9. Use the controller

9.1 Start-up

9.1.1 Warnings

CAUTION! Check again that the equipment and wiring are correct as required in this manual. Keep people or things out of the work area.

9.1.2 Start-up procedure

Follow this procedure for correct controller start-up:

Step	Task	Reference in the manual
1	Complete all electrical power connections at mains voltage.	"Electrical installation" on page 26
2	Complete the input connections (i.e., transducers), outputs, and remote controls. ***NOTICE**: follow the indicated steps for correct Modbus connection operations.*	"Connections" on page 28
3	Set-up the type of control command for the EC fans on DIP switch SW1.	"DIP switch SW1" on page 16
4	Set the enabling/disabling of the emergency speed management for EC fans on DIP switch SW1.	"DIP switch SW1" on page 16
5	Turn on power.	-
6	Select the configuration suitable for the transducers used and the application.	"Select a configuration" on page 69
7	If necessary, enable editing of all parameters on DIP switch SW1 and other functions	"DIP switch SW1" on page 16
8	If necessary, set up the unit of measure to IP to display the temperature and pressure values (default **SI**)	"Configuration parameters" on page 80
9	Set the setpoint 1 or 2 and the night limit as well as the direction of rotation for the fans.	"Editing parameters" on page 72
10	If necessary, set proportional bandwidth and setpoints for any external units and related parameters.	
11	If needed, in PID mode, set the parameters	
12	If necessary, edit the configuration parameters	
13	If necessary, assign the addresses to the EC fans and generate the map.	"Manage ebm-papst and Ziehl-Abegg fans" on page 86
14	If necessary, set the parameters for the special functions.	"Set the common and special functions" on page 96
15	Disable reserved parameter editing on DIP switch SW1.	"DIP switch SW1" on page 16

9.1.3 Information displayed when powered on

When the controller is powered on (or after pressing the **Reset** key), before the home page (see "Home page" on page 63) appears, for a few seconds a page appears that has the following information:

- device type
- firmware version
- type of control command for the set fans

***Note**: if the control command is performed via Modbus, during the start-up step, the system checks the status of the map and the number of fans turned on. During the check, the "Map is cleared" message appears quickly and **Map** and **Run** are both zeroed (see "Home page with Modbus fan control" on page 64).*

Example

```
EC Controller R.6.2
  EC Fans & Spray
Manager & Controller
  ebm Modbus output
```

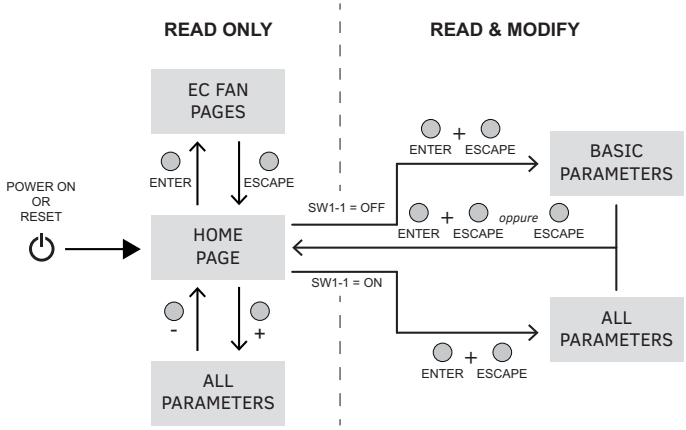
9.2 Navigation structure

9.2.1 Getting started

When turned on, the home page is displayed (see "Home page" on page 63). On the home page, press the **+** and **-** keys to display the current values of all the parameters/measurements (see "List of parameters/measurements" on page 65) or press the **ENTER** key to display the data for the EC fans (see "Display the EC fan data" on page 87).

To edit the parameters, simultaneously press the **ENTER** + **ESCAPE** keys. Based on the position of switch 1 of DIP switch SW1, all parameters are visible (see "Parameter menu" on page 68) or only the base ones are (see "Basic parameters" on page 72).

9.2.2 Navigation map

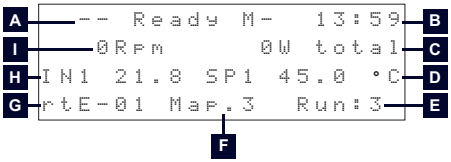


9.3 Home page

9.3.1 Getting started

The information displayed on the home page depends on the fan control mode set using DIP switches 5 and 6, see "DIP switch SW1" on page 16.

9.3.2 Home page with Modbus fan control

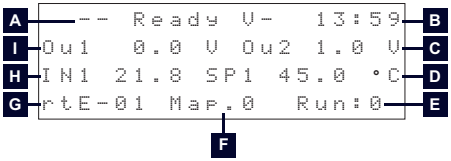


Part	Description
A	System status or alarm/warning message. **System status** ■ **Ready M**: control command value = 0 ■ **Run M CW** (*): control command value > 0. Direction of rotation of the fans: clockwise. ■ **Run M CCW** (*): control command value > 0. Direction of rotation of the fans: counter-clockwise. ■ **Stop**: control disabled (contact **S2** = closed) ■ **RTC N.Limit**: speed limit from active RTC (typically the night speed limit) ■ **Washing Fwd.**.: heat exchanger washing active, normal fan rotation direction ■ **Washing Rev.**.: heat exchanger washing active, reverse fan rotation direction ■ **Cleaning**: dry cleaning of the heat exchanger active ■ **Anti lock**: fan anti-lock rotation running ■ **Floating SP**: control command value > 0 and menu **4: SETUP** > parameter **C5** = **Floating SP** ■ **SP from IN3**: **SP value** from input **IN3** active ■ **Safe Slave**: control command value > 0 and menu **4: SETUP** > parameter **C5** = **Slave safety** (with control in Slave mode). **Alarm and warning messages** See "Troubleshooting" on page 104.
B	Internal clock time
C	Total power absorbed by fans. With **Map.0** and **Run:0** only the unit of measure is visible without the value.
D	Only for Master configurations. Value of the selected setpoint (**SP1** or **SP2**) ***Note**: it is **SP3** if the setpoint is set using **IN3** (menu **4: SETUP** > parameter **C5** = **SP from IN3**) and the input value at **IN3** is > 1 V.*
E	Number of EC fans that respond to the polling on bus RS485 Modbus
F	Number of EC fans mapped
G	Current configuration
H	Value of the prevalent input (**IN1** or **IN2**). The unit of measure depends on the set configuration. ***Note**: it is **Slave IN3** if the control mode is set as Slave by IN3 (menu **4: SETUP** > parameter **C5** = **Slave safety**) and the input value at **IN3** is between 2 and 23.5 mA.*
I	Current fan speed. With **Map.0** and **Run:0** only the unit of measure is visible without the value.

***Note (*)**: the direction of forced rotation during start-up of the system (default = **CW**). The content of the holding register of the motors is overwritten. To modify the direction of rotation, use the reserved parameter **Working Fan Direction** (see "Editing parameters" on page 72).*

***Note**: during the start-up step, the system checks the status of the map and the number of fans that respond. During this check, the "Alarm: No Fans" message appears and **Map** and **Run** are zero.*

9.3.3 Home page with fan 0–10 V output fan control and reading/writing data by Modbus



Part	Description
A	System status or alarm/warning message. **System status** ■ **Ready V**: voltage command, control command value = 0 ■ **Run V CW** (*): voltage command, control command value > 0. Direction of rotation of the fans: clockwise. ■ **Run V CCW** (*): voltage command, control command value > 0. Direction of rotation of the fans: counter-clockwise. ■ **Stop**: control disabled (contact **S2** = closed) ■ **RTC N.Limit**: speed limit from active RTC (typically the night speed limit) ■ **Washing Fwd.**.: heat exchanger washing active, normal fan rotation direction ■ **Cleaning**: dry cleaning of the heat exchanger active ■ **Anti lock**: fan anti-lock rotation running ■ **Floating SP**: control command value > 0 and menu **4: SETUP** > parameter **C5** = **Floating SP** ■ **SP from IN3**: **SP value** from input **IN3** active ■ **Safe Slave**: control command value > 0 and menu **4: SETUP** > parameter **C5** = **Slave safety** (with control in Slave mode). **Alarm and warning messages** See "Troubleshooting" on page 104.
B	Internal clock time
C	Voltage absorbed by **OUT2** analog output
D	Only for Master configurations. Value of the selected setpoint (**SP1** or **SP2**) ***Note**: it is **SP3** if the setpoint is set using **IN3** (menu **4: SETUP** > parameter **C5** = **SP from IN3**) and the input value at **IN3** is > 1 V.*
E	Number of EC fans that respond to the polling on bus RS485 Modbus
F	Number of EC fans mapped
G	Current configuration
H	Value of the prevalent input (**IN1** or **IN2**). The unit of measure depends on the set configuration. ***Note**: it is **Slave IN3** if the control mode is set as Slave by IN3 (menu **4: SETUP** > parameter **C5** = **Slave safety**) and the input value at **IN3** is between 2 and 23.5 mA.*
I	Voltage of the **OUT1** analog output

***Note (*)**: to get the indication of the direction of rotation (**CW** or **CCW**), the fans must be correctly mapped and functioning. With **Map.0** and **Run:0**, the **CW** and **CCW** characters do not appear.*

***Note**: when the 0-10 V regulation mode is active, the fans only need to be mapped to access the information on the fans available by Modbus.*

9.4 Parameters

9.4.1 List of parameters/measurements

Following are all of the parameters for the controller in order of their display.

***Note**: from version 8.0 of the ECM firmware, the temperature and pressure values can be viewed with Imperial units of measure (°F e psi). Therefore, where the text indicates the unit of measure available in °C, it is also available in °F, and where bar is indicated, psi is also available. For the conversion values, use the following formulas: °F = 32+ (°C x 9/5), psi = bar x 14.5.*

Parameter/ page	Description	Unit of measure
Home page	See "Home page" on page 63	-
IN 1	Input value 1	mA/ V dc/ bar/ °C
IN 2	Input value 2	mA/ V dc/ bar/ °C
IN 3	Input value 3	mA/ V dc/ bar/ °C
SP1 (*)	Setpoint 1	°C/ mA/ bar/ V dc
SP2 (*)	Setpoint 2	°C/ mA/ bar/ V dc
LNight	Maximum night limit speed (% RPM)	%
SSpray	Speed (% RPM) with SPRAY on	%
JH 1	Upper speed limit for jump 1 (% RPM)	%
JL 1	Lower speed limit for jump 1 (% RPM)	%
JH 2	Upper speed limit for jump 2 (% RPM)	%
JL 2	Lower speed limit for jump 2 (% RPM)	%
Working Fan Direction	Working (normal) direction of rotation of the fans	-
P (*)	Proportional band	°C/ mA/ bar/ V dc
I (*)	Integral component weight	-
D (*)	Derivative component weight	-
ti (*)	Integration time	s
td (*)	Derivation time	s
SP1 (*)	Setpoint 1	°C/ mA/ bar/ V dc
Pb 1 (*)	Fan proportional band	°C/ mA/ bar/ V dc
Hi 1	Maximum speed limit (% RPM)	%
Lo 1	Minimum speed limit (% RPM)	%
dE 1	Soft-Start acceleration/deceleration time for starter	s
Sh 1	Input value that forces the fan control command to the maximum. (Bypass maximum speed limit)	°C/ mA/ bar/ V dc
ShH 1	Hysteresis on value of **Sh 1** and **Sh 2**	°C/ mA/ bar/ V dc
Sl 1	Input value that forces the fan control command to zero. (Bypass minimum speed limit)	°C/ mA/ bar/ V dc
SlH 1	Hysteresis of value of **Sl 1** and **Sl 2**	°C/ mA/ bar/ V dc
USP 1	Setpoint (RH %) for voltage output to external unit (spray unit) **OUT**	°C/ mA/ bar/ V dc
UPb 1	Proportional band (RH %) for voltage output to external unit (spray unit) **OUT**	°C/ mA/ bar/ V dc
SP2 (*)	Setpoint 2	°C/ mA/ bar/ V dc
Pb 2 (*)	Fan proportional band	°C/ mA/ bar/ V dc
Hi 2	Maximum speed limit (% RPM)	%
Lo 2	Minimum speed limit (% RPM)	%
dE 2	Soft-Start acceleration/deceleration time for starter	s
Sh 2	Input value that forces the fan control command to the maximum. (Bypass maximum speed limit)	°C/ mA/ bar/ V dc
ShH 2	Hysteresis on value of **Sh 1** and **Sh 2**	°C/ mA/ bar/ V dc
Sl 2	Input value that forces the fan control command to zero. (Bypass minimum speed limit)	°C/ mA/ bar/ V dc
SlH 2	Hysteresis of value of **Sl 1** and **Sl 2**	°C/ mA/ bar/ V dc
USP 2	Setpoint (RH %) for voltage output to external unit (spray unit) **OUT**	°C/ mA/ bar/ V dc
UPb 2	Proportional band (RH %) for voltage output to external unit (spray unit) **OUT**	°C/ mA/ bar/ V dc

Parameter/ page	Description	Unit of measure
C0	Operating modes and number of inputs used	-
C1	Input to use. The other input is still visible from the display or from Modbus port (input selection)	-
C2	**IN1** and **IN2** type input	-
		-
C3	Display value conversion	-
C4	Setpoint position	-
C5	Input **IN3** functions	-
C6	Relay **RL1** management	-
C7	**OUT_1** analog output settings	-
C8	**OUT_2** analog output settings	-
Configuration page in use	Working mode set, type of input and display value conversion	-
Modbus page	Modbus communication parameters with PC-BMS	-
Internal clock page (RTC)	Date and time	-
Heat exchanger washing page (Washing) (*)	Parameters for timed washing of the heat exchanger	-
Heat exchanger power management page (LowCapacity) (*)	Heat exchanger power management parameters	-
Fan anti-locking page (Anti Lock Fan) (*)	Fan anti-locking parameters	-
Night limit page (RTC Night Limit) (*)	Parameters for night control	-
Heat exchanger cleaning page (Cleaning) (*)	Heat exchanger cleaning parameters	-
Fans Power (**)	Total power absorbed by EC fans	W
Fans Current (**)	Total current in the intermediate circuit (DC-Link) absorbed by the EC fans	A
Fans Speed (**)	EC fan rotation speed (RPM %)	%
TLogic (**)	Electronic board real time temperature	°C
Out 1 (**)	**OUT1** analog output value	V dc
Out 2 (**)	**OUT2** analog output value	V dc
Co (**)	Control command value for the fans	%

***Note** (*): parameters only visible if the controller configuration calls for it or when the function is active.*

***Note** (**): parameters visible only if the fans are controlled by Modbus.*

9.4.2 Display the values of all the parameters/measurements

***Note**: visible parameters depend on the set configuration.*

1. Press **+** or **-** to scroll through all the parameters/measurements: they are shown in the sequence indicated in "List of parameters/measurements" on page 65.
2. Press the **ESCAPE** key to return to the home page.

9.4.3 Parameter menu

The parameters are listed in the menu and displayed in the following order:

Description	Menu
Basic parameters	**1: BASIC**
Setpoint 1 parameters	**2: EXPERT Bank 1**
Setpoint 2 parameters	**3: EXPERT Bank 2**
Controller configuration parameters	**4: SETUP**
PID control parameters.	**5: PID**
Modbus communication parameters with PC-BMS, over COM-0.	**6: MODBUS**
Internal clock control parameters.	**7: Real Time Clock**
Heat exchanger washing parameters	**8: Washing**
Heat exchanger power management parameters	**9: LowCapacity**
Fan anti-locking parameters	**10: Anti Lock Fan**
Night control with internal clock parameters	**11: RTC Night Limit**
Parameters for set switching of parameters 1 and 2 by temperature probe	**12: Bank Switch ***
EC fan management by Modbus functions	**13: EC FAN Functions**
Heat exchanger cleaning parameters	**14: Cleaning**
Parameters for adjusting the setpoints as a function of the external temperature	**15: Floating SetPoint**

***Note**: menu item only visible if **C5** = **Nothing**.*

9.4.4 Editing parameters

To...	Then...
edit any parameter	see "Edit any parameter" on page 84
edit a basic parameter	see "Edit a basic parameter" on page 74