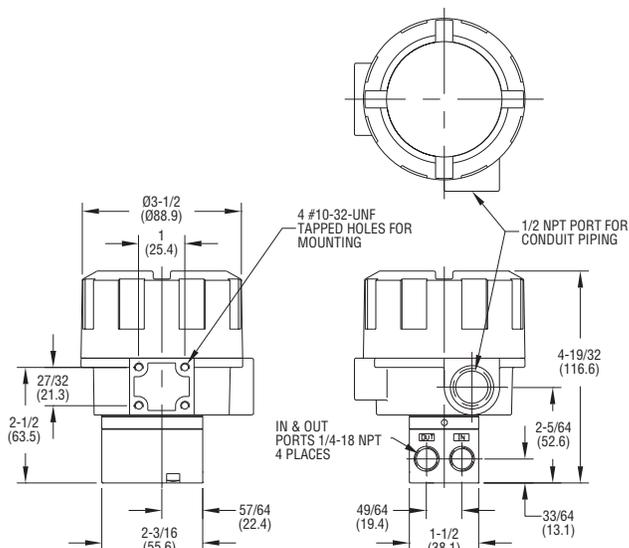




Series 2900 Current to Pressure Transducer

Specifications - Installation and Operating Instructions



The Series 2900 Current to Pressure Transducer delivers reliable high performance for the toughest applications in the most hazardous environments. Its NEMA 4X housing is designed and FM and CSA approved for both intrinsically safe and explosion-proof operation. This unit has advanced circuitry which includes electronic feedback control for superior vibration protection and highly accurate output. The Series 2900 is not position sensitive and the easily accessible zero and span adjustments make field calibration quick and easy. For ease of installation, this model has input and output ports on both the front and back. It is also not vibration sensitive, which makes the Series 2900 ideal for field mounting on a valve. These features coupled with the unit's compact size help make set-up and installation simple.

Model	Input	Output
2913-E	4-20 mA	3-15 psig (0.2-1.0 bar)
2916-E	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: 0.05 scfm (0.02 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: Weatherproof NEMA 4X (IP65), Explosion-proof and intrinsically safe.

Weight: 1.8 lb (0.82 kg).

Agency Approvals: CE, CSA, FM.

INSTALLATION

Requirements

The Series 2900 transducer is suitable for installation in the following locations: Intrinsically safe operation in hazardous locations outdoors (NEMA 4X, CSA.ENC.4 & IP65) and Explosion-proof installation in hazardous locations outdoors (NEMA 4X, CSA.ENC.4 & IP65).

WARNING All wiring must be made to all local and national codes appropriate to the area of installation.

Electrical Input: 4-20 mA DC current source. It is recommended that shielded cable be used and that the shield be grounded to unit and earth ground. See Figure 1 for location of ground screw.

Air Supply: Clean, dry, oil free instrument air filtered to 40 microns.

CAUTION Use caution not to scar threads of fitting during installation as this can void integrity of the seal. Exhaust gas must be vented to a safe area.

Mounting

The Series 2900 has been designed to mount inline, to a standard valve yoke with the A-180 valve mounting kit.

Pneumatic Connections

Clean all pipe lines to remove dirt and scale prior to 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.

Electrical Connections

The Series 2900 is supplied with a 1/2" NPT electrical conduit connection. A two position terminal block that is wire ready is supplied for 22-12 AWG wire. Wire should be stripped approximately 1/4" before insertion. The terminals are labeled "+" and "-" on the terminal board (see Figure 1).

It is recommended that shielded cable be used and that the shield be grounded at the unit (ground screw provided) and to earth ground.

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.

NOTICE Observe polarity. Reverse polarity will not damage the unit, but unit will not operate.

CAUTION Conduit should be connected to prevent condensation from collecting in the unit.

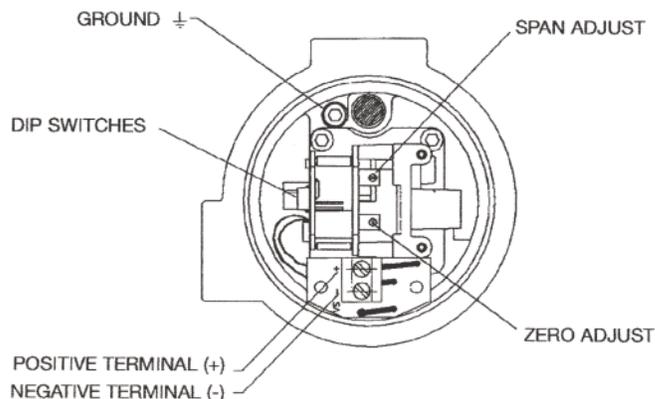


Figure 1
Zero Adjustment and Span Adjustment

Factory Mutual Research (FM) Intrinsically Safe Ratings:

XP/II/1/BCD/T6 Ta = 70°C; DIP/II, III/1/EFG/T6 Ta = 70°C; IS/I, II, III/1/CDEFG/T4 Ta = 70°C - 431-990-025 Entity; I/O/AEx ia IIB T4 Ta = 70°C - 431-990-025 Entity; NI/II/2/ABCD/T4 Ta = 70°C; Type 4X Entity Parameters: U_i (Vmax) = 30 V, I_i (Imax) = 125 mA, P_i = 0.70 W, C_i = 0 mH

Equipment Ratings:

Explosion-proof for Class I Division 1, Groups B, C, and D, T6, Dust Ignitionproof for Class I, Division 1, Groups E, F, and G, T6; Intrinsically safe for Class I, II, and III, Division 1, Groups C, D, E, F, and G, T4 hazardous (classified) locations and intrinsically safe for Class I, Zone 0, Group IIB, T4 hazardous (classified) locations and suitable for Class I, Groups A, B, C, D, T4, and Class II and III, Division 2, Groups F and G, T6 hazardous (classified) locations.

CSA Intrinsically Safe Ratings:

Class I Division 1, Groups B, C, and D; Class I, Division 2, Groups A, B, C and D; Class II, Division 1, Groups E, F, and G; Class II and III, Division 2, Groups F and G. Rated 7 to 30 VDC, 4 to 20 mA; Enclosure Type 4X; Type 4X; Temperature Code T6 (CL I Div 1), T4 (CL I, Div 2), T6 (CL II, III, Div 2); Maximum Ambient 70°C.

Ex ia IIB (Class I, Zone 0, Group IIB)

Temperature Code T4; Maximum Ambient 70°C; Enclosure Type 4X; Intrinsically Safe with the following entity Parameters when installed as per drawing 531-990-0246 U_i = 30 V, I_i = 125 mA, P_i = 0.70 W, C_i = 0 μ F, L_i 0 mH.

NOTICE Cable capacitance and inductance must be considered when connecting to pressure transducer.

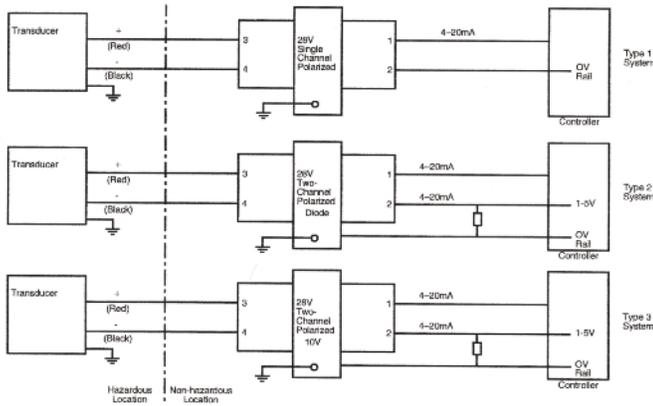


Figure 2
Factory Mutual and Canadian Standards Association I.S.
Installation Drawing

ATEX (KEMA)

Explosion-proof/Intrinsically Safe Pending

EC Declaration of Conformity

RFI/EMI Effect: Less than .5% of span change in output pressure per En 61000-4-3:1998, Amendment 1, Performance Criterion A.

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 dip switches located on the circuit board (see Figure 1) as indicated in Figure 3.

Though the units are factory calibrated for direct acting operation, it is suggested that the user check the calibration to ensure that settings and operation match the application requirements.

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

Figure 3
Direct Acting Switch Settings

NOTICE It is not necessary to remove the plastic 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. 4 mA). 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. After setting the span it will be necessary to recheck the zero. Repeat steps until both end points are at required values.

Reverse Acting Calibration

When calibrating 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 dip switches located on the circuit board (see Figure 1).

WARNING Do not touch any components on circuit board except dip switches. Do not reverse the input leads. Damage may occur. Transducer fails in direct mode regardless of operating mode selected.

- NOTICE**
- Control equipment connected to the Associated Apparatus must not use or generate more than 250 Vrms or VDC.
 - The IS Barriers or Equipment (Associated Apparatus) must be Factory Mutual Research Approved and the configuration of Associated Apparatus may be installed within the Hazardous (Classified) location for which it is approved. The Associated Apparatus and hazardous location loop apparatus manufacturer's control drawings must be followed when installing this equipment. An AEx (ib) Associated Apparatus is suitable only for connection to Class I, Zone 1, Hazardous (Classified) Locations and is not suitable for Class I, Zone 0, or Class I, Division I Hazardous (Classified) Locations.
 - Installation should be in accordance with ANSI/ISA RP12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and Article 500 of the National Electrical Code (ANSI/NFPA 70).
 - All units suitable for Type 4X installations.
 - The Intrinsic Safety Entity concept allows the interconnection of two FM Approved intrinsically safe devices with entity parameters not specifically examined in combination as a system when:

Entity Parameters:	
U_i or $V_{max} > U_o$ or V_{oc} or $V_t > 7.2$ Volts	$U_i (V_{max}) = 30$ V
I_i or $I_{max} > I_o$ or I_{sc} or I_t	$I_i (I_{max}) = 125$ mA
C_a or $C_o > C_i + C_{cable}$	$P_i = 0.70$ watts
L_a or $L_o > L_i + L_{cable}$	$C_i = 0$ uF
$P_i > P_o$	$L_i = mH$
 - No revision to this drawing is permitted without prior Factory Mutual Research Approval.

Hazardous Location Units:
 FM & CSA
 Explosion Proof:
 Class I, Division 1, Groups B, C & D
 Models 2913-E & 2916-E

Dust Ignition Proof:
 Class II & III, Division 1, Groups E, F & G
 Models 2913-E & 2916-E

Intrinsically Safe:
 Class I, II & III, Division 1
 Groups C, D, E, F & G
 Models 2913-E & 2916-E

Suitable For:
 Class I, II & III, Division 2,
 Groups A, B, C, D, F & G
 Models 2913-E & 2916-E

Access circuit board by first removing the die cast cover of the unit. Then remove plastic cover by taking out two screws. Position the dip switches as illustrated in Figure 4. Set the input signal to the minimum value being used. Turn the zero screw to set the maximum output pressure. Turn screw clockwise to decrease and counter-clockwise to increase. Set the span by applying the maximum input signal. Turn the span screw to set the minimum output pressure. Turn screw counter-clockwise to decrease and clockwise to increase. It may be necessary to repeat steps until both end points are at desired values. Replace both covers.

NOTICE Switches not shown match Direct Acting Settings (see Figure 3).

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

Figure 4
Reverse Acting Switch Settings

Split Range Calibration

WARNING Do not touch any components on circuit board except dip switches.

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 dip switches. Access circuit board by first removing the die cast cover of the unit. Then remove plastic cover by taking out two screws. Position switches as illustrated in Figure 5. Replace both covers. After replacing covers, 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).

NOTICE Switches not shown match Direct Acting Settings (see Figure 3).

Switch	1	2
ON	■	■
OFF		

Figure 5
Split Range Switch Settings

TROUBLESHOOTING

Problem	Look For	Solution
Sluggish performance	Blocked orifice No air input	Clean external orifice Check Instrument
Output won't go above 0	Input leads reversed	air supply Reverse input leads
Output stays below 3 psi with increase of input	Bad electrical connection Circuit board failure Insufficient supply pressure	Check input wiring Factory Repair Increase supply
Unit will not go full scale with full-scale input	Leak in connections Circuit board failure	pressure Check connections Factory Repair

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

MAINTENANCE

NOTICE Under normal circumstances, no maintenance should be required.

Failures due to instrument supply air contamination are not covered by warranty. Use of oil and/or water saturated instrument air can cause erratic operation. Poor quality instrument air can result in unit failure. It is recommended that a filter regulator (such as Dwyer Series AFR) be placed upstream of each unit where oil and/or water laden instrument air is suspected. If clean, dry air is not used the orifice can become blocked. To clean, first turn off supply air, then remove the screw located on the side of the unit above the "out" port. Unplug the orifice using a wire that has a smaller diameter than 0.012" (0.30 mm). Replace screw tightly into unit.

WARNING These products are intended for use in industrial compressed-air systems only. Do not use these products where pressures and temperatures can exceed those listed under specifications.

The Series 2900 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.