Application program for pCO¹ and pCO²

Standard Shelter

Manual version 2.0 – April 01, 2003

Program code: FLSTDMMSHE

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS

CAREL

Technology & Evolution

We wish to save you time and money!

We can assure you that the thorough reading of this manual will guarantee correct installation and safe use of the product described.

IMPORTANT WARNINGS

BEFORE INSTALLING OR HANDLING THE DEVICE PLEASE CAREFULLY READ AND FOLLOW THE INSTRUCTIONS DESCRIBED IN THIS MANUAL.

The equipment that this software has been designed for has been manufactured to operate risk-free for its specific purpose, as long as:

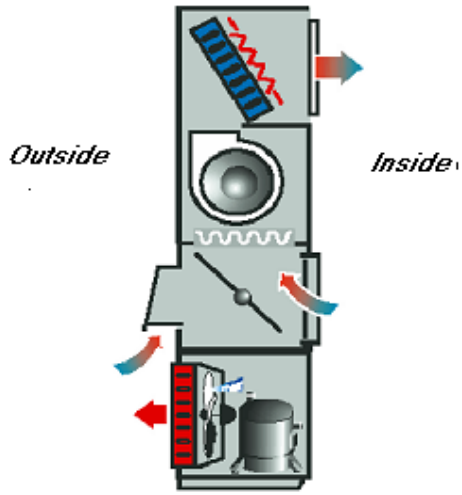
- the installation, programming, operation and maintenance of the software are carried out according to the instructions contained in this manual and by qualified personnel;
- all the required conditions described in the installation and operating manual for the equipment in question have been complied with.

All other uses and modifications that are not authorised by the manufacturer are considered incorrect.
Liability for injury or damage caused by incorrect use lies exclusively with the user.

INDEX

1 GENERAL

1.1 SHELTER



1.2 THE PROGRAM

The “Standard Shelter” program can be used with CAREL pCO1 (xs-small-medium) or pCO2 boards (small-medium), and is used to manage direct expansion shelter units.

The main functions of the program are:

- management of the temperature and the humidity in technological environments
- management of 1 or 2 hermetic or semi-hermetic compressors
- management of 1 electronic valve for each compressor
- management of 1 or 2 electric heaters
- management of one 0-10V modulating or 3-position freecooling damper
- management of an external humidifier
- management of 2 modulating condenser fans, controlled by pressure or temperature
- outlet temperature control
- alarm management, alarm log, signals
- complete management of the device timers
- connection to local supervision networks and BMS (LonWorks, Bacnet, Modbus)
- send SMS (text) messages to GSM cellular phones in the event of alarms on the unit
- possibility to modify the set point and set point limits by sending SMS (text) messages from a GSM cellular phone

The external or built-in terminal with LCD display can be used to perform the following functions, at any time:

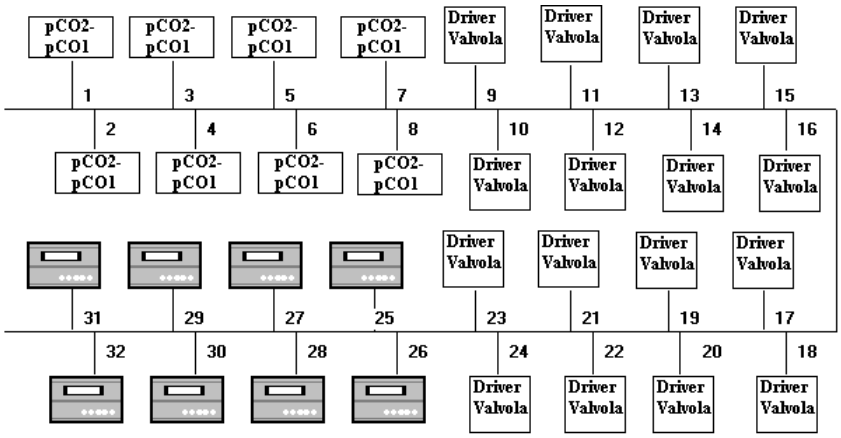
- display the values measured by the probes and calibrate the probes if necessary
- switch the unit on/off
- check and reset the alarms
- program the configuration parameters and the operating parameters with password-protected access
- check the operating hours of the controlled devices with password-protected access
- set the clock
- select one of different languages available (English, Italian, German, French, Spanish)

By connecting to a CAREL pLAN network, the program can also manage the following functions:

- automatic rotation, by time or by alarm, of a maximum of 8 units
- temperature and humidity management on a maximum of 8 units
- use just one external LCD terminal to control a maximum of 8 units

1.3 SETTING UP THE pLAN NETWORK

The following diagram shows the addresses of all the devices that can be controlled using the shelter application.
To set the address of the various devices, refer to the chapter MANAGING THE CONNECTION BETWEEN BOARDS (pLAN)



[driver valvola = valve driver]

2 LIST OF CONFIGURATIONS

The program can manage shelters with pC01 (xs-small-medium) or pCO2 boards (small-medium). When started, the program recognises the type of board and the size, configuring the inputs and the outputs as a consequence. The following diagrams show the configuration of inputs and outputs for the possible combinations. For details on the wiring see the technical manual for the pC01 and pCO2 boards.

2.1 DIGITAL INPUTS

HARDWARE	NO.	FUNCTION
pCO1 XS/SMALL/MEDIUM pCO2 SMALL/MEDIUM	ID 1	Low pressure C1
	ID 2	C1 alarm (High press -Thermal cutout comp. - Thermal cutout condenser fan)
	ID 3	Thermal cutout alarm heater 1
	ID 4	Air flow switch alarm
	ID 5	Dirty filter alarm
	ID 6	Blackout alarm
pCO1 SMALL/MEDIUM pCO2 SMALL/MEDIUM	ID 7	Fire-Smoke alarm
	ID 8	Thermal cutout alarm evaporator fan
pCO1 MEDIUM pCO2 MEDIUM	ID 9	Low pressure C2
	ID 10	C2 alarm (High press -Thermal cutout comp. - Thermal cutout condenser fan)
	ID 11	Thermal cutout alarm heater 2
	ID 12	External alarm
	ID 13	---
	ID 14	---

2.2 ANALOGUE INPUTS

NO.	pCO1 XS	pCO1 – pCO2 SMALL	pCO1 – pCO2 MEDIUM
B 1	Condensing pressure 1/ Condensing temperature 1	Condensing pressure 1/ Condensing temperature 1	Condensing pressure 1/ Condensing temperature 1
B 2	Ambient temperature	Ambient humidity	Ambient humidity
B 3	Outside temperature	Ambient temperature	Condensing pressure 2 Condensing temperature 2
B 4	Outlet temperature	Outside temperature	Outside temperature
B 5		Outlet temperature	Outlet temperature
B 6			Ambient temperature
B 7			---
B 8			---

2.3 DIGITAL OUTPUTS

HARDWARE	NO.	FUNCTION
pCO1 XS/SMALL/MEDIUM pCO2 SMALL/MEDIUM	DO 1	Outlet fan
	DO 2	Compressor 1
	DO 3	Heater 1
	DO 4	Serious alarm
	DO 5	Minor alarm 1
pCO1 SMALL/MEDIUM pCO2 SMALL/MEDIUM	DO 6	Minor alarm 2
	DO 7	Open freecooling
	DO 8	Close freecooling
pCO1 MEDIUM pCO2 MEDIUM	DO 9	Compressor 2
	DO 10	Heater 2
	DO 11	Humidifier On/Off
	DO 12	---
	DO 13	---

2.4 ANALOGUE OUTPUTS

HARDWARE	NO.	FUNCTION
pCO1 XS/SMALL/MEDIUM pCO2 SMALL/MEDIUM	AO 1	Freecooling
	AO 2	Outlet fan
	AO 3	Condenser fan 1
pCO1 MEDIUM pCO2 MEDIUM	AO 4	Condenser fan 2

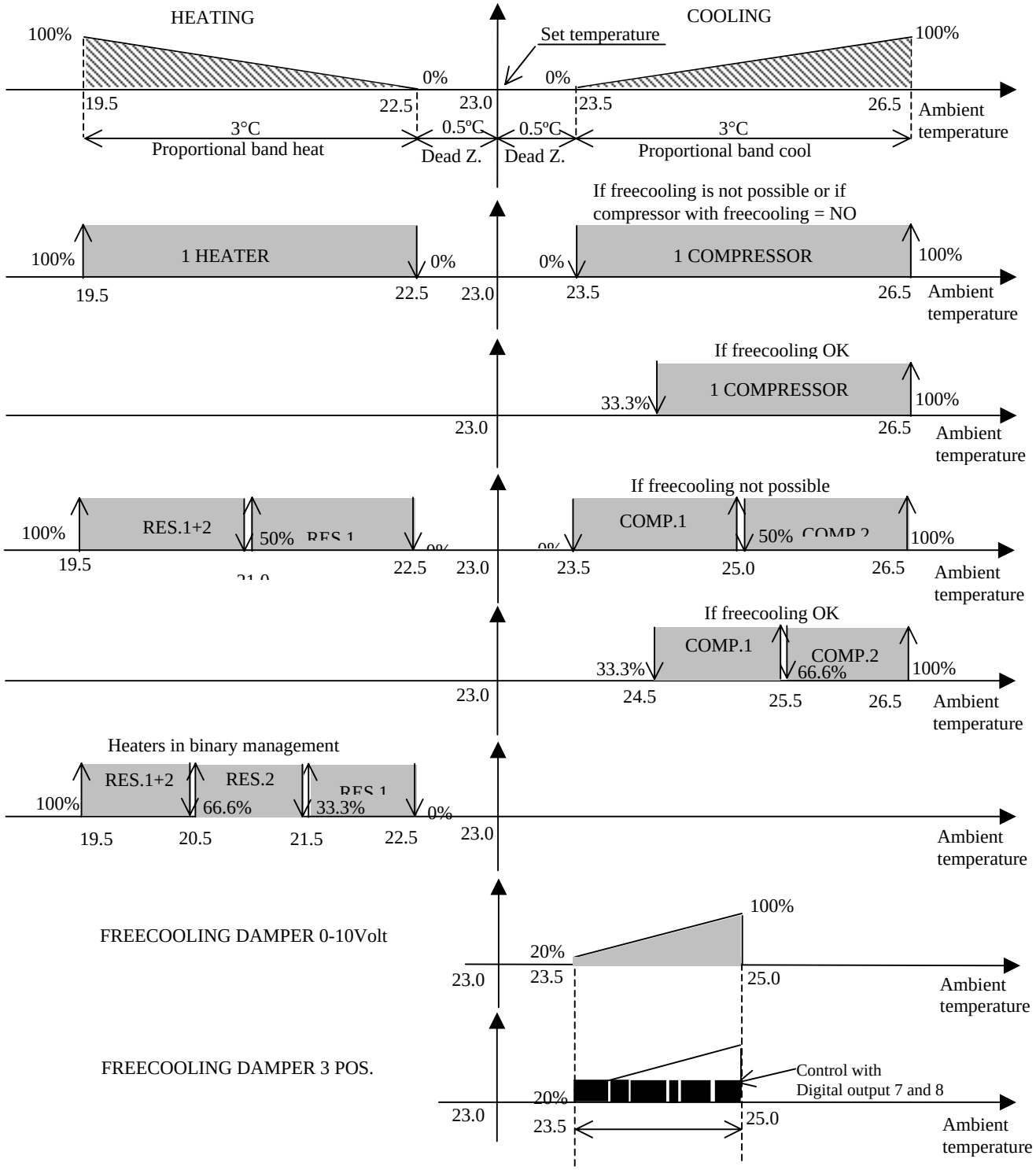
3 TEMPERATURE CONTROL

The heating and cooling devices are managed based on the temperature measured by the room probe, compared against the temperature set point.

- Programmable parameters: temperature set point, proportional band (this may be different for heating and cooling), dead zone, freecooling start and end point as a percentage of the proportional band.
- Fixed parameters: compressor and heater on/off points in the proportional band.

3.1 SHELTER

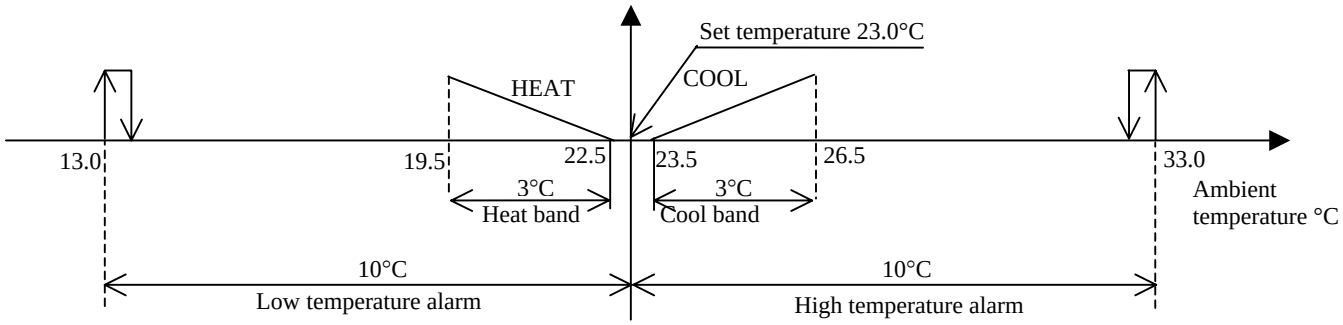
NB.: All the temperature values indicated in the following graphs refer to the default values



3.2 OTHER TEMPERATURE FUNCTIONS

The high and low temperature alarms generate a signal with an alarm screen, and have a modifiable delay.

NB.: All of the values in the following graphs refer to the default values



The stop dehumidification differential defines the minimum temperature below which the dehumidification function is stopped; the function can start again if the temperature rises back over the set Start dehumidification offset; the differential and offset can both be modified.

3.3 HUMIDITY CONTROL

The humidification and dehumidification devices are managed based on the humidity values measured by the probe in the room (or at the intake). This humidity is compared against the humidity set point, and the devices are activated according to the difference. The proportional band identifies the operating field of the shelter, and can have different values in humidification and dehumidification mode. There is a fixed dead zone of 0.2% around the set point equal that identifies a zone in which the devices are not activated.
Humidification is only available on medium boards; dehumidification is on the other hand also available for small boards (not available on the pCOxs, as the humidity probe cannot be installed) and works by activating the compressor/compressors enabled for this function, and by operating the outlet fan at a certain speed. This speed can be modified, and as default is equal to 50% (5.0V).

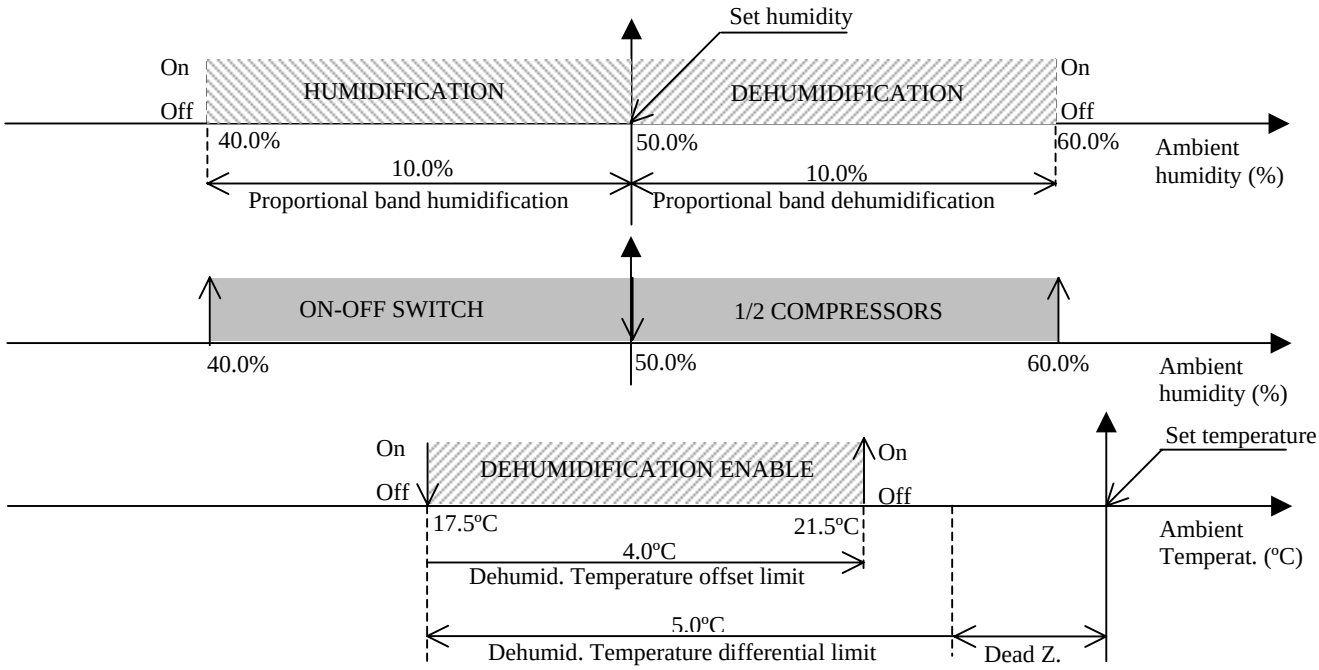
Humidification, on medium boards, is managed using a digital output (open/closed).

Dehumidification, on small and medium boards, is managed by controlling the compressor/compressors.
Dehumidification is interrupted if the ambient temperature falls below a certain value. The corresponding differential and offset can be set. In any case, dehumidification is always possible if: Ambient temperature > Temperature set point – Temperature dead zone.

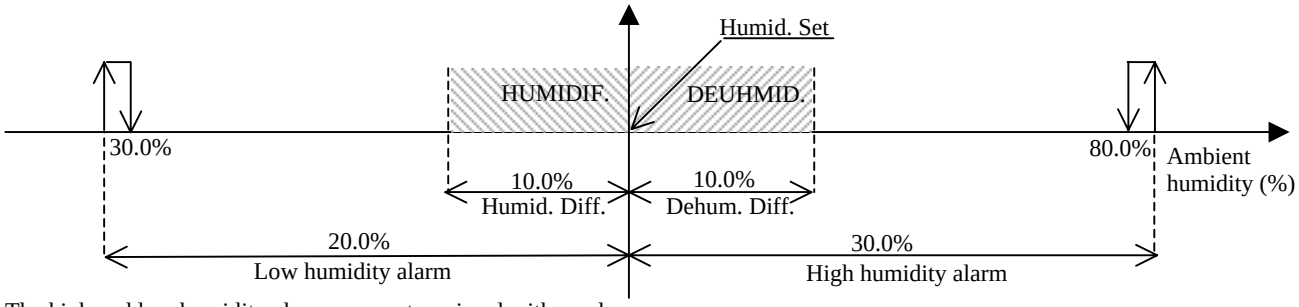
The 0-10Volt modulating output for the outlet fan in dehumidification mode is automatically reduced by 50% (modifiable);
If the outlet fan is managed by a digital output (open/closed), in dehumidification the outlet fan speed will remain unvaried.

The following diagrams illustrate the behaviour of the humidification and dehumidification devices.

NB.: All of the values in the following graphs refer to the default values



3.4 OTHER HUMIDITY FUNCTIONS

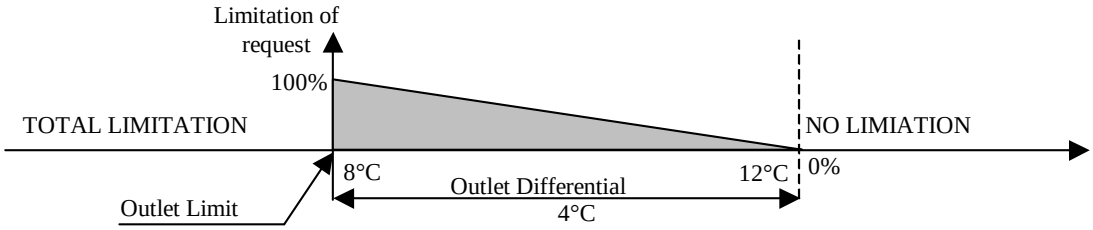


The high and low humidity alarms generate a signal with an alarm screen.
The delay can be modified.

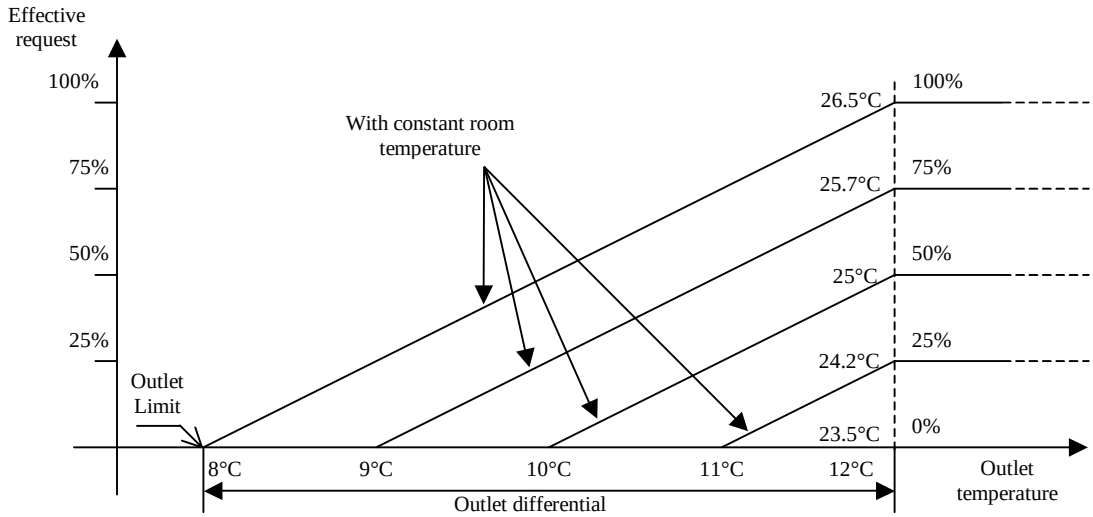
4 OUTLET LIMITATION

This function prevents the introduction of air that is too cold. A temperature probe must be installed on the shelter outlet, and both the probe and the function must be enabled, by setting the following parameters: Outlet limit set point and Outlet differential; these define a limitation zone, as represented in the following diagrams.
The outlet limitation function acts on the proportional cooling request. The effect on the devices is therefore the same as when the room temperature decreases, that is, progressively stopping the devices (see the paragraph on “Temperature control”).

NB.: All of the values in the following graphs refer to the default values

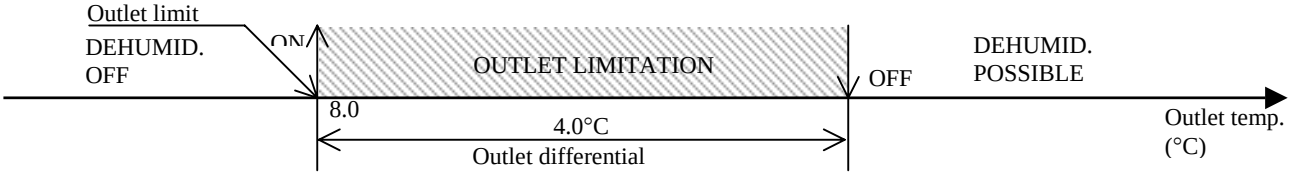


If we consider that the room temperature, and therefore the proportional request, remain constant, a graph can be defined that shows the effective request in the various operating conditions:



As can be seen, if the outlet temperature is between the outlet set point and the outlet differential, the cooling devices are increasingly limited as the temperature lowers.

The limitation function works differently in dehumidification mode, where the modulation zone is ignored, as illustrated in the following diagram:



5 OUTLET FAN

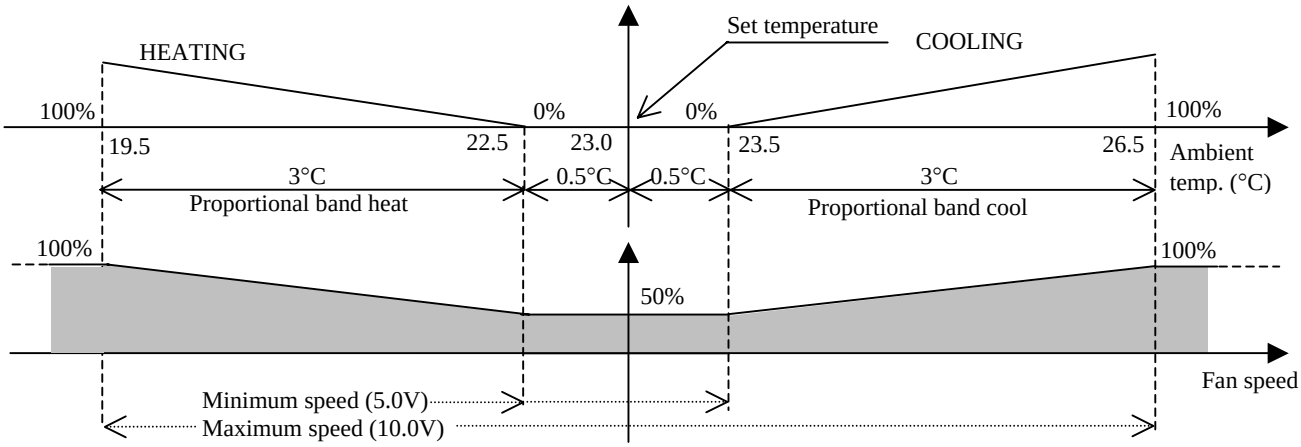
The outlet fan is always on when the unit is ON. It can be managed using an On–Off or modulating output. There are two alarms relating to the fan, thermal cutout and air flow switch, which automatically switch the unit OFF; both the alarms require manual reset.

5.1.1 On-Off management

The outlet fan will start, after a set delay (default 10 sec), when the shelter unit starts. It will stay on until the unit is switched off. A stop delay time for the fan after the unit has been switched off can also be set (default 20 sec).
In the event of a blackout, the outlet fan continues to operate, so as to ensure the recirculation of air inside the technological environment. In this phase the freecooling function can also be modulated if the conditions are suitable.

5.1.2 Modulating management

NB.: All of the values in the following graphs refer to the default values

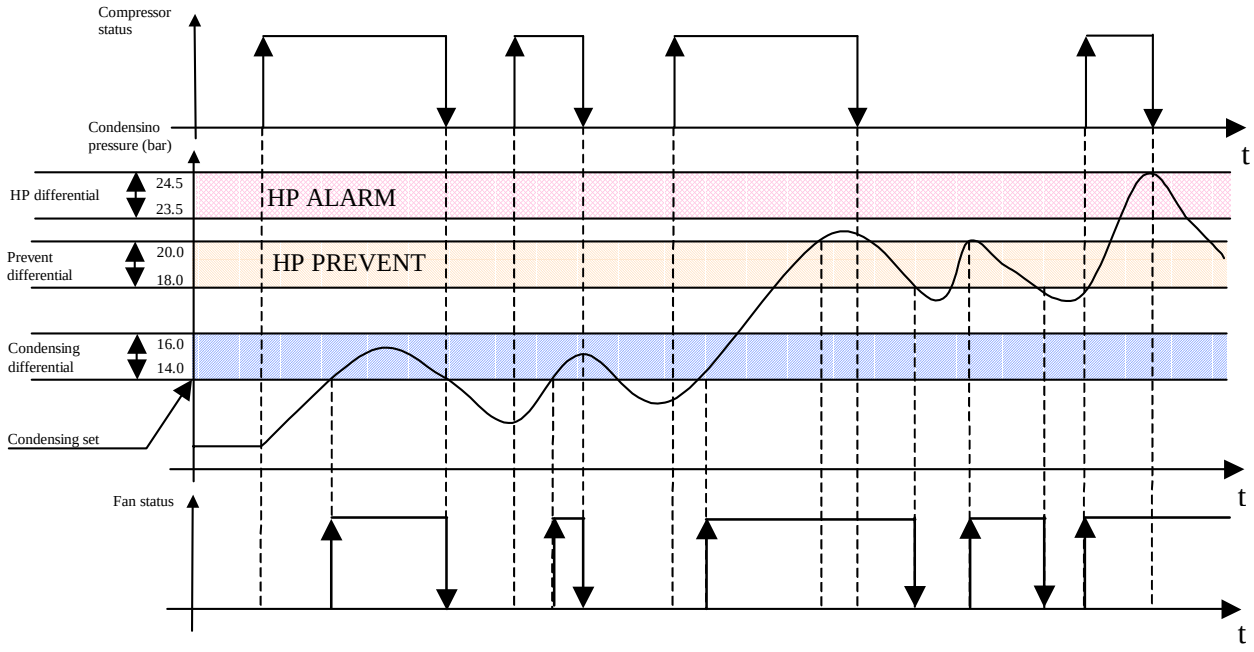


The minimum and maximum speed of the fan can be set. The default values 5.0V and 10.0V.
It should be noted that in dehumidification mode the speed is automatically reduced to the minimum value, 5.0V (50%); this value can be modified if necessary.
In the event of a blackout the outlet fan continues to operate at 100% speed, so as to ensure the constant recirculation of air inside the technological environment. In this phase the freecooling function can also be modulated if the conditions are suitable.

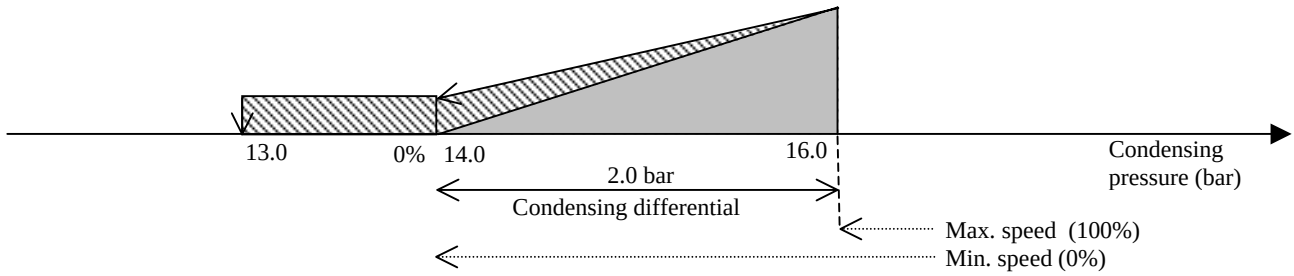
6 CONDENSER FANS

The condenser fans are controlled based on the condensing pressure and the status of the compressors. The fans are managed using 0-10V modulating outputs. The control function uses the Condensing pressure set point and Differential, as shown below:

NB.: All of the values in the following graphs refer to the default values



Representation of the modulating output:



The maximum and minimum speed of the condenser fans can be set; if the minimum speed set is greater than 0V, the fan will be able to operate at the minimum speed down to 1.0 bar below the condensing pressure set point before stopping altogether (see the dashed part in the graph above).

6.1 NUMBER OF PROBES AND CONDENSING COILS

Note: the activation of the fans always depends on the status of the compressors, as well as the values read by the probes.

	1 Coil				2 Coils			
	1 Compressor		2 compressors		1 Compressor		2 compressors	
	1 Fan	2 Fans	1 Fan	2 Fans	1 Fan	2 Fans	1 Fan	2 Fans
0 probes	The fans work together when any of the compressors starts				Each fan starts together with the corresponding compressor			
1 Probe	The probe directly controls the fan. If the probe is faulty the fan will be activated together with the compressor	The probe controls both fans. If the probe is faulty the fans will be activated together with the compressor	The probe directly controls the fan. If the probe is faulty the fan will be activated together with the compressors	The probe controls both fans. If the probe is faulty the fans will be activated together with the compressors	Not possible	Not possible	Not possible	Not possible
2 Probes	Not possible	Not possible	The fan works based on the greater of the 2 pressure values. If both probes are faulty the fan will be activated together with the compressors. If only one probe is faulty the fan works based on the value of the other probe.	The fans work based on the greater of the 2 pressure values. If both probes are faulty the fans will be activated together with the compressors. If only one probe is faulty the fans work based on the value of the other probe	Not possible	Not possible	Not possible	The fans work based on the pressure of the corresponding circuit. If one of the probes is faulty, the fan will be activated when of the compressor in the same circuit starts.

If no condenser probe is enabled, the fans will start when the corresponding compressor starts, if there are 2 coils. With just one coil, on the other hand, the fans will always work together when either of the 2 compressors starts. In this case, they will start at 100% speed.

6.2 PREVENT FUNCTION

This prevents the high pressure alarm when the compressors are off. Normally the condenser fans only start when the compressors are on, but in this case they are forced on so as to lower the pressure and attempt to prevent the high pressure alarm, which would stop the unit. There is no modulation in this phase, and the fans are started immediately at 100% speed.

6.3 SPEED-UP FUNCTION

To overcome the inertia when starting high-power modulating fans, they can be forced on for a few seconds at maximum speed, after which the speed is modulated based on the condensing pressure.

6.4 PRESSURE – TEMPERATURE CONVERSION

Either pressure probes or temperature probes can be used. When using pressure probes, the screens in the I/O branch show the temperature corresponding to the pressure value for each probe, keeping account of the type of refrigerant used, selected by a parameter in the manufacturer branch.

7 COMPRESSORS

The compressors are managed as simple ON-OFF loads (see TEMPERATURE CONTROL). The maximum number of compressors is 2.

7.1 ROTATION

The operation of the compressors can be rotated following FIFO logic (first in, first out). This helps balance the operating hours between the compressors.

7.2 TIMES

A number of safety times are used to protect the compressors:

- minimum on time;
- minimum off time;
- minimum time between starts of the same compressor;
- minimum time between starts of different compressors.

7.3 COMPRESSOR ALARMS

From digital inputs:
- Generic compressor alarm, including: High pressure / Compressor thermal cutout / Condenser fan thermal cutout;
- Low pressure.

If one of the alarm inputs is not used, it should be closed electrically on the 24Vac power supply.
For details on the electrical connections of the alarm inputs see the technical manual for the pC01– pCO2 boards.

From analogue input:
- High pressure alarm from pressure transducer.

7.3.1 GENERIC ALARM: High pressure / Compressor thermal cutout / Condenser fan thermal cutout

Immediate alarm generated by an external pressure switch or by a thermal cutout; the digital input switches from closed to open and the compressor is immediately stopped. Reset is manual, that is, the user must press the Alarm button on the terminal to be able to restart the compressor, as long as the pressure switch or the thermal cutout have been reset and the digital input is closed. After the compressor is stopped, the safety times are counted so that following the reset of the alarm the compressor can not be restarted immediately.

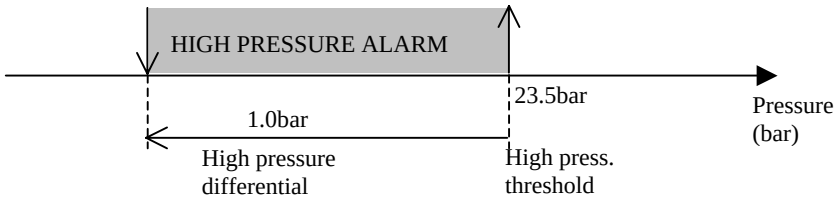
7.3.2 LOW PRESSURE

Alarm generated by an external pressure switch.
This alarm is ignored for a time that can be set on the screen, from when the compressor starts, to allow time for the pressure in the circuit to stabilise. If at the end of the time the contact is still open, the compressor stops and an alarm is signalled. If the contact closes before the time has elapsed, the alarm is not signalled and the timer is reset.
Reset is manual, that is, the user must press the Alarm button on the terminal to be able to restart the compressor, as long as the pressure switch has been reset and the digital input is closed. After the compressor is stopped, the safety times are counted so that following the reset of the alarm the compressor can not be restarted immediately.

7.3.3 HIGH PRESSURE FROM HIGH PRESSURE TRANSDUCER

Immediate alarm generated by the measurement of excessive pressure in the circuit. The set point and differential for the high pressure alarm can be set. Each probe can generate a high pressure alarm that stops the compressor in the corresponding circuit.
If the shelter features 2 compressors but only the probe corresponding to the first circuit is enabled, the high pressure alarm detected by the latter will stop both compressors. In this case, the high pressure alarm will relate to both the first and second circuit.
Reset is manual, that is, the user must press the Alarm button on the terminal to be able to restart the compressor, as long as the pressure has fallen below the set point – differential. After the compressor is stopped, the safety times are counted so that following the reset of the alarm the compressor can not be restarted immediately.

NB.: All the values in the following graph refer to the default values



8 HEATERS

The heaters are managed as simple ON-OFF loads. Normally up to 2 heaters with the same power can be managed, connected to the 2 outputs. "Binary management" allows the use of three heating steps with just two outputs. Consequently, there are two possible options:

- management of 2 loads with different power values;
- management of 3 loads. To use this system, a recognizer is required (NOT supplied), which, connected to the outputs, reads the logic and activates the loads.

The outputs behave as follows:

			CODE	2 DIFFERENT LOADS	3 LOADS
STEP 1	Relay 1=On	Relay 2=Off	10	Heat.1=On / Heat.2=Off	Heat.1=On / Heat.2=Off / Heat.3=Off
STEP 2	Relay 1=Off	Relay 2=On	01	Heat.1=Off / Heat.2=On	Heat.1=On / Heat.2=On / Heat.3=Off
STEP 3	Relay 1=On	Relay 2=On	11	Heat.1=On / Heat.2=On	Heat.1=On / Heat.2=On / Heat.3=On

The outputs are activated with a slight delay from one to the other, to avoid simultaneous peaks.

8.1 HEATER ALARMS

Each heater features a digital input to be connected to a thermal cutout or circuit breaker for signalling any anomalies.
If one of the inputs is not used, it must be closed electrically on the 24Vac power supply.
The alarm is immediate and is generated when the digital input switches from closed to open; the heater is immediately switched off. Reset is manual, that is, the user must press the Alarm button on the terminal to be able to restart the heaters, as long as the thermal cutout - circuit breaker has been reset by closing the digital input.

9 FREECOOLING

Energy savings can be achieved using outside air as a means of cooling the environment being air-conditioned. This is done using a damper to let in outside air that is colder than the air inside the environment.
It must be established whether the temperature of the outside air is sufficiently below the ambient temperature so as to enable freecooling. The difference must be less than or equal to a certain value, defined as the Freecooling offset.
The freecooling function is modulated according to the ambient temperature.

The freecooling option can be set to operate at the same time as the compressors, or alternatively not. If opting for separate operation, when the compressor starts the freecooling damper closes.

The freecooling request decreases proportionally to the lowering of the air outlet temperature (see OUTLET LIMITATION)

If the freecooling function is not enabled, due to one of the above causes, the damper can still remain minimally open, at a level set by the user.
The freecooling damper is closed completely only in the following cases:
- When the shelter is off
- Outside temperature probe faulty, not connected or not enabled
- Room temperature probe faulty or not connected
- Fire/Smoke alarm

The freecooling function can be controlled in two different ways:
- Using a 0-10V modulating output on the pCO1-pCO2
- Using two digital outputs (not available on pCO1xs)

See TEMPERATURE CONTROL.

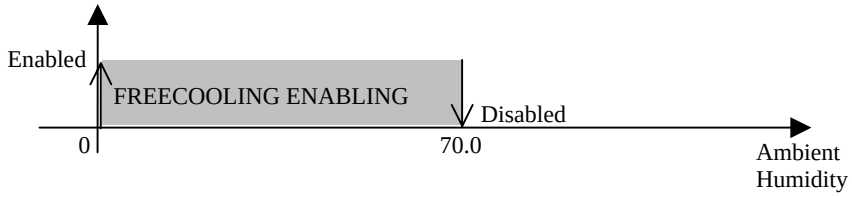
In the event of blackouts, the freecooling function continues to operate, thus continuing, if possible, the inlet of air that is colder than the ambient temperature. During this phase the normal freecooling offset (default value 2.0ºC) is no longer considered, but rather a new fixed offset of 1.0ºC is used. In this phase the outlet fan also operates at 100% speed.

Even if the compressor/compressors cannot operate due to alarms, the normal freecooling offset (default value 2.0ºC) is no longer considered, but rather the fixed offset of 1.0ºC is used.

The humidity in the room is also controlled.

9.1 HUMIDITY CONTROL IN FREECOOLING

NB.: All the values in the following graph refer to the default values



If the ambient humidity is too high, the freecooling function will be disabled for a certain time that can be set by the manufacturer. Once this time has elapsed, if the humidity has fallen below the freecooling re-enabling threshold, the damper will be able to modulate normally again. During a blackout this function is disabled.

9.2 0-10Volt MODULATING DAMPER

Dampers that use a 0-10Volt modulating signal from the pCO1-pCO2 to vary their degree of opening from 0% to 100%. The 0-10Volt electrical signal is directly proportional to the proportional temperature band, therefore the degree of opening always corresponds to demand.

9.3 FREECOOLING CONTROLLED BY DIGITAL OUTPUTS

Based on the activation time of the relays, the degree of opening of the damper varies from 0% to 100%, using a travel time called the “running time” (time required to open or close completely, a rated value for the valves). The degree of opening of the damper is calculated based on the proportion between the temperature differential and the running time.

9.3.1 REALIGNMENT

As can be imagined, the control of the damper using this system is quite difficult for the program to manage, as there is no feedback on the exact position of the damper. The following solutions are used to overcome this problem:
- whenever the temperature control functions require the complete opening or closing of the damper, the program increases the activation time of the opening or closing relays by 25% to ensure the complete closing / opening.
- whenever the board is switched on, the damper is closed completely for the running time, after which modulating operation can begin based on the actual request.

10 MANUAL OPERATION OF THE DEVICES

The devices connected to the outputs can be activated manually, bypassing the safety times, the compressor rotation and independently of the control functions and the values measured by the probes. The only support in manual mode involves the alarms, so as to ensure safety and protect the devices. The activation of the analogue outputs in manual mode sets a value between 0V and 10V. The manual procedure can only be used if the unit has been switched off using the button, and ends automatically 30 minutes after the manual activation of the last device.
During the manual operation of the devices, the shelter cannot be switched on. This operating mode is identified by the message "Manual procedure" on the last row of the display, on the main Menu screen. The parameters for the manual operation of the devices are accessed in the Maintenance branch of screens, with password protection.

11 AUTOMATIC ROTATION BETWEEN DIFFERENT SHELTER UNITS IN A pLAN

The boards connected in a pLAN network have the advantage of being able to be managed directly by the program in certain "critical situations", that is, if anomalies occur (alarms, blackouts…), or alternatively due to the "Rotation" and "Forcing" functions.
The program operates as defined by a number of parameters:

- connection class of the boards: Not present, Present / No Rotation, Present / Rotation. This parameter must be set on each master board. Description:
  - Not present: the unit is not connected to the pLAN network;
  - Present / No Rotation: the unit is physically connected to the pLAN network but is excluded from the rotation function (it can in any case manage the unit in standby, the shared terminal and the print function);
  - Present / Rotation: the unit also takes part in the Rotation function.
- Unit in Standby: In a pLAN network, one of the units in Present / Rotation mode may be in standby. When started using the button, this unit enters Standby mode (that is, off, awaiting activation). Clearly, if there is only one unit in the network, this cannot be in standby.

IMPORTANT. The functions described below are not possible unless:

- There are at least two units selected in Present / Rotation mode
- One unit is in Standby

The functions are managed by the board with pLAN address 1; if this is disconnected from the pLAN network or is switched off due to a blackout, the board in Standby is activated and the functions in question will be suspended until unit 1 is reset. Conversely, switching unit 1 off using the On-off button does not interrupt the network functions.

11.1 CRITICAL SITUATIONS

The unit in Present / Rotation mode that is in Standby is activated in one of the following critical situations on the active boards:

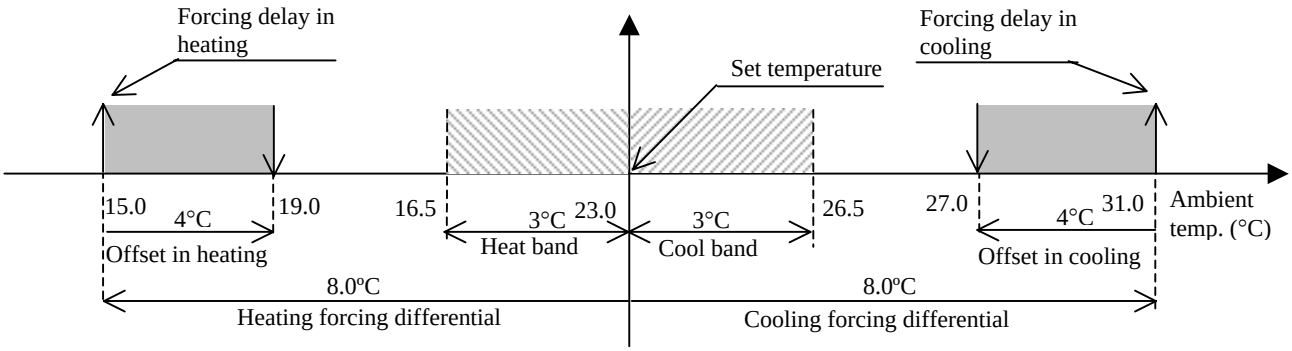
- one of the boards is disconnected from the pLAN network
- one of the boards is switched off using the button
- one of the boards is switched off due to a serious alarm (see the alarm table)

When one of the units in critical situation is reset, this is started again and the spare unit returns to Standby mode.
If a critical situation occurs on the Standby unit, there is no action at a pLAN level, except for the alarm signal on the unit in question.

11.2 FORCING

The unit in Present / Rotation mode that is in Standby is activated automatically in the event where one of the other units cannot manage to satisfy the heating or cooling request. Therefore, if the temperature increases such as to cause an excessive load on the active units, after a certain time the required number of units in standby will be activated. Each unit in this situation can bring about the activation of the units in standby. The parameters that need to be set for the forcing function are the Differential, Offset and Delay, which are different for heating and cooling. The diagram below illustrates the function:

NB.: All the values in the following graph refer to the default values



11.3 FIXED TIME ROTATION

Fixed time rotation is based on a parameter that establishes the interval between rotations. The minimum time that can be set is 0h, and in this case automatic rotation is activated every each 5 minutes. The maximum time is 240h (10 days). The time starts counting when the board with pLAN address 1 is started, and indeed this board manages the rotation functions. Rotation occurs following the order of pLAN addresses.
Rotation will be reset automatically whenever a unit is added to or removed from the rotation function by modifying the connection class (see above).

12 ALARMS

The alarms managed by the program are designed to protect the connected devices and provide signals if the control parameters are outside of the range of normal values or if there are faults on the board. The alarms may derive from the alarm digital inputs, from the probes or from the board. The effect of the alarms ranges from signal-only, to the shutting down of one or more devices, to the shutting down (Off) of the shelter. Many alarms feature modifiable delays.

When an alarm goes off, the following actions occur:

- the buzzer on the external terminal sounds (not featured on the built-in terminal)
- the red LED under the ALARM button comes on
- the message AL flashes on the Menu screen

Pressing the Alarm button mutes the buzzer and displays the alarm screen. If there is more than one active alarm, once having entered the alarm menu, simply use the arrow buttons to scroll the alarms. Pressing any other button exits the alarm screen, however the events remain saved and are displayed again whenever the Alarm button is pressed.

To manually reset the alarms and delete the messages, simply enter the alarm screen and press the Alarm button again; if the cause of the alarms is no longer present (digital inputs reset or temperature returned to normal, etc…) the screen disappears, the red LED goes off and the message NO ACTIVE ALARMS is displayed. If the causes of one or more than one alarm are still present, only the alarms whose causes are no longer present are reset, while the others remain displayed and the buzzer and the red LED come on again.

All the alarms require manual reset.
Therefore, to reset the alarms the operator must act directly on the terminal.

The alarms may be: Serious, Minor 1, Minor 2 (not present on the pCO1xs).
The type is selected on the terminal by the operator.

12.1 ALARM RELAY

Each alarm managed can be selected as Serious or Minor type 1 or 2 (not present on the pCO1xs), thus defining which relays are activated. The delay before closing can be set for all 3 relays.

12.2 SUMMARY ALARM TABLE

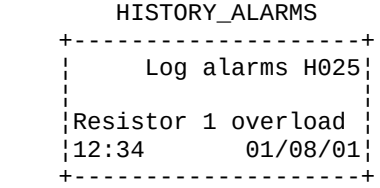
CODE	DESCRIPTION	DELAY	UNIT OFF	DEVICES OFF
AL01	Generic compressor alarm 1 (High press -Thermal cutout comp. - Thermal cutout condens. fan)	-	-	Compressor 1 and Condenser fan 1
AL02	Generic compressor alarm 2 (High press -Thermal cutout comp. - Thermal cutout condens. fan)	-	-	Compressor 2 and Condenser fan 2
AL03	Low pressure compressor 1	See screen T2	-	Compressor 1 and Condenser fan 1
AL04	Low pressure compressor 2	See screen T2	-	Compressor 2 and Condenser fan 2
AL05	No air flow	See screen T4	yes	All
AL06	Outlet fan cutout	-	yes	All
AL07	Thermal cutout heater 1	-	-	Heater 1
AL08	Thermal cutout heater 2	-	-	Heater 2
AL09	Fire / Smoke alarm	-	yes	All
AL10	Filters dirty	See screen T4	-	-
AL11	High ambient temperature	See screen T2	-	-
AL12	Low ambient temperature	See screen T2	-	-
AL13	High ambient humidity	See screen T2	-	-
AL14	Low ambient humidity	See screen T2	-	-
AL15	Operating hour threshold reached, compressor 1	-	-	-
AL16	Operating hour threshold reached, compressor 2	-	-	-
AL17	Operating hour threshold reached, outlet fan	-	-	-
AL18	Room temperature probe faulty or disconnected	60 secs (fixed)	-	-
AL19	Outside air temperature probe faulty or disconnected	60 secs (fixed)	-	-
AL20	Outlet air temperature probe faulty or disconnected	60 secs (fixed)	-	-
AL21	Room humidity probe faulty or disconnected	60 secs (fixed)	-	-
AL22	Condenser 1 pressure probe faulty or disconnected	60 secs (fixed)	-	-
AL23	Condenser 2 pressure probe faulty or disconnected	60 secs (fixed)	-	-
AL24	Condenser 1 temperature probe faulty or disconnected	60 secs (fixed)	-	-
AL25	Condenser 2 temperature probe faulty or disconnected	60 secs (fixed)	-	-
AL26	Blackout	-	-	All except for outlet fan and freecooling
AL27	Clock card absent or not working	-	-	-
AL28	High pressure circuit 1 (from probe)	-	-	Compressor 1 and Condenser fan 1
AL29	High pressure circuit 2 (from probe)	-	-	Compressor 2 and Condenser fan 2
AL30	Auxiliary alarm	-	-	-
AL31	Operating hour threshold reached, humidifier	-	-	-
AL32	pLAN alarms			
AL33	Driver 1 alarm, probes faulty or disconnected	-	-	Compressor 1
AL34	Driver 1 EEPROM faulty or damaged	-	-	Compressor 1
AL35	Driver 1 valve motor faulty or damaged	-	-	Compressor 1
AL36	Driver 1 alarm, battery discharged or faulty	-	-	-
AL37	Driver 1 high evaporation pressure (MOP)	See Fj	-	-
AL38	Driver 1 low evaporation pressure (LOP)	See Fj	-	-
AL39	Driver 1 low superheating	See Fi	-	Compressor 1
AL40	Driver 1 high suction pressure	See Fi	-	-
AL41	Driver 1 valve not closed during blackout	-	-	Compressor 1
AL42	Driver 2 alarm, probes faulty or disconnected	-	-	Compressor 2
AL43	Driver 2 EEPROM faulty or damaged	-	-	Compressor 2
AL44	Driver 2 valve motor faulty or damaged	-	-	Compressor 2
AL45	Driver 2 alarm, battery discharged or faulty	-	-	-
AL46	Driver 2 high evaporation pressure (MOP)	See Fj	-	-
AL47	Driver 2 low evaporation pressure (LOP)	See Fj	-	-
AL48	Driver 2 low superheating	See Fi	-	Compressor 2
AL49	Driver 2 high suction pressure	See Fi	-	-
AL50	Driver 2 valve not closed during blackout	-	-	Compressor 2
AL51	Driver 1 pLAN alarm: not connected to the corresponding unit	60 sec (fixed)	-	Compressor 1
AL52	Driver 2 pLAN alarm: not connected to the corresponding unit	60 sec (fixed)	-	Compressor 2

13 ALARM LOG

The program features two types of log: the BASIC log and the ADVANCED log.

13.1 BASIC LOG (pCO1 only if the clock card is installed – pCO2)

The significant availability of memory space on the pC01-pCO2 boards means that a series of events can be saved. The BASIC log can be enabled by setting a parameter; if the clock card is not present (optional on the pCO1, embedded on the pCO2), the BASIC log is not available. No other optional cards are used. A maximum of 100 events can be saved; on reaching the hundredth alarm, that is, the last available space in the memory, the next alarm is saved over the oldest event (001), which is thus deleted, and so on for subsequent events. The saved events cannot be deleted by the user, unless when installing the default values. The BASIC log screen is accessed by pressing the ALARM button when screen E4 is displayed, and exited by pressing the MENU button (Esc on the Built in terminal). It has the following layout:



The following data are saved for each alarm, corresponding to the shelter at the moment of the event:

- alarm description
- time
- date
- chronological number of the event (0-100)

The chronological number of the event, in the top right corner, indicates how "old" the event is in the list of 100 events available. Event number 001 is first event to be saved after the BASIC log was enabled, and thus the oldest.
Move the cursor to the chronological number and then use the arrow buttons to scroll the alarm log, from 1 to 100.
For example, if event 001 is displayed, pressing the down arrow has no effect (end of the list).
If 15 alarms have been saved and event 015 is displayed, pressing the up arrow has no effect (end of the list).

13.2 ADVANCED LOG (pCO2)

The events are saved in the 1MB memory expansion, available on the pCO2 board. The advantages and characteristics of this log are as follows:

- Log by event: a typical log by event is the alarm log. When an alarm is activated, the event is saved together with other significant values (temperature, humidity, pressure, set point, etc.).
- Log by time: a typical log by time is the temperature/humidity log. The temperature and humidity values are saved at regular intervals.
- Log of logs: a typical log of logs involves the saving of the last alarms/temperature/humidity values recorded before a serious alarm. Unlike the data saved for the log by event and log by time, this data is not overwritten when the memory is full.
- Possibility to choose the values to be saved and the saving options at any time. The "WinLOAD" program can be used to define, using a practical "Wizard", the values to be saved and the options. WinLOAD does not require the application program "files", as it is able to directly receive all the information required from the program installed on the pCO1 – pCO2.
- 1MB dedicated FLASH memory. The system saves the data in the 1MB FLASH memory in the memory expansion (code PCO200MEM0). For example, 1MB of memory is able to store 5000 alarm events with 5 values per alarm, and record 2 values, such as temperature and humidity, for 6 months, saved every 5 minutes.
- Possibility to define up to 7 different log configurations. Typically, each controller will have an alarm log, a log of the control values (temperature/humidity/pressure) and some "logs of logs".
- Possibility to display the data saved on the terminal LCD (external or built-in), or on a PC.
- "Black box" function. The memory expansion that contains the logs can be removed from the pCO² on the unit controlled and inserted in another pCO² to display the data saved. The latter pCO² does not need to have the same application program as the original.
- Reliability of the data saved. The data are saved in FLASH memory, which does not require batteries that risk being discharged. If following a software update the previously saved data are incompatible with the new software, all the data will be deleted (following confirmation).

13.2.1 CONFIGURATION USING "WINLOAD"

The Advanced Log function, including all the options described above, is configured using the "On line help" feature in the WINLOAD32 program, the same used to upload the program software to the pC01 and pCO2 boards.

13.2.2 LIST OF PARAMETERS FOR THE ADVANCED LOG

DESCRIPTION	DIGITAL/ ANALOGUE
enable force standby for temperature	DIGITAL
enable outlet limit	DIGITAL
ain 2 condensing pressure or temperature	DIGITAL
ain 6 condensing pressure or temperature	DIGITAL
filter alarm	DIGITAL
flow alarm	DIGITAL
general compressor 1 alarm	DIGITAL
general compressor 2 alarm	DIGITAL
auxiliary alarm	DIGITAL
driver 1 alarm	DIGITAL
driver 2 alarm	DIGITAL
blackout alarm	DIGITAL
clock alarm	DIGITAL
driver1 EEPROM alarm	DIGITAL
driver2 EEPROM alarm	DIGITAL
outside temperature probe alarm	DIGITAL
fan overload alarm	DIGITAL
fire-smoke alarm	DIGITAL
humidifier op. hours alarm	DIGITAL
main fan op. hours alarm	DIGITAL
high room temperature alarm	DIGITAL
compressor 1 op. hours alarm	DIGITAL
compressor 2 op. hours alarm	DIGITAL
heat 1 overload alarm	DIGITAL
heat 2 overload alarm	DIGITAL
high humidity alarm	DIGITAL
high pressure 1 alarm	DIGITAL
high pressure 2 alarm	DIGITAL
driver 1 high superheat	DIGITAL
driver 2 high superheat	DIGITAL
low room temperature alarm	DIGITAL
driver 1 LOP alarm	DIGITAL
driver 2 LOP alarm	DIGITAL
low room humidity	DIGITAL
low pressure circuit 1	DIGITAL
low pressure circuit 2	DIGITAL
driver 1 low superheat	DIGITAL
driver 2 low superheat	DIGITAL
driver 1 MOP alarm	DIGITAL
driver 2 MOP alarm	DIGITAL
pLAN alarm	DIGITAL
pressure probe 1 alarm	DIGITAL
pressure probe 2 alarm	DIGITAL
driver 1 probe error	DIGITAL
driver 2 probe error	DIGITAL
room humidity probe alarm	DIGITAL
room temperature probe alarm	DIGITAL
driver 1 step motor alarm	DIGITAL
driver 2 step motor alarm	DIGITAL
outlet temperature probe alarm	DIGITAL
condenser 1 temperature probe alarm	DIGITAL
condenser 2 temperature probe alarm	DIGITAL
driver 1 valve not closed	DIGITAL
driver 2 valve not closed	DIGITAL
alarm reset	DIGITAL
driver 1 battery present	DIGITAL
driver 2 battery present	DIGITAL
selection Celsius Farhenait	DIGITAL
compressor + freecooling possible	DIGITAL
condenser coil single or double	DIGITAL
cooling status	DIGITAL
custom close extrasteps	DIGITAL
custom open extrasteps	DIGITAL
enable humidifier	DIGITAL
digital_input_1	DIGITAL
digital_input_10	DIGITAL
digital_input_11	DIGITAL
digital_input_12	DIGITAL
digital_input_2	DIGITAL
digital_input_3	DIGITAL
digital_input_4	DIGITAL
digital_input_5	DIGITAL
digital_input_6	DIGITAL
digital_input_7	DIGITAL
digital_input_8	DIGITAL
digital_input_9	DIGITAL
enable analogue main fan management	DIGITAL
enable clock	DIGITAL
enable dehumidification	DIGITAL
enable outside probe	DIGITAL
enable humidity limit	DIGITAL
enable unit on-off from keypad	DIGITAL
enable pressure probe 1	DIGITAL
enable pressure probe 2	DIGITAL
enable printer	DIGITAL
enable room humidity probe	DIGITAL
enable rotation	DIGITAL
enable supervisor	DIGITAL
enable outlet temperature probe	DIGITAL
enable condenser 1 temperature probe	DIGITAL
enable condenser 2 temperature probe	DIGITAL
enable condenser management	DIGITAL
enable high pressure prevention	DIGITAL
freecooling type	DIGITAL
DOUT 1 manual	DIGITAL
DOUT 2 manual	DIGITAL
DOUT 3 manual	DIGITAL
DOUT 4 manual	DIGITAL
DOUT 5 manual	DIGITAL
DOUT 6 manual	DIGITAL
DOUT 7 manual	DIGITAL
DOUT 8 manual	DIGITAL
DOUT 9 manual	DIGITAL
DOUT 10 manual	DIGITAL
DOUT 11 manual	DIGITAL
driver 1 manual mode	DIGITAL
driver 2 manual mode	DIGITAL
modem active	DIGITAL
GSM modem error p	DIGITAL
GSM modem error t	DIGITAL
enable boss on-off	DIGITAL
pco2_dout_1	DIGITAL
pco2_dout_2	DIGITAL
pco2_dout_3	DIGITAL
pco2_dout_4	DIGITAL
pco2_dout_5	DIGITAL
pco2_dout_6	DIGITAL
pco2_dout_7	DIGITAL
pco2_dout_8	DIGITAL
pco2_dout_9	DIGITAL
pco2_dout_10	DIGITAL
pco2_dout_11	DIGITAL
temperature control type Prop or P+I	DIGITAL
on unit	DIGITAL
modem type	DIGITAL
driver 1 battery status	ANALOGUE
driver 2 battery status	ANALOGUE
communication speed	ANALOGUE
driver high condensing temperature limit	ANALOGUE
condensing temperature 1 (pressure conv.)	ANALOGUE
condensing temperature 2 (pressure conv.)	ANALOGUE
freecooling value opening	ANALOGUE
driver custom_back_steps	ANALOGUE
driver custom_duty_cycle	ANALOGUE
driver custom_max_steps	ANALOGUE
driver custom_min_steps	ANALOGUE
driver custom_run_current	ANALOGUE
driver custom_still_current	ANALOGUE
driver custom_total_steps	ANALOGUE
driver custom_vlv_frequency	ANALOGUE
driver 1 differential factor	ANALOGUE
driver 2 differential factor	ANALOGUE
day rotation	ANALOGUE
driver 1 dead zone	ANALOGUE
driver 2 dead zone	ANALOGUE
dead zone temperature	ANALOGUE
air flow alarm delay	ANALOGUE
filter alarm delay	ANALOGUE

LOP alarm delay	ANALOGUE
MOP alarm delay	ANALOGUE
main fan off delay	ANALOGUE
main fan on delay	ANALOGUE
relay 4 delay serious alarm	ANALOGUE
relay 5 delay light alarm	ANALOGUE
relay delay 6 light alarm	ANALOGUE
high superheat alarm delay	ANALOGUE
low superheat alarm delay	ANALOGUE
dehumidification differential	ANALOGUE
high condensing pressure differential	ANALOGUE
humidification differential	ANALOGUE
low limit differential for stop dehumid.	ANALOGUE
outlet limit differential	ANALOGUE
temperature differential cooling	ANALOGUE
temperature differential heating	ANALOGUE
number of drivers	ANALOGUE
driver 1 valve type	ANALOGUE
driver 2 valve type	ANALOGUE
end cool freecooling	ANALOGUE
outside temperature probe calibration	ANALOGUE
outside air temperature	ANALOGUE
condenser fan (pressure) differential	ANALOGUE
condenser fan (temperature) differential	ANALOGUE
max. condenser fan speed	ANALOGUE
min. condenser fan speed	ANALOGUE
condenser fan (pressure) set point	ANALOGUE
condenser fan (temperature) set point	ANALOGUE
force cond. fan (pressure) differential	ANALOGUE
force cond. fan (temp.) differential	ANALOGUE
high temperature offset	ANALOGUE
low temperature offset	ANALOGUE
high temperature force time	ANALOGUE
low temperature force time	ANALOGUE
driver 1 go ahead type	ANALOGUE
driver 2 go ahead type	ANALOGUE
driver 1 go ahead from screen	ANALOGUE
driver 2 go ahead from screen	ANALOGUE
high room humidity offset	ANALOGUE
high room temperature offset	ANALOGUE
driver 1 integration factor	ANALOGUE
driver 2 integration factor	ANALOGUE
identification number	ANALOGUE
integral_time_hct	ANALOGUE
integral_time_lop	ANALOGUE
integral_time_mop	ANALOGUE
integral_time_shl_drv1	ANALOGUE
integral_time_shl_drv2	ANALOGUE
max humidity limit for freecooling	ANALOGUE
max main fan speed limit	ANALOGUE
max humidity set point limit	ANALOGUE
max temperature set point limit	ANALOGUE
min humidity limit for freecooling	ANALOGUE
min main fan speed limit	ANALOGUE
min humidity set point limit	ANALOGUE
min temperature set point limit	ANALOGUE
low room humidity alarm offset	ANALOGUE
low room temperature alarm offset	ANALOGUE
driver 1 low superheat threshold	ANALOGUE
driver 2 low superheat threshold	ANALOGUE
manual analogue output 1	ANALOGUE
manual analogue output 2	ANALOGUE
manual analogue output 3	ANALOGUE
manual analogue output 4	ANALOGUE
driver 1 manual open steps	ANALOGUE
driver 2 manual open steps	ANALOGUE
driver max evaporator pressure probe	ANALOGUE
suction temperature max limit	ANALOGUE
max. humidity probe	ANALOGUE
max. value pressure probe 1	ANALOGUE
max. value pressure probe 2	ANALOGUE
min. freecooling open	ANALOGUE
driver min evaporator pressure probe	ANALOGUE
min. humidity probe	ANALOGUE
min. value pressure probe 1	ANALOGUE
min. value pressure probe 2	ANALOGUE
modem password	ANALOGUE
modem rings	ANALOGUE
modem status	ANALOGUE

number of compressors	ANALOGUE
number compressor for dehumidification	ANALOGUE
number of condenser fans	ANALOGUE
number of heaters	ANALOGUE
new maintenance password	ANALOGUE
new manufacturer password	ANALOGUE
new service password	ANALOGUE
dehumid. limit offset for low temp.	ANALOGUE
freecooling offset	ANALOGUE
driver 1 proportional factor	ANALOGUE
driver 2 proportional factor	ANALOGUE
driver 1 valve position	ANALOGUE
driver 2 valve position	ANALOGUE
circuit 1 pressure	ANALOGUE
circuit 1 pressure probe calibration	ANALOGUE
circuit 2 pressure	ANALOGUE
circuit 2 pressure probe calibration	ANALOGUE
condensing pressure prevent differential	ANALOGUE
condensing temp. prevent differential	ANALOGUE
condensing pressure prevent set point	ANALOGUE
condensing temp. prevent set point	ANALOGUE
BMS protocol type	ANALOGUE
room humidity	ANALOGUE
room humidity probe calibration	ANALOGUE
room temperature	ANALOGUE
room temperature probe calibration	ANALOGUE
rotation time	ANALOGUE
high running hours compressor 1	ANALOGUE
high running hours compressor 2	ANALOGUE
high running hours main fan	ANALOGUE
low running hours compressor 1	ANALOGUE
low running hours compressor 2	ANALOGUE
low running hours main fan	ANALOGUE
driver 1 saturation temperature	ANALOGUE
driver 2 saturation temperature	ANALOGUE
condenser high press. prevent set point	ANALOGUE
humidity set point	ANALOGUE
outlet limit set point	ANALOGUE
set-point temperature	ANALOGUE
main fan speed in dehumidification	ANALOGUE
cond. fan speed up time	ANALOGUE
start open freecooling	ANALOGUE
MOP delay at startup	ANALOGUE
driver 1 suction pressure	ANALOGUE
driver 2 suction pressure	ANALOGUE
driver 1 suction temperature	ANALOGUE
driver 2 suction temperature	ANALOGUE
driver 1 superheat set point	ANALOGUE
driver 2 superheat set point	ANALOGUE
outlet air temperature probe calibration	ANALOGUE
outlet air temperature	ANALOGUE
condensing temperature 1 from probe	ANALOGUE
condensing temp. 1 probe calibration	ANALOGUE
condensing temperature 2 from probe	ANALOGUE
condensing temp. 2 probe calibration	ANALOGUE
running hours threshold comp.1	ANALOGUE
running hours threshold comp.2	ANALOGUE
running hours threshold humidifier	ANALOGUE
running hours threshold main fan	ANALOGUE
threshold_lop	ANALOGUE
threshold_mop	ANALOGUE
time_betw_comp	ANALOGUE
time_betw_heat	ANALOGUE
time_integr	ANALOGUE
time_low_pres	ANALOGUE
time_min_off	ANALOGUE
time_min_on	ANALOGUE
time_off_freec	ANALOGUE
time_runn_d3p	ANALOGUE
time_same_comp	ANALOGUE
time_thr_alarm	ANALOGUE
total_numbers	ANALOGUE
triac_max_t	ANALOGUE
triac_min_t	ANALOGUE
triac_wave_t	ANALOGUE
type_ain_humid	ANALOGUE
type_ain_pressure1	ANALOGUE
type_ain_pressure2	ANALOGUE
type_al_1	ANALOGUE

type_al_10	ANALOGUE
type_al_11	ANALOGUE
type_al_12	ANALOGUE
type_al_13	ANALOGUE
type_al_14	ANALOGUE
type_al_15	ANALOGUE
type_al_16	ANALOGUE
type_al_17	ANALOGUE
type_al_18	ANALOGUE
type_al_19	ANALOGUE
type_al_2	ANALOGUE
type_al_20	ANALOGUE
type_al_21	ANALOGUE
type_al_22	ANALOGUE
type_al_23	ANALOGUE
type_al_24	ANALOGUE
type_al_25	ANALOGUE
type_al_26	ANALOGUE
type_al_27	ANALOGUE
type_al_28	ANALOGUE
type_al_29	ANALOGUE
type_al_3	ANALOGUE
type_al_30	ANALOGUE
type_al_31	ANALOGUE
type_al_32	ANALOGUE
type_al_33	ANALOGUE
type_al_34	ANALOGUE
type_al_35	ANALOGUE
type_al_36	ANALOGUE
type_al_37	ANALOGUE
type_al_38	ANALOGUE
type_al_39	ANALOGUE
type_al_4	ANALOGUE
type_al_40	ANALOGUE
type_al_41	ANALOGUE
type_al_42	ANALOGUE
type_al_43	ANALOGUE
type_al_44	ANALOGUE
type_al_45	ANALOGUE
type_al_46	ANALOGUE
type_al_47	ANALOGUE
type_al_48	ANALOGUE
type_al_49	ANALOGUE
type_al_5	ANALOGUE
type_al_50	ANALOGUE
type_al_51	ANALOGUE
type_al_52	ANALOGUE
type_al_53	ANALOGUE
type_al_54	ANALOGUE
type_al_55	ANALOGUE
type_al_56	ANALOGUE
type_al_57	ANALOGUE
type_al_58	ANALOGUE
type_al_6	ANALOGUE
type_al_7	ANALOGUE
type_al_8	ANALOGUE
type_al_9	ANALOGUE
type_cond1_temp	ANALOGUE
type_cond2_temp	ANALOGUE
type_ext_temp	ANALOGUE
type_freon	ANALOGUE
type_room_temp	ANALOGUE
type_supply_temp	ANALOGUE
unit_status	ANALOGUE
unit1_mode	ANALOGUE
unit2_mode	ANALOGUE
unit3_mode	ANALOGUE
unit4_mode	ANALOGUE
unit5_mode	ANALOGUE
unit6_mode	ANALOGUE
unit7_mode	ANALOGUE
unit8_mode	ANALOGUE
number of standby units	ANALOGUE
driver 1 preposition power	ANALOGUE
driver 2 preposition power	ANALOGUE

14 LIST OF PARAMETERS AND DEFAULT VALUES

The table below lists the parameters in the program, together with the following information: screen code (the screen code is displayed at the top right) to assist the identification of the parameter, the default value, the minimum and maximum limits (range), and the unit of measure.
To find a specific parameter on the display, proceed as follows:

- Identify the parameter in the table below and the corresponding screen code
- Using the list of the screens (following paragraph) and the screen code, access the screen on the terminal

DESCRIPTION OF THE PARAMETER	SCREEN	DEFAULT VALUE	RANGE	UOM
				
Enter password		1234	0-9999	
Modify outlet fan operating hours	A6	0	0-99 . 0-999	hours
Modify compressor 1 operating hours	A6	0	0-99 . 0-999	hours
Modify compressor 2 operating hours	A6	0	0-99 . 0-999	hours
Device operating hour threshold	A7	99	0-99	hours x 1000
Cond. 1 pressure probe calibration	A8	0	-9.9 - 9.9	%RH
Cond. 2 pressure probe calibration	A8	0	-9.9 - 9.9	bar
Humidity probe calibration	A8	0	-9.9 - 9.9	bar
Room temperature probe calibration	A9	0	-9.9 - 9.9	ºC / ºF
Outside temperature probe calibration	A9	0	-9.9 - 9.9	ºC / ºF
Outlet temperature probe calibration	A9	0	-9.9 - 9.9	ºC / ºF
Cond. 1 temperature probe calibration	Aa	0	-9.9 - 9.9	ºC / ºF
Cond. 2 temperature probe calibration	Aa	0	-9.9 - 9.9	ºC / ºF
Manual activation of digital outputs 1 – 2 – 3	Ab	Off	Off-On	
Manual activation of digital outputs 4 – 5	Ac	Off	Off-On	
Manual activation of digital outputs 6 – 7 – 8	Ad	Off	Off-On	
Manual activation of digital outputs 9 – 10 – 11	Ae	Off	Off-On	
Manual activation of modulating outputs 1 – 2	Af	0	0-10.0	Volt
Manual activation of modulating outputs 3 – 4	Ag	0	0-10.0	Volt
Driver 1 valve control mode	Ah	Automatic	Auto-Man.	
Driver 1 valve manual opening steps	Ah	0	0-9999	Steps
Driver 2 valve control mode	Ai	Automatic	Auto-Man.	
Driver 2 valve manual opening steps	Ai	0	0-9999	Steps
Driver 1 manual release on start-up	Aj	No	No-Yes	
Driver 2 manual release on start-up	Ak	No	No-Yes	
Enter new Maintenance password		1234	0-9999	
				
Cyclical print interval	H0	24	0-999	hours
Send immediate print	H1	No	No-Yes	
				
Hour setting	K0	current hours	0-23	Hours
Minute setting	K0	current minutes	0-59	minutes
Day setting	K0	current day	1-31	
Month setting	K0	current month	1-12	
Year setting	L0	current year	0-99	
				
Temperature set point	S1	23.0	see S1	ºC / ºF
Humidity set point	S1	50.0	see S2	%RH
				
Enter user password		1234	0-9999	
Minimum and maximum temperature set point limits	P1	-99.9 / 99.9	-999.9 - 999.9	ºC / ºF
Minimum and maximum humidity set point limits	P2	0.0 / 100.0	0.0-100.0	%RH
Proportional temperature bands in Heating and cooling	P3	3.0 / 3.0	0.0-100.0	ºC / ºF
Temperature dead zone	P3	0.0	0.0-99.9	ºC / ºF
Proportional bands in Humidification and Dehumidification	P4	2.0 / 2.0	0.0-99.9	%RH

DESCRIPTION OF THE PARAMETER	SCREEN	DEFAULT VALUE	RANGE	UOM
Inside/outside temperature offset for freecooling	P5	2.0	0.0-10.0	ºC / ºF
Enable freecooling humidity limit	P6	No	No-Yes	
Minimum / maximum humidity limit for freecooling	P6	30.0 / 75.0	0.0-99.9	%RH
Display language screen when starting the pCO2-pCO1	P7	Yes	No-Yes	
Switch unit off from button	P7	No	No-Yes	
High and low ambient temperature alarm offset	P8	10.0 / 10.0	-999.9 - 999.9	ºC / ºF
High and low ambient humidity alarm offset	P9	20.0 / 30.0	0-100.0	%RH
Enable outlet limitation function	Pa	No	No-Yes	
Outlet air set point for the limitation function	Pa	12.0	-999.9 - 999.9	ºC / ºF
Outlet air differential for the limitation function	Pa	4.0	-999.9 - 999.9	ºC / ºF
Assign type of alarm from AL01 to AL20 Serious / Minor ½	Pb	5-6-9=S others=1	S-1-2	
Assign type of alarm from AL21 to AL40 Serious / Minor ½	Pc	26=S others=1	S-1-2	
Assign type of alarm from AL41 to AL50 Serious / Minor ½	Pd	All = 1	S-1-2	
Board identification number for supervisory network	Pe	1	0-200	
Board communication speed for supervisory network	Pe	1200	1200-19200	Baudrate
Serial communication protocol	Pe	Carel	Carel,Modbus, Lon,RS232,Gsm	
Telephone numbers entered on analogue modem	Pf	1	1-4	
Enter telephone numbers on analogue/GSM modem	Pf	0	0…9,#,*,@,^	
Number of rings for GSM modem	Pf	0	0-9	
Password to access the pCO2-pCO1 via analogue/GSM modem from a PC or cellular phone (SMS)	Pf	0	0-9999	
Number of rings for analogue modem	Pg	0	0-9	
Type of analogue modem dialling	Pg	Tone	Tone-Pulse	
Enter new user password		1234	0-9999	
				
Enter manufacturer password	Z0	1234	0-9999	
CONFIGURATION →				
Enable BMS	C0	No	No-Yes	
Enable printer	C0	No	No-Yes	
Select unit of measure for temperature probes and parameters	C0	ºC	ºC-ºF	
Enable clock card (pCO1 only)	C0	No	No-Yes	
Select refrigerant	C1	R134a	R22,R134a, R404a,R407C, R410A	
Type of freecooling	C1	0-10V	0-10V-3Pos	
Enable simultaneous freecooling and compressor operation	C1	No	No-Yes	
Enable Dehumidification	C2	No	No-Yes	
Enable Humidification	C2	No	No-Yes	
Number of compressors (only pCO1-pCO2medium)	C3	1	1-2	
Number of heaters for heating (only pCO1-pCO2medium)	C3	1	0-2-Binary	
Number of compressors enabled for dehumidification	C3	1	1-2	
Enable modulating outlet fan	C4	No	No-Yes	
Enable condenser function	C5	No	No-Yes	
Enable second condenser coil	C5	No	No-Yes	
Number of condenser fans (only pCO1-pCO2medium)	C5	1	1-2	
Maximum voltage threshold for Triac	C6	92	0-100	%
Minimum voltage threshold for Triac	C6	70	0-100	%
Triac impulse duration	C6	2	0-10	m seconds
Configuration of analogue input 2	C7	Pressure circ.1	Press./Temp.	
Configuration of analogue input 2	C8	Pressure circ.2	Press./Temp.	
Enable pressure probe 1	C9	Yes	No-Yes	
Type of signal from pressure probe 1	C9	Current	0-1V,0-10V, current	
Minimum and maximum value measured by pressure probe 1	C9	0.0 / 30.0	-20.0 - 50.0	bar
Enable pressure probe 2 (only pCO1-pCO2medium)	Ca	No	No-Yes	
Type of signal from pressure probe 2 (only pCO1-pCO2medium)	Ca	Current	0-1V,0-10V, current	
Minimum and maximum value measured by pressure probe 2 (only pCO1-pCO2medium)	Ca	0.0 / 30.0	-20.0 - 50.0	bar
Enable condenser 1 temperature probe	Cb	Yes	No-Yes	
Type of signal from condenser 1 temperature probe	Cb	NTC	NTC-0-10V, current	
Enable condenser 2 temperature probe (only pCO1-pCO2medium)	Cb	Yes	No-Yes	
Type of signal from condenser 2 temperature probe (only pCO1-pCO2medium)+	Cb	NTC	NTC-0-10V, current	
Enable humidity probe (No pCO1xs)	Cc	Yes	No-Yes	

DESCRIPTION OF THE PARAMETER	SCREEN	DEFAULT VALUE	RANGE	UOM
Type of signal from humidity probe (No pCO1xs)	Cc	0-1V	0-1V,0-10V, current	
Minimum and maximum value measured by the humidity probe (No pCO1xs)	Cc	0.0 / 100.0	0-100.0	%RH
Type of signal from room temperature probe	Cd	NTC	NTC-PT1000	
Enable outlet probe	Cd	No	No-Yes	
Type of signal from outlet temperature probe	Cd	NTC	NTC-PT1000	
Enable outside temperature probe	Ce	No	No-Yes	
Type of signal from outside temperature probe	Ce	NTC	NTC-PT1000	
pLAN connection class for boards 1 – 3	Cf	Present-no rot.	Present-rot., Present-no rot., Not present	
pLAN connection class for boards 4 – 6	Cg	Not present	Present-rot., Present-no rot., Not present	
pLAN connection class for boards 7 – 8	Ch	Not present	Present-rot., Present-no rot., Not present	
PARAMETERS →				
Enable FIFO rotation between compressors	G1	No	No-Yes	
Type of temperature control	G1	Proportional	Prop.-P+I	
Percentage of the proportional band for minimum freecooling opening	G2	0.0%	0.0-100.0	
Percentage of the proportional band for maximum freecooling opening	G2	50.0%	0.0-100.0	
Minimum freecooling opening	G2	2.0	0.0-10.0	Volt
Minimum and maximum modulating outlet fan speed	G3	5.0 / 10.0	0.0-10.0	Volt
Outlet fan speed during dehumidification	G3	5.0	0.0-10.0	Volt
Temperature differential to stop dehumidification	G4	5.0	0.0-99.9	ºC / ºF
Temperature offset to restart dehumidification	G4	4.0	0.0-99.9	ºC / ºF
High pressure alarm set point	G5	23.5	-99.9 - 99.9	bar
High pressure alarm differential	G5	1.0	-99.9 - 99.9	bar
Condensing (pressure) set point	G6	14.0	-99.9 - 99.9	bar
Condensing (pressure) differential	G6	2.0	-99.9 - 99.9	bar
Modulating condenser fan Speed-up time	G6/G7	2	0-999	seconds
Condensing (temperature) set point	G7	55.0	-99.9 - 99.9	ºC / ºF
Condensing (temperature) differential	G7	1.0	-99.9 - 99.9	ºC / ºF
Minimum and maximum modulating condenser fan speed	G8	0.0 / 10.0	0-10.0	Volt
Enable high pressure alarm Prevent function	G9/Ga	No	No-Yes	bar
Prevent function set point (pressure)	G9	20.0	-99.9 - 99.9	bar
Prevent function differential (pressure)	G9	2.0	-99.9 - 99.9	bar
Prevent function set point (temperature)	Ga	70.0	-99.9 - 99.9	ºC / ºF
Prevent function differential (temperature)	Ga	1.0	-99.9 - 99.9	ºC / ºF
Number of units set in Standby mode	Gb	0	0-1	
Automatic rotation interval for units in pLAN network	Gb	24	1-240	Hours
Enable cooling/heating Support function for units in pLAN network	Gc	No	No-Yes	
Forcing delays for low and high ambient temperature	Gc	3 / 3	0-999	minutes
Low ambient temperature differential to force unit in network	Gd	8	0-99.9	ºC / ºF
Low ambient temperature offset to force unit in network	Gd	4	0-99.9	ºC / ºF
High ambient temperature differential to force unit in network	Ge	8	0-99.9	ºC / ºF
High ambient temperature offset to force unit in network	Ge	4	0-99.9	ºC / ºF
CAREL EXV DRIVERS →				
Number of drivers connected	F0	0	0-2	
Enable backup battery driver 1	F0	No	No-Yes	
Enable backup battery driver 2	F0	No	No-Yes	
Type of valve circuit 1	F1	10 (Carel)	0-11 (see 1.5)	
Superheating set point circuit 1	F1	6.0	2.0-50.0	ºC
Dead band circuit 1	F1	0	0-9.9	ºC
Type of valve circuit 2	F2	10 (Carel)	0-11 (see 1.5)	
Superheating set point circuit 2	F2	6.0	2.0-50.0	ºC
Dead band circuit 2	F2	0	0-9.9	ºC
PID control – proportional gain circuit 1	F3	2.5	0.0-99.9	
PID control – integration time circuit 1	F3	25	0-999	seconds
PID control – derivative time circuit 1	F3	5.0	0.0-99.9	seconds
PID control – proportional gain circuit 2	F4	2.5	0.0-99.9	
PID control – integration time circuit 2	F4	25	0-999	seconds
PID control – derivative time circuit 2	F4	5.0	0.0-99.9	seconds
Threshold for low superheat protection circuit 1	F5	4.0	-4.0 - 10.0	ºC
Prot. threshold integration time, low superheat circuit 1	F5	10	0-255	seconds
Threshold for low superheat protection circuit 2	F6	4.0	-4.0 - 10.0	ºC
Prot. threshold integration time, low superheat circuit 2	F6	10	0-255	seconds
Percentage ratio between cooling capacity and Driver capacity C 1	F7	60	0-100	%
Percentage ratio between cooling capacity and Driver capacity C 2	F7	60	0-100	%
LOP threshold	F8	-40.0	-70.0 - 50.0	ºC
LOP threshold integration time	F8	40	0-255	seconds

DESCRIPTION OF THE PARAMETER	SCREEN	DEFAULT VALUE	RANGE	UOM
MOP start delay	F9	30	0-500	seconds
MOP threshold	F9	40.0	-50.0 - 99.9	ºC
MOP threshold integration time	F9	40	0-255	seconds
High condensing temp. protection threshold	Fa	75.0	0-99.9	ºC
Integration time for high condensing temp. threshold	Fa	40	0-255	seconds
High suction temperature threshold	Fb	30.0	0-100.0	ºC
Custom Valve: minimum steps	Fc	0	0-8100	
Custom Valve: maximum steps	Fc	1600	0-8100	
Custom Valve: closing steps	Fd	3600	0-8100	
Custom Valve: return steps	Fd	0	0-8100	
Custom Valve: enable extra step in opening	Fe	No	No-Yes	
Custom Valve: enable extra step in closing	Fe	No	No-Yes	
Custom Valve: operating current	Ff	250	0-1000	mA
Custom Valve: holding current	Ff	100	0-1000	mA
Custom Valve: frequency	Fg	100	32-330	Hertz
Custom Valve: duty cycle	Fg	50	0-100	%
Minimum evaporation pressure probe value	Fh	-0.5	-9.9-10.0	bar
Maximum evaporation pressure probe value	Fh	7.0	3.5-40.0	Bar
Low superheating alarm delay	Fi	0	0-3600	seconds
High suction temperature alarm delay	Fi	0	0-3600	seconds
LOP alarm delay	Fj	0	0-3600	seconds
MOP alarm delay	Fj	0	0-3600	seconds
TIMES →				
Outlet fan start and stop delay	T0	10 / 20	0-999	seconds
Integration time for P+I temperature control	T1	600	0-9999	seconds
Travel time for 3 position freecooling damper	T1	180	0-9999	seconds
Low pressure alarm delay	T2	180	0-9999	seconds
High-low temperature-humidity alarm delays	T2	600	0-9999	seconds
Relay 4 activation delay - serious alarm	T3	0	0-999	seconds
Relay 5 activation delay - minor 1	T3	0	0-999	seconds
Relay 6 activation delay - minor 2	T3	0	0-999	seconds
Dirty filter alarm delay	T4	10	0-9999	seconds
Air flow switch alarm delay	T4	10	0-9999	seconds
Minimum compressor off time	T5	180	0-9999	seconds
Minimum compressor on time	T5	60	0-9999	seconds
Delay between compressor starts	T6	360	0-9999	seconds
Minimum delay between starts of different compressors	T6	10	0-9999	seconds
Freecooling inactivity time to limit excessive humidity	T7	120	0-999	minutes
Activation delay between heaters	T8	3	0-999	seconds
INITIALISATION →				
Enter password for Reset default value function	V0	1234	0-9999	
Delete BASIC alarm LOG	V1	No	No-Yes	
Enter new manufacturer password	V2	1234	0-9999	

15 SCREENS

The screens are sub-divided into 5 categories:

- **USER** screens, not password-protected: these are located in all the branches, except for "**prog**" and "**menu+prog**", and show the values read by the probes, the status of the alarms, the operating hours of the devices, the time and date; they are also used to set the temperature and humidity set point and the clock. These screens are indicated by the "❶" symbol in the following table of parameters.
- **USER** screens, password-protected (1234, modifiable): these are accessed by pressing the "**prog**" button, and are used to set the main functions (times, set points, differentials) for the devices connected; the screens that relate to functions that are not available are not displayed. These screens are indicated by the "❶" symbol in the following table of parameters.
- **MAINTENANCE** screens, password-protected (1234, modifiable): these are accessed by pressing the "**maintenance**" button, and are used for performing the periodical checks on the devices, calibrating the probes, modifying the operating hours and manually activating the devices. These screens are indicated by the "❷" symbol in the following table of parameters.
- **MANUFACTURER** screens, password-protected (1234, modifiable): these are accessed by pressing the "**menu+prog**" buttons and are used to configure the shelter, enable the main functions and select the devices connected. These screens are indicated by the "❸" symbol in the following table of parameters.

15.1 LIST OF THE SCREENS

The following list shows the screens available on the display. The columns in the table represent the loop of screens, with the first screen (A0, B0…) being the one that is displayed when pressing the corresponding button, after which the arrow buttons can be used to scroll the other screens. The codes (Ax, Bx, Cx…) are displayed in the top right corner of the screens, making them easy to identify. The meaning of the symbols ❶, ❷… is explained in the previous paragraph. The annotation PSW indicates screens that are protected by password.

menu
❶ M0
❶ M1
❶ M2

❶	A0
❶	A1
❶	A2
❶	A3
PSW	A4
❷	A5
❷	A6
❷	A7
❷	A8
❷	A9
❷	Aa
❷	Ab
❷	Ac
❷	Ad
❷	Ae
❷	Af
❷	Ag
❷	Ah
❷	Ai
❷	Aj
❷	Ak
❷	Al

❶	H0
❶	H1

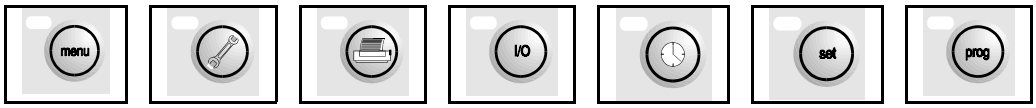
I/O	
❶	I0
❶	I1
❶	I2
❶	I3
❶	I4
❶	I5
❶	I6
❶	I7
❶	I8
❶	I9
❶	Ia
❶	Ib
❶	Ic
❶	Id
❶	Ie
❶	If
❶	Ig
❶	Ih
❶	Ii
❶	Ij
❶	Ik
❶	Il
❶	Im
❶	In
❶	Io
❶	Ip
❶	Iq
❶	Ir
❶	Is
❶	It
❶	Iu
❶	Iv

❶	K0

set	
❶	S0
❶	S1

prog	
PSW	P0
❶	P1
❶	P2
❶	P3
❶	P4
❶	P5
❶	P6
❶	P7
❶	P8
❶	P9
❶	Pa
❶	Pb
❶	Pc
❶	Pd
❶	Pe
❶	Pf
❶	Pg
❶	Ph
❶	Pi

menu + prog		
PSW	Z0	
❸	Z1	
CONFIGURATION	→	❸ C0
		❸ C1
		❸ C2
		❸ C3
		❸ C4
		❸ C5
		❸ C6
		❸ C7
		❸ C8
		❸ C9
		❸ Ca
		❸ Cb
		❸ Cc
		❸ Cd
		❸ Ce
		❸ Cf
		❸ Cg
		❸ Ch
PARAMETERS	→	❸ G0
		❸ G1
		❸ G2
		❸ G3
		❸ G4
		❸ G5
		❸ G6
		❸ G7
		❸ G8
		❸ G9
		❸ Ga
		❸ Gb
		❸ Gc
		❸ Gd
		❸ Ge
CAREL EXV DRIVER	→	❸ F0
		❸ F1
		❸ F2
		❸ F3
		❸ F4
		❸ F5
		❸ F6
		❸ F7
		❸ F8
		❸ F9
		❸ Fa
		❸ Fb



menu + prog			
		❸	Fc
		❸	Fd
		❸	Fe
		❸	Ff
		❸	Fg
		❸	Fh
		❸	Fi
		❸	Fj
TIMES	→	❸	T0
		❸	T1
		❸	T2
		❸	T3
		❸	T4
		❸	T5
		❸	T6
		❸	T7
		❸	T8
INITIALISATION	→	❸	V0
		❸	V1
		❸	V2

16 SUPERVISION

The pCO1 and pCO2 can be connected to a local or remote supervisor PC, via a GSM or analogue modem, as well as to the more commonly-used BMS (Modbus, Bacnet, Lonworks). The use of the functions listed requires the installation of specific optional cards (RS485, RS232, LON) or Gateways (devices that convert the different communication protocols).

16.1 CAREL SUPERVISOR

The local connection between the pCO1– pCO2 board and a supervisor PC requires the installation of the additional RS485 card (pCO2: PCOSER48500; pCO1: PCO1004850) in the "Serial card" slot. The 3-wire RS485 line is then made from the screw connector on the additional card to the RS485/RS232 converter supplied by Carel (PC485KIT00) for connection to the PC.
For a remote connection to the supervisor PC by phone line, simply fit the optional RS232 card (pCO2: PCO200MDM0; pCO1: PCO100MDM0) and connect it to a standard modem (not GSM). The program manages the modem and allows the desired phone numbers to be set. For the connections refer to the instruction sheets.

16.2 BMS

There are various different connections to the BMS supervisor systems.
Lonworks: fit the additional card in the "Serial card" slot (pCO2: PCO20LFTTL / PCO20L485L; pCO1: PCO10LFTTL / PCO10L485L) and make the connections, referring to the instruction sheets. On the LCD terminal enable the LON function.
Modbus: fit the additional RS485 card; no other steps are required as the program automatically manages this protocol.
Bacnet: fit the additional RS485 card and connect it by an RS485 cable to the Carel gateway, code GATEWAYBN0.
Proprietary BMS: Carel has developed many other Gateways for interfacing to less common BMS, such as OTE.

16.3 GSM PROTOCOL

Selecting the GSM protocol allows SMS (text) messages to be sent to and received from GSM telephones, using a GSM modem. The pCO1 or pCO2 send messages to the telephone in the event of alarms, and can receive messages from the telephone at any time; in fact, with a GSM telephone the user can modify the parameters listed below (for more information, refer to the Carel GSM modem protocol manual, code +030220330):

16.4 GSM VARIABLE DATABASE

16.4.1 DIGITAL VARIABLES

DESCRIPTION	SCR	ADD.	TYPE
On/Off unit pLAN address1	--	1	R/W
On/Off unit pLAN address2	--	2	R/W
On/Off unit pLAN address3	--	3	R/W
On/Off unit pLAN address4	--	4	R/W

DESCRIPTION	SCR	ADD.	TYPE
On/Off unit pLAN address5	--	5	R/W
On/Off unit pLAN address6	--	6	R/W
On/Off unit pLAN address7	--	7	R/W
On/Off unit pLAN address8	--	8	R/W

16.4.2 ANALOGUE VARIABLES

DESCRIPTION	SCR	ADD.	TYPE
Temperature set point U1	S0	1	R/W
Humidity set point U1	S0	2	R/W
Low room temp. alarm offset U1	P8	3	R/W
High room temp. alarm offset U1	P8	4	R/W
Low room humidity alarm offset U1	P9	5	R/W
High room humidity alarm offset U1	P9	6	R/W
Outlet air set point limit U1	Pa	7	R/W
Temperature set point U2	S0	8	R/W
Humidity set point U2	S0	9	R/W
Low room temp. alarm offset U2	P8	10	R/W
High room temp. alarm offset U2	P8	11	R/W
Low room humidity alarm offset U2	P9	12	R/W
High room humidity alarm offset U2	P9	13	R/W
Outlet air set point limit U2	Pa	14	R/W
Temperature set point U3	S0	15	R/W
Humidity set point U3	S0	16	R/W
Low room temp. alarm offset U3	P8	17	R/W
High room temp. alarm offset U3	P8	18	R/W
Low room humidity alarm offset U3	P9	19	R/W
High room humidity alarm offset U3	P9	20	R/W
Outlet air set point limit U3	Pa	21	R/W
Temperature set point U4	S0	22	R/W
Humidity set point U4	S0	23	R/W
Low room temp. alarm offset U4	P8	24	R/W
High room temp. alarm offset U4	P8	25	R/W
Low room humidity alarm offset U4	P9	26	R/W
High room humidity alarm offset U4	P9	27	R/W
Outlet air set point limit U4	Pa	28	R/W
Temperature set point U5	S0	29	R/W
Humidity set point U5	S0	30	R/W

DESCRIPTION	SCR	ADD.	TYPE
Low room temp. alarm offset U5	P8	31	R/W
High room temp. alarm offset U5	P8	32	R/W
Low room humidity alarm offset U5	P9	33	R/W
High room humidity alarm offset U5	P9	34	R/W
Outlet air set point limit U5	Pa	35	R/W
Temperature set point U6	S0	36	R/W
Humidity set point U6	S0	37	R/W
Low room temp. alarm offset U6	P8	38	R/W
High room temp. alarm offset U6	P8	39	R/W
Low room humidity alarm offset U6	P9	40	R/W
High room humidity alarm offset U6	P9	41	R/W
Outlet air set point limit U6	Pa	42	R/W
Temperature set point U7	S0	43	R/W
Humidity set point U7	S0	44	R/W
Low room temp. alarm offset U7	P8	45	R/W
High room temp. alarm offset U7	P8	46	R/W
Low room humidity alarm offset U7	P9	47	R/W
High room humidity alarm offset U74	P9	48	R/W
Outlet air set point limit U7	Pa	49	R/W
Temperature set point U8	S0	50	R/W
Humidity set point U8	S0	51	R/W
Low room temp. alarm offset U8	P8	52	R/W
High room temp. alarm offset U8	P8	53	R/W
Low room humidity alarm offset U8	P9	54	R/W
High room humidity alarm offset U8	P9	55	R/W
Outlet air set point limit U8	Pa	56	R/W

For the syntax of the SMS messages sent to the pCO* and further information on the above table, refer to the manual: *GSM modem protocol for pCO2 (code+030220330).*

N.B. When the GSM protocol is active, the remote supervisor cannot call the pCO1 or pCO2 board.

16.5 SUPERVISOR VARIABLE DATABASE

A specific communication database is featured that includes all the more important program variables, from the values read by the probes to the parameters set on the screens. The following table describes the database, divided into digital, integer and analogue variables, indicating for each its description, address and type, that is, read-only (R) or modifiable from the supervisor (R/W).

16.5.1 DIGITAL VARIABLES

DESCRIPTION	SCR.	ADD.	TYPE
Digital input number 1	I3	1	R
Digital input number 2	I3	2	R
Digital input number 3	I3	3	R
Digital input number 4	I4	4	R
Digital input number 5	I4	5	R
Digital input number 6	I4	6	R
Digital input number 7	I5	7	R
Digital input number 8	I5	8	R
Digital input number 9	I6	9	R
Digital input number 10	I6	10	R
Digital input number 11	I6	11	R
Digital input number 12	I7	12	R
Digital output number 1	Ia	13	R
Digital output number 2	Ia	14	R
Digital output number 3	Ia	15	R
Digital output number 4	Ib	16	R
Digital output number 5	Ib	17	R
Digital output number 6	Ic	18	R
Digital output number 7	Ic	19	R
Digital output number 8	Ic	20	R
Digital output number 9	Id	21	R
Digital output number 10	Id	22	R
Digital output number 11	Id	23	R
Generic alarm compressor 1	AL01	24	R
Generic alarm compressor 2	AL02	25	R
Low pressure alarm compressor 1	AL03	26	R
Low pressure alarm compressor 2	AL04	27	R
Air flow alarm	AL05	28	R
Fan thermal cutout alarm	AL06	29	R
Thermal cutout alarm heater 1	AL07	30	R
Thermal cutout alarm heater 2	AL08	31	R
Fire / smoke alarm	AL09	32	R
Dirty filter alarm	AL10	33	R
High ambient temperature alarm	AL11	34	R
Low ambient temperature alarm	AL12	35	R
High ambient humidity alarm	AL13	36	R
Low ambient humidity alarm	AL14	37	R
Op. hour threshold alarm, compressor 1	AL15	38	R
Op. hour threshold alarm, compressor 2	AL16	39	R
Op. hour threshold alarm, fan	AL17	40	R
Room temperature probe faulty alarm	AL18	41	R
Outside temperature probe faulty alarm	AL19	42	R
Outlet temperature probe faulty alarm	AL20	43	R
Room humidity probe faulty alarm	AL21	44	R
Pressure probe 1 faulty alarm	AL22	45	R
Pressure probe 2 faulty alarm	AL23	46	R
Cond. temp. probe 1 faulty alarm	AL24	47	R
Cond. temp. probe 2 faulty alarm	AL25	48	R
Blackout alarm	AL26	49	R
Clock card fault alarm	AL27	50	R
High pressure alarm circuit 1	AL28	51	R
High pressure alarm circuit 2	AL29	52	R
Auxiliary alarm	AL30	53	R
Op. hour threshold alarm, humidifier	AL31	54	R
pLAN alarm	AL32	55	R
Driver 1 alarm, probes faulty or disconnected	AL33	56	R
Driver 1 EEPROM faulty or damaged	AL34	57	R
Driver 1 valve motor faulty or damaged	AL35	58	R
Driver 1 alarm, battery discharged or faulty	AL36	59	R
Driver 1 high evaporation press. (MOP)	AL37	60	R
Driver 1 low evaporation press. (LOP)	AL38	61	R
Driver 1 low superheating	AL39	62	R
Driver 1 high suction pressure	AL40	63	R
Driver 1 valve not closed after blackout	AL41	64	R

DESCRIPTION	SCR.	ADD.	TYPE
Driver 2 alarm, battery discharged or faulty	AL45	68	R
Driver 2 high evaporation press. (MOP)	AL46	69	R
Driver 2 low evaporation press. (LOP)	AL47	70	R
Driver 2 low superheating	AL48	71	R
Driver 2 high suction pressure	AL49	72	R
Driver 2 valve not closed during blackout	AL50	73	R
Cooling mode	M1	74	R
Heating mode	M1	75	R
Humidification mode	M1	76	R
Dehumidification mode	M1	77	R
Cooling limit	M2	78	R
Dehumidification limit	M2	79	R
Type of condenser probe, circuit 1 (0=Pressure; 1=Temperature)	C7	80	R/W
Type of condenser probe, circuit 2 (0=Pressure; 1=Temperature)	C8	81	R/W
Enable pressure probe 1	C9	82	R/W
Enable pressure probe 2	Ca	83	R/W
Enable condenser 1 temp. probe	Cb	84	R/W
Enable condenser 2 temp. probe	Cb	85	R/W
Enable humidity probe	Cc	86	R/W
Enable outlet probe	Cd	87	R/W
Enable outside temperature probe	Ce	88	R/W
Select temperature unit of measure (0=Centigrade; 1=Fahrenheit)	C0	89	R/W
Enable clock card (pCO1)	C0	90	R/W
Enable printer	C0	91	R/W
Type of freecooling (0=0-10V; 1=3pos.)	C1	92	R/W
Enable simultaneous freecooling and compressor operation	C1	93	R/W
Enable dehumidification	C2	94	R/W
Enable humidification	C2	95	R/W
Enable modulating outlet fan	C4	96	R/W
Enable condenser function	C5	97	R/W
Enable second cond. coil	C5	98	R/W
Enable compressor FIFO rotation	G1	99	R/W
Type of temperature control (0=P; 1=P+I)	G1	100	R/W
Enable high press. Prevent function	G9	101	R/W
Enable unit Forcing in pLAN	Gc	102	R/W
Enable freecooling humidity limit	P6	103	R/W
Display language screen when starting the pCO2-pCO1	P7	104	R/W
Enable unit off from button	P7	105	R/W
Enable outlet limitation function	Pa	106	R/W
Unit On-Off from supervisor	--	107	R/W
Confirm hour setting	--	108	R/W
Confirm minute setting	--	109	R/W
Confirm day setting	--	110	R/W
Confirm month setting	--	111	R/W
Confirm year setting	--	112	R/W
Confirm weekday setting	--	113	R/W
Reset alarms from supervisor	--	114	R/W
Driver 1 pLAN alarm	AL51	115	R
Driver 2 pLAN alarm	AL52	116	R

DESCRIPTION	SCR.	ADD.	TYPE
Driver 2 alarm, probes faulty or disconnected	AL42	65	R
Driver 2 EEPROM faulty or damaged	AL43	66	R
Driver 2 valve motor faulty or damaged	AL44	67	R

DESCRIPTION	SCR.	ADD.	TYPE

16.5.2 ANALOGUE VARIABLES

DESCRIPTION	SCR.	ADD.	TYPE
Pressure probe 1 reading	I0	1	R
Humidity probe reading	I0	2	R
Room temperature probe reading	I1	3	R
Outside temperature probe reading	I1	4	R
Air outlet temperature probe reading	I1	5	R
Pressure probe 2 reading	I0	6	R
Cond. 1 temperature probe reading	I0	7	R
Cond. 2 temperature probe reading	I0	8	R
Temperature set point	S0	9	R/W
Minimum temperature set point limit	P1	10	R/W
Maximum temperature set point limit	P1	11	R/W
Humidity set point	S0	12	R/W
Minimum humidity set point limit	P2	13	R/W
Maximum humidity set point limit	P2	14	R/W
Freecooling opening	I8	15	R
Outlet fan speed	I8	16	R
Condenser 1 fan speed	I9	17	R
Condenser 2 fan speed	I9	18	R
Temperature dead zone	P3	19	R/W
Proportional band in Cooling	P3	20	R/W
Proportional band in Heating	P3	21	R/W
Proportional band in Humidification	P4	22	R/W
Proportional band in Dehumidification	P4	23	R/W
Freecooling offset	P5	24	R/W
Minimum humidity limit for freecooling	P6	25	R/W
Maximum humidity limit for freecooling	P6	26	R/W
High ambient temperature alarm offset	P8	27	R/W
Low ambient temperature alarm offset	P8	28	R/W
High ambient humidity alarm offset	P9	29	R/W
Low ambient humidity alarm offset	P9	30	R/W
Outlet limitation set point	Pa	31	R/W
Outlet limitation differential	Pa	32	R/W
Cond. 1 pressure probe calibration	A8	33	R/W
Humidity probe calibration	A8	34	R/W
Room temperature probe calibration	A9	35	R/W
Outside temperature probe calibration	A9	36	R/W
Outlet temperature probe calibration	A9	37	R/W

DESCRIPTION	SCR.	ADD.	TYPE
Cond. 2 pressure probe calibration	A8	38	R/W
Cond. 1 temperature probe calibration	Aa	39	R/W
Cond. 2 temperature probe calibration	Aa	40	R/W
Maximum value pressure probe 1	C9	41	R/W
Minimum value pressure probe 1	C9	42	R/W
Maximum value pressure probe 2	Ca	43	R/W
Minimum value pressure probe 2	Ca	44	R/W
Maximum value humidity probe	Cc	45	R/W
Minimum value humidity probe	Cc	46	R/W
% of band for min. freecool. opening	G2	47	R/W
% of band for max. freecool. opening	G2	48	R/W
Minimum freecooling open	G2	49	R/W
Minimum outlet fan speed	G3	50	R/W
Maximum outlet fan speed	G3	51	R/W
Outlet fan speed in dehumid.	G3	52	R/W
Stop dehumidification temp. differential	G4	53	R/W
Restart dehumidification temp. offset	G4	54	R/W
High pressure alarm set point	G5	55	R/W
High pressure alarm differential	G5	56	R/W
Condensing (pressure) set point	G6	57	R/W
Condensing (pressure) differential	G6	58	R/W
Condensing (temperature) set point	G7	59	R/W
Condensing (temperature) differential	G7	60	R/W
Max. condenser fan speed	G8	61	R/W
Min. condenser fan speed	G8	62	R/W
Prevent set point (pressure)	G9	63	R/W
Prevent differential (pressure)	G9	64	R/W
Prevent set point (temperature)	Ga	65	R/W
Prevent differential (temperature)	Ga	66	R/W
Unit in standby ON for low temperature - differential	Gd	67	R/W
Unit in standby OFF for low temperature - offset	Gd	68	R/W
Unit in standby ON for high temperature - differential	Ge	69	R/W
Unit in standby OFF for high temperature - offset	Ge	70	R/W

16.5.3 INTEGER VARIABLES

DESCRIPTION	SCR.	ADD.	TYPE
Current hours	K0	1	R
Current minutes	K0	2	R
Day	K0	3	R
Month	K0	4	R
Year	K0	5	R
Hour setting	K0	6	R
Minute setting	K0	7	R/W
Day setting	K0	8	R/W
Month setting	K0	9	R/W
Year setting	K0	10	R/W
Select refrigerant (0=no; 1=R22; 2=134a; 3=404a; 4=407C; 5=410A)	C1	11	R/W
Number of compressors	C3	12	R/W
Number of heaters	C3	13	R/W
Number of compressors for dehumidification	C3	14	R/W
Number of condenser fans	C5	15	R/W
Type of signal from pressure probe 1 (2=0-1V; 3=0-10V; 4=current)	C9	16	R/W
Type of signal from pressure probe 2 (2=0-1V; 3=0-10V; 4=current)	Ca	17	R/W
Type of signal, condens. 1 T probe (0=NTC; 1=PT1000; 2=0-1V; 3=0-10V; 4=current)	Cb	18	R/W
Type of signal, condens. 2 T probe (0=NTC; 1=PT1000; 2=0-1V; 3=0-10V; 4=current)	Cb	19	R/W
Type of signal from humidity probe (2=0-1V; 3=0-10V; 4=current)	Cc	20	R/W
Type of signal from room temperature probe (0=NTC; 1=PT1000)	Cd	21	R/W
Type of signal from outlet temperature probe (0=NTC; 1=PT1000)	Cd	22	R/W

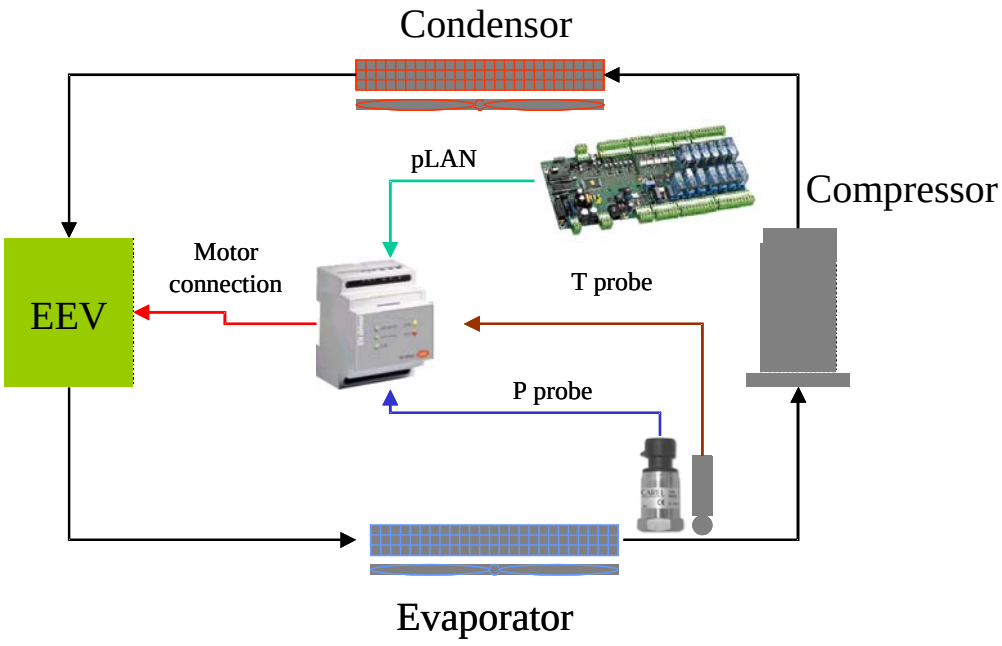
DESCRIPTION	SCR.	ADD.	TYPE
Type AL8 (0=serious;1=min.1;2=min.2)	Pb	62	R/W
Type AL9 (0=serious;1=min.1;2=min.2)	Pb	63	R/W
Type AL10 (0=serious;1=min.1;2=min.2)	Pb	64	R/W
Type AL11 (0=serious;1=min.1;2=min.2)	Pb	65	R/W
Type AL12 (0=serious;1=min.1;2=min.2)	Pb	66	R/W
Type AL13 (0=serious;1=min.1;2=min.2)	Pb	67	R/W
Type AL14 (0=serious;1=min.1;2=min.2)	Pb	68	R/W
Type AL15 (0=serious;1=min.1;2=min.2)	Pb	69	R/W
Type AL16 (0=serious;1=min.1;2=min.2)	Pb	70	R/W
Type AL17 (0=serious;1=min.1;2=min.2)	Pb	71	R/W
Type AL18 (0=serious;1=min.1;2=min.2)	Pb	72	R/W
Type AL19 (0=serious;1=min.1;2=min.2)	Pb	73	R/W
Type AL20 (0=serious;1=min.1;2=min.2)	Pb	74	R/W
Type AL21 (0=serious;1=min.1;2=min.2)	Pc	75	R/W
Type AL22 (0=serious;1=min.1;2=min.2)	Pc	76	R/W
Type AL23 (0=serious;1=min.1;2=min.2)	Pc	77	R/W
Type AL24 (0=serious;1=min.1;2=min.2)	Pc	78	R/W
Type AL25 (0=serious;1=min.1;2=min.2)	Pc	79	R/W
Type AL26 (0=serious;1=min.1;2=min.2)	Pc	80	R/W
Type AL27 (0=serious;1=min.1;2=min.2)	Pc	81	R/W
Type AL28 (0=serious;1=min.1;2=min.2)	Pc	82	R/W
Type AL29 (0=serious;1=min.1;2=min.2)	Pc	83	R/W

DESCRIPTION	SCR.	ADD.	TYPE
Type of signal from outside temperature probe (0=NTC; 1=PT1000)	Ce	23	R/W
pLAN connection class board 1 (0=present/rotation; 1=present/no rot.; 2=not present)	Cf	24	R/W
pLAN connection class board 2 (0=present/rotation; 1=present/no rot.; 2=not present)	Cf	25	R/W
pLAN connection class board 3 (0=present/rotation; 1=present/no rot.; 2=not present)	Cf	26	R/W
pLAN connection class board 4 (0=present/rotation; 1=present/no rot.; 2=not present)	Cg	27	R/W
pLAN connection class board 5 (0=present/rotation; 1=present/no rot.; 2=not present)	Cg	28	R/W
pLAN connection class board 6 (0=present/rotation; 1=present/no rot.; 2=not present)	Cg	29	R/W
pLAN connection class board 7 (0=present/rotation; 1=present/no rot.; 2=not present)	Ch	30	R/W
pLAN connection class board 8 (0=present/rotation; 1=present/no rot.; 2=not present)	Ch	31	R/W
Number of units in Standby mode	Gb	32	R/W
Time for automatic unit rotation in pLAN network	Gb	33	R/W
Cond. fan speed-up time	G6	34	R/W
Forcing delay for high ambient temp.	Gc	35	R/W
Forcing delay for low ambient temp.	Gc	36	R/W
Outlet fan start delay	T0	37	R/W
Outlet fan stop delay	T0	38	R/W
Integration time for P+I control	T1	39	R/W
3 position freecooling travel time	T1	40	R/W
Low pressure alarm delay	T2	41	R/W
High-low temp.-humidity alarm delays	T2	42	R/W
Relay no.4 activation delay, serious alarm	T3	43	R/W
Relay no.5 activation delay, minor alarm	T3	44	R/W
Relay no.6 activation delay, minor alarm	T3	45	R/W
Dirty filter alarm delay	T4	46	R/W
Air flow switch alarm delay	T4	47	R/W
Minimum compressor off time	T5	48	R/W
Minimum compressor on time	T5	49	R/W
Delay between compressor starts	T6	50	R/W
Delay between starts of different compressors	T6	51	R/W
Freecooling off time for humidity limit	T7	52	R/W
Activation delay between heaters	T8	53	R/W
Type AL1 (0=serious;1=min.1;2=min.2)	Pb	54	R/W
Type AL2 (0=serious;1=min.1;2=min.2)	Pb	55	R/W
Type AL3 (0=serious;1=min.1;2=min.2)	Pb	56	R/W
Type AL4 (0=serious;1=min.1;2=min.2)	Pb	57	R/W
Type AL5 (0=serious;1=min.1;2=min.2)	Pb	58	R/W
Type AL6 (0=serious;1=min.1;2=min.2)	Pb	59	R/W
Type AL7 (0=serious;1=min.1;2=min.2)	Pb	60	R/W
		61	R/W

DESCRIPTION	SCR.	ADD.	TYPE
Type AL30 (0=serious;1=min.1;2=min.2)	Pc	84	R/W
Type AL31 (0=serious;1=min.1;2=min.2)	Pc	85	R/W
Type AL32 (0=serious;1=min.1;2=min.2)	Pc	86	R/W
Type AL33 (0=serious;1=min.1;2=min.2)	Pc	87	R/W
Type AL34 (0=serious;1=min.1;2=min.2)	Pc	88	R/W
Type AL35 (0=serious;1=min.1;2=min.2)	Pc	89	R/W
Type AL36 (0=serious;1=min.1;2=min.2)	Pc	90	R/W
Type AL37 (0=serious;1=min.1;2=min.2)	Pc	91	R/W
Type AL38 (0=serious;1=min.1;2=min.2)	Pc	92	R/W
Type AL39 (0=serious;1=min.1;2=min.2)	Pc	93	R/W
Type AL40 (0=serious;1=min.1;2=min.2)	Pc	94	R/W
Type AL41 (0=serious;1=min.1;2=min.2)	Pd	95	R/W
Type AL42 (0=serious;1=min.1;2=min.2)	Pd	96	R/W
Type AL43 (0=serious;1=min.1;2=min.2)	Pd	97	R/W
Type AL44 (0=serious;1=min.1;2=min.2)	Pd	98	R/W
Type AL45 (0=serious;1=min.1;2=min.2)	Pd	99	R/W
Type AL46 (0=serious;1=min.1;2=min.2)	Pd	100	R/W
Type AL47 (0=serious;1=min.1;2=min.2)	Pd	101	R/W
Type AL48 (0=serious;1=min.1;2=min.2)	Pd	102	R/W
Type AL49 (0=serious;1=min.1;2=min.2)	Pd	103	R/W
Type AL50 (0=serious;1=min.1;2=min.2)	Pd	104	R/W
Compressor 1 operating hour threshold	A7	110	R/W
Compressor 2 operating hour threshold	A7	111	R/W
Humidifier operating hour threshold	A7	112	R/W
Fan operating hour threshold	A7	113	R/W

17 ELECTRONIC EXPANSION VALVE

The EVDriver module for the management of electronic expansion valves (EEV) in the pLAN network allows superheating control on the suction side for more efficient and versatile operation of the refrigerating unit.
The use of the electronic expansion valve involves the installation of both the EVDriver same and the expansion valve itself, as well as of a temperature sensor and pressure transducer, both located at the evaporator outlet (on the compressor suction line). The following diagram shows the typical installation layout.



The heart of the superheating control function is a PID algorithm with programmable coefficients.
The possible settings are:

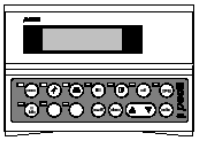
LOW	(Low superheating with programmable integration time and threshold)
LOP	(Low evaporation pressure, active only on changes in capacity, with programmable integration time and threshold)
MOP	(High evaporation pressure, programmable integration time and threshold)
HiTcond	(High condensing pressure, using the condensing pressure probe connected to the pCOx, with programmable integration time and threshold)

The table of parameters lists the control parameters, with the corresponding threshold and default value. The table below explains the meaning of the VALVE TYPE parameter (see screens F1 – F2):

PARAMETER VALUE	CORRESPONDING VALVE TYPE
0	Alco EX5 – EX6
1	Alco EX7
2	Alco EX8
3	Sporlan SIX 0.5 - 11
4	Sporlan SIX 25
5	Sporlan SIX 50 - 250
6	Danfoss ETS 50
7	Danfoss ETS 100
8	---
9	Carel E2V**P
10	---
11	Custom (other type of valve)

18 THE USER TERMINAL

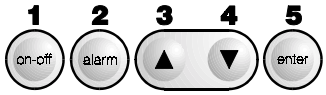
18.1 EXTERNAL DISPLAY



Functions of the buttons on the external terminal

Button		Description
menu	MENU	when pressed in all loops except for Manuf. returns to main screen of the Menu branch when pressed in the Manufacturer loop returns to manufacturer selection screen the Menu branch displays the status of the unit and the readings of the control probes
	MAINT.	goes to the first screen in the Maintenance loop the Maintenance loop is used to check the status of the devices and the probes, perform maintenance and calibration operations, and run the manual procedures
	PRINTER	goes to the first screen in the Printer loop the printer loop is used to set the cyclical print times or perform an immediate print
I/O	INPUTS / OUTPUTS	goes to the first screen in the I/O loop the I/O loop displays the status of the digital and analogue inputs and outputs
	CLOCK	goes to the first screen in the Clock loop the Clock loop is used to display / set the time and date
set	SETPOINT	goes to the screen for setting the temperature and humidity set point the loop also displays the set point modified by the compensation function, if enabled
prog	PROG	goes to the screen for entering the User password the User loop is used to display / set the unit parameters, relating to the devices connected (compressors, valves, probes) and the functions enabled
menu + prog	MENU+PROG	goes to screen for entering the Manufacturer password the Manufacturer loop is used to configure the unit, select the devices connected and enable the functions
info ?	INFO	if using the shared terminal, this is used to switch from one board to another
	RED	temporary display of the pLAN address of the board that the terminal is currently connected to

Functions of the silicon rubber buttons:



1. **ON/OFF** button: switches the shelter on and off
2. **ALARM** button: displays and resets deletes the alarms, mutes the alarm buzzer
3. **UP ARROW**: this button has two functions, 1. scroll the previous screens in the same branch when the cursor is in the home position (top left); 2. increase the value of a setting field when the cursor is in the field; in the case of a selection field, pressing the arrow button displays the previous choice
4. **DOWN ARROW**: this button has two functions, 1. scroll the previous screens in the same branch when the cursor is in the home position (top left); 2. decrease the value of a setting field when the cursor is in the field; in the case of a selection field, pressing the arrow button displays the next choice
5. **ENTER** button: used to move the cursor between the home position (top left) and the setting or selection fields, and to confirm and save the values set for the parameters.

18.2 BUILT-IN DISPLAY

For the functions of the Alarm, Up Arrow, Down Arrow and Enter buttons on the Built-in terminal, see the description of the external terminal.
START: as there is no ON/OFF button, the unit is switched on/off by pressing the Esc+Enter buttons together for 20 seconds, after which a screen is displayed and the Enter button can be used to perform the operation.
SCREEN LOOPS: as there are no buttons that directly access the screen loops, simply press the Prog button to display the list of the loops, then use the arrow buttons to move to the desired loop and press Enter to access the loop.
The **PRG + ENTER** buttons are used for to temporarily display the pLAN address of the board that the terminal is currently connected to.

19 MANAGING THE CONNECTION BETWEEN BOARDS (pLAN)

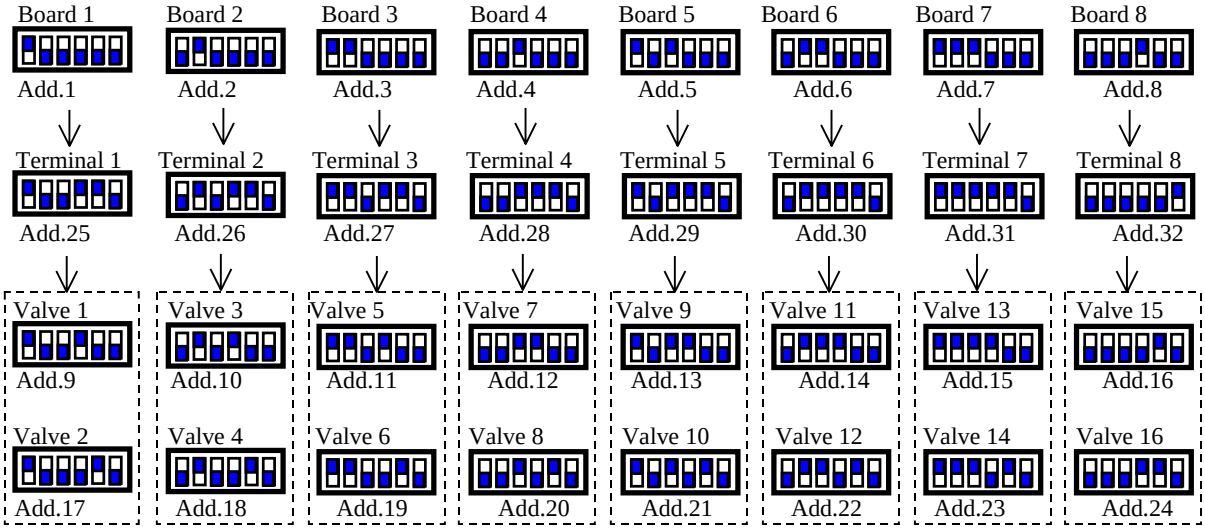
The pLAN network identifies a physical connection between the boards (pCO1 or pCO2) and the external terminals.
The address of the boards and the external terminals (not the built-in terminals) must be set for the correct operation of the pLAN.
If the same address is assigned to two objects in the network, the pLAN will not work!

19.1 ASSIGNING THE ADDRESSES

The pLAN addresses are set with binary logic by changing the position of a set of dipswitches located on the rear of the external terminals and on the pCO2 boards (see figure below), and inside the electronic valve drivers. The operation must be performed when the devices are off. On the pCO1, the address is numeric and is assigned using an external terminal.
For greater information refer to:
- pCO1 manual, Carel code: +030221840
- pCO2 manual, Carel code: +030221825

19.1.1 SETTING THE ADDRESS ON THE PCO2, EXTERNAL TERMINALS AND VALVE DRIVERS

The diagrams below show the addresses to be set on the pCO2 boards, on the external terminals and on the valve drivers. If pC01 boards are used, refer to the following paragraph for the boards only; for the terminals and the drivers the diagrams below are still valid.



The main Menu screen on the terminals shows the address of the board connected in the bottom right corner. Using terminal address 32 all of the boards can be controlled without requiring other terminals. The changeover between the boards is performed by simply pressing the Info button. The shared terminal is the only solution that can be used to print the alarms and the parameters from all the boards.
In all the other program screens the address of the currently connected board can be displayed by pressing the Info button.

19.1.2 SETTING THE ADDRESS ON THE pCO1

Description of the operations to be performed for setting the pLAN address of the pC01 boards.

1. Switch the pCO1 board off and connect an external terminal with pLAN address “0”
2. Switch the pCO1 board on, while holding the Alarm + Up buttons on the terminal, until a screen is displayed
3. Once the screen appears, perform the operations indicated on the display, that is, enter the pLAN address (1,2,3….) using the Up and Down buttons, and then confirm by pressing Enter
4. Switch the pCO1 board off
5. If necessary, assign the correct pLAN address to the external terminal
6. Switch the pCO1 board on

19.1.3 EXAMPLES OF USING THE pLAN NETWORKS

The pLAN network connection of the pC01 - pCO2 boards allows the following functions to be performed:

1. equalise the operating hours between the shelter units by rotating the spare unit (Standby)
2. start the spare unit if one of the other units shuts down due to a serious alarm or blackout
3. start the spare unit to compensate for excessive load
4. control up to 8 shelter units with just one external LCD terminal
5. print the alarms and the values read by the probes, using a shared external terminal

The pLAN network connection allows the configuration of a wide variety of systems. The main types of systems that can be developed are described below, in order of complexity, with suggestions on how to perform the connections:

1. one or more independent shelters (board/boards with pLAN address 1 + external terminal/terminals with pLAN address 25)
2. two or more shelters and only one external terminal (boards with pLAN addresses 1-8 connected via RS485 using J11 connectors, terminal with pLAN address 32 connected to one of the boards); this connection offers the possibility to perform the functions listed above
3. two or more shelters in a pLAN network, each with a private terminal (boards with pLAN addresses 1-8 connected via RS485 using J11 connectors, terminals with pLAN addresses 25-32 connected to the corresponding board); this connection offers the possibility to perform the functions listed above

In the networks where the boards are connected in a pLAN network, the user can decide which units are involved in the Rotation function and which not, thus creating a mixed network with some units that interact and others that are independent.

IMPORTANT: if only one board is used, it must have pLAN address 1, no electrical connection is required for the pLAN, and the external terminal, if present, must have pLAN address 25.

20 INITIAL INSTALLATION AND UPDATING THE SOFTWARE

When the boards are installed for the first time, they must be programmed by DOWNLOADING the application program to the Flash memory on the pCO2-pCO1; this operation can be performed in two ways: using a PC or a hardware key.

20.1 DOWNLOADING THE PROGRAM FROM A HARDWARE KEY

The hardware key available for all the versions of the pCO2 (code PCO201KEY0 1Mbyte version - PCO202KEY0 2Mbyte version) and the pCO1 medium and small (code PCO100KEY0) creates exact copies of the software contained on a master pCO2-pCO1. This is normally used on the assembly line or in the field for programming the pCO2-pCO1, where updating the software by PC would be more complicated.
For further information refer to the instruction sheet supplied with the hardware key.

20.2 DOWNLOADING THE PROGRAM FROM A COMPUTER

The kit code PC485KIT00 (232-485 converter) and the WinLOAD 32 program are required; these are used to upload the program files to the pCO2 or pCO1.
For further information on the installation and use of Winload 32, contact CAREL.

20.3 INSTALLING THE DEFAULT PARAMETERS

The default parameters are the values assigned by CAREL to the main operating parameters of the application program. These values are assigned automatically when downloading the software the first time to a pCO2 or pCO1 board using Winload, or if the version of the software is upgraded.
If necessary, the default parameters can be installed manually by the user, at any time, by accessing the screen V0 (see the list of the screens).
WARNING: this operation must be carried out with extreme care, as it deletes all the parameters from the memory and replaces them with the default values. NB: the previous parameters cannot be restored after this operation

20.4 SELECTING THE LANGUAGE

The default language is English, however the following options are available: Italian, French, German, Spanish. To change the language, proceed as follows:

1. Press the Maintenance button if using the external terminal, or the PRG button if using built-in terminal, and confirm the first item on the MAINTENANCE menu by pressing Enter;
2. The main program screen is displayed, showing the code, the version and the date. Press Enter to move the cursor to the last row;
3. Select the language required using Up or Down.

CAREL S.p.A.
Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 049.9716611 Fax (+39) 049.9716600
http://www.carel.com - e-mail: carel@carel.com

Agency*:*

Preliminary version – dated 23 january 2003