



# AUTOMATIC MULTI-CONTROL VALVE

## MODEL MC-COS-3/MC-COS-16

### HIGH-PRECISION CONTROLLER OPERATED AND MOTORIZED STEAM VALVE

#### Benefits

The MC-COS-3/16 multi-control valve consists of the COS-3/16 pressure reducing valve with integrated separator and steam trap and a motorized actuator. It is used to control either steam pressure or the temperature\* of processes heated by steam.

1. Combination conditioning system includes control valve, condensate separator, and steam trap.
2. Unique SCE separator's 98% efficiency can deliver high quality steam of 99.8% dryness, which improves heat transfer efficiency, enhances product quality, speeds batch times, and extends valve life.
3. Unique double guided piston delivers stable secondary pressure, maintaining high accuracy during severe conditions of varying primary pressure and fluctuating flow rates.
4. Rapid response actuator with brushless DC servo-motor allows precision control of the valve position for maintaining desired steam pressure within  $\pm 1$  psi or process temperature within  $\pm 1$  °F.
5. Internal screens for pilot and main valves extend maintenance-free service.
6. Sizes 3" and larger have internal noise silencers for quiet operation.
7. Designed with PTFE gaskets for inspection ease.
8. Allows highly responsive, high-speed process control when combined with the TLV SC-F71 controller.

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



#### Specifications

Model		MC-COS-3		MC-COS-16		
Connection		<b>Screwed</b>	Flanged	<b>Screwed</b>	Flanged	
Size (in)		<b>¾, 1</b>	1, 1¼, 1½, 2	<b>½, ¾, 1</b>	1, 1¼, 1½, 2, 3, 4	
Body Material		Cast Iron				
Max. Operating Pressure (psig)		PMO	45		250	
Max Operating Temperature (°F)		TMO			428	
Max. Allowable Pressure (psig)		PMA			250	
Max. Allowable Temperature (°F)		TMA			428	
Control Valve	Primary Pressure Range (psig)		15 – 45		30 – 250	
	Adjustable Differential Pressure (psi)		not applicable		10 – 120	
	Pressure Adjustment Range (psig)		1.5 – 7		5 – 210	
	Maximum Adjustable Secondary Pressure (psig)		7		84% of Primary Pressure (or Primary Pressure minus 10 psi, whichever is lower)	
	Minimum Adjustable Secondary Pressure (psig)		1.5		10% of Primary Pressure (or Primary Pressure minus 120 psi, whichever is higher) (except primary pressures up through 85 psi as shown in the capacity tables)	
	Minimum Adjustable Flow Rate				5% of rated flow rate for ½" – 2"; 10% of rated flow rate for 3" – 4"	
	Accuracy of Regulation (psi) AOR				$\pm 1$ (under steady flow conditions)	
	Seat Leakage Rating				Less than 0.1% of Rated Flow Rate	
	Applicable Fluid				Steam	
	Actuator	Input	Valve Opening Input			4 – 20 mA DC (input impedance 250 $\Omega$ )
Power		Line Voltage			Free between 100 – 240 V AC (50/60 Hz)	
		Power Consumption			max. 75 VA	
		Insulation			Between each terminal and ground: 500 V DC min. 100 M $\Omega$	
		Withstand Voltage			Between power terminal and ground terminal: 1800 V AC for 1 second	
Environment		Ambient Temperature			32 – 122 °F	
		Ambient Humidity			10 – 90 % RH (without dew)	
		Vibration Resistance			max. 0.5 G	
		Water Resistance			Rain-proof	
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 sec.
		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	

Connections and sizes in bold are standard

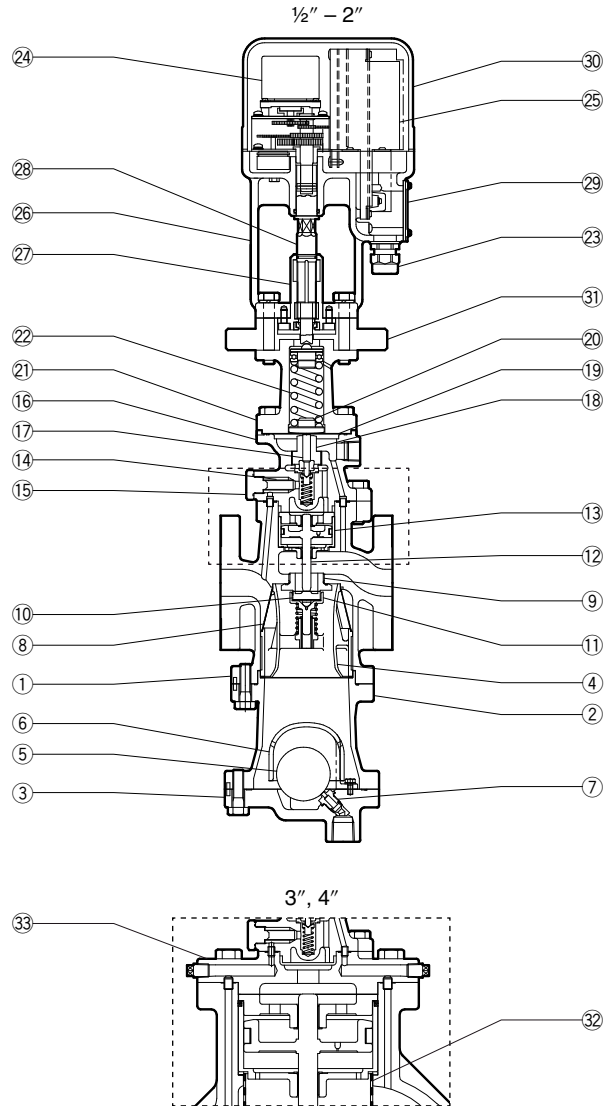


To avoid abnormal operation, accidents or serious injury, DO NOT use products outside of the specification range. Local regulations may restrict the use of this product to below the conditions quoted.

### Configuration

No.	Description	Material
①	Main Body	Cast Iron
②	Trap Body	Cast Iron
③	Trap Cover	Cast Iron
④	Separator	Stainless Steel
⑤	Float	Stainless Steel
⑥	Float Cover	Cast Iron
⑦	Trap Valve Seat	Stainless Steel
⑧	Separator Screen	Stainless Steel
⑨	Main Valve Seat	Stainless Steel
⑩	Main Valve	Stainless Steel
⑪	Main Valve Holder	Stainless Steel
⑫	Piston	Stainless Steel
⑬	Cylinder	Stainless Steel
⑭	Pilot Screen	Stainless Steel
⑮	Pilot Screen Holder	Carbon Steel
⑯	Pilot Valve Body	Ductile Cast Iron
⑰	Pilot Valve	Stainless Steel
⑱	Pilot Valve Seat	Stainless Steel
⑲	Diaphragm	Stainless Steel
⑳	Diaphragm Support	Brass
㉑	Spring Housing	Cast Iron
㉒	Coil Spring	Carbon Steel
㉓	Cable Lock	Nylon
㉔	Motor Unit	—
㉕	Drive Unit	—
㉖	Mounting Plate	Cast Iron
㉗	Adjustment Screw Guide	Stainless Steel
㉘	Adjustment Screw	Stainless Steel
㉙	Terminal Block Cover	Steel Plate
㉚	Motor Cover	Cast Aluminum
㉛	Insulation Plate	Non-Asbestos Cement
㉜	Silencer	Stainless Steel
㉝	Pilot Cover	Cast Iron

Configuration differs slightly depending on connection size.



### Capacity Table MC-COS-3

With external (factory standard) or internal (option) secondary pressure-sensing line or channel (lb/h)

(Parts to activate the internal pressure-sensing channel are available from TLV)

Primary Steam Pressure (psig)	Secondary (Set) Steam Pressure (psig)		Nominal Valve Size				
	External Line	Internal Channel (option)	3/4"	1"	1 1/4"	1 1/2"	2"
15 to less than 29	*7 – **1.5	*7	240	380	1100	1500	2100
	/	6	250	400	1080	1450	2000
		4.5	260	410	1060	1400	1950
		3	270	430	830	1100	1450
		**1.5	220	400	620	840	1060
29 – 45	*7 – **1.5	*7	550	760	1100	1500	2100
	/	6	540	750	1080	1450	2000
		4.5	530	730	1060	1400	1950
		3	340	540	830	1100	1450
		**1.5	220	400	620	840	1060

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

## Capacity Table MC-COS-16

**With external (factory standard) or internal (option) secondary pressure-sensing line or channel (lb/h)**  
 (Parts to activate the internal pressure-sensing channel are available from TLV)

Primary Steam Press. (psig)	Secondary (Set) Steam Pressure (psig)		Nominal Valve Size							
	External Line	Internal Channel (option)	½"	¾"	1"	1¼"	1½"	2"	3"	4"
30	*20	**20	350	485	685	1125	1365	1875	4255	6395
	16	16	400	575	820	1260	1590	2190	4980	7525
	**5 – 14	14	350	545	830	1270	1595	2220	5090	7665
		9	130	345	785	1220	1530	2200	5065	7645
		**5	110	310	750	1145	1455	2180	5050	7625
40	*30	*30	415	610	880	1315	1610	2435	5555	8370
	25	25	435	630	930	1355	1750	2665	6060	9135
	**5 – 20	20	445	655	950	1400	1840	2805	6390	9625
		12	155	385	840	1275	1755	2685	6155	9255
		*5	110	310	750	1145	1595	2465	5650	8490
50	*40	*40	415	615	865	1310	1565	2425	5540	8335
	30	30	475	685	1010	1465	2045	3175	7250	10920
	**5 – 25	25	485	715	1045	1505	2140	3325	7580	11425
		15	175	500	915	1340	1955	3035	6930	10430
		**5	115	305	785	1160	1715	2655	6075	9125
60	*50	*50	475	675	940	1390	1965	3045	6950	10475
	45	45	505	715	1050	1500	2220	3435	7860	11845
	40	40	515	725	1085	1550	2325	3605	8245	12430
	**5 – 30	30	505	780	1180	1655	2560	3960	9040	13635
		18	265	660	1035	1455	2255	3495	7960	12000
75		**5	115	275	845	1190	1840	2840	6495	9765
	*63	*63	440	660	595	1235	1875	2930	6680	10030
	60	60	475	695	760	1315	2020	3145	7175	10790
	50	50	555	800	1195	1665	2590	4020	9165	13820
	**5 – 38	38	585	865	1345	1880	2910	4505	10295	15515
85			23	405	730	1180	1635	2545	3930	8975
		**5	85	255	855	1190	1860	2890	6565	9890
	*71	*71	565	800	1210	1675	2600	4045	9225	13895
	70	70	565	805	1225	1695	2635	4095	9340	14070
	50	50	645	980	1535	2155	3335	5175	11820	17800
100	**5 – 42	42	640	990	1545	2165	3345	5190	11885	17865
		25	420	755	1145	1600	2465	3830	9015	13165
		**5	50	205	880	1240	1945	3000	6760	10330
	*84	*84	540	795	1290	1805	2795	4345	9910	14920
	80	80	585	880	1420	1990	3080	4785	10915	16440
125	60	60	705	1075	1720	2390	3705	5750	13145	19795
	**10 – 50	50	750	1105	1775	2490	3855	5960	13625	20535
		30	440	835	1345	1875	2890	4495	10275	15455
		**10	155	505	945	1320	2050	3195	7295	10980
	*105	*105	670	1045	1695	2365	3655	5675	12970	19475
150	100	100	710	1120	1810	2525	3905	6060	13860	20815
	80	80	890	1335	2150	3010	4660	7220	16500	24910
	**13 – 63	63	970	1375	2210	3090	4780	7410	16955	25465
		35	550	925	1490	2070	3205	4980	11520	17120
		**13	260	525	975	1380	2045	3175	7235	10890
175	*126	*126	600	970	1585	2210	3425	5330	12160	18375
	125	125	605	980	1595	2225	3450	5370	12255	18520
	100	100	860	1390	2225	3110	4805	7450	17040	25575
	**30 – 75	75	1100	1545	2470	3440	5335	8265	18915	28440
		50	750	1120	1800	2505	3890	6025	13995	20715
200		**30	470	810	1250	1755	2600	4040	9295	13860
	*147	*147	865	1445	2330	3235	5020	7780	17790	26720
	145	145	875	1460	2350	3270	5065	7850	17955	26975
	120	120	1085	1670	2700	3755	5820	9025	20640	31130
	**55 – 88	88	1360	1880	2970	4250	6415	9955	22735	34230
225			70	1050	1475	2330	3325	5060	7835	11905
		**55	895	1325	2100	2945	4560	7045	16120	24300
	*168	*168	880	1515	2420	3395	5260	8135	18585	26715
	150	150	1190	1850	3000	4190	6480	10030	22930	34390
	130	130	1305	1975	3110	4540	6730	10420	23810	35805
250	**80 – 100	100	1610	2315	3350	5400	7230	11220	25575	38580
		**80	1210	1695	2490	3485	5400	8355	19090	28660
	*189	*189	990	1675	2710	3765	5855	9080	20750	30995
	175	175	1155	1880	2960	4180	6390	9905	22630	33915
	150	150	1540	2330	3530	5110	7620	11815	26975	40650
250	**105 – 111	111	1860	2745	4170	5805	7910	12255	27935	42195
		**105	1755	2625	3870	5520	7390	11440	26095	39355
	*210	*210	1155	1915	3085	4290	6630	10295	23525	36275
	150	1945	2885	4150	6170	8940	13880	31660	47885	
	**130	2105	3120	4490	6340	8885	13770	31350	47445	

\* Maximum adjustable secondary pressure \*\* Minimum adjustable secondary pressure  
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### Cv Values

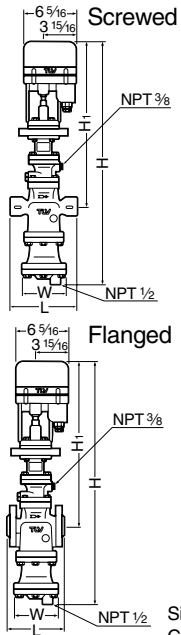
	Nominal Valve Size						
	1/2"*	3/4"	1"	1 1/2"	2"	3"*	4"*
Cv (US)	3.8	6.9	11.1	24.0	37.2	85	128
Cv (UK)	3.2	5.7	9.2	20.0	31.0	70.8	107
Kvs (DIN)	3.3	5.9	9.5	20.6	31.9	72.9	110

\*MC-COS-16 only



The Cv 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 Screwed\* (in)

Size	L	H	H <sub>1</sub>	W	Weight (lb)
3/4	6 7/8	28 3/8	19 7/8	4 1/8	44
1	7 1/2	29 7/16	20	5 7/8	55

\* NPT, other standards available

#### ● MC-COS-3 Flanged (in)

Size	L		H	H <sub>1</sub>	W	Weight* (lb)
	Connects to ASME Class					
	125FF	250RF				
1	6 15/16	7 3/8	29 7/16	20	5 7/8	60
1 1/4	8 1/8	8 11/16	31 3/8	20 3/4	6 1/2	71
1 1/2	8 1/4	8 3/4				
2	10	10 1/4	33 3/8	21 1/4	7 1/2	108

Other standards available, but length and weight may vary  
\* Weight is for Class 250 RF

Size 1/2"-1" shown.  
Configuration of larger sizes differs slightly.

#### ● MC-COS-16 Screwed\* (in)

Size	L	H	H <sub>1</sub>	W	Weight (lb)
1/2	6 7/8	28 3/8	19 7/8	4 1/8	44
3/4					
1	7 1/2	29 7/16	20	5 7/8	55

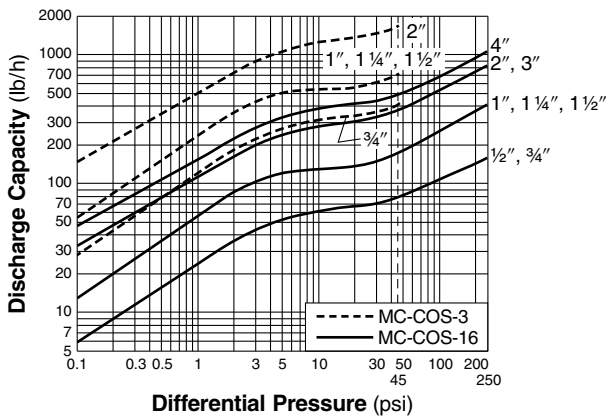
\* NPT, other standards available

#### ● MC-COS-16 Flanged (in)

Size	L		H	H <sub>1</sub>	W	Weight* (lb)
	Connects to ASME Class					
	125FF	250RF				
1	6 15/16	7 3/8	29 7/16	20	5 7/8	60
1 1/4	8 1/8	8 11/16	31 3/8	20 3/4	6 1/2	71
1 1/2	8 1/4	8 3/4				
2	10	10 1/4	33 3/8	21 1/4	7 1/2	108
3	14 3/8	15 1/16	43 3/8	25	11	159
4	17 1/16	17 11/16	49 5/16	26 1/2	13 3/4	214

Other standards available, but length and weight may vary  
\* Weight is for Class 250 RF

### Discharge Capacity of Steam Trap



Note: 1. The discharge capacity is the maximum continuous condensate discharge 11 °F below saturated steam temperature.  
2. The differential pressure is the difference between the COS inlet and its trap outlet pressure.



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



DO NOT DISASSEMBLE OR REMOVE THIS PRODUCT WHILE IT IS UNDER PRESSURE. Allow internal pressure of this product to equal atmospheric pressure and its surface to cool to room temperature before disassembling or removing. Failure to do so could cause burns or other injury. READ INSTRUCTION MANUAL CAREFULLY.

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

