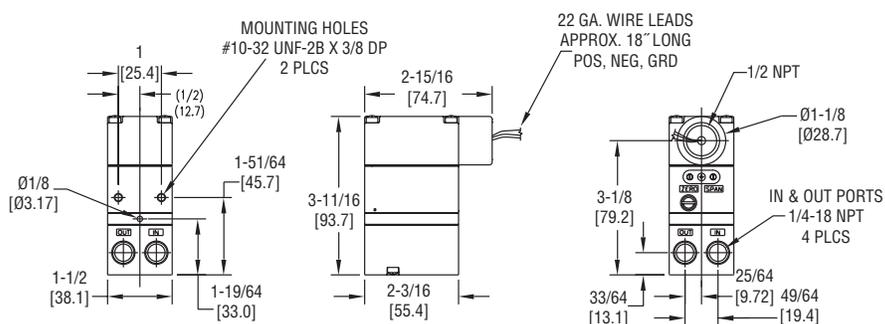




Series 2800 Current to Pressure Transducer

Specifications - Installation and Operating Instructions



The Series 2800 Current to Pressure Transducer converts a current input to a linearly proportional pneumatic output pressure. This unit utilizes a closed loop pressure feedback system that closely controls output and compensates for vibration, mounting angle, temperature, and supply pressure variations. These characteristics make this unit ideal for field mounting on a valve. The control mechanism is a piezoceramic actuator encapsulated in a protective skin, which provides a constant defense against humidity and contaminants. These features make this unit ideal for use in demanding applications. The 2800 also comes in a NEMA 4X enclosure and is field reversible. It is FM and CSA approved intrinsically safe, as well. For ease of installation, this model has input and output ports on both the front and back and can be easily panel mounted.

Model	Input	Output
2813-WP	4-20 mA	3-15 psig (0.2-1.0 bar)
2816-WP	4-20 mA	6-30 psig (0.4-2.1 bar)

SPECIFICATIONS

Service: Oil free, clean dry air filtered to 40 microns.

Input Signal: 4-20 mA.

Air Supply: Minimum: 5 psig (0.3 bar) above maximum output; Maximum: 100 psig (6.9 bar).

Output: 3 to 15 psig (0.2 to 1.0 bar), 6 to 30 psig (0.4 to 2.1 bar).

Accuracy: $\pm 0.1\%$ of span.

Hysteresis: $\pm 0.1\%$ of span.

Repeatability: $\pm 0.1\%$ of span.

Deadband: 0.02% of span.

Power Requirement: Loop powered.

Temperature Limits: Operating: -40 to 160°F (-40 to 71°C); Storage: -40 to 200°F (-40 to 93°C).

Pressure Connections: 1/4" female NPT.

Electrical Connection: 1/2" female NPT.

Air Consumption: 0.025 scfm (0.01 l/s) at midrange typical.

Output Capacity: 4.5 scfm (2.1 l/s) at 25 psig (1.7 bar) supply; 12.0 scfm (5.7 l/s) at 100 psig (6.9 bar) supply.

Enclosure: Chromate-treated aluminum with epoxy paint.

Enclosure Rating: NEMA 4X (IP65) and Intrinsically safe.

Weight: 0.8 lb (0.37 kg).

Agency Approvals: CSA, CE, FM.

INSTALLATION

The Series 2800 transducer is a force balance device in which the piezo actuator is positioned in relation to a nozzle as the input signal is varied. The application of an electrical signal causes axial movement of the actuator. The actuator moves toward the nozzle and creates back pressure which acts as a pilot pressure to an integral booster relay.

Mounting

Each Series 2800 comes with a mounting kit which enables, panel or wall mounting of the unit. Optional mounting kits are available for DIN-rail, pipe, or valve mounting. The 2800 may be mounted at any angle.

Panel: With access to rear of panel, attach transducer to panel using two 10-32 screws and the two threaded mounting holes on the back of the unit. With no access to the rear of a panel, attach bracket to transducer using two 10-32 holes on the back of the unit and mount bracket to panel using four 10-32 screws.

Inline: The Series 2800 has been designed to mount inline to a standard valve yoke with the A-180 valve mounting kit.

The A-182 pipe mounting kit includes the bracket, U-bolt, and nuts needed to mount the transducer to a 1-1/2" pipe. Just attach the bracket to the transducer using the two 10-32 holes on the back of the unit. Then, place the U-bolt around the pipe and through the bracket. Finally, place the nuts on the U-bolt and tighten.

Pneumatic Connections

Clean all pipe lines to remove dirt and scale before installation. Supply air must be filtered to 40 microns and free of moisture and lubricants.

Two 1/4" NPT ports are provided for supply air connections. Either port may be used. The unused port must be plugged with the pipe plug included with the unit.

Two 1/4" NPT ports are provided for pneumatic output connections. Either port may be used and one may be used for the mounting of an output gage. If no gage is installed, the unused port must be plugged with the pipe plug included with the unit. Avoid getting pipe sealant inside the piping or transducer.

Electrical Connections

Electrical connections are made to the red (+) and black (-) leads. The green lead is furnished for case ground (see figure 1).

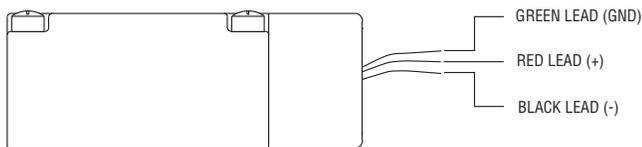


Figure 1
I/P Conduit Connection

WARNING The I/P transducer enclosure contains aluminum and is considered to constitute a potential risk of ignition by impact or friction and must be taken into account during installation.

Factory Mutual Research Corporation (FM) Intrinsically Safe

Ratings: IS / I, II, III / 1 / CDEFG / T4 Ta = 70°C - 431-990-023; Type 4X NI/1/2/ABCD; S/II, III/2/FG/T4 Ta = 70°C; Type 4X. Entity Parameters: Ui (Vmax)=30V, Li (Imax) = 125 mA, Pi = 0.70 W, Ci = 0 µF, Li = 0 mH

Equipment Ratings:

Intrinsically safe for Class I, II, and III, Division 1, Groups C, D, E, F, and G hazardous (classified) locations and intrinsically safe for Class I, Zone 0, Group IIB hazardous (classified) locations and suitable for Class I, II, and III, Division 2, Groups A, B, C, D, F, and G.

CSA Intrinsically Safe Ratings:

Class I, Division 2, Groups A, B, C and D; Class II, Division 2, Groups F, and G; Class III. Rated 7 to 30 VDC, 4 to 20 mA; Temperature Code T4; Maximum Ambient 70°C.

Ex ia IIB (Class I, Zone 0, Group IIB); Temperature Code T4; Intrinsically safe with the following entity Parameters when installed as per drawing 531-990-044; Ui = 30 V, Ii = 125 mA, Pi = 0.70 W, Ci = 0 µF, Li = 0 mH.

OPERATION

Calibration

All units are shipped from the factory calibrated, direct acting. If the user requires a different mode of operation (i.e. reverse acting, split range) it is necessary to reposition internal electrical switches as indicated in the following sections. Though the units are factory calibrated for direct acting it is suggested that the user check the calibration. It is not necessary to remove the cover of the unit for calibration if the direct acting mode is desired.

Direct Acting Calibration

In direct acting operation the unit is calibrated so that minimum input signal corresponds to minimum output pressure and increasing input signal results in increasing output pressure. Apply the minimum input signal of the range being used (e.g. 4mA) (see figure 2). Observe the output pressure. If necessary, adjust the zero screw until reaching minimum output pressure setting. Turn zero screw clockwise to decrease and counter-clockwise to increase.

Apply the maximum input signal of the range being used (e.g. 20 mA). Observe the output pressure. If necessary, adjust the span screw until reaching maximum output pressure setting. Turn span screw clockwise to decrease and counter-clockwise to increase. After setting the span it will be necessary to recheck the zero. Repeat steps 1-4 until both end points are at required values.

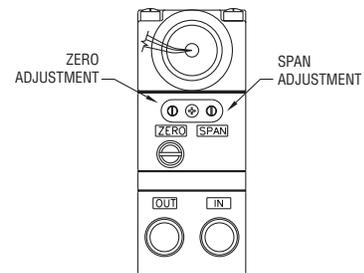


Figure 2
Zero Adjustment and Span Adjustment

Signal	Switch	1	2	3	4	5	6	7	8	9	10	11	12
4-20 mA	ON												
	OFF	■	■	■	■	■	■	■	■	■	■	■	■

Figure 3
Direct Acting - Position of switches for forward acting operation. Standard setting as supplied by factory.

Reverse Acting Calibration

When calibrated to operate in the reverse acting mode the minimum input signal produces the maximum output pressure and increasing the input signal results in decreasing the output pressure. Setting the unit to operate in the reverse acting mode is accomplished by positioning internal electrical switches.

Disconnect input signal and supply pressure. Take off the top cover by removing the four screws.

CAUTION Do not reverse the input leads. Avoid touching circuit board. Shorting possible.

Position switches as illustrated in figure 4. Replace cover. Set the input signal to the minimum value being used. Turn the zero screw to set the maximum output pressure. Set the span by applying the maximum input signal. Turn the span screw to set the minimum output pressure. It may be necessary to repeat steps above until both end points are at desired values.

Switch	3	4	5	6	7	10
ON		■		■		■
OFF	■		■		■	

Figure 4

Position of Switches for Reverse Acting Operation

Note: Switches not shown match Direct Acting Setting (see Figure 3)

Split Range

When calibrated to operate in the split range mode, a full input signal (i.e. 4-20 mA) will operate the unit at one half the normal output span (i.e. 3-9 psig, 9-15 psig). Setting the unit to operate in the split range mode is accomplished by positioning internal electrical switches. Disconnect input signal and supply pressure. Take off the top cover of the unit by removing the four screws.

CAUTION Avoid touching circuit board. Shorting possible.

Position switches as illustrated in figure 5. Replace cover. After setting switches, refer to the appropriate calibration procedure (Direct Acting or Reverse Acting) to get to desired output range (i.e. 3-9 psig, 9-15 psig).

Signal	Switch	1	2
4-20 mA	ON	■	■
	OFF		

Figure 5

Position of Switches for Split Range Operation

Note: Switches not shown match Direct Acting Settings (see Figure 3)

MAINTENANCE

NOTICE

Under normal circumstances, no maintenance should be required.

Cleaning

If clean, dry air is not used the orifice can become blocked. To clean, first turn off supply air, then remove the screw located under the zero adjustment. Unplug the orifice by using a wire that has a smaller diameter than 0.012" (0.30mm). Use compressed air to blow out any loose particles inside the orifice screw assembly.

Precautions

The bonnet should be removed only if a different operation mode is desired which requires a change in circuit board switch settings. In this case, precautions are necessary.

Never handle circuit board unless properly grounded to prevent ESD (Electro-static Discharge).

If ESD grounding equipment is not available, hold the 2800 by its castings and adjust switches using a non-conductive device such as a pencil or a small rubber handled screwdriver.

Never remove circuit board for any reason. This will shift other components and possibly damage the pressure sensor, both cases resulting in malfunction.

Use caution when replacing bonnet. If any resistance is felt, remove bonnet and determine the interference. Typically it will be the strain relief grommet on the wires. The grommet should be oriented so it sits beside the switches.

Clean and dry air should be used with the 2800. Foreign matter in the supply line can clog the orifice openings. (.013" for a 3-15 psig unit, smaller for higher range unit.) Foreign matter can also collect on the actuator causing erratic operation. Moisture in the supply line can damage circuit board components.

The electrical specifications as outlined in these instructions must be complied to. If more than one 2800 unit is driven by the same PLC, there must be a minimum of 9.5 VDC available to each unit.

If difficulty is experienced during calibration or if turning the zero or span screw has no effect on the unit, a resetting technique can be taken. Turn both the zero and span screw a minimum of 30 revolutions in one direction. Then turn both screws exactly 15 revolutions in the opposite direction. This procedure will put the potentiometers at their midpoint of effective adjustability. Next, calibrate to desired settings starting with the zero screw.

Reverse Acting Mode: For reverse acting units, the zero adjustment refers to the minimum electrical signal and maximum output pressure. The span refers to the maximum signal and the minimum output pressure. For calibration in reverse mode the resetting technique can be taken if necessary and calibration should always begin with the zero screw.

TROUBLESHOOTING

Problem	Check
Sluggish performance or reduced range	Blocked orifice Supply pressure
Leakage	Connections
Low or improper span	Supply pressure connections
Erratic Operation	Moisture in air supply Loose wires or connections

NOTICE

If problems are not solved by troubleshooting procedures, contact an applications engineer for further assistance.

WARNING

Failure Modes: This device must not be used for protecting final control elements connected to the output port from the effect of pressure present at the supply port. If devices connected to the output port have a pressure rating less than the pressure present at the supply port, then pressure relieving or pressure limiting devices must be employed to protect the devices from over pressurization, possibly causing physical damage, personal injury and/or property damage.

The Series 2800 Current to Pressure Transducers are not field repairable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.