CONTROL PANEL OPERATING MANUAL

AIR-COOLED SCREW CHILLER

Software version 21.100 and later

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This manual provides installation, setup and troubleshooting information for the control panel of the EWAD650-C18BJYNN, EWAD550-C12BJYNN/Q, EWAD650-C21BJYNN/A, EWAD600-C10BJYNN/Z, EWAP800-C18AJYNN, EWAP850-C18AJYNN/A air-cooled chillers equipped with screw compressor.

All operational descriptions contained in this manual refer to control software ver. 21.101 and subsequent revisions. Chiller operating characteristics and menu selections may differ from those of other versions of the control software. Contact Daikin Service for software update information.

1.1 Installation Precautions

Warning
Electric shock hazard. Injury to personnel or damage to equipment might occur. This equipment must be properly grounded. Connections and service of the control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.

Caution
Static sensitive components. A static discharge while handling electronic circuit boards can cause damage to the components. Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is being applied to the panel.

1.2 Temperature and Humidity considerations

The controller is designed to operate within an ambient temperature range of –40°C to +65°C with a maximum relative humidity of 95% (non-condensing).

2 Associated literature

None

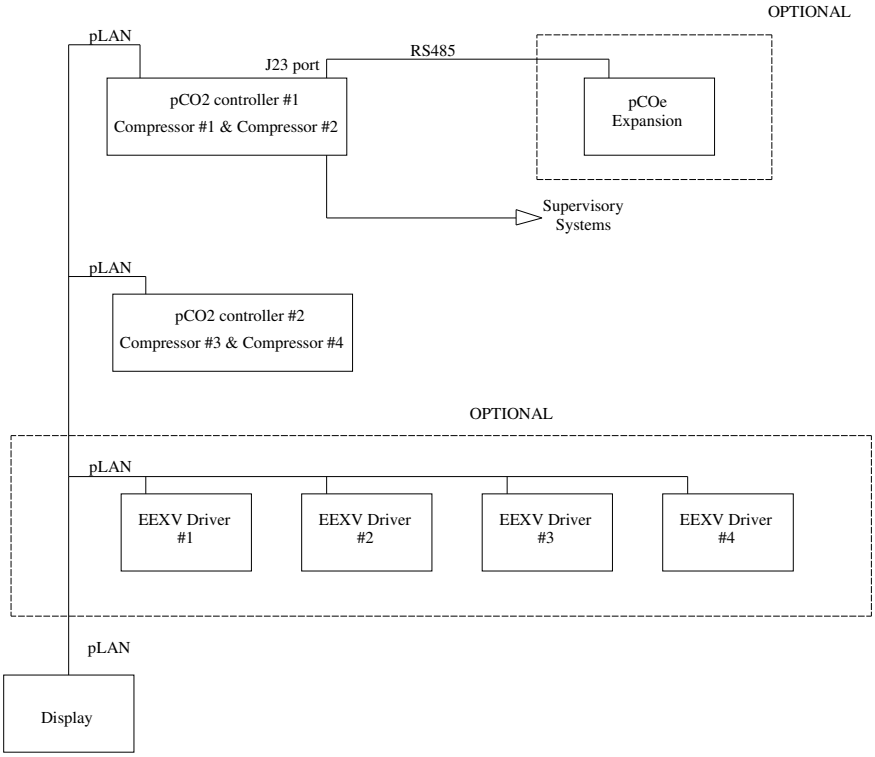
3 General description

The control panel contains a microprocessor based controller which provides all monitoring and control functions required for the safe, efficient operation of the Chiller. The operator can monitor all operating conditions by using the panel's built-in 4-line by 20-character keypad/display or by using an IBM compatible computer running MicroPlant monitor software, release 2.0 and later. In addition to providing all normal operating controls, the PlantVisor 1.0 controller (or later version), monitors all safety devices on the unit and takes a corrective action when the chiller deviates from the normal operation as designed. If a fault condition occurs, the controller will shut-down the system and activate an alarm output. The most important operating conditions at the time an alarm condition occurs are retained in the controller's memory to aid in troubleshooting and fault analysis.

The system is protected by a password scheme which only allows access by authorized personnel. A password must be entered into the panel keypad by the operator before any configuration can be altered.

4 Main features of control software

- Management of air-cooled screw chillers
- Control of evaporator outlet temperature within ± 0.1°C (under stable load conditions)
- Handling of sudden load drops of up to 50%, with a max deviation of 3°C in the controlled temperature
- Readout of all main operating parameters of the unit (temperature, pressures, etc.)
- Condensation control with Step Logic, single or double fan speed controllers and combined step + speed control (speedtroll)
- Control of up to 4 fan stages plus speed modulation using a 0-10 Vdc proportional signal
- Double setpoint for leaving water temperature, with local or remote change-over. This function allows switching of the local setpoint between two preset values.
- Setpoint override using an external signal (4-20 mA) or the evaporator outlet temperature.
- Adjustable max output decrease rate reduces under-shooting in case of sudden low demand in the control loop.
- Hot-water start feature allows the unit to start smoothly even under high temperature condition of evaporator water.
- SoftLoad feature reduces electrical consumption and peak demand charges during loop low demand.
- Power-limiting feature reduces the electrical consumption of the unit by limiting either current (current limit) or capacity demand (demand limit).
- Fan Quiet Mode feature helps reduce noise by limiting the speed of the fans in accordance with a time schedule
- Panel-mounted 15-key keypad for quick interfacing. The operator can log the operating conditions of the chiller on the 4-line by 20-column backlit display.
- Four levels of security protection against unauthorized changes.
- Diagnostic system for compressors which stores last 10 alarms with date, time, and working conditions at the time the alarm occurred
- Weekly and yearly start-stop time schedule
- Easy integration into building automation systems via separate digital connection for unit start/stop and 4-20 mA signals for chilled water temperature setpoint and limitation of demand
- Communication capabilities for remote monitoring, changing of setpoint, trend logging, alarm and event detection, via compatible IBM-PC running PlantVisor 1.0 (or later) software
- BAS communication capability via Modbus protocol
- Remote communication capabilities via modem (up to 8 chillers with Gateway Modem)
- Remote communication capabilities via GSM Modem



The system architecture is based on the use of one pCO2 Carel controller to manage two compressors; an additional pCOe expansion board is used to manage economizer when required.

The system is able to control units equipped with either electronic or thermostatic expansion valve; in the first case, an electronic Carel Driver for each valve is required.

5 Customer Interfaces

5.1 Control Panel

The Control Panel consists of a 4-line by 20-character backlit display and a 15-key keypad whose functions are described below.

Fig. 1 – Control panel – front view

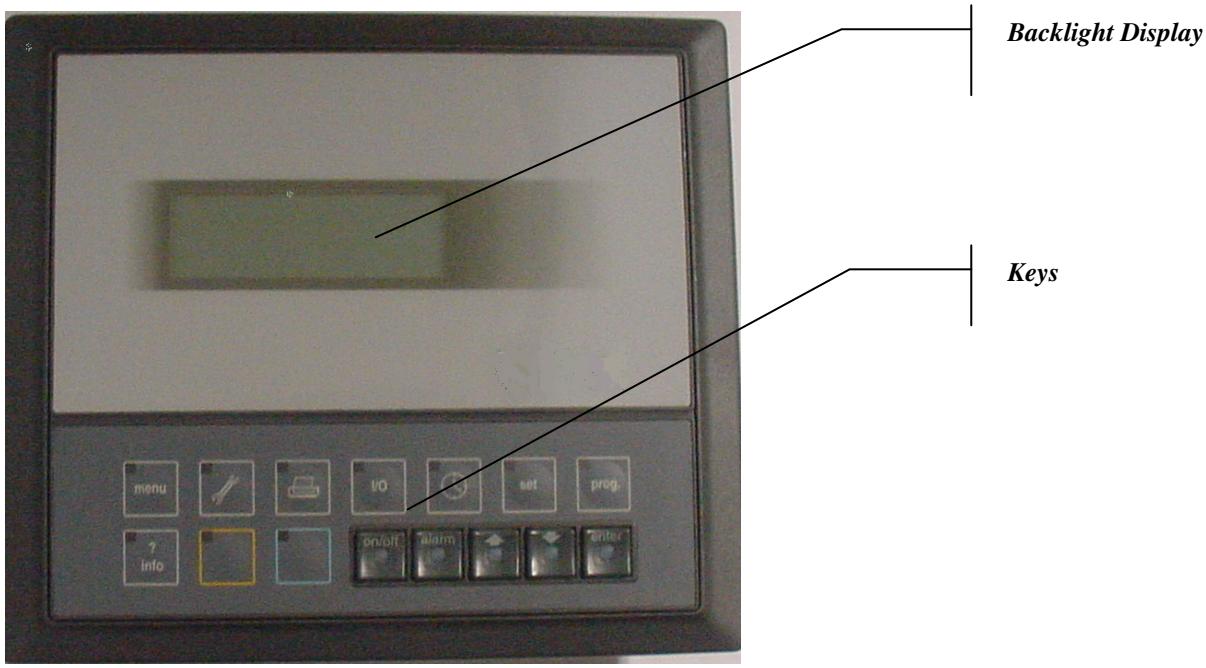
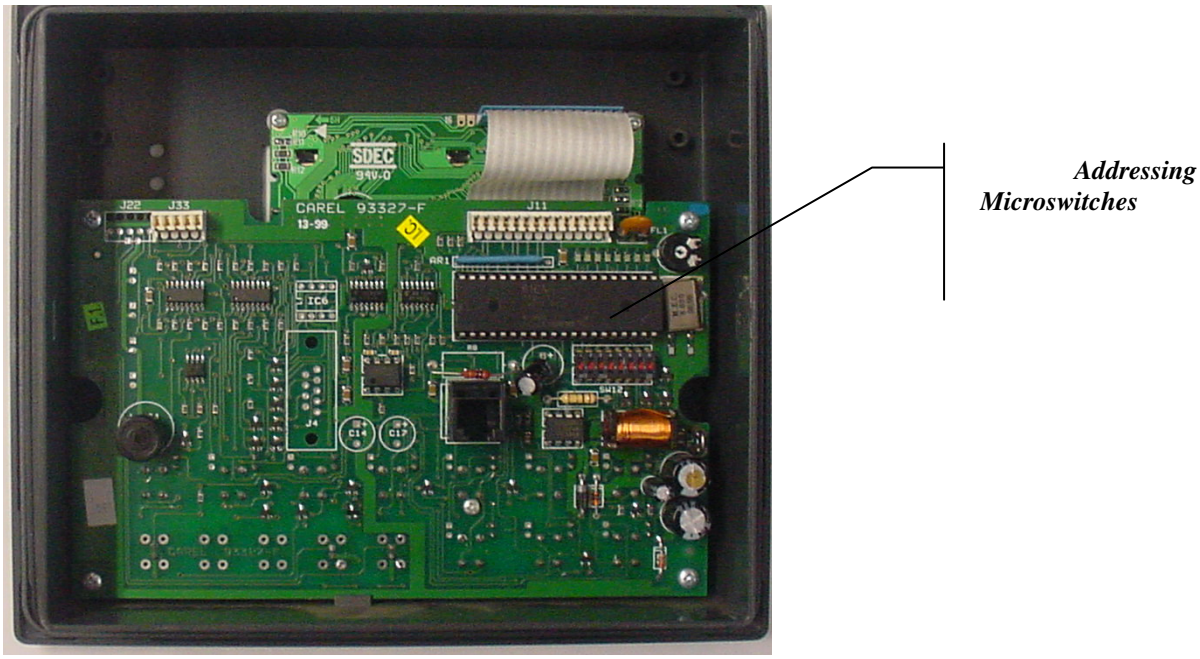


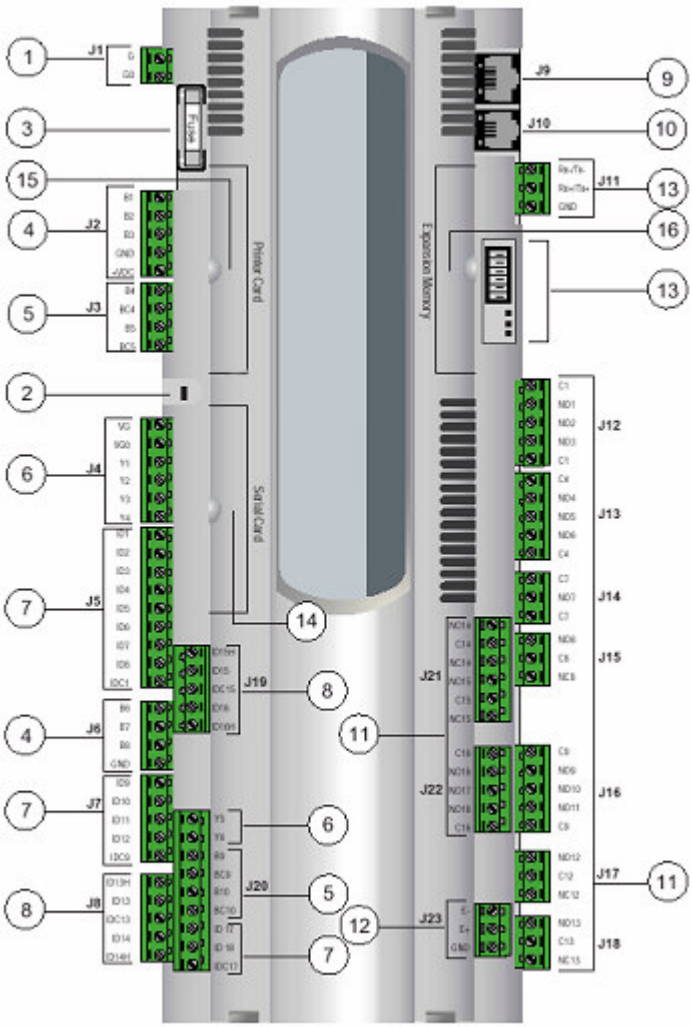
Fig. 2 – Control panel – back view



5.2 Main board

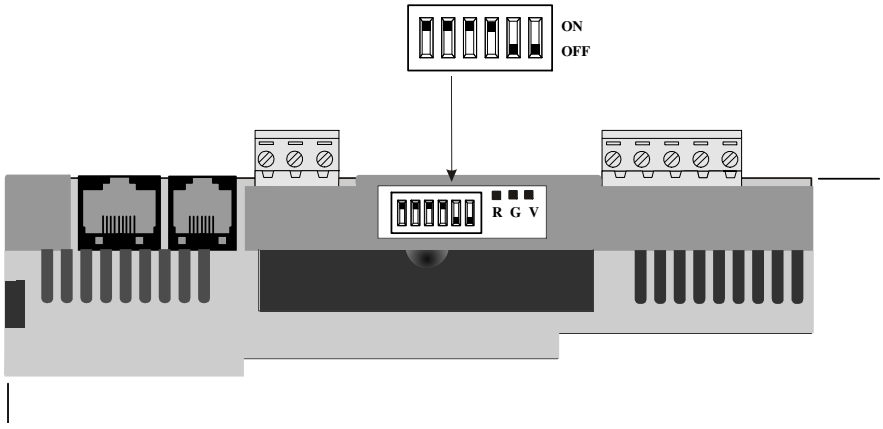
The control board contains the hardware and the software necessary to monitor and to control the unit.

Fig. 3 – Main Control board



1. Power supply G (+), G0 (-)
2. Status LED
3. Fuse, 250Vac
4. Universal analogue inputs (NTC, 0/1V, 0/10V, 0/20mA, 4/20mA)
5. Passive analogue inputs (NTC, PT1000, On-off)
6. Analogue outputs 0/10V
7. 24Vac/Vdc Digital inputs
8. 230Vac or 24Vac/Vdc Digital inputs
9. Synoptic terminal connection
10. Standard terminal (and program download) connector
11. Digital outputs (relays)
12. Expansion board connection
13. pLAN connection and microswitches
14. Serial card connection
15. Printer card connection
16. Memory expansion connection

Fig. 4 – pLAN addressing microswitches



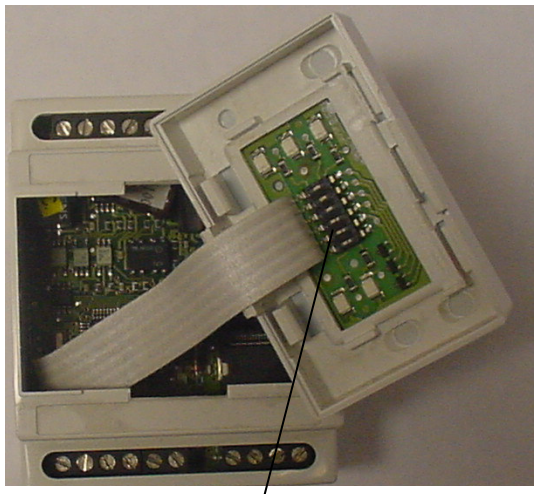
5.3 EEXV Valve Driver

The valve drivers contain the software for the control of the electronic expansion valve and are connected to the battery group which provides power to close valve in case of power failure.

Fig. 5 - Driver

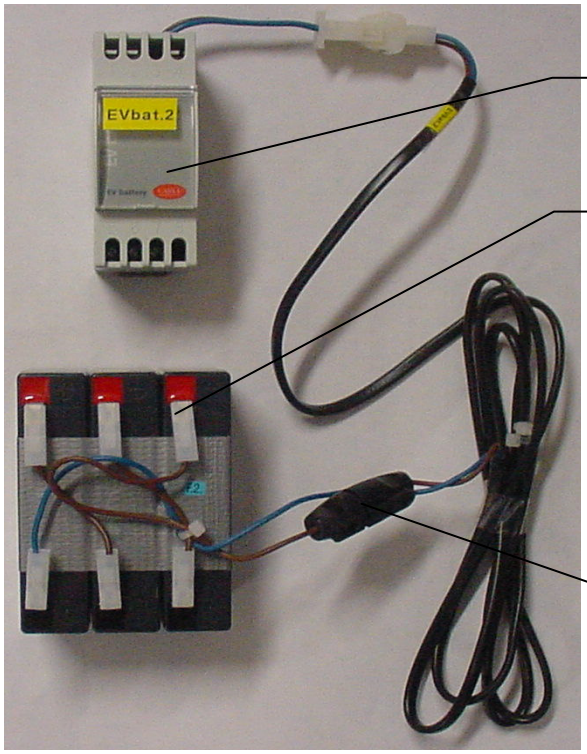
Status Led

Fig. 6 -Inside of Driver



Addressing Microswitches

Fig. 7 - Battery assembly



Battery charger

Chargeble Battery

10 Amp Fuse

5.4 Meaning of the EEXV Driver status LEDs

Under normal conditions, five (5) LEDs indicate:

- POWER: (yellow) remains On in presence of supply. Remains Off in case of battery operation

- OPEN: (green) Flashing during the valve opening. On when valve is fully open.
- CLOSE: (green) Flashing during the valve opening. On when valve is fully close.
- Alarm: (red) On or flashing in case of hardware alarm
- pLAN: (green) On during the normal working of pLAN.

In the event of a critical alarm, the nature of the alarm can be identified by observing the status of the LEDs as shown below. Highest priority is level 7. When more than one alarm occur, only the one with the highest priority level is shown.

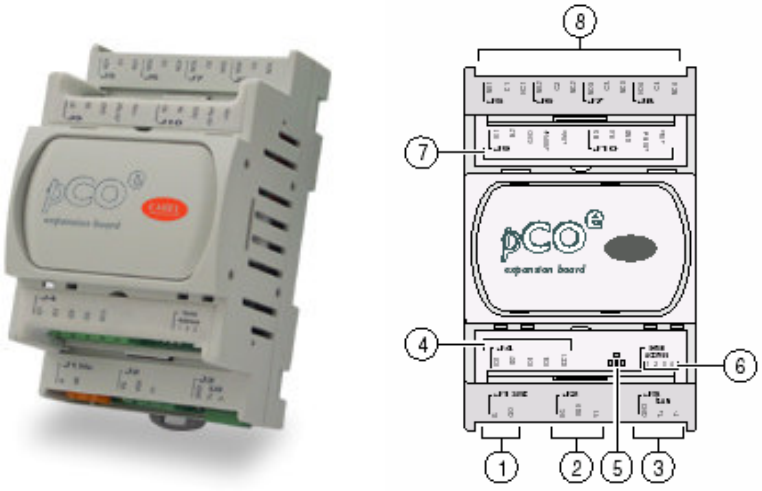
Alarms that will shutdown the system	**PRIORITY**	**LED "OPEN"**	**LED "CLOSE"**	**LED "POWER"**	**LED "ALARM"**
Eprom reading error	7	Off	Off	On	Flashing
Valve remains open on power failure	6	Flashing	Flashing	On	Flashing
At start up, wait for battery loading (parameter…….)	5	Off	On	Flashing	Flashing
Other alarms	**PRIORITY**	**LED "OPEN"**	**LED "CLOSE"**	**LED "POWER"**	**LED "ALARM"**
Motor connection failure	4	Flashing	Flashing	On	On
Sensor/input error	3	Off	Flashing	On	On
Eeprom writing error	2	-	-	On	On
Battery failure	1	-	-	Flashing	On

PL pLAN	**LED pLAN**
Connection OK	On
Driver connection or address error = 0	Off
The Pco Master doesn't answer	Flashing

5.5 pCO Expansion

The introduction of the Economizer functionality (optional) in the architecture requires the use of the Carel expansion board shown in figure 8.

Fig. 8 - Carel Expansion Board

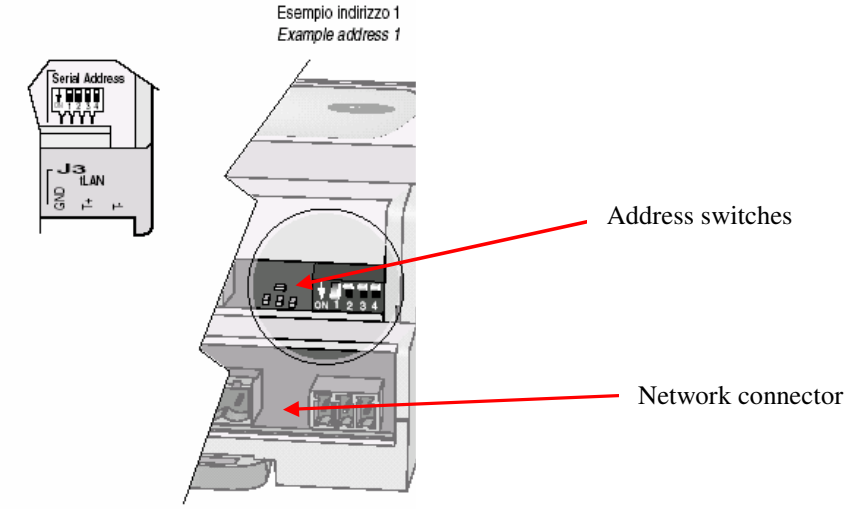


Item

1. Power supply connector [G (+), G0 (-)]
2. Analogue output 0 to 10 V
3. Network connector for expansions in RS485 (GND, T+, T-) or tLAN (GND, T+)
4. 24Vac/Vdc digital inputs
5. Yellow LED showing power supply voltage and 3 signaling LEDs
6. Serial address
7. Analogue inputs and sensor supply
8. Relay digital outputs

This device must be addressed to ensure correct communication with controller via RS485 protocol. Addressing microswitches are placed nearby status leds (refer to item ⑥ in figure 8). Once the address is correctly set, the expansion can be linked to pCO2 board #1. The correct connection is achieved by connecting pin J23 on board #1 with pin J3 on the expansion board (note that expansion board connector is different from the one in the controller, but wires must be placed in the same positions of connectors). Expansion boards are only I/O extensions for the controller and don't need any software.

Fig. 9 – Details of Exp. Board setup for LAN



As shown in figure 9, expansion boards have only four microswitches to set the net address. For more details on microswitches configuration refer to next section.

There are three status LEDs, each one indicating a different condition of the expansion board, as follows.

RED	YELLOW	GREEN	Meaning
-	-	**ON**	CAREL /tLAN supervisory protocol active
-	**ON**	-	Sensor/input error
ON	-	-	"I/O mismatch" error caused by the inhibition matrix
flashing	-	-	Communication failure
-	-	-	Waiting for the system startup by the master (max. 30 s)

5.6 Addressing of pLAN/RS485

To get the correct functionality of the pLAN net system, it is necessary to address correctly all the installed components. Each component, as previously described, has a number of microswitches that must be set as specified in the following table.

pLAN component	**Microswitch**					
	1	**2**	**3**	**4**	**5**	**6**
Local DISPLAY	**ON**	**ON**	**ON**	OFF	**OFF**	OFF
Remote DISPLAY (if any)	OFF	OFF	OFF	**ON**	**OFF**	OFF
COMP. BOARD #1	**ON**	OFF	OFF	OFF	OFF	OFF
COMP. BOARD #2	OFF	**ON**	OFF	OFF	OFF	OFF
DRIVER EXV #1	**ON**	**ON**	OFF	OFF	OFF	OFF
DRIVER EXV #2	OFF	OFF	**ON**	OFF	OFF	OFF
DRIVER EXV #3	**ON**	OFF	**ON**	OFF	OFF	OFF
DRIVER EXV #4	OFF	**ON**	**ON**	OFF	OFF	OFF
RS485 component	**Microswitch**					
	1	**2**	**3**	**4**		
EXP. BOARD #1	**ON**	OFF	**ON**	OFF		

6 Display and keypad

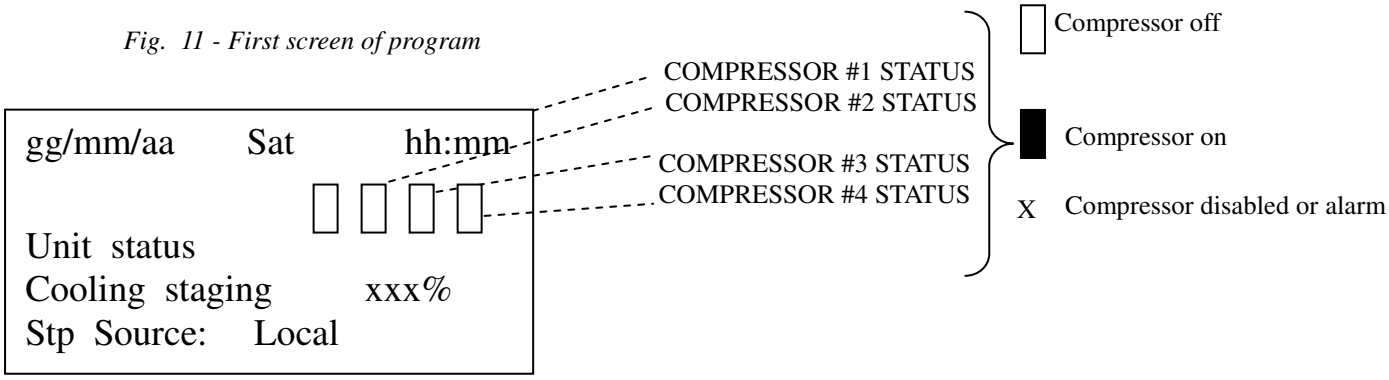
The display and the keypad are the main interfacing elements between operator and unit. Any operational conditions, alarms and setpoints can be monitored on the display, and any setpoint value can be modified through the keypad.

6.1 General description

The keypad has 15 keys for access to the operational conditions of the unit and to the functions of program. The requested information is shown on the 4-line by 20-column backlit display

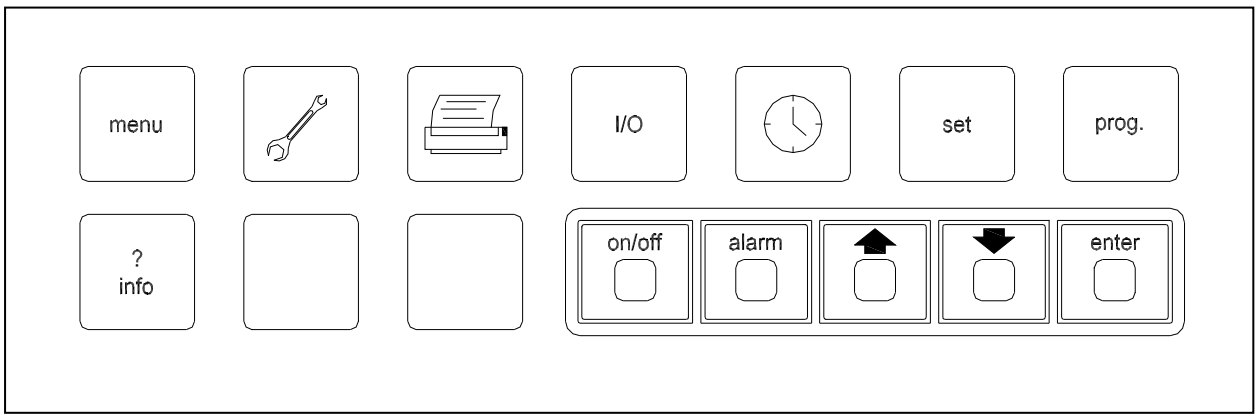
Fig. 10 - Control display

Fig. 11 - First screen of program



6.2 Keypad keys and their functions

Fig. 12 - Keypad

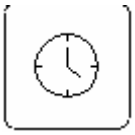


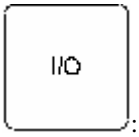
- 

: User parameters; by using a password, it is possible to set the following parameters:
  Setpoint change-over parameters
  Enable double setpoint
  Softload parameters
  Unit load-limiting parameters
  Compressor sequencing logic
  Fan Quiet Mode values
  Main pump timing
  Enabling of digital and supervisory inputs
  Auto restart after power failure and external alarm activation
  Time scheduling
  Supervisory communication parameters
  Interface language

- 

: Setpoints adjustment within the limits set under maintenance password

- 
: Date and time setting

- 

: Input/output display with corresponding circuit functions

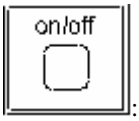
- 
(=print) : print (not available)

- 
(=maint): Maintenance parameters; by using a password, it is possible to set the following parameters:

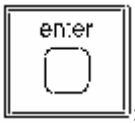
  Reset of hour and start counters
  Water regulation parameters
  Condensation regulation parameters
  Setpoint limits
  Enabling of sensors /input signals
  Sensor offset

- 

it allows to visualize the main menu
- 

it allows shifting from one control board to the other (to access parameters of the respective compressors, namely compressors #1 and #2 for board #1 and compressors #3 and #4 for board #2)
- 

: On/Off key
- 

: It indicates the presence of possible anomalies and their causes
- 
(=up): It is used to return to previous screen
- 
(=down) : It is used to shift to next screen
- 

: It confirms the set values

It is possible to access the different sections of program through the keypad. There are actually 9 screen categories as summarized in the table below, which includes the access keys for each screen along with a description of the category.

CATEGORY	DESCRIPTION	KEYS	PASSWORD
Main	Access to operation parameters (output)	menù	NO
User	Setting of parameters by the user (input)	prog	YES
Setting	Definition of setpoints (input/output)	set	NO
Input/Output	Display of compressors working parameters (output)	I/O	NO
Manufacturer	Setting of manufacturer parameters (input)	Menù+prog	YES
Maintenance	Access to maintenance parameters (input/output)	maint	NO/YES
Maintenance auxiliary	Setting of auxiliary maintenance parameters (input)	Menù+maint	YES
Alarm	Alarms (output)	alarm	NO
Alarm history	Storage of last 10 alarms (output)	Menù+alarm	NO

The password remains valid for 10 minutes after last access.

7 Menus

7.1 Main Menu

This section shows only the output parameters through subsequent screens (it is possible to shift from one to the next by using the arrow key):

-Current date, time and weekday, setpoint origin and load percentage status of the unit, including following information:

- **Off Alarm**: unit shut down due to alarm condition
- **Off Rem Comm**: unit switched off remotely (supervisor or BMS)
- **Off Time Schedule** : unit off as per current time schedule
- **Off Loc/Remote Sw**: unit off through switch
- **Off Keypad**: unit switched off through the keypad on/off key
- **Waiting flow**: unit On waiting for evaporator water flow
- **Waiting load**: unit On, but compressors not running because of low load requirements.
- **No comps available**: unit On with no compressors available for automatic management (compressors switched OFF or in alarm condition or in manual mode)
- **FSM Operation** : unit working in Fan Quiet Mode

-Power-limiting status of the unit (if enabled)
-Evaporator outlet/inlet water temperature (or common temperature for units with two evaporators)
-First and second evaporator outlet temperatures (units with two evaporators)
-Load percentage and status of the compressor, including following information:

- **Off Alarm: compressor shut down due to alarm condition**
- **Off Switch: compressor switched off through the local switch**
- **Off Ready: compressor off, ready to start**
- **Oil Heating: compressor waiting for oil to warm up**
- **Manual Off: compressor disabled through the keypad**
- **Recycle time: compressor waiting for timing**
- **Starting: compressor starting**
- **Prepurge: compressor unloading during start sequence**
- **Auto xx%: automatic control of compressor and load percentage**
- **Manual xx%: manual control of compressor and load percentage**
- **Downl.: compressor unload sequence before stop**
- **Pumping down: compressor pump down**

-Suction and discharge pressure and saturated temperature.
-Suction temperature, suction and discharge superheat, expansion valve position
-Compressor status: off, standby, load or unload.

7.2 User Menu (prog)

The user can define parameters in this section by entering a password and accessing the followings forms:

Lvg water temp.	
Setpoint reset	
	NONE

If **return** is selected the following form appears:

ChLWT Return Reset	
StarT Dt	03.0°C
Max reset	03.0°C

If **4-20mA** value is selected the following form appears:

ChLWT Setpoint	
Override limits	
Setp. Diff	03.0°C

Enable SoftLoad	N

If **Y** is selected the following fields appear:

SoftLoad Max Stage	50%
Max Time min	20min

Unit limiting NONE

The possible options are: NONE**/Demand Limit/Current Limit/Superv. Demand** and **Superv Current**

Current Limit set: 4mA	000A
20mA	400A
Max Curr.	300A

The current limit form appears only if input signal b8 has been enabled in the maintenance menu.

Compressor Sequencing AUTO

If **Manual** is selected the following mask appears:

Set compressor stage	
C #1	1st
C #2	2nd
C #3	3rd
C #4	4th

Fan Quiet Mode N

If **Y** is selected the following fields appear:

Max Inv. Out.	06.0V

And the following forms appear:

FSM Monday_Friday	Start	Stop
1st	00:00	06:00
2nd	18:00	23:59

FSM Saturday	Start	Stop
1st	00:00	06:00
2nd	14:00	23:59

FSM Sunday	Start	Stop
1st	00:00	23:59
2nd	00:00	00:00

FSM Force On Days(1)		
00/00	00/00	00/00
00/00	00/00	00/00
00/00	00/00	00/00

FSM Force On Days(2)		
00/00	00/00	00/00
00/00	00/00	00/00
00/00	00/00	00/00

Time between main pump/fan and comp. Start 030s

Delay on switching The main pump off 180s

Supervisory remote On/off N

Autorestart after Power failure N

Switch off unit On external alarm N

Enable time scheduling N

	Start	Stop
Mon-Fri	00:00	23:59
Sat	00:00	23:59
Sun	00:00	23:59

Holidays (1)		
00/00	00/00	00/00
00/00	00/00	00/00
00/00	00/00	00/00

Holidays (2)		
00/00	00/00	00/00
00/00	00/00	00/00
00/00	00/00	00/00

Communication Supervisor

Protocol ; CAREL Supvervisor Com.Cpeed 19200 (RS485 ONLY) Identificat. No. 001

Choose Language ITALIAN

Change user password 0003

7.3 Setting Menu (set)

In this section, it is possible to set and display the setpoint values:

-Cooling Setpoint (°C)
-Active setpoint

Cooling setpoint 07.0 °C Heating setpoint --------

Actual setpoint Cooling 07.0 °C Heating --------

-if the function “DOUBLE SETPOINT” is enabled, the following form appears:

Cooling double setpoint 07.0 °C Heating double setpoint --------

7.4 Input/Output Menu (I/O Menu)

This section shows the following parameters:
-Software type, release
-Digital Input/Output status (C, O)
-Analogue Input values
-Analogue Output values (Vdc)
-Bios Version/Date Boot Version/Date
-Driver Firmware C:1/C:2

7.5 Manufacturer Menu (menu+prog)

This section allows setting all manufacturer data. A password is required for the operation. The parameters may only be modified by qualified persons.

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
Unit Config	00	00	0 =AIR-COOLED CHILLER 1=NOT ALLOWED 2=NOT ALLOWED 3=NOT ALLOWED	
Expansion valve type	Electronic	Electronic	Electronic Thermostatic	
Gas Type	R134A	R407C	R134a R407c	Only for thermostatic valve
Enable economiser	N	N	Y/N	
economiser on	90%	90%	0-100	Only if economiser is enabled
economiser off	75%	75%	0-econ_on	Only if economiser is enabled
Economiser motor protection				Only if economiser is enabled
set point	60,0°C	60,0°C	0-999,9	
diff.	5,0°C	5,0°C	0-99,9	
Temperature regulation				
Integral time	200 sec	200 sec	0-999	
Derivative time	60 sec	60 sec	1-999	
Compressor configuration				
Number of compressors	2	2	1-4	
Number of evaporators	1	1	1-2	Only if number of compressors > 2
Min. time interval before any given compressor is allowed to re-start	600 sec	600 sec	0-999	
Min. time interval between running periods of any two compressors	120 sec	120 sec	0-999	
Min running time for compressors	120 sec	120 sec	0-999	
Min stop time for compressors	180 sec	180 sec	0-999	
Interstage	210 sec	210 sec	1-999	
Double pulse under	35%	35%	0-100	
P.hold Cond	17,5 bar	26,5 bar	-1-50	
P.down Cond	18,5 bar	27,5 bar	-1-50	
P.hold Evap	1,9 bar	3,6 bar	-1-50	
P.down Evap	1,8 bar	3,4 bar	-1-50	
Alarm setpoint for high discharge temperature	110 °C	110 °C	0-140.0	
Flow switch alarm delay				
start	20 sec	20 sec	0-99	
run	5 sec	5 sec	0-99	

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
Freeze prevent				
setpoint	3.0 °C	3.0 °C	-99,9-99,9	
--------				
diff.	1,0 °C	1,0 °C	-99,9-99,9	
Antifreeze alarm				
setpoint	2,0 °C	2,0 °C	-99,9-99,9	
--------				
diff.	1,0 °C	1,0 °C	-99,9-99,9	
Evap 1 antifreeze alarm				Only for units with 2 evaporators
setpoint	2,0 °C	2,0 °C	-99,9-99,9	
--------				
diff.	1,0 °C	1,0 °C	-99,9-99,9	
Evap 2 antifreeze alarm				Only for units with 2 evaporators
setpoint	2,0 °C	2,0 °C	-99,9-99,9	
--------				
diff.	1,0 °C	1,0 °C	-99,9-99,9	
Number of pulses to load compressor	FR4000 15 FR3200 15	FR4000 15 FR3200 15	0-999	
Compressor unload				
Pulse time	FR4000 0,3 sec FR3200 0,1 sec	FR4000 0,3 sec FR3200 0,1 sec	0-99,9	
min pulse period	1 sec	1 sec	0-99	
max pulse period	90 sec	90 sec	0-999	
Compressor load				
Pulse time	FR4000 0,3 sec FR3200 0,1 sec	FR4000 0,3 sec FR3200 0,1 sec	0-99,9	
min pulse period	5 sec	5 sec	0-99	
max pulse period	90sec	90sec	0-99	
Pumpdown configuration				
Enable	Y	Y	Y/N	
Max Time	30 sec	30 sec	0-999	
Min Pressure	1,2 bar	2.5 bar	-1-9,9	
Condensation				
input	PRESS	PRESS	NONE PRESS TEMP	
Type	VFD	VFD	VFD STEPS SPEDTR	
STEPS	-	-	1-4	

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
Fan step #1				
setpoint	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	
diff.	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	
Fan step #2				
setpoint	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	STEPS or SPEDTR
diff.	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	
Fan step #3				
setpoint	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	
diff.	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	
Fan step #4				
setpoint	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	Available only with electronic expansion valve
diff.	See tab. STEPS and SPEEDTR	See tab. STEPS and SPEEDTR	0-99,9	
Config Inverter				
Min Speed	10 V	10 V	0-10,0	If condensation control is VFD or SPEDTR 6 V for "/Q" extra low noise version
Max Speed	0 V	0 V	0-10,0	
Speed Up time	1 s	1 s	0-99	
Condensation regulation				If condensation control is VFD or SPEDTR
Regulation Band	5.0 bar	5.0 bar	0-99,9	
Dead Band	0 bar	0 bar	0 - reg. band	
Condensation regulation				If condensation control is VFD or SPEDTR
Integral time	600 sec	600 sec	1-999	
Derivative time	1 sec	1 sec	1-999	
Enable oil control	Y	Y	Y/N	
Transducer high pressure alarm				
setpoint	20.5 bar	29.5 bar	0-99.9	
diff.	5.0 bar	5.0 bar	0-99.9	
Transducer low pressure alarm				Only for electronic EXV
setpoint	1,6 bar	3.0	-1.0-9.9	
diff.	0.1 bar	0.1 bar	-99.9-99.9	

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
Low pressure alarm delay				
start	60 sec	60 sec	0-999	
run	40 sec	40 sec	0-999	
Pressure ratio alarm				
setp min load	1.4	1.4	0-9,9	
setp max load	1.8	1.8	0-9,9	
Pressure ratio alarm delay				
start	180 sec	180 sec	0-999	
run	90 sec	90 sec	0-999	
High oil DP alarm				
setp	2.5 bar	2.5 bar	0-99	
delay	20 sec	20 sec	0-999	
Liquid injection				
setpoint	85,0 °C	85,0 °C	0-999,9	
diff.	10,0 °C	10,0 °C	0-99,9	
EXV preopening	FR400 50% FR3200 20%	FR400 50% FR3200 20%	0-100%	
Expansion board test				If type FC=2
Check time	45 sec	45 sec	0-999sec	
Refresh	N	N	0-999sec	

A password is required to access the following forms on the EXV valve.

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
EXV #1 settings				
Actual position	Variable	Variable	0-9999	
Manual position	500	500	0-9999	
Enable EXV manual	AUTO	AUTO	AUTO MANUAL	
EXV #2 settings				
Actual position	Variable	Variable	0-9999	
Manual position	500	500	0-9999	
Enable EXV manual	AUTO	AUTO	AUTO MANUAL	

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
EXV settings Valve type	"ALCO EX8",	"ALCO EX8",	ALCO EX5-EX6", "ALCO EX7", "ALCO EX8", "SPORLAND SEI 0.5-11", "SPORLAND SEI 25", "SPORLAND SEH 50-250", "DANFOSS ETS50", "DANFOSS ETS100", "DANFOSS X", "CAREL E2V", "CAREL NEW", "CUSTOM"	SEH 50-250
gas type	R134A	R407C	R22 R134a R404a R407c R410a R507c R290 R600 R600a R717 R744"	
EXVs settings Opening extra steps Closing extra steps Time extra steps	 Y Y 0 sec	 Y Y 0 sec	 Y/N Y/N 0-9999	
EXV settings SH (superheat) setpoint dead band	 6.0 °C 0.0 °C	 6.0 °C 0.0 °C	 0-50,0 0-9,9	
EXV settings Prop. Factor Integral factor Differential factor	 80.0 30 sec 0.5 sec	 80.0 30 sec 0.5 sec	 0-99,9 0-999 0-99,	For SHE 50-250 35 30 1
EXV settings Low SH protection setpoint integral time	 1.0 °C 1 sec	 1.0 °C 1 sec	 -4,0-21,0 0-300	
EXV settings LOP protection setpoint integral time	 -30 °C 4,0 sec	 -30 °C 4,0 sec	 -50,0-70,0 0-60,0	
EXV settings MOP protection setpoint integral time	 12,0 sec 4,0 sec	 12,0 sec 4,0 sec	 -50-70sec 0-99,9sec	
EXV settings MOP protection startup delay	 90 sec	 90 sec	 0-600sec	

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
EXV settings Suction temperature protection high limit	60.0 ℃	60.0 ℃	-50-100℃	
Custom EXV setting min steps max steps	 - -	 - -	 0-8100 0-8100	
Custom EXV setting closing steps back steps	 - -	 - -	 0-8100 0-8100	
Custom EXV setting Opening extra steps Closing extra steps	 - -	 - -		
Custom EXV setting phase current still current	 - -	 - -	 0-750 0-750	
Custom EXV setting step rate duty-cycle	 - -	 - -	 31-330 1-100%	
Setting of EXV pressure sensor Min value Max value	 -0.5 bar 7.0 bar	 0.0 30	 -1-50 '-1-50	
EXV 1 settings battery present pLAN present	 Y Y	 Y Y		
EXV 2 settings battery present pLAN present	 Y Y	 Y Y		

7.5.1 Fan Steps Settings

Refrigerant R134a	Setpoint/Diff.				
Available steps	STEP 1	STEP 2	STEP 3	STEP 4	
1	N.A.	-	-	-	
2	11.0/4.0	14.0/5.0	-	-	
3	10.0/3.0	12.0/2.0	14.0/2.0	-	
4	8.5/1.5	10.0/2.0	12.0/2.5	14.0/2.0	Available only for electronic expansion valve

Refrigerant R407C	Setpoint/Diff.				
Available steps	STEP 1	STEP 2	STEP 3	STEP 4	
1	N.A.	-	-	-	
2	15.0/ 4.0	18.0/ 4.0	-	-	
3	15.0/ 4.0	17.0/ 3.0	18.0/ 3.0	-	
4	15.0/4.0	16.0/2.0	17.0/2.0	18.0/2.0	Available only for electronic expansion valve

7.5.2 Speedtroll Steps Settings

Refrigerant R134a	Setpoint/Diff.				
Available steps	STEP 1	STEP 2	STEP 3	STEP 4	
1	12.0/ 3.0	-	-	-	
2	12.0/3.0	14.0/3.0	-	-	
3	12.0/3.0	12.0/3.0	14.0/3.0	-	
4	12.0/3.0	13.0/3.0	13.5/3.0	14.5 / 3.0	Available only for electronic expansion valve

Refrigerant R407C	Setpoint/Diff.				
Available steps	STEP 1	STEP 2	STEP 3	STEP 4	
1	17.0 / 4.0	-	-	-	
2	17.0 / 3.0	20.0 / 3.0	-	-	
3	17.0 / 3.0	19.0 / 3.0	20.0 / 3.0	-	
4	17.0 / 3.0	19.0 / 3.0	20.0 / 3.0	21.0 / 3.0	Available only for electronic expansion valve

7.6 5.6 Maintenance Menu (maint)

In this section, it is possible to set the maintenance parameters by accessing the following forms:

- Working time of evaporator pump/condenser pump
- Working time and number of startups of compressor
- PID control status (only master):
- Correction of pressure and temperature sensors
- Correction of compressor running time
- Correction of number of compressor starts
- Correction of compressor load input signals

By entering the maintenance password, it is possible to access the forms for maintenance parameters input.

Hour counter Pump Evap. *High Amb. Temp./*Low Amb. Temp.	 000000
Compressor C:1 Hour counter Number of starts	 000000 00000
Last comp.start C:1 Last comp. Stop	00/00/00 00:00 00/00/00 00:00
EXV Driver State C:1 Batt. Resist Batt.voltage	 000.0 00.0
Compressor C:2 Hour counter Number of starts	 000000 00000
Last comp.start C:2 Last comp. Stop	00/00/00 00:00 00/00/00 00:00
EXV Driver State C:2 Batt. Resist Batt.voltage	 000.0 00.0
Cooling PID Errors Prop. Int. Der.	 03.1°C 3276.0°Cxsec 000.0°C/min
Cool. PID Act	1000

Proportional Integral Derivative	1000 0000 1000
Cooling Reg. Disable stop Increase Stop	 N/Y N/Y
Global PID request Load Unload Standby	 Y/N N/Y N/Y
Digit maintenance password	

The maintenance password is required to access the following forms

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
Evap pump hour counter Threshold reset adjust	 10x1000 N	 10x1000 N	 0-999x1000	
Compressor #1 hours counter Threshold reset adjust	 10x1000 N 000000	 10x1000 N 000000	 0-999x1000	
Compressor #1 starts reset adjust	 N 000000	 N 000000		
Compressor #2 hours counter Threshold reset adjust	 10x1000 N 000000	 10x1000 N 000000	 0-999x1000	
Compressor #2 starts reset adjust	 N 000000	 N 000000		
Water temperature regulation band	3,0°C	3,0°C	0-99,9°C	
dead band max temp. reduction rate	0,2°C 1,2°C/min	0,2°C 1,2°C/min	0-band 0,2-99,9°C/min	
Startup DT shutdwon DT	2,6°C 1.7°C	2,6°C 1.7°C	0-99,9°C 0-99,9°C	
High ChLWT start LWT max load	 25°C 70%	 25°C 70%	 0-99,9°C 0-100%	
Condensation setpoint	9.0 bar	15.0 bar		VFD or SPEEDTR condensation control
ChLWT setpoint limits Min Max	 4°C 10°C	 4°C 10°C	 -99,9-99,9°C -99,9-99,9°C	

Parameter	Refrigerant R134a	Refrigerant R407C	Allowable Range	Notes
Enabling of sensors /input signals	B1=Y B2=Y B3=Y B4=Y B5=Y B6=Y B7=Y B8=Y B9=Y B10=Y	B1=Y B2=Y B3=Y B4=Y B5=Y B6=Y B7=Y B8=Y B9=Y B10=Y		
Sensor Offset	0	0		
Reload DT	0,7°C	0,7°C	-99-99°C	
Time to unload compressor	20 sec	20 sec	0-99s	

5.7 Service Menu (menu+maint)

Service parameters can be defined in this section by entering a password and accessing the followings forms:
-Compressors control (OFF/AUTO/MANUAL) and compressor load in manual mode
-Alarms reset

Compressor #1 Manual load State	 050% Manual/AUTO/OFF
Reset alarm buffer	N/Y
Compressor #2 Manual load State	 050% Manual/AUTO/OFF

7.7 Alarms Menu (alarm)

When an alarm condition occurs the display BUZZER sounds. By pressing the alarm key the current fault is displayed. By pressing the alarm key twice, the buzzer is stopped, and by pressing it three times the alarm is cleared.

REMARK: Sometimes, after an alarm has occurred, it is possible that also a spurious alarm of star/delta transition failed occurs; in this case fix the earlier alarm first and, only if the spurious one occurs again, check the electrical connections.

If the alarm is not cleared after pressing again the alarm key, it means that the fault conditions remain.

7.8 Buffer Alarm Menu (menu+alarm)

The last ten alarms of every chiller circuit are stored in this section.

Each form displays the date, the time and the description of the alarm. By pressing the enter key when an alarm description is displayed, the operating conditions at the time the alarm occurred (temperatures, pressures, expansion valve status and compressor load) are shown.

7.9 Alarm List

In the following table, the list of the possible alarms with the identifier number, the cause and the reset type (A = auto, M = manual) is shown

Alarm		Alarm cause	Reset
001	Phase monitor	Activation of the phase control device. The phases are not correctly sequenced or the supply voltage is out of acceptable limits	M
002	Freeze alarm	Antifreeze protection. The outlet water temperature has reached the antifreeze value.	M

Alarm		Alarm cause	Reset
005	Evaporator Flow alarm	Action by evaporator flow switch in a low flow condition. The water pump might be off	M
006	Low pressure alarm (transducer)	Low pressure intervention by microchip.	M
007	High discharge temperature alarm (temperature switch)	Action by discharge temperature switch	M
008	Fault transition	Starting procedure is not complete. Check the contactors	M
009	Low oil pressure	The oil pressure is not enough for the correct lubrication of compressor. Verify that the condensing pressure is at least 3 times the suction pressure 0	M
011	High oil pressure difference	High oil differential pressure. The oil filter could be dirty or the solenoid valve doesn't work correctly	M
012	High pressure alarm (pressure switch)	Action by high pressure mechanical switch	M
016	Compressor overload	Action by thermal protection of compressor motor or by high temperature switch	M
023	High pressure alarm (transducer)	Action by microchip on high pressure	M
030	B1 sensor /input faulty or not connected	B1 sensor error	M
031	B2 sensor /input faulty or not connected	B2 sensor error	M
032	B3 sensor /input faulty or not connected	B3 sensor error	M
033	B4 sensor /input faulty or not connected	B4 sensor error	M
034	B5 sensor /input faulty or not connected	B5 sensor error	M
035	B6 sensor /input faulty or not connected	B6 sensor error	M
036	B7 sensor /input faulty or not connected	B7 sensor error	M
037	B8 sensor /input faulty or not connected	B8 sensor error	M
039	Evaporator pump maintenance	Request of evaporator pump maintenance	M
040	Condenser pump maintenance	Request of evaporator pump maintenance	M
041	Compressor maintenance	Request of compressor maintenance	M
050	Unit 1 offline	Compressor #1 network error	A
051	Unit 2 offline	Compressor #2 network error	A
052	Unit 3 offline	Compressor #3 network error	A
053	Unit 4 offline	Compressor #4 network error	A
D01	EXV Driver sensor /input fault	Driver EXV sensor /input error	A
D02	EXV step motor error	EXV valve motor error	A
D03	EXV Driver Eeprom error	Driver EXV eeprom Error	M
D04	EXV Driver battery error	Driver EXV battery error	A
D08	EXV not closed during power off	Valve doesn't close on power failure	M
	Alarms Expansion E	Expansion Board Offline or not recognized	M

8 Description of the fan control system

The microchip controller allows fan control system to achieve a more accurate and reliable control of condensation, even under severe environmental conditions.

The controller allows setting, under manufacturer password, the followings fans control logic:

Steps: it is possible to set up to four steps of control of the fans. Each step requires that an activation pressure value is entered through the keyboard along with a differential pressure value (to deactivate step).

Continuous regulation of speed: Through a signal 0-10Vdc, it is possible to control an external regulator of speed. In addition to regulating the rotation speed of the fans according to the condensing pressure, the controller can switch them on/off.

Regulation with Speedtroll system: The logic of regulation of this system combines the benefits of the variable speed control with the simplicity of a steps control. The speed regulator is applied only to some fans, while the others are controlled with the steps system. Such system allows the unit to operate under low air temperatures without having to install complex and more expensive solutions

The Fan Quiet Mode function helps reduce the noise of the unit by limiting the maximum fan speed in accordance with a time schedule. The function may operate only if a continuous speed regulation is used (single or double inverter); its parameters may be set under “User” password. The function is overridden anytime the condensation pressure exceeds the condenser hold pressure threshold.

9 Setpoint change of the refrigerated water

Among the controller's options, there are also many possibilities to regulate the unit with particular logics or outside signals.

One of the functions that engineers and technicians find most useful, is the possibility to modify the local control setpoint of the refrigerated water in accordance with the following logics:

Double SetPoint: Through an external contact (optionally a switch is installed on the electric panel control), it is possible to vary the local setpoint of control between two well defined values. Such option results advantageously applicable in case of installation with ice bank. Such application normally requires a positive setpoint (e.g. 7°C) to be used in the daytime and a second negative setpoint (e.g. -5°C) for the night time. Of course, in the case that the water temperature at the evaporator outlet is lower than 4°C, the correct amount of antifreeze must be added to the water system.

From external signal: By using an external 4-20mA signal, it is possible to modify the value of the local setpoint within predetermined minimum and maximum limits.

From evaporator water Delta T: A reduction in the evaporator water Dt -adjustable under password "Consumer"- corresponds to an increase in the setpoint for refrigerated water temperature control. Such logic of control allows an energetic saving when the unit works at partial load and may be used to simulate the control of return temperature.

10 Limitation of unit load

This function is useful in all those situations where a reduction in the electric consumption of the unit is necessary during certain hours of the day.

It is possible to limit the power consumption of the unit by using any of the two options available under “User” password.

The first way, called “Demand limit” requires a 4-20mA external signal; the unit max load decreases from 100% to 0% as the input increase from 4mA to 20mA. Inputs lower than 4mA have no effect on the unit.

The second way, called “Current limit” requires a direct measurement of the current absorbed by the unit and the setting of the maximum current to be absorbed.

11 Soft load

This function, which can be accessed through the keyboard under User password, limits unit load to a preset value for a pre-determined period of time after unit startup. This function is applicable in situations where the water temperature is high at the startup but thermal load is not consistently high. This logic allows energy saving during unit startup and prevents compressors from unnecessary overloading.

12 Startup with high evaporator water temperature

This function limits the load of each compressor to a set value (default 70%), until the outlet water temperature is over the set value (default 25°C). Such logic helps the startup of the unit when the water temperature is very high (35-40°C), avoiding dangerous superheating of the motor and undesirable triggering of the high pressure protection.

The values of maximum compressor load and water temperature limit are modifiable under "User" password.

13 Startup inhibition

The controller can manage the startup and the shut down of the unit in accordance with manifold logics in function of the requested application.

On/Off Local: unit shutdown through controller (On/Off key). If the switch is enabled, "Off Keypad" will appear on the status display of the unit

Remote On/Off: unit shutdown through digital contact.

If the panel switch is in the “0” position the unit is off by local switch and on the display will appear “Off Loc/Rem Sw”.

- If the switch is in “Loc” position the unit is on (unless other shutdown conditions prevail).
- When the switch in "Rem" position, the digital contact control allows the startup and the shutdown of the unit from a remote location. When the unit is stopped remotely, "Off Loc/Rem Sw”" will appear on the status display of the unit

On/Off Network: this function allows the startup and the shutdown of the unit through supervision system PlantVisor 1.0. If the function is enabled, "Off Rem" will appear on the status display of the unit.

On/Off Time Schedule: this function, if enabled, allows the startup and the shutdown of the unit in accordance with a user defined time schedule. In the case the function is enabled, "Off Time Schedule" will appear on the status display of the unit.

14 Appendix 1: Software upload to the controller

It is possible to upload the software into the controller using two different ways: using the direct download from a personal computer or using the Carel programming key.

14.1 Direct upload from PC

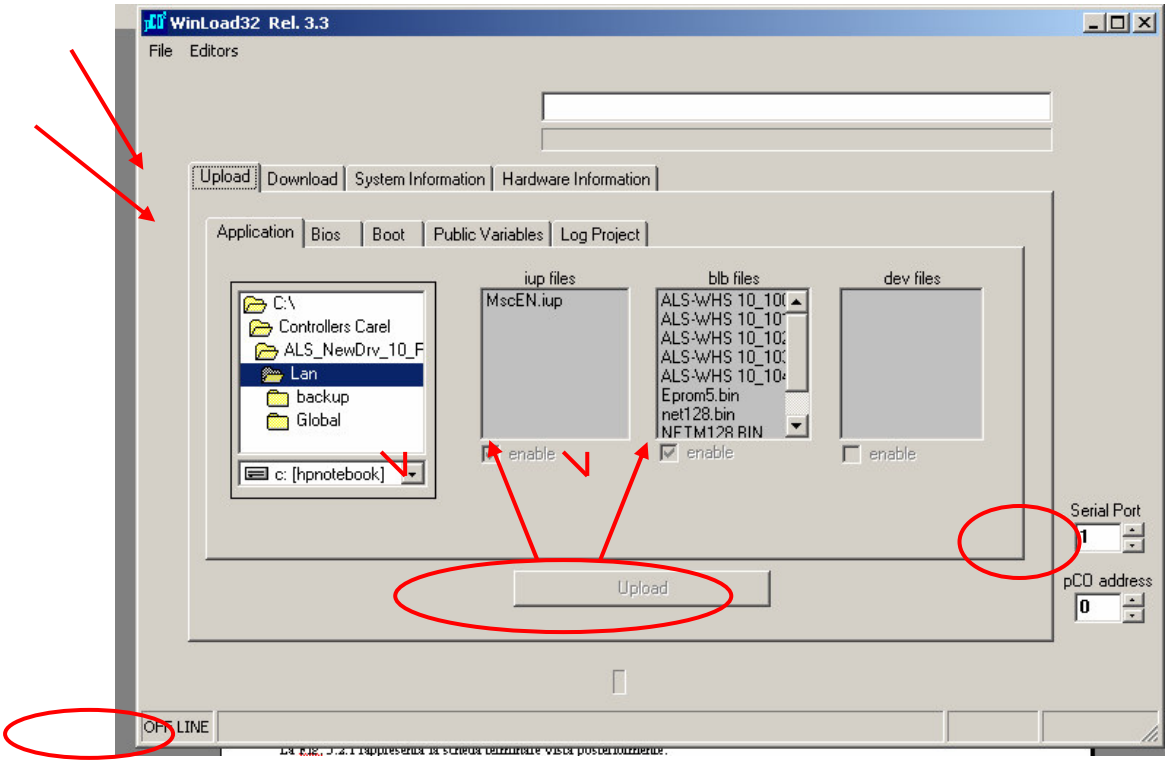
To upload the program, it is necessary:

- to install in the PC the program Winload supplied by Carel and available on the web site ksa.carel.com. It may also be requested to Daikin.
- to connect the PC, by means of a RS232 serial cable, to the Carel RS232/RS485 adapter (code 98C425C001)
- to connect the RS485 adapter port to the controller terminal port (J10) using a 6 wire phone cable (terminal cable)
- to disconnect the controller from pLAN and to set the net address to 0.
- Switch on the controller and run Winload, select the correct serial port number you are using and wait (a few tenths of a second) for the "ON LINE" status (this means that the program is connected to the controller).
- Then select the "Upload" folder and the "Application" section and select all program files supplied by Daikin (one file in the "blb files" box and one or more files in the "iup files" box).

Then press the "Upload" button and wait until the transfer is completed; the program shows the progress of the transfer phase in a window and when the process is completed the "UPLOAD COMPLETED" message will appear.

Finally turn off the controller, disconnect it from the PC, reconnect the pLAN and set the right net address.

This procedure has to be applied to all controllers on the unit.



14.2 Upload from programming key

To upload the program using the Carel programming key (code xxxxxxxx) it is necessary to first upload the program to the key and then download it on one or more controllers. The same procedure has to be used for both operations, just selecting the right position of the key switch:

Key switch position	Transfer type
1 (green light)	key programming from pCO²
2 (red light)	pCO² programming from key

The procedure is described as follows.

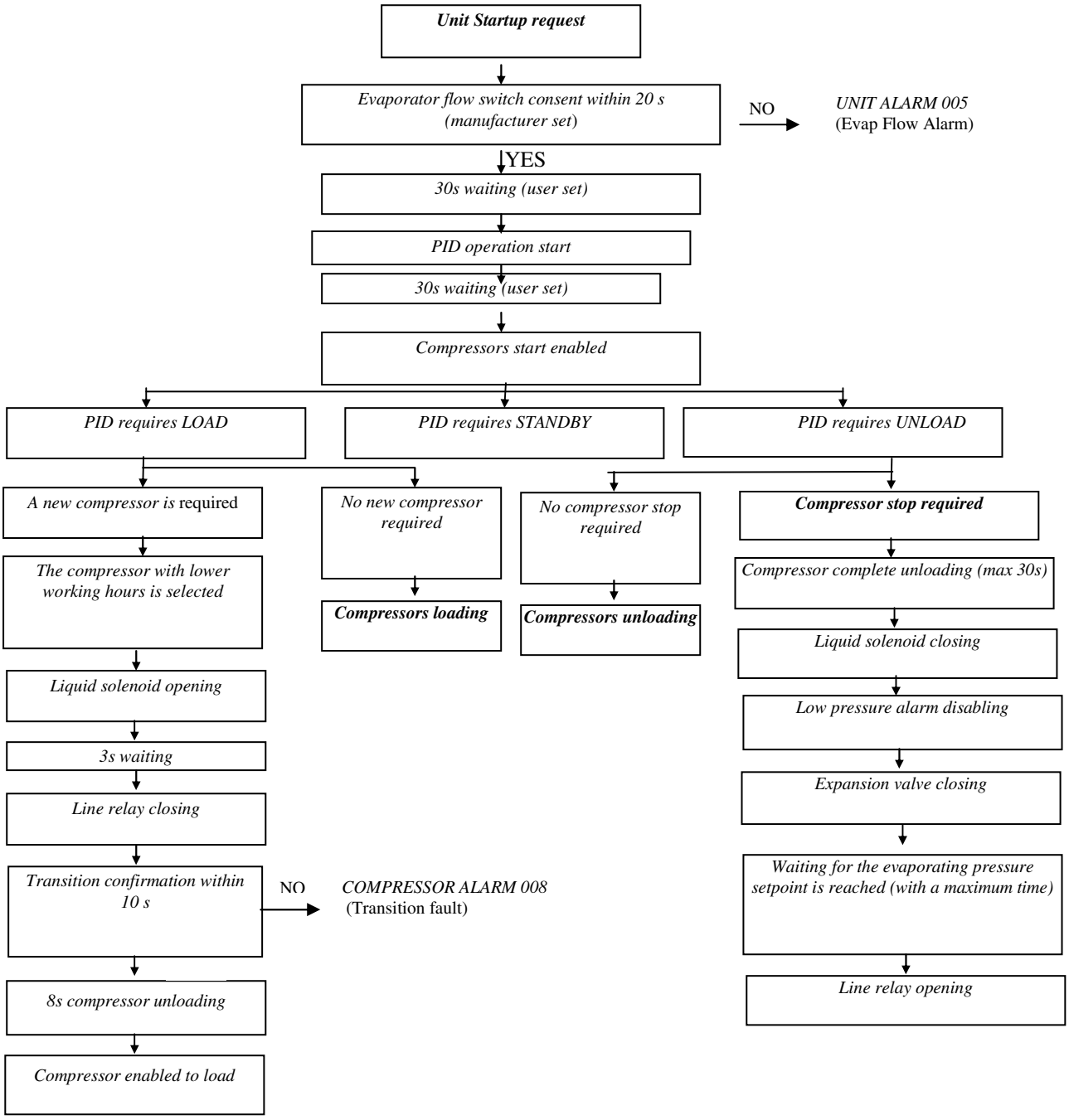
- disconnect the controller from pLAN and set the net address to 0.
- select the right key switch position

- insert the key in the “expansion memory” connection (remove the cover if necessary)
- press “up” and “down” keys at the same time and switch on the controller
- press “enter” key to confirm the operation
- wait until the controller boots up
- turn off the controller
- remove the key.

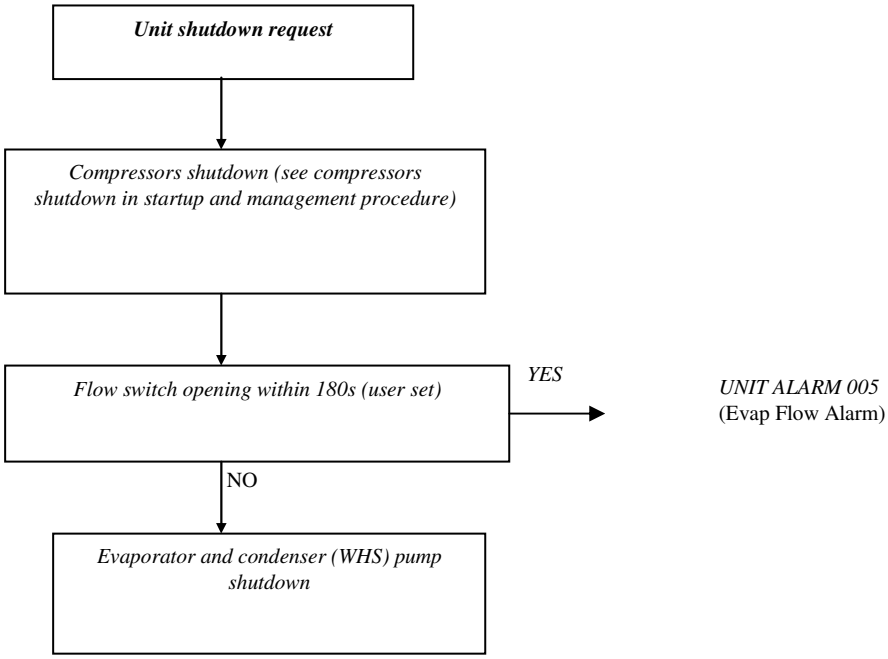
In case no controller with an installed programme is available, the key may be programmed using the same procedure described for the direct upload from a PC. In this case, with the key inserted in the controller and the key switch in position 2 (red light), the program will be written on the key instead of on the controller.

15 Appendix 2: Unit and compressor startup and shutdown procedure

In the following paragraphs, the unit startup, management and shutdown procedures are shown. In addition to this, the compressors loading and unloading strategy is shown.



Unit startup and compressors management



Unit Shutdown

Compressors startup and loading management (4 compressors)

Step n.	Leader Comp.	Lag 1 Comp.	Lag 2 Comp.	Lag 3 Comp.
0	Off	Off	Off	Off
1	If (T – SetP) < Startup DT & Cooling or (SetP - T) < Startup DT & Heating Waiting			
2	Start	Off	Off	Off
3	Load up to 75%	Off	Off	Off
4	If T in Regulation Band Wait inter-stage time			
5	If T is approaching SetP – Waiting			
6a (T in reg band)	Unload up to 50%	Start	Off	Off
6b (T out of reg band)	Fixed at 75%	Start	Off	Off
6	Fixed at 75% or 50%	Load up to 50%	Off	Off
7 (if leader at 50%)	Load up to 75%	Fixed at 50%	Off	Off
8	Fixed at 75%	Load up to 75%	Off	Off
9	If T in Regulation Band Wait inter-stage time			
10	If T is approaching SetP – Waiting			
10a (T in reg band)	Fixed at 75%	Unload up to 50%	Start	Off
10b (T out of reg band)	Fixed at 75%	Fixed at 75%	Start	Off
11	Fixed at 75%	Fixed at 75% or 50%	Load up to 50%	Off
12(if lag1 at 50%)	Fixed at 75%	Load up to 75%	Fixed at 50%	Off
13	Fixed at 75%	Fixed at 75%	Load up to 75%	Off
14	If T in Regulation Band Wait inter-stage time			
15	If T is approaching SetP – Waiting			
16a (T in reg band)	Fixed at 75%	Fixed at 75%	Unload up to 50%	Start
16b (T out of reg band)	Fixed at 75%	Fixed at 75%	Fixed at 75%	Start
17	Fixed at 75%	Fixed at 75%	Fixed at 75% or 50%	Load up to 50%
18(if lag2 at 50%)	Fixed at 75%	Fixed at 75%	Load up to 75%	Fixed at 50%
19	Fixed at 75%	Fixed at 75%	Fixed at 75%	Load up to 75%
20	Load up to 100%	Fixed at 75%	Fixed at 75%	Fixed at 75%
21	Fixed at 100%	Load up to 100%	Fixed at 75%	Fixed at 75%
22	Fixed at 100%	Fixed at 100%	Load up to 100%	Fixed at 75%
23	Fixed at 100%	Fixed at 100%	Fixed at 100%	Load up to 100%
24	Fixed at 100%	Fixed at 100%	Fixed at 100%	Fixed at 100%

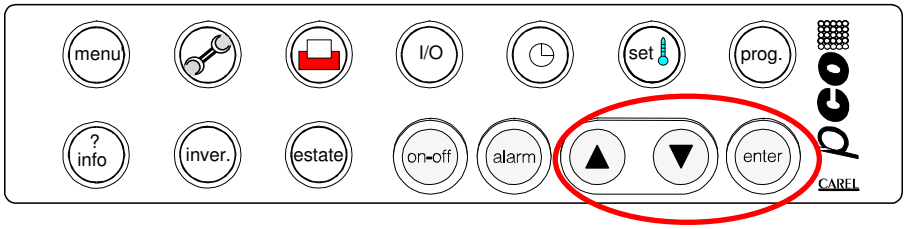
Compressors unload and shutdown management (4 compressors)

Step n.	Leader Comp.	Lag 1 Comp.	Lag 2 Comp.	Lag 3 Comp.
0	100%	100%	100%	100%
1	Fixed at 100%	Fixed at 100%	Fixed at 100%	Unload up to 75%
2	Fixed at 100%	Fixed at 100%	Unload up to 75%	Fixed at 75%
3	Fixed at 100%	Unload up to 75%	Fixed at 75%	Fixed at 75%
4	Unload up to 75%	Fixed at 75%	Fixed at 75%	Fixed at 75%
5	Fixed at 75%	Fixed at 75%	Fixed at 75%	Unload up to 50%
6	Fixed at 75%	Fixed at 75%	Unload up to 50%	Fixed at 50%
7	Fixed at 75%	Fixed at 75%	Fixed at 50%	Unload up to 25%
8	If T is approaching SetP – Waiting			
8a (T in reg band)	Fixed at 75%	Fixed at 75%	Load up to 75%	Stop
8b (T not in reg band)	Fixed at 75%	Fixed at 75%	Fixed at	Stop
9 (if lag2 at 75%)	Fixed at 75%	Fixed at 75%	Fixed at	Off
10	Fixed at 75%	Unload up to 50%	Fixed at 50%	Off
11	Fixed at 75%	Fixed at 50%	Fixed at 25%	Off
12	If T is approaching SetP – Wait …..			
13a (T in reg band)	Fixed at 75%	Load up to 75%	Stop	Off
13b (T out of reg band)	Fixed at 75%	Fixed at 50%	Stop	Off
14(lag1 at 75%)	Fixed at 75%	Unload up to 50%	Off	Off
15	Unload up to 50%	Fixed at 50%	Off	Off
16	Fixed at 50%	Unload up to 25%	Off	Off
17	If T is approaching SetP – Waiting			
18a (T in reg band)	Load up to 75%	Stop	Off	Off
18b (T out of reg band)	Fixed at 50%	Stop	Off	Off
19	Unload up to 25%	Off	Off	Off
20	If T is approaching SetP – Waiting			
21	If (SetP - T) < Shutdown DT & Cooling or (T – SetP) < Shutdown DT & Heating Wait			
22	Stop	Off	Off	Off
23	Off	Off	Off	Off

Appendix 3: pLAN settings

Such operation must be performed if a terminal is added to the pLAN or if settings are changed.

1. Keep the keys “Up”, “Down” and “Enter” pressed for at least 10 seconds



2. A screen will appear with the terminal address and with the address of the board in examination

```
Terminal  Adr: 16
I/O Board Adr: n
```

Using the “Up” and “Down” keys, it is possible to choose the different board (1, 2, 3, 4 for the compressors and 5, 7, 9, 11 for the electronic valve drivers)

Select 1 for “I/O Board Adr” (Board with address 1) and push “Enter”. In about two seconds the following screen will appear:

```
Terminal Config

Press ENTER
To continue
```

3. Push “Enter” again; the following screen will appear:

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

4. If you had to add a second terminal (remote terminal), change the line “Trm2 None –“ with the line “Tmr2 17 sh”. To enable the new configuration, put the pointer on “No” (using the key “Enter”) and with “Up” and “Down” change it to “Yes” and push “Enter”. The operations 1 through 3 must be repeated for all the compressor boards (“I/O Board” from 1 to 4)

At the end of operations turn off and restart the system.

Remark:

It is possible after restart, that the terminal is stuck on a unit. This is due to the fact that the memory of the Drivers remains fed by the buffer battery and retains the data of the preceding configuration. In this case, with the system not fed, it is enough to disconnect batteries from all the drivers and connect them again.

16 Appendix 3: Physical IN/OUT

The software refers to the configuration of the input and output channels of the controller as shown below (Air-cooled chillers).

16.1 Digital input

N	BOARD#1	BOARD#2
1	Compressor #1 On/Off	Compressor #3 On/Off
2	Compressor #2 On/Off	Compressor #4 On/Off
3	Evaporator Flow Switch	---
4	Phase monitor	---
5	Double Setpoint (Ice Mode)	---
6	High Pressure Switch #1	High Pressure Switch #3
7	High Pressure Switch #2	High Pressure Switch #4
8		---
9	Current Limit enable	---
10	Low Pressure Switch #1	Low Pressure Switch #3
11	Low Pressure Switch #2	Low Pressure Switch #3
12	Transition Fault #1	Transition Fault #3
13	Transition Fault #2	Transition Fault #4
14	OverLoad #1	OverLoad #3
15	OverLoad #2	OverLoad #4
16	On/ Off Unit	---
17	Remote Start/ Stop	---
18	External alarm	---

16.2 Analogue input

N	BOARD #1	BOARD #2
B1	Oil pressure #1	Oil pressure #3
B2	Oil pressure #2	Oil pressure #4
B3	Setpoint Override	---
B4	Gas temperature on compressor discharge #1	Gas temperature on compressor discharge #3
B5	Gas temperature on compressor discharge #2	Gas temperature on compressor discharge #4
B6	Gas pressure on compressor discharge #1	Gas pressure on compressor discharge #3
B7	Gas pressure on compressor discharge #2	Gas pressure on compressor discharge #4
B8	Demand limit/Current limit	---
B9	In water Temperature (common on 2 evap unit)	In water Temperature (common on 2 evap unit)
B10	Evaporator Out water Temperature (common on 2 evap unit)	Evaporator Out water Temperature (common on 2 evap unit)

16.3 Digital output

N	BOARD #1	BOARD #2
1	Start Compressor #1	Start Compressor #3
2	Load compressor #1	Load compressor #3
3	Unload compressor #1	Unload compressor #3
4	Liquid injection #1	Liquid injection #3
5	Liquid Line #1 (*)	Liquid Line #3 (***)
6	First step fan #1	First step fan #3
7	Second step fan #1	Second step fan #3
8	Third step fan #1	Third step fan #3
9	Start Compressor #2	Start Compressor #4
10	Load compressor #2	Load compressor #4
11	Unload compressor #2	Unload compressor #4
12	Evaporator water pump	---
13	Unit Alarm	---
14	Liquid injection #2	Liquid injection #4
15	Liquid line #2 (**)	Liquid line #4 (****)
16	First step fan #2	First step fan #4
17	Second step fan #2	Second step fan #4
18	Third step fan #2	Third step fan #4

(*) If Thermostatic expansion valve is used. Fourth step fan #1 if electronic expansion valve is used
(**) If Thermostatic expansion valve is used. Fourth step fan #2 if electronic expansion valve is used
(***) If Thermostatic expansion valve is used. Fourth step fan #3 if electronic expansion valve is used
(****) If Thermostatic expansion valve is used. Fourth step fan #4 if electronic expansion valve is used

16.4 Analogue output

N	BOARD #1	BOARD #2
1	VFD output signal #1	VFD output signal #3
2	Second VFD output signal #1	Second VFD output signal #3
3	SPARE	SPARE
4	VFD output signal #2	VFD output signal #4
5	Second VFD output signal #2	Second VFD output signal #4
6	SPARE	SPARE

17 Appendix 4: Exp. Board #1 physical IN/OUT

The software refers to the configuration of the input and output channels of the Expansion board as shown below:

17.1 Analogue Input

N	Expansion BOARD #1	TYPE
1	Ambient temperature	---
2	SPARE	---
3	SPARE	---
4	SPARE	---

17.2 Digital Input

N	Expansion BOARD #1
1	SPARE
2	SPARE
3	SPARE
4	SPARE

17.3 Analogue Output

N	Expansion BOARD #1
1	SPARE

17.4 Digital Output

N	Expansion BOARD #1
1	Economizer #1
2	Economizer #2
3	Economizer #3
4	Economizer #4

Daikin units comply with the European regulations that guarantee the safety of the product.

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