



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-F70 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..



Specifications

| Model | | MC-COS-3 | MC-COS-16 | |
|--------------------|--|--|---|--|
| Connection | | Flanged | | |
| Size | | DIN DN 20, 25, 40, 50 | ASME DN 15, 20, 25, 40, 50, 65, 80, 100 | |
| Body Material | | Ductile Cast Iron* (GGG40.3) | Cast Iron (JIS FC250) (equivalent to GG-25) | |
| Control Valve | Max. Operating Pressure (barg) PMO | 3 | 16 | |
| | Max. Operating Temperature (°C) TMO | 220 | 200 | |
| | Primary Pressure Range (barg) | 1 - 3 | 2 - 16 | |
| | 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 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), 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 | 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 |

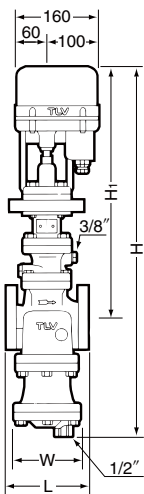
* Only MC-COS-16



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

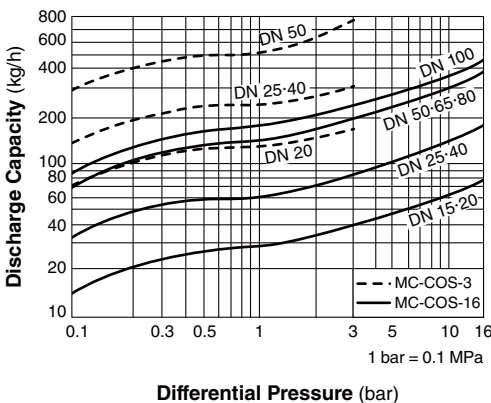


MC-COS-3/MC-COS-16 Flanged (mm)

| DN | L | | | | | H | H 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 | | | | |
| 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 | 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
 ** 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.



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

Manufacturer

ISO 9001/ISO 14001



Kakogawa, Japan
 is approved by LRQA Ltd. to ISO 9001/14001

