PEV P20

Driver for ON/OFF electronic expansion valve
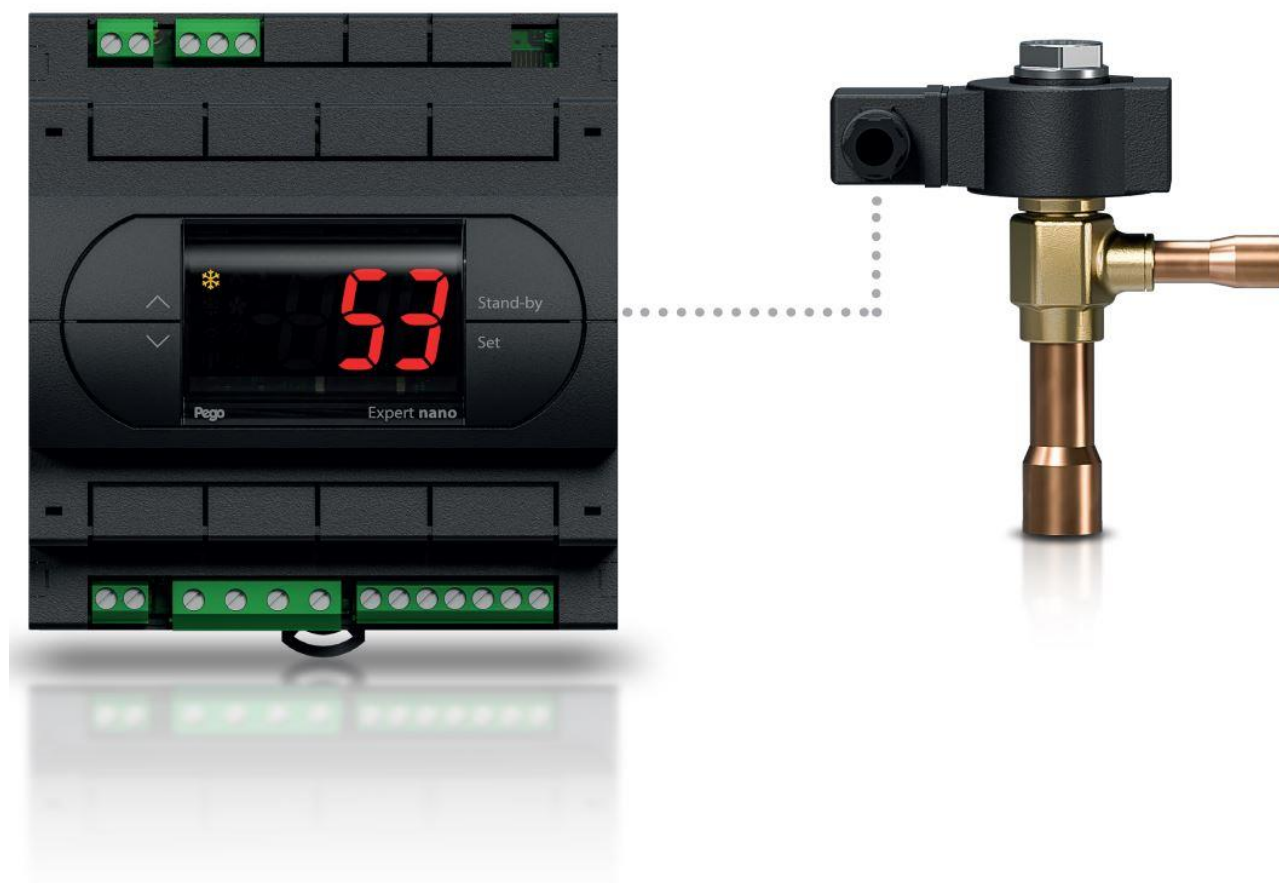
User and maintenance manual

ENGLISH

READ AND KEEP

Rel. 0

CONTENTS

CHAPTER 1: INTRODUCTION

GENERAL 1.1

DESCRIPTION:
The **PEV P20** is an electronic regulator to control ON/OFF electronic expansion valve with 230/110/24 VAC or 24 VDC coil. It can be configured with a remote or integrated display; it manages the most common ON/OFF electronic expansion valves and integrates the evaporator overheating control.

APPLICATIONS:
- Refrigerated counters and cold rooms.

MAIN FEATURES:
- Control of the ON/OFF electronic expansion valve with 230/110/24 VAC and 24 VDC coil.
- Compatible with 23 gases: R404, R134, R22, R407A, R407F, R407H, R410A, R450A, R507, R513A, R744(CO2), R449A, R290, R32, R448A, R452A, R600, R600A, R1270, R1234ze, R23, R717(NH3), R454C.
- Integrated or remote control console.
- RS485 serial connection with TeleNET or Modbus-RTU protocol, selectable by parameter.
- Two configurable digital inputs.
- Inlet temperature and evaporation pressure sensor for evaporator superheat control.
- Display, if remote, with IP65 protection on the front.
- Easy programming of parameters with 4 pre-configurations for the various applications of the electronic expansion valve.
- Alarm signalling.
- Configurable auxiliary relay with alarm/command on the solenoid valve.
- Password function.
- Led signalling of the system status and display of ample dimensions.
- User-friendly keypad.
- USB input for software update.

PRODUCT IDENTIFICATION CODES 1.2

PEVP2001	Electronic regulator for automated electronic expansion valve control. **Integrated console**, it manages the most common ON/OFF electronic expansion valves with 230/110/24 VAC or 24 VDC coil. Evaporator super heating control.
PEVP2002	Electronic regulator for automated electronic expansion valve control. **Without console**, it manages the most common ON/OFF electronic expansion valves with 230/110/24 VAC or 24 VDC coil. Evaporator super heating control.
200NANOTTL01	Remote Console NANO + 10cm long TTL cable
KC-TTLB-L2.5	TTL cable for remote NANO console, 2.5m length.

Example of PEVP2002 configuration + remote console
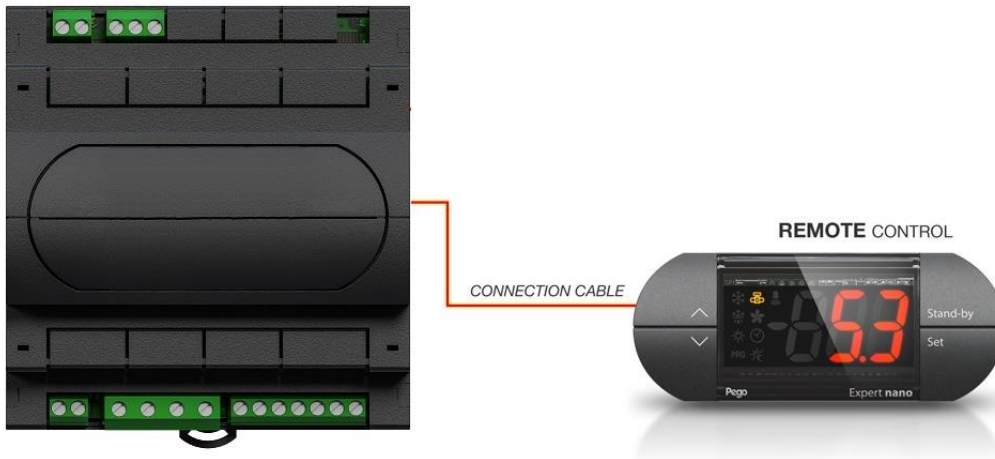
1.3 OVERALL DIMENSIONS

Dimensions in mm.

PEV

CONSOLE
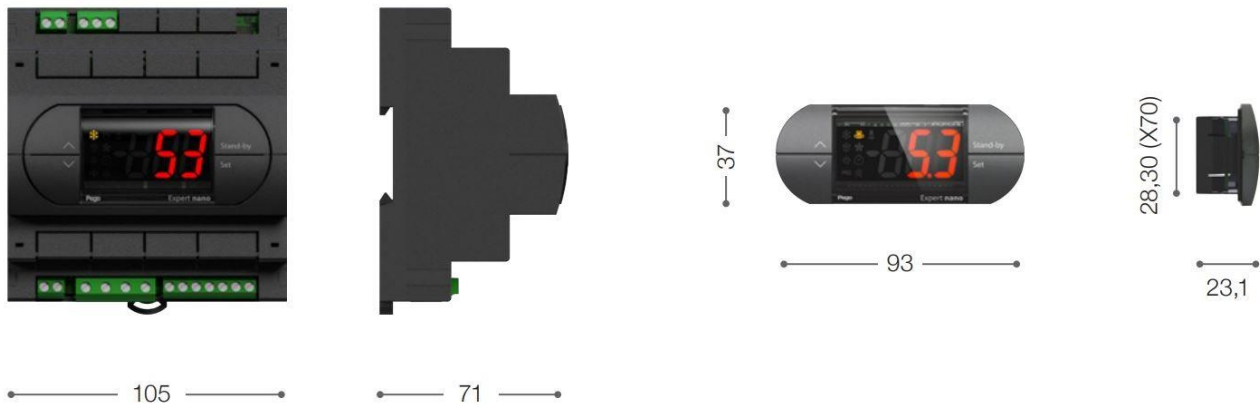
1.4 IDENTIFICATION DATA

The device described in this manual has a plate on one side bearing the identification data:

- Name of Manufacturer
- Code and model of the device
- Serial number
- Date of manufacture
- Power supply

Pego
MADE IN ITALY   CE   UKCA
INTEGRATED DISPLAY
RoHS compliant
Description: PEV P20
Code: PEVP2001
S.N. : 22000000001
MFG Date: 17/11/2022
P. Supply: 24V~ +/-10% 50-60Hz

CHAPTER 2: INSTALLATION

GENERAL WARNINGS FOR THE INSTALLER
2.1

1. Install the device in places that respect its degree of protection.

2. Avoid using multi-pole cables with conductors connected to inductive and power conductors and signal conductors like sensors and digital inputs.

3. Avoid putting in the same channels, power cables with signal cables (sensors and digital inputs).

4. Reduce the lengths of the connection cables as much as possible, preventing the wiring from taking the spiral shape harmful for possible inductive effects on electronics.

5. All electric cables used in wiring must be properly proportionate to support the load that must feed.

6. If it's necessary to prolong the probes cable, the use of appropriate section conductors, and in any case not less than 1mm², is necessary. The extension or shortening of the probes could alter the factory calibration. Then proceed with the verification and calibration by means of an external thermometer.

2.2 ## MECHANICAL FIXING

Place the Module on DIN guide and close the lower hook to block it on it.

Make all electric connections according to the attached patterns for the corresponding model (see the relative tables in attachments). During the wiring it is recommended to keep the power cables away from those of the signal.
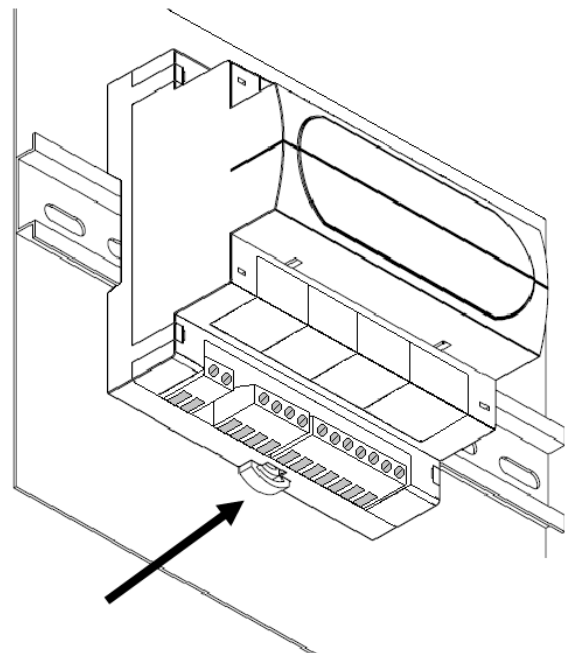
CHAPTER 3: TECHNICAL FEATURES

TECHNICAL FEATURES	3.1

Power supply	
Main Voltage	24V AC/DC ± 10% 50-60Hz
Max power consumption (electronic control only)	~ 7 VA
Climatic conditions	
Operating temperature	-5T50°C <90% R.H. non-condensing
Storage temperature	-10T70°C <90% R.H. non-condensing
General features	
Compatible types of temperature sensor	Temperature sensors: NTC 10K 1% / PTC / PT1000
Resolution of temperature sensors	0,1 °C
Precision of temperature sensor detection	± 0,5 °C
Range of temperature sensor detection	-45 ÷ +99 °C
Compatible type of pressure sensor:	Pressure sensor: 4/20mA

Output features		
Description		**Features of output board**
Alarm (voltage-free contact)	(8A AC1 Relay)	8(3)A 250V∼
ON/OFF valve	triac	---

Dimensional features	
Dimensions	12.15cm x 7.1cm x 10.5cm (HxPxL)
Remote NANO console dimensions	3.7cm x 2.31cm x 9.3cm (HxPxL)

Insulation and mechanical properties	
Degree of protection of front console (if mounted on the front of the electrical panel, remote)	IP65
Material of boxes	UL94 V-0 self-extinguishing PC+ABS
Type of insulation	II Class

CHAPTER 4: WARRANTY TERMS

4.1	WARRANTY TERMS

The **PEV P20** electronic controls 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).

CHAPTER 5: DATA PROGRAMMING
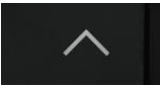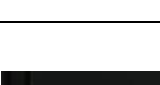
FRONT KEYPAD　　　　　　　　　**5.2**

❶ UP KEY
Increases values / Scrolls up through parameters.
Turns off auditory alarm in progress / Acquires an alarm.

❷ DOWN KEY
Decreases value / Scrolls down through parameters.

❸ **STAND BY**
<u>IMPORTANT</u>: the PEV P20 instrument **cannot be paused by pressing the key**, but only by removing the enable from digital input or LAN.

❹ **SET**
Shows the setpoint.
Enables configuration of the SUPERHEAT setpoint when pressed together with the Down or UP key.
Resets an auditory alarm in progress.

5.3	**DISPLAY LED**

❺ Shows the values / parameters

❻ **DEFROSTING ICON**
LED OFF = Defrosting input OFF
LED ON = Defrosting input ON

❼ **EEV OUTPUT STATUS ICON** Output status of the EEV electronic valve
LED OFF = EEV output OFF
LED ON = EEV output ON

❽ **"PRG" ICON**
Blinking LED = Programming
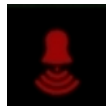
❾ **ALARM IN PROGRESS ICON**
LED OFF = No alarm in progress
LED ON = Alarm triggered and then cancelled
Blinking LED = Alarm in progress

5.4	**COMBINATION OF KEYS**

 EXIT PROGRAMMING
Pressing both keys together for over 3 seconds in any programming menu saves all changes made and exits the menu concerned.
A beep is emitted when the system closes the menu.

 LEVEL 1 PROGRAMMING
Pressing both keys together for more than 3 seconds enables access to the Level 2 programming menu.
When entering the menu, a confirmation BEEP is generated.
This menu is exited automatically after 30 seconds of keyboard inactivity or by pressing the up arrow + down arrow together for a few seconds (a confirmation beep is generated to exit).

∧ **+** Stand-by

LEVEL 2 PROGRAMMING
(EEV parameters)
If pressed simultaneously for more than 3 seconds, they allow access to the second level programming menu.
When entering the menu, a confirmation BEEP is generated.
You can exit this menu by pressing the up arrow + down arrow keys together for a few seconds (a beep confirms exit).

∨ **+** Stand-by

VARIABLE QUICK VIEW MENU
(READ-ONLY)
If pressed simultaneously for more than 3 seconds, they allow access to the quick display menu.
When entering the menu, a confirmation BEEP is generated.
Within this menu, the up and down arrows allow you to scroll through the various parameters.
Pressing the Set key alternates the display of the parameter with its value.
With the parameter value displayed, pressing the up or down arrow still leads to the display of the parameter following or preceding the current one.
You can exit this menu automatically after 2 minutes of console inactivity or by pressing the up arrow + down arrow keys together for a few seconds (an exit confirmation beep is generated).

5.5	VIEWING AND CONFIGURATION OF ESH SETPOINT

1. Press the SET key to view the current SETPOINT value (ESH).
2. Pressing and holding the SET key and pressing one of the keys (▲) or (▼) alters the value of the ESH SETPOINT.

Release the SET key to return to the ESH temperature. Any changes made are saved automatically. Range of the ESH SETPOINT: 0.1 – 25 °C.

5.6	LEVEL 1 PROGRAMMING (Installer level)

To access Level 1 programming, press and hold the UP key (▲), DOWN key (▼) and STAND-BY key for over 3 seconds.
When the first programming parameter appears:

1. Use the (▲) key or (▼) key to select the parameter to be modified. After selecting the required parameter, it will be possible to:
   - View its configuration by pressing the SET key.
   - Edit configuration by pressing and holding the SET key and pressing either the (▲) key or the (▼) key.
2. After setting the configuration values, exit the menu by pressing and holding, for several seconds, keys (▲) and (▼) until the room temperature value appears. The system closes the menu when the keypad is not used for over 30 seconds.
3. Any changes made to the parameters are saved automatically when the system closes the configuration menu.

Valve control continues even when the menu is open.

5.7	LEVEL 1 PARAMETER LIST (Installer Level)

PAR.	MEANING	VALUES	DEFAULT
in1	**Setting of DI1 digital input and activation status**	3 = tPF % fixed opening (N.O.) 2 = Defrosting (N.O.) 1 = ON EEV Driver (N.O.) 0 = Disabled -1 = ON EEV Driver (N.C.) -2 = Defrosting (N.C.) -3 = tPF % fixed opening (N.C.)	1
in2	**Setting of DI2 digital input and activation status**	3 = tPF % fixed opening (N.O.) 2 = Defrosting (N.O.) 1 = ON EEV Driver (N.O.) 0 = Disabled -1 = ON EEV Driver (N.C.) -2 = Defrosting (N.C.) -3 = tPF % fixed opening (N.C.)	0
DO1	**Setting use of DO1 digital output.** **Configurable auxiliary relay / Alarm** Note: Solenoid valve control involves a normal solenoid valve, and the output repeats the ON input of the Driver.	2 = DO1 relay enabled with solenoid valve control 1 = DO1 relay enabled in presence of alarm 0 = DO1 relay disabled -1 = DO1 relay disabled in presence of alarm -2 = DO1 disabled with solenoid valve control	1

PAR.	MEANING	VALUES	DEFAULT
diS	**Viewing of main page**	1 = (tS4) Viewing of Inlet temperature sensor (S4) 2 = (tS5) Viewing of Evaporation temperature sensor (S5) 3 = (PS5) Viewing of Evaporation pressure sensor (S5) 4 = (tSH) Viewing of Superheat temperature 5 = (oEV) Opening percentage of EEV valve	4
SEr	**RS-485 communication protocol**	0 = TeleNET protocol 1 = Modbus-RTU protocol	0
Ad	**Network address** for connection to the TeleNET or Modbus supervision system	0 to 31 (with SEr=0) 1 to 247 (with SEr=1)	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 2 = odd	0
bEE	**Buzzer Enable**	0 = disabled 1 = enabled	1
P1	**Password: type of protection** (active when PA is not at 0)	0 = shows only the setpoint and permits deactivation of the alarms. 1 = shows the setpoint, permits deactivation of the alarms + access to the read-only parameter menu. 2 = disables access to 1° and 2° programming levels (access permitted to all other functions). 3 = disables access to 2° programming levels (access permitted to all other functions).	4
PA	**Password** (see P1 for the type of protection)	0 ÷ 999 0 = function disabled	0
dEF	**Setting the default parameters** Move on the dEF parameter and press all keys for 10 seconds to restore the default parameters. (via Modbus-RTU, send 0x123 code)	---	---
reL	**Software release**	read-only	read-only

5.8 **LEVEL 2 PROGRAMMING (EEV parameters)**

To access Level 2 programming, press and hold the UP key (▲) and STANDBY key for over 3 seconds.
When the first programming parameter appears:
1. Use the (▲) key or (▼) key to select the parameter to be modified. After selecting the required parameter, it will be possible to:
   - View its configuration by pressing the SET key.
   - Edit configuration by pressing and holding the SET key and pressing either the (▲) key or the (▼) key.
2. After setting the configuration values, press and hold both the (▲) key and the (▼) key until the value of the main display reappears and exit the menu.
3. Any changes made to the parameters are saved automatically when the system closes the configuration menu.
Valve control continues even when the menu is open.

5.9 **LEVEL 2 PARAMETER LIST (EEV parameters)**

PAR.	MEANING	VALUES	DEFAULT
EEV	**Management of the EEV electronic valve** Settings 1 to 5 load the default values of the variables **ECt, EPb, Etl, Etd, ELS**. For more details see chapter 5.10.	1 = EEV control (default 1) 2 = EEV control (default 2) 3 = EEV control (default 3) 4 = EEV control (default 4) 5 = EEV control (default 5) 6 = EEV control via Modbus (register 1536) 7 = EEV control via 0-10V input (Table at page 17)	1
ErE	**Type of refrigerant GAS used.** The setting of this parameter is essential for correct operation.	0 = R404　　11 = R449A 1 = R134　　12 = R290 2 = R22　　　13 = R32 3 = R407A　　14 = R448A 4 = R407F　　15 = R452A 5 = R407H　　16 = R600 6 = R410A　　17 = R600A 7 = R450A　　18 = R1270 8 = R507　　19 = R1234ze 9 = R513A　　20 = R23 10=R744(CO2)　21 =R717(NH3) 　　　　　22 = R454C	0
ECt	**Cycle time** This represents the sum of the timers of an EEV valve opening/closing cycle. The opening and closing timers of the EEV are calculated on this basis. Example: if the EEV valve has to be opened by 30%: EEV valve opening timer = ECt* 30/100 EEV valve closing timer = ECt * (100-30)/100	1 ÷ 20 sec	6 sec
EPb	**Proportional band** (gain) superheat control PID.	1 ÷ 100%	15%
Etl	**Integral timer** superheat PID control algorithm	0 ÷ 500 sec steps of 2 sec	100 sec

PAR.	MEANING	VALUES	DEFAULT
Etd	**Derivative timer** superheat PID control algorithm	0,0 ÷ 10,0 sec steps of 0,1 sec	2,0 sec
EOE	**EEV valve opening percentage in event of error with S4 or S5 sensors**. This function permits (diminished) control in the event of a fault with one of the control sensors.	0 ÷ 100%	50%
ESO	**During the Start-up phase, the EEV valve opens by the ESO percentage for the ESt time.**	0 ÷ 100%	85%
ESt	**Duration of the Start-up phase.** **The superheat alarms MOP, LOP and LSH alarms are disabled during this phase.**	0 ÷ Edt tenths of seconds	6 tenths of a second
EdO	**After defrosting, the EEV valve opens by the EdO percentage for the Edt time.**	0 ÷ 100%	100%
Edt	**Duration of EdO valve opening phase after defrosting.** **The superheat alarms MOP, LOP and LSH alarms are disabled during this phase.**	ESt ÷ 250 tenths of seconds	24 tenths of a second
EHO	**Maximum opening percentage of EEV valve**. In the case of an oversize valve, this variable permit limitation of maximum opening of the valve at a set percentage.	0 ÷ 100%	100%
EPt	**Type of temperature transducer (S4):** sets the type of transducer used to detect the temperature (S4)	0 = NTC 1 = PT1000 2 = PTC (-45/80°C)	0
EP4	**Pressure (bar) corresponding to 4mA or 0V**. In relation to the Evaporation pressure sensor (S5)	-1.0 ÷ EP2 bar	0.0 bar
EP2	**Pressure (bar) corresponding to 20mA or 5V**. In relation to the Evaporation pressure sensor (S5)	EP4 ÷ 90.0 bar	12.0 bar
CA4	**Calibration of the inlet temperature transducer (S4)**	-10.0 ÷ +10.0 °C	0,0 °C
CA5	**Calibration of the Evaporation pressure transducer (S5)**	-10.0 ÷ +10.0 Bar	0,0 bar
LSH	**LSH threshold (low superheat temperature)** Superheat values that are too low can cause return of the liquid to the compressor, or extreme oscillations. Below the LSH threshold, the ELS protection forces the PID control to close the valve more quickly and bring the value back up to the superheat setpoint.	0 ÷ SH set °C	2,0 °C
ELS	**Low superheat protection** When this is enabled and **SH < LSH**, the PID integration timer is set based on the selection of 1 to 7 of the ELS. Value 1 is for the quickest closing time. Enabling of this protection starts the SHd counter for activating the LSH alarm. **THE LSH PROTECTION TAKES PRIORITY OVER THE LOP PROTECTION.** THE LSH PROTECTION IS NOT ACTIVATED DURING THE START-UP PHASE (ESt TIMER) OR DURING THE DEFROSTING OR POST-DEFROSTING PHASE (Edt TIMER)	0 = disables the LSH protection and signalling of the relative LSH alarm 1 = 5% Etl 2 = 10% Etl 3 = 15% Etl 4 = 20% Etl 5 = 25% Etl 6 = 30% Etl 7 = 35% Etl 8 = 50% Etl 9 = 100% Etl (no correction, and activation only of the LSH alarm)	2

PAR.	MEANING	VALUES	DEFAULT
SHd	**Activation delay of the superheat alarm:** the LSH superheat alarm is triggered only after it has remained active for the SHd time. In the event of an LSH alarm, the valve closes instantly. The alarm is automatically reset and recalled when **SH ≥ LSH.** When the alarm is active: - The LSH message blinks on the display - The buzzer is activated	0 ÷ 240 tenths of seconds	30
MOP	**MOP threshold (Maximum Saturated Evaporation Temperature in relation to the S5 sensor).** This represents the maximum saturated evaporation pressure above which the MOP protection is activated (EMO parameter). When MOP protection is enabled, the control closes the valve to limit evaporation temperature and to prevent the thermal protection from stopping the compressor.	(LOP+1) ÷ +45°C	+45°C
EMO	**MOP protection (enabled when tS5>MOP)** When MOP protection is enabled, the valve abandons its control PID and, for each stage of the cycle, closes by the EMO percentage starting from the opening percentage of the abandoned PID. Enabling of this protection starts the MOd counter for activating the MOP alarm. THE MOP PROTECTION IS NOT ENABLED DURING THE START-UP PHASE (ESt TIMER) OR DURING THE DEFROSTING OR POST-DEFROSTING PHASE (Edt TIMER).	0= disables the MOP protection and relative MOP alarm signal 0 ÷ 100%	0
MOd	**MOP alarm activation delay:** the MOP alarm is triggered only after the MOP protection has remained active for the MOd time**.** The alarm is automatically reset when **"Temp.S5" ≤ MOP.** When the alarm is active: - The MOP message blinks on the display. - The buzzer is activated.	0 ÷ 240 tenths of seconds	60
LOP	**LOP threshold (minimum saturated evaporation temperature in relation to the S5 sensor)** This represents the minimum saturated evaporation pressure below which the LOP protection is activated. When LOP protection is enabled, the control opens to prevent the compressor from stopping due to low pressure (mechanical pressure switch).	-45°C ÷ (MOP-1)	-45°C
ELO	**LOP protection (activated when tS5<LOP)** When LOP protection is enabled, the valve abandons its control PID and, for each stage of the cycle, opens by the ELO percentage starting from the opening percentage of the abandoned PID. Enabling of this protection starts the LOd counter for activating the LOP alarm. THE LSH PROTECTION TAKES PRIORITY OVER THE LOP PROTECTION. THE LOP PROTECTION IS NOT ENABLED DURING THE START-UP PHASE (ESt TIMER) OR DURING THE DEFROSTING OR POST-DEFROSTING PHASE (Edt TIMER).	0 = disables the LOP protection and relative LOP alarm signal 0 ÷ 100%	0

| PAR.	MEANING	VALUES	DEFAULT
LOd	**LOP alarm activation delay:** the LOP alarm is signaled only after it has remained active for the LOd time. The alarm is self-resetting when **"Temp.S5" ≥ LOP** With the alarm active, LOP is flashing on the display.	0 ÷ 240 tenths of seconds	30
tPF	**Valve forced positioning.** At any time via digital input (if the controller is not in standby) it is possible to force the opening of the valve to a pre-set value.	0 ÷ 100 %	50%

NOTE: all the calculation times of the LSH, MOP and LOP are reset when the control stops or during the start phase (est timer) or during the defrosting or post-defrosting phase (edt timer).

VALVE MANAGEMENT (EEV parameter)   5.10

Setting the EEV parameter from 1 to 5 loads the default values in the **ESH, EPb, Etl, Etd, LSH, ELS, MOP, EMO, LOP, ELO** parameters. In this case the controller acts as a **superheat regulator**, based on the value read by the connected pressure/temperature probes.

Setting value 6 enables the valve position command via Modbus (register 1536): the control imposes the valve opening value received via Modbus and **no superheat control is performed**. In this case it is not necessary to connect the probes and the alarms E4, E5 LSH, MOP, LOP are disabled. The position must be communicated within 60 seconds to avoid closing the valve. Setting value 7 enables the valve position command via 0-10V input: the control imposes the valve opening value calculated based on the input and **no superheat control is performed**. In this case it is not necessary to connect the probes and the alarms E4, E5 LSH, MOP, LOP are disabled. Connect the 0-10V input to terminals 11 (GND) -12 (+V) of the PEV P20, as indicated in chapter A.2.
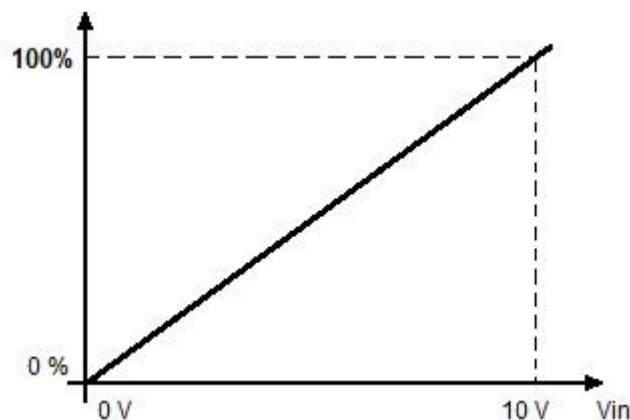
When exiting programming, if the selected EEV value is different from the one previously stored, the defaults relating to the selection are loaded. Pressing the Set key alone to see the current EEV value does not load the defaults.

Loading of default settings based on the EEV variable:

	EEV = 1 DEFAULT PEGO	EEV = 2 (ROOM or TN REFRIGERATED COUNTER control with on-board compressor)	EEV = 3 (ROOM or BT REFRIGERATED COUNTER control with on-board compressor)	EEV = 4 (ROOM or DUCTED TN REFRIGERATED COUNTER control)	EEV = 5 (ROOM or DUCTED BT REFRIGERATED COUNTER control)
ESH	6 °C	6 °C	6 °C	11 °C	11 °C
EPb	15 %	15 %	15 %	15 %	15 %
EtI	100 sec	100 sec	100 sec	150 sec	150 sec
Etd	2,0 sec	2,0 sec	2,0 sec	5,0 sec	5,0 sec
LSH	2 °C	2 °C	2 °C	5 °C	5 °C
ELS	2	2	2	2	2
MOP	+45 °C	5 °C	-15 °C	+5 °C	-15 °C
EMO	0	5	5	5	5
LOP	-45 °C	-25 °C	-45 °C	0	0
ELO	0	15	15	0	0

5.11   **TEMPERATURE TABLE FOR REFRIGERANT FLUIDS**

The following table shows the evaporation temperature limits (tS5, see chapter 5.12) according to the type of refrigerant fluid (ErE parameter).

Parameter ErE	Code	Temperature range	Parameter ErE	Code	Temperature range
0	R404	-50 ÷ 70 °C	11	R449A	-50 ÷ 70 °C
1	R134A	-50 ÷ 70 °C	12	R290	-50 ÷ 70 °C
2	R22	-50 ÷ 70 °C	13	R32	-50 ÷ 70 °C
3	R407A	-50 ÷ 70 °C	14	R448A	-50 ÷ 70 °C
4	R407F	-50 ÷ 70 °C	15	R452A	-50 ÷ 70 °C
5	R407H	-50 ÷ 70 °C	16	R600	-20 ÷ 70 °C
6	R410A	-50 ÷ 70 °C	17	R600A	-30 ÷ 70 °C
7	R450A	-40 ÷ 70 °C	18	R1270	-50 ÷ 70 °C
8	R507	-50 ÷ 70 °C	19	R1234ZE	-30 ÷ 70 °C
9	R513A	-45 ÷ 70 °C	20	R23	-50 ÷ 25 °C
10	R744 (CO2)	-50 ÷ 40 °C	21	R717 (NH3)	-50 ÷ 70 °C
			22	R454C	-50 ÷ 70 °C

5.12   **QUICK VIEW MENU (READ-ONLY)**

During the start-up of the system, it may be useful to simply check the reading of the various probes or of some values to verify or optimize the process. To access the quick view menu, press and hold down the DOWN (▼) and STAND-BY keys for more than 3 seconds. Within this menu, the up or down arrows allow you to scroll through the different parameters.

Pressing the Set key alternates the display of the parameter with its value (to facilitate reading, pressing the SET key switches between parameter and value: it is not necessary to keep it pressed). With the value of the parameter displayed, pressing the up or down arrow keys in any case displays the parameter following or preceding the current one (therefore it automatically exits from displaying the value). This menu is exited automatically after 2 minutes of console inactivity or by pressing the up arrow (▲) + down arrow (▼) keys simultaneously for a few seconds.

5.13 QUICK VIEW MENU PARAMETER LIST (READ-ONLY)

VAR.	MEANING	VALUES
tS4	**View Inlet Temperature sensor (S4)**	(read-only) °C
tS5	**View Evaporation Temperature sensor (S5)**	(read-only) °C
PS5	**View Evaporation Pressure sensor (S5)**	(read-only) Bar
tSH	**View superheat temperature**	(read-only) °C
oEV	**EEV valve opening percentage**	(read-only) %
PAS	**EEV Valve opening position**	(read-only) steps/10

5.14 PASSWORD FUNCTION

The password function is enabled by setting a value other than 0 in the PA parameter. See parameter P1 for the various levels of protection. Protection is enabled automatically when the keypad is not used for 30 seconds. The digits 000 appear on the display. Use the up/down arrow keys to edit the number and press the SET key to confirm. The 000 password window disappears if the keypad is not used for 30 seconds.
Note: If you forget the password, use the universal number **100.**

SOFTWARE UPDATE 5.15

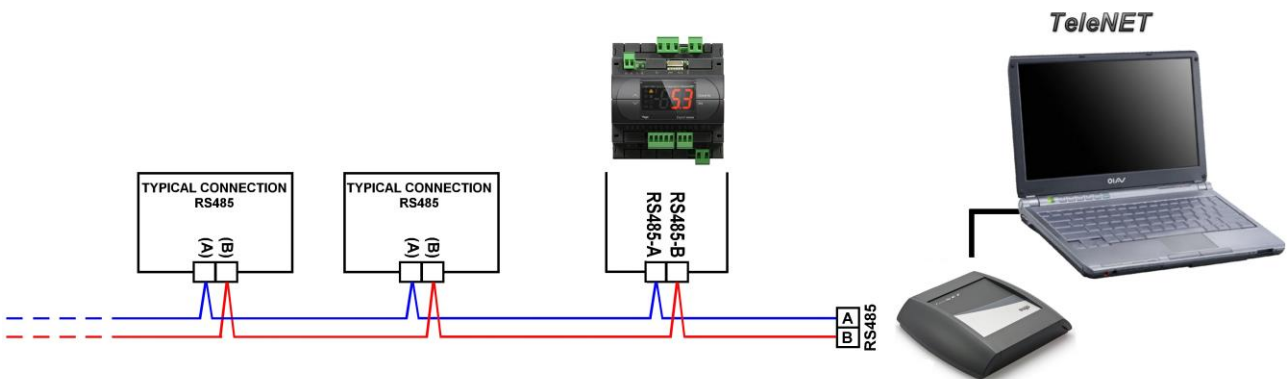**Contact Pego to perform the software update.**

CHAPTER 6: OPTIONS

6.1　　　TELENET MONITORING/SUPERVISION SYSTEM

To connect the electrical panel to a **TeleNET** network, follow the diagram below.
Refer to the **TeleNET** user manual for instrument configuration.
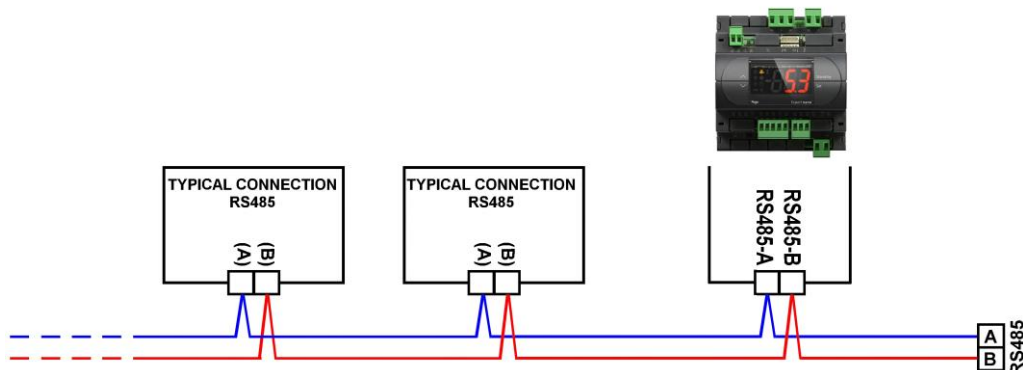**IMPORTANT:** During the configuration, under "Module" select "PEV-PULSE Instrument".

6.2　　　CONFIGURATION OF NETWORK WITH MODBUS-RTU PROTOCOL

Connect the board to a RS485 network with **Modbus-RTU** protocol with reference to the diagram below.
Refer to the **MODBUS-RTU_PEV_P20** manual (available on our website) for the specifications of the MODBUS-RTU communication protocol.

CHAPTER 7: DIAGNOSTICS

DIAGNOSTICS	7.1

In the event of any anomalies, the **PEV P20** controller warns the operator through alarm codes shown on the display and an acoustic signal emitted by a buzzer.

The audible alarm can be silenced by pressing the UP key (the error code remains) and is reactivated by pressing the SET key.

If an alarm condition occurs, one of the following messages will appear on the display:

ALARM CODE	POSSIBLE CAUSE	OPERATION TO BE PERFORMED
E4	**Functional fault of the S4 Inlet temperature sensor.**	• Check the condition of the sensor and its connections. • If problem persists, replace the sensor.
E5	**Functional fault of the S5 Evaporation pressure sensor.**	• Check the condition of the sensor and its connections. • If problem persists, replace the sensor.
LSH	**Low superheat alarm.**	• Check the status of the refrigerating system. • Edit the PID parameters. • If the problem persists, contact the technical support service.
MOP	**Alarm for maximum saturated evaporation temperature exceeded, in relation to sensor S5.**	• Check the status of the refrigerating system. • Edit the PID parameters. • If the problem persists, contact the technical support service.
LOP	**Alarm for minimum saturated evaporation temperature exceeded, in relation to sensor S5.**	• Check the status of the refrigerating system. • Edit the PID parameters. • If the problem persists, contact the technical support service.
En	**Connection between display and unit interrupted.**	• Check display-master connection. • Switch unit off and then back on.
E0 E0i E0E	**Eeprom alarm** An EEPROM memory fault has been detected (the outputs are all disabled except the alarm one if configured).	• Switch unit off and then back on. • Restore the default values (see dEF parameter).

ANNEXES

A.1   DICHIARAZIONE DI CONFORMITA' UE / EU CONFORMITY

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

Pego   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*

   MOD.:   **PEVP2001 / PEVP2002**

IL PRODOTTO DI CUI SOPRA È 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:
THE CONFORMITY REQUIRED BY THE DIRECTIVE IS GUARANTEED BY THE FULFILLMENT TO THE FOLLOWING STANDARDS:

Norme armonizzate: **EN 61010-1:2010, EN 61000-6–2:2019, EN 61000-6–4:2019**
European standards: ***EN 61010-1:2010, EN 61000-6–2:2019, EN 61000-6–4:2019***

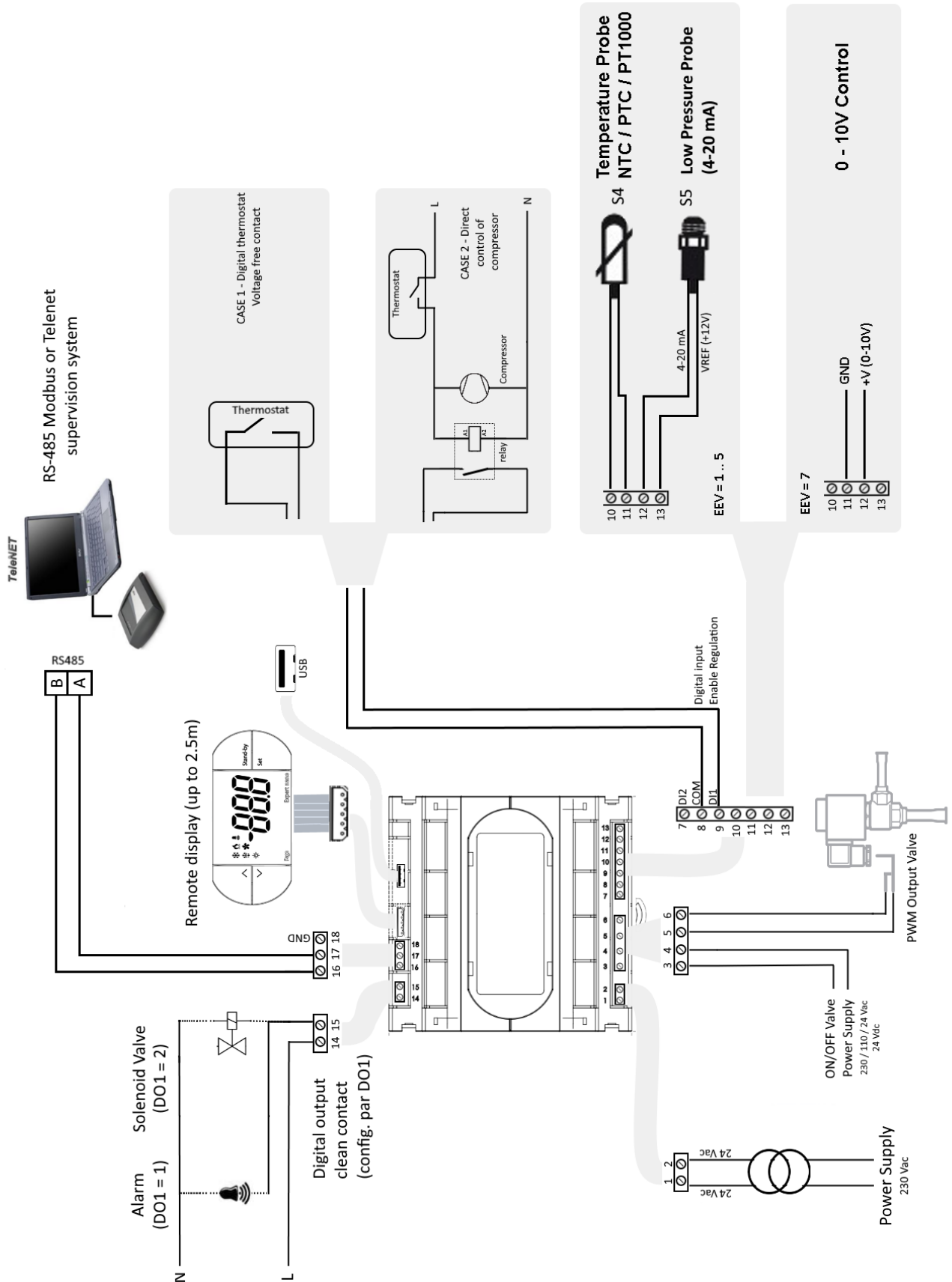Firmato per nome e per conto di:
Signed for and on behalf of:

Pego S.r.l.
Martino Villa
Presidente

Luogo e Data del rilascio:
Place and Date of Release:
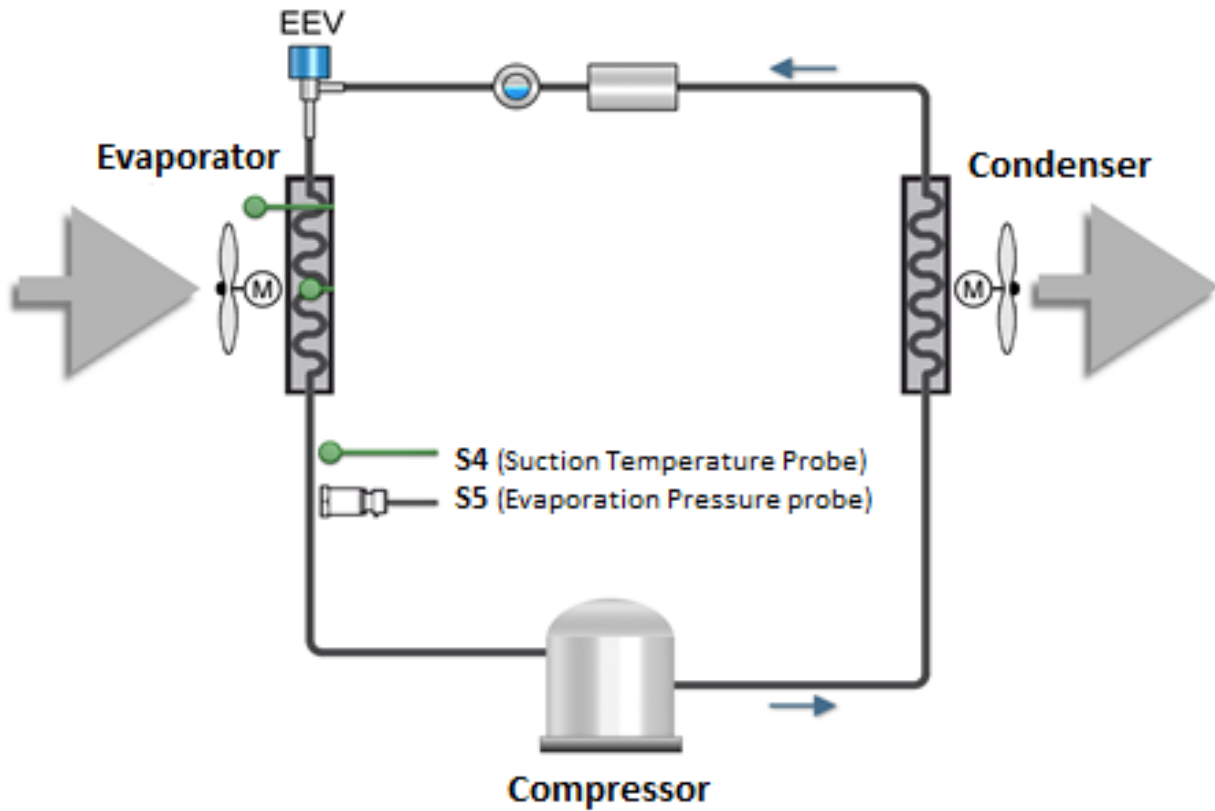
Occhiobello (RO), 01/03/2023

CONNECTION DIAGRAM   **A.2**

A.3 LAYOUT AND DESCRIPTION OF THE SENSORS

EEV

Evaporator

Condenser

S4 (Suction Temperature Probe)
S5 (Evaporation Pressure probe)

Compressor

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