

Installation & Maintenance Instructions

ASCO TRIPOINT SWITCH UNITS
LIMITED ADJUSTABLE DEADBAND SWITCH UNITS

PG—SERIES

OPEN—FRAME TYPE, GENERAL PURPOSE OR EXPLOSIONPROOF SWITCH ENCLOSURE

Form No. P7089R1

DESCRIPTION

The PG—Series Limited Adjustable Deadband Switch Units are used with transducer units to make Tripoint Pressure Switches or Temperature Switches. These switch units are made of aluminum alloy and designed for rugged use. The switch units may be provided as open—frame type construction or with a general purpose or watertight enclosure. All wiring terminals, adjustments, and visual scales are accessible from the front of the switch.

The switch may be supplied as a complete unit, with the switch assembly unit and transducer unit completely assembled. The components may be separate units to be assembled upon installation. The switch has an adjustable set point (set point increasing) and an adjustable deadband which controls (within limits) the reset point (set point decreasing). The switch unit can be mated with a wide selection of pressure or temperature transducers to cover a broad range of pressures, fluids, or temperatures. The switch will control electrical circuits in response to changes in pressure or temperature signals.

IMPORTANT: These instructions cover the installation and use of this switch on pressure and temperature transducers. Select the paragraphs that apply to your particular installation and application. The word *signal* is used in place of pressure, or temperature changes.

INSTALLATION

Check the nameplate for the correct catalog number, pressure range, temperature range, media, and proof pressure or rated overrange temperature. Never apply incompatible fluids or exceed the pressure or temperature rating of the switch. Installation and inspection to be performed by qualified personnel.

Nameplates are located on switch (or switch cover) and on the bottom of the transducer. Check to be sure the third digit in each number is the same. If not, the unit should not be used (Refer to Figure 6).

IMPORTANT: All internal adjustments have been made at the factory. Any adjustment, alteration or repair to the internal parts of the switch other than stated herein voids all warranties. Signal setting adjustments required are made by an adjusting nut on top of the switch (for set point) and a front knob adjustment (for deadband).

Temperature Limitations

Switch ambient temperature limits are -4°F (-20°C) to 122°F (50°C). To determine fluid temperature limitations, see Form No. P7090 for pressure transducer catalog numbers and construction materials, then refer to chart below.

TRANSDUCER CONSTRUCTION MATERIALS	RATINGS FLUID TEMPERATURE
Buna N or Neoprene	-4°F (-20°C) to 180°F (82°C)
VITON*	-4°F (-20°C) to 250°F (121°C)
316 Stainless Steel	-50°F (-45°C) to 300°F (149°C)
All Nylon	Maximum 180°F (82°C)
All Nylon For Water Service	Maximum 130°F (55°C)

For steam service, the fluid temperature with a pigtail (siphon tube or condensate loop) installed directly into the transducer will be below 180°F (82°C).

Assembly Of Switch And Transducer Units (Refer to Figure 6)

IMPORTANT: The switch unit and transducer unit may be purchased as a complete assembly or as separate units. If separate units are purchased, refer to Form No. P7090 for a complete listing of switch unit and transducer unit combinations. Form No. P7090 is provided to ensure that the proper switch unit is assembled to the proper transducer unit.

Pay careful attention to exploded view provided in Figure 6 for assembly of switch unit and transducer unit. Proceed in the following manner:

CAUTION: The third digit in the catalog number on both the switch unit and the transducer unit must be identical. If not, do not assemble to each other. If the same, proceed.

1. Remove bolts (4) from base of switch unit. On general purpose or watertight constructions, remove switch cover.
2. Remove instruction label and pressure or temperature switch range scale from the transducer unit.
3. Place transducer unit on base of switch unit and assemble. Start bolts (4) approximately two turns by hand to avoid the possibility of cross threading. After initial engagement, torque bolts (4) in a crisscross manner to 80 ± 10 in—lbs [$9,0 \pm 1,1$ Nm].
4. Remove backing paper from range scale and install on the front of the switch body over the opening for the adjusting indicator point.

Positioning

Switch may be mounted in any position.

Mounting

Refer to Figures 1, 2, and 3 for mounting.

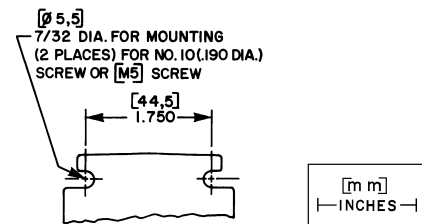


Figure 1. Open—Frame Mounting

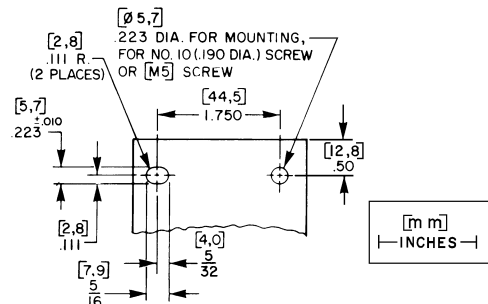


Figure 2. General Purpose Enclosure

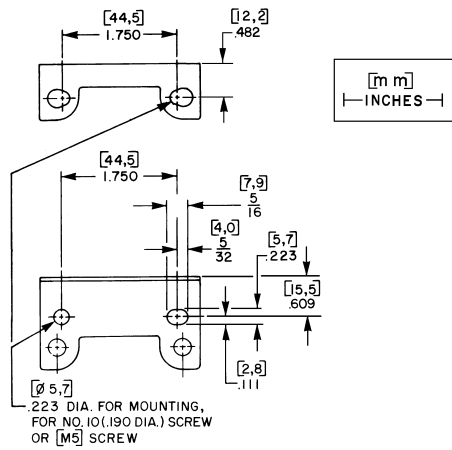


Figure 3. Optional Mounting Bracket

Piping/Tubing (Pressure Transducer)

Adequate support of piping and proper mounting of switch should be made to avoid excessive shock or vibration. To minimize the effect of vibration on a switch, mount perpendicular to vibration. Connect piping or tubing to switch at base of transducer. It is recommended that flexible tubing be used whenever possible. Apply pipe compound sparingly to male pipe threads only. If applied to female threads, the compound may enter the transducer and cause operational difficulty. Avoid pipe strain on switch by properly supporting and aligning piping. When tightening pipe, do not use switch as a lever. Use wrenching flats provided at base of transducer for tightening. Locate wrenches on transducer body or piping as close as possible to connection point.

IMPORTANT: For steam service, install a condensate loop (pigtail or steam syphon tube) directly into the pressure transducer.

CAUTION: To avoid damage to the transducer body, DO NOT OVERTIGHTEN PIPE CONNECTIONS. If TEFLON* tape, paste or similar lubricant is used, use extra care due to reduced friction.

IMPORTANT: To eliminate the effect of undesirable pressure fluctuations in the system, install a surge suppressor.

Wiring

Wiring must comply with local codes and the National Electrical Code. Use No 14 AWG cooper wire rated for 60°C minimum. The switch housing has a wire clamp and ground in screw. Switch is marked *NO* for Normally Open, *NC* for Normally Closed, and *C* for Common. The general purpose switch enclosure is provided with a 7/8" diameter hole to accommodate 1/2" electrical hub or connector. The watertight switch enclosure has a 1/2" conduit hub. It is recommended that a flexible conduit connection be used. If rigid conduit is used, do not use it as a means of supporting (mounting).

IMPORTANT: Electrical load must be within range stated on nameplate. Failure to stay within the electrical range of the switch rating may result in damage to or premature failure of the electrical switch.

CAUTION: Do not exert excessive screwdriver force on snap switch when making terminal connections. When connections are made, be sure there is no stress on the wire leads. Either condition may cause malfunction of switch.

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ELECTRICAL RATINGS		
Switch Unit	Ratings for Limit Controls and Pressure Operated Switches	Ratings for Industrial Controls and Temperature Indicating and Regulating Equipment
Standard Switch Rating	5 Amps Res., 125 VAC 5 Amps Res., 250 VAC 1/8 HP 125 VAC 1/4 HP 250 VAC	15 Amps Res., 125 VAC 10 Amps Res., 250 VAC 1/8 HP 125 VAC 1/4 HP 250 VAC

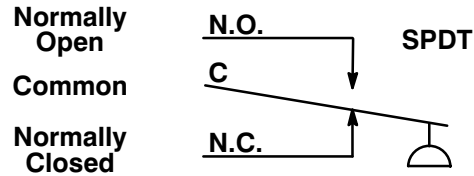


Figure 4. Schematic

INSTALLATION OF TEMPERATURE TRANSDUCERS

Direct Probe

The direct probe (local) temperature transducer is provided with 1/2" NPT connection. When installing, do not use switch unit as a lever for tightening. Use wrenching flats provided at base of transducer for tightening.

Capillary and Bulb

The capillary and bulb (remote) temperature transducers are provided with a length of capillary and a 3/8" diameter sensing bulb.

CAUTION: Do not bend capillary at sharp angles. For proper operation, be sure sensing bulb is completely immersed in fluid and not in contact with heating element or anything that would directly affect the temperature of the fluid being sensed.

Thermal Well (Optional Feature)

A thermal well may be used for capillary and bulb (remote) or direct probe (local) temperature transducers. The thermal well affords protection for the sensing bulb and allows removal of the sensing bulb while maintaining a pressure tight vessel. When installing sensing bulb in thermal well, be sure that it is fully inserted. Where a thermal well already exists, jam nuts may be obtained to adapt the capillary and bulb to the existing thermal well. The existing thermal well must be for a 3/8" diameter sensing bulb.

Union Connector (Optional Feature)

A union connector will allow direct mounting of the sensing bulb in the fluid being controlled. Install union into piping connection before tightening union onto bulb. For maximum performance, the bulb should be inserted in the union connection so that the end of the sensing bulb is even with the end of the union connector nut. Do not apply excessive torque when tightening union connector nut.

Adjustment (Signal Setting) of Limited Adjustable Deadband Switch

When facing switch with the switch in the upright position, the adjusting nut on the top adjusts the signal setting (set point increasing). The knob in the front center of the switch adjusts the deadband (set point decreasing) refer to Figure 6. To make adjustments, a 1/4" wrench or screwdriver is required. A pressure or temperature gage (within suitable range) is also required.

If electrical connection (to line of final application) of the switch is not desirable, a battery-powered test lamp or ohmmeter may be used. Pressure or temperature range scales may be used for initial signal settings. These will be accurate within 5%. Adjust switch until indicator is in the middle of the solid red line below the desired range. For exact signal settings, proceed as follows:

Adjustment (Signal Setting) of Normally Closed or Normally Open Limited Adjustable Deadband Switch

(Refer to Figure 5)

1. If the limited adjustable deadbands switch is in the line of final application when adjustment (signal setting) is made, be sure switch can be test operated without affecting other equipment.
2. On general purpose and raintight constructions, remove switch cover.
3. Turn adjusting nut at top of switch clockwise until setting indicator is fully up. Turn deadband adjusting knob on front of switch clockwise as far as possible.

CAUTION: Adjusting nut and knob will turn easily until they hit a stop. Do not over torque. Over torquing may cause damage.

4. Follow the steps in the chart below to make signal settings.

Adjustment Procedures	NORMALLY CLOSED		NORMALLY OPEN	
	Switch Terminal	Test Lamp On-Off	Switch Terminal	Test Lamp On-Off
1. Starting with zero signal, connect test lamp to common.	NC	On (Closed Circuit)	NO	Off (Open Circuit)
2. Apply desired actuation signal. Then back off (counterclockwise) top adjusting nut until switch actuates (set point increasing).	NC	Off (Open Circuit)	NO	On (Closed Circuit)
3. Lower signal to desired reactivation signal. Then turn dead band adjusting knob counterclockwise until switch reactivates (set point decreasing).	NC	On (Closed Circuit)	NO	Off (Open Circuit)

5. Cycle between two desired signals and make minor adjustments to adjusting nut and knob as required to achieve exact set points.
6. After settings have been made, make permanent electrical connections.

Testing of Installation

If the adjustment of the switch has been made outside of the line of final application, the switch should be retested when installed in the line of final application. Follow adjustment instructions. Be sure switch can be test operated without affecting other equipment.

MAINTENANCE

⚠ WARNING: To prevent the possibility of personal injury or property damage, turn off electrical power and depressurize switch unit before inspection or removal.

IMPORTANT: Switch is not field repairable. The switch must be returned to the factory (Automatic Switch Company, Florham Park, New Jersey) or serviced only by an authorized factory representative. Address all service inquiries to Automatic Switch Company, 50-60 Hanover Road, Florham Park, New Jersey 07932, Valve

Service Department. The only adjustments which may be performed on the switch are the adjustment of the set point and deadband and replacement of the transducer unit. Replacement of transducer should be done only if external leakage is evident.

Preventive Maintenance

- While in service, operate the switch (cycle between desired signals) at least once a month to insure proper operation. If necessary, electrical wiring and pipe connection should be made so that switch can be test operated without affecting other equipment.
- Periodic inspection of the switch, external surfaces only, should be carried out. Switch should be kept clean and free from paint, foreign matter, corrosion, icing, and freezing conditions.
- Keep the medium entering the transducer as free as possible from dirt and foreign material.

Causes of Improper Operation

Switch will not actuate or actuates and reactivates undesirable.

- **Incorrect Electrical Connection:** Check leads to switch. Be sure they are properly connected. Switch is marked *NO* for Normally Open, *NC* for Normally Closed and *C* for Common.
- **Faulty Control Circuit:** Check electrical power supply to switch. Check for loose or blown fuses, open-circuited or grounded wires, loose connections at terminal block or switch. See nameplate for electrical rating and range.
- **Incorrect Adjustment:** Check adjustment of set point and deadband for proper setting. Refer to adjustment instructions.
- **External Leakage:** Check to see that bolts (4) holding transducer to pressure switch are properly torqued to 80 ± 10 in-lbs [$9,0 \pm 1,1$ Nm]. If bolts are tight and leakage is still evident, replace transducer. Refer to paragraph on *Assembly of Switch Unit and Transducer Unit*.
- **Excessive Vibration or Surges Causing Switch to Actuate and Reactuate:** Check for fluctuations in system and install pressure surge suppressor. Check switch mounting and be sure there is no excessive vibration.
- **Incorrect Pressure:** Check pressure in system with suitable pressure gage. Pressure must be within range specified on nameplate.
- **Incorrect Temperature:** Check temperature in system with suitable thermometer. Temperature must be within range specified on nameplate. Check location of capillary and bulb for incorrect mounting. Refer to paragraphs on *Installation of Temperature Transducers*.

If the operation of the switch cannot be corrected by the above means, the entire switch unit should be replaced or an authorized factory representative consulted.

FOR SERVICE, REPLACEMENT, OR NEW TRANSDUCER

Consult Factory, or Authorized Factory Representative or Distributors

ORDERING INFORMATION

For Limited Adjustable Deadband Switch or New Transducer When Ordering, Specify Catalog Numbers, Fluid, Pressure Range, Temperature Range, Serial Numbers, and Proof Pressure or Rated Overrange Temperature.

NAMEPLATES ARE LOCATED ON SWITCH COVER AND BOTTOM OF TRANSDUCER.

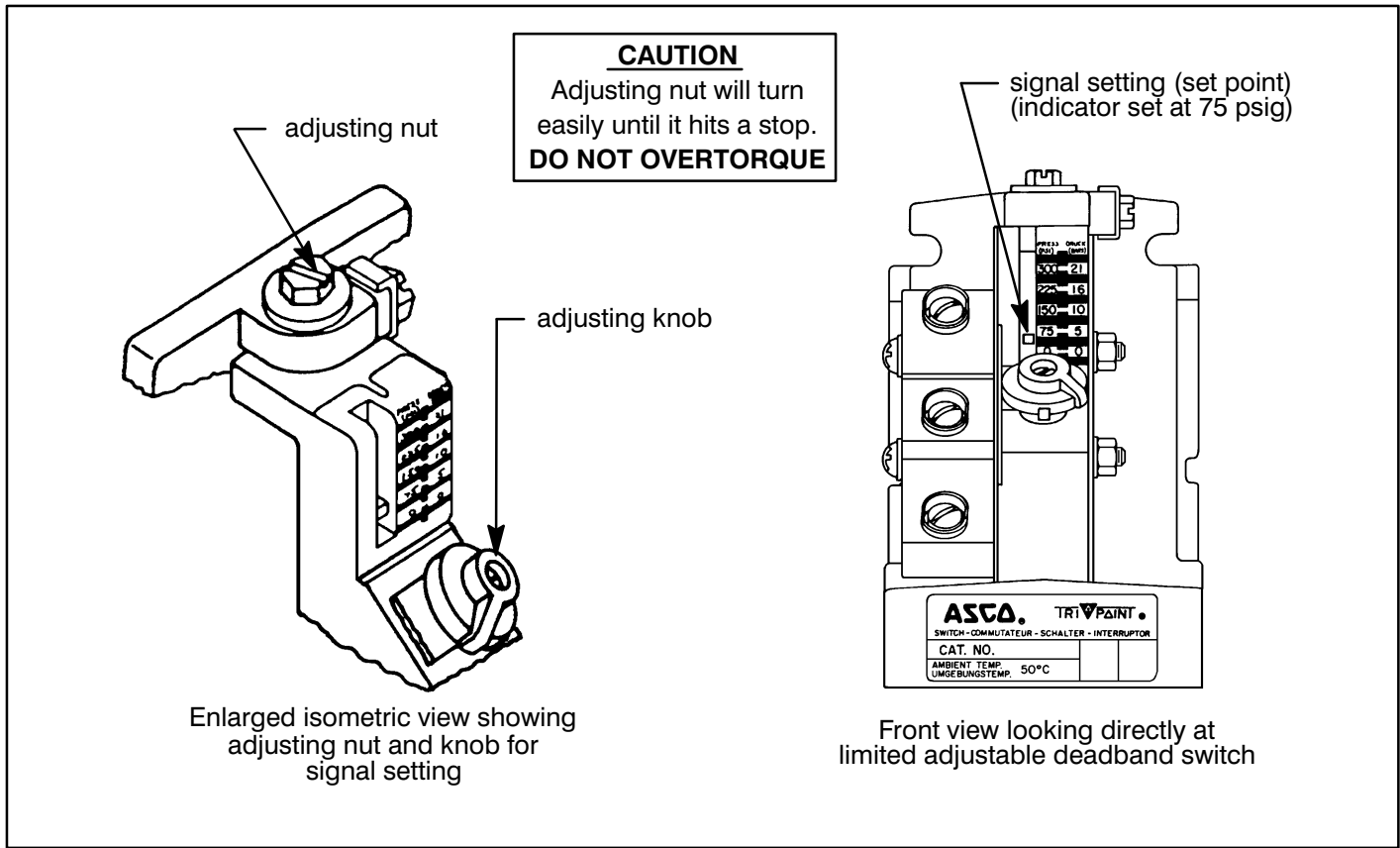


Figure 5. Adjustment (Signal Setting) of Limited Adjustable Deadband Switch.

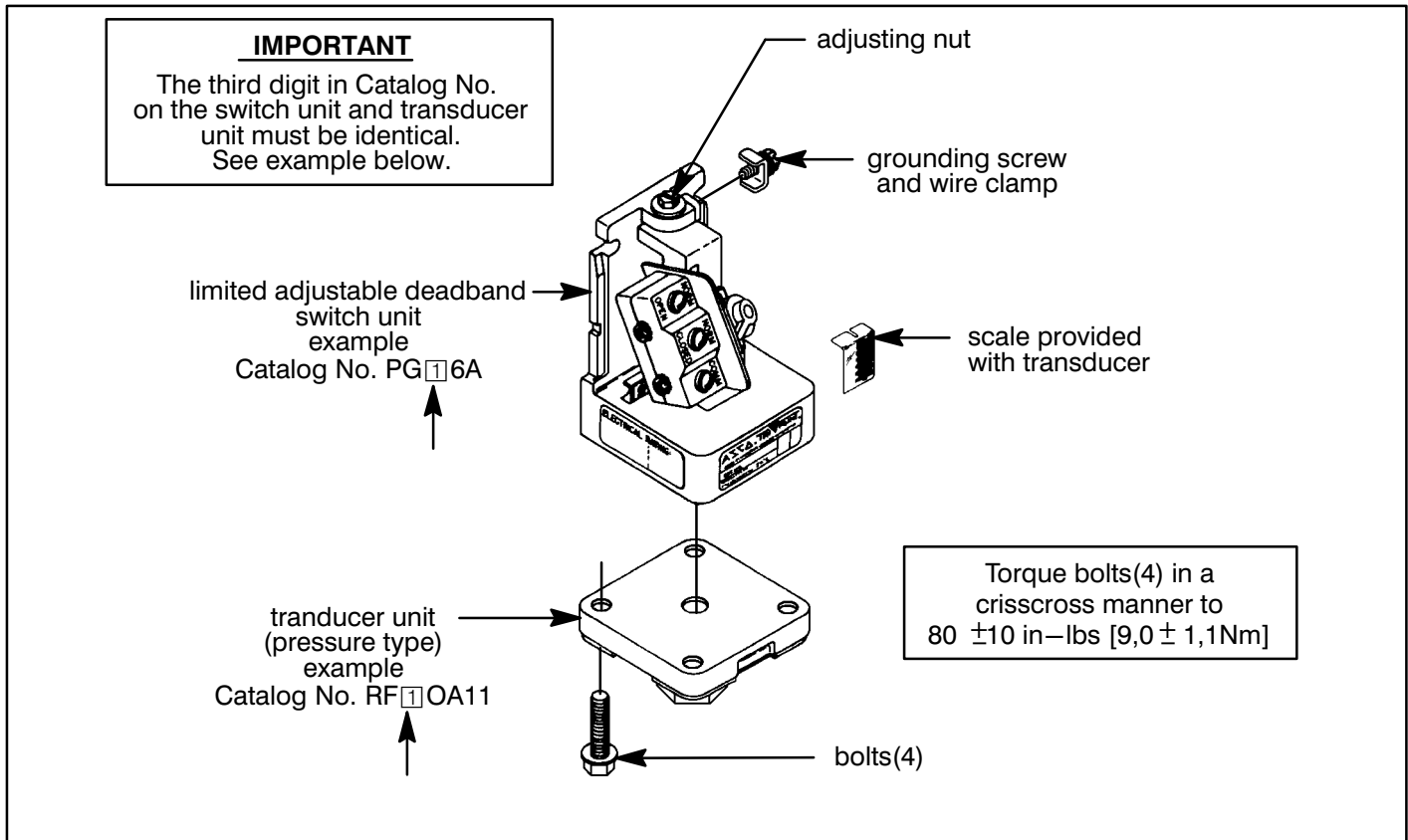


Figure 6. Open-Frame Switch Unit and Transducer Unit to be assembled.