ASHCROFT®

# SERIES 4000 PRESSURE TRANSMITTER

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

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**Figure 1**. Indicating and Non-Indicating Ashcroft Pressure Transmitters

# GENERAL DESCRIPTION

Ashcroft Pressure Transmitters, Series 4000 (refer to Fig. 1), are self-nulling, motion balance instruments. They utilize a non-bleed force balance, pneumatic relay to convert input pressure into proportional low air pressure, for transmission to remote indicators or controllers.

The Series 4000 operates independently of electrical power and is not subject to interference from nearby power lines.

As shown in Figures 2 and 3, the transmitter consists of the following major components:

a. A pressure-sensitive input element to translate applied pressure into linear motion.

b. A vane assembly, mounted on the free end of the input element, to provide a positional reference which moves vertically to follow the change in input pressure.

c. A nozzle assembly, which together with the vane assembly establishes the null condition, accurately balancing output pressure against input pressure. This assembly comprises a supply nozzle and a collector nozzle; the supply nozzle sends a jet of air across a gap to the collector nozzle, to sense the motion of the lower edge of the vane assembly. The nozzles are mounted on a temperature-compensated flexure leaf, which follows the lower edge of the vane assembly until the null condition is established.

d. A pneumatic relay, which senses pressure at the collector nozzle and controls the low-pressure air, to establish output pressure directly proportional to the pressure applied to the input element.

e. A feedback bellows, actuated by output pressure, to position the nozzle assembly so that It follows the lower edge of the vane assembly, maintaining a balanced pneumatic circuit.

f. In indicating transmitters, a standard Ashcroft movement, linked to the input element, to drive the pointer of a gauge mounted on the face of the instrument.

g. An air actuated dash pot is provided on all pressure transmitters of 100 psig range or below.

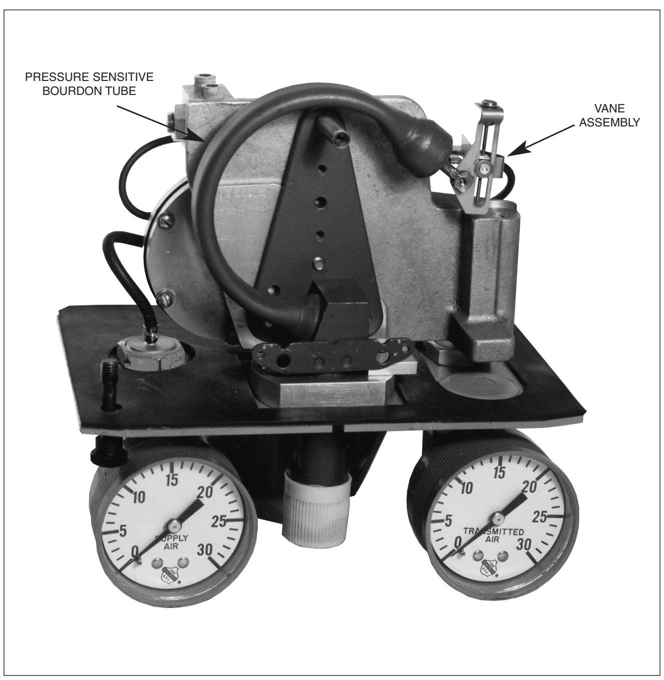



**Figure 2.** Non-Indicating Pressure Transmitter, Front View with Cover Removed

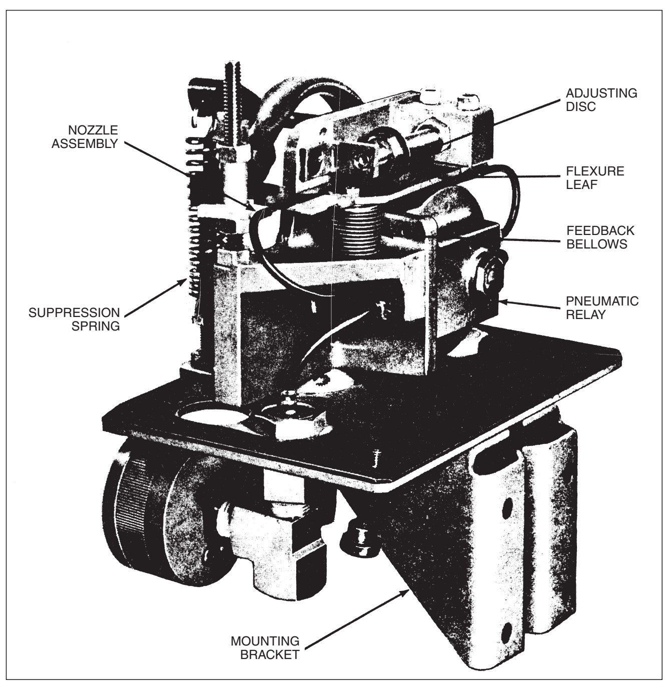



**Figure 3.** Short Span Pressure Transmitter, Rear View with Cover Removed

# INSTALLATION

## Mounting

Ashcroft pressure transmitters are designed for bracket mounting (refer to Fig. 4), to ensure free action of all components, thereby maintaining accurate calibration. The transmitters may be pipe mounted, wall mounted or stem mounted. Typical methods of mounting are shown in Figures 4 and 5. Applicable dimensions are given in the illustrations.

For most trouble-free performance, transmitters should be mounted vertically. Some loss of accuracy may result from angular mounting; this may be minimized by recalibration after mounting.

The transmitters have been designed to withstand severe pulsation and vibration. However, in keeping with good instrument practice, it is recommended that they be installed so as to minimize vibration and pulsation.

## Ambient Conditions

Ashcroft transmitters are temperature compensated for the normal range of ambient temperatures. Extremes of ambient temperature may result in inaccuracies. The transmitter should not be subjected to temperatures exceeding 150˚F. If the process temperature will exceed this limit, install a diaphragm seal or suitable length of pipe to protect the transmitter from excessive temperatures. If very low temperatures will be encountered, make certain to eliminate any possibility of moisture in the air lines. Condensation and vaporization of moisture in air lines cause unpredictable variations in accuracy. For low ambient temperature installation, a case heating device is recommended.

## Steam Pressure Measurement

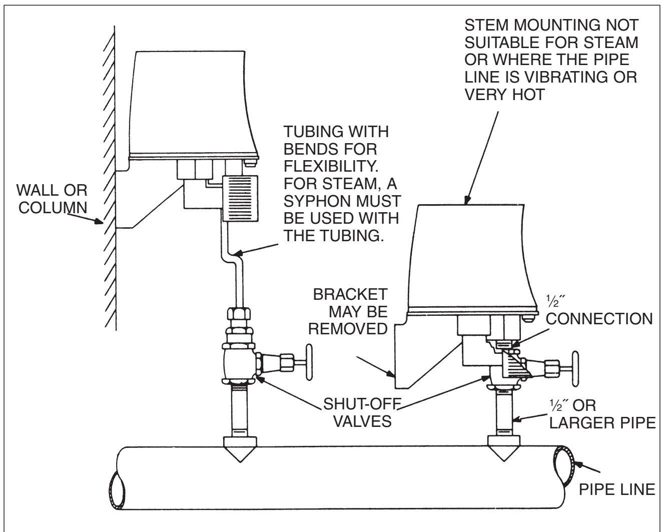
When a transmitter is used for steam pressure measurement, a siphon filled with water must be installed between the line and the input element. When the system is subject to occasional vacuum, provide a length of piping which cannot be emptied by the vacuum. Install a drain cock or plug at the bottom of this leg to provide for cleaning out sediment. Refer to the Calibration section for the method of zeroing the transmitter to compensate for the "head" effect of introducing the condensate water leg.

## Pressure Connection

The process pressure connection is the center connection at the bottom of the transmitter. Always use a wrench on the flats of the process connection to avoid applying strain to socket mounting screws and the internal mechanism.

**CAUTION**

Avoid piping strains in accordance with good installation practice except in the case of stem mounting, it is preferable to use flexible tubing for the last length of piping leading to the transmitter.




**NOTES:**

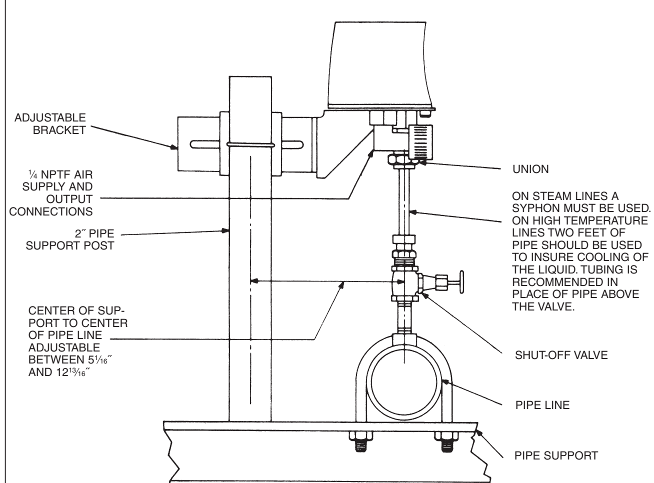
PULSATIONS SHOULD BE DAMPENED BY SUITABLE THROTTLING DEVICES. AS USED ON PRESSURE GAUGES AND LISTED IN THE ASHCROFT GAUGE ACCESSORY CATALOG

DIAPHRAGM SEALS MAY BE INSTALLED DIRECTLY TO THE TRANSMITTER OR WITH A CAPILLARY LINE. (BOURDON TUBE ELEMENTS ONLY.

SUPPLY AND OUTPUT AIR CONNECTIONS ARE ¼ NPT FEMALE.

DRAIN OR VENT VALVES SHOULD BE INSTALLED ABOVE THE SHUT OFF VALVE ON HIGH PRESSURE GAS OR DANGEROUS LIQUID INSTALLATIONS.

**Figure 4.** Wall and Stem-Mounted Pressure Transmitter Installation




GOOD INSTALLATION PRACTICE DICTATES THAT THE INSTALLATION SHOULD BE FREE OF VIBRATION AND PIPING STRAIN. IF THERE IS VIBRATION IN THE PIPE LINE. THE 2˝ PIPE SUPPORT SHOULD BE MOUNTED ON SOME INDEPENDENT MEMBER AND THE PRESSURE CONNECTION TO THE TRANSMITTER SHOULD BE TUBING WITH SUFFICIENT FLEXIBILITY TO DAMPEN THE VIBRATION.

**Figure 5.** Pipe-Mounted Pressure Transmitter Installation

### Air Connections

Connect the LOW pressure instrument air SUPPLY to the ¼ female NPT connection, marked SUPPLY, at the left of the process pressure connection. The instrument air is to he clean, dry, and liquid free. Connect the remote equipment line to the ¼ female NPT connection, marked OUTPUT, at the right. The use of metal or plastic tubing in place of piping is strongly recommended. It is important that the transmitted airline be free of leaks: the use of metal or plastic tubing reduces the possibility of leaks. The supply air pressure required for 3-15 psi transmitted range is 18-20 psi.

The supply air pressure required for 3-27 psi transmitted range is 30-35 psi.

Any number of pneumatic receivers may be connected to the transmitted air line. However, the total length of the transmitted air line should not exceed 1000 feet, or the speed of response will be reduced. Response speed versus line length for various sizes of tubing Is shown In Figure 6.

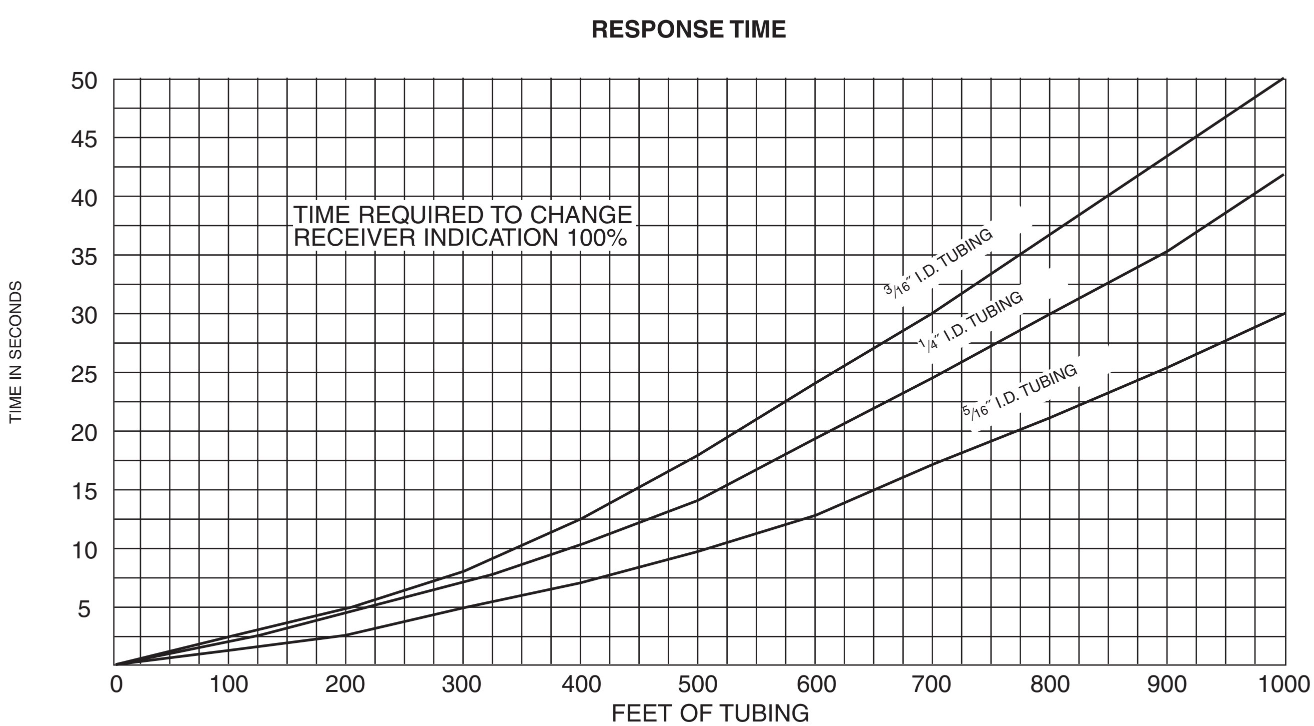



**Figure 6.** Response Speed versus Tubing Diameter and Length

# THEORY OF OPERATION

### Input Element

The input element of the pressure transmitter is a pressure-sensitive bourdon tube. As mounted in a transmitter, increasing pressure raises the free end of the bourdon tube, while decreasing pressure lowers it. The height of the free end with respect to any fixed reference point is, therefore, a direct measure of internal pressure.

In the pressure transmitter, a vane assembly is secured to the free end of the input element. This assembly comprises a thin metal vane mounted vertically on a bracket provided with a means of vertical adjustment. For any applied pressure, the lower edge of this vane establishes a height which is an accurate measure of applied pressure.

### Flexure and Nozzle Assembly

The flexure is a cantilevered leaf spring one end of which is free to move vertically to follow the lower edge of the vane. The free end rests on and is actuated by the feedback bellows. A disc clamped by two jam nuts on a threaded rod mounted over the leaf spring contacts the spring to establish the range of operation. This disc is in contact with the leaf spring at all times. By moving the disc along the length of the leaf spring, the deflection of the free end of the spring for a given applied air pressure can be varied.

Two opposed nozzles having a short gap between them are mounted on the free end of the leaf spring by means of a temperature-compensating, bi-metallic strip. The opposed nozzles, actuated by the feedback system of leaf spring and bellows, are moved vertically on opposite sides of the vane, as shown in Figure 16. Supply pressure applied to one nozzle crosses the gap as a jet of air to the other nozzle. As the vane cuts across this jet of air, the pressure developed at the collector nozzle is altered to a degree proportionate to the extent of interference by the edge of the vane.

An increase in process pressure will cause the vane to rise, allowing pressure at the collector nozzle to increase as the vane moves from the jet of air. This increase in pressure is transmitted to a pneumatic relay which acts to increase pressure in the feedback bellows, raising the leaf spring. As the leaf spring rises, the lower edge of the vane cuts the jet of air to establish a new pressure null in the feedback bellows. This pressure will be directly proportionate to the new position of the vane.

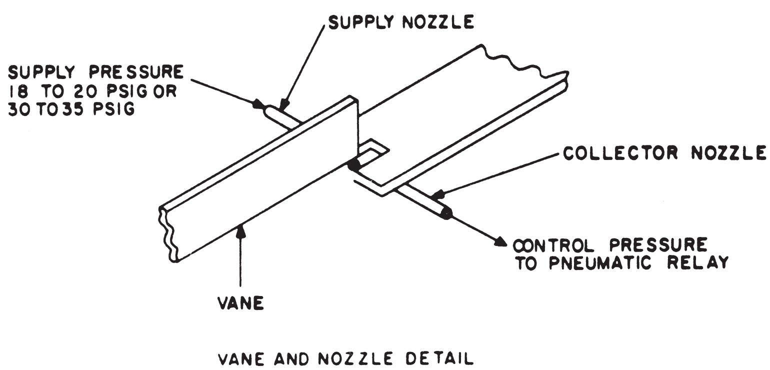
If process pressure decreases, the vane will be lowered into the jet of air, causing collector nozzle pressure to decrease. This is translated by the pneumatic relay into a decrease in pressure in the feedback bellows. The leaf spring moves down, moving the nozzles lower with respect to the vane, until a new null is established. The air pressure in the feedback bellows is the transmitted signal.

### Pneumatic Relay

As described above, the opposed nozzles and vane act as an error detector. Any movement of the vane with respect to the opposed nozzles will be reflected as a change in pressure at the collector nozzle. As shown in Figure 7, this pressure is applied to chamber A in the pneumatic relay, where it acts against diaphragm D2. Supply pressure is admitted to chamber C, where it acts against diaphragm D1, by the opening of the pilot valve.

If an imbalance exists between the forces applied to diaphragms D1 and D2, the diaphragm assembly will move toward the chamber exerting the lower force. Since diaphragm D2 has approximately four times the area of diaphragm D1, balance is achieved when pressure in chamber C is four times that in chamber A. If pressure in chamber A increases due to an increase in pressure at the collector nozzle, the diaphragm assembly will drive the pilot valve open, admitting supply pressure to chamber C until balance is again established. If pressure in chamber A decreases, the diaphragm assembly will be driven from the ball valve end of the pilot valve, allowing pressure from chamber C to exhaust through chamber B to atmosphere until balance is again established.

As shown in Figure 7, the pressure established in chamber C is applied to the feedback bellows and the transmitted air line. Any error pressure established at the collector nozzle is, therefore, amplified and relayed as a corresponding change of pressure in the feedback bellows, causing the nozzle assembly to follow vane movement. This pressure is therefore an accurate measure of input process pressure, and maybe used for remote indication or to actuate pneumatic control devices.



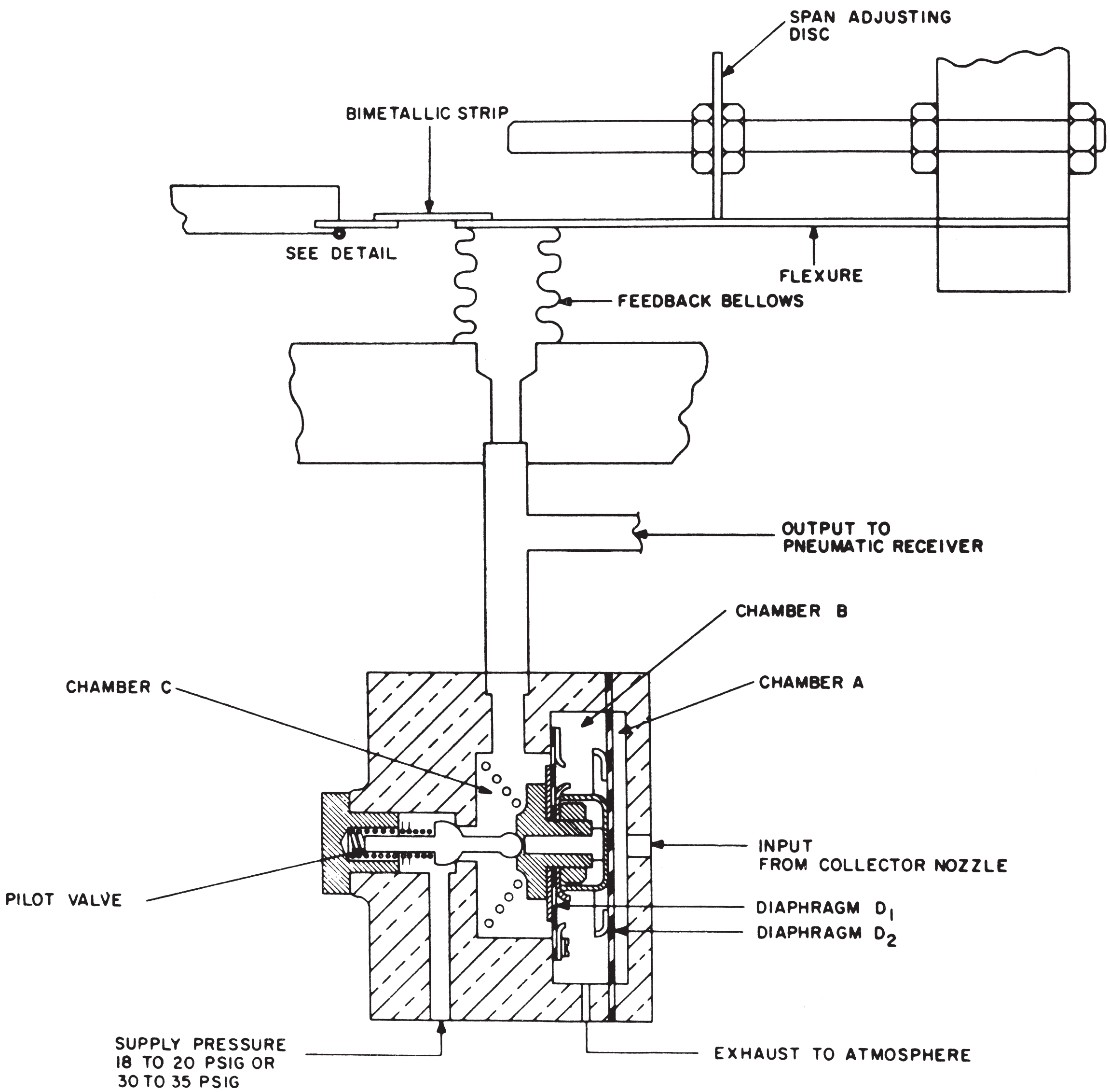




**Figure 7.** Transmitter Actuation Principle

# TROUBLESHOOTING

**General**

Many complaints of faulty transmitter operation have, on investigation, proven to be due to faulty installation. For this reason, the following possible causes of trouble should be considered whenever trouble develops after a new installation or change in conditions:

**Note:** To facilitate maintenance and adjustment, the transmitter should be mounted to provide easy access.

a. In critical installations where the pressure tap is at a different elevation from the transmitter, correction must be made for liquid "head" or "leg."

b. Supply air should be filtered and dried.

c. Supply air pressure should be within the specified ranges.

d. The transmitter should be mounted vertically, to ensure correct action of components and to maintain calibration position. If angular mounting is necessary, the transmitter should be recalibrated in the position to be used, in order to ensure maximum accuracy.

e. Extremes of ambient temperature should be avoided. The transmitter should not be subjected to temperature above 150°F. If process temperatures exceed this limit, protect the transmitter by means of a siphon or diaphragm seal.

**Note:** Since most pressure take-offs are dead end service, with resultant cooling, it is unlikely that the transmitter itself will be subjected to temperatures exceeding 150°F, except in extreme cases.

f. If very low temperatures are encountered, care must be taken to eliminate any possibility of moisture in the air lines.

g. For all installations, both the transmitter and the receiver should be checked together, as a unit, before operation.

**Troubleshooting Procedures**

To assist in correcting installation or operational deficiencies, refer to the following listing of possible troubles and suggested corrective actions

**CAUTION**

Dash pot is air actuated. Do not use oil.

| TROUBLE | CORRECTIVE ACTION |
|---|---|
| 1. Pulsation at receiver. | 1. Check output line from transmitter to receiver for leaks. Tighten all faulty connections; repair or replace defective tubing. |
| | 2. Remove hex cap on relay and clean seat and seat valve, removing any dirt or foreign matter which may have entered from air lines. |
| | 3. Check for contact between vane and nozzle. Bend vane slightly to center It between nozzles. |
| 2. Pulsation at input to transmitter. | 1. Install pulsation dampener or needle valve slightly ahead of bourdon tube, throttling down the dampener or valve until pulsation stops but still maintaining an opening in the line. |
| 3. Vibration on transmitter panel. | 1. Brace or shock-mount the transmitter as necessary. Vibration should be eliminated insofar as possible to prevent loss of calibration of the transmitter. |
| 4. Loss of calibration. | 1. Check for and eliminate severe piping strains. (Note: Ashcroft transmitters are designed and constructed to eliminate normal piping strains.) |
| | 2. Check for and eliminate wedging between base casting and plate by screws, nuts, or other foreign objects. |
| 5. Receiver not corresponding to transmitter. | 1. Check for and eliminate leaks in output line. |
| | 2. Check for and eliminate foreign matter in output line. |
| | 3. Check to be certain that transmitter is connected to proper receiver. |
| 6. Gross non-linearity in output. | 1. Check for interference which may be compressing tubing from relay to input nozzle. Position tubing to prevent interference. |
| | 2. Check for lack of contact between flexure assembly and adjusting disc. Replace flexure assembly if not in contact with disc. |

# REMOVAL AND REPLACEMENT OF PARTS

## General

The assemblies and parts illustrated in Figures 8 and 9 and listed in the Parts List are available for replacement purposes. When a detail part not shown as a separate item requires replacement, replace the assembly of which it is a part.

When a pressure transmitter has been purchased for one type of service but is to be used for a different type of service, the range and/or the material of the input system assembly may be changed to meet the new requirements. In similar manner, the pneumatic output range may be changed. In some cases where the input system assembly is changed, and in most cases where the output range is changed, a new flexure assembly will be required.

To select the most suitable range and/or material for a new input system assembly, refer to Product Catalog. To order a new input system assembly, specify the desired input range and material, the desired output range, and the present input and output ranges. If a new flexure assembly is required, it will be furnished with the input system assembly.

## Input Element

To replace the input system assembly, refer to the applicable illustration (Fig. 8 and 9) and proceed as follows:

a. Loosen two captive screws (31) and remove cover (36 or 36a).

**Note:** Steps b through g are required on indicating pressure transmitters only.

b. Remove ring/case gasket (52) from ring (50).

c. Loosen two screws (51) and remove ring (50) from dial (44), removing window (49) and ring/glass gasket (48) from ring.

d. Being careful not to damage pointer, draw pointer assembly (47) from shaft of movement (38). Use of hand jack is recommended.

e. Remove two screws (46) and screw (45) and remove dial (44) from movement (38).

f. Remove screw (4a) and separate link (4) from system assembly (2).

g. If necessary to remove movement (38), remove screw (40) and post (39) securing movement to system assembly (2).

h. Remove relay assembly and gasket (17) from body assembly (7b) by removing two screws (20) and lock-washers (21).

i. Remove three screws (8) securing system assembly (2) to body assembly (7, 7a or 7b).

j. Loosen two screws (1h) securing clamp (1b) to base plate assembly (1).

k. Loosen allen head screw (1k) and lift system assembly (2) from clamp (1b).

l. Break adhesive bond by heating screw (4) securing zero adjusting assembly (3) to system assembly (2) and remove screw and zero adjusting assembly.

**Note:** On indicating pressure transmitters, break adhesive bond by heating nut (5) securing zero adjusting assembly and remove nut and zero adjusting assembly. On short span pressure transmitters, remove vane assembly (3a) by removing two screws (4b).

m. Install new system assembly by performing the above procedures in reverse. After system assembly has been secured in position, align zero adjusting assembly so that slot is vertical. Secure by applying Devcon 2 ton epoxy adhesive and assembling and tightening screw (or nut). Machine or file back side of tip on bored tube systems to a 3/32 thickness.

**Note:** If necessary, bend vane of zero adjusting assembly so that vane is centered in slot of flexure assembly.

n. After replacement of system assembly, calibrate pressure transmitter as described in the Calibration section.

**Note:** Replacement systems ordered from factory will have zero adjusting assembly attached.

## Flexure and Nozzle Assembly

To replace the flexure assembly, refer to the applicable illustration (Fig. 7 through 9) and proceed as follows:

a. Remove tubings (22c) from nozzles on flexure assembly (13).

b. Remove nut (16) securing flexure assembly (13) to feedback bellows of body assembly (7, 7a or 7b).

c. Remove two screws (15) and clamping plate (14) and remove flexure assembly (13) from body assembly (7, 7a or 7b).

d. Install new flexure assembly by performing the above procedure in reverse.

e. After replacement of flexure assembly (13) calibrate pressure transmitter as described in the Calibration section.

## Pneumatic Relay Assembly Parts

To disassemble the relay assembly, follow the sequence of the index numbers shown in Figure 10. Disassemble only to the extent necessary for cleaning, inspection, and replacement of parts. Take care not to deform diaphragms or springs during disassembly and reassembly. Reassemble in the reverse order of the index numbers shown in Figure 10.

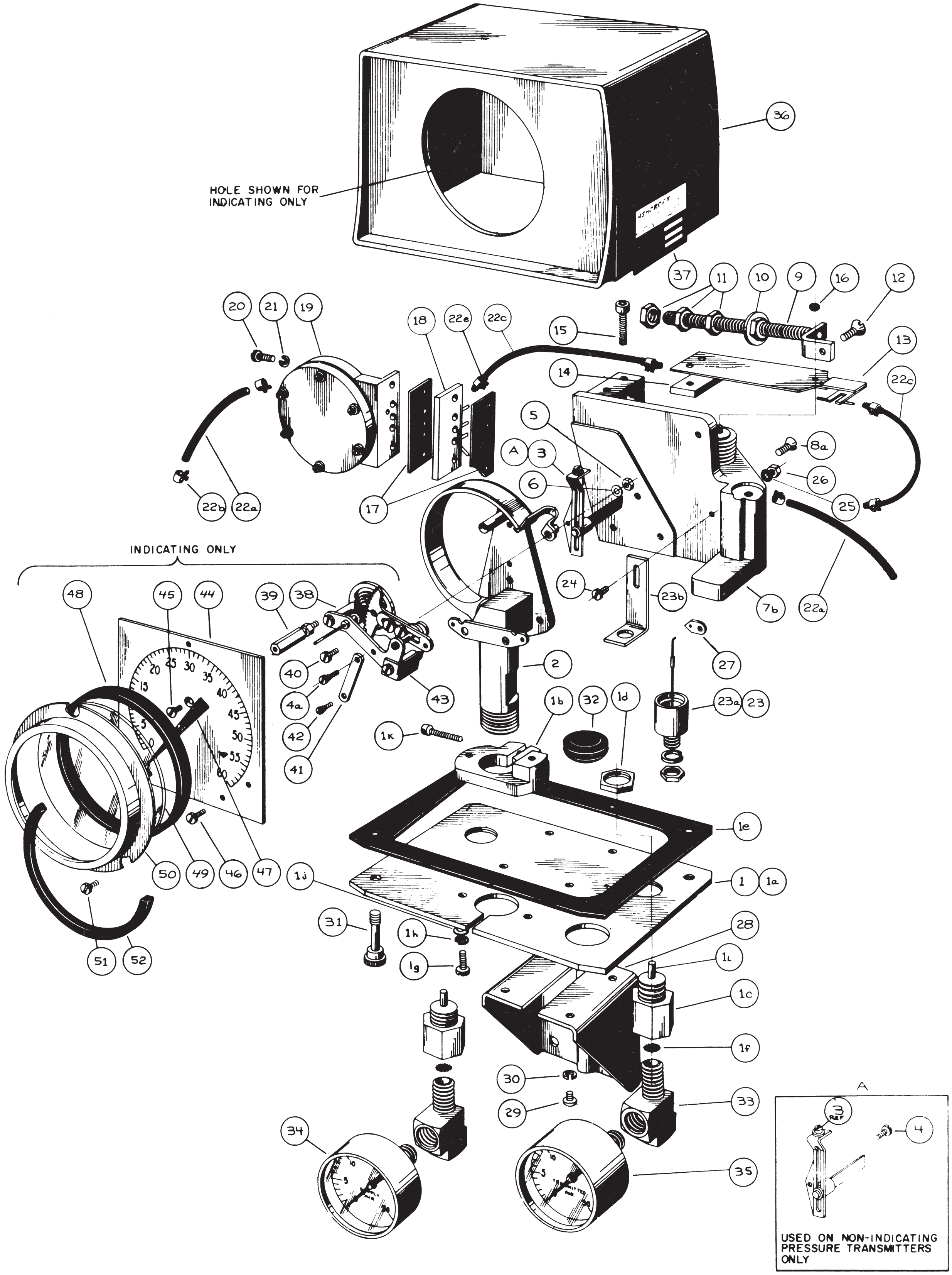



**Figure 8.** Indicating and Non-Indicating Pressure Transmitter, Series 45-C4080 and Series 45-C4480

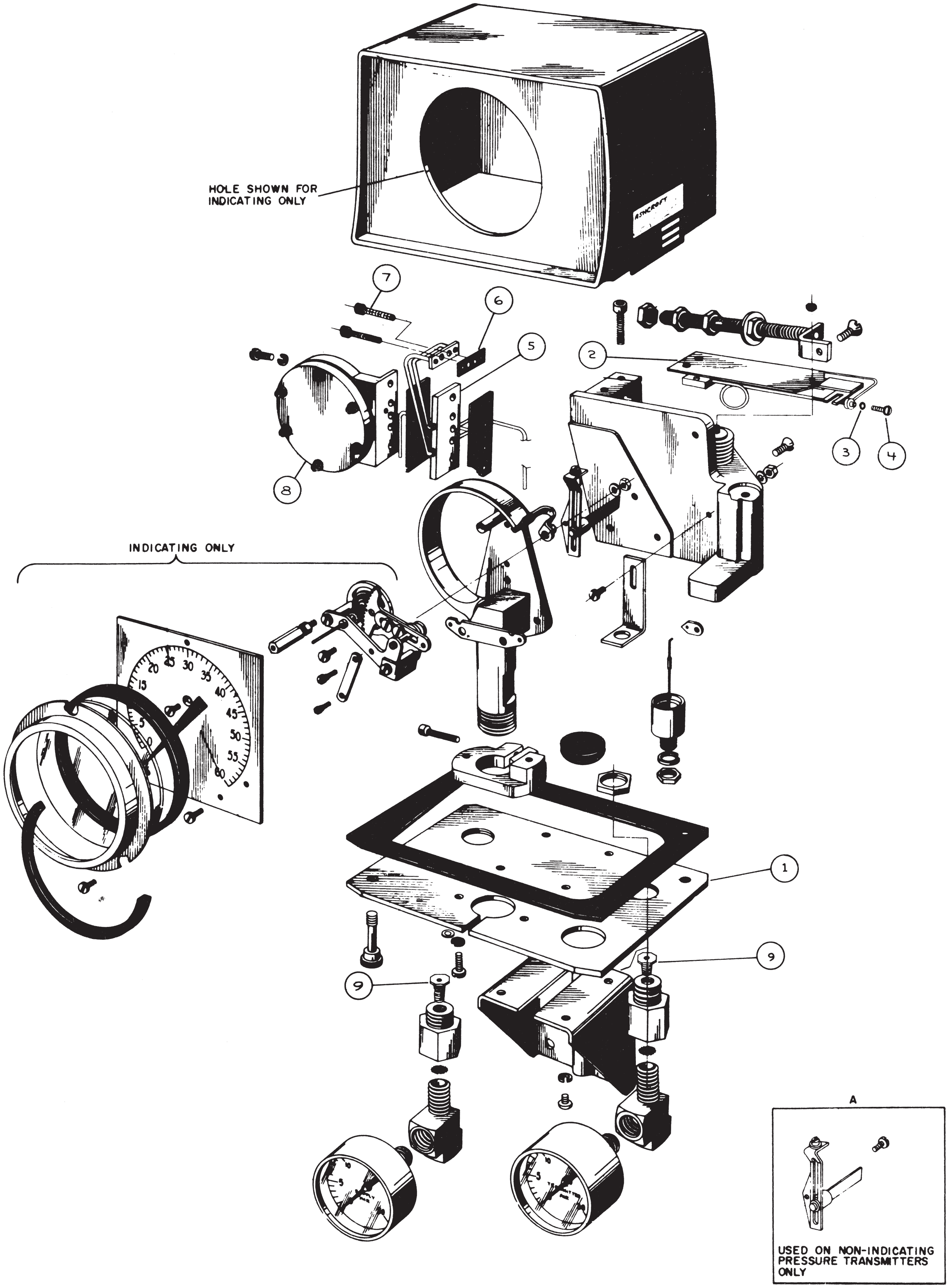



**Figure 9.** XMV Variation (Metal Tubing)

# CALIBRATION

**General**

Calibration of the transmitter Is very similar to calibration of a gauge. A coarse zero adjustment corresponds to the setting of the pointer on the shaft of a gauge. A fine zero-adjustment corresponds to the micrometer adjustment on the pointer of a gauge. A span adjustment corresponds to the slide on a gauge movement. No linearity adjustment is required, since the transmitter is inherently linear In Its action.

**Procedure**

To calibrate span indicating pressure transmitters, perform the procedures outlined below. To calibrate non-indicating pressure transmitters, perform the procedures outlined below but omitting steps g through i.

a. With pressure transmitter mounted in final position, connect a variable source of process pressure to input system assembly. An accurate test gauge, deadweight tester, or manometer must be provided in this line to establish the required known input pressures.

b. Connect a source of supply air to left-hand connection marked “supply.” Use a 20 psig air supply if output pressure range is to be 3 to 15 psig. Use a 30-psig air supply if output pressure range is to be 3 to 27 psig.

c. Connect an accurate receiver gauge to air connection marked “output.”

d. Loosen two captive screws (31), Fig. 8) and remove cover (36), removing ring/case gasket (52) from ring (50) (on indicating pressure transmitters).

e. With supply air turned off, move span adjusting disc (10) on nut assembly (9) to approximate center of adjustment range.

f. Turn adjusting screw on zero adjusting assembly (3) until bottom edge of vane is approximately flush with top surface of nozzle plate of flexure assembly (13). Check to be certain that vane is centered between nozzles. If not, bend vane slightly to center it.

g. Remove ring (50), pointer (47), and dial (44).

h. Calibrate indicating portion of transmitter to required accuracy (normally ASA Grade AA accuracy). This calibration is identical to Ashcroft Duragauge calibration.

i. Install dial (44), position pointer (47), and install ring (50).

j. Turn on supply pressure and turn adjusting screw on zero adjusting assembly (3) until receiver gauge indicates 3 psig.

k. Apply process pressure and adjust pressure for full scale indication.

l. Check to be certain that tubing (22c) does not touch any stationary part within 1½ inches of nozzle.

m. Check that vane does not touch either nozzle at any time.

n. Move span adjusting disc (10) on nut assembly (9) toward bellows if receiver gauge indicates less than full scale indication desired (15 or 27 psig). Move range adjusting disc away from bellows if receiver gauge indicates above full scale indication desired.

o. Remove process pressure and turn adjusting screw on zero adjusting assembly (3), if necessary, to obtain a 3-psig indication on receiver gauge.

p. Apply full scale process pressure and check receiver gauge indication. If necessary, repeat step n.

q. Repeat steps 0 and p until zero and full scale indications are correct.

r. Decrease process pressure to 50 percent of full scale and check that receiver gauge indication is correct within plus or minus ½ percent of full scale.

s. Reduce process pressure to zero. Then increase process pressure to 50 percent of full scale and check that receiver gauge indication is correct within ½ percent of full scale.

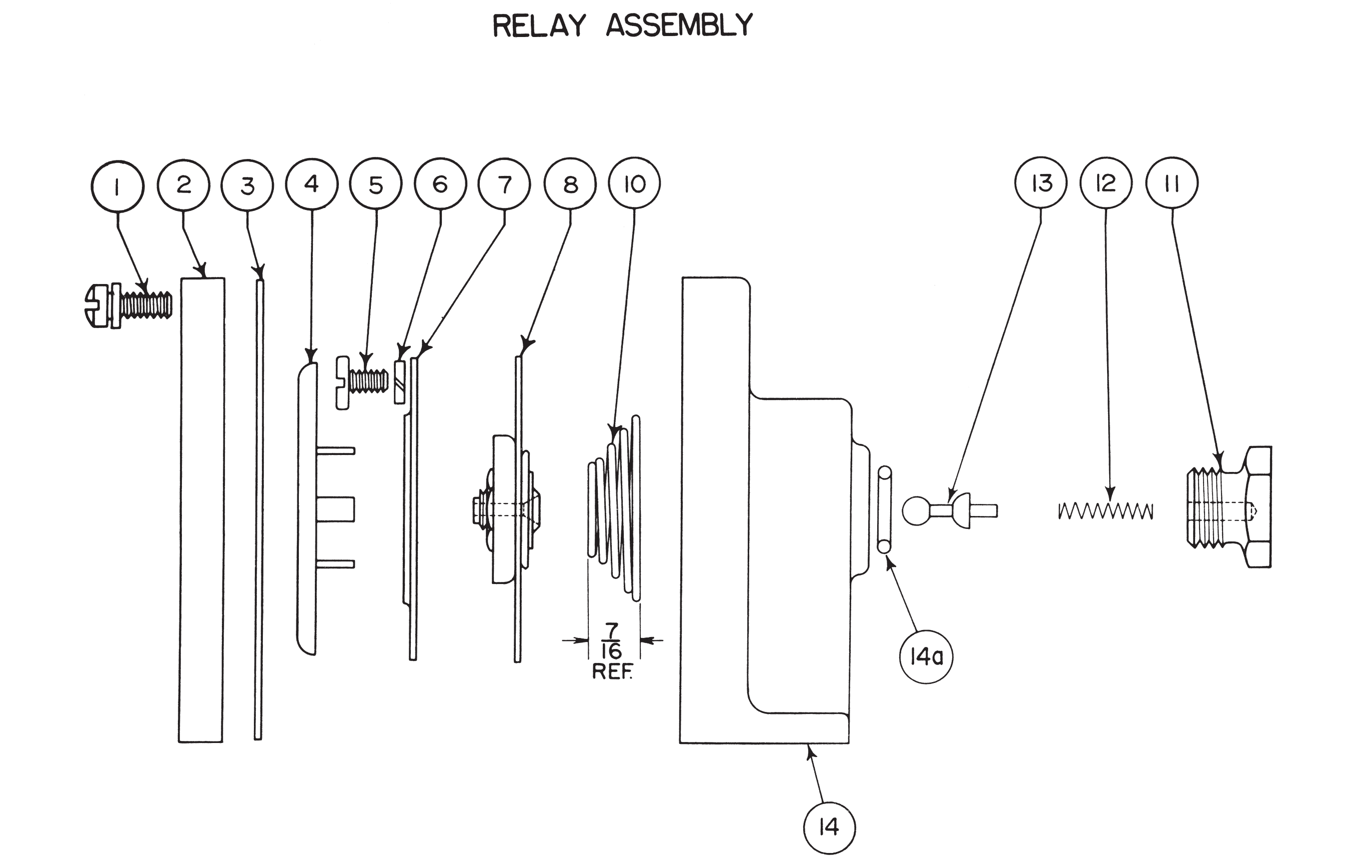



**Figure 10.** Pneumatic Relay, cross-sectional view, order of assembly/dis-assembly

# PARTS LIST

| ITEM | NAME OF ASSEMBLY OR PART | PART NO. | QTY. |
|---|---|---|---|
| 1 | Base Plate Assembly | 295B143-03 | 1 |
| 1a. | Plate | 295B142-01 | 1 |
| 1b. | Clamp Assembly | | 1 |
| 1c. | Adapter | 141A135-01 | 2 |
| 1d. | Nut | 117A118-01 | 2 |
| 1e. | Gasket | 124B119-01 | 1 |
| 1f. | Filter | 571A102-01 | 2 |
| 1g. | Screw | SIFH-93 | 2 |
| 1h. | Washer Lock | SSSS-118 | 2 |
| 1j. | Washer Flat | SSSS-1228 | 2 |
| 1k. | Cap Screw | 112A103-17 | 1 |
| 1l. | Connector (Tubing) | 451A107-02 | 2 |
| 2 | System | As Required | 1 |
| 3 | Zero Adj. & Vane Assembly – Full Span | 112B168-01 | 1 |
| 4 | Mounting Screw – Non-Indicating | SIFH-101 | 1 |
| 4a. | Indicating Pressure (4080) | 112A170-02 | 1 |
| 5 | Nut – Indicating Only | 117A122-01 | 1 |
| 6 | Washer – Indicating Only | SSSS-1119 | 1 |
| 7 | Bracket Assembly | 287B177-03 | 1 |
| 8 | Screw Bracket Mounting (Ranges below 100 psi) | SMIF-165 | 3 |
| 9 | Bracket & Stud Assembly | 287A169-01 | 1 |
| 10 | Nut (Special Span) | 117A120-01 | 1 |
| 11 | Nut (Locking) | SSSS-1226 | 3 |
| 12 | Screw (Steel Mounting) | SMIF27X | 1 |
| 13 | Flexure | 3-15# 241A107-01<br>3-15# 241A107-02 | |
| 14 | Plate Clamping | 295A146-01 | |
| 15 | Screw | 112A103-15 | 2 |
| 16 | Nut (Bellow Mounting) | SSSS-107 | 1 |
| 17 | Gasket (Relay) | ADD-121 | 2 |
| 18 | Manifold (Relay) | 295A269-01 | 1 |
| 19 | Relay | 043C103-02 | 1 |
| 20 | Screw (Relay Mounting) | SIFH-93 | 2 |
| 21 | Washer (Relay Mounting) | SSSS-118 | 2 |
| 22 | Tubing & Clamp Group (Not Shown) | 451A112 | 1 |
| 22a. | Tubing | 451A108-01 | 2 |
| 22c. | Tubing – Supply Nozzle | 451A108-03 | 1 |
| 22d. | Tubing – Collector Nozzle | 451A108-03 | 1 |
| 22e. | Sleeve | | 2 |
| 23 | Dash Pot & Bracket Assembly (Ranges below 100 psi) | 555A117-01 | 1 |
| 23a. | Dash Pot | 555A116-01 | 1 |
| 23b. | Bracket | 287A174-01 | 1 |
| 24 | Screw | AJU-83H | 1 |
| 25 | Washer | SSSS-119 | 1 |
| 26 | Nut | SSSS-1138 | 1 |
| 27 | Link | 311A114-01 | 1 |
| 28 | Bracket (Transmitter Mtg.) | 287B173-01 | 1 |

| ITEM | NAME OF ASSEMBLY OR PART | PART NO. | QTY. |
|---|---|---|---|
| 29 | Screw | SIFH-93 | 4 |
| 30 | Washer (Lock) | SSSS-118 | 4 |
| 31 | Screw (Cover) | APF-9907 | 2 |
| 32 | Disc (Safety) | AMP-9652 | 1 |
| 33 | Tee 2 | | 2 |
| 34 | Gauge – (Supply Air) 1 | | 1 |
| 35 | Gauge – (Trans. Air) 1 | | 1 |
| 36 | Cover Indicating | 484C134-02 | 1 |
| 36a. | Non-Indicating | 484C134-01 | 1 |
| 37 | Name Plate | 236A112-01 | 1 |
| 38 | Movement | 532B188-01 | 1 |
| **ADDITIONAL GROUPS FOR INDICATING SERIES** | | | |
| 39 | Post | 273A104-01 | 1 |
| 40 | Screw (Movementless Mtg.) | 112A001-02 | 1 |
| 41 | Link | 311A128-01 | 1 |
| 42 | Screw (Link) | | 1 |
| 43 | Stop | APF-6978 | 1 |
| 44 | Dial | As Required | 1 |
| 45 | Screw – Dial Mtg. – Upper | 112A345-02 | 1 |
| 46 | Screw – Dial Mtg. – Lower | 112A001-02 | 2 |
| 47 | Pointer | 244A166-0 | 1 |
| 48 | Gasket | 124A120-01 | 1 |
| 49 | Window | AMP-5334 | 1 |
| 50 | Ring | 158B112-01 | 1 |
| 51 | Screw (Ring Mounting) | 112A001-02 | 3 |
| 52 | Gasket | 124A121-01 | 1 |
| **ADDITIONAL GROUPS FOR XMV VARIATION (METAL TUBING) PER FIG. 9** | | | |
| 1 | Base Plate | 295B243-01 | 1 |
| 2 | Flexure | 241B137-(as req'd.) | 1 |
| 3 | Washer (Nozzle) | 122A162-01 | 1 |
| 4 | Screw (Nozzle) | 112A106-07 | 1 |
| 5 | Manifold Assembly | 295B268-01 | 1 |
| 6 | Gasket | 124A157-01 | 1 |
| 7 | Screw | 112A001-05 | 2 |
| 8 | Relay | 043C103-03 | 1 |
| 9 | Coupling | 255A126-01 | 2 |

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