

Air-air and water-air units

CONTROL BROCHURE

NA 11.24 E 09 - 2019

Electronic control

AVANT / AVANT+

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ORIGINAL TEXT: SPANISH VERSION

1. GENERAL DESCRIPTION

Electronic module by microprocessor designed for controlling and supervising Air-Air and Water-Air units with 1 or 2 cooling circuits and 1 to 4 control stages. Two versions available:

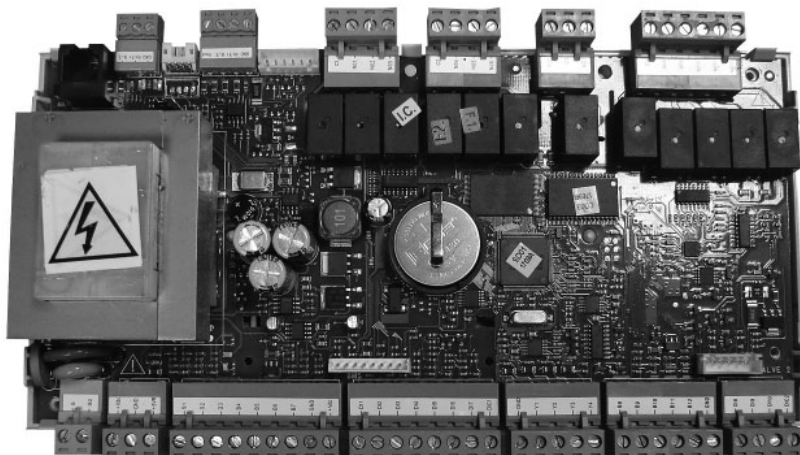
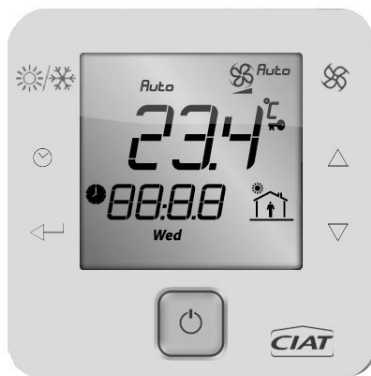
- AVANT version: 1 cooling circuit with 1 or 2 compressors.
- AVANT+ version: 2 cooling circuits with 2 or 4 compressors.

Main functions:

- Control in COOLING, HEATING, AUTOMATIC, FAN and DEHUMIDIFICATION modes and modification of the setpoint.
- Permanent control of the operating parameters.
- Timing of the compressors
- Defrosting management (air-air heat pumps).
- Condensation and evaporation pressure control.
- Control of the supply temperature.
- Compensation of the setpoint based on the outdoor temperature.
- Anti-fire safety.
- Timer and weekly programming.
- Failure diagnosis and main alarm.

Optional functions:

- Humidity control.
- Thermal free-cooling with return (or ambient) air and outdoor temperature probes.
- Enthalpic free-cooling with return air and outdoor air relative humidity probes (*only with the AVANT+ version*).
- Control of the minimum opening of the outdoor air damper.
- On/off or proportional control of the auxiliary electrical heaters.
- On/off or proportional control of a hot water auxiliary coil.
- Control of electronic fans.
- Detection of clogged filters.
- Condensate pump alarm management.
- Connection to a centralised technical management system (BMS) with the Carel or Modbus communication protocol via an RS485 serial communication card on each of the devices and a USB converter for connection to a PC. It is also possible to use Lonworks, Bacnet, Konnex and Ethernet communication protocols with their respective serial cards.



2. SET-UP

2.1. microPC control board

Main CPU board installed in the unit's electric panel, which allows data to be input, treated by the microcontroller and the operation of the unit to be managed completely.

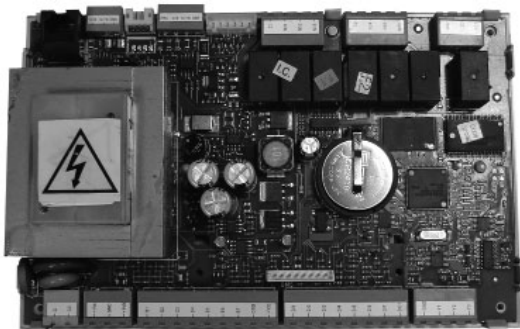
The program and the parameters are stored in non-volatile memory, there by ensuring their storage even in the case of a power failure (without needing an auxiliary coil). The program can be loaded through the PC or from a program key.

This board has the following main characteristics:

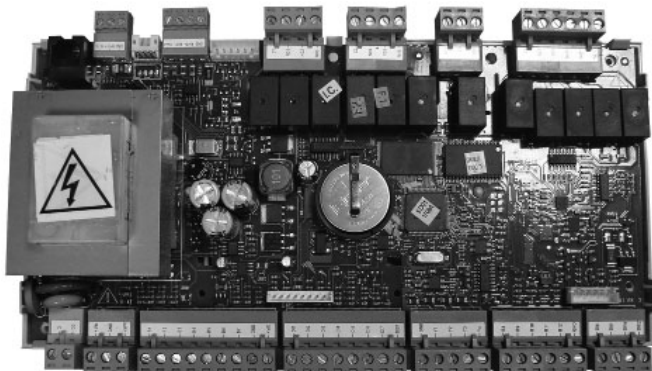
- Removable connectors.
- Built-in clock.
- Power supply voltage 230 Vac.
- Connection to a TCO user terminal.
- Connection to a pGD1 maintenance terminal.
- RS485 serial supervisory through an optional card.
- Plastic base for installation on a DIN rack.

There are two versions:

- AVANT (SMALL board): 10 DIN modules (175 mm x 113 mm).
- AVANT+ (MEDIUM board): 13 DIN modules (228 mm x 113 mm).



AVANT version



AVANT+ version

2.2. TCO user terminal

The TCO user terminal allows:

- Regulation of the setpoint.
- The selection of the operating mode.
- The display of controlled variables and probe values.
- On-screen display of alarms.

This terminal has an ambient temperature probe by standard (optionally may be replaced by a return air probe connected in the control board).

Available in two configurations:



Surface terminal

Dimensions:
Length: 142 mm *
Width: 86 mm *
Depth: 23 mm
* Interchangeable



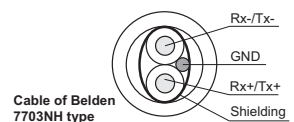
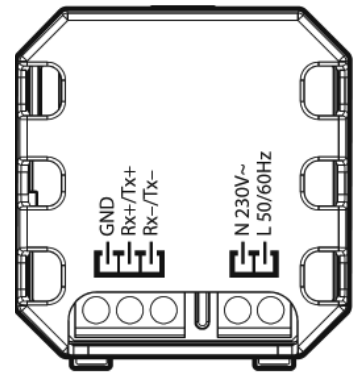
Terminal to fit

Dimensions:
Length: 86 mm
Width: 86 mm
Depth: 51 mm

Terminal connection:

The terminal can be installed at a maximum distance of 100 metres from the microPC control board. The connection requires the following:

- Power supply (the same as the control board) at 230Vac 50/60Hz (L and N): 2 wires (section 0.5 at 1.5 mm²).
- Communication with the board (RX+/TX+ & RX-/TX-): shielded cable type AWG20 or AWG22 with 1 braided pair + drainwire + shielding (e.g., model BELDEN 7703NH).



2.3. pGD1 maintenance terminal

The pGD1 terminal for maintaining the unit enables:

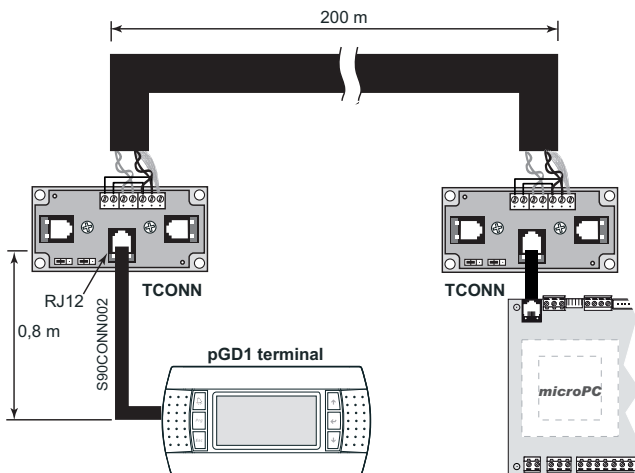
- The initial programming of the unit.
- Regulation of the setpoints.
- The selection of the operating mode.
- The display of controlled variables and probe values.
- On-screen display of alarms.
- The modification of operating parameters.



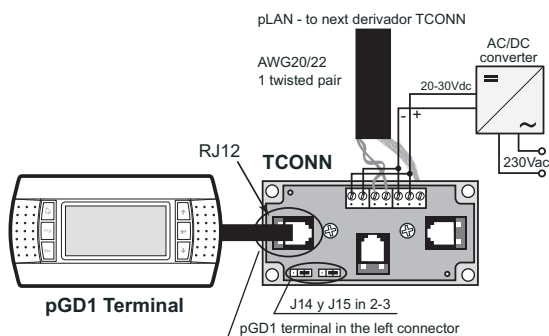
Terminal connection:

The terminal can be installed at a maximum distance of 500 metres from the microPC control board.

- Up to 50 metres, it can be connected directly with telephone wire.
- From 50 to 200 metres, it is necessary to use the TCONN bypass cards and AWG 20/22 shielded cable with 2 twisted pairs.



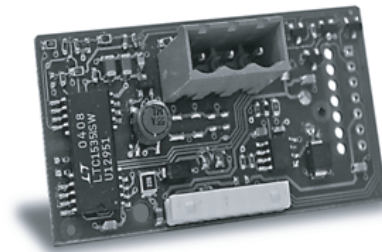
- From 200 to 500 metres, it is necessary to use the TCONN bypass cards, AWG 20/22 shielded cable with 1 twisted pair and external 20...30Vdc (150 mA) power supply.



2.4. RS485 serial card (optional)

The RS485 serial card enables connecting the microPC board to an RS485 network.

This ensures connection to a remote support and remote and/or local supervisory service.



2.5. Temperature, pressure and humidity probes

The standard probes included in the control are:

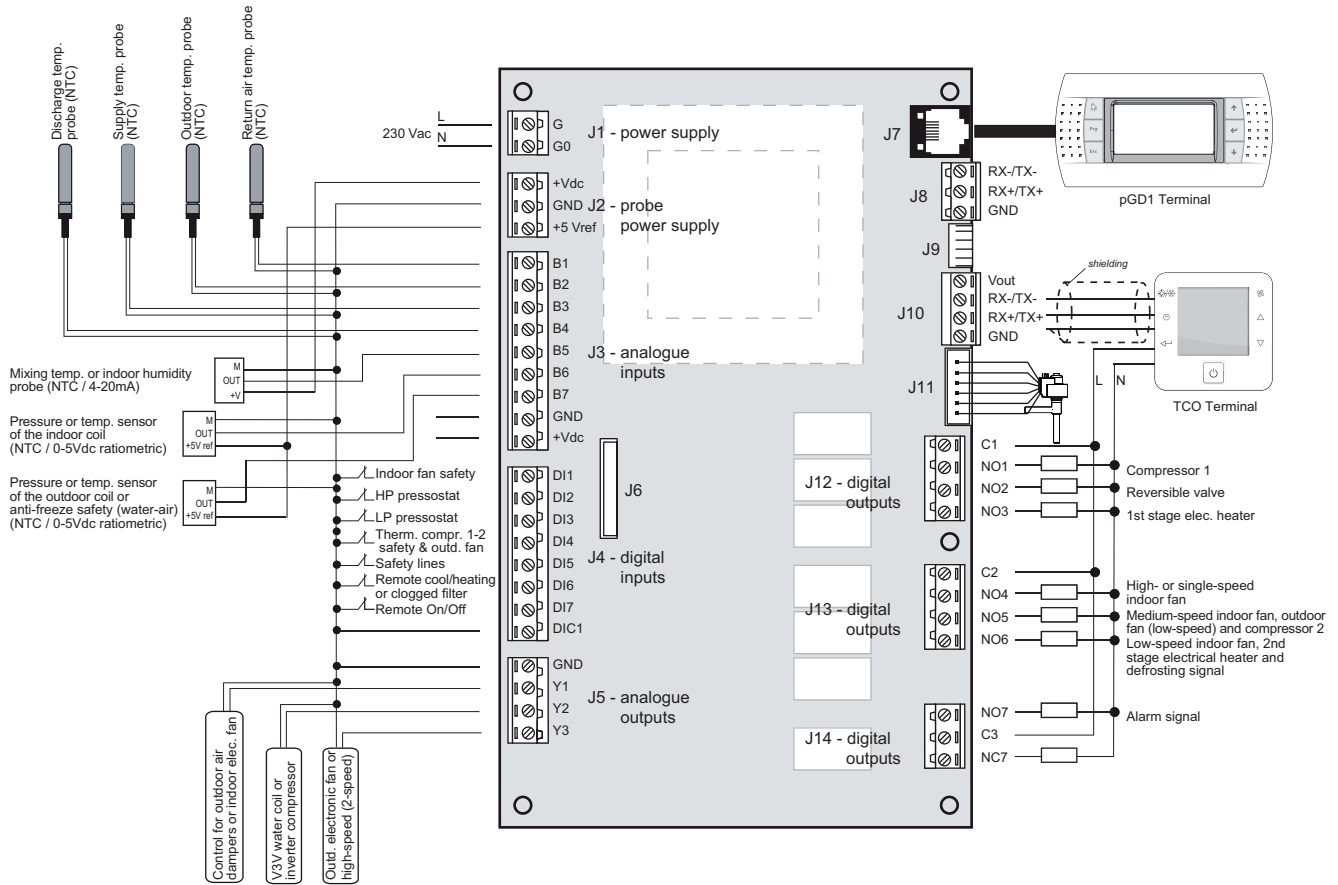
- Ambient temperature probe (included in the TCO user thermostat).
- Pressure transducers in outdoor coils 1 and 2 (defrosting, condensation control in COOLING and evaporation control in HEATING). For water-air units, these are required as a safety device for anti-freezing. Note: It is possible to include temperature probes instead of transducers.
- Temperature probe for the discharge from the compressors (in units with compressors without klixon discharge).
- Supply air temperature probe: required for all the thermal and enthalpic free-cooling options and to control the supply temperature.
- Outdoor air temperature probe: standard in air-air units and optional in water-air units. It's required in order to defrost and compensate the setpoint depending on the outdoor temperature and for the thermal and enthalpic free-cooling options.

Optional probes:

- Temperature of the return air: probe connected in the board instead of the ambient temperature probe in the TCO user terminal. If the unit only has the pGD1 maintenance terminal this probe, or an ambient probe connected to the board, is obligatory. This probe is necessary for the anti-fire safety.
- Relative humidity of the return necessary for controlling dehumidification by humidity and/or for the enthalpic free-cooling option.
- Relative humidity of the outdoor air necessary for the enthalpic free-cooling option (*only in the AVANT+ version*).
- Mixing temperature: necessary for the thermal and enthalpic free-cooling options.
- Pressure / temperature in the indoor coils: necessary for the refrigerant shortage safety device, evaporation control in COOLING mode and condensation control in HEATING mode.

3. MAIN microPC BOARD

3.1. AVANT version (1 circuit and 1 or 2 compressors)



Analogue inputs (B1 to B7)

- B1: Return temperature probe (optional)
- B2: Outdoor temperature probe (in water-air only units with free-cooling)
- B3: Supply air probe
- B4: Temperature probe for compressor(s) discharge
- B5: Temperature probe of mixed air or return air humidity probe
- B6: Temperature / pressure probe for the indoor coil
- B7: Pressure / temperature outdoor coil (air-air) or anti-freeze safety (water-air)

Digital inputs (DI1 to DI7)

- DI1: Indoor fan safety device
- DI2: High pressure pressostat
- DI3: Low pressure pressostat
- DI4: Thermal safety device for compressors 1-2 and outdoor fan
- DI5: Safety device for electrical heaters, anti-freeze of the hot water auxiliary coil, condensate pump, defrosting signal or flow switch (in air-water units)
- DI6: Remote COOLING/HEATING or clogged filter
- DI7: Remote OFF/ON

Note: Simultaneous opening DI3 and DI4, klaxon compressor discharge safety device (in units with klaxon).

Analogues outputs (Y1 to Y3)

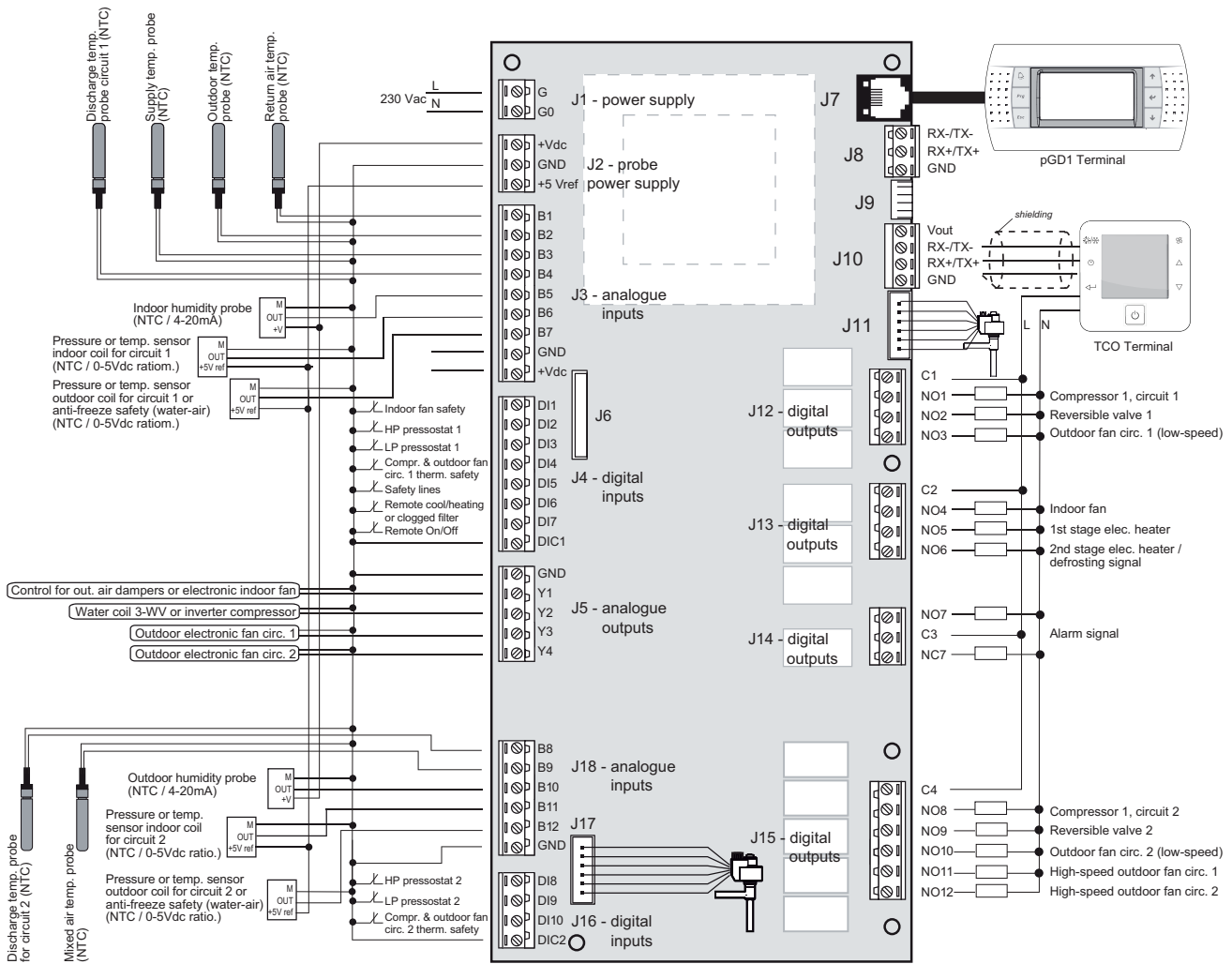
- Y1: Control of the free-cooling dampers or electronic indoor fan
- Y2: 3-way valve control for the hot water auxiliary coil (or a proportional electrical heater stage)
- Y3: Electronic outdoor fan or high-speed (in 2-speed outdoor fan) or 3-way valve (in water-air units)

Digital outputs (NO1 to NO7)

- NO1: Compressor 1
- NO2: Reversible valve 1
- NO3: 1st electrical heater stage (or on/off hot water coil)
- NO4: High-speed (V3) or single-speed indoor fan
- NO5: Medium-speed indoor fan (V2). Compressor 2. Low-speed (in 2-speed outdoor fan).
- NO6: Low-speed indoor fan (V1). 2nd stage electrical heater Defrosting signal
- NO7-NC7: Alarm signal

Note: In units with 1 circuit with version AVANT+, the description and position of inputs and outputs coincides with that described here for the AVANT version except for the mixing temperature probe with enthalpic free-cooling that will be connected in B9.

3.2. AVANT+ version (2 circuits and 2 compressors)



Analogue inputs (B1 to B12)

- B1: Return temperature probe (optional)
- B2: Outdoor temperature probe (in water-air only units with free-cooling)
- B3: Supply air probe
- B4: Temperature probe for compressor(s) discharge for circuit 1
- B5: Return humidity probe
- B6: Temperature/pressure probe for the indoor coil for circuit 1
- B7: Pressure / temperature probe for outdoor coil circuit 1 (air-air) or anti-freeze safety (water-air)
- B8: Temperature probe for compressor(s) discharge for circuit 2
- B9: Mixing air temperature probe
- B10: Outdoor humidity probe
- B11: Temperature/pressure probe for the indoor coil for circuit 2
- B12: Pressure / temperature probe for outdoor coil circuit 2 (air-air) or anti-freeze safety (water-air)

Digital inputs (D11 to D110)

- D11: Indoor fan safety device
- D12: High pressure pressostat for circuit 1
- D13: Low pressure pressostat for circuit 1
- D14: Thermal safety device(s) for compressor(s) and outdoor fan for circuit 1
- D15: Safety device for electrical heaters, anti-freeze of the hot water auxiliary coil, condensate pump, defrosting signal or flow switch (in air-water units).
- D16: Remote COOLING/HEATING or clogged filter
- D17: Remote OFF/ON
- D18: High pressure pressostat for circuit 2

D19: Low pressure pressostat for circuit 2

D110: Thermal safety device(s) for compressor(s) and outdoor fan for circuit 2

Note: Simultaneous opening D13 - D14 or D19 - D110, klixon compressor discharge safety device for circuit 1 or circuit 2 (in units with klixon).

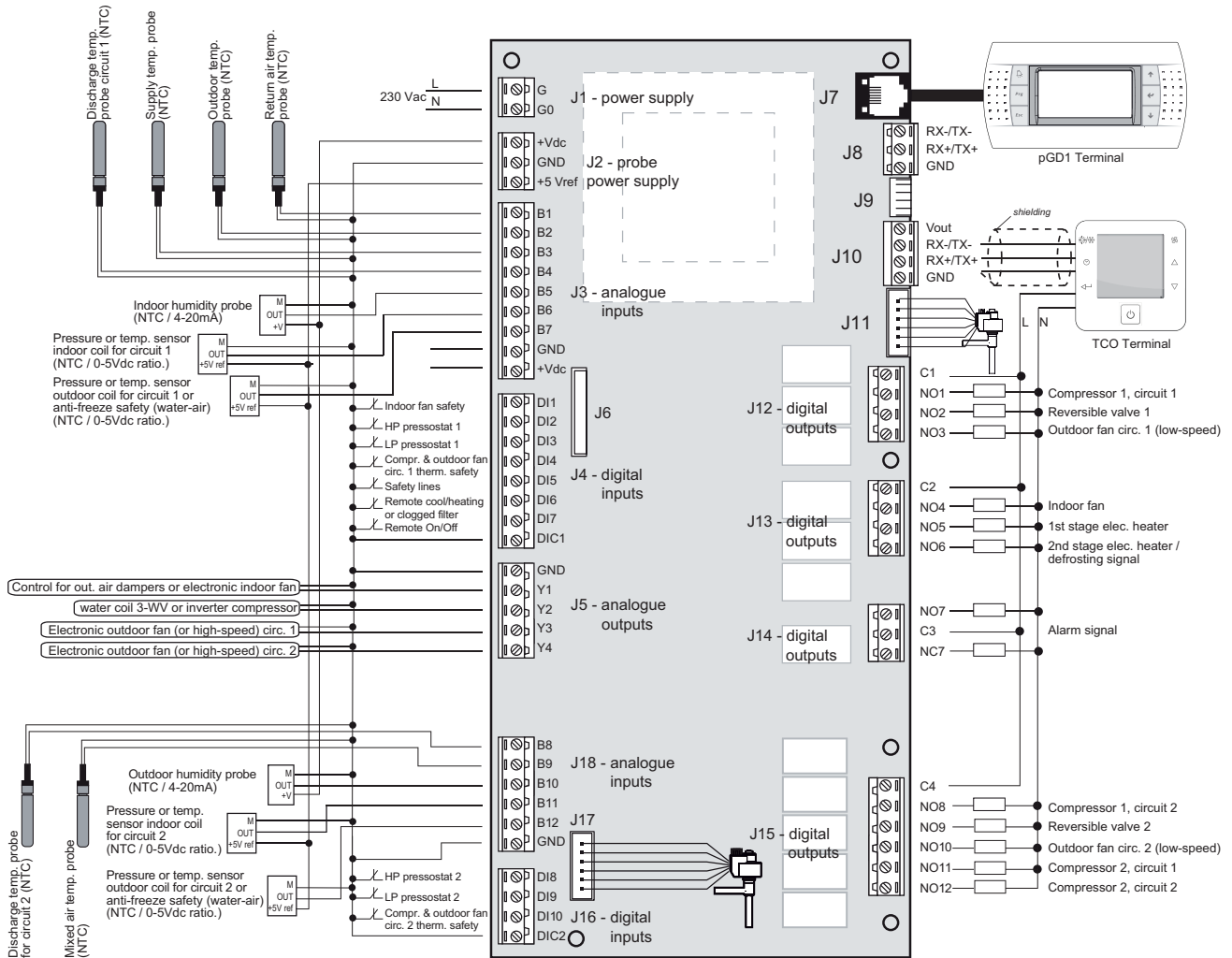
Analogue outputs (Y1 to Y4)

- Y1: Control of the free-cooling dampers or electronic indoor fan
- Y2: 3-way valve control for the hot water auxiliary coil (or a proportional electrical heater stage)
- Y3: Electronic outdoor fan circuit 1 (air-air) or 3-way valve circuit 1 (water-air)
- Y4: Electronic outdoor fan circuit 2 (air-air) or 3-way valve circuit 2 (water-air)

Digital outputs (NO1 to NO12)

- NO1: Compressor 1, circuit 1
- NO2: Reversible valve for circuit 1
- NO3: Outdoor fan circuit 1 (at low speed in 2-speed fan)
- NO4: Indoor fan
- NO5: 1st electrical heater stage (or on/off hot water coil)
- NO6: 2nd stage electrical heater. Defrosting signal
- NO7-NC7: Alarm signal
- NO8: Compressor 1, circuit 2
- NO9: Reversible valve for circuit 2
- NO10: Outdoor fan circuit 2 (at low speed in 2-speed fan)
- NO11: High speed outdoor fan circuit 1 (in 2-speed fan)
- NO12: High speed outdoor fan circuit 2 (in 2-speed fan)

3.3. AVANT+ version (2 circuits and 4 compressors)



Analogue inputs (B1 to B12)

- B1: Return temperature probe (optional)
- B2: Outdoor temperature probe (in water-air only units with free-cooling)
- B3: Supply air probe
- B4: Temperature probe for compressor(s) discharge for circuit 1
- B5: Return humidity probe
- B6: Temperature/pressure probe for the indoor coil for circuit 1
- B7: Pressure / temperature probe for outdoor coil circuit 1 (air-air) or anti-freeze safety (water-air)
- B8: Temperature probe for compressor(s) discharge for circuit 2
- B9: Mixing air temperature probe
- B10: Outdoor humidity probe
- B11: Temperature/pressure probe for the indoor coil for circuit 2
- B12: Pressure / temperature probe for outdoor coil circuit 2 (air-air) or anti-freeze safety (water-air)

Digital inputs (DI1 to DI10)

- DI1: Indoor fan safety device
- DI2: High pressure pressostat for circuit 1
- DI3: Low pressure pressostat for circuit 1
- DI4: Thermal safety device(s) for compressor(s) and outdoor fan for circuit 1
- DI5: Safety device for electrical heaters, anti-freeze of the hot water auxiliary coil, condensate pump, defrosting signal or flow switch (in air-water units)
- DI6: Remote COOLING/HEATING or clogged filter
- DI7: Remote OFF/ON
- DI8: High pressure pressostat for circuit 2

DI9: Low pressure pressostat for circuit 2

DI10: Thermal safety device(s) for compressor(s) and outdoor fan for circ. 2
 Note: Simultaneous opening DI3 - DI4 or DI9 - DI10, klixon compressor discharge safety device for circuit 1 or circuit 2 (in units with klixon).

Analogue outputs (Y1 to Y4)

- Y1: Control of the free-cooling dampers or electronic indoor fan
- Y2: 3-way valve control for the hot water auxiliary coil (or a proportional electrical heater stage)
- Y3: Electronic outdoor fan circuit 1 or high speed (in 2-speed outdoor fan) (air-air) or 3-way valve circuit 1 (water-air)
- Y4: Electronic outdoor fan circuit 2 or high speed (in 2-speed outdoor fan) (air-air) or 3-way valve circuit 2 (water-air)

Digital outputs (NO1 to NO12)

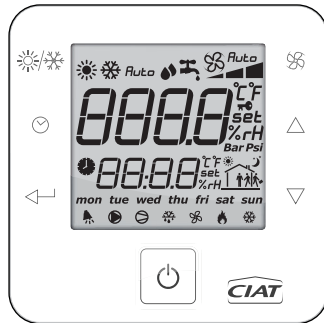
- NO1: Compressor 1, circuit 1
- NO2: Reversible valve for circuit 1
- NO3: Outdoor fan circuit 1 (at low speed in 2-speed fan)
- NO4: Indoor fan
- NO5: 1st electrical heater stage (or on/off hot water coil)
- NO6: 2nd stage electrical heater Defrosting signal
- NO7-NC7: Alarm signal
- NO8: Compressor 1, circuit 2
- NO9: Reversible valve for circuit 2
- NO10: Outdoor fan circuit 2 (at low speed in 2-speed fan)
- NO11: Compressor 2, circuit 1
- NO12: Compressor 2, circuit 2

4. TCO USER TERMINAL

4.1. Description

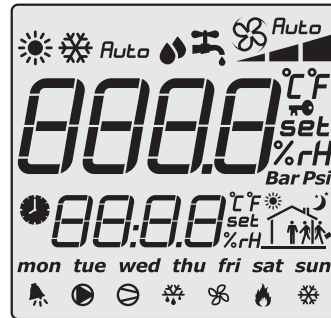
With this terminal, the user can select the operating mode, the scheduled programming and the temperature or humidity setpoint.

The installer can also modify some operation parameters and view the values measured by the probes.



4.3. Display

The terminal has an LCD display, backlit in blue, to show the information of the unit and to interact with the user.




4.2. Keys and combinations (quick guide)

Key		Function
	Mode of operation	Allows the operating mode to be selected: HEATING, COOLING, AUTO, DEHUMIDIFICATION, FAN
	Fan	Short press: allows the speed of the indoor fan to be selected (<i>only in the AVANT version</i>). Long press (3 secs): allows AUTO or CONTINUOUS operation of the indoor fan to be selected.
	Programme schedule	Short press: allows the programme schedule to activate. Long press (3 secs): allows the time and the programme schedule to be modified.
	Up/Down	These keys allow the user to go forward and backward to consult the information found on the display. They can also modify values.
	Enter	This enables confirming the modified values. It also allows the set of values to be seen on the display (temperature, temperature setpoint, humidity, humidity setpoint, outdoor temperature, pressure circuit 1, pressure circuit 2 and supply air temperature).
	Off/on	Allows the unit to be turned OFF/ON.
	Fan + Off/on	Long press (3 seconds), to access the PARAMETERS display, for configuring and maintaining the unit. These are only accessed with different passwords.
	Mode + Clock	When the alarm icon is pressed on the display, access is given to the ALARM code display by pressing these keys for a long time (3 seconds).
	Mode + Fan	A 3-second press causes all terminal key presses to be blocked. To unblock, these keys must be pressed again for 3 sec.

Symbol	Meaning
	Selection of HEATING mode (winter)
	Selection of COOLING mode (summer)
Auto	Selection of AUTOMATIC mode
	Selection of DEHUMIDIFICATION mode
	Selection of FAN mode - Indoor fan speed -> 3-speed (according to model) - Operation of the fan: AUTO or CONTINUOUS
	Main indicator of: - Temperature (°C or °F) - Activated block key (key) - Setpoint (set) - Relative humidity (%RH) - Pressure (bar)
	Secondary indicator of: - Temperature (°C or °F) - Setpoint (set) - Hour and minute - Relative humidity (%RH)
	Alarm indicator
	Compressor in operation
	Defrosting indicator
	Indoor fan on
	Active support in heating
	Operation in cooling mode (in AUTO mode it makes known whether the unit is operating in COOLING or HEATING)
	Selection of the type of scheduled programming: 6 possible phases.
	Activation indicator of the timer programming
mon tue wed thu fri sat sun	Indicators of the days of the week (Monday to Sunday)

4.4. Main functions

Stopping/starting the unit

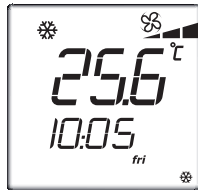
By pressing the  button, the unit is turned off/on. When the unit is off, the display will only show the date, time and the OFF symbol.





Note: If the unit is stopped from the terminal, it cannot be started using any of the other operations (see Chapter 6).

Modification of the setpoint

When the unit is on, the current ambient or return air temperature (whichever has been selected) is shown on the main display.




To modify the setpoint, i.e., the desired temperature for comfort, it is necessary to press only the  or  keys.



At that time, the display will light up and the current setpoint value will appear next to the text **set**.


Selection of the operating mode

By pressing the  key, the operating mode of the unit can be selected.

With each press, the icon corresponding to the operating mode selected will be lit up, except in FAN mode, where no icon will appear.

The available modes are: HEATING  - COOLING  - AUTO  - DEHUMIDIFICATION  and FAN (without icon).

Selection of the indoor fan speed


By pressing the  key for a short while, the speed of the indoor fan can be selected (for 3-speed fans).


The icon of the selected speed will be illuminated on this display:




Selection of the fan mode

If the unit has an ambient air probe in the TCO terminal, the AUTOMATIC mode of operation can be selected from the indoor fan (see Section 9.3).

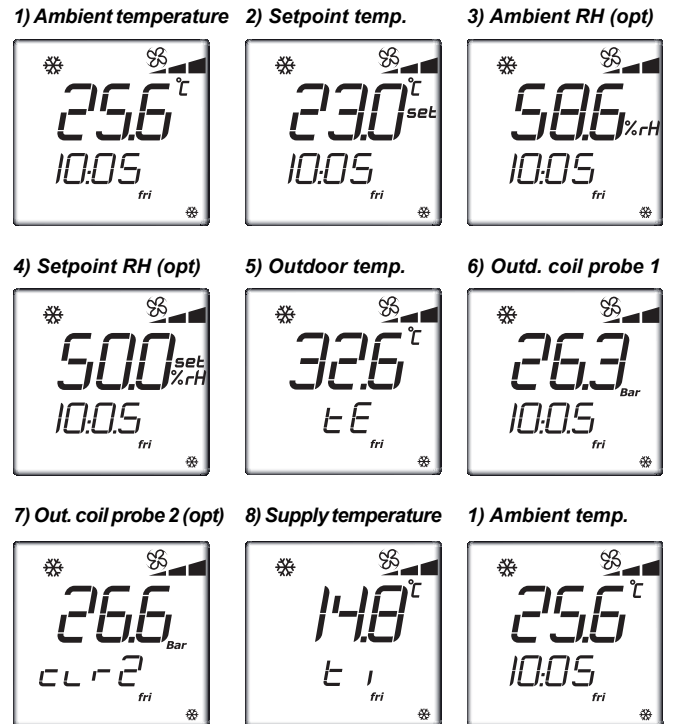
To activate it, it is necessary to press the  key for a long time.

The Auto symbol will light up on the display: 



View of the values measured by the probes


In addition to view in the ambient (or return) air temperature on the main display, it is possible to view other values through the set that is activated by pressing the  key.

The following values will be shown with each press:






Terminal block

The TCO terminal block is done by simultaneously pressing the  and  keys for a few seconds.

At that moment, the symbol  will light up on the main display to indicate that the terminal has been blocked.


The terminal is blocked by pressing these keys again.

Indication of the type of alarm with codes

If there are active alarms, the icon  appears on the TCO terminal display. By simultaneously pressing the  and  keys for a few seconds, these alarms can be seen and reset (see Chapter 15).



Timer programming




By pressing the  for a short time, the schedule programming can be activated or deactivated. For a detailed description of how this programming is established, consult Chapter 16.

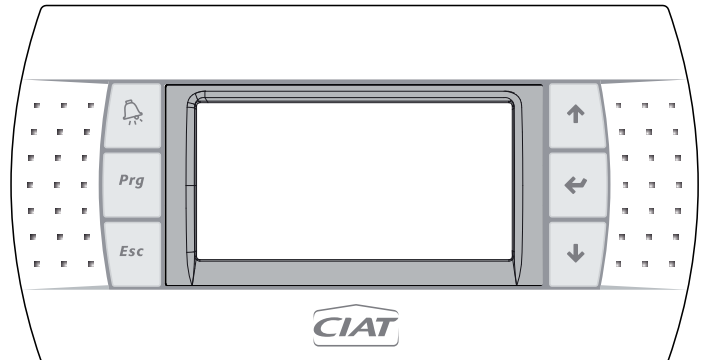
5. PGD1 MAINTENANCE TERMINAL

5.1. Configuration










This terminal has an LCD display, and via texts, the installer can view the operating state, the unit configuration and the alarms produced. The control parameters can also be modified.

To ensure communication between the pGD1 terminal and the board, the terminal must be configured with address 16. In the event of a terminal supplied separately, this is not sent addressed and the following procedure must be carried out:

Simultaneously press the  +  +  keys. On the display accessed, set address 16 in "Display address setting".



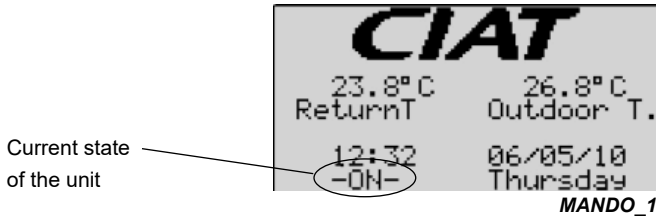
5.2. Keys and combinations (quick guide)

Key		Function
	Alarm	There is/are active alarm(s) if the key is illuminated red. By pressing the key once, the description of the first alarm will be shown. By using the up/down keys, the other alarms stored in the memory can be consulted. By pressing this key for a second time, they will be reset. If no alarm is active, the message "No alarm active" appears.
	Programming	This allows the main menu display to be accessed to view the setpoints, inputs/outputs and timer programming (no password required).
	Escape	To exit any display, pressing this key returns the user to the start display of the previous menu.
	Up/down	These keys enable consulting the information displayed on-display by going forward or back. They can also modify values. By pressing both keys simultaneously, direct access is gained to the group of input/output displays.
	Enter	This enables confirming the modified values. By pressing the key once, the cursor is placed on the first display parameter. Pressing the key again confirms the adjusted parameter value and it then proceeds to the next parameter.
	Prog + Escape	From the main display of the main menu, by pressing both keys, access is given to the technical menu displays for configuring and maintaining the unit to which access is given only through different passwords.
	Alarm + Prog	The display contrast (LCD with a resolution of 133 x 64 pixels) can be set by pressing these keys at the same time + the up or down key.
	Alarm + Enter	By pressing both keys for approximately 3 seconds, access is gained to the system information display (BOOT and BIOS).
	Alarm + Escape	From the main display of the main menu, by pressing both keys simultaneously, access is given to the DEBUG displays, displays used the software programmer, to which access is given only through different passwords.

5.3. Main functions

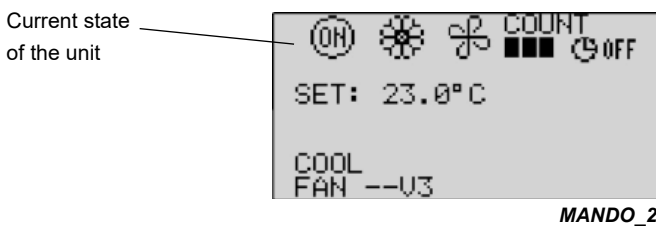
Stopping/starting the unit

When the pGD1 terminal is connected, access is given to a general information display for the unit, which indicates the return air temperature (or humidity), outdoor air temperature (or humidity), date, day, time, and current operating state:



Next, pressing the key gives access to another information display for the unit state (MANDO_2), on which it may be turned on or off.

By pressing the key, the cursor is placed intermittently over each of the icons. The value can be modified with the keys. The change is confirmed by pressing the key again.

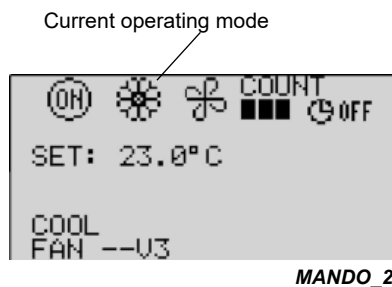


Selection of the operating mode

With the cursor placed over the icon for the current operating mode (cooling mode in the example), the value can be changed with the keys. The change is confirmed by pressing the key again.

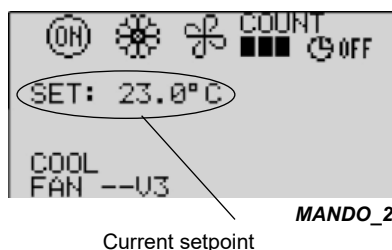
Available modes:

- HEATING
- COOLING
- AUTO AUTO
- DEHUMIDIFICATION
- FAN



Modification of the setpoint

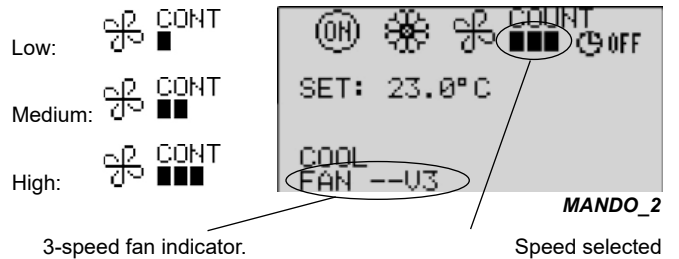
With the cursor placed next to the SET symbol, the setpoint value can be changed with the keys (Desired comfort temperature).



Selection of the indoor fan speed

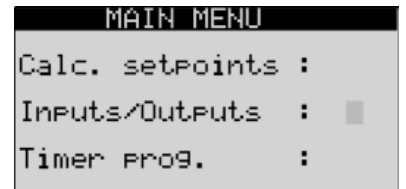
With the cursor placed under the symbol CONT, the speed of the indoor fan can be selected (for 3-speed fans).

The icon of the selected speed will be illuminated on this display:

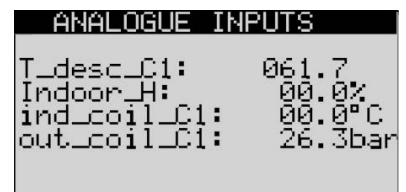
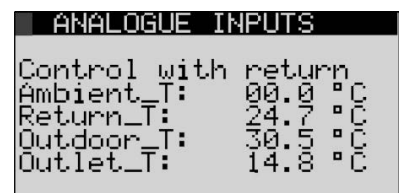


View of the values measured by the probes

By pressing the key from any display, the Main Menu is accessed for viewing the setpoints, inputs/outputs and scheduled programming (no password required).



Pressing the key with the cursor placed over "INPUTS/OUTPUTS" gives access to the displays for viewing the state of both analogue and digital inputs and outputs. The reading from the analogue inputs corresponds to the values measured by the unit probes.



Note: the "INPUTS/OUTPUTS" menu can be accessed from any display by simultaneously pressing the keys.

View of the alarms

If there are active alarms, the key from the pGD1 terminal will be lit red. Pressing this key gives access to the group of alarm displays, on which all of the active alarms may be seen, as well as allowing them to be reset (see Chapter 14).

Timer programming

Pressing the key gives access to the main menu of displays for viewing the timer programming. For a detailed description of how this programming is established, consult Chapter 15.


6. STOPPING/STARTING THE UNIT

There are different procedures for stopping/starting:

- **By terminal:**

This operation is always valid. If the unit is stopped from the terminal, it cannot be started using any of the other operations.

Stopping/starting can be done:

- on the TCO terminal by pressing the key 
- on the pGD1 terminal from the *MANDO_2* display for information on the unit state (see the previous chapter).

If the unit is stopped, all the functions and the different variables are disabled.

- **Remote off/on:**

This operation should be enabled under password protection on the display of the corresponding user. The "on" option should be selected on the terminal.

In the digital input ID7 of connector J4:

- closed contact: unit started (ON)
- open contact: unit stopped (OFF)

Note: To activate the remote off/on the bridge made in this input must be eliminated (see wiring diagram).

- **By schedule stage:**

With timer programming, the unit can be stopped outside of the schedule. The "on" option should be selected on the terminal.


Note: If both the remote On/Off and schedule stage procedures are active at the same time, the unit will only start if both coincide.

7. SWITCHING OF THE OPERATING MODE

There are two options for selecting the type of switching:

- **By terminal:**

The selection of the operating mode can be done:

- on the TCO terminal by pressing the key 
- on the pGD1 terminal from the *MANDO_2* display for information on the unit state (see the previous chapter).

The available modes are: HEATING, COOLING, AUTO, DEHUMIDIFICATION, FAN

- **Remote mode:**

The selection of the operating mode is performed via a switch connected to digital input DI6 of connector J4:

- open contact: HEATING MODE
- closed contact: COOLING MODE

In this case, only the COOLING and HEATING modes are available.

8. TEMPERATURE CONTROL

Control of the ambient temperature is carried out by starting up the unit, compressor(s) and/or the available components (electrical heater, water coil, etc.). The programme has a single setpoint available (desired temperature value) that is used both for functioning in COOLING mode (summer) and for functioning in HEATING mode (winter).

Two types of control can be selected:

- Proportional control (P): the control will try to take the system as close as possible to the setpoint by acting directly proportionally to the difference with regard to it.
- Proportional control - Integral (P+I): in addition to proportional control a time constant is introduced which characterises the response speed (little time implies high speed). This type of control is very useful for offsetting typical oscillations in the proportional control.

9. OPERATING MODES

9.1. Operation in FAN mode

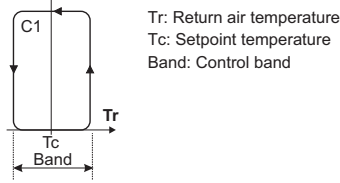
The terminal will order the unit to work in FAN mode. In this mode of operation, the indoor fan will continuously operate independently from the return or ambient air temperature.

9.2. COOLING operating mode

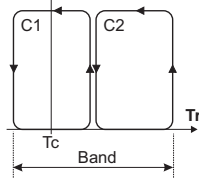
The thermostat will command the unit to work in COOLING mode (summer) to maintain the desired comfort level. In order to do so, the control will compare the temperature reading of the ambient (or return) air probe with the value set for the setpoint and with the value of the control band.

COOLING mode (summer)

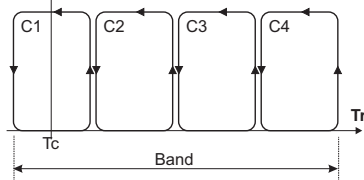
- 1 compressor



- 2 compressors



- 4 compressors



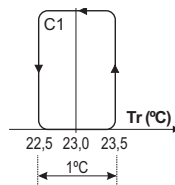
Illustrative example:

Setpoint = 23.0°C

- Units 1 compressor:

Differential band = 1.0°C (by default)

When the temperature is below 22.5°C, the compressor stops. If the temperature starts to rise and exceeds 23.5°C, the compressor starts and will function until the temperature drops below 22.5°C.



- Units 2 compressors:

Differential band = 2.0°C (by default)

When the temperature is below 22.5°C, the compressors stop. If the temperature starts to rise and exceeds 23.5°C, compressor 1 starts. If it continues to rise and exceeds 24.5°C, compressor C2 is also activated. If the temperature drops below 24.5°C, compressor C2 stops. If it continues to drop until reaching a value below 22.0°C, compressor C1 will stop.

- Units 4 compressors:

Differential band = 4.0°C (by default)

The control band is divided between 4 compressors, activating respectively at C1: 23.5°C, C2: 24.5°C C3: 25.5°C and C4: 26.5°C.

Warning: The order for stopping and starting the compressors will depend on whether or not rotation is activated.

9.3. HEATING operating mode

The thermostat will command the unit to work in HEATING (winter) mode to maintain the desired comfort level. In order to do so, the control will compare the temperature reading of the ambient (or return) air probe with the value set for the setpoint.

The units may optionally have one- or two-stage electrical heaters (H) and/or a hot water auxiliary coil (V3V).

For control of the hot water coil, the control has a proportional Y2 output (0/10V) which controls the three-way valve. To handle electrical heaters, the control has two on/off outputs NO3-NO6 (version AVANT) or NO5-NO6 (version AVANT+).

The previous configuration is typical for the options however the control can also administer a proportional electrical heater stage in the output Y2 and an on/off water coil in output NO3 (version AVANT) or NO5 (version AVANT+).

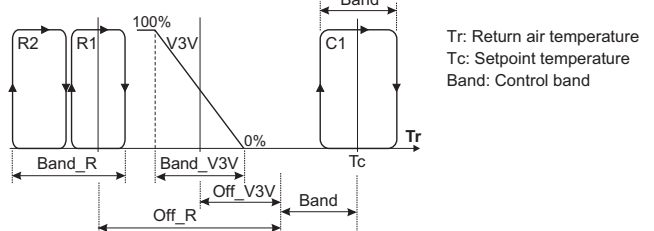
For the input of the compressor phases, the control will use the control band value, whilst for the input of heaters and of the hot water coil, it will take the respective differentials into account.

In the case of electrical heaters, this is defined by parameter that if the outdoor temperature is higher than 20°C, they cannot be activated (in units with outdoor temperature probe).

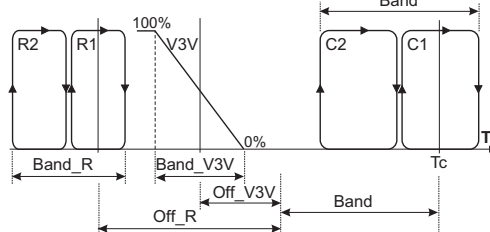
The input command of the various phases is the one featured on the following chart:

HEATING mode (winter)

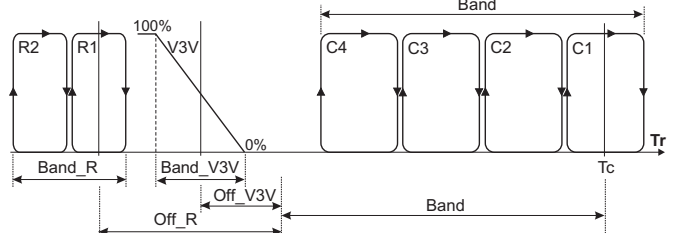
- 1 compressor



- 2 compressors



- 4 compressors



The input command for the previous chart can be modified using parameters in order to:

- give priority to the hot water coil.
- activate the electrical heater stage without activating the compressor(s) for cases of compressor breakdown or blocking due to a low outdoor temperature.

By using parameters, it is also possible to disconnect compressor or electrical heater stages. This is useful for reducing electric consumption in time bands when the electric price rate is high.

Illustrative example:

Setpoint = 23.0°C

Enable 3-way valve = yes

Offset for 3-way valve = 0°C

Control band for 3-way valve = 1.0°C

Number of heaters: 2

Elec. Heater offset = 1.0°C

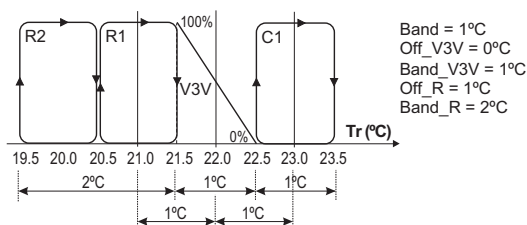
Control band for heaters = 2.0°C

• *Units 1 compressor:*

Differential band = 1.0°C (by default)

When the return or ambient air temperature is above 23.5°C, the compressor and heating elements are stopped. If the temperature goes below 22.5°C, compressor (C1) starts. If it continues to go down, the proportional output of the 3-way valve (V3V) is activated so that at 22.5°C, the opening is 0%, and at 21.5°C, the opening is 100%. If the temperature continues to go down and falls below 20.5°C, the first-stage electrical heater (R1) is connected, and if below 19.5°C, the second-stage electrical heater (R2) is connected.

When the return or ambient temperature rises, the various elements will be disconnected in the following order: the 2nd-stage electrical heater, at 20.5°C; the 1st-stage electrical heater, at 21.5°C; the analogue output of the 3-way valve will be put at 0% at 22.5°C and the compressor C1 will be stopped at 23.5°C.



• *Units 2 compressors:*

Differential band = 2.0°C (by default)

When the return or ambient air temperature is above 23.5°C, the compressor and heating elements stop. If the temperature drops below 22.5°C, the compressor C1 is started. If it continues to go down below 21.5°C, the compressor C2 starts.

If it continues to go down, the proportional output of the 3-way valve (V3V) is activated so that at 21.5°C, the opening is 0 %, and at 20.5°C, the opening is 100%. If the temperature continues to go down and falls below 19.5°C, the first-stage electrical heater (R1) is connected, and if below 18.5°C, the second-stage electrical heater (R2) is connected.

When the return or ambient temperature rises, the various elements will be disconnected in the following order: the 2nd-stage electrical heater, at 19.5°C; the 1st-stage electrical heater, at 20.5°C; the analogue output of the 3-way valve will be put at 0% at 21.5°C, the compressor C2 will be stopped at 22.5°C and the compressor C1 will be stopped at 23.5°C.

• *Units 4 compressors:*

Differential band = 4.0°C (by default)

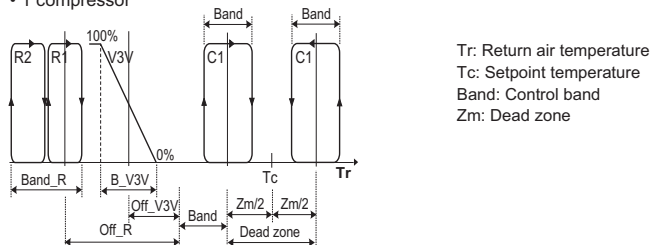
The operating mode is exactly the same as described above.

Warning: The order for stopping and starting the compressors will depend on whether or not rotation is activated.

9.4. AUTO operating mode

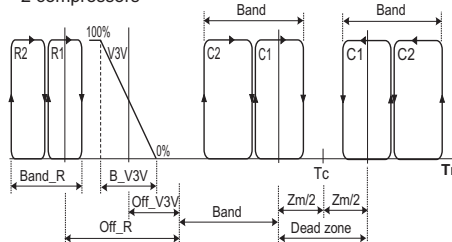
The terminal will order the unit to work in HEATING or COOLING mode based on the temperature measured by the ambient or return air probe, the temperature set as a setpoint and the dead zone.

• 1 compressor

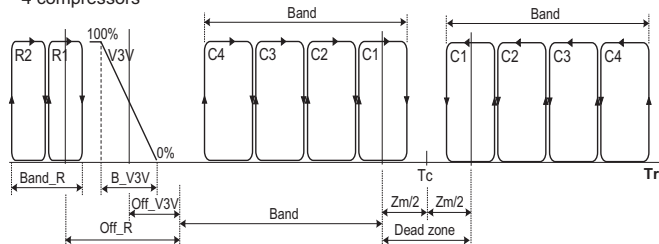


Tr: Return air temperature
Tc: Setpoint temperature
Band: Control band
Zm: Dead zone

• 2 compressors



• 4 compressors



If the ambient or return temperature is greater than the setpoint plus one-half of the dead zone, the unit will operate in COOLING mode, and if it is less than the setpoint minus one-half of the dead zone, it will operate in HEATING mode.

Operation is exactly the same as described previously for COOLING and HEATING modes.

9.5. Operation in DEHUMIDIFICATION mode

The terminal will order the unit to work in DEHUMIDIFICATION mode. This control will be done based on the temperature or the humidity (if the unit has that type of probe). The control type is selected per parameter.

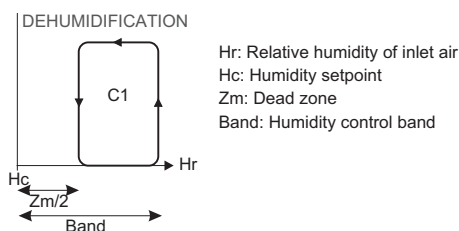
Defrosting by temperature

In this mode, the compressor will be started in COOLING mode for a fixed time (calculated based on the dehumidification setpoint temperature) and will be stopped for another period of time, successively, making the operation times shorter and shorter as the return air temperature continues to drop until reaching a fixed value such as the dehumidification setpoint, by default 20°C. The compressor will not start until this setpoint.

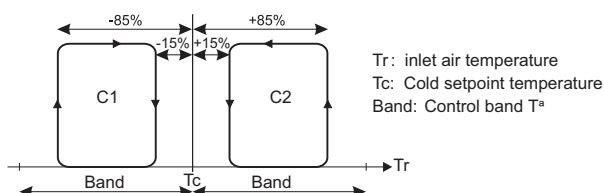
Dehumidification by humidity

This function is carried out by starting up the compressors in COOLING mode when the relative humidity of the return air is greater than the humidity setpoint established plus the control band and stops when going below the dead zone.

Note: In the event that two compressors have been selected in dehumidification, these will start or stop through the same dehumidification stage.



To ensure that the compressors can control humidity, the return air must have a temperature ranging between the setpoint $\pm 15\%$ of the temperature differential and the setpoint $\pm 85\%$ of the temperature differential, as indicated in the following chart.



10. COMPONENT MANAGEMENT

10.1. Four-way valve

Heat pump units have a four-way valve per circuit which allows the COOLING / HEATING operation mode of the unit to be selected.

- Valve with voltage (N.O.): for operating in COOLING mode and during the defrosting process.
- Valve without voltage (N.C.): for operating in HEATING mode.

10.2. Compressors

Rotation of the compressors

The control allows the rotation of the compressors to equal their number of operating hours. With this function, activated by default, the compressor which starts up first is the one which has the least number of accumulated operating hours. For units with 4 compressors and two circuits, the next compressor to operate will be the one in the same circuit.

Note: The control has counters for the number of times each compressor starts and for the cumulative operating time (see maintenance parameters).

Compressor timing

All compressors shall observe the following timings:

- **Delay of the start-up of the outdoor fan with regard to the indoor fan ($t_0=30s$)**

This determines the minimum time that should elapse between the start-up of the indoor fan and the start-up of the outdoor fan in order to guarantee a stable airflow.

- **Delay of the start-up of the compressor with regard to the outdoor fan ($t_1=10s$)**

This determines the minimum time that should elapse between the start-up of the outdoor fan and the start-up of the first compressor to limit the simultaneous start-up. Therefore for the start-up of the first compressor it must pass: $t_0 + t_1$

- **Minimum operation time ($t_2=120s$)**

This keeps the compressor in operation during the period selected. It is not allowed to be shut down unless there is a failure in the circuit.

- **Minimum shut-down time ($t_3=180s$)**

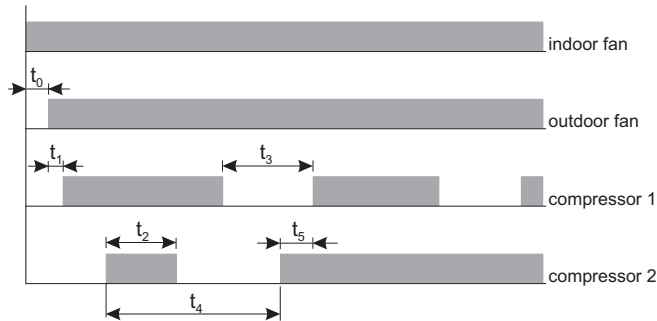
This determines the time that must elapse from the last shutdown of the compressor before it can start up again.

- **Time between start-ups of the same compressor ($t_4=300s$)**

This sets the maximum number of compressor start-ups in one hour.

- Time between start-ups of various compressors ($t_5=60s$)

This sets the time that must elapse between the connection of a compressor and the connection of the next one. It limits simultaneous connection and start-up current surges by the unit.



Note: on a display in the maintenance terminal it is possible to see the remaining time until completing t_3 and t_4 in each compressor. These times can also be cancelled for maintenance operations.

Blocking the compressors

Blocking the compressors can be enabled when the following conditions are met:

- in HEATING mode, if the outdoor temperature is below the value set in a parameter, the compressors will not be activated. This will result in energy savings. Upon disabling the compressors, both the setpoints and the offset of the support elements will adapt to the absence of the compressors.
- in COOLING mode, if the unit has the free-cooling option and either the outdoor temperature is lower than the value set in a parameter or the difference between the outdoor temperature and the return air temperature is greater than a value set in a parameter, the compressors will not be activated. In this case, free-cooling is sufficient for maintaining the conditions of the ambient air. This will result in energy savings.

10.3. Indoor circuit fan

The indoor circuit includes a centrifugal fan that drives the air-conditioned air to the premises through the network of ducts.

If the unit has an ambient air probe in the TCO terminal, two types of operation can be selected: CONTINUOUS or AUTOMATIC. With the return air probe, it is only possible to operate in CONTINUOUS mode.

- AUTOMATIC mode:
 - The fan is in operation only when there is demand from stages.
 - It starts 30 seconds before the compressor starts.

- Stopping is timed to the stopping of the compressor in 60 seconds both in COOLING mode (to avoid the appearance of humidity on the coil) and HEATING mode (to dissipate the heat of the heaters and the condenser).

• CONTINUOUS mode:

- Fan is in operation when the control is ON.
- In HEATING mode, it is possible to perform ON and OFF cycles to avoid the stratification of hot air masses (feeling of COLDNESS).

During defrosting, it is possible to stop the indoor fan if there is no support heat stage in operation.

During maintenance operations, the indoor fan can be started up from a MAINTENANCE display (pGD1 terminal) if no alarm prevents this.

Note: The control has counters for the number of connections from the fan motor and for the number of operating hours (see maintenance parameters).

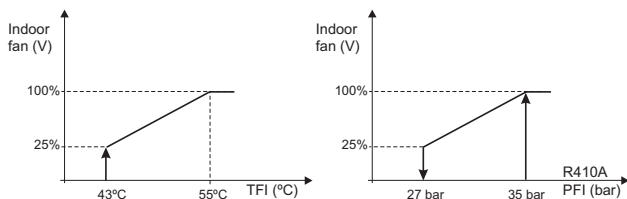
The control allows different types of ventilators to be managed:

- 1-speed fan.
- 3-speed fan (in some units with 1 compressor and single-phase fan).
- Fan with damper.
- Electronic fan. In this case, the maximum speed of the indoor fan can be controlled, via parameters, in COOLING (to prevent formation of drops) and HEATING modes. It is also possible to select the minimum speed before turning the fan OFF both in HEATING mode and in COOLING mode.

The operation of the indoor fan can be enabled based on the pressure/temperature of the refrigerant in the indoor coil (optional):

Condensation control of the indoor fan (HEATING mode)

- Indoor 1-speed fan:
 - * VI=OFF if TFI < 31°C or PFI < 19 bar
 - * VI=ON if TFI > 33°C or PFI > 27 bar
 - * Timing for start, 120 seconds
- Indoor 3-speed fan:
 - * Initial parameter, TFI = 43°C or PFI = 27 bar
 - * Final parameter, TFI = 31°C or PFI = 19 bar
 - * Timing for start-up to maximum speed = 120 seconds
 - * Band 12°C / 3 speeds = 4°C, as such the following is obtained:
 - V3 (fast) ON, if TFI > 43°C
 - V2 (medium) ON, if 39°C > TFI > 35°C
 - V1 (slow) ON, if 35°C > TFI > 31°C
- Electronic indoor fan or with damper:
 - * Initial ramp parameter, TFI = 43°C or PFI = 27 bar
 - * Final ramp parameter, TFI = 55°C or PFI = 35 bar
 - * Timing for start-up to maximum speed = 30 seconds



	Temperature	Pressure R410a	Pressure R407c
Setpoint	43°C	27.0 bar	17.0 bar
Band	12°C	8.0 bar	6.5 bar

Evaporation control of the indoor fan (COOLING mode)

- Indoor 1-speed fan:

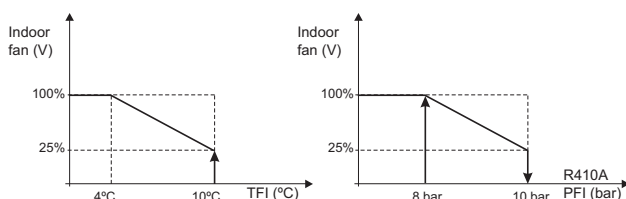
- * VI=OFF if TFI > 16°C or PFI > 12 bar
- * VI=ON if TFI < 14°C or PFI < 10 bar
- * Timing for start, 120 seconds

- Indoor 3-speed fan:

- * Initial parameter, TFI = 100C or PFI = 10 bar
- * Final parameter, TFI = 16°C or PFI = 12 bar
- * Timing for start, 120 seconds
- * Band: 6°C / 3 = 2°C, as such the following is obtained:
 - V1 (slow) ON, if 14°C < TFI < 16°C
 - V2 (medium) ON, if 12°C < TFI < 14°C
 - V3 (fast) ON, if TFI < 10°C

- Electronic indoor fan or with damper:

- * Initial ramp parameter, TFI = 10°C or PFI = 10 bar
- * Final ramp parameter, TFI = 4°C or PFI = 8 bar
- * Timing for start-up to maximum speed = 30 seconds



	Temperature	Pressure R410a	Pressure R407c
Setpoint	10°C	10.0 bar	5.0 bar
Band	6°C	2.0 bar	1.8 bar

10.4. Outdoor circuit fans

For air-air units, the outdoor circuit uses a fan that makes the outdoor air pass over the outdoor coil. Its operation is simultaneous to the operation of the compressor, except in these cases:

- * Connection 5 seconds before the compressor.

* Disconnection is timed to the stopping of the compressor in 60 seconds both in COOLING mode (to reduce the condensation pressure) and HEATING mode (to remove ice from the coil).

* Disconnection during defrosting, except when the defrosting is started by low pressure, which will operate if the pressure drops below the ON value and will disconnect if the pressure drops below the OFF value.

	Pressure R410a	Pressure R407c
ON value	35.0 bar	22.0 bar
OFF value	33.0 bar	20.0 bar

Note: The control has counters for the number of connections from the fan motors and for the number of operating hours (see maintenance parameters).

The control allows different types of ventilators to be managed:

- 1-speed axial fan.
- 2-speed axial fan. For units with a single volume of outdoor air and pressure probe(s) in the outdoor coil, they can act on the speed of the outdoor fan. Start-up must always be done at maximum speed, and after 120 seconds (modifiable by parameter), it can be changed to the minimum speed based on the pressure measured by the probes. This change will be timed as 1 second (modifiable by parameter).
- Electronic axial fan. In this case, the maximum speed of the outdoor fan can be controlled, via parameters, in COOLING mode (to prevent formation of drops*) and in HEATING mode. It is also possible to select the minimum speed before turning the fan OFF both in HEATING mode and in COOLING mode.
- Centrifugal fan with damper.

Maximum speed	Pressure R410a	Pressure R407c
Start in condensation	34.0 bar	21.0 bar
End in condensation	27.0 bar	17.0 bar
Start in evaporation	8.0 bar	3.0 bar
End in evaporation	10.0 bar	5.0 bar

The operation of the outdoor fan can be enabled based on the pressure/temperature of the refrigerant in the outdoor coil:

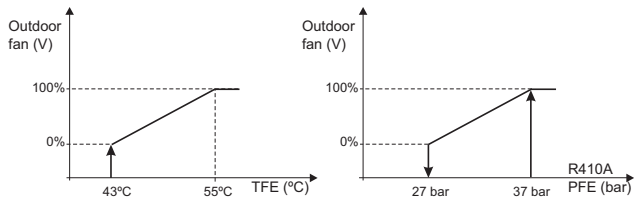
Condensation control of the outdoor fan (COOLING mode)

- Standard outdoor fan (1 speed):

- * VEXT=OFF, TFE < 31°C or PFE < 19.0 bar in R410a
- * VEXT=ON, TFE > 33°C or PFE > 27.0 bar in R410a
- * Timing for start, 120 seconds

- Electronic outdoor fan or centrifugal with damper:

- * Initial ramp parameter, TFE = 43°C or PFE = 27.0 bar in R410a
- * Final ramp parameter, TFE = 55°C or PFE = 37.0 bar in R410a
- * Timing for start to maximum speed, 30 seconds.



	Temperature	Pressure R410a	Pressure R407c
Setpoint	43°C	27.0 bar	17.0 bar
Band	12°C	10.0 bar	6.5 bar

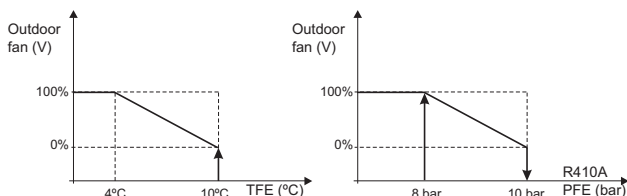
Evaporation control of the outdoor fan (HEATING mode)

- Standard outdoor fan (1 speed):

- * VEXT=OFF, TFE > 16°C or PFE > 12.0 bar in R410a
- * VEXT=ON, TFE < 14°C or PFE < 10.0 bar in R410a
- * Timing for start, 120 seconds

- Electronic outdoor fan or centrifugal with damper:

- * Initial ramp parameter, TFI = 10°C or PFI = 10 bar
- * Final ramp parameter, TFI = 4°C or PFI = 8 bar
- * Timing for start to maximum speed, 30 seconds.



	Temperature	Pressure R410a	Pressure R407c
Setpoint	10°C	10.0 bar	5.0 bar
Band	6°C	2.0 bar	1.8 bar

10.5. Outdoor circuit 3-way valve

For water-air units, the outdoor circuit uses a 3-way valve that controls the water circulate by the plates exchanger. Its operation is simultaneous to the operation of the compressor, except in the following cases:

- Connection 70 seconds before the compressor.
- Timed disconnection at 300 seconds. With this, heat can be dissipated in COOLING mode and problems with freezing can be avoided in HEATING mode.

Condensation pressure control

When the unit operates in COOLING mode the condensation pressure acting on the proportional 3-way valve can be controlled.

It will be regulated depending on the pressure measured by the refrigerant anti-freeze sensor by the signal 0..10Vdc of the analogue outputs Y3 and Y4. The control is similar to that of the electronic outdoor fans.

- * Initial ramp parameter, PFI = 27 bar (R410A)
- * Final ramp parameter, PFI = 34 bar (R410A)
- * Start-up delay to maximum speed, 120 seconds

Evaporation pressure control

When the unit operates in HEATING mode the condensation pressure acting on the proportional 3-way valve can be controlled. The control is similar to that of the electronic outdoor fans.

- * Initial ramp parameter, PFI = 10 bar (R410A)
- * Final ramp parameter, PFI = 6 bar (R410A)
- * Start-up delay to maximum speed, 120 seconds

10.6. Outdoor air damper (optional)

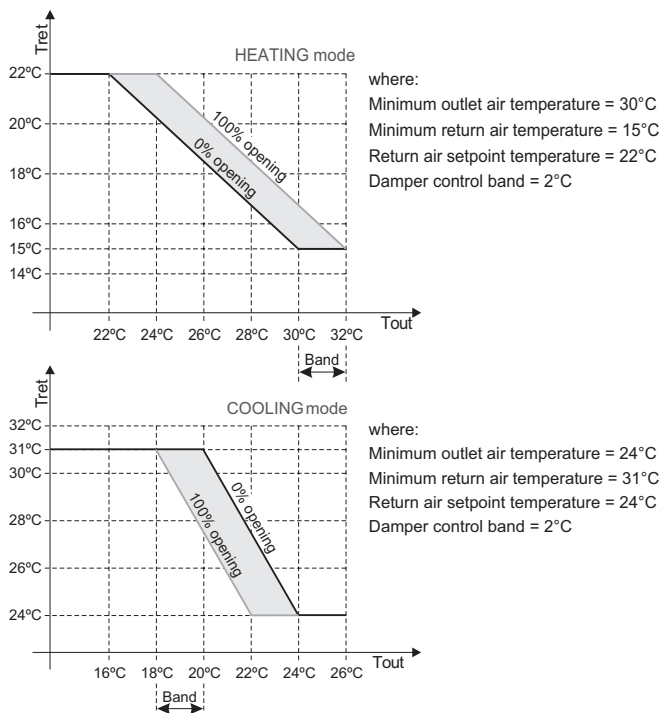
For control of the outdoor air damper, the control has a proportional output 0/10V. This will be activated for the following circumstances:

Air refreshing

To refresh the air, the control will compare the following percentages, and will establish the instantaneous opening of the outdoor air damper with the minimum value from among them:

- % of air refreshing desired per parameter.
- % of air refreshing allowed based on the temperature of the supply and return air (or ambient). If the supply and/or return air temperature conditions are very unfavourable, the command will be given for the closing of the outdoor damper, ignoring the air refreshing, until optimum conditions are reached.

The following chart shows the logic applied by the control with the value obtained for these temperatures:



- % of air refreshing allowed based on the temperatures of the outdoor and return air (or ambient air) and minimum mixed air temperature:

$$\% \text{ refreshing} = \frac{\text{Return air Temp.} - \text{mixed air Temp. (12}^\circ\text{C)}}{\text{Return temperature} - \text{Outdoor temperature}} \times 100$$

Next, depending on the air refreshing calculated with the following formula, the opening or the closing of the damper will be ordered:

$$\% \text{ refreshing} = \frac{\text{Return air Temp.} - \text{mixed air Temp.}}{\text{Return temperature} - \text{Outdoor temperature}} \times 100$$

A maximum variation of the same of 3% for a time period of 60 seconds (values adjustable by parameters) is established for the opening or closing of the damper.

Note: the maximum opening value of the damper can also be blocked by parameter and will take priority over the one previously obtained.

If the outdoor conditions change and the unit starts to request free-cooling, the starting position of the damper will be the one that it had for air refreshing at this time.

The outdoor air damper will remain closed and, therefore, there will be no air refreshing, with the unit stopped during the defrosting operation or due to the anti-freeze thermostat alarm.

Free-cooling

The operation of the unit in free-cooling allows the outdoor air conditions to be taken advantage of when these are more favourable than those of the return (or ambient) air. As such, this allows the cooling capacity to be reduced under these circumstances. The percentage of air refreshing will range from 0% to 100%.

To check whether or not the conditions of the outdoor air are more favourable than those for the return air, three procedures can be used:

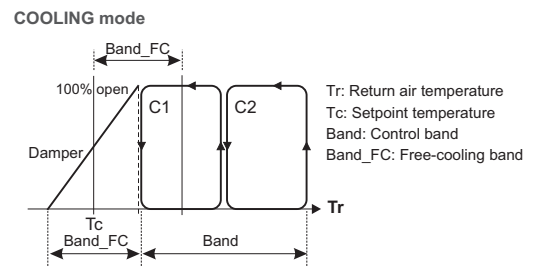
- For **thermal free-cooling**, the opening of the outdoor air damper is ordered when the temperature of the outdoor air is lower than that of the return (or ambient) air plus a differential. In this case, the control uses the outdoor and return (or ambient) air temperature probes.
- For **enthalpic free-cooling**, the opening of the outdoor air damper is ordered when the enthalpy of the outdoor air is lower than that of the return (or ambient) air plus a differential, which allows the outdoor conditions to be taken advantage of in a better manner. In this case, the control uses the outdoor and return (or ambient) air humidity probes (*this option is available only with the AVANT+ version*).

For **thermal-enthalpic free-cooling**, the opening of the outdoor air damper is performed when the enthalpy of the outdoor air is lower than that of the return (or ambient) air plus a differential and it also meets the condition that the outdoor temperature is lower than that of the return air by 1°C, which allows the outdoor conditions to be taken advantage of in a better manner. In this case, the control uses the outdoor and return (or ambient) air humidity probes (*this option is available only with the AVANT+ version*).

There are two operating modes:

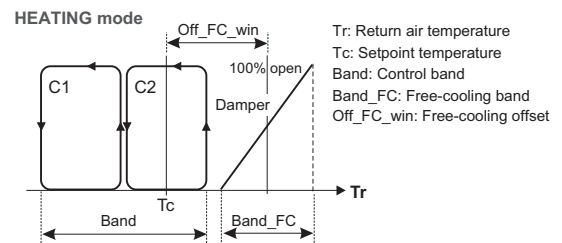
• Free-cooling in summer

When the unit is working in COOLING mode, if the conditions for the activation of free-cooling are met, the compressor control band is displaced from the setpoint. This displacement will coincide with the free-cooling differential. The control allows the compressors to be disabled if it is considered that the difference between the outdoor and return air temperatures is sufficient with free-cooling (values fixed by parameter).



• Free-cooling in winter

This free-cooling in winter is useful, for example, in public places such as shopping centres, discos, etc. where during operation in winter, due to overheating, the temperature is greater than the setpoint and cooling has to be initiated instead of heating. When the unit is working in HEATING mode, if the conditions for the activation of free-cooling are met and the supply temperature is above 7°C, the operation of the damper will be as follows.



10.7. Electrical heater (optional)

To handle electrical heaters, the control has two on/off outputs NO5 and NO6 (except in units with an indoor 3-speed fan). These will be activated under the following circumstances:

- As support in HEATING mode for heat pump units, following the input of all the available compressors and the hot water coil (optional).
- As a heating stage in HEATING mode for cooling-only units.
- In HEATING mode, as a replacement for the compressor stages (very useful in the case of a compressor breakdown).
- During the defrosting operation if selected as support.

Optionally, for the control of the electrical heater the proportional Y2 output can be used which is usually intended for the hot water coil. In this case the control of the coil must be on/off.

Note: The control has counters for the number of connections from the two electrical heater stages and for the number of operating hours (see maintenance parameters).

10.8. Water auxiliary coils (optional)

To control the hot water coil, the control has a proportional output Y2 (0/10V) which controls the three-way valve that acts on the coil. This will be activated under the following circumstances:

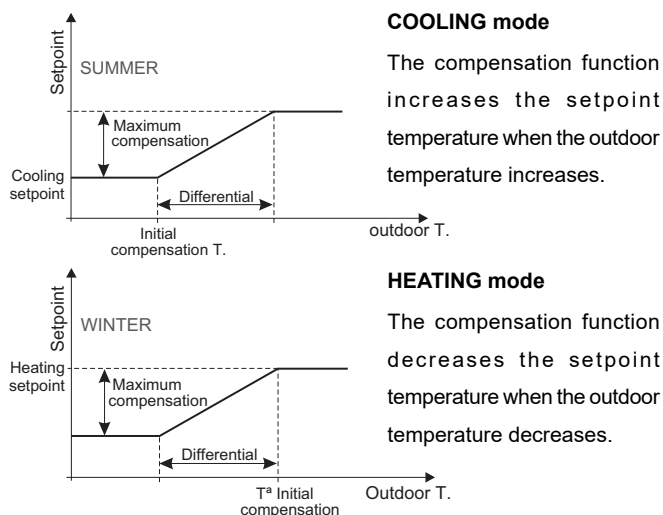
- As support in HEATING mode. Its actuation can be after the input of all the compressors available or prior to the input of the compressors (adjustable through parameters).
- During the defrosting operation, if selected as support through this parameter.
- With the unit running or off if an anti-freeze thermostat alarm is triggered.
- With the unit stopped when the outdoor temperature drops below 4°C (modifiable by parameter).

If the unit is configured with the proportional electrical heater, for the control of the auxiliary coil the off/on output NO3 (version AVANT) or NO5 (version AVANT+) can be used which is normally used for the first electrical heater stage.

11. OUTDOOR TEMPERATURE COMPENSATION

This function allows the setpoint temperature to vary in accordance with the temperature measured by the outdoor air probe (in all air-air units and also water-air with free-cooling control). The outdoor temperature compensation rules are different for HEATING and COOLING mode operation.

The compensation of the setpoint enables thermal "shock" between the inside and outside of the premises to be prevented whilst at the same time providing significant energy savings when the outdoor temperature values are particularly significant for ambient temperature control.



12. SUPPLY AIR TEMPERATURE CONTROL

The control of the temperature limit in the supply air prevents excessively significant drops or rises in the ambient temperature. Two types of control can be selected: Proportional (P) and Proportional - Integral (P+I). The P+I control is used by default, since it is very useful for offsetting typical oscillations in the proportional control.

If, during the operation of the unit in COOLING mode, the supply air temperature drops below 12°C (supply air setpoint of 7°C with a differential of 5°C), the compressors will disconnect in succession to avoid an excessively low supply air temperature.

If, during the operation of the unit in HEATING mode, the supply air temperature rises above 40°C (supply air setpoint of 45°C with a differential of 5°C), the compressors will disconnect in succession, first the support stages and then the compressors, until arriving at 45°C. An excessively high supply air temperature is thereby avoided.

13. DEFROSTING FUNCTION

For air-air units operating in HEATING mode, the defrosting of the outdoor coils is performed by cycle inversion in order to remove any ice which has accumulated on them.

13.1. Types of defrosting

The control enables up to 3 methods for managing the defrosting procedure:

Defrosting by minimum pressure or temperature

This type of defrosting is selected by default.

If the evaporation pressure or temperature measured by the probe(s) of the outdoor coil(s) goes below the setpoint set by parameter.

Temperature	Pressure R410a	Pressure R407c
-15°C	2.5 bar	1.0 bar

Note: If the unit tries to perform a 3rd defrosting operation in less than an hour this could be due to a lack of refrigerant which means that the control will trigger a low pressure alarm. This alarm will be reset manually.

Defrosting by difference with the outdoor temperature

This type of defrosting is selected by default.

The defrosting function is activated if the difference between the temperature measured by the outdoor probe and the evaporation temperature measured in the outdoor coil(s) exceeds the value set by parameter (by default 16°C).

In addition to this condition, it has to be done whenever the pressure or temperature measured in the outdoor coil(s) is lower than the initial setpoint for defrosting.

Defrosting by time

This type of defrosting is not selected by default.

This function, known as intelligent defrosting, optimises this operation by adjusting the time between defrosting operations to the real needs of the unit. The analysis is carried out based on the parameters:

- Number of defrosting operations to start intelligent defrosting.
- Variation in time between defrosting operations.
- Minimum time between defrosting operations.
- Maximum time between defrosting operations.

When starting the unit, the first period between defrosting operations that will be taken into account for the activation of the defrosting function will always be the minimum time between defrosting operations.

The logic of intelligent defrosting is as follows: if the condition of number of defrosting procedures for intelligent defrosting has been fulfilled, whenever the time between defrosting procedures has elapsed, there are two possibilities:

- If the temperature or pressure to start the defrosting procedure has been reached, it is started and the time between defrosting procedures will be diminished in the "variation of time between defrosting procedures" value.
- If the temperature or pressure to start the defrosting procedure has not been reached, the time between defrosting procedures will be increased in the "variation of time between defrosting procedures" value.

Intelligent defrosting is deactivated by setting the same value for minimum and maximum time.

Note: The control has a counter for the number of defrosting procedures performed by the unit and for the duration of the final defrosting procedure (see maintenance parameters).

13.2. Independent or simultaneous defrosting

In units with 2 cooling circuits, it is necessary to take into account whether or not the outdoor coils function with a single volume of outdoor air or with two independent volumes of outdoor air.

The handling of the defrosting operation will be different based on its configuration:

- With a single volume of outdoor air, the defrosting procedure will be simultaneous, i.e., the two circuits will perform the defrosting procedure at the same time. To start the defrosting procedure, the lowest value from among the outdoor coil probes will be used. To end the defrosting procedure, the lowest probe value or the value of the probe for each circuit of the coil (selected by parameter) can be used.

- With a double volume of outdoor air, the defrosting procedure will be independent, i.e., the one will not start until the first one finishes. There is one exception, that being low pressure or evaporation temperature. In that case, the circuit in wait will start the defrosting procedure even if the first one has not finished.

Note: In units with a 2x1 configuration (two indoor units with a single outdoor unit), it is necessary to select by parameter which activates the digital output N06 (J14) in order to perform simultaneous defrosting.

13.3. Defrosting operation

Starting defrosting

In order to start, whichever method was selected, in addition to the conditions demanded for each method, the following conditions must be met:

- Unit operating in HEATING mode.
- Compressors in operation (for simultaneous defrosting, at least one must be in operation).
- The temperature or pressure measured by the outdoor coil probe is lower than that at the start of defrosting.

Temperature	Pressure R410a	Pressure R407c
-1.5°C	5.6 bar	2.7 bar

If these conditions are met, once the delay has elapsed at the start of defrosting, the compressor(s) will be turned off.

By parameters it's possible to adjust the operating of the outdoor fan during the start of the desfrosting, in order that during the stop of the compressor in this maneuver, outdoor air (to higher temperature) continues passing across the coil.

Forty-five seconds after the compressors are stopped, the regimen will be changed, giving power to the 4-way valve (adjustable by parameter).

After 30 seconds, the compressor(s) will be started up so that they can perform the defrosting procedure.

Note: Stopping compressors during defrosting prevents vibrations from being produced in the cycle reversing pipes, and thereby, noises and possible breakage.

During the defrosting operation, the behaviour of the other unit components will be as follows:

- The indoor fan will continue to operate. One can select by parameter that it remain stopped, but only in the case of simultaneous defrosting without an electrical heater.
- One or two electrical heaters (optional) can be enabled by parameter.
- The hot water coil (optional) can be enabled by parameter, furthermore indicating the opening percentage of the valve.
- If it includes an outdoor air damper, this will remain closed.

- The status of the outdoor fans will depend on the type of defrosting procedure activated:

- by time: they will remain stopped.
- by minimum pressure / temperature or by difference with the outdoor temperature: when an ON pressure value is exceeded, if the outdoor temperature is higher than -5°C, the outdoor fans will connect.

These will not disconnect until this pressure has not dropped below another OFF value, provided that the outdoor temperature does not fall below -6°C or the maximum connection time is not exceeded. This action enables prolonging the duration of defrosting and, as such, the ice accumulated on the coil is completely removed.

Note: in the case of temperature probes, the outdoor fans will be connected when the tared pressure from the condensation pressure control pressostat is exceeded.

	Pressure R410a	Pressure R407c
ON value	35.0 bar	22.0 bar
OFF value	33.0 bar	20.0 bar

Ending defrosting

The defrosting ends if any of the following conditions are met:

- By pressure/temperature, when the measurement from the outdoor coil probe is greater than the value at the end of defrosting.

Temperature	Pressure R410a	Pressure R407c
18°C	33.0 bar	21.0 bar

- By maximum time, if the maximum time set for the duration of the defrosting procedure has been exceeded (by default 20 minutes).
- By opening the high pressure pressostat. In this case, the digital output of the control will be disconnected for the compressor(s). This opening will not be signalled as an alarm.

When the defrosting operation finishes, the following actuations will be performed:

- Reversing of the 4-way valve for operating in HEATING mode. By default, this reversing will be done with the anticipated stoppage of the compressor(s), adjustable by parameters.
- Connection of the outdoor fans when the compressor(s) function(s).
- Activation of the indoor fan if it was stopped (for more efficient defrosting, it is advised not to stop the indoor fan).
- Deactivation of the electrical heater that was activated and is not necessary to control the temperature.
- Close of the hot water coil valve that was activated and is not necessary to control the temperature.
- If it includes an outdoor air damper, it will go back to functioning according to the control.

14. SAFETY DEVICES MANAGEMENT

To manage the safety devices for the units where this control is going to be installed, it will use the different digital and analogue inputs.

The control board has a digital output NO7-NC7 (J14) that can activate a remote relay when an alarm occurs in the control. Alarms that activate this output are selected by parameter. It is also possible to select that the relay remains permanently active whilst this alarm is indicated in the terminal.

The safety devices that have the control are as follows:

14.1. Indoor thermal fan

Performed through digital input DI1 (J4). Its actuation is only effective when the unit is in operation, causing them to stop. Its actuation is timed to 30 seconds (by default) through a parameter, if the unit has an air differential pressostat for controlling the flow. This safety device is reset manually.

14.2. Compressor and outdoor fan thermal

It is performed through digital input DI4 (J4) for circuit 1 and through digital input DI10 (J16) for circuit 2. Its actuation causes the compressor(s) and the outdoor fan(s) in the corresponding circuit to stop.

In units with 2 circuits, in case one circuit fails, the other will be connected in replacement. If this circuit was already connected with the unit working in HEATING mode, the heat support can be enabled (first the heating auxiliary coil and then the electrical heaters).

This safety device is reset automatically, going on to manual resetting when 4 alarms occur in less than 30 minutes.

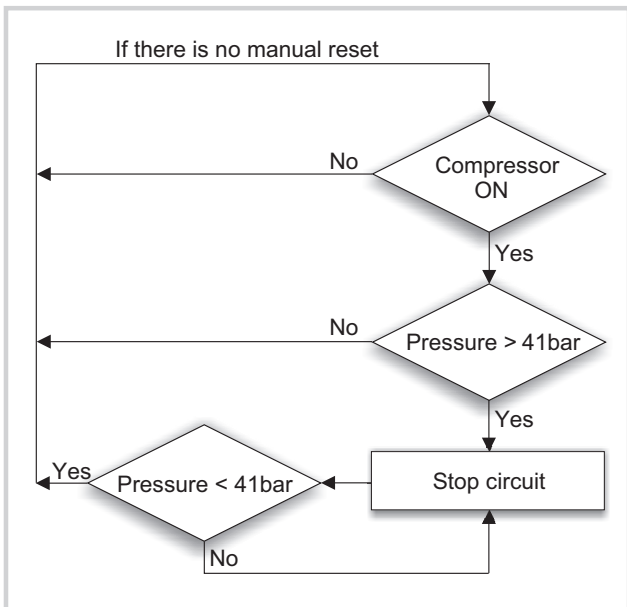
14.3. High pressure safety device

The digital and analogue inputs are carried out in the following manner:

- Digital input D12 (J4) for circuit 1 and digital input D18 (J16) for circuit 2. A.N.O. auxiliary contact from the compressor contact is connected to this input, since the high pressure pressostat is connected in serial with the compressor contact. Its actuation is inhibited for the first 2 sec. the compressor is in operation.
- Analogue input B (J3) for circuit 1 and analogue input B12 (J18) for circuit 2, with the pressure transducer in the outdoor coil and the unit operating in COOLING mode. Actuation according to the chart.
- Analogue input B6 (J3) for circuit 1 and analogue input B11 (J18) for circuit 2, with the pressure transducer in the indoor coil and the unit operating in HEATING mode. Actuation according to the chart.

Values based on the refrigerant:

	Pressure R410a	Pressure R407c
Alarm start value	41,0 bar	28,0 bar
Alarm end value	30,0 bar	19,0 bar



- Short-circuiting of the analogue input B7 (J3) for circuit 1 and analogue input B12 (J18) for circuit 2. This option will be used in units where the control is mounted on the outdoor unit in order to limit the number of interconnection wires between the outdoor unit and the indoor unit.

The actuation of the high pressure safety device causes the compressor(s) and outdoor fan(s) of the corresponding circuit to be stopped. During defrosting, its actuation causes the compressor(s) to be stopped and this operation to be finalised, without counting it as a failure.

In case one circuit should fail, the other will be connected in replacement, and if that one should already be connected and the unit was in HEATING mode, the auxiliary heater will be connected (first the heating auxiliary coil and then the electrical heaters). This safety device is reset automatically, going on to manual resetting when 4 alarms occur in less than 30 minutes (adjustable by parameters).

14.4. Low pressure safety device

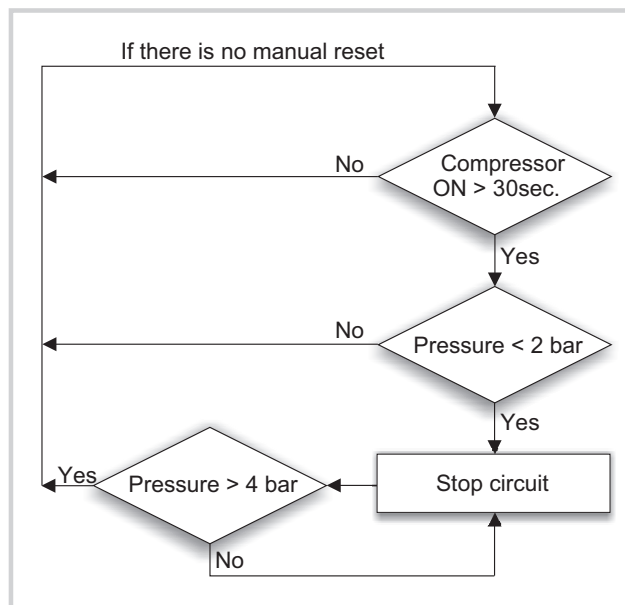
The digital and analogue inputs are carried out in the following manner:

- Digital input DI3 (J4) for circuit 1 and digital input DI9 (J16) for circuit 2. The low pressure pressostat is connected in this input. If the unit does not have a low pressure pressostat, this input can be cancelled via a parameter.

- Analogue input B6 (J3) for circuit 1 and analogue input B11 (J18) for circuit 2, with temperature or pressure probe in the indoor coil and the unit operating in COOLING mode. Actuation according to the chart.
- Analogue input B7 (J3) for circuit 1 and analogue input B12 (J18) for circuit 2, with temperature or pressure probe in the outdoor coil and the unit operating in HEATING mode. Actuation according to the chart.

Values based on the temperature/pressure and refrigerant:

	Temperature	Pressure R410a	Pressure R407c
Start COOLING alarm	-10°C	2.0 bar	0.5 bar
End COOLING alarm	10°C	4.0 bar	5.4 bar
Start HEATING alarm	-22°C	2.0 bar	0.5 bar
End HEATING alarm	-15°C	4.0 bar	5.4 bar



The actuation of the low pressure safety is not taken into account during a period of time since the unit start-up, default 1 second (value adjustable by parameter).

Its actuation causes the compressor(s) and outdoor fan(s) of the corresponding circuit to be stopped.

Its actuation during the defrosting procedure can be inhibited via a parameter.

In case one circuit should fail, the other will be connected in replacement, and if that one should already be connected and the unit was in HEATING mode, the auxiliary heater will be connected (first the heating auxiliary coil and then the electrical heaters).

This safety device is reset automatically, going on to manual resetting when 4 alarms occur in less than 30 minutes (adjustable by parameters).

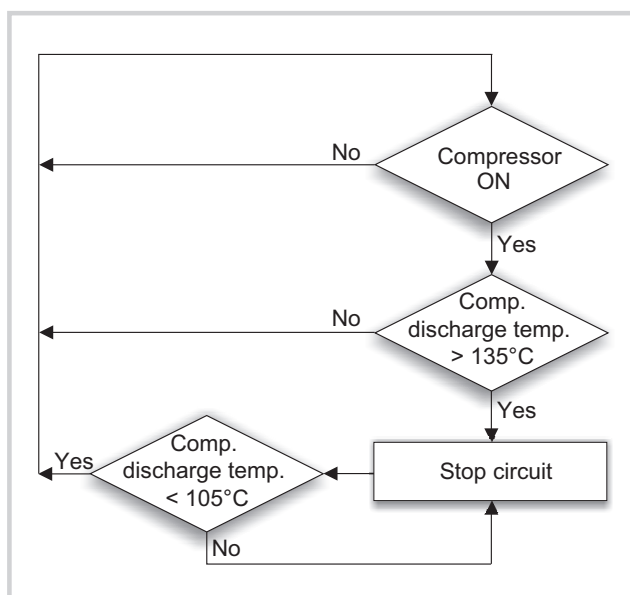
Note: If the unit tries to perform a 3rd defrosting operation due to minimum pressure or temperature in less than an hour this could be due to a lack of refrigerant caused by a small leak or failure in the expansion valve which means that the control will trigger a low pressure alarm.

This safety device is reset manually.

14.5. High temperature discharge compressor safety device

The digital and analogue inputs are carried out in the following manner:

- Digital inputs DI3 and DI4 (J4) for circuit 1 and digital inputs DI9 and DI10 (J16) for circuit 2. The discharge klaxon for the compressor(s) will be connected to the common terminal for these digital inputs in such a way that its opening would cause the opening of the two digital inputs at the same time.
- Analogue input B4 (J3) for circuit 1 and analogue input B8 (J18) for circuit 2. A temperature probe will be connected, whose actuation will be done graphically.



	Temperature
Alarm start value	135°C
Alarm end value	105°C

Its actuation causes the compressor(s) and outdoor fan of the corresponding circuit to be stopped.

In case one circuit should fail, the other will be connected in replacement, and if that one should already be connected and the unit was in heating mode, the auxiliary heater will be connected (first the heating auxiliary coil and then the electrical heaters).

This safety device is reset automatically.

14.6. Refrigerant leak safety device

It is performed through analogue input B6 (J3) for circuit 1 and through analogue input B11 (J18) for circuit 2. This safety device will be activated through a parameter as long as the unit is configured with temperature probe in the indoor coil (optional).

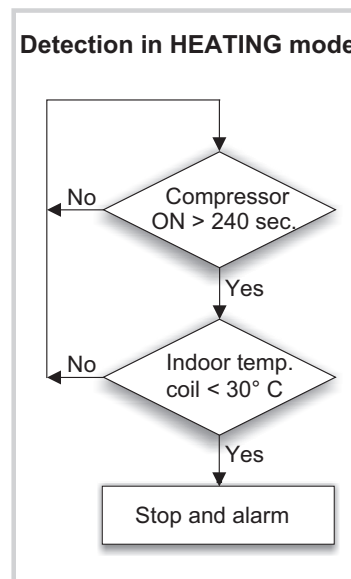
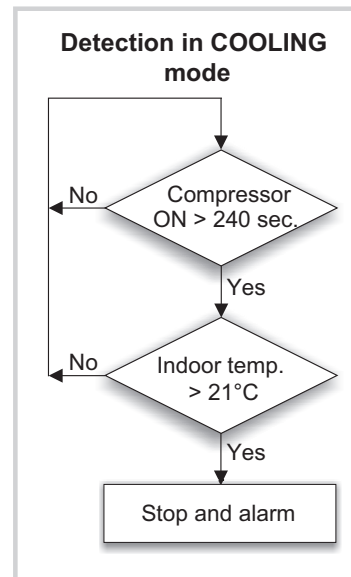
This safety device is important in units that do not have a low pressure pressostat.

For this safety device to operate better, the condensation and evaporation control must be activated in the indoor unit, since in this case it will stop the indoor fan.

Its actuation is not taken into account until the compressor(s) of the corresponding circuit operate(s) for 240 seconds.

Its actuation causes the compressor(s) and outdoor fan of the corresponding circuit to be stopped.

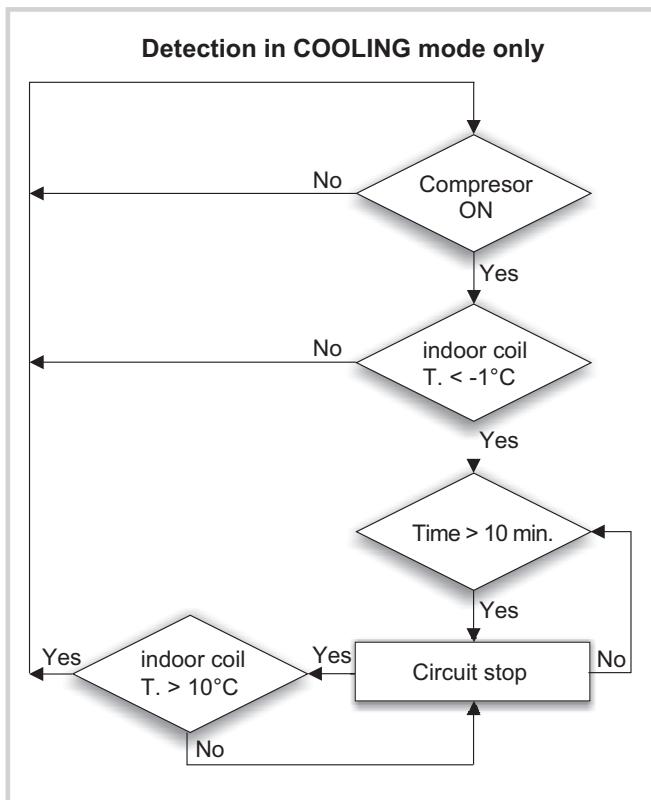
In case one circuit should fail, the other will be connected in replacement, and if that one should already be connected, with the unit operating in HEATING mode, the auxiliary heater will be connected (first the heating auxiliary coil and then the electrical heaters). This safety device is reset automatically, going on to manual resetting when 4 alarms occur in less than 30 minutes (adjustable by parameters).



14.7. Anti-freeze safety device

It is performed through analogue input B6 (J3) for circuit 1 and through analogue input B11 (J18) for circuit 2, for units with a temperature or pressure probe in the indoor coil (optional).

	Temperature	Pressure R410a	Pressure R407c
Initial alarm value	-1°C	6.7 bar	3.4 bar
Final alarm value	10°C	9.8 bar	5.4 bar



Its actuation is not taken into account until the compressor(s) of the corresponding circuit operate(s) with a pressure or temperature lower than that of activation of the safety device plus 10 minutes (adjustable by parameters).

Its actuation causes the compressor(s) and outdoor fan(s) of the corresponding circuit to be stopped.

In case one circuit should fail, the other will be connected in replacement, and if that one should already be connected, and with the unit operating in HEATING mode, the auxiliary heater will be connected (first the heating auxiliary coil and then the electrical heaters).

This safety device is reset automatically.

14.8. Anti-freeze thermostat of the hot water auxiliary coil

This is performed through digital input DI5 if it has been configured with this option.

Its actuation is taken into account only if a hot water auxiliary coil has been configured, causing the unit to stop, the free-cooling damper to be closed and the hot water coil to be activated.

This safety device is reset manually.

14.9. Thermistors of electrical heaters

Its indication in the control is performed through digital input DI5 if it has been configured with this option.

If the unit includes an electrical heater, the safety thermistors directly cut off the supply to the electrical heaters independently of the control.

This safety device is reset manually.

14.10. Condensate pump

This is performed through digital input DI5 if it has been configured with this option. Its actuation is taken into account only in COOLING mode when the digital input is open for a time longer than 60 sec. (value modifiable by parameters). Its actuation causes the compressor(s) and outdoor fan(s) to be stopped. This safety device is reset automatically.

14.11. Pressostat for clogged filters

This is performed through digital input DI6 if it has been configured with this option. Its actuation is only taken into account with the unit in operation (ON), only causing the alarm to be indicated. This safety device is reset automatically.

14.12. Anti-freeze safety device in water-air units

This is done through the analogue inputs B7 (circuit 1) and B12 (circuit 2), through the conversion to the measurement temperature taken by the pressure transducer located between the plate exchanger and the cycle reversing valve.

This safety device is started if, after 120 seconds of operation by the compressor working in HEATING mode, the refrigerant temperature is lower than -2°C (early alarm). If this temperature does not exceed -1°C after 90 seconds the compressor stops. Once the minimum OFF time of the compressor has elapsed, if the refrigerant temperature is greater than 6°C (-2°C + 8°C differential), the compressor can once again be started. Otherwise, the refrigerant anti-freeze alarm is considered and it will be manually reset.

If the refrigerant temperature is less than -5°C after the compressor has been operating for 120 seconds, the compressor is stopped and directly, and without delay, the refrigerant anti-freeze alarm is considered.

If 10 early anti-freeze alarms (T^a < -2°C) are triggered in less than 120 minutes these will also be considered as a refrigerant anti-freeze alarm.

Note: If 10 alarms are triggered in less than 24 hours the water-air unit is blocked by the anti-freeze alarm. The resetting of this safety device can only be performed from the pDG1 maintenance terminal or through a supervisory variable.

14.13. Flow switch in the water-air units

This is performed through digital input DI5 if it has been configured with this option. Its actuation is taken into account only in HEATING mode when the circulation pump (which will be connected to the output of the outdoor fan) functions for longer than 60 seconds (value modifiable by parameter) and the digital input is open for more than 5 seconds. Its actuation causes the unit to stop. Automatic reactivation.

14.14. Alarm for high or low ambient (or return) air temperature

This is done through analogue input B1 (return air temperature probe) or the ambient air temperature probe of the TCO thermostat. Its actuation is only taken into account with the unit in operation (ON) and timed for 10 minutes (adjustable by parameter). Its actuation only causes the alarm to be indicated. Automatic reactivation.

14.15. Alarm for high or low outdoor air temperature

This is done through analogue input B2 (outdoor air temperature probe, in all air-air units and also water-air with free-cooling control) or the ambient air temperature probe of the TCO thermostat. Its actuation is only taken into account with the unit in operation (ON) and timed for 10 minutes (adjustable by parameter). Its actuation only causes the alarm to be indicated. Automatic reactivation.

14.16. Anti-fire safety

When the return air temperature exceeds a safety value the anti-fire safety device will be activated (60°C by default) and the unit will stop. It cannot return to operation until the temperature has dropped to below 40°C (60°C setpoint - 20°C differential).

In units with outdoor air damper it is possible to select the damper position (open or closed) in the event of an anti-fire alarm. This safety device is reset manually.

Note: for this security is needed the return probe (optional).

14.17. Safety device for short-circuiting or opening of the analogue inputs

Its actuation depends on the function that the analogue input is performing. The different actuations are detailed below, taking into account the function of the analogue input:

- Opening or short-circuiting of the return or ambient air temperature probe:

Its actuation causes the unit to stop, except for the indoor fan if it is in continuous mode. It resets automatically.

- Opening or short-circuiting of the outdoor air temperature probe:
Its actuation causes only signalling and the closing of the outdoor damper if free-cooling has been activated. It resets automatically.
- Opening or short-circuiting of the supply air temperature probe:
Its actuation causes the compressor(s) and outdoor fan(s) to be stopped. It resets automatically.
- Opening or short-circuiting of the outlet water temperature probe:
Its actuation is only taken into account if the unit has been configured as water-air. Its actuation causes the unit to stop. It resets automatically.
- Opening or short-circuiting of the compressor discharge temperature probe:
Its actuation is taken into account only if the compressor discharge probe has been enabled. Its actuation causes the compressor(s) and outdoor fan(s) to be stopped. It resets automatically.
- Opening or short-circuiting of the pressure transducer or the outdoor coil temperature probe:
Its actuation causes the compressor(s) and outdoor fan(s) to be stopped. It resets automatically.
- Opening or short-circuiting of the pressure transducer or the temperature probe of the indoor coil (optional):
Its actuation is taken into account only if the temperature or pressure probe of the indoor coil has been enabled. Its actuation causes the compressor(s) and outdoor fan(s) to be stopped. It resets automatically.
- Opening or short-circuiting of the mixed air temperature probe (optional):
Its actuation is taken into account only if the free-cooling configuration has been enabled. Its actuation causes the control of the opening/closing of the outdoor damper with the % of air refreshing calculated with the mixed air temperature. It resets automatically.
- Opening or short-circuiting of the return air humidity probe (optional):
This probe uses the unit with options for enthalpic free-cooling or dehumidification by humidity. Its actuation causes the enthalpic free-cooling and dehumidification by humidity to be disabled. It resets automatically.
- Opening or short-circuiting of the outdoor humidity probe (option only available in the AVANT+ version).
This probe uses the unit with the option for enthalpic free-cooling. Its actuation causes the free-cooling to be disabled. It resets automatically.

15. MANAGEMENT OF THE ALARMS

To manage the alarms, the electronic control has a log of the last 100 alarms produced, along with their time and date. It also counts the number of times that each alarm has occurred (see maintenance parameters).


Code	Description	Reset	Delay
AL 01	Indoor thermal fan and/or air flow switch	Manual	0s (standard) 30s (air flow switch)
AL 03	Compressor and fan thermal for circuit 1	Auto/Man.	
AL 04	High pressure alarm for circuit 1	Auto/Man.	
AL 05	Low pressure alarm for circuit 1	Auto/Man.	1 second
AL 07	Compressor and fan thermal for circuit 2	Auto/Man.	
AL 08	High pressure alarm for circuit 2	Auto/Man.	
AL 09	Low pressure alarm for circuit 2	Auto/Man.	1 second
AL 10	Thermistors of electrical heaters	Manual	
AL 13	Anti-freeze alarm for circuit 1	Auto	10 minutes
AL 14	Anti-freeze alarm for circuit 2	Auto	10 minutes
AL 17	Broken or disconnected supply air probe	Auto	
AL 18	Condensate pump alarm	Auto	60 seconds
AL 20	Broken or disconnected outdoor coil probe 1	Auto	
AL 21	Broken or disconnected outdoor coil probe 2	Auto	
AL 22	Broken or disconnected indoor coil probe 1	Auto	
AL 23	Broken or disconnected indoor coil probe 2	Auto	
AL 24	Broken or disconnected return air probe (board)	Auto	
AL 25	Refrigerant leak in circuit 1	Auto/Man.	240 seconds
AL 26	Refrigerant leak in circuit 2	Auto/Man.	240 seconds
AL 27	Low temperature of outlet water alarm	Manual	
AL 28	Hot water coil anti-freeze alarm	Manual	
AL 29	Broken ambient probe (thermostat) (*)	Auto	
AL 31	Open flow switch alarm	Auto	5 seconds
AL 33	Alarm for clogged filters	Auto	
AL 35	Discharge limit of compressor circ. 1 exceeded	Auto	
AL 36	Discharge limit of compressor circ. 2 exceeded	Auto	
AL 43	Broken outdoor air temperature probe (*)	Auto	
AL 44	Broken discharge temperature probe circ. 1 (*)	Auto	
AL 45	Broken discharge temperature probe circ. 2 (*)	Auto	
AL 46	Broken indoor humidity probe (*)	Auto	
AL 47	Broken outdoor humidity probe (*)	Auto	
AL 48	Broken mixed air temperature probe (*)	Auto	
AL 77	Ambient air high temperature setpoint exceeded	Auto	
AL 78	Ambient air low temperature setpoint exceeded	Auto	
AL 79	Outdoor air high temperature setpoint exceeded	Auto	
AL 80	Outdoor air low temperature setpoint exceeded	Auto	
AL 81	Permanently failed memory severe alarm (indication)	Auto	
AL 82	Clock does not work (indication)	Auto	
AL 83	Serious anti-fire safety alarm	Manual	
AL 84	Anti-freeze alarm refrigerant circuit 1	Auto (**)	120 seconds
AL 85	Anti-freeze alarm refrigerant circuit 2	Auto (**)	120 seconds
AL 86	Unit blocking due to anti-freeze alarm	Manual	




(*) Broken or disconnected probe


(**) If 10 alarms are triggered in less than 24 hours the water-air unit is blocked by the anti-freeze alarm (manual reset).


The control board has a digital output NO7-NC7 (J14) that can activate a remote relay when any alarm among those selected by parameter from the previous list.



View of the alarms in the TCO terminal

If the icon  appears on the TCO terminal display, there is/are active alarm(s).

By simultaneously pressing the / and  keys for a few seconds, the code of the first alarm will be shown.


With the  keys, the rest of the alarms stored in memory can be queried.

The text "RES ALM" appears on the screen below the alarms. Pressing the  key will reset inactive alarms and will return to the main display.

To exit without resetting alarms, press the  key when the text "RES ALM" appears on the display, then it will change to the text "ESC". By pressing the  key, it will return to the main display:






View of the alarms in the pGD1 terminal

If the  key for terminal pGD1 is lit red, there is/are active alarm(s).

Pressing the key once will show the description of the first alarm.



With the   keys, the rest of the alarms stored in the memory can be queried.

Pressing the  keys a second time will cause inactive alarms to be reset.

If the unit does not have any alarm, the message "NO ACTIVE ALARM" appears.





16. TIMER PROGRAMMING







The AVANT/AVANT+ control has a schedule programmer that allows 6 time slots to be chosen for each day of the week. A change in the setpoint temperature or the disconnection of the unit can be scheduled in these time slots

16.1. Schedule programming with the TCO terminal


Enter the time for the terminal

By pressing the  key for a long time, the terminal changes to the initial clock display (CLOC). From there, by pressing the  key, the time update display is accessed.




The current time appears intermittently and can be modified with the help of the   keys. The new time can be validated with the  key. The minutes appear below intermittently. Its value can also be modified with the   keys and validated with the  key.




There are two ways of returning to the main display: by repeatedly pressing the key  or not acting on the terminal for some seconds.

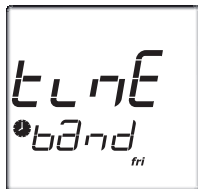
Note: The day of the week cannot be modified, since it depends on the day, months and year entered in the parameters (see Chapter 17).



Creation of a schedule programme

By pressing the  key for a long time, the terminal changes to the initial clock display (CLOC).






Next, by pressing the  key, the terminal changes to the initial schedule programming display (TIME BAND).

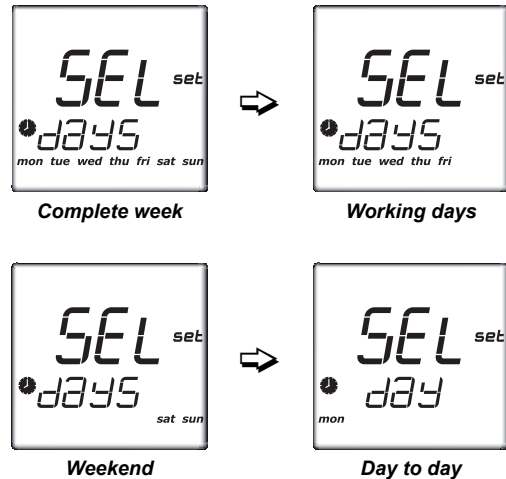




If it is desired to abandon the programming, by pressing the  key again, the terminal changes to the exit display (ESC), which is exited by pressing .




If it is desired to continue with the scheduled programme,  must be pressed with the terminal on the initial programming display (TIME BAND).

The text SEL DAYS will then appear on the display to select the days of the week to which the schedule will apply. With the   keys, the following groups can be selected:




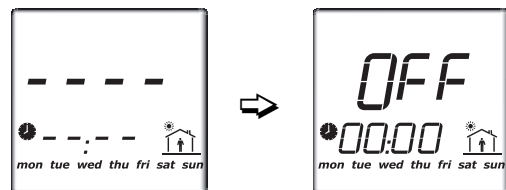
If it is desired to abandon the programming, by pressing the  key again, the terminal changes to the exit display (ESC), which is exited by pressing .





If it is desired to continue with the scheduled programme, the  key must be pressed on the display of the days to which it applies in order to access the first time slot. The sequence of these slots is as follows:

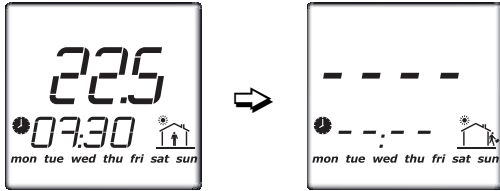


The first time slot will flicker on this display. If it is desired to schedule this slot, the  key will be pressed and automatically stop flickering, going on to appear as follows:






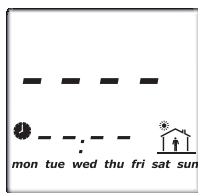
Next, with the  key, the activation time of the programming for the selected slot will be set, and then, whether the unit will remain stopped (OFF) or at the setpoint value.

Finally, the schedule slot will cease flickering. By pressing the  key, the scheduling created will be saved and the terminal will go on to display the next slot.




It will be necessary to define a minimum of two slots for each day, since only the initial time is established for each slot, and not the ending time.


To delete the schedule from a time slot, it is necessary to select it with the  key, and then, by pressing the   keys, the time will be modified until the display returns to show the following:

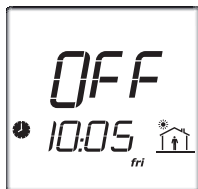




Note: Before making a new schedule, it must be checked whether there is already one defined. If any schedule is made that may affect another that is already stored, the latter will not be saved.

Activation of the timer programming

By pressing the  for a short time, the stored schedule programming corresponding to the activation time is activated.



The symbol  and the active scheduling slot will always appear on the main display, both on stopped units and units in operation.



With the unit in operation, by pressing the keys  or  the setpoint for the time slot will be shown.





Note: The text **set** will appear next to the setpoint value.

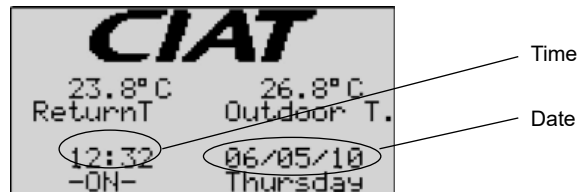


To deactivate the scheduled programme, it is necessary only to press the  key for a short while. Therefore, if it is not desired for anyone to be able to deactivate the set schedule, the terminal must be blocked by simultaneously pressing the  and keys for a few seconds (in that case, the symbol will be lit on the main display).


16.2. Schedule programming with the pGD1 terminal


Enter the time for the terminal

On the main display of the terminal, by pressing the  key, the cursor is placed intermittently over the time. The value can be modified with the   keys. The change is confirmed by pressing the  key again. Likewise, the minutes, day, month and year can be modified. The day of the week will be adjusted automatically.






Creation of a schedule programme

By pressing the  key from any display, the Main Menu is accessed for viewing the setpoints, inputs/outputs and scheduled programming (no password required).

By pressing the  key with the cursor placed over "TIMER PROGRAMMING", the creation and activation displays for the scheduled programming are accessed.

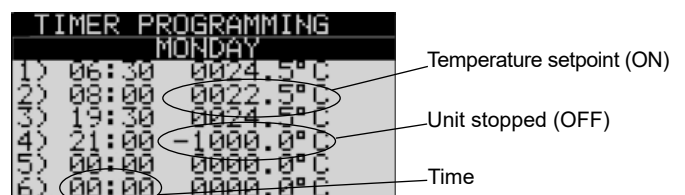


A schedule can be created for each of the 7 days of the week from the pGD1 terminal.

With the   keys, it will rotate to the display corresponding to each day, and with the  key, the time and setpoint can be saved for each slot of the day (6 slots available).

Note: The value -1000.0°C will be assigned to the setpoint of those slots in which the unit will be stopped (OFF).

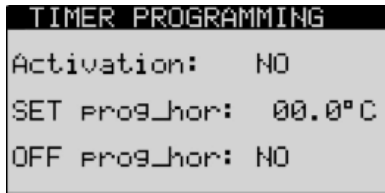
For example, the following display corresponds to a scheduled programming defined for Monday.



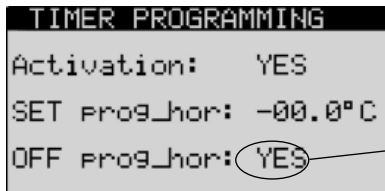
Note: The terminal does not allow the schedule to be copied from one day to another.

Activation of the timer programming

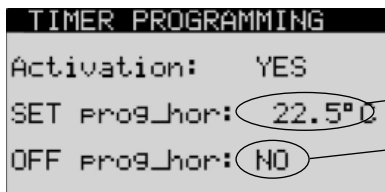
To activate the scheduled programming, it is necessary to access the following display from the menu:



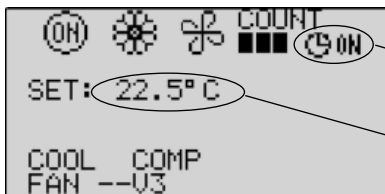
By pressing the key, the cursor is placed intermittently over "Activation". The value can be modified to "YES" with the keys and the schedule stored for the current day of the week will be activated. If the unit is scheduled to stop in the current hour (OFF prog_hour = YES), the display will look as follows:



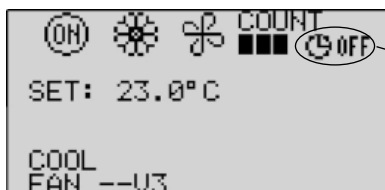
If, on the contrary, the unit will be in operation at the current hour (OFF prog_hour = NO), the display will also show the value of the setpoint set for this time slot:



If the schedule is active, the following symbol will appear on the unit operation information display (MANDO_2):



If the schedule is deactivated, the unit operation information display (MANDO_2) will show the following symbol:



17. SCHEDULING PARAMETERS

17.1. Access to parameters with the TCO terminal

By pressing the and keys for a long time (approximately 3 seconds) the Parameter Menu is accessed.

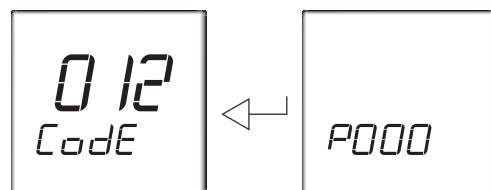
The text CODE appears on the display so that a password may be entered. According to the password entered, it will access a different number of menus. The terminal is configured with 11 menus and 4 access levels.






The user will only access level 1 (password = 12). For the rest of the levels, it is necessary to request the access password.

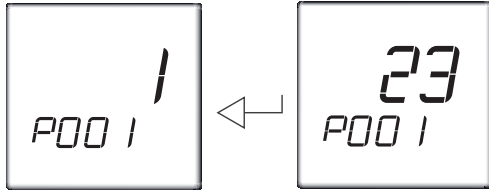
The passwords and menus are as follows:


- Level 1 Menu P000 = general parameters
- Level 2 Menu P000 = general parameters
Menu U000 = user parameters
- Level 3 Menu P000 = general parameters
Menu U000 = user parameters
Menu M000 = Input/output maintenance
Menu M100 = View of counters
- Level 4 Menu P000 = general parameters
Menu U000 = user parameters
Menu M000 = Input/output maintenance
Menu M100 = View of counters
Menu C000 = unit configuration
Menu C100 = defrosting configuration
Menu C200 = compressor configuration
Menu C300 = control configuration
Menu C400 = safety device configuration
Menu C500 = alarm configuration
Menu C600 = unit initialisation

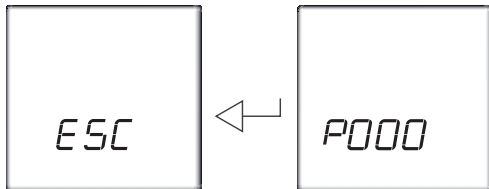
For example, the day, month and year that appears on the terminal can be modified in the general parameters menu. By entering the correct password into CODE with the help of the keys and confirming with the key, the P000 menu will be accessed:




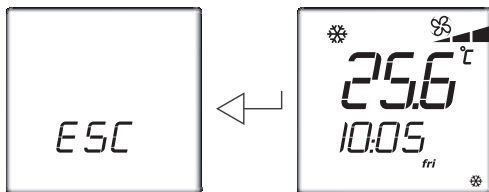
By pressing the  key again, the first parameter P001 is accessed, which coincides with the current day. To modify it, it is necessary to return to pressing . At that time, the day value with flicker. It will be modified with the   keys and confirmed with the  key.



At that time, the terminal goes on to show the P002 parameter (month), then P003 parameter (year), and so on, successively, for all the parameters of the P000 menu until reaching a display with the ESC indicator. By pressing the  key, this menu can be exited.



To permanently abandon the parameter displays, it is necessary to look for a display with the ESC indicator and confirm with .





Note: All parameters, as well as their descriptions, can be queried in the following chapter.

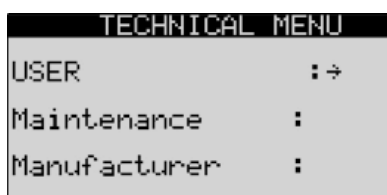



Important: After a power failure should take 5 min. in order to access parameters from this terminal.

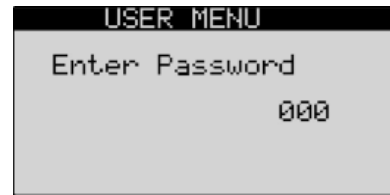
17.2. Access to parameters with the pGD1 terminal

From the main terminal display (MANDO_1), by simultaneously pressing the  and  buttons, the Technical Menu for screens to configure and maintain the unit are accessed, protected by passwords. If it is necessary to know some of these passwords: consult.

All the parameters listed in the following chapter are grouped in the Technical Menu and Main Menu displays.



Once the password has been entered, it is possible to access the other group displays by pressing .



The access level is equivalent to the TCO terminal in such a manner that:

Level 1: Main Menu (no password)

Level 2: Main Menu (no password)

Technical menu: User

Level 3: Main Menu (no password)

Technical menu: User and Maintenance

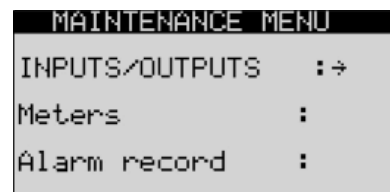
Level 4: Main Menu (no password)

Technical menu: User, Maintenance and Builder

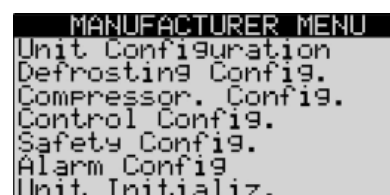
In the **User Menu**, it can be configured whether the unit has a return or ambient air probe, the values associated with the setpoint, compensation due to outdoor temperature, communication in a supervision network and the configuration of the terminal.



The **Maintenance Menu** is reserved for the technical support service (SAT). It is intended for the management of the counters for the number of starts and for the hours of operation of the different elements of the unit, for fast reading of the analogue inputs and outputs measured, for the calibration of the probes connected and for authorising a forced defrosting of the coils.



In this displays of the **Builder Menu**, the unit is configured with the selection of the elements that make it up and the options that have to be controlled. This configuration is factory-set and must not be modified unless there is a change in components.



18. LIST OF PARAMETERS

18.1. Parameters from the main display

Param. No.	Designation	Description	Value by default	Units	Minimum	Maximum	Possible value	PGD1 Display	Type	Reading/ Writing
Main display	MODO_ON_OFF	Select operating mode	0	---	0	1	0: Stop 1: Operating 2: Stop (by schedule)	MANDO_2	Integer	Writing
Main display	MODO_FUNCIONAMIENTO	Select operating mode	3	---	0	5	0: Humidification 1: Dehumidification 2: Automatic 3: Cool 4: Heating 5: Fan	MANDO_2	Integer	Writing
Main display	MODO_VINT_AUTO	Enabling operation of indoor fan in AUTO mode	0	---	0	1	0: Continuous 1: Automatic	MANDO_2	Digital	Writing
Main display	VEL_VENT_INT	Indoor fan speed	3	---	1	3	0: Without fan 1: 1st speed 2: 2nd speed 3: 3rd speed	MANDO_2	Integer	Writing
Main display	SET_POINT_TEMP	Temperature setpoint	23	°C	MIN_SET_POINT_TEMP,0	MAX_SET_POINT_TEMP,0		MANDO_2	Analogue	Writing
Main display	SET_POINT_HUM	Humidity setpoint	50	% RH	MIN_SET_POINT_HUM,0	MAX_SET_POINT_HUM,0		MANDO_2	Analogue	Writing
Main display	HAB_PROG_HORARIA	Enable schedule programming	0	---	0	1	0: Stop 1: On	MANDO_2	Digital	Writing
Main display	NEW_HOUR		0	h	0	23		MANDO_1	Integer	Writing
Main display	NEW_MINUTE		0	---	0	59		MANDO_1	Integer	Writing

18.2. Schedule programming parameters

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible values	PGD1 Display	Type	Reading/ Writing
	HAB_PROG_HORARIA	Enable schedule programming	0	---	0	1	0: No 1: Yes	PROG_HOR_1	Digital	Writing
	SET_POINT_TEMP_HORARIO	Temperature setpoint by schedule	0	°C	0	50		PROG_HOR_1	Analogue	Reading
	OFF_PROG_HOR	Signal ON-OFF by scheduled programming	0	---	0	1	0: No 1: Yes	PROG_HOR_1	Digital	Reading
	thTune_Term1_SD1_1_H		6	h	0	24		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_1_M		30	min	0	60		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_1_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_2	Analogue	Writing
	ON_DIA1_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_2	Digital	Reading
	thTune_Term1_SD1_2_H		8	h	0	24		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_2_M		0	min	0	60		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_2_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_2	Analogue	Writing
	ON_DIA1_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_2	Digital	Reading
	thTune_Term1_SD1_3_H		14	h	0	24		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_3_M		0	min	0	60		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_3_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_2	Analogue	Writing
	ON_DIA1_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_2	Digital	Reading

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible values	PGD1 Display	Type	Reading/ Writing
	thTune_Term1_SD1_4_H		15	h	0	24		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_4_M		0	min	0	60		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_4_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_2	Analogue	Writing
	ON_DIA1_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_2	Digital	Reading
	thTune_Term1_SD1_5_H		19	h	0	24		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_5_M		0	min	0	60		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_5_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_2	Analogue	Writing
	ON_DIA1_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_2	Digital	Reading
	thTune_Term1_SD1_6_H		20	h	0	24		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_6_M		0	min	0	60		PROG_HOR_2	Integer	Writing
	thTune_Term1_SD1_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_2	Analogue	Writing
	ON_DIA1_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_2	Digital	Reading
	thTune_Term1_SD2_1_H		6	h	0	24		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_1_M		30	min	0	60		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_1_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_3	Analogue	Writing
	ON_DIA2_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_3	Digital	Reading
	thTune_Term1_SD2_2_H		8	h	0	24		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_2_M		0	min	0	60		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_2_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_3	Analogue	Writing
	ON_DIA2_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_3	Digital	Reading
	thTune_Term1_SD2_3_H		14	h	0	24		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_3_M		0	min	0	60		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_3_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_3	Analogue	Writing
	ON_DIA2_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_3	Digital	Reading
	thTune_Term1_SD2_4_H		15	h	0	24		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_4_M		0	min	0	60		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_4_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_3	Analogue	Writing
	ON_DIA2_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_3	Digital	Reading
	thTune_Term1_SD2_5_H		19	h	0	24		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_5_M		0	min	0	60		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_5_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_3	Analogue	Writing
	ON_DIA2_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_3	Digital	Reading
	thTune_Term1_SD2_6_H		20	h	0	24		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_6_M		0	min	0	60		PROG_HOR_3	Integer	Writing
	thTune_Term1_SD2_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_3	Analogue	Writing
	ON_DIA2_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_3	Digital	Reading
	thTune_Term1_SD3_1_H		6	h	0	24		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_1_M		30	min	0	60		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_1_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_4	Analogue	Writing
	ON_DIA3_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_4	Digital	Reading

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible values	PGD1 Display	Type	Reading/ Writing
	thTune_Term1_SD3_2_H		8	h	0	24		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_2_M		0	min	0	60		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_2_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_4	Analogue	Writing
	ON_DIA3_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_4	Digital	Reading
	thTune_Term1_SD3_3_H		14	h	0	24		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_3_M		0	min	0	60		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_3_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_4	Analogue	Writing
	ON_DIA3_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_4	Digital	Reading
	thTune_Term1_SD3_4_H		15	h	0	24		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_4_M		0	min	0	60		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_4_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_4	Analogue	Writing
	ON_DIA3_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_4	Digital	Reading
	thTune_Term1_SD3_5_H		19	h	0	24		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_5_M		0	min	0	60		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_5_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_4	Analogue	Writing
	ON_DIA3_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_4	Digital	Reading
	thTune_Term1_SD3_6_H		20	h	0	24		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_6_M		0	min	0	60		PROG_HOR_4	Integer	Writing
	thTune_Term1_SD3_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_4	Analogue	Writing
	ON_DIA3_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_4	Digital	Reading
	thTune_Term1_SD4_1_H		6	h	0	24		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_1_M		30	min	0	60		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_1_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_5	Analogue	Writing
	ON_DIA4_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_5	Digital	Reading
	thTune_Term1_SD4_2_H		8	h	0	24		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_2_M		0	min	0	60		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_2_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_5	Analogue	Writing
	ON_DIA4_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_5	Digital	Reading
	thTune_Term1_SD4_3_H		14	h	0	24		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_3_M		0	min	0	60		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_3_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_5	Analogue	Writing
	ON_DIA4_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_5	Digital	Reading
	thTune_Term1_SD4_4_H		15	h	0	24		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_4_M		0	min	0	60		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_4_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_5	Analogue	Writing
	ON_DIA4_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_5	Digital	Reading
	thTune_Term1_SD4_5_H		19	h	0	24		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_5_M		0	min	0	60		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_5_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_5	Analogue	Writing
	ON_DIA4_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_5	Digital	Reading

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible values	PGD1 Display	Type	Reading/ Writing
	thTune_Term1_SD4_6_H		20	h	0	24		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_6_M		0	min	0	60		PROG_HOR_5	Integer	Writing
	thTune_Term1_SD4_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_5	Analogue	Writing
	ON_DIA4_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_5	Digital	Reading
	thTune_Term1_SD5_1_H		6	h	0	24		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_1_M		30	min	0	60		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_1_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_6	Analogue	Writing
	ON_DIA5_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_6	Digital	Reading
	thTune_Term1_SD5_2_H		8	h	0	24		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_2_M		0	min	0	60		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_2_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_6	Analogue	Writing
	ON_DIA5_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_6	Digital	Reading
	thTune_Term1_SD5_3_H		14	h	0	24		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_3_M		0	min	0	60		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_3_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_6	Analogue	Writing
	ON_DIA5_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_6	Digital	Reading
	thTune_Term1_SD5_4_H		15	h	0	24		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_4_M		0	min	0	60		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_4_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_6	Analogue	Writing
	ON_DIA5_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_6	Digital	Reading
	thTune_Term1_SD5_5_H		19	h	0	24		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_5_M		0	min	0	60		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_5_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_6	Analogue	Writing
	ON_DIA5_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_6	Digital	Reading
	thTune_Term1_SD5_6_H		20	h	0	24		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_6_M		0	min	0	60		PROG_HOR_6	Integer	Writing
	thTune_Term1_SD5_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_6	Analogue	Writing
	ON_DIA5_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_6	Digital	Reading
	thTune_Term1_SD6_1_H		6	h	0	24		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_1_M		30	min	0	60		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_1_S		21	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_7	Analogue	Writing
	ON_DIA6_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_7	Digital	Reading
	thTune_Term1_SD6_2_H		8	h	0	24		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_2_M		0	min	0	60		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_2_S		23	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_7	Analogue	Writing
	ON_DIA6_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_7	Digital	Reading
	thTune_Term1_SD6_3_H		15	h	0	24		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_3_M		0	min	0	60		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_3_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_7	Analogue	Writing
	ON_DIA6_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_7	Digital	Reading

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible values	PGD1 Display	Type	Reading/ Writing
	thTune_Term1_SD6_4_H		24	h	0	24		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_4_M		60	min	0	60		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_4_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_7	Analogue	Writing
	ON_DIA6_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_7	Digital	Reading
	thTune_Term1_SD6_5_H		24	h	0	24		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_5_M		60	min	0	60		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_5_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_7	Analogue	Writing
	ON_DIA6_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_7	Digital	Reading
	thTune_Term1_SD6_6_H		24	h	0	24		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_6_M		60	min	0	60		PROG_HOR_7	Integer	Writing
	thTune_Term1_SD6_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_7	Analogue	Writing
	ON_DIA6_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_7	Digital	Reading
	thTune_Term1_SD7_1_H		24	h	0	24		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_1_M		60	min	0	60		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_1_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_8	Analogue	Writing
	ON_DIA7_F1	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_8	Digital	Reading
	thTune_Term1_SD7_2_H		24	h	0	24		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_2_M		60	min	0	60		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_2_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_8	Analogue	Writing
	ON_DIA7_F2	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_8	Digital	Reading
	thTune_Term1_SD7_3_H		24	h	0	24		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_3_M		60	min	0	60		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_3_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_8	Analogue	Writing
	ON_DIA7_F3	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_8	Digital	Reading
	thTune_Term1_SD7_4_H		24	h	0	24		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_4_M		60	min	0	60		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_4_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_8	Analogue	Writing
	ON_DIA7_F4	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_8	Digital	Reading
	thTune_Term1_SD7_5_H		24	h	0	24		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_5_M		60	min	0	60		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_5_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_8	Analogue	Writing
	ON_DIA7_F5	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_8	Digital	Reading
	thTune_Term1_SD7_6_H		24	h	0	24		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_6_M		60	min	0	60		PROG_HOR_8	Integer	Writing
	thTune_Term1_SD7_6_S		-1000	°C	-1000	MAX_SET_POINT_TEMP		PROG_HOR_8	Analogue	Writing
	ON_DIA7_F6	Active schedule programming signal	0	---	0	1	0: Inactive 1: Active	PROG_HOR_8	Digital	Reading

18.3. Parameters in the P000 menu: Input / output displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
P001	CURRENT_DAY	Current day	0	---	1	31		MANDO_1	Integer	Writeable
P002	CURRENT_MONTH	Current month	0	---	1	12		MANDO_1	Integer	Writeable
P003	CURRENT_YEAR	Current year	0	---	0	99		MANDO_1	Integer	Writeable
P004	thTune_ED4_1	Digital inputs from 4...1	0	---	0	1	0: Closed 1: Open	ENT_SAL_1	Digital	Readable
P005	thTune_ED8_5	Digital inputs from 8...5	0	---	0	1	0: Closed 1: Open	ENT_SAL_1	Digital	Readable
P006	thTune_ED12_9	Digital inputs from 12...9	0	---	0	1	0: Closed 1: Open	ENT_SAL_1	Digital	Readable
P007	thTune_SD4_1	Digital outputs from 4...1	0	---	0	1	0: Output 1: Inlet	ENT_SAL_2	Digital	Readable
P008	thTune_SD8_5	Digital outputs from 8...5	0	---	0	1	0: Output 1: Inlet	ENT_SAL_2	Digital	Readable
P009	thTune_SD12_9	Digital outputs from 12...9	0	---	0	1	0: Output 1: Inlet	ENT_SAL_2	Digital	Readable
P010	TEMP_AMB	Ambient temperature	0	°C	-99	99		ENT_SAL_3	Analogue	Readable
P011	TEMP_RET	Return air temperature	0	°C	-99	99		ENT_SAL_3	Analogue	Readable
P012	TEMP_EXT	Outdoor temperature	0	°C	-99	99		ENT_SAL_3	Analogue	Readable
P013	TEMP_IMP	Supply air temperature	0	°C	-99,9	99		ENT_SAL_3	Analogue	Readable
P014	TEMP_MEZCLA	Mixed air temperature	0	°C	-99	99		ENT_SAL_3	Analogue	Readable
P015	HUM_REG	Humidity control	0	% RH	-99	99		ENT_SAL_4	Analogue	Readable
P016	HUM_EXT	Outdoor humidity	0	% RH	-99	99		ENT_SAL_5	Analogue	Readable
P017	ENTALPIA_INT	Indoor enthalpy calculated	0	Kcal/kg	-99	99		ENT_SAL_8	Analogue	Readable
P018	ENTALPIA_EXT	Outdoor enthalpy calculated	0	Kcal/kg	-99	99		ENT_SAL_8	Analogue	Readable
P019	TEMP_DES_C1	Discharge temperature for circuit 1	0	°C	-99	150		ENT_SAL_4	Analogue	Readable
P020	TEMP_DES_C2	Discharge temperature for circuit 2	0	°C	-99	150		ENT_SAL_5	Analogue	Readable
P021	T_P_BINT_C1	Temperature-pressure indoor coil for circuit 1	0	°C / bar	-99	99		ENT_SAL_4	Analogue	Readable
P022	TEMP_CAL_BINT_C1	Temperature calculated for the indoor coil for circuit 1	0	°C	-99	99		ENT_SAL_6	Analogue	Readable
P023	T_P_BEXT_C1	Temperature-pressure outdoor coil for circuit 1	0	°C / bar	-99	99		ENT_SAL_4	Analogue	Readable
P024	TEMP_CAL_BEXT_C1	Temperature calculated for the outdoor coil for circuit 1	0	°C	-99	99		ENT_SAL_6	Analogue	Readable
P025	T_P_BINT_C2	Temperature-pressure indoor coil for circuit 2	0	°C / bar	-99	99		ENT_SAL_5	Analogue	Readable
P026	TEMP_CAL_BINT_C2	Temperature calculated for the indoor coil for circuit 2	0	°C	-99	99		ENT_SAL_7	Analogue	Readable
P027	T_P_BEXT_C2	Temperature-pressure outdoor coil for circuit 2	0	°C / bar	-99	99		ENT_SAL_5	Analogue	Readable
P028	TEMP_CAL_BEXT_C2	Temperature calculated for the outdoor coil for circuit 2	0	°C	-99	99		ENT_SAL_7	Analogue	Readable
P029	ON_ECONFORT	Ecomfort Activation	0	---	0	1	0: No 1: Yes	ENT_SAL_9	Digital	Readable
P030	AOUT1_VISUALIZADA	Analogue output viewed on display	0	%	0	99		ENT_SAL_11	Integer	Readable
P031	AOUT2_VISUALIZADA	Analogue output viewed on display	0	%	0	99		ENT_SAL_11	Integer	Readable
P032	AOUT3_VISUALIZADA	Analogue output viewed on display	0	%	0	99		ENT_SAL_12	Integer	Readable
P033	AOUT4_VISUALIZADA	Analogue output viewed on display	0	%	0	99		ENT_SAL_12	Integer	Readable

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
P034	INFO_EQUIPO_1	Information on type of unit, machine and heaters	0	---	0	99	0: Air-Air Cooling 1: Air-Air Cooling + Heaters 2: Air-Air H.C. 3: Air-Air H.C. + Heaters 4: Water-Air Cooling 5: Water-Air Cooling + Heaters 6: Water-Air H.C. 7: Air-Air H.C. + Heaters	M_INFO_EQUIPO	Integer	Readable
P035	INFO_EQUIPO_2	Information on the number of compressors, circuit, outdoor unit, indoor unit	0	---	0	9	0: 1comp / 1circ / Vint-1vel 1: 1comp / 1circ / Vint-3vel 2: 2comp / 1circ 3: 2comp / 2circ / 1vol-ext 4: 2comp / 2circ / 2vol-ext 5: 4comp / 2circ	M_INFO_EQUIPO	Integer	Readable
P036	VER_SOFTWARE	Software version	1.3	---	0	99,9		M_VERSION	Analogue	Readable
P037	thTune_Term1_Term_UI_hw	TCO terminal hardware version	184	---	0	999		M_VERSION	Integer	Readable
P038	thTune_Term1_Term_UI_fw	TCO terminal firmware version	1.0	---	0	99,9		M_VERSION	Integer	Readable
P039	SET_POINT_TEMP_CAL	Setpoint calculated based on the compensation of the outdoor temperature	0,0	°C	0	50,0			Analogue	Readable

18.4. Parameters in the U000 menu: user displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
U001	HAB_TEMP_RET	Enable the return air probe as a control probe	0	---	0	1	0: Ambient 1: Return	USUARIO_REG_1	Digital	Writeable
U002	SET_POINT_TEMP	Temperature setpoint	23	°C	MIN_SET_POINT_TEMP,0	MAX_SET_POINT_TEMP,0		USUARIO_REG_1	Analogue	Writeable
U003	MIN_SET_POINT_TEMP	Minimum temperature setpoint	15	°C	0	50		USUARIO_REG_1	Analogue	Writeable
U004	MAX_SET_POINT_TEMP	Maximum temperature setpoint	30	°C	0	50		USUARIO_REG_1	Analogue	Writeable
U005	BANDA	Control band	1	°C	0	6		USUARIO_REG_2	Analogue	Writeable
U006	ZONA_MUERTA	Control dead zone (AUTO mode)	2	°C	0,5	6		USUARIO_REG_2	Analogue	Writeable
U007	SET_POINT_TEMP_DESH	Temperature setpoint for dehumidification	20	°C	0	50		USUARIO_REG_3	Analogue	Writeable
U008	HAB_HUM_RET	Enabling the return air humidity probe as an indoor humidity probe	1	---	0	1	0: Ambient 1: Return	USUARIO_REG_4	Digital	Writeable
U009	SET_POINT_HUM	Humidity setpoint	50	% RH	MIN_SET_POINT_HUM,0	MAX_SET_POINT_HUM,0		USUARIO_REG_4	Analogue	Writeable
U010	MIN_SET_POINT_HUM	Minimum humidity setpoint	30	% RH	0	99,9		USUARIO_REG_4	Analogue	Writeable
U011	MAX_SET_POINT_HUM	Maximum humidity setpoint	70	% RH	0	99,9		USUARIO_REG_4	Analogue	Writeable
U012	BANDA_HUMEDAD	Humidity control band	5	% RH	0	10		USUARIO_REG_5	Analogue	Writeable
U013	NUM_COMP_DESHUM	Number of compressors for dehumidification	1	---	0	2		USUARIO_REG_5	Integer	Writeable

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
U014	BANDA_FCOOL	Band operating in free-cooling	1	°C	0	6		USUARIO_REG_6	Analogue	Writeable
U015	OFFSET_FCOOL_INV	Displacement of winter foooling input with respect to the calculated setpoint	2	°C	1	9,9		USUARIO_REG_6	Analogue	Writeable
U016	VAL_DIF_FCOOL	Difference between the return air temperature and the outdoor air temperature for allowing the operation of free-cooling	2	°C	0	6		USUARIO_REG_7	Analogue	Writeable
U017	VAL_DIF_FCOOL_ENT	Difference between the return air enthalpy and the outdoor air enthalpy for allowing the operation of free-cooling	1	Kcal/kg	0	9,9		USUARIO_REG_8	Analogue	Writeable
U018	MIN_RENOVACION_AIRE	Minimum air refreshing desired.	20	%	0	99		USUARIO_REG_9	Integer	Writeable
U019	HAB_OFF_COMPUERTA_INI_CALOR	Enabling closed damper until the heating setpoint temperature is reached	0	°C	0	1	0: Normal 1: Closed	USUARIO_REG_9	Digital	Writeable
U020	BANDA_RES	Heater control band	1	°C	0	6		USUARIO_REG_10	Analogue	Writeable
U021	OFFSET_RES	Displacement of electrical heaters with respect to the setpoint calculated - band	1	°C	0	9,9		USUARIO_REG_10	Analogue	Writeable
U022	BANDA_BAC	Hot water coil control band	1	°C	0	6		USUARIO_REG_11	Analogue	Writeable
U023	OFFSET_BAC	Displacement of the hot water coil with respect to the setpoint calculated - band	0	°C	0	9,9		USUARIO_REG_11	Analogue	Writeable
U024	HAB_COMPENSACION	Enable compensation of the setpoint based on the outdoor temp.	0	---	0	1	0: No 1: Yes	USUARIO_REG_12	Digital	Writeable
U025	SET_COMP_EXT_FRIO	Set outdoor temperature for compensation in COOLING	30	°C	20	50		USUARIO_REG_13	Analogue	Writeable
U026	VAL_DIF_COMP_EXT_FRIO	Outdoor temperature differential for compensation in COOLING	5	°C	0	10		USUARIO_REG_13	Analogue	Writeable
U027	MAX_COMP_EXT_FRIO	Maximum compensation in COOLING	5	°C	0	10		USUARIO_REG_13	Analogue	Writeable
U028	SET_COMP_EXT_CALOR	Set outdoor temperature for compensation in HEATING	0	°C	-10	20		USUARIO_REG_14	Analogue	Writeable
U029	VAL_DIF_COMP_EXT_CALOR	Outdoor temperature differential for compensation in HEATING	5	°C	0	10		USUARIO_REG_14	Analogue	Writeable
U030	MAX_COMP_EXT_CALOR	Maximum compensation in HEATING	5	°C	0	10		USUARIO_REG_14	Analogue	Writeable
U031	BMS_ADDRESS	Supervisory address	1	---	0	207		USUARIO_COM_1	Integer	Writeable
U032	TIPO_PROT_COM	Type of communication protocol	1	---	1	4	1: Carel 485 2: Carel 232 3: Modbus 4: Commis. 5: Lonworks	USUARIO_COM_1	Integer	Writeable
U033	BAUDRATE	Communication speed in BMS	4	---	0	4	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200	USUARIO_COM_1	Integer	Writeable
U034	HAB_ONOFF_REMOTO	Enabling remote ON/OFF	1	---	0	1	0: No 1: Yes	USUARIO_VAR_1	Digital	Writeable
U035	HAB_CALOR_FRIO_REMOTO	Enable digital input HEATING/COOLING	0	---	0	1	0: No 1: Yes	USUARIO_VAR_1	Digital	Writeable
U036	TIME_LIGHT_PANT_PGD	Time the PGD1 is lit	30	s	0	999		USUARIO_VAR_2	Integer	Writeable
U037	HAB_RET_MENÚ_PGD	Enables return to the main display of the PGD1	0	---	0	1	0: No 1: Yes	USUARIO_VAR_3	Digital	Writeable
U038	TIME_RET_MENÚ_PGD	Time to return to the main display of the PGD1	120	s	0	999		USUARIO_VAR_3	Integer	Writeable
U039	DESCONEXION_NUM_COMPRESORES	Number of compressor stages to be disconnected	0	---	0	4		USER_REG_15	Integer	Writeable
U040	DESCONEXION_NUM_RESISTENCIAS	Number of heater stages to be disconnected	0	---	0	3		USER_REG_15	Integer	Writeable
---	AUTOSTART	Automatic start-up after blocking	1	---	0	1	0: No 1: Yes	USUARIO_VAR_1	Digital	Writeable
U041	TIME_ON_AUTOSTART	Automatic start timing after a power supply cut	5	s	5	999		USUARIO_VAR_1	Integer	Writeable
U042	SET_HAB_RES_TEMP_EXT	Setpoint for enabling the electrical heater due to outdoor temperature	20	°C	-20	40		USUARIO_REG_10	Analogue	Writeable

18.5. Parameters in the M000 menu: maintenance displays (inputs / outputs)

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
M001	TAR_AIN1	Analogue input delay 1	0	---	-20	20		MANT_ENT_SAL_1	Analogue	Writeable
M002	TAR_AIN2	Analogue input delay 2	0	---	-20	20		MANT_ENT_SAL_1	Analogue	Writeable
M003	TAR_AIN3	Analogue input delay 3	0	---	-20	20		MANT_ENT_SAL_1	Analogue	Writeable
M004	TAR_AIN4	Analogue input delay 4	0	---	-20	20		MANT_ENT_SAL_1	Analogue	Writeable
M005	TAR_AIN5	Analogue input delay 5	0	---	-20	20		MANT_ENT_SAL_1	Analogue	Writeable
M006	TAR_AIN6	Analogue input delay 6	0	---	-20	20		MANT_ENT_SAL_1	Analogue	Writeable
M007	TAR_AIN7	Analogue input delay 7	0	---	-20	20		MANT_ENT_SAL_2	Analogue	Writeable
M008	TAR_AIN8	Analogue input delay 8	0	---	-20	20		MANT_ENT_SAL_2	Analogue	Writeable
M009	TAR_AIN9	Analogue input delay 9	0	---	-20	20		MANT_ENT_SAL_2	Analogue	Writeable
M010	TAR_AIN10	Analogue input delay 10	0	---	-20	20		MANT_ENT_SAL_2	Analogue	Writeable
M011	TAR_AIN11	Analogue input delay 11	0	---	-20	20		MANT_ENT_SAL_2	Analogue	Writeable
M012	TAR_AIN12	Analogue input delay 12	0	---	-20	20		MANT_ENT_SAL_2	Analogue	Writeable
M013	LIM_MIN_HUM	Minimum humidity signal limit for alarm	0	% RH	0	100		MANT_ENT_SAL_3	Analogue	Writeable
M014	LIM_MAX_HUM	Maximum humidity signal limit for alarm	100	% RH	0	100		MANT_ENT_SAL_3	Analogue	Writeable
M015	LIM_MIN_PRES	Minimum pressure signal limit for alarm	0	Bara	-99,9	99,9		MANT_ENT_SAL_3	Analogue	Writeable
M016	LIM_MAX_PRES	Maximum pressure signal limit for alarm	45	Bara	0	99,9		MANT_ENT_SAL_3	Analogue	Writeable
M017	AIN1	View analogue input 1	0	---	0	999,9		MANT_ENT_SAL_4	Analogue	Readable
M018	AIN2	View analogue input 2	0	---	0	999		MANT_ENT_SAL_4	Analogue	Readable
M019	AIN3	View analogue input 3	0	---	0	999,9		MANT_ENT_SAL_4	Analogue	Readable
M020	AIN4	View analogue input 4	0	---	0	999,9		MANT_ENT_SAL_4	Analogue	Readable
M021	AIN5	View analogue input 5	0	---	0	999,9		MANT_ENT_SAL_4	Analogue	Readable
M022	AIN6	View analogue input 6	0	---	0	999,9		MANT_ENT_SAL_4	Analogue	Readable
M023	AIN7	View analogue input 7	0	---	0	999,9		MANT_ENT_SAL_5	Analogue	Readable
M024	AIN8	View analogue input 8	0	---	0	999,9		MANT_ENT_SAL_5	Analogue	Readable
M025	AIN9	View analogue input 9	0	---	0	999,9		MANT_ENT_SAL_5	Analogue	Readable
M026	AIN10	View analogue input 10	0	---	0	999,9		MANT_ENT_SAL_5	Analogue	Readable
M027	AIN11	View analogue input 11	0	---	0	999,9		MANT_ENT_SAL_5	Analogue	Readable
M028	AIN12	View analogue input 12	0	---	0	999,9		MANT_ENT_SAL_5	Analogue	Readable
M029	AOUT1_VIRT	View analogue output 1	0	---	0	1000		MANT_ENT_SAL_6	Integer	Readable
M030	AOUT2_VIRT	View analogue output 2	0	---	0	1000		MANT_ENT_SAL_6	Integer	Readable
M031	AOUT3_VIRT	View analogue output 3	0	---	0	1000		MANT_ENT_SAL_6	Integer	Readable
M032	AOUT4_VIRT	View analogue output 4	0	---	0	1000		MANT_ENT_SAL_6	Integer	Readable
M033	MAN_VENT_INT	MANUAL operation of the indoor fan	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_7	Digital	Writeable
M034	MAN_COMPRESOR_1	MANUAL operation of compressor 1 from circuit 1	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_7	Digital	Writeable
M035	MAN_COMPRESOR_2	MANUAL operation of compressor 1, circuit 2 (or compressor 2 for one circuit units)	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_7	Digital	Writeable
M036	MAN_COMPRESOR_3	MANUAL operation of compressor 2, circuit 1 (or compressor 2 for one circuit units)	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_7	Digital	Writeable
M037	MAN_COMPRESOR_4	MANUAL operation of compressor 2 from circuit 2	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_7	Digital	Writeable
M038	MAN_VIC_1	MANUAL operation of 4-way valve for circuit 1	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_8	Digital	Writeable
M039	MAN_VIC_2	MANUAL operation of 4-way valve for circuit 2	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_8	Digital	Writeable

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
M040	MAN_RESISTENCIA_1	MANUAL operation of heater 1	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_8	Digital	Writeable
M041	MAN_RESISTENCIA_2	MANUAL operation of heater 2	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_8	Digital	Writeable
M042	MAN_AOUT1	Manual activation of analogue output 1	0	%	0	100		MANT_ENT_SAL_9	Integer	Writeable
M043	MAN_AOUT2	Manual activation of analogue output 2	0	%	0	100		MANT_ENT_SAL_9	Integer	Writeable
M044	MAN_AOUT3	Manual activation of analogue output 3	0	%	0	100		MANT_ENT_SAL_9	Integer	Writeable
M045	MAN_AOUT4	Manual activation of analogue output 4	0	%	0	100		MANT_ENT_SAL_9	Integer	Writeable
M046	MAN_DESESCARCHE_1	MANUAL operation of defrosting for circuit 1	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_10	Digital	Writeable
M047	MAN_DESESCARCHE_2	MANUAL operation of defrosting for circuit 1	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_10	Digital	Writeable
M048	TIME_PROX_DES_C1	Timing for next defrosting for circuit 1 (minutes)	0	min	0	60		MANT_ENT_SAL_12	Integer	Readable
M049	TIME_PROX_DES_C2	Timing for next defrosting for circuit 1 (minutes)	0	min	0	60		MANT_ENT_SAL_12	Integer	Readable
M050	TIME_ENTRE_DES_C1	Timing between defrosting operations for circuit 1 (minutes)	0	min	0	60		MANT_ENT_SAL_12	Integer	Readable
M051	TIME_ENTRE_DES_C2	Timing between defrosting operations for circuit 2 (minutes)	0	min	0	60		MANT_ENT_SAL_12	Integer	Readable
M052	SET_RENOVACION_AIRE	Setpoint for air refreshing	0	---	0	99		MANT_ENT_SAL_13	Integer	Readable
M053	CAL_RENOVACION_AIRE	Calculation of the refreshing based on the return, outdoor and mixed air	0	---	0	99		MANT_ENT_SAL_13	Integer	Readable
M054	COMPUERTA_APERT_1	Intermediate value for calculating the opening	0	---	0	100		MANT_ENT_SAL_13	Integer	Readable
M055	TIME_CAL_APERT_COMP	Time for calculating the opening of the damper	60	s	0	99		MANT_ENT_SAL_13	Integer	Writeable
M056	CTE_CAL_APERT_COMP	Constant for calculating the opening of the damper	3	%	0	99		MANT_ENT_SAL_13	Integer	Writeable
---	DIF_TEMP_RENOVACION_CAL	Difference between mixed air temperature and return, and between mixed air temperature and outdoor for refreshing calculation	2	°C	0	99		MANT_ENT_SAL_13	Integer	Writeable
M057	HAB_FILTRO1	Enable the probe filter	0	---	0	1	0: No 1: Yes	MANT_ENT_SAL_14	Digital	Writeable
M058	TIME_FILTRO1	Timing for the probe filter	1	s	0	99		MANT_ENT_SAL_14	Integer	Writeable
M059	DT_FILTRO1	Difference for the probe filter	1	---	0	9		MANT_ENT_SAL_14	Analogue	Writeable

18.6. Parameters in the M100 menu: maintenance displays (counters)

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
M101	N_HOR_VINT_H_X	Number of hours of the indoor fan (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M102	N_HOR_VINT_L_X	Number of hours of the indoor fan (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M103	N_HOR_COMP1_H_X	Number of hours of compr. 1, circuit 1 (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M104	N_HOR_COMP1_L_X	Number of hours of compr. 1, circuit 1 (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M105	N_HOR_COMP2_H_X	Number of hours of compressor 1, circuit 2 (or compressor 2 for one circuit units) (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M106	N_HOR_COMP2_L_X	Number of hours of compressor 1, circuit 2 (or compressor 2 for one circuit units) (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M107	N_HOR_COMP3_H_X	Number of hours of compr. 2, circuit 1 (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M108	N_HOR_COMP3_L_X	Number of hours of compr. 2, circuit 1 (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M109	N_HOR_COMP4_H_X	Number of hours of compr. 2, circuit 2 (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M110	N_HOR_COMP4_L_X	Number of hours of compr. 2, circuit 2 (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M111	N_HOR_RES_ELEC1_H_X	Number of hours of electrical heater 1 (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M112	N_HOR_RES_ELEC1_L_X	Number of hours of electrical heater 1 (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M113	N_HOR_RES_ELEC2_H_X	Number of hours of electrical heater 2 (high level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M114	N_HOR_RES_ELEC2_L_X	Number of hours of electrical heater 2 (low level)	0	h	0	999		MANT_CONT_1	Integer	Readable
M115	N_ARR_VINT_H	Number of indoor fan starts (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M116	N_ARR_VINT_L	Number of indoor fan starts (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M117	N_ARR_COMP1_H	Number of starts compressor 1, circuit 1 (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M118	N_ARR_COMP1_L	Number of starts compressor 1, circuit 1 (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M119	N_ARR_COMP2_H	Number of starts compressor 1, circuit 2 (or compressor 2 for one circuit units) (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M120	N_ARR_COMP2_L	Number of compressor 1 from circuit 2 (or compressor 2 for one circuit units) starts (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M121	N_ARR_COMP3_H	Number of starts compressor 2, circuit 1 (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M122	N_ARR_COMP3_L	Number of starts compressor 2, circuit 1 (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M123	N_ARR_COMP4_H	Number of starts compressor 2, circuit 2 (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M124	N_ARR_COMP4_L	Number of starts compressor 2, circuit 2 (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M125	N_ARR_RES1_H	Number of heater 1 starts (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M126	N_ARR_RES1_L	Number of heater 1 starts (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M127	N_ARR_RES2_H	Number of heater 2 starts (high level)	0	---	0	99		MANT_CONT_2	Integer	Readable
M128	N_ARR_RES2_L	Number of heater 2 starts (low level)	0	---	0	9999		MANT_CONT_2	Integer	Readable
M129	N_DES_C1_L	Number of defrosting operations for circuit 1 (low level)	0	---	0	9999		MANT_CONT_3	Integer	Readable
M130	N_SEG_ULT_DES_C1	Number of seconds for final defrosting for circuit 1	0	s	0	999		MANT_CONT_3	Integer	Readable
M131	CONTADOR_TED_C1	Counter of time between the last two defrosting operations for circuit 1		min	0	9999		MANT_CONT_4	Integer	Readable
M132	N_DES_C2_L	Number of defrosting operations for circuit 2 (low level)	0	---	0	9999		MANT_CONT_4	Integer	Readable
M133	N_SEG_ULT_DES_C2	Number of seconds for final defrosting for circuit 2	0	s	0	999		MANT_CONT_4	Integer	Readable
M134	CONTADOR_TED_C2	Counter of time between the last two defrosting operations for circuit 2		min	0	9999		MANT_CONT_4	Integer	Readable
M135	N_AL_AP1	Number of high pressure alarms for circuit 1	0	---	0	9999		MANT_CONT_5	Integer	Readable
M136	N_AL_AP2	Number of high pressure alarms for circuit 2	0	---	0	9999		MANT_CONT_5	Integer	Readable
M137	N_AL_BP1	Number of low pressure alarms for circuit 1	0	---	0	9999		MANT_CONT_5	Integer	Readable
M138	N_AL_BP2	Number of low pressure alarms for circuit 2	0	---	0	9999		MANT_CONT_5	Integer	Readable

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/Writing
M139	N_AL_KLD1	Number of discharge alarms compressor circuit 1	0	---	0	9999		MANT_CONT_5	Integer	Readable
M140	N_AL_KLD2	Number of discharge alarms compressor circuit 2	0	---	0	9999		MANT_CONT_5	Integer	Readable
M141	N_AL_TERM_VENT_INT	Number of indoor fan thermal alarms	0	---	0	9999		MANT_CONT_6	Integer	Readable
M142	N_AL_TERM_RES_ELECTRICA	Number of alarms for thermistor of the electrical heaters	0	---	0	9999		MANT_CONT_6	Integer	Readable
M143	N_AL_TERM_COMP_VEXT_1	Number of alarms for the compressor and outdoor fan thermal of circuit 1	0	---	0	9999		MANT_CONT_6	Integer	Readable
M144	N_AL_TERM_COMP_VEXT_2	Number of alarms for the compressor and outdoor fan thermal of circuit 2	0	---	0	9999		MANT_CONT_6	Integer	Readable
M145	N_AL_FUGA_REFRIG_C1	Number of alarms for refrigerant leakage for circuit 1	0	---	0	9999		MANT_CONT_6	Integer	Readable
M146	N_AL_FUGA_REFRIG_C2	Number of alarms for refrigerant leakage for circuit 2	0	---	0	9999		MANT_CONT_6	Integer	Readable
M147	N_AL_ANTIESCARCHE_C1	Number of anti-freeze alarms for circuit 1	0	---	0	9999		MANT_CONT_7	Integer	Readable
M148	N_AL_ANTIESCARCHE_C2	Number of anti-freeze alarms for circuit 2	0	---	0	9999		MANT_CONT_7	Integer	Readable
M149	N_AL_ANTIHIELO_BAC	Number of alarms for anti-freeze thermostat for the hot water coil	0	---	0	9999		MANT_CONT_7	Integer	Readable
M150	N_AL_ANTIHIELO_AGUA	Number of alarms due to low temperature outlet water	0	---	0	9999		MANT_CONT_7	Integer	Readable
M151	N_AL_BOMBA_CONDENSADOS	Number of alarms for condensate pump	0	---	0	9999		MANT_CONT_7	Integer	Readable
M152	N_AL_CAUDAL_AGUA	Number of alarms for water flow switch	0	---	0	9999		MANT_CONT_7	Integer	Readable
M153	N_AL_T_P_BINT_C1	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_8	Integer	Readable
M154	N_AL_T_P_BINT_C2	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_8	Integer	Readable
M155	N_AL_T_P_BEXT_C1	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_8	Integer	Readable
M156	N_AL_T_P_BEXT_C2	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_8	Integer	Readable
M157	N_AL_TEMP_DESC_C2	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_8	Integer	Readable
M158	N_AL_TEMP_DESC_C1	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_8	Integer	Readable
M159	N_AL_HUM_REG	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_9	Integer	Readable
M160	N_AL_HUM_EXT	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_9	Integer	Readable
M161	N_AL_TEMP_REG	Number of alarms for opening or short-circuiting control probe	0	---	0	9999		MANT_CONT_9	Integer	Readable
M162	N_AL_TEMP_EXT	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_9	Integer	Readable
M163	N_AL_TEMP_IMP	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_9	Integer	Readable
M164	N_AL_TEMP_MEZCLA	Number of alarms for opening or short-circuiting probe	0	---	0	9999		MANT_CONT_9	Integer	Readable
M165	RESET_ON_HORAS	Reset the counter for number of hours of operation	0	---	0	1	0: No 1: Yes	MANT_CONT_10	Digital	Writeable
M166	RESET_ON_CONT	Reset the counter of starts of motors and heaters	0	---	0	1	0: No 1: Yes	MANT_CONT_10	Digital	Writeable
M167	RESET_DES_CONT	Reset the counter of defrosting operations	0	---	0	1	0: No 1: Yes	MANT_CONT_10	Digital	Writeable
M168	RESET_ON_CONT_AL	Reset the counter of alarms	0	---	0	1	0: No 1: Yes	MANT_CONT_10	Digital	Writeable
M169	N_AL_INCENDIO	Number of serious alarms anti-fire thermostat	0	---	0	9999		MANT_CONT_7	Integer	Readable
M170	N_AL_ANTIHIELO_REF_C1	Number of anti-freeze alarms refrigerant circuit 1	0	---	0	9999		MAINT_COUNT_71	Integer	Readable
M171	N_AL_ANTIHIELO_REF_C2	Number of anti-freeze alarms refrigerant circuit 2	0	---	0	9999		MAINT_COUNT_71	Integer	Readable
M172	N_AL_BQ_ANTIHIELO	Number of unit blocking due to anti-freeze alarm	0	---	0	9999		MAINT_COUNT_71	Integer	Readable
M173	N_JUMP_INICIAL	Number of electrical power supply cuts	0	---	0	9999		MAINT_COUNT_71	Integer	Readable

18.7. Parameters in the C000 menu: unit configuration displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C001	TIPO_EQUIPO	Selection of the unit type	0	---	0	1	0: Air-Air 1: Water-Air	CONF_UNIDAD_1	Integer	Writeable
C002	TIPO_MAQUINA	Selection of the machine type	1	---	0	1	0: Only Cooling 1: Rev. Heat pump	CONF_UNIDAD_1	Integer	Writeable
C003	NUM_CIRCUITOS	Number of circuits installed	1	---	1	2		CONF_UNIDAD_2	Integer	Writeable
C004	NUM_COMPRESORES	Number of compressors installed	1	---	1	4		CONF_UNIDAD_2	Integer	Writeable
C005	HAB_UNICO_VOL_AIRE_EXT	Selection of the single volume of outdoor air operation	1	---	0	1	0: Double 1: Single	CONF_UNIDAD_2	Digital	Writeable
C006	NUM_RESISTENCIAS	Number of back-up electrical heaters installed	0	---	0	4	0: No 1: 1 stage 2: 2 stages 3: 3 stages 4: Proportional	CONF_UNIDAD_2	Integer	Writeable
C007	TIPO_VENT_INT	Type of indoor fan	1	---	1	4	0: --- 1: Centrifugal 2: Cent. DD / radial 3: 3-speed 4: Electronic	CONF_UNIDAD_3	Integer	Writeable
C008	MAX_AOUT_VENT_INT_FRIO	Maximum analogue output for the indoor fan in COOLING mode	100	%	30	100		CONF_UNIDAD_3	Analogue	Writeable
C009	MAX_AOUT_VENT_INT_CALOR	Maximum analogue output for the indoor fan in HEATING mode	100	%	30	100		CONF_UNIDAD_3	Analogue	Writeable
C010	TIPO_VENT_EXT	Type of outdoor fan	1	---	1	4	0: --- 1: Centrifugal 2: Axial / radial 3: 2-speed 4: Electronic	CONF_UNIDAD_4	Integer	Writeable
C011	MAX_AOUT_VENT_EXT_FRIO	Maximum analogue output for the outdoor fan in COOLING mode	100	%	30	100		CONF_UNIDAD_4	Analogue	Writeable
C012	MAX_AOUT_VENT_EXT_CALOR	Maximum analogue output for the outdoor fan in HEATING mode	100	%	30	100		CONF_UNIDAD_4	Analogue	Writeable
C013	VAL_FIN_VEXT_ALTA_VEL_COND	Final value of the outdoor fan at high speed in condensation	27	Bara	0	50		CONF_UNIDAD_5	Analogue	Writeable
C014	VAL_INI_VEXT_ALTA_VEL_COND	Initial value of the outdoor fan at high speed in condensation	34	Bara	0	50		CONF_UNIDAD_5	Analogue	Writeable
C015	VAL_FIN_VEXT_ALTA_VEL_EVAP	Final value of the outdoor fan at high speed in evaporation	9	Bara	0	50		CONF_UNIDAD_5	Analogue	Writeable
C016	VAL_INI_VEXT_ALTA_VEL_EVAP	Initial value of the outdoor fan at high speed in evaporation	6	Bara	0	50		CONF_UNIDAD_5	Analogue	Writeable
C017	TIME_CAMBIO_VEL_VEXT	Timing for changing the speed of the outdoor fan	1	s	1	10		CONF_UNIDAD_5	Integer	Writeable
C018	MIN_AOUT_VENT_INT	Minimum analogue output for the indoor fan	0	%	0	100		CONF_UNIDAD_6	Analogue	Writeable
C019	MIN_AOUT_VENT_EXT	Minimum analogue output for the outdoor fan	0	%	0	100		CONF_UNIDAD_6	Analogue	Writeable
C020	HAB_COMP_REG_PRES_U_EXT	Enable damper for controlling the pressure of the outdoor unit	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_7	Digital	Writeable
C021	HAB_DIN_PB	Enable low pressure pressostat	1	---	0	1	0: No 1: Low press.	CONF_UNIDAD_8	Digital	Writeable
C022	TIPO_DIN5	Type of digital input 5	0	---	0	4	0: Therm. Heater 1: Defrosting 2: Indoor flow 3: Cond. pump 4: Anti-freeze HWC	CONF_UNIDAD_9	Integer	Writeable
C023	TIPO_DIN6	Type of digital input 6	1	---	0	1	0: Cooling/Heating 1: Clogged filter	CONF_UNIDAD_9	Integer	Writeable
C024	HAB_TEMP_IMP	Enable control of supply air temperature	1	---	0	1	0: No 1: Yes	CONF_UNIDAD_10	Digital	Writeable
C025	HAB_TEMP_EXT	Enable outdoor air probe	1	---	0	1	0: No 1: Yes	CONF_UNIDAD_10	Digital	Writeable

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C026	HAB_MEZCLA	Enable mixed air temperature probe	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_10	Digital	Readable
C027	HAB_T_P_BAT_INT	Enable indoor coil probe	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_11	Digital	Writeable
C028	HAB_TEMP_DES_COMP	Enable compressor discharge temperature probe	1	---	0	1	0: No 1: Yes	CONF_UNIDAD_11	Digital	Writeable
C029	HAB_TEMP_BINT	Enable indoor coil probe by temperature (remove pressure transducer)	1	---	0	1	0: Pressure 1: Temperature	CONF_UNIDAD_12	Digital	Writeable
C030	HAB_TEMP_BEXT	Enable outdoor coil probe by temperature (remove pressure transducer)	0	---	0	1	0: Pressure 1: Temperature	CONF_UNIDAD_12	Digital	Writeable
C031	TIPO_FREECOOLING	Type of free-cooling (thermal or enthalpic)	0	---	0	3	0: None 1: Thermal 2: Enthalpic 3: Thermal-enthalpic	CONF_UNIDAD_13	Integer	Writeable
C032	HAB_FREECOOLING_INV	Enable the unit to operate in free-cooling in winter	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_13	Digital	Writeable
C033	SET_IMPULSION_CALOR_APERT_COMP	Supply air setpoint in HEATING for opening the damper	30	°C	0	50		CONF_UNIDAD_14	Analogue	Writeable
C034	SET_RETORNO_CALOR_APERT_COMP	Return air setpoint in HEATING for opening the damper	15	°C	0	50		CONF_UNIDAD_14	Analogue	Writeable
C035	BANDA_RETORNO_CALOR_APERT_COMP	Control band of the return air setpoint in HEATING for opening the damper	2	°C	0	5		CONF_UNIDAD_14	Analogue	Writeable
C036	SET_IMPULSION_FRIO_APERT_COMP	Supply air setpoint in COOLING for opening the damper	20	°C	0	50		CONF_UNIDAD_15	Analogue	Writeable
C037	SET_RETORNO_FRIO_APERT_COMP	Return air setpoint in COOLING for opening the damper	31	°C	0	50		CONF_UNIDAD_15	Analogue	Writeable
C038	BANDA_RETORNO_FRIO_APERT_COMP	Control band of the return air setpoint in COOLING for opening the damper	2	°C	0	5		CONF_UNIDAD_15	Analogue	Writeable
C039	SET_MEZCLA	Mixed air temperature setpoint for calculating the maximum refreshing allowed	12	°C	0	50		CONF_UNIDAD_16	Analogue	Writeable
C040	HAB_VALVULA_CALOR	Enable hot water coil valve	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_17	Digital	Writeable
C041	HAB_VALVULA_CALOR_ON_OFF	Enable hot water coil valve on-off	0	---	0	1	0: Proportional 1: On/off	CONF_UNIDAD_17	Digital	Writeable
C042	HAB_PRIORIDAD_BAC	Enable priority for HWC before the compressors operate	0	---	0	1		CONF_UNIDAD_17	Digital	Writeable
C043	SET_BAJ_TEMP_EXT_BAC	Outdoor hot water coil low temperature setpoint	4	°C	-10	10		CONF_UNIDAD_18	Analogue	Writeable
C044	HAB_VIC_ON_CALOR	Enable 4-way valve setpoint on HEATING	0	---	0	1	0: Cool 1: Heating	CONF_UNIDAD_19	Digital	Writeable
C045	TIPO_REFRIGERANTE	Type of refrigerant	4	---	0	4	0: R22 1: R134A 2: R404A 3: R407C 4: R410A	CONF_UNIDAD_19	Integer	Writeable
C046	PUNTO_ROCIO_BURBUJA	Value for calculating the temperature (0=dew, 1=boiling)	0	---	0	1	0: Dew 1: Boiling	CONF_UNIDAD_19	Digital	Writeable
C047	HAB_ECONFORT	Enable Ecomfort operation	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_20	Digital	Writeable
C048	HAB_DESHUM_HUMEDAD	Enable dehumidification by humidity	0	---	0	1	0: Temperature 1: Humidity	CONF_UNIDAD_20	Digital	Writeable
C049	HAB_COMP_REG_PRES_U_INT	Enable damper for controlling the pressure of the indoor unit	0	---	0	1	0: No 1: Yes	CONF_UNIT_71	Digital	Writeable
C050	HAB_RES_SIN_COMPRESOR	Enable electrical heater instead of the compressor	0	---	0	1	0: No 1: Yes	CONF_UNIDAD_2	Digital	Writeable
C051	MAX_APERTURA_COMPUERTA	Maximum opening of the outdoor air damper	100	%	0	100		CONF_UNIDAD_13	Analogue	Writeable

18.8. Parameters in the C100 menu: defrosting configuration displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C101	HAB_DES_TIEMPO	Enabling defrosting by time	0	---	0	1	0: No 1: Yes	CONF_DES_1	Digital	Writeable
C102	HAB_DES_MIN	Enable defrosting by minimum temperature or pressure	1	---	0	1	0: No 1: Yes	CONF_DES_1	Digital	Writeable
C103	HAB_DES_DIF	Enable defrosting by difference with outdoor temp.	1	---	0	1	0: No 1: Yes	CONF_DES_1	Digital	Writeable
C104	TIME_MIN_ENTRE_DES	Minimum timing between defrosting operations	20	min	1	60		CONF_DES_2	Integer	Writeable
C105	TIME_MAX_ENTRE_DES	Maximum timing between defrosting operations	40	min	1	60		CONF_DES_2	Integer	Writeable
C106	TIME_RED_ENTRE_DES	Timing reduction between defrosting operations	5	min	1	60		CONF_DES_2	Integer	Writeable
C107	NUM_DES_INT	Number of defrosting operations for intelligent defrosting	2	---	1	20		CONF_DES_2	Integer	Writeable
C108	VAL_DES_MIN	Mandatory value for starting the defrosting by minimum temperature or pressure	2,5	Bar / °C	-25	50		CONF_DES_3	Analogue	Writeable
C109	TIME_MAX_DUR_DES_MIN	Maximum time duration for defrosting by minimum pressure or temperature	240s - fan.out cent 240s - No fan.out. centrifugal	s	60	600		CONF_DES_3	Integer	Writeable
C110	VAL_DES_DIF	Difference value with outdoor temp. for mandatory start of the defrosting	16	°C	0	20		CONF_DES_4	Analogue	Writeable
C111	TIME_MAX_DUR_DES_DIF	Maximum time duration for defrosting by difference with outdoor temperature	90s - fan.out cent 120s - No fan.out. centrifugal	s	60	600		CONF_DES_4	Integer	Writeable
C112	TIME_DES_C1_2	Timing between defrosting of circuit 1 and circuit 2	90	s	0	999		CONF_DES_5	Integer	Writeable
C113	TIME_ENTRE_DES_DIF	Time between defrosting operations by difference between outdoor temp. and evaporation temp.	20	min	0	99		CONF_DES_5	Integer	Writeable
C114	VAL_ON_VEXT_DES_OBL	On value of the outdoor fan by defrosting by low pressure	35	Bara	0	50		CONF_DES_5	Analogue	Writeable
C115	VAL_OFF_VEXT_DES_OBL	OFF value of the outdoor fan by defrosting by low pressure	33	Bara	0	50		CONF_DES_5	Analogue	Writeable
---	HAB_ON_VEXT_INI_DES	Enabling outdoor fan operation to start the defrosting	1	---	0	1	0: No 1: Yes	CONF_DES_6b	Digital	Writeable
---	TIME_ON_VEXT_INI_DES	Operating time outdoor fan to start the defrosting	45	s	0	120		CONF_DES_6b	Integer	Writeable
C116	VAL_INI_DES	Initial value for defrosting operation	5,6	Bar / °C	-10	50		CONF_DES_6	Analogue	Writeable
C117	VAL_FIN_DES	Final value for defrosting operation	33	Bar / °C	0	50		CONF_DES_6	Analogue	Writeable
C118	TIME_RET_INICIO_DES	Time delay for starting defrosting	90	s	0	240		CONF_DES_7	Integer	Writeable
C119	TIME_MIN_DUR_DES	Minimum timing for duration of defrosting	30	s	10	120		CONF_DES_7	Integer	Writeable
C120	TIME_MAX_DUR_DES	Maximum timing for duration of defrosting	10	min	1	20		CONF_DES_7	Integer	Writeable
C121	HAB_FIN_DES_POR_MIN	End of defrosting by the lowest temp. or pressure (single volume of air)	0	---	0	1	0: No 1: Yes	CONF_DES_8	Digital	Writeable
C122	HAB_OFF_VINT_DESESCARCHE	Enable indoor fan stoppage during defrosting	0	---	0	1	0: No 1: Yes	CONF_DES_8	Digital	Writeable
C123	HAB_RES_DESESCARCHE	Enable electrical heaters during defrosting	0	---	0	1		CONF_DES_9	Digital	Writeable
C124	NUM_RES_DESESCARCHE	Number of heaters during defrosting	0	---	0	2		CONF_DES_9	Integer	Writeable
C125	HAB_BAC_DESESCARCHE	Enable hot water coil during defrosting	0	---	0	1		C O N F _ DES_10	Digital	Writeable
C126	VAL_BAC_DESESCARCHE	Value of the hot water coil valve during defrosting	100	%	0	100		C O N F _ DES_10	Integer	Writeable
C127	HAB_DOUT_DESESCARCHE	Enable unit output signal while defrosting	0	---	0	1	0: No 1: Yes	C O N F _ DES_11	Digital	Writeable
C128	SET_TEXT_VEXT_OFF_DES	Outdoor temp. setpoint below the start of the outdoor fan is not permitted during defrosting	-6	°C	-10	10		CONF_DES_6	Analogue	Writeable

18.9. Parameters in the C200 menu: compressor configuration displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C201	TIME_MIN_OFF_COMP	Minimum stop time for a compressor	180	s	0	360		CONF_COMP_1	Integer	Writeable
C202	TIME_MIN_ON_COMP	Minimum operating time for a compressor	120	s	0	360		CONF_COMP_1	Integer	Writeable
C203	TIME_MIN_ON_ON_COMP	Minimum time between 2 starts of the compressor	300	s	0	360		CONF_COMP_2	Integer	Writeable
C204	TIME_MIN_ON_ON_COMP_DIST	Minimum time between 2 start-ups of different compressors	60	s	0	60		CONF_COMP_2	Integer	Writeable
C205	HAB_ROT_COMP	Enabling of the compressor rotation	1	---	0	1	0: No 1: Yes	CONF_COMP_3	Digital	Writeable
C206	TIME_RET_COMP_TRAS_VINT	Time delay for ON of compressor after ON of indoor fan	30	s	0	120		CONF_COMP_3	Integer	Writeable
---	TIME_RET_ON_COMP_ON_VEXT	Delay of the start-up of the compressors with regard to the outdoor fan	10	s	10	120		CONF_COMP_3	Integer	
C207	HAB_OFF_COMPRESOR_DES	Enable the compressor to be stopped by the defrosting operation	1	---	0	1	0: No 1: Yes	CONF_COMP_4	Digital	Writeable
C208	TIME_OFF_COMP_DES	Timing for the compressor during the defrosting	45	s	0	120		CONF_COMP_4	Integer	Writeable
C209	TIME_CAMBIO_V4V	Time to change the 4-way valve after stopping the compressor	30	s	0	120		CONF_COMP_5	Integer	Writeable
C210	HAB_OFF_COMPRESOR_CAMBIO_F_C	Enable stoppage for the compressor with COOLING/HEATING change	1	---	0	1	0: No 1: Yes	CONF_COMP_6	Digital	Writeable
C211	TIME_OFF_COMP_CAMBIO_F_C	Time stoppage for the compressor by COOLING/HEATING change	180	s	0	360		CONF_COMP_6	Integer	Writeable
C212	TIPO_BLOQ_COMP_VER	Compressor block type in summer with free-cooling	0	---	0	2	0: No 1: By outdoor setpoint 2: By diff. Ret.T-Out. T	CONF_COMP_7	Integer	Writeable
C213	SET_BLOQ_COMP_VER	Block compressor setpoint in summer with free-cooling with low outdoor temperature	10	°C	0	50		CONF_COMP_7	Analogue	Writeable
C214	VAL_DIF_BLOQ_COMP_VER	Differential between outdoor and return air temps. for blocking compressor in summer by free-cooling	14	°C	0	50		CONF_COMP_7	Analogue	Writeable
C215	HAB_BLOQ_COMP_INV	Enable compressor blocking in winter based on the outdoor temperature	0	---	0	1	0: No 1: Yes	CONF_COMP_8	Digital	Writeable
C216	SET_BLOQ_COMP_INV	Block compressor setpoint in winter due to low outdoor temperature	-10	°C	-20	20		CONF_COMP_8	Analogue	Writeable

18.10. Parameters in the C300 menu: control configuration displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C301	CONTROL_P_PI	Type of control: proportional or proportional + integral	0	---	0	1	0: P 1: P+I	CONF_CONTROL_1	Digital	Writeable
C302	TIME_INTEGRACION	Integration time for P+I control	600	s	0	999		CONF_CONTROL_1	Integer	Writeable
C303	CONTROL_P_PI_IMP	Type of control: proportional or proportional + integral for supply air	1	---	0	1	0: P 1: P+I	CONF_CONTROL_2	Digital	Writeable
C304	TIME_INTEGRACION_IMP	Integration time for P+I control for supply air	120	s	0	999		CONF_CONTROL_2	Integer	Writeable
C305	VAL_INI_LIM_TEMP_IMP_FRIO	Initial temperature limit value for supply air in COOLING mode	7	°C	0	30		CONF_CONTROL_3	Analogue	Writeable
C306	VAL_DIF_LIM_TEMP_IMP_FRIO	Differential temperature limit value for supply air in COOLING mode	5	°C	0	20		CONF_CONTROL_3	Analogue	Writeable
C307	VAL_INI_LIM_TEMP_IMP_CALOR	Initial temperature limit value for supply air in HEATING mode	45	°C	0	60		CONF_CONTROL_4	Analogue	Writeable
C308	VAL_DIF_LIM_TEMP_IMP_CALOR	Differential temperature limit value for supply air in HEATING mode	5	°C	0	20		CONF_CONTROL_4	Analogue	Writeable
C309	HAB_C_EVAP_VENT_INT	Enable evaporation control in indoor fan	0	---	0	1	0: No 1: Yes	CONF_CONTROL_5	Digital	Writeable

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C310	VAL_INI_C_EVAP_VINT	Evaporation control setpoint of the indoor fan	10.0°C	bar / °C	0	99,9		CONF_CONTROL_5	Analogue	Writeable
C311	VAL_FIN_C_EVAP_VINT	Evaporation control band of the indoor fan	6.0°C	bar / °C	0	99,9		CONF_CONTROL_5	Analogue	Writeable
C312	HAB_C_COND_VENT_INT	Enable condensation control in indoor fan	0	---	0	1	0: No 1: Yes	CONF_CONTROL_6	Digital	Writeable
C313	VAL_INI_C_COND_VINT	Condensation control setpoint of the indoor fan	45.0°C	bar / °C	0	99,9		CONF_CONTROL_6	Analogue	Writeable
C314	VAL_FIN_C_COND_VINT	Condensation control band of the indoor fan	10.0°C	bar / °C	0	99,9		CONF_CONTROL_6	Analogue	Writeable
C315	HAB_C_EVAP_VENT_EXT	Enable evaporation control in outdoor fan	0	---	0	1	0: No 1: Yes	CONF_CONTROL_7	Digital	Writeable
C316	VAL_INI_C_EVAP_VEXT	Evaporation control setpoint of the outdoor fan	10.0 bar	bar / °C	0	99,9		CONF_CONTROL_7	Analogue	Writeable
C317	VAL_FIN_C_EVAP_VEXT	Evaporation control setpoint of the outdoor fan	2.0 bar	bar / °C	0	99,9		CONF_CONTROL_7	Analogue	Writeable
C318	HAB_C_COND_VENT_EXT	Enable condensation control in outdoor fan	0	---	0	1	0: No 1: Yes	CONF_CONTROL_8	Digital	Writeable
C319	VAL_INI_C_COND_VEXT	Condensation control setpoint of the outdoor fan	27.0 bar	bar / °C	0	99,9		CONF_CONTROL_8	Analogue	Writeable
C320	VAL_FIN_C_COND_VEXT	Condensation control band of the outdoor fan	8.0 bar	bar / °C	0	99,9		CONF_CONTROL_8	Analogue	Writeable
C321	TIME_VINT_ON_MAX	Time for maximum fan speed before condensation/evaporation control	120s 30s (electronic or damper)	s	0	240		CONF_CONTROL_9	Integer	Writeable
C322	TIME_VEXT_ON_MAX	Time for maximum fan speed before condensation/evaporation control	120s 30s (electronic or damper)	s	0	240		CONF_CONTROL_9	Integer	Writeable
C323	TIME_OFF_VINT_FRIO	Time for STOPPING indoor fan in COOLING mode	10	s	0	120		CONF_CONTROL_10	Integer	Writeable
C324	TIME_OFF_VINT_CALOR	Time for STOPPING indoor fan in HEATING mode	60	s	0	120		CONF_CONTROL_10	Integer	Writeable
C325	TIME_OFF_VEXT_FRIO	Time for STOPPING outdoor fan in COOLING mode	60	s	0	120		CONF_CONTROL_11	Integer	Writeable
C326	TIME_OFF_VEXT_CALOR	Time for STOPPING outdoor fan in HEATING mode	60	s	0	120		CONF_CONTROL_11	Integer	Writeable
C327	HAB_VINT_CONT_ON_OFF	Enabling operation of fan in CONTINUOUS mode with ON-OFF cycles	0	---	0	1	0: No 1: Yes	CONF_CONTROL_12	Digital	Writeable
C328	TIME_VINT_CONT_OFF	Time for indoor fan in continuous mode OFF	1	min	0	10		CONF_CONTROL_12	Integer	Writeable
C329	TIME_VINT_CONT_ON	Time for indoor fan in continuous mode ON	1	min	0	10		CONF_CONTROL_12	Integer	Writeable
C330	CONTROL_P_PI_C_EVAP_VINT	Control type P or P+I for evaporation control indoor unit	0: P 1: P+I (electron. or damper)	---	0	1	0: P 1: P+I	CONF_CONTROL_5	Digital	Writeable
C331	TIME_INT_C_EVAP_VINT	Integration time for PI control for evaporation control indoor unit	120 s	s	0	999		CONF_CONTROL_5	Integer	Writeable
C332	CONTROL_P_PI_C_COND_VINT	Control type P or P+I for condensation control indoor unit	0: P 1: P+I (electron. or damper)	---	0	1	0: P 1: P+I	CONF_CONTROL_6	Digital	Writeable
C333	TIME_INT_C_COND_VINT	Integration time for PI control for condensation control indoor unit	120 s	s	0	999		CONF_CONTROL_6	Integer	Writeable
C334	CONTROL_P_PI_C_EVAP_VEXT	Control type P or P+I for evaporation control outdoor unit	0: P 1: P+I (electron. or damper)	---	0	1	0: P 1: P+I	CONF_CONTROL_7	Digital	Writeable
C335	TIME_INT_C_EVAP_VEXT	Integration time for PI control for evaporation control outdoor unit	120 s	s	0	999		CONF_CONTROL_7	Integer	Writeable
C336	CONTROL_P_PI_C_COND_VEXT	Control type P or P+I for condensation control outdoor unit	0: P 1: P+I (electron. or damper)	---	0	1	0: P 1: P+I	CONF_CONTROL_8	Digital	Writeable
C337	TIME_INT_C_COND_VEXT	Integration time for PI control for condensation control outdoor unit	120 s	s	0	999		CONF_CONTROL_8	Integer	Writeable

18.11. Parameters in the C400 menu: safety configuration displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/Writing
C401	VAL_INI_AL_BP_FRIO	Initial value of low pressure alarm in COOLING mode	-10	Bar/°C	-99	99		CONF_SEG_1	Analogue	Writeable
C402	VAL_FIN_AL_BP_FRIO	Final value of low pressure alarm in COOLING mode	10	Bar/°C	-99	99		CONF_SEG_1	Analogue	Writeable
C403	VAL_INI_AL_BP_CALOR	Initial value of low pressure alarm in HEATING mode	2	Bar/°C	-99	99		CONF_SEG_2	Analogue	Writeable
C404	VAL_FIN_AL_BP_CALOR	Final value of low pressure alarm in HEATING mode	4	Bar/°C	-99	99		CONF_SEG_2	Analogue	Writeable
C405	TIME_RET_AL_BP	Time delay for low pressure alarm	1	s	0	240		CONF_SEG_3	Integer	Writeable
C406	DESHAB_AL_PB_DES	Disable low pressure alarm in defrosting	0	---	0	1	0: No 1: Yes	CONF_SEG_3	Digital	Writeable
C407	VAL_INI_AL_AP	Initial value of high pressure alarm	41	Bara	0	99,9		CONF_SEG_4	Analogue	Writeable
C408	VAL_FIN_AL_AP	Final value of high pressure alarm	30	Bara	0	99,9		CONF_SEG_4	Analogue	Writeable
C409	HAB_AL_FUGA_REFRIG	Enable the refrigerant leak circuit	0	---	0	1	0: No 1: Yes	CONF_SEG_5	Digital	Writeable
C410	VAL_INI_AL_FUG_FRIO	Initial value of the refrigerant leak alarm in COOLING mode	21	°C	0	99,9		CONF_SEG_5	Analogue	Writeable
C411	VAL_INI_AL_FUG_CALOR	Initial value of the refrigerant leak alarm in HEATING mode	30	°C	0	99,9		CONF_SEG_5	Analogue	Writeable
C412	VAL_INI_AL_KLD	Initial value of the compressor discharge temperature alarm	135	°C	0	200		CONF_SEG_6	Analogue	Writeable
C413	VAL_FIN_AL_KLD	Final value of the compressor discharge temperature alarm	105	°C	0	200		CONF_SEG_6	Analogue	Writeable
C414	VAL_INI_AL_ANTIHIELO	Initial value of the anti-freeze alarm for water-air units	-2 (R410A) -6 (R407C)	°C	-10	50		CONF_SEG_7	Analogue	Writeable
C415	VAL_DIF_AL_ANTIHIELO	Initial value of the anti-freeze alarm for water-air units	8	°C	0	50		CONF_SEG_7	Analogue	Writeable
C416	VAL_INI_AL_ANTIESCARCHA	Initial value of the anti-freeze alarm	-1	°C	-10	50		CONF_SEG_8	Analogue	Writeable
C417	VAL_FIN_AL_ANTIESCARCHA	Final value of the anti-freeze alarm	10	°C	0	50		CONF_SEG_8	Analogue	Writeable
C418	TIME_RET_AL_ANTIESCARCHA	Time for the anti-freeze alarm	10	min	0	60		CONF_SEG_8	Integer	Writeable
C419	TIME_RET_AL_BOMBA_CONDENSADOS	Time delay for the condensate pump alarm	60	s	0	120		CONF_SEG_9	Integer	Writeable
C420	TIME_RET_AL_CAUDAL_AGUA	Time delay water or air flow alarm (centrifugal fan with electrical heater and pressure control damper)	60	s	0	120		CONF_SEG_9	Integer	Writeable
C421	TIME_RET_AL_TERM_VENT_INT	Time delay for alarm for indoor fan thermal	0 (standard) 30s (air flow switch)	s	0	60		CONF_SEG_9	Integer	Writeable
C422	SET_BAJ_TEMP	Low temp. setpoint for ambient or return air	10	°C	0	60		CONF_SEG_10	Analogue	Writeable
C423	SET_ALT_TEMP	High temp. setpoint for ambient or return air	50	°C	0	60		CONF_SEG_10	Analogue	Writeable
C424	SET_BAJ_TEMP_EXT	Low temperature setpoint for outdoor air	-10	°C	-20	60		CONF_SEG_11	Analogue	Writeable
C425	SET_ALT_TEMP_EXT	High temp. setpoint for ambient or return air	50	°C	0	60		CONF_SEG_11	Analogue	Writeable
C426	TIME_RET_AL_TEMP	Time delay alarm for high and low temperature	10	s	0	99		CONF_SEG_12	Integer	Writeable
C427	VAL_INI_SEG_ECONFORT_FRIO	Initial safety device value in Ecomfort in COOLING mode	-4	°C	-9,9	9,9		CONF_SEG_13	Analogue	Writeable
C428	VAL_FIN_SEG_ECONFORT_FRIO	Final safety device value in Ecomfort in COOLING mode	3,5	°C	-9,9	9,9		CONF_SEG_13	Analogue	Writeable
C429	VAL_INI_SEG_ECONFORT_CALOR	Initial safety device value in Ecomfort in HEATING mode	55	°C	10	70		CONF_SEG_14	Analogue	Writeable
C430	VAL_FIN_SEG_ECONFORT_CALOR	Final safety device value in Ecomfort in HEATING mode	40	°C	10	70		CONF_SEG_14	Analogue	Writeable
C431	TIME_ON_COMP_HAB_ECO_RES	Time the compressor is on to enable the heaters	15	min	0	30		CONF_SEG_15	Integer	Writeable
C432	VAL_INI_SEG_ECONFORT_RES	Initial safety device value in Ecomfort in HEATING mode + heaters	47	°C	10	70		CONF_SEG_15	Analogue	Writeable
C433	VAL_FIN_SEG_ECONFORT_RES	Final safety device value in Ecomfort in HEATING mode + heaters	40	°C	10	70		CONF_SEG_15	Analogue	Writeable
C434	SET_AL_INCENDIO	Fire alarm setpoint (with return probe)	60.0°C	°C	40	80		CONF_SAFE_16		
C435	DIF_AL_INCENDIO	Fire alarm differential (return temperature)	20.0°C	°C	10	50		CONF_SAFE_16		
C436	OFF_COMPUERTA_AL_INCENDIO	Damper status during the anti-fire alarm	0	---	0	1	0:Open 1:Closed	CONF_SAFE_16		

18.12. Parameters in the C500 menu: alarm configuration displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/Writing
C501	HAB_RL_AL_VINT	Enable by alarm relay for indoor fan thermal	1	---	0	1	0: No 1: Yes	CONF_AL_1	Digital	Writeable
C502	HAB_RL_AL_AP	Enable by alarm relay due to high pressure failure	1	---	0	1	0: No 1: Yes	CONF_AL_1	Digital	Writeable
C503	HAB_RL_AL_BP	Enable by alarm relay due to low pressure failure	1	---	0	1	0: No 1: Yes	CONF_AL_1	Digital	Writeable
C504	HAB_RL_AL_COMP	Enable the alarm relay by compressor and outdoor fan thermal	1	---	0	1	0: No 1: Yes	CONF_AL_1	Digital	Writeable
C505	HAB_RL_AL_KLD	Enable the alarm relay by discharge temperature of the compressor	1	---	0	1	0: No 1: Yes	CONF_AL_1	Digital	Writeable
C506	HAB_RL_AL_FS	Enable the alarm relay due to clogged filter	1	---	0	1	0: No 1: Yes	CONF_AL_1	Digital	Writeable
C507	HAB_RL_AL_FRE	Enable the alarm relay due to refrigerant leak	1	---	0	1	0: No 1: Yes	CONF_AL_2	Digital	Writeable
C508	HAB_RL_AL_TRE	Enable the alarm relay by electrical heater thermistor	1	---	0	1	0: No 1: Yes	CONF_AL_2	Digital	Writeable
C509	HAB_RL_AL_IC	Enable the alarm relay by flow switch	1	---	0	1	0: No 1: Yes	CONF_AL_2	Digital	Writeable
C510	HAB_RL_AL_BAC	Enable the alarm relay by hot water coil anti-freeze	1	---	0	1	0: No 1: Yes	CONF_AL_2	Digital	Writeable
C511	HAB_RL_AL_AES	Enable the alarm relay due to anti-freeze leak	1	---	0	1	0: No 1: Yes	CONF_AL_2	Digital	Writeable
C512	HAB_RL_AL_AH	Enable the alarm relay by outlet water temperature	1	---	0	1	0: No 1: Yes	CONF_AL_2	Digital	Writeable
C513	HAB_RL_AL_TREG	Enable the alarm relay by high or low control temperature	1	---	0	1	0: No 1: Yes	CONF_AL_3	Digital	Writeable
C514	HAB_RL_AL_TEXT	Enable the alarm relay by high or low control outdoor air temperature	1	---	0	1	0: No 1: Yes	CONF_AL_3	Digital	Writeable
C515	HAB_RL_AL_BC	Enable the alarm relay due to condensate pump failure	1	---	0	1	0: No 1: Yes	CONF_AL_3	Digital	Writeable
C516	HAB_RL_AL_SRG	Enable the alarm relay by opening or short-circuiting control probes	1	---	0	1	0: No 1: Yes	CONF_AL_3	Digital	Writeable
C517	HAB_RL_AL_SCF	Enable the alarm relay by opening or short-circuiting control probes of the cooling circuit	1	---	0	1	0: No 1: Yes	CONF_AL_3	Digital	Writeable
C518	HAB_BQ_AL_AP	Enable high pressure alarm blocking	1	---	0	1	0: No 1: Yes	CONF_AL_4	Digital	Writeable
C519	NUM_VECES_BQ_AL_AP	Number of times to block the unit due to high pressure alarm	4	---	0	20		CONF_AL_4	Integer	Writeable
C520	TIME_BQ_AL_AP	Time in minutes to count the number of times an alarm occurs for blocking due to high pressure	30	min	0	1440		CONF_AL_4	Integer	Writeable
C521	HAB_BQ_AL_BP	Enable low pressure alarm blocking	1	---	0	1	0: No 1: Yes	CONF_AL_5	Digital	Writeable
C522	NUM_VECES_BQ_AL_BP	Number of times to block the unit due to low pressure alarm	4	---	0	20		CONF_AL_5	Integer	Writeable
C523	TIME_BQ_AL_BP	Time in minutes to count the number of times an alarm occurs for blocking due to low pressure	30	min	0	1440		CONF_AL_5	Integer	Writeable
C524	HAB_BQ_AL_TERM	Enable blocking of thermal alarm	1	---	0	1	0: No 1: Yes	CONF_AL_6	Digital	Writeable
C525	NUM_VECES_BQ_AL_TERM	Number of times to block the unit due to thermal alarm	4	---	0	20		CONF_AL_6	Integer	Writeable
C526	TIME_BQ_AL_TERM	Time in minutes to take into account the number of times an alarm occurs for blocking due to thermal	30	min	0	1440		CONF_AL_6	Integer	Writeable
C527	HAB_BQ_AL_FUG	Enable block of refrigerant leak alarm	1	---	0	1	0: No 1: Yes	CONF_AL_7	Digital	Writeable
C528	NUM_VECES_BQ_AL_FUG	Number of times to block the unit due to refrigerant leak alarm	4	---	0	20		CONF_AL_7	Integer	Writeable
C529	TIME_BQ_AL_FUG	Time in minutes to count the number of times an alarm occurs for blocking due to refrigerant leak	30	min	0	99		CONF_AL_7	Integer	Writeable
C530	HAB_RELE_ALARM_POR_MASK	Activation of the relay with the active alarm selected on the display	1	---	0	1	0: No 1: Yes	CONF_AL_8	Digital	Writeable

18.13. Parameters in the C600 menu: unit initialisation displays

Param. No.	Designation	Description	Value by default	Units	Min.	Max.	Possible value	PGD1 Display	Type	Reading/ Writing
C601	LANGUAGE	Language selection in the PGD1 terminal	0	---	0	3	0: Spanish 1: French 2: English 3: Italian	LANGUAGE	Integer	Writeable
C602	TIPO_LOGO	Select the logotype to insert in the main display of the PGD1	0	---	0	1	0: Ciat 1: Ciatesa	LANGUAGE	Integer	Writeable
C603	ERASE_PERM_MEM	Erase the permanent memory	0	---	0	1	0: No 1: Yes	INICIALIZACION	Digital	Writeable
C604	VIRT_PONTE	Manual activation by loading the default values	0	---	0	1	0: No 1: Yes	INICIALIZACION	Digital	Writeable
C605	RESET_EVENTOS	Reset the alarms log	0	---	0	1	0: No 1: Yes	RESET_HIST_ALARMAS	Digital	Writeable
C606	VIRT_VAL_ENSAYO	Manual activation by loading the default test values	0	---	0	1	0: No 1: Yes	ENSAYO_UNIDAD	Digital	Writeable
C607	VIRT_VAL_NORMAL	Manual activation by loading the normal values	0	---	0	1	0: No 1: Yes	ENSAYO_UNIDAD	Digital	Writeable

19. CAREL AND MODBUS SUPERVISORY VARIABLES

19.1. Equivalence between the Carel and Modbus protocols

Carel		Modbus		Conversion
Variable type	Maximum number of addresses	Variable type	Maximum number of addresses	
Digital	1 ... 207	Digital	1 ... 207	Modbus Address = Carel Address
Analogue	1 ... 207	Word registry	1 ... 207	Modbus Address = Carel Address
Integer	1 ... 207	Word registry	208 ... 415	Modbus Address = Carel Address + 208

Note: Carel peripherals do not allow the 0 address.

19.2. Digital variables

Carel Address	Designation	Description	Read/Write
1	DIN_AP1	High pressure digital input 1	Readable
2	DIN_AP2	High pressure digital input 2	Readable
3	DIN_BP1	Low pressure digital input 1	Readable
4	DIN_BP2	Low pressure digital input 2	Readable
5	DIN_TERM_COMP_VEXT_1	Digital input for compressors and outdoor fans for circuit 1	Readable
6	DIN_TERM_COMP_VEXT_2	Digital input for compressors and outdoor fans for circuit 2	Readable
7	DIN_TERMISTOR_R_ELECTRICA	Digital input for electrical heater thermistors	Readable
8	DIN_ON_OFF	Digital input ON/OFF	Readable
9	DIN_CALOR_FRIO	Digital input HEATING / COOLING (0=HEAT, 1=COOL)	Readable
10	DIN_ANTIHIELO_BAC	Hot water coil anti-freeze digital input	Readable
11	DIN_FILTRO_SUCIO	Digital input for clogged filter	Readable
12	DIN_TERM_VENT_INT	Digital input for the indoor fan thermal	Readable
13	DIN_KLD1	Digital input klixon for compressor(s) discharge for circuit 1	Readable
14	DIN_KLD2	Digital input klixon for compressor(s) discharge for circuit 2	Readable
15	DIN_INT_CAUDAL_AGUA	Digital input water flow switch	Readable
16	DIN_BOMBA_CONDENSADOS	Digital input for condensate pump failure	Readable
17	DIN_DESESCARCHE_C1	Digital input signal for defrosting from another board	Readable
18	HAB_FRIO	Enable cooling mode	Readable
19	HAB_CALOR	Enable heating mode	Readable
20	VENT_INTERIOR_V1	Output of the indoor fan (speed 1) slow speed	Readable
21	VENT_INTERIOR_V2	Output of the indoor fan (speed 2) medium speed	Readable
22	VENT_INTERIOR_V3	Output of the indoor fan (speed 3) fast speed or single speed	Readable
23	COMPRESOR_1	Output of compressor 1 from circuit 1	Readable
24	COMPRESOR_2	Output of compressor 1 from circuit 2 (or compressor 2 for one circuit units)	Readable
25	COMPRESOR_3	Output of compressor 2 from circuit 1	Readable
26	COMPRESOR_4	Output of compressor 2 from circuit 2	Readable
27	VIC_1	Output from the 4-way valve of circuit 1	Readable
28	VIC_2	Output from the 4-way valve of circuit 2	Readable
29	VENT_EXTERIOR_1	Output from the outdoor air fan for circuit 1	Readable
30	VENT_EXTERIOR_2	Output from the outdoor air fan for circuit 2	Readable
31	CAL_ELECTRICA_1	Output from electrical heater 1	Readable
32	CAL_ELECTRICA_2	Output from electrical heater 2	Readable
33	SYS_ON	ON mode activated from the command	Writeable
34	SYS_ON1	System in ON mode	Readable
35	UNICO_VOL_AIRE_EXT	Selection of the single volume of outdoor air operation	Writeable
36	SET_DATE	Change the date and time with the values entered in NEW_YEAR, NEW_MONTH, NEW_DAY, NEW_HOUR, NEW_MINUTE	Writeable
37	MODO_VENT_AUTO	Enabling operation of the fan in AUTO mode	Writeable
38	GLOBAL_ALARM		Readable

Carel Address	Designation	Description	Read/Write
39	RELE_ALARMA	Output from the alarm relay	Readable
40	RESET_ALARMS	Reset alarms	Writable
41	mAL_TERM_VENT_INT	Indoor fan thermal alarm	Readable
42	mAL_AP1	High pressure alarm 1	Readable
43	mAL_AP2	High pressure alarm 2	Readable
44	mAL_BP1	Low pressure alarm 1	Readable
45	mAL_BP2	Low pressure alarm 2	Readable
46	mAL_KLD1	Klixon alarm for discharge compressor(s) for circuit 1	Readable
47	mAL_KLD2	Klixon alarm for discharge compressor(s) for circuit 2	Readable
48	mAL_TERM_COMP_VEXT_1	Alarm for compressors and outdoor fans for circuit 1	Readable
49	mAL_TERM_COMP_VEXT_2	Alarm for compressors and outdoor fans for circuit 2	Readable
50	mAL_TERMISTOR_R_ELECTRICA	Alarm for electrical heater thermistors	Readable
51	mAL_FUGA_REFRIG_C1	Alarm for refrigerant leak in circuit 1	Readable
52	mAL_FUGA_REFRIG_C2	Alarm for refrigerant leak in circuit 2	Readable
53	mAL_ANTIESCARCHA_C1	Alarm for the anti-freeze safety device in circuit 1	Readable
54	mAL_ANTIESCARCHA_C2	Alarm for the anti-freeze safety device in circuit 2	Readable
55	mAL_CAUDAL_AGUA	Water flow switch alarm	Readable
56	mAL_BAJA_TEMP_IMP_AGUA	Low temperature of water outlet alarm for water-air units	Readable
57	mAL_BOMBA_CONDENSADOS	Condensate pump failure alarm	Readable
58	mAL_ANTIHIELO_BAC	Hot water coil anti-freeze alarm	Readable
59	mAL_TEMP_AMB	Ambient air temperature probe alarm	Readable
60	mAL_TEMP_RET	Return air temperature probe alarm	Readable
61	mAL_T_P_BINT_C1	Alarm for the temperature-pressure probe indoor coil for circuit 1	Readable
62	mAL_T_P_BINT_C2	Alarm for the temperature-pressure probe indoor coil for circuit 2	Readable
63	mAL_T_P_BEXT_C1	Alarm for the temperature-pressure probe outdoor coil for circuit 1	Readable
64	mAL_T_P_BEXT_C2	Alarm for the temperature-pressure probe outdoor coil for circuit 2	Readable
65	mAL_TEMP_DES_C1	Alarm for discharge temperature probe for circuit 1	Readable
66	mAL_TEMP_DES_C2	Alarm for discharge temperature probe for circuit 2	Readable
67	mAL_TEMP_EXT	Outdoor air temperature probe alarm	Readable
68	mAL_TEMP_IMP	Alarm for the supply air or outlet water temperature probe	Readable
69	mAL_HUM_INT	Indoor air humidity probe alarm	Readable
70	mAL_HUM_EXT	Outdoor air humidity probe alarm	Readable
71	mAL_FILTRO_SUCIO	Clogged filter alarm	Readable
72	mAL_ALT_TEMP	High temperature alarm for ambient or return air	Readable
73	mAL_BAJ_TEMP	Low temperature alarm for ambient or return air	Readable
74	mAL_ALT_TEMP_EXT	High outdoor air temperature alarm	Readable
75	mAL_BAJ_TEMP_EXT	Low outdoor air temperature alarm	Readable
76	PERM_MEM_ERROR	Permanent memory failure alarm	Readable
77	CLOCK_ERROR	Clock failure alarm	Readable
78	mAL_TEMP_MEZCLA	Mixed air temperature probe alarm	Readable
79	mAL_TEMP_ECONFORT	Ecomfort signal alarm	Readable
80	ON_ECONFORT	Signal of active Ecomfort mode	Readable
81	HAB_PROG_HORARIA	Enable schedule programming	Writable
82	OFF_PROG_HOR	Signal ON-OFF by scheduled programming	Readable
83	HAB_TEMP_RET	Enable the return air probe as a control probe	Writable
84	HAB_HUM_RET	Enable the return air humidity probe as an indoor humidity probe	Writable
85	HAB_OFF_COMPUERTA_INI_CALOR	Damper closed until the HEATING setpoint temperature is reached	Writable
86	HAB_COMPENSACION	Enable compensation of the setpoint based on the outdoor temperature	Writable
87	HAB_ONOFF_REMOTO	Enable remote ON/OFF	Writable
88	HAB_CALOR_FRIO_REMOTO	Enable digital input for HEATING/COOLING mode	Writable
89	HAB_FILTRO1	Enable the probe filter	Writable

Carel Address	Designation	Description	Read/Write
90	RESET_ON_HORAS	Reset the counter for number of hours of operation	Writeable
91	RESET_ON_CONT	Reset the counter of starts of motors and heaters	Writeable
92	RESET_DES_CONT	Reset the counter of defrosting operations	Writeable
93	HAB_TEMP_BINT	Enable indoor coil probe by temperature (remove pressure transducer)	Writeable
94	HAB_TEMP_BEXT	Enable outdoor coil probe by temperature (remove pressure transducer)	Writeable
95	HAB_FREECOOLING_INV	Enable the unit to operate in free-cooling in winter	Writeable
96	HAB_VALVULA_CALOR	Enable hot water coil valve	Writeable
97	HAB_PRIORIDAD_BAC	Enable priority for HWC before the compressors operate	Writeable
98	HAB_ECONFORT	Enable Ecomfort operation	Writeable
99	HAB_DESHUM_HUMEDAD	Enable dehumidification by humidity	Writeable
100	HAB_DES_TIEMPO	Enabling defrosting by time	Writeable
101	HAB_DES_MIN	Enable defrosting by minimum temperature or pressure	Writeable
102	HAB_DES_DIF	Enable defrosting by difference with outdoor temperature	Writeable
103	HAB_FIN_DES_POR_MIN	End of defrosting by the lowest temp. or pressure (single volume of air)	Writeable
104	HAB_OFF_VINT_DESESCARCHE	Enable indoor fan stoppage during defrosting	Writeable
105	HAB_RES_DESESCARCHE	Enable electrical heaters during defrosting	Writeable
106	HAB_BAC_DESESCARCHE	Enable hot water coil during defrosting	Writeable
107	HAB_ROT_COMP	Enable rotation of compressors	Writeable
108	HAB_OFF_COMPRESOR_DES	Enable the compressor to be stopped by the defrosting operation	Writeable
109	HAB_OFF_COMPRESOR_CAMBIO_F_C	Enable stoppage for the compressor with COOLING / HEATING change	Writeable
110	HAB_BLOQ_COMP_INV	Enable block compressor setpoint in winter based on the outdoor temp.	Writeable
111	CONTROL_P_PI	Type of control: proportional or proportional + integral	Writeable
112	HAB_C_EVAP_VENT_INT	Enable evaporation control in indoor fan	Writeable
113	HAB_C_COND_VENT_INT	Enable condensation control in indoor fan	Writeable
114	HAB_C_EVAP_VENT_EXT	Enable evaporation control in outdoor fan	Writeable
115	HAB_C_COND_VENT_EXT	Enable condensation control in outdoor fan	Writeable
116	DESHAB_AL_PB_DES	Disable low pressure alarm in defrosting	Writeable
117	HAB_RELE_ALARMA_POR_MASK	Activation of the relay with the active alarm selected on the display.	Writeable
118	HAB_COMP_REG_PRES_U_INT	Enable damper for controlling the pressure of the indoor unit	Writeable
119	CONTROL_P_PI_C_EVAP_VINT	Control type P or P+I for evaporation control indoor unit	Writeable
120	CONTROL_P_PI_C_COND_VINT	Control type P or P+I for condensation control indoor unit	Writeable
121	CONTROL_P_PI_C_EVAP_VEXT	Control type P or P+I for evaporation control outdoor unit	Writeable
122	CONTROL_P_PI_C_COND_VEXT	Control type P or P+I for condensation control outdoor unit	Writeable
123	HAB_RES_SIN_COMPRESOR	Enable electrical heater only to substitute the compressor	Writeable
124	OFF_COMPUERTA_AL_INCENDIO	Damper status during the anti-fire alarm	Writeable
125	FREECOOLING_ON	View of the freecooling in operation	Readable
126	RESET_TIME_COMPRESOR	Reset of the compressor timers	Writeable
127	mAL_INCENDIO	Serious anti-fire thermostat alarm	Readable
128	mAL_ANTIHIELO_REF_C1	Anti-freeze alarm refrigerant circuit 1	Readable
129	mAL_ANTIHIELO_REF_C2	Anti-freeze alarm refrigerant circuit 2	Readable
130	mAL_BQ_ANTIHIELO	Unit blocking due to anti-freeze alarm	Readable
131	RESET_AL_BQ_ANTIHIELO	Reset of the blocking of the anti-freeze alarm	Writeable
132	VAR_DIGITAL_AUX_PVPRO_1	Digital variable reserved for the PVPRO n1	Writeable
133	VAR_DIGITAL_AUX_PVPRO_2	Digital variable reserved for the PVPRO n2	Writeable
134	DESESCARCHE_ON	Unit defrosting signal	Readable
135	VENT_EXTERIOR_1_ALTA	Output from the outdoor air fan for circuit 1 - HIGH SPEED	Readable
136	VENT_EXTERIOR_2_ALTA	Output from the outdoor air fan for circuit 2 - HIGH SPEED	Readable
137	COMPRESOR_ON	Compressor status	Readable
138	RES_ELECTRICA_ON	View of electrical heater operation	Readable
139	NOT_SYS_ON1	Unit OFF view	Readable
140	AUTOSTART	Automatic start after blocking / voltage drop	Writeable
141	HAB_ON_VEXT_INI_DES	Enabling outdoor fan operation to start the defrosting	Writeable

19.3. Analogue variables

Carel Address	Designation	Description	Read/Write
1	TEMP_REG	Temperature control	Readable
2	TEMP_EXT	Outdoor temperature	Readable
3	T_P_BEXT_C1	Temperature-pressure outdoor coil for circuit 1	Readable
4	T_P_BEXT_C2	Temperature-pressure outdoor coil for circuit 2	Readable
5	HUM_INT	Indoor humidity	Readable
6	HUM_EXT	Outdoor humidity	Readable
7	TEMP_IMP	Supply air temperature	Readable
8	TEMP_MEZCLA	Mixed air temperature	Readable
9	TEMP_DES_C1	Discharge temperature for circuit 1	Readable
10	TEMP_DES_C2	Discharge temperature for circuit 2	Readable
11	T_P_BINT_C1	Temperature-pressure indoor coil for circuit 1	Readable
12	T_P_BINT_C2	Temperature-pressure indoor coil for circuit 2	Readable
13	TEMP_ECONFORT	Ecomfort temperature	Readable
14	AOUT_COMPUERTA	Analogue output for the outdoor air damper	Readable
15	AOUT_COMPRESOR_INV	Analogue output of the inverter compressor	Readable
16	AOUT_VALVULA_BAC	Analogue output of the hot water coil valve	Readable
17	AOUT_VEN_INT	Analogue output for the indoor fan	Readable
18	AOUT_VEN_EXT1	Analogue output for outdoor fan 1	Readable
19	AOUT_VEN_EXT2	Analogue output for outdoor fan 2	Readable
20	SET_POINT	Temperature setpoint	Writeable
21	SET_POINT_TEMP_HORARIO	Temperature setpoint by schedule	Readable
22	ENTALPIA_INT	Indoor enthalpy calculated	Readable
23	ENTALPIA_EXT	Outdoor enthalpy calculated	Readable
24	VER_SOFTWARE	Software version	Readable
25	MIN_SET_POINT_TEMP	Minimum temperature setpoint	Writeable
26	MAX_SET_POINT_TEMP	Maximum temperature setpoint	Writeable
27	BANDA	Control band	Writeable
28	ZONA_MUERTA	Control dead zone (auto mode)	Writeable
29	SET_POINT_TEMP_DESH	Temperature setpoint for dehumidification	Writeable
30	SET_POINT_HUM	Humidity setpoint	Writeable
31	MIN_SET_POINT_HUM	Minimum humidity setpoint	Writeable
32	MAX_SET_POINT_HUM	Maximum humidity setpoint	Writeable
33	BANDA_HUMEDAD	Humidity control band	Writeable
34	BANDA_FCOOL	Band operating in free-cooling	Writeable
35	OFFSET_FCOOL_INV	Displacement of winter free-cooling input with respect to the calculated setpoint	Writeable
36	VAL_DIF_FCOOL	Difference between the return air temperature and the outdoor air temperature for allowing the operation of free-cooling	Writeable
37	VAL_DIF_FCOOL_ENT	Difference between the return and outdoor enthalpy for allowing the operation of free-cooling	Writeable
38	BANDA_RES	Heater control band	Writeable
39	OFFSET_RES	Displacement of electrical heaters with respect to the setpoint calculated - band	Writeable
40	BANDA_BAC	Hot water coil control band	Writeable
41	OFFSET_BAC	Displacement of the hot water coil with respect to the setpoint calculated - band	Writeable
42	SET_COMP_EXT_FRIO	Set outdoor temperature for compensation in COOLING	Writeable
43	VAL_DIF_COMP_EXT_FRIO	Outdoor temperature differential for compensation in COOLING	Writeable
44	MAX_COMP_EXT_FRIO	Maximum compensation in COOLING	Writeable
45	SET_COMP_EXT_CALOR	Set outdoor temperature for compensation in HEATING	Writeable
46	VAL_DIF_COMP_EXT_CALOR	Outdoor temperature differential for compensation in HEATING	Writeable
47	MAX_COMP_EXT_CALOR	Maximum compensation in HEATING	Writeable
48	TAR_AIN1	Analogue input delay 1	Writeable
49	TAR_AIN2	Analogue input delay 2	Writeable
50	TAR_AIN3	Analogue input delay 3	Writeable
51	TAR_AIN4	Analogue input delay 4	Writeable
52	TAR_AIN5	Analogue input delay 5	Writeable

Carel Address	Designation	Description	Read/Write
53	TAR_AIN6	Analogue input delay 6	Writeable
54	TAR_AIN7	Analogue input delay 7	Writeable
55	TAR_AIN8	Analogue input delay 8	Writeable
56	TAR_AIN9	Analogue input delay 9	Writeable
57	TAR_AIN10	Analogue input delay 10	Writeable
58	TAR_AIN11	Analogue input delay 11	Writeable
59	TAR_AIN12	Analogue input delay 12	Writeable
60	LIM_MIN_HUM	Minimum humidity signal limit for alarm	Writeable
61	LIM_MAX_HUM	Maximum humidity signal limit for alarm	Writeable
62	LIM_MIN_PRES	Minimum pressure signal limit for alarm	Writeable
63	LIM_MAX_PRES	Maximum pressure signal limit for alarm	Writeable
64	SET_IMPULSION_CALOR_APERT_COMP	Supply air setpoint in HEATING for opening the damper	Writeable
65	SET_RETORNO_CALOR_APERT_COMP	Return air setpoint in HEATING for opening the damper	Writeable
66	BANDA_RETORNO_CALOR_APERT_COMP	Control band of the return air setpoint in HEATING for opening the damper	Writeable
67	SET_IMPULSION_FRIO_APERT_COMP	Supply air setpoint in COOLING for opening the damper	Writeable
68	SET_RETORNO_FRIO_APERT_COMP	Return air setpoint in COOLING for opening the damper	Writeable
69	BANDA_RETORNO_FRIO_APERT_COMP	Control band of the return air setpoint in COOLING for opening the damper	Writeable
70	SET_MEZCLA	Mixed air temperature setpoint for calculating the maximum refreshing allowed	Writeable
71	SET_BAJ_TEMP_EXT_BAC	Outdoor hot water coil low temperature setpoint	Writeable
72	VAL_DES_MIN	Mandatory value for starting the defrosting by minimum temperature or pressure	Writeable
73	VAL_DES_DIF	Difference value with outdoor temp. for mandatory start of the defrosting	Writeable
74	VAL_ON_VEXT_DES_OBL	ON value of the outdoor fan by defrosting by low pressure	Writeable
75	VAL_OFF_VEXT_DES_OBL	OFF value of the outdoor fan by defrosting by low pressure	Writeable
76	VAL_INI_DES	Initial value for defrosting operation	Writeable
77	VAL_FIN_DES	Final value for defrosting operation	Writeable
78	SET_BLOQ_COMP_VER	Block compressor setpoint in summer with free-cooling with low outdoor temp.	Writeable
79	VAL_DIF_BLOQ_COMP_VER	Differential between outdoor and return air temps. for blocking compressor in summer by FC	Writeable
80	SET_BLOQ_COMP_INV	Block compressor setpoint in winter with free-cooling by low outdoor temperature	Writeable
81	VAL_INI_LIM_TEMP_IMP_FRIO	Initial temperature limit value for supply air in COOLING mode	Writeable
82	VAL_DIF_LIM_TEMP_IMP_FRIO	Differential temperature limit value for supply air in COOLING mode	Writeable
83	VAL_INI_LIM_TEMP_IMP_CALOR	Initial temperature limit value for supply air in HEATING mode	Writeable
84	VAL_DIF_LIM_TEMP_IMP_CALOR	Differential temperature limit value for supply air in HEATING mode	Writeable
85	VAL_INI_C_EVAP_VINT	Evaporation control setpoint of the indoor fan	Writeable
86	VAL_FIN_C_EVAP_VINT	Evaporation control band of the indoor fan	Writeable
87	VAL_INI_C_COND_VINT	Condensation control setpoint of the indoor fan	Writeable
88	VAL_FIN_C_COND_VINT	Condensation control band of the indoor fan	Writeable
89	VAL_INI_C_EVAP_VEXT	Evaporation control setpoint of the outdoor fan	Writeable
90	VAL_FIN_C_EVAP_VEXT	Evaporation control setpoint of the outdoor fan	Writeable
91	VAL_INI_C_COND_VEXT	Condensation control setpoint of the outdoor fan	Writeable
92	VAL_FIN_C_COND_VEXT	Condensation control band of the outdoor fan	Writeable
93	SET_BAJ_TEMP	Low temperature setpoint for ambient or return air	Writeable
94	SET_ALT_TEMP	High temperature setpoint for ambient or return air	Writeable
95	SET_BAJ_TEMP_EXT	Low temperature setpoint for outdoor air	Writeable
96	SET_ALT_TEMP_EXT	High temperature setpoint for ambient or return air	Writeable
97	SET_POINT_TEMP_CAL	Setpoint calculated based on the compensation of the outdoor temperature	Readable
98	TEMP_CAL_BEXT_C1	Temperature calculated for the outdoor coil for circuit 1	Readable
99	TEMP_CAL_BEXT_C2	Temperature calculated for the outdoor coil for circuit 2	Readable
100	TEMP_CAL_BINT_C1	Temperature calculated for the indoor coil for circuit 1	Readable
101	TEMP_CAL_BINT_C2	Temperature calculated for the indoor coil for circuit 2	Readable
105	SET_AL_INCENDIO	Fire alarm setpoint (with return probe)	Writeable
106	DIF_AL_INCENDIO	Fire alarm differential (return temperature)	Writeable
107	VAR_ANALOGICA_AUX_PVPRO_1	Analogue variable reserved for the PVPRO n1	Writeable
108	VAR_ANALOGICA_AUX_PVPRO_2	Digital variable reserved for the PVPRO n2	Writeable
109	SET_HAB_RES_TEMP_EXT	Setpoint for enabling the electrical heater due to outdoor temperature	Writeable
110	DIF_TEMP_RENOVACION_CAL	Temperatures differential for refereshing calculated	Writeable

19.4. Integer variables

Carel Address	Designation	Description	Read/Write
1	MODO_FUNCIONAMIENTO	Select operating mode	Writeable
2	VEL_VENT_INT	Indoor fan speed	Writeable
3	TIPO_EQUIPO	Selection of the unit type	Writeable
4	TIPO_MAQUINA	Selection of the machine type	Writeable
5	NUM_CIRCUITOS	Number of circuits installed	Writeable
6	NUM_COMPRESORES	Number of compressors installed	Writeable
7	NUM_RESISTENCIAS	Number of back-up electrical heaters installed	Writeable
8	TIPO_VENT_INT	Type of indoor fan	Writeable
9	TIPO_VENT_EXT	Type of outdoor fan	Writeable
10	TIPO_FREECOOLING	Type of free-cooling (thermal or enthalpic)	Writeable
11	CURRENT_MINUTE	Current minute	Readable
12	CURRENT_HOUR	Current hour	Readable
13	CURRENT_DAY	Current day	Readable
14	CURRENT_MONTH	Current month	Readable
15	CURRENT_YEAR	Current year	Readable
16	NEW_MINUTE	Minute change	Writeable
17	NEW_HOUR	Hour change	Writeable
18	NEW_DAY	Day change	Writeable
19	NEW_MONTH	Month change	Writeable
20	NEW_YEAR	Year change	Writeable
21	N_ARR_V_INT_H	Number of starts of the indoor fan (high level)	Readable
22	N_ARR_V_INT_L	Number of starts of the indoor fan (low level)	Readable
23	N_ARR_COMP1_H	Number of starts of compressor 1 from circuit 1 (high level)	Readable
24	N_ARR_COMP1_L	Number of starts of compressor 1 from circuit 1 (low level)	Readable
25	N_ARR_COMP2_H	Number of starts of compressor 1 from circuit 2 (or compressor 2 for one circuit units) (high level)	Readable
26	N_ARR_COMP2_L	Number of starts of compressor 1 from circuit 2 (or compressor 2 for one circuit units) (low level)	Readable
27	N_ARR_COMP3_H	Number of starts of compressor 2 from circuit 1 (high level)	Readable
28	N_ARR_COMP3_L	Number of starts of compressor 2 from circuit 1 (low level)	Readable
29	N_ARR_COMP4_H	Number of starts of compressor 2 from circuit 2 (high level)	Readable
30	N_ARR_COMP4_L	Number of starts of compressor 2 from circuit 2 (low level)	Readable
31	N_ARR_RES1_H	Number of starts of heater 1 (high level)	Readable
32	N_ARR_RES1_L	Number of starts of heater 1 (low level)	Readable
33	N_ARR_RES2_H	Number of starts of heater 2 (high level)	Readable
34	N_ARR_RES2_L	Number of starts of heater 2 (low level)	Readable
35	N_HOR_VINT_H_X	Number of hours of the indoor fan (high level)	Readable
36	N_HOR_VINT_L_X	Number of hours of the indoor fan (low level)	Readable
37	N_HOR_COMP1_H_X	Number of hours of compressor 1 from circuit 1 (high level)	Readable
38	N_HOR_COMP1_L_X	Number of hours of compressor 1 from circuit 1 (low level)	Readable
39	N_HOR_COMP2_H_X	Number of hours of compressor 1 from circuit 2 (or compressor 2 for one circuit units) (high level)	Readable
40	N_HOR_COMP2_L_X	Number of hours of compressor 1 from circuit 2 (or compressor 2 for one circuit units) (low level)	Readable
41	N_HOR_COMP3_H_X	Number of hours of compressor 2 from circuit 1 (high level)	Readable
42	N_HOR_COMP3_L_X	Number of hours of compressor 2 from circuit 1 (low level)	Readable
43	N_HOR_COMP4_H_X	Number of hours of compressor 2 from circuit 2 (high level)	Readable
44	N_HOR_COMP4_L_X	Number of hours of compressor 2 from circuit 2 (low level)	Readable
45	N_HOR_CAL_ELEC1_H_X	Number of hours of electrical heater 1 (high level)	Readable
46	N_HOR_CAL_ELEC1_L_X	Number of hours of electrical heater 1 (low level)	Readable
47	N_HOR_CAL_ELEC2_H_X	Number of hours of electrical heater 2 (high level)	Readable
48	N_HOR_CAL_ELEC2_L_X	Number of hours of electrical heater 2 (low level)	Readable
49	N_DES_C1_H	Number of defrosting operations for circuit 1 (high level)	Readable

Carel Address	Designation	Description	Read/Write
50	N_DES_C1_L	Number of defrosting operations for circuit 1 (low level)	Readable
51	N_DES_C2_H	Number of defrosting operations for circuit 2 (high level)	Readable
52	N_DES_C2_L	Number of defrosting operations for circuit 2 (low level)	Readable
53	N_SEG_ULT_DES_C1	Number of seconds for final defrosting for circuit 1	Readable
54	N_SEG_ULT_DES_C2	Number of seconds for final defrosting for circuit 2	Readable
55	MODO_ON_OFF	Select operating mode	Readable
56	ESTADO_MAQUINA	Indicates the machine state	Readable
57	NUM_AL	Number of active alarms.	Readable
58	INFO_EQUIPO_1	Information on type of unit, machine and heaters	Readable
59	INFO_EQUIPO_2	Information on the number of compressors, circuit, outdoor unit, indoor unit	Readable
60	NUM_COMP_DESHUM	Number of compressors for dehumidification	Writeable
61	MIN_RENOVACION_AIRE	Minimum air refreshing desired.	Writeable
62	SET_RENOVACION_AIRE	Setpoint for air refreshing	Readable
63	CAL_RENOVACION_AIRE	Calculation of the refreshing based on the return, outdoor and mixed air	Readable
64	COMPUERTA_APERT_1	Intermediate value for calculating the opening	Readable
65	TIME_FILTRO1	Timing for the probe filter	Writeable
66	DT_FILTRO1	Difference for the probe filter	Writeable
67	TIPO_DIN5	Type of digital input 5	Writeable
68	TIPO_DIN6	Type of digital input 6	Writeable
69	TIPO_REFRIGERANTE	Type of refrigerant	Writeable
70	TIME_MAX_DUR_DES_MIN	Maximum time duration for defrosting by minimum pressure or temperature (min.)	Writeable
71	TIME_MAX_DUR_DES_DIF	Maximum time duration for defrosting by difference with outdoor temperature (min.)	Writeable
72	TIME_RET_INICIO_DES	Time delay for starting defrosting	Writeable
73	TIME_MIN_DUR_DES	Minimum timing for duration of defrosting (seconds)	Writeable
74	TIME_MAX_DUR_DES	Maximum timing for duration of defrosting (minutes)	Writeable
75	NUM_RES_DESESCARCHE	Number of heaters during defrosting	Writeable
76	VAL_BAC_DESESCARCHE	Value of the hot water coil valve during defrosting	Writeable
77	TIME_MIN_OFF_COMP	Minimum OFF time for a compressor	Writeable
78	TIME_MIN_ON_COMP	Minimum ON time for a compressor	Writeable
79	TIME_MIN_ON_ON_COMP	Minimum time between 2 start-ups of the same compressor	Writeable
80	TIME_MIN_ON_ON_COMP_DIST	Minimum time between 2 start-ups of different compressors	Writeable
81	TIME_RET_COMP_TRAS_VINT	Time delay for activation of compressor after activation of indoor fan	Writeable
82	TIPO_BLOQ_COMP_VER	Compressor block type in summer with free-cooling	Writeable
83	TIME_INTEGRACION	Integration time for P+I control	Writeable
84	TIME_OFF_VINT_FRIO	Time for stopping indoor fan in COOLING mode	Writeable
85	TIME_OFF_VINT_CALOR	Time for stopping indoor fan in HEATING mode	Writeable
86	TIME_RET_AL_BP	Time delay for low pressure alarm	Writeable
87	TIME_RET_AL_TERM_VENT_INT	Time delay for alarm for indoor fan thermal	Writeable
88	TIME_RET_AL_TEMP	Time delay alarm for high and low temperature	Writeable
89	LANGUAGE	Language: Spanish, French or English	Writeable
90	TIME_INT_C_EVAP_VINT	Integration time for PI control for evaporation control indoor unit	Writeable
91	TIME_INT_C_COND_VINT	Integration time for PI control for condensation control indoor unit	Writeable
92	TIME_INT_C_EVAP_VEXT	Integration time for PI control for evaporation control outdoor unit	Writeable
93	TIME_INT_C_COND_VEXT	Integration time for PI control for condensation control outdoor unit	Writeable
94	DESCONEXION_NUM_COMPRESORES	Number of compressor stages to be disconnected	Writeable
95	DESCONEXION_NUM_RESISTENCIAS	Number of heater stages to be disconnected	Writeable
96	MAX_APERTURA_COMPUERTA	Maximum opening of the outdoor air damper	Writeable
97	VAR_ENTERA_AUX_PVPRO_1	Whole variable reserved for the PVPRO n1	Writeable
98	VAR_ENTERA_AUX_PVPRO_2	Whole variable reserved for the PVPRO n2	Writeable
99	TIME_ON_AUTOSTART	Time for automatic start-up after blocking	Writeable
100	TIME_ON_VEXT_INI_DES	Time for operating of outdoor fan to start the defrosting	Writeable

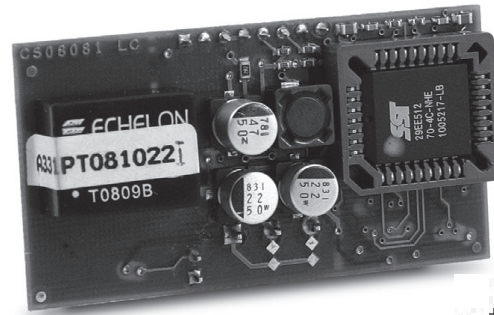
Note: for Modbus communication it is necessary to add 208 to the Carel address

20. LONWORKS® SUPERVISORY VARIABLES

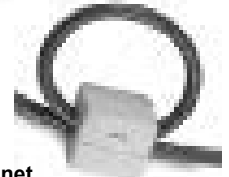
To establish communication with a network with the LonWorks® protocol, each pCO3 board needs a CAREL PCO1000F0 FTT-10A Rev2 (TP/FT-10), FTT-10A 78kbs (TP/FT-10) serial card which is supplied with a magnet to satisfy the required specifications for this component.

The LonWorks® network will be selected from a display on the pGD1 maintenance terminal. This network enables a data transmission rate of 4800 bps.

The supervisory program is stored in flash memory and can be programmed directly from the LonWorks® network by using tools such as LonMaker®. By default, it will be written in the factory with the variables indicated in the following table. It is possible to change these variables, but a maximum of 59 variables can be written.



PCO1000F0 card



magnet

Type	microPC index	Description	Name NV	Type NV	Address
Analogue	1	Recirculation air temperature	nvoRoomTemp	105	output
Analogue	2	Outdoor air temperature	nvoOutsideTemp	105	output
Analogue	3	Temperature - pressure outdoor coil for circuit 1	nvoCoilExtPrTe1	105	output
Analogue	4	Temperature - pressure outdoor coil for circuit 2	nvoCoilExtPrTe2	105	output
Analogue	5	Relative recirculation humidity	nvoRoomHR	81	output
Analogue	6	Outdoor air relative humidity	nvoOutsideHR	81	output
Analogue	7	Supply temperature	nvoSupTemp	105	output
Analogue	8	Mixing air temperature	nvoMixTemp	105	output
Analogue	9	Discharge temperature of circuit No. 1	nvoSupCompC1	105	output
Analogue	10	Discharge temperature of circuit No. 2	nvoSupCompC2	105	output
Analogue	11	Temperature - pressure indoor coil for circuit 1	nvoCoilIntPrTe1	105	output
Analogue	12	Temperature - pressure indoor coil for circuit 2	nvoCoilIntPrTe2	105	output
Analogue	14	Outdoor air damper outlet	nvoFcoolDamp	105	output
Analogue	16	Heat valve outlet	nvoV3VPos	105	output
Analogue	18	Output for outdoor fan 1	nvoFanExt1	105	output
Analogue	19	Output for outdoor fan 2	nvoFanExt2	105	output
Analogue	20	Temperature setpoint	nviSetTemp	105	input
Analogue	20	Temperature setpoint	nvoSetTemp	105	output
Analogue	30	Relative humidity setpoint	nviSetRH	81	input
Analogue	30	Relative humidity setpoint	nviSetRH	81	output
Integer	1	Operating mode	nviHeatCool	8	input
Integer	1	Operating mode	nvoHeatCool	8	output
Integer	36	Indoor fan operating hours	nvoHourSupFan	8	output
Integer	38	Operating hours of compressor No. 1	nvoHourComp1	8	output
Integer	40	Operating hours of compressor No. 2	nvoHourComp2	8	output
Integer	42	Operating hours of compressor No. 3	nvoHourComp1	8	output
Integer	44	Operating hours of compressor No. 4	nvoHourComp2	8	output

Type	microPC index	Description	Name NV	Type NV	Address
Digital	33	Unit off / on	nviOnOff	95	input
Digital	34	Machine state view (off/on)	nvoOnOff	95	output
Digital	18	View of machine status in cooling mode	nvoCool	95	output
Digital	19	View of machine status in heating mode	nvoHeat	95	output
Digital	22	Main fan	nvoOnSupFan	95	output
Digital	23	Compressor contact 1	nvoOnComp1	95	output
Digital	24	Compressor contact 2	nvoOnComp2	95	output
Digital	25	Compressor contact 3	nvoOnComp3	95	output
Digital	26	Compressor contact 4	nvoOnComp4	95	output
Digital	27	Cycle reversing valve 1	nvoOnV4v1	95	output
Digital	28	Cycle reversing valve 2	nvoOnV4v2	95	output
Digital	29	Outdoor fan 1	nvoOnFanExt1	95	output
Digital	30	Outdoor fan 2	nvoOnFanExt2	95	output
Digital	31	Heater contact 1	nvoOnRes1	95	output
Digital	32	Heater contact 2	nvoOnRes2	95	output
Digital	38	General alarm	nvoAlrGen	95	output
Digital	41	Indoor thermal fan	nvoAlrTermFan	95	output
Digital	42	High pressure 1	nvoAlrHPC1	95	output
Digital	43	High pressure 2	nvoAlrHPC2	95	output
Digital	44	Low pressure 1	nvoAlrLPC1	95	output
Digital	45	Low pressure 2	nvoAlrLPC2	95	output
Digital	48	Thermal 1	nvoAlrTermC1	95	output
Digital	49	Thermal 2	nvoAlrTermC2	95	output
Digital	50	Thermal heater	nvoAlrTermRes	95	output
Digital	71	Clogged filter	nvoAlrDirtFilt	95	output
Digital	72	Overly high return air temperature	nvoAlrRoomHT	95	output
Digital	73	Overly low return air temperature	nvoAlrRoomLT	95	output
Digital	76	Damaged EPROM	novAlrEprom	95	output
Digital	81	Enable schedule phase	nviHabProg	95	input
Digital	81	Enable schedule phase	nvoHabProg	95	output
Digital	130	Anti-freeze water-air unit	nvoAlrIce	95	output
Digital	134	Defrosting	nvoAlrDes	95	output

21. TECHNICAL AND ELECTRICAL CHARACTERISTICS

microPC board	
ELECTRICAL FEATURES	
Power supply (controller with terminal connected)	230 Vac +10/-15% (by default) 24 Vac +10/-15% 50/60 Hz and 28 to 36 Vdc +10/-20% (optional)
Maximum current with the connected terminal	25 VA (Vac)
Terminal strip	with removable male/female connectors (250 Vac max.) connectors set with screws
Isolation between the power supply line and the control	double
Data memory	13 kB at 8 bits (max. limit: 400,000 writes per memory location)
Working cycle with applications of average complexity	0.2 s
Analogue inputs	
Analogue conversion	A/D converter to 10-bit integrated in CPU
Maximum number	7 in SMALL boards and 12 in MEDIUM boards
Input type: B1, B2, B3, B4, B8 and B9	low temperature NTC: 10kΩ ± 0.1% to 25°C; -50/90°C high temperature NTC: 50kΩ to 25°C; 0/150°C input: 0/1 Vdc
Input type: B5 and B10	low temperature NTC: 10kΩ to 25°C; -50/90°C high temperature NTC: 50kΩ to 25°C; 0/150°C input: 0/1 Vdc and 4/20 mA
Input type: B6, B7, B11 and B12	low temperature NTC: 10kΩ to 25°C; -50/90°C high temperature NTC: 50kΩ to 25°C; 0/150°C input: 0/1 Vdc radiometric pressure probe
Time constant for each input	0.5 s
Input precision	± 0.3% of the complete scale
Classification of the average circuits (IEC EN 61010-1)	Category I
Digital inputs	
No. of inputs on SMALL boards	7
No. of inputs on MEDIUM boards	10
Analogue outputs	
Maximum number	3 in SMALL boards and 4 in MEDIUM boards
Type	0 to 10Vdc
Precision	± 3% of the complete scale or ± 5% of the complete scale (maximum load 5mA)
Resolution	8-bit
Maximum charge	2 kΩ (5 mA)
Digital outputs	
Composition of groups	SMALL board: Group 1 (1 to 6); Group 2 (7) MEDIUM board: Group 1 (1 to 6); Group 2 (7); Group 3 (8 to 12)
Electrical contacts	SMALL board (relays 1 to 7): EN60730-1: NO 1(1)A 250Vac cos φ =0.4; 100,000 $\chi\psi\chi\lambda\epsilon\sigma$ UL-873: NO 1 A resistive 24 Vac, 30 Vdc; 100,000 cycles Test capacity: 24Vac; pulse 15A; continuous 1A 30,000 cycles MEDIUM board (relays 1 to 12): EN60730-1: NO 1(1)A 250Vac cos φ =0.4; 100,000 $\chi\psi\chi\lambda\epsilon\sigma$ UL-873: NO 1 A resistive 24 Vac, 30 Vdc; 100,000 cycles Test capacity: 24Vac; pulse 15A; continuous 1A 30,000 cycles Note: relays of the same group with basic isolation must have the same power supply (24 Vdc or 230 Vac). Relays of the same group have basic isolation among themselves. The isolation between the various groups is double.

microPC board**TECHNICAL CHARACTERISTICS**

Storage conditions	-20T70 °C; %RH 90 non-condensation
Operating conditions	-10T60 °C; %RH 90 non-condensation
Protection index	IP00
Environmental pollution	normal
Classification according to protection against electric shocks	To be incorporated in class I and/or II appliances
PTI of the insulating materials	250V
Period of electric stress across the insulating parts	Long
Type of relay action	1C
Type of disconnection or microswitching	Micro-switch for all of the relay outlets
Category of resistance to heat and fire	Category D (UL94 - V0)
Immunity from voltage surge	Category 1
Ageing specifications (operating hours)	80.000
Number of automatic operating cycles	100,000 (EN 60730-1); 30,000 (UL 873)
Software class and structure	Class A
Category of protection against discharges (IEC EN 61000-4-5)	Category III
Dimensions: Length x Height x Depth	SMALL board: 175 x 113 x 55 mm (10 DIN modules) MEDIUM board: 228 x 113 x 55 mm (13 DIN modules)

pGD1 Terminal**TECHNICAL CHARACTERISTICS OF THE DISPLAY**

Type	FSTN graphic
Back-lighting	Blue LED (controlled using software)
Resolution	132 x 64 pixel

TECHNICAL CHARACTERISTICS OF THE POWER SUPPLY

Voltage	Power supply through the telephone cable or external source 18/30 Vdc protected by an external 250 mA fuse
Maximum power input	1.2 W

CONNECTION WITH THE microPC BOARD

Type	asynchronous half duplex, 2 dedicated wires
Connector for the terminal	6-way telephone plug
Driver	CMR 7 V (type RS485) balanced differential

GENERAL FEATURES

Protection index	IP65 for assembly in panel
	IP40 for wall assembly
UL	type 1
Operating conditions	-20T60 °C, 90% RH non-condensing
Storage conditions	-20T70 °C, 90% RH non-condensing
Software class and structure	A
Classification according to protection against electric shocks	To be incorporated in class I or II appliances
PTI of the insulating material	250V
Dimensions: Length x Height x Depth	156 x 82 x 31 mm

TCO Terminal**TECHNICAL CHARACTERISTICS OF THE POWER SUPPLY**

Voltage	Power supply 230Vac(+10/-15) 50/60Hz
Maximum power	1 VA

CONNECTION WITH THE microPC BOARD

Type	AGW20 or AGW22 with 1 braided pair + drainwire + shielding
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GENERAL FEATURES

Protection index	IP20
Operating conditions	-10T60 °C, 10 to 90% RH non-condensing
Storage conditions	-20T70 °C, 10 to 90% RH non-condensing
Software class and structure	A
Environmental pollution	2
Category of resistance to heat and fire	Category D
Immunity from voltage surge	Category 2
Classification according to protection against electric shocks	To be incorporated in class I and/or II appliances
Electric safety	IEC EN 60730-1, IEC EN 60730-2-9
Electromagnetic compatibility	IEC EN 61000-6-1, IEC 61000-6-3, IEC EN 61000-6-2, IEC EN 61000-6-4
PTI of the insulating material	275 V
Precision of the temperature measurement	0T40 °C ± 1%
Dimensions: Length x Height x Depth	Model to fit: 86 x 86 x 51 mm Surface model: 86 x 142 x 23 mm or 142 x 86 x 23 mm

