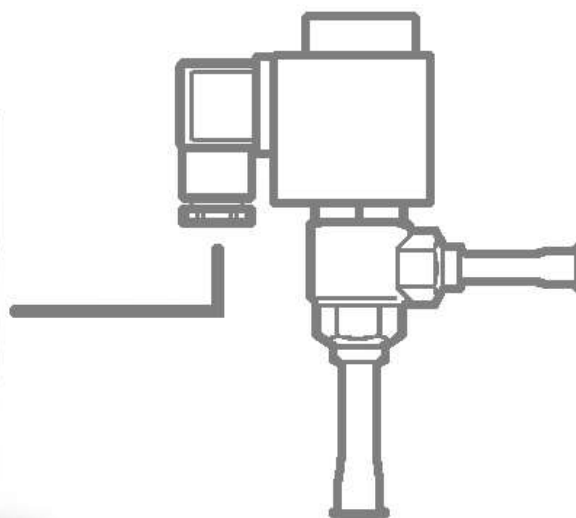


# PEVPULSE

Driver for 230V Pulse electronic expansion valve



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## User and maintenance manual

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## ENGLISH

**READ AND KEEP**

Rel. Software : 8

# CONTENTS

## INTRODUCTION

### CHAP. 1

|        |     |                              |
|--------|-----|------------------------------|
| Page 3 | 1.1 | General                      |
| Page 3 | 1.2 | Product identification codes |
| Page 4 | 1.3 | Overall dimensions           |
| Page 4 | 1.4 | Identification data          |

## INSTALLATION

### CHAP. 2

|        |     |   |
|--------|-----|---|
| Page 5 | 2.1 | General rules for the installer         |
| Page 5 | 2.2 | Standard equipment for assembly and use |
| Page 6 | 2.3 | Installation of the controller          |

## TECHNICAL FEATURES

### CHAP. 3

|        |     |                    |
|--------|-----|--------------------|
| Page 7 | 3.1 | Technical features |
|--------|-----|--------------------|

## WARRANTY

### CHAP. 4

|        |     |          |
|--------|-----|----------|
| Page 8 | 4.1 | Warranty |
|--------|-----|----------|

## DATA PROGRAMMING

### CHAP. 5

|         |      |   |
|---------|------|---|
| Page 9  | 5.1  | Control panel   |
| Page 9  | 5.2  | Front keypad  |
| Page 10 | 5.3  | LED display   |
| Page 10 | 5.4  | Combination of keys                                       |
| Page 11 | 5.5  | Setting and viewing of ESH set points                     |
| Page 12 | 5.6  | Level 1 programming                                       |
| Page 12 | 5.7  | List of Level 1 variables                                 |
| Page 13 | 5.8  | Level 2 programming                                       |
| Page 13 | 5.9  | List of Level 2 variables                                 |
| Page 17 | 5.10 | Temperature table for refrigerant fluids                  |
| Page 17 | 5.11 | Quick menu for variables displaying (read-only)           |
| Page 17 | 5.12 | List of variables in variable quick view menu (read-only) |
| Page 17 | 5.13 | Password function   |

## OPTIONS

### CHAP. 6

|         |     |  |
|---------|-----|--|
| Page 18 | 6.1 | TeleNET monitoring/supervision system          |
| Page 18 | 6.2 | Network configuration with Modbus-RTU protocol |

## DIAGNOSTICS

### CHAP. 7

|         |     |             |
|---------|-----|-------------|
| Page 19 | 7.1 | Diagnostics |
|---------|-----|-------------|

## ANNEXES

|         |     |                                   |
|---------|-----|-----------------------------------|
| Page 20 | A.1 | EU Declaration of Conformity      |
| Page 21 | A.2 | Connection diagram                |
| Page 22 | A.3 | Layout and description of sensors |

# CHAPTER 1: INTRODUCTION

## GENERAL

1.1

### DESCRIPTION

The **PEV PULSE** is an electronic regulator for controlling the 230 VAC ON/OFF electronic expansion valve with coil. It can be configured on either the remote display or the integrated display. It is compatible with the most common 230VAC ON/OFF electronic expansion valves and integrates evaporator superheat control.

### APPLICATIONS:

- Refrigerated counters and cold rooms.

### MAIN FEATURES:

- Control of the 230VAC ON/OFF electronic expansion valve.
- Compatible with 23 gases: R404, R134, R22, R407A, R407F, R407H, R410A, R450A, R507, R513A, R744(CO<sub>2</sub>), R449A, R290, R32, R448A, R452A, R600, R600A, R1270, R1234ze, R23, R717(NH<sub>3</sub>), R454C.
- Integrated or remote-control console.
- RS485 serial connection with TeleNET or Modbus protocol which can be selected in the parameters.
- Two configurable digital inputs.
- Inlet temperature and evaporation pressure sensor for evaporator superheat control.
- Remote display with IP65 protection.
- Easy programming of parameters with 4 pre-settings for the various applications of the electronic expansion valve.
- Alarm signalling.
- LED status signals and large display screen.
- User-friendly keypad.

## PRODUCT IDENTIFICATION CODES

1.2

### 200PEVP01



Electronic regulator for the control of the electronic expansion valve. With integrated display, it manages the most common 230VAC ON/OFF electronic expansion valves. Evaporator superheat control.

**200PEVP02**

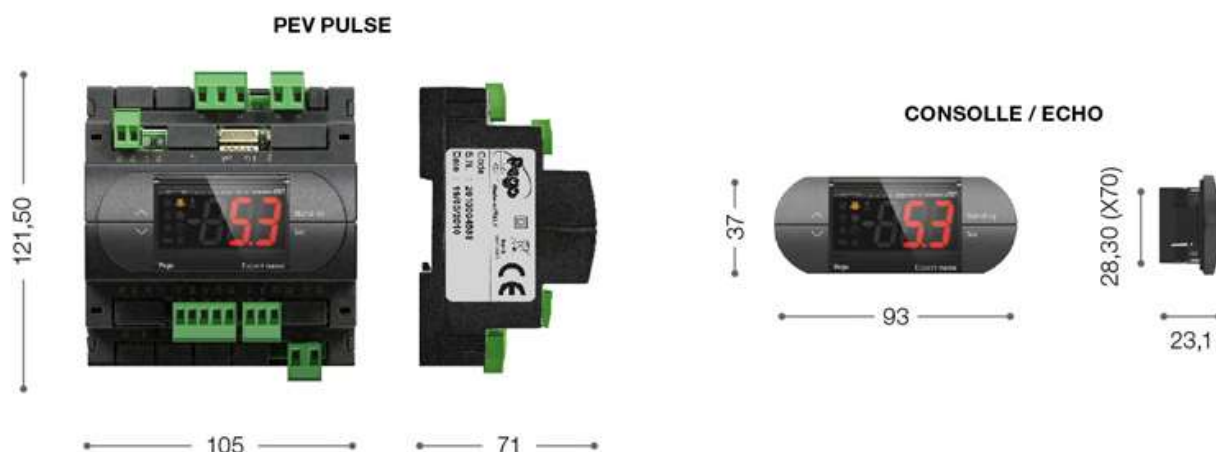
Electronic regulator for the control of the electronic expansion valve. With remote display, it manages the most common 230VAC ON/OFF electronic expansion valves. Evaporator superheat control (remote display 200NANOTTTL01, not included).

**200NANOTTTL01**

CONNECTION CABLE

**1.3****OVERALL DIMENSIONS**

Dimensions in mm

**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



## CHAPTER 2: INSTALLATION

### GENERAL RULES FOR THE INSTALLER

2.1

1. Install the device in an area that ensures the correct degree of protection and take all due care when drilling holes in the box for the cable glands and/or hoses.
2. Avoid using multi-pole cables with conductors connected to inductive and power conductors and signal conductors like sensors and digital inputs.
3. Avoid inserting ducts and power cables with signal cables (sensors and digital inputs) in these.
4. Minimize the length of the connecting cables to prevent these from coiling up and adversely affecting the electronics through induction.
5. All the conductors of the cables must be of an appropriate size to withstand the required load.
6. When extensions are needed for the sensors, it is necessary to use conductors of a suitable size measuring no less than 1mm<sup>2</sup>. Extension or shortening of the sensors may alter the factory settings; use an external thermometer, therefore, for testing and calibration.

### STANDARD EQUIPMENT FOR ASSEMBLY AND USE

2.2

The **PEV PULSE** electronic controller is provided with the following for assembly and use:

- 1 User manual.

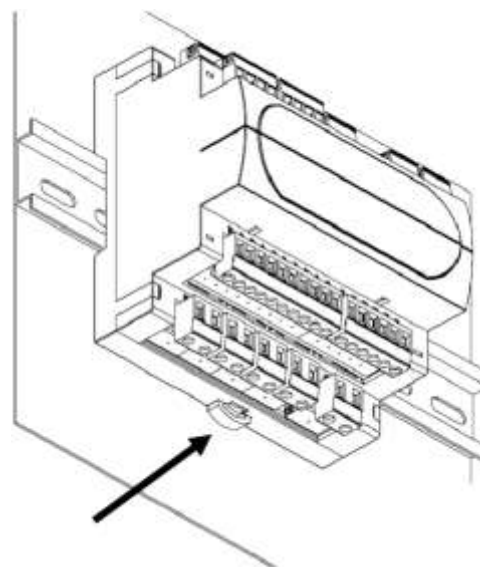
The accessories, which can be ordered separately, are as follows:

- **200NANOTTTL01** - ECHO NANO display for PEV PULSE + 10cm TTL cable.  
Can be used as a remote primary display for the 200PEVP02 controller and as a secondary ECHO display for both controllers.
- **KC-TTLB-L2.5** - TTL cable for ECHO NANO display. Length 2.5 meters.  
Recommended for installations with remote display.

## 2.3

## INSTALLATION OF THE CONTROLLER

**Fig. 1:** Install the module on the DIN guide and close the bottom clamp to hold it in place.



Make all the electrical connections with reference to the diagrams of the relative model (see the relative tables in the ANNEXES). During the cabling process, it is advisable to keep the power conductors isolated from the signal conductors.



## CHAPTER 3: TECHNICAL FEATURES

### TECHNICAL FEATURES

3.1

| Power supply  |                 |  |
|---|-----------------|--|
| Voltage   |                 | 230 V~ ± 10% 50-60Hz                       |
| Max power consumption (electronic control only)   |                 | ~ 7 VA                                     |
| Climatic conditions   |                 |  |
| Operating temperature   |                 | -5 to +50 °C                               |
| Storage temperature   |                 | -10 to +70 °C                              |
| Relative ambient humidity   |                 | Less than 90% RH                           |
| General features  |                 |  |
| Compatible types of temperature sensor  |                 | Temperature sensors: NTC 10K 1%            |
| Resolution of temperature sensors   |                 | 0.1 °C                                     |
| Precision of temperature sensor detection   |                 | ± 0.5 °C                                   |
| Range of temperature sensor detection   |                 | -45 to +45 °C                              |
| Compatible type of pressure sensor:   |                 | pressure sensor: 4/20mA / radiometric 0-5V |
| Output features   |                 |  |
| Description   | Relay installed | Features of output board                   |
| Alarm (voltage-free contact)  | (8A AC1 relay)  | 8(3)A 250V~                                |
| Pulse valve   | triac           | 50VA (pulse valve)                         |
| Dimensional features  |                 |  |
| Dimensions  |                 | 12.15cm x 7.1cm x 10.5cm (HxWxL)           |
| Dimensions (console/echo)   |                 | 3.7cm x 2.31cm x 9.3cm (HxWxL)             |
| Insulation and mechanical properties  |                 |  |
| Degree of protection of front console (remote-controlled by the power section if assembled on front of board) |                 | IP65                                       |
| Material of boxes   |                 | PC+ABS self-extinguishing UL94 V-0         |
| Type of insulation  |                 | Class II                                   |

## 4.1

## WARRANTY

The **PEV PULSE** 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 with the prior request of the Return Authorization Number.

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

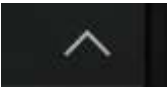
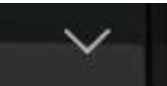
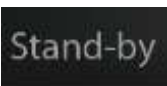

### CONTROL PANEL

5.1



### FRONT KEYPAD

5.2

- |          |   |   |
|----------|---|---|
| <b>1</b> |  | <b>UP KEY</b><br>Increases value / Scrolls up through parameters<br>Turns off auditory alarm in progress / Acquires an alarm.   |
| <b>2</b> |  | <b>DOWN KEY</b><br>Decreases value / Scrolls down through parameters.   |
| <b>3</b> |  | <b>STAND BY</b><br><u>IMPORTANT:</u> the PEV PULSE instrument <b>cannot be paused by pressing the key</b> , but only by removing the enable from digital input or LAN.      |
| <b>4</b> |  | <b>SET</b><br>Shows the setpoint<br>Enables configuration of the SUPERHEAT setpoint when pressed together with the Down or UP key.<br>Resets an auditory alarm in progress. |

## 5.3

## LED DISPLAY

5



Shows the values / parameters.

6

**DEFROSTING ICON**

LED OFF = Defrosting input OFF

LED ON = Defrosting input ON

7

**EEV OUTPUT STATUS ICON** Output status of the EEV electronic valve

LED OFF = EEV output OFF

LED ON = EEV output ON

8

**"PRG" ICON**

Blinking LED = Programming

9

**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.

A beep is emitted when the system opens the menu.

To exit the menu, press the up and down arrow keys together (the system beeps to confirm). Alternatively, the system closes the menu automatically when the keypad is not used for 30 seconds.

### LEVEL 2 PROGRAMMING (EEV parameters)



Pressing both keys together for more than 3 seconds enables access to the Level 3 programming menu. The system beeps to confirm access to the menu.

To exit the menu, press the up and down arrow keys together (the system beeps to confirm). Alternatively, the system closes the menu automatically when the keypad is not used for 30 seconds.

### VARIABLE QUICK VIEW MENU (READ-ONLY)



Pressing both together for more than 3 seconds enables access to the variable quick view menu.

The system beeps to confirm access to the menu.

Use the Up and Down arrow keys to view the labels of the variables.

Press the Set key to alternate between a label and its value.

With the value of a label on display, press the up or down arrow to view the next or previous label.

To exit the menu, press the up and down arrow keys together (the system beeps to confirm). Alternatively, the system closes the menu automatically when the keypad is not used for 30 seconds.

## VIEWING AND CONFIGURATION OF ESH SETPOINT

5.5

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 ( $\blacktriangle$ ) or ( $\blacktriangledown$ ) 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 variable appears:

1. Use the (▲) key or (▼) key to select the variable to be modified. After selecting the required variable, it is possible to:
2. View its configuration by pressing the SET key.
3. Edit configuration by pressing and holding the SET key and pressing either the (▲) key or the (▼) key.
4. 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.
5. Any changes made to the variables are saved automatically when the system closes the configuration menu.

Valve control continues even when the menu is open.

## 5.7

## LIST OF LEVEL 1 VARIABLES (Installer Level)

| VARIABLES | MEANING   | VALUES   | DEFAULT |
|-----------|---|--|---------|
| In1       | Setting of DI1 digital input and activation status  | 2 = Defrosting (with DI=1)<br>1 = ON EEV Driver (with DI=1)<br>0 = Disabled<br>-1 = ON EEV Driver (with DI=0)<br>-2 = Defrosting (with DI=0)   | 1       |
| In2       | Setting of DI2 digital input and activation status  | 2 = Defrosting (with DI=1)<br>1 = ON EEV Driver (with DI=1)<br>0 = Disabled<br>-1 = ON EEV Driver (with DI=0)<br>-2 = Defrosting (with DI=0)   | 0       |
| DO3       | Setting use of DO3 digital output.<br>Configurable auxiliary relay / Alarm<br>Note: Solenoid valve control involves a normal solenoid valve, and the output repeats the ON input of the Driver. | 2 = DO3 relay enabled with solenoid valve control<br>1 = DO3 relay enabled in presence of alarm<br>0 = DO3 relay disabled<br>-1 = DO3 relay disabled in presence of alarm<br>-2 = DO3 disabled with solenoid valve control   | 1       |
| dIS       | Viewing of main page  | 1 = (tS4) Viewing of Inlet temperature sensor (S4)<br>2 = (tS5) Viewing of Evaporation temperature sensor (S5)<br>3 = (PS5) Viewing of Evaporation pressure sensor (S5)<br>4 = (tSH) Viewing of Superheat temperature<br>5 = (oEV) Opening percentage of EEV valve | 4       |
| SEr       | RS-485 communication protocol   | 0 = TeleNET protocol<br>1 = Modbus-RTU protocol  | 0       |
| Ad        | Network address for connection to the TeleNET or Modbus supervision system  | 0 to 31 (with SEr=0)<br>1 to 247 (with SEr=1)  | 0       |
| Bdr       | Modbus baudrate   | 0=300 baud      3=2400 baud      6=14400 baud<br>1=600 baud      4=4800 baud      7=19200 baud<br>2=1200 baud      5=9600 baud      8=38400 baud   | 5       |

|            |   |  |           |
|------------|---|--|-----------|
| <b>Prt</b> | <b>Modbus parity check configuration</b>                            | 0 = none   1 = even   2 = odd  | 0         |
| <b>BEE</b> | <b>Buzzer Enable</b>  | 0 = disabled<br>1 = enabled  | 1         |
| <b>P1</b>  | <b>Password: type of protection</b><br>(active when PA is not at 0) | 0 = shows only the setpoint and permits deactivation of the alarms<br>1 = shows the setpoint, permits deactivation of the alarms + access to the read-only variable menu<br>2 = disables access to level 1 and 2 programming (access permitted to all other functions)<br>3 = disables access to level 2 programming (access permitted to all other functions) | 3         |
| <b>PA</b>  | <b>Password</b><br>(see P1 for the type of protection)              | 0...999<br>0 = function disabled   | 0         |
| <b>dEF</b> | <b>Reserved parameter</b>   | ---  | ---       |
| <b>reL</b> | <b>Software release</b>   | read-only  | read-only |

## LEVEL 2 PROGRAMMING (EEV parameters)

5.8

To access Level 2 programming, press and hold the UP key (▲) and STANDBY key for over 3 seconds. When the first programming variable appears:

1. Use the (▲) key or (▼) key to select the variable to be modified. After selecting the required variable, it is possible to:
2. View its configuration by pressing the SET key.
3. Edit configuration by pressing and holding the SET key and pressing either the (▲) key or the (▼) key.
4. After setting the configuration values, press and hold both the (▲) key and the (▼) key to return to the room temperature value and exit the menu. The system exits the menu when the keypad is not used in 30 seconds.
5. Any changes made to the variables are saved automatically when the system closes the configuration menu. Valve control continues even when the menu is open.

## LIST OF LEVEL 2 VARIABLES (EEV parameters)

5.9

| VARIABLES  | MEANING   | VALUES   | DEFAULT |
|------------|---|--|---------|
| <b>EEV</b> | <p><b>Management of the EEV electronic valve</b><br/>With EEV=0 all the controls and relative signals are disabled. The relative errors of the S4 sensors (outlet temperature) and S5 sensors (evaporation pressure) are also disabled and excluded.<br/>Settings 1 to 4 load the default values of the variables <b>ECt, EPb, EtI, Etd, ELS</b>.<br/><b>After exiting the programming process</b> the default values are loaded if the value of the EEV differs from the one saved previously.<br/>Pressing just the Set key to view the current EEV value does not load the default values.</p> | <p>1 = EEV control (default 1)<br/>2 = EEV control (default 2)<br/>3 = EEV control (default 3)<br/>4 = EEV control (default 4)<br/>5 = EEV control (default 5)</p> | 1       |

|     |  |   |                          |
|-----|--|---|--------------------------|
| ErE | <b>Type of refrigerant GAS in use.</b><br>The setting of this parameter is essential for correct operation.  | 0 = R404<br>1 = R134<br>2 = R22<br>3 = R407A<br>4 = R407F<br>5 = R407H<br>6 = R410A<br>7 = R450A<br>8 = R507<br>9 = R513A<br>10=R744(CO2)<br>11 = R449A<br>12 = R290<br>13 = R32<br>14 = R448A<br>15 = R452A<br>16 = R600<br>17 = R600A<br>18 = R1270<br>19 = R1234ze<br>20 = R23<br>21 = R717(NH3)<br>22 = R454C | 0                        |
| ECt | <b>Cycle time</b><br>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.<br><br>Example: if the EEV valve has to be opened by 30%:<br>EEV valve opening timer = ECt* 30/100<br>EEV valve closing timer = ECt * (100-30)/100 | 1 ÷ 20 sec  | 6 sec                    |
| EPb | <b>Proportional band</b> (gain) superheat control PID.   | 1 ÷ 100%  | 15%                      |
| Etl | <b>Integral timer</b> superheat PID control algorithm  | 0 ÷ 500 sec<br>steps of 2 sec   | 100 sec                  |
| Etd | <b>Derivative timer</b> superheat PID control algorithm  | 0,0 ÷ 10,0 sec<br>steps of 0,1 sec  | 2,0 sec                  |
| EOE | <b>EEV valve opening percentage in event of error with S4 or S5 sensors.</b><br>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 | <b>Duration of the Start-up phase.</b><br><b>The MOP, LOP and LSH superheat alarms are disabled during this phase.</b>   | 0 ÷ Edt<br>tenths of a second   | 6<br>tenths of a second  |
| EdO | After defrost, the EEV valve opens by the EdO percentage for the Edt time.   | 0 ÷ 100%  | 100%                     |
| Edt | Duration of EdO valve opening phase after defrost.<br><b>The MOP, LOP and LSH superheat alarms are disabled during this phase.</b>   | ESt ÷ 250<br>tenths of a second   | 24<br>tenths of a second |
| EHO | <b>Maximum opening percentage of EEV valve.</b><br>In the case of an oversize valve, this variable permit limitation of maximum opening of the valve at a set percentage.  | 0 ÷ 100%  | 100%                     |
| EPP | <b>Type of pressure transducer (S5):</b><br>Sets the type of transducer for detecting the Evaporation pressure (S5)  | 0 = 4-20mA pressure transducer connected to the instrument<br><br>1 = 0-5V ratiometric pressure transducer connected to the instrument  | 0                        |
| EP4 | <b>Pressure (bar) corresponding to 4mA or 0V.</b><br>In relation to the Evaporation pressure sensor (S5)   | -1.0 ÷ EP2 bar  | 0.0                      |
| EP2 | <b>Pressure (bar) corresponding to 20mA or 5V.</b><br>In relation to the Evaporation pressure sensor (S5)  | EP4 ÷ 90.0 bar  | 12.0                     |

|     |  |   |                        |
|-----|--|---|------------------------|
| CA4 | <b>Calibration of the inlet temperature transducer</b>   | $-10.0 \div +10.0 \text{ }^{\circ}\text{C}$   | 0.0 $^{\circ}\text{C}$ |
| CA5 | <b>Calibration of the Evaporation pressure transducer (S5)</b>   | $-10.0 \div +10.0 \text{ Bar}$  | 0.0 Bar                |
| LSH | <b>LSH threshold (low superheat temperature)</b><br>Superheat values that are too low can cause return of the liquid to the compressor, or extreme oscillations.<br>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.  | $0 \div \text{SH set } ^{\circ}\text{C}$  | 2 $^{\circ}\text{C}$   |
| ELS | <b>Low superheat protection</b><br>When this is enabled and $\text{SH} < \text{LSH}$ , the PID integration timer is set on the basis of the selection of 1 to 7 of the ELS.<br>Value 1 is for the quickest closing time.<br>Enabling of this protection starts the SHd counter for activating the LSH alarm.<br><b>THE LSH PROTECTION TAKES PRIORITY OVER THE LOP PROTECTION.</b><br><br>THE LSH PROTECTION IS NOT ACTIVATED DURING THE START-UP PHASE (ES <sub>t</sub> TIMER) OR DURING THE DEFROSTING OR POST-DEFROSTING PHASE (Ed <sub>t</sub> TIMER) | 0 = disables the LSH protection and signalling of the relative LSH alarm<br>1 = 5% E <sub>tl</sub><br>2 = 10% E <sub>tl</sub><br>3 = 15% E <sub>tl</sub><br>4 = 20% E <sub>tl</sub><br>5 = 25% E <sub>tl</sub><br>6 = 30% E <sub>tl</sub><br>7 = 35% E <sub>tl</sub><br>8 = 50% E <sub>tl</sub><br>9 = 100% E <sub>tl</sub> (no correction, and activation only of the LSH alarm) | 2                      |
| SHd | <b>Activation delay of the superheat alarm:</b> 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;<br>The alarm is automatically reset and recalled when $\text{SH} \geq \text{LSH}$<br>When the alarm is active: <ul style="list-style-type: none"> <li>- The LSH message blinks on the display</li> <li>- The buzzer is activated</li> </ul>   | $0 \div 240$<br>tenths of a second  | 30                     |
| MOP | <b>MOP threshold (Maximum Saturated Evaporation Temperature in relation to the S5 sensor)</b><br>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.   | $(\text{LOP}+1) \div +45^{\circ}\text{C}$   | +45 $^{\circ}\text{C}$ |
| EMO | <b>MOP protection (enabled when <math>\text{tS5} &gt; \text{MOP}</math>)</b><br>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.<br>Enabling of this protection starts the MOd counter for activating the MOP alarm.<br><br>THE MOP PROTECTION IS NOT ENABLED DURING THE START-UP PHASE (ES <sub>t</sub> TIMER) OR DURING THE DEFROSTING OR POST-DEFROSTING PHASE (Ed <sub>t</sub> TIMER).                   | 0 = disables the MOP protection and relative MOP alarm signal<br><br>$0 \div 100\%$   | 0                      |



|            |  |   |                       |
|------------|--|---|-----------------------|
| <b>MOd</b> | <b>MOP alarm activation delay:</b> the MOP alarm is triggered only after the MOP protection has remained active for the MOd time.<br>The alarm is automatically reset when " <b>Temp.S5</b> " ≤ <b>MOP</b><br>When the alarm is active:<br>- The MOP message blinks on the display<br>- The buzzer is activated  | $0 \div 240$<br>tenths of a second  | 60                    |
| <b>LOP</b> | <b>LOP threshold (minimum saturated evaporation temperature in relation to the S5 sensor)</b><br>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).   | $-45^{\circ}\text{C} \div (\text{MOP}-1)$                                       | $-45^{\circ}\text{C}$ |
| <b>ELO</b> | <b>LOP protection (activated when <math>tS5 &lt; \text{LOP}</math>)</b><br>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.<br>Enabling of this protection starts the LOd counter for activating the LOP alarm.<br>THE LSH PROTECTION TAKES PRIORITY OVER THE LOP PROTECTION.<br>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<br>$0 \div 100\%$ | 0                     |
| <b>LOd</b> | <b>Activation delay of the LOP alarm:</b> the LOP alarm is triggered only after it has remained active for the LOd time. In the event of an LOP alarm:<br>The alarm is automatically reset when " <b>Temp.S5</b> " ≥ <b>LOP</b><br>When the alarm is active:<br>- The LOP message blinks on the display<br>- The buzzer is activated   | $0 \div 240$<br>tenths of a second  | 30                    |

**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).

Loading of default settings on the basis of the EEV variable:

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



## TEMPERATURE TABLE FOR REFRIGERANT FLUIDS

5.10

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       |

## QUICK MENU FOR VARIABLES DISPLAYING (READ-ONLY)

5.11

During start-up of the system, it can be useful to quickly check the detection efficiency of the various sensors or some of the values to assess or improve upon the process.

To access the variable quick view menu, press and hold the DOWN key (▼) and STANDBY key for over 3 seconds. Use the Up and Down arrow keys to view the labels of the variables in this menu. Press the Set key to alternate between a label and its value. (to facilitate reading, press the Set key to switch between a label and its value. It is not necessary to hold down the set key). With the value of a label on display, press the up or down arrow to view the next or previous label (and switch from the value to the label). To exit the menu, press the up and down arrow keys together. Alternatively, the system closes the menu automatically when the keypad is not used for 2 minutes.

## LIST OF VARIABLES IN THE QUICK MENU (READ-ONLY)

5.12

| 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) %   |

## PASSWORD FUNCTION

5.13

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. If you forget the password, use the universal number 100.

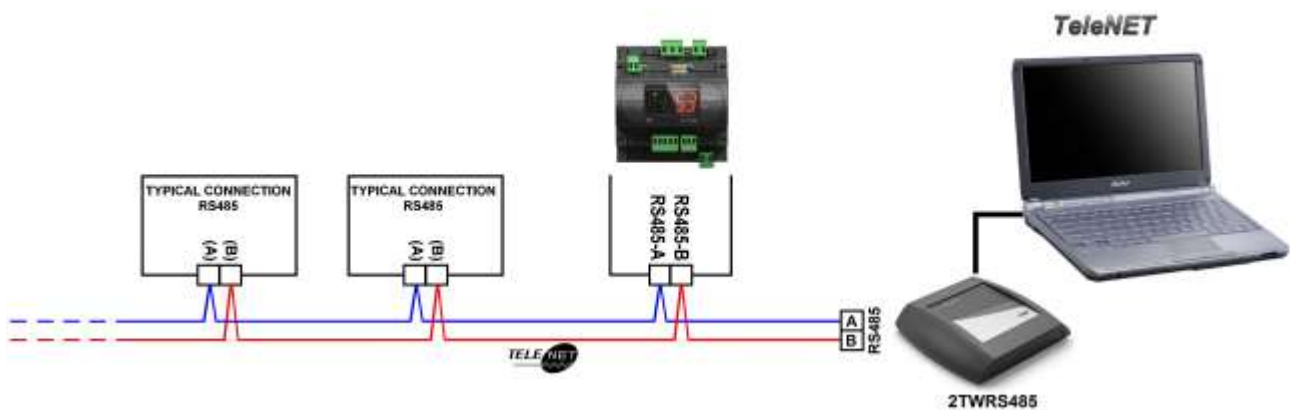
## CHAPTER 6: OPTIONS

### 6.1

#### TELENET MONITORING/SUPERVISION SYSTEM

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 " PEV-PULSE instrument ".

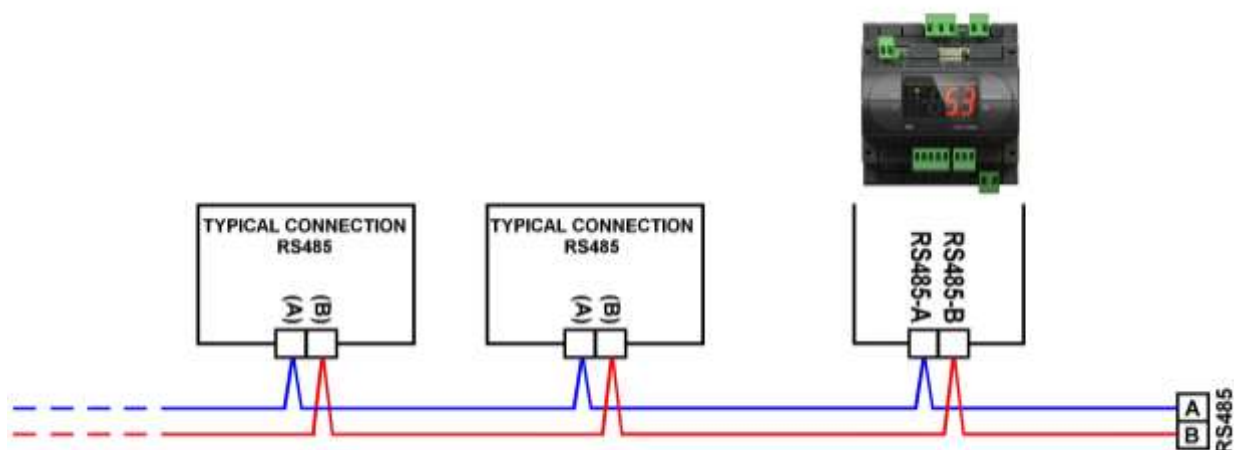


### 6.2

#### 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\_PULSE manual (available on our website) for the specifications of the MODBUS-RTU communication protocol.



## CHAPTER 7: DIAGNOSTICS

### DIAGNOSTICS

#### 7.1

In the event of a fault, the **PEV PULSE** controller displays alarm codes on the screen and triggers the buzzer (when applicable).

The auditory alarm can be stopped by pressing the UP key (the error code remains) and reactivated by pressing the SET key.

One of the following messages appears on the screen when an alarm condition occurs:

| ALARM CODE | POSSIBLE CAUSE   | ACTION TO BE TAKEN   |
|------------|--|--|
| E4         | Functional fault of the S4 Inlet temperature sensor.   | <ul style="list-style-type: none"> <li>• Check the condition of the sensor and its connections</li> <li>• If the problem persists, replace the sensor</li> </ul> |
| E5         | Functional fault of the S5 Evaporation pressure sensor.  | <ul style="list-style-type: none"> <li>• Check the condition of the sensor and its connections</li> <li>• If the problem persists, replace the sensor</li> </ul> |
| LSH        | Low superheat alarm.   |  |
| MOP        | Alarm for maximum saturated evaporation temperature exceeded, in relation to sensor S5.  |  |
| LOP        | Alarm for minimum saturated evaporation temperature exceeded, in relation to sensor S5.  |  |
| En         | Connection between display and unit interrupted.   | Automatic  |
| EE         | <b>EEPROM alarm</b><br>An error was found in the EEPROM memory (the outputs are all disabled apart from the alarm outputs, if configured). | Requires reactivation of the board   |

**ANNEXES****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.: 200PEVP01 (PEV PULSE with integrated display)  
200PEVP02 (PEV PULSE with remote display)

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 60335-1:2012, EN 61000-6-1:2007, EN 61000-6-3:2007  
*European standards: EN 60335-1:2012, EN 61000-6-1:2007, EN 61000-6-3:2007*

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

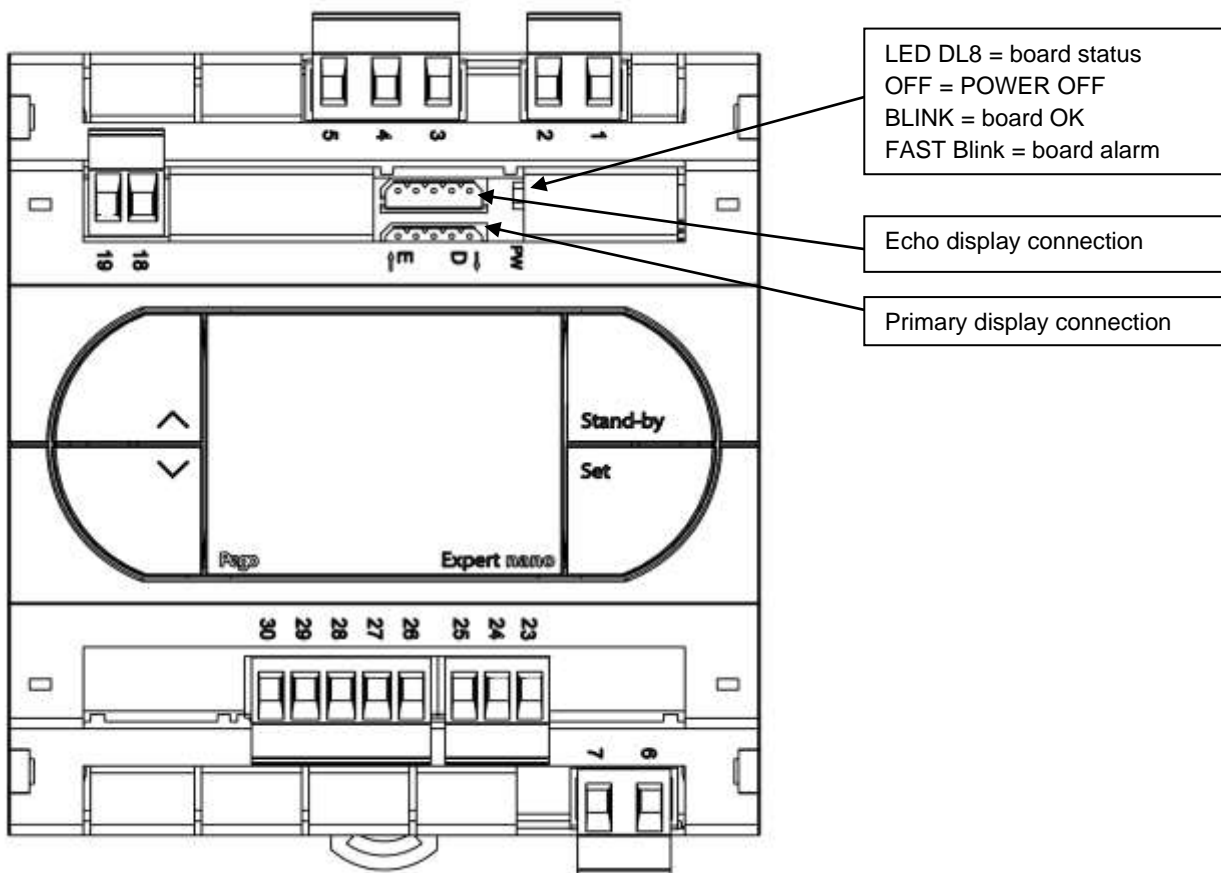
Pego S.r.l.  
Martino Villa  
Presidente

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

Occhiobello (RO), 01/01/2022

## CONNECTION DIAGRAM

A.2

**Power supply section**

1-2: 230 Vac 50-60Hz power supply

**Section of EEV electronic valve (230Vac) (J2 internal bridge set between 1-2)**

3: PWM output for control of EEV electronic valve at 230Vac

4: PWM output for control of EEV electronic valve at 230Vac

5: **NOT USED****Section of digital outputs (voltage-free contacts)**

6-7: (DO3) Configurable relay / Alarm [ RELAY 8A AC1 ]

**TeleNet section**

18: (RS485-A2) To terminal 4 of the RS485 interface for TeleNet – Modbus-RTU

19: (RS485-A2) To terminal 3 of the RS485 interface for TeleNet – Modbus-RTU

**Section of digital inputs**

23: (DI2) Configurable digital input 2

24: (DI2) Configurable digital input 1

25: (COM DI) Common digital inputs

**Section of analogue inputs**

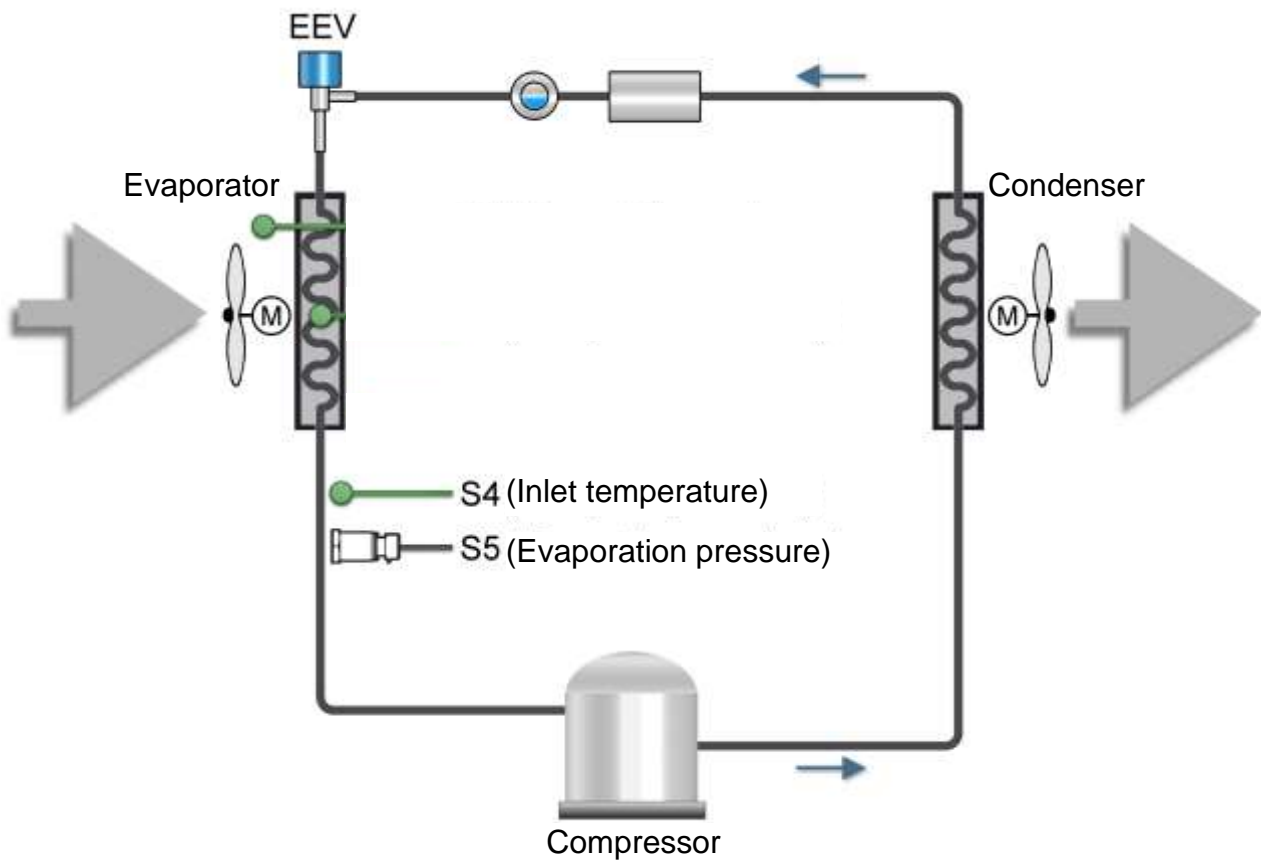
26: (COM AN gnd) Common analogue sensors (gnd)

27: (AN\_4) Input NTC sensor (S4). [Temperature of superheated gas for EEV].

28: (AN\_5) Evaporation pressure sensor (S5) [x EEV] (4-20mA analogue input with **closed J1** / 0-5V x ratiometric pressure sensor with **open J1**)29: (COM AN +5V) +5V (ratiometric sensor power supply, to be used only with **open J1**)30: (COM AN +12V) +12V (4-20mA sensor power supply, to be used only with **closed J1**)

## A.3

## LAYOUT AND DESCRIPTION OF THE SENSORS







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