

Firmware versions and pump models:

- 151.06 and higher for e-LNEEE, e-LNESE, e-LNTEE and e-LNTSE
- 101.10 and higher for e-HME, e-SVE, VME and e-SVIE

BACnet® Protocol  
Parameter List



# Smart Pump Range

xylem

# Table of Contents

- 1 Introduction and Safety ..... 3
  - 1.1 Purpose of this manual..... 3
  - 1.2 Acronyms ..... 3
- 2 Protocol Implementation Conformance Statement (PICS) ..... 4
  - 2.1 BACnet Protocol Implementation Conformance Statement..... 4
  - 2.2 BACnet® standard device profile (Annex L) ..... 4
  - 2.3 BACnet® interoperability blocks (Annex K) ..... 4
    - 2.3.1 Data exchange..... 4
    - 2.3.2 Alarm and event management ..... 5
    - 2.3.3 Scheduling and programming ..... 5
    - 2.3.4 Capability of handling logs (trending) ..... 5
    - 2.3.5 Network device management ..... 5
    - 2.3.6 Network management ..... 5
  - 2.4 Supported standard objects ..... 6
  - 2.5 Segmentation capabilities ..... 6
  - 2.6 Data link level ..... 6
  - 2.7 Device Address Binding ..... 6
  - 2.8 Network options..... 6
  - 2.9 Network safety options ..... 6
  - 2.10 Set of supported characters..... 6
- 3 BACnet® Device e BACnet® Device Object Identifier ..... 7
  - 3.1 BACnet® Device Object Identifier ..... 7
  - 3.2 MAC address ..... 7
- 4 Connections and data handling ..... 8
  - 4.1 Connect a stand-alone product to an External Device ..... 8
  - 4.2 Connect two e-LNEEE, e-LNESE, e-LNTEE or e-LNTSE pumps running in Dual Pump mode to an External Device 9
  - 4.3 Connect two or three e-HME, e-SVE, VME and e-SVIE pumps running in Multi-Pump mode to an External Device 10
- 5 BACnet® data management for models e-LNEEE, e-LNESE, e-LNTEE and e-LNTSE ..... 12
  - 5.1 Analog\_Values..... 12
  - 5.2 Analog\_Inputs ..... 13
- 6 BACnet® data management for models e-HME, e-SVE, VME and e-SVIE ..... 16
  - 6.1 Analog Values..... 16
  - 6.2 Analog Inputs ..... 18

# 1 Introduction and Safety

## 1.1 Purpose of this manual

This manual shows and discusses the BACnet® addresses implemented in Smart Pump Range products.

The managed data consist of:

- Parameters: read & write, used to set modes, activate functions and write on the drive
- Information: read only, to acquire values from the drive.




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### CAUTION:

Before using the unit make, sure to read and fully understand the Smart Pump Range Use and Maintenance Manual.

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## 1.2 Acronyms

MIN	Minimum
MAX	Maximum
DEF	Default
R	Read only
R/W	Read & Write
UM	Unit of measurement
LSW/MSW	Least Significant Word / Most Significant Word
MS/TP	Master-slave token passing
N.A.	Not accessible through the user interface

# 2 Protocol Implementation Conformance Statement (PICS)

## 2.1 BACnet Protocol Implementation Conformance Statement

Date	23 February 2018
Vendor name	Lowara PUMP
Product name	SMART PUMP RANGE
Product model number	SMART PUMP RANGE
Application software version	101 open loop, 151 close loop
Firmware revision	10 open loop, 06 close loop
BACnet® protocol version	1

## 2.2 BACnet® standard device profile (Annex L)

<input type="checkbox"/>	BACnet® Advanced Workstation	(B-AWS)
<input type="checkbox"/>	BACnet® Operator Workstation	(B-OWS)
<input type="checkbox"/>	BACnet® Operator Display	(B-OD)
<input type="checkbox"/>	BACnet® Building Controller	(B-BC)
<input type="checkbox"/>	BACnet® Advanced Application Controller	(B-AAC)
<input type="checkbox"/>	BACnet® Application Specific Controller	(B-ASC)
<input type="checkbox"/>	BACnet® Smart Sensor	(B-SS)
<input checked="" type="checkbox"/>	BACnet® Smart Actuator	(B-SA)

## 2.3 BACnet® interoperability blocks (Annex K)

### 2.3.1 Data exchange

<input type="checkbox"/>	Data Sharing - Read Property-A	DS-RP-A
<input checked="" type="checkbox"/>	Data Sharing - Read Property-B	DS-RP-B
<input type="checkbox"/>	Data Sharing - Read Property Multiple-A	DS-RPM-A
<input type="checkbox"/>	Data Sharing - Read Property Multiple-B	DS-RPM-B
<input type="checkbox"/>	Data Sharing - Write Property-A	DS-WP-A
<input checked="" type="checkbox"/>	Data Sharing - Write Property-B	DS-WP-B
<input type="checkbox"/>	Data Sharing - Write Property Multiple-A	DS-WPM-A
<input type="checkbox"/>	Data Sharing - Write Property Multiple-B	DS-WPM-B
<input type="checkbox"/>	Data Sharing - Change of Value-A	DS-COV-A
<input type="checkbox"/>	Data Sharing - Change of Value-B	DS-COV-B
<input type="checkbox"/>	Data Sharing - Change of Value Property-A	DS-COVP-A
<input type="checkbox"/>	Data Sharing - Change of Value Property-B	DS-COVP-B
<input type="checkbox"/>	Data Sharing - Change of Value Unsolicited-A	DS-COVU-A
<input type="checkbox"/>	Data Sharing - Change of Value Unsolicited-B	DS-COVU-B
<input type="checkbox"/>	Data Sharing - View-A	DS-V-A
<input type="checkbox"/>	Data Sharing - Advanced View-A	DS-AV-A
<input type="checkbox"/>	Data Sharing - Modify-A	DS-M-A
<input type="checkbox"/>	Data Sharing - Advanced Modify-A	DS-AM-A

### 2.3.2 Alarm and event management

Not present.

### 2.3.3 Scheduling and programming

Not present.

### 2.3.4 Capability of handling logs (trending)

Not present.

### 2.3.5 Network device management

<input type="checkbox"/>	Device Management - Dynamic Device Binding-A	DM-DDB-A
<input checked="" type="checkbox"/>	Device Management - Dynamic Device Binding-B	DM-DDB-B
<input type="checkbox"/>	Device Management - Dynamic Object Binding-A	DM-DOB-A
<input type="checkbox"/>	Device Management - Dynamic Object Binding-B	DM-DOB-B
<input type="checkbox"/>	Device Management - Device Communication Control-A	DM-DCC-A
<input type="checkbox"/>	Device Management - Device Communication Control -B	DM-DCC-B
<input type="checkbox"/>	Device Management - Private Transfer-A	DM-PT-A
<input type="checkbox"/>	Device Management - Private Transfer-B	DM-PT-B
<input type="checkbox"/>	Device Management - Text Message-A	DM-TM-A
<input type="checkbox"/>	Device Management - Text Message-B	DM-TM-B
<input type="checkbox"/>	Device Management - Time Synchronization-A	DM-TS-A
<input type="checkbox"/>	Device Management - Time Synchronization-B	DM-TS-B
<input type="checkbox"/>	Device Management - UTC Time Synchronization-A	DM-UTC-A
<input type="checkbox"/>	Device Management - UTC Time Synchronization-B	DM-UTC-B
<input type="checkbox"/>	Device Management - Reinitialize Device-A	DM-RD-A
<input type="checkbox"/>	Device Management - Reinitialize Device-B	DM-RD-B
<input type="checkbox"/>	Device Management - Backup and Restore-A	DM-BR-A
<input type="checkbox"/>	Device Management - Backup and Restore-B	DM-BR-B
<input type="checkbox"/>	Device Management - Restart-A	DM-R-A
<input type="checkbox"/>	Device Management - Restart-B	DM-R-B
<input type="checkbox"/>	Device Management - List Manipulation-A	DM-LM-A
<input type="checkbox"/>	Device Management - List Manipulation-B	DM-LM-B
<input type="checkbox"/>	Device Management - Object Creation and Deletion-A	DM-OCD-A
<input type="checkbox"/>	Device Management - Object Creation and Deletion-B	DM-OCD-B
<input type="checkbox"/>	Device Management - Virtual Terminal-A	DM-VT-A
<input type="checkbox"/>	Device Management - Virtual Terminal-B	DM-VT-B
<input type="checkbox"/>	Device Management - Automatic Network Mapping-A	DM-ANM-A
<input type="checkbox"/>	Device Management - Automatic Device Mapping-A	DM-ADM-A
<input type="checkbox"/>	Device Management - Automatic Time Synchronization-A	DM-ATS-A
<input type="checkbox"/>	Device Management - Manual Time Synchronization-A	DM-MTS-A

### 2.3.6 Network management

Not present.

## 2.4 Supported standard objects

Object	Supported	Created / deleted dynamically	Optional properties supported	Writing properties
Analog Input	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Description	
Analog Value	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Description	
Device	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Description, Max_Master, Max_Info_Frames	Object_Identifier

## 2.5 Segmentation capabilities

Not present.

## 2.6 Data link level

<input type="checkbox"/>	BACnet IP, (Annex J)	
<input type="checkbox"/>	BACnet IP, (Annex J), Foreign Device	
<input type="checkbox"/>	ISO 8802-3, Ethernet (Clause 7)	
<input type="checkbox"/>	ANSI/ATA 878.1, 2,5 Mb ARCNET (Clause 8)	
<input type="checkbox"/>	ANSI/ATA 878.1, 2,5 Mb ARCNET (Clause 8), baud rate(s)	
<input checked="" type="checkbox"/>	MS/TP master (Clause 9), baud rate(s)	4800 <sup>1</sup> 9600 14400 19200 38400 <sup>2</sup> 56000 57600
<input type="checkbox"/>	MS/TP slave (Clause 9), baud rate(s)	
<input type="checkbox"/>	Point-To-Point, EIA 232 (Clause 10), baud rate(s)	
<input type="checkbox"/>	Point-To-Point, modem (Clause 10), baud rate(s)	
<input type="checkbox"/>	LonTalk (Clause 11), medium	
<input type="checkbox"/>	Other	

## 2.7 Device Address Binding

Is static device binding supported? This is currently necessary for two-way communication with MS/TP slaves and certain other devices.	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
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## 2.8 Network options

Not present.

## 2.9 Network safety options

Not present.

## 2.10 Set of supported characters

Not present.

<sup>1</sup> Baud rate 4800 allows limited functionality, frequent timeouts are expected due to the slow speed

<sup>2</sup> Suggested baud rate

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# 3 BACnet® Device e BACnet® Device Object Identifier

The Smart Pump Range unit is a BACnet® Device, as it supports digital communication through the BACnet® protocol.

Each BACnet® Device contains a Device Object. This is a standard object whose properties represent the characteristics that can be viewed from the outside.

Smart Pump Range units connected to the local MS/TP network are localised through:

- a Device Object Identifier, and
- a MAC address.

## 3.1 BACnet® Device Object Identifier

The factory set value is 84002.

To change value, use the Write Property service in the Object\_Identifier property of the Device Object, or the specific parameter P53 BACnet® device ID offset, available on the display. See the Smart Pump Range manual.

## 3.2 MAC address

The factory set value is 1.

Check that each Smart Pump Range unit connected to the MS/TP network is identified with a different address via the parameter P51 Address. See the Smart Pump Range manual.

# 4 Connections and data handling

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**NOTE:**

For detailed information regarding installation, wiring and configuration of the Smart Pump range product, please read and follow the relative manual.

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**NOTE:**

It is suggested to set parameter "P69 Avoid frequent parameters saving" to YES when a Smart Pump range product is connected to an External Device via Modbus®. This parameter limits the frequency with which the unit stores the required value P02 in the EEPROM memory, in order to extend its life.

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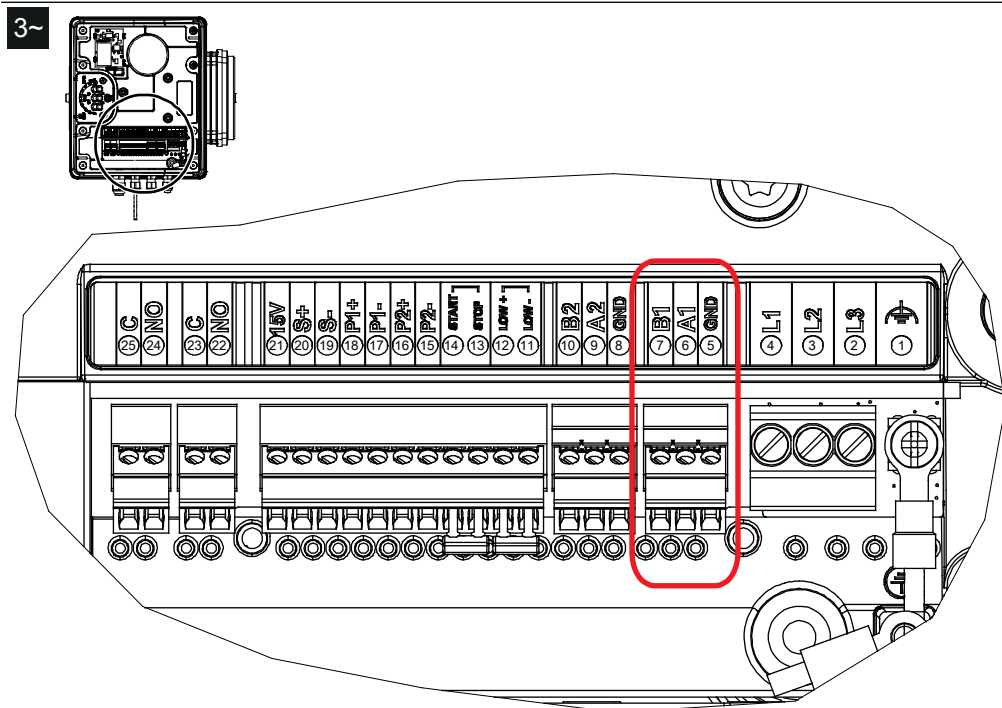
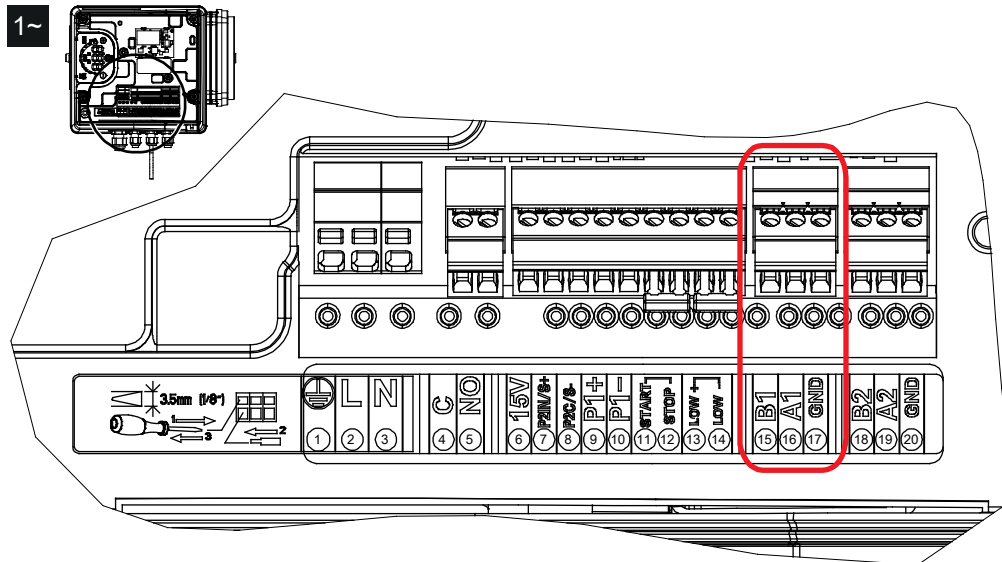
When the BACnet® MS/TP communication is active between the Smart Pump range product and an External Device, the Smart Pump range product "locks" the possibility to change most of the system parameters from the local push buttons on the drive. This is to prevent conflicts between the values (read and written) by the (remote) External Device, and the parameters values that could be over-written/changed by the local operator. The remote lock for parameters edit can be disabled stopping the BACnet® communication.

## 4.1 Connect a stand-alone product to an External Device

- Unscrew the dedicated screws and remove the plastic cover of the Smart Pump electronic drive, in order to proceed wiring the control terminals; for reference, the wiring harness scheme is reported on the terminal block label.
- Terminal position and numbering is different between single phase and three-phase version.
- No additional modules are needed to connect a stand-alone Smart Pump range product to an External Device via RS485.
- Terminals 15 (B1), 16 (A1) and 17 (GND) on single-phase version and 7 (B1), 6 (A1), 5 (GND) on three-phase version are used for the communication with an external control device (e.g. PLC, MBS, etc.).
- Do not connect the ground of the control card to other voltage potentials or to PE.

See chapter 5 for the Object List of e-LNEEE, e-LNESE, e-LNTEE and e-LNTSE pumps.  
See chapter 6 for the Object List of e-HME, e-SVE, VME and e-SVIE pumps.





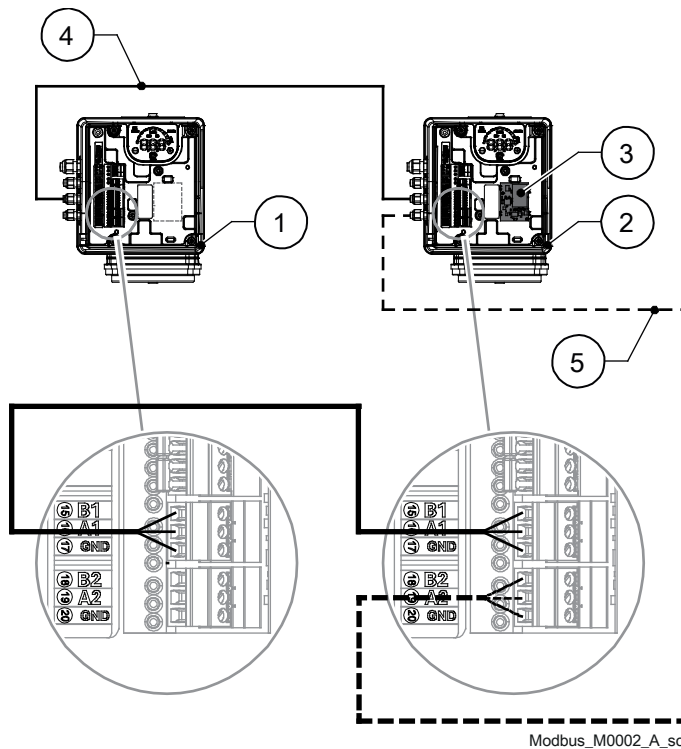
Modbus\_M0001\_E\_sc

## 4.2 Connect two e-LNEEE, e-LNESE, e-LNTEE or e-LNTSE pumps running in Dual Pump mode to an External Device

The Dual Pump mode, available only for e-LNEEE, e-LNESE, e-LNTEE and e-LNTSE pumps, allows the connection of two motor drives in a MASTER - FOLLOWER configuration.

- Master or Follower configuration can be set via parameter P38 Dual Pump Configuration.
- The information about the Follower unit are available through the BACnet® Objects of the Master Unit, see **BACnet® data management for models e-LNEEE, e-LNESE, e-LNTEE and e-LNTSE**, page 12.
- The parameters P51 Address and P53 BACnet device ID offset need be set only on the MASTER pump.
- To connect a Dual Pump mode set to an External Device, an RS485 Module Smart Pump must be installed on the MASTER unit.
- Terminals 15 (B1), 16 (A1) and 17 (GND) (on single-phase version) and 7 (B1), 6 (A1), 5 (GND) (on three-phase version) are dedicated to the Master - Follower communication (dual pump link).

- Terminals 18 (B2), 19 (A2) and 20 (GND) on single-phase MASTER unit, or terminals 10 (B2), 9 (A2) and 8 (GND) on three-phase MASTER unit, are dedicated to the External Device communication network.



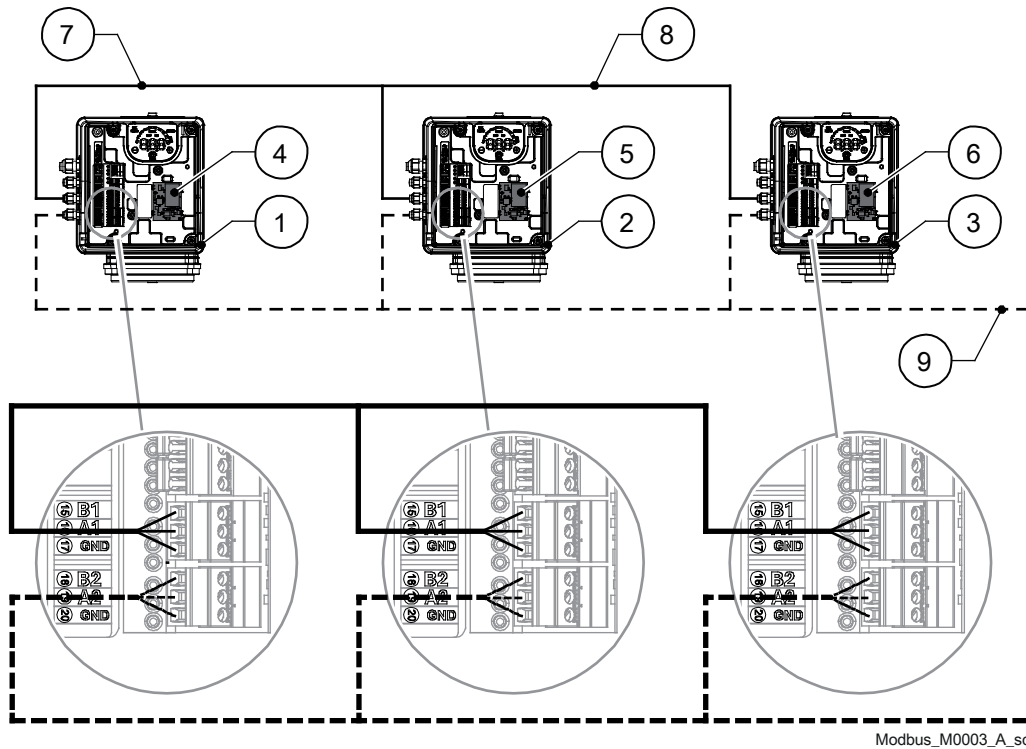
Modbus\_M0002\_A\_sc

1. Follower drive
2. Master drive
3. RS485 module
4. Dual pump link
5. External device communication network

### 4.3 Connect two or three e-HME, e-SVE, VME and e-SVIE pumps running in Multi-Pump mode to an External Device

The Multi-Pump mode, available only for e-HME, e-SVE, VME and e-SVIE pumps, allows the connection of two or three motor drives in a Multi-Master Multi-Pump configuration.

- Each unit of the booster set equipped with a RS485 Module Smart Pump has its unique BACnet® device ID and MAC address.
- The parameters P51 Address and P53 BACnet® device ID offset must be set to a unique value on each unit of the booster set. The parameters P51 Address and P53 BACnet® device ID offset are the identification number of the Smart Pump range product in the BACnet® network.
- The parameter P55 Multipump Address must be set to a unique value on each unit of the booster set. The parameter P55 is the identification number of the Smart Pump range product in the Multi-Pump network.
- To connect a Multi-Pump mode booster set to an External Device, each drive must be equipped with a RS485 Module Smart Pump. For a two pumps booster set, two RS485 Modules are needed; for a three pumps booster set, three RS485 modules are needed.
- Terminals 15 (B1), 16 (A1) and 17 (GND) (on single-phase unit) and 7 (B1), 6 (A1), 5 (GND) (on three-phase unit) are dedicated to the Multi-Pump communication (multi-pump link).
- Terminals 18 (B2), 19 (A2) and 20 (GND) on single-phase unit, or terminals 10 (B2), 9 (A2) and 8 (GND) on three-phase unit, are dedicated to the External Device communication network.



1. First drive
2. Second drive
3. Third drive
4. RS485 module
5. RS485 module
6. RS485 module
7. Multi pump link
8. Multi pump link
9. External device communication network

Special care should be taken when an External Device (by mean of BACnet® protocol), requires to read and write Smart Pump range product parameters, being the drive connected into a Multi-Pump system too.

In particular:

- In a Multi-Pump application each Smart Pump range product returns to the External Device exclusively its own object values, not object values of other drives connected in the booster set
- In a Multi-Pump application, requests of "Write Value" on the BACnet® objects must be sent by the external device to all Smart Pump range products connected, even if the parameters to be written are "Global" (for the booster set).

# 5 BACnet® data management for models e-LNEEE, e-LNESE, e-LNTEE and e-LNTSE

The data managed by Smart Pump Range can be accessed considering the BACnet® virtual memory, consisting of:

- Analog\_Values [R/W]
- Analog\_Inputs [R].

## 5.1 Analog\_Values

Group of objects with Read & Write Present\_Value property.

Object_Identifier	Menu Index	Object_Name	Unit of measurement	Present_Value			Description
				MIN	MAX	DEF	
0	On display	STOP START	-	0	1	0	Start/Stop command 0 = START 1 = STOP
1	P25	CONTROL MODES	-	0	3	1	Control mode 0 = [ACT] 1 = [CPP] 2 = [PPP/MSE] 3 = [MSY]
2	On display	RPM SETPOINT	rpm	Parameter P27	Parameter P26	Depending on the type of pump unit	Speed set in ACT mode
3	P41	BAR PSI SELECT	-	0	1	0	Pressure Sensor Unit Of Measure 0 = [BAR] 1 = [PSI]
4	On display	CONST HEAD S.P	bar/psi	0	Depending on the type of pump unit	Depending on the type of pump unit	Pressure setting for CPP
5	P42	4_20 PROBE FS	bar/psi	0	25 bar / 363 psi	Depending on the type of pump unit	Full scale value for pressure sensor 1
6	P26	ABS MAX RPM	rpm	Speed set in ACT mode	3600	Depending on the type of pump unit	Max RPM set
7	P27	ABS MIN RPM	rpm	800	Speed set in ACT mode	Depending on the type of pump unit	Min. speed
8	N.A.	LOG IDX SEL.	-	0	7	0	Datalog selection index
9	P68	RESET DEFAULT	-	0	1	0	Default values reset 0 = [No] 1 = [Res]
10	P48	LOW BEHAV	-	0	2	0	Lack of water input setting 0 = [dis] 1 = [ALR] 2 = [err]
11	P22	HMI PASSWORD	-	1	999	66	System password

12	P23	HMI PAR LOCK	-	0	1	1	Parameter lock 0 = [OFF] 1 = [ON]
13	P69	AVOID EEP SAV	-	0	1	0	Avoid Frequent Parameters Saving 0 = [no] 1 = [yes]
14	P65	TST RUN START	h	0	100	100	Test Run - Start
15	P66	TST RUN RPM	rpm	Parameter P27	Parameter P26	2000	Test Run - Speed
16	P67	TST RUN TIME	s	0	180	10	Test Run - Duration
17	P40	SENSOR CONFIG.	-	0	2	1	Sensor selection 0 = [No sensor] 1 = [Two individual sensors] 2 = [One differential sensor]
18	P43	0_10 PROBE FS	bar/psi	0	25 bar / 363 psi	Depending on the type of pump unit	Full scale value for pressure sensor 2
19	N.A.	PROP HEAD S.P.	bar/psi	Depending on the type of pump unit	Depending on the type of pump unit	Depending on the type of pump unit	Proportional pressure setting
20	N.A.	TWIN CTRL MODE	-	-	999	35	Twin mode selection 0 = [Backup] 1 = [Alternate] 2 = [Parallel] 3 = [Force parallel]

## 5.2 Analog\_Inputs

Group of objects with Read Only Present\_Value property.

Object_Identifier	Menu Index	Object_Name	Unit of measurement	Present_Value			Description
				MIN	MAX	DEF	
0	P16	MEASURED RPM	rpm	-	-	-	Motor Speed
1	On display	MEASURED HEAD	bar/psi	0	-	-	Current pressure
2	P14	QUAD CURRENT	A	0	-	-	Inverter Current
3	P15	GRID VOLTAGE	V	0	-	-	Inverter Voltage
4	N.A.	INPUT POWER	W	0	-	-	Current power
5	N.A.	W1 TEMP	°C	0	255	-	Temperature of winding 1
6	N.A.	W2 TEMP	°C	0	255	-	Temperature of winding 2
7	N.A.	W3 TEMP	°C	0	255	-	Temperature of winding 3
8	P13	POWER MOD TEMP	°C	0	255	-	Power Module Temperature
9	On display	ERROR CODE	-	-	-	-	Current error
10	N.A.	ERROR B.F. MSW	-	0	65535	0	Error bitField MSW bit 0: reserved bit 1: E13 Pressure sensor configuration error bit 2: reserved bit 3: reserved bit 4: reserved bit 5: reserved bit 6: E15 Loss of phase error bit 7: E05 Motor selection error bit 8: E44 Missing speed reference analog input

11	N.A.	ERROR B.F. LSW	-	0	65535	0	Error bitField LSW bit 0: E01 Internal communication error bit 1: E02 Motor overload error bit 2: E03 DC-bus overvoltage error bit 3: E04 Motor step loss bit 4: E05 EEPROM Data memory error bit 5: E06 Grid voltage error bit 6: E07 Motor winding temperature error bit 7: E08 Power module temperature error bit 8: E05 Corrupted factory data bit 9: E05 Corrupted memory password bit 10: E09 NTC probe overtemperature bit 11: E10 Dry run bit 12: E09 NTC probe error bit 13: E04 Locked rotor bit 14: E09 Motor not connected bit 15: E11 Error LOW
12	On display	ALARM CODE	-	-	-	0	Current alarm
13	N.A.	ALARM 1 B.F.	-	0	65535	0	Alarm bitField LSW bit 0: A15 EEPROM write failure bit 1: reserved bit 2: A03 Derating bit 3: reserved bit 4: A06 LOW alarm bit 5: reserved bit 6: reserved bit 7: A05 Data memory alarm bit 9: A43 Both sensors faulty bit 10: reserved bit 11: reserved bit 12: reserved bit 13: A41 Sensor 1 faulty bit 14: A42 Sensor 2 faulty bit 15: reserved
14	N.A.	ALARM 2 B.F.	-	0	65535	0	Alarm bitField MSW bit 0: A20 Internal alarm bit 1: A20 Internal alarm bit 2: A20 Internal alarm bit 3: A20 Internal alarm bit 4: A20 Internal alarm bit 5: A20 Internal alarm bit 6: A20 Internal alarm
15	P05-P06	LIFE TIMER	s	-	-	-	Time of use
16	P07-P08	RUNNING TIMER	s	-	-	-	Motor time of use
17	N.A.	LOG ACT ERR	-	-	-	-	Error code when AV8 (LOG IDX SEL.) takes a value from 0 to 7
18	N.A.	LOG ERR STA T	s	-	-	-	Error start time when AV8 (LOG IDX SEL.) takes a value from 0 to 7
19	N.A.	LOG ERR END T	s	-	-	-	Error end time when AV8 (LOG IDX SEL.) takes a value from 0 to 7
20	N.A.	LOG ERR B.F.	-	-	-	-	Error bitField LSW when AV8 (LOG IDX SEL.) takes a value from 0 to 7
21	N.A.	LOG ERR COUNT	-	-	-	-	Counter of how many times the error occurred when AV8 (LOG IDX SEL.) takes a value from 0 to 7
22	N.A.	LOG RPM SET	rpm	-	-	-	RPM set when AV8 (LOG IDX SEL.) takes a value from 0 to 7
23	N.A.	LOG RPM VALUE	rpm	-	-	-	RPM measured when AV8 (LOG IDX SEL.) takes a value from 0 to 7
24	N.A.	LOG IQ	A	-	-	-	Phase current when AV8 (LOG IDX SEL.) takes a value from 0 to 7
25	N.A.	LOG AL 1 B.F.	-	-	-	-	BitField alarms 1 when AV8 (LOG IDX SEL.) takes a value from 0 to 7

26	N.A.	LOG AL 2 B.F	-	-	-	-	BitField alarms 2 when AV8 (LOG IDX SEL.) takes a value from 0 to 7
27	N.A.	LOG B.F. IO	-	-	-	-	BitField status I/O when AV8 (LOG IDX SEL.) takes a value from 0 to 7
28	N.A.	LOG PWR	W	-	-	-	Power when AV8 (LOG IDX SEL.) takes a value from 0 to 7
29	N.A.	N. A.	m	-	-	-	Not used
30	N.A.	LOG H	bar/psi	-	-	-	Pressure when AV8 (LOG IDX SEL.) takes a value from 0 to 7
31	N.A.	LOG PWR.M. T.	°C	-	-	-	Temperature of the power module when AV8 (LOG IDX SEL.) takes a value from 0 to 7
32	N.A.	LOG STOP START	-	-	-	-	Value AV0 when AV8 (LOG IDX SEL.) takes a value from 0 to 7
33	N.A.	RESERVED	-	-	-	-	Reserved
34	N.A.	N. A.	-	-	-	-	Not used
35	N.A.	N. A.	-	-	-	-	Not used
36	N.A.	N. A.	-	-	-	-	Not used
37	N.A.	RESERVED	-	-	-	-	Reserved
38	N.A.	FOLL INPUT PWR	W	-	-	-	Twin pump follower – Current power
39	N.A.	FOLL MEAS HEAD	bar/psi	-	-	-	Twin pump follower – Current head
40	N.A.	FOLL RESERVED	-	-	-	-	Reserved
41	N.A.	FOLL MEAS RPM	rpm	-	-	-	Twin pump follower – Motor speed
42	N.A.	FOLL W1 TEMP	°C	-	-	-	Twin pump follower – Temperature of winding 1
43	N.A.	FOLL W2 TEMP	°C	-	-	-	Twin pump follower – Temperature of winding 2
44	N.A.	FOLL W3 TEMP	°C	-	-	-	Twin pump follower – Temperature of winding 3
45	N.A.	FOLL MOD TEMP	°C	-	-	-	Twin pump follower – Power module temperature
46	N.A.	FOLL QUAD CURR	A	-	-	-	Twin pump follower – Inverter current
47	N.A.	FOLL ALR1 B.F.	-	-	-	-	Twin pump follower – Alarm BitField LSW bit 0: A15 EEPROM write failure bit 1: reserved bit 2: A03 Derating bit 3: reserved bit 4: A06 LOW alarm bit 5: reserved bit 6: reserved bit 7: A05 Data memory alarm bit 9: A43 Both sensors faulty bit 10: reserved bit 11: reserved bit 12: reserved bit 13: A41 Sensor 1 faulty bit 14: A42 Sensor 2 faulty bit 15: reserved
48	N.A.	FOLL ALR2 B.F.	-	-	-	-	Twin pump follower – Alarm BitField MSW bit 0: A20 Internal alarm bit 1: A20 Internal alarm bit 2: A20 Internal alarm bit 3: A20 Internal alarm bit 4: A20 Internal alarm bit 5: A20 Internal alarm bit 6: A20 Internal alarm
49	N.A.	FOLL ERR CODE	-	-	-	-	Twin pump follower – Current error

# 6 BACnet® data management for models e-HME, e-SVE, VME and e-SVIE

The data managed by Smart Pump Range can be accessed considering the BACnet® virtual memory, consisting of:

- Analog\_Values [R/W]
- Analog\_Inputs [R].

## 6.1 Analog Values

Group of objects with Read & Write Present\_Value property.

Object_Identifier	Menu Index	Object_Name	Unit of measurement	Present_Value			Description
				MIN	MAX	DEF	
0	On display	STOP START	-	0	1	0	Start/Stop command 0 = START 1 = STOP
1	P25	CONTROL MODES	-	0	3	1	Control mode 0 = [ACT] 1 = [HCS] 2 = [MSE] 3 = [MSY]
2	On display	RPM SETPOINT	rpm	Parameter P27	Parameter P26	Depending on the type of pump unit	Speed set in ACT mode
3	P41	BAR PSI SELECT	-	0	1	0	Pressure Sensor Unit Of Measure 0 = [BAR] 1 = [PSI]
4	On display	HEAD S.P	bar/psi	0	Depending on the type of pump unit	Depending on the type of pump unit	Pressure setting for HCS/MSE/MSY control modes
5	P42	4_20 PROBE FS	bar/psi	0	25 bar / 363 psi	Depending on the type of pump unit	Full scale value for pressure sensor 1
6	P26	ABS MAX RPM	rpm	Speed set in ACT mode	3600	Depending on the type of pump unit	Max RPM set
7	P27	ABS MIN RPM	rpm	800	Speed set in ACT mode	Depending on the type of pump unit	Min. speed
8	N.A.	LOG IDX SEL.	-	0	7	0	Datalog selection index
9	P68	RESET DEFAULT	-	0	1	0	Default values reset 0 = [No] 1 = [Res]
10	P48	LOW BEHAV	-	0	2	0	Lack of water input setting 0 = [dis] 1 = [ALR] 2 = [err]
11	P22	HMI PASSWORD	-	1	999	66	System password



12	P23	HMI PAR LOCK	-	0	1	1	Parameter lock 0 = [OFF] 1 = [ON]
13	P69	AVOID EEP SAV	-	0	1	0	Avoid Frequent Parameters Saving 0 = [no] 1 = [yes]
14	P65	TST RUN START	h	0	100	100	Test Run – Start
15	P66	TST RUN RPM	rpm	Parameter P27	Parameter P26	2000	Test Run – Speed
16	P67	TST RUN TIME	s	0	180	10	Test Run – Duration
17	P04	AUTOSTART	-	0	1	1	Automatic start 0 = [OFF] 1 = [ON]
18	P28	RAMP 1	s	1	250	3	Ramp 1
19	P29	RAMP 2	s	1	250	3	Ramp 2
20	P30	RAMP 3	s	1	999	35	Ramp 3
21	P31	RAMP 4	s	1	999	35	Ramp 4
22	P32	RAMP SMIN A	s	2	25	2	Acceleration ramp at startup
23	P33	RAMP SMIN D	s	2	25	2	Deceleration ramp at shutdown
24	P34	CONF SMIN	-	0	1	1	Minimum speed configuration 0 = [STP] 1 = [SMI]
25	P35	SMIN TIME	s	0	100	0	Minimum speed – Duration
26	P36	% RPM WINDOW	%	0	100	10	Adjustment window
27	P37	% RPM HYSTER	%	0	100	80	Adjustment hysteresis
28	P03	% RESTART VAL	%	0	100	100	Restart adjustment value
29	P45	MIN THRESH LIM	bar/psi	0	Pressure setpoint (see Object_Identifier 4)	0	Pressure minimum threshold
30	P46	TH LIM DELAY	s	1	100	2	Pressure minimum threshold – Delay Time
31	P47	TH LIM ERR RES	0	0	1	1	Pressure minimum threshold – Automatic error reset 0 = [dis] 1 = [enb]
32	P57	SWC OVER INTER	h	0	250	24	Multipump – Switch Interval
33	P61	SYNC RPM LIM	rpm	Min	3600	Depending on the type of pump unit	Multipump Synchronous – Shutdown speed
34	P62	SYNC WINDOW	rpm	0	1000	150	Multipump Synchronous – Window
35	P58	ACT VAL INC	bar/psi	0	25/363	0.35	Multipump – Actual Value Increase
36	P59	ACT VAL DEC	bar/psi	0	25/363	0.15	Multipump – Actual Value Decrease
37	P60	ENABLE SPEED	rpm	Parameter P27	Parameter P26	Depending on the type of pump unit	Multipump – Enable Speed

38	P56	MP MAX UNIT	-	1	3	3	Multipump - Max Units
39	P38	SPEED LIFT	rpm	0	3600	Min	Speed Lift
40	P39	LIFT AMOUNT	%	0	200	0	Lift Amount

## 6.2 Analog Inputs

Group of objects with Read Only Present\_Value property.

Object_Identifier	Menu Index	Object_Name	Unit of measurement	Present_Value			Description
				MIN	MAX	DEF	
0	P16	MEASURED RPM	rpm	-	-	-	Motor Speed
1	On display	MEASURED HEAD	bar/psi	0	-	-	Current pressure
2	P14	QUAD CURRENT	A	0	-	-	Inverter Current
3	P15	GRID VOLTAGE	V	0	-	-	Inverter Voltage
4	N.A.	INPUT POWER	W	0	-	-	Current power
5	N.A.	W1 TEMP	°C	0	255	-	Temperature of winding 1
6	N.A.	W2 TEMP	°C	0	255	-	Temperature of winding 2
7	N.A.	W3 TEMP	°C	0	255	-	Temperature of winding 3
8	P13	POWER MOD TEMP	°C	0	255	-	Power Module Temperature
9	On display	ERROR CODE	-	-	-	-	Current error
10	N.A.	ERROR B.F. MSW	-	0	65535	0	Error bitField MSW bit 0: E12 Sensor faulty bit 1: E13 Pressure sensor configuration error bit 2: E30 Multi-pump protocol error bit 3: E14 Low pressure error bit 4: reserved bit 5: reserved bit 6: E15 Loss of phase error bit 7: E05 Motor selection error bit 8: E44 Missing speed reference analog input
11	N.A.	ERROR B.F. LSW	-	0	65535	0	Error bitField LSW bit 0: E01 Internal communication error bit 1: E02 Motor overload error bit 2: E03 DC-bus overvoltage error bit 3: E04 Motor step loss bit 4: E05 EEPROM Data memory error bit 5: E06 Grid voltage error bit 6: E07 Motor winding temperature error bit 7: E08 Power module temperature error bit 8: E05 Corrupted factory data bit 9: E05 Corrupted memory password bit 10: E09 NTC probe overtemperature bit 11: E10 Dry run bit 12: E09 NTC probe error bit 13: E04 Locked rotor bit 14: E09 Motor not connected bit 15: E11 Error LOW
12	On display	ALARM CODE	-	-	-	0	Current alarm
13	N.A.	ALARM 1 B.F.	-	0	65535	0	Alarm bitField LSW bit 0: A15 EEPROM write failure bit 1: reserved

							bit 2: A03 Derating bit 3: reserved bit 4: A06 LOW alarm bit 5: A30 Multi-pump connection alarm bit 6: A31 Loss of multi-pump connection bit 7: A05 Data memory alarm
14	N.A.	ALARM 2 B.F.	-	0	65535	0	Alarm bitField MSW bit 0: A20 Internal alarm bit 1: A20 Internal alarm bit 2: A20 Internal alarm bit 3: A20 Internal alarm bit 4: A20 Internal alarm bit 5: A20 Internal alarm bit 6: A20 Internal alarm
15	P05-P06	LIFE TIMER	s	-	-	-	Time of use
16	P07-P08	RUNNING TIMER	s	-	-	-	Motor time of use
17	N.A.	LOG ACT ERR	-	-	-	-	Error code when AV8 (LOG IDX SEL.) takes a value from 0 to 7
18	N.A.	LOG ERR STA T	s	-	-	-	Error start time when AV8 (LOG IDX SEL.) takes a value from 0 to 7
19	N.A.	LOG ERR END T	s	-	-	-	Error end time when AV8 (LOG IDX SEL.) takes a value from 0 to 7
20	N.A.	LOG ERR B.F.	-	-	-	-	Error bitField LSW when AV8 (LOG IDX SEL.) takes a value from 0 to 7
21	N.A.	LOG ERR COUNT	-	-	-	-	Counter of how many times the error occurred when AV8 (LOG IDX SEL.) takes a value from 0 to 7
22	N.A.	LOG RPM SET	rpm	-	-	-	RPM set when AV8 (LOG IDX SEL.) takes a value from 0 to 7
23	N.A.	LOG RPM VALUE	rpm	-	-	-	RPM measured when AV8 (LOG IDX SEL.) takes a value from 0 to 7
24	N.A.	LOG PHASE CURR	A	-	-	-	Phase current when AV8 (LOG IDX SEL.) takes a value from 0 to 7
25	N.A.	LOG AL 1 B.F.	-	-	-	-	BitField alarms 1 when AV8 (LOG IDX SEL.) takes a value from 0 to 7
26	N.A.	LOG AL 2 B.F.	-	-	-	-	BitField alarms 2 when AV8 (LOG IDX SEL.) takes a value from 0 to 7
27	N.A.	LOG B.F. IO	-	-	-	-	BitField status I/O when AV8 (LOG IDX SEL.) takes a value from 0 to 7
28	N.A.	LOG PWR	W	-	-	-	Power when AV8 (LOG IDX SEL.) takes a value from 0 to 7
29	N.A.	N. A.	-	-	-	-	Not used
30	N.A.	LOG H	bar/psi	-	-	-	Pressure when AV8 (LOG IDX SEL.) takes a value from 0 to 7
31	N.A.	LOG PWR.M. T.	°C	-	-	-	Temperature of the power module when AV8 (LOG IDX SEL.) takes a value from 0 to 7
32	N.A.	LOG STOP START	-	-	-	-	Value AV0 when AV8 (LOG IDX SEL.) takes a value from 0 to 7
33	N.A.	RESERVED	-	-	-	-	Reserved
34	N.A.	N. A.	-	-	-	-	Not used
35	N.A.	N. A.	-	-	-	-	Not used
36	N.A.	N. A.	-	-	-	-	Not used

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- 2) A leading global water technology company.

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