

PLUS200 EXPERT THR



Use and maintenance manual

ENGLISH

READ AND KEEP

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CHAPTER 1: INTRODUCTION

1.1

GENERAL FEATURES

DESCRIPTION:

The **PLUS200 EXPERT THR** system allows the user to control temperature and humidity in seasoning/preservation rooms and industrial processes.

The system is composed by a single container in which are fixed both the card with the big LCD display and the power card on which there are the driving relays and where all the wiring connections are made. The system allows the user to control cold, heat, ventilation, the room light, humidification, air change, pauses, dehumidification, defrosting and alarms, up to five programs, of seven phases each, settable and customizable.

APPLICATIONS:

- Seasoning/drying rooms.
- Germination rooms with day/night cycles.
- Storage rooms with or without humidity control.

MAIN FEATURES:

- Backlit LCD screen.
- Clock and calendar.
- Manual or automatic mode.
- Up to a maximum of 5 fully customizable programs. Automatic management of 7 phases for each program. Possibility of combining multiple programs to overcome the limit of 7 phases.
- Possibility of excluding heat and humidity to manage a storage-only cell with the activation of defrosts.
- Temperature to one decimal point.
- Password for keypad lock.
- Day/night cycle for germination systems with double set-point.
- Dehumidification program with cold or heat call.

PRODUCT IDENTIFICATION CODE

1.2

200P200ETHR

Temperature and humidity control for seasoning, preservation and industrial processes.

DIMENSIONS

1.3

Dimensions in mm

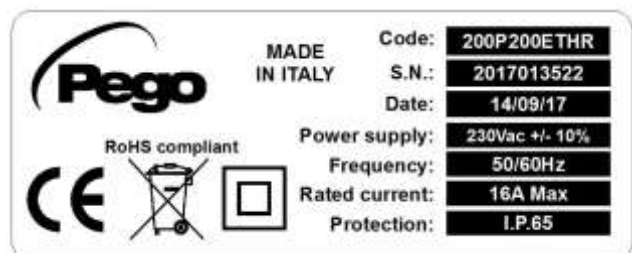


IDENTIFICATION DATA

1.4

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

- Manufacturer name
- Device code
- Serial number
- Data
- Power supply
- Frequency supply
- Maximum power
- IP protection rating



CHAPTER 2: INSTALLATION

2.1

IMPORTANT GENERAL 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. Install a general protection fuse upstream of the electronic control.
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 have a cross-section of at least 1mm². Probes extension or shortening could alter their factory calibration; therefore, to check and calibrate the probes through an external thermometer.
8. Tighten the 4 closing screws of the electrical panel with a torque not exceeding 1 newton meter.

2.2

STANDARD ASSEMBLY KIT

PLUS200 EXPERT THR electronic controller kit, for assembling and using, contains:

- N° 2 temperature probes;
- N° 1 user manual;
- N° 3 seals, to be fitted between the fixing screws and the box back panel.

INSTALLING THE UNIT

2.3

- Lift the transparent door that protects the differential magneto thermic circuit breaker and remove the cover for the screws on the right side.
- Remove the 4 fastening screws from the front panel of the box.
- Open the front of the box by lifting it and sliding the two hinges as far as they will go. Flex the hinges and rotate the front 180° downwards to access the inside of the electrical panel
- Using the three holes provided, 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.
- Make all the electrical connections according to the attached diagram. To make the electrical connections reliably and maintain the degree of protection of the box, it is advisable to use suitable cable glands and / or pipe presses to tighten all the wiring. It is advisable to distribute the passage of conductors inside the switchboard in the most orderly way possible; in particular, keep the power conductors away from the signal conductors. Use any sealing bands.
- Close the front cover, making sure that all cables are inside the box and that the box gasket is properly housed in its seat. Tighten the front cover with the 4 screws with a torque not exceeding 1 newton meter. Power the panel and carry out a scrupulous reading / programming of all the parameters set.
- 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; do not exceed 1 newton meter of torque.
- On all loads connected to the PLUS200 EXPERT THR electronic controller, install overcurrent protection devices for short circuits, to avoid damage to 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 to ensure maximum safety for the operator.

FUNCTIONS MANAGED BY PLUS200 EXPERT THR

2.4

- Display and adjustment of temperature and humidity settings (neutral zone).
- Stand-by activation/deactivation.
- Sensor alarms.
- Air change parameter adjustment.
- Defrost parameter adjustment.
- Pauses parameter adjustment.
- Fan parameter adjustment.
- Outputs status display.
- Simultaneous display of temperature and humidity.
- Automatic program control with automatic variation of temperature and humidity settings over time.
- Clock function.

CHAPTER 3: TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS

3.1

Power Supply			
Voltage	230V~ ± 10% 50/60Hz		
Max. power absorption (only electronic control)	~ 15 VA		
Ambient Conditions			
Operating temperature	-5 ÷ +50 °C		
Storage temperature	-10 ÷ +70 °C		
Relative ambient humidity	Lower than 90% Rh		
General Features			
Type of connectable probes (temperature)	NTC 10K 1%		
Resolution (ambient temperature)	0,1 °C		
Reading accuracy of probes (ambient temperature)	± 0,5 °C		
Reading range	-45 ÷ +45 °C		
Humidity probe	Analogic input 4-20 mA		
Reading accuracy of humidity probe	See humidity probe specifications		
Reading range of humidity probe	0-99 Rh%		
Output Characteristics			
Description	Installed relay	Board output characteristics	Notes
Cold (output 43-44)	(Relay 30A AC1)	10A 250V~ (AC3) (2HP) (100000 cycles)	All outputs are free of voltage contacts The sum of contemporary absorptions of these outputs has not to exceed 16A
n° 9 outputs from 25 to 42 (see connection scheme)	(Relay 16A AC1)	16A 250V~ (AC1)	
General electrical protection		Differential magnetothermic circuit breaker 16A Id=300 mA Disconnecting power 4.5 kA	
Dimensional Characteristics			
Dimensions	18cm x 9.6cm x 26.3cm (HxWxL)		
Insulation and Mechanical Characteristics			
Display protection rate	IP65		
Box material	Extinguishing ABS		
Type of insulation	Class II		

CHAPTER 4: WARRANTY TERMS

4.1

WARRANTY TERMS

PLUS200 EXPERT THR 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 5: PARAMETERS PROGRAMMING





CONTROL PANEL

5.1



FRONTAL KEYBOARD

5.2

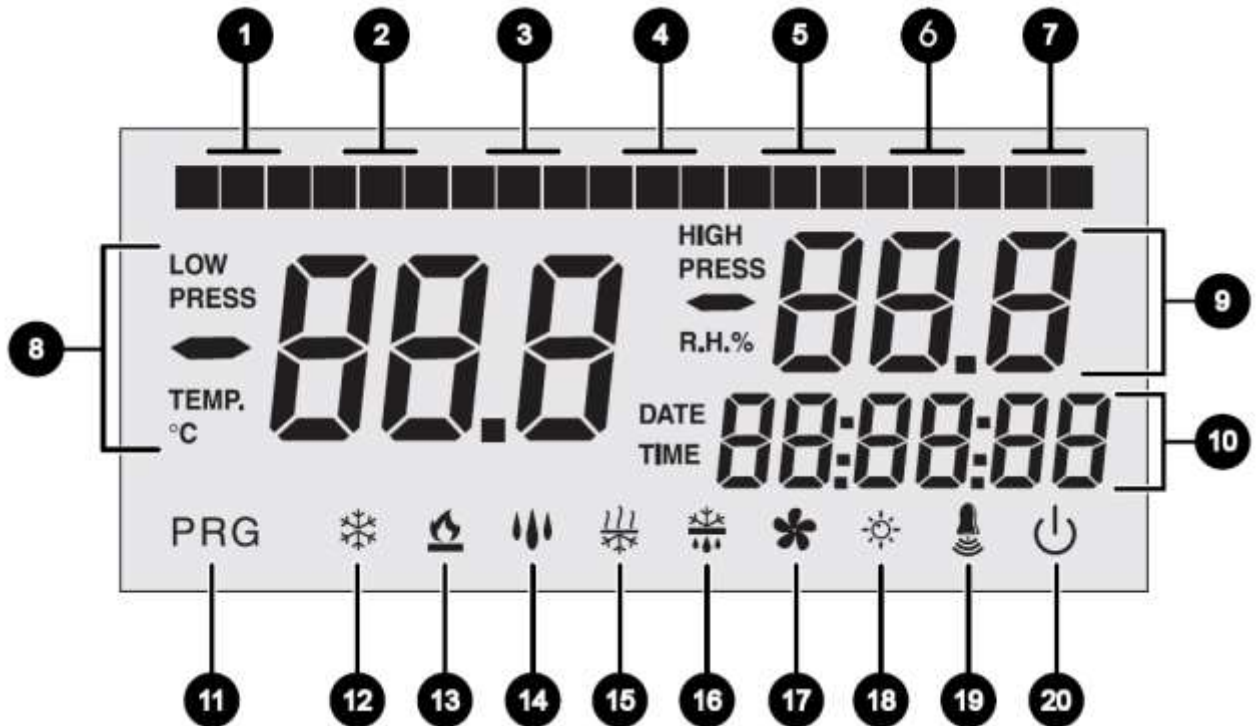
- 1**  **PROGRAM START/STOP** (to press 5 seconds for selecting the program to run, to press 5 seconds for finishing a running program)
TIMER (displays remaining time of running phase with a single key press)
- 2**  **UP**
MANUAL PAUSE and DEFROST (activates both functions)
- 3**  **STAND BY** (system ON/OFF, the running program maintains the count of remaining time)
- 4**  **SET** ambient temperature and humidity (following pressures alternate temperature and humidity)

5  DOWN / MUTE ALARM / FORCING AIR CHANGE

6  ROOM LIGHT

5.3

DISPLAY LED















1  **0** PHASE 0 advancing/ Dripping / Day germination phase

2  **1** PHASE 1 advancement

3  **2** PHASE 2 advancement

4  **3** PHASE 3 advancement

5  **4** PHASE 4 advancement / Night PHASE germination

- 6**  **PHASE 5 advancement**
- 7**  **Refreshment**
- 8**  **Ambient temperature value/ parameters**
- 9**  **Ambient relative humidity / parameters value / error codes**
- 10**  **Time / date / time parameters value / running program / timer**
- 11** **PRG** **Programming (the controller is in programming phase)**
- 12**  **Cold (flashing if called for dehumidification only)**
- 13**  **Hot (flashing if called for dehumidification only)**
- 14**  **Humidification (flashes if a hot/cold block has occurred)**
- 15**  **Dehumidification (flashes if a hot/cold block has occurred)**
- 16**  **Defrost**
- 17**  **Fans**
- 18**  **Light (flashing if the door switch is active)**

19



Alarm

20



Stand-by

5.4

GENERAL FEATURES



For safety reasons and to simplify the operator's work, the **PLUS200 EXPERT THR** has two programming levels; the first level is used to modify **SETPOINT** parameters (i.e. those parameters that are changed frequently). The second level is for general parameter programming of the various board work modes.

It is not possible to access the first programming level directly from the second level: you must exit the programming mode first.

5.5

KEY TO SYMBOLS

For practical purposes the following symbols are used:

- (▲) indicates the UP key  used to increase value and to force the defrost / pause;
- (▼) indicates the DOWN key  used to decrease value, to mute the alarm and to force the air changing.

5.6

SET POINT PROGRAMMING AND DISPLAYING

1. Push the **SET key** to display the current **SET POINT** (temperature and humidity alternately).
2. Press the **SET key** and push one of (▲) or (▼) keys to modify the **SET POINT** value. Release the **SET key** to return to cold room temperature display; modifications are saved automatically.

FIRST LEVEL PROGRAMMING (User Level)

5.7

To access the first programming level proceed as follows:

1. Press the (**▲**) and (**▼**) **keys** simultaneously and keep them pressed for a few seconds until the first programming variable appears on the display.
2. Release the (**▲**) and (**▼**) keys.
3. Select the variable to be modified using the (**▲**) or (**▼**) key.
4. When the variable has been selected it is possible:
 - To display its setting by pressing **SET**.
 - To modify its setting by pressing the **SET key** and the (**▲**) or (**▼**) buttons.

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

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

LIST OF 1ST LEVEL VARIABLES (User Level)

5.8

VARIABLES	MEANING	VALUES	DEFAULT
dtC	HOT temperature differential with reference to main SET-POINT. It is expressed in absolute value and it defines the temperature hysteresis for the HOT referred to temperature SET POINT.	$(dtn+0,2) \div 10 \text{ } ^\circ\text{C}$	2 °C
dtF	COLD temperature differential with reference to main SET-POINT. It is expressed in absolute value and it defines the temperature hysteresis for the COLD referred to temperature SET POINT.	$(dtn+0,2) \div 10 \text{ } ^\circ\text{C}$	2 °C
dtn	Temperature NEUTRAL zone with reference to main SET-POINT. In neutral zone cold and hot are not activated; it includes symmetrically both a superior part (hot) and an inferior part (cold) as to temperature SET-POINT.	$dtF > dtn \div 0 \text{ } ^\circ\text{C}$ $dtC > dtn \div 0 \text{ } ^\circ\text{C}$	0 °C
dUU	HUMIDIFICATION differential with reference to humidity SET-POINT. It is expressed in absolute value and it defines the humidification hysteresis referred to humidity SET-POINT.	$(dUn+1) \div 10 \text{ Rh}\%$	5 Rh%
dUd	DEHUMIDIFICATION differential with reference to humidity SET-POINT. It is expressed in absolute value and it defines the dehumidification hysteresis referred to humidity SET-POINT.	$(dUn+1) \div 10 \text{ Rh}\%$	5 Rh%
dUn	Humidity NEUTRAL zone with reference to main SET-POINT. In neutral zone humidification and dehumidification are not activated; it includes symmetrically both a superior part (humidification) and an inferior part (dehumidification) as to humidity SET-POINT.	$dUU > dUn \div 0 \text{ Rh}\%$ $dUd > dUn \div 0 \text{ Rh}\%$	0 Rh%
d4	Defrost interval (hours). d4=0 disables the defrosts	0 ÷ 24 hours	0 hours
d5	Maximum length of defrost (minutes)	1 ÷ 60 min	10 min
d6	End of defrost setpoint. Defrost is not executed if the temperature read from defrost probe is superior to d6 value. (In case of broken probe, it will have a timing defrost)	-35 ÷ 45 °C	15°C

VARIABLES	MEANING	VALUES	DEFAULT
d7	Dripping duration (minutes) At the end of defrosting, the compressor and the fans remain still for the d7 set time, the defrosting icon 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
At1	Minimum temperature alarm Enables defining a minimum temperature value to the ambient. Below value At1, the alarm status will be signalled with the alarm icon flashing, the temperature flashes and an internal buzzer acoustically signals the existence of an anomaly. The alarm is signalled after the Ald time.	-45 ÷ At2-1 °C	-45°C
At2	Maximum temperature alarm Enables defining a maximum temperature value to the ambient. Above value At2, the alarm status will be signalled with the alarm icon flashing, the temperature flashing and an internal buzzer acoustically signals the existence of an anomaly. The alarm is signalled after the Ald time. The alarm does not suspend any defrosting in progress.	At1+1 ÷ 45 °C	+45°C
AU1	Minimum humidity alarm Enables defining a minimum humidity value to the ambient to be humidified. Below the AU1 value, the Eu alarm status will be signalled with the alarm icon flashing and the buzzer active. Silencing, the humidity and the alarm icon remain flashing. The alarm is signalled after the Ald time.	1 ÷ AU2-1 Rh%	1 Rh%
AU2	Maximum humidity alarm Enables defining a maximum humidity value to the ambient to be humidified. Below the AU2 value, the Eu alarm status will be signalled with the alarm icon flashing and the buzzer active. By silencing, the humidity and the alarm icon remain flashing. The alarm is signalled after the Ald time. AU2=99 does not signal the alarm.	AU1+1 ÷ 99 Rh%	99 Rh%
rA	Air change enabling in real time With rA=1 it is possible to set up to 6 air changes in real time during one day, through parameters rA1...rA6.	0 = Disabled 1 = Enabled	0
rA1 ... rA6	Air change times programming It is possible to set up to 6 times for the air changes. The previous value blocks the subsequent one making them sequential.	00:00 ÷ 23:50	--
drA	Air change duration	0 ÷ 60 min	6 min
tEu	Evaporator probe temperature display (if dE =1 nothing is displayed)	Temperature	only reading

SECOND LEVEL PROGRAMMING (Installer Level)

5.9

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 variable appears the system automatically goes to stand-by.

1. Select the variable to be modified by pressing the UP (▲) and DOWN (▼) keys. When the parameter has been selected it is possible:
2. To display the parameter setting by pressing the SET key.
3. To modify the parameter setting by pressing the SET key and pressing the (▲) or (▼) key.
4. When setting has been completed you can exit the menu by pressing the (▲) and (▼) keys simultaneously and keeping them pressed until the cold room temperature reappears.
5. Modifications are saved automatically when you exit the configuration menu.
6. Press STAND-BY to enable electronic control.

LIST OF 2ND LEVEL VARIABLES (Installer Level)

5.10

VARIABLES	MEANING	VALUES	DEFAULT
AC	Door switch input status (with door closed)	0 = usually open 1 = usually closed	0
Pc	Main alarm digital input status (9-18)	0 = NO 1 = NC	0 = NO
F3	Fans status when cold, hot, humidification and dehumidification are at a stand-still	0 = Fans in continuous start. 1 = Fans switched-off if cold, hot, humidification and dehumidification switched-off.	1
F4	Fans pause during defrosting	0 = Fans working during defrosting. 1 = Fans not working during defrosting.	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. The speed of the fans (high/low) is the same as that selected for the phase in progress.	0 – 240 min 0 = (function not activated)	0 min
F7	Evaporator fans duration for air recirculation. Operating time of the air recirculation fans, for the time F6.	0-240 seconds	0:00:10



VARIABLES	MEANING	VALUES	DEFAULT
F8	Fans speed during seasoning / preservation. The value of this variable is amended based on the set-up made during the last phase of a performed program.	0 = High speed 1 = Low speed (only if rin=1)	0
Pr	Refreshment period. Interval between one refreshment and the subsequent one. The refreshment is a work pause in which cold, hot, humidifies and dehumidifies are disabled.	0 ÷ 24 hours (at 10 min steps) 0 = Disabled	0 h
dr	Refreshment phase duration.	1 ÷ 240 min	120 min
rin	Signal delay and alarm display time of minimum or maximum temperature or humidity.	0 = Refreshment 1 = Fans low speed	0
Ald	Signal delay and alarm display time of minimum or maximum temperature or humidity.	(1 min ÷ 4 hours)	240 min
C1	Minimum time between switch-off and subsequent ignition of the compressor. It also stops the fans if they are not active for other functions	0...15 min	0
dEU	Dehumidification method selection. The separate dehumidification calls hot and cold only for temperature	0 = cooling 1 = heating 2 = separate dehumidification	0
EnU	Humidification enabling	0 = disabled 1 = enabled	1
End	Dehumidification enabling	0 = disabled 1 = enabled	1
Cat	Ambient probe value correction	-10...+10	0
CaU	Humidity probe value correction	-20...+20	0
EnH	Hot enabling	EnH = 1 hot enabled EnH = 0 hot disabled	1
Hr	Humidity management	Hr = 1 enables humidity management. Hr = 0 disables humidity management. The humidity probe can be disconnected without error on display. The evaporator probe is displayed instead of humidity (if dE= 0).	1
dE	Evaporator probe exclusion	0 = probe present 1 = probe absent	1
d1	Type of defrosting , at cycle inversion (hot gas) or resistance. The compressor output is also activated with hot gas	1 = with hot gas 0 = with resistance	0
LSt	Minimum value attributable to setpoint of temperature.	-45 ÷ HSt °C	-45°C
HSt	Maximum value attributable to setpoint of temperature	+45 ÷ LSt °C	+45°C

VARIABLES	MEANING	VALUES	DEFAULT
btF	Temperature differential referred to Setpoint for COLD BLOCK . It constitutes the SET-btF limit below which the cold call relay (43-44) and the dehumidification relay (29-30) are disabled.	0 ÷ 20 °C 0 = Disabled	2
btC	Temperature differential referred to Setpoint for HOT BLOCK . It constitutes the SET+btC limit above which the hot call relay (41-42), the humidification relay (35-36) and the dehumidification relay (29-30) are disabled.	0 ÷ 20 °C 0 = Disabled	2
dEt	Limit time for DEHUMIDIFICATION. If the dehumidification request is not satisfied (achievement of humidity SET) within the time (dEt), the variable (dEO) is taken into consideration for the operation to be performed. Counting starts at every new dehumidification request.	(0 min ÷ 4 ore) (Steps of 1 min) 0 = Disabled	0
dEo	Operation to be performed in case Timeout for dehumidification (dEt) intervenes dEO= 0 an alarm signal (Ed) + buzzer + alarm relay is given. The alarm is displayed even when humidity set is achieved; it does not block the normal functioning and once silenced, the dEt count re-starts. dEO= 1 a refreshment of the duration (dr) is launched and the timer relating to the interval (Pr), if present, is recharged.	0 = alarm only 1 = a refreshment is performed.	0
Ad	Net address for connection to TeleNET supervision system	0 ÷ 31	0
Aut	Automatic cycles management or via TeleNET. For managing the cycles via TeleNET to set Aut=1	0 = local cycles 1 = TeleNET management	0
Cg	Seasoning or germination selection	0 = seasoning cycles active 1 = germination day/night cycle active	0
CgA	Not used.	0	0
tg2	Not used.	0	0

VARIABLES	MEANING	VALUES	DEFAULT
P1	Password: type of protection. (Active when PA is different from 0).	0 = Total block. It is possible to only see the temperature and humidity set point. 1 = Blocks access in 1st and 2nd level programmes. Blocks access in germination cycle amendment and programmes amendment. 2 = Blocks access in 1st and 2nd level programmes. 3 = Blocks access in 2nd level programmes.	3
PA	Protection password	0 ÷ 999	
dMY	Current date	dd:mm:yy	
HMS	Current time	0:00 ÷ 23:59	
reL	Software release	Shows the software release	(reading only) 6

5.11

AUTOMATIC PROGRAMS Pr1, Pr2, Pr3, Pr4, Pr5

To access the automatic programmes parameters, keep keys  START/STOP and  SET pressed for a few seconds (the function is active only if Cg=0).

- Using key (**▲**) or key (**▼**) select the program to be amended. After having selected the program, press the SET key to display the parameters.
- Using key (**▲**) or key (**▼**) select the parameter to be amended.
- Amend the setting by keeping the SET key pressed and by pressing one of the keys (**▲**) or (**▼**).
- Once configuration values have been set, to exit the menu press keys (**▲**) and (**▼**) simultaneously keeping them pressed for a few seconds, until the temperature value appears.
- Memorisation of the amendments made to the variables will happen automatically when exiting the configuration menu. Exiting from the menu happens spontaneously after an inactivity period or by simultaneously pressing keys (**▲**) and (**▼**) for a few seconds.

The following table represents any one of the Pr1, Pr2, Pr3, Pr4, Pr5 programmes:



VARIABLES	MEANING	VALUES	DEFAULT
CIC	<p>CIC=0 at the end of the last program phase (phase 5) it moves to manual.</p> <p>CIC=1 at the end of the last timed phase (phase 5) it returns to initial phase (phase 0). An infinite loop of the phases is therefore created.</p> <p>CIC=2 at the end of the last program phase (phase 5) it moves on to the subsequent program.</p>	<p>0 = it ends the program and moves on to manual.</p> <p>1 = loop phases</p> <p>2 = calls subsequent program</p>	0
Sgt	Phase 0 or dripping phase temperature setpoint	-45 ÷ +45°C	0
SgU	Phase 0 or dripping phase humidity setpoint	0...99 Rh% 0 = disabled	60%
Sg	Dripping enabling	0 = normal functioning 1 = hot only enabled 2 = hot, cold only enabled	0
Sgr	Refreshment	0 = NO 1 = YES	0
vSg	Dripping phase evaporator fans speed. Amends the value of 2nd level variable (F8)	0 = High speed 1 = Low speed (only if rin=1)	0
tSg	Dripping phase duration	0:00...99:30 (in steps of 30 min)	0:00
St1	Phase 1 temperature setpoint	-45 ÷ +45°C	0
SU1	Phase 1 humidity setpoint	0...99 Rh% 0 = Disabled	60
rn1	Phase 1 refreshment	0= NO 1= YES	0
v1	Phase 1 evaporator fans speed. Amends the value of 2nd level variable (F8)	0 = High speed 1 = Low speed (only if rin=1)	0
t1	Phase 1 duration	0:00...99:30 (in steps of 30 min)	0:00
St2	Phase 2 temperature setpoint	-45 ÷ +45°C	0
SU2	Phase 2 humidity setpoint	0...99 Rh% 0 = Disabled	60%
rn2	Phase 2 refreshment	0 = NO 1 = YES	0
v2	Phase 2 evaporator fans speed. Amends the value of 2nd level variable (F8)	0 = High speed 1 = Low speed (only if rin=1)	0
t2	Phase 2 duration	0:00...99:30 (in steps of 30 min)	0:00
St3	Phase 3 temperature setpoint	-45 ÷ +45°C	0
SU3	Phase 3 humidity setpoint	0...99 Rh% 0 = Disabled	60%
rn3	Phase 3 refreshment	0 = NO 1 = YES	0

VARIABLES	MEANING	VALUES	DEFAULT
v3	Phase 3 evaporator fans speed. Amends the value of 2nd level variable (F8)	0 = High speed 1 = Low speed (only if rin=1)	0
t3	Phase 3 duration	0:00...99:30 (in steps of 30 min)	0:00
St4	Phase 4 temperature setpoint	-45 ÷ +45°C	0
SU4	Phase 4 humidity setpoint	0...99 Rh% 0 = Disabled	60%
rn4	Phase 4 refreshment	0 = NO 1 = YES	0
v4	Phase 4 evaporator fans speed. Amends the value of 2nd level variable (F8)	0 = High speed 1 = Low speed (only if rin=1)	0
t4	Phase 4 duration	0:00...99:30 (in steps of 30 min)	0:00
St5	Phase 5 temperature setpoint	-45 ÷ +45°C	0
SU5	Phase 5 humidity setpoint	0...99 Rh% 0 = Disabled	60%
rn5	Phase 5 refreshment	0 = NO 1 = YES	0
v5	Phase 5 evaporator fans speed. Amends the value of 2nd level variable (F8)	0= High speed 1 = Low speed (only if rin=1)	0
t5	Phase 5 duration	0:00...99:30 (in steps of 30 min)	0:00
St	Seasoning/preservation temperature setpoint	-45 ÷ +45°C	0
SU	Seasoning/preservation humidity setpoint	0...99 Rh% 0 = Disabled	60%
tSC	Seasoning/preservation end timeout	0 ÷ 240 days	0
vSC	Seasoning/preservation evaporator fans speed. Amends the value of 2nd level variable (F8)	0 = High speed 1 = Low speed (only if rin=1)	0

5.12

GERMINATION DAY/NIGHT CYCLE

To access the day/night cycle parameters for germination lights it is necessary to:

1. Check that parameter Cg=1
2. Keep keys  (▼) DOWN and  LIGHT pressed for a few seconds.
3. Using key (▲) or key (▼) select the parameter to be amended.
4. Amend the setting by keeping the SET key pressed and by pressing one of the keys (▲) or (▼).

5. Memorisation of the amendments made to the variables will happen automatically when exiting the configuration menu. Exiting from the menu happens spontaneously after an inactivity period or by simultaneously pressing keys (▲) and (▼) for a few seconds.

VARIABLES	MEANING	VALUES	DEFAULT
tdS	Day phase start time. Germination lights active only during the day phase.	00:00 ÷ 23:50 (10 min steps)	0
tdE	Day phase end time. tdE can also be < of tdS; for example, a day phase can start at 10 pm and end at 4 pm of the following day.	00:00 ÷ 23:50 (10 min steps)	0
tt1	t1 Temperature SET start time.	00:00 ÷ 23:50 (10 min steps)	0
tt2	t2 Temperature SET start time.	00:00 ÷ 23:50 (10 min steps)	0
t1	Temperature 1 SET.	-45 ÷ +45°C	0 °C
t2	Temperature 2 SET.	-45 ÷ +45°C	0 °C

TURN ON PLUS200 EXPERT THR ELECTRONIC CONTROL

5.13

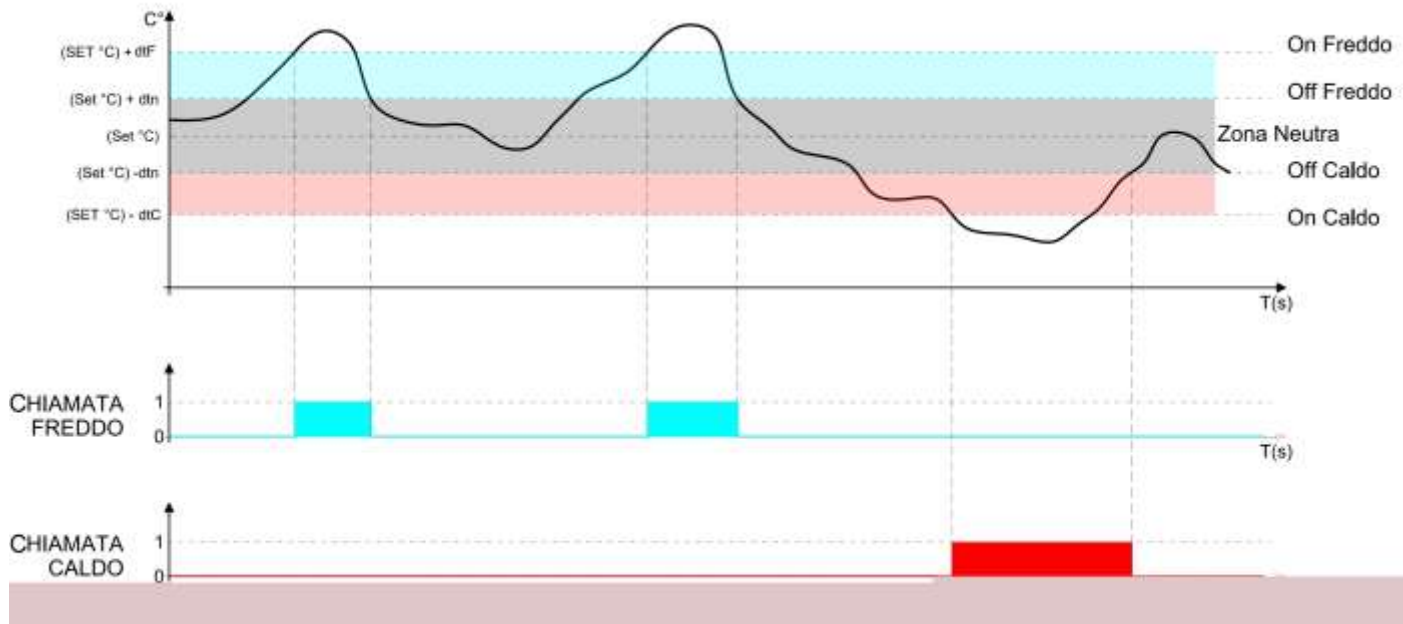
After having wired the electronic controller, apply voltage 230Vac; the control will immediately and simultaneously emit a sound for a few seconds and remain fully switched-on on the display.

COLD/HOT: PRESERVATION OF AMBIENT TEMPERATURE

5.14


The cold and hot call is managed in neutral area depending on the set temperature setpoint (📅 key 4) and to the temperature differentials (parameters dtC and dtF). The cold is activated upon exceeding of set + dtF and remains active until set is achieved (with dtn=0). The hot is activated below set - dtC and remains active until set is achieved (with dtn=0).

It is possible to set a "dead area" with parameters dtn that deactivates hot and cold when the temperature is between SET-dtn and SET+dtn.



Parameter C1 introduces a delay between a switch-off and the subsequent re-activation of the cold. Hot can be deactivated with parameter EnH (EnH=0 disables the hot relay in all conditions).

5.15 HUMIDITY/DEHUMIDIFICATION: PRESERVATION OF AMBIENT HUMIDITY

The humidity and the dehumidification call is managed in neutral area depending on the set humidity setpoint ( key 4) and to the humidity differentials (parameters dUU and dUd). Dehumidification is activated upon exceeding of set + dUd and remains active until set is achieved (with dUn=0). Humidification is activated below set - dUU and remains active until set is achieved (with dUn=0).

It is possible to set a "dead area" with parameters dUn that deactivates humidification and dehumidification when humidity is between SET-dUn and SET+dUn.

The humidity management can be excluded with parameter Hr.

Dehumidification only can be excluded with parameter End.

Humidification only can be excluded with parameter EnU.

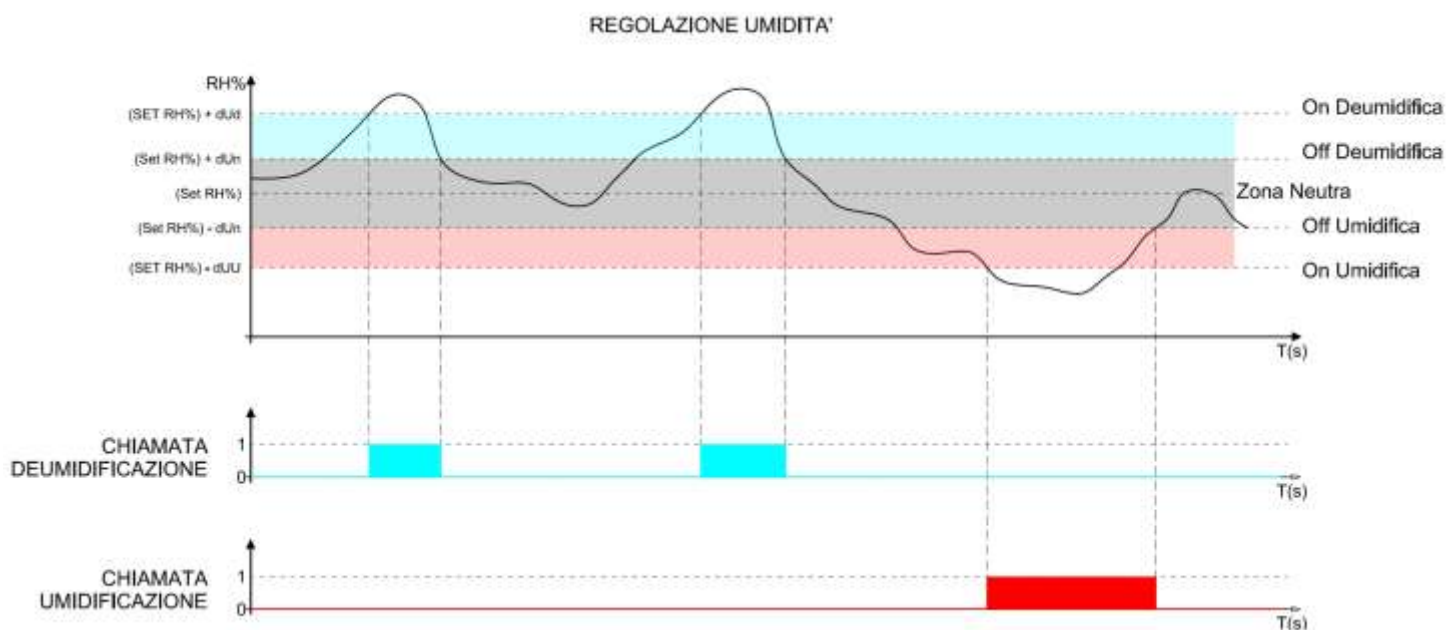
There are three dehumidification methods (parameter dEU):

1. Dehumidifies with the cold (the cold is called to dehumidify, the hot is added only to maintain ambient temperature).

2. Dehumidifies with the hot (the hot is called to dehumidify, the cold is added only to maintain ambient temperature).

3. Separate dehumidification (only the dehumidification output activates but hot and cold are not called).

It is possible to give a maximum time for the dehumidification phase (parameter dEt) by signaling an alarm or forcing a refreshment (parameter dEo).



5.16

VENTILATION

The parameters of the second level programming F3, F4, F6, F7, F8 enable setting the management of the fans in the different modes.

By setting parameter rin=1, it is possible to differentiate high and low speed of the fans in the various phases of a program (parameters vSg, v1, v2, v3, v4, v5, vSC).


5.17

AIR CHANGE

The air changes can be enabled with parameter rA. Up to six daily execution times for air change can be set in parameters from rA1 up to rA6.

The duration of the air change is defined by parameter drA.

During air change, hot, cold, humidity and dehumidification do not activate.


It is possible, at any time, to force an air change with the DOWN  key.

5.18

PAUSE

The refreshment is a phase of the pause process of the temperature and humidity management. Refreshments are managed with parameters Pr and dr.


Pr defines the interval between one refreshment and the following one, dr defines the duration of the refreshment.

It is possible, at any time, to force an air change with the UP  key. (a defrosting is also simultaneously activated).

To interrupt a refreshment, position the control in stand-by (the times are reloaded).

5.19

DEFROST

Defrosting can be managed with parameters d4, d5, d6, d7, F5 that define the intervals, the maximum duration, the defrosting end temperature, the dripping and the fans stop. To manually activate defrosting it is sufficient to press the UP  key. Defrosting is not activated in case the temperature set for defrosting end (d6) is lower than the temperature detected by the evaporator probe. Defrosting will complete upon reaching the defrosting end temperature (d6) or for defrosting maximum duration (d5).

5.20

HOT GAS DEFROST

Set parameter d1=1 for managing cycle inversion defrosting.

The compressor relay and the defrosting relay are activated for the entire defrosting phase.

For the correct management of the plant, it will be the responsibility of the installer to use the defrost output, that must allow the opening of the cycle inversion solenoid valve and the closing of the liquid solenoid valve.

For the capillary plants (without thermostatic valve) it is sufficient to control the cycle inversion solenoid valve using the defrosting relay control.

PASSWORD FUNCTION

5.21

The password function activates by setting a value different from 0 for parameter PA. See parameter P1 for the different protection levels.

Protection is enabled automatically after approx. 2 minutes of inactivity on the keyboard.

Numbers 000 appear on the display.

By keeping SET pressed, the first digit flashes for amendment using up/down arrow.

Release SET and press SET again: the second amendable digit flashes.

Release SET and press SET again: the third amendable digit flashes.

The operation is cyclical and therefore by pressing SET again, the first digit flashes again, and so-on.

If password is forgotten use universal number 100.

AUTOMATIC PROGRAMS

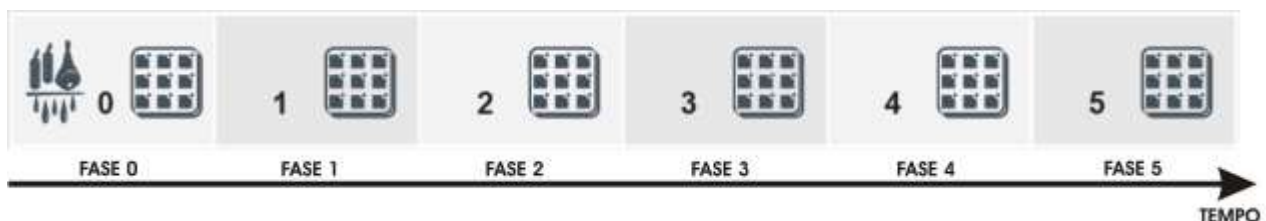
5.22

An automatic program is a work cycle made of a maximum of 7 phases in which it is possible to automatically amend the temperature and the humidity set point when passing from one phase to the following one.

In each phase it is possible to choose whether to enable or not the movements (managed with parameters Pr and dr) and manage a different speed for the fans.

It is possible to set up to 5 programmes (identified with Pr1, Pr2, Pr3, Pr4, Pr5) each of which has a different setting according to the table of paragraph 5.10 .

For each program, the first phase is defined dripping or phase 0; 5 process phases follow. The last phase is the seasoning/preserving phase with unlimited duration in time.





Each phase and the dripping are characterised by:

- Temperature setpoint.
- Humidity setpoint.
- Refreshments enabling/disabling.
- High or low fans speed.
- Phase duration (maximum 99 hours with 30 min steps).

For the dripping phase it is possible to exclude the humidity and the cold management. The program starts by pressing the START key for a few seconds, the program selection and, therefore, the pressing of the SET key.

Program start:

- 1) press the START  key for a few seconds
- 2) using the UP and DOWN arrows select the wanted program
- 3) press the SET  key to start the program


The time evolution is highlighted by the advancing bars. During program execution, it is possible to amend the humidity and temperature setpoint directly from the keyboard without having to access programming. Variations are provisional and do not alter the pre-set program.

If a phase has 0 time, it moves on to the following one.

The times of the phases proceed even in case of no electric power supply or control stand-by.

Using the START key (pressed briefly) it is possible to see the remaining time of the phase in progress.

With parameter CIC, it is possible to program a cycle (once the program has finished it automatically starts from the beginning) or to hook programmes between them, in order to have a greater number of phases of the 6 of the individual program.

A program can always be interrupted by pressing the START/STOP  key for a few seconds.

DAY/NIGHT CYCLE FOR GERMINATION LIGHTS

5.23

By setting parameter Cg (Germination/seasoning cycle) at second programming level, it is possible to choose the use of the programmes or a special program suitable for day/night cycles:

Cg = 0 (default) activates the automatic programmes management for seasoning;

Cg = 1 activates the management of the germination day/night cycle.

By means of the parameters indicated in paragraph 5.11, it is possible to determine the day start and end times and manage two differential temperature setpoint.

During the day phase, the germination lights are switched on and the display shows the references of phase 0 switched-on. During the night phase, the germination lights are switched-off and the references of phase 4 switch-on.

The connection of the germination lights is separate from the cell light that can be used as service light (managed as usual from the door switch and the light key).

The day/night cycle starts by pressing the cycle start key.

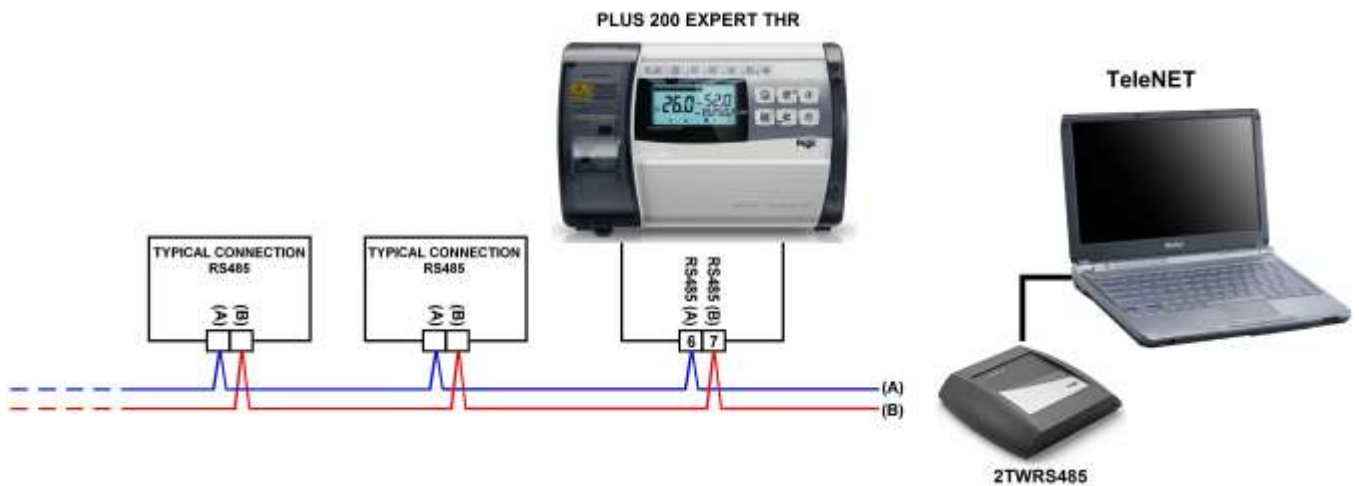
CHAPTER 6: OPTIONS

6.1

TELENET MONITORING/SUPERVISION SYSTEM

To insert the board in a **TeleNET** network, refer to the layout below. To configure the instrument, refer to the **TeleNET** manual.

IMPORTANT: During configuration, select “Instrument PLUS 100 THR rel. 8 or higher” under the item “Module”.



CHAPTER 7: DIAGNOSTIC

DIAGNOSTIC

7.1

In the event of a fault the **PLUS200 EXPERT THR** controller warns the operator by displaying an alarm code and emitting a warning sound via the buzzer inside the control console.

If alarm conditions arise, the display will show one of the following messages:

ALLARM CODE	POSSIBLE CAUSE	OPERATION TO BE PERFORMED
E0	Temperature sensor fault	<ul style="list-style-type: none"> • Check the room temperature sensor • If the problem persists replace the sensor
E1	Humidity sensor fault	<ul style="list-style-type: none"> • Check the humidity sensor • If the problem persists replace the sensor
E2	Defrost sensor fault (In this case eventual defrosts will last as d5)	<ul style="list-style-type: none"> • Check the defrost sensor • If the problem persists replace the sensor
E3	Eeprom alarm An error in the EEPROM memory has been detected. (all output deactivated except the alarm ones)	<ul style="list-style-type: none"> • Switch system off and back on again
E4	Software compatibility error	<ul style="list-style-type: none"> • Check for proper match between MASTER board and console board
E6	Flat battery alarm	<ul style="list-style-type: none"> • Replace lithium battery (CR2032 type) of the Console
Ec	General alarm (e.g. overheating or max pressure switch) (All outputs except alarm, if present, are deactivated)	<ul style="list-style-type: none"> • Check compressor absorption • If the problem persists, to contact the technical assistance service
En	No connection between the Console and the MASTER board.	<ul style="list-style-type: none"> • Check the connection between the two units. • If the problem persists, to contact the technical assistance service
Eu	Minimum or maximum humidity alarm. A humidity higher or lower to that set for minimum or maximum humidity alarm has been reached in the ambient (See variables AU1 and AU2, user programming level)	<ul style="list-style-type: none"> • Check humidity management. • The probe does not correctly detect the humidity.
Et + Temperature on display is flashing	Minimum or maximum temperature alarm. A temperature higher or lower to that set for minimum or maximum temperature alarm has been reached in the ambient (See variables At1 and At2, user programming level)	<ul style="list-style-type: none"> • Check the compressor status. • The probe incorrectly detects the temperature or the stop/start control of the compressor does not work.
Ed	Limit Timeout for dehumidification.	<ul style="list-style-type: none"> • Check humidity management. • The probe does not correctly detect the humidity.

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.: **PLUS200 EXPERT THR**

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
<i>Low voltage directive (LVD):</i>	2014/35/EU
Direttiva EMC:	2014/30/UE
<i>Electromagnetic compatibility (EMC):</i>	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 60730-1:2016, EN 60730-2-9:2010, EN 61000-6-1:2007, EN 61000-6-3:2007**
 European standards: **EN 60730-1:2016, EN 60730-2-9:2010, EN 61000-6-1:2007, EN 61000-6-3:2007**

IL PRODOTTO E' COSTITUITO PER ESSERE INCORPORATO IN UNA MACCHINA O PER ESSERE ASSEMBLATO CON ALTRI MACCHINARI PER COSTITUIRE UNA MACCHINA CONSIDERATE DALLA DIRETTIVA: 2006/42/CE "Direttiva Macchine".
THE PRODUCT HAS BEEN MANUFACTURED TO BE INCLUDED IN A MACHINE OR TO BE ASSEMBLED TOGETHER WITH OTHER MACHINERY TO COMPLETE A MACHINE ACCORDING TO DIRECTIVE: EC/2006/42 "Machinery Directive".

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

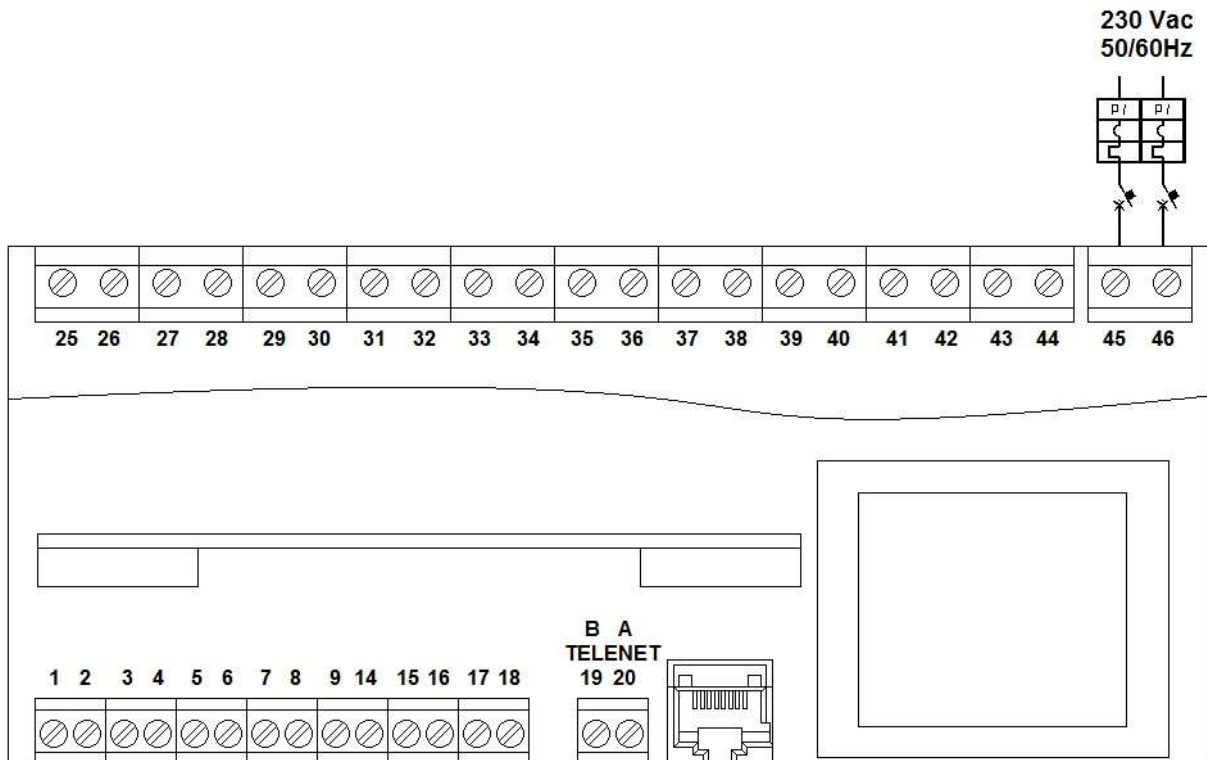
Pego S.r.l.
Martino Villa
Presidente

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

Occhiobello (RO), 01/01/2020

PLUS200 EXPERT THR WIRING DIAGRAM

A.2

**Power supply section**

45-46 Power supply 230VAC 50/60 Hz

Digital input section

3-4 Evaporator NTC probe

5-6 Humidity probe 4-20 mA (0-100Rh%)
(5=V+ 6=Y)

7-8 Ambient NTC probe

9-14 Stand-by forcing

9-15 Disable hot (forces the variable
EnH=0)9-16 Disable humidity (forces the variable
Hr=0)

9-17 Door switch

9-18 General alarm (stops all outputs)

1-2 Not used

Output section (free of voltage contacts)

25-26 Alarm

27-28 Defrost

29-30 De-humidification

31-32 Pause (rin=0)/ low speed fans (rin=1)

33-34 Air change

35-36 Humidification

37-38 Room light

39-40 Fans (high speed if rin=1)

41-42 Hot

43-44 Cold

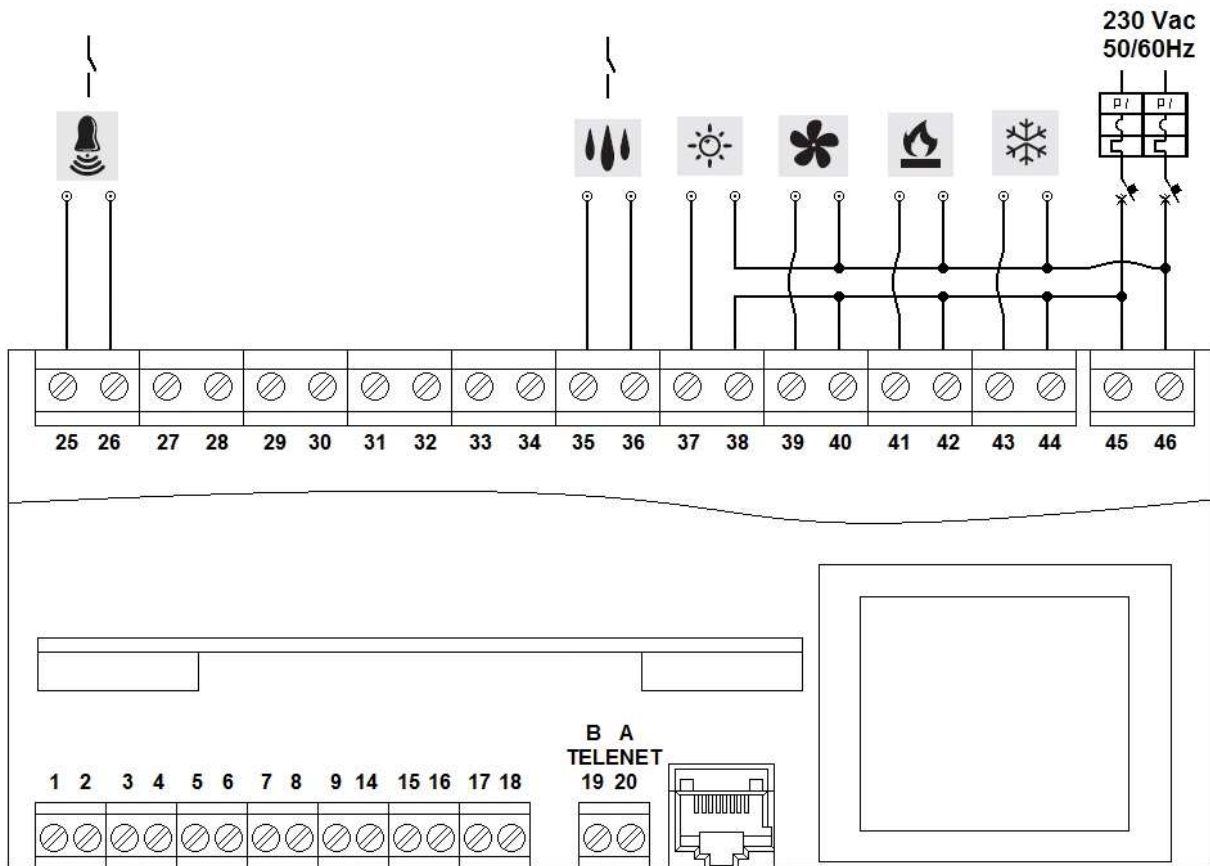
TeleNET section:

19 line B or clamp 4 of TWRS485

20 line A or clamp 3 of TWRS485

EXAMPLE OF CONNECTION TO PLUS 200 EXPERT THR

A.3



Example of electrical connection to the PLUS200 EXPERT THR with voltage contacts (230VAC) for compressor, heat, fans, light and contacts left without voltage for humidification and alarm.



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