

ECP300 EXPERT



Use and maintenance manual

READ AND KEEP

Rel. Software: 26

Thanks for choosing this PEGO electrical panel.

This manual gives detailed information on installation, use and maintenance of **ECP300 EXPERT** series electrical panels and special version. Our products are designed and built-in compliance with current standards, on the specific field of refrigeration and conditioning systems. A different use is allowed respecting the working conditions for which the panel is designed and made.

Before using the panel, it's suggested to fully read this manual paying special attention to the highlighted parts with the symbology described below:



This symbol is used to focus on notes concerning installation, use and maintenance operations



This symbol is used to focus on important notes



This symbol is placed to indicate the prohibition to perform the indicated operation.

Instructions for disposal:

The electric board is made up of metal parts and plastic parts. In reference to European Union directive 2012/19/EC issued on 4 July 2012 and the related national legislation, please note that:

- A. WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately.
- B. The public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment.
- C. The equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment.



- D. The symbol  (crossed-out wheeled bin) shown on the product and on the user manual indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately.
- E. In the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

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CHAPTER 1: INTRODUCTION

1.1

GENERALITY

DESCRIPTION:

Line of three-phase power and control panels for refrigeration systems with compressor or for the control of the evaporating unit, designed for the complete management of the room. The magnetothermic protections and the motor protector for the compressor, which are accessible from the front panel and are combined with an innovative shape, make it a perfect and functional choice.

ECP300 EXPERT VD

Line of power and control panels for refrigeration systems with three-phase compressor up to 7.5HP, designed for the complete management of the room. The different power ranges, combined with the various options, allow the selection of an "AD HOC" panel for the system.

APPLICATIONS:

- Complete management of three-phase refrigerating systems up to 7,5HP static or ventilated, with off-cycle or electrical defrosting.

ECP300 EXPERT U VD

Line of power and control panels dedicated to the management of a three-phase evaporating unit only, where this unit is served by a refrigeration plant or a remote condensing unit.

The different power ranges, combined with the various options, allow the selection of an "AD HOC" panel for the system.

APPLICATIONS:

- Control of evaporating unit with electrical defrost up to 12kW.
- Remote control for the consent of the compressor, to be combined with a power panel.

CHAPTER 2: TECHNICAL CHARACTERISTICS

PRODUCT ID CODES

2.1

(*) Code available on request

Line of electrical panel of **ECP300 EXPERT VD 4** series:

SIEMENS COMPONENTS	
PEGO identification codes	Compressor motor circuit breaker range
110300EVD401 (*)	1,1-1,6A
110300EVD402	1,4-2A
110300EVD403	1,8-2,5A
110300EVD404	2,2-3,2A
110300EVD405	2,8-4A
110300EVD406	3,5-5A
110300EVD407	4,5-6,3A
110300EVD408	5,5-8A
110300EVD409	7-10A
110300EVD410 (*)	9-12A

Line of electrical panel of **ECP300 EXPERT VD 7** series:

SIEMENS COMPONENTS	
PEGO identification codes	Compressor motor circuit breaker range
110300EVD701 (*)	5,5-8A
110300EVD702 (*)	7-10A
110300EVD703	9-12,5A
110300EVD704	11-16A
110300EVD705	14-20A

Line of electrical panel of **ECP300 EXPERT U VD** series:

SIEMENS COMPONENTS	
PEGO identification codes	Electric resistance defrosting
110300EUVD01	6kW
110300EUVD02	12kW

2.2

PRODUCT SERIES – TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS	ECP300 EXPERT VD 4	ECP300 EXPERT VD 7
Box dimensions	400x300x135 mm	400x300x135 mm
Weight	9 Kg	10 Kg
Protection rating	IP65	IP65
Power supply (3F+N+T)	400Vac ±10% 50/60Hz	400Vac ±10% 50/60Hz
Type of electric load	3-phase	3-phase
Working temperature	- 5 ÷ + 40 °C	- 5 ÷ + 40 °C
Storage temperature	-25 ÷ +55 °C	-25 ÷ +55 °C
Relative ambient humidity	From 30% to 95% RH without condensate	From 30% to 95% RH without condensate
Altitude	< 1.000 m	< 1.000 m
Main switch / general protection Interruption power	4 poles magnetothermic 16A "D" Icn=6kA / Ics=8kA / Icu=15kA	4 poles magnetothermic 25A "D" Icn=6kA / Ics=8kA / Icu=15kA
Compressor protection	Adjustable motor circuit breaker	Adjustable motor circuit breaker
Control	PEGO	PEGO
Defrosting	Electrical	Electrical
Status indicators	LED + display	LED + display
Alarm signals	LED + Buzzer	LED + Buzzer
INPUTS		
Ambient probe	NTC 10K 1%	NTC 10K 1%
Evaporator probe	NTC 10K 1%	NTC 10K 1%
Door switch	Present	Present
High/low pressure switch	Present	Present
Kriwan® connection	Present	Present
Compressor functioning mode selection	Pump-down / Thermostat	Pump-down / Thermostat
OUTPUTS		
Compressor	See motor circuit breaker thermal range relative to PEGO panel ID code	See motor circuit breaker thermal range relative to PEGO panel ID code
Condenser fans output 1	800W (1ph)	800W total
Condenser fans output 2 (separated)		(1ph)
Evaporator fans	500W (1ph)	2000W (1ph / 3ph)
Defrosting heaters	6000W (AC1) eq. resistive load	9000W (AC1) eq. resistive load
Room light	800W (AC1) resistive load	800W (AC1) resistive load
Solenoid valve	Present	Present
Compressor oil heater	Present	Present
Aux1	100W	100W
Aux2	100W	100W
Supervision system	TeleNET or Modbus	TeleNET or Modbus

TECHNICAL CHARACTERISTICS	ECP300 EXPERT U VD 6	ECP300 EXPERT U VD 12
Box dimensions	400x300x135 mm	400x300x135 mm
Weight	9 Kg	10 Kg
Protection rating	IP65	IP65
Power supply (3F+N+T)	400Vac ±10% 50/60Hz	400Vac ±10% 50/60Hz
Type of electric load	3-phase	3-phase
Working temperature	- 5 ÷ + 40 °C	- 5 ÷ + 40 °C
Storage temperature	-25 ÷ +55 °C	-25 ÷ +55 °C
Relative ambient humidity	From 30% to 95% RH without condensate	From 30% to 95% RH without condensate
Main switch / general protection Interruption power	4 poles magnetothermic 16A "D" Icn=6kA / Ics=8kA / Icu=15kA	4 poles magnetothermic 25A "D" Icn=6kA / Ics=8kA / Icu=15kA
Dedicated protection for cell light	Differential magnetothermic circuit breaker Id=30mA	Differential magnetothermic circuit breaker Id=30mA
Control	PEGO	PEGO
Defrosting	Electrical	Electrical
Status indicators	LED + display	LED + display
Alarm signals	LED + Buzzer	LED + Buzzer
INPUTS		
Ambient probe	NTC 10K 1%	NTC 10K 1%
Evaporator probe	NTC 10K 1%	NTC 10K 1%
Door switch	Present	Present
Man in cold-room alarm	Available	Available
OUTPUTS		
Evaporator fans	500W (1ph)	2000W (1ph / 3ph)
Defrosting heaters	6000W (AC1) eq. resistive load	12000W (AC1) eq. resistive load
Room light	800W (AC1) resistive load	1200W (AC1) resistive load
Solenoid valve	Present	Present
Enable condensing unit	Present	Present
Aux1	100W	100W
Aux2	100W	100W
Door heater	Present	Present
Supervision system	TeleNET or Modbus	TeleNET or Modbus

2.3

OVERALL DIMENSIONS

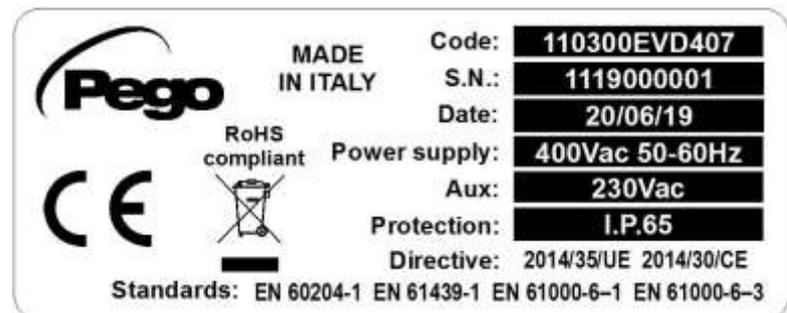


IDENTIFICATION DATA

2.4

The device described in this manual is provided on the side of a tag showing its identification data:

- Manufacturer's Name
- Code of the electrical panel
- Serial number (S.N.)
- Power supply
- Voltage of auxiliary circuits
- IP protection rating



2.5

TRANSPORT AND STORAGE

Each electrical panel is supplied packed to be shipped without being damaged under normal conditions of transport. In the case of subsequent transport, it must be verified that:



- there are no objects or free parts inside the panel.
- the door of the panel is correctly closed and locked
- if the original packaging is not used, adequately protect the product to allow transport without damage.

The storage room must have an adequate temperature and must be free from humidity; furthermore, prevent the electrical panel from coming into contact with aggressive contaminants that could compromise the functionality and electrical safety.

WARRANTY CONDITIONS

2.6

ECP300 EXPERT series products are covered by a 24-months warranty against all manufacturing defects as from the date indicated on the product ID code.

In case of defect the product must be appropriately packaged and sent to our production plant or to any authorized Service Center with the prior request of the Return Authorization Number.

Customers are entitled to have defective products repaired, spare parts and labor included. The costs and the risks of transport are at the total charge of the Customer. Any warranty action does not extend or renew its expiration.

The Warranty does not cover:

- Damages resulting from tampering, impact or improper installation of the product and its accessories.
- Installation, use or maintenance that does not comply with the instructions provided with the product.
- Repair work carried out by unauthorized personnel.
- Damage due to natural phenomena such as lightning, natural disasters, etc.

In all these cases the costs for repair will be charged to the customer.

The intervention service in warranty can be refused when the equipment is modified or transformed.



Under no circumstances **Pego S.r.l.** will be liable for any loss of data and information, costs of goods or substitute services, damage to property, people or animals, loss of sales or earnings, business interruption, any direct, indirect, incidental, consequential, damaging, punitive, special or consequential damages, in any way whatsoever caused, whether they are contractual, extra contractual or due to negligence or other liability arising from the use of the product or its installation.

Malfunction caused by tampering, bumps, inadequate installation automatically declines the warranty. It is compulsory to observe all the instructions in this manual and the operating conditions of the product.

Pego S.r.l. disclaims any liability for possible inaccuracies contained in this manual if due to errors in printing or transcription.

Pego S.r.l. reserves the right to make changes to its products which it deems necessary or useful without affecting its essential characteristics.

Each new release of the Pego product user manual replaces all the previous ones.

As far as not expressly indicated, is applicable the Law and, in particular, the art. 1512 C.C. (Italian Civil Code).

For any controversy is elected and recognized by the parties the jurisdiction of the Court of Rovigo.

CHAPTER 3: INSTALLATION

3.1

STANDARD EQUIPMENT FOR ASSEMBLY AND USE

The **ECP300 EXPERT** electrical panel, for assembly and use, is equipped with:

- Nr 4 sealing gaskets, to be placed between the fixing screw and the back of the box.
- Nr 1 use and maintenance manual.
- Nr 1 wiring diagram.
- Nr 1 drilling layout.
- Nr 2 NTC probes 10K 1% .

3.2

MECHANICAL ASSEMBLY OF THE PANEL



- ❑ Each panel is designed for wall mounting; choose an appropriate fixing system, depending on the weight of the panel and the type of support on which it will be fixed.
- ❑ Install the panel in places that respect its IP rating.
- ❑ Keep the IP protection level of the appliance intact by properly assembling the cable glands and/or the pipe clamps with appropriate characteristics.
- ❑ Install the panel at a height that allows the operator an easy use and internal access. The operator should not come to be in a dangerous situation when he is working on the panel. The height must however be between 0.6 and 1.7 meters from the floor.
- ❑ Install the electrical panel in an area away from sources of heat and possibly protected from atmospheric agents.

Following are the steps to perform a correct mechanical installation of the panel.

Fig. 1: Lift the transparent protection cover of the general magneto-thermal switch.



Fig. 2: Remove the screw cover on the right side.



Fig. 3: Unscrew the 4 fixing screws of the front panel.



Fig. 4: Close the transparent protection cover of the general magneto-thermal switch.



Fig. 5: Open the front of the panel by lifting it up and sliding the two black hinges up to the end of the stroke.



Fig. 6: Flex the hinges and rotate the front panel 180° downwards to access the inside of the panel and disconnect the electronic board connector.

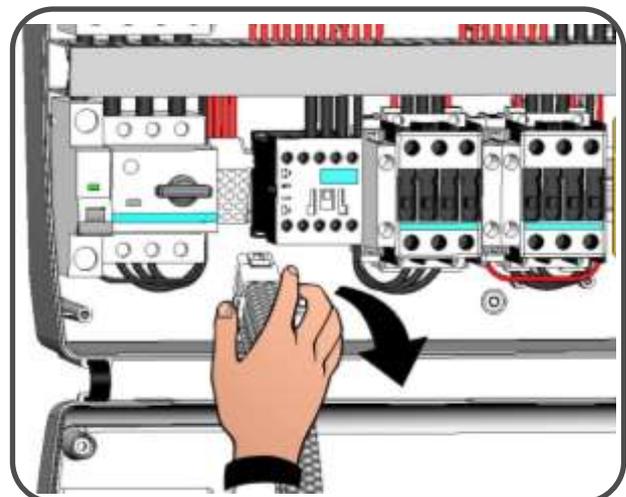


Fig. 7: Apply pressure on the sides of each individual hinge to remove it from its seat and completely remove the front panel.

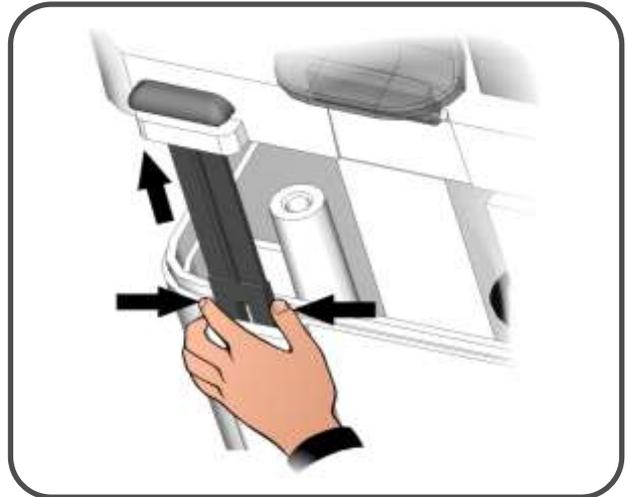


Fig. 8: Using a screwdriver, press the four pre-set holes on the back to make the four fixing holes of the electrical panel.

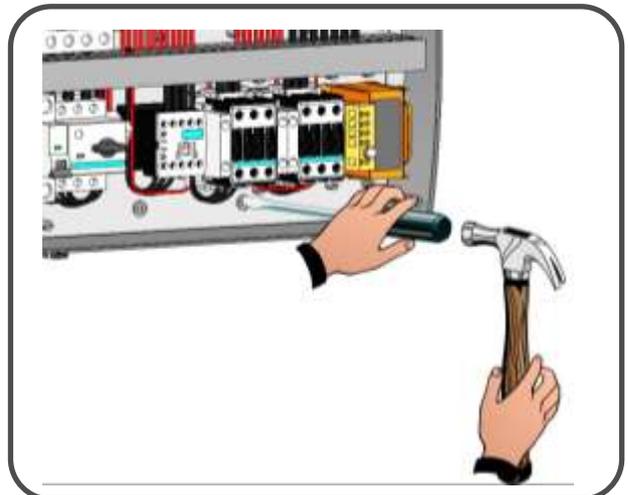


Fig. 9: Using the supplied drilling layout, make the four fixing holes on the wall.

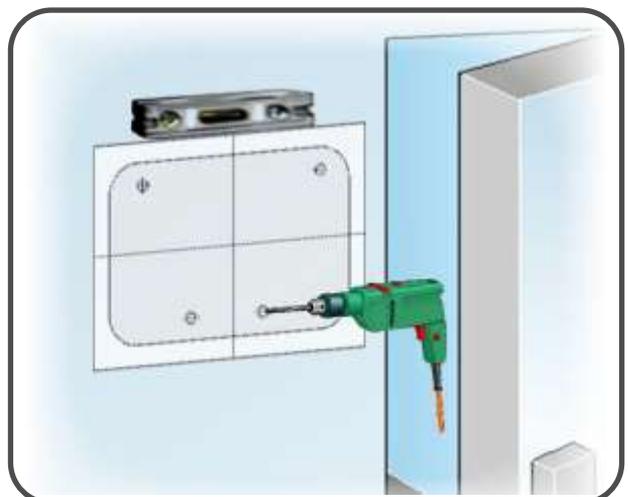


Fig.10: Using the four holes made previously, fix the back of the box using four screws of adequate length in relation to the thickness of the wall. Place a rubber washer (supplied) between each fastening screw and the back of the box.

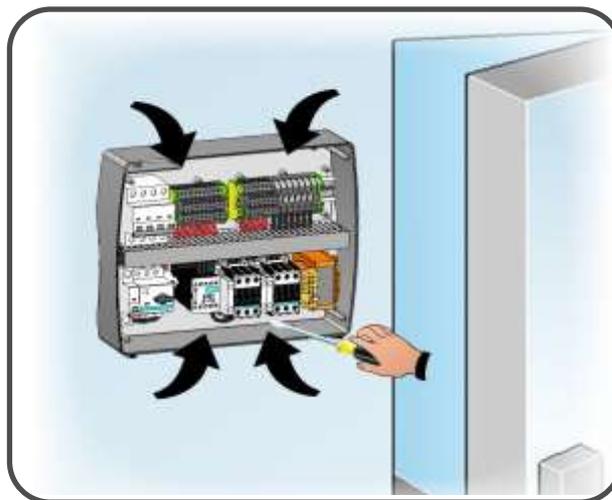
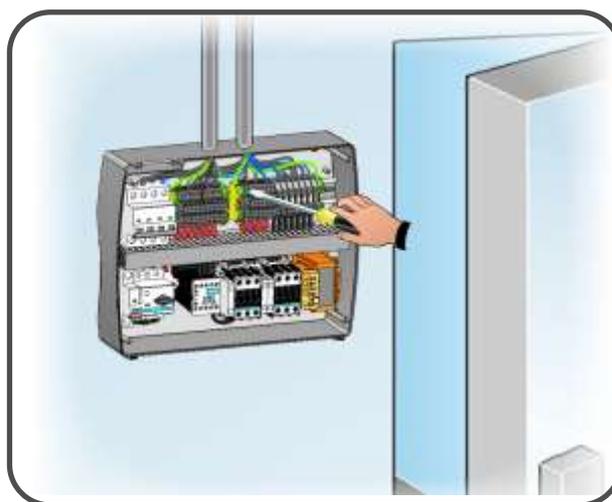


Fig.11: Now make the electrical connections as indicated in the following chapter.



ELECTRICAL WIRINGS

3.3



- ❑ For electrical connections, refer to the specific wiring diagram and to the technical characteristics of the panel model to be installed.
- ❑ The power supply to the panel must be carried out exclusively with a dedicated line, upstream of which a device suitable for protection against indirect contacts (differential switch) must be installed.
- ❑ Avoid putting power cables and signal cables (probes and digital inputs) in the same conduits (or pipes).
- ❑ Avoid using multipolar cables in which there are conductors connected to inductive and power loads and signal conductors such as probes and digital inputs.
- ❑ Reduce the lengths of the connecting cables as much as possible, preventing the wiring from taking the spiral shape that is harmful to possible inductive effects on the electronics.
- ❑ If it's necessary to extend the probes, conductors must be used with a suitable section and in any case not less than 1mm².
- ❑ For connections to the electrical panel, cables with a section suitable for the current passing through them must be used. The degree of insulation must also be compatible with the applied voltages. Prefer cables with flame retardant insulator and with a low emission of toxic fumes if affected by fire.



- ❑ It's **mandatory** to connect the clamp marked with the initials **PE** to the ground system of the power supply network. If necessary, check the efficiency of the ground system.



- ❑ Other conductors with the exception of the external protection conductor must not be connected to the **PE** terminal.

3.4

CONNECTION OF THE FRONT PANEL

Re-hook the front panel and reconnect the connector of the electronic board as indicated below.

Fig.12: Re-hook the front panel at the back of the box by reinserting the two black hinges in the appropriate seats.



Fig.13: Flex the hinges and rotate the front panel 180° downwards to access the inside of the panel and reconnect the connector of the electronic board.

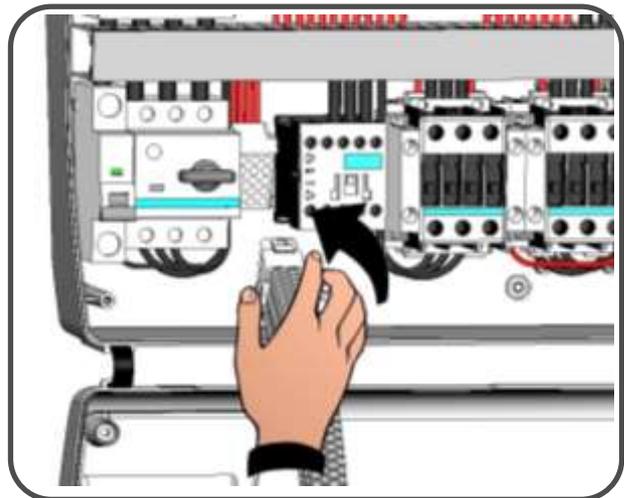
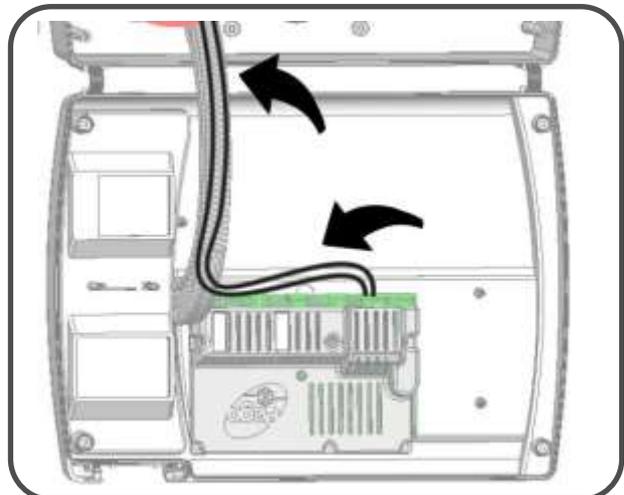


Fig.14: In case panel is connected with TeleNET/Modbus network and/or Alarm/Aux relays are used, wirings must be done directly on the electronic card clamps.
It's suggested to put those wirings beside the connection cables from electronic card and bottom of the box.
For further clarification on the clamps please refer to the chapter 6.





- ❑ After having carried out the wiring, check the correct execution of the same by means of the wiring diagram.
- ❑ Make sure that the screws on the clamps are properly tightened.
- ❑ Check, when possible, the correct functioning of external protection devices.
- ❑ Make a correct calibration of the motor protection switch (if present) dedicated to the compressor motor, as indicated in the following chapter.



- ❑ After turning on the electrical panel, check the correct current absorption of the various loads. After operating the system for a few hours, it is advised to check the correct tightening of the terminal board screws (including the connection of the power supply line).
Caution: before carrying out this operation, the panel must be switched off by cutting off the supply line upstream and blocking the sectioning with a padlock to ensure maximum safety. Check the absence of voltage with a Tester before any operation.

3.6

COMPRESSOR MOTOR CIRCUIT BREAKER CALIBRATION

Below we show step by step how to correctly calibrate motor circuit breaker dedicated to the compressor.

Fig.15: When the system is started for first time it's suggested to calibrate the motor circuit breaker on the compressor power circuits. Using an ammeter verify the effective absorption.

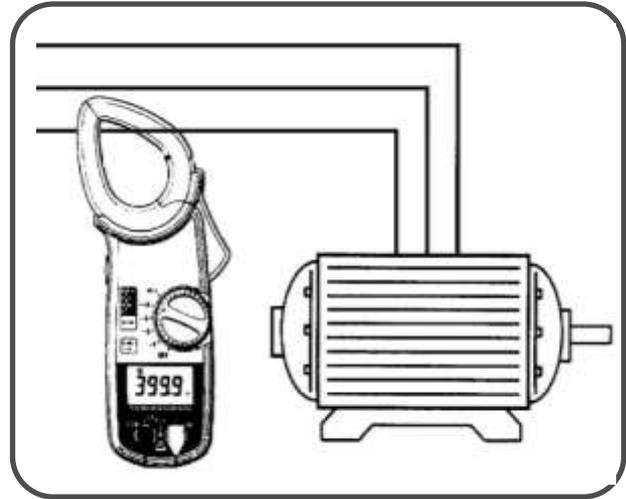
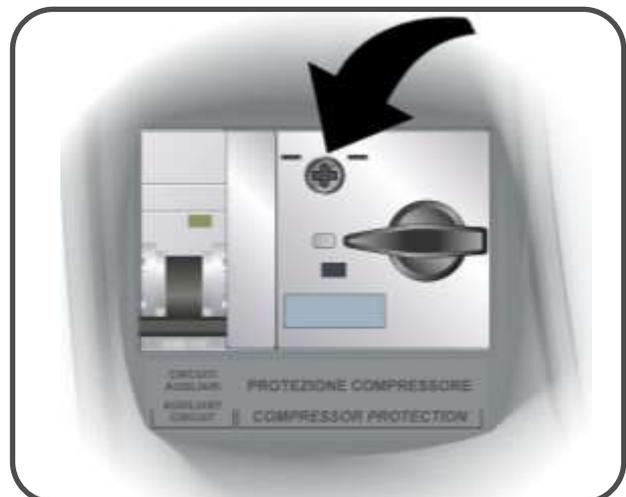


Fig.16: Make the motor circuit breaker calibration basing on the measured absorption. Anyway, the set-up value must not be higher than the one expected by the compressor manufacturer.

Caution: incorrect calibration may cause compressor failure or unwanted action of the motor protection switch.



Fig.17: To carry out the calibration, use the adjustment screw on the front of the motor protection switch.



CLOSING THE ELECTRICAL PANEL

3.7

Once the electrical connections, checks and calibrations have been completed, the electrical panel can be closed.

Fig.18: Close the front panel, making sure that all cables are inside the box and that the box gasket is correctly housed.



Fig.19: Tighten the front panel using the 4 screws. Refit the cover of the screws on the right side.



Fig.20: Power up the panel and carry out thorough reading / programming of all the parameters.



CHAPTER 4: FUNCTIONALITY

4.1

FUNCTIONS MANAGED BY THE ECP300 EXPERT ELECTRICAL PANEL

- Signalling with LED icons of the plant status.
- Electronic control with wide LED display and easy-to-use keyboard.
- Display and regulation of the cell temperature with decimal point.
- Display of evaporator temperature from parameter.
- Activation / deactivation of plant control.
- Signaling of plant alarms: probe error, minimum and maximum temperature alarm, compressor protection (man in cold room alarm in preset models).
- Evaporator fans management.
- Automatic and manual defrost management (static, with resistors).
- Direct or pump-down management and control of the motor-compressor unit (selection by means of a bridge in the terminal board, in the predisposed models).
- Activation of the light of the cell with key on the panel or through door switch.
- Two auxiliary relays with activation configurable by parameter.
- RS485 always available for connection to TeleNET/Modbus supervision network.
- Management of access to parameters with password (4 different selectable restriction levels).
- Magnetothermic general protection accessible from the front panel, with the function of a general switch.
- Adjustable motor protection switch to protect the compressor, accessible from the front panel (in the predisposed models).
- Differential magnetothermic $I_d=30\text{mA}$ dedicated to the light of the cell, accessible from the front panel (in the predisposed models).

CHAPTER 5: DATA PROGRAMMING

CONTROL PANEL

5.1



FRONT KEYPAD

5.2

- 1**  **AUXILIARY RELAY CONTROL**
(it manually controls the auxiliary relays, if parameter AU1/AU2 = 2/-2)
- 2**  **UP / MUTE BUZZER ALARM**
- 3**  **STANDBY** (if the system shuts down the LED flashes)
- 4**  **COLD ROOM TEMPERATURE SETTING**
- 5**  **DOWN / MANUAL DEFROST**
- 6**  **COLD ROOM LIGHT**

5.3

LED DISPLAY

7

AMBIENT TEMPERATURE VALUE / SETTINGS

8

**STANDBY ICON**

Led OFF = Electrical panel OFF

Led ON = Electrical panel ON and in regulation

Led flashing = Electrical panel in stand-by (outputs are disabled)

9

**DOOR SWITCH / COLD ROOM LIGHT ICON**

Led OFF = Door switch disabled or not in use and cold room light OFF

Led ON = Cold room light ON

Led Flashing = Door switch enabled and cold room light ON

10

**COLD CALL ICON**

Led OFF = Cold call OFF

Led ON = Cold call ON

11

**FAN CALL ICON**

Led OFF = Fan call OFF

Led ON = Fan call ON

12

**DEFROST CALL ICON**

Led OFF = Defrost call OFF

Led ON = Defrost call ON

Led Flashing = Dripping phase in progress after defrosting (see parameter d7)

13

**AUXILIARY RELAY ICON** (AUX relay call signalling if AU1/AU2 = +/- 2 or +/- 3)

Led OFF = Aux relay call OFF

Led ON = Aux relay call ON

14

**ALARM ICON**

Led OFF = No alarm in progress

Led ON = Alarm activated then stopped

Led Flashing = Alarm in progress

15

**DECIMAL POINT** (flashing in night mode)

16

**HOT MODE** (signaling of activation of resistances)

GENERALITY

5.4

For safety reasons and greater practicality for the operator, the **ECP300 EXPERT** system provides two levels of programming; the first one for the simple configuration of the frequently editable **SETPOINT** parameters, the second one for the programming and the setting of the general parameters related to the various operating modes of the board.

If you are in a programming level, you cannot directly access another level, but you must exit the programming in advance.

SYMBOLOLOGY

5.5

For practicality we will indicate with the symbols:

- (▲) the UP key  that performs the value increase and alarm mute functions.
- (▼) the DOWN key  that performs the functions of decreasing the value and forcing defrost.

SETTING AND DISPLAYING THE SET POINT

5.6

1. Press the **SET key** to display the current **SETPOINT** value (temperature).
2. Holding down the **SET key** and pressing one of the (▲) or (▼) keys, you change the **SETPOINT** value.

Release the SET key to return to the cell temperature display; the memorization of the changes made will take place automatically.

5.7

LEVEL 1 PROGRAMMING (User Level)

To access the first level configuration menu it is necessary to:

1. Press the (\blacktriangle) and (\blacktriangledown) keys simultaneously and keep pressed for more than 3 seconds until the first programming variable appears on the display.
2. Release the (\blacktriangle) and (\blacktriangledown) keys.
3. Use the (\blacktriangle) key or the (\blacktriangledown) key to select the variable to be modified.
4. After selecting the desired variable, it will be possible:
 - Display its setting by pressing the SET button.
 - Change its setting by holding down the SET button and pressing one of the (\blacktriangle) or (\blacktriangledown) key.

Once values configuration has been completed, to exit the menu press the keys (\blacktriangle) and (\blacktriangledown) and hold them down for a few seconds until the cell temperature value reappears.

The memorization of the changes made to the variables will occur automatically when exiting the configuration menu.

LIST OF LEVEL 1 VARIABLES (User Level)

5.8

VARIABLES	MEANING	VALUE	DEFAULT
r0	Temperature differential referred to the main set point	0,2 ÷ 10,0 °C	2,0 °C
d0	Interval for defrost (hours) If d0 = 0 the cyclic defrosts are disabled	0 ÷ 24 hours	4 hours
d2	Set point for the end of defrost. Defrost is not carried out if the temperature read by the defrost probe is greater than the value of d2. (If the probe is broken defrost is performed based on time)	-35 ÷ 45 °C	15°C
d3	Maximum defrost time (minutes)	1 ÷ 240 min	25 min
d7	Dripping time (minutes) At the end of defrosting, the compressor and the fans remain still for the d7 set time, the defrosting led on the front of the panel flashes.	0 ÷ 10 min	0 min
F5	Fans pause after defrosting (minutes) Enables keeping the fans still for an F5 time after dripping. This time starts from the end of dripping. If dripping is not set, at the end of defrosting the fans pause occurs directly.	0 ÷ 10 min	0 min
A1	Minimum temperature alarm Allows user to define a minimum temperature for the room being refrigerated. Below value A1 an alarm trips: the alarm LED flashes, displayed temperature flashes and the buzzer sounds to indicate the problem.	-45 ÷ (A2-1) °C	-45°C
A2	Maximum temperature alarm Allows user to define a maximum temperature for the room being refrigerated. Above value A2 an alarm trips: the alarm LED flashes, displayed temperature flashes and the buzzer sounds to indicate the problem.	(A1+1) ÷ 99 °C	+99°C
tEu	Evaporator probe temperature display (displays nothing if dE = 1)	Temperature	Read only

5.9

LEVEL 2 PROGRAMMING (Installer Level)

To access the first level configuration menu it is necessary to:

1. Press the UP (▲), DOWN (▼) and LIGHT keys simultaneously and keep pressed for more than 3 seconds.

When the first programming variable appears, the system automatically switches to stand-by.

2. Use the (▲) key or the (▼) key to select the variable to be modified. After selecting the desired variable, it will be possible:
 - Display its setting by pressing the SET button.
 - Change its setting by holding down the SET button and pressing one of the (▲) or (▼) key.

- Display its setting by pressing the SET button.
- Change its setting by holding down the SET button and pressing one of the (▲) or (▼) key.

3. Once configuration values have been completed, to exit the menu, keep the (▲) and (▼) keys pressed down for a few seconds until the cell temperature value reappears. At the output of the menu a sound signal will be emitted, if the BUZZER is present.

The memorization of the changes made to the variables will occur automatically when exiting the configuration menu.

NOTE: Press the STAND-BY button to enable electronic control.

5.10

LIST OF LEVEL 2 VARIABLES (Installer Level)

VARIABLES	MEANING	VALUES	DEFAULT
F3	Fan status with compressor off	0 = Fans run continuously 1 = Fans only run when compressor is working 2 = Fans disabled	1
F4	Fan pause during defrosting	0 = Fans run during defrost 1 = Fans do not run during defrost	1
F6	Evaporator fans activation for air recirculation. The fans are activated for a time defined by F7 if they have not started operating for the time F6. If the time of activation coincides with the defrost phase, the defrost end is still awaited.	0 ÷ 240 min 0 = (function not activated)	0 min
F7	Duration of activation of the evaporator fans for air recirculation. Fan operating time for F6	0 ÷ 240 sec	10 sec
dE	Evaporator probe presence. If the evaporator sensor is disabled, defrosts are carried out cyclically with period d0: defrosting ends when an external device trips and closes the remote defrost contact or when time d3 expires.	0 = evaporator sensor present 1 = no evaporator sensor	0
d1	Defrost type: with heater elements, cycle inversion (hot gas) or with thermostatic resistance. <u>Warning: do not set d1=1 in this type of panel; see Section 5.15.</u>	2 = with thermostatic resistance 1 = hot gas (see Section 5.15) 0 = element	0
dPo	Defrost at start up	0 = disabled 1 = defrost at startup (if possible)	0
dSE	Smart defrosts	0 = disabled 1 = enabled	0

dSt	Smart defrost setpoint (if dSE=1) The count of the time between defrosts is increased only if the compressor is on and the evaporator temperature is lower than dSt.	-30 ÷ 30 °C	1°C
dFd	Display during defrost	0 = current room temperature 1 = room temperature at the beginning of the defrost 2 = "DEF"	1
Ad	Net address for connection to TeleNET supervision system or Modbus	0 ÷ 31 (with SEr=0) 1 ÷ 247 (with SEr=1)	0
SEr	RS-485 communication protocol	0 = TeleNET protocol 1 = Modbus protocol	0
Bdr	Modbus baudrate	0 = 300 baud 3 = 2400 baud 6 = 14400 baud 1 = 600 baud 4 = 4800 baud 7 = 19200 baud 2 = 1200baud 5 = 9600 baud 8 = 38400 baud	5
Prt	Modbus parity check	0 = none 1 = even 2 = odd	0
Ald	Delay time for signalling and for displaying the minimum or maximum temperature alarm	0 ÷ 240 minutes	120 min
C1	Minimum time between shutdown and subsequent switching on of the compressor.	0 ÷ 15 min	0 min
CAL	Cold room sensor value correction	-10,0 ÷ +10,0 °C	0
CE1	Compressor ON operating time in the event of a faulty ambient probe. (Emergency operation) With CE1=0 the emergency operation in the presence of error E0 remains disabled, the compressor remains off and defrosts are inhibited to preserve the residual cold.	0 ÷ 240 minutes 0 = disabled	0 min
CE2	Compressor OFF operating time in the event of a faulty ambient probe.	5 ÷ 240 minutes	5 min
doC	Compressor safety time for door switch. When the door is opened, the evaporator fans shut down and the compressor will continue working for time doC , after which it will shut down.	0 ÷ 5 minutes	0
tdo	Compressor restart time after door opening. When the door is opened and after tdo time, it's setted back the normal functioning giving door open alarm (Ed). If the door switch is closed and the light stays on for longer than tdo, the cell light alarm (E9) is signalled. With tdo=0 the parameter is disabled.	0 ÷ 240 minutes 0 = disabled	0
Fst	FAN shutdown TEMPERATURE The fans will stop if the temperature value read by the evaporator sensor is higher than this value.	-45 ÷ +99 °C	+99°C
Fd	Fst differential	1 ÷ +10 °C	2°C
LSE	Minimum value attributable to setpoint.	-45 ÷ (HSE-1) °C	-45°C
HSE	Maximum value attributable to setpoint.	(LSE+1) ÷ +99°C	+99°C

<p>AU1</p>	<p>Auxiliary / Alarm 1 relay configuration</p>	<p>-6 (NC) = relay de-energized in stand-by -5 (NC) = Contact for crankcase heater control (AUX relay closed with compressor output not active). -4 (NC) = pump down function (see chap. 5.16) -3 (NC) = automatic auxiliary relay managed by the StA temperature set with 2°C differential -2 (NC) = manual auxiliary relay controlled by the AUX key -1 (NC) = Alarm relay 0 = Relay disabled 1 (NO) = Alarm relay 2 (NO) = manual auxiliary relay controlled by the AUX key 3 (NO) = automatic auxiliary relay managed by the StA temperature set with 2°C differential 4 (NO) = pump down function (see chap. 5.16) 5 (NO) = contact without voltage for call of the condensing unit (AUX relay in parallel with the compressor) 6 (NO) = relay energized in stand-by</p>	<p>0</p>
<p>AU2</p>	<p>Auxiliary / Alarm 2 relay configuration</p>	<p>- Same legend AU1 values -</p>	<p>5</p>
<p>StA</p>	<p>Temperature setting for auxiliary relay</p>	<p>-45...+45°C</p>	<p>0</p>
<p>nSC</p>	<p>Correction factor for the SET button during night operation (energy saving). (with In1 or In2 = 8 o -8) During night operation the control set is: Set Control = Set + nSC In night mode decimal point flashes.</p>	<p>-20,0 ÷ +20,0 °C</p>	<p>0,0°C</p>
<p>In1</p>	<p>Input INP-1 setting</p>	<p>8 = Night mode dig. input (energy saving, N.O.) 7 = Remote defrost Stop (N.O.) (The impulse rising edge is taken) 6 = Remote defrost Start (N.O.) (The impulse rising edge is taken) 5 = Remote Stand-by (N.O.) To indicate remote stand-by, 'IN5' appears on the display 4 = Pump-down pressure switch (N.O.) 3 = Man-in-room alarm (N.O.) 2 = Compressor protection (N.O.) 1 = Door switch (N.O.) 0 = disabled -1 = Door switch (N.C.) -2 = Compressor protection (N.C.) -3 = Man-in-room alarm (N.C.) -4 = Pump-down pressure switch (N.C.) -5 = Remote Stand-by (N.C.). To indicate remote stand-by, 'IN5' appears on the display -6 = Remote defrost Start (N.C.) (The pulse descent front is taken) -7 = Remote defrost Stop (N.C.) (The pulse descent front is taken) -8 = Night mode dig. input (energy saving, N.C.)</p>	<p>2</p>
<p>In2</p>	<p>Input INP-2 setting</p>	<p>- Same legend In1 values -</p>	<p>1</p>

bEE	Buzzer enable	0 = disabled 1 = enabled	1
mOd	Operating mode Thermoregulator	0 = cold call 1 = hot call (with mOd=1 the defrosts and the fan block Fst are excluded)	0
P1	Password type of protection (active when PA is not equal 0)	0 = only display set point 1 = display set point, AUX, light access 2 = access in programming not permitted 3 = access in second level programming not permitted	3
PA	Password (see P1 for the type of protection)	0...999 0 = not active	0
reL	Software release	indicates software version	Read only (26)

5.11

SWITCHING ON ECP300 EXPERT PANEL

After completing the wiring of the electrical panel, power it by operating the main switch; immediately the electrical panel will emit a sound for a few seconds and at the same time all the LEDs will light up on the display.

5.12

HOT/COLD ACTIVATION/DEACTIVATION CONDITIONS

In cold mode (mOd=0), the **ECP300 EXPERT** controller activates the compressor command when the room temperature exceeds the set value plus the differential (r0); it disables the compressor when the room temperature is lower than the set value set.

If the Pump-down function is selected (Parameter AU1/AU2 = 4 / -4) refer to Chapter 5.16 for compressor on / off conditions.

In hot mode (mOd=1), the **ECP300 EXPERT** controller activates the hot output (COMPR output) when the room temperature drops below the set value minus the differential (r0); it switches off the hot output (COMPR output) when the room temperature is higher than the set value set.

5.13

MANUAL DEFROST ACTIVATION / DEACTIVATION

To activate the defrost, simply press the dedicated key (see Chapter 5.2) in this way the resistance relay is activated. Defrost is not activated if the set end defrost temperature (d2) is lower than the temperature detected by the evaporator probe. Defrost will end when the end defrost temperature (d2) is reached or for maximum defrost duration (d3) or for manual defrosting end forcing (defrost end button or digital input).

DEFROST WITH THERMOSTATED RESISTANCES

5.14

Set the parameter **d1=2** for the management of the resistance defrost with time limit. During defrosting, the defrost relay is activated if the temperature read by the defrost probe is less than **d2**. The defrost phase lasts **d3** minutes, regardless of the state of the relay. This allows a better defrosting of the evaporator with a consequent energy saving.

HOT GAS DEFROST

5.15

Warning: do not set d1 = 1 in this type of electrical panel.

For systems with hot gas defrost there is a dedicated line of ECP300 EXPERT electrical panels with pre-fitted wiring.

PUMP DOWN FUNCTION

5.16

Selection of PUMP DOWN functioning mode for the compressor working on X1 terminal block, changing the selection connection as indicated in the wiring diagram.

Warning: Parameters AU1 / AU2 must never be set to 4 / -4 because the PUMP DOWN function is made in electromechanical inside the electrical panel.

PASSWORD FUNCTION

5.17

When parameter PA is setting with value different to 0 the protection function is activated. See parameter P1 for the different protection.

When PA is setting the protection start after two minutes of inactivity. On display appear 000. With up/down modify the number, with set key confirm it.

Use universal number 100 if you don't remember the password.

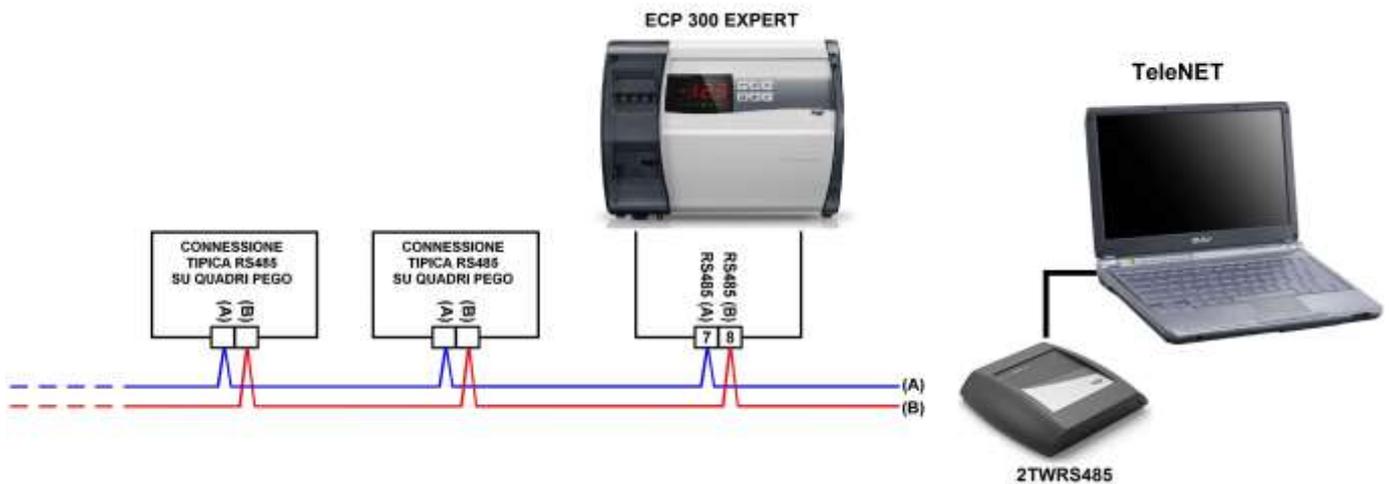
CHAPTER 6: OPTIONS

6.1

TELENET MONITORING AND SUPERVISION SYSTEM

To connect the panel in a **TeleNET** network, follow the diagram below. Refer to **TeleNET** user manual for instrument configuration.

WARNING: During configuration, at entry "Module" select "Instrument ECP Base Series / ECP Expert Series rel. 25 or higher".

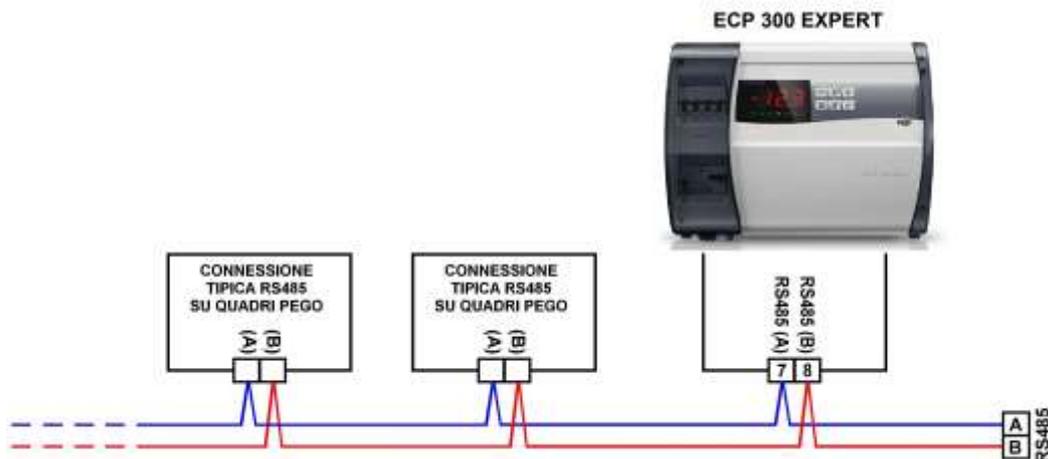


6.2

NET CONFIGURATION WITH MODBUS-RTU PROTOCOL

To connect the panel in an **RS485** network with **Modbus-RTU** protocol, follow the diagram below.

Refer to MODBUS-RTU_ECP202EXP user manual (available on Pego Internet web site) for MODBUS-RTU communication protocol specification.



CHAPTER 7: DIAGNOSTICS

7.1

DIAGNOSTICS BY MEANS OF ALARM CODES

In case of anomaly, the **ECP300 EXPERT** controller will alert the operator through the alarm codes displayed on the screen and with an acoustic signal emitted by a buzzer. The EL and EH temperature alarms remain visible even after they have returned (alarm icon on steady) until they are acquired by pressing the mute key. In the event of an alarm condition, one of the following messages will appear on the display:

ALARM CODE	POSSIBLE CAUSE	SOLUTION
E0	Functional anomaly of the ambient probe	<ul style="list-style-type: none"> • Check that ambient probe is working properly. • Check the electrical connections of the ambient probe. • If the problem persists, replace the probe.
E1	Functional anomaly of the defrosting probe (In this case any defrosting will last for the amount of time established by d3).	<ul style="list-style-type: none"> • Check that defrost probe is working properly. • Check the electrical connections of the defrost probe. • If the problems persist, replace the probe.
E2	Eeprom alarm An EEPROM memory alarm has been detected (All outputs, except the alarm one, are deactivated)	<ul style="list-style-type: none"> • Switch the appliance off and on again by turning the auxiliary circuit breaker inside the transparent door.
E8	Man in cold room alarm	<ul style="list-style-type: none"> • Reset the "man in cold room alarm" input.
Ec	Compressor protection tripped (for example: thermal protection, pressure switch, Kriwan, etc.) (All outputs, except the alarm one, are deactivated)	<ul style="list-style-type: none"> • Check that compressor is working properly. • Check compressor absorption. • If the problem persists, contact the technical assistance service.
Ed	Open door Alarm. When the door is opened and the time tdo has passed, the normal operation of the control is restored, giving the open-door alarm (Ed).	<ul style="list-style-type: none"> • Check door switch status. • Check door switch electrical connections. • If the problem persists, contact the technical assistance service.
E9	Cell light alarm. The cell light remained on for longer than tdo.	<ul style="list-style-type: none"> • Turn off the light.
EH	Maximum temperature alarm. A temperature higher than the one set for the maximum temperature alarm was reached from the room (See variable A2, user programming level)	<ul style="list-style-type: none"> • Check that the compressor is working properly. • Sensor not reading temperature properly or compressor start/stop control is not working.
EL	Minimum temperature alarm. A lower temperature than the one set for the minimum temperature alarm was reached from the room (See variable A1, user programming level)	<ul style="list-style-type: none"> • Check that the compressor is working properly. • Sensor not reading temperature properly or compressor start/stop control is not working.

TROUBLESHOOTING

7.2

If there is not an alarm code, we list below some of the most common causes that can cause anomalies. These causes can be due to problems internal or external to the electrical panel.

EVENTS	POSSIBLE CAUSE	OPERATION TO BE PERFORMED
The compressor doesn't start The display is off	Absence of power supply.	<ul style="list-style-type: none"> Check that the display on the panel and the plant in operation green light  are on. Check the connections of the ambient probe. If the problem persists, replace the probe.
	Intervention of the general protection circuit breaker.	<ul style="list-style-type: none"> Before reinserting the circuit breaker, check that there are no short circuits. Then reinsert the circuit breaker checking all the absorptions to identify any anomalies.
	Intervention of the circuit breaker of the auxiliary circuits.	<ul style="list-style-type: none"> Before reinserting the circuit breaker, check that there are no short circuits. Then reinsert the circuit breaker checking all the absorptions to identify any anomalies.
	Intervention of the secondary circuit protection fuse on the transformer.	<ul style="list-style-type: none"> Restore the fuse (Glass fuse 10x20 F250mA 250V). Check that the absorption on the secondary of the transformer does not exceed 0.25A. Check that no other users have been connected to the Kriwan power supply terminals. Check that there are no short circuits on the secondary circuit.
The compressor doesn't start	The panel is in stand-by.	<ul style="list-style-type: none"> Verify that the panel is not in standby mode (flashing  green light). In this case, press the key to reactivate the panel (green light  on steady).
	Intervention or anomaly of pressure switches or Kriwan.	<ul style="list-style-type: none"> Check the electrical connections, the calibrations and the correct functioning of the sensors and the compressor. If it is the first ignition, check the presence of the "PumpDown / Thermostat" operating mode selection bridge on terminal board X1 and jumper the consent terminals of the devices that are not present in the system (Pressure Switches, Kriwan)
The defrost cycle is not performed	Incorrect setting of the parameters relating to the defrost cycle	<ul style="list-style-type: none"> Check the correct entry of the parameters.

CHAPTER 8: MAINTENANCE

8.1

GENERAL SAFETY RULES

Whatever the nature of the maintenance, it must be performed exclusively by specialized technical personnel.



In the event of a fault or maintenance to the electrical system, before proceeding with any checks, the panel must be disconnected from the mains power switch in the open position (O). Check the absence of voltage with a Tester before any operation.

Each element of the electrical panel, if it proves to be faulty, must be replaced only with original parts.

If maintenance involves parts outside the panel, perform the following steps:

- Securely and safely isolate the panel power supply in one of the following ways:
 - 1) Turn the 300 EXPERT main switch OFF and padlock the front cover.
 - 2) Isolate the power supply upstream of our panel permanently, by tapping it to OFF).
- Put signals to indicate that the machine is under maintenance.

Before proceeding with maintenance operations, carry out the following safety instructions:



- The electrical panel must be disconnected from the power supply.
- Prevent unauthorized personnel from being present in the intervention area.
- Put signals to indicate that the machine is under maintenance.
- Wear work clothes (suits, gloves, shoes, headgear) suitable and free of free appendages.
- Remove, if worn, any object that can get caught in protruding parts of the electrical panel.
- Have accident prevention equipment and tools suitable for operations.
- Tools must be clean and degreased.
- Have available the technical documentation necessary to perform the maintenance intervention (wiring diagrams, tables, drawings, etc.).
- At the end of the maintenance operations, remove all the residual materials and carefully clean the panel.



It's absolutely forbidden to accommodate additional parts inside the panel.

**The manufacturer declines every responsibility
if the points in this chapter are not observed.**

MAINTENANCE

8.2

Scheduled maintenance is necessary to guarantee the functionality of the electrical panel over time and to prevent the deterioration of some elements from being a source of danger for people. It must only be carried out by specialized technical personnel and in compliance with the general safety regulations.

DEVICE	TYPE OF INTERVENTION	FREQUENCY
Terminal block	Wires tightening	After first 20 days of functioning
Terminal block	Wires tightening	Annual

SPARE PARTS

8.3

ECP300 EXPERT panels spare parts

PEGO Identification Codes	DESCRIPTION
200SCHBASE4	Spare part electronic card
COP300EXP	Spare protection cover of the general magneto-thermal switch and screw covers



Spare parts must be requested to your distributor.

ATTACHMENTS / APPENDICES**A.1****DICHIARAZIONE DI CONFORMITA' UE / EU CONFORMITY**

LA PRESENTE DICHIARAZIONE DI CONFORMITÀ È RILASCIATA SOTTO LA RESPONSABILITÀ ESCLUSIVA DEL FABBRICANTE:
THIS DECLARATION OF CONFORMITY IS ISSUED UNDER THE EXCLUSIVE RESPONSIBILITY OF THE MANUFACTURER:



PEGO S.r.l. a socio unico - Via Piacentina 6/b, 45030 Occhiobello (RO) – Italy –
 Società soggetta all'attività di direzione e coordinamento di Castel S.r.l.

DENOMINAZIONE DEL PRODOTTO IN OGGETTO / DENOMINATION OF THE PRODUCT IN OBJECT

QUADRI ELETTRICI PER LA REFRIGERAZIONE / *ELECTRICAL PANELS FOR REFRIGERATING PLANTS*

- ECP300 EXPERT VD4 ECP300 EXPERT VD7 ECP300 EXPERT VD3 LIGHT
 ECP300 EXPERT U VD6 ECP300 EXPERT U VD 12

IL PRODOTTO DI CUI SOPRA E' CONFORME ALLA PERTINENTE NORMATIVA DI ARMONIZZAZIONE DELL'UNIONE EUROPEA:
THE PRODUCT IS IN CONFORMITY WITH THE RELEVANT EUROPEAN HARMONIZATION LEGISLATION:

Direttiva Bassa Tensione (LVD): **2014/35/UE**
Low voltage directive (LVD): **2014/35/EU**

Direttiva EMC: **2014/30/UE**
Electromagnetic compatibility (EMC): **2014/30/EU**

LA CONFORMITA' PRESCRITTA DALLA DIRETTIVA È GARANTITA DALL'ADEMPIMENTO A TUTTI GLI EFFETTI DELLE SEGUENTI NORME (comprese tutte le modifiche):
THE CONFORMITY WITH THE REQUIREMENTS OF THIS DIRECTIVE IS TESTIFIED BY COMPLETE ADHERENCE TO THE FOLLOWING STANDARDS (including all amendments):

Norme armonizzate: **EN 60204-1:2018, EN 61439-1:2022, EN 61000-6-1:2007, EN 61000-6-3:2007**
European standards: **EN 60204-1:2018, EN 61439-1:2022, EN 61000-6-1:2007, EN 61000-6-3:2007**

Firmato per nome e per conto di:
Signed for and on behalf of:

Pego S.r.l.
Martino Villa
Presidente

Luogo e Data del rilascio:
Place and Date of Release:

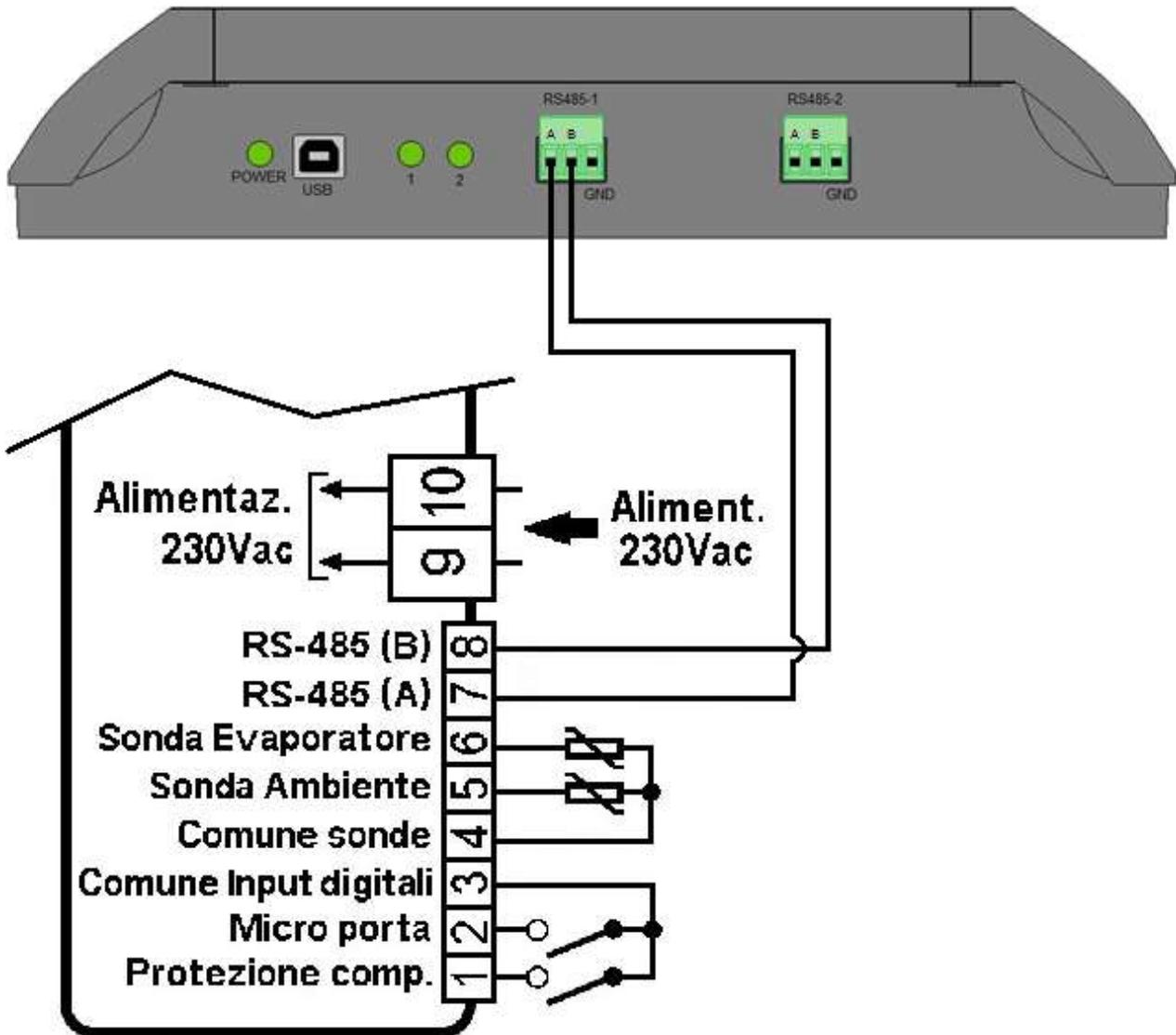
Occhiobello (RO), 01/01/2022

A.2

DIAGRAM CONNECTION TO THE TELENET NETWORK

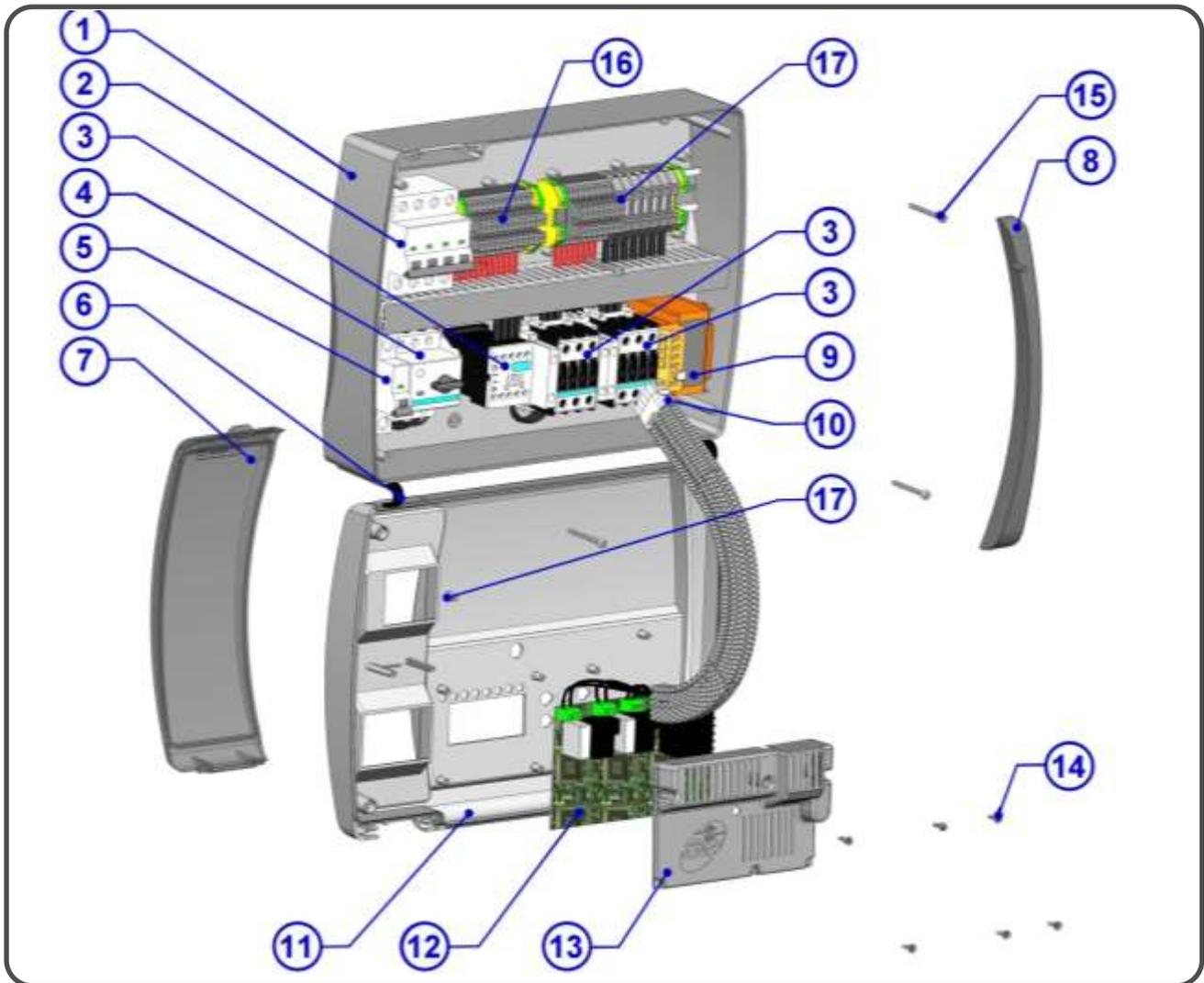


Remember to assign a network address that is consistent with the current TeleNET network, if any (2nd level parameter **Ad**)



PART LIST

A.3



LEGEND

RIF.	DESCRIPTION
1	Box rear in ABS
2	4 poles magnetothermic circuit breaker with general switch / general protection function
3	Contactors for units control
4	Compressor protection motor circuit breaker
5	Auxiliary protection 1-pole magnetothermic circuit breaker
6	Box front opening hinges
7	Front cover in transparent polycarbonate
8	Transparent polycarbonate screw cover
9	Auxiliary circuits transformer (N.B. with inside a glass fuse 10X20 F250mA 250V)
10	Connector for linking panel and the electronic card
11	Front panel
12	Electronic card
13	Electronic card cover
14	Electronic card fixing screws
15	Box closure screws
16	Auxiliary terminal block X1
17	Power terminal block X2

Attention:

This part list is purely indicative and refers to the ECP300VD7 model. Components on the various panels may be different.



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