EtherNet/IP for Digital Dosing

CIM 500 Ethernet for EtherNet/IP

Functional profile and user manual

GRUNDFOS

EtherNet/IP for Digital Dosing

English (GB)

Functional profile and user manual 4
Appendix A 25

Original functional profile and user manual

Table of contents

1. General information 4
1.1 Hazard statements 4
1.2 Notes 4

2. Introduction 5
2.1 About this functional profile 5
2.2 EDS file 5
2.3 Assumptions 5
2.4 Definitions and abbreviations 5

3. System description 6

4. Specifications 7
4.1 CIM module 7
4.2 CIM 500 Ethernet 7
4.3 Ethernet/IP 8

5. EtherNet/IP, CIM 500 setup 9
5.1 Connecting the Ethernet cable 9
5.2 Setting the industrial Ethernet protocol 9
5.3 Setting the IP addresses 9
5.4 Establishing a connection to the webserver 9
5.5 Status LEDs 10
5.6 Data activity and link LEDs 10
5.7 Communication watchdogs 10

6. Detailed description of data parameters 11
6.1 Connection and assembly overview 11
6.2 Dosing input/output assembly details 11
6.3 Control parameters, output assembly 1 12
6.4 Other settings 15
6.5 Overview of DDA settings and controls 16
6.6 Configuration parameters, Input/Output explicit messaging 17
6.7 Dynamic status parameters, input assembly 2 18
6.8 Static status parameters, input assembly 3 22
6.9 Measured parameters, input assembly 4 22
6.10 Special parameters, input explicit messaging 23

7. Product simulation 23

8. Fault finding the product 24
8.1 Ethernet/IP 24

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 or units:

- CIM 500 Ethernet for EtherNet/IP.

It explains the EtherNet/IP communication with the Smart Digital Dosing pump type DDA model C and DDA XL, referred to as DDA pump in this document.

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

2.2 EDS file

For this product, an associated Electronic Data Sheet file (Grundfos_EIP_Dosing_Adapter_EDS.eds) can be downloaded from the Grundfos Product Center.

2.3 Assumptions

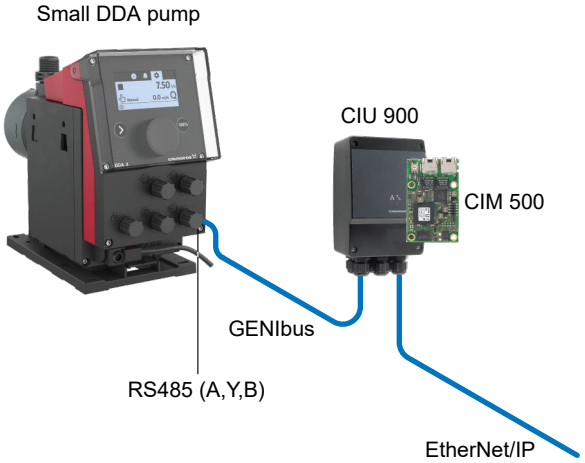
This functional profile assumes that the reader is familiar with commissioning and programming the EtherNet/IP devices.

2.4 Definitions and abbreviations

ARP	Address Resolution Protocol: It translates IP addresses into MAC addresses.
Auto-MDIX	Interface ensuring that both crossover cable types and non-crossover cable types can be used
BCD	Binary coded decimal
CAT5	Ethernet cable type with four twisted pairs of wires
CAT5e	Enhanced CAT5 cable with better performance
CAT6	High performance Ethernet cable compatible with CAT5 and CAT5e
CIM	Communication Interface Module
CIU	Communication Interface Unit
CRC	Cyclic Redundancy Check: a data error detection method
DDA	Digital Dosing Advanced
DHCP	Dynamic Host Configuration Protocol: used for configuring network devices so that they can communicate on an IP network
DNS	Domain Name System: used for resolving host names to IP addresses
E-box	Extension box containing the CIM, mounted underneath the small DDA pump
Enumeration	List of values
GENIbus	Proprietary Grundfos fieldbus standard
GENIpro	Proprietary Grundfos fieldbus protocol
Grundfos GO Remote	Grundfos application designed to control Grundfos products via infrared or radio communication available for iOS and Android devices
H	Head: abbreviation for water head (pressure in metres)
HTTP	Hyper Text Transfer Protocol: the protocol commonly used to navigate the world wide web
IANA	Internet Assigned Numbers Authority
IP	Internet Protocol
LED	Light-emitting Diode
MAC	Media Access Control: unique network address for a piece of hardware
Ping	Packet InterNet Groper: software utility that tests the connectivity between two TCP/IP hosts
Q	Flow rate
SELV	Separated or Safety Extra-Low Voltage
TCP/IP	Transmission Control Protocol/Internet Protocol: for Internet communication, also used as middle-layer protocol for most Ethernet-based fieldbuses
URL	Uniform Resource Locator: the IP address used for connecting to a server
UTC	Coordinated Universal Time: the primary time standard by which the world regulates clocks and time
PLC	Programmable Logic Controller

3. System description

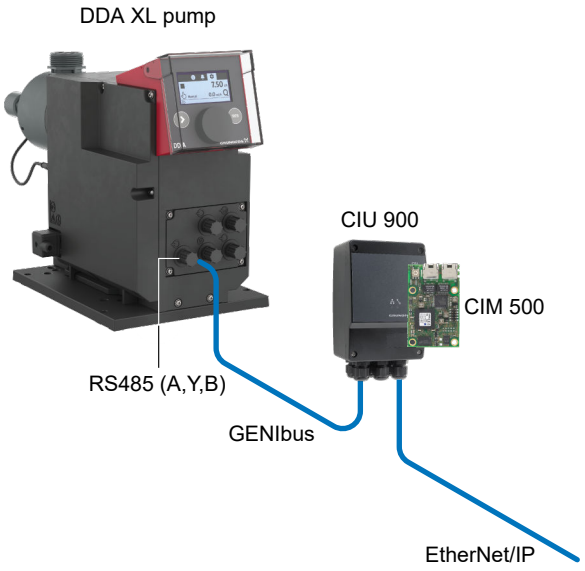
The system diagram provides an overview of the two different connection types using a CIU box.
The CIU box must have a CIM 500 mounted upon installation.



TM089052

DDA model C pump connected to an EtherNet/IP network via a CIM 500

Connect the DDA pump model C to the CIU 900 with a CIM 500 installed in it using the RS485 A, Y, B terminals. The CIU 900 has its own 24-240V AC/DC supply.
The A,Y, B protocol should be set to GENIbus, 9600 bits/s via the pump HMI or the GO app.



TM089053

DDA XL pump connected to an EtherNet/IP network via a CIM 500 communication module

Connect the DDA XL pump to the CIU 900 with a CIM 500 installed in it using the RS485 A, Y, B terminals. The CIU 900 has its own 24-240V AC/DC supply.

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	
Fieldbus visual diagnostics	LED1	Four possible states: Off, flashing green, permanent red, flashing red
GENIbus visual diagnostics	LED2	Four possible states: Off, permanent green, flashing red, permanent red.
Power supply (CIU)	24-240 V	Integrated in the unit
GENIbus connection type (CIU)	RS-485, 3-wire + screen	Conductors: A, B and Y
CIU box enclosure class	IP54	
CIU box dimensions (H × W × D)	182 × 108 × 82 mm	

Related information

5.5 Status LEDs

4.2 CIM 500 Ethernet

CIM 500 Ethernet specifications	Description	Comments
Application layer	DHCP, HTTP, Ping, FTP, fieldbus protocols	
Transport layer	TCP	
Internet layer	Internet protocol V4 (IPv4)	
Link layer	ARP, Media Access Control (Ethernet)	
Ethernet cable	CAT5, CAT5e or CAT6	Auto cable-crossover detecting (Auto-MDIX) supported
Maximum cable length	100 metres at 10/100 Mbit/s	Equivalent to 328 feet
Transmission speed	10 Mbit/s, 100 Mbit/s	Auto-detected
Industrial Ethernet fieldbus protocols	PROFINET IO, Modbus TCP, BACnet IP, EtherNet/IP	Selected with rotary switch

Related information

5.2 Setting the industrial Ethernet protocol

4.3 Ethernet/IP

EtherNet/IP specifications	Description
Minimum requested packet interval	15 ms
I/O data	505 bytes output 509 bytes input Maximum 255 bytes I/O data per assembly
Number of IO connections	10 Default; configurable depending on available socket resources
Number of encapsulation sessions	10 Default; configurable depending on available socket resources
Number of explicit messaging connections	2 explicit messaging connections per encapsulation session 20 explicit messaging connections in total, configurable
User-specific objects	Object 100, depending on the connected product: • Grundfos pump • Grundfos booster • Grundfos dosing • Grundfos water utility.
Maximum number of connections	2 explicit messaging connections × 10 encapsulation sessions Additional 10 I/O connections Total: 30 connections
Standard objects	• Identity object (class 0x01) • Message Router object (class 0x02) • Assembly object (class 0x04), assembly: up to 32 • Connection Manager object (class 0x06) • Device Level Ring (DLR) object (0x47) • Quality of Service (QoS) object (0x48) • TCP/IP Interface object (0xF5) • Ethernet Link object (0xF6)
DHCP	Supported
Functional scope	• Adapter • Support of 2 Ethernet Link objects for implementing ring and daisy chain topologies • Device Level Ring (DLR) protocol (announce-based ring node) • Quality of Service (QoS) • IPv4 Address Conflict Detection (ACD)
Watchdog	Communication watchdog with fixed 10 s time-out, only active if the DDA bus/cloud control has been enabled It can be enabled/disabled from EtherNet/IP and the GO app.
Certificate	Conformance August 2024

Related information

A.7. Update

5. EtherNet/IP, CIM 500 setup

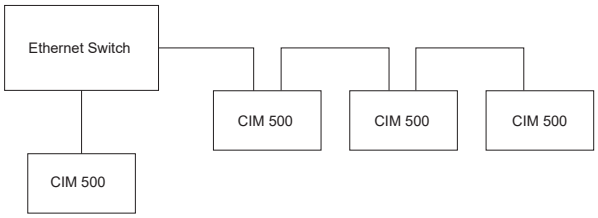
WARNING
Electric shock
Death or serious personal injury
- Connect the CIM 500 only to SELV or PELV circuits.

5.1 Connecting the Ethernet cable

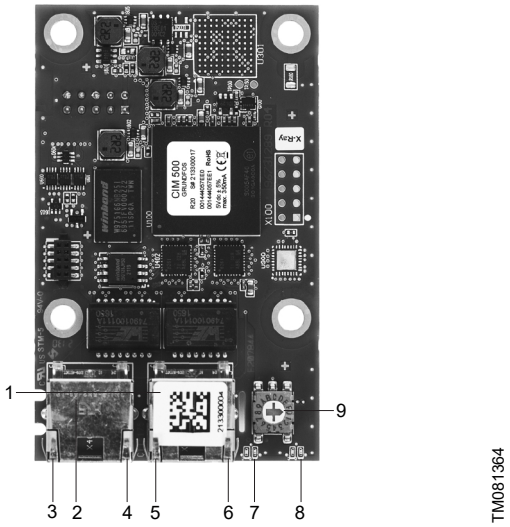
Use RJ45 plugs and Ethernet cable. Connect the cable shield to protective earth at both ends.

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

The CIM 500 is designed for flexible network installation: the built-in 2-port switch makes it possible to daisy chain from product to product without 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



Example of Ethernet connection

Pos.	Description	Designation
1	Industrial Ethernet RJ45 connector 1	ETH1
2	Industrial Ethernet RJ45 connector 2	ETH2
3	Connector 1, 10/100 Mbits/s speed	DATA1
4	Link LED for connector 1	LINK1
5	Connector 2, 10/100 Mbits/s speed	DATA2
6	Link LED for connector 2	LINK2
7	Green and red status LED for Ethernet communication	LED1
8	Green and red status LED for internal communication between module and pump	LED2
9	Rotary switch for protocol selection	SW1

5.2 Setting the industrial Ethernet protocol

The CIM 500 Ethernet module has a rotary switch for selecting the industrial Ethernet protocol.

Selecting the industrial Ethernet protocol

Pos.	Description
0	PROFINET IO (default)
1	Modbus TCP
2	BACnet IP, not supporting DDA pumps
3	Ethernet/IP
4...E	Reserved, LED1 permanently red to indicate an invalid switch position

When the module is powered on, every change of the rotary switch setting causes the module to restart and prepare for the selected protocol.

5.3 Setting the IP addresses

The CIM 500 Ethernet module is set by default 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 Ethernet/IP	This must be set via the webserver and it must be different from the webserver address.

5.4 Establishing a connection to the webserver

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

1. Connect the PC and the CIM 500 using an Ethernet cable.
2. Configure the PC Ethernet port to the same subnetwork as the CIM 500, for example, 192.168.1.101, and the subnet mask to 255.255.255.0.
3. Open a standard internet browser and type 192.168.1.100 in the URL field.
4. The browser shows one or more security warnings, depending on which browser is used. Ignore these and proceed until you see the CIM 500 home page main menu.

5. Log in to the webserver using the following:

User name (default)	admin
Password (default)	Grundfos

The user name and password may have been changed from their default values and if you cannot remember them, the CIM 500 must be reset to factory settings.

If the password has not been changed, you are prompted to change it to a new and stronger password.

TM056436

CIM 500 connected to a PC via Ethernet cable

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

You can access the webserver while the selected industrial Ethernet protocol is active.

Related information

A.2. Webserver configuration

5.5 Status LEDs

The CIM 500 Ethernet module has two status LEDs:

- LED1: red and green status LED for Ethernet communication
- LED2: red and green status LED for internal communication between the CIM 500 and the Grundfos product.

LED1

Status	Description
Off	The Ethernet link is not active.
Permanent green	The Ethernet link is active, connection is established.
Flashing green	The Ethernet link is active, no connection is established.
Permanent red	The Ethernet link is active, an IP address conflict is detected.
Flashing red	The Ethernet link is active, one or both connections are timed out.

LED2

Status	Description
Off	The CIM 500 is switched off.
Flashing red	There is no internal communication between the CIM 500 and the Grundfos product.
Permanent red	The CIM 500 does not support the Grundfos product connected.
Permanent green	Internal communication between the CIM 500 and the Grundfos product is OK.
Permanent red and green	There is a memory fault.

During startup, there is a delay of up to 5 seconds before the LED1 and LED2 status is updated.

Related information

5.1 Connecting the Ethernet cable

5.6 Data activity and link LEDs

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

DATA1 and DATA2

These yellow LEDs indicate the speed of the data connection.

Status	Description
Off	The RJ45 connection speed is 10 Mbits/s or there is no link.
On	The RJ45 connection speed is 100 Mbits/s.

LINK1 and LINK2

These green LEDs show whether the Ethernet cable is properly connected to the RJ45 connector in question.

Status	Description
Off	There is no link connection on the RJ45 connector.
On	There is link connection on the RJ45 connector without data traffic.
Flashing	There is link connection on the RJ45 connector with data traffic.

Related information

5.1 Connecting the Ethernet cable

5.7 Communication watchdogs

Although they are enabled, none of the communication watchdogs are active if “Control from Cloud/bus” has not been enabled from HMI or the GO app.

5.7.1 EtherNet/IP communication watchdog

The watchdog enabling/disabling can be controlled with control parameter #11, SetWatchdogEnable, and for DDA model C, also from the GO app **Settings > Communication** menu (E/D setting is not available from pump HMI).

The actual E/D status of the watchdog can be read from parameter #100 bit 14, WatchdogED.

The EtherNet/IP watchdog action is triggered if “Control from bus/cloud” is enabled and EtherNet/IP communication is lost for more than 10 s. The dosing pump stops with a red display backlight and an alarm description “Communication with main network lost” (code 15) in the event log. If for DDA model C the GO app connection is active, the backlight remains blue and the event log can be accessed via the GO app.

When EtherNet/IP communication is reestablished, the pump resumes dosing and returns to the normal display backlight.

5.7.2 GENIbus communication watchdog

The GENIbus communication watchdog with a fixed 10 s timeout, which monitors the connection between CIU 900 and the DDA pump, is enabled for the first when time bus/cloud control has been selected. For DDA model C, it can be enabled/disabled with the GO app. For DDA XL, it is always enabled.

The GENIbus watchdog is triggered only if “Control from bus/cloud” is enabled and communication is lost between CIU 900 and the pump for more than 10 s. Dosing stops with a red display backlight and an alarm description “Communication with CIM module lost” (code 159) in the event log. This alarm is also readable from EtherNet/IP via parameter #105, AlarmCode.

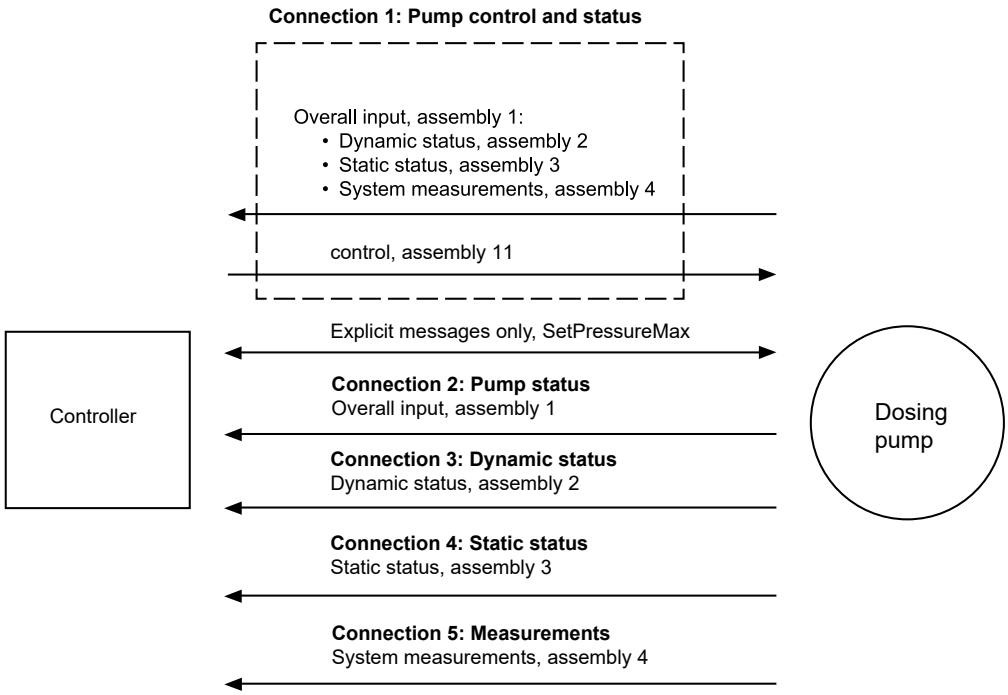
When GENIbus communication is reestablished, the pump resumes dosing and returns to the normal display backlight.

6. Detailed description of data parameters

Operating panel refers to the following:

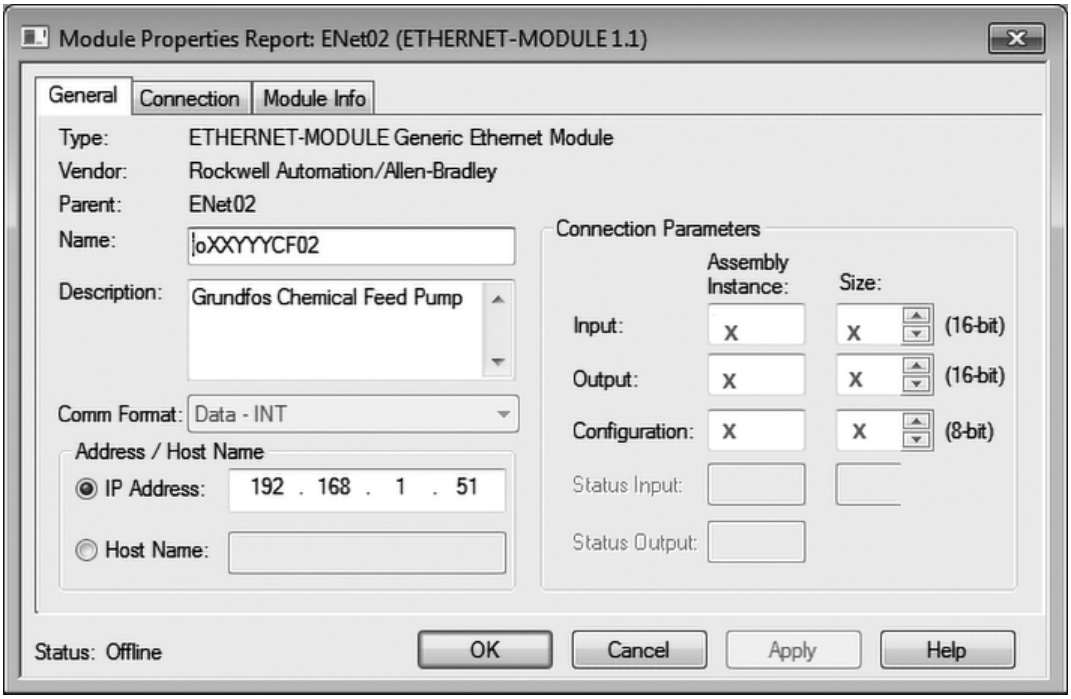
- For DDA model C, it refers to the pump HMI or the Grundfos GO app.
- For DDA XL, it refers to the display and the buttons.

6.1 Connection and assembly overview



6.2 Dosing input/output assembly details

Connection No	Connection type	Connection name	Input assembly instance	Input assembly size	Output assembly instance	Output assembly size
1	Exclusive owner	Dosing control and status	1	100	11	44
2	Input only	Dosing status	1	100	197	0
3	Input only	Dosing dynamic status	2	20	197	0
4	Input only	Dosing static status	3	8	197	0
5	Input only	Dosing measurements	4	72	197	0



Rockwell PLC dialogue box for entering information manually

6.3 Control parameters, output assembly 1

The control parameters are output parameters for controlling the digital dosing pump. All the settings and control actions represented by the EtherNet/IP control parameters below can also be done from the operating panel, unless otherwise stated.

The present status of each parameter can be read from the associated Dynamic status parameter. See section Dynamic status parameters, input assembly 2.

Note that to enable any control from bus, the bus control must be activated in the Setup menu via the operating panel of the DDA pump.

Parameters	Name	Data type	Scaling	Range/ Resolution	Description
1	SetRemoteLocal	SINT8, 0xC2	Bool (state)	0, 1	Setting of Remote/Local state: 0: Local (outputs disabled) 1: Remote
2	SetStartStop				Setting of pump Start/Stop state: 0: Stop pump 1: Start pump
3	-				-
4	SetDeaeratingOnOff				Setting of De-aerating On/Off state.: 0: De-aerating off 1: De-aerating on
5	SetAnalogMode				Setting of Analog Mode: 0: 0-20 mA 1: 4-20 mA (default)
6	SetTimerMode				Setting of Timer Mode (Opr. mode Timer): 0: Cycle timer 1: Week timer
7	SetSlowModeVelocity				Setting of Slow Mode velocity: 0: 50 % (default) 1: 25 %
8	SetSlowModeEnable				Enabling of Slow Mode (Anti-cavitation): 0: Disable 1: Enable
9	SetAutoDeaeratingEnable				Enabling of the Auto-de-aerating function: 0: Disable 1: Enable
10	SetFlowControlEnable				Enabling of the Flow Control function: 0: Disable 1: Enable
11	SetWatchdogEnable				Enabling of the EtherNet/IP watchdog: 0: Disable 1: Enable
12	SetAutoFlowAdaptEnable				Enabling of the Auto Flow Adapt function: 0: Disable 1: Enable
13	SetPulseMemoryEnable				Enabling of the Pulse Memory function: 0: Disable 1: Enable
14	SetOutputRelay1				Control of output relay 1 (not possible from the operating panel): 0: Inactive 1: Active
15	SetOutputRelay2				Control of output relay 2 (not possible from the operating panel): 0: Inactive 1: Active
16	TrigResetAlarm	SINT8, 0xC2	Bool (event)	↑1 (edge)	Command: triggering resetting of alarms
17	TrigPulse				Command: triggering a pulse input (not possible from the operating panel)
18	TrigResetVolumeCnt				Command: triggering resetting of volume counter
19	TrigSetRTC				Command: triggering updating of RTC

Parameters	Name	Data type	Scaling	Range/ Resolution	Description
20	SetOperatingMode	SINT8, 0xC2	Enum	0-4	Selecting Operating mode: 0: Manual 1: Pulse 2: Analog 3: Timer 4: Batch
30	SetpointManual	SINT32, 0xC4	0.1 ml/h	0 - Nameplate max.	Setting the Setpoint in Manual mode operation
31	SetPulseVolume		1 nl	0 - Max. for pump type	Setting the pulse volume for Pulse mode operation
32	SetBatchDosingVolume		0.001 ml	0 - Max. for pump type	Setting the batch dosing volume for Batch mode operation
33	SetBatchDosingTime		0.1 s	0 - Max. for pump type	Setting the batch dosing time for Batch mode operation
34	SetAnalogOutput	SINT16, 0xC3	0.001 mA	0 - 20 mA	Setting the analog output value (not possible from the operating panel)
35	SetRTCYear	SINT8, 0xC2	1 year	0-127 year	Setting of the Real Time Clock years (after 2000) BCD-coded value
36	SetRTCMonth		1 month	1-12 month	Setting of the Real Time Clock months BCD-coded value
37	SetRTCDay		1 day	1-31 day	Setting of the Real Time Clock days BCD-coded value
38	SetRTCHour		1 h	0-23 h	Setting of the Real Time Clock hours BCD-coded value
39	SetRTCMinute		1 min	0-59 min	Setting of the Real Time Clock minutes BCD-coded value
40	SetRTCSecond		1 s	0-59 s	Setting of the Real Time Clock seconds BCD-coded value

Related information

6.7 Dynamic status parameters, input assembly 2

6.3.1 Explanation of event trigger

State

Control bits with a state event trigger behave like a state that is forced upon the DDA pump. The CIM 500 attempts to make the pump operate according to the requested state. Due to certain state/mode restrictions, this may not always be possible. See section Explanation of the control bits. The actual state of the pump can be read from the belonging dynamic status parameters.

Rising edge

Control bits with a rising-edge event trigger behave like a command that is executed when a bit transition from 0 to 1 occurs. Each of them has a corresponding acknowledge bit in the PumpStatus (parameter 100) that is set when the command is executed and cleared when the control bit is written back to 0.

Value change

Control parameters with a value-change trigger behave like a value update that is executed when the parameter changes its value. The CIM 500 attempts to make the DDA pump operate according to the requested value. The change is reflected in the corresponding parameter in the dynamic status parameters or in the measured parameters. Parameters that are controlled by a value-change event trigger can be controlled from both the EtherNet/IP and the operating panel. The last value change, no matter from which source it comes, becomes active, if not prevented by other conditions. See section Explanation of the control bits.

6.3.2 Explanation of control bits

RemoteAccessReq

It is the control bit used by the CIM 500 to activate control from the bus.

0:	The pump can only be controlled via the operating panel and from its external signal inputs. With this setting, all control bits and writings to any output parameter have no influence.
1:	CIM 500 can control the pump according to the settings of control bits and the writing to the other output parameters. The pump can also be controlled from its external signal inputs and stopped from the operating panel.

SetDeaeratingOnOff

It is a control bit used for starting and stopping the de-aeration of the pump.

0:	It stops the de-aeration of the pump.
1:	It starts the de-aeration of the pump. It is the same as pressing 100% on the operating panel.

If the pump has been stopped via the operating panel (symbol ■), it is not possible to start and stop de-aerating the pump from the bus.

If de-aerating of the pump has been started from the bus, it can be stopped by pressing 100% or › on the pump.

SetAnalogMode

It is a control bit used for selecting the type of the analog input signal.

0:	0-20 mA
1:	4-20 mA

Toggling this bit has no effect unless the pump is in operating mode Analog. The actual state, readable from the PumpStatus, is reset to 4-20 mA whenever another operating mode is selected.

SetTimerMode

It is a control bit used for selecting the timer mode.

0:	Cycle timer mode The pump repeats a cyclical dosing of the batch volume that can be programmed from the EtherNet/IP with parameters SetBatchDosingVolume and SetBatchDosingTime.
1:	Week timer mode Up to 16 time-controlled dosing procedures are defined for a week. These procedures have to be programmed via the operating panel.

SetSlowModeEnable

It is the control bit used for slowing down the suction stroke velocity.

0:	SlowMode disabled. There is no slow-down of the suction stroke velocity.
1:	SlowMode enable: It slows down the suction stroke velocity to the velocity selected with control parameter SetSlowModeVelocity.

SetSlowModeVelocity

It is a control bit used for selecting the SlowMode suction stroke velocity.

0:	Selects SlowMode velocity 50 %
1:	Selects SlowMode velocity 25 %

Toggling this bit has no effect unless the pump operates in SlowMode. Suction stroke is reset to 50 % velocity whenever the SlowMode is disabled.

SetAutoDeaeratingEnable

0:	Automatic pump de-aeration disabled
1:	Automatic pump deaeration enabled: The pump is automatically de-aerated (degassed) at regular intervals.

DigitalOutputs (parameter 101), bit 4, signals whenever the automatic pump de-aeration is active.

SetFlowControlEnable

When the FlowControl function is enabled, various faults and deviations related to the dosing process are detected and indicated.

0:	FlowControl function disabled
1:	FlowControl function enabled

The enabling or disabling of the FlowControl means the enabling or disabling of all alarms and warnings that are associated with flow measurement. See section Static status parameters, input assembly 3.

If the FlowControl function is disabled, the AutoFlowAdapt function (see control bit SetAutoFlowAdaptEnable) cannot be enabled.

SetWatchdogEnable

The EtherNet/IP software watchdog is used to monitor the EtherNet/IP connection if control from the bus/cloud has been selected at HMI or the GO app. If the connection is broken for more than 10 s, the DDA pump stops dosing and indicates a bus communication fault.

0:	EtherNet/IP watchdog disabled.
1:	EtherNet/IP watchdog enabled.

See section EtherNet/IP communication watchdog for a description of how to use the watchdog features.

SetAutoFlowAdaptEnable

The AutoFlowAdapt function detects changes in various parameters and responds accordingly to keep the flow constant. Dosing accuracy is increased when this function is enabled.

0:	AutoFlowAdapt function disabled
1:	AutoFlowAdapt function enabled

The AutoFlowAdapt function can only be enabled if the FlowControl function is also enabled.

SetPulseMemoryEnable

The Pulse memory function can be used in operating mode Pulse. When it is enabled, up to 65000 unprocessed pulses can be saved for subsequent processing.

0:	Pulse memory function disabled
1:	Pulse memory function enabled

TrigResetAlarm

When this control bit is toggled 0→1, the pump attempts to reset pending alarms and warnings, and restart the pump if it was stopped due to an alarm.

TrigPulse

When this control bit is toggled 0→1, a pulse signal is sent to the pump. This can be used in operating modes Pulse and Batch, and is equivalent to a pulse signal from the signal inputs.

TrigResetVolumeCnt

When this control bit is toggled 0→1, VolumeTripCounter (parameter 313) is reset to 0.

TrigSetRTC

When this control bit is toggled 0→1, the internal Real Time Clock (RTC) in the DDA pump is updated. The values had to be previously written to the SetRTC parameters 35-40.

SetStartStop

It is a control bit for remote start/stop of the pump.

Value	Name
0	Stop If the pump is ready to be controlled from EtherNet/IP (parameter 100, PumpStatus. RemoteLocal = "1"), this value stops the pump and the operating panel shows ⏸ . If the pump is stopped from the bus, it cannot be started via the operating panel (unless Bus control is deselected). Stop cannot stop the pump when it is de-aerating. Only SetDeareatingOnOff can do that.
1	Start If the pump is ready to be controlled from the EtherNet/IP (parameter 100, PumpStatus. RemoteLocal = "1"), this value starts the pump and it starts dosing according to the selected operating mode. If the pump is stopped via the ❯ button, it restarts when ❯ is pressed again.

PumpStatus.StopFromBus (parameter 100) reflects the setting.

SetOperatingMode

It is a control enumeration for the selection of the operating mode.

Value	Name
0	**Manual** In this operating mode, the pump permanently doses the dosing flow set via the SetpointManual (parameter 30) or the operating panel.
1	**Pulse** In this operating mode, the pump doses the volume set via the SetPulseVolume (parameter 31) or the operating panel for each incoming pulse. Reception of the Pulse command from the EtherNet/IP has the same effect as an incoming contact pulse signal. If the pump receives more pulses than it can process at the maximum dosing flow, excess pulses are ignored if the Memory function (PumpStatusPumpMemoryED bit) is not enabled.
2	**Analog** In this operating mode, the pump doses according to the external analog signal. It can operate according to a 4-20 mA or 0-20 mA signal selected via the SetAnalogMode bit or the operating panel. If the input value in Analog mode 4-20 mA falls below 2 mA, an alarm is displayed and the pump stops. The relation between the analog signal and the dosing value is called analog scaling and must be set via the operating panel.
3	**Timer** The time the dosing should take place is controlled by a cyclic timer or by week timers. The selection is done via the TimerMode bit, the pump HMI, or the GO app. Some other parameters are related to timer dosing. They can only be programmed via the pump HMI or the GO app.
4	**Batch** In this operating mode, the pump doses the volume set via the SetBatchDosingVolume (parameter 32) over a time period of the SetBatchDosingTime (parameter 33) for each incoming pulse or EtherNet/IP Pulse command. The remaining batch volume during dosing can be read from the RemainingDosingVolume (parameter 311).

Related information

5.7.1 EtherNet/IP communication watchdog
6.8 Static status parameters, input assembly 3
6.10 Special parameters, input explicit messaging

6.4 Other settings

SetOutputRelays

The SetOutputRelay1 (parameter 14) and SetOutputRelay2 (parameter 15) are used for controlling the output relays 1 and 2. A relay has to be set to Bus control via the operating panel if it should be controllable from the bus. Via the operating panel, the relays can also be individually configured to be of type NO or NC.

Value	Name
0	Not active
1	Active

The present status of the output relays can always be read from the DigitalOutputs (parameter 101).

SetAnalogOutput

It is used for controlling the analog output signal. The type of signal (4-20 mA or 0-20 mA) is selected with the SetAnalogMode parameter. The analog output has to be set to Bus control via the operating panel if it should be controllable from the bus.

The present value of the analog output signal can always be read from the AnalogOutput (parameter 320).

Setting of the Real Time Clock

The control parameters below are used for setting the internal Real Time Clock (RTC):

SetRCTYear (parameter 35): Year (from year 2000)

SetRCTMonth (parameter 36): Month [1-12]

SetRCTDay (parameter 37): Day [1-31]

SetRCTHour (parameter 38): Hour [0-23]

SetRCTMinute (parameter 39): Minute [0-59]

SetRCTSecond (parameter 40): Second [0-59].

Each parameter is a binary-coded decimal (BCD) value. Sending the TrigSetRTC (parameter 19) command executes the update.

Example:

15:38:00, April 24, 2011 is coded with hexadecimal numbers as: Year = 11h, Month = 04h, Day = 24h, Hour = 15h, Minute = 38h, Second = 00h.

It can also be set via the operating panel.

The present value of the Real Time Clock can always be read from the RTC status parameters 108-113.

6.5 Overview of DDA settings and controls

	Selectable from bus	Selectable from HMI/GO app	Preserved after power cycling	DDA Model C	DDA XL
General dosing settings					
Main network watchdog (enable, disable)	✓	✓ 1)	✓ 2)	✓	✓
Bus control (enable, disable)		✓	✓	✓	✓
Stop after power failure (enable, disable)		✓	✓	✓	✓
Auto de-aerating (enable, disable)	✓	✓	✓	✓	✓
Flow control (enable, disable)	✓	✓	✓	✓	✓
Delay (short, medium, long)		✓	✓	✓	✓
Sensitivity (low, medium, high)		✓	✓	✓	✓
Auto FlowAdapt (enable, disable)	✓	✓	✓	✓	✓
Pressure monitor					
Min. pressure		✓	✓	✓	
Max. pressure	✓	✓	✓	✓	✓
Min. pressure alarm (On, Off)		✓	✓	✓	✓
Max. capacity		✓	✓	✓	
Slow mode (enable, disable)	✓	✓	✓	✓	✓
Velocity (25 %, 50 %)	✓	✓	✓	✓	✓
Action commands					
Reset fault	✓	✓	✓	✓	✓
Generate single pulse 3)	✓	✓		✓	✓
De-aerating (100 %)	✓	✓		✓	✓
Reset volume counter	✓	✓	✓	✓	✓
Set Real Time Clock	✓	✓	✓	✓	✓
Reset Statistics counters		✓	✓	✓	
Reset service		✓	✓	✓	✓
Operation control					
Requested start	✓	✓	✓	✓	✓
Requested stop	✓	✓	✓	✓	✓
Operating mode					
Manual	✓	✓	✓	✓	✓
Manual setpoint	✓	✓	✓	✓	✓
Pulse	✓	✓	✓	✓	✓
Pulse volume	✓	✓	✓	✓	✓
Pulse memory enable	✓	✓	✓	✓	✓
Analog	✓	✓	✓	✓	✓
Analog mode (0-20 mA, 4-20 mA)	✓	✓	✓	✓	✓
Analog scaling		✓	✓	✓	✓
Timer	✓	✓	✓		✓
Timer mode (cycle, week)	✓	✓	✓		✓
Batch	✓	✓	✓	✓	✓
Batch dosing volume	✓	✓	✓	✓	✓
Batch dosing time	✓	✓	✓	✓	✓
Batch priority (volume, time)		✓	✓	✓	
Batch trigger		✓	✓	✓	
Batch cycle time		✓	✓	✓	
Batch week procedures		✓	✓	✓	
Batch start delay		✓	✓	✓	
Output signal control/setting					
Control output relay (On/off)	✓	4)	✓	✓	✓
Control analog output value	✓	✓ 5)	✓	✓	✓
Relay function selection		✓	✓	✓	✓
Digital input (NO, NC)		✓	✓	✓	✓
Debounce of pulse input (enable, disable)		✓	✓	✓	
HMI/Display/bus settings					
Key lock		✓	✓	✓	✓
Display settings		✓	✓	✓	✓
Bluetooth (enable, disable)		✓	✓	✓	

	Selectable from bus	Selectable from HMI/GO app	Preserved after power cycling	DDA Model C	DDA XL
RS485, AYB (GENIbus protocol settings)	✓	✓	✓	✓	
Ethernet (protocol settings) [6]		✓	✓	✓	
Advanced functions					
Condition check		✓	✓	✓	
Sensor calibration		✓	✓	✓	✓
Analog border input/output		✓ [1]	✓	✓	
Analog calibration input/output		✓ [1]	✓	✓	

1) It is only possible with the DDA model C and only from the GO app.

2) It is only possible with the DDA model C.

3) In Pulse or Batch mode, a pulse command from the bus can trigger dosing. In Batch mode on model C, only a batch can be triggered from the HMI.

4) It can be done by toggling the NO/NC setting via the HMI or the GO just for test purposes.

5) Only the pump flow, back pressure and analog input can be set.

6) It is for the built-in Ethernet port.

6.6 Configuration parameters, Input/Output explicit messaging

Configuration parameters are parameters that can be used for programming selected settings of the digital dosing pump.

Parameters	Name	Data type	Scaling	Range/Resolution	Description
50	SetPressureMax	SINT16, 0xC3	0.1 bar	0 - 3276.7 bar	Setting the pressure max. alarm limit

6.7 Dynamic status parameters, input assembly 2

Dynamic status parameters are parameters that describe the actual modes and states of the digital dosing pump. They are thus variables that can often change during the operation of the digital dosing pump.

This assembly is included in assembly 1.

Parameter	Name	Data type	Scaling	Range/ Resolution	Description
100	PumpStatus	DWORD, 0xD3	Array of Bools	Bool (state)	Miscellaneous states/modes
	0. RemoteLocal			0, 1	Status of Remote/Local state: 0: Local The pump can only be controlled from the operating panel and its external signal inputs. In this state writing to any control parameter will have no influence. 1: Remote In this state, the pump can be controlled by the control parameters, as well as via the Start/Stop button and from the external signal inputs. To enter this state, the bus control must be selected from the operating panel, the SetRemoteLocal bit (parameter 1) must be set and the pump must be started by the Start/Stop button.
	1. Dosing				Status of Dosing State: 0: Pump not dosing (pump is not running) 1: Pump dosing (pump is running)
	2. Warning				Status of Warning State: 0: No warnings present 1: One or more warnings, see parameter 107 WarningBits and parameter 106 WarningCode The pump continues dosing if no alarm appears.
	3. Alarm				Status of Alarm State: 0: No alarm present 1: Alarm present, see parameter 105 AlarmCode The pump has stopped dosing and remains stopped as long as the alarm is present. See section Alarms and warnings.
	4. De-aerating				Status of De-aerating State: 0: Pump not de-aerating 1: Pump de-aerating: This is the result of pressing the de-aerating button on the operating panel or using the SetDeaeratingOnOff (parameter 4).
	5. AnalogMode				Status of the selected type of the Analog Mode input signal: 0: 0-20 mA 1: 4-20 mA (default if not in Analog Mode)
	6. TimerMode				Status of the selected Timer Mode: 0: Cyclic Timer 1: Week Timer
	7. SlowMode				Status of Slow Mode (Anti-cavitation): it slows down suction stroke velocity according to velocity selection. 0: Slow Mode disabled 1: Slow Mode enabled
	8. SlowModeVelocity				Status of the selected Slow Mode suction stroke velocity: 0: 50 % velocity (default if Slow Mode is disabled) 1: 25 % velocity
	9. StopFromHMI				Status of Stop from the operating panel: 0: Not stopped from the operating panel start/stop button 1: Stopped from the operating panel start/stop button, can be released by the SetStopKeyOn (parameter 3)

Parameter	Name	Data type	Scaling	Range/ Resolution	Description
100	10. StopFromExternal	DWORD, 0xD3	Bool (state)	0, 1	Status of Stop from external digital input DI3: 0: Stop signal from the external digital input DI3 not active 1: Stop signal from the external digital input DI3 active
	11. StopFromBus				Status of Stop from the bus: 0: Stop command from the bus not active 1: Stopped from the bus with SetStartStop command (parameter 2)
	12. AutoDeaeratingED				Status of Auto De-aerating E/D: 0: Auto De-aerating disabled 1: Auto De-aerating enabled The digital output, DO5, goes high if Auto De-aerating becomes active.
	13. FlowControlED				Status of Flow Control E/D: 0: Flow Control function disabled 1: Flow Control function enabled
	14. WatchdogED				Status of EtherNet/IP Watchdog E/D: 0: EtherNet/IP watchdog disabled 1: EtherNet/IP watchdog enabled The watchdog can be enabled or disabled independently via the SetWatchdogEnable (parameter 11) or via the GO app (DDA model C only). For the watchdog to be monitoring the EtherNet/IP communication, control from the bus/cloud must have been selected at pump HMI or via the GO app.
	15. AutoFlowAdaptED				Status of Auto Flow Adapt E/D: 0: Auto Flow Adapt function disabled (default when Flow Control function disabled) 1: Auto Flow Adapt function enabled
	16. PulseMemoryED				Status of Pulse Memory E/D: 0: Pulse Memory function disabled 1: Pulse Memory function enabled
	17. BusControlLocallyED				Status of Bus Control Locally E/D: This indicates whether Bus control is enabled in the Settings menu on the operating panel. 0: Bus control not enabled (setting of the SetRemoteLocal control bit has no effect) 1: Bus control enabled (setting of the SetRemoteLocal control bit transfers control of all settings to the bus)
	18. ResetAlarmAck				Status of TrigResetAlarm command: 0: TrigResetAlarm ready to execute 1: TrigResetAlarm execution acknowledge The bit is cleared when TrigResetAlarm is set to 0.
	19. PulseAck				Status of TrigPulse command: 0: TrigPulse ready to execute 1: TrigPulse execution acknowledge (bit cleared when TrigPulse set to 0)
	20. ResetVolumeCntAck				Status of TrigResetVolumeCnt command: 0: TrigResetVolumeCnt ready to execute 1: TrigResetVolumeCnt execution acknowledge (bit cleared when TrigResetVolume set to 0)
	21. SetRTCAck				Status of TrigSetRTC command: 0: TrigSetRTC ready to execute 1: TrigSetRTC execution acknowledge (bit cleared when TrigResetAlarm set to 0)
101	Digital Outputs	BYTE, 0xD1	Array of Bools		Digital outputs
	0. DO1		Bool (state)	0, 1	Status of DO1 – Relay 1
	1. DO2				Status of DO2 – Relay 2
	2. DO3				Status of DO3
	3. DO4				Status of DO4
	4. DO5				Status of DO5 – Auto De-aerating
102	Digital Inputs	BYTE, 0xD1	Array of Bools		Digital inputs
	0. DI1		Bool (state)	0, 1	Status of DI1 – Level low
	1. DI2				Status of DI2 – Level empty
	2. DI3				Status of DI3 – Extern stop
	3. DI4				Status of DI4

Parameter	Name	Data type	Scaling	Range/ Resolution	Description
103	ActualStartStop	SINT8, 0xC2	Enum	0-3	Actual Start Stop mode 0: Requested Stop 1: Requested Start 2: Calibrating 3: Service Mode
104	ActualOperatingMode	SINT8, 0xC2	Enum	0-4	Actual Operating Mode 0: Manual 1: Pulse 2: Analog 3: Timer 4: Batch 5: Batch, HMI or GO app controlled 6-225: -
105	AlarmCode	SINT16, 0xC3	Enum	0-255	Alarm code An alarm event makes the pump stop. Some require an acknowledge before the pump can be restarted. See section Alarms and warnings. An acknowledge can come from the operating panel or from the EtherNet/IP by using the TrigResetAlarm command (parameter 16). The EtherNet/IP can only indicate one active alarm at a time.
106	WarningCode	SINT16, 0xC3	Enum	0-255	Warning code A warning does not stop the pump.
107	WarningBits	WORD, 0xD2	Bits	Bits	It shows all active warnings. The belonging event code is shown in parenthesis.
			Bool (state)	0, 1	**Byte 1**
					Bit 0: Backpressure low (211) [7]
					Bit 1: Gas in pump head (35) [7]
					Bit 2: Cavitation (208) [7]
					Bit 3: Discharge valve leakage (36) [7]
					Bit 4: Suction valve leakage (37) [7]
					Bit 5: -- reserved --
					Bit 6: Service now (12)
					Bit 7: Service soon (33)
					Byte 2
					Bit 0: Low level in tank (206)
					Bit 1: -- reserved --
					Bit 2: FlowControl cable defect (169) [7]
					Bit 3: Real Time Clock out of order / Battery low (157)
					Bit 4: -- reserved --
					Bit 5: Flow deviation / pumping capacity too low (17) [7]
					Bit 6: -- reserved --
					Bit 7: -- reserved --
108	RTCYear	SINT8, 0xC2	1 year	0-127 years	Status of the Real Time Clock years (after 2000) BCD-coded value
109	RTCMonth		1 month	1-12 months	Status of the Real Time Clock months BCD-coded value
110	RTCDay		1 day	1-31 days	Status of the Real Time Clock days BCD-coded value
111	RTCHour		1 hour	0-23 h	Status of the Real Time Clock hours BCD-coded value
112	RTCMinute		1 minute	0-59 min	Status of the Real Time Clock minutes BCD-coded value
113	RTCSecond		1 second	0-59 s	Status of the Real Time Clock seconds BCD-coded value

[7] It requires the FlowControlEnable bit in control register 00102 to be set.

Related information

6.7.1 Alarms and warnings

6.7.1 Alarms and warnings

Event code	Event group	Event description	Depends on FlowControl enabled	Event action	Auto-acknowledge
12	Pump head	Service now (time for service exceeded)	No	Warning	No
17		Flow deviation (performance requirement not met)	Yes	Warning [8)]	Yes
33		Soon time for service (general service information)	No	Warning	No
35		Air bubbles, gas in pump head, de-aerating problem	Yes	Warning [8)]	Yes
36		Discharge (pressure) valve leakage	Yes	Warning [8)]	Yes
37		Suction valve leakage	Yes	Warning [8)]	Yes
51		Blocked motor/pump	No	Alarm	No
208		Cavitation	Yes	Warning [8)]	Yes
210		Maximum pressure limit exceeded. ActualPressureMax (parameter 304)	Yes	Alarm	Yes
211		Back pressure too low Fixed low-pressure limit (1.5 bar)	Yes	Alarm/ Warning [8) 9)]	Yes
57	Tank	Empty tank (dry running)	No	Alarm	Yes
206		Low level in tank	No	Warning	Yes
169	Input signals	FlowControl cable defect	Yes	Warning [8)]	Yes
15	Communication	EtherNet/IP communication fault (main network communication fault)	No	Alarm [10)]	No
159		There is a CIU box communication fault (GENIbus communication fault). The cable is defective between the CIU 900 and the DDA pump	No	Alarm	No
64	Motor head	The motor head is over heated	No	Alarm	Yes
157	RTC battery	Real Time Clock is out of order / low battery	No	Warning	Yes
165	Input signal	Setpoint signal fault, Analog input current above 21 mA	No	Alarm	Yes
97	Input signal	Setpoint signal fault, Analog input current below 2 mA	No	Alarm	Yes
247	Supply	Pump powered on	No	Alarm [11)]	No

8) It requires the SetFlowControlEnable (parameter 10) to be set.

9) Warning or alarm is selected in the Settings menu via the operating panel.

10) An alarm only occurs when the WatchdogED bit has been set and the control from the bus/cloud is enabled in **DDA Settings > Communication** menu.

11) Occurs only if pump has been configured to be stopped after power on.

6.7.2 Explanation of ActualStartStop

It is a status enumeration for reading whether the pump is started, stopped, calibrating or in service mode.

Value	Name
0	**Started** This has the following meaning for the different operating modes: • Manual: The pump is dosing according to the ActualSetpointManual (parameter 300). • Analog: The pump is dosing according to the analog input signal and the analog scaling. • Pulse: The pump is dosing according to the reception of pulses and the value of the ActualPulseVolume (parameter 301). Pulses can be generated via the external pulse input signal or can come from the TrigPulse (parameter 17) command. • Batch: The pump is dosing according to the reception of pulses and the values of the ActualBatchDosingVolume (parameter 302) and the ActualBatchDosingTime (parameter 303). • Timer: The pump is dosing according to the timer functions using the batch dosing settings.
1	**Stopped** The pump is stopped by one of the control sources. The state of the control sources can be read from the PumpStatus.StopFromHMI, StopFromExternal and StopFromBus (bits 9, 10 and 11).
2	**Calibrating** The pump is calibrating the dosing accuracy. This is only possible via the operating panel by selecting Calibration in the Setup menu.
3	**Service** The pump stopped and has been brought into Service mode. The display shows "(-". This is only possible via the operating panel and can be done by pressing ❯ and 100% simultaneously.

6.7.3 Explanation of ActualOperatingMode

It is a status enumeration for reading the actual operating mode. For an explanation of these modes and the belonging enumeration, see section Explanation of control bits.

Related information

6.3.2 Explanation of control bits

6.8 Static status parameters, input assembly 3

Static status parameters are parameters that describe characteristics of the digital dosing pump. They are constants whose values cannot change.

This assembly is included in assembly 1.

Parameters	Name	Data type	Scaling	Range/ Resolution	Description
200	UnitFamily	SINT8, 0xC2	Enum	0-127	Unit Family
201	UnitType				Unit Type
202	UnitVersion				Unit Version
203	CIMSoftwareVersion		1		CIM Software Version
204	CIMSoftwareRevision				CIM Software Revision
205	CIMSoftwareFix				CIM Software Fix
206	StatusReserved1				Reserved for future use
207	StatusReserved2				Reserved for future use

6.8.1 Device identification

The UnitFamily and the UnitType parameters identify what dosing product the EtherNet/IP is connected to.

UnitFamily [enumeration]	UnitType [enumeration]
30: Smart Digital Dosing, DDA	1: Smart Digital Dosing, DDA 2: - 3: Smart Digital Dosing, DDA XL 4: Smart Digital Dosing, DDA-C

6.9 Measured parameters, input assembly 4

Measured parameters are physical values measured by internal and external sensors and values calculated by the digital dosing pump itself based on its state/mode behaviour and the measured values.

This assembly is included in assembly 1.

Parameters	Name	Data type	Scaling	Range/Resolution	Description
300	ActualSetpointManual	SINT32, 0xC4	0.1 ml/h	0 - Max. for pump type	Actual value of Setpoint used in operating mode Manual, set via the SetpointManual (parameter 30) or at the operating panel
301	ActualPulseVolume		1 nl		Actual value of Pulse Volume used in operating mode Pulse, set via the SetPulseVolume (parameter 31) or at the operating panel
302	ActualBatchDosingVolume		0.001 ml		Actual value of Batch Dosing Volume used in operating mode Batch, set via the SetBatchDosingVolume (parameter 32) or at the operating panel
303	ActualBatchDosingTime		0.1 s		Actual value of Batch Dosing Time used in operating mode Batch, set via SetBatchDosingTime (parameter 33) or at the operating panel
304	ActualPressureMax	SINT16, 0xC3	0.1 bar	0 - Max. for pump type	Actual value of max. pressure alarm limit setting, set via the SetPressureMax (parameter 50) or at the operating panel
305	DosingPressureMax				Max. dosing pressure, fixed for this pump type in factory
306	DosingCapacityMax	SINT32, 0xC4	0.1 ml/h	0 - Max. for pump type	Max. dosing capacity, fixed for this pump type in factory
307	DosingCapacityReference		0.1 ml/h		Dosing capacity setpoint shown in the display, represents the actual setpoint belonging to the actual operating mode and dosing state
308	MeasuredDosingCapacity		0.1 ml/h		Measured actual dosing capacity The SetFlowControlEnable bit (parameter 10) must be set for this value to be available.

Parameters	Name	Data type	Scaling	Range/Resolution	Description
309	MeasuredPressure	SINT16, 0xC3	0.1 bar	0 - 3276.7 bar	Measured pressure The SetFlowControlEnable bit (parameter 10) must be set for this value to be available. Except for the atmospheric pressure, it corresponds to the Backpressure reading on the display.
310	PulseInputFrequency		1 Hz	0 - 32767 Hz	Frequency of pulse input: either an external pulse input signal or pulses coming via the TrigPulse (parameter 17) command
311	RemainingDosingVolume	SINT32, 0xC4	0.001 ml	0 - 2147.5 l	Remaining volume to be dosed (used in Batch mode)
312	VolumeTotal		0.001 l	0 - 2147.5 m^3	Total volume dosed (non-resettable)
313	VolumeTripCounter		0.001 l	0 - 2147.5 m^3	Volume trip counter: reset with the TrigResetVolumeCnt (parameter 18) command
314	NoOfPowerOns		1	0 - (2^{31}-1)	Number of times the pump has been powered on (non-resettable)
315	RunTime		1 min	0 - (2^{31}-1) min	Amount of time the pump has been dosing (non-resettable)
316	OperatingTime		1 min	0 - (2^{31}-1) min	Amount of time the pump has been powered on (non-resettable)
317	StrokeCounter		1	0 - (2^{31}-1)	Total number of strokes (non-resettable)
318	TimeToNextDosing		1 s	0 - (2^{31}-1) s	Time till next dosing (only available in operating mode Timer)
319	AnalogInput	SINT16, 0xC3	0.001 mA	0 - 20.000 mA	Analog input value (used as setpoint in operating mode Analog)
320	AnalogOutput		0.001 mA	0 - 20.000 mA	Analog output value The parameter to map to the output is selected via the operating panel. If Controlled from bus is selected, the analog output signal can be controlled from the SetAnalogOutput (parameter 34).

6.10 Special parameters, input explicit messaging

Special parameters are parameters that might be used by the PLC but bear no relation to the operation of the digital dosing pump.

Parameters	Name	Data type	Scaling	Range/ Resolution	Description
500	RPILimits	UINT32, 0xC8	1 µs	15000 - 200000 µs	Requested Packet Interval
600	TCPIPCapability	DWORD32, 0xD3	-	-	For Logix EDS AOP integration

7. Product simulation

The CIM can be put in product simulation mode in which it generates life-like values of all the EtherNet/IP input data parameters.

Thus it is possible to connect an EtherNet/IP master to the CIU 500 without this device being connected to a real pump in a real-life system. In an office environment, it can then be verified that communication works and data is received and handled correctly by the master application program, for example, the PLC program, before the equipment is installed under real-life conditions.

Product simulation mode is accessed via the webserver.

The below functional profiles can be selected from the webserver:

- Grundfos pump profile
- Grundfos booster system profile
- Grundfos digital dosing DDA profile
- Grundfos water utility profile.

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

Related information

A.2. Webserver configuration

8. Fault finding the product

8.1 Ethernet/IP

Faults in a module are detected by observing the two status LEDs.
The prerequisite is either that a CIM 500 is fitted in a Grundfos product or a CIM 500 is fitted in a CIU 900 (this assembly is named CIU 500).

Make sure the SW1 is in position 3.

8.1.1 Both LED1 and LED2 remain off when the power supply is connected

Cause	Remedy
The module is fitted incorrectly in the Grundfos product.	• Make sure the module is fitted and connected correctly.
The module is defective.	• Make sure that module is fitted and connected correctly.
The CIU 500 is defective.	• Replace the CIU 500.

8.1.2 LED1 remains off

Cause	Remedy
SW1 is not set correctly.	• Set the switch to 3.

8.1.3 LED1 is flashing red

Cause	Remedy
The connection timed out.	• Verify the connection and communication between the PLC and the CIM 500.

8.1.4 LED1 is permanently red

Cause	Remedy
There is an IP address conflict.	• Check the IP address configuration.
The SW1 is in illegal position.	• Make sure the SW1 is set to 3.

8.1.5 LED2 is flashing red

Cause	Remedy
There is no internal communication between the module and the Grundfos product.	• Make sure the module is fitted correctly in the Grundfos product.
There is no internal communication between the CIU 500 and the Grundfos product.	• Check the cable connection between the Grundfos product and the CIU 500. • Make sure the individual conductors are connected correctly, for example, not reversed. • Check the power supply to the Grundfos product.

8.1.6 LED2 is permanently red

Cause	Remedy
The module does not support the connected Grundfos host product.	• Contact the nearest Grundfos company.

8.1.7 LED1 is permanently red and green at the same time

Cause	Remedy
There is an error in the firmware download.	• Use the webserver to download the firmware again.

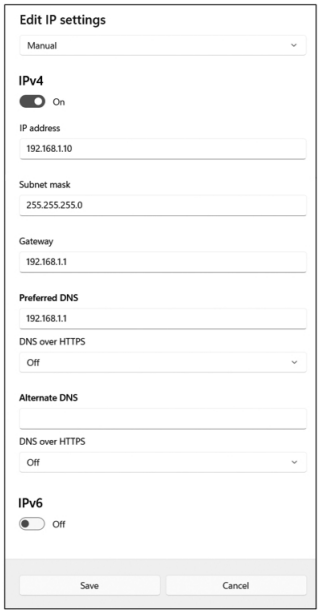
8.1.8 LED2 is permanently red and green at the same time

Cause	Remedy
There is a memory fault.	• Replace the CIM.

A.1. How to configure an IP address on your PC using Windows 11

Make sure that you have the necessary administrator rights.

1. Go to Ethernet settings (for example, use the Windows "Search" function).
2. Select the drop-down menu for the Ethernet port in question.
3. Select Edit at the IP assignment.
4. Fill in the settings as below. Note that all addresses belong to the CIM 500 subnetwork 192.168.1.x. but are unique (gateway and DNS can be identical).



TM087414

Example from Windows 11

A.2. Webserver configuration

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

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

Before configuration

- Make sure that the PC and the CIM 500 are connected via an Ethernet cable.
- Make sure 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 the 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.

A.3. Login

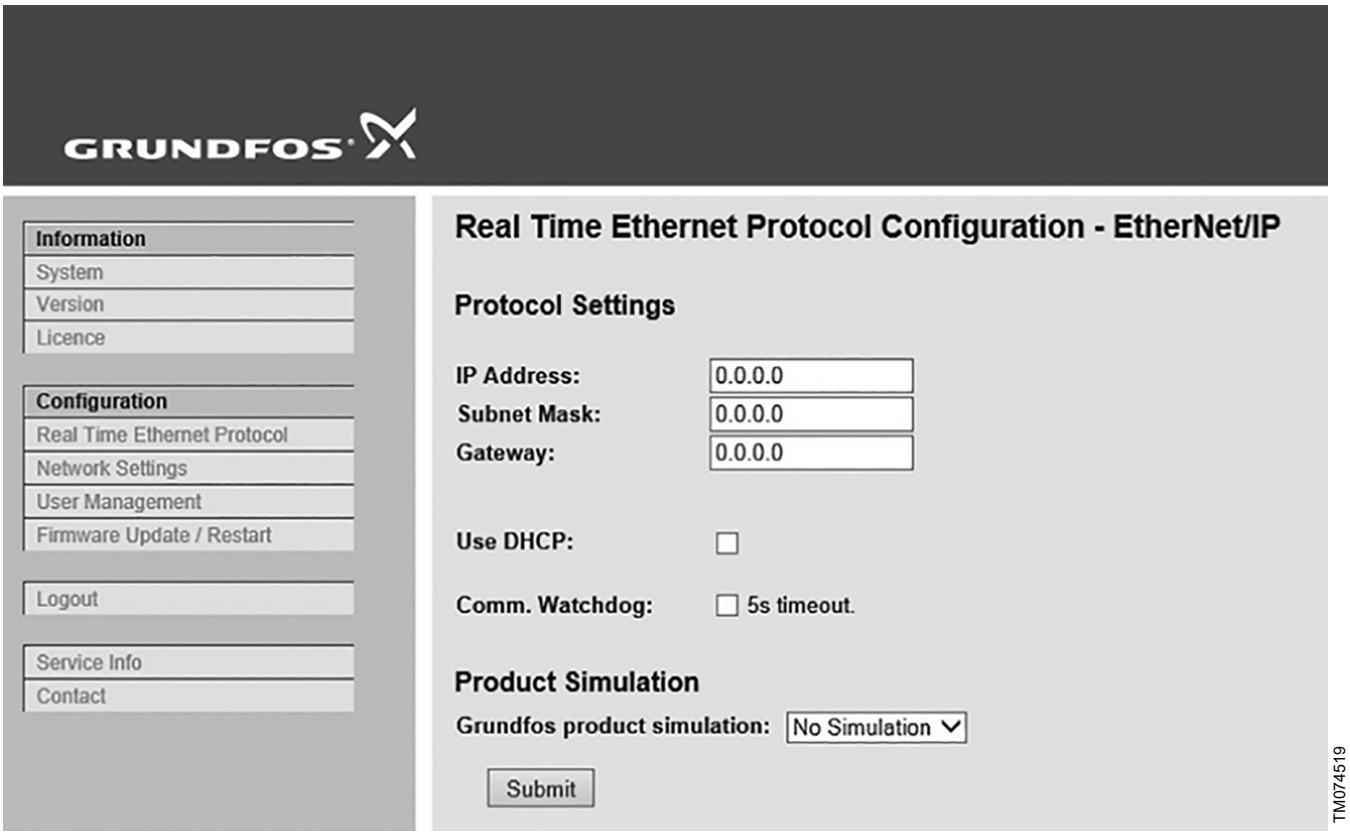
Login

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

The user name and password can be changed on the web server under Grundfos Management.

A.4. EtherNet/IP configuration

This web page is used for configuring all the parameters relevant to the EtherNet/IP protocol standard.

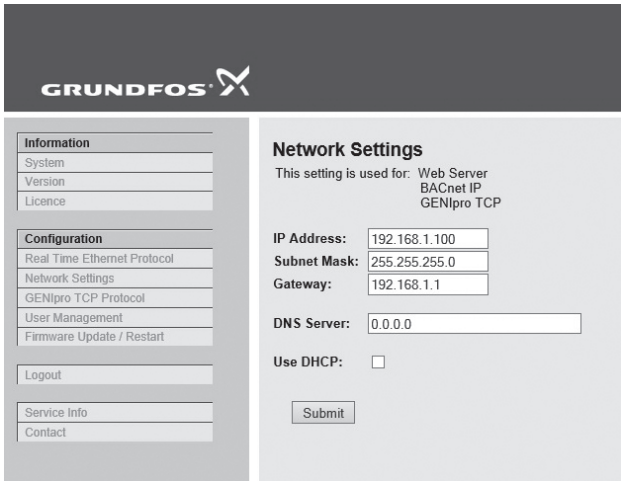


Real-Time Ethernet Protocol Configuration - EtherNet/IP

Object	Description
IP Address	It is for configuring the static IP address if a DHCP server is not used. The EtherNet/IP is not allowed to share the IP address with a CIM 500 webserver.
Subnet Mask	It is for configuring the subnet mask if a DHCP server is not used.
Gateway	It is for configuring the gateway address if a DHCP server is not used.
Use DHCP	The CIM 500 can be configured to automatically obtain its EtherNet/IP network settings from a DHCP server if available on the network. Default: There is no use of DHCP.
Communication Watchdog	It is not applicable for DDA pumps. See section Communication watchdogs for watchdog features in relation to DDA dosing pumps.
Grundfos product simulation	The module can be put in product simulation mode to generate realistic simulated values of all the EtherNet/IP input data. It is thus possible to connect an EtherNet/IP master to a module fitted in a CIU 900 without installing this device in a real industrial process system. In an office environment, it can then be verified that communication works, and data is received and handled correctly by the EtherNet/IP master application program (for example PLC program) before installing the device. To enable product simulation, select a product type from the dropdown list. To terminate product simulation, select No Simulation.

A.5. Network settings

This web page is used for configuring the network settings of the webserver and of the GENIpro TCP protocol. The network settings here are also used for the BACnet IP. Additional configuration of the BACnet IP is done in the Real-Time Ethernet Protocol menu.



TM074524

Network settings

Object	Description
IP Address	It is for configuring the static IP address if a DHCP server is not used. Default: 192.168.1.100
Subnet Mask	It is for configuring the subnet mask if a DHCP server is not used. Default: 255.255.255.0
Gateway	It is for configuring the gateway address if a DHCP server is not used. Default: 192.168.1.1
DNS Server	The module can be configured to use a specific domain name server if available on the network. Default: 0.0.0.0
Use DHCP	The module can be configured to automatically obtain the IP address from a DHCP server if available on the network. Default: Do not use DHCP

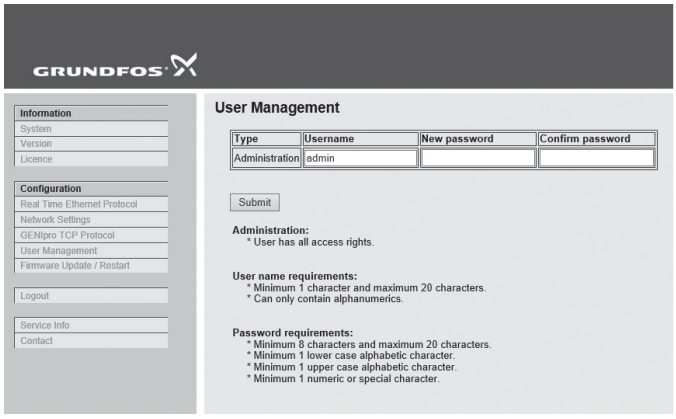
Related information

A.4. EtherNet/IP configuration

A.6. User Management

A login is required for any change in the CIM 500 settings, and this web page is used for configuring the username and password.

It is possible to configure one user only.



TM074527

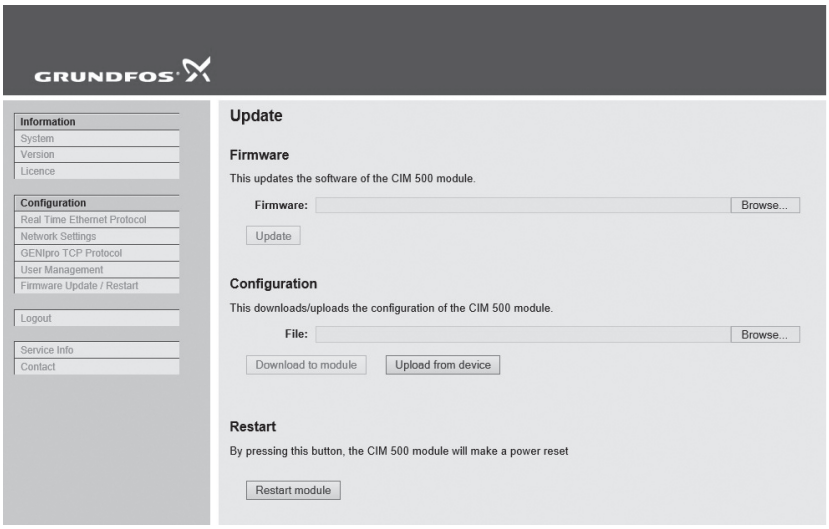
User management

Related information

A.3. Login

A.7. Update

You can update the firmware by the built-in webserver. The binary file is supplied by Grundfos.
To make installation and configuration easier, you can upload the configuration to a PC for backup or distribution to multiple modules.



TM074526

Update

Object	Description
Firmware	Path to binary firmware image that can be used for updating the module
Update	Button for starting the update (approx. 1 minute)
File	Path to the configuration file
Download to module	For transferring the configuration file to the module
Upload from device	For uploading the configuration of the module to a file on your PC
Restart module	Button for performing a power-up reset on the CIM 500

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

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

Colombia
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 South East Europe 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

Kazakhstan
Grundfos Kazakhstan LLP
7' Kyz-Zhibek Str., Kok-Tobe micr.
KZ-050020 Almaty Kazakhstan
Tel.: +7 (727) 227-98-55/56

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

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
ТОВ "ГРУНДФОС УКРАЇНА"
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.
Global Headquarters for WU
856 Koomey Road
Brookshire, Texas 77423 USA
Phone: +1-630-236-5500

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

© 2025 Grundfos Holding A/S, all rights reserved.

Trademarks displayed in this material, including but not limited to Grundfos and the Grundfos logo, are registered trademarks owned by The Grundfos Group.

99804403 **01.2025**

ECM: 1415306