

Valtek Electro-pneumatic Transducers

GENERAL INFORMATION

The following instructions are designed to assist in installing, operating, calibrating and performing maintenance as required on the Valtek Electro-pneumatic Transducer. Product users and maintenance personnel should thoroughly review this bulletin prior to working on the transducer in conjunction with the Valtek Installation, Operation, Maintenance Instructions for the appropriate control valve and control valve positioner being used.

To avoid possible injury to personnel or damage to valve parts, WARNING and CAUTION notes must be strictly adhered to. Modifying this product, substituting nonfactory parts, or using maintenance procedures other than outlined could drastically affect performance, be hazardous to personnel and equipment, and may void existing warranties.

The Valtek Electro-pneumatic (I/P) Transducer may be mounted directly to the control valve, or mounted remotely from the valve in any position. A two-inch pipe mounting bracket is available from the factory.

The (I/P) transducer is Factory Mutual approved and intrinsically safe for Class I, II, III, Division 1, Groups C, D, E, F and G, when installed with the appropriate energy limiting safety barriers. The unit is also explosion-proof for Class I, Division 1, Groups B, C and D; dust-ignition proof for Class II, Division 1, Groups E, F and G; and suitable for Class III, Division 1, hazardous locations, indoors.

I/P TRANSDUCER OPERATION

The input current flows through a fixed coil where a magnetic force is created. The flux lines of the coil are exposed at a gap, creating a magnetic force proportional to the input current. This force is applied against the force of a small magnet mounted on the end of a balance beam. The magnet is positioned in the electromagnetic field, it interacts with the small magnet on the balance beam, thus repositioning a flapper at the opposite end of balance beam. When energized, this flapper/balance beam is the only moving part in the system.

The flapper is in close proximity to a nozzle. The nozzle is supplied with air through a throttle from the output of a power amplifier that is controlled by the pressure change in front of the nozzle. The air flowing from the nozzle forms a restoring force to the force applied to the magnet. Hence, a linear correspondence of electric input and pneumatic output signal is achieved.

The zero adjustment is made by twisting the tension bad to which the balance beam / flapper is mounted.

Range adjustment is performed at the potentiometer connected with a resistor in parallel to the coil.

INSTALLATION INSTRUCTIONS

The following instructions are designed to assist in the field installation of Electro-pneumatic Transducers.

The I/P transducer may be mounted directly to the control valve with a bracket supplied by the customer, or remotely from the control valve with a two-inch pipe mounting bracket available from the factory.

NOTE: The air supply should conform to ISA standard S7.3 (a dew point at least 18 F below ambient temperature, particle size below 5 microns, oil content not to exceed 1 part per million).

Control Valve Mounting

To mount the transducer directly to the control valve, a bracket must be fabricated by the user.

1. Securely attach the bracket to the control valve in a position that will not interfere with the movements of either the valve stem, the positioner linkage, or accessories.
2. Mount the transducer to the bracket using the two quarter-inch holes that are drilled through the transducer housing. Be certain the 1/8-inch NPT holes are accessible.

Two-inch Pipe Mounting

To mount the transducer remotely from the control valve, use the two-inch pipe mounting kit available from the factory (part number 70691.999).

1. Attach the mounting kit in any position as required by the user to a two-inch pipe.
2. Mount the transducer to the mounting kit. Be certain the 1/8-inch NPT holes are accessible.

Air Connections

1. Screw the pipe or tube fittings into the 1/8-inch NPT holes on either side of the housing.

CAUTION: The supply air pressure must not exceed 20 psi (± 1.5 psi).

2. Be certain there are no air leaks in fittings.

Control Signal (Milliamp) Connections

1. Remove the housing cover.

WARNING: Make sure the area is clear of combustible gasses before removing the cover, unless the unit has been installed with the appropriate intrinsically safe barriers.

2. Attach signal wiring to the transmitter terminal block, using caution to attach the positive and negative wires to the appropriate terminal.

CALIBRATION

When an electro-pneumatic transducer installed in the field requires output signal adjustment, refer to Figure 1 and proceed as follows:

CAUTION: If the valve cannot be stroked without disturbing the process fluid, it may be necessary to bypass or remove the valve from the line before calibrating the transducer.

WARNING: Prior to removing the valve from the

line, depressurize the line to atmospheric pressure. Drain all process fluids and (if caustic of hazardous material are present) decontaminate the valve. Failure to do so can cause serious injury.

Zero and Range Adjustments

1. Remove the housing cover.

WARNING: Make sure area is clear of combustible gases before removing the cover, unless the unit has been installed with the appropriate intrinsically safe barriers.

2. Check zero with an air supply of 20 psi connected and an input signal of 4 mA. Any deviation in the output signal from 3 psi can be corrected with the zero adjustment screw.
3. Increase the input signal to 20 mA. Any deviation in the output from the value of 15 psi can be corrected with the range potentiometer.

REVERSING SIGNAL

If the signal to the I/P transducer must be reversed, consult factory for instructions.

CLEANING FLAPPER AND NOZZLE

If the flapper and nozzle become sticky and need to be cleaned of dirt build-up, refer to Figure 1 and proceed as follows:

1. Remove the housing cover.

WARNING: Make sure area is clear of combustible gases before removing the cover, unless the unit has been installed with the appropriate intrinsically safe barriers.

2. Remove the rectangular cover by loosening center screw.
3. Using a heavy piece of lint-free-paper soaked in denatured alcohol, gently lift the flapper and nozzle. Work paper back and forth until dirt build-up is removed.

CAUTION: Do not lift the flapper more than 1/16-inch or it may be damaged.

4. Replace the rectangular and housing covers.

DISASSEMBLING AND REASSEMBLING BOOSTER SECTION

Disassembling Booster Section

To disassemble the booster section, refer to Figure 2 and proceed as follows:

1. Remove I/P transducer from line.
2. Using a three millimeter hex wrench, remove the two housing bolts (119).
3. Carefully remove the lower three sections of the booster assembly.

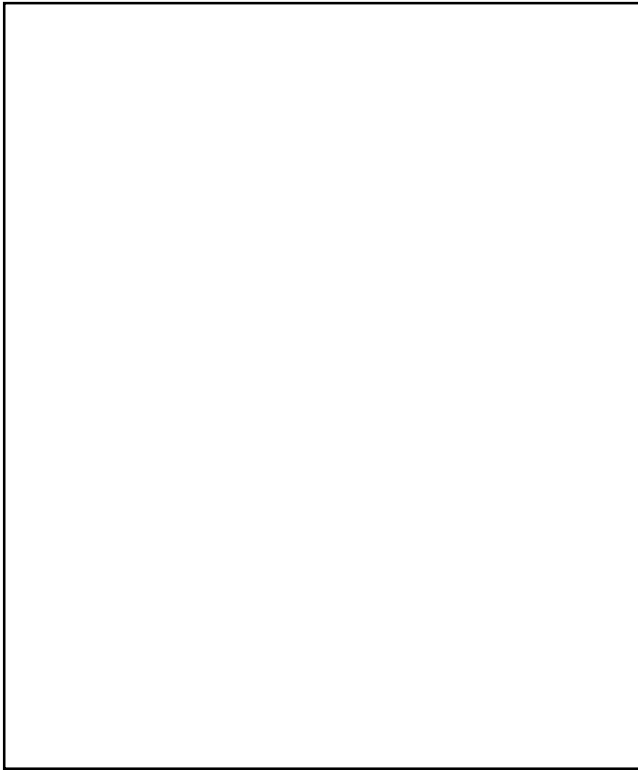


Figure 1: I/P Transducer with Housing and Electronic Module Covers Removed

CAUTION: There are numerous springs and parts under compression within this section. Care must be used not to lose these parts.

At this point, the orifices in the booster section may be cleaned, or a ruptured diaphragm may be replaced.

The orifices may be cleaned by using an air nozzle, or by inserting an instrument (which is less than .009-inch in diameter) into the orifices.

Replace a ruptured diaphragm with the same part. (See Figure 2 for item numbers.)

Reassembling the Booster Section

To reassemble the booster section, refer to Figure 2 and proceed as follows: (Numbers in parenthesis refer to item numbers; see Figure 2.)

1. Invert the I/P transducer so that it rests on the round housing cover.
2. Place the first stage feedback spring (110) in the housing hole.
3. Place the spring button (111) on the first stage feedback spring (110) with the spring guide in the spring.
4. Place the upper diaphragm (112, with three holes) on the spring button (111) with the convolution facing down and with the small hole in the diaphragm over the orifice.

Parts List

101 Cover	115 Vent block
102 Cover O-ring	116 Booster diaphragm
103 Electronic module cover	117 Booster spring
104 Electronic module	118 Connecting block
105 Nozzle O-ring	119 Housing bolt / washer
106 Flame arrestor cover	120 Electronic module cover screw
107 Terminal block	121 Electronic module mounting screw
108 Arrestor O-ring	122 Terminal block mounting screw
109 Transducer base	123 Booster poppet
110 Feedback spring	124 Poppet spring
111 Spring button	125 Poppet retainer
112 Upper diaphragm	126 Ground screw
113 Nozzle block	127 Ground clamp
114 Lower diaphragm	128 Washer

Figure 2: Electro-pneumatic (i/P) Transducer – Exploded View

5. Place the nozzle block (113) on the upper diaphragm (112) with the nozzle down, aligning the hole in the corner with the orifice in the I/P base (109).
6. Place the lower diaphragm (114, with four holes) onto the assembly with the convolution facing up, aligning the four holes appropriately.
7. Place the vent block (115) on the assembly with the vent hole on the side aligned with the NPT opening. Be certain the mounting holes and pneumatic passages are aligned.
8. Place the booster diaphragm and vent assembly (116) on the assembly with the brass vent assembly facing up. Be certain the large holes in the small pneumatic passages are aligned.
9. Place the large booster spring (117) on the diaphragm and over the brass vent assembly.
10. Place the connection block (118) on the assembly with the plugged hole facing opposite the electrical NPT connection.
11. Tighten the entire booster section together with the two housing bolts (119).

Troubleshooting

Failure	Probable Cause	Corrective Action
Operation erratic and inconsistent	<ol style="list-style-type: none"> 1. Loose signal wire connection 2. Dirt build-up on flapper and nozzle 	<ol style="list-style-type: none"> 1. Tighten signal wire connection 2. Remove dirt build-up; see "Cleaning Flapper and Nozzle " section
Won't calibrate to full span with normal air pressure	<ol style="list-style-type: none"> 1. Dirt build-up on nozzle and flapper 2. Air supply pressure too high or low 	<ol style="list-style-type: none"> 1. Remove dirt build-up; see "Cleaning Flapper and Nozzle" section 2. Adjust air supply to 20 psi
Excessive air consumption	<ol style="list-style-type: none"> 1. Ruptured diaphragm 2. Housing bolts loose 	<ol style="list-style-type: none"> 1. Replace diaphragm; see "Disassembling and Reassembling Booster" section 2. Tighten housing bolts
Transducer does not respond to signal	<ol style="list-style-type: none"> 1. Plugged orifices 2. Shorted or open circuit coil 	<ol style="list-style-type: none"> 1. Clean orifices; see Disassembling and Reassembling Booster" section 2. Replace transducer

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications presented in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any of its worldwide operations or offices.

For more information, contact:

For more information about Flowserve, contact www.flowserve.com or call USA 972 443 6500

Regional Headquarters

1350 N. Mt. Springs Prkwy.
Springville, UT 84663
Phone 801 489 8611
Facsimile 801 489 3719

12 Tuas Avenue 20
Republic of Singapore 638824
Phone (65) 862 3332
Facsimile (65) 862 4940

12, av. du Québec, B.P. 645
91965, Courtaboeuf Cedex,
France
Phone (33 1) 60 92 32 51
Facsimile (33 1) 60 92 32 99

Quick Response Centers

5114 Railroad Street
Deer Park, TX 77536 USA
Phone 281 479 9500
Facsimile 281 479 8511

104 Chelsea Parkway
Boothwyn, PA 19061 USA
Phone 610 497 8600
Facsimile 610 497 6680

1300 Parkway View Drive
Pittsburgh, PA 15205 USA
Phone 412 787 8803
Facsimile 412 787 1944



Flowserve and Valtek are registered trademarks of Flowserve Corporation.