



# AUTOMATIC MULTI-CONTROL VALVE

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

### CONTROLLER OPERATED AND MOTORIZED STEAM VALVE

#### 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-F71 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 cyclone 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..



#### Pressure Equipment Directive (PED)

Classification according to PED 2014/68/EU, fluid group 2

Size	Category	CE marking
DN 15 to DN 40	—*	Art. 4, Sec. 3 (sound engineering practice), CE marking not allowed
DN 50	I	With CE marking and Declaration of Conformity
DN 65 to DN 100	II	With CE marking and Declaration of Conformity

\* Manufactured in accordance with sound engineering practice

#### Specifications

Model		MC-COS-3		MC-COS-16	
Connection		Flanged			
Size		DIN	ASME	DIN	ASME
Body Material		Ductile Cast Iron (GGG40.3/EN 5.3103)		Cast Iron (JIS FC250) (equivalent to GG-25/EN-JL1040)	
Control Valve	Max. Operating Pressure (barg)	PMO	3	16	13
	Max. Operating Temperature (°C)	TMO	220	200	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	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 Ω)		
	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: 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		
		Water Resistance	Rain-resistant		
	Others	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 When input power is cut off: held at position just before power cutoff			
Manual Operation	Possible with power OFF				

\* Cast stainless steel DN 15 - DN 50 available on request.

1 bar = 0.1 MPa  
 PRESSURE SHELL DESIGN CONDITIONS (NOT OPERATING CONDITIONS): Maximum Allowable Pressure (barg) PMA: 21 (GGG40.3/EN 5.3103), 13 (FC250)  
 Maximum Allowable Temperature (°C) TMA: 220 (GGG40.3/EN 5.3103), 200 (FC250)  
 Minimum Allowable Temperature (°C): 0



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.

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## 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	40	50	65	80	100
2	*1.3	170	240	340	670	920	1460	2090	3150
	1.1	180	260	370	720	990	1570	2250	3400
	1	185	270	380	730	1010	1610	2310	3480
	0.7	60	160	360	700	1000	1600	2300	3470
	**0.3	50	140	340	660	990	1590	2290	3460
3	*2.3	190	280	400	710	1090	1740	2500	3760
	2	200	290	430	800	1240	1790	2820	4250
	1.5	210	310	450	880	1370	2180	3120	4700
	1	80	190	400	840	1300	2080	2980	4480
	**0.3	50	140	340	740	1150	1830	2630	3950
4	*3.3	200	290	410	800	1250	1980	2840	4280
	3	220	310	450	920	1420	2270	3250	4900
	2.5	230	320	480	1040	1610	2570	3690	5560
	2	240	350	520	1130	1750	2790	3990	6020
	1	80	280	440	960	1490	2370	3390	5110
	**0.4	60	150	390	850	1310	2090	3000	4510
5	*4.2	220	320	370	940	1460	2320	3330	5010
	4	240	340	470	1030	1590	2530	3630	5470
	3	260	380	590	1270	1980	3050	4510	6800
	2.5	270	400	620	1350	2080	3320	4760	7170
	1.5	170	320	520	1120	1730	2760	3950	5950
	**0.5	60	150	410	890	1380	2190	3140	4730
6	*5	250	350	520	1120	1740	2770	3970	5980
	4	280	410	660	1420	2210	3520	5040	7590
	3.5	290	440	690	1500	2330	3710	5320	8010
	3	300	460	720	1560	2420	3860	5530	8330
	1.5	170	320	480	1030	1600	2550	3800	5500
	**0.6	60	150	420	920	1420	2260	3250	4890
7	*5.8	250	370	600	1300	2020	3220	4610	6940
	5	290	450	720	1560	2420	3850	5520	8320
	4	330	500	800	1720	2670	4260	6110	9200
	3.5	350	510	820	1780	2750	4390	6290	9480
	2	200	380	610	1310	2040	3250	4660	7010
	**0.7	70	230	430	930	1450	2310	3310	4980
8	*6.7	280	410	670	1440	2230	3550	5100	7620
	6	300	480	780	1680	2610	4160	5970	8980
	5	340	540	870	1890	2930	4670	6690	10100
	4	400	570	920	1990	3090	4920	7060	10600
	2	200	380	610	1310	2040	3250	4660	7010
	**0.8	70	160	410	900	1390	2220	3180	4780
10	*8.4	310	500	810	1750	2720	4330	6210	9360
	7	390	630	1010	2180	3380	5390	7730	11600
	6	470	670	1080	2340	3620	5780	8280	12500
	5	500	700	1120	2420	3750	5990	8580	12900
	3	300	460	740	1600	2480	3950	5790	8520
	**1.5	170	320	480	970	1510	2390	3430	5170
12	*10	350	610	980	2110	3270	5220	7480	11300
	8	500	760	1230	2650	4110	6560	9400	14200
	7	570	800	1290	2780	4310	6870	9850	14800
	6	600	820	1320	2850	4420	7050	10100	15200
	5	500	680	1090	2370	3670	5850	8380	12600
	**3.5	360	550	890	1930	2980	4760	6820	10300
13	*10.9	360	650	1040	2250	3490	5560	7960	12000
	10	410	740	1190	2560	3970	6330	9080	13700
	8	470	850	1360	2950	4570	7290	10500	15700
	6.5	480	880	1410	3060	4740	7550	10800	16300
	5.5	400	730	1180	2550	3950	6290	9010	13600
	**4.5	320	580	940	2020	3140	5000	7170	10800
14	*11.7	410	700	1120	2430	3760	6000	8590	12400
	10	540	840	1360	2940	4550	7260	10400	15600
	8	670	980	1490	3220	4990	7950	11400	17200
	7	730	1050	1520	3280	5090	8110	11600	17500
	6	600	840	1240	2690	4170	6650	9530	14300
	**5.5	550	770	1130	2450	3790	6040	8660	13000
16	*13.4	470	790	1270	2740	4250	6770	9710	14600
	10	730	1100	1650	3560	5520	8800	12600	19000
	9	790	1200	1750	3650	5660	9030	12900	19500
	8	880	1300	2000	3710	5750	9170	13100	19800
	**7.5	820	1250	1800	3400	5260	8390	12000	18100

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

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

1 bar = 0.1 MPa

### 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
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

### Cv & Kvs Values

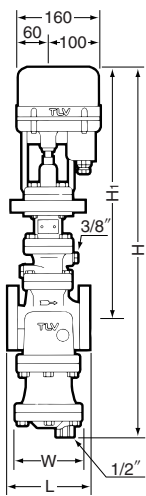
	Nominal Valve Size (DN)							
	15*	20	25	40	50	65*	80*	100*
Kvs (DIN)	3.3	5.9	9.5	20.6	31.9	50.8	72.9	110
Cv (UK)	3.2	5.7	9.2	20.0	31.0	49.4	70.8	107
Cv (US)	3.8	6.9	11.1	24.0	37.2	59.3	85.0	128

\* Only MC-COS-16

**CAUTION** 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

Flanged

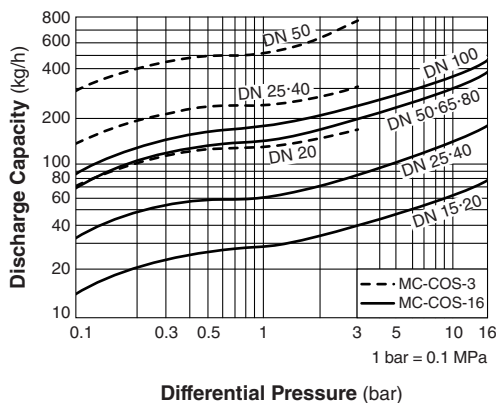


**MC-COS-3/MC-COS-16** Flanged (mm)

DN	L					H	H <sub>1</sub>	W	Weight* (kg)
	DIN 2501	ASME Class							
	PN25/40	125FF	(150RF)	250RF	(300RF)				
(15)**	150	-	170	-	170	720	510	105	22
(20)		-	182	-	182				
25	160	176	188	188	192	747	507	150	27
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				
100**	434	434	434	450	450				

( ) 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  
 \*\* Only MC-COS-16  
 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.

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

Manufacturer  
**TLV** CO., LTD.  
 Kakogawa, Japan  
 is approved by LRQA Ltd. to ISO 9001/14001

