c-pro 3 NODE giga AHU

Controllers for industrial air handling units

Application handbook ver. 1.0 July 2020 | ENGLISH
Code 144CP3NGAE104

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and save this document
CONSIDER THE ENVIRONMENT

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WebServer

Modbus

approved controller for ebmpapst products

APPROVED CONTROLLER FOR ZIEHL-ABEGG

IMPORTANT

Read this document thoroughly before installation and before use of the device and follow all recommendations; keep this document with the device for future consultation.

Use the device only in the ways described in this document.

Index

1 INTRODUCTION

1.1 Preliminary notes

Programmable controller for industrial air handling units for the management of single or double flow air handling units (with heat recovery unit) operating with three coils plus one pre-heating coil; the coils can be electric, water or direct expansion.

The controller can manage the return fan and the supply fan independently (up to 3 speeds or modulating). It is possible to manage a network of 32 MODBUS fans (16 supply fans and 16 return fans) or the connection of 2 EVCO inverter (1 supply fan and 1 return fan). It can also manage the humidifier, external damper, by-pass damper and the mixing chamber damper.

With 28 I/O and a wide variety of ports, it supports various communication protocols, benefiting the interaction between devices and their use in both local and remote monitoring systems.

Using the TTL port and the suitable serial interface it is possible to monitor and configure the device via the EPoCA cloud platform.

The controller can be connected via BUS to a remote interface with integrated temperature and humidity sensors.

1.2 Models available, technical features and purchase codes

The following table outlines the models available, purchase codes and technical features of c-pro 3 NODE giga AHU controllers.

Format		
10 open frame DIN modules	•	
10 boxed DIN modules		•
User interface		
Blind version	•	
Installation		
On DIN rail	•	•
Connections		
Fixed screw terminal blocks	•	
Plug-in screw terminal blocks		•
Power supply		
115… 230 VAC	•	•
Analogue-digital inputs		
Configurable	10	10
Digital inputs		
Configurable	5	5
Analogue outputs		
Configurable	4	4
Digital outputs		
Configurable	9	9
Communications ports		
TTL MODBUS		
INTRABUS		
RS-485 MODBUS slave	•	•
RS-485 MODBUS master	•	•
CAN	•	•
USB	•	•
Ethernet (MODBUS TCP, Web Server)	•	•
Other features		
Clock	•	•
Purchase codes		
Purchase code	EPG9OHX1AH	EPG9BHX1AH

The following table outlines the models available, the purchase codes and the technical features of the EVJ LCD user interfaces.

Format								
111.4 x 76.4 mm	•	•	•	•	•	•	•	•
User interface								
LCD display + 6 capacitive keys	•	•	•	•	•	•	•	•
Installation								
Wall-mounted	•	•	•	•				
Wall-mounted with rear slot for flush-fit box					•	•	•	•
Connections								
Fixed screw terminal blocks	•	•	•	•	•	•	•	•
Power supply								
12 VAC/DC	•	•	•	•				
115... 230 VAC					•	•	•	•
Analogue inputs								
Analogue inputs					2	2	2	2
Communications ports								
INTRABUS	•	•	•	•	•	•	•	•
Other features								
Alarm buzzer	•	•	•	•	•	•	•	•
Built-in temperature and humidity sensor			•	•			•	•
Built-in Bluetooth Low Energy sensor		•		•		•		•
Purchase codes								
Purchase code	EVJD900N2VW	EVJD900N2VWIV	EVJD920N2VW	EVJD920N2VWIV	EVJD902N9VP	EVJD902N9VPIV	EVJD922N9VP	EVJD922N9VPIV

(1) With INTRABUS communications protocol

The EVJ LCD user interfaces are also available in the version for panel installation; for further information, please contact the EVCO sales network.

The following table outlines the models available, the purchase codes and the technical features of the EPJ LCD user interfaces.

Format				
111.4 x 76.4 mm	•	•	•	•
User interface				
LCD display + 6 capacitive keys	•	•	•	•
Installation				
Wall-mounted	•	•		
Wall-mounted with rear slot for flush-fit box			•	•
Connections				
Fixed screw terminal blocks	•	•	•	•
Power supply				
12 VAC/DC	•	•		
115... 230 VAC			•	•
Analogue inputs				
Analogue inputs			2	2
Communications ports				
CAN	•	•	•	•
USB	•	•	•	•
Other features				
Alarm buzzer	•	•	•	•
Built-in temperature and humidity sensor		•		•
Purchase codes				
Purchase code	EPJD900N3VW	EPJD920N3VW	EPJD902N9VP	EPJD922N9VP

La seguente tabella illustra i modelli disponibili, i codici di acquisto e le caratteristiche tecniche delle interfacce utente EPJgraph.

Format		
111.4 x 76.4 mm	•	•
User interface		
2.8 in colour LCD graphic display + 6 capacitive keys	•	•
Installation		
Panel mounting	•	
Wall mounting		•
Connections		
Fixed screw terminal blocks		•
Plug-in screw terminal blocks	•	
Power supply		
24 VAC/12... 30 VDC	•	•
Communications ports		
CAN	•	•
Other features		
Alarm buzzer	•	•
Purchase codes		
Purchase code	EPJG900X4	EPJG900X4VW

The following table outlines the models available, the purchase codes and the technical features of the EPcolor user interfaces.

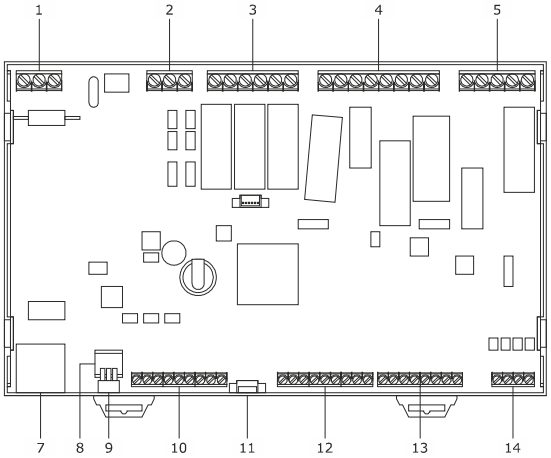
	EPcolor S	EPcolor M	EPcolor L
Format			
111.4 x 76.4 mm	•		
166 x 118 mm		•	
216 x 156 mm			•
User interface			
3.5 in TFT touch-screen graphic display	•		
5 in TFT touch-screen graphic display		•	
7 in TFT touch-screen graphic display			•
Installation			
Panel mounting	•		
Back panel mounting		•	•
Connections			
Plug-in screw terminal blocks	•	•	•
Power supply			
24 VAC/12... 30 VDC	•	•	•
Communications ports			
MODBUS slave RS-485		•	•
MODBUS master RS-485		•	•
MODBUS master/slave RS-485	•		
CAN	•	•	•
USB	•	•	•
Other features			
Real time clock	•	•	•
Alarm buzzer	•	•	•
Purchase codes			
Purchase code	EPCJ01X4EXXAH	EPCM00X4EXXAH	EPCL00X4EXXAH

2 DESCRIPTION

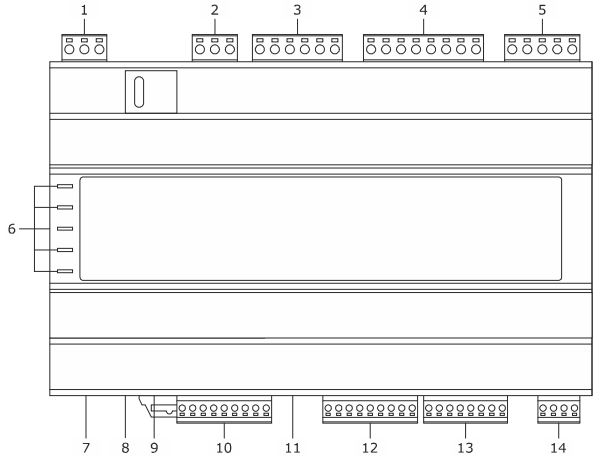
2.1 Description of c-pro 3 NODE giga AHU

The following diagram shows the appearance of the c-pro 3 NODE giga AHU controllers.

OPEN FRAME MODELS



BOXED MODELS



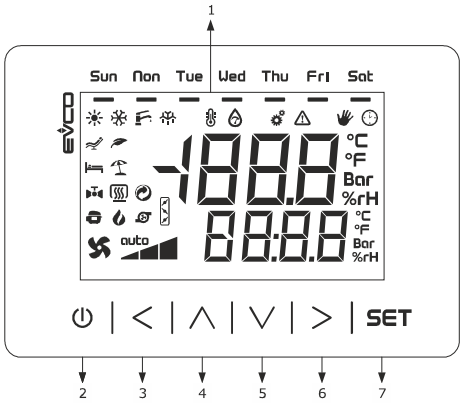
The following table illustrates the meaning of the parts of the c-pro 3 NODE giga AHU.

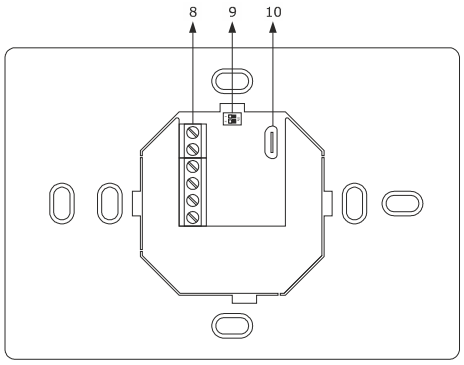
PART	MEANING
1	Power supply
2	High voltage digital inputs
3	Digital outputs (electro-mechanical relays) 1... 3
4	Digital outputs (electro-mechanical relays) 4... 7
5	Digital outputs (electro-mechanical relays) 8... 9
6	Signalling LED
7	Ethernet port (MODBUS TCP, WebServer)
8	Micro-switch for: - fitting the termination resistor of the CAN network - fitting the termination resistor of the RS-485 network connected to the RS-485 MODBUS slave port - fitting the termination resistor of the RS-485 network connected to the RS-485 (MODBUS master/slave) port
9	USB port
10	CAN port, RS-485 (MODBUS master/slave) port, RS-485 MODBUS slave port and INTRABUS port
11	TTL MODBUS port
12	Analogue-digital inputs 1... 5 and dry contact digital inputs and for pulse trains up to 2 KHz
13	Analogue-digital inputs 6... 10
14	Analogue outputs

For further information, see the following sections.

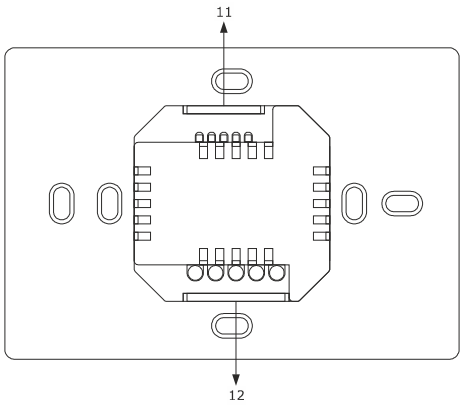
2.2 Description of EVJ LCD and EPJ LCD

The following diagram shows the appearance of user interfaces EVJ LCD and EPJ LCD.





MODELS FOR WALL MOUNTING



MODELS FOR WALL MOUNTING WITH BACK-SLOT FOR IN-WALL BOX

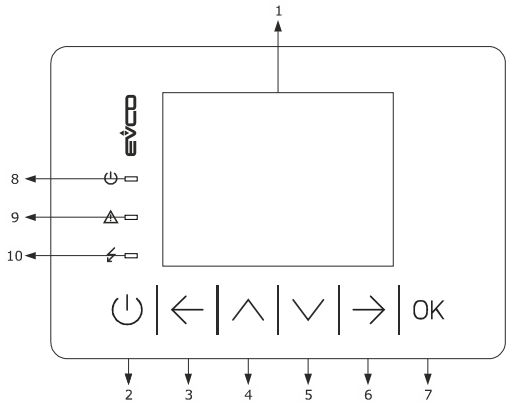
The following table illustrates the meaning of the parts of the user interfaces EVJ LCD and EPJ LCD.

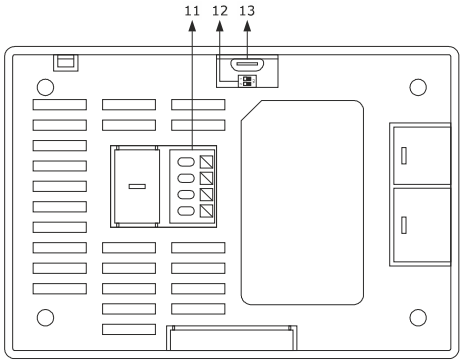
PART	MEANING
1	display
2	On/Off key (subsequently also called the "On/stand-by key")
3	left key (subsequently also called "left key")
4	increase key (subsequently also called the "up key")
5	decrease key (subsequently also called "down key")
6	right key (subsequently also called the "right key")
7	settings key (subsequently also called "set")
8	Fixed screw terminal block for power supply and for INTRABUS port (in models EVJ LCD) or CAN port (in models EPJ LCD)
9	- in models EPJ LCD, micro switch for the termination of the CAN network - not otherwise present
10	- reserved in models EVJ LCD - in models EPJ LCD, Micro USB connector for device programming
11	fixed screw terminal block for analogue inputs
12	fixed screw terminal block for power supply

For further information, see the following sections.

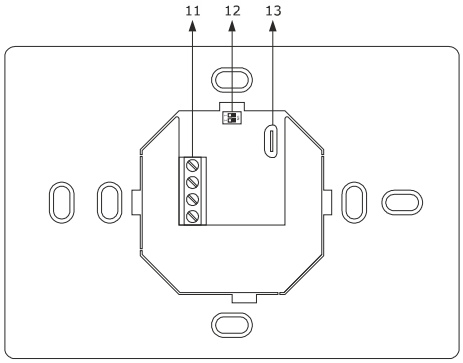
2.3 Description of EPJgraph

The following diagram shows the appearance of the EPJgraph user interfaces.





MODELS FOR PANEL MOUNTING



MODELS FOR WALL MOUNTING

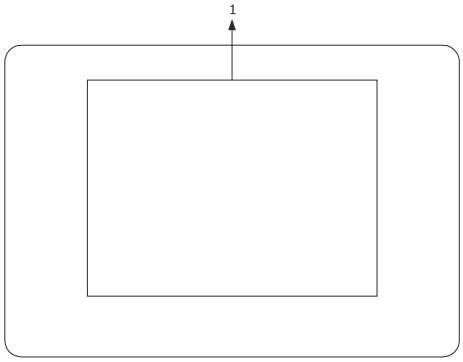
The following diagram illustrates the meaning of the parts of the EPJgraph user interfaces.

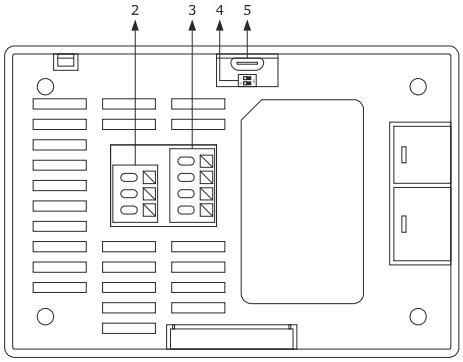
PART	MEANING
1	display
2	on/off key (subsequently also called the "On/stand-by key")
3	left key (subsequently also called "left key")
4	increase key (subsequently also called the "up key")
5	decrease key (subsequently also called "down key")
6	right key (subsequently also called the "right key")
7	settings key (subsequently also called "set")
8	on/off LED
9	alarm LED
10	power supply LED
11	plug-in or fixed screw terminal block for power supply and CAN port
12	micro switch for the termination of the CAN network
13	reserved EVCO

For further information, see the following sections.

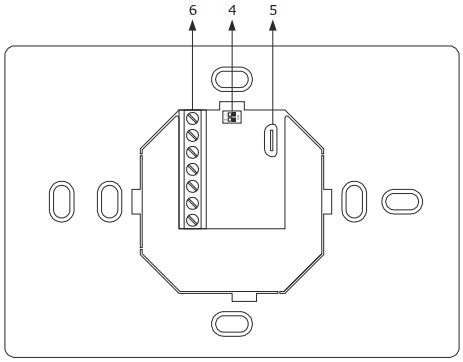
2.4 Description of EPcolor S

The following diagram shows the appearance of the EPcolor S user interfaces.





MODELS FOR PANEL MOUNTING



MODELS FOR WALL MOUNTING

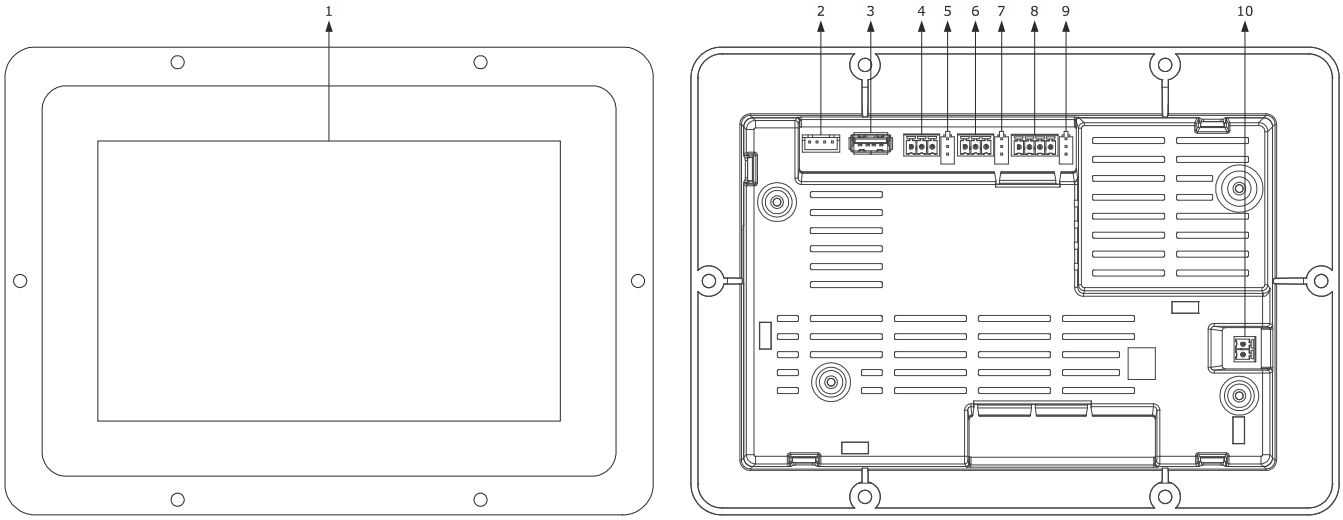
The following diagram illustrates the meaning of the parts of the EPJgraph user interfaces.

PART	MEANING
1	display
2	plug-in screw terminal block for MODBUS master/slave RS-485 port
3	plug-in screw terminal block for power supply and CAN port
4	micro switch for the termination of the MODBUS RS-485 and CAN network
5	USB port for programming the device
6	fixed screw terminal block for power supply, MODBUS master/slave RS-485 and CAN port

For further information, see the following sections.

2.5 Description of EPcolor L

The following diagram shows the appearance of the EPcolor M and L user interfaces.



The following diagram illustrates the meaning of the parts of the EPcolor M and L user interfaces.

PART	MEANING
1	display
2	reserved EVCO
3	USB port for programming the device
4	plug-in screw terminal block for CAN port
5	micro switch for the termination of the CAN network
6	plug-in screw terminal block for MODBUS slave RS-485 port
7	micro switch for the termination of the MODBUS RS-485 slave network
8	plug-in screw terminal block for MODBUS master RS-485 port
9	micro switch for the termination of the MODBUS RS-485 master network
10	earthing equipment

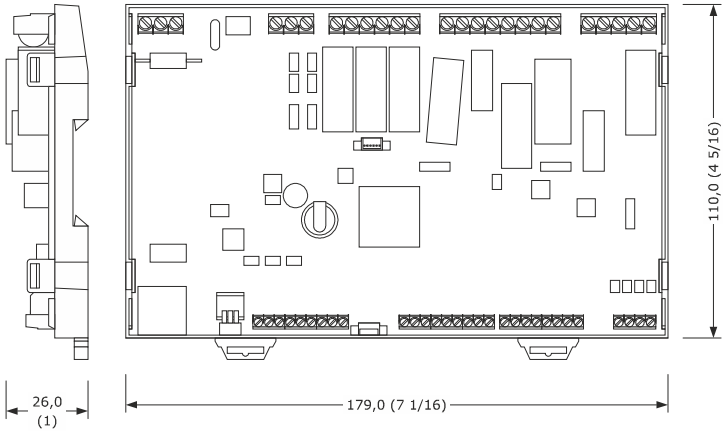
For further information, see the following sections.

3 DIMENSIONS AND INSTALLATION

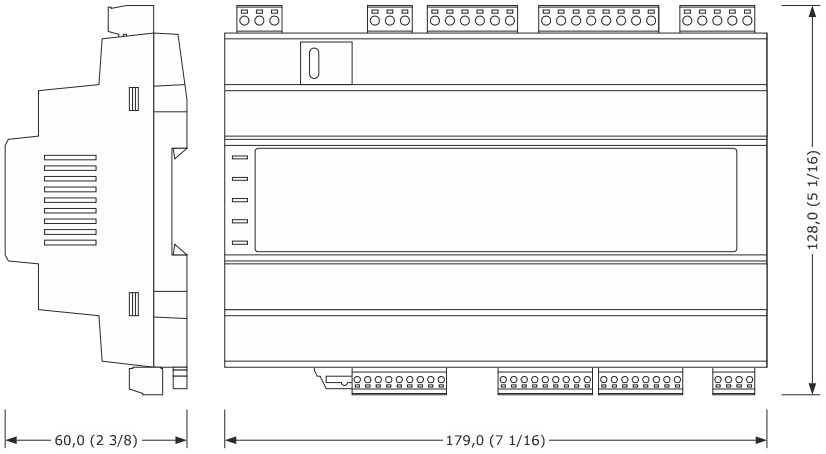
3.1 Dimensions and installation of c-pro 3 NODE giga AHU

The following diagram outlines the dimensions of the c-pro 3 NODE giga AHU controllers (10 DIN modules). The dimensions are expressed in mm (in).

OPEN FRAME MODELS



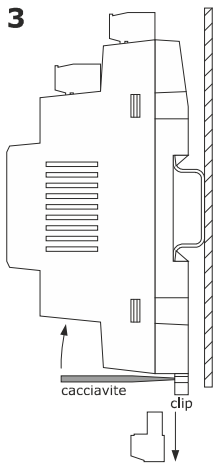
BOXED MODELS

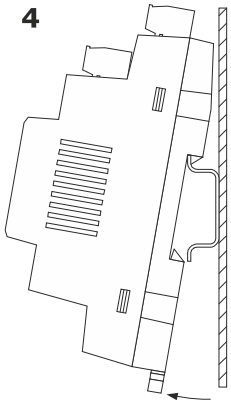


It is designed to be installed on a DIN rail in a control panel.

To install the c-pro 3 NODE giga AHU controllers, follow the indications outlined in the following diagram.

To remove c-pro 3 NODE giga AHU controllers, first use a screwdriver to remove any plug-in screw terminal blocks inserted in the lower part, then open the clip on the DIN rail with a screwdriver as illustrated in the following diagram.

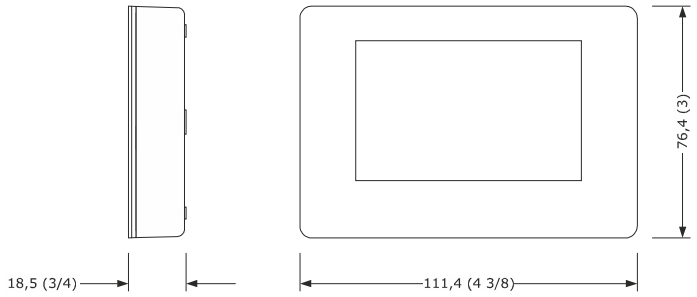




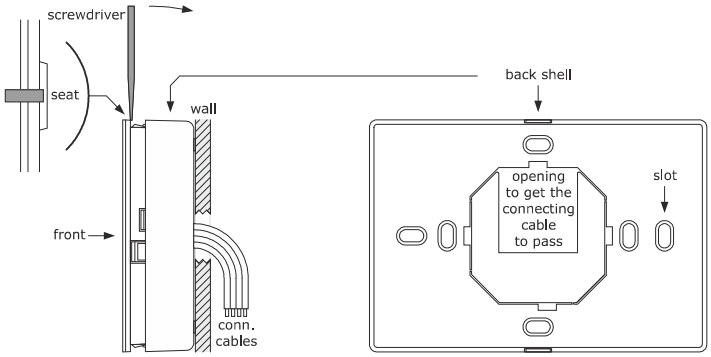
To reinstall the c-pro 3 NODE giga AHU controllers, first press the DIN rail fully in.

3.2 Description and installation of EVJ LCD and EPJ LCD

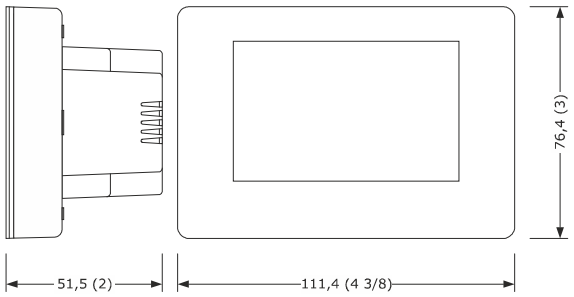
The following diagram shows the dimensions of the EVJ LCD and EPJ LCD user interfaces for wall installation. The dimensions are expressed in mm (in).



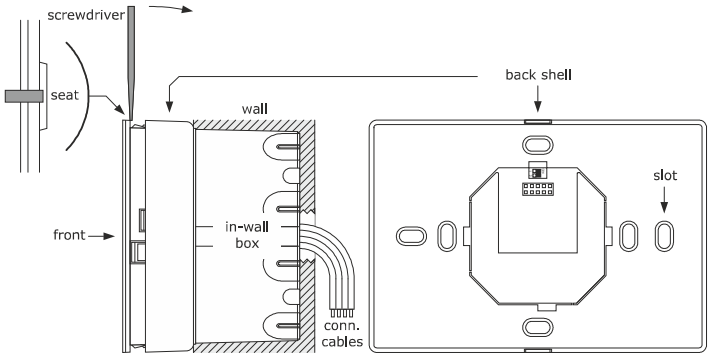
They are designed to be mounted on the wall (with rawl plugs and fastening screws) or in a flush-mount box (with fastening screws).



The following diagram shows the dimensions of the EVJ LCD and EPJ LCD user interfaces for wall installation, with a rear slot for a flush-mount box. The dimensions are expressed in mm (in).

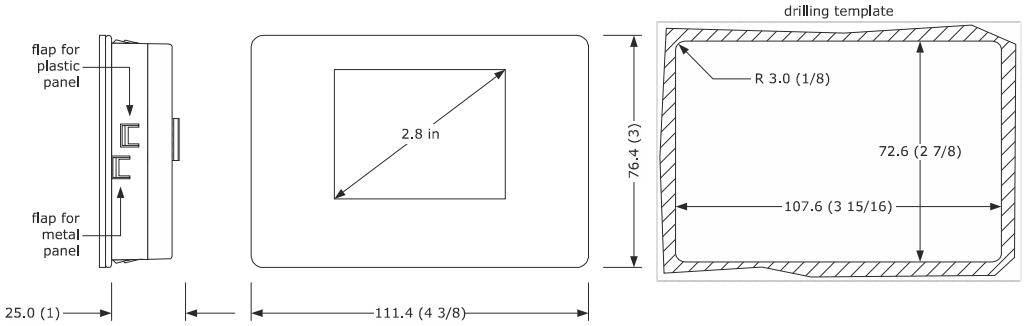


They are designed to be mounted on the wall (with rawl plugs and fastening screws) or in a flush-mount box (with fastening screws).

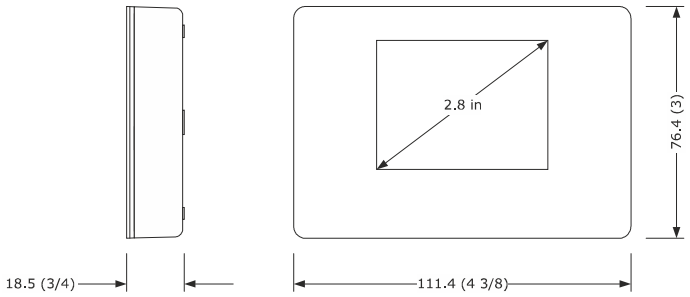


3.3 Dimensions and installation of EPJgraph

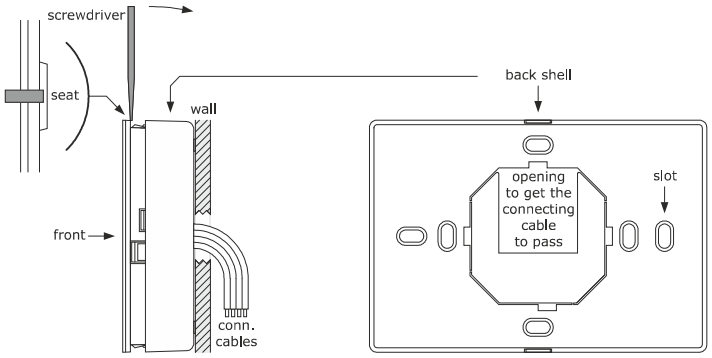
The following diagram illustrates the EPJgraph user interface dimensions for panel installation. The dimensions are expressed in mm (in).
They are designed to be fitted to a panel, with elastic holding flaps.



The following diagram illustrates the EPJgraph user interface dimensions for wall installation. The dimensions are expressed in mm (in).

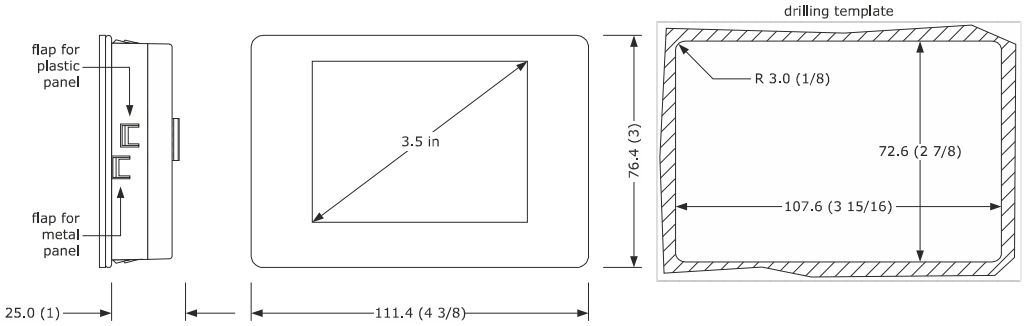


They are designed to be mounted on the wall (with rawl plugs and fastening screws) or in a flush-mount box (with fastening screws).

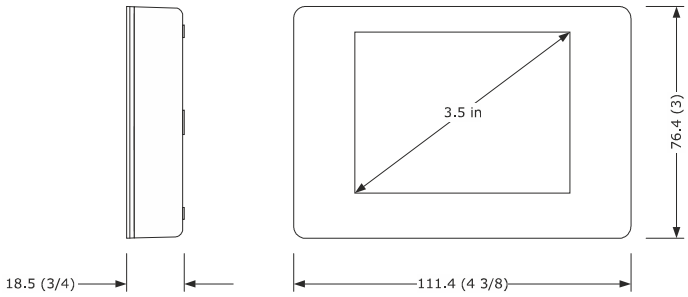


3.4 Dimensions and installation of EPcolor S

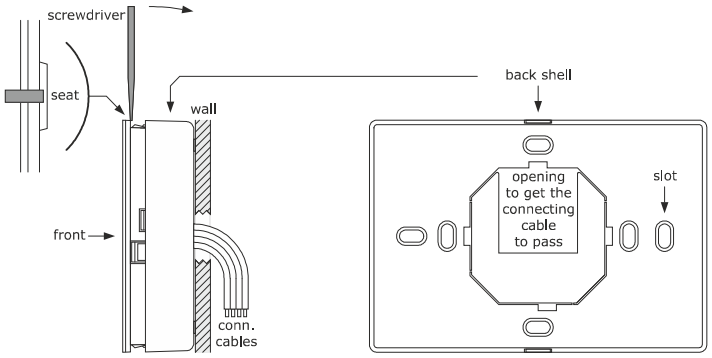
The following diagram illustrates the EPcolor S user interface dimensions for panel installation. The dimensions are expressed in mm (in).
They are designed to be fitted to a panel, with elastic holding flaps.



The following diagram illustrates the EPcolor S user interface dimensions for wall installation. The dimensions are expressed in mm (in).

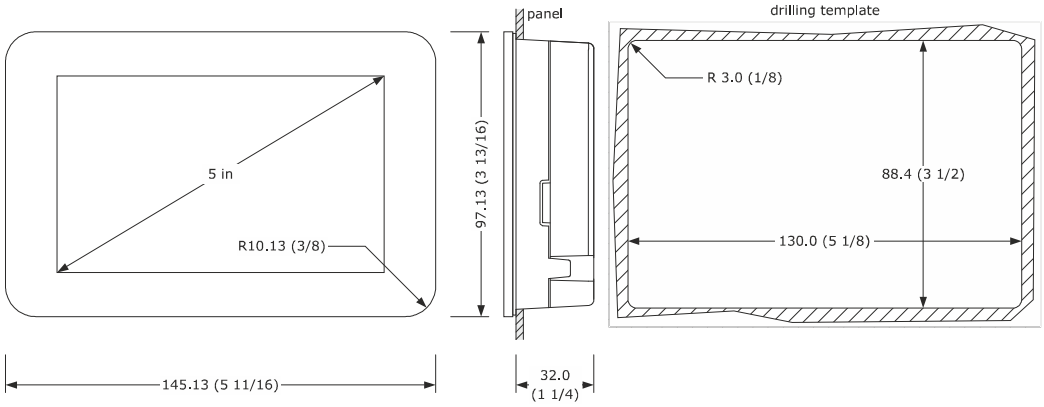


They are designed to be mounted on the wall (with rawl plugs and fastening screws) or in a flush-mount box (with fastening screws).

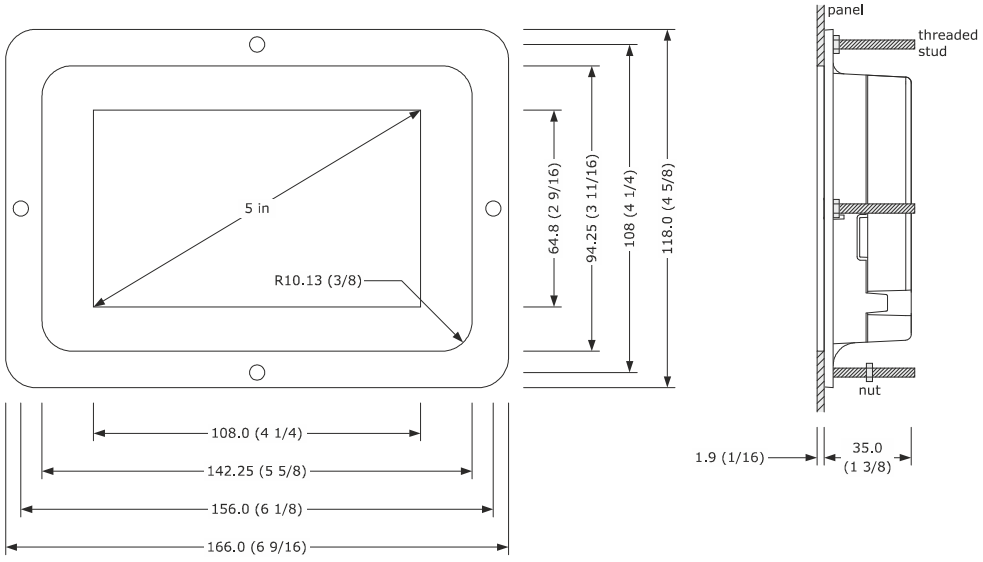


3.5 Dimensions and installation of EPcolor M

The following diagram illustrates the EPcolor M user interface dimensions for panel installation. The dimensions are expressed in mm (in).
They are designed to be fitted to a panel, with elastic holding flaps.

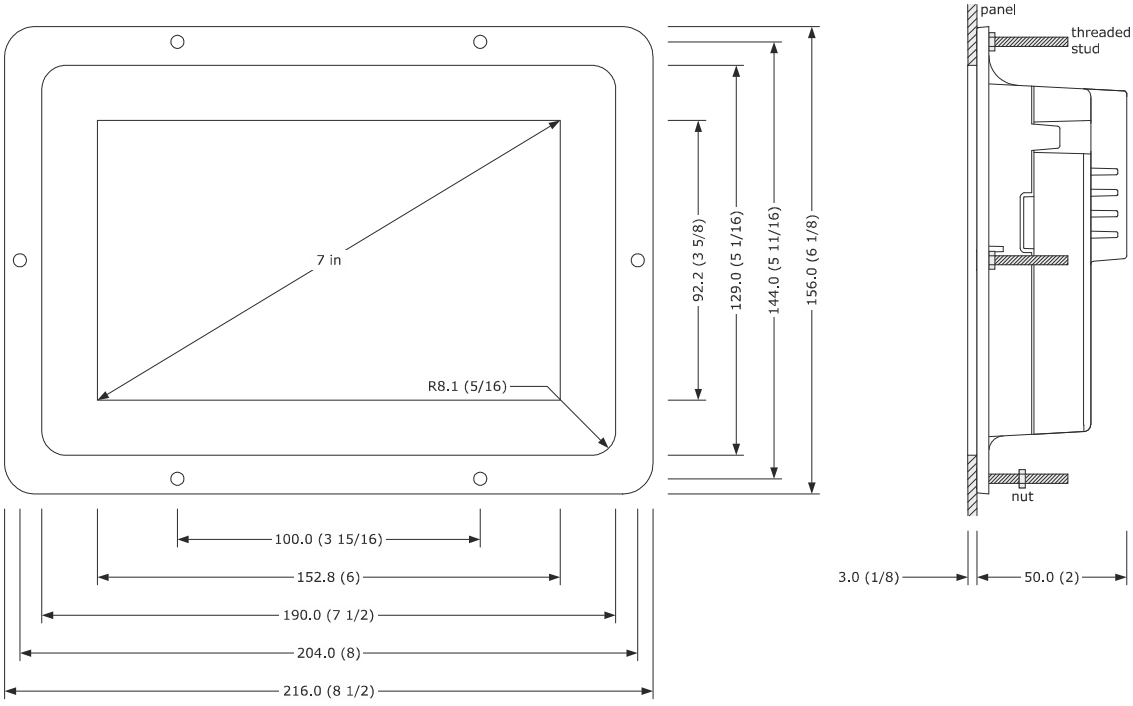


The following diagram illustrates the EPcolor M user interface dimensions for back-panel installation. The dimensions are expressed in mm (in).
They are designed to be back-panel mounted (with threaded studs).



3.6 Dimensions and installation of EPcolor L

The following diagram illustrates the EPcolor L user interface dimensions for back-panel installation. The dimensions are expressed in mm (in).
They are designed to be back-panel mounted (with threaded studs).



ADVICE FOR INSTALLATION

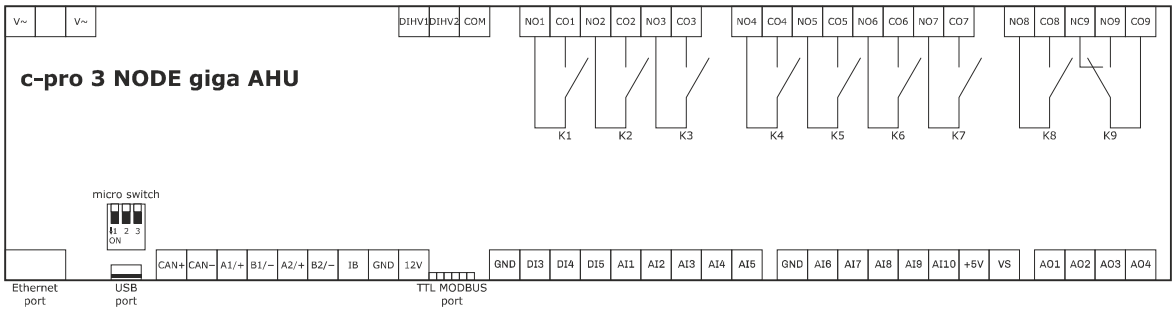
- ensure that the working conditions are within the limits stated in the *TECHNICAL SPECIFICATIONS* section
- do not install the device close to heat sources, equipment with a strong magnetic field, in places subject to direct sunlight, rain, damp, excessive dust, mechanical vibrations or shocks
- in compliance with Safety Standards, the device must be installed correctly and, in a way, to protect against any contact with electric parts; all the parts providing protection must be secured so that they cannot be removed without the use of tools.

4 ELECTRIC CONNECTION

CAUTION
- use cables with an adequate section for the current running through them
- to eliminate any electromagnetic interferences, place the power cables as far away as possible from the signal cables and connect to a RS-485 MODBUS and/or CAN network using a Belden 3106A cable or equivalent.

4.1 Connectors of c-pro 3 NODE giga AHU

The following diagram shows the appearance of the c-pro 3 NODE giga AHU controllers.



The following tables outline the meaning of the parts of the c-pro 3 NODE giga AHU controllers.

CONN.	DESCRIPTION
V~	device power supply (115... 230 VAC)
V~	device power supply (115... 230 VAC)

CONN.	DESCRIPTION
DIHV1	high voltage digital input; DI1
DIHV2	high voltage digital input; DI2
COM	common contact high voltage digital inputs

CONN.	DESCRIPTION
NO1	K1 digital output normally open contact (3 A res. @ 250 VAC)
CO1	K1 digital output common contact
NO2	K2 digital output normally open contact (3 A res. @ 250 VAC)
CO2	K2 digital output common contact
NO3	K3 digital output normally open contact (3 A res. @ 250 VAC)
CO3	K3 digital output common contact

CONN.	DESCRIPTION
NO4	K4 digital output normally open contact (3 A res. @ 250 VAC)
CO4	K4 digital output common contact
NO5	K5 digital output normally open contact (2 A res. @ 250 VAC)
CO5	K5 digital output common contact
NO6	K6 digital output normally open contact (3 A res. @ 250 VAC)
CO6	K6 digital output common contact
NO7	K7 digital output normally open contact (8 A res. @ 250 VAC)
CO7	K7 digital output common contact

CONN.	DESCRIPTION
NO8	K8 digital output normally open contact (2 A res. @ 250 VAC)
CO8	K8 digital output common contact
NC9	K9 digital output normally closed contact
NO9	K9 digital output normally open contact (3 A res. @ 250 VAC)
CO9	K9 digital output common contact

CONN.	DESCRIPTION
CAN+	signal + CAN port
CAN-	signal - CAN port
A1/+	signal+ RS-485 MODBUS slave port
B1/-	signal - RS-485 MODBUS slave port
A2/+	signal + RS-485 (MODBUS master/slave) port
B2/-	signal - RS-485 (MODBUS master/slave) port
IB	INTRABUS port
GND	reference (GND)
12V	power supply remote user interfaces (13 VDC)

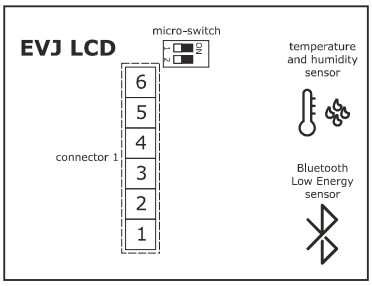
CONN.	DESCRIPTION
GND	reference (GND)
DI3	digital input 3 (dry contact and for pulse trains up to 2 KHz); DI3
DI4	digital input 4 (dry contact and for pulse trains up to 2 KHz); DI4
DI5	digital input 5 (dry contact and for pulse trains up to 2 KHz); DI5
AI1	analogue input 1 (for PTC, NTC or Pt 1000 probes) AI1 can also be configured for dry contact digital input
AI2	analogue input 2 (for PTC, NTC or Pt 1000 probes) AI2 can also be configured for dry contact digital input
AI3	analogue input 3 (for PTC, NTC or Pt 1000 probes) AI3 can also be configured for dry contact digital input
AI4	analogue input 4 (for PTC, NTC or Pt 1000 probes) AI4 can also be configured for dry contact digital input
AI5	analogue input 5 (for PTC, NTC or Pt 1000 probes) AI5 can also be configured for dry contact digital input

CONN.	DESCRIPTION
GND	reference (GND)
AI6	analogue input 6 (for PTC, NTC or Pt 1000 probes, 0-5 V, 0-10 V, 0-20 mA or 4-20 mA transducers); AI6 can also be configured for dry contact digital input
AI7	analogue input 7 (for PTC, NTC or Pt 1000 probes, 0-5 V, 0-10 V, 0-20 mA or 4-20 mA transducers); AI7 can also be configured for dry contact digital input
AI8	analogue input 8 (for PTC, NTC or Pt 1000 probes, 0-5 V, 0-10 V, 0-20 mA or 4-20 mA transducers); AI8 can also be configured for dry contact digital input
AI9	analogue input 9 (for PTC, NTC or Pt 1000 probes, 0-5 V, 0-10 V, 0-20 mA or 4-20 mA transducers); AI9 can also be configured for dry contact digital input
AI10	analogue input 10 (for PTC, NTC or Pt 1000 probes, 0-5 V, 0-10 V, 0-20 mA or 4-20 mA transducers); AI10 can also be configured for dry contact digital input
+5V	0-5 V ratiometric transducers power supply (5 VDC)
VS	transducers power supply (13 VDC)

CONN.	DESCRIPTION
AO1	analogue output 1 (for 0-10 V or PWM signal)
AO2	analogue output 2 (for 0-10 V or PWM signal)
AO3	analogue output 3 (for 0-10 V or PWM signal)
AO4	analogue output 4 (for 0-10 V or PWM signal)

4.2 EVJ LCD connectors

The following diagram illustrates the EVJ LCD user interface connectors for wall installation.

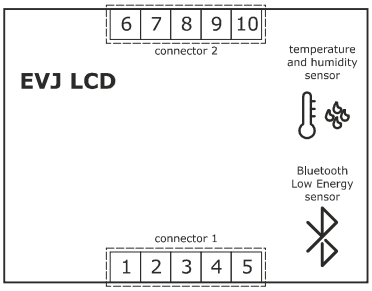


The following tables illustrate the meaning of the EVJ LCD user interface connectors for wall installation.

Connector 1

Part	Meaning
1	INTRABUS port reference (GND)
2	INTRABUS port signal
3	device power supply (12 VAC/DC); if the device is powered by direct current, connect the negative pole
4	device power supply (12 VAC/DC); if the device is powered by direct current, connect the positive pole
5	not used
6	not used

The following diagram shows the EVJ LCD user interface connectors for wall installation, with a rear slot for a flush-mount box.



The following diagram shows the meaning of the EVJ LCD user interface connectors for wall installation, with a rear slot for a flush-mount box.

Connector 1

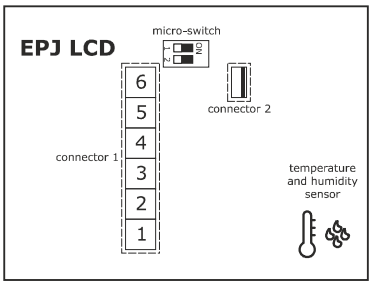
Part	Meaning
1	device power supply (115... 230 VAC)
2	device power supply (115... 230 VAC)
3	not used
4	not used
5	not used

Connector 2

Part	Meaning
6	AI2 analogue input (NTC)
7	AI1 analogue input (NTC)
8	AI1 and AI2 analogue input reference (GND)
9	INTRABUS port signal
10	INTRABUS port reference (GND)

4.3 EPJ LCD connectors

The following diagram illustrates the EPJ LCD user interface connectors for wall installation.



The following tables illustrate the meaning of the EPJ LCD user interface connectors for wall installation.

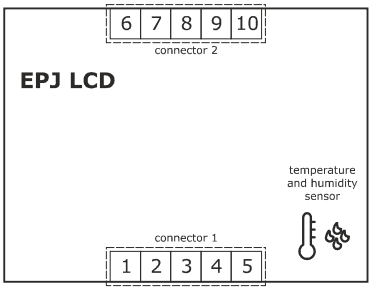
Connector 1

Part	Meaning
1	signal (-) CAN port
2	signal (+) CAN port
3	device power supply (12 VAC/DC); if the device is powered by direct current, connect the negative pole
4	device power supply (12 VAC/DC); if the device is powered by direct current, connect the positive pole
5	not used
6	not used

Connector 2

USB port.

The following diagram shows the EPJ LCD user interface connectors for wall installation, with a rear slot for a flush-mount box.



The following diagram shows the meaning of the EPJ LCD user interface connectors for wall installation, with a rear slot for a flush-mount box.

Connector 1

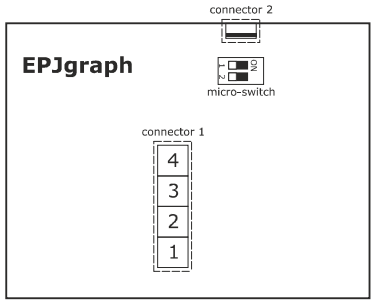
Part	Meaning
1	device power supply (115... 230 VAC)
2	device power supply (115... 230 VAC)
3	not used
4	not used
5	not used

Connector 2

Part	Meaning
6	AI2 analogue input (NTC)
7	AI1 analogue input (NTC)
8	AI1 and AI2 analogue input reference (GND)
9	signal (+) CAN port
10	signal (-) CAN port

4.4 EPJgraph connectors

The following diagram illustrates the EPJgraph user interface connectors for panel installation.



The following tables illustrate the meaning of the EPJ LCD user interface connectors for wall installation.

Connector 1

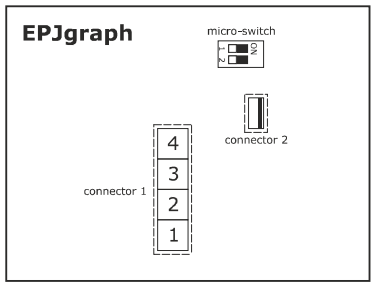
Part	Meaning
1	CAN port reference -
2	CAN port reference +
3	device power supply (24 VAC/12... 30 VDC). If the device is fed by DC power, connect terminal minus
4	device power supply (24 VAC/12... 30 VDC). If the device is fed by DC power, connect terminal plus

Connector 2

Reserved for EVCO.

Micro-switch to insert the CAN port termination resistor.

The following diagram shows the EPJgraph user interface connectors for wall installation.



The following diagram shows the meaning of the EPJgraph user interface connectors for wall installation.

Connector 1

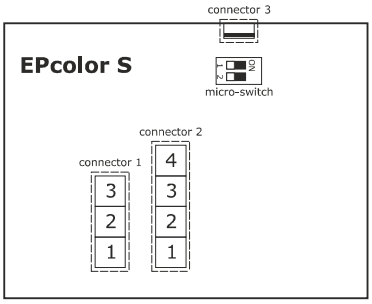
Part	Meaning
1	CAN port reference -
2	CAN port reference +
3	device power supply (24 VAC/12... 30 VDC). If the device is fed by DC power, connect terminal minus
4	device power supply (24 VAC/12... 30 VDC). If the device is fed by DC power, connect terminal plus

Micro-switch to insert the CAN port termination resistor.

The following diagram shows the EPJgraph user interface connectors for wall installation.

4.5 EPcolor S connectors

The following diagram illustrates the EPcolor S user interface connectors for panel installation.



The following tables illustrate the meaning of the EPcolor S user interface connectors for wall installation.

Connector 1

Part	Meaning
1	RS-485 MODBUS port GND reference
2	signal - RS-485 MODBUS port
3	signal + RS-485 MODBUS port

Connector 2

Part	Meaning
1	signal - CAN port
2	signal + CAN port
3	device power supply (24 VAC/ 12... 30 VDC); if the device is powered by direct current connect the negative terminal
4	device power supply (24 VAC/ 12... 30 VDC); if the device is powered by direct current connect the positive terminal

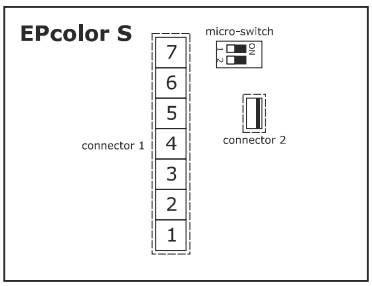
Connector 3

USB port to programme the device.

Micro-switch

- to fit the termination resistor of the RS-485 MODBUS port
- to fit the termination resistor of the CAN port.

The following diagram shows the EPcolor S user interface connectors for wall installation.



The following diagram shows the meaning of the EPcolor S user interface connectors for wall installation.

Connector 1

Part	Meaning
1	signal - CAN port
2	signal + CAN port
3	device power supply (24 VAC/ 12... 30 VDC); if the device is powered by direct current connect the negative terminal
4	device power supply (24 VAC/ 12... 30 VDC); if the device is powered by direct current connect the positive terminal
5	RS-485 MODBUS port GND reference
6	signal - RS-485 MODBUS port
7	signal + RS-485 MODBUS port

Connector 2

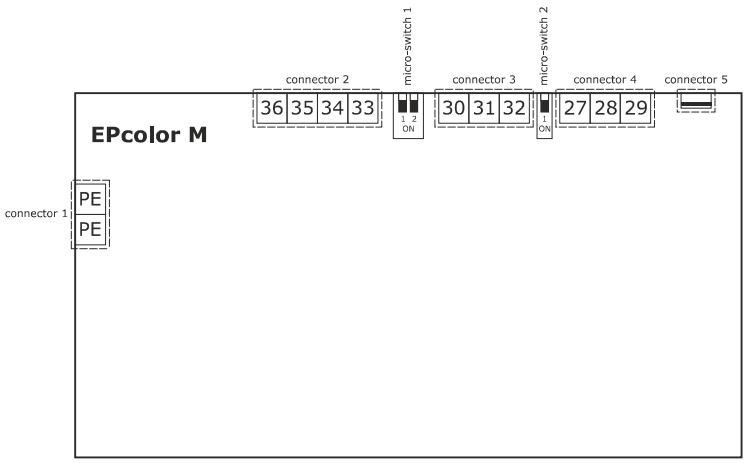
USB port to programme the device.

Micro-switch

- to fit the termination resistor of the RS-485 MODBUS port
- to fit the termination resistor of the CAN port.

4.6 EPcolor M connectors

The following diagram illustrates the EPcolor M user interface connectors.



The following tables illustrate the meaning of the EPcolor M user interface connectors.

Connector 1

Part	Meaning
PE	appliance earthing
PE	appliance earthing

Connector 2

Part	Meaning
36	device power supply and RS-485 MODBUS master port GND reference
35	signal - RS-485 MODBUS master port
34	signal + RS-485 MODBUS master port
33	device power supply (24 VAC/12... 30 VDC)

Connector 3

Part	Meaning
30	RS-485 MODBUS slave port GND reference
31	signal - RS-485 MODBUS slave port
32	signal + RS-485 MODBUS slave port

Connector 4

Part	Meaning
27	CAN port GND reference
28	signal - CAN port
29	signal + CAN port

Connector 5

USB port to programme the device.

Micro-switch 1

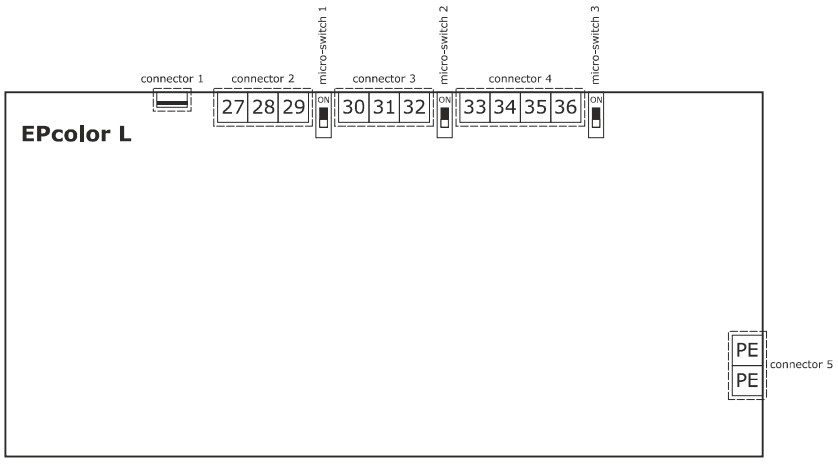
- to fit the termination resistor of the RS-485 MODBUS master port
- to fit the termination resistor of the RS-485 MODBUS slave port.

Micro-switch 2

To fit the termination resistor of the CAN port.

4.7 EPcolor L connectors

The following diagram illustrates the EPcolor L user interface connectors.



The following tables illustrate the meaning of the EPcolor L user interface connectors.

Connector 1

USB port to programme the device.

Connector 2

Part	Meaning
27	CAN port GND reference
28	signal - CAN port
29	signal + CAN port

Connector 3

Part	Meaning
30	RS-485 MODBUS slave port GND reference
31	signal - RS-485 MODBUS slave port
32	signal + RS-485 MODBUS slave port

Connector 4

Part	Meaning
33	device power supply (24 VAC/12... 30 VDC)
34	signal + RS-485 MODBUS master port
35	signal - RS-485 MODBUS master port
36	device power supply and RS-485 MODBUS master port GND reference

Connector 5

Part	Meaning
PE	appliance earthing
PE	appliance earthing

Micro-switch 1
To fit the termination resistor of the CAN port.

Micro-switch 2
To fit the termination resistor of the RS-485 MODBUS slave port.

Micro-switch 3
To fit the termination resistor of the RS-485 MODBUS master port.

4.8 Termination of RS-485 MODBUS and CAN networks

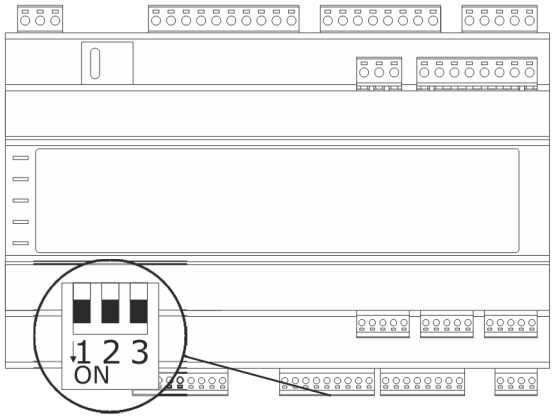
To reduce any signal reflections along the cables which connect the devices to an RS-485 MODBUS and/or CAN network, the network must be terminated in line with the first and last device on the network.

c-pro 3 NODE giga AHU controllers

To fit the termination resistor of the CAN network, place the **CANLT** micro-switch in position ON.

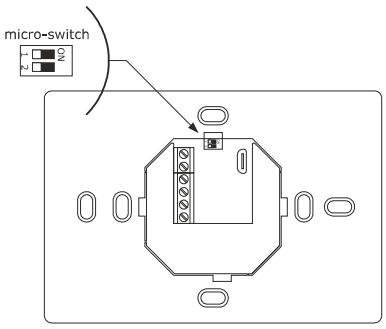
To fit the termination resistor of the RS-485 network connected to the RS-485 MODBUS slave port, place the **MBS1LT** micro-switch in position ON.

To fit the termination resistor of the RS-485 network connected to the RS-485 (MODBUS master/slave) port, place the **MBS2LT** micro-switch in position ON.



EPJ LCD user interface

To terminate the CAN port, put micro-switch 2 to ON.

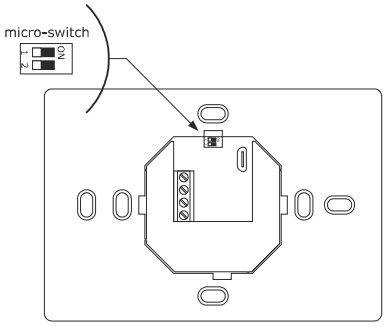


ADVICE FOR THE ELECTRICAL CONNECTION

- If you use electric or pneumatic screwdrivers, loosen the tightening torque
- If the device has been moved from a cold to a warm place, humidity may have caused condensation to form inside. Wait about an hour before switching on power
- make sure that the supply voltage, electrical frequency and power are within the set limits. See the *TECHNICAL SPECIFICATIONS* section
- disconnect the power supply before starting any maintenance work
- do not use this device as a safety device
- for repairs and for further information, contact the EVCO sales network.

EPJgraph user interface

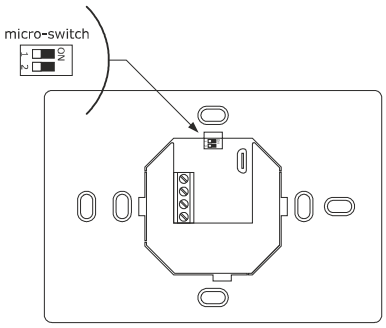
To terminate the CAN port, put micro-switch 2 to ON.



EPcolor S user interface

To terminate the RS-485 MODBUS port, put micro-switch 1 to ON.

To terminate the CAN port, put micro-switch 2 to ON.

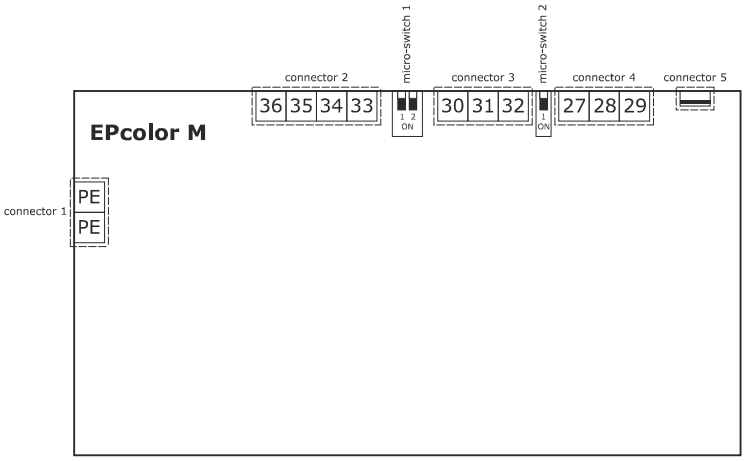


EPcolor M user interface

To terminate the RS-485 MODBUS master port, place dip 1 of micro-switch 1 in the ON position.

To terminate the RS-485 MODBUS slave port, place dip 2 of micro-switch 1 in the ON position.

To terminate the CAN port, place micro-switch 2 in the ON position.

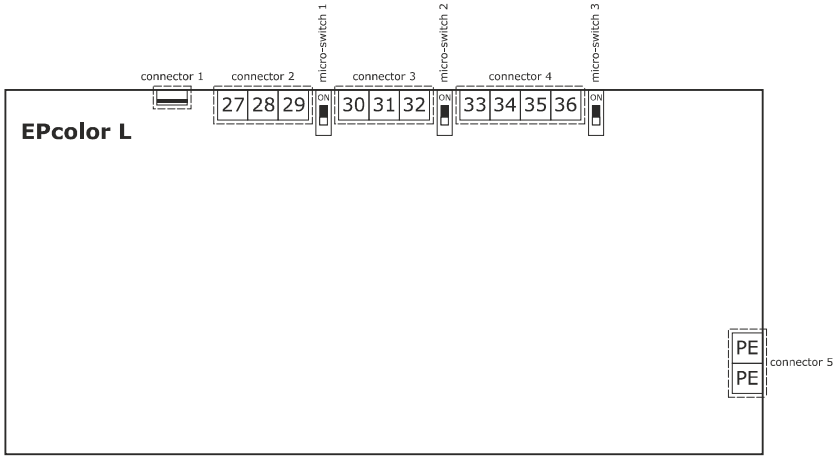


EPcolor L user interface

To terminate the CAN port, place micro-switch 1 in the ON position.

To terminate the RS-485 MODBUS port, place micro-switch 2 in the ON position.

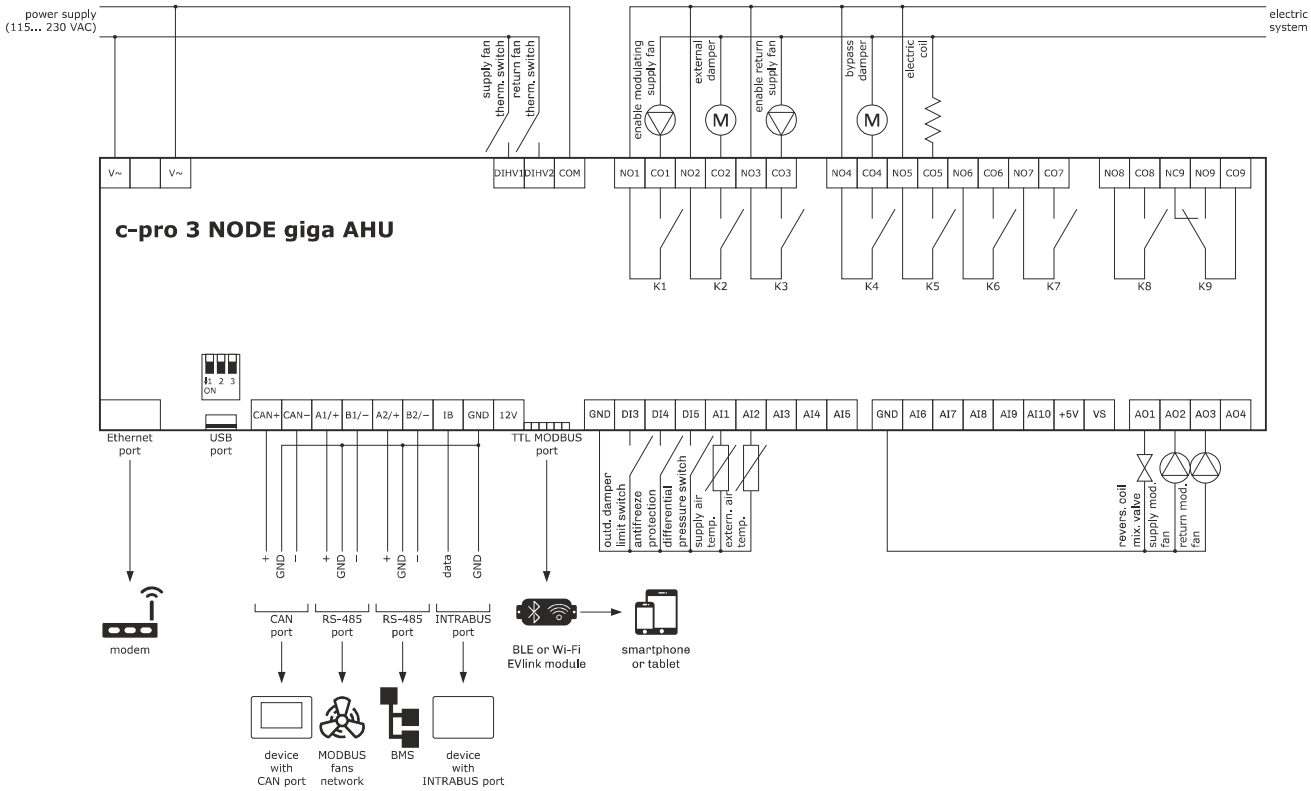
To terminate the RS-485 MODBUS port, place micro-switch 3 in the ON position.



4.9 Example of electrical connection of a c-pro 3 NODE giga AHU controller

The following diagram gives an example of the electrical connection of c-pro 3 NODE giga AHU controllers.

To configure the I/O, refer to the "LIST OF PARAMETERS" section.



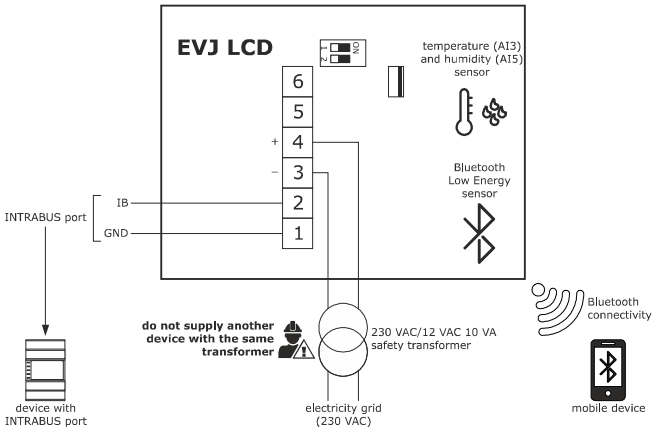
4.10 Example of electrical connection of an EVJ LCD user interface

The following diagram gives an example of the electrical connection of an EVJ LCD user interface for wall installation.

In this example, EVJ LCD is powered by a safety transformer.

CAUTION:

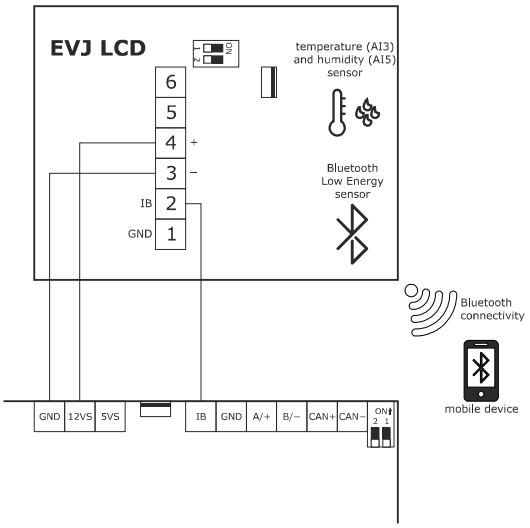
- do not power another device with the same transformer
- the maximum connection cable length allowed for the INTRABUS port is 30 m (98.4 ft).



In this example, EVJ LCD is powered by a device.

CAUTION:

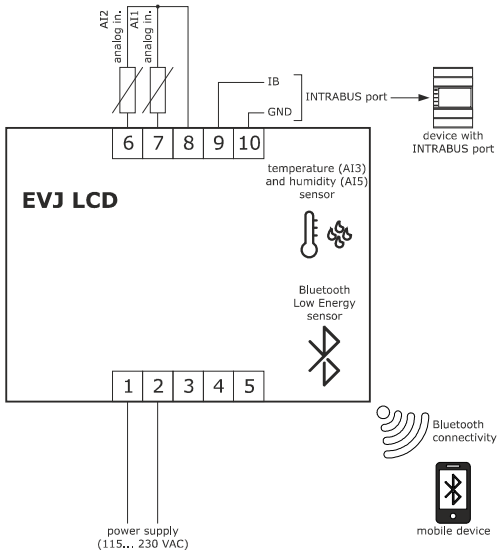
- make sure that the current supplied by the controller falls within the limits outlined in the TECHNICAL SPECIFICATIONS section
- the maximum connection cable length allowed for the INTRABUS port is 10 m (32.8 ft).



The following diagram gives an example of the electrical connection of an EVJ LCD user interface for wall installation, with a rear slot for a flush-mount box.

CAUTION:

- the maximum connection cable length allowed for the INTRABUS port is 30 m (98.4 ft).



4.11 Example of electrical connection of an EPJ LCD user interface

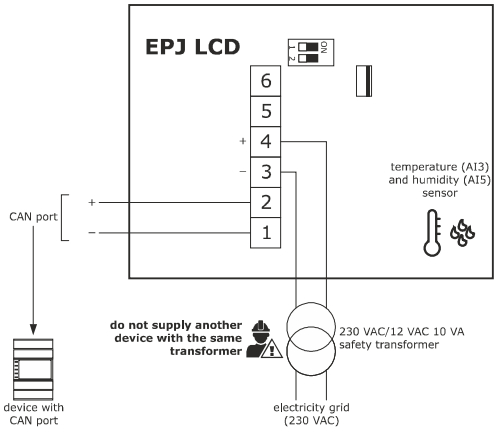
The following diagram gives an example of the electrical connection of an EPJ LCD user interface for wall installation.

In this example, EPJ LCD is powered by a safety transformer.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

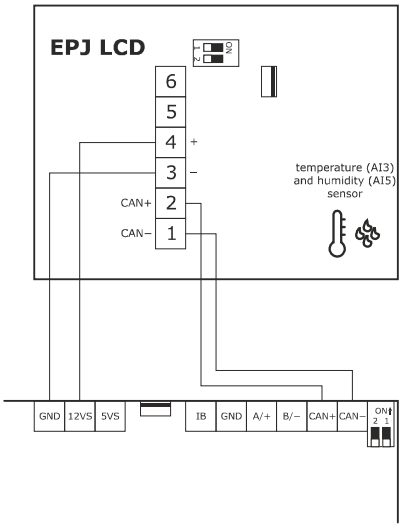
  over 10 m (32.8 ft), use a shielded cable.



In this example, EPJ LCD is powered by a device.

CAUTION:

- make sure that the current supplied by the controller falls within the limits outlined in the TECHNICAL SPECIFICATIONS section
- the maximum connection cable length allowed for the CAN port is 10 m (32.8 ft).

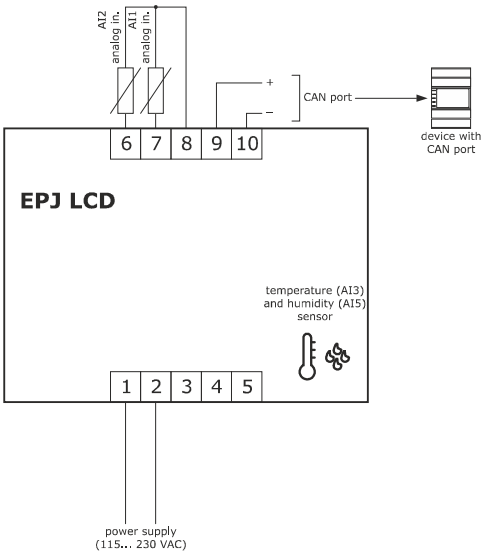


The following diagram gives an example of the electrical connection of an EPJ LCD user interface for wall installation, with a rear slot for a flush-mount box.

CAUTION:

- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

  over 10 m (32.8 ft), use a shielded cable.



4.12 Example of electrical connection of an EPJgraph

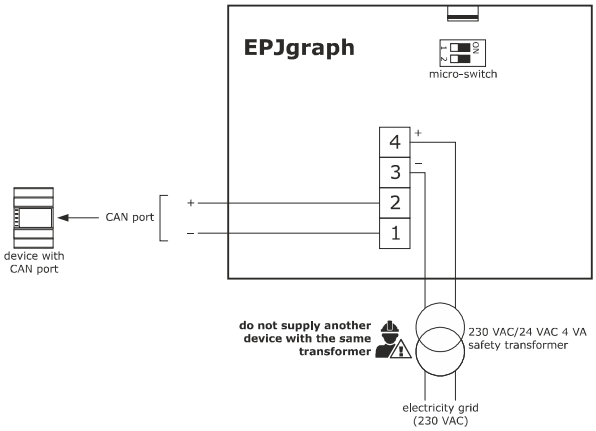
The following diagram gives an example of the electrical connection of an EPJgraph user interface for panel installation.

In this example, EPJgraph is powered by a safety transformer.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

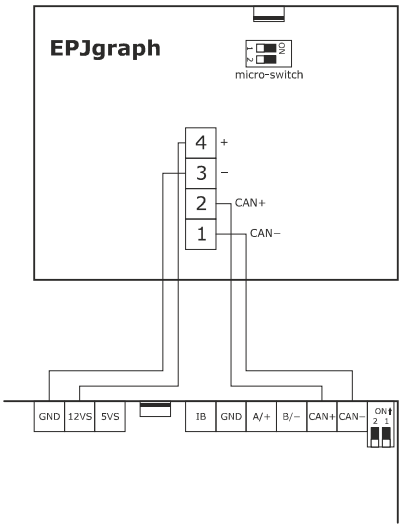
  over 10 m (32.8 ft), use a shielded cable.



In this example, EPJgraph is powered by a device.

CAUTION:

- make sure that the current supplied by the controller falls within the limits outlined in the TECHNICAL SPECIFICATIONS section
- the maximum connection cable length allowed for the CAN port is 10 m (32.8 ft).



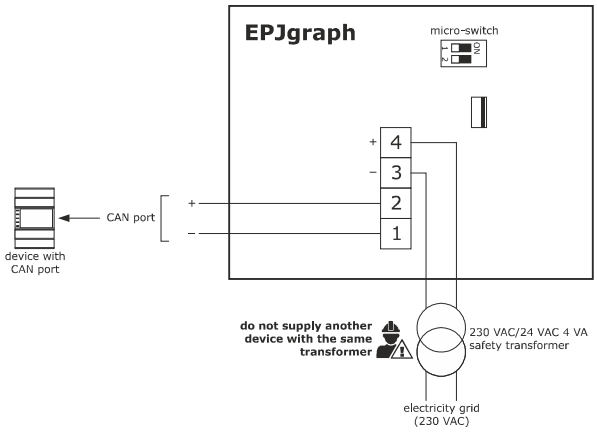
The following diagram gives an example of the electrical connection of an EPJgraph user interface for wall installation.

In this example, EPJgraph is powered by a safety transformer.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

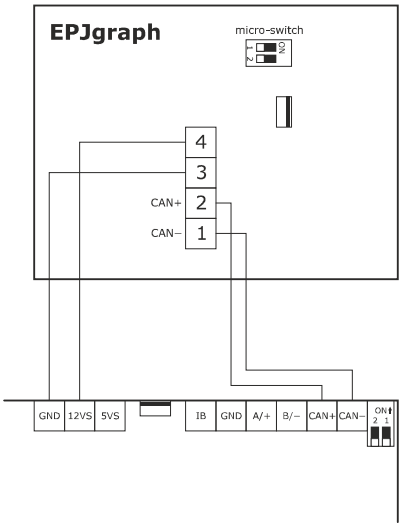
  over 10 m (32.8 ft), use a shielded cable.



In this example, EPJgraph is powered by a device.

CAUTION:

- make sure that the current supplied by the controller falls within the limits outlined in the TECHNICAL SPECIFICATIONS section
- the maximum connection cable length allowed for the CAN port is 10 m (32.8 ft).



4.13 Example of electrical connection of an EPcolor S

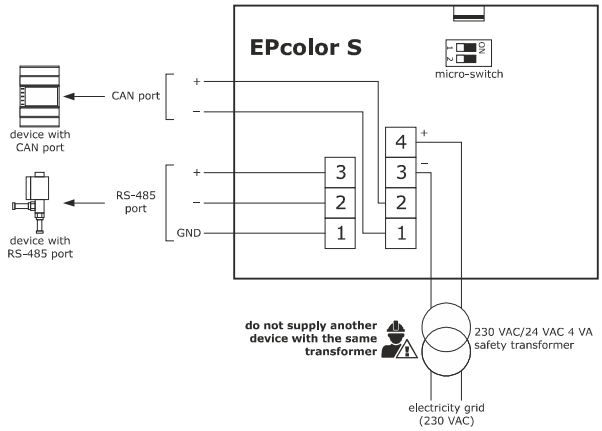
The following diagram gives an example of the electrical connection of an EPcolor S user interface for panel installation.

In this example, EPcolor S is powered by a safety transformer.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

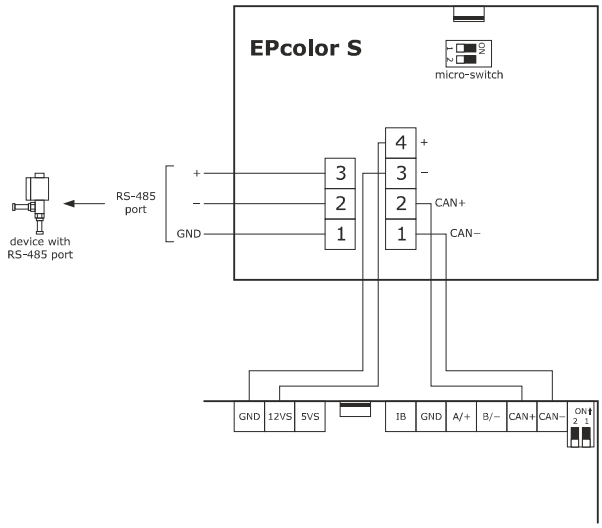
  over 10 m (32.8 ft), use a shielded cable.



In this example, EPcolor S is powered by a device.

CAUTION:

- make sure that the current supplied by the controller falls within the limits outlined in the TECHNICAL SPECIFICATIONS section
- the maximum connection cable length allowed for the CAN port is 10 m (32.8 ft).



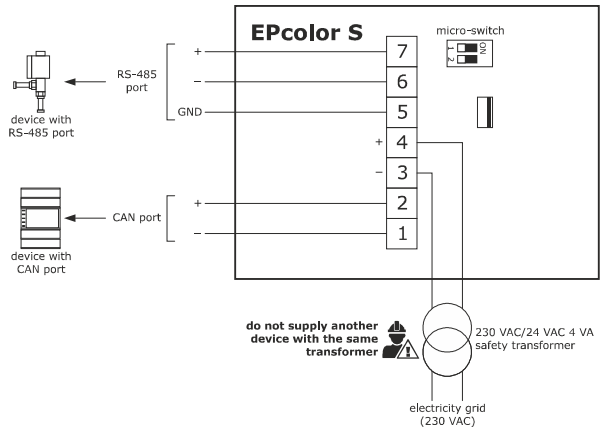
The following diagram gives an example of the electrical connection of an EPcolor S user interface for wall installation.

In this example, EPcolor S is powered by a safety transformer.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

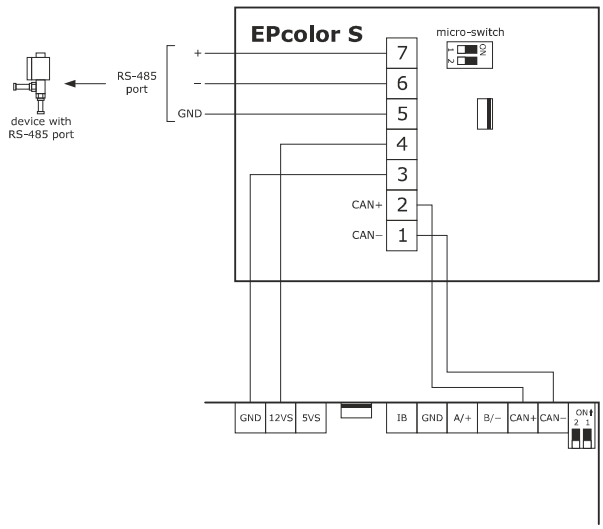
  over 10 m (32.8 ft), use a shielded cable.



In this example, EPcolor S is powered by a device.

CAUTION:

- make sure that the current supplied by the controller falls within the limits outlined in the TECHNICAL SPECIFICATIONS section
- the maximum connection cable length allowed for the CAN port is 10 m (32.8 ft).



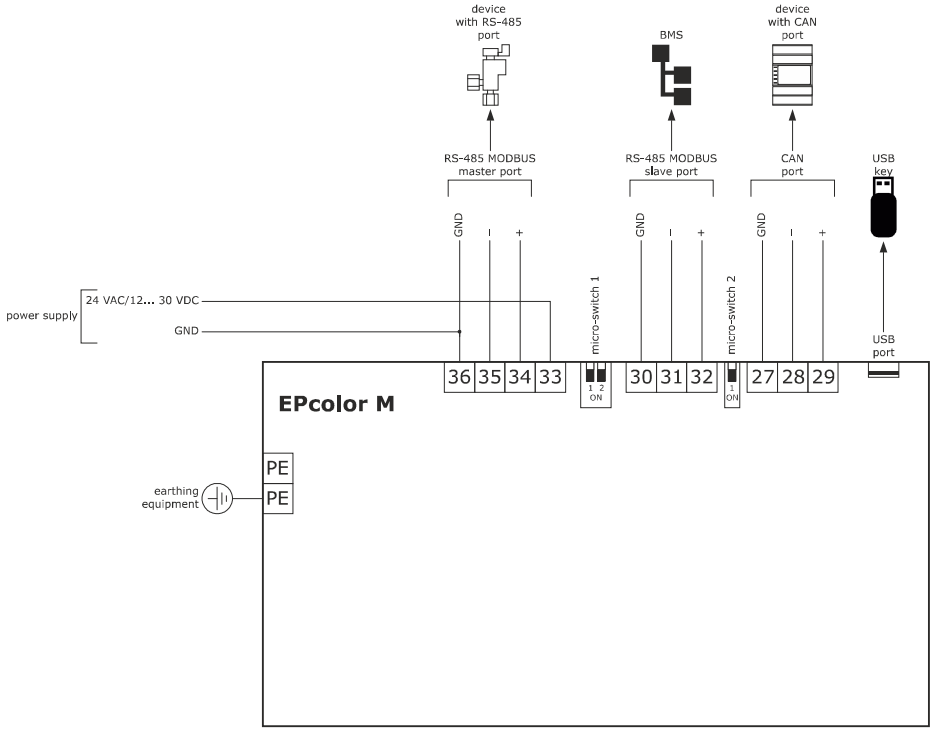
4.14 Example of electrical connection of an EPcolor M

The following diagram gives an example of the electrical connection of an EPcolor M.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

  over 10 m (32.8 ft), use a shielded cable.



4.15 Example of electrical connection of an EPcolor L

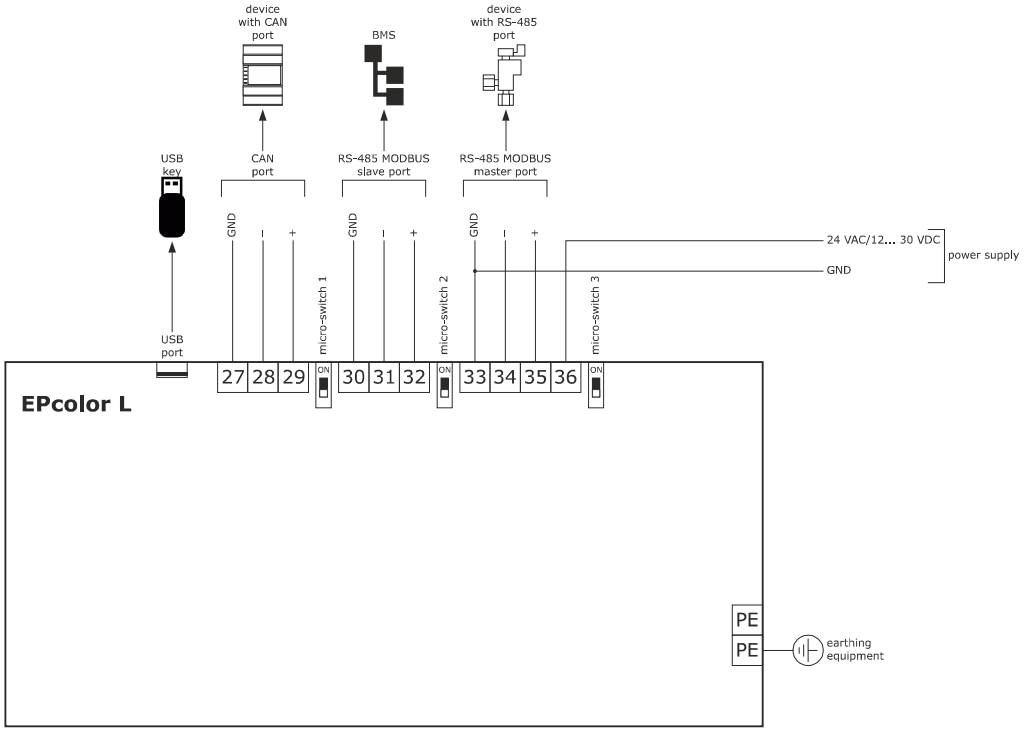
The following diagram gives an example of the electrical connection of an EPcolor L user interface for panel installation.

In this example, EPcolor L is powered by a safety transformer.

CAUTION:

- do not power another device with the same transformer
- the maximum connection cable length allowed for the CAN port depends on the baud rate:
  - 1,000 m (3,280 ft), with baud rate of 20,000
  - 500 m (1,640 ft), with baud rate of 50,000
  - 250 m (820 ft), with baud rate of 125,000
  - 50 m (164 ft) with baud rate of 500,000.

  over 10 m (32.8 ft), use a shielded cable.



5 USER INTERFACE

5.1 EPJgraph keypad and display

The air handling unit is capable to manage up to two EPJgraph displays, in case you want to have a local user interface installed on the unit panel and an interface of the same type to be connected remotely. If you need to use a second EPJgraph display, simply configure the local node of the second display as 97.
The keypad has 6 navigation and value-setting keys with the following functions:

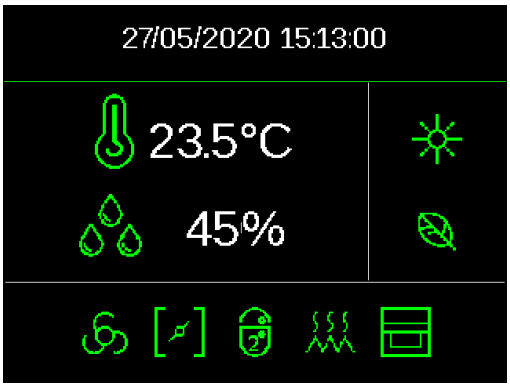
- | ^ | and | v | (UP/ DOWN): when editing, you can change the parameters or otherwise, move the cursor. If you press and hold these keys down, different actions occur depending on the type of fan control:
- PF01 = 0, 1, 2, 3 and 7: Selects the forced thresholds in sequence (PF21-PF23 for the supply fan and PF33-PF35 for the return fan), the sequence will be:
  Disabled ↔ Set 1 ↔ Set 2 ↔ Set 3
- PF01 = 4 and 5: No effect
- PF01 = 6: Increases (UP key) / Decreases (DOWN key) the PF06 fan speed.
- | ← | and | → | (LEFT/RIGHT): displays the pages on the same level in sequence. If you press and hold the RIGHT key, the booster function is activated. This function turns the supply fan off and increases the return fan speed to 100% for a time equal to PF58 minutes (default = 0).
- | OK | (SET/ENTER): when editing, this confirms the value or else sends the commands associated with the entry on which the cursor is positioned.

If held down for about 2 seconds, the ENTER key grants access to the main menu.
If held down while an alarm page is being displayed, this key makes it possible to re-arm the alarm.
When the alarm pages are displayed, pressing ENTER key will scroll through all the active alarms.

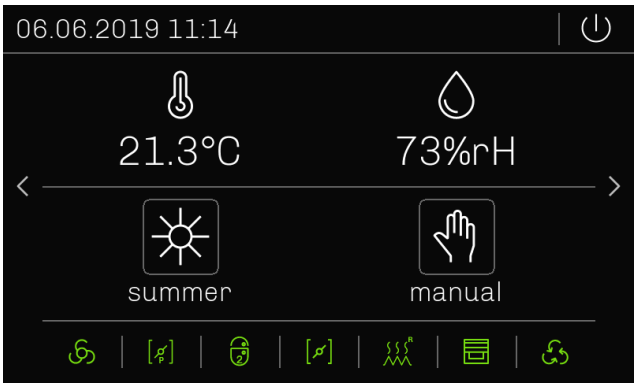
- | ⏻ | (STAND-BY/ESC): when editing, this deletes the value or else requests the default page which could be associated with the current page.

If held down for about 2 seconds, the ESC key enables the machine to be switched on or off.
If held down while on the main page, this key grants access to the list of active alarms.

EPJgraph



EPcolor



Unit status icon:

Absent:	The uniti s switched on
Present:	The uniti s switched off

Iummer/winter icon: The meaning of this icon depends on parameter PH 41

Snowflake	Winter mode active.
Sun	Summer mode active.

Alarm icon:

Absent:	*No alarm in progress*
Present:	At least 1 alarm is active.

Program icon:

Manual:	No time bands active.
Off:	The unit is switched off via time bans.
Comfort:	Comfort time band active.
Economy:	Economy time band active.
Night:	Night time band active.
Holiday:	Holiday time band active.
Economy DI:	The digital input Economy is ctive

Fan icon:

"Hollow":	Fans are off.
"Solid":	At least 1 fan is on.

Water coil icon:

Absent:	Coils are off.
Present:	At least 1 water coil is active.

Direct expansion coil icon:

Absent:	The compressors are off.
Present:	At least 1 compressor is on.

Defrost icon:

Absent:	Defrost is not active.
Present:	Defrost is active.
If flashing slowly:	If it flashes alternatively to the direct expansion coil icon, the defrost is waiting for a compressor protection time, otherwise it indicates the dripping phase of defrost is active.

Electric coil icon:

Absent:	The heating elements are off.
Present:	At least one heating element is on.

Damper icon:

Absent:	*All* the dampers are closed.
Present:	At least one damper is open.

°C/°F icon: This indicates the temperature measurement unit of the selected probe.

5.2 List of pages

This section lists the main pages and the menus for the application. The general menu is divided into four levels: User, Servicer, Installer and Manufacturer.

The menu structure is the following:

- General menu
- User menu (level 1)
- Time bands (level 1)
- Servicer menu (level 2)
- Servicer menu counter section
- Servicer menu calibration section
- Servicer menu input/output section
- Servicer menu Modbus Master section
- Installer menu (level 3)
- Installer menu setup section
- Installer menu regulation section
- Installer menu fan section
- Installer menu coil section
- Installer menu humidity section
- Installer menu dampers section
- Installer menu recovery section
- Installe menu auxiliay section
- Installer menu safety section
- Installer menu MODBUS section
- Installer menu Ethernet section
- Installer menu miscellaneous section
- Installer menu default section
- Manufacturer menu (level 4)
- Manufacturer menu fan section
- Manufacturer menu inverter section
- Manufacturer menu coils section
- Manufacturer menu direct expansion section
- Manufacturer menu humidity section
- Manufacturer menu damper section
- Manufacturer menu recovery section
- Manufacturer menu pumps section
- Manufacturer menu safety section
- Manufacturer menu MODBUS section
- Manufacturer menu Ethernet section
- Manufacturer menu miscellaneous section
- Manufacturer menu configuration section

- Manufacturer menu hardware section
- RTC menu (level 0)
- Alarms menu (level 0)
- Alarms display
- History menu (level 0)
- Displays the alarm history
- SAVE/RESTORE menu (3 levels)
- Menu SAVE/RESTORE section (save parameters)
- Menu SAVE/RESTORE section (restore parameters)
- Menu SAVE/RESTORE section import/export parameters
- Info menu (level 0).

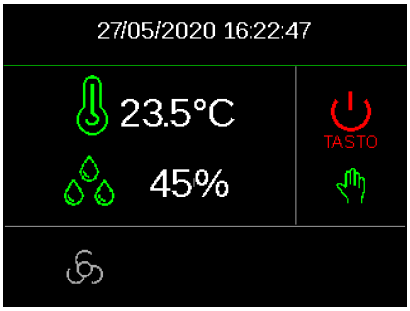
5.3 Passwords

Each menu level sets the accessibility to the various functions which can be accessed by entering a password.
Once the correct password has been entered, it is possible to access the protected functions, unlock the level in question and unlock the various sublevels. Level passwords can be changed by the level in question or by higher levels. For example, from the manufacturer level, it is possible to the change the passwords of the lower levels.
To set a password, the possible values range from -999 to 9999.
The time allowed to set the password expires within 4 minutes, after which a new password must be set.

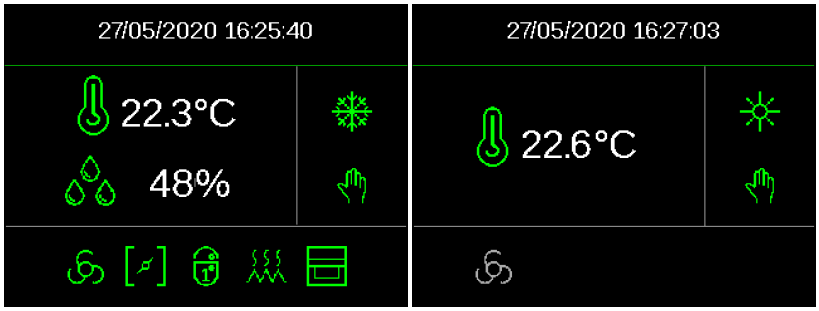
5.4 Main page

In the EVJ LCD and EPJ LCD display the machine status determines what is displayed on the main page, i.e. it can switch between on and off.
If the machine is off, the text "OFF" will be displayed on the top line, while on the bottom line the reason for switching off ("KEY" from key, "dI" from digital input, "SUP" from supervisor, "SCHE" from scheduler, "ALrM" from alarm)

In the EPJgraph and EPcolor display the page will remain the same and the machine off icon will be displayed instead of the operating mode icon.
If the machine is off (OFF), the OFF icon will be displayed and the reason for the shutdown will be indicated below (dedicated key, lack of authorization from digital insertion, supervisor, program, alarm).



If you press the RIGHT or LEFT keys from the main page, information is also displayed about the status of the circuit, RTC (Real Time Clock) and probes configured.
If the probe is faulty, the relevant field will display: "**----** "or "...." if it is disabled.



By pressing the RIGHT or LEFT keys from the main page, information relating to the status of the circuit, the time bands and the configured probes can also be viewed.
In the event of a probe error, the value field of the probe will display: "----" or "...." if it is disabled.

5.5 Meaning of icons

The following table describes the meaning of the EVJ LCD and EPJ LCD user interfaces.

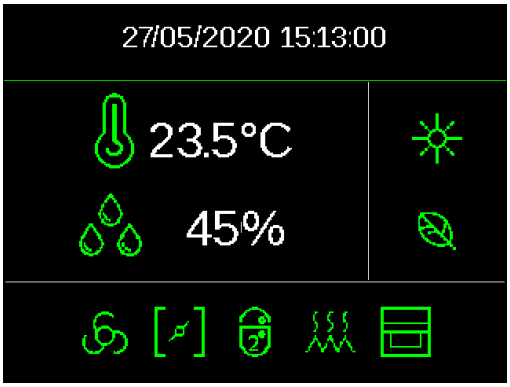
LED indicators for EVJ LCD and EPJ LCD	Meaning
	Heating and cooling. Depending on the value of parameter PH41, the following modes are enabled: - PH41 = 0 cooling mode enabled (summer) and heating mode enabled (winter) - PH41 = 1 heating mode on (winter) and cooling mode on (summer) Flashes slowly if the automatic mode change function is enabled
	- If off, there are no active alarms - If flashing, at least one active alarm
	- If off, you are in the main menu - If on, you have entered the settings menu
	- If off, the time bands are enabled - If on, the machine is operating in manual mode
	- If off, the machine is operating in manual mode - If off, the time bands are enabled
	- If off, no dehumidification or humidification requests are enabled - If on, a dehumidification or humidification request is present
	- If off, the fans are switched off - If flashing, the fans are about to be switched on or off - If on, at least one fan is operating
	- If off, the compressors are switched off - If flashing, a compressor is waiting to be switched on or off - If on, at least one compressor is operating
	- if off, the defrost is not active - if flashing alternatively to the direct expansion coil icon, the defrost is waiting for a compressor protection time, otherwise it indicates the dripping phase of defrost is active. - if on, the defrost is active
	- If off, the heating elements are switched off - If on, at least one heating element is enabled (including the pre-heating and re-heating coils)
	- If off, the heat exchanger is switched off - If on, the heat exchanger is switched on
	- If off, the dampers are closed - If on, at least one damper is open (mixing chamber, external or warm-up)
	- If flashing, it indicates for which day the time bands are being altered - If on, indicates the day of the week
	If on, the comfort time band is on
	- If flashing, the Economy digital input is enabled - If on, the Economy time band is enabled
	If on, the night time band is enabled
	If on, holiday is enabled
	- If off, temperature regulation has not been requested - If on, a temperature regulation request is present
auto	- If off, the fans that are operating are regulated manually - If on, the fans that are operating are regulated automatically

	Current fan speed
	- If off, the first coil is switched off - If on, the first coil is switched on
	- If off, the second coil and any pre- or re-heating water coils are switched off - If on, at least one water coil, included in the second and any pre- or re-heating water coils, is switched on
	- If off, the pumps are switched off - If on, at least one pump is operating
°C 1st line	Unit of measurement of the temperature regulation probe if the PH32 parameter is set to degrees Celsius. If the probe has not been configured or is in error mode, the LED is not visible.
°F 1st line	Unit of measurement of the temperature regulation probe if the PH32 parameter is set to degrees Fahrenheit. If the probe has not been configured or is in error mode, the LED is not visible.
°C 2nd line	Unit of measurement of the setpoint if the PH32 parameter is set to degrees Celsius. Visible only if the humidity probe has not been configured.
°F 2nd line	Unit of measurement of the setpoint if the PH32 parameter is set to degrees Fahrenheit. Visible only if the humidity probe has not been configured.
%rH 2nd line	Unit of measurement of the humidity probe. Visible if the humidity probe has been configured and is not faulty.

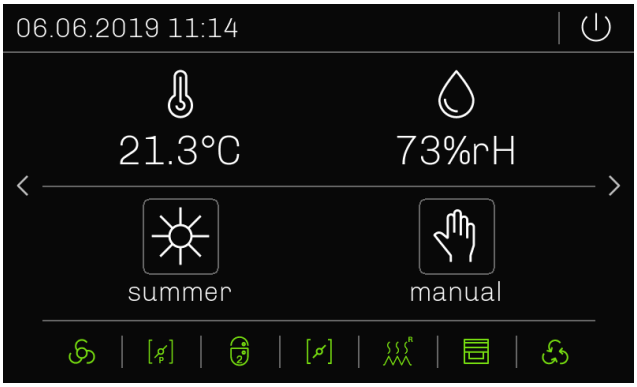
5.6 EPJgraph and EPcolor user interface

Once you have accessed the controller from the remote user interface, the home page will be displayed with the icons of the statuses managed by the controller.

EPJgraph



EPcolor



The graphic icons shown above are briefly described below, starting from the first at the top right, then proceeding with those at the bottom from left to right.

1. (the meanings change based on parameter PH41!) Summer manual / Winter manual / (flashing) Summer automatic / (flashing) Winter automatic / Machine off (with the reason for the shutdown indicated below / Alarm

2. Time bands not active / Unit off via tme bands / Comfort time band / Economy time band / Night time band / Holiday / Economy (DI)

3. Supply fan: No fan switched on / At least 1 fan switched on / (flashing) Fan switching off protection time / (flashing) Booster active or fan switching on protection time.

4. At least one water coil is on (including pre- and re-heating coils)

5. 1st step DX coil on (or analogue > 0) / 2nd step DX coil on / (flashing) step in stand-by to turn on or off / (flashing alternatively to the compressor icon) defrost waiting for a compressor protection / (flashing) during thr dripping phase of defrost / (fixed) defrost active

6. At least one heating element is on (including pre- and re-heating coils)

7. At least one damper is open, out of the external, warm-up and mixing chamber dampers

By pressing the ESC key in this page, the user returns to the Alarm/History page.

Press the LEFT and RIGHT keys together for 3 seconds on this page to change the Summer/Winter machine status.

After the main screen, the individual status pages can be displayed (using the LEFT/RIGHT keys), only of the statuses for which the utilities are configured (except for the settings page and probes which are always present).

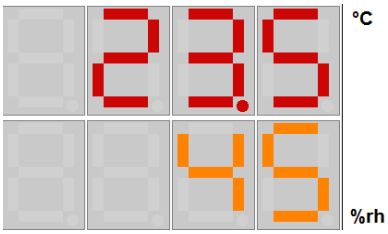
5.7 EVJ LCD and EPJ LCD user interface

In the remote EVJ LCD AND EPJ LCD user interfaces, the individual status pages for the configured utilities (except for the settings page and for probes configuration) can be displayed with the LEFT/RIGHT keys.

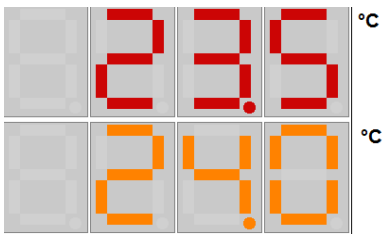
The information available can be displayed by pressing the UP/DOWN keys on every page.

If the temperature and humidity regulation probes have been configured, the values of these two probes will be displayed on the main page with the temperature value in the top line and the humidity value in the bottom one.

If, however, only the temperature probe has been configured in the main page, the value of this probe will be displayed in the top line and the room set-point in the bottom line.



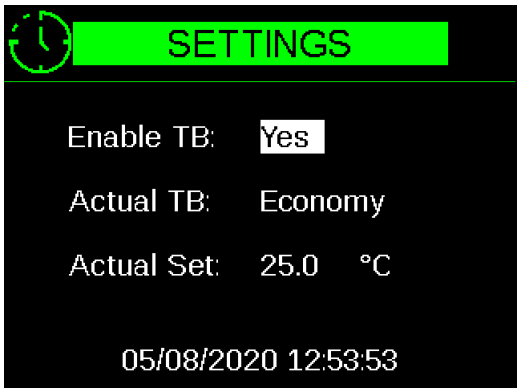
Main page with both probes configured



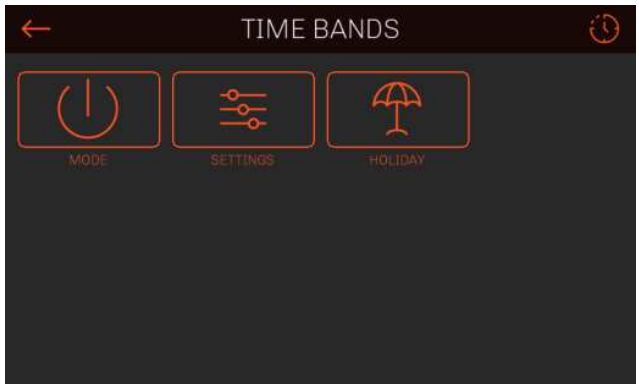
Main page with only the temperature probe configured

Settings page

EPJgraph



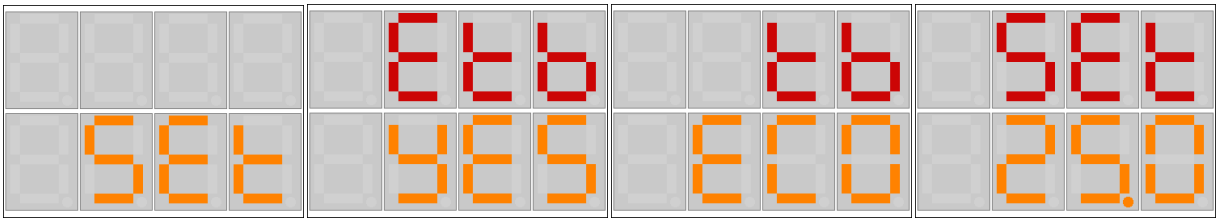
EPcolor



On this page, it is possible to adjust the time bands via "Enable TB", display the time band currently in progress via "Active band" and display and modify the setting currently in use via "Set attuale".

From this page, if you press the | ← | and | → | keys at the same time (LEFT/RIGHT) for 3 seconds, you can access the time bands configuration page.

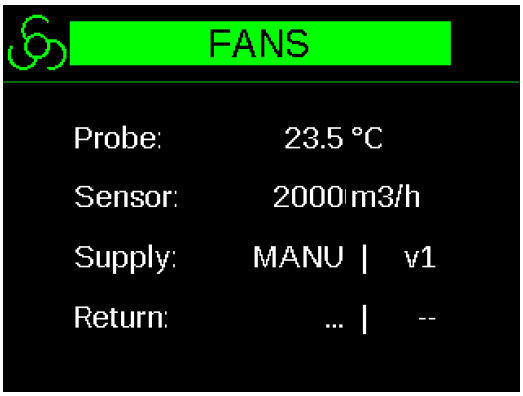
EVJ LCD and EPJ LCD user interface



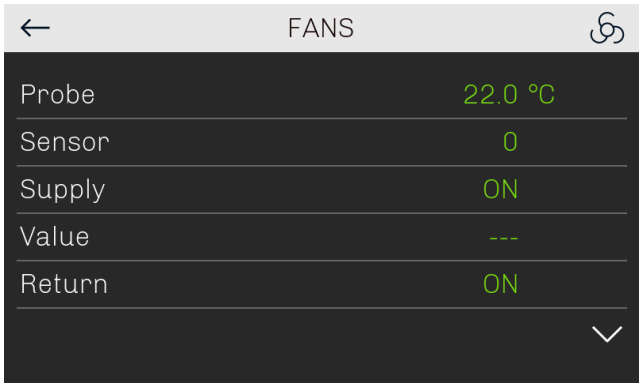
On this page, you can adjust the time bands via “Etb”, display the current time band in progress via “tb” and display and modify the setting currently in use via “SEt”.

Fans page

EPJgraph

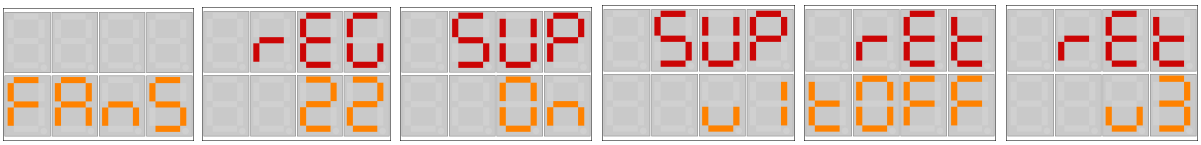


EPcolor



The supply and return fan status and speed are displayed.

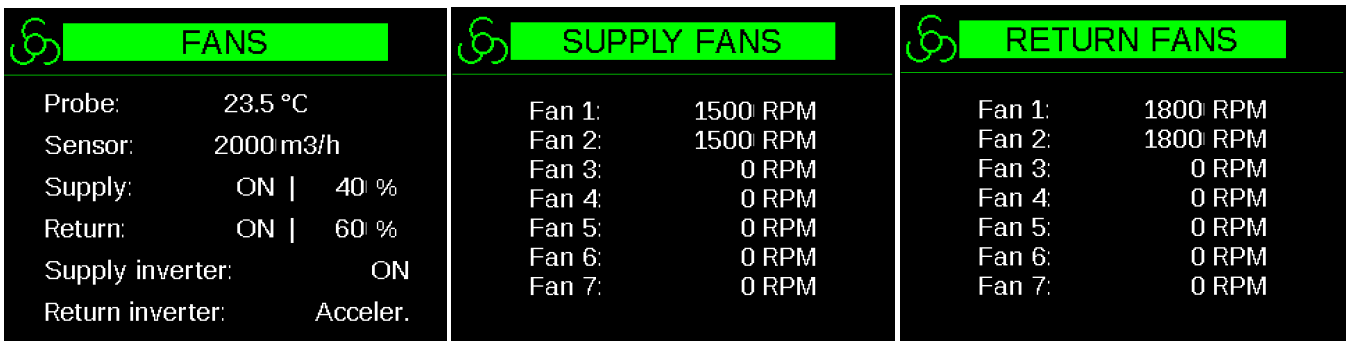
EVJ LCD and EPJ LCD user interface



On these screens, you can display the probe/sensor (temperature in decimals and ppm/Pa/m3h expressed in tens) indicated with “rEG”, the supply fan status and speed indicated with "SUP” and the return fan status and speed indicated with “rEt”.

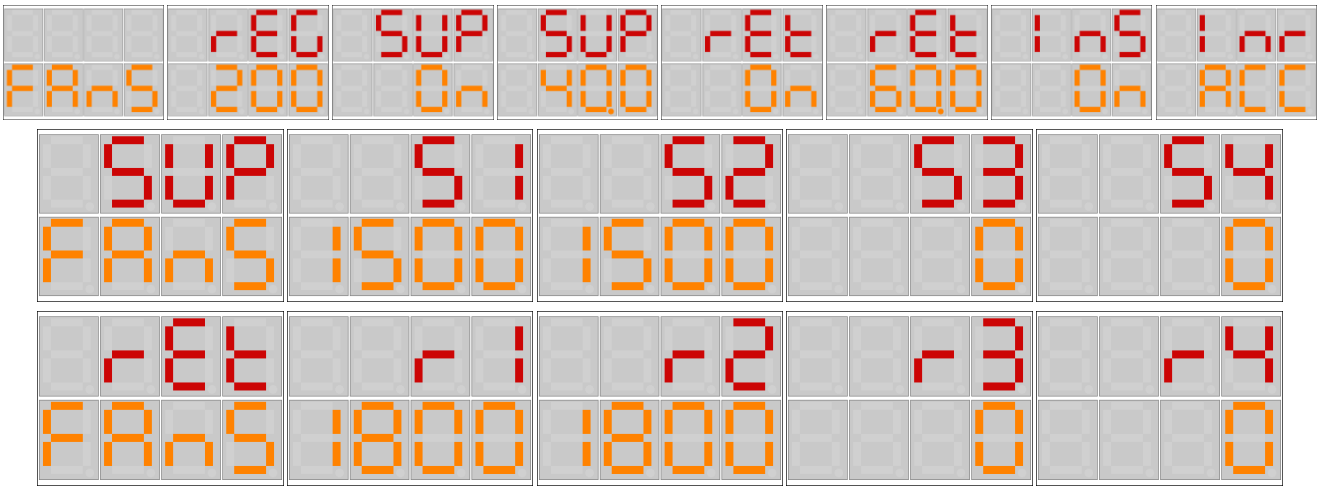
MODBUS fans pages

EPJ Graph



Three separate pages are displayed for the Modbus fans: the first displays information on the status and speed expressed as a percentage of the supply and return fans and the states of the inverters. The second and third pages show the speeds expressed in rpm of the individual supply and return fans.

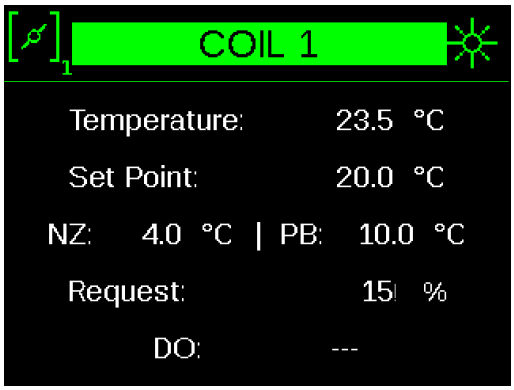
EVJ LCD and EPJ LCD user interface



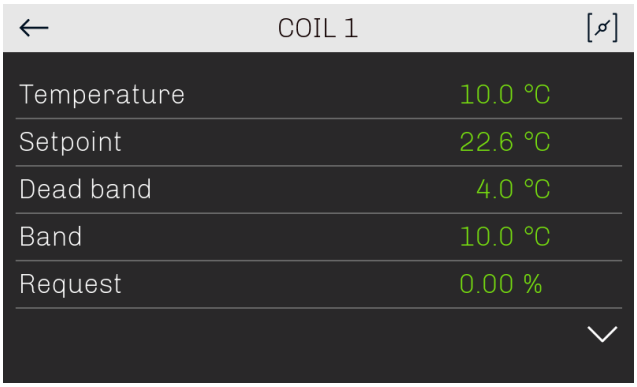
Three separate pages are displayed for Modbus fans: the first displays information relating to the value of the probe / sensor (temperature without decimals and ppm / Pa / m3h expressed in tens) indicated with "rEG", the status and speed of the fans of delivery indicated by "SUP", the status and speed of the return fans indicated by "rEt", the status of the "InS" delivery and "Inr" return inverters. (--- = disabled, rEAd = ready, On = inverter on, ACC = inver-ter in acceleration, dEC = inverter in deceleration, ALrM = inverter in alarm, OULd = inverter in overload).
The second and third pages show the speeds expressed in rpm of the individual supply fans (indicated with s1 .... s16) and return fans (indicated with r1 ... r16).

Coil 1 regulation status page

EPJgraph

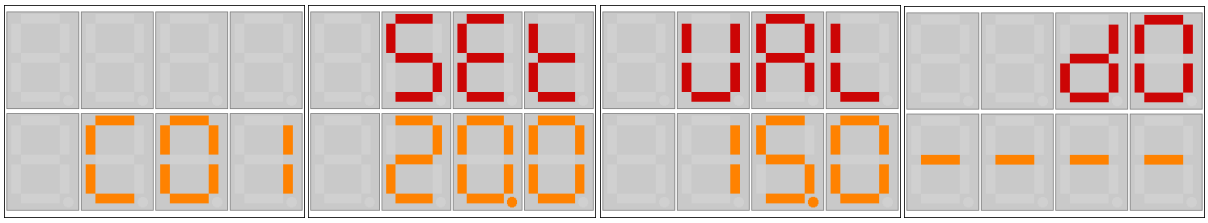


EPcolor



The regulation status of coil 1 is displayed, the control probe value, the current setpoint, the neutral zone and bandwidth values, the coil request and its status if an on/off or 3-point regulation is used.

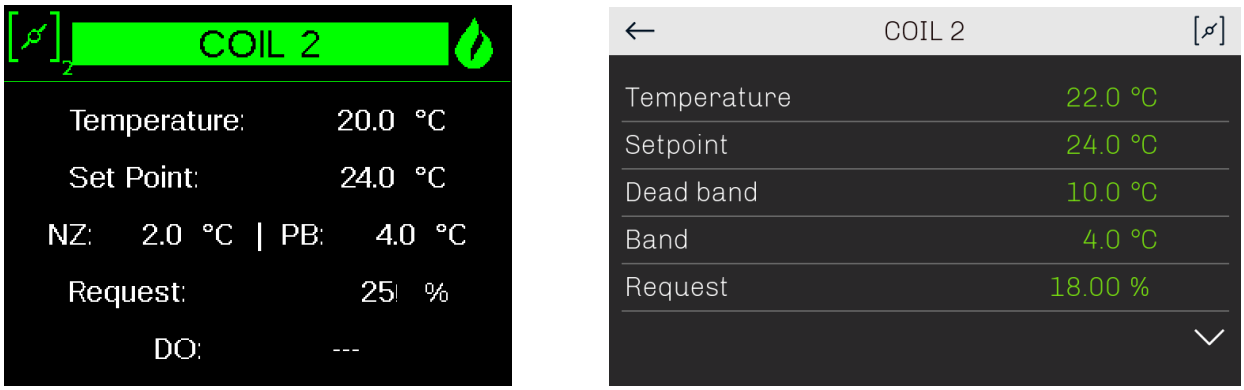
EVJ LCD and EPJ LCD user interface



On these pages, it is possible to view the current setpoint (SEt), the coil request (VAL) and its status (dO) if an on/off or 3-point regulation is used (---- = no coil with 3-point check or on/off configured, CLOS = coil with 3-point check closed, OPnG = coil with 3-point check opening, OPEn = coil with 3-point check open, CLnG = coil with 3-point check closing, ALIn = coil with 3-point check alignment, OFF = on/off coil off, On = on/off coil on).

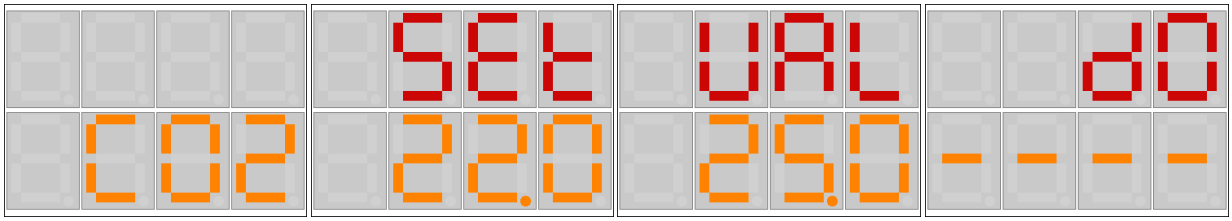
Coil 2 regulation status page

EPcolor



The regulation status of coil 2 is displayed, the control probe value, the current setpoint, the neutral zone and bandwidth values, the coil request and its status if an on/off or 3-point regulation is used.

EVJ LCD and EPJ LCD user interface

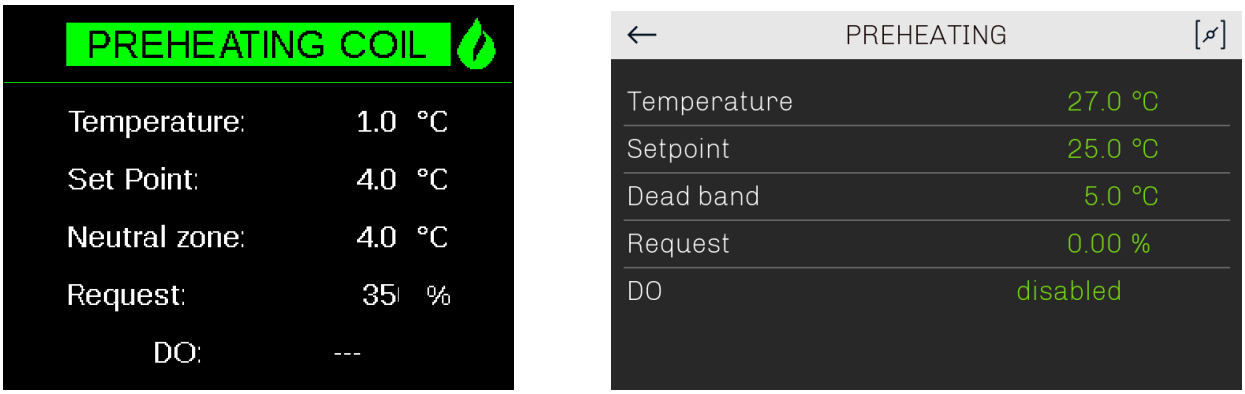


On these pages, it is possible to view the current setpoint (SEt), the coil request (VAL) and its status (dO) if an on/off or 3-point regulation is used (---- = no coil with 3-point check or on/off configured, CLOS = coil with 3-point check closed, OPnG = coil with 3-point check opening, OPEn = coil with 3-point check open, CLnG = coil with 3-point check closing, ALIn = coil with 3-point check alignment, OFF = on/off coil off, On = on/off coil on).

Pre-heating coil regulation status page

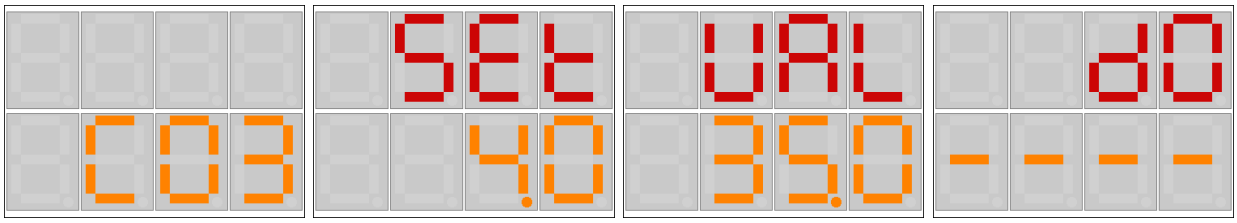
EPJgraph

EPcolor



The status of the pre-heating coil regulation is displayed, the temperature of the regulation probe (outside air or expelled air), the setpoint and neutral zone values, the battery request and its status in the event that it is used an on / off or 3-point regulation.

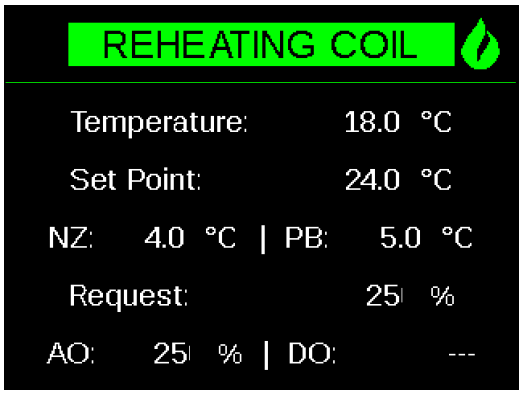
EVJ LCD and EPJ LCD user interface



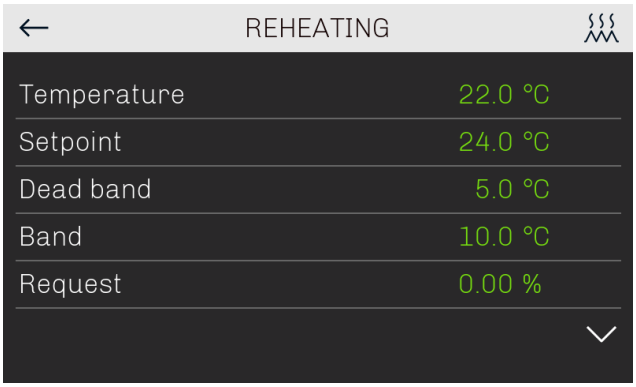
On these pages, it is possible to view the setpoint (SEt), the coil request (VAL) and its status (dO) if an on/off or 3-point regulation is used (---- = no coil with 3-point check or on/off configured, CLOS = coil with 3-point check closed, OPnG = coil with 3-point check opening, OPEn = coil with 3-point check open, CLnG = coil with 3-point check closing, ALIn = coil with 3-point check alignment, OFF = on/off coil off, On = on/off coil on).

Re-heating coil regulation status page

EPJgraph

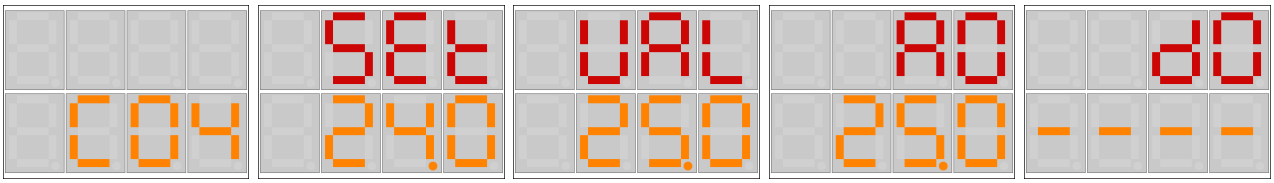


EPcolor



The following are displayed: re-heating coil regulation status, the control probe temperature, the current setpoint, the neutral zone and bandwidth values, the coil request, the value of the analogue output of the water coil or the electric modulating coil and the status if an on/off or 3-point regulation of the water coil or electric digital coil is used.

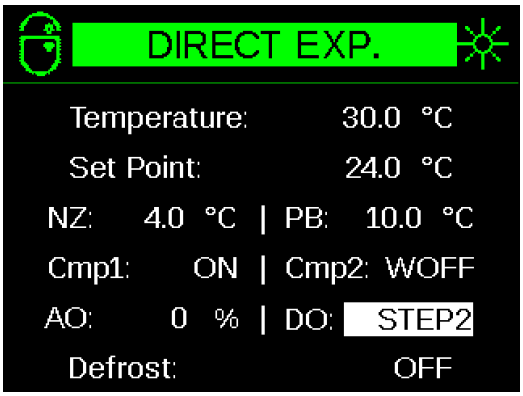
EVJ LCD and EPJ LCD user interface



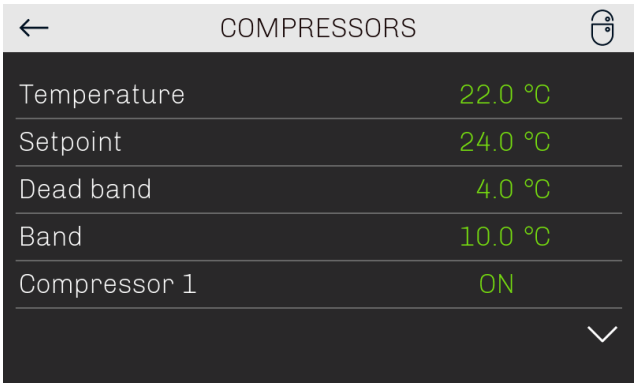
On these pages, you can view the current setpoint (SEt), coil request (VAL), the value of the analogue output (AO) of the water coil or modulating electric coil and the status (dO) if an on/off or 3-point check of the water coil is used or in the case of a digital electric battery (---- = no coil with 3-point check or on/off and no digital heating element configured, CLOS = H2O coil with 3-point check closed, OPnG = H2O coil with 3-point check opening, OPEn = H2O coil with 3-point check open, CLnG = H2O coil with 3-point check closing, ALIn = H2O coil with 3-point check alignment, OFF = on/off H2O coil off or no heating element step active, On = H2O coil with on/off check on, 1On = 1 heating element step on, 2On = 2 heating element steps on)

Direct expansion coil regulation status page

EPJgraph

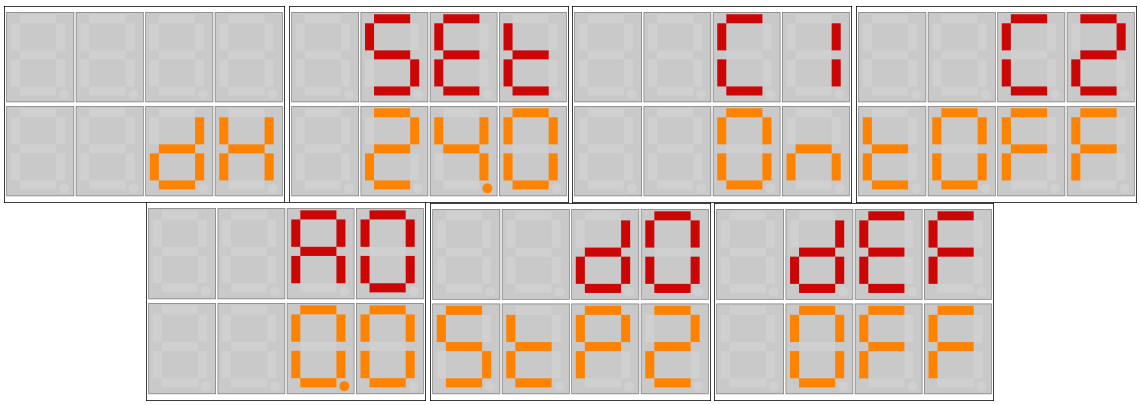


EPcolor



The direct expansion coil regulation status is displayed, plus the control probe value, the current setpoint, the neutral zone and bandwidth values, the status of compressor 1, the status of compressor 2, the modulating compressor request, the digital compressor request and the defrost status.

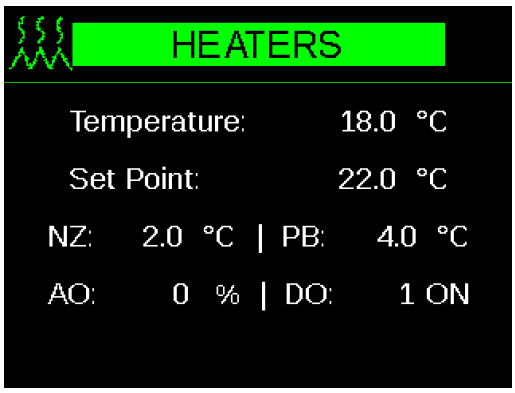
EVJ LCD and EPJ LCD user interface



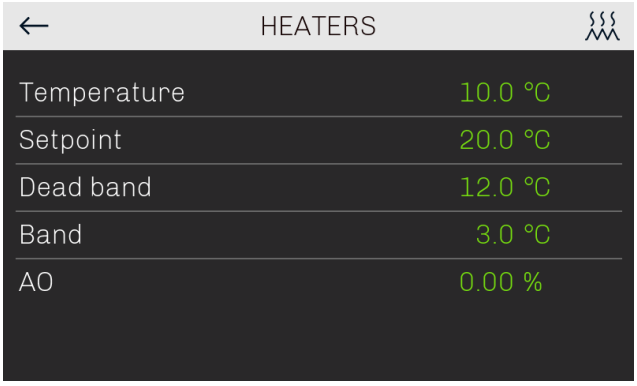
On these pages, it is possible to view the current setpoint (SEt), the status of the compressor 1 (C1), the status of the compressor 2 (C2), the modulating compressor request (AO), digital compressors request (dO) and the defrost status (dEF) (OFF = defrost not active, tON = defrost waiting for a compressor protection, ON = defrost active, "drIP" = dripping phase of defrost).

Heating element status page

EPJgraph

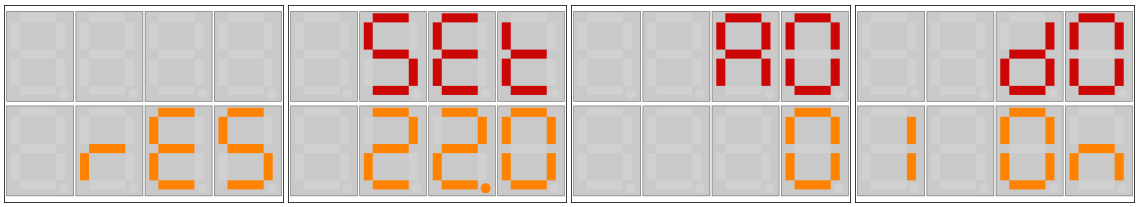


EPcolor



The status of the following is displayed: the heating elements, regulation sensor value, current setpoint, neutral zone and bandwidth values, modulating heating element request and digital heating element status.

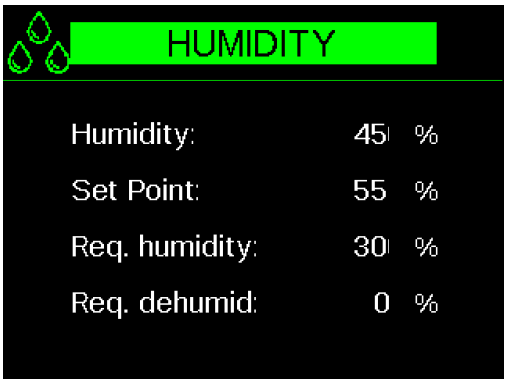
EVJ LCD and EPJ LCD user interface



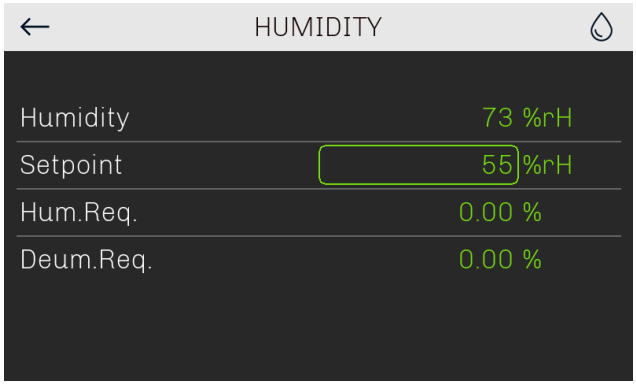
On this page, it is possible to view the current setpoint (Set), the modulating heating element request (AO) and the digital heating element status (dO).

Humidity regulation status page

EPJgraph

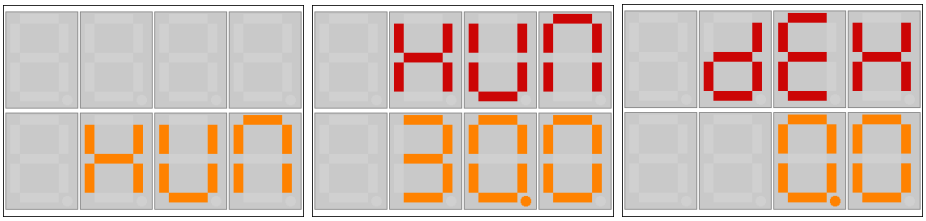


EPcolor



The humidity regulation status is displayed.

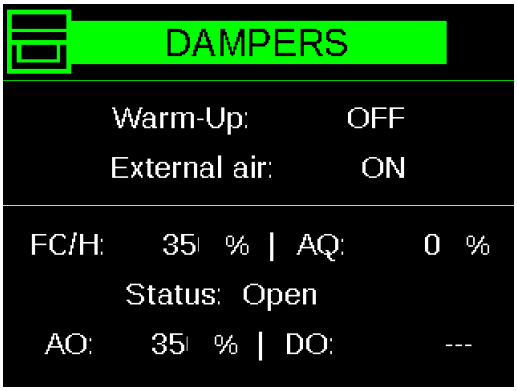
EVJ LCD and EPJ LCD user interface



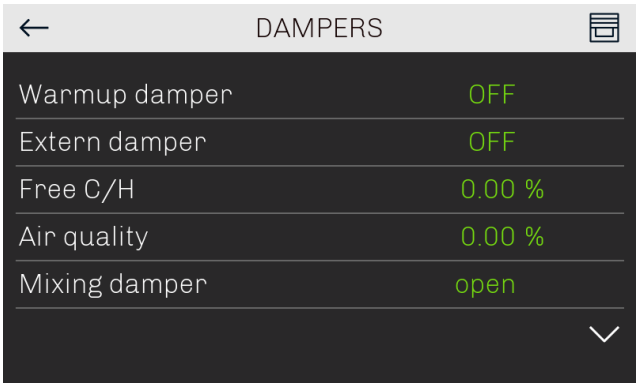
On these pages, it is possible to view the humidification request (HUM) and the dehumidification request (dEH).

Damper status page for air recirculation

EPJgraph



EPcolor



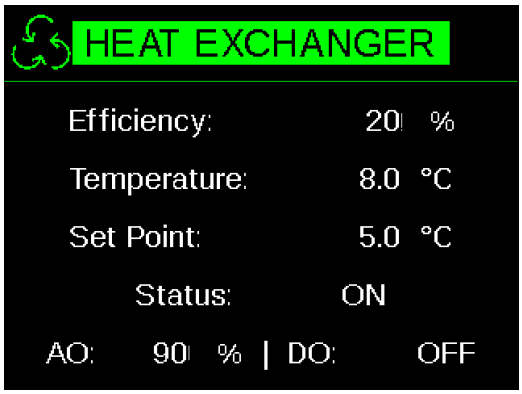
The following are displayed: the status of the warm-up damper for reaching the operating temperature, the status of the external air damper, the Free-cooling/heating request, the air quality request, the status of the mixing chamber damper, the analogue output value and status if an on/off or 3-point regulation is used.

EVJ LCD and EPJ LCD user interface

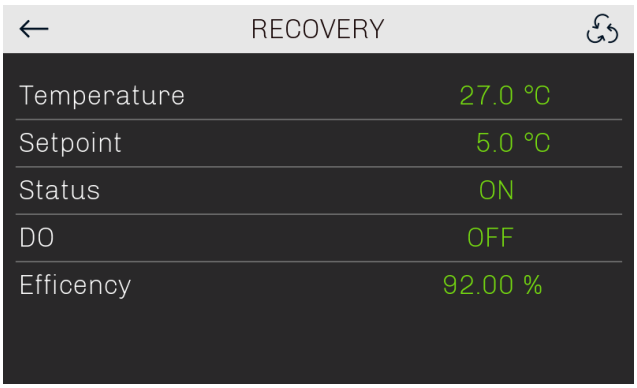
On these pages, it is possible to view the warm-up damper status (uuP) for reaching the operating temperature, the status of the external air damper (Out), the Free-cooling/heating (FCH) request, the air quality request (Air), the status of the mixing chamber damper (StS), the analogue output value (AO) and status (dO) if an on/off or 3-point regulation is used (---- = non 3-point or on/off damper configured, CLOS = damper with 3-point check closed, OPnG = damper with 3-point check opening, OPEn = damper with 3-point check open, CLnG = damper with 3-point check closing, ALIn = damper with 3-point check alignment, OFF = on/off damper closed, On = on/off damper open).

Heat recovery status page

EPJgraph

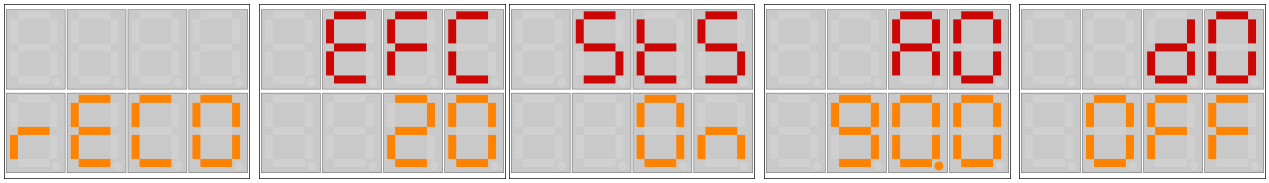


EPcolor



The following are displayed: the heat recovery status, the efficiency, the heat recovery temperature regulation, the setpoint, the heat recovery status, the modulating heat recovery request and the digital heat recovery status.

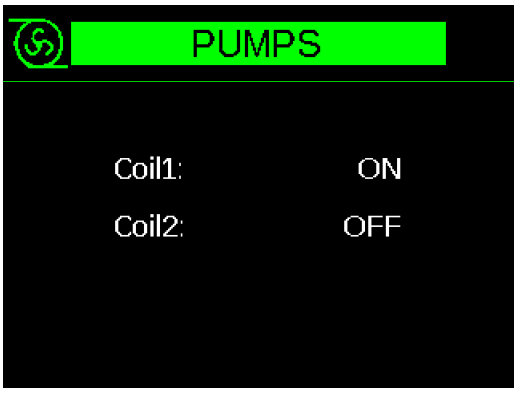
EVJ LCD and EPJ LCD user interface



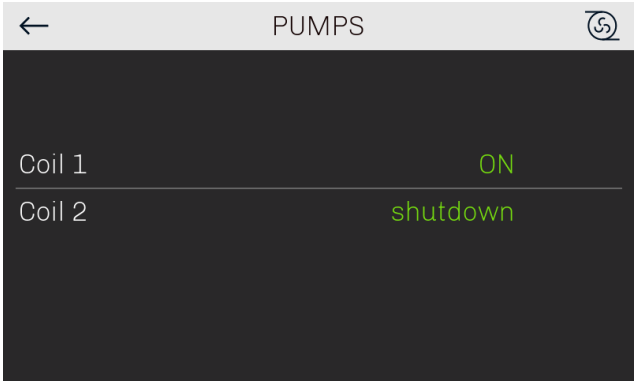
On these pages, it is possible to view the efficiency (EFC), the heat recovery status (StS), the modulating heat recovery request (AO) and the digital heat recovery status (dO).

Circulation pumps status page

EPJgraph

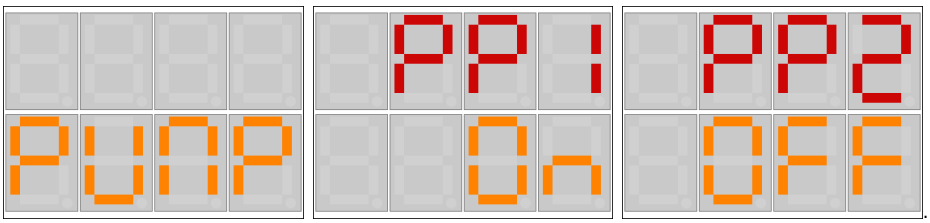


EPcolor



The status of the circulation pumps is displayed.

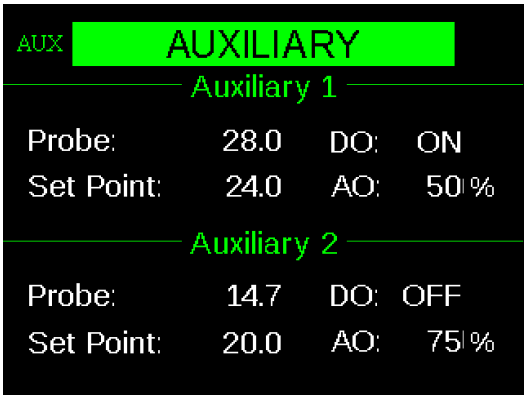
EVJ LCD and EPJ LCD user interface



On these pages, it is possible to view the status of pump 1 (PP1) and pump 2 (PP2).

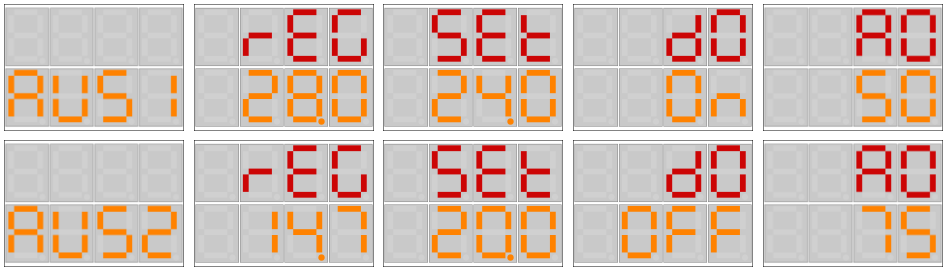
Auxiliary regulation status page

EPJ Graph



The status of the auxiliary settings, the control probe, the setpoint, the status of the digital output and the value of the analogue output of both auxiliary regulation 1 and auxiliary regulation 2 are displayed.

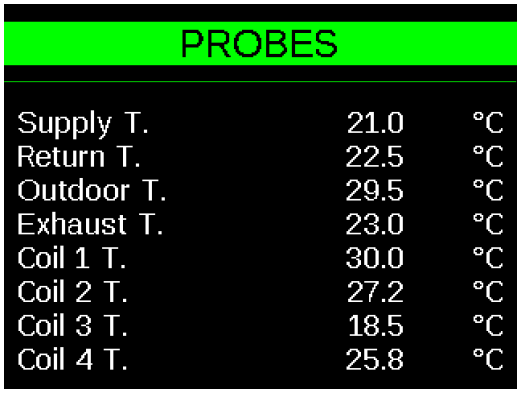
EVJ LCD and EPJ LCD user interface



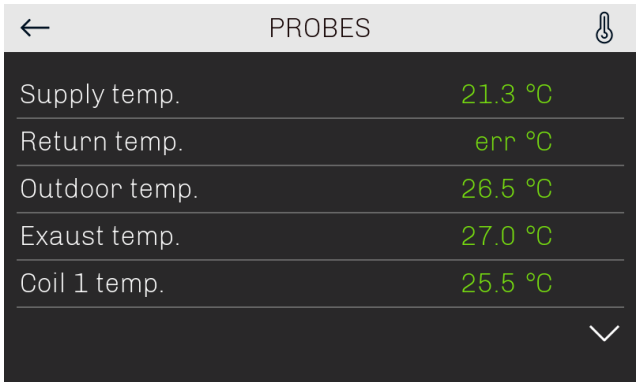
In these pages it is possible to view the control probe "rEG", the current setpoint "SEt", the status of the digital output "dO" and the value of the analog output "AO" of the auxiliary controls 1 "AUS1" and 2 " OFF2 ".

Sensors status page

EPJgraph

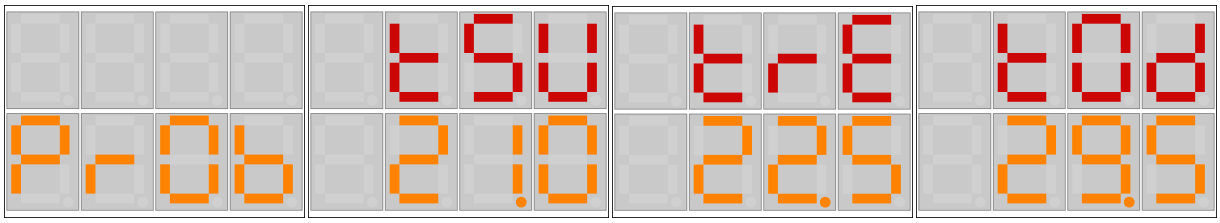


EPcolor



The status of the sensors is displayed.

EVJ LCD and EPJ LCD user interface



On these pages, it is possible to display the status of the sensors indicated with this label:
Supply t. (tSU), return t. (trE), outside t. (tOd), expelled t. (tEH), coil 1 t. (tC1), coil 2 t. (tC2), pre-heat coil t. (tC3), post-heat coil t.(tC4), compressor defrost t. (tdF), return h. (Hrt), Supply pressure/flow (PSU), return pressure/flow (PrE), Air quality (AIr), supply h. (HSU), outdoor H (Hod), potentiometer remote setting (SEt), potentiometer remote damper (dMP), potentiometer remote fans (FAn).

5.8 General menu

The general menu is the access point for all the other system menus (the equivalent is shown in brackets for the EVJ LCD and EPJ LCD user interfaces).

USER (USEr)
TIME BANDS (tb)
SERVICER (MAIn)
INSTALLER (InSt)
MANUFACTURER (COSt)
RTC (rtc)
ALARMS (ALAr)
HISTORY (HISt)
SALVA/RIPRISTINA/IMP.EXP PARAMETRI (SAvE/rESt/MAP)
INFO (InFO)

It is possible to view this menu from any point on the user interface by pressing ENTER for about 2 seconds. From this menu, you can choose the pages you wish to view by pressing the UP and DOWN keys, followed by the ENTER key to confirm.

5.9 User menu

The user menu is level 1 and, therefore, it is necessary to enter the User level password (or that of a higher level) to view/change the parameters in this section. If the user password is set to 0 (default), no password is requested to enter the menu. The same also applies to the higher levels, if the password is set to 0, none will be requested to enter that level.
This section contains the following parameters:

- summer/winter/automatic operation
- summer operation setpoint
- winter operation setpoint
- room humidity setpoint
- comfort band cooling setpoint
- heating band cooling setpoint
- economy band cooling offset
- economy band heating offset
- night band cooling offset
- night band heating offset
- cooling setpoint forced by DI
- heating setpoint forced by DI
- fan manual setpoint
- comfort band fan setpoint
- economy band fan setpoint
- night band fan setpoint
- comfort band damper setpoint
- economy band damper setpoint
- night band damper setpoint
- constant supply pressure/flow setpoint
- constant return pressure/flow setpoint
- display backlight percentage (only in the EVJ LCD and EPJ LCD user interfaces)
- display backlight timeout (only in the EVJ LCD and EPJ LCD user interfaces)
- language
- user password.
- EPoCA service user password

5.10 Servicer menu

The servicer menu is level 2, so you must enter the servicer level password (or higher) to view/modify the parameters in this section (in brackets the equivalent displayed by the EVJ LCD and EPJ LCD user interfaces).

COUNTERS (Cntr)
CALIBRATION (CAL)
I/O STATUS (I-O)
MB MASTER (MB)
SERVICER MENU password (PSd)

This menu can display the status of the various devices and the inputs and outputs used by the application.
By pressing the ENTER key on the "SERVICER MENU" label, you enter the page to change the password (*PSd2)*.
In the COUNTERS menu, the operating features of the following are displayed/enabled: fans, compressors, pumps and heating elements, e.g. the number of operating hours and the permitted threshold for the maximum number of hours. In the case of fans under constant pressure / flow rate, this menu displays the last stored speed value if parameter PF49 "Enable speed storage for constant pressure / constant flow regulation" is enabled.

Pressing the LEFT key in this menu enables the latest maintenance date for the machine to be viewed and updated.
The CALIBRATION menu can be used to enter any corrections to be applied to the analogue inputs to compensate for the offsets due to the cabling and probe position.
The I/O STATUS menu can be used to view the board inputs and outputs directly.
You can execute the self-aligning of the Modbus fans in the MB MASTER menu.

5.11 Installer menu

The installer menu is level 3, so you must enter the installer level password (or higher) to view/modify the parameters in this section (in brackets the equivalent displayed by the EPJ LCD user interfaces).

SETUP (SEt)
REGULATION (rEG)
FANS (FAnS)
COILS (COIL)
HUMIDITY (HUM)
DAMPER (dAMP)
RECOVERY (rECO)
AUXILIARY (AUX)
SECURITY (SECU)
MODBUS (MbUS)
ETHERNET (EtH)
OTHER (OtHr)
DEFAULT (DEFt)
INSTALLER MENU password (PSd)

The installer Menu contains all the parameters related to the configuration of all operations (alarms, control, logic, features) used by this device.
Press the ENTER key on the "INSTALLER MENU" to enter the password change page (*PSd3)*.
The SETUP section allows you to configure the main machine features via a wizard or machine code.
In the REGULATION Menu you can set/view parameters for various specific controls:
- compensation regulation setpoint
- sniffing cycles for detecting room temperature
- control probe positioning
- configuration of probe and threshold for automatic summer/winter changeover

In the FANS, COILS, DIRECT.EXP HUMIDITY, DAMPER, RECOVERY and AUXILIARY menus, you can set the parameters for controlling the devices:
- regulation parameters
- time frames
- operation

The SECURITY menu contains all the parameters relating to alarms and security management for the devices protecting the air handling unit:
- enabling
- signal delays
- type of reset
- alarm signals

The MODBUS menu contains all the parameters for configuring the slave network.
The ETHERNET menu contains all the parameters for configuring the Ethernet connection.
The OTHERS menu contains some other general parameters:
- minimum and maximum threshold values setting, cooling and heating setpoint
- ancillary function enabling
- log cancellation
- unit of measurement setting
- atmospheric pressure setting

The DEFAULT menu makes it possible to reset the values for all the application parameters to the default settings.

5.12 Manufacturer menu

The manufacturer menu is level 4, therefore it is necessary to enter the manufacturer level password to view / modify the parameters contained in this section (in brackets the correspondence displayed by the user interfaces EPJ LCD and EVJ LCD).

FANS (FAnS)
INVERTER (InVE)
COILS (COIL)
DIRECT EXPANSION (dESP)
HUMIDITY (HUM)
DAMPERS (dAMP)
RECUPERATOR (rECO)
PUMPS (PUMP)
SAFETIES (SECU)
MODBUS (MbUS)
ETHERNET(EtH)
MISCELLANEOUS (OtHr)
SETTING (COnF)
HARDWARE (HArd)
MANUFACTURER MENU password (PSd)

The manufacturer menu contains all the parameters relating to the configuration of the functions which for safety reasons are only accessible to the manufacturer of the unit (alarms, regulations, logics, characteristics) used by this device.
By pressing the ENTER key on the text "MANUFACTURER MENU" you enter the page to change the password (PSd4).
In the FANS, INVERTER, BATTERY, DIRECT EXPANSION, HUMIDITY, SHUTTERS, RECOVERY and PUMPS menus you can set the parameters relating to the management of the devices:

- regulation parameters
- times
- functionalities

The SAFETY menu contains the parameters about alarms and the management of the safety devices for the devices that protect the air handling unit:

- enabling
- delays
- kind of reset
- alarms signals

The MODBUS menu contains all the parameters for configuring the Master network.
The ETHERNET menu contains all the parameters for configuring BacNET.
In the MISCELLANEOUS menu there are other general parameters:

- setting of the minimum and maximum threshold values of the probes
- CAN communication settings.

In the CONFIGURATION menu you can set / view the parameters relating to the characteristics of the machine.

- coils number
- device enabling

The HARDWARE menu contains the parameters relating to the use of the inputs and outputs of the controller. In this menu, using the LEFT / RIGHT keys, it is possible to scroll through the various pages for setting the parameters of the analog inputs and outputs and the digital inputs and outputs.

5.13 RTC menu

This menu contains the RTC (Real Time Clock) system functions.

5.14 Alarms menu

This menu allows you to view and reset the alarms.
Whenever the DOWN key is pressed the next active alarm will be displayed. If there are no alarms, “NO ALARMS” is displayed.
Press the ENTER key for about 2 seconds to reset the alarm if the error conditions are no longer active.

5.15 Alarm history menu

This menu allows you to view the alarm history log.
The ALARM HISTORY page shows the last alarm. To view previous alarms, press the ENTER key. This can be repeated until the first alarm is displayed. The history is viewed in a circular manner.
Press the ESC key or wait 60 seconds without pressing any key to return to viewing the main page.

5.16 Menu save/restore/parameters imp. exp.

This menu is level, therefore it is necessary to enter the Installer level password (or higher level) to save / load the parameters from a previously saved parameter map.
In the SAVE PARAMETERS and RESET PARAMETERS sections it is possible to save or load a parameter map from the internal memory of the device or from a USB stick.
In the PARAMETERS IMPORT / EXPORT section, on the other hand, it is possible to import / export all the parameters, or only the dedicated ones of a level (User, Maintainer, Installer or Manufacturer) by inserting a USB stick into the device containing a text file suitably created as explained in the dedicated chapter.
In all sections there is feedback to recognize if the device has correctly recognized the connected key.

5.17 Info menu

This menu displays information in sequence on the design versions and the controller firmware:
Design number <-> Design version <-> Design revision <->
Firmware number <-> Firmware version <-> Firmware revision <->
To scroll this information in the EPJ LCD user interfaces, use the UP and DOWN keys. To return to the application page, press the ESC key.

6 LIST OF PARAMETERS

The list of parameters managed by the application is given below. A brief description of each parameter is given, plus the range of admissible values, the units of measurement, the suggested default value and the menu containing the parameter. Menus are structured on the basis of the following logic:

OR: Clock menu
UT: User menu
TB: Time bands
MA: Servicer menu
MA-F: Servicer menu – counter section
MA-M: Servicer menu - manual section
MA-CA: Servicer menu – calibration section
IS: Installer menu
IS-R: Installer menu - regulation section
IS-F: Installer menu - fan section
IS-B: Installer menu - coil section
IS-U: Installer menu - humidity section
IS-SE: Installer menu - damper section
IS-RH: Installer menu - recovery section
IS-AU: Installer menu – auxiliary section
IS-S: Installer menu - security section
IS-M: Installer menu - modbus section
IS-N: Installer menu - ethernet section
IS-V: Installer menu - others section
IS-D: Installer menu - default section
CO-F: Manufacturer menu – fan section
CO-IN: Manufacturer menu – inverter section
CO-B: Manufacturer menu – coils section
CO-DE: Manufacturer menu – direct expansion section
CO-U: Manufacturer menu – humidity section
CO-SE: Manufacturer menu – dampers section
CO-RH: Manufacturer menu – recovery section
CO-P: Manufacturer menu – pumps section
CO-S: Manufacturer menu – safeties section
CO-M: Manufacturer menu – MODBUS section
CO-N: Manufacturer menu – Ethernet section
CO-V: Manufacturer menu – miscellaneous section
CO-C: Manufacturer menu – setting section
CO-AI: Manufacturer menu – AI hardware parameters section
CO-DI: Manufacturer menu – DI hardware parameters section
CO-AO: Manufacturer menu – AO hardware parameters section
CO-DO: Manufacturer menu – DO hardware parameters section

6.1 List of configuration parameters

Once the machine parameters have been configured and any changes made to the configuration parameters, it is advisable to switch the machine off and restart the system to allow the board to configure itself correctly.

Code	Parameter description	Default	Min	Max	U.M.	Menu	Notes
	TIME BAND MENU					TB	
	Monday band 1 - Operation 0: Disabled 1: OFF 2: Comfort 3: Economy 4: Night	2	0	4		TB	
	Monday band 1 - Start time	06:00:00	00:00:00	23:59:59		TB	
	Monday band 2 - Operation	3	0	4		TB	
	Monday band 2 - Start time	07:30:00	00:00:00	23:59:59		TB	
	Monday band type 3 – Operation	2	0	4		TB	
	Monday time band 3 – Starting time	17:00:00	00:00:00	23:59:59		TB	
	Monday band type 4 – Operation	4	0	4		TB	

Code	Parameter description	Default	Min	Max	U.M.	Menu	Notes
	Monday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	
	Tuesday band type 1 – Operation	2	0	4		TB	
	Tuesday time band 1 – Starting time	06:00:00	00:00:00	23:59:59		TB	
	Tuesday band type 2 – Operation	3	0	4		TB	
	Tuesday time band 2 – Starting time	07:30:00	00:00:00	23:59:59		TB	
	Tuesday band type 3 – Operation	2	0	4		TB	
	Tuesday time band 3 – Starting time	17:00:00	00:00:00	23:59:59		TB	
	Tuesday band type 4 – Operation	4	0	4		TB	
	Tuesday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	
	Wednesday band type 1 – Operation	2	0	4		TB	
	Wednesday time band 1 – Starting time	06:00:00	00:00:00	23:59:59		TB	
	Wednesday band type 2 – Operation	3	0	4		TB	
	Wednesday time band 2 – Starting time	07:30:00	00:00:00	23:59:59		TB	
	Wednesday band type 3 – Operation	2	0	4		TB	
	Wednesday time band 3 – Starting time	17:00:00	00:00:00	23:59:59		TB	
	Wednesday band type 4 – Operation	4	0	4		TB	
	Wednesday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	
	Thursday band type 1 – Operation	2	0	4		TB	
	Thursday time band 1 – Starting time	06:00:00	00:00:00	23:59:59		TB	
	Thursday band type 2 – Operation	3	0	4		TB	
	Thursday time band 2 – Starting time	07:30:00	00:00:00	23:59:59		TB	
	Thursday band type 3 – Operation	2	0	4		TB	
	Thursday time band 3 – Starting time	17:00:00	00:00:00	23:59:59		TB	
	Thursday band type 4 – Operation	4	0	4		TB	
	Thursday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	
	Friday band type 1 – Operation	2	0	4		TB	
	Friday time band 1 – Starting time	06:00:00	00:00:00	23:59:59		TB	
	Friday band type 2 – Operation	3	0	4		TB	
	Friday time band 2 – Starting time	07:30:00	00:00:00	23:59:59		TB	
	Friday band type 3 – Operation	2	0	4		TB	
	Friday time band 3 – Starting time	17:00:00	00:00:00	23:59:59		TB	
	Friday band type 4 – Operation	4	0	4		TB	
	Friday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	
	Saturday band type 1 – Operation	2	0	4		TB	
	Saturday time band 1 – Starting time	06:00:00	00:00:00	23:59:59		TB	
	Saturday band type 2 – Operation	3	0	4		TB	
	Saturday time band 2 – Starting time	07:30:00	00:00:00	23:59:59		TB	
	Saturday band type 3 – Operation	2	0	4		TB	
	Saturday time band 3 – Starting time	12:00:00	00:00:00	23:59:59		TB	
	Saturday band type 4 – Operation	4	0	4		TB	
	Saturday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	

Code	Parameter description	Default	Min	Max	U.M.	Menu	Notes
	Sunday band type 1 – Operation	3	0	4		TB	
	Sunday time band 1 – Starting time	04:00:00	00:00:00	23:59:59		TB	
	Sunday band type 2 – Operation	2	0	4		TB	
	Sunday time band 2 – Starting time	06:00:00	00:00:00	23:59:59		TB	
	Sunday band type 3 – Operation	3	0	4		TB	
	Sunday time band 3 – Starting time	20:00:00	00:00:00	23:59:59		TB	
	Sunday band type 4 – Operation	4	0	4		TB	
	Sunday time band 4 – Starting time	21:00:00	00:00:00	23:59:59		TB	
	Number of days holiday	7	0	255		TB	
	Number of hours holiday	0	0	23		TB	
	Holiday unit status 0: Unit off 1: Unit on	1	0	1		TB	
Level 1	USER MENU						EPJ LCD
MOdE	Operating mode 0: Summer (Cooling) 1: Winter (Heating) 2: Automatic	0	0	2		UT	MOd
SEtC	Summer setpoint	24.0	PH03	PH04	°C	UT	StC
SEtH	Winter setpoint	20.0	PH26	PH27	°C	UT	StH
PU01	Humidity setpoint	55	0	100	%	UT	u01
SCC	Comfort range cooling setpoint	24.0	PH03	PH04	°C	UT	SCC
SCH	Comfort range heating setpoint	21.0	PH26	PH27	°C	UT	SCH
OEC	Economy range cooling offset	1.0	-20.0	20.0	°C	UT	OEC
OEH	Economy range heating offset	-1.0	-20.0	20.0	°C	UT	OEH
ONC	Night range cooling offset	2.0	-20.0	20.0	°C	UT	OnC
ONH	Night range heating offset	-2.0	-20.0	20.0	°C	UT	OnH
SDC	Cooling threshold forced by DI	26.0	PH03	PH04	°C	UT	SdC
SDH	Heating threshold forced by DI	19.0	PH26	PH27	°C	UT	SdH
FSM	Fan manual setpoint	0.00	0.00 DO PF03 AO	100.00 DO PF04 AO	%	UT	FSM
FSC	Comfort range fan setpoint	80.00	0.00 DO PF03 AO	100.00 DO PF04 AO	%	UT	FSC
FSE	Economy range fan setpoint	60.00	0.00 DO PF03 AO	100.00 DO PF04 AO	%	UT	FSE
FSN	Night range fan setpoint	40.00	0.00 DO PF03 AO	100.00 DO PF04 AO	%	UT	FSN
DSC	Comfort range damper setpoint	20.00	PS05	PS06	%	UT	dSC
DSE	Economy range damper setpoint	20.00	PS05	PS06	%	UT	dSE
DSN	Night range damper setpoint	20.00	PS05	PS06	%	UT	dSn
PF40	Constant supply pressure/flow setpoint	35.0	PF50	PF51	Pa/m^3min	UT	F40
PF42	Constant return pressure/flow setpoint	35.0	PF52	PF53	Pa/ m^3min	UT	F42
BKM	EVJ LCD and EPJ LCD backlight mode	1	0	3		UT	bKM only present on the EVJ LCD and EPJ LCD display

Code	Parameter description	Default	Min	Max	U.M.	Menu	Notes
BKU	Backlight percentage EVJ LCD and EPJ LCD	15	0	100	%	UT	bkU only present on the EVJ LCD and EPJ LCD display If the TH probes are present, it is forced to 15%
BKT	Backlight time EVJ LCD and EPJ LCD 0...240 seconds	30	0	240	Sec	UT	bkt only present on the EVJ LCD and EPJ LCD display If the TH probes are present, it is forced to 30 seconds
LNG	Language: 0: English 1: Italian 2: Spanish	0	0	2		UT	LNG
PSd1	User level (1) password	0	-999	9999		UT	PS1
PSdE	EPoCA service user level password	426	-999	9999		UT	PSE
Level 2	SERVICER MENU						
	COUNTERS						
PM00	Maximum number of fan operation hours. Beyond this limit, the relevant alarm will be triggered.	2000.0	0.0	6500.0	Hours x10	MA-F	M00
PM01	Supply fan operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M01
PM02	Return fan operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M02
PM03	Maximum number of compressor operation hours. Beyond this limit, the relevant alarm will be triggered.	2000.0	0.0	6500.0	Hours x10	MA-F	M03
PM04	Compressor 1 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M04
PM05	Compressor 2 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M05
PM06	Compressor 1 peaks	0.00	0.00	650.00	Peaks x 100	MA-F	M06
PM07	Compressor 2 peaks	0.00	0.00	650.00	Peaks x 100	MA-F	M07
PM10	Maximum number of pump operation hours. Beyond this limit, the relevant alarm will be triggered.	2000.0	0.0	6500.0	Hours x10	MA-F	M10
PM11	Coil 1 pump operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M11
PM12	Coil 2 pump operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M12
PM15	Heating element step 1 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M15
PM16	Heating element step 2 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M16
PM17	Heating element step 3 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M17
PM18	Heating element step 4 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M18
PM19	Heating element step 5 operating hours	0.0	0.0	6500.0	Hours x10	MA-F	M19
LMSF	Last recorded speed supply pressure/flow	0.00	0.00	100.00	%	MA-F	LMS
LMRF	Last recorded speed return pressure/flow	0.00	0.00	100.00	%	MA-F	LMR
PM90	Last machine maintenance date					MA-F	PM90
	CALIBRATION						
PM79	Outdoor humidity probe calibration	0	-10	10	%	MA-CA	M79

PM80	Outside air temperature probe calibration	0.0	-10.0	10.0	°C	MA-CA	M80
PM81	Room air temperature probe calibration	0.0	-10.0	10.0	°C	MA-CA	M81
PM82	Calibration of the supply air temperature sensor	0.0	-10.0	10.0	°C	MA-CA	M82
PM83	Calibration of the room humidity sensor	0	-10	10	%	MA-CA	M83
PM84	Calibration of the expelled air temperature probe	0.0	-10.0	10.0	°C	MA-CA	M84
PM85	Calibration of the supply pressure/flow probe	0.0	-999.9	999.9	Pa/m^{3}min	MA-CA	M85
PM86	Calibration of the air quality probe (CO2/VOC)	0	-100	100	ppm	MA-CA	M86
PM87	Calibration of the room humidity sensor	0	-10	10	%	MA-CA	M87
PM88	Calibration of the remote setpoint	0.0	-10.0	10.0	°C	MA-CA	M88
PM89	Calibration of the remote damper control	0.00	-10.00	10.00	%	MA-CA	M89
PM91	Calibration of the return pressure/flow probe	0.0	-999.9	999.9	Pa/m^{3}min	MA-CA	M91
PM92	Calibration of the pre-heating coil temperature probe	0.0	-10.0	10.0	°C	MA-CA	M92
PM93	Calibration of the coil 1 temperature probe	0.0	-10.0	10.0	°C	MA-CA	M93
PM94	Calibration of the coil 2 temperature probe	0.0	-10.0	10.0	°C	MA-CA	M94
PM95	Calibration of the compressor defrost temperature probe	0.0	-10.0	10.0	°C	MA-CA	M95
PM96	Calibration of the re-heating coil temperature probe	0.0	-10.0	10.0	°C	MA-CA	M96
PM97	Calibration of the remote fan control	0.00	-10.00	10.00	%	MA-CA	M97
PM98	Auxiliary 1 probe calibration	0.0	-36.0	36.0		MA-CA	M98
PM99	Auxiliary 2 probe calibration	0.0	-36.0	36.0		MA-CA	M99
PSd2	Servicer level password (2)	-11	-999	9999		MA	PS2
Level 3	INSTALLATION OPERATOR MENU						
	CONTROL						
PC01	Enable compensation Set Point summer	NO (0)	NO (0)	YES (1)		IS-R	C01
PC02	Maximum setpoint for summer compensation	28.0	SEtC	PH04	°C	IS-R	C02
PC03	Setpoint (on outside temperature) of compensation start	26.0	PH03	PH04	°C	IS-R	C03
PC04	Differential (on outside temp.) of end of summer setpoint compensation	4.0	0.0	20.0	°C	IS-R	C04
PC05	Enables sniffing cycles for the room temperature (when the probe is on the return)	NO (0)	NO (0)	YES (1)		IS-R	C05
PC06	Waiting time for sniffing cycle	6	1	99	Min	IS-R	C06
PC07	Activation time for sniffing cycle	2	1	30	Min	IS-R	C07
PC08	Activates both fans for sniffing 0: NO – Activates return fan only 1: YES – Activates both fans	YES (1)	NO (0)	YES (1)		IS-R	C08
PC10	Control probe 0: Return 1: Supply	1	0	1		IS-R	C10 Forced on return if direct expansion coil
PC61	Summer changeover setpoint	20.0	PC62	70.0	°C	IS-R	C61
PC62	Winter changeover setpoint	10.0	-20.0	PC61	°C	IS-R	C62
PC63	Probe active for automatic conversion 0: External temperature 1: Coil 1 temperature 2: Room/return temperature	2	0	2		IS-R	C63

	FANS						
PF02	Fan regulation differential	5.0	0.0	30.0	°C	IS-F	PF01=0 or 1 F02
PF06	Modulating or manual step regulation value	5.00	1.00	100.00	%	IS-F	F06 Binding if digital fans
PF21	Supply fan forced setpoint 1	33.0	-999.0	3276.0		IS-F	F21
PF22	Supply fan forced setpoint 2	66.0	-999.0	3276.0		IS-F	F22
PF23	Supply fan forced setpoint 3	100.0	-999.0	3276.0		IS-F	F23
PF28	Return fan percentage delta	0	-100	100	%	IS-F	F28
PF29	Return fan step delta	0	-2	2	Step	IS-F	F29
PF33	Return fan forced setpoint 1	15.0	PF52	PF53	Pa/m^{3}min	IS-F	F33
PF34	Return fan forced setpoint 2	42.0	PF52	PF53	Pa/m^{3}min	IS-F	F34
PF35	Return fan forced setpoint 3	50.0	PF52	PF53	Pa/m^{3}min	IS-F	F35
PF36	Type of forced setpoint: 0: No setpoint 1: Setpoint 1 2: Setpoint 2 3: Setpoint 3	0	0	3		IS-F	F36
PF41	Constant supply pressure/flow neutral zone	3.0	1.0	999.0	Pa/m^{3}min	IS-F	F41
PF43	Neutral zone constant return pressure/flow	3.0	1.0	999.0	Pa/m^{3}min	IS-F	F43
PF44	Constant pressure/flow fan speed increase/decrease time	5	1	100	Sec	IS-F	F44
PF45	Fan speed increase/decrease percentage in constant pressure/flow	1.00	0.00	100.00	%	IS-F	F45
PF48	Supply fan flow coefficient	72	0	9999		IS-F	F48
PF56	Return fan flow coefficient	72	0	9999		IS-F	F56
PF58	Booster time if enabled by key	0	0	255	Min	IS-F	F58
PF59	Comfort band constant supply pressure/flow setpoint	35.0	PF50	PF51	Pa/m^{3}min	IS-F	F59
PF60	Economy band constant supply pressure/flow setpoint	35.0	PF50	PF51	Pa/m^{3}min	IS-F	F60
PF61	Night band constant supply pressure/flow setpoint	35.0	PF50	PF51	Pa/m^{3}min	IS-F	F61
PF62	Comfort band constant return pressure/flow setpoint	35.0	PF52	PF53	Pa/m^{3}min	IS-F	F62
PF63	Economy band constant return pressure/flow setpoint	35.0	PF52	PF53	Pa/m^{3}min	IS-F	F63
PF64	Night band constant return pressure/flow setpoint	35.0	PF52	PF53	Pa/m^{3}min	IS-F	F64
	COILS						
Pb01	Proportional band for regulating the cooling and heating valves	10.0	0.0	20.0	°C	IS-B	b01
Pb02	Integral time for regulating the cooling and heating valves	0	0	999	Sec	IS-B	If Pb02=0 integral action not present b02
Pb03	Neutral zone for temperature regulation	4.0	0.0	20.0	°C	IS-B	b03

Pb05	Maximum deviation for the floating supply setpoint calculation	3.0	0.0	20.0	°C	IS-B	If Pb05=0 function not enabled b05
Pb06	Proportional band for the calculation of the floating supply setpoint	5.0	0.0	20.0	°C	IS-B	b06
Pb21	Second complete hot neutral zone for two heating coils	12.0	0.0	20.0	°C	IS-B	b21
Pb22	Second differential for 2 heating coils	3.0	0.0	10.0	°C	IS-B	b22
Pb23	Entire neutral zone for mid-season control	4.0	0.0	20.0	°C	IS-B	b23
Pb24	Differential or mid-season control	10.0	0.0	10.0	°C	IS-B	b24
Pb30	Enable supply limitation 0: Disabled 1: Heating 2: Cooling 3: Enabled	3	0	3		IS-B	b30
Pb31	Cooling limitation setpoint	10.0	-15.0	70.0	°C	IS-B	b31
Pb32	Cooling limitation differential	5.0	0.0	30.0	°C	IS-B	b32
Pb33	Cooling limitation minimum value	0.0	0.0	100.0	%	IS-B	b33
Pb34	Heating limitation setpoint	30.0	-15.0	70.0	°C	IS-B	b34
Pb35	Heating limitation differential	5.0	0.0	30.0	°C	IS-B	b35
Pb36	Heating limitation minimum value	0.0	0.0	100.0	%	IS-B	b36
	HUMIDIFIER						
PU02	Neutral zone for humidity regulation	6	0	100	%	IS-U	U02
PU03	Humidity regulation differential	10	0	100	%	IS-U	U03
PU04	Integral time for regulating dehumidification (on a cooling coil)	0	0	999	Sec	IS-U	If PU04=0 integral action not present U04
PU17	Winter dehumidification enabling	YES (1)	NO (0)	YES (1)		IS-U	U17
PU18	Winter dehumidification setpoint	55	0	100	%	UT	U18
PU19	Winter dehumidification neutral zone	6	0	100	%	IS-U	U19
PU20	Winter dehumidification differential	10	0	100	%	IS-U	U20
PU21	Winter dehumidification integral time	0	0	999	Sec	IS-U	If PU04=0 integral action not present U21
PU22	Setpoint for maximum damper opening in winter dehumidification	50.00	0.00	100.00	%	IS-U	U22
PU23	Differential for maximum damper opening in winter dehumidification	20.00	0.00	100.00	%	IS-U	U23
PU24	Mixing chamber damper control in winter dehumidifi-cation: 0: Winter dehumidification only 1: Regulation only 2: Greater of the two 3: Average of the two	1	0	3		IS-U	U24
	DAMPERS						
PS01	Type of Free-Cooling / Free-Heating 0: Disabled 1: Free-Cooling / Free-Heating in temperature 2: Enthalpy free-Cooling / Free-Heating	0	0	2		IS-SE	S01

PS03	Damper control type 0: For Free-Cooling/Free-Heating only 1: For controlling air quality only 2: Priority to the greater of the two requests 3: Average of the two requests 4: Fixed opening 5: Greater between fixed opening and Free-Cooling/Heating	0	0	5		IS-SE	S03
PS10	Damper opening fixed value	50.0	0.0	100.0	%	IS-SE	S10
PS12	Differential setpoint for disabling free-cooling and free-heating in temperature	2.0	0.0	20.0	°C	IS-SE	S12
PS13	Differential setpoint for enabling free-cooling and free-heating in temperature	4.0	0.0	20.0	°C	IS-SE	S13
PS15	Enable minimum damper opening 0: Disabled 1: Only inside band 2: Always	0	0	2		IS-SE	S15
PS16	Differential regulation outside band	4.0	0	20.0	°C	IS-SE	S16
PS17	Maximum time outside band 0...240 minutes 241: Always active	30	0	241	Min	IS-SE	S17
PS19	Enable regulation of mixing chamber damper outside band	NO (0)	NO (0)	YES (1)		IS-SE	S19
PS20	Setpoint - air quality regulation	600	0	9999	ppm	IS-SE	S20
PS21	Differential - air quality regulation	100	0	2000	ppm	IS-SE	S21
PS25	Differential activating the enthalpy free-cooling and free-heating	8.0	0.0	100.0	KJ/Kg	IS-SE	S25
PS26	Differential setpoint activating the enthalpy free-cooling and free-heating	10.0	0.0	200.0	KJ/Kg	IS-SE	S26
	RECOVERY HEAT EXCHANGER						
Pr01	Differential setpoint for recovery heat exchanger regulation	5.0	0.0	20.0	°C	IS-RH	r01
Pr02	Recovery heat exchanger regulation differential	3.0	0.0	20.0	°C	IS-RH	r02
	AUXILIARY						
PL01	Kind of auxiliary 1 regulation: 0: Cooling 1: Heating 2: Direct 3: Reverse	0	0	3		IS-AU	L01
PL02	Auxiliary 1 cooling setpoint	14.0	-3276.8	3276.7		IS-AU	L02
PL03	Auxiliary 1 heating setpoint	36.0	-3276.8	3276.7		IS-AU	L03
PL04	Auxiliary 1 cooling differential	2.0	0.0	3276.7		IS-AU	L04
PL05	Auxiliary 1 heating differential	2.0	0.0	3276.7		IS-AU	L05
PL06	Auxiliary 1 output minimum value	0.00	0.00	PL07	%	IS-AU	L06
PL07	Auxiliary 1 output maximum value	100.00	PL06	100.00	%	IS-AU	L07
PL08	Kind of analogue regulation auxiliary 1: 0: Minimum with unit ON 1: Enabling step	1	0	1		IS-AU	L08
PL09	Enable auxiliary 1 regulation with unit OFF	NO (0)	NO (0)	SI (1)		IS-AU	L09

PL10	Regulation probe for auxiliary 1: 0: Disabled 1: Supply temperature 2: Return temperature 3: Outdoor temperature 4: Discharging temperature 5: First coil temperature 6: Second coil temperature 7: Pre-heating coil temperature 8: Re-heating coil temperature 9: Compressor defros temperature 10: Auxiliary 1 11: Auxiliary 2 12: Supply humidity 13: Return humidity 14: Outdoor humidity 15: Supply pressure/flow 16: Return pressure/flow 17: Air quality 18: Offset potentiometer 19: Damper potentiometer 20: Fans potentiometer	0	0	20		IS-AU	L10
PL11	Auxiliary 1 aarm delay	10	0	999	Sec	IS-AU	L11
PL21	Kind of auxiliary 1 regulation: 0: Cooling 1: Heating 2: Direct 3: Reverse	0	0	3		IS-AU	L21
PL22	Auxiliary 1 cooling setpoint	14.0	-3276.8	3276.7		IS-AU	L22
PL23	Auxiliary 1 heating setpoint	36.0	-3276.8	3276.7		IS-AU	L23
PL24	Auxiliary 1 cooling differential	2.0	0.0	3276.7		IS-AU	L24
PL25	Auxiliary 1 heating differential	2.0	0.0	3276.7		IS-AU	L25
PL26	Auxiliary 1 output minimum value	0.00	0.00	PL27	%	IS-AU	L26
PL27	Auxiliary 1 output maximum value	100.00	PL26	100.00	%	IS-AU	L27
PL28	Kind of analogue regulation auxiliary 1: 0: Minimum with unit ON 1: Enabling step	1	0	1		IS-AU	L28
PL29	Enable auxiliary 1 regulation with unit OFF	NO (0)	NO (0)	SI (1)		IS-AU	L29

PL30	Regulation probe for auxiliary 1: 0: Disabled 1: Supply temperature 2: Return temperature 3: Outdoor temperature 4: Discharging temperature 5: First coil temperature 6: Second coil temperature 7: Pre-heating coil temperature 8: Re-heating coil temperature 9: Compressor defros temperature 10: Auxiliary 1 11: Auxiliary 2 12: Supply humidity 13: Return humidity 14: Outdoor humidity 15: Supply pressure/flow 16: Return pressure/flow 17: Air quality 18: Offset potentiometer 19: Damper potentiometer 20: Fans potentiometer	0	0	20		IS-AU	L30
PL31	Auxiliary 1 aarm delay	10	0	999	Sec	IS-AU	L31
	SAFETY DEVICES						
PA01	Enables alarm for fan operating hours	YES (1)	NO (0)	YES (1)		IS-S	A01
PA02	Enables alarm for pump operating hours	NO (0)	NO (0)	YES (1)		IS-S	A02
PA03	Type of alarm signal for operating hours: 0: No relay 1: Non-serious alarm 2: Serious alarm	1	0	2		IS-S	A03
PA06	Enables alarm for compressor operating hours	YES (1)	NO (0)	YES (1)		IS-S	A06
PA24	Type of re-arm for air filter pressure switch alarm	Manu (1)	Auto (0)	Manu (1)		IS-S	A24
PA25	Air filter pressure switch alarm delay	2	0	999	Sec	IS-S	A25
PA26	Type of re-arm for air filter pressure switch alarm	1	0	2		IS-S	A26
PA38	Coil anti-freeze alarm setting	3.0	-15.0	20.0	°C	IS-S	A38
PA39	Coil anti-freeze alarm differential	2.0	0.1	10.0	°C	IS-S	A39
PA44	Type of fire/smoke alarm 0: Fire extinguishing 1: Smoke evacuation	1	0	1		IS-S	A44
PA45	Type of fire/smoke alarm signal:	2	0	2		IS-S	A45
PA56	Generic warning delay	30	0	999	Sec	IS-S	A56
PA57	Type of generic warning alarm reset	Auto (0)	Auto (0)	Manu (1)		IS-S	A57
PA58	Supply filters service alarm delay	0	0	999	Hx100	IS-S	A58
PA59	Return filters service alarm delay	0	0	999	Hx100	IS-S	A59
PA60	Tachometer alarm delay from fan start-up	30	0	999	Sec	IS-S	A60
PA61	Tachometer alarm	5	0	999	Sec	IS-S	A61
PA62	Fan minimum speed for tachometer alarm	40.0	PF03	PF04	%	IS-S	A62
	MODBUS PARAMETERS						
PH11	Modbus slave address	1	1	247		IS-M	H11
PH12	Modbus slave baud rate (0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=28800, 6=38400, 7=57600)	3	0	7		IS-M	H12

PH13	ModBus slave parity (0=none, 1=odd, 2=even)	2	0	2		IS-M	H13
PH14	ModBus slave stop bit (0=1bit, 1=2bit)	0	0	1		IS-M	H14
	ETHERNET PARAMETERS						
PH46	IP address	192.168.0.2	0.0.0.0	255.255.255.255		IS-N	H46
PH47	Subnet Mask	255.255.255.0	0.0.0.0	255.255.255.255		IS-N	H47
PH48	Gateway	192.168.0.1	0.0.0.0	255.255.255.255		IS-N	H48
PH49	WebServer password (up to 12 alphanumeric characters; only available in the models integrating the WebServer)	EVCO@AHU				CO-N	Disponibile solo da Parameters Manager
	VARIOUS PARAMETERS						
PH03	Minimum value cooling setpoint	20.0	-15.0	PH04	°C	IS-V	H03
PH04	Maximum value cooling setpoint	28.0	PH03	70.0	°C	IS-V	H04
PH05	Enables machine switch on/switch off by pressing the ESC/Stand-By key	YES (1)	NO (0)	YES (1)		IS-V	H05
PH08	Summer/winter changeover type 0: Manual 1: Manual + Automatic 2: Auto	0	0	2		IS-V	H08
PH09	Enables supervisor machine switch on/switch off	NO (0)	NO (0)	YES (1)		IS-V	H09
PH18	Delete alarm history	NO (0)	NO (0)	YES (1)		IS-V	Set YES (1) and wait for the NO value (0) H18
PH19	Enables machine start-up/shut-down on program timing	NO (0)	NO (0)	YES (1)		IS-V	H19
PH20	Enables the program timing	NO (0)	NO (0)	YES (1)		IS-V	H20
PH21	Holiday unit status 0: Unit off 1: Unit on	1	0	1		IS-V	H21
PH25	Enables automatic daylight saving time 0: Disabled 1: Europe 2: North America	0	0	2		IS-V	H25
PH26	Minimum value heating setpoint	14.0	-15.0	PH27	°C	IS-V	H26
PH27	Maximum value heating setpoint	26.0	PH26	70.0	°C	IS-V	H27
PH32	Temperature measurement unit: 0: °Celsius 1: °Fahrenheit	0 (°C)	0 (°C)	1 (°F)		IS-V	H32
PH34	Atmospheric pressure	1013	0	9999	hPa	IS-V	H34
PH35	Time log probes in EPoCA	10	1	255	Min	IS-V	H35
PH41	Meaning of summer/winter icon 0: Sun=Summer - Snow=Winter 1: Sun=Winter - Snow=Summer	0	0	1		IS-V	H41
	DEFAULT						

PH15	Reset manufacturer's default parameters	NO (0)	NO (0)	YES (1)		IS-D	Wait for the NO (0) value on reset completion H15
PSd3	Installer level (3) password	-22	-999	9999		IS	PS3
Level 4	MANUFATURER MENU						
	FANS						
PF01	Type of fan regulation 0: Digital temperature regulation in steps 1: Modulating temperature regulation 2: Constant pressure regulation 3: Constant flow regulation 4: Digital AQ regulation in steps 5: Modulating AQ regulation 6: Manual regulation 7: Remote potentiometer regulation	6	0	7		CO-F	F01
PF03	Minimum speed for the control of fan modules	40.0	0.0	PF04	%	CO-F	F03
PF04	Maximum speed for the control of fan modules	100.0	PF03	100.0	%	CO-F	F04
PF05	Minimum time lapse between switch-on of both fans	5	0	999	Sec	CO-F	F05
PF07	Minimum speed supply fan with heating elements switched on	100.0	-999.0	3276.0		CO-F	F07
PF08	Enabling step differential on the fan modulating regulation ramp	0.0	0.0	60.0	%	CO-F	PF01=1 F08
PF09	Waiting time (on and off) for enabling step on fan modulating regulation ramp	10	0	999	Sec	CO-F	PF01=1 F09
PF10	Supply fan speed with active defrost (DI or direct expansion defrost)	100.0	-999.0	3276.0		CO-F	F10
PF11	Return fan speed with active defrost (DI or direct expansion defrost)	100.0	-999.0	3276.0		CO-F	F11
PF12	Minimum supply fan speed with active compressor	100.0	-999.0	3276.0		CO-F	F12
PF13	Minimum return fan speed with heating elements on	15.0	PF52	PF53	Pa/m^{3}min	CO-F	F13
PF14	Minimum return fan speed with active compressor	15.0	PF52	PF53	Pa/m^{3}min	CO-F	F14
PF15	Enables fan limitation on supply temperature	NO (0)	NO (0)	SI (1)		CO-F	F15
PF16	Minimum limitation temperature	10.0	-15.0	PF17	°C	CO-F	F16
PF17	Maximum limitation temperature	40.0	PF16	70.0	°C	CO-F	F17
PF18	Fan limitation differential	5.0	0.0	30.0	°C	CO-F	F18
PF19	Minimum value for air quality regulation setpoint	500	0	PF20	ppm	CO-F	PF01=4 PF01=5 F19
PF20	Maximum value for air quality regulation setpoint	1100	PF19	9999	ppm	CO-F	PF01=4 PF01=5 F20
PF24	Fan speed change time	2	0	999	Sec	CO-F	F24
PF25	Minimum fan switch-on time	60	0	999	Sec	CO-F	F25
PF27	Time for fans in post-ventilation	30	0	999	Sec	CO-F	F27

PF30	Fan speed increase/decrease percentage in heat exchanger defrost	5.00	0.00	100.00	%	CO-F	F30
PF31	Fan speed increase/decrease time in heat exchanger defrost	5	1	100	Sec	CO-F	F31
PF32	Return fan percentage delta in heat exchanger defrost	10.00	0.00	100.00	%	CO-F	F32
PF46	Constant pressure/flow fan start-up speed	60.00	0.00	100.00	%	CO-F	F46
PF47	Fan start-up time in constant pressure/flow	0	0	9999	Sec	CO-F	F47
PF49	Enable recording the speed for constant pressure/flow regulation	SI (1)	NO (0)	SI (1)		CO-F	F49
PF50	Minimum supply pressure/flow setpoint value	1.0	-999.0	PF51	Pa/m^{3}min	CO-F	F50
PF51	Maximum supply pressure/flow setpoint value	170.0	PF50	3276.0	Pa/m^{3}min	CO-F	F51
PF52	Minimum return pressure/flow setpoint value	1.0	-999.0	PF53	Pa/m^{3}min	CO-F	F52
PF53	Maximum return pressure/flow setpoint value	170.0	PF52	3276.0	Pa/m^{3}min	CO-F	F53
PF57	Return fan status with machine in full recirculation 0: Off 1: On	1	0	1		CO-F	F57
PF65	Supply fan pulse for round	1	1	10		CO-F	F65
PF66	Supply fan maximum rpm	1400	0	9999	Rpm	CO-F	F66
PF67	Return fan pulse for round	1	1	10		CO-F	F67
PF68	Return fan maximum rpm	1400	0	9999	Rpm	CO-F	F68
PF69	Fan off time after commutation recovery bypass damper	0	0	999	Sec	CO-F	F69
PF70	Number of Modbus supply fans	1	1	16		CO-F	F70
PF71	Type of Modbus supply fans: 0: Disabled 1: EBM 2: Ziehl 3: EVCO	0	0	3		CO-F	F71
PF72	Number of Modbus supply fans in alarm for unit switch-off	1	1	PF70		CO-F	F72
PF73	Number of Modbus return fans	1	1	16		CO-F	F73
PF74	Type of Modbus return fans: 0: Disabled 1: EBM 2: Ziehl 3: EVCO	0	0	3		CO-F	F74
PF75	Number of Modbus return fans in alarm for unit switch-off	1	1	PF73		CO-F	F75
	INVERTER						
Pd01	Kind of supply inverter: 0: 750W 1: 1K5W 2: 2K2W 3: 2K3W	0	0	3		CO-IN	d01
Pd02	Number of automatic reset for supply inverter alarm	0	0	99		CO-IN	d02
Pd03	Delay automatic reset for supply inverter alarm	5.0	0.1	120.0	Sec	CO-IN	d03

Pd04	Acceleration ramp for supply inverter	3.0	0.2	200.0	Sec	CO-IN	d04
Pd05	Deceleration ramp for supply inverter	5.0	0.2	200.0	Sec	CO-IN	d05
Pd06	Minimum speed supply inverter	300	150	Pd07	Rpm	CO-IN	d06
Pd07	Maximum speed supply inverter	1500	Pd06	Pd12	Rpm	CO-IN	d07
Pd08	Communicaton timeout for supply inverter	0.0	0.0	60.0	Sec	CO-IN	d08
Pd09	Nominal current motor for supply inverter	2.9	0.1	13.2	A	CO-IN	d09
Pd10	Nominal voltage motor for supply inverter	230	50	400	V	CO-IN	d10
Pd11	Number of polar couples for supply inverter	2	1	8		CO-IN	d11
Pd12	Nominal rounds for supply inverter	1390	1	6000	Rpm	CO-IN	d12
Pd13	Boost motor for supply inverter	5	0	25	%	CO-IN	d13
Pd14	Maximum voltage motor for supply inverter	100	10	112	%	CO-IN	d14
Pd15	Overload percentage motor for supply inverter	50	0	100	%	CO-IN	d15
Pd16	Overload time motor for supply inverter	30	0	60	Sec	CO-IN	d16
	Command send parameters to the supply inverter: 0: Disabled 1: Send parameters	0	0	1		CO-IN	
Pd31	Kind of return inverter: 0: 750W 1: 1K5W 2: 2K2W 3: 2K3W	0	0	3		CO-IN	d31
Pd32	Number of automatic reset for return inverter alarm	0	0	99		CO-IN	d32
Pd33	Delay automatic reset for return inverter alarm	5.0	0.1	120.0	Sec	CO-IN	d33
Pd34	Acceleration ramp for return inverter	3.0	0.2	200.0	Sec	CO-IN	d34
Pd35	Deceleration ramp for return inverter	5.0	0.2	200.0	Sec	CO-IN	d35
Pd36	Minimum speed return inverter	300	150	Pd37	Rpm	CO-IN	d36
Pd37	Maximum speed return inverter	1500	Pd36	Pd42	Rpm	CO-IN	d37
Pd38	Communicaton timeout for return inverter	0.0	0.0	60.0	Sec	CO-IN	d38
Pd39	Nominal current motor for return inverter	2.9	0.1	13.2	A	CO-IN	d39
Pd40	Nominal voltage motor for return inverter	230	50	400	V	CO-IN	d40
Pd41	Number of polar couples for return inverter	2	1	8		CO-IN	d41
Pd42	Nominal rounds for return inverter	1390	1	6000	Rpm	CO-IN	d42
Pd43	Boost motor for return inverter	5	0	25	%	CO-IN	d43
Pd44	Maximum voltage motor for return inverter	100	10	112	%	CO-IN	d44
Pd45	Overload percentage motor for return inverter	50	0	100	%	CO-IN	d45
Pd46	Overload time motor for return inverter	30	0	60	Sec	CO-IN	d46
	Command send parameters to the return inverter: 0: Disabled 1: Send parameters	0	0	1		CO-IN	
	COILS						
Pb04	Modulating heating element power compared to total	100.00	0.0	100.00	%	CO-B	b04
Pb07	Enables heating element rotation	YES (1)	NO (0)	YES (1)		CO-B	b07
Pb10	Opening of heating valves in control probe alarm	30.0	0.0	100.0	%	CO-B	b10

Pb11	Opening of cooling valves in control probe alarm	30.0	0.0	100.0	%	CO-B	b11
Pb12	Pre-heating function setpoint	10.0	-15.0	30.0	°C	CO-B	b12
Pb13	Pre-heating operation differential	10.0	0.1	20.0	°C	CO-B	b13
Pb14	Pre-heating maximum operation duration	0	0	60	Min	CO-B	b14
Pb15	Cooling request priority 0: Mode 1: Dehumidification 2: Greater 3: Average	2	0	3		CO-B	b15
Pb16	Modulating post- heating element power compared to total	100.00	0.0	100.00	%	CO-B	b16
Pb17	Minimum value for post- heating element output	0.00	0.00	100.00	%	CO-B	b17
Pb20	Insertion/release time of single heating element stage	60	0	999	Sec	CO-B	b20
Pb25	Minimum value for modulating heater output	0.00	0.00	100.00	%	CO-B	b25
Pb40	Pre-heating setpoint	4.0	-15.0	20.0	°C	CO-B	b40
Pb41	Pre-heating neutral zone	4.0	0.2	20.0	°C	CO-B	b41
Pb42	Pre-heating modulation time	3	1	255	Sec x10	CO-B	b42
Pb43	Pre-heating modulation percentage variation	5.0	1.0	50.0	%	CO-B	b43
Pb44	Coil 1 run time with 3-point check	20	0	3600	Sec	CO-B	b44
Pb45	Extra time for coil 1 limit switch with 3-point check	10	0	600	Sec	CO-B	b45
Pb46	Coil 2 run time with 3-point check	20	0	3600	Sec	CO-B	b46
Pb47	Extra time for coil 2 limit switch with 3-point check	10	0	600	Sec	CO-B	b47
Pb48	Pre-heating coil run time with 3-point check	20	0	3600	Sec	CO-B	b48
Pb49	Extra time for pre-heating coil limit switch with 3-point check	10	0	600	Sec	CO-B	b49
Pb50	Minimum variation for coil relay activation with 3-point check	0.00	0.00	100.00	%	CO-B	b50
Pb51	Re-heating coil run time with 3-point check	20	0	3600	Sec	CO-B	b51
Pb52	Extra time re-heating coil limit switch with 3-point check	10	0	600	Sec	CO-B	b52
	DIRECT EXPANSION						
PE01	Minimum compressor switch-off time	180	0	9999	Sec	CO-DE	E01
PE02	Minimum compressor switch-on time	60	0	9999	Sec	CO-DE	E02
PE03	Minimum time between two switch-ons of the same compressor	300	0	9999	Sec	CO-DE	E03
PE04	Switch off time between two compressors	20	0	999	Sec	CO-DE	E04
PE05	Switch on time between two compressors	10	0	9999	Sec	CO-DE	E05
PE06	Defrost interval	8	1	99	H	CO-DE	E06
PE07	Type of defrost 0: Cycle reversal 1: Compressor stoppage	0	0	1		CO-DE	E07
PE08	End of defrost setpoint	10.0	PE12	20.0	°C	CO-DE	E08
PE09	Defrosting maximum time	30	1	99	Min	CO-DE	E09

PE10	Dripping duration	2	0	15	Min	CO-DE	E10
PE11	Counting type defrost interval 0: Unit ON 1: Compressor ON 2: Defrost.T < PE12 threshold	2	0	2		CO-DE	E11
PE12	Start defrost count threshold	8.0	0.0	PE08	°C	CO-DE	E12
PE13	Type of compressor rotation 0: Fixed sequence 1: Hours + startings	0	0	1		CO-DE	E13
PE14	Wear: based on hours	1	0	50		CO-DE	E14
PE15	Wear: based on peaks	1	0	50		CO-DE	E15
PE16	Minimum output value in cooling for custom regulation	2.20	0.00	PE17	V	CO-DE	E16
PE17	Maximum output value in cooling for custom regulation	8.50	PE16	10.00	V	CO-DE	E17
PE18	Minimum output value in heating for custom regulation	1.50	0.00	PE19	V	CO-DE	E18
PE19	Maximum output value in heating for custom regulation	8.50	PE18	10.00	V	CO-DE	E19
	HUMIDIFIER						
PU05	Enable functional limit for dehumidification	NO (0)	NO (0)	YES (1)		CO-U	U05
PU06	Humidity regulation sensor: 0: Room/return 1: Supply	0	0	1		CO-U	U06
PU10	Enable humidifier regulation on supply temperature	NO (0)	NO (0)	YES (1)		CO-U	U10
PU11	Set Point on the return temperature to enable the humidifier	22.0	PH26	PH27	°C	CO-U	Only if PU10=1 U11
PU12	Differential on the return temperature to enable the humidifier	3.0	0.0	20.0	°C	CO-U	Only if PU10=1 U12
PU13	Enables humidifier regulation on supply humidity	NO (0)	NO (0)	YES (1)		CO-U	U13
PU14	Setpoint on the supply temperature to enable the humidifier	80	0	95	%	CO-U	U14
PU15	Differential on the supply temperature to enable the humidifier	20	0	40	%	CO-U	U15
PU16	Minimum value for modulating humidifier output	0.00	0.00	100.00	%	CO-U	U16
	DAMPERS						
PS05	Minimum opening mixing chamber damper	20.0	0.0	PS06	%	CO-SE	S05
PS06	Maximum opening mixing chamber damper	100.0	PS05	100.0	%	CO-SE	S06
PS07	Pre-start time	45	0	9999	Sec	CO-SE	S07
PS08	Switch-off delay	15	0	9999	Sec	CO-SE	S08
PS09	Mixing chamber damper run time	60	0	999	Sec	CO-SE	S09
PS18	Warm-up damper run time	60	0	999	Sec	CO-SE	S18
PS22	Mixing chamber damper run time with 3-point check	20	0	3600	Sec	CO-SE	S22
PS23	Extra-time mixing chamber damper limit switch with 3-point check	10	0	600	Sec	CO-SE	S23
PS24	Minimum variation for mixing chamber relay activation with 3-point check	5.00	0.00	100.00	%	CO-SE	S24

	RECOVERY HEAT EXCHANGER						
Pr03	Heat exchanger defrost setpoint	4.0	-15.0	70.0	°C	CO-RH	r03
Pr04	Heat exchanger defrost neutral zone	2.0	0.0	20.0	°C	CO-RH	r04
Pr05	By-pass cycle time for the cross-flow recovery heat exchanger for defrost	5	1	99	Min	CO-RH	r05
Pr07	Minimum velocity of rotating heat exchanger velocity	0.0	0.0	Pr08	%	CO-RH	r07
Pr08	Maximum velocity of rotating heat exchanger velocity	100.0	Pr07	100.0	%	CO-RH	r08
Pr09	Recovery heat exchanger defrost stop setpoint	2.0	-15.0	70.0	°C	CO-RH	r09
Pr10	Recovery heat exchanger defrost stop differential	3.0	0.0	20.0	°C	CO-RH	r10
Pr11	Speed increase/decrease time rotary heat exchanger in defrost	5	1	100	Sec	CO-RH	r11
Pr12	Percentage increase/decrease time rotary heat exchanger in defrost	5.00	0.00	100.00	%	CO-RH	r12
Pr13	PWM period rotary heat exchanger in defrost	10	1	2000	Hz	CO-RH	r13
Pr14	Probe for heat recovery efficiency calculation: 0: None 1: Supply.t 2: Discharge.t	1	0	2		CO-RH	r14
	PUMP						
PP01	Pump regulation type 0: Continuous operation 1: Temperature regulation on request	1	0	1		CO-P	P01
PP02	Setpoint on the control ramp for pump start-up	5.0	PP03	90.0	%	CO-P	Only if PP01=1 P02
PP03	Setpoint on the control ramp for pump switch-off	2.0	1.0	PP02	%	CO-P	P03
PP04	Waiting time for pump switch-off (only if PP01=1)	10	1	99	Min	CO-P	Unit OFF - pump is switched off immediately P04
	SAFETY DEVICES						
PA04	Probe alarm delay	10	0	240	Sec	CO-S	A04
PA03	Type of alarm signal for operating hours: 0: No relay 1: Non-serious alarm 2: Serious alarm	1	0	2		CO-S	A03
PA09	Type of thermal fan, heating element and compressor alarm signal	2	0	2		CO-S	A09
PA16	Type of pump thermal alarm signal	2	0	2		CO-S	A16
PA20	Type of re-arm for pressure switch alarm (recovery heat exchanger) 0: Auto - Automatic 1: Manu - Manual	Auto (0)	Auto (0)	Manu (1)		CO-S	A20
PA21	Delay for pressure switch alarm on recovery heat exchanger	30	0	999	Sec	CO-S	A21
PA22	Type of re-arm for generic alarm	Manu (1)	Auto (0)	Manu (1)		CO-S	A22
PA23	Generic alarm delay	30	0	999	Sec	CO-S	A23
PA28	Pressure switch reset alarm delay	30	0	999	Sec	CO-S	A28
PA29	Flow switch alarm delay	5	0	999	Sec	CO-S	A29
PA30	Type of airflow alarm signal	2	0	2		CO-S	A30

PA31	Type of re-arm for humidifier/hygrostat alarm	Auto (0)	Auto (0)	Manu (1)		CO-S	A31
PA32	Humidifier/hygrostat alarm delay	2	0	999	Sec	CO-S	A32
PA33	Type of humidifier alarm signal	1	0	2		CO-S	A33
PA34	Type of heating element circuit breaker alarm reset	Auto (0)	Auto (0)	Manu (1)		CO-S	A34
PA35	Heater thermal switch alarm delay	2	0	999	Sec	CO-S	A35
PA36	Anti-freeze alarm delay	5	0	999	Sec	CO-S	A36
PA37	Type of anti-freeze alarm enabling	0	0	1		CO-S	A37
PA40	Enables RTC alarm	NO (0)	NO (0)	YES (1)		CO-S	A40
PA41	Type of re-arm for RTC alarm	Auto (0)	Auto (0)	Manu (1)		CO-S	A41
PA42	Type of RTC alarm signal	1	0	2		CO-S	A42
PA46	Mixing control by-pass time	60	0	999	Sec	CO-S	A46
PA47	Mixing control delay on	60	0	999	Sec	CO-S	A47
PA48	Mixing control delay off	120	0	999	Sec	CO-S	A48
PA49	Type of congruent water alarm signal	2	0	2		CO-S	A49
PA50	Type of compressor pressure alarm signal	2	0	2		CO-S	A50
PA51	Low pressure alarm by-pass time	120	0	999	Sec	CO-S	A51
PA52	Low pressure alarm delay	10	0	999	Sec	CO-S	A52
PA53	Number of low pressure alarm interventions	3	0	5		CO-S	A53
PA54	Type of compressor thermal alarm reset	Manu (1)	Auto (0)	Manu (1)		CO-S	A54
PA55	Compressor thermal alarm delay	2	0	999	Sec	CO-S	A55
PA63	Kind of signal for fan alarm	2	0	2		CO-S	A63
PA64	Alarm threshold for 0-1V probe	1.10	0.00	2.00	V	CO-S	A64
PA65	Freezing time humidity probe 0-1V for probe error	0	0	255	Min	CO-S	A65
PA66	Supply pressure/flow alarm setpoint	0.0	-999.0	3276.0	Pa/m^{3}min	CO-S	A66
PA67	Return pressure/flow alarm setpoint	0.0	-999.0	3276.0	Pa/m^{3}min	CO-S	A67
PA68	Kind of signal auxiliary alarm	1	0	2		CO-S	A68
	MODBUS PARAMETERS						
PH43	Modbus master baud rate (0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=28800, 6=38400, 7=57600)	4	0	7		CO-M	H43
PH44	ModBus master parity (0=none, 1=odd, 2=even)	2	0	2		CO-M	H44
PH45	ModBus master stop bit (0=1bit, 1=2bit)	0	0	1		CO-M	H45
	ETHERNET PARAMETERS						
PH62	Bacnet IP device identifier (only available in the models integrating the Bacnet protocol)	127	1	4194303		CO-N	Not available on EVJ LCD and EPJ LCD
PH63	Bacnet IP port number (only available in the models integrating the Bacnet protocol)	47808	47808	47823		CO-N	Not available on EVJ LCD and EPJ LCD
PH64	Bacnet Broadcast Management Device (BBMD) IP address (only available in the models integrating the Bacnet protocol)	255.255.255.255	0.0.0.0	255.255.255.255		CO-N	Not available on EVJ LCD and EPJ LCD
PH65	Bacnet Broadcast Management Device (BBMD) port number (only available in the models integrating the Bacnet protocol)	47808	47808	47823		CO-N	Not available on EVJ LCD and EPJ LCD

PH66	Bacnet Broadcast Management Device (BBMD) service time (only available in the models integrating the Bacnet protocol)	300	15	65535	Sec	CO-N	Not available on EVJ LCD and EPJ LCD
	VARIOUS PARAMETERS						
PH01	Minimum value supply pressure probe	0.0	-3200.0	PH02		CO-V	H01
PH02	Maximum value supply pressure probe	500.0	PH01	3200.0		CO-V	H02
PH16	CAN Baud Rate 1:20 KB 2:50 KB 3:125 KB 4:500 KB	3	1	4	KB	CO-V	H16
PH17	CAN local network node	1	1	127		CO-V	H17
PH23	Minimum value return pressure probe	0.0	-3200.0	PH24		CO-V	H23
PH24	Maximum value return pressure probe	500.0	PH23	3200.0		CO-V	H24
PH28	Minimum value for temperature active probes	-40.0	-70.0	PH29	°C	CO-V	H28
PH29	Maximum value for temperature active probes	60.0	PH28	150.0	°C	CO-V	H29
PH30	Minimum value for humidity probe	0	0	PH31	%	CO-V	H30
PH31	Maximum value for humidity probe	100	PH30	100	%	CO-V	H31
PH37	Minimum CO2/VOC transducer PPM value	0	0	PH38	ppm	CO-V	H37
PH38	Maximum CO2/VOC transducer PPM value	2000	PH37	9999	ppm	CO-V	H38
PH39	Minimum value for setpoint change potentiometer	-5.0	-10.0	PH40	°C	CO-V	H39
PH40	Maximum value for setpoint change potentiometer	5.0	PH39	10.0	°C	CO-V	H40
PH50	AO polarity coil 1: 0: 0-10 V (direct) 1: 10-0 V (reverse)	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H50
PH51	AO polarity coil 2:	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H51
PH52	AO polarity supply fan	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H52
PH53	AO polarity return fan	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H53
PH54	AO polarity mixing chamber damper	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H54
PH55	AO polarity humidifier	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H55
PH56	AO heating element polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H56
PH57	AO heat exchanger polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H57
PH58	AO pre-heating coil polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H58
PH59	Direct expansion AO polarity 0: 0-10V 1: 10-0V 2: Custom	0 (0-10 V)	0 (0-10 V)	2 (Custom)		CO-V	H59
PH60	AO re-heating H2O coil polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H60
PH61	AO re-heating electric coil polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H61
PH67	Auxiliary 1 AO polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H67
PH68	Auxiliary 2 AO polarity	0 (0-10 V)	0 (0-10 V)	1 (10-0 V)		CO-V	H68
	CONFIGURATION PARAMETERS						
PG02	Ventilation steps	0	0	3		CO-C	G02

PG03	Coil 1 type 0: Disabled 1: Water 2: Heating elements 3: Direct expansion	0	0	3		CO-C	G03
PG04	Coil 1 mode 0: Disabled 1: Cooling 2: Heating 3: Cooling/Heating	0	0	3		CO-C	G04
PG05	Coil 2 type 0: Disabled 1: Water 2: Heating elements	0	0	2		CO-C	G05
PG06	Heater type 0: Disabled 1: Modulating (AO) 2: Modulating + 1 step (AO + 1xDO) 3: Modulating + 2 steps (AO + 2xDO) 4: Modulating + 3 steps (AO + 3xDO) 5: Modulating + 4 steps (AO + 4xDO) 6: 1 step (1xDO) 7: 2 steps (2xDO) 8: 3 steps (3xDO) 9: 4 steps (4xDO) 10: 5 steps (5xDO)	0	0	10		CO-C	G06
PG07	Direct expansion type 0: Disabled 1: On-Off 1 step 2: On-Off 2 steps 3: Modulating	0	0	3		CO-C	G07
PG08	Type of pre-heating coil 0: Disabled 1: Water 2: Heating elements	2	0	2		CO-C	G08
PG09	Type of re-heating coil 0: Disabled 1: Water 2: Heating elements	0	0	2		CO-C	G09
PG10	Post-heat heating element type 0: Disabled 1: AO modulating 2: DO digital 3: Modulating + digital (AO+DO)	0	0	3		CO-C	G10
PG12	Enables dehumidification	SI (1)	NO (0)	SI (1)		CO-C	G12
PG13	Type of heat recovery 0: Disabled 1: With cross flows 2: Using two coils 3: Rotary	0	0	3		CO-C	G13
PG14	Regulation probe position: 0: Room sensor 1: Probe in duct	0	0	1		CO-C	G14
	AI HARDWARE PARAMETERS						

HA00	Use of temperature and humidity probes: 0: Nessuno 1: EPJ LCD T 2: EPJ LCD TH 3: EVJ LCD T 4: EVJ LCD TH	0	0	4		CO-AI	A00
HA01	Allocation AI1 (look at table 6.2)	0	-42	42		CO-AI	A01
Pi01	Kind of sensor AI1 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i01
HA02	Allocation AI2	0	-42	42		CO-AI	A02
Pi02	Kind of sensor AI2 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i02
HA03	Allocation AI3	0	-42	42		CO-AI	A03
Pi03	Kind of sensor AI3 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i03
HA04	Allocation AI4	0	-42	42		CO-AI	A04
Pi04	Kind of sensor AI4 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i04
HA05	Allocation AI5	0	-42	42		CO-AI	A05
Pi05	Kind of sensor AI5 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i05
HA06	Allocation AI6	0	-42	42		CO-AI	A06
Pi06	Kind of sensor AI6: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i06
HA07	Allocation AI7	0	-42	42		CO-AI	A07

Pi07	Kind of sensor AI7: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i07
HA08	Allocation AI8	0	-42	42		CO-AI	A08
Pi08	Kind of sensor AI8: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i08
HA09	Allocation AI9	0	-42	42		CO-AI	A09
Pi09	Kind of sensor AI9: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i09
HA10	Allocation AI10	0	-42	42		CO-AI	A10
Pi10	Kind of sensor AI10: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i10
HA11	Allocation AI11	0	-42	42		CO-AI	A11
Pi11	Kind of sensor AI11: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i11
HA12	Allocation AI12	0	-42	42		CO-AI	A12

Pi12	Kind of sensor AI12: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i12
HA13	Allocation AI13	0	-42	42		CO-AI	A13
Pi13	Kind of sensor AI13: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i13
HA14	Allocation AI14	0	-42	42		CO-AI	A14
Pi14	Kind of sensor AI14: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000	1	0	4		CO-AI	i14
HA15	Allocation AI15	0	-42	42		CO-AI	A15
Pi15	Kind of sensor AI15: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i15
HA16	Allocation AI16	0	-42	42		CO-AI	A16
Pi16	Kind of sensor AI16: 0: DI 1: NTC 2: PTC 3: Pt1000 4: Ni1000 5: 4-20mA 6: 0-20mA 7: 0-10V 8: 0-5V 9: 0-1V	1	0	9		CO-AI	i16
HA17	Allocation AI1 EPJ LCD	0	-42	42		CO-AI	A17
Pi17	Kind of sensor AI1 EPJ LCD: 0: DI 1: NTC	1	0	1		CO-AI	i17
HA18	Allocation AI2 EPJ LCD	0	-42	42		CO-AI	A18
Pi18	Kind of sensor AI2 EPJ LCD: 0: DI 1: NTC	1	0	1		CO-AI	i18
HA19	Allocation AI4 EPJ LCD 12V	0	-42	42		CO-AI	A19
Pi19	Kind of sensor AI4 EPJ LCD 12V: 0: DI 1: NTC	1	0	1		CO-AI	i19
HA20	Allocation AI1 EVJ LCD	0	-42	42		CO-AI	A20

Pi20	Kind of sensor AI1 EVJ LCD: 0: DI 1: NTC	1	0	1		CO-AI	i20
HA21	Allocation AI2 EVJ LCD	0	-42	42		CO-AI	A21
Pi21	Kind of sensor AI2 EVJ LCD: 0: DI 1: NTC	1	0	1		CO-AI	i21
HA22	Allocation AI4 EVJ LCD 12V	0	-42	42		CO-AI	A22
Pi22	Kind of sensor AI4 EVJ LCD 12V: 0: DI 1: NTC	1	0	1		CO-AI	i22
	DI HARDWARE PARAMETERS						
HB01	DI1 allocation (see table in section 6.3)	0	-42	42		CO-DI	b01
HB02	DI2 allocation	0	-42	42		CO-DI	b02
HB03	DI3 allocation	0	-42	44		CO-DI	b03
HB04	DI4 allocation	0	-42	44		CO-DI	b04
HB05	DI5 allocation	0	-42	44		CO-DI	b05
	AO HARDWARE PARAMETERS						
HC01	AO1 allocation (see table in section 6.5)	0	-44	47		CO-AO	C01
Po01	Kind of sensor AO1: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o01
HC02	AO2 allocation	0	-44	47		CO-AO	C02
Po02	Kind of sensor AO2: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o02
HC03	AO3 allocation	0	-44	47		CO-AO	C03
Po03	Kind of sensor AO3: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o03
HC04	AO4 allocation	0	-44	47		CO-AO	C04
Po04	Kind of sensor AO4: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o04
HC05	AO5 allocation	0	-44	47		CO-AO	C05
Po05	Kind of sensor AO5: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o05
HC06	AO6 allocation	0	-44	47		CO-AO	C06

Po06	Kind of sensor AO6: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o06
HC07	AO7 allocation	0	-44	47		CO-AO	C07
Po07	Kind of sensor AO7: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o07
HC08	AO8 allocation	0	-44	47		CO-AO	C08
Po08	Kind of sensor AO8: 0: DO 1: 0-10V 2: PWM 3: slow PWM	1	0	3		CO-AO	o08
HCF1	Frequency/period PWM AO1	10	1	2000	Hz/Sec	CO-AO	CF1
HCF2	Frequency/period PWM AO2	10	1	2000	Hz/Sec	CO-AO	CF2
HCF3	Frequency/period PWM AO3	10	1	2000	Hz/Sec	CO-AO	CF3
HCF4	Frequency/period PWM AO4	10	1	2000	Hz/Sec	CO-AO	CF4
HCF5	Frequency/period PWM AO5	10	1	2000	Hz/Sec	CO-AO	CF5
HCF6	Frequency/period PWM AO6	10	1	2000	Hz/Sec	CO-AO	CF6
HCF7	Frequency/period PWM AO7	10	1	2000	Hz/Sec	CO-AO	CF7
HCF8	Frequency/period PWM AO8	10	1	2000	Hz/Sec	CO-AO	CF8
HCV1	Maximum Volt AO1 output	10.00	1.00	10.00	V	CO-AO	CV1
HCV2	Maximum Volt AO2 output	10.00	1.00	10.00	V	CO-AO	CV2
HCV3	Maximum Volt AO3 output	10.00	1.00	10.00	V	CO-AO	CV3
HCV4	Maximum Volt AO4 output	10.00	1.00	10.00	V	CO-AO	CV4
HCV5	Maximum Volt AO5 output	10.00	1.00	10.00	V	CO-AO	CV5
HCV6	Maximum Volt AO6 output	10.00	1.00	10.00	V	CO-AO	CV6
HCV7	Maximum Volt AO7 output	10.00	1.00	10.00	V	CO-AO	CV7
HCV8	Maximum Volt AO8 output	10.00	1.00	10.00	V	CO-AO	CV8
	DO HARDWARE PARAMETERS						
HD01	DO1 allocation (see table in section 6.4)	0	-44	47		CO-DO	d01
HD02	DO2 allocation	0	-44	47		CO-DO	d02
HD03	DO3 allocation	0	-44	47		CO-DO	d03
HD04	DO4 allocation	0	-44	47		CO-DO	d04
HD05	DO5 allocation	0	-44	47		CO-DO	d05
HD06	DO6 allocation	0	-44	47		CO-DO	d06
HD07	DO7 allocation	0	-44	47		CO-DO	d07
HD08	DO8 allocation	0	-44	47		CO-DO	d08
HD09	DO9 allocation	0	-44	47		CO-DO	d09
HD10	DO10 allocation	0	-44	47		CO-DO	d10
HD11	DO11 allocation	0	-44	47		CO-DO	d11
HD12	DO12 allocation	0	-44	47		CO-DO	d12

HD13	DO13 allocation	0	-44	47		CO-DO	d13
HD14	DO14 allocation	0	-44	47		CO-DO	d14
PSd4	Manufacturer level password (4)	-33	-999	9999		CO	PS4

Once the machine parameters have been configured and any changes made to the configuration parameters, it is advisable to switch the machine off and restart the system to allow the board to configure itself correctly.

** For a PWM the parameter is expressed in Hz and will be limited to between 10Hz and 2000Hz, for a slow PWM the parameter is expressed in seconds and will be limited to between 1 and 255 seconds.

6.2 I/O Table AI (Analogue Inputs) parameters

AI6-7-8-9-10-15-16 c-pro 3 NODE giga AHU	
Code	Description
-42	Phases sequence NC
-41	Auxiliary 2 alarm 2 NC
-40	Auxiliary 1 alarm 1 NC
-39	Auxiliary 2 NC
-38	Auxiliary 1 NC
-37	Booster fans NC
-36	Set 3 fans NC
-35	Set 2 fans NC
-34	Set 1 fans NC
-33	Generic warning NC
-32	Re-heating heater thermal switch NC
-31	Heat pump operating mode NC
-30	Differential pressure switch return filter level 4 NC
-29	Differential pressure switch return filter level 3 NC
-28	Differential pressure switch return filter level 2 NC
-27	Differential pressure switch supply filter level 4 NC
-26	Differential pressure switch supply filter 3 NC
-25	Differential pressure switch supply filter 2 NC
-24	Compressor thermal switch NC
-23	Compressors low pressure switch NC
-22	Compressors high pressure switch NC
-21	Differential pressure switch return filter level 1 NC
-20	Warm up damper limit switch NC
-19	Pre-heating heater thermal switch NC
-18	Fire/smoke NC
-17	Return air flow switch NC
-16	Supply air flow switch NC
-15	Exchanger pressure switch (antifreeze) NC
-14	Second coil pump thermal switch NC
-13	First coil pump thermal switch NC
-12	Electric coil thermal switch NC
-11	Humidifier alarm NC
-10	Outdoor damper air limit switch NC
-9	Return fan thermal switch NC
-8	Supply fan thermal switch NC
-7	Freezing circuit defrost NC
-6	Generic alarm input NC
-5	Economy NC
-4	Summer Winter NC
-3	Remote on-off NC
-2	Differential pressure switch supply filters level 1 NC
-1	Antifreeze thermostat NC
0	Disabled
1	Supply temperature / Antifreeze thermostat NO
2	Return/room temperature / Differential pressure switch supply filters level 1 NO
3	Outdoor temperature / Remote on-off NO
4	Expelled air temperature / Summer Winter NO
5	Water temperature coil 1 / Economy NO
6	Water temperature coil 2 / Generic alarm input NO
7	Water temperature pre-heating coil / Freezing circuit defrost NO
8	Water temperature re-heating coil / Supply fan thermal switch NO
9	Compressors defrost temperature / Return fan thermal switch NO
10	Auxiliary 1 / Outdoor damper air limit switch NO
11	Auxiliary 2 / Humidifier alarm NO
12	Supply humidity / Electric coil thermal switch NO
13	Return humidity / First coil pump thermal switch NO
14	Outdoor humidity / Second coil pump thermal switch NO
15	Supply pressure/flow / Exchanger pressure switch (antifreeze) NO
16	Return pressure/flow / Supply air flow switch NO
17	Air quality / Return air flow switch NO
18	Remote offset potentiometer / Fire/smoke NO
19	Mixing chamber damper potentiometer / Pre-heating heater thermal switch NO
20	Potentiometer fans / Warm up damper limit switch NO
21	Differential pressure switch return filter level 1 NO
22	Compressors high pressure switch NO
23	Compressors low pressure switch NO
24	Compressor thermal switch NO
25	Differential pressure switch supply filter level 2 NO
26	Differential pressure switch supply filter level 3 NO
27	Differential pressure switch supply filter level 4 NO
28	Differential pressure switch return filter level 2 NO
29	Differential pressure switch return filter level 3 NO
30	Differential pressure switch return filter level 4 NO
31	Heat pump operating mode NO
32	Re-heating heater thermal switch NO
33	Generic warning NO
34	Set 1 fans NO
35	Set 2 fans NO
36	Set 3 fans NO

37	Booster fans NO
38	Auxiliary 1 NO
39	Auxiliary 2 NO
40	Auxiliary 2 alarm 1 NO
41	Auxiliary 2 alarm 2 NO
42	Phases sequence NO

AI1-2-3-4-5-11-12-13-14 c-pro 3 GIGA AHU - AI1-2-4 EPJ LCD - AI1-2-4 EVJ LCD

Code	Description
-42	Phases sequence NC
-41	Auxiliary 2 alarm 2 NC
-40	Auxiliary 1 alarm 1 NC
-39	Auxiliary 2 NC
-38	Auxiliary 1 NC
-37	Booster fans NC
-36	Set 3 fans NC
-35	Set 2 fans NC
-34	Set 1 fans NC
-33	Generic warning NC
-32	Re-heating heater thermal switch NC
-31	Heat pump operating mode NC
-30	Differential pressure switch return filter level 4 NC
-29	Differential pressure switch return filter level 3 NC
-28	Differential pressure switch return filter level 2 NC
-27	Differential pressure switch supply filter level 4 NC
-26	Differential pressure switch supply filter 3 NC
-25	Differential pressure switch supply filter 2 NC
-24	Compressor thermal switch NC
-23	Compressors low pressure switch NC
-22	Compressors high pressure switch NC
-21	Differential pressure switch return filter level 1 NC
-20	Warm up damper limit switch NC
-19	Pre-heating heater thermal switch NC
-18	Fire/smoke NC
-17	Return air flow switch NC
-16	Supply air flow switch NC
-15	Exchanger pressure switch (antifreeze) NC
-14	Second coil pump thermal switch NC
-13	First coil pump thermal switch NC
-12	Electric coil thermal switch NC
-11	Humidifier alarm NC
-10	Outdoor damper air limit switch NC
-9	Return fan thermal switch NC
-8	Supply fan thermal switch NC
-7	Freezing circuit defrost NC
-6	Generic alarm input NC
-5	Economy NC
-4	Summer Winter NC
-3	Remote on-off NC
-2	Differential pressure switch supply filters level 1 NC
-1	Antifreeze thermostat NC
0	Disabled
1	Supply temperature / Antifreeze thermostat NO
2	Return/room temperature / Differential pressure switch supply filters level 1 NO
3	Outdoor temperature / Remote on-off NO
4	Expelled air temperature / Summer Winter NO
5	Water temperature coil 1 / Economy NO
6	Water temperature coil 2 / Generic alarm input NO
7	Water temperature pre-heating coil / Freezing circuit defrost NO
8	Water temperature re-heating coil / Supply fan thermal switch NO
9	Compressors defrost temperature / Return fan thermal switch NO
10	Auxiliary 1 / Outdoor damper air limit switch NO
11	Auxiliary 2 / Humidifier alarm NO
12	Electric coil thermal switch NO
13	First coil pump thermal switch NO
14	Second coil pump thermal switch NO
15	Exchanger pressure switch (antifreeze) NO
16	Supply air flow switch NO
17	Return air flow switch NO
18	Fire/smoke NO
19	Pre-heating heater thermal switch NO
20	Warm up damper limit switch NO
21	Differential pressure switch return filter level 1 NO
22	Compressors high pressure switch NO
23	Compressors low pressure switch NO
24	Compressor thermal switch NO
25	Differential pressure switch supply filter level 2 NO
26	Differential pressure switch supply filter level 3 NO
27	Differential pressure switch supply filter level 4 NO
28	Differential pressure switch return filter level 2 NO
29	Differential pressure switch return filter level 3 NO
30	Differential pressure switch return filter level 4 NO
31	Heat pump operating mode NO

32	Re-heating heater thermal switch NO
33	Generic warning NO
34	Set 1 fans NO
35	Set 2 fans NO
36	Set 3 fans NO
37	Booster fans NO
38	Auxiliary 1 NO
39	Auxiliary 2 NO
40	Auxiliary 2 alarm 1 NO
41	Auxiliary 2 alarm 2 NO
42	Phases sequence NO

For analog inputs it is possible to choose the kind of sensor via parameters Pi01...Pi22 belonging to manufacturer menu – hardware section AI. The available sensors are:

0 = DI (the analog input will be used as digital)
1 = NTC
2 = PTC
3 = PT1000
4 = Ni1000
5 = 4-20mA
6 = 0-20mA
7 = 0-10V
8 = 0-5V
9 = 0-1V

If a probe is configured as active probe (4-20mA, 0-20mA, 0-10V, 0-5V or 0-1V) it is necessary to set parameters *PH28 Minimum value for active probes* " and *PH29 "Maximum value for active probes"* for a proper operation.

6.3 I/O Table DI (Digital Inputs) parameters

DI	
Code	Description
-42	Phases sequence NC
-41	Auxiliary 2 alarm 2 NC
-40	Auxiliary 1 alarm 1 NC
-39	Auxiliary 2 NC
-38	Auxiliary 1 NC
-37	Booster fans NC
-36	Set 3 fans NC
-35	Set 2 fans NC
-34	Set 1 fans NC
-33	Generic warning NC
-32	Re-heating heater thermal switch NC
-31	Heat pump operating mode NC
-30	Differential pressure switch return filter level 4 NC
-29	Differential pressure switch return filter level 3 NC
-28	Differential pressure switch return filter level 2 NC
-27	Differential pressure switch supply filter level 4 NC
-26	Differential pressure switch supply filter 3 NC
-25	Differential pressure switch supply filter 2 NC
-24	Compressor thermal switch NC
-23	Compressors low pressure switch NC
-22	Compressors high pressure switch NC
-21	Differential pressure switch return filter level 1 NC
-20	Warm up damper limit switch NC
-19	Pre-heating heater thermal switch NC
-18	Fire/smoke NC
-17	Return air flow switch NC
-16	Supply air flow switch NC
-15	Exchanger pressure switch (antifreeze) NC
-14	Second coil pump thermal switch NC
-13	First coil pump thermal switch NC
-12	Electric coil thermal switch NC
-11	Humidifier alarm NC
-10	Outdoor damper air limit switch NC
-9	Return fan thermal switch NC
-8	Supply fan thermal switch NC
-7	Freezing circuit defrost NC
-6	Generic alarm input NC
-5	Economy NC
-4	Summer Winter NC
-3	Remote on-off NC
-2	Differential pressure switch supply filters level 1 NC
-1	Antifreeze thermostat NC
0	Disabled
1	Antifreeze thermostat NO
2	Differential pressure switch supply filters level 1 NO
3	Remote on-off NO
4	Summer Winter NO
5	Economy NO
6	Generic alarm input NO
7	Freezing circuit defrost NO
8	Supply fan thermal switch NO
9	Return fan thermal switch NO
10	Outdoor damper air limit switch NO
11	Humidifier alarm NO
12	Electric coil thermal switch NO
13	First coil pump thermal switch NO
14	Second coil pump thermal switch NO
15	Exchanger pressure switch (antifreeze) NO

16	Supply air flow switch NO
17	Return air flow switch NO
18	Fire/smoke NO
19	Pre-heating heater thermal switch NO
20	Warm up damper limit switch NO
21	Differential pressure switch return filter level 1 NO
22	Compressors high pressure switch NO
23	Compressors low pressure switch NO
24	Compressor thermal switch NO
25	Differential pressure switch supply filter level 2 NO
26	Differential pressure switch supply filter level 3 NO
27	Differential pressure switch supply filter level 4 NO
28	Differential pressure switch return filter level 2 NO
29	Differential pressure switch return filter level 3 NO
30	Differential pressure switch return filter level 4 NO
31	Heat pump operating mode NO
32	Re-heating heater thermal switch NO
33	Generic warning NO
34	Set 1 fans NO
35	Set 2 fans NO
36	Set 3 fans NO
37	Booster fans NO
38	Auxiliary 1 NO
39	Auxiliary 2 NO
40	Auxiliary 2 alarm 1 NO
41	Auxiliary 2 alarm 2 NO
42	Phases sequence NO
43	Supply fan tachometer NO (only for DI3/DI4/DI5 pulse train)
44	Return fan tachometer NO (only for DI3/DI4/DI5 pulse train)

6.4 I/O Table DO (Digital Outputs) parameters

DO	
Code	Description
-44	Auxiliary 2 NC
-43	Auxiliary 1 NC
-42	Light alarm NC
-41	Step 2 re-heating electric coil NC
-40	Step 2 re-heating electric coil NC
-39	Re-heating water coil on/off NC
-38	Closing re-heating water coil NC
-37	Opening re-heating water coil NC
-36	On/Off NC
-35	Step 5 heater NC
-34	Step 4 heater NC
-33	Step 3 heater NC
-32	Reversing valve NC
-31	Mixing chamber damper on/off NC
-30	Closing mixing chamber damper NC
-29	Opening mixing chamber damper NC
-28	Pre-heating coil on/off NC
-27	Coil 2 on/off NC
-26	Coil 1 on/off NC
-25	Closing pre-heating coil NC
-24	Opening pre-heating coil NC
-23	Closing coil 2 NC
-22	Opening coil 2 NC
-21	Closing coil 1 NC
-20	Opening coil 1 NC
-19	Warm up damper NC
-18	Second coil pump command NC
-17	First coil pump command NC
-16	Summer-Winter NC
-15	Important alarm NC
-14	Second step DX coil NC
-13	First step DX coil NC
-12	Motocondensing On-Off NC
-11	Step 2 heater NC
-10	Step 1 heater NC
-9	Humidifier NC
-8	Recuperator / By-pass On/Off NC
-7	Outdoor air damper NC
-6	V3 return fan NC
-5	V2 return fan NC
-4	V1 return fan NC (enabling) NC
-3	V3 supply fan NC
-2	V2 supply fan NC
-1	V1 supply fan NC (enabling) NC
0	Disabilitato
1	V1 supply fan NC (enabling) NO
2	V2 supply fan NO
3	V3 supply fan NO
4	V1 return fan NC (enabling) NO
5	V2 return fan NO

6	Outdoor air damper NO
7	Outdoor air damper NO
8	Recuperator / By-pass On/Off NO
9	Humidifier NO
10	Step 1 heater NO
11	Step 2 heater NO
12	Motocondensing On-Off NO
13	First step DX coil NO
14	Second step DX coil NO
15	Important alarm NO
16	Summer-Winter NO
17	First coil pump command NO
18	Second coil pump command NO
19	Warm up damper NC
20	Opening coil 1 NO
21	Closing coil 1 NO
22	Opening coil 2 NO
23	Closing coil 2 NO
24	Opening pre-heating coil NO
25	Closing pre-heating coil NO
26	Coil 1 on/off NO
27	Coil 2 on/off NO
28	Pre-heating coil on/off NO
29	Opening mixing chamber damper NO
30	Closing mixing chamber damper NO
31	Mixing chamber damper on/off NO
32	Reversing valve NO
33	Step 3 heater NO
34	Step 4 heater NO
35	Step 5 heater NO
36	On/Off NO
37	Opening re-heating water coil NO
38	Closing re-heating water coil NO
39	Re-heating water coil on/off NO
40	Step 1 re-heating electric coil NO
41	Step 2 re-heating electric coil NO
42	Light alarm NO
43	Auxiliary 1 NO
44	Auxiliary 2 NO
45	Electric coil slow PWM output NO
46	Pre-heating heater slow PWM output NO
47	Re-heating heater slow PWM output NO

6.5 I/O Table AO (Analogue Outputs) parameters

AO	
Code	Description
-44	Auxiliary 2 NC
-43	Auxiliary 1 NC
-42	Light alarm NC
-41	re-heating electric coil step 2 NC
-40	re-heating electric coil step 1 NC
-39	Re-heating water coil on/off NC
-38	Closing re-heating wter coil NC
-37	Opening re-heating wter coil NC
-36	On/Off NC
-35	Step 5 heater NC
-34	Step 4 heater NC
-33	Step 3 heater NC
-32	Reversing valve NC
-31	Mixing chamber damper on/off NC
-30	Closing mixing chamber damper NC
-29	Opening mixing chamber damper NC
-28	Pre-heating coil on/off NC
-27	Coil 2 on/off NC
-26	Coil 1 on/off NC
-25	Closing pre-heating coil NC
-24	Opening pre-heating coil NC
-23	Closing coil 2 NC
-22	Opening coil 2 NC
-21	Closing coil 1 NC
-20	Opening coil 1 NC
-19	Warm up damper NC
-18	Second coil pump command NC
-17	First coil pump command NC
-16	Summer-Winter C
-15	Important alarm NC

-14	Second step DX coil NC
-13	First step DX coil NC
-12	Motoncondensing on-off NC
-11	Step 2 heater NC
-10	Step 1 heater NC
-9	Humidifier NC
-8	Recuperator / By-pass on-off NC
-7	Serranda aria esterna NC
-6	V3 return fan NC
-5	V2 return fan NC
-4	V1 return fan (enabling)
-3	V3 supply fan NC
-2	V2 supply fan NC
-1	V1 supply fan (enabling) NC
0	Disabled
1	Vmix first coil / V1 supply fan (enabling) NO
2	Vmix second coil / V2 supply fan NO
3	Supply fan / V3 supply fan NO
4	Return fan / V1 return fan (enabling) NO
5	Mixing chamber damper / V2 return fan NO
6	Humidifier / V3 return fan NO
7	electric coil / Outdoor air damper NO
8	Recuperator/Bypass / Recuperator/Bypass On-Off NO
9	Pre-heating electric coil / Humidifier NO
10	Direct expansion / Step 1 heater NO
11	Re-heating water coil / Step heater 2 NO
12	Re-heating electric coil / Motocondensing on-off NO
13	Auxiliary 1 / First step DX coil NO
14	Auxiliary 2 / Second step DX coil NO
15	Important alarm NO
16	Summer Winter NO
17	First coil pump command NO
18	Second coil pump command NO
19	Warm-up damper NO
20	Opening coil 1 NO
21	Closing coil 1 NO
22	Aopening coil 2 NO
23	Closing coil 2 NO
24	Opening pre-heating coil NO
25	Closing pre-heating coil NO
26	Coil 1 on/off NO
27	Coil 2 on/off NO
28	Pre-heating coil on/off NO
29	Opening mixing chamber damper NO
30	Closing mixing chamber damper NO
31	Mixing chamber damper on/off NO
32	Reversing valve NO
33	Step 3 heater NO
34	Step 4 heater NO
35	Step 5 heater NO
36	On/Off NO
37	Opening re-heating water coil NO
38	Closing re-heating water coil NO
39	Re-heating coil on/off H2O NO
40	Step 1 re-heating electric coil NO
41	Step 1 re-heating electric coil NO
42	Light alarm NO
43	Auxiliary 1 NO
44	Auxiliary 2 NO
45	Electric coil slow PWM output NO
46	Pre-heating heater slow PWM output NO
47	Re-heating heater slow PWM output NO

For the analog outputs it is possibel to choose via parameters Po01...Po08 belonging to manufacturer menu – section hardware AO the kind of sensor. The available sensors are:

0 = DO (the analog output will be used as digital)

1 = 0-10 V

2 = PWM

3 = slow PWM

If PWM or slow PWM is selected, it is necessary to set the frequency/period of PWM via parameters HCF1...HCF8 according to the selected output.

If slow PWM is selected it is also necessary to set the maximum output voltage via parameters HCV1...HCV8 according to the selected output.

7 REGULATIONS

7.1 Machine status

There are several ways to switch the unit on/off, switching on the unit is the combination of all the methods, i.e. all the switching on methods enabled must be active at the same time for the unit to switch on:

1. By pressing the appropriate On/Off key (Stand-BY/ESC key, function enabled by parameter *PH05*).
   Switching ON – Press the relevant key for about 2 seconds
   Switching OFF – Press the relevant key for about 2 seconds: the machine will switch to the "OFF by Key" status.

2. Using the On/Off command from the digital input if the relative ID is configured.
   Switching ON - close the remote On/Off contact
   Switching OFF - open the remote On/Off contact: the machine will switch to "OFF by digital input".

3. Using a supervisory protocol (this function is enabled via parameter *PH09*).
   Switching ON – Activate the switching ON status via protocol.
   Switching OFF – Activate the switching OFF status via communication protocol: the machine will switch to "OFF by Supervisor" status.

4. Using the time band program (function enabled by parameter *PH19*).
   Switching ON – the machine turns on if the date and time of the RTC indicate switching on status.
   Switching OFF – if the date and time of the RTC indicate switching off status, the machine will switch to "OFF by scheduler".

The On/Off status controlled by the digital input, by the supervision protocol and by program can only be reached with the machine switched on by key.

7.2 OFF by alarm status

When the machine is switched on there is an additional **OFF by alarm** status that switches off the unit, all the devices and closes the dampers completely until the alarm situation is resolved.
The alarms which provoke this status are as follows:

- fan thermal/tachometer alarm
- supply/return flow switch alarm
- configuration alarm
- generic alarm
- external air damper limit switch alarm
- warm-up damper limit switch alarm
- Modbus fan alarm
- phases sequence alarm
- number of MODBUS supply fans in alarm compared with parameter PF73
- number of MODBUS return fans in alarm compared with parameter PF76

Once the situation has been resolved the machine returns to normal functioning.

7.3 Operating mode control

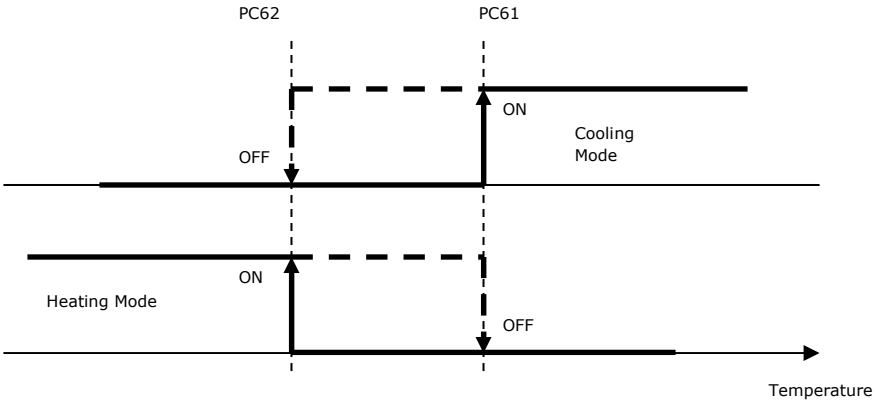
The operating modes can assume the following values:

PARAMETER "MODE"	DESCRIPTION
0=COOL – ***SUMMER***	Summer operation
1=HEAT – ***WINTER***	Winter operation
2=AUTOMATIC	Operation based on switching probe

The user interface will indicate the operating mode with the "CRYSTAL" () or "SUN" () symbol, flashing in the case of automatic change mode, depending on the value assigned to parameter *PH41*.
There are a number of procedures for setting the unit's operating mode:

1. Via the **MOdE *parameter*** in the user menu (function enabled by parameter *PH08=0* or *PH08=1*).
   Setting: go to the ModE parameter, press the ENTER/SET key, modify the values using the UP and DOWN keys. Confirm by pressing ENTER/SET again.
2. Using the Summer/Winter command from the digital input if the relative ID is configured.
   - **WINTER MODE** - close the remote Summer/Winter contact
   - **SUMMER MODE** - open the remote Summer/Winter contact

3. Through **automatic mode change function** (function enabled by parameter *PH08=1* and *MOdE=2* or *PH08=2*).
Setting - when the value of the external air temperature or the coil 1 temperature or the return air temperature (parameter *PC63*) exceeds the summer changeover setpoint (parameter *PC61*), the unit switches to summer operating mode.
Conversely, when the air temperature falls below the winter changeover setpoint (parameter *PC62*), the unit switches to winter operating mode.



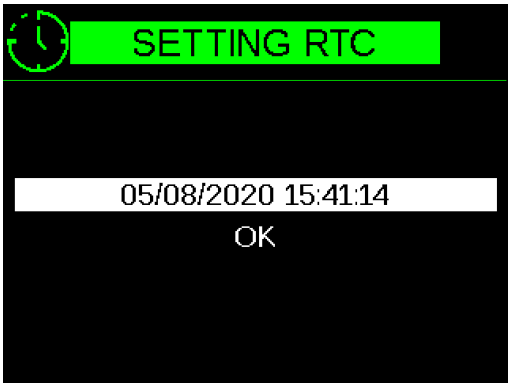
4. By pressing a combination of keys from the application status page (LEFT and RIGHT pressed and held for 3 seconds, not available on the EVJ LCD or EPJ LCD displays).

It is advisable to change the summer/winter operating mode with the machine switched off.

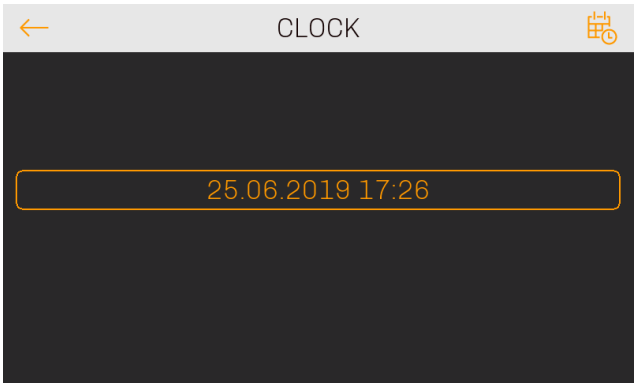
7.4 Set real time clock

When the controller is switched on the first time, the correct date and time must be entered. In this case, upon machine start-up the following page will appear allowing the time to be set:

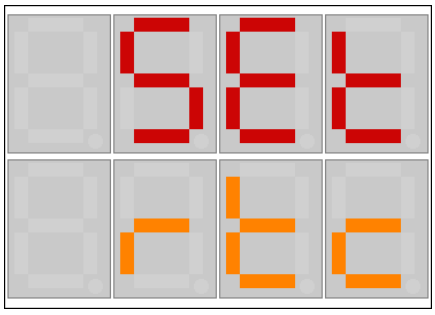
EPJgraph



EPcolor



EVJ LCD or EPJ LCS user interface display



Once the clock has been configured, press **OK** to update the RTC time. The main application page will be shown. Press **OK** to confirm the data entered, thus deleting the alarm situation (AL29).

If the alarm does not disappear: disconnect and reconnect the controller from the electricity supply and reset the alarm manually.

7.5 System set-up

With the machine in OFF mode, use the configuration wizard, accessible from the SETUP section in the INSTALLER menu, to choose the main features of the machine, such as the presence of the recovery heat exchanger, the type of fans and their possible speed and the number and type of coils.

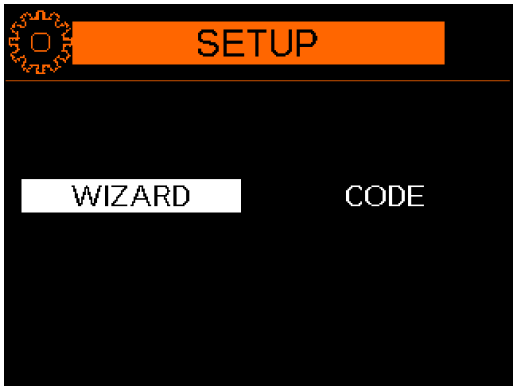
The regulation parameters and other parameters associated with the functions are to be changed manually to meet the user's needs.

7.6 Initial page set-up

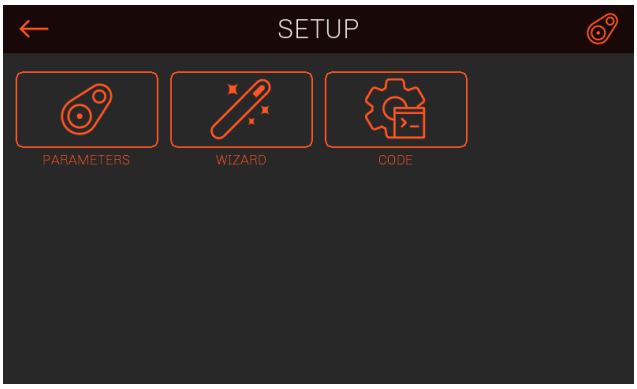
The screens are shown below in which the system can be configured.

If the EVJ LCD or EPJ LCD user interface is used, you can scroll through the various configurations using the UP/DOWN keys. To confirm the choices, hold the SET button down.

EPJgraph



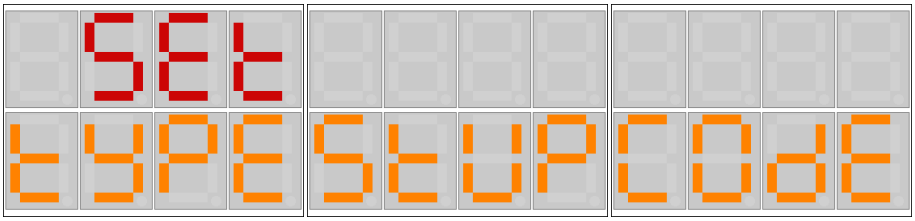
EPcolor



This is the initial configuration screen. If you want to configure the machine using the simplified procedure, choose “Wizard”, whereas if you want to configure the machine using machine code, choose “Code”. For configuration using code, please refer to section 7.15 where the possible choices are described.

Press the ESC key to return to the main page of the Installer menu.

EVJ LCD or EPJ LCD user interface

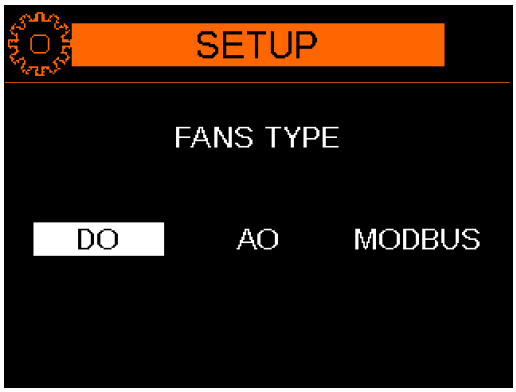


This is the initial configuration screen. If you want to configure the machine using the simplified procedure, choose “StUP”, whereas if you want to configure the machine using machine code, choose “COdE”. For configuration using code, please refer to section 7.15 where the possible choices are described.

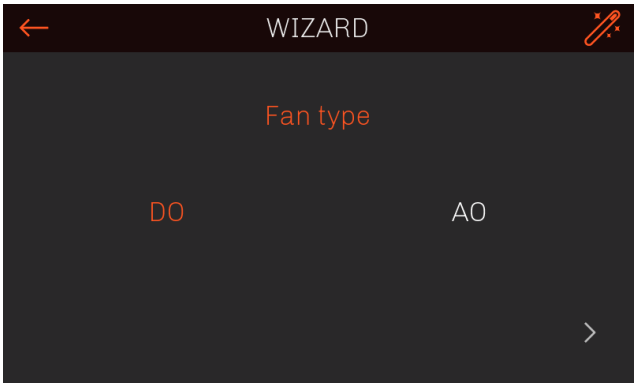
Press the ESC key to return to the main page of the Installer menu.

7.7 Fans set-up

EPJgraph

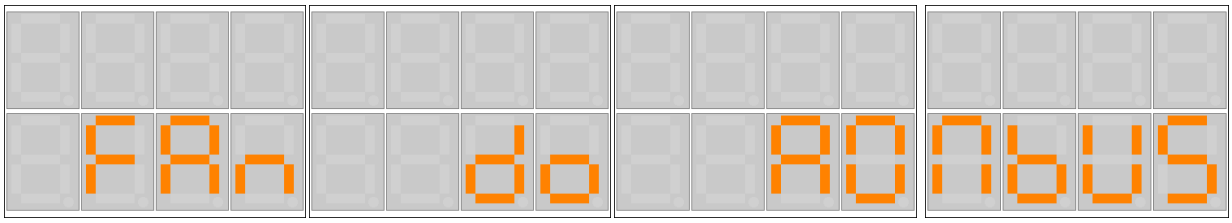


EPcolor



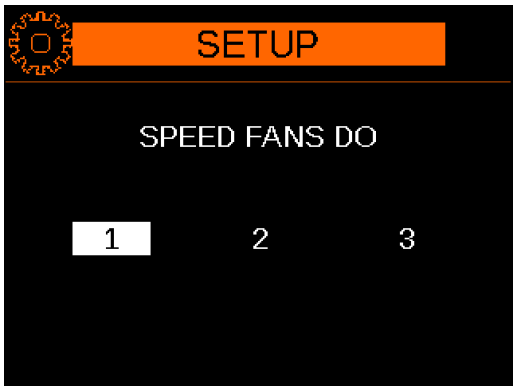
Fan type configuration screen, select “DO” if the fans are controlled by digital outputs, “AO” if modulating fans or “Modbus” if the fans are controlled by serial communication.

EVJ LCD or EPJ LCD user interface

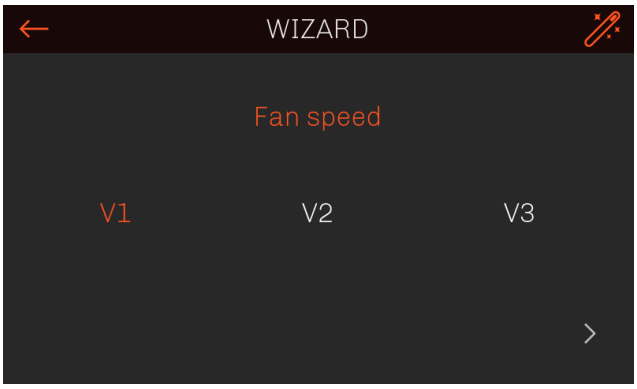


Fan type configuration screens, select "DO" if the fans are controlled by digital outputs, "AO" if modulating fans or "MbUS" if the fans are controlled by serial communication.

EPJgraph

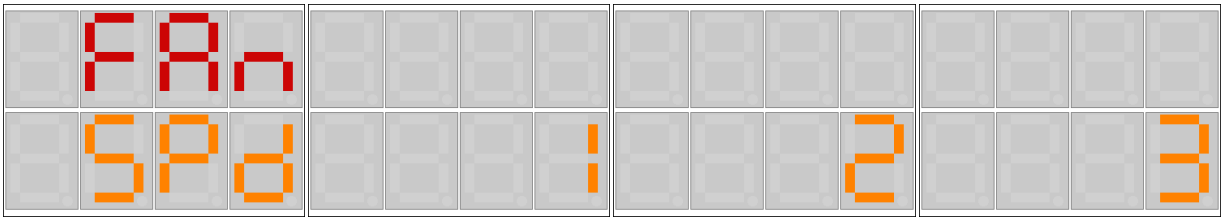


EPcolor



If "DO" configured in previous screen, therefore by digital output, the fan speed will now be set by selecting 1, 2 or 3.

EVJ LCD or EPJ LCD user interface

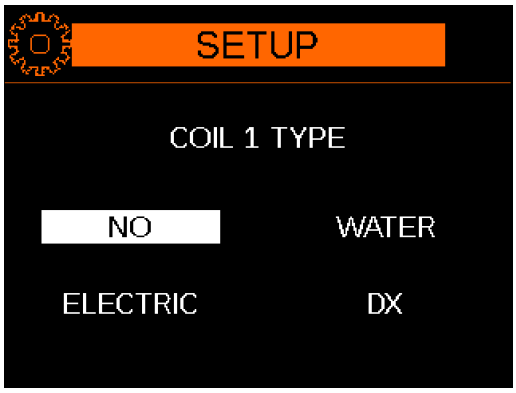


If "do" configured in previous screen, therefore by digital output, the fan speed will now be set by selecting 1, 2 or 3.

7.8 Coil 1 set-up

If the first coil is not configured, the second coil will not be displayed.
If the first coil is configured as electric, the choice of the second coil will not be displayed because it is assumed this is the only coil present.

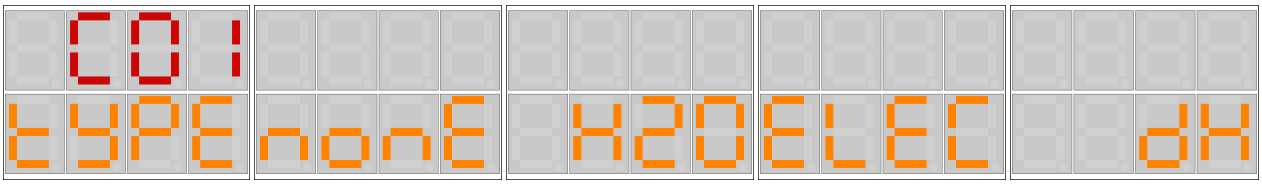
EPJgraph



EPcolor

Screen to configure coil 1 type, select "No" if no coil is present, "Water" for a water coil, "Electric" for an electric coil or "DX" for direct expansion.

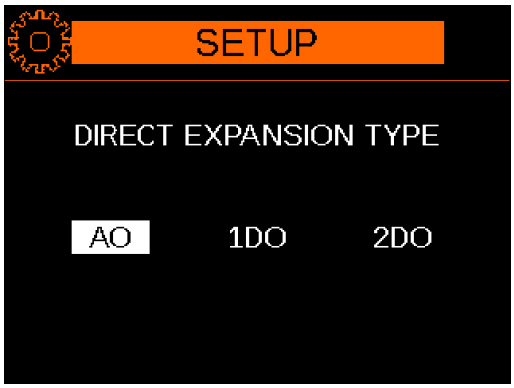
EVJ LCD or EPJ LCD user interface



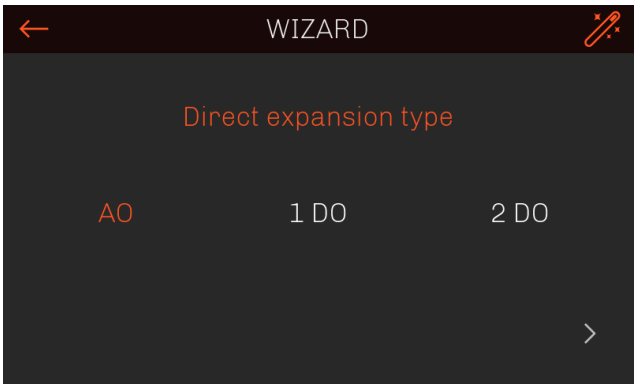
Screens to configure coil 1 type, select "nonE" if no coil is present, "H2O" for a water coil, "ELEC" for an electric coil or "dX" or direct expansion.

To configure an electric coil type, please refer to section 7.10.
If the coil 1 in the previous screens was configured as direct expansion (DX), now select the type of direct expansion.

EPJgraph

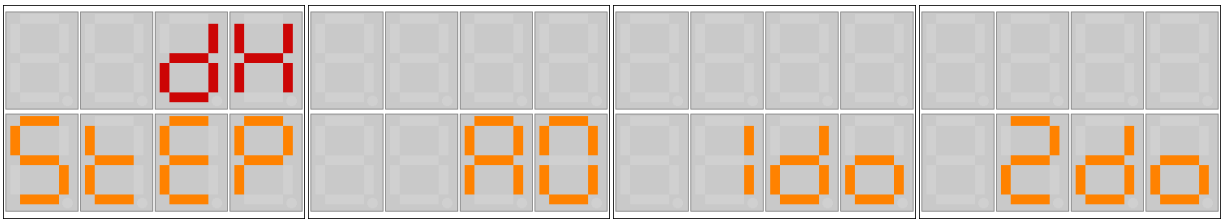


EPcolor



Screen to configure direct expansion type, select "AO" for modulating direct expansion, "1DO" for digital direct expansion with 1 step or "2DO" for digital direct expansion with 2 steps.

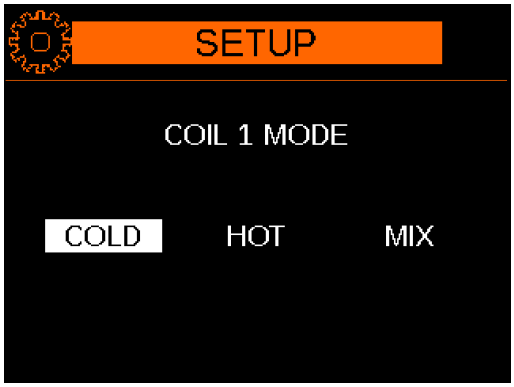
EVJ LCD or EPJ LCD user interface



Screens to configure direct expansion type, select "AO" for modulating direct expansion, "1do" for digital direct expansion with 1 step or "2do" for digital direct expansion with 2 steps.

After configuring the direct expansion type or if the water coil has been selected, the first coil is now configured.

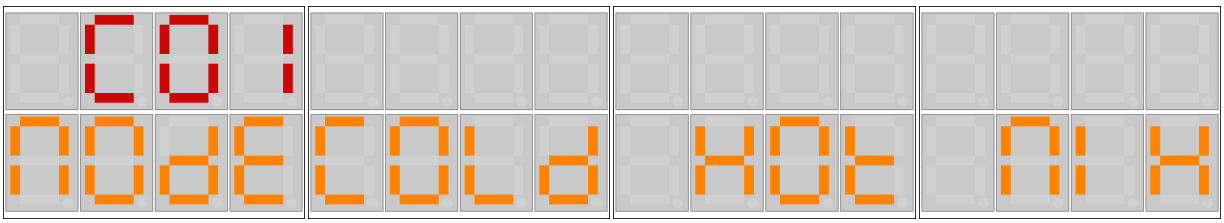
EPJgraph



EPcolor

Screen to configure the first coil mode, select "Cold" for cooling coil, "Hot" for heating coil or "Mix" for cooling/heating coil.

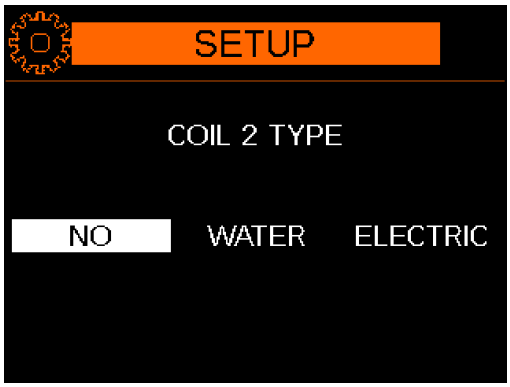
EVJ LCD or EPJ LCD user interface



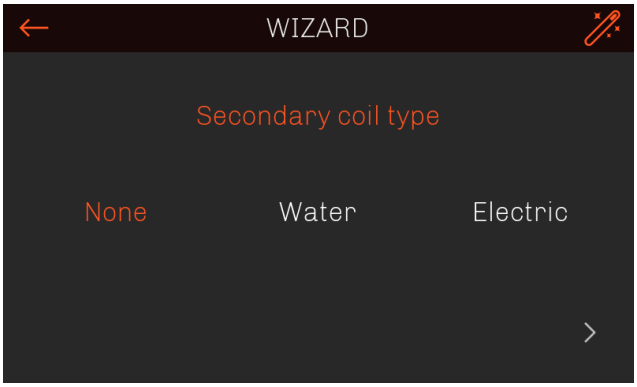
Screens to configure the first coil mode, select "COLd" for cooling coil, "HOt" for heating coil or "MIX" for cooling/heating coil.

7.9 Coil 2 set-up

EPJgraph

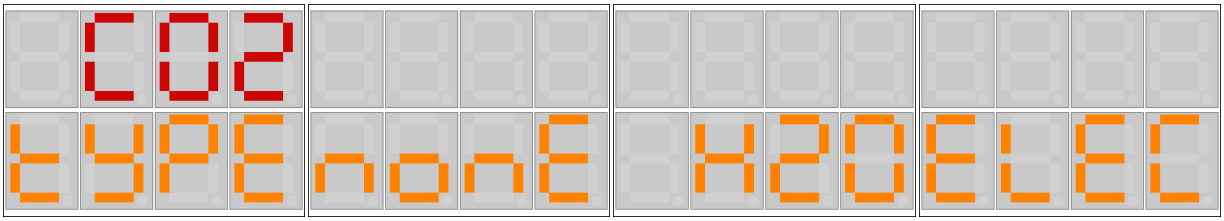


EPcolor



Screen to configure the type of coil 2, select "No" if coil not present, "Water" for a water coil or "Electric" for an electric coil.

EVJ LCD or EPJ LCD user interface

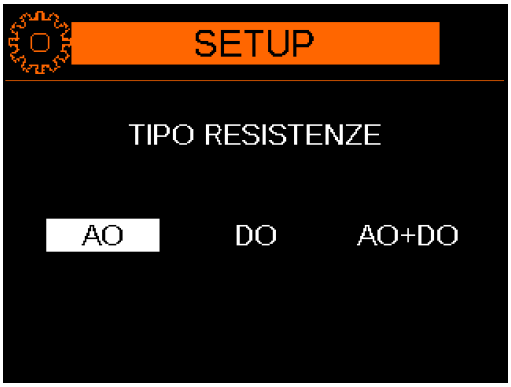


Screen to configure the type of coil 2, select "nonE" if coil not present, "H2O" for a water coil or "ELEC" for an electric coil.

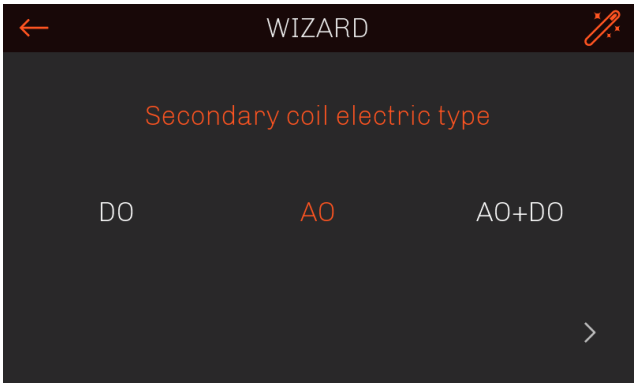
7.10 Electric coil set-up

If coil 1 or coil 2 have been selected as "Electric", the type and number of heating elements must now be configured.

EPJgraph

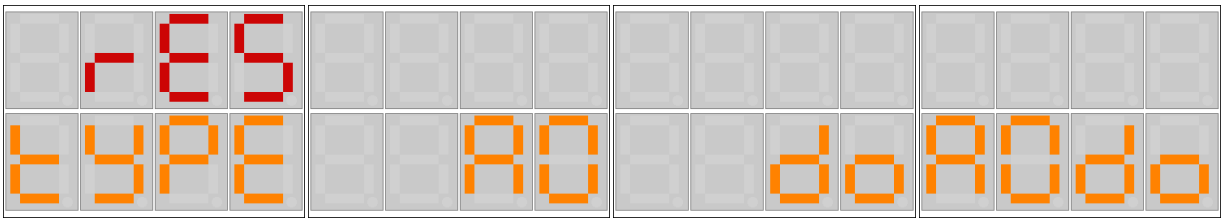


EPcolor



Screen to configure the type of heating elements, select "AO" for a single modulating heating element, "DO" for digital heating elements or "AO+DO" for one modulating heating element and more than one digital heating elements with sawtooth regulation.

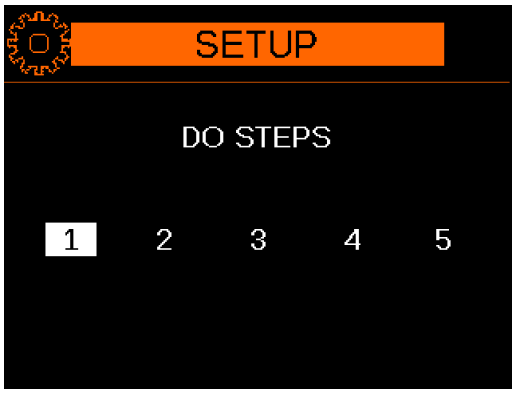
EVJ LCD or EPJ LCD user interface



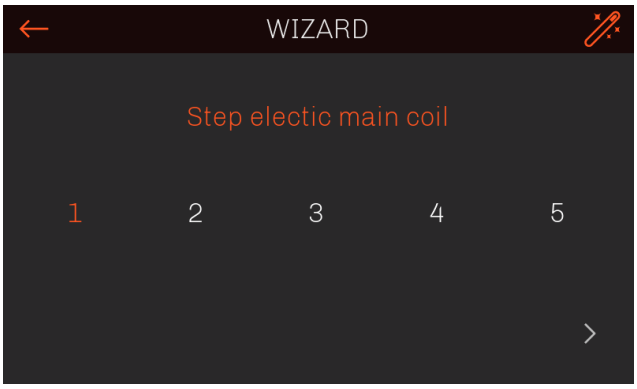
Screens to configure the type of heating elements, select “AO” for a single modulating heating element, “DO” for digital heating elements or “AOdo” for one modulating heating element and more than one digital heating elements with sawtooth regulation.

If the heating elements have been configured as digital (DO) in the previous screen, the number of steps must now be set.

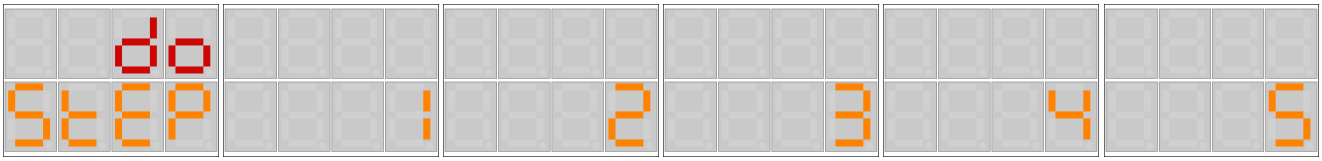
EPJgraph



EPcolor



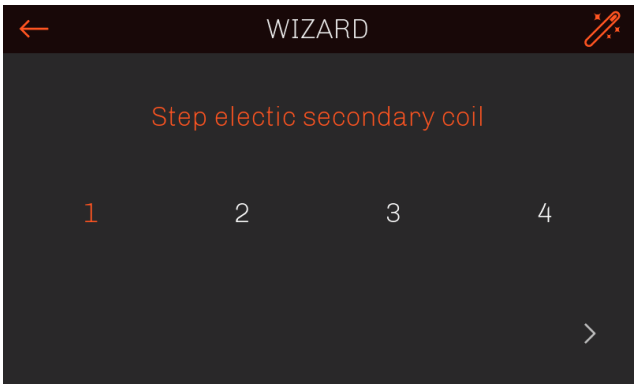
EVJ LCD or EPJ LCD user interface



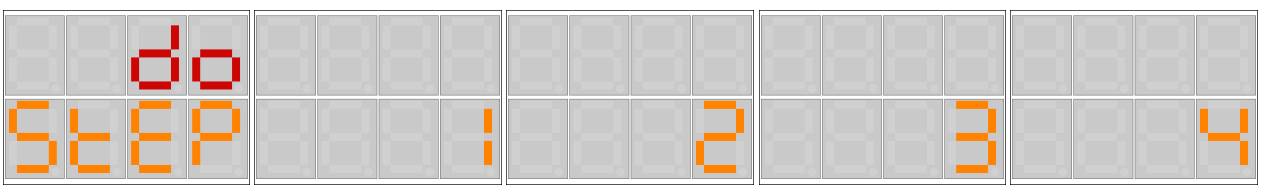
If the heating elements have been configured in the previous screen as modulating heating element plus digital heating elements (AO+DO), the number of digital heating element steps must be set.

EPJgraph

EPcolor



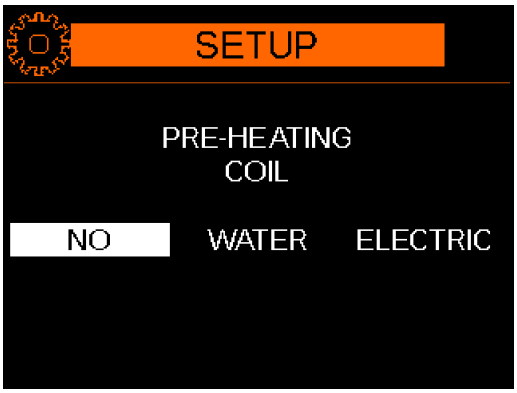
EVJ LCD or EPJ LCD user interface



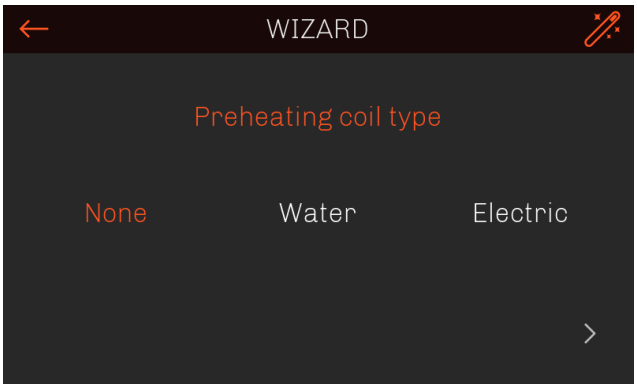
7.11 Pre-heating coil set-up

The pre-heating coil configuration is always present even if coils 1 and 2 have not been configured.

EPJgraph

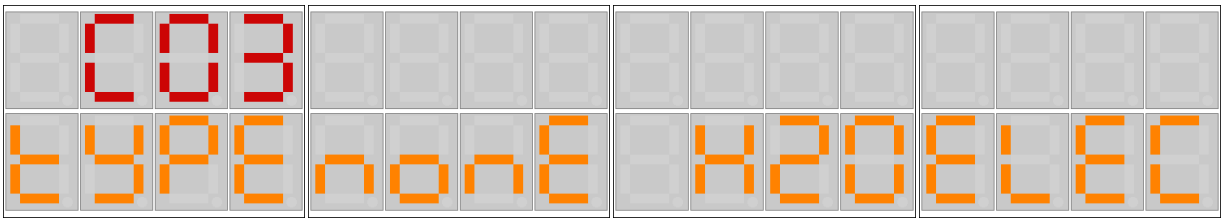


EPcolor



Screen to configure the type of pre-heating coil, select “No” if not present, “Water” for a water coil or “Electric” for an electric coil.

EVJ LCD EPJ LCD user interface

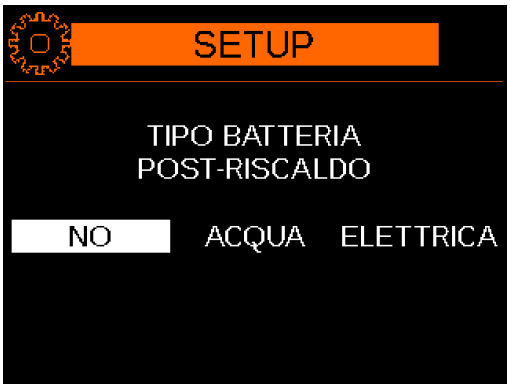


Screen to configure the type of pre-heating coil, select “nonE” if not present, “H2O” for a water coil or “ELEC” for an electric coil.

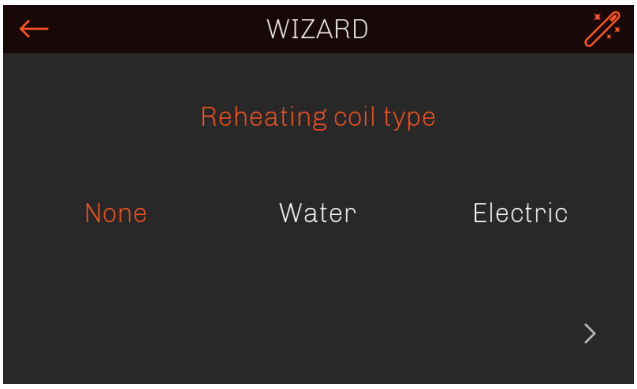
7.12 Re-heating coil set-up

If first coil has been configured for cooling or mixed mode, another coil can be configured for re-heating.

EPJgraph

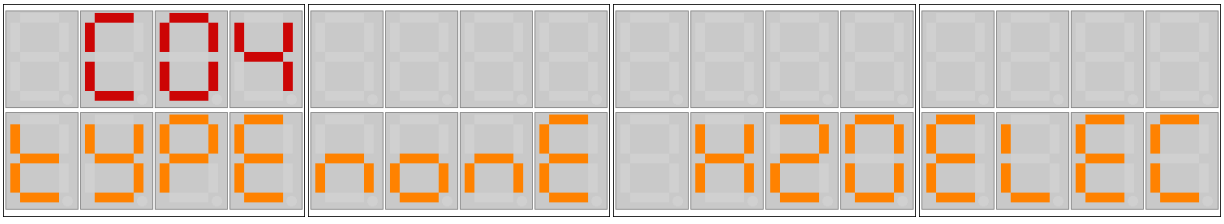


EPcolor



Screen to configure the type of re-heating coil, select “No” if not present, “Water” for a water coil or “Electric” for an electric coil.

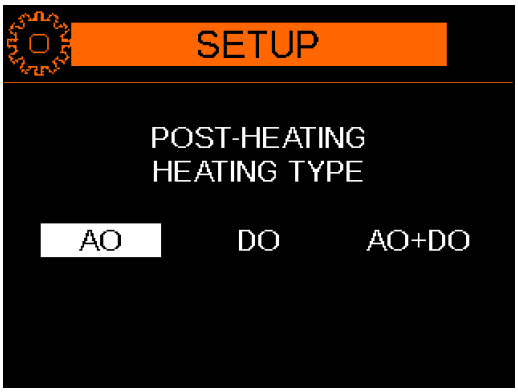
EVJ LCD or EPJ LCD user interface



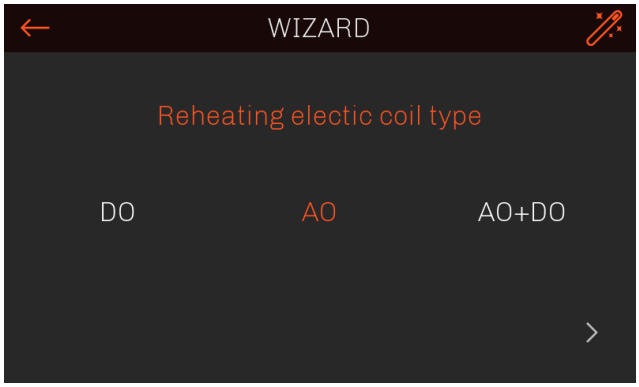
Screens to configure the type of re-heating coil, select “nonE” if not present, “H2O” for a water coil or “ELEC” for an electric coil.

If the coil in the previous screen has been configured as electric, then the type of heating elements must be selected.

EPJgraph

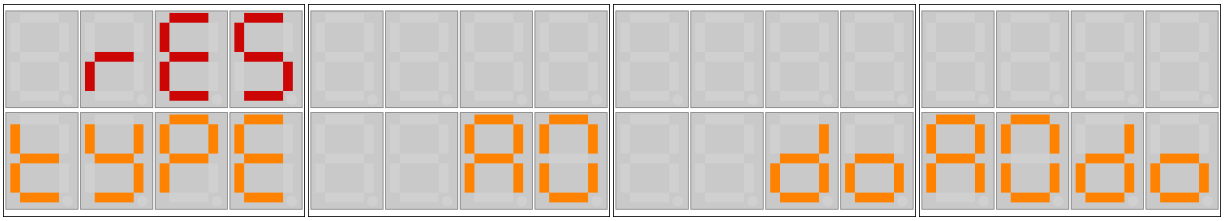


EPcolor



Screen to configure the type of post-heat heating elements, select “AO” for modulating heating elements, “DO” for digital heating elements or “AO+DO” for modulating heating element and digital heating element with sawtooth regulation.

EVJ LCD or EPJ LCD user interface

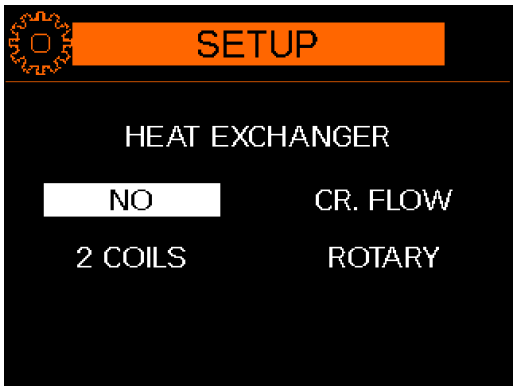


Screens to configure the type of post-heat heating elements, select “AO” for modulating heating elements, “DO” for digital heating elements or “AOdo” for modulating heating element and digital heating element with sawtooth regulation.

7.13 Heat exchanger set-up

The final configuration screen is for configuring the type of heat exchanger on the machine.

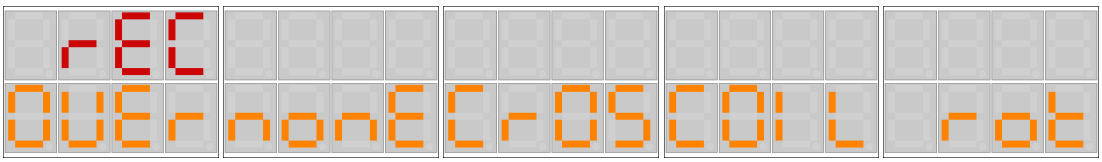
EPJgraph



EPcolor

Screen to configure the type of heat exchanger, select “No” if no unit is present, “Fl.inc” for a cross-flow unit, “2 batt.” for a double coil unit, “Rot DO” for a rotary digital unit or “Rot AO” for a rotary analogue unit.

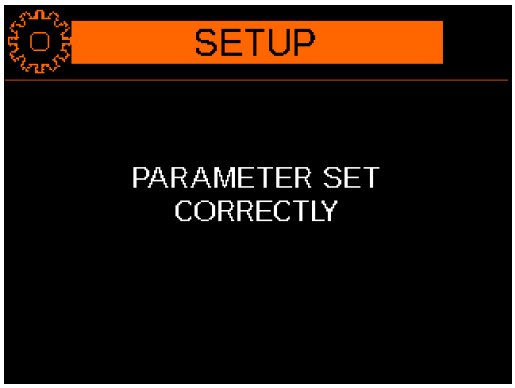
EVJ LCD or EPJ LCD user interface



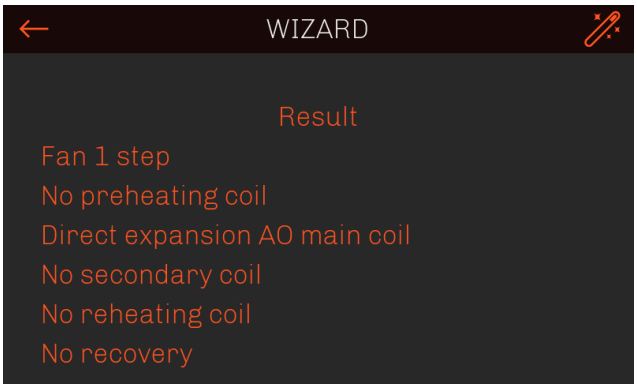
Screens to configure the type of heat exchanger, select “nonE” if no unit is present, “CrOS” for a cross-flow unit, “COIL” for a double coil unit or “rot” for a rotary unit.

Once the heat exchanger has been configured, the wizard will finish, the parameters will be set with the configurations selected and the following screen will appear:

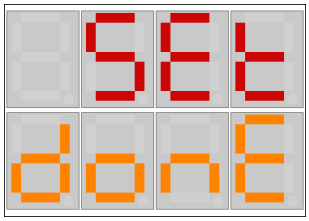
EPJgraph



EPcolor



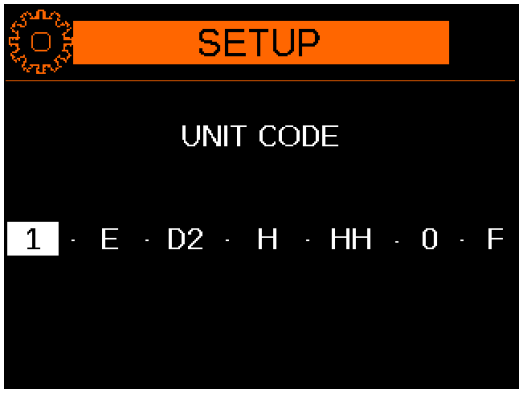
EVJ LCD or EPJ LCD user interface



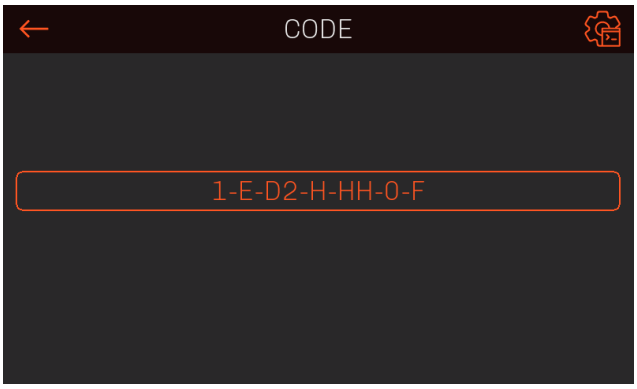
7.14 Setup using machine code

If you chose to configure the machine using machine code in the first page, the following screen will appear:

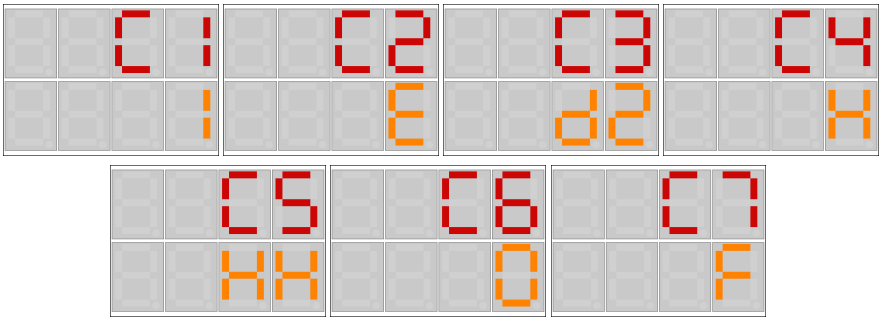
EPJgraph



EPcolor



EVJ LCD or EPJ LCD user interface



The code consists of 7 elements laid out in this order: type of fan, type of pre-heating coil, type of coil 1, modulating coil 1, type of coil 2, type of re-heating coil and type of heat exchanger. The possible configurations are outlined in the table below.

In the EPJgraph user interface, you can move between the code elements by using the LEFT and RIGHT keys. Press the SET key to confirm the configuration of an element.

It is possible to browse the code elements in the EVJ LCD or EPJ LCD interface using the UP and DOWN keys. Press the SET key to confirm the configuration of an element.

The following constraints are also present which force some elements to a predefined value:

- If the first coil is configured as disabled, the elements for the mode and second coil are forced to "disabled".
- If the first coil is configured as electric, the elements for the mode and second coil are forced to "disabled".
- If the mode for the first coil has been configured as disabled or heating, the re-heating coil element is forced to "disabled".

Element 1: fan type

0: None
1: 1-speed digital fans
2: 2-speed digital fans
3: 3-speed digital fans
M: Analogue fans
M: Modbus fans

Element 2: type of pre-heating coil

0: Absent
H: Water
E: Electric

Element 3: first coil type

00: Absent
HH: Water
D1: Digital direct expansion with 1 step
D2: Digital direct expansion with 2 steps
DM: Modulating direct expansion
E1: Electric digital 1 step
E2: Electric digital 2 steps
E3: Electric digital 3 steps
E4: Electric digital 4 steps
E5: Electric digital 5 steps
EM: Electric modulating
EN: Electric modulating + 1 digital step
EP: Electric modulating + 2 digital steps
EQ: Electric modulating + 3 digital steps
ER: Electric modulating + 4 digital steps

Element 4: first coil mode (to be configured for water and direct expansion coils only)

0: Absent
C: Cooling coil
H: Heating coil
R: Mixed coil

Element 5: second coil type

00: Absent
HH: Water
E1: Electric digital 1 step
E2: Electric digital 2 steps
E3: Electric digital 3 steps
E4: Electric digital 4 steps
E5: Electric digital 5 steps
EM: Electric modulating
EN: Electric modulating + 1 digital step
EP: Electric modulating + 2 digital steps
EQ: Electric modulating + 3 digital steps
ER: Electric modulating + 4 digital steps

Element 6: type of after-heating coil

0: Absent
H: Water
E: Electric digital
M: Electric modulating
N: Electric modulating + 1 digital step

Element 7: heat exchanger type

0: Absent
F: With cross flows

C: Double coil
R: Rotary

7.15 Fans

The type of fans is configured preliminarily in the SETUP operation carried out by the installer during the start-up operations to define the type of machine used.
The air-handling system can run two fans, one for supply and one for return.
Both fans are regulated in the same way; the type of regulation is determined by parameter *PF01* (digital temperature step regulation, modulating temperature regulation, constant pressure regulation, constant flow regulation, digital step AQ regulation, modulating AQ regulation, time band regulation, manual regulation, remote potentiometer regulation).
For a unit with 2 fans, it is possible to set a differential between the supply fan speed (reference point) and the return fan speed.
This differential can always be both positive (return fan turns faster than the supply fan) and negative (return fan turns more slowly than the supply fan) and is defined by the parameters:

- *PF28* in the case of modulating fans with automatic regulation. The differential in this case is defined as a percentage. For example, by setting *PF28*=20%, the return fan will always turn 20% faster than the supply fan.
- *PF29* in the case of "digital step" fans. The differential in this case is defined as the number of speed steps. For example, by setting *PF29*=-1, the return fan will always turn one step more slowly than the supply fan.

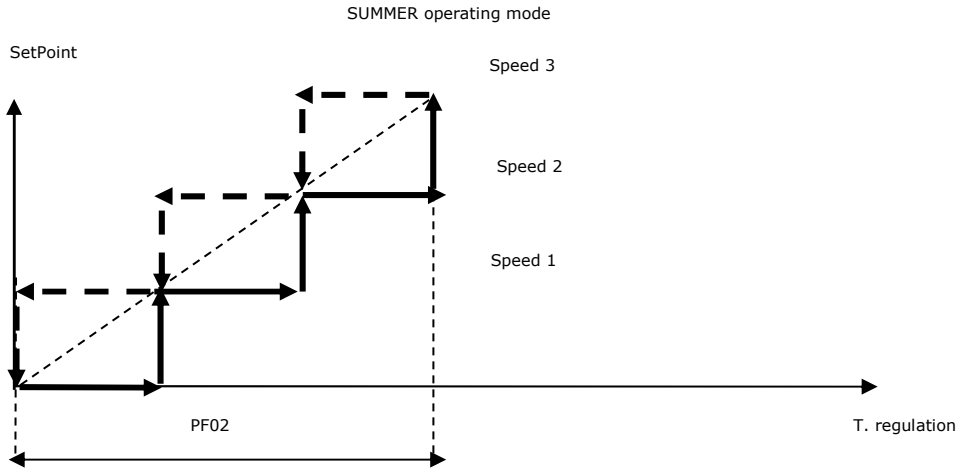
However, the minimum and maximum limits of the return fan always apply (V1/V3 for step fans and parameters *PF03/PF04* for constantly modulating fans).

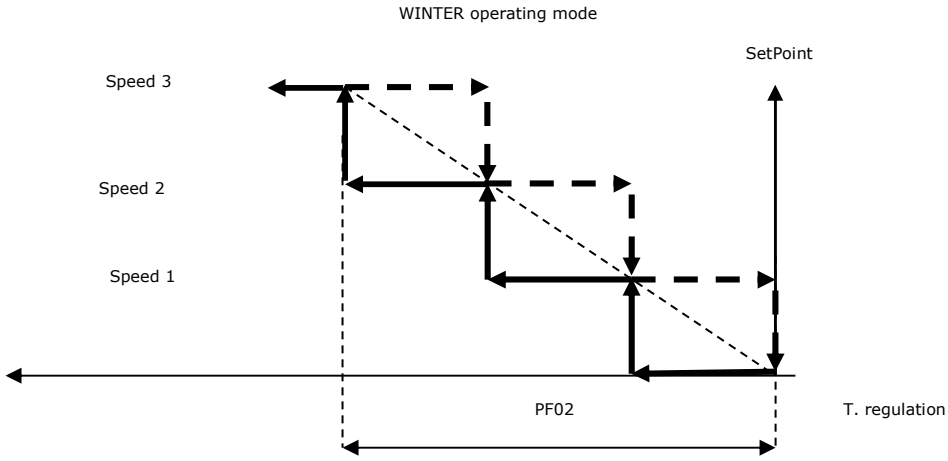
It is possible to limit the minimum fan speed in the case of resistances or active compressors by acting on parameters PF07 and PF12. In the case of step regulation, for a correct minimum speed the number of steps must be set (1.0 = 1 step, 2.0 = 2 steps, 3.0 = 3 steps). In the case of pressure or constant flow regulation, these parameters are to be understood as the minimum setpoint in the case of resistors or active compressors and will have as a unit of measure Pa or m3 / min. Furthermore, in the case of pressure or constant flow regulation with two separate sensors for delivery and return, it is possible to set different minimum speed parameters for recovery by acting on parameters PF13 and PF14.
In the case of activation of the digital defrost input or defrosting of the direct expansion coil, the speed at which the fans must go during these phases is possible by setting the parameters PF10 for the delivery and PF11 for the recovery. In the case of step regulation, the number of steps must be set (1.0 = 1 step, 2.0 = 2 steps, 3.0 = 3 steps). In the case of constant pressure / flow regulation, parameters PF10 and PF11 are to be understood as setpoints, they will have Pa or m3 / min as the unit of measurement and will be used by the regulations throughout the defrosting phase.
Regardless of the differential, switching off the supply fan will always cause the return fan to switch off as well.
The fan type is determined by the configuration of the relevant hardware parameters.
The temperature regulation probe controls the fans via a setpoint and a differential value (PF01=0 or 1).
The parameter *PF05 = Minimum time that must elapse between switching on the two fans (supply and return)* allows you to set the delay between the start of the supply and return fans.

PF01: Type of fan regulation
PF05: Minimum time lapse between switch-on of both fans (supply and return).

7.16 Digital step regulation (PF01 = 0)

The digital regulation in steps allows you to switch the fans on and off based on the regulation temperature.
The regulation temperature is compared with a control setpoint (*SEtC, SEtH*) and a differential (*PF02*).
The differential is divided proportionally according to the configuration of the number of fans.
If *PF01 = 0,* the fan speed regulation is based on the regulation temperature (supply or ambient temperature based on parameter *PC10*) according to the diagrams shown below.
Each operating mode (summer/winter) has its own regulation pattern.





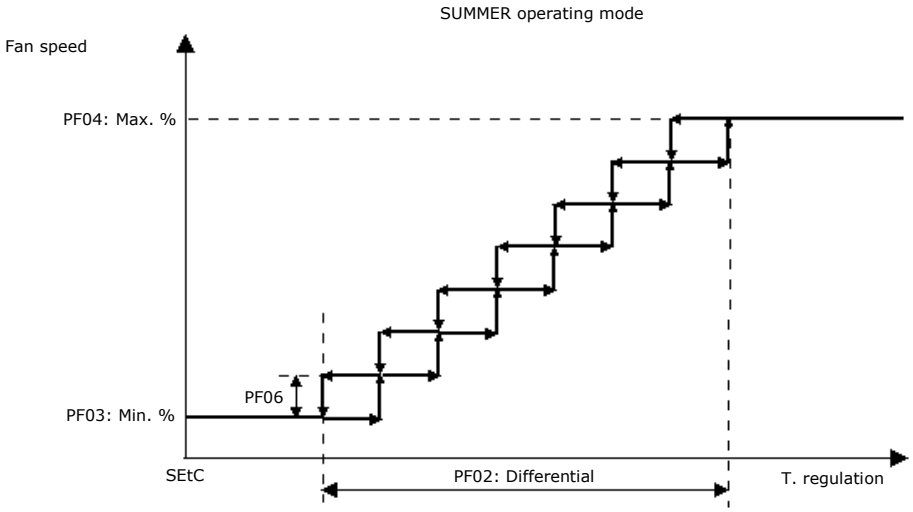
7.17 Modulating temperature regulation (PF01 = 1)

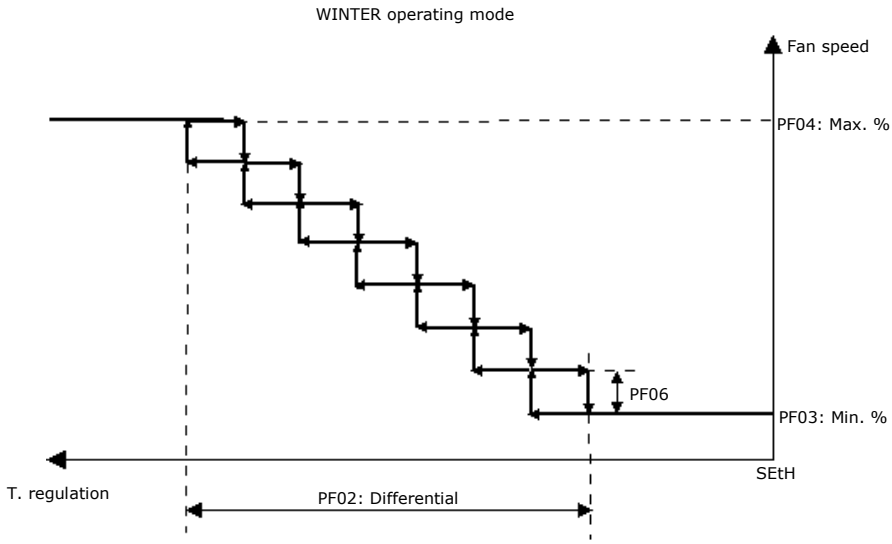
This regulation performs a more accurate control than the digital regulation of the heating (winter operation) or cooling power (summer operation), focusing on energy saving in particular.

The temperature regulation probe controls the variable fan speed which will increase or decrease by the step value defined by parameter *PF06 Modulating or manual step value regulation*.

The control setpoint (*SEtC*, *SEtH*) and proportional band (*PF02*) must be definite. To set this regulation, select *PF01=1*.

Each operating mode (summer/winter) has its own regulation pattern.





PF01: Fan regulation type
PF02: Fan speed regulation differential
PF03: Minimum fan speed
PF04: Maximum fan speed
PF06: Modulating or manual step regulation value

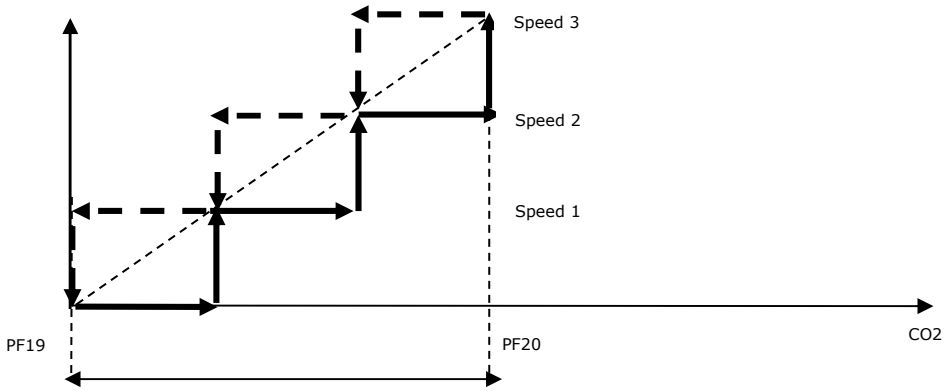
7.18 Constant pressure/flow regulation (PF01 = 2) (PF01 = 3)

Connecting a pressure/flow sensor to the unit makes it possible to adjust the fan speed and keep it constant. The regulation is in the neutral zone.
When the pressure/flow value remains inside the neutral zone, the fan operates at the optimal speed, when the pressure/flow value is outside the neutral zone, the fan speed will be increased or decreased by the value indicated by parameter *PF45* every *PF44* seconds.
If you configure another pressure/flow sensor, you can separate the operation of the supply fans from the return fans. The fan speed will be increased/decreased by the value indicated by parameter *PF45* every *PF44* seconds. The regulation of the return fan will have an independent fan setpoint, neutral zone and flow coefficient while all the other parameters will be the same as the ones for the supply fan.
To allow for independent linear operation, the return pressure/flow sensor will have dedicated minimum and maximum threshold values (*PH01-PH02* for supply fan and *PH23-PH24* for recovery fan).
Since there is a single setpoint for pressure and flow, pay attention that if a constant flow regulation is used the unit of measurement of the setpoint is cubic meters per minute while if a constant pressure regulation is used, the unit of measurement of the setpoint is Pascal.
If the time bands are active for constant pressure / flow rate regulation, a different setpoint will be used, defined by parameters PF59, PF60 and PF61 for the flow and PF62, PF63 and PF64 for the recovery according to the active time band.
It is also possible to set a minimum pressure / flow setpoint to be used in the case of active heaters or compressors, separate for supply and return, by correctly configuring parameters PF07 and PF13 for the heaters and PF12 and PF14 for the compressors. If the current regulation setpoint is higher than the minimum setpoint, the reference will remain unchanged, while if the current regulation setpoint is lower, the minimum setpoint will be used to ensure correct fan speed. The unit of measurement of these parameters is Pa in the case of constant pressure regulation or m^3/min in the case of constant flow regulation.
If the digital defrost input is active or defrosting the direct expansion coil is active, it is possible to set a dedicated pressure / flow setpoint for these phases, by setting parameter PF10 for the supply and PF11 for the return.
There is the function to memorize the last speed of reaching the setpoint, which can be enabled through parameter PF49. If this function is active (default) and the setpoint has been reached at least once, the fans at the next activation request will go to this initial speed, visible in the meter section maintenance menu from the parameters LMSF for the supply and LMRF for the return.

PF01: Fan regulation type
PF03: Minimum fan speed
PF04: Maximum fan speed
PF07: Minimum supply speed with active heater
PF10: Supply fan speed with active defrost
PF11: Return fan speed with active defrost
PF12: Minimum supply speed with active compressor
PF13: Minimum return speed with active heater
PF14: Minimum return speed with active compressor
PF40: Constant supply pressure/flow setpoint (the unit of measure for the flow will be in tens of cubic metres/minute)
PF41: Constant supply pressure/flow neutral zone
PF42: Constant return pressure/flow setpoint (the unit of measure for the flow will be in tens of cubic metres/minute)
PF43: Neutral zone constant return pressure/flow
PF44: Constant pressure/flow fan speed increase/decrease time
PF45: Fan speed increase/decrease percentage in constant pressure/flow
PF46: Constant pressure/flow fan start-up speed
PF47: Fan start-up time in constant pressure/flow
PF48: Supply fan flow coefficient
PF49: Enable speed recording for constant pressure/flow regulation
PF50: Minimun setpoint value supply pressure/flow
PF51: Maximum setpoint value supply pressure/flow
PF52: Minimun setpoint value return pressure/flow
PF53: Maximum setpoint value return pressure/flow
PF56: Return fan flow coefficient
PF59: Comfort band supply pressure/flow setpoint
PF60: Economy band supply pressure/flow setpoint
PF61: Night band supply pressure/flow setpoint
PF62: Comfort band return pressure/flow setpoint
PF63: Economy band return pressure/flow setpoint
PF64: Night band return pressure/flow setpoint
PH01: Minimum threshold value for supply pressure/flow probe
PH02: Maximum threshold value for supply pressure/flow probe
PH23: Minimum threshold value for return pressure/flow probe
PH24: Maximum threshold value for return pressure/flow probe
LMSF: Last recorded speed supply pressure/flow
LMRF: Last recorded speed return pressure/flow

7.19 AQ step regulation (PF01 = 4)

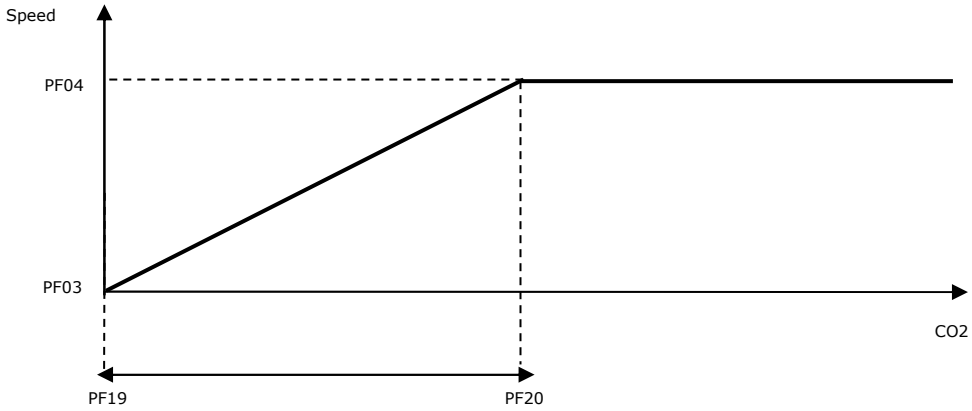
This regulation is the same as the digital one in temperature steps, but is based on the air quality probe which must be connected and configured.



PF01: Fan regulation type
PF19: Minimum setpoint air quality regulation
PF20: Maximum setpoint air quality regulation
PH37: Minimum value air quality transducer
PH38: Maximum value air quality transducer

7.20 AQ modulating regulation (PF01 = 5)

This regulation based on the air quality probe that must be connected and configured, sets the fan speed between a minimum setpoint defined by parameter *PF19* and a maximum setpoint defined by parameter *PF20* as described in the graph below.



PF01: Fan regulation type
PF03: Minimum fan speed
PF04: Maximum fan speed
PF19: Minimum setpoint air quality regulation
PF20: Maximum setpoint air quality regulation
PH37: Minimum value air quality transducer
PH38: Maximum value air quality transducer

7.21 anual regulation (PF01 = 6)

When manual regulation is selected by pressing and holding down | ← | and | → | keys (UP/ DOWN), it is possible to increase or decrease the fan speed (both on-off and modulating). A buzzer on the keypad warns the user of the correct speed increase/decrease.
The speed of the manual regulation can also be set by acting on the FSM parameter Manual fan setpoint present in the user menu.
In digital fans, the speed will increase/decrease by one step at a time while in the analogue fans, the speed will increase/decrease by the value defined by parameter *PF06 Modulating or manual regulation step value*.

In this regulation, the fan speed is set to the value of the *FSC*, *FSE* and *FSN* parameters according to which time band is active.

FSC: Comfort time band fan setpoint

FSE: Economy time band fan setpoint

FSN: Night time band fan setpoint

In the case of digital fans, the percentage to be set depends on the number of steps configured:

- 3 steps: percentage from 0 to 32%: no active step; from 33 to 65%: one active step; from 66 to 99%: two active steps; 100%: 3 active steps.
- 2 steps: percentage from 0 to 49%: no active step; from 50 to 99%: one active step; 100%: 2 active steps
- 1 step: percentage from 0 to 99%: no active step; 100%: 1 active step.

7.22 Regulation of the remote potentiometer (PF01 = 7)

This regulation is based on the remote potentiometer of the fans which must be connected and not in error mode. The speed will be in line between the minimum *PF03* and the maximum *PF04* based on the value of the relevant sensor.

7.23 Set-speed forced by keypad or DI

Depending on which fan regulation has been configured via parameter *PF01*, this function allows you to modify the regulation setting or the fan speed directly. This function can be activated in 3 ways:

- by acting directly on the parameter *PF36 Type of forced setpoint* from the Installer menu
- by configuring and activating the digital inputs for changing the setting/speed of the fans (see configuration table DI for further information)
- by pressing the UP/DOWN keys (UP to select the higher forced setting, DOWN to select the lower forced setting). A buzzer on the keypad warns the user of the correct change to the setpoint or speed.

The forced setpoint values are defined by the following parameters: *PF21* for forced setpoint 1, *PF22* forced setpoint 2 e *PF23* forced setpoint 3. Their operation and unit of measurement will change based on the type of regulation used and will be described in the sections below.

If a constant pressure/flow regulation is used with two sensors, it is possible to use independent forced setpoints for the return, by configuring the *PF21*, *PF22* and *PF23* parameters for the supply regulation and the *PF33*, *PF34* and *PF35* parameters respectively for forced setpoint 1, forced setpoint 2 and forced setpoint 3 of the return regulation.

- If a digital regulation with temperature steps is used (*PF01=0*) or a modulating temperature regulation (*PF01=1*), the forced setpoints are intended as temperature setpoints, so their unit of measurement will be defined by parameter*PH32*. With forcing active, the forced setpoint will be used instead of the current set-point to make the regulation.
- if constant pressure regulation is used (*PF01=2*), the forced setpoints are intended as pressure settings. The unit of measurement of the supply forced settings (parameters *PF21, PF22, PF23*) will be tens of Pascal.

With forcing active, the forced setpoint will be used instead of the regulation setpoint defined by the parameter *PF40 - Constant supply pressure/flow setpoint*.

If two independent sensors for supply and return are used, with forcing active, the forced setpoint will be used instead of the regulation setpoint defined by the parameter *PF42 - Constant return pressure/flow setpoint*.

- if constant flow regulation is used (*PF01=3*), the forced setpoints should be intended as flow setpoints. The unit of measurement of the supply forced setpoints (parameters *PF21, PF22, PF23*) will be tens of cubic metres per minute.

With forcing active, the forced setpoint will be used instead of the regulation setpoint defined by the parameter *PF40 - Constant supply pressure/flow setpoint*.

If two independent sensors for supply and return are used, with forcing active, the forced setpoint will be used instead of the regulation setpoint defined by the parameter *PF42 - Constant return pressure/flow setpoint*.

- if an AQ digital step regulation (*PF01=4*) or an AQ modulating regulation is used (*PF01=5*), the forcing will have NO effect.
- if a manual regulation (*PF01=6*) or a remote regulation is used (*PF01=7*), the forced setpoints should be intended as speeds, so their unit of measurement will be %.

With forcing active, the fan speed will equal to the value of parameter *PF21, PF22 or PF23* based on the forced setpoint used. In the case of digital fans, the percentage to be set depends on the number of steps configured:

- 3 steps: percentage from 0 to 32%: no active step; from 33 to 65%: one active step; from 66 to 99%: two active steps; 100%: 3 active steps.
- 2steps: percentage from 0 to 49%: no active step; from 50 to 99%: one active step; 100%: 2 active steps.
- 1step: percentage from 0 to 99%: no active step; 100%: 1 active step.

In the case of manual regulation, pressing the UP and DOWN keys will not have any effect on the choice of the forced setpoint because these keys are already used to increase/decrease speed.

7.24 Fan booster function (for units without warm-up damper only)

If the warm-up damper is configured, this function CANNOT be enabled, the configuration of a digital input as "Fan booster" or by pressing and holding down the RIGHT key do not have any effect.

This function can be enabled simply by configuring a digital input as "Fan booster" or by pressing and holding down the RIGHT key on any screen. A buzzer on the keypad warns that the booster function has been correctly enabled.

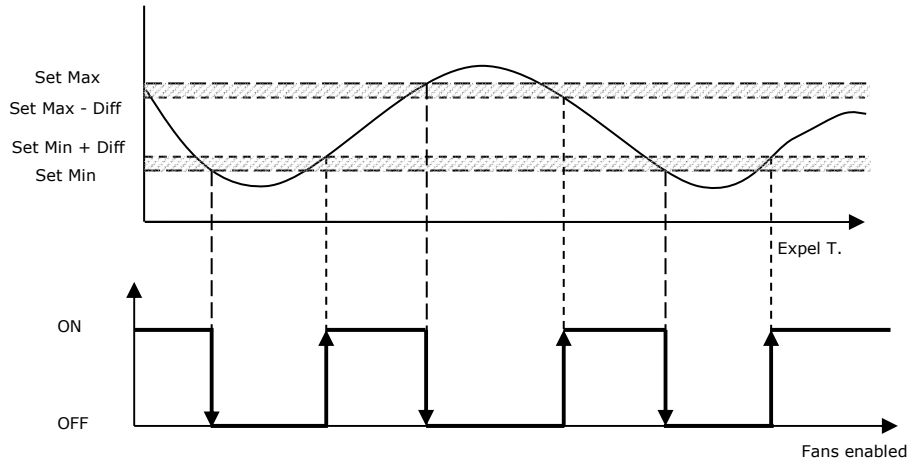
Enabling this function will force the supply fan to switch off and the return fan to maximum speed. The fans are, however, still subject to any interventions triggered by alarms.

The function will remain active for a time defined by parameter *PF58* if it has been activated by pressing a key or until the digital input is opened if it has been activated by digital input.

7.25 Minimum/maximum supply temperature

This function is useful for avoiding the introduction into the room of air that is too hot (in summer) or too cold (in winter) above all when the treatment coils are not working.

When the supply temperature exceeds the maximum or minimum parameters *PF16* or *PF17*, ventilation is halted.



PF15: Enables fan limitation
PF16: Minimum limitation temperature
PF17: Maximum limitation temperature
PF18: Fan limitation differential

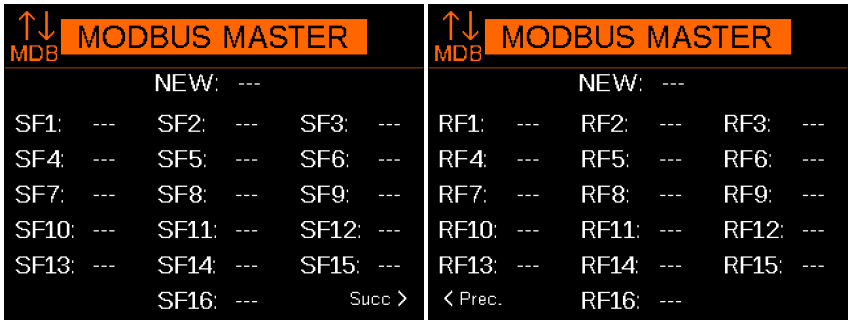
7.26 Extraction cycles

When the temperature control probe is positioned on the return duct (parameter *PG14=1*), the fans can be switched off when the setting is reached by activating the return fan cycle to measure the room temperature (enabling parameter *PC05*).
The cycle consists of a waiting time (parameter *PC06*), during which the fans stay switched off, and a waiting time for activation (parameter *PC07*), during which the fans are switched on. The cycle starts, always with a pause period, as soon as the fan is switched off by room regulation (conditions met). The cycle ends if during the activation phase the room temperature regulation ramp exceeds the fan activation point.
Parameter *PC08* allows you to decide whether to activate only the return fan (*PC08 = 0*) or both the supply and return fans (*PC08 = 1*) when assessing the room conditions.
The time allowed to activate the fans during the cycle (parameter *PC07*) must be long enough compared to the protection time during start-up of the two fans (parameter *PF05*), to ensure that both fans can switch on during the start-up phase of the measurement air quality.

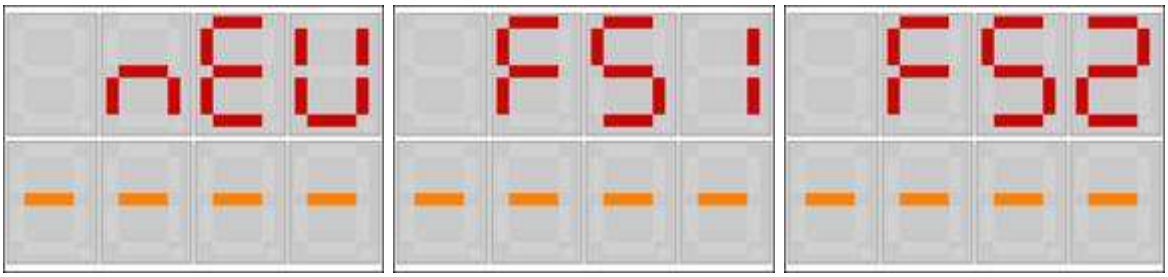
7.27 Modbus fan management

To use the Modbus fans, you must configure the number of supply and return fans in the unit (parameters *PF70* e *PF73* respectively) and their type by choosing between EBM, Ziehl oppure gli inverter EVCO (*PF71* and *PF74* parameters). It is also possible to configure the number of supply and return fans in alarm to trigger an alarm for blocking the unit (*PF72* e *PF75* parameters).
For EVCO inverters, all the parameters relating to the control and the motor connected to it must also be set by acting on parameters Pd01-Pd16 for the supply inverter and Pd31-Pd46 for the return inverter available in the inverter section manufacturer menu. . Once the self-addressing is finished, it will always be possible to configure the EVCO inverters by sending the parameters to the inverter using the command in the inverter menu. It is advisable to use this function with the machine off and the engine stopped.
Once configured, the fans will be able to execute the self-aligning procedure: on the display used, the Modbus fan page featured in the Mb Master section of the maintenance menu must be loaded and only one fan connected at a time, starting with the supply fans and followed by the return fans.
Every 30 seconds, the program will check if any new fans are present. If a new fan is detected that has not yet been configured, the message OK will appear next to the word NEW. Self-alignment will then automatically occur by resetting the fan software. The supply fan addresses will range from 10 to 25 while the return fan address will range from 30 to 45. Once the procedure is finished the word OK will disappear next to NEW and will appear on the configured fan, at this point it will be possible to proceed with the next fan.
To use Modbus fans it is necessary to configure the number of supply and return fans present in the unit (parameters PF70 and PF73 respectively) and their type by choosing between three-phase or single-phase EBM and three-phase or single-phase Ziehl (parameters PF71 and PF74). It is also possible to configure the number of supply and return fans in alarm to generate a blocking alarm for the unit (parameters PF72 and PF75).
Once the fans have been configured, it will be possible to run the self-alignment procedure:
1) On the display used, the Modbus fan page featured in the Mb Master section of the Maintenance menu must be loaded

EPJ Graph



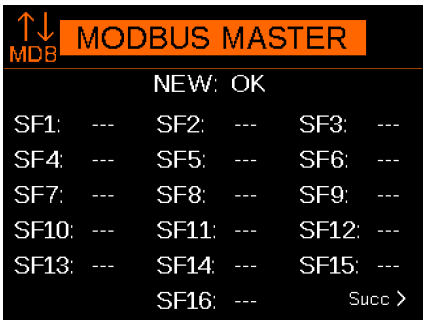
EVJ LCD and EPJ LCD user interface



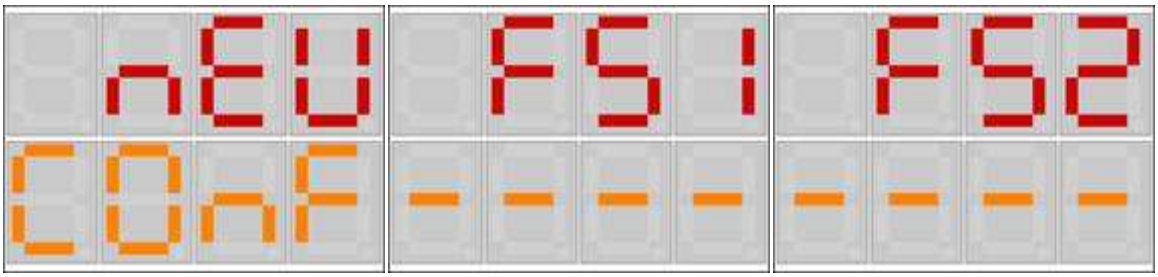
2) Connect the supply fan first. To correctly align the fans, run the procedure on the supply fans first, followed by the return fans. WARNING: it is important to connect one fan at a time.

3) Every 30 seconds, the program will check if any new fans are present. If a new fan is detected that has not yet been configured, the message OK will appear next to the word NEW.

EPJ Graph



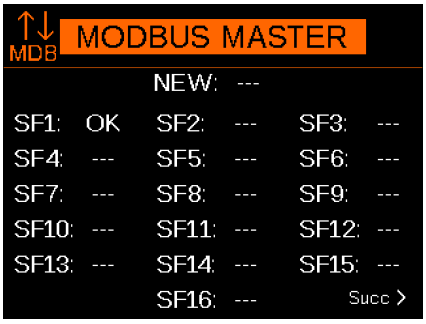
EVJ LCD or EPJ LCD user interface



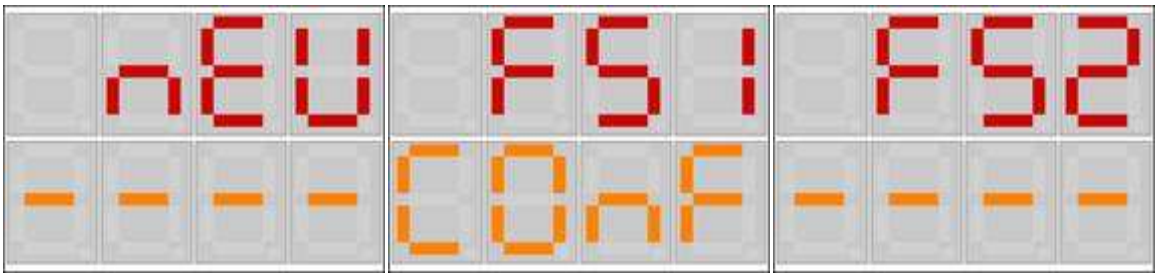
4) The program will now automatically self-align by performing a software reset of the fan. The supply fan addresses will range from 10 to 25 while the return fan address will range from 30 to 45. A fan is typically recognised within 60 s.

5) Once the fan has been aligned, the message OK will appear next to the fan configured and you can proceed to the next fan.

EPJ Graph



EVJ LCD and EPJ LCD user interface



Example of fan allocation with 2 supply and 2 return fans:

First to supply > Second to supply > First to return > Second to return

7.28 Fan status

Below are the different operating modes in which each fan may find itself:

1. *Disabled:* the fan has not been configured for the system. In this state, you will see the symbol "---" on the user interface.
2. *Off*: the fan is switched off. In this state, you will see "*OFF*" displayed on the user interface.
3. *On*: the fan is switched on. In this status, you will see "*ON*" displayed on the user interface.
4. *Waiting for Start-up:* the fan is ready for switch on but is momentarily in a queue. In this state in the user interface you will see written (and flashing) "WON".
5. *Alarm*: the fan is in alarm status due to a dedicated digital input. In this state, you will see "ALARM" displayed on the user interface.
6. *Manual*: the fan is operating manually. In this state, you will see "MANU" displayed on the user interface.
   A fan operating manually is nevertheless sensitive to eventual alarms; in this case the status will be that of Alarm.

7.29 Fan alarm inputs

For each of the fans present, it is possible to configure a thermal alarm or a tachometric alarm through the dedicated digital inputs.
Activating one of the digital protection inputs generates a blocking alarm for the unit.
The tachometer alarm, which is manually reset, is activated after a delay defined by parameter PA61 if the rpm measured by the digital tachometer input (only configurable in the high frequency digital inputs) is lower than the rpm calculated on the minimum speed defined by parameter PA62. To calculate the latter, it will also be necessary to set the maximum rpm that can be reached by the fan defined by parameter PF66 for the supply fan and PF68 for the return fan. A delay is also managed from the start of the fan defined by parameter PA60. For correct alarm management it will also be necessary to define the impulses per revolution of the fan by acting on parameter PF67 for the delivery and PF69 for the return.

7.30 Ambient temperature probe error

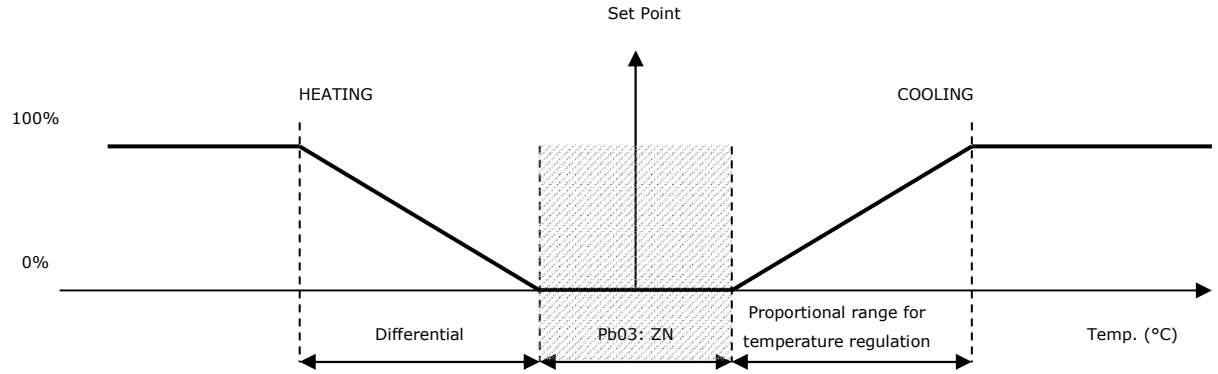
If an error occurs on the control probe, the speed defined by the manual set point FSM will be used or if the time bands are active, the set point of the active time band (FSC, FSE or FSN depending on the band).

8 MAIN CONTROLS

The unit regulates both the temperature and the humidity. Both regulations include a Neutral Zone (parameter *Pb03* for temperature and *PU02* for humidity) within which no regulation is made. The regulation logic is shown below.

The **temperature regulation** works on the heating and cooling coils in order to maintain the temperature as close as possible to the setpoint.

The diagram below shows a purely proportional system even if the regulation includes an integral part enabling errors to be cancelled while up and working.



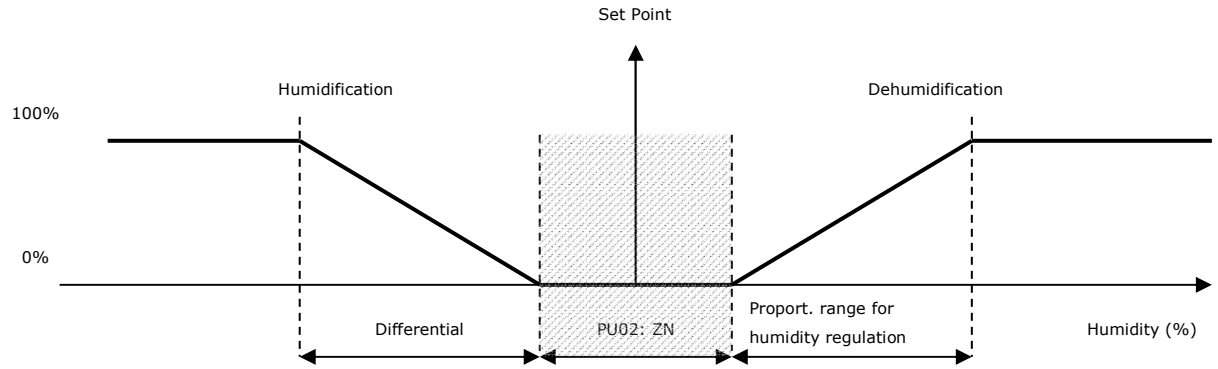
Pb01: Proportional band for temperature regulation

Pb02: Integral time for temperature regulation

Pb03: Neutral zone temperature regulation

Humidity regulation acts on the humidifier and on the dehumidification process (using the cooling coil) to keep the humidity as close as possible to the setpoint. The humidification process can be carried out using an On-Off humidifier.

The diagram below shows a purely proportional system even if the regulation includes an integral part enabling errors to be cancelled while up and working.



PU02: Neutral zone humidity control

PU03: Humidity regulation proportional band

PU04: Humidity regulation integral time

For both of the controls (humidity and temperature), the *Neutral Zone* is positioned around the setpoint. The starting point of the respective regulation functions are respectively: *SP + (ZN/2)* and *SP - (ZN/2)*.

8.1 Cooling and heating regulation

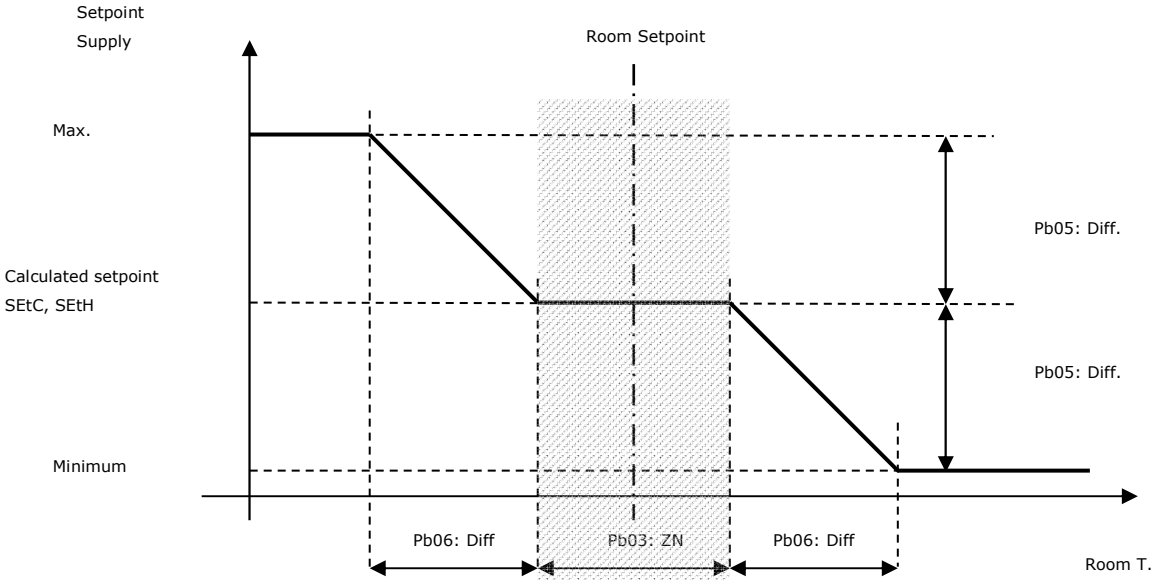
It is possible to configure which probe, either the supply or return probe, to use for regulations, using parameter *PC10 - Control probe*. In direct expansion units, this parameter is forced by using the return probe so any change will have no effect. If both probes are present and an error condition occurs on the selected probe, the other probe will be used until the error condition of the regulation probe is solved.

If there is a return/room probe as well as the supply probe and having chosen the latter as the control probe, the regulation will be in a "cascade". The temperature setpoint for the supply air depends on the differential in room temperature in relation to the setpoint.

The valve is controlled by a proportional algorithm (P) or by a proportional integral controller (PI). The reference probe is the for the supply temperature as described in the following sections.

Cascade control

This regulation involves the modification of the supply threshold in relation to the deviation between setpoint and return/room temperature as indicated in the diagram. The supply threshold calculated in this way will determine the modulating control of the valves.

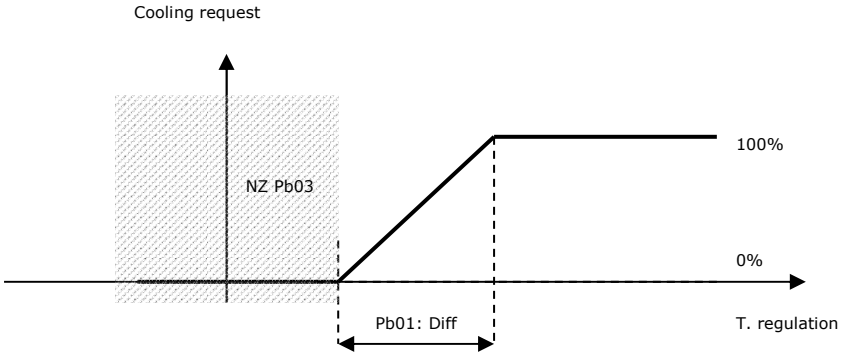


The *Minimum limit* and the *Maximum limit* are expresses as a deviation (parameter *Pb05*) of the temperature compared to *SEtC*, room regulation setpoint.
The neutral zone is the same zone set for regulating the supply temperature coils.
If set to *Pb05=0* the function will behave as if it is not enabled, in which case the supply setpoint will coincide with the regulation setpoint.

8.2 Modulating coil regulation

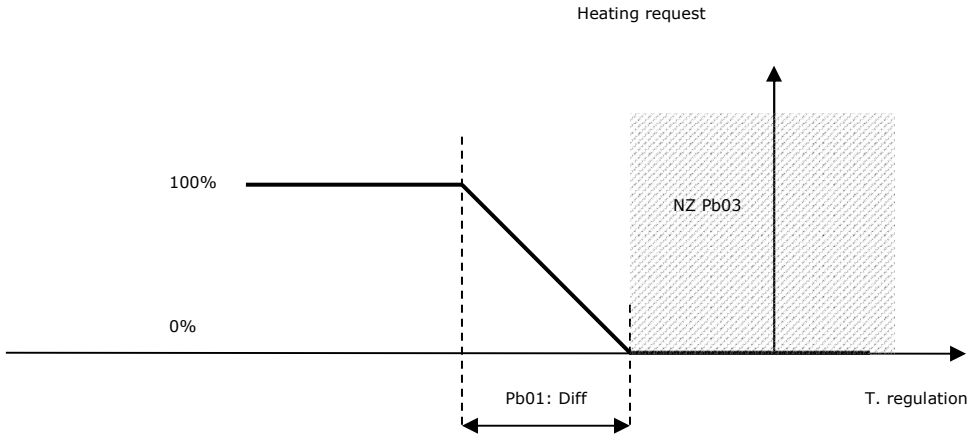
In order to use only proportional regulation, the integral time has to be set at zero (parameter *Pb02=0*). Setting an integral time above zero (parameter *Pb02>0*) provides more precise regulation in that the integral part brings the output to working order thus reducing the error introduced by the proportional component only (by default the integral component is disabled).

COOLING: proportional regulation of the cooling coil.



The cooling valve is the same as that which is utilized for the dehumidification, thus the cooling control is also influenced by the request for dehumidification; for additional information refer to paragraph *"Dehumidification regulation"*.

HEATING: Proportional regulation of the heating coil.

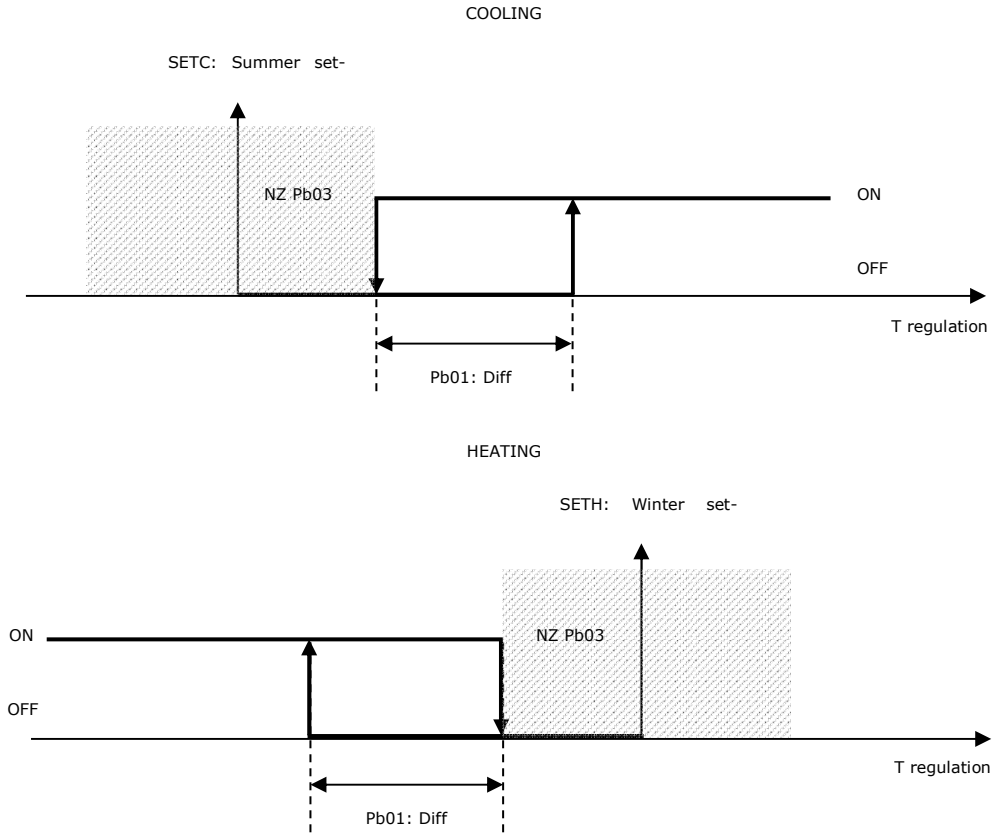


If an error occurs on the regulation probe, it is possible to select the valve opening value during the alarm by setting the parameters *Pb10* and *Pb11.*

For direct expansion, the probe error forces the regulation output to 0.

8.3 Coil on-off regulation

It is possible to set an on-off type regulation of the coils by configuring a digital output such as *"Coil N on-off"*.
The digital output will be activated when the request for cooling or heating of the coil reaches 100%, and will be deactivated when the request has been completed.



SETC: Summer setpoint
SETH: Winter setpoint
Pb01: Coil regulation differential
Pb03: Temperature control neutral zone

8.4 3-point control of water coils

In addition to modulating and on-off regulation, a 3-point control can also be set using two digital opening control outputs and the closing of the water valve. To enable this control, both opening and closing relays of the relevant coil must be configured.

To correctly control the water valve, it is necessary to set the following parameters:

- time taken by the valve to switch from 0% to 100% (parameters *Pb44* for the first coil, *Pb46* for the second coil, *Pb48* for the pre-heating coil, *Pb51* for the re-heating coil).
- maximum time to maintain the end-of-run signal on the relays (parameters *Pb45* for the first coil, *Pb47* for the second coil, *Pb49* for the pre-heating coil, *Pb52* for the re-heating coil).
- minimum variation: if greater than 0, the command to the relays is given only when the actual variation on the control ramp exceeds the set value. This parameter is the same for all 4 coils (parameter *Pb50*).

Every time the controller is switched on or the power is reset after a black-out, the valve is realigned; for the entire run time (plus any time the signal is maintained for the end of the run), the valve is closed and the control is interrupted. Once the run time has elapsed, the control will return to its normal operating state. This is necessary to ensure that the valve is correctly positioned.

In the pages related to the coil status, the current state of the water valve will be displayed which can be one of the following, the equivalent displays for the EVJ LCD or EPJ LCD user interface are shown in brackets:

1. *Disabled:* the valve is disabled. While in this state you will see the symbol "---" on the user interface.
2. *Closed:* the valve is closed (value 0.0%). In this state, you will see "Closed" (CLOS) displayed on the user interface.
3. *Opening:* the valve is opening. In this state, you will see "Opening" (OPnG) displayed on the user interface.
4. *Open:* the valve is fixed and open at a specific value. In this state, you will see "Open" (OPEn) displayed on the user interface.
5. *Closing:* the valve is closing. In this state, you will see "Closing" (CLnG) displayed on the user interface.
6. *Alignment:* the valve is aligned due to start-up or when power is restored. In this state, you will see "Allin." (ALIn) displayed on the user interface.

8.5 Second coil

The second coil is always a heating coil and it can be water or electric.

There are 3 types of control that can be configured for the water coil:

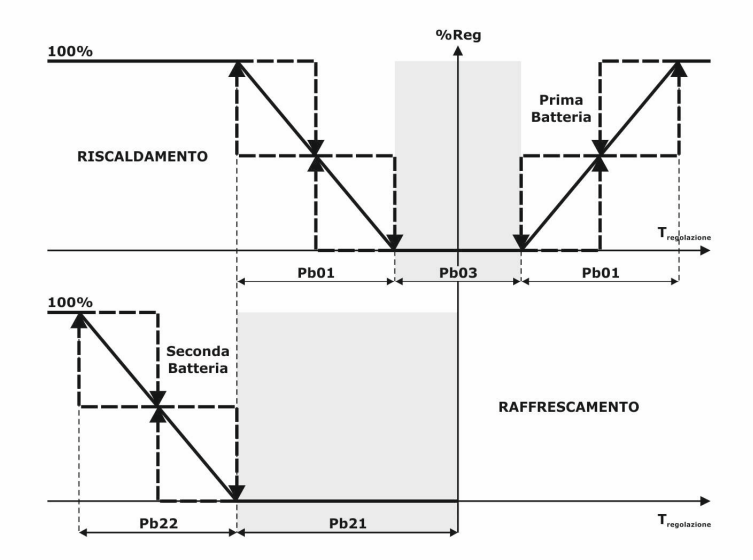
- modulating by configuring an analogue output as "Vmix second coil"
- with 3 points by configuring 2 digital outputs, one as "coil 2 opening" and one as "coil 2 closing". For the information on how it works, please refer to the previous section.
- on-off by configuring a digital output as "On-Off coil 2".

If the coil is electric, please refer to the specific sections (8.10.1 and successive)

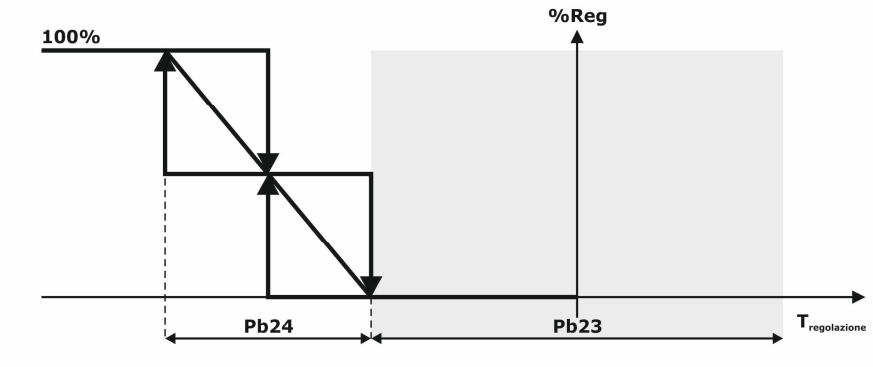
If the first coil functions in heating mode, the second will be used to integrate the heat, in which case regulation is according to the settings for parameters *PB21* (neutral zone) and *PB22* (differential). The second coil will never be active unless the first coil is regulating to 100% of its capacity.

If the first coil is working in cooling mode and there is no dedicated coil for re-heating, the second coil will act as a re-heating coil in the dehumidification phase to compensate for any excessive drop in temperature.

In this case, the second coil controls based on the primary control parameters *PB01* (differential) and *PB03* (neutral zone).



If the machine is working in cooling mode and a coil is a heater coil, the mid-season function will be active, that being a heating phase using heaters if the temperature falls below the regulation setpoint, in which case parameters *PB23* (neutral zone) and *PB24* (differential) will have effect.

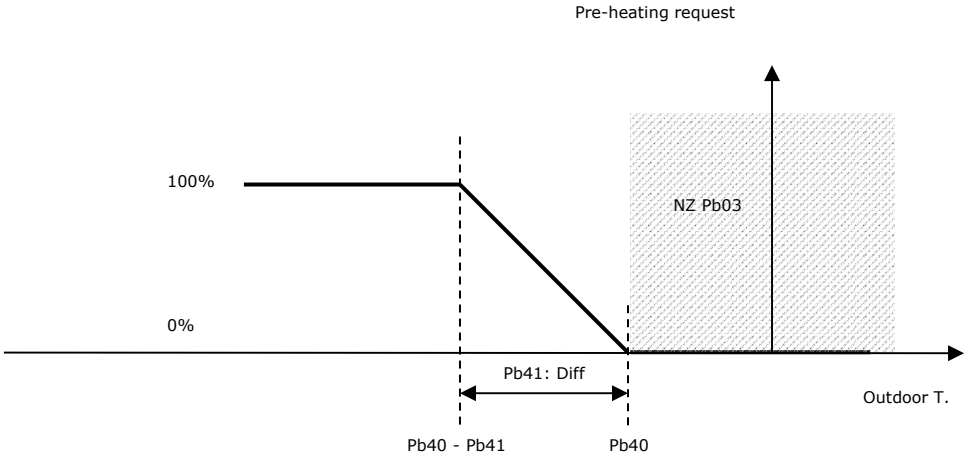


8.6 Pre-heating coil

The program also controls a third coil for pre-heating which can be either water or electric (parameter *PG08*).
It is possible to set 3 types of control:
- modulating by configuring an analogue output
- with 3 points by configuring 2 digital outputs, one as "pre-heating coil opening" and one as "pre-heating coil closing". For the information on how it works, please refer to the previous section 8.4 - 3-point control of water coils.
- on-off by configuring a digital output as "On-Off pre-heating coil".

The pre-heating function is based on the expulsion temperature and, if this is not present or in error, on the external temperature. If both probes are disconnected or in error, the function is disabled.
If the expulsion probe has been configured, the regulation is neutral zone with these parameters:
Pb40: Pre-heating setpoint
Pb41: Pre-heating neutral zone
Pb42: Pre-heating modulation time
Pb43: Pre-heating modulation percentage variation

If the external temperature probe is used as a reference, the regulation is proportional as described in the graph below:

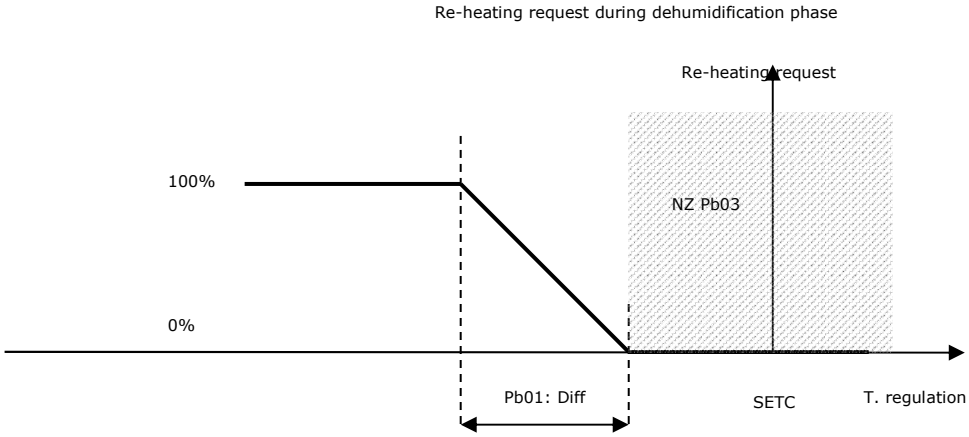


Pb40: Pre-heating setpoint
Pb41: Pre-heating neutral zone (differential)

8.7 Re-heating coil

In some units, the heating coil is installed before the cooling coil for anti-freeze safety purposes with low external temperatures, so if a re-heating treatment is required during dehumidification, a dedicated coil is required.
The program, therefore, manages a fourth coil which can be either water or electric (parameter *PG09*).
If the electric battery is selected, the type of heating element must be set, choosing between modulating, digital or modulating + digital with sawtooth regulation (parameter *PG10*).
There are 3 types of control that can be configured for the water coil:
- modulating by configuring an analogue output
- with 3 points by configuring 2 digital outputs, one as "re-heating coil opening" and one as "re-heating coil closing". For the information on how it works, please refer to the previous section 8.4 - 3-point control of water coils.
- on-off by configuring a digital output as "On-Off re-heating coil".

The valve is controlled by a proportional algorithm (P) or by a proportional integral (PI), the regulation setpoint is the summer one, the differential and the neutral zone are those used for controlling the cooling and heating valves (parameters *Pb01* and *Pb03*) and the reference probe is the one for temperature control. In order to use only proportional regulation, the integral time has to be set at zero (parameter *Pb02=0*). Setting an integral time above zero (parameter *Pb02>0*) provides more precise regulation in that the integral part brings the output to working order thus reducing the error introduced by the proportional component only (by default the integral component is disabled).



8.8 Water coil temperature check

In this unit, it is possible to manage an anti-freeze check and a congruity check for any water coils that have been configured by configuring the relevant water temperature probe.

The anti-freeze check is based on the following parameters which are the same for all 4 coils:

PA36: Anti-freeze alarm delay

PA38: Coil anti-freeze alarm setting

PA39: Coil anti-freeze alarm differential

If the water temperature of the coil is lower than the setpoint (parameter *PA38*) after the alarm activation delay (parameter *PA36*), the relevant anti-freeze alarm will be triggered (AL40 for the first coil, AL41 for the second coil, AL37 for the pre-heating coil and AL58 for the re-heating coil) which will switch off both the supply and return fans and close the dampers on the unit.

This alarm will stay on until the coil water temperature exceeds the setpoint (parameter *PA38*) + the relevant differential (parameter *PA39*), at this point, the alarm will switch off and the machine will return to normal operations.

The congruity check is based on the following parameters which are the same for all 3 coils:

SETC: Summer setpoint

SETH: Winter setpoint

Pb01: Coil regulation differential

PA46: Bypass time congruity check for battery activation

PA47: Alarm activation delay

PA48: Alarm reset delay

In winter mode, if the water temperature of the coil is lower than the winter setpoint, after the by-pass time from the opening of the water valve (parameter *PA46*) and after the alarm activation delay (parameter *PA47*), the relevant water congruity alarm will be triggered (AL42 for the first coil, AL43 for the second coil, AL44 for the pre-heating coil and AL59 for the re-heating coil) which will switch off the coil.

The alarm will switch off, after the alarm reset delay (parameter *PA48*), and the machine will return to normal operations if the temperature exceeds the winter setpoint + the relevant differential (parameter *Pb01*).

In summer mode, if the water temperature of the coil is higher than the summer setpoint, after the by-pass time from the opening of the water valve (parameter *PA46*) and after the alarm activation delay (parameter *PA47*), the relevant water congruity alarm will be signalled (AL42 for the first coil, AL43 for the second coil, AL44 for the pre-heating coil and AL59 for the re-heating coil) which will switch off the coil.

The alarm will switch off, after the alarm reset delay (parameter *PA48*) and the machine will return to normal operations if the temperature falls below the summer setpoint + the relevant differential (parameter *Pb01*).

8.8.1 Input for heat pump operation mode

For water coils, it is possible to set an additional congruity check by configuring a digital input for “Heat pump operation mode”.

If the heat pump mode does not match the machine's operating mode (Summer/Winter), any active water coils are immediately switched off and the water congruity alarm is triggered (AL42 for the first coil, AL43 for the second coil and AL44 for the pre-heating coil).

8.9 Pre-heating function

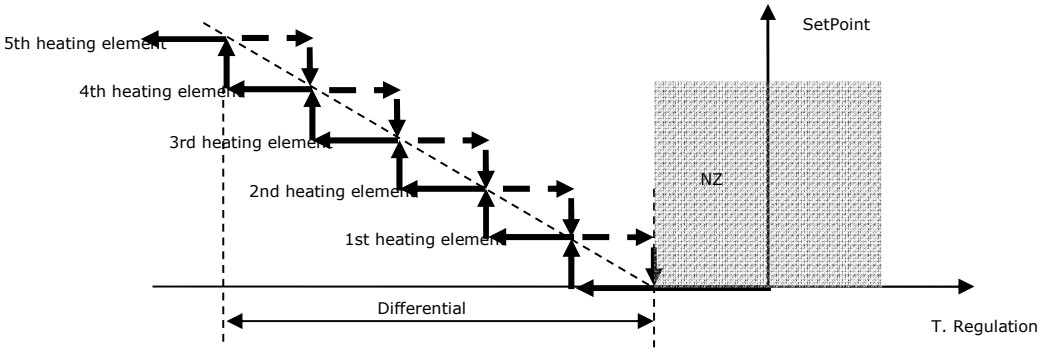
In winter with very low outside temperatures, it is necessary to activate the hot water coils before turning on the fans and opening the external air damper to prevent air that is too cold from entering the room and freezing the water coils which rarely have glycols and are not drained during winter.
If the first coil is a water/mixed coil or the second coil is a water coil and is configured and the external temperature probe is not in error mode, the pre-heating function is enabled.
This function, when the machine is turned on, activates all the hot water coils present for a modulated duration based on the outside temperature, from 0 minutes when the temperature exceeds the setpoint (parameter *Pb12*) to a maximum (parameter *Pb14*) when the temperature falls below the setpoint minus a differential (parameter *Pb13*). During this period, the fans will remain switched off and the external air and warm-up dampers will stay closed.
To disable the function, simply set the maximum time defined by the parameter to 0 *Pb14*.

8.10 Electric coils

It is possible to configure one of the treatment coils which uses "digital" electric heating elements (activated via digital output - from 1 to 5) or modulating elements (activated via analogue output). Mixed situations are also possible.

8.10.1 Coil with ON-OFF heating elements (digital)

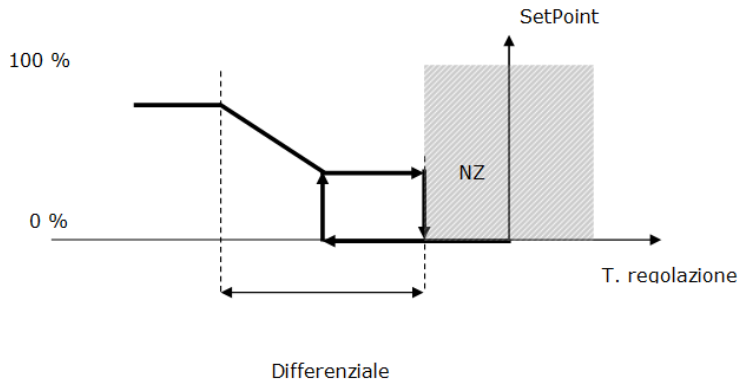
Based on the number of heating elements that have been configured (parameter *PG06*), the regulation differential is divided proportionally (parameters *Pb01/Pb22/Pb24* depending on the cases).



It is possible to enable the rotation of the heating element steps using the parameter *Pb07*. This rotation is LIFO type and is based on the comparison the number of operating hours of the individual steps. When starting up, the step with the least number of operating hours will be prioritised, while when switching off, the step with the greatest number of hours will take precedence.
If it necessary to choose between steps with the same number of operating hours, a FIFO type rotation is activated, to guarantee rotation even if there are the number of hours present.
A certain amount of time (parameter *Pb20*) must elapse between each heating element start-up/switch-off in order to avoid simultaneous peaks.

8.10.2 Coil with modulating heating element

To regulate the heating elements by modulation, set parameter *PG06=1*.



On opening, the output stays at 0% until the request reaches a higher value than the parameter *Pb25*, then assumes the request value. On closing, the output assumes the request value until it reaches a higher value than parameter *Pb25*, then it is maintained at the value of *Pb25* until request is lowered to 0%.

8.10.3Coil with modulating heating element + 1 on/off step

A sawtooth regulation has been implemented to manage the modulating heating elements together with the digital steps.
In this case, the heat regulator needs to know the ratio between the maximum power that can be supplied by the modulating heating element (parameter *Pb04* for coils 1 and 2 and *Pb16* for the re-heating coil) and the power supplied by the ON-OFF heating element in order to correctly divide the proportional band ($PB=PB_{MOD}+PB_{ON-OFF}$). The power that can be supplied by the on-off heating element can be easily calculated using the formula $PB_{ONOFF}= 100-PB_{MOD}$;
For example, if the modulating heating element supplies 60% of the power and the ON-OFF heating element 40%, the proportional band will be divided so that this power ratio is respected: $PB_{MOD}=60\% \times PB$, $PB_{ON-OFF}=40\% \times PB$.
The minimum power that can be supplied by the modulating heating element is defined by parameter *Pb25* for coils 1 and 2 and by *Pb17* for the re-heating coil.
As the temperature detected by the heat regulation probe decreases, the power requested increases in proportion (P_{REQ}) to the heating elements. The actions performed by the heat regulator depending on the required power level reached, are the following:

- $P_{REQ} < P_{MOD-MIN}$ *(Minimum power supplied by the modulating heating element)* → Both the modulating and ON-OFF heating elements stay off.
- $P_{REQ} = P_{MOD-MIN}$ → The modulating heating element is switched on at minimum power.
- $P_{MOD-MIN} < P_{REQ} < P_{MOD-MAX}$ *(Maximum power supplied by the modulating heating element)* → The power of the modulating heating element is adapted to the power requested.
- $P_{REQ} = P_{MOD-MIN}$ → The modulating heating element is switched to maximum power.
- $P_{MOD-MAX} < P_{REQ} < P_{MOD-MIN} + P_{ON-OFF}$ *(Power of the ON-OFF heating element)* → The modulating heating element stays at maximum power and the ON-OFF heating element stays switched off.
- $P_{REQ} = P_{MOD-MIN} + P_{ON-OFF}$ → First the modulating heating element is taken from maximum to minimum power, taking into account the safety times, when the modulating heating element has reached minimum power, the ON-OFF heating element is activated.
- $P_{MOD-MIN} + P_{ON-OFF} < P_{REQ} < P_{MOD-MAX} + P_{ON-OFF}$ → The ON-OFF heating element is on and the modulating heating element power is adapted to the power requested.
- $P_{REQ} \geq P_{MOD-MAX} + P_{ON-OFF}$ → The ON-OFF heating element is on and the modulating heating element operates at maximum power.

As the temperature detected by the temperature control probe increases, the required power decreases proportionately. The pathway described above is followed in the opposite direction for the modulating parts; the behaviour is instead different in the following cases:

- $P_{MOD-MIN} + P_{ON-OFF} > P_{REQ} > P_{MOD-MAX}$ → The ON-OFF heating element stays active and the modulating heating element operates at minimum power.
- $P_{REQ} = P_{MOD-MAX}$ → First the ON-OFF heating element is switched off and then the modulating heating element is switched from minimum to maximum power, taking into account the safety times.
- $P_{MOD-MIN} > P_{REQ} > 0$ → The modulating heating element operates at the minimum power supplied.
- $P_{REQ} = 0$ → The modulating heating element only turns off when the requested power reaches 0.

8.10.4Coil with modulating heating element + N on/off steps

It works like the previous case, but with up to four steps to be managed in the same way as the first ON-OFF step. The modulating heating element will always have a sawtooth type modulation.
It is possible to enable the rotation of the heating element steps using the parameter *Pb07*. This rotation is LIFO type and is based on the comparison the number of operating hours of the individual steps. When starting up, the step with the least number of operating hours will be prioritised, while when switching off, the step with the greatest number of hours will take precedence. To guarantee modulation, the modulating compressor is not considered in the rotation and will always switch on first and switch off last.
If it necessary to choose between steps with the same number of operating hours, a FIFO type rotation is activated, to guarantee rotation even if there are the number of hours present.
A certain amount of time (parameter *Pb20*) must elapse between each heating element start-up/switch-off in order to avoid simultaneous peaks.

8.10.5Heating element status

Every one of the five heating element stages can operate in the following ways:

1. *Disabled:* the heating element stage is not managed by the controller. In the user interface you will see the symbol "---" when in this state.
2. *Off:* the heating element stage is off. In this state, you will see "*OFF*" displayed on the user interface.
3. *Waiting for Start-up:* the stage of the resistances is about to Start-up, and is in queue for a protection timetable. In this state, you will see "*WON*" displayed on the user interface.
4. *Waiting for Start-up:* the stage of the heating elements is about to Start-up, and is in queue for a protection timetable. For this status the user interface displays the word "WOFF".
5. *On:* the heating element stage is on. In this status, you will see "*ON*" displayed on the user interface.
6. *Alarm:* the heating elements are blocked as a result of the relative thermal alarms. In this state, you will see "ALARM" displayed on the user interface.

8.11 Single coil unit

This type of unit has only one coil for heating and/or cooling and, if enabled, there is a single circulation pump. The operating mode (parameter *MOdE*) determines which function to use.
In the same way, all the regulations (fans, free-cooling/free-heating, regulation of setpoints, alarms, etc.) are set according to the operating mode.
It is not possible to manage dehumidification and re-heating in this type of unit.

8.12 Direct expansion coil

The program offers the possibility of configuring the first coil as a direct expansion coil via the parameter *PG03=3*. This coil can be cooling (parameter *PG04=1*), heating (parameter *PG04=2*) or mixed (parameter *PG04=3*).

Via parameter *PG07* it possible to set how many compressors are present and what type they are. The possible choices are:

- 1 On-Off compressor 1-step direct expansion coil
- 2 On-Off compressors 2-step direct expansion coil
- 1 modulating compressor Modulating direct expansion coil

This section will explain the common points of the 3 regulations. Please refer to the following sections for the graphs of the relevant regulations.

If a low pressure alarm, high pressure alarm or compressor thermal alarm is triggered, all the active compressors in the unit are switched off.

The following parameters define the safety times and will be valid for all the compressors:

PE01: Minimum compressor switch-off time

PE02: Minimum compressor switch-on time

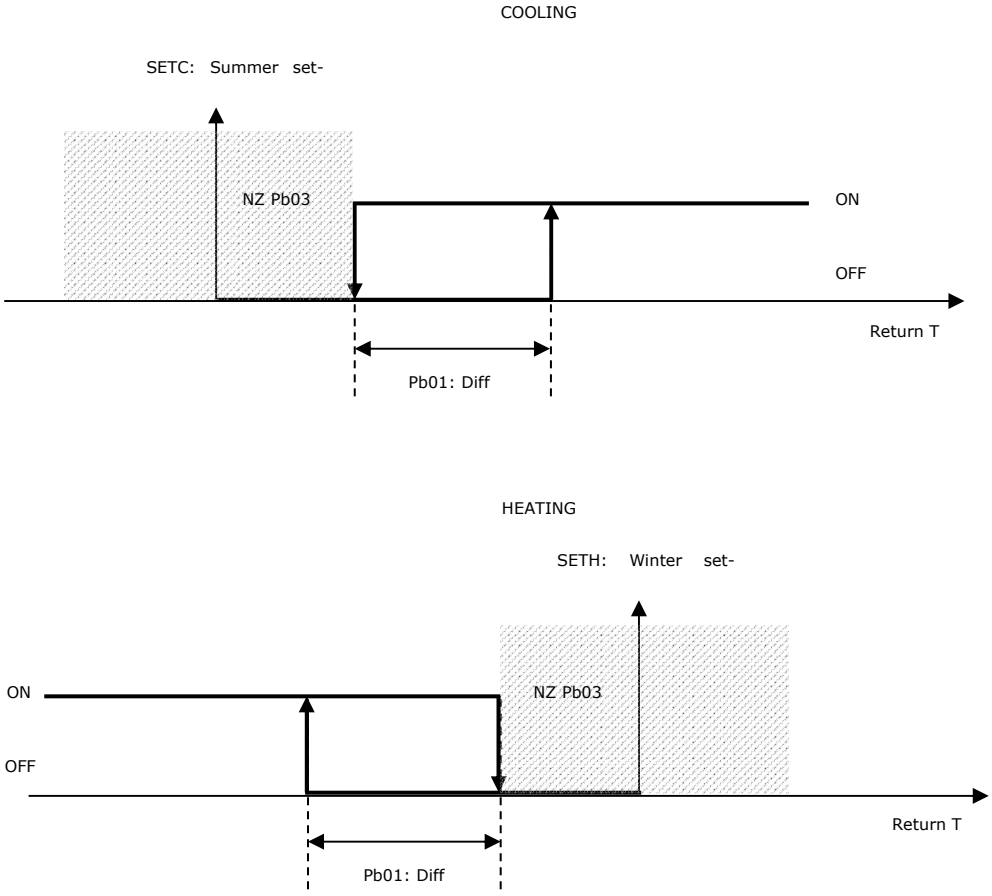
PE03: Minimum time between two switch-ons of the same compressor

PE04: Minimum time between different compressor switch-offs

PE05: Minimum time between different compressor switch-ons

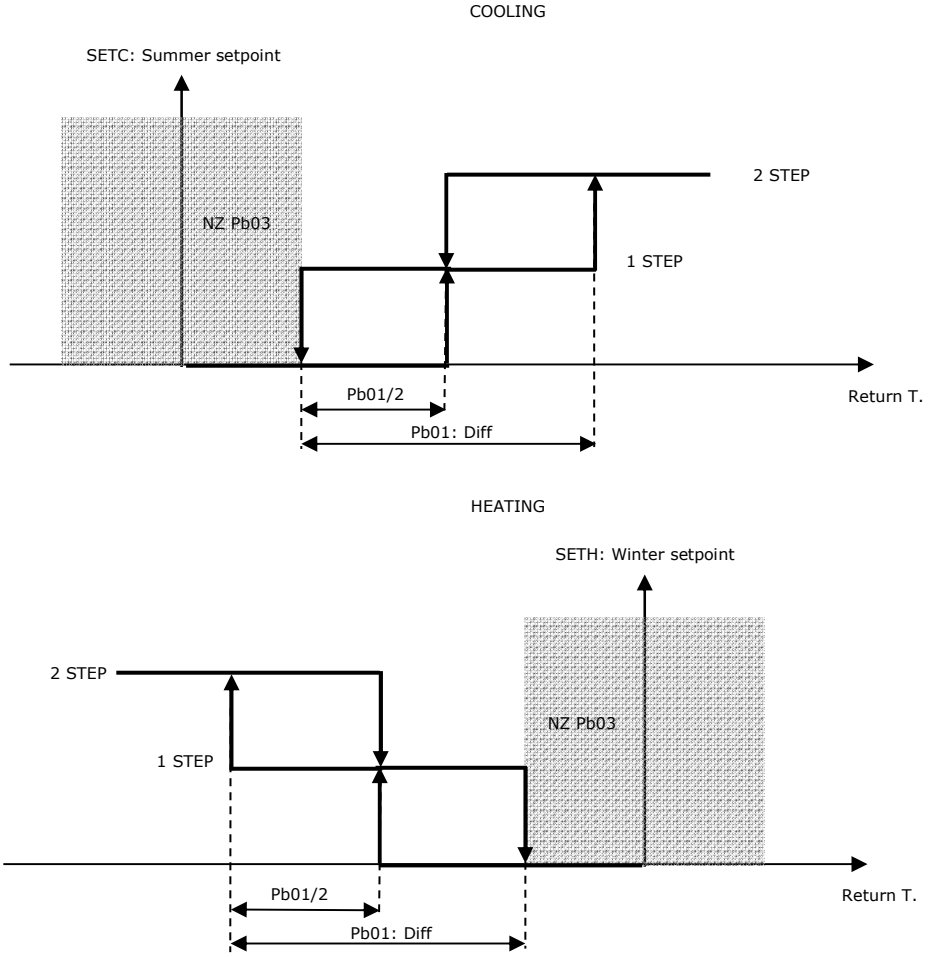
8.12.1 1-step direct expansion coil

To use the 1-step regulation, set parameter *PG07=1*.



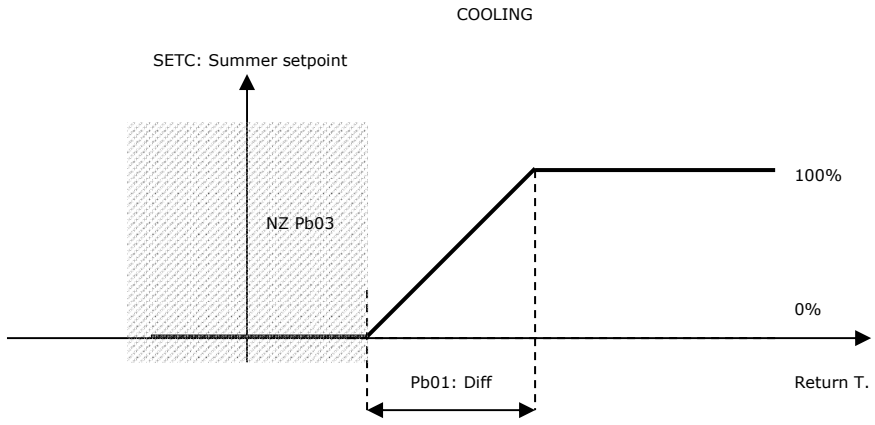
8.12.22-step direct expansion coil

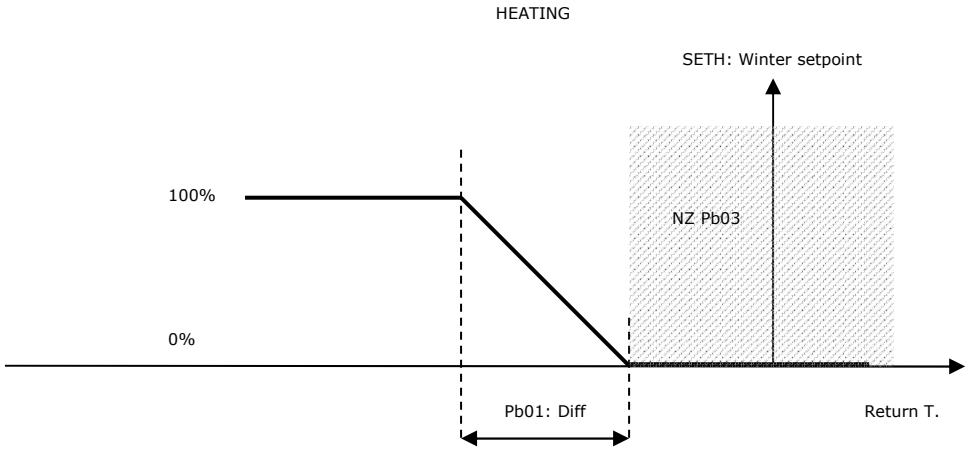
To use the 2-step regulation, set parameter *PG07=2*.



8.12.3Modulating direct expansion coil

To use the modulating regulation, set parameter *PG07=3*.





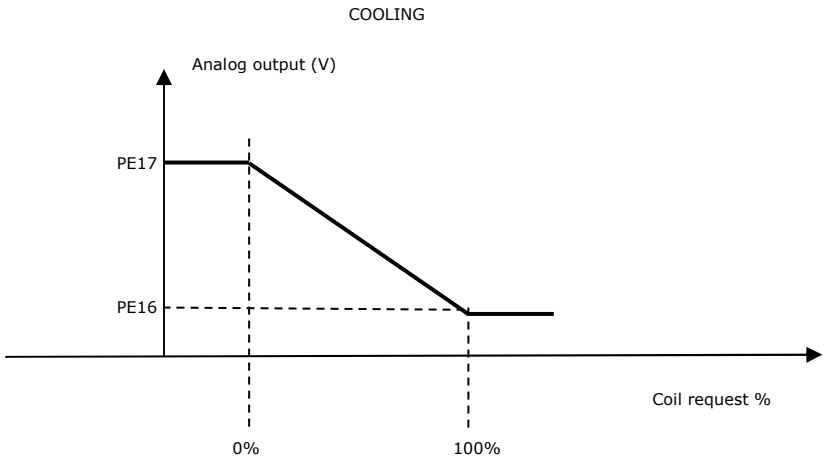
By setting parameter PH59 of the polarity of the analog output of the direct expansion battery to Custom, it is possible to manage the direct expansion battery according to the logic defined by the graphs below. To use this function correctly, the following parameters must also be set:

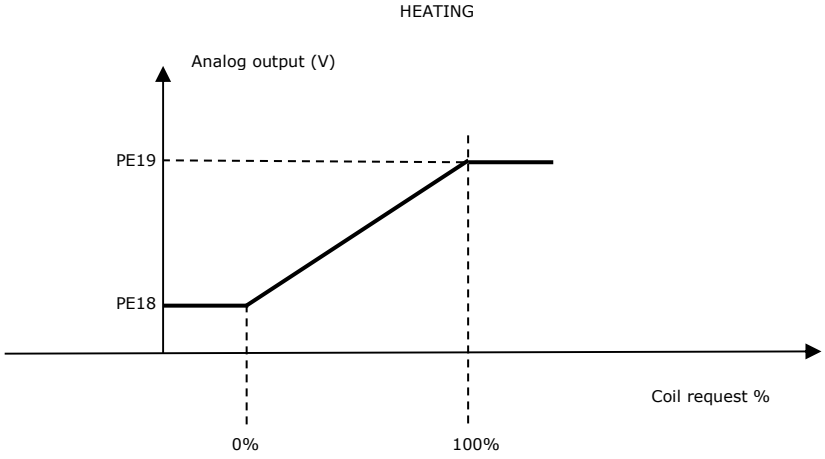
PE16: Minimum output value in cooling for custom regulation

PE17: Maximum output value in cooling for custom regulation

PE18: Minimum output value in heating for custom regulation

PE19: Maximum output value in heating for custom regulation





8.12.4Compressor switch-on sequence

In a configuration with 2 On-Off compressors, the compressors are switched on in steps. It is possible to choose the rotation of the compressors by acting on parameter PE13 choosing between a rotation with a fixed sequence and a rotation that considers the number of hours and starting points of the single compressor.
Regarding the "hours + starting" rotation, regardless of the number of active compressors, the "next" compressor to be activated will be the one that, based on the number of operating hours and the number of starts, has the least mechanical wear among those off. In the same way, the "next" compressor to be switched off will be that with the most mechanical wear among those switched on.
The compressors will be switched both on and off in ascending order based on wear. The wear (w) of the compressors is defined by a formula which compares the number of operating hours (h) and the number of peaks (s) using two coefficients (n,k) defined by the two parameters:

$$w = n_x h + k_x s$$

On selecting this type of sequence and putting on of the two parameters, which express the coefficients, to 0, only the number of operating hours or only the number of peaks can be taken into consideration. It is not possible to set both parameters to 0. The inactive compressor with the lowest wear indicator will be activated first. The active compressor with the highest wear indicator will be switched off first.

PE13: Type of compressor rotation
PE14: Wear based on hours
PE15: Wear based on peaks

8.12.5Compressor defrosting

Defrosting will be performed after an operating period with a duration defined by parameter *PE06*. The calculation of this interval of time can be configured on 3 types of events:

PE11=1 Unit on. In this case, the counting period will start when the machine is switched on. When the machine is switched off, the counting will be suspended
PE11=2 Compressor on. In this case, the counting will start when a compressor is switched on. If all the compressors are switched off, the counting will be suspended.
PE11=3 Compressor defrosting temperature < Setpoint (PE12). For this counting option, the compressor defrosting probe must be configured (after being correctly positioned). The count will start when the temperature detected by the probe is lower that the setpoint *PE12*. If the temperature exceeds the setpoint, the count will be suspended.

There are two types of defrosting which can be configured using parameter *PE07*:

PE07=0 Cycle inversion: the compressor stays on during the active defrost phase and the inversion valve is switched to the cooling position. After this phase, the compressor will be switched and the dripping stage begins.
PE07=1 Compressor stoppage: the compressor will be switched off during the active defrosting stage. After this phase, the dripping phase will start.
The active defrost phase will end when the temperature detected by the relevant probe exceeds the defrost end threshold (parameter *PE08*). If this condition is not reached within the maximum defrost time (parameter *PE09*), the active defrost phase is still completed and the dripping phase will start, the duration of which is set by parameter *PE10*.
During the active defrost phase, the fans will have a speed defined by parameter PF10 for the supply and parameter PF11 for the return. In the case of step fan regulation, the number of active steps must be set (1.0 = 1 step, 2.0 = 2 steps, 3.0 = 3 steps). In the case of constant pressure / flow regulation these two parameters must be understood as pressure / flow setpoint. The unit of measurement will be Pascal in the case of constant pressure and cu-bi / minute in the case of constant flow.

PE06: Defrost interval
PE07: Type of defrost
PE08: End of defrost setpoint
PE09: Defrosting maximum time
PE10: Dripping duration
PE11: Counting type defrost interval
PE12: Start defrost count threshold
PF11: Supply fan stop in compressor defrost
PF10: Supply fan speed with active defrost
PF11: Return fan speed with active defrost

8.12.6Compressor status

Each one of the compressors can take on the following operating states. The description shown by the EVJ LCD or EPJ LCD remote user interfaces in give in brackets.

1. *Disabled:* the compressor is not managed by the controller. While in this state you will see the symbol "---" on the user interface.
2. *Off:* the compressor is off. In this state, you will see "*OFF*" (*OFF*) displayed on the user interface.
3. *Waiting for start-up:* the compressor is about to switch on, it is waiting for some protection timing. In this state, you will see "*WON*" (*tON*) displayed on the user interface.
4. *Waiting for switch off:* the compressor is about to switch off, it is waiting for some protection timing. In this state, you will see "WOFF" (*tOFF*) displayed on the user interface.
5. *On:* the compressor is switched on. In this state, you will see "ON" (*On*) displayed on the user interface.
6. *Alarm:* the compressor is switched off due to a low pressure, high pressure or thermal alarm. In this state, you will see "ALL" (*ALrM*) displayed on the user interface.

8.13 Pumps

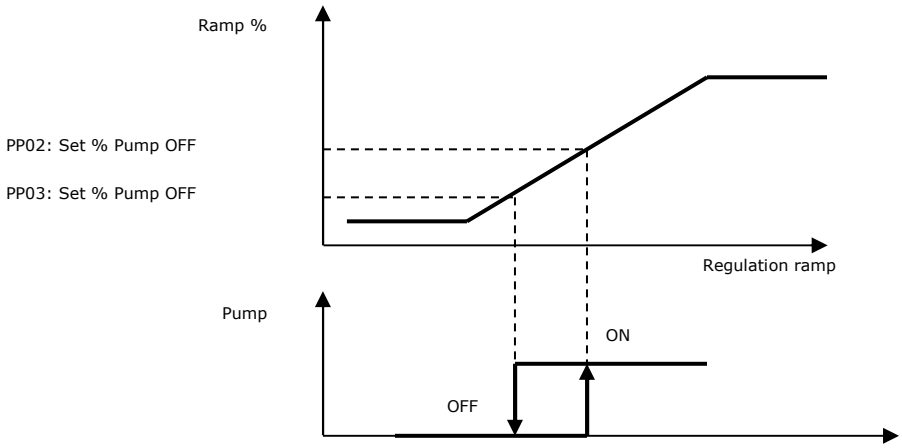
A simple management is envisaged for the coil circulation pumps.
The relevant digital outputs just have to be enabled to enable the pumps.

8.13.1 Continuous operation

Continuous operation is linked only to the status of the central power unit. The pumps switch on and off when the machine is switched on and off.
To set this regulation, set parameter *PP01=0*.

8.13.2 Operation on regulation request

The circulation pumps are activated when there is an actual request for heating/cooling/dehumidification that exceeds a start-up threshold (parameter *PP02*) and they switch off when the same request falls below a specific switch-off threshold (parameter *PP03*). To set this regulation, set parameter *PP01=1*.



When the regulation ramp exceeds the parameter *PP02*, the pump is activated, when it falls below the parameter *PP03* a timer is activated which keeps the pump active for a pre-set time (parameter *PP04*).
The timer is reset if the ramp returns above parameter *PP02*.
The pump is switched off by the unit switch-off command, cancelling any timing still active.

8.13.3 Pump status

Both pumps may assume any of the following operating states:

1. *Disabled:* the pump is not managed by the controller. In this state, you will see " --- " displayed on the user interface.
2. *Off:* the pump is switched off. In this state, you will see "*OFF*" displayed on the user interface.
3. *Waiting to switch off:* the pump is about to switch off and is waiting for the required protection time. In this state, you will see "*WOFF*" displayed on the user interface.
4. *On:* the pump is switched on. In the user interface you will see written "ON " when in this state.
5. *Alarm:* the pump is in alarm mode. In this state, you will see "ALARM" displayed on the user interface.

8.13.4 Pump alarm inputs

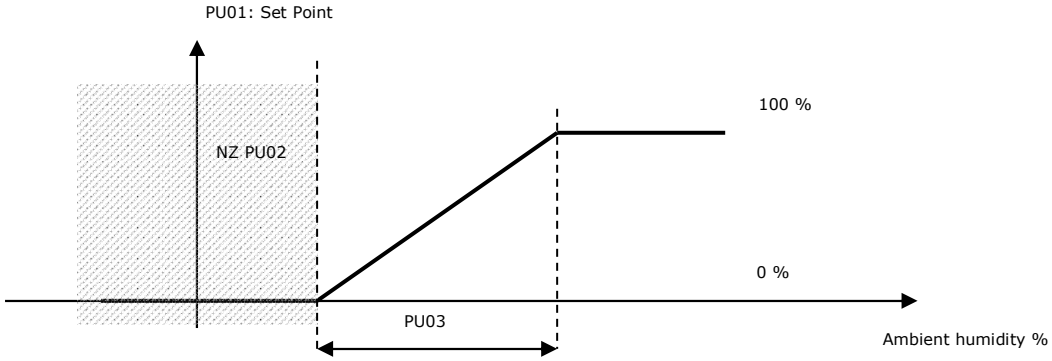
The pump thermal switch system can be managed for both configured pumps.

8.14 Dehumidification

To obtain comfortable environments, you should also consider the air humidity and adjust it based on a specific desired percentage setpoint (parameter *PU01*) and on a neutral zone (parameter *PU02*) in which the humidity conditions are acceptable and no intervention is requested. If the room humidity sensor is present it is possible to command a dehumidification process by utilizing the cooling coil in order to eliminate the humidity from the incoming air.
Dehumidification management is enabled by activating parameter *PG12=1*, in the configuration menu.
The regulation of the dehumidification is proportional-integral, to make it proportional only, just set the integral time to zero (parameter *PU04=0*).

8.14.2Dehumidification control

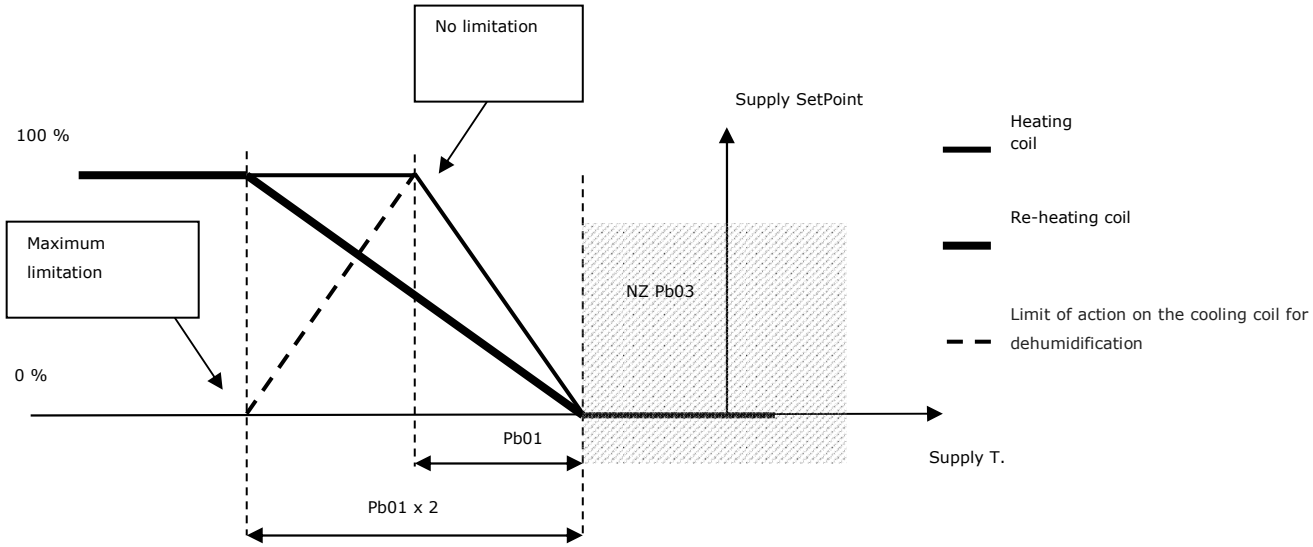
The regulation uses the cooling coil, and requires a second coil or re-heating battery to be used (otherwise the function is not available).
Set parameter *PU06* to select the supply or return humidity probe for regulation.
These probes must be configured in the AI hardware parameters.
If the probe is disabled or faulty, the control of the humidifier is inhibited.
Since the same coil is used for the cooling the control of dehumidification assumes the following rules:
- when requesting only cooling the coil is controlled according to the logic previously seen
- when requesting only dehumidification, the coil is used exclusively for dehumidifying the room air, as shown in the diagram below:



- if a combined dehumidification and cooling is requested, the value set by parameter *Pb15* is used as a reference point:
Pb15=0 Cooling
Pb15=1 Dehumidifies
Pb15=2 Higher value between cooling and dehumidification
Pb15=3 Average value between cooling and dehumidification
When *Pb15>0* the re-heating coil will compensate for any excessive cooling.

8.14.3Limit control on dehumidification

When there is an active request for dehumidification and there is a pending request for continuous heating, this function (enabled by parameter *PU05=1*) allows for limiting the cooling valve opening to dehumidify in order to contrast the continuous decrease in temperature (required by the dehumidification) and rapidly returning to the desired conditions in temperature.
This action has a more immediate effect on the temperature and also enables energy saving, optimising control of the coil.
When the dehumidification request is active the action limit's objective will be to limit the dehumidification in order to prevent continuously cooling the air (caused by dehumidification) and, as a result, to always request more heat to the heating (and re-heating) coils.



This action optimizes the control resulting also in energy savings.
If there is a fault with the supply air temperature probe, this regulation is not possible.

Example 1

Dehumidification request = 80%

Dehumidification limitation = 50%

In this situation, the dehumidification request for the coil will be 40%, i.e. 50% of the 80% request.

Example 2

Dehumidification request = 80%

Dehumidification limitation = 25%

In this situation, the dehumidification request for the coil will be 20%, i.e. 25% of the 80% request.

Example 3

Dehumidification request = 80%

Dehumidification limitation = 0%

In this situation the dehumidification request will be totally handled by the coil.

The dehumidification request and the cooling coil are regulated by parameter *PB15*. The priority of these requests is:

Pb15=0: cooling request

Pb15=1: dehumidification request

Pb15=2: higher request between the two requests

Pb15=3: mathematical average of the two requests

8.14.4Winter dehumidification

The dehumidification function is also available when the machine operates in winter mode.

Winter dehumidification works like summer dehumidification, but uses specific parameters (*PU17 - PU24*).

The mixing chamber damper is used to perform dehumidification, but if this is not available, the fans are used.

8.15 Humidification

To obtain comfortable environments, you should also consider the air humidity and adjust it based on a specific desired percentage setpoint (parameter *PU01*) and on a neutral zone (parameter *PU02*).

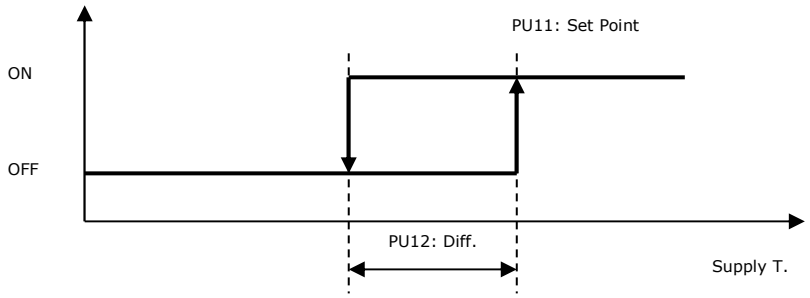
If the room humidity probe is present, it is possible to control an On/Off or a modulating humidifier.

Humidification management is enabled by configuring an output dedicated to the ON-OFF or modulating humidifier using the configuration parameters. The room air humidity probe must also be configured. If the probe is disabled or in error mode humidification management is inhibited.

8.15.1Humidifier enabling (depending on the supply temperature)

To work properly, the humidifier requires a minimum air temperature value, for which a setpoint is identified (parameter *PU11*) and the relevant hysteresis (parameter *PU12*) on the supply temperature to enable/disable the humidifier.

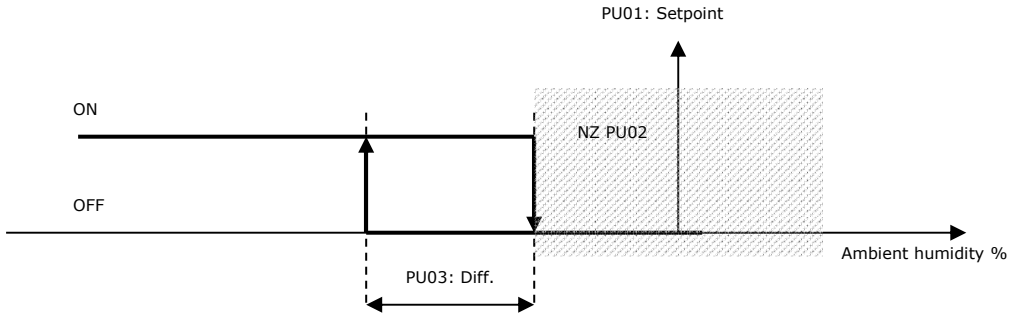
This function is enabled by parameter *PU10*; if *PU10 = 0* (function not enabled), the humidifier turns on/off at the normal percentage setpoint (parameter *PU01*).



If the supply probe is in error, the function will be inhibited and the humidifier will switch on/off at the normal percentage setpoint.

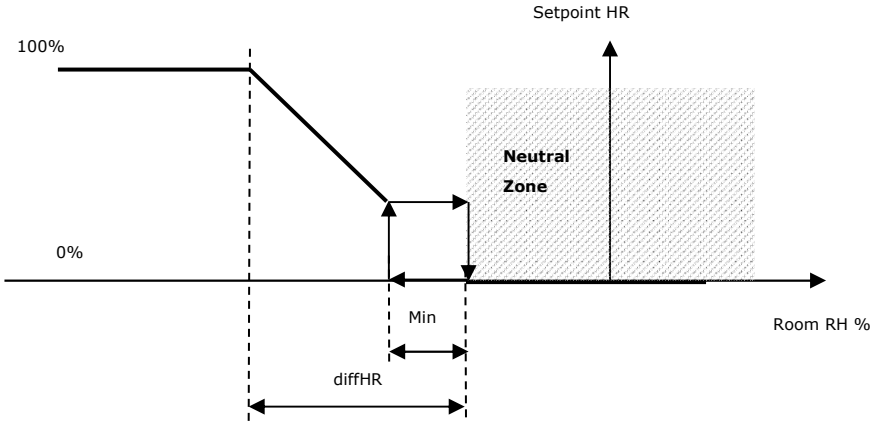
8.15.3Humidifier On/Off

To use the On/Off regulation of the humidifier, configure a dedicated digital output among those available.



8.15.4Modulating humidifier with enabling step

To use the modulating control of the humidifier, associate the humidifier with an analogue output *(HC* parameters*)*. It is also possible to configure a digital output to use as a relay for enabling the humidifier.



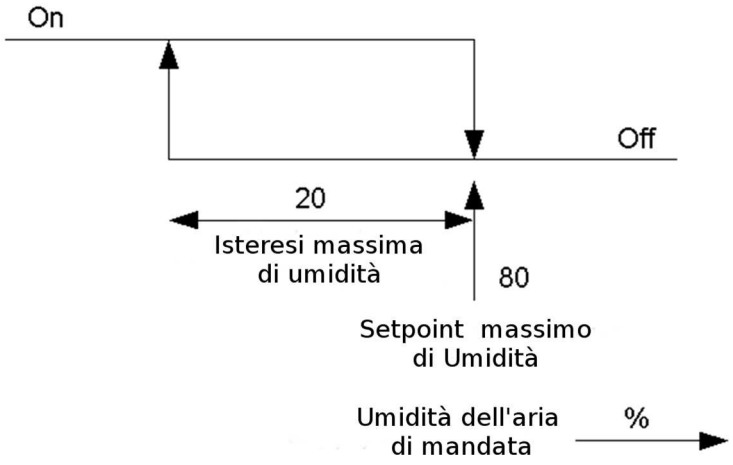
On opening, the output stays at 0% until the request reaches a higher value than the parameter *PU16*, then assumes the request value. On closing, the output assumes the request value until it reaches a higher value than *PU16*, then it is maintained at the value of *PU16* until request is lowered to 0%.

8.15.5Maximum humidification regulation (in supply)

The maximum humidity probe (in supply) can be connected to the controller to avoid excessive humidity in the supply duct.

To use this function, you must configure parameter *PU13* to 1 and enable the supply air humidity probe.

If the supply air humidity exceeds the maximum humidity setpoint (parameter *PU14*), the humidification is switched off. If the supply air humidity falls below the maximum humidity setpoint – hysteresis maximum humidity (parameter *PU15*), the humidifier is enabled again.



8.15.6 Humidifier status

The humidifier assumes the following operating states:

1. *Disabled:* the humidifier has not been configured for the system. In the user interface you will see the symbol "---" when in this state.
2. *Off:* the humidifier is off. In this state, you will see "*OFF*" displayed on the user interface.
3. *Off due to supply air:* the humidifier is switched off due to the low temperature of the supply air. While in this state, you will see "*Off"* displayed on the user interface.
4. *On:* the humidifier is on. In this state, you will see "*ON*" displayed on the user interface.
5. *Alarm:* the humidifier is in alarm mode. In this state, you will see "ALARM" displayed on the user interface.

8.16 Mixing chamber damper

The program is able to manage a motorised damper for the introduction of external air to support regulation of the room temperature. The mixing chamber damper can be used for two regulations: free-cooling/free-heating and air quality control.
It will be possible to set a modulating regulation by enabling the relevant analogue output, a 3-point regulation by enabling the 2 digital outputs of the damper opening and closing or an on-off regulation by enabling the relevant digital output.
The priority for these requests is provided by parameter *PS03:*
PS03=0: The damper is controlled by Free-cooling/Free-heating.
PS03=1: The damper is controlled by air quality control.
PS03=2: The damper is controlled by the highest request.
PS03=3: The request of the shutter is calculated as the arithmetic mean of the two requests for free-cooling (/free-heating) and air quality control in order to fulfil both active requests.
PS03=4: The damper is forced to a fixed opening position defined by parameter *PS10*.
PS03=5: The damper is controlled by the higher request between fixed opening and the Free-Cooling / Free-Heating request.
To command the external damper motor correctly, the following parameters must be set:
PS05: Minimum position of dampers.
PS06: Maximum position of dampers.
PS15: The minimum damper opening can be disabled (*PS15=0*), active only in the regulation range (*PS15=1*), or always active (*PS15=2*).

8.16.1 Modulating damper control

In modulating control, the shutter can be utilized for:
- Free-Cooling / Free-Heating in temperature (parameter *PS01=1*)
- Free-Cooling / Free-Heating enthalpy (parametr *PS01=2*)
- Air quality control.

The control also provides a position of minimal opening of the shutter to guarantee the minimal quantity of projected renewed air (parameter *PS05*) and the corresponding maximum position of the opening (parameter *PS06*).

8.16.2 Fixed opening regulation

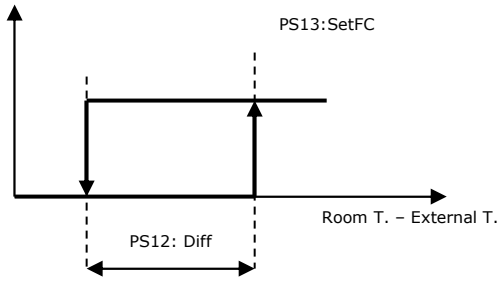
In this mode the external air damper always assumes the same value of opening as decided by parameter *PS10*. In this regulation, the range of opening values is from 0% to 100% and there is no minimum opening value. To use this regulation, set *PS03=4*.

With this type of regulation only, if the time bands are enabled, the percentage that the damper opens will adjust to the value defined by the parameters *DSC* (Comfort band), *DSE* (Economy band) and *DSN* (Night band) based on the active time band.
Free-cooling, free-heating and air quality control cannot be used in this mode.

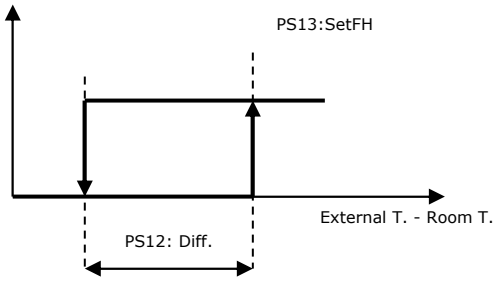
8.16.4Enabling Free-Cooling and Free-Heating in temperature

The free-cooling in temperature, if enabled (*PS01=1*), can be activated when the difference between the room air temperature and the outdoor air temperature reaches the Setpoint which has been set (parameter *PS13*) and relative hysteresis (parameter *PS12*).
Free-heating in temperature, if enabled (*PS01=1*), is activated when the difference between the room air temperature and the external air temperature reaches the setpoint (parameter *PS13*) and the associated hysteresis (parameter *PS12*).

Enable Free-Cooling in temperature



Enable Free-Heating in temperature

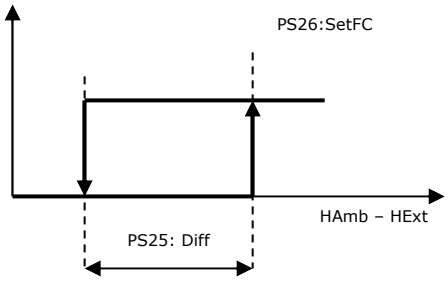


The external air temperature probe must be configured. If the probe is in error mode this type of regulation is not enabled.

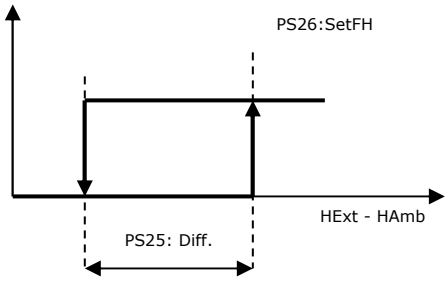
8.16.5Enabling the enthalpy free-cooling and free-heating

The enthalpy regulation also considers the humidity of the air to enable the free-cooling and free-heating processes.
To use this function, it is necessary to set PS01 = 2 and it is necessary that the temperature and ambient humidity probes and the external temperature and humidity probes are configured and not in error. Furthermore, it is necessary to set the atmospheric pressure value in hPa (parameter PH34).
The regulation provides for the calculation of the external enthalpy (HExt) and the ambient enthalpy (HAmb). The enthalpy is calculated using the temperature and humidity value, also using the atmospheric pressure for a more precise calculation.
To use this function correctly, the differential setpoint (parameter PS26) and relative hysteresis (parameter PS25) must be set.
Enabling follows these graphs:

Enabling the enthalpy free-cooling



Enabling the enthalpy free-heating



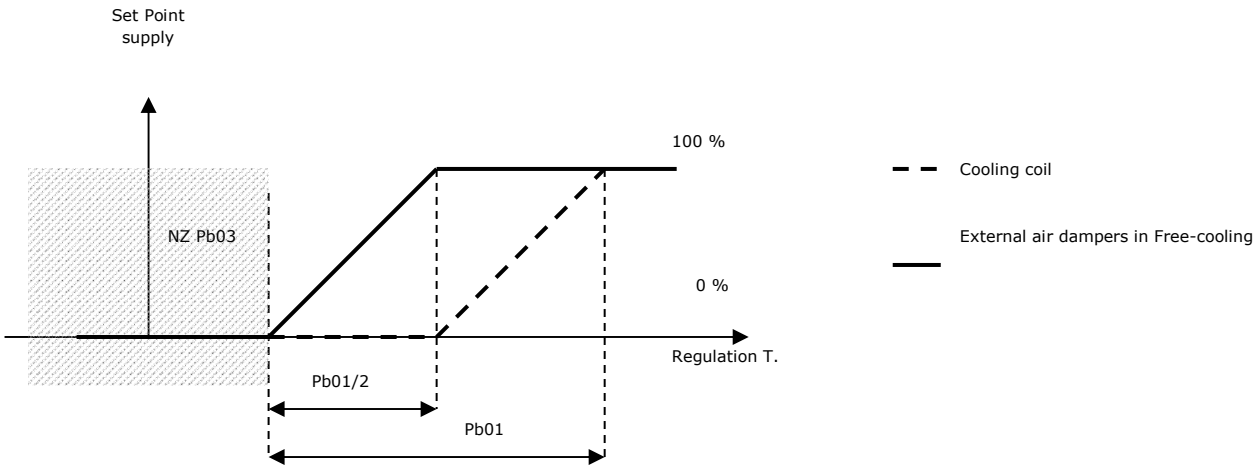
8.16.6Free-Cooling and Free-Heating regulation

The free-cooling/free-heating regulation controls the opening of the mixing chamber damper as well as the heat exchanger

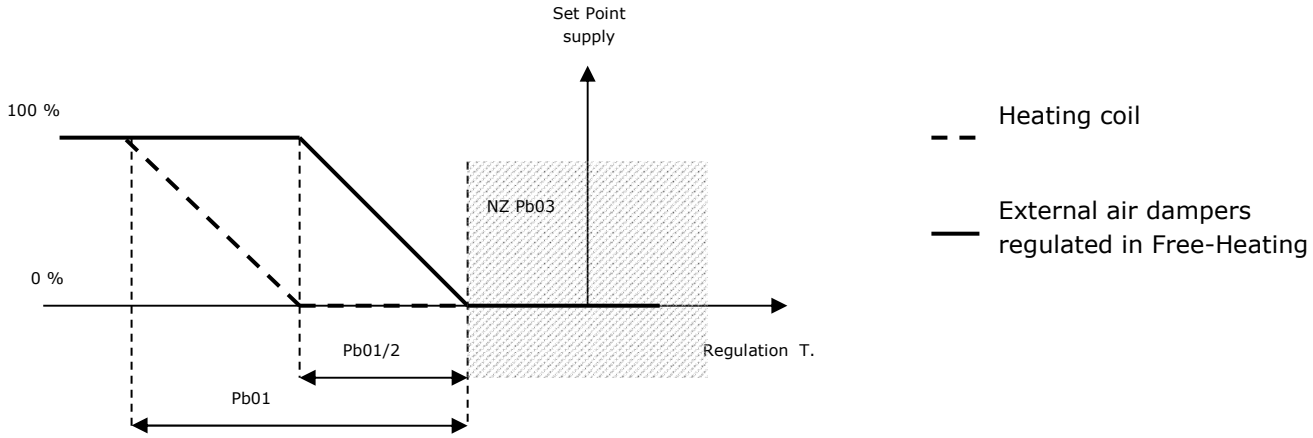
In free-cooling/free-heating conditions or if regulation is enabled (and the request is greater than zero) the ramps commanding heating/cooling are divided into two subsequent ramps, the first (on half the differential) regulates free-cooling/free-heating by the external air damper, the second regulates the heating/cooling valves.

When there is a request for Free-Cooling/Free-Heating (request greater than 0), the heat exchanger (if present) is deactivated by opening the by-pass damper, stopping the rotary heat exchanger.

SUMMER/COOLING operation Free-Cooling



WINTER operation/HEATING: Free-Heating



If one of the probes involved in regulation is in error mode, free-cooling/free-heating regulation can no longer be used and the heating/cooling ramps regulate based on the total regulation differential.

8.16.7Air quality control

The mixing chamber damper can be used for air exchange on request of the relevant VOC/CO2 probe. Parameter *PS03* must be set accordingly and the control probe configured correctly for air quality. The mixing chamber damper is activated according to the regulation probe, the setpoint (parameter *PS20*) and the relative differential (parameter *PS21*).

If the air quality probe is in error mode, this type of regulation will be inhibited. The probe may be one of two types: 4..20mA or 0..10V.

8.16.8 Out-of-range regulation

The out-of-range regulation, prior to the other regulations (with the exception of the Free-Cooling/Free-Heating) and can be enabled through the parameter *PS19*, has the effect of closing the mixing chamber damper in order to speed up the return to the regulation temperature band.
This function is activated, by closing the damper, if the regulation temperature:

- is above the cooling threshold + the out-of-range differential (parameter *PS16*) in cooling
- is below the heating threshold + the out-of-range differential (parameter *PS16*) in heating.

The function is disabled and the damper returns to adjusting based on the type of check selected (parameter *PS03*) if:
In cooling mode

- the regulation temperature is equal to or below the cooling threshold
- after the maximum out-of-range time allowed (parameter *PS17*) if the regulation temperature is below the cooling setpoint + the out-of-range differential (parameter *PS16*), otherwise the damper will stay closed and the maximum time *PS17* time is restarted.

In heating mode

- the regulation temperature is equal to or higher than the heating threshold
- after the maximum out-of-range time allowed (parameter *PS17*) if the regulation temperature is higher than the heating threshold - the out-of-range differential (parameter *PS16*), otherwise the damper will stay closed and the maximum time *PS17* time is restarted.

8.16.9 Damper status

In the user interface you can identify the operating status of the shutters which will present you with one of the following:

1. *Disabled:* the damper is not managed by the controller. In this state, you will see "---" displayed on the user interface.
2. *Closed:* the damper is closed. In this state, you will see "*CLOSED*" and the value 0.0% displayed on the user interface.
3. *Opening:* the damper is opening. For this status the user interface displays the word "*OPENING*" and the corresponding value.
4. *Open:* the damper is fixed and open at a specific value. For this status the user interface displays the word "OPEN" and the corresponding opening value.
5. *Closing:* the damper is closing. For this status the user interface displays the word "CLOSING" and the corresponding value.
6. *Alignment:* the damper is aligning due to the unit being switched on or the power supply being restored. For this status the user interface displays the word "ALIGN" and the value 0.0%.

8.17 Warm-up damper

The purpose of the warm-up damper is to return the room temperature to the regulation range, excluding outside air in order to speed up the return to the thermal comfort zone before allowing the intake of outside air. This damper and the relevant regulation can be enabled by configuring a digital output as "warm-up damper".
Configuring parameter *PF57* allows you to enable or disable the return fan during recycling.

On start-up, the machine opens the warm-up damper and, after the time allowed for the damper to open (parameter *PS18*), it will enter recycling mode for the time duration set by parameter*PC07*. In the "start-up" phase, the machine can operate in different ways depending on the request by the fans, whether "sniffing" is enabled or disabled and on the configuration of parameter *PF57*:

- Sniffing enabled and *PF57="Off"*: supply fan started at maximum speed
- Sniffing enabled and *PF57="On"*: supply and return fan started at maximum speed
- Sniffing disabled and no fan request: the fans stay switched off
- Sniffing disabled, fan request and *PF57="Off"*: supply fan started at the requested speed
- Sniffing disabled, fan request and *PF57="On"*: supply and return fan started at the requested speed

When the start-up time expires, the machine will operate in two ways:
In cooling mode

- if the regulation temperature is above the cooling setpoint + the out-of-range differential (*PS16*), the machine will stay in recycling mode starting the maximum out-of-range time counter
- if the regulation temperature is below the cooling setpoint + the out-of-range differential (*PS16*), the warm-up damper will be closed with the closing timer frames (*PS18*) and the machine will return to normal operating mode.

In heating mode

- if the regulation temperature is below the heating setpoint - the out-of-range differential (*PS16*), the machine will stay in recycling mode starting the maximum out-of-range time counter
- if the regulation temperature is above the cooling setpoint - the out-of-range differential (*PS16*), the warm-up damper will be closed with the closing timer frames (*PS18*) and the machine will return to normal operating mode.

In normal operating mode, the machine will enter recycling, opening the warm-up damper in the opening time frames set by parameter *PS18*, if the regulation temperature:

- is above the cooling setpoint + the out-of-range differential (*PS16*) in cooling
- falls below the heating setpoint - the out-of-range differential (*PS16*) in heating.

The damper will close, in line with the times set by parameter *PS18*, and the machine will return to normal operating mode if:
In cooling mode

- the regulation temperature is equal to or below the cooling threshold
- after the maximum out-of-range time allowed (*PS17*) if the regulation temperature is below the cooling setpoint + the out-of-range differential (*PS16*), otherwise the machine will stay in recycling mode and the *PS17* time is reset.

In heating mode

- the regulation temperature is equal to or higher than the heating threshold
- after the maximum out-of-range time allowed (*PS17*) if the regulation temperate is above the heating setpoint + the out-of-range differential (*PS16*), otherwise the machine will stay in recycling mode and the *PS17* time is reset.

After the machine is switched off, the damper will remain closed.
It is also possible to configure an end-of-run digital input for the warm-up damper. When the end-of-run time has expired (parameter *PS18*), if the contact is not closed, the warm-up damper alarm (AL33) is triggered with manual reset which will switch off the machine.

8.18 Recovery heat exchangers

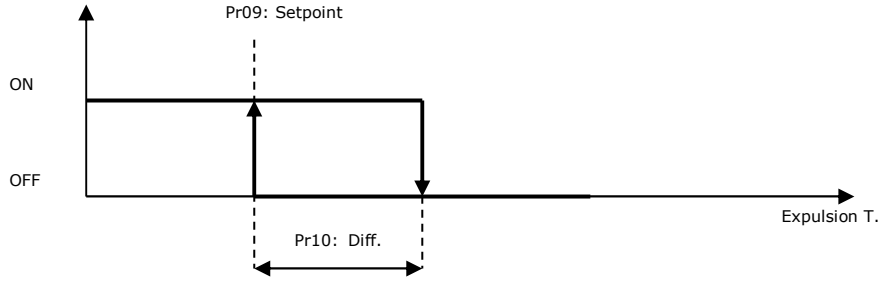
When a notable quantity of renewal air is required, the air handling units have a system that recovers expelled air for improved energy saving.
Using the parameter (*PG13>0*), it is possible to utilize the heat recovery by selecting one of the following different heat exchangers:
PG13 = 0: Management disabled
PG13 = 1: Heat exchangers at cross flow
PG13 = 2: Double coil recovery heat exchanger
PG13 = 3: Heat exchanger rotating

8.18.1 Cross-flow heat exchanger

To use this heat exchanger, set parameter *PG13=1*. The heat exchanger has a bypass damper used to block the passage of external air through the air ducts of the heat exchanger.
To use the analogue regulation of the recuperator it will be necessary to set an analogue output as "Recuperator / Bypass", while to use the digital regulation it will be necessary to configure a digital output as "Recuperator / Bypass On-Off". If analogue regulation is used, it will always be possible to configure a digital output to enable the recuperator.
The heat exchanger is normally always active but bypassed during free-cooling/free-heating phases or during a defrost cycle when the external temperatures are too low.
During the winter cycle, the heat exchanger exchanges heat between the expelled air flow (hot and humid) and the input air flow (cold and dry). If the outside air is very cold, the temperature of the expelled air flow may drop to almost freezing temperature with the risk of blocking the heat exchanger, preventing regular air flow.

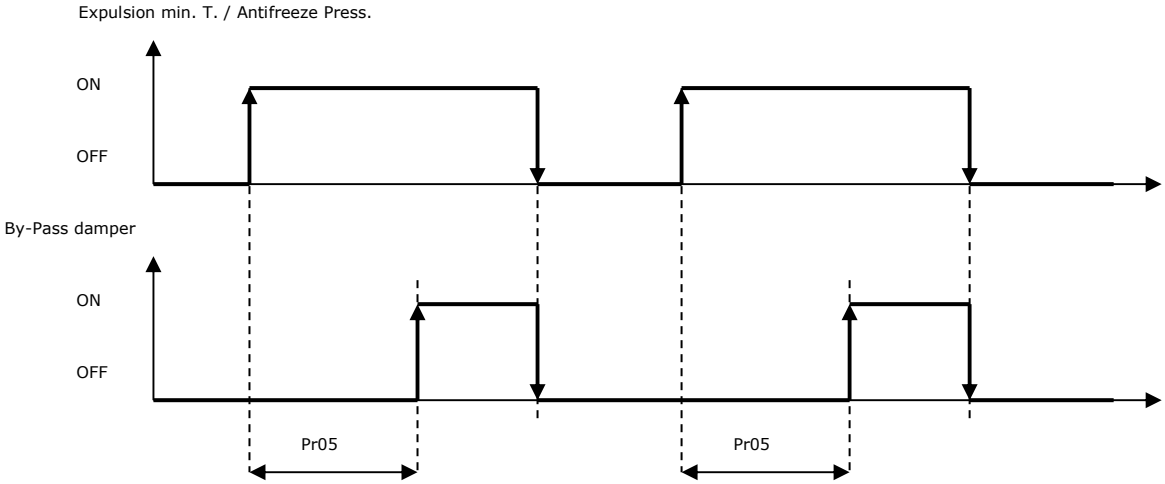
To this from happening, an attempt is made to prevent the temperature of the expelled air flow from being lowered too much by monitoring the temperature of the expelled air or the outdoor temperature if the expelled air probe is not present e and, when necessary, by first slowing down the supply fan only and then both fans. This function is active only if the digital input of the exchanger antifreeze pressure switch is not configured, neither the defrost from digital input nor that of the direct expansion coil and the fans are of the analog type.
If the expelled air probe is configured and not in error the regulation takes place in the neutral zone with setpoint *Pr03*, band *Pr04*, increment step *PF30* and time *PF31* on the temperature of the discharge probe. If the temperature is too low (less than the threshold - band/2), the speed of the supply fan decreases compared to the return fan speed up to a maximum differential (parameter *PF32*), whilst always taking into account any speed balancing (parameter *PF28*) which is always valid. If the defrost request remains, the speed of both fans will decrease at the same rate up to the minimum allowed (parameter *PF03*). If, however, the temperature falls below the critical value (parameter *Pr09*), the by-pass damper will open.
If the expulsion probe is not present and the external temperature probe is configured and not in error, the latter will be used to slow down the fans. In this case, the regulation is proportional: if the external temperature is higher than the set point Pr03, the fan speed will remain that defined by the regulation. If the temperature is lower than the setpoint, the delivery fan speed will be proportionally decreased with respect to the return fan speed up to the maximum differential (parameter PF32), always taking into account any speed balance (parameter PF28) which remains valid. If the outdoor temperature continues to drop, the speed of both fans will decrease simultaneously up to the maximum allowed which will reach the setpoint minus the differential Pr04.
If both probes are not present or are in error, regulation is inhibited.
Whatever the fan speed regulation in place, it will be suspended for the entire duration of the defrost cycle. When the defrost cycle ends, the fan speed regulation resumes normally.
In particular, in the case of manual regulation, it is always possible to set a different value for the fan speed, but this value will be valid only at the end of the defrost cycle.
Pr03: Heat exchanger defrost setpoint
Pr04: Heat exchanger defrost neutral zone
Pr09: Recovery heat exchanger defrost stop setpoint
Pr10: Recovery heat exchanger defrost stop differential
PF28: Return fan percentage delta
PF30: Heat exchanger defrost speed increase/decrease step
PF31: Heat exchanger defrost speed increase/decrease time
PF32: Return fan percentage delta in heat exchanger defrost

For the digital regulation the setpoint (parameter *Pr09*) and relevant differential (parameter *Pr10*) must be set to activate of the damper bypass due to defrosting. To use this function, a discharge sensor must be configured.

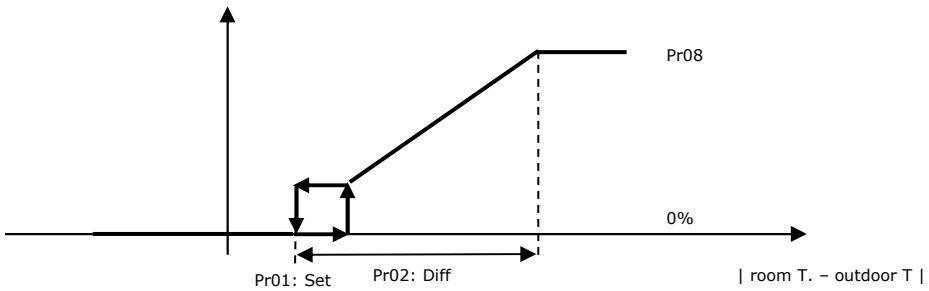


Alternatively, the defrost function may also be used following closure of the "exchanger antifreeze pressure switch".
When the minimum expulsion air temperature is reached, (or if the exchanger antifreeze pressure switch intervenes), as shown in the diagram, a cyclical bypass sequence is activated by the recovery heat exchanger to allow the expelled room hot air to defrost the exchanger air ducts.
After the delay *Pr05*, the by-pass shutter will activate in order to allow for defrosting.
When the temperature rises to above the permitted value, the damper is deactivated and the recovery heat exchanger restarts.
During the changeover of the recovery unit, to avoid unwanted noises, both fans can be turned off for a period defined by parameter PF69.

If an expulsion probe is being used and it is in alarm mode the function is disabled.



In the case of modulating regulation, the differential set point Pr01 and the differential Pr02 must be set and both the ambient probe and the external temperature probe must be configured.
If free-cooling / free-heating is enabled (PS01 = 1) the modulating output of the recovery unit will be the same as the free-cooling / free-heating request.
If the absolute value of the room temperature minus the room temperature minus the external temperature is lower than the set point Pr01 the request will be equal to 0. If the absolute value exceeds the set point Pr01 plus the differential Pr02 the request will be equal to the maximum percentage of the recovery unit defined by the parameter Pr08. Between these two conditions the request will be linearized from 0% up to the maximum Pr08.
During opening, the output remains at 0% as long as the request does not become greater than parameter Pr07, then assumes the value of the request. In closing, the output assumes the value of the request until it is greater than parameter Pr07, then it is kept at the value of Pr07 until the request goes to 0%.
If the temperature of the expelled air or of the external air, if the expulsion probe is not configured or is in error, drops below the critical set (parameter Pr09) minus the neutral zone / 2 (parameter Pr10), the damper opening up to 100%. If the temperature exceeds the critical set Pr09 plus the neutral zone Pr10 / 2, the opening of the damper will decrease until it returns to the percentage required. This regulation is based on a neutral zone with set point Pr09, band Pr10, increase step Pr12 and time Pr11. Whatever the request for opening the existing shutter, it is suspended for the entire duration of this regulation in the neutral zone.



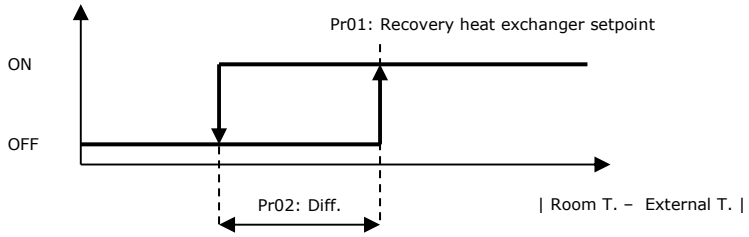
8.18.2Double coil recovery heat exchanger

To use this heat exchanger, set parameter *PG13=2*.

The double coil recovery heat exchanger is activated by the circulation pump for the exchange fluid between the two coils.

In order to limit the pumps energy consumption, the activation will be managed by the difference between the room air temperature and outdoor air temperature (parameter *Pr01* and relative differential *Pr02*).

The circulation pump is stopped during the free-cooling and free-heating phases.



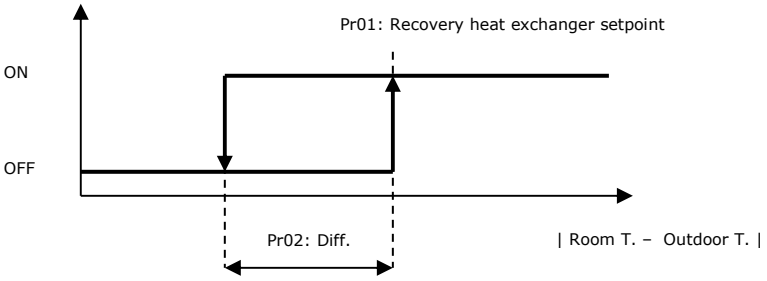
This heat exchanger does not require minimum expulsion temperature control because no icing up of the coil occurs.

8.18.3Rotating heat exchanger

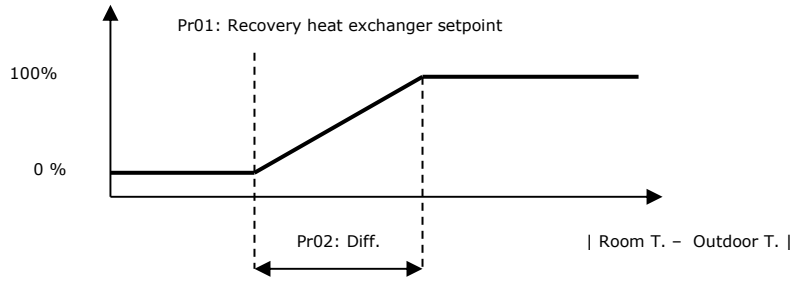
In this case the recuperator can be regulated in two different ways: modulating or On-Off depending on how the hardware parameters relating to the outputs have been configured. In the case of a modulating recovery unit, it is also possible to configure the digital output which has an activation relay function.

The recovery heat exchanger is deactivated during the free-cooling and free-heating phases.

Digital rotating heat exchanger



Modulating rotating heat exchanger



During the winter cycle, the heat exchanger exchanges heat between the expelled air flow (hot and humid) and the input air flow (cold and dry). If the outside air is very cold, the temperature of the expelled air flow may drop to almost freezing temperature with the risk of blocking the heat exchanger, preventing regular air flow.

To prevent this event, an attempt is made to prevent the temperature of the flow of expelled air from falling too low by keeping the temperature of the expelled air or the external temperature monitored if the expulsion probe is not present and, when needed, first by slowing down only the cooling fan. flow and then both fans. This function is active only if the digital input of the exchanger anti-freeze pressure switch is not configured, neither defrosting nor defrosting from digital input is active but that of the direct expansion coil and the fans are analog.

If the expulsion probe is configured and it is not in error, the regulation takes place in the neutral zone with setpoint *Pr03*, band *Pr04*, increment step *PF30* and time *PF31* on the temperature of the discharge probe. If the temperature is too low (less than the threshold - band/2), the speed of the supply fan decreases compared to the return fan speed up to a maximum differential (parameter *PF32*), whilst always taking into account any speed balancing (parameter *PF28*) which is always valid. If the defrost request remains, the speed of both fans will decrease at the same rate up to the minimum allowed (parameter *PF03*).

If the expulsion probe is not present and the external temperature probe is configured and not in error, the latter will be used to slow down the fans. In this case, the regulation is proportional: if the external temperature is higher than the set point Pr03, the fan speed will remain that defined by the regulation. If the temperature is lower than the setpoint, the delivery fan speed will be proportionally decreased with respect to the return fan speed up to the maximum differential (parameter PF32), always taking into account any speed balance (parameter PF28) which remains valid. If the outdoor temperature continues to drop, the speed of both fans will decrease simultaneously up to the maximum allowed which will reach the setpoint minus the differential Pr04.

If both probes are not present or are in error, regulation is inhibited.

Whatever the regulation of the current heat exchanger speed is, this regulation is suspended in the neutral zone for the entire duration.

When the defrost ends, the fan speed regulation resumes normally.
In particular, in the case of manual regulation, it will always be possible to set a different value for the fan speed, this value will however only be valid at the end of the defrost.
If the temperature of the expelled air drops below the critical set (parameter Pr09), the speed of the analog rotary recuperator will begin to decrease to its minimum speed (parameter Pr07), or in the case of the digital rotary recuperator, an attempt will be made to reduce its activation through a slow PWM regulation. These two regulations are based on a regulation in the neutral zone with set point Pr09, band Pr10, increase step Pr12 and time Pr11.
In the case of the digital rotary heat recovery unit, the slow PWM period must also be set (parameter Pr13).
Whatever the current recuperator speed regulation is, it is suspended for the entire duration of this regulation in the neutral zone.

Pr03: Heat exchanger defrost setpoint
Pr04: Heat exchanger defrost neutral zone
Pr07: Recovery heat exchanger minimum speed
Pr09: Recovery heat exchanger defrost stop setpoint
Pr10: Recovery heat exchanger defrost stop differential
Pr11: Speed increase/decrease time rotary heat exchanger in defrost
Pr12: Speed increase/decrease step rotary heat exchanger in defrost
Pr13: PWM period rotary heat exchanger in defrost
PF28: Return fan percentage delta
PF30: Heat exchanger defrost speed increase/decrease step
PF31: Heat exchanger defrost speed increase/decrease time
PF32: Return fan percentage delta in heat exchanger defrost

8.18.4Heat exchanger efficiency calculator

The program can calculate the current efficiency of the heat exchanger and it is possible to choose which probe to use for the calculation using the parameter *Pr14*.
Efficiency will be displayed on the heat exchanger status page.

Pr14=0 The efficiency calculation is disabled. The "...." symbol will appear on the heat exchanger status page.
Pr14=1 Efficiency is calculated using the supply probe with the following formula: ((supplyT - externalT) / (returnT - externalT))
Pr14=2 Efficiency is calculated using the discharge probe with the following formula: ((returnT - dischargeT) / (returnT - externalT))

If an error condition occurs on any of the probes involved in the calculation, the efficiency calculation will be disabled and the "...." symbol will appear on the heat exchanger status page.

8.18.5Heat exchanger status

The heat exchanger may assume one of the following modes of operation:

1. *Disabled:* The heat exchanger is not managed. In this state, you will see "*…*" displayed on the user interface.
2. *Off:* the heat exchanger is off. In this state, you will see "*OFF*" displayed on the user interface.
3. *Defrosting*: the heat exchanger is off and defrosting is activated (only for cross-flow heat exchanger *PG13=1*). In this state, you will see "*OFF_D*" displayed on the user interface.
4. *Off for free-cooling/heating*: the heat exchanger is switched off due to a free-cooling/heating request. In this state, you will see "OFF_F" displayed on the user interface.
5. *On:* the heat exchanger is switched on. In this state, you will see "*ON*" displayed on the user interface.

8.19Regolazioni ausiliarie

The device also manages 2 auxiliary settings that can be used by configuring the relative digital or analog outputs.

For each regulation, the following parameters can be set:

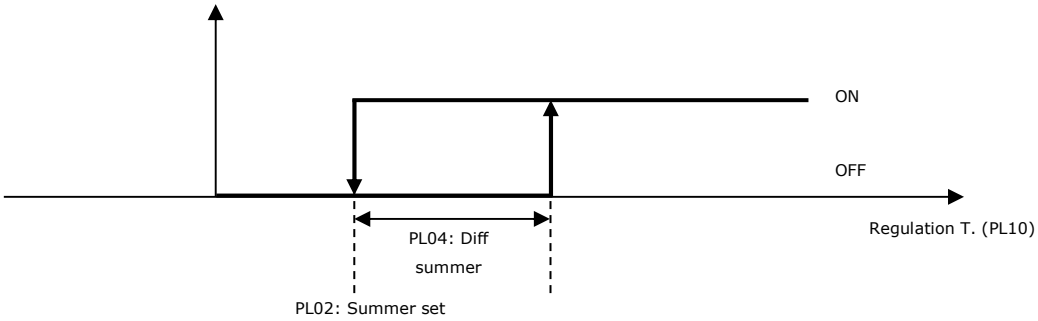
- type of regulation, to be chosen between cooling, heating, directly or inversely proportional to the operating mode
- type of probe to be used for regulation, chosen from all those available in the device
- dedicated setpoint and differential for operating mode
- minimum and maximum modulating output value
- presence of the analog output enable step
- enabling auxiliary regulation even with the machine off
- delay from the activation of the digital alarm input which blocks the auxiliary regulation

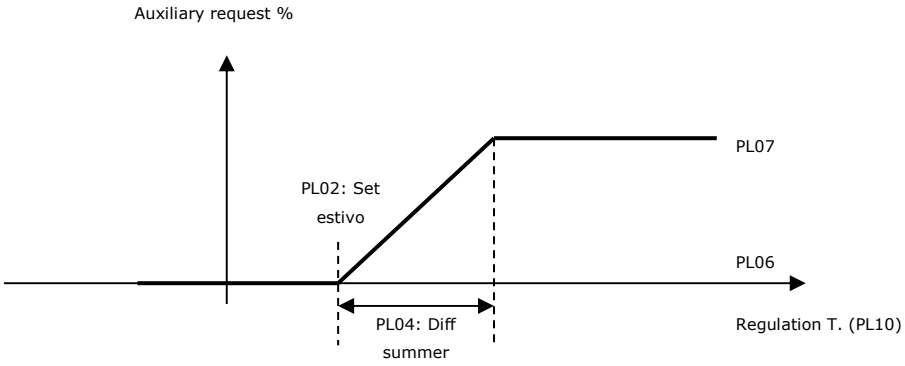
By configuring an "Auxiliary" digital input it will be possible to directly control the auxiliary digital output upon activation of the digital contact.

If analogue auxiliary regulation is used, it will always be possible to configure a digital output that will function as regulation enabling relay.

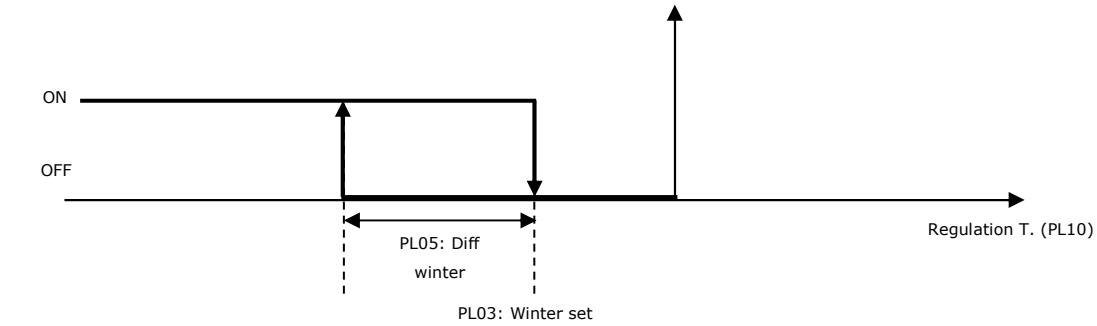
Otherwise the digital and modulating regulations are based on the following graphs:

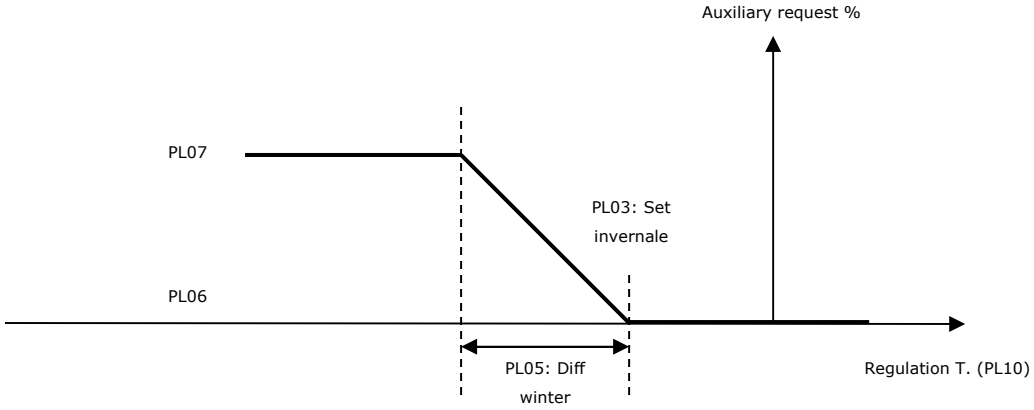
COOLING





HEATING


ON
OFF
PL05: Diff
winter
Regulation T. (PL10)
PL03: Winter set


Auxiliary request %
PL07
PL03: Set
invernale
PL06
PL05: Diff
winter
Regulation T. (PL10)

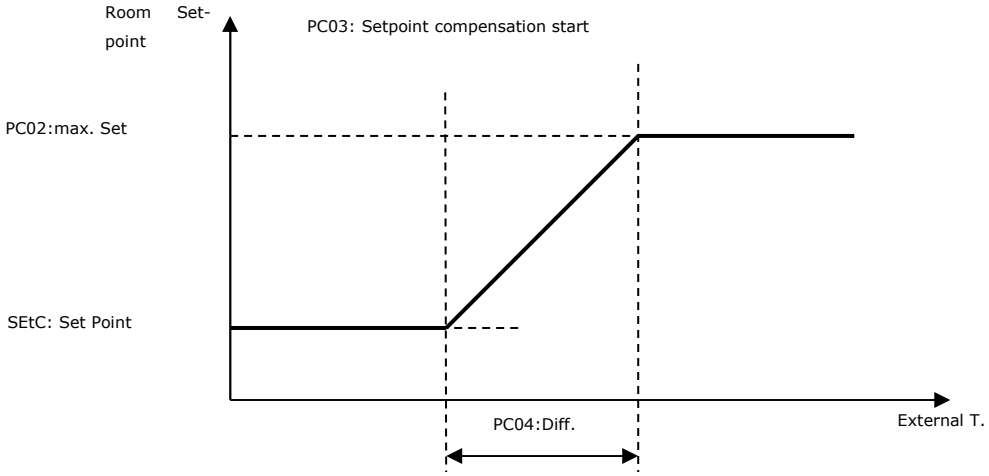
9 MANAGEMENT OF OTHERS

some auxiliary regulations are envisaged, briefly described in the following sections.

9.1 Compensation for setpoint

For summer mode only (parameter *MOdE=0=CooL*), the cooling regulation requests compensation of the room regulation setpoint according to the external temperature (parameter *P*C01 enables summer setpoint compensation).

This function is important for avoiding excessive changes of temperature between the outside and indoor environments to ensure comfort in the different conditions. It is also very important for enabling the system to save energy.



The compensation setpoint increases in proportion to the increase in the external temperature until it reaches the maximum admissible threshold set by the parameter *PC02* (Maximum setpoint for summer compensation).

The external temperature probe must be enabled to use this function. If the external probe is in error mode, this function is inhibited.

9.2 Last date of maintenance

In the Menu *Maintenance ->Counters* you will find a page with the ability to memorize the last date of maintenance for the plant.

By pressing "Update", the old date which is in the system will automatically be updated with the new correct date; updating the maintenance date can be done at parameter *PM90*.

9.3 Automatic daylight saving time

The program can manage the automatic switch-over from daylight saving time to standard time. The parameter *PH25 Enable automatic standard time* allows you to control the enabling and the choice of the zone between Europe and North America.

By enabling the Europe zone function at 1 am on the last Sunday of March, the clock will be moved one hour ahead while at 1 am on the last Sunday in October, it will be moved one hour back.

By enabling the N. America zone function at 2 am on the second Sunday of March, the clock will be moved one hour ahead while at 2 am on the first Sunday in November, it will be moved one hour back.

10 DIAGNOSTICS

The application is capable of managing a set of alarms relating to the fans, pumps, probes and other system functions.
Depending on the type of alarm it is possible to configure a manual or automatic re-arm, a delay in signalling the alarm and any action to be taken in specific situations.
When one or more alarms are active, the alarm icon flashes on the display.
In order to view the various alarms, the "Alarm" menu must be displayed from the main page, using the ESC key, followed by the ENTER key. By pressing the ESC key from an alarm page, or waiting for the 60-second timeout, the user is brought back to the application's main page.
To scroll the various active alarms, the ENTER key must be pressed once more: alarms are listed in order of priority, just as they are listed in the Alarm Table of chapter 10.4.
All digital inputs relating to alarms are managed by an *Alarm Logic* parameter, which takes on the following significance:

- If set to "NO", the inputs will be normally de-energised (open): N.O. logic.
- If set to "NC", the inputs will be normally energised (closed): N.C. logic.

10.1 Manual and automatic alarms

There are two types of alarms, those with manual reset and those with automatic reset.
These alarms enable the end-user to use a parameter to set the type of re-arm that best suits the user's needs.

10.2 Manual alarms

If an alarm with manual reset occurs:
the alarm icon will start flashing.
Press the ENTER key on the "Alarm" menu to view the code of the first active alarm.
Once the conditions which had triggered the alarm are back to normal, the alarm can be manually reset. To perform this operation:
position on the page of the alarm to be restored
Hold the ENTER key pressed down for about 2 seconds.
At this point, in the absence of any further alarms, the page showing "NONE" is displayed, the alarm icon is switched OFF, and the machine goes back to normal operation; otherwise, the code relating to the next active alarm will be displayed.
The consequences that derive from an active manual alarm remain valid until the user cancels the alarm message.

10.3 Automatic-reset alarms

If an alarm with automatic reset occurs:
the alarm icon will start flashing.
Press the ENTER key on the "Alarm" menu to view the code of the first active alarm.
Once the situation that triggered the alarm has been resolved, re-arm and cancellation of the alarm message will happen automatically without the user having to take any action.
The consequences that derive from an active automatic alarm remain valid until the causes triggering the alarm are reset.

10.4 Alarms Table

The table below lists all the alarms managed by the application.
The alarms are presented in the order in which the alarms are shown when active. The alarms can all be seen even with the machine switched off.

CODE	ALARM DESCRIPTION	RESET	CONSEQUENCE	DELAY
AL01	Fan thermal switch alarm (*²) or inverter alarm (supply) (thermal or tachometer)	Auto for thermal Manu for tachometer	Shuts down all devices	Fixed 2 sec. for thermal Configurable for tachometer
AL02	Fan thermal switch alarm (*²) or inverter alarm (supply) (thermal or tachometer)	Auto for thermal Manu for tachometer	Shuts down all devices	Fixed 2 sec. for thermal Configurable for tachometer
AL03	Supply air flow switch (*²)	Manu	Shuts down all devices	Configurable
AL04	Return air flow switch (*²)	Manu	Shuts down all devices	Configurable
AL05	Coil 1 pump thermal switch alarm	Auto	Stops pump	Fixed 2 sec.
AL06	Coil 2 pump thermal switch alarm	Auto	Stops pump	Fixed 2 sec.
AL07	Heater thermal switch alarm	A/M	Switches all the active heating elements off and forces the fans to 100%	Configurable
AL08	Supply air pressure switch filters level 1	A/M	Display	Configurable
AL09	Humidifier	A/M	Stops humidifier	Configurable

AL10	Generic alarm (*²)	A/M	Shuts down all devices	Configurable
AL11	Anti-freeze	Auto	Switches fans off and closes damper Forces heating coil at 100% Forces cooling coil at 0%	Configurable
AL12	Recovery heat exchanger alarm	A/M	Activates recovery heat exchanger by-pass	Configurable
AL13	Fire/smoke alarm (*²)	Auto	Shuts down all devices	-
AL14	Supply fan operating hours	Manu*¹	Display	-
AL15	Operating hours - Return fans	Manu*¹	Display	-
AL16	Operating hours - coil 1 pump	Manu*¹	Display	-
AL17	Operating hours - coil 2 pump	Manu*¹	Display	-
AL18	Room/return air probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL19	Supply air probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL20	External air probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL21	Room/return humidity probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL22	Expulsion air probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL23	Supply duct pressure probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL24	Air quality probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL25	Supply humidity probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL26	Remote setpoint converter potentiometer faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL27	Damper opening potentiometer faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL28	I/O configuration error (*²)	Auto	Shuts down all devices	-
AL29	RTC clock faulty or disconnected	A/M	Inhibits time band management	-
AL30	End-of-run outside air damper (*²)	Manu	Shuts down all devices	Configurable
AL31	Reserved	- - - -	- - - -	- - - -
AL32	Pre-heating heater thermal switch alarm	A/M	Switches all the active heating elements off and forces the fans to 100%	Configurable
AL33	End-of-run warm-up damper (*²)	Manu	Shuts down all devices	Configurable
AL34	Return duct pressure probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL35	Return air pressure switch filters level 1	A/M	Display	Configurable
AL36	Pre-heating coil temperature probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL37	Anti-freeze for pre-heating coil	Auto	Switches fans off and closes damper	Configurable
AL38	Coil 1 temperature probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL39	Coil 2 temperature probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL40	Anti-freeze coil 1	Auto	Switches fans off and closes damper	Configurable
AL41	Anti-freeze coil 2	Auto	Switches fans off and closes damper	Configurable
AL42	Coil 1 water congruency	Auto	Forces coil 1 to 0%	Configurable
AL43	Coil 2 water congruency	Auto	Forces coil 2 to 0%	Configurable
AL44	Pre-heating coil water congruency	Auto	Forces the pre-heating coil to 0%	Configurable
AL45	Defrost compressors temperature probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL46	High pressure compressors	Manu	Switches the compressors off	Fixed 2 seconds
AL47	Low pressure compressors	A/M	Switches the compressors off	Configurable
AL48	Compressor thermal alarm	A/M	Switches the compressors off	Configurable

AL49	Operating hours - compressor 1	Manu*¹	Display	-
AL50	Operating hours - compressor 2	Manu*¹	Display	-
AL51	Supply air pressure switch filters level 2	A/M	Display	Configurable
AL52	Supply air pressure switch filters level 3	A/M	Display	Configurable
AL53	Supply air pressure switch filters level 4	A/M	Display	Configurable
AL54	Return air pressure switch filters level 2	A/M	Display	Configurable
AL55	Return air pressure switch filters level 3	A/M	Display	Configurable
AL56	Return air pressure switch filters level 4	A/M	Display	Configurable
AL57	Re-heating coil temperature probe faulty or disconnected	Auto	Inhibits regulation dependent on it	Configurable
AL58	Anti-freeze for re-heating coil	Auto	Switches fans off and closes damper	Configurable
AL59	Re-heating coil water congruency	Auto	Forces the re-heating coil to 0%	Configurable
AL60	Pre-heating heater thermal switch alarm	A/M	Turn all heating elements off and force fans to 100%	Configurable
AL61	Generic warning	A/M	Display	Configurable
AL62	Fan potentiometer faulty or disconnected	Auto	Inhibits the controls upon which the sensor is dependent	Configurable
AL63	Auxiliary 1 probe in error or disconnected	Auto	Inhibits the controls upon which the sensor is dependent	- Configurable
AL64	Auxiliary 2 probe in error or disconnected	Auto	Inhibits the controls upon which the sensor is dependent	- Configurable
AL65	Auxiliary 1 alarm	Auto	Forces to 0% the auxiliary 1 regulation	- Configurable
AL66	Auxiliary 2 alarm	Auto	Forces to 0% the auxiliary 2 regulation	- Configurable
AL67	Phases sequence (*²)	Manu	Turns off all the devices	-
AL68	MODBUS supply fan (*²)(*³)	Auto	Turns off the fan indicated by the alarm	-
AL69	MODBUS return fan (*²)(*³)	Auto	Turns off the fan indicated by the alarm	-
AL70	Outdoor humidity probe in error or disconnected	Auto	Inhibits the controls upon which the sensor is dependent	- Configurable

A/M: Automatic or Manual alarm (set from parameter)

(*¹) To re-arm alarms linked to operating hours, zero the device hours.

(*²) These alarms cause the unit to shutdown bringing it to the status OFF from alarm

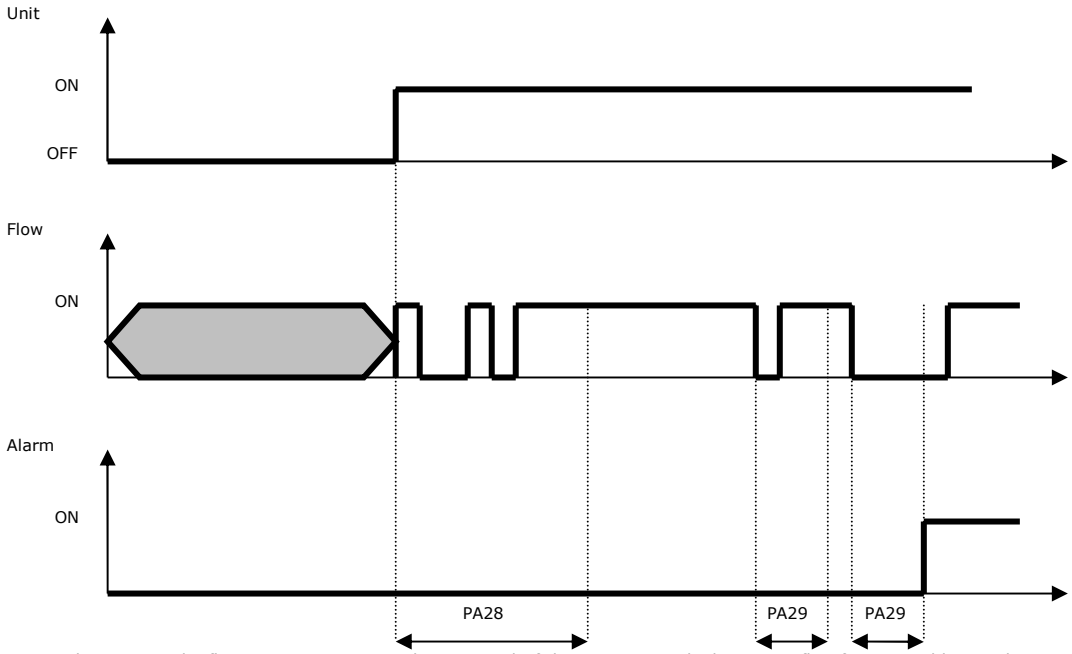
In the case of Modbus fan alarms (AL68 and AL69), to switch off the unit, the number of fans in alarm must be equal to or greater than that set by parameter, respectively PF72 for the supply fans and PF75 for the return fans.

(*³) This alarm includes the following messages:

- No phases
- Inverter high temperature
- Master/slave communication
- Inverter error
- Motor high temperature
- Hall sensor
- Motor overload
- Low voltage DC
- Communication error
- Overvoltage (only visible with EVCO inverter)
- Overcurrent (only visible with EVCO inverter)
- Analogue input (only visible with EVCO inverter)
- Eeprom data (only visible with EVCO inverter)
- Safe torque off (only visible with EVCO inverter)
- Motor status (only visible with EVCO inverter)
- Earthing failure (only visible with EVCO inverter)

10.5 Air flow switch alarm

The flow switch is operated after the unit is initially switched on and after the *Flow switch reset delay (*parameter *PA28)*: when this time has expired, if the contract signals that there is no flow, the alarm is triggered.



During normal operation, the flow sensor is continuously monitored: if the contact signals there is no flow for a period longer than parameter *PA29*, the alarm is triggered.

If the pressure probe (supply / return) has been configured and is not in error, it can be used to control the flow instead of the digital input.

Also in this case the alarm will be managed after the flow switch delay from reset (parameter PA28).

During normal operation, if the value of the pressure probe is lower than the dedicated setpoint (parameter PA66 for the suppy and parameter PA67 for the return) for a period longer than the parameter PA29 the alarm is signaled.

The flow switch alarm is manually reset, activation leads to the unit being switched off bringing it to *OFF by Alarm s*tatus.

10.6 High pressure alarm

If the "compressors high pressure" digital input is activated, the compressors high pressure alarm is activated after a 2-second fixed delay (AL46) which causes the compressors to stop immediately and must be manually reset.

10.7 Low pressure alarm

If the "low compressor pressure" digital input is activated and remains active for the low pressure alarm delay (parameter *PA52*), the compressor low pressure alarm is activated, which stops the compressor immediately and must initially be reset automatically, unless it exceeds a certain number of interventions in the hour (parameter *PA53*), in this case it switches to manual reset and can be reset if, in the meantime, the digital input is no longer active.

Some particular cases should be indicated:

- If the digital input is active when the compressors are off and there Is a request to switch on a compressor, the latter cannot be switched on.
- When the first compressor is turned on, the low pressure alarm is inhibited for the low pressure alarm by-pass time (parameter *PA51*) during which time, if the digital input is activated is does not trigger the alarm.
- During compressor defrosting, the low pressure alarm is inhibited.

10.8 Timed air filter pressure switch alarm

The air filter pressure switch alarm can be managed by time as well as by configuring the relative digital input.

To enable this function, the parameter of the operating hours limit expressed in hundreds of hours must be set (parameter PA58 for the delivery and PA59 for the recovery) to a value other than 0. (0 = disabled). When the operating hours of the fan exceed the operating hours limit, the relative alarm will be signaled (AL08 for the delivery and AL35 for the recovery) with manual reset.

10.9 Fire/smoke alarm

There are two distinct operating modes for the fire/smoke alarm, which can be set using the parameter *PA44* and can have the following options:

- Fire extinguishing: an attempt is made to extinguish the fire, by trying to prevent oxygen from entering the room. Without turning off the machine, the fans and any additional function will be stopped and the mixing chamber damper will be closed in order to isolate the interior from the exterior as far as possible.
- Smoke evacuation: statistically, more people in fires die of suffocation from smoke, therefore, the default parameter will be this, even if the side effect will be to increase the flames. To evacuate the smoke, the mixing chamber damper, if there is one, will open 100% and both fans will run at maximum speed in order to evacuate as much smoke as possible. Here again, any additional functions will also be interrupted.

10.10 Alarm relay

The program includes the option of managing two configurable alarm relays, one for non-serious alarms and one for serious alarms.

For each type of alarm, there is a parameter that allows you to choose whether this alarm should be signalled and on which alarm relay. Additional alarms can be addressed at relay.

It is possible to establish the polarity (NO or NC) of the digital outputs of alarms via the relevant configuration.

11 ACCESSORIES

11.1 Accessories for c-pro 3 NODE giga AHU

INTRABUS/RS-485 serial interface (EVIF22ISX)

Makes it possible to convert the INTRABUS signal into an RS-485 signal.

EVlink Wi-Fi serial interface (EVIF25TWX)

Through the TTL communications port, it provides the controller with Wi-Fi connectivity which enables remote management and monitoring from the Internet using the EPoCA cloud system.

USB extension cable (0810500023)

Makes it possible to connect to a personal computer. Length: 1 m (3.28 ft).

USB extension cable (0810500025)

Makes it possible to connect a USB flash drive. Length: 2 m (6.56 ft).

Connection kit (CJAV47)

For wiring the controllers with the plug-in screw terminal blocks.

0,75 KW @ 230 VAC single-phase inverter (EI750M2C04O0VXX)

It allows a modulating control of asynchronous motors.

1, 5 KW @ 230 VAC single-phase inverter (EI1K5M2C04O0VXX)

It allows a modulating control of asynchronous motors.

2,2 KW @ 230 VAC single-phase inverter (EI2K2M2C04O0VXX)

It allows a modulating control of asynchronous motors.

Serial probe (EPJP920N9VP)

Using the probe it is possible to read the temperature and humidity value and transmit it via CAN.

Serial probe (EVJP920N9VP)

Using the probe it is possible to read the temperature and humidity value and transmit it via INTRABUS.

RS-485/USB serial interface (EVIF20SUXI)

Using the interface it is possible to connect the device to the setup software system Parameters Manager.

USB flash drive (EVUSB4096M)

Makes possible configuration upload and download.

4GB of memory.

12 TECHNICAL SPECIFICATIONS

The following table outlines the technical specifications of the c-pro 3 NODE giga AHU controllers.

Purpose of the control device:	Function controller.	
Construction of the control device:	Built-in electronic device.	
Container:	Grey, self-extinguishing.	
Category of heat and fire resistance:	D.	
Measurements:		
10 DIN modules: 179.0 x 110.0 x 26.0 mm (7 1/16 x 4 5/16 x 1 in) the open frame models	10 DIN modules: 179.0 x 128.0 x 60.0 mm (7 1/16 x 5 1/16 x 2 3/8 in) the models with enclosure.	
Mounting methods for the control device:	To be fitted on a DIN rail, in a control panel.	
Degree of protection provided by the covering:		
IP00 the open frame models	IP40 the front of the models with enclosure.	
Connection method:		
screw terminal blocks for wires up to 1.5 mm² and 2.5 mm² the open frame models	removable screw terminal blocks for wires up to 1.5 mm² and 2.5 mm² the models with enclosure	
Pico-Blade connector	Micro-USB connector	
RJ45 F telephone connector (according to the model).		
Maximum permitted length for connection cables:		
Power supply: 10 m (32.8 ft)	Analogue inputs: 10 m (32.8 ft)	
Auxiliary power supply and 0-5 V ratiometric transducer power supply: 10 m (32.8 ft)	Digital inputs: 10 m (32.8 ft)	
0-10 V analogue outputs: 10 m (32.8 ft)	PWM analogue outputs: 1 m (3.28 ft)	
Digital outputs: 100 m (328 ft)	INTRABUS port: 10 m (32.8 ft)	
RS-485 MODBUS port: 1,000 m (3,280 ft)	USB port: 1 m (3.28 ft).	
CAN port:	1,000 m (3,280 ft), baud rate: 20,000 baud	
	500 m (1,640 ft), baud rate: 50,000 baud	
	250 m (820 ft), baud rate: 125,000 baud	
	50 m (164 ft), baud rate: 500,000 baud.	
Operating temperature:	From -10 to 55 °C (from 14 to 131 °F).	
Storage temperature:	From -20 to 70 °C (from -4 to 158 °F).	
Operating humidity:	Relative humidity without condensate from 5 to 95%.	
Pollution status of the control device:	2.	
Compliance:		
RoHS 2011/65/EC	WEEE 2012/19/EU	REACH (EC) Regulation no. 1907/2006
EMC 2014/30/EU	LVD 2014/35/UE.	
Power supply:	115... 230 VAC (+10% -15%), 50/60 Hz (±3 Hz), max. 16 VA.	
Earthing methods for the control device:	None.	
Rated impulse-withstand voltage:	2.5 KV.	
Over-voltage category:	II.	
Software class and structure:	A.	
Clock:	With secondary lithium battery.	
Clock drift:	≤ 30s/month at 25°C (77 °F).	
Clock battery autonomy in the absence of a power supply:	> 6 months at 25 °C (77 °F).	

Clock battery charging time:			24h (the battery is charged by the power supply of the device).
Analogue inputs:			5 for PTC, NTC or Pt 1000 probes (can be configured also for dry contact digital input)
			5 for PTC, NTC or Pt 1000 probes, 0-5 V, 0-10 V, 0-20 mA or 4-20 mA transducers (can be configured also for dry contact digital input).
PTC probes:	Sensor type:		KTY 81-121 (990 Ohm @ 25 °C, 77 °F)
	Measurement field:		from -50 to 150 °C (from -58 to 302 °F)
	Resolution:		0.1 °C (1 °F).
NTC probes:	Sensor type:		ß3435 (10 KOhm @ 25 °C, 77 °F)
	Measurement field:		from -50 to 120 °C (from -58 to 248 °F)
	Resolution:		0.1 °C (1 °F).
Pt 1000 probes:	Sensor type:		1 KOhm @ 0 °C, 32 °F
	Measurement field:		from -100 to 400 °C (from -148 to 752 °F)
	Resolution:		1 °C (1 °F).
0-5 V transducers:	Input resistance:		≥ 10 KOhm
	Resolution:		0.01 V.
0-10 V transducers:	Input resistance:		≥ 10 KOhm
	Resolution:		0.01 V.
0/4-20 mA transducers:	Input resistance:		≤ 200 Ohm
	Resolution:		0.01 mA.
Power supply remote user interfaces:			13 VDC, +20 % -10%, 150 mA max.
Power supply transducers:			13 VDC, +20 % -10%, 100 mA max.
Power supply 0-5 V ratiometric transducers:			5 VDC, ±10 %, 20 mA max.
Digital inputs:			3 dry contact and for pulse trains up to 2 KHz
			2 high voltage.
Dry contact:		Contact type:	3.3 VDC, 1 mA
		Power supply:	
High voltage contac:		Power supply:	115... 230 VAC.
Analogue outputs:			4 for 0-10 V or PWM signal
0-10 V signal:	Minimum applicable impedance:		1 KOhm
	Resolution:		0.01 V.
PWM signal:	Power supply:		0... 10 VDC, 10 mA max.
	Frequency:		10 Hz... 2 KHz
	Duty:		0... 100%
	Resolution:		1% up to 500 Hz, 5% up to 2 KHz.
Digital outputs:			2 with SPST electro-mechanical relay, 2 A res. @ 250 VAC
			5 with SPST electro-mechanical relay, 3 A res. @ 250 VAC
			1 with SPDT electro-mechanical relay, 3 A res. @ 250 VAC
			1 with SPST electro-mechanical relay, 8 A res. @ 250 VAC.

The device guarantees:

- reinforced insulation between SELV circuits and relay outputs
- reinforced insulation between "groups" of relay outputs
- basic insulation between relay outputs belonging to the same group
- reinforced insulation between live parts and SELV circuits

- reinforced insulation between "group 1" of relay outputs (K1... K3) and high voltage digital inputs (DIHV1 and DIHV2)
- basic insulation between live parts of opposite polarity (line-neutral).

Type 1 or Type 2 Actions:	Type 1.
Additional features of Type 1 or Type 2 actions:	C.
Communications ports:	
1 TTL MODBUS port	1 INTRABUS port (RS-485 MODBUS master/slave by connecting the serial interface EVIF22ISX)
1 RS-485 MODBUS slave port	1 RS-485 port (MODBUS master/slave)
1 CAN port	1 USB port

according to the model, Ethernet port (MODBUS TCP, WebServer).

c-pro 3 NODE giga AHU
Controller for industrial air handling units
Application manual ver. 1.0
PT - 29/20
Code 144CP3NGAE104

CAUTION
The device must be disposed of in compliance with local Standards regarding the collection of electric and electronic equipment.

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