Anderson Greenwood Instrumentation 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 desired.

TECHNICAL DATA

Materials:
CS, 316 SS, Monel®, Hastelloy®

Seats:
Metal or soft

Connections:
Instrument: Flanged
Process: Flanged or 1/2" NPT

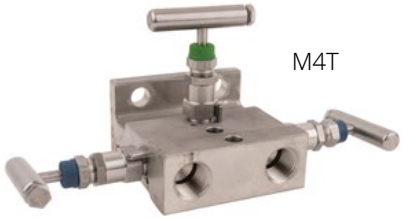
Pressure (max):
6000 psig (414 barg) standard

Temperature range (min/max):
-313°C to 1000°F
(-192°C to 538°C)

Hastelloy® is a registered trademark of Haynes International, Inc
Monel® is a registered trademark of Special Metals Corporation.

M4A

M4T



Features

- Cost savings of 20-30% when utilizing the manifold by eliminating several parts used in conventional methods of 'piping up'.
- 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.
- AGI Mount option provides installation ease and maintenance benefits.
- Stem caps color coded to easily identify valve operational purpose.

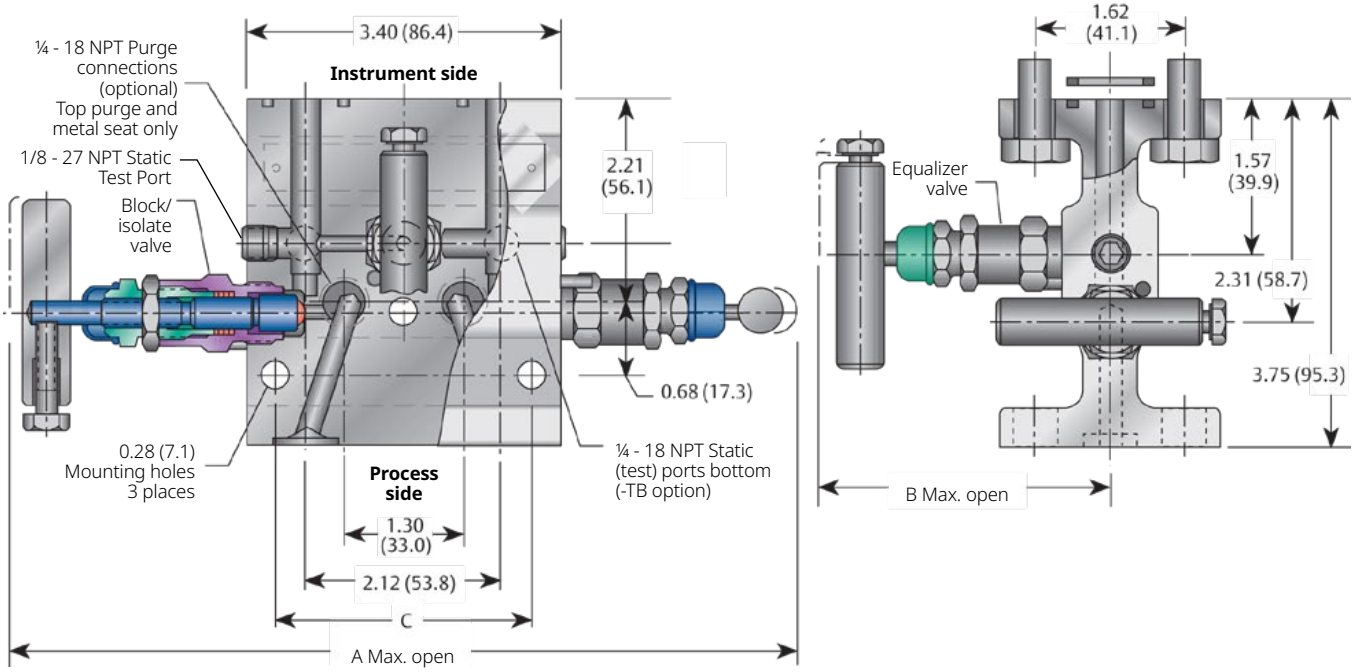
TESCOMAGI_M4A_M4T 0301223

M4A SERIES

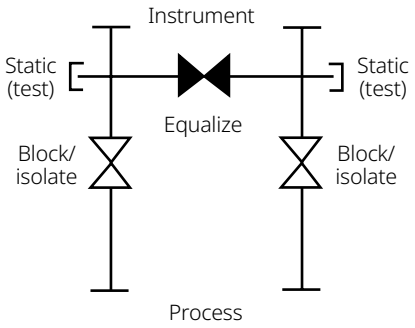
Anderson Greenwood Instrumentation Manifolds - Three Valve

M4A Dimensions

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



Color of Cap	Type of Valve
	Block / Isolate
	Equalize



Dimensions, inches (mm)

Valve[1]	A	B	C
Soft seat - PTFE packed	8.7(221)	3.18(80.8)	1.06 (27)
Metal seat - PTFE packed	8.7 (221)	3.18 (80.8)	2.80 (71)
Metal seat - Graphite packed	8.7 (221)	3.18 (80.8)	2.80 (71)

Note

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

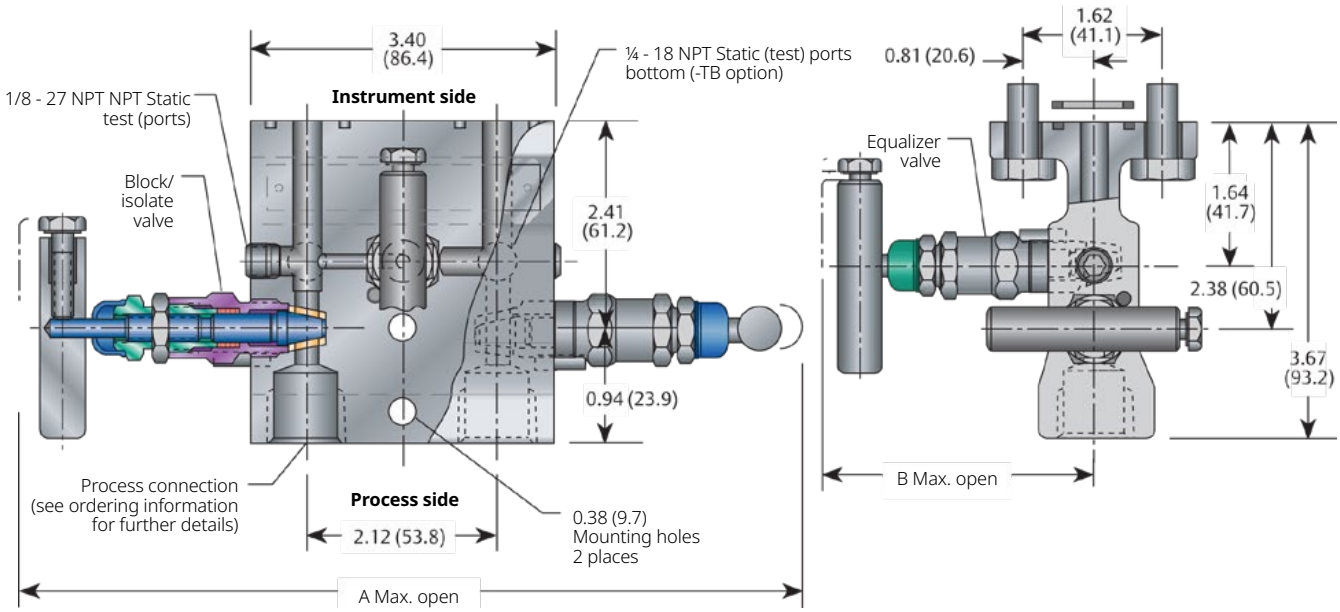
Mounting

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 ½" pipe or tubing connections.

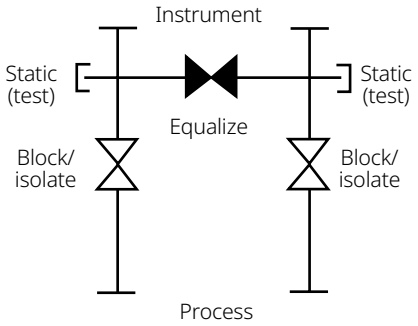
Anderson Greenwood Instrumentation Manifolds - Three Valve

M4T Dimensions

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



Color of Cap	Type of Valve
	Block / Isolate
	Equalize



Dimensions, inches (mm)

Valve[1]	A	B
Soft seat - PTFE packed	8.7(221)	3.18(80.8)
Metal seat - PTFE packed	8.7 (221)	3.18 (80.8)
Metal seat - Graphite packed	8.7 (221)	3.18 (80.8)

Note

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

M4A/M4T SERIES

Anderson Greenwood Instrumentation 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 PTFE or Graphite 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.

Optional 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]	A576-1018	A108 CS	A276-316	17-4 PH
CS[1] PTFE/Graphite	A105	A108/ ASTM 479 316SS	A276-316	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	A276-316	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
1. Instrument mounting kit furnished with the M4 includes (4) A193-B7 bolts and (2) PTFE or Graphite flange gaskets to match bonnet packing.
2. CS parts are zinc TCP plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).
5. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Anderson Greenwood Instrumentation 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]	Graphite Graphite	6000 psig at 200°F (414 barg at 93°C) 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 Graphite	6000 psig at 200°F (414 barg at 93°C) 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]	Graphite	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®	Graphite	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® Graphite packed	-70°F (-57°C)

NOTES

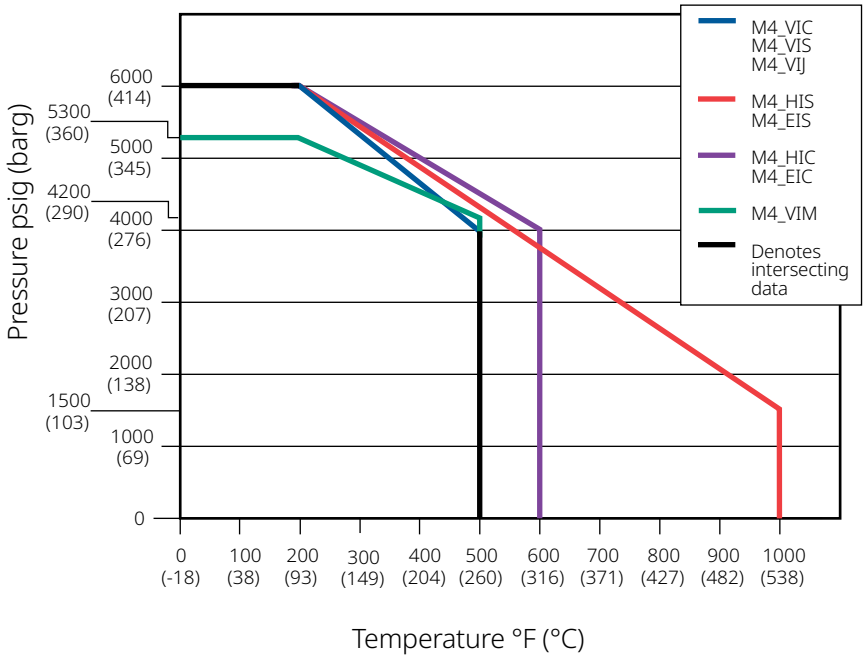
1. CS parts are zinc TCP plated to prevent corrosion.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).
4. Minimum temperature -70°F (-57°C). Carbon Steel and O-ring -20°F (-29°C), Delrin® 316SS seat -40°F (-40°C). 316SS integral metal seat minimum temperature (-313°F (-192°C) @ 2500 psi (172 bar)

M4A/M4T SERIES

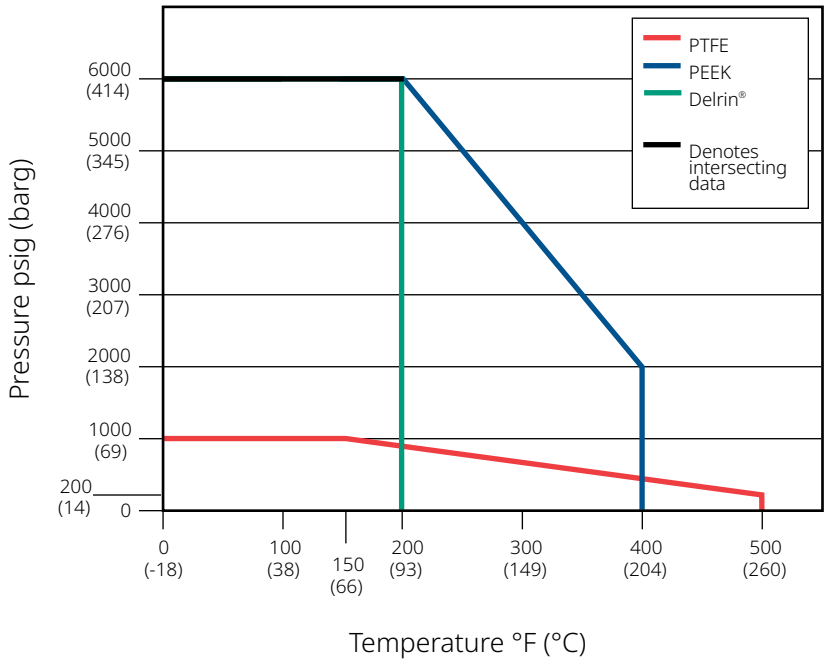
Anderson Greenwood Instrumentation Manifolds - Three Valve

Pressure vs. Temperature

Pressure vs. Temperature - Metal Seat



Pressure vs. Temperature - Soft Seat



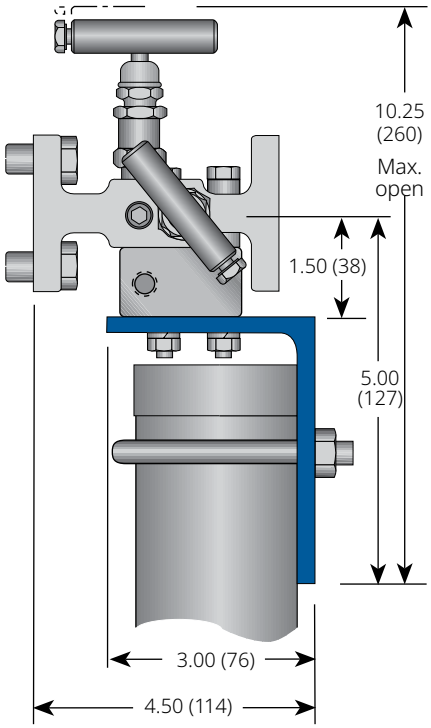
Minimum temperature -70°F (-57°C). Carbon Steel and O-ring -20°F (-29°C), Delrin® 316SS seat -40°F (-40°C).
316SS integral metal seat minimum temperature (-313°F (-192°C) @ 2500 psi (172 bar)

Anderson Greenwood Instrumentation Manifolds - Three Valve

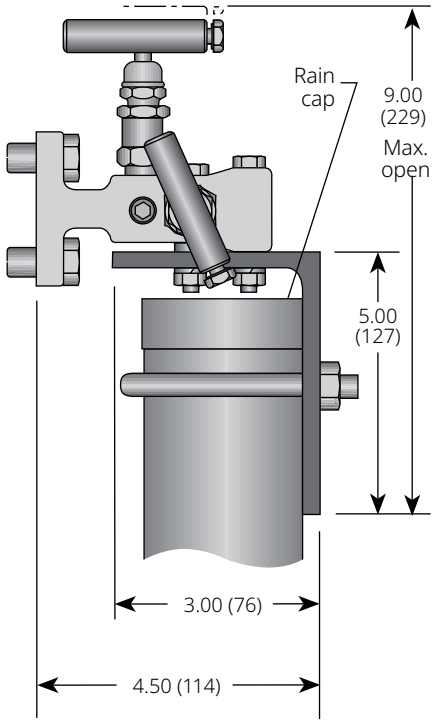
M4A/M4T Dimensions

AGCO mount with M4 manifold dimensions, inches [mm]

M4A



M4T



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).
- AGI mount system is essentially free if you get credit from the transmitter company for the mounting bracket and futbol connectors.

Mounting

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

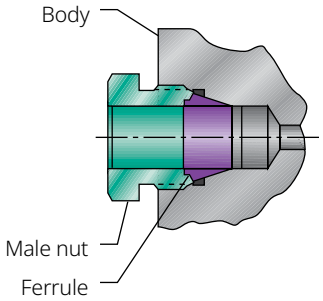
NOTES
1. Vertical 2-way brackets are available.
2. Zinc TCP plated.

M4A/M4T SERIES

Anderson Greenwood Instrumentation 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.
- Tests indicate the minimum torque required to break the collar loose is greater than the torque required to twist off handle.

NOTE
1.Standard on power plant manifolds.

BONNET LOCK[1]

Anderson Greenwood Instrumentation 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** AGI Mount kit for 2-inch pipe stand mounting of manifold (see table page 7)
	R O-ring (FKM)	**E** PEEK	**S** SS, A479-316		**AMS** AGI Mount kit for 2" pipe stand mounting of manifold 316SS Plate (see table page 7)
M4T 3-Valve manifold, FNPT x flange		**V** PTFE	**W** SS, A479-316L-maximum pressure 5000 psig (345 barg)		**BL** Bonnet lock device
					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 (¼-inch FNPT) (option not available for M4A with -AM)
					SS All 316 SS material for non wetted components
					SST 316SS Circular Tag (10 Characters max)

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

Anderson Greenwood Instrumentation 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 Graphite bonnet assemble A105)	**4** 1/2-inch FNPT	**AM** AGI Mount kit for 2-inch pipe stand mounting of manifold (see table page 7)
M4T 3-Valve manifold, FNPT x flange	**H** Graphite		**S** SS, A479-316	**AT**[2] Integral single ferrule tube fittings -A44T 1/2-inch, 316 SS	**AMS** AGI Mount kit for 2" pipe stand mounting of manifold 316SS Plate (see table page 7)
					BL Bonnet lock device
	E Low emissions graphite		**M** Monel® 400 (M4A and M4T only)		**BP** Accessory bracket - mount purge meters with -AM
			J Hastelloy®		**HD** Hydrostatic testing (100 percent) (MSS SP-61)
			W SS, A479-316L - maximum pressure 5000 psig (345 barg)		**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 (¼-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
					LT Low Temperature for integral seat 316SS -313°F (-192°C) @ 2500 psi (1782 bar) Must use with -SSB option and Integral Seats and Graphite packing 316SS
					SST 316SS Circular Tag (10 Characters max)

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.

Anderson Greenwood Instrumentation 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** AGI 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. xflange 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
			SST 316SS Circular Tag (10 Characters max)

NOTES

1. Integral tube fitting design, refer to page 8.
2. All manifolds come standard with Graphite 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. Hastelloy® is a registered trademark of Haynes International, Inc.
8. Elgiloy® is a registered trademark of Elgiloy Specialty Metals.
9. Monel® is a registered trademark of the Special Metals Corporation.