

# CIM/CIU COMMUNICATION INTERFACES

COMPLETE CONTROL FOR PUMPS AND PUMP SYSTEMS



# MANAGE YOUR SYSTEMS WITH CIM/CIU COMMUNICATION INTERFACES

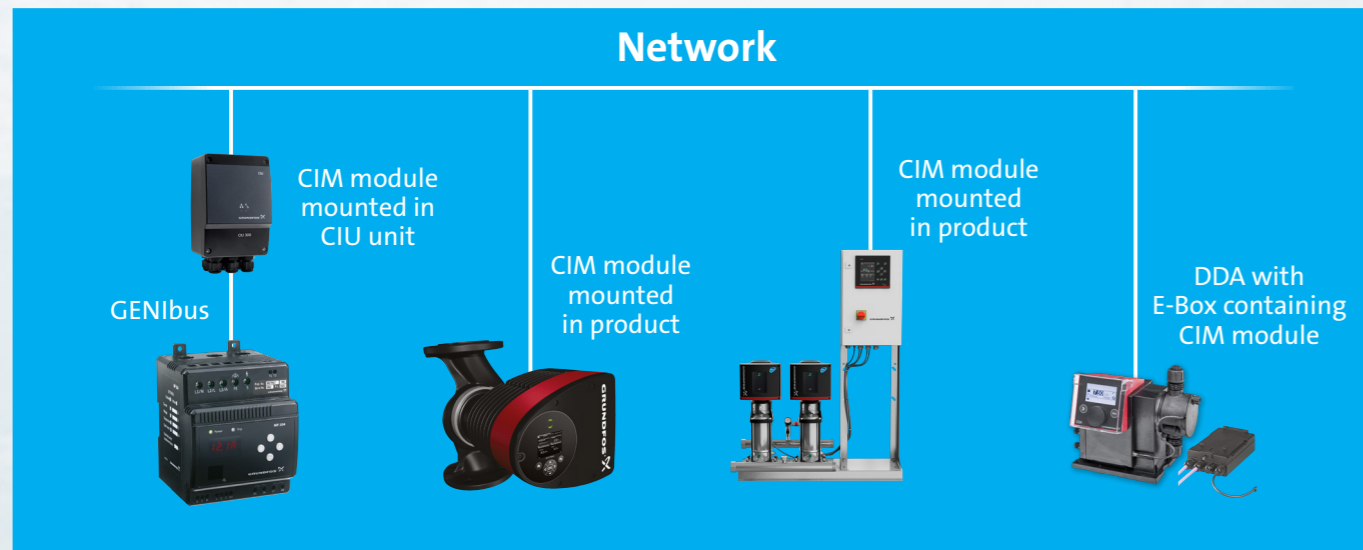
For complete control of pump systems, the Grundfos fieldbus concept is the right solution. The innovative Communication Interface Module (CIM) and the Communication Interface Unit (CIU) enable data communication via open and interoperable networks such as

- Modbus RTU
- Modbus TCP
- BACnet MS/TP
- BACnet IP
- LONWorks
- PROFIBUS DP
- PROFINET IO
- EtherNet/IP
- 3G/4G cellular data connection and SMS
- Connectivity to Grundfos iSOLUTIONS Cloud applications like Grundfos Connect

The series of Grundfos CIM/CIU communication interfaces offer ease of installation and commissioning, user-friendliness and great value for money in the long term. The modules are based on standard functional profiles for an easy integration into the network and easy understanding of data points.

## WHY CIM/CIU CONNECTIVITY INTERFACES?

- Pumps and controllers have better reliability with reduced downtime, due to monitoring and control functionality on a PLC, BMS/SCADA system
- The operational cost of pumps can be lowered by reducing setpoints to match precise system needs via remote control
- Remote monitoring and control via PLC, BMS/ SCADA systems reduce manual settings, monitoring time and travel time to sites or installations
- Enable predictive maintenance and fast reaction time on process changes and exceptions
- One solution for all products with a modular design prepared for future needs, offering complete process monitoring and control
- Allow SCADA systems or Grundfos cloud solutions to create reports and support answers by remote monitoring and analysis
- Flexible wide range power supply 24-240 VAC/VDC (CIU unit)
- Easy to install and commission, as Grundfos delivers the required support files and functional profile manuals



## Available communication interfaces

- CIM 050 for GENIbus
- CIM 060 for radio communication to Grundfos GO Remote
- CIM 100/110 for LONWorks
- CIM 150 and E-Box 150 for PROFIBUS DP
- CIM 200 and E-Box 200 for Modbus RTU
- CIM 260 for 3G/4G cellular networks (EU)
- CIM 290-MA LPWAN GIC cellular LTE-M to Grundfos Connect
- CIM 300 for BACnet MS/TP
- CIM 500 for PROFINET IO, Modbus TCP, BACnet IP, EtherNet/IP
- CIM 550 for Ethernet connection to Grundfos Connect
- E-Box 500 for PROFINET IO, Modbus TCP, EtherNet/IP
- CIU 900 unit for any CIM interface
- CIU 901 unit with IO board
- CIU 902 unit for wastewater AUTOADAPT
- CIU 903 for SQFlex/MGFlex

## Grundfos Communication Interface Modules (CIM) and Units (CIU)

Creating intelligent communications solutions for applications in Industry, Building Services and Water Utility.

### Mounting CIM in CIU unit or E-Box

	CIM	CIU 900	CIU 901 (IO 270)	CIU 902 (AUTOADAPT)	CIU 903 (SQ Flex/MG Flex)	E-Box (Small DDA)
LONWorks	CIM 100/110	CIU 100/110 assembly				
PROFIBUS DP	CIM 150	CIU 150 assembly		CIU 152 assembly		E-Box 150
Modbus RTU	CIM 200	CIU 200 assembly	CIU 201 assembly	CIU 202 assembly		E-Box 200
BACnet MS/TP	CIM 300	CIU 300 assembly				
Cellular 3G/4G for SCADA	CIM 260 EU	CIU 260 EU assembly	CIU 261 EU assembly	CIU 262 EU assembly		
Cellular LTE-M for Grundfos iSOLUTIONS Cloud applications like Grundfos Connect	CIM 290-MA LPWAN GIC	CIU 290-MA LPWAN GIC assembly *)	CIU 291-MA LPWAN GIC assembly *)	CIU 292-MA LPWAN GIC assembly *)	CIU 293-MA LPWAN GIC assembly *)	
Industrial Ethernet	CIM 500	CIU 500 assembly *)	CIU 501 assembly, for Modbus TCP only	CIU 502 assembly, for Modbus TCP, PROFINET, EtherNet/IP only		E-Box 500 for Modbus TCP, PROFINET IO, EtherNet/IP only
Ethernet - wired for Grundfos Connect	CIM 550	CIU 550 assembly *)	CIU 551 assembly *)	CIU 552 assembly *)	CIU 553 assembly *)	

Note: All devices denoted as "assembly" consist of two parts, that are ordered separately.

### CIM modules

The CIM is an add-on communication module installed internally.

#### Single pumps:

- E-pumps based on MGE motor model H/I/J/K
- E-pumps based on MGE motor 11-22 kW
- MAGNA3 circulator pumps

#### Boosters:

- Hydro/Control MPC, CU 352
- DDD control, CU 354
- Hydro Multi-E and Hydro Multi-B
- MAGNA3-D twin circulator pumps
- TPED twin pump model H/I/J/K

#### Water Utility controllers:

- Dedicated Controls, CU 362
- Level Control, LC 2X1 wastewater, LC 2X2 submersible

### CIU 900 wall-mounted/DIN rail unit

The CIU 900 with internal power supply is for Grundfos products that do not support the internal mounting of the CIM module.

- TPED 11-22 kW
- CUE drive for various standard pumps
- MP 204 motor protector
- DDA model XL and DDA ,C'

### CIU 901 wall-mounted/DIN-rail unit

A CIU 900 unit with additional I/O board integrated which contains:

- 2 configurable inputs (digital or analog 0/4-20 mA, 0-10 V)
- 1 Relay output (230 V, 2 A)
- 1 Analog signal output (0-10 V)
- 1 Temperature input (Pt100/Pt1000, 2-wire)
- 2 digital inputs

Supported from CIM 200 Modbus RTU, CIM 260 3G/4G cellular, CIM 290-MA LPWAN GIC, CIM 550, CIM 500 (Modbus TCP)

\*) Reach out to Grundfos to verify that your product is supported from the cloud as this depends on the available cloud driver.

### CIU 902 wall-mounted/DIN rail unit

A CIU 900 unit but with integrated powerline communication to connect 1 to 4 wastewater AUTOADAPT pumps.

Supported from:

- CIM 150 PROFIBUS DP
- CIM 200 Modbus RTU
- CIM 260 cellular
- CIM 290-MA LPWAN GIC (\*), CIM 550 (\*)
- CIM 500 for Modbus TCP, PROFINET, EtherNet/IP

### CIU 903 wall-mounted/DIN rail unit

A CIU 900 unit but with integrated powerline communication to connect wastewater MGEFlex and SQFlex pumps.

Supported from:

- CIM 290-MA LPWAN GIC (\*), CIM 550 (\*)

### E-Box

An external communication unit for small DDA dosing pumps.

- E-Box 150 PROFIBUS DP with built-in CIM 150
- E-Box 200 Modbus RTU with built-in CIM 200
- E-Box 500 Ethernet with built-in CIM 500 for support of PROFINET IO, Modbus TCP, EtherNet/IP

# CIM/CIU interface products mapped to protocols

	MAGNA3-D Twin pump 2)	MAGNA 3	TPED 11-22 kW Twin pump	Twin pump TPED Model H/I/J/K 1)	E-pump MGE model H/I/J/K+ 11-22 kW	CUE	Hydro MPC (CU 352)	Multi-E MGE 11-22 kW model G/F	Multi-E Model H/I/J/K 1)	MP 204	Dedicated Controls (CU 362)	Wastewater AUTOADAPT 1-4 pumps	Level Controller LC 2x1, LC 2x2	DDA small dosing	DDA XL dosing
GENibus			built-in	built-in	built-in	built-in		built-in	built-in	built-in				built-in	built-in
LONWorks															
PROFIBUS DP															
PROFINET IO															
Modbus TCP															
Modbus RTU															
EtherNet/IP															
BACnet MS/TP															
BACnet IP															
Grundfos Connect 4)															
Cellular data connection for SCADA and SMS 3)															
Wireless to Grundfos GO	Built-in GENIair/Bluetooth	Built-in GENIair/Bluetooth		Built-in GENIair/Bluetooth	Built-in GENIair/Bluetooth				Built-in GENIair/Bluetooth						

Note: To create a CIU xxx solution, you need to order a CIU 900 + the required CIM xxx interface and mount the CIM xxx interface into CIU 900. This is the same for a CIU 901, CIU 902, CIU 903.

- 1) A second CIM module can optionally be mounted in pump no. 2 for redundancy
- 2) MAGNA3-D model D requires 1x CIM in master head, MAGNA3-D models A-C require a CIM in each head (for LONWorks 2x CIM 100)
- 3) CIM 260 3G/4G cellular is only available in regional version for EU, it requires an external 4G/3G/2G antenna for EU with PN 99518079 and a SIM data subscription card.
- 4) CIM 290-MA LPWAN GIC requires an external 4G/3G antenna for EU with PN 99838775. Always reach out to Grundfos to align whether the wished product is supported from cloud side and whether the CIM interface is available for your region; The interface will be delivered with a eUICC SIM card in the package with a Grundfos specific roaming profile, it require a contract with Grundfos.

Reach out to Grundfos to verify that your product is supported from the cloud, as this depends on the available cloud driver and regional availability.

Note: Hydro Multi-B is supported by CIM 050 GENibus, CIM 110 LON, CIM 200 Modbus RTU, CIM 300 BACnet MS/TP, CIM 500 (Modbus TCP, BACnet IP), CIM 260 3G/4G cellular).

Note: E-pumps are CRE/CRNE/CRIE, MTRE, CME, TPE2/TPE3, NBE/NKE.

Note: For products with embedded Fieldbus please have a look on page 12.

# BACnet IP, BACnet MS/TP, LONWorks - For pumps and boosters

## General CIU 900 data

Supply voltage	24-240 VAC/VDC, -10 %/+15 %
Frequency	0-60 Hz
Power consumption	Max. 11 W
Cable size	IEC: 0.2-4 mm <sup>2</sup> , UL: 24-12 AWG
Enclosure class	IP 54, according to IEC 60529
Cable entry	6 x M16 Ø4 - Ø10
Operating temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperatures	-20 °C to +60 °C (-4 °F to +140 °F)
Dimensions (H/W/D)	182 x 108 x 82 mm

## GENibus Communication

Protocol	GENibus
Transceiver	RS-485
Recommended cable type	Screened, double twisted-pair
Maximum cable length	1200 m/4000 ft

## CIM 500 BACnet IP Communication

Protocol	BACnet IP (set rotary switch to position 2)
Transmission speeds	10/100 Mbit/s
Ports	2x RJ45
IP settings	built-in webserver

## CIM 300 BACnet MS/TP Communication

Protocol	BACnet MS/TP (Master)
Transceiver	RS-485
Transmission speeds	9.6, 19.2, 38.4, 76.8 kbits/s
BACnet master address	0-127

## CIM 100 LON for pump/CIM 110 LON for booster & twin pump communication

Protocol	LONtalk
Transceiver	FTT-10
Transmission speed	78 kbits/s

## Example with BACnet IP



## Data points

### BACnet IP, BACnet MS/TP, LONWorks

	MAGNA/ UPE	MAGNA3	E-pumps <11 kW E-pumps model J	CUE E-pumps 11-22 kW	Multi-E, TPED	Hydro MPC/ Control MPC	Hydro Multi-B
s = if sensor installed							
s* = available with sensor or TPE 2000 and TPE3							
<sup>1</sup> differential or absolute, depends on sensor							
<sup>2</sup> Not standard for Control MPC							
G = only for MGE model G or later							
H = only for MGE model H or later							

Control							
Operating Mode	•	•	•	•	•	•	•
Setpoint	•	•	•	•	•	•	•
Control Mode	•	•	•	•	H	•	•
Relay Control					H		
Tank filling status							•

Status							
Operating Mode status	•	•	•	•	•	•	•
Control Mode Status	•	•	•	•	•	•	•
Feedback	•	•	•	•	•	•	•
Alarm/warning information	•	•	•	•	•	•	•
Bearing Service Information			G	•			
Tank filling control							•

Measured Data							
Power/Energy Consumption	•	•	•	•	•	•	•
Pressure (Head) <sup>1</sup>	•	•	s*	s*	•	• <sup>2</sup>	s
Flow	•	•	s*	s*	H+s	• <sup>2</sup>	
Relative Performance	•	•	•	•	•	•	•
Speed and Frequency	•	•	•	•	•	•	•
Digital Input/Output	•	•	•	•	•	•	•
Motor Current							
Motor Voltage			G only	•			
Remote Flow			s	G+s	s	H+s	
Inlet Pressure <sup>1</sup>				G+s	s	H+s	s
Remote Pressure <sup>1</sup>			s	G+s	s	H+s	s
Level				s	s	H+s	s
Motor Temperature				G+s	s		
Remote Temperature				s	s	H+s	s
Pump Liquid Temperature	•	•		G+s	s	H+s	
Bearing Temperatures				H+s	s		
Auxiliary Sensor Input				s	s	H+s	
Operation Time (Run Time)	•	•	•	•	•	•	•
Total on time	•	•	•	•	•	•	•
Number Of Starts			•	•	•	•	•
Volume				H+s	CUE + s		
Ambient Temperature				H+s		H+s	s
Inlet and Outlet Temperatures							s
Heat energy meter	•	•		H			
Outlet Pressure <sup>1</sup>				H+s		H+s	s
Feed Tank Level				H+s		H+s	s

Subpump Data							
Alarm/Status information					•	•	•
Operation Time (Run Time)					•	•	•
Speed					H	•	•
Line current/power consumption					H	•	•
Motor temperature					H	•	•
Number of starts					H	•	•
Control pump: force to stop/auto						•	•

Note: E-pumps = CRE/CRNE/CRIE, MTRE, CME, TPE2/TPE3, NBE/NKE.  
 Note: TPED twin pump model F or G in range 3-22 kW needs always 2 CIU modules.  
 Note: MAGNA3-D twinpump model D requires 1x CIM interface installed in master head.  
 For LONWorks 1x CIM 110 installed in master head.

## BACnet IP, BACnet MS/TP - For water utility products

### General CIU 900

Supply voltage	24-240 VAC/VDC, -10 %/+15 %
Frequency	0-60 Hz
Power consumption	Max. 11 W
Cable size	IEC: 0.2-4 mm <sup>2</sup> , UL: 24-12 AWG
Enclosure class	IP 54, according to IEC 60529
Cable entry	6 x M16 Ø4 - Ø10
Operating temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperatures	-20 °C to +60 °C (-4 °F to +140 °F)
Dimensions (H/W/D)	182 x 108 x 82 mm

### GENibus Communication

Protocol	GENibus
Transceiver	RS-485
Recommended cable type	Screened, double twisted-pair
Maximum cable length	1200 m/4000 ft

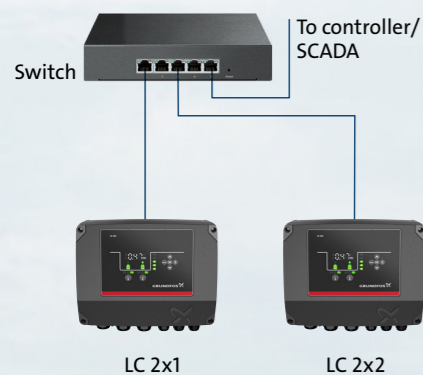
### CIM 500 BACnet IP Communication

Protocol	BACnet IP (set rotary switch to position 2)
Transmission speeds	10/100 Mbits/s
Ports	2x RJ45
IP settings	built-in webserver

### CIM 300 BACnet MS/TP Communication

Protocol	BACnet MS/TP (Master)
Transceiver	RS-485
Transmission speeds	9.6, 19.2, 38.4, 76.8 kbits/s
BACnet master address	0-127

### Example with CIM 500



### Data points

BACnet IP, BACnet MS/TP		LC 2x1	LC 2x2
<b>System Control</b>			
Reset alarm		•	•
Interlock pit			
Custom relay control (On/Off/Pulse)			
<b>Pump Control</b>			
Pumps On/Off/Auto		•	•
Pump down			
<b>Configuration</b>			
Set system and pumps control levels		•	•
<b>System status</b>			
System operation mode		•	•
Active alarms/warnings		•	•
System mode (single/multi)			
Status/function of float switches		•	•
Presence of sensors		•	•
Real time clock (read and set)			
System control source (Manual/Auto)		•	•
System and pumps control levels		•	•
Water level		•	•
Water level max			
In/out flow			
Power/Energy consumption		•	•
Specific energy			
Volume			
Overflow volume/time/counter			
Operation time		•	•
Operation time for simultaneous pumps			
Mixer average starts per hours			
3 x user defined sensor inputs		•	•
Float switches		•	•
Digital inputs		•	•
8 x I/O logic outputs			
Digital Outputs		•	•
<b>Pump status</b>			
Presence of pump		•	•
Pump enabled/disabled			
Running/Stopped		•	•
Active alarms/warnings		•	•
Auxiliary equipment status			
Control source		•	•
Operation time		• <sup>1</sup>	• <sup>1</sup>
Starts counter (total/average)		• <sup>1</sup>	• <sup>1</sup>
Latest continuous operation time			
Max continuous operation time			
Time to service		•	•
Pulse Flow meter			
Current (actual/latest)		• <sup>2</sup>	• <sup>2</sup>
Voltage/frequency			
Current asymmetry			
Power/Power factor/Energy consumption		• <sup>3</sup>	• <sup>3</sup>
Motor temperature			
Insulation			
Water in oil			

1) Available as 3 datapoints for yesterday, today and total  
For information related to Grundfos iSOLUTIONS Cloud please contact Grundfos  
2) LC 2X1 and LC 2X2 only have actual current  
3) LC 2X1 and LC 2X2 do not measure power factor

## PROFINET IO, Modbus TCP, EtherNet/IP, PROFIBUS DP, Modbus RTU - For pumps and boosters

### General CIU 900, CIU 901, CIU 902

Supply voltage	24-240 VAC/VDC, -10 %/+15 %
Frequency	0-60 Hz
Power consumption	Max. 11 W
Cable size	IEC: 0.2-4 mm <sup>2</sup> , UL: 24-12 AWG
Enclosure class	IP 54, according to IEC 60529
Cable entry	6 x M16 Ø4 - Ø10
Operating temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperatures	-20 °C to +60 °C (-4 °F to +140 °F)
Dimensions (H/W/D)	182 x 108 x 82 mm

CIU 902 is used together with wastewater AUTOADAPT pumps

### GENibus Communication

Protocol	GENibus
Transceiver	RS-485
Recommended cable type	Screened, double twisted-pair
Maximum cable length	1200 m/4000 ft

### CIM 500 PROFINET IO, Modbus TCP, EtherNet/IP Communication

Protocol	PROFINET IO (rotary switch position 0) Modbus TCP (rotary switch position 1) EtherNet/IP (rotary switch position 3)
Transmission speeds	10/100 Mbits/s
Ports	2x RJ45
Conformance class	B

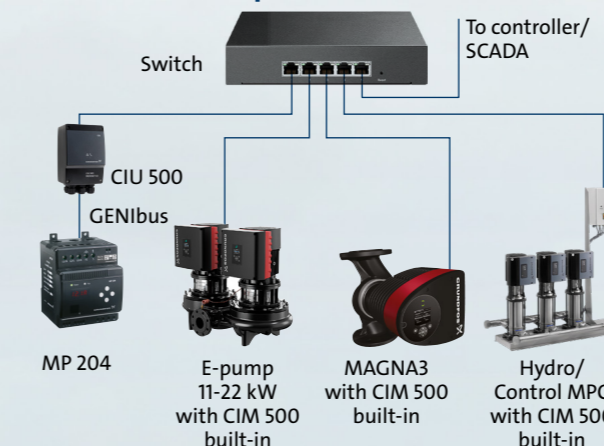
### CIM 200 Modbus RTU Communication

Protocol	Modbus RTU
Transceiver	RS-485
Transmission speeds	1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kbits/s
Parity settings	Even, Odd or No parity
Stop bits	1 or 2
Modbus Slave address	1-247, set via rotary switches

### CIM 150 PROFIBUS DP Communication

Protocol	PROFIBUS DP
Transceiver	RS-485
Implementation class	DP-V0
Transmission speeds	9600 bits/s to 12 Mbit/s
Slave address	1-126, set via rotary switches

### Example with CIM 500



### Data points

PROFINET IO, Modbus TCP, EtherNet/IP, PROFIBUS DP, Modbus RTU		MAGNA/UEPE	MAGNA3	E-pumps <11 kW E-pumps model J	E-pumps 11-22 kW CUE	Multi-E, TPED	Hydro MPC/ Control MPC	Hydro Multi-B	MP 204
<b>Control</b>									
Operating Mode		•	•	•	•	•	•	•	•
Setpoint		•	•	•	•	•	•	•	•
Control Mode		•	•	•	•	H	•	•	•
Relay Control				•	•				
Tank filling control								•	
<b>Status</b>									
Operating Mode Status		•	•	•	•	•	•	•	•
Control Mode Status		•	•	•	•	•	•	•	•
Feedback		•	•	•	•	•	•	•	•
Alarm and warning information		•	•	•	•	•	•	•	•
Bearing Service information				H	•				
Tank filling status information								•	
<b>Measured Data</b>									
Power/Energy Consumption		•	•	•	•	•	•	•	•
Pressure (Head) <sup>1</sup>		•	•	s*	s*	•	•	•	s
Flow		•	•	s*	s*	H+s	•	•	•
Relative Performance		•	•	•	•	•	•	•	•
Speed and Frequency		•	•	•	•	•	•	•	•
Digital Input/Output		•	•	•	•	•	•	•	•
Motor Current		•	•	•	•	•	•	•	•
DC Link Voltage		•	•	•	•	•	•	•	•
Motor Voltage				G only	•				•
Remote Flow		s	G+s	s	H+s				
Inlet Pressure <sup>1</sup>				G+s	s	H+s	s	s	
Remote Pressure <sup>1</sup>		s	G+s	s	H+s	s	s		
Level				s	s	H+s	s	s	
Motor Temperature				G+s	s				s
Remote Temperature		s	s	s	H+s	s			
Pump Liquid Temperature		•	•	G+s	s				
Bearing Temperatures				H+s	s				
Auxiliary Sensor Input				s	s	H+s			
Operation Time (Run Time)		•	•	•	•	•	•	•	•
Total on time		•	•	•	•	•	•	•	•
Torque (N/A on 1-phased motors)				•	•				
Number Of Starts		•	•	•	•	•	•	•	•
Volume				H+s	CUE + s				
Ambient Temperature				H+s		H+s	s		
Inlet and Outlet Temperatures							s		
Heat energy meter		•	H						
Outlet Pressure <sup>1</sup>				H+s		H+s	• <sup>2</sup>	s	
Feed Tank Level				H+s		H+s	s	s	
Phase Voltages									•
Line Voltages/Currents/Frequency									•
Start/Run Capacitor									•
Voltages Angles + Cos phi									•
Insulation resistance									•
Starts/h and auto restarts/24h									•
<b>Subpump Data (for each sub pump in the system)</b>									
Status information							•	•	•
Alarm information							•	•	•
Operation Time (Run Time)							•	•	•
Speed							H	•	•
Line current/power consumption							H	•	•
Motor temperature							H	•	•
Number of starts							H	•	•
Control pump: forc to stop/auto								•	•

Note: E-pumps = CRE/CRNE/CME, MTR, CHIE, TPE2/TPE3, NBE/NKE  
Note: For DDA dosing pumps please view to DDA related pages  
Note: TPED twin pump model F or G in range 3-22 kW needs always 2 CIU modules  
Note: MAGNA3-D twin pump model D only requires 1x CIM interface installed in master head  
Note: Hydro Multi-B only supported by Modbus RTU and Modbus TCP

# PROFINET IO, Modbus TCP, EtherNet/IP, PROFIBUS DP, Modbus RTU

## - For water utility products

### General CIU 900, CIU 901, CIU 902

Supply voltage	24-240 VAC/VDC, -10 %/+15 %
Frequency	0-60 Hz
Power consumption	Max. 11 W
Cable size	IEC: 0.2-4 mm <sup>2</sup> , UL: 24-12 AWG
Enclosure class	IP 54, according to IEC 60529
Cable entry	6 x M16 Ø4 - Ø10
Operating temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperatures	-20 °C to +60 °C (-4 °F to +140 °F)
Dimensions (H/W/D)	182 x 108 x 82 mm

CIU 902 is used together with wastewater AUTOADAPT pumps

### GENibus Communication

Protocol	GENibus
Transceiver	RS-485
Recommended cable type	Screened, double twisted-pair
Maximum cable length	1200 m/4000 ft

### CIM 500 PROFINET IO, Modbus TCP, EtherNet/IP Communication

Protocol	PROFINET IO (rotary switch position 0) Modbus TCP (rotary switch position 1) EtherNet/IP (rotary switch position 3)
Transmission speeds	10/100 Mbits/s
Ports	2x RJ45
Conformance class	B

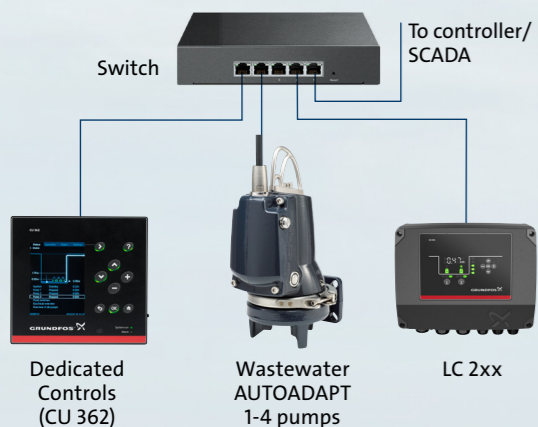
### CIM 200 Modbus RTU Communication

Protocol	Modbus RTU
Transceiver	RS-485
Transmission speeds	1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kbits/s
Parity settings	Even, Odd or No parity
Stop bits	1 or 2
Modbus Slave address	1-247, set via rotary switches

### CIM 150 PROFIBUS DP Communication

Protocol	PROFIBUS DP
Transceiver	RS-485
Implementation class	DP-V0
Transmission speeds	9600 bits/s to 12 Mbit/s
Slave address	1-126, set via rotary switches

### Example with CIM 500



### Data points

PROFINET IO, Modbus TCP, EtherNet/IP, PROFIBUS DP, Modbus RTU	LC 2x1 / LC 2x2	Dedicated Controls CU 362	Wastewater AUTOADAPT CIU xx2*
<b>System Control</b>			
Reset alarm	•	•	•
Interlock pit		•	
Custom relay control (On/Off/Pulse)		•	
<b>Pump Control</b>			
Pumps On/Off/Auto	•	•	•
Pump down		•	•
<b>Configuration</b>			
Set system and pumps control levels	•	•	•
<b>System status</b>			
System operation mode	•	•	•
Active alarms/warnings	•	•	•
Pit mode (single/multi)			•
Status/function of float switches	•	•	
Presence of sensors	•	•	
Real time clock (read and set)	•	•	
System control source (Manual/Auto)	•	•	•
System and pumps control levels	•	•	•
Water level	•	•	•
Water level max			•
In/ out flow or pulse flow meter	• <sup>5</sup>	•	
Power/Energy consumption	•	• <sup>1</sup>	• <sup>1</sup>
Specific energy		•	
Volume		• <sup>1</sup>	
Overflow volume/time/counter		• <sup>1</sup>	
Operation time	•	•	•
Operation time for simultaneous pumps		• <sup>1</sup>	•
Mixer average starts per hours		•	
3 x user defined sensor inputs	•	•	
Float switches	•	•	
Digital inputs	•	•	•
8 x I/O logic outputs		•	•
Digital Outputs	•		
<b>Pump status</b>			
Presence of pump	•	•	•
Pump enabled/disabled		•	
Running/Stopped	•	•	•
Active alarms/warnings	•	•	•
Auxiliary equipment status		•	
Control source	•	•	•
Operation time	• <sup>1</sup>	• <sup>1</sup>	• <sup>1</sup>
Starts counter (total/average)	• <sup>1</sup>	• <sup>1</sup>	• <sup>1</sup>
Latest continuous operation time		•	•
Max continuous operation time		•	•
Time to service	•	•	
Flow (actual/latest)		•	
Current (actual/latest)	• <sup>2</sup>	•	•
Voltage/frequency		•	•
Current asymmetry		•	
Power/Power factor/Energy consumption	• <sup>3</sup>	•	• <sup>3</sup>
Motor temperature		•	•
Insulation		•	
Water in oil		•	
<b>Special (Modbus only)</b>			
Hour log (latest 72h of main pit/pump values)		•	
Event log (50 latest alarms/warnings w. time stamp)	• <sup>4</sup>	•	
User defined data log (40000 registers)	• <sup>4</sup>	•	

1) Available as 3 datapoints for yesterday, today and total  
For information related to Grundfos iSOLUTIONS Cloud please contact Grundfos  
2) LC 2X1 and LC 2X2 only have actual current  
3) LC 2X1, LC 2X2 and AUTOADAPT do not measure power factor  
4) LC 2X1 and LC 2X2 only have 40 logs  
5) LC 2X2 only

\*To create a CIU 152, you order CIU 902 + CIM 150. To create a CIU 202, you order CIU 902 + CIM 200. To create a CIU 502, you order CIU 902 + CIM 500

# Cellular data connection to SCADA or operation via SMS

## - For pumps and boosters

### General CIU 900, CIU 901, CIU 902

Supply voltage	24-240 VAC/VDC, -10 %/+15 %
Frequency	0-60 Hz
Power consumption	Max. 11 W
Cable size	IEC: 0.2-4 mm <sup>2</sup> , UL: 24-12 AWG
Enclosure class	IP 54, according to IEC 60529
Cable entry	6 x M16 Ø4 - Ø10
Operating temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Dimensions (H/W/D)	182 x 108 x 82 mm

CIU 902 is used together with wastewater AUTOADAPT pumps

### GENibus communication

Protocol	GENibus
Transceiver	RS-485
Recommended cable type	Screened, double twisted-pair
Maximum cable length	1200 m/4000 ft

### 3G/4G cellular communication

Protocol	SMS
	Data connection (Modbus TCP)
3G/4G antenna	Available as an option
Battery	Available as an option
SIM card	To be supplied by user/installer

### SMS features

Read product status	E.g. pressure, power, temperature etc. (depends on product type) Request active alarms/warnings Request I/O signal status
Read network status	E.g. signal level, battery status, cellular status and data statistics.
Self-triggered messages	Alarm/warning event messages Heart beat messages
Control	Set operating mode (e.g. Start/stop) Set control mode (e.g. constant pressure) Set setpoint Reset alarms Set analog output
Configuration	SMS access control via PIN code Configuration of SMS functions Configuration of cellular connection
CIU 901 I/O board	2 configurable inputs (digital or analog 0/4-20 mA, 0-10 V) 1 Relay output (230 V, 2 A) 1 Analog signal input (0-10 V) 1 Temperature input (Pt100/Pt1000, 2-wire) 2 digital inputs

### Data points

CIM 260 3G/4G cellular for Europe	MAGNA/UEPE	MAGNA3	E-pumps <11 kW E-pumps model J	E-pumps 11-22 kW CUE	Multi-E, TPED	Hydro MPC/Control MPC	Hydro Multi-B	MP 204
<b>Control</b>								
Operating Mode	•	•	•	•	•	•	•	•
Setpoint	•	•	•	•	•	•	•	•
Control Mode	•	•	•	•	H	•		
Relay Control			•	•				
Tank filling control							•	
<b>Status</b>								
Operating Mode status	•	•	•	•	•	•	•	•
Control Mode status	•	•	•	•	•	•	•	•
Feedback	•	•	•	•	•	•	•	•
Alarm/warning information	•	•	•	•	•	•	•	•
Bearing Service Information			G	•				
Tank filling status information							•	
<b>Measured Data</b>								
Power/Energy Consumption	•	•	•	•	•	•	•	•
Pressure (Head) <sup>1</sup>	•	•	s*	s*	•	• <sup>2</sup>	s	
Flow	•	•	s*	s*	H+s	• <sup>2</sup>		
Relative Performance	•	•	•	•	•	•	•	
Speed and Frequency	•	•	•	•				
Digital Input/Output			•	•	•	•	•	
Motor Current			•	•	•			•
DC Link Voltage			•	•				
Motor Voltage			G only	•				•
Remote Flow		s	G+s	s	H+s			
Inlet Pressure <sup>1</sup>			G+s	s	H+s	s	s	
Remote Pressure <sup>1</sup>		s	G+s	s	H+s	s		
Level			s	s	H+s	s	s	
Motor Temperature			G+s	s				s
Remote Temperature		s	s	s	H+s	s		
Pump Liquid Temperature	•	•	G+s	s				
Bearing Temperatures			H+s	s				
Auxiliary Sensor Input			s	s	H+s			
Operation Time (Run Time)	•	•	•	•	•	•	•	•
Total on time	•	•	•	•	•	•	•	•
Number Of Starts			•	•				•
Volume			H+s	CUE + s				
Ambient Temperature			H+s		H+s	s		
Inlet and Outlet Temperatures						s		
Heat energy meter	•	H						
Outlet Pressure <sup>1</sup>			H+s		H+s	• <sup>2</sup>	s	
Feed Tank Level			H+s		H+s	s	s	
Phase Voltages								•
Line Voltages/Currents/Frequency								•
Start/Run Capacitor								•
Voltage Angles + Cos phi								•
Insulation resistance								•
Starts/h and auto restarts/24h								•
<b>Subpump Data</b>								
Alarm/Status information					•	•	•	
Operation Time (Run Time)					•	•	•	
Speed					H	•	•	
Line current/power consumption					H	•	•	
Motor temperature						•	•	
Number of starts						•	•	
Control pump: force to stop/auto						•	•	

Note: E-pumps = CRE/CRNE/CRIE, MTRE, CME, TPE2/TPE3, NBE/NKE.  
Note: TPED twin pump model F or G in range 3-22 kW needs always 2 CIU modules.  
Note: MAGNA3-D twin pump model D requires 1x CIM interface installed in master head.

# Cellular data connection to SCADA or operation via SMS

## - For water utility products

### General CIU 900, CIU 901, CIU 902

Supply voltage	24-240 VAC/VDC, -10 %/+15 %
Frequency	0-60 Hz
Power consumption	Max. 11 W
Cable size	IEC: 0.2-4 mm <sup>2</sup> , UL: 24-12 AWG
Enclosure class	IP 54, according to IEC 60529
Cable entry	6 x M16 Ø4 - Ø10
Operation temperatures	-20 °C to +45 °C (-4 °F to +113 °F)
Storage temperatures	-20 °C to +60 °C (-4 °F to +140 °F)
Dimensions (H/W/D)	182 x 108 x 82 mm

CIU 902 is used together with wastewater AUTOADAPT pumps

### GENIbus communication

Protocol	GENIbus
Transceiver	RS-485
Recommended cable type	Screened, double twisted-pair
Maximum cable length	1200 m/4000 ft

### Cellular communication

Protocol	SMS
	Cellular data connection (Modbus TCP)
3G/4G antenna	Available as an option
Battery	Available as an option
SIM card	To be supplied by user/installer

### SMS features

Read product status	E.g. pressure, power, temperature etc. (depends on product type) Request active alarms/warnings Request I/O signal status
Read network status	E.g. signal level, battery status, cellular status and data statistics.
Self-triggered messages	Alarm/warning event messages Heart beat messages
Control	Pit interlocking Reset alarms
Configuration	SMS access control via PIN code Configuration of SMS functions Configuration of cellular connection
I/O board	2 configurable inputs (digital or analog 0/4-20 mA, 0-10 V) 1 Relay output (230 V, 2 A) 1 Analog signal output (0-10 V) 1 Temperature input (Pt100/Pt1000, 2-wire) 2 digital inputs

### Data points

CIM 260 3G/4G cellular for Europe			
	LC 2x1 / LC 2x2	Dedicated Controls CU 362	Wastewater AUTOADAPT CIU 262 <sup>1</sup>
<b>System Control</b>			
Reset alarm	•	•	•
Interlock pit		•	
Custom relay control (On/Off/Pulse)		•	
<b>Pump Control</b>			
Pumps On/Off/Auto	•	•	•
Pump down			•
<b>Configuration</b>			
Set system and pumps control levels	•	•	•
<b>System status</b>			
System operation mode	•	•	•
Active alarms/warnings	•	•	•
Pit mode (single/multi)			•
Status/function of float switches	•	•	
Presence of sensors	•	•	
Real time clock (read and set)	•	•	
System control source (Manual/Auto)	•	•	•
System and pumps control levels	•	•	•
Water level	•	•	•
Water level max			•
In/ out flow or pulse meter	• <sup>5</sup>	•	
Power/Energy consumption	•	• <sup>1</sup>	• <sup>1</sup>
Specific energy		•	
Volume		• <sup>1</sup>	
Overflow volume/time/counter		• <sup>1</sup>	
Operation time	•	•	•
Operation time for simultaneous pumps		• <sup>1</sup>	•
Mixer average starts per hours		•	
3 x user defined sensor inputs	•	•	
Float switches	•	•	
Digital inputs	•	•	•
8 x I/O logic outputs		•	
Digital Outputs	•	•	
<b>Pump status</b>			
Presence of pump	•	•	•
Pump enabled/disabled		•	
Running/Stopped	•	•	•
Active alarms/warnings	•	•	•
Auxiliary equipment status		•	
Control source	•	•	
Operation time	• <sup>1</sup>	• <sup>1</sup>	• <sup>1</sup>
Starts counter (total/average)	• <sup>1</sup>	• <sup>1</sup>	• <sup>1</sup>
Latest continuous operation time		•	•
Max continuous operation time			•
Time to service	•	•	
Flow (actual/latest)		•	
Current (actual/latest)	• <sup>2</sup>	•	•
Voltage/frequency		•	•
Current asymmetry		•	
Power/Power factor/Energy consumption	• <sup>3</sup>	•	• <sup>3</sup>
Motor temperature		•	•
Insulation		•	
Water in oil		•	
<b>Special (Modbus only)</b>			
Hour log (latest 72h of main pit/pump values)		•	
Event log (50 latest alarms/warnings w. time stamp)	• <sup>4</sup>	•	
User defined data log (40000 registers)	• <sup>4</sup>	•	

1) Available as 3 datapoints for yesterday, today and total  
For information related to Modbus TCP, PROFINET or Grundfos iSOLUTIONS Cloud please contact Grundfos  
2) LC 2X1 and LC 2X2 only have actual current  
3) LC 2X1, LC 2X2 and AUTOADAPT do not measure power factor  
4) LC 2X1 and LC 2X2 only have 40 logs  
5) LC 2X2 only

\* To create a CIU 262, you order a CIU 902 + CIM 260

# DDA E-Box versions

## - For small Grundfos digital dosing pumps

The small DDA is mounted directly on top of the E-Box, and the bus cable included with the E-Box is connected between the small DDA and E-Box. The small DDA can also use the CIU unit and in that case the GENIbus cable is ordered separately. The DDA XL always uses the CIU unit solution, the DDA 'C' has embedded Modbus and use CIU unit for other protocols (see page 12).

### PROFIBUS -DP Communication (E-Box 150)

Protocol	PROFIBUS DP
Implementation Class	DP-V0
Transmission speeds	9600 bits/s to 12 Mbits/s
Slave address	1-126, set via DDA display

### Modbus RTU Communication (E-Box 200)

Protocol	Modbus RTU
Transceiver	RS-485
Transmission speeds	1.2, 2.4, 4.8, 9.6, 19.2, 38.4 kbits/s
Parity settings	Even, Odd or No parity
Stop bits	1 or 2
Slave address	1-247, set via DDA display

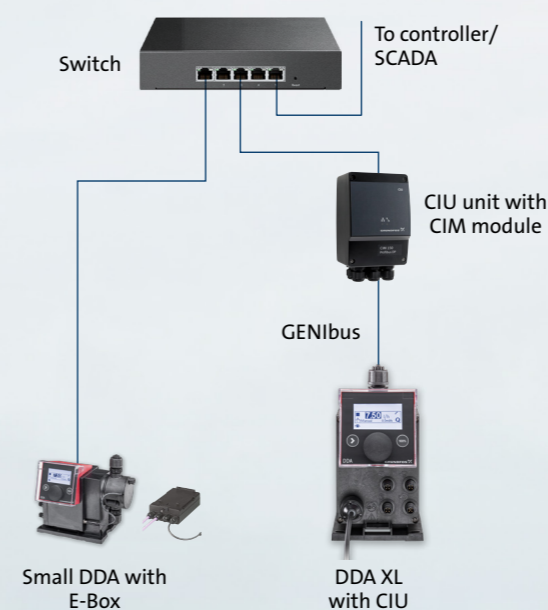
### CIM 500 PROFINET IO, Modbus TCP, EtherNet/IP Communication

Protocol	PROFINET IO (rotary switch position 0) Modbus TCP (rotary switch position 1) EtherNet/IP (rotary switch position 3)
Transmission speed	10/100 Mbits/s
Ports	2 x RJ45
PROFINET conformance class	B







### Data points

DDA E-Box 150, E-Box 200 or E-Box 500			
	Control variant FCM	Control variant FC	Control variant AR
<b>Control</b>			
Operating Mode (Start, Stop, Service, Calibrating), Functions (Slow mode, Viscosity selection), Deaerating mode	•	•	•
Function Enable/Disable (AutoDeaerating, FlowMonitor, Profibus Watchdog, AutoFlow, PulseMemory)	•	•	•
Pulse signal from bus	•	•	•
Reset Fault and Volume Counter	•	•	•
Control Mode (Manual, Pulse, Analogue, Timer, Batch)	•	•	•
Set Manual Flow Setpoint	•	•	•
Set Pulse Volume	•	•	•
Set Batch Volume	•	•	•
Set Batch Dosing Time	•	•	•
Set Flow Monitor Pressure Alarm Limit	•	•	•
Relay Control of Relay 1 and 2	•	•	•
Set Analog Output	•	•	•
Set Date & Time	•	•	•
<b>Status</b>			
Operating Mode Status	•	•	•
Control Mode Status	•	•	•
Alarm/warning/dosing (running) Status	•	•	•
Actual Manual Flow Setpoint	•	•	•
Actual Pulse Volume Setting	•	•	•
Actual Batch Dosing Volume Setting	•	•	•
Actual Batch Dosing Time Setting	•	•	•
Actual Flow Monitor Pressure Alarm Limit Setting	•	•	•
Control Source ( HMI, External, Bus)	•	•	•
Fault & Warning Code	•	•	•
Warning Status Bits	•	•	•
Actual Date & Time	•	•	•
Max Dosing Pressure	•	•	•
Max Dosing Capacity	•	•	•
Resulting Dosing Capacity Setpoint	•	•	•
Remaining Dosing Volume	•	•	•
Total Dosed Volume	•	•	•
Volume Trip Counter	•	•	•
Actual Analog Output Signal	•	•	•
Digital Outputs	•	•	•
Number Of Starts	•	•	•
Run Time	•	•	•
Total On Time	•	•	•
Stroke Counter	•	•	•
Time To Next Dosing	•	•	•
<b>Measured Data</b>			
Digital Inputs	•	•	•
Analog Input Signal	•	•	•
Pulse Input Frequency	•	•	•
Measured Dosing Capacity	•	•	•
Measured Dosing Pressure	•	•	•

### Network example with CIM 500 Ethernet



## SoftCIM options in products

	E-pump model K 	TPED model K 	Multi-E model K 	SQ Controller 	DDA-C dosing 	MIXIT 
<b>Modbus RTU</b>	free	free	free	free	Later in 2024	partly licensed
<b>BACnet MS/TP</b>	Later in 2024	Later in 2024	Later in 2024	-	-	partly licensed
<b>Modbus TCP</b>	Later in 2024	Later in 2024	Later in 2024	-	Later in 2024	partly licensed
<b>BACnet IP</b>	Later in 2024	Later in 2024	Later in 2024	-	-	partly licensed
<b>Ethernet GDP to Grundfos Connect</b>	subscription	subscription	subscription	subscription	subscription 2024	subscription

A SoftCIM is like a communication interface module integrated as a software component in the software of the product.

The necessary electro-mechanical components and the physical layer of the communications protocol is an integrated part of the product hardware.

## Product numbers of Grundfos CIM/CIU communication interfaces

Interface name	Product no.	Comment
CIM 040 GENI TTL	98415941	For CU 354 DDD
CIM 050 GENIbus	96824631	
CIM 060 GlowPan	98778356	Require 98778357 Antenna kit for CIM 060
CIM 100 LON	96824797	LONWorks for pumps
CIM 110 LON	96824798	LONWorks for boosters and twin pumps. Install CIM in master head in twin pumps and Multi-E
CIM 150 PROFIBUS DP	96824793	
E-Box 150 PROFIBUS DP	97513994	For small DDA pumps
CIM 200 Modbus RTU	96824796	
E-Box 200 Modbus RTU	98563350	For small DDA pumps
CIM 260-EU 3G/4G cellular	99439302	For European frequency bands. Requires PN 99518079 antenna kit 3G/4G SIM card
CIM 290-MA LPWAN GIC for Grundfos iSOLUTIONS Cloud Application like Grundfos Connect (including eUICC SIM card) Cellular LTE-M 1)	92865300	For Regions where Telecom operators has rolled out LTE-M technology. Requires an antenna PN: 99838775. Includes eUICC SIM card in package. Ask Grundfos which products are supported from the cloud and if its available for your region. Some Digital Offerings require additional a contract.
Antenna 3G/4G LTE (for CIM 290 cellular interface)	99838775	For CIM 290 cellular interfaces, antenna with 3 m cable and magnetic base
Antenna extension cable SMA connector (male + female) 10 m cable length	92589374	
Antenna extension cable SMA connector (male + female) 20 m cable length	92589395	
CIM 300 BACnet MS/TP	96893770	
CIM 500 Ethernet 1)	98301408	For Industrial Ethernet protocols PROFINET, Modbus TCP, BACnet IP, EtherNet/IP
CIM 550 Ethernet for Grundfos iSOLUTIONS Cloud applications like Grundfos Connect 1)	92546689	For wired Internet connectivity to Grundfos Connect. Ask Grundfos which products are supported from the cloud and if approvals for your regions are available.
E-Box 500 Ethernet 1)	99171932	For Industrial Ethernet protocols PROFINET, Modbus TCP, EtherNet/IP (small DDA pump only)
CIU 900	99448387	Empty CIU unit. For all CIM modules
CIU 901	99448389	Empty CIU unit with built-in IO board (IO 270) For CIM 200, CIM 260 and CIM 500
CIU 902 AUTOADAPT	97644690	Empty CIU unit with built-in SEG AUTOADAPT board for interface to 1-4 SEG AUTOADAPT pumps. For CIM 150, CIM 200, CIM 260 and CIM 500
CIU 903 MGEFlex/SQFlex	98106399	Empty CIU unit with interface for MGE Flex and SQ Flex. Only used for CIM 290
CIM 060 antenna kit	98778357	Antenna required only in case of no sight view
CIM 260 puc antenna kit (1.5 m cable)	99518079	For CIM 260 EU
CIM 260 optional battery	99499908	For CIM 260 EU to send a last power failure alarm if power drops
CIM 500 RJ45 Field plug kit	98471752	RJ45 plug assembly kit for flexible Ethernet cable to CIM 500 in CIU 90x (contains 2x RJ45 plug, without cable)
DDA GENIbus cable (3 m)	98589048	For connection to CIU unit
Robustel R3000-L3H, 3G router	99043055	For use in Europe with CIM 550
Robustel R3000-L4L, 4G router	99043057	For use in Europe with CIM 550
3G/4G rod antenna for Robustel Router (5 m cable)	99043061	
External power supply 12 V for Robustel Router	99043052	

Note: To create a CIU xxx version you need to order a CIU 900 + CIM xxx interface, similar for a CIU 901, 902, 903

1) Contract with Grundfos is required for data hosting in Grundfos Connect

## CIM and CIU Manuals and installation files



Enter the link below to access the CIM and CIU manuals and installation files mentioned in this leaflet.

[http://net.grundfos.com/qr/i/CIM\\_CIU\\_01](http://net.grundfos.com/qr/i/CIM_CIU_01)

### BACnet functional profile manuals

For each product type, a manual exists covering the following:

- CIM 300 BACnet MS/TP
- CIM 500 BACnet IP
- BACnet for MIXIT
- BACnet PICS for CIM 300
- BACnet PICS for CIM 500



### EtherNet/IP functional profile manuals

For each product type, a manual exists covering the following:

- CIM 500 EtherNet/IP



### Modbus functional profile manuals

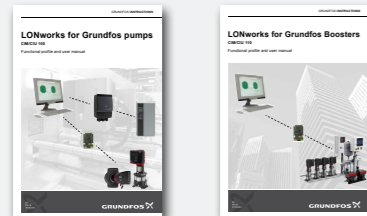
For each product type, a manual exists covering the following:

- CIM 200 Modbus RTU
- CIM 260 Modbus cellular
- CIM 500 Modbus TCP
- Modbus for MIXIT
- Modbus for Grundfos SQ controller



### LONWorks functional profile manuals

- CIM 100 LON for pumps
- CIM 110 LON for boosters



### PROFIBUS/PROFINET functional profile manuals

For each product type, a manual exists covering the following:

- CIM 150 PROFIBUS DP
- CIM 500 PROFINET IO



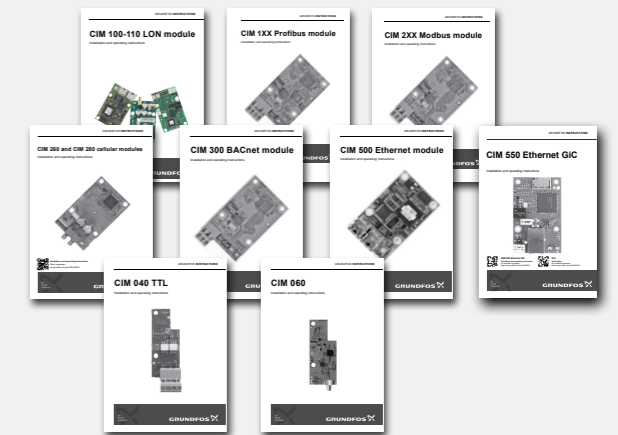
### Miscellaneous instructions

- CIM 260 SMS commands
- Multi-purpose IO module in CIU 901 (IO 270)
- Multi-purpose IO module for Grundfos AUTOADAPT pumps
- Multi-purpose IO module for SQ Flex
- Modbus for multi-purpose IO module IO 270
- E-Box 150 Profibus
- E-Box 200 Modbus
- E-Box 500 Ethernet
- CIU - Communication Interface Unit
- CIU - Quick Guide



### CIM modules instructions

- CIM 100/110 LON
- CIM 150 PROFIBUS DP
- CIM 200 Modbus RTU
- CIM 260 and CIM 290 cellular modules
- CIM 300 BACnet MS/TP
- CIM 500 Ethernet
- CIM 550 Ethernet Grundfos iSOLUTIONS Cloud
- CIM 040 TTL
- CIM 060



## EICA Selection tool (Electrical Instrumentation, Control and Automation)

Grundfos has introduced for easy and simple selection of required fieldbus interfaces an online selection tool.

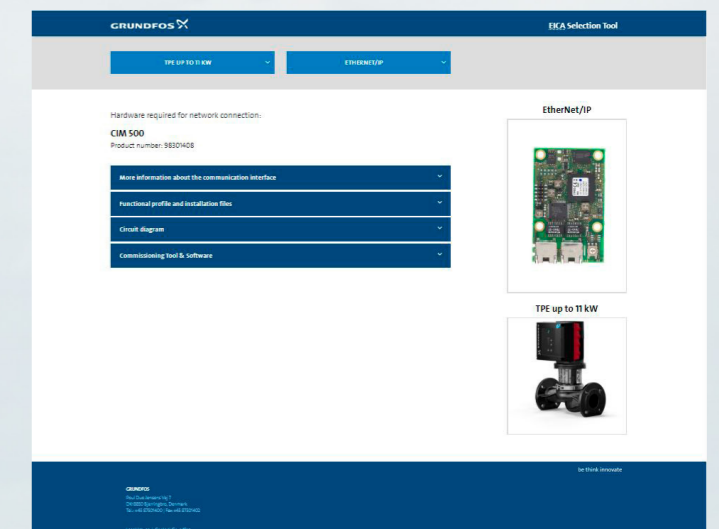
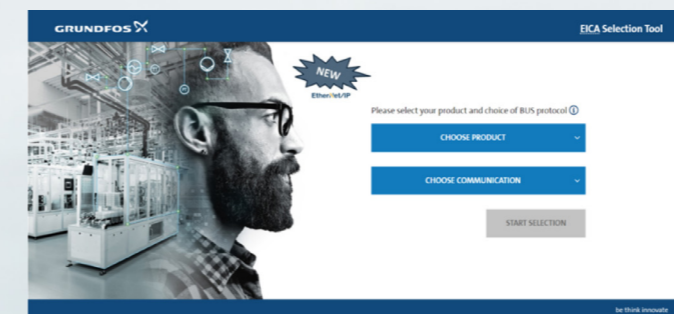
EICA tool contains:

- Selection of correct CIM interface
- Selection of documentation/manuals
- Selection of installation files
- PLC Programming examples for PROFIBUS/PROFINET

- PC Tool CIM/CIU
- Circuit diagrams

Select the relevant product (pump, controller) and the required BUS protocol type and the page will display all the information you need to efficiently handle your projects.

<https://www.grundfos-eica.com/>





### Advantages of Grundfos CIM/CIU communication interfaces

- Enables connection of any Grundfos pump or controller to a PLC, BMS/ SCADA system
- Pumps and controllers have better reliability with reduced downtime, due to monitoring and control functionality on a PLC, BMS/ SCADA system
- The operational cost of pumps can be lowered by reducing setpoints to match precise system needs via remote control
- Remote monitoring and control via PLC, BMS/ SCADA systems reduce manual settings, monitoring time and travel time to sites or installations
- Enable predictive maintenance and fast reaction time on process changes and exceptions
- Simple configuration of Fieldbus settings saves commissioning time
- Modular design – prepared for future needs
- Wide range 24-240 VAC/VDC power supply in CIU
- Easy to install, as Grundfos delivers the required support files and functional profile manuals

### About Grundfos

Grundfos is one of the world's leading pump manufacturers and has been renowned for its innovative and reliable solutions since 1945. Today, we produce more than 16 million pump units every year for a wide range of application areas. Grundfos iSOLUTIONS brings a new era of intelligence to pump systems and water technology with solutions that look beyond individual components and optimise the entire system.

Learn more at [www.grundfos.com](http://www.grundfos.com)