

Metering Valves

MS, MV, ML and MH Series



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FITOK
Valves and Fittings

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Features

MS Series

- Maximum working pressure: 2000 psig (138 bar)
- Working temperature: -10°F to 400°F (-23°C to 204°C)
- Orifice size: 0.032" (0.81 mm)
- Flow coefficient (Cv): 0.004
- Stem taper: 1°
- Turns to open: 9 to 12
- Shutoff service: not available
- Variety of end connections
- Panel mountable
- Flow pattern: straight, angle, cross and double
- Handle type: knurled, vernier, slotted and adjustable-torque
- Variety of materials available for valve body



MV and ML Series

- Maximum working pressure: 1000 psig (68.9 bar)
- Working temperature: -10°F to 400°F (-23°C to 204°C)
- Flow coefficients (Cv):
 - MV series: 0.03
 - ML series: 0.15
- Orifice sizes:
 - MV series: 0.056" (1.42 mm)
 - ML series: 0.128" (3.25 mm)
- Stem taper:
 - MV series: 3°
 - ML series: 6.5°
- Turns to open:
 - MV series: 8 to 10
 - ML series: 10 to 11
- Shutoff service:
 - MV series: not available
 - ML series: available
- Variety of end connections
- Panel mountable
- Flow pattern: straight, angle, cross (MV Series) and double (MV Series)
- Handle type:
 - MV series: knurled, vernier and slotted
 - ML series: round and vernier
- Variety of materials available for valve body

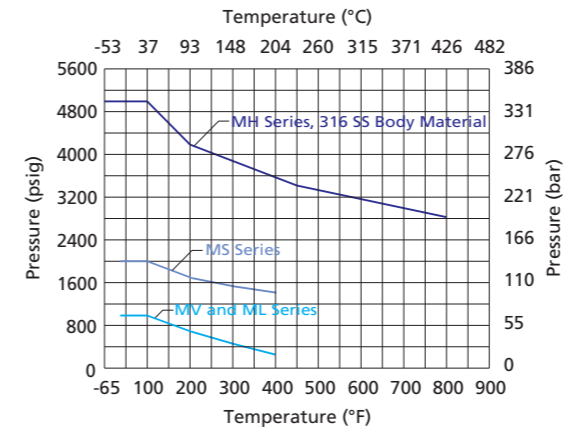


MH Series

- Maximum working pressure: 5000 psig (344 bar)
- Working temperature: -65°F to 850°F (-54°C to 454°C)
- Orifice size: 0.062" (1.6 mm)
- Flow coefficient (Cv): 0.04
- Stem taper: 2°
- Shutoff service: available
- Variety of end connections
- Turns to open: 9 to 10
- Panel mountable
- Flow pattern: straight and angle
- Handle type: round phenolic and vernier
- Variety of materials available for valve body



Pressure vs. Temperature



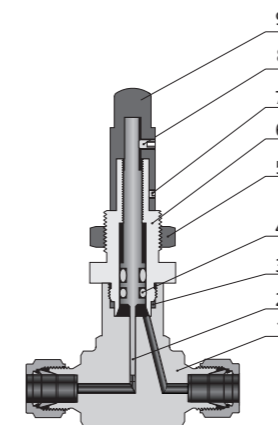
- Graphs are based on stem packing.
- Contact the authorized representative or FITOK Group for curve graph of other materials.

Temperature Ranges for Different seal Materials

Seal Material	Temperature Range °F (°C)
O-Ring (for MS, MV, ML Series)	
Buna N	-10 to 300 (-23 to 148)
Ethylene Propylene	-10 to 300 (-23 to 148)
Fluorocarbon FKM	-10 to 400 (-23 to 204)
Kalrez	-10 to 527 (-23 to 275)
Neoprene	-10 to 250 (-23 to 121)
Stem Packing (for MH Series)	
PTFE	-65 to 400 (-54 to 232)
Graphite	-65 to 850 (-54 to 454)

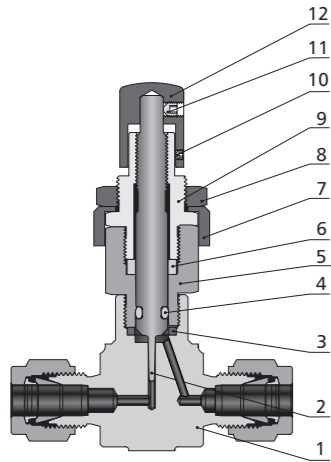
Standard Materials of Construction

MS Series



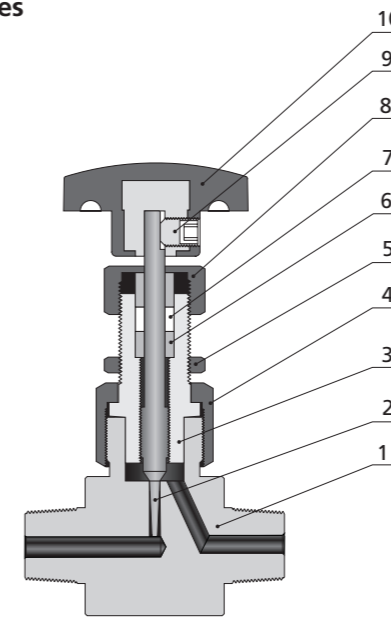
Component	Valve Body Material Grade/ASTM Specification	
	316 SS	Brass
1 Body	316 SS/A182	Silver-mist chrome-plated C37700/B283
2 Stem	Hard chrome-plated S17400 SS/A564	
3 Body Seal	Fluorocarbon FKM	Buna N
4 O-ring	Fluorocarbon FKM	Buna N
5 Panel Mount Nut	316 SS/B783	Silver-mist chrome-plated C36000/B16
6 Bonnet	316 SS/A479	Silver-mist chrome-plated C34500/B453
7 Lock Screw	Black oxide alloy steel/ANSI 18.3	
8 Handle Screw	Black oxide alloy steel/ANSI 18.3	
9 Handle	300 SS/A276	Silver-mist chrome-plated C36000/B16

MV Series



Component	Valve Body Material Grade/ASTM Specification	
	316 SS	Brass
1 Body	316 SS/A182	Silver-mist chrome-plated C37700/B283
2 Stem	Hard chrome-plated 316 SS/A479	
3 Body Seal	Fluorocarbon FKM	Buna N
4 O-ring	Fluorocarbon FKM	Buna N
5 Body Extension	316 SS/A479	Silver-mist chrome-plated C34500/B453
6 Stem Guide Ring	Glass-filled PTFE	
7 Bonnet Sleeve	Sintered 316 SS	
8 Pannel Mount Nut	316 SS/B783	Silver-mist chrome-plated C36000/B16
9 Bonnet	316 SS/A479	Silver-mist chrome-plated C34500/B453
10 Lock Screw	Black oxide alloy steel/ANSI 18.3	
11 Handle Screw	Black oxide alloy steel/ANSI 18.3	
12 Handle	300 SS/A276	Silver-mist chrome-plated C36000/B16

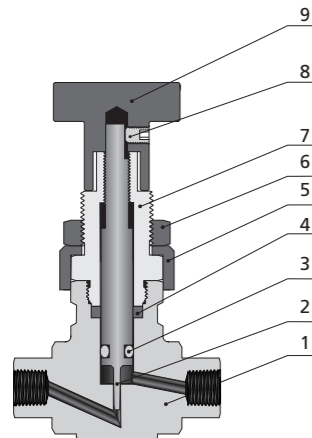
MH Series



Component	Material Grade/ASTM Specification
1 Body	316 SS/A479
2 Stem	440C SS/A276
3 Bonnet	316 SS/A479
4 Union Nut	316 SS/A276
5 Panel Mount Nut	316 SS/B783
6 Packing Gland	316 SS/A276
7 Packing	PTFE/D1710
8 Union Nut	316 SS/A276
9 Handle Screw	Black oxide alloy steel/ANSI 18.3
10 Handle	Phenolic/D4617

Lubricant: Nickel antiseize with hydrocarbon carrier

ML Series



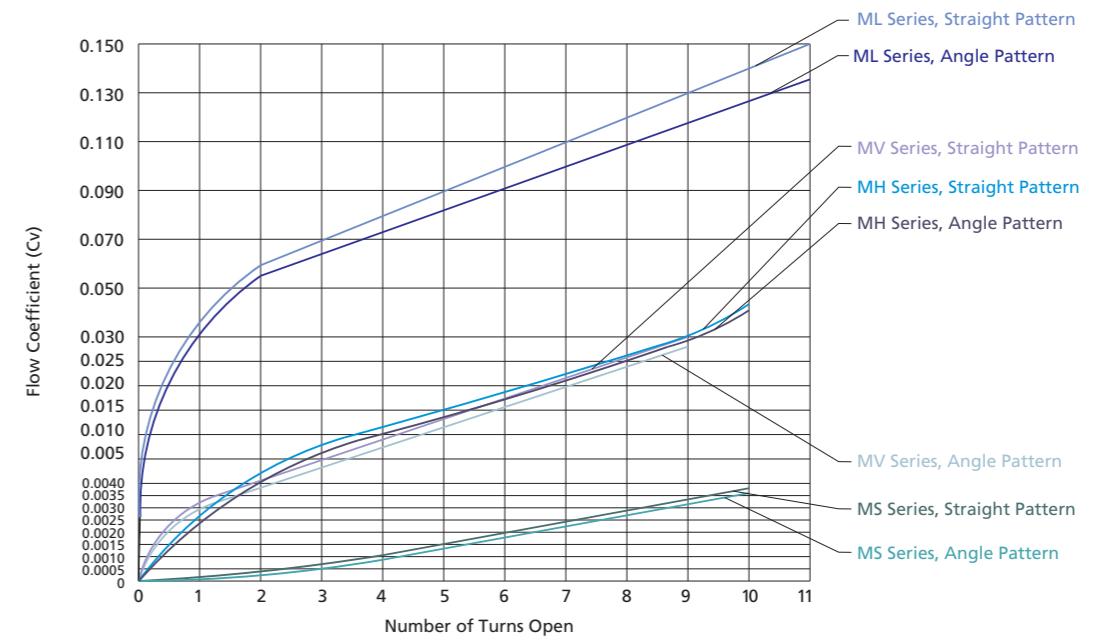
Component	Valve Body Material Grade/ASTM Specification	
	316 SS	Brass
1 Body	316 SS/A182	Silver-mist chrome-plated C37700/B283
2 Stem	Hard chrome-plated 316 SS/A479	
3 O-ring	Fluorocarbon FKM	Buna N
4 Stem Guide Ring	Glass-filled PTFE	
5 Bonnet Sleeve	Sintered 316 SS	
6 Pannel Mount Nut	316 SS/B783	Silver-mist chrome-plated C36000/B16
7 Bonnet	316 SS/A479	Silver-mist chrome-plated C34500/B453
8 Handle Screw	Black oxide alloy steel/ANSI 18.3	
9 Handle	300 SS/A276	Silver-mist chrome-plated C36000/B16

1. Lubricants: Molybdenum disulfide-based and silicone-based
 2. Contact the authorized representative or FITOK Group for other materials.

Flow Data at 70°F (20°C)

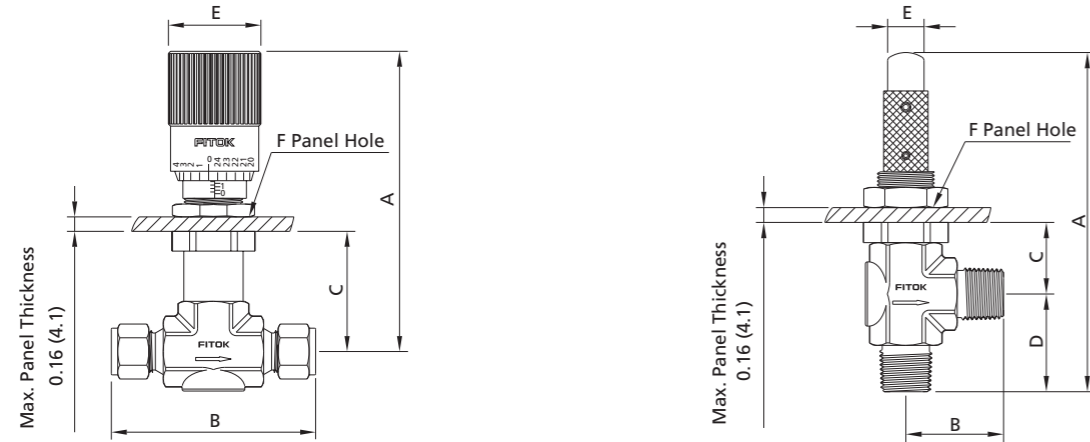
Pressure Drop to Atmosphere psig (bar)	MS Series		MV Series		ML Series		MH Series	
	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)	Air Flow std ft ³ /min (std L/min)	Water Flow U.S. gal/min (L/min)
10 (0.69)	0.04 (1.1)	0.01 (0.03)	0.33 (9.3)	0.09 (0.34)	2.00 (56.6)	0.51 (1.90)	0.45 (12.7)	0.12 (0.45)
50 (3.45)	0.10 (2.8)	0.02 (0.07)	0.90 (25.4)	0.21 (0.79)	6.40 (181)	1.20 (4.50)	1.20 (33.9)	0.28 (1.00)
100 (6.90)	0.20 (5.6)	0.04 (0.15)	1.50 (42.4)	0.30 (1.10)	11.40 (323)	1.70 (6.40)	2.10 (59.4)	0.40 (1.50)

Flow Coefficient at Turns Open



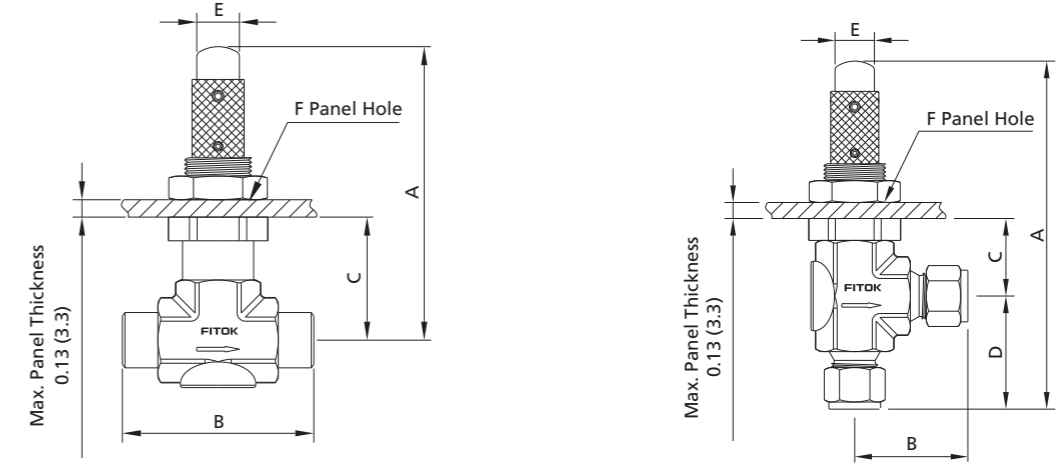
Dimensions

MS Series



Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
Straight Pattern								
MS□□-FL1-	1/16" FITOK	1/16" FITOK	2.34 (59.4)	1.56 (39.6)	0.92 (23.4)	—	0.38 (9.6)	0.45 (11.4)
MS□□-FL2-	1/8" FITOK	1/8" FITOK		1.90 (48.3)				
MS□□-FL4-	1/4" FITOK	1/4" FITOK		2.04 (51.8)				
MS□□-ML3-	3 mm FITOK	3 mm FITOK		1.90 (48.3)				
MS□□-ML6-	6 mm FITOK	6 mm FITOK		2.04 (51.8)				
MS□□-FR4-	1/4 Male FR	1/4 Male FR		2.06 (52.3)				
Angle Pattern								
MS□□-FL1-	1/16" FITOK	1/16" FITOK	3.22 (81.8)	0.81 (20.6)	0.92 (23.4)	1.02 (25.9)	0.38 (9.6)	0.45 (11.4)
MS□□-FL2-	1/8" FITOK	1/8" FITOK	3.32 (84.3)	0.98 (24.9)				
MS□□-FL4-	1/4" FITOK	1/4" FITOK	3.36 (85.3)	1.02 (25.9)				
MS□□-ML3-	3 mm FITOK	3 mm FITOK	3.32 (84.3)	0.98 (24.9)				
MS□□-FNS2-	1/8 Female NPT	1/8 Female NPT	3.07 (78.0)	0.98 (24.9)				
				0.88 (22.4)				
				0.98 (24.9)				

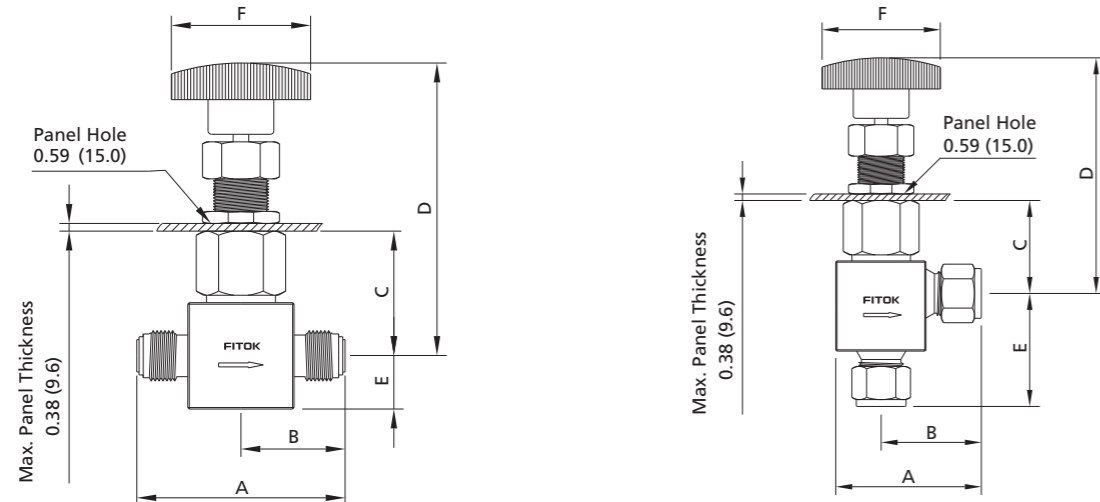
MV and ML Series



Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)										
	Inlet	Outlet	A	B	C	D	E	F					
Straight Pattern													
MV□□-FL2-	1/8" FITOK	1/8" FITOK	2.78 (70.6)	2.02 (51.3)	1.56 (39.6)	—	0.50 (12.7)	0.58 (14.7)					
MV□□-FL4-	1/4" FITOK	1/4" FITOK		2.20 (55.9)									
MV□□-ML3-	3 mm FITOK	3 mm FITOK		2.02 (51.3)									
MV□□-ML6-	6 mm FITOK	6 mm FITOK		2.20 (55.9)									
MV□□-NS2-	1/8 Male NPT	1/8 Male NPT		1.50 (38.1)									
MV□□-NS4-	1/4 Male NPT	1/4 Male NPT		1.96 (49.8)									
MV□□-FNS2-	1/8 Female NPT	1/8 Female NPT		1.94 (49.3)									
MV□□-FR4-	1/4 Male FR	1/4 Male FR		2.06 (52.3)									
Angle Pattern													
MV□□-FL2-	1/8" FITOK	1/8" FITOK		3.30 (83.8)					1.01 (25.7)	1.07 (27.2)	1.01 (25.7)	0.50 (12.7)	0.58 (14.7)
MV□□-FL4-	1/4" FITOK	1/4" FITOK	3.39 (86.1)	1.10 (27.9)									
MV□□-ML3-	3 mm FITOK	3 mm FITOK	3.30 (83.8)	1.01 (25.7)									
MV□□-ML6-	6 mm FITOK	6 mm FITOK	3.39 (86.1)	1.10 (27.9)									
MV□□-NS2-	1/8 Male NPT	1/8 Male NPT	3.04 (77.2)	0.75 (19.1)									
MV□□-NS4-	1/4 Male NPT	1/4 Male NPT	3.27 (83.1)	0.98 (24.9)									
MV□□-FNS2-	1/8 Female NPT	1/8 Female NPT	3.04 (77.2)	1.01 (25.7)									
MV□□-FR4-	1/4 Male FR	1/4 Male FR	3.26 (82.8)	0.97 (24.6)									
				1.10 (27.9)									
				0.75 (19.1)									

Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
Straight Pattern								
ML□□-FL4-	1/4" FITOK	1/4" FITOK	2.82 (71.6)	2.34 (59.4)	1.26 (32.0)	—	1.13 (28.7)	0.58 (14.7)
ML□□-FL6-	3/8" FITOK	3/8" FITOK		2.46 (62.5)				
ML□□-ML6-	6 mm FITOK	6 mm FITOK		2.34 (59.4)				
ML□□-NS4-	1/4 Male NPT	1/4 Male NPT		2.00 (50.8)				
Angle Pattern								
ML□□-FL4-	1/4" FITOK	1/4" FITOK	3.77 (95.8)	1.17 (29.7)	1.04 (26.4)	1.17 (29.7)	1.13 (28.7)	0.58 (14.7)
ML□□-ML6-	6 mm FITOK	6 mm FITOK						

MH Series

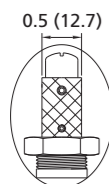


Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
Straight Pattern								
MH□□-FL4-	1/4" FITOK	1/4" FITOK	2.40 (61.0)	1.20 (30.5)	1.09 (27.7)	3.60 (91.4)	0.38 (9.6)	1.38 (35.1)
MH□□-ML6-	6 mm FITOK	6 mm FITOK						
MH□□-FNS2-	1/8 Female NPT	1/8 Female NPT						
MH□□-FNS4-	1/4 Female NPT	1/4 Female NPT	2.06 (52.3)	1.03 (26.2)				
Angle Pattern								
MH□□-FL4-	1/4" FITOK	1/4" FITOK	1.54 (39.1)	1.16 (29.5)	1.09 (27.7)	3.60 (91.4)	1.48 (37.6)	1.38 (35.1)
MH□□-ML6-	6 mm FITOK	6 mm FITOK						
MH□□-FNS2-	1/8 Female NPT	1/8 Female NPT						
MH□□-FNS4-	1/4 Female NPT	1/4 Female NPT	1.28 (32.5)	0.91 (23.1)	1.28 (32.5)	3.80 (96.5)	1.00 (25.4)	

Optional Handles

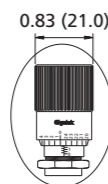
Slotted Handle

- Flow setting adjustment is available with a screwdriver
- Ideal for installation where access to handle
- Available for MS and MV series



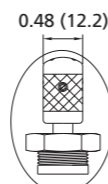
Vernier Handle

- Precise graduated aluminum alloy handle
- Repeatable flow setting
- Adjustment accurate to 1/25 turn (1/1000 of an inch)
- Available for all series



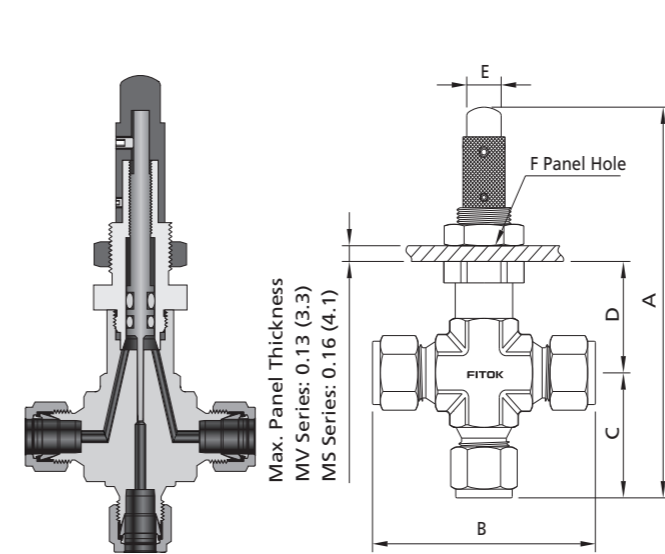
Adjustable-torque Handle

- Precise flow control
- Two top-mounted screws for torque adjustment
- Convenient operation with knurled metal handle
- Available for MS series

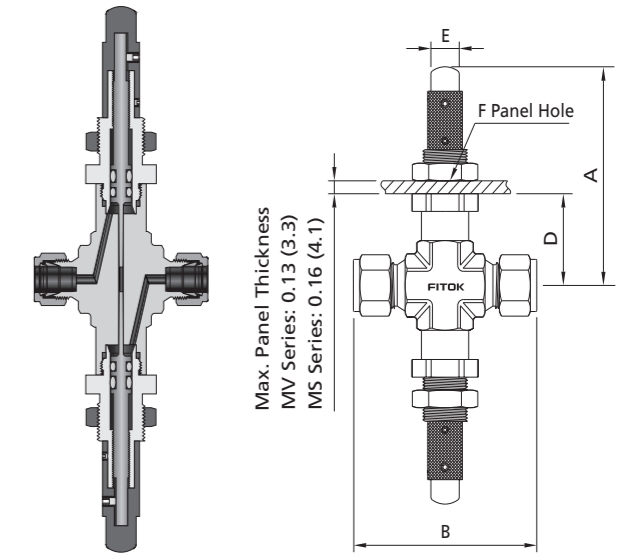


Optional Patterns

Cross Pattern



Double Pattern

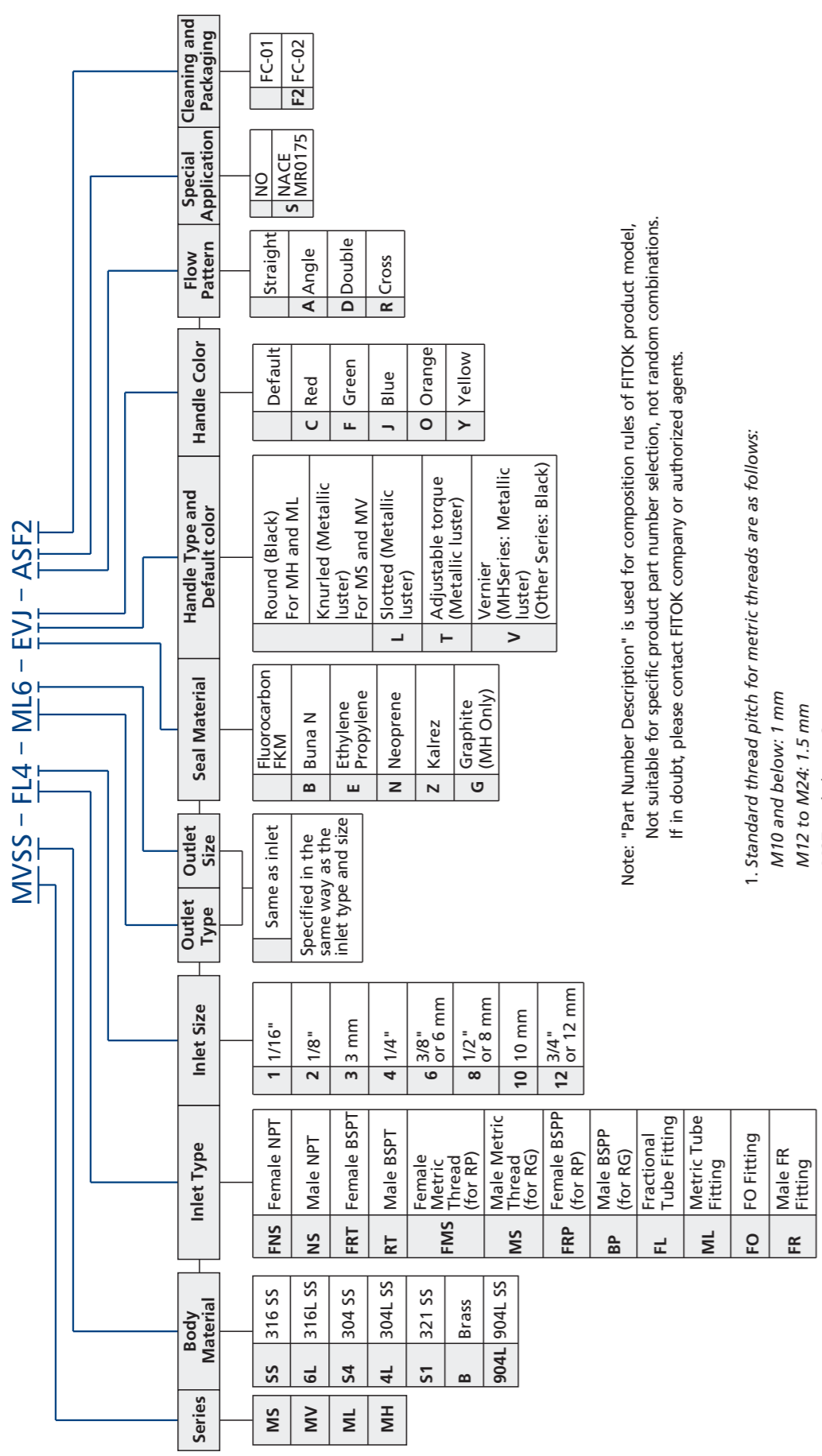


- Fluid flows between side ports around stem in any stem position.
- Fluid flows through branch port can be metered in both directions.

Inlet valve handle can be set and locked at desired maximum flow, outlet valve handle can be used for fine flow control up to the preset maximum of the inlet valve.

Basic Ordering Number	Connection Type and Size		Dimension, in. (mm)					
	Inlet	Outlet	A	B	C	D	E	F
Cross Pattern								
MS□□-FL2-	1/8" FITOK	1/8" FITOK	3.32 (84.3)	1.96 (49.8)	0.98 (24.9)	0.92 (23.4)	0.38 (9.6)	0.45 (11.4)
MS□□-ML3-	3 mm FITOK	3 mm FITOK			0.99 (25.1)			
Double Pattern								
MS□□-FL2-	1/8" FITOK	1/8" FITOK	2.34 (59.4)	1.90 (48.3)	—	0.92 (23.4)	0.38 (9.6)	0.45 (11.4)
MS□□-ML3-	3 mm FITOK	3 mm FITOK						
Cross Pattern								
MV□□-FL4-	1/4" FITOK	1/4" FITOK	3.39 (86.1)	2.20 (55.9)	1.10 (27.9)	1.07 (27.2)	0.50 (12.7)	0.58 (14.7)
MV□□-ML6-	6 mm FITOK	6 mm FITOK						
Double Pattern								
MV□□-FL4-	1/4" FITOK	1/4" FITOK	2.78 (70.6)	2.20 (55.9)	—	1.56 (39.6)	0.50 (12.7)	0.58 (14.7)
MV□□-ML6-	6 mm FITOK	6 mm FITOK						

- FITOK means FITOK double ferrule tube fittings, FR means metal gasket seal fittings.
- Sizes and types listed are standard. Other sizes and types are available upon request. For special sizes and types, refer to the ordering information.
- Dimensions are shown with FITOK nuts finger-tightened. All dimensions are for reference only and are subject to change. For dimensions not shown above, please contact the authorized representative or FITOK Group.



Note: "Part Number Description" is used for composition rules of FITOK product model, Not suitable for specific product part number selection, not random combinations. If in doubt, please contact FITOK company or authorized agents.

- Standard thread pitch for metric threads are as follows:
 M10 and below: 1 mm
 M12 to M24: 1.5 mm
 M27 and above: 2 mm
 Standard thread pitch should be ignored in the ordering number, others should be specified.
- Cleaning and Packaging:
 FC-01: Standard cleaning and packaging for general industrial procedures.
 FC-02: Special cleaning and packaging for wetted system components to ensure compliance with product cleaning requirement as stated in ASTM G93 Level C.