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User Manual

for

ECCN02-CT0

ECCN06-CT0

Version 3.0

ebm-papst A&NZ Pty Ltd
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1 Quick start

1.1 Checklist – requirements

Only ebm-papst EC fans with MODBUS 5.0 or above can be used with the following gateway:

- ECCN02-CT0 for MODBUS 5.0
- ECCN06-CT0 for MODBUS 6.0 or above

Further requirements:

- EC Control Software
- RS485 to USB interface
- Fans are not connected to the gateway

1.2 Connecting EC fans to the gateway

NOTE: Please make sure all steps are followed to ensure operation of the Gateway is successful.

Step 1: Address Fans (see 3.1 Addressing fans, page 9)

- Assign individual MODBUS addresses to all EC fans using EC Control software
- Start with address 2, the highest address is 18
- Zone pressurisation set up: Please contact ebm-papst representative for information on the set up requirements

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Step 2: Check the control mode of the fan

- Follow the settings in EC Control software as shown in Figure 1 and check “Control mode (P1)” under “Parameter set 1” tab.
- If control mode is not on **“PWM control”**, change the settings and press **“Set”**

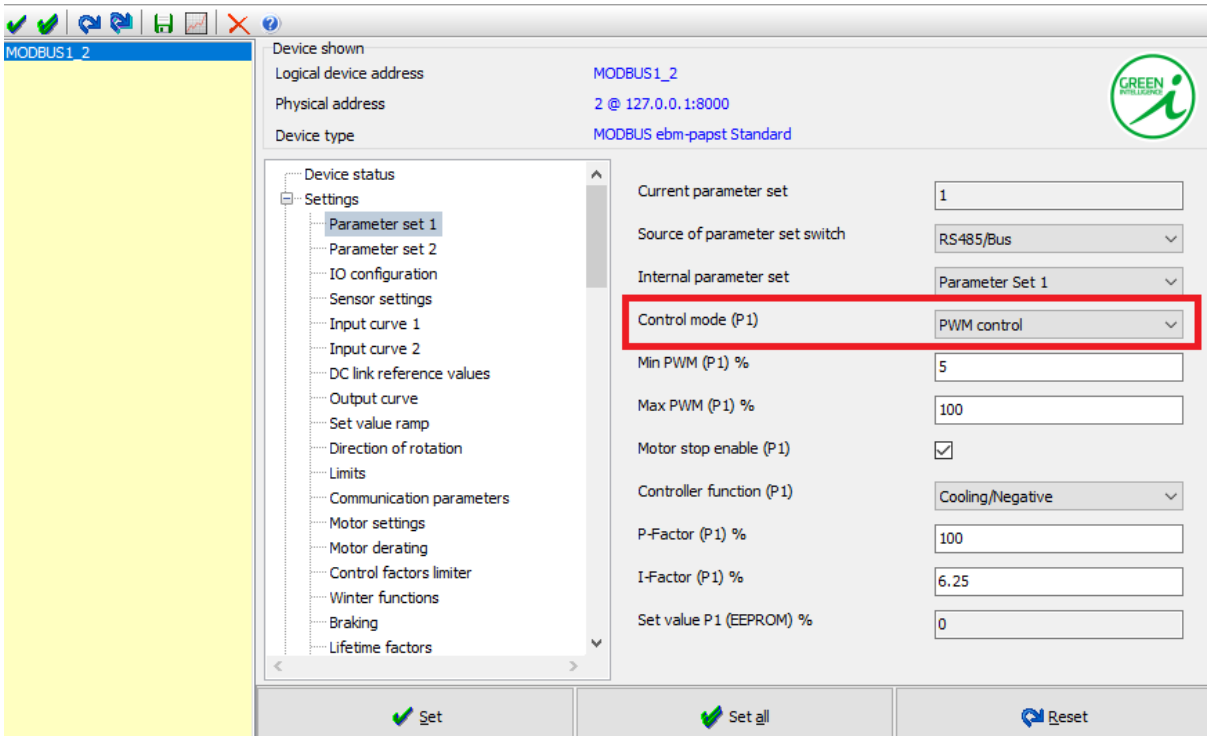

Figure 1: Control mode settings

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Step 3: Change the fan to MODBUS control (skip this step if BMS control is not required)

- Follow the settings in EC Control software as shown in Figure 2. Under the "IO configuration" tab, change "Source of set value" to **"RS485/Bus"** and press **"Set"**
- Then go to "Device status" tab and ensure "Save set value to EEPROM" checkbox is **UNTICKED** as shown in Figure 3.

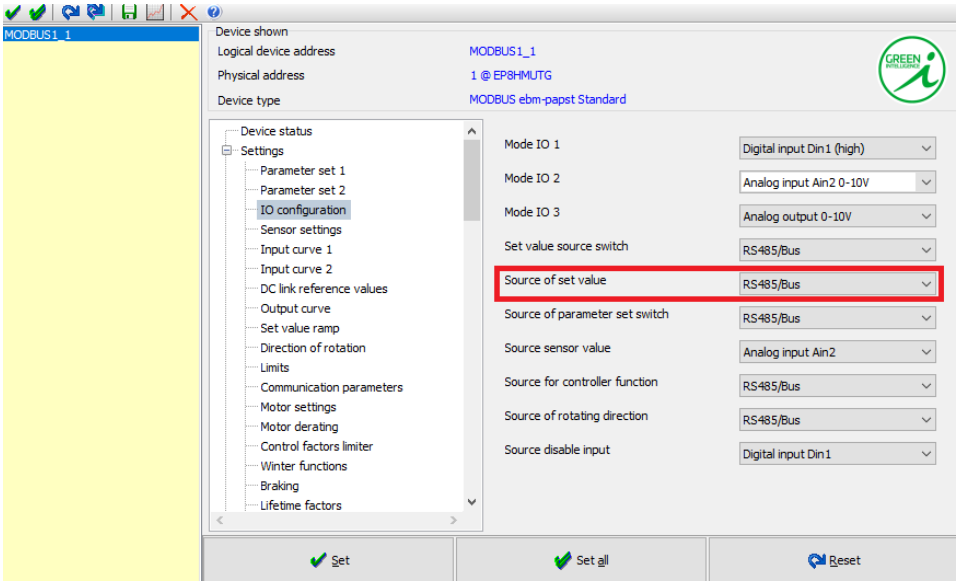

Figure 2: Source of set value setting

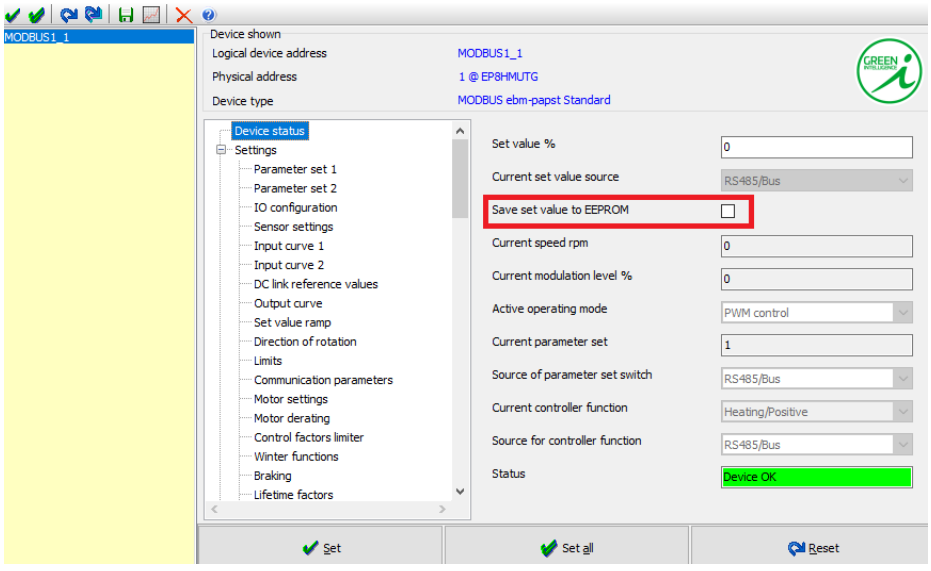

Figure 3: Set value EEPROM setting

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Step 4: Set up fans in the Gateway (see 4.2 Fan enabling, page 12)

- Activate the fans in the Gateway

Step 5: Connect fans to Gateway (see 5.1 Fan status, page 13)

- Connect EC fans to the Gateway via RS485
- Check connection status on the Gateway

Step 6: Configure BMS communication parameters (see 6.2 Communication portal settings, page 19)

- Choose either TCP/IP (Ethernet) or MS/TP RS 485
- Set up parameters to match BMS settings
- REBOOT after updating!

Step 7: Check BMS communication

- Test communication with the BMS consultant

Step 8: Update time and date on the Gateway (see 4.1 Date / time settings, page 11)

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2 Gateway set up

2.1 Important start up note

DO NOT connect the MODBUS and BACnet wiring to the Gateway before the setup is completed.

The power supply to the Gateway and terminals or series of BACnet Gateways and terminals must be separated inside the switch board from the power supply to the other electrical devices like contactors and other electromechanical components. A 250 V 800mAT fuse must be installed in the power supply line. The power supply is functionally isolated from the rest of the I/O circuit, including the serial connections.

For technical specifications of the BACnet Gateway, please refer to the technical specifications document by scanning the product QR code, or go to the following website:

http://go2se.com/web/guest/landing/services/ref=TM172PDG28S?redirect=false

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2.2 Terminals information

The below outlines the terminals of the Gateways.

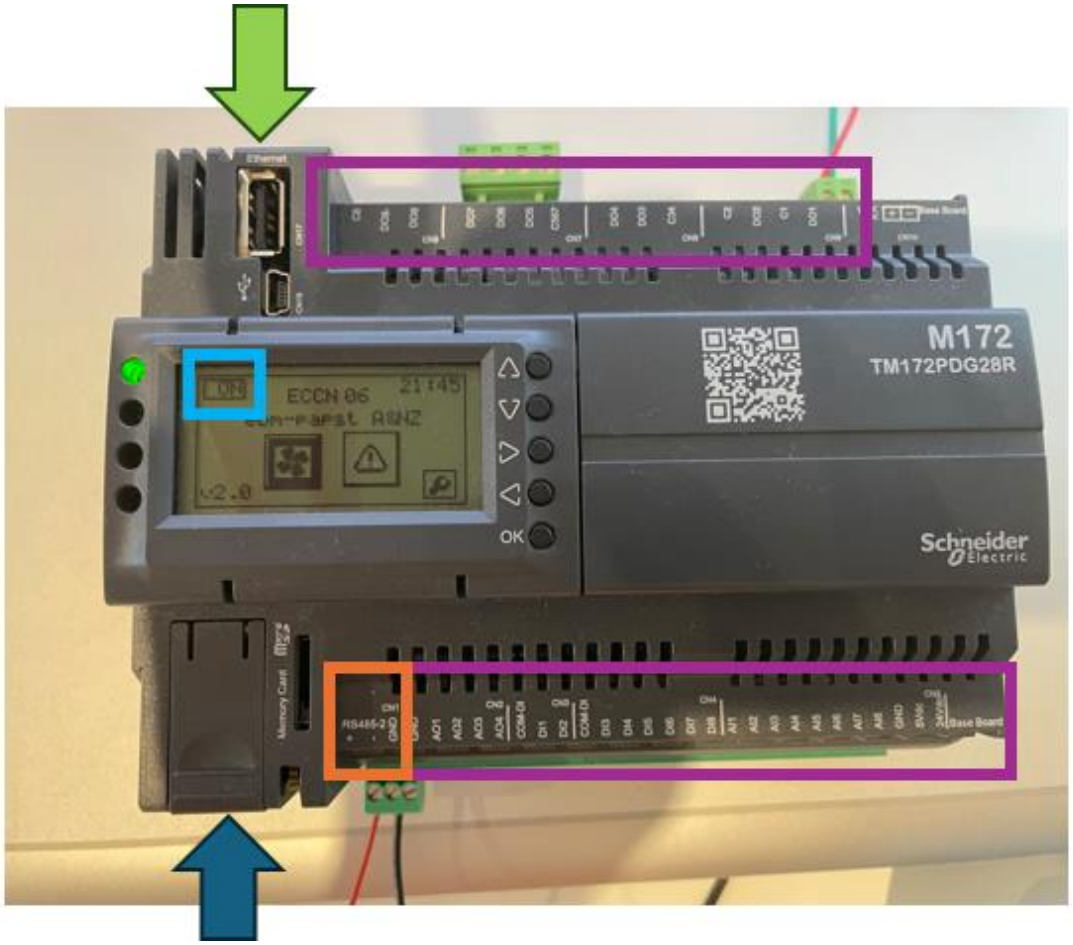

Figure 4: Connection information for Gateway

Terminal	Specification
DO5	Digital output alarm for fan error
DO6	Digital output alarm for fan warning
RS485 +	To be connected to fan's RSA
RS485 -	To be connected to fan's RSB
Ethernet TCP/IP	Connection to BMS for Ethernet TCP/IP
MS/TP RS485	Connection to BMS for MS/TP RS485
ON/OFF	MODBUS control of fans. When is ON, one or more fans are in MODBUS control

Table 1: Terminal information for the BACnet Gateway

NOTE: Ensure the GROUND (GND) terminal for all equipment in the system is interlinked!

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3 General settings and monitoring

3.1 Addressing fans

The BACnet Gateway will not automatically assign addresses to the fans. Therefore, before setting up the BACnet Gateway, the addresses of all ebm-papst fans must be programmed using EC-Control. Assigning multiple fans to the same address must be avoided. Failure to do this will result in the BACnet Gateway operating incorrectly. ebm-papst recommends programming the first fan to address 2, and subsequent fans as “n+1”. This recommendation aims to avoid any confusion when a new fan unit is added to the network, as ebm-papst fans are addressed 1 by factory default settings.

The maximum number of fans that can be connected to the Gateway is 18.

3.2 Buttons and symbols indication

Button	Action	Function
	Short press	Previous field / Up
	Short press	Next field / Down
	Short press Long press	Previous field / Left Exit
	Short press	Next field / Right
	Short press	Enter / Edit field

Table 2: Buttons functionality on BACnet Gateway

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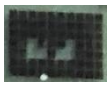
Symbols	Name	Symbol indicates:
	Fan Status	Fan Status page not selected
	Fan Status	Fan Status page selected
	Alarms	Alarms page not selected
	Alarms	Alarms page selected
	Settings	Settings page not selected
	Settings	Settings page selected
	Selection	Selection arrow not selected
	Selection	Selection arrow selected. Pressing OK will lead to further information on the fan
	Number edit	Edit field for numbers. It can be RO (Read only) or RW (Read or Write). Press OK to start editing, you can see a flashing line when it is editable. Select the column using Left / Right button. Adjust number using Up / Down button
	ON / OFF edit	Edit field for ON / OFF. It can be RO (Read only) or RW (Read or Write). Press OK to start editing, after editing press OK again to save change.
	YES / NO edit	Edit field for YES / NO. Press OK to start editing, after editing press OK again to save change

Table 3: Symbols description on gateway

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4 Start-up settings

4.1 Date / time settings

Figure 5: Gateway screen

1. Connect RSA and RSB of the fan interface to the terminals of BACnet Gateway as shown in chapter 2.2 Terminals information.
2. Power up the BACnet Gateway. Wait until the screen as shown in Figure 5 appears.

Figure 6: Gateway screen

3. Navigate to Settings button and press OK

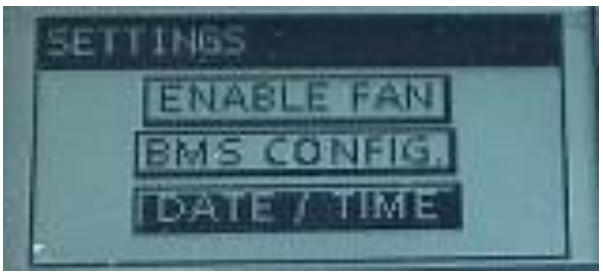

Figure 7: Gateway screen

4. Navigate to “DATE / TIME” and press OK, see Figure 7

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Figure 8: Gateway screen

5. Edit the time and date, see Figure 8. Each number field must be edited separately. After editing, navigate to "UPDATE" and press OK. It will close the page automatically bringing you to the previous page.

4.2 Fan enabling

EC fans need to be individually addressed with a MODBUS address between 1 and 18 prior to be connected to the gateway. Refer to chapter 3.1 for details.

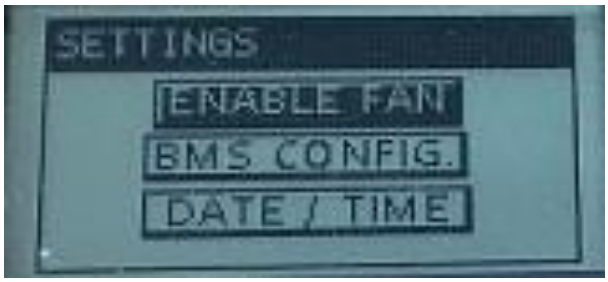

Figure 9: Gateway screen - fan enabling

1. Navigate to "ENABLE FAN" and press OK, see Figure 9.

Figure 10: Gateway screen - fan enabling

2. Edit the ON / OFF fields by pressing the previous / next field. Select ON for fans according to the fan address assigned in Chapter 3.1. Exit the screen when completed.

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5 Monitoring on screen

5.1 Fan status

5.1.1 Fan status overview

Figure 11: Gateway screen - fan status

1. On the main screen, navigate to Fan Status and press OK, see Gateway screen - fan status

Figure 12: Gateway screen - fan status

2. Using the selection symbol, an individual fan can be monitored by pressing OK. To nagivate to fan addresses greater than 6, press NEXT Field until the next page shows.

Fan Status Indicators	What it means:
N/A	Not connected. The fan is not enabled in BACnet Gateway.
FAN OK	Connected. The fan is connected to the BACnet Gateway and is running at the observed RPM.
D/C	Disconnected. An enabled fan is disconnected from BACnet Gateway.
WARN	Warning. Fan warning is active
ERROR	Error. Fan error is active
ON/OFF	Indicates if the fan has been enabled (ON) or not (OFF)

Table 2: Fan status indicators explanation

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5.1.2 Fan status of ECCN02-CT0

Figure 13: ECCN02-CT0 Fan Information Screen

Fan Information	What it means:
Speed	Fan's current speed in rotational per minute (RPM)
Power	Fan's current power consumption in Watts (W)
PWM	Fan's current pulse width modulation in percentage (%)
Input	Analogue input to the fan in Volts (V)
Parameter	Fan's current parameter set
Hours	Fan's current operation hours (HR)

Table 3: Fan information and its meaning

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5.1.3 Fan status of ECCN06-CT0

Figure 14: ECCN06-CT0 Fan Information Screen

Fan Information	What it means:
Parameter	Fan's current parameter set
Power	Fan's current power consumption in Watts (W)
PWM	Fan's current pulse width modulation in percentage (%)
Input	Analogue input to the fan in Volts (V)
Energy	Fan's total energy consumption from factory (kWh)
Hours	Fan's current operation hours (HR)

Table 4: Fan information and its meaning

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5.2 Fan alarms

Figure 15: Gateway screen - fan alarms

1. On the main screen, navigate to Alarms and press OK

Figure 16: Gateway screen - fan alarms

2. Using the selection symbol, individual fan alarms can be monitored by pressing OK.

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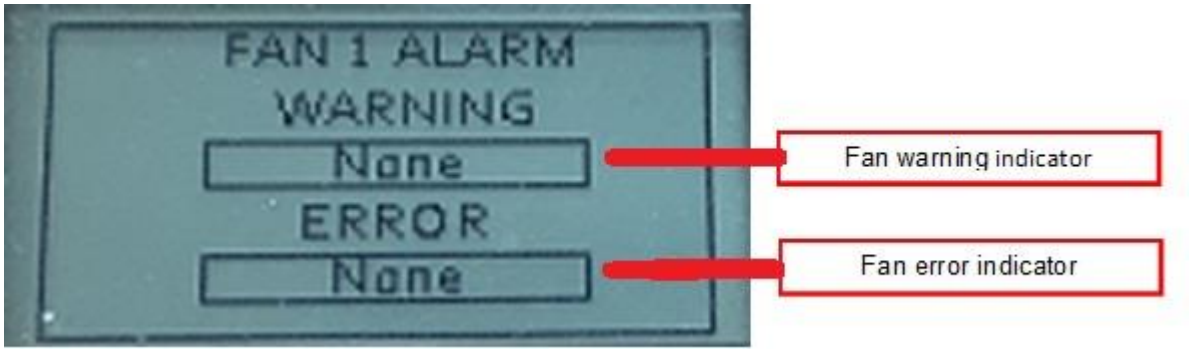

Figure 17: Gateway screen - fan warning and error indicator

WARNING INDICATOR	The **WARNING** status can refer to any of the following occurrences: ▪ TE_high: Output stage temperature high ▪ TM_high: Motor temperature high ▪ TEI_high: Electronics interior temperature high ▪ Cable break: Cable break at set value analogue input ▪ N/A: Refer to EC Control for warning details
ERROR INDICATOR	The **ERROR** status can refer to any of the following occurrences: ▪ UzLow: DC–link under voltage ▪ BLK: Locked motor ▪ HLL: Hall sensor error ▪ FB: Fan bad error ▪ TFE: Power modulation overheated ▪ PHA: Mains under voltage (1-phase devices) or phase failure (3-phase devices) ▪ SKF: Communication error between master controller and slave controller ▪ TFM: Motor overheated

Table 5: Fan warning and error indicator

NOTE: Only the last error or warning will be displayed. For full list, connect fan to EC Control.

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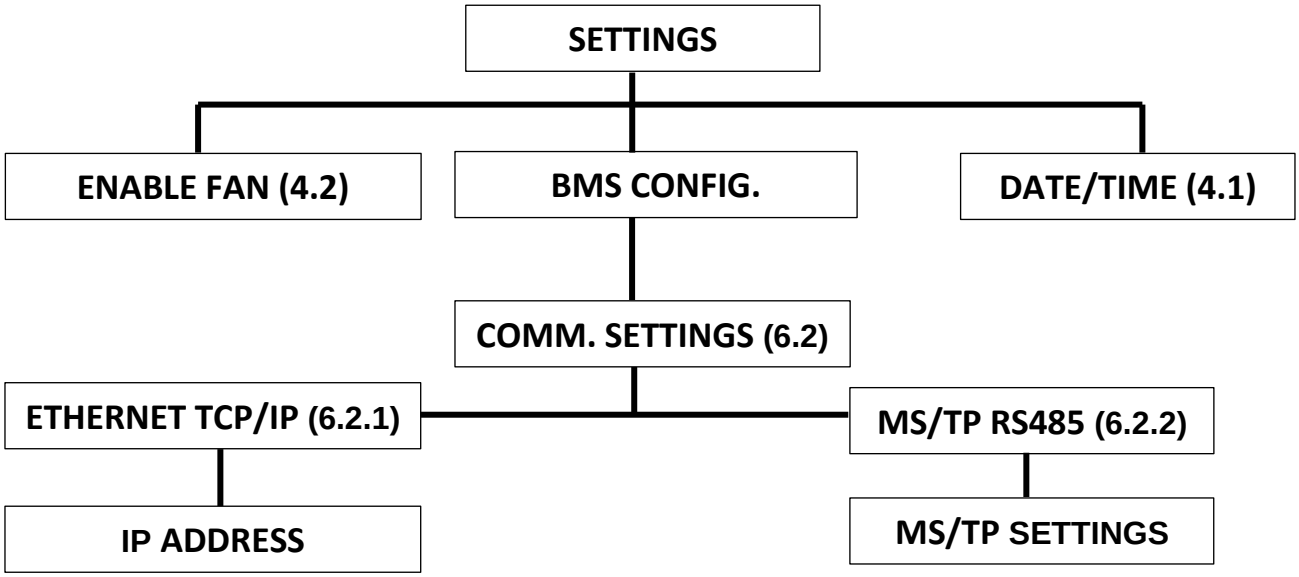
6 Gateway settings

6.1 Overview of gateway menu



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6.2 Communication portal settings

6.2.1 Set ethernet TCP/IP communication parameters

 Figure 18: Gateway screen - set Ethernet TCP/IP communication parameters	1. On the main screen, navigate to SETTINGS and press OK
 Figure 19: Gateway screen - set Ethernet TCP/IP communication parameters	2. Navigate to BMS CONFIG. and press OK
 Figure 20: Gateway screen - set Ethernet TCP/IP communication parameters	3. Navigate to COMM. SETTINGS and press OK

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Figure 21: Gateway screen - set Ethernet TCP/IP communication parameters

4. Ethernet TCP/IP port is activated by default.

Figure 22: Gateway screen - set Ethernet TCP/IP communication parameters

5. Navigate to IP SETTINGS and press OK

Figure 23: Gateway screen - set Ethernet TCP/IP communication parameters

6. Adjust Ethernet communication settings in the Numbers field. Each number field must be edited separately. After editing, navigate to REBOOT and press OK.
   - Default IP address: 10.0.0.100
   - Default Net Mask: 255.255.255.0
   - UDP port: hex 0xBAC0 = decimal 47808

   NOTE: REBOOT is necessary for the new IP address to be written into BACnet Gateway. Failing to do so will result in miscommunication with BMS!

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6.2.2 Set MS/TP RS485 communication parameters

 Figure 24: Gateway screen - set MS/TP RS485 communication parameters	1. On the main screen, navigate to SETTINGS and press OK
 Figure 25: Gateway screen - set MS/TP RS485 communication parameter	2. Navigate to BMS CONFIG. and press OK
 Figure 26: Gateway screen - set MS/TP RS485 communication parameter	3. Navigate to COMM. SETTINGS and press OK

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 **Figure 27: Gateway screen - set MS/TP RS485 communication parameter**	4. Ethernet TCP/IP port is activated by default.
 **Figure 28: Gateway screen - set MS/TP RS485 communication parameter**	5. To change, press OK to start editing. Navigate to MS/TP and press OK
 **Figure 29: Gateway screen - set MS/TP RS485 communication parameter**	6. The MSTP SETTINGS button will appear.
 **Figure 30: Gateway screen - set MS/TP RS485 communication parameter**	7. Navigate to the MSTP SETTINGS and press OK

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Figure 31: Gateway screen - set MS/TP RS485 communication parameter

8. Adjust MS/TP communication settings using the number fields. Default values as shown in Figure 31. Each number field must be edited separately. After editing, navigate to REBOOT and press OK. The device instance will be updated automatically after GATEWAY performs a reboot.
    - Default Device Instance: 47000
    - Default Baudrate: 19200
    - Default Mac Address: 1
    - Default Parity: 8E1

Note: REBOOT is necessary for the new Device Instance to be written into BACnet Gateway. Failing to do so will result in miscommunication with BMS!

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6.3 BACnet variable for PWM input

6.3.1 Variables table for ECCN02-CT0

BACnet Analogue Value	Description	Object Name
Analogue value 180	FAN 1 BMS PWM (0-100%)	BAV0_FAN_1_BMS_PWM
Analogue value 181	FAN 2 BMS PWM (0-100%)	BAV0_FAN_1_BMS_PWM
Analogue value 182	FAN 3 BMS PWM (0-100%)	BAV0_FAN_2_BMS_PWM
Analogue value 183	FAN 4 BMS PWM (0-100%)	BAV0_FAN_3_BMS_PWM
Analogue value 184	FAN 5 BMS PWM (0-100%)	BAV0_FAN_4_BMS_PWM
Analogue value 185	FAN 6 BMS PWM (0-100%)	BAV0_FAN_5_BMS_PWM
Analogue value 186	FAN 7 BMS PWM (0-100%)	BAV0_FAN_6_BMS_PWM
Analogue value 187	FAN 8 BMS PWM (0-100%)	BAV0_FAN_7_BMS_PWM
Analogue value 188	FAN 9 BMS PWM (0-100%)	BAV0_FAN_8_BMS_PWM
Analogue value 189	FAN 10 BMS PWM (0-100%)	BAV0_FAN_9_BMS_PWM
Analogue value 190	FAN 11 BMS PWM (0-100%)	BAV0_FAN_10_BMS_PWM
Analogue value 191	FAN 12 BMS PWM (0-100%)	BAV0_FAN_12_BMS_PWM
Analogue value 192	FAN 13 BMS PWM (0-100%)	BAV0_FAN_13_BMS_PWM
Analogue value 193	FAN 14 BMS PWM (0-100%)	BAV0_FAN_14_BMS_PWM
Analogue value 194	FAN 15 BMS PWM (0-100%)	BAV0_FAN_15_BMS_PWM
Analogue value 195	FAN 16 BMS PWM (0-100%)	BAV0_FAN_16_BMS_PWM
Analogue value 196	FAN 17 BMS PWM (0-100%)	BAV0_FAN_17_BMS_PWM
Analogue value 197	FAN 18 BMS PWM (0-100%)	BAV0_FAN_18_BMS_PWM

Table 6: BACnet variable for PWM input for ECCN02-CT0

6.3.2 Variables table for ECCN06-CT0

BACnet Analogue Value	Description	Object Name
Analogue value 0	FAN 1 BMS PWM (0-100%)	BAV0_FAN_1_BMS_PWM
Analogue value 1	FAN 2 BMS PWM (0-100%)	BAV0_FAN_1_BMS_PWM
Analogue value 2	FAN 3 BMS PWM (0-100%)	BAV0_FAN_2_BMS_PWM
Analogue value 3	FAN 4 BMS PWM (0-100%)	BAV0_FAN_3_BMS_PWM
Analogue value 4	FAN 5 BMS PWM (0-100%)	BAV0_FAN_4_BMS_PWM
Analogue value 5	FAN 6 BMS PWM (0-100%)	BAV0_FAN_5_BMS_PWM
Analogue value 6	FAN 7 BMS PWM (0-100%)	BAV0_FAN_6_BMS_PWM
Analogue value 7	FAN 8 BMS PWM (0-100%)	BAV0_FAN_7_BMS_PWM
Analogue value 8	FAN 9 BMS PWM (0-100%)	BAV0_FAN_8_BMS_PWM
Analogue value 9	FAN 10 BMS PWM (0-100%)	BAV0_FAN_9_BMS_PWM
Analogue value 10	FAN 11 BMS PWM (0-100%)	BAV0_FAN_10_BMS_PWM
Analogue value 11	FAN 12 BMS PWM (0-100%)	BAV0_FAN_12_BMS_PWM
Analogue value 12	FAN 13 BMS PWM (0-100%)	BAV0_FAN_13_BMS_PWM
Analogue value 13	FAN 14 BMS PWM (0-100%)	BAV0_FAN_14_BMS_PWM
Analogue value 14	FAN 15 BMS PWM (0-100%)	BAV0_FAN_15_BMS_PWM
Analogue value 15	FAN 16 BMS PWM (0-100%)	BAV0_FAN_16_BMS_PWM
Analogue value 16	FAN 17 BMS PWM (0-100%)	BAV0_FAN_17_BMS_PWM
Analogue value 17	FAN 18 BMS PWM (0-100%)	BAV0_FAN_18_BMS_PWM

Table 7: BACnet variable for PWM input for ECCN06-CT0

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7 Reference documents

The following documents can be provided upon request:

- EC-Control Manual
- EC-Control Application Guide

8 Contact details

For any further questions, please contact your ebm-papst representative or one of the ebm-papst offices:

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