PRESSURE INDEPENDENT CONTROL VALVE

MSM Series

50-250 mm / 2" - 10"

FEATURES / CHARACTERISTICS

Valve:	
Static pressure	: 4000 kPa / 580 psi
Ambient temperature	: -10°C to +50°C / +14°F to +122°F
Media temperature	: -20°C to +120°C / -4°F to +248°F
Material:	
Housing and covers	: Ductile iron ASTM A395 Grade 60-40-18
Composite components internal)	: PPS (glass-reinforced) / PE / PC / POM
Metal components (internal)	: Stainless steel
Stem seal and O-rings	: EPDM
Diaphragm	: HNBR
Bracket	: PA
Snap ring	: PE
Stroke	
MSM.3.X DN50-80 / 2"-3"	: 2160°
MSM.4.X DN80-100 / 3"-4"	: 2160°
MSM.5.X DN125-150 / 5"-6"	: 2160°
MSM.6.2 DN200-250 / 8"10"	: 3600°
Maximum close off pressure	: 800 kPa / 116 psi
Maximum operational ΔP	: 800 kPaD / 116 psid
Maximum allowable operating pressure	: 1600 kPaD / 232 psid
Control characteristic	: Linear flow (may be converted to equal% or linear rotation on actuator)
Rangeability	: >100:1
Turn down ratio	: >100:1
Shut-off leakage	: ANSI / FCI 70-2 206 / IEC 60534-4 - Class IV
Flow rate range	: 0.0416-76.8 l/sec / 0.659-1220 GPM
End connection	: Universal flange connections which can be used with both ISO and ANSI flanges. Mounting kits are not supplied by Maplef
Housing taps	: 1/4" ISO

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Maplef Actuator[1]	**: MSM.0.0.1.3 (standard)/MSM.0.0.1.4 (standard failsafe)/ MSM.0.0.1.5 (BUS)/MSM.0.0.1.6 (BUS failsafe)**
Supply voltage	: 24V AC ±20%, 50/60 Hz or 24V DC ±20%
Type	: Electrical, Bi-directional synchronous motor
Power consumption	:
MSM.0.0.1.3/5	: 24V AC: 2.2VA standby / 3.8VA operating / 15VA max 24V DC: 1.0W standby / 1.7W operating / 8.0W max
MSM.0.0.1.4/6	: 24V AC: 3.3VA standby / 4.5VA operating / 15VA max 24V DC: 2.0W standby / 3.0W operating / 8.0W max
Control signal	: Analog 0(2)-10V DC or 0(4)-20mA and digital 3-point-floating or 2-position
Resolution	: 1:1000 (0-10V analog) and 1:800 (2-10V analog)
Feedback	: Linear flow Auto (equal to analog control signal), 0-10V DC, 2-10V DC or 4-20mA
Control mode	: Linear flow, equal percentage or linear rotation
Supply voltage failsafe	: MSM.0.0.1.3/5: Fail in place
MSM.0.0.1.4/6	: Fail in place or settable 0-100% open
Control signal failsafe	: Fail in place or settable 0-100% open
Manuel override	: Yes
Position indicator	: No
Operation time:	• MSM.3-5: 190 sec (from closed to fully open valve) • MSM.6: 317 sec (from closed to fully open valve)
Actuating force	: 9 Nm opening / 7.5 Nm closing
Stroke:	• Maplef valve MSM.3-5: 2160° • Maplef valve MSM.6: 3600°
Ambient temperature	: -10°C to +50°C / +14°F to +122°F
Humidity rating	: 5..95% rH, no condensation
Protection	: IP54 including upside-down mounting
CE conformity	: EN 60730, class II
Calibration	: Automatic at startup
Cable:	
MSM.0.0.1.3/4	: Fixed, 5 wires x 0.75 mm2 / AWG18, halogen free, 1 meter / 3 ft
MSM.0.0.1.5/6	: Fixed, 7 wires x 0.75 mm2 / AWG18, halogen free, 1 meter / 3 ft
Material:	
• Cover, top	: PA (glass-reinforced), UL94, V0 rated
• Cover, bottom	: PC (glass-reinforced), UL94, V0 rated
• Spindle adaptor	: Brass and EPDM
Valve-actuator coupling	: Easy snap coupling
Programming	: MSM.0.0.1.3/4: Programming of all settings on interface with buttons and display : MSM.0.0.1.5/6: Programming of all settings on interface with buttons and display or via BACnet and Modbus

Modbus (MSM.0.0.1.5/6)

Transmission type	: RTU slave
Interface	: EIA-485 / RS-485
Baud rates supported	: 9600, 19200, 38400, 76800 and 115200
Start/stop bits	: 8N2 (standard)
Participants	: Up to 32 recommended, max. 127 participants
Load	: 1/8

Note 1: Maplef warranty is voided using other actuators than supplied or recommended by Maplef Valves & Fittings LTD.

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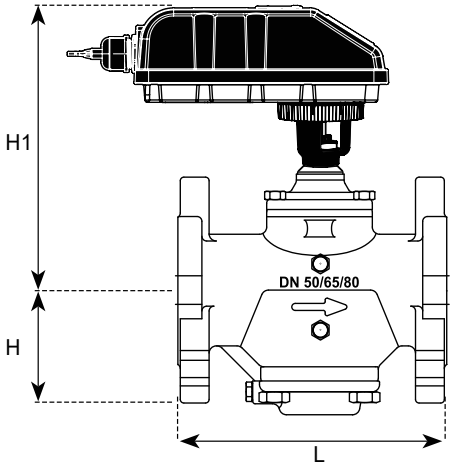
FEATURES / CHARACTERISTICS

BACnet (MSM.0.0.1.5/6)

Protocol	: BACnet MS/TP
Interface	: EIA-485 / RS-485
Device profile	: BACnet Application Specific Controller (B-ASC) type server
Baud rates supported	: 9600, 19200, 38400, 76800 and 115200
Services (BIBBS) supported	: DS-RP-B, DS-WP-B, DM-DDB-B, DM-DOB-B and DM-DCC-B
BACnet fallback action	: Yes
Participants	: Up to 32 recommended, max. 127 participants
Load	: 1/8

DIMENSIONS AND WEIGHTS (NOMINAL)

Model No	Valve Size mm (in)	L mm (in)	H mm (in)	H1 mm (in)	Weight[2] Kg (lb)
MSM.3.0 MSM.3.1 MSM.3.2	50 (2) 65 (2½) 80 (3)	224 (8.82)	95.0 (3.74)	247 (9.72)	13.0 (28.6)
MSM.4.1 MSM.4.2	80 (3) 100 (4)	320 (12.6)	135 (5.31)	287 (11.3)	29.5 (65.0)
MSM.4.3	80 (3) 100 (4)	320 (12.6)	135 (5.31)	287 (11.3)	32.3 (71.2)
MSM.5.1 MSM.5.2	125 (5) 150 (6)	422 (16.6)	180 (7.09)	338 (13.3)	59.4 (131)
MSM.6.2	200 (8) 250(10)	725 (28.5)	292 (11.5)	467 (18.4)	230 (506)



Note 2: Weight includes valve and actuator (standard).

MODEL NUMBER SELECTION[3]

MSM.[SIZE].[CONTROL RANGE].[P/T PLUG].[ACTUATOR]

	PARTS	OPTIONS
1	Housing size:	3=DN50-80 / 2"-3" 4=DN80-100 / 3"-4" 5=DN125-150 / 5"-6" 6=DN200-250 / 8"-10"
2	Control range:	0=30-800 kPaD / 4.4-116 psid (MSM.3 only) 1=30-800 kPaD / 4.4-116 psid 2=35-800 kPaD / 5.1-116 psid 3=50-800 kPaD / 7.3-116 psid (MSM.4 only)
3	P/t plug requirements:	B = p/t plugs (standard)
4	Type of actuator:	0=no actuator 3=standard (Maplef MSM.0.0.1.3) 4=standard and failsafe (Maplef MSM.0.0.1.4) 5=BUS (BACnet and Modbus) (MSM.0.0.1.5) 6=BUS (BACnet and Modbus) and failsafe (MSM.0.0.1.6)

Example:

Maplef MSM.3.1.B.4.0.0.0 = MSM DN50-80 body for 30-800 kPaD with p/t plugs and standard failsafe actuator.

Note 3: Model no. and pressure range are indicated on label affixed to valve.

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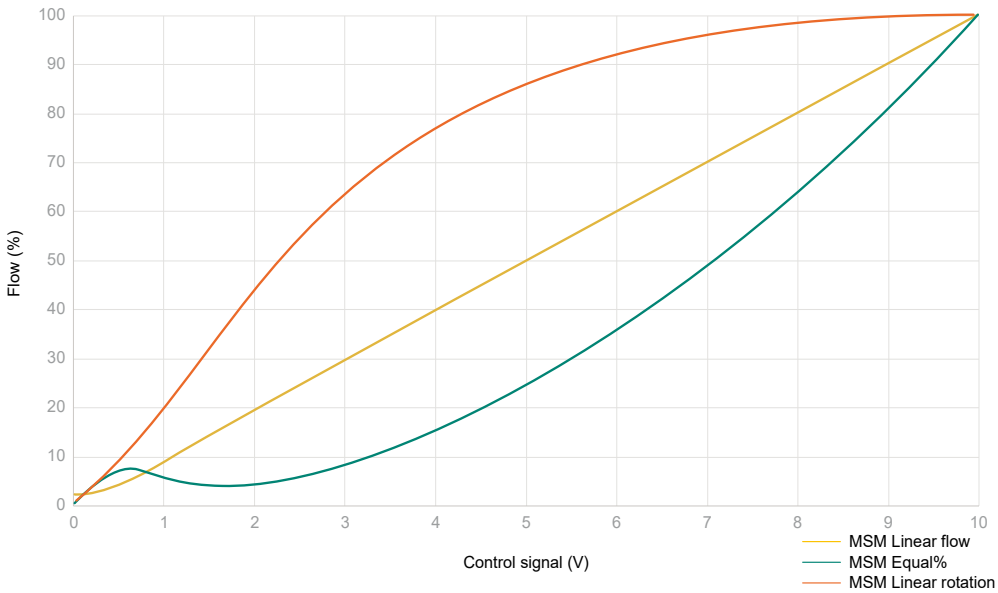
FLANGE MATCH

Model no.	Flange size (inch)	ASME B16.5 weld neck		Flange size (mm)	EN 1092-1 Weld neck			
		Class 150	Class 300		PN10	PN16	PN25	PN40
MSM.3.X	2	-	-	50	X	X	X	X
	2 1/2	X	X	65	X	X	X	X
	3	X	X	80	X	X	X	X
MSM.4.X	3	X	X	80	X	X	X	X
	4	X	X	100	X	X	X	X
MSM.5.X	5	X	X	125	X	X	X	X
	6	X	-	150	X	X	X	X
MSM.6.2	8	-	X	200	-	-	X	X
	10	X	-	250	X	X	X	X

DESCRIPTION

The MSM series is a range of self-balancing dynamic flow control valves that are pressure independent and 2-way and ready to accept digital or analog input signals. Each valve has an adjustable maximum flow rate setting to enable flow limitation to and balancing of the coil or zone which the valve is controlling.
All MSM actuators are microprocessor based with a self-calibrating feature. The MSM actuator range includes standard incl. feedback, failsafe and BUS (BACnet and Modbus).
All MSM actuators are programmable and with display. The MSM actuators accept analog 0(2)10V DC or 0(4)-20mA as well as digital 3-point floating or 2-position input signals and work with control mode of linear flow or linear rotation.
The smaller range of MSM-valves are all designed for double union piping connection. They are available in two different valve body sizes with a range of end connections. All shall have snap connection for fast mounting of actuator.

CONTROL CURVE



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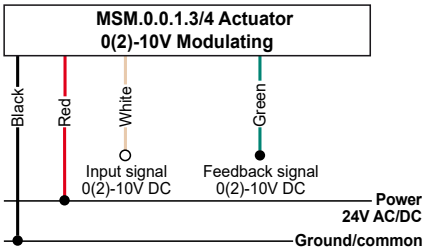
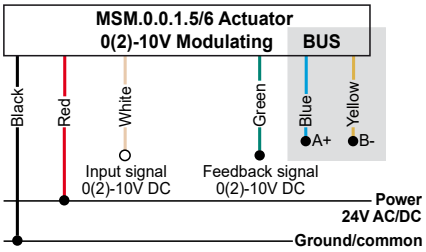
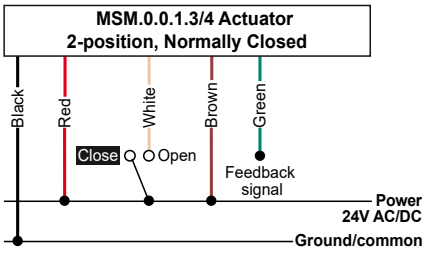
WIRING INSTRUCTION[4]

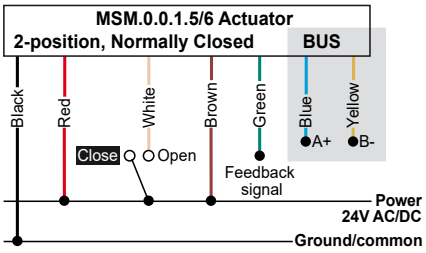
ELECTRICAL MODULATING

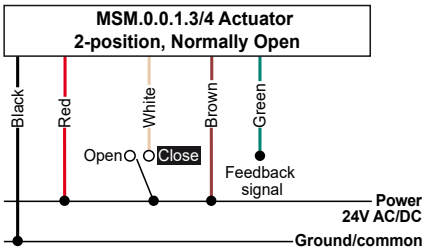


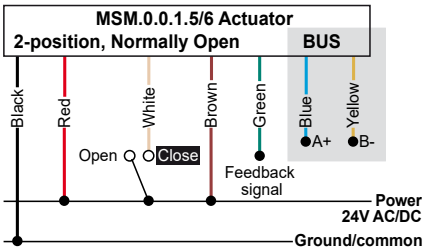


ELECTRICAL 2-POSITION

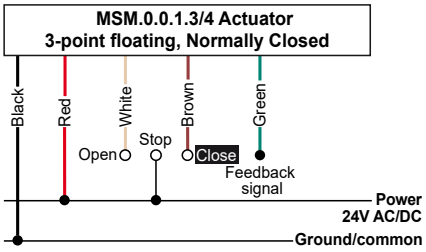


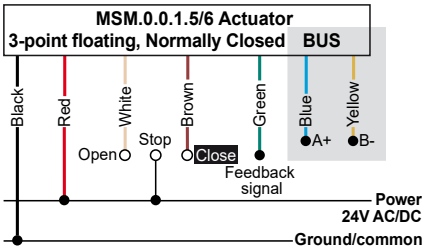


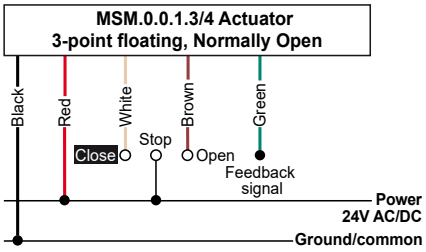


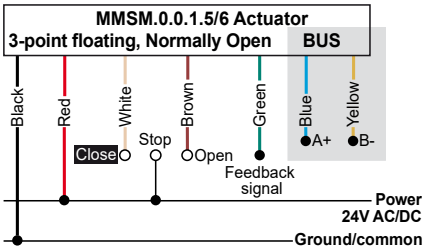


ELECTRICAL 3-POINT FLOATING









Note 4: For all setups: if feedback signal is not required, leave green wire detached.
For modulating setup, brown wire is not used and may be cut.

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MSM Series
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FLOW RATE SETTINGS[5]

Maplef MSM.3.X	Flow Rate Setting Table								
	Valve size: DN50-80 / 2"-3"								
Pressure range, ΔP:	30-800 kPaD / 4.4-116 psid			30-800 kPaD / 4.4-116 psid			35-800 kPaD / 5.1-116 psid		
	MSM.3.0			MSM.3.1			MSM.3.2		
	l/sec	l/hr	GPM	l/sec	l/hr	GPM	l/sec	l/hr	GPM
Lowest settable max flow	0.0416	150	0.659	0.0715	257	1.13	0.0989	356	1.57
Increments	0.0416	150	0.659	0.0715	257	1.13	0.0989	356	1.57
Highest settable max flow	4.16	15000	65.9	7.15	25700	113	9.89	35600	157

Maplef MSM.4.X	Flow Rate Setting Table								
	Valve size: DN80-100 / 3"-4"								
Pressure range, ΔP:	30-800 kPaD / 4.4-116 psid			35-800 kPaD / 5.1-116 psid			50-800 kPaD / 7.3-116 psid		
	MSM.4.1			MSM.4.2			MSM.4.3		
	l/sec	l/hr	GPM	l/sec	l/hr	GPM	l/sec	l/hr	GPM
Lowest settable max flow	0.0938	338	1.49	0.142	510	2.25	0.202	727	3.20
Increments	0.0938	338	1.49	0.142	510	2.25	0.202	727	3.20
Highest settable max flow	9.38	33800	149	14.2	51000	225	20.2	72700	320

Maplef MSM.5.X	Flow Rate Setting Table					
	Valve size: DN125-150 / 5"-6"					
Pressure range, ΔP:	30-800 kPaD / 4.4-116 psid			35-800 kPaD / 5.1-116 psid		
	MSM.5.1			MSM.5.2		
	l/sec	l/hr	GPM	l/sec	l/hr	l/sec
Lowest settable max flow	0.233	838	3.69	0.295	1060	4.68
Increments	0.233	838	3.69	0.295	1060	4.68
Highest settable max flow	23.3	83800	369	29.5	106000	468

Maplef MSM.6.2	Flow Rate Setting Table		
	Valve size: DN200-250 / 8"-10"		
Pressure range, ΔP:	35-800 kPaD / 5.1-116 psid		
	MSM.6.2		
	l/sec	l/hr	GPM
Lowest settable max flow	0.768	2770	12.2
Increments	0.768	2770	12.2
Highest settable max flow	76.8	277000	1220

Note 5:
Accuracy: Greatest of either ±5% of the controlled flow or ±2% of the maximum flow applies for MSM.3.x–MSM.5.x at flow rates between 35% and 100% of rated valve capacity, and for MSM.6.2 at flow rates between 12% and 100% of rated valve capacity.
Maplef recommends valve's max flow to minimum 50% of rated valve capacity.
Above table indicates settable max flow defining the flow through the valve at maximum control signal, normally 10V.

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GENERAL SPECIFICATIONS

1. Pressure independent dynamic control valves - Maplef MSM

1.1. Contractor shall install pressure independent dynamic control valves where indicated in drawings.
1.2. Valve shall be an electronic, dynamic, modulating, 2-way pressure independent control device.
1.3. Valve shall accurately control flow, independent of system pressure fluctuation.
1.4. Housing shall be permanently marked to show direction of flow.

2. Valve actuator

2.1. Valve-actuator coupling shall be snap coupling for fast mounting and de-mounting.
2.2. Actuator housing shall be rated to IP54 including upside-down mounting.
2.3. Actuator shall be driven by a 24V AC/DC motor and shall accept 0(2)-10V, 0(4)-20mA, 3-point floating or 2-position control signal.
2.4. Actuator control mode shall be selectable to linear flow, equal percentage or linear rotation.
2.5. Actuator shall be capable of providing linear flow feedback signal to the control system. Feedback signal shall be selectable to Auto (equal to input signal), 4-20mA, 0-10V DC or 2-10V DC.
2.6. In case of lost control signal, actuator shall be capable of operating valve to any set 0-100% open position or remain in place.
2.7. Automatic calibration of valve position shall be standard.
2.8. Actuator shall include buttons for external programming of all settings with the valve in-line and system in operation.
2.9. Actuator display showing current valve flow, maximum valve flow, input signal, feedback signal, operational direction and control mode shall be standard.
2.10. Optional failsafe versions shall be available. In case of power failure, failsafe versions shall be capable of operating valve to any set 0-100% open position or remain in place.
2.11. Optional BUS versions shall be available. BUS versions shall provide remote setting and control of actuator via BACnet and Modbus.

3. Valve housing

3.1. Housing shall consist of ductile iron ASTM A395 Grade-40-18 rated at no less than 4000 kPa (580 psi) static pressure and +120°C (+248°F).
3.2. Housing shall be for installation between flanges.
3.3. Pressure/temperature test plugs for verifying accuracy of flow performance shall be standard on all valve sizes.
3.4. Identification label according to PED-requirements shall be available for all valves.

4. Flow regulation unit

4.1. Flow regulation unit shall consist of PPS (glass-reinforced) / PE / PC / POM with EPDM sealings and a HNBR diaphragm.
4.2. Flow regulation unit shall be accessible for change-out or maintenance.
4.3. Flow regulation unit shall, via the actuator, be externally adjustable to 100 different settings; minimum pressure range shall be capable of being activated by 30 kPaD (4.4 psid). Further, the flow regulation unit shall be capable of controlling the flow within ±5% of controlled flow or ±2% of maximum flow in a specified range of rated valve capacity.

APPLICATION AND SCHEMATIC EXAMPLE