EMERSON PS1/PS2 Series Pressure Controls Instruction Manual

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Instruction Manual

Pressure Controls Series PS1 / PS2
OPERATING INSTRUCTIONS

Contents

General information:

For application in refrigeration systems and heat pumps.

⚠ The device has a potential ignition source and has not been qualified according to ATEX standards. Installation only in “non-explosive location”.

⚠ Safety instructions:

- Read operating instructions thoroughly. Failure to comply can result in device failure, system damage or personal injury.
- This product is intended for use by qualified personnel having the appropriate knowledge and skills like trained according to EN 13313 or a specific training for flammable refrigerants.
- Flammable refrigerants require special handling and care due to its flammability. Sufficient ventilation is required during service of the system.
- Contact with rapidly expanding gases can cause frostbite and eye damage. Proper protective equipment (gloves, eye protection, etc.) must be used.
- Ensure that the system is correctly labeled with applied refrigerant type and a warning for explosion risk.
- In a severely contaminated system, avoid breathing acid vapors and avoid contact with skin from contaminated refrigerant / lubricants. Failure to do so could result in injury.
- Before opening any system make sure pressure in system is brought to and remains at atmospheric pressure.
- Do not release any refrigerant into the atmosphere!
- Do not exceed the specified maximum ratings for pressure, temperature, voltage and current.
- Ensure that the system piping is grounded.
- Before installation or service disconnect all voltages from system and device.
- Observe and avoid mechanical damage of housing in order to maintain protection class.
- Do not use any other fluid media without prior approval of EMERSON.
  Use of fluids not listed could result in:
  – Change of hazard category of product and consequently change of conformity assessment requirement for product in accordance with European Pressure Equipment Directive 2014/68/EU.
- Ensure that design, installation and operation comply with European and national standards/regulations.
- For flammable refrigerants only use valves and accessories approved for it!

Function:
Fig. 1a: automatic reset function:

- PS1/PS2 Pressure switches are equipped with SPDT snap action contacts switching from 1-2 to 1-4 on rising

and from 1-4 to 1-2 on falling pressure.

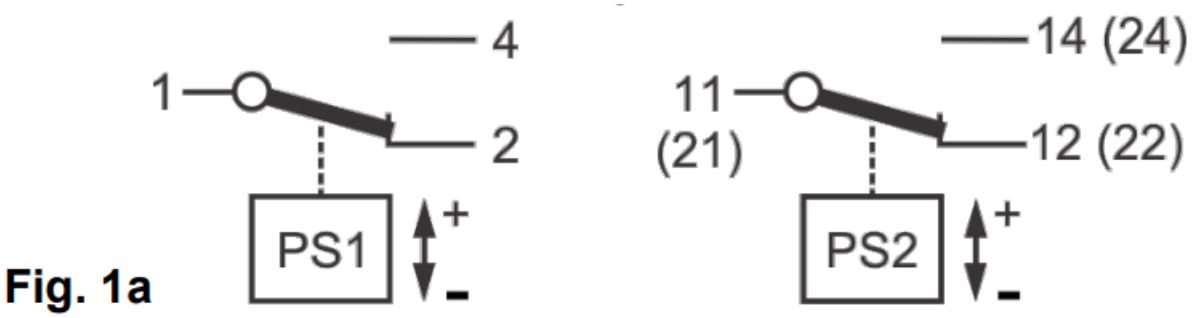


Fig. 1a

Fig. b: manual reset function for low pressure reset /
Fig. 1c: manual reset function for high pressure reset:

- PS1/PS2 with manual reset (high pressure/low pressure reset): Reaching the preset switching point contact 1-4 switches to 1-2 (low pressure switch) or from 1-2 to 1-4 (high pressure switch) and locks in this position. After the pressure rises or drops by a fixed differential the switch can be reset by pushing the reset button.

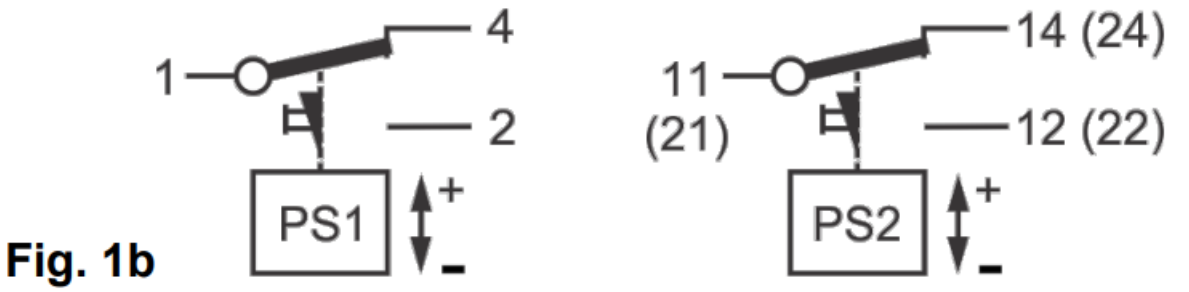


Fig. 1b

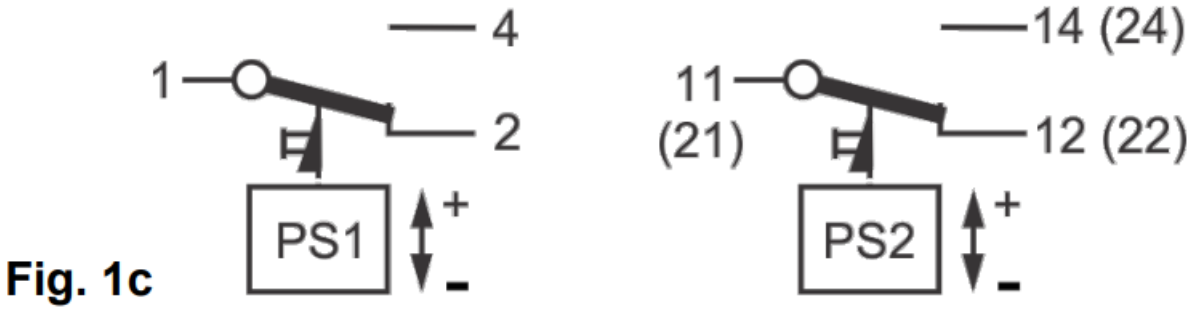


Fig. 1c

Mounting location :
Any direction except upside down
Installation: (Fig. 2)

- PS1/PS2 controls may be installed by using a mounting plate or as a wall-mounted device against a flat surface.
- Use universal thread M4 or UNC8-32 mounting holes for installation via mounting plate.
- Use the standard mounting holes at the backside for wall mounting.
- Use mounting screws supplied with control.
- Mounting screws must not penetrate control backside by more than 8 mm to ensure proper operation.
- Do not use PS1/PS2 in pulsating operating conditions! To achieve protection class IP44, the following instructions must be observed:
- Cover must be closed, and cover screw fastened

- Control must be mounted against a flat surface so that all openings on the housing backside are fully covered

Pressure connection: (Fig. 3)

- Connection of the pressure side depends on the exact model / pressure connector.
- When connecting PS1/PS2 to the hot gas line of a refrigeration system, a pipe, capillary or flexible tube of at least 80 mm shall be used to allow sufficient temperature drop between refrigeration line and pressure switch bellows.

Threaded connection:

- Connectors A & C: Do not apply torsional load to pressure connector; use second spanner to counterbalance torque when tightening pressure connection.
- K-type connectors: use copper gasket supplied with control.

Brazing connection:

- Perform the brazing joint as per EN 14324.
- Before and after brazing clean tubing and brazing joints.
- Minimize vibrations in the piping lines by appropriate solutions.
- Do not exceed the max. surface temperature of 70 °C!

Pressure Test:
After completion of installation, a pressure test must be carried out as follows:
– according to EN 378 for systems which must comply with European pressure equipment directive 2014/68/EU.
– to maximum working pressure of system for other applications.

Tightness Test:
Conduct a tightness test according to EN 378-2 with appropriate equipment and method to identify leakages from joints and products. The allowable leakage rate must be according system manufacturer's specification.

⚠ WARNING:

- Failure to pressure test or tightness test as described could result in loss of refrigerant, damage to property and/or personal injury.
- The tests must be conducted by skilled personnel with due respect regarding the danger related to pressure.

Electrical connection: (Fig. 4)

1. Range spindle
2. Lock plate
3. Differential spindle
4. Electrical terminals
5. Check-out lever
6. Cable entry grommet

7. Pressure Connection

- Entire electrical connections have to comply with local regulations.
- Wire size must match the electrical load connected to the switch contacts.
- Ensure that the cables are mounted without tension; always leave the cable a bit loose.
- Ensure that cables are not mounted near sharp edges.
- Do not bend or mechanically stress the cable outlet, maintain a clearance of 20 mm to neighboring parts.
- Feed cables through rubber grommet at switch bottom.
- Optionally, the rubber grommet may be replaced by a standard PG 13.5 cable gland.
- Connect wires to terminals by considering switch functions as shown in Fig. 1a to Fig. 1c.
- Fasten terminal screws with torque 1.2 Nm max.
- For electronic applications with low electrical loads (voltage < 24 V and current <50 mA) gold plated contacts are recommended.

Setpoint adjustment: (Fig. 5)

- PS1/PS2 pressure switches come with individually adjustable range and differential depending on the exact model.
- Manual reset switches always have a fixed differential.
- Use a flat screwdriver or a 1/4” refrigeration (square) wrench to adjust setpoints as described below.
- Adjust upper setpoint using the range spindle.
- Adjust lower setpoint by turning the differential spindle.

Upper setpoint – Differential = Lower setpoint

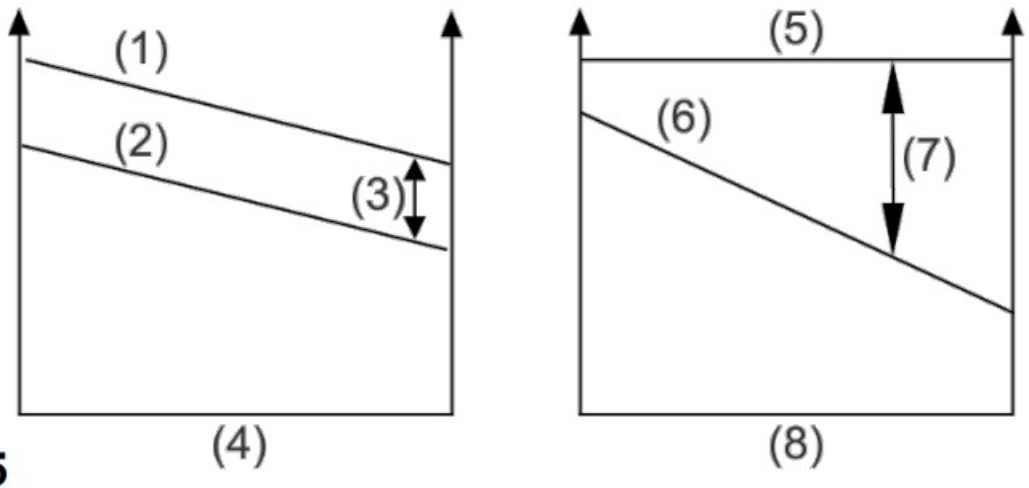


Fig. 5

(1) Upper setpoint (2) Lower setpoint (3) Differential = constant (4) Turning range spindle	(5) Upper setpoint (6) Lower setpoint (7) Differential = variable (8) Turning differential spindle

- A separate gauge must be used for exact adjustment of the setpoints. The integrated display scale can only be used for obtaining approximate settings.

- When changing the upper setpoint the lower setpoint must be re-checked.
- Refer to the Emerson catalogue or Technical Information for standard factory settings.

Manual reset / Universal reset: (Fig. 6a-c)

- Manual reset (external): press the reset button (1) as indicated by Fig. 6a.
- Manual reset (internal): remove the housing cover and press the reset button (2) as indicated by Fig. 6b.
- Note that the reset is 'trip-free', i. e. reset is only possible if the pressure has reached its reset threshold.
- Universal reset: remove the cover and change the universal toggle to the desired position (manual (3) or auto reset (4).(Fig. 6c)

Check- out lever: ((5) Fig. 4 & Fig. 7)

- Use the check-out lever to manually override the electrical contact position for testing out the system.
- Use the check-out lever on low pressure switches to manually override the electrical contact position for evacuating the refrigeration system.

Service / Maintenance:

- Disconnect electrical power before service.
- In case of repair work or replacing the control always use a new gasket. (K-Types)
- According to EN 378-4 during each periodic maintenance, tightness tests shall be carried out at the relevant part of the refrigerating system. This shall apply where appropriate following any repair.

Technical Data:

Medium compatibility	Fluid Group II A1 R448A, R449A, R513A, R450A, R134a, R452A, R23, R410A, R407C, R404A, R507, R124, R1234ze (A2L)	Fluid Group A2L R32, R452B, R454B, R454A, R454C, I R455A, R1234yf
Electrical rating	Resistive load (AC1) 24 A / 230 VAC Inductive load (AC15) 10 A / 230 VAC Inductive load (DC13) 0.1 A / 230 VDC 3 A / 24 VDC 6 A / 12 VDC Start-up (AC3) 144 A / 120 VAC / 230 VAC Motor rating (FLA) 24 A / 120 VAC / 240 VAC Locked rotor (LRA) 144 A / 120 VAC / 240 VAC	Resistive load (AC1) 10 A / 230 VAC* Inductive load (AC15) 1 A / 230 VAC* ; 10 A / 24 VAC* Inductive load (DC13) 0.1 A / 230 VDC* 3 A / 24 VDC* 6 A / 12 VDC* Start-up (AC3) – Moto rating (FLA) – Locked rotor (LRA) – *) Acc. IEC 60335-2-40 max. electrical load = 2.5 kVA

NOTE: Use proper fuse for short circuit case by considering above voltages/currents		
Protection class (IEC 529/EN 60529)	IP44	
Temperature range TS |Storage / Transport / Ambient / Medium	-50 °C…+70 °C	
Max. allowable pressure PS/ Test pressure PT	See Type code table	
Vibration resistance (acc. EN 12263)	4 g (10…1000 Hz)	
Standards	– EN 12263 – PED 2014/68/EU, Category IV for all devices with TÜV approval under EN12263	– LVD 2014/35/EU, – EN 60947-1, EN 60947-5-1

Marking	CE 0035 for devices under PED UKCA pending CE for devices under LVD EAC all types	c UL us LISTED all types (E85974) all types
Dimensions	See Fig. 2	

Type Code:

PS	1	-	A	7	A

Product Name
- **PS1** Single standard version
- **PSA** Customer specific version PS1

Function
- **A** Pressure control, automatic reset
- **B** Pressure cut out, external manual reset EN 12263
- **R** Pressure control, external manual reset
- **S** Safety pressure cut-out, internal manual reset EN 12263
- **U** Convertible from R to A
- **W** Pressure limiter, automatic, DIN / EN 12263
- **X** Pressure control, automatic with extended adjustment spindles

Pressure Connector
- **A** 7/16"-20 UNF male
- **C** R 1/4" male, stainless steel with steel bellows
- **J** 1 m capillary with 6 mm-ODM solder tube
- **K** 1 m capillary with 7/16"-20 UNF flare nut and schrader valve opener
- **L** 1 m capillary with 1/4"-ODM solder tube
- **R** R 1/4" male, brass
- **U** 6 mm ODF solder, 80 mm length
- **X** 1/4"-ODF solder, 80 mm length

Pressure Range (bar)

		PS	PT			PS	PT
1	-0.75…3	11	13	**4**	1…20	20	23
2	-0.8…1.5	11	13	**5**	6…31	31	35
3	-0.5…7	22	24				

PS	2	-	A	7	A

Product Name

PS2	Dual Standard version
PSB	Customer specific version PS2

Function

A	both sides: Pressure control, automatic reset
B	both sides: Pressure cut- out, external manual reset EN 12263
C	left: Pressure limiter, automatic right: Pressure cut out, external manual reset, EN 12263
G	left: Pressure cut out, external manual reset, right: Safety pressure cut-out, internal manual reset EN 12263
L	left: Pressure control, automatic reset, right: Pressure control external manual reset
M	left: Pressure control, automatic reset, right: Convertible from R to A
N	left: Pressure control, automatic reset, right: Convertible from R to A, EN 12263
R	both sides: Pressure control, external manual reset
S	both sides: Safety pressure cut-out, internal manual reset EN 12263
T	left: Pressure limiter, automatic right: Safety pressure cut- out, internal manual reset EN 12263
U	both sides: Convertible from R to A
W	both sides: Pressure limiter, automatic, DIN / EN 12263
X	both sides: Pressure control, automatic with extended adjustment spindles
Y	left: Pressure control, automatic reset right: Convertible from R to A; extended adjustment spindles
Z	both sides: Convertible from R to A, extended adjustment spindles

Pressure Connector

A	7/16”-20 UNF male
C	R 1/4” male, stainless steel with steel bellows
J	1 m capillary with 6 mm-ODM solder tube
K	1 m capillary with 7/16”-20 UNF flare nut and schrader valve opener
L	1 m capillary with 1/4”-ODM solder tube
U	6 mm ODF solder, 80 mm length
X	1/4”-ODF solder, 80 mm length

Pressure Range (bar)

	left	PS	PT	right	PS	PT
7	-0.5…7	22	24	6…31	31	35
8	6…31	31	35	6…31	31	35
9	-0.75…3	11	13	6…31	31	35

Fig. 2

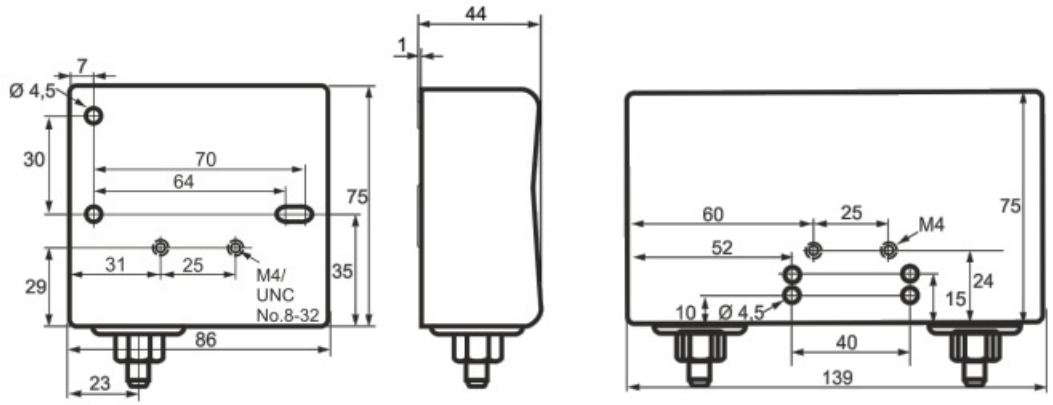


Fig. 3

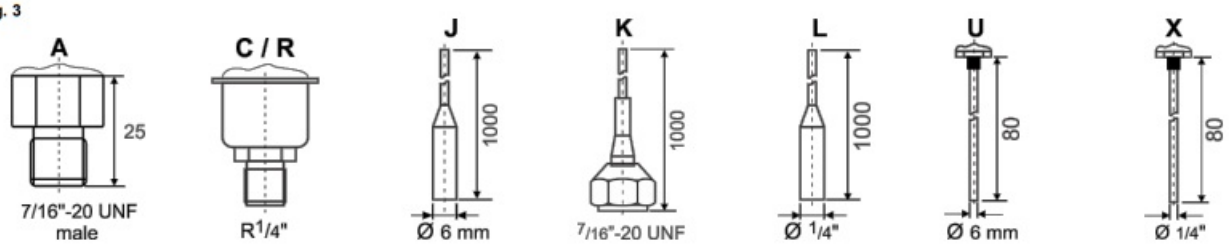


Fig. 4

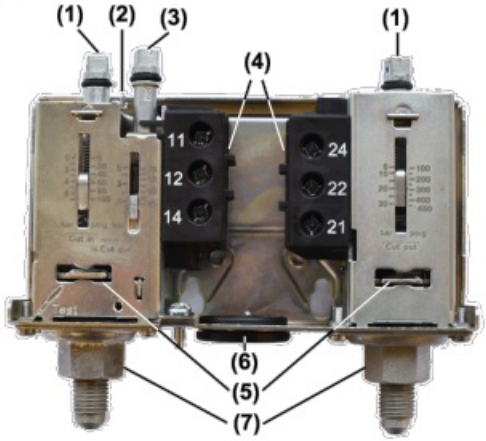


Fig. 7:

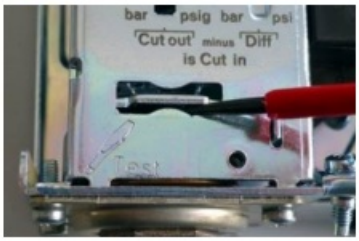


Fig. 6a

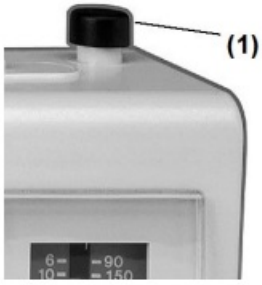


Fig. 6b

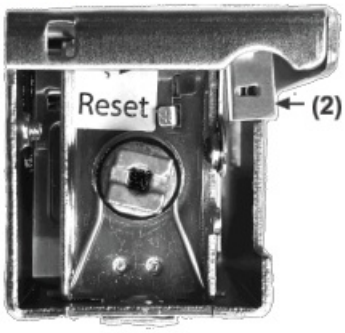
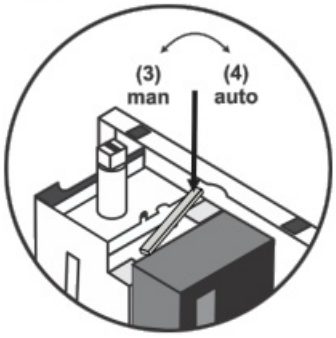


Fig. 6c



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Documents / Resources

	**EMERSON PS1/PS2 Series Pressure Controls** [pdf] Instruction Manual PS1, PS2, PS1 PS2 Series, Pressure Controls, PS1 Series Pressure Controls, PS2 Series Pressure Controls, Pressure Controls, PS2 Series, PS1 Series

References

- **Copeland is Engineered for Sustainability | Copeland GB**