Standard air conditioning unit
pCO in *p*LAN

Manual version: 1.1 - 09/07/1998

Program code: **EPSTDECZUB**

CAREL

Technology & Evolution

CONTENTS

REGULATION AND MICROPROCESSOR-CONTROL MANUAL FOR AIR-CONDITIONING UNITS:

1. INTRODUCTION TO THE REGULATION:

The system provides advanced microprocessor management of air-treatment and air-conditioning units.

1.1. FUNCTIONS CARRIED OUT BY THE SYSTEM

- Temperature and relative humidity regulation.
- Control and signalling of the status of all the components in the plant.
- Possibility to set and modify the regulation parameters.
-Signalling of possible anomalies of the devices controlled by means of acoustic (BUZZER) and visual (ALARM MASK) signals.
- USER - MACHINE (KEYPAD- DISPLAY) communication interface.
- Possibility of connection to remote supervisor through RS422 serial communication.
- Possibility of connection up to 8 pCO units in pLAN with STAND-BY management.
- Possibility to control all pCO units, using just 1 DISPLAY.

1.2. HARDWARE BEING UTILISED

1. 8-Analog input pCO card.
2. 4x20 LCD pCO terminal.
3. Clock board with address (Only for pCO card n.1).
4. Address board for the other pCO cards.

EPROM codes:
Italian version: **EPSTDICZUB**
English version: **EPSTDECZUB**

General description :

Where a series of many A/C units (close controls) are installed for cooling a single environment - tipically in Telecom switching rooms - one unit is configured as STAND-BY. This unit intervenes when a RUNNING unit is stopped because of an alarm or for giving a *rest* to the running unit in
order to balance the working hours for each close control.

STAND-BY A/C UNITS MANAGEMENT

pLAN

RUNNING   RUNNING   STAND-BY
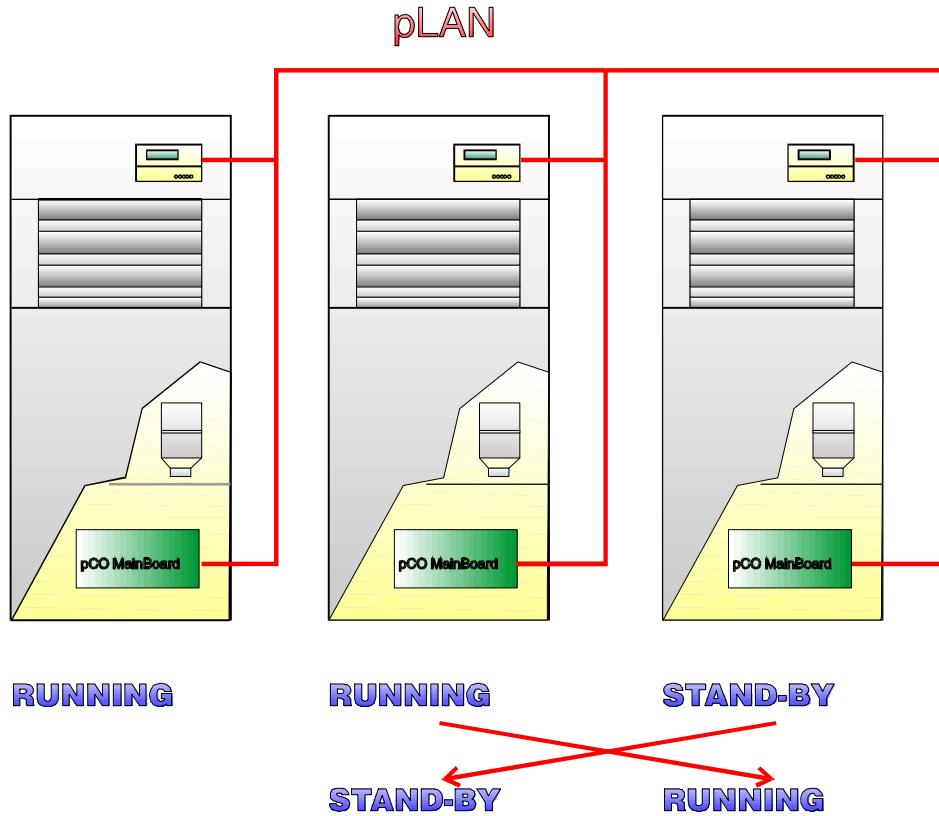
STAND-BY   RUNNING

In the picture above the second running unit becomes a stand-by one and the third stand-by units intervene becoming a runnning unit.
This pLAN system can be also connected with EasyTel, Carel supervisory/telemaintenance Network.

2. INPUT/OUTPUT DESCRIPTION

The control card represents the heart of the system, as it contains the microprocessor that executes the control algorithm.
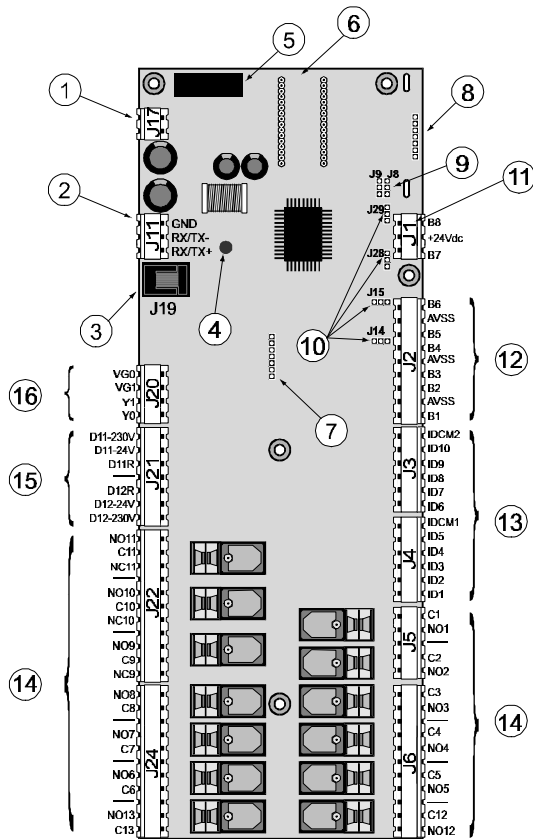
1. Power supply connector 24 V~ 50/60 Hz 15 VA or 24 V ⎓ 10 W
2. pLAN connector
3. Telephone-type connector for connection to the User terminal unit (MMI, Man Machine Interface) or to local network
4. Yellow LED indicating the mains power present.
5. `250 VAC, 2 A slow-blow fuse (2TA).
6. EPROM containing the application program.
7. Address /real time clock card (optional).
8. RS422 or RS485 card for connection to serial line for CAREL supervisor and/or telemaintenance network.
9. Jumpers to select the local network communication mode:
   J8 at position 1-2 allows you to connect the board to a terminal unit or, possibly, to the supervisory PC; at position 2-3 allows you to connect the board to the local network;
   J9 at position 1-2 allows the supervisory PC to reset the pCO; at position 2-3 prevents the supervisory PC from resetting the pCO
10. Jumpers for selecting the analogue inputs: J14=B5; J15=B6; J28=B7; J29=B8.
11. Additional analogue inputs no.7 and no.8 (only in the cards with 8 analogue inputs) can be selected to accept either 4÷20mA or 0÷1VDC signals.
12. Analogue inputs
    B(n): Analogue input 1÷6 (8 for boards with 8 analogue inputs, code PCOB000**1)
    AVSS: Common reference for analogue inputs B(n)
    From B1 to B4 preset to accept Carel NTC probes. B5 and B6 can be selected to accept either 0÷1 VDC or 4÷20 mA signals (see point 10).

13. Digital inputs, 24 VAC (10 mA):
    ID(n): Digital inputs 1÷10;
   IDCM1: Common reference for digital inputs 1÷5;
    IDCM2: Common reference for digital inputs 6÷10.

14. Digital outputs (commutable power 2500 VA, 10 A/250 VAC):
    NO(n): Normally open contact output(n)
    NC(n): Normally closed contact output(n)
    C(n): Common contact output(n)

15. Digital inputs available at 230 VAC or 24VAC (10 mA):
    ID11-230 VAC, ID12-230 VAC: Digital inputs 11 and 12 for signals at 230 VAC;
    ID11-24 VAC, ID12-24 VAC: Digital inputs 11 and 12 for signals at 24 VAC;
    ID11R, ID12R: common reference for, respectively, digital inputs ID11 and ID12.
    230 VAC signals must not be connected to 24 VAC terminals, as this will damage the board itself.

16. Analogue outputs, 0÷10 VDC:
    Y(n): Analogue outputs 1 and 2, 10 mA max;
    VG1: External power for analogue outputs (24 VAC or 24 VDC);
    VG0: Reference for power and for the analogue output signal Y0 and Y1.

The "Reference" column indicates the contacts on the pCO card.

2.1. DIGITAL INPUTS

REFERENCE	DIGITAL INPUT
ID1 - IDCM1	COMPRESSOR 1 GENERAL ALARM (HIGH PRESSURE OR THERMAL)
ID2 - IDCM1	COMPRESSOR 2 GENERAL ALARM (HIGH PRESSURE OR THERMAL)
ID3 - IDCM1	COMPRESSOR 1 LOW PRESSURE
ID4 - IDCM1	COMPRESSOR 2 LOW PRESSURE
ID5 - IDCM1	DIRTY FILTER SIGNALLING
ID6 - IDCM2	FAN THERMAL
ID7 - IDCM2	AIR FLOW CONTROLLER
ID8 - IDCM2	REMOTE ON / OFF
ID9 - IDCM2	THERMAL RESISTANCE 1
ID10 - IDCM2	THERMAL RESISTANCE 2
ID11 - ID11R	HUMIDIFIER LEVEL CONTACT
ID12 - ID12R	PRESENCE OF FIRE

2.2. ANALOG INPUTS

REFERENCE	ANALOG INPUT
B1 - AVSS	AMBIENT TEMPERATURE PROBE
B2 - AVSS	AIR THROW TEMPERATURE PROBE
B3 - AVSS	OUTLET WATER TEMPERATURE PROBE
B4 - AVSS	EXTERNAL AIR / INLET WATER TEMPERATURE PROBE
B5 - AVSS	AMBIENT HUMIDITY PROBE
B7 - AVSS	CURRENT MEASUREMENT PROBE IN THE HUMIDIFIER
B8 - AVSS	HUMIDIFIER INLET-WATER CONDUCTIVITY PROBE

2.3. DIGITAL OUTPUTS

REFERENCE	DIGITAL OUTPUT
C1-NO1	DEHUMIDIFICATION
C2-NO2	MAIN FAN - (ACTIVE UNIT)
C3-NO3	ENERGY SAVING VALVE
C4-NO4	HUMIDIFICATION / HUMIDIFIER POWER REMOTE-CONTROL SWITCH
C5-NO5	COMPRESSOR 1 CAPACITY CONTROL / HUMIDIF. WATER-LOAD
C6-NO6	COMPRESSOR 2 CAPACITY CONTROL / HUMID. WATER-DRAIN
C-7-NO7	3 POINT COLD VALVE OPENING / COMPRESSOR 1
C-8-NO8	3 POINT COLD VALVE CLOSING / COMPRESSOR
C-9-NO9 or C9-NA9	3 POINT WARM VALVE OPENING / RESISTANCE 1
C10-NO10 or C10-NA10	3 POINT WARM VALVE CLOSING / RESISTANCE 2
C11-NO11 or C11-NA11	GENERIC ALARM SITUATION

2.4. ANALOG OUTPUTS

REFERENCE	ANALOG OUTPUT
VG0 - Y0	COLD WATER RAMP
VG0 - Y1	WARM WATER RAMP

Connections :
In the following picture the wiring between pCO and devices is shown :
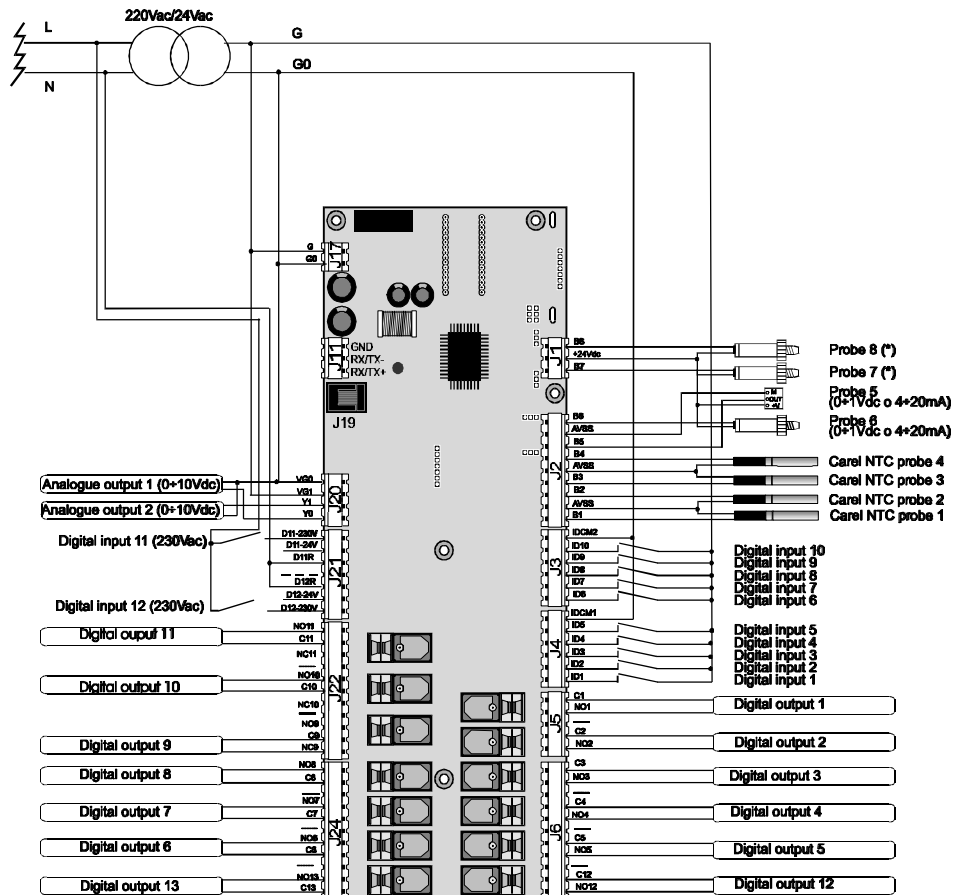
3.   INITIAL INSTALLATION OR UPDATING THE EPROM

The initial installation can be divided into three parts:

a) Hardware connection

AFTER MAKING SURE THAT THE MATERIAL RECEIVED CORRESPONDS EXACTLY TO THAT ORDERED, BEGIN UNPACKING AND CONNECT THE INDIVIDUAL PARTS TO ASSEMBLE THE CONTROLLER.

The sequence of the operations is as follows:

- connect the telephone cable between the user terminal and the relay board.

Insert the program eprom into the special socket .

☛ BE CAREFUL TO INSERT THE EPROM IN THE CORRECT DIRECTION

connect the probes and devices to the relay card, as per the input/output table on page 4

connect the power supply to the interface

connect the card in pLAN using the J11 connector

b)pLAN configuration (see chapter 8.0 pLAN network))

c) Software initialisation

SOFTWARE INITIALISATION INVOLVES SETTING THE FOLLOWING:

- the control parameters (set-points, alarm thresholds, etc.)
- the type of control (proportional; proportional +integral; compressor rotation, etc.)
- the available devices (compressors; valves; etc.)
- ALL THE SELECTED DATA IS STORED IN THE PERMANENT MEMORY SO AS TO AVOID IT BEING LOST WHEN THE UNIT IS CLEARED.

d) Updating the EPROM program

Every time the eprom is changed, the unit must be reprogrammed. To carry out this operation select the parameter found in the "M_DEFAULT" window in "UNIT INSTALLATION ", protected by manufacturer's password.

4.   REGULATION STRATEGIES

The temperature control can be of the proportional or proportional + integral type; selection is possible in the M_MANUF_PARAM2 window, "Unit configuration under manufacturer's word" branch. The proportional control operates according to the difference between the temperature or humidity requested (**SET POINT**) and the value actually being measured, consequently real. The P+I regulation depends on the difference between the requested temperature and the temperature being measured and on the permanence time (the integration constant is selectable at the M_MANUF_TIME2 window). The humidity control is only proportional.

The **PROPORTIONAL BAND** defines the area of the temperature / humidity control. The control effect is proportional to the deviation from the set-point. The **DEAD ZONE** defines an area near the set-point in which no device is energised.

PROPORTIONAL CONTROL
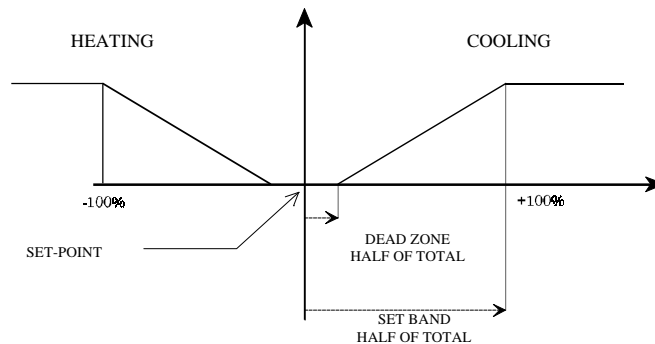
STEP CONCEPT

By step is meant an area of the proportional band which defines the values of switching on and off of a device (e.g. compressors; resistance; humidifier; etc.)

MEANING OF STEP
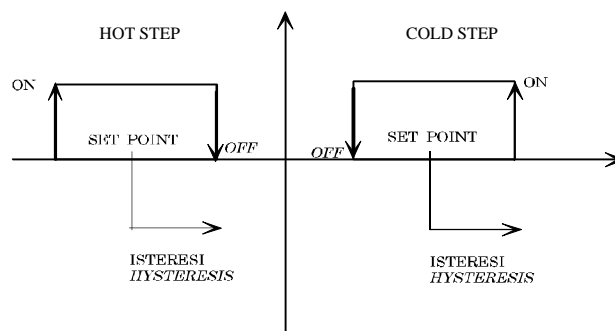
- the hysteresis is expressed as half the range between switching on (ON) and switching off (OFF).

5. TEMPERATURE REGULATION DIAGRAMS

5.1. TWO-COMPRESSOR UNIT WITHOUT THE ENERGY-SAVING OPTION

RAMPA ACQUA FREDDA
COLD WATER RAMP

GRADINO2
STEP2

GRADINO1
STEP1

ALTO LIMITE DEUMID.
HIGH LIMIT DEHUM.

0%   25%   50%   75%   100%

BANDA (META' DELLA TOTALE)
BAND (HALF OF THE TOTAL)
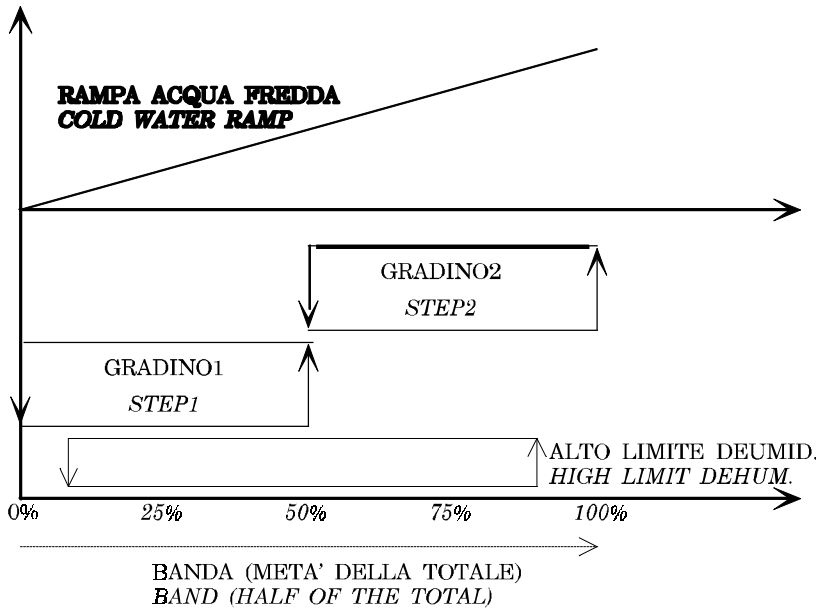
Factory values:
- Compressor1set: 25%   Compressor1 hysteresis: 25%
- Compressor2set: 75%   Compressor1 hysteresis: 25%
If factory capacity-controlled compressors are utilised the steps of the compressors and its capacity controls coincide.

5.2. A TWO-COMPRESSOR UNIT WITH THE ENERGY SAVING OPTION

RAMPA ACQUA FREDDA
COLD WATER RAMP

GRADINO2
STEP2

GRADINO1
STEP1

ALTO LIMITE DEUMID.
HIGH LIMIT DEHUM.

0%   33%   50%   66%   100%

BANDA (META' DELLA TOTALE)
BAND (HALF OF THE TOTAL)
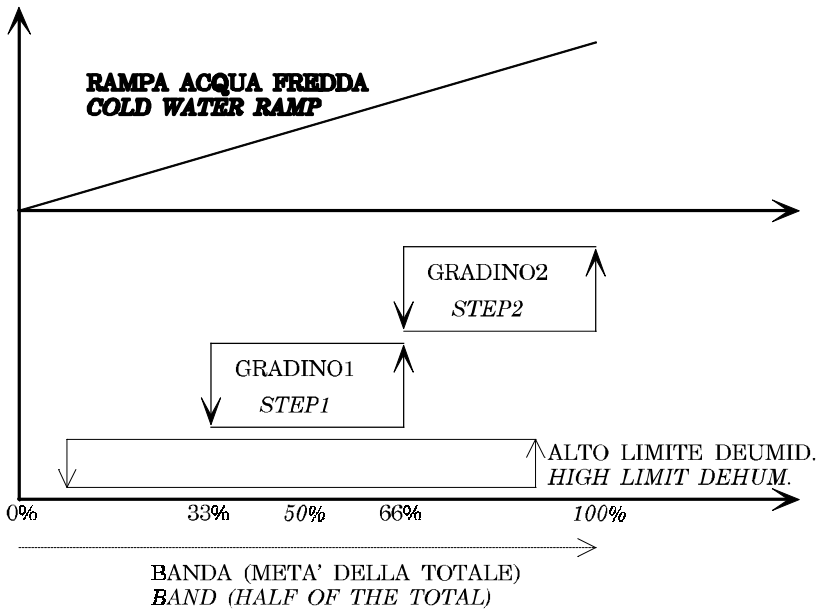
Factory values:
- Compressor1set: 49%   Compressor1 hysteresis: 16%
- Compressor2set: 82%   Compressor1hysteresis: 16%

If factory capacity-controlled compressors are utilised the steps of the compressors and its capacity controls coincide.

5.3.   SINGLE-COMPRESSOR UNIT WITHOUT ENERGY SAVING OPTION
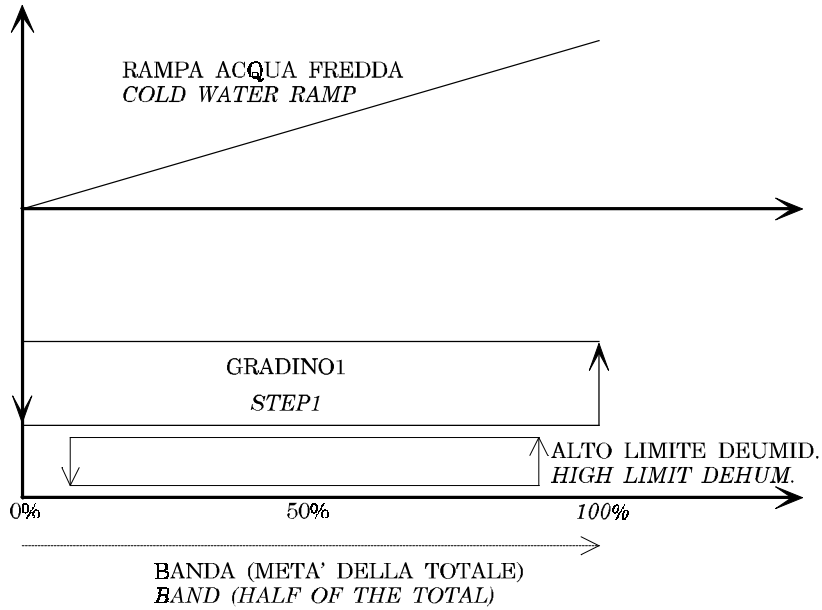
Factory values:
- Compressor set: 50%   Compressor hysteresis: 50%
If factory capacity-controlled compressors are utilised the step of the compressor and its capacity control coincide.

5.4.   SINGLE-COMPRESSOR UNIT WITH THE ENERGY SAVING OPTION
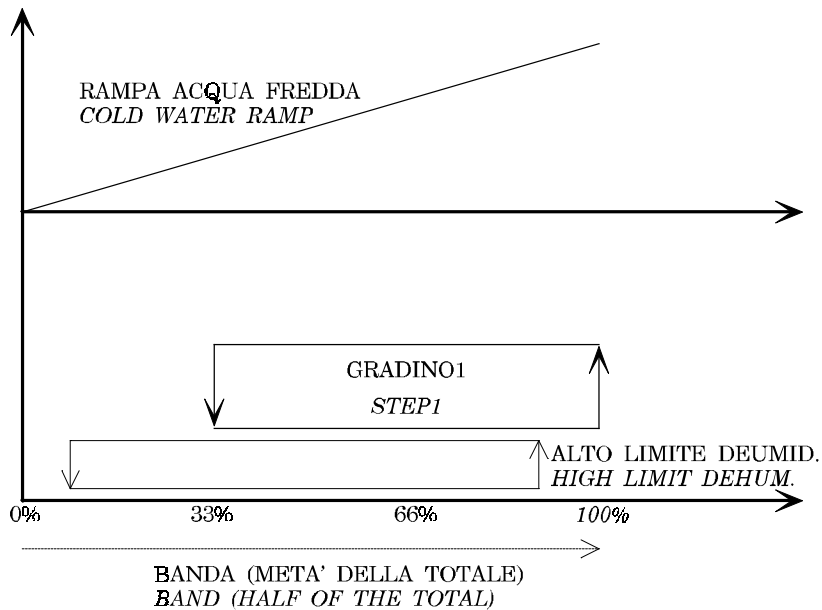
Factory values:
- Compressor1 set: 66%   Compressor1 hysteresis: 33%
If factory capacity-controlled compressors are utilised the step of the compressor and its capacity control coincide.

5.5. TWO-RESISTANCE UNIT

Rampa Acqua Calda

HOT WATER RAMP

LIMITE BASSA DEUMID.
LOW LIMIT DEUMID.

GRADINO2
STEP2

GRADINO1
STEP1

-100%   -66%   -33%   0%

BANDA (META' DELLA TOTALE)
BAND (HALF OF THE TOTAL)
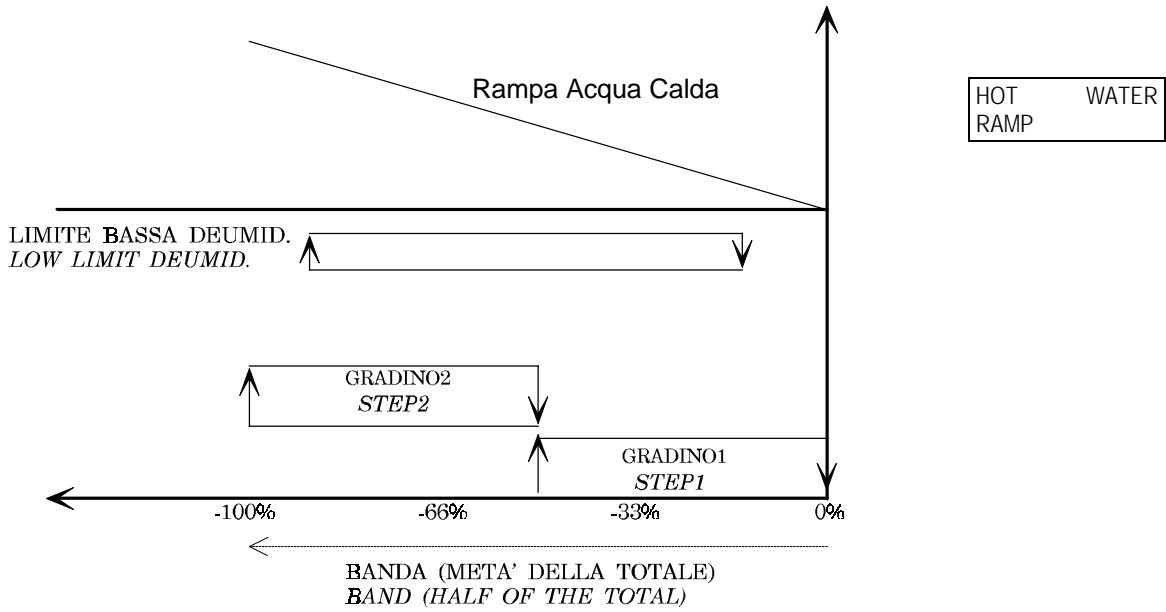
Factory values:
- Resistance1 set: 25%   Resistance1 hysteresis: 25%
- Resistance2 set: 75%   Resistance 2 hysteresis: 25%

5.6. SINGLE-RESISTANCE UNIT

Rampa Acqua Calda

HOT WATER RAMP

LIMITE BASSA DEUMID.
LOW LIMIT DEUMID.

GRADINO1
STEP1

-100%   -50%   0%

BANDA (META' DELLA TOTALE)
BAND (HALF OF THE TOTAL)
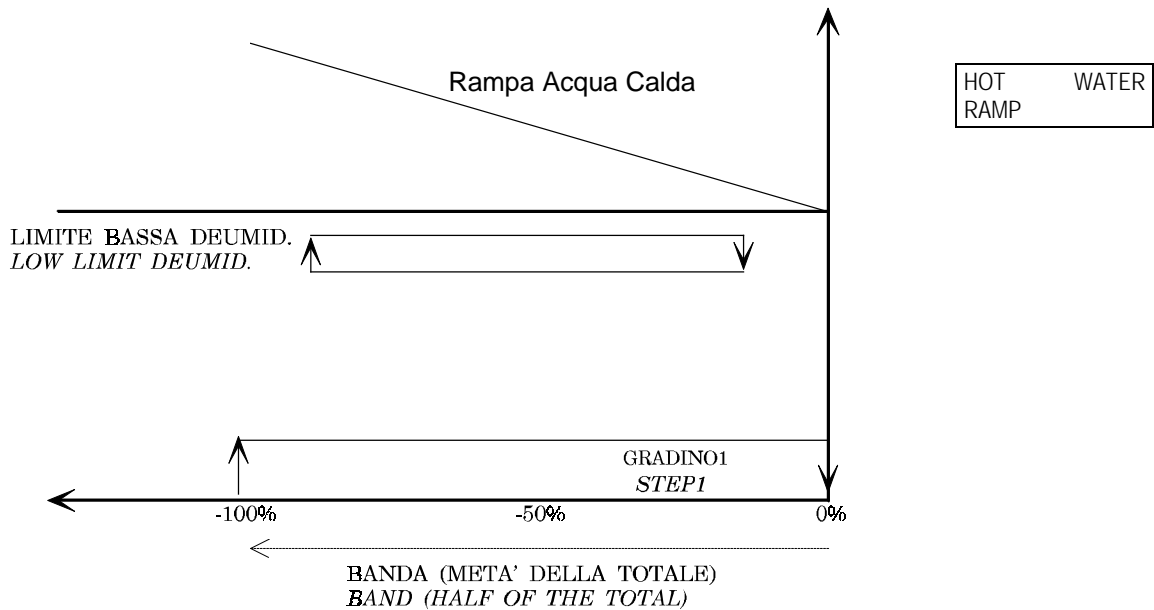
Factory value:
- Resistance set: 50%   Resistance hysteresis: 50%

6. DEVICE MANAGEMENT:

6.1. COMPRESSORS

Once started a compressor can not be stopped before 1 min. (factory-made) (MASK-SELECTABLE VALUE).
Once started a compressor can not be stopped before 6 min. (factory-made) (MASK-SELECTABLE VALUE).
The possible starting of the second compressor can not take place within 3 min. from the starting of the first one (factory-made)
(MASK-SELECTABLE VALUE).
In the two-compressor configuration the compressor ROTATION can be selected
RESISTANCE
In the 2-resistance configuration the following 2 functions are available:

- STANDARD

during connection:

       RESISTANCE1
       RESISTANCE1 + RESISTANCE2

during disconnection:

 RESISTANCE1 + RESISTANCE2
 RESISTANCE1

- BINARY

during insertion

 RESISTANCE1
 RESISTANCE2
 RESISTANCE2 + RESISTANCE1

during connection

 RESISTANCE2 + RESISTANCE1
 RESISTANCE2
 RESISTANCE1

6.2. DEHUMIDIFICATION STOP

The HIGH-LIMIT step operates during the dehumidification as follows:
- when reaching the upper limit of the cold band (85%) the HIGH-LIMIT step is energised and stops the dehumidification.
the step remains energised up to a value of 15% of the warming band, and the dehumidification will start again only if still
requested.

6.3. NOTES ON THE ENERGY SAVING

In order to be able to exploit the Energy Saving option the following relationship has to be verified:
Tambient - Twater > (SETenergy saving + IST energy saving)
The value SET ENERGY SAVING is mask-selectable (M_MANUF_PARAM10 window in the "General parameters" branch).
If this situation is verified then the following will occur:

- if in the M_MANUF_PARAM1window ("Compressors with valve in Energy Saving") you answer yes, then the compressor steps within the band
  are delayed in reference to the cold-water ramp, but only when the necessary conditions for the energy saving operation occur. In the opposite
  case, namely energy saving being enabled but in the absence of the functioning conditions, the compressors operate normally.
- if you answer no in this window, then the compressor steps are eliminated and only the ramp in action is maintained in the presence of the
  conditions which require that energy saving be started. In the opposite case the compressors operate normally.

6.4. MANUAL CONTROL

This part of the program allows you to manually operate the unit's DEVICES, thus excluding the operation of the pCO control, but maintaining the
interlock with the protections in order to ensure the security and integrity of the components being utilised.
To enable manual functioning it is necessary to carry out the operations described in the paragraph dedicated to the pCO keypad.
The manual state of the machine is identified by the appearance of the message "Manual procedure" on the last line of the display.

7. HUMIDITY REGULATION GRAPH

Humidity regulation can be selected from the M_MANUF_CONF4 window in UNIT CONFIGURAT., protected by the manufacturer's password.
DEHUMIDIFICATION can be carried out:
- by means of the compressor starting (selected in the mask M_MANUF_PARAM2 within the "PARAMETRI GENERAL" branch);
- with capacity control of the cold-water ramp
- through the reduction of the fan speed
- Dehumidification is enabled only if the ambient temperature falls within the alarm limits.
FOR VALUES EXCEEDING THIS TEMPERATURE RANGE DEHUMIDIFICATION IS INHIBITED (see graphs of the temperature control).
Humidification can be carried out through the ON/OFF control as for the dehumidification, described above (that is a humidification step is selected in exactly the same way as for dehumidification) or with the integrated-humidifier control (selectable from M_MANUF_CONF4 mask, under the "Unit configuration" branch, protected by manufacturer's password).

HUMIDITY CONTROL
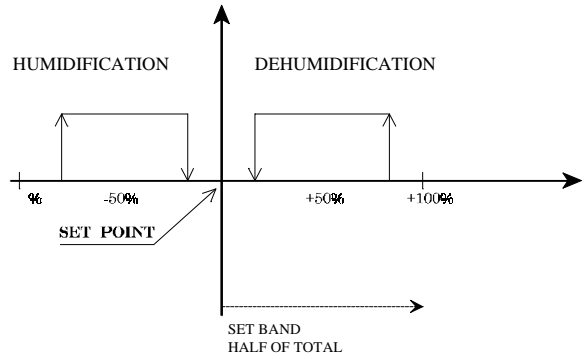
7.1. Integrated humidifier control

The humidifier control standard pCO for air conditioning units manages the immersed-electrode humidifiers (to be paired with the OEM kits) , can control all the humidifiers from 1 to 42Kg/h , three-phase single-phase, with power-supply voltage from 200 to 660 V.(220-240 V or 380-415 V voltages are recommended). For the regulation an eight analog-input pCO interface is being utilised along with an optional card, so as the pCO interface can read the signal from the TAM current transducer, the conductivity-reading signal and the full sensor. The pCO, in accordance with the current and relative humidity, controls the steam production and the working conditions of the humidifier; it also manages and signals all the states and alarms of the humidifier.

pCOUMID0000 card connection diagram:
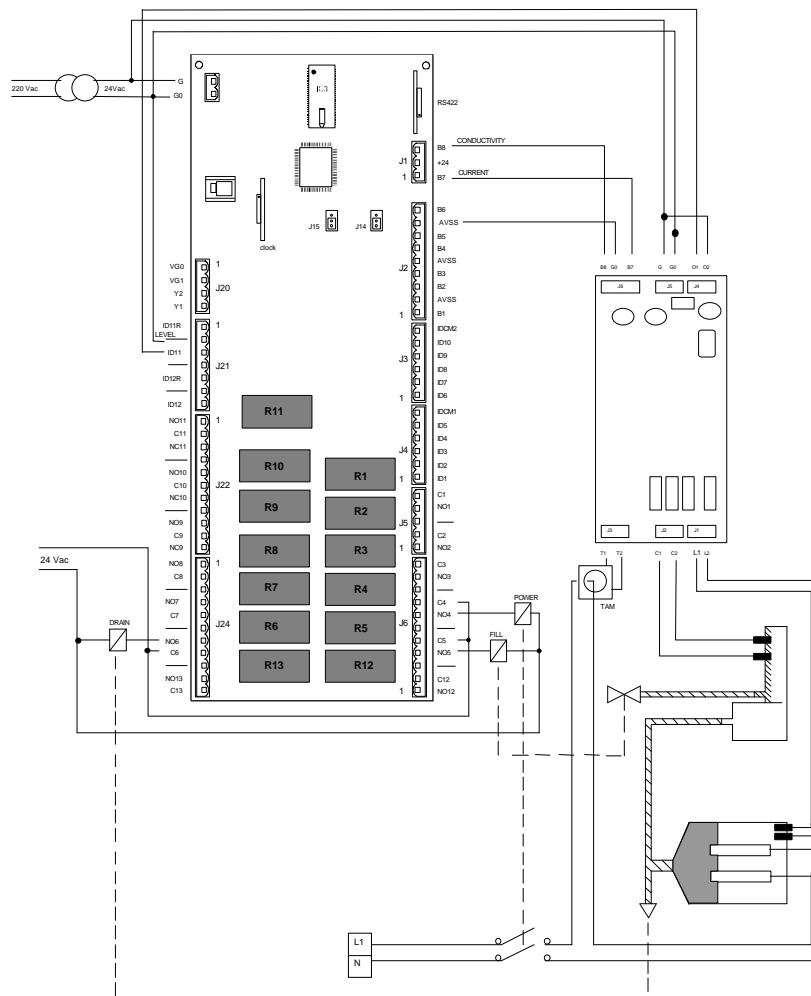
Description of the humidifier parameters

To select and control the humidifier it is necessary to properly preset the following parameters:

N.	NAME	DESCRIPTION	U.M.	RANGE.	DEF.
1	Nominal cap.	Cylinder nominal or maximum-output capacity	kg/h	0.42	3
2	Voltage	Supply voltage	Volt	0.660	220
3	Phase no.	Phase no. of the mains	....	1/3	1
4	TAM model	TAM model utilised	.....	50.700	100
5	Preset capacity	Capacity preset as maximum	kg/h	30%Pn.. 100%Pn	3
6	Humidity set-point	Set-point of the humidity regulation	rH%	0.100 rH%	50
7	Humidity differential	Band of the humidity regulation	rH%	0.100 rH%	10
8	High humidity threshold	High humidity alarm threshold	rH%	0.100 rH%	80
9	Low humidity threshold	Low humidity alarm threshold	rH%	0.100 rH%	30
10	C0	Algorithm constant (see the following paragraph)	...	...	93
11	C1	Algorithm constant (see the following paragraph)	...	...	70

Preset tables of the C0-C1 parameters

The C0 and C1 constants change according to the type of humidifier being connected. In the following tables the values of C0 and C1are reported as a function of the nominal capacity (columns) and of the voltage (rows) :

C0 and C1 for F200MA single-phase cylinders with a nominal capacity from 1 to 3Kg/h :

	Nominale Capacity in Kg/h					
	1 Kg/h		**2** Kg/h		**3** Kg/h	
	C0	C1	C0	C1	C0	C1
208	90	70	96	70	103	70
220	78	70	86	70	93	70
230	72	70	80	70	87	70
240	67	70	74	70	82	70

C0 and C1 for F400TA three-phase cylinders with a nominal capacity from 3 to 5 Kg/h :

	Nominal Production in Kg/h			
	3Kg/h		**5**Kg/h	
	C0	C1	C0	C1
208	94	150	100	150
220	84	150	90	150
230	78	150	83	150
240	72	150	77	150
380	34	150	39	150
400	31	150	37	150
415	29	150	35	150
440	27	150	33	150
480	25	150	31	150
575	20	150	26	150

C0 and C1 for E400TA three-phase cylinders with a nominal capacity from 8 to 13 Kg/h:

	Nominal Capacity in Kg/h			
	8 Kg/h		**13** Kg/h	
	C0	C1	C0	C1
208	95	250	103	250
220	84	250	93	250
230	78	250	85	250
240	72	250	79	250
380	34	250	37	250
400	32	250	34	250
415	30	250	32	250
440	28	250	30	250
480	26	250	27	250
575	21	250	22	250

C0 and C1 for I400TW three-phase cylinders with a nominal capacity from 23 to 42Kg/h

| | Nominal Capacity in Kg/h | | | |
| | 23Kg/h | | 33Kg/h | |
	C0	C1	C0	C1
208	57	500	59	500
220	52	500	53	500
230	48	500	49	500
240	44	500	46	500
380	20	500	22	500
400	18	500	20	500
415	17	500	19	500
440	16	500	17	500
480	14	500	16	500
575	11	500	13	500

| | Nominal Capacity | |
| | 42Kg/h | |
	C0	C1
380	23	150
400	21	150
415	20	150
440	19	150
480	18	150
575	15	150

7.2.   Programming of the humidifier

Selection of the type of humidifier

To select the type of humidifier to be controlled you must properly preselect 4 parameters in the masks intended for the humidifier under the manufacturer's password:

NOMINAL C. is the nominal steam capacity or maximum cylinder delivery that is available. It is possible to preset values ranging from 1Kg/h to 42 Kg/h.

VOLTAGE is the voltage value of the power supply. It is possible to preselect values ranging from 0 to 660 V.

PHASE NUMBER is the phase number of the power supply. It is possible to preset 1 or 3 phases (single-phase or three-phase)

TAM MODEL you select the model of amperometric transformer to be utilised. By presetting 0= TAM 50, 1=TAM 100, 2=TAM 150, 3=TAM 300, 4=TAM 500 , 5=TAM 700

DRAIN ENABLING WITHOUT VOLTAGE you preset how to carry out the drainage, that is to say with the power remote control switch being connected or disconnected.

Capacity and humidity regulation

The regulation of the humidifier steam capacity depends on:

 -Humidity Regulation
 -Preset capacity CAPACITY (window M_PARAM_USER4 protected by manufacturer's password)

The humidity regulation is carried out by the control based on the reading of the humidity probe at a set-point and a humidity differential. The control calculate a proportional humidity error ERP :
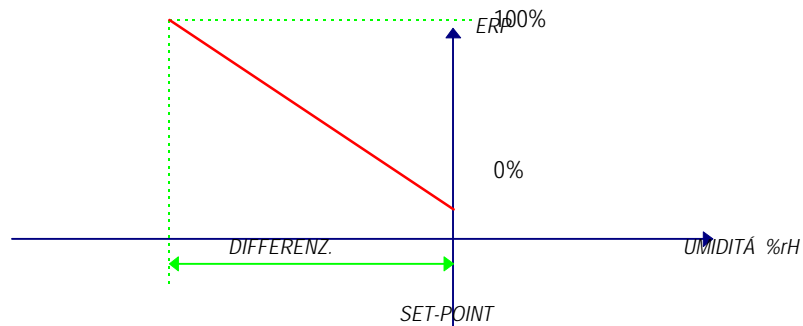
The preset capacity is the maximum required capacity and is a value that can change between the 30% of nominal C. and the 100% of nominal C. According to the nominal capacity, the preset capacity and the ERP proportional humidity error, the following humidifier graph will be obtained :

ERP = propotional humidity error
relevant set and differential

Steam production to de obtained :
    A-100%Pn
    B-50%Pn
    C-30%Pn
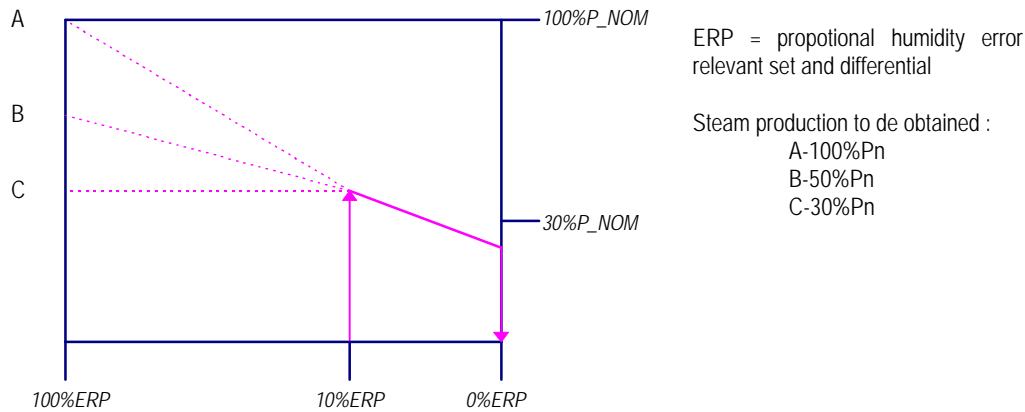
The humidifier has a minimum capacity equal to the 30% of the nominal C. when the ERP = 0 and increases proportionally to the increase of the preset capacity when the ERP=100%

Monitoring of the steam capacity and of the humidifier characteristic values
The user can verify the instantaneous steam production by checking the value present in the mask group bound to the MENU button. Furthermore, the user will be able to monitor some characteristic values such as the feedwater conductivity, the absorbed current per phase and the different working modes in the group of masks bound to the I/O button.

7.3.   Management of the humidifier Alarms

Below the various detectable alarms are listed, together with the detection criterion and the possible corrective operations.

DISPLAY	CRITERIA	OPERATION	RELAY	SIRENS
Alarm deficiency of current	When the water level reaches the sensor of full and Im <5%In is measured [1]	Turn off the power Empty out the cylinder[2]	Yes	Yes
Alarm deficiency of water	Load valve open for more than 20 minutes consecutive	None	Yes	Yes
High or low humidity alarm	Humidity over or below the preset threshold. Signalled only 20 minutes after the pressure of the ON button	None	Yes	Yes
Foam presence indication	Foam has been detected inside the cylinder. The presence of foam is signalled in the "i/o" HUMI_PCO_IO window.	The situation is managed up to its extinction with a special procedure by the control. (temporarily maximum capacity is not guaranteed)	NO	NO
Full cylinder indication	The cylinders saturated with limestone.	(cylinder replacement is suggested)	NO	NO
High current alarm	Current higher than the established limits (see relevant chapter)	Forced drain for 5 seconds. Cut off power.		

High current alarm. To prevent the current from raising over the maximum allowable values, limits have been established. These however are bound to time, since they must allow temporary peaks at the instrument switching on.
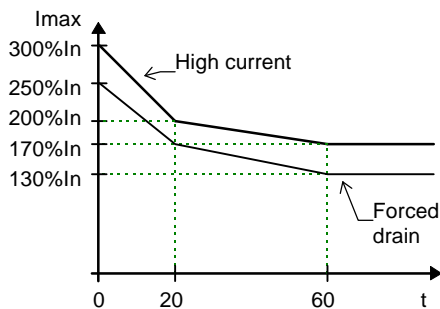
The forced drain lasts 5 seconds, and is not signalled. The high current alarm causes a 30-second water drainage and stops the humidifier.

---

[1] In case of current failure neither the control should operate, but if only a phase is absent you could measure no current whereas actually this is above the security threshold

[2] This to prevent the current, once the alarm has been reset and the power contactor reenergised, from raising quickly beyond the allowed limits.

8.   pLAN NETWORK

Every pLAN node must be addressed to be identified by the other nodes. Each address (an integer number) must be unique in the network for avoiding messages mismatch: in case two or more nodes have the same identifing address <u>the network cannot work.</u>
The max address number selectable is in the 1-16 range for the Terminals and 1-16 for the pCO main boards.

☝ BECAUSE OF HARDWARE CHARACTERISTICS IT IS POSSIBLE TO CONNECT **UP TO 16** ADDRESSES.

A example of combinations could be :   8 Terminals + 8 pCO main boards

8.1.   pCO MAIN BOARD ADDRESS SELECTION

pCO main boards are addressed using the additional `PCOADR0000` / `PCOCLKMEM0` plug-in cards. They have these part numbers:

☞ **PCOCLKMEM0**   Plug - in board for address selection plus real time clock and calendar (only for pCO n.1)

☞ **PCOADR0000**   Plug - in board for address selection (for the other pCO boards)

These boards must be present on every pCO main board for a correct networking. If the addressing board is not plugged, the pCO main board works as stand-alone without interacting with all the others local network nodes (pCO main boards and Terminals).

Adr	Sw1	Sw2	Sw3	Sw4
0	not possible			
1	on	off	off	off
2	off	on	off	off
3	on	on	off	off
4	off	off	on	off
....	....	....	....	....
15	off	on	on	on
16	on	on	on	on

	Sw1		Sw2		Sw3		Sw4	
State	off	on	off	on	off	on	off	on
P	0	1	0	2	0	4	0	8
Addr=P(Sw1)+P(Sw2)+P(Sw3)+P(Sw4)								

Sw1
Sw2
Sw3
Sw4
Sw5
NOT USED

OFF   ON

OFF   ON

STATUS LED

R Y G

present only in pCOADDCLK0

PCOADR0000 or PCOADDCLK0

Address selection
(see table)
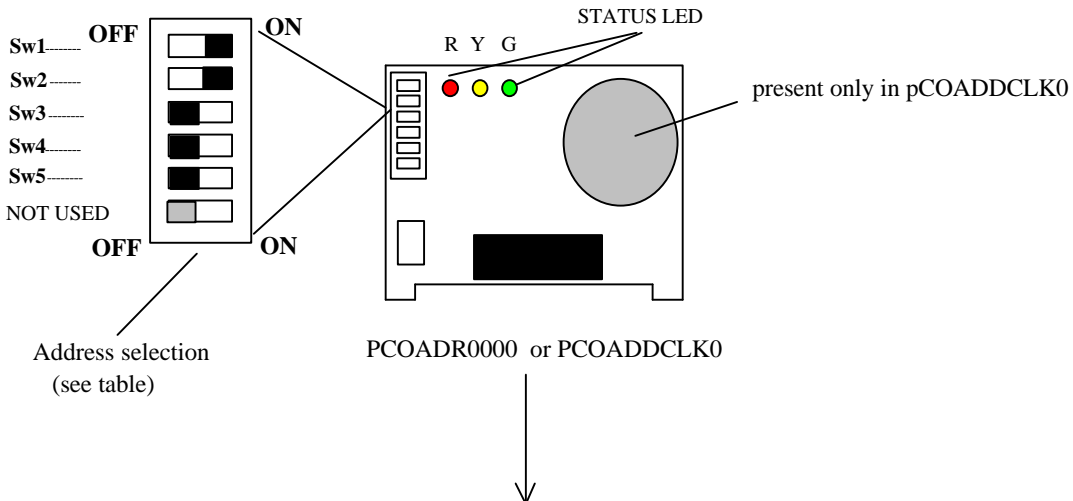
to be inserted on pCO main board - clock board pin-strip

In the application standard air conditioning + humidifier EPSTD*CZUB unit, the dip-switches configuration allowed for the pCO cards are the following :

Unit n.1   Unit n.2   Unit n.3   Unit n.4
Unit n.5   Unit n.6   Unit n.7   Unit n.8
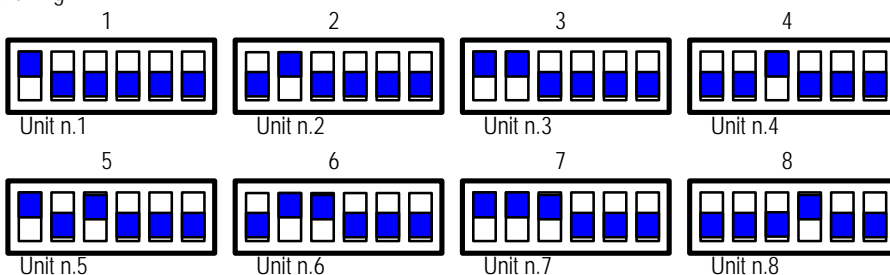
If all the dip-switches are OFF (not allowed configuration) the R-Y-G Leds are lit.
PCOADRxxxx boards have three LEDs on the top side for indicating basic node status. They are Red, Yellow and Green coloured.

LED	STATUS	DESCRIPTION
	ON	pCO main board is syncronized with all the other pLAN nodes. The node is working correctly.
GREEN		
	OFF	pCO main board is not network conneceted or it doesn' t receive any signal from the pLAN
	BLINKING	pCO main board is transmitting data to other network nodes
YELLOW		
	OFF	pCO main board is not transmitting messages
	OFF	No hardware and software problem
	ON	pCO main board software not compatible or variables database not correct
		Contact Carel Service
RED		
	BLINKING	pCO main board hardware is not compatible - RAM is smaller than 32KB. The pCO board model is just for working in a stand-alone mode.

At the start-up all Leds are ON and after few seconds OFF again. After 5-15 secs elapse , the led configuration is among those listed above.

NOTE: If PCOADRxxxx board is removed (or it fails) while pCO main board is working it doesn't affect the correct program running, but the next restart, for instance after a black out or after having replaced a board, the pCO main board doesn't recognize any address card and it is excluded from the network system.

☛ **For a correct pLAN working every PCOADRxxxx card must be left inserted on its own pCO main board during the run-time.**

8.2. pCO TERMINALS ADDRESS SELECTION

Terminal address is programmed by means the dip-switches set on the Terminal board rear side. Dip-switches are selectable without removing the Terminal plastic case. Ref. to the pCO main board addressing table for setting Terminal address and refer also to the picture below.
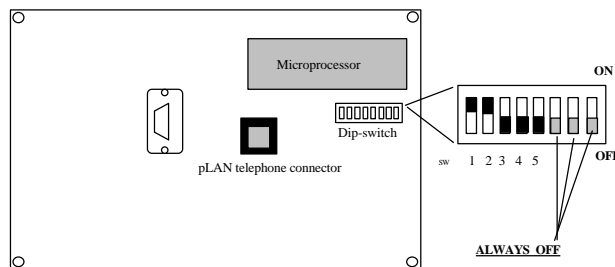
In the application standard air conditioning + humidifier EPSTD*CZUB unit, the dip-switches configuration allowed for the pCO Terminal are the following :

	Sw1		Sw2		Sw3		Sw4		Sw5	
State	off	on	off	on	off	on	off	on	off	on
P	0	1	0	2	0	4	0	8	0	16
Addr=P(Sw1)+P(Sw2)+P(Sw3)+P(Sw4)+P(Sw5)										

In the application standard air conditioning + humidifier EPSTD*CZUB unit, the dip-switches configuration allowed for the terminals are the following :
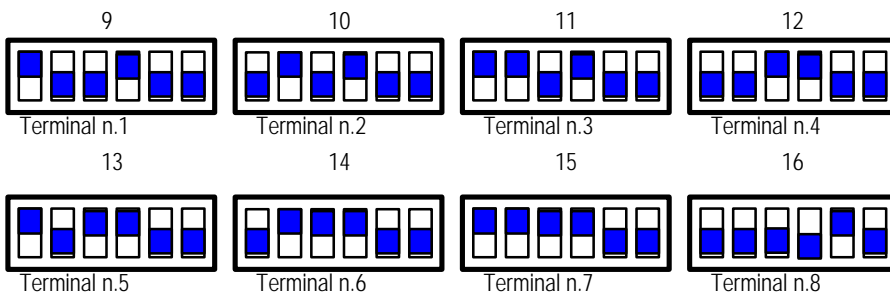
☛ **SW6,SW7,SW8 ALWAYS OFF.**

☛ **NOTE:**
Take care in avoiding to leave all the dip switches on OFF position. In this case the network will not work properly.

8.3. NETWORK NODES ADDRESSING PROCEDURE

After having electrically connected every node by T-DEVICES as described before, follow these stages for completing the nodes addressing depending on the project strategy chosen.

☞ pCO main boards and Terminals (if they have an external power supply) powered OFF.

☞ Select the pCO main board address by means of the dip switches located on PCOADRxxxxx boards looking at the above table and instructions.

☞ Insert the PCOADRxxxxx card into the pin strip usually reserved for the clock board on pCO main board. Make this operation carefully for not damaging the connectors and the boards. Touch with hands a metal case connected to earth before handling every board (see also pCO User Manual).

☞ Repeat this procedure with all the other pCO main boards you are going to install into the network.

☞ Address Terminals using the dedicated dip switches on the Terminal rear side.

☞ pCO main boards and Terminals (if they have an external power supply) powered ON. At this point all the addresses are recognized by all the pCO main boards and Terminals.

☞ Now pLAN can be ready to be *logically* configured (see after).

NOTE:
The network nodes addressing procedure must be done and checked every time a new pCO main board or a new Terminal is linked to the network and when a new Eprom program is installed on a pCO main board.
If the user realize to have programmed wrong addresses, the addressing procedure must be repeated from scratch.

8.4. pLAN NODES LOGIC CONFIGURATION

This chapter describes how to create logic relations among all the Terminals and pCO main boards connected - and already addressed - in pLAN.
Before starting this procedure check that every node address is properly programmed.
This procedure can be carried out using just one Terminal, but with all the other Terminals connected to pLAN.

8.5. USER-TERMINALS LOGIC TYPES

Before describing the config. procedure , a description about the two modes how a Terminal can be configured is explained.
A **pCO** user-terminal in the pLAN will be considered as ***PRIVATE*** *or* ***SHARED*** (hardware is the same) in the pLAN strategy.

☞ *PRIVATE* **pCO user-terminal**

The terminal is dedicated to work with only **one pCO** main board.
This terminal will receive and transmit data only to **one** (its own) **pCO** main board. It means that all messages which appear on the display and leds will be driven by **one pCO** main board. Every key-stroke signal will be sent to **one pCO** main board.
A terminal is defined as PRIVATE by the user during an <u>initial</u> configuration procedure (a built-in function in BIOS firmware). Terminal status (Private or Shared) cannot be changed during the run time for avoiding any system bad working.
PRIVATE terminals can also drive (option) a local serial printer.

☞ *SHARED* **pCO user-terminal**

A SHARED terminal can be associated to two or more **pCO** main boards.
In a certain moment only one **pCO** main board can keep the shared terminal under control and sending or receiving commands to/from a **pCO** terminal.

Switching a shared terminal from one to another **pCO** main board can be done in two ways:

☞ **Automatically**: Depending on the particular application program. The EasyTools application program, built-in the **pCO** main board Eprom, can set a dedicated variable for this aim.

☞ **Manually**: Pushing dedicated keys on **pCO** terminal keyboard. A terminal is defined as SHARED by the user during an initial configuration procedure (a built-in function in BIOS firmware) when it is possible to assign also the **pCO** main board associated address.

☝ **Max no. 3 terminals can be software-driven by only one pCO main board. Among these three terminals only one can be assigned as SHARED. The remaining two terminals must be configured as PRIVATE.**

☝ **A SHARED and a PRIVATE Terminal must be of the same type.**

Every pCO main board up to date PRIVATE terminals indications continuously. A SHARED terminal is up to date by the pCO main board which is keeping the terminal under control in that particular moment.

Ex:
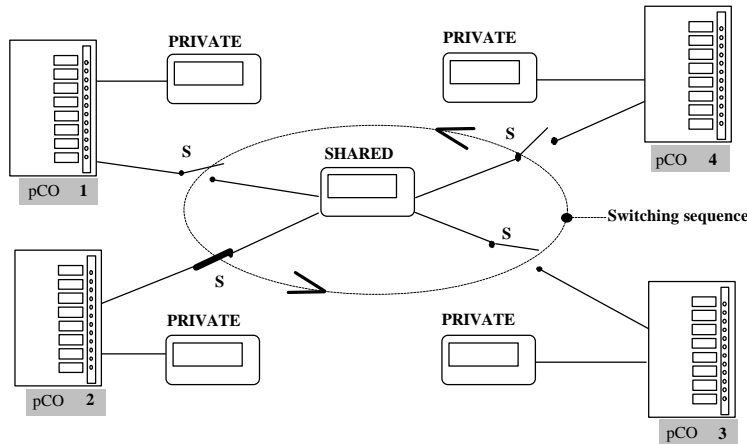
In the picture above the SHARED terminal is associated to pCO main boards no. 1,2,3,4 but in this moment it is kept under control by pCO main board no. 2. <**S**> is just a logic switch indicating which pCO main board is controlling the shared terminal at a certain time.
For switching to the next pCO main board :
☞   push keys. The switching sequence is (1--> 2---> 3---> 4---> 1--->2 ....)   or
☞   wait for the automatic switching sequence managed by the particular application program
VERY IMPORTANT. In the application standard air conditioning + humidifier EPSTD*CZUB unit, two possibilities are given to the customer. First one is to connect a terminal for any pCO board. Second one is to connect just a terminal (number 16) shared between all pCO boards. It could be also possible to foresee a mixed configuration : private terminals plus a shared terminal.

8.6.   pLAN CONFIGURING PROCEDURE
Follow these stages for a correct pLAN Terminals configuration. Firstly the procedure for a LCD display Terminal is described; then the one for a LED display Terminal.
The program is stored in the Terminal microprocessor.

STAGE 1: pCO main board selection
This stage associates a pCO main board to the Terminal.
Push simoultaneously the first three keys on the upper left corner of the keyboard. Push them for at least 5 seconds.
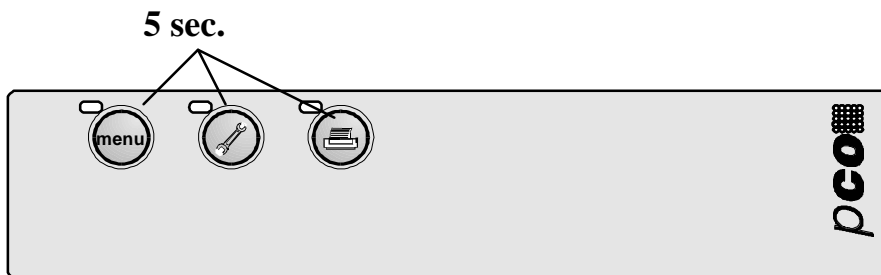
This mask appears:

```
Terminal  Adr: nn
I/O Board Adr:  01
```
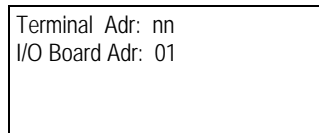
Terminal Adr is not changable. <**nn**> represents the address set on the dip-switch on the rear side of the Terminal.
I/O Board Adr   field shows the pCO main board address that is connected to the Terminal.
Arrow keys: change the pCO main board address in order to connect the Terminal with another pCO main board.
If no pCO main board is connected with the Terminal a '**--**' is shown in place of the figure representing the pCO main board address. Push Arrow Keys for changing it. If no pCOmain board is connected to the pLAN or no pCO main board is addressed it is not possible to make any communication.
Enter: Exit from the STAGE 1 procedure. STAGE 2 first mask appears.
The configuration procedure is automatically cleared if no key is pushed within 15 seconds from the former key-stroke.

STAGE 2: Selection of Terminals associated with a pCO main board.

```
          Terminal  Config

          Press ENTER
          to continue
```

Push ENTER key to Continue. A new mask appears:

```
 P:01  Adr   Priv/Shared
Trm1   09       Pr
Trm2   none     --
Trm3   16       Sh   Ok? No
```

We can now associate up to no. 3 Terminals (Trm1 , Trm2, Trm3) to the pCO main board addressed 01.

Fields LEGENDA:
P:01
Address of pCO main board connected to the Terminal. In this case the address is 01.
Trm(x):
Terminal. (x) = 3 indicates the max number of terminals (3) which can be logically related to a single pCO main board. The Terminal you are using for configuring the pLAN could not be among Trm1/2/3 indicated on the mask: for instance it could have address 11 (not shown in the mask) and not associated to pCO main board no. 01.
Priv/Shared:
Terminal attribute : PRIVATE or SHARED (see above). If the Trm1 is Shared it means that it is associated with pCO main board n. 01 and at least to another pCO main board .
Trm2 is Private: it means that it can be associated (managed) by only pCO main board no. 01.

PROCEDURE:

    Enter key: it allows to move the cursor to the mask fields , in sequence.

    Arrow keys: When the cursor is positioned on the field where you are going to change an address, push **arrow keys**   for selecting another address.

    For **confirming your selection** press ENTER key until the cursor is positioned on Ok? field. Push Arrow keys for selecting Y (Yes) or N(No) and confirm pushing ENTER key.

    If Yes: data are stored in the memory

    If No: You can change some value that couldn' t be selected properly according with your pLAN strategy.

    For **exiting without storing changes** into memory just wait for 30 seconds without pushing any key.

Repeat STAGE 1 and STAGE 2 for associating other Terminals to other pCO main boards present in pLAN.

TERMINAL RUNNING MESSAGES
If the pCO main board controlling the Terminal is faulty or there is some problem in communication or it was disconnected from the Terminal this message occours:

```
I/O Board  xx  faulty


```

where xx stands for the pCOmain board address.
If the Terminal doesn' t receive any token message (network syncro signal) for at least 10 sec., this message appears on the LCD (This message corresponds to the PCOADDxxxx Green LED OFF information.) :

```
          NO LINK


```

9. STAND-BY

The connection of pCO boards in a pLAN local network allows them to communicate with one another and exchange variables.

The main function of this exchange of variables is to allow all the units to be controlled by one single pCO terminal.

In addition, it allows the units to be rotated according to a time schedule, with the possibility to leave one of them in Stand-By, ready in the case where one of the units in operation malfunctions. Below is a schematised diagram of the connections which need to be made.
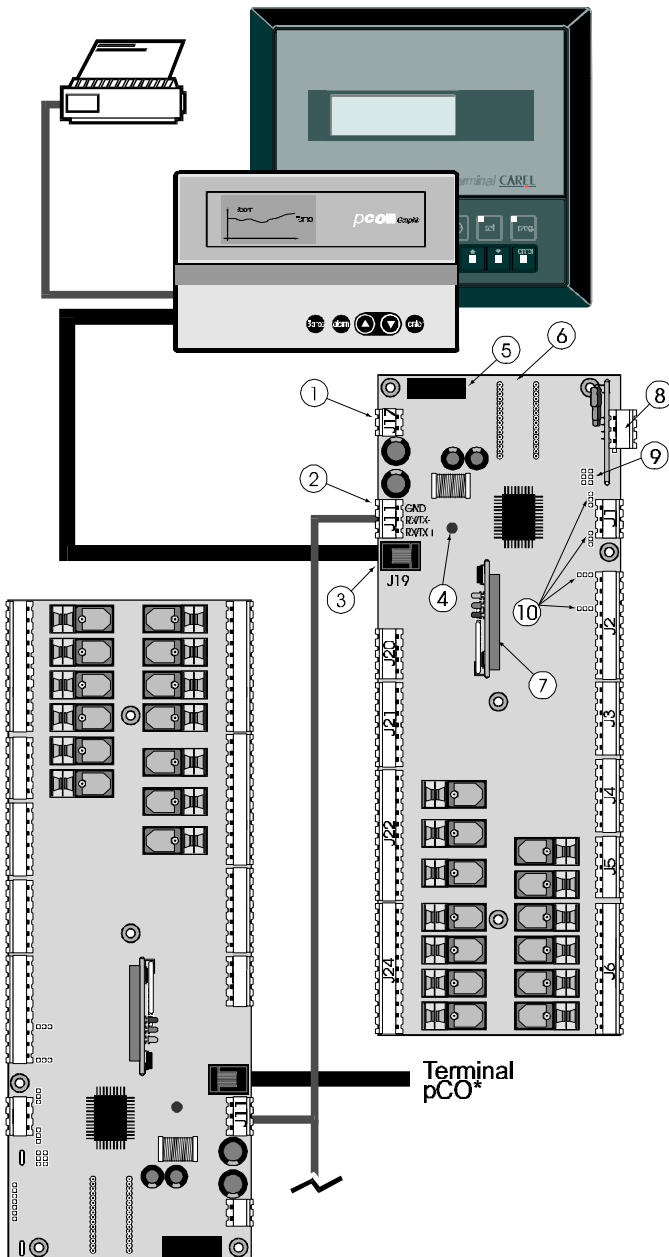
The connection between boards in the pLAN network is made using an AWG20/22 shielded cable, twisted pair + shield. The boards are connected in parallel, using terminal J11 as reference. WARNING: make sure the order of connection is respected.

The following parameters manage the rotation of the units and are present only in the screen of unit number 1. They are listed and described below.

- screen M_MANUF_PARAM25 (manuf. branch). *Number Units*: indicates the total number of units involved in the scheduled rotation (the number set must also take into account unit number 1).
- screen M_MANUF_PARAM25 (manuf. branch). *Reset Rotation*: if enabled, this parameter resets the rotation; this should be set after having completed the parameter installation procedures.
- screen M_MANUF_PARAM26 (manuf. branch). *Select. Hours/Minutes*: determines if the rotations are performed in minutes (test only) or in hours (normal conditions)
- screen M_MANUF_PARAM26 (manuf. branch). *Type of Rotation*: if Cyclical the units in Stand-By follow the order 1, 2, 3...1, etc...; if Op. Time, at the end of the rotation time the unit with the highest number of operating hours is placed Stand-By (referred to the number of operating hours of the main fan)
- screen M_MANUF_PARAM27 (manuf. branch). *Test Rotation Cycle*: sets the number of minutes for the rotation test
- screen M_MANUF_PARAM27 (manuf. branch). *Rotation Cycle*: sets the number of hours of rotation in normal operation

One further parameter is however present on all units

- screen M_MANUF_CONF7 (manuf. branch). *Unit Configuration*: sets if the unit functions alone (INDEPENDENT UNIT), that is without being part of the rotation, or in rotation (UNIT IN ROTATION)

After all these parameters have been correctly set, the rotation reset should be performed using the Reset Rotation parameter, and then the units should be started.

IMPORTANT. It is good practice for the units which are part of the rotation to have sequential addresses. If, for example, an installation to be configured with 4 units in rotation and 2 independent units, the first 4 units must have addresses from 1 to 4, and the other 2 must have addresses 5 and 6.

When a critical alarm occurs in one of the units, this unit may continue to function and the stand-by unit is switched on. List of critical alarms :
- compressor high pressure
- compressor low pressure
- electrical element thermal cut-out
- high / low ambient temperature
- high / low water temperature at outlet
- faulty ambient temperature / water outlet / external air / supply air probe
- high current at humidifier
- no current at humidifier
- no water in humidifier
- eeprom malfunction
- interruption to the pLAN local network

When a serious alarm occurs in one of the units, this unit is switched off and the stand-by unit is switched on. List of serious alarms:
- air flowmeter
- main fan thermal cut-out
- fire / smoke
- unit black-out

The PCOCLKMEM0 clock board installed in unit number 1 allows the cyclical rotation, the timer and the address of the unit in stand-by to be store in the clock's buffer RAM. Following a black-out, the system recommences from the state before the black-out (same unit in stand-by, the cyclical rotation timer does not start from 0 but rather counts the hours already passed).

10.   LIST 0F THE PROGRAMMABLE SETS

When the factory values are inserted the machine is configured with the presence of the following devices:

- Outlet water temperature probe
- Internal humidity
- Both the compressors
- Both the resistance
- Warm modulating valve
- Cold modulating valve

Factory values being taken as machine parameters by the pCO if you answer yes to the first window of the "Init. configuration" in the manufacturer's menu:

SELECTABLE QUANTITIES	LEVEL	RANGE	PRE-SET
Fan hour threshold	**assistance**	**0 / 999 (x1000)**	**200h**
Compressor 1 hour threshold	**assistance**	**0 / 999 (x1000)**	**100h**
Compressor 2 hour threshold	**assistance**	**0 / 999 (x1000)**	**100h**
Temperature probe calibration	**assistance**	**-99°C / 99°C**	**0°C**
Delivery air temp. probe calibration	**assistance**	**-99°C / 99°C**	**0°C**
Outlet water probe calibration	**assistance**	**-99°C / 99°C**	**0°C**
External air temp. probe calibration	**assistance**	**-99°C / 99°C**	**0°C**
Manual procedure	**assistance**		
Fan			**N**
Energy saving			**N**
Dehumidifier			**N**
Humidifier			**N**
Compressor 1			**N**
Compressor 2			**N**
Resistance 1			**N**
Resistance 2			**N**
Cold fan		**0 / 10.0V**	**N 0V**
Warm fan		**0 / 10.0V**	**N 0V**

SELECTABLE QUANTITIES	LEVEL	RANGE	PRE-SET
Temperature set-point	**set-points**	**variable**	**23°C**
Humidity set-point	**set-points**	**variable**	**50%**
Temperature minimum set-point limits	**user**	**-99.9 / 99.9°C**	**-99.9°C**
Temperature maximum set-point limits	**user**	**-99.9 / 99.9°C**	**99.9°C**
Humidity minimum set-point limits set-point	**user**	**0%**	**0%**
Humidity minimum set-point limits	**user**	**100%**	**100%**
Temperature band	**user**	**0 / 99.9°C**	**3°C**
Temperature neutral zone	**user**	**0 / 99.9°C**	**0°C**
Humidity band	**user**	**0 / 99.9%**	**10%**
Capacity	**user**	**variable**	**3 kg/h**
Automatic restart after voltage drop	**user**		**N**
Remote ON/OFF enabling	**user**		**N**
Compensation enabling	**user**		**N**
Compensation set-point	**user**	**-99.9 / 99.9**	
Compensation band	**user**	**-99.9 / 99.9**	
Compensation offset	**user**	**-99.9 / 99.9**	
Temperature alarm	**user**		
low offset		**0 / 100°C**	**10°C**
high offset		**0 / 100°C**	**10°C**
Humidity alarm	**user**		
low offset		**0 / 100%**	**20%**
high offset		**0 / 100%**	**30%**
Outlet water temperature threshold alarm	**user**		
low offset		**-99.9 / 99.9°C**	**2°C**
high offset		**-99.9 / 99.9°C**	**20°C**
Print repetition	**printer**	**0 / 999h**	**24h**
Temperature set-point automatic variation	**clock**		**N**
Temperature time band (1-4)	**clock**		
Start time		**00:00 / 23:59**	**00:00**
Set-point		**variable**	**0°C**
Humidity time band (1-4)	**clock**		
Start time		**00:00 / 23:59**	**00:00**
Set-point		**variable**	**0%**
(MANUFACTURER'S PARAMETERS)			
Clock card enabling	**unit configurat.**		**N**
Printer enabling	**unit configurat.**		**N**
Supervisory system enabling	**unit configurat.**		**N**
Delivery air probe enabling	**unit configurat.**		**N**
Outlet water probe enabling	**unit configurat.**		**S**
External air probe enabling	**unit configurat.**		**N**
Inlet water probe enabling	**unit configurat.**		**N**
Humidity probe enabling	**unit configurat.**		**S**
Integrated humidifier enabling	**unit configurat.**		**N**
Energy Saving enabling			**N**
No. resistance	**unit configurat.**	**0 / 2**	**2**
No. compressors	**unit configurat.**	**0 / 2**	**2**
Compressor capacity control enabling	**unit configurat.**		**N**
Cold modulating valve enabling	**unit configurat.**		**S**
Warm modulating valve enabling	**unit configurat.**		**S**
Cold 3 point valve enabling	**unit configurat.**		**N**
Warm 3 point valve enabling	**unit configurat.**		**N**
Configuration Unit Type	**unit configurat.**	**Rotation / Stand-Alone**	**Rotation**
Regulation time	**general parameters**	**Prop. / Prop.+Integral**	**Prop.**
Dehumidification logic	**general parameters**		**Normal. Open**

SELECTABLE QUANTITIES	LEVEL	RANGE	PRE-SET
1/2 compressor step with/without Energy Saving	**general parameters**		
Position		0 / 100 %	0%
Hysteresis		0 / 100 %	100%
1/2 capacity control step with/without Energy Saving	**general parameters**		
Position		0 / 100 %	0%
Hysteresis		0 / 100 %	100%
1/2/binary resistance step	**general parameters**		
Position		0 / 100 %	0%
Hysteresis		0 / 100 %	100%
Cold modulating valve	**general parameters**		
Start		0%	0%
End		100%	100%
Warm modulating valve	**general parameters**		
Start		0%	0%
End		100%	100%
Cold 3 point valve	**general parameters**		
Start		0 / 100%	0%
End		0 / 100%	100%
Warm 3 point valve	**general parameters**		
Start		0 / 100%	0%
End		0 / 100%	100%
Humidification step	**general parameters**		
Position		0 / 100%	50%
Hysteresis		0 / 100%	50%
Dehumidification step	**general parameters**		
Position		0 / 100%	50%
Hysteresis		0 / 100%	50%
Low temp. limit (stop dehumidification)	**general parameters**		
Position		0 / 100%	50%
Hysteresis		0 / 100%	35%
High temp. limit (stop dehumidification)	**general parameters**		
Position		0 / 100%	50%
Hysteresis		0 / 100%	35%
Humidifier nominal capacity	**general parameters**	0 / 42	3 kg/h
Humidifier Voltage	**general parameters**	0 / 660	220V
Humidifier phase No.	**general parameters**	1 o 3	1
Humidifier TAM model	**general parameters**	50 / 700	100
Drain enabling without voltage	**general parameters**		N
C0 parameter		0 / 1000	93
C1 parameter		0 / 1000	75
Number of Units engaged for Rotation	**general parameters**	1 / 8	0
Rotation's Reset	**general parameters**	0 / 1	0
Select Hours / Minutes of Rotation	**general parameters**	Hours/ Minutes	Hours
Rotation's Type	**general parameters**	Cyclic / Running Hours	Cyclic
Rotation Cycle Test	**general parameters**	1 / 10	0
Rotation Cycle Time	**general parameters**	1 / 168	0
Fan start delay time	**time**	0 / 999	10 sec.
Fan stop delay time	**time**	0 / 999	20 sec.
Integration time	**time**	0 / 9999	600 sec.
3 point valve opening time	**time**	0 / 9999	180 sec.
Low pressure alarm delay	**time**	0 / 9999	180 sec.
Probe alarm delay (temperature, humidity, outlet water)	**time**	0 / 9999	600 sec.
Air flow controller alarm delay	**time**	0 / 9999	10 sec.
Delay between 2 capacity controller start	**time**	0 / 9999	10 sec.
Delay between different resistance start	**time**	0 / 9999	3 sec.

11.   ALARM MANAGEMENT

Every state of alarm is signalled:
- acoustically by the buzzer incorporated into the pCO relay card;
- visually by the LED lighting of the ALARM button
It is possible to recall a message relative to an alarm occurred by pressing the *ALARM* button. *To rearm the alarms merely press the ALARM button when an alarm window is displayed.*

The alarms are divided into three categories:

	LED signalling	Window signalling	Remote signalling	Stops the unit	Stops the device
Serious alarms	yes	yes	yes	yes	yes
Device alarms	yes	yes	yes	no	no
Signalling alarms	yes	yes	yes	no	no

ALARM	V	C1	C2	R1	R2	V1	V2	V3P1	V3P2	REARM	DELAY	ONLY VIS	HUMID.	NOTES
compressor 1 general		yes								man.	imm.			
general compressor 2			yes							man.	imm.			
low pressure 1		yes								man.	imm.			
low pressure 2			yes							man.	imm.			
air flow controller	yes	yes	yes	yes	yes	yes	yes	yes	yes	man.	imm.		yes	
fan general	yes	yes	yes	yes	yes	yes	yes	yes	yes	man.	imm.		yes	
resistance 1thermal			yes							man.	imm.			
resistance 2 thermal				yes						man.	imm.			
fire / smoke	yes	yes	yes	yes	yes	yes	yes	yes	yes	man.	imm.		yes	
air filter										man.	imm.	yes		
high temperature										man.	imp.	yes		
low temperature										man.	imp.	yes		
high humidity										man.	imp.	yes		
low humidity										man.	imp.	yes		
outlet water high temperature										man.	imp.	yes		
outlet water low temperature										man.	imp.	yes		
comp1working hours										man.	imm.	yes		
comp2 working hours										man.	imm.	yes		
fan working hours										man.	imm.	yes		
ambient temperature probe out of order										man.	1 MIN.	yes		
outlet water probe out of order										man.	1 MIN.	yes		
inlet water temp. probe or external air out of order										man.	1 MIN.	yes		
delivery air temperature probe out of order										man.	1 MIN.	yes		
humidity probe out of order										man.	imm.	yes		
high curr. in the humidifier										man.	imm.		yes	
absence of water in the humidifier										man.	20 MIN	yes		LOAD
current failure to the humidifier										man.	imm.		yes	UNLOAD
clock card failure										man.	imm.	yes		

12.   USER INTERFACE

The user interface of this application is divided into three fundamental parts:

-A USER part, not protected by password, which allows monitoring the quantities being regulated, selecting the set-point of principal control, displaying the active alarms and the stored alarms.

- A USER part, protected by password, which allows selecting all the control parameters of the various functions and processes managed by the program: set-point limits, regulation differential , regulation dead zone, compensation.....; only the parameters regarding functions enabled under manufacturer's password will be displayed and consequently selectable.

-An ASSISTANCE part , protected by password , intended for the assistance, for the hour counter management of the compressors and machine , for the calibration of the connected probes and for forcing of the relay outputs.

-A MANUFACTURER part , protected by Password , enables the configuration of the system with the selection and activation of the functions of the devices to be controlled.

12.1.   KEYPAD

The pCO is equipped with a 15-button keypad that along with the display represents the interface between the operator and the pCO system. The keypad provides the operator with the following functions:

ON / OFF button	Energises and deenergizes the unit. The unit has to be switched on by this button in order to carry out any control, verification or operation. (See Regulation ON/OFF)
ALARM button	The pressure of this button displays the first active alarm window and simultaneously it switches off the buzzer. A second pressure of this button reactivates the alarm or the active alarm. The display of several alarm masks can be obtained by pressing the UP / DOWN arrow buttons. If there are no active alarms in storage, by pressing this button you go to the window NO ACTIVE ALARM.(See the regulation of the Alarms)
▲▼ buttons	These buttons have a double functionality: 1) Scrolling of the mask branches; when the cursor is on the upper left 2) Increasing and decreasing the parameters or changing the values, when the cursor is at the beginning of the parameter.
ENTER button	In the value pre-setting masks, by pressing the button the first time, the cursor goes to the first parameter of the window. When pressing again, the selected parameter is confirmed and the cursor moves to the following parameter. Afterwards, from the last parameter you return to the **position on the upper left** (cursor in the 0.0 position of the display)
MENU button	Go to the MAIN_MASK window
INFO button	Go to the next pCO-boards
MANUT button	Go to the M_VIS_TIMER1 window
PRINT button	Usable in the version with printer
I/O button	Go to the M_SYNOPTIC1 window
HOUR button	Go to the M_REG_CLOCK window
SET button	Go to the M_CALC_SETP window
PROG button	The password is requested. If properly introduced, you move to the M_PARAM_USER3 window
MENU+PROG buttons	The buttons must be pressed and released simultaneously. The password is requested. If properly introduced, you move to the M_MANUF_PASS window

12.2.   LED

At the side of each button a green LED is found which lights up when the associated button is being pressed and indicates in which group of masks the user is situated.

Three other LEDs are placed under the rubber buttons and indicate respectively:

1.   ON / OFF button   green LED
                                        indicates that the instrument is ON and operating.

2.   ALARM button   red LED
                                        indicates the presence of an alarm condition.

3.   ENTER button   yellow LED
                                        Indicates that the instrument is properly supplied.

13. TREE OF THE MASKS

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START
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
º                 º        Appears when the pCO is switched on
º-- WAIT  PLEASE --º       Remains visible for about 5 seconds
º-- READING INPUTS --º     and is used as a warning to wait for the
º                 º        machine to be initialised
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
MENU BUTTON
MAIN_MASK
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Displays the current working modes
º00:00 00/00/00 Unit1º     of temperature and humidity.
ºRoom temp.   00.0 §Cº
ºRoom humid.  00.0%  º
º                 º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
WORK_MODE
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Displays the current working
º    Working mode     º    mode. The blackened box
º                 º        means that the specific
ºÛ Cooling Û Heating º      function at issue is now activated
ºÛ Humid.   Û Dehumid. º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
MAINTENANCE BUTTON
M_VIS_TIMER1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Shows the operating time of the equipment's
ºOperating hours:    º
ºMain fan      000000º
ºCompressor 1  000000º
ºCompressor 2  000000º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MAINT_PASS
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
ºEnter maintenance   º
ºpassword            º
º          0000      º
ºRight password!     º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SEL_TIMER1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Pre-setting of the fan time operating time
ºMain fan hour meter º      established before the maintenance
º                 º
ºThreshold: 000x1000 º
ºReq.reset: N 000000 º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SEL_TIMER2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
ºCompressor 1 hour   º
ºmeter               º
ºThreshold:: 000x1000º
ºReq.reset: N 000000 º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SEL_TIMER3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
ºCompressor 2 hour   º
ºmeter               º
ºThreshold:: 000x1000º
ºReq.reset: N 000000 º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_CALIBRATION1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Probe calibration window no.1
ºProbe adjustment:   º
ºRoom temp.:   0.0§C º
ºSupply air:  0.0§C  º
ºOut water:   0.0§C  º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_CALIBRATION2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Probe calibration window no.2
ºProbe adjustment:   º
ºInlet water: 0.0 §C º
ºRoom humid.:0.0 %   º
º                 º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUAL1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Manual activation of the devices
ºManual procedure:   º
º                 º
ºMain fan:     N     º
ºEnergy saving    N  º
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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M_MANUAL2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°Manual procedure:   °
°                    °
°Dehumidifier     N °
° Humidifier      N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUAL3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°Manual procedure:   °
°                    °
°Open cool.fl.v.  N °
°Close cool.fl.v. N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUAL4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°Manual procedure:   °
°                    °
°Unloader 1       N °
°Unloader 2       N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUAL5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°Manual procedure:   °
°                    °
°Open heat.fl.v.  N °
°Close heat.fl.v. N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M _MANUAL6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°Manual procedure    °
°                    °
°Cool. valve N 00.0 V°
°Heat. valve N 00.0 V°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DISABLE_HUMID
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
° Integr. humidifier °          Integrated humidifier disabling
°Disable humid.   N °          Manual drainage activation(maximum 120 sec.)
°Manual drain     N °
°Manual drain     N °
°(120 sec of timeout)°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
PRINTER BUTTON
M_PRINTER
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
° Printer management °
°Cyclic print   000 h°          Time interval for the cyclic print
°Immediate print of  °          Activation /forcing of a print
°unit report      N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
I/O BUTTON
M_SYNOPTIC1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°    Analog inputs   °          Displays the state of the analog inputs and outputs
°Room Temp.   00.0 §C°          It is displayed with the I/0 button
°Supply air  -00.0 §C°
°Room humid. -00.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°    Analog Inputs   °
°Inlet water -00.0 §C°
°Outlet water-00.0 §C°
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°   Digital inputs   °
°C=Close  0=0pen     °
°01:CCCCC 06:CCCCC   °
°11:CC               °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above
°   Analog outputs   °
°                    °
°Cooling valve 00.0 V°
°Heating valve 00.0 V°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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M_SYNOPTIC5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°  Digital outputs   °
°C=Close  0=Open     °
°01: 000    04: 000  °
°07: 000    10: 00   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            As above
°      Humidifier    °
°Main switch    OFF  °
°Fill valve     OFF °
°Drain valve    OFF  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC7
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            Current absorbed by the humidifier
°      Humidifier    °            Current to be maintained
°Measur. Amps 000. 00 A°          Maximum current allowed by the cylinder
°Target Amps 000. 00 A°
°Nomin. Amps 000. 00 A°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC8
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            As above
°      Humidifier    °
°                    °
°Wat. level open     °
°Conduct.   0000 uS/Cm°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SYNOPTIC9
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            As above
°      Humidifier    °
°Cyl. worn out     N °
°Mode      ---------°
°Status h.  ---------°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_VERSION
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°CONTROLLER STANDARD °  Current version of the software.
°CLOSE CONTROL UNITS °
°  Code EPSTDECZUB   °
°Ver. 1. 312 - 04/06/98°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
CLOCK BUTTON
M_REG_CLOCK
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            Regulation of the internal clock
°    Clock & date    °            (it is necessary to mount the watch card)
°Setting             °
°Time      00: 00    °
°Date      00/00/00  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_CLOCK_PASS
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Enter the clock     °
°password            °
°           0000     °
°Right password      °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY_TEMP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            Enabling of the automatic operation with
°Daily time zone with°            change of the temperature set-point
°automatic temper.   °
°set-point variation °
°            N       °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY1_TEMP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»            Pre-setting of the time band no. 1
°    Temperature     °            The time band starting hour
°Daily time zone 1   °            and the relevant temperature set-point
°Start time  00: 00  °            will be selected.
°Set-point     00. 0§C°           The time band ending will be the
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼            beginning of the following one.
M_DAILY2_TEMP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°    Temperature     °
°Daily time zone 2   °
°Start time  00: 00  °
°Set-point     00. 0§C°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY3_TEMP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°    Temperature     °
°Daily time zone 3   °
°Start time  00: 00  °
°Set-point     00. 0§C°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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M_DAILY4_TEMP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°    Temperature       °
°Daily time zone 4     °
°Start time  00:00     °
°Set-point    00.0 §C°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY_HUMID
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Enabling of the automatic operation with change of the
°Daily time zone with°        humidity set-point
°automatic humidity   °
°set-point variation  °
°               N      °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY_HUMID1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Time band no.1 pre-setting
°     Humidity         °        The band hour-start and the relevant humidity
°Daily time zone 1     °        set-point will be preset.
°Start time  00:00     °        The end of the time band will be the start of the
°Set-point    000.0 %°        following  one.
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY_HUMID2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°     Humidity         °
°Daily time zone 2     °
°Start time  00:00     °
°Set-point    000.0 %°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY_HUMID3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°     Humidity         °
°Daily time zone 3     °
°Start time  00:00     °
°Set-point    000.0 %°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DAILY_HUMID4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°     Humidity         °
°     Humidity         °
°Daily time zone 4     °
°Start time  00:00     °
°Set-point    000.0 %
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
SET BUTTON
M_CALC_SETP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Displays the values of the
°Actual set-points     °        active set-points.
°Temperature  00.0 §C°        (if the functions are active   of time
°Humidity    000.0 % °        and temperature compensation and
°                      °        humidity or compensation)
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_SELECT_SETP
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Change of the set-points.
°Set-points            °        The values must be included within the limits
°Temperature  00.0 §C°        being preset
°Humidity    000.0 % °        in the M_PARAM_USERx masks
°                      °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
PROG BUTTON
M_SERV_PASS
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Enter the service     °
°password              °
°              0000    °
°Right password        °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Presetting of the temperature set-point limits.
°Temperature setpoint°
°limits                °
°Minimum     00.0§C  °
°Maximum     00.0 §C°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Presetting of the humidity set-point limits
°Humidity setpoint     °
°limits                °
°Minimum    000.0 % °
°Maximum    000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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M_PARAM_USER3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Presetting of the proportional band
°    Temperature     °          and of the neutral zone for the temperature
°Band         00.0§C °          regulation.
°Neutral zone 00.0§C °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°      Humidity      °
°Band       00.0 %   °          Humidity proportional band
°Production 00.0 kg/h°          Maximum preset production
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Automatic start enabling after voltage drop.
°Automatic restart   °
°after power fail. N  °
°Remote on/off        °          Enabling / disabling On/Off remote
°enabled          N   °          (from digital input)
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Presetting of the offset parameter
°Offset energy       °          energy saving
°saving      00.0 §C °
°                    °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER7
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Enabling of the temperature set-point compensation
°Compensation        °
°enabled         N   °
°                    °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER8
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Parameters for the compensation
°Compensation        °
°Setpoint    00.0 §C °
°Band        00.0 §C °
°Offset      00.0 §C °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER9
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Values that limit the temperature range
°Room temperature    °
°alarms              °          Value to be subtracted from the temperature set-point
°Offset low   00.0 §C°          Value to be added to the temperature set-point
°Offset high  00.0 §C°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER10
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          As above for the humidity
°Room humidity       °
°alarms              °
°Offset low  000.0 % °
°Offset high 000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER11
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Values within which the outlet water temperature has to
°Outlet water temp.  °          be maintained
°thresholds alarms   °
°Low          00.0 §C°
°High         00.0 §C°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER12
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Address for the serial connection
°Identific. address  °          to an external supervisory system
°for supervisor      °
°system network   000°
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PARAM_USER13
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          New user password presetting
°Enter new service   °
°password            °
°             0000   °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
MENU+PROG BUTTON
M_MANUF_PASS
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Enter manufacturer  °
°password             °
°          0000       °
°Right password       °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_MENU
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»   Submenu of the manufacturer's branch.
°Unit configuration  °   To preset the item being requested
°General parameters  °   you move downwards with arrow and
°Timing              °   and presetting is made with ENTER
°Unit initializat.   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          The devices present in the machine are enabled
°Clock board      N °
°Printer          N °
°Supervisor board N °
°                   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°Supply air temper.  °
°probe enabled    N °
°Outlet water temper.°
°probe enabled      N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°External air temper.°
°probe enabled    N °
°Inlet water temper. °
°probe enabled    N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°Room humidity       °
°probe enabled    N °
°Integr. humidifier  °
°enabled          N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°Energy saving    N °
°Heaters no.      0 °
°Compressors no.  0 °
°Unloader comp.   N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  As above
°Cooling valve    N °
°Heating valve    N °
°Cooling fl.valve N °
°Heating fl.valve N °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_CONF7
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»  Select if the unit will work in Rotation
°Unit Configuration  °          (Auto Sequence) or indipendently (Stand-Alone)
°                    °
°   AUTO SEQUENCE    °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_PARAM1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Compresser with     °          In this window, if at least one
°valve in            °          compressor is installed, it is specified
°energy saving    N °          if the valve will be operating in energy saving
°                    °          with the compressors
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_PARAM2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          I two compressors are installed,
°Temp.regulation  P °          operation in rotation of the compressors;
°Rotation comp.   N °          no. of compressors for the dehumidification;
°Comp.per dehumid.0 °          capacity control logic: Normally Closed or
°Logic unloader  N.C.°          Normally Open.  The regulation
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼          proportional(P) or proportional +integral(P+I)
```

```
M_MANUF_PARAM3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»          Logic of the dehumidification relay
°Logic               °
°dehumidific.   N.O.°
°                    °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
M_MANUF_PARAM4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step compressor 1    °
°without energy sav.  °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
Position of the steps with respect to the proportional band. To better understand the function go to the paragraph "Concept of step", see "regulation graphs"

```
M_MANUF_PARAM5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step compressor 2    °
°without energy sav.  °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step unloader 1      °
°without energy sav.  °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM7
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step unloader 2      °
°without energy sav.  °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM8
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step compressor 1    °
°with energy saving   °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
Parameters relevant to the position of the compressors, capacity controls with energy saving.
See "Unit with a compressor in energy saving"

```
M_MANUF_PARAM9
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step compressor 2    °
°with energy saving   °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM10
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step unloader 1      °
°with energy saving   °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM11
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step unloader 2      °
°with energy saving   °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM12
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step heater 1        °
°                     °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
Presetting of of the step relevant to the resistance heating. See paragraph "Concept of step"

```
M_MANUF_PARAM13
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step heater 2        °
°                     °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM14
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Step heater binary   °
°control              °
°Position    000.0 % °
°Hysteresis  000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

```
M_MANUF_PARAM15
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Cooling 0/10V valve  °
°                     °
°Begin       000.0 % °
°End         000.0 % °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
Parameters for the regulation of the 0/10V modulating cooling valve type. The operating features are described in the paragraph "Temperature regulation graphs"

```
M_MANUF_PARAM16
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°Heating 0/10V valve °
°                    °
°Begin      000.0 %  °
°End        000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM17
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Parameters for the three-point modulating
°Cooling 3p valve    °      valve. See " Temperature regulation graphs"
°                    °
°Begin      000.0 %  °
°End        000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM18
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°Heating 3p valve    °
°                    °
°Begin      000.0 %  °
°End        000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM19
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Humidification step regulation.
°Step humidification °      See "HUMIDITY CONTROL GRAPHS"
°                    °
°Position   000.0 %  °
°Hysteresis 000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM20
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Humidification step regulation.
°Step dehumidific.   °      See "HUMIDITY CONTROL GRAPHS"
°                    °
°Position   000.0 %  °
°Hysteresis 000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM21
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Dehumidification stop step.
°Low temperature     °      See "HUMIDITY CONTROL GRAPHS"
°limit (stop dehum.) °
°Position   000.0 %  °
°Hysteresis 000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM22
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Dehumidification stop step.
°High temperature    °      See "HUMIDITY CONTROL GRAPHS"
°limit (stop dehum.) °
°Position   000.0 %  °
°Hysteresis 000.0 %  °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM23
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Parameters for the identification of
°Nomin. prod. 00 kg/h°     humidifier type
°Voltage    000 V    °
°Phase number  1     °
°TAM model     050   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM24
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Enabling of the drain without voltage
°Enable drain without°
°voltage          N  °
°Parameter C0   0000 °      CAREL PARAMETER 0(see paragraph Integrated humidifier control)
°Parameter C1   0000 °      CAREL PARAMETER 1
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM25
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°                    °
°Units Number     0  °      Select total Unit's number engaged for rotation
°                    °
°Sequence Reset   N  °      Rotation's Reset and restart
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM26
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Select Hour/Minute  °      Select rotation cycle: Hours (normal) or Minutes (test)
°   HOUR             °
°Rotation Type       °      Rotation can be cyclic (1, 2, 3, 1, 2...) or depending
°   NORMAL           °      by the unit who have the major amount of Running Hours
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_PARAM27
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Test Change Over P. °      Select minutes number for Rotation test
°    00 minutes      °
°Change Over Period  °      Select Rotation hours
°    000 hours       °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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M_MANUF_TIME1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Fan start time delay»
°Time delay switching°
°main fan on  000 sec°        Fan stop time delay°
°Time delay switching°
°main fan off 000 sec°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ


M_MANUF_TIME2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»       Constant for the temperature control
°Integral time       °        proportional + integral.
°(only P+I)  0000 sec°        Three point modulating valve opening time
°Float. valve running°
°time        0000 sec°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_TIME3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Low pressure alarm delay. Starts when the
°Low pressure alarm  °        compressor starts.
°delay time  0000 sec°        high /low humidity alarm delay
°Temperature alarm   °
°delay time  0000 sec°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_TIME4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Air flow controller acquisition delay
°Air flow alarm delay°
°time        0000 sec°
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_TIME5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Compressor timing
°Minimum compressor  °
°off time    0000 sec°
°Minimum compressor  °
°on time     0000 sec°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_TIME6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        As above
°Delay between starts°
°same comp.  0000 sec°
°Delay between starts°
°diff. comp. 0000 sec°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_MANUF_TIME7
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Resistance timing
°Delay between starts°
°two unload. 0000 sec°
°Delay between starts°
°diff. heat. 0000 sec°
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_DEFAULT
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        Storage loading of the factory values
°Press key ENTER to  °        See table "PROGRAMMABLE SETS"
°insert manufacturer °
°parameters          °
°    WAIT PLEASE      °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
M_PASS_MANUF
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°Enter new           °
°manufacturer        °
°password       0000  °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
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14. ALARMS:

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AL_1
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        High pressure alarm or thermal
°AL01  00:00 00/00/00°        of the compressor  number 1.
°     Compressor 1   °
°     General Alarm  °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_2
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»        High pressure alarm or thermal
°AL02  00:00 00/00/00°        of the compressor  number 2.
°     Compressor 2   °
°     General Alarm  °
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_3
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL03  00:00 00/00/00°
°     Low Pressure   °
°Circuit 1 Pressostat°
°                    °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

```
AL_4
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL04  00:00 00/00/00°
°     Low Pressure    °
°Circuit 2 Pressostat°
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_5
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL05  00:00 00/00/00°
°   Air Flow Alarm    °
°   (serious alarm)   °
°        UNIT OFF     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_6
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL06  00:00 00/00/00°
° Main Fan Overload   °
°   (serious alarm)   °
°        UNIT OFF     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_7
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL07  00:00 00/00/00°
°                     °
° Heater 1 Overload   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_8
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL08  00:00 00/00/00°
°                     °
° Heater 2 Overload   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_9
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL09  00:00 00/00/00°
°Fire or Smoke Alarm °
°   (serious alarm)   °
°        UNIT OFF     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_10
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL10  00:00 00/00/00°
°   Air Filter Alarm  °
°                     °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_11
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL11  00:00 00/00/00°
°      High Room      °
° Temperature Alarm   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_12
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL12  00:00 00/00/00°
°       Low Room      °
° Temperature Alarm   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_13
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL13  00:00 00/00/00°
°      High Room      °
°    Humidity Alarm   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_14
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL14  00:00 00/00/00°
°       Low Room      °
°    Humidity Alarm   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_15
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL15  00:00 00/00/00°
° High Outlet Water   °
° Temperature Alarm   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
AL_16
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL16  00:00 00/00/00°
°  Low Outlet Water   °
° Temperature Alarm   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_17
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL17  00:00 00/00/00°
°    Compressor 1     °
°   Operation Hour    °
°        Alarm        °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
The operating threshold
preset in the mainutenance branch has been
exceeded

AL_18
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL18  00:00 00/00/00°
°    Compressor 2     °
°   Operation Hours   °
°        Alarm        °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

AL_19
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL19  00:00 00/00/00°
°       Main Fan      °
°   Operation Hours   °
°        Alarm        °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```
As above

AL_20
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL20  00:00 00/00/00°
°  Room Temperature   °
°Probe Faulty or not  °
°       Connected     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_21
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL21  00:00 00/00/00°
° Outlet Water Temp. °
°Probe Faulty or not  °
°       Connected     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_22
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL22  00:00 00/00/00°
°Inlet water temp.    °
°Probe Faulty or not  °
°       Connected     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_23
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL23  00:00 00/00/00°
°  Supply Air Temp.  °
°Probe Faulty or not  °
°       Connected     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_24
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL24  00:00 00/00/00°
°   Room Humidity     °
°Probe Faulty or not  °
°       Connected     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_25
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL25  00:00 00/00/00°
°       Alarm E06     °
°     High Current    °
° in the Humidifier   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_26
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL26  00:00 00/00/00°
°       Alarm E09     °
°    Lack of Water    °
° in the Humidifier   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_27
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL27  00:00 00/00/00°
°       Alarm E10     °
°   Lack of Current   °
° in the Humidifier   °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_28
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL28  00:00 00/00/00°
°     Clock Board     °
°    Faulty or not    °
°       Connected     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

AL_29
```
ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
°AL29  00:00 00/00/00°
°    EEPROM Faulty    °
°   Call Assistance   °
°                     °
ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
```

15. DATABASE OF THE SUPERVISOR

The variables reported below will be transmitted between pCO and supervisor only if all the following conditions will be met:
- the serial card is inserted into the proper connector that is found on the interface
- the supervisory function is enabled in the M_MANUF_CONF1.window protected by manufacturer's password
- the address of the unit is properly select with reference to the supervisory network in the M_PARAM_USER12 window protected by user password.
- the equipments have been correctly connected to the network (supervisor and pCO)

15.1. Digital variables

Address	Description	Type	Communication type
1	Compressor 1 general alarm digital input	Digital	Reading
2	Compressor 2 general alarm digital input	Digital	Reading
3	Pressure controller 1 low pressure circuit digital input	Digital	Reading
4	Pressure controller 2 low pressure circuit alarm digital input	Digital	Reading
5	Air filter alarm digital input	Digital	Reading
6	Fan thermal alarm digital input	Digital	Reading
7	Air flow controller alarm digital input	Digital	Reading
8	ON/OFF remote	Digital	Reading
9	Resistance 1 thermal alarm digital input	Digital	Reading
10	Resistance 2 thermal alarm digital input	Digital	Reading
11	fire / smoke alarm digital input	Digital	Reading
12	Dehumidification	Digital	Reading
13	ON /OFF unit	Digital	Reading
14	Energy saving	Digital	Reading
15	Humidification / Humidification power contact	Digital	Reading
16	Compressor 1 capacity control / Integrated humidifier loading	Digital	Reading
17	Compressor 2 capacity control / Integrated humidifier unloading	Digital	Reading
18	3p cold valve opening contact	Digital	Reading
19	3p cold valve closing contact	Digital	Reading
20	3p warm valve opening contact	Digital	Reading
21	3p warm valve closing contact	Digital	Reading
22	General alarm	Digital	Reading
23	Compressor 1 general alarm	Digital	Reading
24	Compressor 2 general alarm	Digital	Reading
25	Circuit 1 low pressure pressure-controller alarm	Digital	Reading
26	Circuit 2 low pressure pressure-controller alarm	Digital	Reading
27	Air flow controller alarm	Digital	Reading
28	Fan thermal alarm	Digital	Reading
29	Resistance 1 thermal alarm	Digital	Reading
30	Resistance 2 thermal alarm	Digital	Reading
31	Fire / smoke alarm	Digital	Reading
32	Air filter alarm	Digital	Reading
33	Ambient high temperature alarm	Digital	Reading
34	Ambient low temperature alarm	Digital	Reading
35	Ambient high humidity alarm	Digital	Reading
36	Ambient low humidity alarm	Digital	Reading
37	Compressor 1 operating time alarm	Digital	Reading
38	Compressor 2 operating time alarm	Digital	Reading
40	Fan operating time alarm	Digital	Reading
43	Outlet water high temperature alarm	Digital	Reading
44	Outlet water low temperature alarm	Digital	Reading
45	Ambient temperature probe failure alarm	Digital	Reading
46	Air supply temperature probe failure alarm	Digital	Reading
47	Outlet water temperature probe failure alarm	Digital	Reading
48	External air temperature probe disconnection alarm	Digital	Reading
49	Humidity probe failure alarm	Digital	Reading
51	E²PROM failure alarm	Digital	Reading
53	Temperature regulation type	Digital	Writing / Reading
55	Humidity probe enabling	Digital	Writing / Reading
56	Outlet water probe enabling	Digital	Writing / Reading

Address	Description	Type	Communication type
57	External water probe enabling	Digital	Reading
58	Inlet water probe enabling	Digital	Writing / Reading
59	Supply air probe enabling	Digital	Writing / Reading
60	Binary combination resistance enabling	Digital	Reading
61	Cold modulating valve 0/10V enabling	Digital	Writing / Reading
62	Energy saving enabling	Digital	Writing / Reading
63	Enabling of simultaneous operation of compressors with 0/10V valve	Digital	Writing / Reading
64	Warm 0/10V modulating valve enabling	Digital	Writing / Reading
65	Capacity control enabling	Digital	Writing / Reading
66	Compressor rotation enabling	Digital	Writing / Reading
67	Compressor 1dehumidification enabling	Digital	Reading
68	Compressor 2 dehumidification enabling	Digital	Reading
71	Temperature time band enabling	Digital	Writing / Reading
73	ON/OFF from supervisor enabling	Digital	Writing / Reading
74	3p cold valve enabling	Digital	Reading
75	3p warm valve enabling	Digital	Reading
76	Manual procedure enabling	Digital	Reading
77	Alarm-stopped machine alarm	Digital	Reading
78	Humidity time band enabling	Digital	Writing / Reading
80	High current in the humidifier alarm	Digital	Reading
82	Water absence in the humidifier alarm	Digital	Reading
83	No current in the humidifier alarm	Digital	Reading
90	Integrated humidifier enabling	Digital	Reading
100	Supervisor internal variable for version check	Digital	Reading

15.2. Whole variables

Address	Description	Type	Communication type
10	Cold 0/10V valve ramp start	Whole	Writing / Reading
11	Cold 0/10V valve ramp end	Whole	Writing / Reading
12	Warm 0/10V valve ramp start	Whole	Writing / Reading
13	Warm 0/10V valve ramp end	Whole	Writing / Reading
16	Compressor 1 step without energy saving	Whole	Writing / Reading
17	Compressor 1 hysteresis without energy saving	Whole	Writing / Reading
18	Compressor 2 step without energy saving	Whole	Writing / Reading
19	Compressor 2 hysteresis without energy saving	Whole	Writing / Reading
22	Compressor 1 step with energy saving	Whole	Writing / Reading
23	Compressor 1 hysteresis with energy saving	Whole	Writing / Reading
24	Compressor 2 step with energy saving	Whole	Writing / Reading
25	Compressor 2 hysteresis with energy saving	Whole	Writing / Reading
26	Time interval between same compressor switching on	Whole	Writing / Reading
28	Low pressure delay alarm	Whole	Writing / Reading
29	Stop minimum time	Whole	Writing / Reading
30	Time interval between different compressor switching on	Whole	Writing / Reading
31	Resistance no.	Whole	Writing / Reading
32	Compressor no.	Whole	Writing / Reading
33	High / low temperature / humidity alarm delay	Whole	Writing / Reading
34	Resistance switching on time interval	Whole	Writing / Reading
38	Capacity control 1 step without energy saving	Whole	Writing / Reading
39	Capacity control 1 hysteresis without energy saving	Whole	Writing / Reading
40	Capacity control 2 step without energy saving	Whole	Writing / Reading
41	Capacity control 2 hysteresis without energy energy saving	Whole	Writing / Reading
44	Capacity control 1 step saving	Whole	Writing / Reading
45	Capacity control 1 hysteresis with energy saving	Whole	Writing / Reading
46	Capacity control 2 step with energy saving	Whole	Writing / Reading
47	Capacity control 2 hysteresis with energy saving	Whole	Writing / Reading
48	Integration time	Whole	Writing / Reading
50	Fan operation time limit	Whole	Writing / Reading
51	Compressor 1 operation time limit	Whole	Writing / Reading
52	Compressor 2 operation time limit	Whole	Writing / Reading
54	Cold 3p valve ramp start	Whole	Writing / Reading

Address	Description	Type	Communication type
55	Cold 3p valve ramp end	Whole	Writing / Reading
56	Warm 3p valve start ramp	Whole	Writing / Reading
57	Warm 3p valve end ramp	Whole	Writing / Reading
58	3p valve complete opening time	Whole	Writing / Reading
59	Fan switching on delay	Whole	Writing / Reading
61	Cold valve ramp limit	Whole	Reading
62	Warm valve ramp limit	Whole	Reading
63	Fan operating-hour carried out high part	Whole	Reading
65	Compressor 1 operating-hour carried out high part	Whole	Reading
66	Compressor 2 operating-hour carried out high part	Whole	Reading
67	Fan operating-hour low part	Whole	Reading
68	Compressor 1 operating-hour carried out low part	Whole	Reading
69	Compressor 2 operating-hour carried out low part	Whole	Reading

15.3.   Analog variables

Address	Description	Type	Communication type
1	Ambient temperature	Analog	Reading
2	Ambient humidity	Analog	Reading
3	Outlet water temperature	Analog	Reading
4	External air temperature	Analog	Reading
5	Supply air temperature	Analog	Reading
6	Dead zone in temperature	Analog	Writing / Reading
7	Ambient humidity band	Analog	Writing / Reading
8	Ambient humidity set	Analog	Writing / Reading
9	Low temperature alarm offset	Analog	Writing / Reading
10	High temperature alarm offset	Analog	Writing / Reading
11	Low humidity alarm offset	Analog	Writing / Reading
12	High humidity alarm offset	Analog	Writing / Reading
13	Ambient temperature set	Analog	Writing / Reading
17	Ambient temperature band	Analog	Writing / Reading
18	Water low temperature limit	Analog	Writing / Reading
19	Water high temperature limit	Analog	Writing / Reading

16.   MATERIALS AND CODES

The Standard pCO for Air Conditioning units consists of the following devices:

- user interface :   cod. PCOT000CB0   LCD "4X20"

- eprom :   cod. EPSTD*CZUB
                                               English(E) and Italian(I) versions are available

- pCO relay card:
       - extractable terminals   cod. PCOB000A21
       - fix terminals   cod. PCOB000B21

- interface / main board connection cables :   cod. S90CONN000/1/2

-address board :
       -address + clock + EEPROM 32Kb   cod. PCOCLKMEM0 (necessary for the pCO board n.1)
       -address only   cod. PCOADR0000 (for the other units)

-T connector for terminals :   cod. TCONN6J000

- probes: of different type and code according to request.