



AUTOMATIC MULTI-CONTROL VALVE

MODEL MC-COS-3/MC-COS-16
DUCTILE CAST IRON, CAST IRON

Features

The MC-COS multi control valve consists of the COS pressure reducing valve with integrated separator and steam trap and a motorized actuator. It is used to condition steam and control either steam pressure or the temperature* of processes heated by steam.

1. When combined with the control algorithms of TLV's SC-F70 controller or SP-F70 programmable controller, the rapid response brushless motor precisely adjusts the valve position to ensure extremely accurate pressure control, even during adverse process conditions.
2. 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.
3. Large surface area integral screens for pilot valve and main valve extend trouble-free service.
4. Can be used in conjunction with standard PID controllers as a replacement for a standard control valve to significantly improve T & P control performance.
5. Internal secondary pressure-sensing channel makes external sensing line unnecessary.
6. MC-COS-16, sizes 65 mm and larger have a silencer for noise reduction.

* MC-COS-3 cannot be used for temperature control applications.



Specifications

Model		MC-COS-3		MC-COS-16	
Control Valve	Connection	Flanged			
		DIN	ASME	DIN	ASME
	Size	DN 20, 25, 40, 50		DN 15, 20, 25, 40, 50, 65, 80, 100	
	Body Material	Ductile Cast Iron (GGG-40.3)*	Cast Iron (FC250)	Ductile Cast Iron (GGG-40.3)*	Cast Iron (FC250)
	Max. Operating Pressure (barg) PMO	3		16	13
	Max. Operating Temperature (°C) TMO	220	200	220	200
	Primary Pressure Range (barg)	1 - 3		2 - 16	2 - 13
Adjustable Pressure Range (all conditions must be met)	0.1 - 0.5 barg		Within 10 - 84% of primary pressure but with a minimum pressure of 0.3 barg		
Minimum Adjustable Flow Rate	5% of rated flow rate		Differential Pressure between 0.7 - 8.5 bar 5% of rated flow rate (For DN 65 - DN 100: 10% of rated flow rate)		
Fluid	Steam				
Actuator**	Input	Valve Opening Input 4 - 20 mA DC (input impedance 250 MΩ)			
	Power	Line Voltage	Free between 100 V AC and 240 V AC (50/60 Hz)		
		Power Consumption	max. 75 VA		
		Insulation	Between each terminal and ground: 500 V DC min. 100 MΩ		
		Withstand Voltage	Between power terminal and ground terminal: 1500 V AC for 1 minute or 1800 V AC for 1 second		
	Environment	Ambient Temperature	0 - 50 °C		
		Ambient Humidity	10 - 90 % RH (without dew)		
		Vibration Resistance	max. 0.5 G		
	Others	Water Resistance	Rain-resistant		
		Drive System	Positional control by DC brushless motor		
Thermal Protection		Built-in overcurrent protection circuit			
Open/Close Time		Fully closed → fully open: approximately 15 seconds			
Emergency Action		When operation signal input is cut off: fully closed			
Manual Operation	Possible with power OFF				

* MC-COS-16: cast stainless steel DN 15 - DN 50 and cast steel DN 65, DN 80 available on request.

** Actuator with flameproof enclosure is available in UL, ATEX or Japanese standard.

1 bar = 0.1 MPa

PRESSURE SHELL DESIGN CONDITIONS (NOT OPERATING CONDITIONS):

Maximum Allowable Pressure (barg) PMA: 21 (GGG40.3), 13 (FC250)

Maximum Allowable Temperature (°C) TMA: 220 (GGG40.3), 200 (FC250)



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.

Capacity Table

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

Primary Steam Press. (barg)	Secondary "Set" Steam Pressure (barg)	Nominal Valve Size (DN)								
		15	20	25	32	40	50	65	80	100
2	*1.3	170	240	340	540	670	920	1460	2090	3150
	1.1	180	260	370	570	720	990	1570	2250	3400
	1	185	270	380	580	730	1010	1610	2310	3480
	0.7	60	160	360	560	700	1000	1600	2300	3470
	**0.3	50	140	340	520	660	990	1590	2290	3460
3	*2.3	190	280	400	600	710	1090	1740	2500	3760
	2	200	290	430	620	800	1240	1790	2820	4250
	1.5	210	310	450	660	880	1370	2180	3120	4700
	1	80	190	400	600	840	1300	2080	2980	4480
	**0.3	50	140	340	520	740	1150	1830	2630	3950
4	*3.3	200	290	410	610	800	1250	1980	2840	4280
	3	220	310	450	650	920	1420	2270	3250	4900
	2.5	230	320	480	690	1040	1610	2570	3690	5560
	2	240	350	520	730	1130	1750	2790	3990	6020
	1	80	280	440	620	960	1490	2370	3390	5110
	**0.4	60	150	390	550	850	1310	2090	3000	4510
5	*4.2	220	320	370	610	940	1460	2320	3330	5010
	4	240	340	470	660	1030	1590	2530	3630	5470
	3	260	380	590	820	1270	1980	3050	4510	6800
	2.5	270	400	620	870	1350	2080	3320	4760	7170
	1.5	170	320	520	720	1120	1730	2760	3950	5950
	**0.5	60	150	410	570	890	1380	2190	3140	4730
6	*5	250	350	520	720	1120	1740	2770	3970	5980
	4	280	410	660	920	1420	2210	3520	5040	7590
	3.5	290	440	690	970	1500	2330	3710	5320	8010
	3	300	460	720	1010	1560	2420	3860	5530	8330
	1.5	170	320	480	670	1030	1600	2550	3800	5500
	**0.6	60	150	420	590	920	1420	2260	3250	4890
7	*5.8	250	370	600	840	1300	2020	3220	4610	6940
	5	290	450	720	1010	1560	2420	3850	5520	8320
	4	330	500	800	1110	1720	2670	4260	6110	9200
	3.5	350	510	820	1150	1780	2750	4390	6290	9480
	2	200	380	610	850	1310	2040	3250	4660	7010
	**0.7	70	230	430	600	930	1450	2310	3310	4980
8	*6.7	280	410	670	930	1440	2230	3550	5100	7620
	6	300	480	780	1090	1680	2610	4160	5970	8980
	5	340	540	870	1220	1890	2930	4670	6690	10100
	4	400	570	920	1290	1990	3090	4920	7060	10600
	2	200	380	610	850	1310	2040	3250	4660	7010
	**0.8	70	160	410	580	900	1390	2220	3180	4780
10	*8.4	310	500	810	1130	1750	2720	4330	6210	9360
	7	390	630	1010	1410	2180	3380	5390	7730	11600
	6	470	670	1080	1510	2340	3620	5780	8280	12500
	5	500	700	1120	1560	2420	3750	5990	8580	12900
	3	300	460	740	1030	1600	2480	3950	5790	8520
	**1.5	170	320	480	680	970	1510	2390	3430	5170
12	*10	350	610	980	1360	2110	3270	5220	7480	11300
	8	500	760	1230	1710	2650	4110	6560	9400	14200
	7	570	800	1290	1800	2780	4310	6870	9850	14800
	6	600	820	1320	1840	2850	4420	7050	10100	15200
	5	500	680	1090	1530	2370	3670	5850	8380	12600
	**3.5	360	550	890	1240	1930	2980	4760	6820	10300
13	*10.9	360	650	1040	1450	2250	3490	5560	7960	12000
	10	410	740	1190	1660	2560	3970	6330	9080	13700
	8	470	850	1360	1910	2950	4570	7290	10500	15700
	6.5	480	880	1410	1970	3060	4740	7550	10800	16300
	5.5	400	730	1180	1640	2550	3950	6290	9010	13600
	**4.5	320	580	940	1310	2020	3140	5000	7170	10800
14	*11.7	410	700	1120	1570	2430	3760	6000	8590	12400
	10	540	840	1360	1900	2940	4550	7260	10400	15600
	8	670	980	1490	2300	3220	4990	7950	11400	17200
	7	730	1050	1520	2450	3280	5090	8110	11600	17500
	6	600	840	1240	2000	2690	4170	6650	9530	14300
	**5.5	550	770	1130	1580	2450	3790	6040	8660	13000
16	*13.4	470	790	1270	1770	2740	4250	6770	9710	14600
	10	730	1100	1650	2400	3560	5520	8800	12600	19000
	9	790	1200	1750	2600	3650	5660	9030	12900	19500
	8	880	1300	2000	2700	3710	5750	9170	13100	19800
		**7.5	820	1250	1800	2600	3400	5260	8390	12000

* Maximum adjustable secondary pressure ** Minimum adjustable secondary pressure

1 bar = 0.1 MPa

Capacity Table

MC-COS-16 with external secondary pressure-sensing line (optional)

(kg/h)

Primary Steam Press. (barg)	Secondary "Set" Steam Pressure (barg)	Nominal Valve Size (DN)								
		15	20	25	32	40	50	65	80	100
2	*1.3	170	240	340	540	670	920	1460	2090	3150
	1.1	180	260	370	570	720	990	1570	2250	3400
	**0.3 - 1	185	270	380	580	730	1010	1610	2310	3480
3	*2.3	190	280	400	600	710	1090	1740	2500	3760
	2	200	290	430	620	800	1240	1790	2820	4250
	**0.3 - 1.5	210	310	450	660	880	1370	2180	3120	4700
4	*3.3	200	290	410	610	800	1250	1980	2840	4280
	3	220	310	450	650	920	1420	2270	3250	4900
	2.5	230	320	480	690	1040	1610	2570	3690	5560
	**0.4 - 2	240	350	520	730	1130	1750	2790	3990	6020
5	*4.2	220	320	370	610	940	1460	2320	3330	5010
	4	240	340	470	660	1030	1590	2530	3630	5470
	3	260	380	590	820	1270	1980	3050	4510	6800
	**0.5 - 2.5	270	400	620	870	1350	2080	3320	4760	7170
6	*5	250	350	520	720	1120	1740	2770	3970	5980
	4	280	410	660	920	1420	2210	3520	5040	7590
	3.5	290	440	690	970	1500	2330	3710	5320	8010
	**0.6 - 3	300	460	720	1010	1560	2420	3860	5530	8330
7	*5.8	250	370	600	840	1300	2020	3220	4610	6940
	5	290	450	720	1010	1560	2420	3850	5520	8320
	4	330	500	800	1110	1720	2670	4260	6110	9200
	**0.7 - 3.5	350	510	820	1150	1780	2750	4390	6290	9480
8	*6.7	280	410	670	930	1440	2230	3550	5100	7620
	6	300	480	780	1090	1680	2610	4160	5970	8980
	5	340	540	870	1220	1890	2930	4670	6690	10100
	**0.8 - 4	400	570	920	1290	1990	3090	4920	7060	10600
10	*8.4	310	500	810	1130	1750	2720	4330	6210	9360
	7	390	630	1010	1410	2180	3380	5390	7730	11600
	6	470	670	1080	1510	2340	3620	5780	8280	12500
	**1.5 - 5	500	700	1120	1560	2420	3750	5990	8580	12900
12	*10	350	610	980	1360	2110	3270	5220	7480	11300
	8	500	760	1230	1710	2650	4110	6560	9400	14200
	7	570	800	1290	1800	2780	4310	6870	9850	14800
	**3.5 - 6	600	820	1320	1840	2850	4420	7050	10100	15200
13	*10.9	360	650	1040	1450	2250	3490	5560	7960	12000
	10	410	740	1190	1660	2560	3970	6330	9080	13700
	8	470	850	1360	1910	2950	4570	7290	10500	15700
	**4.5 - 6.5	480	880	1410	1970	3060	4740	7550	10800	16300
14	*11.7	410	700	1120	1570	2430	3760	6000	8590	12400
	10	540	840	1360	1900	2940	4550	7260	10400	15600
	8	670	980	1490	2300	3220	4990	7950	11400	17200
	**5.5 - 7	730	1050	1520	2450	3280	5090	8110	11600	17500
16	*13.4	470	790	1270	1770	2740	4250	6770	9710	14600
	10	730	1100	1650	2400	3560	5520	8800	12600	19000
	9	790	1200	1750	2600	3650	5660	9030	12900	19500
	**7.5 - 8	880	1300	2000	2700	3710	5750	9170	13100	19800

* Maximum adjustable secondary pressure ** Minimum adjustable secondary pressure

1 bar = 0.1 MPa

Cv & Kvs Values

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



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

Capacity Table

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

Pressure Sensing Method	Primary steam Pressure barg	Secondary (Set) steam Pressure barg	Nominal Valve Size (DN)			
			20	25	40	50
Cv & Kvs Values		Kvs (DIN)	5.9	9.5	20.6	31.9
		Cv (UK)	5.7	9.2	20.0	31.0
		Cv (US)	6.9	11.1	24.0	37.2
Internal sensing channel (factory standard)	1 to less than 2	*0.5	120	180	750	950
		0.4	130	190	700	920
		0.3	135	195	680	900
		0.2	140	200	500	690
		**0.1	100	180	380	500
	2 - 3	*0.5	240	340	750	950
		0.4	230	330	700	920
		0.3	220	320	680	900
		0.2	160	250	500	690
		**0.1	100	180	380	500
External sensing line (optional)	1 to less than 2	*0.5 - **0.1	120	180	750	950
	2 - 3	*0.5 - **0.1	240	340	750	950

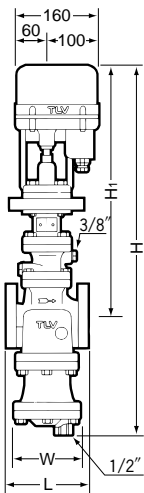
* Maximum adjustable pressure ** Minimum adjustable pressure

1 bar = 0.1 MPa



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

Dimensions



MC-COS-3 Flanged (mm)

DN	L					H	H ₁	W	Weight* (kg)
	DIN 2501	ASME Class							
	PN25/40	125FF	(150RF)	250RF	(300RF)				
(20)	150	-	182	-	182	720	510	105	22
25	160	176	188	188	192	747	507	150	27
32	-	206	-	220	220	797	527	165	-
40	200	209	220	222	224	797	527	165	34
50	230	255	255	260	261	860	540	195	49

() No ASME standard exists for cast iron; machined to fit steel flanges
 Class 125 FF can connect to 150 RF, 250 RF can connect to 300 RF
 Other standards available, but length and weight may vary

* Weight is for DIN PN 25/40

MC-COS-16 Flanged (mm)

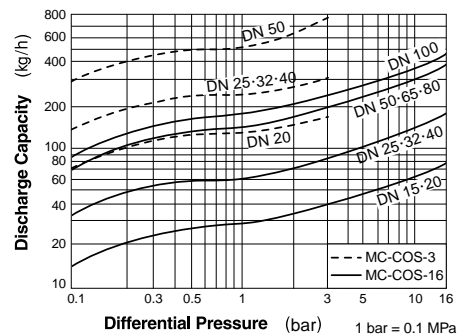
DN	L					H	H ₁	W	Weight* (kg)
	DIN 2501	ASME Class							
	PN25/40	125FF	(150RF)	250RF	(300RF)				
(15)	-	-	170	-	170	720	510	105	22
(20)	150	-	182	-	182	720	510	105	22
25	160	176	188	188	192	747	507	150	27
32	-	206	-	220	220	797	527	165	-
40	200	209	220	222	224	797	527	165	34
50	230	255	255	260	261	860	540	195	49
65	370	362	372	377	378	1095	635	280	72
80	374	365	374	383	384	1095	635	280	72
100	434	434	434	450	450	1252	672	350	97

() No ASME standard exists for cast iron; machined to fit steel flanges
 Class 125 FF can connect to 150 RF, 250 RF can connect to 300 RF
 Other standards available, but length and weight may vary

* Weight is for DIN PN 25/40

Flange to flange dimension of DN 15 and DN 65-100 not according to DIN standard, due to size of separator and steam trap

Trap Discharge Capacity



- 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 MC-COS inlet and its trap outlet pressure.



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

Manufacturer

ISO 9001/ISO 14001

TLV CO., LTD.
Kakogawa, Japan

is approved by LRQA Ltd. to ISO 9001/14001

