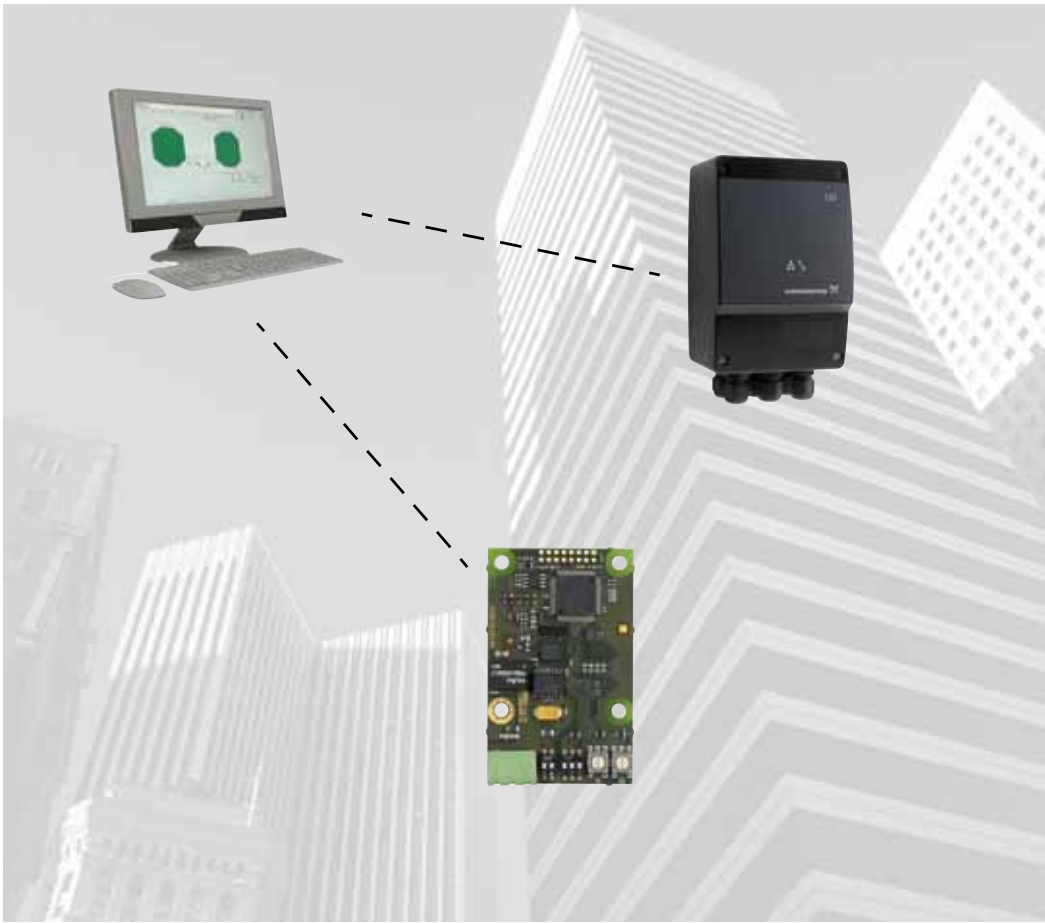


# BACnet PICS CIM 300

Protocol Implementation Conformance Statement for Grundfos CIM 300  
BACnet MS/TP for Grundfos pumps, booster systems and  
Grundfos Level Control LC 2X1 and LC 2X2

Installation and operating instructions, supplement



# English (GB) Installation and operating instructions

## Original installation and operating instructions

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## 1. General information

### 1.1 Hazard statements

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



#### DANGER

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



#### WARNING

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



#### CAUTION

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

The hazard statements are structured in the following way:



#### SIGNAL WORD

##### Description of hazard

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

## 1.2 Notes

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



Observe these instructions for explosion-proof products.



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



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



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



Tips and advice that make the work easier.



**Fig. 1** The CIM 300 BACnet MS/TP passed the BTL test in August 2014

### Grundfos CIM 300 BACnet MS/TP for pumps

Document date: 20.02.2020

Vendor name: Grundfos

Product name: CIM

Product model number: 300 BACnet MS/TP

Application software: V04.20.00

Firmware revision: V04.20.00

BACnet protocol rev.: 9 (for HW R8)

## 2. Product description

The CIM 300 BACnet MS/TP 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 MS/TP 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.

CIM 300 BACnet MS/TP passed the BTL test in August 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 creatable/deletable |
|-------------------|-----------|---------------------------------|
| Analog input      | •         | -                               |
| Analog output     | •         | -                               |
| Analog value      | •         | -                               |
| Binary input      | •         | -                               |
| Binary output     | •         | -                               |
| Multistate input  | •         | -                               |
| Multistate output | •         | -                               |
| Device            | •         | -                               |

### 3.1 Data Link Layer options

MS/TP master (Clause 9), baud rate(s):

- 9,600 bps
- 19,200 bps
- 38,400 bps
- 76,800 bps.

### 3.2 Device address binding

The device does not support static device binding, which is necessary for two-way communication with MS/TP slaves and certain other devices.

### 3.3 Networking options

- ☐ Router, Clause 6 - List all routing configurations, for example 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.
  - Grundfos Level Control LC 2X1 level control system for wastewater pumps
  - Grundfos Level Control LC 2X2 level control system for submersible products
- \* Additional Grundfos GENIbus module required.

## 4. Complete object list

### 4.1 Complete object list for pumps

**Table Legend**

|      |  |
|------|--|
| 3    | Only available on MAGNA3.  |
| G    | Only available on model G 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.   |

| ID     | Object Name             | R/W | Notes   | MAGNA/<br>UPE<br>Series | E-pumps<br>0.25 - 7.5<br>kW | CUE/<br>E-pumps<br>11-22 kW |
|--------|-------------------------|-----|---|-------------------------|-----------------------------|-----------------------------|
| Bl, 0  | Control source status   | R   | Status of the actual control source.<br>0: Local control<br>1: Bus control.               | •                       | •                           | •                           |
| Bl, 1  | Actual direction        | R   | Rotational direction of the pump impeller.<br>0: Clockwise<br>1: Counterclockwise         | 3                       | •                           | •                           |
| Bl, 2  | Rotation status         | R   | Rotation status.<br>0: No rotation<br>1: Rotation (pump running).                         | •                       | •                           | •                           |
| Bl, 3  | At minimum speed        | R   | 0: Not running at minimum speed<br>1: Running at minimum speed.                           | •                       | •                           | •                           |
| Bl, 4  | At maximum speed        | R   | 0: Not running at maximum speed<br>1: Running at maximum speed.                           | •                       | •                           | •                           |
| Bl, 11 | Digital input 1 status  | R   | 0: Not active<br>1: Active.   | 3                       | •                           | •                           |
| Bl, 12 | Digital input 2 status  | R   | 0: Not active<br>1: Active.   | 3                       | •                           | •                           |
| Bl, 13 | Digital input 3 status  | R   | 0: Not active<br>1: Active.   | -                       | •                           | •                           |
| Bl, 14 | Digital output 1 status | R   | 0: Not active<br>1: Active.   | 3                       | •                           | •                           |
| Bl, 15 | Digital output 2 status | R   | 0: Not active<br>1: Active.   | 3                       | •                           | •                           |
| Bl, 28 | Fault simulation status | R   | Fault simulation status.<br>0: Fault simulation not active<br>1: Fault simulation active. | •                       | •                           | •                           |
| Bl, 31 | At power limit          | R   | 0: Not running at power limit<br>1: Running at power limit.                               | 3                       | -                           | -                           |
| Bl, 38 | Setpoint influence      | R   | 0: Not active<br>1: Active.   | •                       | -                           | -                           |

| ID     | Object Name               | R/W | Notes   | MAGNA/<br>UPE<br>Series | E-pumps<br>0.25 - 7.5<br>kW | CUE/<br>E-pumps<br>11-22 kW |
|--------|---------------------------|-----|---|-------------------------|-----------------------------|-----------------------------|
| BI, 39 | Max. flow limit           | R   | 0: Not active<br>1: Active.   | 3                       | -                           | -                           |
| BO, 0  | Set control source        | W   | Sets the control source.<br>Set to 1 to enable pump control via BACnet.<br>0: Local control (default)<br>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.<br>0: Closed (default)<br>1: Open.  | -                       | •                           | •                           |
| BO, 2  | Relay 2 control           | W   | Controls relay 2 if bus control is enabled and relay 2 is set to be controlled via bus.<br>0: Closed (default)<br>1: Open.  | -                       | -                           | •                           |
| BO, 4  | Reset fault               | W   | Resets fault if bus control is enabled.<br>(Triggered on rising edge).<br>0: No resetting (default)<br>1: Resetting.  | •                       | •                           | •                           |
| BO, 5  | Fault simulation          | W   | Enables simulated fault if bus control is enabled.<br>0: Disabled (default)<br>1: Enabled.  | •                       | •                           | •                           |
| BO, 6  | Copy settings to local    | W   | Copies remote settings to local pump settings.<br>0: Disabled<br>1: Enabled.  | 3                       | -                           | -                           |
| BO, 9  | Enable max. flow limit    | W   | 0: Disabled<br>1: Enabled.  | 3                       | -                           | -                           |
| MI, 0  | Actual control mode       | R   | Reads the current control mode.<br>1: Constant speed<br>2: Constant pressure<br>3: Proportional pressure<br>4: Automatic / AUTO <sub>ADAPT</sub><br>5: Constant flow<br>6: Constant temperature<br>7: Constant level<br>8: Constant percentage<br>9: Auto flow<br>10: Closed-loop sensor control. | •                       | •                           | •                           |
| MI, 1  | Actual operating mode     | R   | Reads the current operating mode.<br>1: Start (normal)<br>2: Stop<br>3: Minimum<br>4: Maximum.  | •                       | •                           | •                           |
| MI, 2  | Next bearing-service type | R   | Type of next bearing service.<br>1: Service type unknown<br>2: Lubricate bearings<br>3: Change bearings.  | -                       | -                           | •                           |

| ID     | Object Name             | R/W | Notes  | MAGNA/<br>UPE<br>Series | E-pumps<br>0.25 - 7.5<br>kW | CUE/<br>E-pumps<br>11-22 kW |
|--------|-------------------------|-----|--|-------------------------|-----------------------------|-----------------------------|
| MI, 3  | CIM status              | R   | Reads the status of the CIM module, useful for fault finding.<br>1: OK<br>2: EEPROM fault<br>3: Memory fault.  | •                       | •                           | •                           |
| MI, 11 | Feedback sensor unit    | R   | Unit of the feedback sensor.<br>1: Unknown<br>2: bar<br>3: mbar<br>4: m<br>5: kPa<br>6: psi<br>7: ft<br>8: m <sup>3</sup> /h<br>9: m <sup>3</sup> /s<br>10: l/s<br>11: gpm<br>12: °C<br>13: °F<br>14: %<br>15: K<br>16: l/h.   | •                       | •                           | •                           |
| MO, 0  | Set control mode        | W   | Sets the control mode if bus control is enabled.<br>1: Constant speed<br>2: Constant pressure<br>3: Proportional pressure<br>4: Automatic / AUTO <sub>ADAPT</sub><br>5: Constant flow<br>6: Constant temperature<br>7: Constant level<br>8: Constant percentage<br>9: Auto flow<br>10: Closed-loop sensor control. | •                       | •                           | •                           |
| MO, 1  | Set operating mode      | W   | Sets the operating mode if bus control is enabled.<br>1: Start (normal)<br>2: Stop<br>3: Minimum<br>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.<br>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.  | •                       | •                           | •                           |

| ID     | Object Name                  | R/W | Notes  | MAGNA/<br>UPE<br>Series | E-pumps<br>0.25 - 7.5<br>kW | CUE/<br>E-pumps<br>11-22 kW |
|--------|------------------------------|-----|--|-------------------------|-----------------------------|-----------------------------|
| Al, 9  | Actual setpoint              | R   | Actual setpoint.                                 | •                       | •                           | •                           |
| Al, 10 | Motor current                | R   | Actual motor current.                            | 3                       | •                           | •                           |
| Al, 11 | DC link voltage              | R   | Frequency converter DC Link voltage.             | •                       | •                           | •                           |
| Al, 12 | Motor voltage                | R   | Motor voltage.                                   | -                       | •                           | •                           |
| Al, 13 | Power                        | R   | Total power consumption of the pump.             | •                       | •                           | •                           |
| Al, 14 | Remote flow                  | R   | Measured flow at external sensor.                | 3+S                     | G+S                         | S                           |
| Al, 15 | Inlet pressure               | R   | System inlet pressure.                           | -                       | G+S                         | S                           |
| Al, 16 | Remote pressure              | R   | Measured pressure at external sensor.            | 3+S                     | G+S                         | S                           |
| Al, 17 | Level                        | R   | Tank level.                                      | -                       | S                           | S                           |
| Al, 18 | Power electronic temperature | R   | Temperature in frequency converter.              | 3                       | •                           | •                           |
| Al, 19 | Motor temperature            | R   | Motor winding temperature.                       | -                       | G                           | •                           |
| Al, 20 | Remote temperature           | R   | Temperature at external sensor.                  | -                       | S                           | S                           |
| Al, 21 | Electronic temperature       | R   | Pump electronics temperature.                    | -                       | -                           | S                           |
| Al, 22 | Fluid temperature            | R   | Pumped-liquid temperature.                       | •                       | G                           | S                           |
| Al, 23 | Bearing temperature DE       | R   | Bearing temperature, drive end.                  | -                       | -                           | S                           |
| Al, 24 | Bearing temperature NDE      | R   | Bearing temperature, non-drive end.              | -                       | -                           | S                           |
| Al, 25 | Auxiliary sensor input       | R   | Auxiliary sensor input.                          | -                       | S                           | S                           |
| Al, 26 | Specific energy              | R   | Specific energy consumption.                     | 3                       | -                           | CUE                         |
| Al, 27 | Runtime                      | R   | Total operating time of the pump.                | •                       | •                           | •                           |
| Al, 28 | Total ontime                 | R   | Total power-on time of the pump.                 | •                       | •                           | •                           |
| Al, 29 | Torque                       | R   | Motor torque.                                    | -                       | 3-ph                        | •                           |
| Al, 30 | Energy consumption           | R   | Total energy consumption of the pump.            | •                       | •                           | •                           |
| Al, 31 | Number of starts             | R   | Number of times the pump has started.            | 3                       | •                           | •                           |
| Al, 32 | Volume                       | R   | Total pumped volume.                             | 3                       | -                           | CUE                         |
| Al, 37 | Outlet pressure              | R   | System outlet pressure                           | -                       | H                           | -                           |
| Al, 57 | Remote temperature 2         | R   | Temperature at external temperature sensor 2.    | 3+S                     | -                           | -                           |
| Al, 58 | User setpoint                | R   | User-selected setpoint.                          | •                       | •                           | •                           |
| Al, 85 | Minimum of feedback sensor   | R   | Minimum value of feedback sensor.                | •                       | •                           | •                           |
| Al, 86 | Maximum of feedback sensor   | R   | Maximum value of feedback sensor.                | •                       | •                           | •                           |
| Al, 92 | Load percent                 | R   | Motor current in percent of rated motor current. | 3                       | -                           | -                           |



| ID     | Object Name                          | R/W | Notes   | MAGNA/<br>UPE<br>Series | E-pumps<br>0.25 - 7.5<br>kW | CUE/<br>E-pumps<br>11-22 kW |
|--------|--------------------------------------|-----|---|-------------------------|-----------------------------|-----------------------------|
| 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.<br>A value of 0 does not imply a stop.  | •                       | •                           | •                           |
| AO, 5  | Set max. flow limit                  | W   | Sets the maximum flow limit value.  | 3                       | -                           | -                           |
| AV, 0  | Custom device object instance number | R/W | Value for Custom Device Object Instance Number. Used in conjunction with DIP switch SW3.<br>Present_Value range: 0-0x3FFFFE.<br>Default Present_Value: 0xE7.                        | •                       | •                           | •                           |
| AV, 1  | BACnet watchdog                      | R/W | Time in seconds before BACnet communication watchdog times out, and sets the pump to local control mode.<br>0: Disabled (default).<br>Set to a value between 5 and 3,600 to enable. | •                       | •                           | •                           |
| AV, 2  | Simulation fault code                | R/W | Fault code to simulate.<br>Can be cleared by writing a value of 0.  | •                       | •                           | •                           |
| AV, 3  | Simulation warning code              | R/W | Warning code to simulate.<br>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                       | -                           | -                           |
| AV, 12 | Remote sensor feedback               | R/W | Sensor value communicated via fieldbus.   | -                       | H                           | -                           |

## 4.2 Complete object list for booster system

| ID     | Object Name                    | R/W | Notes  | Units | Hydro Multi-B | Hydro MPC | Hydro Multi-E |
|--------|--------------------------------|-----|--|-------|---------------|-----------|---------------|
| Bl, 0  | Control source status          | R   | Status of the actual control source.<br>0: Local control<br>1: Bus control.    | -     | •             | •         | •             |
| Bl, 2  | Rotation status                | R   | Rotation status.<br>0: No rotation<br>1: Rotation (one or more pumps running). | -     | •             | •         | •             |
| Bl, 3  | At minimum speed               | R   | 0: Not running at minimum speed<br>1: Running at minimum speed.                | -     | -             | •         | •             |
| Bl, 4  | At maximum speed               | R   | 0: Not running at maximum speed<br>1: Running at maximum speed.                | -     | -             | •         | •             |
| Bl, 5  | Standby pumps active           | R   | 0: Standby pumps not active<br>1: Standby pumps active.                        | -     | -             | •         | -             |
| Bl, 6  | Pressure relief active         | R   | 0: Pressure relief not active<br>1: Pressure relief active.                    | -     | -             | •         | -             |
| Bl, 7  | Soft pressure active           | R   | 0: Soft pressure not active<br>1: Soft pressure active.                        | -     | -             | •         | -             |
| Bl, 8  | Low-flow boost active          | R   | 0: Low-flow boost not active<br>1: Low-flow boost active.                      | -     | -             | •         | -             |
| Bl, 9  | Low-flow stop active           | R   | 0: Low-flow stop not active<br>1: Low-flow stop active.                        | -     | •             | •         | -             |
| Bl, 10 | Alternative setpoint active    | R   | 0: Alternative setpoint not active<br>1: Alternative setpoint active.          | -     | -             | •         | -             |
| Bl, 11 | Digital input 1 status         | R   | 0: Not active<br>1: Active.  | -     | •             | •         | •             |
| Bl, 12 | Digital input 2 status         | R   | 0: Not active<br>1: Active.  | -     | •             | •         | •             |
| Bl, 13 | Digital input 3 status         | R   | 0: Not active<br>1: Active.  | -     | •             | •         | •             |
| Bl, 14 | Digital output 1 status        | R   | 0: Not active<br>1: Active.  | -     | •             | •         | •             |
| Bl, 15 | Digital output 2 status        | R   | 0: Not active<br>1: Active.  | -     | •             | •         | •             |
| Bl, 16 | Subpump 1 presence             | R   | 0: Subpump not present<br>1: Subpump present.                                  | -     | •             | •         | •             |
| Bl, 17 | Subpump 1 communication status | R   | 0: Communication OK<br>1: Communication fault.                                 | -     | •             | •         | •             |
| Bl, 18 | Subpump 2 presence             | R   | 0: Subpump not present<br>1: Subpump present.                                  | -     | •             | •         | •             |
| Bl, 19 | Subpump 2 communication status | R   | 0: Communication OK<br>1: Communication fault.                                 | -     | •             | •         | •             |
| Bl, 20 | Subpump 3 presence             | R   | 0: Subpump not present<br>1: Subpump present.                                  | -     | •             | •         | •             |
| Bl, 21 | Subpump 3 communication status | R   | 0: Communication OK<br>1: Communication fault.                                 | -     | •             | •         | •             |
| Bl, 22 | Subpump 4 presence             | R   | 0: Subpump not present<br>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<br>1: Communication fault.  | -     | •             | •         | •             |
| BI, 24 | Subpump 5 presence               | R   | 0: Subpump not present<br>1: Subpump present.   | -     | -             | •         | •             |
| BI, 25 | Subpump 5 communication status   | R   | 0: Communication OK<br>1: Communication fault.  | -     | -             | •         | •             |
| BI, 26 | Subpump 6 presence               | R   | 0: Subpump not present<br>1: Subpump present.   | -     | -             | •         | •             |
| BI, 27 | Subpump 6 communication status   | R   | 0: Communication OK<br>1: Communication fault.  | -     | -             | •         | •             |
| BI, 28 | Fault simulation status          | R   | Fault simulation status.<br>0: Fault simulation disabled<br>1: Fault simulation enabled.                            | -     | •             | •         | -             |
| BI, 32 | Subpump 1 auto mode              | R   | 0: Manual control<br>1: Auto-control.   | -     | •             | •         | -             |
| BI, 33 | Subpump 2 auto mode              | R   | 0: Manual control<br>1: Auto-control.   | -     | •             | •         | -             |
| BI, 34 | Subpump 3 auto mode              | R   | 0: Manual control<br>1: Auto-control.   | -     | •             | •         | -             |
| BI, 35 | Subpump 4 auto mode              | R   | 0: Manual control<br>1: Auto-control.   | -     | •             | •         | -             |
| BI, 36 | Subpump 5 auto mode              | R   | 0: Manual control<br>1: Auto-control.   | -     | -             | •         | -             |
| BI, 37 | Subpump 6 auto mode              | R   | 0: Manual control<br>1: Auto-control.   | -     | -             | •         | -             |
| BI, 38 | Setpoint influence active        | R   | 0: No influence on setpoint<br>1: Setpoint influence active.  | -     | -             | •         | -             |
| BI, 40 | Pilot pump auto mode             | R   | 0: Manual control<br>1: Auto-control.   | -     | -             | •         | -             |
| BI, 41 | Pilot pump presence              | R   | 0: Pilot pump not present<br>1: Pilot pump present.   | -     | -             | •         | -             |
| BI, 42 | Pilot pump communication status  | R   | 0: Communication OK<br>1: Communication fault.  | -     | -             | •         | -             |
| BI, 43 | Backup pump auto mode            | R   | 0: Manual control<br>1: Auto-control.   | -     | -             | •         | -             |
| BI, 44 | Backup pump presence             | R   | 0: Backup pump not present<br>1: Backup pump present.   | -     | -             | •         | -             |
| BI, 45 | Backup pump communication status | R   | 0: Communication OK<br>1: Communication fault.  | -     | -             | •         | -             |
| BO, 0  | Set control source               | W   | Sets the control source.<br>Set to 1 to enable control via BACnet.<br>0: Local control (default)<br>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.<br>(Triggered on rising edge).<br>0: No resetting (default)<br>1: Resetting.   | -     | •             | •         | •             |
| BO, 5 | Fault simulation         | W   | Enables fault simulation.<br>0: Disabled (default)<br>1: Enabled.  | -     | •             | •         | -             |
| MI, 0 | Actual control mode      | R   | Reads the current control mode.<br>1: Constant speed<br>2: Constant pressure<br>3: Proportional pressure<br>4: RESERVED<br>5: Constant flow<br>6: Constant temperature<br>7: Constant level<br>8: Constant percentage. | -     | •             | •         | •             |
| MI, 1 | Actual operating mode    | R   | Reads the current operating mode.<br>1: Start (normal)<br>2: Stop<br>3: Minimum<br>4: Maximum.   | -     | •             | •         | •             |
| MI, 3 | CIM status               | R   | Reads the status of the CIM module, useful for fault finding.<br>1: OK<br>2: EEPROM fault<br>3: Memory fault.  | -     | •             | •         | •             |
| MI, 4 | Subpump 1 control source | R   | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.  | -     | •             | •         | -             |
| MI, 5 | Subpump 2 control source | R   | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.  | -     | •             | •         | -             |
| MI, 6 | Subpump 3 control source | R   | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.  | -     | •             | •         | -             |
| MI, 7 | Subpump 4 control source | R   | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.  | -     | •             | •         | -             |
| MI, 8 | Subpump 5 control source | R   | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.  | -     | -             | •         | -             |
| MI, 9 | Subpump 6 control source | R   | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>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<br>2: Heating pumps on hot side<br>3: Heating pumps on cold side<br>4: AirCon pumps on hot side<br>5: AirCon pumps on cold side<br>6: MPC S2000 heating pumps on hot side<br>7: MPC S2000 heating pumps on cold side<br>8: MPC S2000 AirCon pumps on hot side<br>9: MPC S2000 AirCon pumps on cold side<br>10: Tank filling<br>11: Tank filling (float switches)<br>12: Undefined. | -     | •             | •         | -             |
| MI, 11 | Feedback sensor unit       | R   | 1: Unknown<br>2: bar<br>3: mbar<br>4: m<br>5: kPa<br>6: psi<br>7: ft<br>8: m <sup>3</sup> /h<br>9: m <sup>3</sup> /s<br>10: l/s<br>11: gpm<br>12: °C<br>13: °F<br>14: %<br>15: K<br>16: l/h   | -     | •             | •         | -             |
| MI, 12 | Pilot pump control source  |     | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.   | -     | -             | •         | -             |
| MI, 13 | Backup pump control source |     | 1: Buttons<br>2: GENIbus<br>3: GENIlink<br>4: External control.   | -     | -             | •         | -             |
| MO, 0  | Set control mode           | W   | Sets the control mode if bus control is enabled.<br>1: Constant speed<br>2: Constant pressure<br>3: Proportional pressure<br>4: RESERVED<br>5: Constant flow<br>6: Constant temperature<br>7: Constant level<br>8: Constant percentage.<br>Note that Hydro Multi-E always runs in constant-pressure mode.   | -     | -             | •         | -             |
| MO, 1  | Set operating mode         | W   | Sets the operating mode if bus control is enabled.<br>1: Start (normal)<br>2: Stop<br>3: Minimum (Hydro MPC only)<br>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).<br>1: Disabled<br>5: Hydro Multi-E<br>6: Hydro MPC<br>7: Hydro Multi-B. | -                 | •             | •         | •             |
| MO, 3  | Control subpump 1    | W   | Manual control of subpump 1.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.   | -                 | •             | •         | -             |
| MO, 4  | Control subpump 2    | W   | Manual control of subpump 2.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.   | -                 | •             | •         | -             |
| MO, 5  | Control subpump 3    | W   | Manual control of subpump 3.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.   | -                 | •             | •         | -             |
| MO, 6  | Control subpump 4    | W   | Manual control of subpump 4.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.   | -                 | •             | •         | -             |
| MO, 7  | Control subpump 5    | W   | Manual control of subpump 5.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.   | -                 | -             | •         | -             |
| MO, 8  | Control subpump 6    | W   | Manual control of subpump 6.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.   | -                 | -             | •         | -             |
| MO, 9  | Control pilot pump   | W   | Manual control of pilot pump.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>3: Forced stop.  | -                 | -             | •         | -             |
| MO, 10 | Control back-up pump | W   | Manual control of backup pump.<br>1: Automatic control (default)<br>2: Forced start (not available)<br>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 <sup>3</sup> /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 <sup>3</sup> | -             | 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.                  | -                  | -             | ●         | ●             |

| ID     | Object Name                           | R/W | Notes  | Units                 | Hydro Multi-B | Hydro MPC | Hydro Multi-E |
|--------|---------------------------------------|-----|--|-----------------------|---------------|-----------|---------------|
| Al, 55 | Subpump 6 runtime                     | R   | Total operating time, subpump 6.             | h                     | -             | ●         | ●             |
| Al, 56 | Subpump 6 speed                       | R   | Actual speed, subpump 6.                     | %                     | -             | ●         | -             |
| Al, 58 | User setpoint                         | R   | User-defined setpoint.                       | %                     | ●             | ●         | -             |
| Al, 59 | Analogue influence                    | R   | Analog setpoint influence.                   | %                     | ●             | ●         | -             |
| Al, 60 | Power-on counter                      | R   | Number of power-on cycles.                   | -                     | ●             | ●         | -             |
| Al, 61 | Subpump 1                             | R   | Line current, subpump 1.                     | A                     | ●             | ●         | -             |
| Al, 62 | Subpump 1                             | R   | Power consumption, subpump 1.                | W                     | ●             | ●         | -             |
| Al, 63 | Subpump 1                             | R   | Motor temperature, subpump 1.                | °C                    | ●             | ●         | -             |
| Al, 64 | Subpump 1                             | R   | Number of starts, subpump 1.                 | -                     | ●             | ●         | -             |
| Al, 65 | Subpump 2                             | R   | Line current, subpump 2.                     | A                     | ●             | ●         | -             |
| Al, 66 | Subpump 2                             | R   | Power consumption, subpump 2.                | W                     | ●             | ●         | -             |
| Al, 67 | Subpump 2                             | R   | Motor temperature, subpump 2.                | °C                    | ●             | ●         | -             |
| Al, 68 | Subpump 2                             | R   | Number of starts, subpump 2.                 | -                     | ●             | ●         | -             |
| Al, 69 | Subpump 3                             | R   | Line current, subpump 3.                     | A                     | ●             | ●         | -             |
| Al, 70 | Subpump 3                             | R   | Power consumption, subpump 3.                | W                     | ●             | ●         | -             |
| Al, 71 | Subpump 3                             | R   | Motor temperature, subpump 3.                | °C                    | ●             | ●         | -             |
| Al, 72 | Subpump 3                             | R   | Number of starts, subpump 3.                 | -                     | ●             | ●         | -             |
| Al, 73 | Subpump 4                             | R   | Line current, subpump 4.                     | A                     | ●             | ●         | -             |
| Al, 74 | Subpump 4                             | R   | Power consumption, subpump 4.                | W                     | ●             | ●         | -             |
| Al, 75 | Subpump 4                             | R   | Motor temperature, subpump 4.                | °C                    | ●             | ●         | -             |
| Al, 76 | Subpump 4                             | R   | Number of starts, subpump 4.                 | -                     | ●             | ●         | -             |
| Al, 77 | Subpump 5                             | R   | Line current, subpump 5.                     | A                     | -             | ●         | -             |
| Al, 78 | Subpump 5                             | R   | Power consumption, subpump 5.                | W                     | -             | ●         | -             |
| Al, 79 | Subpump 5                             | R   | Motor temperature, subpump 5.                | °C                    | -             | ●         | -             |
| Al, 80 | Subpump 5                             | R   | Number of starts, subpump 5.                 | -                     | -             | ●         | -             |
| Al, 81 | Subpump 6                             | R   | Line current, subpump 6.                     | A                     | -             | ●         | -             |
| Al, 82 | Subpump 6                             | R   | Power consumption, subpump 6.                | W                     | -             | ●         | -             |
| Al, 83 | Subpump 6                             | R   | Motor temperature, subpump 6.                | °C                    | -             | ●         | -             |
| Al, 84 | Subpump 6                             | R   | Number of starts, subpump 6.                 | -                     | -             | ●         | -             |
| Al, 85 | Minimum of feedback sensor            | R   | Minimum of feedback sensor.                  | (see MI, 11 for unit) | -             | ●         | ●             |
| Al, 86 | Maximum of feedback sensor            | R   | Maximum of feedback sensor.                  | (see MI, 11 for unit) | -             | ●         | ●             |
| Al, 87 | Actual tank-filling tank height       | R   | Tank height in tank-filling mode.            | m                     | ●             | -         | -             |
| Al, 88 | Actual tank-filling start limit       | R   | Start limit in percent of tank height.       | %                     | ●             | -         | -             |
| Al, 89 | Actual tank-filling stop limit        | R   | Stop limit in percent of tank height.        | %                     | ●             | -         | -             |
| Al, 90 | Actual tank-filling alarm high-limit  | R   | Alarm high-limit in percent of tank height.  | %                     | ●             | -         | -             |
| Al, 91 | Actual tank-filling warning low-limit | R   | Warning low-limit in percent of tank height. | %                     | ●             | -         | -             |



| ID      | Object Name                   | R/W | Notes   | Units              | Hydro Multi-B | Hydro MPC | Hydro Multi-E |
|---------|-------------------------------|-----|---|--------------------|---------------|-----------|---------------|
| AI, 96  | Specific energy average       | R   | Average specific energy.  | kWh/m <sup>3</sup> | -             | S         | -             |
| AI, 97  | Flow measurement 1            | R   | Flow measurement 1.   | m <sup>3</sup> /h  | -             | S         | -             |
| AI, 98  | Flow measurement 2            | R   | Flow measurement 2.   | m <sup>3</sup> /h  | -             | S         | -             |
| AI, 99  | Flow measurement 3            | R   | Flow measurement 3.   | m <sup>3</sup> /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 | Backup pump fault code        | R   | Fault code, backup pump.  | -                  | -             | ●         | -             |
| AI, 108 | Backup pump runtime           | R   | Total operating time, backup pump.  | h                  | -             | ●         | -             |
| AI, 109 | Backup pump speed             | R   | Actual speed, backup pump.  | %                  | -             | ●         | -             |
| AI, 110 | Backup pump line current      | R   | Line current, backup pump.  | A                  | -             | ●         | -             |
| AI, 111 | Backup pump power consumption | R   | Power consumption, backup pump.   | W                  | -             | ●         | -             |
| AI, 112 | Backup pump motor temperature | R   | Motor temperature, backup pump.   | °C                 | -             | ●         | -             |
| AI, 113 | Backup 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.   | %                  | ●             | -         | -             |

| ID    | Object Name                          | R/W | Notes  | Units | Hydro Multi-B | Hydro MPC | Hydro Multi-E |
|-------|--------------------------------------|-----|--|-------|---------------|-----------|---------------|
| 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.  | %     | ●             | -         | -             |
| AV, 0 | Custom device object instance number | R/W | Value for Custom Device Object Instance Number.<br>Used in conjunction with DIP switch SW3.<br>Present_Value range: 0-0x3FFFFE.<br>Default Present_Value: 0xE7.  | -     | ●             | ●         | ●             |
| AV, 1 | BACnet watchdog                      | R/W | Time in seconds before BACnet communication watchdog times out, and sets the booster system to use its local settings.<br>0: Disabled (default).<br>Set to a value between 5 and 3600 to enable.   | s     | ●             | ●         | ●             |
| AV, 4 | Simulation event code                | R/W | Event code to simulate.<br>The following event code values are available for simulation of CU 35X (among others):<br>000: No alarm<br>003: External fault<br>010: Booster system communication alarm<br>089: Closed-loop feedback sensor signal fault<br>088: General (measuring) sensor signal fault<br>203: All pumps in alarm<br>210: Pressure high<br>211: Pressure low<br>214: Water shortage<br>231: No Ethernet address from DHCP server. | -     | ●             | ●         | -             |
| AV, 5 | Simulation device type               | R/W | Device type of simulated event.<br>0: Controller<br>2: Pump<br>3: IO 351<br>4: Primary sensor<br>7: IO 351<br>8: System<br>9: Analog input<br>10: Pilot booster system<br>11: Limit-exceeded function.   | -     | ●             | ●         | -             |
| AV, 6 | Simulation device number             | R/W | Device number of simulated event.<br>If the device type is "Pump", the device number indicates the pump number [1-6].<br>If the device type is "Analog input", the device number indicates the sensor that generated the event [1-7].  | -     | ●             | ●         | -             |

| ID     | Object Name                    | R/W | Notes   | Units             | Hydro Multi-B | Hydro MPC | Hydro Multi-E |
|--------|--------------------------------|-----|---|-------------------|---------------|-----------|---------------|
| AV, 7  | Simulation event action type   | R/W | The associated action to the event.<br>0: Go to operating mode "Stop".<br>1: Go to operating mode "Stop" (delay).<br>2: Go to operating mode "Minimum".<br>3: Go to operating mode "User-defined".<br>4: Go to operating mode "Maximum".<br>5: Set pumps in source mode to "Local control".<br>6: No action (warning only).<br>7: Go to operating mode "Emergency run". | -                 | -             | ●         | -             |
| AV, 8  | Simulation event reset type    | R/W | Resetting type for simulated event. Manual or automatic.<br>0: Manual resetting<br>1: Automatic resetting.  | -                 | -             | ●         | -             |
| 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 <sup>3</sup> /h to be used in proportional-pressure control mode.  | m <sup>3</sup> /h | -             | ●         | -             |
| AV, 13 | Remote Sensor 1                | R/W | Remote Sensor 1 via BACnet (CU 352)   | %                 | -             | ●         | -             |
| AV, 14 | Remote Sensor 2                | R/W | Remote Sensor 2 via BACnet (CU 352)   | %                 | -             | ●         | -             |
| AV, 15 | Remote Sensor 3                | R/W | Remote Sensor 3 via BACnet (CU 352)   | %                 | -             | ●         | -             |
| AV, 16 | Remote Sensor 4                | R/W | Remote Sensor 4 via BACnet (CU 352)   | %                 | -             | ●         | -             |
| AV, 17 | Remote Sensor 5                | R/W | Remote Sensor 5 via BACnet (CU 352)   | %                 | -             | ●         | -             |
| AV, 18 | Remote Sensor 6                | R/W | Remote Sensor 6 via BACnet (CU 352)   | %                 | -             | ●         | -             |

### 4.3 Complete object list for Level Control LC 2X1

| ID    | Object Name                          | R/W | Notes  | Units |
|-------|--------------------------------------|-----|--|-------|
| AV, 0 | Custom device object instance number | R/W | Present_Value range: 0-0x3FFFFE.<br>Default Present_Value: 0xE7. [RD = 0]  | -     |
| AV, 1 | Product time and date                | R/W | Set clock in UNIX format   | s     |
| BO, 0 | Reset alarms                         | W   | 0: No resetting<br>1: Resetting alarms   | -     |
| MO, 0 | Control Pump 1                       | W   | 1: Auto<br>2: Forced Start<br>3: Forced Stop   | -     |
| MO, 1 | Control Pump 2                       | W   | 1: Auto<br>2: Forced Start<br>3: Forced Stop   | -     |
| AO, 0 | SetHighLevel                         | W   | Set high level in centimetres.   | cm    |
| AO, 1 | SetDryRunningLevel                   | W   | Set dry running level in centimetres.  | cm    |
| AO, 2 | SetStartLevelPump1                   | W   | Set start level for pump 1 in centimetres.   | cm    |
| AO, 3 | SetStopLevelPump1                    | W   | Set stop level for pump 1 in centimetres.  | cm    |
| AO, 4 | SetStartLevelPump2                   | W   | Set start level for pump 2 in centimetres.   | cm    |
| MI, 0 | System Operating Mode                | R   | 0: Standby<br>1: Start-up delay<br>2: Pumping<br>3: Stop delay<br>4: Pumping max<br>5: Stopped<br>6: Foam draining<br>7: Daily emptying<br>8: Pump anti-seizing<br>9: Manual control<br>10: Interlock control<br>11: Mains failure<br>12: Level sensor error<br>13: All pumps in alarm<br>14 = All pumps out of operation<br>15: Service mode, alarms suppressed | -     |
| MI, 1 | CIM status                           | R   | 1: OK<br>2: EEPROM fault<br>3: Memory fault<br>4: Unknown  | -     |
| MI, 3 | System control sensor type           | R   | Reports the type of sensor controlling the system.<br>Possible values:<br>• 1: Analog level sensor<br>• 2: Float switch<br>• 3: Unknown  | -     |
| AI, 0 | Fault code                           | R   | Grundfos fault code  | -     |
| AI, 1 | Warning code                         | R   | Grundfos warning code  | -     |
| AI, 2 | HighLevel                            | R   | High level in centimetres.   | cm    |
| AI, 3 | StartLevelPump1                      | R   | Start level for pump 1 in centimetres.   | cm    |
| AI, 4 | StopLevelPump1                       | R   | Stop level for pump 1 in centimetres.  | cm    |
| AI, 5 | StartLevelPump2                      | R   | Start level for pump 2 in centimetres.   | cm    |
| AI, 6 | Pit water level                      | R   | Pit water level in centimetres.  | cm    |
| AI, 7 | Pit power consumption                | R   | Pit power consumption in watts.  | W     |
| AI, 8 | Pit energy consumption               | R   | Pit energy consumption in kilowatt hours.  | kWh   |
| AI, 9 | Pit running time                     | R   | Pit running time in minutes.   | min   |

| ID   | Object Name                 | R/W | Notes   | Units |
|--|-----------------------------|-----|---|-------|
| AI, 10   | Analog Input 1 (AI1)        | R   | Analog Input 1  | %     |
| AI, 11   | Analog Input 2 (AI2)        | R   | Analog Input 2  | %     |
| AI, 12   | Analog input 3 (AI3)        | R   | Analog Input 3  | %     |
| AI, 13   | Pump1 time to service       | R   | Pump 1 time to service in minutes.  | min   |
| AI, 14   | Pump2 time to service       | R   | Pump 2 time to service in minutes.  | min   |
| AI, 15   | Pump1 start counter         | R   | Pump 1 start counter.   | -     |
| AI, 16   | Pump2 start counter         | R   | Pump 2 start counter.   | -     |
| AI, 17   | Pump1 current               | R   | Pump 1 current in amperes.  | A     |
| AI, 18   | Pump2 current               | R   | Pump 2 current in amperes.  | A     |
| AI, 19   | Pump1 operating time        | R   | Pump 1 overall operating time in minutes.   | min   |
| AI, 20   | Pump2 operating time        | R   | Pump 2 overall operating time in minutes.   | min   |
| AI, 21   | UserAnalogInput1            | R   | User-defined measurement, analog input 1.   | %     |
| AI, 22   | UserAnalogInput2            | R   | User-defined measurement, analog input 2.   | %     |
| AI, 23   | UserAnalogInput3            | R   | User-defined measurement, analog input 3.   | %     |
| AI, 24   | UserAnalogInput4            | R   | User-defined measurement, analog input 4.   | %     |
| AI, 25   | UserAnalogInput5            | R   | User-defined measurement, analog input 5.   | %     |
| AI, 26   | Latest operating time pump1 | R   | Pump 1 latest running time in minutes.  | min   |
| AI, 27   | Latest operating time pump2 | R   | Pump 2 latest running time in minutes.  | min   |
| AI, 28   | Energy consumption pump1    | R   | Pump 1 energy consumption in kilowatt hours.  | kWh   |
| AI, 29   | Energy consumption pump2    | R   | Pump 2 energy consumption in kilowatt hours.  | kWh   |
| Values are transmitted in the following order: <ul style="list-style-type: none"> <li>• bit 0: Status warnings1</li> <li>• bit 1: Status warnings2</li> <li>• bit 2: Status warnings3</li> <li>• bit 3: Status warnings4</li> <li>• bit 4: Status warnings5</li> <li>• bit 8: Status alarms1</li> <li>• bit 9: Status alarms2</li> <li>• bit 10: Status alarms3</li> <li>• bit 11: Status alarms4</li> <li>• bit 12: Status alarms5</li> </ul> |                             |     |   |       |
| AI, 39   | Alarms 1-5 and warnings 1-5 | R   | Bit values indicate the following: <ul style="list-style-type: none"> <li>• bit value 0: Alarm or warning not present</li> <li>• bit value 1: Alarm or warning present</li> </ul> | -     |

| ID     | Object Name           | R/W | Notes   | Units |
|--------|-----------------------|-----|---|-------|
| AI, 40 | Sensor present status | R   | Values are transmitted in the following order: <ul style="list-style-type: none"> <li>• bit 0: Flow sensor present</li> <li>• bit 1: Power/energy sensor present</li> <li>• bit 2: AI sensor 1 present</li> <li>• bit 3: AI sensor 2 present</li> <li>• bit 4: AI sensor 3 present</li> <li>• bit 5: AI sensor 4 present</li> <li>• bit 6: AI sensor 5 present</li> <li>• bit 7: Turbidity sensor present</li> <li>• bit 8: pH sensor present</li> <li>• bit 9: Conductivity sensor present</li> <li>• bit 10: Pulse flow meter present</li> <li>• bit 11: Pressure sensor present</li> <li>• bit 12: Level sensor present</li> </ul> | -     |
|        |                       |     | Bit values indicate the following: <ul style="list-style-type: none"> <li>• bit value 0: Sensor not present</li> <li>• bit value 1: Sensor present</li> </ul>   |       |
| BI, 0  | AcknowledgeAlarm      | R   | 0: Not acknowledged<br>1: Acknowledged  | -     |
| BI, 1  | FloatSwitch1Status    | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 2  | FloatSwitch2Status    | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 3  | FloatSwitch3Status    | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 4  | FloatSwitch4Status    | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 5  | FloatSwitch5Status    | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 6  | Pump1Present          | R   | 0: Not present<br>1: Present  | -     |
| BI, 7  | Pump2Present          | R   | 0: Not present<br>1: Present  | -     |
| BI, 8  | Pump1Running          | R   | 0: Not running<br>1: Running  | -     |
| BI, 9  | Pump2Running          | R   | 0: Not running<br>1: Running  | -     |
| BI, 10 | Pump1CommFault        | R   | 0: No communication fault<br>1: Pump or auxiliary device communication fault  | -     |
| BI, 11 | Pump2CommFault        | R   | 0: No communication fault<br>1: Pump or auxiliary device communication fault  | -     |
| BI, 12 | Pump1Alarm            | R   | 0: No alarm<br>1: Alarm   | -     |
| BI, 13 | Pump2Alarm            | R   | 0: No alarm<br>1: Alarm   | -     |
| BI, 14 | Pump1Warning          | R   | 0: No warning<br>1: Warning   | -     |
| BI, 15 | Pump2Warning          | R   | 0: No warning<br>1: Warning   | -     |
| BI, 16 | Pump1Disabled         | R   | 0: Enabled<br>1: Disabled (Out of operation)  | -     |

| ID     | Object Name                | R/W | Notes  | Units |
|--------|----------------------------|-----|--|-------|
| BI, 17 | Pump2Disabled              | R   | 0: Enabled<br>1: Disabled (Out of operation) | -     |
| BI,18  | UserDigitalInBlock1, DI 1  | R   | 0: Inactive<br>1: Active                     | -     |
| BI,19  | UserDigitalInBlock1, DI 2  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 20 | UserDigitalInBlock1, DI 3  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 21 | UserDigitalInBlock1, DI 4  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 22 | UserDigitalInBlock1, DI 5  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 23 | UserDigitalInBlock1, DI 6  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 24 | UserDigitalInBlock1, DI 7  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 25 | UserDigitalInBlock1, DI 8  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 26 | UserDigitalInBlock1, DI 9  | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 27 | UserDigitalInBlock1, DI 10 | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 28 | UserDigitalInBlock1, DI 11 | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 29 | UserDigitalInBlock1, DI 12 | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 30 | UserDigitalInBlock1, DI 13 | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 31 | UserDigitalInBlock1, DI 14 | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 32 | UserDigitalInBlock1, DI 15 | R   | 0: Inactive<br>1: Active                     | -     |
| BI, 33 | UserDigitalInBlock1, DI 16 | R   | 0: Inactive<br>1: Active                     | -     |

#### 4.4 Complete object list for Level Control LC 2X2

| ID    | Object Name                          | R/W | Notes  | Units |
|-------|--------------------------------------|-----|--|-------|
| AV, 0 | Custom device object instance number | R/W | Present_Value range: 0-0x3FFFFE.<br>Default Present_Value: 0xE7. [RD = 0]  | -     |
| AV, 1 | Product time and date                | R/W | Set clock in UNIX format   | s     |
| AV, 2 | CIMSoftwareVersion                   | R   | Decimal value  | -     |
| BO, 0 | Reset alarms                         | W   | 0: No resetting<br>1: Resetting alarms   | -     |
| BO, 1 | Reset EventLog                       | W   | 0: No resetting<br>1: Resetting alarms   | -     |
| MO, 0 | Control Pump 1                       | W   | 1: Auto<br>2: Forced Start<br>3: Forced Stop   | -     |
| MO, 1 | Control Pump 2                       | W   | 1: Auto<br>2: Forced Start<br>3: Forced Stop   | -     |
| AO, 0 | SetHighLevel                         | W   | Set high level in centimetres.   | cm    |
| AO, 1 | SetDryRunningLevel                   | W   | Set dry running level in centimetres.  | cm    |
| AO, 2 | SetStartLevelPump1                   | W   | Set start level for pump 1 in centimetres.   | cm    |
| AO, 3 | SetStopLevelPump1                    | W   | Set stop level for pump 1 in centimetres.  | cm    |
| AO, 4 | SetStartLevelPump2                   | W   | Set start level for pump 2 in centimetres.   | cm    |
| MI, 0 | System Operating Mode                | R   | 0: Standby<br>1: Start-up delay<br>2: Pumping<br>3: Stop delay<br>4: Pumping max<br>5: Stopped<br>6: Foam draining<br>7: Daily emptying<br>8: Pump anti-seizing<br>9: Manual control<br>10: Interlock control<br>11: Mains failure<br>12: Level sensor error<br>13: All pumps in alarm<br>14 = All pumps out of operation<br>15: Service mode, alarms suppressed | -     |
| MI, 1 | CIM status                           | R   | 1: OK<br>2: EEPROM fault<br>3: Memory fault<br>4: Unknown  | -     |
| MI, 2 | System status                        | R   | STATUS_MAIN_STATUS reported by bits 0-2.<br>Possible values:<br>• 1: System OK<br>• 2: Warnings present<br>• 3: Alarms Present<br>• 4: Unknown   | -     |
| MI, 3 | System control sensor type           | R   | Reports the type of sensor controlling the system.<br>Possible values:<br>• 1: Analog level sensor<br>• 2: Float switch<br>• 3: Unknown  | -     |
| AI, 0 | Fault code                           | R   | Grundfos fault code  | -     |
| AI, 1 | Warning code                         | R   | Grundfos warning code  | -     |



| ID     | Object Name                 | R/W | Notes   | Units |
|--------|-----------------------------|-----|---|-------|
| AI, 2  | HighLevel                   | R   | High level in centimetres.                          | cm    |
| AI, 3  | StartLevelPump1             | R   | Start level for pump 1 in centimetres.              | cm    |
| AI, 4  | StopLevelPump1              | R   | Stop level for pump 1 in centimetres.               | cm    |
| AI, 5  | StartLevelPump2             | R   | Start level for pump 2 in centimetres.              | cm    |
| AI, 6  | Pit water level             | R   | Pit water level in centimetres.                     | cm    |
| AI, 7  | Pit power consumption       | R   | Pit power consumption in watts.                     | W     |
| AI, 8  | Pit energy consumption      | R   | Pit energy consumption in kilowatt hours.           | kWh   |
| AI, 9  | Pit running time            | R   | Pit running time in minutes.                        | min   |
| AI, 10 | Analog Input 1 (AI1)        | R   | Analog Input 1                                      | %     |
| AI, 11 | Analog Input 2 (AI2)        | R   | Analog Input 2                                      | %     |
| AI, 12 | Analog input 3 (AI3)        | R   | Analog Input 3                                      | %     |
| AI, 13 | Pump1 time to service       | R   | Pump 1 time to service in minutes.                  | min   |
| AI, 14 | Pump2 time to service       | R   | Pump 2 time to service in minutes.                  | min   |
| AI, 15 | Pump1 start counter         | R   | Pump 1 start counter.                               | -     |
| AI, 16 | Pump2 start counter         | R   | Pump 2 start counter.                               | -     |
| AI, 17 | Pump1 current               | R   | Pump 1 current in amperes.                          | A     |
| AI, 18 | Pump2 current               | R   | Pump 2 current in amperes.                          | A     |
| AI, 19 | Pump1 operating time        | R   | Pump 1 overall operating time in minutes.           | min   |
| AI, 20 | Pump2 operating time        | R   | Pump 2 overall operating time in minutes.           | min   |
| AI, 21 | UserAnalogInput1            | R   | User-defined measurement, analog input 1.           | %     |
| AI, 22 | UserAnalogInput2            | R   | User-defined measurement, analog input 2.           | %     |
| AI, 23 | UserAnalogInput3            | R   | User-defined measurement, analog input 3.           | %     |
| AI, 24 | UserAnalogInput4            | R   | User-defined measurement, analog input 4.           | %     |
| AI, 25 | UserAnalogInput5            | R   | User-defined measurement, analog input 5.           | %     |
| AI, 26 | Latest operating time pump1 | R   | Pump 1 latest running time in minutes.              | min   |
| AI, 27 | Latest operating time pump2 | R   | Pump 2 latest running time in minutes.              | min   |
| AI, 28 | Energy consumption pump1    | R   | Pump 1 energy consumption in kilowatt hours.        | kWh   |
| AI, 29 | Energy consumption pump2    | R   | Pump 2 energy consumption in kilowatt hours.        | kWh   |
| AI, 30 | System Energy today         | R   | DATA_ENERGY_TODAY reported with 0.1 kWh resolution. | kWh   |
| AI, 31 | PulseFlowMeter              | R   | DATA_PULSE_FLOW_METER                               | l/s   |
| AI, 32 | Turbidity                   | R   | DATA_TURBIDITY reported with 0.1 NTU resolution.    | NTU   |
| AI, 33 | PhMeasure                   | R   | DATA_PH_MEASURE reported with 0.1 pH resolution.    | pH    |
| AI, 34 | Conductivity                | R   | DATA_CONDUCTIVITY reported with 1 S/m resolution.   | S/m   |
| AI, 35 | Pump1OprTimeToday           | R   | DATA_PUMP1_RUNTIME_TODAY                            | min   |
| AI, 36 | Pump2OprTimeToday           | R   | DATA_PUMP2_RUNTIME_TODAY                            | min   |
| AI, 37 | Pump1StartCounterToday      | R   | DATA_PUMP1_RUNTIME_TODAY                            | min   |
| AI, 38 | Pump2StartCounterToday      | R   | DATA_PUMP2_RUNTIME_TODAY                            | min   |

| ID     | Object Name                 | R/W | Notes   | Units |
|--------|-----------------------------|-----|---|-------|
| AI, 39 | Alarms 1-5 and warnings 1-5 | R   | Values are transmitted in the following order: <ul style="list-style-type: none"> <li>• bit 0: Status warnings1</li> <li>• bit 1: Status warnings2</li> <li>• bit 2: Status warnings3</li> <li>• bit 3: Status warnings4</li> <li>• bit 4: Status warnings5</li> <li>• bit 8: Status alarms1</li> <li>• bit 9: Status alarms2</li> <li>• bit 10: Status alarms3</li> <li>• bit 11: Status alarms4</li> <li>• bit 12: Status alarms5</li> </ul>  | -     |
|        |                             |     | Bit values indicate the following: <ul style="list-style-type: none"> <li>• bit value 0: Alarm or warning not present</li> <li>• bit value 1: Alarm or warning present</li> </ul>   |       |
| AI, 40 | Sensor present status       | R   | Values are transmitted in the following order: <ul style="list-style-type: none"> <li>• bit 0: Flow sensor present</li> <li>• bit 1: Power/energy sensor present</li> <li>• bit 2: AI sensor 1 present</li> <li>• bit 3: AI sensor 2 present</li> <li>• bit 4: AI sensor 3 present</li> <li>• bit 5: AI sensor 4 present</li> <li>• bit 6: AI sensor 5 present</li> <li>• bit 7: Turbidity sensor present</li> <li>• bit 8: pH sensor present</li> <li>• bit 9: Conductivity sensor present</li> <li>• bit 10: Pulse flow meter present</li> <li>• bit 11: Pressure sensor present</li> <li>• bit 12: Level sensor present</li> </ul> | -     |
|        |                             |     | Bit values indicate the following: <ul style="list-style-type: none"> <li>• bit value 0: Sensor not present</li> <li>• bit value 1: Sensor present</li> </ul>   |       |
| BI, 0  | AcknowledgeAlarm            | R   | 0: Not acknowledged<br>1: Acknowledged  | -     |
| BI, 1  | FloatSwitch1Status          | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 2  | FloatSwitch2Status          | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 3  | FloatSwitch3Status          | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 4  | FloatSwitch4Status          | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 5  | FloatSwitch5Status          | R   | 0: Off (Float switch down)<br>1: On (Float switch up)   | -     |
| BI, 6  | Pump1Present                | R   | 0: Not present<br>1: Present  | -     |
| BI, 7  | Pump2Present                | R   | 0: Not present<br>1: Present  | -     |
| BI, 8  | Pump1Running                | R   | 0: Not running<br>1: Running  | -     |
| BI, 9  | Pump2Running                | R   | 0: Not running<br>1: Running  | -     |

| ID     | Object Name                       | R/W | Notes  | Units |
|--------|-----------------------------------|-----|--|-------|
| Bl, 10 | Pump1CommFault                    | R   | 0: No communication fault<br>1: Pump or auxiliary device communication fault | -     |
| Bl, 11 | Pump2CommFault                    | R   | 0: No communication fault<br>1: Pump or auxiliary device communication fault | -     |
| Bl, 12 | Pump1Alarm                        | R   | 0: No alarm<br>1: Alarm  | -     |
| Bl, 13 | Pump2Alarm                        | R   | 0: No alarm<br>1: Alarm  | -     |
| Bl, 14 | Pump1Warning                      | R   | 0: No warning<br>1: Warning  | -     |
| Bl, 15 | Pump2Warning                      | R   | 0: No warning<br>1: Warning  | -     |
| Bl, 16 | Pump1Disabled                     | R   | 0: Enabled<br>1: Disabled (Out of operation)                                 | -     |
| Bl, 17 | Pump2Disabled                     | R   | 0: Enabled<br>1: Disabled (Out of operation)                                 | -     |
| Bl, 34 | Acknowledge<br>ResetEventLogAlarm | R   | 0: Not Acknowledged<br>1: Acknowledged                                       | -     |
| Bl, 35 | Control Status                    | R   | 0: Auto control<br>1: Manual control   | -     |

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