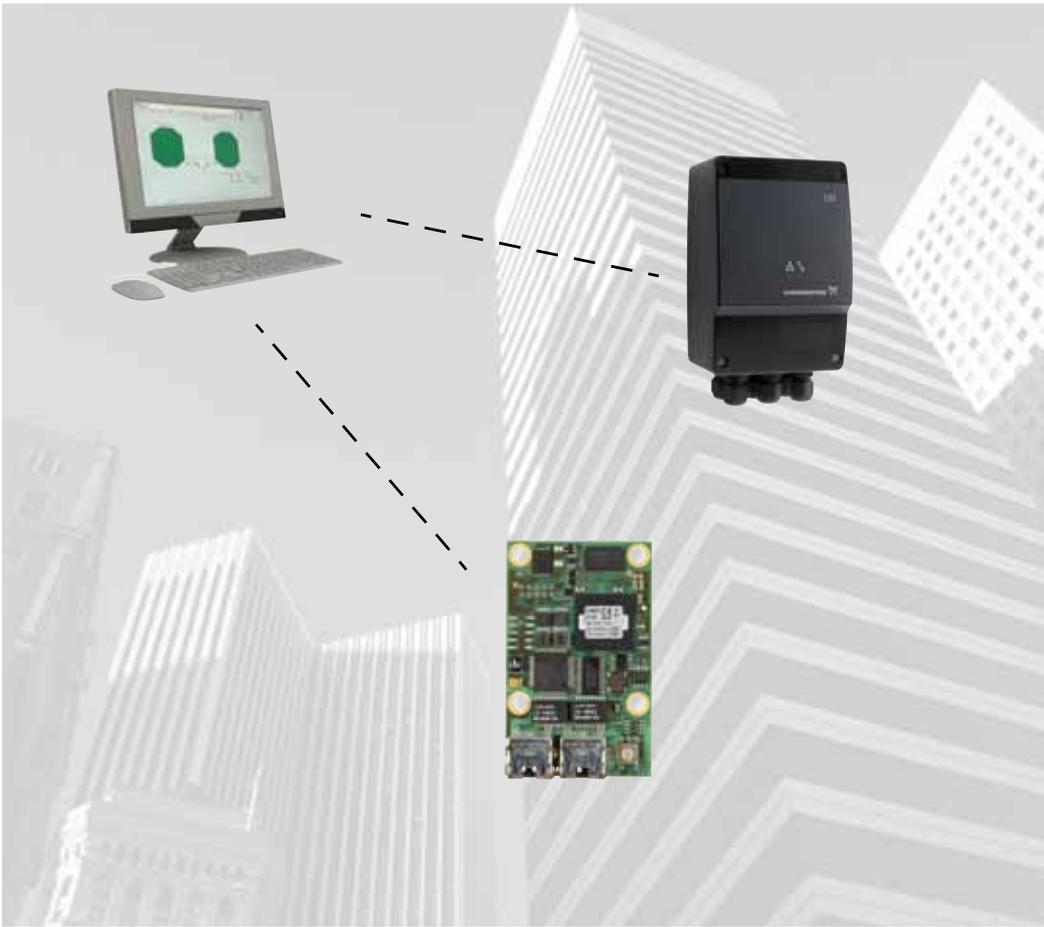


BACnet PICS CIM 500

Protocol Implementation Conformance Statement
for Grundfos CIM 500 BACnet IP for Grundfos pumps and booster systems
Installation and operating instructions, supplement



English (GB) Installation and operating instructions

Original installation and operating instructions.

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1. Introduction



Fig. 1 The CIM 500 BACnet IP passed the BTL test in April 2014

Grundfos CIM 500 BACnet IP for pumps

Document date: 25-04-2014

Vendor name: Grundfos

Product name: CIM

Product model number: 500 BACnet IP

Application software: V01.05

Firmware revision: V01.05

BACnet protocol rev.: 9

2. Product description

The CIM 500 BACnet IP interface from Grundfos enables BACnet communication with Grundfos pumps and systems that have a GENibus interface. The communication interface module can either be installed directly in the Grundfos pump/system to enable BACnet IP communication, or in an external power supply unit (CIU unit) connected to the pump/system. In both cases, the communication interface module is the same.

Note

The CIM 500 BACnet IP passed the BTL test in April 2014.

BACnet Standardised Device Profile (Annex L)

- BACnet Operator Workstation (B-OWS)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

3. Supported BACnet Interoperability Building Blocks

Data sharing services:

Name	BACnet BIBB
ReadProperty	DS-RP-B
ReadPropertyMultiple	DS-RPM-B
WriteProperty	DS-WP-B
WritePropertyMultiple	DS-WPM-B
SubscribeCOV	
ConfirmedCOVNotification	DS-COV-B
UnconfirmedCOVNotification	

Device management services:

Name	BACnet BIBB
Who-is/I-am	DM-DDB-A
	DM-DDB-B
Who-has/I-have	DM-DOB-B
DeviceCommunicationControl	DM-DCC-B

Segmentation capability

Segmented requests supported

Window Size _____

Segmented responses supported

Window Size _____

Note

Segmentation is not supported.

Object type	Supported	Dynamically create-able/delete-able
Analog input	●	-
Analog output	●	-
Analog value	●	-
Binary input	●	-
Binary output	●	-
Multistate input	●	-
Multistate output	●	-
Device	●	-

3.1 Data Link Layer options

BACnet IP (Annex J).

3.2 Device address binding

The device does not support static device binding.

3.3 Networking options

Router, Clause 6 - List all routing configurations, e.g. ARCNET-Ethernet, Ethernet-MS/TP, etc.

Annex H, BACnet Tunneling Router over IP

BACnet/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by foreign devices? Yes No

3.4 Character sets supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

Character set	Supported
ANSI X3.4	●
ISO 10646 (UCS-2)	-
ISO 10646 (UCS-4)	-
IBM™ / Microsoft™ / DBCS™	-
ISO 8859-1	-
JIS C 6226	-
UTF-8	●

3.5 Non-BACnet equipment supported

Types of non-BACnet equipment supported:

- Grundfos MAGNA circulator pumps*
 - Grundfos MAGNA3 circulator pumps
 - Grundfos UPE Series 2000 (UPE 80-120 and 100-120) circulator pumps
 - Grundfos CRE, CRNE, CRIE, MTRE, CME (single-phase and three-phase, up to 11 kW + three-phase, 11-22 kW)
 - Grundfos TPE, TPE Series 2000, NBE, NKE (single-phase and three-phase, up to 11 kW + three-phase, 11-22 kW)
 - Grundfos CUE frequency converter (all versions, 0.55 - 250 kW)
 - Grundfos Hydro MPC (CU 35X)* and Hydro Multi-E booster systems
 - Grundfos Control MPC (CU 35X)* multipump controller
 - Grundfos Hydro Multi-B (CU 323) booster system.
- * Additional Grundfos GENibus module required.

4. Complete object list

4.1 Complete object list for pumps

ID	Object Name	R/W	Notes	MAGNA/ UPE Series	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
BI, 0	Control source status	R	Status of the actual control source. 0: Local control 1: Bus control.	•	•	•
BI, 1	Actual direction	R	Rotational direction of the pump impeller. 0: Clockwise 1: Counter-clockwise.	3	•	•
BI, 2	Rotation status	R	Rotation status. 0: No rotation 1: Rotation (pump running).	•	•	•
BI, 3	At minimum speed	R	0: Not running at minimum speed 1: Running at minimum speed.	•	•	•
BI, 4	At maximum speed	R	0: Not running at maximum speed 1: Running at maximum speed.	•	•	•
BI, 11	Digital input 1 status	R	0: Not active 1: Active.	3	•	•
BI, 12	Digital input 2 status	R	0: Not active 1: Active.	3	•	•
BI, 13	Digital input 3 status	R	0: Not active 1: Active.	-	•	•
BI, 14	Digital output 1 status	R	0: Not active 1: Active.	3	•	•
BI, 15	Digital output 2 status	R	0: Not active 1: Active.	3	•	•
BI, 28	Fault simulation status	R	Fault simulation status. 0: Fault simulation not active 1: Fault simulation active.	•	•	•
BI, 31	At power limit	R	0: Not running at power limit 1: Running at power limit.	3	-	-
BI, 38	Setpoint influence	R	0: Not active 1: Active.	•	-	-
BI, 39	Max. flow limit	R	0: Not active 1: Active.	3	-	-
BO, 0	Set control source	W	Sets the control source. Set to 1 to enable pump control via BACnet. 0: Local control (default) 1: Bus control.	•	•	•
BO, 1	Relay 1 control	W	Controls relay 1 if bus control is enabled and relay 1 is set to be controlled via bus. 0: Closed (default) 1: Open.	-	•	•

ID	Object Name	R/W	Notes	MAGNA/ UPE Series	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
BO, 2	Relay 2 control	W	Controls relay 2 if bus control is enabled and relay 2 is set to be controlled via bus. 0: Closed (default) 1: Open.	-	-	•
BO, 4	Reset fault	W	Resets fault if bus control is enabled. (Triggered on rising edge). 0: No resetting (default) 1: Resetting.	•	•	•
BO, 5	Fault simulation	W	Enables simulated fault if bus control is enabled. 0: Disabled (default) 1: Enabled.	•	•	•
BO, 6	Copy settings to local	W	Copies remote settings to local pump settings. 0: Disabled 1: Enabled.	3	-	-
BO, 9	Enable max. flow limit	W	0: Disabled 1: Enabled.	3	-	-
MI, 0	Actual control mode	R	Reads the current control mode. 1: Constant speed 2: Constant pressure 3: Proportional pressure 4: Automatic / AUTO _{ADAPT} 5: Constant flow 6: Constant temperature 7: Constant level 8: Constant percentage 9: Auto flow 10: Closed-loop sensor control.	•	•	•
MI, 1	Actual operating mode	R	Reads the current operating mode. 1: Start (normal) 2: Stop 3: Minimum 4: Maximum.	•	•	•
MI, 2	Next bearing-service type	R	Type of next bearing service. 1: Service type unknown 2: Lubricate bearings 3: Change bearings.	-	-	•
MI, 3	CIM status	R	Reads the status of the CIM module, useful for fault finding. 1: OK 2: EEPROM fault 3: Memory fault.	•	•	•

ID	Object Name	R/W	Notes	MAGNA/ UPE Series	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
MI, 11	Feedback sensor unit	R	Unit of the feedback sensor. 1: Unknown 2: bar 3: mbar 4: m 5: kPa 6: psi 7: ft 8: m ³ /h 9: m ³ /s 10: l/s 11: gpm 12: °C 13: °F 14: % 15: K 16: W.	•	•	•
MO, 0	Set control mode	W	Sets the control mode if bus control is enabled. 1: Constant speed 2: Constant pressure 3: Proportional pressure 4: Automatic / AUTO _{ADAPT} 5: Constant flow 6: Constant temperature 7: Constant level 8: Constant percentage 9: Auto flow 10: Closed-loop sensor control.	•	•	•
MO, 1	Set operating mode	W	Sets the operating mode if bus control is enabled. 1: Start (normal) 2: Stop 3: Minimum 4: Maximum.	•	•	•
AI, 0	Fault code	R	Grundfos fault code.	•	•	•
AI, 1	Warning code	R	Grundfos warning code.	3	•	•
AI, 2	Time to bearing service	R	Time to bearing service in months. A value of 24 means "24 or more".	-	-	•
AI, 3	Capacity	R	Actual capacity value (process feedback).	•	•	•
AI, 4	Head	R	Actual system head/pressure.	S	S	S
AI, 5	Flow	R	Actual system flow.	S*	S*	S*
AI, 6	Relative performance	R	Performance relative to maximum performance.	•	•	•
AI, 7	Speed	R	Motor speed.	•	•	•
AI, 8	Frequency	R	Actual control signal applied to motor.	•	•	•
AI, 9	Actual setpoint	R	Actual setpoint.	•	•	•
AI, 10	Motor current	R	Actual motor current.	3	•	•
AI, 11	DC link voltage	R	Frequency converter DC Link voltage.	•	•	•
AI, 12	Motor voltage	R	Motor voltage.	-	•	•

ID	Object Name	R/W	Notes	MAGNA/ UPE Series	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
AI, 13	Power	R	Total power consumption of the pump.	•	•	•
AI, 14	Remote flow	R	Measured flow at external sensor.	3+S	G+S	S
AI, 15	Inlet pressure	R	System inlet pressure.	-	G+S	S
AI, 16	Remote pressure	R	Measured pressure at external sensor.	3+S	G+S	S
AI, 17	Level	R	Tank level.	-	S	S
AI, 18	Power electronic temperature	R	Temperature in frequency converter.	3	•	•
AI, 19	Motor temperature	R	Motor winding temperature.	-	G	•
AI, 20	Remote temperature	R	Temperature at external sensor.	-	S	S
AI, 21	Electronic temperature	R	Pump electronics temperature.	-	-	S
AI, 22	Fluid temperature	R	Pumped-liquid temperature.	•	G	S
AI, 23	Bearing temperature DE	R	Bearing temperature, drive end.	-	-	S
AI, 24	Bearing temperature NDE	R	Bearing temperature, non-drive end.	-	-	S
AI, 25	Auxiliary sensor input	R	Auxiliary sensor input.	-	S	S
AI, 26	Specific energy	R	Specific energy consumption.	3	-	CUE
AI, 27	Runtime	R	Total operating time of the pump.	•	•	•
AI, 28	Total ontime	R	Total power-on time of the pump.	•	•	•
AI, 29	Torque	R	Motor torque.	-	3-ph	•
AI, 30	Energy consumption	R	Total energy consumption of the pump.	•	•	•
AI, 31	Number of starts	R	Number of times the pump has started.	3	•	•
AI, 32	Volume	R	Total pumped volume.	3	-	CUE
AI, 37	Outlet pressure	R	System outlet pressure.	-	H	-
AI, 57	Remote temperature 2	R	Temperature at external temperature sensor 2.	3+S	-	-
AI, 58	User setpoint	R	User-selected setpoint.	•	•	•
AI, 85	Minimum of feedback sensor	R	Minimum value of feedback sensor.	•	•	•
AI, 86	Maximum of feedback sensor	R	Maximum value of feedback sensor.	•	•	•
AI, 92	Load percent	R	Motor current in percent of rated motor current.	3	-	-
AI, 93	Differential pressure	R	Pressure between pump flanges.	3	-	-
AI, 95	Actual flow limit	R	Actual maximum flow limit.	3	-	-
AO, 0	Set setpoint	W	Sets the pump setpoint if bus control is enabled. A value of 0 does not imply a stop.	•	•	•
AO, 5	Set max. flow limit	W	Sets the maximum flow limit value.	3	-	-

ID	Object Name	R/W	Notes	MAGNA/ UPE Series	E-pumps 0.25 - 7.5 kW	CUE/ E-pumps 11-22 kW
AV, 0	Custom device object instance number	R/W	Value for Custom Device Object Instance Number. Used in conjunction with DIP switch SW3. Present_Value range: 0-0x3FFFFE. Default Present_Value: 0xE7.	•	•	•
AV, 2	Simulation fault code	R/W	Fault code to simulate. Can be cleared by writing a value of 0.	•	•	•
AV, 3	Simulation warning code	R/W	Warning code to simulate. Can be cleared by writing a value of 0.	3	•	•
AV, 9	Product time and date	R/W	Pump time and date in UNIX format (seconds since 00:00 01-01-1970).	3	-	-

3 Only available on MAGNA3.

G Only available on model G and later versions.

H Only available on model H and later versions.

• Always available.

S Sensor required.

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

CUE Only available on CUE (with sensor).

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

4.2 Complete object list for booster systems

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
BI, 0	Control source status	R	Status of the actual control source. 0: Local control 1: Bus control.		•	•	•
BI, 2	Rotation status	R	Rotation status. 0: No rotation 1: Rotation (one or more pumps running).		•	•	•
BI, 3	At minimum speed	R	0: Not running at minimum speed 1: Running at minimum speed.		-	•	•
BI, 4	At maximum speed	R	0: Not running at maximum speed 1: Running at maximum speed.		-	•	•
BI, 5	Standby pumps active	R	0: Standby pumps not active 1: Standby pumps active.		-	•	-
BI, 6	Pressure relief active	R	0: Pressure relief not active 1: Pressure relief active.		-	•	-
BI, 7	Soft pressure active	R	0: Soft pressure not active 1: Soft pressure active.		-	•	-
BI, 8	Low-flow boost active	R	0: Low-flow boost not active 1: Low-flow boost active.		-	•	-
BI, 9	Low-flow stop active	R	0: Low-flow stop not active 1: Low-flow stop active.		•	•	-
BI, 10	Alternative setpoint active	R	0: Alternative setpoint not active 1: Alternative setpoint active.		-	•	-
BI, 11	Digital input 1 status	R	0: Not active 1: Active.		•	•	•
BI, 12	Digital input 2 status	R	0: Not active 1: Active.		•	•	•
BI, 13	Digital input 3 status	R	0: Not active 1: Active.		•	•	•
BI, 14	Digital output 1 status	R	0: Not active 1: Active.		•	•	•
BI, 15	Digital output 2 status	R	0: Not active 1: Active.		•	•	•
BI, 16	Subpump 1 presence	R	0: Subpump not present 1: Subpump present.		•	•	•
BI, 17	Subpump 1 communication status	R	0: Communication OK 1: Communication fault.		•	•	•
BI, 18	Subpump 2 presence	R	0: Subpump not present 1: Subpump present.		•	•	•
BI, 19	Subpump 2 communication status	R	0: Communication OK 1: Communication fault.		•	•	•
BI, 20	Subpump 3 presence	R	0: Subpump not present 1: Subpump present.		•	•	•
BI, 21	Subpump 3 communication status	R	0: Communication OK 1: Communication fault.		•	•	•
BI, 22	Subpump 4 presence	R	0: Subpump not present 1: Subpump present.		•	•	•

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
BI, 23	Subpump 4 communication status	R	0: Communication OK 1: Communication fault.		•	•	•
BI, 24	Subpump 5 presence	R	0: Subpump not present 1: Subpump present.		-	•	•
BI, 25	Subpump 5 communication status	R	0: Communication OK 1: Communication fault.		-	•	•
BI, 26	Subpump 6 presence	R	0: Subpump not present 1: Subpump present.		-	•	•
BI, 27	Subpump 6 communication status	R	0: Communication OK 1: Communication fault.		-	•	•
BI, 28	Fault simulation status	R	Fault simulation status. 0: Fault simulation disabled 1: Fault simulation enabled.		•	•	-
BI, 32	Subpump 1 auto mode	R	0: Manual control 1: Auto-control.		•	•	-
BI, 33	Subpump 2 auto mode	R	0: Manual control 1: Auto-control.		•	•	-
BI, 34	Subpump 3 auto mode	R	0: Manual control 1: Auto-control.		•	•	-
BI, 35	Subpump 4 auto mode	R	0: Manual control 1: Auto-control.		•	•	-
BI, 36	Subpump 5 auto mode	R	0: Manual control 1: Auto-control.		-	•	-
BI, 37	Subpump 6 auto mode	R	0: Manual control 1: Auto-control.		-	•	-
BI, 38	Setpoint influence active	R	0: No influence on setpoint 1: Setpoint influence active.		-	•	-
BI, 40	Pilot pump auto mode	R	0: Manual control 1: Auto-control.		-	•	-
BI, 41	Pilot pump presence	R	0: Pilot pump not present 1: Pilot pump present.		-	•	-
BI, 42	Pilot pump communication status	R	0: Communication OK 1: Communication fault.		-	•	-
BI, 43	Back-up pump auto mode	R	0: Manual control 1: Auto-control.		-	•	-
BI, 44	Back-up pump presence	R	0: Backup pump not present 1: Backup pump present.		-	•	-
BI, 45	Back-up pump communication status	R	0: Communication OK 1: Communication fault.		-	•	-
BO, 0	Set control source	W	Sets the control source. Set to 1 to enable control via BACnet. 0: Local control (default) 1: Bus control.		•	•	•

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
BO, 4	Reset fault	W	Resets alarm if bus control is enabled. (Triggered on rising edge). 0: No resetting (default) 1: Resetting.		•	•	•
BO, 5	Fault simulation	W	Enables fault simulation. 0: Disabled (default) 1: Enabled.		•	•	-
MI, 0	Actual control mode	R	Reads the current control mode. 1: Constant speed 2: Constant pressure 3: Proportional pressure 4: RESERVED 5: Constant flow 6: Constant temperature 7: Constant level 8: Constant percentage.		•	•	•
MI, 1	Actual operating mode	R	Reads the current operating mode. 1: Start (normal) 2: Stop 3: Minimum 4: Maximum.		•	•	•
MI, 3	CIM status	R	Reads the status of the CIM module, useful for fault finding. 1: OK 2: EEPROM fault 3: Memory fault.		•	•	•
MI, 4	Subpump 1 control source	R	1: Buttons 2: GENIbus 3: GENIlink 4: External control.		•	•	-
MI, 5	Subpump 2 control source	R	1: Buttons 2: GENIbus 3: GENIlink 4: External control.		•	•	-
MI, 6	Subpump 3 control source	R	1: Buttons 2: GENIbus 3: GENIlink 4: External control.		•	•	-
MI, 7	Subpump 4 control source	R	1: Buttons 2: GENIbus 3: GENIlink 4: External control.		•	•	-
MI, 8	Subpump 5 control source	R	1: Buttons 2: GENIbus 3: GENIlink 4: External control.		-	•	-
MI, 9	Subpump 6 control source	R	1: Buttons 2: GENIbus 3: GENIlink 4: External control.		-	•	-

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
MI, 10	Application type	R	1: Pressure boosting 2: Heating pumps on hot side 3: Heating pumps on cold side 4: AirCon pumps on hot side 5: AirCon pumps on cold side 6: MPC S2000 heating pumps on hot side 7: MPC S2000 heating pumps on cold side 8: MPC S2000 AirCon pumps on hot side 9: MPC S2000 AirCon pumps on cold side 10: Tank filling 11: Tank filling (float switches) 12: Undefined.		•	•	-
MI, 11	Feedback sensor unit	R	1: Unknown 2: bar 3: mbar 4: m 5: kPa 6: psi 7: ft 8: m ³ /h 9: m ³ /s 10: l/s 11: gpm 12: °C 13: °F 14: % 15: K 16: W.		•	•	-
MI, 12	Pilot pump control source		1: Buttons 2: GENIbus 3: GENIlink 4: External control.		-	•	-
MI, 13	Back-up pump control source		1: Buttons 2: GENIbus 3: GENIlink 4: External control.		-	•	-
MO, 0	Set control mode	W	Sets the control mode if bus control is enabled. 1: Constant speed 2: Constant pressure 3: Proportional pressure 4: RESERVED 5: Constant flow 6: Constant temperature 7: Constant level 8: Constant percentage. Note: Hydro Multi-E always runs in constant-pressure mode.		-	•	-
MO, 1	Set operating mode	W	Sets the operating mode if bus control is enabled. 1: Start (normal) 2: Stop 3: Minimum (Hydro MPC only) 4: Maximum (Hydro MPC and Hydro Multi-E only).		•	•	•

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
MO, 2	Product simulation	W	Enables product simulation (for commissioning and testing purposes, can only be enabled when no physical booster system is present). 1: Disabled 5: Hydro Multi-E 6: Hydro MPC 7: Hydro Multi-B.		•	•	•
MO, 3	Control subpump 1	W	Manual control of subpump 1. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		•	•	-
MO, 4	Control subpump 2	W	Manual control of subpump 2. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		•	•	-
MO, 5	Control subpump 3	W	Manual control of subpump 3. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		•	•	-
MO, 6	Control subpump 4	W	Manual control of subpump 4. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		•	•	-
MO, 7	Control subpump 5	W	Manual control of subpump 5. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		-	•	-
MO, 8	Control subpump 6	W	Manual control of subpump 6. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		-	•	-
MO, 9	Control pilot pump	W	Manual control of pilot pump. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		-	•	-
MO, 10	Control back-up pump	W	Manual control of back-up pump. 1: Automatic control (default) 2: Forced start (not available) 3: Forced stop.		-	•	-
AI, 0	Fault code	R	Grundfos fault code.	-	•	•	•
AI, 1	Warning code	R	Grundfos warning code.	-	•	•	•
AI, 3	Capacity	R	Actual capacity value (process feedback).	%	•	•	•
AI, 4	Head	R	Actual system head/pressure.	bar	-	S	S
AI, 5	Flow	R	Actual system flow.	m ³ /h	-	S	S
AI, 6	Relative performance	R	Performance relative to maximum performance.	%	•	•	•
AI, 9	Actual setpoint	R	Actual setpoint.	%	•	•	•
AI, 10	Motor current	R	Actual motor current.	A	-	-	•
AI, 13	Power	R	Total power consumption of the system.	W	•	•	•
AI, 15	Inlet pressure	R	System inlet pressure.	bar	S	S	-

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
AI, 16	Remote pressure	R	Measured pressure at external sensor.	bar	-	S	-
AI, 17	Level	R	Tank level.	m	S	S	S
AI, 20	Remote temperature	R	Temperature at external sensor.	°C	-	S	S
AI, 25	Auxiliary sensor input	R	Auxiliary sensor input.	%	S	-	S
AI, 26	Specific Energy	R	Specific energy of the system.	kWh/m ³	-	S	-
AI, 27	Runtime	R	Total operating time of the system.	h	●	●	●
AI, 30	Energy consumption	R	Total energy consumption of the system.	kWh	●	●	●
AI, 33	Ambient temperature	R	Ambient temperature.	°C	-	S	-
AI, 34	Forward temperature	R	Flow-pipe temperature.	°C	-	S	-
AI, 35	Return temperature	R	Return-pipe temperature.	°C	-	S	-
AI, 36	Differential temperature	R	Differential temperature.	°C	-	S	-
AI, 37	Outlet pressure	R	System outlet pressure.	bar	S	S	-
AI, 38	Feed tank level	R	Actual level in the feed tank.	m	-	S	-
AI, 39	Subpump1 fault code	R	Fault code, subpump 1.	-	●	●	●
AI, 40	Subpump 1 runtime	R	Total operating time, subpump 1.	h	●	●	●
AI, 41	Subpump 1 speed	R	Actual speed, subpump 1.	%	●	●	-
AI, 42	Subpump 2 fault code	R	Fault code, subpump 2.	-	●	●	●
AI, 43	Subpump 2 runtime	R	Total operating time, subpump 2.	h	●	●	●
AI, 44	Subpump 2 speed	R	Actual speed, subpump 2.	%	●	●	-
AI, 45	Subpump 3 fault code	R	Fault code, subpump 3.	-	●	●	●
AI, 46	Subpump 3 runtime	R	Total operating time, subpump 3.	h	●	●	●
AI, 47	Subpump 3 speed	R	Actual speed, subpump 3.	%	●	●	-
AI, 48	Subpump 4 fault code	R	Fault code, subpump 4.	-	●	●	●
AI, 49	Subpump 4 runtime	R	Total operating time, subpump 4.	h	●	●	●
AI, 50	Subpump 4 speed	R	Actual speed, subpump 4.	%	●	●	-
AI, 51	Subpump 5 fault code	R	Fault code, subpump 5.	-	-	●	●
AI, 52	Subpump 5 runtime	R	Total operating time, subpump 5.	h	-	●	●
AI, 53	Subpump 5 speed	R	Actual speed, subpump 5.	%	-	●	-
AI, 54	Subpump 6 fault code	R	Fault code, subpump 6.	-	-	●	●
AI, 55	Subpump 6 runtime	R	Total operating time, subpump 6.	h	-	●	●
AI, 56	Subpump 6 speed	R	Actual speed, subpump 6.	%	-	●	-
AI, 58	User setpoint	R	User-defined setpoint.	%	●	●	-
AI, 59	Analogue influence	R	Analog setpoint influence.	%	●	●	-

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
AI, 60	Power-on counter	R	Number of power-on cycles.	-	●	●	-
AI, 61	Subpump 1	R	Line current, subpump 1.	A	●	●	-
AI, 62	Subpump 1	R	Power consumption, subpump 1.	W	●	●	-
AI, 63	Subpump 1	R	Motor temperature, subpump 1.	C	●	●	-
AI, 64	Subpump 1	R	Number of starts, subpump 1.	-	●	●	-
AI, 65	Subpump 2	R	Line current, subpump 2.	A	●	●	-
AI, 66	Subpump 2	R	Power consumption, subpump 2.	W	●	●	-
AI, 67	Subpump 2	R	Motor temperature, subpump 2.	C	●	●	-
AI, 68	Subpump 2	R	Number of starts, subpump 2.	-	●	●	-
AI, 69	Subpump 3	R	Line current, subpump 3.	A	●	●	-
AI, 70	Subpump 3	R	Power consumption, subpump 3.	W	●	●	-
AI, 71	Subpump 3	R	Motor temperature, subpump 3.	C	●	●	-
AI, 72	Subpump 3	R	Number of starts, subpump 3.	-	●	●	-
AI, 73	Subpump 4	R	Line current, subpump 4.	A	●	●	-
AI, 74	Subpump 4	R	Power consumption, subpump 4.	W	●	●	-
AI, 75	Subpump 4	R	Motor temperature, subpump 4.	C	●	●	-
AI, 76	Subpump 4	R	Number of starts, subpump 4.	-	●	●	-
AI, 77	Subpump 5	R	Line current, subpump 5.	A	-	●	-
AI, 78	Subpump 5	R	Power consumption, subpump 5.	W	-	●	-
AI, 79	Subpump 5	R	Motor temperature, subpump 5.	C	-	●	-
AI, 80	Subpump 5	R	Number of starts, subpump 5.	-	-	●	-
AI, 81	Subpump 6	R	Line current, subpump 6.	A	-	●	-
AI, 82	Subpump 6	R	Power consumption, subpump 6.	W	-	●	-
AI, 83	Subpump 6	R	Motor temperature, subpump 6.	C	-	●	-
AI, 84	Subpump 6	R	Number of starts, subpump 6.	-	-	●	-
AI, 85	Minimum of feedback sensor	R	Minimum of feedback sensor.	(see MI, 11 for unit)	-	●	●
AI, 86	Maximum of feedback sensor	R	Maximum of feedback sensor.	(see MI, 11 for unit)	-	●	●
AI, 87	Actual tank-filling tank height	R	Tank height in tank-filling mode.	m	●	-	-
AI, 88	Actual tank-filling start limit	R	Start limit in percent of tank height.	%	●	-	-
AI, 89	Actual tank-filling stop limit	R	Stop limit in percent of tank height.	%	●	-	-
AI, 90	Actual tank-filling alarm high-limit	R	Alarm high-limit in percent of tank height.	%	●	-	-
AI, 91	Actual tank-filling warning low-limit	R	Warning low-limit in percent of tank height.	%	●	-	-
AI, 96	Specific energy average	R	Average specific energy.	kWh/m ³	-	S	-
AI, 97	Flow measurement 1	R	Flow measurement 1.	m ³ /h	-	S	-

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
AI, 98	Flow measurement 2	R	Flow measurement 2.	m ³ /h	-	S	-
AI, 99	Flow measurement 3	R	Flow measurement 3.	m ³ /h	-	S	-
AI, 100	Pilot pump fault code	R	Fault code, pilot pump.	-	-	●	-
AI, 101	Pilot pump runtime	R	Total operating time, pilot pump.	h	-	●	-
AI, 102	Pilot pump speed	R	Actual speed, pilot pump.	%	-	●	-
AI, 103	Pilot pump line current	R	Line current, pilot pump.	A	-	●	-
AI, 104	Pilot pump power consumption	R	Power consumption, pilot pump.	W	-	●	-
AI, 105	Pilot pump motor temperature	R	Motor temperature, pilot pump.	C	-	●	-
AI, 106	Pilot pump number of starts	R	Number of starts, pilot pump.	-	-	●	-
AI, 107	Back-up pump fault code	R	Fault code, backup pump.	-	-	●	-
AI, 108	Back-up pump runtime	R	Total operating time, backup pump.	h	-	●	-
AI, 109	Back-up pump speed	R	Actual speed, backup pump.	%	-	●	-
AI, 110	Back-up pump line current	R	Line current, backup pump.	A	-	●	-
AI, 111	Back-up pump power consumption	R	Power consumption, backup pump.	W	-	●	-
AI, 112	Back-up pump motor temperature	R	Motor temperature, backup pump.	C	-	●	-
AI, 113	Back-up pump number of starts	R	Number of starts, backup pump.	-	-	●	-
AI, 122	Subpump 1	R	Energy consumption	kWh	-	●	-
AI, 123	Subpump 2	R	Energy consumption	kWh	-	●	-
AI, 124	Subpump 3	R	Energy consumption	kWh	-	●	-
AI, 125	Subpump 4	R	Energy consumption	kWh	-	●	-
AI, 126	Subpump 5	R	Energy consumption	kWh	-	●	-
AI, 127	Subpump 6	R	Energy consumption	kWh	-	●	-
AI, 128	Pilot pump	R	Energy consumption	kWh	-	●	-
AI, 129	Backup pump	R	Energy consumption	kWh	-	●	-
AO, 0	Set setpoint	W	Sets the booster system setpoint if bus control is enabled. A value of 0 does not imply a stop.	%	●	●	●
AO, 1	Tank-filling start limit	W	Sets the start limit in percent of tank height.	%	●	-	-
AO, 2	Tank-filling stop limit	W	Sets the stop limit in percent of tank height.	%	●	-	-
AO, 3	Tank-filling alarm high-limit	W	Sets the alarm high-limit in percent of tank height.	%	●	-	-
AO, 4	Tank-filling warning low-limit	W	Sets the warning low-limit in percent of tank height.	%	●	-	-

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
AV, 0	Custom device object instance number	R/W	Value for Custom Device Object Instance Number. Used in conjunction with DIP switch SW3. Present_Value range: 0-0x3FFFFE. Default Present_Value: 0xE7.		•	•	•
AV, 4	Simulation event code	R/W	Event code to simulate. The following event code values are available for simulation of CU 35X (among others): 000: No alarm 003: External fault 010: Booster system communication alarm 089: Closed-loop feedback sensor signal fault 088: General (measuring) sensor signal fault 203: All pumps in alarm 210: Pressure high 211: Pressure low 214: Water shortage 231: No Ethernet address from DHCP server.		•	•	-
AV, 5	Simulation device type	R/W	Device type of simulated event. 0: Controller 2: Pump 3: IO 351 4: Primary sensor 7: IO 351 8: System 9: Analog input 10: Pilot booster system 11: Limit-exceeded function.		•	•	-
AV, 6	Simulation device number	R/W	Device number of simulated event. If the device type is "Pump", the device number indicates the pump number [1-6]. If the device type is "Analog input", the device number indicates the sensor that generated the event [1-7].		•	•	-
AV, 7	Simulation event action type	R/W	The associated action to the event. 0: Go to operating mode "Stop". 1: Go to operating mode "Stop" (delay). 2: Go to operating mode "Minimum". 3: Go to operating mode "User-defined". 4: Go to operating mode "Maximum". 5: Set pumps in source mode to "Local control". 6: No action (warning only). 7: Go to operating mode "Emergency run".		-	•	-
AV, 8	Simulation event reset type	R/W	Resetting type for simulated event. Manual or automatic. 0: Manual resetting 1: Automatic resetting.		-	•	-

ID	Object Name	R/W	Notes	Units	Hydro Multi-B	Hydro MPC	Hydro Multi-E
AV. 10	Proportional-control reduction	R/W	Reduction in % to be used in proportional-pressure control mode.		-	•	-
AV. 11	Proportional-control flow max.	R/W	Max. flow in m ³ /h to be used in proportional-pressure control mode.		-	•	-

Subject to alterations.

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