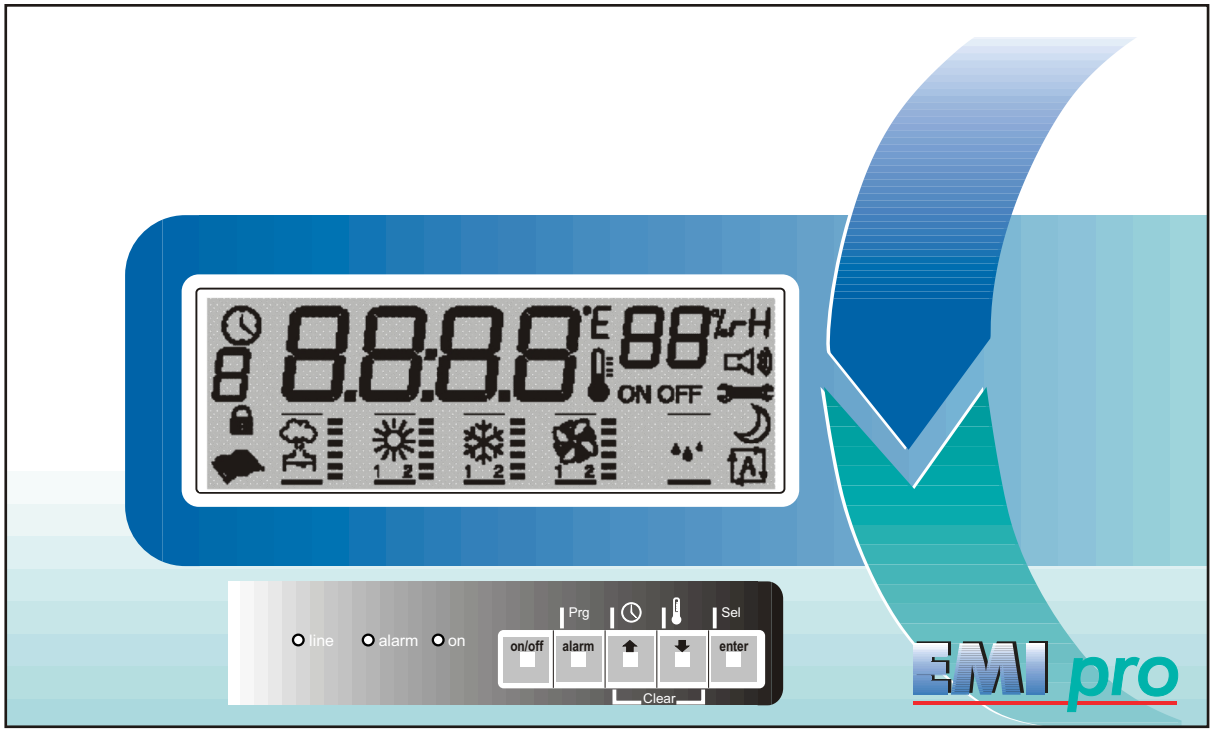
Библиотека СОК

EMICON
HIGH-TECH AIR CONDITIONING AND REFRIGERATION

CE

OPERATION AND MAINTENANCE MANUAL



EMIpro

MICROPROCESSOR

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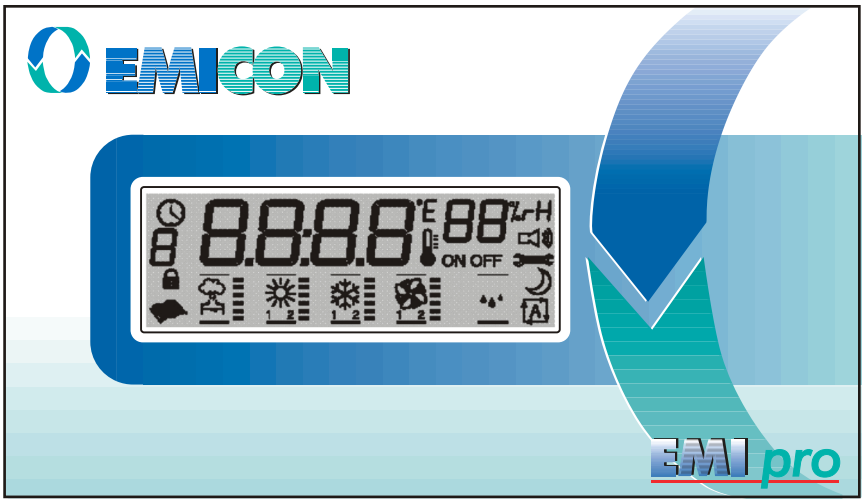
1 - GENERAL CHARACTERISTICS

1.1 General description

The EMIpro is an electronic control for the complete management of precision air-conditioners, both in direct expansion versions (with 1 or 2 compressors), with 1 or 2 heating elements or with batteries (valve on the heating battery and/or valve on the cooling battery).
The control also allows the management of a humidifier and dehumidification with various pre-settable configurations.

2 - EMIPRO USER INTERFACE

The EMIPRO is made up of a display and a power board, see **Picture 2**.



Picture 1

2.1 The display

Picture 2

Picture 2 illustrates all the symbols and the messages shown on the display; this occurs on starting the regulator.

8.8.8.8 Ambient temperature, when programming it displays the value of the parameters

°C - °F Temperature unit of measure: degrees Centigrade/Fahrenheit.

88 Ambient humidity, when programming it displays the no. of the parameters

%rH Relative humidity unit of measure.

Buzzer active.

Hour counter limit exceeded.

OFF status from time bands.

Time bands active.

ON OFF External contact status:
- ON machine enabled;
- OFF machine in stand-by.

Indicates that the value displayed is the temperature (without this symbol the Set-point is displayed)

Time band selected.

Dehumidification active.

Ventilation active (fan speed compared to maximum speed)

1 2

Cooling active:
- number (1 o 2) cooling actuators (opening cooling valve, or **in shelter mode,** opening free cooling damper).

1 2

Heating active:
- number (1 o 2) heating actuators.
- % opening valve.

Humidification active(steam production compared to maximum production).

Programming phase.

- Password setting;
- Parameter modification blocked.

8 Day of the week (in clock mode)

- Clock display;
- Clock Set-up.

2.2 Operating indicators

The main states of the regulator are displayed to the user through 3 Led on the front panel (Picture **3**).

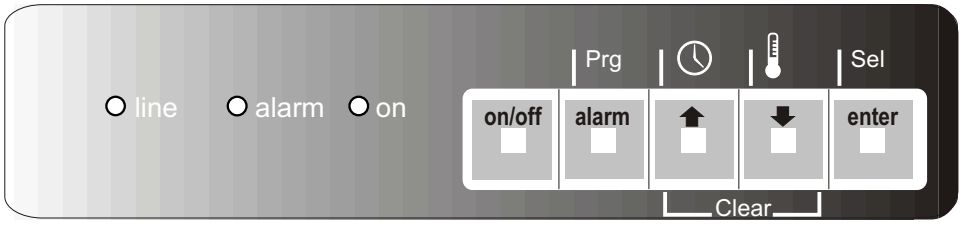
Picture 3

led LINE (yellow): control powered;
led ALARM (red): machine alarm (the siren symbol on the display is on only when the buzzer is active);
led ON (green): machine ON from keypad or supervisor.

The effective ON status of the machine may, in addition, depend on the ON-OFF digital input, on the active time band,the stand-by condition transmitted from the master unit (for units in network), and is indicated by the light of the fan symbol.

The ON-OFF symbols on the display are lighted only when the input of the remote contact is enabled and i indicate the status of such contact.

2.3 The keypad



Picture 4

The buttons have the following meanings:

on/off Commutes status: if the machine is on, one press of the button places it in Standby; vice-versa, it is re-enabled.

alarm Pressed for 5 seconds accesses the User parameters.
In presence of an alarm silences the buzzer.

Repeated pressing displays, cyclically: the current time, date and the temperature of the air in the room.
In programming phase scrolls or increases the value of the parameters.

Held pressed displays the set-point.
In programming phase scrolls or decreases the value of the parameters

enter Pressed for 5 seconds accesses the Direct parameters.

+ Pressed together for 2 seconds reset the alarms.

alarm + **enter** Pressed together for 2 seconds access the Factory parameters.

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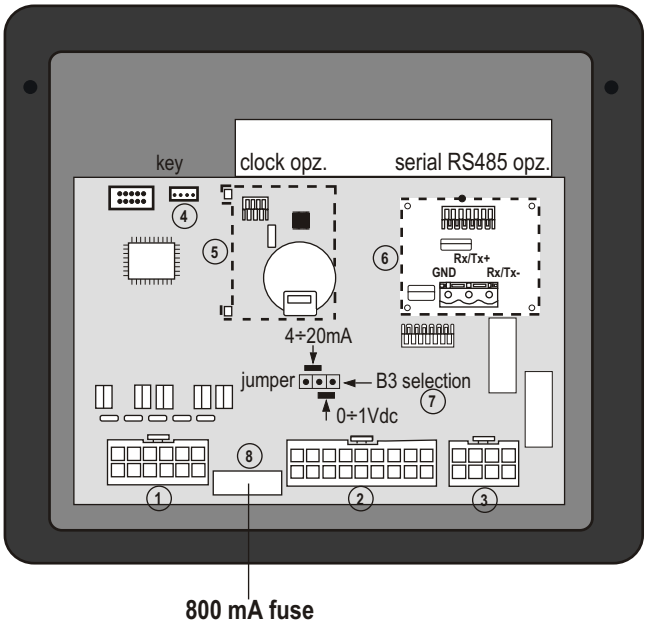
2.4 I/O Card (Input/Output)

Picture 5 depicts the I/O Card.
The I/O Card shows following components:

- Molex connectors (1 - 2 - 3), for carry out the main connections;
- male connector (4),for unloading or copying data;
- prearranged housing (5)for the clock board memory (**optional**);
- prearranged housing (6) for the serial card RS 485 (**optional**);
- jumper (7)for hardware selection of probe B3 (4÷20 mA/ 0÷1 Vdc), with default 0÷1 Vdc;
- protection fuse (8) of 800 mA.



Picture 5

2.5 Meaning of the inputs and outputs

Following table shows the meaning of the inputs and outputs according to the selected machine.

UV=	heat and cool coils locker;
UV warm/cold=	one coil for operating heat and cool locker;
ED=	direct expansion locker;
Shelter=	complete locker with condenser but without humidifier.

The values found between brackets are parameters that can influence the meaning of the input/output examined.

Table 1 - I/O Inputs and outputs

Digital inputs - Connector 2

	UV	UV warm/cold	ED	Shelter
ID1	On/Off remote (HE=1)	On/Off remote (HE=1)	On/Off remote (HE=1)	On/Off remote (HE=1)
ID2	Flow gauge	Flow gauge	Flow gauge	Flow gauge
ID3	Filter dirty	Filter dirty	Filter dirty	Filter dirty
ID4	Heating elements safety	Heating elements safety	Heating elements safety	Heating elements safety
ID5	External alarm/input for rotation of more units (Pb, H2, HA)	External alarm/input for rotation of more units (Pb, H2, HA)	External alarm/input for rotation of more units (Pb, H2, HA)	External alarm/input for rotation of more units (Pb, H2, HA)
ID6	Humidifier alarm (H8=1)	Humidifier alarm (H8=1)	Humidifier alarm (H8=1)	Humidifier alarm (H8=1)
ID7	-	Summer-winter	High pressure C1	High pressure C1
ID8	-	-	Low pressure C1	Low pressure C1
ID9	Water flow alarm(PF=1)	Water flow alarm(PF=1)	High pressure C2 Compressor thermal (H5)	Compressor thermal
ID10	Fan thermal	Fan thermal	Low pressure C2 Fan thermal (H5)	Fan thermal

Analog inputs - Connector 2

	UV	UV warm/cold	ED	Shelter
B1	Return temperature	Return temperature	Return temperature	Return temperature
B2	External air temperature for compensation (/1, Hc)	External air temperature for compensation (/1, Hc)	External air temperature for compensation (/1, Hc) Condensation control (/1, Hc, HB)	External air temperature for free cooling (/1, Hc)
B3	Ambient humidity (/2, Hd)	Ambient humidity (/2, Hd)	Ambient humidity (/2, Hd)	Condensation pressure (/2, Hd, Hb)
B4	Supply temperature (/3=1)	Supply temperature (/3=1)	Supply temperature (/3=1)	Supply temperature (/3=1)

Digital outputs to SSR - Connector 1

	UV	UV warm/cold	ED	Shelter
Out1	Cooling valve opening (H5)	Cooling/heating valve opening (H1, H5)	Compressor 1 (H5)	Compressor
Out2	Cooling valve closing (H5)	Cooling/heating valve closing (H1, H5)	Compressor 2 (H5)	Heating element
Out3	Heating valve opening (H5)	Heating element 1 (H6)	Heating element 1 (H6)	Damper opens (/2, Hc) Damper On/Off
Out4	Heating valve closing (H6)	Heating element 2 (H6)	Heating element 2 (H6)	Camper closes (/2, Hc)
Out5	Supply fan 1	Supply fan 1	Supply fan 1	Supply fan 1

Digital outputs to relay - Connector 3

	UV	UV warm/cold	ED	Shelter
Out6	Alarm (HF)	Alarm (HF)	Alarm (HF)	Alarm (HF)
Out7	Dehumidification/humidific. (HA) Alarm(HA) Rotation (H2) Supply fan 2 (HA=6,7)	Dehumidification/humidific. (HA) Alarm(HA) Rotation (H2) Supply fan 2 (HA=6,7)	Dehumidification/humidific. (HA) Alarm(HA) Rotation (H2) Supply fan 2 (HA=6,7)	Alarm(HA) Rotation (H2) Supply fan 2 (HA=6,7)

Analog outputs - Connector 1

	UV	UV warm/cold	ED	Shelter
Y1	Humidifier control (/2, H8)	Humidifier control (/2, H8)	Humidifier control (/2, H8)	Damper output (/2, Hc)
Y2	Supply fan (Hb)	Supply fan (Hb)	Supply/condensation fan (/1, /2, Hb, Hc)	Condensation fan (/1, /2, Hb, Hc)

3 - PROGRAMMING PARAMETERS AND THEIR MODIFICATION

3.1 Parameters

The parameters are divided into 3 levels, each of them contains the previous, which the user can access to customise the operation of the EMIpro.

Livel	Access
DIRECT (D)	Immediate access
USER (U)	Access with Service Center password
FACTORY (F)	Access with manufacturer password

3.2 Parameters modification

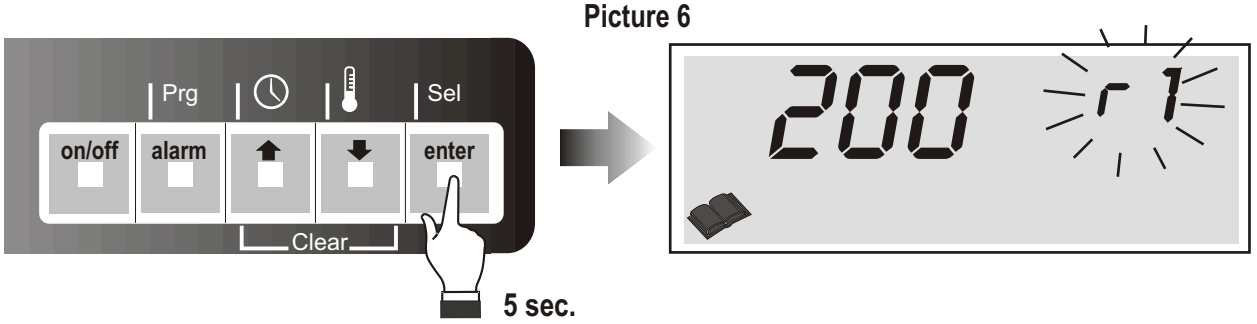
This manual presents Informations how to access and modfy D parameters.
U and F parameters can be modified only by an authorised Service Center or by the manufacturer.

A wrong U and F parameters setting can damage the unit.

3.2.1 Direct parameters (D) modification

Press the button enter for 5 seconds.

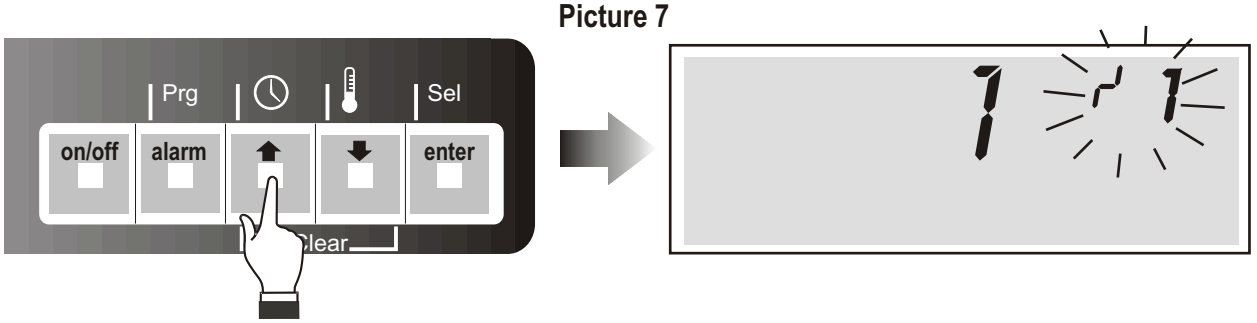
Picture 6



The value of the first accessible parameter is displayed in the upper right, with the parameter code flashing.

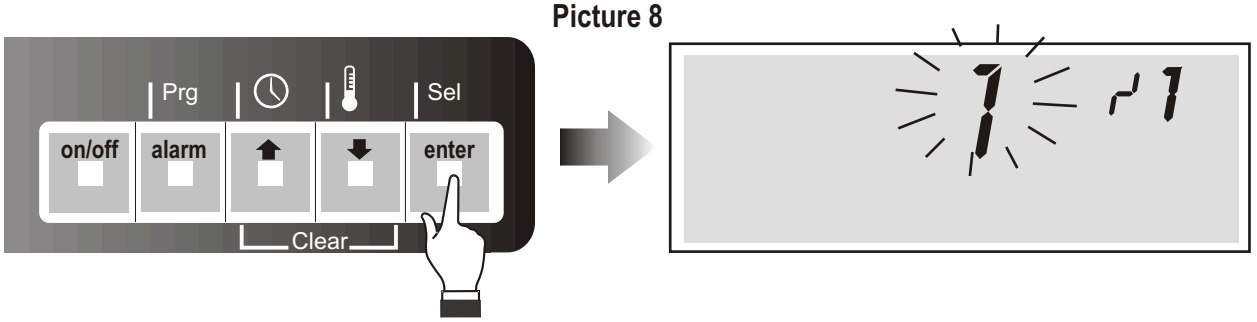
With button and it is possibile to scroll the various parameters.

Picture 7



Once having entered any level of parameters, one pressing of the enter button displays the value, flashing, of the Parameter selected, while the ↑ and ↓ buttons can be used to modify such value.

Picture 8



Press again enter to confirm the new value.

Then, using the ↑ and ↓ buttons, scroll the parameters menu, repeating the previous steps for each parameter to be modified.

Press the alarm button, on the other hand, to store the modifications made.

During all phases of setting the parameters the open book symbol is displayed in the lower left of the display, on the other hand, when setting the password, a lock also appears, confirming the presence of a "block".

The presence of parameters in the various family is subject to the value of some of them:

1) presence of external air probe;
2) presence of humidity probe;
3) presence of supply air probe.

4 - DESCRIPTION AND CONFIGURATION OF THE PARAMETERS

/	Probes	Type	Min.	Max.	U.o.M.	Default	Value
1	Presence external air probe 0 = absent 1 = NTC Carel	F	0	1	flag	0	
2	Type of humidity/pressure/temperature probe B3 0 = absent 1 = 0-1Vdc or 0-20mA 2 = 4-20mA	F	0	2	flag	0	
3	Presence supply air B4 0 = absent 1 = NTC Carel (enable corresponding alarm)	F	0	1	flag	0	
4	Value of humidity/pressure at 0 mA, 4mA or 0Vdc	F	0	/5	%rH bar	0	
5	Value of humidity/pressure at 20mA 0r 1Vdc	F	/4	100	%rH bar	100	
6	Calibration probe B1	U	-6.0 -10.8	6.0 10.8	°C °F	0.0	
7	Calibration probe B2	U	-6.0 -10.8	6.0 10.8	°C °F	0.0	
8	Calibration probe B3	U	-10.0	10.0	%rH bar	0.0	
9	Calibration probe B4	U	-6.0 -10.8	6.0 10.8	°C °F	0.0	
A	Digital filter	U	1	15	-	4	
b	Input limit	U	1	15	-	8	
c	Unit of measure 0=°C 1=°F	U	0	1	flag	0	

r	Regulator	Type	Min.	Max.	U.o.M.	Default	Value
1	Temperature Set Point (summer)	D	rA	rb	°C/°F	20.0	
2	Cooling differential	D	0.1 0.1	11.0 19.8	°C °F	3.0	
3	Heating differential	D	0.1 0.1	11.0 19.8	°C °F	2.0	
4	Temperature dead zone	D	0.1 0.1	20.0 36.0	°C °F	1.0	
5	Humidity Set Point	D	rc	rd	%rH	50	
6	Humidification differential	D	1	20	%rH	4	
7	Dehumidification differential	D	1	20	%rH	3	
8	Humidity dead zone	D	0	20	%rH	2	
9	Temperature Set Point (winter)	D	rA	rb	°C/°F	18.0	
A	Minimum temperature set point (also for compensation)	U	-20 -4	rb	°C °F	0	
b	Maximum temperature set point (also for compensation)	U	rA	60 140	°C °F	50	
c	Minimum humidity set point	U	0	rd	%rH	0	
d	Maximum humidity set point	U	rc	100	%rH	100	
E	Type of temperature regulation 0=Proportional 1=Proportionl and integral	U	0	1	flag	0	
F	Integration time for Proportional and Integral action	U	10	3600	s	600	
G	Authority (unique for summer/winter) for compensation	U	-2.0	2.0	-	0.5	
H	Set Point compensation on temp. read by B2 (summer)	U	-20 -4	60 140	°C °F	25.0	
i	Set Point compensation on temp. read by B2 (winter)	U	-20 -4	60 140	°C °F	10.0	
L	Free cooling differential	U	0 0	30 54	°C °F	9	
n	Lower supply temperature limit during free cooling	U	-20 -4	30 86	°C °F	5	
o	Reading from probe B2	D	-	-	°C/°F	-	
P	Reading from probe B3	D	-	-	%rH bar	-	
r	Reading from probe B4	D	-	-	°C/°F	-	
t	Time band setting 0 = disabled 1 = fan on minimum with temp. monitoring 2 = On/off	U	0	2	flag	0	

c	Compressor	Type	Min	Max	U.o.M.	Default	Value
1	Minimum ON time	U	0	300	s	60	
2	Minimum OFF time	U	0	900	s	60	
3	Time between 2 start-ups	U	0	900	s	360	
4	ON delay between the 2 compressors	U	0	300	s	30	
5	OFF delay between the 2 compressors	U	0	300	s	0	
6	Compressor rotation 0 = disabled 1 = enabled	F	0	1	flag	0	
7	Delay compressor ON from supply fan start-up	U	0	300	s	20	
8	Hour counter threshold for the compressor 0= disabled	U	0	30000	h	0	
9	Hour counter compressor 1	D	0	30000	h	0	
A	Hour counter compressor 2	D	0	30000	h	0	

F	Fans	Type	Min	Max	U.o.M.	Default	Value
1	Fan operating mode 0 = always ON 1 = proportional speed regulation* 2 = proportional speed regulation**	F	0	2	flag	1	
2	Minimum Triac voltage threshold	F	0	F3	step	35	
3	Maximum Triac voltage threshold	F	F2	100	step	75	
4	Triac pulse width	F	0	15	ms	2	
5	Regulation band for minimum speed or temperature/pressure /4 bar for minimum speed in condensation	U	0 0 /4	F6	% °C/°F bar	0.1	
6	Regulation band for maximum speed or temperature/pressure /5 bar for maximum speed in condensation	U	F5	100 158 /5	% °C/°F bar	100	
7	Minimum output value (higher than F2)	U	0	F8	%	10	
8	Maximum output value (lower than F3)	U	F7	100	%	100	
9	Fan hour counter threshold 0 = disabled	U	0	30000	h	0	
A	Supply fan hour counter	D	0	30000	h	0	
b	Filter hour counter threshold 0 = disabled	U	0	30000	h	0	
c	Filter hour counter	D	0	30000	h	0	
d	Supply fan OFF delay	U	0	900	s	20	
E	Fan pick-up time in condensation	U	0	60	s	4	

* If used in condensation the fan is kept at minimum even below the value of F5.

** If used in condensation the fan is switched off below the value of F5, with an hysteresis of 0.5 bar for pressure or 1°C for temperature

P	Alarm	Type	Min	Max	U.o.M.	Default	Value
1	Flow alarm delay from fan start-up	U	0	250	s	20	
2	Flow alarm delay during operation	U	0	90	s	5	
3	Low pressure alarm delay from compressor ON	U	0	250	s	40	
4	Buzzer activation 0 = OFF, 1-14= min. 15= continuous	U	0	15	min	0	
5	Reset alarms (various configurations)	F	1	5	flag	1	
6	Delta from effective set point for low temperature alarm	U	0	50 / 90	°C / °F	10	
7	Delta from effective set point for high temperature alarm	U	0	50 / 90	°C / °F	10	
8	Delta from set point for low humidity alarm	U	0	50	%rH	20	
9	Delta from set point for high humidity alarm	U	0	50	%rH	20	
A	Alarm delay high/low temperature/humidity on start-up	U	0	150	min	20	
b	Type of management of generic alarm input ID5 0 = no alarm connected 1 = signal only alarm - automatic reset 2 = signal only alarm - manual reset 3 = serious alarm - automatic reset 4 = serious alarm - manual reset 5 = serious alarm - automatic reset also active in stand-by 6 = serious alarm - manual reset also active in stand-by	U	0	6	flag	1	
c	Generic alarm delay	U	0	250	s	60	
d	Return-supply temp. difference for supply temp. alarm	U	0	20 / 36	°C / °F	3	
E	Imput ID4 selection	U	0	1	flag	0	
F	Imput ID9 selection	U	0	1	flag	0	
G	High temperature pre-alarm enabled	U	0	1	flag	0	

H	General	Type	Min	Max	U.o.M.	Default	Value
1	Machine model 0 = ED unit 1 = UV unit 2 = UV unit (Heat/Cold) 3 = shelter	F	0	3	flag	0	
2	No. of machines in rotation 0 = stand-alone machine 1 = 1 unit (master) 2 = 2 units.....6= 6 units	U	0	6	flag	0	
3	Address of unit in rotation	U	1	6	-	1	
4	Rotation time between a series of units 0 = test mode(rotation mode 2 minute)	U	0	250	h	0	

H	General	Type	Min	Max	U.o.M.	Default	Value
5	Operating mode of the 2 "cool" outputs 1 = 1 compressor 2 = compressors on 2 circuits 3 = three-point valve 4 = 2 compressors in binary parallel 5 = 2 compressors in tandem (50+50%)	F	1	5	flag	1	
6	Operating mode of the 2 "heat" outputs 0 = no heating element 1 = 1 heating element 2 = 2 heating elements 3 = three-point valve 4 = 2 heating elements in binary	F	0	4	flag	1	
7	3P valve or damper excursion time	F	0	600	s	150	
8	Presence of humidifier	F	0	1	flag	0	
9	Type of dehumidification 0 = comp. 1 ON 1 = comp. 2 ON 2 = two comp. ON 3 = capacity-controlled cooling ramp 4 = fan speed reduction 5 = action 4+0 6 = action 4+1 7 = action 4+2 8 = action 4+3 9 = no action	F	0	9	flag	0	
A	Function of the dehumidification/humidification relay 0= energised in dehumidification 1 = de-energised in dehumidification 2 = relay for non-serious alarms (follows logic of parameter HF) 3 = output for rotation control 4 = energised in humidification 5 = de-energised in humidification 6 = fan 2 ON in dehumidification 7 = fan 2 OFF in dehumidification	F	0	5	flag	0	
b	Function of output Y2 (phase-cut) 0 = supply fan speed control 1 = condensation fan speed control using B3 2 = condensation fan speed control using B2	F	0	2	flag	0	
c	Function of probe B2 0 = compensation 1 = free-cooling using 0-10V 2 = free-cooling using Out3-Out4 3 = free-cooling ON/OFF with Out3 4 = condensation control	F	0	3	flag	0	

H	General	Type	Min	Max	U.o.M.	Default	Value
d	Function of probe B3 0 = humidity control 1 = condensation control	F	0	1	flag	0	
E	ON/OFF digital input 0 = absent 1 = present	U	0	1	flag	0	
F	Alarm relay logic 0 = de-energised in alarm for all alarms 1 = energised in alarm for all alarms 2 = de-energised in alarm only for serious alarms 3 = energised in alarm only for serious alarms	U	0	3	flag	0	
G	Delay on start-up	U	0	300	s	0	
H	USER password	U	0	200	-	22	
i	Block parameter modifications (displayed by lock) 0 = no block	U	0	1	flag	0	
L	Parameter sets	F	0	3	flag	0	
n	Select data shown on display 0= probes B1, B3 (if present) 1= temperature. and humid. set-point (if present) 2= day and time (if clock present)	U	0	2	flag	0	
o	Supervisor network serial address	U	1	200	-	1	
P	Supervisor serial baudrate 1= 1200, 2= 2400, 3= 4800, 4= 9600, 5=19200 Baud	U	1	5	flag	5	
r	Software version	D	-	-	-	1.3	

5 - CLOCK, TIME BANDS AND ALARM LOG

Functions enabled only with the clock board memory installed.

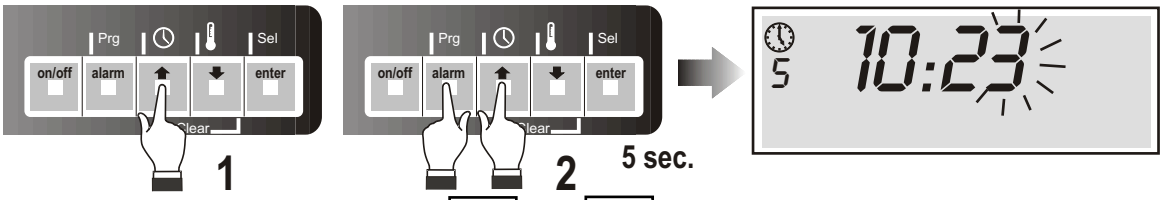
5.1 Clock

5.1.1 Time display

Pressing the button displays the current time and date.
Pressing the button once displays the time and the day of the week (1= Monday, 2= Tuesday, ..., 7= Sunday); pressing it again displays the date in the format day-month-year.

5.1.2 Time setting

First press the button (keeping it pressed) and then the alarm button, keeping both pressed for 5 seconds.



Picture 9

The minutes will begin to flash; use the and buttons to set the desired time.

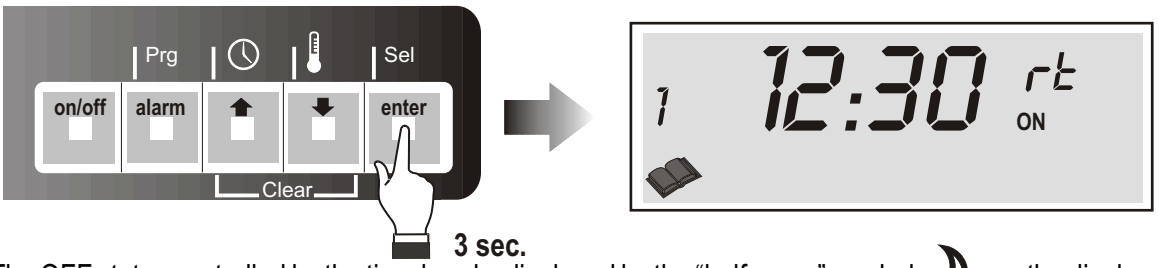
Use the enter button, on the other hand, to select, in order, the fields: hours - day of the week - year - month - day of the month. At the end, press the alarm button to confirm the modifications made.

5.2 Time bands

Entering the parameter rt (see USER parameter modification) allows the selection of **rt= 1 or 2**, enabling the time band function.
Pressing the enter button displays, in sequence, with the scrolling of a segment, time bands 1, 2, 3, 4 of day 1 (Monday), ... , time bands 1, 2, 3, 4 of day 7 (Sunday).
The buttons allow, with 10 minute steps, the start time of the selected band to be modified, while the on/off button enables or disables the action of the band itself, confirmed by the messages ON/OFF on the display.

5.2.1 Copying the time bands

If the times set for the bands are also valid for the following days, these can be simply copied by pressing and holding the enter button for 3 seconds.
Once the copy has been made, the following day is automatically displayed: if this too is to be copied, release the enter button and then press it again for a further 3 seconds.



Picture 10

The OFF status controlled by the time bands, displayed by the "half moon" symbol on the display, acts according to whether parameter **rt** is set to 1 or 2:

rt= 1 Sleep mode**:** during the **Off** status, the fan, works and the actuators remain off.
The machine is reactivated in the following conditions:
a) the temperature exceeds 70% of the high/low alarm threshold, returning to Sleep if the temperature falls within 40% of the alarm delta.
b) the on/off is pressed: in this case the on status lasts until the next time band; during this period the symbol A flashes.

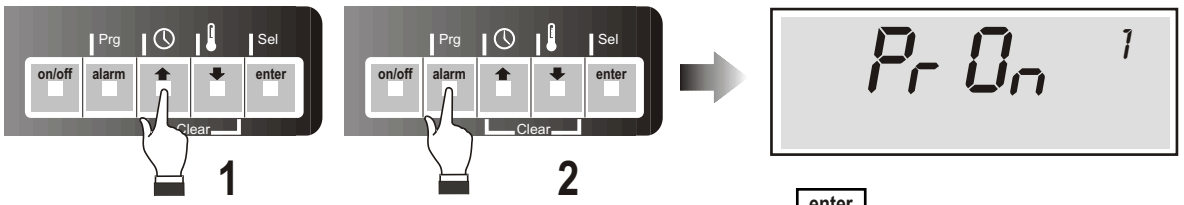
rt= 2 the machine is in stand-by, as if the on/off had been pressed.
In this case too, pressing the on/off button activates the machine until the next band switching **Off** time.

5.3 Alarm log

In the event of an alarm the alarm code, hour, minute and data are recorded, up to a maximum of 300 signals. On reaching the maximum number the oldest events are deleted (code 1 always indicates the most recent alarm).

5.3.1 Display alarm log

To display the list of alarms recorded, press the button , followed by the alarm button.



Picture 11

The code of the last alarm event is shown, and, on repeatedly pressing enter, the hour, minute and the date.
The buttons scroll the alarm data.

In places where no alarm has been recorded, dashes are displayed instead of the code.

The display includes an incremental index in the right-hand field, which identifies the current position; the hundreds then appear in the field on the left (e.g.: "1 rES 55" indicates that a reset of the machine was performed, and the position is 155).

Picture 12

5.3.2 Alarm log exit

To exit the menu Alarm log push the button alarm .
Exit occurs however by time-out after 60 seconds.

6 - CONNECTION OF A SERIES OF UNITS

This configuration is possible both for direct expansion units(ED) and coil unit (UV) and Shelter type.
It allows rotation of a unit placed in stand-by among a group of maximum 6 units.
If one of the working unit signal an alarm, the stand-by unit activates.
This is possible with the use of a digital input and output that send the command, by means of the "master", enabling or disabling the stand-by unit (the command is updated every 10 minutes).
The wiring diagram shows how all board are similar and that only during installation the connection must be carried out with a three-pole cable between each lockers.
During the installation phase pay attention to the following three points:

1) One unit must be set as master
2) It is recommended to end the line with a resistance (RT) di 220 /5W o di 470 4W;
3) Make sure the GO of the transformer are not place on the ground in order to prevent undesired current in the GO itself.

Set parameters H2, H3, H4, HA (see parameters table) to operate.

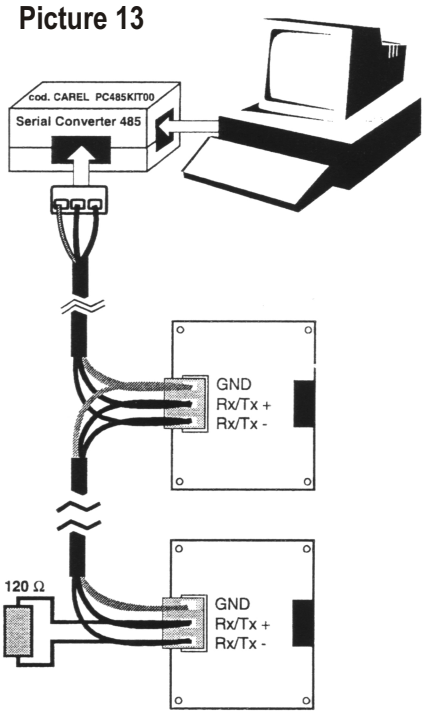
7 - SERIAL CARD RS 485

The use of the EMIpro unit inside a supervision network or remote servicing RS 485 requires the optional serial card RS 485. The installation of the serial card must be done as follows:

1) disconnect the EMIpro unit;
2) insert the serial card RS 485 on the prearranged connector located on the I/O card(see picture 13);
3) proceed with the serial line connection, conforming with the indicated polarity;
4) connect the EMIpro unit to the power supply.

The serial line must be closed by a 120 ohm - 1/4 W resistance placed between the terminals Tx/Rx found on the card RS 485 of the unit, on the opposite end of the network respect to the supervisor.

Picture 13



Set the network address of the EMIpro by means of the Ho parameter and the speed by means of the HP parameter.

EMICON HIGH-TECH AIR CONDITIONING AND REFRIGERATION

8 - ALARMS AND SIGNALS

In the event of an alarm, the machine performs the following actions:

- activates the buzzer and display , (if enabled and machine ON);
- activates the alarm relay (according to parameters HF, HA);
- displays the alarm code and switches on the corresponding red Led.

In this condition, pressing the alarm button silences the buzzer.

The termination of alarms with automatic reset, if no alarms with manual reset are active, brings about:

- the switching off of the buzzer;
- the deactivation of the alarm relay, see parameter HF;
- the switching off of the red alarm Led;
- the re-activation of the actuators switched off by the alarm.

Pressing the buttons together for 2 seconds cancels the display of the alarm codes.

In the event of alarms with manual reset, pressing the buttons together for 2 seconds brings about:

- the deactivation of the alarm relay, see parameter HF;
- the switching off of the red alarm Led;
- the re-activation of the actuators switched off by the alarm.

The maintenance signals for compressors 1 and/or 2, the fan and the filter, due to the exceeding of the hour counter thresholds, activate the symbol on the display, the red Led, the buzzer and the alarm relay.

The alarm messages are shown cyclically in the order indicated in the following table. On termination, the display of the percentage of humidity (if present) returns for 6 seconds.

8.1 Table of alarm

n.	Code	Description
1	E1	probe B1
2	E2	probe B2
3	E3	probe B3
4	E4	probe B4
5	Er: E	Eeprom boot
6	EE	Eeprom run
7	EL	insufficient power
8	H1	high pressure C1
9	H2	high pressure C2
10	L1	low pressure C1
11	L2	low pressure C2
12	F1	filter dirty
13	FL	flow
14	FA	smoke - fire
15	CF	water flow
16	r1	heating elements
17	At	supply temperature
18	AH	humidifier
19	Lt	low temperature
20	HT	high temperature
21	ht	high temperature pre-alarm
22	LH	low humidity
23	HH	high humidity
24	tC	compressor thermal
25	tF	fan thermal
26	t1/t2	fan thermal 1/2
27	AL	serious generic
28	PA	power fail
29	CL	clock
30	n1 +	hour counter threshold compressor 1
31	n2 +	hour counter threshold compressor 2
32	nF +	hour counter threshold filter
33	nn +	hour counter threshold fan

8.2 Alarm signals and description

All the alarms, except for the generic external alarm (AL), configured by parameter Pb, and the clock, are detected only when the machine is **On**.

E1: ambient temperature probe(B1) failure: generated due to open or short-circuited probe. Alarm delayed by 1 minute from the instant the machine is placed ON and when the error is detected. At the moment of detection the control is placed OFF, respecting the configured times, except for the fan.

E2: external air probe (B2) failure: generated due to open or short-circuited probe. Alarm delayed by 1 minute from the instant the machine is placed ON and when the error is detected. At the moment of detection the corresponding functions -compensation and free cooling are deactivated.
If probe B2 is used for condensation, the fan is forced on at maximum speed.

E3: humidity / pressure probe(B3) failure: generated due to open probe and for voltages above 1.15V, if the input is configured as 0÷1V, or, if the input is configured as 4÷20mA, for currents below 3mA and over 23mA. Alarm delayed by 1 minute from the instant the machine is placed ON and when the error is detected.
At the moment of detection the corresponding functions are deactivated:
- humidity control (humidification, dehumidification);
- if probe B3 is used as a pressure sensor, for the control of condensation, and probe B2 is present for reading the external air temperature, the fan is forced on at maximum speed if the temperature measured by B2>15°C. The same is true if probe B2 is not present.
If the temperature B2² 15°C, on the other hand, the fan operates at half speed.

E4: supply air temperature probe(B4) failure: generated due to open or short-circuited probe.
Alarm delayed by 1 minute from the instant the machine is placed ON and when the error is detected. At the moment of detection the corresponding functions are deactivated: supply temperature alarm management (At), and, if free-cooling is active with control of the supply temperature, the damper is closed.

EE: EEPROM data read/write error.
Can occur also during a reset only if it is not possible to make the correction to the secondary bank. This error does not affect the operation of the regulator.

EL: insufficient power supply during EEPROM write
Data write error to EEPROM due to power failure or power below 13V.

H1-H2: high pressure C1-C2
Detected irrespective of the activation of the compressor, and causes its immediate switching off without waiting the corresponding delay times. The alarm H2 is managed only if parameter H5= 2 or 4 (two independent circuits).
If condensation fan regulation is present, this is activated for 60 seconds at maximum speed before switching off.

L1-L2: low pressure C1-C2
Detected only with the compressor on, and causes its immediate switching off without waiting the corresponding delay times.
The alarm is delayed by P3 seconds on the start-up of the compressor. If automatic reset is set, parameter P5, a compressor restart is attempted 10 times, then the alarm is automatic reset automatically.
The alarm L2 is managed only if parameter H5= 2 or 4 (two independent circuits).

F1: dirty filter
Signal-only alarm. No outputs are deactivated.

FL: air flow alarm
Alarm delayed by parameters P1 and P2.
The activation of this alarm causes the switching off of all of devices without waiting the delay times of the compressors and the fan. If set for automatic reset, parameter P5, a restart of the outputs is attempted 10 times.

FA: smoke-fire alarm
This alarm can be configured using the PE=1 parameter.
If configured, it can causes the switching off of all actuators without respecting the timing. This alarm is noted with machine in stand-by too.

CF: water flow
This alarm can be configured for UV unit only, using the PF=1 parameter.
When this alarm occurs, it causes the closing of the cooling valve.

r1: heating element thermal overload alarm
Causes the immediate switching off of the heating elements.

At: high supply temperature alarm (cooling function)
Enabled by the presence of the supply air temperature probe B4 (parameter /2) and by the setting of parameter Pd. The alarm has a fixed delay of 2 minutes, and is activated only if the cooling actuators are on and heating actuators are off. In particular, the conditions leading to the activation of the alarm are:

ED: at least one compressor on and heating elements off or heating valve closed;
UV: cooling valve open more than 50% and heating valve closed or heating elements off.

This alarm, when detected, only blocks the compressor on at that moment, while the second compressor remains enabled.

AH: humidifier alarm
Alarm delayed by 30 seconds. If detected, the humidifier output (0÷10Vdc or relay) is deactivated.

Ht: high temperature alarm
These alarms are delayed on the start-up of the regulator (or on exiting stand-by mode) for a period equal to parameter PA, and for 1 minute on exceeding the set threshold.
The reset occurs, if programmed as automatic, 1° C below the threshold.
In addition, exceeding the high temperature threshold causes the immediate start-up of the compressors without waiting the corresponding delay times.

Lt: low temperature alarm
This alarm is delayed on the start-up of the regulator (or by going out of the stand-by) for a time equal to the parameter PAand of 1 minute from the overcoming of the threshold.
If programmed as automatic, the reset occurs 1° C above the threshold.

ht: high temperature prealarm
This alarm can be configured using the PG = 1 parameter. This alarm is delayed by the start-up of the regulator (or by going out of the stand-by) for a time equal to the parameter PAand of 1 minute from the overcoming of the threshold. If programmed as automatic, the reset occurs 1° C below the P7/2 threshold.

LH-HH: low-high humidity alarm
These alarms are delayed on start-up (or by going out of the stand-by mode) for a period equal to parameter PA, and for 1 minute from exceeding the set threshold.
These are signal-only alarms, with an hysteresis of 1%

tC: compressor thermal overload alarm
Immediate alarm, causes the instant switching off of the compressor.
This is managed only if parameter H5= 1 or 5 (one compressor only or two compressors in tandem).

tF: fan thermal overload alarm
Immediate alarm, causes the instant switching off of all devices without respecting the compressor delay times.
This is managed only if parameter H5= 1 or 5 (one compressor only or two compressors in tandem).

t1/t2: fan 1-2 thermal
This alarm can be configured by setting parameters HA = 6 o 7.
Immediate alarm, it causes the instantaneous shutdown of the connected output:
t1= 1 (Id2) supply fan
t2= 2 (Id4) supply fan
If both of them are ON the flow alarm is forced too turning OFF all the outputs (see description FL).

AL: generic external alarm
This alarm can be configured by setting parameters Pb and PC.
If configured as a serious alarm, it switches off all actuators without respecting the delay times.

PA: shelter power failure alarm
External power failure alarm delayed by 2 seconds.
This is generated for models configured as shelters when input ID6 is open; it causes the immediate switching off of the compressor and the heating element.

CL: clock failure alarm
Alarm generated by the malfunctioning of the clock board.
Interrupts the time band function, and the regulator goes into ON status if even the current band provides an off command. This event does not block the alarm log, which continues to store the signals, however with incorrect time values.

n2: compressor 2 maintenance warning
Signal-only alarm generated when the hour counter threshold has been exceeded, displayed together with the symbol , see parameters c9 (compressor 1) and cA (compressor 2).

nF: filter maintenance warning
Signal-only alarm, see parameter Fc.

nn: fan maintenance warning
Signal-only alarm generated when the hour counter threshold has been exceeded, displayed together with the symbol, see parameter FA(fan).

8.3 Machine shut-down signals

These appear in the event of internal machine malfunctions and cause its shut-down.
The code is displayed in the ambient temperature (or hour-minutes) field of the LCD display.

Er: C Checksum error during code check in Flash: the control can no longer be used.
Er: E The content of the EEPROM (parameter memory) is damaged.
A reset can be attempted by reloading the default values.
Er: L Insufficient power: Power voltage (lower than 13V) when writing the default values or during an attempt to automatically recovery an EEPROM damaged sector.