

Manifolds - Three Valve

Differential pressure manifolds with two main block valves and an equalizing valve for direct or remote mounting at pressures to 6000 psig (414 barg)

General Application

The M4A is designed for mounting on differential pressure transmitters with 2 1/8" (54 mm) center-to-center connections. The M4T is used in applications where direct coupling to orifice flanges is not wanted.

TECHNICAL DATA

Materials

CS, 316 SS, Monel®, Hastelloy®

Seats:

Metal or soft

Connections:

Instrument: Flanged

Process: Flanged or 1/2" NPT

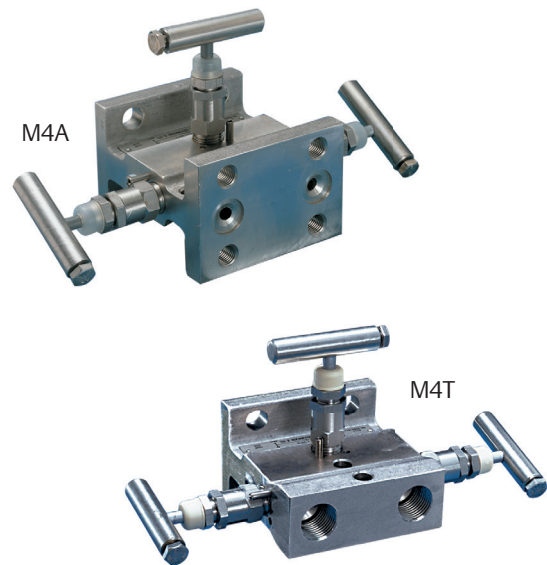
Pressure (max):

6000 psig (414 barg) standard

Temperature range (min/max):

-70°C to 1000°F

(-57°C to 538°C)



Features

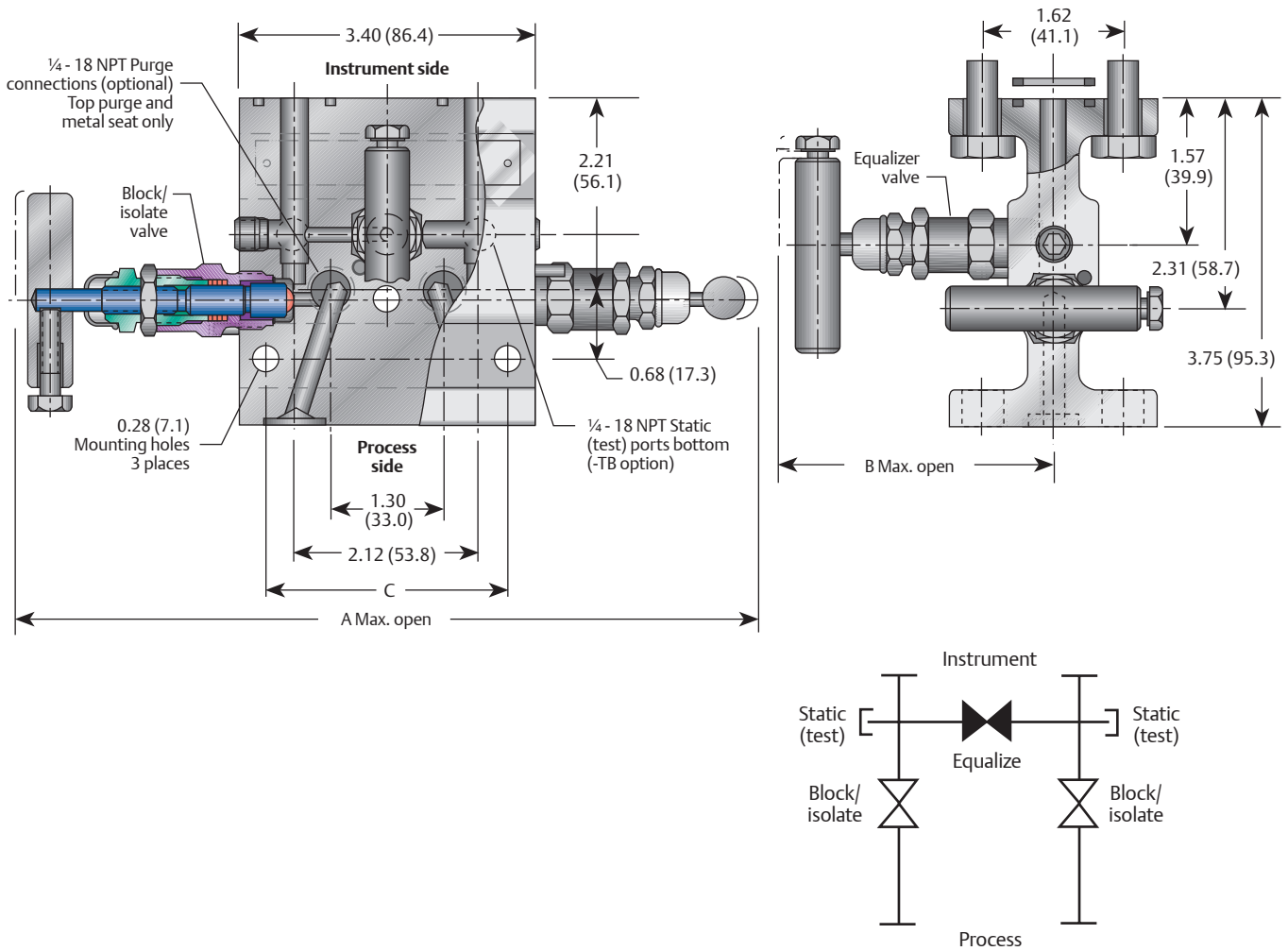
- Cost savings of 20-30% when unitizing the manifolding by eliminating several parts used in conventional methods of 'piping up'.
- ENC plated roddable soft seats simplify maintenance and ensure accuracy.
- Back seat stem design eliminates stem blowout or accidental removal while in operation.
- Fewer leak points reduce the chances of leakage.
- Soft seat design enables field replacement without valve removal.
- Rolled stem threads provide a stronger, more durable thread area, increasing valve life.
- Mirror stem finish in the packing area ensures smooth operation and extends packing life.
- Constant compression metal-to-metal bonnet-to-body seal below bonnet threads prevents corrosion, eliminates tensile breakage and creates a reliable seal point.
- Easily adjustable stem packing decreases downtime and provides long service life.
- PTFE-packed design's bonnet cap protects against atmospheric contamination; reduces thread galling by containment of stem lubricant and increases valve life.
- AGCO Mount option provides installation and service benefits.

M4A SERIES

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M4A Dimensions

M4A Metal Seat (Soft Seat available) Dimensions, inches [mm]



Dimensions, inches (mm)

Valve ^[1]	A	B	C
Soft seat - PTFE packed	8.60 (218)	3.20 (81)	1.06 (27)
Metal seat - PTFE packed	8.60 (218)	3.20 (81)	2.80 (71)
Metal seat - GRAFOIL® packed	9.90 (251)	3.85 (98)	2.80 (71)

NOTE

- Approximate valve weight: 4.7 lb (2.1 kg).
 Metal seat:
 0.156-inch (4.0 mm) diameter orifice.
 Valve Cv 0.36 maximum.
 Soft seat:
 0.187-inch (4.8 mm) diameter orifice.
 Valve Cv 0.83 maximum.

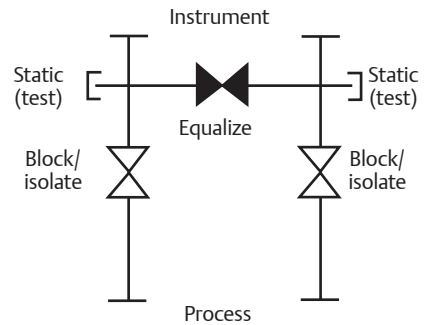
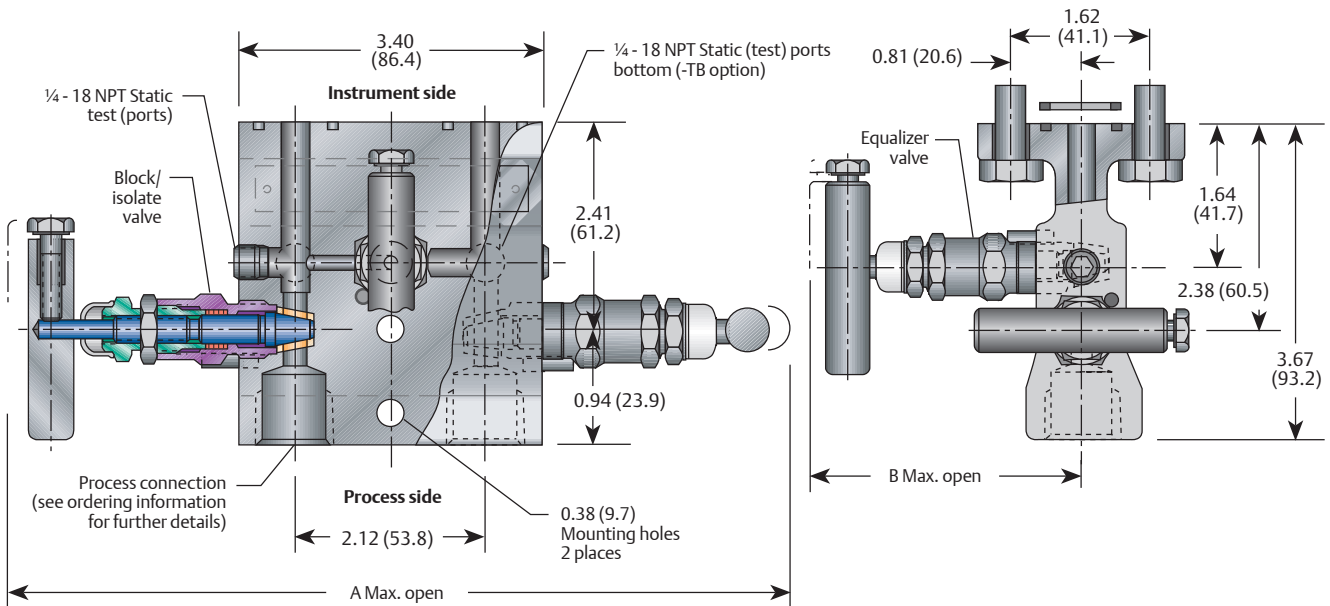
Mounting

The M4A mounts either directly at the orifice flange union or to a 2" pipe stand using the AGCO Mount kit. For direct or remote mounting, it enables the transmitter's futbol flanges to connect the process signal lines to the manifold directly, with either 1/2" pipe or tubing connections.

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M4T Dimensions

M4T Soft Seat (Metal Seat available) Dimensions, inches [mm]



Dimensions, inches (mm)

Valve ^[1]	A	B
Soft seat - PTFE packed	8.60 (218)	3.20 (81)
Metal seat - PTFE packed	8.60 (218)	3.20 (81)
Metal seat - GRAFOIL [®] packed	9.90 (251)	3.85 (98)

NOTE

- Approximate valve weight: 4.5 lb (2.0 kg).
 Metal seat:
 0.187-inch (4.8 mm) diameter orifice.
 Valve Cv 0.36 maximum.
 Soft seat:
 0.187-inch (4.8 mm) diameter orifice.
 Valve Cv 0.83 maximum.

M4A/M4T SERIES

Manifolds - Three Valve

Bonnet Assembly Options

The M4A and M4T offer the option of metal or roddable soft seats. All stem threads are ENC plated, rolled and lubricated to prevent galling and reduce operating torque. The stem seal is a patented PTFE packing gland which is adjustable in service. All bonnets are assembled with a bonnet locking pin to prevent accidental removal while in service and a protective dust cap is fitted to contain stem lubricant and prevent the influx of contaminants.

Soft-seated Bonnet Assemblies

The soft-seated bonnet assemblies have a one-piece rotating stem and plug. In addition to the adjustable PTFE packing gland, the bonnets are available with a FKM O-ring and PTFE back-up ring.

Metal-seated Bonnet Assemblies

The metal-seated bonnet assemblies have a rotating stem with free swivel ball-type seat for long service life. The specially hardened ball seat is ideal for both gas and liquid service.

Standard Materials

Metal seat				
Valve	Body ⁽¹⁾	Bonnet	Stem	Ball
CS ⁽²⁾	A108	A108 CS	A581-303	17-4 PH
CS ⁽²⁾	A105	A105 CS	A581-303	17-4 PH
316 SS	A479-316	A479-316	A276-316	316 SS
SG ⁽³⁾	A479-316	A479-316	Monel® 400	Monel® K500
SG3 ⁽⁴⁾	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®
Monel®	Monel® 400	Monel® R405	Monel® 400	Monel® K500
Hastelloy®	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®

Soft Seat				
Valve	Body	Bonnet	Stem	Seat ⁽⁴⁾
CS ⁽²⁾	A576-1018	A108 CS	A581-303	Delrin®
316 SS	A479-316	A479-316	A276-316	Delrin®
SG ⁽³⁾	A479-316	A479-316	Monel® 400	Delrin®
SG3 ⁽⁴⁾	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Delrin®

NOTES

- Instrument mounting kit furnished with the M4 includes (4) A193-B7 bolts and (2) PTFE or GRAFOIL® flange gaskets to match bonnet packing.
- CS parts are zinc TCP plated to prevent corrosion.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).
- 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Manifolds - Three Valve

Pressure and Temperature

Pressure and Temperature Ratings

Metal seat		
Valve	Packing	Ratings ^[5]
CS ^[1]	PTFE	6000 psig at 200°F (414 barg at 93°C)
		4000 psig at 500°F (276 barg at 260°C)
CS ^[1]	GRAFOIL [®]	6000 psig at 200°F (414 barg at 93°C)
	Graphite	4000 psig at 600°F (276 barg at 316°C)
316 SS	PTFE	6000 psig at 200°F (414 barg at 93°C)
		4000 psig at 500°F (276 barg at 260°C)
316 SS	Graphite	6000 psig at 200°F (414 barg at 93°C)
	GRAFOIL [®]	1500 psig at 1000°F (103 barg at 538°C)
SG ^[2] or SG3 ^[3]	PTFE	6000 psig at 200°F (414 barg at 93°C)
		4000 psig at 500°F (276 barg at 260°C)
SG ^[2] or SG3 ^[3]	GRAFOIL [®]	6000 psig at 200°F (414 barg at 93°C)
		1500 psig at 1000°F (103 barg at 538°C)
Monel [®]	PTFE	5300 psig at 200°F (360 barg at 93°C)
		4200 psig at 500°F (290 barg at 260°C)
Hastelloy [®]	PTFE	6000 psig at 200°F (414 barg at 93°C)
		4000 psig at 500°F (276 barg at 260°C)
Hastelloy [®]	GRAFOIL [®]	6000 psig at 200°F (414 barg at 93°C)
		4200 psig at 800°F (290 barg at 426°C)

Soft seat		
Valve	Packing	Ratings
CS ^[1]	PTFE	6000 psig at 200°F (414 barg at 93°C)
316 SS	FKM O-ring with PTFE back up ring	
SG ^[2] or SG3 ^[3]	PTFE	6000 psig at 200°F (414 barg at 93°C)

Minimum Temperature

Carbon steel	-20°F (-29°C)
316 SS O-ring seal	-20°F (-29°C)
316 SS, Monel [®] , Hastelloy [®]	-70°F (-57°C)
PTFE packed	
Delrin [®] Seats	-40°F (-40°)
316 SS, Hastelloy [®]	-70°F (-57°C)
GRAFOIL [®] packed	

NOTES

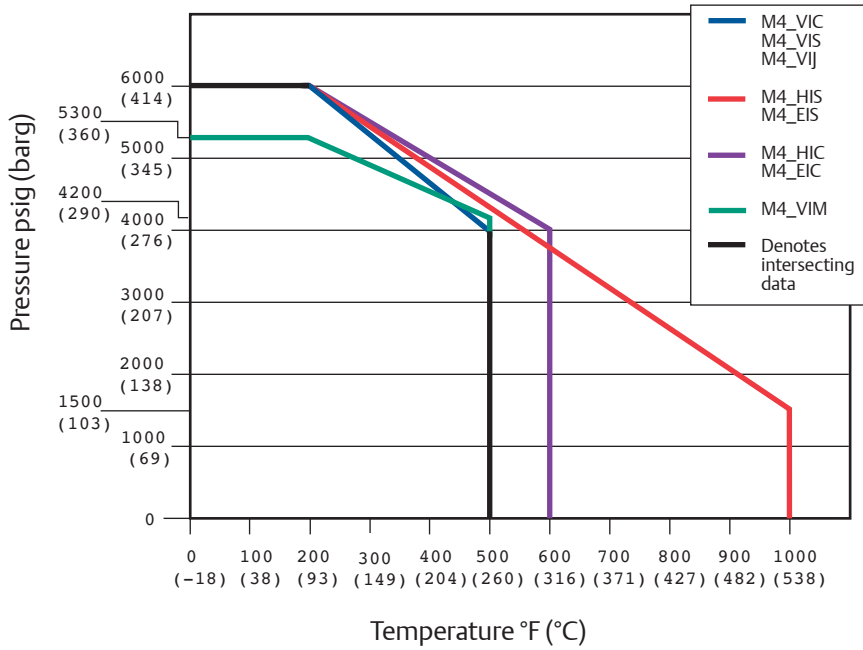
1. CS parts are zinc TCP plated to prevent corrosion.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).

M4A/M4T SERIES

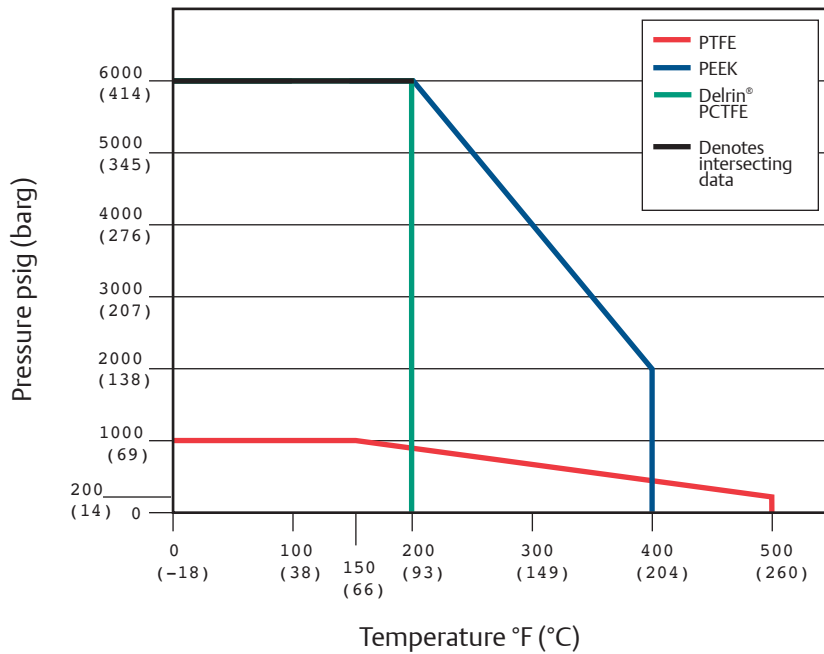
Manifolds - Three Valve

Pressure vs. Temperature

Pressure vs. Temperature - Metal Seat



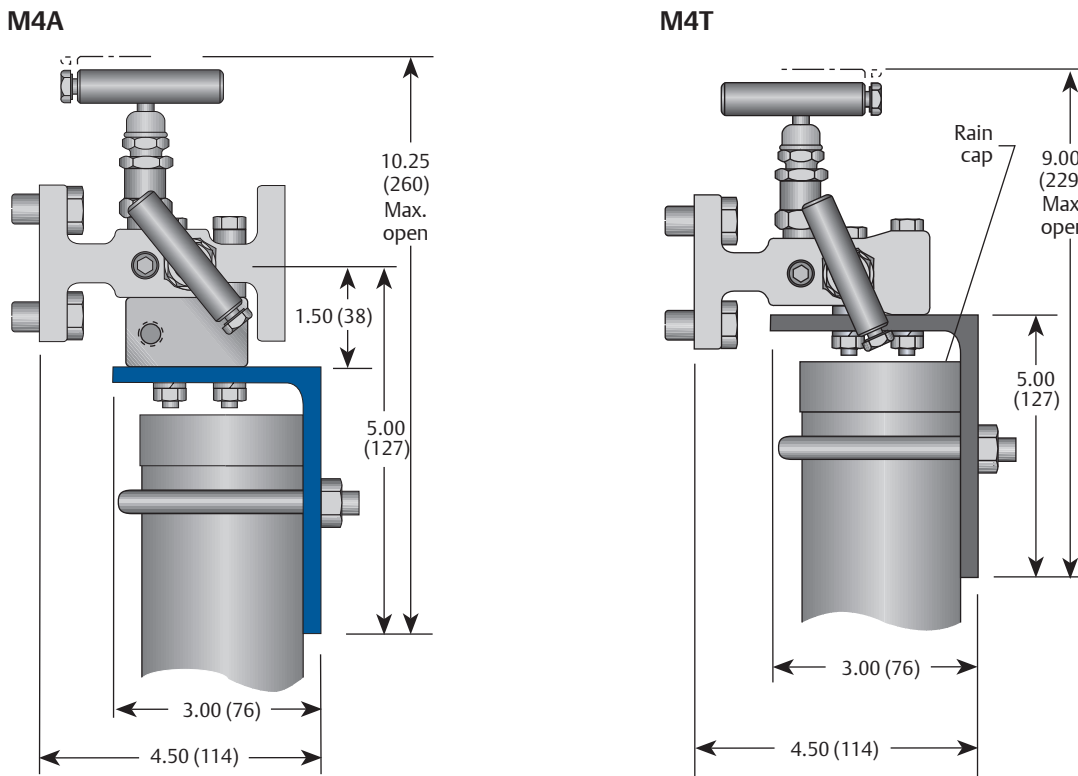
Pressure vs. Temperature - Soft Seat



Manifolds - Three Valve

M4A/M4T Dimensions

AGCO mount with M4 manifold dimensions, inches [mm]



Features and Benefits

- Lowers maintenance costs by simply removing four transmitter bolts, disconnecting signal leads and performing needed transmitter maintenance.
- Reduces potential environmental contamination and the possibility of signal-line damage.
- Reduces pipestand corrosion by using the bracket overhang and plastic rain hat to cover the pipestand.
- Optional steam heat block permits tracing the manifold and transmitter from a common connection.
- Shipped ready for assembly and installation; includes optional heat block and purge ports (if specified).
- AGCO mount system is essentially free if you get credit from the transmitter company for the mounting bracket and futbol connectors.

AGCO Mount Kits

Manifold style	Material	Description
M4T ^[1]	CS ^[2]	a. Standard kit b. For bottom purge c. With steam block
M4T ^[1]	316 SS	a. Standard kit b. For bottom purge c. With steam block
M4A ^[1] (hard seat)	CS ^[2]	a. Standard kit b. With SS bolting c. With steam block d. With steam block and SS bolting
M4A ^[1] (hard seat)	316 SS	a. Standard kit
M4A ^[1] (soft seat)	CS ^[2]	a. Standard kit b. With steam block

NOTES

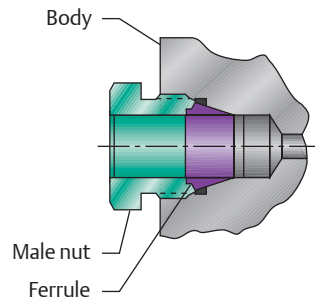
1. Vertical 2-way brackets are available.
2. Zinc TCP plated.

M4A/M4T SERIES

Manifolds - Three Valve

M4T Option

Single ferrule 'bowing' design



AGCO-Tube:

Integral tube fitting design

- Proven design performance.
- No tube twist on makeup.
- Low torque in assembly.
- Male nut
 - Silver plated to prevent galling.
 - Threads are rolled for additional strength.
 - Gives superior tubing support for vibration resistance.
- Bubble-tight seal on make and remakes.
- Fitting will hold to the burst of the tubing.
- Makeup is industry standard 1¼ turns from finger tight.
- Remake is ½ turn from finger tight which brings you back to original position, then snug slightly to respring the ferrule(s) into a sealing position.

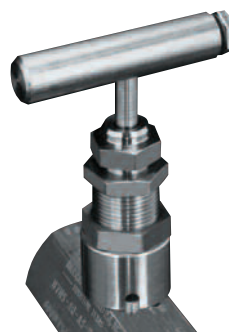
M4A and M4T Option

Bonnet lock (BL) (patented)

- Anderson Greenwood's Bonnet Lock prevents accidental loosening of the bonnet-to-body seal.
- A high-strength, short bonnet pin aligns a hex collar over the bonnet. A standard panel nut (GRAFOIL® packed) then locks the collar against the valve.
- Tests indicate the minimum torque required to break the collar loose is greater than the torque required to twist off handle.
- Available on GRAFOIL® packed bonnets.

NOTE

1. Standard on power plant manifolds.



GRAFOIL® PACKED BONNET LOCK⁽¹⁾

Manifolds - Three Valve

Selection Guide - Soft Seat

M4T		V	D	S	-4	-SG	
BASIC SERIES	BONNET PACKING	SEAT	BODY MATERIAL	PROCESS CONNECTIONS (M4T ONLY)	OPTIONS		
M4A 3-Valve manifold, flange x flange	V PTFE	D Delrin®	C CS ⁽³⁾ , A576-1018	4 1/2-inch FNPT	AM	AGCO Mount kit for 2-inch pipe stand mounting of manifold (see table page 7)	
M4T 3-Valve manifold, FNPT x flange	R O-ring (FKM)	E PEEK	S SS, A479-316		BL	Bonnet lock device (GRAFOIL® only)	
		K PCTFE	W SS, A479-316L- maximum pressure 5000 psig (345 barg)		BP	Accessory bracket - mount purge meters with -AM	
		V PTFE			HD	Hydrostatic testing (100 percent) (MSS SP-61)	
					MS	Monel® stem (standard on Monel and SG valves)	
					OC00	Cleaned for oxygen service	
					R3V	Add for use with Rosemount® model 3051C (SS 18-8 bolts)	
					SB	Steam block (CS)	
					SSA⁽¹⁾	SS flange bolt (grade 18-8) - maximum pressure rating 4500 psi (310 barg)	
					-SSB⁽¹⁾	316 SS flange bolt (B8M Class 2) - will provide full pressure rating	
					SSC⁽¹⁾	316 flange bolt (B8M) - maximum pressure rating 4500 psi (310 barg)	
					SG	(Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103 (SS valves only) (not available for O-ring packed valves)	
					SG	3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm])	
					TB	Test ports - bottom of manifold (1/4-inch FNPT) (option not available for M4A with -AM)	
					SS	All 316 SS material for non wetted components	

NOTES

1. If SS flange bolts are requested, manifold ratings are downrated.
2. Integral tube fitting design, refer to page 8.
3. CS parts are zinc TCP plated to prevent corrosion.

M4A/M4T SERIES

Manifolds - Three Valve

Selection Guide - Metal Seat

M4T		V	I	S	-4	-SG	
BASIC SERIES	BONNET PACKING	SEAT	BODY MATERIAL	PROCESS CONNECTIONS (M4T ONLY)	OPTIONS		
M4A 3-Valve manifold, flange x flange	V PTFE	I Integral (body material)	C CS ^[3] , A576-1018 (for Grafoil bonnet assemble A105)	4 1/2-inch FNPT	AM AGCO Mount kit for 2-inch pipe stand mounting of manifold (see table page 7)		
M4T 3-Valve manifold, FNPT x flange	H GRAFOIL®		S SS, A479-316	AT^[2] Integral single ferrule tube fittings -A44T 1/2-inch, 316 SS	BL Bonnet lock device (GRAFOIL® only)		
	E Low emissions graphite		M Monel® 400 (M4A and M4T only) J Hastelloy® W SS, A479-316L - maximum pressure 5000 psig (345 barg)		BP Accessory bracket - mount purge meters with -AM HD Hydrostatic testing (100 percent) (MSS SP-61) MS Monel® stem (standard on Monel® and SG valves) OC00 Cleaned for oxygen service -R3V Add for use with Rosemount® model 3051C (SS 18-8 bolts) SB Steam block (CS) SSA^[1] SS flange bolt (grade 18-8) - maximum pressure rating 4500 psi (310 barg) SSB^[1] 316 SS flange bolt (B8M Class 2) - will provide full pressure rating SSC^[1] 316 flange bolt (B8M) - maximum pressure rating 4500 psi (310 barg) SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103 (SS valves only) (not available for O-ring packed valves) SG 3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]) TB Test ports - bottom of manifold (1/4-inch FNPT) (option not available for M4A with -AM) TR68 Add for use with Rosemount® models 1151DP 6, 7, 8 and 1151HP 6, 7, 8 and any DP transmitter with bolt spacing between 2.125-inch (54 mm) and 2.281-inch (58 mm) (metal seat only) SS All 316 SS material on non wetted components T For large gasket area sealing		

NOTES

1. If SS flange bolts are requested, manifold ratings are downrated.
2. Integral tube fitting design, refer to page 8.
3. CS parts are zinc TCP plated to prevent corrosion.



Manifolds - Three Valve

Selection Guide - Power Industry Applications^[2]

M4THP		S	-4 -XP		-SSB	
BASIC SERIES		BODY MATERIAL	CONNECTIONS (PROCESS X INSTRUMENT X VENT) (M4T ONLY) ^[5]		OPTIONS	
M4AHP	3-Valve manifold, flange x flange	S SS, A479-316	4	½-inch FNPT x flange x ¼-inch FNPT	AM	AGCO Mount kit for 2-inch pipe stand mounting of manifold (see table page 7)
M4THP	3-Valve manifold, FNPT x flange		4AT	½-inch AGCO tube x flange x ¼-inch FNPT	SSB	316 SS flange bolt (B8M Class 2) - will provide full pressure rating
			4B	½-inch pipe S.W. x flange x ¼-inch FNPT	SS	All 316 SS material for non wetted components
			4TB	½-inch tube S.W. x flange x ¼-inch FNPT	R3V	Add for use with Rosemount® model 3051C (with -XP B8M Class 2 SS bolts)
					XP	Meets the requirements of B31.1

NOTES

1. Integral tube fitting design, refer to page 8.
2. All manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
3. Manifold ratings:
 - 316 SS 6000 psig at 100°F (414 barg at 38°C)
 - 3030 psig at 1000°F (209 barg at 538°C)
4. Test bottom ports standard (TB ports).
5. M4A connections are flange x flange x ¼ -inch FNPT.
6. To ASME B31.1 or B31.3, meets MSS SP-105.
7. GRAFOIL® is a registered trademark of GrafTech International.
8. Hastelloy® is a registered trademark of Haynes International, Inc.
9. Elgiloy® is a registered trademark of Elgiloy Specialty Metals.
10. Monel® is a registered trademark of the Special Metals Corporation.