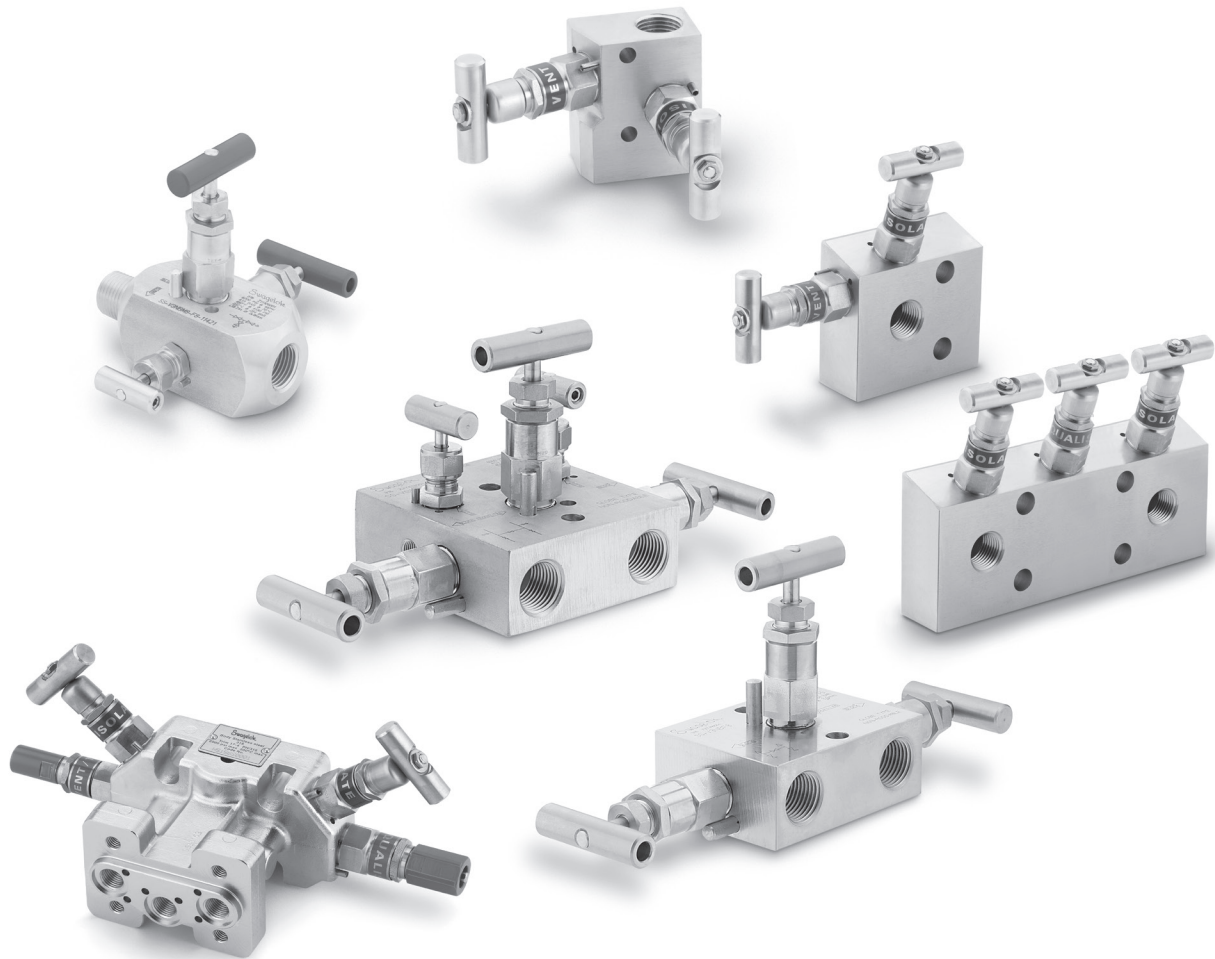


Instrument Manifold Systems



Instrument, Direct, and Remote-Mount Manifolds and Modular Systems

- V, VB, and VL series 2-, 3-, and 5-valve instrument manifolds
- VE series 2-, 3-, and 5-valve direct-mount manifolds
- 2-valve remote-mount manifolds
- Mod 85 modular instrumentation systems
- Low Emissions certification per API 624 available for direct- and remote-mount manifolds and Mod 85 systems

Contents

V, VB, and VL Series Instrument Manifolds

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Instrument Manifold Systems Accessories

V, VB, and VL Series Instrument Manifolds

Manifold Features

Swagelok offers a variety of 2-, 3-, and 5-valve instrument manifolds. The 2-valve manifolds are designed for static pressure and liquid level applications; the 3- and 5-valve manifolds are designed for differential pressure applications.

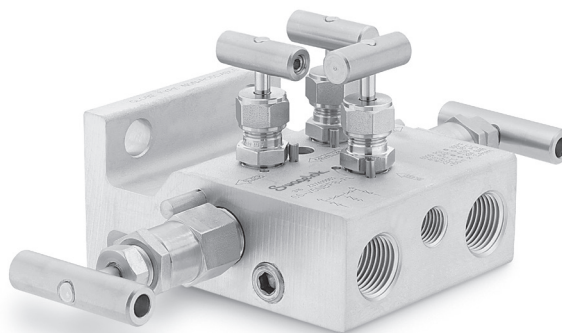
These manifolds are available in traditional and compact body designs. Manifold connections include female Swagelok® tube fittings, pipe ends (NPT and ISO 228/1), and flanges (MSS SP-99) in 1/2 and 3/4 in. and 12 mm sizes.

Body Design

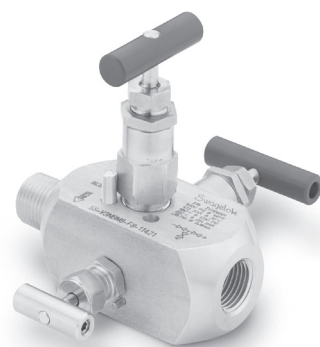
- All 316 stainless steel.
- One-piece construction provides strength.
- Designed with 4:1 design factor.

Bonnet-to-Body Seal

- Metal-to-metal seal eliminates the need for O-ring seals.



Traditional Body



Compact Body

Safety Stop Pin

- 316 stainless steel pin prevents detachment of the bonnet from the body due to vibration.
- Design is vibration tested to MIL-STD 167-1, Sections 5.1.2.4.2 through 5.1.2.4.6.

Internal Finish

- Burr-free threads and internal surfaces reduce leaks, promoting accurate transmitter readings.

Flange Connections

- Flange design meets the requirements of MSS SP-99.
- Standard flange seal is a fluorocarbon FKM O-ring.
- Flange seals and flange bolts are included with manifold.

Mounting Options

- 2 1/8 in. (54 mm) port center lines for direct instrument mounting with flange connections.
- Remote mounting with female Swagelok tube fitting and NPT connections.

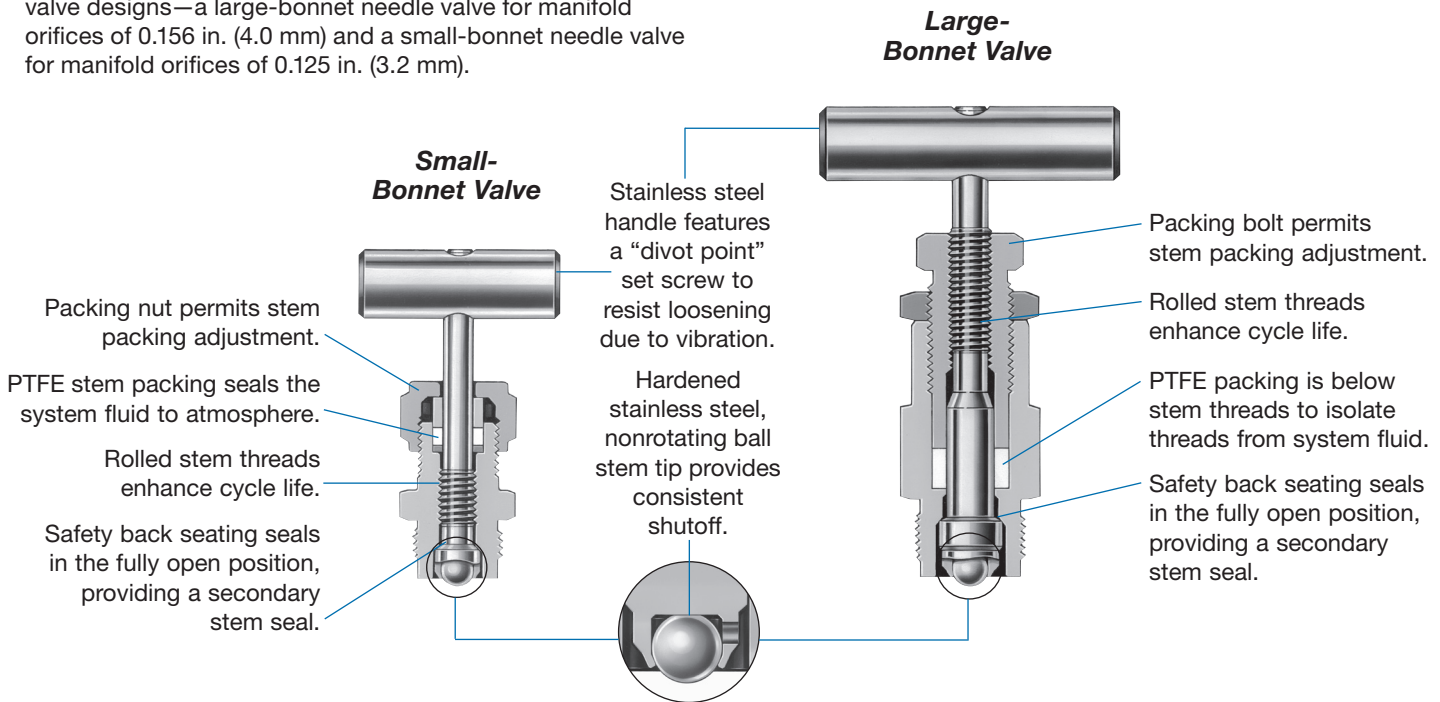
- ⚠ A packing adjustment may be required periodically to increase service life and to prevent leakage.
- ⚠ Valves that have not been cycled for a period of time may have a higher initial actuation torque.
- ⚠ To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.

Valve Features

The flow through a Swagelok manifold is controlled by a series of stainless steel needle valves. Each valve has a specific function—to block pressure, to bleed off pressure, or to equalize pressure—depending on its location on the manifold.

The control of all these functions is shared by two needle valve designs—a large-bonnet needle valve for manifold orifices of 0.156 in. (4.0 mm) and a small-bonnet needle valve for manifold orifices of 0.125 in. (3.2 mm).

On both designs, the stem packing is externally adjustable in the open position. PTFE is the standard packing material; optional Grafoil packing is available for high-temperature applications.



Technical Data

Traditional Body Manifolds

Orifice Size (isolation valve)	0.125 in. (3.2 mm) for all 2-valve V series
	0.156 in. (4.0 mm) for all others
Weight	2-valve: 2.0 to 3.5 lb (0.9 to 1.6 kg)
	3-valve: 3.2 to 6.4 lb (1.5 to 2.9 kg)
	5-valve: 6.0 to 8.0 lb (2.7 to 3.6 kg)

Compact Body Manifolds

Orifice Size	Vent valves—0.125 in. (3.2 mm)
	Isolation valves—0.156 in. (4.0 mm)
Weight	Block and bleed valves— 2.75 to 3.00 lb (1.25 to 1.36 kg)
	Double block and bleed valves— 3.10 to 3.35 lb (1.41 to 1.52 kg)

Pressure-Temperature Ratings^①

ASME Class	2500
Material Group	2.2
Material Name	316 SS
Temperature °F (°C)	Working Pressure psig (bar)
-65 (-53) to 100 (37)	200 (93)
	250 (121)
	300 (148)
	350 (176)
	400 (204)
	450 (232)
500 (260)	550 (287)
	600 (315)
	650 (343)
	700 (371)
	750 (398)
800 (426)	850 (454)
	900 (482)
	950 (510)
	1000 (537)
1050 (565)	1100 (593)
	1150 (621)
	1200 (648)
	1250 (676)
	1300 (704)

① Ratings based on optional Grafoil packing. Ratings limited to:

- -20 to 450°F (-28 to 232°C) with standard fluorocarbon FKM flange seals.
- 450°F (232°C) with standard PTFE packing.
- 1000°F (537°C) with Grafoil packing and MSS flange end connection.

V and VL Series 2-Valve Manifolds

Materials of Construction

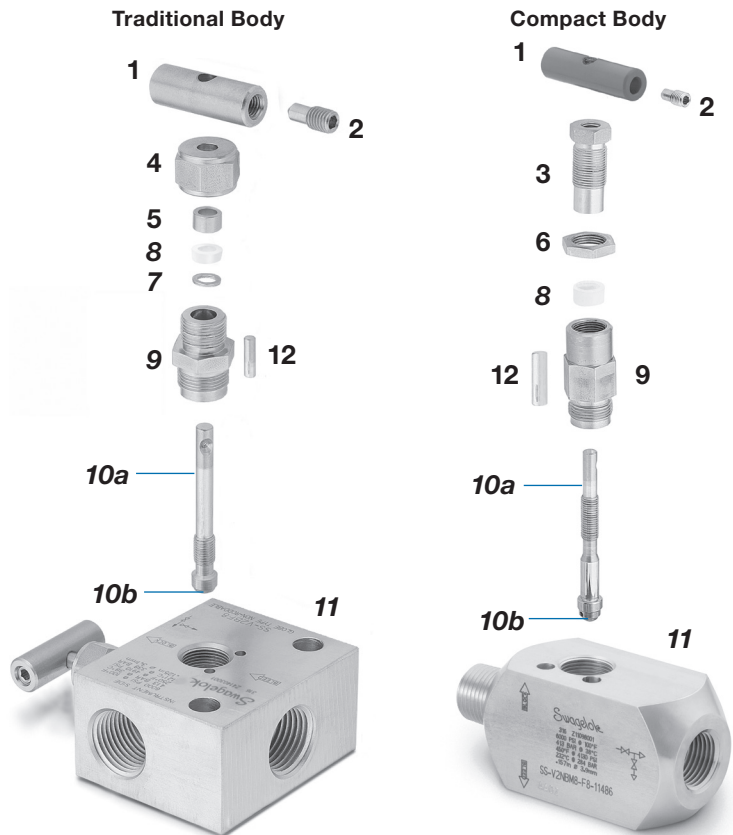
Materials for pressure-containing wetted parts are in compliance with ASME B31.1.

Component	Material Grade/ ASTM Specification
1 Handle ^①	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Packing nut	
5 Upper gland	
6 Jam nut	316 SS/A276
7 Lower gland	316 SS/A240 or A167
8 Packing	PTFE/D1710
9 Bonnet	316 SS/A479
10a Stem	316 SS/A276
10b Ball tip	316 SS/A479
11 Body	
12 Stop pin	316 SS/A479
Flange seals (not shown)	Fluorocarbon FKM
Flange bolts (not shown)	B8M CL.2B/A193
Lubricants	Fluorinated base with PTFE and tungsten disulfide
	Hydrocarbon-based

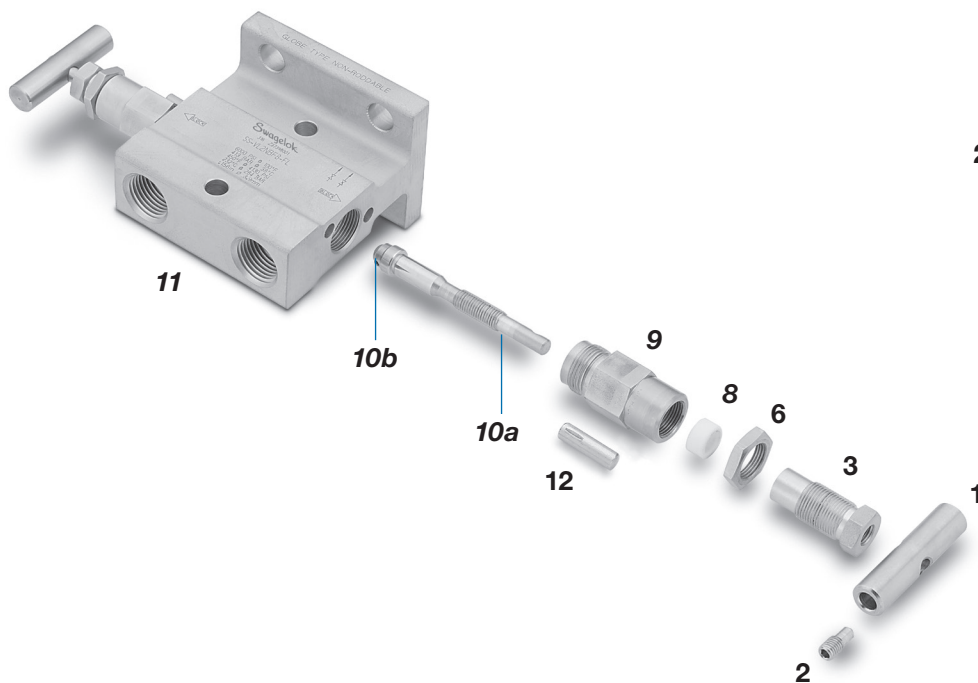
Wetted components listed in *italics*.

① Isolation valve handles of compact models are blue enamel coated.

V Series

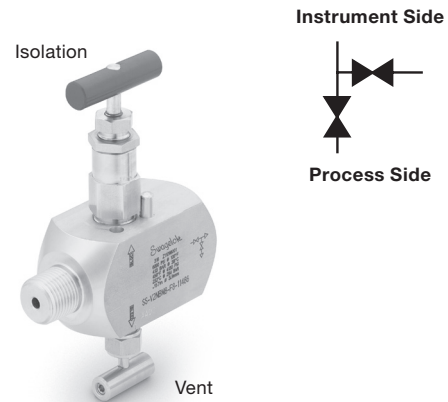
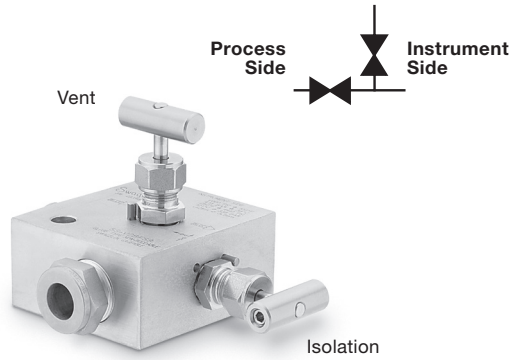


VL Series



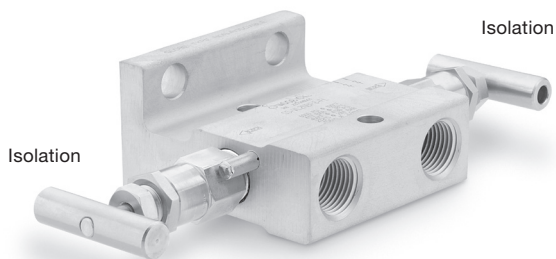
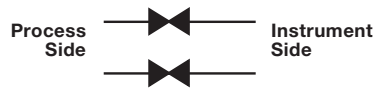
V and VL Series 2-Valve Manifolds

V Series



- Allows for block and bleed (or calibration) of a gauge- or absolute-pressure transmitter or gauge
- Consists of one isolation valve and one vent valve
- End connections—1/2 in. and 12 mm female Swagelok® tube fitting; 1/2 in. female pipe (NPT); flange (MSS)
- Direct instrument mount and remote mount

VL Series



- Designed for liquid level applications
- Consists of two isolation valves operating in parallel to shut off either one of the two process lines through the manifold
- No equalizing passage through the manifold
- End connections—1/2 in. female pipe (NPT) to flange
- Direct instrument mount

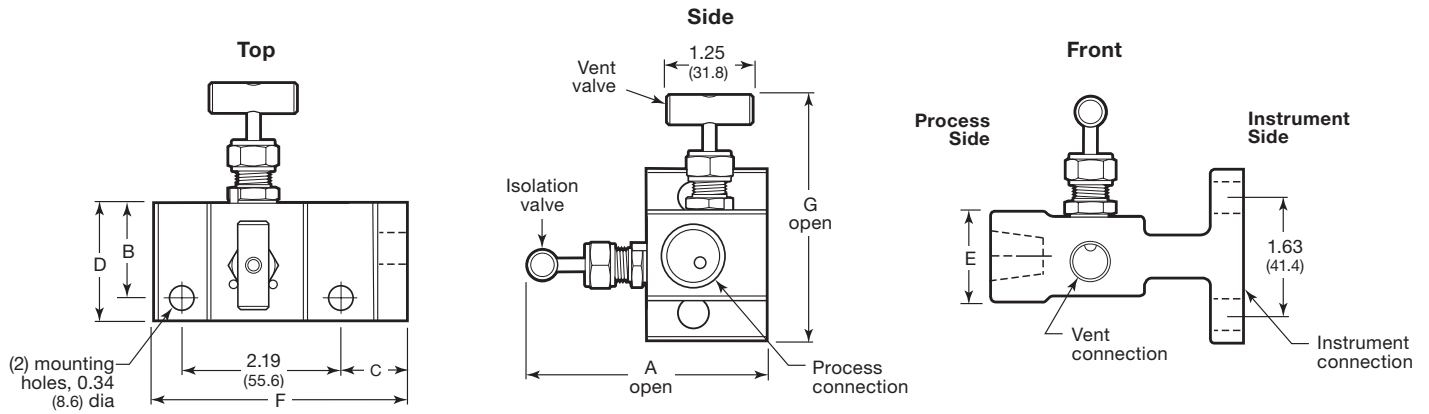
V and VL Series 2-Valve Manifolds

Ordering Information and Dimensions

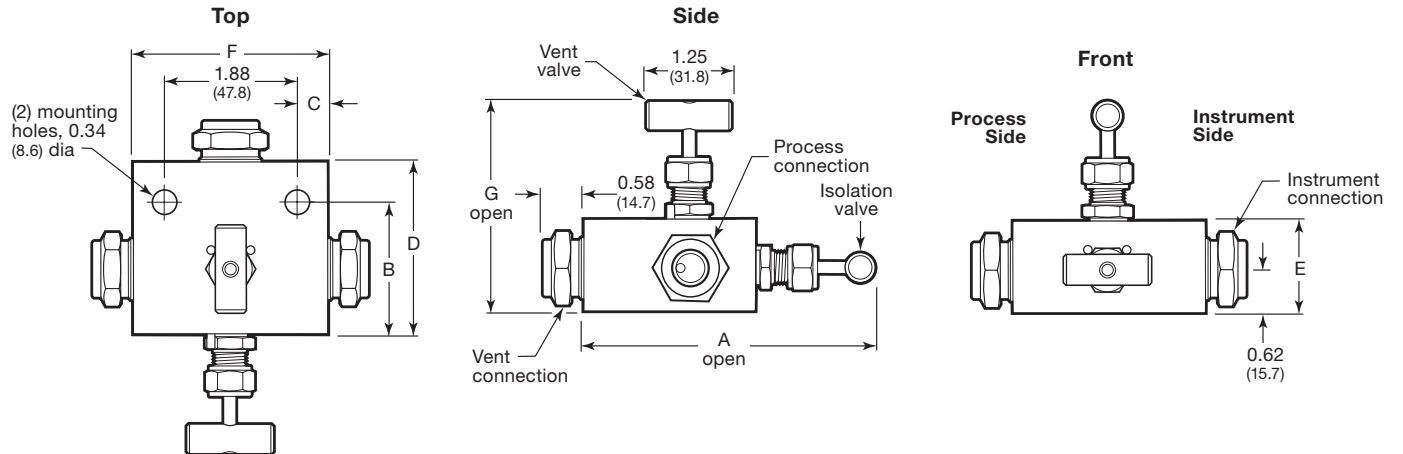
Dimensions, in inches (millimeters), are for reference only and are subject to change.

V Series

Instrument Manifolds with Flange Connections



Manifolds with Female Swagelok Tube Fitting and Pipe Connections



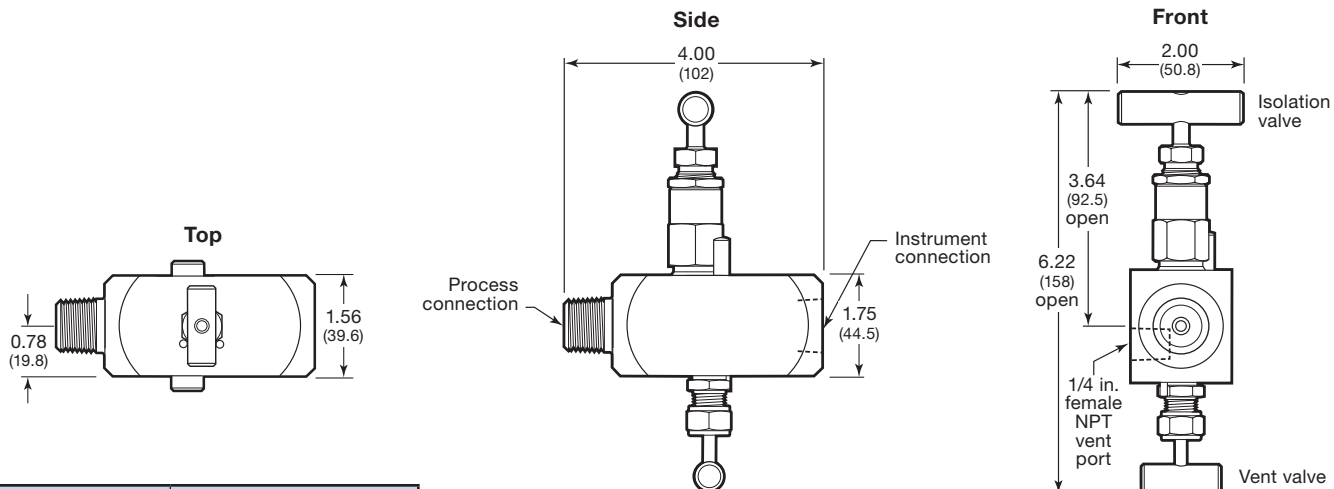
End Connections			Ordering Number	Dimensions, in. (mm)						
Process	Instrument	Vent		A	B	C	D	E	F	G
1/2 in. female Swagelok tube fitting			SS-V2BFS8	4.19 (106)	1.89 (48.0)	0.44 (11.2)	2.48 (63.0)	1.31 (33.3)	2.75 (69.9)	3.05 (77.5)
1/2 in. female Swagelok tube fitting	Flange (MSS)	1/4 in. female NPT	SS-V2BFS8-FL	3.36 (85.3)	1.31 (33.3)	0.90 (22.9)	1.63 (41.4)	1.25 (31.8)	3.46 (87.9)	3.48 (88.4)
12 mm female Swagelok tube fitting			SS-V2BFS12MM	4.19 (106)	1.89 (48.0)	0.44 (11.2)	2.48 (63.0)	1.31 (33.3)	2.75 (69.9)	3.05 (77.5)
12 mm female Swagelok tube fitting	Flange (MSS)	1/4 in. female NPT	SS-V2BFS12MM-FL	3.36 (85.3)	1.31 (33.3)	0.90 (22.9)	1.63 (41.4)	1.25 (31.8)	3.46 (87.9)	3.48 (88.4)
1/2 in. female NPT			SS-V2BF8	3.82 (97.0)	1.62 (41.1)	0.31 (7.9)	2.12 (53.8)	1.31 (33.3)	2.50 (63.5)	3.05 (77.5)
1/2 in. female NPT	Flange (MSS)	1/4 in. female NPT	SS-V2BF8-FL	3.36 (85.3)	1.31 (33.3)	0.90 (22.9)	1.63 (41.4)	1.25 (31.8)	3.48 (88.4)	3.48 (88.4)

V and VL Series 2-Valve Manifolds

Ordering Information and Dimensions

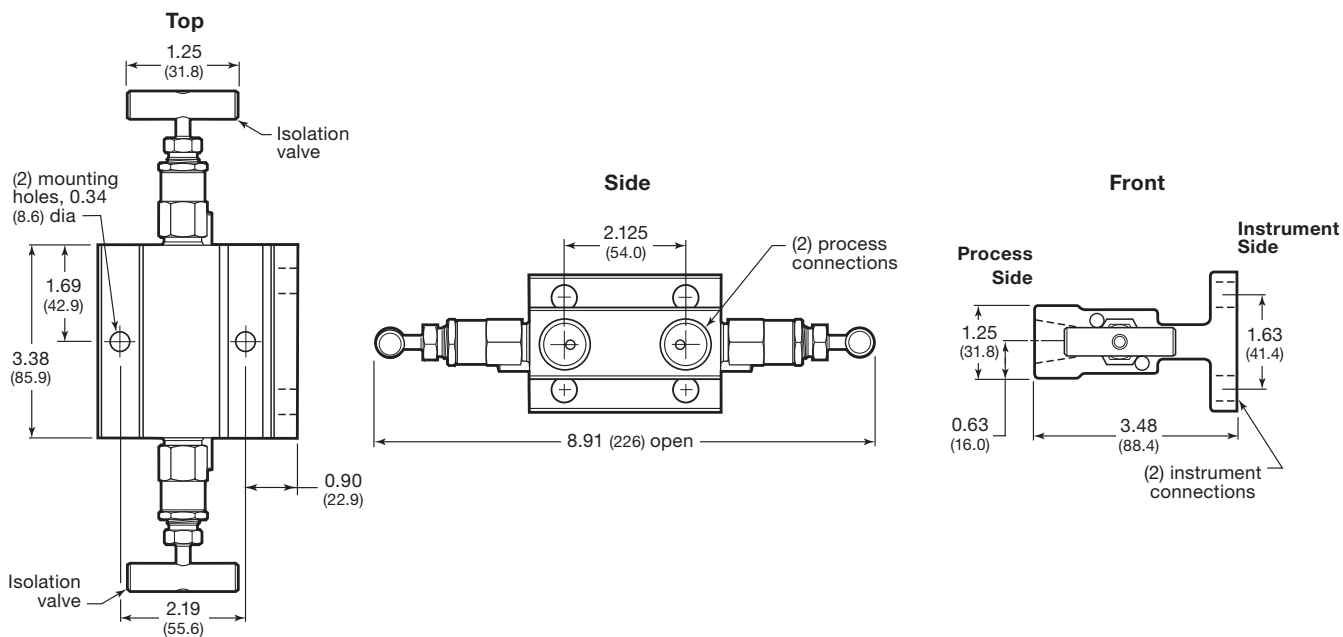
Dimensions, in inches (millimeters), are for reference only and are subject to change.

V Series



Inlet End Connection	Ordering Number
1/2 in. male NPT	SS-V2NBM8-F8-11486
3/4 in. male NPT	SS-V2NBM12-F8-11486

VL Series



End Connections		Ordering Number
Process	Instrument	
1/2 in. female NPT	Flange (MSS)	SS-VL2NBF8-FL

V Series 3-Valve Manifolds

Materials of Construction

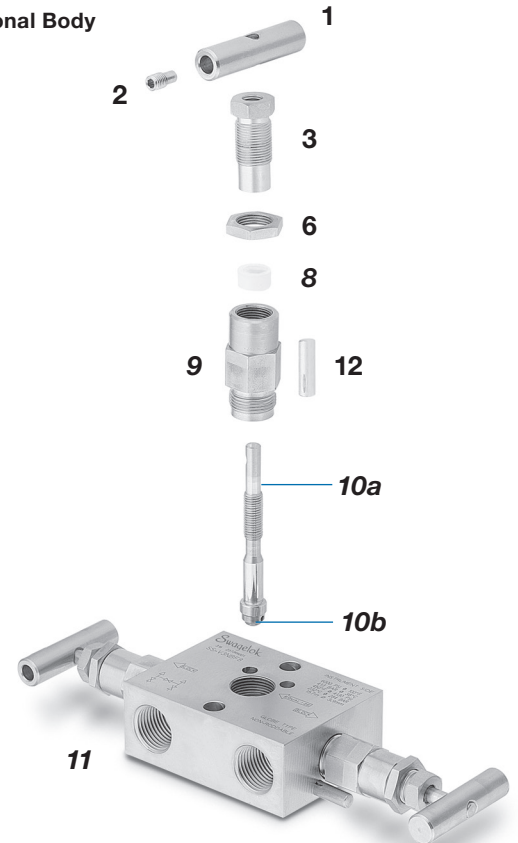
Materials for pressure-containing wetted parts are in compliance with ASME B31.1.

Component	Material Grade/ ASTM Specification
1 Handle ^①	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Packing nut	
5 Upper gland	
6 Jam nut	316 SS/A276
7 Lower gland	316 SS/A240 or A167
8 Packing	PTFE/D1710
9 Bonnet	316 SS/A479
10a Stem	316 SS/A276
10b Ball tip	316 SS/A479
11 Body	
12 Stop pin	316 SS/A479
Flange seals (not shown)	Fluorocarbon FKM
Flange bolts (not shown)	B8M CL.2B/A193
Lubricants	Fluorinated base with PTFE and tungsten disulfide
	Hydrocarbon-based

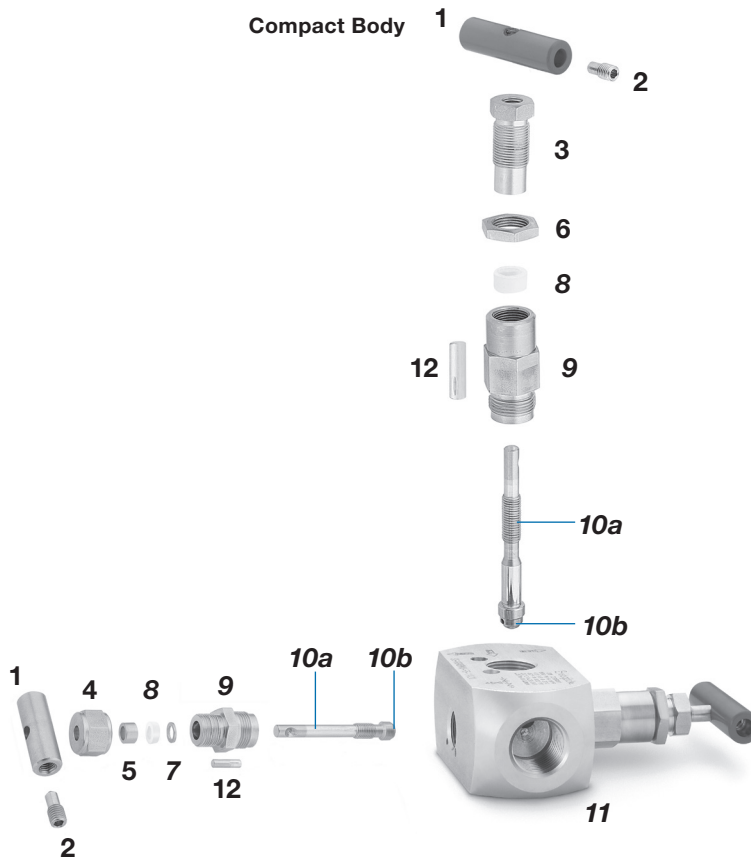
Wetted components listed in *italics*.

① Isolation valve handles of compact models are blue enamel coated.

Traditional Body



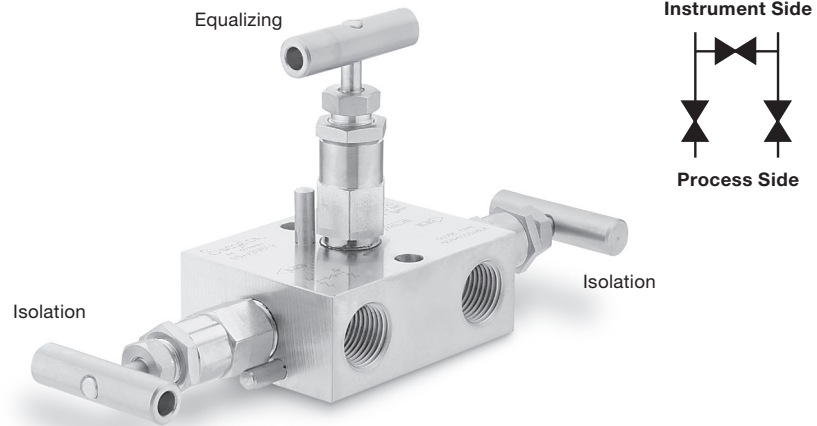
Compact Body



V Series 3-Valve Manifolds

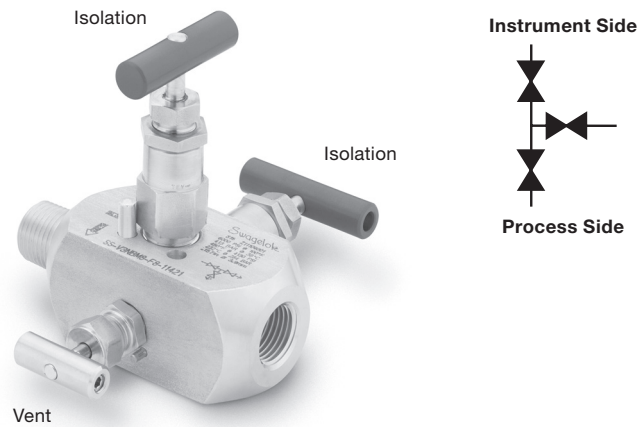
Traditional Body

- Designed for mounting on differential pressure transmitters with 2 1/8 in. (54 mm) center-to-center connections
- Consists of two isolation valves and one equalizing valve
- End connections—1/2 in. and 12 mm female Swagelok tube fitting, 1/2 in. female pipe (NPT), and flange (MSS)
- Instrument flange mount and remote mount



Compact Body

- Allows for block and bleed (or calibration) of a gauge or absolute pressure transmitter or gauge
- Consists of two isolation valves and one vent valve
- End connections—1/2 in. female pipe (NPT)
- Direct instrument mount and remote mount

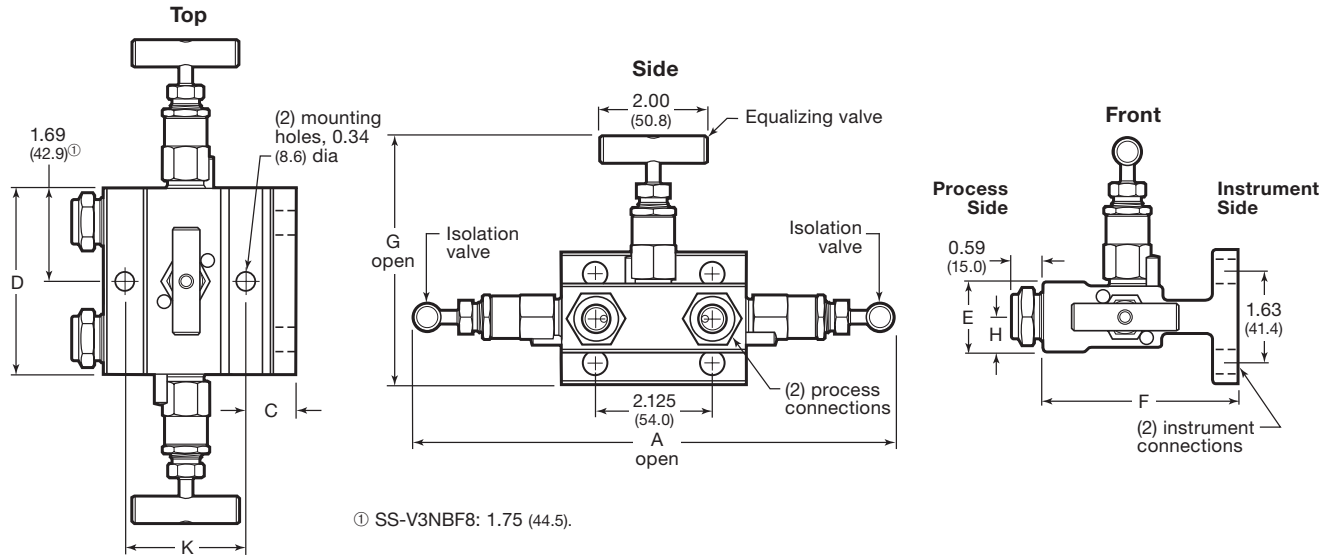


V Series 3-Valve Manifolds

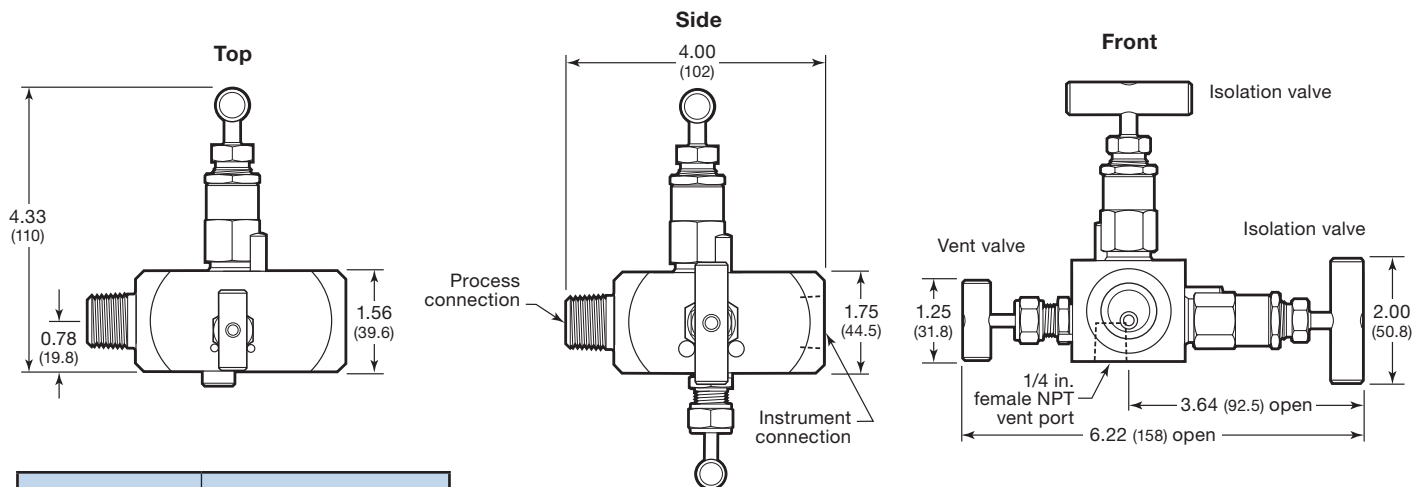
Ordering Information and Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

Manifold with Female Swagelok Tube Fitting-To-Flange Connections



End Connections		Ordering Number	Dimensions, in. (mm)							
Process	Instrument		A	C	D	E	F	G	H	K
1/2 in. female NPT		SS-V3NBF8	9.03 (229)	0.31 (7.9)	3.50 (88.9)	1.31 (33.3)	2.50 (63.5)	4.08 (104)	0.66 (16.8)	1.88 (47.8)
1/2 in. female NPT	Flange (MSS)	SS-V3NBF8-FL	8.91 (226)	0.90 (22.9)	3.38 (85.9)	1.25 (31.8)	3.48 (88.4)	4.51 (115)	0.63 (16.0)	2.19 (55.6)
1/2 in. female Swagelok tube fitting		SS-V3NBFS8		0.46 (11.7)		1.31 (33.3)	3.04 (77.2)	4.08 (104)	0.66 (16.8)	1.88 (47.8)
1/2 in. female Swagelok tube fitting	Flange (MSS)	SS-V3NBFS8-FL		0.90 (22.9)		1.25 (31.8)	3.48 (88.4)	4.51 (115)	0.63 (16.0)	2.19 (55.6)
12 mm female Swagelok tube fitting		SS-V3NBFS12MM		0.46 (11.7)		1.31 (33.3)	3.04 (77.2)	4.08 (104)	0.66 (16.8)	1.88 (47.8)
12 mm female Swagelok tube fitting	Flange (MSS)	SS-V3NBFS12MM-FL		0.90 (22.9)		1.25 (31.8)	3.48 (88.4)	4.51 (115)	0.63 (16.0)	2.19 (55.6)
Flange (MSS)		SS-V3NBFL		2.40 (61.0)		4.07 (103)	4.55 (116)	1.20 (30.5)	1.88 (47.8)	



Inlet End Connection	Ordering Number
1/2 in. male NPT	SS-V3NBM8-F8-11421
3/4 in. male NPT	SS-V3NBM12-F8-11421

V and VB Series 5-Valve Manifolds

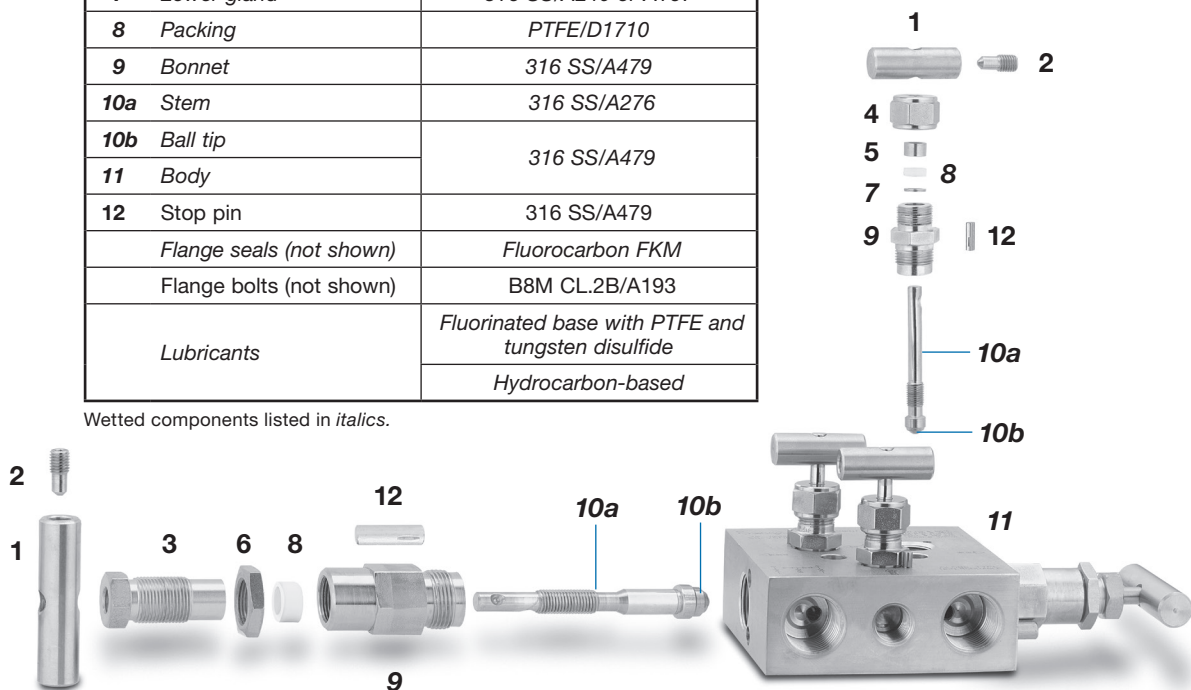
- 1/2 in. and 12 mm female Swagelok tube fittings, 1/2 in. female pipe (NPT), and flange (MSS) end connections
- Instrument flange mount and remote mount

Materials of Construction

Materials for pressure-containing wetted parts are in compliance with ASME B31.1.

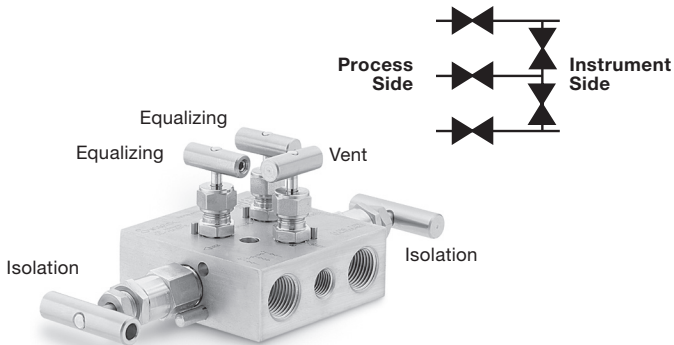
Component	Material Grade/ ASTM Specification
1 Handle	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Packing nut	
5 Upper gland	
6 Jam nut	316 SS/A276
7 Lower gland	316 SS/A240 or A167
8 Packing	PTFE/D1710
9 Bonnet	316 SS/A479
10a Stem	316 SS/A276
10b Ball tip	316 SS/A479
11 Body	
12 Stop pin	316 SS/A479
Flange seals (not shown)	Fluorocarbon FKM
Flange bolts (not shown)	B8M CL.2B/A193
Lubricants	Fluorinated base with PTFE and tungsten disulfide
	Hydrocarbon-based

Wetted components listed in italics.



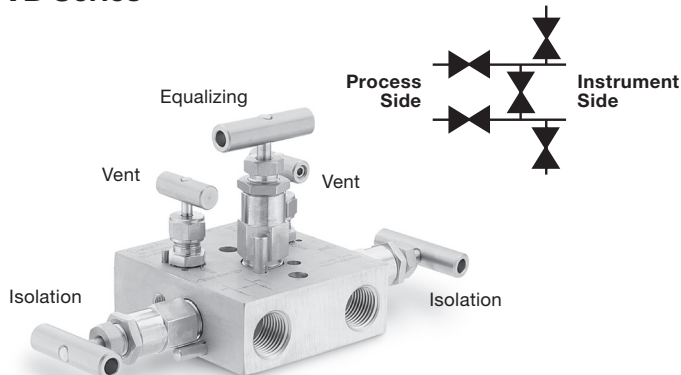
V series body shown.

V Series



- Designed for mounting on differential pressure transmitters where a double-equalize function is required
- Consists of two isolation valves, two equalizing valves, and one vent valve

VB Series



- Designed for mounting on differential pressure transmitters where a double-bleed function is required.
- Consists of two isolation valves, two vent valves, and one equalizing valve

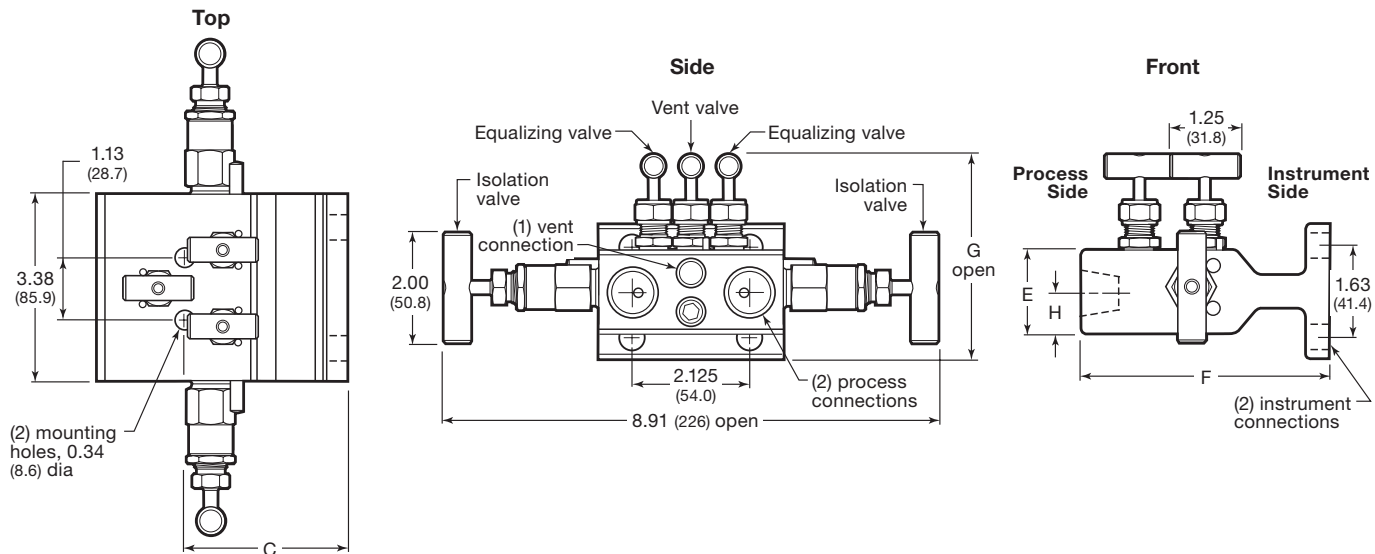
V and VB Series 5-Valve Manifolds

Ordering Information and Dimensions

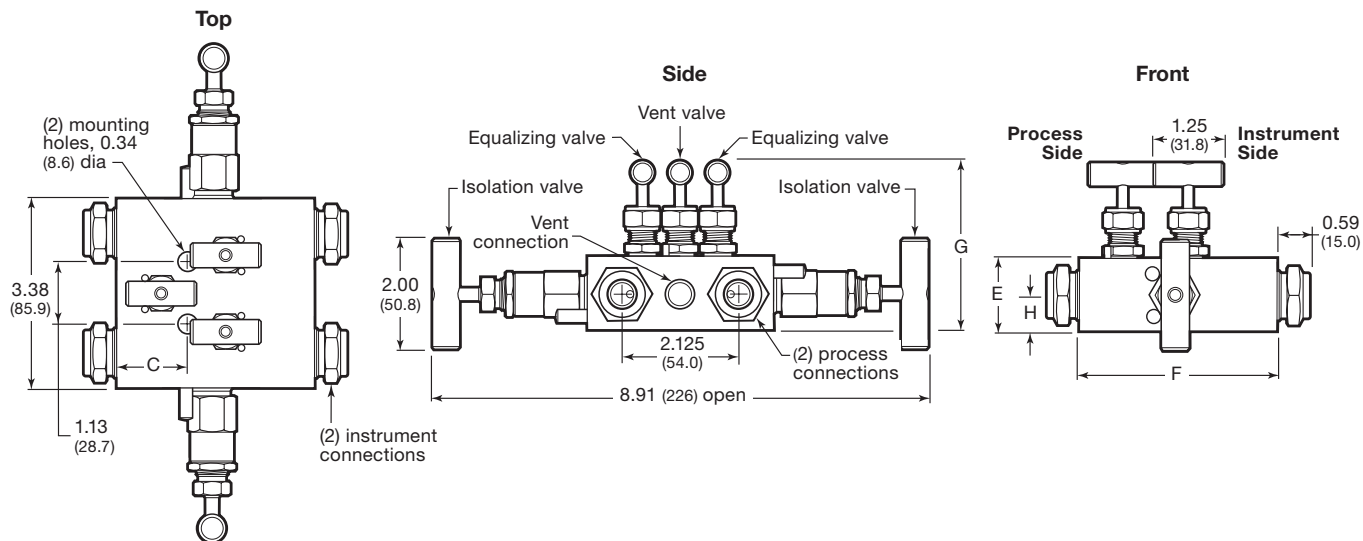
Dimensions, in inches (millimeters), are for reference only and are subject to change.

V Series

Direct Instrument Mount Manifolds with Flange Connections



Manifolds with Female Swagelok Tube Fitting and Pipe Connections



End Connections			Ordering Number	Dimensions, in. (mm)				
Process	Instrument	Vent		C	E	F	G	H
1/2 in. female Swagelok tube fitting		1/4 in. female NPT	SS-V5NBFS8	1.28 (32.5)	1.31 (33.3)	3.55 (90.2)	3.05 (77.5)	0.63 (16.0)
1/2 in. female Swagelok tube fitting	Flange (MSS)		SS-V5NBFS8-FL	2.88 (73.2)	1.49 (37.8)	4.43 (114)	3.64 (92.5)	0.75 (19.1)
12 mm female Swagelok tube fitting			SS-V5NBFS12MM	1.28 (32.5)	1.31 (33.3)	3.55 (90.2)	3.05 (77.5)	0.63 (16.0)
12 mm female Swagelok tube fitting	Flange (MSS)		SS-V5NBFS12MM-FL	2.88 (73.2)	1.49 (37.8)	4.43 (114)	3.64 (92.5)	0.75 (19.1)
1/2 in. female NPT			SS-V5NBF8	1.42 (36.0)	1.31 (33.3)	3.62 (91.9)	3.05 (77.5)	0.63 (16.0)
1/2 in. female NPT	Flange (MSS)		SS-V5NBF8-FL	2.88 (73.2)	1.49 (37.8)	4.47 (114)	3.66 (93.0)	0.75 (19.1)
Flange (MSS)		1/8 in. female NPT	SS-V5NBFL	2.98 (75.7)	1.50 (38.1)	5.00 (127)		—

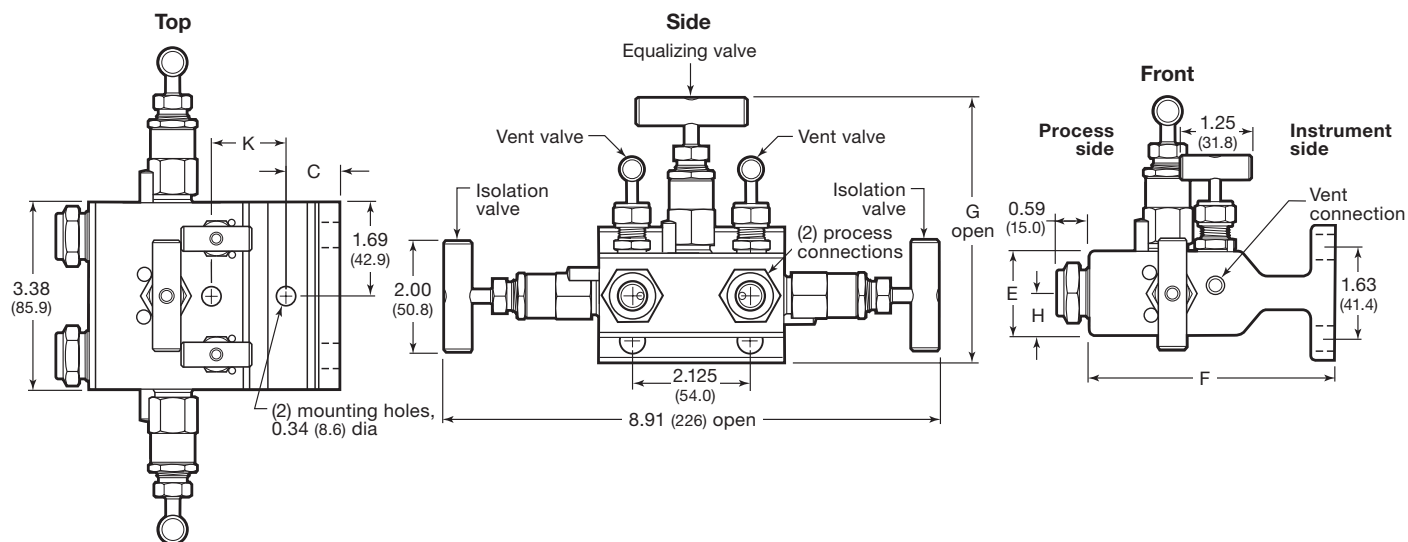
V and VB Series 5-Valve Manifolds

Ordering Information and Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

VB Series

Manifold With Female Swagelok Tube Fitting-To-Flange Connections



End Connections			Ordering Number	Dimensions, in. (mm)					
Process	Instrument	Vent		C	E	F	G	H	K
1/2 in. female NPT		1/8 in. female NPT	SS-VB5NBF8	1.22 (31.0)	1.31 (33.3)	3.62 (91.9)	4.10 (104)	0.61 (15.5)	1.88 (47.8)
1/2 in. female NPT	Flange (MSS)		SS-VB5NBF8-FL	0.94 (23.9)	1.49 (37.8)	4.47 (114)	4.76 (121)	0.75 (19.1)	1.35 (34.3)
1/2 in. female Swagelok tube fitting			SS-VB5NBFS8	1.22 (31.0)	1.31 (33.3)	3.65 (92.7)	4.10 (104)	0.61 (15.5)	1.88 (47.8)
1/2 in. female Swagelok tube fitting	Flange (MSS)		SS-VB5NBFS8-FL	0.94 (23.9)	1.49 (37.8)	4.43 (113)	4.76 (121)	0.75 (19.1)	1.35 (34.3)

Testing

Every Swagelok V, VB, and VL series instrument manifold is factory tested with nitrogen at 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm³/min.

Shell testing is performed with a liquid leak detector to a requirement of no detectable leakage.

Cleaning and Packaging

Every Swagelok V, VB, and VL series instrument manifold is cleaned and packaged in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)* catalog, [MS-06-62](#).

Options

High-Temperature Packing

- Grafoil valve packing material for high-temperature service. See **Pressure-Temperature Ratings**, page 3.
- Includes Grafoil flange seals on MSS flanges.

To order a manifold with optional Grafoil packing, add **-G** to the manifold ordering number.

Example: SS-V3NBF8-FL-G

Flange Seal Materials

- MSS flange seals are available in Grafoil, virgin PTFE, and reinforced PTFE for system compatibility.
- Temperature ratings are included in the table below.

To order a manifold with an optional MSS flange seal material, add a material designator to the manifold ordering number.

Example: SS-V3NBF8-FL-T

MSS Flange Seal Material	Material Designator	Lubricant/Sealant	Temperature Rating °F (°C)	Packing Material
Fluorocarbon FKM	—	Silicone base	-20 to 450 (-28 to 232)	PTFE
Grafoil	-G	Fluorinated base	-65 to 1000 (-53 to 537)	Grafoil
Virgin PTFE	-T	Silicone base	-65 to 250 (-53 to 121)	PTFE
Reinforced PTFE	-TRL			PTFE

Mounting Kits

Mounting Bracket Kit

Kit contains stainless steel bracket, U-bolts, cap screws, nuts, lock washers, spacer, and instructions. Kit does not fit 3-valve manifolds with flange-to-flange end connections.

Ordering number: **SS-MB-VBK**



Steam-Trace Block Kits

Kit contains plated steel trace block with two 1/4 in. female NPT ports, cap screws, nuts, lock washers, block retainer plate, heat transfer gasket, and instructions.



Manifold Styles	Kit Ordering Number
3-valve, flange	S-MB-M3SK
3-valve, pipe-to-pipe	S-MB-M5SK
3-valve, tube-to-tube	
5-valve, all styles	

MSS Flange Fasteners

- Optional long studs or short bolts are available for special flange mounting applications. See table below for flange fastener length comparison.
- All fasteners are stainless steel with 7/16-20 threads.
- Optional fasteners are available for all V, VB, and VL series manifolds with MSS flanges.

To order a manifold with optional flange fasteners, add a fastener designator to the manifold ordering number.

MSS Flange Fasteners	Length in. (mm)	Hex Size in.	Fastener Designator
Standard hex head bolt	1.0 (25.4)	5/8	—
Long stud with hex nut	2.6 (66.0)	11/16	-LGB
Short hex head bolt	0.875 (22.2)	5/8	-SHB

Example: SS-V3NBF8-FL-LGB

Mounting Hole Center Line

- Elongated mounting holes on the instrument flange allow for center line installations between 2 1/8 and 2 1/4 in. (54.0 and 57.2 mm).
- Available on 3- and 5-valve V and VB series manifolds with MSS flanges.
- Pressure rating is 3600 psig at 100°F (248 bar at 37°C) and 2480 psig at 450°F (170 bar at 232°C).

To order, add **-EH** to the manifold ordering number.

Example: SS-V5NBF8-FL-EH

Hydrostatic Testing

Hydrostatic testing is available as an option.

To order, add **-W20** to the manifold ordering number.

Example: SS-V2BF8-W20

Maintenance Kits

Flange Seal and Bolt Kits

- Kit contains flange seals, flange bolts, lubricant, and instructions.
- Select a kit ordering number from the tables below based on the manifold series, flange style, and seal material.



V, VB, and VL Series with MSS Flanges

Flange Seal Material	Kit Ordering Number	
	2-Valve	3- and 5-Valve
Fluorocarbon FKM	SS-MK-V2V	SS-MK-V3V
Grafoil	SS-MK-V2G	SS-MK-V3G
Virgin PTFE	SS-MK-V2T	SS-MK-V3T
Reinforced PTFE	SS-MK-V2R	SS-MK-V3R

Direct- and Remote-Mount Manifolds

VE and MSBG Series Manifolds

Features

- Compact design
- Stainless steel stop pin
- Color-coded valve label rings
- Graphite packing and seals available
- Material traceability available; contact your authorized Swagelok sales and service representative.
- Low Emissions certification per API 624 available

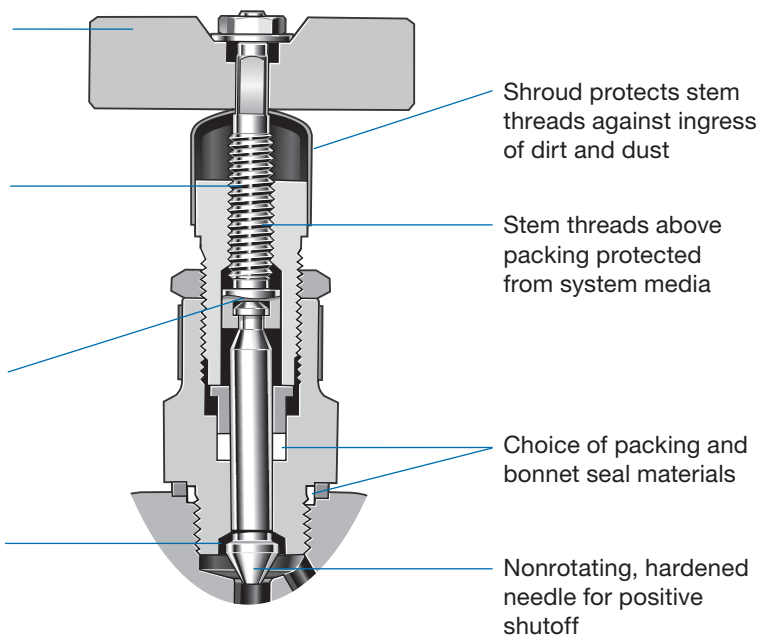
Valve

Stainless steel handle with square drive stem and lock nut to ensure positive actuation

Stem threads are cold rolled for high strength and smooth operation

Two-piece knuckle joint enables nonrotating needle; joint is above packing, protected from system media

Safety back-seating needle seals in fully open position



Materials of Construction

Component	Grade/ASTM Specification
<i>Body, bonnets</i>	316/316L SS/A479
<i>Needles</i>	S17400 SS/A564 Condition H1150D
<i>Packing, bonnet seals</i>	PTFE ^① or graphite
<i>Lubricant</i>	Molybdenum disulfide in hydrocarbon carrier
Gland lock nuts	300 series powdered metal SS
All other components	316 SS

Wetted components listed in *italics*.

① Optional Low Emissions configuration supplied with Carbon/glass-filled PTFE.

Pressure-Temperature Ratings

Orifice Size in. (mm)	PTFE Seals		Graphite Seals	
	Temperature °F (°C)	Working Pressure psig (bar)	Temperature °F (°C)	Working Pressure psig (bar)
0.197 (5)	-58 (-50) to 200 (93)	6000 (413)	-58 (-50) to 200 (93)	6000 (413)
	201 (94) to 400 (204)	4000 (275)	201 (94) to 850 (454)	3000 (206)

Low Fugitive Emissions

The American Petroleum Institute's API 624 tests for fugitive emissions to atmosphere for direct- and remote-mount manifolds, see page 19 and 20 for ordering information. The tests are conducted at a third party lab and certify that at no point in the test did the valve leak in excess of 100 ppm of methane. Certificates stating that the manifold is certified for Low Emissions service are available. For more information, contact your authorized Swagelok sales and service representative.

- ⚠ **A packing adjustment may be required periodically to increase service life and to prevent leakage.**
- ⚠ **Valves that have not been cycled for a period of time may have a higher initial actuation torque.**
- ⚠ **To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

VE Series Direct-Mount Manifolds

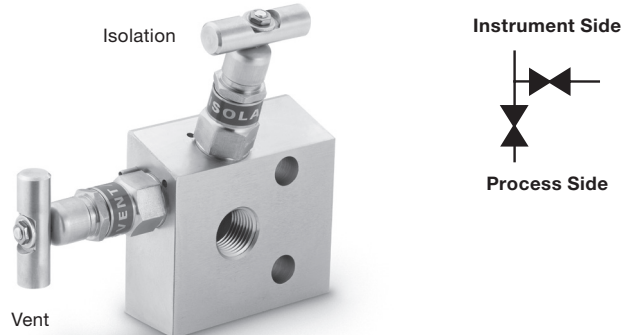
Features

VE series manifolds mount directly to pressure and differential pressure transmitters

- MSS SP-99 and DIN EN 61518 flange connections are available
- High-tensile steel instrument bolt and PTFE seal kit are included with each manifold
- Mounting bracket kits are available

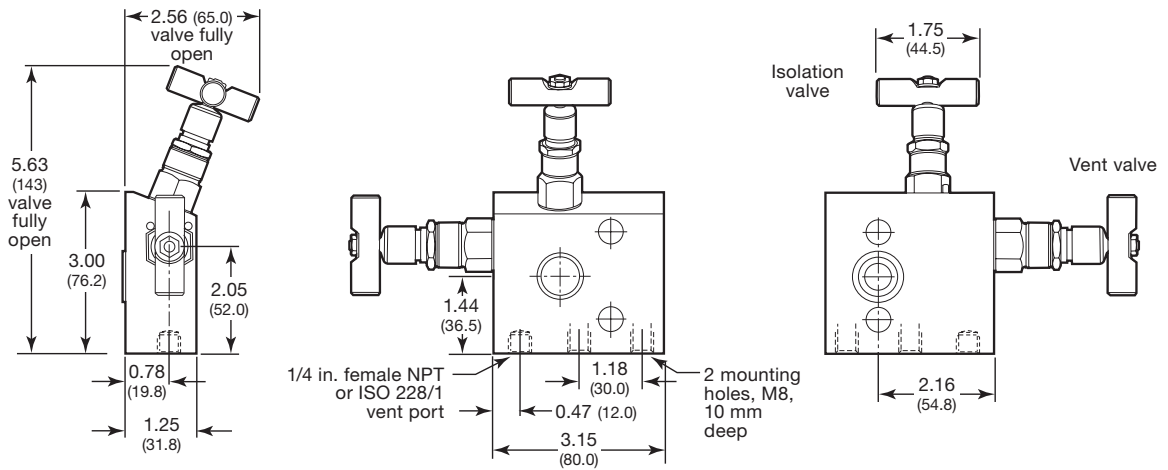
2-Valve Manifold

- Direct mounting to gauges, pressure switches, or absolute pressure transmitters
- Vent port
 - female NPT with NPT process connection
 - female ISO 228/1 with ISO 228/1 process connection



Dimensions

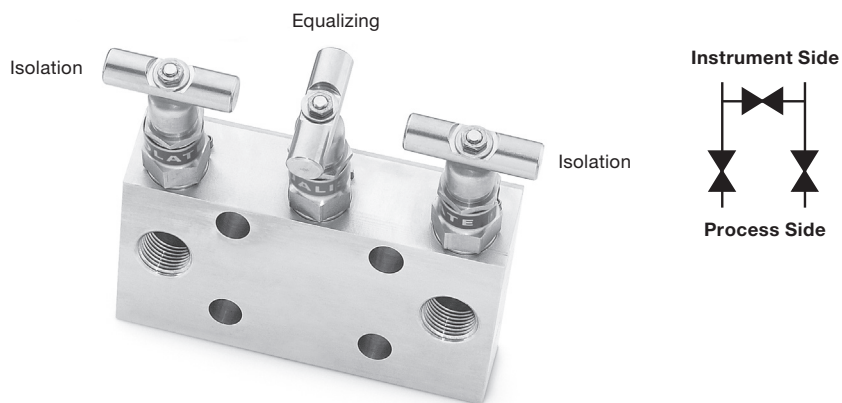
Dimensions, in inches (millimeters), are for reference only and are subject to change.



VE Series Direct-Mount Manifolds

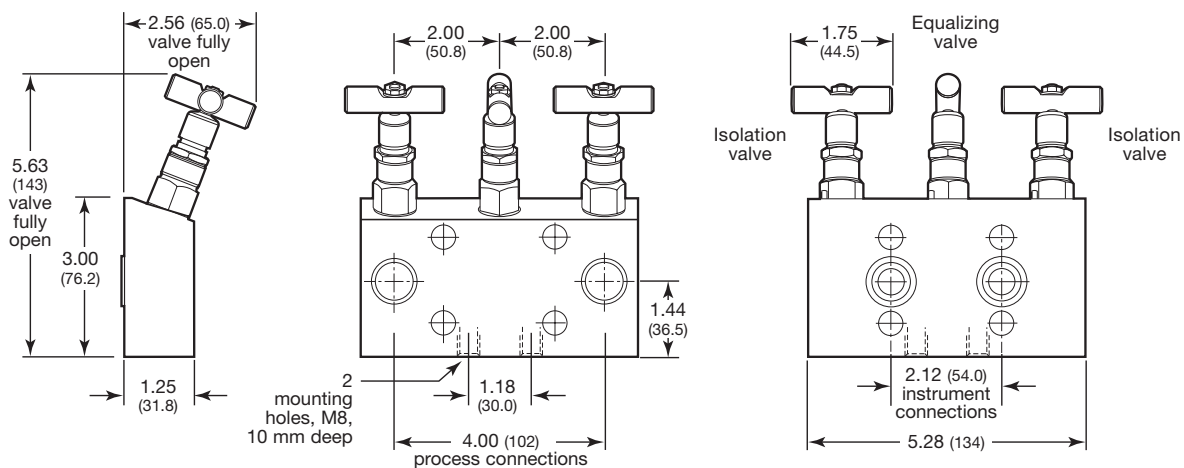
3-Valve Manifold

- Direct mounting to instrument on 2.12 in. (54.0 mm) centers



Dimensions

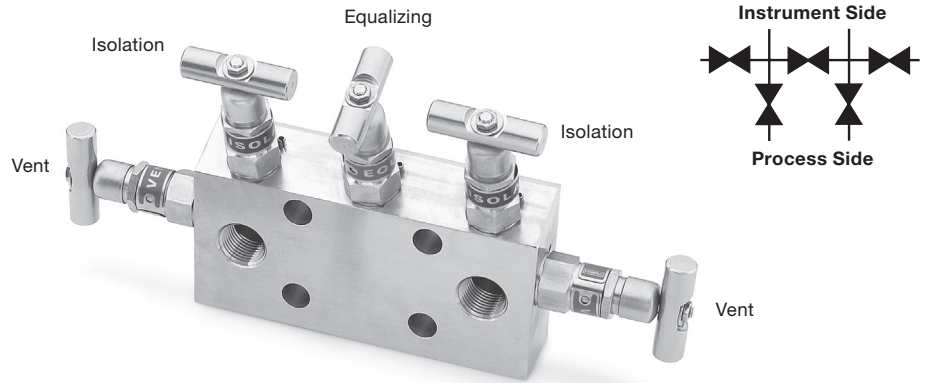
Dimensions, in inches (millimeters), are for reference only and are subject to change.



VE Series Direct-Mount Manifolds

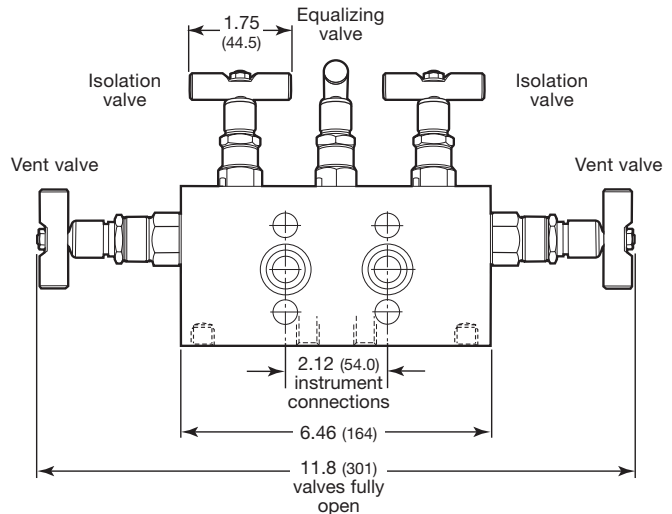
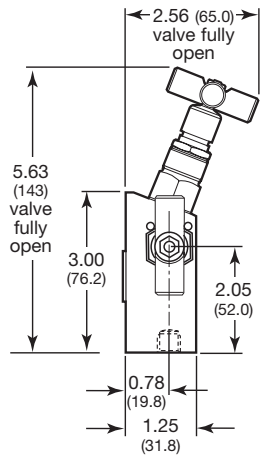
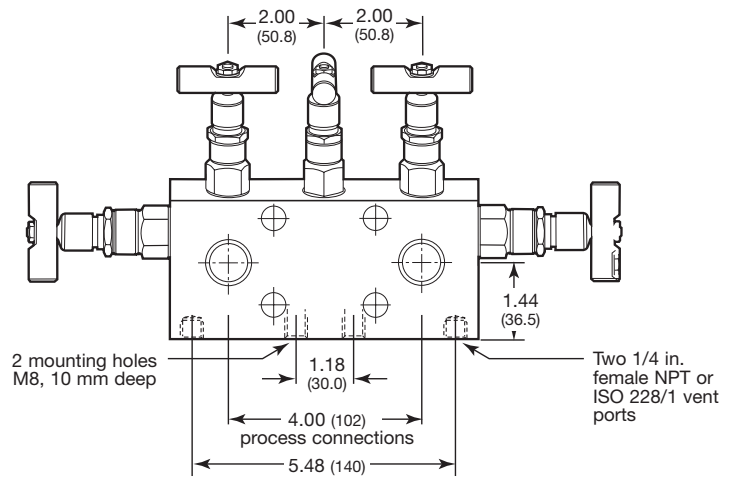
5-Valve Manifold

- Direct mounting to instrument on 2.12 in. (54.0 mm) centers
- Two vent ports
 - female NPT with NPT process connections
 - female ISO 228/1 with ISO 228/1 process connections



Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.



VE Series Direct-Mount Manifolds

Ordering Information

Build a direct-mount manifold ordering number by combining the designators in the sequence shown below.

A **B** **C** **D** **E** **F** **G**
SS – VE 5 V F8 – FD – AG

A Material

SS = 316 stainless steel

B Series

VE = Direct-mount manifold

C Manifold

2 = Two-valve
 3 = Three-valve
 5 = Five-valve

D Valve Stem

V = Nonrotating vee tip

E Process connections

F8 = 1/2 in. female NPT
 F8RP = 1/2 in. female ISO 228/1 pipe

F Flange

FD = DIN/IEC 61518 Type A flange
 FL = MSS flange

G Options

A = Antitamper equalizing valve^①
 B = Antitamper vent valve^①
 C = Antitamper equalizing and vent valves^①
 G = Graphite packing, bonnet seals, and flange seals
 L = Carbon/glass-filled PTFE packing and bonnet seal (Low Emissions option)
 S = Stainless steel instrument flange bolts

^① Antitamper key sold separately; see page 25.

Accessories

Flange Seal and Bolt Kits

A high-tensile steel instrument bolt and PTFE seal kit is included with each VE manifold. Additional instrument bolt and seal kits may be ordered.

- Kit contains flange seals and flange bolts.
- For additional or alternative bolt and seal kits, select an ordering number from the table based on the manifold, flange, bolt material, and flange seal material.

Mounting Bracket Kit

Kit contains stainless steel bracket, U-bolts, cap screws, nuts, lock washers, spacer, and instructions.

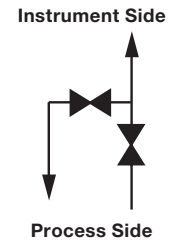
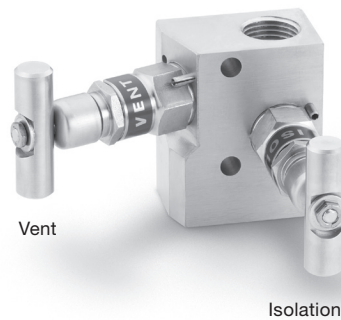
Ordering number: **SS-MB-VCBK**

Manifold	Flange	Bolt Material	Flange Seal Material	Ordering Number
2-valve	DIN	Stainless steel/ A193 B8M	PTFE	K100934-FD-S
			Graphite	K100934-FD-GS
		High-tensile steel grade S	PTFE	K100934-FD-H
			Graphite	K100934-FD-GH
	MSS	Stainless steel/ A193 B8M	PTFE	K100934-S
			Graphite	K100934-GS
High-tensile steel grade S		PTFE	K100934-H	
		Graphite	K100934-GH	
3-valve, 5-valve	DIN	Stainless steel/ A193 B8M	PTFE	K100935-FD-S
			Graphite	K100935-FD-GS
		High-tensile steel grade S	PTFE	K100935-FD-H
			Graphite	K100935-FD-GH
	MSS	Stainless steel/ A193 B8M	PTFE	K100935-S
			Graphite	K100935-GS
		High-tensile steel grade S	PTFE	K100935-H
			Graphite	K100935-GH

2-Valve Remote-Mount Manifold

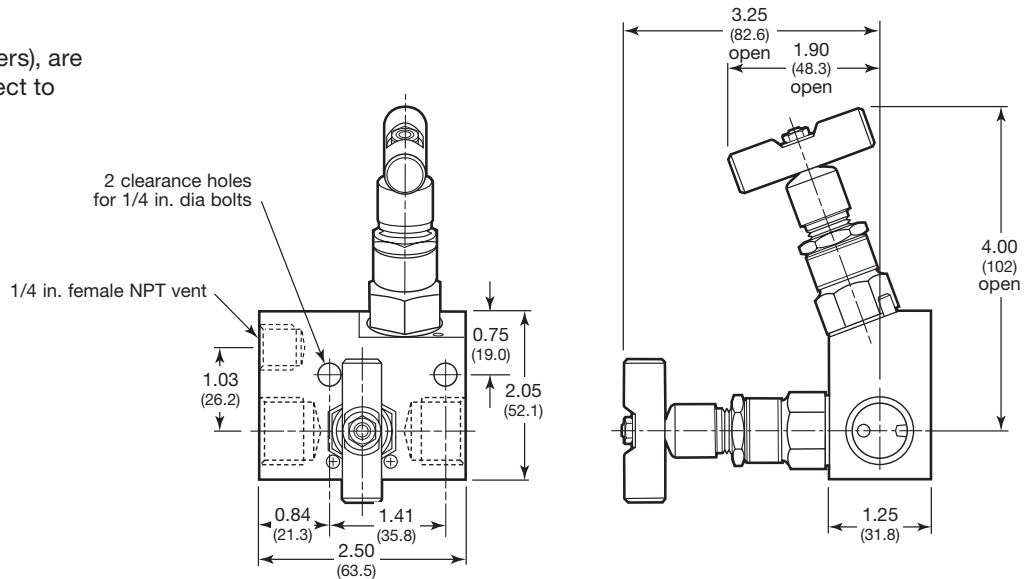
Features

- Angled vent valve for panel mounting
- Color-coded valve label rings for easy valve identification
- Available graphite packing and seals for high-temperature service



Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.



Ordering Information

Build a remote-mount manifold ordering number by combining the designators in the sequence shown below.

A B C
M S B G 4N A T

A Material

- S = Stainless steel
- C = Carbon steel

B End Connections

- 2N = 1/4 in. female NPT
- 4N = 1/2 in. female NPT

C Packing, Bonnet Seal Material

- A = PTFE
- C = Graphite
- L = Carbon/glass-filled PTFE (Low Emissions option)

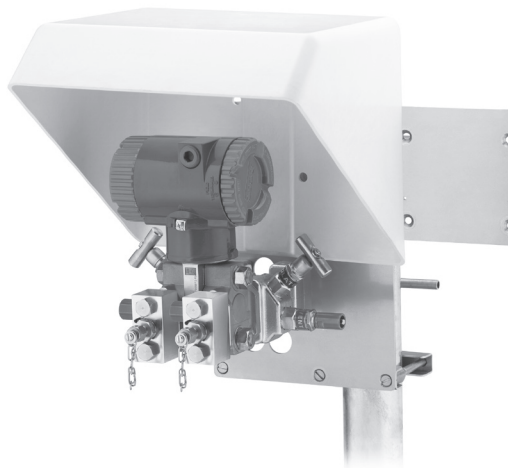
Testing

Every direct- and remote-mount manifold is factory tested hydrostatically. A shell test is performed at 1.5 times maximum rated working pressure, and a seat test is performed at 1.1 times maximum rated working pressure, in accordance with BS EN 12266-1 (formerly BS 6755 part 1).

Modular 85 System

Features

- A standard series of 2- and 4- valve manifolds for pressure and differential pressure measurement
- Instrument monoflanges provide isolation and vent functions for local instrument or indicator mounting
- Metal-to-metal seals and parallel threads in accordance with BS 2779 (ISO 228/1)
- Allows pre-assembly that can reduce field installation time and cost
- Hydrostatic test certificates complete with full chemical and physical material certifications available
- Low Emissions certification per API 624 available

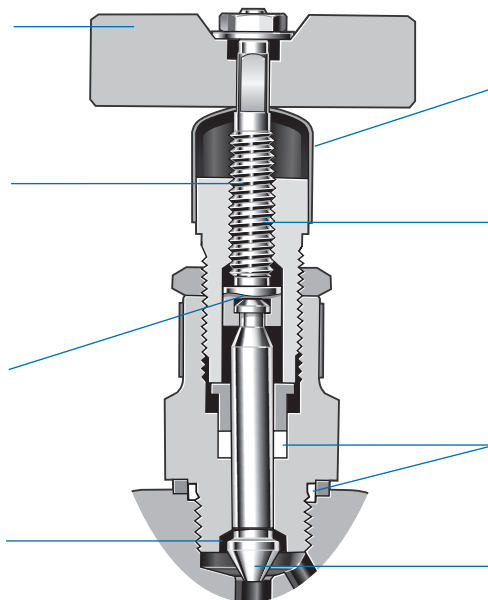


Stainless steel handle with square drive stem and lock nut to ensure positive actuation

Stem threads are cold rolled for high strength and smooth operation

Two-piece knuckle joint enables nonrotating needle; joint is above packing, protected from system media

Safety back-seating needle seals in fully open position



Shroud protects stem threads against ingress of dirt and dust

Stem threads above packing protected from system media

Choice of packing and bonnet seal materials

Nonrotating, hardened needle for positive shutoff

Materials of Construction

Component	Grade/ASTM Specification
<i>Body</i>	CF8M/ASTM A351
<i>Bonnets</i>	316/316L SS/A479
<i>Needles</i>	S17400 SS/A564 Condition H1150D
<i>Packing, bonnet seals</i>	PTFE ^①
<i>Lubricant</i>	Molybdenum disulfide in hydrocarbon carrier
Gland lock nuts	300 series powdered metal SS
All other components	316 SS

Wetted components listed in *italics*.

① Optional Low Emissions configuration supplied with Carbon/glass-filled PTFE.

Pressure-Temperature Ratings

Orifice Size in. (mm)	PTFE Seals		Graphite Seals	
	Temperature °F (°C)	Working Pressure psig (bar)	Temperature °F (°C)	Working Pressure psig (bar)
0.197 (5)	-58 (-50) to 200 (93)	6000 (413)	-58 (-50) to 200 (93)	6000 (413)
	201 (94) to 400 (204)	4000 (275)	201 (94) to 850 (454)	3000 (206)

Low Fugitive Emissions

The American Petroleum Institute's API 624 tests for fugitive emissions to atmosphere for modular 85 system. The tests are conducted at a third party lab and certify that at no point in the test did the valve leak in excess of 100 ppm of methane. Certificates stating that the modular 85 system is certified for Low Emissions service are available. For more information, contact your authorized Swagelok sales and service representative.

- ⚠ **A packing adjustment may be required periodically to increase service life and to prevent leakage.**
- ⚠ **Valves that have not been cycled for a period of time may have a higher initial actuation torque.**
- ⚠ **To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

Instrument Manifolds

Features

- Bar handle on isolation valves
- Equalizing and vent valves fitted with antitamper feature
- All valves color coded and labeled
- Process and vent connection: 1/4 in. ISO parallel thread (G1/4) with locking pin feature

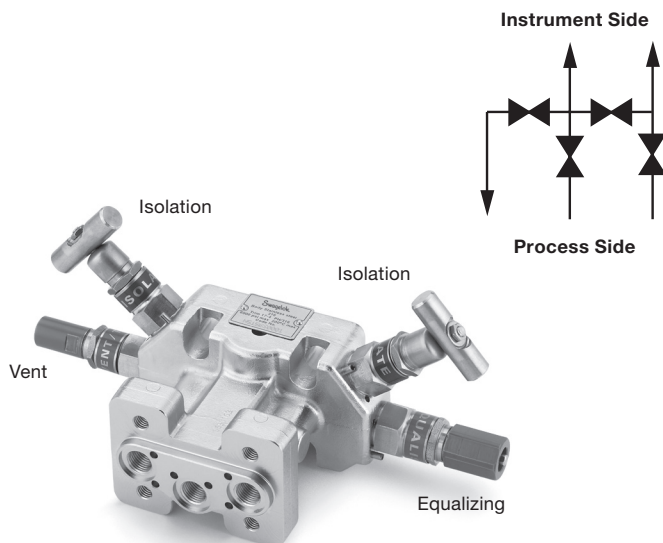
- Supplied complete with locking pins, gaskets, and four M8 mounting plate screws
- Factory installed and tested Swagelok® tube fittings with locking pin and gasket available
- Instrument mounting face in accordance with DIN 19213

Four-Valve Differential-Pressure Manifold

- Two isolation, one equalizing, and one vent valves
- Direct mounting to instrument on 2 1/8 in. (54 mm) centers and mounting plate
- Installation allows vent port to be higher than the process ports for liquid service, and below for gas service; manifolds marked for liquid and gas service
- Bolt and seal kit **K7179** included with each manifold purchased

Ordering Information

Description	Ordering Number
G1/4 (as shown)	M5156S0001
G1/4 with 3/8 in. Swagelok tube fittings installed	M5156S0003
G1/4 with 10 mm Swagelok tube fittings installed	M5156S0005

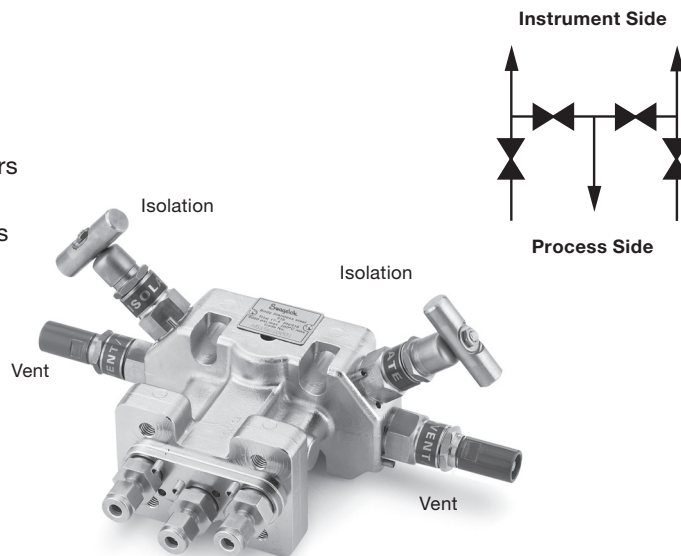


Four-Valve Differential-Pressure Manifold

- For applications where cross-contamination of process fluids is not permitted
- Two isolation and two vent valves
- Direct mounting to instrument on 2 1/8 in. (54 mm) centers and mounting plate
- Installation allows vent port to be higher than the process ports for liquid service, and below for gas service; manifolds marked for liquid and gas service
- Bolt and seal kit **K7179** included with each manifold purchased

Ordering Information

Description	Ordering Number
G1/4	M5705S0001
G1/4 with 3/8 in. Swagelok tube fittings installed	M5705S0003
G1/4 with 10 mm Swagelok tube fittings installed (as shown)	M5705S0005



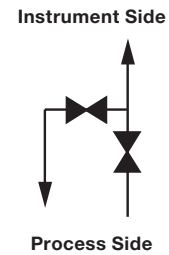
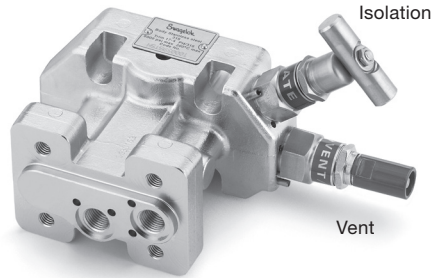
Instrument Manifolds

Two-Valve Pressure Manifold

- For absolute and gauge pressure transmitters
- One isolation and one vent valve
- Bolt and seal kit **K7180** included with each manifold purchased

Ordering Information

Description	Ordering Number
G1/4 (as shown)	M6006S0001
G1/4 with 3/8 in. Swagelok tube fittings installed	M6006S0003
G1/4 with 10 mm Swagelok tube fittings installed	M6006S0005

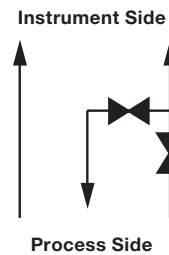
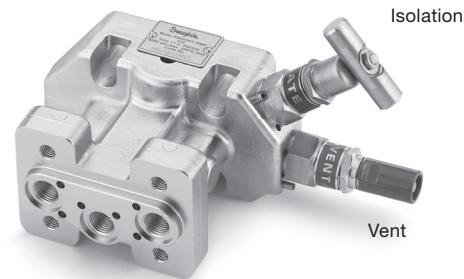


Two-Valve Differential Pressure Manifold

- For low-pressure applications and level measure on atmospheric tanks with differential pressure cell
- One isolation and one vent valve
- Direct mounting to instrument on 2 1/8 in. (54 mm) centers, and mounting plate
- Bolt and seal kit **K7179** included with each manifold purchased

Ordering Information

Description	Ordering Number
G1/4 (as shown)	M5706S0001
G1/4 with 3/8 in. Swagelok tube fittings installed	M5706S0003
G1/4 with 10 mm Swagelok tube fittings installed	M5706S0005

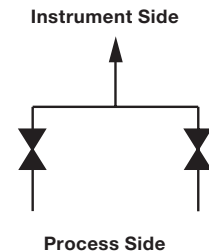
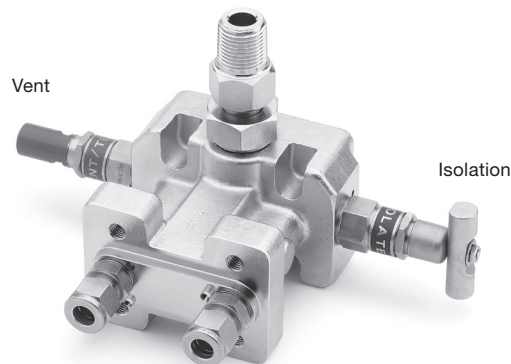


Pressure Manifold

- For direct connecting to pressure transmitters or pressure gauges and mounting plates
- One isolation and one vent valve
- Integral gauge adapter, 1/2 in. NPT for 360° positioning, 1/2 in. ISO parallel thread (G1/2) option

Ordering Information

Description	Ordering Number
G1/4 (process), 1/2 in. positionable male NPT (instrument)	M5713S1001
G1/4 (process), 1/2 in. positionable female NPT (instrument)	M5713S2001
G1/4 with 3/8 in. Swagelok tube fitting installed (1/2 in. male NPT) (as shown)	M5713S1003
G1/4 with 10 mm Swagelok tube fitting installed (1/2 in. female NPT)	M5713S2005



Purge Blocks

Features

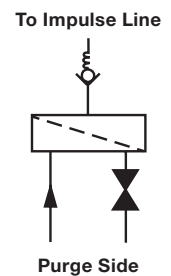
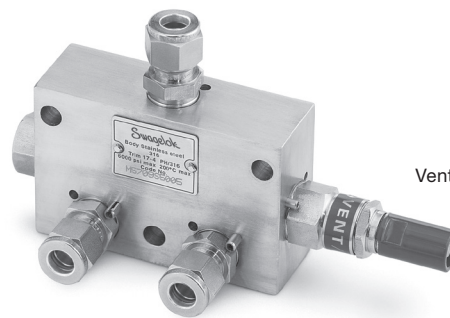
- Complete with one vent valve, one integral filter, one or two soft-seated check valves
- Suitable for connecting to instrument impulse lines on 2 1/8 in. (54 mm) centers
- Brackets and fixing bolts supplied for mounting to 2 in. pipe stand
- Vent valve fitted with antitamper feature
- Integral filter screen: 750 µm
- Check valve spring: nickel alloy
- Process connections: 10 mm or 3/8 in. Swagelok tube fitting
- Purge supply and vent connection: 1/4 in. ISO parallel thread (G1/4) or 1/4 in. NPT option with locking pin and gasket
- Pressure-temperature ratings:
6000 psig (413 bar) at 100°F (37°C)
4000 psig (275 bar) at 400°F (204°C)
- Factory installed and tested Swagelok tube fittings with locking pin and gasket

Self-Venting Single Purge Block

- For pressure measurement and differential pressure measurement.

Ordering Information

Description	Ordering Number
G1/4 inlet and vent G1/4 with 3/8 in. Swagelok tube fitting installed outlet	M5709S3001
G1/4 with 3/8 in. Swagelok tube fittings installed	M5709S3003
G1/4 inlet and vent G1/4 with 10 mm Swagelok tube fittings installed outlet	M5709S5001
G1/4 with 10 mm Swagelok tube fittings installed	M5709S5005

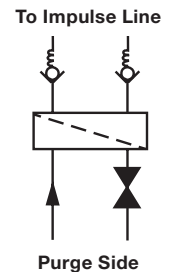
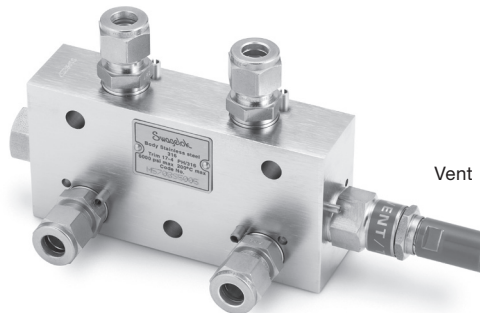


Self-Venting Double Purge Block

- Suitable for differential pressure measurement and for connecting to instrument impulse lines on 2 1/8 in. (54 mm) centers

Ordering Information

Description	Ordering Number
G1/4 with 3/8 in. Swagelok tube fittings installed	M5708S3003
G1/4 with 10 mm Swagelok tube fittings installed	M5708S5005



Accessories

Electric Heater Block

- For use where heating of manifolds and instrument bodies is required for winterization purposes
- Power: 250 W max
- Area classification: Zone 1 Gas Group IIA, IIB, and IIC
- Type of Protection: Explosion proof ATEX certified II 2 G EExd IIC T3 and T4

Ordering number, 110/240 V (ac) nominal voltage: **S900001**

Ordering number, 12/36 V (dc) nominal voltage: **S900001-CS2S**



Steam Tracing Block

- For use where heating of transmitter bodies and manifold is required.
- Bolts directly to manifold body
- 10 mm or 3/8 in. Swagelok tube fitting
- Pressure-temperature ratings: 290 psig (19.9 bar) at 410°F (210°C)
- Factory-installed and tested Swagelok tube fittings with locking pin and gasket available



Ordering Information

Description	Ordering Number
G1/4 ISO parallel thread	K5829S1001
G1/4 with 3/8 in. Swagelok tube fittings installed	K5829S1003
G1/4 with 10 mm Swagelok tube fittings installed	K5829S1005

Purge Orifice Nipple

- Restricted orifice nipple and data tag plate supplied for 6 and 10 mm; 1/4 and 3/8 in. tubing
- Specify orifice size requirements when ordering



Ordering Information

Tube Size	Ordering Number
6 mm	K5981S-1M
10 mm	K5981S-3M
3/8 in.	K5981S-3D
1/4 in.	K5981S-2D

Mounting Plate Assembly (Type A)

- Allows mounting of manifold, electrical connection box, or air filter/regulator, nameplate, and protection shade to a 2 in. pipe stand
- Supplied complete with fasteners, clamps, and brackets
- Drilled to suit all components as indicated in the modular system, process connections, and steam tracer tubing, etc.



Ordering number, Type A1 assembly, *with* capacity for mounting electrical connection box: **K5839S**

Ordering number, Type A2 assembly, *without* capacity for mounting electrical connection box: **K100222-4**

Mounting Plate Assembly (Type B)

- Allows mounting of manifold, electrical connection box, or air filter/regulator, and nameplate to a 2 in. pipe stand
- Supplied complete with fasteners, clamps, and brackets
- Drilled to suit all components as indicated in the modular system, process connections, and steam tracer tubing, etc.



Ordering number, Type B1 assembly, *with* capacity for mounting electrical connection box: **K6261S**

Ordering number, Type B2 assembly, *without* capacity for mounting electrical connection box: **K100222-5**

Antitamper Key

- Fits all vent and equalizing valves within the system
- Order separately

Ordering number: **S004468**



Instrument Manifold Systems Accessories

Eccentric Flanges

- Used with flange-to-flange manifolds to allow the connection of process flange taps or process root valves.
- Offered with Swagelok tube fitting, female NPT, or pipe butt weld connections.
- Provide an offset connection of 1/16 in. (1.6 mm) from the bolt hole center line.



Eccentric View



Swagelok Tube Fitting



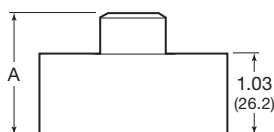
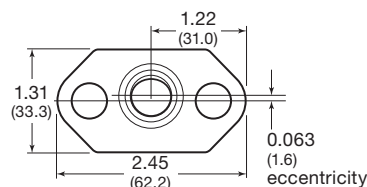
Female NPT



Pipe Butt Weld

Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.



End Connection	A, in. (mm)
Swagelok tube fitting	2.25 (57.2)
Female NPT	1.03 (26.2)
Pipe butt weld	1.55 (39.4)

Ordering Information

- Kit includes two (2) flanges, two (2) flange seals, four (4) 7/16-20 hex bolts, lubricant, and instructions.
- Flange seal material is fluorocarbon FKM with a temperature rating of -20 to 450°F (-28 to 232°C).



Eccentric Flange Seal Kits

Material Grade/ASTM Specification	End Connection		Kit Ordering Number	Bolt Material
	Size	Type		
CF8M SS/ ASTM A351	1/4 in.	Female NPT	SS-MKV-V3F4	316 SS
	1/2 in.	Swagelok tube fitting	SS-MKV-V3S8	
		Female NPT	SS-MKV-V3F8	
CF3M SS/ ASTM A351	1/2 in.	Pipe butt weld	SS-MKV-V3W8P	

Optional Eccentric Flange Seal Materials

To order an eccentric flange seal kit with an optional seal material, replace **MKV** in the kit ordering number with a seal designator.

Flange Seal Material	Seal Designator	Temperature Rating °F (°C)
Virgin PTFE	-MKT	-65 to 250 (-53 to 121)
Reinforced PTFE	-MKR	
Grafoil	-MKG	-65 to 1000 (-53 to 537)

Example: SS-**MKT**-V3F4

Concentric and Eccentric Pipe Nipples

- Used with eccentric flanges to adapt to different flange tap spacings.
- Provide an offset of 1/16 in. (1.6 mm) from center line.
- Offered with 1/2 in. male NPT end connections.
- Available in 316 stainless steel and carbon steel.



Concentric Pipe Nipples

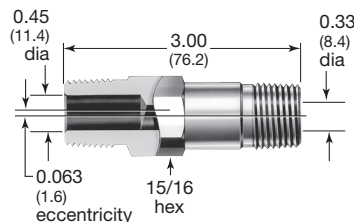
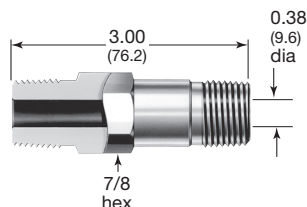


Eccentric Pipe Nipples



Ordering Information

- Order pipe nipples as individual components.
- See ordering number in the **Pipe Nipple Selection** table below.



Dimensions, in inches (millimeters), are for reference only and are subject to change.

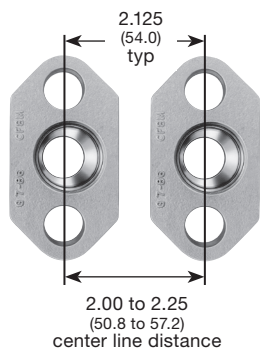
Pipe Nipple Selection

Type	Material Grade/ASTM Specification	Ordering Number	Pressure Rating at 70°F (20°C) psig (bar)	Temperature Rating °F (°C)	Pressure Rating at Maximum Temperature
Concentric	316 SS/A276	SS-CLNM8	10 000 (689)	-65 to 1200 (-53 to 648)	2850 psig at 1200°F (196 bar at 648°C)
	Carbon steel/A108	S-CLNM8	8 000 (551)	-20 to 350 (-28 to 176)	6970 psig at 350°F (480 bar at 176°C)
Eccentric	316 SS/A276	SS-ELNM8	7 500 (516)	-65 to 1200 (-53 to 648)	2140 psig at 1200°F (147 bar at 648°C)
	Carbon steel/A108	S-ELNM8	6 000 (413)	-20 to 350 (-28 to 176)	5230 psig at 350°F (360 bar at 176°C)

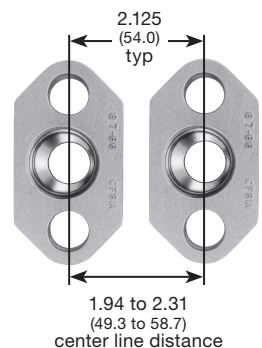
Optional Center Line Distances

- A variety of center line distances can be obtained by using various combinations of eccentric flanges and pipe nipples.
- The illustrations at the right show these combinations using female NPT eccentric flanges.

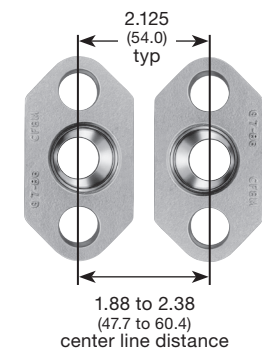
Two Female NPT Eccentric Flanges with Two Concentric Pipe Nipples



Two Female NPT Eccentric Flanges with One Concentric Pipe Nipple and One Eccentric Pipe Nipple



Two Female NPT Eccentric Flanges with Two Eccentric Pipe Nipples



Dimensions, in inches (millimeters), are for reference only and are subject to change.

DP Transmitter Calibration Fittings

- Speed transmitter calibration by reducing the number of steps in the traditional calibration.
- Allow rapid access to the cell for calibration—only the vent port tap requires removal to access transmitter ports.
- Prevent possible galling of transmitter NPT body threads—straight threads on the calibration tube fitting screw directly into plug/vent port fittings.
- Choice of fitting with 5/16-24 in. thread and 1/4 in. tubing or 1/4-28 in. thread and 1/4 in. tubing, depending on the vent port size of the transmitter plug.
- Are available in 316 stainless steel material.

Ordering number for fitting with 5/16-24 thread:
SS-400-1-0253

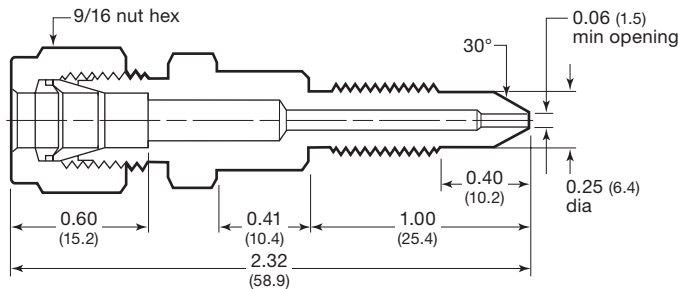


Ordering number for fitting with 1/4-28 thread:
SS-400-1-0257

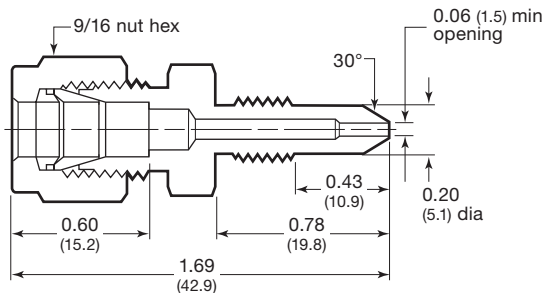
Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

Calibration Fitting with 5/16-24 in. Thread

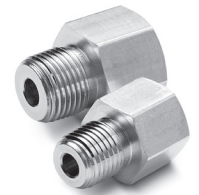


Calibration Fitting with 1/4-28 in. Thread



Gauge Adapters

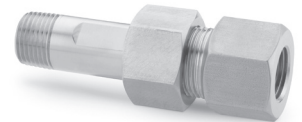
- Adapt female ISO/BSP parallel thread to male NPT threads.
- Are offered in 1/4, 3/8, and 1/2 in. male NPT sizes.
- Are available in 316 stainless steel material.



Refer to Swagelok *Pipe Fittings* catalog, [MS-01-147](#), for additional information.

Positionable Gauge Adapters

- Allow 360° orientation of pressure gauges.
- Are offered with 1/2 in. male NPT inlet connection.
- Are available with 1/2 in. NPT and ISO parallel gauge connections.
- Are all 316 stainless steel material.



Refer to Swagelok *Pressure Gauges, Industrial and Process—PGI Series* catalog, [MS-02-170](#), for additional information.

Protective Shade

- For extra protection of electronic instruments against environmental conditions
- Mounts directly to mounting plate assembly
- Fire-retardant fiberglass construction with stainless steel fasteners

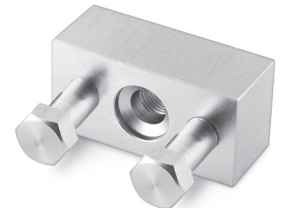


Ordering number: **K5983-06**

Manifold Kidney Flange Blank

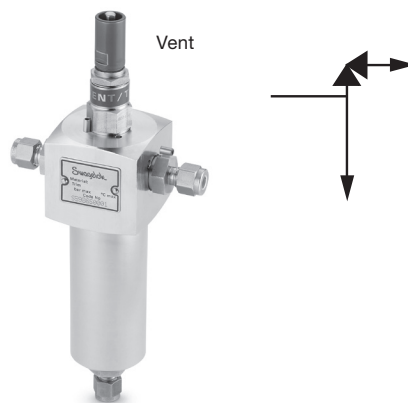
- For protecting process lines when removing the differential pressure instrument.

Ordering number: **K5982S**



Seal Pot with Integral Vent valve

- Liquid chamber of 50 cm³
- Valve fitted with high-temperature graphite packing and seals
- Process and vent connections: 1/4 in. ISO parallel thread (G1/4) with locking pins and gasket
- Pressure-temperature ratings:
6000 psig (413 bar) at 100°F (37°C)
3000 psig (206 bar) at 842°F (450°C)
- Factory-installed and tested Swagelok tube fittings with locking pin and gasket available



Ordering Information

Description	Ordering Number
G1/4 ISO parallel thread	S5986S0001
G1/4 with 3/8 in. Swagelok tube fittings installed	S5986S0003
G1/4 with 10 mm with Swagelok tube fittings installed	S5986S0005

Filling Connector

- With integral, soft-seated nonreturn valve
- Suitable for direct bolting to the flange face of pressure transmitters
- 6 mm or 1/4 in. tube fitting with retained cap
- Supplied complete with 2 × 7/16-20 bolts, PTFE flange seal, plug, and retaining chain
- Pressure-temperature ratings:
6000 psig (413 bar) at 100°F (37°C)
4000 psig (275 bar) at 400°F (204°C)



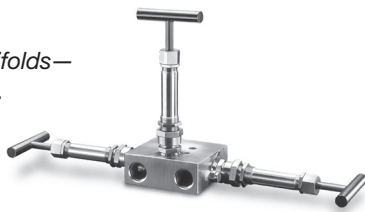
Ordering Information

Description	Ordering Number
G1/4 with 1/4 in. Swagelok tube fitting installed	K5837S0003
G1/4 with 6 mm Swagelok tube fitting installed	K5837S0005

Additional Manifold Products

For bellows-sealed 3-valve manifolds, refer to Swagelok *Bellows-Sealed 3-Valve Manifolds—V3 Series* catalog, [MS-02-07](#).

The manifolds use B or U series bellows-sealed valves for systems with difficult fluid containment requirements.



Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

⚠ Warning: Do not mix/interchange Swagelok products or components not governed by industrial design standards, including Swagelok tube fitting end connections, with those of other manufacturers.

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Grafoil—TM GrafTech International Holdings, Inc.
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