

# 3570 Series Pneumatic Valve Positioners

## Contents

<b>Introduction</b> .....	2
Scope of Manual .....	2
Description .....	2
Valve Positioner Type Numbers .....	2
Specifications .....	4
<b>Installation, Mounting, and Connections</b> .....	4
Installation .....	4
Diagnostic Test Connections (Optional) .....	4
Connections:	
Piping Sizes .....	4
Vent .....	4
Supply Pressure Connections .....	6
Cylinder Connections .....	7
Instrument Connection .....	7
<b>Operating Information</b> .....	7
Initial Adjustments .....	7
Signal Range Codes .....	8
Frequency Response .....	8
Adjustment Procedures .....	8
Changing Positioner Action .....	12
Split Range Operation .....	13
Initial Range Spring Extension Procedure for Type 3570P and 3570PC Positioners .....	13
<b>Principle of Operation</b> .....	14
Type 3570, 3570C, 3570P, 3570PC, and 3571 Valve Positioners .....	14
Type 3572 and 3576 Valve Positioners .....	15
Type 3573 and 3577 Valve Positioners .....	16
Relay Operation .....	16
<b>Maintenance</b> .....	17
Troubleshooting .....	18
Converting a Type 3570 Valve Positioner to a Type 3570C Valve Positioner .....	18
Range Spring .....	19
Disassembly .....	19
Assembly .....	20
Bias Spring .....	20
Disassembly .....	20
Assembly .....	20



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Figure 1. Type 3570 Positioner Mounted on Type 470 Actuator

<b>Parts Ordering</b> .....	20
<b>Parts Kits</b> .....	20
Positioner Repair Kits .....	20
Diagnostic Test Connection Kits .....	20
<b>Parts List</b> .....	21
Positioner Common Parts .....	21
Relay Assembly Parts .....	23



# 3570 Series

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## Introduction

### Scope of Manual

This manual provides installation, operation, adjustment, maintenance, and parts ordering information for the 3570 Series pneumatic valve positioners. The various product types within this series are described later in this manual. Please refer to figure 1 for a typical mounting of a Type 3570 positioner. Refer to separate instruction manuals for information concerning the actuator, valve, and accessories.

#### Note

**Only personnel qualified through training or experience should install, operate, and maintain these positioners. If there are any questions concerning these instructions, contact your Fisher sales representative or sales office before proceeding.**

### Description

The 3570 Series pneumatic valve positioners are used with control valve assemblies to provide an accurate valve stem position that is proportional to the input signal received from a control device. The input signal range can be 3 to 15 psig (0.2 to 1.0 bar), 6 to 30 psig (0.4 to 2.0 bar), or another pneumatic input signal range, as required.

These positioners are normally used with pneumatic piston actuators. However, product types within the 3570 Series can be used with pneumatic, long-stroke, cylinder actuators or with pneumatic diaphragm actuators.

### Valve Positioner Type Numbers

**Type 3570** — Pneumatic valve positioner with two relays for use with Fisher 470 and 480 Series pneumatic piston actuators. See figure 2. The positioner includes three pressure gauges for input signal, for relay output pressure to the top of the actuator cylinder, and for relay output pressure to the bottom (piston underside) of the actuator cylinder.

The Type 3570 positioner is mounted on the top of the actuator cylinder. The actuator stem position feedback is provided through extension of the range spring attached to the actuator piston rod.

**Type 3570C** — Pneumatic valve positioner with automotive tire valves instead of pressure gauges. Tire valves can be used for clip-on test pressure gauges.

The relay nozzles are locked in place with locknuts to resist unwanted nozzle movement due to vibration.

**Type 3570P** — Pneumatic valve positioner with two relays for use with Fisher 490 Series pneumatic piston actuators. The positioner includes three pressure gauges for input signal, for relay output pressure to the top of the actuator cylinder, and for relay output pressure to the bottom (piston underside) of the actuator cylinder.

The Type 3570P positioner is mounted alongside the actuator cylinder. Actuator stem position feedback is provided from the actuator-valve stem connector through a cable and spool assembly.

**Type 3570PC** — Pneumatic valve positioner with automotive tire valves instead of pressure gauges. Tire valves can be used for clip-on test pressure gauges. The relay nozzles are locked in place with locknuts to resist unwanted nozzle movement due to vibration.

**Type 3571** — Pneumatic valve positioner with two relays for use with long-stroke cylinder actuators. The positioner includes three pressure gauges for input signal, for relay output pressure to the top of the actuator cylinder, and for relay output pressure to the bottom (piston underside) of the actuator cylinder.

The Type 3571 positioner is bracket-mounted to the side of the actuator. Actuator stem position feedback is provided through a wire from the actuator-valve stem connector.

**Type 3572** — Pneumatic valve positioner with one relay. The Type 3572 positioner is normally used on the Fisher Type 472 pneumatic piston actuator mounted on valve bodies having push-down-to-open (PDTO) action. The positioner includes two pressure gauges. The pressure gauges monitor input signal pressure and relay output pressure to the top of the actuator cylinder.

The Type 3572 positioner is mounted on the top of the actuator cylinder. Actuator stem position feedback is provided through an extension of the actuator piston rod.

**Type 3573** — Pneumatic valve positioner that is similar to Type 3572 positioner with the relay output pressure piped to the bottom (piston underside) of the actuator cylinder. The Type 3573 positioner is normally used on the Fisher Type 473 pneumatic piston actuator with valve bodies having push-down-to-close (PDTC) action.

**Type 3576** — Pneumatic valve positioner with one relay for use on direct-acting pneumatic diaphragm actuators that require high operating pressures. The Type 3576 positioner includes two pressure gauges. The pressure gauges monitor input signal pressure and relay output pressure to the top of the actuator diaphragm.

Table 1. Specifications

<p><b>Available Configurations</b></p> <p>See the positioner type number descriptions given above.</p> <p><b>Input Signal<sup>(1)</sup></b></p> <p><b>Standard Ranges:</b> 3 to 15 psig (0.2 to 1.0 bar) or 6 to 30 psig (0.4 to 2.0 bar)  <b>Optional Ranges:</b> As desired, within the limits of the bellows  <b>Split Ranges:</b> Use one-half of either standard range when two control valves are operated by one output signal from a single control device</p> <p><b>Output Signal<sup>(1)</sup></b></p> <p><b>Type:</b> Pneumatic pressure as required to maintain the correct valve stem position and seat load  <b>Action:</b> Field-reversible between direct and reverse</p> <p><b>Resolution<sup>(1)(2)</sup></b></p> <p>0.2% of instrument pressure span</p> <p><b>Repeatability<sup>(1)(2)</sup></b></p> <p>0.3% of total stroke or instrument pressure span</p> <p><b>Frequency Response<sup>(1)(2)</sup></b></p> <p>See figure 5</p> <p><b>Pressure Connections</b></p> <p><b>Vent:</b> 3/8-inch NPT  <b>All others:</b> 1/4-inch NPT</p>	<p><b>Pressure Indications</b></p> <p><b>Type 3570C and 3570CP Positioners:</b> Tire valves accept standard pressure gauge chucks (gauges not supplied)  <b>All Other Types:</b> Gauges supplied per table 2</p> <p><b>Bellows Pressure Rating</b></p> <p><b>Standard Bellows:</b> 50 psig (3.4 bar)  <b>Optional Bellows:</b> 90 psig (6.2 bar)</p> <p><b>Supply Pressure</b></p> <p><b>Maximum:</b> 150 psig (10.4 bar)  <b>Minimum:</b> 35 psig (2.4 bar)</p> <p><b>Steady-State Air Consumption<sup>(3)</sup></b></p> <p>20 scfh (0.54 normal m<sup>3</sup>/h) with 100 psig (6.9 bar) supply pressure</p> <p><b>Operative Ambient Temperature Limits<sup>(1)(2)</sup></b></p> <p><b>With Nitrite O-Rings and Diaphragms:</b> -30 to 160°F (-34 to 71°C)  <b>With Fluoroelastomer O-Rings and Polyacrylate Diaphragms (Optional):</b> 0 to 220°F (-18 to 104°C)</p> <p><b>Options</b></p> <p>■ Type SS-52 clip-on chuck (with or without gauge) for Type 3570C positioners; ■ restrictor (high-frequency filter for bellows)</p> <p><b>Approximate Weight</b></p> <p>6 pounds (2.7 kg) without optional mounting bracket or actuator/valve assembly</p>
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1. These terms are defined in ISA Standard S51.1:1979.  
2. For a Type 3570 or 3570C positioner mounted on a Type 470 or 480 actuator. Values do not apply to other constructions or actuator-valve combinations.  
3. Scfh at 60°F, 14.7 psia (m<sup>3</sup>/h at 0°C, 1.01325 bar, absolute).

Table 2. Pressure Indications

PRESSURE MONITORED	NUMBER OF GAUGES SUPPLIED		STANDARD GAUGE RANGE <sup>(1)</sup>
	Two-Relay Positioner	One-Relay Positioner	
Positioner input signal pressure	1	1	0-30 psi/0-0.2 MPa/0-2 bar or 0-60 psi/0-0.4 Mpa/0-4 bar
Cylinder (relay output) pressure	2	1	0-160 psi/0-1.1 MPa/0-11 bar

1. For gauges marked in other units and ranges, consult your Fisher sales representative or sales office.

The Type 3576 positioner is bracket-mounted to the actuator yoke. Actuator stem position feedback is provided through a wire from the actuator-valve stem connector.

Table 3. Action Under Normal Operating Conditions

POSITIONER ACTION	DESIRED PISTON MOTION <sup>(1)</sup>	
	Down	Up
Direct-acting	Increasing input signal pressure to bellows	Decreasing input signal pressure to bellows
Reverse-acting	Decreasing input signal pressure to bellows	Increasing input signal pressure to bellows

1. Supply pressure is routed through relays to piston.

**Type 3577** — Pneumatic valve positioner that is similar to Type 3576 positioner with the relay output pressure piped to the underside of the actuator diaphragm on reverse-acting pneumatic diaphragm actuators.

## Specifications

Specifications for the 3570 Series positioners are listed in table 1.

# 3570 Series

## Installation, Mounting, and Connections

### Installation

The positioner is usually mounted on the actuator at the Fisher Controls' factory. However, if the positioner and actuator are ordered separately, it is necessary to mount the positioner on the actuator. Before mounting the positioner, be certain the O-ring (key 33, figure 11) is in place in the cylinder (top connection) in the base of the positioner.

For appropriate actuator/positioner combinations, refer to the positioner type number descriptions given earlier in this instruction manual.

- **For Type 3570, 3570C, 3572, and 3573 positioners**, mount the positioner with two cap screws (key 32, figure 11). If the range and bias springs are not installed in the positioner, refer to the range spring and bias spring procedures in the Maintenance section.

Insert the threaded end of the spring retainer (key 19, figure 3) into the center of the range spring (see figure 3). Then, insert a screwdriver into the center of the range spring and extend the spring until the spring retainer can be screwed into the top of the actuator piston rod extension. Tighten the spring retainer into the top of the actuator piston rod extension. If the range spring and/or bias spring is not installed in the positioner, refer to the procedures for either spring in the Maintenance section.

- **For Type 3570P and 3570PC positioners**, attach the positioner extension and positioner to the cylinder mounting plate with the two cap screws (key 100, figure 13). Make the required pressure connections as described in the following procedure. Go to the initial range spring extension procedures for Type 3570P and 3570PC positioners.

- **For Type 3571, 3576, and 3577 positioners**, insert two cap screws through the holes in the mounting bracket (key 55, figure 14) to attach the positioner to the actuator mounting boss. Attach the hex drive stud to the actuator-valve stem connection. Attach the end bearing (key 56E, figure 14) to the hex drive stud.

### **Diagnostic Test Connectors (Optional)**

Diagnostic test connectors are available from the factory, when the unit is ordered, or they can be installed on an existing control valve assembly in the field. These connectors are especially useful for "quick" connections when using the FlowScanner™. The FlowScanner™ is a portable, microprocessor-based diagnostic and calibration system specifically designed for use with pneumatically-operated control valves.

To support diagnostic testing of the control valve assembly, the connectors, piping, and other hardware can be installed between the 3570 Series positioner and the actuator. A typical connector installation is shown in figure 4. For connectors, please refer to the FlowScanner™ Diagnostic Connection kit listing in the parts list.

The hardware used includes 3/4-inch NPT pipe nipple, pipe tee, and pipe bushings with a 1/8-inch NPT pipe bushing for the connector. The connector consists of 1/8-inch NPT body and body protector (see figure 4).

1. Before assembling the pipe nipple, pipe tee, pipe bushings, actuator piping, and connector body, apply sealant to all threads.
2. Position the pipe tee, connector body, and body protector for easy access when doing diagnostic testing.

## Connections

### **Piping Sizes**

All pressure connections on the 3570 Series positioners are 1/4-inch NPT (female). Use 3/8-inch pipe or tubing for supply, cylinder (bottom connection), and instrument (input signal) connections. For the remote vent pipe, if one is required, use 3/4-inch (19 mm) (minimum inside diameter) pipe for runs up to 20 feet (6.09 meters). For vent piping runs from 20 to 100 feet (6.09 to 30.5 meters), use 1-inch (25.4 mm) (minimum inside diameter) pipe. Refer to figure 2 for the locations and sizes of connections.

### **Vent**



**If a flammable, toxic, corrosive, or reactive gas is to be used as the supply pressure medium, personal injury or property damage could result from fire or explosion of accumulated gas or from contact with toxic, corrosive, or reactive gas. The positioner/actuator assembly does not form a gas-tight seal, and when the assembly is enclosed, a remote vent line, adequate ventilation, and necessary safety measures should be used. A remote vent pipe alone cannot be relied upon to remove all hazardous gas. Vent line piping should comply with local and regional codes and should be as short as possible with adequate inside diameter and few bends to reduce case pressure buildup.**

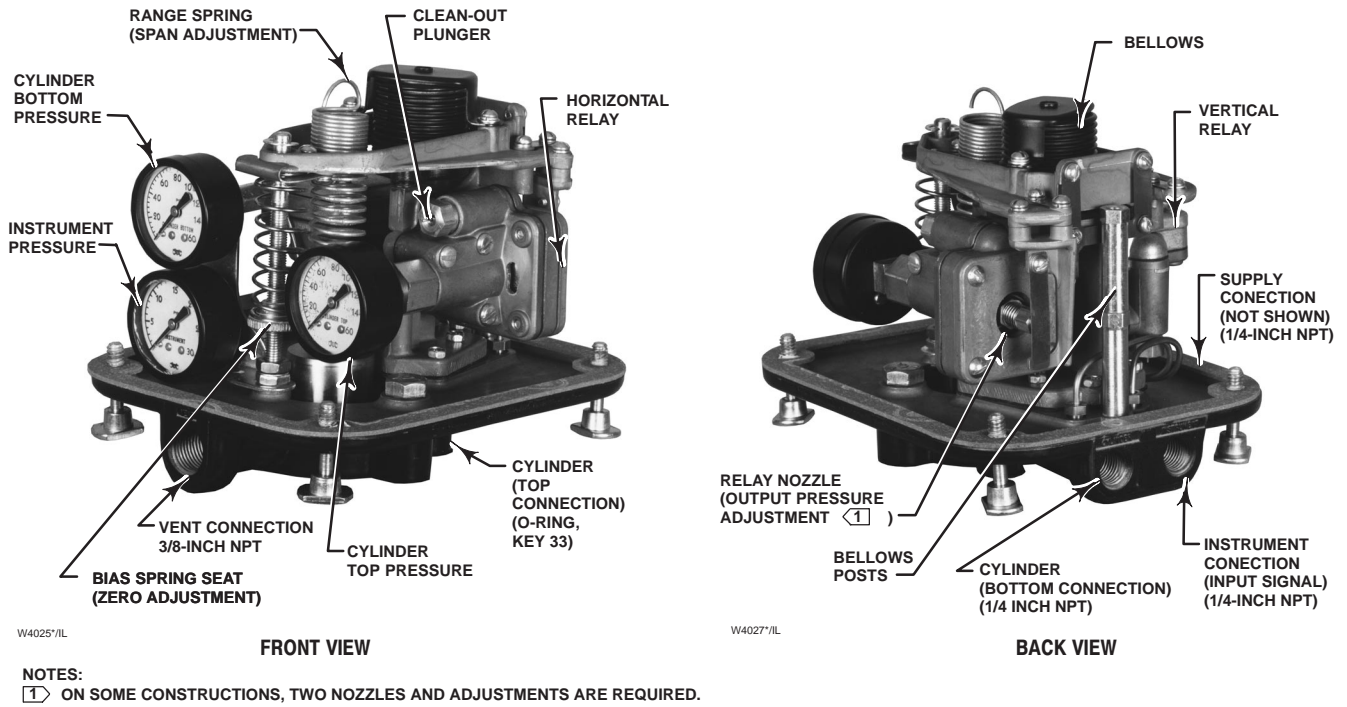
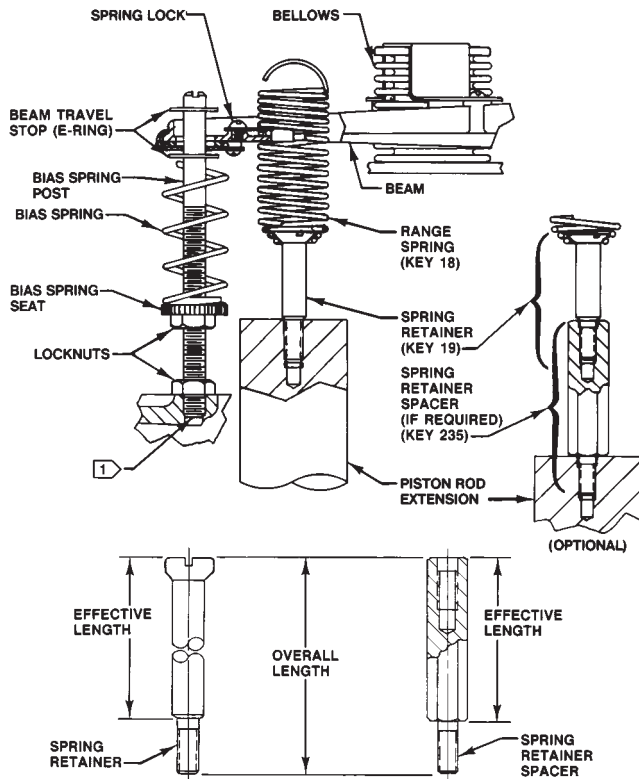


Figure 2. Typical Location of Type 3570 Positioner Parts and Adjustments

NOTES:  
 1 ON SOME CONSTRUCTIONS, TWO NOZZLES AND ADJUSTMENTS ARE REQUIRED.



NOTE:  
 1 BOTTOM OF BIAS SPRING POST THREAD MUST BE POSITIONED AS SHOWN FOR PROPER POSITION OF E-RING TRAVEL STOPS.  
 AJ7270-C  
 1H8907-C  
 1J2233-C  
 B2402/IL

Figure 3. Bias and Range Springs for Zero and Span Adjustments

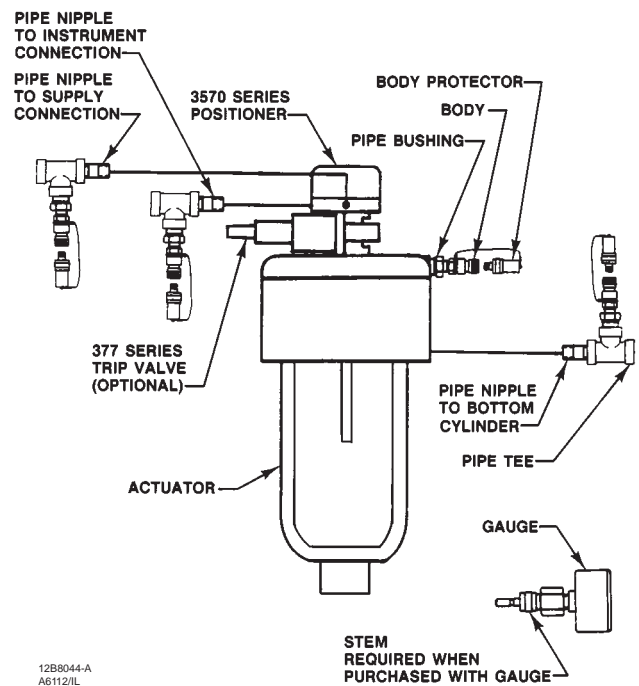


Figure 4. Diagnostic Test Connections

# 3570 Series

## CAUTION

When installing a remote vent pipe, take care not to overtighten the pipe in the vent connection. Excessive torque will damage the threads in the connection.

### Note

The vent connection is always plugged with a pipe plug for Type 3570P and 3570PC positioners when mounted on Fisher 490 Series actuators.

The connection marked VENT (see figure 2) should be left open if the actuator is installed in the vertical position. However, the vent must be protected against the entrance of any foreign material that could plug it. Check the vent periodically to be certain it is not plugged.

If the actuator is mounted in other than the vertical position, be sure there is a vent and drain at the lowest point of the positioner. To do this, remove the pipe plug (key 36, figure 10) from the cover. Then, position the cover in such a way that the hole in the cover is at the lowest point. Plug the vent connection because the positioner is now vented through the cover.

### Note

A remote vent is not possible with Type 3570P, 3570PC, 3571, 3576, and 3577 positioners.

If a remote vent is required, the vent line must be as short as possible with a minimum number of bends or elbows. Vent line piping should have a minimum inside diameter of 3/4 inches (19 mm) for runs up to 20 feet (6.09 meters) and a minimum inside diameter of 1-inch (25.4 mm) for runs from 20 to 100 feet (6.09 to 30.5 meters).

## Supply Pressure Connections

## WARNING

Personal injury or property damage may occur from an uncontrolled process if the supply medium is not clean, dry, oil-free, or non-corrosive gas. Industry instrument air quality standards describe acceptable dirt, oil, and moisture content. Due to the variability in nature of the problems these

influences can have on pneumatic equipment, Fisher Controls has no technical basis to recommend the level of filtration equipment required to prevent performance degradation of pneumatic equipment. A filter or filter regulator capable of removing particles 40 microns in diameter should suffice for most applications. Use of suitable filtration equipment and the establishment of a maintenance cycle to monitor its operation is recommended.

## WARNING

To avoid personal injury or property damage resulting from the sudden release of pressure, do not install the valve assembly where service conditions could exceed the limits given in this manual or on the appropriate nameplates. Use pressure-relieving devices as required by government or accepted industry codes and good engineering practices.

## CAUTION

If the supply pressure medium is corrosive, make sure the tubing and instrument components that contact the corrosive medium are of suitable corrosion-resistant material. The use of unsuitable materials might result in personal injury or property damage due to the uncontrolled release of the corrosive media.

The connection marked SUPPLY (see figure 2) must be provided with clean, dry air or a non-corrosive gas. Install a 40-micron filter and suitable equipment to dry the supply medium. Establish a maintenance cycle to ensure that the regulator and filter are working correctly.

The maximum allowable supply pressure to prevent damage to the components of the positioner, actuator, and valve is normally stamped on the actuator nameplate. Use a suitable supply pressure regulator to reduce the supply pressure source to the value stamped on the nameplate.

If this maximum supply pressure value is not available, use a supply pressure that does not exceed any of the following:

- The maximum supply pressure for the positioner as shown in table 1.

- The maximum pressure rating of the actuator, from the appropriate actuator instruction manual.
- The maximum allowable valve plug stem load for the specific valve body assembly being used. Contact your Fisher sales representative or sales office for valve plug stem load information, if required.
- For diaphragm actuators, refer to the actuator instruction manual for the recommended supply pressure and use the larger value of the range listed.

The recommended supply pressure for use with piston actuators is the highest available supply pressure between 50 psig (3.4 bar) and the maximum limit determined by the actuator and positioner specifications. Selecting the highest pressure within the limits will minimize load error and will maximize stroking speed and thrust. For the lowest supply pressure that will assure satisfactory performance, the factors of valve plug unbalance force, valve plug seating force, and frictional force must be considered in the following relationship:

$$\text{Supply pressure, = } 98 \left[ \frac{(\text{Valve unbalance, kg}) + (\text{Seating force, kg}) + (\text{Frictional force, kg})}{(\text{Area of the actuator piston, in square mm})} \right] + 0.7 \text{ bar}$$

or

$$\text{Supply pressure, = } \left[ \frac{(\text{Valve unbalance, pounds}) + (\text{Seating force, pounds}) + (\text{Frictional force, pounds})}{(\text{Area of the actuator piston, in square inches})} \right] + 10 \text{ psig}$$

Consult your Fisher sales office or sales representative for the appropriate values for specific actuators, valves, and service conditions. The 10 psig (0.7 bar) is added to the equation to account for an approximate 10 psi (0.7 bar) differential pressure loss in the positioner. For spring-return piston actuators, the pressure required to compress the actuator spring completely must also be considered.

## Cylinder Connections

1. The connection marked CYLINDER (see figure 2) is connected at the factory to the lower part of the cylinder (bottom) or to the lower diaphragm casing if the positioner is used with a pneumatic diaphragm actuator.
2. The cylinder top connection is a pressure passage located in the bottom of the positioner base (key 1, figure 10). On Type 3570 and 3570C positioners, an O-ring (key 33, figure 10) is used between the bottom of the positioner and the top of the actuator. On Type

3570P, 3570PC, 3571, 3576, and 3577 positioners, a mounting bracket (key 55, figure 13) is required. This mounting bracket connects to the bottom of the base. An O-ring (key 33, figure 10) is placed between the base and mounting bracket. This mounting bracket provides a 1/4-inch NPT connection for the positioner output. This connection is made at the factory if the positioner is ordered mounted to the actuator or if the mounting bracket is installed.

## Instrument Connection

The connection marked INSTRUMENT (see figure 2) connects to the output signal connection of the control device. The positioner operates only on a pneumatic input signal; the input signal range is marked on the nameplate (key 23, figure 10). The maximum allowable input signal for positioners with standard or optional bellows is in table 1 (bellows pressure rating). The instrument connection is made at the factory when a complete control valve assembly with a valve-mounted control device is ordered. Otherwise, make field connections to the positioner from an appropriate control device. Refer to table 1 and the nameplate for input signal pressure ranges.

## Operating Information

### Initial Adjustments

Normally, no adjustments are necessary upon initial installation. The positioner is set at the factory for the travel, input signal range, and action specified in the order. Adjustment is necessary when operating conditions are changed, when the unit has been dismantled and reassembled, or when the control valve travel does not correspond to the desired input signal range. If the operating conditions have not changed but the positioner requires adjustment, refer to the adjustment procedures in this section. If the operating conditions have changed, first, refer to the signal range code descriptions, then, refer to the adjustment procedures.

### Signal Range Codes

The range spring and the bias spring are matched to a specific input signal range and length of travel. Also, the spring retainer length is matched to the application on the Type 3570, 3570C, 3572, and 3573 positioners. Refer to figure 3 for location of parts.

The signal range codes in table 4 are based on the following applications:

- **Codes for valve travels up to and including 2 inches (50 mm)** are used for actuators that have a

# 3570 Series

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2-inch (50 mm) maximum travel. If the actuator maximum travel is greater than 2 inches (50 mm), an additional retainer spacer (key 235, see figure 3) is required. Refer to the parts list for the additional spring retainer spacer (key 235) part number.

- **Codes for valve travels greater than 2 inches (50 mm), up to and including 4-1/8 inches (105 mm)**, are used for actuators that have a 4-1/8 inch (105 mm) maximum travel, except the Types 480-12 or 480-15 Size 20 actuators which have a 2-1/8 inch (54 mm) maximum travel. If the actuator maximum travel is greater than 4-1/8 inches (105 mm), two additional spring retainers are required. Refer to the parts list for the additional spring retainer spacer (key 235) part numbers.

- **Codes for valve travels greater than 4-1/8 inches (105 mm), up to and including 8-1/8 inches (206 mm)**, are for actuators that have a 8-1/8 inch (206 mm) maximum travel. If the valve travel is 4-1/8 inches (105 mm) or less, two additional spring retainers are required. Refer to the parts list for the additional spring retainer spacer (key 235) part numbers.

If the input signal range and travel do not match any of the selections in table 4, consult your Fisher sales office or sales representative for information. To change the springs, refer to the range and bias spring procedures in the Maintenance section.

From table 4, select the signal range that matches your application. Find the travel length for the application under the signal range selected, then use the code (from the direct or reverse column) that matches the direct or reverse operation of the positioner.

The first number in the code is used to identify the range spring, the letter in the code is used to identify the bias spring, and the second number (after the letter) is used to identify the spring retainer. For example, from table 4, for a signal range of 0 to 15 psig (0 to 1.0 bar), an actuator travel of 9/16-inch (14.3 mm), and direct action, the signal range code from table 4 is 6G3. The "6" indicates the range spring. The "G" indicates the bias spring. The "3" indicates the spring retainer.

## Note

**It is necessary to add the bias spring seat (key 8) to a unit when changing from an extension type spring (key 9) to a compression type spring (key 48).**

When planning to change the bias spring in an existing unit, inspect the unit first to determine if the current bias spring is an extension type spring (key 9) or a compression type spring (key 48). To change from an

extension type spring to a compression type spring, it is necessary to add the bias spring seat (key 8). Refer to the appropriate procedures in the Maintenance section of this manual.

In some cases, it is necessary to add an additional spring retainer spacer or change from the standard bellows to the optional high pressure bellows. Table 4 footnotes indicate the use of an additional spring retainer spacer or high pressure bellows.

Use the code from table 4 while referring to tables 5, 6, and 7 to determine the part numbers for the range spring, bias spring, and spring retainer. Unless otherwise specified, use the standard bellows. Also, no spring retainer spacer is required unless the spacer is specified in the footnotes of table 4.

## Frequency Response

Figure 5 shows how a Type 3570 or Type 3570C positioner with Type 470 or Type 480 actuator responds when the input signal pressure is cycled at a small amplitude (3 to 5 percent), and at an increasing frequency. Assume the cycling input signal and the movement of the actuator rod are represented by sine waves. As the actuator rod is forced to move faster, its motion begins to fall behind the input signal in both time (shown as phase lag) and amplitude (shown as normalized gain).

## Adjustment Procedures

Refer to figure 3. The 3570 Series positioners have three adjustments:

- **The bias spring.** It is the zero adjustment which determines the starting point of the valve plug travel.
- **The range spring.** It is the span adjustment which determines the full valve plug travel for a given input signal range.
- **The relay nozzle adjustment.** This adjustment determines the steady-state positioner output pressure.

To illustrate the use of the various adjustments, assume that the positioner has been repaired or has become completely out of adjustment. Assume also that the input signal range is 3 to 15 psig (0.2 to 1 bar). Proceed as follows:

1. Make sure the input signal range and the valve travel stamped on the nameplate agree with the present operating conditions.
2. Loosen the four thumb screws on the underside of the positioner base and remove the cover.



# 3570 Series

Table 4. Type 3570 Signal Range Codes<sup>(9)</sup>

SIGNAL RANGE 0 to 15 psig (0 to 1.0 bar)				SIGNAL RANGE 3 to 9 psig (0.2 to 0.6 bar)				SIGNAL RANGE 3 to 15 psig (0.2 to 1.0 bar)				SIGNAL RANGE 3 to 15 psig (0.2 to 1.0 bar)			
Travel		Code		Travel		Code		Travel		Code		Travel		Code	
Inches	mm	Direct	Reverse	Inches	mm	Direct	Reverse	Inches	mm	Direct	Reverse	Inches	mm	Direct	Reverse
9/16	14.3	6G3	6D3	2-5/8	66.7	15G13	15A13	2-1/8 <sup>(2)</sup>	54	4G1	4B1	7-1/2	190.5	19G5	19C5
11/16	17.5	2G4	2G4	3	76.2	14G8	14A8	2-1/8 <sup>(8)</sup>	54	4G8	4B8	7.6	193	19G8	19C8
3/4	19	7A1	7C1	3-1/8	79.4	14G8	14A8	2-3/16	55.6	9G3	9B3	7-3/4	196.6	19G3	19B3
13/16	20.6	7G1	7B1	3-1/4	82.6	14G8	14A8	2-1/4	57.1	9G3	9B3	7-13/16	198.9	19G8	19B8
1-1/32	26.2	5A12	5D12	3-3/8	85.7	14G8	14A8	2-5/16 <sup>(2)</sup>	58.7	9G2	9B2	8	203.2	19G8	19B8
								2-11/32	59.5	9G3	9B3	8-1/8	206.4	19G12	19B12
								2-3/8	60.3	9G3	9B3	SIGNAL RANGE 3 to 27 psig (0.2 to 1.8 bar)			
1-1/8	28.6	5C8	5C8	3-1/2	88.9	14G8	14A8	2-1/2	63.5	9G3	9B3				
1-3/16	30.2	12A13	12C13	3-13/16	96.8	14G8	14A8	2-5/8	66.7	9B3	9B3	3/8	9.5	10A2	10D2
1-1/2	38.1	8G5	8B5	4	101.6	14G8	14A8	2-11/16	68.3	9G10	9B10	7/16	11.1	10A2	10D2
1-9/16	39.7	8G12	8B12	4-1/8	104.8	13G8	13A8	2-3/4	69.9	9G10	9B10	5/8	15.9	3A2	3D2
1-3/4	44.5	8G5	8A5	4-5/8 <sup>(1)</sup>	117.5	13G3	13A3	2-7/8	73	9G5	9B5	3/4	19	11A4	11D4
												7/8	22.2	11A5	11D5
2	50.8	8G5	8A5	5 <sup>(2)</sup>	127	13G4	13A4	2-15/16	74.6	9G5	9B5	1	25.4	2C5	2C5
3-1/8	79.4	9A3	9B3	6	152.4	13G3	13A3	3	76.2	9G12	9A12	1-1/8	28.6	2A5	2D5
4	101.6	9A12	9B12	6-1/2	165.1	13G3	13A3	3.09	78.5	9G8	9B8	1-1/4	31.8	5G4	5D4
4-1/8	104.8	9G1	9B1	7	177.8	13G8	13A8	3-1/8	79.4	9G7	9B7	1-5/16	33.3	2A12	2D12
5	127	21B8	21D8	8	203.2	18G8	18A8	3-1/4	82.6	9G10	9B10	1-1/2	38.1	2C10	2C10
				8-1/8	206.4	18G8	18A8								
SIGNAL RANGE 0 to 30 psig (0 to 2.0 bar)				SIGNAL RANGE 3 to 15 psig (0.2 to 1.0 bar)				SIGNAL RANGE 3 to 15 psig (0.2 to 1.0 bar)				SIGNAL RANGE 3 to 15 psig (0.2 to 1.0 bar)			
5/8	15.9	10D2	10D2	1/8	3.2	17H4	17H4	3-11/32	84.9	9G8	9B8	1.73	43.9	2G12	2D12
3/4	19	10D3	10D3	1/8 <sup>(5)</sup>	3.2	10D3	10D3	3-3/8	85.7	9G13	9B13	1-7/8	47.6	2G10	2C10
1	25.4	11A4	11D4	5/32	4	10D2	10H2	3-13/32	86.5	9G10	9B10	2	50.8	5G10	5D10
1-1/8	28.6	11A5	11D5	1/4	6.4	10B4	10H4	3-1/2	88.9	9G13	9B13	2-1/8	54	12A3	12D3
1-5/16	33.3	11A12	11D12	11/32	8.7	6A3	6C3	3-5/8	92	9G13	9B13	2-1/8 <sup>(8)</sup>	54	12G13	12D13
				3/8	9.5	6A3	6C3					2-1/2	63.5	1A3	1D3
1-1/2	38.1	11D12	11D12					3-21/32	92.9	9G8	9B8	3	76.2	1B12	1D12
2	50.8	2G5	2D5	7/16	11.1	6A4	6D4	3-3/4	95.3	9G8	9B8	3-1/8	79.4	1A12	1D12
2-1/8 <sup>(1)</sup>	54	12G7	12D7	0.469	11.9	6A4	6D4	3-13/16	96.8	9G8	9C8	3-1/4	82.6	4G1	4C1
2-1/8 <sup>(8)</sup>	54	12G10	12D10	1/2	12.7	7G1	7C1	3-15/16	100	21G8	21B8	3-1/2	88.9	4G4	4D4
3	76.2	12C3	12C3	0.582	14.8	5G4	5C4	4	101.6	21G8	21A8	4	101.6	4G1	4B1
3-1/8 <sup>(1)</sup>	79.4	12A8	12D8	5/8	15.9	7G3	7B3								
4	101.6	1G1	1D1					4 <sup>(5)</sup>	101.6	14G1	14A1	4-1/8	104.8	4G5	4D5
4-1/8	104.8	1G1	1C1	11/16	17.5	7G4	7B4	4-1/8	104.8	16G8	16B8	4-1/2 <sup>(6)</sup>	114.3	21A13	21D13
SIGNAL RANGE 3 to 9 psig (0.2 to 0.6 bar)				3/4	19	7G4	7C4	4-1/4 <sup>(3)</sup>	108	16G13	16D13	5 <sup>(5)</sup>	127	21A4	21D4
7/16	11.1	5G5	5A5	13/16	20.6	7A5	7B5	4-3/8 <sup>(1)</sup>	111.1	16G1	16C1	5-1/4 <sup>(5)</sup>	133.4	21A3	21D3
1/2	12.7	8G5	8A5	7/8	22.2	5G5	5C5	4-1/2 <sup>(5)</sup>	114.3	20A8	20C8	6 <sup>(4)</sup>	152.4	16G3	16C3
5/8	15.9	8G10	8A10	15/16	23.8	8G5	8B5					7-1/2 <sup>(1)</sup>	190.5	21G1	21D1
3/4	19	8G13	8A13					4.6 <sup>(3)</sup>	116.8	16G4	16C4	8 <sup>(3)</sup>	203.2	21G10	21D10
7/8	22.2	8G8	8B8					4-5/8 <sup>(1)</sup>	117.5	16G3	16B3	SIGNAL RANGE 6 to 18 psig (0.4 to 1.2 bar)			
				1	25.4	8G5	8B5	4-3/4 <sup>(1)</sup>	120.7	16G3	16B3	3/4	19	5G5	5C5
1	25.4	4G8	4B8	1-1/16	27	8G12	8B12	5 <sup>(4)</sup>	127	14G1	14C1	1-1/8	28.6	8G12	8B12
1-1/16	27	4G8	4B8	1-1/4	28.6	8G12	8B12	5-1/4 <sup>(4)</sup>	133.4	16G10	16C10	1-1/2	38.1	8G8	8B8
1-1/8	28.6	9G8	9A8	1-1/4	31.8	8G12	8B12					2	50.8	4G8	4B8
1-3/8	35	9G8	9A8	1-5/16	33.3	8G10	8C10	5-1/2 <sup>(4)</sup>	139.7	14G1	14B1	2-1/8	54	9G3	9C3
1-1/2	38.1	9G8	9A8					6 <sup>(4)</sup>	152.4	13G3	13A3	2-1/8 <sup>(8)</sup>	54	9G12	9B12
				1-3/8	35	8G10	8B10	6-1/8 <sup>(4)</sup>	155.6	13G3	13A3	3	76.2	9G5	9C5
1-5/8	41.3	9G8	9A8	1-7/16	36.5	8G13	8B13	6-1/2 <sup>(4)</sup>	165.1	13G3	13A3	4-1/8	101.6	21G8	21B8
2	50.8	15G8	15A8	1-1/2	38.1	8G13	8B13	6-11/16	169.9	20G3	20B3	4	104.8	16G8	16B8
2-1/8	54	15A1	15A1	1-9/16	39.7	8G8	8C8					6 <sup>(3)</sup>	152.4	13G1	13B1
2-1/8 <sup>(8)</sup>	54	15G5	15A5	1-5/8	41.3	8G8	8B8	6-3/4 <sup>(4)</sup>	171.5	13G5	13A5				
2-5/16	58.7	15G1	15A1					6-13/16	173	20G3	20A3				
2-1/2	63.5	15G3	15A3	1-3/4	44.5	8G8	8B8	7	177.8	20G5	20C5				
				1-13/16	46	4G8	4C8	7-5/32 <sup>(1)(5)</sup>	181.8	13G1	13A1				
				1-7/8	47.6	4G7	4B7	7-13/32	188.1	20G3	20B3				
				2	50.8	4G8	4B8								

1. Use spring retainer spacer 1J8038 46172; for additional information, see table 7.  
 2. Use spring retainer spacer 1J2233 46172; for additional information, see table 7.  
 3. Use spring retainer spacer 1J8039 46172; for additional information, see table 7.  
 4. Use with high pressure bellows and spring retainer spacer 1J8039 46172; for additional information, see table 7.  
 5. Use with high pressure bellows.  
 6. Use with high pressure bellows and spring retainer spacer 1J2233 46172; for additional information, see table 7.  
 7. Use spring retainer spacer 1P3957 X012; for additional information, see table 7.  
 8. For use with Type 480-12 or 480-15 size 20 actuators.  
 9. For Type 3570P signal range codes, contact your Fisher sales office or sales representative.

# 3570 Series

Table 4. Type 3570 Signal Range Codes<sup>(9)</sup> (Continued)

SIGNAL RANGE 6 to 18 psig (0.4 to 1.2 bar)				SIGNAL RANGE 6 to 30 psig (0.4 to 2.0 bar)				SIGNAL RANGE 9 to 15 psig (0.6 to 1.0 bar)				SIGNAL RANGE 9 to 15 psig (0.6 to 1.0 bar)											
Travel		Code		Travel		Code		Travel		Code		Travel		Code									
Inches	mm	Direct	Reverse	Inches	mm	Direct	Reverse	Inches	mm	Direct	Reverse	Inches	mm	Direct	Reverse								
6-1/2 <sup>(4)</sup>	165.1	13G3	13A3	2-1/4	57.1	12G1	12D1	11/32	8.7	5A13	5D13	4-1/8	104.8	14G8	14B8								
8-1/8	206.4	19G5	19C5	2.3	58.4	12G3	12C3					4-5/8	117.5	13G3	13B8	5 <sup>(2)</sup>	127	13G12	13B12				
SIGNAL RANGE 6 to 30 psig (0.4 to 2.0 bar)												2-3/8	60.3	12A10	12D10					1/2	12.7	12G13	12B13
				2-1/2	63.5	1G3	1H3					3/4	19	8G10	8B10								
2-5/8	66.7	1G3	1D3	1	25.4	4F8	4B8																
2-3/4	69.9	1G4	1D4	1-1/8	28.6	9G8	9B8	7	177.8	13G3	13B3												
3	76.2	1G1	1D1	3-1/8	79.4	4G1	4C1	1-1/2	38.1	9F8	9B8	8	203.2	18G8	18B8								
3-1/8	79.4	4G1	4C1	3-1/4	82.6	4G1	4C1	1-5/8	41.3	9F8	9B8					8-1/8	206.4	18G8	18B8				
3/8 <sup>(5)</sup>	9.5	10A4	10H4	3-5/16	84.1	4G3	4D3	2	50.8	15G8	15B8	SIGNAL RANGE 18 to 30 psig (1.2 to 2.0 bar)											
7/16	11.1	10A2	10H2	3-3/8	85.7	4G1	4H1									2-1/8	54	15G1	15B1	3/4	19	5G10	5D10
1/2	12.7	10A2	10D2	3-1/2	88.9	1G12	1D12					2-1/8 <sup>(8)</sup>	54	15F5	15B5	1-1/8	28.6	5G8	5D8				
5/8	15.9	3G2	3H2	3-9/16	90.5	4G1	4D1					2-5/16	58.7	15G1	15C1	1-1/2	38.1	8F5	8C5				
1/4	6.4	17H4	17H4	3-1/4	82.6	4G1	4C1					2-1/2	63.5	15F1	15A1	2	50.8	4F8	4D8				
				3-5/16	84.1	4G3	4D3	2-7/8	73	14G8	14B8	3	76.2	9G8	9H8								
				3-3/8	85.7	4G1	4H1	3	76.2	14G8	14B8	3-1/8	79.4	9F8	9C8								
				3-1/2	88.9	1G12	1D12					3-1/4	82.6	14G8	14B8	3-1/4	82.6	9F8	9C8				
				1-1/32	26.2	2G4	2H4	3-9/16	90.5	4G1	4D1	3-7/16	87.3	14G8	14B8	4 <sup>(5)</sup>	101.6	14E8	14D8				
1-1/8	28.6	2G5	2D5	3-21/32	92.9	4G14G	4D1	3-1/2	88.9	14G8	14B8	4-1/8	104.8	16F8	16D8								
3/8	9.5	10A4	10H4	3-3/4	95.3	1	4D1	3	76.2	14G8	14B8	3-1/8	79.4	14G8	14B8								
				4	101.6	4G4	4D4					3-1/4	82.6	14G8	14B8	3-1/4	82.6	14E8	14D8				
				4-1/8	104.8	4G4	4D4					3-7/16	87.3	14G8	14B8	4-1/8	104.8	16F8	16D8				
				5 <sup>(5)</sup>	127	21A5	21H5					4	101.6	14G8	14B8	5 <sup>(4)</sup>	127	14F1	14D1				
				5-1/4 <sup>(5)</sup>	133.4	21A13	21D13					3-9/16	90.5	20F8	20A8	5-1/4 <sup>(2)</sup>	133.4	19F3	19D3				
5-5/8 <sup>(5)</sup>	142.9	16G1	16D1	3-13/16	96.8	14G8	14B8	3-13/16	96.8	14G8	14B8	6-1/2 <sup>(4)</sup>	165	13F3	13B3								
6 <sup>(4)</sup>	152.4	16G3	16C3	4	101.6	14G8	14B8	4	101.6	14G8	14A8	8-1/8 <sup>(4)</sup>	206.4	18F1	18D1								
6-1/2 <sup>(4)</sup>	165.1	16G1	16C1	8 <sup>(3)</sup>	203.2	21E12	21D12																

1. Use spring retainer spacer 1J8038 46172; for additional information, see table 7.  
 2. Use spring retainer spacer 1J2233 46172; for additional information, see table 7.  
 3. Use spring retainer spacer 1J8039 46172; for additional information, see table 7.  
 4. Use with high pressure bellows and spring retainer spacer 1J8039 46172; for additional information, see table 7.  
 5. Use with high pressure bellows.

6. Use with high pressure bellows and spring retainer spacer 1J2233 46172; for additional information, see table 7.  
 7. Use spring retainer spacer 1P3957 X012; for additional information, see table 7.  
 8. For use with Type 480-12 or 480-15 size 20 actuators.  
 9. For Type 3570P signal range codes, contact your Fisher sales office or sales representative.

3. Provide a means for varying the input signal pressure from zero to 1 or 2 psig (0.07 or 0.14 bar) above the higher value of the input signal range (see table 1). Provide an accurate means of measuring the input signal pressure. Check the accuracy of the positioner instrument pressure gauge (see figure 2). The gauge accuracy is  $\pm 0.6$  psig ( $\pm 0.04$  bar) on a 0 to 30 psig (0 to 2 bar) gauge, and  $\pm 1.2$  psig ( $\pm 0.08$  bar) on a 0 to 60 psig (0 to 2 bar) gauge. This accuracy is measured at the mid-point of the full range of the scale.

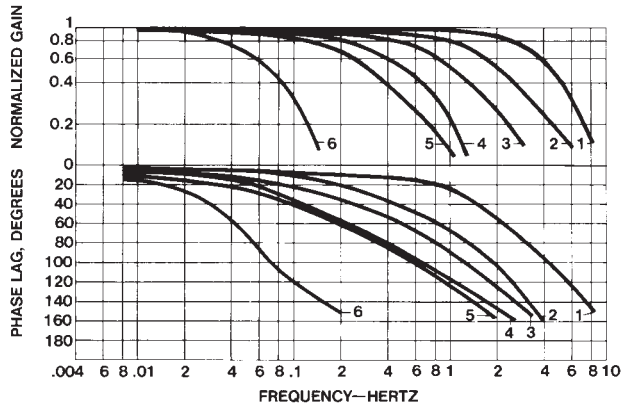
4. Set the input signal pressure at the mid-point of its range [9 psig (0.6 bar) in this example]. Observe the valve travel indicator scale attached to the yoke. The indicator disk should be somewhere between the open and closed positions.

5. Loosen the locknut directly below the bias spring seat (see figure 3) and adjust the bias spring up or down until the valve travel indicator disk shows that the valve plug is somewhere between the open and closed positions. Upward movement of the bias spring adjustment causes downward travel of the valve stem.

6. For positioners with two relays (Type 3570, 3570C, 3570P, 3570PC, and 3571 positioners), observe the relay output pressures. If the cylinder gauges are present as shown in figure 2, read the cylinder top and cylinder bottom gauges or use clip-on test pressure gauges. The two relay output pressures should be approximately equal [within 5 psig (0.3 bar)] and should be approximately 75 percent of the supply pressure. For example, if the supply pressure is 100 psig (7 bar), the two relay output pressures should be within 5 psig (0.3 bar) of each other, and should be approximately 75 psig (5.2 bar).



**The relays in the Type 3570C and 3570PC positioners use a locknut (key 29P, figure 11) on the nozzle (key 29Q). If the nozzle is rotated when the locknut is tight, damage to the relay diaphragm might result. Always use a wrench on the nozzle to prevent it from turning while loosening or tightening the locknut.**



1. SIZE 30—3/4-INCH (19 mm) TRAVEL
2. SIZE 40—1-1/2-INCH (38 mm) TRAVEL
3. SIZE 60—1-1/2-INCH (38 mm) TRAVEL
4. SIZE 80—2-INCH (51 mm) TRAVEL
5. SIZE 100—2-INCH (51 mm) TRAVEL
6. SIZE 130—3-INCH (76 mm) TRAVEL

2K5255-R  
A1285-2/L

Figure 5. Typical Frequency Response for a Type 3570 or 3570C Positioner Mounted on a Type 470 or 480 Actuator

Table 5. Range<sup>(1)(2)</sup>

Code Number	Part Number <sup>(3)</sup>
1	1H8914 000A2
2	1H8915 000A2
3	1H8916 000A2
4	1H8917 000A2
5	1H8918 000A2
6	1H8919 000A2
7	1H8920 000A2
8	1H8921 000A2
9	1H8922 000A2
10	1H8955 000A2
11	1H8956 27012
12	1H8957 000A2
13	1J5185 000A2
14	1J5715 000A2
15	1K5363 000A2
16	1K6684 000A2
17	1R6135 27012
18	1R2822 000A2
19	1R8535 27012
20	1R8998 27012
21	1U5827 27012
22	17A3811 X022

1. The range spring code number is the first number given in each signal range code listed in table 4. For example, for a signal range of 0 to 15 psig (0 to 1.0 bar), an actuator travel of 9/16-inch (14.3 mm), and direct action, the signal range code from table 4 is 6G3. The appropriate range spring is indicated by "6".
2. Range springs do not have a color code. All range springs are silver.
3. The first six numbers of a range spring part number is also the tag number. For example, a range spring with part number 1H8914 000A2 has a tag number of 1H8914. Tags are attached to the parts at the time the parts are manufactured.

If the relay output pressures are not at the values mentioned, adjust the nozzles. Counterclockwise rotation of either nozzle will move the nozzle closer to the beam and will increase relay output pressure.

For all 3570 Series positioners, examine the end of the beam near the bias spring (see figure 3). The beam should be approximately centered between the two E-ring travel stops. Observing the caution above for Type 3570C and 3570PC positioners, rotate the nozzle(s) to center the beam between the E-rings. For

Table 6. Bias Spring<sup>(1)(2)</sup>

Code Letter	Color Code	Part Number
A	Silver	1H8618 27012 <sup>(3)</sup>
B	Light blue	1H8932 27012 <sup>(3)</sup>
C	Red	1H8933 27012 <sup>(3)</sup>
D	Light green	1H8968 27012 <sup>(3)</sup>
E	Dark green	1J2932 X00A2 <sup>(4)</sup>
F	Pink	1J2933 000A2 <sup>(4)</sup>
G	Black	1N7177 000A2 <sup>(4)</sup>
H	Brown	1R6134 27012 <sup>(3)</sup>

1. The bias spring code letter is the letter given in each signal range code listed in table 4. For example, for a signal range of 0 to 15 psig (0 to 1.0 bar), an actuator travel of 9/16-inch (14.3 mm), and direct action, the signal range code from table 3 is 6G3. The appropriate bias spring is indicated by "G".

2. It is necessary to add the bias spring seat (key 8) to a unit when changing from an extension type spring (key 9) to a compression type spring (key 48).

3. Compression type bias spring (key 48).

4. Extension type bias spring (key 9).

Table 7. Spring Retainer

CODE NUMBER <sup>(1)</sup>	OVERALL LENGTH <sup>(2)</sup>		EFFECTIVE LENGTH <sup>(2)</sup>		PART NUMBER <sup>(3)</sup>
	Inches	mm	Inches	mm	
1	2-15/64	57	1-47/64	44	1H890724102
2	2-5/64	53	1-37/64	40	1H890824102
3	1-63/64	50	1-31/64	38	1H890924102
4	1-7/8	48	1-3/8	35	1H891124102
5	1-11/16	43	1-3/16	30	1H891024102
7	31/32	25	15/32	12	1H891224102
8	7/8	22	3/8	10	1H855224102
10	1-3/8	35	55/64	22	1H891324102
12	1-1/2	38	1	25	1J357224102
13	1-1/8	29	21/32	16	1J979624102

1. Code numbers 6, 9, and 11 are not used.
2. Refer to figure 3.
3. The spring retainer code number is the second number given in each signal range code listed in table 4. For example, for a signal range of 0 to 15 psig (0 to 1.0 bar), an actuator travel of 9/16-inch (14.3 mm), and direct action, the signal range code from table 4 is 6G3. The appropriate spring retainer is indicated by "3".

Table 8. Spring Retainer Spacer

OVERALL LENGTH <sup>(1)</sup>		EFFECTIVE LENGTH <sup>(1)</sup>		PART NUMBER <sup>(2)</sup>
Inches	mm	Inches	mm	
1-5/8	41	1-1/8	29	1L2069X0012
2-1/16	52	1-9/16	40	1J223346172
2-1/4	57	1-3/4	44	1J803846172
3-11/16	94	3-3/16	81	1P3957X0012
3-13/16	97	3-5/16	84	1J803946172

1. Refer to figure 3.
2. The spacer number is the first 6 characters of the part number and is stamped on the part.

positioners with two relays, the relay output pressures must be approximately equal [within 5 psig (0.3 bar)] and approximately 75 percent of supply pressure after the beam is centered.

7. Apply an input signal equal to the low value of the input signal range [3 psig (0.2 bar) in this example]. Adjust the bias spring (see figure 3) up or down until the valve travel is at the starting point.

8. Loosen the spring lock (see figure 3) and slowly increase the input signal toward the high end of the input signal range [15 psig (1.0 bar) in this example]. If the valve travel is less than its expected range, increase the travel by adjusting the range spring counterclockwise. If the valve travel reaches the end of its

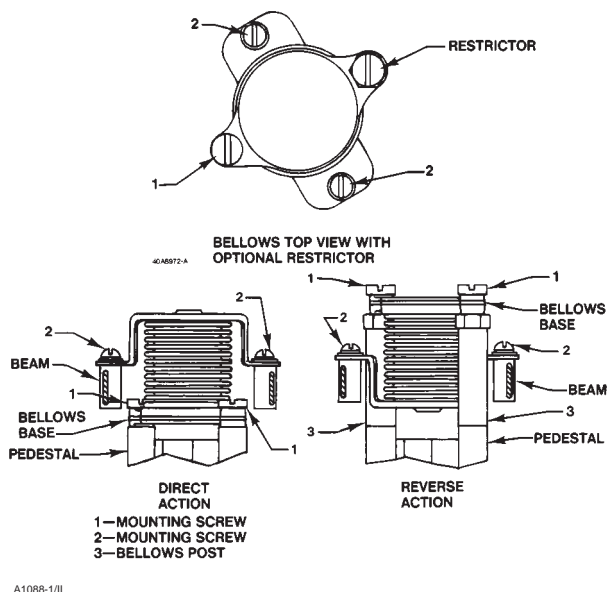


Figure 6. Bellows Mounting for Direct and Reverse Action

expected range with an input signal less than the high value of the input signal range, decrease the travel by adjusting the range spring clockwise.

9. Repeat steps 7 and 8 until the valve plug or travel indicator action corresponds to the input signal requirements of the application [3 to 15 psig (0.2 to 1.0 bar) in this example].

10. Lock the range spring and the bias spring seat in position. The positioner is then ready for operation.

11. If the positioner is unstable and adjustment does not correct the problem, it might be due to unwanted fluctuations in the input signal. A restrictor assembly (key 47, figure 11) can be installed in the input signal circuit to dampen these fluctuations. The restrictor might help to minimize instability. To take the restrictor out of service, exchange the location of the restrictor with that of the bellows mounting screw (key 46, figure 11).

12. Replace the cover (key 39) on the positioner.

## Changing Positioner Action

The instructions given below are to be used after the springs have been changed or if no spring change is required. Numbered parts mentioned in this section are shown in figure 6 unless otherwise noted.



**WARNING**

**The following procedures require taking the positioner, actuator, and control**

valve assembly out of service. To avoid personal injury or property damage caused by uncontrolled process pressure, provide a temporary means of control for the process before taking the assembly out of service.

Before removing the input signal and supply pressure connections from the positioner, remove the input signal and supply pressure sources from the connections. The sudden release of pressure can cause personal injury or property damage.

### Note

Changing the positioner action might require changing the bias spring and/or the spring retainer. Refer to table 4 for correct signal range codes. Refer to the Maintenance section for disassembly and assembly procedures.

## Changing to Reverse Action

1. Bypass the control valve and shut off the input signal line and the supply pressure line to the positioner.
2. Loosen the four thumb screws on the underside of the positioner base and remove the cover.
3. Two bellows posts are provided. The posts are screwed into storage holes in the positioner base immediately above the CYLINDER and INSTRUMENT connections. Unscrew these posts.

### Note

An optional restrictor (see the top view in figure 6) can be found in place of one of the bellows mounting screws (number 1). If so, note the location of the restrictor and replace it in the same location during reassembly. The restrictor has a hex head; the mounting screws do not.

4. Remove the four mounting screws (numbers 1 and 2) and lift out the bellows assembly.
5. Screw the bellows posts (number 3) into the holes where the screws (number 1) originally were.
6. Invert the bellows and replace the screws (numbers 1 and 2).
7. Refer to the adjustment procedures to check operation of the positioner.
8. Make a notation on the action label (key 43, figure 11) that the action of the positioner has been changed.
9. Replace the cover (key 39) on the positioner.

## Changing to Direct Action

1. Bypass the control valve and shut off the input signal line and the supply pressure line to the positioner.
2. Remove the positioner cover by loosening the four thumb screws on the underside of the base.

### Note

**An optional restrictor (see the top view in figure 6) can be found in place of one of the bellows mounting screws (number 1). If so, note the location of the restrictor and replace it in the same location during reassembly. The restrictor has a hex head; the mounting screws do not.**

3. Remove the four mounting screws (numbers 1 and 2), bellows, and bellows posts (number 3).
4. Invert the bellows and reinstall it in the positioner. Secure the bellows with the four screws (numbers 1 and 2). Screw the bellows posts into the storage holes provided in the base immediately above the cylinder and instrument connections.
5. Refer to the adjustment procedures to check the operation of the positioner. If the input signal range has not been changed, adjustment of the range spring might not be necessary.
6. Make a notation on the positioner action label (key 43, figure 11) that the action of the positioner has been changed.
7. Replace the cover (key 39) on the positioner.

## Split Range Operation

The 3570 Series valve positioners are suitable for split range operation. In split range operation, two or more control valves are operated by one output signal from a single control device. When two control valves are split ranged, one valve strokes fully with one half the input signal range and the second valve strokes fully with the other half of the input signal range.

Valve positioners shipped from the factory for split range operation are constructed and adjusted accordingly. If it is necessary to convert an existing positioner to one suitable for split range operation, refer to table 4. If the application requires a selection not listed in table 4, consult your Fisher sales office or sales representative to determine the new parts required. For most changes, a new range spring and possibly a new bias spring will be required. A new range spring retainer might also be required for Type 3570, 3570C, 3572, and 3573 positioners.

When corresponding with your Fisher sales office or sales representative, supply all information possible about the desired operating conditions and the serial numbers of the control valve assembly. This information will facilitate the proper selection of the required parts.

To change an existing valve positioner to one suitable for split range operation, refer to the range and bias spring removal and replacement procedures in the Maintenance section. Be certain the required new parts are on hand before beginning any maintenance operation.

## Initial Range Spring Extension Procedures for Type 3570P And 3570PC Positioners

This procedure must be performed whenever the range spring has been changed or the positioner has been removed. Key numbers used in this procedure are shown in figure 13 except where indicated.

1. With the cap screw (key 87) removed, hook the small ball of the positioner cable (key 91) into the slot of the smaller portion of the cable spool (key 96). Wind the cable on the spool until the coils of the range spring (key 18, figure 11) are slightly separated. Be certain the cable is wound so that it comes off the side of the spool opposite the access opening and that the cable cannot cross itself on the spool.
2. Install the ball end of the actuator cable (key 92) into the slot of the large portion of the spool that is closer to the access opening. Wrap the cable on the spool as many times as possible, then bring the cable out through the bottom of the positioner extension. Be certain the cable is wound so that it comes off the side of the spool opposite the access opening and that the cable cannot cross itself on the spool. Attach the cable to the cable strap (key 93), leaving approximately a 1/32-inch (0.8 mm) gap between the cable eye and cap screw head (key 94).
3. With the actuator piston rod completely retracted and the range spring coils slightly separated, attach the cable strap to the actuator feedback arm. Use the set of cable-strap holes closest to the range spring. Turn the spring cap (key 86) one turn counterclockwise and install one cap screw (key 87).
4. Adjust the range spring (key 18, figure 11) to obtain full travel for the input signal range (span adjustment). Refer to step 7 of the adjustment procedures. Adjustment of the bias spring (zero adjustment) does not need to be done at this time.
5. Remove the screw from the spring cap and slowly release the torsion spring force by turning the spring cap clockwise. Disconnect the cable strap from the actuator and remove all range spring extension by rotating the cable spool.

# 3570 Series

6. Rotate the cable spool to obtain the correct initial range spring extension. Each full revolution of the spool extends the range spring 2 inches (50.8 mm) [1/4-inch (6.4 mm) for 1/8 revolution]. If the initial range spring extension is not specified, calculate it using one of the equations given below. Round off the amount of extension (e) obtained from the equation to the next higher 1/4 inch (6.4 mm).

$$e = \frac{T}{1.87 (P_n)} \text{ (standard bellows)}$$

$$e = \frac{T}{1.25 (P_n)} \text{ (optional high pressure bellows)}$$

where:

- e = initial range spring extension required in inches
- T = actuator travel in inches
- P<sub>n</sub> = input signal span in psi (for example, 12 psi for a 3 to 15 psig input signal range)

or

where:

- e = initial range spring extension required in mm
- T = actuator travel in mm
- P<sub>n</sub> = input signal span in bar (for example, 0.8 bar for a 0.2 to 1 bar input signal range)

7. If necessary, move the actuator cable ball to the spool slot nearer the access opening. With the actuator piston rod fully retracted and the range spring at the correct initial extension, attach the cable strap to the actuator feedback arm. Use the set of cable strap holes that is closest to the tapped holes in the feedback arm.

8. Refer to the positioner adjustment procedures.

## Principle of Operation

### Type 3570, 3570C, 3570P, 3570PC, and 3571 Valve Positioners

Refer to the schematic diagram in figure 7. The pneumatic output signal from a control device is piped to the positioner bellows. For explanation purposes, assume this signal has increased. The bellows expands and moves the beam, which pivots around a fixed point and simultaneously uncovers the nozzle of relay B and covers the nozzle of relay A. The nozzle pres-

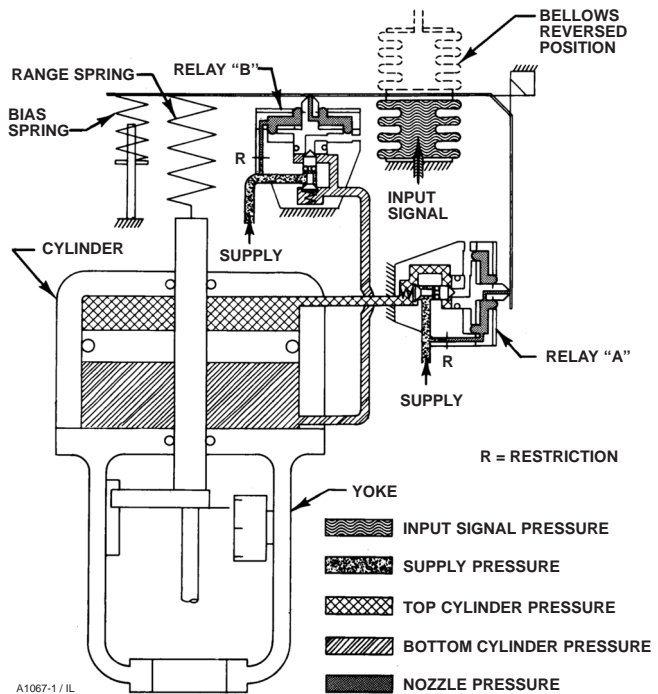


Figure 7. Schematic Diagram of Type 3570 Positioner with a 470 Series Pneumatic Piston Actuator

sure in relay A increases due to the restriction created by the beam covering the nozzle. Through relay action, the pressure to the top of the piston increases. At the same time, relay B reacts to the change in beam position to decrease the pressure to the underside of the piston. These unbalanced pressures move the actuator piston down.

In the Type 3570 and 3570C positioners, the piston movement is fed back to the beam by means of a range spring, which is connected to the beam and to the piston rod extension. In the Type 3570P, 3570PC, and 3571 positioners, the feedback is provided to the range spring by a cable or wire that is connected to the actuator-valve stem connector. The downward movement of the piston rod extension extends the range spring until the torque on the beam balances the torque exerted by the instrument bellows.

As the input signal decreases, the reverse action takes place. The bellows contracts, and as the beam pivots, it covers the nozzle of relay B and uncovers the nozzle of relay A. Through relay action, the pressure below the piston increases and the pressure above the piston decreases to move the piston upward.

### Type 3572 and 3576 Valve Positioners

Refer to the schematic diagram in figure 8, which shows the Type 3572 positioner mounted on a Fisher

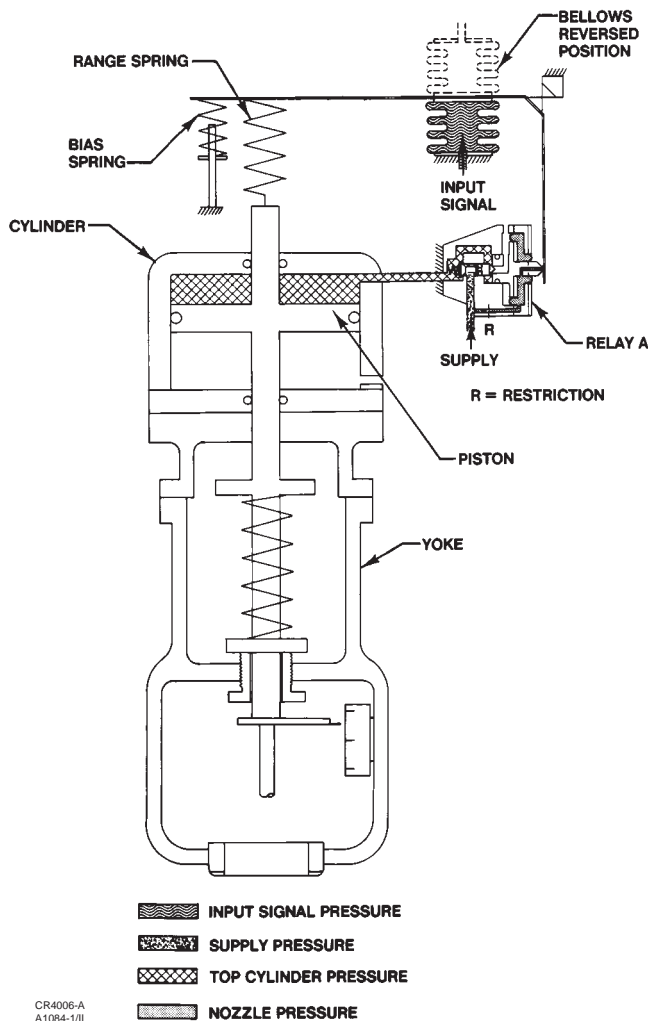


Figure 8. Schematic Diagram of Type 3572 Positioner with a Type 472 Pneumatic Piston Actuator

Type 472 pneumatic piston actuator. For the Type 3576 positioner, the principle of operation is identical to the Type 3572 positioner but the actuator can be a direct or reverse acting pneumatic diaphragm actuator.

The pneumatic output signal from a control device is piped to the positioner bellows. For explanation purposes, assume this signal has increased. The bellows expands and moves the beam, which pivots around a fixed point and covers the relay nozzle. The nozzle pressure in the relay increases due to the restriction created by the beam covering the nozzle. Through relay action, the pressure above the piston overcomes the force exerted by the actuator spring, and the piston moves downward. This changes the valve plug position.

In the Type 3572 positioner, piston movement is fed back to the beam by means of a range spring, which is connected to the beam and the piston rod extension. As the piston rod extension moves downward, the range spring is extended until the torque of the beam balances the torque exerted by the instrument bellows.

In the Type 3576 positioner, the feedback is provided to the range spring by a wire that is connected to the actuator-valve stem connector.

As the input signal decreases, the reverse action takes place. The bellows contracts, and as the beam pivots, it uncovers the relay nozzle. Through relay action, the pressure on top of the piston decreases, and the force of the actuator spring moves the piston upward.

## Type 3573 and 3577 Valve Positioners

Refer to the schematic diagram in figure 9, which shows the Type 3573 positioner mounted on a Fisher Type 473 pneumatic piston actuator. For the Type 3577 positioner, the principle of operation is identical to the Type 3573 positioner, but the actuator can be direct or reverse acting.

The pneumatic output signal from a control device is piped to the positioner bellows. For explanation purposes, assume this signal has increased. The bellows expands and moves the beam, which pivots around a fixed point and uncovers the relay nozzle. The nozzle pressure decreases due to the uncovering of the nozzle by the beam. Through relay action, the pressure to the underside of the piston decreases. The force exerted by the actuator spring overcomes the force of the pressure below the piston, and the piston moves downward. This changes the valve plug position.

In the Type 3573 positioner, piston movement is fed back to the beam by means of a range spring, which is connected to the piston rod extension. The downward movement of the piston rod extension extends the range spring until the torque of the beam balances the torque exerted by the instrument bellows.

In the Type 3577 positioner, feedback is provided to the range spring by a wire that is connected to the actuator-valve stem connector.

As the input signal decreases, the reverse action takes place. The bellows contracts, and as the beam pivots, it covers the relay nozzle. Through relay action, the pressure on the underside of the piston increases to overcome the force exerted by the actuator spring, and the piston moves upward.

# 3570 Series

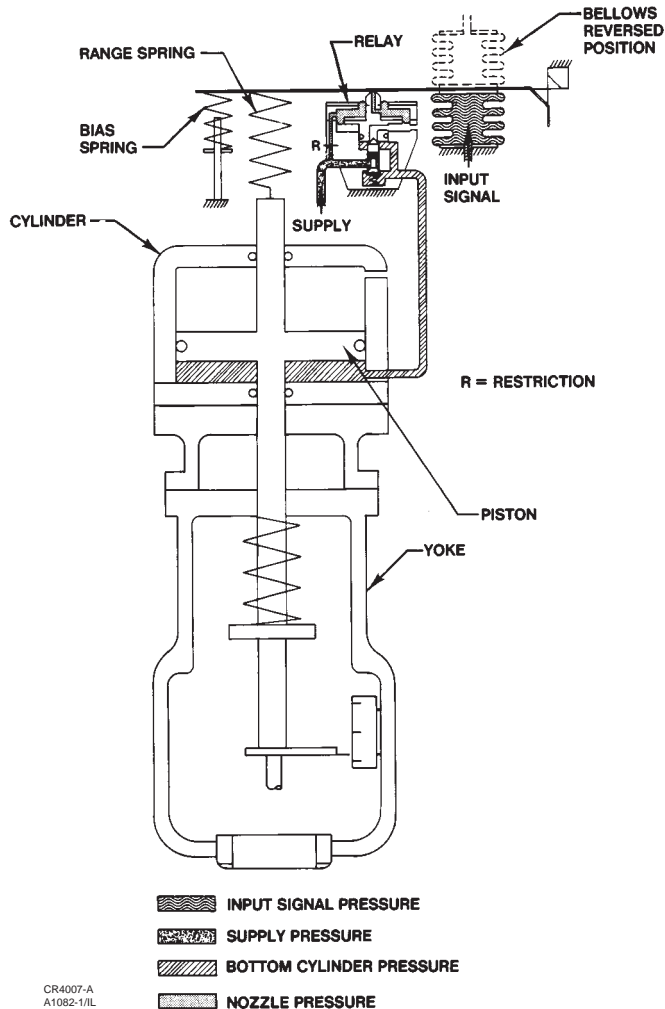


Figure 9. Schematic Diagram of Type 3573 Positioner with Type 473 Pneumatic Piston Actuator

## Relay Operation

Refer to figure 10, which shows a sectional view of a typical relay.

Supply pressure reaches the relay(s) through passages in the positioner base and is channeled to fixed restriction R and to point A between the supply valve B and the balancing O-ring of the relay valve. The fixed restriction is an integral part of the relay restriction plug and wire assembly G. The orifice in nozzle F is larger than the fixed restriction. This allows the supply pressure to bleed to atmosphere faster than it enters the unit through the fixed restriction when the beam flapper is away from the nozzle.

Assume that a change in the input signal causes the beam flapper to cover the nozzle of a relay. The supply pressure flows through fixed restriction R into the

chamber between the two relay diaphragms. Due to the restricting effect of the flapper over the nozzle, pressure builds up in the chamber between the diaphragms, forcing the diaphragm head assembly E downward to open supply valve B, allowing output pressure to increase.

The supply pressure flows past supply valve B to increase the output pressure to the actuator cylinder. The cylinder pressure (relay output pressure) also acts on the area D. This provides an air feedback that returns the diaphragm head assembly E and the movable nozzle F to their original positions, thus preventing any further increase in output pressure. The feedback arrangement and the movable nozzle ensure accurate and stable positioning of the actuator piston without introducing cycling or over-correction. After any change in the output pressure, supply valve B and exhaust valve C always return to the closed position to put the nozzle back in its original, or equilibrium, position. The spring behind supply valve B aids in closing the valve as the diaphragm head assembly is forced upward.

When the beam flapper moves away from the nozzle F, the supply pressure bleeds out at a greater rate than it enters through the fixed restriction R. The pressure then decreases in the chamber between diaphragms. The force of the cylinder pressure acting on area D pushes diaphragm head assembly E upward, opening exhaust valve C. Cylinder pressure bleeds through the exhaust port to atmosphere. As the cylinder pressure decreases and the force on area D decreases, the force of the nozzle pressure in the chamber between the diaphragms returns the assembly to its original position. The unit is again in equilibrium, but at a lower nozzle pressure and a lower output pressure.

Each relay has a 4:1 ratio between the nozzle pressure and the output pressure. For example, a 10 psig (0.7 bar) nozzle pressure change, produces a 40 psig (2.7 bar) output pressure change; a 20 psig (1.4 bar) nozzle pressure change produces an 80 psig (5.5 bar) output pressure change. With a constant input signal pressure, the internal parts of the relay are at equilibrium with the supply and exhaust valves closed.

## Maintenance



**Avoid personal injury from sudden release of process pressure. Before performing any maintenance operations:**



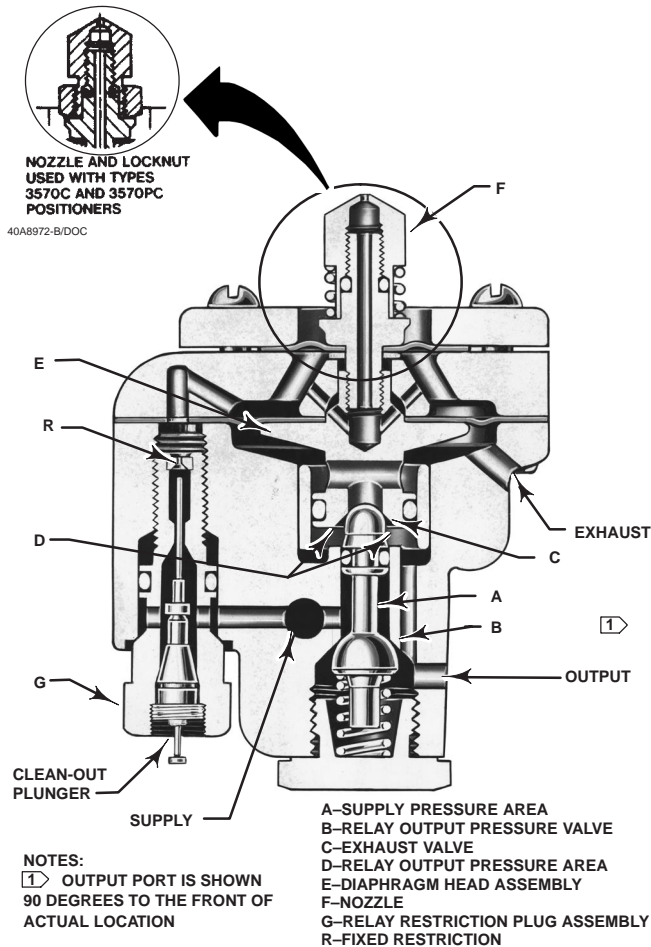


Figure 10. Sectional View of a Typical Relay

- **Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**

- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.**

- **Vent the power actuator loading pressure and relieve any actuator spring precompression.**

- **Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.**

## Troubleshooting

If the positioner causes sluggish or erratic operation or the malfunctioning of the actuator, first, be certain that

the range springs, bias springs, and spring retainer are correct for the application. Refer to table 4 or consult your Fisher sales office or sales representative.

If the springs and spring retainer are correct, and careful adjustment of the unit does not produce smooth and satisfactory operation, check the following points. Key numbers used in this procedure are shown in figure 11 except where indicated. Figure 2 shows part locations.

1. Clean out the primary orifice on each relay by depressing the clean-out plunger. The plunger is located in the orifice assembly (key 29S). This operation runs a fine wire through the orifice to clear the hole.
2. Check the nozzle (key 29Q) of each relay for plugging. To clean, swing the flapper (key 12) away from the nozzle by loosening the screw that holds the flapper in place.

## CAUTION

The relays used in Type 3570C and 3570PC positioners use a locknut (key 29P, figure 12) on the nozzle (key 29Q, figure 12). If the nozzle is rotated when the locknut is tight, damage to the relay diaphragm will result. Always use a wrench on the nozzle to prevent it from turning while loosening or tightening the locknut.

Unscrew the nozzle and run a fine wire through it. Do not enlarge the hole. Also check the surface of the flapper for any accumulation of dirt or foreign materials.

3. Check the bellows assembly for damage, misalignment, or leakage. Also check all gasketed joints for leakage. Use soap solution for leak detection.
4. Check the beam for damage, binding or rubbing against stationary parts. Check the flexure strip screws (key 17) for tightness.
5. If the positioner operation has improved, refer to the adjustment procedures.
6. If the positioner operation does not improve, go to step 7.
7. Unscrew the three machine screws (key 31) from each relay and remove the relays.
8. Check the two relay diaphragms (keys 29F and 29K) for holes or cuts. Note that the larger of the two diaphragms has five holes in it: four holes are for the flange screws and one permits the flow of air from the primary orifice to the chamber between diaphragms.
9. Check the relay valve plug (key 29B) for nicks, cuts, or dirt. Also check both inlet and exhaust ports.

# 3570 Series

10. Check all O-rings for wear or damage.
11. Check all metal parts for damage. Do not attempt to remove the stainless steel bushing in the relay body. If this part is damaged, install a new relay body (key 29A).
12. Check the clean-out wire assembly in the core and orifice assembly (key 29S).
13. When reassembling, clean all parts and coat all O-rings with a good quality grease that is compatible with the elastomer O-rings. The grease should be of the type that does not readily oxidize to form a hard deposit. It should also resist being carried away from the lubricated surfaces by the supply pressure.
14. When replacing the relay flange (key 29N), depress the nozzle and hold it down until the four flange screws (key 29R) have been tightened. This ensures the proper amount of slack in the two diaphragms.
15. Mount the relays in their respective positions on the positioner pedestal, making certain that the relay gasket (key 30) is in good condition and is in place.
16. If the positioner operation is still sluggish, a slight adjustment of the bias spring post (see figure 3) might be necessary. Loosen the locknut and rotate the post in half-turn increments, checking after each half turn for proper operation. Rotate the post no more than two turns from the position shown in figure 3. Refer to the adjustment procedures after rotating the post to check the position of the post and beam assemblies.

## Converting a Type 3570 Valve Positioner to a Type 3570C Valve Positioner

If desired, tire valves can be substituted for pressure gauges. Also, locking relay nozzles can be added on any 3570 Series positioner. This provides the construction that is standard with the Type 3570C and 3570PC positioners.

Key numbers used in this procedure are shown in figure 11 except where indicated. When reassembling, coat all pipe threads with a good quality pipe thread compound.

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve body, and drain the process media from both sides of the valve. If using a power actuator, also shut-off all pressure lines to the power actuator, release all pressure from the actuator. Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
2. Loosen the knurled screws (key 38) and remove the cover (key 39).

3. Disconnect the tubing assemblies (keys 28 and 45) from the base and from the gauges (keys 24 and 25). Unscrew the hex nuts (key 27) from the back of the gauges and remove the gauges (keys 24 and 25).
4. Unscrew the pressure gauge (key 54) from the gauge adaptor (key 29U).
5. Unscrew and remove the nozzle and spring (keys 29Q and 29P) from each relay.
6. The gauge bracket (key 5) can be removed if desired. To remove it, loosen the locknut (key 7) and remove the bias spring post and cap screw (keys 6 and 32). When replacing the bias spring post, be sure that the bottom of the post thread is positioned as shown in figure 3 for proper positioning of the E-ring travel stops. This alignment can be verified visually through the vent port.
7. Use compression plugs (key 52) to plug the holes opened in the base when the tubing is removed.



### CAUTION

**Never rotate the nozzle (key 29Q) when the locknut (key 29P) is tight, or damage to the relay diaphragm will result. Always use a wrench on the nozzle to prevent it from turning while loosening or tightening the locknut.**

8. Install the locknut and nozzle (keys 29P and 29Q) on each relay.
9. Install the tire valve (key 26, figure 12) into the gauge adaptor (key 29U).
10. Install the service tee and tire valve adaptor (keys 49 and 53, figure 12) into the CYLINDER connection. Connect the pressure line that runs to the lower part of the cylinder to the service tee.
11. Install the pipe nipple, pipe tee, and tire valve adaptor (keys 50, 51, and 53, figure 12) into the INSTRUMENT connection. Connect the input signal line to the pipe tee.
12. Refer to the adjustment procedures.

## Range Spring

### Disassembly

Unless otherwise directed, key numbers refer to figures 11 and 12.



### WARNING

**The following procedure requires taking the positioner, actuator, and control**

**valve assembly out of service. To avoid personal injury or property damage caused by uncontrolled process pressure, provide a temporary means of control for the process before taking the assembly out of service.**

**Before removing the input signal and supply pressure connections from the positioner, remove the input signal and supply pressure sources from the connections. The sudden release of pressure can cause personal injury or property damage.**

1. Bypass the control valve and shut off the input signal and the supply pressure lines to the positioner.
2. Remove the positioner cover (key 39).
3. Loosen the spring lock (see figure 3) that holds the range spring (key 18) to the beam.
4. Disconnect the other end of the range spring by performing one of the following steps:

- **For Type 3570, 3570C, 3572, and 3573 positioners**, use a screwdriver to remove the spring retainer (key 19, figure 3) from the piston rod extension.

- **For Type 3570P and 3570PC positioners** (see figure 12), remove the screws (key 87), from the cap (key 86) and rotate the cap clockwise to remove all torsion spring force. Disconnect the actuator cable (key 92) from the cable strap (key 93). Unhook the positioner cable (key 91) from the cable spool (key 96).

- **For Type 3571, 3576, and 3577 positioners**, loosen the set screw found in the spring retainer (key 56A, figure 14) and remove the spring wire (key 56D) from the retainer.

5. Remove the range spring from the beam by rotating the range spring counter clockwise.

## Assembly

1. Install the new range spring. For Type 3570, 3570C, 3572, and 3573 positioners, also install the spring retainer. See figures 3 or 11.
2. Reconnect the range spring to the piston rod extension (Type 3570, 3570C, 3572, and 3573 positioners) or the feedback wire (Type 3571, 3576, and 3577 positioners, figure 14). For Type 3570P and 3570PC positioners, install the positioner cable (key 91, figure 13) in the range spring so that the large ball on the cable seats in the conical portion of the spring.
3. Install the spring lock (key 20, figure 11). Adjust the positioner per instructions in the adjustments procedures.

The action of the positioner can be reversed in the same manner as described in the changing positioner action procedures. However, before attempting to reverse the action, see table 4 or consult your Fisher sales office or sales representative to determine if any different parts are required.

## Bias Spring

### Disassembly

1. Refer to figure 3. Remove the top E-ring travel stop.
2. Loosen the locknut securing the bias spring seat in place. Then rotate the adjusting screw until the spring force is at a minimum.
3. Loosen the locknut that secures the bias spring post to the positioner base. Using a screwdriver in the slot in the top of the post, unscrew the post from the base.
4. Tilt the bottom of the post out and remove the post from the beam.
5. Remove the locking nuts and the spring seat from the bias spring post.

### Assembly

1. Install the new bias spring, spring seat, and locking nuts on the bias spring post.
2. Replace the bias spring post into the beam and install the top E-ring travel stop.
3. Install the bias spring post into the base. Be certain that the bottom of the post thread is positioned as shown in figure 3. Ensure that the beam does not rub on the post.
4. For Type 3570P and 3570PC positioners, go to the initial range spring extension procedures for Type 3570P and 3570PC positioners.
5. Adjust the positioner as described in the adjustments procedures.

The action of the positioner can be reversed in the same manner as described in the changing positioner action procedures. However, before attempting to reverse the action, see table 4 or consult your Fisher sales office or sales representative to determine if a different retainer, different range springs or different bias springs are required.

## Parts Ordering

A serial number is assigned to each positioner. The serial number is stamped on the nameplate. Always refer to the serial number when corresponding with your Fisher sales office or sales representative regard-

# 3570 Series

ing spare parts or technical information. When ordering replacement parts, also specify the complete 11-character part number from the parts kits or parts list information.

## Parts Kits

### Note

**Parts kits for the 3570 Series positioners contain the gaskets, diaphragms, and O-ring seals as specified by the type and temperature limitations. Parts are for Type 3570, 3570C, 3570P, and 3570PC positioners.**

## Positioner Repair Kits

Positioner kit includes:

keys 3, 12, 29C, 29D, 29F, 29K, 29M, 29P, 29Q, 29S, 30, 33, and 37

For the Type 3570

For the Type 3570 (hi-temp. const.)

For the Type 3570C

For the Type 3570C (hi-temp. const.)

R3570 X00012

R3570 X00H12

R3570 CX0012

R3570 CX0H12

## Diagnostic Test Connection Kits

Kit includes pipe tee, pipe nipple, pipe bushings, connector body, and body protector used with the FlowScanner<sup>(1)</sup>.

Also, part number provides correct quantities of each item.

### For Diaphragm Actuators

Stainless steel

Steel

12B8042X012

12B8042X022

### For Piston Actuators

Stainless steel

Steel

12B8043X012

12B8043X022

Pipe Thread Sealant (not furnished with hardware or connectors)

Key	Description	Part Number
9	Bias Spring, extension type Color Code: Black Pink Dark green	1N7177 000A2 1J2933 000A2 1J2932 X00A2
10	Retaining ring, pl steel (2 req'd)	1P2575 28992
11	Beam, aluminum	3H8579 08022
12	Flapper, SST (2 req'd)	1H8542 36012
13	Flapper arm, aluminum	2H8573 08022
14	Horizontal flexure strip (2 req'd)	1H8543 43992
15	Vertical flexure strip	1H8544 43992
16	Machine screw, pl steel (2 req'd)	1H8546 28982
17	Machine screw, pl steel For Types 3570, 3570C, 3571 (12 req'd) For Types 3572, 3573, 3576, 3577 (11 req'd)	1H8545 28982
18	Range Spring, pl steel	See table 5, above
19	Spring retainer, pl steel	See table 7, above
20	Spring lock, SST	1H8551 36012
21*	Bellows assembly, brass To 50 psig (3.4 bar) High pressure bellows, brass, over 50 psig (3.4 bar)	1H8610 000A2 1H9010 000A2
22	Bellows post, brass (2 req'd)	1H8566 14022
23	Name plate, aluminum	2H8609 X0052
24*	Instrument gauge, plastic case/brass wetted parts For all types except 3570C 0-30 psi/0-.2 MPa/0-2 bar 0-60 psi/0-.4 MPa/0-4 bar	21B4037 X012 21B4037 X022
25	Cylinder bottom gauge, plastic case/brass wetted parts For Types 3570, 3571, 3573, 3577 0-160 psi/0-1.1 MPa/0-11 bar	21B4037 X032
26	Valve Assembly For Type 3570C only	1N9088 99012
27	Hex nut, brass For Types 3570, 3571, 3573 (2 req'd) For Types 3572, 3576, 3577 (1 req'd) For Type 3570C (none req'd)	1C7240 18992 1C7240 18992
28	Instrument tubing assembly, copper For all types except 3570C	1H8612 000A2
29	Relay assembly	See following table

### Note

**The parts included in the relay assembly are listed in the Relay Assembly Parts section.**

30*	Relay gasket, (2 req'd) Neoprene (std. const.) Silicone (hi-temp. const.)	1H8559 03012 1H8559 04142
31	Machine screw, pl steel For Types 3570, 3570C, 3571 (6 req'd) For Types 3572, 3573, 3576, 3577 (3 req'd)	1H8569 28992 1H8569 28992
32	Cap screw, pl steel (2 req'd)	1A7820 24052
33*	O-ring Nitrile (std. const.) Fluoroelastomer (hi-temp. const.)	1C8538 06992 1C8538 X0052
34	Spring anchor, SST	1J2934 35022
35	Machine screw, pl steel (2 req'd)	1H8545 28982
36	Pipe plug, pl steel	1B6366 24162
37*	Cover gasket, Cork (std. const.) Silicone (hi-temp. const.)	1H8538 04042 1H8538 04142

## Parts List

### Positioner Common Parts (figures 10 and 11)

Key	Description	Part Number
1	Pilot base, aluminum	3H8580 08022
2	Pedestal, zinc	3H8582 44012
3*	Pedestal gasket Neoprene (std. const.) Fluoroelastomer (hi-temp. const.)	1H8547 03012 1H8547 X0012
4	Machine screw, pl steel (5 req'd)	1K7811 28992
5	Gauge bracket, pl steel For all types except 3570C	20B3886 X012
6	Bias spring post, pl steel	1H8549 24102
7	Hex nut, pl steel (2 req'd)	1A4997 24122
8	Spring seat, pl steel (use with key 48 only)	1H8550 24102

Key	Description	Part Number
38	Cover screw, pl steel (4 req'd)	1H8541 24652
39	Cover, aluminum	3H8583 08022
40	Washer, brass plated (2 req'd)	1H3397 18992
41	Relay blank, aluminum (see figure 13) For Types 3572, 3573, 3576, 3577	1J3149 07012
42	Screw, pl steel (see figure 13) For Types 3572, 3573, 3576, 3577 (3 req'd)	1A5199 28992
43	Label, paper For direct-acting units For reverse-acting units	1J6007 06032 1J6008 06032
45	Cylinder tubing assembly, copper For Types 3570, 3571, 3573, 3577	1H8611 000A2
46	Bolt, brass w/o restrictor assembly (2 req'd) w/restrictor assembly (1 req'd)	1H8567 14022 1H8567 14022
47	Restrictor assembly, SST	1R6540 000A2
48	Bias spring, compression type, pl steel Color Code: Silver Light blue Red Light green Brown	1H8618 27012 1H8932 27012 1H8933 27012 1H8968 27012 1R6134 27012
49	Service tee, iron For Type 3570C only	1P3123 21992
50	Pipe nipple, pl steel For Type 3570C only	1B2188 26232
51	Pipe tee, iron For Type 3570C only	1C5975 47362
52	Compression plug, brass For Type 3570C only (2 req'd)	1P2796 14012
53	Adaptor, brass For Type 3570C only (2 req'd)	1H4470 99022
54*	Cylinder top gauge, plastic case/brass wetted parts, For Types 3570, 3571, 3572, 3576 triple scale, 0-160 psi/0-1.1 MPa/0-11 bar dual scale, 0-160 psi/0-11 kg/cm <sup>2</sup>	11B4040 X032 11B4040 X062

## Refer to figure 13 for keys 55 through 56E

55	Mounting bracket, aluminum For Types 3571, 3576, 3577	2H9120000A2
56A	Spring retainer, pl steel For Types 3571, 3576, 3577	1H9123 24102
56B	Set screw, pl steel For Types 3571, 3576, 3577 (2 req'd)	1H8164 28992
56C*	Boot, neoprene For Types 3571, 3576, 3577	1H9122 06992
56D	Spring wire, pl steel For Type 3571 For Types 3576, 3577	1H9146 27022 11B6841 X012
56E	End bearing For Types 3571, 3576, 3577	1H9145 99012
75	Tubing, copper (specify length)	0500201701W
77	Elbow, 3/8-inch, brass (specify quantity)	15A6002X162
78	Connector, 3/8-inch brass (specify quantity)	15A6002X202
84	Spring retainer spacer, SST	See table 8, above

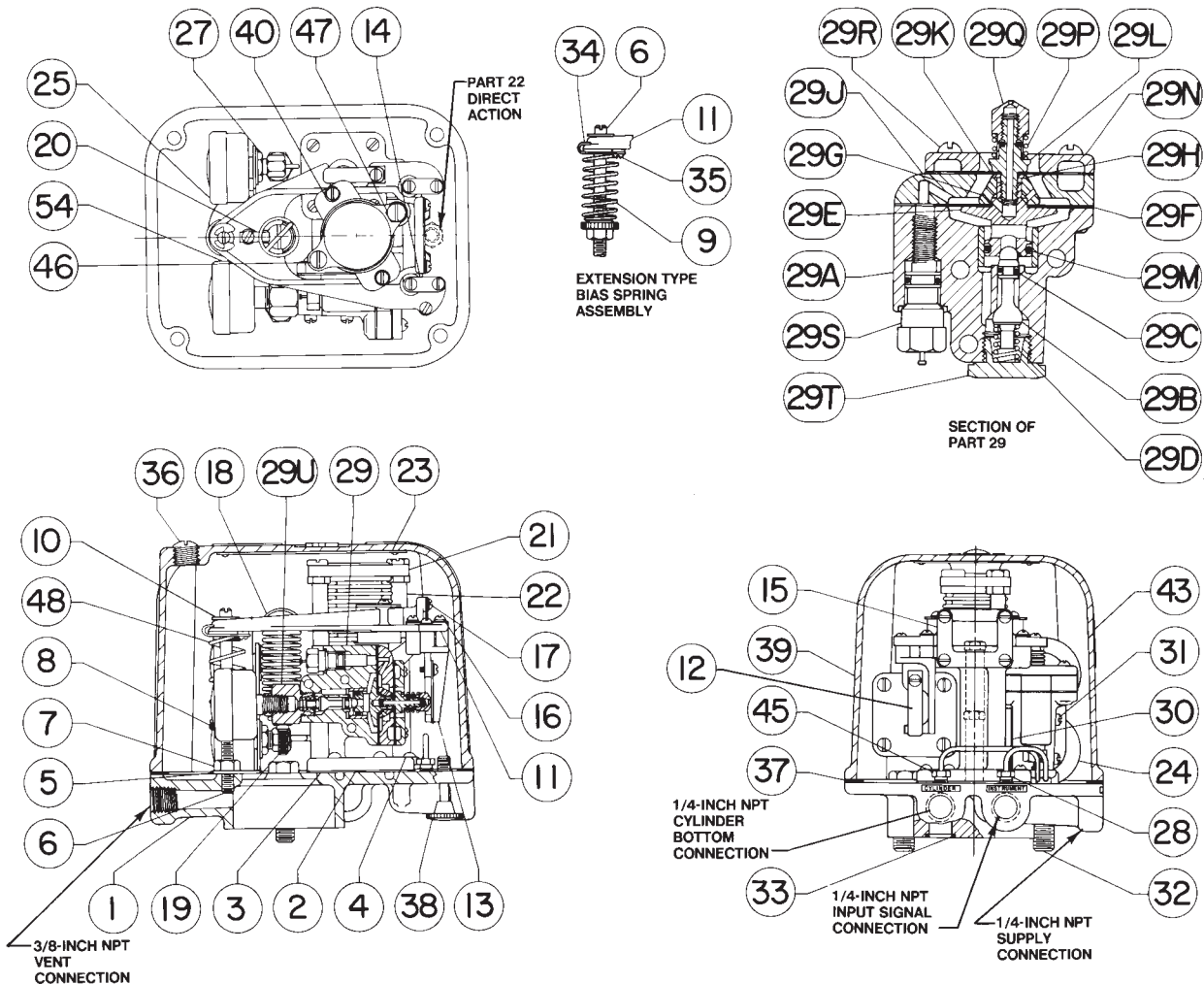
## Refer to figure 12 for keys 86 through 101

86	Spring cap assembly, aluminum and SST	11A7195 X012
87	Machine screw, pl steel (2 req'd)	1B8481 28982
88	Torsion spring, steel	11A7196 X012
89	Extension cover, aluminum	11A7194 X012
90	Machine screw, pl steel (6 req'd)	1J8415 28982
91	Positioner cable	21A7189 X012
92	Actuator cable	11A7188 X012
93	Cable strap, brass	11A7193 X012
94	Cap screw, pl steel (3 req'd)	1U8768 32982
95	Hex nut, pl steel	1A8396 28982
96	Cable spool, acetal plastic	21A7198 X012
97	Spring guide, aluminum	11A7191 X012
98	Warning plate	11A7192 X012
99	Self-tapping screw, pl steel	1P4269 28982
100	Cap screw, pl steel (2 req'd)	1A7711 32982
101	Positioner extension assembly, aluminum	41A7199 X022
102	Washer, SST For Types 3572, 3576 (1 req'd) For Types 3570, 3571, 3573, 3577 (2 req'd)	1P3305 38992 1P3305 38992
235	Spring retainer spacer, SST 4-1/8 inches (104.8 mm) maximum actuator travel, 2-1/8 inches (54.0 mm) or less valve travel 8-1/8 inches (206.4 mm) maximum actuator travel, between 2-1/8 inches (54.0 mm) and 4-1/8 inches (104.8 mm) valve travel (1 of each req'd)  8-1/8 inches (206.4 mm) maximum actuator travel, less than 2-1/8 inches (54.0 mm) valve travel (2 req'd)	1J223346172  1J223346172 1P3957X0012  1P3957X0012

## Relay Assembly Parts (figures 10 and 11)

29A	Body assembly, aluminum and SST	1H8565 000A2
29B	Relay valve, SST	1H8553 35032
29C*	O-Ring (2 req'd) Nitrile (std. const.) Fluoroelastomer (hi-temp. const.)	1E2226 X0012 1N8387 06382
29D	Valve spring, SST	1J4683 37022
29E	Exhaust port, brass	1H8554 14012
29F*	Relay diaphragm Nitrile (std. const.) Polyacrylate/nylon (hi-temp. const.)	1H8563 02032 1P8076 X0012
29G	Head spacer, brass	1H8556 14012
29H	Washer, brass	1H8555 14012
29J	Spacer, zinc	2H8574 X0012
29K*	Sealing diaphragm Nitrile (std. const.) Polyacrylate/nylon (hi-temp. const.)	1H8562 02032 1P8075 X0012
29L	Head bolt, brass	1H8561 14012
29M*	O-Ring Nitrile (std. const.) Fluoroelastomer (hi-temp. const.)	1E2163 06992 1L9493 06382
29N	Flange, aluminum	17A0963 X012

# 3570 Series

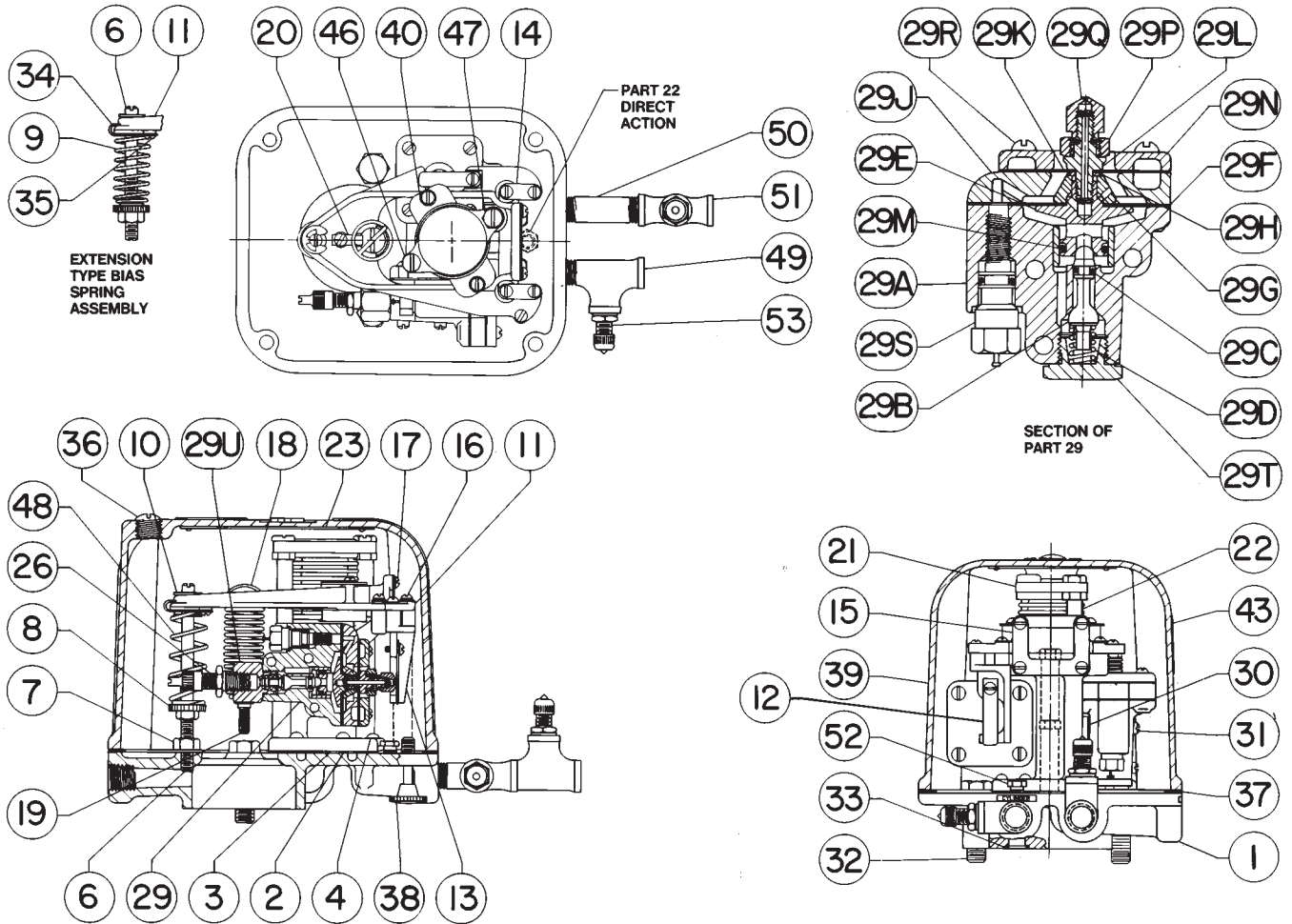


40A8973-C  
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Figure 11. Type 3570 Positioner

Key	Description	Part Number	Key	Description	Part Number
29P	Locknut, SST For Type 3570C only	1P7804 35032	29S	Restriction plug and wire assembly, aluminum/SST	12B1537 X022
29P	Nozzle spring, pl steel For all types except 3570C	1A5941 27012	29S*	O-Ring Nitrile (std. const.) Fluoroelastomer (hi-temp. const.)	1D6875 06992 1N4304 06382
29Q	Nozzle, SST For Type 3570C	1P7805 35032	29T	Body cap, brass Vertical relay	1B7975 14012
29R	Screw, pl steel (4 req'd) For all other Types	1H8560 35032	29U	Gauge adaptor, pl brass Horizontal relay	1H8558 14022

# 3570 Series



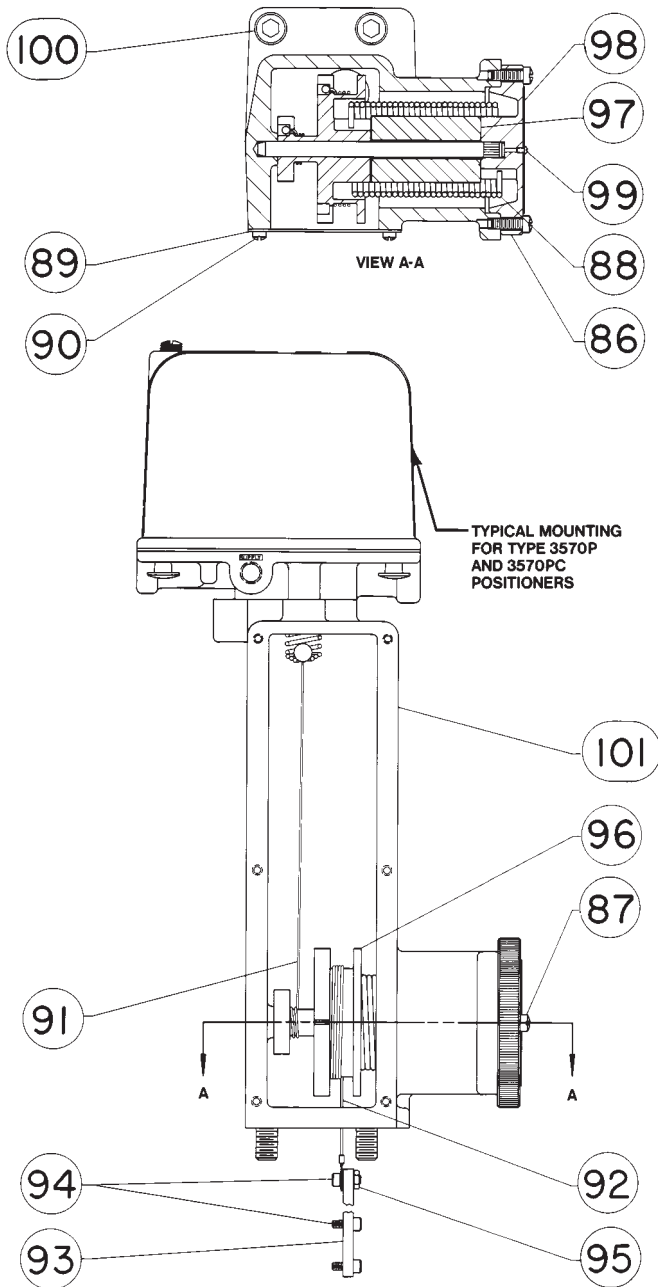
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Figure 12. Type 3570C Positioner

Key 29 Relay assembly

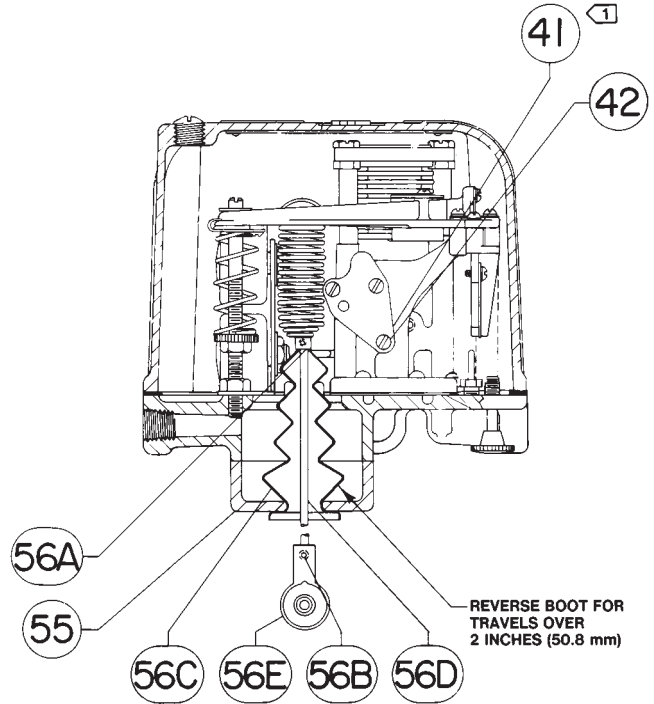
TYPE	STANDARD RELAY		HIGH TEMPERATURE RELAY	
	Vertical	Horizontal	Vertical	Horizontal
3570	AJ6205 000A2	AJ6206 000A2	AJ6205 X0022	AJ6206 X0022
3570C	BR4304 000A2	BR4303 000A2	BR4304 X0022	BR4303 X0022
3571	AJ6205 000A2	AJ6206 000A2	—	—
3572	—	AJ6206 000A2	—	—
3573	AJ6205 000A2	—	—	—
3576	—	AJ6206 000A2	—	—
3577	AJ6205 000A2	—	—	—

# 3570 Series



41A7131-A  
B1839/IL

Figure 13. Type 3570P and 3570PC Positioner



**NOTE:**

1 RELAY BLANK AND SCREWS (KEY 41 AND 42) ARE INSTALLED WHERE SHOWN FOR TYPE 3573 AND 3577 POSITIONERS. FOR TYPE 3572 AND 3576 POSITIONERS, THESE PARTS ARE INSTALLED ON THE OPPOSITE SIDE OF THE POSITIONER.

40A9335-C  
A3230/IL

Figure 14. Feedback Wire Assembly (Typical with Type 3571, 3576, and 3577 Positioners)

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