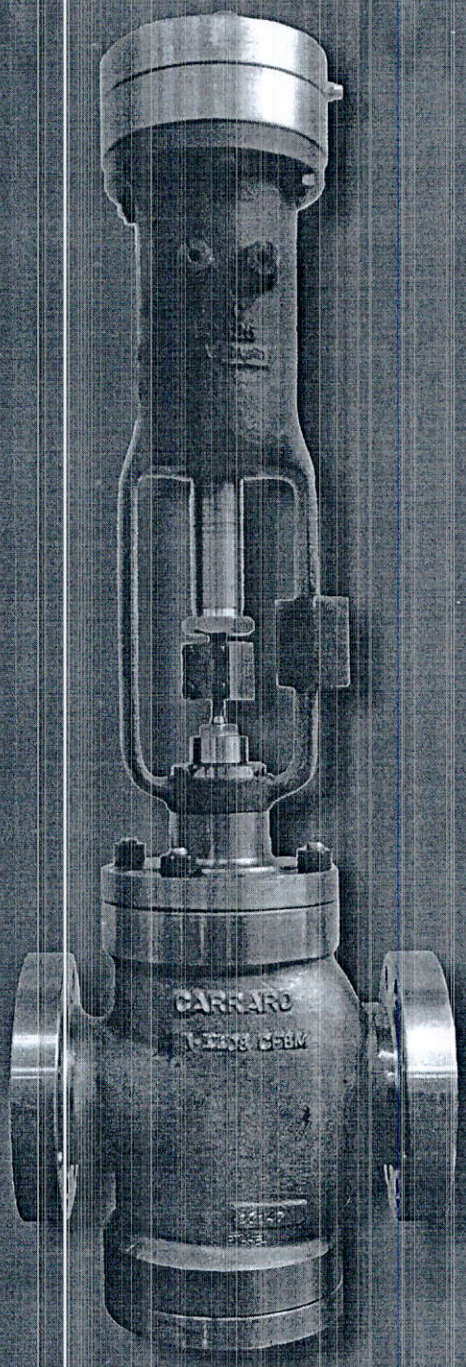
CARRARO®

MM & BPM Series

Direct-operated, spring pressure regulators



Suitable for:

- Air & process gases
- Liquids
- Steam

Markets:

- Oil & gas
- Blanketing systems
- General industry
- Power

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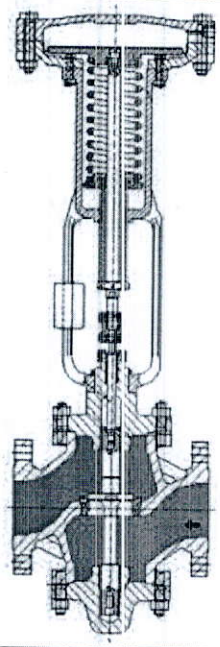
Valve ID card

Function
Reducing - Relief / Backpressure
Seat type
Single/Double
Inlet / Outlet diameters
From 1" up to 10" (standard ISA constructions)
Up to 20" (special constructions)
Body material
Carbon steel, Stainless steel and Exotic materials
End connections
Flanged (ANSI or NP)
Max rating
ANSI 1500
CV
From 6 to 850
Trim materials
Stainless steel (std) and Exotic materials
Diaphragms
Polychloroprene, EPDM, FKM, FVMQ, other



Inlet pressure

Outlet pressure

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MM Series:
Flanged Connections Carbon Steel, Stainless Steel & Alloy Construction

The MM series are spring loaded, self actuated, direct-operated, valves. This series features both pressure reducing and pressure relief/backpressure valves.
Pressure reducing valves are devices whose main function is to match the flow of the medium (gas, steam or liquid) through the regulator to the demand of the medium by the system. At the same time a regulator must maintain the system pressure at a requested value, or within an acceptable range of this pressure.
Pressure relief valves are used to protect the system from over pressure. They can be used also as backpressure regulators as they have excellent throttling characteristics. They are available in 1 up to 10 inches (DN25 through DN250) body sizes. These regulators feature a construction capable of sustaining rugged use and their construction makes them easy to install and to maintain.
The MM series is divided into 2 main groups:

- Downstream pressure regulating valves (pressure reducing valves):
  a. Single seat (**MM81-83**)
  b. Double seat (**MM71-73**)
- Upstream pressure regulating valves (backpressure valves):
  a. Single seat (**MM82-84**)
  b. Double seat (**MM72-74**)

General features:

- Flow to open design
- Available with ISA Face to face dimensions
- 3 different trim sizes for each body size, to meet a wide range of applications
- Quick-opening flow characteristics
- Trim features: Metal or Soft tightness, single or double ported
- Leakage Classes range from II up to VI (according to ANSI/FCI 70-3)
- External pressure sensing
- Stem tightness packing is available as elastomeric (lip seal) or graphite gasket
- Wide range of actuators according to the requested regulation range
- Wide range of elastomeric diaphragms

Special constructions:

MM regulators are also available in special configurations:

- Exotic materials in short lead times (e.g. duplex, superduplex, alloy steel, monel, etc.)
- Flow characteristics other than quick-opening
- Stem packing made of PTFE coated gaskets
- Body sizes up to DN 20"

Optionals e special configurations:

- Extended bonnet
- Hand wheel
- Double diaphragm
- Separation tank to handle superheated steam or high viscosity fluids
- Bolts and Nuts PTFE coated
- Butt weld and socket weld connections
- Pressure gauges

Tab. [1] - **Fluid applications**

Gas	Air, inert gas, CO2, CO, hydrocarbons, O2, H2, F, NH3.
Steam / Vapour	Water Steam, alcoholic vapours, organic vapours, sulphuric acid, refrigerating vapour.
Liquids	Water, aqueous solutions, hydrocarbons, alcohol, lubricating oils, diathermic, oils, solvents, refrigerating fluids, acrylic compounds.

Tab. [2a] - **CV values** | Single seated valves (MM81 MM82 MM83 MM84)

Trim size	Seat diameter (mm)	DN				
		25	40	50	80	100
1/2"	16,5	6				
3/4"	20,5	9	9			
1"	25	13	16	16		
1 1/2"	40		34	40	40	
2"	50			52	62	62
3"	70				110	128
4"	90					180

Tab. [2b] - **CV values** | Double seated valves (MM71 MM72 MM73 MM74)

Trim size	Seats diameter (mm)	DN							
		25	40	50	80	100	150	200	250
1/2"	16,5/14,5	6							
3/4"	20,5/18,5	9	9						
1"	25/23	13	18	18					
1 1/2"	40/38		40	43	43				
2"	50/48			54	64	64			
3"	70/68				112	128	128		
4"	90/88					204	240	240	
6"	135/132						430	440	440
8"	180/177							620	720
10"	225/222								850

Tab. [3] - **Actuators operating range**

Actuator	Actuators spring ranges							
	Min				Max		Maximum allowable pressure	
	Elastomeric packing (lip seal)		Graphite packing					
120	4,00 barg	(58,0 psig)	12,3 barg	(178 psig)	26,9 barg	(390 psig)	31 barg	(445 psig)
140	2,00 barg	(29,0 psig)	6,1 barg	(88 psig)	15,3 barg	(222 psig)	17 barg	(249 psig)
182	0,90 barg	(13,1 psig)	2,7 barg	(39 psig)	6,8 barg	(99 psig)	7,7 barg	(112 psig)
245	0,380 barg	(5,51 psig)	1,1 barg	(16 psig)	2,9 barg	(42,1 psig)	3,2 barg	(47,0 psig)
345	0,0045 barg	(0,07 psig)	0,47 barg	(6,8 psig)	1,2 barg	(17,4 psig)	1,8 barg	(26,5 psig)

NOTE:
Actuators spring ranges are based on the following assumptions:
- Stroke from setpoint is ±7mm
- Offset max 33% for minimum set pressure
- Low unbalancing forces on the plug
- Metal tightness, unless otherwise specified
- Seat leakage performance not taken into account for minimum set pressure evaluation

If different operating conditions are required please contact Carraro Technical Dept.

Tab. [4] - **Material Combinations**

	Body		
	Carbon steel (AF2)	316 SS (IF2)	Full 316 SS (IF3)
	-29°C ≤ T ≤ 427°C	-29°C ≤ T ≤ 540°C	-196°C ≤ T ≤ 540°C
	(-20°F ≤ T ≤ 800°F)	(-20°F ≤ T ≤ 1000°F)	(-321°F ≤ T ≤ 1000°F)
Valve body	ASME SA-216 WCC	ASME SA-351 CF8M	ASME SA-351 CF8M
Bonnet	ASME SA-216 WCC	ASME SA-351 CF8M	ASME SA-351 CF8M
Body cover	ASME SA-216 WCC	ASME SA-351 CF8M	ASME SA-351 CF8M
Packing	See Tab.5		
Gaskets set	See Tab.6		
	Trim		
Seat	ASME SA-479 316	ASME SA-479 316	ASME SA-479 316
Plug	ASME SA-479 316	ASME SA-479 316	ASME SA-479 316
Plug seating surface	See Tab.7		
Guide bushing	ASTM A-564 17-4PH	ASTM A.276/A-479 UNS S21800	ASTM A.276/A-479 UNS S21800
	Actuator		
Spring case	ASME SA-216 WCC	ASME SA-351 CF8M	ASME SA-351 CF8M
Lower diaphragm case	ASME SA-216 WCC	ASME SA-216 WCC	ASME SA-351 CF8M
Spring	ASTM A 401	ASTM A 401	ASTM A-313 316
Diaphragm	See Tab.8		

NOTE:
- SS = Stainless steel
- Carbon steel parts are painted according to Carraro's internal procedures
- NACE material requirements: these material combinations meet the requirements of NACE MR 0103, non exposed conditions (par. 5.3).
In case of exposed conditions (par. 5.2), or a different standard (e.g. NACE MR 0175-2003) please contact Carraro Technical Dept.

Tab. [5] - **Temperature range for packing materials**

Materials	Temperature limits
FKM Lip Seal	-10 to 200°C (14 to 392°F)
Graphite	-200 to 600°C (-328 to 1110°F)
PTFE coated aramidic fiber	-200 to 260°C (-328 to 500°F)

Tab. [6] - **Temperature range for flat gaskets**

Materials	Temperature limits
Polytetrafluoroethylene (PTFE)	-200 to 250°C (-328 to 482°F)
No asbestos	-50 to 200°C (-58 to 392°F)
Graphite + AISI 316	-200 to 600°C (-328 to 1110°F)

Tab. [7] - **Temperature range for plug seating surface**

Materials	Temperature limits	Valve model
Stainless steel	-196 to 540°C (-321 to 1000°F)	MM71 MM72 MM81 MM82
Stellite 6	-150 to 600°C (-238 to 1110°F)	
Fluoroelastomer (FKM-FPM)	-10 to 200°C (-14 to 392°F)	MM73 MM74 MM83 MM84
Chloroprene (CR)	-20 to 90°C (-4 to 194°F)	
Nitrile (NBR)	-25 to 90°C (-13 to 194°F)	
Ethylene-Propylene (EPDM)	-35 to 150°C (-31 to 320°F)	
Silicone (VMQ)	-50 to 150°C (-58 to 300°F)	
Polytetrafluoroethylene (PTFE)	-200 to 250°C (-328 to 482°F)	MM83 MM84

Tab. [8] - **Temperature range for diaphragms**

Materials	Temperature limits
Chloroprene (CR)	-20 to 90°C (-4 to 194°F)
NBR	-25 to 90°C (-13 to 194°F)
Fluorocarbon (FKM-FPM) + polyester	-10 to 150°C (14 to 302°F)
Fluorocarbon (FKM-FPM) + polyaramid	-10 to 200°C (14 to 392°F)
Ethylene-Propylene (EPDM)	-35 to 150°C (-31 to 320°F)
Fluorosilicone (FVMQ)	-50 to 150°C (-58 to 300°F)

NOTE:
Diaphragm material is selected in order to withstand both temperature and chemical composition of the medium.

Tab. [9] - **Valve body weights**

Valve Model	DN	Connections									
		ANSI 150		ANSI 300		ANSI 600		ANSI 900		ANSI1500	
		PN10-16		PN25-40				PN160		PN250	
		kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs
MM81 - MM83 MM82 - MM84 (single seated)	**25**	14	31	15	33	16	34	33	73	33	73
	40	23	51	26	56	27	58	46	101	46	101
	50	29	64	31	68	33	73	65	143	65	143
	80	56	123	60	132	63	139	89	196	115	253
	100	74	163	78	172	96	211	145	319	176	387
MM71 - MM73 MM72 - MM74 (double seated)	**25**	15	32	16	34	16	35	34	74	34	74
	40	27	59	30	65	31	67	50	110	50	110
	50	36	79	38	84	40	88	70	154	70	154
	80	66	145	70	154	73	161	106	233	134	295
	100	99	218	103	227	116	255	174	383	207	455
	150	168	370	182	400	224	493	//	//	//	//
	200	285	627	303	667	421	926	//	//	//	//
	250	430	946	457	1005	671	1476	//	//	//	//

Tab. [10] - **Actuator weights**

Actuator	kg	lbs
120	32	70
140	32	70
182	30	66
245	35	77
345	48	106