

Fisher® 1B and 1BR Constant-Pressure Pump Governor Actuators

The Fisher 1B pump governor actuator (figure 1) is used to maintain a constant discharge pressure on steam driven turbine or reciprocating pumps and for pressure reducing or pressure relief applications. Typical pump governor applications include fire pumps, boiler feedwater pumps, and industrial or refining pumps where the discharge medium is oil, steam, air, or other noncorrosive fluid.

The 1BR pump governor actuator is combined with a push-down-to-open valve for service as a relief governor. A relief governor is used to divert excess pump discharge to the suction side of the pump.

Features

- **Rugged Construction**—Brass and steel construction combats wear for long service life.
- **Ease of Maintenance**—Few moving parts and easy access reduce maintenance and downtime.
- **Ease of Adjustment**—Readily accessible spring adjustment without removing any parts.
- **Leakfree Service**—Leakfree piston cups available to 66°C (150°F).
- **Fast Acting**— Direct-operated configuration provides fast speed of response.



W2232-1

Fisher 1B Actuator on Direct-Acting easy-e™ Valve



Specifications

Available Configurations

1B: Direct-acting with increased control pressure closing push-down-to-close valves such as Fisher ED and ET
1BR: Reverse-acting with increased control pressure opening push-down-to-open valves such as Fisher EDR and ETR

Maximum Cylinder Pressure⁽¹⁾

48.3 bar (700 psi)

Spring Ranges

See table 1

Effective Piston Area

45 cm² (7.07 square inches)

Travel

Up to 19.1 mm (0.75 inch)

Travel Stops

Available for 6 and 11.1 mm (0.25 and 0.4375 inch) travels (reverse acting constructions)

Construction Materials

Cylinder Cap and Yoke: Cast iron
Piston: Brass, chrome-plated
Cylinder: Brass
Piston Rod: Steel, zinc-plated
Piston Cup: Partial Nitrile or 100% Nitrile for leakfree service

Maximum Cylinder Operating Temperature⁽¹⁾

130°C (265°F)
 or 66°C (150°F) for leakfree service

Cylinder Connections

See figure 2

Yoke Boss and Stem Diameters

mm		INCHES	
Yoke Boss	Stem	Yoke Boss	Stem
54	9.5	2-1/8	3/8
71	12.7	2-13/16	1/2

APPROXIMATE WEIGHTS

Actuator with 54 mm (2-1/8 Inch) Yoke Boss: 9.1 kg (20 pounds)
Actuator with 71 mm (2-13/16 Inch) Yoke Boss: 20.4 kg (45 pounds)

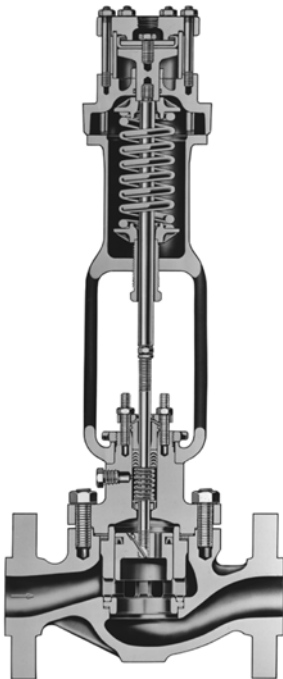
1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation for valve should not be exceeded.

Table 1. Spring Information

TYPE NUMBER		METRIC UNITS				U.S. UNITS				SPRING PART NUMBER
		Pressure Range, Bar	Spring Rate, N/mm	Sensitivity mm/Bar	Safe Load, N	Pressure Range, Psig	Spring Rate, Lbf/in	Sensitivity In./Psi	Safe Load, Lbf	
1B		6.6 to 8.3	85.8	0.524	4715	95 to 120	490	0.014	1060	1F176827092
		8.3 to 13.5	221	0.204	8184	120 to 195	1260	0.006	1840	1E795327082
		13.5 to 15.9	257	0.175	9786	195 to 230	1470	0.005	2200	1E792427082
		15.9 to 22.1	368	0.122	13,545	230 to 320	2100	0.003	3045	1E793327082
1BR	9.5 mm (3/8 inch) stem	22.1 to 34.5	928	0.048	23,575	320 to 500	5300	0.001	5300	1H106827082
		6.6 to 8.3	85.8	0.524	4715	95 to 120	490	0.014	1060	1F176827092
		8.3 to 13.5	221	0.204	8184	120 to 195	1260	0.006	1840	1E795327082
		13.5 to 15.9	257	0.175	9786	195 to 230	1470	0.005	2200	1E792427082
	12.7 mm (1/2 inch) stem ⁽¹⁾	15.9 to 22.1	368	0.122	13,545	230 to 320	2100	0.003	3045	1E793327082
		6.6 to 8.3	85.8	0.524	4715	95 to 120	490	0.014	1060	1F176827092
		8.3 to 13.5	221	0.204	8184	120 to 195	1260	0.006	1840	1E795327082
		13.5 to 15.9	257	0.175	9786	195 to 230	1470	0.005	2200	1E792427082
	15.9 to 22.1	368	0.122	13,545	230 to 320	2100	0.003	3045	1E793327082	
	22.1 to 34.5	928	0.048	23,575	320 to 500	5300	0.001	5300	1H106827082	

1. If the valve/stem connection is cut down to 9.5 mm (3/8 inch), then the maximum relief pressure range is limited to 22.1 bar (320 psig).

Figure 1. Fisher 1B-ED Pump Governor Sectional



W2254-1

Sizing Information

The following procedure is used to select the correct spring for the actuator:

1. Determine the average steam cylinder pressure and steam required by the pump from the Pump Governor Sizing bulletin (61.9:005, D100182X012).
2. Determine the proper valve size from Catalog 12.
3. Find:

Push-Down-To-Close Valve

$$P_t = P_c - \frac{(P_1 A - F_p + F_s)}{7.07}$$

Push-Down-To-Open Valve

$$P_t = P_c - \frac{(P_1 A - F_p - F_s)}{7.07}$$

where:

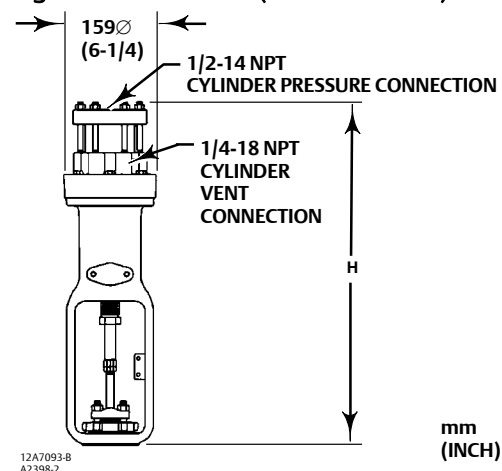
- P_t = force summation, pressure acting on piston (psig)
- P_c = cylinder pressure (psig)
- P_1 = valve inlet pressure (psig)
- A = valve plug unbalance area (in square inches) (from Catalog 12)
- F_p = packing friction force (lbf) (from Catalog 12)
- F_s = seat load force (lbf) (from Catalog 12). If tight shutoff is not a service condition, F_s may be considered to be zero

4. Select the spring from table 1 that has the pressure range which includes P_t . If P_t is equal to the upper pressure range, go to the next larger size spring.

Table 2. Dimensions

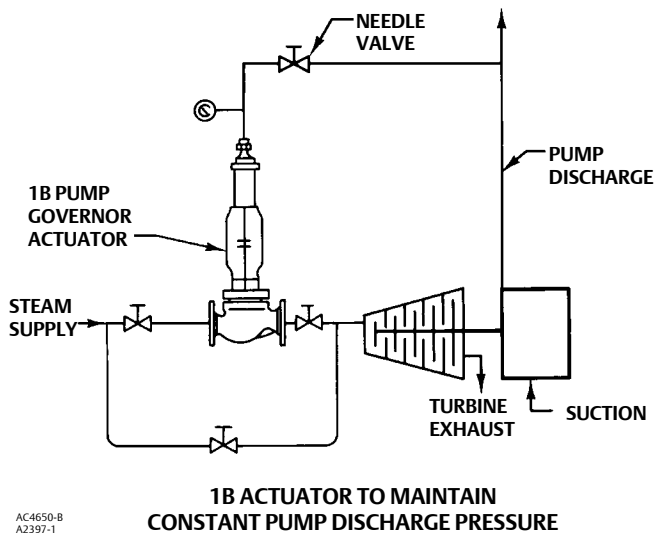
VALVE SIZE, NPS	DIMENSION H	
	mm	Inches
1/2 to 1-1/2	548	21-9/16
2 to 4	597	23-1/2

Figure 2. Dimensions (also see table 2)

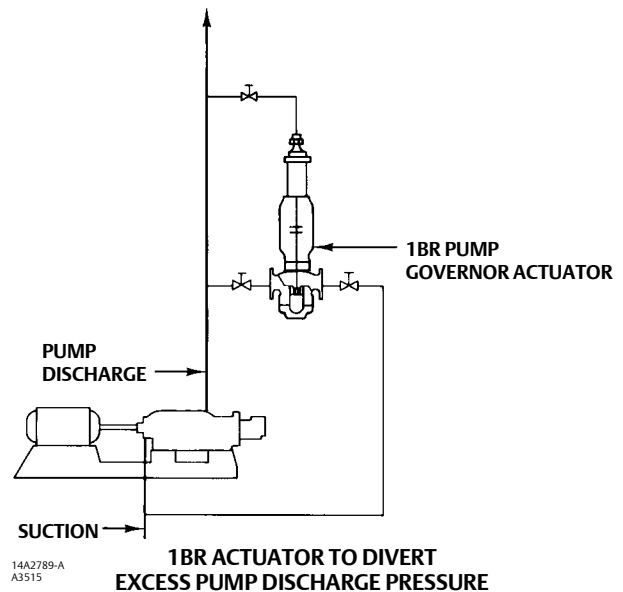


12A7093-B
A2398-2

Figure 3. Typical Installations



AC4650-B
A2397-1



14A2789-A
A3515

Installation

1B and 1BR pump governor actuators may be installed in any position. Typical installations are shown in figure 3. See figure 2 for dimensions.

3. Temperature (normal operating and maximum)
4. Flow rate (normal and maximum)
5. Required spring (see Sizing Information)

Ordering Information

Application Information

When ordering a 1B or 1BR pump governor actuator, specify:

1. Action (direct or reverse)
2. Pressure range

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Actuator Information

Refer to the specifications table. Review the description to the right of each specification and in the referenced table. Specify choice where there is a selection to be made.

Valve Body and Accessories Information

Refer to separate valve body and accessories bulletins for ordering information.

