I. INTRODUCTION

DC Output Pressure Transducers combine a rugged and reliable variable reluctance pressure sensor with a solid state carrier demodulator, yielding a DC-DC transducer capable of operating from an unregulated power supply and providing a proportional analog output signal.

Differential and gage versions feature symmetrical pressure cavities with only corrosion resistant materials and O-ring cavity seals in contact with the pressure media. Absolute versions feature all-welded stainless steel construction and are not field serviceable. Both versions provide internal adjustments for Zero and output Span.

II. UNPACKING

Transducers are shipped with plastic caps, plugs or adhesive stickers over the pressure ports. These prevent dirt from entering the pressure cavities. It is recommended that the covers be left on the ports until making pressure connections.

On very low range units, the port covers may have a small hole in them. This is done to eliminate internal pressures caused by installing the cover. Be sure to check the shipping carton thoroughly for any accessory items – pressure fitting adapters, mating connectors, etc. – that may have been ordered. A pressure fitting adapter with O-ring seal is also provided with absolute versions.

III. INSTALLATION

Proper installation of a transducer is important but not difficult. This section covers a few guidelines regarding mounting, pressure connections, plumbing, liquid-filling (or "bleeding") and electrical connections which, when observed, will go a long way toward assuring the success of the measurement.

Mounting. An integral plate with four holes is provided for mounting on a flat surface (See Figure 1 for details). To prevent strains on the tubing connections, the absolute version, or the differential version with fitting adapters for use with tubing systems, should be mounted using the integral plate. The differential version with two 1/8-27 NPT female pipe ports may be mounted by rigid pipe connections.

To prevent strain on the transducer body, the integral plate should be mounted on a flat surface. Such strain can cause small zero shifts that can be accentuated by temperature changes.

Mounting the transducer above the point of measurement will minimize accumulation of dirt or condensate, enhancing the internal cleanliness of the transducer. Finally, be sure to provide access to the electrical connector and bleed ports.

Plumbing. Plumbing should allow transducer removal and re-installation without shutdown of the pressure system. If the transducer is used for gage pressure measurement where one port is left open to the atmosphere, a simple shutoff valve can be installed in the line to the transducer. The open (reference) port should be covered by a porous filter to prevent access of dirt and dust (use a plastic cap with a small hole). Non-porous plugs are not recommended; the relatively small volume of air in the reference cavity will severely damp transducer response and substantially increase temperature error.

A differential pressure transducer used to measure the pressure drop across an orifice or filter requires more extensive valving not only to place it into operation but also to remove it without overpressure damage. In this case a valve arrangement as shown in Figure 2 should be used.

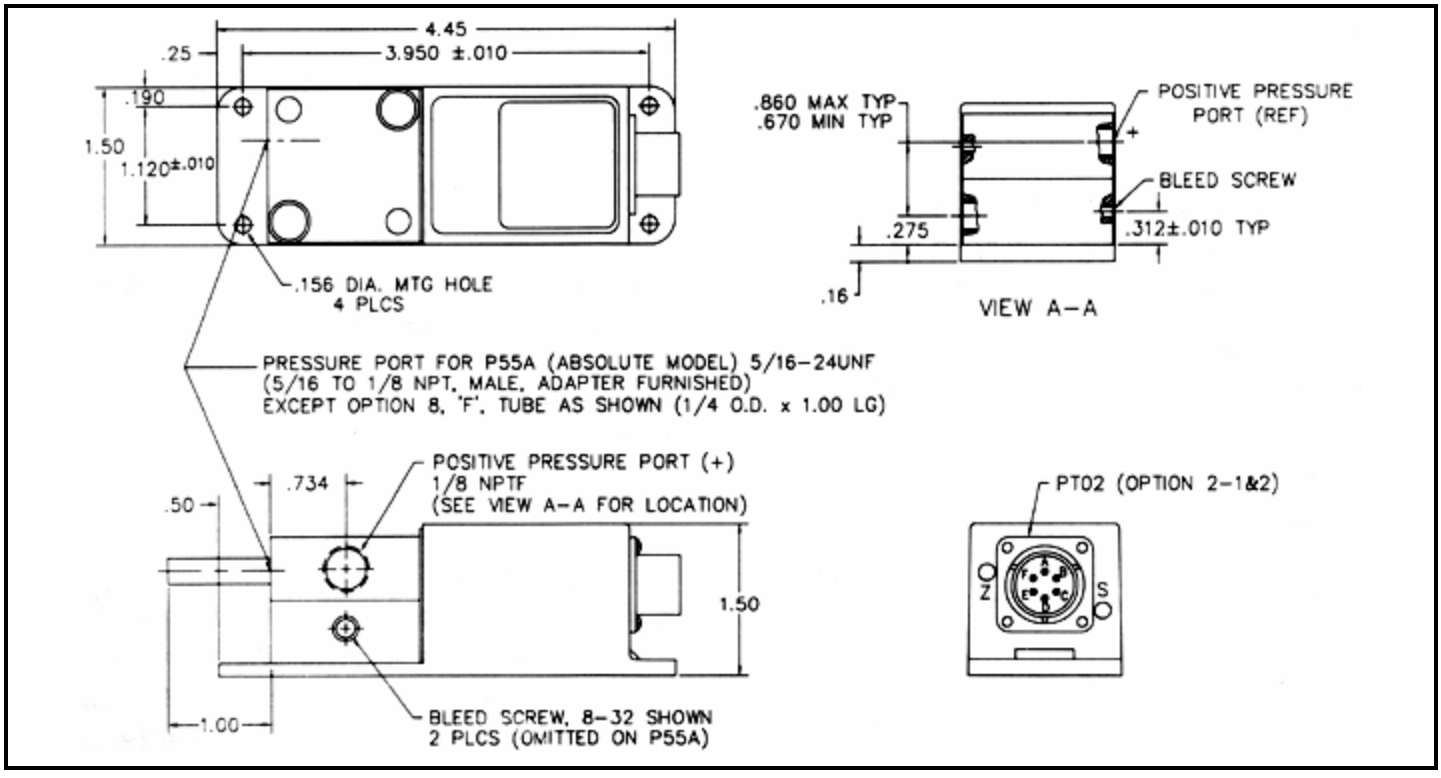

FIGURE 1. Outline/Installation Drawing

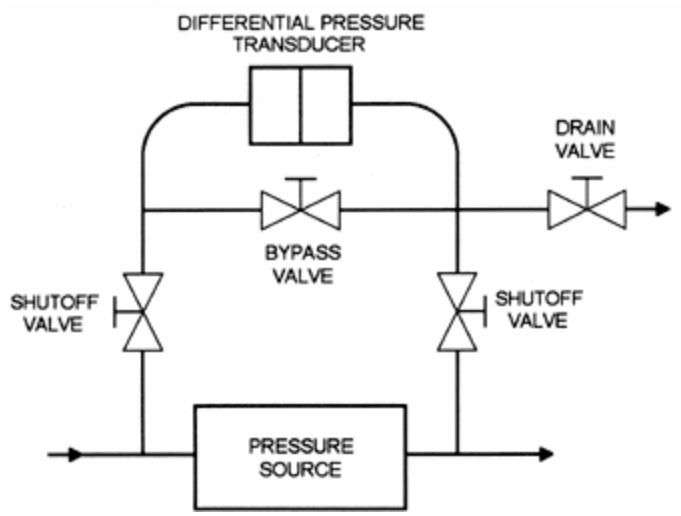

FIGURE 2. Typical Valve Arrangement for DP Use

To pressurize the transducer, close the drain valve and open the bypass valve. Then both shutoff valves are opened to apply line pressure equally to both sides of the transducer. Finally, close the bypass valve. To remove the transducer, open the bypass valve, close the shutoff valves and open the drain valve. Valve manifolds for this purpose are commercially available from valve and fitting suppliers.

Pressure Connections. Pressure connections are made via ports in each cavity. Before making connections to the transducer, be sure the connecting pipe or fitting is free of loose internal scale and check the threads for cleanliness or damage. If torn or nicked, clean up the thread with a die or chaser. Then wrap the tapered thread with two layers of 0.5" wide Teflon pipe thread tape (available at most plumbing supply stores), stretching it lightly as it's wrapped so that it conforms to the threads. Wrap in the direction of the thread, as if screwing on a fitting. The Teflon acts as both a thread lubricant and sealant, minimizes thread galling and makes disassembly easier.

When attaching the pipe or fitting, screw it in with a small wrench until it is snug, then, give it another one-half turn. If the threads are not properly prepared and/or excessive torque is applied to the tapered thread, the case material around the pressure port can crack from the high tensile stress created.

The 5/16-24 port requires a mating fitting adapter with an O-ring to make a leak-free connection. A 5/1 6-24 to 1/8-27 NPT male fitting adapter, with O-ring, is standard.

Liquid-Filling ("Bleeding"). A bleed port for each pressure cavity facilitates cleaning or liquid filling of the cavities. The bleed port is sealed with a set screw machined to carry a glass-filled Teflon gasket at its inner end. The gasket provides the sealing action. For static pressure measurements it is generally unnecessary to fill the pressure cavity with the liquid media as any trapped air or gas will transmit the pressure to the sensing diaphragm. However, when good response to dynamic pressure changes or oscillations in liquid-filled systems is important, the pressure cavities and transducer connections should be free of gas. Otherwise the trapped gas acts as a pneumatic damper and can seriously decrease the frequency response of the measuring system. To remove entrapped gases, loosen the bleed screw one or two turns with a 5/64" hex wrench, with system pressure ON (It is recommended that the bleed screw not be fully removed as the bleed screw gasket could be lost, making an effective seal impossible). After the trapped gas has been expelled and bubble-free liquid begins to flow out the vent hole, tighten the bleed screw to seal the cavity. Note that the bleed port vent hole for the negative pressure cavity is covered by the integral (mounting) plate with the transducer normally mounted. If it is necessary to liquid-fill this cavity, it is suggested that the two screws used to secure the transducer to the base plate be removed to provide sufficient clearance for the expelled media to exit the vent during the bleed operation.

Electrical Connections. The standard electrical connector is a 6-pin PT02A-10-6P (Bendix, or equivalent). Input and output connections are as shown on Figure 1. The internal circuitry is electrically isolated from the transducer case. If desired, the cable shield can be connected to the transducer case through the connector shell. However, if the transducer is grounded through its mounting or through the pressure connections, the cable shield should be left floating at the transducer end to eliminate noise from ground currents circulating through the cable shield.

IV. CALIBRATION

As supplied from the factory, DC transducers have been calibrated for the full scale pressure and output voltage levels specified on the purchase order. If desired, the transducer can be adjusted for other pressure/voltage relationships, using internal Zero and Span adjustments provided in the electronics module. To determine the range of full scale pressures a given transducer may be calibrated to without diaphragm replacement, see the Pressure Range Chart.

EQUIPMENT REQUIRED:

DC Power Supply
Digital Voltmeter, 0 to 10.OOVdc
scale Calibrated Pressure Source

PROCEDURE:

A. Connect the transducer to a calibrated pressure source commensurate with the transducer range. For absolute versions, use a vacuum pump for zero psia input and full scale ranges less than atmospheric pressure.

B. Connect the DC power supply to terminals A (+) and D (-) of the connector. Set the supply voltage to the voltage to be used at the installation. See the data sheet specification for the particular unit for power supply voltages.

C. Connect the DVM to terminals B (+) and C (-) of the connector.

D. Apply zero pressure to the transducer, and adjust zero potentiometer Z for a DVM reading of ±001Vdc. (This can be set at any value between ±1Vdc). CW rotation causes (+) increases in output.

E. Apply full scale pressure to the transducer and adjust potentiometer S for a DVM reading of 5.00 ±0.01 Vdc. This can be set at any voltage between 3 and 5.5 Vdc.

F. Repeat steps E and F until interaction between adjustments is eliminated.