

# Mark 78 Series

CRN Registration Number Available

## Globe Style Control Valve

The Mark 78 pneumatic control valve is designed for accurate performance and simplified maintenance. This versatile product can be used on a variety of applications, including viscous/corrosive liquids, process gases or utility steam in process or utility service.

### FUNCTION

The Mark 78 globe style control valve utilizes a cage retained seat design with unbalanced plug. The top entry cage design allows maintenance while the valve is in the line. The trim comes with stainless steel standard, or can easily accommodate special materials for maximum corrosion resistance. Threaded, welded, or flanged ends complete a truly versatile valve that covers a wide variety of applications from utility steam to process gases, to corrosive/viscous liquids.

### FEATURES

- Top entry cage design – allows easy, in-line maintenance
- Optional soft seats – enables bubble-tight ANSI Class VI shutoff
- Characterized flow options – including linear, equal percentage, quick opening, or an equal-linear combination
- High capacity service – Cv's up to 60 (Kv's up to 51,6) in 2" (DN50) valves
- Lift out seats – seats are not screwed in, and lift out of the valve body for easy access and quick maintenance.
- Versatile use – can be used on a variety of applications including liquids, gases or steam



**SPECIFICATIONS**

**Sizes:** 1/2" through 2" (DN15 through DN50)

**End Connections**

- Threaded – NPT, BSPT, BSPP
- ANSI Flanges – 150#, 300#
- DIN Flanges – PN 10/16, PN25/40
- Companion Flanges – PN10/16, PN25/40
- Integral Flanges – ANSI 150#, 300#

**Body Materials**

- Bronze
- Carbon Steel
- Stainless Steel

**Trim Materials**

- 316 Stainless Steel

**Seats**

- Teflon/Stainless Steel
- Metal

**O-Ring/Gasket**

- Viton, EPDM

**Shutoff**

- ANSI Class VI with soft seat
- ANSI Class IV with hard seat

**O-Ring/Gasket**

- Viton, EPDM

**Actuator**

- Sizes: 35M, 55M, 85M
- Signal Range: 3-15 psi (0,2-1,0 bar) standard
- Maximum Actuator Pressure: 45 psi (3,1 bar)
- Available with side or top mounted positioners.

**Flow Characteristics**

- Equal Percentage
- Linear
- Quick Opening
- Equal-linear combination

**Rangeability**

- Equal percentage or equal-linear: 60:1
- Linear: 30:1

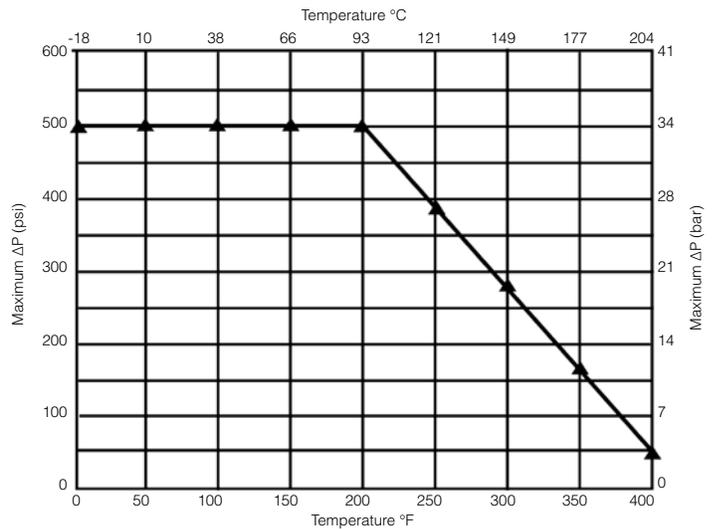
**Recovery Factor,  $F_L$ :** 0.9

**Valve Capacity,  $C_v$  (Kv)**

Plug Style	Cv (Kv) per Valve Seat Size				
	1/2" DN15	3/4" DN20	1" DN25	1-1/2" DN40	2" DN50
Equal Percentage	4.4 (3,8)	8.0 (6,9)	11.5 (9,9)	30 (26)	45 (39)
Linear	4.4 (3,8)	8.0 (6,9)	12.2 (10,5)	30 (26)	45 (39)
Equal-Linear	4.4 (3,8)	8.0 (6,9)	12.0 (10,3)	35 (30)	50 (43)
Quick Opening	4.6 (4,0)	9.0 (7,7)	12.7 (10,9)	40 (34)	60 (52)

**PRESSURE TEMPERATURE CHARTS**

- Pressure/Temperature Ratings, Soft Seat



**Pressure Temperature Limits**

- Viton: -20°F to 400°F (-29°C to 204°C)
- EPDM: -40°F to 450°F (-40°C to 232°C)

**Pressure/Temperature Ratings, Hard Seat**

°F (°C)	-20 (-29)	100 (38)	200 (93)	300 (149)	400 (204)
PSI (BAR) BRZ	500 (34)	500 (34)	475 (33)	425 (29)	375 (26)
PSI (BAR) CS/SS	1000 (69)	1000 (69)	1000 (69)	1000 (69)	1000 (69)

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## SPECIFICATIONS

### Maximum Working Pressure (PSI) @ 100°F

End Connection Size	Bronze			Carbon Steel				Stainless Steel			
	150 FLG	300 FLG	TE	150 FLG	300 FLG	600 FLG	TE SWE	150 FLG	300 FLG	600 FLG	TE SWE
All	225	500	500	285	740	1000	1000	275	720	1000	1000

### Pressure At Maximum Temperature

O-ring Material	Bronze			Carbon Steel				Stainless Steel			
	150 FLG	300 FLG	TE	150 FLG	300 FLG	600 FLG	TE SWE	150 FLG	300 FLG	600 FLG	TE SWE
Viton	170/400	375/400	375/400	200/400	635/400	1000/400	1000/400	195/400	515/400	1000/400	1000/400
EPDM	160/450	350/450	350/450	185/450	615/450	1000/450	1000/450	180/450	495/450	990/450	990/450

### Maximum Allowable ΔP, PSI

*Note: Can not exceed valve psi rating @ 100°F*

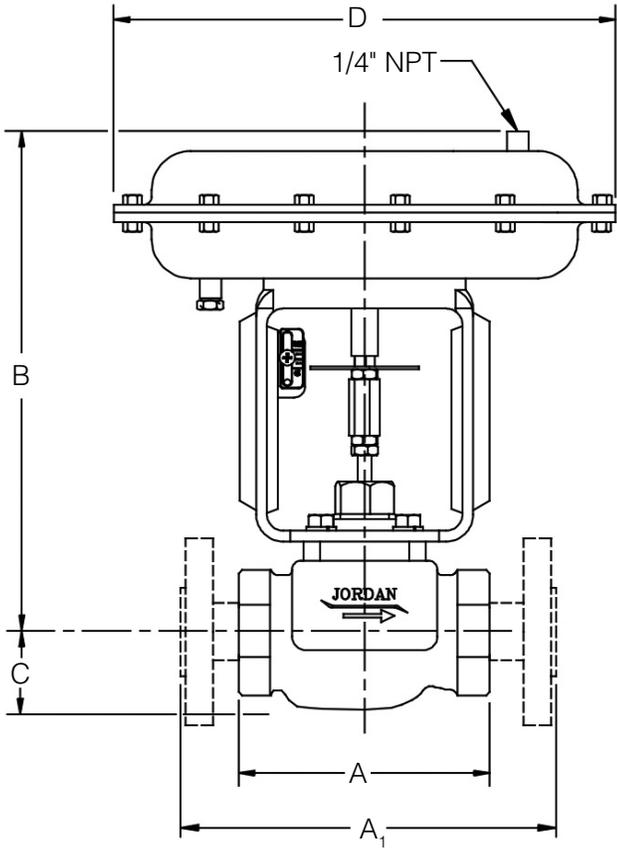
*Equal Percentage / Linear / Equal-Linear*

Valve Size	Valve Cv	Actuator Size	ATO 3-15	ATO-6-30 or with positioner @ 40	ATC 3-15 or with positioner @ 20 psi	ATC 6-30 @ 40 psi
1/2" - 1"	1.8 - 4.4	35M	400	800	1000	1000
3/4" - 1"	5.0 - 8.0	35M	225	450	750	750
1"	11.5 - 12.0	35M	125	250	450	450
1/2" - 1"	1.8 - 4.4	55M	600	1000	1000	1000
3/4" - 1"	5.0 - 8.0	55M	350	700	1000	1000
1"	11.5 - 12.0	55M	225	450	675	675
1-1/2"	8.0 - 35	55M	80	160	240	240
1-1/2"	8.0 - 35	85M	100	200	400	400
2"	35 - 50	55M	40	80	125	125
2"	35 - 50	85M	75	150	230	230
2"	8 - 30	55M	80	160	240	240
2"	8 - 30	85M	100	200	400	400
<b>Quick Opening</b>						
1/2" - 1"	4.6	35M	400	800	1000	1000
1/2" - 1"	4.6	55M	600	1000	1000	1000
3/4" - 1"	9.0	35M	225	450	750	750
3/4" - 1"	9.0	55M	350	700	1000	1000
1"	12.7	35M	125	250	450	450
1"	12.7	55M	225	450	675	675
1-1/2" - 2"	40	55M	80	160	240	240
1-1/2" - 2"	40	85M	100	200	400	400
2"	60	55M	40	80	125	125
2"	60	85M	75	150	230	230

Note: 1/2" - 2" with positioner ATO actuator is bench set @ 6-30 psi / ATC actuator is bench set @ 3-15 psi.

# MARK 78 GLOBE STYLE CONTROL VALVE

## DIMENSIONS



- Flanged Ends, ASME Flanges

Size	Actuator Size	ANSI Flange	Dimensions (inches)				Weight Lbs
			A <sub>1</sub>	B	C	D	
1/2"	35M	150#	7.25	10.87	1.31	9.50	12
	55M		7.25	12.13	1.31	12.50	32
	35M	300#	7.50	10.87	1.31	12.50	14
	55M		7.50	12.13	1.31	12.50	34
3/4"	35M	150#	7.25	10.87	1.31	9.50	14
	55M		7.25	12.13	1.31	12.50	34
	35M	300#	7.62	10.87	1.31	9.50	16
	55M		7.62	12.13	1.31	12.50	36
1"	35M	150#	7.25	10.87	1.31	12.50	14
	55M		7.25	12.13	1.31	15.00	34
	35M	300#	7.75	10.87	1.31	12.50	16
	55M		7.75	12.13	1.31	15.00	36
1-1/2"	55M	150#	8.75*	13.25	2.18	12.50	51
	85M		8.75*	14.13	2.18	15.00	61
	55M	300#	9.25*	13.25	2.18	12.50	57
	85M		9.25*	14.13	2.18	12.50	67
2"	55M	150#	10.00	13.25	2.18	15.00	55
	85M		10.00	14.13	2.18	15.00	65
	55M	300#	10.50	13.25	2.18	12.50	59
	85M		10.50	14.13	2.18	15.00	69

\*1-1/2" CS/S6 option I5 (IFE) only. All materials welded and threaded flanges face-to-face is 11.00" which is not ASME standard.

- Threaded & FSW Ends, Customary

Size	Actuator Size	Dimensions (inches)				Weight Lbs
		A	B	C	D	
1/2" & 3/4"	35M	4.50	10.87	1.31	9.50	10
	55M	4.50	12.13	1.31	12.50	30
1"	35M	4.50	10.87	1.31	9.50	10
	55M	4.50	12.13	1.31	12.50	30
1-1/2"	55M	6.75	13.25	2.18	12.50	45
	85M	6.75	14.13	2.18	15.00	55
2"	55M	6.75	13.25	2.18	12.50	45
	85M	6.75	14.13	2.18	15.00	55

- Flanged Ends, Metric P.N. Flanges

Size DN	Actuator Size	Flange (PN)	Dimensions (metric)				Weight Kgs
			A <sub>1</sub> *	B	C	D	
15	35M	10/16	184	276	33	241	5,4
	55M	25/40	184	308	33	318	14,5
20	35M	10/16	184	276	33	241	6,3
	55M	25/40	184	308	33	318	15,4
25	35M	10/16	184	276	33	241	6,3
	55M	25/40	184	308	33	318	15,4
40	55M	10/16	279	337	55	318	23,1
	85M	25/40	279	359	55	381	27,7
50	55M	10/16	279	337	55	318	24,9
	85M	25/40	279	359	55	381	29,5

\* Not per DIN 3202

- Threaded Ends & FSW, Metric

Size	Actuator Size	Dimensions (metric)				Weight Kgs
		A	B	C	D	
DN15 & DN20	35M	114	276	33	241	4,5
	55M	114	308	33	318	13,6
DN25	35M	114	276	33	241	4,5
	55M	114	308	33	318	13,6
DN40	55M	171	337	55	318	20,4
	85M	171	359	55	381	25,0
DN50	55M	171	337	55	318	20,4
	85M	171	359	55	381	25,0

Integral flange ends (IFE) available for 1-1/2" & 2" WCB and CF8M only

All bronze ends are threaded

# MARK 78 GLOBE STYLE CONTROL VALVE

## ORDERING SCHEMATIC

Model No	Size	Body Mat'l	/	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

	Model
78	Standard
78TP	Top Mounted Positioner
78SP	Side Mounted Positioner

	Size
050	1/2" (DN15)
075	3/4" (DN20)
100	1" (DN25)
150	1-1/2" (DN40)
200	2" (DN50)

	Body Material
BR	Bronze
CS	Carbon Steel (WCB)
S6	Stainless Steel (CF8M)

1 & 2	End Connections
PT	NPT
BT	BSPT
BP	BSPP
SW	FSW
F5	150# FE (WFE)
F3	300# FE (WFE)
I5	150# FE (IFE)*
I3	300# FE (IFE)*
F7	PN 10 DIN FE (WFE)
F6	PN 16 DIN FE (WFE)
F8	PN 25 DIN FE (WFE)
F4	PN40 DIN FE (WFE)
ZZ	Non-Standard

\* 1-1/2" and 2" WCB and CF8M only

3 & 4	Trim
TS	316SS Teflon Packing
BS	316SS Teflon Braided Packing
ZZ	Non-Standard

5	Seats (Characteristic)
A	Linear Hard
B	Linear Soft
C	Equal Percentage Hard
D	Equal Percentage Soft
E	Quick Open Hard
F	Quick Open Soft
G	Equal Linear Hard
H	Equal Linear Soft
Z	Non-Standard

6	Seats (Cv (Kv))
4	1.8 (1,5)
5	2.5 (2,2)
6	4.4 (3,8)
7	4.6 (4,0)
8	8.0 (6,9)
M	9.0 (7,7)
N	11.5 (9,9)
P	12.0 (10)
Q	12.2 (10,5)
R	12.7 (10,9)
9	15 (25,8)
B	30 (25,8)
V	35 (30,1)
U	40 (34,4)
W	45 (38,7)
C	50 (43,0)
1	60 (51,6)
Z	Non-Standard

MARK 78 GLOBE STYLE CONTROL VALVE

ORDERING SCHEMATIC (CON'T)

Model No	Size	Body Mat'l	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

7 & 8	Actuator Range		
	Range		Actuator
	78 & 78TP		
A	3-15 DIR	3	35M
B	3-15 REV	5	55M
C**	3-9 DIR	8	85M
D**	3-9 REV		
E**	9-15 DIR		
F**	9-15 REV		
G	6-30 DIR		
H	6-30 REV		
	78SP		
A	DIR		
B	REV		
ZZ	Non-Standard		

13 & 14	Accessories	
00	None	
AR	Air Regulator	

15	Action	
D	Air-to-Close	
R	Air-to-Open	

16	I/P	
0	None	
3	I/P 35M Actuator	4-20Ma/3-15 psi
5	I/P 55M Actuator	4-20Ma/3-15 psi
8	I/P 85M Actuator	4-20MA/3-15 psi

\*\* Positioner required

9 & 10	Diaphragm		
	Material		Size
	Buna-N	3	35M
B		5	55M
		8	85M
ZZ	Non-Standard		

17	O-Ring	
E	EPDM	
V	Viton	
ZZ	Non-Standard	

11 & 12	Actuator		
	Type		Size
	78		
A	Standard	3	35M
		5	55M
		8	85M
	78SP		
S	w/ side mount positioner		
	78TP		
D	Air-to-Close		
R	Air-to-Open		
ZZ	Non-Standard		

18	SMP	
A	MK16SMP P/P DIR/REV	3-15
B	MK16SMP P/P DIR/REV	3-9
C	MK16SMP P/P DIR/REV	9-15
D	MK16SMP I/P DIR/REV	4-20
E	MK16SMP I/P DIR/REV	4-12
F	MK16SMP I/P DIR/REV	12-20
G	MK16IQ-S 4-20 78 .5-2" DIR/REV	
H	MK16IQ-B 4-20 78 .5-2" DIR/REV	
J	MK16IQ-FF 78 .5-2" DIR/REV	

19	PED Compliance	
0	Not Required	
F	CE Category 1	
ZZ	Non-Standard	

For boxes 7 & 8, 9 & 10, and 11 & 12, the actuator size choice must match

