PLUS100 2PLT

Use and maintenance manual

ENGLISH

ELECTRICAL BOARDS FOR REFRIGERATING INSTALLATIONS

Pego

CONTENTS

INTRODUCTION

INSTALLATION

FUNCTIONS

TECHNICAL SPECIFICATIONS

DATA PROGRAMMING

OPTIONS

DIAGNOSTICS

ATTACHMENTS

CHAPTER 1: INTRODUCTION

1.1   GENERAL

The electronic controllers of the **PLUS100 2PLT** series have been designed to control static or ventilated cold rooms.

The **PLUS100 2PLT** electronic panel allows the user to control all the components on a refrigeration unit equipped with a double system. The panel allows the user to control the essential components of a refrigeration system with up to two compressors, a double evaporator (fans and defrosting elements) and a cold room light.
The double evaporator is controlled separately with a double defrosting sensor and it's possible to set different start times for defrost the evaporators. It's possible to insert a secondary environment probe to ensure the proper functioning of the system in case of failure of the main room sensor.

APPLICATIONS:

- Control static or ventilated cold rooms with double system.

MAIN FEATURES:

- Backlit LCD display.

- Clock and date.

- Temperature with decimal point.

- Password lock keys.

- Management of two separate evaporators (start cyclic or time set).

- Double room sensor management for operation in critical situations.

- Room light control.

- Management of heater defrost, with temperature control.

- Management of hot gas defrost (with or without basin resistance).

- Management of compressor rotation (for a similar aging).

PRODUCT ID CODES

1.2

PLUS100 2PLT   Controller for cold storage cell with double system.

OVERALL DIMENSIONS

1.3

Dimensions in mm

PLUS100 2PLT DISPLAY

193

203

79

100N MASTER3 2PLT

121,50

175

71
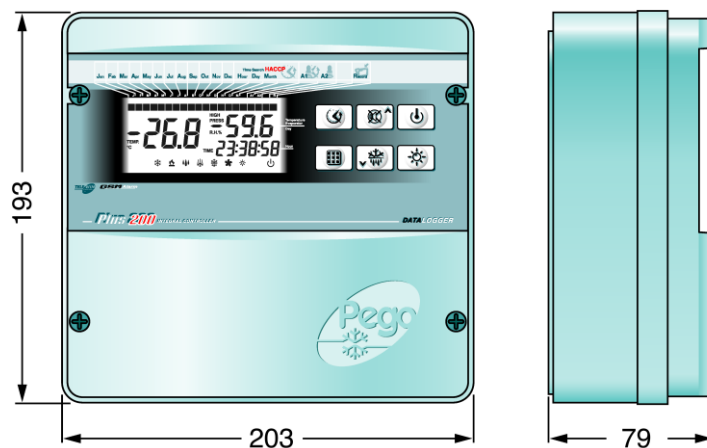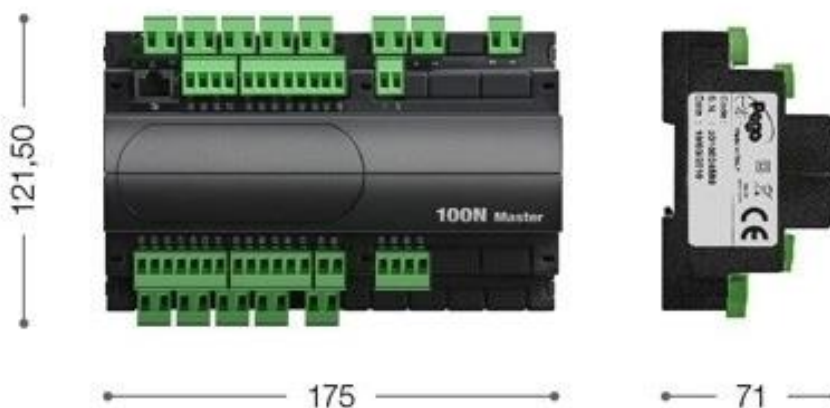
DENTIFICATION DATA

1.4

The unit described in this manual has on its side an ID plate showing all the relevant identification data:

- Manufacturer's name
- Description and code
- Serial number
- Date of production
- Supply voltage
- Degree of protection

Pego
MADE IN ITALY
RoHS compliant
Code: 200P1002PLT
S.N.: 23000000001
MFG Date: 03/07/23
Power supply: 230Vac +/-10%
Frequency: 50-60Hz
Protection: IP65
Operating temp. : -5T50°C

Pego
MADE IN ITALY
RoHS compliant
Description: PLUS100 2PLT
Code: 200P1002PLT
S.N. : 23000000001
MFG Date: 03/07/2023
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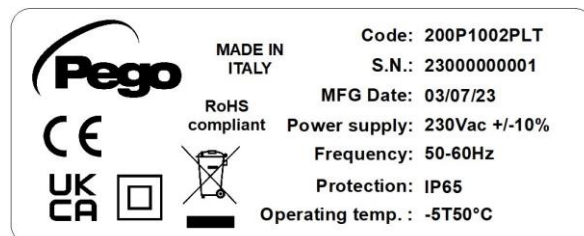
CHAPTER 2: INSTALLATION

2.1	IMPORTANT INFORMATION FOR THE INSTALLER

1. Install the device in places where the protection rating is observed and try not to damage the box when drilling holes for wire/pipe seats.

2. Do not use multi-polar cables in which there are wires connected to inductive/power loads or signalling wires (e.g. probes/sensors and digital inputs).

3. Do not fit power supply wiring and signal wiring (probes/sensors and digital inputs) in the same raceways or ducts.

4. Minimise the length of connector wires so that wiring does not twist into a spiral shape as this could have negative effects on the electronics.

5. Fit a general protection fuse upstream from the electronic controller.

6. All wiring must be of a cross-section suitable for relevant power levels.

7. When it is necessary to make a probe/sensor extension, the wires must be of the correct cross-section, which in any case must be at least $1mm^2$. The extension or shortening of the probes could alter the factory calibration, then proceed to checkout and calibration by means of an external thermometer.

2.2	STANDARD ASSEMBLY AND USE KIT

The **PLUS100 2 PLT** electronic controller is supplied with the following assembly and utilisation items:

- N° 2 NTC temperature probes of 1.5m (room 1 and 2);
- N° 2 NTC temperature probes of 3m (evaporator 1 and 2);
- N° 1 telephone plug cable of 5m (**KCVTELPL8/5**);
- N° 1 user's manual;
- N° 1 Console PLUS100 2PLT;
- N° 1 100N MASTER3 (**200100NMSTH3**);

| INSTALLATION | 2.3 |

- **CONSOLE**

    Fig. 1: Unscrew the 4 closing screws on the front.

    Fig. 2: Using the three pre-existing holes, fix the bottom of the box using three screws of adequate length in relation to the thickness of the wall on which to fix the panel. Place a rubber washer (supplied) between each fixing screw and the bottom of the box.
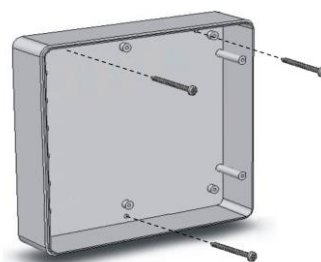
    Fig. 3: Connect the flat cable, close the front cover, making sure that the gasket of the box is correctly seated in its seat.
    Tighten the front cover with the 4 screws, reusing the O-rings present on the groove of each screw.

- **100N MASTER 3**

    Fig. 1: Place the **100N MASTER** module on the DIN rail and close the 2 lower hooks to lock it on it.
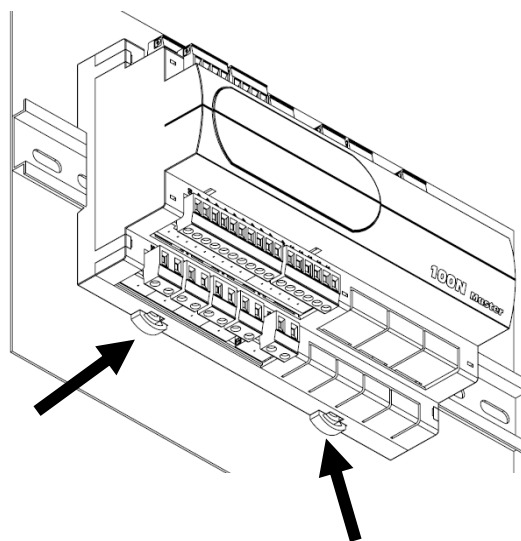
Be careful not to over tighten the closing screws as they could cause deformation to the box and alter the correct functioning and tactile effect of the panel keyboard. On all loads connected to the PLUS100 2PLT electronic controller, install overcurrent protection devices for short circuits, to avoid damaging the device. Each intervention and / or maintenance operation must be carried out by disconnecting the panel from the power supply and from all possible inductive and power loads to which it is connected; this is to ensure the condition of maximum safety for the operator.

CHAPTER 3: FUNCTIONS

3.1   FUNCTIONS MANAGED BY THE PLUS100 2PLT ELECTRICAL PANEL

- Visualization and regulation of the cold room temperature.

- Evaporator 1 and evaporator 2 temperature display.

- Ambient probe 1 and ambient probe 2 temperature display.

- Activation/deactivation of refrigeration system control.

- Function with single set-point and control of two condensing units with delays between the two starts that can be set by parameter.

- Compressor rotation management (for equal ageing).

- Function with double set point for the gradual introduction of the cooling capacity.

- System alarm signaling (ambient temperature probe error, evaporator temperature probe error, minimum and maximum temperature alarm, compressor 1 and compressor 2 protection, person in cold room alarm, different probe alarm).

- Management of evaporator 1 and evaporator 2 fans.

- Air recirculation management.

- Automatic and manual defrosting management (static, with heaters, with thermostated heaters, cycle inversion, cycle inversion with tray heater).

- Clock for managing defrosts in real time clock of the two evaporators simultaneously or separately, (even if the defrost cycle is set at the same time as the end defrost temperature and the management of the fan start delay of the two evaporators is independent).

- Cell light activation with key on the control panel or via door switch.

- Alarm relay.

- Management of double safety ambient probe. If room probe 1 is faulty, the alarm is signaled and the controller changes the reference probe automatically.

- Password functionality to control access to the different programming levels.

- Operation in emergency mode if all the ambient probes are faulty.

CHAPTER 4: TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS 4.1

Power supply	
Voltage	230 V~ ± 10% 50/60Hz
Max. power absorption (only electronic control)	~ 8 VA
Climatic conditions	
Working temperature	-5T50°C <90% R.H. non-condensing
Storage temperature	-10T70°C <90% R.H. non-condensing
General characteristics	
Type of sensors that can be connected	NTC 10K 1%
Resolution	0,1 °C
Sensor read precision	± 0,5 °C
Read range	-45 ÷ +99 °C

Output characteristics

Description	Installed relay	Output board characteristics	Notes
Cold (output 3-4)	(Relay 30A AC1)	30A 240V~ (AC1) 10A 240V~ (AC3) (2HP) (100000 cycles)	All outputs are free-voltage contacts.
n°7 outputs from 5 to 26 (see connection diagram)	(Relay 16A AC1)	16A 240V~ (AC1) 3A 240V~ (AC3)	

Dimensional characteristics	
Dimensions 100N MASTER 3	121,50mm x 71mm x 175mm (HxPxL)
Dimensions PLUS100 2PLT	19.3cm x 7.9cm x 20.3cm (HxPxL)
Insulation / mechanical characteristics	
Display protection rating	IP65
Box material	ABS self-extinguishing

4.2 WARRANTY CONDITIONS

PLUS100 2PLT 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 <u>with the prior request of the Return Authorization Number</u>.

Customers are entitled to have defective products repaired, spare parts and labour 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.
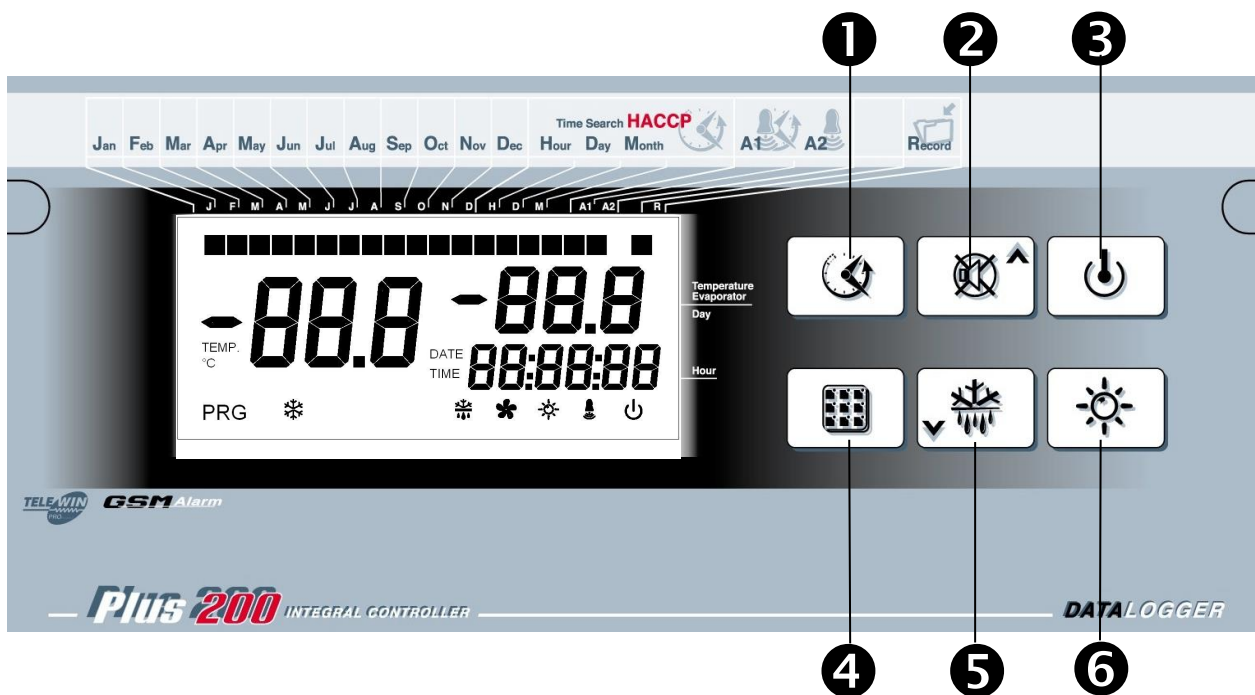
As far as not expressly indicated, is applicable the Law and in particular the art. 1512 C.C. (Italian Civil Code).

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

CHAPTER 5: DATA PROGRAMMING

PANEL LAYOUT
5.1

KEYPAD FUNCTIONS
5.2

❶ **PROBE VALUES / TIME DISPLAY**
(if pressed for more than 3 seconds the current time is displayed for a few seconds)

❷ **UP**
MUTE ALARM / DISPLAY LAST ALARM (if long pressed)

❸ **STAND BY** (ON/OFF)

❹ **SET key,** room temperature
(with double set point both are shown alternately)

❺ **DOWN / ENTER MANUAL DEFROST MENU** (if long pressed)

6 ☀ **ROOM LIGHT**

| 5.3 | DISPLAY LCD |
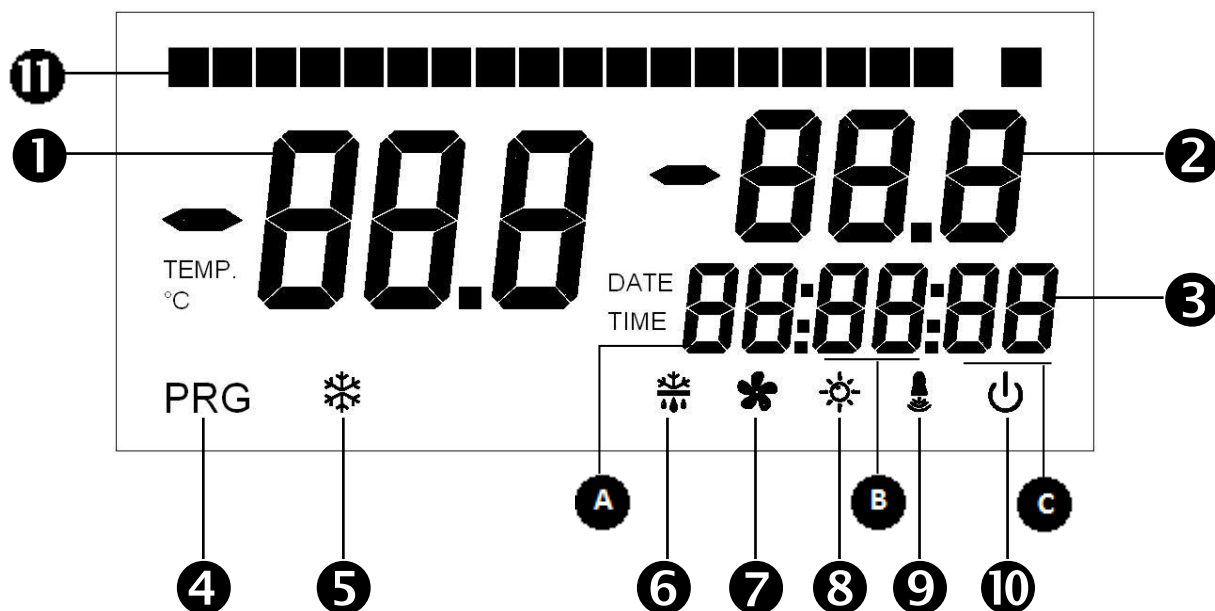
1. **Ambient temperature / parameters**

2. **Room probe temperature value (tA1 and tA2) / evaporator 1 temperature value (td1) / evaporator 2 temperature value (td2) / day of the current month / parameter value / Alarm code**

3.

System status / time / time parameter values

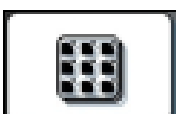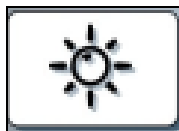| Zone	Written displayed	Fixed state	Flashing state
C	C1	Compressor 1 active	Compressor 1 waiting for C1 delay, it will be next to start. (2° programming level)
B	C2	Compressor 2 active	Compressor 2 waiting for C1 delay, it will be next to start. (2° programming level)
C	d1	Evaporator 1 defrosting	Evaporator 1 in dripping
B	d2	Evaporator 2 defrosting	Evaporator 2 in dripping
A **B** **C**	Current time		Hour : minute : second
	Defrost time		Hour: minute : second
A **B** **C**	dEFr	Defrost menu active	
A	Regulation probe index (displayed in zone 1)	1 = ambient probe 1 2 = ambient probe 2 A = average value of room probes	

4. **PRG** **Programming** (control is in programming mode)

5. ❄ **Cold** (compressor call indicator, if flashing a compressor 1 is waiting C1 delay)

6.		**Defrost** (if flashing an evaporator is in drip mode)
7.		**Fans** (flashing during fan stop – parameter F5)
8.		**Light**
9.		**Alarm**
10.		**Stand-by** (flashing in stand-by. Outputs deactivated.)
11.		**Current month**

GENERAL INFORMATION   5.4

For reasons of safety and greater practicality for the operator, the **PLUS100 2PLT** system provides two levels of parameter programming; the first for the configuration of parameters that can be frequently modified by the user, the second reserved for the installer for programming of the parameters relating to the various operating modes.

If first level programming is being performed, it's not possible to directly access the second level but instead it is necessary to exit the programming menu beforehand.

KEY TO SYMBOLS   5.5

For convenience we will indicate with the symbols:

- **(⌃)** the UP key is used to increase values, mute the buzzer and display last temperature alarm;

- **(⌄)** the DOWN key is used to decrease values and force defrosting.

5.6	SETTING AND DISPLAYING THE SET-POINTS

1. Press the **SET key** to display the current **SET-POINT** (temperature).

2. Hold down the **SET key** and press the (▲) or (▼) keys to modify the **SET-POINT**.

3. Release the **SET key** to return to room temperature display: the new setting will be saved automatically.

Note: with the double set point configuration the display of the two set points is alternated each time SET is pressed.

5.7	PROBES VALUE DISPLAY

Repeatedly press the [⟳] **Probe values** key to alternate the display of the temperature detected by ambient probe 1 (tA1) / ambient probe 2 (tA2) / evaporator probe 1 (td1) / evaporator probe 2 (td2) / day of the current month.

If the probe is faulty or not present, "- - -" is displayed.

5.8	LEVEL 1 PROGRAMMING (USER LEVEL)

To gain access to the Level 1 configuration menu proceed as follows:

1. Press the (▲) and (▼) keys simultaneously and keep them pressed for a few seconds until the first programming parameter appears on the display.

2. Release the (▲) and (▼) keys.

3. Select the parameter to be modified using the (▲) or (▼) key.

4. When the parameter has been selected it is possible:

• to display the setting by pressing SET.

• to modify the setting by pressing the SET key and the (▲) or (▼) keys.

When configuration values have been set you can exit the menu by pressing the (▲) and (▼) keys simultaneously for a few seconds until the cold room temperature reappears.

5. The new settings are saved automatically when you exit the configuration menu.

LIST OF LEVEL 1 PARAMETERS (User level)

5.9

PARAMETER	MEANING	VALUES	DEFAULT
r0	**Temperature differential** referred to main SETPOINT (both sets in case of double setpoint)	0,2 ÷ 10,0 °C	2,0°C
d0	**Defrost interval (hours).** In the case of the double evaporator defrost start is simultaneous.	0 ÷ 24 hours 0 = disabled	4 hours
d21	**End-of-defrost set point, evaporator 1**. Defrost is not executed if the temperature read by the defrost sensor is greater than value d21 (if the sensor is faulty defrosting is time-based).	-35,0 ÷ 45,0 °C	15,0°C
d22	**End-of-defrost set point, evaporator 2**. Defrost is not executed if the temperature read by the defrost sensor is greater than value d22 (if the sensor is faulty defrosting is time-based).	-35,0 ÷ 45,0 °C	15,0°C
d31	**Maximum defrost duration, evaporator 1** (minutes)	1 ÷ 120 min	25 min
d32	**Maximum defrost duration, evaporator 2** (minutes)	1 ÷ 120 min	25 min
d7	**Drip duration** (minutes) At the end of defrosting the compressor and the fans remain at standstill for time setting d7: the defrost LED on the front of the panel flashes.	0 ÷ 120 min	0 min
F5	**Fan pause** after defrost (minutes) Allows fans to be kept at standstill for a time F5 after dripping. This time is counted from the end of dripping. If dripping is not set the fan pause is executed directly after the end of defrosting. During the pause the fan icon flashes.	0 ÷ 10 min	0 min
dEL	**Second system start delay** (valid if nrC=2 e Set=1)	0 ÷ 60 min	30 min
A1	**Minimum temperature alarm** Allows user to define a minimum cold room storage temperature. Below the value A1 (after Ald delay) a warning is given: the alarm LED and the alarm code EL flash and the fault is also highlighted by an internal buzzer.	-45 ÷ (A2-1) °C	-45°C
A2	**Maximum temperature alarm** Allows user to define a maximum cold room storage temperature. Above the value A2 (after Ald delay) a warning is given: the alarm LED and the alarm code EH flash and the fault is also highlighted by an internal buzzer.	(A1+1) ÷ 99 °C	+45°C
dF1	**Real-time defrost enable, evaporator 1** With dF1=1 it is possible to set up to 6 defrosts in real time in a day by using the parameters d41…d46 (not considered if d0 differs from 0).	0 = disabled 1 = enabled	0
dF2	**Real-time defrost enable, evaporator 2** With dF2=1 it is possible to set up to 6 defrosts in real time in a day by using the parameters d51…d56 (not considered if d0 differs from 0).	0 = disabled 1 = enabled	0
d41…d46	**Programming defrost times, evaporator 1** It's possible to set up to 6 defrosting times.	00:00:00 ÷ 23:59:00	00:00:00
d51…d56	**Programming defrost times, evaporator 2** It's possible to set up to 6 defrosting times.	00:00:00 ÷ 23:59:00	00:00:00

| **5.10** | **LEVEL 2 PROGRAMMING (Installer level)** |

To access the second programming level press the UP (▲) and DOWN (▼) keys and the LIGHT key simultaneously for a few seconds.

When the first programming parameter appears the system automatically goes to stand-by.

1. Select the parameter to be modified by pressing the UP (▲) and DOWN (▼) keys.

When the parameter has been selected it is possible to:

2. View the setting by pressing the SET key.

3. Modify the setting by holding the SET key down and pressing the (▲) or (▼) key.

4. When configuration settings have been completed you can exit the menu by pressing the (▲) and (▼) keys simultaneously and keeping them pressed until the room temperature value reappears.

5. Changes are saved automatically when you exit the configuration menu.

6. Press the STAND-BY key to enable electronic control.

| **5.11** | **LIST OF LEVEL 2 PARAMETERS (Installer level)** |

PARAMETER	MEANING	VALUES		DEFAULT
nrC	**Number of compressors (or solenoids or systems)**	1 = 1 system 2 = 2 system		2
nrE	**Number of evaporators**	1 = 1 evaporator 2 = 2 evaporators		2
Set	**Single or double set-point setting** (ignored if nrC = 1)	1 = one setting only 2 = double setting		1
rot	**Compressor rotation** (ignored if nrC = 1)	0 = compressor rotation 1 = fixed call		0
F3	**Fan status with compressor off**	0 = Fans running continuously 1 = Fans running only if compressor is working 2 = fans disabled		1
F4	**Fan pause during defrost**	0 = Fans running during defrost 1 = Fans not working during defrost		1
F6	**Evaporator fans activation for air recirculation.** The fans activate for a time defined by F7 if they have not started working for the F6 time. If activation time coincides with the defrosting time, end of defrosting is awaited.	0 ÷ 240 min 0 = (function not activated)		0 min
F7	**Evaporator fans duration for air recirculation.** Fans working time for F6	0 ÷ 30 min		10 min
dE1	**Evaporator 1 sensor presence.** Disabling the evaporator sensor causes defrosts to occur cyclically with period d0 or by real time clock and terminate according to time d31	0 = evaporator 1 sensor present 1 = evaporator 1 sensor absent		0
dE2	**Evaporator 2 sensor presence.** Disabling the evaporator sensor causes defrosts to occur cyclically with period d0 or by real time clock and terminate according to time d32	0 = evaporator 2 sensor present 1 = evaporator 2 sensor absent		0

PARAMETER	MEANING	VALUES	DEFAULT
d1	**Defrost type**, cycle inversion (hot gas) or elements With 2 compressors and only 1 evaporator both compressors are activated	0 = element 1 = hot gas 2 = hot gas with basin 3 = heater, with temperature control	0
d8	**Post-defrost compressor start mode**. Determines whether system compressor start is possible or not if second is defrosting	0 = if an evaporator is still defrosting the second system can continue working. 1 = compressors do not start until all defrosts have been completed.	0
Ad	**Network address** for connection to TeleNET / Modbus supervision system.	0 ÷ 31 if SEr=0 1 ÷ 247 if SEr=1	1
SEr	**RS-485 communication protocol**	0 = TeleNet Protocol 1 = Modbus-RTU Protocol	0
Bdr	**Modbus baudrate** 0 = 300 baud 3 = 2400 baud 6 = 14400 baud 1 = 600 baud 4 = 4800 baud 7 = 19200 baud 2 = 1200 baud 5 = 9600 baud 8 = 38400 baud		5
Prt	**Modbus parity check**	0 = none 1 = even parity 2 = odd parity	0
Ald	**Minimum and maximum temperature** signalling and alarm display delay	0 ÷ 240 min	120 min
C1	Minimum time between shutdown and **subsequent switching on of the compressor**.	0 ÷ 15 min	0 min
CE1	**Duration of compressor ON time in the case of faulty ambient probe (emergency mode).** If CE1=0 the emergency mode in the presence of error E1/E2 remains disabled, the compressor remains off and defrosting is prevented to conserve the remaining cold.	0 ÷ 240 minutes (0 = disabled)	0
CE2	**Duration of compressor OFF time in the case of faulty ambient probe** (emergency mode).	5 ÷ 240 min	5 min
Hr1	**Compressor 1 hour counter** (can be reset by pressing the set and clock keys for 10 sec)	0 ÷ 999 tens of hours	0
Hr2	**Compressor 2 hour counter** (can be reset by pressing the set and clock keys for 10 sec)	0 ÷ 999 tens of hours	0
CL1	**Room sensor 1 value correction**	-10,0 ÷ 10,0 °C	0,0
CL2	**Room sensor 2 value correction**	-10,0 ÷ 10,0 °C	0,0
HSE	**Maximum value attributable to set point**	(LSE+1) ÷ 99°C	45°C
LSE	**Minimum value attributable to set point**	-45°C ÷ (HSE-1)	-45°C
bEE	**Buzzer state**	0 = disabled 1 = enabled	1
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 min	0 min
Tdo	**Time to re-insert compressor after opening door.** When opening the door and after time tdo the normal operation of the control is restored giving the alarm for open door (Ed).	0 ÷ 240 min (0 = disabled)	0 min

PARAMETER	MEANING	VALUES	DEFAULT

In1 … In4	**DI1…DI4 digital input configuration**
	9 = fan 2 protection (N.O.)
	8 = fan 1 protection (N.O.)
	7 = Stop defrosting remotely (N.O.)
	   (reads leading edge of impulse)
	6= Remote defrost start (N.O.)
	   (reads leading edge of impulse)
	5= Remote Stand-by (N.O.)
	4= Door switch (N.O.)
	3 = man in room alarm (N.O.)
	2= Compressor 2 protection (N.O.)
	1= Compressor 1 protection (N.O.)
	0= Disabled
	-1= Compressor 1 protection (N.C.)
	-2= Compressor 2 protection (N.C.)
	-3= man in room alarm (N.C.)
	-4= Door switch (N.C.)
	-5= Remote Stand-by (N.C.)
	-6= Remote defrost start (N.C.)
	   (reads leading edge of impulse)
	-7= Stop defrosting remotely (N.C.)
	   (reads leading edge of impulse)
	-8 = fan 1 protection (N.C.)
	-9 = fan 2 protection (N.C.)
		-9 ÷ 9
		
		(the input terminals of DI1, DI2, DI3, DI4 are displayed in Appendix par. A.2)
		
		N.B. in the case of digital input configured for "protection fan", the control maintains the operation and the failure is signalled on the display and via the alarm relay
			In1 = 1
			
			In2 = 2
			
			In3 = 3
			
			In4 = 4

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
rA	**DO digital output setting** (the output terminal of DO is displayed in Appendix par. A.2)	2 = Anti-fog resistance of the door (NO) 1 = General alarm (NO) 0 = disabled -1 = General alarm (NC) -2 = Anti-fog resistance of the door (NC)	1
StA	**Setpoint anti-fog resistance relay** If the temperature measured by the room principal probe is less than this value, it activates the auxiliary relay (if rA=± 2)	-45°C ÷ 99°C	0
dEF	**Reserved parameter**	---	---
dY	**Day set up**	01 ÷ 31	01
Mo	**Month set up**	01 ÷ 12	01
Yr	**Year set up**	00 ÷ 99	13
hMS	**Time set up**	Hours – minutes - seconds	12:00:00
P1	**Password: protection type** (active when PA is different from 0)	0 = displays only the set point and allows alarms to be silenced (blocks access to programming). 1 = displays the set point, allows alarms, defrost, light to be silenced (blocks access to programming). 2 = blocks 1st and 2nd level programming access (all other functions are allowed). 3 = blocks access to 2nd level programming (all other functions are allowed).	1

PARAMETER	MEANING	VALUES	DEFAULT
PA	**Password** (see P1 for protection type)	0 ÷ 999 (0 = disabled)	0
mOd	**Mode of operation**	1 = only ambient 1 regulation probe. 2 = only ambient 2 regulation probe. 3 = ambient 1 regulation probe, ambient 2 safety probe. 4 = adjustment with the average value of the probes.	1
rEL	**Release software**	Read only	Read only

5.12 SWITCHING ON THE PLUS100 2PLT ELECTRONIC CONTROLLER

After wiring the controller correctly, power up at 230VAC; the panel will immediately emit a beep and all segments and LEDs come on simultaneously for a few seconds.

5.13 COMPRESSOR ACTIVATION / DEACTIVATION CONDITIONS

The **PLUS100 2PLT** controller activates the compressor when cold room temperature exceeds setting + differential (r0); it deactivates the compressor when cold room temperature is lower than the setting.

5.14 CONFIGURATIONS

- Control of 2 motor condenser units with 2 evaporators
- Control of 1 motor condenser unit with 2 evaporators
- Control of unit panel with 2 evaporators
- Control of 2 motor condenser units with 1 evaporator
- Control of 1 motor condenser units with 1 evaporator

Functional combinations are managed by nrC (number of compressors) and nrE (number of evaporators) parameters.

5.15 SINGLE SET POINT WITH DOUBLE SYSTEM

With a single set point (parameter SEt=1, Considered set: Set 1) and double system (parameter nrC=2) the controller initially 'calls' the compressor which has worked less if rot=0 or calls compressor 1 and then 2 after the delay if rot=1. If the set point is not reached within time DeL (1st level parameter) the second presser is switched on to help. In event of Stand-by or power off compressors restart according to DeL parameter.

5.16 DOUBLE SET POINT

With SEt=2 (double set), there are 2 distinct set points for the 2 compressors. The 2 set points are set by pressing the set key the first time and the value of the set will appear alongside St1, pressing the second time the value of the second set will appear alongside St2.

If rot=0 there will be rotation of the compressors (with reference to the lowest set point, the compressor that worked the least will start). With SEt=2 the DeL parameter is ignored, the compressors are linked to the setpoints: if the room temperature exceeds the lower setpoint +r0, the first compressor (and the related fans, if enabled) is activated, if the temperature exceeds the higher setpoint +r0, yes activates the second compressor. In the event of Stand-by or disconnection of the power supply, the compressors restart at the same time.

DEFROST MANAGEMENT	**5.17**

The defrost start mode are as follows:

- manual defrosting: press the dedicated key (see section 5.2) you will enter the defrost

start / stop management menu. In particular, pressing [⊗^] or [❄] it is possible to

choose the defrost of plant 1 (written "1"), plant 2 (written "2") or both (written "1-2").

Pressing button [⊞] you can start / stop defrost for the selected plant. Manual defrost is

possible even if you have set defrosts in real time clock.

- according to the programmed start times $d41 \div d46$ e $d51 \div d56$, active in the case in

which the parameter of cyclic defrosting d0 is 0 and dF1=1 or dF2=1.

- start-up cycle depending on the parameter d0.

The start of a evaporator defrost involves the activation of the corresponding resistors relay. The parameter d0 acts on both evaporators and has precedence over the real time programmed defrost. Defrosting is not activated if the appropriate conditions are not present (end-of defrosting temperature (d21 for evaporator 1 or d22 for evaporator 2) set lower than the temperature read by the evaporator probe). Defrosting terminates when the end-of defrosting temperature (d21 or d22) is reached or for a maximum defrosting time (d31 for evaporator 1 or d32 for evaporator 2, also when defrost probe faulty or absent) or by manually forced end-of-defrosting (end-of-defrosting key).

The enabling of the second system in the case when the first is in defrost depends on the parameter d8. If nrE=1 the only one evaporator considered is the one of the plant 1 (evaporator 1 and fans 1).

HEATER DEFROST, WITH TEMPERATURE CONTROL	**5.18**

Set the parameter d1=3 for the management of heater defrost, end by time with temperature control. During the entire defrosting process the defrost relays are activated if the temperature read by defrost probe is lower than d21 or d22. Defrosting phase lasts d31 or d32 anyway, in spite of relays state. This allow a better defrost process and energy saving.

| 5.19 | HOT GAS DEFROSTING |

Set parameter d1=1 or d1=2 to manage defrost in cycle inversion mode.

During the entire defrosting process the compressor and defrost relays are activated. During dripping (d7) the compressor stops and, if d1=2, the defrost relays remain activated to ensure the ignition of the resistances of the basins. If d1=2 it may be necessary to add external electromechanical components for proper control of the solenoid valves. For a correct control of the system, the installer must use the

defrost output which must allow the opening of the inversion cycle electrovalve and closing of the liquid electrovalve. For capillary systems (without thermostatic valve) it is sufficient to control the inversion cycle electrovalve using the defrost relay command.

| 5.20 | OPERATING MODE |

The control can operate in four different modes, depending on the value of the mOd parameter:

mOd = 1. Probe 1 used as regulation probe. The presence of ambient probe 2 is ignored. If probe 1 fails alarm E1 is signalled and the control enters emergency mode (CE1 and CE2 parameters);

mOd = 2. Probe 2 used as regulation probe. The presence of ambient probe 1 is ignored. If probe 2 fails alarm E2 is signalled and the control enters emergency mode (CE1 and CE2 parameters);

mOd = 3. Probe 1 used as regulation probe, probe 2 used as control probe.

If probe 1 fails alarm E1 is signalled and the ambient probe 2 becomes the regulation probe. If probe 2 fails alarm E2 is signalled and ambient probe 1 remains the regulation probe.

If both ambient probes fail E1 error is reported and the control enters emergency mode (CE1 and CE2 parameters).

If the temperature difference between the ambient probes is greater than 5°C for a time greater than 10 minutes then EdP alarm is signalled.

mOd = 4. Temperature control by considering the average of the values measured by the 1 and 2 ambient probes. If the ambient probe 1 fails, the ambient probe 2 is considered as the control probe (and vice versa). If both ambient probes fail E1 error is reported and the control enters emergency mode (CE1 and CE2 parameters).
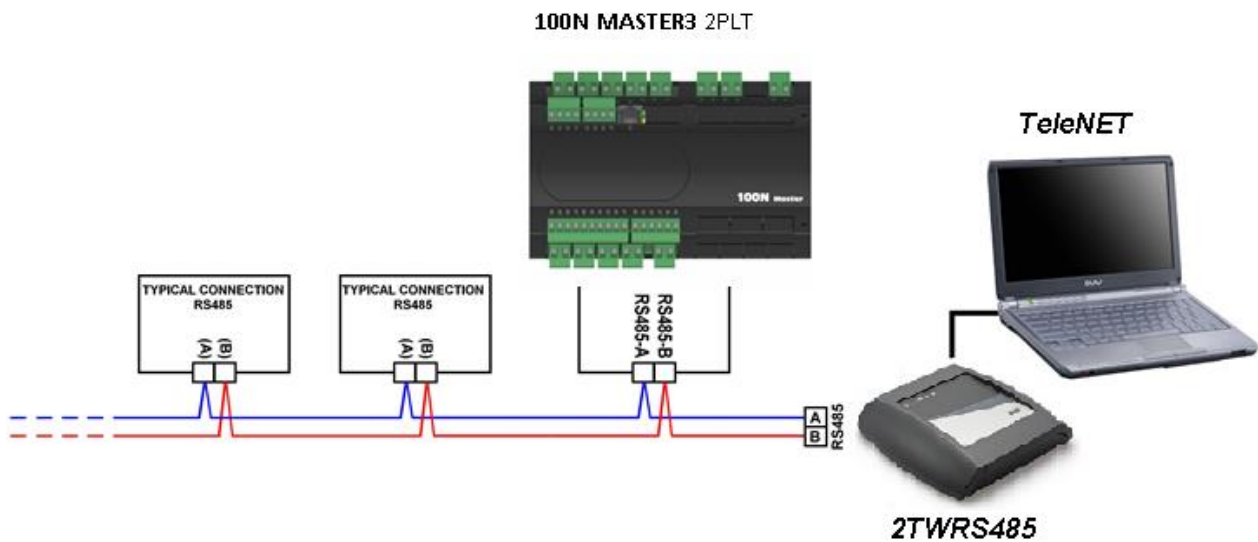
CHAPTER 6: OPTIONS

TELENET MONITORING / SUPERVISION SYSTEM

6.1

In order to connect the board to the **TeleNET** network, follow the diagram below. Configure the instrument with reference to the **TeleNET** manual.

IMPORTANT: During configuration of the "Module", select "<u>PLUS 200 2 PLT / VISION 100 2PLT Instrument</u> ".

CHAPTER 7: DIAGNOSTICS

7.1	DIAGNOSTICS

In case of anomalies, the **PLUS100 2PLT** controller warns the operator using alarm codes shown by the display and an acoustic signal emitted by a buzzer inside the Operational console. If the alarm EL or EH falls without operator intervention the control keeps track of the error over time.

Long press the "mute alarm" key will display the error code already ceased. If happen in sequence an EH alarm and an EL alarm (in any order), only the alarm EH (maximum temperature alarm) is kept in memory.

ALARM CODE	POSSIBLE CAUSE / DESCRIPTION	ACTION TO BE TAKEN
E1	**Room temperature sensor 1 faulty**	• Check that the room sensor is working properly • If the problem persists replace the sensor
E2	**Room temperature sensor 2 faulty**	• Check that the room sensor is working properly • If the problem persists replace the sensor
Ed1	**Defrost sensor 1 faulty** (In this event any defrosts will have duration time d31)	• Check that the defrost sensor is working properly • If the problem persists replace the sensor
Ed2	**Defrost sensor 2 faulty** (In this event any defrosts will have duration time d32)	• Check that the defrost sensor is working properly • If the problem persists replace the sensor
E0	**EEPROM alarm** EEPROM memory error detected. (All outputs deactivated except alarms)	• Switch off unit and switch back on
EL	**Minimum temperature alarm** The ambient temperature is lower than that set for the minimum temperature alarm (see A1 parameter)	• Check compressor status • The probe does not correctly detect the temperature or the command to start / stop the compressor does not work
EH	**Maximum temperature alarm** The ambient temperature is greater than that set for the maximum temperature alarm (see A2 parameter)	• Check compressor status • The probe does not correctly detect the temperature or the command to start / stop the compressor does not work
En	**Communication error with 100N MASTER 3**	• Switch off unit and switch back on • If problem persists contact technical assistance service
E6	**Low battery alarm:** the controller will function for at least another 20 days; subsequently any power loss to the board will involve loss of time settings.	• Replace the battery (CR2032) present in the display.
E0n	**EEPROM alarm on 100N MASTER 3**	• Switch off unit and switch back on

E8	**Man in cold room alarm.** The man in room alarm switch in the room has been pressed to indicate a dangerous situation	• Reset the alarm switch inside the cold room
Ed	**Open door alarm**. When the door switch opens and the Tdo time has elapsed, normal function of the control is reset, triggering the door open alarm (Ed)	• Close the door
Ec1	**Compressor 1 safety device tripped** (e.g. Overheat or max. pressure switch.)	• Check the compressor status • Check compressor absorption • If problem persists contact technical assistance service
Ec2	**Compressor 2 safety device tripped** (e.g. Overheat or max. pressure switch.)	• Check the compressor status • Check compressor absorption • If problem persists contact technical assistance service
EdP	**Possible functional anomaly of one of the two probes.** If the mOd parameter is set to 3, if the detected temperature by the main probe differs from the value measured by the control sensor for more than 5 ° C then the possible fault is reported (the operating system remains unchanged)	• Check that the room sensors are working properly
Ev1	**Fans 1 protection**	• Check fan status • If problem persists contact technical assistance service
Ev2	**Fans 2 protection**	• Check fan status • If problem persists contact technical assistance service

ATTACHMENTS

| **A.1** | EU DECLARATION OF CONFORMITY |

LA PRESENTE DICHIARAZIONE DI CONFORMITA' E' RILASCIATA SOTTO LA RESPONSABILITA' ESCLUSIVA DEL FABBRICANTE:
THIS DECLARATION OF CONFORMITY IS ISSUED UNDER THE EXCLUSIVE RESPONSIBILITY OF THE MANUFACTURER:

PEGO S.r.l.   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*

MOD.:   **PLUS100 2PLT**

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 E' GARANTITA DALL'ADEMPIMENTO A TUTTI GLI EFFETTI DELLE SEGUENTI NORME:
THE CONFORMITY REQUIRED BY THE DIRECTIVE IS GUARANTEED BY THE FULFILLMENT TO THE FOLLOWING STANDARDS:

Norme armonizzate:	**EN 61010-1:2010, EN 61326-1:2013**
European standards:	***EN 61010-1:2010, EN 61326-1:2013***

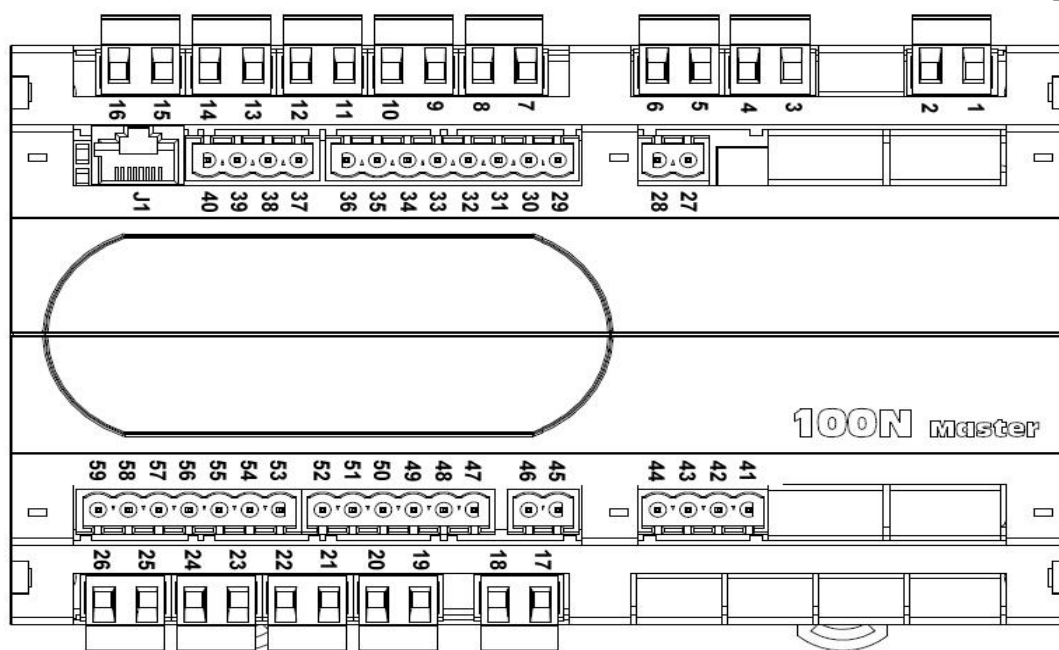Firmato per nome e per conto di:
Signed for and on behalf of:

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

Pego S.r.l.
Martino Villa
Presidente

Occhiobello (RO), 01/01/2022

100N MASTER3 CONNECTION LAYOUT

A.2

Power supply

PIN TERMINAL	DESCRIPTION
1 – 2	N – L Power supply terminal **1 – 2** 115÷230Vac ±10% 50/60Hz Power absorption: 20 VA max.
45	Connect the ground to terminal 45 on the console (functional ground). This connection helps to limit the effects of electromagnetic disturbances on the control system. The ground connection must be made in compliance with the applicable regulations.

Digital outputs

PIN TERMINAL	RELAY OUTPUTS FEATURES (Voltage free contacts)	DESCRIPTION
3 – 4	Relay 30A 240V~ (AC1) 10A 240V~ (AC3) (2HP)	Compressor 1
5 – 6	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	Compressor 2
7 – 8	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	Fans 1
9 – 10	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	Fans 2
11 – 12	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	Defrost 1
13 – 14	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	Defrost 2

15 - 16	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	Cold room light
17 - 18	Relay 16A 240V~ (AC1) 3A 240V~ (AC3)	DO configurable digital output

Analog inputs

PIN TERMINAL	PROBE TYPE	DESCRIPTION
29 – 30	NTC 10K	Ambient 1 probe
31 – 32	NTC 10K	Ambient 2 probe
33 – 34	NTC 10K	Evaporator 1 probe
35 – 36	NTC 10K	Evaporator 2 probe

Digital inputs

PIN TERMINAL	DESCRIPTION
59 – 47	DI1 digital input
59 – 48	DI2 digital input
59 – 49	DI3 digital input
59 – 50	DI4 digital input

TeleNET

PIN TERMINAL	DESCRIPTION
39	Line A of 2TWRS485
40	Line B of 2TWRS485

Configuring internal bridges Power Board
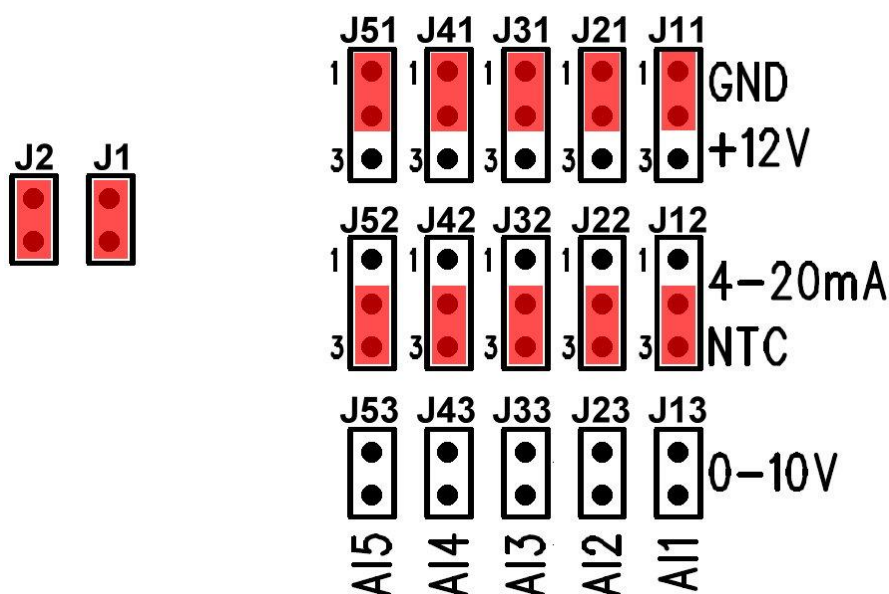
PEGO s.r.l.
Via Piacentina, 6/b 45030 Occhiobello (RO) – ITALY
Tel. +39 0425 762906
e-mail: info@pego.it – www.pego.it

TECHNICAL ASSISTANCE
Tel. +39 0425 762906   e-mail: tecnico@pego.it

Distributor: