Operating instructions

Supplement to Mounting and operating instructions CALEC® ST - Art. No. 11741

aqua
metro

CALEC® ST
BACnet MS/TP Interface

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General information

Content

This appendix includes BACnet MS/TP specific information linked to BTU meter CALEC® ST. General information of CALEC® ST are in the main operating manual.

General information to BACnet: www.bacnet.org

Ordering process

| Product	Art. No.
CALEC® ST - PT100 - BACnet MS/TP	94654
CALEC® ST - PT500 - BACnet MS/TP	94655

In case of spare part orders, the main serial number of the calculator module included the necessary spare parts has to be mentioned.

CALEC® ST: Overview of supported functions

Function	Parameter	Description	More information
Aquametro vendor ID	431		
Data protocol	BACnet MS/TP		
BACnet device profile	B-ASC		
MAC address	0...127 master and slave 0...254 slave	Factory setting: the lower 2 digits of the device serial no. master/slave changeover: Changeable via CALEC® ST operating menu. Factory setting: master	See: Mode master/slave
Baud rate	9600, 19200, 38400, 57600, 76800	Automatically adjustment	See: BACnet baud rate
Device instance number		5 lower digits of the BTU meter serial no.	See: Device object instance number (DIN)
BACnet connection type		RS 485	

Installation of CALEC® ST: electrical connection

For using the BACnet MS/TP interface, please connect the RS 485 cable to connection 90 (a +) and 91 (b -). These connections are below the calculation module of CALEC® ST.
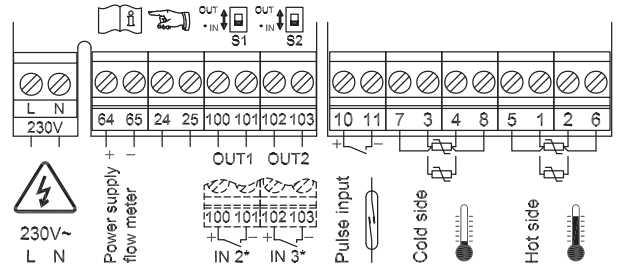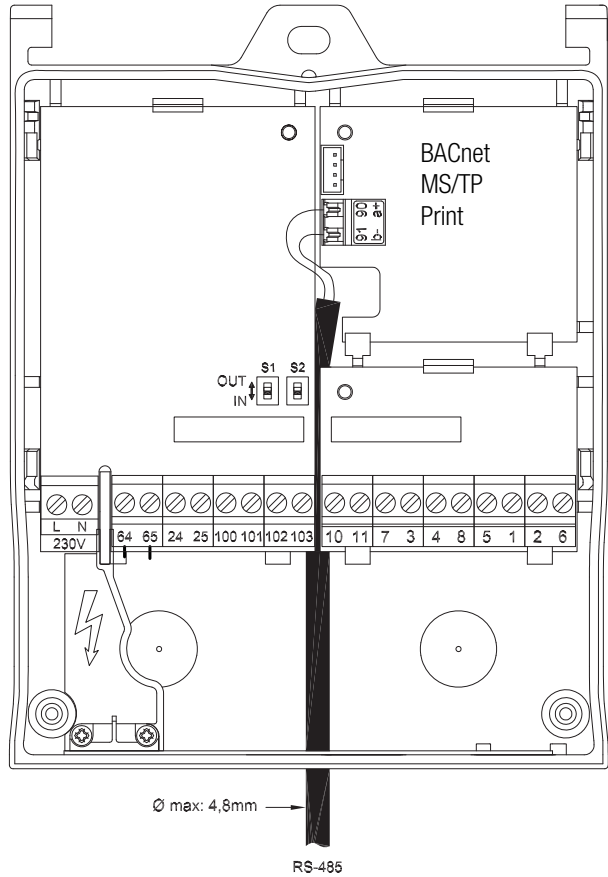
Remarks:
- Clamp 64 / 65:   Only for use sensor supply
- Clamp 24 / 25:   No functionality
- Clamp 90 / 91:   RS 485 connection
- Clamp 100 / 101:   Auxiliary counter 2
- Clamp 102 / 103:   Auxiliary counter 3
- Clamp 10/11:   Pulse Input / counter 1

Power supply:
- 230 VAC

CALEC® ST BACnet MS/TP information

Line termination and bias resistor
An external termination resistor must be connected to each end of the two segments. The BACnet MS/TP specification recommends a 120 Ohm resistor. The device has internal bias resistors (100 k).

Commissioning of CALEC® ST with BACnet MS/TP interface

After connecting the RS 485 to connection 90 and 91, following steps are necessary.

Step	Action	Description
1	Configuration of the CALEC® ST for application use	The information are in the operating manual of CALEC® ST
2	Configuration of the CALEC® ST for BACnet use	According to this appendix

BACnet baud rate

The baud rate adjustment of CALEC® ST will be set automatically after connecting the BTU meter to the network. Supported baud rates are 9600, 19200, 38400, 57600 and 76800.

Mode master/slave

The BACnet MS/TP MAC address is valid between 0 and 254, master functionality (0…127) and slave functionality (0…254). The differentiation between master and slave address will be managed via operating menu of the CALEC® ST.

With the mode function (master/slave) a changeover of both functions are possible.

After 30 seconds, the adjustments of mode will be active in the BMS system.

BACnet MAC address (Adr)

The BACnet MS/TP MAC address is changeable via the operating menu of CALEC® ST.

Operating menu: Bus ⇨ BAcnEt ⇨ Adr.

BACnet mode, master slave selection (Mod)

The BACnet MS/TP mode selection is to be used to select the mode behaviour of the CALEC® ST between master and slave operation.

Operating menu: Bus ⇨ BAcnEt ⇨ Mod

Device object instance number (DIN)

The device object instance number can be adjusted via the operating menu of CALEC® ST. The 5 lowest digits of the serial no. (CALEC® ST), represents the factory settings for DIN.

Operating menu: Bus ⇨ BAcnEt ⇨ DIN

Additionally it is a writeable parameter of the BACnet implementation at CALEC® ST.

Device object name

The parameter "fevice object name" is implemented as writeable (Default: "Calec BACnet")

Supported BACnet services

CALEC® ST works as a BACnet Application Specific Controller (B-ASC).

Supported Objects

The CALEC® ST with BACnet MS/TP supports the device objects and analog input objects.

Analog inputs		Energy and energy-BDE units	
AI-0	Energy	**Unit**	**BACnet Enum**
AI-1	Energy-BDE	J	16
AI-2	Volume	kJ	17
AI-3	Volume-BDE	kJ/kg	125
AI-4	Mass flow	MJ	126
AI-5	Auxiliary counter 1	Wh	18
AI-6	Auxiliary counter 2	kWh	19
AI-7	Auxiliary counter 3	MWh	146
AI-8	Power	BTU	20
AI-9	Volume flow	kBTU	147
AI-10	Mass flow	MBTU	148
AI-11	Temperature warm	Thm	21
AI-12	Temperature cold	Th	22
AI-13	Temperature diff		
AI-14	Density		

Volume and volume-BDE units

Unit	BACnet Enum
Cft	79
M^3	80
Imp.gal.	81
L	82
US.gal.	83

Mass units

Unit	BACnet Enum
Kg	39
Lb	40
Tons	41

Auxiliary counter 1...3 units

The selectable units depends on the assignment of the auxiliary counters in the CALEC® ST.

In case of energy:

Unit	BACnet Enum
J	16
kJ	17
kJ/kg	125
MJ	126
Wh	18
kWh	19
MWh	146
BTU	20
kBTU	147
MBTU	148
thm	21
Th	22

In case of volume:

Unit	BACnet Enum
cft	79
M^3	80
Imp.gal.	81
L	82
US.gal.	83

In case of mass:

Unit	BACnet Enum
kg	39
lb	40
tons	41

In case of no unit:

Unit	BACnet Enum
no-unit	95

Power units

Unit	BACnet Enum
mW	132
W	47
kW	48
MW	49
BTU/h	50
kBTU/h	157
PS	51
RT	52

Volume flow units

Unit	BACnet Enum
cft/s	142
cft/min	84
M^3/s	85
M^3/min	165
M^3/h	135
Imp.gal./min	86
l/s	87
l/min	88
l/h	136
US.gal./min	89

Mass flow units

Unit	BACnet Enum
g/s	154
g/min	155
kg/s	42
kg/min	43
kg/h	44
lb/s	119
lb/min	45
lb/h	46
tons/h	47

Temperature units

Unit	BACnet Enum
°C	62
°K	63
°K/h	181
°K/min	182
°F	64
°dF	66
Δ°F	120
Δ°L	121

Temperature difference units

Unit	BACnet Enum
°K	63

BACnet connectivity for e.g. water and oil meters

Two auxiliary inputs are available to totalise pulses from other meters e.g. water and oil meters with pulse signals and communicate the total directly to the BACnet MS/TP network.

Alarming

The status messages of CALEC® ST are linked to BACnet objects. Aquametro will differentiate between follow types of status messages:

Device status "error"
All important device errors have to be monitored, like "system error" with the error code.

Measurement value status "alarm":
Specific messages like "dt alarm" have to be monitored with the alarm code (for more information please see error messages in the operating manual of CALEC® ST).

PICS document

The PICS document of CALEC® ST is available on www.aquametro.com.

Troubleshooting

Error / Fault	Possible reason	Remedy
CALEC® ST does not communicate on the BACnet MS/TP network	Wiring of the network Configuration of CALEC® ST Configuration of BMS	Ensure that the cabling between BACnet MS/TP devices is correctly. Ensure that the termination and bus topology are correctly. Ensure that the BACnet MAC address and device object instance number are configured correctly and are unique on the network.

DISTRIBUTOR:

Contact, Adress and Stamp

HEAD OFFICE:

AQUAMETRO AG
Ringstrasse 75
CH-4106 Therwil
Phone +41 61 725 11 22
Fax   +41 61 725 15 95
info@aquametro.com

www.aquametro.com

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