QCV - MB

Valves actuators CONTROL BOX:
- 24 Volt (3 Point)
- 230 Volt ON-OFF

9034140 - 9034147

CE

E 01/17
E 01/17
Cod. 4050960

ENGLISH

General index

1 – General Descriptions

The QCV-MB box control's realized in order to manage the MAESTRO FCU uquipped with valves linked to ON-OFF actuators 230Vac Power supplied.

The box's realized with a galvanized steel structure composed by an a bottom part where are fitted the electromechanical/electronic devices and by an a metallic cover.

The structure's provided with n°6 holes, inclusive to a plastic protection, for the external wirings access.

2 – Internal components

- MB electronic board able to manage the fan speeds and the 1 or 2 water valves actuators. The MB board's also able to be connected with the SABIANET supervisor system.
- DIN rail 4mmq screws terminals as customer interface;
- FCU inlet air temperature NTC 10K probe (T1);
- FCU heat exchanger water temperature NTC 10K probe (T3);
- FCU change-over NTC 10K probe (T2); **- Not Wired -**
- T-MB LCD remote wall control; **- Not Wired -**
- Speed switch selector SEL (Single SEL for the article 9034111 linkable to the units size 1-6 or double SEL for the article 9034117 linkable to the unit size 7 only) as interface device between the MB board and the motor;

3 – Package internal documents

- MB Technical manual;
- This instruction sheet for the box control installation and wiring.

4 – Principal technical data

- External dimensions: 350 x 300 x 85mm;
- Protection degree: IP20;
- Power supply: 230Vac 50Hz;
- T-MB wall remote control regulation range: 10°C ÷ 30°C

5 – Principal functions

- Fan speed management;
- 2 o 4 pipes plant managemen;
- Management of valve actuator 24 Volt 3 points with PID control, 2.5 VA max;
- Management of actuated valves 230 Volt On / Off;
- 4 pipes plant with a simultaneously presence of fluid (dead zone);
- Possibility to set the fan logic function (Continuously ventilation or contemporary to the valves opening);
- Possibility to receive, by a free contacts, the occupancy sensor or window sensor wiring;
- Possibility to the fan interlock with the exchanger water probe (T3 probe) where:

On the Heat mode_ FAN OFF se TH20<36°C

On the Cool mode_FAN OFF se TH20>22°C (This function's for 2 pipes plant only);

- Auto change over sensor (T2) - Mode is set based on temperature of the incoming water flow, ideal for 2-pipe systems.

Logic for auto change over sensor:

T2<20°C the cooling mode will be active.

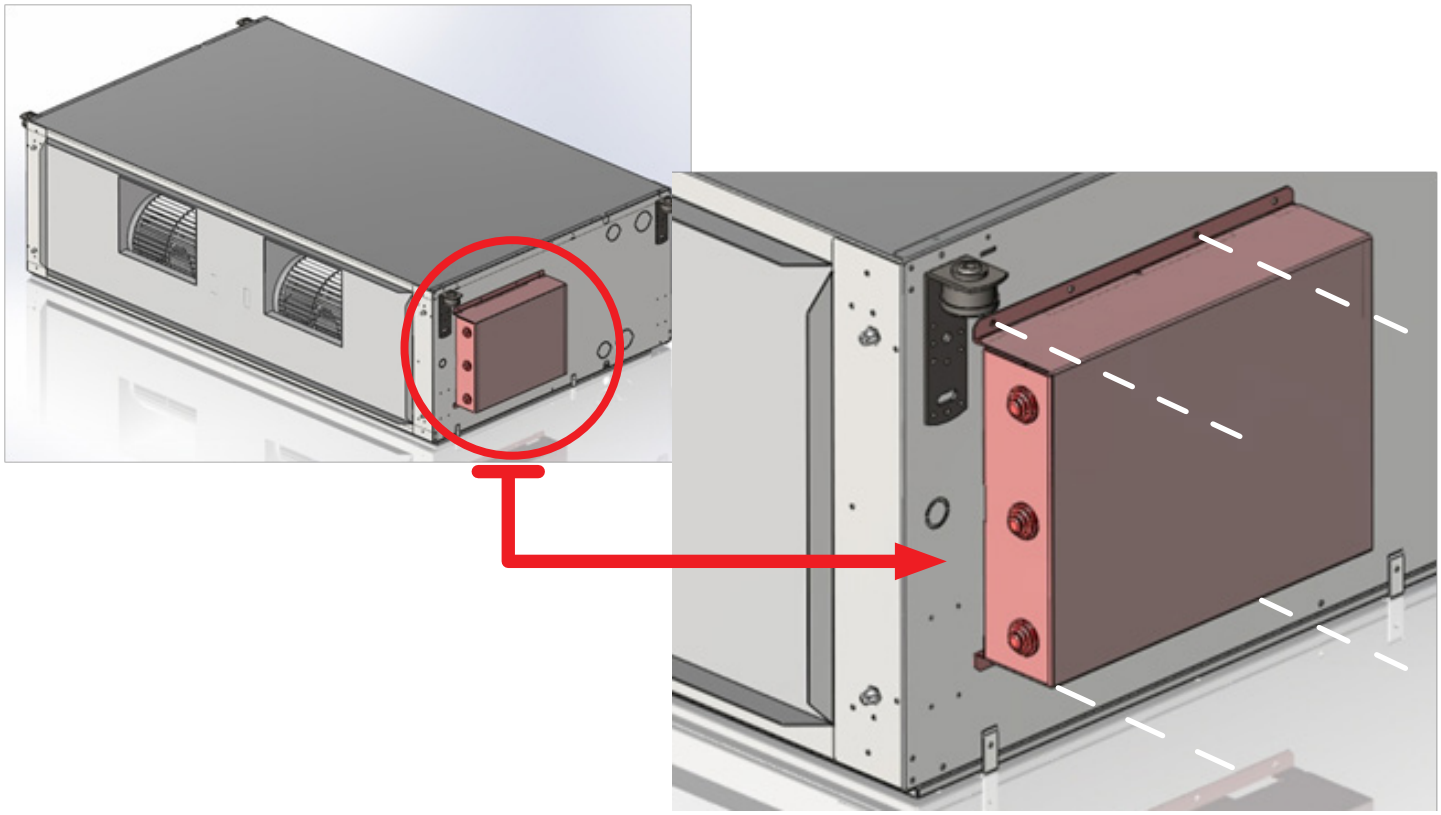
T2>30°C the heating mode will be active.

6 – Installation

- Fix, using n°4 self threading 3.9x13 screws, the control box onto the hydraulic connection opposite side panel as represented with the images on end.

-Get, onto the box, the motor cabling that, on the detail:

a) Speaking about the units size 1-5, will be made by the customer;



b) Speaking about the units size 7, is connected onto the standard FCU terminal box.

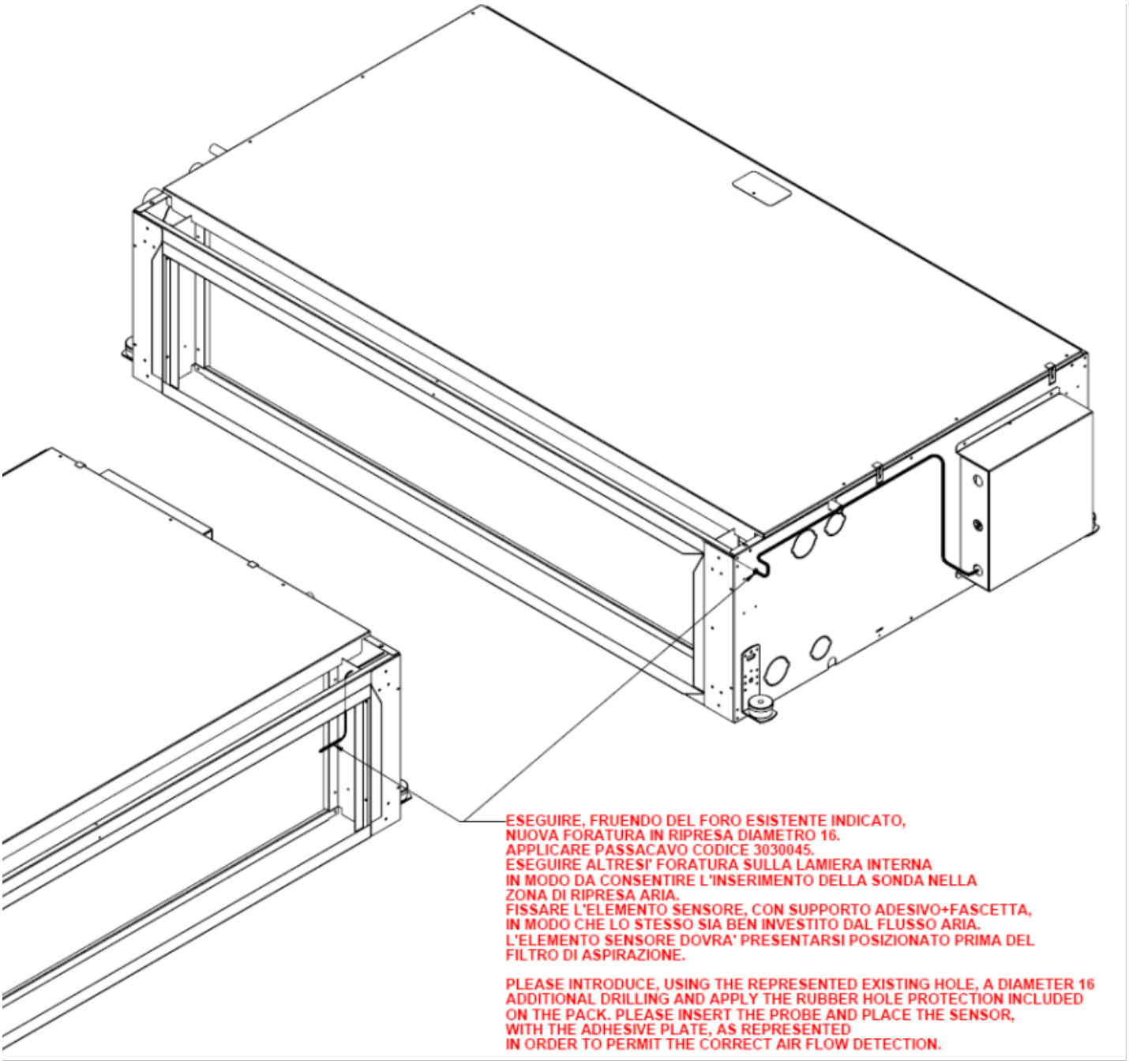
- Motor cable insertion and wiring are represented on the wiring diagram manual section.

- It's very important made the inlet air temperature probe positioning (T1) and the water temperature

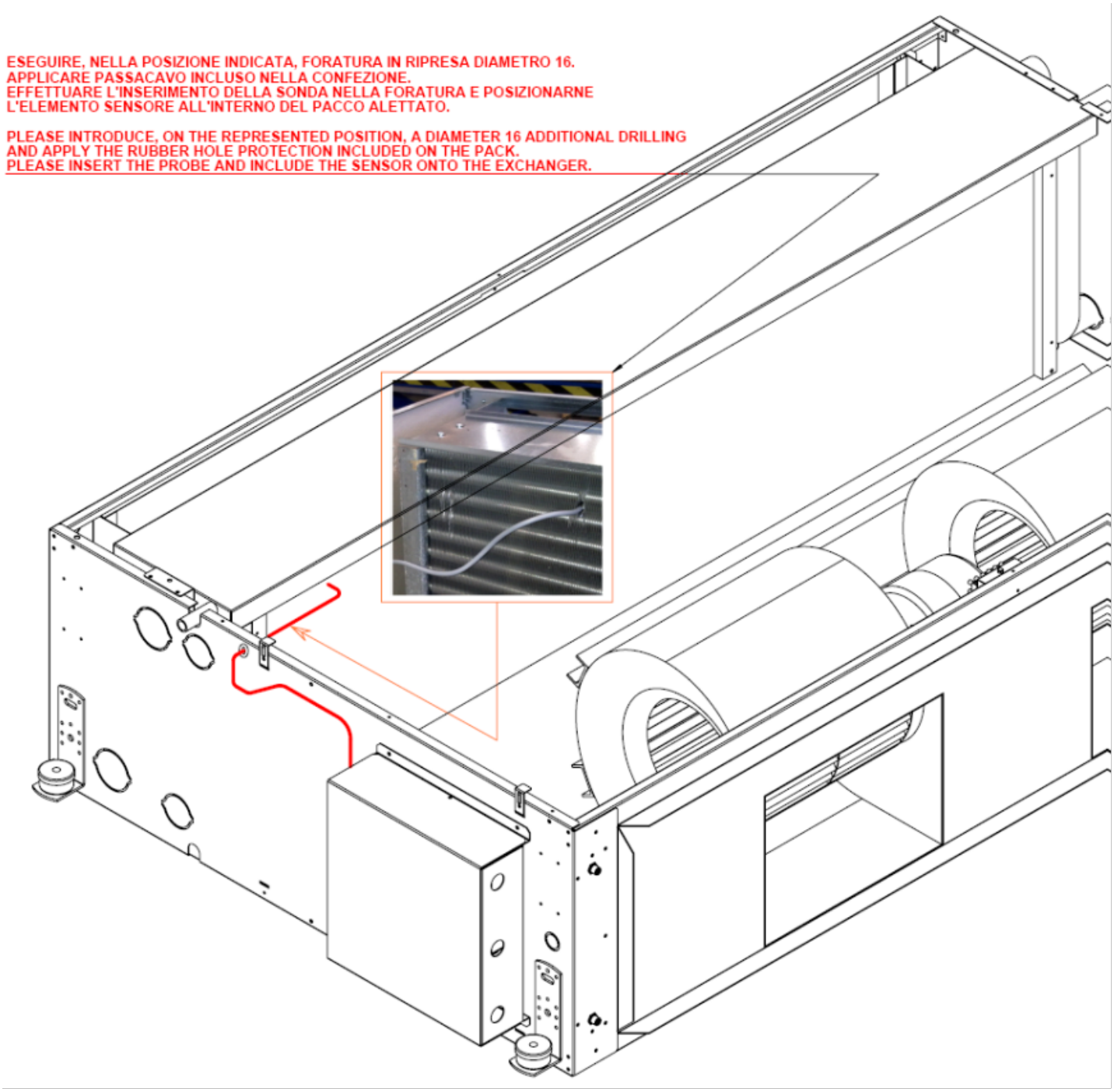
probe positioning (T3 – to be insert onto the heat exchanger).

IMPORTANT!: These probes positioning are represented on end.

Inlet Air probe positioning (T1)

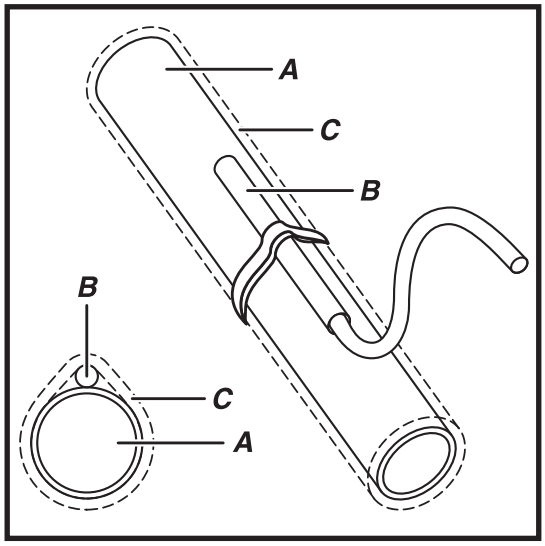


Heat exchanger water probe positioning (T3)



- Please connect, as last operation, and as represented onto the wiring diagrams section, the remote LCD wall control T-MB.

Positioning probe T2 on the water pipe system



Change Over probe T2

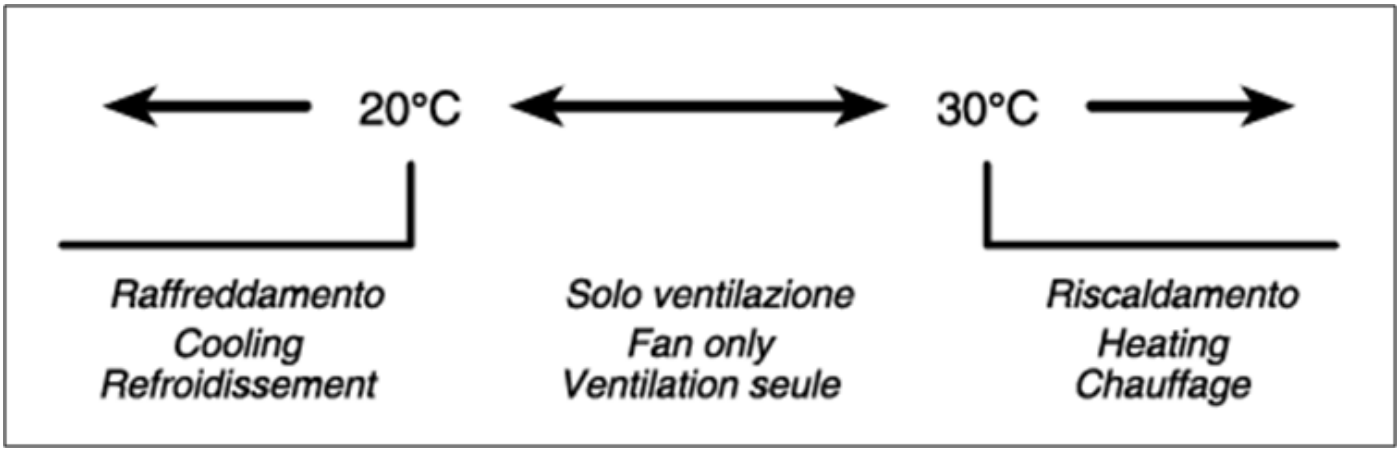
Only on the fan coil units designed for two-pipe systems, the heating/cooling changeover can be performed automatically by installing, on the water pipe supplying the coil, the Change Over probe T2 (optional).

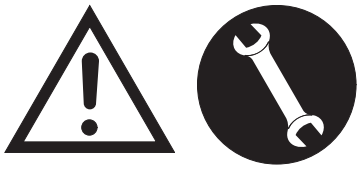
The probe should be installed before the three-way valve.

Based on the temperature measured by the probe, the appliance will switch to heating or cooling operation. If using probe T2 in installations with Master and Slave units, probe T2 must be fitted on all the appliances.

A = Water pipe
B = Probe
C = Anti-condensation insulation

Operating logic with probe T2

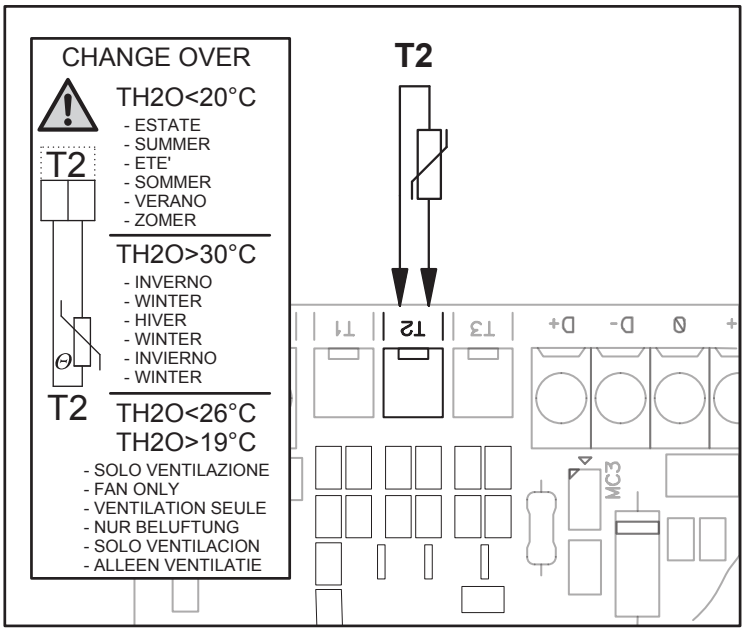




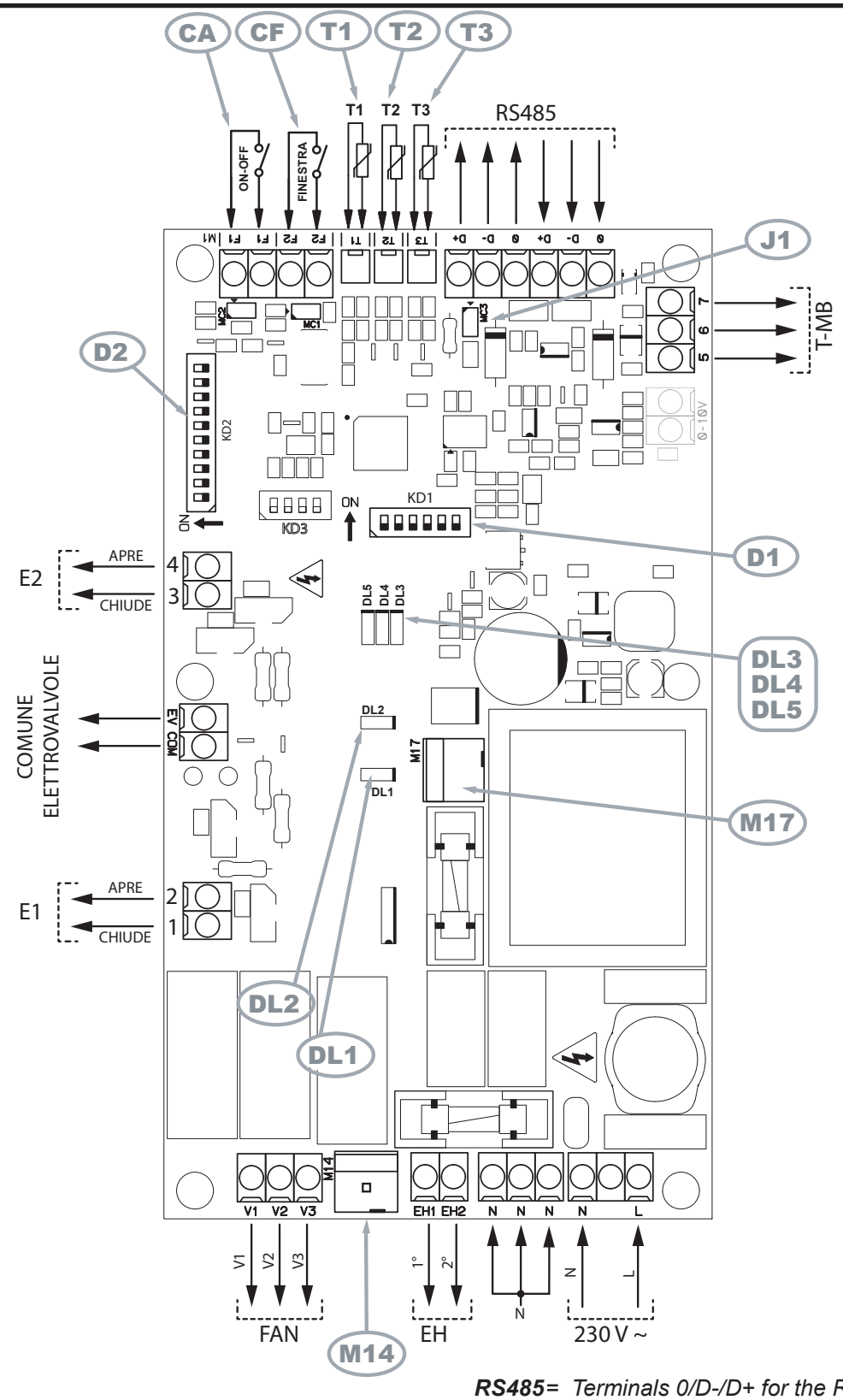
Probe T2 (cod. 3021290)

Type: NTC 10K Ohm (25°C = 10000 Ohm)

Insert the probe connector to terminals 0 – T2 on the board.



7 – QCV-MB Electronic board



KEY:

D1 = *Address dipswitches*

D2 = *Configuration dipswitches*

J1 = *Jumper MC2*

T1 = *Air probe (fitted at the appliance intake)*

T2 = *Change-Over probe (optional)*

T3 = *Minimum probe*

CF = *F2-F2 Window open / person presence voltage-free contact. If open the unit stops*

CA = *F1-F1 remote ON-OFF or remote summer/ winter Change-Over (See DIP 6 setting)*

RS485= *Terminals 0/D-/D+ for the RS485 serial connection*

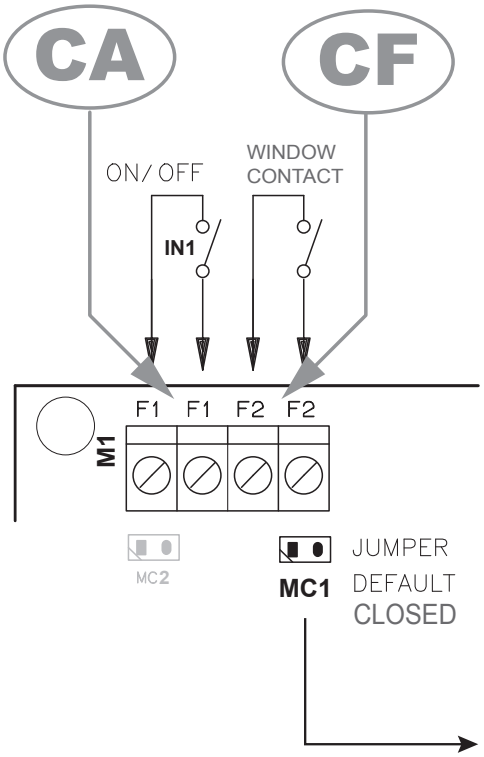
M14 = *Electrical connection valves for use On / Off 230 volts*

M17 = *Electrical connection to use 3-point valve 24 volt*

DL1 - DL2 = *Leds signaling activity actuators*

DL3 - DL4 - DL5 = *Signaling Leds*

8 – Function of the auxiliary contacts



Contact CA [F1-F1]:
Remote ON-OFF or remote Summer/Winter Change-Over (See DIP 6 setting).

- with DIP No 6 set on OFF
is configured as remote ON/OFF where:
- contact open = ON
- contact closed = OFF

- with DIP No 6 set on ON
is configured as Summer/Winter where:
- In 1 open = Winter
- In 1 closed = Summer

CONTACT CF (F2-F2)
- window open contact;
- person presence sensors;
- other systems.

If used, remove the MC1 Jumper for contact closure.

When the contact is closed the appliance can operate.

When the contact is open the appliance is stopped.

9 - Setting the configuration DipSwitches

		Position	
DIP	**DEFAULT**	**ON**	**OFF**
1	OFF	4 PIPE UNITS	2 PIPE UNITS
2	OFF	Simultaneous thermostatic control	Thermostatic control on the valve
3	OFF	T3 Winter and Summer	T3 only Winter
4	OFF	Resistance-coils Management	IAQ Filter Management
5	OFF	Resistance-coils with T2	T2 as CH Change-Over (resistance phase II)
6	OFF	IN1 = Remote Summer/Winter	IN1 = Remote ON/OFF
7	OFF	Slave	Master
8	OFF	Manage opening times valve Actuator 24-Volt 3-point	
9	OFF		
10	OFF		

- Set time of opening the valve with actuator 24 Volt 3 points:

Dip Switch Configuration 8-9-10

TIME (Sec)	DIP n°		
	8	9	10
150	OFF	OFF	OFF
60	OFF	OFF	ON
90	OFF	ON	OFF
200	OFF	ON	ON
240	ON	OFF	OFF
NA	ON	OFF	ON
NA	ON	ON	OFF
Valves On-Off	ON	ON	ON

10 - Led Signal table

- LED indicates the communication status, alarms, sensors and state IN1 and IN2

	LED 3			LED 4				LED 5			
	ON	BLINK	OFF	OFF	ON	BLINK	4+2	OFF	ON	BLINK	4+2
RX 485	Ko	OK									
T1			OK	OK		Ko	Ko				
T3			OK	OK	Ko		Ko				
IN2								OK		Open	Open
IN1								OK	Open		Open

NOTE:

4+2 = Led fixed for 4 seconds + 2 seconds flashing.

OK = working

Ko = not working

open = open contact

- Leds signaling activity actuators:

DL2 ON fixed: hot water actuator opening (or hot water valve open if on-off valves)

DL2 ON flashing: actuator hot water in closing

DL1 ON fixed: cold water actuator opening (or cold water valve open if on-off valves)

DL1 ON flashing: actuator cold water in closing

11 – Master/Slave operation

Managing a group of appliances, via serial connection, with just one remote control or with the T–MB control

It is possible to connect multiple devices controlling them simultaneously, transmitting settings from the remote control or from the T–MB control to a single MASTER unit. All other units are defined SLAVE.

The operation of each individual appliance will depend, on the other hand, on the temperature conditions measured by each of these.

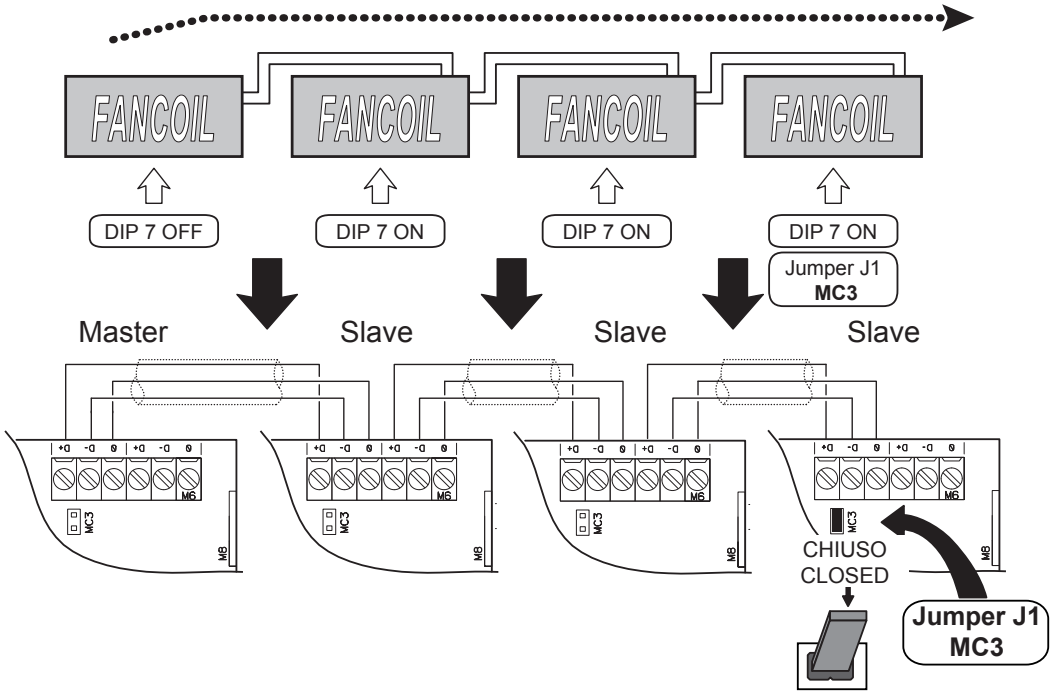
Whenever a serial network is set up, the end of the line must be defined by closing jumper J1 MC3 on the last unit connected.

Note: The Master fan coil will have Dip 7 positioned on OFF, while all other devices connected as Slave will have Dip 7 positioned ON.

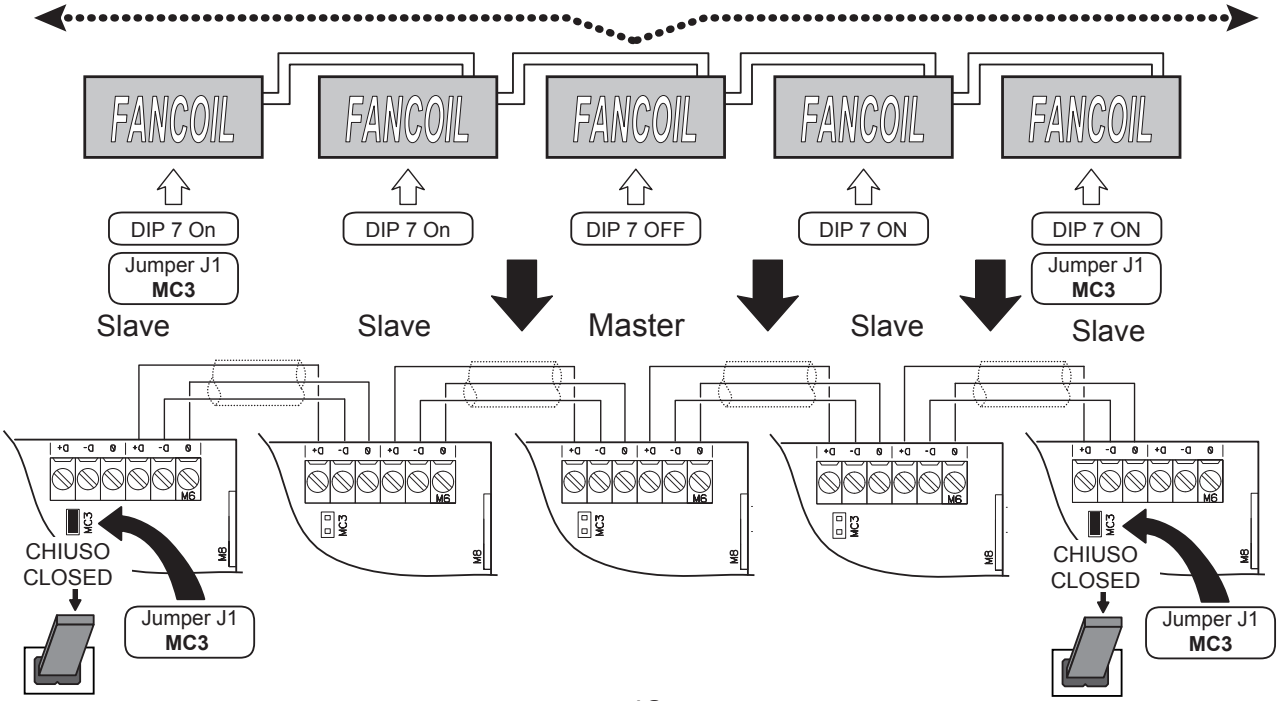
Serial Connection end network jumper

In the case of RS485 connection (Master/Slave or Sabianet) the network supplying the last machine should be disconnected. Disconnection is made closing the Jumper J1 **MC3**.

Connection with the Master at the start of the network



Connection with the Master inside the network



12 – Operating instructions for connection via an RS485 serial line

When making the electrical connections in a network of fan coils communicating via a serial line, extreme care must be paid to some important details:

1 - type of cables used: twisted pair with shield, 22 AWG, flexible

2 - the overall length of the network must not exceed 700/800 metres

3 - a maximum of 20 fan coils can be connected

The shielded cable to be used

BELDEN 9841, RS-485, 1x2x24 AWG SFTP, 120 Ohm

Note di installazione

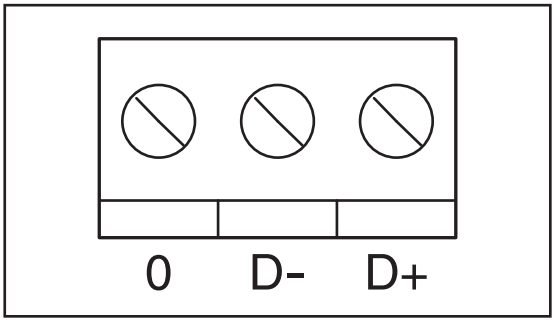
- the cables should be tightened to a force of less than 12 kg. Higher forces may fray the wires and reduce the transmission properties;
- do not twist, knot,crush or fray the wires;
- do not lay the signal cables and power cables together;
- if the signal cable needs to cross a power cable, make sure the intersection is at 90°;
- do not join sections of cable. Always use one single cable to connect the units together;
- do not excessively tighten the wires under the connection terminals. Strip the end of the cable with care. Do not crush the cable at the cable glands or safety supports;
- always observe the positions of the colours corresponding to the start and end of the connections;
- once having completed the wiring, visually and physically check that the cables are in good condition and correctly positioned;
- install the cables and the unit in such as way as to minimise the possibility of accidental contact with other power cables or potentially dangerous cables, such as the cables for the lighting system;
- do not lay the 12 volt power cables and communication cables near power devices, lights, antennae, transformers or hot water or steam pipes;
- never position the communication cables in any conduits, pipes, junction boxes or other containers together with the power cables or the lighting system cables;
- always ensure there is adequate separation between the communication cables and all other electrical cables;
- keep the communication cables, and the units themselves, at least 2 metres away from appliances with significant inductive loads (distribution panels, motors, generators forlighting systems).

Earthing the network

When performing the serial connection between the appliances, follow the connection symbols:

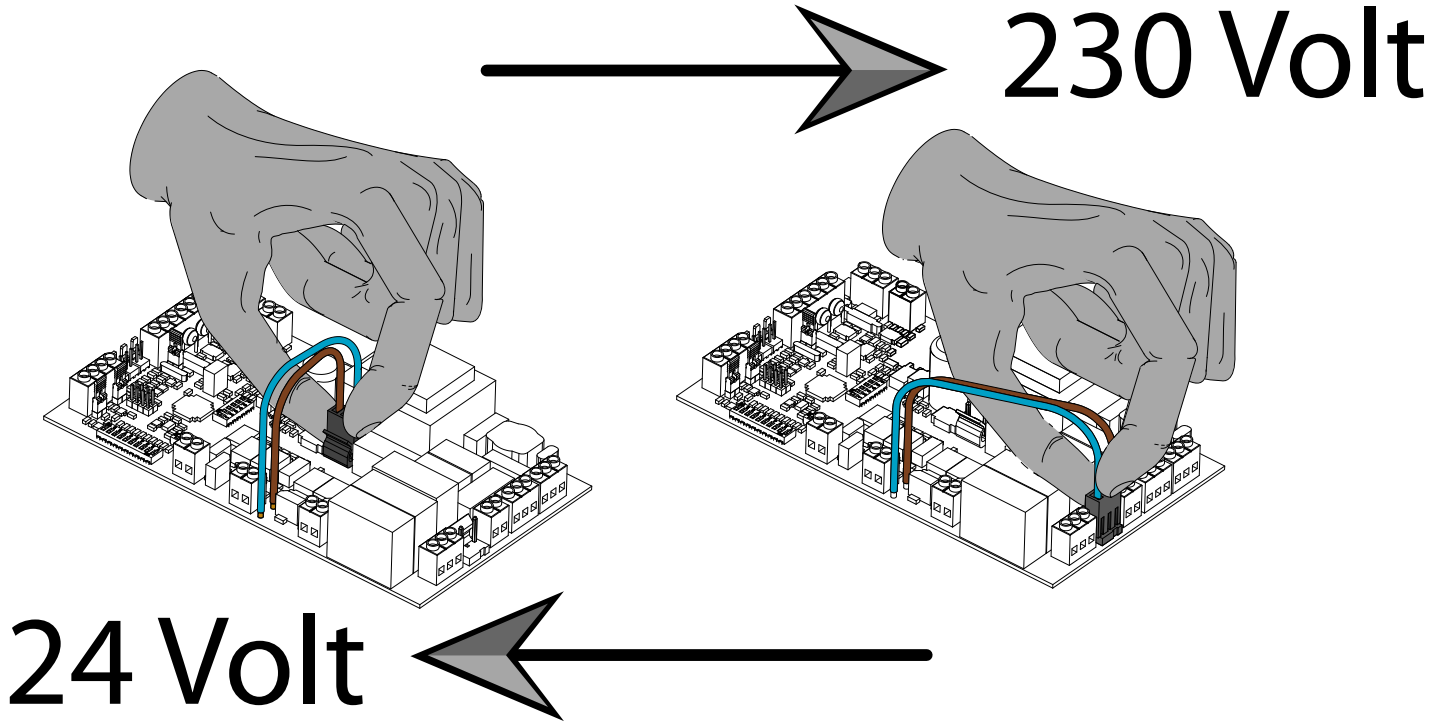
- Terminal “D-” with terminal “D-”
- Terminal “D+” with terminal “D+”
- Terminal “0”: connect the shield of the serial cable.

Never reverse the connections.

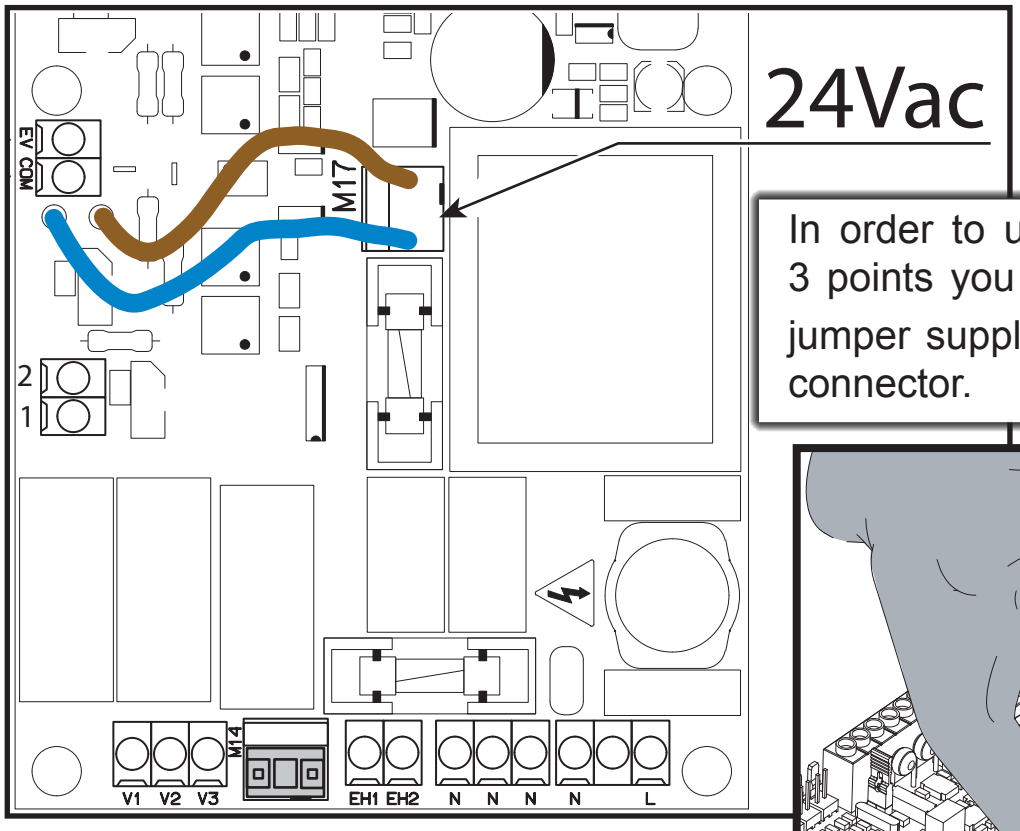


13 - Selecting the operating voltage of valve actuators

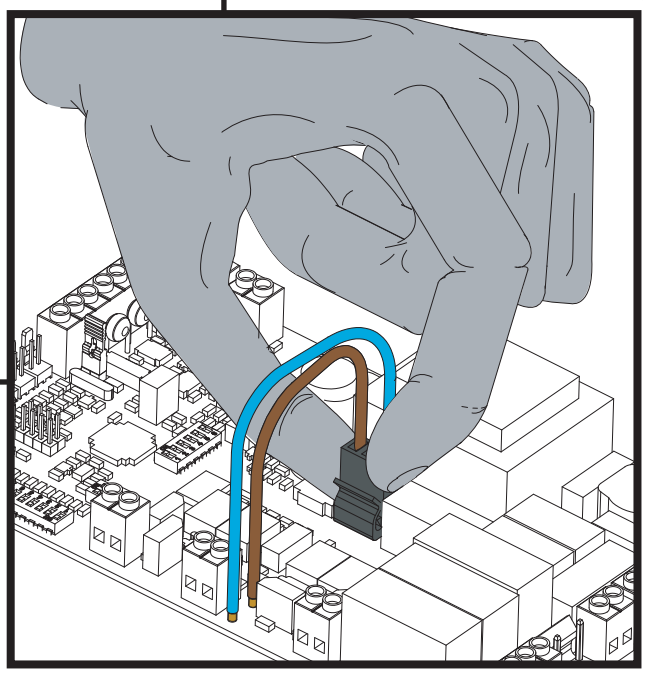
The control is able to manage both valves On / Off at 230 Volts that 3 points 24 Volt.



CONFIGURATION FOR ACTUATORS 3 POINTS 24 VOLT

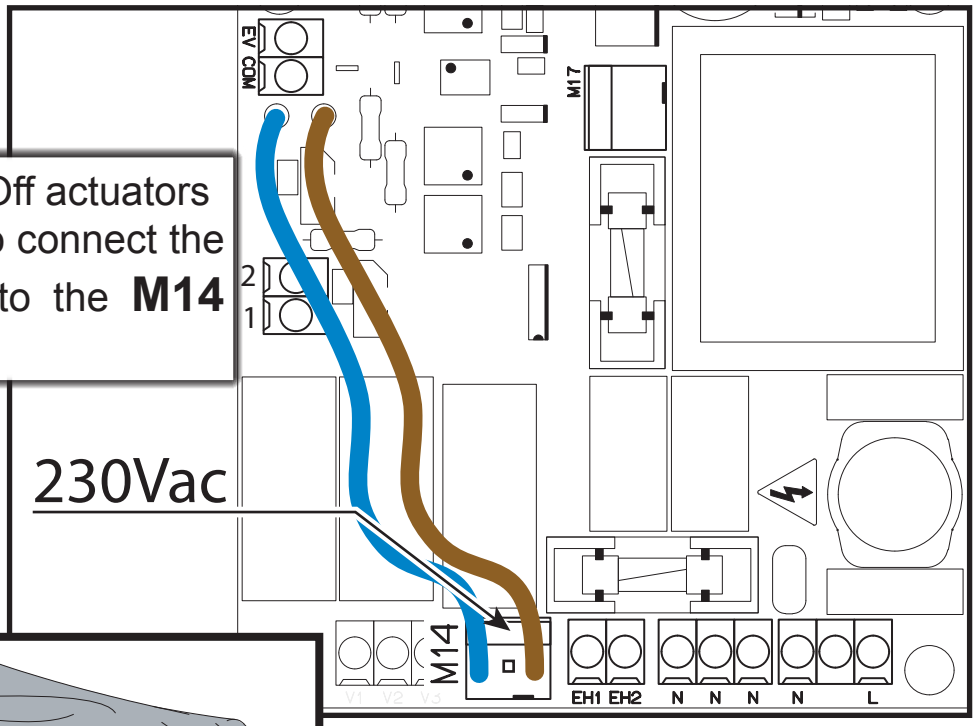


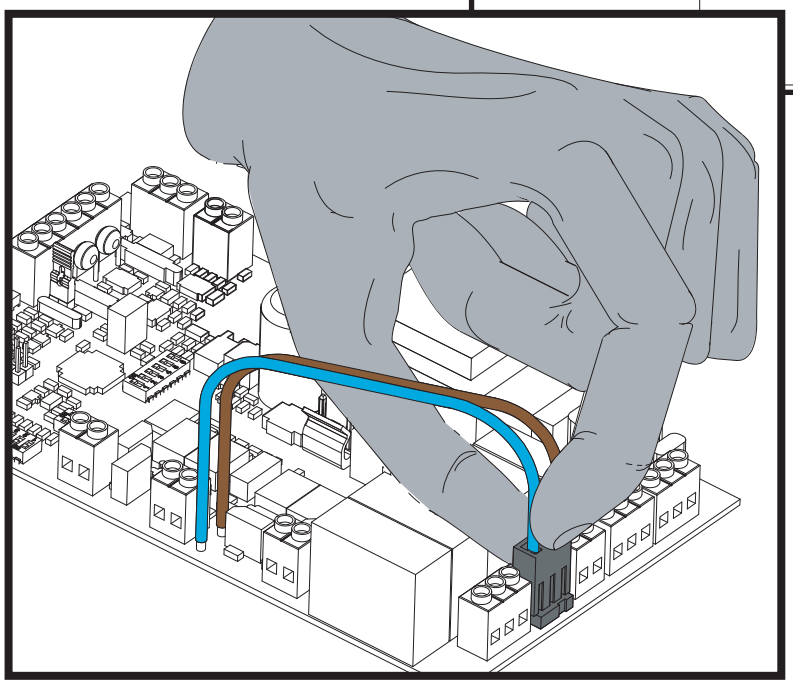
In order to use actuators 24 Volt 3 points you need to connect the jumper supply valves to the **M17** connector.



Using the configuration for 24-Volt actuators, position the cover on the terminal connector **M14**.

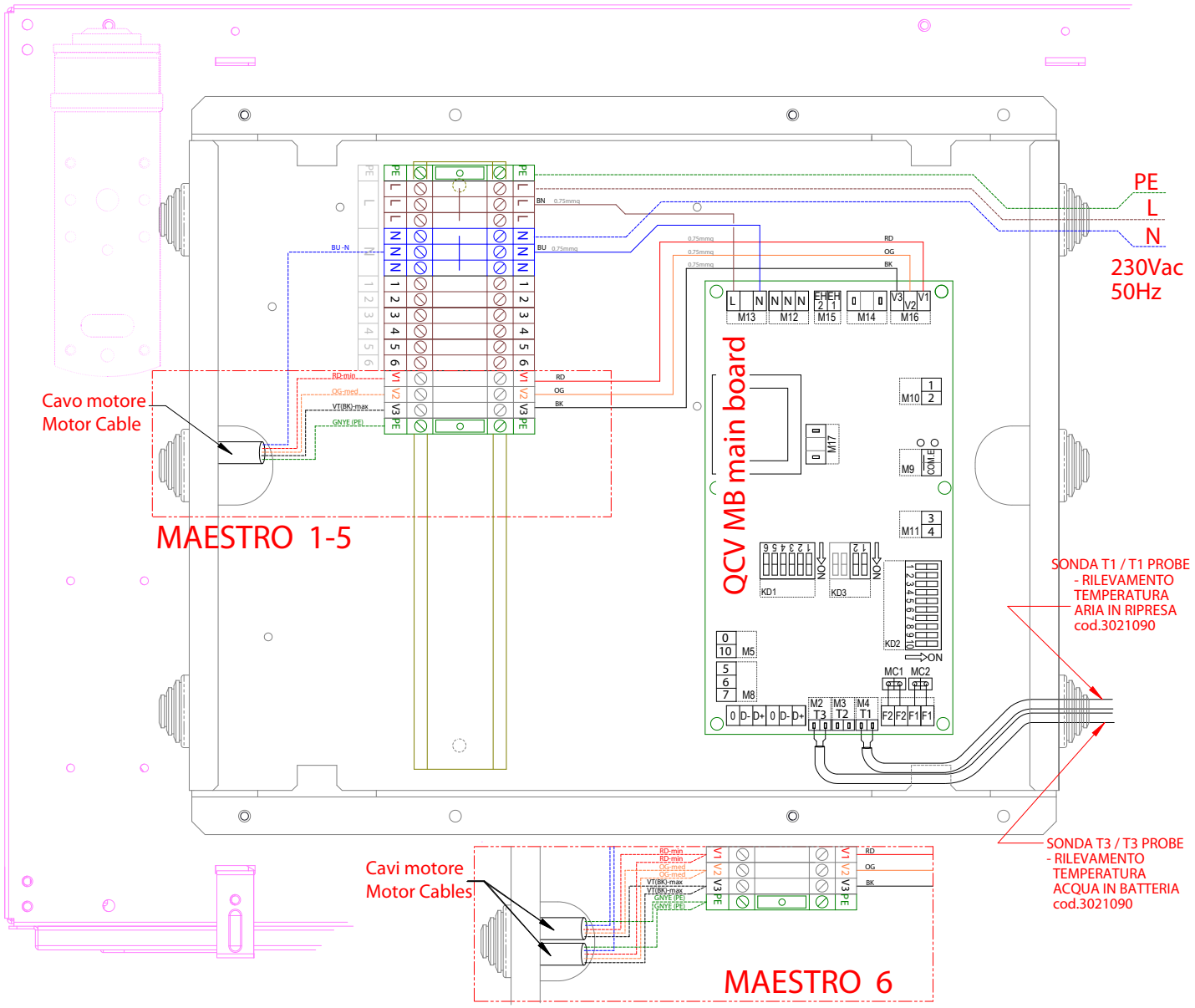
In order to use the On-Off actuators 230 Volt is necessary to connect the jumper supply valves to the **M14** connector



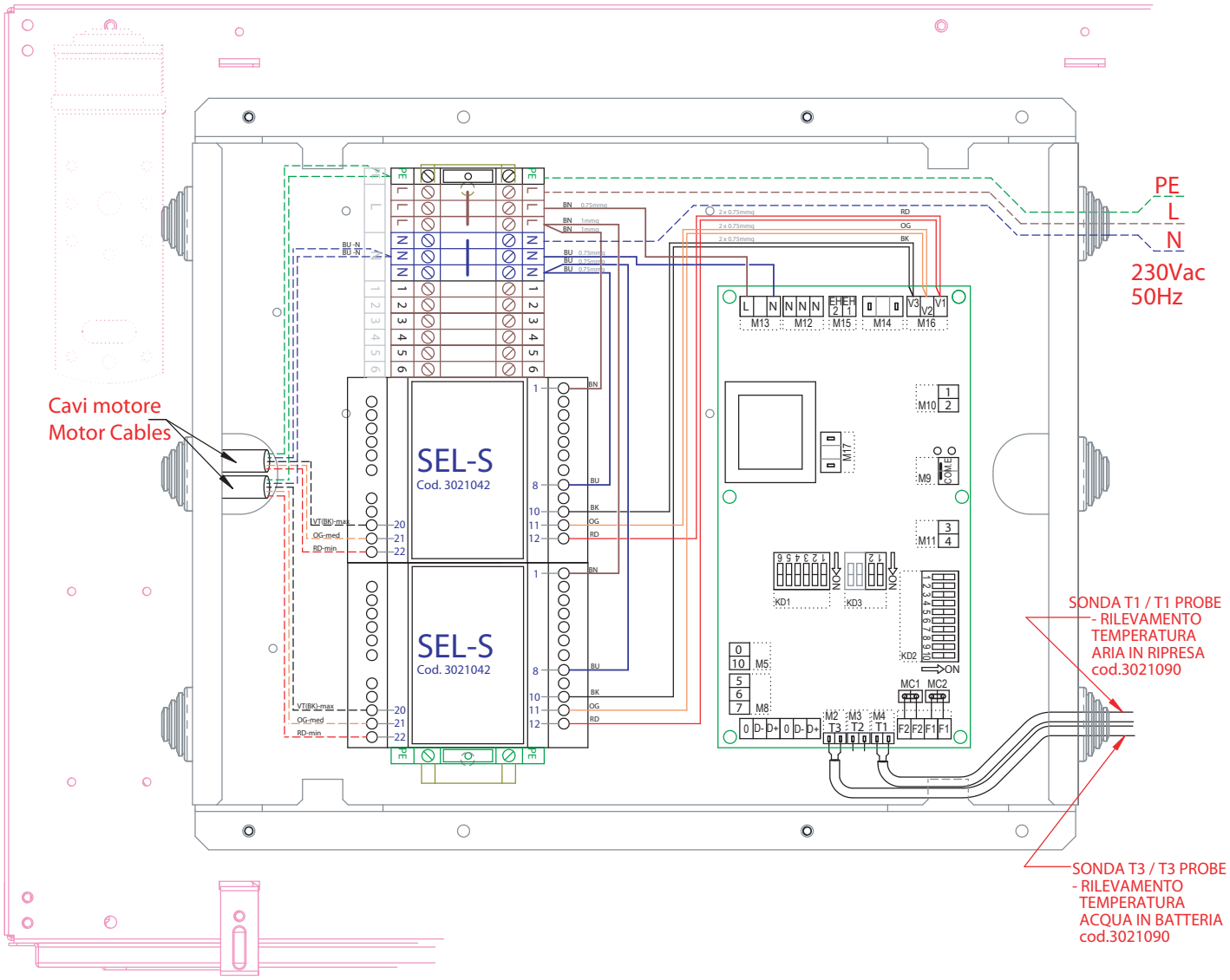


Using the configuration for 230 Volt actuators, position the cover on the terminal connector **M17**.

Models size 1-5 and 6 (code 9034140)



Model size 7 (code 9034147)



LEGEND:

M *= Fan*
E1 *= Hot water valve (4-pipes system)*
Hot and cold water valve (2-pipe system)

E2 *= Cold water valve*
(4-pipes system)

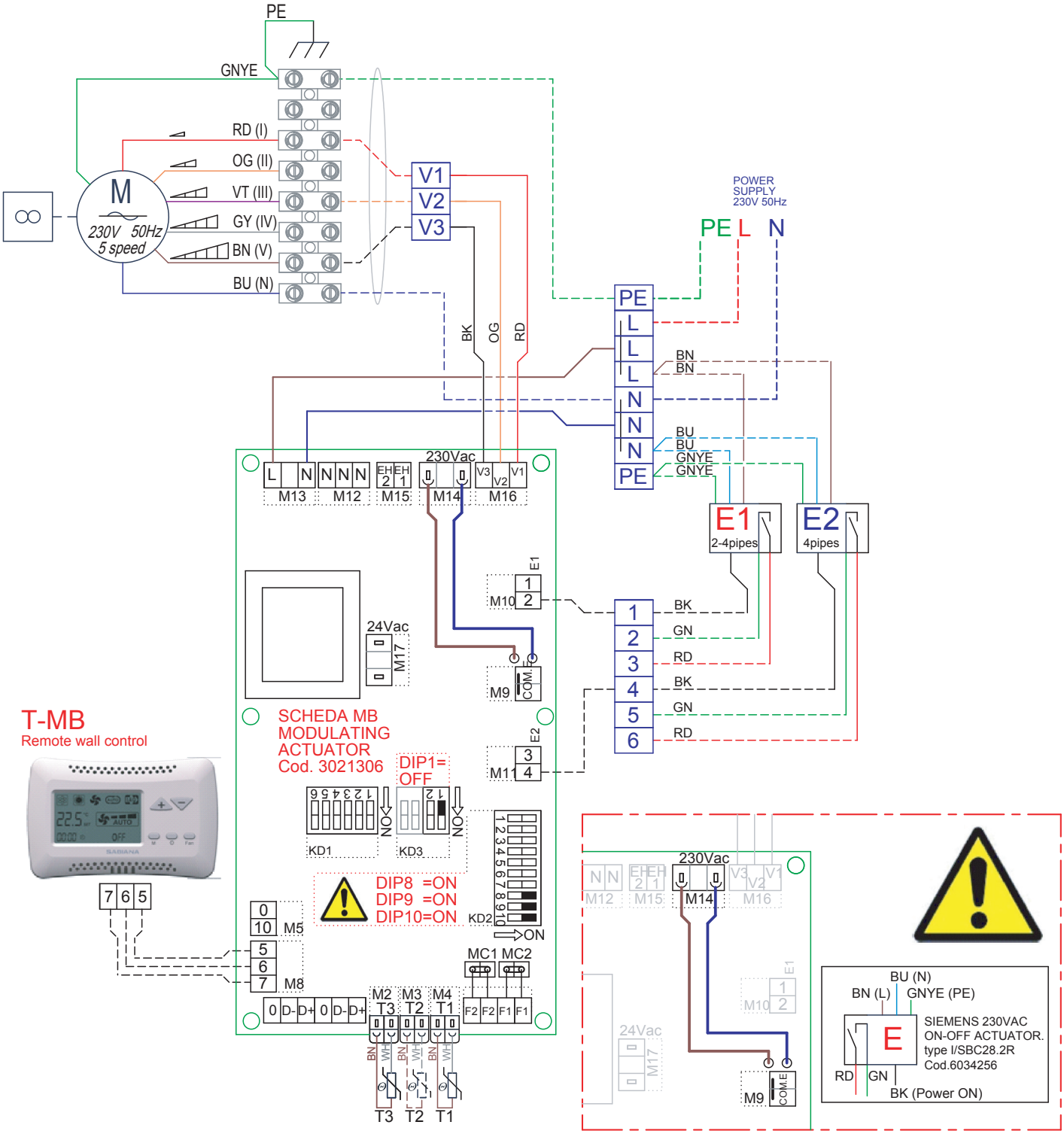
T1 *= Air probe*
T2 *= CHANGE-OVER*
T3 *= Low temperature cut-out thermostat*

CONNECTIONS:

GNYE *= Yellow/Green*
GN *= Green*
RD *= Red = Low*
OG *= Orange = Medium*
BK *= Black = High*
BN *= Brown*
BU *= Dark blue*
WH *= White*

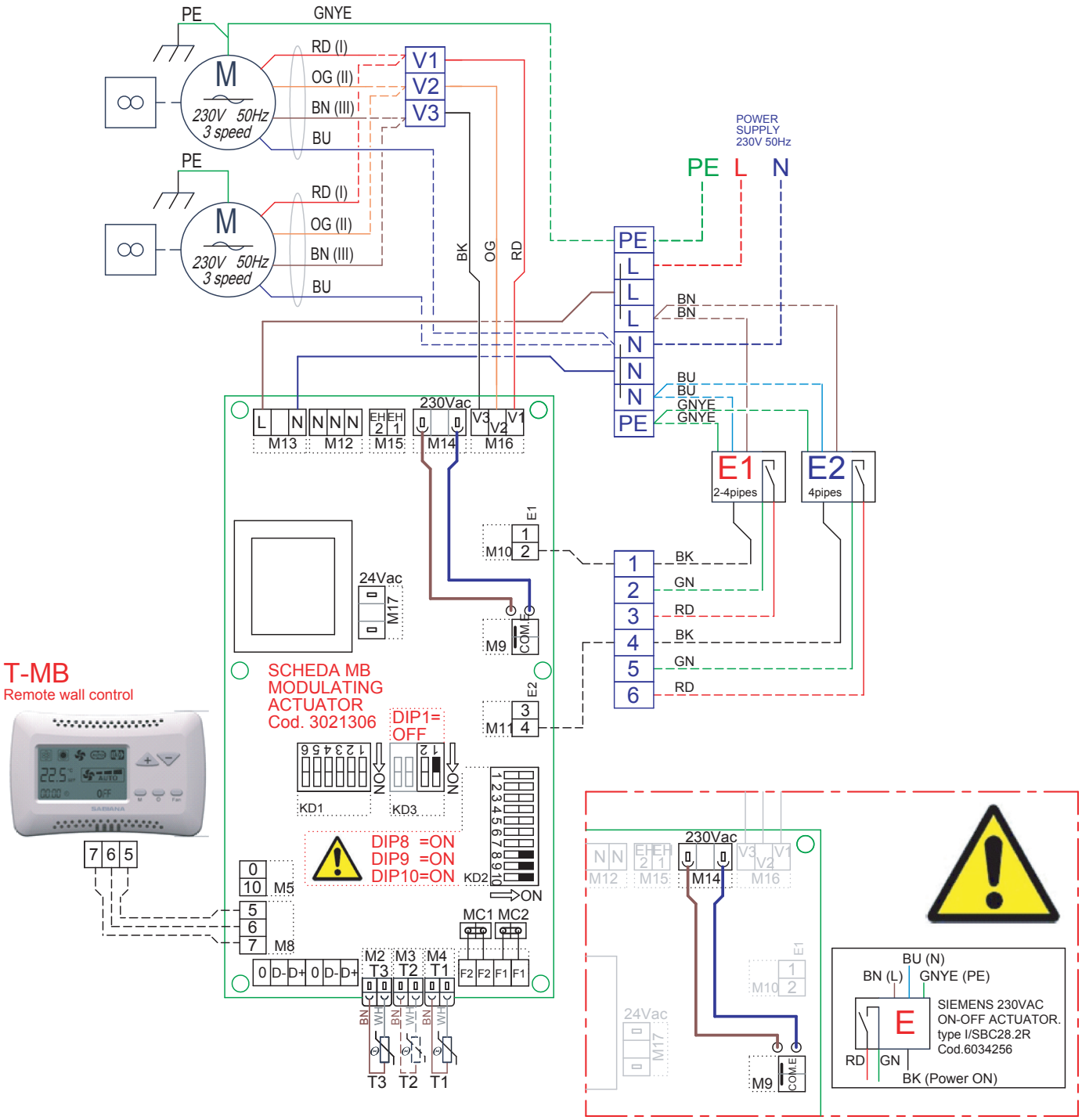
Wiring diagram - High Pressure Fan Coil Units running for sizes 1-5
- Actuators Valves 230 Volt -

MTO 1-5

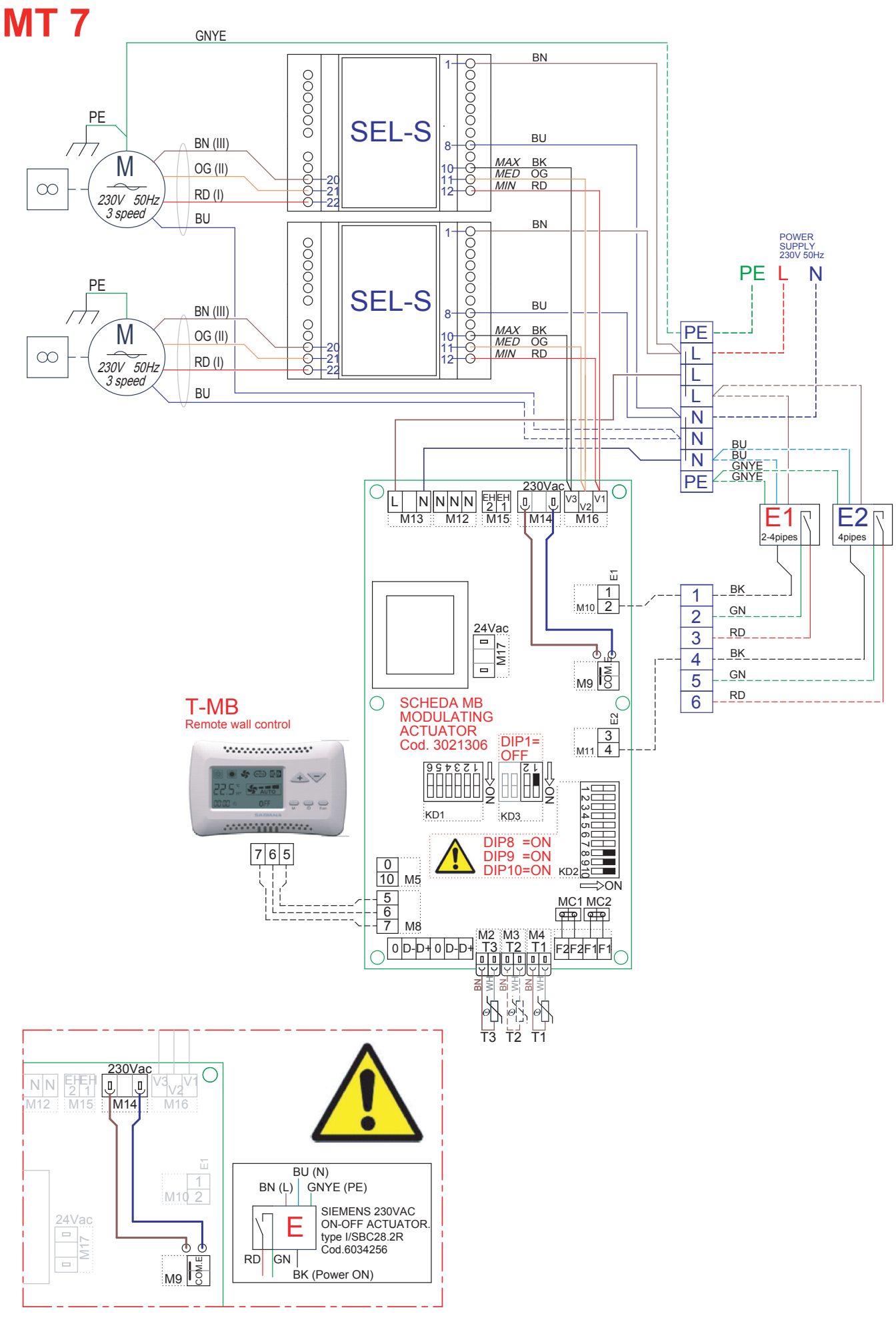


Wiring diagram - High Pressure Fan Coil Units running for size 6
- Actuators Valves 230 Volt -

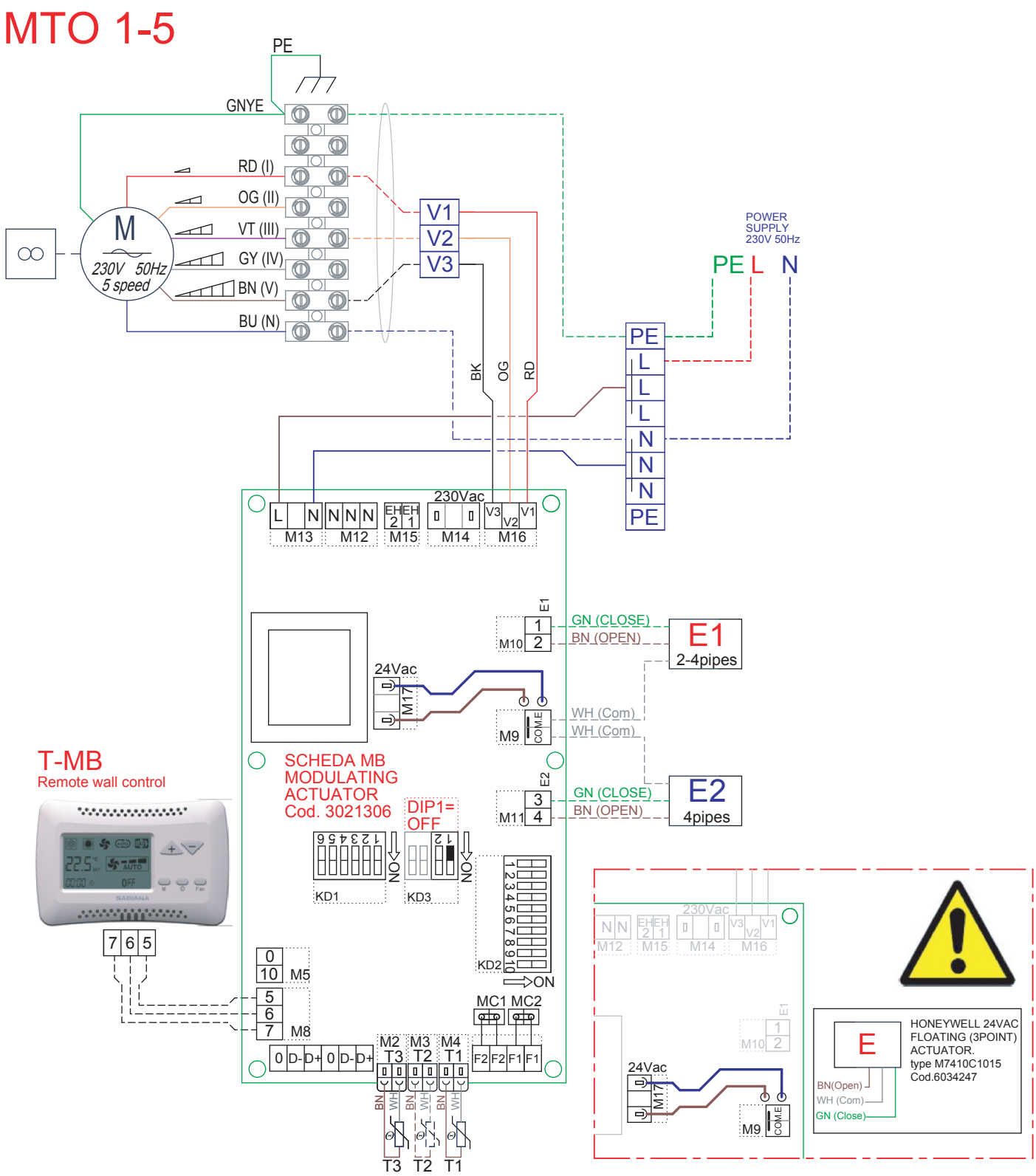
MT 6



Wiring diagram - High Pressure Fan Coil Units running for size 7
- Actuators Valves 230 Volt -

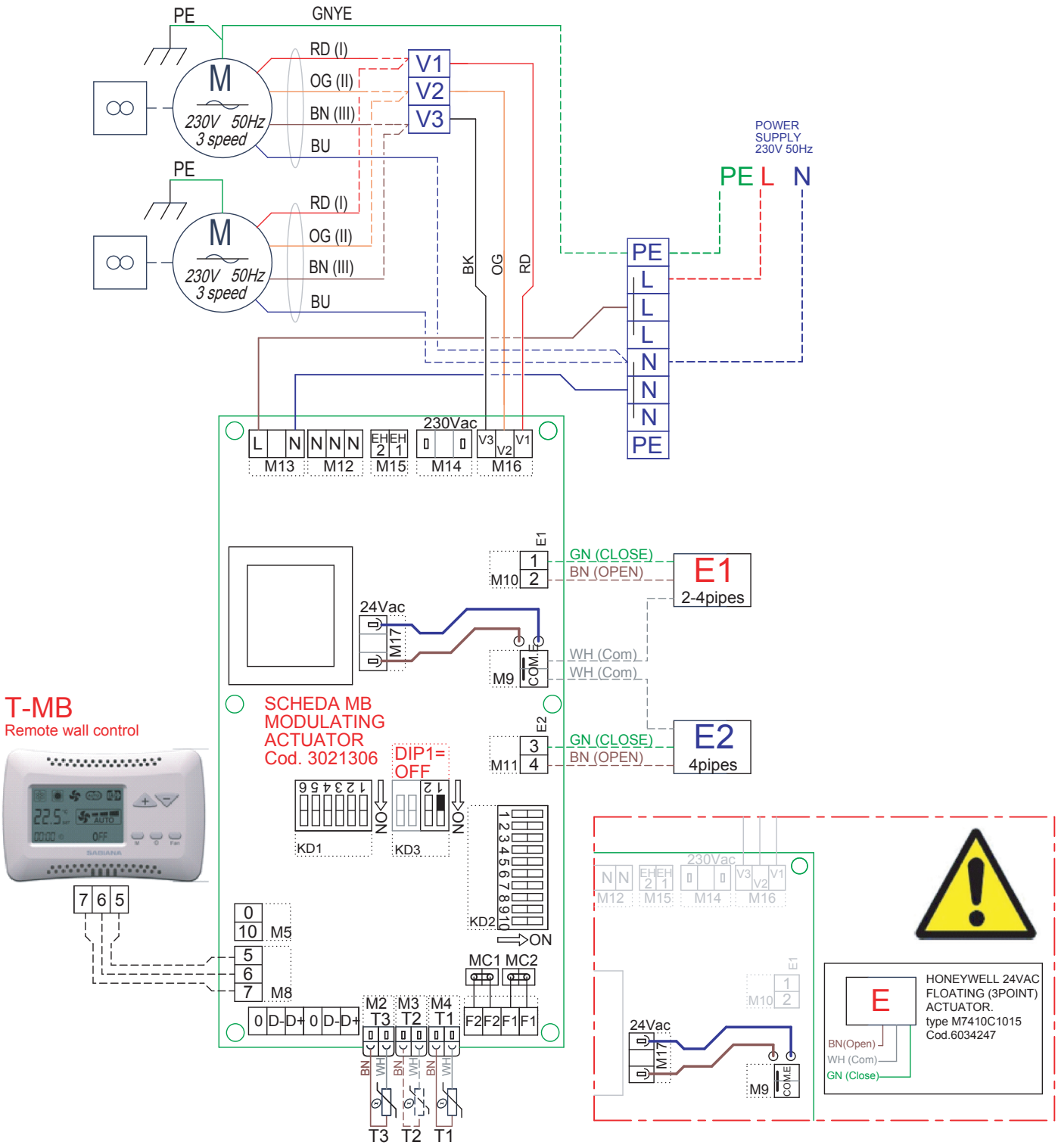


Wiring diagram - High Pressure Fan Coil Units running for sizes 1-5
- Actuators Valves 3 point 24Volt -

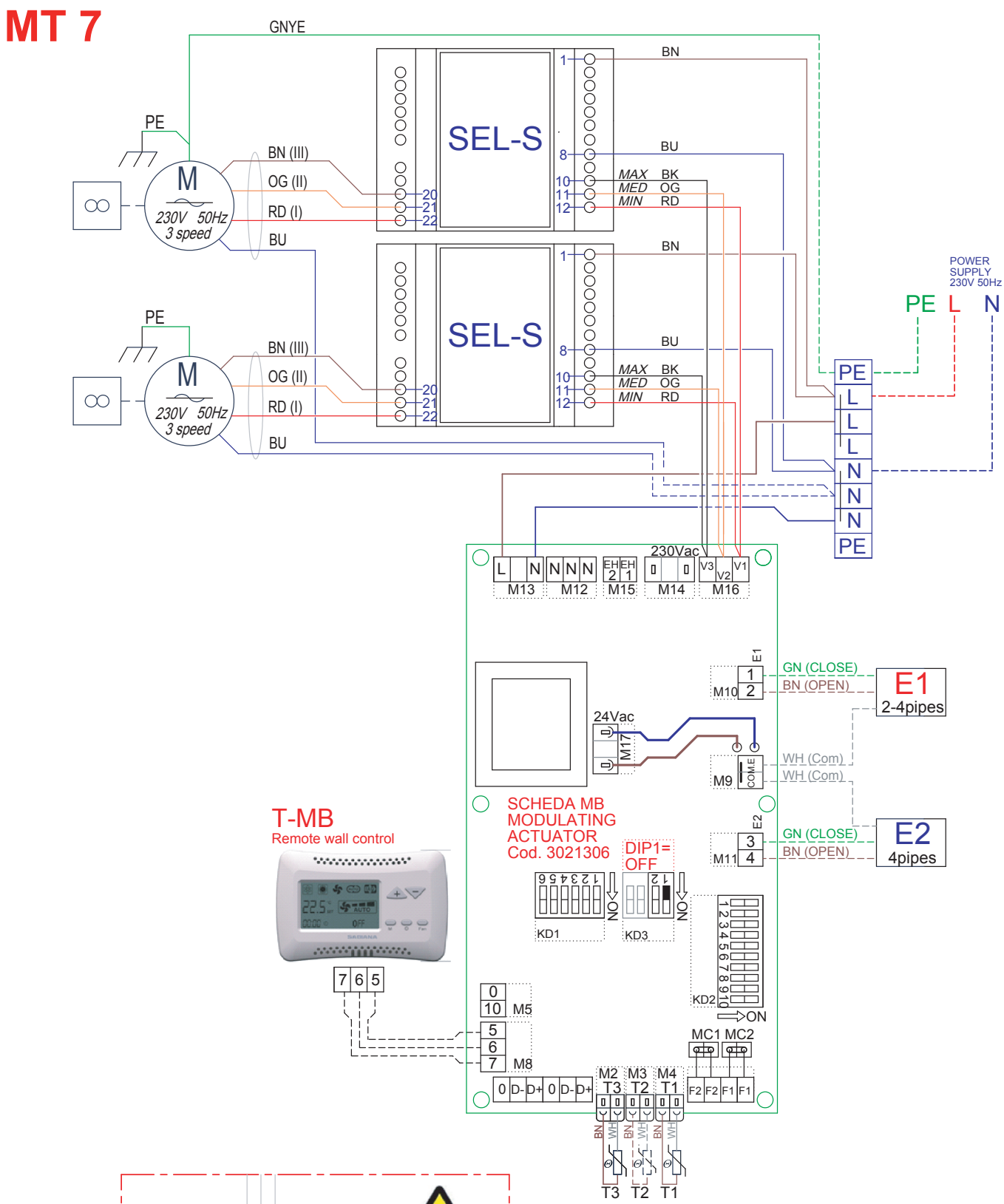


Wiring diagram - High Pressure Fan Coil Units running for size 6
- Actuators Valves 3 point 24Volt -

MT 6



Wiring diagram - High Pressure Fan Coil Units running for size 7
- Actuators Valves 3 point 24Volt -



15 - T–MB WALL-MOUNTED CONTROLLER Cod. 9066331E
- GENERAL NOTES -

*The **T-MB** is a wall-mounted controller that can be connected to fan coils fitted with the MB electronic board and connected in an RS 485 network.*

The controller features the following functions (Fig. 1):

1) switch the appliance on and off

2) set the fan speed

3) temperature set.

4) setting the operating mode

Control panel symbol (Fig. 1):

5) Cooling mode

6) Heating mode

7) Fan

8) Automatic mode

9) Active resistance signaling

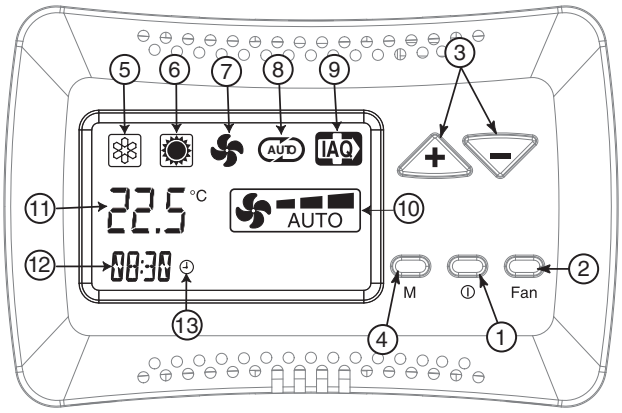
10) Set Ventilation

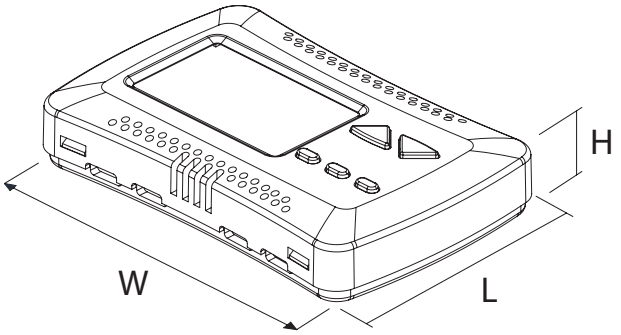
11) Environment temperature measured / SET / OFF

12) Clock

13) Timer active

Fig. 1

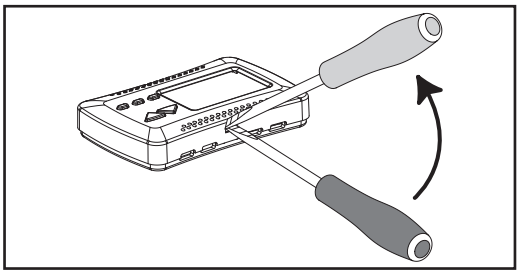




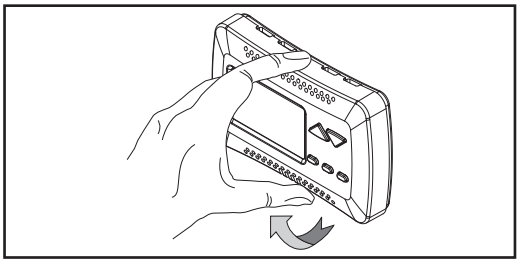
LxWxH (mm) : 72x110x25

READ THIS USER MANUAL CAREFULLY BEFORE INSTALLING AND USING THE CONTROLLER

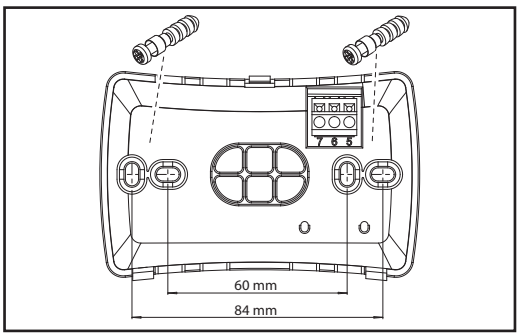
Control Installation



Separate the front of the controller from the rear plate by using a screwdriver to press the locking tongue on the top of the controller.

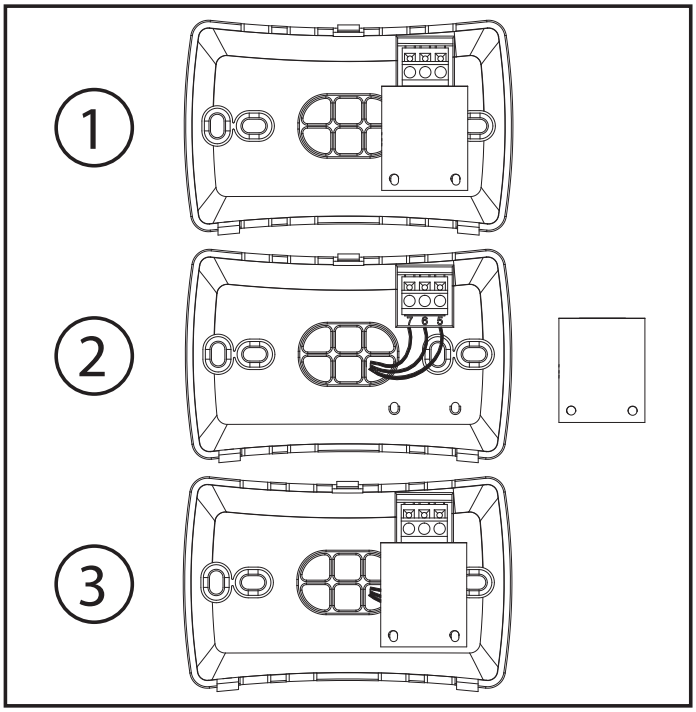


Place the rear plate on the wall and mark the mounting holes.
Drill the holes, insert the screw plugs in the wall and fasten the plate with screws.



Make the electrical connections as shown in the wiring diagram on the following page.

Fig. 2



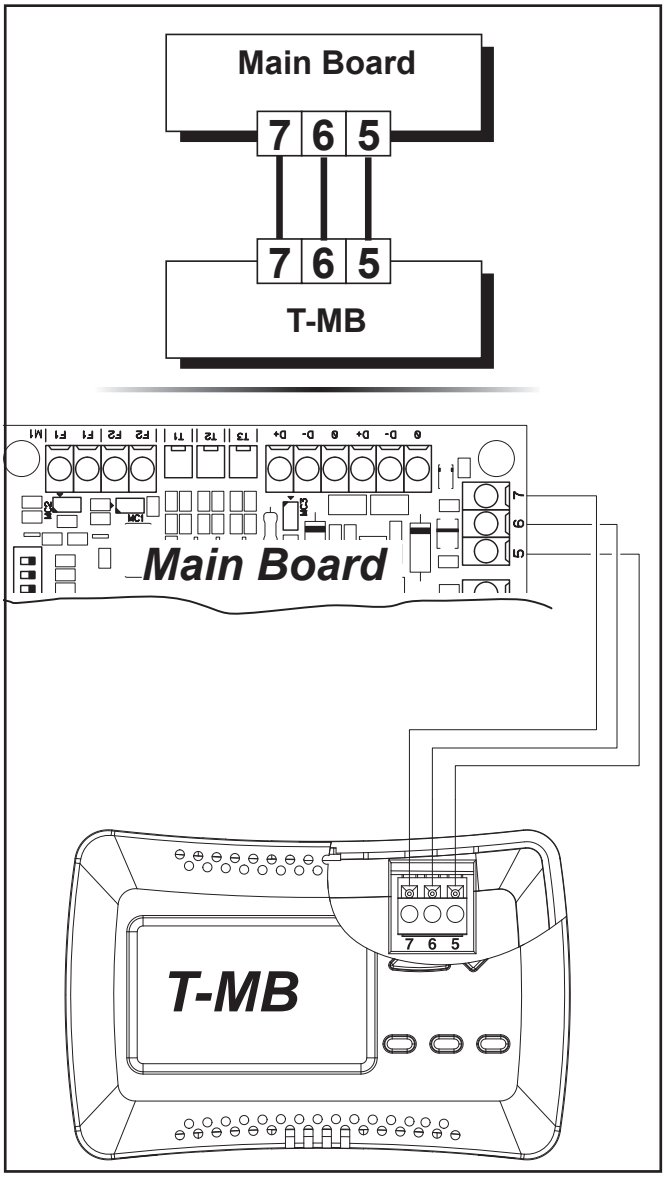
ATTENTION!

To carry out the electrical connections to the T-MB control, remove the insulated protection device from the clamp.

Once the electrical connections are completed, replace the protection device, as in figure 2.

Reassemble the front part of the control, placing the two flaps located on the lower side and then close the control, by making the upper flap click.

Control Wiring Connections



The control panel must be wired to the power board located inside the electrical compartment of the Cassette/Fancoil unit, complying with the correspondence of the common numbering to both boards.

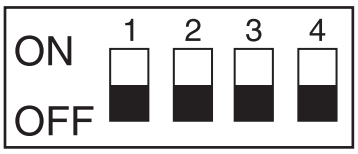
Use 3 conductors with 0.5 mm^2 section.

NOTE: The connection wirings must not exceed 20 metres in length.

RESPECT THE RIGHT WIRING SEQUENCES

Setting dip switches

DEFAULT



Set Dip can be used to modify the functions performed by the controller (as shown in the table below).

DIP	***FUNZIONE / FUNCTION / FONCTION***	***POSIZIONE POSITION POSITION***
1	Configurazione ***T–MB*** in versione +/- ***T–MB*** *configuration in +/- version* Configuration ***T–MB*** en version +/-	ON
	Configurazione ***T–MB*** come controllo completo ***T–MB*** *configuration as complete controller* Configuration ***T–MB*** comme contrôle complet	OFF
2	Seleziona il sensore di temperatura montato sull'apparecchio *Select the temperature sensor fitted on the appliance* Sélectionne le capteur de température monté sur l'appareil	ON
	Seleziona il sensore di temperatura presente sul ***T–MB*** *Select the temperature sensor on the* ***T–MB*** Sélectionne le capteur de température présent sur ***T–MB***	OFF
3	Non utilizzato / *Not used* / Non utilisé	–
	Non utilizzato / *Not used* / Non utilisé	–
4	Non utilizzato / *Not used* / Non utilisé	–
	Non utilizzato / *Not used* / Non utilisé	–

Enable room air temperature probe - Dip nr. 2 -

In particular, DIP N° 2 defines which room probe must be used. In fact, an air probe (T1 probe) is installed on the intake of the cassette and fancoil devices.

The T-MB control is also equipped with air probe.

- DIP nr. 2 **OFF**
  the inside T-MB sensor is activate

- DIP nr. 2 **ON**
  the T1 probe, connected to the device main board (intake air probe) is activated.

Fig. "A" / Abb. "A"

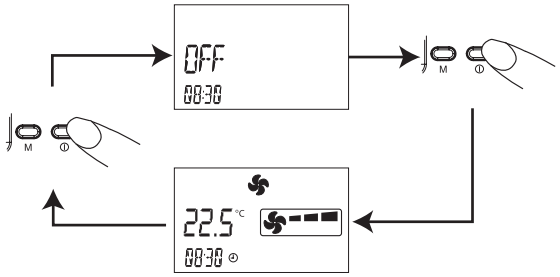


Fig. "B" / Abb. "B"

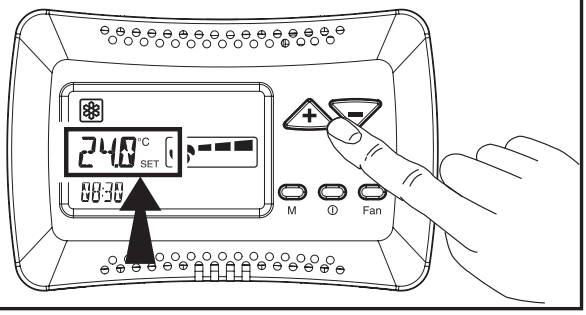


Fig. "C" / Abb. "C"

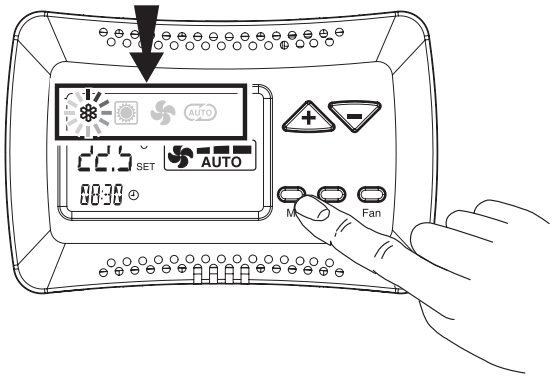
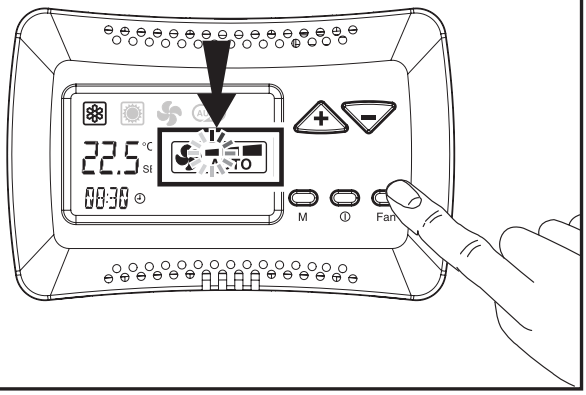


Fig. "D" / Abb. "D"



On/Off (Fig. "A"):

- Press the ON/OFF button to activate the thermostat.
- Press the ON/OFF button to deactivate the thermostat.
- The word "**ON**" or "**OFF**" will appear in the display.

Set Temperature (fig. "B"):

- Press the "**+**" or "**-**" buttons the set temperature will flash.
- Adjust the set temperature using the "**+**" or "**-**" buttons.

Selecting Modes (fig. "C"):

- Press the "**M**" button to select the desired operation mode;
- Use buttons "**+**" or "**-**" to select the operation mode.

– the cooling mode is set.

– the heating mode is set.

– AUTO automatic cooling/heating mode is set (to be used only with 4 pipe systems).

– the ventilation mode only is set.

- Press the "**M**" button to confirm.

Fan speed selection (fig. "D"):

- *Press the **FAN** button to set:*

– Fan low speed

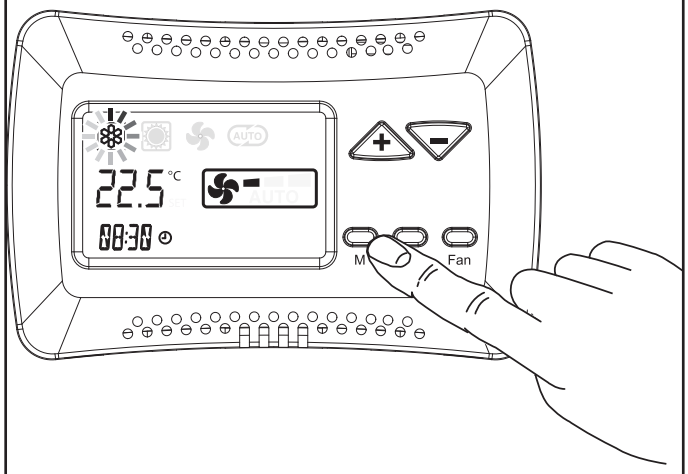
– Fan medium speed

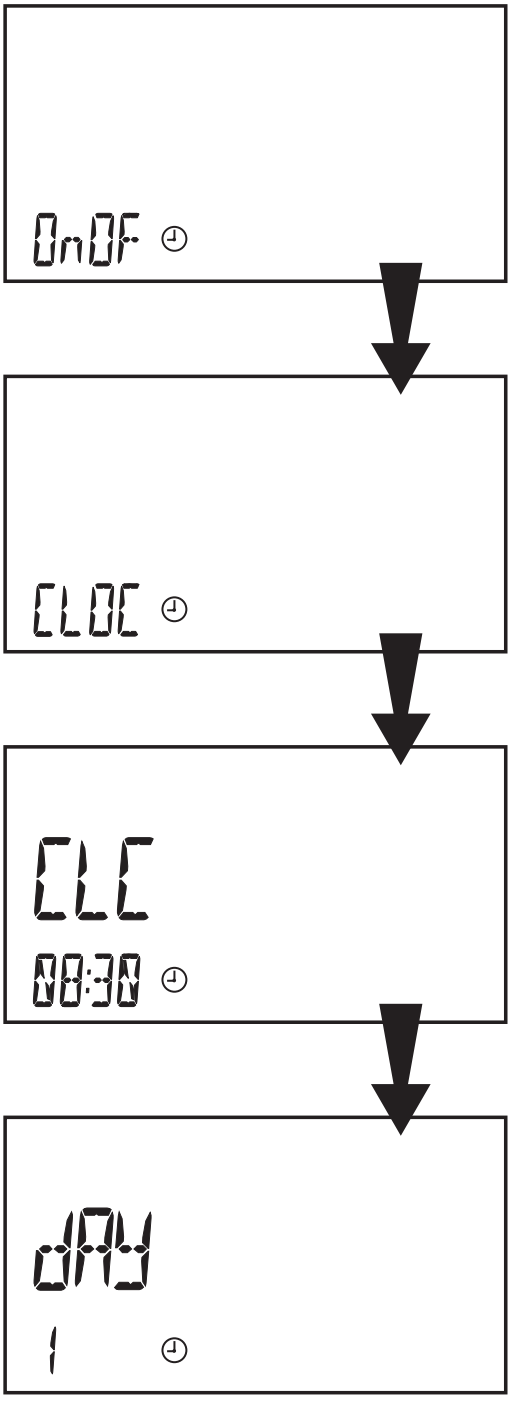
– Fan high speed

– AUTO Sets the speed automatic variation of the fan.

Setting the Clock (Fig.”E”)

Fig. “E” / Abb. “E”





• By pressing the “**M**” button:

The mode symbol starts flashing:

• Press buttons **(+)** or (**-**), until selecting the watch symbol “ ”;

Confirm using the “**M**” button.

• Press button “**+**” again to position on CLOC mode and confirm using the “**M**” button;

• Use (**+**) or (**-**) buttons to set the current time.

Confirm using the “**M**” button.

• Press buttons (+) or (-), until selecting the day of the week :

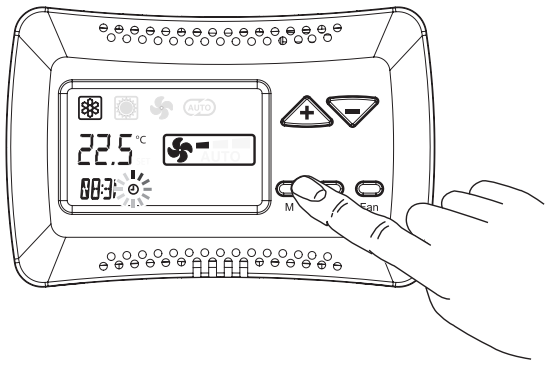
day 1 = Monday
day 2 = Tuesday
.....
day 7 = Sundey

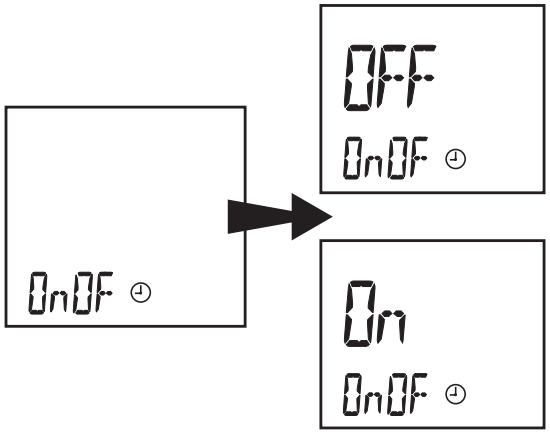
Confirm using the “**M**” button.

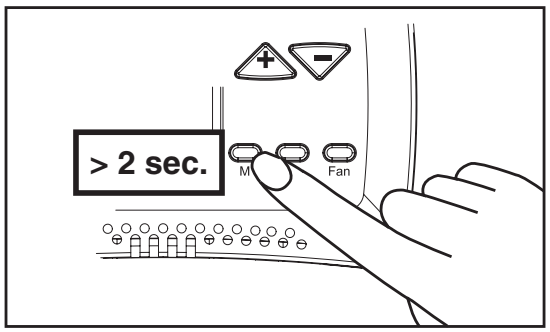
• Press the “**M**” button for 3 seconds to exit the program.

Timer (Fig.”F”)

Fig. “F” / Abb. “F”







1) Activation / Deactivation (Fig. “F”):

• Press the “**M**” button: ;

The operation mode symbol will start flashing;

• Press button (+) or (-) until selecting the watch symbol “ ”;

Confirm using the “**M**” button.

• Press the “**M**” button to access to the activation/ deactivation.

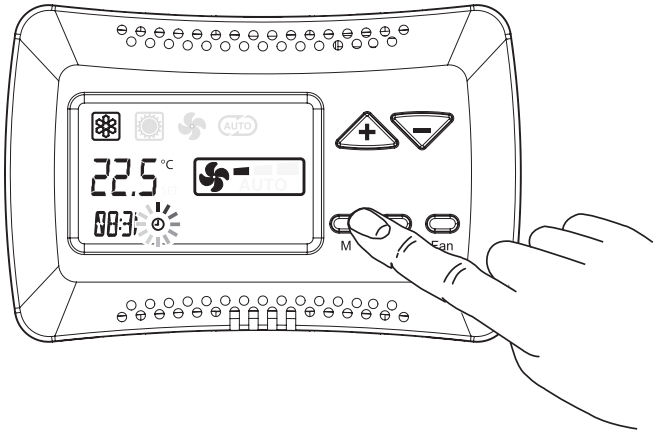
• The default TIMER is in OFF position;

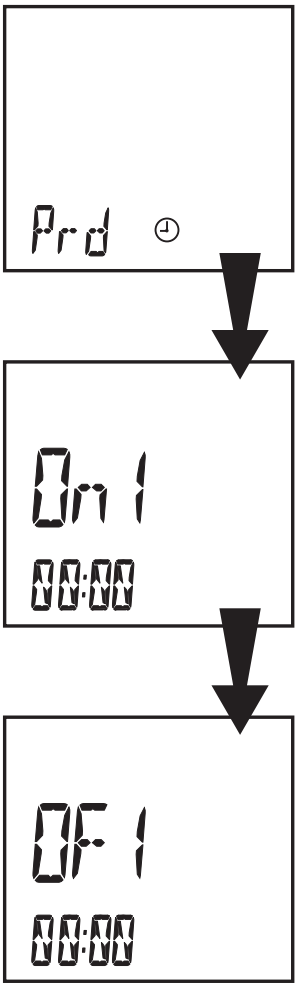
use buttons (+) o (-) to select :

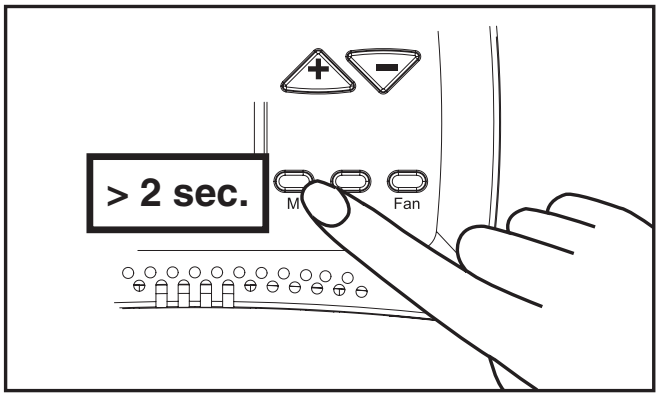
TIMER OFF (deactivated) or TIMER ON (activated).

• Press the “**M**” button for more than 2 seconds to turn back to the operation mode.

Fig. “G” / Abb. “G”







2) Programming (Fig. “G”):

• Press the “**M**” button; The operation mode symbol will start flashing;

•Press button (+) or (-), until selecting the watch symbol “ ”;

Confirm using the “**M**” button.

• Press button “**+**” twice; The abbrevation “***Prd***” will be displayed.

Press the “**M**” button to confirm.

• The display shows the “**On 1**” message, start time of the first day of the week, and message 00:00;

Using buttons (+) or (-), set the desired activation time;

Confirm using the “**M**” button.

• The display shows the “**OF 1**” message, off time of the first day of the week, and message 00:00;

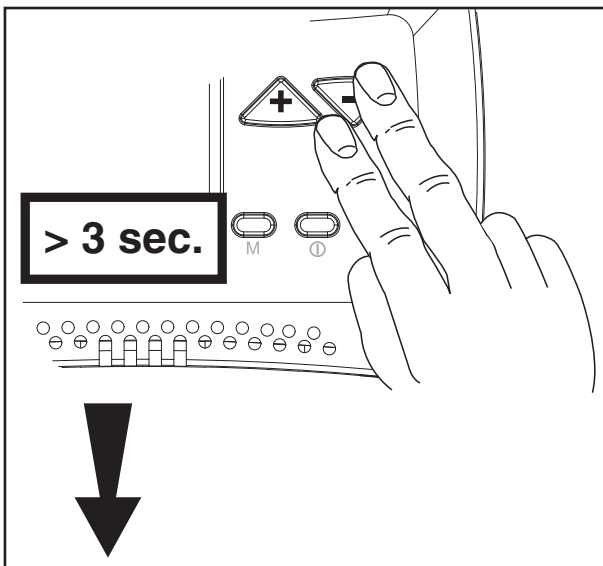
Using buttons (+) or (-), set the desired deactivation time;

Confirm using the “**M**” button.

• How to program all 7 days is explained below

After the last programming, press the “**M**” button to confirm and turn back to display the main menu.

• Press the “**M**” button for more than 2 seconds to turn back to the operation mode.



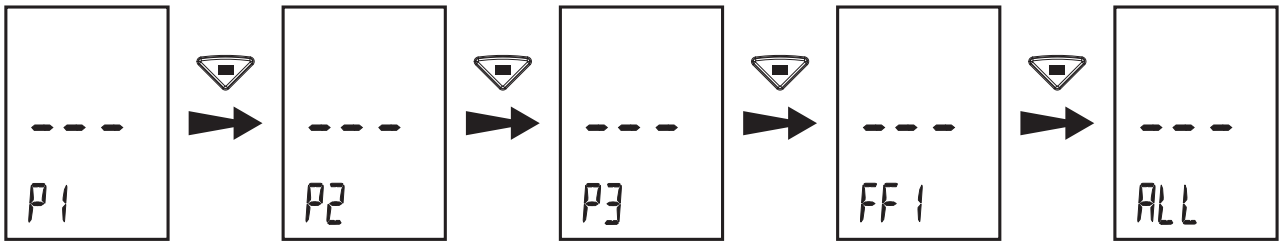
This menu allows verifying some parameters of the control (probe values, window contact status, any alarms).

Press the " **+** " and " **-** " buttons simultaneously for 3 seconds, using the "**OFF**" command.

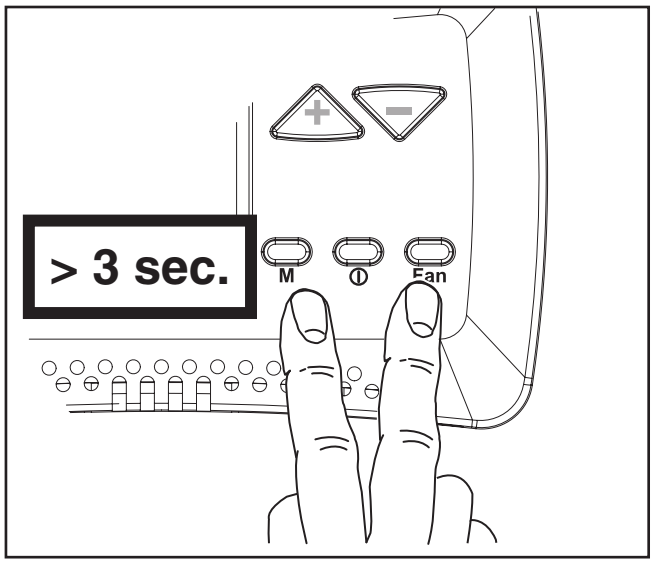
Select the desired parameter, pressing button " **+** " or " **-** " and confirm using the "M" button.

Once the parameter is selected,the value will be displayed.

To exit the menu,press the "**M**" buttonfor more than 5 seconds.



Function	Description	Status
P1	View Air T1 probe value	diS = Probe is not connected
P2	View T2 probe value	diS = Probe is not connected
P3	View T3 minimum probe value	diS = Probe is not connected
FF1	View status of the contact window	C = Closed / O = Open
ALL	View any alarms	--- = No alarm / AL1 = Faulty T1 probe AL2 = Faulty T2 probe / AL3 = Faulty T3 probe AL4 = Incorrect configuration Master dip AL5 = TM-B incorrect configuration dip AL6 = RS485 transmission failure (Master/Slave) AL7 = TTL transmission fails (T-MB/Slave)
Usc1	Display of the voltage sent from the master inverter (only for ECM version)	



This menù allows modifying the operation parameters of the thermostat, electronic motor, of the +/- 3 version and many other parameters (pump cycle, RESET).
With the control set on "**OFF**", pressthe **M** and **Fan** buttons simultaneously for 3 seconds.

Select the desired parameter to be modified, pressing button "**+**" or "**-**" and confirm using the "**M**" button.

Once the parameter is selected, the value will be displayed.The value can be modified using button "**+**" or "**-**".

Press the "M" button once to turn back to the parameter selection; to exit the menu, press the "**M**" button for more than 5 seconds.

THERMOSTAT PARAMETERS – *Only for **T–MB** and **T–MB ± 3°C** versions*			
Function	*Description*	*Range*	*Default*
OFS	Thermostat NTC probe offset variation	± 3°C	0°C
dEds	Dead area central point	18 ÷ 30°C	22°C
dEdr	Dead area setting field	1 ÷ 6°C	2°C
IrL	Relay hysteresis	0,5 ÷ 2,0°C	0,7°C
THERMOSTAT PARAMETERS – *Only for **T–MB ± 3°C version***			
Function	*Description*	*Range*	*Default*
dS	Set variation range with T–MB	± 9°C	± 3°C
PARAMETERS of the T2 probe, CHANGE-OVER			
Function	*Description*	*Range*	*Default*
T2-1	Status changeover from ventilation to cooling	15 ÷ 25°C	< 22°C
T2-2	Status changeover from ventilation to heating	25 ÷ 35°C	> 32°C
PARAMETERS of the T3 probe, TME minimum probe			
Function	*Description*	*Range*	*Default*
T3-1	Fan ON in heating mode	> 30 ÷ 40°C	< 36°C
T3-2	Fan ON in cooling mode	< 10 ÷ 25°C	> 22°C
I-T3	T3 probe hysteresis	2 ÷ 6°C	4°C
PARAMETERS of the Stratification Cycle			
Function	*Description*	*Range*	*Default*
t1ds	Decompensation air probe T1 winter cycle (only for Cassette)	0,5 ÷ 2,0°C	1,5°C
F-t1	Fan OFF time	5 ÷ 13 min.	10 min.
F-t2	RL2 ON time	30 ÷ 120 sec.	40 sec.
F-t3	Post ventilation time	5 ÷ 240 sec.	60 sec.
THERMOSTAT PARAMETERS – *Only for **T–MB–ECM version***			
Function	*Description*	*Range*	*Default*
SIu1	Speed min. voltage	1 ÷ 6	1 V
SCu2	Speed medium voltage	3 ÷ 8	5 V
SHu3	Speed max. voltage	6 ÷ 10	10 V
LLSI	Speed min. voltage for winter auto fan	1 ÷ 6	1 V
HLSI	Speed max. voltage for winter auto fan	5 ÷ 10	10 V
LLSE	Speed min. voltage for summer auto fan	1 ÷ 6	1 V
HLSE	Speed max. voltage for summer auto fan	5 ÷ 10	10 V
PFC	Cooling proportional band	2,0 ÷ 6,0	3,5°C
PFH	Heating proportional band	2,0 ÷ 6,0	3,5°C
PARAMETERS of the Pump Timer			
Function	*Description*	*Range*	*Default*
Pt1	Pump intervention delay time	0 ÷ 300 sec.	150 sec.
Pt2	OFF time during Summer	30 ÷ 90 min.	60 min.
Pt3	ON time during Summer	0 ÷ 5 min.	3 min.
OTHER FUNCTIONS			
Function	*Description*	*Operation*	
rE-t	General reset and restore of default values	Confirmation with O/I and Fan buttons	

NOTES