# BACnet for Grundfos pumps

CIM/CIU 300 BACnet MS/TP

CIM/CIU 500 Ethernet for BACnet IP

Functional profile and user manual

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GRUNDFOS

BACnet for Grundfos pumps

English (GB) Functional profile and user manual

Original functional profile and user manual

Table of contents

1. General information

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

1.1 Hazard statements

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

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

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

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

The hazard statements are structured in the following way:

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

1.2 Notes

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

Observe these instructions for explosion-proof products.

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

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

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

Tips and advice that make the work easier.

2. Introduction

2.1 About this functional profile

This functional profile describes the following modules and units:

- CIM/CIU 300 BACnet MS/TP
- CIM/CIU 500 Ethernet for BACnet IP

For the following Grundfos pumps:

- Grundfos MAGNA3 (with add-on CIM)
- Grundfos CRE, CRNE, CRIE, MTRE, CME Grundfos TPE, TPE Series 2000, NBE, NKE Grundfos CUE frequency converter.

Grundfos cannot be held responsible for any problems caused directly or indirectly by using information in this functional profile.

2.2 Assumptions

This functional profile assumes that the reader is familiar with commissioning and programming BACnet devices. The reader should have some basic knowledge of the BACnet protocol and technical specifications. It is also assumed that an existing BACnet MS/TP or BACnet IP network is present.

2.3 Definitions and abbreviations

APDU	Application Protocol Data Unit.
ARP	Address Resolution Protocol. Translates IP addresses into MAC addresses.
Auto-MDIX	Ensures that both crossover cable types and non-crossover cable types can be used.
CAT5	Ethernet cable 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. A Grundfos add-on module.
CIU	Communication Interface Unit. Grundfos box for CIM modules.
CRC	Cyclic Redundancy Check. A data error detection method.
Device	A node on the BACnet MS/TP network.
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.
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.
Inter-network	A set of two or more BACnet networks interconnected by routers.
IP	Internet Protocol.
LED	Light-Emitting Diode.
MAC	Unique network address for a piece of hardware.
MS/TP	Master-Slave / Token-Passing. A data protocol used for BACnet RS-485.
Ping	Packet InterNet Groper. A software utility that tests the connectivity between two TCP/IP hosts.
Router	A device that connects two or more networks at the network layer.
SELV	Separated or Safety Extra-Low Voltage.

SELV-E	Separated or Safety Extra-Low Voltage with earth connection.
SMTP	Simple Mail Transfer Protocol.
SNTP	Simple Network Time Protocol. Used for clock 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, bit/s.
Trunk cable	Main RS-485 cable on a BACnet MS/TP network.
URL	Uniform Resource Locator. The IP 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.

2.4 System diagrams

The system diagrams give an overview of how to connect the module or unit to the Grundfos pump that is to be connected to a BACnet network.

CIM solution

The Communication Interface Module (CIM) is an add-on communication module thatyou install internally in a Grundfos pump, using a 10-pin connection. In this setup, the pump will supply power to the module. See fig. Pump with built-in CIM 300. This installation option is currently available for Grundfos E pumps (11-22 kW), MGE models H, I and J based E-pumps and Grundfos MAGNA3 pumps.

> **!** TPED twin-head pump with MGE motors model H or I in multipump mode and MAGNA3 twin-head pump in multi-pump mode, requires a CIM module installed in the master pump and uses the functional profile for boosters.

CIU solution

The Communication Interface Unit (CIU) unit is a box with a power supply module and a CIM BACnet module. You can mount it either on a DIN rail or on a wall. See fig. Pump connected to CIU 300 via GENIbus.

You use it in conjunction with Grundfos E-pumps that do not support an internal, add-on communication module CIM.

BACnet MS/TP RS-485

TM079766

Pump with built-in CIM 300

BACnet IP RS-485

TM079767

Pump with built-in CIM 500

BACnet MS/TP RS-485   CIU 300   GENIbus RS-485

TM045804_3909

Pump connected to CIU 300 via GENIbus

BACnet MS/TP RS-485   CIU 500   GENIbus RS-485

TM080195

Pump connected to CIU 500 via GENIbus

2.5 Specifications

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 LEDs.

BACnet MS/TP	Description	Comments
BACnet connector	Screw-type terminal	3 pins. See section CIM 300 BACnet module.
BACnet connection type	RS-485	
BACnet wire configuration	Two-wire + ground	Conductors: Plus, Minus and Ground. See section Connecting to the BACnet network.
Maximum cable length	1200 m	Equals 4000 ft
Recommended cross-section of BACnet cable	0.20 - 0.25 mm^2	AWG24 or AWG23
MAC address	0-127	Set via rotary switches SW6 and SW7. See section Selecting the BACnet MAC address.
Line termination	On or Off	Set via DIP switches SW1 and SW2. See section Termination resistor.
Supported transmission speeds [bit/s]	9600, 19200, 38400, 76800	Set via DIP switches SW4 and SW5. See section Setting the BACnet transmission speed.
Data bits	8	Fixed value
Stop bits	1	Fixed value
Parity	None	Fixed value
BACnet visual diagnostics	LED1	Red and green status LED. See section LED1, BACnet MS/TP communication.
Maximum number of BACnet devices	32	Using repeaters, this number can be increased.
Grundfos BACnet vendor ID	227	
BACnet segmentation support	No	
Character set support	ANSI X3.4	Base definition for the widely used character code known as ASCII.
BACnet device profile	B-ASC	BACnet Application-Specific controller
BACnet MS/TP master	Yes	CIM/CIU 300 and 500 are BACnet MS/TP master devices.
Manual slave address binding	No	
BACnet protocol revision	For hardware version R4: 4 For hardware version R8: 9	

BACnet IP	Description	Comments
Application layer	DHCP, HTTP, Ping, FTP, SMTP, SNTP, BACnet IP	Rotary switch in position 2.
Transport layer	UDP	
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 Mbit/s	Corresponds to 328 feet.
Transmission speed	10 Mbit/s, 100 Mbit/s	Auto-detected
Industrial Ethernet protocols	PROFINET IO, BACnet IP etc.	Selected with rotary switch, section Setting the Industrial Ethernet protocol.
BACnet protocol revision	9	

CIM 300 and 500

Dimensions [w x h x d] [mm]	50 x 19 x 80	
Power supply		Supplied by the booster system.
Connection to booster system	10-pin connection	

CIU 300 and 500	Description	Comments
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	
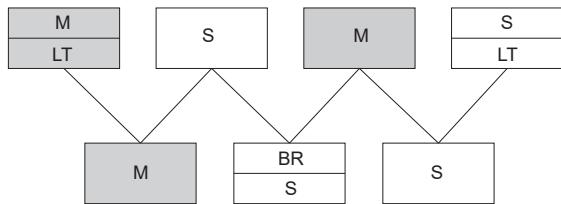
Related information

3. BACnet MS/TP, CIM 300 setup

3.1 BACnet bus topology

Grundfos CIM/CIU 300 is connected as a BACnet MS/TP master directly to the BACnet MS/TP network.

Example of BACnet MS/TP network

Pos.	Description
M	Master
S	Slave
LT	Line Termination
BR	Bias Resistors

BACnet MS/TP is a multi-master system, meaning that there can be more than one master on the network. It uses a token to control access to the bus network. A master node may initiate the transmission of a data telegram when it holds the token. Both master and slave nodes may transmit data telegrams in response to requests from master nodes, but slaves never hold the token. Master nodes pass the token between them.

A BACnet MS/TP segment is a single contiguous medium to which BACnet nodes are attached. Segments can be connected by use of repeaters or bridges, thus forming networks.

Multiple networks may be interconnected by BACnet routers to form a BACnet inter-network.

3.1.1 Line termination resistors
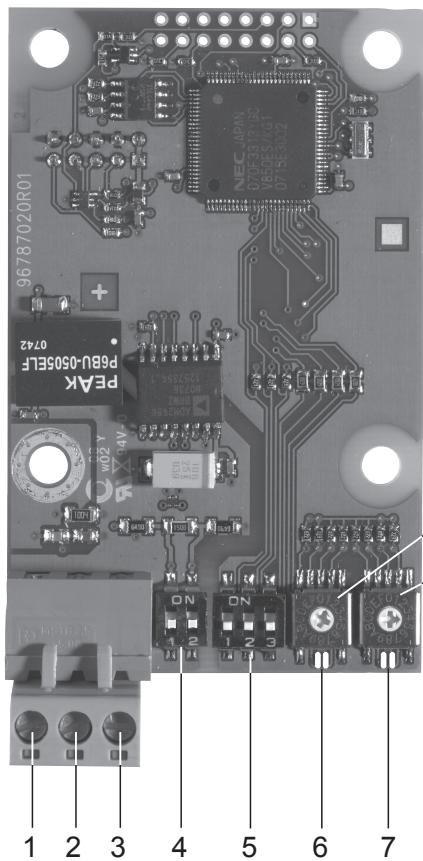
Line termination must be connected at each of the two ends of the segment medium. CIM/CIU 300 has optional line termination resistor on board.

3.1.2 Bias resistors

At least one set, and no more than two sets, of network bias resistors must exist for each segment so that an undriven communications line will be held in a guaranteed logical one state. The bias provides a reliable way for stations to detect the presence or absence of signals on the line. An unbiased line will take an indeterminate state in the absence of any driving node.

CIM/CIU 300 has no bias resistors.

3.2 CIM 300 BACnet module

CIM 300 BACnet module

Pos.	Designation	Description
1	Plus	BACnet Plus terminal, RS-485 positive data signal
2	Minus	BACnet Minus terminal, RS-485 negative data signal
3	Ground	BACnet ground terminal
4	SW1/SW2	On and off switches for termination resistor
5	SW3/SW4/SW5	Switches for selecting the BACnet transmission speed and the default or custom Device Object Instance Number
6	LED1	Red and green status LED for BACnet communication
7	LED2	Red and green status LED for internal communication between CIM 300 and the booster system
8	SW6	Hexadecimal rotary switch for setting the BACnet MAC address (four most significant bits)
9	SW7	Hexadecimal rotary switch for setting the BACnet MAC address (four least significant bits)

3.3 Connecting to the BACnet network

Use a screened, twisted-pair cable.
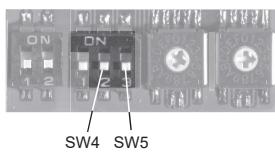
BACnet terminal	Recommended colour	Data signal
Plus	Red	Positive
Minus	Green	Negative
Ground	Grey	Ground

The ANSI/ASHRAE BACnet standard states that the cable screen must only be earthed at one end of the segment to prevent earth fault currents.

3.4 Setting the BACnet transmission speed

Set the transmission speed correctly before CIM 300 is ready to communicate on the BACnet MS/TP network. Use DIP switches SW4 and SW5 to set the transmission speed.

The default transmission speed is 9600 bit/s, but we recommend higher speeds for better data throughput. All devices on the BACnet MS/TP network must communicate at the same transmission speed.

BACnet transmission speed settings

3.4.1 DIP switch settings

Available transmission speeds in bit/s: 9600, 19200, 38400 and 76800.
Use DIP switches SW4 and SW5 to select the desired speed.

Transmission speed [bit/s]	SW4	SW5
9600	OFF	OFF
19200	OFF	ON
38400	ON	OFF
76800	ON	ON

The default transmission speed is 9600 bit/s, as per the BACnet MS/TP standard. The transmission speed will be effective immediately after setting the values of the DIP switch.

3.5 Selecting the Device Object Instance Number

The Device Object Identifier value consists of two components:

- a 10-bit Object Type (bits 22 to 31)
- a 22-bit Instance Number (bits 0 to 21).

31	22	21	...	0
Object type 10 bits		Instance Number 22 bits		

Bit numbers

The Object Type is fixed and determines that it is a Device Object. The Instance Number is a numeric code that is used to identify the device. It must be unique inter-network-wide, i.e. on all interconnected networks.

CIM 300 offers two different approaches to setting the BACnet Device Object Instance Number: default and custom, both described in the following subsections.

3.5.1 Default Instance Number

By default, CIM 300 uses a pre-defined Device Object Instance Number, which is 227XXX where XXX is the BACnet MAC address. This gives an Instance Number range of 227000 to 227127.

Example
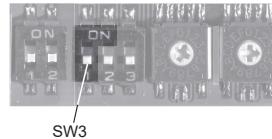
The BACnet MAC address is set to 20 via the hexadecimal rotary switches, so the Device Object Instance Number is 227020.

Related information

3.7 Selecting the BACnet MAC address

3.5.2 Custom Instance Number

To use the complete Instance Number range, set the new Instance Number with the BACnet object Custom Device Object Instance Number (AV, 0), and set SW3 to ON. This will immediately set the new Device Object Instance Number.

Device Object Instance Number

Device Object Instance Number	SW3
Default (227000 + BACnet MAC address)	OFF
Custom, set with object (AV, 0)	ON

The default Present_Value of the Custom Device Object Instance Number is 231.

Example

The Present_Value of the Custom Device Object Instance Number (AV, 0) is 231, so the Device Object Instance Number is 231.

The Present_Value of the Custom Device Object Instance Number cannot be 4194303, as this is a reserved value.

3.6 Selecting the Device Object Name

The property Device_Name is a character string that must be unique inter-network-wide. By default, the name will be constructed as "Grundfos - XXXXXX" where XXXXXX is the current Device Object Instance Number as described in section Selecting the Device Object Instance Number.

Example

The Device Object Instance Number is 227001, so the Device Object Name is "Grundfos - 227001".

If a new name is selected, it will be stored in the device and replace the default naming scheme.
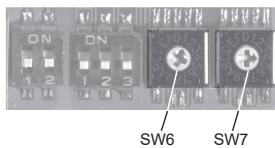
Related information

3.5 Selecting the Device Object Instance Number

3.7 Selecting the BACnet MAC address

To set the BACnet MAC address, use the two hexadecimal rotary switches, SW6 and SW7.

The value must be within the range of 0 to 127. An illegal value will result in a MAC address of 0.

SW6   SW7

Setting the BACnet MAC address

For a complete overview of BACnet addresses, see section BACnet MAC address, CIM 300.

> ! You must set the BACnet MAC address decimally from 0 to 127 and it must be unique on the BACnet MS/TP segment.
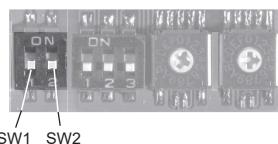
Related information

11. BACnet MAC address, CIM 300

3.8 Termination resistor

A termination resistor for line termination is fitted on CIM 300 and has a value of 120 Ω. It is to be cut in if CIM 300 is set as the last station on the network.

CIM 300 has two DIP switches, SW1 and SW2, for cutting the termination resistor in and out.

SW1   SW2

Cutting the termination resistor in and out

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

Default setting: Termination resistor cut out.

3.9 Cable length

The maximum recommended cable length within a BACnet MS/TP segment is 1200 metres (4000 ft) with 0.82 mm^2 (AWG 18) cable.

The connection between the BACnet modules must be made by use of a screened, twisted-pair cable with a characteristic impedance between 100 and 130 Ω.

3.10 LEDs

CIM 300 BACnet has two LEDs.

- Red and green status LED (LED1) for BACnet MS/TP communication
- Red and green status LED (LED2) for internal communication between CIM 300 and the Grundfos pump.

3.10.1 LED1, BACnet MS/TP communication

Status	Description
Off	No communication.
Flashing green	Communication active.
Flashing red	Fault in the BACnet communication.
Permanently red	Fault in the CIM 300 BACnet configuration.

3.10.2 LED2, internal communication

Status	Description
Off	CIM 300 has been switched off or is starting up.
Flashing red	No internal communication between CIM 300 and the pump.
Permanently red	CIM 300 does not support the specific pump version.
Permanently green	Internal communication between CIM 300 and the pump is OK.

> ! During startup, there may be a delay of up to 5 seconds before the LED status is updated.

4. BACnet IP, CIM 500 setup

⚠️ **WARNING**
Electric shock
Death or serious personal injury
- Connect CIM 500 only to SELV or SELV-E circuits.
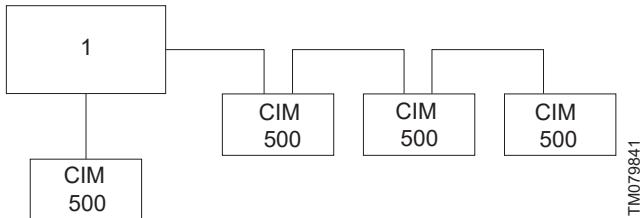
4.1 Connecting the Ethernet cable

Use RJ45 plugs and Ethernet cable. Connect the cable shield to protective earth at both ends.
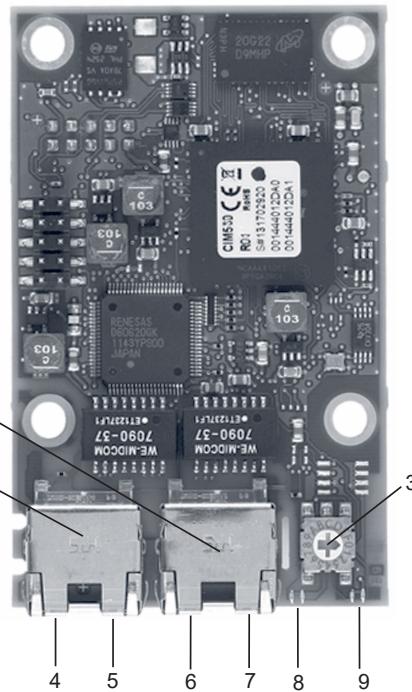
❗ It is important to connect the cable shield to earth through an earth clamp or to connect the cable shield to earth in the connector.

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.

Example of Industrial Ethernet network

Pos.	Description
1	Ethernet switch
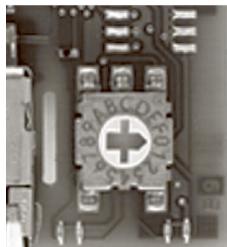
Example of Ethernet connection

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	LED1
9	Green and red status LED for internal communication between the module and the pump.	LED2

4.2 Setting the Industrial Ethernet protocol

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

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 to be set in this position for 20 seconds to reset 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.

4.3 Setting the IP addresses

The CIM 500 Ethernet module is default set to a fixed IP address. You can 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 BACnet IP	Make the settings via the webserver	

4.4 Establishing 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 the CIM 500 module 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.
• Open a standard Internet browser and type 192.168.1.100 in the URL field.
• Log in to the webserver:

User	admin (default)
Password	Grundfos (default)

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

Change username and password at first login.

CIM 500 connected to PC via Ethernet cable

For further information on how to use the webserver. See section Webserver configuration.

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.

4.5 Status LEDs

The CIM 500 Ethernet module has two status LEDs, LED1 and LED2.

- 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	No BACnet IP communication or switched off.
Flashing green	BACnet IP communication active.
Permanently red	CIM 500 module configuration fault.
Permanently red and green	Error in firmware download.
Flashing red and green	Resetting to factory default. After 20 seconds, CIM 500 restarts.

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.

4.6 DATA and LINK LEDs

The CIM 500 Ethernet module has two connectivity LEDs related to each RJ45 connector.

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.

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.

5. Supported services

BACnet Interoperability Building Blocks (BIBBs) are collections of one or more BACnet services. These are described in terms of an "A" and a "B" device. Both devices are nodes on a BACnet inter-network. In most cases, the "A" device will act as the user of data (client), and the "B" device will be the provider of this data (server).

CIM/CIU 300 and 500 are BACnet Application-Specific Controllers (B-ASC) with a few additional services.

5.1 Data-sharing services

Name	BACnet BIBB code	Notes	Initiate	Execute
ReadProperty	DS-RP-B	CIM 300 and 500 can be a provider of data.	-	●
ReadPropertyMultiple	DS-RPM-B	CIM 300 and 500 can be a provider of data and return multiple values at one time.	-	●
WriteProperty	DS-WP-B	CIM 300 and 500 allow a value to be changed over the network.	-	●
WritePropertyMultiple	DS-WPM-B	CIM 300 and 500 allow multiple values to be changed over the network.	-	●
SubscribeCOV	DS-COV-B	CIM 300 and 500 can be a provider of "Change Of Value" data. It supports up to 10 simultaneous COV subscriptions. Subscription lifetime can be limited or unlimited.	-	●
ConfirmedCOVNotification			●	-
UnconfirmedCOVNotification			●	-

5.2 Device management services

Name	BACnet BIBB code	Notes	Initiate	Execute
Who-Is	DM-DDB-A	CIM 300 and 500 can seek information about device attributes of other devices and interpret device announcements.	●	-
I-Am			-	●
Who-Is	DM-DDB-B	CIM 300 and 500 can provide information about their device attributes and responds to requests to identify themselves.	-	●
I-Am			●	
Who-Has	DM-DOB-B	CIM 300 and 500 can provide address information about their objects upon request.	-	●
I-Have			●	-
DeviceCommunicationControl	DM-DCC-B	CIM 300 and 500 can respond to communication control requests. They support both limited and unlimited duration. The password, if required, is "Grundfos".	-	●

6. Object overview

6.1 Device Object

The following properties are supported in the Device Object
(available for all pump types).

Property identifier	Data type	Notes	Access
Object_Identifier	BACnetObjectIdentifier	See section Selecting the Device Object Instance Number.	R
Object_Name	CharacterString	See section Selecting the Device Object Name for details on object name.	W
Object_Type	BACnetObjectType	DEVICE.	R
System_Status	BACnetDeviceStatus	OPERATIONAL.	R
Vendor_Name	CharacterString	Grundfos.	R
Vendor_Identifier	Unsigned16	227.	R
Model_Name	CharacterString	Will show the Grundfos pump model to which the CIM/CIU module is connected.	R
Firmware_Revision	CharacterString	Revision of the firmware in the CIM/CIU module.	R
Application_Software_Version	CharacterString	Software build date, DD-MM-YYYY.	R
Location	CharacterString	The user can enter a location here (maximum 200 characters).	W
Description	CharacterString	The user can enter a description here (maximum 200 characters).	W
Protocol_Version	Unsigned	Actual version of the BACnet protocol.	R
Protocol_Revision	Unsigned	Actual revision of the BACnet protocol.	R
Protocol_Services_Supported	BACnetServicesSupported	Indicates which standardised protocol services are supported.	R
Protocol_Object_Types_Supported	BACnetObjectTypesSupported	Indicates which standardised protocol object types are supported.	R
Object_List	BACnetARRAY[N]of BACnetObjectIdentifier	An array of objects available.	R
Max_APDU_Length_Accepted	Unsigned	CIM 300: The maximum number of bytes that may be contained in a single APDU. Fixed to 480. CIM 500: The maximum is 1476.	R
Segmentation_Supported	BACnetSegmentation	Indicates if segmentation of messages is possible. Will always read NO_SEGMENTATION to indicate that segmentation is not possible.	R
APDU_Timeout	Unsigned	Indicates the amount of time in ms before time-out.	R
Number_Of_APDU_Retries	Unsigned	Maximum number of times an APDU is to be retransmitted.	R
Max_Master	Unsigned	Specifies the highest possible address for master nodes and must be between 1 and 127. The default value is 127, but this value can be lowered by the user to reduce transmission overhead.	W
Max_Info_Frames	Unsigned	Specifies the maximum number of information frames that are sent before the token is passed on. Fixed to 1.	R
Device_Address_Binding	List of BACnetAddressBindings	Holds address bindings to other devices, if any.	R
Database_Revision	Unsigned	Logical revision number for the device database.	R

Related information

6.2 Binary inputs

Binary objects that provide information from the Grundfos pump.

ID	Object name	R/W	Notes	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
BI, 0	Control source status	R	Status of the actual control source. 0: Local control 1: Bus control.	●	●	●
BI, 1	Actual direction	R	Rotational direction of the pump impeller. 0: Clockwise 1: Counterclockwise.	●	●	●
BI, 2	Rotation status	R	Rotation status. 0: No rotation 1: Rotation (pump running).	●	●	●
BI, 3	At minimum speed	R	0: Not running at minimum speed 1: Running at minimum speed.	●	●	●
BI, 4	At maximum speed	R	0: Not running at maximum speed 1: Running at maximum speed.	●	●	●
BI, 9	Low Flow stop active	R	0: Not active 1: Active.	-	H	-
BI, 11	Digital input 1 status	R	0: Not active 1: Active.	●	●	●
BI, 12	Digital input 2 status	R	0: Not active 1: Active.	●	●	●
BI, 13	Digital input 3 status	R	0: Not active 1: Active.	-	●	●
BI, 14	Digital output 1 status	R	0: Not active 1: Active.	●	●	●
BI, 15	Digital output 2 status	R	0: Not active 1: Active.	●	●	●
BI, 28	Fault simulation status	R	Fault simulation status. 0: Fault simulation not active 1: Fault simulation active.	●	H	●
BI, 31	At power limit	R	0: Not running at power limit 1: Running at power limit.	●	H	-
BI, 38	Setpoint influence	R	0: Not active 1: Active.	●	H	-
BI, 39	Max. flow limit	R	0: Not active 1: Active.	●	H	-
BI, 62	Flow estimation below range	R	0: Flow estimation inside range 1: Flow estimation below range	●	H	●
BI, 63	Flow estimation above range	R	0: Flow estimation not above range 1: Flow estimation above range	●	-	-
BI, 64	Forced to local	R	0: Not forced to local 1: Forced to local	●	H	-
BI, 86	Status direct control (Positive K_p)	R	0: Disabled 1: Enabled (Positive K_p).	●	H	-

H: Only available on MGE model H and later.

6.3 Binary outputs

Binary objects for control of the Grundfos pump.

ID	Object name	R/W	Notes	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
BO, 0	Set control source	W	Sets the control source. Set to 1 to enable pump control via BACnet. 0: Local control (default) 1: Bus control.	●	●	●
BO, 1	Relay 1 control	W	Controls relay 1 if bus control is enabled and relay 1 is set to be controlled via bus. 0: Closed (default) 1: Open.	-	●	●
BO, 2	Relay 2 control	W	Controls relay 2 if bus control is enabled and relay 2 is set to be controlled via bus. 0: Closed (default) 1: Open.	-	H	●
BO, 4	Reset fault	W	Resets fault if bus control is enabled. (Triggered on rising edge). 0: No resetting (default) 1: Resetting.	●	●	●
BO, 5	Fault simulation	W	Enables simulated fault if bus control is enabled. 0: Disabled (default) 1: Enabled.	●	●	●
BO, 6	Copy settings to local	W	Copies remote settings to local pump settings. 0: Disabled 1: Enabled. **NOTE** Copy of the Control Context, which is Control mode, Operating mode, On/off and Setpoint, from the remote setting to the local setting takes place when CopyToLocal has been enabled, but only during a Remote->Local transition. It is necessary to introduce such a transition whenever the user wants the local setting to be updated and stored in the EEPROM.	●	H	-
BO, 9	Enable max. flow limit	W	0: Disabled 1: Enabled.	●	H	-
BO, 21	Set direct control	W	0: Disabled (negative Kp) 1: Enabled (positive K_p).	●	H	-

H: Only available on MGE model H and later.

6.4 Multistate inputs

Objects that contain an enumeration value from the pump.

ID	Object name	R/W	Notes	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
MI, 0	Actual control mode	R	Reads the current control mode. 1: Constant speed 2: Constant pressure 3: Proportional pressure 4: Automatic / AUTO$_{ADAPT}$ 5: Constant flow 6: Constant temperature 7: Constant level 8: Constant percentage 9: FLOW$_{ADAPT}$ 10: Closed-loop sensor control 11: Constant diff. pressure 12: Constant diff. temperature. See section Control modes for details on the control modes.	●	●	●
MI, 1	Actual operating mode	R	Reads the current operating mode. 1: Start (normal) 2: Stop 3: Minimum 4: Maximum.	●	●	●
MI, 2	Next bearing-service type	R	Type of next bearing service. 1: Service type unknown 2: Lubricate bearings 3: Change bearings.	-	H	●
MI, 3	CIM status	R	Reads the status of the CIM module, useful for fault finding. 1: OK 2: EEPROM fault 3: Memory fault.	●	●	●
MI, 11	Feedback sensor unit	R	Unit of the feedback sensor. 1: Unknown 2: bar 3: mbar 4: m 5: kPa 6: psi 7: ft 8: m^3/h 9: m^3/s 10: l/s 11: gpm 12: °C 13: °F 14: % 15: K 16: l/h.	●	●	●

H: Only available on MGE model H and later.

Related information

6.5 Multistate outputs

Objects that set an enumeration value in the pump.

ID	Object name	R/W	Notes	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
MO, 0	Set control mode	W	Sets the control mode if bus control is enabled. 1: Constant speed (default) 2: Constant pressure 3: Proportional pressure 4: Automatic / AUTO$_{ADAPT}$ 5: Constant flow 6: Constant temperature 7: Constant level 8: Constant percentage (not for MAGNA and MGE) 9: FLOW$_{ADAPT}$ 10: Closed-loop sensor control (not for MAGNA and MGE) 11: Constant diff. pressure 12: Constant diff. temperature. See section Control modes for details on the control modes.	●	●	●
MO, 1	Set operating mode	W	Sets the operating mode if bus control is enabled. 1: Start (normal) 2: Stop (default) 3: Minimum 4: Maximum.	●	●	●
MO, 2	Product simulation	W	Enables product simulation (for commissioning and testing purposes, can only be enabled when no physical pump is present). 1: Disabled (default) 2: MAGNA 3: E-pumps 0.25 - 7.5 kW 4: E-pumps 11-22 kW / CUE 8: MAGNA3 9: E-pumps based on MGE model H. See section Product simulation for details.	●	●	●

H: Only available on MGE model H and later.

Related information

6.6 Analog inputs

Objects with measured values and status information from the pump.

ID	Object name	R/W	Notes	Unit	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
AI, 0	Fault code	R	Grundfos fault code. See section BACnet MAC address (CIM 300).	-	●	●	●
AI, 1	Warning code	R		-	●	●	●
AI, 2	Time to bearing service	R	Time to bearing service in months. A value of 24 means "24 or more".	month	-	H	●
AI, 3	Capacity	R	Actual capacity value (process feedback).	%	●	●	●
AI, 4	Head	R	Actual system head/pressure.	bar	S	S	S
AI, 5	Flow	R	Actual system flow rate.	m³/h	S *	S *	S *
AI, 6	Relative performance	R	Performance relative to maximum performance.	%	●	●	●
AI, 7	Speed	R	Motor speed.	rpm	●	●	●
AI, 8	Frequency	R	Actual control signal applied to motor.	Hz	●	●	●
AI, 9	Actual setpoint	R	Actual setpoint. Open loop: % of nominal frequency. Closed loop: % of sensor maximum.	%	●	●	●
AI, 10	Motor current	R	Actual motor current.	A	●	●	●
AI, 11	DC link voltage	R	Frequency converter DC Link voltage.	V	●	●	●
AI, 12	Motor voltage	R	Motor voltage.	V	-	Model G only	●
AI, 13	Power	R	Total power consumption of the pump.	W	●	●	●
AI, 14	Remote flow	R	Measured flow at external sensor.	m³/h	S	G + S	S
AI, 15	Inlet pressure	R	System inlet pressure.	bar	-	G + S	S
AI, 16	Remote pressure	R	Measured pressure at external sensor.	bar	S	G + S	S
AI, 17	Level	R	Tank level.	m	-	S	S
AI, 18	Power electronic temp.	R	Temperature in frequency converter.	°C	●	●	●
AI, 19	Motor temperature	R	Motor winding temperature.	°C	-	G	●
AI, 20	Remote temperature	R	Temperature at external sensor.	°C	-	S	S
AI, 21	Electronic temperature	R	Pump electronics temperature.	°C	-	H + S	S
AI, 22	Fluid temperature	R	Pumped-liquid temperature.	°C	●	G	S
AI, 23	Bearing temperature DE	R	Bearing temperature, drive end.	°C	-	-	CUE + S
AI, 24	Bearing temp. NDE	R	Bearing temperature, non-drive end.	°C	-	-	CUE + S
AI, 25	Auxiliary sensor input	R	Auxiliary sensor input.	%	-	S	S
AI, 26	Specific energy	R	Specific energy consumption.	kWh/m³	●	H + S	CUE
AI, 27	Runtime	R	Total operating time of the pump.	h	●	●	●
AI, 28	Total on time	R	Total power-on time of the pump.	h	●	●	●
AI, 29	Torque	R	Motor torque.	Nm	-	-	●
AI, 30	Energy consumption	R	Total energy consumption of the pump.	kWh	●	●	●
AI, 31	Number of starts	R	Number of times the pump has started.	-	●	●	●
AI, 32	Volume	R	Total pumped volume.	m³	●	H + S	CUE
AI, 37	Outlet pressure	R	System outlet pressure.	bar	-	H	-
AI, 57	Remote temperature 2	R	Temperature at external temperature sensor 2.	°C	S	H + S	-
AI, 58	User setpoint	R	User-selected setpoint. Open loop: % of nominal frequency. Closed loop: % of setpoint range.	%	●	●	●
AI, 85	Min. of feedback sensor	R	Minimum value of feedback sensor.	-	●	●	●
AI, 86	Max. of feedback sensor	R	Maximum value of feedback sensor.	-	●	●	●
AI, 92	Load percent	R	Motor current in percent of rated motor current.	%	-	H	-
AI, 93	Differential pressure	R	Pressure between pump flanges.	bar	●	H + S	-
AI, 95	Actual flow limit	R	Actual maximum flow limit.	m³/h	●	H	-
AI, 114	Remote diff. temperature	R	Differential temperature at remote sensor.	°C	-	H + S	-
AI, 115	Inlet diff. pressure	R	Differential pressure at the inlet pipe.	bar	-	H + S	-
AI, 116	Outlet diff. pressure	R	Differential pressure at the outlet pipe.	bar	-	H + S	-

ID	Object name	R/W	Notes	Unit	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
AI, 117	Remote diff. pressure	R	Differential pressure at remote sensor.	bar	-	H + S	-
AI, 118	Storage tank Level	R	Water level in the storage tank.	m	-	H + S	-
AI, 119	Heat energy counter	R	Accumulated heat energy in pump life.	kWh	S	H + S	-
AI, 120	Heat power	R	Actual heat power.	W	S	H + S	-
AI, 121	Heat diff. temperature	R	Differential temperature (heat).	K	S	H + S	-
AI, 130	Nominal frequency	R	Nominal pump frequency.	Hz	●	H	-
AI, 131	Minimum frequency	R	Minimum frequency in % of nominal frequency.	%	●	H	-
AI, 132	Maximum frequency	R	Maximum frequency in % of nominal frequency.	%	●	H	-
AI, 133	Setpoint range minimum	R	Minimum value of setpoint range in % of sensor maximum value.	%	●	H	-
AI, 134	Setpoint range maximum	R	Maximum value of setpoint range in % of sensor maximum value	%	●	H	-
AI, 135	Heat energy counter 2	R	Heat energy counter 2	kWh	●	-	-
AI, 136	Volume counter 2	R	Volume counter 2	m^3	●	-	-

G: Only available on MGE model G and later versions.

●: Always available.

S: Sensor required.

H: Only available on MGE model H and later.

S*: On TPE Series 2000 and MAGNA/UPE, the flow is estimated and is only to be used for monitoring, not for control purposes. On all other pump types, a flow sensor is required.

CUE: Only available on CUE (with sensor).

3-ph: Only available on three-phase E-pumps.

Related information

6.7 Analog outputs

Object for setting a new setpoint in the pump.

ID	Object name	R/W	Notes	Unit	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
AO, 0	Set setpoint	W	Sets the pump setpoint if bus control is enabled. Closed loop: % of setpoint range. Open loop: % of nominal frequency. A value of 0 does not imply a stop. See section Setpoint.	%	●	●	●
AO, 5	Set max. flow limit	W	Sets the maximum flow limit value.	m³/h	●	H	-

H: Only available on MGE model H and later.

Related information

7.2 Setpoint

6.8 Analog values

Objects for configuration of the module,the unit and the pump.

ID	Object name	R/W	Notes	Unit	MAGNA3	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
AV, 0	Custom Device Object Instance Number	R/W	Value for Custom Device Object Instance Number. Used in conjunction with DIP switch SW3. See section Selecting the Device Object Instance Number. Present_Value range: 0-0x3FFFFE. Default Present_Value: 0xE7.	-	●	●	●
AV, 1	BACnet watchdog	R/W	Time in seconds before BACnet communication watchdog times out, and sets the pump to local control mode. See section BACnet communication watchdog. 0: Disabled (default). Set to a value between 5 and 3600 to enable.	s	●	H	●
AV, 2	Simulation fault code	R/W	Fault code to simulate. See section BACnet MAC address (CIM 300). Can be cleared by writing a value of 0.	-	●	H	●
AV, 3	Simulation warning code	R/W	Warning code to simulate. See section BACnet MAC address (CIM 300). Can be cleared by writing a value of 0.	-	S	H	●
AV, 9	Product time and date	R/W	Pump time and date in UNIX format (seconds since 00:00 01-01-1970).	s	S	H	-
AV, 12	Remote sensor feedback	R/W	Sensor value via fieldbus	%	●	H	-
AV, 19	Set Kp	R/W	Set proportional gain K_p	0.1	●	H	-
AV, 20	Set Ti	R/W	Set integral action time T_i	0.1 s	●	H	-

H: Only available on MGE model H and later.

Related information
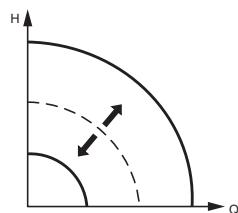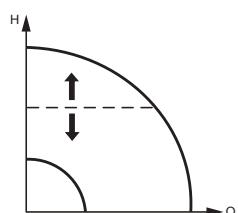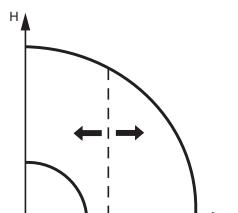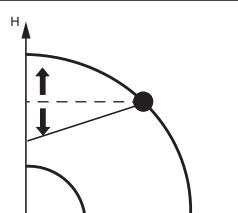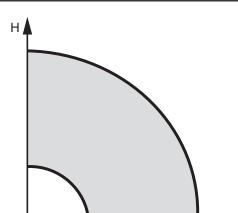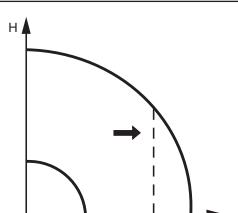
3.5 Selecting the Device Object Instance Number

7.3 BACnet communication watchdog

11. BACnet MAC address, CIM 300

7. Detailed descriptions

7.1 Control modes

Control modes	Description	Illustration
Constant speed	**Open loop** The setpoint of the pump is interpreted as the setpoint for the pump speed in %. The setpoint value is a percentage of the maximum speed of the pump. No sensor is required.	TM079755
Constant pressure Constant diff. pressure	**Closed loop** The setpoint of the pump is interpreted as the setpoint for the pressure. The controller inside the pump adapts the pump speed so that the pressure is constant, regardless of the flow. A pressure sensor is required.	TM079756
Constant flow Constant level Constant temperature Constant diff. temperature Constant percentage Closed loop sensor control	**Closed loop** You can obtain a constant flow, constant level, constant temperature or constant percentage by replacing the main pressure sensor with another sensor. For example a flow sensor is needed for flow control, a level sensor is needed for level control and a temperature sensor is needed for temperature control. Closed loop sensor control is not available for the current pump. Constant flow is illustrated to the right.	TM079754
Proportional pressure	**Closed loop** The setpoint of the pump is interpreted as the basic setpoint for the proportional-pressure mode (the black dot in the illustration). This control mode is only available on GRUNDFOS MAGNA series and TPE Series 2000 pumps.	TM079757
AUTO$_{ADAPT}$	**AUTO$_{ADAPT}$** For this control mode, the optimum setpoint is automatically estimated and used. This also means that any setpoint value is ignored. Only available on GRUNDFOS MAGNA Series and some three-phase motors of 0.55 to 7.5 kW. A pressure sensor is required.	TM079753
FLOW$_{ADAPT}$	**AUTO$_{ADAPT}$ with flow limitation** For this control mode, the optimum setpoint is automatically estimated and used, but the flow is limited by the maximum flow limit value set by the user. Set the value with AO, 5.	TM079758

H: Pressure (Head)
Q: Flow

Important notes to control modes

Only valid control modes are accepted.

Example: If the pump is a TPE Series 2000, with an MGE motor model G, and the control mode is changed to Constant temperature, the pump will not change its control mode because it is not possible for a TPE Series 2000 to run in this mode. The mode will then be the last valid control mode.

7.2 Setpoint

This object accepts values ranging from 0 to 100 (0 % to 100 %).

The setpoint value can represent speed, pressure, flow, etc., depending on the selected control mode.

A setpoint of 0 does not imply a stop.

7.2.1 Setpoint in closed-loop control

The setpoint is written to AO, 0 Setpoint as a percentage value of the setpoint range. The selected setpoint is reflected in object AI, 58 UserSetpoint with the same scaling.

The actual setpoint, whether it has been set with Grundfos GO Remote, the pump display, the pump buttons or the fieldbus, can be read from AI, 9 ActualSetpoint. It is a percentage value of FeedbackSensorMax.

Generally, the actual setpoint value represents head, pressure, flow, temperature and so on depending on how the feedback sensor has been set to measure. The unit of measure can be read from MI,11 FeedbackSensorUnit.
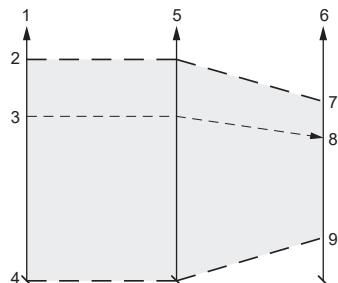
It is possible to calculate back and forth between the setpoint in percent and its scaled value:

$X_{act}[unit] =$

$X_{set}[\%] \times (r_{max} - r_{min}) + r_{min}$

Where:

- r_{max} = SetpointRangeMax × FeedbackSensorMax × FeedbackSensorUnit
- r_{min} = SetpointRangeMin × FeedbackSensorMax × FeedbackSensorUnit

Setpoint in closed-loop control

Pos.	Description
1	Setpoint* (AO, 0)
2	100 %
3	X_{set}
4	0 %
5	UserSetpoint* (AI, 58)
6	ActualSetpoint** (AI, 9)
7	SetpointRangeMax (AI, 134)
8	X_{act}
9	SetpointRangeMin (AI, 133)

* Percentage of setpoint range.
** Percentage of sensor maximum.

MAGNA3 40-100 example:

SetpointRangeMin: 5 %

SetpointRangeMax: 50 %

FeedbackSensorMax: 20

FeedbackSensorUnit: m

$r_{max} =$

SetpointRangeMax × FeedbackSensorMax × FeedbackSensorUnit

= 50 % × 20 × m = 10 m

$r_{min} =$

SetpointRangeMin × FeedbackSensorMax × FeedbackSensorUnit

= 5 % × 20 × m = 1 m

$X_{act}[unit] =$

$X_{set}[\%] \times (r_{max} - r_{min}) + r_{min}$

$X_{set}[\%] \times (10\ m - 1\ m) + 1\ m$
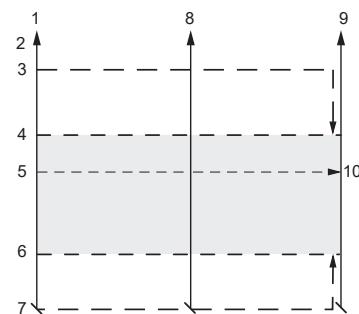
$X_{set}[\%] \times 9\ m + 1\ m$

If $X_{set}[\%]$ has value 40 %, the pump will have an actual setpoint of 40 % × 9 m + 1 m = 4.6 m.

7.2.2 Setpoint in open-loop control

The setpoint is written to AO, 0 Setpoint as a percentage value of the nominal frequency, fnom, represented by AI, 130 NomFrequency. The selected setpoint is reflected in AI, 58 UserSetpoint with the same scaling. From the fieldbus, it will get whatever value written to Setpoint, but from the display and Grundfos GO Remote, it is truncated to range [f_{min}; f_{max}], represented by AI, 132 MaxFrequency and AI, 131 MinFrequency.

The actual setpoint, whether it has been set with Grundfos GO Remote, the pump display, the pump buttons or the fieldbus, can be read from AI, 9 ActualSetpoint, and it always reflects the frequency limitations. It equals the value that the pump actually uses.

Setpoint in open-loop control

Pos.	Description
1	Setpoint* (AO, 0)
2	NomFrequency, Hz (AI, 130)
3	100 %
4	MaxFrequency (AI, 132)
5	X_{set}
6	MinFrequency (AI, 131)
7	0 %
8	UserSetpoint* (AI, 58)
9	ActualSetpoint* (AI, 9)
10	X_{act}

* Percentage of f_{nom}.

For MGE motors and the CUE drive:

- [f_{min}; f_{max}] can be adjusted from the display and Grundfos GO Remote.
- With f_{max} greater than f_{nom}, a setpoint above 100 % is possible (over synchronous).

For MAGNA3:

- [f_{min}; f_{max}] are fixed.
- $f_{max} = f_{nom}$ always.

7.3 BACnet communication watchdog

A BACnet communication watchdog is implemented in CIM/CIU 300 and CIM/CIU 500.

If no BACnet communication is detected for the time period defined by the BACnet watchdog object (AV, 1) and the pump is set to Bus control mode (BO, 0), the pump is automatically switched to local control mode, and its local settings will be used.

This functionality can be used to define the pump behaviour in case of a BACnet communication breakdown. Before enabling the watchdog, the local pump settings must be made with either a Grundfos PC Tool or Grundfos GO Remote. This ensures that the pump behaves as expected if the BACnet communication breaks down.

When BACnet communication is re-established after a watchdog time-out, the user must manually set the pump back to Bus control mode (BO, 0).

When the Present_Value of the AV, 1 object is set to 0, the watchdog is disabled (default). To enable the watchdog, set the Present_Value to [5-3600] seconds.

7.4 Fault monitoring and resetting

This example shows how to monitor faults or warnings in the Grundfos pump and how to manually reset a fault.

The Fault code object (AV, 0) and the Warning code object (AV, 1) can both hold a Grundfos-specific fault code. See section BACnet MAC address (CIM 300) for code interpretation.

Warnings are notifications only and will not stop the pump, whereas faults will stop the pump. Most pumps can be configured to either automatically reset the fault when the fault condition disappears or to require manual resetting.

If a fault is to be manually reset, use the Reset fault object (BO, 4). When the Present_Value of this object is set to 1, a Reset fault command is sent to the device.

Example of fault simulation

Fault simulation can be helpful for testing alarm behaviour of a pump. The pump will behave exactly as if a real alarm was on.

This example shows how to simulate "undervoltage".

- Set "B0, 0 to value 1 (control source = remote).
- Set "Simulation fault code" (AV, 2) to 40 (undervoltage).
- Set "Fault simulation" (BO, 5) to 1 (enabled).
- Read "Fault code" (AI, 0), and check if it is set to 40.
- The red LED on the pump will indicate an alarm.
- Remove the simulated alarm settings by setting "Fault simulation" (BO, 5) to 0 (disabled).
- Reset the alarm via the pump display or via the BACnet object. "Reset fault" (BO, 4) and the pump will return to normal operation.

Related information

7.5 Pump control via BACnet

This example shows how to set a GRUNDFOS MAGNA to 50 % setpoint, in proportional-pressure mode.

- Before enabling pump control via BACnet, values for setpoint, control mode and operating mode must be set.
- Set operating mode with Multistate output 1. In this example, the value for operating mode must be 1 (Start).
- Set control mode with Multistate output 0. A value of 3 corresponds to Proportional pressure.
- Set the setpoint to a value of 50 % in Analog output 0. See section Setpoint for details on setpoint.
- To enable bus control, set Binary output 0 to a value of 1.

Now the GRUNDFOS MAGNA pump should be running at 50 % in proportional-pressure mode with bus control enabled.

Related information

7.6 Product simulation

Product profile simulation or pump simulation can be useful for testing and pre-commissioning purposes. It is possible to simulate a pump profile when using a CIU 300 that is not connected to a pump. CIU 300 will behave as if a pump was connected on the GENIbus, even if that is not the case. The objects supported by the simulated product will be available, although the data will only be dummy values that do not simulate real pump behaviour.

Product simulation is enabled by setting the Multistate output object "Product simulation" (MO, 2):

Product to simulate	Value
Disabled (no simulation)	1
MAGNA/UPE	2
E-pumps 0.25 - 7.5 kW	3
E-pumps 11-22 kW / CUE	4
MAGNA3	8
E-pumps based on MGE model H	9

Product simulation will always be disabled on power-up.

If a physical pump is detected on GENIbus during power-up, it will not be possible to enable product simulation.

7.7 Remote sensor feedback

Product	Sensor reading [%]	Value communicated via fieldbus to the pump
MAGNA3	0-100	0-100
MGE model H and later	0-100	0-100

8. Commissioning

8.1 Step-by-step guide to hardware setup, CIU 300

Step	Action
1	Complete the pump configuration, for example sensor configuration.
2	Select the BACnet MAC address (0-127) on CIM 300.
3	Select the transmission speed of CIM 300.
4	Select Device Object Instance Number.
5	If necessary, set line termination.
6	Connect the GENIbus cable from CIU 300 to the pump.
7	Connect the necessary cables from CIU 300 to the BACnet network.
8	Connect the power cable to CIU 300, and switch it on.
9	Confirm that the GENIbus LED is permanently green and that the BACnet LED is either off or flashing green, indicating communication.

CIU 300 is now configured and ready.

Related information

8.2 Step-by-step guide to hardware setup, CIM 300

Step	Action
1	Complete the pump configuration, for example sensor configuration.
2	Select the BACnet MAC address (0-127) on CIM 300.
3	Select the transmission speed of CIM 300.
4	Select Device Object Instance Number.
5	If necessary, set line termination.
6	Connect the necessary cables from CIM 300 to the BACnet network.
7	Confirm that the GENIbus LED is permanently green and that the BACnet LED is either off or flashing green, indicating communication.

CIM 300 is now configured and ready.

Related information

8.3 BACnet IP communication setup, CIM 500

Step	Action
1	Install CIM 500 in the Grundfos E-pump according to the pump documentation.
2	Select position 2 at the protocol rotary switch.
3	Power on the E-pump, and observe LED2 turn permanently green and LED1 remaining off.
4	Complete the pump configuration, for example sensor configuration and selection of local Operating mode, local Control mode and local Setpoint, for example with Grundfos GO Remote.
5	Connect one of the CIM 500 Ethernet ports (RJ45) to a PC using an Ethernet cable.
6	Configure the PC Ethernet port to the same subnetwork as CIM 500, for example 192.168.1.1, and the subnet mask to 255.255.255.0.

Step	Action
7	Open your internet browser and make contact to the CIM 500 webserver. Default: 192.168.1.100
8	Log in to the webserver. Default: User: admin Password: Grundfos.
9	In the menu column to the left select: Configuration > Real time Ethernet protocol
10	Type in the required settings for BACnet IP.
11	Click [Submit] to transfer the new settings, and close the web browser.

CIM 500 is now ready to be accessed from a BACnet IP master via one of its Ethernet ports. Use the IP address selected under step 9.

- The CIM 500 LED1 will be flashing green when BACnet IP communication takes place.
- You can use the two Ethernet ports for daisy chaining of CIM 500 modules.
- It is possible to have connection to the webserver simultaneously with a connection to a BACnet IP master.
- It is possible to have connection to more BACnet IP masters simultaneously, for example to have connection to PC Tool CIM/CIU while connected to another BACnet IP master.

Related information

8.4 BACnet IP communication setup, CIU 500

Step	Action
1	Check that both CIU 500 and the E-pump are powered off.
2	Remove the front cover of CIU 500.
3	Select position 2 at the CIM 500 module protocol rotary switch.
4	Connect the GENIbus cable from CIU 500 to the E-pump. See the CIU quick guide.
5	Power on CIU 500 and the E-pump, and observe LED2 turn permanently green and LED1 remaining off.
6	Connect one of the CIU 500 Ethernet ports (RJ45) to a PC using an Ethernet cable.
7	Configure the PC Ethernet port to the same subnetwork as CIM 500, for example 192.168.1.1, and the subnet mask to 255.255.255.0. See section How to configure an IP address on your PC.
8	Open your internet browser and make contact to the CIM 500 webserver. Default: 192.168.1.100.
9	Log in to the webserver. Default: User: admin Password: Grundfos.
10	In the menu column to the left select: Configuration > Real time Ethernet protocol
11	Type in the required settings for BACnet IP. See section Webserver configuration.
12	Click [Submit] to transfer the new settings and close the web browser.

CIM 500 is now ready to be accessed from a BACnet IP master via one of its Ethernet ports. Use the IP address selected under step 10.

• The CIU 500 LED1 will be flashing green when BACnet IP communication takes place.

• You can use the two Ethernet ports for daisy chaining of CIM 500 modules.

• It is possible to have connection to the webserver simultaneously with a connection to a BACnet IP master.

• It is possible to have connection to more BACnet IP masters simultaneously, for example to have connection to PC Tool CIM/CIU while connected to another BACnet IP master.

Related information

4.2 Setting the Industrial Ethernet protocol

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9. Fault finding the product

9.1 CIM/CIU 300 BACnet IP

9.1.1 LED status

Faults in a CIM 300 can be detected by observing the status of the two communication LEDs. See the table below.

Fault (LED status)	Possible cause	Remedy
LED1 and LED2 remain off when the power supply is connected, and 5 seconds have passed.	CIM 300 is defective.	Replace CIM 300.
LED2 for internal communication is flashing red.	No internal communication between CIM 300 and the Grundfos pump.	• Check that the individual conductors are fitted correctly. • Check the power supply to the pump.
LED2 for internal communication is permanently red.	CIM 300 does not support the connected pump.	Contact the nearest Grundfos company.
BACnet LED1 is permanently red.	Fault in the CIM 300 BACnet configuration.	• Ensure that the BACnet MAC address has a valid setting. • Ensure that the Device Object Instance Number is within the allowed range.
BACnet LED1 is flashing red.	Fault in the BACnet communication (cyclic redundancy check).	• Check the transmission speed, switches SW4 and SW5. See section Setting the BACnet transmission speed. • Check the cable connection between CIM 300 and the BACnet network. • Check the termination resistor settings, switches SW1 and SW2.

9.1.2 BACnet faults

Fault	Possible cause	Remedy
CIM/CIU 300 does not communicate on the BACnet MS/TP network.	Configuration or wiring fault.	Ensure that the cable between the BACnet MS/TP devices is connected correctly.
		Ensure that the BACnet MAC address and Device Object Instance Number are configured correctly and are unique on the network.
		Ensure that the transmission speed is configured correctly.
		Ensure that each end of the BACnet MS/TP trunk cable is terminated, if necessary.
		Ensure that the bus topology for a BACnet MS/TP network is correct.
	CIM/CIU 300 is instructed to not communicate on the BACnet network via the DeviceCommunicationControl service.	Use the Device Communication Control service to enable communication from the device.
The pump does not react to control commands from the bus.	The pump is running in local mode.	Set the pump to bus control by setting the Present_Value of BO, 0 to 1.
There are only a few BACnet objects available, and the GENIbus LED flashes red.	There is no communication between CIM 300 and the pump.	Ensure that the GENIbus cable between CIM 300 and the pump is connected correctly. Ensure that the pump is switched on and able to communicate on GENIbus.

Related information

9.2 CIM/CIU 500 BACnet IP

You can detect faults in CIU 500 by observing the status of the two communication LEDs.

9.2.1 LED status

CIU 500 connected to an E-pump

Fault (LED status)	Possible cause	Remedy
LED1 and LED2 remain off when the power supply is connected.	CIM 500 is fitted incorrectly in the Grundfos product.	Check that CIM 500 is fitted and connected correctly.
	CIM 500 is defective.	Replace CIM 500.
LED2 for internal communication is flashing red.	No internal communication between CIM 500 and the Grundfos product.	Check that CIM 500 is fitted correctly in the Grundfos product.
LED2 for internal communication is permanently red.	CIM 500 does not support the Grundfos product connected.	Contact the nearest Grundfos company.
BACnet LED1 is permanently red.	Fault in the CIM 500 BACnet IP configuration.	Check that the rotary switch SW1 is set to 2. Check that BACnet IP-address configuration is correct. See section Webserver configuration.
LED1 is permanently red and green at the same time.	Error in firmware download.	Use the webserver to download the firmware again.
LED2 is permanently red and green at the same time.	Memory fault.	Replace CIM 500.

CIM 500 fitted in CIU 500

Fault (LED status)	Possible cause	Remedy
LED1 and LED2 remain off when the power supply is connected.	CIU 500 is defective.	Replace CIU 500.
LED2 for internal communication is flashing red.	No internal communication between CIU 500 and the Grundfos product.	• Check the cable connection between the Grundfos product and CIU 500. • Check that the individual conductors have been fitted correctly, for example not reversed. • Check the power supply to the Grundfos product.
LED2 for internal communication is permanently red.	CIM 500 does not support the Grundfos product connected.	Contact the nearest Grundfos company.
The Ethernet LED1 is permanently red.	Fault in the CIM 500 BACnet IP configuration.	Check that the rotary switch SW1 is set to 2. Check that BACnet IP-address configuration is correct. See section Webserver configuration.
LED1 is permanently red and green at the same time.	Error in firmware download.	Use the webserver to download the firmware again.
LED2 is permanently red and green at the same time.	Memory fault.	Replace CIM 500.

9.2.2 CIM/CIU 500 BACnet IP communication faults

Fault	Possible cause	Remedy
The slave does not respond to telegrams.	Configuration or wiring error.	• Check the visual diagnostics on the BACnet slave. Normal conditions are that the Grundfos GENIbus LED (LED2) is permanently green and that the BACnet IP LED (LED1) is off or flashing green. If not, see section LED status. • Make sure that the cable between the BACnet IP master and the BACnet slave is connected correctly. • Ensure that the slave IP address is configured correctly, and that the correct slave IP address is used in the BACnet master poll.
The slave returns data value 0xFFFF (65535).	The value is unavailable. A data value of 0xFFFF does not necessarily indicate an error condition. It means that the value is unavailable from the E-pump.	See section Object overview for available data.
	The E-pump is not configured to show the value or lacks a sensor to read the value.	See section Analog inputs for data values that require a sensor.
The slave does not react to control actions or to writing of settings.	The E-pump might be in "Local" mode, in which case Operating mode, Control mode and Setpoint cannot be changed from bus.	Set the E-pump in "Remote mode" by setting binary output BO, = "Set control source" to value 1 (=Remote). The E-pump should show "Controlled from bus" when status is read in Grundfos GO Remote.

Related information

10. BACnet telegrams

10.1 BACnet MS/TP telegram overview

All BACnet MS/TP telegrams have the following format:

Preamble	Telegram type	Destination	Source	Length	Header CRC	Data	Data CRC	Pad
2 bytes: 0x55 0xFF	1 byte	1 byte	1 byte	2 bytes, MSB first	1 byte	Variable, [0-501] bytes	2 bytes, LSB first	At most 1 byte 0xFF

For BACnet MS/TP, the destination address and source address are MAC addresses. A destination address of 255 (0xFF) denotes broadcast. The length field specifies the length in bytes of the data field which must be between 0 and 501 bytes long.

Related information

3.7 Selecting the BACnet MAC address

10.2 Telegram types

The available telegram types are listed below.

Type	Name	Description
00	Token	Used to pass network mastership to the destination device.
01	Poll for master	Discovers the presence of other master devices on the network.
02	Reply to poll for master	Used by a master to indicate a wish to enter the token ring.
03	Test request	Used to initiate a loopback test.
04	Test response	A reply to a test request telegram.
05	BACnet data, expecting reply	Used for data transmission where a reply is expected.
06	BACnet data, not expecting reply	Used for data transmission where no reply is expected.
07	Reply postponed	Used by master devices to defer sending a BACnet data reply.

11. BACnet MAC address, CIM 300

BACnet address	SW6	SW7	BACnet address	SW6	SW7	BACnet address	SW6	SW7
0	0	0	45	2	D	90	5	A
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	127	7	F
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			

If the MAC address switches are set to an invalid MAC address value, a MAC address of 0 will be used.

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

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

Code	Description	Code	Description	Code	Description
208	Cavitation	209	Non-return valve fault	210	High pressure
211	Low pressure	212	Diaphragm tank precharge pressure out of range	213	VFD not ready
214	Water shortage, level 2	215	Soft pressure buildup time-out	216	Pilot pump alarm
217	Alarm, general-purpose sensor high	218	Alarm, general-purpose sensor low	219	Pressure relief not adequate
220	Fault, motor contactor feedback	221	Fault, mixer contactor feedback	222	Time for service, mixer
223	Time for service, mixer	224	Pump fault, due to auxiliary component or general fault	225	Communication fault, pump module
226	Communication fault, I/O module	227	Combi event	228	Night flow max. limit exceeded
229	Water on floor	230	Network alarm	231	Ethernet: No IP address from DHCP server
232	Ethernet: Auto-disabled due to misuse	233	Ethernet: IP address conflict	234	Backup pump alarm
235	Gas detected	236	Pump 1 fault	237	Pump 2 fault
238	Pump 3 fault	239	Pump 4 fault	240	Lubricate bearings (specific service information)
241	Motor phase failure	242	Automatic motor model recognition failed	243	Motor relay has been forced (manually operated or commanded)
244	Fault, On/Off/Auto switch	245	Pump continuous runtime too long	246	User-defined relay has been forced (manually operated or commanded)
247	Power-on notice, (device or system has been switched off)	248	Fault, battery/UPS	249	User-defined event 1
250	User-defined event 2	251	User-defined event 3	252	User-defined event 4
253	SMS data from DDD sensor not received within time limit	254	Inconsistent data model		
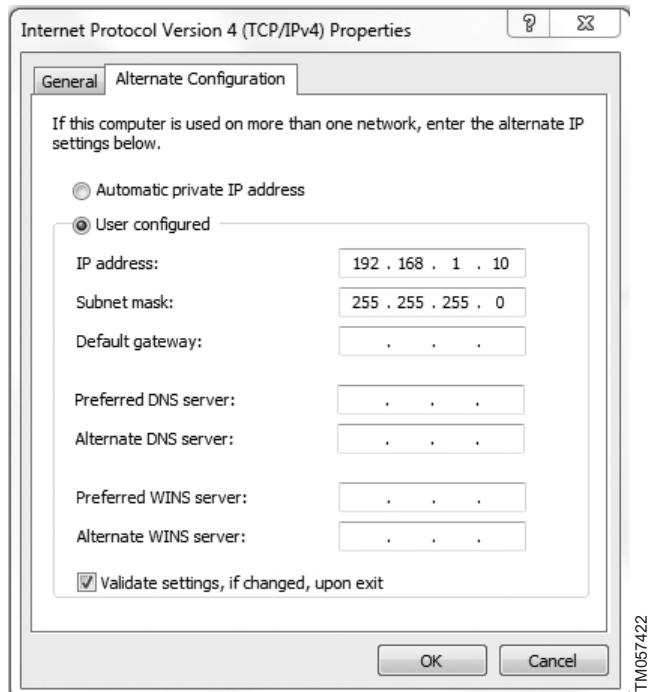
A.1. Appendix

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

A.1.1. 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 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. Example from Windows 7.

Example from Windows 7

A.1.2. 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 CIM 500, and store or restore settings.

To establish a connection from a PC to CIM 500, proceed as follows:

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 the CIM 500. For network configuration, see section How to configure an IP address on your PC.
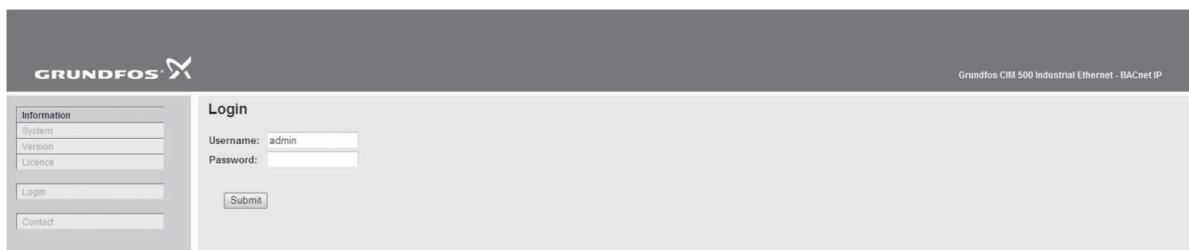
To establish a connection from a PC to CIM 500 for the first time, the following steps are required:

1. Open a standard Internet browser and type 192.168.1.100 in the URL address field.

2. Log in to the webserver.

Related information

A.1.3. Login

Login

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

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

A.1.4. BACnet IP configuration

Real Time Ethernet Protocol Configuration - BACnet IP

Object	Description
UDP Port Number	Select the UDP port number. The default number is 47808, the standard UDP port number for BACnet IP.
Device Instance	Select the Device Instance. The default number is 227000. The Device Instance must be unique in the BACnet network. Grundfos is 227 and it is fixed. The last three digits can be changed.
Device Name	You can name the device. The device name must be unique in the BACnet network (optional).
Device Location	You can name the device location for local identification (optional).
Max APDU	Select the maximum Application Protocol Data Unit, between 50 and 1476. By default it is 1476 bytes.
Custom device in-stance enable	If ticked, CIM 500 is configured to use a BACnet custom device instance number.
Foreign Device	If ticked, CIM 500 is configured as a foreign device.
IP Address	Enter the foreign IP address.
UDP Port	Select the UDP port number. The default number is 47808.
Re Register Time	Select the time period during which the foreign device must re-register on the BACnet network.

The IP address and subnet mask can be defined under "Network Settings".

Argentina
Bombas GRUNDFOS de Argentina S.A.
Ruta Panamericana km. 37.500industin
1619 - Garín Pcia. de B.A.
Tel.: +54-3327 414 444
Fax: +54-3327 45 3190

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

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

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

Belarus
Представительство ГРУНДФОС в Минске
220125, Минск
ул. Шафарнянская, 11, оф. 56, БЦ «Порт»
Тел.: +375 17 397 397 3
      +375 17 397 397 4
Факс: +375 17 397 397 1
E-mail: minsk@grundfos.com

Bosnia and Herzegovina
GRUNDFOS Sarajevo
Zmaja od Bosne 7-7A
BiH-71000 Sarajevo
Tel.: +387 33 592 480
Fax: +387 33 590 465
www.ba.grundfos.com
E-mail: grundfos@bih.net.ba

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

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

Canada
GRUNDFOS Canada inc.
2941 Brighton Road
Oakville, Ontario
L6H 6C9
Tel.: +1-905 829 9533
Fax: +1-905 829 9512

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

Columbia
GRUNDFOS Colombia S.A.S.
Km 1.5 vía Siberia-Cota Conj. Potrero Chico,
Parque Empresarial Arcos de Cota Bod. 1A.
Cota, Cundinamarca
Tel.: +57(1)-2913444
Fax: +57(1)-8764586

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

Czech Republic
GRUNDFOS Sales Czechia and Slovakia s.r.o.
Čajkovského 21
779 00 Olomouc
Tel.: +420-585-716 111

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

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

Finland
OY GRUNDFOS Pumput AB
Trukkikuja 1
FI-01360 Vantaa
Tel.: +358-(0) 207 889 500

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

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

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

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

Hungary
GRUNDFOS Hungária Kft.
Tópark u. 8
H-2045 Törökbálint
Tel.: +36-23 511 110
Fax: +36-23 511 111

India
GRUNDFOS Pumps india Private Limited
118 Old Mahabalipuram Road
Thoraipakkam
Chennai 600 097
Tel.: +91-44 2496 6800

Indonesia
PT GRUNDFOS Pompa
Graha intirub Lt. 2 & 3
Jln. Cililitan Besar No.454. Makasar, Jakarta Timur
ID-Jakarta 13650
Tel.: +62 21-469-51900
Fax: +62 21-460 6910 / 460 6901

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

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

Japan
GRUNDFOS Pumps K.K.
1-2-3, Shin-Miyakoda, Kita-ku
Hamamatsu
431-2103 Japan
Tel.: +81 53 428 4760
Fax: +81 53 428 5005

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

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

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

Malaysia
GRUNDFOS Pumps Sdn. Bhd.
7 Jalan Peguam U1/25
Glenmarie industrial Park
40150 Shah Alam, Selangor
Tel.: +60-3-5569 2922
Fax: +60-3-5569 2866

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

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

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

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

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

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

Romania
GRUNDFOS Pompe România SRL
S-PARK BUSINESS CENTER, Clădirea A2, etaj 2
Str. Tipografilor, Nr. 11-15, Sector 1, Cod 013714
Bucuresti, Romania
Tel.: 004 021 2004 100
E-mail: romania@grundfos.ro

Russia
ООО Грундфос Россия
ул. Школьная, 39-41
Москва, RU-109544, Russia
Тел. (+7) 495 564-88-00 (495) 737-30-00
Факс (+7) 495 564 8811
E-mail grundfos.moscow@grundfos.com

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

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

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

Slovenia
GRUNDFOS LJUBLJANA, d.o.o.
Leskoškova 9e, 1122 Ljubljana
Tel.: +386 (0) 1 568 06 10
Fax: +386 (0)1 568 06 19
E-mail: tehnika-si@grundfos.com

South Africa
GRUNDFOS (PTY) LTD
16 Lascelles Drive, Meadowbrook Estate
1609 Germiston, Johannesburg
Tel.: (+27) 10 248 6000
Fax: (+27) 10 248 6002
E-mail: lgradidge@grundfos.com

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

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

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

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

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

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

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

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

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

U.S.A.
GRUNDFOS Water Utility Headquarters
856 Koomey Road
Brookshire, Texas 77423 USA

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

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