

PJ easy ECOBOX-EVO - electronic controller for energy saving display cabinets and showcases

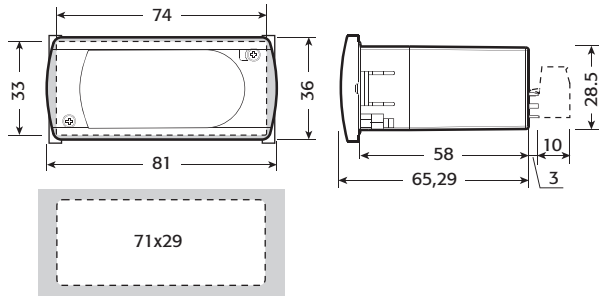
CAREL



Description
ECOBX-EVO represents a range of electronic microprocessor controllers with LED display developed for the management of the energy saving display cabinets and showcases, by the detection of door-switch. The status of the door-switch determines the change of set point and ON/OFF of the light. Two representative codes of the ECOBOX-EVO range are:

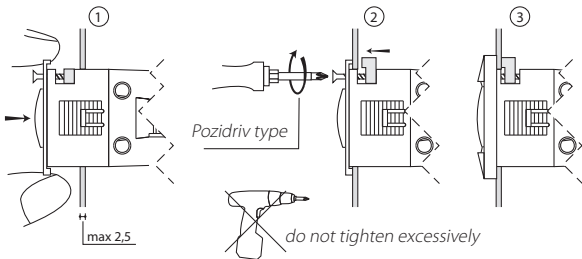
- PZHBCOH00V (230VAC 2HP 8A 8A 2NTC 1D.I. REMOVABLE TERMINALS RED DISPLAY)
- PZHBCOH12V (115VAC 2HP 8A 8A 2NTC 1D.I. SPADE TERMINALS RED DISPLAY).

Dimensions (mm)

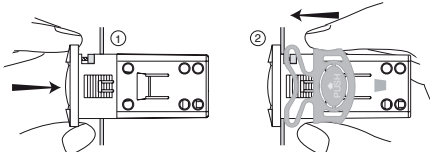


Panel mounting

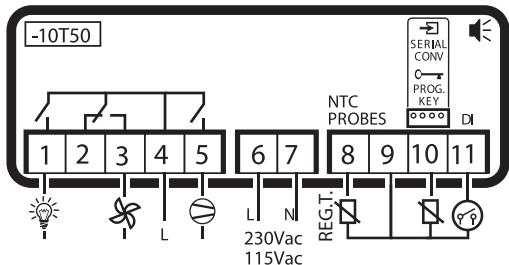
Front (with 2 screws ø 2,5x12 mm)



Rear (with 2 quick-fit side brackets)



Electrical connections



Inputs:

- PINS:8-9 Regulation probe (air return temperature)
- PINS:10-9 Function of the 2nd input is defined by the parameter A11
A11=0 = Evaporator probe (default);
A11=1 = Condenser probe;
A11=2 = High pressure switch;
A11=3 = Evaporator probe and high pressure switch;
- PINS:11-9 Door switch (or curtain switch)

Optional accessories

serial conv.	IROPZ485S0
prog. key	IROPZKEY*

Alarms table

Alarm code	Buzzer	Alarm LED	Description	Reset
E0	active	ON	Regulation probe error	automatic
E1	inactive	ON	Second probe error	automatic
E2	inactive	ON	Door switch fault	automatic
E3	inactive	ON	Mitigation algorithm: when enabled, if regulation temperature > /b and increasing	automatic
dOr	active	ON	Open door alarm	automatic
LO	active	ON	Low temperature alarm	automatic
HI	active	ON	High temperature alarm	automatic
EE	inactive	ON	Internal parameters error	not possible
EF	inactive	ON	Operating parameters error	automatic
dF	inactive	OFF	Defrost is on going	automatic
cht	inactive	ON	CO2 Condenser High Temperature: pre-alarm status	Automatic
CHt	active	ON	CO2 Condenser High Temperature: alarm status.	Manual(A14 =0) Automatic(A14 >0)
Err	active	ON	Refrigerant System Failure Alarm: alarm status	automatic
ECO	inactive	OFF	ECO mode is on going	automatic
CCP	active	ON	Cold Climate Protection mode is on going	automatic
hPr	active	ON	CO2 High pressure alarm: pre-alarm status	automatic
HPr	active	ON	CO2 High pressure alarm: alarm status	manual

Technical specifications

power supply (*)	230 Vac +10 /-15% 50/60 Hz; 115 Vac +10 /-15% 50/60 Hz
rated power	3,5 VA
inputs (*)	NTC probes 1 or 2 inputs. Digital input as third input
relay outputs (*)	2 HP relay UL: 12 A Res. 12 FLA 72 LRA - 240 Vac (***), UL: 12 A Res. 10 FLA 60 LRA - 240 Vac (****) EN60730-1: 10(10) A 250 Vac (**) 16 A relay UL: 12 A Res. 5 FLA 30 LRA - 240 Vac C300, EN60730-1: 12(2) A NO/NC, 10(4) A up to 60 °C NO, 2(2) A CO - 250 Vac 8 A relay UL: 8 A Res. 2 FLA 12 LRA - 240 Vac C300, EN60730-1: 8(4) A NO, 6(4) A NC, 2(2) A CO - 250 Vac
type of probe (*)	Std CAREL NTC 10 KΩ at 25 °C
connections (*)	screw terminals for cables with cross-sect. from 0.5 mm² to 1.5 mm². Plug-in terminals for screw blocks or with crimped contact (cable cross-sect. up to 2.5 mm²). Rated maximum current per terminal 12 A.
assembly (*)	terminal: using screws from the front panel or with rear brackets. Interface: wall mounting, 4 screws, spacing 101x151 mm
display	3 digit LED display with sign (-199 to 999) and decimal point; six status LEDs
operating conditions	-10T50 °C - humidity <90% rH non-condensing
storage conditions	-20T70 °C - humidity <90% rH non-condensing
range of measurement	-50T90 °C (-58T194 °F) - resolution 0.1 °C/°F
front panel index of protection	panel installation with IP65 type 1 gasket
case	plastic terminal, 81x36x65 mm
classification according to protection against electric shock	Class II when suitably integrated
environmental pollution	normal
PTI of the insulating material	250 V
period of stress across the insulating parts	long
category of resistance to heat and fire	category D (UL94 - V0)
immunity against voltage surges	category 1
type of action and disconnection	1C relay contacts
no. of relay automatic operating cycles (*)	EN60730-1: 100,000 operations UL: 30,000 operations (250 Vac)
software class and structure	Class A
cleaning the instrument	Only use neutral detergents and water.
cable max. lenght	serial: 1 km; probes: 30 m; relay: 10 m

Warning: do not run the power cable less than 3 cm from the bottom part of the device or from the probes; **for the connections only use copper wires.**
(*) The features indicated differ according to the model.
(**) T OFF minimum time between two starts of the motor must be greater than 60 s.

Parameters table

	PARAMETER	Min	Max	UOM	Def.	SPV
PS	Password	0	200	-	22	I20
/	PROBE PARAMETERS					
/2	Measurement stability	1	15	-	4	I21
/4	Select probe/input displayed	1	5	-	1	I22
/5	Select °C/°F (0=°C; 1=°F)	0	1	-	0	D27
/6	Disable decimal point (0=enable; 1=disable)	0	1	-	0	D28
/8	Mitigation algorithm: visualization offset	-99,0	99,0	°C/°F	0	A25
/9	Mitigation algorithm: min displayed value	-40,0	/A	°C/°F	-3,5	A26
/A	Mitigation algorithm: max displayed value	/9	/b	°C/°F	3,0	A27
/b	Mitigation algorithm: signalling threshold 1	/A	199,0	°C/°F	13,0	A28
/E	Mitigation algorithm: visualization filter	0	50	-	0	I63
/C1	Probe 1 calibration	-50,0	50,0	°C/°F	0	A5
/C2	Probe 2 calibration	-50,0	50,0	°C/°F	0	A6
r	REGULATION PARAMETERS					
St	DAY setpoint.	r1	r2	°C/°F	4	A8
rd	DAY differential	0	19,0	°C/°F	2	A9
r1	Minimum DAY set point allowed.	-50	r2	°C/°F	-50	A10
r2	Maximum DAY set point allowed.	r1	200	°C/°F	90	A11
r4	NIGHT setpoint delta (automatically added to St)	-50	50	°C/°F	3	A12
r5	NIGHT differential.	0,0	19,0	°C/°F	4,0	A13
r6	Automatic DAY to NIGHT switch: max time period with close door.	0	90	Hours	4	I23
r7	Automatic NIGHT to DAY switch: max time period in Night mode	1	90	Hours	6	I24
r8	Manual DAY to NIGHT switch, by keyboard: time to allow the door closure (when installed into the cabinet)	0	90	seconds	10	I25
CCt	Cold Climate Protection mode: temperature delta	0,1	20,0	°C/°F	2,0	A14
CCd	Cold Climate Protection mode: time delay	0	199	Min	30	I26
Pt	Pull Down mode: start temperature threshold	0	127	°C/°F	30,0	A15
Pd	Pull Down mode: max duration time	0	250	Hours	250	I27
r9	Pull Down mode: ECO mode inhibition time after P.D.	0	24	Hours	0	I28
r10	Automatic NIGHT to DAY switch: light activation delay	0	24	Hours	0	I29
c	COMPRESSOR PARAMETERS					
c0	Comp. and Fan start delay at power-up.	0	100	Min	0	I30
c1	Min. time between consecutive comp. starts.	0	100	Min	0	I31
c2	Min. comp. OFF time.	0	100	Min	0	I32
c3	Min. comp. ON time.	0	100	Min	0	I33
c4	Comp. ON time when duty setting.	0	100	Min	0	I34
d	DEFROST PARAMETERS					
d0	Type of defrost d0 START END 0 by Time dI by Time dP 1 by Time dI by Time dP 2 by Temp. d10 or by Temp. 3 by Time dI or by Temp. dt, whichever come first.	0	3	-	0	I35
d01	Enable HOT GAS defrost 0=normal defrost (compressor OFF) 1= HOT GAS defrost (compressor ON)	0	1	-	0	D29
dI	START defrost condition: interval time between two defrosts	0	199	h/min (see dC)	8	I36
1dI	START defrost condition: interval time "dI" way of counting: 0=dI is always counted; 1=dI is counted only when Compressor is ON	0	1	-	1	D30
dt	END defrost condition: evaporator temperature threshold	-50	130	°C/°F	4	A16
dP	END defrost condition: max time defrost duration	1	199	min/s (see dC)	30	I37
d4	START defrost condition at power-on: every time the controller is plugged, a defrost is launched (0=no; 1=yes)	0	1	-	0	D31
d5	START defrost condition at power-on: defrost launch delay at power-on, when d4=1	0	199	min	0	I38
d6	DURING defrost, temperature displayed: d6=0 current temperature and "dF" are displayed; d6=1 "frozen" temperature is displayed	0	1	-	1	D32
dd	AFTER defrost: compressor stop time for dripping time	0	15	min	2	I39
d8	AFTER defrost: temperature alarms bypass time	0	15	Hours	1	I40
d9	START defrost condition: defrost priority over compressor protections (d9=1 c2, c3, c4 are bypassed)	0	1	-	0	D33
d/	Second probe reading (read only parameter)	-	-	°C/°F	-	A1
dC	Time base change for defrost test: dC=0: dI in hours, dP in minutes (default); dC=1: dI in minutes, dP in seconds.	0	1	-	0	D34
d10	START defrost condition: evaporator temp. start threshold (evap.temp.< d10)	-50,0	127,0	°C/°F	-10,0	A17

	PARAMETER	Min	Max	UOM	Def.	SPV
d11	ENABLE START defrost condition : air temp. enable threshold (air temp.< d11)	-50,0	127,0	°C/°F	15,0	A18
d13	DURING defrost, evaporator FAN status: d13=0 FAN ON (default); d13=1 FAN OFF	0	1	-	0	D35
d12	Refrigerant System Failure Alarm: total time with Compressor continuously ON and Regulation Probe doesn't decrease	A10	200	min	30	I41
d20	Refrigerant System Failure Alarm: samples evaluation time	3	200	min	3	I42
d21	Refrigerant System Failure Alarm: number of defrost tentative before RSF Alarm is detected.	1	5	-	1	I43
d22	Refrigerant System Failure Alarm: samples evaluation temperature minimum gap	0,0	5,0	°C/°F	0,1	A19
A	ALARM PARAMETERS					
A0	Temperature alarm differential	-20	20,0	°C/°F	2	A20
AL	LOW Temp. alarm: absolute threshold (A0≤0) or relative deviation (A0>0).	-50	250	°C/°F	0	A21
AH	HIGH Temp. alarm: absolute threshold (A0≤0) or relative deviation (A0>0).	-50	250	°C/°F	0	A22
Ad	Temperature alarm delay	0	199	min	0	I44
A10	Door open alarm delay	0	10	min	5	I45
A11	Probe 2 mode selection: A11=0 Evap.Temp., if enabled by Defrost (def); A11=1 CO2 Cond. High Temperature; A11=2 CO2 High Pressure Switch; A11=3 Evap. Probe and CO2 High Pressure Switch	0	3	-	0	I46
A12	CO2 High pressure alarm: alarm counter to request the manual reset	0	16	-	3	I47
A13	CO2 High pressure alarm: time to reset the alarm counter	0	240	hours	24	I48
A14	CO2 Cond. High Temp. / CO2 High pressure alarm: delay time to auto-reset the alarm status.	0	240	min	60	I49
A15	CO2 High pressure alarm: light status when in alarm status	0	1	-	1	D36
A16	A11=3, delay time to detect open probe alarm (E1). A16=0 open probe detection disabled.	0	60	min	15	I50
A17	A11=3, reaction behavior when Probe 2 fault alarm (E1). A17=0 std reaction (only when hPr): - display = "E1" and Air Temp. alternatively; - regulation is enabled; - defrost is managed as d0=0. A17=1 High Pres. alarm remains active: - display = "E1", hPr (or hPr) and Air Temp. altern. - regulation remains disabled	0	1	-	0	D37
A18	CO2 High pressure alarm: allow power cycle of controller to manually reset alarm. A18=0 manual reset only; A18=1 manual reset and power cycle reset (def.)	0	1	-	1	D38
A20	Faulty Door Switch alarm delay: alarm is detected when A10≠0 and door open for more than A20 time	A10	60	min	15	I51
Ac	CO2 Cond. High Temp. alarm: alarm threshold.	-50	250	°C/°F	70	A23
AE	CO2 Cond. High Temp. alarm: alarm differential.	0.1	20.0	°C/°F	5.0	A24
Ac d	CO2 Cond. High Temp. alarm: alarm delay.	0	250	min	0	I52
F	EVAPORATOR FAN PARAMETERS					
F0	Comp. and Fan start delay when both are required ON by the Regulation.	1	100	Sec	3	I53
Fd0	Fan DAY Duty Cycle: ON time	1	100	min	20	I54
FdF	Fan DAY Duty Cycle: OFF time	0	100	min	10	I55
Fn0	Fan NIGHT Duty Cycle: ON time	1	100	min	25	I56
FnF	Fan NIGHT Duty Cycle: OFF time	0	100	min	10	I57
H	OTHER SETTINGS					
H0	Supervisor serial address	0	207	-	1	I58
H2	Enable keypad H2=0 keypad disabled; H2=1 keypad enabled (default); H2=2 keypad enabled except for NIGHT / DAY; H2=3 keypad enabled except for LIGHT	0	3	-	1	I59
H4	Disable buzzer 0=enable (default); 1=disable.	0	1	-	0	D39
H5	ID code (read-only) H5 can be set with Key or Supervisor to a positive value. If a parameter is modified by keypad, H5 is automatically set to the negative value	0	199	-	199	I60
EZY	rapid parameters set selection	0	4	-	0	I61

Display and functions

During normal operation, the controller displays the value of the probe set using parameter /4 (=1 ambient probe, default, =2 second probe, 3= third probe). In addition, the display has LEDs that indicate the activation of the control functions, while the 3 buttons can be used to activate/deactivate some of the functions.

LEDs and associated functions

icon	function	normal operation	OFF	blink	start up
⊖	compressor	on	off	request	ON
⚡	fan	on	off	request	ON
❄	defrost	on	off	request	ON
AUX	aux	output on	output off	-	ON
🔔	alarm	all	no alarm	-	ON

Table of functions activated by the buttons

button	normal operation	pressed together	pressed together	start up pressing the button alone
🔇	Buzzer mute.			
UP/MUTE	More than 5 sec.: access parameters setting menu, protected by PSW "22".	--	--	--
💡	Toggle Light ON/OFF		Start parameters reset procedure	Firm vers
🌙	Toggle DAY/ NIGHT mode	Start / stop defrost		--

Access and setting parameters

- press UP/MUTE for 5 s (the display will show "PS");
- to access the type F and C parameter menu, enter the password "22" using UP/ DOWN;
 - scroll inside the parameter menu using UP/DOWN
- to display/set the values of the parameter displayed, press DAY/NIGHT, then UP/DOWN and finally DAY/NIGHT to confirm the changes (returning to the parameter menu).
 - To save all the new values and exit the parameter menu, press DAY/NIGHT for 3 s;
 - To exit the menu without saving the changed values (exit by timeout) do not press any button for at least 60 s.

FUNCTIONS

Energy Saving

Energy Saving logic manages the automatic switching between DAY mode and NIGHT mode.

- Automatic switching from DAY mode to NIGHT mode: when door continuously closed for more than “r6” time.
- Automatic switching from NIGHT mode to DAY mode: when door continuously closed for more than “r7” time.
- Manual switching from DAY mode to NIGHT mode : pushing the “MOON” button.
- Manual switching from NIGHT mode to DAY mode : pushing the “MOON” button or opening the door.

DAY/NIGHT mode is saved in eeprom in order to resume previous operation if Power-Off.

DAY / NIGHT temperature regulation

- DAY mode set point = “St”
- DAY mode differential = “rd”
- NIGHT mode set point = “St” + “r4”
- NIGHT mode differential = “r5”

Temperature Pull down

Pull down mode starts every time the regulation temperature is above the threshold temperature “Pt”. When in pull down mode:

- set point and differential are as in DAY mode;
- defrost requests are ignored;

- automatic switching from DAY mode to NIGHT mode is inhibited.

Pull down mode ends when the regulation temperature reaches the DAY set point or “Pd” time elapsed.

After pull down ends, the automatic switching from DAY mode to NIGHT mode is still inhibited for the “r9” period.

Mitigation algorithm

The displayed value of the regulation temperature can be filtered and limited in order to give a representative value of the product temperature.

Regulation temperature	Temperature tendency	Displayed value
above “/b”	increasing	“E3”
	decreasing	“...”
above “/A”	increasing	“/A”
	decreasing	“...”
between “/9” and “/A”	not relevant	Regulation Temperature (*)
below “/9”	not relevant	“/9”

- (*) - the speed temperature variation can be adjusted using the “/E” visualization filter;
- the displayed value can be adjusted using the “/8” visualization offset.

When “/E”=0 the mitigation algorithm is disabled.

The temperature regulation algorithm is not influenced by the mitigation algorithm.

Defrost management

The defrost is performed by stopping the compressor and managing the evaporator fan according to “d13” parameter; defrost is enabled when the regulation probe value is below the “d11” value. Defrost is not performed during Initial Pull Down.

Defrost is performed ONLY BY TIME when “d0”=0; in this case, parameters “dl” and “dP” only are taken in consideration. “dl” is the interval between defrosts and it can be counted in two ways, defined by the “1dl” parameter : it can be always counted or it can be counted only when the compressor is ON.

Defrost is performed ALSO BY TEMPERATURE when “d0”≠0; these features are available when the 2nd input is enabled to sense the evaporator temperature, that is:

- A11=0: 2nd input senses the evaporator temperature;
- A11=3: 2nd input senses the evapor. probe and the pressure switch (Normally Closed). In these cases only, parameters “dt” and “d10” are taken in consideration.

Evaporator Fan management

When the compressor output is ON, the evaporator fan output is ON.

When the compressor output is OFF, the evaporator fan output performs a cycle:

- if in DAY mode : “Fd0” is the fan ON time, “FdF” is the fan OFF time;
- if in NIGHT mode : “Fn0” is the fan ON time, “FnF” is the fan OFF time;

Light management

DAY mode: light output status = ON.

When the automatic switching from NIGHT mode to DAY mode performs, the light output activation can be delayed for the “r10” period.

NIGHT mode: light output status = OFF.

Advanced protections

Refrigerant System Failure Alarm

Alarm code	Description	Reset	Meaning
Err	Refrigerant System Failure Alarm: alarm status	automatic	<ul style="list-style-type: none">• When the compressor is switched ON, the timer “d12” starts counting; during the period “d12” the regulation probe value is sampled every “d20” minutes and the gap between the values is compared with “d22” minimum gap. When the compressor is continuously ON for more than the period “d12” time and Regulation Probe doesn’t decrease a defrost is activated. When this kind of defrost starting condition occurs “d21” times consecutively since power on, the Refrigerant System Failure Alarm is activated.• controller stops all functions: compressor, fan and light relay are OFF.• automatic reset powering down the cabinet.

Cold Climate Protection

Alarm code	Description	Reset	Meaning
CCP	Cold Climate Protection mode is on going	automatic	<ul style="list-style-type: none">• When the regulation probe value is below the (“St” – “CCt”) value for a longer period then “CCd” delay time, the Cold Climate Protection is activated.• Compressor relay is maintained OFF while fan and light relay are ON.• automatic reset when the regulation probe value is above the “St” value.

Loads activation delay

The “F0” parameter allows to avoid the activation of the loads at the same time, separating with a short delay of a few seconds.

Compressor protections

ECOBX-EVO is fitted with automatic compressor protection system to avoid continual starts or stops of the unit. The protection is based on the times in minutes set for parameters c0, c1, c2, c3.

CO2 applications management

For the CO2 applications, that normally work at very high discharge pressure, ECO-BOX-EVO is able to detect potential dangerous high temperature or high pressure conditions. The detection is related to 2 different technical approaches used for the cabinet design:

- to use a temperature probe on the condenser, or gas cooler, in order to detect the high pressure condition indirectly;
- to use a pressure switch on the gas pipe, in order to detect the high pressure condition directly.

When the condition is detected, ECOBOX-EVO reacts with two actions:

- switches off the compressor relay and the evaporator fan relays;
- manages the compressor protection after the condition is ended.



Important warnings: ECOBOX-EVO controller cannot be considered as a safety device for high pressure potential dangerous conditions; the real safety device must be a mechanical device, able to switch off the compressor, independently from the controller.

ECOBX-EVO must be configured for the different CO2 solutions changing the configuration of the 2nd input, that is changing the “A11” parameter:

- A11=1: 2nd input senses the condenser probe;
- A11=2: 2nd input senses the pressure switch (Normally Closed);
- A11=3: 2nd input senses the evaporator probe and the pressure switch (Norm.Closed).

A11=1: CO2 applications with condenser probe

Alarm code	Description	Reset	Meaning
cht	CO2 Condenser High Temperature: pre-alarm status	automatic	<ul style="list-style-type: none">• “cht” indicates that the temperature measured has exceeded the limit between “Ac” and “AE”. The limit value is equal to (“Ac”-“AE”)/2• controller continues normal operation• automatic reset when the temperature measured by condenser probe falls below “Ac”-“AE” value
CHt	CO2 Con- denser High Temperature: alarm status.	<div>Manual (A14 =0)</div> <div>Automatic (A14 >0)</div>	<ul style="list-style-type: none">• “CHT” indicates that the temperature measured has exceeded the limit “Ac” and the delay time “Acd” has elapsed;• controller stops all functions;• if “A14”=0, manual reset only is available : press both the keys UP and DOWN for 5 seconds, then enter password “44”.• if “A14” >0, automatic reset is also available: waiting the delay time “A14” is expired or powering down the cabinet.

A11=2: CO2 applications with pressure switch

This logic is designed to fit on an electric schema that provides a pressure switch that can interrupt the power supply both to the compressor and to an external relay, which Normally Open contact is connected to the 2nd input of the ECOBOX-EVO.

Alarm code	Description	Reset	Meaning
hPr	CO2 High pressure alarm: pre-alarm status	automatic	<ul style="list-style-type: none">• “hPr” indicates that the 2nd input has been opened; the number of openings counted is less than the “A12” max events; each opening event is counted when it reoccurs within “A13” hours from the previous event. When “A13” timer expires without any other “hPr” event, the event counter is reset.• controller stops all functions: compressor and fan relay are OFF, light relay status is defined by “A15” parameter.• automatic reset : everytime the “c2” timer (min comp off timer) expires, the compressor relay turns ON for 5 seconds to detect the 2nd input status: - if 2nd input is detected as OPEN, “hPr” alarm remains active; - if 2nd input is detected as CLOSE, “hPr” alarm remains active but “A14” is counted. When also “A14” expires, “hPr” alarm has been reset and light relay status is aligned to DAY/NIGHT current status.
HPr	CO2 High pressure alarm: alarm status	Manual	<ul style="list-style-type: none">• “HPr” indicates that the 2nd input has been opened; the number of openings counted is equal to the “A12” max events.• controller stops all functions: compressor and fan relay are OFF, light relay status is defined by “A15” parameter.• manual reset: - if “A18”=0, only pressing both the keys UP and DOWN for 5 seconds, then entering password “44”. - if “A18”=1, also powering down the cabinet is allowed as manual reset.

A11=3: CO2 applications with evaporator probe and pressure switch

This logic is designed to fit on an electric schema that provides a pressure switch that can interrupt the power supply both to the common line of the loads connected to ECOBOX-EVO and to an external relay, which Normally Open contact is connected to the 2nd input of the ECOBOX-EVO and to the evaporator probe; while the pressure switch is not interrupting the power supply, the 2nd input senses the evaporator

Alarm code	Description	Reset	Meaning
hPr	CO2 High pressure alarm: pre-alarm status	automatic	<ul style="list-style-type: none">• “hPr” indicates that the 2nd input has been opened; the number of openings counted is less than the “A12” max events; each opening event is counted when it reoccurs within “A13” hours from the previous event. When “A13” timer expires without any other “hPr” event, the event counter is reset.• controller stops all functions: compressor and fan relay are OFF, light relay status is defined by “A15” parameter.• If the 2nd input remains OPEN for more than “A16” time, then the open probe alarm “E1” is activated and “hPr” alarm is aborted. Behavior of controller when “E1” alarm occurs is defined by “A17” parameter.• automatic reset : when the 2nd input is detected as CLOSE, “hPr” alarm remains active and “A14” starts to be counted. When also “A14” expires, “hPr
HPr	CO2 High pressure alarm: alarm status	Manual	<ul style="list-style-type: none">• “HPr” indicates that the 2nd input has been opened; the number of openings counted is equal to the “A12” max events.• controller stops all functions: compressor and fan relay are OFF, light relay status is defined by “A15” parameter.• manual reset: - if “A18”=0, only pressing both the keys UP and DOWN for 5 seconds, then entering password “44”. - if “A18”=1, also powering down the cabinet is allowed as manual reset.



TECHNICAL NOTE:

the probes are devices managed with a low current signal; instead of common loads - such as compressor, fan, lights - that are managed with high currents.

To interrupt the power supply of the common loads, “power” relay are required - same kind of relay mounted into the cotroller.

To interrupt the probes signal, “signal” relay are preferred.

The low current used to read an NTC probe, could be not enough to maintain clean

and unoxidized the internal contact of “power” relays; the stability of the measurement of the probe connected to a “power” relay, could be not guaranteed in time. “Signal” relays grant this stability because are made in a different technology.

Open-front applications management

For the “Open Front” cabinets, that normally use the curtain switch instead of the door switch, the following settings are suggested:

- “r6”=0 and “r8”=0, in order to have the immediate switching from DAY mode to NIGHT mode when the curtain is closed.
- “A10”=0, in order to disable the “Door Alarm”.

Rapid parameters set selection

Into the eeprom memory of the controller, there are 2 kind of parameters lists.

There is the main list of parameters, which has the complete list of all the items used live by the controller, that are the ones editable via keypad.

In addition to this, can be stored 4 lists of parameters, made up of a maximum of 25 items, with alternative values; these lists are useful to change rapidly the complete setting of the controller in one single operation, selecting the appropriate list. The values stored into the 4 lists are unused by the controller up to the moment when a list is chosen with the “EZY” parameter; only in that moment the values of the chosen list overwrite the corresponding live parameters. The 4 lists of parameters are not editable via keypad: to identify the 25 items and the relative values use the CAREL software VPM “Visual Parameter Manager”, available for free on <http://ksa.carel.com/>

The factory preloaded values of the 4 lists are defined to let you rapidly test the configurable 2nd input functions :

- EZY = 1 : 2nd input senses the evaporator probe, if required by defrost (default values);
- EZY = 2 : 2nd input senses the condenser probe;
- EZY = 3 : 2nd input senses the pressure switch[Normally Closed];
- EZY = 4 : 2nd input senses the evaporator probe and the pressure switch[Normally Closed].

Parameter involved		EZY=1	EZY=2	EZY=3	EZY=4
c2	Min. comp. OFF time.	0 default	0 default	2 when the c2 expires, compressor relè turns on for 5 seconds	0 default
d0	Type of defrost	0 default, by time	0 default, by time	0 default, by time	3 by evapor. temperature
A11	Probe 2 mode selection	0 Default. Evap.Temp., if required by defrost	1 CO2 Cond. High Temperature	2 CO2 High Pressure Switch	3 Evap. Probe and CO2 High Pressure Switch.
A14	CO2 Cond. High Temp. / CO2 High pressure alarm: delay time to auto-reset the alarm status.	60 default	0 manual reset	60 default	60 default



WARNINGS

Safety standards

Compliant with the relevant European standards. Installation precautions:

- the connection cables must guarantee insulation up to 90 °C;
- for 12 Vac versions use Class II transformers. To ensure compliance with the immunity standards (surge), the transformer must be one of the models specified (see the CAREL price list). For the 12 Vac/dc versions, as double insulation cannot be guaranteed between the power supply and the relay outputs, only use safety low voltage loads (up to 42 V effective rated value); ensure a space of at least 10 mm between the case and the nearby conductive parts;
- digital and analogue input connections less than 30 m away; adopt suitable measures for separating the cables so as to ensure compliance with the immunity standards;
- Secure the connection cables of the outputs so as to avoid contact with very low voltage parts.

IMPORTANT WARNINGS

The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website www.carel.com.
- The client (builder, developer or installer of the final equipment) assumes every responsibility and risk relating to the phase of configuration the product in order to reach the expected results in relation to the specific final installation and/or equipment. The lack of such phase of study, which is requested/indicated in the user manual, can cause the final product to malfunction of which CAREL can not be held responsible. The final client must use the product only in the manner described in the documentation related to the product itself. The liability of CAREL in relation to its own product is regulated by CAREL’s general contract conditions edited on the website www.carel.com and/or by specific agreements with clients.



READ CAREFULLY IN THE TEXT

Warnings: eparate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel wiring) and signal cables in the same conduits.



Guidelines for disposal

The device (or product) must be disposed of separately in accordance with the local waste disposal legislation in force. Do not dispose of the product as municipal waste; it must be disposed of through specialist waste disposal centres. Improper use or incorrect disposal of the product may negative effects on human health and on the environment. In the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

CAREL

CAREL INDUSTRIES HQs
Via dell’Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 0499716611 – Fax (+39) 0499716600 – <http://www.carel.com> – e-mail: carel@carel.com

CAREL reserves the right to modify the features of its products without prior notice.

+050004215 - rel. 1.2 - 13.03.2015