberOfStarts	7	-	Number of pump starts.	•	•	•	•
139	PumpPower	7	1 W	Pump power consumption.	•	•	•	•
140	PumpEnergy	7	0.1 kWh	Pump energy consumption.	•	•	•	•
141	PumpLevel	6	0.01 m	Level in pit as measured by an integrated pump sensor.	-	•	•	-

7.10 User-defined counters

The three user-defined counters use digital inputs on the IO 351 module to show events. These events are defined by the user and the programming is done on the CU 36X controller display. Which scaling, text, to associate with the event is also programmed on CU 36X. The value of the counters can be transferred via PROFIBUS/PROFINET input modules 145, 146 and 147, and the values can be individually reset with the PROFIBUS/PROFINET output module 144.

Module	Name	In/Out	Data type	Unit	Description	CU 36X Dedicated Controls	CIU XX2 AUTO _{ADAPT}		LC 2X1
							Single pit	Multi-pit	
144	ResetUserDefCounters	Output	5	Bits	Bit Name Event trigger	●	-	-	-
					0 ResetUserDefCounter1 Rising edge				
					1 ResetUserDefCounter2 Rising edge				
					2 ResetUserDefCounter3 Rising edge				
					3-7 - -				
145	UserDefCounter1	Input	6	-	Value of user-defined counter 1, setup from CU 36X	●	-	-	
146	UserDefCounter2	Input	6	-	Value of user-defined counter 2, setup from CU 36X	●	-	-	-
147	UserDefCounter3	Input	6	-	Value of user-defined counter 3, setup from CU 36X	●	-	-	-

7.11 Dedicated Controls (CU 36X), alarms and warnings

7.11.1 Dedicated Controls (CU 36X), general alarm and warning behaviour

All alarms and warnings can be of acknowledge type "Auto" or "Manual".

If the acknowledge type is "Auto", for the event in question, CU 36X does not use any restart delay for the pumps. Except for the delay that might be present in the auxiliary devices, for MP 204 this is programmable, a pump restarts immediately when the alarm condition that caused its stop disappears. The belonging alarm or warning modules and the LED indication are also reset automatically. The alarm and warning relay has its own Auto/Manual acknowledge setting.

If the acknowledge type is "Manual", for the event in question, CU 36X remains in alarm or warning state when the alarm or warning condition disappears. No pump is auto-restarted. The belonging alarm or warning indication in data modules remains and so will the LED indication. The alarm and warning relay has its own Auto/Manual acknowledge setting. A ResetAlarm command or an alarm acknowledgement via the CU 36X display is necessary to clear the alarm and warning indication. This also deactivates the alarm and warning relay if it was set to manual acknowledgement.

7.11.2 Dedicated Controls (CU 36X), alarm and warning modules

Module	Name	Data type	Unit	Description
49	AlarmCode	5	Enum	Code for active alarm in the Dedicated Controls system. Prioritised. See code description in section 7.11.3 Dedicated Controls (CU 36X), alarm and warning .
50	WarningCode	5	Enum	Code for active warning in the Dedicated Controls system. Prioritised. See code description in section 7.11.3 Dedicated Controls (CU 36X), alarm and warning .
51	DCLCPitAlarmBits	10	Bits	All active system alarms in the Dedicated Controls system. One bit for each alarm. See bit description in section 7.11.4 Dedicated Controls (CU 36X), alarm and warning bits .
52	DCLCPitWarningBits	10	Bits	All active system warnings in the Dedicated Controls system. One bit for each warning. See bit description in section 7.11.4 Dedicated Controls (CU 36X), alarm and warning bits .
57	PitPumpsCommFault	5	Bits	Bits 0-5: Communication fault status for pumps 1 to 6. One bit for each pump.
58	PitPumpsAlarm	5	Bits	Bits 0-5: Alarm status for pumps 1 to 6. One bit for each pump.
59	PitPumpsWarning	5	Bits	Bits 0-5: Warning status for pumps 1 to 6. One bit for each pump.
117	DCLCPumpAlarmBits	10	Bits	All active pump alarms in the Dedicated Controls system. One bit for each alarm. The pump in question is selected by PumpIndex (module 111). See bit description in section 7.11.4 Dedicated Controls (CU 36X), alarm and warning bits .
118	DCLCPumpWarningBits	10	Bits	All active pump warnings in the Dedicated Controls system. One bit for each warning. The pump in question is selected by PumpIndex (module 111). See bit description in section 7.11.4 Dedicated Controls (CU 36X), alarm and warning bits .

7.11.3 Dedicated Controls (CU 36X), alarm and warning

The codes below are used for data module 49, AlarmCode, and 50, WarningCode.

Code	Description of alarm and warning	Source of the alarm and warning
1	Leakage current	CUE
2	Missing phase	MP 204/CUE
3	External fault signal	System
4	Too many pump auto-restarts per 24 h	MP 204
6	Mains fault	System/DI
9	Phase sequence reversal	MP 204
10	Communication fault, pump	IO 113, pump no [1; 6]
11	Water-in-oil fault, motor oil	AI/IO 113
12	Time for service, general service information	System
15	Communication fault, main system, SCADA	System
16	Other	CUE
18	Motor-protector commanded test trip	MP 204
20	Motor-insulation resistance low	IO 113/MP 204
21	Too many motor starts per hour	System
22	Moisture switch alarm, digital	IO 113
24	Motor/pump vibration high	IO 113
25	Setup conflict	IO 113, pump no [1; 6]
26	Load continues even if the motor has been switched off	MP 204
27	External motor protector activated	DI
30	Change bearings, specific service information	CUE
32	Overvoltage	MP 204/CUE
40	Undervoltage	MP 204/CUE
48	Overload	AI/MP 204/CUE
49	Overcurrent (i_line, i_dc, i_mo)	CUE
51	Blocked motor or pump	System
55	Motor current protection activated, MCP	CUE
56	Underload	AI/MP 204
57	Dry running	System/CUE
58	Low pump flow	System
64	Motor-stator temperature high (T1, Pt1000/Pt100)	IO 113/CUE
69	Thermal relay 1 in motor, for example Klaxon	IO 113
70	Thermal relay 2 in motor, for example thermistor	IO 351/MP 204/CUE
71	Motor-stator temperature high (T2, Pt1000/Pt100)	MP 204
72	Hardware fault (general)	CU 36X/IO 351/IO 113/MP 204, pump no [1; 6]
77	Communication fault, twin-head pump	CUE
88	Sensor fault, motor current	AI, pump no [1; 6]
89	Signal fault, (feedback) sensor 1	CUE
91	Signal fault, temperature 1 sensor	CUE
93	Signal fault, sensor 2	CUE
102	Dosing pump not ready	System
103	Emergency stop	System
111	Current asymmetry	MP 204
112	Cos(φ) too high	MP 204
113	Cos(φ) too low	MP 204
115	Too many grinder reversals or failed reversal attempts	Grinder
116	Overtemperature of motor for grinder	Grinder
117	Intrusion (door opened)	System
118	Sensor fault, Hydrogen sulphide (H ₂ S)	System
145	Motor support-bearing temperature high (Pt100)	IO 113
146	Motor main-bearing temperature high (Pt100)	IO 113
148	Motor-bearing temperature high (Pt100) in drive end (DE)	CUE
149	Motor-bearing temperature high (Pt100) in non-drive end (NDE)	CUE
155	Inrush fault	CUE
159	CIM fault (Communication Interface Module)	Add-on CIM

Code	Description of alarm and warning	Source of the alarm and warning
160	SIM card fault	Add-on CIM
168	Signal fault, pressure sensor, outlet line	AI (pressure sensor)
169	Signal fault, flow sensor	AI (flow sensor)
170	Signal fault, water-in-oil (WIO) sensor	AI
175	Signal fault, Pt100 sensor	IO 113/MP 204/CUE
176	Signal fault, temperature 3 sensor (t_mo3)	CUE
179	Signal fault, motor support-bearing temperature-sensor	IO 113
180	Signal fault, motor main-bearing temperature-sensor	IO 113
181	Signal fault, PTC sensor, short circuited	IO 113
186	Signal fault, power meter sensor	AI (power sensor)
188	Signal fault, user-defined sensor 1	AI (user-defined sensor 1)
188	Signal fault, user-defined sensor 2	AI (user-defined sensor 2)
188	Signal fault, user-defined sensor 3	AI (user-defined sensor 3)
189	Signal fault, level sensor	AI (level sensor)
190	Alarm-level alarm	System
191	High-level alarm	System
192	Overflow level alarm	System
204	Inconsistency between float switches and sensors	System
205	Float-switch sequence inconsistency	System
213	VFD not ready	IO 351
220	Fault, motor-contactor feedback	DI
221	Fault, mixer-contactor feedback	DI (mixer contactor)
222	Time for service, mixer	Mixer
223	Maximum number of mixer starts per hour exceeded	System
224	Pump fault, due to auxiliary component or general fault	System
225	Communication fault, pump module	IO 113
226	Communication fault, I/O module	IO 351
227	Combi event 1	System
227	Combi event 2	System
227	Combi event 3	System
227	Combi event 4	System
229	Water on floor	DI
231	Ethernet: No IP address from DHCP server	System
232	Ethernet: Auto-disabled due to misuse	System
235	Gas detected	DI
240	Lubricate bearings, specific service information	CUE
241	Motor-phase failure	DI/CUE
242	Automatic motor-model recognition failed	CUE
243	Motor relay has been forced (manually operated or commanded)	DI
245	Pump continuous runtime too long	System
246	User-defined relay has been forced (manually operated/ commanded)	CU 36X
247	Power-on notice, the device or system has been switched off	System
248	Fault, battery/UPS	Battery/UPS
249	User-defined event 1	User-defined
250	User-defined event 2	User-defined
251	User-defined event 3	User-defined
252	User-defined event 4	User-defined

7.11.4 Dedicated Controls (CU 36X), alarm and warning bits

Module	Name	Data type	Unit	Description
51	DCLCPitAlarmBits	10	Bits	All active system alarms in the Dedicated Controls system.
				Byte 1 bit
				Description
				Code
				Source
				0 Overflow level alarm 192 System
				1 High-level alarm 191 System
				2 Alarm-level alarm 190 System
				3 Dry running 57 System
				4 Mains fault 6 System
				5 Float switch sequence inconsistency 205 System
				6 Inconsistency between float switches and sensors 204 System
				7 Signal fault, level sensor 189 AI, level sensor
				Byte 2 bit
				Description
				Code
				Source
				0 Signal fault, flow sensor 169 AI, flow sensor
				1 Signal fault, power meter sensor 186 AI, power sensor
				2 Fault, mixer-contactor feedback 221 DI, mixer contactor
				3 Communication fault, I/O module 226 IO 351
				4 CIM fault, Communication Interface Module 159 Add-on CIM
				5 SIM card fault 160 Add-on CIM
				6 Communication fault, main system, SCADA 15 System
				7 Power-on notice 247 System
				Byte 3 bit
				Description
				Code
				Source
				0 Fault, battery or UPS fault 248 Battery/UPS
				1 Hardware fault (general) 72 CU 36X/IO 351
				2 Ethernet: No IP address from DHCP server 231 System
				3 Ethernet: Auto-disabled due to misuse 232 System
				4 Time for service, mixer 222 Mixer
				5 Maximum number of mixer starts per hour exceeded 223 System
				6 User-defined relay has been forced 246 CU 36X
				7 RESERVED - -
				Byte 4 bit
				Description
				Code
				Source
				0 External fault signal 3 System
				1 Combi event 1 227 System
				2 Combi event 2 227 System
				3 Combi event 3 227 System
				4 Combi event 4 227 System
				5 Signal fault, user-defined sensor 1 188 AI, user-defined sensor 1
				6 Signal fault, user-defined sensor 2 188 AI, user-defined sensor 2
				7 Signal fault, user-defined sensor 3 188 AI, user-defined sensor 3

Module	Name	Data type	Unit	Description
51	DCLCPitAlarmBits	10	Bits	Byte 5 bit
				Description
				Code
				Source
				0
				Signal fault, pressure sensor, outlet line
				168
				AI, pressure sensor
				1
				Water on floor
				229
				DI
				2
				Gas detected
				235
DI				
3				
User-defined event 1				
249				
User-defined				
4				
User-defined event 2				
250				
User-defined				
5				
User-defined event 3				
251				
User-defined				
6				
User-defined event 4				
252				
User-defined				
7				
Sensor fault, Hydrogen sulphide (H ₂ S)				
118				
System				
				Byte 6 bit
				Description
				Code
				Source
				0
				Dosing pump not ready
				102
				System
				1
				Emergency stop
				103
				System
				2
				Too many grinder reversals or failed reversal attempt
				115
Grinder				
3				
Overtemperature of motor for grinder				
116				
Grinder				
4				
Intrusion, door opened				
117				
System				
117	DCLCPumpAlarmBits	10	Bits	All active pump alarms in the Dedicated Controls system. The pump in question is selected by PumpIndex (module 111).
				Byte 1 bit
				Description
				Code
				Source
				0
				Thermal relay 1 in motor, for example Klixon
				69
				IO 113
				1
				Thermal relay 2 in motor, for example thermistor
				70
				IO 351/MP 204/CUE
				2
				Motor-stator temperature high (T1, Pt1000/Pt100)
				64
				IO 113/CUE
				3
				Motor stator temperature high (T2, Pt1000/Pt100)
				71
				MP 204
				4
				Motor support-bearing temperature high (Pt100)
				145
				IO 113
5				
Motor main-bearing temperature high (Pt100)				
146				
IO 113				
6				
Motor-insulation resistance low				
20				
IO 113/MP 204				
7				
Undervoltage				
40				
MP 204/CUE				
				Byte 2 bit
				Description
				Code
				Source
				0
				Overvoltage
				32
				MP 204/CUE
				1
				Phase sequence reversal
				9
				MP 204
				2
				Overload
				48
AI/MP 204/CUE				
3				
Underload				
56				
AI/MP 204				
4				
External motor protector activated				
27				
DI				
5				
Missing phase				
2				
MP 204/CUE				
6				
Current asymmetry				
111				
MP 204				
7				
Load continues even if the motor has been switched off				
26				
MP 204				

Module	Name	Data type	Unit	Description			
117	DCLCPumpAlarmBits	10	Bits	Byte 3 bit			
				Description			
				Code			
				Source			
				0	Motor-protector commanded test trip	18	MP 204
				1	Motor-phase failure	241	DI/CUE
				2	Moisture switch alarm, digital	22	IO 113
				3	Motor/pump vibration high	24	IO 113
				4	Water-in-oil fault, motor oil	11	AI/IO 113
				5	Mains fault	6	DI
				6	Fault, motor-contactor feedback	220	DI
				7	Too many motor starts per hour	21	System
				Byte 4 bit			
				Description			
				Code			
				Source			
				0	Time for service, general service information	12	System
				1	Too many pump auto-restarts per 24 h	4	MP 204
				2	Low pump flow	58	System
				3	Pump continuous runtime too long	245	System
				4	Cos(φ) too high	112	MP 204
				5	Cos(φ) too low	113	MP 204
				6-7	RESERVED	-	-
				Byte 5 bit			
				Description			
				Code			
				Source			
				0	Pump fault, due to auxiliary component or general fault	224	System
				1	Communication fault, pump module	225	IO 113
				2	Motor relay has been forced (manually operated/commanded)	243	DI
				3	Signal fault, Pt100 sensor	175	IO 113/MP 204/CUE
				4	Signal fault, PTC sensor, short-circuited	181	IO 113
				5	Signal fault, water-in-oil (WIO) sensor	170	AI
				6	Signal fault, motor support-bearing temperature sensor	179	IO 113
				7	Signal fault, motor main-bearing temperature sensor	180	IO 113
				Byte 6 bit			
Description							
Code							
Source							
0	Communication fault, pump	10	IO 113, pump no [1; 6]				
1	Setup conflict	25	IO 113, pump no [1; 6]				
2	Hardware fault (general)	72	IO 113/MP 204, pump no [1; 6]				
3	Sensor fault, motor current	88	AI, pump no [1; 6]				
4	Inrush fault	155	CUE				
5	Signal fault, sensor 2	93	CUE				
6	Motor-bearing temperature high (Pt100) in drive end (DE)	148	CUE				
7	Motor-bearing temperature high (Pt100) in non-drive end (NDE)	149	CUE				

Module	Name	Data type	Unit	Description			
117	DCLCPumpAlarmBits	10	Bits	Byte 7 bit	Description	Code	Source
				0	Leakage current	1	CUE
				1	Signal fault, temperature 3 sensor (t_mo3)	176	CUE
				2	Signal fault, (feedback) sensor 1	89	CUE
				3	Overcurrent (i_line, i_dc, i_mo)	49	CUE
				4	Motor current protection activated, MCP	55	CUE
				5	Change bearings, specific service information	30	CUE
				6	Lubricate bearings, specific service information	240	CUE
				7	Automatic motor-model recognition failed	242	CUE
				Byte 8 bit	Description	Code	Source
				0	Communication fault, twin-head pump	77	CUE
				1	Signal fault, temperature 1 sensor	91	CUE
				2	Dry running	57	CUE
				3	VFD not ready	213	IO 351
				4	Other	16	CUE
				5	Blocked motor or pump	51	System
				6	Signal fault, power meter sensor	186	AI
				7	RESERVED	-	-
				118	DCLCPumpWarningBits	10	Bits

7.12 Level Control (LC 2X1), alarms and warnings

7.12.1 Level Control (LC 2X1), general alarm and warning behaviour

All alarms and warnings can be of acknowledge type "Auto" or "Manual".

If the acknowledge type is "Auto", for the event in question, LC 2X1 does not use any restart delay for the pumps. A pump restarts immediately when the alarm condition that caused its stop disappears. The belonging alarm and warning modules and the display indication are also reset automatically.

If the acknowledge type is "Manual", for the event in question, LC 2X1 remains in alarm or warning state when the alarm or warning condition disappears. No pump is auto-restarted. The belonging alarm or warning indication in data modules remain and so will the display indication. A ResetAlarm command or an alarm acknowledgement via the LC 2X1 display is necessary to clear the alarm or warning indication.

7.12.2 Level Control (LC 2X1), alarm and warning modules

Module	Name	Data type	Unit	Description
49	AlarmCode	5	Enum	Code for active alarm in wastewater Level Control, LC 2X1. Prioritised. See code description in section 7.12.3 Level Control (LC 2X1), alarm and warning .
50	WarningCode	5	Enum	Code for active warning in wastewater Level Control, LC 2X1. Prioritised. See code description in section 7.12.3 Level Control (LC 2X1), alarm and warning .
51	DCLCPitAlarmBits	10	Bits	All active system alarms in wastewater Level Control, LC 2X1. One bit for each alarm. See bit description in section 7.12.4 Level Control (LC 2X1), alarm and warning bits .
52	DCLCPitWarningBits	10	Bits	All active system warnings in wastewater Level Control, LC 2X1. One bit for each warning. See bit description in section 7.12.4 Level Control (LC 2X1), alarm and warning bits .
57	PitPumpsCommFault	5	Bits	Bits 0-1: Communication fault status for pumps 1 to 2. One bit for each pump.
58	PitPumpsAlarm	5	Bits	Bits 0-1: Alarm status for pumps 1 to 2. One bit for each pump.
59	PitPumpsWarning	5	Bits	Bits 0-1: Warning status for pumps 1 to 2. One bit for each pump.
117	DCLCPumpAlarmBits	10	Bits	All active pump alarms in wastewater Level Control, LC 2X1. One bit for each alarm. The pump in question is selected by PumpIndex (module 111). See bit description in section 7.12.4 Level Control (LC 2X1), alarm and warning bits .
118	DCLCPumpWarningBits	10	Bits	All active pump warnings in wastewater Level Control, LC 2X1. One bit for each warning. The pump in question is selected by PumpIndex (module 111). See bit description in section 7.12.4 Level Control (LC 2X1), alarm and warning bits .

7.12.3 Level Control (LC 2X1), alarm and warning

The codes below are used for data module 49, AlarmCode, and 50, WarningCode.

Code	Description of alarm and warning	Source of the alarm and warning
2	Missing phase	Pump module
4	Too many pump auto-restarts per 24 h	Pump module
9	Phase sequence reversal	Pump module
12	Time for service	-
22	Moisture switch alarm, digital	Pump module
25	Setup conflict	System hardware
48	Overload	Pump module
57	Dry running	System
69	Thermal relay 1 in motor, for example Klixon	Pump module
72	Hardware fault (general)	Pump module
76	Internal communication failure	System hardware
84	Memory-access error	System hardware
85	Parameter-verification error (EEPROM)	Pump module
117	Intrusion (open door)	System
159	CIM fault (Communication Interface Module)	System hardware
163	Setup conflict, current measurement	Pump module
165	Signal fault, user-defined sensor 1	AI (user-defined sensor 1)
190	Alarm-level alarm	System
191	High-level alarm (limit exceeded, sensor 2)	System
205	Float switch sequence inconsistency	System
225	Communication fault, pump module	Pump module
226	Communication fault, I/O module	IO 241
229	Water on floor	System
249	User-defined event 1	User-defined
250	User-defined event 2	User-defined

7.12.4 Level Control (LC 2X1), alarm and warning bits

Module	Name	Data type	Unit	Description
51	DCLCPitAlarmBits	10	Bits	All active system alarms in the Level Control system.
				Byte 1 bit Description Code Source
				1 High-level alarm 191 System
				3 Dry running 57 System
				5 Float switch sequence inconsistency 205 System
				Byte 2 bit Description Code Source
				3 Communication fault, I/O module 226 IO 241/IO 242
				Byte 4 bit Description Code Source
				5 Signal fault, user-defined sensor 1 165 AI (user-defined sensor 1)
				Byte 5 bit Description Code Source
				3 User-defined event 1 249 User-defined
				4 User-defined event 2 250 User-defined
				Byte 6 bit Description Code Source
				6 Internal communication failure 76 System hardware
				7 Setup conflict 25 System hardware
52	DCLCPitWarningBits	10	Bits	System warnings in Level Control, LC 2X1
				Byte 2 Bit Description Code Source
				4 CIM fault (Communication Interface Module) 159 System hardware
				Byte 5 Bit Description Code Source
				1 Water on floor 229 System
				3 User-defined event 1 249 User-defined
				4 User-defined event 2 250 User-defined
				Byte 6 Bit Description Code Source
				4 Intrusion (door opened) 117 System
				5 Memory-access error 84 System hardware

Module	Name	Data type	Unit	Description
117	DCLCPumpAlarmBits	10	Bits	All active pump alarms in the Level Control system. The pump in question is selected by PumpIndex (module 111).
				Byte 1 bit
				Description
				Code
				Source
				0 Thermal relay 1 in motor, for example Klixon 69 Pump module
				Byte 2 bit
				Description
				Code
				Source
				1 Phase sequence reversal 9 Pump module
				2 Overload 48 Pump module
				5 Missing phase 2 Pump module
				Byte 3 bit
				Description
				Code
				Source
				2 Moisture switch alarm, digital 22 Pump module
118	DCLCPumpWarningBits	10	Bits	Byte 4 bit
				Description
				Code
				Source
				1 Too many pump auto-restarts (per 24 h) 4 Pump module
				6 Parameter-verification error (EEPROM) 85 Pump module
				Byte 5 bit
				Description
				Code
				Source
				1 Communication fault, pump module 225 Pump module
				Byte 6 bit
				Description
				Code
				Source
				1 Setup conflict, current measurement 163 Pump module
				2 Hardware fault (general) 72 Pump module
118	DCLCPumpWarningBits	10	Bits	Pump warnings in Level Control, LC 2X1
				Byte 4 bit
				Description
				Code
				Source
				0 Time for service 12 -

7.13 AUTO_{ADAPT} system (CIU XX2), alarms and warnings

7.13.1 AUTO_{ADAPT} systems (CIU XX2), general alarm and warning behaviour

A pump will automatically restart after an alarm when the alarm condition disappears. Overcurrent is not detected before the pump attempts to restart. To prevent rapid and continuous switching out and in of a pump due to an overcurrent alarm appearing and disappearing, the pump uses an overcurrent alarm restart-delay with a fixed factory value of 5 minutes.

All other alarm conditions can be detected while the pump is stopped. A value hysteresis for the measured voltage and temperature values eliminates continuous switching in and out in these situations.

7.13.2 AUTO_{ADAPT} systems (CIU XX2), alarm and warning modules

Module	Name	Data type	Unit	Description
49	AlarmCode	5	Enum	Code for active alarm in the AUTO _{ADAPT} wastewater system. Prioritised. See code description in section 7.13.3 AUTO_{ADAPT} systems (CIU XX2), alarm and warning codes .
50	WarningCode	5	Enum	Code for active warning in the AUTO _{ADAPT} wastewater system. Prioritised. See code description in section 7.13.3 AUTO_{ADAPT} systems (CIU XX2), alarm and warning codes .
53	AAPitAlarmBits	6	Bits	All active system alarms in the AUTO _{ADAPT} wastewater system. One bit for each alarm. See code description in section 7.13.4 AUTO_{ADAPT} systems (CIU XX2), alarm and warning bits .
54	AAPitWarningBits	6	Bits	All active system warnings in the AUTO _{ADAPT} wastewater system. One bit for each warning. See code description in section 7.13.4 AUTO_{ADAPT} systems (CIU XX2), alarm and warning bits .
57	PitPumpsCommFault	5	Bits	Bits 0-3: Communication fault status for pumps 1 to 4. One bit for each pump.
58	PitPumpsAlarm	5	Bits	Bits 0-3: Alarm status for pumps 1 to 4. One bit for each pump.
59	PitPumpsWarning	5	Bits	Bits 0-3: Warning status for pumps 1 to 4. One bit for each pump.
119	AAPumpAlarmBits	6	Bits	All active pump alarms in the AUTO _{ADAPT} wastewater system. One bit for each alarm. The pump in question is selected by PumpIndex (module 111). See code description in section 7.13.4 AUTO_{ADAPT} systems (CIU XX2), alarm and warning bits .
120	AAPumpWarningBits	6	Bits	All active pump warnings in the AUTO _{ADAPT} wastewater system. One bit for each warning. The pump in question is selected by PumpIndex (module 111). See code description in section 7.13.4 AUTO_{ADAPT} systems (CIU XX2), alarm and warning bits .

7.13.3 AUTO_{ADAPT} systems (CIU XX2), alarm and warning codes

The codes below are used for data modules 49, AlarmCode, and 50, WarningCode.

Code	Description of alarm and warning	Source of the alarm and warning
3	External fault signal	Digital input, DI1
10	Communication fault, pump	CIU XX2
25	Setup conflict, parameter inconsistency	CIU XX2
82	Verification error, code area (ROM, FLASH)	CIU XX2
83	Verification error, FE parameter area (EEPROM)	CIU XX2
191	Limit exceeded, sensor 2 (high level)	Digital input, DI0
230	Network alarm	CIU XX2
236	Pump 1 fault	Pump 1
237	Pump 2 fault	Pump 2
238	Pump 3 fault	Pump 3
239	Pump 4 fault	Pump 4

7.13.4 AUTO_{ADAPT} systems (CIU XX2), alarm and warning bits

Module	Name	Data type	Unit	Description
53	AAPitAlarmBits	6	Bits	All active system alarms in the AUTO _{ADAPT} wastewater system. The pump in question is selected by PumpIndex (module 111).
				Byte 1 bit
				Description
				Code
				Source
				0 External fault signal 3 Digital input, DI1
				1 Communication fault, pump 10 CIU XX2
				2 Verification error, code area (ROM, FLASH) 82 CIU XX2
				3 Pump 1 fault 236 Pump 1
				4 Pump 2 fault 237 Pump 2
				5 Pump 3 fault 238 Pump 3
				6 Pump 4 fault 239 Pump 4
				7 High-level alarm 191 Digital input, DI0
				Byte 2 bit
				Description
				Code
				Source
				0 Setup conflict 25 CIU XX2
				1 Network alarm 230 CIU XX2
				2 Verification error, FE parameter area (EEPROM) 83 CIU XX2
				3-7 RESERVED - -
54	AAPitWarningBits	6	Bits	All active system warnings in the AUTO _{ADAPT} wastewater system. Same bit interpretation as AAPitAlarmBits (module 53).
119	AAPumpAlarmBits	6	Bits	All active pump alarms in the AUTO _{ADAPT} wastewater system. The pump in question is selected by PumpIndex (module 111).
				Byte 1 bit
				Description
				Code
				Source
				0 Phase sequence reversal 9 Pump
				1 Motor high voltage 32 Pump
				2 Motor low voltage 40 Pump
				3 Motor overload, maximum current exceeded 48 Pump
				4 Blocked motor or pump 51 Pump
				5 Dry running 57 Digital sensor
				6 Motor temperature high 65 Pump
				7 High temperature, control electronics 66 Pump
				Byte 2 bit
				Description
				Code
				Source
				0 Thermal relay 1 in motor, for example Klixon 69 Pump
				1 Thermal relay 2 in motor, for example thermistor 70 Pump
				2 Verification error, code area (ROM, FLASH) 82 Pump
				3 Verification error, FE parameter area (EEPROM) 83 Pump
				4 Sensor fault 88 Analog sensor
				5 High-water level exceeded 191 Analog sensor
				6 Too many restarts 4 Pump
				7 RESERVED - -
120	AAPumpWarningBits	6	Bits	All active pump warnings in the AUTO _{ADAPT} wastewater system. The pump in question is selected by PumpIndex (module 111). Bit description is identical to AAPumpAlarmBits (module 119).

7.14 Device identification (DeviceIdentification, module 142)

The data type is 10, non-standard.

Byte	Name and description	
	UnitFamily [enumeration]	UnitType [enumeration]
1	1: UPE/MAGNA circulator pump	5: UPE, 3-phase 7: MAGNA, 1-phase 9: MAGNA, 1-phase, small 10: MAGNA 3
	2: E-pump, 1-phase/3-phase, based on MGE motor or CUE frequency converter	2: MGE, 1-phase 3: MGE, 3-phase 4: MGE, 3-phase, large 5: CUE frequency converter 6: MGE, 3-phase, model G 7: MGE, 3-phase, model H and later
	7: MP 204 motor protector	1: MP 204
	17: Hydro Multi-E model G and earlier models	1: With 3-phase pumps 2: With 1-phase pumps
	21: Hydro MPC/Control MPC, Hydro Multi-B	1: Hydro MPC/Control MPC, CU 351 2: Hydro Multi-B, CU 323
	25: CR Monitor	1: CR Monitor, CU 351
	26: Dedicated Controls	1: Dedicated Controls, CU 36X
	28: CIU XX2 AUTO _{ADAPT}	1: CIU XX2
	30: Smart Digital Dosing, DDA	1: Smart Digital Dosing, DDA
	28: MAGNA twin pump	1: MAGNA3-D 2: MAGNA1-D
	39: Hydro Multi-E model H and later models	1: With 3-phase pumps 2: With 1-phase pumps
	48: Wastewater level controller	1: Modular type LC 241 2: Wall-mount type LC 231
2	UnitType [enumeration] According to description above.	
3	UnitVersion [enumeration] Used by Grundfos.	
4	CIMSoftwareVersion [number]	
5	CIMSoftwareRevision [number]	
6	CIMModel [enumeration]	

8. Product simulation

The CIM module 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 152 or CIU 502 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, for example PLC program, before the equipment is installed under real-life conditions.

8.1 CIM 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. See section 5.4 Setting the PROFIBUS address		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 CIM 500 product simulation

Product simulation mode is entered via the webserver. See section [A.4 PROFINET IO configuration](#) on page 52.

9. Fault finding the product

9.1 CIM/CIU 150

You can detect faults in a CIM 150 PROFIBUS module by observing the status of the two communication LEDs. See the table below.

9.1.1 LED status

CIM 150 fitted in Grundfos CU 35X

Fault (LED status)	Possible cause	Remedy
1. Both LED1 and LED2 remain off when the power supply is connected.	a) CIM 150 is fitted incorrectly in CU 35X.	Check that CIM 150 is fitted and connected correctly.
	b) CIM 150 is defective.	Replace CIM 150.
2. LED2 for internal communication is flashing red.	a) No internal communication between CIM 150 and CU 35X.	Check that CIM 150 is fitted correctly in CU 35X.
3. LED2 for internal communication is permanently red.	a) CIM 150 does not support the connected Grundfos product.	Contact the nearest Grundfos company.
4. The PROFIBUS LED1 is permanently red.	a) Fault in CIM 150.	Contact the nearest Grundfos company.
	b) Connected product is not supported	Contact the nearest Grundfos company.
5. The PROFIBUS LED1 is flashing red.	a) Fault in the CIM 150 PROFIBUS configuration.	<ul style="list-style-type: none"> • 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. See section 5.3 Connecting the PROFIBUS. • Check that the PROFIBUS termination is correct. See section 5.5 Termination resistors.
	b) No contact to PROFIBUS master.	<ul style="list-style-type: none"> • Check cable connections. • Check that the PROFIBUS master is running.

CIM 150 fitted in Grundfos LC 2X1

Fault (LED status)	Possible cause	Remedy
1. Both LED1 and LED2 remain off when the power supply is connected.	a) CIM 150 is fitted incorrectly in LC 2X1.	Check that CIM 150 is fitted and connected correctly.
	b) CIM 150 is defective.	Replace CIM 150.
2. LED2 for internal communication is flashing red.	a) No internal communication between CIM 150 and LC 2X1.	Check that CIM 150 is fitted correctly in LC 2X1.
3. LED2 for internal communication is permanently red.	a) CIM 150 does not support the connected Grundfos product.	Contact the nearest Grundfos company.
4. The PROFIBUS LED1 is permanently red.	a) Fault in CIM 150.	Contact the nearest Grundfos company.
	b) Connected product is not supported	Contact the nearest Grundfos company.
5. The PROFIBUS LED1 is flashing red.	a) Fault in the CIM 150 PROFIBUS configuration.	<ul style="list-style-type: none"> • 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. See section 5.3 Connecting the PROFIBUS. • Check that the PROFIBUS termination is correct. See section 5.5 Termination resistors.
	b) No contact to PROFIBUS master.	<ul style="list-style-type: none"> • Check cable connections. • Check that PROFIBUS master is running.

CIM 150 fitted in CIU 152

Fault (LED status)	Possible cause	Remedy
1. Both LED1 and LED2 remain off when the power supply is connected.	a) CIU 150 is defective.	Replace CIU 150.
2. LED2 for internal communication is flashing red.	a) No internal communication between CIU 150 and CIU 152.	Check that CIM 150 is fitted correctly in CIU 152.
3. LED2 for internal communication is permanently red.	a) CIM 150 does not support the connected Grundfos product.	Contact the nearest Grundfos company.
4. The PROFIBUS LED1 is permanently red.	a) Fault in CIM 150.	Contact the nearest Grundfos company.
	b) Connected product is not supported	Contact the nearest Grundfos company.
5. The PROFIBUS LED1 is flashing red.	a) Fault in the CIM 150 PROFIBUS configuration.	<ul style="list-style-type: none"> • 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 CIM/CIU 500

You can detect faults in CIU 500 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

CIM 500 fitted in Grundfos CU 35X

Fault (LED status)	Possible cause	Remedy
1. Both LED1 and LED2 remain off when the power supply is connected.	a) CIM 500 is fitted incorrectly in the Grundfos product.	Check that CIM 500 is fitted and connected correctly.
	b) CIM 500 is defective.	Replace CIM 500.
2. The PROFINET IO LED1 remains off.	a) The protocol selection switch, SW1, has been set in wrong position	Set the switch to "0".
3. LED2 for internal communication is flashing red.	a) No internal communication between CIM 500 and the Grundfos product.	Check that CIM 500 is fitted correctly in the Grundfos product.
4. LED2 for internal communication is permanently red.	a) CIM 500 does not support the Grundfos product connected.	Contact the nearest Grundfos company.
5. The PROFINET IO 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 CIM 500 PROFINET IO configuration.	Check that the right GSDML file is used. Check that PROFINET IO IP address configuration is correct. See section A.4 PROFINET IO configuration on page 52. Check the device name in CIM 500 and PROFINET IO master.
7. The PROFINET IO LED1 is pulsing red.	a) Connection to the master is lost.	Check that the cables are connected correctly. Check that the master is running.
8. LED1 is permanently red and green at the same time.	a) Error in firmware download.	Use the webserver to download the firmware again.
9. LED2 is permanently red and green at the same time.	a) Memory fault.	Replace CIM 500.

CIM 500 fitted in Grundfos LC 2X1

Fault (LED status)	Possible cause	Remedy
1. Both LED1 and LED2 remain off when the power supply is connected.	a) CIM 500 is fitted incorrectly in the Grundfos product.	Check that CIM 500 is fitted and connected correctly.
	b) CIM 500 is defective.	Replace CIM 500.
2. The PROFINET IO LED1 remains off.	a) The protocol selection switch, SW1, has not been set in PROFINET position	Set the switch to "0".
3. LED2 for internal communication is flashing red.	a) No internal communication between CIM 500 and the Grundfos product.	Check that CIM 500 is fitted correctly in the Grundfos product.
4. LED2 for internal communication is permanently red.	a) CIM 500 does not support the Grundfos product connected.	Contact the nearest Grundfos company.
5. The PROFINET IO 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 CIM 500 PROFINET IO configuration.	Check that the right GSDML file is used. Check that PROFINET IO IP address configuration is correct. See section A.4 PROFINET IO configuration on page 52. Check the device name in CIM 500 and PROFINET IO master.
7. The PROFINET IO LED1 is pulsing red.	a) Connection to the master is lost.	Check that the cables are connected correctly. Check that the master is running.
8. LED1 is permanently red and green at the same time.	a) Error in firmware download.	Use the webserver to download the firmware again.
9. LED2 is permanently red and green at the same time.	a) Memory fault.	Replace CIM 500.

CIM 500 fitted in CIU 502

Fault (LED status)	Possible cause	Remedy
1. Both LED1 and LED2 remain off when the power supply is connected	a) CIU 502 is defective.	Replace CIU 502.
2. The PROFINET IO LED1 remains off.	a) The protocol selection switch, SW1, has not been set in PROFINET position	Set the switch in position "0".
3. LED2 for internal communication is flashing red.	a) No internal communication between CIM 500 and CIU 502.	Check that CIM 150 is fitted correctly in CIU 502.
4. LED2 for internal communication is permanently red.	a) CIM 500 does not support the Grundfos product connected.	Contact the nearest Grundfos company.
5. The PROFINET IO 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 CIM 500 PROFINET IO configuration.	<ul style="list-style-type: none"> • 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 the device name in CIM 500 and PROFINET IO master.
7. The PROFINET IO LED1 is pulsing red.	a) Connection to the master is lost.	<ul style="list-style-type: none"> • Check that the cables are connected correctly. • Check that the master is running.
8. LED1 is permanently red and green at the same time	a) Error in firmware download.	Use the webserver to download the firmware again.
9. LED2 is permanently red and green at the same time	a) Memory fault.	Replace CIM 500.

10. 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			

11. Grundfos alarm and warning codes

This is a complete list of alarm and warning codes for Grundfos products. For the codes supported by this product, see the alarms and warnings section.

Code	Description	Code	Description	Code	Description
1	Leakage current	36	Outlet valve leakage	71	Motor temperature 2 (Pt100, t_mo2)
2	Missing phase	37	Inlet valve leakage	72	Hardware fault, type 1
3	External fault signal	38	Vent valve defective	73	Hardware shutdown (HSD)
4	Too many restarts	39	Valve stuck or defective	74	Internal supply voltage too high
5	Regenerative braking	40	Undervoltage	75	Internal supply voltage too low
6	Mains fault	41	Undervoltage transient	76	Internal communication fault
7	Too many hardware shutdowns	42	Cut-in fault (dV/dt)	77	Communication fault, twin-head pump
8	PWM switching frequency reduced	43	-	78	Fault, speed plug
9	Phase sequence reversal	44	-	79	Functional fault, add-on module
10	Communication fault, pump	45	Voltage asymmetry	80	Hardware fault, type 2
11	Water-in-oil fault (motor oil)	46	-	81	Verification error, data area (RAM)
12	Time for service (general service information)	47	-	82	Verification error, code area (ROM, FLASH)
13	Moisture alarm, analog	48	Overload	83	Verification error, FE parameter area (EEPROM)
14	Electronic DC-link protection activated (ERP)	49	Overcurrent (i_line, i_dc, i_mo)	84	Memory access error
15	Communication fault, main system (SCADA)	50	Motor protection function, general shutdown (MPF)	85	Verification error, BE parameter area (EEPROM)
16	Other	51	Blocked motor or pump	86	Fault (add-on) I/O module
17	Performance requirement cannot be met	52	Motor slip high	87	-
18	Commanded alarm standby (trip)	53	Stalled motor	88	Sensor fault
19	Diaphragm break (dosing pump)	54	Motor protection function, 3 sec. limit	89	Signal fault, (feedback) sensor 1
20	Insulation resistance low	55	Motor current protection activated (MCP)	90	Signal fault, speed sensor
21	Too many starts per hour	56	Underload	91	Signal fault, temperature sensor 1
22	Moisture switch alarm, digital	57	Dry running	92	Calibration fault, (feedback) sensor
23	Smart trim gap alarm	58	Low flow	93	Signal fault, sensor 2
24	Vibration	59	No flow	94	Limit exceeded, sensor 1
25	Setup conflict	60	Low input power	95	Limit exceeded, sensor 2
26	Load continues even if the motor has been switched off	61	-	96	Setpoint signal outside range
27	External motor protector activated (for example MP 204)	62	-	97	Signal fault, setpoint input
28	Battery low	63	-	98	Signal fault, input for setpoint influence
29	Turbine operation (impellers forced backwards)	64	-	99	Signal fault, input for analog setpoint
30	Change bearings (specific service information)	65	Motor temperature 1 (t_m or t_mo or t_mo1)	100	RTC time synchronisation with GSM occurred
31	Change varistor(s) (specific service information)	66	Temperature, control electronics (t_e)	101	-
32	Overvoltage	67	Temperature too high, internal frequency converter module (t_m)	102	Dosing pump not ready
33	Soon time for service (general service information)	68	External temperature or water temperature (t_w)	103	Emergency stop
34	No priming water	69	Thermal relay 1 in motor, for example Klixon	104	Software shutdown
35	Gas in pump head, deaerating problem	70	Thermal relay 2 in motor, for example thermistor	105	Electronic rectifier protection activated (ERP)

Code	Description	Code	Description	Code	Description
106	Electronic inverter protection activated (EIP)	141	-	176	Signal fault, temperature sensor 3 (t_mo3)
107	-	142	-	177	Signal fault, Smart trim gap sensor
108	-	143	-	178	Signal fault, vibration sensor
109	-	144	Motor temperature 3 (Pt100, t_mo3)	179	Signal fault, bearing temperature sensor (Pt100), general or top bearing
110	Skew load, electrical asymmetry	145	Bearing temperature high (Pt100), in general or top bearing	180	Signal fault, bearing temperature sensor (Pt100), middle bearing
111	Current asymmetry	146	Bearing temperature high (Pt100), middle bearing	181	Signal fault, PTC sensor (short circuited)
1112	Cosφ too high	147	Bearing temperature high (Pt100), bottom bearing	182	Signal fault, bearing temperature sensor (Pt100), bottom bearing
113	Cosφ too low	148	Motor bearing temperature high (Pt100) in drive end (DE)	183	Signal fault, extra temperature sensor
114	Motor heater function activated (frost protection)	149	Motor bearing temperature high (Pt100) in non-drive end (NDE)	184	Signal fault, general-purpose sensor
115	Too many grinder reversals or grinder reversal attempt failed	150	Fault (add-on) pump module	185	Unknown sensor type
116	Grinder motor overtemperature	151	Fault, display (HMI)	186	Signal fault, power meter sensor
117	Intrusion (door opened)	152	Communication fault, add-on module	187	Signal fault, energy meter
118	Signal fault, hydrogen sulfide H2S sensor	153	Fault, analog output	188	Signal fault, user-defined sensor
119	Signal fault, analog input AI4	154	Communication fault, display	189	Signal fault, level sensor
120	Auxiliary winding fault (single phase motors)	155	Inrush fault	190	Limit exceeded, sensor 1 (for example alarm level in WW application)
121	Auxiliary winding current too high (single-phase motors)	156	Communication fault, internal frequency converter module	191	Limit exceeded, sensor 2 (for example high level in WW application)
122	Auxiliary winding current too low (single-phase motors)	157	Real-time clock out of order	192	Limit exceeded, sensor 3 (for example overflow level in WW application)
123	Start capacitor, low (single-phase motors)	158	Hardware circuit measurement fault	193	Limit exceeded, sensor 4 (for example low level in WW/tank filling application)
124	Run capacitor, low (single-phase motors)	159	CIM fault (Communication Interface Module)	194	Limit exceeded, sensor 5
125	Signal fault, outdoor temperature sensor	160	GSM modem, SIM card fault	195	Limit exceeded, sensor 6
126	Signal fault, air temperature sensor	161	Sensor supply fault, 5 V	196	Operation with reduced efficiency
127	Signal fault, shunt relative pressure sensor	162	Sensor supply fault, 24 V	197	Operation with reduced pressure
128	Strainer clogged	163	Measurement fault, motor protection	198	Operation with increased power consumption
129	-	164	Signal fault, LiqTec sensor	199	Process out of range (monitoring, estimation, calculation, control)
130	-	165	Signal fault, analog input 1	200	Application alarm
131	-	166	Signal fault, analog input 2	201	External sensor input high
132	-	167	Signal fault, analog input 3	202	External sensor input low
133	-	168	Signal fault, pressure sensor	203	Alarm on all pumps
134	-	169	Signal fault, flow sensor	204	Inconsistency between sensors
135	-	170	Signal fault, water-in-oil (WIO) sensor	205	Level float switch sequence inconsistency
136	-	171	Signal fault, moisture sensor	206	Water shortage, level 1
137	-	172	Signal fault, atmospheric pressure sensor	207	Water leakage
138	-	173	Signal fault, rotor position sensor (Hall sensor)	208	Cavitation
139	-	174	Signal fault, rotor origo sensor	209	Non-return valve fault
140	-	175	Signal fault, temperature sensor 2 (t_mo2)	210	High pressure

Code	Description	Code	Description	Code	Description
211	Low pressure	226	Communication fault, I/O module	241	Motor phase failure
212	Diaphragm tank precharge pressure out of range	227	Combi event	242	Automatic motor model recognition failed
213	VFD not ready	228	Night flow max. limit exceeded	243	Motor relay has been forced (manually operated or commanded)
214	Water shortage, level 2	229	Water on floor	244	Fault, On/Off/Auto switch
215	Soft pressure buildup time-out	230	Network alarm	245	Pump continuous runtime too long
216	Pilot pump alarm	231	Ethernet: No IP address from DHCP server	246	User-defined relay has been forced (manually operated or commanded)
217	Alarm, general-purpose sensor high	232	Ethernet: Auto-disabled due to misuse	247	Power-on notice, (device or system has been switched off)
218	Alarm, general-purpose sensor low	233	Ethernet: IP address conflict	248	Fault, battery/UPS
219	Pressure relief not adequate	234	Backup pump alarm	249	User-defined event 1
220	Fault, motor contactor feedback	235	Gas detected	250	User-defined event 2
221	Fault, mixer contactor feedback	236	Pump 1 fault	251	User-defined event 3
222	Time for service, mixer	237	Pump 2 fault	252	User-defined event 4
223	Time for service, mixer	238	Pump 3 fault	253	SMS data from DDD sensor not received within time
224	Pump fault, due to auxiliary component or general fault	239	Pump 4 fault	254	Inconsistent data model
225	Communication fault, pump module	240	Lubricate bearings (specific service information)		

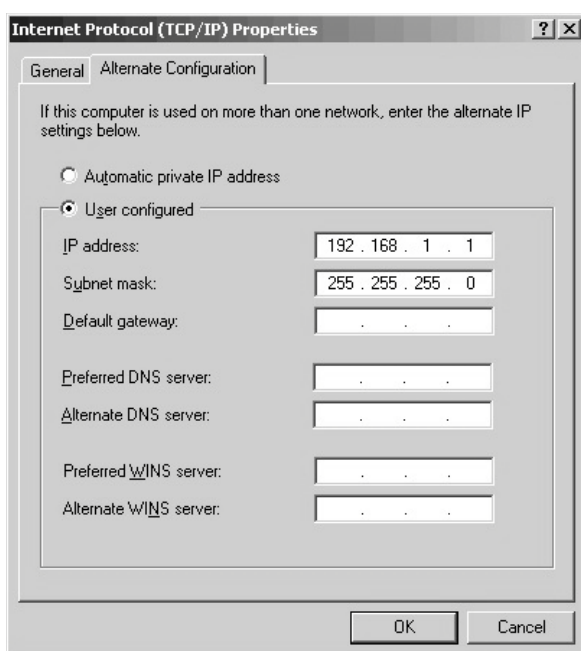
Appendix

The appendix describes the parts of the CIM 500 webserver needed for the configuration of a PROFINET IO ethernet connection. For other CIM 500 webserver features, not specifically related to PROFINET IO, see the installation and operating instructions for CIM 500.

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

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

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



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Fig. 1 Example from Windows

A.2 Webserver configuration

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

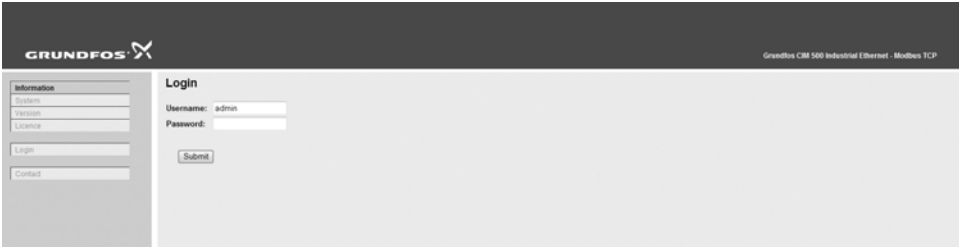
Before configuration

- Check that the PC and CIM 500 are connected via an ethernet cable.
- Check that the PC ethernet port is set to the same network as CIM 500. 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 web browser and type 192.168.1.100 in the URL address field.
2. Log in to the webserver.

A.3 Login



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Fig. 2 Login

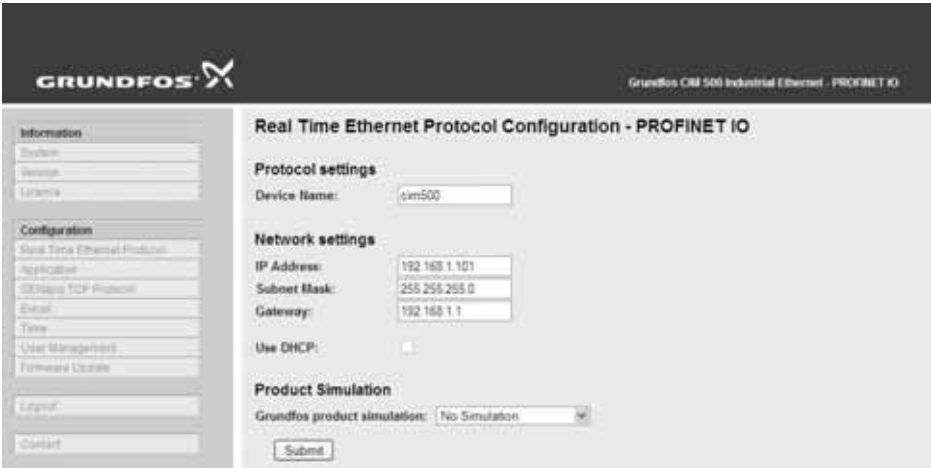
User name	Enter user name. Default: admin.
Password	Enter password. Default: Grundfos.



You can change the user name and password on the webserver under "User 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 the internet.



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Fig. 3 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. It must be unique.
Subnet Mask	Configure the subnet mask for CIM 500 on the PROFINET IO network.
Gateway	Configure the default gateway for the PROFINET IO network.
Use DHCP	CIM 500 can be configured to automatically obtain the IP address from a DHCP server on the network.
Grundfos product simulation	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 CIM 500 fitted in a CIU unit 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, for example 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.

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