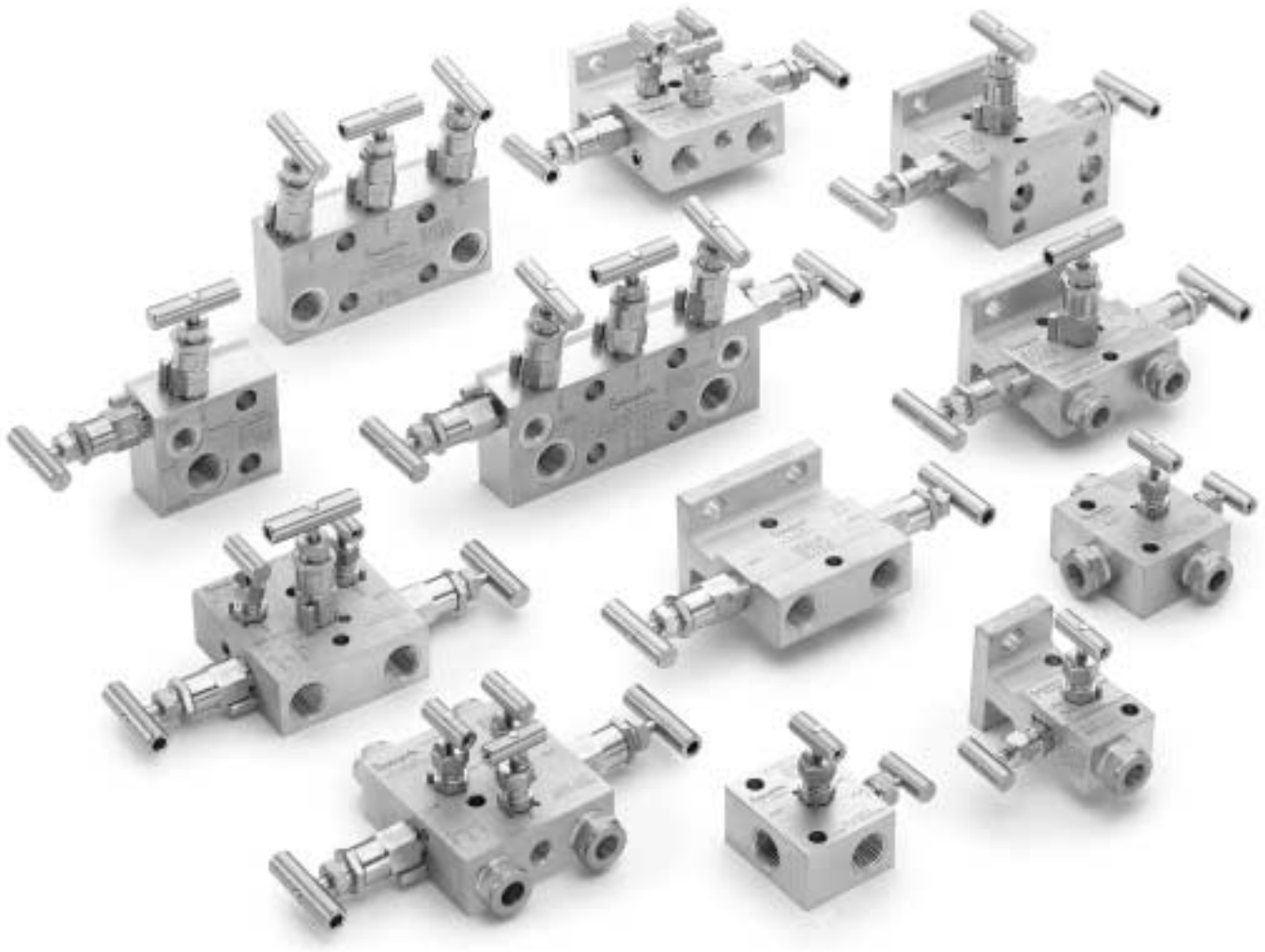
Instrument Manifolds



V, VB, VC, and VL Series

- 2-, 3-, and 5-valve instrument manifolds
- All 316 stainless steel construction with PTFE packing
- Working pressures up to 6000 psig (413 bar)
- Temperatures up to 1200°F (648°C) with Grafoil® valve packing

Swagelok

Contents

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.

The V, VB, and VL series manifolds feature a horizontal body design; the VC and VCB series manifolds feature a compact, vertical body design. Choice of manifold connections include 1/2 in. and 12 mm female Swagelok tube fitting, 1/2 in. female pipe (NPT and ISO 228/1), and flange (DIN EN 61518 and MSS SP-99).

Flange Connections

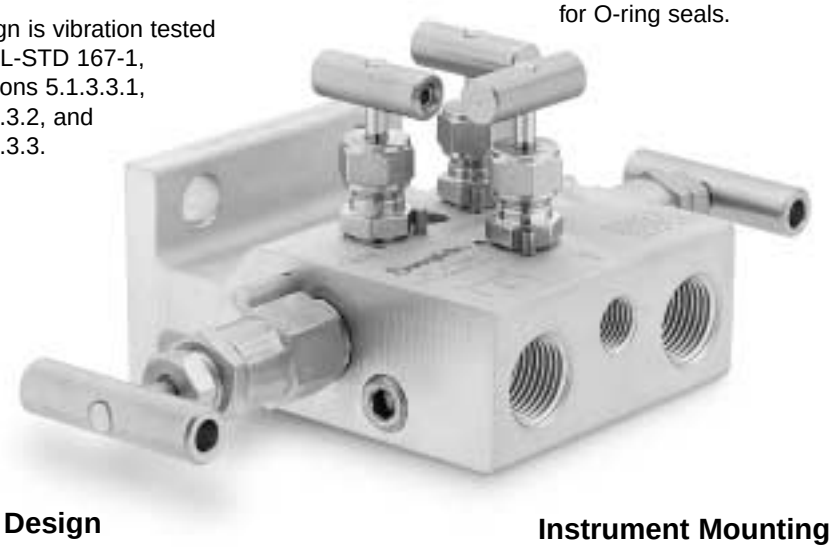
- Choice of flange designs meets the requirements of MSS SP-99 or DIN EN 61518.
- Standard flange seal is a fluorocarbon FKM O-ring.
- Flange seals and flange bolts are included with manifold.

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 5.1.3.3.1, 5.1.3.3.2, and 5.1.3.3.3.

Bonnet-to-Body Seal

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



Body Design

- One-piece construction provides strength.

Instrument Mounting

- 2 1/8 in. (54 mm) port center lines for proper instrument alignment.

Materials of Construction

- All 316 stainless steel construction
- Designed with 4:1 design factor

Internal Finish

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

⚠ **Packing adjustments may be required during the service life of the valve.**

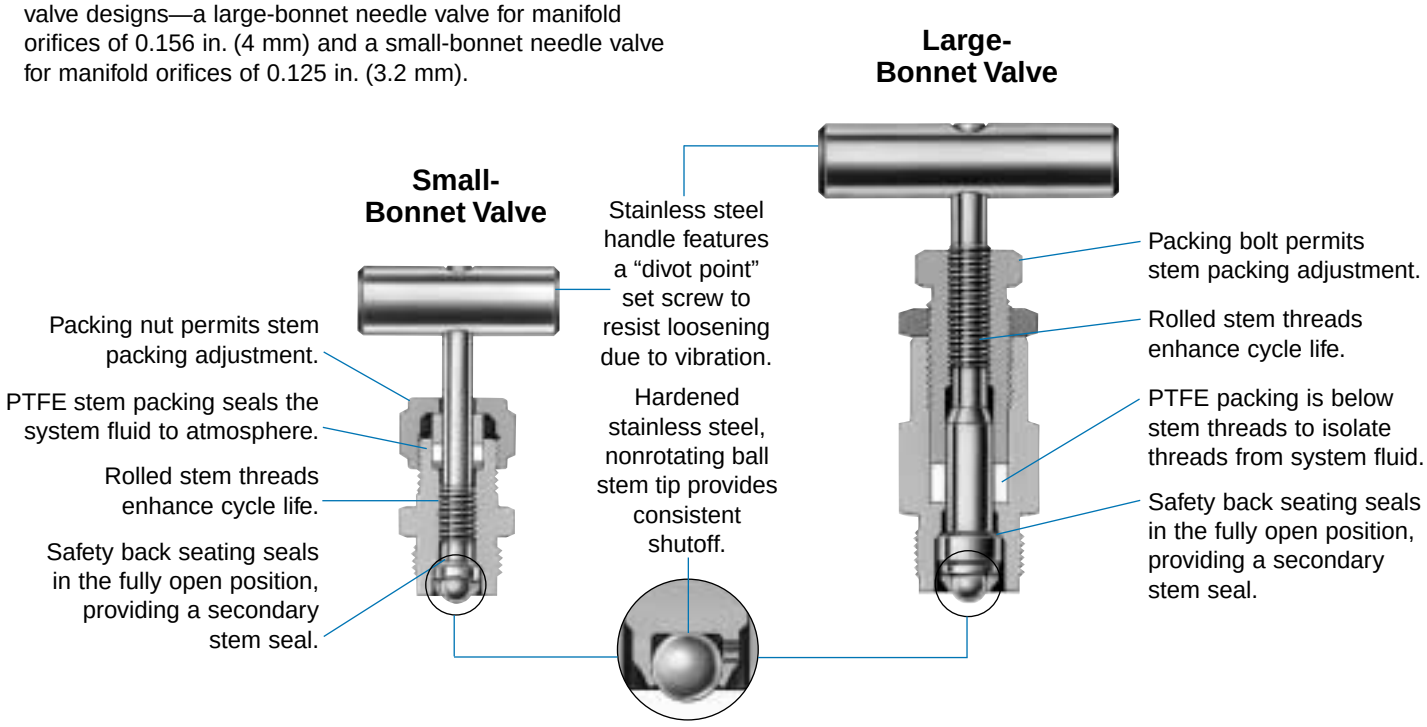
⚠ **Valves that have not been cycled for a period of time may have a higher initial actuation torque.**

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 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 or closed position. PTFE is the standard packing material; optional Grafoil packing is available for high-temperature applications.



Technical Data

Orifice Size (block 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)

Testing

Every Swagelok instrument manifold is factory tested with nitrogen at 1000 psig (69 bar). Seats have a maximum allowable leak rate of 0.1 std cm^3/min.

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

Cleaning and Packaging

Every Swagelok instrument manifold is cleaned and packaged in accordance with *Swagelok Specification SC-10.*

Pressure-Temperature Ratings①

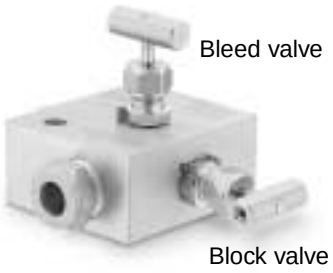
ASME Class	2500
Material Group	**2.2**
Material Name	**316 SS**
Temperature °F (°C)	**Working Pressure** psig (bar)
–65 (–53) to 100 (37)	6000 (413)
200 (93)	5160 (355)
250 (121)	4910 (338)
300 (148)	4660 (321)
350 (176)	4470 (307)
400 (204)	4280 (294)
450 (232)	4130 (284)
500 (260)	3980 (274)
550 (287)	3870 (266)
600 (315)	3760 (259)
650 (343)	3700 (254)
700 (371)	3600 (248)
750 (398)	3520 (242)
800 (426)	3460 (235)
850 (454)	3380 (232)
900 (482)	3280 (225)
950 (510)	3220 (221)
1000 (537)	3030 (208)
1050 (565)	3000 (206)
1100 (593)	2685 (184)
1150 (621)	2285 (157)
1200 (648)	1715 (118)

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.

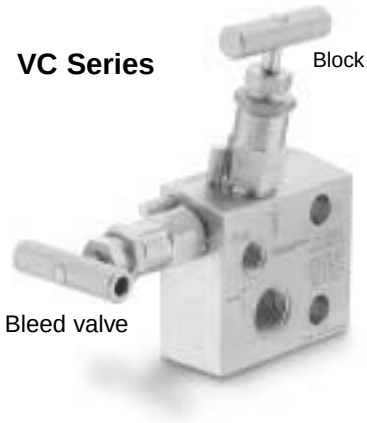
2-Valve Manifolds

V Series



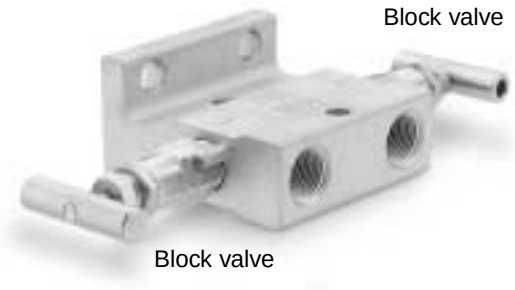
- Allows for block and bleed (or calibration) of static pressure transmitter or gauge
- Consists of one block valve and one bleed valve
- End connections—1/2 in. and 12 mm female Swagelok tube fitting; 1/2 in. female pipe (NPT); flange (MSS)
- Horizontal body style

VC Series



- Allows for block and bleed (or calibration) of static pressure transmitter or gauge
- Consists of one block valve and one bleed valve
- End connections—1/2 in. female pipe (NPT and ISO 228/1) and flange (DIN and MSS)
- Vertical body style

VL Series



- Designed for liquid level applications
- Consists of two block valves operating in parallel to shut off either one of the two process lines through the manifold
- No equalizer passage through the manifold
- End connections—1/2 in. female pipe (NPT) to flange
- Horizontal body style

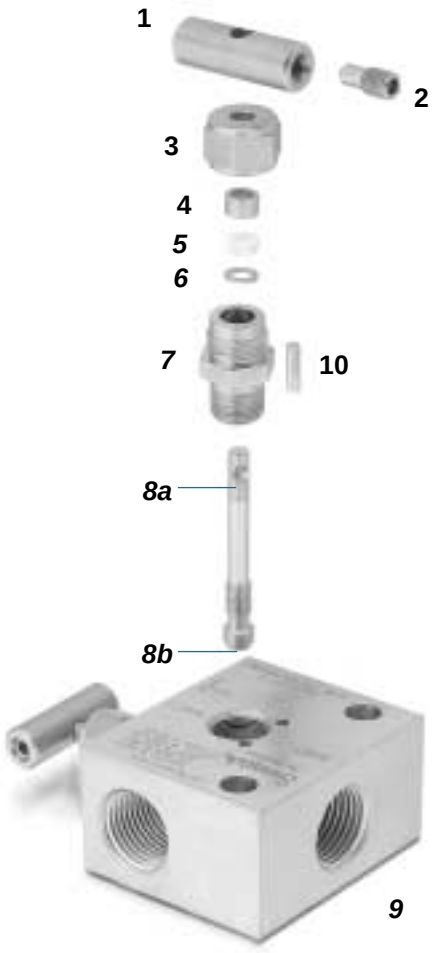
V Series

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 nut	
4 Upper gland	
5 *Packing*	*PTFE/D1710*
6 *Lower gland*	*316 SS/A240 or A167*
7 *Bonnet*	*316 SS/A479*
8a *Stem*	*316 SS/A276*
8b *Ball tip*	*316 SS/A479*
9 *Body*	
10 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*.



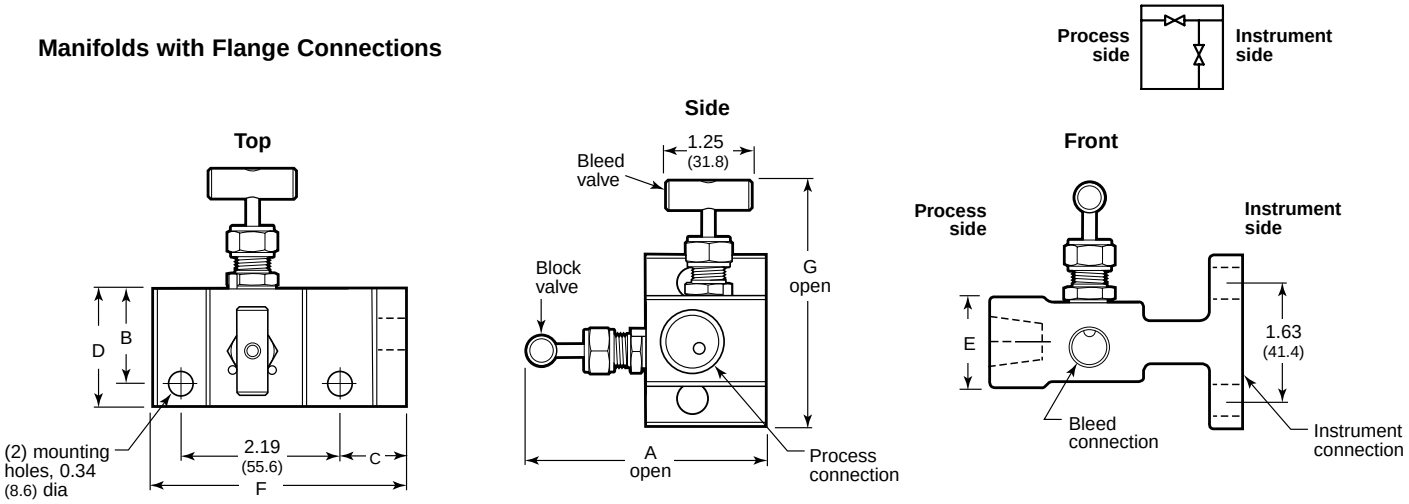
2-Valve Manifolds

V Series

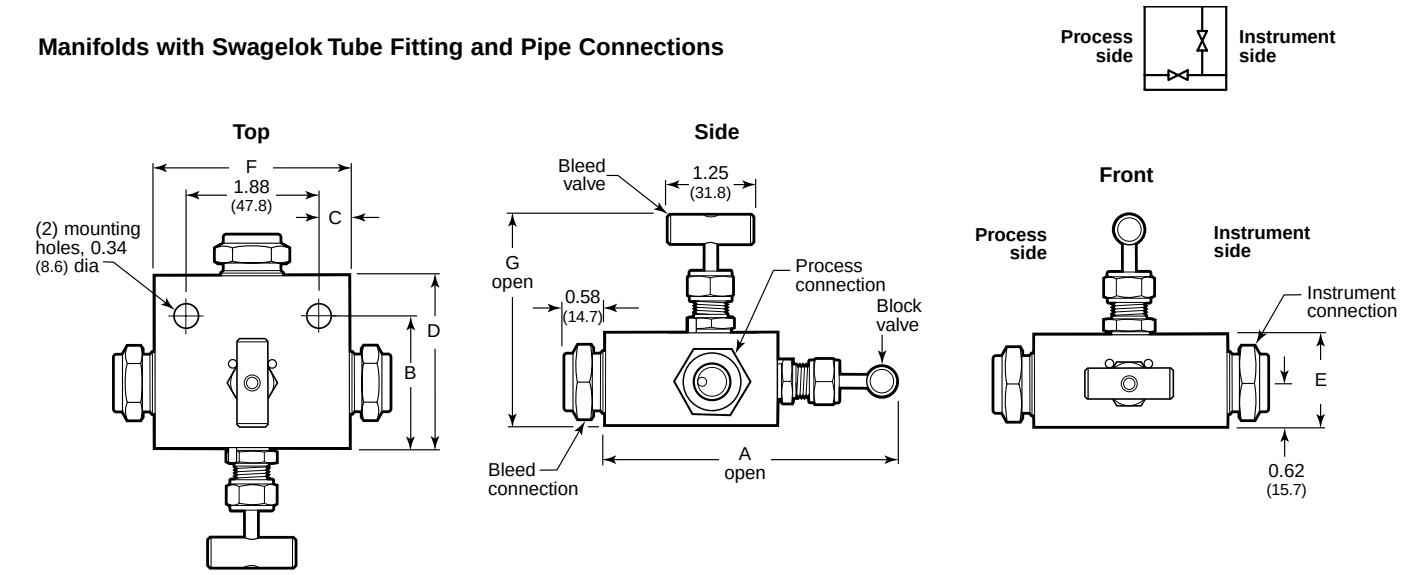
Ordering Information and Dimensions

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

Manifolds with Flange Connections



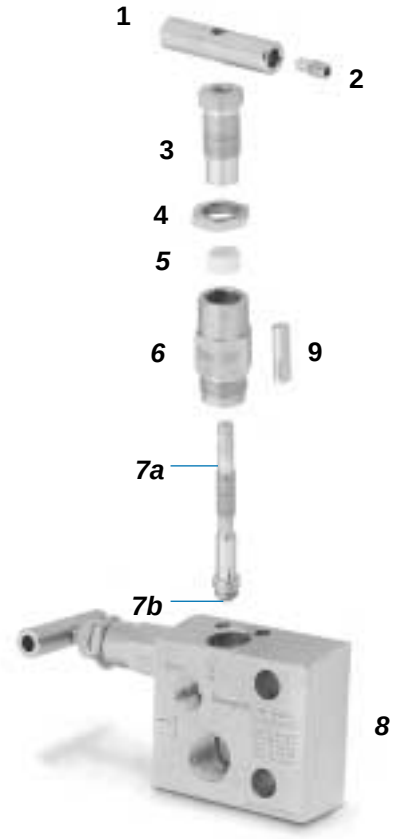
Manifolds with Swagelok Tube Fitting and Pipe Connections



End Connections			Ordering Number	Dimensions, in. (mm)						
Process	Instrument	Bleed		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)	3.02 (76.7)
1/2 in. female Swagelok tube fitting	Flange (MSS)	1/4 in. female NPT	SS-V2BFS8-FL	3.33 (84.6)	1.31 (33.3)	0.90 (22.9)	1.63 (41.4)	1.25 (31.8)	3.46 (87.9)	3.46 (87.9)
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)	3.02 (76.7)
12 mm female Swagelok tube fitting	Flange (MSS)	1/4 in. female NPT	SS-V2BFS12MM-FL	3.33 (84.6)	1.31 (33.3)	0.90 (22.9)	1.63 (41.4)	1.25 (31.8)	3.46 (87.9)	3.46 (87.9)
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)	3.02 (76.7)
1/2 in. female NPT	Flange (MSS)	1/4 in. female NPT	SS-V2BF8-FL	3.33 (84.6)	1.31 (33.3)	0.90 (22.9)	1.63 (41.4)	1.25 (31.8)	3.48 (88.4)	3.46 (87.9)

2-Valve Manifolds

VC Series



Materials of Construction

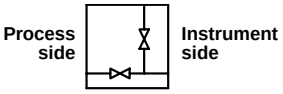
Materials for pressure-containing wetted parts are in compliance with ASME B31.1.

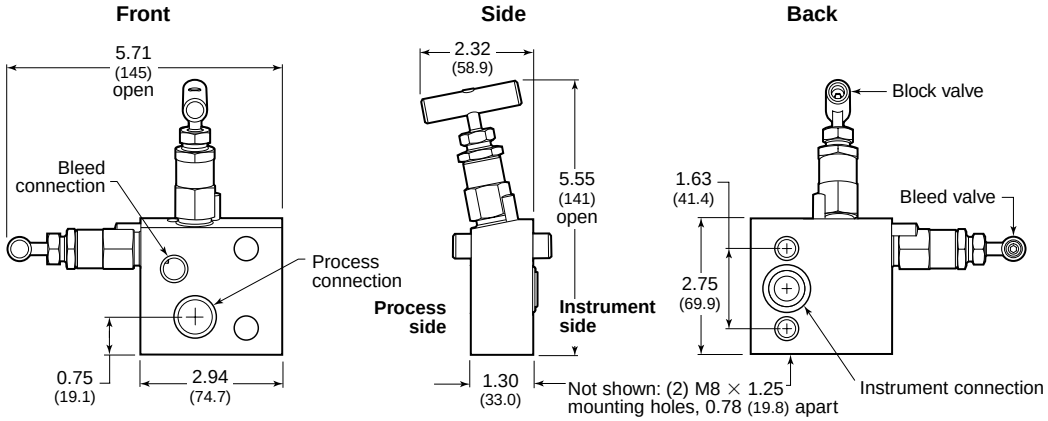
Component	Material Grade/ ASTM Specification
1 Handle	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Jam nut	316 SS/A276
5 *Packing*	*PTFE/D1710*
6 *Bonnet*	*316 SS/A479*
7a *Stem*	*316 SS/A276*
7b *Ball tip*	*316 SS/A479*
8 *Body*	
9 Stop pin	316 SS/A479
Flange seals (not shown)	*Fluorocarbon FKM*
Flange bolts (not shown)	B8M CL.2B/A193 (fractional); ISO 3506 (metric)
Lubricants	*Fluorinated base with PTFE and tungsten disulfide*
	Hydrocarbon-based

Wetted components listed in *italics*.

Ordering Information and Dimensions

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





End Connections			Ordering Number
Process	**Instrument**	**Bleed**	
1/2 in. female NPT	Flange (MSS)	1/4 in. female NPT	SS-VC2NBF8-FL
	Flange (DIN)		SS-VC2NBF8-FD3
1/2 in. female ISO 228/1 pipe	Flange (MSS)	1/4 in. female ISO 228/1 pipe	SS-VC2NBF8RP-FL
	Flange (DIN)		SS-VC2NBF8RP-FD3

2-Valve Manifolds

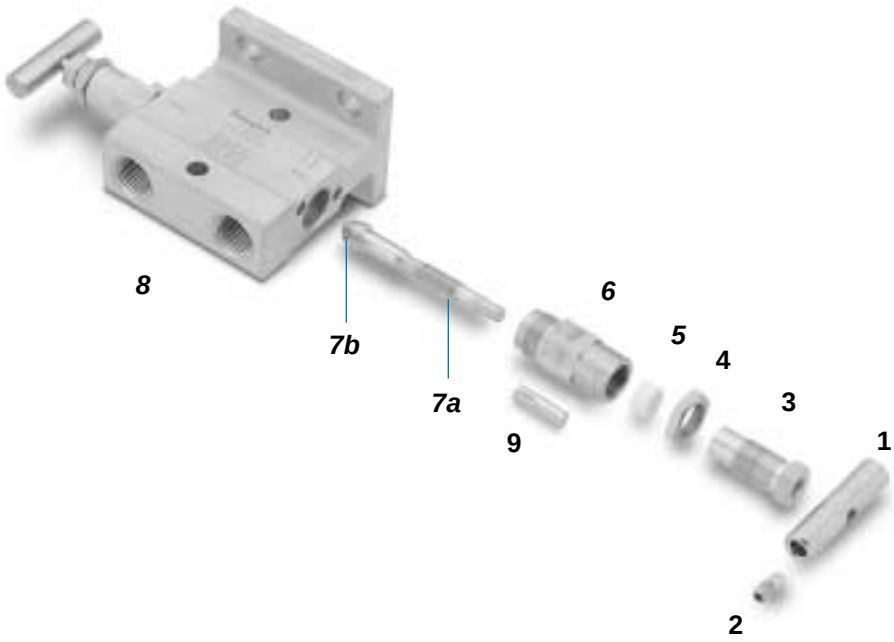
VL Series

Materials of Construction

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

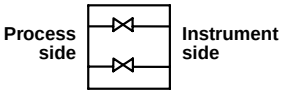
Component	Material Grade/ ASTM Specification
1 Handle	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Jam nut	316 SS/A276
5 *Packing*	*PTFE/D1710*
6 *Bonnet*	*316 SS/A479*
7a *Stem*	*316 SS/A276*
7b *Ball tip*	*316 SS/A479*
8 *Body*	
9 Stop pin	316 SS/A479
Flange seals (not shown)	*Fluorocarbon FKM*
Flange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

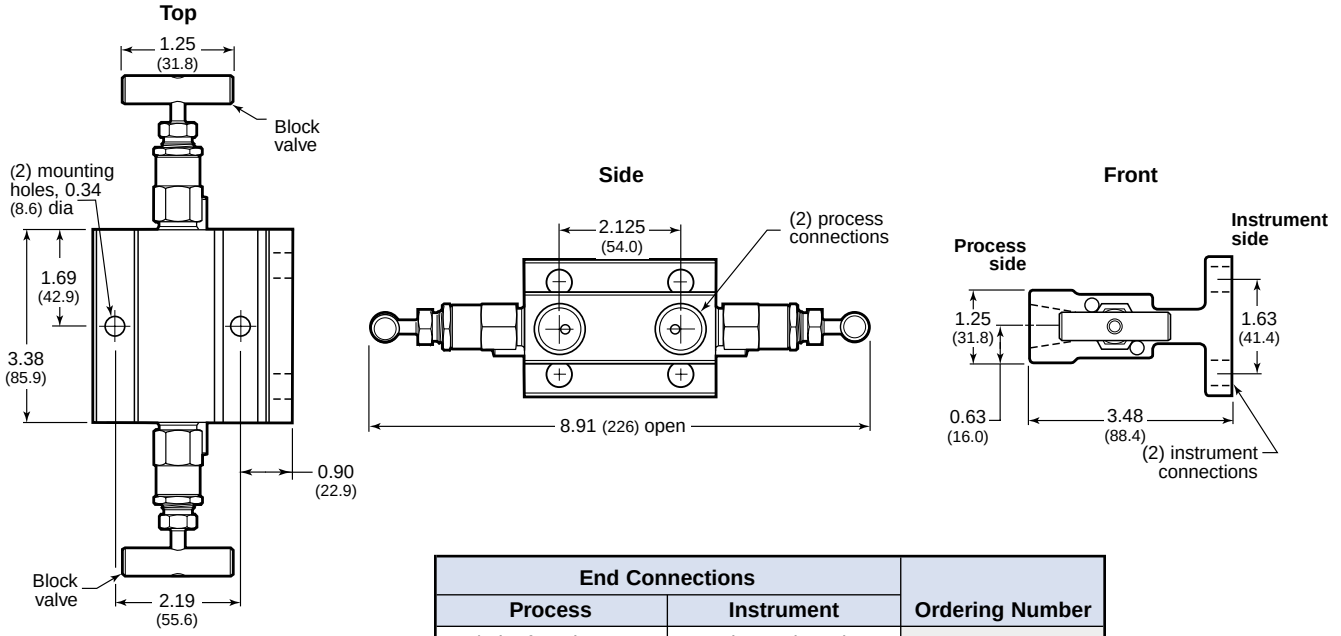
Wetted components listed in *italics.*



Ordering Information and Dimensions

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

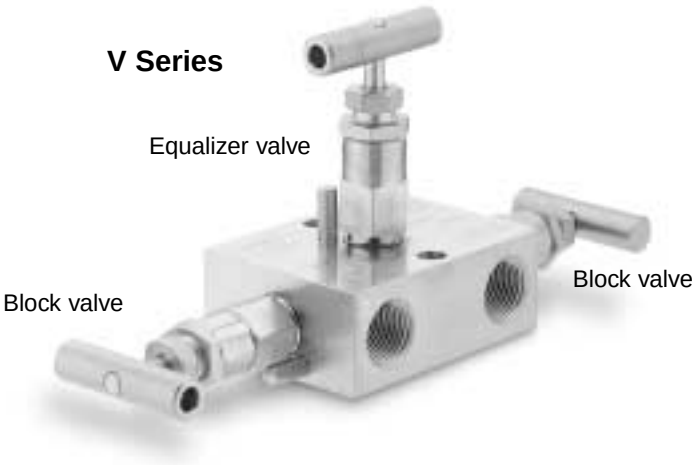




End Connections		Ordering Number
Process	**Instrument**	
1/2 in. female NPT	Flange (MSS)	SS-VL2NBF8-FL

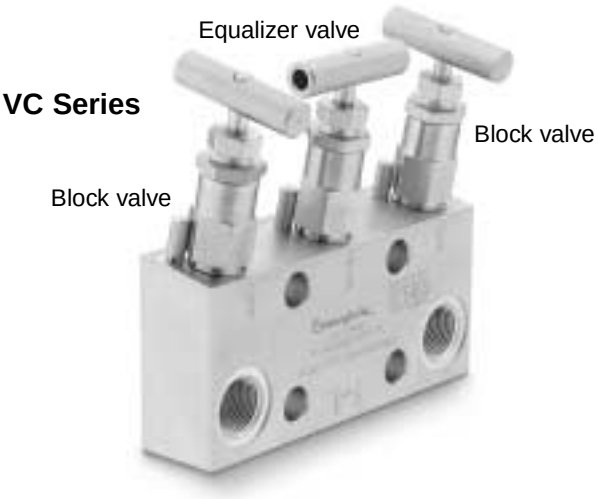
3-Valve Manifolds

V Series



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

VC Series



- Designed for mounting on differential pressure transmitters with 2 1/8 in. (54 mm) center-to-center connections
- Consists of two block valves and one equalizer valve
- End connections—1/2 in. female pipe (NPT and ISO 228/1) and flange (DIN and MSS)
- Vertical body style

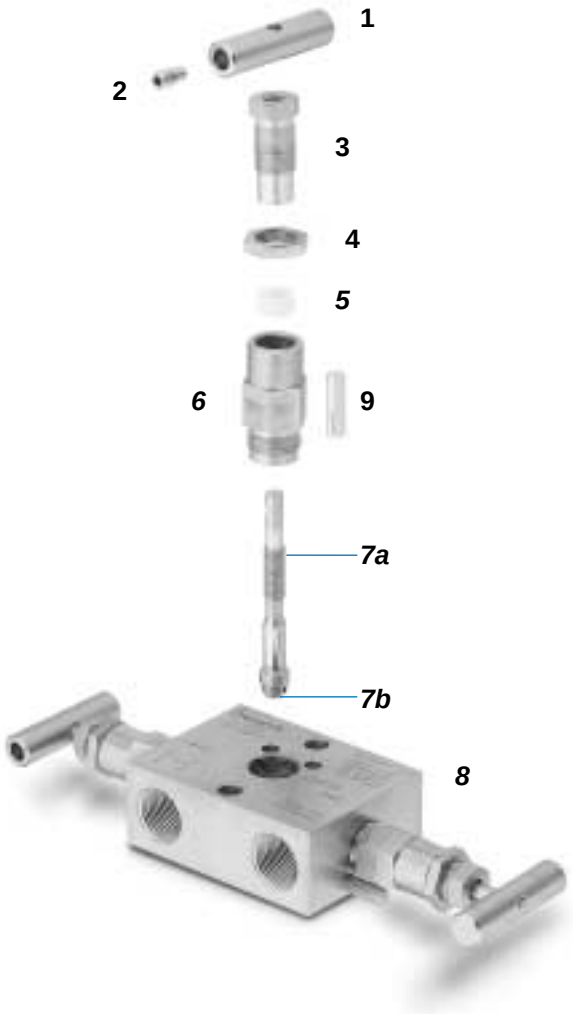
V Series and VC Series

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 Jam nut	316 SS/A276
5 *Packing*	*PTFE/D1710*
6 *Bonnet*	*316 SS/A479*
7a *Stem*	*316 SS/A276*
7b *Ball tip*	*316 SS/A479*
8 *Body*	
9 Stop pin	316 SS/A479
Flange seals (not shown)	*Fluorocarbon FKM*
Flange bolts (not shown)	B8M CL.2B/A193 (V and VC, fractional); ISO 3506 (VC only, metric)
Lubricants	*Fluorinated base with PTFE and tungsten disulfide*
	Hydrocarbon-based

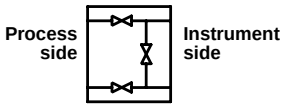
Wetted components listed in *italics.*



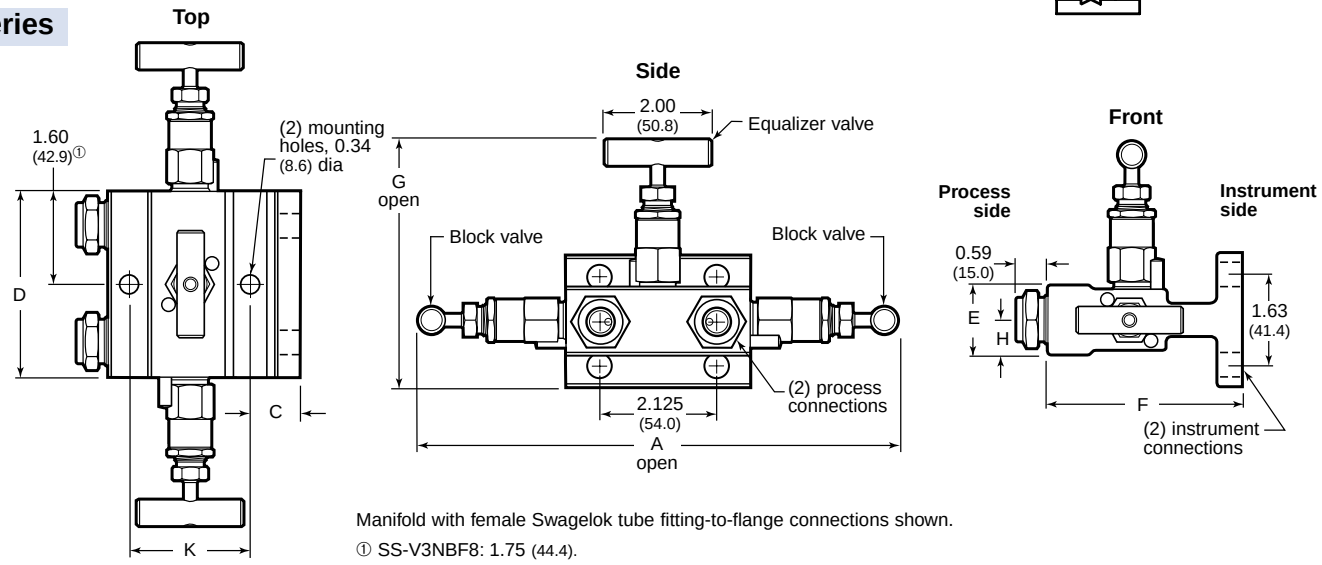
3-Valve Manifolds

Ordering Information and Dimensions

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



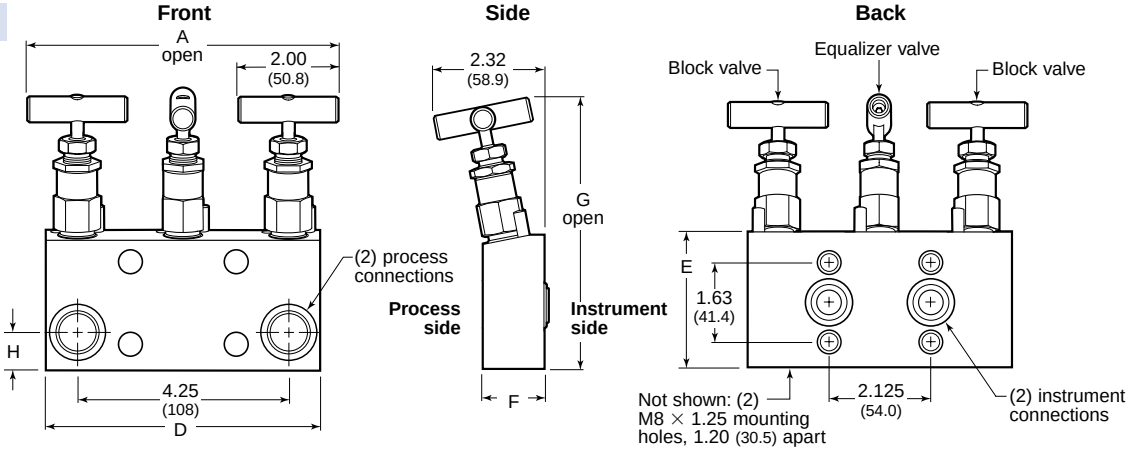
V Series



Manifold with female Swagelok tube fitting-to-flange connections shown.

① SS-V3NBF8: 1.75 (44.4).

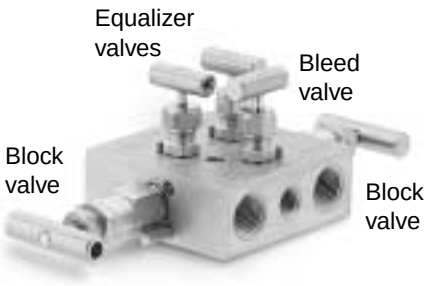
VC Series



Series	End Connections		Ordering Number	Dimensions, in. (mm)							
	Process	Instrument		A	C	D	E	F	G	H	K
V Series	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)	Flange (MSS)	SS-V3NBFL				2.40 (61.0)	4.07 (103)	4.55 (116)	1.20 (30.5)	
VC Series	1/2 in. female NPT	Flange (MSS)	SS-VC3NBF8-FL	6.25 (159)	—	5.50 (140)	2.75 (69.9)	1.30 (33.0)	5.55 (141)	0.75 (19.1)	—
		Flange (DIN)	SS-VC3NBF8-FD3								
	1/2 in. female ISO 228/1 pipe	Flange (MSS)	SS-VC3NBF8RP-FL								
		Flange (DIN)	SS-VC3NBF8RP-FD3								

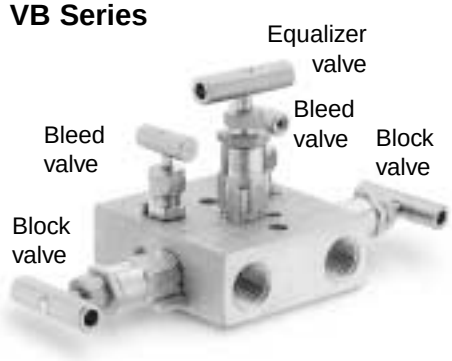
5-Valve Manifolds

V Series



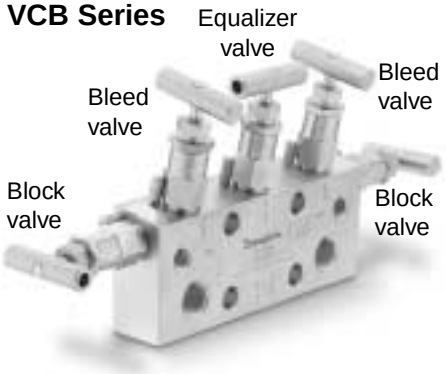
- Designed for mounting on differential pressure transmitters where a double-equalize function is required
- Consists of two block valves, two equalizer valves, and one bleed valve
- End connections—1/2 in. and 12 mm female Swagelok tube fittings, 1/2 in. female pipe (NPT), and flange (MSS)
- Horizontal body style

VB Series



- Designed for mounting on differential pressure transmitters where a double-bleed function is required.
- Consists of two block valves, two bleed valves, and one equalizer valve
- End connections—1/2 in. and 12 mm female Swagelok tube fittings, 1/2 in. female pipe (NPT), and flange (MSS)
- Horizontal body style

VCB Series



- Designed for mounting on differential pressure transmitters where a double-bleed function is required.
- Consists of two block valves, two bleed valves, and one equalizer valve
- End connections—1/2 in. female pipe (NPT and ISO 228/1) and flange (DIN and MSS)
- Vertical body style

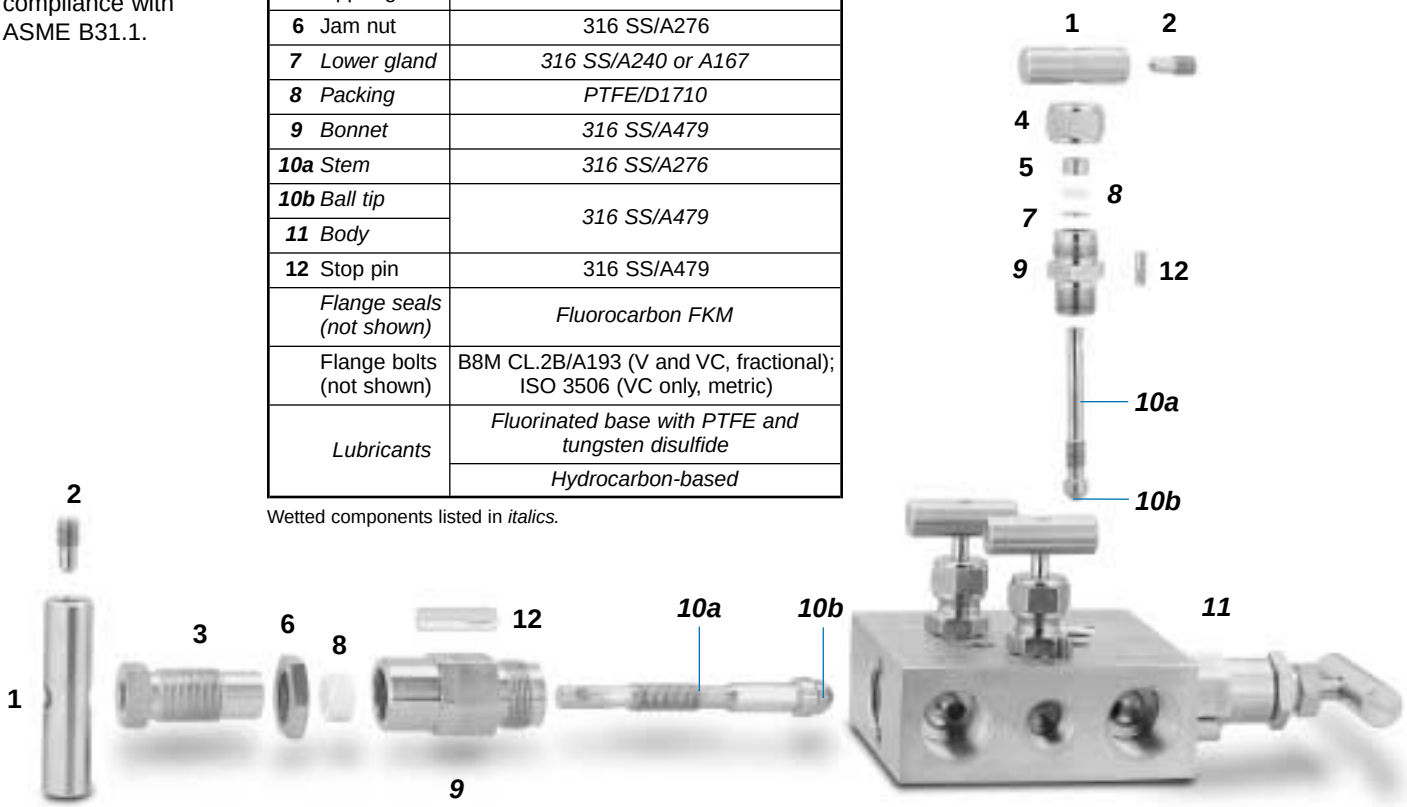
V Series

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 (V and VC, fractional); ISO 3506 (VC only, metric)
Lubricants	*Fluorinated base with PTFE and tungsten disulfide*
	Hydrocarbon-based

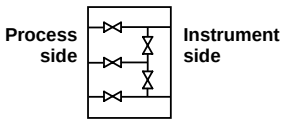
Wetted components listed in *italics*.



5-Valve Manifolds

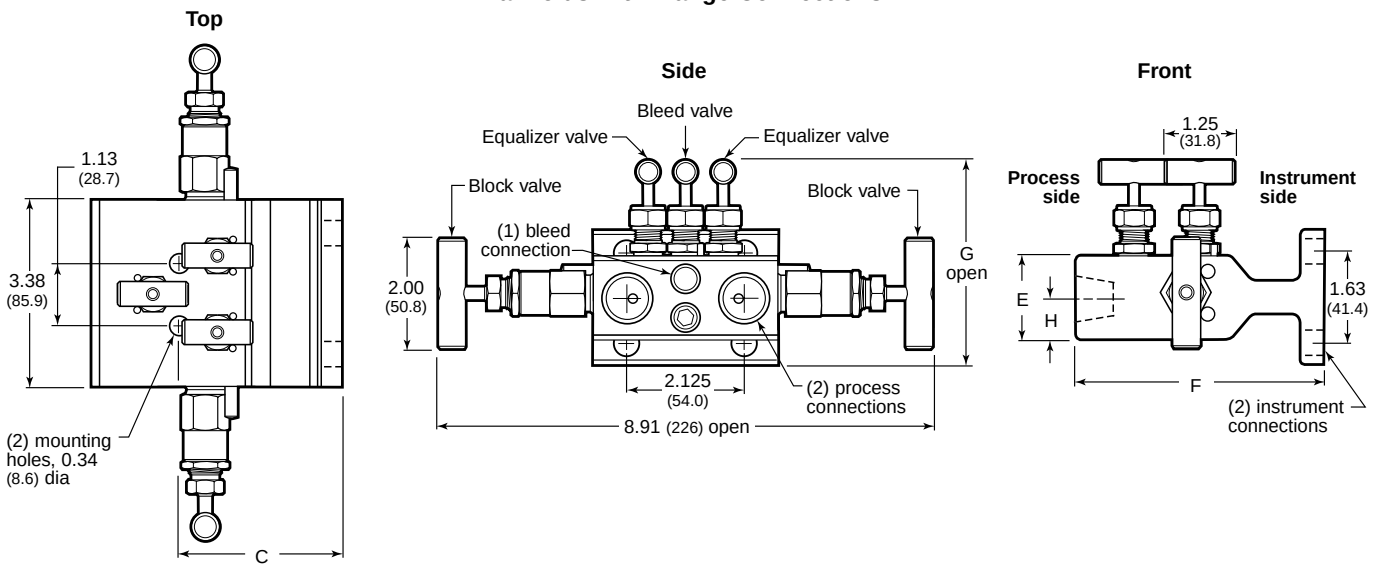
Ordering Information and Dimensions

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

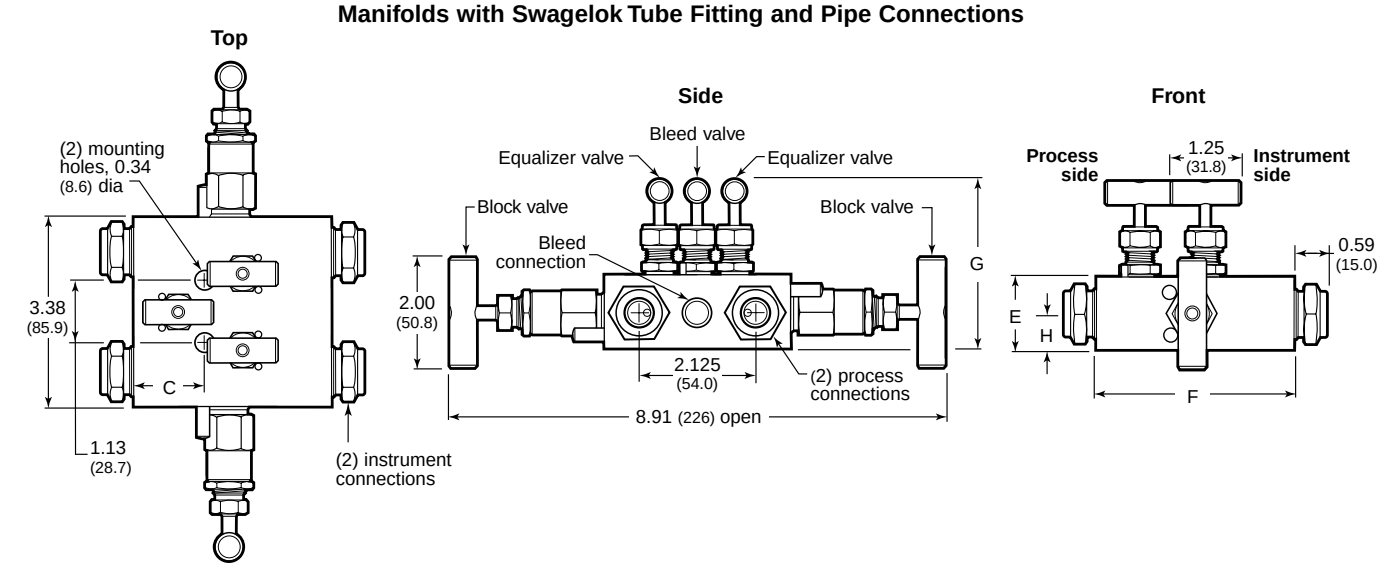


V Series

Manifolds with Flange Connections



Manifolds with Swagelok Tube Fitting and Pipe Connections



End Connections			Ordering Number	Dimensions, in. (mm)				
Process	Instrument	Bleed		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)	3.65 (92.7)	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)	3.65 (92.7)	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)	3.07 (78.0)	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)	3.66 (93.0)	—

5-Valve Manifolds

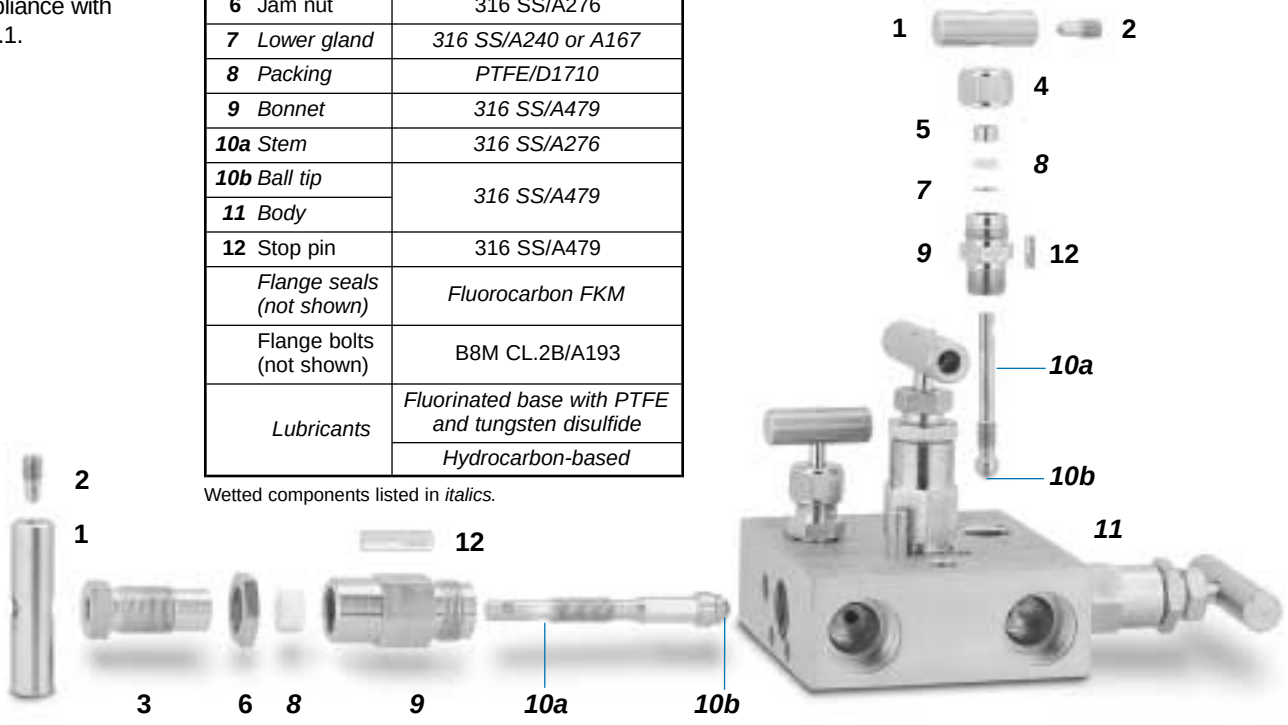
VB Series

Materials of Construction

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

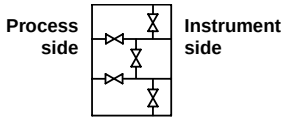
Component	Material Grade/ ASTM Specification
1 Handle	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Packing nut	
5 Upper gland	
6 Jam nut	316 SS/A276
7 *Lower gland*	*316 SS/A240 or A167*
8 *Packing*	*PTFE/D1710*
9 *Bonnet*	*316 SS/A479*
10a *Stem*	*316 SS/A276*
10b *Ball tip*	*316 SS/A479*
11 *Body*	
12 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

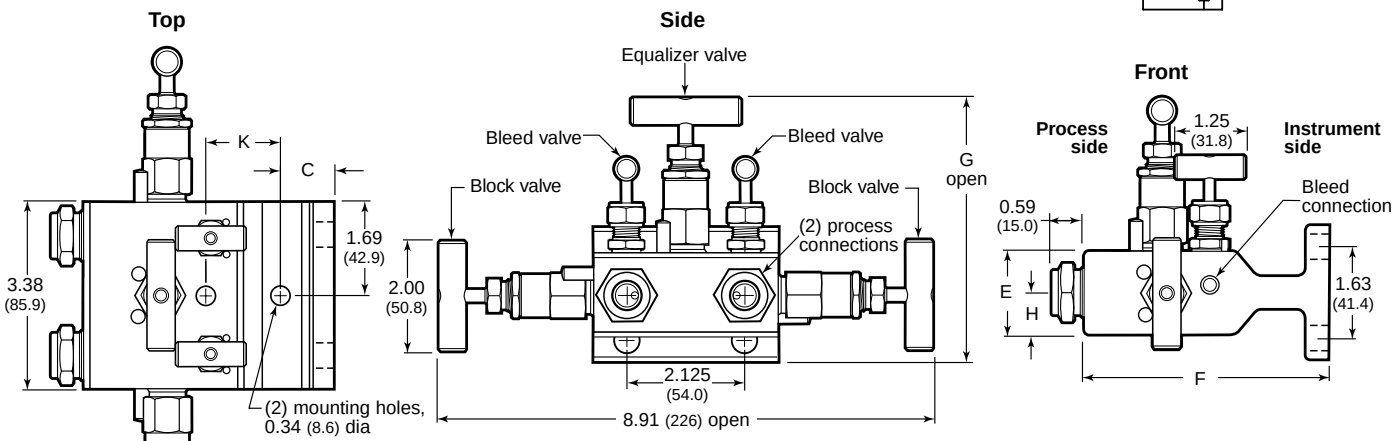
Wetted components listed in *italics*.



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 shown.

End Connections			Ordering Number	Dimensions, in. (mm)					
Process	Instrument	Bleed		C	E	F	G	H	K
1/2 in. female NPT		1/8 in. female NPT	SS-VB5NBF8	3.09 (78.5)	1.31 (33.3)	3.62 (91.9)	4.08 (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)	0.71 (18.0)	1.35 (34.3)
1/2 in. female Swagelok tube fitting			SS-VB5NBFS8	3.05 (77.5)	1.31 (33.3)	3.55 (90.2)	4.08 (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)	4.71 (120)	0.75 (19.1)	1.35 (34.3)

5-Valve Manifolds

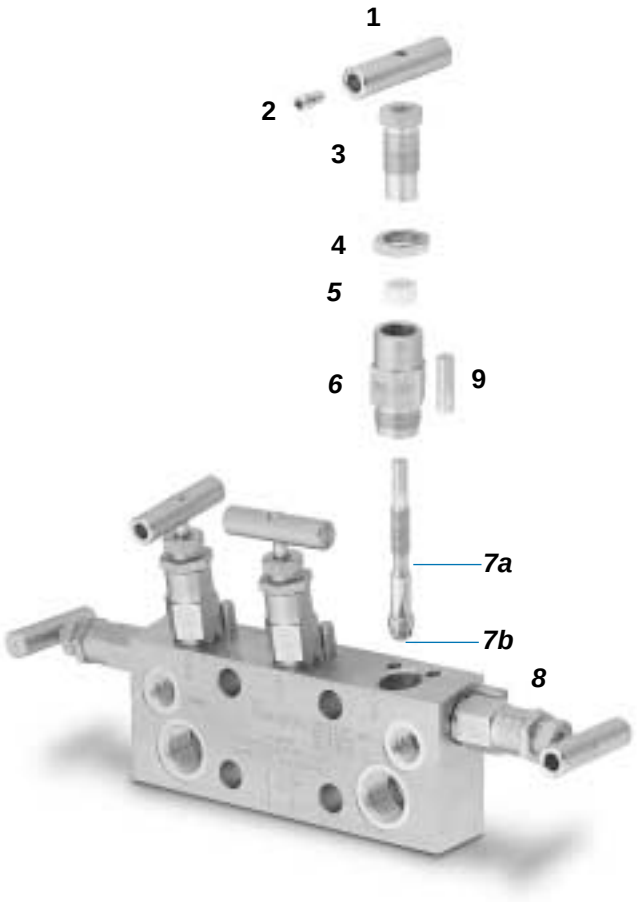
VCB Series

Materials of Construction

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

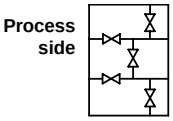
Component	Material Grade/ ASTM Specification
1 Handle	316 SS/A479
2 Set screw	
3 Packing bolt	
4 Jam nut	316 SS/A276
5 *Packing*	*PTFE/D1710*
6 *Bonnet*	*316 SS/A479*
7a *Stem*	*316 SS/A276*
7b *Ball tip*	*316 SS/A479*
8 *Body*	
9 Stop pin	316 SS/A479
Flange seals (not shown)	*Fluorocarbon FKM*
Flange bolts (not shown)	B8M CL.2B/A193 (fractional); ISO 3506 (metric)
Lubricants	*Fluorinated base with PTFE and tungsten disulfide*
	Hydrocarbon-based

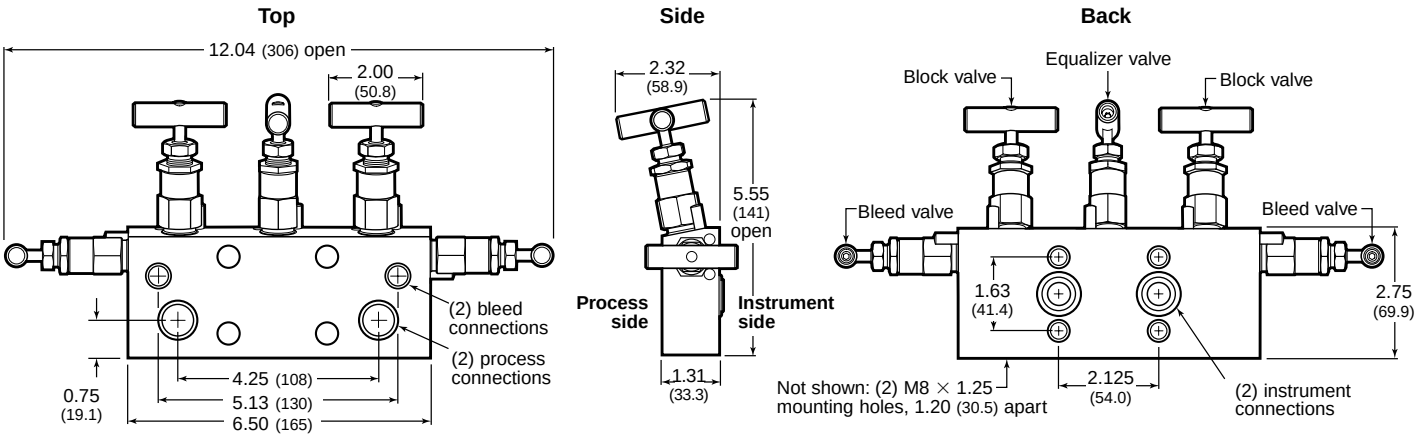
Wetted components listed in *italics*.



Ordering Information and Dimensions

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





End Connections			Ordering Number
Process	**Instrument**	**Bleed**	
1/2 in. female NPT	Flange (MSS)	1/4 in. female NPT	SS-VCB5NBF8-FL
	Flange (DIN)		SS-VCB5NBF8-FD3
1/2 in. female ISO 228/1 pipe	Flange (MSS)	1/4 in. female ISO 228/1 pipe	SS-VCB5NBF8RP-FL
	Flange (DIN)		SS-VCB5NBF8RP-FD3

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.
- Not available on manifolds with DIN flanges.

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

Example: SS-VC3NBF8-FL**-G**

Flange Seal Materials

- MSS flange seals are available in Grafoil, virgin PTFE, and reinforced PTFE for system compatibility.
- DIN flange seals are available in fluorocarbon FKM only, as specified by DIN EN 61518.
- 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.

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

Example: SS-VC3NBF8-FL**-T**

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** as a suffix 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

VC and VCB Series with MSS Flanges

Flange Seal Material	Kit Ordering Number	
	2-Valve	3- and 5-Valve
Fluorocarbon FKM	SS-MK-VC2V	SS-MK-VC3V
Grafoil	SS-MK-VC2G	SS-MK-VC3G
Virgin PTFE	SS-MK-VC2T	SS-MK-VC3T
Reinforced PTFE	SS-MK-VC2R	SS-MK-VC3R

VC and VCB Series with DIN Flanges

Flange Seal Material	Kit Ordering Number	
	2-Valve	3- and 5-Valve
Fluorocarbon FKM	SS-MK-VC2VFD3	SS-MK-VC3VFD3

Mounting Kits

Mounting Bracket Kit

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

Manifold Series	Kit Ordering Number
V, VB, and VL	SS-MB-VBK
VC	SS-MB-VCBK

Steam-Trace Block Kit

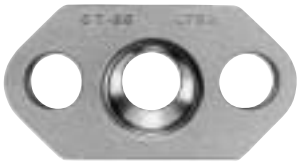
Kit contains plated steel trace block with two 1/4 in. female NPT ports, cap screws, nuts, lock washers, block retainer plate, heat transfer gasket, and instructions.

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	

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

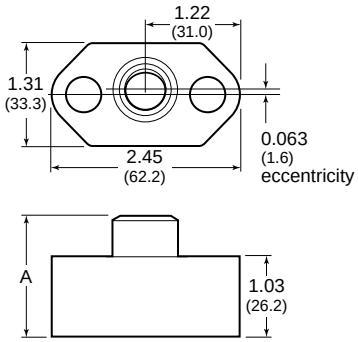
Swagelok Tube Fitting

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	
		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
Virgin PTFE	-MKT	–65 to 250°F (–53 to 121°C)
Reinforced PTFE	-MKR	
Grafoil	-MKG	–65 to 1000°F (–53 to 537°C)

Example: SS-**MKT**-V3F4

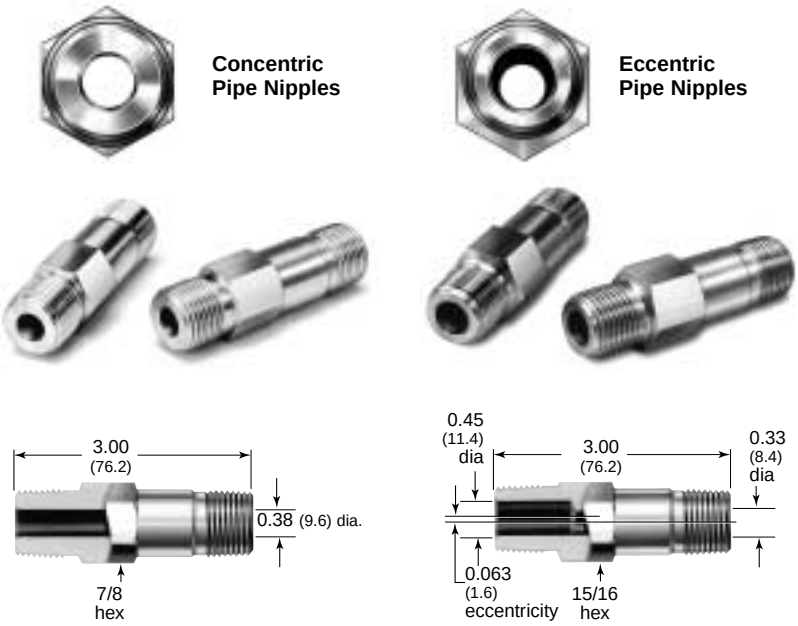
Accessories

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.

Ordering Information

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



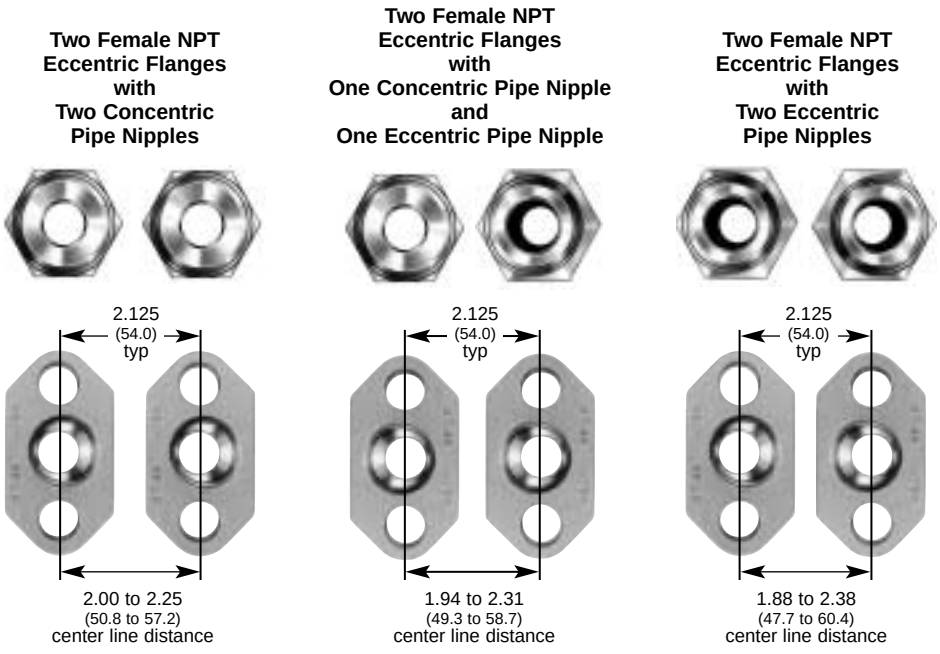
Dimensions, in inches (millimeters), are for reference only and are subject to change.

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.



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

Accessories

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 bleed 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/bleed 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 bleed port size of the transmitter plug.
- Are available in 316 stainless steel material.

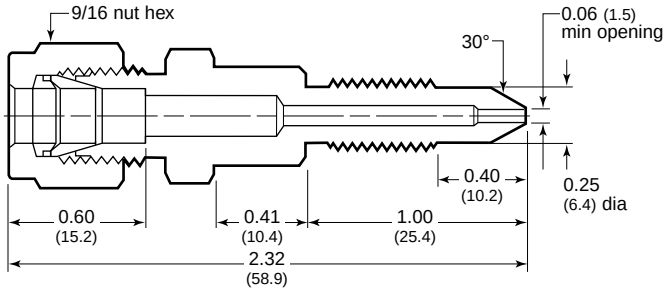
Ordering number for fitting with 5/16-24 thread:
SS-400-1-0253

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

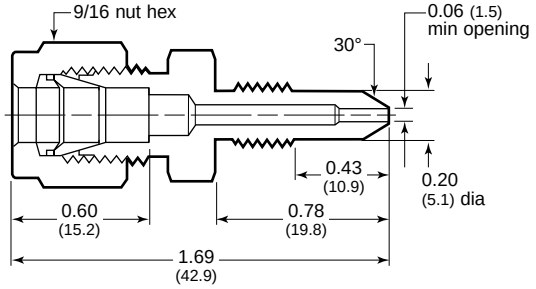
Dimensions

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 BSP/ISO 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.

For more information, see the Swagelok *Pipe Fittings* catalog.

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.

Caution: Do not mix or interchange parts with those of other manufacturers.

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