



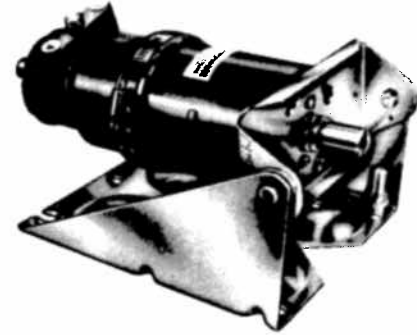
INSTALLATION INSTRUCTIONS

MP903A&B MP904A&B PNEUMATIC DAMPER OPERATORS

BEFORE INSTALLING, NOTE: _____

CAUTION: The operator will not function if the diaphragm is wrinkled. When the operator is installed and connected to a sealed air line, the diaphragm will wrinkle if the piston is pulled out by manually opening the dampers. Vacuum created by the piston being pulled away causes the diaphragm to collapse. When the dampers are released, the operator spring causes the piston to snap back and pinch or wrinkle the diaphragm.

When the operator is to be installed internally on a damper not provided with appropriate mounts, use Mounting Kit 14000716-001. See installation instructions packed with kit.



If the damper is normally open and the drive blade is not or cannot be slotted, use Reversing Linkage Kit 14000693-001 for MP904 operators, and 14000693-002 for MP903 operators. See installation instructions packed with kit.

INSTALLATION _____

HIGH VELOCITY MIXING BOXES

The damper operators are usually installed by the mixing box manufacturer and are ready to be connected to the controller. Specific fittings for various manufacturer's units are illustrated in Form No. 75-2556.

DAMPER MOTORS—EXTERNALLY MOUNTED

Refer to Figures 1, 2, and 3.

If mounting conditions at the duct wall are unfavorable, the damper operator may be right-angle mounted on the top or bottom of the duct. The drive axis is then at right angles to the bracket mounting surface; the pushrod strokes through the vee slot in the mounting bracket. Refer to Fig. 1.

The universal mounting bracket can be installed near the damper drive shaft on the duct wall. A bag supplied with the unit contains the crank-arm, ball joint, pushrod, and clevis assembly, (2, 3, 4, and 5, Fig. 3) used to link the operator to the damper shaft. When connected to the operator, this drive shaft is parallel to the base of the mounting bracket. (Note the position of the motor within its mounting bracket in Figures 2 and 3.

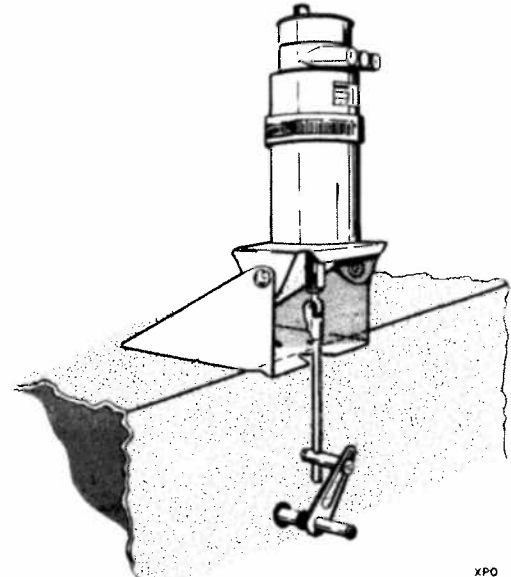


Fig. 1—Right Angle Mounting.

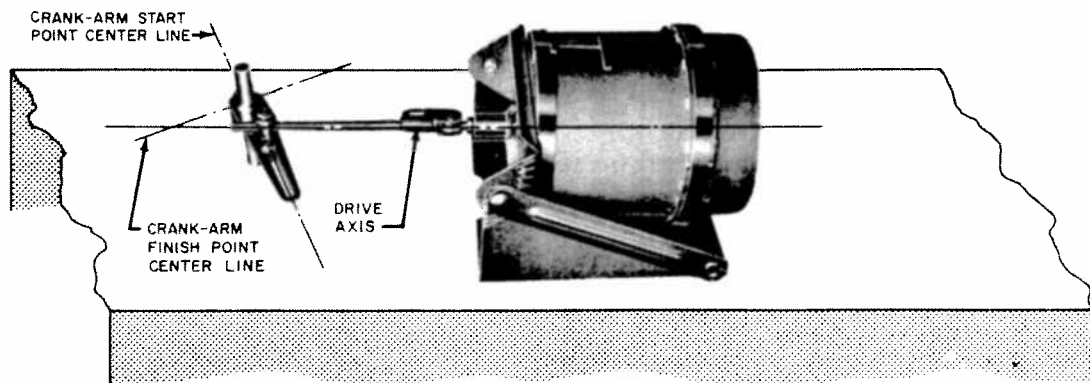
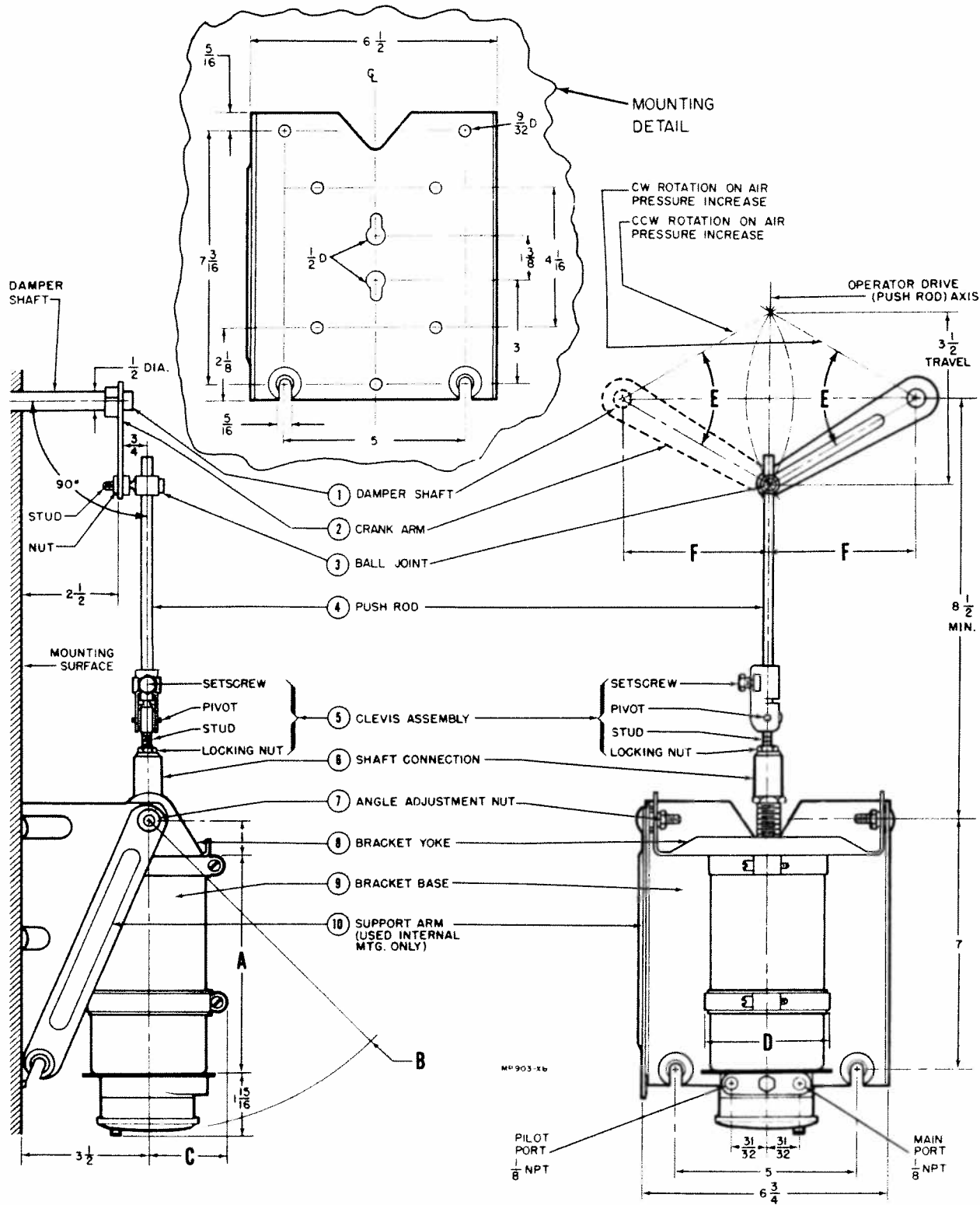


Fig. 2—Externally Mounted MP904B Damper Operator.



| Mounting Dimensions | | | | |
|---------------------|------------|---------|-------|-------|
| Model No. | Dimensions | | | |
| | A | B | C | D |
| MP903A | 6-1/16 | 9-7/16 | 2-1/2 | 3-3/4 |
| MP903B | 6-1/16 | 7-5/8 | 2-1/2 | 3-3/4 |
| MP904A | 6-15/16 | 10-5/16 | 3-5/8 | 6-1/4 |
| MP904B | 6-15/16 | 8-7/8 | 3-5/8 | 6-1/4 |

| Adjustments CW & CCW | |
|-------------------------|----------------|
| Angular Travel | Shaft Location |
| E | F |
| 90° | 2 |
| 75° | 2-7/16 |
| 60° | 3-1/16 |
| 45° | 4-1/8 |

Fig. 3—Externally Mounted MP903A Damper Operator Dimensions and Detail. MP904A Similar.

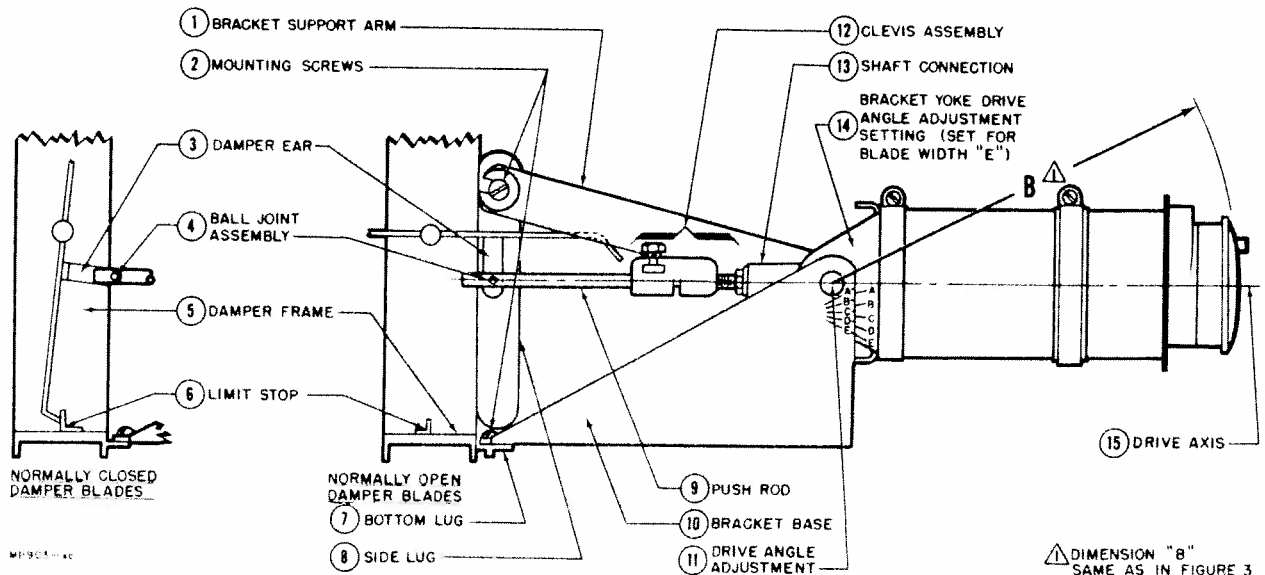


Fig. 4—Typical Internal Installation.

DAMPER OPERATOR—INTERNAL MOUNTING

Refer to Figures 4 and 5.

Normally Open or Closed Damper

Note the position of the operator on the mounting bracket in Figure 4. The operator DRIVE AXIS (15) is set for damper blade width by means of lettered scales on the yoke (14) and the base of the bracket (10). The scales are set to coincide at letters stamped near the drive ear on the drive blades of Honeywell Dampers. Linkage from the shaft connection (13) to the damper ear (3) is supplied in the bag of parts furnished with the unit.

PROCEDURE:

1. Loosen the drive angle adjustment nuts (11) and swing the operator and yoke (14) until the scale letters coincide to letters stamped on the damper drive blade. Tighten the adjustment nuts.
2. Engage the two mounting slots of the bracket base (10) on the screws in the bottom damper lug (7).
3. Engage the slot in the bracket support arm (1) on the mounting screw in the side damper lug (8). Tighten the screws on all damper lugs.
4. Install the ball-joint assembly (4) on the damper ear (3).
5. Screw the stud of the clevis assembly (12) into the operator shaft connection (13). The clevis assembly must be in the position shown in Figure 4 to provide proper pivot action for the push-rod.
6. Turn the locking nut on the clevis assembly down against the face of the operator shaft connection and tighten.
7. Insert the pushrod (9) into the ball-joint and clevis assemblies (4, 12). Tighten the clevis assembly setscrew.
8. Hold or block the damper blades at normal position (see Figure 4) and tighten the ball-joint to the push rod.

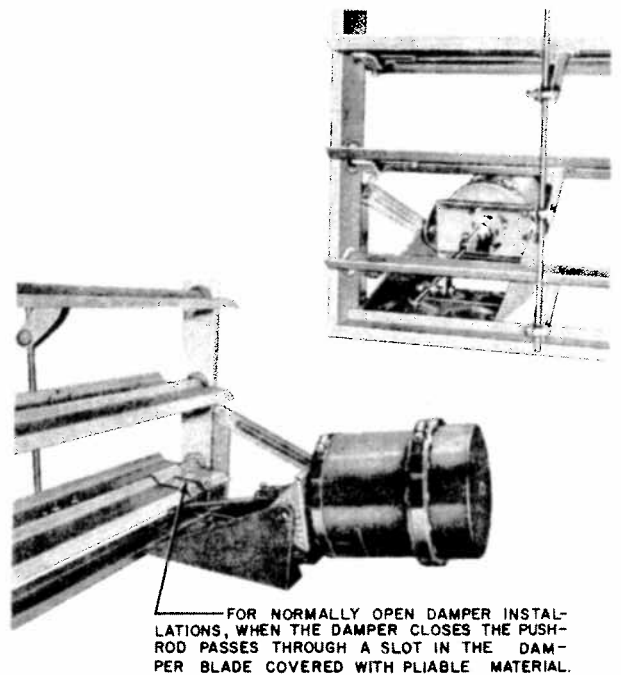


Fig. 5—Internal Installation.

NOTE: A damper position other than fully closed or fully open at the start of stroke can be adjusted at the ball-joint connection to the pushrod. For dampers starting at a position other than fully closed and driving to fully open or in certain mixing box applications, the travel finish adjustment band on certain models of the MP903B only (7, Fig. 7) must be readjusted to reduce the length of operator stroke. This is to prevent overdriving the damper. Damper blades 7 inches and larger require the maximum 3-1/2 in. travel. Damper blades narrower than 7 inches require a 2-1/2 in. shaft travel. It should be noted that a 2-1/2 in. shaft travel adjustment will result in an actual operating range of 5/7 of the range of the operator (or 5/7 of the range set on an operator with a positioner). See the "Shaft Travel (Stroke) Limiting Adjustment" section under "ADJUSTMENTS".

AIR CONNECTION

Three 1/8 NPT air ports are provided on the positioners of the MP903A and MP904A. Connect the main air supply to the port marked "M" and the pilot air line to the port marked "P". For multiple operators on the same damper, one or more MP903B operators can be controlled from an MP903A positioner (and one or more MP904B operators from an MP904A positioner). In this case, connect the air line from the MP903B (or -4B) to the "B" port on the positioner (See Figure 6). If this "B" tapping is not used, plug the port. (Use the plug provided).

NOTE: On some installations it may be necessary to swivel the positioner to provide access to the ports.

PROCEDURE:

1. Insert a screwdriver or similar tool into the slots in the positioner locking plate (15, Fig. 7).
2. Turn the plate counterclockwise until the positioner unlocks.
3. Prevent pipe dope, chips, oil, or other material from entering the air piping.
4. Install the ball-joint assembly (4) on the damper ear (3).
5. Tubing should be cut off squarely and cleanly, and the burrs removed.
6. If tubing is bent close to the connector nut, make the bend before inserting the tubing.
7. Make connections air tight.

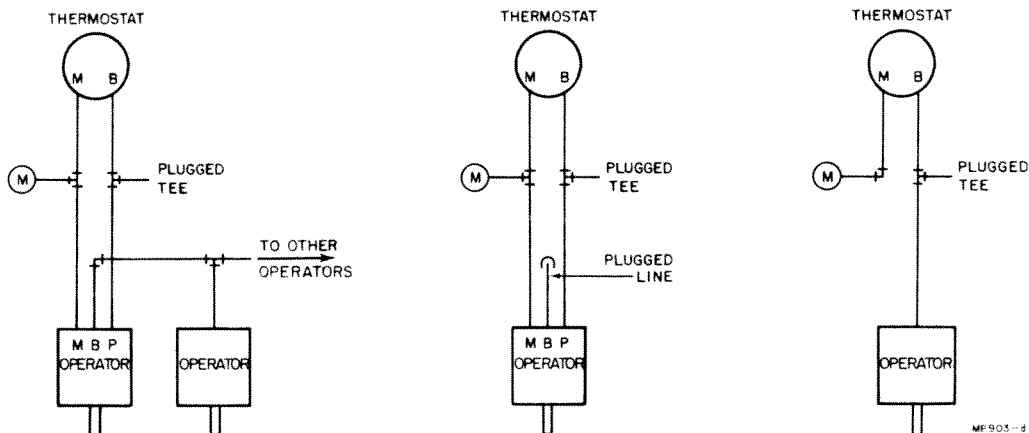


Fig. 6—Typical Piping Diagrams, With and Without Gradutrol* Relay.

ADJUSTMENTS

GRADUTROL RELAY

OPERATING RANGE AND START POINT

The range adjustment screws position the range rings to increase or decrease the area of the pilot diaphragm. This determines the pilot pressure change necessary to move the operator through its entire stroke. Decreasing the effective area of the diaphragm increases the operating range. These screws may be adjusted to give operating ranges of three, five, or ten psi.

The start point is adjusted by turning the start point adjustment knob which changes the pre-load on the pilot diaphragm created by the start point spring. The start point knob has an external calibration scale and may be adjusted from three to ten psi.

PROCEDURE:

Using a stat wrench (part no. 301572A), loosen the cover locking screw. Unscrew the start point adjustment knob and make adjustments according to the directions printed inside the cover as follows:

1. 3 lb. range, all screws backed off to the friction stop.
2. 5 lb. range, plated screws tightened. Black screws backed off to the friction stop.
3. 10 lb. range, all screws tightened.

*Trademark

Start Point Adjustment

1. Tighten the cover until it bottoms.
2. Back the cover off (one turn max.) until the desired start point of the correct range scale lines up with the indicator near the "B" marking.

Adjustment Check

1. Install gages in the main and pilot air lines.
2. Slowly apply pilot pressure and note the pressure at which the operator starts to move. This pressure should be within $\pm 3/4$ psi of the start point setting.
3. Slowly increase pilot pressure until the operator travel is complete. The pressure should be within $\pm 3/4$ psi of the startpoint pressure plus the range setting.
4. Make find adjustment, if needed, with the start point adjustment knob.
5. Tighten the cover locking screw.

SHAFT TRAVEL (STROKE) LIMITING ADJUSTMENT

Refer to Figure 7.

This adjustment consists of two sliding limit stops positioned by a steel band and clamp screw (6, 7). The operator is factory-set for a maximum 3-1/2 in. shaft

travel. It should be noted that a reduction in stroke also reduces the operating range. The actual operating range is equal to—

Actual travel set on operator x either
 $\frac{3-1/2}{3-1/2}$ (1) range of operator less positioner
 or
 (2) range set on operator with positioner.

EXAMPLE: A 5 in. damper is used which requires a 2-1/2 in. travel. The operator has a positioner with

a 5 psi range set in. The actual operating range would be:

$$\text{Actual operating range} = \frac{2-1/2 \text{ in.}}{3-1/2 \text{ in.}} \times 5 \text{ psi} = 3.5 \text{ psi}$$

PROCEDURE:

Refer to Figure 7.

1. Cut-off the air pressure to the operator.
2. Loosen the clamp screw (6).
3. Slide the adjustment band (7) back.
4. Slowly increase air pressure until the desired damper blade finish position is obtained. Tighten the clamp screw.

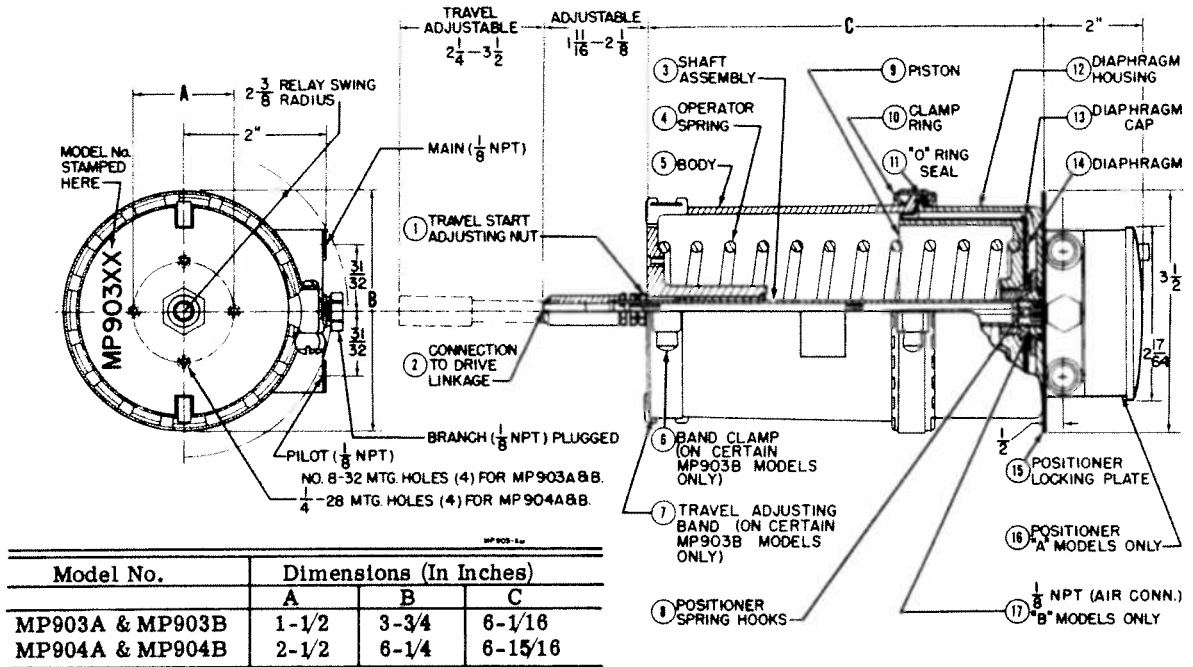


Fig. 7—MP903 and MP904 Dimensions and Details (MP903 Shown).

Mechanical devices must be serviced periodically if they are expected to give continued satisfactory performance, and controls are not an exception. How accurate and how trouble-free your control system will be in the years to come depends largely on the maintenance given it. For best results, all devices in your system should be serviced at one time.

Time and trouble can be saved by arranging with Minneapolis-Honeywell for a maintenance agreement which will guarantee expert, economical care, and insure maximum life and efficiency from your system.