Enidine / Conoflow
105 Commerce Way
Westminster, SC 29693
(864) 647-9521
(864) 647-7993 (fax)

Engineered for life

INSTALLATION AND MAINTENANCE MANUAL

GT210, GT410 and GT610 Series Miniature I/P – E/P Transducers

WARNING: These instructions must be read carefully prior to installation and system startup.

PRINCIPLE OF OPERATION

Inputs: 4-20 or 10-50 mA DC
0-5 or 1-9 VDC

Outputs: GT210 = 3-15 PSIG (21-103 kPa)
GT410 = 3-27 PSIG (21-186 kPa)
GT610 = 6-30 PSIG (41-207 kPa)

In the direct acting mode, an increase in the electrical input signal drives the coil out of the magnet, which moves the flexure assembly towards the nozzle in the pilot body. This reduces the flow through the nozzle increasing the back pressure on top of the diaphragm assembly. The increased pressure drives the diaphragm assembly downward, opening the relay valve and increasing the output pressure. The output pressure will continue to increase until it is equal to the nozzle back pressure and the forces on the diaphragm assembly are balanced.

A decrease in the electrical input signal allows the coil to move toward the magnet, which moves the flexure assembly away from the nozzle. This allows the flow to vent through the top of the pilot body. Since the output pressure is greater than the nozzle back pressure, there is a net upward force on the diaphragm assembly which causes it to move upward allowing the relay valve to close.

As the diaphragm assembly moves upward, it lifts off the top of the relay valve.

WARNING

Conoflow's products are designed and manufactured using materials and workmanship required to meet applicable standards. The use of these products should be confined to services specified and/or recommended in the Conoflow catalogs, instructions, or by Conoflow application engineers.

To avoid personal injury or equipment damage resulting from misuse or misapplication of a product, it is necessary to select the proper materials of construction and pressure-temperature ratings which are consistent with performance requirements.

This movement, in turn, opens the relief port and permits outlet pressure to vent from the exhaust ports in the diaphragm spacer. The excess output pressure is vented to atmosphere through the exhaust ports until equilibrium is established.

In the reverse acting mode, an increase in the input signal permits the coil to move toward the magnet instead of being driven away from it since the direction of the current through the coil is reversed. An increasing signal causes a proportionally decreasing output.

SPECIFICATIONS

- Supply Pressure Effect: 0.08 PSIG decrease for every 10 PSIG increase in supply pressure
- Position Effect:
  - 3 PSIG Output
    - Output decreases by 0.65 PSIG at 45° tilt.
    - Output decreases by 2.03 PSIG at 90° tilt.
  - 15 PSIG Output
    - Output decreases by 0.78 PSIG at 45° tilt.
    - Output decreases by 2.54 PSIG at 90° tilt.
- Maximum Supply Pressure: 100 psig
- Air Consumption: Approximately 0.1 scfm
- Air Delivery Rate (Max.): 4 scfm
- Exhaust Rate (Max.): 1.5 scfm
- Linearity: +/- 0.75% if span
- Ambient Temperature Range: 0 to 130 °F (-17 to 55 °C)
- Approx. Shipping Weight: 1.7 lb (0.77 kg)

INSTALLATION

ELECTRICAL CONNECTION

Electrical connection for this product can be made in two different methods, depending on the cover option chosen. The conduit connection is ½" NPSM

1. **Metal cover with terminal access hole**
   Remove the top access cover and connect the positive wire to the + terminal and the negative wire to the other terminal for the direct acting mode. For reverse acting mode, reverse the electrical input leads.
2. **Metal cover without terminal access hole**
   This option provides two (2) leads 20" (508 mm) long #18 Ga wire. (Positive – RED) (Negative – BLACK).

CAUTION: It is recommended that these transducers not be wired with hot leads. If hot wiring cannot be avoided, exercise extra care when installing the lead wires. Accidental contact of the screwdriver to the metal cover may cause a short circuit.

IMPORTANT: Assure all metal chips are removed from conduit prior to installation, to prevent malfunction of the coil / magnet assembly.

RANGE SELECTOR SWITCH

The GT210 series incorporates a range selector jumper switch on the printed circuit board. For milliamp electrical input models, the jumper can be positioned to accept a 4-20 or a 10-50 mA DC electrical input signal. For voltage electrical input models, the jumper can be positioned to accept a 0-5 or a 1-9 VDC electrical input. To prevent contamination of the transducer, a filter or filter-regulator is recommended (40 micron or finer).

The ¼" NPT outlet (marked "OUT" delivers a pneumatic outlet pressure in proportion to the electrical signal input.

The transducer is equipped with two (2) outlet pressure gauge ports ("G1" and "G2").

PNEUMATIC CONNECTIONS

Connect the supply pressure line to the ¼" NPT inlet (marked "IN"). A clean, filtered supply of 20-100 psi (138-690 kPa) is required for the 3-15 psi (21-103 kPa) output range model. A clean, filtered supply of 35 to 100 psi (242 to 690 kPa) is required for the 3-27 / 6-30 psi (21-103 / 41-207 kPa) models.

ADJUSTMENTS

It is recommended that the transducer is calibrated after final installation / mounting, using the following procedure.

1. Connect the filtered air supply to the inlet ("IN" port) of the transducer.
2. Connect a pressure measuring instrument to the outlet ("OUT") or to either outlet gauge port ("G1" or "G2").
3. Connect the electrical input power source to the circuit board per the ELECTRICAL CONNECTION instructions on pages 1 or 2
4. Power on the electrical input signal and set it to the 0% value per Table 1.
5. Adjust the output pressure to the 0% value per Table 2 by turning the zero adjust screw located on the side of the transducer. Turning the screw clockwise will increase the output pressure.
6. Increase the electrical input signal to the 100% value per Table 1.
7. Adjust the output pressure to the 100% value per Table 2 (direct acting) or Table 3 (reverse acting) by turning the range potentiometer beneath the rubber grommet on the front of the cover. Turning the range potentiometer clockwise decreases the output pressure.
8. The zero and range adjustments are interactive. Repeat steps 4 through 7 until both end points are at the required values.
9. For reverse acting transducers, use the same procedures noting the values for zero (0% output) and span (100% output) are reversed in Table 3.

% Input	4-20 mA	10-50 mA	0-5 VDC	1-9 VDC
0	4.00	10.00	0.00	1.00
100	20.00	50.00	5.00	9.00

Table 1 – Input values

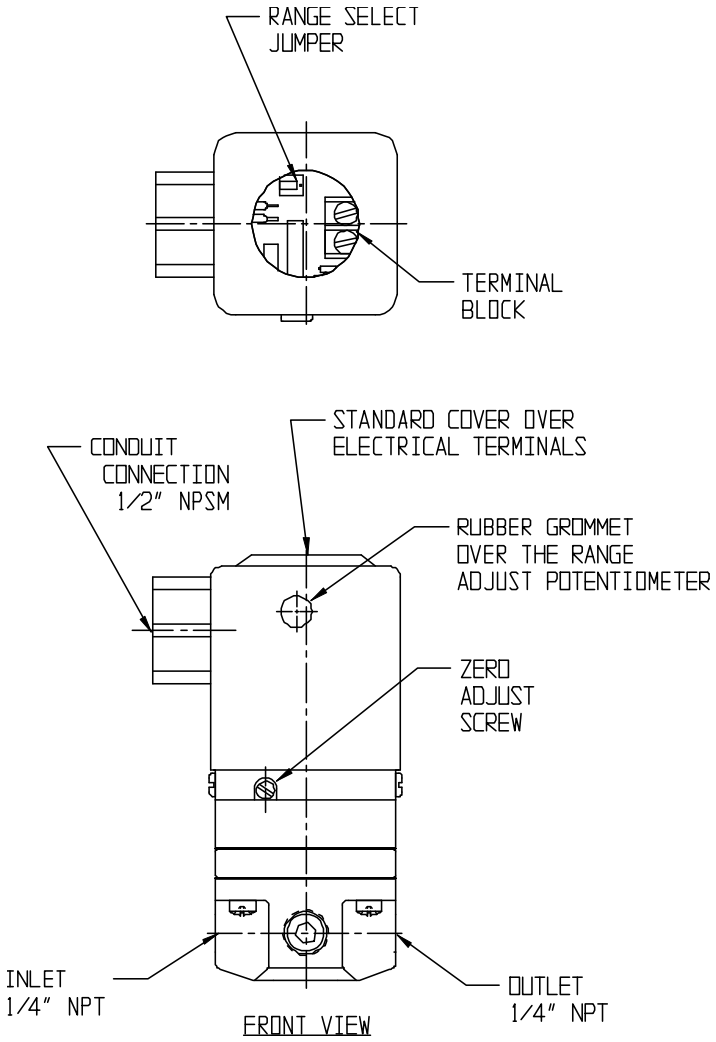
	DIRECT ACTING		
% Output	3-15 PSI	3-27 PSI	6-30 PSI
0	3.00	3.00	6.00
100	15.00	27.00	30.00

Table 2 – Output values – direct acting

	REVERSE ACTING		
% Output	15-3 PSI	27-3 PSI	30-6 PSI
0	15.00	27.00	30.00
100	3.00	3.00	3.00

Table 3 – Output values – reverse acting

Once calibration is complete, replace the span adjustment cover (rubber grommet) and the hole plug over the electrical terminals (or cover if not equipped with standard terminal block access hole).



FEATURE IDENTIFICATION
FOR INSTALLATION AND CALIBRATION

TROUBLESHOOTING

PNEUMATIC

1. Check the supply pressure. Fluctuations in supply pressure will cause associated zero shift in the transducer output. If excessive fluctuation in the supply pressure is present, an upstream regulator is recommended.
2. Make sure pressure connections are tight.
3. Check and adjust, as necessary, the output pressure calibration.
4. Check to see if the inlet wire screen is obstructed.
5. Verify the downstream flow demand does not exceed the flow capacity of the transducer.
6. Check the diaphragms for rupture and replace if necessary. See disassembly procedure under maintenance.
7. If disassembly of the transducer is necessary, it must be performed in a clean area. Should foreign particles enter any area of the assembly, a malfunction may occur. Do not attempt to remove the magnet housing sub-assembly as this will destroy the calibration of the nozzle and flexure assembly relationship.
8. If the maximum specified output pressure cannot be obtained, verify the supply pressure using an alternate gauge. Also verify the electrical input using a digital multi-meter. Some field calibrators may not be capable of supplying sufficient current to the higher voltage units.

ELECTRICAL

1. Verify the range select jumper is in the proper 4-20 / 10-50 mA DC, or 0-5 / 1-9 VDC position.
2. Check the polarity of the electrical input leads to the terminal block. The output of the GT210 transducer is reversing when the electrical input polarity is reversed.
3. Verify there are no loose wires at terminal connections.
4. Check internal resistance by connecting an ohmmeter to the terminal block. In making any resistance tests, the electrical input wires from the controller must be disconnected.
   - Do not change the setting of the range adjust potentiometer on the printed circuit board while performing this test.
   - If the unit does not have the correct nominal input impedance indicated in the table below, the transducer should be returned for repair.

Input Range	Nominal Input Impedance
4-20 mA DC	225 ohms
10-50 mA DC	91 ohms
0-5 VDC	385 ohms
1-9 VDC	535 ohms

Transducer Model Number Breakdown (CED Code)

Text Position	Code	Definition of Character
1 - 5	GT210 = 3-15 PSI (21-103 kPa) Output	GT21R = 15-3 PSI (103-21 kPa) Output
	GT410 = 3-27 PSI (21-186 kPa) Output	GT41R = 27-3 PSI (186-21 kPa) Output
	GT610 = 6-30 PSI (41-207 kPa) Output	GT61R = 30-6 PSI (207-41 kPa) Output
	GT810 = Special Output (see Note 1)	GT81R = Special Output (Reverse Acting – Note 1)

NOTE 1: Customer to consult factory with required output pressure span.

6 Electrical Input Option Codes
- 2 — 0-5 and 1-9 VDC Voltage Input
- 8 — 4-20 and 10-50 mA DC Current Input
- 9 — Special Input (Customer to specify input required – Consult Factory)

NOTE: See position 7 for electrical input range coding

7 Electrical Input Range Codes
- E — 4-20 mA DC
- F — 10-50 mA DC
- H — 0-5 VDC
- J — 1-9 VDC
- Y — Special Input (Consult Factory)

8 Air Supply Accessories
- D — Standard

Consult factory for a suitable filter or filter regulator

9 Mounting Accessory
- A=2” (50.8 mm) U-Clamp for Pipe Mounting
- X=Standard (Standard mounting bracket and screws included)

10 Operation Mode
- A=FM Global Approved – Intrinsically Safe
- X= Standard (Unless option code is specified)

11 Housing / Cover
- X=Standard (unless option code is specified (Note 1)
- M=Metal Cover having no top access cover (Note 2)

NOTES: 1. This cover is used when electrical input connection is made directly to the internal terminal block.
2. This cover is used when electrical connection is made to 2 – Leads 20” long
3. For dimensional data, refer to drawing:
A28-45 = metal cover with top access cover
A28-46 = metal cover with 20” leads

12 Special Input Range

When option “Y” in position seven (7) is used, the factory will apply a four digit code defining the product configuration.

MAINTANANCE AND REPAIR

WARNING: Assure line pressure has been bled prior to removal for service. This product must be removed from piping for maintenance and repair.

CAUTION: Maintenance and repair must take place in a clean, well illuminated environment.

NOTE: Under normal conditions, the only maintenance required is changing elastomers (rubber parts) which will eventually degrade from normal aging.

REMOVAL FROM SERVICE

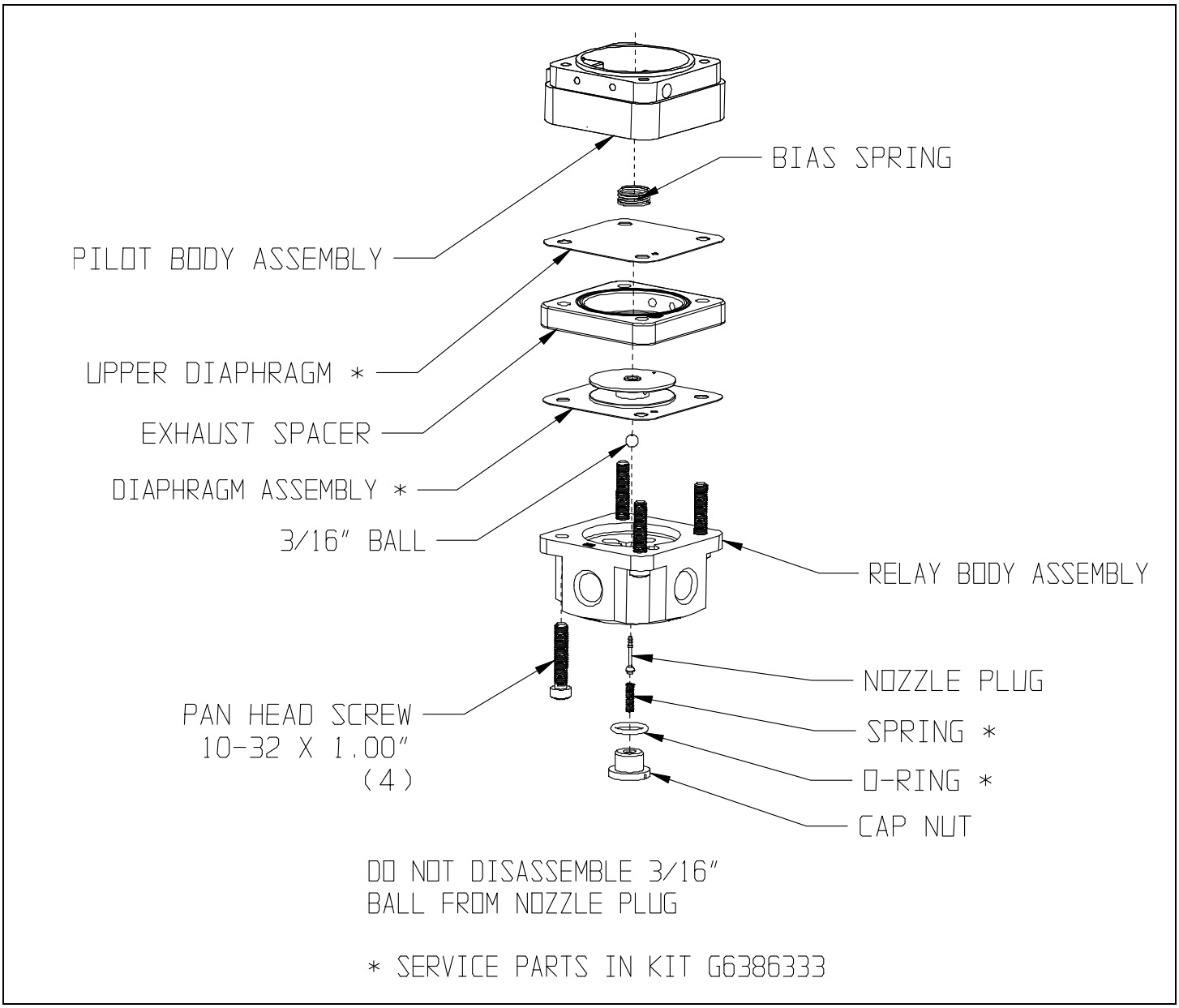
1. Shut off and lock out air pressure and electrical input energy to the pressure transducer.
2. Remove the metal cover hole plug (or cover as applicable) and disconnect the electrical input signal wires from the circuit board terminals.
3. Disconnect the supply and outlet connections
4. Remove transducer from its mounted location.

DISASSEMBLY

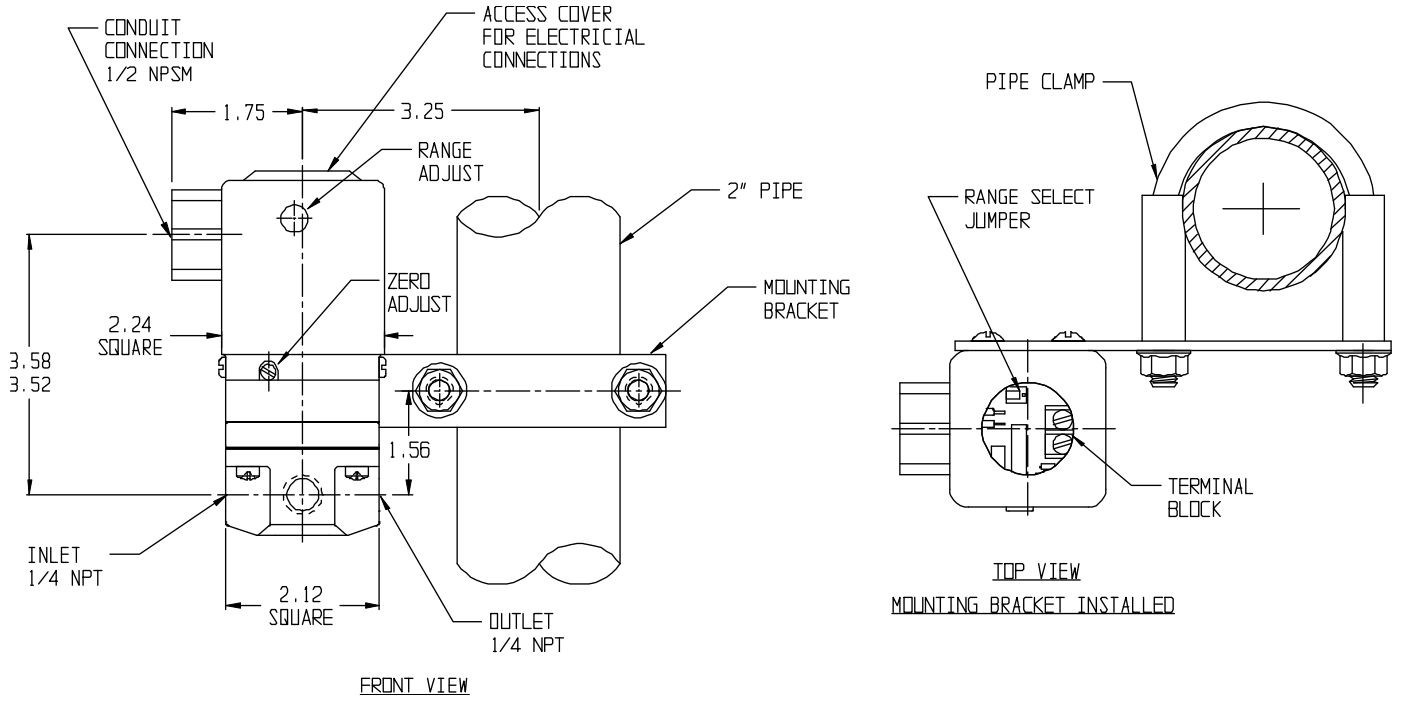
1. Invert (circuit board downward) the transducer and loosen the valve cap with a large slotted screwdriver.
2. Remove the relay body, diaphragm assembly, exhaust spacer and upper diaphragm from the pilot body / magnet assembly / circuit board assembly by loosening and removing the four (4) Phillips pan head screws.
3. Lift off the relay body assembly, the diaphragm assembly, the exhaust spacer and the upper diaphragm. Discard the diaphragm assembly and the upper diaphragm.
4. Carefully unscrew the valve cap from the bottom of the relay body. Remove and discard the o-ring and the plug spring.

ASSEMBLY

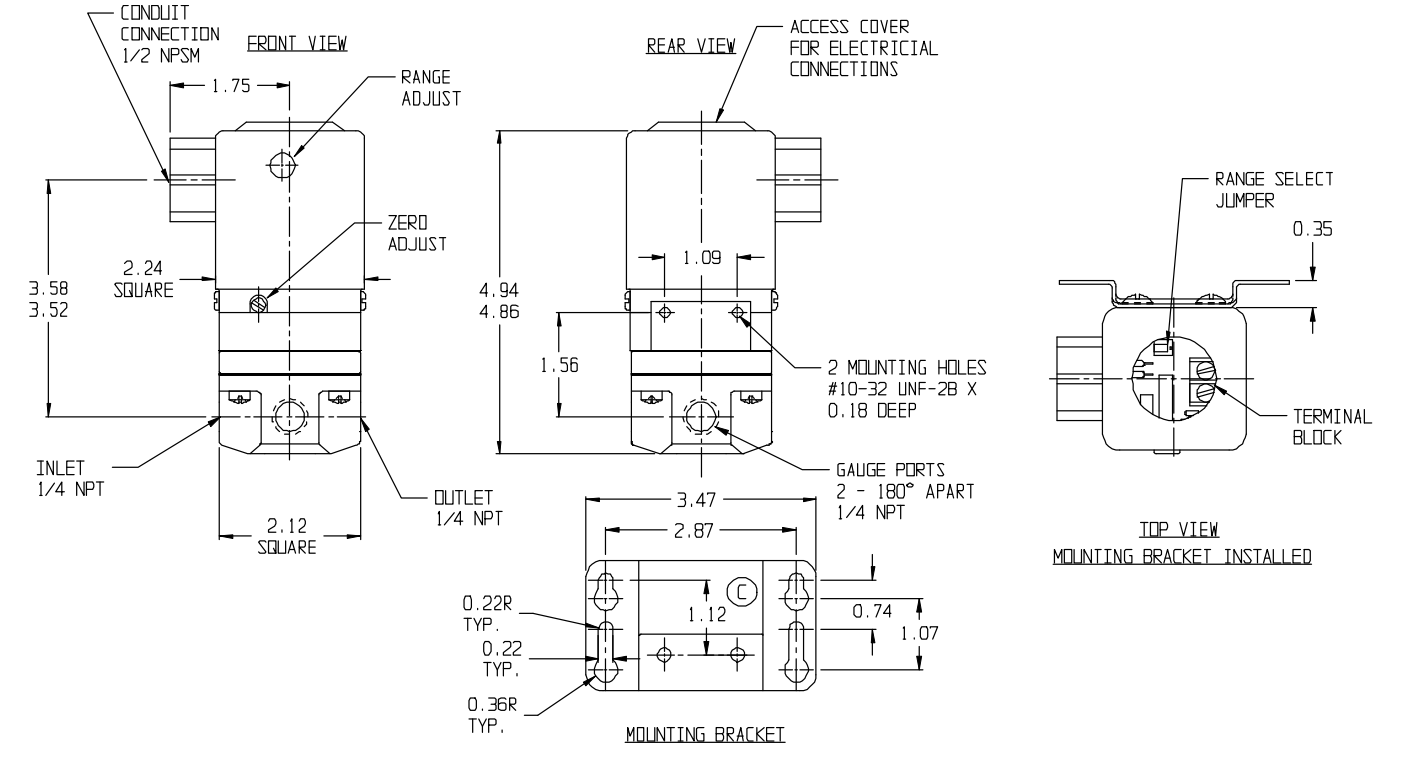
1. Spare parts kit G6386333 contains a new diaphragm assembly, a new cap o-ring, a new valve plug spring, and a new upper diaphragm.
2. Place a new o-ring on the valve cap. Place a new valve spring in the valve cap.
3. Holding the relay body assembly over the valve cap with the white ball depressed, thread the valve cap into the relay body so the plug spring engages the end of the nozzle plug. After several turns of thread engagement, release the white ball. Lightly tighten the valve cap.
4. Verify correct nozzle plug / plug spring engagement by depressing the white ball several times to ensure proper engagement of the plug spring.
5. Secure the relay body and tighten the valve cap until metal to metal contact is felt, indicated full seating of the o-ring.
6. Place the new upper diaphragm on the bottom of the pilot body and bias spring, assuring the orifice hole lines up with the orifice position.
7. Replace the exhaust spacer on top of the upper diaphragm, aligning the orifice hole with the features on the upper diaphragm and pilot body.
8. Replace the diaphragm assembly with the plates oriented into the exhaust spacer. Align the orifice hole with the hole in the exhaust spacer.
9. Align the output pressure slot of the relay body to the orifice hole in the diaphragm. Secure with the four (4) Phillips head screws to a minimum of 14 in-lb assembly torque, using a cross pattern.
10. Bench test the assembly, per ADJUSTMENTS section on page 2, prior to installation.


BIAS SPRING
PILOT BODY ASSEMBLY
UPPER DIAPHRAGM *
EXHAUST SPACER
DIAPHRAGM ASSEMBLY *
3/16" BALL
RELAY BODY ASSEMBLY
NOZZLE PLUG
PAN HEAD SCREW
10-32 X 1.00"
(4)
SPRING *
O-RING *
CAP NUT
DO NOT DISASSEMBLE 3/16"
BALL FROM NOZZLE PLUG
* SERVICE PARTS IN KIT G6386333

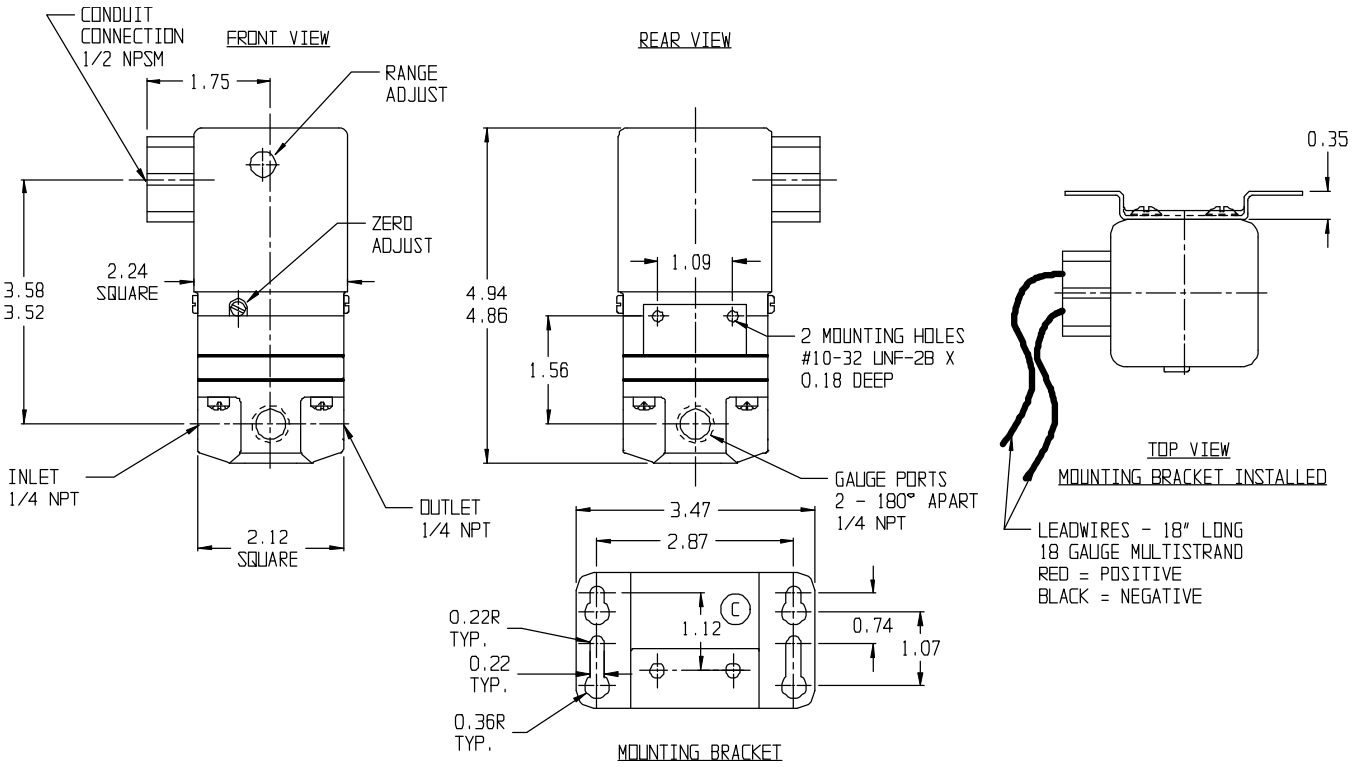
DIMENSIONAL DRAWINGS



FOR CERTIFIED DIMENSIONAL DRAWING, REFER TO A28-50



FOR CERTIFIED DIMENSIONAL DRAWING, REFER TO A28-45



FOR CERTIFIED DIMENSIONAL DRAWING, REFER TO A28-46

NONHAZARDOUS LOCATION

HAZARDOUS LOCATION
CLASS I, DIVISION 1 & 2
APPLICABLE GROUPS
(SEE TABLE #2)

INTRINSIC SAFETY BARRIER
SEE TABLE #2

ELECTROPNEUMATIC TRANSDUCER
SEE TABLE #1

MAXIMUM SAFE VOLTAGE IS 250 VAC

TABLE 1

ELECTROPNEUMATIC TRANSDUCERS MODELS GT210, GT21R, GT410, GT41R, GT610, GT61R, GT810, AND GT81R ARE INTRINSICALLY SAFE FOR CLASS I, DIVISION 1, AND NONINCENDIVE FOR CLASS I, DIVISION 2, APPLICABLE GROUPS WHEN INTERFACED WITH:

TABLE 2

BARRIER	GROUPS
PEPPERL + FUCHS 1072	C & D
ABB INC. NO. 766610AAAV1	D
INVENSYS SYSTEMS INC. INTERFACE MODULE NO'S 2A0-V2I-FGB, 2A0-VAI-FGB 2A0-V3I-FGB, 3A2-D3I CS-E/FGB-A, 3A2-D2I CS-E/FGB-A	D
PEPPERL+ FUCHS GmbH KHP-104/Ex-2A (SINGLE AND DUAL CHANNEL) 1022 1032	D
STAHL BARRIERS 8901/31-280-100-70 8901/33-293-000-79	D

NOTES:
1. ALL REVISIONS MUST BE APPROVED BY FM GLOBAL
2. CABLE PARAMETERS TO BE SPECIFIED BY BARRIER MANUFACTURER
3. INSTALL IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ANSI / ISA RP12.6

FOR CONTROL DRAWING, REFER TO 6385547