11. Manage ebm-papst and Ziehl-Abegg fans

11.1 What you need to know

11.1.1 Getting started

If the EC fans are connected and controlled by Modbus, it is possible to read and modify some of the data for the fans.

The controller manages EC fans made by: ebm-papst and Ziehl -Abegg.

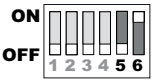
11.1.2 Set the control by Modbus

To enable management of the EC fans using Modbus, use DIP switch SW1 as indicated below:

ebm-papst fans



Ziehl-Abegg fans



11.1.3 Modbus communication mode

The communication parameters are predefined as requested by the manufacturers of EC fans and cannot be modified:

- 19200 baud rate
- 8-bit
- 1 stop bit
- even parity

Transmission of the control is instantaneous. If no changes are required, a control refresh is executed every 5 s.

11.1.4 Available functions

Function	ebm-papst	Ziehl-Abegg	See
Display main data	x	x	"Display the EC fan data" on page 87
Set the emergency speed	x	x	"Set the emergency speed for the fans" on page 88
Set the maximum speed limit	x	x	"Set the maximum speed limit for the fans" on page 89
Update the fan map on the controller	x	x	"Update the fan map" on page 90
Assign the address to all fans	x	x	"Assign the address to all ebm-papst fans" on page 91 "Assign the address to all Ziehl Abegg fans" on page 92
Command the speed of a single fan	x	x	"Command the speed of a single fan" on page 90
Assign an address to a single fan	x	x	"Assign an address to a single fan" on page 92
Assign addresses to multiple fans automatically	-	x	"Assign new addresses to one or more Ziehl -Abegg fans." on page 94
Change the direction of rotation and the speed	x	x	"Change the direction of rotation and the speed of the fans" on page 94
Free from ice	x	-	"Free frozen ebm-papst fans" on page 95

11.1.5 Change from Modbus control to analog output control

If, after setting up and controlling EC fans with Modbus control, analog output control must be reset, follow the steps below:

***Note**: function available only if the Modbus connection with the EC fans is active and operative.*

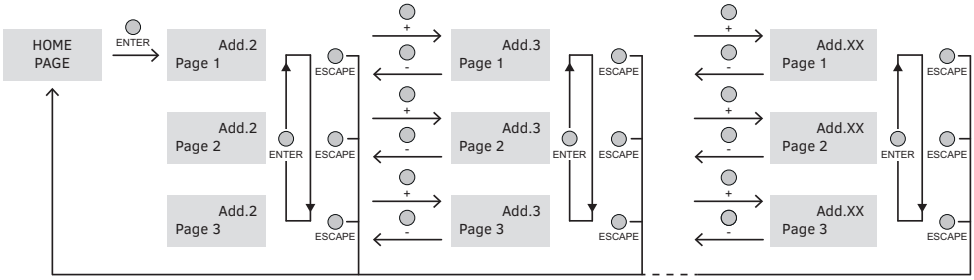
To set the EC fans...	Then...
with the controller	1. Make certain that the EC fans are correctly connected with the RS485 cable and are mapped. 2. Set switch 5 = On (DIP switch SW1). 3. Read and execute the instructions that appear on the display. **Result**: the controller send the fans a Modbus command to enable reception of the control command using the analog output. ***Note**: if the controller locks (for ex.: display locked, control locked, or faulty operation), press the reset button or turn the controller off and on.*
without controller	execute the EC fan manufacturer's instructions (Ziehl-Abegg or ebm-papst) using the suitable programming devices indicated.

11.2 Display the EC fan data

11.2.1 Getting started

From the home page, press the **ENTER** key to scroll through the pages for the individual EC fans.
For each fan connected by Modbus, mapped and on, three pages of data are available.
Fans are ordered starting from the one with the lowest Modbus address.

11.2.2 Navigation mode



***Note**: form any page, press the **ESCAPE** key to return to the home page.*

11.2.3 Data displayed

Element	Description	Page	
		ebm-papst	Ziehl-Abegg
Status	Fan status: ■ **OK** = operating correctly ■ or a first error, in order of priority or before the present malfunction	**All**	**All**
Add.	Modbus address	**All**	**All**
RPM	Current speed	**1**	**1**
W	Absorbed power	**1**	**1**

Element	Description	Page	
		ebm-papst	Ziehl-Abegg
ID	Identification of the type of electronics and protocol version for the ebm-papst fan	**1**	**Unavailable**
RpmMax	Maximum speed	**1**	**1**
h.wo	Total work hours	**1**	**Unavailable**
FW	Firmware identification	**Unavailable**	**1**
Emergency	Fan emergency speed and relative operation delay	**1**	**1**
Tp	Power module temperature	**2**	**2**
Tm	Motor temperature	**2**	**2**
Te	Electronic board temperature	**2**	**2**
DC-Link	Intermediate circuit voltage and current	**2**	**2**
ebm SN	Serial number..	**3**	**Unavailable**
UDS	Unique Device Signature (on two lines).	**Unavailable**	**3**

***Note**: for more information on the meaning of the information provided, please refer to the documentation provided in "Related documents" on page 6.*

Example (ebm-papst fan)

Page 1

```
 Status OK .Add.    4
   0Rpm      0W ID   8
1200RpmMax    151h.Wo
No Emergency Operat.
```

Page 2

```
 Status OK .Add.    4
Tp   8C Tm   7C Te 17C
DC-link       0mA 558V
```

Page 3

```
 Status OK .Add.    4
ebm SN: 1105 00 0NNO
```

Example (Ziehl-Abegg fan)

Page 1

```
 Status OK .Add.    4
 298 Rpm       420 W
 950 RpmMax   FW13.31
No Emergency Operat.
```

Page 2

```
 Status OK .Add.    4
Tp   9C Tm   0C Te 13C
DC-link    200mA 562V
```

Page 3

```
 Status OK .Add.    4
UDS   FF39 05D6 3459
      3639 6659 4318
```

11.3 Set the emergency speed for the fans

11.3.1 When the emergency speed is activated

The fans run at emergency speed (only if it has been setup previously) and only under the following conditions:

- for 0.75-10 control fans and with "cable break" function active: the control signal falls below the value of 0.75 V for a period longer than the set safety period

  ***Note**: the "Cable Break" function can be activated only if there is a Modbus connection with the EC fans.*

- for fans with Modbus control: communication with the Modbus network is cut-off for a period longer than the set safety interval (parameter **Time**)
- on direct command of the controller when it is in under an alarm condition.

***Note**: if the emergency speed has not been set and communications on the Modbus network are cut-off, the fans maintain the speed of the last speed command received.*

11.3.2 Procedure

***Note**: the change is transmitted at the same time to all the fans in the network.*

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Emergency Values Set & Modify

1. For EC Fans with 0.75–10 V control, to avoid untimely intervention of the emergency speed, check that the output setting is **output SLAVE 0.75-10V** (for **OUT_1** parameter **C7**, for **OUT_2** parameter **C8**).
2. Press **ENTER** to enter the function: the **enabled**, **speed**, and **time** parameters appear, with the current values.
3. Press the **ENTER** key and then the **+** or **-** key to edit the parameter value.

   ***Note**: the parameter of the change is highlighted with "edit".*
4. Press the **ENTER** key to confirm the value and to proceed to the next parameter.
5. After modifying the last parameter, press **ENTER**: "edit" disappears.
6. Press the **+** key: the "start process" command appears.
7. To start the operation, press the **ENTER** key: the "work in progress" message appears.

   ***Note**: it is possible to exit the function at any time by pressing the **ESCAPE** key, except once the operation has been started.*

   ***Note**: after editing, wait 5 seconds before re-reading the updated value.*

11.3.3 Parameters

Parameter	Description	Notes on values
enabled	Enabling emergency speed	▪ **ON** enables. ▪ **OFF** disables.
speed (RPM)	Emergency speed value	0-**X** (where x is the maximum value set in "Set the maximum speed limit for the fans" on page 89).
time (s)	Operation delay	5–25

11.4 Set the maximum speed limit for the fans

11.4.1 Introduction

***Note**: the maximum allowed value is defined by the type of EC fan. For more information on the meaning of the information provided, please refer to the technical documents supplied for the EC fans.*

The changes are transmitted at the same time to all of the fans in the network.

11.4.2 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Max Speed Set & Modify

1. Press the **ENTER** key and enter the function: the name of the register "D119", the **speed** parameter with the current value, and the list of possible actions appear.
2. Press the **+** or **-** key to modify the **speed** value: after a few seconds, the fans rotate at the set speed.

   Suggestion: increase/decrease the value of one or two units at a time in order to perceive the effect of the change.
3. To further change the value, press the **+** or **-** key: as a consequence, the fans change speed.
4. To exit the function without saving the value, press the **ESCAPE** key. To save the set value, press the **ENTER** key: the "work in progress" message appears.

   ***Note**: after editing, wait 10 seconds before re-reading the updated value.*

11.4.3 Parameters

Parameter	Description	Notes on values
speed (RPM)	Maximum speed set	**0–x** where x is the maximum value set.

11.5 Command the speed of a single fan

11.5.1 Introduction

***NOTICE**: this function zeros the speed of all the other EC fans.*

It is possible to control only one EC fan at a time and only if a map of the fans is defined in "Update the fan map" on page 90 and if the parameter **bus drive** = ON.

The maximum speed that can be set is defined in "Set the maximum speed limit for the fans" on page 89.

11.5.2 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Single Fan Manual Driving

1. Press **ENTER** to enter the function: the **fan ADD**, **speed rpm**, and **bus drive** parameters appear, with the current values.
2. Press the **ENTER** key and then the **+** or **-** key to edit the parameter value.
3. Press the **ENTER** key to confirm the value and to proceed to the next parameter: the selected fan moves at the set speed.

   ***Note**: the parameter of the change is highlighted with "edit".*
4. To control another fan, press **ENTER** after the last parameter: the parameter **fan ADD** can be modified again. The previously controlled fan stops.
5. To exit, press the **ESCAPE** key: normal operation is restored.

11.5.3 Parameters

Parameter	Description	Notes on values
fan ADD	Address of the selected fan, among those present on the map	-
speed rpm	Desired speed	0-**x** (where x is the maximum value set in "Set the maximum speed limit for the fans" on page 89).
bus drive	Read-only parameter. Command source of the fan control	▪ **ON**: control command by Modbus. ▪ **OFF**: control command by 0-10 V analog input.

11.6 Update the fan map

11.6.1 Applications

To install the controller with a pre-existing network of EC fans.

11.6.2 Prerequisites

The fans must already be assigned a specific and unique address (other than the factory default address).

11.6.3 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Existing fans map acquisition

1. Press **ENTER** to select the function.
2. With the **+** or **-** key, set the **Fans to find** parameter.
3. To start the scan, press the **ENTER** key: the address of the interrogation is shown at the top and below the addresses of the fans found.
4. To interrupt the scan, press **ESCAPE**. The partial scan can be saved.
5. Wait for all of the expected fans to be found. The operation may take a few minutes.
6. Press the **ENTER** key to save the new map or **ESCAPE** to keep the previous map.

11.6.4 Parameters

Parameter	Description	Notes on values
Fans to find	Number of EC fans present in the network	**0** = the map is reset and the situation prior to the scan is restored ***Note**: if a greater number is set than what is effectively present, all addresses are scanned.*

11.7 Assign the address to all ebm-papst fans

11.7.1 Applications

During machine commissioning.

11.7.2 Assumptions

It is assumed that all EC fans have an address of 1. Fans with addresses other than 1 can be set to 1 in a preliminary step of the procedure.

11.7.3 Prerequisites

The fans must be powered and stable for at least 10 s.

11.7.4 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Total Addressing Procedure

1. Press **ENTER** to select the function.
2. To start automatic assignment of address 1 to all of the fans, press the **ENTER** key. If all fans already have an address of 1, press the **ESCAPE** key.
3. Turn off all of the fans. Wait for **at least 10 s** and press the **+** key: the first address that the first fan will be assigned appears.
4. Power on the first fan, wait **at least 10 s** and press the **ENTER** key: the controller generates the fan address. A temporary message indicates the result of the assignment operation:

If the operation...	And...	Then...
fails	the "EC Fan at ADD 1 not found!" message appears and the previous address is proposed again	1. check the power supply to the fan and wait the indicated amount of time 2. retry to assign
when successful	the "Fan X programmed" message appears	continue to step 5.

5. Repeat step 4 one at a time for all fans.
6. After configuring the last fan, end operations by pressing the **ESCAPE** key.
7. Press the **+** key to start automatic generation of the map. Press the **-** key or wait 5 minutes before leaving and then execute generation of the map manually (see "Update the fan map" on page 90).

11.8 Assign the address to all Ziehl Abegg fans

11.8.1 Applications

During machine commissioning.

11.8.2 Assumptions

It is assumed that all EC fans have an address of 247. Fans with addresses other than 247 can be set to 247 in a preliminary step of the procedure.

11.8.3 Prerequisites

The fans must be powered and stable for at least 10 s.

11.8.4 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Total Addressing Procedure

1. Press **ENTER** to select the function.
2. To start automatic assignment of address 247 to all of the fans, press the **ENTER** key. If all fans already have an address of 247, press the **ESCAPE** key.
3. Turn off all of the fans. Wait for **at least 10 s** and press the **+** key: the first address that the first fan will be assigned appears.
4. Power on the first fan, wait **at least 10 s** and press the **ENTER** key: the controller generates the fan address. A temporary message indicates the result of the assignment operation:

If the operation...	And...	Then...
fails	the "EC Fan at ADD 247 not found!" message appears and the previous address is proposed again	1. check the power supply to the fan and wait the indicated amount of time 2. retry to assign
when successful	the "Fan X programmed" message appears	continue to step 5.

5. Turn off the fan that was configured and press the **+** key.
6. Repeat steps 4 and 5, one at a time, for all of the fans.
7. After assigning the last fan address, end operations by pressing the **ESCAPE** key.
8. Turn on all fans and wait **at least 10 s**.
9. Press the **+** key to start automatic generation of the map. Press the **-** key or wait and execute generation of the map manually (see "Update the fan map" on page 90).

   ***Note**: if acquisition is not started and 5 minutes pass from the last time the keys were touched, the function automatically closes without generating the new map.*

11.9 Assign an address to a single fan

11.9.1 Applications

Replace a fan or add a fan to the network.

11.9.2 Introduction

***NOTICE**: two EC fans cannot have the same address.*
A new fan can be assigned the settings or another fan present in the network

11.9.3 Prerequisites

The new fan must be in one of the following conditions:

- be assigned the factory default address
- be assigned a known address
- be assigned an unknown address but can be the only fan connected to the COM1 serial line of the controller

11.9.4 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Single Address Change

1. Press **ENTER** to enter the function: the **final ADD**, **origin ADD** and **master ADD** parameters appear, with the current values.
2. Press the **ENTER** key and then the **+** or **-** key to edit the parameter value.

   ***Note**: the parameter of the change is highlighted with "edit".*
3. Press the **ENTER** key to confirm the value and to proceed to the next parameter.
4. After modifying the last parameter, press **ENTER**: "edit" disappears.
5. Press the **+** key: the "start process" message appears.
6. To start the operation, press the **ENTER** key: the "work in progress writing fan slave" message appears.

   ***Note**: it is possible to exit the function at any time by pressing the **ESCAPE** key, except once the operation has been started.*
7. Only for Ziehl-Abegg fans. Restart the fan (that is: turn it off, wait 10 s and turn it back on) to complete assignment of the address.
8. If a fan has been added, regenerate the fan map (see "Update the fan map" on page 90).

11.9.5 Parameters

Parameter	Description	Notes on values
final ADD (automatic fill-in by the system)	First address on the map with no associated fan	▪ **0** = no missing fan, complete map. ▪ **≠ 0**= addressed proposed by the system to be assigned to the new fan.
final ADD (manual setup)	Address to be assigned to the new fan.	Set a value other than 0. ***NOTICE**: do not use the default factory address (**1** for ebm-papst and **247** for Ziehl-Abegg).*
origin ADD	Current address of the new fan	▪ **0** = for fan with unknown address ***NOTICE**: the fan must be the only one connected to the network.* ▪ **1** = for ebm-papst fan with default factory address ▪ **247** = for Ziehl-Abegg fan with default factory address ▪ **x** = (with known address x of the fan)
master ADD	Fan address from which settings are to be copied	▪ **0** = copy of settings not enabled ▪ **≠ 0**= fan address form which settings are to be copied

11.10 Assign new addresses to one or more Ziehl -Abegg fans.

11.10.1 Assignment mode

Assignment is performed automatically starting from the set value. This value is attributed to the first fan in the chain (with the ID input connected to ground). The next one is assigned this same value incremented by one, and so on through to the last fan in the chain.

11.10.2 Prerequisites

The fans must be Ziehl-Abegg fans and must be wired as described in the "Ziehl-Abegg AM-MODBUS/AM_MODBUS-W, Communication Module for ECblue fans" manual, para. 5.3 "Communication".

11.10.3 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Auto Addressing Procedure

1. Press **ENTER** to select the function.
2. With the **+** or **-** key, set the **start ADD** parameter.
3. To start the operation, press the **ENTER** key: the system provides information on the advancement of the operation. When the operation is concluded, the home page is displayed.

   ***Note**: it is possible to exit the function at any time by pressing the **ESCAPE** key, except once the operation has been started.*

11.10.4 Parameters

Parameter	Description	Notes on values
start ADD	Address to be assigned to the first fan in the chain.	1–240 (multiples of 10)

11.11 Change the direction of rotation and the speed of the fans

11.11.1 Applications

Cleaning the heat exchanger or other needs of the system

11.11.2 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Rotation Direction Temporary Change

1. Press **ENTER** to enter the function: the **rotation** and **speed** parameters appear, with the current values.
2. Press the **ENTER** key and then the **+** or **-** key to edit the parameter value.

   ***Note**: the parameter of the change is highlighted with "edit".*
3. Press the **ENTER** key to confirm the value and to proceed to the next parameter: the fans move in the direction and at the speed set.
4. To exit, press the **ESCAPE** key: normal operation is restored.

11.11.3 Parameters

Parameter	Description	Notes on values
rotation	Direction of rotation of the fans	▪ **CW** clockwise ▪ **CCW** counter-clockwise ***Note**: to know the default direction of rotation of the fans, please refer to the product documentation.*
speed (RPM)	Fan speed	0-**x** (where x is the maximum value set in "Set the maximum speed limit for the fans" on page 89).

11.12 Free frozen ebm-papst fans

11.12.1 Applications

Presence of ice on the fan impellers.

11.12.2 Release mode

This function is automatically activated if the fan impellers are blocked and calls for movements in both directions of rotation with increasing intensity.

***Note**: for more information on the meaning of the data provided, please refer to the MODBUS parameters specification for "ebm-papst series 84/112/150/200" V.5.00 para. 2.39 "Shedding Function".*

11.12.3 Procedure

SW1-1** = On > **ESCAPE** + **ENTER** > **13: EC FAN functions** > **Shedding Function Set & Modify

1. Press **ENTER** to enter the function: the **enabled** and **attempts** parameters appear, with the current values.
2. Press the **ENTER** key and then the **+** or **-** key to edit the parameter value.

   ***Note**: the parameter of the change is highlighted with "edit".*
3. Press the **ENTER** key to confirm the value and to proceed to the next parameter.
4. After modifying the last parameter, press **ENTER**: "edit" disappears.
5. Press the **+** key: the "start process" command appears.
6. To start the operation, press the **ENTER** key: the "work in progress" message appears.

   ***Note**: it is possible to exit the function at any time by pressing the **ESCAPE** key, except once the operation has been started.*

11.12.4 Parameters

Parameter	Description	Notes on values
enabled	Enable function	▪ **ON** enables. ▪ **OFF** disables.
attempts	Attempts to restart the impellers	1–200