Instruction Manual

English

InstruMate®

Mechanical Pressure Switch with SPDT switch Model 221

Contents (English)

1. Introduction

1-1) All InstruMate pressure switches are made under the management system certified to ISO9001 and strictly controlled for production process.

1-2) Installation site regulations and local safety requirements are to be observed prior to this instruction manual.

1-3) It is recommended to skilled worker or personnel to study instruction manual before handling the instrument.

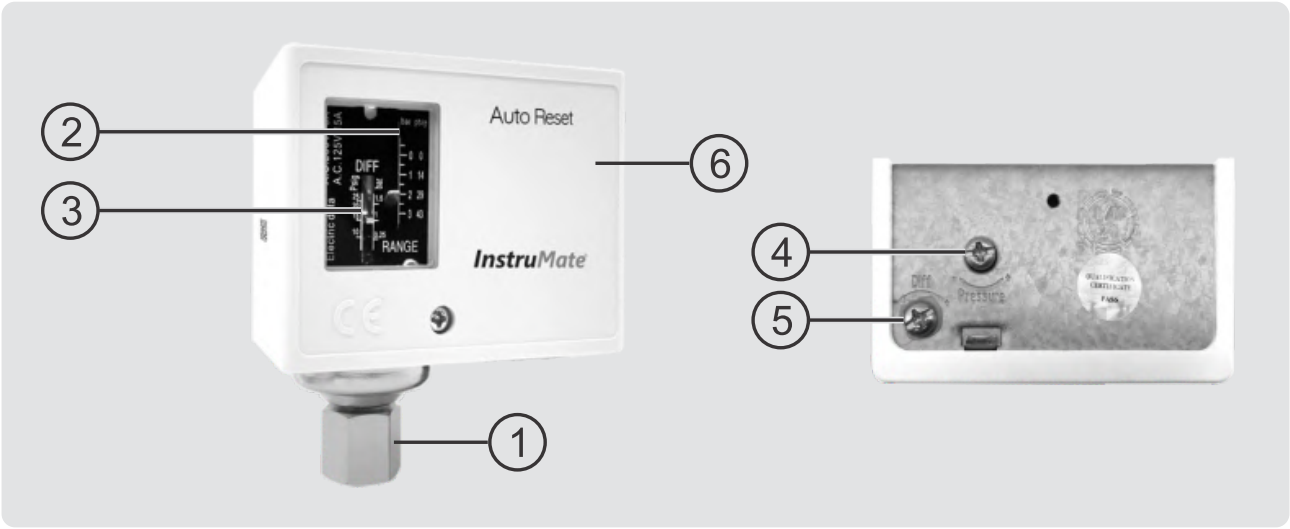
1-4) This instrument in your hands is suitable for the applications and specifications given in the corresponding product data sheet.

1-5) InstruMate Co., Limited insists on permanent improvement. As a result, technical info are subject to modifications.

Data sheets and more information can be found at:
www.instrumate.com

Technical consults: info@instrumate.com

2. Overview



1. Process connection
2. Switch point setting display
3. Switch differential setting display
4. Switch point pressure adjustment screw
5. Switch differential pressure adjustment screw
6. Removable plastic cover

3. Proper Application & Safety Measures

3-1) The pressure element of the Switch-Mate model 221 is a resilient bellow which works against a spring mechanism with an adjustable switching point. On the spring mechanism there is a contact arm for actuating the SPDT switch contact. The switch is actuated as soon as the force generated by the pressure in the

pressure element is greater than the set switching point.

3-2) User shall pay attention to applying condition like ambient temperature and humidity which can affect the performance of the device if not observed according to product data sheet.

3-3) Only Skilled personnel shall carry out handling of this instrument based on their training or technical knowledge.

4. Storage, Package & Transport

4-1) Humidity shall be in a way that no condensation happens. If the instrument is transported from a cold into a warm environment, wait for the instrument temperature and the room temperature to equalize.

4-2) Package is specially designed to protect the instrument from shock and possible damage while transportation.

4-3) Before mounting the instrument, check its appearance for obvious damages possibly caused in transportation.

4-4) Avoid exposure to direct sunlight or hot objects, avoid mechanical vibration or shock and maintain storage humidity of 35% to 85% without condensation.

5. Installation

5-1) Make sure the process pressure will not exceed the maximum operating pressure. Mounting is only permitted in the depressurized state.

5-2) Follow the permissible ambient and medium temperature ranges.

5-3) There must be standard sealing faces; cleaned and undamaged. There should be sufficient space for a safe electrical installation.

5-4) Only use the spanner flats on the instrument connection for installing the instrument and do not grab the case for tightening.

6. Switch Point Setting

You should arrange a test assembly for precise setting of the switchpoint. It can be arranged using a pressure comparator and an InstruMate digital pressure gauge model 3203.

6-1) Connect the pressure switch and the digital pressure gauge to the pressure comparator. You can visualize the switching point using an equivalent circuit like a light bulb.

6-2) Drive slowly towards the required switch point pressure with the pressure generation and pressure reference.

- If the instrument switches before the required switch point is reached, the adjustment screw must be corrected to the right (+).
- If the instrument switches after the required switch point is reached, the adjustment screw must be corrected to the left (-).

After each correction, release the pressure and repeat this

procedure until the switch point is set correctly.

6-3) Release the pressure slowly and check the reset point.

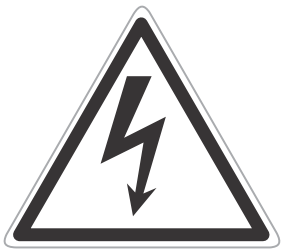
- If the pressure value of the reset point is too high, the adjustment screw for the switch differential must be corrected to the left (+).
- If the pressure value of the reset point is too low, the adjustment screw for the switch differential must be corrected to the right (-).

6-4) After correcting the switch differential, the switch point must be re-checked. Repeat (6-2).

6-5) with attention to instrument accuracy class, if the switch point and the reset point coincide with the required pressure values, the switch point setting is complete.

It is suggested to check the switch point setting every 18 months.

7. Electrical Mounting



DANGER!
Danger to life caused by electric current. This instrument must only be installed by skilled personnel.

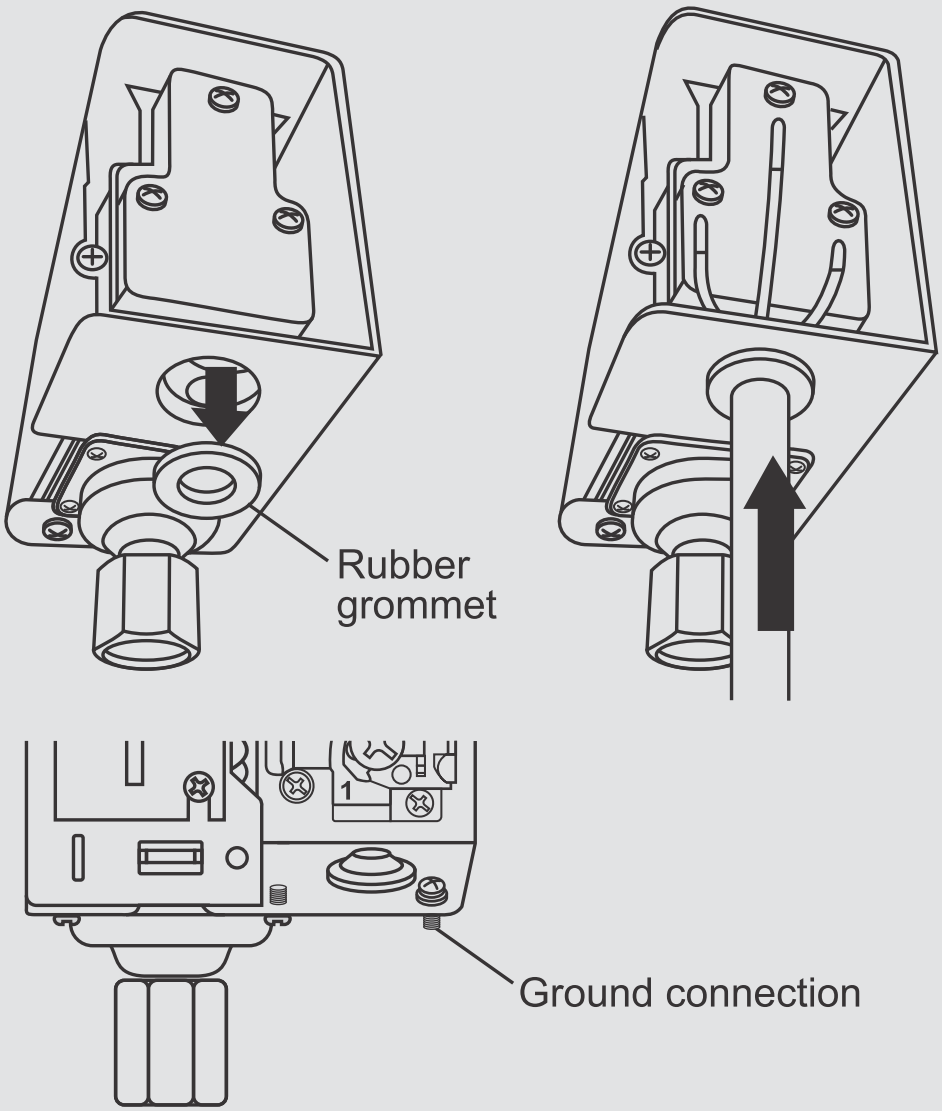
7-1) Switch off the load circuit before starting work.

7-2) Choose standard cables. We recommend a 4 wire cable.

7-3) Clamping the cable:

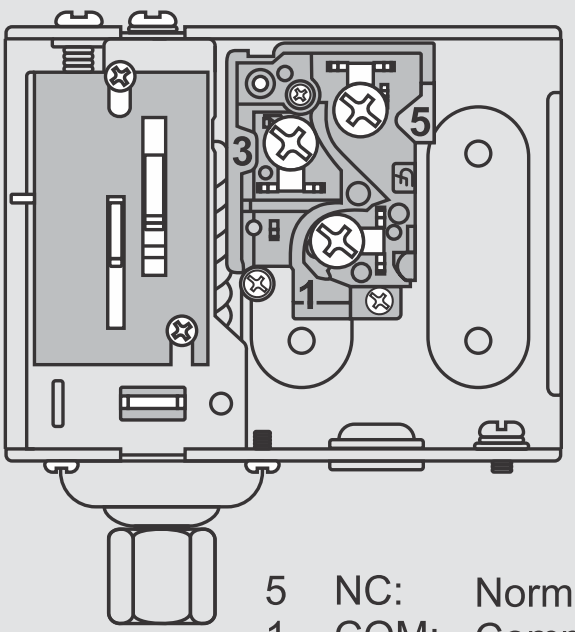
7-3-1) Remove the rubber grommet and match it to the cable diameter.

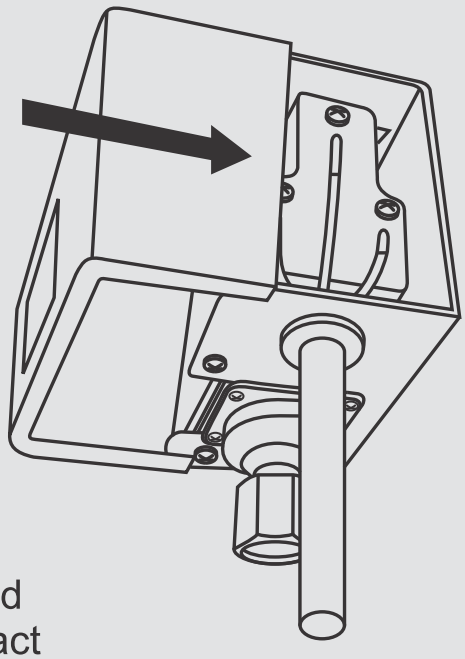
7-3-2) Insert the rubber grommet and route the cable as shown.



7-3-3) Carry out the terminal assignment according to the switching function max. tightening torque: 2 Nm (18 lbf in).

7-3-4) Close the plastic cover and fix again with screw.





5	NC:	Normally Closed
1	COM:	Common Contact
3	NO:	Normally Open
⏚	GND:	Ground connection

8. Faults

DANGER!
If faults cannot be eliminated by means of the listed measures, the instrument must be taken out of operation immediately.

A list of common faults and their reasons:

Faults	Causes	Measures
Contact is not switching in accordance with the specification at the set switch point / reset point	Electrical connection is interrupted.	Carry out a continuity test on the electrical connection lines.
	Wiring error, e.g. short circuit	Check the pin assignment and correct it if necessary
	Electrical load unsuitable for the switch contact model.	Maintain the permissible electrical loads for the switch contact model.
	Switch differential greater than the switch point.	Carry out switch point setting with matching test assembly, see chapter 6.
	Vibrations	Decouple the instrument mechanically.
Short circuit	Moisture in the instrument	Only use in ambient conditions for which the ingress protection is suitable.
Contact chatter (repeated, short-duration opening and closing).	Vibrations	Decouple the instrument mechanically.

Faults	Causes	Measures
Switching status remains unchanged despite reaching the switch point / reset point.	Error with switch point setting.	Carry out switch point setting with matching test assembly, see chapter 6.
	Contacts defective (e.g.fused contact zone).	Replace the instrument. Before recommissioning the new instrument, provide a protective circuit for the contact
	Pressure port blocked	Replace the instrument.
	Leakage	Carry out a leak test. Seal the process connection or replace the instrument.

9. Maintenance & Cleaning

InstruMate pressure switches are maintenance free. They are built economically to save industry costs so they are not for repair.

Only the surface of the pressure switch can be cleaned using a moist towel. The pressure switch must be dismounted from process and electric connections before cleaning.

10. Uninstallation & Disposal

System must be depressurized and Load circuit must be switched off before dismounting. If used on hot media, let the instrument cool down sufficiently before dismounting it.

You should follow your country regulations in case of disposal of the instrument.

11. Specifications

Default Specification:

Ambient Temperature: -40…+65 °C
Media Temperature Inside the Pressure Switch: -25…+65 °C
Rated Impulse Voltage: 4kV
Short Circuit Protection Fuse: 16A
Insulation: 400V
Connection: Free cutting steel, Nickel plated

Reference Conditions:

Relative Humidity per BS 6134: < 50 % r. h. at 40 °C [104 °F]
< 90 % r. h. at 20 °C [68 °F]
Non-Repeatability of the Switch Point: ≤ 2 % of span

Pressure Ranges:

Setting Range (bar)	Adjustable differential (bar)	Permissible switch point on rising pressure (bar)
-0.2 … 7.5	0.7 … 4	0.5 … 7.5
1 … 10	0.7 … 4	1.7 … 10
2 … 14	1 … 4	3 … 14
5 … 32	2 … 6	7 … 32
0 … -1	0.2 … 0.5	-0.2 ... -1

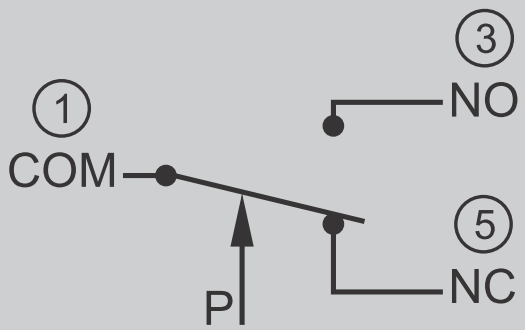
* Above pressure ranges are dual scale in bar and psi.

Electrical Rating:

Rated Voltage	125 V AC	250 V AC	24 V DC
Non-inductive current	20A	10A	10A
Inductive full load	15A	8A	8A
Inductive Instrument Current	72A	72A	64A

Switch Contact:

SPDT[1] (change over)



5 NC: Normally Closed
1 COM: Common Contact
3 NO: Normally Open

P: Pressure

1. Single pole double throw

Available Connections:

Thread Type & Size	Code
G ¼ female	F4
G ¼ B	G4
¼ flare	U4

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