

# 700 Series Anti-corrosion Control Valves

Specification Data

CH9020

11/97



**Split Body PTFE Lined  
Control Valves  
for Corrosive Applications**

**Masoneilan**  
Valve & Controls **DRESSER**

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## Foreword

The 700 Series is designed for those applications where severe corrosion resistance is required. With its varied trim options and configurations, it is a most versatile valve for corrosive services. Features include:

### PTFE Lining

Isostatic compaction of PTFE to the base metal ensures a perfect bond.

### Broad Range of $C_v$ 's

$C_v$ 's from 0.47 to 175 standard, with micro trim for lower  $C_v$ 's available.

### Quick Trim Changeout

Clamped in seat ring allows "in line" trim replacement when necessary.

### Bellows Seal

Unique block design eliminates torsional stressing, increasing the life span to four times that of helix designs.

### Trim Replacement

Trim replacement is easily accomplished and does not require bellows replacement.

### Safety Sealing Ring

External seal box with leak detector is standard for safe operation in the event of bellows failure.

For additional information, contact your Masoneilan Representative.

Trade names noted throughout are for reference only. Masoneilan reserves the right to supply trade named material or its equivalent.

## General Data

### • Body

type : PTFE lined split body globe  
 liner : virgin PTFE  
 flow direction : flow to open  
 $C_v$  ratio : 30:1  
 base materials : cast ductile iron  
 end connections : 150# flanges  
                           ANSI B16.10 Face to Face  
                           or PN16  
 max rating : 230 psi (16 bar) at maximum  
                           120°F (49°C)

### • Actuator

type : spring diaphragm  
 handwheel : optional

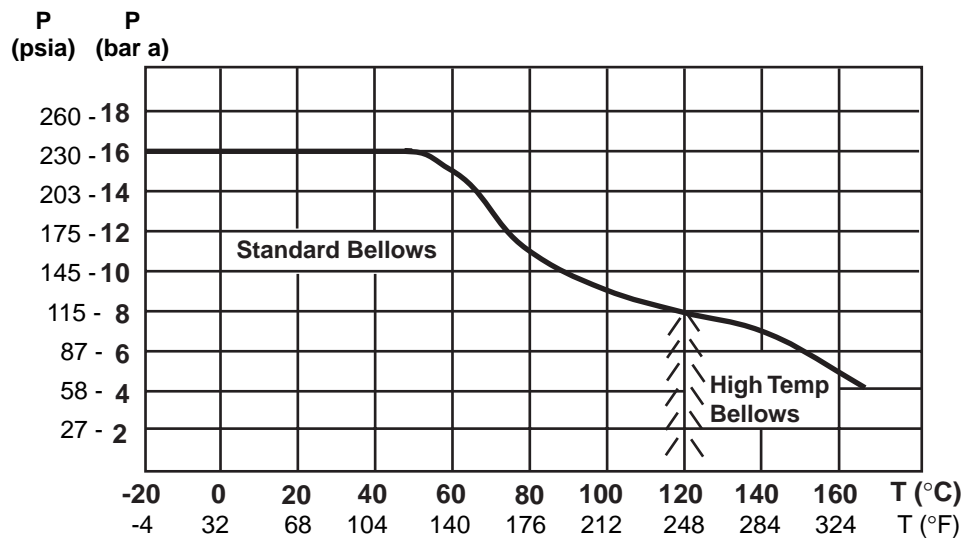
### • Trim

type : contoured plug  
 materials :  
   - plug PTFE encapsulated 316 St. St.  
           (Other plug materials available)  
   - stem stainless steel  
   - seat ring PTFE encapsulated 316 St. St.  
               with other materials available  
   - guide PTFE encapsulated 316 St. St.  
 flow  
 characteristics : linear  
                           equal percentage

## Seat Leakage

Valve Size		Maximum Working Pressure	Seat Type	Maximum Seat Leakage per IEC 534-4 and ANSI/FCI 70.2
mm	inch			
25-100	1 - 4	230 psi (16 bar)	PTFE	Class VI
			Metal	Class IV

## Pressure/Temperature Diagram



**Flow Coefficients - Rated  $C_v$   
Critical Flow Factor  $F_L$  (0.85 at Valve Fully Open)**

Valve size		Seat Diameter inches (mm)								
mm	inch	.234 (6)	.312 (8)	.702 (18)	.780 (20)	1.40 (36)	1.87 (48)	2.15 (55)	2.34 (60)	3.12 (80)
25	1	0.47 1.15	2.9	4.7 8.2	12.3					
50	2					8.2 21 30.0	47			
80	3							21 30 47	108	
100	4									30 50 115 175

**Typical Applications\***

PTFE offers compatibility with the following chemicals :

SO <sub>3</sub>	Sulfur Trioxide	HNO <sub>3</sub>	Nitric Acid
H <sub>2</sub> SO <sub>4</sub>	Sulfuric Acid	Br	Bromine
HCl	Hydrochloric Acid	Cl <sub>2</sub>	Wet and Dry Chlorine
HF	Hydrofluoric Acid (max 100°C)	PCl <sub>5</sub>	Phosphorous Pentachloride
ClSO <sub>2</sub> OH	Chlorosulfonic Acid		

\*Partial listing only

## C<sub>v</sub> Versus Travel

Flow Direction : Flow to Open

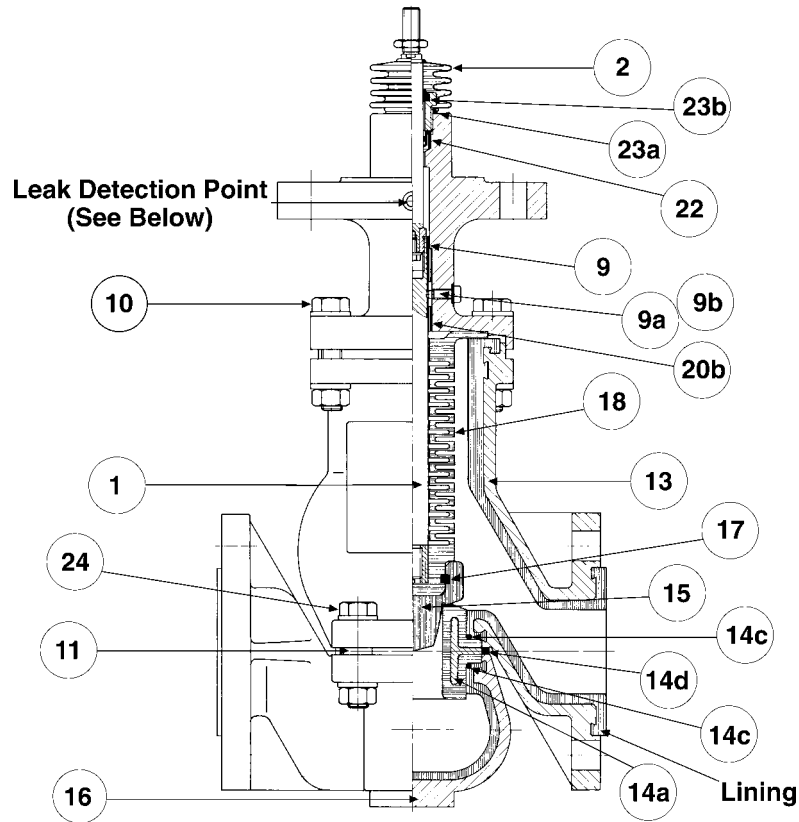
Flow Characteristic : Equal Percentage

Percent of Plug Travel			10	20	30	40	50	60	70	80	90	100
Valve size		Travel inches (mm)	C <sub>v</sub>									
mm	inch											
25	1	0.8 (20.3)	0.02	0.03	0.04	0.05	0.07	0.10	0.16	0.23	0.33	0.47
			0.04	0.05	0.08	0.12	0.18	0.26	0.38	0.55	0.80	1.15
			0.10	0.15	0.22	0.32	0.46	0.66	0.96	1.40	2.00	2.90
			0.17	0.25	0.36	0.51	0.74	1.10	1.60	2.30	3.30	4.70
			0.30	0.43	0.63	0.90	1.30	1.90	2.70	3.90	5.70	8.20
50	2	0.8 (20.3)	0.45	0.65	0.93	1.33	1.95	2.90	4.10	5.90	8.51	12.30
			0.30	0.43	0.62	0.90	1.30	1.90	2.70	3.90	5.70	8.20
			0.76	1.10	1.60	2.30	3.30	4.80	6.90	10.00	14.50	21.00
			1.10	1.60	2.30	3.30	4.70	6.90	9.90	14.40	20.80	30.00
			1.70	2.50	3.60	5.20	7.40	10.70	15.50	22.50	32.50	47.00
80	3	1.5 (38.1)	0.76	1.10	1.60	2.30	3.30	4.80	6.90	10.00	14.50	21.00
			1.10	1.60	2.30	3.30	4.70	6.90	9.90	14.40	20.80	30.00
			1.70	2.50	3.60	5.20	7.40	10.70	15.50	22.50	32.50	47.00
			3.90	5.60	8.20	11.80	17.10	24.70	28.30	51.70	74.70	108.00
			1.10	1.60	2.30	3.30	4.70	6.90	9.90	14.40	20.80	30.00
100	4	2 (50.8)	1.80	2.60	3.80	5.50	7.90	11.40	16.50	23.90	34.60	50.00
			4.10	5.90	8.50	12.50	18.20	26.30	38.00	55.00	79.60	115.00
			6.30	9.20	13.20	19.10	27.70	40.00	57.90	83.70	121.00	175.00

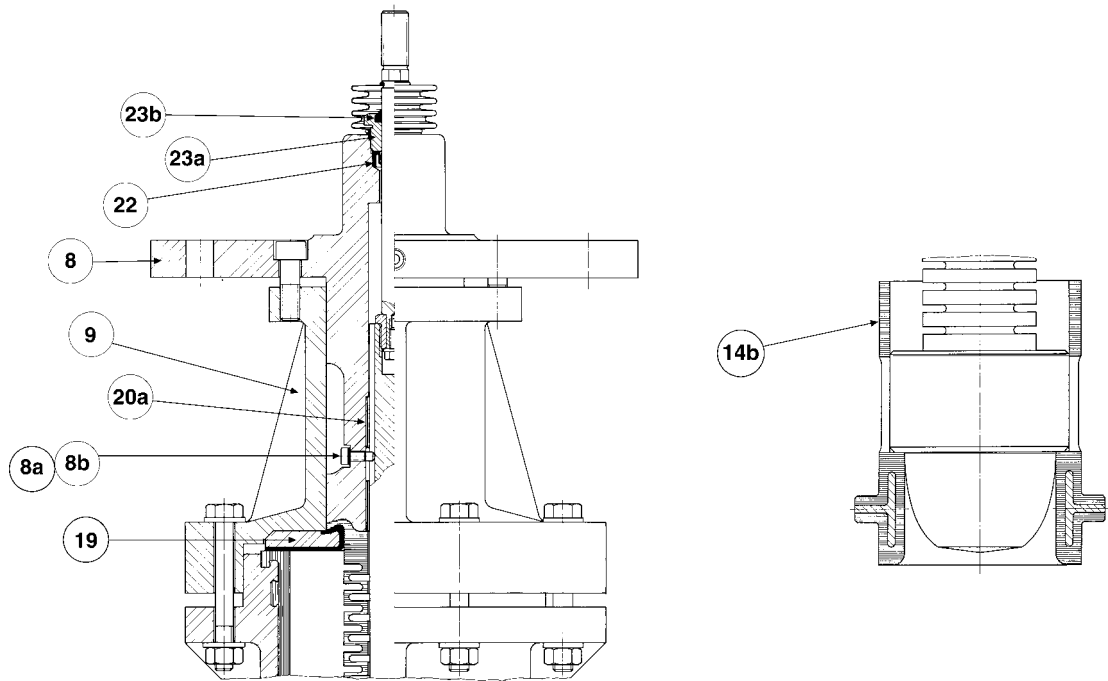
Flow Characteristic : Linear

Percent of Plug Travel			10	20	30	40	50	60	70	80	90	100
Valve size		Travel inches (mm)	C <sub>v</sub>									
mm	inch											
25	1	0.8 (20.3)	0.06	0.10	0.15	0.20	0.24	0.28	0.32	0.37	0.42	0.47
			0.14	0.25	0.36	0.48	0.59	0.70	0.81	0.93	1.05	1.15
			0.36	0.64	0.92	1.20	1.50	1.80	2.10	2.30	2.60	2.90
			0.50	1.00	1.50	2.00	2.40	2.80	3.30	3.70	4.20	4.70
			1.00	1.80	2.60	3.40	4.20	5.00	5.80	6.60	7.40	8.20
50	2	0.8 (20.3)	1.54	2.80	3.90	5.13	6.40	7.50	8.71	9.94	11.10	12.30
			1.00	1.80	2.60	3.40	4.20	5.00	5.80	6.60	7.40	8.20
			2.60	4.60	6.70	8.70	10.80	12.80	14.90	16.90	19.00	21.00
			3.70	6.60	9.50	12.50	15.40	18.30	21.20	24.20	27.10	30.00
			5.70	10.40	14.90	19.60	24.10	28.70	33.30	37.90	42.40	47.00
80	3	1.5 (38.1)	2.60	4.60	6.70	8.70	10.80	12.80	14.90	16.90	19.00	21.00
			3.70	6.60	9.50	12.50	15.40	18.30	21.20	24.20	27.10	30.00
			5.73	10.30	14.90	19.60	24.10	28.70	33.30	37.90	42.40	47.00
			13.20	23.70	34.30	44.90	55.40	65.90	76.40	87.00	97.80	108.00
			3.70	6.60	9.50	12.50	15.40	18.50	21.20	24.20	27.10	30.00
100	4	2 (50.8)	6.10	11.00	15.90	20.80	25.60	30.50	35.40	40.40	45.10	50.00
			14.10	23.30	36.60	47.50	56.80	70.20	81.40	92.60	104.20	115.00

# Materials



**Standard Design  
1" and 2" Sizes**



**Standard Design  
3" and 4" Sizes**

Leak Detection point, 1/4" - 1/8" NPT

## Materials

Ref. No.	Description	Standard Materials	Size (in.)			
			1	2	3	4
1	Stem	Stainless Steel				
2	Boot	Neoprene				
8	Internal Bonnet	Ductile Iron				
8a and 8b	Antirotation Screw	St. St. with Gasket				
9	External Bonnet	Ductile Iron				
9a and 9b	Antirotation Screw	St. St. with Gasket				
10	Bonnet Bolt	Stainless Steel				
11	Washer	Stainless Steel				
13	Upper Body	Ductile Iron				
	Lining	Virgin PTFE				
14a	Seat	Virgin PTFE with or without St. St. Insert				
14b	Cage Seat	Virgin PTFE with or without St. St. Insert				
14c	O-ring	Viton Coated PTFE				
14d	Distance Ring	Stainless Steel				
15	Plug	Virgin PTFE				
16	Lower Body	Ductile Iron				
	Lining	Virgin PTFE				
17	Connecting Rod	Virgin PTFE				
18	Bellows	Virgin PTFE				
19	Bellows Centering Disc	PTFE Lined St. St.				
20a	Guide Bushing	PTFE Encapsulated Stainless Steel				
20b	Guide Bushing	PTFE Encapsulated Steel				
22	Packing Box Ring	PTFE				
23a	Packing Box Gland	Stainless Steel				
23b	Wiper Ring	Neoprene				
24	Body Bolt	Stainless Steel				

Note : Other corrosion resistant materials may be available on request. Consult Masoneilan.

## Allowable Shutoff Pressure Flow to Open

Type 88 Actuator - Air to Open

Note : Supply pressure is 5 psi (0.4 bar) over bench range

Valve Size		Cv	Actuator Size	Travel inches (mm)	Bench Range (psig)	Allowable Shut-off Pressure psi (bar)			
mm	inch								
25	1	.47 to 12.3	6	0.8 (20.3)	3-15	40 (2.8)			
			6	0.8 (20.3)	6-30	230 (16)			
50	2	8.2 to 30	10	0.8 (20.3)	6-30	210 (14)			
			10	0.8 (20.3)	11-23	230 (16)			
		47	10	0.8 (20.3)	11-23	230 (16)			
			16	0.8 (20.3)	3-15	35 (2.4)			
			16	0.8 (20.3)	6-30	200 (14)			
			16	0.8 (20.3)	11-23	230 (16)			
			23	0.8 (20.3)	3-15	100 (6.9)			
			23	0.8 (20.3)	6-30	230 (16)			
80	3	21 to 47	10	1.50 (38.1)	6-30	45 (3.1)			
			10	1.50 (38.1)	11-23	175 (12)			
			10	1.50 (38.1)	21-45	230 (16)			
			16	1.50 (38.1)	6-30	140 (9.7)			
			23	1.50 (38.1)	3-15	65 (4.5)			
			23	1.50 (38.1)	6-30	230 (16)			
		108	10	1.50 (38.1)	6-30	25 (1.7)			
			10	1.50 (38.1)	11-23	140 (9.7)			
			10	1.50 (38.1)	21-45	230 (16)			
			16	1.50 (38.1)	6-30	110 (7.6)			
			23	1.50 (38.1)	3-15	45 (3.1)			
			23	1.50 (38.1)	6-30	200 (14)			
			100	4		16	2.00 (50.8)	6-30	40 (2.8)
						16	2.00 (50.8)	11-23	140 (9.7)
16	2.00 (50.8)	21-45				230 (16)			
23	2.00 (50.8)	6-30				100 (6.9)			



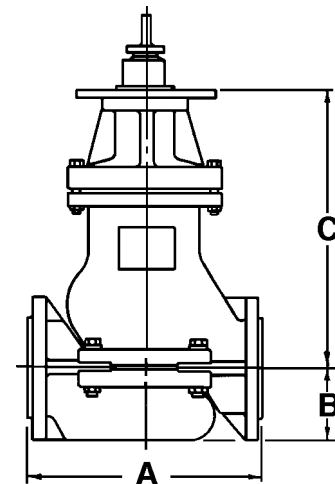
## Allowable Shutoff Pressure Flow to Open

### Type 87 Actuator - Air to Close

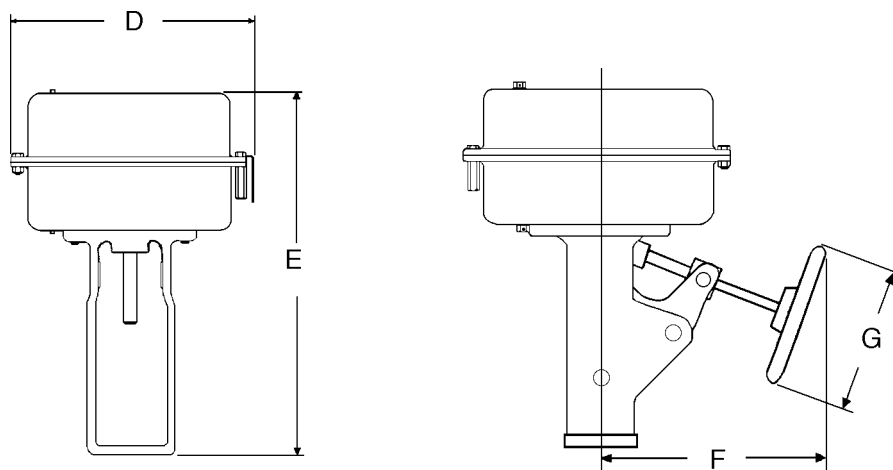
Valve Size		Cv	Actuator Size	Travel inches (mm)	Bench Range (psig)	Allowable Shut-off Pressure psi (bar)			
						Supply Pressure psig (bar)			
mm	inch					20 psig (1.4 bar)	30 psig (2.1 bar)	35 psig (2.4 bar)	
25	1	.47 to 12.3	6	0.8 (20.3)	3-15	230 (16)	-	-	
50	2	8.2 to 30	10	0.8 (20.3)	3-15	130 (9.0)	230 (16)	-	
			10	0.8 (20.3)	6-30	0	0	130 (9.0)	
			16	0.8 (20.3)	3-15	230 (16)	-	-	
			16	0.8 (20.3)	6-30	0	0	230 (16)	
	47	10	0.8 (20.3)	10	0.8 (20.3)	3-15	46 (3.2)	230 (16)	-
				10	0.8 (20.3)	6-30	0	0	46 (3.2)
				16	0.8 (20.3)	3-15	140 (9.7)	230 (16)	-
				16	0.8 (20.3)	6-30	0	0	140 (9.7)
				23	0.8 (20.3)	3-15	230 (16)	-	-
				23	0.8 (20.3)	6-30	0	0	230 (16)
80	3	21 to 47	10	1.50 (38.1)	3-15	20 (1.4)	230 (16)	-	
			10	1.50 (38.1)	6-30	0	0	20 (1.4)	
			16	1.50 (38.1)	3-15	100 (6.9)	230 (16)	-	
			16	1.50 (38.1)	6-30	0	0	100 (6.9)	
			23	1.50 (38.1)	3-15	200 (14)	230 (16)	-	
			23	1.50 (38.1)	6-30	0	0	200 (14)	
	108	10	1.50 (38.1)	10	1.50 (38.1)	3-15	0	230 (16)	-
				16	1.50 (38.1)	3-15	75 (5.2)	230 (16)	-
				16	1.50 (38.1)	6-30	0	0	75 (5.2)
				23	1.50 (38.1)	3-15	150 (10)	230 (16)	-
				23	1.50 (38.1)	6-30	0	0	150 (10)
100	4	30 to 175	16	2.00 (50.8)	3-15	20 (1.4)	230 (16)	-	
			16	2.00 (50.8)	6-30	0	0	20 (1.4)	
			23	2.00 (50.8)	3-15	65 (4.5)	230 (16)	-	
			23	2.00 (50.8)	6-30	0	0	65 (4.5)	

## Body S/A Dimensions and Weights

Valve Size		A inches (mm)		B inches (mm)	C <sup>①</sup> inches (mm)	Weight lbs (kg)
mm	inch	ANSI Class 150	PN 16			
25	1	7.25 (184)	6.30 (160)	2.12 (54)	9.61 (245)	25 (12)
50	2	10.00 (254)	9.06 (230)	3.00 (76)	11.02 (280)	61 (28)
80	3	11.75 (298)	12.20 (310)	3.75 (95)	13.66 (347)	128 (58)
100	4	13.88 (353)	13.78 (350)	4.50 (114)	18.58 (472)	264 (120)



## Actuator Dimensions and Weights



Shown with optional handwheel

Actuator Size	D inches (mm)	E <sup>①</sup> inches (mm)	F inches (mm)	G inches (mm)	Weight without Handwheel lbs (kg)	Weight with Handwheel lbs (kg)
6	11.50 (292)	15.54 (395)	10.00 (254)	9.00 (229)	45 (20)	60 (27)
10	14.50 (368)	19.58 (497)	10.90 (277)	12.00 (305)	85 (38)	105 (47)
16	18.75 (476)	28.22 (717)	13.00 (330)	18.00 (457)	210 (95)	245 (111)
23	21.63 (549)	30.71 (780)	15.00 (381)	18.00 (457)	265 (120)	320 (145)

Actuator removal clearance = 6 inches (150 mm)

<sup>①</sup>Total height from valve centerline to top of actuator is C + E

### Accessories

Side Mounted Handwheels  
For 87/88 Actuators  
(See Specification Data CR8788)

4700 P Series Pneumatic Positioner  
Instrument Signals 3-15 and 6-30 psig  
(0.2-1 and 0.4-2 bar)

8012/8013 Series Electropneumatic Positioners  
Input range 4-20 mA  
Split range  
(See Specification Data CS5000)

7000 Electropneumatic (I/P) Transducer  
Input range 4-20 mA  
Split range  
Output 0.2-1 bar, adjustable  
0.4-2 bar, adjustable  
3-15 psi, adjustable  
6-30 psi, adjustable  
(See TS-Model 7000)

Smart Valve Interface (SVI™)  
Smart Positioner and Smart Valve Process  
Controller  
Input range 4-20 mA  
Split range  
HART Communication  
(See Brochure BW1000)

ValVue Software  
Calibration, Configuration, Diagnostic, and  
Operator Interface Tool  
(See Brochure BW1000)

496 Rotary Electric Switches  
(See Specification Data CS7000)  
496-1 (1-Switch SPDT)  
496-2 (2-Switches SPDT)  
496-3 Potentiometric Position Transmitter  
496-6 (1-Switch DPDT)  
496-7 (2-Switches DPDT)  
496-8 Opto-electronic Position Transmitter

Other Limit Switches

77-4 or 77-40 Airset  
(See Specification Data CY7700)  
80-4 or 80-40 Airset  
(See Specification Data CY7800)  
77-6 or 77-60 Lockup Valve  
2" Gauge 0-30 psi (0 - 2 bar)

2700 Controllers  
(See Specification Data CW6000)

Solenoid Valves

### Options

Custom Trim Materials  
Limit Stops

**For additional accessories and options consult Masoneilan.**