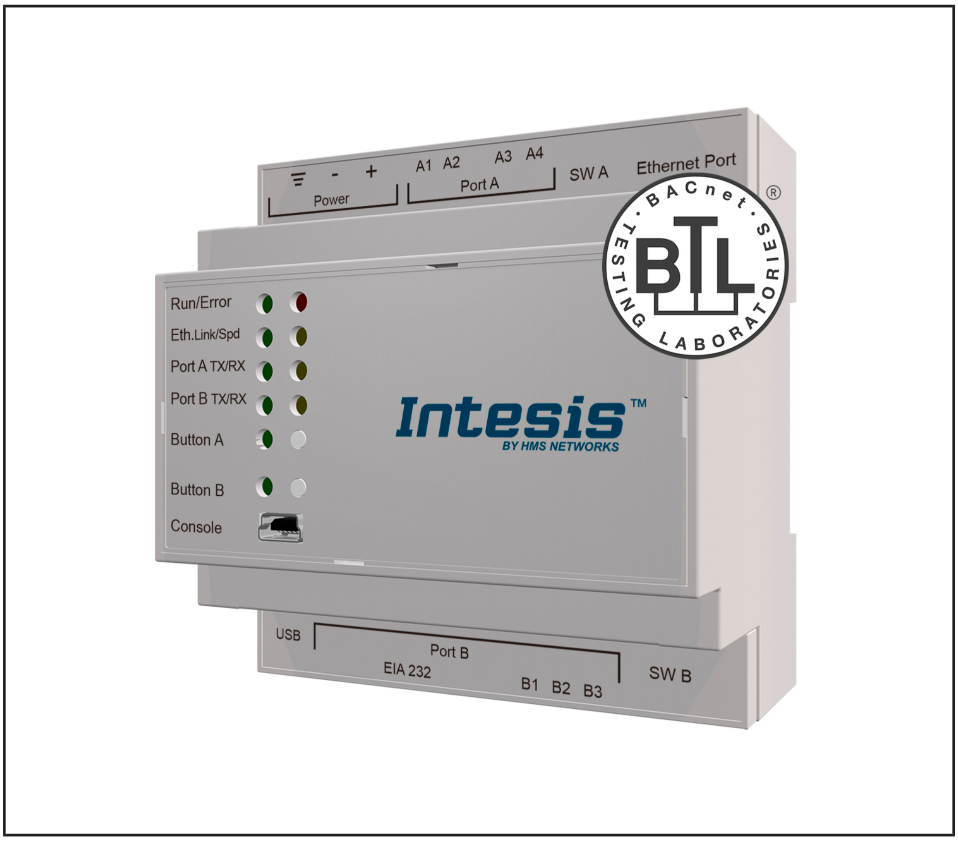
BACnet MS/TP Gateway

For BoosterCommand Pro(+)

Supplementary Operating Manual



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Supplementary Operating Manual BACnet MS/TP Gateway

Original operating manual

Contents

1 Supplementary Operating Manual

1.1 General

This supplementary operating manual accompanies the installation/operating manual. All information contained in the installation/operating manual must be observed.

Table 1: Relevant operating manuals

Type series	Reference number of the installation/operating manual
KSB Delta Macro	1983.843
KSB Delta Primo	1983.811

For a detailed description of the components used observe the operating manuals provided by the respective component's manufacturer.

This document only covers the operation of the device in connection with the pressure booster system.

1.2 BACnet MS/TP gateway settings and standard configuration

For detailed information on the BACnet MS/TP gateway see the Intesis product literature:
https://www.intesis.com/products/protocol-translator/bacnet-gateways/bacnet-client-modbus-server-ibox-mbs-bac?ordercode=INMBSBAC1000000

For configuring the BACnet MS/TP gateway the software *Intesis MAPS* is required, which can be downloaded from the following address:
https://www.intesis.com/products/protocol-translator/bacnet-gateways/bacnet-client-modbus-server-ibox-mbs-bac?ordercode=INMBSBAC1000000

Table 2: BACnet MS/TP gateway standard configuration

Controller	Control unit	Gateway
Communication protocol	Modbus RTU	BACnet MSTP
Slave address	1	246
Baud rate	38400	Automatic
Parity	None	-

BACnet MS/TP gateway DIP switch settings

- SWA: 1 = ON, 2 = ON, 3 = ON
- SWB: 1 = ON, 2 = ON, 3 = ON

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1.3 BACnet MS/TP gateway description

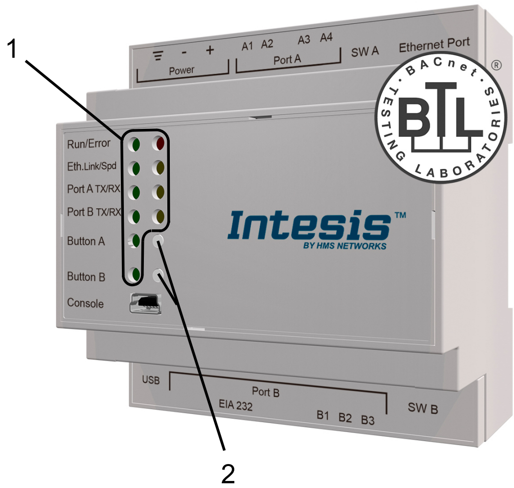

Fig. 1: LEDs and buttons

1	LEDs	2	Buttons

Table 3: BACnet MS/TP gateway LEDs overview

LED	Status	Description
Run	Off	Module off
	Green	In operation
Error	Off	No error
	Red	Error present
Port A (TX/RX) – Modbus RTU	Off	No activity at Port A
	TX flashing green	Data is being sent.
	RX flashing yellow	Data is being received.
Port B (TX/RX) – Modbus RTU (when using BACnet IP)	Off	No activity at Port B TX/RX
	TX flashing green	Data is being sent.
	RX flashing yellow	Data is being received.
Port B (TX/RX) – Modbus RTU (when using BACnet MS/TP)	Off	No activity at Port B TX/RX
	TX flashing green	Data is being sent.
	RX flashing yellow	Data is being received.
Button A – Modbus RTU	Off / red	No function
Button B – Modbus RTU (when using BACnet IP)	Off / red	No function
Button B – Modbus RTU (when using BACnet MS/TP)	Off / red	No IP address available
	Green	IP address available

Table 4: BACnet MS/TP gateway buttons overview

Button	Status	Description
Button A – Modbus RTU	No function	Can be set via the configuration software.
Button B – Modbus RTU (when using BACnet IP)	No function	Can be set via the configuration software.
Button B – Modbus RTU (when using BACnet MS/TP)	-	Sends "Who am I“ identification message

1.4 Loading a pre-configured project from BACnet MS/TP gateway

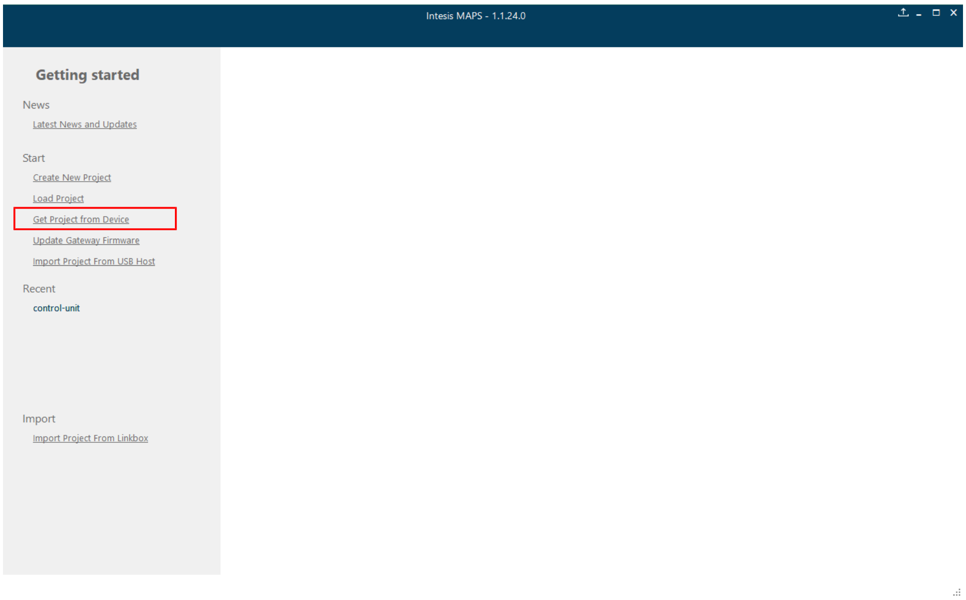

Fig. 2: Loading a pre-configured project

1. Click on *"Get Project from Device"* .

   ⇨ The project that has been pre-configured at the factory is loaded onto the PC / laptop with all registers available.

1.5 Loading a new configuration to the BACnet MS/TP gateway

1. Connect the BACnet MS/TP gateway to a PC / laptop with a USB cable at the *Console* USB port.

Fig. 3: Intesis MAPS desktop icon

2. Open the *Intesis MAPS* application.

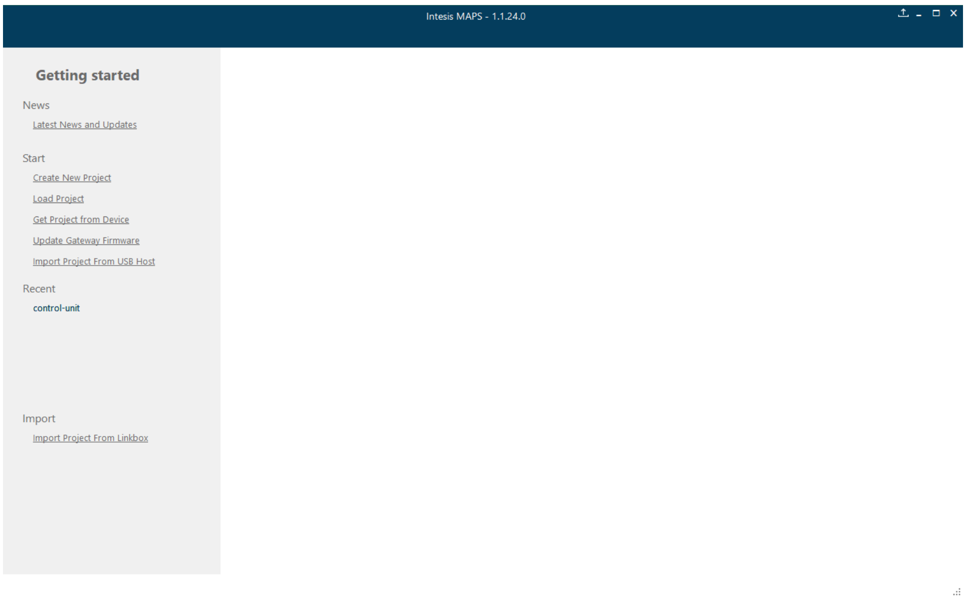

Fig. 4: Selecting the files to be loaded

3. Select the file (e.g. DPCIII bacnet) to be loaded.

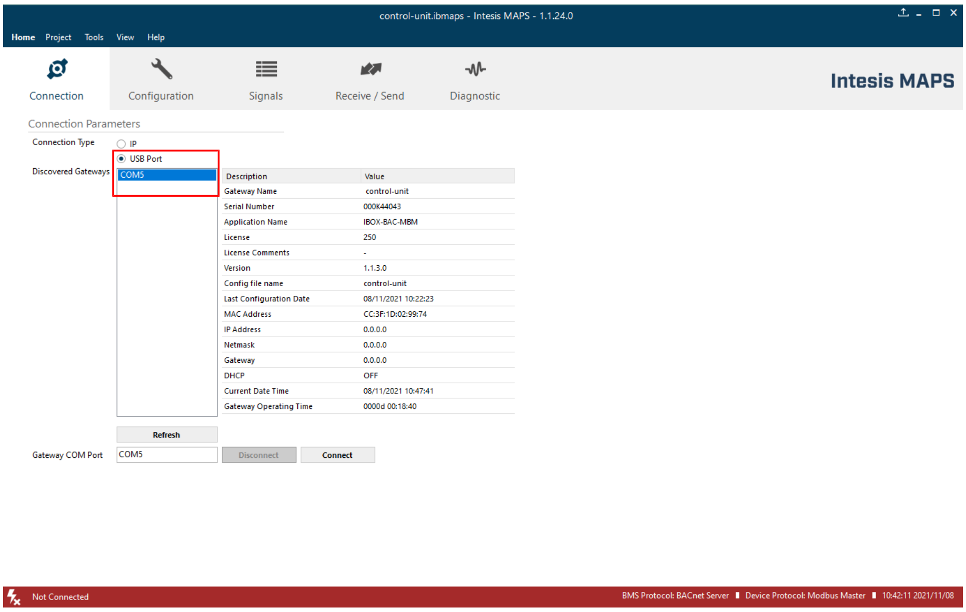

Fig. 5: Selecting the COM port

4. Select the COM port connecting the BACnet MS/TP gateway to the PC / laptop.

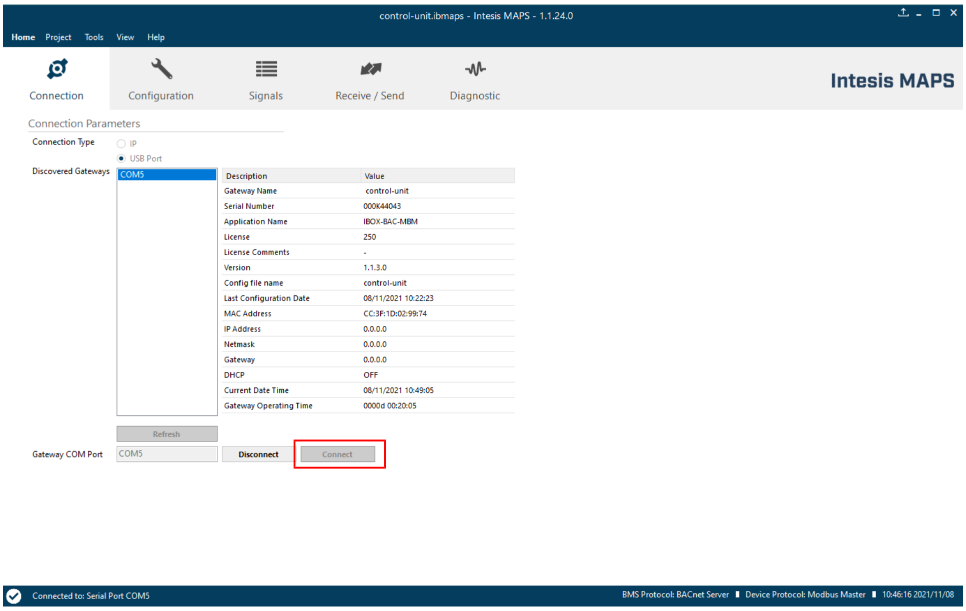

Fig. 6: Establishing a connection

5. Establish a connection to the BACnet MS/TP gateway.
   (Connection >> Connect)

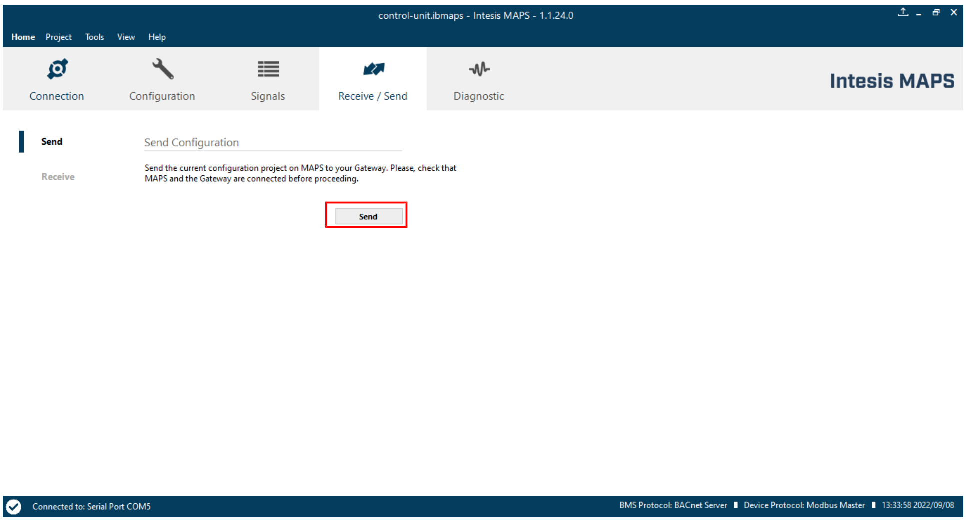

Fig. 7: Loading the file to the BACnet MS/TP gateway

6. Load the file to the BACnet MS/TP gateway.
   Receive
7. Disconnect the BACnet MS/TP gateway from the PC / laptop.

1.6 Checking the operation of the BACnet MS/TP gateway

LED indicators

The following status of the LEDs indicates that the configuration has been successful:

- If no BACnet master is connected:
  - LED Run = On
  - LED Error = Off
  - LED Eth. Link/Spd = Off / Off
  - LED Port A TX/RX = Flashing
  - LED Port B TX/RX = Off
- If a BACnet master is connected:
  - LED Run = On
  - LED Error = Off
  - LED Eth. Link/Spd = Flashing / On
  - LED Port A TX/RX = Flashing
  - LED Port B TX/RX = Flashing

Communication

If the configuration has been successful, values are shown in the Modbus column in the overview:

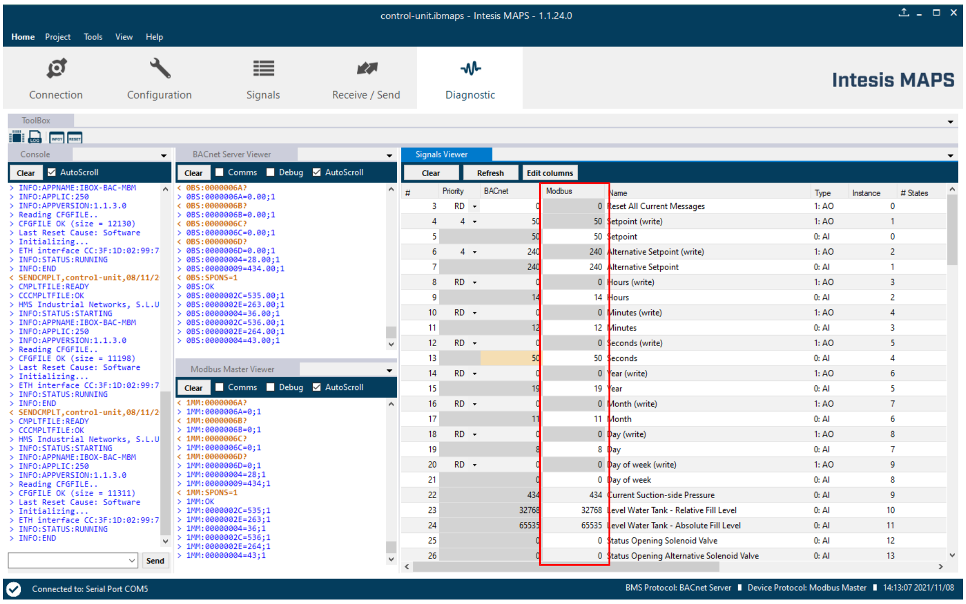

Fig. 8: Communication with the BACnet MS/TP gateway

1.7 Adding additional registers

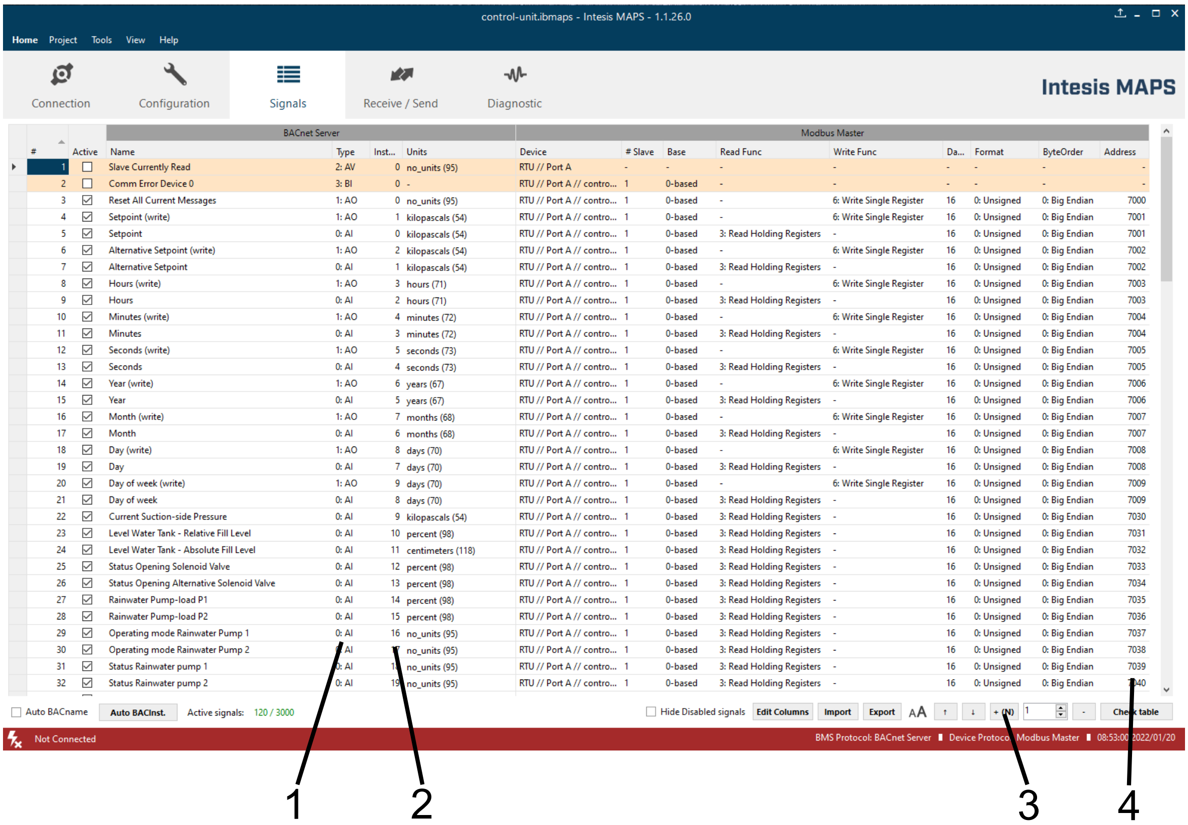

Fig. 9: Adding additional registers

1	Type	2	Instance
3	Add a register	4	BACnet register

1. Add an additional register.
2. Make the following settings:

- Type
  0: AI = read
  1: AO: = write
- Modbus register (minus 40001)

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1.8 Network settings

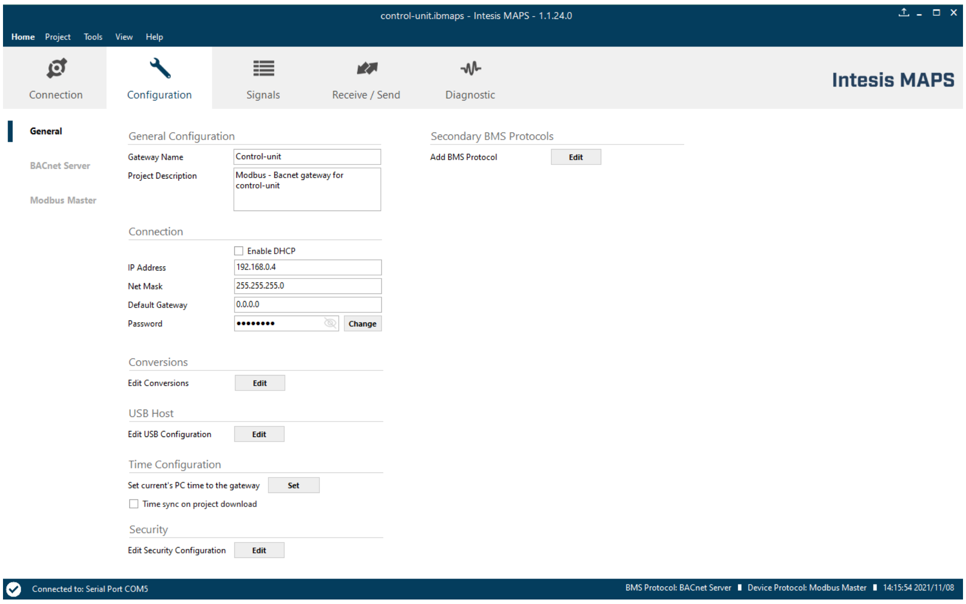

Fig. 10: Entering / selecting general network settings (connection to the PC / laptop)

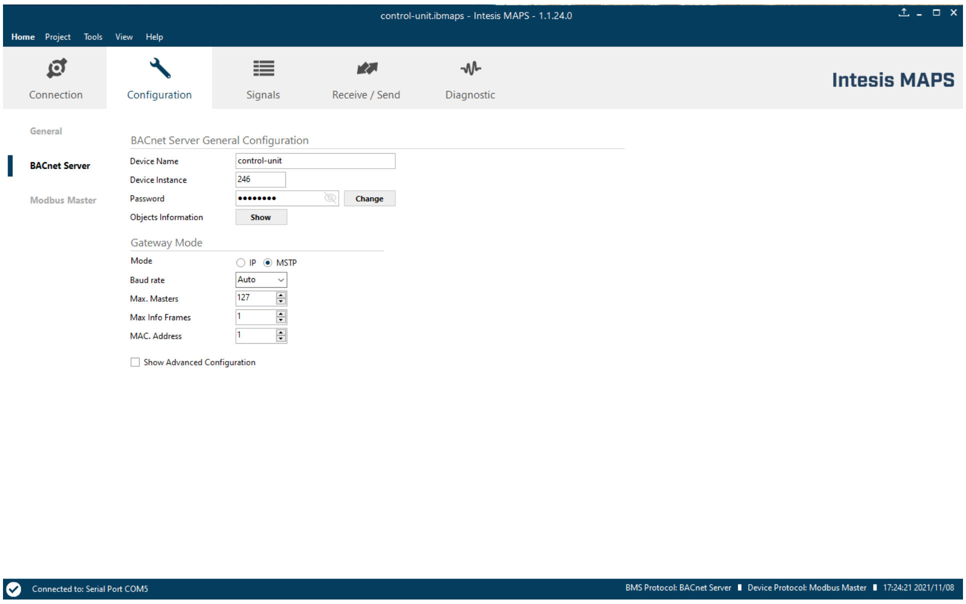

Fig. 11: Entering / selecting settings for the BACnet server

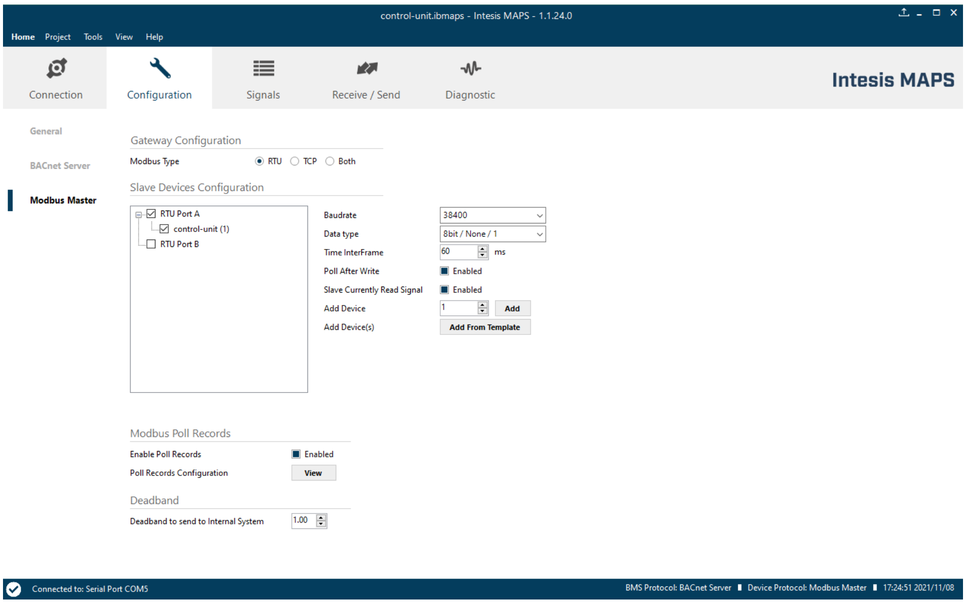

Fig. 12: Entering/selecting settings for the Modbus master

1.9 Parameter lists

1.9.1 List of write parameters

Table 5: List of write parameters

ID	Description	Value range	Unit	Modbus register	Length (byte)	Gateway address	Length	BACnet instance	Unit	Type
1	Reset all current messages	1: Reset all	-	47001	2	7000	16	0	95	1:AO
2	Setpoint	0 … 9900 kPa	kPa	47002	2	7001	16	1	54	1:AO
3	Alternative setpoint	0 … 9900 kPa	kPa	47003	2	7002	16	2	54	1:AO
4	Hours	0 … 23	Hours	47004	2	7003	16	3	71	1:AO
5	Minutes	0 … 59	Minutes	47005	2	7004	16	4	72	1:AO
6	Seconds	0 … 59	Seconds	47006	2	7005	16	5	73	1:AO
7	Year	2019 … 2099	Year	47007	2	7006	16	6	67	1:AO
8	Month	1 … 12	Month	47008	2	7007	16	7	68	1:AO
9	Day	1 … 31	Day	47009	2	7008	16	8	70	1:AO
10	Day of week	0 … 6	Day of week	47010	2	7009	16	9	95	1:AO

1.9.2 List of read parameters

Table 6: List of read parameters

ID	Description	Value range	Unit	Modbus register	Length (byte)	Gateway address	Length	BACnet instance	Unit	Type
2	Setpoint	0 … 9900 kPa	kPa	47002	2	7001	16	1	54	0:AI
3	Alternative setpoint	0 … 9900 kPa	kPa	47003	2	7002	16	2	54	0:AI
4	Hours	0 … 23	Hours	47004	2	7003	16	3	71	0:AI
5	Minutes	0 … 59	Minutes	47005	2	7004	16	4	72	0:AI

ID	Description	Value range	Unit	Modbus register	Length (byte)	Gateway address	Length	BACnet instance	Unit	Type
6	Seconds	0 … 59	Seconds	47006	2	7005	16	5	73	0:AI
7	Year	2019 … 2099	Years	47007	2	7006	16	6	67	0:AI
8	Month	1 … 12	Month	47008	2	7007	16	7	68	0:AI
9	Day	1 … 31	Day	47009	2	7008	16	8	70	0:AI
10	Day of week	0 … 6	Day of week	47010	2	7009	16	9	95	0:AI
31	Current suction-side pressure	kPa	kPa	47031	2	7030	16	30	54	0: AI
32	Level water tank - relative fill level	cm	Percent	47032	2	7031	16	31	98	0: AI
33	Level water tank - absolute fill level	cm	cm	47033	2	7032	16	32	118	0: AI
34	Status opening solenoid valve	%	Percent	47034	2	7033	16	33	98	0: AI
35	Status opening alternative solenoid valve	%	Percent	47035	2	7034	16	34	98	0: AI
36	Rainwater pump load P1	%	Percent	47036	2	7035	16	35	98	0: AI
37	Rainwater pump load P2	%	Percent	47037	2	7036	16	36	98	0: AI
38	Operating mode, rainwater pump 1	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47038	2	7037	16	37	95	0: AI
39	Operating mode, rainwater pump 2	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47039	2	7038	16	38	95	0: AI
40	Status, rainwater pump 1	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47040	2	7039	16	39	95	0: AI
41	Status, rainwater pump 2	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47041	2	7040	16	40	95	0: AI
42	Pump load P1	%	Percent	47042	2	7041	16	41	98	0: AI
43	Pump load P2	%	Percent	47043	2	7042	16	42	98	0: AI
44	Pump load P3	%	Percent	47044	2	7043	16	43	98	0: AI
45	Pump load P4	%	Percent	47045	2	7044	16	44	98	0: AI
46	Pump load P5	%	Percent	47046	2	7045	16	45	98	0: AI
47	Pump load P6	%	Percent	47047	2	7046	16	46	98	0: AI
48	Operating mode, pump 1	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47048	2	7047	16	47	95	0: AI
49	Operating mode, pump 2	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47049	2	7048	16	48	95	0: AI
50	Operating mode, pump 3	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47050	2	7049	16	49	95	0: AI
51	Operating mode, pump 4	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47051	2	7050	16	50	95	0: AI
52	Operating mode, pump 5	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47052	2	7051	16	51	95	0: AI

ID	Description	Value range	Unit	Modbus register	Length (byte)	Gateway address	Length	BACnet instance	Unit	Type
53	Operating mode, pump 6	0: AUTOMATIC 1: MANUAL-OFF 2: MANUAL-ON	-	47053	2	7052	16	52	95	0: AI
54	Status, pump 1	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47054	2	7053	16	53	95	0: AI
55	Status, pump 2	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47055	2	7054	16	54	95	0: AI
56	Status, pump 3	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47056	2	7055	16	55	95	0: AI
57	Status, pump 4	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47057	2	7056	16	56	95	0: AI
58	Status, pump 5	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47058	2	7057	16	57	95	0: AI
59	Status, pump 6	0: IDLE 1: STARTING 2: RUNNING 3: STOPPING	-	47059	2	7058	16	58	95	0: AI
60	Frequency, pump 1	Hz	Hz	47060	2	7059	16	59	27	0: AI
61	Frequency, pump 2	Hz	Hz	47061	2	7060	16	60	27	0: AI
62	Frequency, pump 3	Hz	Hz	47062	2	7061	16	61	27	0: AI
63	Frequency, pump 4	Hz	Hz	47063	2	7062	16	62	27	0: AI
64	Frequency, pump 5	Hz	Hz	47064	2	7063	16	63	27	0: AI
65	Frequency, pump 6	Hz	Hz	47065	2	7064	16	64	27	0: AI
66	Current discharge-side pressure	kPa	kPa	47066	2	7065	16	65	54	0: AI
67	Current setpoint	kPa	kPa	47067	2	7066	16	66	54	0: AI
68	Temperature	°C	°C	47068	2	7067	16	67	62	0: AI
69	Message group, pump 1	-	-	47069	2	7068	16	68	95	0: AI
70	Message group, frequency inverter 1	-	-	47070	2	7069	16	69	95	0: AI
71	Message group, pump 2	-	-	47071	2	7070	16	70	95	0: AI
72	Message group, frequency inverter 2	-	-	47072	2	7071	16	71	95	0: AI
73	Message group, pump 3	-	-	47073	2	7072	16	72	95	0: AI
74	Message group, frequency inverter 3	-	-	47074	2	7073	16	73	95	0: AI
75	Message group, pump 4	-	-	47075	2	7074	16	74	95	0: AI
76	Message group, frequency inverter 4	-	-	47076	2	7075	16	75	95	0: AI
77	Message group, pump 5	-	-	47077	2	7076	16	76	95	0: AI
78	Message group, frequency inverter 5	-	-	47078	2	7077	16	77	95	0: AI

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ID	Description	Value range	Unit	Modbus register	Length (byte)	Gateway address	Length	BACnet instance	Unit	Type
79	Message group, pump 6	-	-	47079	2	7078	16	78	95	0: AI
80	Message group, frequency inverter 6	-	-	47080	2	7079	16	79	95	0: AI
81	Message group, pressure sensor suction side	-	-	47081	2	7080	16	80	95	0: AI
82	Message group, pressure sensor discharge side	-	-	47082	2	7081	16	81	95	0: AI
83	Message group, pressure sensor at the tank	-	-	47083	2	7082	16	82	95	0: AI
84	Message group, temperature sensor	-	-	47084	2	7083	16	83	95	0: AI
85	Message group, leakage detection	-	-	47085	2	7084	16	84	95	0: AI
86	Message group, dry running protection	-	-	47086	2	7085	16	85	95	0: AI
87	Message group, rainwater	-	-	47087	2	7086	16	86	95	0: AI
88	Message group, inlet tank control	-	-	47088	2	7087	16	87	95	0: AI
89	Message group, hygiene functions	-	-	47089	2	7088	16	88	95	0: AI
90	Message group, pipe filling	-	-	47090	2	7089	16	89	95	0: AI
91	Message group, membrane rupture	-	-	47091	2	7090	16	90	95	0: AI
92	Message group, special operating mode	-	-	47092	2	7091	16	91	95	0: AI
93	Message group, MPO modes	-	-	47093	2	7092	16	92	95	0: AI
94	Message group, servicing	-	-	47094	2	7093	16	93	95	0: AI
95	Message group, screen	-	-	47095	2	7094	16	94	95	0: AI
96	Message group, control unit	-	-	47096	2	7095	16	95	95	0: AI
97	System status	-	-	47097	2	7096	16	96	95	0: AI
98	Operating hours, system	0…136 years	Hours	47098	2	7097	16	97	95	0: AI
99				47099	2	7098	16	98	95	0: AI
100	Operating hours P1	0…136 years	Hours	47100	2	7099	16	99	95	0: AI
101				47101	2	7100	16	100	95	0: AI
102	Operating hours P2	0…136 years	Hours	47102	2	7101	16	101	95	0: AI
103				47103	2	7102	16	102	95	0: AI
104	Operating hours P3	0…136 years	Hours	47104	2	7103	16	103	95	0: AI
105				47105	2	7104	16	104	95	0: AI
106	Operating hours P4	0…136 years	Hours	47106	2	7105	16	105	95	0: AI
107				47107	2	7106	16	106	95	0: AI
108	Operating hours P5	0…136 years	Hours	47108	2	7107	16	107	95	0: AI
109				47109	2	7108	16	108	95	0: AI
110	Operating hours P6	0…136 years	Hours	47110	2	7109	16	109	95	0: AI
111				47111	2	7110	16	110	95	0: AI
112	Number of pump starts P1	-	-	47112	2	7111	16	111	95	0: AI
113			-	47113	2	7112	16	112	95	0: AI
114	Number of pump starts P2	-	-	47114	2	7113	16	113	95	0: AI
115			-	47115	2	7114	16	114	95	0: AI

ID	Description	Value range	Unit	Modbus register	Length (byte)	Gateway address	Length	BACnet instance	Unit	Type
116	Number of pump starts P3	-	-	47116	2	7115	16	115	95	0: AI
117			-	47117	2	7116	16	116	95	0: AI
118	Number of pump starts P4	-	-	47118	2	7117	16	117	95	0: AI
119			-	47119	2	7118	16	118	95	0: AI
120	Number of pump starts P5	-	-	47120	2	7119	16	119	95	0: AI
121			-	47121	2	7120	16	120	95	0: AI
122	Number of pump starts P6	-	-	47122	2	7121	16	121	95	0: AI
123			-	47123	2	7122	16	122	95	0: AI
124	Operating hours, rainwater pump 1	0…136 years	Hours	47124	2	7123	16	123	95	0: AI
125				47125	2	7124	16	124	95	0: AI
126	Operating hours, rainwater pump 2	0…136 years	Hours	47126	2	7125	16	125	95	0: AI
127				47127	2	7126	16	126	95	0: AI
128	Number of pump starts, rainwater pump 1	-	-	47128	2	7127	16	127	95	0: AI
129			-	47129	2	7128	16	128	95	0: AI
130	Number of pump starts, rainwater pump 2	-	-	47130	2	7129	16	129	95	0: AI
131			-	47131	2	7130	16	130	95	0: AI

1.10 Messages

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47069	-	-	Message group, pump 1	-	bin16	4	r
	0	100	Failure motor circuit breaker pump 1	0: inactive 1: active	bin16	4	r
	1	101	Manual ON pump 1	0: inactive 1: active	bin16	4	r
	2	102	Manual OFF pump 1	0: inactive 1: active	bin16	4	r
	3	103	Over-temperature motor pump 1	0: inactive 1: active	bin16	4	r
47070	-	-	Message group, frequency inverter 1	-	bin16	16	r
	0	150	Fault motor circuit breaker frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	1	151	Fault frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	2	152	Communication error frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	3	153	Incorrect check sum frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	4	154	Internal fault frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	5	155	Mains fault frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	6	156	Phase failure frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	7	157	Overvoltage frequency inverter pump 1	0: inactive 1: active	bin16	16	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47070	8	158	Undervoltage frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	9	159	Overload frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	10	160	Brake resistor frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	11	161	Temperature fault frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	12	162	AMA fault frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	13	163	Short circuit frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	14	164	Safety stop frequency inverter pump 1	0: inactive 1: active	bin16	16	r
	15	165	Configuration invalid frequency inverter pump 1	0: inactive 1: active	bin16	16	r
47071	-	-	Message group, pump 2	-	bin16	4	r
	0	200	Failure motor circuit breaker pump 2	0: inactive 1: active	bin16	4	r
	1	201	Manual ON pump 2	0: inactive 1: active	bin16	4	r
	2	202	Manual OFF pump 2	0: inactive 1: active	bin16	4	r
	3	203	Excessive temperature motor pump 2	0: inactive 1: active	bin16	4	r
47072	-	-	Message group, frequency inverter 2	-	bin16	16	r
	0	250	Fault motor circuit breaker frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	1	251	Fault frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	2	252	Communication error frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	3	253	Incorrect check sum frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	4	254	Internal fault frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	5	255	Mains fault frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	6	256	Phase failure frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	7	257	Overvoltage frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	8	258	Undervoltage frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	9	259	Overload frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	10	260	Brake resistor frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	11	261	Temperature fault frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	12	262	AMA fault frequency inverter pump 2	0: inactive 1: active	bin16	16	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47072	13	263	Short circuit frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	14	264	Safety stop frequency inverter pump 2	0: inactive 1: active	bin16	16	r
	15	265	Configuration invalid frequency inverter pump 2	0: inactive 1: active	bin16	16	r
47073	-	-	Message group, pump 3	-	bin16	4	r
	0	300	Failure motor circuit breaker pump 3	0: inactive 1: active	bin16	4	r
	1	301	Manual ON pump 3	0: inactive 1: active	bin16	4	r
	2	302	Manual OFF pump 3	0: inactive 1: active	bin16	4	r
	3	303	Excessive temperature motor pump 3	0: inactive 1: active	bin16	4	r
47074	-	-	Message group, frequency inverter 3	-	bin16	16	r
	0	350	Fault motor circuit breaker frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	1	351	Fault frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	2	352	Communication error frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	3	353	Incorrect check sum frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	4	354	Internal fault frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	5	355	Mains fault frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	6	356	Phase failure frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	7	357	Overvoltage frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	8	358	Undervoltage frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	9	359	Overload frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	10	360	Brake resistor frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	11	361	Temperature fault frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	12	362	AMA fault frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	13	363	Short circuit frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	14	364	Safety stop frequency inverter pump 3	0: inactive 1: active	bin16	16	r
	15	365	Configuration invalid frequency inverter pump 3	0: inactive 1: active	bin16	16	r
47075	-	-	Message group, pump 4	-	bin16	4	r
	0	400	Failure motor circuit breaker pump 4	0: inactive 1: active	bin16	4	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47075	1	401	Manual ON pump 4	0: inactive 1: active	bin16	4	r
	2	402	Manual OFF pump 4	0: inactive 1: active	bin16	4	r
	3	403	Excessive temperature motor pump 4	0: inactive 1: active	bin16	4	r
47076	-	-	Message group, frequency inverter 4	-	bin16	16	r
	0	450	Fault motor circuit breaker frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	1	451	Fault frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	2	452	Communication error frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	3	453	Incorrect check sum frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	4	454	Internal fault frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	5	455	Mains fault frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	6	456	Phase failure frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	7	457	Overvoltage frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	8	458	Undervoltage frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	9	459	Overload frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	10	460	Brake resistor frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	11	461	Temperature fault frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	12	462	AMA fault frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	13	463	Short circuit frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	14	464	Safety stop frequency inverter pump 4	0: inactive 1: active	bin16	16	r
	15	465	Configuration invalid frequency inverter pump 4	0: inactive 1: active	bin16	16	r
47077	-	-	Message group, pump 5	-	bin16	4	r
	0	500	Failure motor circuit breaker pump 5	0: inactive 1: active	bin16	4	r
	1	501	Manual ON pump 5	0: inactive 1: active	bin16	4	r
	2	502	Manual OFF pump 5	0: inactive 1: active	bin16	4	r
	3	503	Excessive temperature motor pump 5	0: inactive 1: active	bin16	4	r
47078	-	-	Message group, frequency inverter 5	-	bin16	16	r
	0	550	Fault motor circuit breaker frequency inverter pump 5	0: inactive 1: active	bin16	16	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47078	1	551	Fault frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	2	552	Communication error frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	3	553	Incorrect check sum frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	4	554	Internal fault frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	5	555	Mains fault frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	6	556	Phase failure frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	7	557	Overvoltage frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	8	558	Undervoltage frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	9	559	Overload frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	10	560	Brake resistor frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	11	561	Temperature fault frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	12	562	AMA fault frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	13	563	Short circuit frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	14	564	Safety stop frequency inverter pump 5	0: inactive 1: active	bin16	16	r
	15	565	Configuration invalid frequency inverter pump 5	0: inactive 1: active	bin16	16	r
47079	-	-	Message group, pump 6	-	bin16	4	r
	0	600	Failure motor circuit breaker pump 6	0: inactive 1: active	bin16	4	r
	1	601	Manual ON pump 6	0: inactive 1: active	bin16	4	r
	2	602	Manual OFF pump 6	0: inactive 1: active	bin16	4	r
	3	603	Excessive temperature motor pump 6	0: inactive 1: active	bin16	4	r
47080	-	-	Message group, frequency inverter 6	-	bin16	16	r
	0	650	Fault motor circuit breaker frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	1	651	Fault frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	2	652	Communication error frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	3	653	Incorrect check sum frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	4	654	Internal fault frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	5	655	Mains fault frequency inverter pump 6	0: inactive 1: active	bin16	16	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47080	6	656	Phase failure frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	7	657	Overvoltage frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	8	658	Undervoltage frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	9	659	Overload frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	10	660	Brake resistor frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	11	661	Temperature fault frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	12	662	AMA fault frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	13	663	Short circuit frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	14	664	Safety stop frequency inverter pump 6	0: inactive 1: active	bin16	16	r
	15	665	Configuration invalid frequency inverter pump 6	0: inactive 1: active	bin16	16	r
47081	-	-	Message group, pressure sensor suction side	-	bin16	5	r
	2	702	Fault pressure sensor suction side	0: inactive 1: active	bin16	5	r
	3	703	Broken wire pressure sensor suction side	0: inactive 1: active	bin16	5	r
	4	704	Short circuit pressure sensor suction side	0: inactive 1: active	bin16	5	r
47082	-	-	Message group, pressure sensor discharge side	-	bin16	7	r
	0	720	Discharge-side pressure too low	0: inactive 1: active	bin16	7	r
	1	721	Discharge-side pressure too high	0: inactive 1: active	bin16	7	r
	2	722	Fault pressure sensor discharge side	0: inactive 1: active	bin16	7	r
	3	723	Broken wire pressure sensor discharge side	0: inactive 1: active	bin16	7	r
	4	724	Broken wire pressure sensor discharge side	0: inactive 1: active	bin16	7	r
	5	725	Discharge-side pressure too low too often	0: inactive 1: active	bin16	7	r
	6	726	Discharge-side pressure too high too often	0: inactive 1: active	bin16	7	r
47083	-	-	Message group, pressure sensor at the tank	-	bin16	13	r
	10	750	Fault pressure sensor at tank	0: inactive 1: active	bin16	13	r
	11	751	Broken wire pressure sensor at tank	0: inactive 1: active	bin16	13	r
	12	752	Short-circuit pressure sensor at tank	0: inactive 1: active	bin16	13	r
47084	-	-	Message group, temperature sensor	-	bin16	2	r
	0	760	Fault temperature sensor	0: inactive 1: active	bin16	2	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47084	1	761	Temperature too high	0: inactive 1: active	bin16	2	r
47085	-	-	Message group, leakage detection	-	bin16	1	r
	0	770	Leakage of pump system	0: inactive 1: active	bin16	1	r
47086	-	-	Message group, dry running protection	-	bin16	2	r
	0	800	Lack of water	0: inactive 1: active	bin16	2	r
	1	801	Dry running protection too often within time frame	0: inactive 1: active	bin16	2	r
47087	-	-	Message group, rainwater	-	bin16	11	r
	0	810	Fault rainwater pump 1	0: inactive 1: active	bin16	11	r
	1	811	Starts per hour exceeded rainwater pump 1	0: inactive 1: active	bin16	11	r
	2	812	Manual OFF rainwater pump 1	0: inactive 1: active	bin16	11	r
	3	813	Manual ON rainwater pump 1	0: inactive 1: active	bin16	11	r
	4	814	Fault rainwater pump 2	0: inactive 1: active	bin16	11	r
	5	815	Starts per hour exceeded rainwater pump 2	0: inactive 1: active	bin16	11	r
	6	816	Manual OFF rainwater pump 2	0: inactive 1: active	bin16	11	r
	7	817	Manual ON rainwater pump 2	0: inactive 1: active	bin16	11	r
	8	818	All rainwater pumps OFF	0: inactive 1: active	bin16	11	r
	9	819	Lack of rainwater	0: inactive 1: active	bin16	11	r
	10	820	Use of drinking water	0: inactive 1: active	bin16	11	r
47088	-	-	Message group, inlet tank control	-	bin16	10	r
	0	830	Tank fill level too low	0: inactive 1: active	bin16	10	r
	1	831	Tank fill level critical	0: inactive 1: active	bin16	10	r
	2	832	Tank fill level too high	0: inactive 1: active	bin16	10	r
	3	833	Overflow of tank	0: inactive 1: active	bin16	10	r
	5	835	Flushing of inlet line	0: inactive 1: active	bin16	10	r
	7	837	Flushing of inlet line incomplete	0: inactive 1: active	bin16	10	r
	8	838	Fault inlet valve	0: inactive 1: active	bin16	10	r
	9	839	Fault additional inlet valve	0: inactive 1: active	bin16	10	r
47089	-	-	Message group, hygiene functions	-	bin16	3	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47089	0	850	Water stagnation	0: inactive 1: active	bin16	3	r
	1	851	Flushing	0: inactive 1: active	bin16	3	r
	2	852	Flushing too often	0: inactive 1: active	bin16	3	r
47090	-	-	Message group, pipe filling	-	bin16	3	r
	0	860	Pipe filling active	0: inactive 1: active	bin16	3	r
	1	861	Maximum pipe filling attempts exceeded	0: inactive 1: active	bin16	3	r
	2	862	Pipe filling failed	0: inactive 1: active	bin16	3	r
47091	-	-	Message group, membrane rupture	-	bin16	1	r
	0	870	Membrane rupture detection	0: inactive 1: active	bin16	1	r
47092	-	-	Message group, special operating mode	-	bin16	5	r
	0	900	Several pumps OFF	0: inactive 1: active	bin16	5	r
	1	901	External OFF	0: inactive 1: active	bin16	5	r
	2	902	Fire alarm	0: inactive 1: active	bin16	5	r
	3	903	Emergency power supply	0: inactive 1: active	bin16	5	r
	4	904	Redundant system availability	0: inactive 1: active	bin16	5	r
47093	-	-	Message group, MPO modes	-	bin16	1	r
	0	920	System flow estimation failed	0: inactive 1: active	bin16	1	r
47094	-	-	Message group, servicing	-	bin16	1	r
	0	950	Service required	0: inactive 1: active	bin16	1	r
47095	-	-	Message group, screen	-	bin16	1	r
	0	960	Too many failed login attempts	0: inactive 1: active	bin16	1	r
47096	-	-	Message group, control unit	-	bin16	7	r
	0	970	Database invalid	0: inactive 1: active	bin16	7	r
	1	971	Database not compatible	0: inactive 1: active	bin16	7	r
	2	972	Extension board not available	0: inactive 1: active	bin16	7	r
	3	973	Overcurrent detected	0: inactive 1: active	bin16	7	r
	4	974	Power failure	0: inactive 1: active	bin16	7	r
	5	975	Failure of real-time clock	0: inactive 1: active	bin16	7	r
	6	976	Display failure	0: inactive 1: active	bin16	7	r

Modbus register	Bit position	Message ID	Description	Value range	Type	Length (bits)	read/write
47097	-	-	System status	-	bin16	4	r
	0	-	Warning output active	0: inactive 1: active	bin16	4	r
	1	-	Alert output active	0: inactive 1: active	bin16	4	r
	2-3	-	Status of system messages	0: OK 1: warning 2: alert	bin16	4	r

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