Range Spring, Bias Spring, and Spring Retainer/ Spacer Selection for Fisher™ 3570 Pneumatic Valve Positioners

Normally, no adjustments to the 3570 positioner 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 changed a new range spring, bias spring, and spring retainer/spacer may be required.

Refer to the signal range code descriptions below and table 1, 2, 3, and 4. Once the appropriate range spring, bias spring, and spring retainer/spacer are obtained refer to the Maintenance and Adjustment procedures found in the 3570 instruction manual (D200137X012) available from your Emerson sales office or at Fisher.com.

Refer to the instruction manual for all other information regarding 3570 positioners.

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 3570, 3570C, 3572, and 3573 positioners. Refer to figure 1 for location of parts.

The signal range codes in table 1 are based on the following applications:

- **Codes for valve travels up to and including 50 mm (2 inches)** are used for actuators that have a 50 mm (2 inch) maximum travel. If the actuator maximum travel is greater than 50 mm (2 inches), an additional retainer spacer (key 235, see figure 1) is required. Refer to the parts list for the additional spring retainer spacer (key 235) part number.
- **Codes for valve travels greater than 50 mm (2 inches), up to and including 105 mm (4-1/8 inches)**, are used for actuators that have a 105 mm (4-1/8 inch) maximum travel, except the 480-12 or 480-15 Size 20 actuators which have a 54 mm (2-1/8 inch) maximum travel. If the actuator maximum travel is greater than 105 mm (4-1/8 inches), an additional retainer spacer are required. Refer to the parts list for the additional spring retainer spacer (key 235) part numbers.
- **Codes for valve travels greater than 105 mm (4-1/8 inches), up to and including 206 mm (8-1/8 inches)**, are for actuators that have a 206 mm (8-1/8 inch) maximum travel. If the valve travel is 105 mm (4-1/8 inches) or less, two additional spring retainer spacers 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 1, consult your Emerson sales office for information. To change the springs, refer to the range and bias spring procedures in the Maintenance section of the 3570 instruction manual (D200137X012).

From table 1, 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 1, for a signal range of 0 to 1.0 bar (0 to 15 psig), an actuator travel of 14.3 mm (9/16-inch), and direct action, the signal range code from table 1 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 found in the 3570 instruction manual (D200137X012).

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 1 footnotes indicate the use of an additional spring retainer spacer or high pressure bellows.

Use the code from table 1 while referring to tables 2, 3, and 4 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 1.

Table 1. Fisher 3570 Signal Range Codes[1]

SIGNAL RANGE 0 to 1.0 bar (0 to 15 psig)			
Travel		Code	
mm	Inches	Direct	Reverse
14.3	9/16	6G3	6D3
17.5	11/16	2G4	2G4
19	3/4	7A1	7C3
20.6	13/16	7G1	7B1
26.2	1-1/32	5A12	5D12
28.6	1-1/8	5C8	5C8
30.2	1-3/16	12A13	12C13
38.1	1-1/2	8G5	8B5
39.7	1-9/16	8G12	8B12
44.5	1-3/4	8G5	8A5
50.8	2	8G5	8A5
79.4	3-1/8	9A3	9B3
101.6	4	9A12	9B12
104.8	4-1/8	9G1	9B1
127	5	21B8	21D8

SIGNAL RANGE 0 to 2.0 bar (0 to 30 psig)			
15.9	5/8	10D2	10D2
19	3/4	10D3	10D3
25.4	1	11A4	11D4
28.6	1-1/8	11A5	11D5
33.3	1-5/16	11A12	11D12
38.1	1-1/2	11D12	11D12
50.8	2	2G5	2D5
54	2-1/8[2]	12G7	12D7
54	2-1/8[8]	12G10	12D10
76.2	3	12C3	12C3
79.4	3-1/8[3]	12G8	12D8
101.6	4	1G1	1D1
104.8	4-1/8	1G1	1C1

SIGNAL RANGE 0.2 to 0.6 bar (3 to 9 psig)			
11.1	7/16	5G5	5A5
12.7	1/2	8G5	8A5
15.9	5/8	8G10	8A10
19	3/4	8G13	8A13
22.2	7/8	8G8	8B8
25.4	1	4G8	4B8
27	1-1/16	4G8	4B8
28.6	1-1/8	9G8	9A8
35	1-3/8	9G8	9A8
38.1	1-1/2	9G8	9A8
41.3	1-5/8	9G8	9A8
50.8	2	15G8	15A8
54	2-1/8	15A1	15A1
54	2-1/8[8]	15G5	15A5
58.7	2-5/16	15G1	15A1
63.5	2-1/2	15G3	15A3

SIGNAL RANGE 0.2 to 0.6 bar (3 to 9 psig)			
Travel		Code	
mm	Inches	Direct	Reverse
66.7	2-5/8	15G13	15A13
76.2	3	14G8	14A8
79.4	3-1/8	14G8	14A8
82.6	3-1/4	14G8	14A8
85.7	3-3/8	14G8	14A8
88.9	3-1/2	14G8	14A8
96.8	3-13/16	14G8	14A8
101.6	4	14G8	14A8
104.8	4-1/8	14G8	14A8
117.5	4-5/8[2]	13G3	13A3
127	5[3]	13G4	13A4
152.4	6	13G3	13A3
165.1	6-1/2	13G3	13A3
177.8	7	13G8	13A8
203.2	8	18G8	18A8
206.4	8-1/8	18G8	18A8

SIGNAL RANGE 0.2 to 1.0 bar (3 to 15 psig)			
3.2	1/8	17H4	17H4
3.2	1/8[6]	10D3	10D3
4	5/32	10D2	10H2
6.4	1/4	10B4	10H4
8.7	11/32	6A3	6C3
9.5	3/8	6A3	6C3
11.1	7/16	6A4	6D4
11.9	0.469	6A4	6D4
12.7	1/2	7G1	7C1
14.8	0.582	5G4	5C4
15.9	5/8	7G3	7B3
17.5	11/16	7G4	7B4
19	3/4	7G4	7C4
20.6	13/16	7A5	7B5
22.2	7/8	5G5	5C5
23.8	15/16	8G5	8B5
25.4	1	8G5	8B5
27	1-1/16	8G12	8B12
28.6	1-1/8	8G12	8B12
31.8	1-1/4	8G12	8B12
33.3	1-5/16	8G10	8C10
35	1-3/8	8G10	8B10
36.5	1-7/16	8G13	8B13
38.1	1-1/2	8G13	8B13
39.7	1-9/16	8G8	8C8
41.3	1-5/8	8G8	8B8
44.5	1-3/4	8G8	8B8
46	1-13/16	4G8	4C8
47.6	1-7/8	4G7	4B7
50.8	2	4G8	4B8

SIGNAL RANGE 0.2 to 1.0 bar (3 to 15 psig)			
Travel		Code	
mm	Inches	Direct	Reverse
54	2-1/8	4G1	4B1
54	2-1/8[8]	4G8	4B8
55.6	2-3/16	9G3	9B3
57.1	2-1/4	9G3	9B3
58.7	2-5/16	9G2	9B2
59.5	2-11/32	9G3	9B3
60.3	2-3/8	9G3	9B3
63.5	2-1/2	9G3	9B3
66.7	2-5/8	9G3	9B3
68.3	2-11/16	9G10	9B10
69.9	2-3/4	9G10	9B10
73	2-7/8	9G5	9B5
74.6	2-15/16	9G5	9B5
76.2	3	9G12	9B12
78.5	3.09	9G8	9B8
79.4	3-1/8	9G7	9B7
82.6	3-1/4	9G10	9B10
84.9	3-11/32	9G8	9B8
85.7	3-3/8	9G13	9B13
86.5	3-13/32	9G10	9B10
88.9	3-1/2	9G13	9B13
92	3-5/8	9G13	9B13
92.9	3-21/32	9G8	9B8
95.3	3-3/4	9G8	9B8
96.8	3-13/16	9G8	9C8
100	3-15/16	21G8	21B8
101.6	4	21G8	21A8
101.6	4[6]	14G1	14A1
104.8	4-1/8	16G8	16B8
108	4-1/4[4]	16G13	16D13
111.1	4-3/8[2]	16G1	16C1
114.3	4-1/2[6]	20A8	20C8
116.8	4.6[4]	16G4	16C4
117.5	4-5/8[2]	16G3	16B3
120.7	4-3/4[2]	16G3	16B3
127	5[5]	14G1	14C1
133.4	5-1/4[5]	19G10	19C10
139.7	5-1/2[5]	14G1	14B1
152.4	6[5]	13G3	13A3
155.6	6-1/8[5]	13G3	13A3
165.1	6-1/2[5]	13G3	13A3
169.9	6-11/16	20G3	20B3
171.5	6-3/4[5]	13G5	13A5
173	6-13/16	20G3	20B3
177.8	7	20G5	20C5
181.8	7-5/32[2,6]	13G1	13A1
188.1	7-13/32	20G3	20B3

SIGNAL RANGE 0.2 to 1.0 bar (3 to 15 psig)			
Travel		Code	
mm	Inches	Direct	Reverse
190.5	7-1/2	19G5	19C5
193	7.6	19G8	19C8
196.6	7-3/4	19G3	19B3
198.9	7-13/16	19G8	19B8
203.2	8	19G8	19B8
206.4	8-1/8	19G12	19B3

SIGNAL RANGE 0.2 to 1.8 bar (3 to 27 psig)			
9.5	3/8	10A2	10D2
11.1	7/16	10A2	10D2
15.9	5/8	3A2	3D2
19	3/4	11A4	11D4
22.2	7/8	11A5	11D5
25.4	1	2C5	2C5
28.6	1-1/8	2A5	2D5
31.8	1-1/4	5G4	5D4
33.3	1-5/16	2A12	2D12
38.1	1-1/2	2C10	2C10
43.9	1.73	2G12	2D12
47.6	1-7/8	2G10	2C10
50.8	2	5G10	5D10
54	2-1/8	12A3	12D3
54	2-1/8[8]	12G13	12D13
63.5	2-1/2	1A3	1D3
76.2	3	1B12	1D12
79.4	3-1/8	1A12	1D12
82.6	3-1/4	4G1	4C1
88.9	3-1/2	4G4	4D4
101.6	4	4G1	4B1
104.8	4-1/8	4G5	4D5
114.3	4-1/2[7]	21A13	21D13
127	5[6]	21A4	21D4
133.4	5-1/4[6]	21A3	21D3
152.4	6[5]	16G3	16C3
190.5	7-1/2[2]	21G1	21D1
203.2	8[4]	21G10	21D10

SIGNAL RANGE 0.4 to 1.2 bar (6 to 18 psig)			
19	3/4	5G5	5C5
28.6	1-1/8	8G12	8B12
38.1	1-1/2	8G8	8B8
50.8	2	4G8	4B8
54	2-1/8	9G3	9C3
54	2-1/8[8]	9G12	9B12
76.2	3	9G5	9C5
101.6	4	21G8	21B8
104.8	4-1/8	16G8	16B8
152.4	6[4]	13G1	13B1

-Continued-

Table 1. Fisher 3570 Signal Range Codes[1] (Continued)

SIGNAL RANGE 0.4 to 1.2 bar (6 to 18 psig)				SIGNAL RANGE 0.4 to 2.0 bar (6 to 30 psig)				SIGNAL RANGE 0.6 to 1.0 bar (9 to 15 psig)				SIGNAL RANGE 0.6 to 1.0 bar (9 to 15 psig)			
Travel		Code		Travel		Code		Travel		Code		Travel		Code	
mm	Inches	Direct	Reverse	mm	Inches	Direct	Reverse	mm	Inches	Direct	Reverse	mm	Inches	Direct	Reverse
165.1 206.4	6-1/2[5] 8-1/8	13G3 19G5	13A3 19C5	57.1	2-1/4	12G1	12D1	8.7 11.1 12.7 15.9 17.5	11/32 7/16 1/2 5/8 11/16	5A13 5G5 12G13 8G8 8G8	5D13 5B5 12B13 8B8 8C8	104.8 117.5	4-1/8 4-5/8[5]	14G8 13G3	14B8 13B3
SIGNAL RANGE 0.4 to 2.0 bar (6 to 30 psig)				58.4 60.3	2.3 2-3/8	12G3 12A10	12C3 12D10					127 152.4 155.6 165.1 177.8	5[3] 6 6-1/8 6-1/2 7	13G12 13G3 13G4 13G12 13G3	13B12 13B3 13B4 13B12 13B3
6.4 9.5 11.1 12.7 15.9	1/4 3/8[6] 7/16 1/2 5/8	17H4 10A4 10A2 10A2 3G2	17H4 10H4 10H2 10D2 3H2	63.5 66.7 69.9 76.2 79.4	2-1/2 2-5/8 2-3/4 3 3-1/8	1G3 1G3 1G4 1G1 4G1	1H3 1D3 1D4 1D1 4C1	19 25.4 28.6 38.1 41.3	3/4 1 1-1/8 1-1/2 1-5/8	8G10 4F8 9G8 9F8 9F8	8B10 4B8 9B8 9B8 9B8	203.2 206.4	8 8-1/8	18G8 18G8	18B8 18B8
19 22.2 25.4 26.2 28.6	3/4 7/8 1 1-1/32 1-1/8	11G4 11A5 2G4 2G4 2G5	11H4 11H5 2D4 2H4 2D5	82.6 84.1 85.7 88.9 90.5	3-1/4 3-5/16 3-3/8 3-1/2 3-9/16	4G1 4G3 4G1 1G12 4G1	4C1 4D3 4H1 1D12 4D1	50.8 54 54 58.7 63.5 73	2 2-1/8 2-1/8[8] 2-5/16 2-1/2 2-7/8	15G8 15G1 15F5 15G1 15F1 14G8	15B8 15B1 15B5 15C1 15A1 14B8	**SIGNAL RANGE 1.2 to 2.0 bar (18 to 30 psig)**			
31.8 35 38.1 39.7 41.3	1-1/4 1-3/8 1-1/2 1-9/16 1-5/8	2G5 2G12 5G5 5G5 5G5	2D5 2D12 5D5 5D5 5D5	92.9 95.3 101.6 104.8 127	3-21/32 3-3/4 4 4-1/8 5[6]	4G1 4G1 4G4 4G12 21A5	4D1 4D1 4D4 4D12 21H5	76.2 79.4 82.6 87.3 88.9	3 3-1/8 3-1/4 3-7/16 3-1/2	14G8 14G8 14G8 14G8 14G8	14B8 14B8 14B8 14B8 14B8	19 28.6 38.1 50.8 76.2	3/4 1-1/8 1-1/2 2 3	5G10 5G8 8F5 4F8 9G8	5D10 5D8 8C5 4D8 9H8
46 48.3 50.8 54 54	1-13/16 1.9 2 2-1/8[3] 2-1/8[8]	5G5 12G13 12C8 12G7 12G13	5D5 12H13 12C8 12D7 12D13	133.4 142.9 152.4 165.1 177.8	5-1/4[6] 5-5/8[6] 6[5] 6-1/2[6] 7[4]	21A13 16G1 16G3 16G1 21G12	21D13 16D1 16C3 16C1 21D12	90.5 96.8 101.6	3-9/16 3-13/16 4	20F8 14G8 14G8	20A8 14B8 14A8	79.4 82.6 101.6 104.8 127	3-1/8 3-1/4 4[6] 4-1/8 5[5]	9F8 9F8 14E1 16F8 14F1	9C8 9C8 14D1 16D8 14D1
				203.2	8[4]	21E12	21D12					133.4 165 206.4	5-1/4[3] 6-1/2[5] 8-1/8[5]	19F3 13F3 18F1	19D3 13B3 18D1

1. For 3570P signal range codes, contact your Emerson sales office.
2. Use spring retainer spacer 1J803846172; for additional information, see table 4.
3. Use spring retainer spacer 1J223346172; for additional information, see table 4.
4. Use spring retainer spacer 1J803946172; for additional information, see table 4.
5. Use with high pressure bellows and spring retainer spacer 1J803946172; for additional information, see table 4.
6. Use with high pressure bellows.
7. Use with high pressure bellows and spring retainer spacer 1J223346172; for additional information, see table 4.
8. For use with 480-12 or 480-15 size 20 actuators.

Table 2. Range[1,2]

Code Number	Part Number[3]
1	1H8914000A2
2	1H8915000A2
3	1H8916000A2
4	1H8917000A2
5	1H8918000A2
6	1H8919000A2
7	1H8920000A2
8	1H8921000A2
9	1H8922000A2
10	1H8955000A2
11	1H895627012
12	1H8957000A2
13	1J5185000A2
14	1J5715000A2
15	1K5363000A2
16	1K6684000A2
17	1R613527012
18	1R2822000A2
19	1R853527012
20	1R899827012
21	1U582727012
22	17A3811X022

1. The range spring code number is the first number given in each signal range code listed in table 1. For example, for a signal range of 0 to 1.0 bar (0 to 15 psig), an actuator travel of 14.3 mm (9/16-inch), and direct action, the signal range code from table 1 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.

Table 3. Bias Spring[1,2]

Code Letter	Color Code	Part Number
A	Silver	1H861827012[3]
B	Light blue	1H893227012[3]
C	Red	1H893327012[3]
D	Light green	1H896827012[3]
E	Dark green	1J2932X00A2[4]
F	Pink	1J2933000A2[4]
G	Black	1N7177000A2[4]
H	Brown	1R613427012[3]

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

CODE NUMBER[1]	OVERALL LENGTH[2]		EFFECTIVE LENGTH[2]		PART NUMBER[3]
	mm	Inches	mm	Inches	
1	57	2-15/64	44	1-47/64	1H8907X0012
2	53	2-5/64	40	1-37/64	1H8908X0012
3	50	1-63/64	38	1-31/64	1H8909X0012
4	48	1-7/8	35	1-3/8	1H8911X0012
5	43	1-11/16	30	1-3/16	1H8910X0012
7	25	31/32	12	15/32	1H8912X0012
8	22	7/8	10	3/8	1H8552X0012
10	35	1-3/8	22	55/64	1H8913X0012
12	38	1-1/2	25	1	1J3572X0012
13	29	1-1/8	16	21/32	1J9796X0012

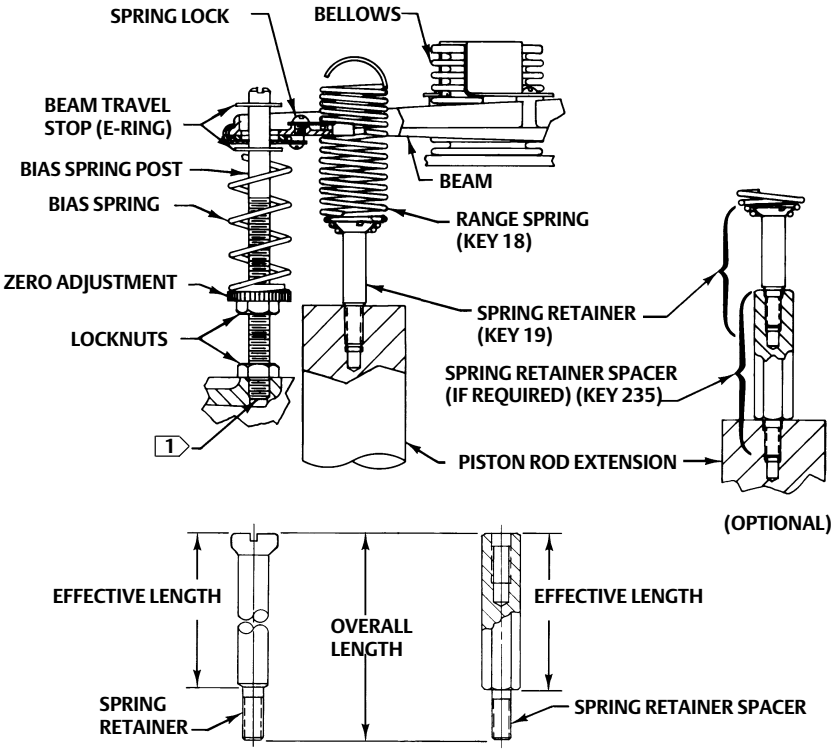
1. Code numbers 6, 9, and 11 are not used.
2. Refer to figure 1.
3. The spring retainer code number is the second number given in each signal range code listed in table 1. For example, for a signal range of 0 to 1.0 bar (0 to 15 psig), an actuator travel of 14.3 mm (9/16-inch), and direct action, the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

Table 5. Spring Retainer Spacer

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

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

Figure 1. Bias and Range Springs for Zero and Span Adjustments



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

Emerson Automation Solutions
Marshalltown, Iowa 50158 USA
Sorocaba, 18087 Brazil
Cernay, 68700 France
Dubai, United Arab Emirates
Singapore 128461 Singapore

www.Fisher.com