

Paramax™ 36004 Series Control Ball Valve

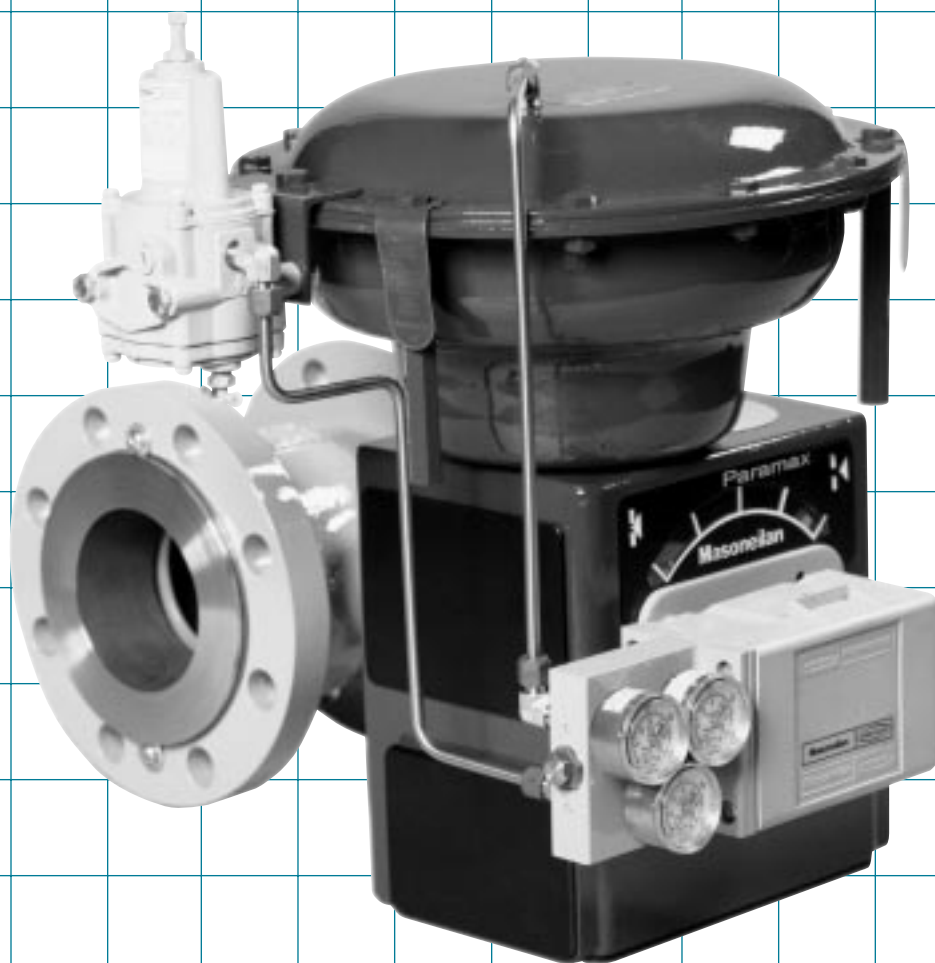


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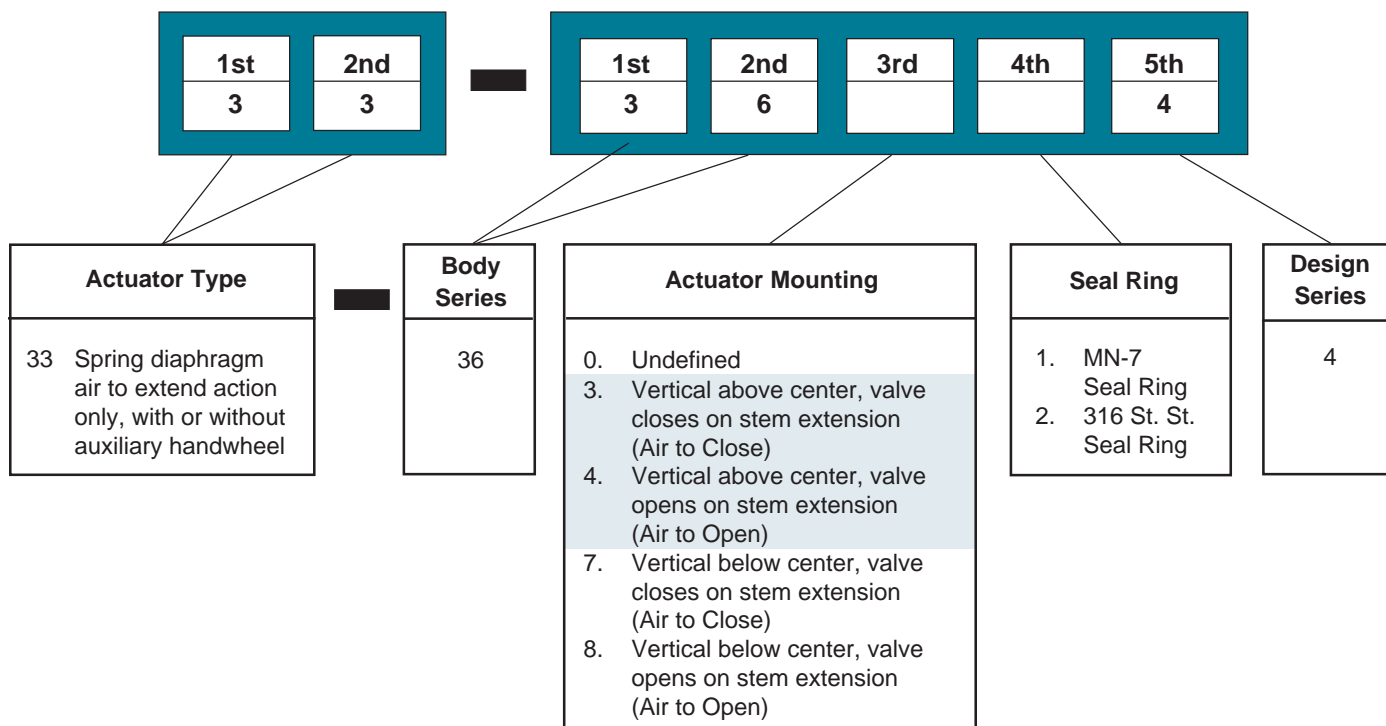
Foreword

Paramax™ is a heavy-duty automatic throttling control ball valve incorporating the design features listed below:

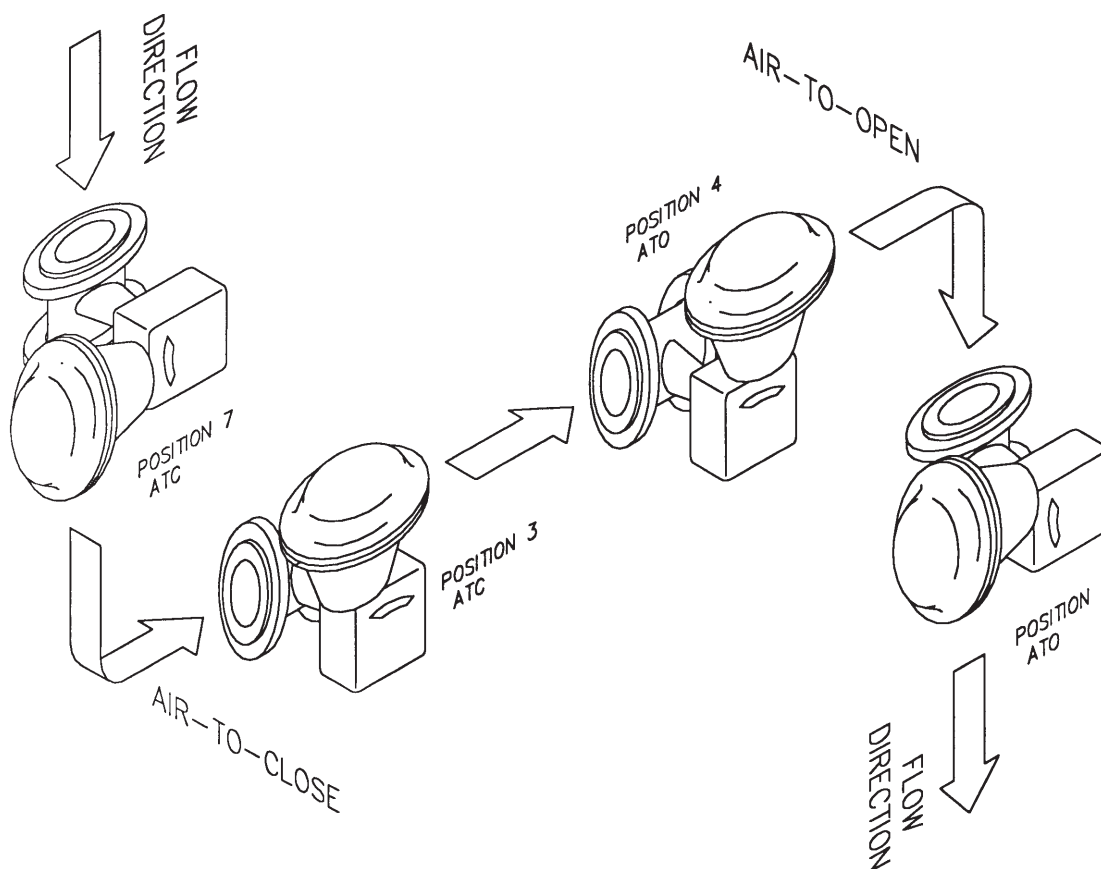
- Integrally cast raised face flanges. ANSI Class 150 or 300.
- Available in ISA S75.04 (ANSI Class 150 and 300) as well as ASME/ANSI B16.10 short pattern face-to-face dimensions (ANSI Class 150 only).
- Segmented ball provides optimum flow capacity and low torque requirements.
- Parabolic shaping of the ball's leading edge provides excellent flow characterization combined with shearing action to ensure nonclogging operation.
- MN-7 low-friction polymeric seal ring providing Class VI shutoff.
- Standard fugitive emission shaft seals.
- High temperature capabilities (600°F) using metal seal, stellite bearings and flexible graphite packing.
- Unique seal design requires no shims, even with the metal version.
- Fully splined plug, shaft and actuator connections virtually eliminate backlash, while delivering totally reliable operation
- Body materials of carbon steel, 316 and 317 stainless steel are standard.
- Easy maintenance. The seal ring may be changed by simply removing two machine screws on the inlet flange. Actuator removal or complete valve disassembly is not required.
- Model 33 spring return, diaphragm type.
 - Two sizes cover complete range
 - Positive fail-safe action
 - All moving parts completely enclosed
 - Highly visible position indicator
 - Field reversible with no part changes required
 - Uses all standard Masoneilan accessories

For additional information, contact your local Masoneilan Representative or Sales Office.

Numbering System



Shading indicates standard mounting positions



Specifications

• Body

- type: cast with integral bonnet
- sizes: 2" - 12"
- ratings: ANSI Class 150 or 300
- materials: ASTM A216 Gr WCB carbon steel
ASTM A351 Gr CG8M type 317
ASTM A351 Gr CF8M type 316
- connections: ANSI Class 150 or 300 raised face flanges
- packing box: bolted, EF Seal standard
flow
- characteristics: equal percentage
min. fluid
temperature: -20°F (-29°C) carbon steel
-50°F (-45°C) stainless steel
max. fluid
temperature: 425°F (218°C) MN-7 seal ring (see page 5)
600°F (316°C) 316 stainless steel seal ring, metal bearings and flexible graphite packing
- seat leakage: ANSI/FCI 70.2 Class VI – MN-7 seal ring
ANSI/FCI 70.2 Class IV – 316 stainless steel seal ring
- C_v ratio: greater than 300:1

• Trim

- plug: segmented ball with parabolic opening
- material: 317 stainless steel hard chromium plated
- seal ring: MN-7 (polymeric reinforced PTFE) or 316 St. St. (optional)
- packing: split ring PTFE jacketed Kevlar -50°F to 450°F (-45°C to 232°C)
flexible graphite optional -50°F to 600°F (-45°C to 316°C)
- shaft: one-piece splined both ends 17-4 PH stainless steel condition H1075 – carbon steel construction
Nitronic 50 – stainless steel construction
- bushings: 316 stainless steel with low-friction liner or Stellite No. 6 (optional)

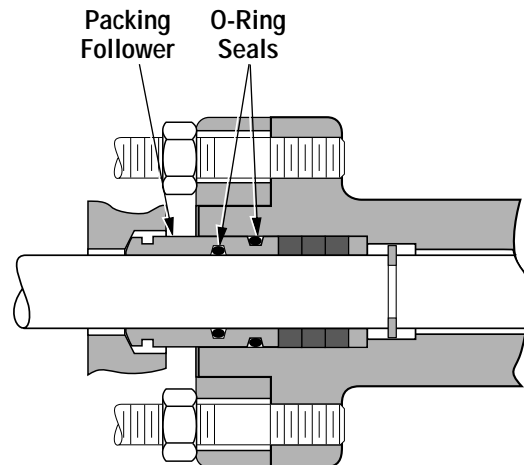
• Actuator

- type: spring opposed diaphragm
- sizes: B and C
- spring range: 7-16 psi (48-110 kPa) – Size B
9-16 psi (62-110 kPa) – Size C
- action: air to close or air to open
air
- connection: 1/4" NPT
- handwheel: (optional) rising stem push type

EF Seal® (Emission Free)

Double o-ring seal packing follower - EF Seal fugitive emission containment package.

To prevent dangerous emissions, Masoneilan provides as standard a double o-ring sealed packing box. This economical solution to fugitive emissions will not compromise control performance when it is used in environmentally sensitive applications.

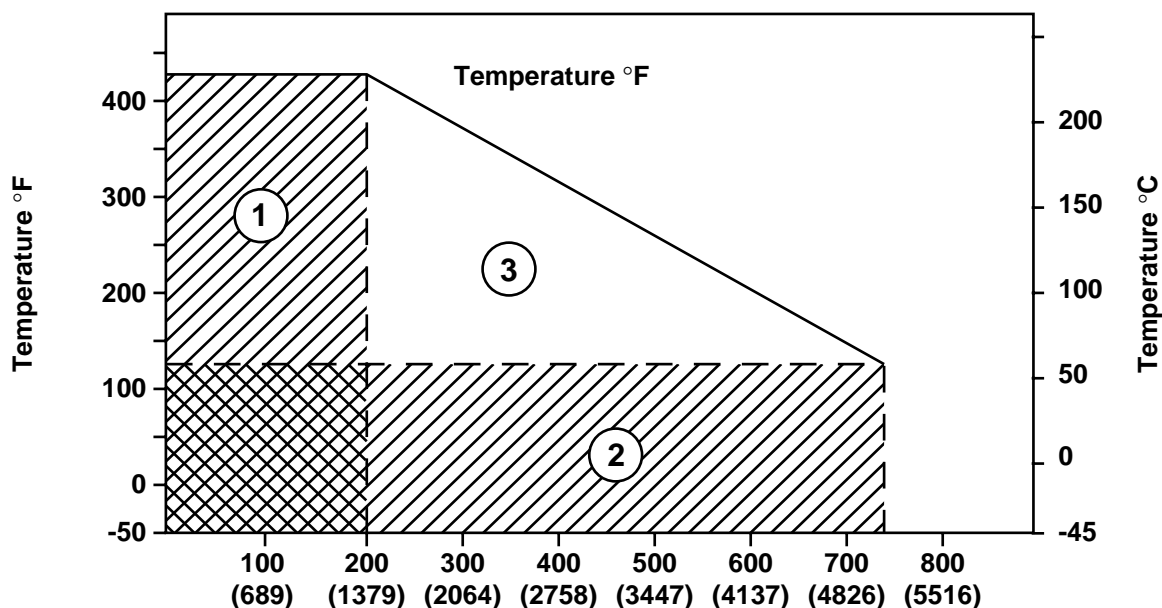


Metal Seal Ring Temperature Limitations

A strain hardened 316 stainless steel seal ring is an available option when the MN-7 Seal is not suitable. The metal seal ring can be used with either the MN-7 lined bearings or the optional solid metal bearings. The fluid temperature is limited to 425°F when using the MN-7 lined bearings.

A high temperature package consisting of metal seal ring, bearings and flexible graphite packing elevates fluid temperature limitations to 600°F maximum or ANSI working pressure and temperature limitations.

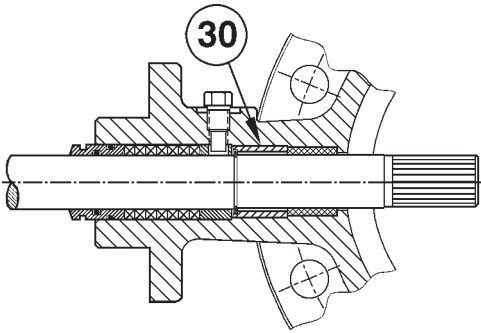
MN-7 Seal Ring Temperature Limitations



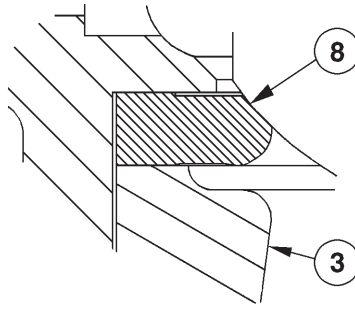
Pressure Drop psi (kPa)

- ① Zone of maximum temperature limits
- ② Zone of maximum pressure limits
- ③ Zone of maximum interactive pressure/temperature limits

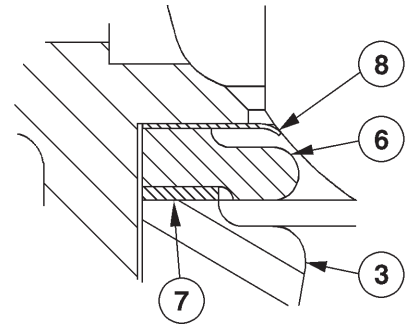
* For higher temperatures and other materials, consult Masoneilan



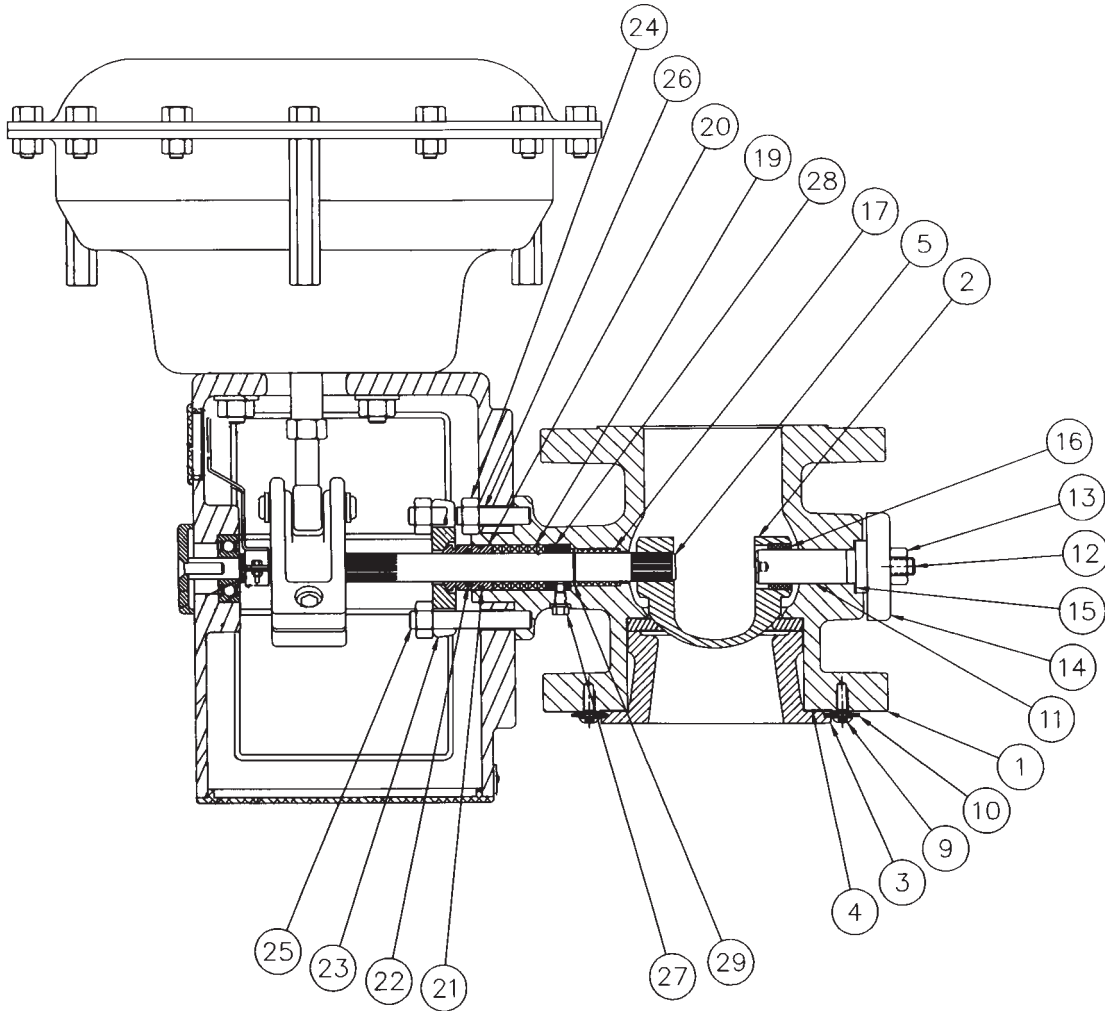
Space Tube Detail
(8" only)



MN-7 Seal Ring



Metal Seal Ring



General Arrangement with Standard Retainer

Materials

Temperature		-50°F	-20°F	+425°F	+450°F	+600°F
Ref. No.	Description	Standard Materials				
1	Body Flanged		ASTM A216 Gr WCB Carbon Steel			
			ASTM A351 Gr CF8M Type 316			
			ASTM A351 Gr CG8M Type 317			
2	Ball Plug	ASTM A351 Gr CG8M Type 317, Hard Chromium Plated				
3	Retainer Standard (ISA S75.04)	ASTM A351 Gr CG8M Type 317				
	Retainer Extended (ANSI B16.10)					
4	Gasket (Retainer Body)	Graphite				
5	Shaft	ASTM 564 Gr 630 H1075 (Carbon Steel Body)				
		Nitronic 50 (Stainless Steel Body)				
6	Backup Ring (Metal Seal)	317 Stainless Steel				
7	Gasket (Metal Seal)	316 Stainless Steel / Flexible Graphite				
8	Seal Ring (Metal)	316 Stainless Steel				
	Seal Ring	MN-7				
9	Slot Button Head Screw	Carbon Steel Plated				
10	Flat Washer	Carbon Steel Plated				
11	Pin Shaft	ASTM A564 Gr 630 H1075 (Carbon Steel Body)				
		Nitronic 50 (Stainless Steel Body)				
12	Stud, End Flange	ASTM A193 Gr B8				
13	Nut, End Flange	ASTM A194 Gr 8				
14	End Flange	ASTM A36 Plated				
15	Gasket (Pin Shaft)	Bluegard 3000				
16	Lower Bushing	316 Stainless Steel / MN-7 Lined				
		Stellite				
17	Upper Bushing	316 Stainless Steel / MN-7 Lined				
		Stellite				
19	Packing	Crane 285K - TFE Aramid Core				
		Flexible Graphite				
20	Packing Follower	ASTM A582 Type 303				
21	O-ring	Viton				
22	O-ring	Viton				
23	Packing Box Flange	ASTM A105 Plated				
24	Nut	ASTM A194 Gr 8				
25	Stud Packing Flange	ASTM A193 Gr B8				
26	Stud Bonnet	ASTM A193 Gr B8				
27	Safety Pin	ASTM A479 Type 316				
28	Packing Adapter	ASTM A479 Type 316				
29	Shaft Ring	ASTM A564 Gr 632				
30	Spacer Tube (8" only)	316 Stainless Steel				

Flow Coefficients C_v at % Maximum Opening (90° Rotation)

Percent (%) of Max. Opening	10	20	30	40	50	60	70	80	90	100
Percent (%) of Max. C_v	1	5	8.5	15	24	34	46	60	78	100
Valve Size (in.)	Rated C_v									
2	1.1	5.3	8.9	15.8	25	36	48	63	82	105
3	2.5	12.5	21	38	60	85	115	150	195	250
4	5.1	26	43	77	122	173	235	306	398	510
6	10.3	52	88	155	247	350	474	618	803	1030
8	18.3	92	156	275	439	622	842	1098	1427	1830
10	29	145	247	435	696	986	1334	1740	2262	2900
12	43	213	361	638	1020	1445	1955	2550	3315	4250

Valve (F_L) as a Function of Capacity

Percent (%) of Max. C_v	10	20	30	40	50	60	70	80	90	100
F_L	.88	.86	.82	.78	.73	.68	.65	.63	.61	.60

Actuators

Valve Size (in)	Shaft Diameter		Actuator Size		Spring Range psig	Actuator Eff. Area		Actuator Stroke		Handwheel Diameter	
	inches	(mm)	Standard	Oversized		sq. in.	(sq. cm)	inches	(mm)	inches	(mm)
2	0.62	(15.7)	B		7-16	70	(452)	2.625	(66.5)	10	(254)
3	0.62	(15.7)	B		7-16	70	(452)	2.625	(66.5)	10	(254)
3	0.62	(15.7)		C	9-16	140	(903)	2.625	(66.5)	10	(254)
4	0.93	(23.7)	B		7-16	70	(452)	2.625	(66.5)	10	(254)
4	0.93	(23.7)		C	9-16	140	(903)	2.625	(66.5)	10	(254)
6	0.93	(23.7)	C		9-16	140	(903)	2.625	(66.5)	10	(254)
8	1.20	(30.5)	C		9-16	140	(903)	2.625	(66.5)	10	(254)
10	1.20	(30.5)	C		9-16	140	(903)	2.625	(66.5)	10	(254)
12	1.37	(34.8)	C		9-16	140	(903)	2.625	(66.5)	10	(254)

Allowable Pressure Drops (psi)

Model 33 Actuator

MN-7 Seal with Lined 316 Bearings

Flow Direction into Seal Ring Side

Seat Leakage per ANSI /FCI 70.2 Class VI

Temperature: -50°F to +425°F

(-45°C to +218°C)

Required Supply Pressure: 25 psig (172 kPag)

Valve Size		Act. Size	Air to Open/Air to Close								
			Allowable Pressure Drops (psi) by Temperature Temperature in °F								
inches	(mm)		-50 to 0	0 to 125	150	200	250	300	350	400	425
2	(50)	B	750	750	700	600	510	420	340	250	200
3	(80)	B	750	750	700	600	510	420	340	250	200
4	(100)	B	440	750	700	600	510	420	340	250	200
4	(100)	C	750	750	700	600	510	420	340	250	200
6	(150)	C	530	720	700	600	510	420	340	250	200
8	(200)	C	210	450	450	450	450	420	340	250	200
10	(250)	C	60	225	225	225	225	225	225	225	200
12	(300)	C	0	110	110	110	110	110	110	110	110

Model 33 Actuator

St. St. Seal with Metal Bearings

Flow Direction into Seal Ring Side

Seat Leakage per ANSI/FCI 70.2 Class IV

Temperature: -50°F to +600°F

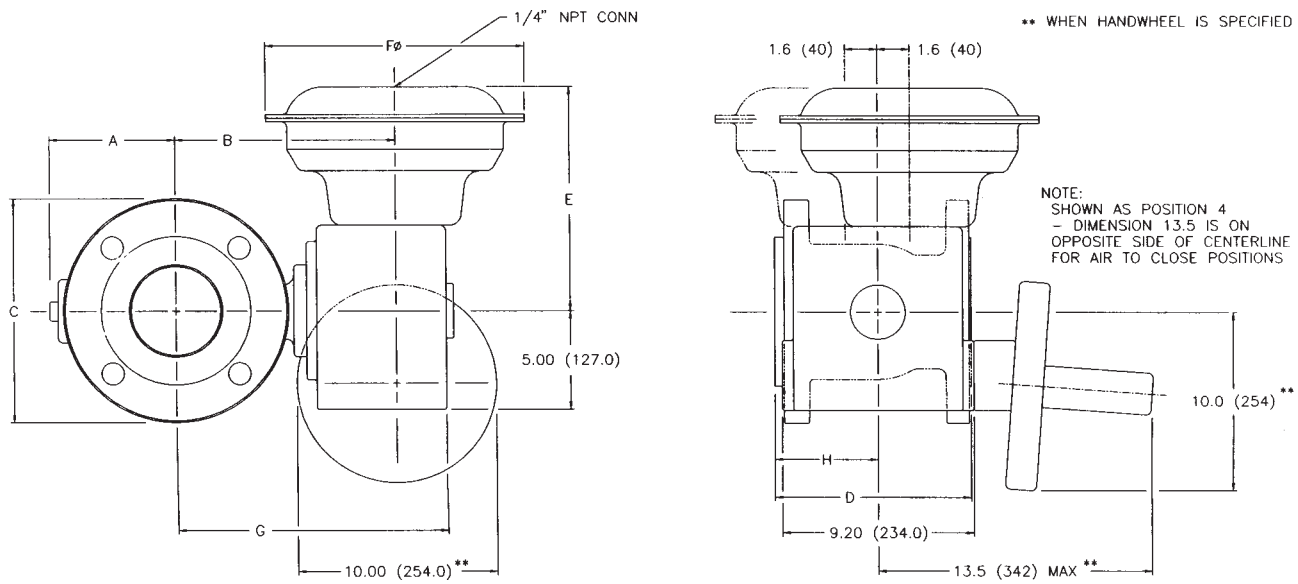
(-45°C to +316°C)

Required Supply Pressure: 25 psig (172 kPag)

Valve Size		Act. Size	Air to Open/Air to Close
			Allowable Pressure Drops (psi) by Temperature Temperature in °F
inches	(mm)		
2	(50)	B	750
3	(80)	B	660
3	(80)	C	750
4	(100)	B	250
4	(100)	C	700
6	(150)	C	290
8	(200)	C	155
10	(250)	C	80
12	(300)	C	50

NOTE: The information in these tables has been developed on the basis of testing using water and/or a dry gas. The physical characteristics of actual process fluids vary greatly and their effects should be taken into consideration. These tables are purely informational and are not a substitute for good engineering judgement.

Dimensions - in. (mm)



Dimension Size (in.)	A		B	C ①		D ($\pm .06$)	
	150#	300#		150#	300#	Standard ②	Optional Extended ③
2	4.03 (102.4)	5.33 (135.4)	8.19 (208.1)	6.00 (152.4)	6.50 (165.1)	4.88 (124.0)	7.00 (177.8)
3	4.40 (111.8)	4.40 (111.8)	8.68 (220.5)	7.50 (190.5)	8.25 (209.6)	6.50 (165.1)	8.00 (203.2)
4	5.17 (131.3)	5.17 (131.3)	10.70 (271.9)	9.00 (228.6)	10.00 (254.0)	7.62 (193.5)	9.00 (228.6)
6	6.60 (167.6)	6.60 (167.6)	11.91 (302.6)	11.00 (279.4)	12.50 (317.5)	9.00 (228.6)	10.50 (266.7)
8	7.48 (189.9)	7.48 (189.9)	13.43 (341.1)	13.5 (342.9)	15.00 (381.0)	9.56 (242.8)	11.50 (292.1)
10	9.01 (228.7)	9.01 (228.7)	14.56 (369.8)	16.00 (406.4)	17.50 (444.5)	11.69 (296.9)	13.00 (330.2)
12	10.52 (267.1)	10.52 (267.1)	16.25 (412.8)	19.00 (482.6)	20.50 (520.7)	13.31 (338.1)	14.00 (355.6)

Dimension Size (in.)	E	F	G	H	
				Standard ②	Optional Extended ③
2	11.50 (292.1)	13.00 (330.2)	10.88 (276.4)	2.59 (65.8)	4.56 (115.8)
3	11.50 (292.1)	13.00 (330.2)	11.37 (288.8)	3.40 (86.4)	4.89 (124.2)
4	11.50 (292.1)	13.00 (330.2)	13.39 (340.2)	3.96 (100.6)	5.34 (135.6)
6	15.20 (386.1)	17.50 (444.5)	14.60 (370.9)	4.69 (119.1)	6.25 (158.8)
8	15.20 (386.1)	17.50 (444.5)	16.12 (409.4)	5.02 (127.5)	6.97 (177.0)
10	15.20 (386.1)	17.50 (444.5)	17.25 (438.2)	6.09 (154.7)	7.40 (188.0)
12	15.20 (386.1)	17.50 (444.5)	18.94 (481.1)	7.11 (180.6)	7.80 (198.1)

① Conforms to ASME/ANSI Standard B16.5 - 1988 "Pipe Flanges and Flanged Fittings"

② Conforms to ISA Standard S75.04

③ Conforms to ASME Standard B16.10 - 1992 (formerly ANSI Standard B16.10 - 1973)

Short pattern ball available for ANSI 150 Class valves only.

Weights (lbs.)

Size (in.)	Standard Face to Face		Extended Face to Face
	150#	300#	150#
2	92	96	94
3	104	114	107
4	126	144	130
6	223	263	233
8	290	346	304
10	371	447	385
12	483	585	505

Accessories and Options

4700P Series Positioner
Instrument Signals 3-15 and 6-30 psig

8012 Electropneumatic Valve Positioner
(See Specification Data CS5000)
Instrument Signals
10-50 mA; 104 ohms
4-20 mA; 173 ohms
4-12, 12-20 mA, 173 ohms split range

7000 Electropneumatic (I/P) Transducer
TS-Model 7000
Input Range 4-20 mA
Split range up to 3 times
Output 3-15 psi, adjustable to 1-17
6-30 psi, adjustable 0-20, 0-35, 3-27

496 Rotary Switches
(See Specification Data CS7000)
496-2 (2 Switches) Limit Switch
(See Specification Data CS7000)

80-4 or 80-40 Airset
(See Specification Data CY7800)
77-6 Lockup Valve
(See Specification Data CY7700)
2" Gauge 0-30 psi

For solenoid valves consult factory

Additional Options Available

Handwheel
Other Body Materials NACE
Adjustable Limit Stops

Refer to specific actuator and accessory specification literature for complete information.

USEFUL EQUIVALENTS

U.S. CUSTOMARY UNITS

Specific gravity of air G = 1 (reference for gases)

U.S. gallon of water = 8.33 lbs @ std. cond.
 1 cubic foot of water = 7.48 gallons
 Air specific volume = 1/density = 13.1 cubic feet/lb
 G of any gas = density of gas/0.076

Specific gravity of water = 1 (reference for liquids)

1 cubic foot of water = 62.34 lbs @ std. cond. (= density)
 1 cubic foot of air = 0.076 lbs @ std. cond. (= air density)
 Air molecular weight M = 29
 G of any gas = molecular wt. of gas/29

$$G \text{ of gas at flowing temp.} = \frac{G \times 520}{T + 460}$$

Standard conditions (U.S. customary) are at 14.69 psia and 60°F.

Flow conversion of gas

$$\text{SCFH} = \frac{\text{Lbs/hr}}{\text{density}} \quad \text{SCFH} = \frac{\text{Lbs/hr} \times 379}{M} \quad \text{SCFH} = \frac{\text{Lbs/hr} \times 13.1}{G}$$

Flow conversion of liquid

$$\text{GPM} = \frac{\text{Lbs/hr}}{500 \times G}$$

Temperature Conversion

$$F \text{ (Fahrenheit)} = C \text{ (9/5)} + 32$$

$$C \text{ (Celsius)} = (F - 32) \text{ 5/9}$$

METRIC CONVERSION TABLES

Multiply	By	To Obtain
LENGTH		
millimeters	0.039	inches
centimeters	0.394	inches
inches	2.54	centimeters
feet	30.48	centimeters
feet	0.304	meters
AREA		
sq. centimeters	0.155	sq. inches
sq. centimeters	0.001076	sq. feet
sq. inches	6.452	sq. centimeters
sq. inches	0.00694	sq. feet
sq. feet	929	sq. centimeters
FLOW RATES		
gallons US/minute (GPM)	3.785	liters/min
gallons US/minute	0.133	ft ³ /min
gallons US/minute	0.227	m ³ /hr
cubic feet/minute	7.481	GPM
cubic feet/hour	0.1247	GPM
cubic feet/hour	0.01667	ft ³ /min
cubic meters/hour	4.403	GPM
cubic meters/hour	35.31	ft ³ /hr
VELOCITY		
feet per second	0.3048	meters/second
feet per second	1.097	km/hr
feet per second	0.6818	miles/hr

Multiply	By	To Obtain
VOLUME AND CAPACITY		
cubic feet	28.32	liters
cubic feet	7.4805	gallons
liters	61.02	cubic inches
liters	0.03531	cubic feet
liters	0.264	gallons
gallons	3785.0	cubic cm
gallons	231.0	cubic inches
gallons	0.1337	cubic feet
WEIGHT		
pounds	0.453	kilogram
kilogram	2.205	pounds
PRESSURE AND HEAD		
pounds/sq. inch	0.06895	bar
pounds/sq. inch	0.06804	atmosphere
pounds/sq. inch	0.0703	kg/cm ²
pounds/sq. inch	2.307	ft. of H ₂ O (4°C)
pounds/sq. inch	0.703	m of H ₂ O (4°C)
pounds/sq. inch	5.171	cm of Hg (0°C)
pounds/sq. inch	2.036	in. of Hg (0°C)
atmosphere	14.69	psi
atmosphere	1.013	bar
atmosphere	1.033	kg/cm ²
atmosphere	101.3	kPa
bar	14.50	psi
kilogram/sq. cm	14.22	psi
kiloPascal	0.145	psi

Facilities: Brazil, Canada, France, Germany, Italy, Japan, Mexico, Netherlands, Singapore, Spain, United Kingdom, United States



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