



# MOTORIZED PRESSURE REDUCING VALVE FOR STEAM

## MODEL M-COS-3/M-COS-16

### Features

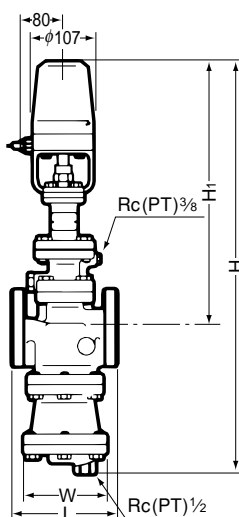
The technologically advanced pilot operated pressure reducing valve incorporates a separator and a steam trap together with a motorized actuator for remote adjustment of secondary pressure set point.

1. Space-saving unit simplifies system layout, piping and maintenance.
2. Patented self-aligning shock-absorbing spherical piston and advanced pilot regulator designs maintain secondary steam pressure accuracy, even during adverse process conditions.
3. Built-in patented separator, with condensate separation efficiency as high as 98 %, and self-modulating free float steam trap provide dry, high-quality steam supply.
4. Major internal components made of stainless steel for long service life.
5. Large surface area integral screens for pilot valve and main valve extend trouble-free service.
6. Internal secondary pressure-sensing channel makes external sensing line unnecessary.
7. M-COS-16, sizes 65 mm and larger have a silencer for noise reduction.
8. The MC-2 controller is equipped with secondary pressure display, pressure locking and upper pressure limit setting functions.
9. A locking device is included to prevent accidental changes to set pressure.



### Dimension

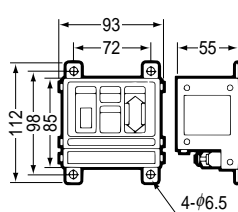
#### Valve



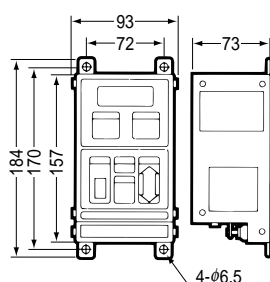
DN 15 - 50 shown.  
Configuration of larger sizes differs slightly.

#### Controller

##### MC-1



##### MC-2



#### M-COS-3 Flanged\* (mm)

Size	L(ASME Class)		H	H <sub>1</sub>	Weight (approx. kg)
	150RF	300RF			
20	182	182	680	470	19
25	188	192	707	467	24
32	220	220	757	487	29
40	220	224			31
50	255	261	820	500	46

\* Other standards available, but length and weight may vary

#### M-COS-16 Flanged\* (mm)

Size	L(ASME Class)		H	H <sub>1</sub>	Weight (approx. kg)
	150RF	300RF			
15	170	170	680	470	19
20	182	182			
25	188	192	707	467	24
32	220	220	757	487	29
40	220	224			31
50	255	261	820	500	46
65	372	378	1055	595	72
80	374	384			75
100	434	450	1213	633	108

\* Other standards available, but length and weight may vary

## Specifications

Model		M-COS-3	M-COS-16
Valve	Connection	Flanged	
	Size (mm)	20 – 50	15 – 100
	Body Material	Cast Iron	
	Maximum Operating Pressure (MPaG) PMO	0.3	1.57
	Maximum Operating Temperature (°C) TMO	220	
	Primary Pressure Range (MPaG)	0.1 – 0.3	0.2 – 1.57
	Adjustable Pressure Range (all conditions must be met)	0.01 – 0.05 MPaG	Within 10 – 84 % of primary pressure but with a minimum pressure of 0.03 MPaG
Minimum Adjustable Flow Rate	5 % of rated flow rate	Differential pressure between 0.07 – 0.85 MPa 5% of rated flow rate (For 65 mm – 100 mm: 10 % of rated flow rate)	
Actuator	Drive System	ON/OFF control of reversible motor	
	Line Voltage	AC100/110 V or 200/220 V (50/60Hz) (Supplied from controller) (Single phase)	
	Power Consumption	Included in controller	
	Ambient Temperature	0 – 60 °C	
	Water Resistance	Rain-resistant (Motor must not come into contact with dew)	
	Vibration Resistance	max. 0.5 G	
	Heat Resistivity of Cable	70 °C (Avoid direct contact with steam piping)	
	Thermal Protection	Built-in 120 °C cut off protection circuit	
	Withstand Voltage	AC 1500 V for 1 minute or AC 1800 V for 1 second	
	Insulation	min. DC 500 V 100 MΩ	
	Open/Close Time	Approx. 40 seconds	
	Continual Actuator Operation	max. Approx. 5 minutes	
	Manual Operation	Possible	

PRESSURE SHELL DESIGN CONDITIONS (**NOT** OPERATING CONDITIONS): Maximum Allowable Pressure (MPaG) PMA: 1.57 1 MPa = 10.197 kg/cm<sup>2</sup>  
Maximum Allowable Temperature (°C) TMA: 220



To avoid abnormal operation, accidents or serious injury, DO NOT use this product outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

## Controller

Model	MC-1	MC-2
Pressure Display Function	No	Yes (select between displays of measured pressure and upper pressure)
Pressure Upper Limit Setting Function	Possible by externally connecting pressure switch	Setting is possible
Power	AC 100/110 V or 200/220 V (50/60 Hz)	
Power Consumption during motor STOP	2 VA	7 VA
Power Consumption during motor RUN	(TYP.) 60 VA max. 70 VA	(TYP.) 65 VA max. 75 VA
Withstand Voltage	Between power terminal and ground terminal: AC 1500 V for 1 minute; or AC 1800 V for 1 second	
Insulation	Between each terminal and ground: min. DC 500 V 100 MΩ	
Ambient Temperature	0 – 50 °C	
Ambient Humidity	5 – 90 % RH (without dew) indoor use	
Vibration Resistance	0.5 G max.	
Dimensions	93 (W) × 112 (H) × 55 (D) mm	93 (W) × 184 (H) × 73 (D) mm
Weight	0.45 kg	1.1 kg
Installation	Wall mounting	
Material / Coating	Steel plate / black melamine	
Pressure Indication Range	—	0 – 19.99 kg/cm <sup>2</sup> G
Pressure Indication Accuracy	—	± 0.5 % F. S.
Maximum Allowable Pressure Setting	—	0 – 19.99 kg/cm <sup>2</sup> G
Pressure Sensor	—	Standard accessory

## Pressure Sensor

	Model	MBS33M
Operating Range	Pressure Measurement Range*	0 – 0.5 MPaG 0 – 2 MPaG
	Measurement Accuracy	± 0.3 % F. S.
	Temperature Drift	± 0.02 % F. S. / °C
	Signal Output	4 – 20 mA (Load Resistance max. 250 Ω)
Others	Maximum Allowable Pressure	Two times the maximum value of measurement range
	Ambient Temperature	– 40 – 85 °C
	Water Resistance	Rain-resistant
	Siphon Tube Connection	G (PF) 3/8
	Liquid Contacted Material	Stainless Steel ANSI 316W / DIN 1.4401
	Weight	Approx. 400 g
	Accessories	Siphon tube (connector screw for piping installation end: R (PT) 3/8)

\* When selecting M-COS-16 for secondary (set) pressures of 0.3 MPaG or less, specify a sensor for 0 – 0.5 MPaG.

## Capacity Table

### M-COS-16 with internal secondary pressure-sensing channel (factory standard) (kg/h)

Primary Steam Press. MPaG	Secondary (Set) Steam Press. MPaG	Nominal Valve Size (mm)								
		15	20	25	32	40	50	65	80	100
0.2	*0.13	170	240	340	540	670	920	1460	2090	3150
	0.11	180	260	370	570	720	990	1570	2250	3400
	0.1	185	270	380	580	730	1010	1610	2310	3480
	0.07	60	160	360	560	700	1000	1600	2300	3470
	**0.03	50	140	340	520	660	990	1590	2290	3460
0.3	*0.23	190	280	400	600	710	1090	1740	2500	3760
	0.2	200	290	430	620	800	1240	1790	2820	4250
	0.15	210	310	450	660	880	1370	2180	3120	4700
	0.1	80	190	400	600	840	1300	2080	2980	4480
	**0.03	50	140	340	520	740	1150	1830	2630	3950
0.4	*0.33	200	290	410	610	800	1250	1980	2840	4280
	0.3	220	310	450	650	920	1420	2270	3250	4900
	0.25	230	320	480	690	1040	1610	2570	3690	5560
	0.2	240	350	520	730	1130	1750	2790	3990	6020
	0.1	80	280	440	620	960	1490	2370	3390	5110
	**0.04	60	150	390	550	850	1310	2090	3000	4510
0.5	*0.42	220	320	370	610	940	1460	2320	3330	5010
	0.4	240	340	470	660	1030	1590	2530	3630	5470
	0.3	260	380	590	820	1270	1980	3050	4510	6800
	0.25	270	400	620	870	1350	2080	3320	4760	7170
	0.15	170	320	520	720	1120	1730	2760	3950	5950
	**0.05	60	150	410	570	890	1380	2190	3140	4730
0.6	*0.5	250	350	520	720	1120	1740	2770	3970	5980
	0.4	280	410	660	920	1420	2210	3520	5040	7590
	0.35	290	440	690	970	1500	2330	3710	5320	8010
	0.3	300	460	720	1010	1560	2420	3860	5530	8330
	0.15	170	320	480	670	1030	1600	2550	3800	5500
	**0.06	60	150	420	590	920	1420	2260	3250	4890
0.7	*0.58	250	370	600	840	1300	2020	3220	4610	6940
	0.5	290	450	720	1010	1560	2420	3850	5520	8320
	0.4	330	500	800	1110	1720	2670	4260	6110	9200
	0.35	350	510	820	1150	1780	2750	4390	6290	9480
	0.2	200	380	610	850	1310	2040	3250	4660	7010
	**0.07	70	230	430	600	930	1450	2310	3310	4980
0.8	*0.67	280	410	670	930	1440	2230	3550	5100	7620
	0.6	300	480	780	1090	1680	2610	4160	5970	8980
	0.5	340	540	870	1220	1890	2930	4670	6690	10100
	0.4	400	570	920	1290	1990	3090	4920	7060	10600
	0.2	200	380	610	850	1310	2040	3250	4660	7010
	**0.08	70	160	410	580	900	1390	2220	3180	4780
1.0	*0.84	310	500	810	1130	1750	2720	4330	6210	9360
	0.7	390	630	1010	1410	2180	3380	5390	7730	11600
	0.6	470	670	1080	1510	2340	3620	5780	8280	12500
	0.5	500	700	1120	1560	2420	3750	5990	8580	12900
	0.3	300	460	740	1030	1600	2480	3950	5790	8520
	**0.15	170	320	480	680	970	1510	2390	3430	5170
1.2	*1.0	350	610	980	1360	2110	3270	5220	7480	11300
	0.8	500	760	1230	1710	2650	4110	6560	9400	14200
	0.7	570	800	1290	1800	2780	4310	6870	9850	14800
	0.6	600	820	1320	1840	2850	4420	7050	10100	15200
	0.5	500	680	1090	1530	2370	3670	5850	8380	12600
	**0.35	360	550	890	1240	1930	2980	4760	6820	10300
1.4	*1.17	410	700	1120	1570	2430	3760	6000	8590	12400
	1.0	540	840	1360	1900	2940	4550	7260	10400	15600
	0.8	670	980	1490	2300	3220	4990	7950	11400	17200
	0.7	730	1050	1520	2450	3280	5090	8110	11600	17500
	0.6	600	840	1240	2000	2690	4170	6650	9530	14300
	**0.55	550	770	1130	1580	2450	3790	6040	8660	13000
1.57	*1.32	420	770	1240	1730	2670	4140	6600	9460	14200
	1.0	730	1100	1650	2400	3560	5520	8800	12600	19000
	0.9	790	1200	1750	2600	3650	5660	9030	12900	19500
	0.8	880	1300	2000	2700	3710	5750	9170	13100	19800
	**0.75	820	1250	1800	2600	3400	5260	8390	12000	18100

\* Maximum adjustable secondary pressure    \*\* Minimum adjustable secondary pressure

1 MPa = 10.197 kg/cm<sup>2</sup>

**Capacity Table**

**M-COS-16 with external secondary pressure-sensing line (optional) (kg/h)**

Primary Steam Press. MPaG	Secondary (Set) Steam Press. MPaG	Nominal Valve Size (mm)								
		15	20	25	32	40	50	65	80	100
0.2	*0.13	170	240	340	540	670	920	1460	2090	3150
	0.11	180	260	370	570	720	990	1570	2250	3400
	**0.03 - 0.1	185	270	380	580	730	1010	1610	2310	3480
0.3	*0.23	190	280	400	600	710	1090	1740	2500	3760
	0.2	200	290	430	620	800	1240	1790	2820	4250
	**0.03 - 0.15	210	310	450	660	880	1370	2180	3120	4700
0.4	*0.33	200	290	410	610	800	1250	1980	2840	4280
	0.3	220	310	450	650	920	1420	2270	3250	4900
	0.25	230	320	480	690	1040	1610	2570	3690	5560
	**0.04 - 0.2	240	350	520	730	1130	1750	2790	3990	6020
0.5	*0.42	220	320	370	610	940	1460	2320	3330	5010
	0.4	240	340	470	660	1030	1590	2530	3630	5470
	0.3	260	380	590	820	1270	1980	3050	4510	6800
	**0.05 - 0.25	270	400	620	870	1350	2080	3320	4760	7170
0.6	*0.5	250	350	520	720	1120	1740	2770	3970	5980
	0.4	280	410	660	920	1420	2210	3520	5040	7590
	0.35	290	440	690	970	1500	2330	3710	5320	8010
	**0.06 - 0.3	300	460	720	1010	1560	2420	3860	5530	8330
0.7	*0.58	250	370	600	840	1300	2020	3220	4610	6940
	0.5	290	450	720	1010	1560	2420	3850	5520	8320
	0.4	330	500	800	1110	1720	2670	4260	6110	9200
	**0.07 - 0.35	350	510	820	1150	1780	2750	4390	6290	9480
0.8	*0.67	280	410	670	930	1440	2230	3550	5100	7620
	0.6	300	480	780	1090	1680	2610	4160	5970	8980
	0.5	340	540	870	1220	1890	2930	4670	6690	10100
	**0.08 - 0.4	400	570	920	1290	1990	3090	4920	7060	10600
1.0	*0.84	310	500	810	1130	1750	2720	4330	6210	9360
	0.7	390	630	1010	1410	2180	3380	5390	7730	11600
	0.6	470	670	1080	1510	2340	3620	5780	8280	12500
	**0.15 - 0.5	500	700	1120	1560	2420	3750	5990	8580	12900
1.2	*1.0	350	610	980	1360	2110	3270	5220	7480	11300
	0.8	500	760	1230	1710	2650	4110	6560	9400	14200
	0.7	570	800	1290	1800	2780	4310	6870	9850	14800
	**0.35 - 0.6	600	820	1320	1840	2850	4420	7050	10100	15200
1.4	*1.17	410	700	1120	1570	2430	3760	6000	8590	12400
	1.0	540	840	1360	1900	2940	4550	7260	10400	15600
	0.8	670	980	1490	2300	3220	4990	7950	11400	17200
	**0.55 - 0.7	730	1050	1520	2450	3280	5090	8110	11600	17500
1.57	*1.32	420	770	1240	1730	2670	4140	6600	9460	14200
	1.0	730	1100	1650	2400	3560	5520	8800	12600	19000
	0.9	790	1200	1750	2600	3650	5660	9030	12900	19500
	**0.75 - 0.8	880	1300	2000	2700	3710	5750	9170	13100	19800

\* Maximum adjustable secondary pressure \*\* Minimum adjustable secondary pressure

1 MPa = 10.197 kg/cm<sup>2</sup>

**Cv & Kvs Values**

	Nominal Valve Size (mm)								
	15	20	25	32	40	50	65	80	100
Cv (US)	3.8	6.9	11.1	15.5	24.0	37.2	59.3	85.0	128
Cv (UK)	3.2	5.7	9.2	12.9	20.0	31.0	49.4	70.8	107
Kvs (DIN)	3.3	5.9	9.5	13.3	20.6	31.9	50.8	72.9	110



The Cv & Kvs values shown are for the valve in the full fail open position. These values are not to be used for M-COS sizing, and instead may be used as one of the factors in calculations for safety valve selection.

## Capacity Table

### M-COS-3 with internal or external secondary pressure-sensing channel or line

Pressure Sensing Method	Primary Pressure MPaG	Secondary (Set) Pressure MPaG	Normal valve Size (mm)				
			20	25	32	40	50
Cv Values		Cv(US)	6.9	11.1	15.5	24.0	37.2
		Cv(UK)	5.7	9.2	12.9	20.0	31.0
		Kvs(DIN)	5.9	9.5	13.3	20.6	31.9
Internal sensing channel (factory standard)	0.1 to less than 0.2	*0.05	120	180	540	750	950
		0.04	130	190	520	700	920
		0.03	135	195	510	680	900
		0.02	140	200	390	500	690
		**0.01	100	180	290	380	500
	0.2 - 0.3	*0.05	240	340	540	750	950
		0.04	230	330	520	700	920
		0.03	220	320	510	680	900
		0.02	160	250	390	500	690
		**0.01	100	180	290	380	500
External sensing line (optional)	0.1 to less than 0.2	*0.05 - **0.01	120	180	540	750	950
	0.2 - 0.3	*0.05 - **0.01	240	340	510	750	950

\* Maximum adjustable pressure \*\* Minimum adjustable pressure

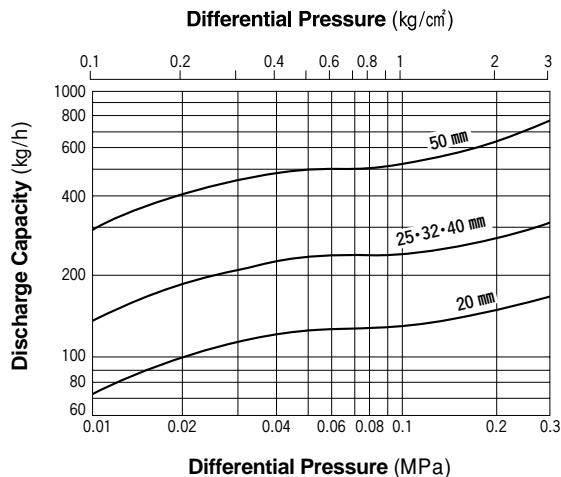
1 MPa = 10.197 kg/cm<sup>2</sup>



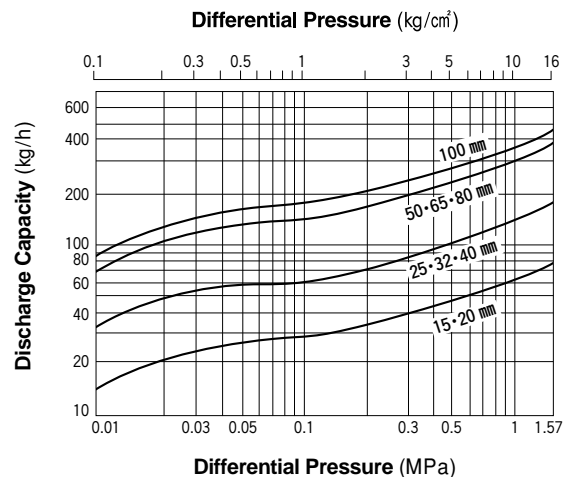
The Cv & Kvs values shown are for the valve in the full fail open position. These values are not to be used for M-COS sizing, and instead may be used as one of the factors in calculations for safety valve selection.

## Discharge Capacity

### M-COS-3



### M-COS-16



- Note: 1. The discharge capacity is the maximum continuous condensate discharge 6°C below saturated steam temperature.  
 2. The differential pressure is the difference between the M-COS inlet and its trap outlet pressure.



DO NOT use traps under conditions that exceed maximum differential pressure, as condensate backup will occur!

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**Manufacturer**

**ISO 9001/ISO 14001**

**TLV<sup>®</sup> CO., LTD.**  
**Kakogawa, Japan**

is approved by LRQA Ltd. to ISO 9001/14001

