C-PRO 3 CLIMA sistema+

Climatic modules for the air conditioning and heating of buildings

ENGLISH

INSTALLER MANUAL ver. 1.1

CODICE 144CP3CSE114

Important

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.

The following symbols support reading of the document:

- indicates a suggestion
- ⚠ indicates a warning.

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

Index

1 GENERALITIES

1.1 Description

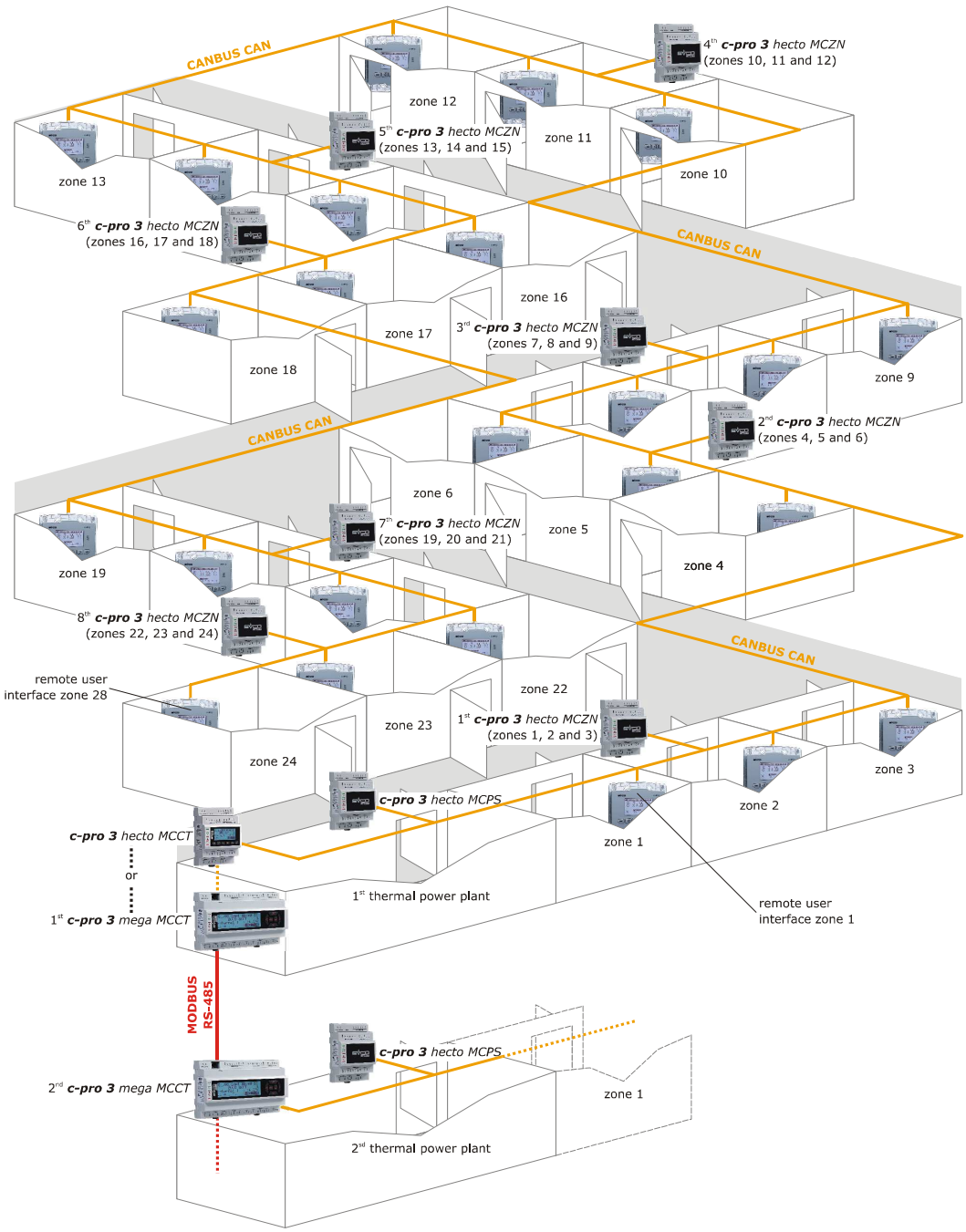
The climatic modules of the ***c-pro 3*** *CLIMA sistema* series are devices studied for the air conditioning and the heating of buildings.
They make use of the programmable controllers belonging to the ***c-pro 3*** series and of the user interfaces belonging to the same series.
They are available in built-in and in blind version with remote user interface (according to the kind of module).
They can be powered both in alternating and in direct current (24 VAC/20... 40 VDC).
The modules allow realizing an expandable and modular control device network distributed in the main rooms of the building reducing the wiring work to a minimum: the modules ***c-pro 3*** *hecto* MCCT can manage the thermal power plant, the ***c-pro 3*** *hecto* MCZN ones the air conditioning and the heating of two zones instead and the ***c-pro 3*** *hecto* MCPS ones finally the thermal solar panels.
The central module thermal MCCT is indispensable for the functioning of the system, it can be connected from one to eight zones MCZN control modules, each of which can handle up to a maximum of six zones.
In total, thanks to this system can be operated up to a maximum of 48 zones in temperature and humidity.
The user interfaces can easily be integrated in residential and commercial rooms (at the front of the interfaces it is possible to apply the plates CPVP or the plates belonging to the series "Living" and to the series "Light" Bticino).
All the modules have communication ports (programming, CAN, RS-485, with MODBUS communication protocol, etc.).
Through the programming port it is possible to make the upload and the download of the configuration parameters (using the programming key EVKEY10); through the RS-485 one, with MODBUS communication protocol, it is possible to connect the devices to the set-up software system Parameters Manager or to the plants monitoring and supervision one RICS (through a serial interface) instead.
Through the CAN communication port it is possible to connect the devices among them.

2 APPLICATIONS

Example of maximum configuration

- n. 1 thermal power plant module c-pro 3 mega MCCT or c-pro 3 hecto
- n. 8 zone modules c-pro 3 hecto MCZN
- n. 1 thermal solar panels c-pro 3 hecto MCPS
- n. 1 remote user interface for each zone

Up to n. 48 zones (with temperature control only) or n. 24 zones (both with temperature and humidity control)

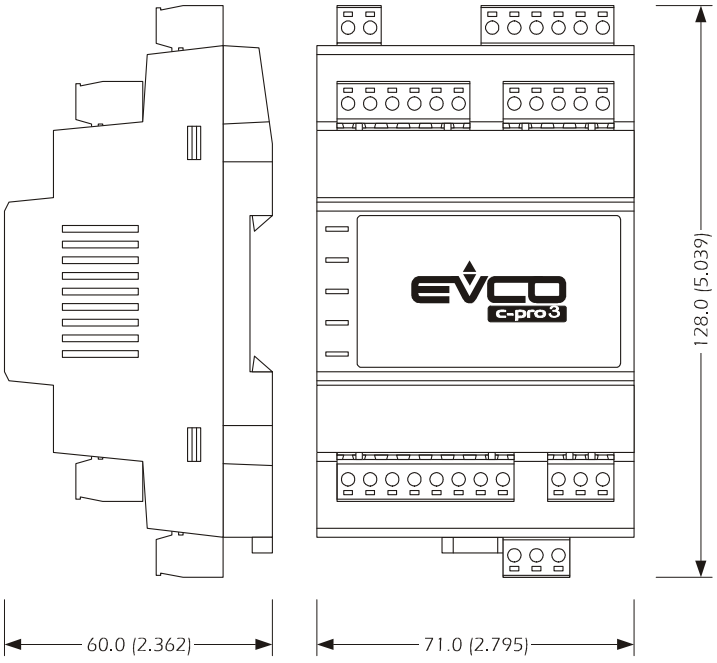


3 INSTALLATION

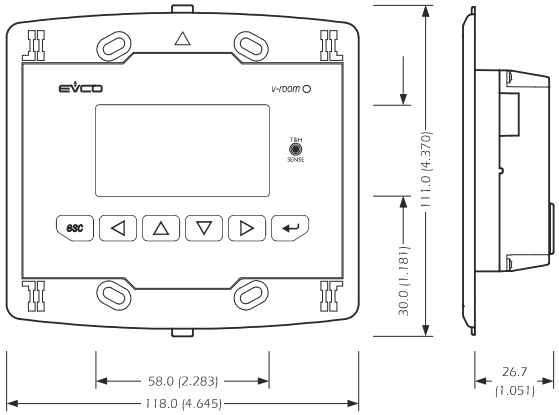
Below we will show the dimensions, assembly and electric connections of the ***c-pro 3*** *CLIMA sistema*, made up from thermal power plant modules (MCCT), Zones (MCZN), solar panels (MCPS) and graphical displays (***Vroom***).

3.1 Dimensions

3.1.1 Thermal power plant (MCCT), zone modules (MCZN) and solar panels (MCPS) dimensional drawing.



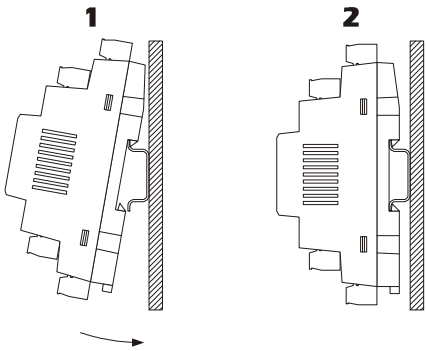
3.1.2 Graphical display dimensional drawing (*Vroom*).



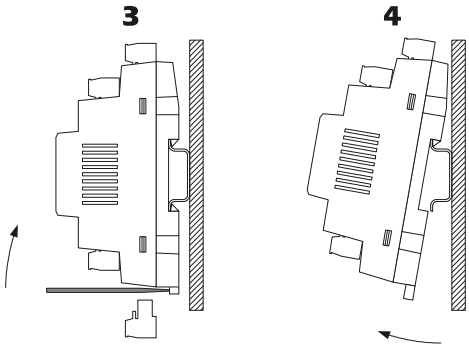
3.2 Assembly

3.2.1 Assembly of thermal power plant modules (MCCT), Zone (MCZN) and solar panels (MCPS)

To install the thermal power plant, zone and solar panels module, operate as indicated in the diagrams (points 1 and 2).



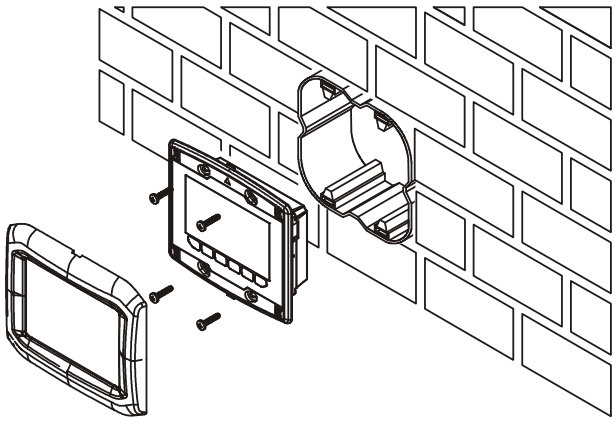
To remove thermal power plant, zone and solar panels module, use a screwdriver and operate as indicated in the diagrams (points 3 and 4).



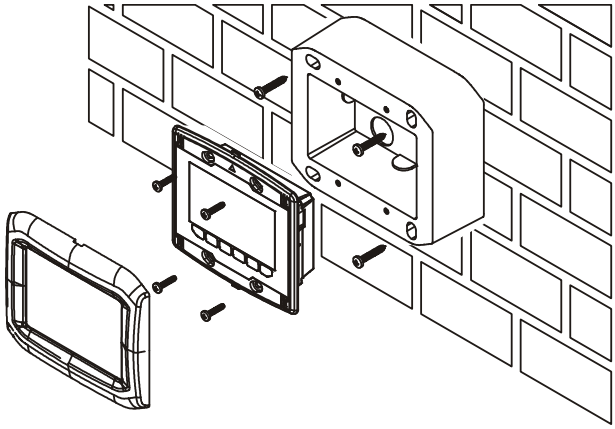
3.2.2 Display Assembly (*Vroom*)

There are three possibilities for assembly of the ***Vroom*** graphical display:

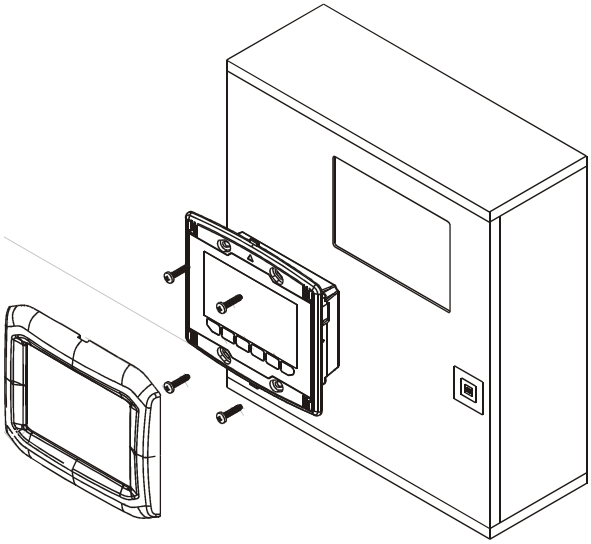
3.2.2.1 Wall recessed in 506E box



3.2.2.2 Wall-installation, on Evco CPVW00 support

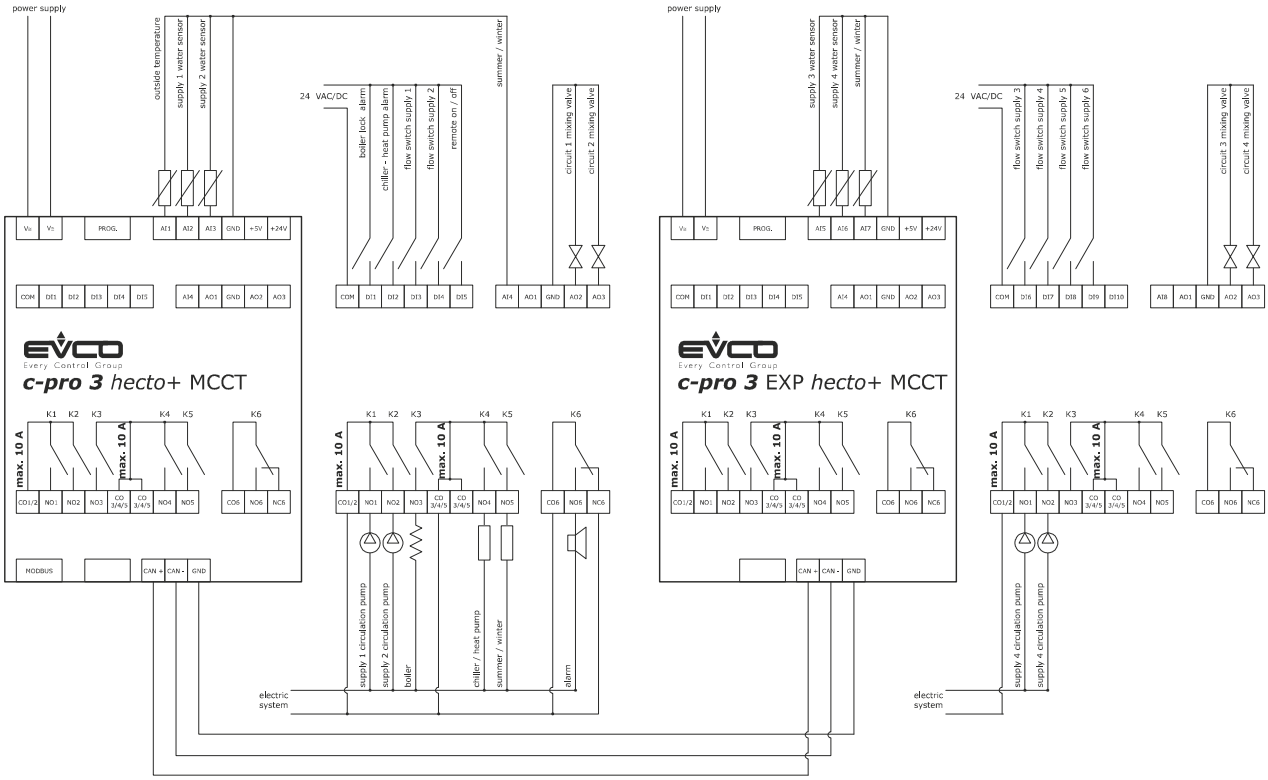


3.2.2.3 Panel installation



3.3 Electric connections

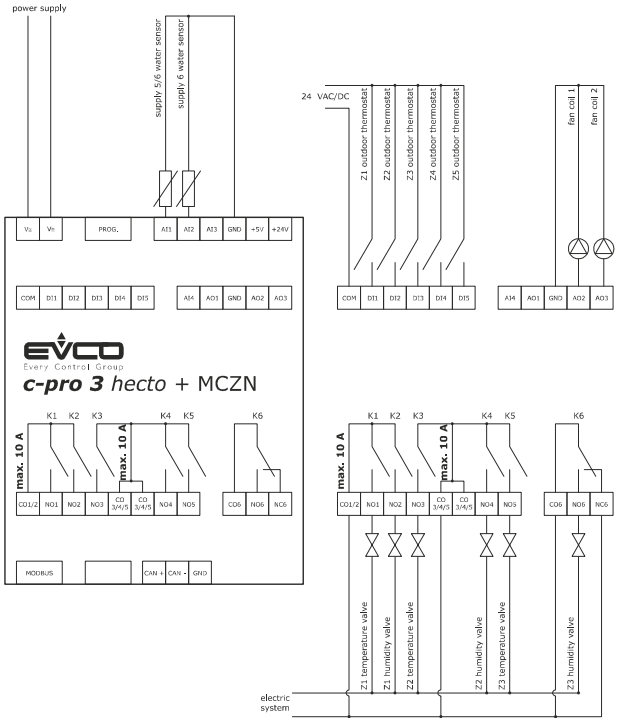
3.3.1 Thermal power plant electric connections (MCCT) *hecto* +



***c-pro 3 hecto*+ Thermal plant controller**		
I/O	Description	
	1 or 2 delivery lines (PL01 = 1 or 2)	3 or more delivery lines (PL01 = from 3 to 6)
	Analog inputs (NTC / 0-5V / 4-20mA)	
A/I 1 CT	External air temperature – NTC	External air temperature – NTC
A/I 2 CT	Delivery temperature 1 – NTC	Delivery temperature 1 – NTC
A/I 3 CT	Delivery temperature 2 – NTC	Delivery temperature 2 – NTC
A/I 4 CT	Summer/Winter	Summer/Winter
A/I 5 EXP	*Not used*	Delivery temperature 3 – NTC
A/I 6 EXP	*Not used*	Delivery temperature 4 – NTC
A/I 7 EXP	*Not used*	Summer/Winter
A/I 8 EXP	*Not used*	*Not used*
	Serial ports	
Rs485	RS485 modbus RTU (su RJ45)	RS485 modbus RTU (su RJ45)
CANbus	Ai moduli ***c-pro 3*** *CLIMA sistema*	Ai moduli ***c-pro 3*** *CLIMA sistema*
	Digital inputs (ON-OFF 24V)	
D/I 1 CT	Alarm (block) Boiler	Alarm (block) Boiler
D/I 2 CT	Alarm chiller – heat pump	Alarm chiller – heat pump
D/I 3 CT	Delivery pump 1 flow switch (and/or thermal switch)	Delivery pump 1 flow switch (and/or thermal switch)
D/I 4 CT	Delivery pump 2 flow switch (and/or thermal switch)	Delivery pump 2 flow switch (and/or thermal switch)
D/I 5 CT	ON-OFF remote	ON-OFF remote
D/I 6 EXP	*Not used*	Delivery pump 3 flow switch (and/or thermal

		switch)
D/I 7 EXP	*Not used*	Delivery pump 4 flow switch (and/or thermal switch)
D/I 8 EXP	*Not used*	Delivery pump 5 flow switch (and/or thermal switch)
D/I 9 EXP	*Not used*	Delivery pump 6 flow switch (and/or thermal switch)
D/I 10 EXP	*Not used*	*Not used*
	Analog outputs (PWM / 0-10 V / 4-20mA)	
A/O 1 CT	*Not used*	*Not used*
A/O 2 CT	Delivery 1 modulating valve control (0-10 V)	Delivery 1 modulating valve control (0-10 V)
A/O 3 CT	Delivery 2 modulating valve control (0-10 V)	Delivery 2 modulating valve control (0-10 V)
A/O 4 EXP	*Not used*	*Not used*
A/O 5 EXP	*Not used*	Delivery 3 modulating valve control (0-10 V)
A/O 6 EXP	*Not used*	Delivery 4 modulating valve control (0-10 V)
	Digital outputs (Relay)	
D/O 1 CT	Delivery 1 circulation pump	Delivery 1 circulation pump
D/O 2 CT	Delivery 2 circulation pump	Delivery 2 circulation pump
D/O 3 CT	Boiler	Boiler
D/O 4 CT	Chiller/Heat pump	Chiller/Heat pump
D/O 5 CT	Summer/winter	Summer/winter
D/O 6 CT	Alarm	Alarm
D/O 7 EXP	*Not used*	Delivery 3 circulation pump
D/O 8 EXP	*Not used*	Delivery 4 circulation pump
D/O 9 EXP	*Not used*	*Not used*
D/O 10 EXP	*Not used*	*Not used*
D/O 11 EXP	*Not used*	*Not used*
D/O 12 EXP	*Not used*	*Not used*

3.3.2 Zones electric connections (MCZN).



***c-pro 3 hecto*+ zones controller**	
I/O	Description
	Analog inputs (NTC / 0-5V / 4-20mA)
A/I 1 ZN	Delivery temperature 5/6 – NTC
A/I 2 ZN	Delivery temperature 6 – NTC
A/I 3 ZN	*Not used*
A/I 4 ZN	*Not used*
	Serial ports
TTL (485)	Rs485 modbus RTU (RJ45)
CANbus	At the ***c-pro 3*** *CLIMA sistema*
	Digital inputs (ON-OFF pocoverial-free contact)
D/I 1 ZN	Z1 external thermostat
D/I 2 ZN	Z2 external thermostat
D/I 3 ZN	Z3 external thermostat
D/I 4 ZN	Z4 external thermostat
D/I 5 ZN	Z5 external thermostat
	Analog outputs (PWM / 0-10 V / 4-20mA)
A/O 1 ZN	*Not used*
A/O 2 ZN	Fan coil 1 (0-10V)
A/O 3 ZN	Fan coil 2 (0-10V)
	Digital outputs (Relay)
D/O 1 ZN	Z1 temperature valve
D/O 2 ZN	Z1 humidity valve
D/O 3 ZN	Z2 temperature valve
D/O 4 ZN	Z2 humidity valve
D/O 5 ZN	Z3 temperature valve
D/O 6 ZN	Z3 humidity valve

3.3.3 Return temperature control

The return temperature is monitored so as to avoid, for example in summer mode, that if cooling is required and the water that arrives at Vmix is hot heads are activated by heating the environment rather than cool it. A check is done after verifying that a time from the opening of the parameter Vmix the return water temperature (in cold weather) is not higher than the flow temperature setpoint active plus a delta parameter, in case of higher temperature will be the Vmix closed and an alarm signaled the return temperature. Conversely for the heating mode, the return temperature should not be lower than the flow temperature setpoint less active as a delta parameter.

3.3.4 Richiesta Chiller/pompa di calore

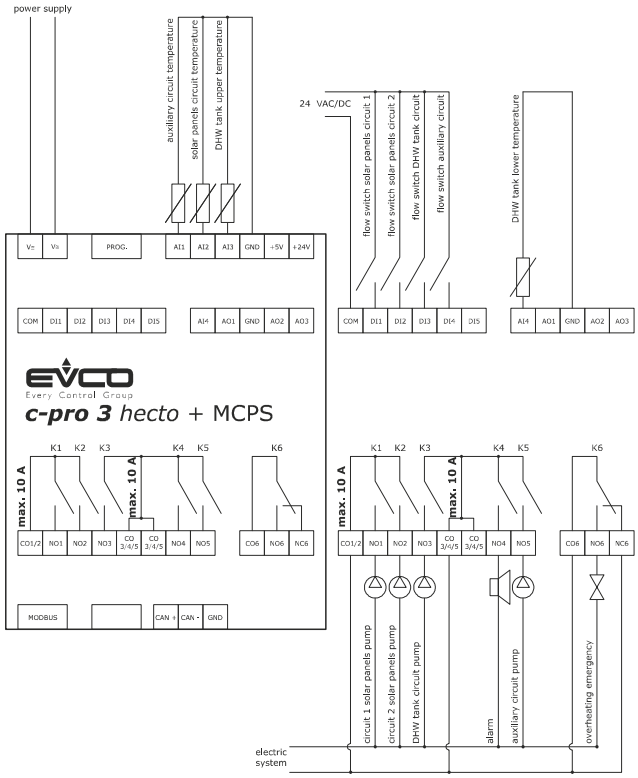
You have the option of dehumidification with cold water or not regulated and enabling command request chiller / heat pump based on the regulation band / opening Vmix MAX / MIN opening Vmix.

3.3.5 Configuration Options

Depending on the configuration chosen for each digital output is assigned a function, as in the table below.

Priority assignment DO
Pump Discharge Line 5
Pump Discharge Line 6
Fancoil V1
Fancoil V2
Fancoil V3
Fancoil 1 Valve C/F
Fancoil 1 Valve C
Fancoil 1 Coil
Fancoil 2 Valve C/F
Fancoil 2 Valve C
Fancoil 2 Coil
Z1 Valve T
Z1 Valve H
Z1 Booster
Z2 Valve T
Z2 Valve H
Z2 Booster
Z3 Valve T
Z3 Valve H
Z3 Booster
Z4 Valve T
Z4 Valve H
Z4 Booster
Z5 Valve T
Z5 Valve H
Z5 Booster
Z6 Valve T
Z6 Valve H
Z6 Booster

3.3.6 Solar panels electric connections (MCPS).



***c-pro 3 hecto*+ solar panels controller**	
I/O	Description
	Analogue inputs (NTC / 0-5V / 4-20mA)
A/I 1 PS	DHW tank temperature (upper) (NTC)
A/I 2 PS	DHW tank lower temperature (NTC)
A/I 3 PS	Auxiliary temperature 1 (NTC) Solar panel 2 temperature (4-20 mA).
A/I 4 PS	Solar panel 1 temperature (4-20 mA).
	Serial ports
TTL (485)	Rs485 modbus RTU (RJ45)
CANbus	At the ***c-pro 3*** *CLIMA sistema*
	Digital inputs (ON-OFF pocoverial-free contact)
D/I 1 PS	Solar panels 1 circuit pump (thermal) flow switch
D/I 2 PS	Solar panels 2 circuit pump (thermal) flow switch
D/I 3 PS	DHW circuit pump (thermal) flow switch
D/I 4 PS	Auxiliary system circuit pump (thermal) flow switch
D/I 5 PS	*Not used*
	Digital outputs (Relay)
D/O 1 PS	Solar panels 1 circuit pump
D/O 2 PS	Solar panels 2 circuit pump
D/O 3 PS	DHW circuit pump
D/O 4 PS	Alarm (that can be configured)
D/O 5 PS	Auxiliary 1 circuit pump Anti-stagnation emergency (cover opening)
D/O 6 PS	Anti-stagnation emergency (heat disposal/cover opening) Anti-stagnation emergency (cover closing)

3.4 Regulators network configuration

The ***c-pro 3*** *CLIMA sistema* is based on the CANbus communication between the various control modules present in the network, with the following maximum configuration:

- N° 1 ***c-pro 3*** *hecto*+ MCCT thermal power plant regulator regulator and ***c-pro 3*** EXP *hecto*+ by request
- N° 8 ***c-pro 3*** *hecto*+ MCZN zone regulators
- N° 1 regulator for ***c-pro 3*** *hecto*+ MCPS solar panels

Every controller present in the network must be assigned with a different and specific CANbus address, according to the logic position of the controller inside the ***c-pro 3*** *CLIMA sistema*, following the layout given below:

Type of controller	**Controller code**	**CANbus address**
Thermal power plant regulator	***c-pro 3*** *hecto*+ MCCT	1 (default)
Expansion	***c-pro 3*** EXP *hecto*+ MCCT	11
Zone 1 regulator (zones 1-2)	***c-pro 3*** *hecto*+ MCZN	2 (default)
Zone 2 regulator (zones 3-4)	***c-pro 3*** *hecto*+ MCZN	3
Zone 3 regulator (zones 5-6)	***c-pro 3*** *hecto*+ MCZN	4
Zone 4 regulator (zones 7-8)	***c-pro 3*** *hecto*+ MCZN	5
Zone 5 regulator (zones 9-10)	***c-pro 3*** *hecto*+ MCZN	6
Zone 6 regulator (zones 11-12)	***c-pro 3*** *hecto*+ MCZN	7
Zone 7 regulator (zones 13-14)	***c-pro 3*** *hecto*+ MCZN	8
Zone 8 regulator (zones 15-16)	***c-pro 3*** *hecto*+ MCZN	9
Regulator for solar panels	***c-pro 3*** *hecto*+ MCPS	17 (default)

As highlighted in the previous table, the controllers are set by default to be automatically recognised in network as:

- thermal power plant regulator CANbus 1 address
- zone 1 regulator CANbus 2 address
- regulator for solar panels CANbus 17 address

3.4.1 MCCT thermal power plant controller network configuration

The controller of thermal power plant (the logical center of the controlled), you must first set the number of zone controllers MCZN will be present in the system, using the following procedure:

1. Enter the *Installer* → *General parameters* menu of the MCCT regulator
2. Set the total number of zones controlled and the number of MCZN zone regulators present in the system
3. To set the communication speed (125k suggested) go to the menu *Installer -> general parameters* and modify the baud rate parameter.

3.4.2 Network Configuration zone modules MCZN

The zone regulator leaves the factory configured as zone 1 module (therefore with CANbus 2 address).
Whenever it is necessary to install more than one zone controller in the system, it will be necessary to configure the regulators present as zone regulators 2, 3, etc…up to a maximum of 8.

To change the network configuration of the MCZN zone module network, follow the procedure below:

1. Connect a zone regulator to the CANbus network (leaving all of the other zone regulators disconnected from the network);the controller connected will be recognised as zone 1 controller
2. Access the MCZN zone regulator application
3. Enter the *Installer* → *General parameters* menu
4. Set the number of local zones managed by the MCZN regulator
5. Set the number of the last zone regulator that is to be inserted in the system managed (e.g. zone 4 regulator).
6. The controller will automatically assume the appropriate CANbus address
7. Repeat the operation, connecting the next to last zone controller to the CANbus network and so on, until the second zone regulator is connected (zone 2 regulator).

3.4.3 MCPS solar panels controller network configuration

The controller for solar panels MCPS is the sole controller of this type can be installed in the plant, for its configuration will be sufficient to enable the presence of the regulator MCPS by the application of thermal power plant, with the following procedure:

1. Enter the *Installatore* → *Parametri generali* (Installer, General parameters) menu of the MCCT regulator
2. Enable the presence of the MCPS regulator in the system

3.5 Displays network configuration

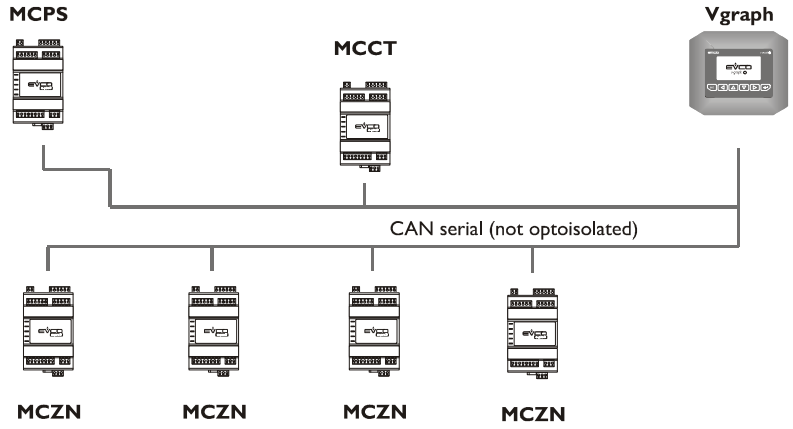
For the final user, the ***c-pro 3*** *CLIMA sistema* envisions the use of a series of user terminals installed in zone, from which it is possible to display temperature, humidity, state of the zone and set the work set-points, time bands, etc.
The maximum number of user terminals that can be set in the system depends mainly on the configuration of the terminal selected by the installer, from the following possibilities:

- Public terminal ***Vgraph*** (maximum n°1 display for the entire system)
- Module private terminal (maximum n°8 displays for the entire system)
- Zone private terminal

Depending on the type of terminal desired, settings must be made in the MCZN zone controller and in the ***Vroom*** user terminal, illustrated in the following paragraphs.

3.5.1 Public terminal

If the viewer is configured as a terminal ***Vgraph*** public (universal), will be able to view all zone controllers MCZN in the system and all areas managed by the controllers MCZN to 6 zones.



A hotel is given as an example.

The unique ***Vgraph*** display will be installed in an area with access to authorised staff only, which will establish the temperatures and time bands predefined for every Zone (hotel room) managed.

The hotel client will only have the possibility to change the room temperature, using the EVSET remote set-point variator (installed in the room), by ±3-5°C (from parameter).

Vgraph **settings:**

Below find the network settings to be made on ***Vgraph*** to make it a public terminal (for the setting procedures, consult the ***Vgraph*** hardware manual):

CANbus address: 100

CANbus map:

Network node	Address
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9

MCCT thermal power plant controller settings:

Below find the settings to make on the MCCT regulator to make ***Vgraph*** a public terminal:

From the *Installer* → *Other parameters*, enable the presence of the public ***Vgraph*** display via *Enab.* ***Vgraph*** - parameter

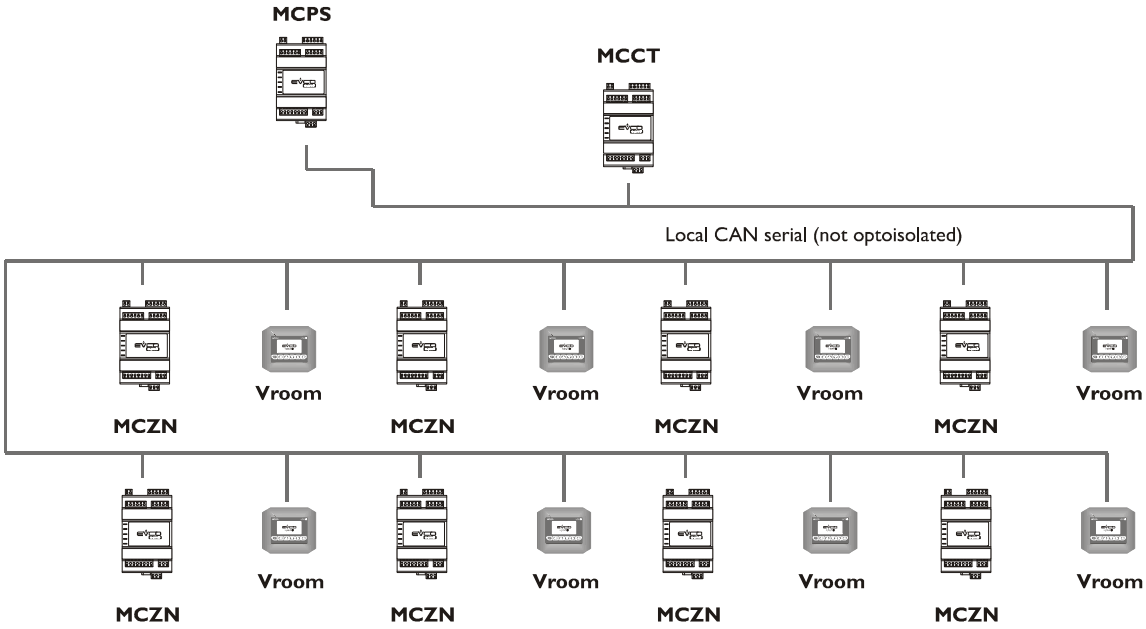
MCZN zone controllers settings:

Below find the settings to make on the MCZN regulators to make ***Vgraph*** a public terminal:

From the *Installer* → *General parameters* menu, enable the presence of the public ***Vgraph*** display by setting the ***Vgraph*** *mode* parameter in *UNIV*.

3.5.2 Module private terminal

If the viewer is configured as a private terminal of separate zones, each viewer will be able to display only the regulator MCZN chosen area, managing the areas controlled by the controller MCZN.



A condominium is given as an example.

A ***Vroom*** display will be installed in every apartment, which will establish temperatures and time bands for the Zones present in the apartment, without the possibility to display or modify the settings of the other apartments present.

***Vroom* settings:**

Below find the network settings to be made on ***Vroom*** to make it a private module terminal (for the setting procedures, consult the ***Vroom*** hardware manual):

CANbus address: 40 + address of the MCZN zone regulator to which the connection is to be made

CANbus map:

Network node	Address
1	MCZN associated controller address

MCCT thermal power plant controller settings:

Below find the settings to make on the MCCT regulator to make ***Vgraph*** a private module:

From the *Installer → Other parameters* enable *public Vgraph*

MCZN zone controllers settings:

Below find the settings to make on the MCZN regulators to make ***Vgraph*** a private module:

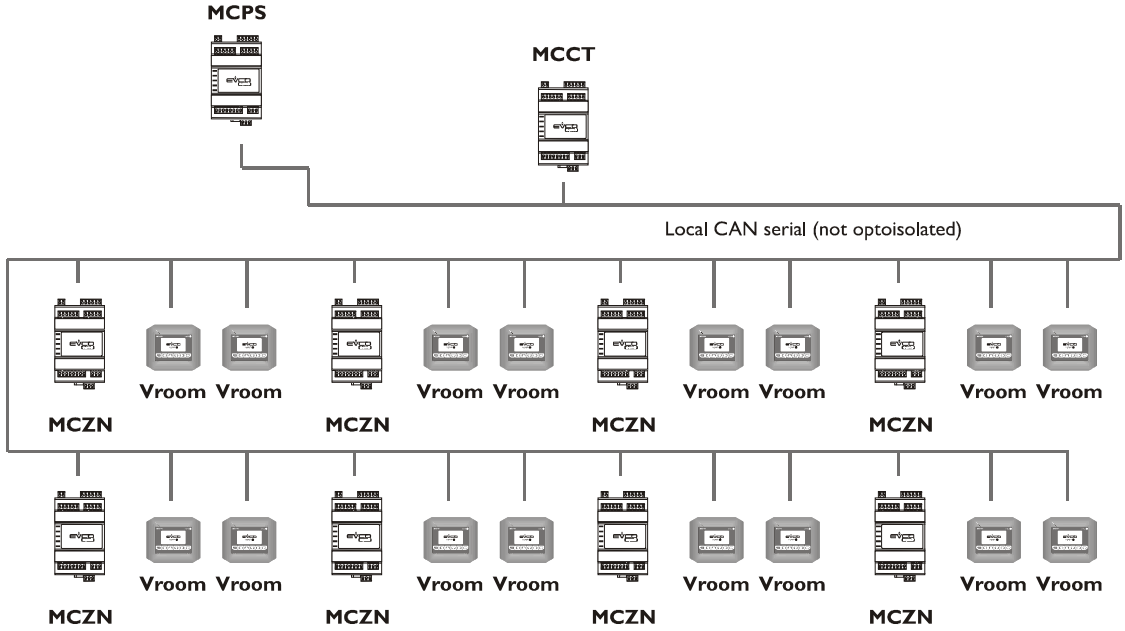
From the *Installer → Other parameters* enable *public Vroom*

1:Separate zones

2: All zones in 1 V-room only

3.5.3 Zone private terminal

If the viewer Vroom is configured as a private terminal areas separated, every ***Vroom*** display will be able to only show the preselected MCZN zone regulator, and only the zone selected managed by the MCZN controller.



As an example, an individually owned villa on two floors.

A ***Vroom*** display will be installed for each zone controlled (living room, bedroom, bathroom), which will establish temperatures and time bands for the Zone where the display is installed, without possibility of displaying or modifying the settings of the other zones present.

***Vroom* settings:**

Below find the network settings to be made on ***Vroom*** to make it a private zone terminal (for the setting procedures, consult the ***Vroom*** hardware manual):

CANbus map:

Modulo Zona	**Indirizzo CAN**	**Vroom**
Zone 1	2	Z1: Addr42 Z2: Addr 52
Zone 2	3	Z1: Addr43 Z2: Addr 53
Zone 3	4	Z1: Addr44 Z2: Addr 54
Zone 4	5	Z1: Addr45 Z2: Addr 55
Zone 5	6	Z1: Addr46 Z2: Addr 56
Zone 6	7	Z1: Addr47 Z2: Addr 57
Zone 7	8	Z1: Addr48 Z2: Addr 58
Zone 8	9	Z1: Addr49 Z2: Addr 59

MCZN zone controllers settings:

Below find the settings to make on the MCZN regulators to make ***Vroom*** a private zone terminal:

From the *Installer → Other parameters* menu, enable the presence of the private zone ***Vroom*** display by setting *Separate Zone*

4 USER INTERFACE

4.1 Display and keyboard

For the application there is a graphic LCD display and 6 dedicated keys.

4.1.1 Built-in interface

The built-in interface is integrated directly onto the MCCT.

There are 6 navigation and value editing pages present in the keyboard with the following meaning:

- ▲ and ▼ (UP and DOWN): when editing it modifies the parameters; otherwise moves the cursor.
- ◀ (LEFT): moves the cursor to the left or takes to the previous menu.
- ▶ (RIGHT): moves the cursor to the right.
- ↵ (ENTER): in editing it confirms the value; otherwise it sends any controls associated to the text where the cursor is present.
- esc (ESC): in editing it annuls the value; otherwise request of the default page eventually associated to the current page. If the ESC key is held for about 2 seconds, the machine can be switched on/off,

4.2 Navigation through the applications making up the system

The ***c-pro 3*** *hecto*+ MCCT controller represents the heart of the ***c-pro 3*** *CLIMA sistema*, also from a user interface point of view.
To access the other system components, the procedure given in the following paragraphs must be followed.

4.2.1 Access a *c-pro 3* hecto+ MCZN zone regulator

To access one of the ***c-pro 3*** *hecto*+ MCZN zone regulators present in the system, access the "Regulators state in serial network" page present in the "States" section and select the regulator to which access is to be made from the list of regulators available.

4.2.2 Access the regulator for *c-pro 3 hecto* MCPS solar panels

To access the regulator for ***c-pro 3*** *hecto*+ MCPS solar panels present in the system, the "Solar panels functioning state" page must be accessed, present in the "States" section and select to access the MCPS regulator (if configured).

5 *c-pro 3 hecto*+ MCCT regulator

Through the module, you can manage the circulation pumps, boiler and chiller-heat pump.
It is able to manage up to two discharge lines (expandable to four by using the expansion I / O c-pro 3 hecto + EXP), eight modules and a module area of solar thermal panels.

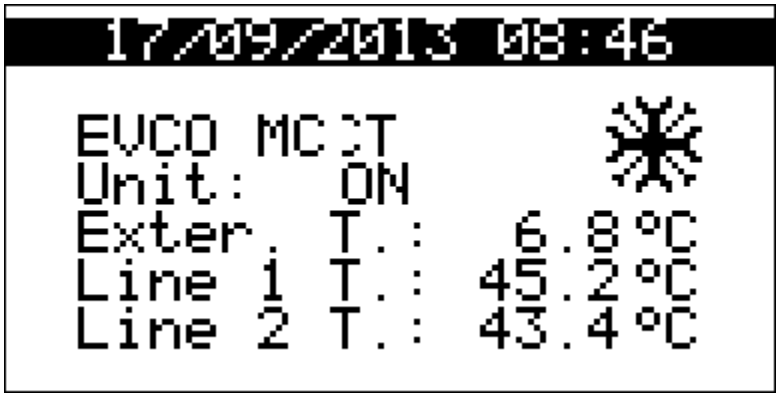
5.1 List of pages

This paragraph presents the main pages and menus found in the MCCT application. As shown previously, the main menu is divided into 3 levels: user, maintenance technician and installer.
A "States" section is also present that can be consulted freely, also necessary for navigation between modules.

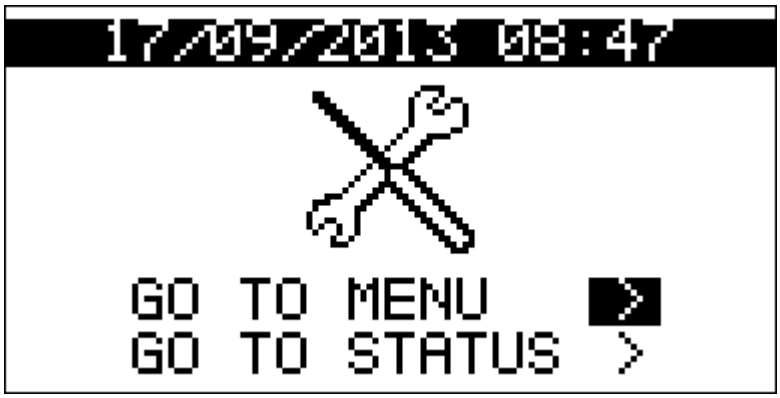
5.2 Menu

The menu interface from the controller or from 128x64 V-Graph public (as above). The new interface will match the standard EVCO

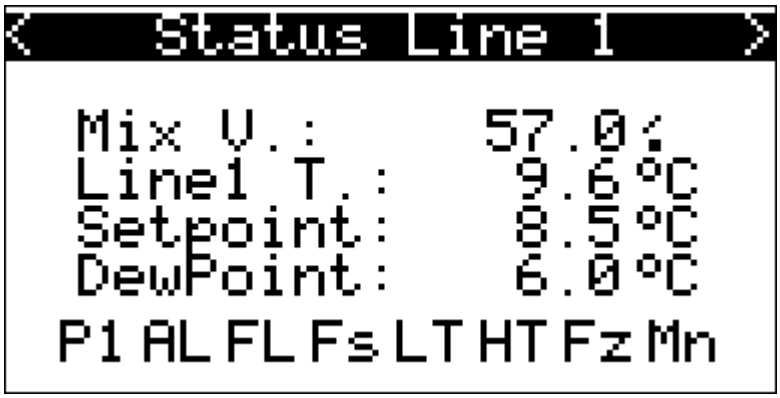
5.2.1 Home page:



From the home by pressing ESC will display the screen below that allow you to access the menu or to the various states



5.2.2 Status page



P1: Pump discharge line on

AL : Pump lock

FL: Flow alarm

Fs: Reached maximum number flow alarms

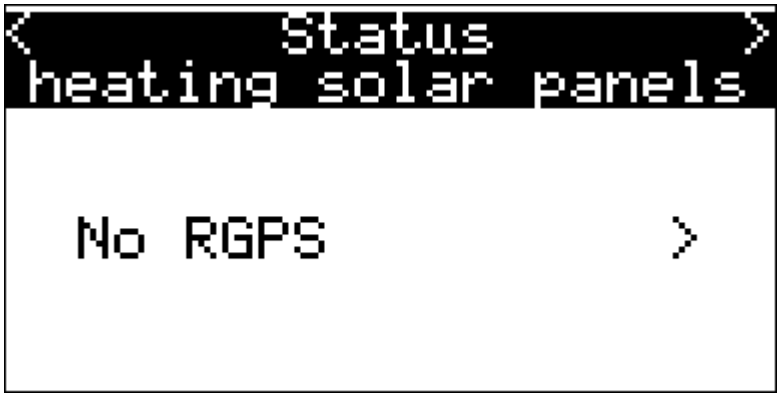
LT: Low temperature alarm sent

HT: High temperature alarm sent

Fz: Forcing pump antifreeze flow

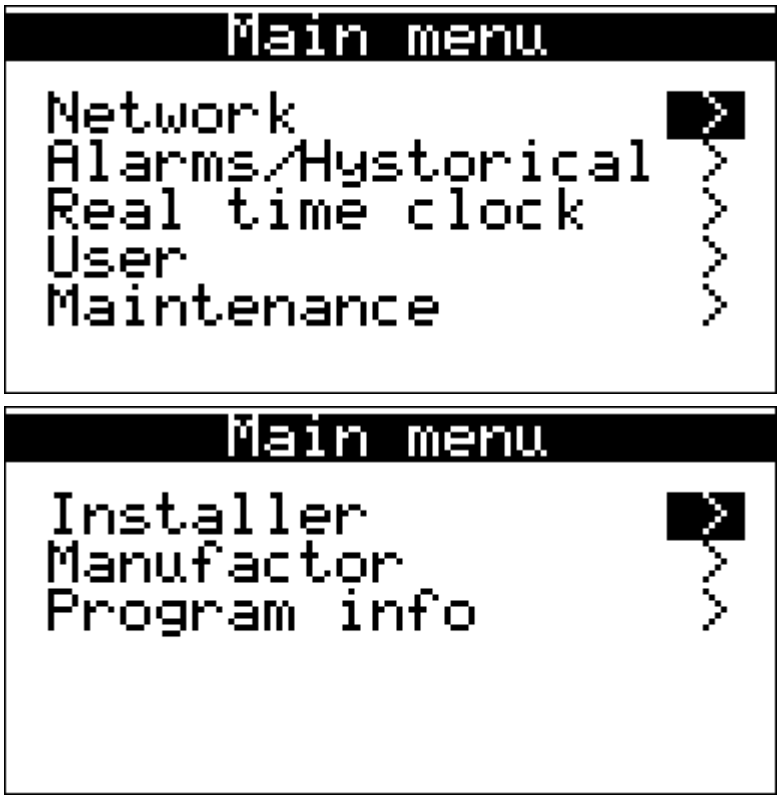
Mn: Pump Manual

Scrolling with the RIGHT button to the right will display the states of the lines up to 6. Finally you will see the screen

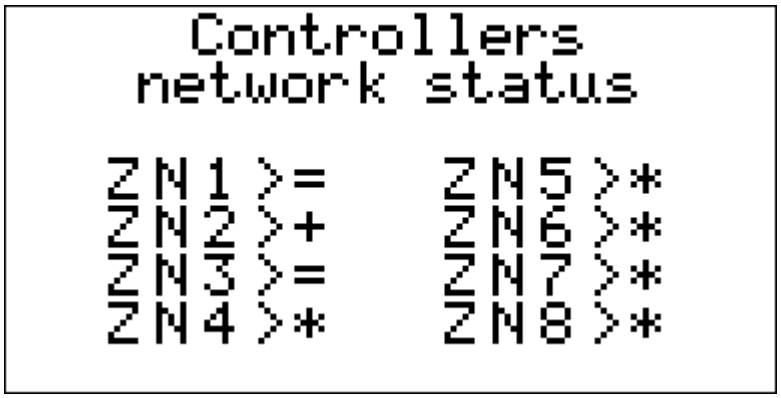


Sliding the screen that is displayed with the DOWN button, you switch to the next screen

5.2.3 Menu page



5.2.4 Network



*: Zone not configured

A: Zone in alarm

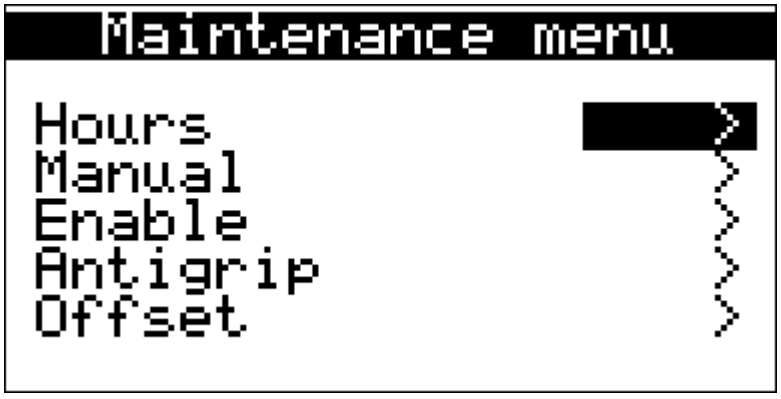
!: Zone disabled

?: Zone offline

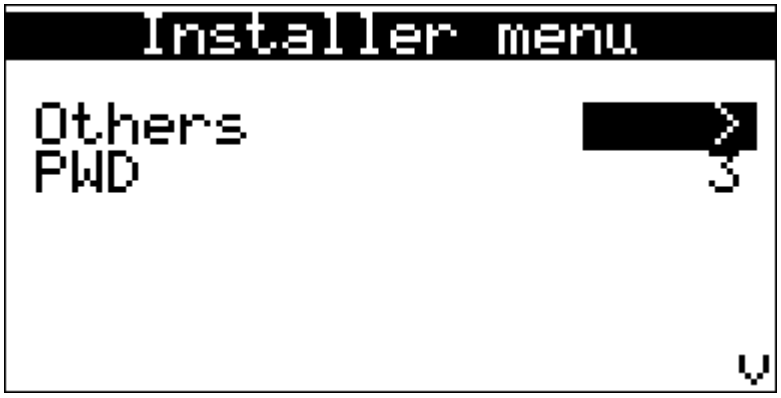
=: Zone OK

+: Zone request with C / F

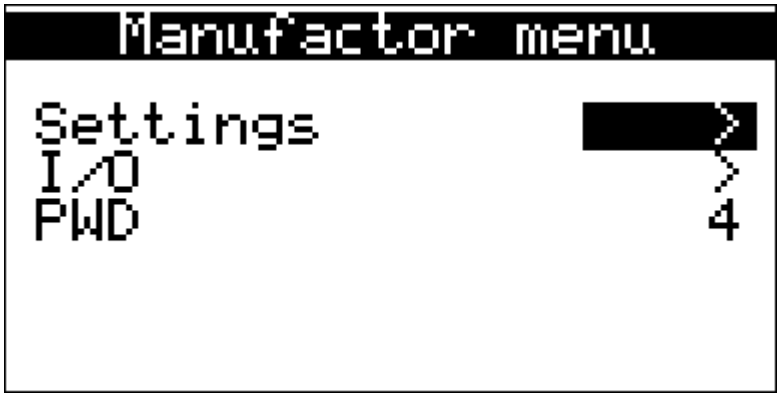
5.2.5 Maintenance menu



5.2.6 Installer menu



5.2.7 Manufactor menu



5.3 Alarms/log menu

This menu contains the functionality linked to the controller alarms and the alarms log of the system.

5.3.1 Alarms log

To view the system alarms log (MCCT regulator and MCZN regulators), press ENTER on "*hystorical alarms*".
In order to see the previous item, press ENTER on ">>". Repeating this procedure will cycle through all the elements of the center until you get to the first element inserted, from here, to request the next item, the last item stored is proposed: the display of the log is circular.
To exit from the pages of historical press the ESC key or wait the 60 seconds timeout. This level is not password protected.

5.3.2 Reset active alarms

To view the active alarms of the MCCT regulator, press ENTER on "*Rst running alarms"*.
If there are no alarms present, "*no alarms* is displayed, otherwise a series of pages appear containing all possible alarms present in the controller with relative codes and description.
The alarm or the alarms present, will be highlighted by flashing "Rst ALARM".
If the ESC key is pressed from an alarm page or 60 timeout seconds are allowed to pass, you go back to the main page of the application. This level is not protected by a password.

5.3.3 Reset alarms log

To reset the memorised alarms log, press ENTER on "Rst hyst. alarms" and take the value of the "*Do you want to erase hystorical alarms memory?*" parameter to the "Yes" value.
To exit the alarms log reset pages, press the ESC key or wait 60 timeout seconds. This level is not protected by a password.

5.3.4 Table of alarms

Code	Alarms description	Kind	Effect	Notes
AL01	Outdoor temperature probe	A	Disable supply on T. regulation	
AL02	Supply Temperature probe L1	A	Disable supply on T. regulation	
AL03	Supply Temperature probe L2	A	Disable supply on T. regulation	
AL04	Supply Temperature probe L3	A	Disable supply on T. regulation	
AL05	Supply Temperature probe L4	A	Disable supply on T. regulation	
AL06	Supply Temperature probe L5	A	Disable supply on T. regulation	

AL07	Supply Temperature probe L6	A	Disable supply on T. regulation	
AL08	Return Temperature probe	A	Disable return on T. control	
AL09	Return temperature alarm	A	Closed mixing valves	PAR retard
AL10	Alarm lock pump L1	A	Line Lock	PAR retard
AL11	Alarm pump operating hours L1			Signaling only
AL12	Alarm lock pump L2	A	Line Lock	PAR retard
AL13	Alarm pump operating hours L2			Signaling only
AL14	Alarm lock pump L3	A	Line Lock	PAR retard
AL15	Alarm pump operating hours L3			Signaling only
AL16	Alarm lock pump L4	A	Line Lock	PAR retard
AL17	Alarm pump operating hours L4			Signaling only
AL18	Alarm lock pump L5	A	Line Lock	PAR retard
AL19	Alarm pump operating hours L5			Signaling only
AL20	Alarm lock pump L6	A	Line Lock	PAR retard
AL21	Alarm pump operating hours L6			Signaling only
AL22	Flow switch alarm L1	A/M	Line Lock	PAR retard

AL23	Flow switch alarm L2	A/M	Line Lock	PAR retard
AL24	Flow switch alarm L3	A/M	Line Lock	PAR retard
AL25	Flow switch alarm L4	A/M	Line Lock	PAR retard
AL26	Flow switch alarm L5	A/M	Line Lock	PAR retard
AL27	Flow switch alarm L6	A/M	Line Lock	PAR retard
AL28	Lock boiler alarm	A	Line Lock	
AL29	Alarm boiler operating hours		Signaling only	
AL30	Alarm lock chiller-heat pump	A	CH-HP Lock	
AL31	Alarm hours operating chiller-heat pump		Signaling only	
AL32	Zone alarm OFFLINE	A	Signaling only	30 seconds retard
AL33	RTC alarm	A	Signaling only	

5.4 Clock menu

From this menu you can set/change the value of the date and time that the module ***c-pro 3*** MCCT extends to the whole **c-pro 3** CLIMA sistema.

To set/modify the date and/or real time, press ENTER on "*Real time clock*" and set the desired value.

If the ESC key is pressed from a setting page or 60 timeout seconds are allowed to pass, you go back to the main page of the application. This level is not protected by a password.

5.5 User menu

The user menu level 1, that is used to enter the password of the user level to be able to view/edit the parameters in this branch.
From the menu you can view ON/OFF button from the system and change the operating mode (Summer and Winter).

5.6 Maintenance menu

The menu is level 2, that is used to enter the password level of maintenance to be able to view/edit the parameters in this branch.
In this menu you can view the hours of operation of utilities and it is also possible to change the operating mode (auto-manual), select the zones to enable, set the anti-grip operation and finally the calibration of the probes.

5.7 Installer menu

The Installer menu is level 3, that is used to enter the password installer level to be able to view/edit the parameters in this branch.
From this menu you can view and set the configuration of the system managed by the MCCT. Below is a list of the menus can be set:
- *Lines* Menu: we define the main characteristics relating to discharge lines present and enabled on the system such as the type of controlled delivery lines present, the presence of the mixing valve, how to manage the circulation pumps and the definition of their type of digital input protection.
- *Control* Menu: you can set the configuration of the system (boiler, chiller, heat pump and antifreeze system).
- *Pumps* Menu: we define the timing of the pumps of all the lines
- *Valves* Menu: you define the offset of the heating curve, valid for all lines in the system. From this menu you access the operating parameters of the mixing valves.
- *Alarms* Menu: you can enable and set the various alarms of the thermal plant.
- *Others* Menu: finally, it is possible to set the general parameters.

5.8 Manufactor menu

The menu manufactor is level 4, that is used to insert the manufactor level password in order to view/edit the parameters in this branch.
From this menu you can select the elements of the installation and configure Input/Output. Below is a list of the menus can be set:
- *Settings* Menu: entering the settings you define the main features present in the controlled such as the presence and type of heating elements/cooling elements (boiler, chiller, heat pump), the number of lines of output and the number of zone controllers MCZN present, the presence of the module for the management MCPS tank ACS and/or plant solar panels.
- Menu I/O: enter this menu, you can set the logic of the digital inputs/outputs

5.9 Main OFF page

The main OFF page changes depending on the reason for which the unit is off.
The unit in *OFF alarm* can be switched off completely using the key, digital input or supervisor.
This type of display is temporary. When the 30 seconds time-out has passed, the controller will go back to the display of the main ON page, however indicating the OFF state of the unit.

5.10 Main ON page

The main page is displayed during the ON state:
Pressing the DOWN key, it is possible to scroll all information contained in the page (External Temperature, Temperature of all the supply lines). Pressing the ESC key, you can access Main Menu and by States Pages.

5.11 State pages

By accessing the state pages from the ON main page, access the following four screens representing the machine states of the ***c-pro 3*** *mega* MCCT controller and the entire controlled system.

5.11.1 State page supply lines L1 to L6

The status pages Supply line from 1 to 6 show, and the status of the line described in the above illustration, the percentage of opening of the mixing valve, the water temperature of the flow line, the working setpoint active and calculation the dew point for the corresponding line.

Press RIGHT on the ">" to go to the next page of state, corresponding to the Supply line 2.
Pressing RIGHT on the ">" to go to the next page of state, ie the status page/access SOLAR PANELS.
After the expiration of time-out of 30 seconds or by pressing ESC controller will return to the main page is displayed ON.

5.11.2 State page and access to the MCPS solar panels module

The status page and access to the module solar panels MCPS shows the status of the network.
Pressing ENTER on the state of the module MCPS (with MCPS module enabled and online), you can access the controller MCPS.
After the expiration of time-out of 30 seconds or by pressing ESC controller will return to the main page is displayed ON.

5.11.3 State and access page of the MCZN zone regulators modules

The status page and access regulator modules MCZN area shows the status of the network of regulators MCZN described in the above illustration.
Pressing ENTER on the ">" at the top right of the screen to return to the status page SUPPLY LINE L1.
Pressing ENTER on the state of the module MCZN selected (with module MCZN present, enabled and online), you can access the corresponding application MCZN.
After the expiration of time-out of 30 seconds or by pressing ESC controller will return to the main page is displayed ON.

5.12 Configuration parameters

The following task map lists all the configuration parameters contained in the user menu, maintainer, installer and manufacturer.

For each parameter is also provided a brief description, the range of permissible values, the unit of measure and the default value proposed.

The menus are structured according to the logic stated in the corresponding sections described above.

5.12.1 List of configuration parameters

Label	Parameter description	Default	Min	Max
	USER PARAMETERS			
ONOFF	State of the unit	OFF	0: OFF	1: ON
Mode	Season mod.	Winter	0:Winter	1:Summer
	MAINTENANCE PARAMETERS: HOURS			
PM01	Pump operation time alarm	20000	0	65535
PM02	Line 1 pump operation time	0	0	65535
PM03	Line 2 pump operation time	0	0	65535
PM04	Line 3 pump operation time	0	0	65535
PM05	Line 4 pump operation time	0	0	65535
PM06	Line 5 pump operation time	0	0	65535
PM07	Line 6 pump operation time	0	0	65535
PM08	Boiler operation time alarm	20000	0	65535
PM09	Boiler operation time	0	0	65535
PM10	Chiller-Heat pump operation time alarm	20000	0	65535
PM11	Chiller-Heat pump operation time	0	0	65535
	MAINTENANCE PARAMETERS: MANUAL			
PM30	Enable manual operation line 1 pump	Disab.	0:Disab.	1:Enab.
PM31	Force manual line 1 pump	OFF	OFF	ON
PM32	Enable manual operation line 2 pump	Disab.	0:Disab.	1:Enab.
PM33	Force manual line 2 pump	OFF	OFF	ON
PM34	Enable manual operation line 3 pump	Disab.	0:Disab.	1:Enab.
PM35	Force manual line 3 pump	OFF	OFF	ON
PM36	Enable manual operation line 4 pump	Disab.	0:Disab.	1:Enab.
PM37	Force manual line 4 pump	OFF	OFF	ON
PM38	Enable manual operation line 5 pump	Disab.	0:Disab.	1:Enab.
PM39	Force manual line 5 pump	OFF	OFF	ON
PM40	Enable manual operation line 6 pump	Disab.	0:Disab.	1:Enab.
PM41	Force manual line 6 pump	OFF	OFF	ON
PM42	Enable manual HP	Disab.	0:Disab.	1:Enab.
PM43	Force manual HP	OFF	OFF	ON
PM44	Enable manual boiler	Disab.	0:Disab.	1:Enab.
PM45	Force manual boiler	OFF	OFF	ON
PM46	Enable manual chiller	Disab.	0:Disab.	1:Enab.
PM47	Force manual chiller	OFF	OFF	ON
	MAINTENANCE PARAMETERS: ENABLING			
PM51	Enabling MCZN1	YES	NO	YES
PM52	Enabling MCZN2	YES	NO	YES
PM53	Enabling MCZN3	YES	NO	YES
PM54	Enabling MCZN4	YES	NO	YES
PM55	Enabling MCZN5	YES	NO	YES
PM56	Enabling MCZN6	YES	NO	YES
PM57	Enabling MCZN7	YES	NO	YES
PM58	Enabling MCZN8	YES	NO	YES
	MAINTENANCE PARAMETERS: ANTIGRIP			
PM20	Enable pumps antigrip	Enab.	Disab.	Enab.
PM21	Enable mixing valve antigrip	Enab.	Disab.	Enab.
PM22	Week day for antigrip	Ven.	Dom.	Sab.
PM23	Hour for antigrip	2	0	23
	MAINTENANCE PARAMETERS: OFFSET			
PM80	Offset delivery 1	0.0	-10.0	10.0
PM81	Offset delivery 2	0.0	-10.0	10.0
PM82	Offset delivery 3	0.0	-10.0	10.0

PM83	Offset delivery 4	0.0	-10.0	10.0
PM84	Offset delivery 5	0.0	-10.0	10.0
PM85	Offset delivery 6	0.0	-10.0	10.0
PM86	Offset external	0.0	-10.0	10.0
PM87	Offset return	0.0	-10.0	10.0
	INSTALLER PARAMETERS: LINES			
PL01	Number of lines	1	0	6
PL02	Line 5 assignment on zone	0	0	8
PL03	Line 6 assignment on zone	0	0	8
PL04	Numero f zone modules	1	0	8
PL05	CH-HP regulation: 0: Band 1: Valve max 2: Valve min	Band	Band	Valve min
PL06	CH-HP switching off delay (active request) [minutes]	1	0	30
	INSTALLER PARAMETERS: CONTROL			
PR01	Enabling boiler	YES	NO	YES
PR02	Kind of refrigeration unit: 0: Boiler 1: Chiller 2: Chiller+HP	Chiller	Boiler	Chiller+HP
PR04	Summer/Winter switching limit	5.0	-30.0	30.0
PR05	Winter/Summer switching limit	30.0	-30.0	30.0
PR06	Summer/Winter switching delay [h]	1	0	255
PR10	Enabling antifreeze	Enab.	Disab.	Enab.
PR11	Antifreeze temperature ignition pumps	-5.0	-15.0	15.0
PR12	Antefreeze set cycling pump	-1.0	-15.0	15.0
PR13	Antifreeze offset cycling pump	2.0	0.0	20.0
PR14	ON time of cycling pump [min]	10	0	999
PR15	OFF time of cycling pump [min]	360	0	999
PR16	External temperature set for HP to boiler switching	7.0	-20.0	30.0
PR17	External temperature offset for HP to boiler switching	5.0	0.0	10.0
PR18	Maximum number of HP functioning hours	3	0	65535
	INSTALLER PARAMETERS: PUMPS			
PP01	ON lines pump delay [sec]	30	0	255
PP02	OFF lines pump delay [sec]	30	0	255
PP03	Mixing valve delay from lines pump ON [sec]	30	0	255
PP04	CH-HP delay from lines pump ON [sec]	60	0	255
	INSTALLER PARAMETERS: VALVES			
PV01	Climatic curve summer offset	5.0	0.0	90.0
PV02	Climatic curve winter offset	5.0	0.0	90.0
	INSTALLER PARAMETERS: MIXING VALVE1			
PV03	Mode 0:Closed 1:Modul. 2:Fix	Modul.	Closed	Fix
PV04	Fix opening	20	0	100
PV05	Proportional band	5.0	0.0	10.0
PV06	Integral time [sec]	0	0	65535
PV07	Dew point offset	3.0	-10.0	10.0
PV08	Climatic curve min. external temperature (summer)	10.0	0.0	30.0
PV09	Climatic curve max. external temperature (summer)	30.0	10.0	60.0
PV10	Climatic curve setpoint (summer)	7.0	0.0	40.0
PV11	Climatic curve min. external temperature (winter)	-5.0	-30.0	30.0
PV12	Climatic curve max. external temperature (winter)	10.0	0.0	30.0
PV13	Climatic curve setpoint (winter)	35.0	0.0	90.0
PV70	Min. value	0	0	100
PV71	Max. value	100	0	100
	INSTALLER PARAMETERS: MIXING VALVE2			
PV14	Mode 0:Closed 1:Modul. 2:Fix	Modul.	Closed	Fix
PV15	Fix opening	20	0	100
PV16	Proportional band	5.0	0.0	10.0
PV17	Integral time [sec]	0	0	65535
PV18	Dew point offset	3.0	-10.0	10.0
PV19	Climatic curve min. external temperature (summer)	10.0	0.0	30.0
PV20	Climatic curve max. external temperature (summer)	30.0	10.0	60.0
PV21	Climatic curve setpoint (summer)	7.0	0.0	40.0

PV22	Climatic curve min. external temperature (winter)	-5.0	-30.0	30.0
PV23	Climatic curve max. external temperature (winter)	10.0	0.0	30.0
PV24	Climatic curve setpoint (winter)	35.0	0.0	90.0
PV72	Min. value	0	0	100
PV73	Max. value	100	0	100
	INSTALLER PARAMETERS: MIXING VALVE3			
PV25	Mode 0:Closed 1:Modul. 2:Fix	Modul.	Closed	Fix
PV26	Fix opening	20	0	100
PV27	Proportional band	5.0	0.0	10.0
PV28	Integral time [sec]	0	0	65535
PV29	Dew point offset	3.0	-10.0	10.0
PV30	Climatic curve min. external temperature (summer)	10.0	0.0	30.0
PV31	Climatic curve max. external temperature (summer)	30.0	10.0	60.0
PV32	Climatic curve setpoint (summer)	7.0	0.0	40.0
PV33	Climatic curve min. external temperature (winter)	-5.0	-30.0	30.0
PV34	Climatic curve max. external temperature (winter)	10.0	0.0	30.0
PV35	Climatic curve setpoint (winter)	35.0	0.0	90.0
PV74	Min. value	0	0	100
PV75	Max. value	100	0	100
	INSTALLER PARAMETERS: MIXING VALVE4			
PV36	Mode 0:Closed 1:Modul. 2:Fix	Modul.	Closed	Fix
PV37	Fix opening	20	0	100
PV38	Proportional band	5.0	0.0	10.0
PV39	Integral time [sec]	0	0	65535
PV40	Dew point offset	3.0	-10.0	10.0
PV41	Climatic curve min. external temperature (summer)	10.0	0.0	30.0
PV42	Climatic curve max. external temperature (summer)	30.0	10.0	60.0
PV43	Climatic curve setpoint (summer)	7.0	0.0	40.0
PV44	Climatic curve min. external temperature (winter)	-5.0	-30.0	30.0
PV45	Climatic curve max. external temperature (winter)	10.0	0.0	30.0
PV46	Climatic curve setpoint (winter)	35.0	0.0	90.0
PV76	Min. value	0	0	100
PV77	Max. value	100	0	100
	INSTALLER PARAMETERS: MIXING VALVE5			
PV47	Mode 0:Closed 1:Modul. 2:Fix	Modul.	Closed	Fix
PV48	Fix opening	20	0	100
PV49	Proportional band	5.0	0.0	10.0
PV50	Integral time [sec]	0	0	65535
PV51	Dew point offset	3.0	-10.0	10.0
PV52	Climatic curve min. external temperature (summer)	10.0	0.0	30.0
PV53	Climatic curve max. external temperature (summer)	30.0	10.0	60.0
PV54	Climatic curve setpoint (summer)	7.0	0.0	40.0
PV55	Climatic curve min. external temperature (winter)	-5.0	-30.0	30.0
PV56	Climatic curve max. external temperature (winter)	10.0	0.0	30.0
PV57	Climatic curve setpoint (winter)	35.0	0.0	90.0
PV78	Min. value	0	0	100
PV79	Max. value	100	0	100
	INSTALLER PARAMETERS: MIXING VALVE6			
PV58	Mode 0:Closed 1:Modul. 2:Fix	Modul.	Closed	Fix
PV59	Fix opening	20	0	100
PV60	Proportional band	5.0	0.0	10.0
PV61	Integral time [sec]	0	0	65535
PV62	Dew point offset	3.0	-10.0	10.0
PV63	Climatic curve min. external temperature (summer)	10.0	0.0	30.0
PV64	Climatic curve max. external temperature (summer)	30.0	10.0	60.0
PV65	Climatic curve setpoint (summer)	7.0	0.0	40.0
PV66	Climatic curve min. external temperature (winter)	-5.0	-30.0	30.0
PV67	Climatic curve max. external temperature (winter)	10.0	0.0	30.0

PV68	Climatic curve setpoint (winter)	35.0	0.0	90.0
PV80	Min. value	0	0	100
PV81	Max. value	100	0	100
	INSTALLER PARAMETERS: ALARMS			
PA01	Enabling pumps operation time hours alarm	Enab.	Disab.	Enab.
PA02	Enabling boiler operation time hours alarm	Enab.	Disab.	Enab.
PA03	Enabling CH-HP operation time hours alarm	Enab.	Disab.	Enab.
PA04	Pumps alarm delay [sec]	0	0	999
PA05	Flow switch alarm delay at start [sec]	30	0	255
PA06	Flow switch alarm delay [sec]	5	0	255
PA07	Max. alarm flow alarm for manual	3	0	255
PA08	Return for alarm delta temperature	3.0	0.0	20.0
PA09	Return temperature alarm delay	180	0	999
PA10	Set HT linea1	45.0	0.0	90.0
PA11	Diff. HT linea1	5.0	0.0	10.0
PA12	Set LT linea1	10.0	-10.0	40.0
PA13	Diff. LT linea1	5.0	0.0	10.0
PA14	Set HT linea2	80.0	0.0	90.0
PA15	Diff. HT linea2	5.0	0.0	10.0
PA16	Set LT linea2	4.0	-10.0	40.0
PA17	Diff. LT linea2	5.0	0.0	10.0
PA18	Set HT linea3	45.0	0.0	90.0
PA19	Diff. HT linea3	5.0	0.0	10.0
PA20	Set LT linea3	10.0	-10.0	40.0
PA21	Diff. LT linea3	5.0	0.0	10.0
PA22	Set HT linea4	80.0	0.0	90.0
PA23	Diff. HT linea4	5.0	0.0	10.0
PA24	Set LT linea4	4.0	-10.0	40.0
PA25	Diff. LT linea4	5.0	0.0	10.0
PA26	Set HT linea5	45.0	0.0	90.0
PA27	Diff. HT linea5	5.0	0.0	10.0
PA28	Set LT linea5	10.0	-10.0	40.0
PA29	Diff. LT linea5	5.0	0.0	10.0
PA30	Set HT linea6	80.0	0.0	90.0
PA31	Diff. HT linea6	5.0	0.0	10.0
PA32	Set LT linea6	4.0	-10.0	40.0
PA33	Diff. LT linea6	5.0	0.0	10.0
	INSTALLER PARAMETERS: OTHERS			
PH01	Language 0:English 1:Italian	English	English	Italian
PH02	Kind of unit On/Off 0:DI 1:BMS	DI	DI	BMS
PH03	Kind of changeover 0: None 1: BMS 2: DI 3: Automatic	Auto	---	Auto
PH05	CAN address	1	1	127
PH06	CAN Baudrate 0:20K 1:50K 2:125K 3:500K	50K	20K	500K
PH07	Enable public V-Graph	YES	NO	YES
PH11	Modbus address	1	1	247
PH12	Modbus Baud [Kbit] 0:1200 1:2400 2:4800 3:9600 4:19200	9600	1200	19200
PH13	Modbus parity 0:None 1:Odd 2:Even	Even	None	Even
PH14	Modbus Stopbit 0:1 bit 1: 2 bit	1 bit	1 bit	2 bit

	MANUFACTOR PARAMETERS: SETTINGS			
PG00	Enable MCPS	Disab.	Disab.	Enab.
PG01	Enable external temperature probe	Enab.	Disab.	Enab.
PG02	Assignment AI4 probe 0: DI summer/winter 1:Return temperature	DI E/I	DI E/I	Return t.
PG03	Enable mixing valv1	Enab.	Disab.	Enab.
PG04	Enable mixing valv2	Enab.	Disab.	Enab.
PG05	Enable mixing valv3	Enab.	Disab.	Enab.
PG06	Enable mixing valv4	Enab.	Disab.	Enab.
PG07	Enable mixing valv5	Enab.	Disab.	Enab.
PG08	Enable mixing valv6	Enab.	Disab.	Enab.
PG09	Line 1 pump mode	Thermo.	Cont.	Thermo.
PG10	Line 2 pump mode	Thermo.	Cont.	Thermo.
PG11	Line 3 pump mode	Thermo.	Cont.	Thermo.
PG12	Line 4 pump mode	Thermo.	Cont.	Thermo.
PG13	Line 5 pump mode	Thermo.	Cont.	Thermo.
PG14	Line 6 pump mode	Thermo.	Cont.	Thermo.
PG15	Kind of protection line1	Lock	Lock	Flow
PG16	Kind of protection line2	Lock	Lock	Flow
PG17	Kind of protection line3	Lock	Lock	Flow
PG18	Kind of protection line4	Lock	Lock	Flow
PG19	Kind of protection line5	Lock	Lock	Flow
PG20	Kind of protection line6	Lock	Lock	Flow
	MANUFACTOR PARAMETERS: I/O			
PH30	Boiler alarm logic	N.O.	N.O.	N.C.
PH31	CH-HP alarm boiler	N.O.	N.O.	N.C.
PH32	Pump L1 flow/thermal alarm logic	N.O.	N.O.	N.C.
PH33	Pump L2 flow/thermal alarm logic	N.O.	N.O.	N.C.
PH34	Remote ON/OFF logic	N.O.	N.O.	N.C.
PH35	Pump L3 flow/thermal alarm logic	N.O.	N.O.	N.C.
PH36	Pump L4 flow/thermal alarm logic	N.O.	N.O.	N.C.
PH37	Pump L5 flow/thermal alarm logic	N.O.	N.O.	N.C.
PH38	Pump L6 flow/thermal alarm logic	N.O.	N.O.	N.C.
PH39	Summer/Winter logic	N.O.	N.O.	N.C.

5.13 State of the unit

There are several procedures for switching the unit on/off:

1) Via the relative **On/Off key**
   Switch-on: press the relative key for about 2 seconds: if all of the other conditions enabled are present, the machine goes to "ON".
   Switch-off: press the relative key for about 2 seconds: the machine goes to "OFF" mode.

2) Via the relative controlling **On/Off key** from digital input (parameter PH2)
   Switch-on: close contact of the remote On/Off: If all other conditions are enabled, the machine switches to "ON".
   Switch-off: if the contact of remote On/Off is open, the machine switches to "OFF from digital input" (marked with the words "OFF in. Digital").

3) Via **supervision protocol**
   Switch-on: to activate the switch-on state from protocol: if all of the other conditions enabled are present, the machine goes to "ON".
   Switch-off: if the ignition state is deactivated from protocol, the machine goes to "OFF from supervision protocol" (also indicated by "OFF supervisor").

The On/Off state from key has priority with respect to the other two. In fact, the On/Off states from digital input and supervision protocol can only be reached with machine on from key.

The machine On/Off key is the ESC key, pressed for about 2 seconds.
The remote On/Off input (when present) can be configured via the parameters:

- *PH02*: Enables the function
- *PH34* : Sets the NC, NO logic for the digital contact

5.13.1 OFF state due to alarm

When the machine is on, a further state exists **OFF due to alarm**, which switches the nit and all devices off until the alarm condition has been reset. If digital consent is missing in this state from supervisor or switch-off is requested from key, the power plant goes into the relative OFF state. The alarms that cause this state are:

- Delivery 1 probe alarm
- Delivery 2 probe alarm

The machine works normally again when the alarm has been reset.

5.14 Summer/winter functioning mode

The operational mode can assume the following values:

E/I keyboard parameter	Description
S= ***SUMMER***	Summer functioning mode
W= ***WINTER***	Winter functioning mode

There are procedures that allow to set the ***c-pro 3*** *CLIMA sistema* functioning mode:

1) Via the **parameter regarding *S/W keyboard*** in the maintenance menu
   Setting - Be positioned on the *S/W keyboard* parameter and, pressing the ENTER key, modify the value using the UP and DOWN keys. Confirm by pressing ENTER again.

2) Via **supervision protocol** (function enabled by parameter *PH03*)
   Setting - Send the operational mode change control via relative state from protocol.
   This control has priority with respect to the *S/W control from keyboard*

3) Using the **Summer/Winter from digital input control** *PH03*
   Setting - With contact open the unit is in "winter" functioning mode, with contact closed in "summer" functioning mode.

4) Using **Summer/Winter automatic switch-over function** *PH03*
   Setting - Switch-over from summer to winter takes place when the external temperature remains above the value established with the *PH05* parameter for the time established by the *PH06* parameter
   Conversely, switch-over from winter to summer takes place when the external temperature remains below the value established with the *PH04* parameter for the time established by the *PH06* parameter
   This control has priority with respect to the *S/W control from digital input*

As well as selection of the operational mode, a digital output is linked to the summer/winter functioning mode, which functions as follows:

Functioning mode	State of the digital input
S= ***SUMMER***	Summer/Winter output ACTIVE
W= ***WINTER***	Summer/Winter output OFF

A typical application of the summer/winter relay is to automatically inform the chiller/heat pump unit of the system functioning mode.

Note. For the two manual summer/winter change modes (procedures 1 and 2) it is recommended to carry out the summer/winter change with the machine off.

6 *c-pro 3* hecto MCZN regulator

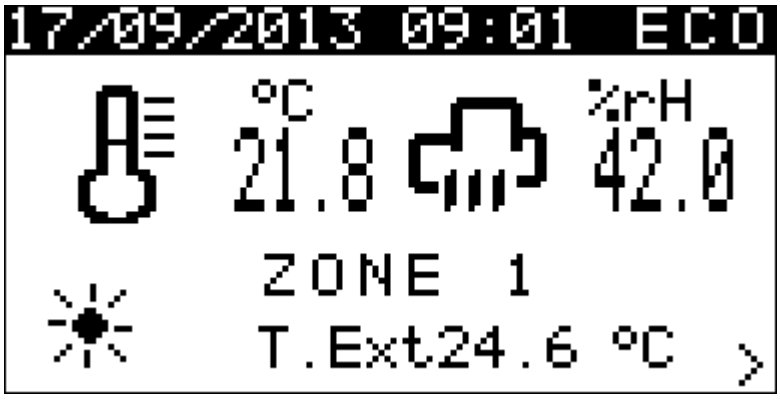
Via the form you can manage the collectors of heating/cooling and dehumidification of those, for its management is necessary to use a remote user interface.
It is able to handle up to six zones (with only temperature control) or three areas (both with control of temperature and humidity).

6.1 List of pages

This paragraph presents the main pages and menus on the form MCZN. As stated previously the general menu is divided into two levels: maintainer, manufacturer and installer, and there are sections: section of alarms and info and free consultation.

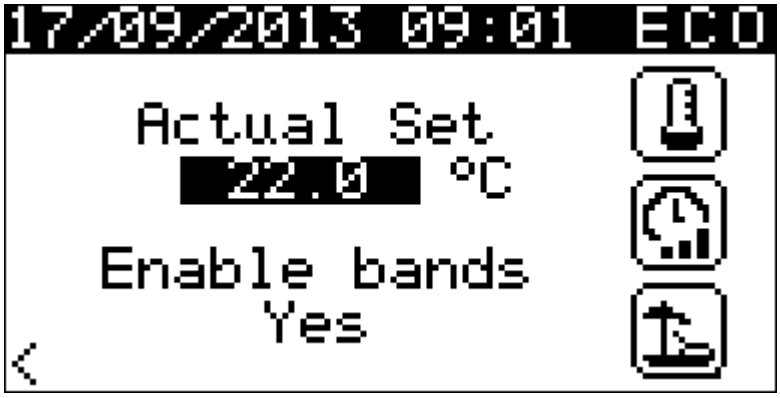
6.2 Menu

6.2.1 Main Screen area



Main screen that displays date, time, time slot current, temperature, humidity, outside temperature, season and zone name. Press RIGHT to access the configuration screen area.

6.2.2 Configuration screen area



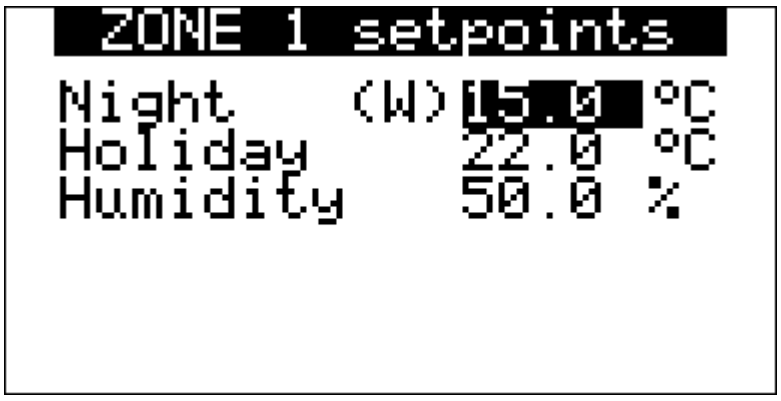
In this screen you can see and change the current setpoint by pressing DOWN and also select one of the 3 icons on the right that will allow you to access the following screens:

1 - Setpoint area

2 - Set time slots

3 - Setting the holiday function

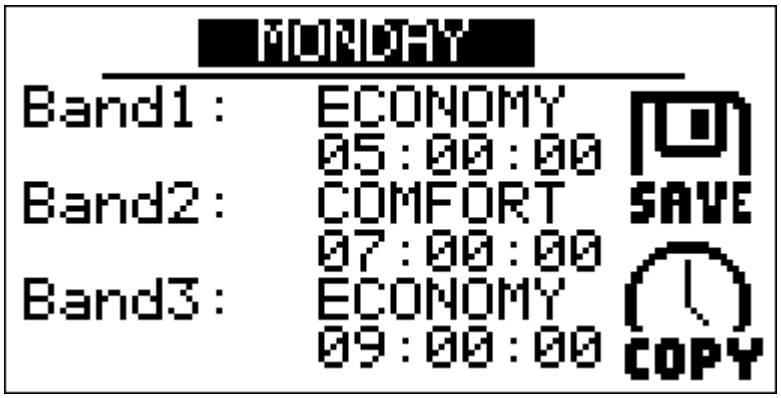
6.2.3 Screenshot setpoint area



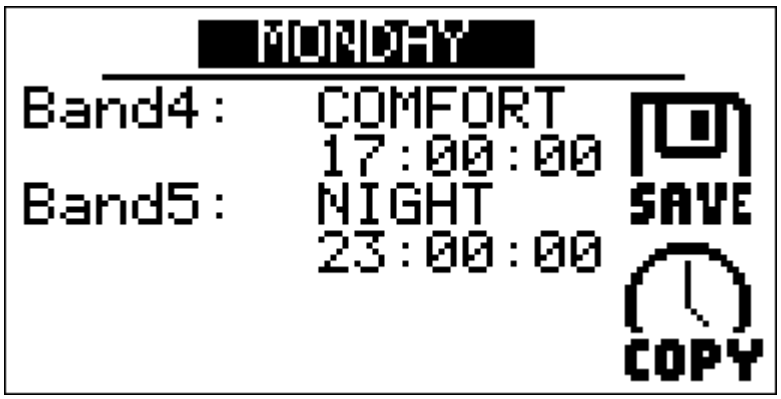
Configuration Screen 1

6.2.4 Screen time zones

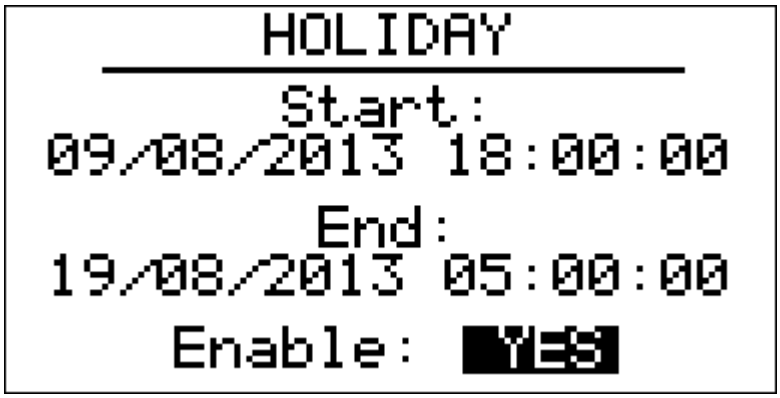
The time slots are available for each day 5 and for each of them can be configured setpoint "night", "economy", "comfort" and a start time.



The time slot set to continue until the next time is reached, if there are no set time periods subsequent to the current time slot will continue indefinitely.
It 'also a facility "COPY" setting that allows you to copy all the settings of the time slots of the day preceding the day edited. At the end of the SAVE position settings and confirm the save.



6.2.5 Screenshot holiday



You can set the start date and end and enabling the vacation mode.

6.3 Main menu accessible by MCCT

Under Network Module MCCT you can access the setup pages of all the operating parameters of the controller are organized in the following sub-menus:

6.3.1 Alarm menu

This menu contains information related to the MCZN alarms present/active in the controller.
For more details refer to the section of the form MCCT, Menu alarms.

6.3.2 Maintainer menu

The maintenance menu is level 2, enter the password that is used for maintenance level or higher to view/edit the parameters in this branch.
From this menu you can change the operating mode (auto-manual), the calibration probes and finally setting the drive's remote setpoint.
For submenu in the Setup menu for the module maintainer explained previously MCCT.

6.3.3 Installer menu

The Installer menu is level 3, that is used to enter the password installer level to be able to view / edit the parameters in this branch.
From this menu you can view and set the configuration of the system managed by the MCZN.
- Menu ZONE: entering areas in the menu you can set the address of the CAN module MCZN, set the number of zones of the module and enable the adaptive adjustment.
At this point you can access the parameters dedicated to each of the 6 zones and set the control type, the supply line and associated probes associated.
- Menu CLIMATE: Climate entering the menu you can configure the parameters of the temperature curve for each zone.
- Menu DEHUMIDIFY: entering the menu you can enable dehumidification operation of the water supply for the dehumidification function and configure the dehumidification function.
- Menu fancoils: fancoils entering the menu you can set the number and type of fan coil units can be managed and how they work.
- Menu ALARM: entering in the alarm menu you can configure the general parameters.

6.3.4 Manufactor menu

The menu manufactor is level 4, that is used to enter the password level builder to be able to view/edit the parameters in this branch.

- Menu *AI*: AI entering the menu you can configure the types of sensors.
- Menu *DI*: entering the menu you can configure the function associated with each DI, its logic and the assignment to the desired zone.
- Menu *DO*: DO entering the menu you can then configure the logic of use.

6.4 Pages On/Off

By accessing the pages of On/Off Controller MCZN you have the ability to view the system status (On/Off), the season, the state of the network module MCCT and the presence of alarms.

6.5 Configuration Parameters

The following task map lists all the configuration parameters contained in the maintenance menu, installer and manufacturer MCZN managed by the application.

For each parameter is also provided a brief description, the range of permissible values, the unit of measure and the default value proposed.

The menus are structured according to the logic stated in the respective paragraphs of description.

6.5.1 List of configuration parameters

Label	Parameter description	Default	Min	Max
	MAINTENANCE PARAMETERS: MANUAL			
PM10	Enable manual mode DO1	Disab.	0:Disab.	1:Enab.
PM11	Force manual DO1	OFF	OFF	ON
PM12	Enable manual mode DO2	Disab.	0:Disab.	1:Enab.
PM13	Force manual DO2	OFF	OFF	ON
PM14	Enable manual mode DO3	Disab.	0:Disab.	1:Enab.
PM15	Force manual DO3	OFF	OFF	ON
PM16	Enable manual mode DO4	Disab.	0:Disab.	1:Enab.
PM17	Force manual DO4	OFF	OFF	ON
PM18	Enable manual mode DO5	Disab.	0:Disab.	1:Enab.
PM19	Force manual DO5	OFF	OFF	ON
PM20	Enable manual mode DO6	Disab.	0:Disab.	1:Enab.
PM21	Force manual DO6	OFF	OFF	ON
	MAINTENANCE PARAMETERS: CALIBRATION			
PM80	Offset T. Z1	0.0	-10.0	10.0
PM81	Offset T. Z2	0.0	-10.0	10.0
PM82	Offset T. Z3	0.0	-10.0	10.0
PM83	Offset T. Z4	0.0	-10.0	10.0
PM84	Offset T. Z5	0.0	-10.0	10.0
PM85	Offset T. Z6	0.0	-10.0	10.0
PM86	Offset H. Z1	0.0	-10.0	10.0
PM87	Offset H. Z2	0.0	-10.0	10.0
PM88	Offset H. Z3	0.0	-10.0	10.0
PM89	Offset H. Z4	0.0	-10.0	10.0
PM90	Offset H. Z5	0.0	-10.0	10.0
PM91	Offset H. Z6	0.0	-10.0	10.0
	INSTALLER PARAMETERS: ZONES			
PZ01	Zone module logic position in the CAN network	1	0	8
PZ02	Zones number inside the module	3	1	6
PZ03	Enable auto adaptative control	Enab.	Disab.	Enab.
	INSTALLER PARAMETERS: ZONE 1			
PZ04	Kind of regulation 0: OFF	S/W	OFF	S/W

	1: Summer 2: Winter 3: Summer/Winter			
PZ05	Kind of booster 0: OFF 1: Summer 2: Winter 3: Summer + Winter	---	OFF	S+W
PZ16	Delivery line associated (CT)	1	1	6
PZ22	Temperature probe 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ23	Humidity transducer 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ24	Humidity transducer 0: --- 1: AI1 2: AI2 3: AI3 4: AI4	---	---	AI4
PZ40	Enable regulator	Enab.	Disab.	Enab.
PZ46	Diff. Temperature valve regulation	1.0	0.0	99.9
PZ52	Diff. Humidity valve regulation	5	0	99
	INSTALLER PARAMETERS: ZONE 2			
PZ06	Kind of regulation 0: OFF 1: Summer 2: Winter 3: Summer/Winter	E/I	OFF	E/I
PZ07	Kind of booster 0: OFF 1: Summer 2: Winter 3: Summer + Winter	---	OFF	E+I
PZ17	Delivery line associated (CT)	1	1	6
PZ25	Temperature probe 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ26	Humidity transducer 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ27	Humidity transducer 0: --- 1: AI1 2: AI2 3: AI3 4: AI4	---	---	AI4
PZ41	Enable regulator	Enab.	Disab.	Enab.
PZ47	Diff. Temperature valve regulation	1.0	0.0	99.9
PZ53	Diff. Humidity valve regulation	5	0	99
	INSTALLER PARAMETERS: ZONE 3			
PZ08	Kind of regulation 0: OFF 1: Summer 2: Winter	E/I	OFF	E/I

	3: Summer/Winter			
PZ09	Kind of booster 0: OFF 1: Summer 2: Winter 3: Summer + Winter	---	OFF	E+I
PZ18	Delivery line associated (CT)	1	1	6
PZ28	Temperature probe 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ29	Humidity transducer 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ30	Humidity transducer 0: --- 1: AI1 2: AI2 3: AI3 4: AI4	---	---	AI4
PZ42	Enable regulator	Enab.	Disab.	Enab.
PZ48	Diff. Temperature valve regulation	1.0	0.0	99.9
PZ54	Diff. Humidity valve regulation	5	0	99
	INSTALLER PARAMETERS: ZONE 4			
PZ10	Kind of regulation 0: OFF 1: Summer 2: Winter 3: Summer/Winter	E/I	OFF	E/I
PZ11	Kind of booster 0: OFF 1: Summer 2: Winter 3: Summer + Winter	---	OFF	E+I
PZ19	Delivery line associated (CT)	1	1	6
PZ31	Temperature probe 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ32	Humidity transducer 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ33	Humidity transducer 0: --- 1: AI1 2: AI2 3: AI3 4: AI4	---	---	AI4
PZ43	Enable regulator	Enab.	Disab.	Enab.
PZ49	Diff. Temperature valve regulation	1.0	0.0	99.9
PZ55	Diff. Humidity valve regulation	5	0	99
	INSTALLER PARAMETERS: ZONE 5			
PZ12	Kind of regulation 0: OFF 1: Summer 2: Winter 3: Summer/Winter	E/I	OFF	E/I
PZ13	Kind of booster	---	OFF	E+I

	0: OFF 1: Summer 2: Winter 3: Summer + Winter			
PZ20	Delivery line associated (CT)	1	1	6
PZ34	Temperature probe 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ35	Humidity transducer 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ36	Humidity transducer 0: --- 1: AI1 2: AI2 3: AI3 4: AI4	---	---	AI4
PZ44	Enable regulator	Enab.	Disab.	Enab.
PZ50	Diff. Temperature valve regulation	1.0	0.0	99.9
PZ56	Diff. Humidity valve regulation	5	0	99
	INSTALLER PARAMETERS: ZONE 6			
PZ14	Kind of regulation 0: OFF 1: Summer 2: Winter 3: Summer/Winter	E/I	OFF	E/I
PZ15	Kind of booster 0: OFF 1: Summer 2: Winter 3: Summer + Winter	---	OFF	E+I
PZ21	Delivery line associated (CT)	1	1	6
PZ37	Temperature probe 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ38	Humidity transducer 0: --- 1: Vroom 2: AI1 3: AI2 4: AI3 5: AI4	Vroom	---	AI4
PZ39	Humidity transducer 0: --- 1: AI1 2: AI2 3: AI3 4: AI4	---	---	AI4
PZ45	Enable regulator	Enab.	Disab.	Enab.
PZ51	Diff. Temperature valve regulation	1.0	0.0	99.9
PZ57	Diff. Humidity valve regulation	5	0	99
	INSTALLER PARAMETERS: CLIMATIC			
PC01	Min external temp. curve Z1 (Summer)	12.0	0.0	60.0
PC02	Min external temp. curve Z1 (Winter)	-5.0	-30.0	60.0
PC03	Max external temp curve Z1 (Summer)	35.0	0.0	60.0
PC04	Max external temp curve Z1 (Winter)	12.0	-30.0	60.0
PC05	Delta curve Z1	0.0	-10.0	10.0
PC06	Min external temp. curve Z2 (Summer)	12.0	0.0	60.0
PC07	Min external temp. curve Z2 (Winter)	-5.0	-30.0	60.0
PC08	Max external temp curve Z2 (Summer)	35.0	0.0	60.0

PC09	Max external temp curve Z2 (Winter)	12.0	-30.0	60.0
PC10	Delta curve Z2	0.0	-10.0	10.0
PC11	Min external temp. curve Z3 (Summer)	12.0	0.0	60.0
PC12	Min external temp. curve Z3 (Winter)	-5.0	-30.0	60.0
PC13	Max external temp curve Z3 (Summer)	35.0	0.0	60.0
PC14	Max external temp curve Z3 (Winter)	12.0	-30.0	60.0
PC15	Delta curve Z3	0.0	-10.0	10.0
PC16	Min external temp. curve Z4 (Summer)	12.0	0.0	60.0
PC17	Min external temp. curve Z4 (Winter)	-5.0	-30.0	60.0
PC18	Max external temp curve Z4 (Summer)	35.0	0.0	60.0
PC19	Max external temp curve Z4 (Winter)	12.0	-30.0	60.0
PC20	Delta curve Z4	0.0	-10.0	10.0
PC21	Min external temp. curve Z5 (Summer)	12.0	0.0	60.0
PC22	Min external temp. curve Z5 (Winter)	-5.0	-30.0	60.0
PC23	Max external temp curve Z5 (Summer)	35.0	0.0	60.0
PC24	Max external temp curve Z5 (Winter)	12.0	-30.0	60.0
PC25	Delta curve Z5	0.0	-10.0	10.0
PC26	Min external temp. curve Z6 (Summer)	12.0	0.0	60.0
PC27	Min external temp. curve Z6 (Winter)	-5.0	-30.0	60.0
PC28	Max external temp curve Z6 (Summer)	35.0	0.0	60.0
PC29	Max external temp curve Z6 (Winter)	12.0	-30.0	60.0
PC30	Delta curve Z6	0.0	-10.0	10.0
	INSTALLER PARAMETERS: DEHUMID			
PD01	Enable delivery water for dehumidification 0: No 1: Yes 2: Solo CH-HP	Yes	No	Solo CHHP
PD02	Booster/dehumidificator bond	Enab.	Disab.	Enab.
PD04	Delta integration Z1 (Winter)	1.0	0.0	10.0
PD05	Delay integration Z1 (Winter) [min]	5	1	255
PD06	Delta integration Z1 (Summer)	0.0	0.0	10.0
PD07	Delay integration Z1 (Summer) [min]	5	1	255
PD08	Delta integration Z2 (Winter)	1.0	0.0	10.0
PD09	Delay integration Z2 (Winter) [min]	5	1	255
PD10	Delta integration Z2 (Summer)	0.0	0.0	10.0
PD11	Delay integration Z2 (Summer) [min]	5	1	255
PD12	Delta integration Z3 (Winter)	1.0	0.0	10.0
PD13	Delay integration Z3 (Winter) [min]	5	1	255
PD14	Delta integration Z3 (Summer)	0.0	0.0	10.0
PD15	Delay integration Z3 (Summer) [min]	5	1	255
PD16	Delta integration Z4 (Winter)	1.0	0.0	10.0
PD17	Delay integration Z4 (Winter) [min]	5	1	255
PD18	Delta integration Z4 (Summer)	0.0	0.0	10.0
PD19	Delay integration Z4 (Summer) [min]	5	1	255
PD20	Delta integration Z5 (Winter)	1.0	0.0	10.0
PD21	Delay integration Z5 (Winter) [min]	5	1	255
PD22	Delta integration Z5 (Summer)	0.0	0.0	10.0
PD23	Delay integration Z5 (Summer) [min]	5	1	255
PD24	Delta integration Z6 (Winter)	1.0	0.0	10.0
PD25	Delay integration Z6 (Winter) [min]	5	1	255
PD26	Delta integration Z6 (Summer)	0.0	0.0	10.0
PD27	Delay integration Z6 (Summer) [min]	5	1	255
	PARAMETRI INSTALLATORE: FANCOILS			
PF00	Fancoils number 0: --- 1: 1 DO 2: 1 AO 3: 2 AO	0	0	2
PF01	Fancoil 1 tubes	2	2	4
PF02	Kind of fancoil 1 0: --- 1: Post heating 2: Post heating + heating	---	---	PR+R
PF03	Priority of fancoil 1 0: Temp. 1: Humid.	Temp.	Temp.	Humid.
PF04	fancoil 2 tubes	2	2	4
PF05	Kind of fancoil 2	---	---	PR+R
PF06	Priority of fancoil 2	Temp.	Temp.	Humid.
PF07	Heating fancoil 1 delta	1.0	0.0	10.0

PF08	Heating fancoil 1 delay [min]	5	1	255
PF09	Heating fancoil 2 delta	1.0	0.0	10.0
PF10	Heating fancoil 2 delay [min]	5	1	255
	INSTALLER PARAMETERS: ALARMS			
PA01	Dehumidificator alarm delay [sec]	0	0	65535
PA02	Kind of dehumidificator alarm	Auto	auto	Manu
PA03	Anti-freeze setpoint	3.0	-10.0	30.0
PA04	Anti-freeze band	1.0	-10.0	30.0
	INSTALLER PARAMETERS: OTHERS			
PH05	Kind of V-room visualizations 1: Separate zones 2: all zones in a single V-room	Zone sep.	Zone sep.	All
PH06	Baudrate CAN 0:20K 1:50K 2:125K 3:500K	50K	20K	500K
PH11	Modbus address	1	1	247
PH12	Baud Modbus[Kbit] 0:1200 1:2400 2:4800 3:9600 4:19200	9600	1200	19200
PH13	Modbus parity 0:None 1:Odd 2:Even	Even	None	Even
PH14	Stopbit Modbus 0:1 bit 1: 2 bit	1 bit	1 bit	2 bit
	MANUFACTOR PARAMETERS: AI			
PH50	Sensor AI1: 1: PTC 2: NTC 3: 0-20mA 4: 4-20mA 5: 0-5V 6: 0-10V 7: PT1000 8: NTC 10K-2 9: NTC 10K-3	NTC	PTC	NTC 10K-3
PH51	Sensor AI2	NTC	PTC	NTC 10K-3
PH52	Sensor AI3	NTC	PTC	NTC 10K-3
	MANUFACTOR PARAMETERS: DI			
PH53	Kind of DI1: 0: --- 1: Zone ON/OFF 2: Zone alarm 3: Zone temperature external thermostat 4: Zone humidity external thermostat	Termo.T.	---	Termo.U.
PH54	Kind of DI2: 0: --- 1: Zone ON/OFF 2: Zone alarm 3: Zone temperature external thermostat 4: Zone humidity external thermostat	Termo.T.	---	Termo.U.
PH55	Kind of DI3: 0: --- 1: Zone ON/OFF 2: Zone alarm 3: Zone temperature external thermostat 4: Zone humidity external thermostat	Termo.T.	---	Termo.U.
PH56	Kind of DI4: 0: --- 1: Zone ON/OFF 2: Zone alarm 3: Zone temperature external thermostat 4: Zone humidity external thermostat	Termo.T.	---	Termo.U.
PH57	Kind of DI5:	Termo.T.	---	Termo.U.

	0: --- 1: Zone ON/OFF 2: Zone alarm 3: Zone temperature external thermostat 4: Zone humidity external thermostat			
PH58	Assignment DI1	1	---	6
PH59	Assignment DI2	2	---	6
PH60	Assignment DI3	3	---	6
PH61	Assignment DI4	4	---	6
PH62	Assignment DI5	5	---	6
PH63	Logic DI1	N.O.	N.O.	N.C.
PH64	Logic DI2	N.O.	N.O.	N.C.
PH65	Logic DI3	N.O.	N.O.	N.C.
PH66	Logic DI4	N.O.	N.O.	N.C.
PH67	Logic DI5	N.O.	N.O.	N.C.
	MANUFACTOR PARAMETERS: DO			
PH68	Logic DO1	N.O.	N.O.	N.C.
PH69	Logic DO2	N.O.	N.O.	N.C.
PH70	Logic DO3	N.O.	N.O.	N.C.
PH71	Logic DO4	N.O.	N.O.	N.C.
PH72	Logic DO5	N.O.	N.O.	N.C.
PH73	Logic DO6	N.O.	N.O.	N.C.

6.6 Unit status

The state controller MCZN is given by the state regulator central heat MCCT.

6.7 Zones status

There are two ways to change the status of regulation of the 6 areas:

1) Using Remote **On/Off Keyboard**

   Through the pages of the installer parameters.

2) Using the commands **On/Off from digital input** for all 6 zones

Switch On: close contact with On/Off Remote zone: enabled if all other conditions are present, the regulation of the zone switches to "ON".

Power Off: If the contact of the On/Off remote zone is open, the control zone goes OFF.

7 *c-pro 3 hecto* MCPS regulator

7.1 List of pages

This paragraph presents the main pages and menus found in the MCPS application. As shown previously, the main menu is divided into 2 levels: maintenance technician and installer are also present along with "States" and "System Network" sections for free consultation. The latter is also necessary for navigation among modules.

The menus have the following structure:

- States
    - Functioning state of DHW circuit (boiler)
    - Functioning state of solar panels 1 circuit
    - Functioning state of solar panels 2 circuit
    - Functioning state of auxiliary circuit (aux1)

- Main menu
    - Alarms/Log
        - Alarms log
        - Reset active alarms
        - Reset alarms log
    - Set-point
        - Setting DHW tank set-point (boiler)
        - Setting auxiliary circuit set-point (aux1)
    - Maintenance (maintenance technician menu)
        - general parameters
        - Panels maintenance
        - Auxiliary circuit management (aux1)
        - DHW tank management (boiler)
        - Flow switches
        - Manual
        - Timer
    - Installer
        - I/O configuration
        - general parameters
        - Solar panels
        - Initialisation
    - Program info

- System Network
    - MCPS system local network

7.2 Main page

The main page is displayed during the ON state:
By pressing the DOWN key it is possible to select whether to access the State, pages, the Main Menu or the System Network, described below.
By pressing ESC key, the controller will go back to the main display of the MCCT thermal power plant controller.

7.3 State pages

By accessing the *STATUS* menu from the "Main Page" access the state pages relative to the DHW circuit (boiler), the two solar panels circuits and the auxiliary circuit (aux1) managed by the MCPS regulator.

7.3.1 Functioning state of DHW circuit (boiler)

The DHW circuit state page (boiler) will contain the following information:
The DHW (boiler) circuit state pages show, as well as the state of the line described in the previous illustration, the regulation temperature of the DHW tank (i.e. the lower of the two), the DHW tank work set-point, the upper and lower temperature of the DHW tank and the days missing to the next planned running of the antilegionella cycle.

Pressing ENTER on the "**>**" access the next state page, corresponding with the SOLAR PANELS CIRCUIT 1.
By pressing ENTER on the "<" access the last state page, i.e. the AUXILIARY 1 CIRCUIT state page.
When the 60 seconds time-out has passed or by pressing ESC, the controller will go back to the display of the main ON page.

7.3.2 Functioning state of solar panels circuit 1 and 2

The functioning state page of the solar panels circuits 1 and 2 will contain the following information:
The state page of the solar panels circuit 1-2 shows, as well as the state of the line described in the previous illustration, the temperature of the water in the solar panels circuit and the maximum temperature accepted before the high temperature alarm is signalled

Pressing ENTER on the "**>**" access the next state page, corresponding with the SOLAR PANELS CIRCUIT 2.
By pressing ENTER on the "<" access the previous state page, i.e. the DHW CIRCUIT state page.
When the 60 seconds time-out has passed or by pressing ESC, the controller will go back to the display of the main ON page.

7.3.3 Functioning state of auxiliary circuit

The auxiliary circuit state page will contain the following information:
The state page of the auxiliary circuit shows, as well as the state of the line described in the previous illustration, the temperature of the water of the auxiliary circuit and its work set-point set.

Pressing ENTER on the "**>**" access the next initial state page, corresponding with the DHW CIRCUIT.
By pressing ENTER on the "<" access the previous state page, i.e. the SOLAR PANELS 2 state page.
When the 60 seconds time-out has passed or by pressing ESC, the controller will go back to the display of the main ON page.

7.4 Main menu

By accessing the pages of the main menu from the "Main Page" of the MCPS regulator, access the setting pages of all regulator functioning parameters organised in the following sub-menu:

7.4.1 Alarms/log menu

This menu contains the functionality linked to the controller alarms and the alarms log of the system.

7.4.2 Alarms log

To view the MCPS regulator alarms log, press ENTER on "*storico allarmi (alarms log)*".
If there are no elements present, *"NO ALLARMI" (NO ALARMS)* is displayed, otherwise the following page is proposed, where the information of the last element memorised in the log is given:
To view the previous element, press ENTER on ">>". By repeating this procedure, scroll all log elements until the first element inserted is reached. From here, on request of the next element, the last element memorised is re-proposed: the log display is circular.
To exit the log pages, press the ESC key or wait 60 timeout seconds. This level is not protected by a password.

7.4.3 Reset active alarms

To view the active alarms of the MCPS regulator, press ENTER on "*Rst running alarms"* .
If there are no alarms present, *"no alarms"* is displayed, otherwise a series of pages appear containing all possible alarms present in the controller with relative codes and description.
The alarm or the alarms present, will be highlighted by flashing "Rst ALARM".
If the ESC key is pressed from an alarm page or 60 timeout seconds are allowed to pass, you go back to the main page of the application. This level is not protected by a password.

7.4.4 Reset alarms log

To reset the memorised alarms log, press ENTER on "Rst storico allarmi" (Rest alarms log) and take the value of the "*Cancellazione totale elementi storico in memoria* (Total cancellation of log elements in memory)" parameter to the "Yes" value.
To exit the alarms log reset pages, press the ESC key or wait 60 timeout seconds. This level is not protected by a password.

7.4.5 Set-point menu

From this menu it is possible to display and set the temperature work set-point for the DHW tank and for the AUX1 auxiliary circuit.
If the ESC key is pressed from a setting page or 240 timeout seconds are allowed to pass, you go back to the main page of the application. This level is not protected by a password.

7.4.6 Maintenance menu

The maintenance menu is level 1, i.e. used to insert the maintenance level password or higher in order to display/modify the parameters present in this branch.
From this menu it is possible to enable and set all features relative to the functions linked to the DHW tank and the DHW circuits, solar panels and auxiliaries, contained in the MCPS application and precisely.

Entering the *GENERAL PARAMETERS* menu, it is possible to enable/disable and set the parameters relative to the execution of the Antigrip and Antilegionella cycles, as well as the calibration of the signals coming from the temperature probes.

From the *PANELS MAINTENANCE* menu, it is possible to enable/disable and set the parameters relative to the periodic activation cycles of the solar panels heat pumps and the solar panels Antistagnation function. The activation/deactivation differentials of the pumps are set as well as the minimum and maximum temperature limits for the two circuits.

The *AUX 1 MANAGEMENT* menu allows to set the parameters relative to the management of the Auxiliary, defining the circulation pump activation mode, the plant type where it is placed, the water work set-point, its differential and the calibration of the auxiliary probe.

Entering the *DHW MANAGEMENT* menu, it is possible to set an activation delay of the DHW circuit circulation pump.

For all flow switches present in the MCPS application, the *FLOW SWITCHES* menu allows to set a delay time from machine ON, a delay time in normal conditions and the number of alarms with manual rearm in order to pass to the necessity for automatic rearm of the alarm.

The *MANUAL* menu allows to set the functioning of the utilities managed by the application in manual/automatic mode, thus forcing the state, to test its functionality.

Finally, the *TIME COUNTER* menu allows to display, enable, set and reset the functioning hours and the maintenance requests for the users to manage the MCPS application.

7.4.7 Installer menu

The installer menu is level 2, i.e. used to insert the installer level password or higher in order to display/modify the parameters present in this branch.
From this menu it is possible to view and set the configuration of the DHW system, the solar panels system/s and the auxiliary system and their controls.

Entering the *I/O CONFIGURATION* menu it is possible to view the type of analogue inputs set in the application and set the polarity of the digital inputs used.

Entering the *GENERAL PARAMETERS* menu, it is possible to define the main features present in the regulator for solar panels, i.e. the name of the MCPS regulator, the number of solar panel circuits present in the system, the presence or not of the auxiliary circuit, the number of temperature probes present in the DHW tank, the type of digital inputs for protection of the circulation pumps and the features of the serial communication parameters both CANbus (***c-pro 3** CLIMA sistema* controllers network) and Modbus (towards the RICS supervision system or other BMS systems).

Entering the *SOLAR PANELS* menu it is possible to set the calibration of the solar panels temperature transducers, also defining their minimum and maximum calibration values.

Finally the *PASSWORDS* menu allows to display and modify the 3 password levels present in the application.

7.5 System Network page

From page network system controller MCPS you have the option to return to the application of thermal power plant MCCT, as follows:
By pressing ESC key, the controller will go back all the same to the main display of the MCCT thermal power plant controller.

7.6 Configuration parameters

Below find a list of all configuration parameters contained in the MAINTENANCE menu (maintenance technician) and INSTALLER managed by the MCPS application.
A brief description is supplied for every parameter, the range of acceptable values, unit of measurement and the default value proposed.

7.6.1 List of MAINTENANCE menu configuration parameters

Label	Parameter description	Default	Min	Max
	GENERAL PARAMETERS			
General parameters Antigrip Execution day	Antigrip function start day	Monday	Sunday	Saturday
General parameters Antigrip Execution hour	Antigrip function start time	2:00	0:00	23:00
General parameters Probes offset Upper DHW tank	Boiler upper probe calibration (offset) (expressed in °C)	0.0	-10.0	10.0
General parameters Probes offset Lower DHW tank	Boiler lower probe calibration (offset) (expressed in °C)	0.0	-10.0	10.0
General parameters Antilegionella Enable	Enabling of antilegionella cycle	No	No	Yes
General parameters Antilegionella Mode	Antilegionella cycle activation mode - MONTH = Monthly - WEEK = Weekly - DAY = Daily	WEEK	MONTH	DAY
General parameters Antilegionella Start hour	Time of antilegionella cycle start (expressed in hours:minutes)	16:00	0:00	23:00
General parameters Antilegionella Day week	Day of the week for antilegionella cycle start (if weekly activation enabled)	Wednes-day	Sunday	Saturday
General parameters Antilegionella Day month	Day of the month for antilegionella cycle start (if monthly activation enabled)	15	1	28

General parameters Antilegionella Setpoint	Water temperature set-point during the antilegionella cycle (expressed in °C)	70.0	0.0	150.0
General parameters Antilegionella Duration	Duration of the antilegionella cycle (expressed in minutes)	60	0	255
	MAINTENANCE			
Panels Maintenance Periodic cycle Interval	Interval between two periodic activation cycles of the solar panels circulation pumps (expressed in minutes)	30	0	255
Panels MAINTENANCE Periodic cycle Duration	Duration of the periodic activation cycle of the solar panels circulation pumps (expressed in minutes)	10	0	255
Panels maintenance Stag.emergency	Anti-stagnation emergency management mode - ON/OFF = via a heat disposal ON-OFF valve - Cover1 = via cover opening closing management (on same relay contact) - Cover2 = via cover opening closing management (on two relay contacts)	ON/OFF	ON/OFF	Cover2
Panels maintenance ON hyst.	Offset (differential) solar panels pump connection, relative to work set-point. (expressed in °C)	10.0	0.0	50.0
Panels maintenance OFF hyst.	Offset (differential) solar panels pump disconnection, relative to work set-point. (expressed in °C)	5.0	-50.0	50.0
Panels maintenance Temperature limits HT setpoint	Solar panels circuit water high temperature alarm set-point (expressed in °C)	130.0	0.0	200.0
Panels maintenance Temperature limits HT hyst.	Solar panels circuit water high temperature alarm set-point differential, relative to the high temperature alarm set-point (expressed in °C)	20.0	0.0	50.0
Panels maintenance Temperature limits LT setpoint	Solar panels circuit water low temperature alarm set-point (expressed in °C)	5.0	-10.0	40.0
Panels maintenance Temperature limits LT hyst.	Solar panels circuit water low temperature alarm set-point differential, relative to the low temperature alarm set-point (expressed in °C)	5.0	0.0	10.0
	AUX 1 MANAGEMENT			
Aux 1 Maintenance Mode	Auxiliary circuit 1 circulation pump regulation mode: - CONT. = Continuous - T.RICH. = On temperature request	T.RICH.	CONT.	T.RICH.
Aux 1 Maintenance Contr. probe	Circuit connected with AUX1 for differential temperature control for AUX1circulation pump activation:	SOL	DHW	SOL

	- DHW = heat exchange with DHW tank - SOL = heat exchange with solar panel			
Aux1 Maintenance Setpoint	Auxiliary 1 circuit water temperature set-point (expressed in °C)	60.0	35.0	80.0
Aux1 Maintenance Hysteresis	Hysteresis (differential) for auxiliary circuit circulation pump start (expressed in °C)	5.0	0.0	20.0
Aux1 Maintenance Offset ON	Temperature differential between control probe and AUX1 probe for auxiliary circuit circulation pump activation (expressed in °C)	10.0	-50.0	50.0
Aux1 Maintenance Offset OFF	Temperature differential between control probe and AUX1 probe for auxiliary circuit circulation pump deactivation (expressed in °C)	5.0	-50.0	50.0
Aux1 Maintenance Probe offset	Auxiliary circuit 1 probe calibration (offset) (expressed in °C)	0.0	-10.0	10.0
Aux1 Maintenance HT setpoint	Auxiliary circuit 1 high temperature alarm set-point (expressed in °C)	70.0	0.0	90.0
Aux1 Maintenance HT hyst.	High temperature alarm differential (Hysteresis) relative to the high temperature alarm set-point (expressed in °C)	5.0	0.0	10.0
Aux1 Maintenance LT setpoint	Auxiliary circuit 1 low temperature alarm set-point (expressed in °C)	10.0	-10.0	40.0
Aux1 Maintenance LT hyst.	Low temperature alarm differential (Hysteresis) relative to the low temperature alarm set-point (expressed in °C)	5.0	0.0	10.0
Aux 1 Maintenance Mode	Auxiliary circuit 1 circulation pump regulation mode: - CONT. = Continuous - T.RICH. = On temperature request	T.RICH.	CONT.	T.RICH.
	DHW MANAGEMENT			
DHW maintenance Delay	Delay on activation of the DHW circuit pump (expressed in seconds)	30	0	255
	FLOW SWITCHES			
Flow switches Alr ON delay	Delay on activation of the flow switch alarm from system start-up (expressed in seconds)	3 0	0	255
Flow switches Alr RUN delay	Delay on activation of the flow switch alarm with system in normal conditions (expressed in seconds)	5	0	255
Flow switches Auto reset n°	Maximum number of flow switch alarms with automatic rearm for passage to manual rearm	3	0	255

7.6.2 List of INSTALLER menu configuration parameters

Label	Parameter description	Default	Min	Max
	I/O CONFIGURATION			
I/O configuration AIn 1	Type of analogue input configured for AIn2: read only parameter	NTC	NTC	NTC
I/O configuration AIn 2	Type of analogue input configured for AIn2: read only parameter	NTC	NTC	NTC
I/O configuration AIn 3	Type of analogue input configured for AIn3: read only parameter	NTC	NTC	4-20mA
I/O configuration AIn 4	Type of analogue input configured for AIn4: read only parameter	4-20mA	4-20mA	4-20mA
I/O configuration DIn	Type of contact for digital inputs: NO = normally open NC = normally closed	N.C.	N.C.	N.O.
	GENERAL PARAMETERS			
General parameters Solar panels	Number of solar panel circuits present in the plant	1	0	2
General parameters Aux 1 circuit	Enabling of auxiliary circuit 1 (aux1)	No	No	Yes
General parameters DHW probes Upper probe en.	Enabling of DHW tank upper probe (boiler)	Yes	No	Yes
General parameters DHW probes Upper probe en.	Enabling of DHW tank lower probe (boiler)	Yes	No	Yes
General parameters Pumps alarm setup Solar pump 1	Type of digital input for protection of solar panel circuit circulation pump 1: THERMAL = Protection input FLOW = Flow switch	FLOW	THER-MAL	FLOW
General parameters Pumps alarm setup Solar pump 2	Type of digital input for protection of solar panel circuit circulation pump 2: THERMAL = Protection input FLOW = Flow switch	FLOW	THER-MAL	FLOW
General parameters Pumps alarms cfg DHW pump	Type of digital input for protection of DHW circuit circulation pump: THERMAL = Protection input FLOW = Flow switch	FLOW	THER-MAL	FLOW
General parameters Pumps alarms cfg AUX1 pump	Type of digital input for protection of AUX1 circuit circulation pump: THERMAL = Protection input FLOW = Flow switch	FLOW	THER-MAL	FLOW
General parameters CANbus address	CANbus serial address	17	0	255
General parameters	CANbus communication speed (baud rate)	125Kbit	20Kbit	500Kbit

Baud rate	-20Kbit -50Kbit -125Kbit -500Kbit			
General parameters MODBUS network Idx	Modbus serial address	1	1	247
General parameters MODBUS network Baud	Modbus communication speed (baud rate) - 1200Kb - 2400Kb - 4800Kb - 9600Kb - 19200Kb	9600Kb	1200Kb	19200Kb
General parameters MODBUS network Parity	Type of Modbus communication parity - NO - ODD - EVEN	EVEN	NO	EVEN
General parameters MODBUS network Stop	Modbus communication Bit Stop position	1b	1b	2b
	SOLAR PANELS			
Solar panels Probes offset Panel 1	Solar panel 1 water temperature transducer (offset) calibration (expressed in °C)	0.0	-10.0	10.0
Solar panels Probes offset Panel 2	Solar panel 2 water temperature transducer (offset) calibration (expressed in °C)	0.0	-10.0	10.0

7.7 Unit status

The state of ON-OFF controller MCPS is given by the state regulator central heat MCCT.

8 Regulations

In this chapter you will find all the major adjustments made by the ***c-pro 3** CLIMA sistema*.

At the side of the title of every paragraph, in brackets find the control module or modules involved in these regulations.

It can therefore be immediately understood from which application to set the function and if the function is available or not in the system available, depending on the presence or not of the control modules indicated.

8.1 Regulation of the zone temperature (MCZN, MCCT modules)

8.1.1 Regulation principle

Depending on the system functioning mode (summer or winter) and the time band active in every zone regulated by the system (manual, night, holiday, economy, comfort in summer and manual, anti-freeze, comfort in winter), when the temperature detected by the room probe is over (summer) or below (winter) the active zone set-point value plus

the value of the differential for that zone, the MCZN regulator will activate the corresponding zone heating/cooling manifold.

The activation of the manifold automatically generates an activation request for the delivery circulation pump in the MCCT controller that serves the requesting zone which, after a delay time that can be set from the parameter, activates the circulation of water in the system and the management of the mixing valve.

After activation of the circulation pump the delivery water temperature control is performed.
Whenever the temperature of the delivery water does not satisfy the delivery set-point (or the mixing valve set-point, if present) after a delay time that can be set from parameter, the heat pump/boiler can be activated in winter mode (depending on the settings made) or the chiller is activated in summer mode.

To regulate the delivery water temperature of the mixing valve and the relative utilities for heating/cooling of the water, consult the relative paragraphs.

8.1.2 Management of the zone heating/cooling manifolds (MCZN module)

The zone heating/cooling manifold is activated when:

- Winter functioning mode: the value of the room set-point is lower that the active room set-point - hysteresis value (differential)
- Summer functioning mode: the value of the room set-point is higher that the active room set-point + hysteresis value (differential)

Every zone heating/cooling manifold present in the system works independently and, once activated, generates an activation request of the delivery circulation pump to which it is associated using the relevant parameter.
There is also the adaptive management of valve, this feature allows you to disable the valve in advance of the zone temperature setpoint temperature is reached, so as to guarantee an optimal comfort zone avoiding excessive temperature fluctuations as well as switching in advance.

8.1.3 Fan Coil

In the case of fan coil system that provides a setting other than serving both in temperature and moisture (summer mode). For the characteristics of the zone module it is possible to predict the speed control of the fans is a 3-step is modulating.
Are manage the following loads:

- ON-OFF water valve (one for heating/cooling) or free water – cooling function / dehumidification
- ON-OFF hot water valve – heating / post-heating function
- Post-heating electric coil / heating support – dehumidification / heating function
- 3 fan speed – cooling / heating / dehumidification function
- Modular fan speed regulation – cooling / heating / dehumidification function.

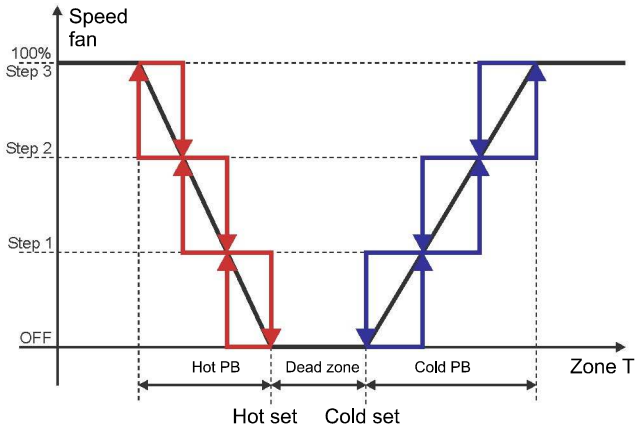
Depending on the configuration will be activated on the valve as a function of the set and of the control band. May also be activated also the electric battery configured as support for the heating according to its own offset and a delay for the activation of the resource.

Both the cooling and the dehumidification will be activated, according to its set and individual regulation proportional band, the cold water valve. To manage the dehumidification request when there is not request of cooling, there will be the following possibilities:

If it is **NOT** configured an electric battery or hot water with the function of post-heating the request of temperature or humidity will take precedence in accordance with the priorities defined by parameter. If it **IS** configured a battery electric or hot water function with re-heating it will be activated to prevent excessive cooling environment.

The post heating will be activated when it is in stock the dehumidification function without cooling demand. Will be deactivated with the request for activation of the dehumidification or cooling demand.

The fan could be 3 speed or modulare and will be pilot as the figure:



For the ventilation 3 step activation will be divided the proportional band in equal parts (will be the same of the zone valve).

8.1.4 Zone work set-point (MCZN module)

The working setpoint of the area is decided, depending on the working mode, either manually or automatically (time slots scheduled weekly), again through the use of the viewer area Vroom.
There are also the additional possibility of changing the working setpoint established by MCCT, in the ways listed below.

8.1.4.1 Variation of the zone work set-point for "climatic curves" (MCZN, MCCT modules)

By activating the work set-point variation function for "climatic curve", depending on the external temperature it is possible (available on the MCCT regulator) to vary the active zone work set-point value within the minimum and maximum limits that can be set from parameter, in order to adapt the room temperature to the external climatic conditions, as follows:

- set the minimum and maximum external temperature limits specific for summer functioning and winter functioning, within which the variation function of the room set-point is active
- the room work set-point minimum and maximum variation values are set
- set the direction of the compensation if direct or inverse for increase or decrease compensation of the work set-point.

8.1.4.2 Variation of the zone work set-point for "manual compensation" (MCZN module)

By activating the work set-point variation function for "manual compensation" by installing a remote set-point variator it is possible (e.g. the EVTP010V01 accessory), to allow the final user to increase/lower the active zone work set-point within the pre-established limits, by simply acting on the pocoveriometer distinguished by the + / - indication.

Remote set-point variator
EVTP010V01

The system installer/maintenance technician must enable and set the function features from parameter, i.e.:

- set the room work set-point minimum and maximum variation values
- enable and set the presence of the remote set-point variator
- calibrate the movement of the potentiometer for 3 basic positions, i.e. maximum negative variation, neutral (0°C variation) and maximum positive variation.

Calibration procedure

- access the remote set-point variator calibration screen
  MCZN: Installer Menu → Zone A(B) → Zone A(B) setup → R.Set calibr.
- position the cursor on position P1
- move the pocoveriometer into the negative set-point maximum variation position (the display will show the number of points read by the pocoveriometer)
- press ENTER to calibrate the first calibration point
- position the cursor on position P2
- move the pocoveriometer into the neutral position (variation of 0°C set-point, the display will show the number of points read by the pocoveriometer)
- press ENTER to calibrate the second calibration point
- position the cursor on position P3
- move the pocoveriometer into the positive set-point maximum variation position (the display will show the number of points read by the pocoveriometer)
- press ENTER to calibrate the third and last calibration point

8.1.5 Zone anti-freeze protection (MCZN module)

During the winter functioning mode when the system is not running (i.e. in OFF state or with time bands enabled but in a day when the system is off), however an zone anti-freeze protection control remains active
If the zone room temperature goes below the anti-freeze set-point, the system will however function (activating the zone manifolds, the circulation pump of the associated delivery line, the heat pump or the boiler if necessary), in order to guarantee a minimum temperature in the room and so as not to risk compromising the good functioning of the system due to frozen piping.

8.1.6 "Heating/cooling integration" function (MCZN modules)

You can activate the "auxiliary heating/cooling" (also referred to by the term "booster").
This function allows the use of the battery housed in the dehumidifier for adjustment of temperature, through an air system in support of that regularly checked by the system. This function is used to compensate for the transient adjustment in steps of first heating up or adjustment conditions for switching between very distant from each other.

The auxiliary heating/cooling may be summer or winter, and is defined as a delta from setpoint work environment. When the ambient temperature is above/below the temperature setpoint of the delta value for a continuous time defined by parameter, then you will be given the activation of the booster hot/cold.
Should be set to the dependence of integration or booster by one or more zones by assigning the function from specific parameter maintainer.
The setting is separate for hot and cold booster in order to be flexible to accommodate the adjustment of the set temperature in the different zones.

8.2 Regulation of the delivery temperature (MCCT modules)

8.2.1 Management of the delivery circulation pumps (MCCT module)

The controller of thermal power station is able to handle up to 6 delivery lines, each with the corresponding circulation pump.
As previously mentioned, each controlled area should be associated with the discharge line from which it is served. Through the appropriate parameter circulation pumps can be operated in the following way:

- CONTINUOUS: the circulation pump discharge will remain continuously active system with ON and no alarms blockers.
- REQUEST FOR TEMPERATURE: the circulation pump discharge will be activated at the request of at least one of the manifolds heating/cooling zone associated with the discharge line itself.

The activation / deactivation of circulating pumps will follow the timing delay at power on / off established through the appropriate parameters.

In addition to the demand from collectors for heating / cooling zone, the circulation pumps discharge will be activated for the following special cycles:
- Protection of low temperature flow line
- Frost protection system
- Cycle anti-grip

The correct functioning of the circulation pumps is controlled via a digital input that can be configured as pump protection input (block) or delivery flow switch (consult the relative explanatory paragraph).

8.2.2 Management of the utilities set-up for heating delivery water: boiler (and heat pump (MCCT module)

During winter regulation, once the water has been put into circulation in the system, whenever the delivery work set-point is not satisfied, the ***c-pro 3*** *CLIMA sistema* will send a request to the thermal power plant controller for the activation of the utilities set-up for heating of the delivery water.
The request will remain active until the satisfaction of the set point or stays open until the mixing valve (selected by parameter PL05). If PL05 = 0 , the demand for hot/cold is deactivated to the achievement of the set flow; PL05 if = 1, the demand for hot/cold is switched off with a delay defined by parameter PL06, complete closure of the mixing valve.
The regulator of central heat MCCT is able to control two different utilities for heating water flow : heat pump and a water heater.
Depending on the type of system the two utilities of heating may be present separately or simultaneously and will be handled in the following way:

- Management of the water heater (boiler): correct operation of the boiler is controlled by a digital input block heater that, if activated, will immediately block the user
- Management of the heat pump : the correct operation of the heat pump is controlled by a digital input alarm chiller-heat pump that, when activated, will immediately block the user.
- Management of the water heater and the heat pump, the heat pump will always have priority with respect to the activation of boiler, which will be activated in the following cases, simultaneously with the deactivation of the heat pump:

1) Activation of digital input alarm chiller-heat pump
2) Outdoor temperature below the set value with the appropriate parameter (for then poor performance of the heat pump due to low outdoor temperature)
3) Achieved number of hours of continuous activation of the heat pump

The correct operation of the boiler is always controlled via the digital input block heater that, if activated, will immediately block the user.

In case N°3, the intervention of the digital input boiler block will cause the automatic reactivation of the heat pump utility.

8.2.3 Management of the utility set-up for cooling delivery water: the chiller (MCCT module)

During summer regulation, once water has been made to circulate in the system, whenever the delivery temperature is above the Summer delivery work set-point of the hysteresis value, then a chiller activation request will be sent.
Correct chiller functioning is controlled via a chiller-heat pump digital input alarm which, whenever activated, will block the utility immediately.

8.2.4 Delivery work set-point (MCCT module)

The working setpoint discharge summer/winter is set to manual mode during installation of the system by authorized personnel.
The working setpoint flow corresponds to the actual setpoint adjustment only in the case in which there is no flow in the mixing valve.

8.2.5 Output of the delivery mixing valve (MCCT module)

The thermal power plant controller can regulate a mixing valve for every delivery line, via two 0-10V proportional analogue outputs.
If the mixing valve check is enabled, the regulation set-point of the delivery line will be given by the regulation set-point calculated for the valve
The mixing valve control can be enabled individually for each delivery line.
Normally the mixing valve is used for low temperature delivery lines in high-low temperature systems.

It is possible to set the functioning mode of the mixing valve for the distinct summer and winter functioning mode among the following possibilities:

- Valve forced closed: the valve remains always closed during the entire functioning independently from the system functioning conditions.
- Valve forced open: the valve remains open at the percentage set until the regulation is active, with regulation off the valve is closed.
- Valve in modulation: the opening of the mixing valve is controlled on the measurement of the delivery water temperature with respect to the regulation set-point.

In the installation phase it is necessary to set a proportional regulation band and, if necessary, an integration constant for a PI control, on the basis of system features.

8.2.6 Mixing valve delivery work set-point (MCCT module)

The summer/winter delivery mixing valve work set-point only has effect if the mixing valve is present and if the modulation valve regulation is enabled.
If the mixing valve check is enabled, the regulation set-point of the delivery line will be given by the regulation set-point calculated for the valve.

The regulation set-point can be the fixed type or linked to the linear calculation on the external air temperature measurement.
If the external air temperature probe is present and functioning, the regulation set-point is calculated according to a climatic curve.
If the external air temperature probe is not present or broken, the regulation set-point is fixed. It is established via a relevant maintenance level parameter.

The climatic curve for calculation of the set-point envisions the setting of two pairs of External-Set-point temperature values.
This two pairs determine a linearisation line of the two set-point values. All intermediate values relative to the external temperature conditions included between the minimum and maximum values set are calculated between the two set-point values.

The two climatic curves and set-points differ due to Summer and Winter functioning modes, separating the functioning of the valve in the two seasons

8.2.7 Dew point control (MCCT, MCZN modules)

During the SUMMER functioning mode, the work set-point of the mixing valve (or delivery valve) will be continuously monitored and if necessary modified in order to check the dew point of each individual active Zone.

The dew point is the temperature at which a mass of air must be cooled at constant pressure, so that it becomes saturated (i.e. when the percentage of water vapour reaches 100%) and can therefore start to condense if further heat is lost.
This would lead to the formation of dew in the cooled floor, thus compromising the integrity of the controlled room.
Every active Zone, equipped with room temperature and humidity sensor, calculates the temperature of its own dew point and sends this data to the thermal power plant.

Given the different zones associated to the specific delivery line the thermal power plant regulator will consider the highest dew point value sent by the individual zones as the dew point of the entire delivery line.
To consider the construction features of the system, the dew point will be raised by a predefined offset that can be set by parameter.
The regulation set-point of the mixing valve (or delivery line) will be limited to the minimum value given by the "delivery dew point + offset" calculated whenever necessary.

8.2.8 Control of the high and low delivery temperature (MCCT module)

Whenever the temperature of the delivery water exceeds or drops below the minimum and maximum temperature values accepted for the system of the hysteresis value, then the ***c-pro 3*** *mega* MCCT thermal power plant will start special management cycles for these emergencies:

- High temperature protection: the high temperature protection intervention will force the immediate closure of the mixing valve in order to prevent overtemperatures in the controlled system, until the temperature returns to the maximum values accepted for the system.
- Low temperature protection: After a fixed delay of 60 seconds, the intervention of the low temperature protection will cause the activation of the delivery circulation pump in order to ease heating of the water in the system. The pump will remain on until the minimum temperature conditions are recovered.

8.3 Regulation of the zone humidity (MCZN, MCCT modules)

8.3.1 Regulation principle

Whenever the function is enabled and a room humidity transducer is present in zone, during SUMMER functioning mode when the relative humidity detected by the room humidity transducer is over the active zone humidity set-point value plus the value of the differential, the MCZN regulator will activate the corresponding manifold/zone dehumidification valve.

Whenever dehumidification makes use of the delivery water for its action (established via the relative parameter), the activation of the manifold/zone dehumidification valve generates the same sequence of activations/controls triggered with zone heating/cooling.
For its functioning, consult the zone temperature regulation part.

8.3.2 Management of the dehumidification manifold/valve (MCZN module)

The manifold/zone dehumidification valve is activated when the value of the room relative humidity is over the active room humidity set-point + hysteresis value (differential).

8.3.2.1 Valve closed in advance

This function (enabled from the parameter), thanks to a self-learning allow to disable the valve zone temperature early with respect to the setpoint temperature is reached, so as to ensure optimum comfort zone avoiding excessive temperature fluctuations.

8.3.3 Zone humidity work set-point (MCZN module)

The zone humidity work set-point is decided in manual mode via the relative maintenance technical parameters present in the MCZN module or automatically, set by the final user via programmed weekly time bands.
To set the automatic humidity work set-points (Economy and Comfort set-points), consult the ***c-pro 3*** *CLIMA sistema* user manual.

8.3.4 Management of digital on/off dehumidifier

The zone controller ***c-pro 3*** *hecto* MCZN has two digital inputs (one for each zone) on/off dehumidifiers.
If the digital input is at logic level "disabled", the corresponding additional dehumidifier will be considered in the OFF state and all of its settings are disabled.
In order to make such control active, the inputs must be activated through the appropriate parameters maintainer.

8.4 Regulation of the DHW tank temperature for the DHW water (MCPS module)

8.4.1 Regulation principle

Whenever the ***c-pro 3*** *hecto* MCPS module is present and enabled in the system, the system will automatically consider the presence of a DHW storage tank in the system for the DHW.
With the presence of the DHW tank, the temperature regulation principle of the entire system will change significantly in the following way:

- WINTER REGULATION Via its utilities proposed for heating, the ***c-pro 3*** *CLIMA sistema*, always keeps the DHW tank at the pre-fixed temperature.
  The delivery hot water for any heating requests of the Zones is withdrawn directly from the DHW tank.

- SUMMER REGULATION: Via its utilities proposed for heating EXCEPT the heat pump, the ***c-pro 3*** *CLIMA sistema*, always keeps the DHW tank at the pre-fixed temperature.
  The cool delivery water for any cooling requests from the Zones will be supplied by the chiller unit, obviously without the use of the DHW tank.

8.4.2 Management of the DHW circuit circulation pump (MCPS module)

The MCPS solar panels controller can manage a DHW tank with relative circulation pump.
The circulation pump is activated on temperature request of the DHW tank, whenever the heat pump or boiler utilities are used to heat the DHW. When the use of the solar panel circuit/s for heating is sufficient, the DHW circulation pump will not be used.

The activation of the DHW circulation pump will follow the delay times on switch-on established via the relevant parameter.

As well as the request by the DHW tank, the DHW circulation pump can be activated during a special anti-grip or antilegionella cycle.

The correct functioning of the circulation pumps is controlled via a digital input that can be configured as pump protection input (thermal switch) or delivery flow switch (consult the relative explanatory paragraph).

8.4.2.1 DHW circuit circulation pump management (MCPS module) with setpoint panel mode.

The controller for solar panels MCPS is able to manage a DHW tank with circulation pump.
The circulation pump is activated by temperature request of the DHW tank (upper DHW tank probe), if are used for domestic water heating the heat pump or the boiler.
The pump activation of DHW circulation pump follows the power on delay time established by the appropriate parameter.

In addition to the request of the DHW tank, the DHW circulation pump can be activated during a spcial anti-grip or antilegionella cycle.

The correct functioning of the circulation pumps is controller by a digital input which can be configured as pump protection or supply flow-switch.

8.4.3 DHW tank work set-point (MCPS module) With DHW setpoint mode

The DHW working setpoint is manual established from the setpoint menu on the ***c-pro 3*** *hecto* MCPS main menu.
According to the plant dimensions, the DHW tank can use only one temperature probe (DHW tank probe) or 2 temperature probes (upper and lower DHW tank probes).
If the DHW tank use two probes, the regulation of the temperature will be made when the lower and the upper water reaches the working setpoint.

The DHW tank regulation differential is fixed and is -1°C.

8.4.3.1 DHW tank working setpoint (MCPS module) with panels setpoint type

The DHW tank working setpoint is manual established from the setpoint menu in the ***c-pro 3*** *hecto* MCPS module main menu.
The regulation of the temperature will be made when the upper DHW tank water reaches the working setpoint.

The DHW tank regulation differential is fixed and is -1°C.

8.4.4 Management of the AUX1 auxiliary circuit circulation pump (MCPS module)

The MCPS solar panels controller can manage an AUX1 hot water auxiliary circuit with relative circulation pump.
Via the relevant parameter, the circulation pump can be managed as follows:

- CONTINUOUS: the auxiliary circuit circulation pump will remain constantly activated with system ON and in absence of blocking alarms.
- TEMPERATURE REQUEST: with heating request by the AUX1 circuit (depending from work set-point and differential), when the temperature of the DHW tank or of the solar panels circuit (depending on the value of *Control probe* parameter) is over a value set by the (*Offset ON*) parameter at the temperature of the AUX1 circuit, then the AUX1 water circulation pump will be switched on, in a way to contribute with the heating of the AUX1 circuit.
  Whenever the difference between DHW tank (or solar panels circuit) temperature and AUX1 becomes lower than a value set by (*Offset OFF*) parameter, the AUX1 circulation pump will be switched off.

As well as the request by the AUX 1 circuit, the solar panels circuit circulation pump will be activated for the following special cycles:

- auxiliary circuit low temperature protection
- anti-grip cycle

The correct functioning of the circulation pump is controlled via a digital input that can be configured as pump protection input (thermal switch) or delivery flow switch (consult the relative explanatory paragraph).

N.B.
The AUX1 auxiliary circuit can be managed only in systems with individual heating solar panels circuits. If this is not the case, all other enablings and settings made will have no effect.

8.4.5 Control of the high and low temperature of the auxiliary circuit AUX1 (MCPS module)

Whenever the temperature of the AUX1 auxiliary circuit water exceeds or drops below the minimum and maximum temperature values accepted for the system of the hysteresis value, then the ***c-pro 3*** *hecto* MCPS solar panels regulator will start special management cycles for these emergencies:

- High temperature protection: the high temperature protection intervention will trigger a simple signal to the maintenance staff.
- Low temperature protection: the low temperature protection will trigger the activation of the circulation pump of the auxiliary circuit in order to ease heating of the circuit water. The pump will remain on until the minimum temperature conditions are recovered.

8.4.6 Management and setting of the periodic antilegionella cycle for the DHW tank (MCPS module)

In order to disinfect the DHW tank from the proliferation of legionella bacteria due to the deposit of DHW, the ***c-pro 3*** *CLIMA sistema* envisions the periodic management of anti-legionella cycles.
Depending on the type of system, it is possible to select daily, weekly or monthly antilegionella cycles.
An anti-legionella cycle consists in taking, the temperature of the DHW tank to a temperature such to destroy bacteria (standard to 70°C, but which can be set from parameter) for a long enough period of time (standard at 60 minutes, but can be set from parameter) by activation of the boiler and the DHW circulation pump.
These periodic cycles will help with respect to the Standards in force on the subject.

8.5 Management and configuration of the heating solar panel circuits (MCPS module)

8.5.1 With DHW setpoint

Whenever the ***c-pro 3*** *hecto* MCPS module for solar panels is present and enabled in the system, one or two heating solar panel circuits management can be enabled, with the function of heating the DHW in the DHW tank.

The heating solar panels circuits will be added to the other utilities set-up for heating the DHW tank, with PRIMARY importance with respect to the other utilities, with the following functioning principle:

- with heating request by the DHW tank, when the temperature of the solar panels circuit is over a value set by the (*Offset ON*) (ON Offset) parameter at the temperature of the DHW tank, then the solar panels circuit will start its own water circulation pump, in a way to contribute with the heating of the DHW tank.
  Whenever the contribution of the solar panels circuits is sufficient to reach the DHW set-point, at this point the solar panels circuit circulation pump will be switched off.
  Whenever the difference between solar panels and DHW tank temperature becomes lower than a value set by (OFF Offset) parameter, the solar panels circulation pump will be switched off and the other utilities set-up for heating will be activated (heat pump or boiler, with the rules and times described in the previous points), in order to reach the work set-point set for the DHW tank.

The presence of the second circuit of solar hating panels automatically disables the presence of the AUX1 auxiliary circuit and of the management of the anti-stagnation emergency in *Tenda2* (Cover2) mode.

8.5.2 con tipo setpoint pannelli

If it is present and enabled in the plant the ***c-pro 3*** *hecto* MCPS module for solar panels, is possible to enable the management of one or two circuits of solar panels, with the fuction to heat the the domestic water of the DHW tank.

The heating panel circuit will be added to the other heating loads of the DHW tank, with integrative priority on other loads, with the following functioning:

- with heating request from the DHW tank, when the temperature of the solar panels circuit is higher of a set value (*Offset ON*) of the lower temperature od DHW tank, the solar panel circuit will start the water circulation pump, to help to the DHW tank heating.
  If the difference between the solar panel temperature and the DHW tank lower temperature is lower than the value set by parameter (*Offset ON*), the solar panels water circulation pump will stop.

The presence of the second solar panel circuit will automatically disable the presence of the AUX1 auxiliary circuit and the emergency anti-stagnation in *Tenda2* mode.

8.5.3 Management of the solar panels circuits circulation (MCPS module)

The controller for the MCPS solar panels can manage up to 2 thermal solar panel circuits, each with relative circulation pump.
The circulation pump is activated on temperature request of the DHW tank, whenever the conditions described in previous paragraph 9.5.4. are satisfied.

As well as the request by the DHW tank, the solar panels circuits circulation pumps
will be activated for the following special cycles:

- periodic activation cycle for uniformity of temperatures
- solar panels circuits low temperature protection
- anti-stagnation emergency
- anti-grip cycle

The correct functioning of the circulation pumps is controlled via a digital input that can be configured as pump protection input (thermal switch) or delivery flow switch (consult the relative explanatory paragraph).

8.5.4 Control of the high and low temperature of the solar panel circuits (MCPS module)

Whenever the temperature of one of the solar panels circuits exceeds or drops below the minimum and maximum temperature values accepted for the system of the hysteresis value, then the ***c-pro 3** hecto* MCPS solar panels regulator will start special management cycles for these emergencies:

- High temperature protection: after a fixed delay of 60 seconds, the high temperature protection intervention will start an anti-stagnation emergency cycle (described in the following paragraph), in order to dispose of the overheated water and to take the temperature of the water back within the system safety conditions.
- Low temperature protection: after a fixed delay of 60 seconds, the intervention of the low temperature protection will cause the activation of the solar panels circuit circulation pump in order to ease heating of the water in the circuit. The pump will remain on until the minimum temperature conditions are recovered.

8.5.5 Management and setting the stagnation emergency for solar panels circuits (MCPS module)

Whenever the temperature of the water in one of the solar panels circuits exceeds the maximum temperature value accepted for the system of the hysteresis value, then the regulator for ***c-pro 3** hecto* MCPS solar panels will start a special stagnation emergency cycle.
The emergency condition must remain at least for a fixed time of 60 seconds and will be managed in the following way, according to the value set for the *Stagnation emergency* parameter:

- *ON/OFF:* the stagnation emergency will be managed via the activation of a solenoid vent valve, which will dispose of the hot water.
  The heat disposal relay will remain enabled until the temperature of the solar panels circuit has gone back below the maximum temperature value accepted of the hysteresis value (differential).
  As well as the heat disposal relay, the circulation pump of the corresponding solar panels circuit is activated at the same.
- *Cover1:* the stagnation emergency will be managed by the opening of a motorised cover (servomotor with spring return) which will cover the surface of the solar panels from solar exposure.
  The cover opening relay will remain enabled until the temperature of the solar panels circuit has gone back below the maximum temperature value accepted of the hysteresis value (differential).

As well as the cover opening relay, the circulation pump of the corresponding solar panels circuit is activated at the same.

- *Cover2:* the stagnation emergency will be managed by the opening/closing of a motorised cover (servomotor with separate opening and closing controls) which will cover the surface of the solar panels from solar exposure.
  The cover opening relay will remain enabled until the temperature of the solar panels circuit temperature has returned below the maximum temperature value accepted of the hysteresis value (differential). If this is not the case, the cover closing relay will remain active for all periods in which the cover must be closed.
  As well as management of the cover opening/closing relays, the circulation pump of the solar panels circuit is activated at the same.

N.B.
Setting the parameter at the *Cover2* value will not have any effect if the system has been configured to manage the second solar panels circuit or if the Aux1 auxiliary circuit is present.

8.6 Other regulations

8.6.1 Management and setting of the periodic anti-grip cycle (MCCT, MCPS modules)

The function has the purpose of preventing the blocking of the pumps and valves present in the ***c-pro 3*** *CLIMA sistema* during system standstill due to any deposits present in the system or due to the formation of crystalline aggregates (lime scale or other) on the mechanical seals of the pumps and valves.
The function automatically activates all pumps and valves in sequence once a week, which have been at a standstill for at least a week.
The day and time of weekly activation can be set by the user via the relevant Maintenance technician parameters.
The sequence scans the various utilities in the system every minute (pumps and valves): the cycle leads to the activation of the element considered for 30 seconds.

The enabling and setting of the periodic anti-grip cycle is set separately on the thermal power plant ***c-pro 3*** *mega* MCCT controller and on the ***c-pro 3*** *hecto* MCPS module for solar panels, respectively for the following utilities:

MCCT regulator anti-grip :	delivery 1 circulation pump	if enabled from parameter
	delivery 1 mixing valve	if enabled from parameter
	delivery 2 circulation pump	if enabled from parameter
	delivery 2 mixing valve	if enabled from parameter

MCPS regulator anti-grip :	DHW circuit circulation pump	always enabled
	AUX1 circuit circulation pump	always enabled
	solar panels 1 circuit circulation pump	always enabled
	solar panels 2 circuit circulation pump	always enabled

8.6.2 Management of the circulation pumps protection digital input (MCCT, MCPS modules)

Every circulation pump present in the ***c-pro 3*** *CLIMA sistema* has a protection digital input.
Every protection digital input linked to a circulation pump can be associated to one of the following functionalities, depending on the value selected via the relevant parameters.

- THERMAL SWITCH: every activation of the digital input will cause the immediate deactivation of the relative circulation pump.
  Once the digital input is deactivated, the circulation pump will start to work according to its own regulation (automatic rearm).
- FLOW: every activation of the digital input, after a delay time or from the activation of the pump (start) or from the activation of the input itself (normal conditions), will cause the deactivation of the relative circulation pump.
  Once the digital input is deactivated, the circulation pump will start to work according to its own regulation (automatic rearm) unless the maximum number of flow switch alarms is not reached for automatic rearm, however the deactivation of the alarm will be possible only with manual procedure (manual rearm).

The regulation parameters relative to the delivery 1 and 2 circulation pumps are present in the MCCT thermal power plant controller while the parameters relative to the circulation pumps of the auxiliary DHW circuit, solar panels 1 and 2 are present in the MCPS controller for solar panels.

8.6.3 Manual functioning mode (MCCT, MCZN, MCPS modules)

The ***c-pro 3*** *CLIMA sistema* allows to set manual functioning for the various uses.

In this state the devices are not governed by the automatic functions, but are however sensitive to any alarms.

The manual activation of the devices replaces the regulation for the determined device, therefore from now on gives origin to all automatic controllers for the activation of the system.

For example, if the zone valve is controlled manually, it will be interpreted by the system as thermostatic activation causing the activation of the relative delivery circulation pump, the mixing valve and the boiler/chiller etc.

The manual functioning of the devices is useful for the execution of functional tests on system start-up or in case or probe breakage or other.

c-pro 3 *CLIMA sistema*
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