

Design D3 FloPro Control Valve

The Design D3 FloPro control valve (figure 1) is a compact, rugged valve designed for on-off control. This valve is ideal for use as a dump valve on gas separators and scrubbers. It is also well suited for other high pressure applications in natural gas production, compression, and processing. The Design D3 FloPro control valve is available in NPS 1 and 2 CL900 NPT end connections and NPS 2 CL600 raised face flanged end connections.

The Design D3 FloPro offers easy maintenance. The trim and packing can be maintained by removing the patented deep-bore hammer nut and lifting the actuator/bonnet assembly off the valve without disassembling the actuator.

Note

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Features

- **Safer Bonnet / Valve Body Connection—**

The unique design provides additional protection if disassembly of bonnet/valve body connection is inadvertently started while there is still pressure in the valve body. Pins mounted in the valve bonnet help ensure the bonnet disengages from the valve body as the hammer nut is loosened, while the threads are still engaged. This allows internal pressure to be vented, while keeping the actuator retained to the valve body.

- **Field-Selectable Flow Rates—**The FloPro feature allows adjustment of the flow capacity without changing the trim. In this way, a single trim set can be used for more than one flow requirement, reducing inventory and maintenance costs. See figure 2.



W9249

Figure 1. Design D3 FloPro Control Valve
(NPS 2 RF Flanged End Connection)

- **Two End Connection Styles—**The Design D3 FloPro control valve is available in both CL900 screwed-end and CL600 RF flanged construction, see figure 1.

- **Live-loaded Packing System—**The packing system provides an improved stem seal to help prevent the loss of valuable or hazardous process fluids or gases. It features ENVIRO-SEAL® packing technology to provide reduced packing maintenance and excellent emissions control.

- **Low Temperature Materials—**Valve construction materials allow use in applications as low as -46°C (-50°F).

- **Rugged Trim Design—**The pinned and guided plug/stem assembly is field-proven and easy to maintain.



Table 1. Design D3 Materials of Construction

Part	Material
Valve Body and Bonnet	ASME SA 352 LCC
Valve Plug and Seat	Standard/Sour: S17400 (NACE MR0175/ISO 15156) Severe Service: Tungsten Carbide/S17400 (NACE MR0175/ISO 15156)
Pin	S17400
Valve Stem	S20910
O-rings	HNBR (Nitrile)
Packing	PTFE/Carbon PTFE
Stem Bushing	PPS (polyphenylene sulfide)
Packing Springs	N07718
Packing Retainer	S17400
Actuator Diaphragm	CR (chloroprene/polyester)
Actuator Springs	Painted Steel

Table 2. Valve Sizes and Connection Styles

VALVE SIZE, NPS	PORT DIAMETER, (INCHES)	THREADED	RAISED FACE (RF) FLANGED
		CL900	CL600
1	0.375, 0.75, 1	X	---
2	0.375, 0.75, 1	X	X

X = Available construction.

Table 3. Design D3 Maximum Shutoff Pressure Drops

FLOW DIRECTION	ACTUATOR ACTION	INPUT SIGNAL	NUMBER OF SPRINGS	MAXIMUM ΔP (PSI) PER PORT SIZE (INCH)		
		psi		0.375	0.75	1.00
Up	Spring-to-Close	0-20	3	2250	544	341
		0-35	6	2250	1504	999
	Spring-to-Open	0-20	2	2250	935	608
		0-35	2	2250	2250	2094
Down	Spring-to-Close	0-20	2	1558	1800	950
		0-35	3	2250	2250	2250
	Spring-to-Open	0-20	2	2250	1700	939
		0-35	3	2250	2250	1575

Features (continued)

- **Severe Service Capability with Tungsten Carbide Trim**—D3 valves are available with tungsten carbide trim for erosive service. Fisher® tungsten carbide trim is designed specifically for severe service applications in the oil and gas industry. Durable tungsten carbide trim may benefit your application by wearing better and lasting longer.

- **Easy Installation**—The compact design allows installation where space is a premium.

- **Easy Maintenance**—The hammer nut bonnet/body joint allows repair or maintenance with a minimum of tools, without removing the valve body from the piping system. The seat ring can be removed with a standard hex socket.

- **Integral Bonnet Flange**—The bonnet has an integral flange, retained by a hammer nut, making the bonnet-to-body connection. This eliminates use of snap rings, which can be subject to possible failure in sour service or in atmospheric corrosion.

- **Application Flexibility**—A selection of end connections, trim materials, and flow capacities allows the D3 to be used in a broad range of applications, including sour service.

- **NACE MR0175/ISO 15156 Service-Ready**—The standard D3 FloPro trim, valve body, and bonnet meet the metallurgical requirements of NACE MR0175/ISO 15156.

- **Field-Reversible Actuator**—The Design D3 FloPro actuator can be field-converted from spring-to-close to spring-to-open action.

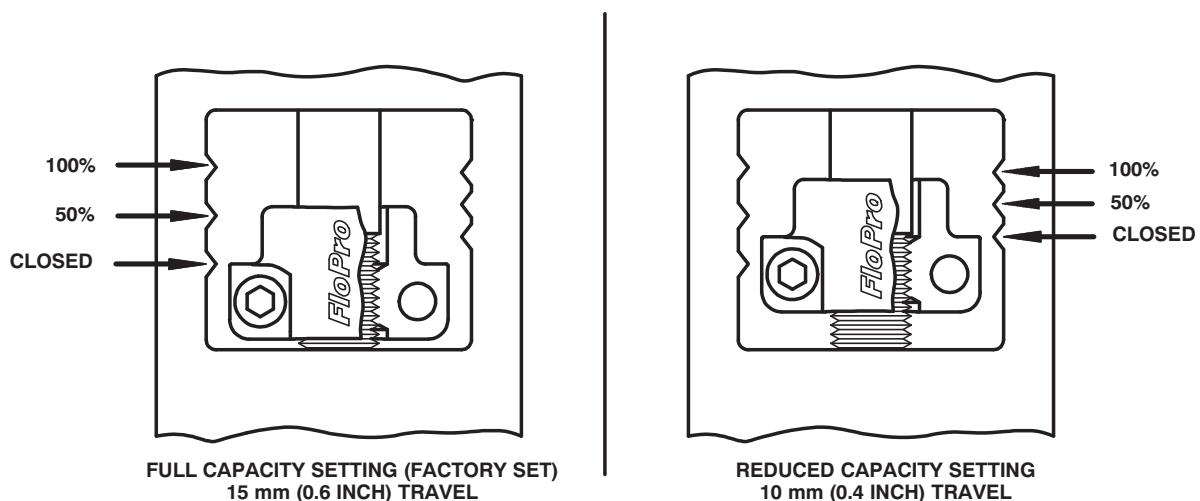


Figure 2. FloPro Adjusts to Vary Flow Capacity
(Shown with Valve Plug in Seated Position)

Table 4. Design D3 Valve Flow Coefficients, Flow Up

VALVE BODY SIZE		PORT DIAMETER		FLOW COEFFICIENTS (Cv)	
NPS		Inches		Full Capacity 15 mm (0.6 Inch) Travel	Reduced Capacity 10 mm (0.4 Inch) Travel
1		0.375		3.7	2.1
		0.75		10.4	6.5
		1.00		13.6	---
2		0.375		3.7	2.1
		0.75		11.5	6.6
		1.00		16.8	---

Table 5. Design D3 Valve Flow Coefficients, Flow-Down

VALVE BODY SIZE		PORT DIAMETER		FLOW COEFFICIENTS (Cv)	
NPS		Inches		Full Capacity 15 mm (0.6 Inch) Travel	Reduced Capacity 10 mm (0.4 Inch) Travel
1		0.375		5.0	2.9
		0.75		9.1	6.6
		1.00		11.5	---
2		0.375		4.7	2.9
		0.75		10.4	6.8
		1.00		13.8	---

Table 6. Design D3 Control Valve Dimensions⁽¹⁾ (also see figure 3)

VALVE SIZE	DIMENSION														WEIGHT	
	A		B		C		D		E		AR ⁽²⁾ Spring-to-Close		AR ⁽²⁾ Spring-to-Open			
	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	kg	lb
NPS 1 NPT	159	6.25	51	2.00	148	5.83	289	11.38	127	5.00	57	2.25	76	3.00	16	35
NPS 2 NPT	191	7.50	46	1.80	159	6.28	289	11.38	127	5.00	57	2.25	76	3.00	17	38
NPS 2 CL600 RF	286	11.25	44	1.74	159	6.28	289	11.38	127	5.00	57	2.25	76	3.00	25	56
1. All dimensions except AR are identical for both spring-to-close and spring-to-open. 2. Actuator removal clearance.																

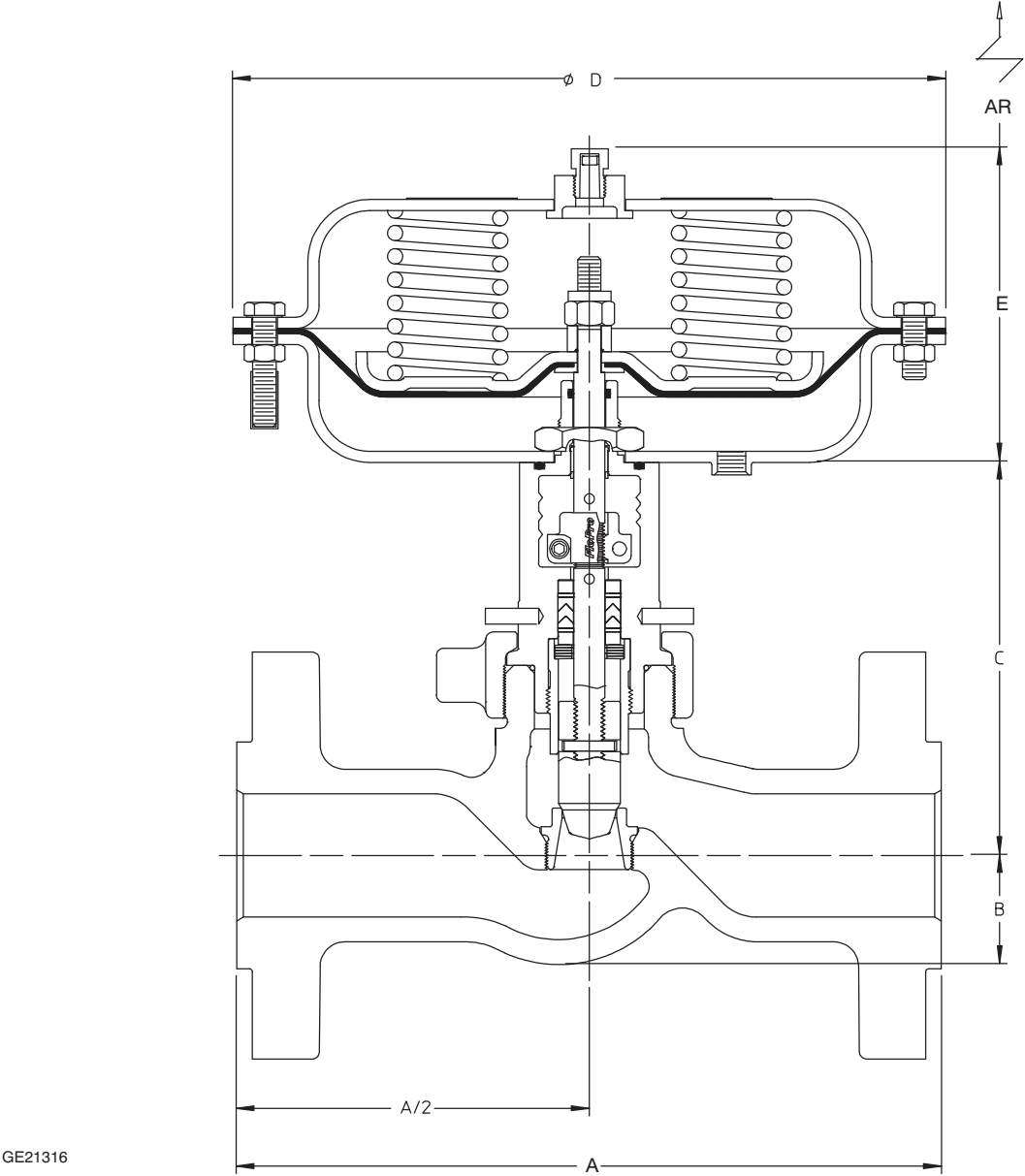
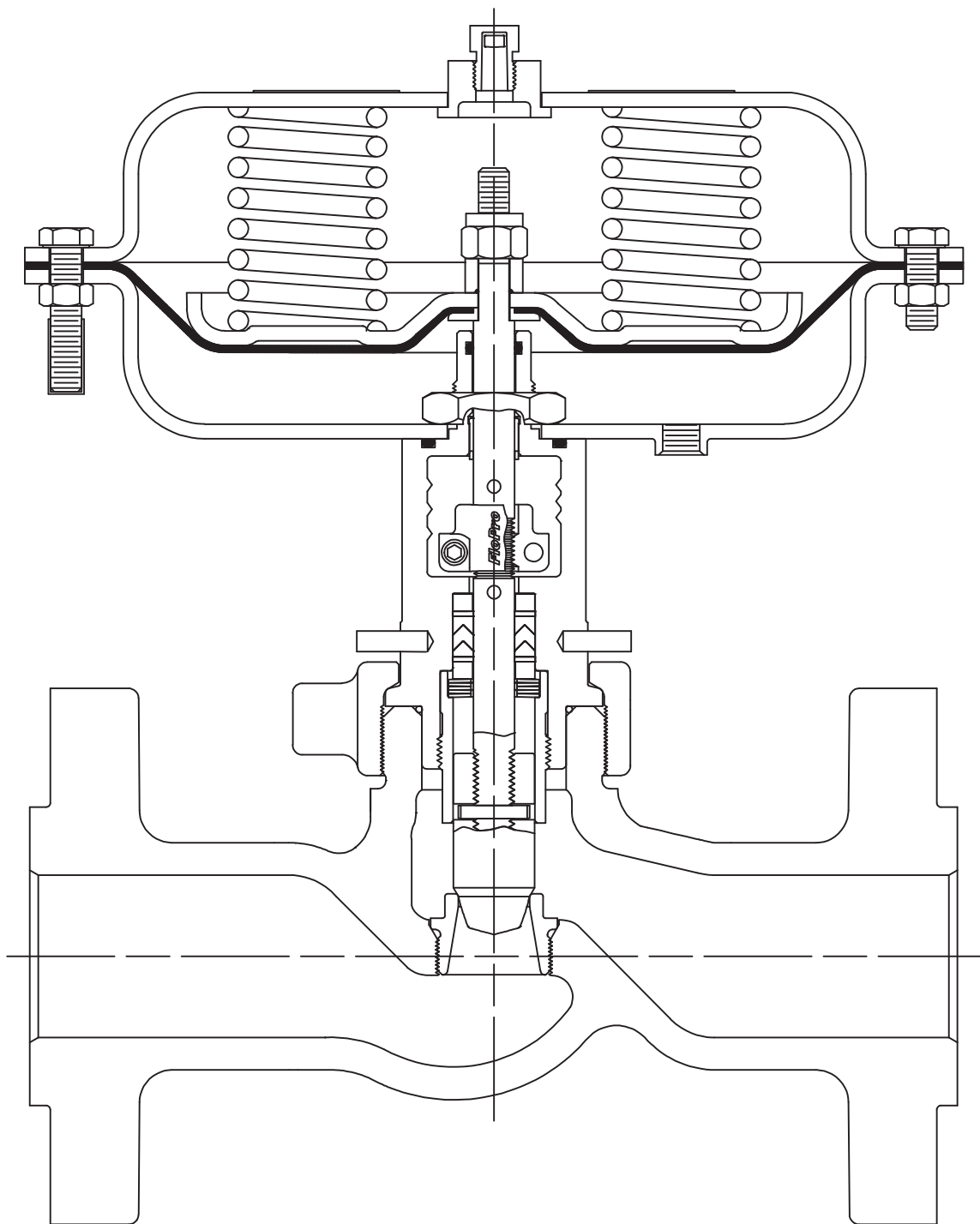
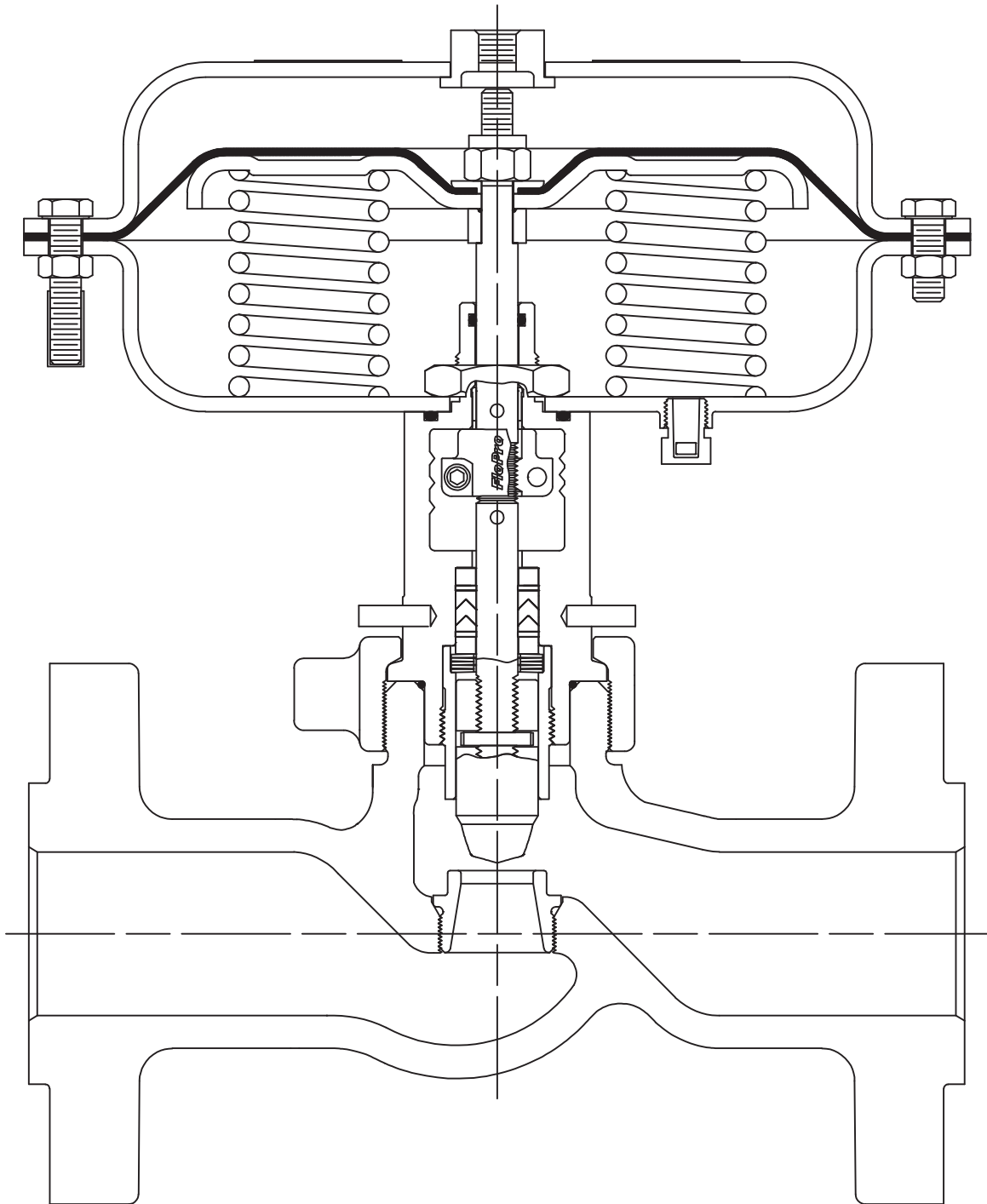


Figure 3. Design D3 Control Valve Dimensions (also see table 6)



GE21316

Figure 4. Design D3 Control Valve with Size 30 Actuator and NPS 2 Flanged Valve Body (Spring-to-Close Configuration)



GE21342

Figure 5. Design D3 Control Valve with Size 30 Actuator and NPS 2 Flanged Valve Body (Spring-to-Open Configuration)

Specifications

Valve Body Sizes and End Connection Styles⁽¹⁾

See table 2

Maximum Inlet Pressures and Temperatures⁽¹⁾

VALVE BODY SIZE	MAXIMUM INLET PRESSURE	TEMPERATURE RANGE
	bar (psig)	°C (°F)
NPS 1 NPT CL900	155 (2250)	-46 to 93 (-50 to 200)
	150 (2185)	93 to 149 (200 to 300)
NPS 2 NPT CL900	155 (2250)	-46 to 93 (-50 to 200)
	150 (2185)	93 to 149 (200 to 300)
NPS 2 RF CL600	103 (1500)	-46 to 93 (-50 to 200)
	100 (1455)	93 to 149 (200 to 300)

Maximum Shutoff Pressure Drops⁽¹⁾

See table 3

Shutoff Classification per ANSI/FCI 70-2 and IEC 60534-4

Class IV

Flow Characteristic/Valve Plug Style

Equal percentage/Micro-Form Valve Plug

Port Diameters

See table 2

Maximum Travel

15 mm (0.6 inch)

Material Temperature Capabilities⁽¹⁾

Valve Body Assembly: -46 to 149°C
(-50 to 300°F)

Actuator Assembly: -34 to 82°C (-30 to 180°F)

Construction Materials

See table 1

Flow Direction

Flow Up or Flow Down

Available Actuator Configurations

Spring-to-Open
Spring-to-Close

Maximum Actuator Casing Pressure⁽¹⁾

3.4 bar (50 psig)

Actuator Diaphragm Effective Area

329 cm² (51 square inches)

Actuator Pressure Connections

1/4 NPT internal

1. The pressure or temperature limits in the referenced tables and any applicable ASME code limitations should not be exceeded.

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