

INSTRUMENTS • CONTROLS • VALVES



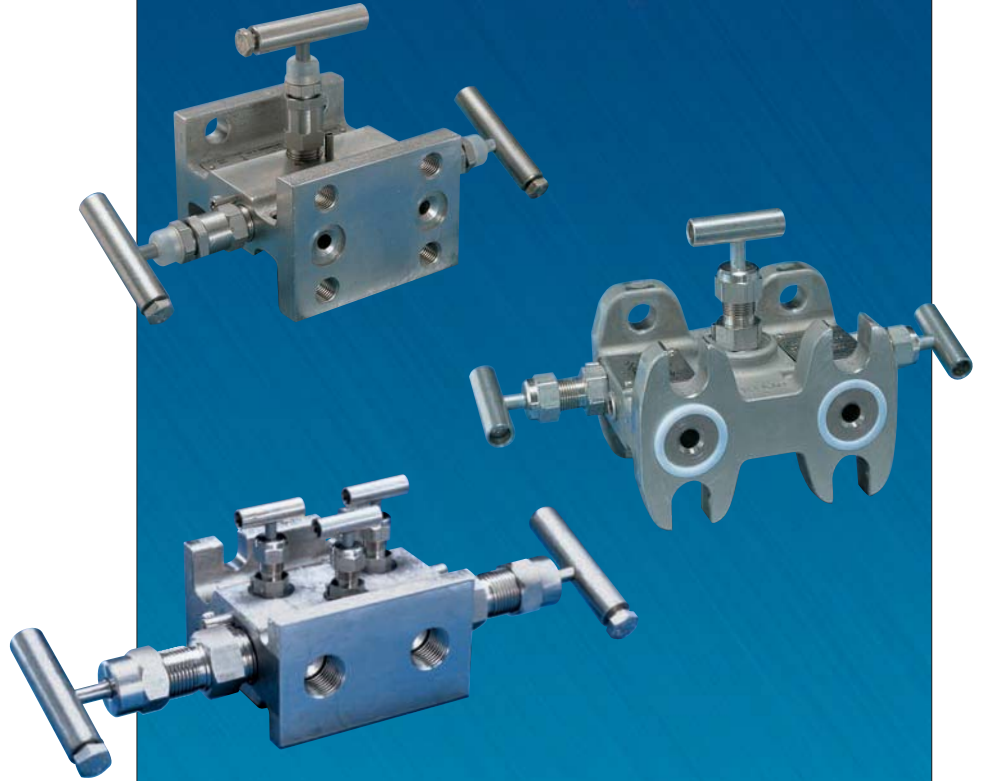
Engineering, Inc.
SINCE 1954
www.arcoengineering.com

3317 Gilmore Industrial Blvd.
Louisville, KY 40213

Ph: (502) 966-3134
Fx: (502) 966-3135

ANDERSON GREENWOOD INSTRUMENTATION PRODUCTS

Manifolds and Accessories



Flow Manifolds
Static Pressure Manifolds
Liquid Level Manifolds

Anderson Greenwood is the industry leader in instrument valve technology and the original innovator of the 3-valve manifold. Our capabilities include over 50 years of research, design and manufacture of instrumentation products. Our products are designed to be maintenance free, and are offered with numerous configurations, materials, end connections and special requirements.

Anderson Greenwood Instrumentation Products is a registered trademark of Tyco International Services AG or its affiliates in the United States and/or other countries. All other brand names, product names, or trademarks belong to their respective holders.

Contents

Bonnet Technology

Soft and Metal Seated Bonnet Assembly	1
Mini-Valve Bonnet Assembly	2

Static Pressure Manifolds

M4AP and M4TP

Product Overview – Features and Benefits	3
M4AP Dimensions	4
M4TP Dimensions	5
Materials, Pressure and Temperature Ratings	6 - 7
Ordering Information	8
ASME B31.1 or B31.3 Ordering Information	9

MP1 and MP2 Manifold

Product Overview – Features and Benefits	10
MP1 Dimensions	11
MP2 Dimensions	12
Materials, Pressure and Temperature Ratings	13 - 14
Ordering Information	14

PTM and PT7 2-Valve Manifolds

Product Overview – Features and Benefits	15
PTM Dimensions	16
PTMV Dimensions, Materials	17
PT7 Dimensions, Materials	18
Pressure and Temperature Ratings	19 - 20
Ordering Information	20 - 21
ASME B31.1 or B31.3 Ordering Information	22

A30 2-Valve Manifold

Product Overview – Features and Benefits	23
Dimensions	24
Materials, Pressure and Temperature Ratings	25
Ordering Information	26

M25, M25A, M25B, M251 and M251B Manifolds

Product Overview – Features and Benefits	27
M25 and M251 Dimensions	28
M25A Dimensions	29
M25B and M251B Dimensions	30
Materials	31
Pressure and Temperature Ratings	32
Ordering Information	33 - 34

MM2

Product Overview – Features and Benefits	35
Dimensions, Materials	36
Pressure and Temperature Ratings, Ordering Information	37

AGCO Mount Kits	38
------------------------------	----

Liquid Level Manifolds

M4TL 2-Valve Manifold

Product Overview – Features and Benefits	39
Dimensions, Materials	40
Pressure and Temperature Ratings	41
Ordering Information	42
AGCO Mount Kits	43

Differential Pressure Manifolds

M1 and M110 3-Valve Manifold

Product Overview – Features and Benefits	44
M1 Dimensions, Materials	45 - 46
Pressure and Temperature Ratings	45 - 47
Ordering Information	48 - 49
ASME B31.1 or B31.3 Ordering Information	50
M110 Dimensions, Materials, Pressure and Temperature Ratings	51 - 52
Ordering Information	52

MM1 3-Valve Mini-Manifold

Product Overview – Features and Benefits	53
Dimensions	54
Materials, Pressure and Temperature Ratings	55 - 56
Ordering Information	56

A22N Manifold

Product Overview – Features and Benefits	57
Dimensions, Materials	58
Pressure and Temperature Ratings	59
Ordering Information	60

M3A Equalizer Manifold

Product Overview – Features and Benefits	61
Dimensions, Materials	62
Pressure and Temperature Ratings, Ordering Information	63

M4A and M4T 3-Valve Manifolds

Product Overview – Features and Benefits	64
M4A Dimensions	65
M4T Dimensions	66
Materials, Pressure and Temperature Ratings	67 - 68
Ordering Information	69 - 70
ASME B31.1 or B31.3 Ordering Information	71

M45A 3-Valve Manifold

Product Overview – Features and Benefits	72
Dimensions	72
Materials, Pressure and Temperature Ratings	73
Ordering Information	74
Options	75

AX3A and AX3T 3-Valve Manifolds

Product Overview – Features and Benefits	76
Dimensions	77
Materials, Pressure and Temperature Ratings	78
Ordering Information	79
AGCO Mount Kits	80

M20 Meter Manifold

Product Overview – Features and Benefits 81
 Dimensions, Materials, Pressure and Temperature Ratings 82 - 83
 Operation Sequence 83
 Ordering Information 84

M24 5-Valve Manifold

Product Overview – Features and Benefits 85
 Dimensions 86
 Materials, Options 87
 Pressure and Temperature Ratings 88
 Ordering Information 89
 ASME B31.1 or B31.3 Ordering Information 90

A26 5-Valve Manifold

Product Overview – Features and Benefits 91
 Dimensions, Materials, Options 92
 Pressure and Temperature Ratings 93
 Ordering Information 94

MDP 5-Valve Manifold

Product Overview – Features and Benefits 95
 Dimensions, Materials 96
 Pressure and Temperature Ratings 97
 Ordering Information 98

DPM 5-Valve Manifold

Product Overview – Features and Benefits 99
 Dimensions, Materials, Pressure and Temperature Ratings 100
 ASME B31.1 or B31.3 Ordering Information 101

MM5 5-Valve Manifold

Product Overview – Features and Benefits 102
 Dimensions, Materials 103
 Pressure and Temperature Ratings, Ordering Information 104

Integral Manifolds

MC and MT

Product Overview – Features and Benefits 105
 MC2 Dimensions, Materials, Pressure and Temperature Ratings 106
 MC3 Dimensions, Materials, Pressure and Temperature Ratings 107
 MC5G Dimensions, Materials, Pressure and Temperature Ratings 108
 MC5P Dimensions, Materials, Pressure and Temperature Ratings 109
 MT2 Dimensions, Materials, Pressure and Temperature Ratings 110
 MT3 Dimensions, Materials, Pressure and Temperature Ratings 111
 Pressure vs. Temperature 112
AGCO Mount Kits 113
 Ordering Information 114 - 115
 ASME B31.1 or B31.3 Ordering Information 116

MB

Product Overview – Features and Benefits 117
 MB Dimensions, Materials, Pressure and Temperature Ratings 118 - 121
 Pressure vs. Temperature 122
AGCO Mount Kits 122
 Ordering Information 123
 ASME B31.1 or B31.3 Ordering Information 124

IMSA and IMST

Product Overview – Features and Benefits	125
IMSA Dimensions	126
IMST Dimensions	127
Materials, Pressure and Temperature Ratings	128 - 129
Ordering Information	130
ASME B31.1 or B31.3 Ordering Information	131

Natural Flow Gas Manifolds

M6A, M6T, M6TA 5-Valve Manifolds

Product Overview – Features and Benefits	132
M6A Dimensions	133
M6T Dimensions	134
M6TA Dimensions	135
Materials, Pressure and Temperature Ratings	136 - 137
Ordering Information	138

M63A, M65T, M65A 5-Valve Manifolds

Product Overview – Features and Benefits	139
M63A Dimensions	140
M65A Dimensions	141
M65T Dimensions	142
Materials, Pressure and Temperature Ratings	143 - 144
Ordering Information	145
AGCO Mount Kits	146

M19 Meter Manifold

Product Overview – Features and Benefits	147
Dimensions	148
Materials, Pressure and Temperature Ratings	149
Ordering Information	150

Distribution Manifolds

ADME

Product Overview – Features and Benefits	151
Dimensions	152
Materials, Pressure and Temperature Ratings, Ordering Information	153

Accessories

Bonnet Lock	154
Seat Resurfacing Tool	154
Rod-Out Device	155

ASME Codes

ASME B31.1 Code Requirements	156
--	-----

Notes

1. IntelliMount™ is a trademark of Anderson Greenwood, patented.
2. Bonnet Lock is a patent held by Anderson Greenwood.
3. Delrin®, Kel-F®, Teflon® and Velcro® are all registered trademarks of E.I. Du Pont de Nemours and Company.
4. Rosemount® is a registered trademark of Rosemount, Inc.
5. Multivariable™ and Coplanar™ are trademarks of Rosemount, Inc.
6. Hastelloy® is a registered trademark of Haynes International, Inc.
7. Incoloy®, Inconel® and Monel® are registered trademarks of Special Metals Corporation.
8. Elgiloy® is a registered trademark of Elgiloy Specialty Metals.
9. GRAFOIL® is a registered trademark of Graftech, Inc.
10. Viton® is a registered trademark of DuPont Performance Elastomers.

Bonnet Technology

Soft-Seated Bonnet Assembly

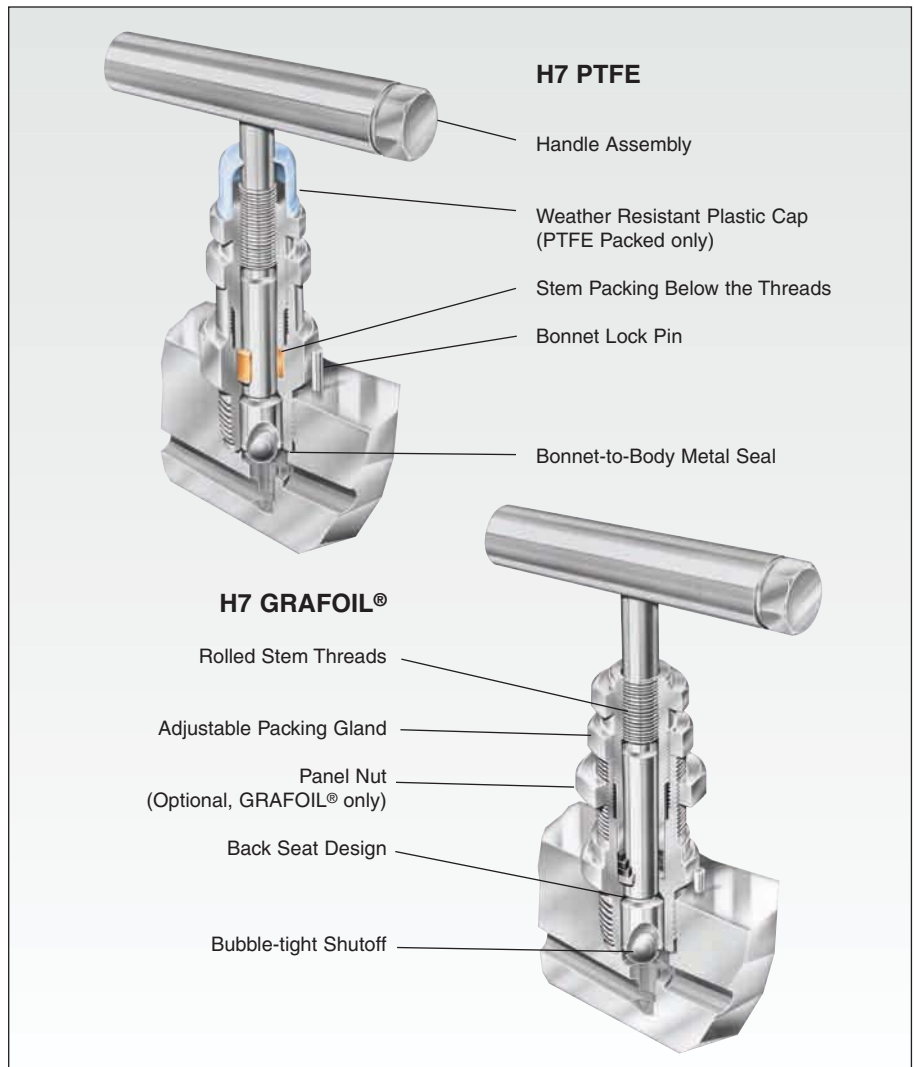
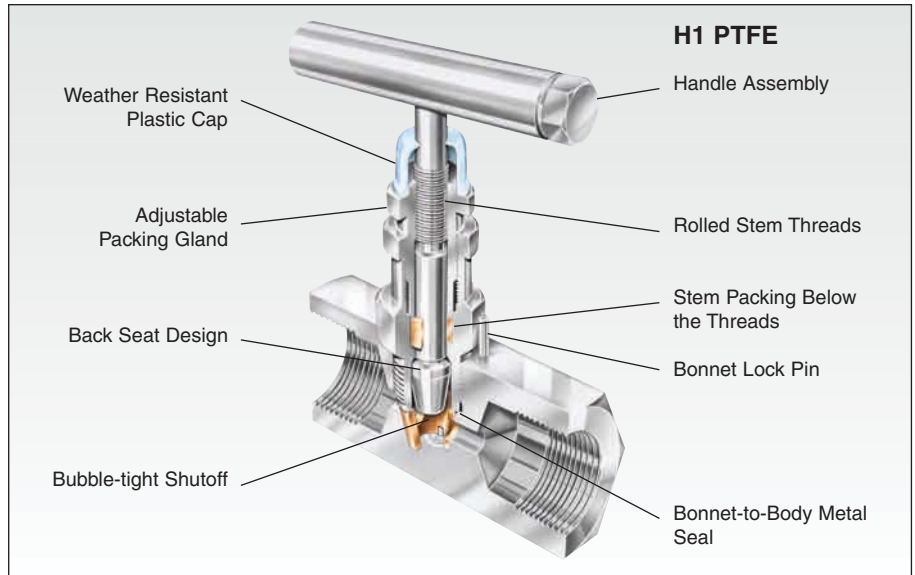
The soft-seated bonnet assembly has a one-piece rotating stem and plug. The stem threads are rolled and lubricated to prevent galling and reduce operating torque. Available with a patented PTFE packing gland, which is adjustable in service, or with a Viton® O-ring and PTFE back-up ring. A protective dust cap is fitted to contain stem lubricant and prevent the influx of contaminants. The standard hand valves have either 3/16-inch [4.8 mm] or 1/4-inch [6.4 mm] diameter orifice size. All bonnets are assembled with a bonnet locking pin to prevent accidental removal while in service.

Metal-Seated Bonnet Assembly

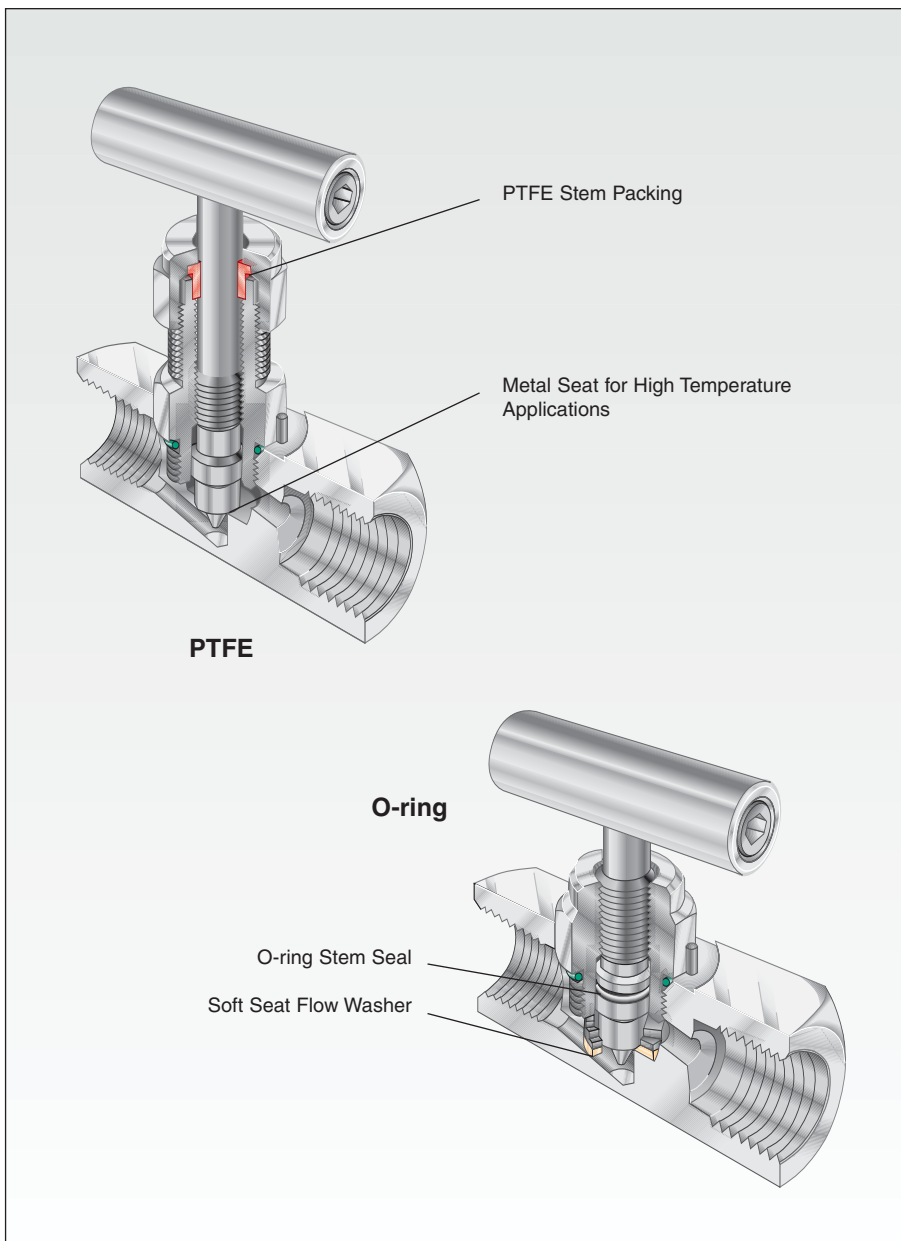
The metal-seated bonnet assembly has a rotating stem with free swivel ball-type seat for long service life. The stem threads are rolled and lubricated to prevent galling and reduce operating torque. The stem seal is a patented PTFE packing gland which is adjustable in service. A protective dust cap is fitted to contain stem lubricant and prevent the influx of contaminants. The specially hardened ball seat is ideal for both gas and liquid service. All bonnets are assembled with a bonnet locking pin to prevent accidental removal while in service.

The 10,000 psig [689 barg] bonnet assembly uses a strengthened stem and bonnet. The stem seal is a patented PTFE packing gland which is adjustable in service. A protective dust cap is fitted to contain stem lubricant and prevent the influx of contaminants. This bonnet is also fitted with a larger size T-bar handle.

The high-temperature bonnet assemblies utilizes a similarly designed stem and bonnet, and incorporates adjustable GRAFOIL® O-rings and back-up pressure rings to ensure a leak-free stem seal.



Bonnet Technology, continued



Mini-Valve Bonnet Assembly

The mini-valve bonnet assembly has a compact design with a one-piece rotating stem which is 'V' tipped with a shoulder for use as a metal or soft seated valve. The stem threads are rolled and lubricated to prevent galling and reduce operating torque.

The mini-valve bonnet comes in three designs. An adjustable PTFE stem packed bonnet is suitable for panel mounting via external bonnet threads. The O-ring bonnet assemblies use a Viton® O-ring seal below the stem thread.

A GRAFOIL® packed bonnet suitable for temperatures of up to 500°F [260°C] is available for SS valves only.

Arctic Lube

The low temperature rating for standard Anderson Greenwood carbon steel and 316 stainless steel instrumentation products is -20°F [-28°C] (standard products - standard lubrication). Our -AL (Arctic Lube) option extends the lower temperature limit to -70°F [-57°C] on all stainless steel models.

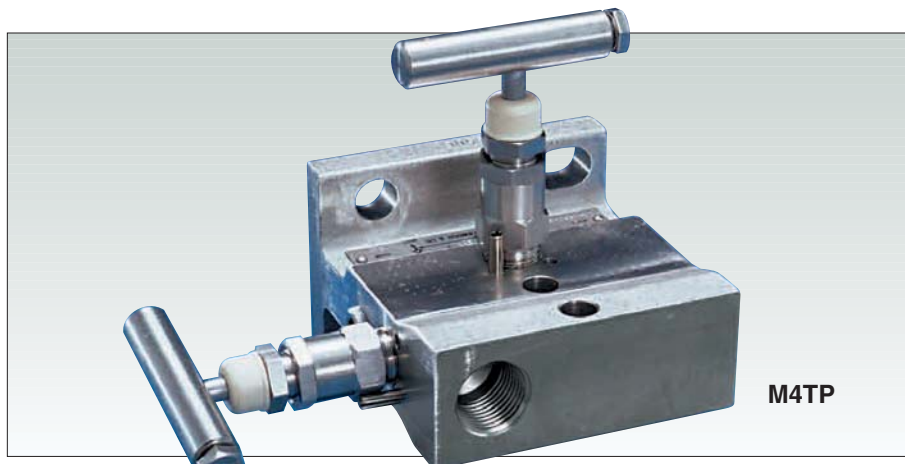
Static Pressure Manifolds – M4AP and M4TP Manifolds

Product Overview

The M4AP and M4TP are block and bleed, static pressure manifolds. They are designed for use with DP-style pressure transmitters.

The manifold's two valves have free-swiveling, ball-ended stems or soft seats. The block valve isolates the instrument from the process and is open during normal operation. When the block valve is closed, the bleed valve can be opened to vent pressure from the transmitter.

The M4AP permits the transmitter's futbol flange to connect the process signal line to the manifold directly, with either a 1/2-inch pipe or tubing connection. The M4TP has a 1/2-inch NPT inlet connection. A 1/4-inch NPT purge connection is available. The 1/4-inch NPT vent port may be used for testing calibration. They may be mounted using the AGCO Mount option for ease of assembly and maintenance.

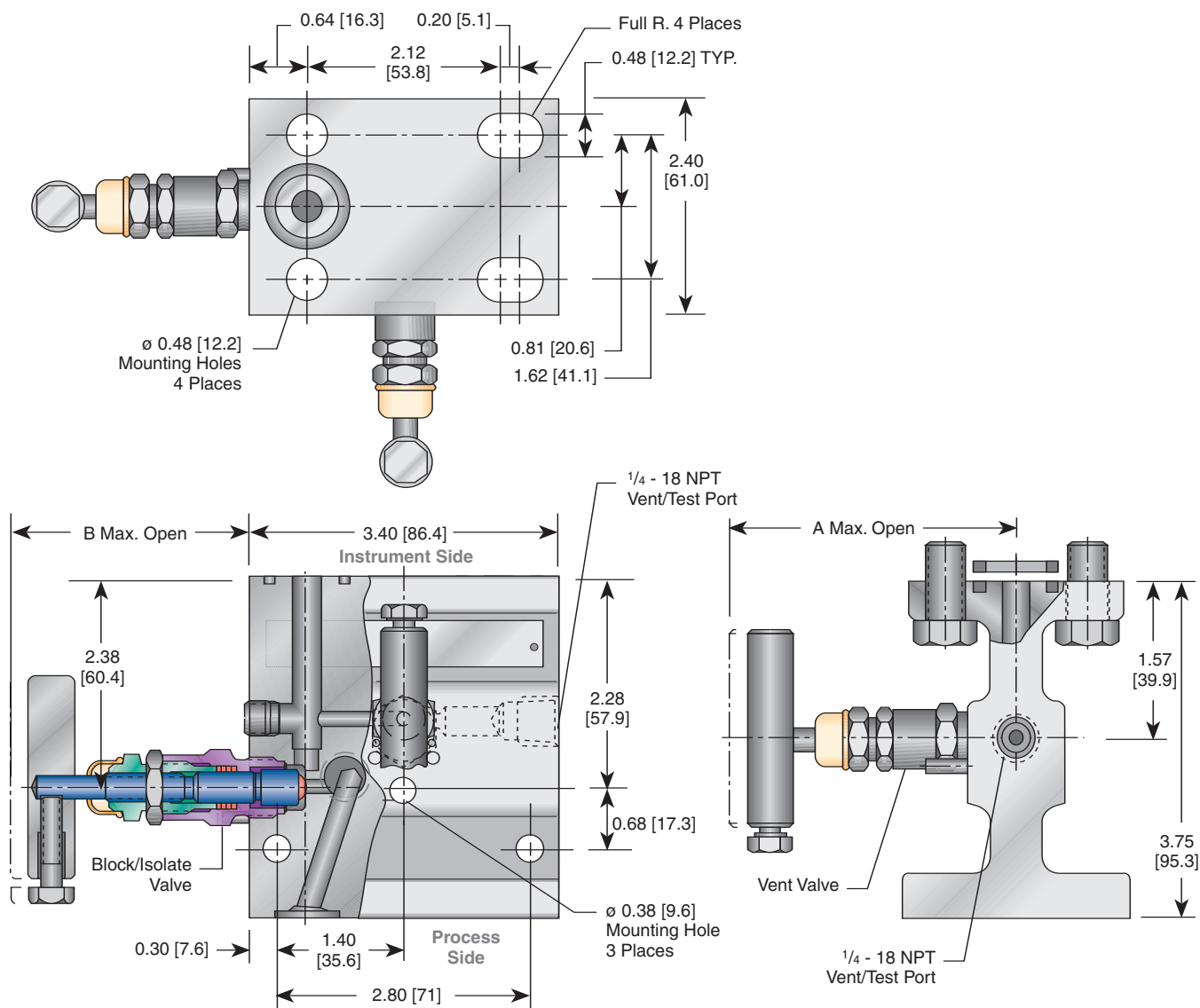


Features and Benefits

- **Cost savings** when manifolding the instruments. This eliminates several parts used in conventional methods of 'piping up' resulting in cost reduction of 20-30 percent.
- **Compact design** requires minimum space for operation and installation.
- **Fewer leak points** reduce leakage by having fewer parts to assemble.
- **Free-swiveling ball end stem (metal seat)** assures bubble-tight valve closure without seat galling.
- **The AGCO Mount provides easy instrument removal.** Direct bolting to the manifold allows the instrument to be removed independently of the piping. This facilitates repairs, service, and calibration.
- **Immediate installation** with AGCO Mount's manifold, steam block, bracket, and all associated piping can be installed without the instrument at the time of plant construction.
- **Secure mounting** is provided by the AGCO Mount. Instrument piping stability is enhanced when directly supported by the pipe stand through the manifold.
- **All valve threading is isolated.** Packing is below stem threads, body-to-bonnet seal is below the threads eliminating process fluid corrosion.
- **Less instrument damage** with the AGCO Mount. The instrument can be safely warehoused until final 'loop' checkout, reducing the chances of damage during construction.

Static Pressure Manifolds – M4AP Specifications

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

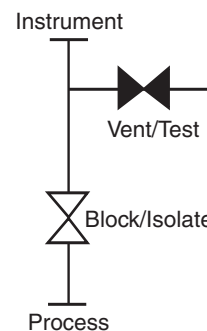


Dimensions, inches [mm]

Packing	A	B
Teflon®	3.14 [79.8]	2.60 [66.0]
GRAFOIL®	3.79 [96.3]	3.25 [82.6]

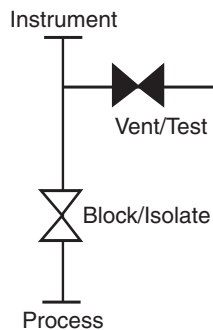
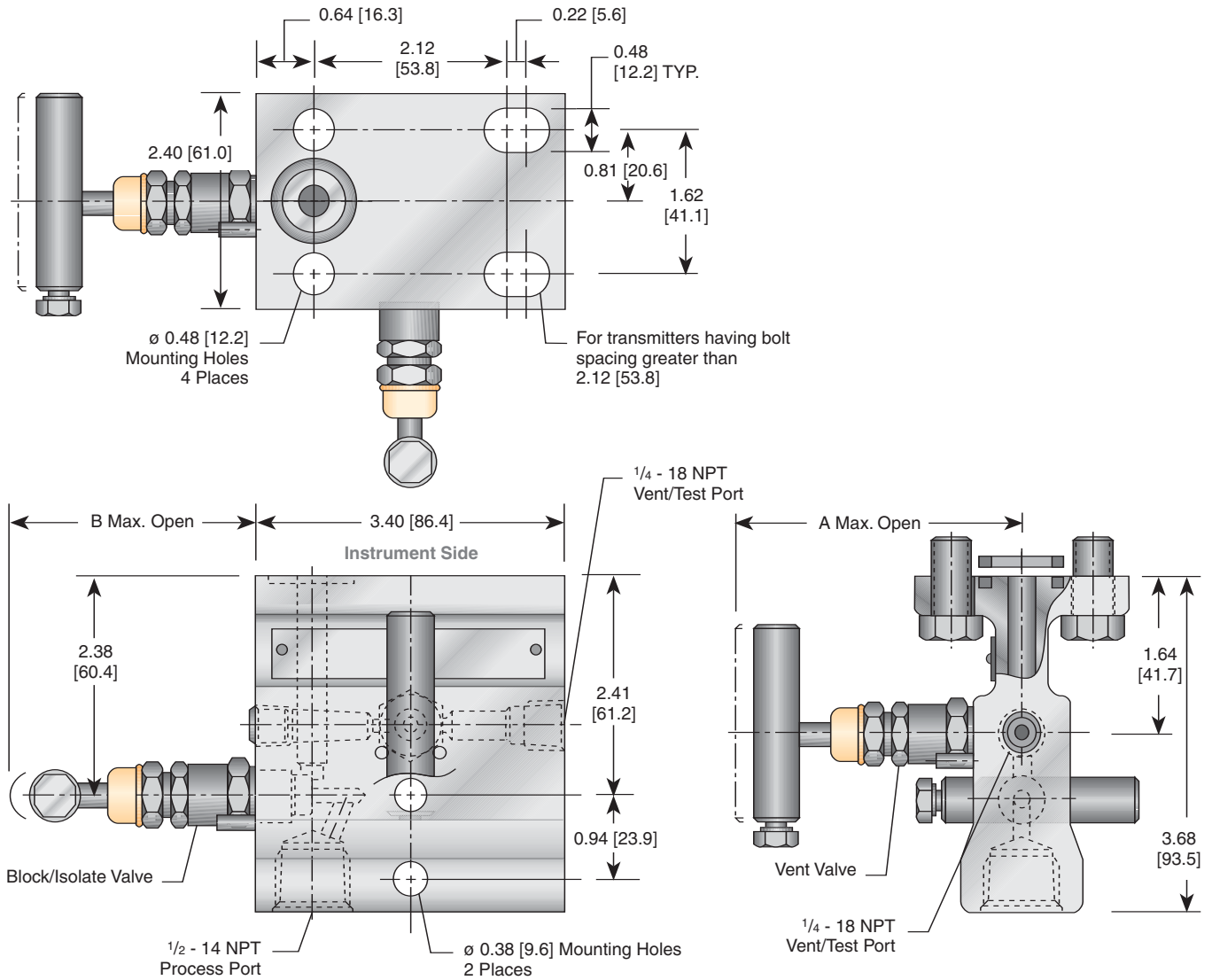
Note

- Approximate valve weight: 4.4 lb [2.0 kg].
Metal seat:
0.156-inch [4 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.



Static Pressure Manifolds – M4TP Specifications

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



Dimensions, inches [mm]

Packing	A	B
Teflon®	3.14 [79.8]	2.60 [66.0]
GRAFOIL®	3.79	3.25
Low Emissions Graphite	[96.3]	[82.6]

Note

- Approximate valve weight: 4.2 lb [1.9 kg].
Metal seat:
0.156-inch [4 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.

Static Pressure Manifolds – M4AP and M4TP Specifications

Standard Materials

Valve	Body	Bonnet	Stem	Ball	Bolts	Packing
CS ¹	A576-10L18	A108	A581-303	17-4 PH	A193-B7	Teflon®
CS ¹	A576-10L18	A105	A581-303	17-4 PH	A193-B7	GRAFOIL®
316 SS	A479-316	A479-316	A276-316	316 SS	A193-B7	Teflon®
316 SS	A479-316	A479-316	A276-316	316 SS	A193-B7	GRAFOIL®
SG ²	A479-316	A479-316	Monel® 400	Monel® K500	A193-B7	Teflon®
Monel®	Monel® 400	Monel® R405	Monel® 400	Monel® K500	A193-B7	Teflon®
SG3 ³	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®	A193-B7	Teflon®

Pressure and Temperature Ratings⁴

Packing	Valve	Seat	Pressure and Temperature Ratings	
Teflon®	CS, SS	Delrin®	6000 psig @ 200°F	[414 barg @ 93°C]
Teflon®	CS, SS	PEEK	6000 psig @ 200°F 2000 psig @ 400°F	[414 barg @ 93°C] [138 barg @ 204°C]
Teflon®	CS, SS	Teflon®	1000 psig @ 150°F 200 psig @ 500°F	[69 barg @ 66°C] [14 barg @ 260°C]
Teflon®	CS, SS	Integral	6000 psig @ 200°F 4000 psig @ 500°F	[414 barg @ 93°C] [276 barg @ 260°C]
Teflon®	Monel®	Integral	5300 psig @ 200°F 4200 psig @ 500°F	[365 barg @ 93°C] [290 barg @ 260°C]
GRAFOIL®/ Low Emissions Graphite	CS	Integral	6000 psig @ 200°F 4000 psig @ 600°F	[414 barg @ 93°C] [276 barg @ 316°C]
GRAFOIL®/ Low Emissions Graphite	SS	Integral	6000 psig @ 200°F 1500 psig @ 1000°F	[414 barg @ 93°C] [103 barg @ 538°C]

Notes

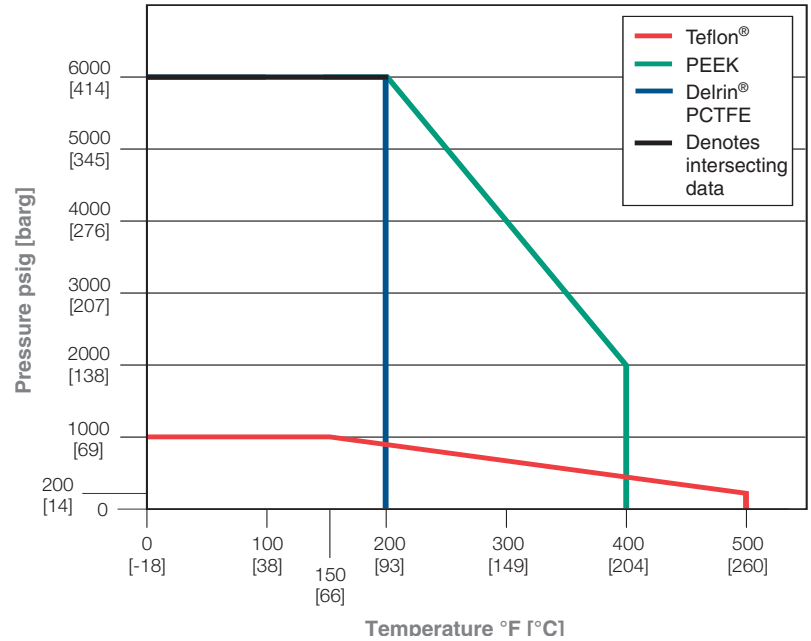
1. CS is zinc cobalt plated to prevent corrosion.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).
4. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Static Pressure Manifolds – M4AP and M4TP Specifications

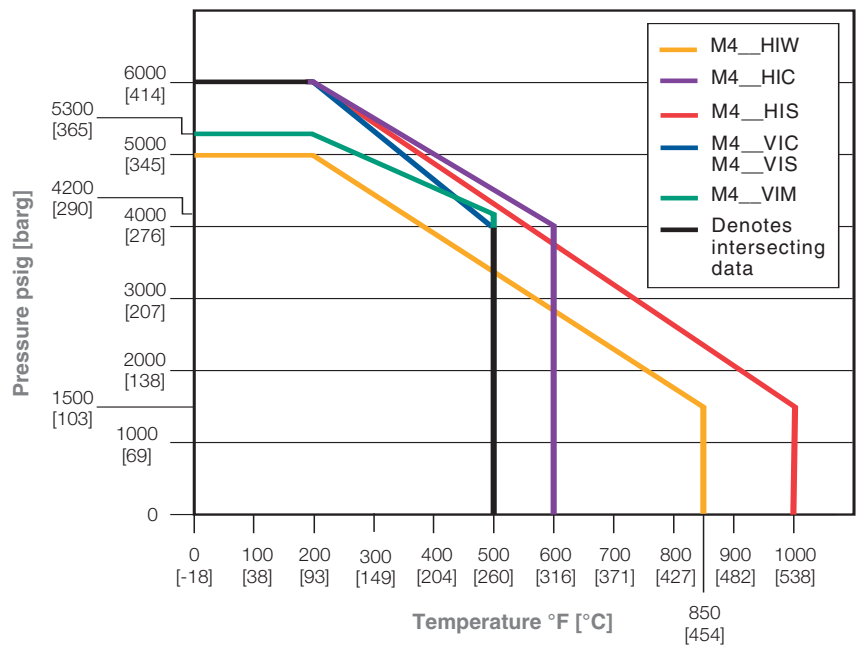
Notes

1. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
2. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Pressure vs. Temperature – Soft Seat



Pressure vs. Temperature – Metal Seat



Static Pressure Manifolds – M4AP and M4TP Specifications

Ordering Information

M4TP V D C - 4 - AM

Valve Type

M4AP – Flange x Flange
M4TP – FNPT x Flange

Bonnet Packing

V – Teflon® (Soft and Integral seats)
H – GRAFOIL® (Integral seat only)
E – Low Emissions Graphite
(Integral seat only)

Seat Material

D – Delrin® (standard)
V – Teflon®
E – PEEK
K – PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®
I – Integral (body material)

Body Material

C – CS
S – 316 SS
M – Monel®
W – 316L SS
J – Hastelloy®

Process Connections

4 – 1/2-inch FNPT (M4TP only)

Options

AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 38)
BC – Accessory bracket for mounting conduit with AGCO Mount
BP – Accessory bracket for mounting purge meters with AGCO Mount
CL – Cleaned for chlorine service
HD – Hydrostatic testing (100 percent) (MSS SP-61)
OC – Cleaned for oxygen service
PB – Bottom purge port (Metal Seat only)
R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
SB – Steam Block (CS)
SSA' – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
SSC' – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005
SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
SP – Special Requirements - please specify

Note

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Static Pressure Manifolds – M4TP ASME B31.1 or B31.3 Specifications Meets MSS SP-105³

Ordering Information – Power Industry Applications¹

	M4TPHP	S	- 4	-XP	- AM
Valve Type					
M4TPHP					
Body Material					
C – CS, A105					
S – 316 SS					
W – 316L SS					
J – Hastelloy®					
Process Connections (Process x Instrument x Vent)					
4 – 1/2-inch FNPT					
4AT – Integral 1/2-inch Single Ferrule Tube Fittings 316 SS Ferrule and Nut					
4ATD – Integral 1/2-inch Dual Ferrule Tube Fittings 316 SS Ferrule and Nut					
4TB – 1/2-inch Tube S.W. x Flange x 1/4-inch FNPT					

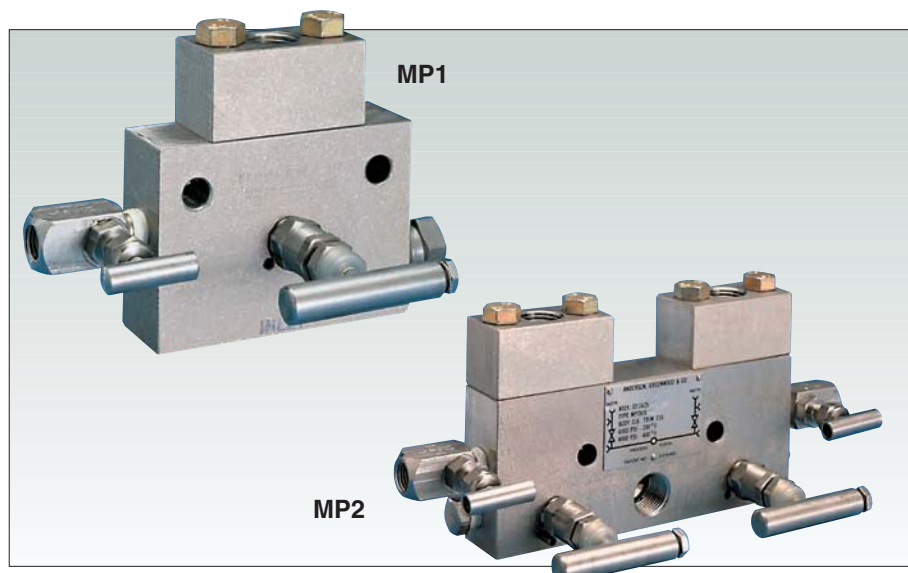
Options

- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 38)
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SB – Steam Block (CS)
- SSA⁴ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC⁴ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SP – Special Requirements - please specify

Notes

1. All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
2. Manifold ratings:
 - SST
 - 6000 psig @ 100°F [414 barg @ 38°C]
 - 3030 psig @ 1000°F [209 barg @ 538°C]
 - STL
 - 6170 psig @ 100°F [425 barg @ 38°C]
 - 3430 psig @ 800°F [236 barg @ 427°C]
3. See page 156 for Code Requirements.
4. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Static Pressure Manifolds – MP1 and MP2



Product Overview

The MP1 is a two-valve pressure manifold used for single instrument applications, such as block and bleed, test and calibration, and instrument zeroing. It serves as both manifold and mount in one unit.

The MP2 is a pressure manifold designed to mount two different pressure instruments simultaneously from a single pressure source. It has dual block and bleed valves, each operating independently of the other. The MP2 serves as both manifold and mount in one unit.

The block valves have free-swiveling, ball ended stems used to isolate the pressure devices from the process. During normal operation the block valves are open. However, when either valve is closed, the respective bleed valve can be used to vent pressure from the isolated instrument.

The pressure instruments are connected to the manifold with 1/2-inch FNPT union connectors or 1/2-inch MNPT union connectors.

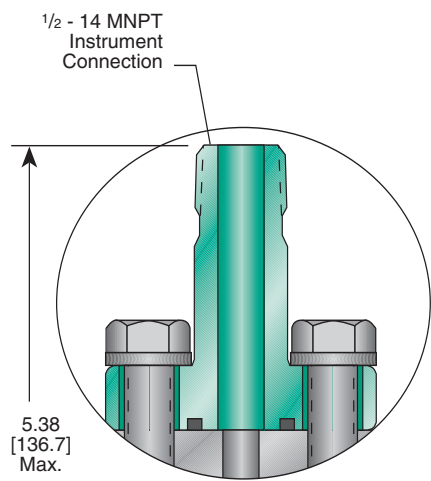
Features and Benefits

- **Cost savings** when manifolding the instruments. This eliminates several parts used in conventional methods of 'piping up' resulting in cost reduction of 20-30 percent.
- **Compact design** requires minimum space for operation and installation.
- **Immediate installation with the AGCO Mount.** Steam block, bracket, and all associated piping can be installed without the instrument at the time of plant construction. Thus, there is no work stoppage pending instrument delivery.
- **The AGCO Mount provides secure mounting.** Instrument piping stability is enhanced when directly supported by the pipe stand through the manifold.
- **All block valve threading is isolated.** Packing is below the stem threads and seal is below body-to-bonnet threads, keeping corrosion to a minimum.
- **Free-swiveling ball end stem design** assures bubble-tight valve closure without seat galling.
- **Lower piping costs** occur when two instruments are mounted on the same manifold and pipe stand.
- **Less instrument damage** with the AGCO Mount. The instrument can be safely warehoused until final 'loop' checkout, reducing the chances of damage during construction.
- **Fewer leak points** reduces leakage by having fewer parts to assemble.

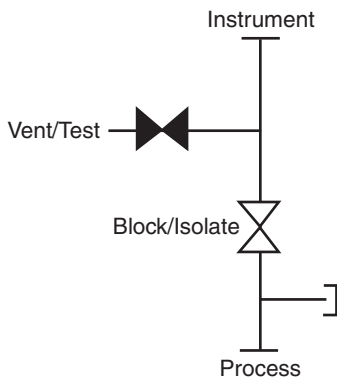
Static Pressure Manifolds – MP1 Specifications



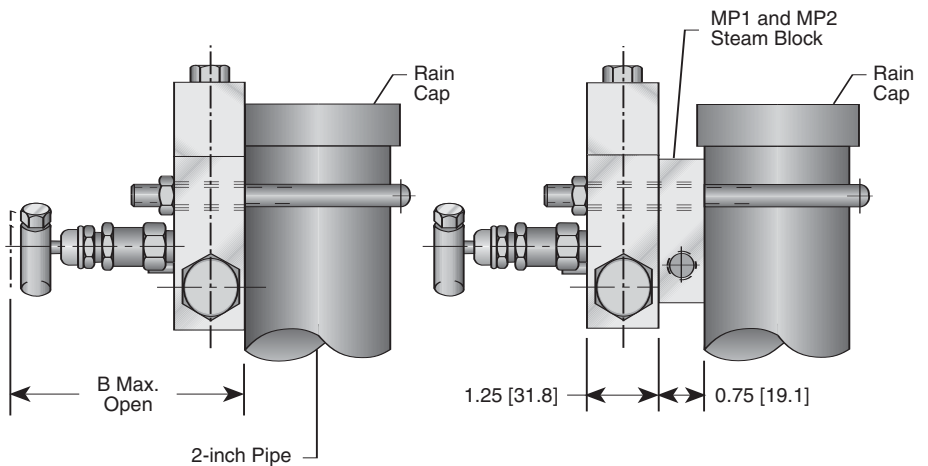
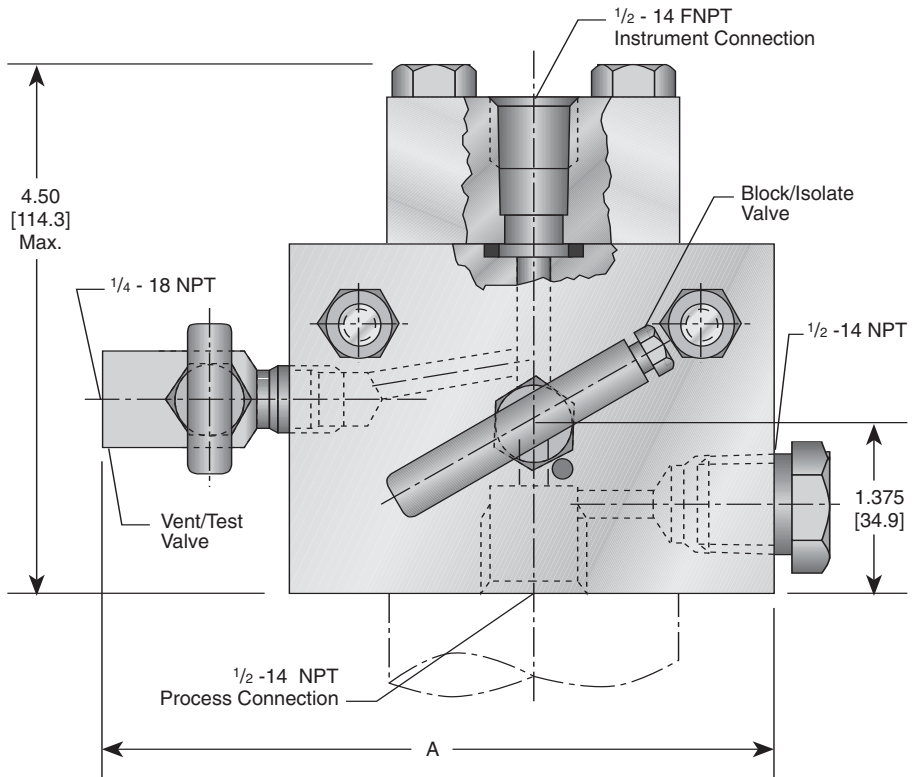
MP1 Pressure Mount



Close-couple Futbol Male Outlet
(option -44)



Dimensions, inches [mm]



Dimensions

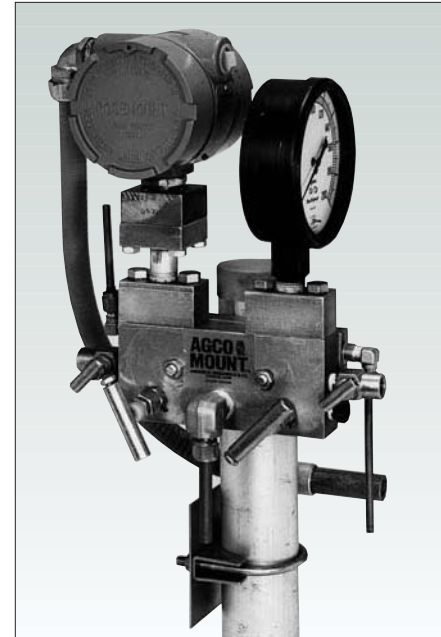
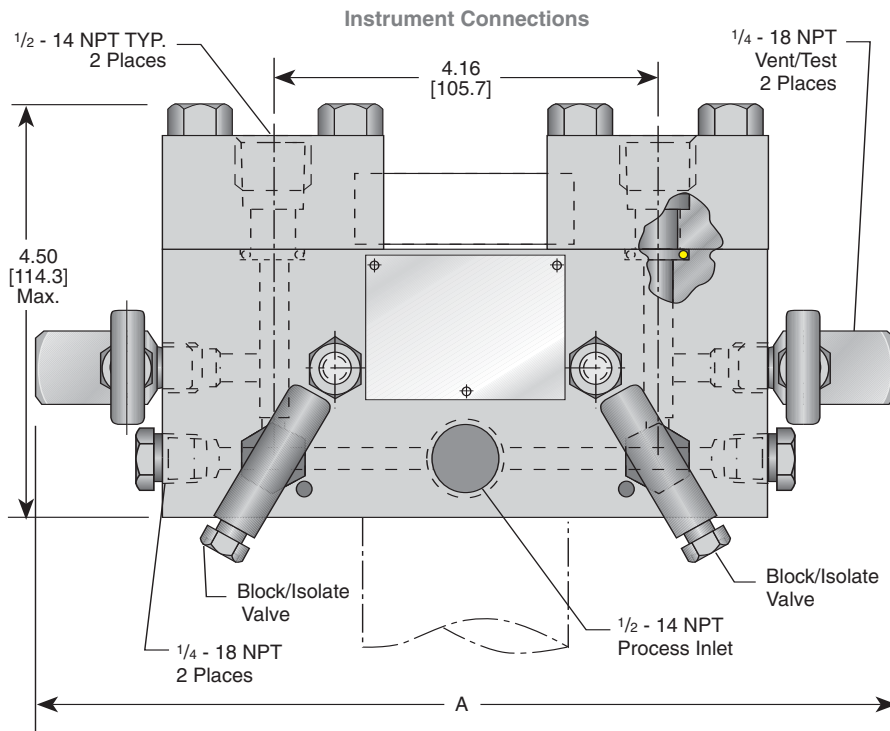
Packing	A	B
Teflon®	5.62 [142.7]	3.85 [97.8]
GRAFOIL®/ Low Emissions	8.20 [208.3]	4.50 [114.3]
Graphite		

Notes

1. Pressure seal between union connectors and manifold body is Viton® O-ring for Teflon® packed valves, GRAFOIL® for GRAFOIL® packed valves.
2. Approximate valve weight: 6.0 lb [2.72 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.

Static Pressure Manifolds – MP2 Specifications (Patented)

Dimensions, inches [mm]



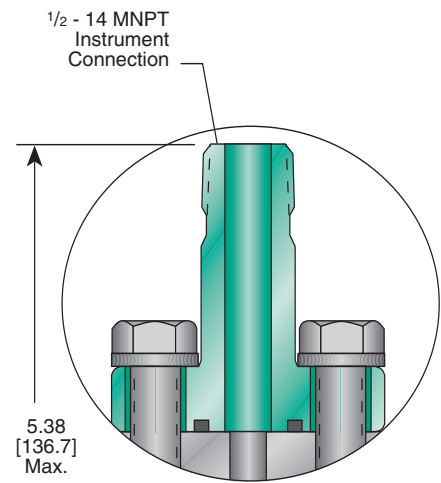
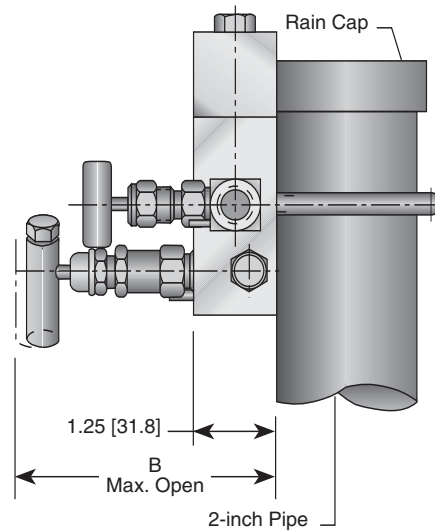
MP2 Dual Pressure Mount

Dimensions, inches [mm]

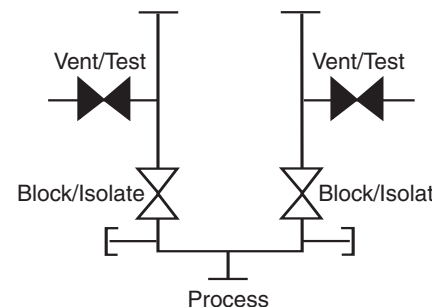
Packing	A	B
Teflon®	9.81 [250.0]	3.85 [97.8]
GRAFOIL®/ Low Emissions Graphite	13.98 [355.1]	4.50 [114.3]

Notes

1. Pressure seal between union connectors and manifold body is Viton® O-ring for Teflon® packed valves, GRAFOIL® for GRAFOIL® packed valves.
2. Approximate valve weight: 10.0 lb [4.54 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.



Close-couple Futbol Male Outlet
(option FB1)



Static Pressure Manifolds – MP1 and MP2 Specifications

Notes

1. CS parts are zinc cobalt plated to prevent corrosion.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. Teflon[®] packed bleed valve body is 10L18 steel.
4. Stem is Monel[®] 400 for hot packed bonnets.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Standard Materials – MP1

Valve	Body	Bonnet	Stem/Ball (Block Valve)	Stem (Bleed Valve)	Vent/Test Valve	Bolts
CS ¹	A105	A108	A581-303 Stem 17-4 Ball	A581-303	A105 ³	A193-B7
SS	A479-316	A479-316	A276-316 Stem 316 SS Ball	A276-316	A479-316	A193-B7
SG ²	A479-316	A479-316	Monel [®] 400 Stem Monel [®] K-500 Ball	Monel [®] R405	A479-316	A193-B7
Monel [®]	Monel [®] 400	Monel [®] R405	Monel [®] 400 Stem Monel [®] K-500 Ball	Monel [®] R405	Monel [®]	A193-B7
SG3 ⁵	Hastelloy [®] C276	Hastelloy [®] C276	Hastelloy [®] C276 Elgiloy [®]	Hastelloy [®]	Hastelloy [®]	A193-B7

Standard Materials – MP2

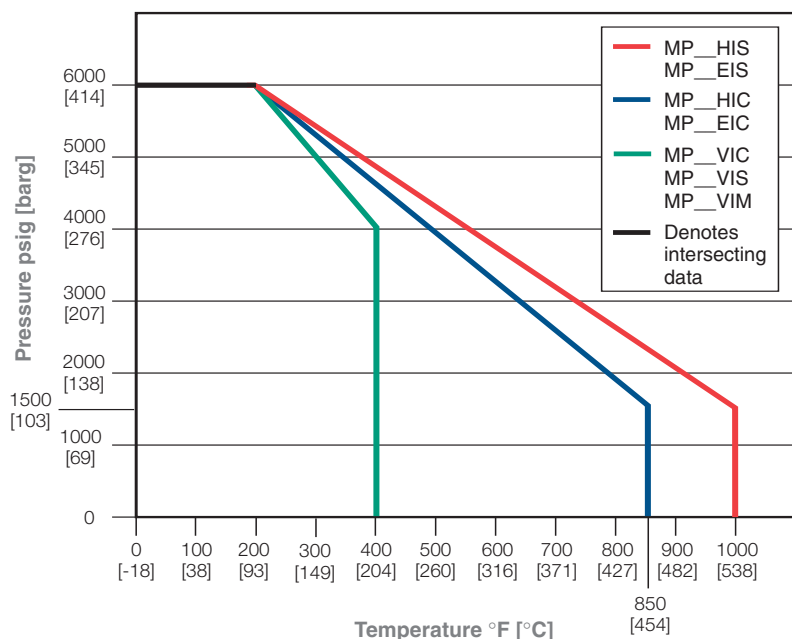
Valve	Body	Bonnet	Stem/Ball (Block Valve)	Stem (Bleed Valve)	Vent/Test Valve	Bolts
CS ¹	A108	A108	A581-303 Stem 17-4 Ball	A581-303	A105 ³	A193-B7
SS	A479-316	A479-316	A276-316 Stem 316 SS Ball	A276-316	A479-316	A193-B7
SG ²	A479-316	A479-316	Monel [®] 400 Stem Monel [®] K-500 Ball	Monel [®] 405 ⁴	A479-316	A193-B7
SG3 ⁵	Hastelloy [®] C276	Hastelloy [®] C276	Hastelloy [®] C276 Elgiloy [®]	Hastelloy [®]	Hastelloy [®]	A193-B7

Pressure and Temperature Ratings

Valve	Packing	Ratings
CS ¹ , SS and SG ²	Teflon [®]	6000 psig @ 200°F 4000 psig @ 400°F
CS ¹	GRAFOIL [®] /Low Emissions Graphite	6000 psig @ 200°F 1500 psig @ 850°F
SS SG ²	GRAFOIL [®] /Low Emissions Graphite	6000 psig @ 200°F 1500 psig @ 1000°F

Static Pressure Manifolds – MP1 and MP2 Specifications

Pressure vs. Temperature



Note

1. MP1 and MP2 includes U-bolt and nuts for 2-inch pipe mounting.

Ordering Information

MP1

V

I

C

- 4

- BC

Model

MP1 – Pressure Manifold (one instrument) MP2 – Pressure Manifold (two instruments)

Packing

V – Teflon® H – GRAFOIL® E – Low Emissions Graphite

Seat

I – Integral (body material)

Body Material

C – CS S – 316 SS M – Monel® W – 316L SS J – Hastelloy®

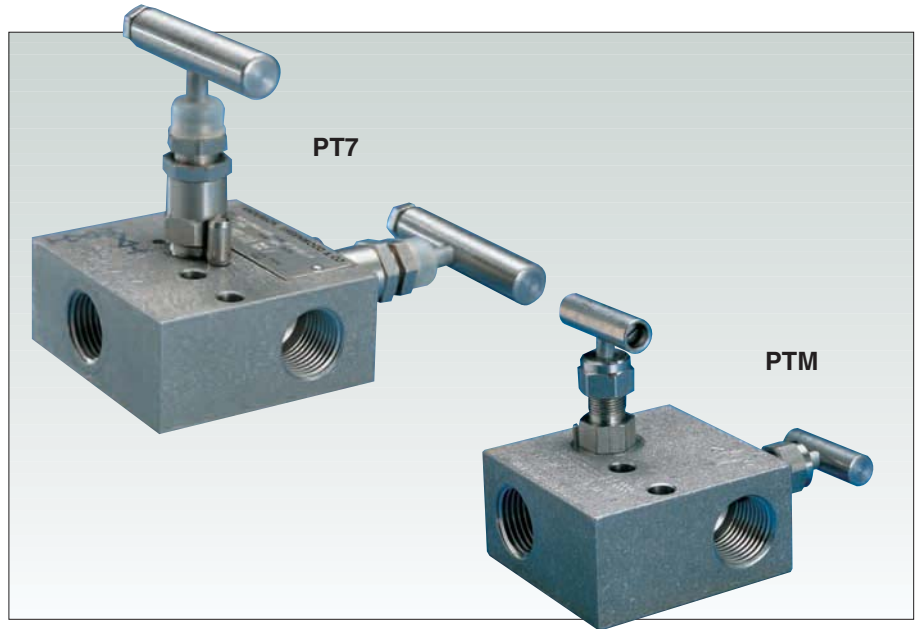
Connections

- 4 – 1/2-inch FNPT Process x 1/2-inch FNPT Instrument
- 44 – 1/2-inch FNPT Process x 1/2-inch MNPT Instrument (MP1 only)
- 4-FB1 – MP2 with 1 each 1/2-inch MNPT Process x 1/2-inch FNPT Instrument

Options¹

- AL – Arctic Lubricant (low temperature service -70°F)
- BC – Accessory bracket for mounting conduit with AGCO Mount
- BL – Bonnet Lock Device (block valves) (page 154)
- FB1 – MP2 with 1 each MNPT and FNPT connectors
- SB – Steam Block
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm] and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])

Static Pressure Manifolds – PTM and PT7 2-Valve Manifolds



Product Overview

The PT Two-Valve Calibration Manifolds are used on static pressure transmitters, switches or gauges. The shutoff valve, tee, calibration valve, and all immediate tubing/fittings are available in one simple manifold. The PT manifolds are available with either metal seats or replaceable soft seat inserts.

The PTM manifold features a unique valve seat that can be converted from soft to hard by simply removing two insert washers. No other parts are required.

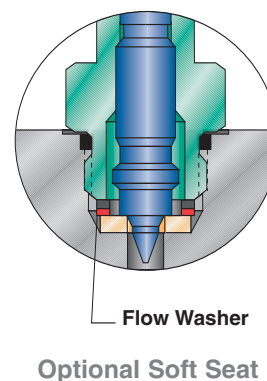
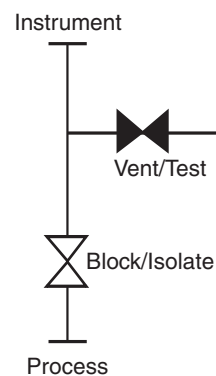
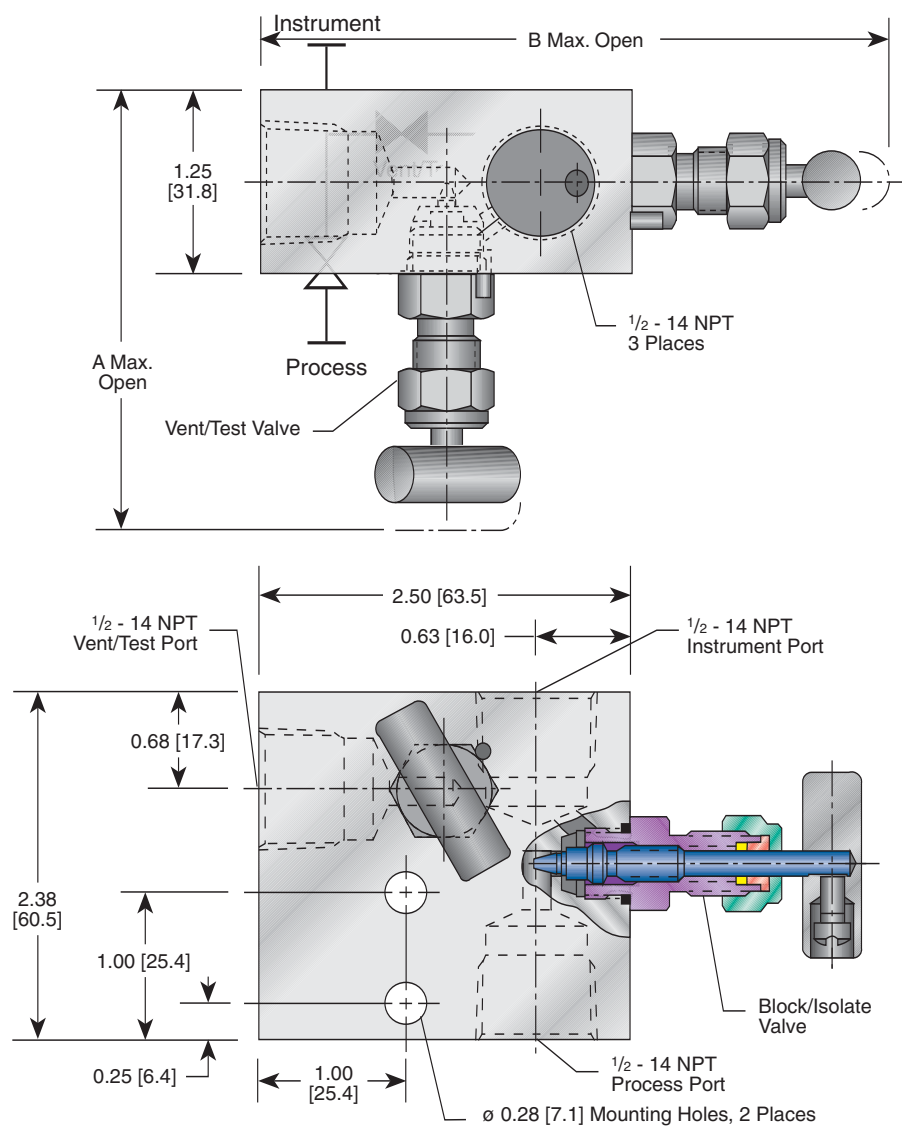
The PT7 manifold is available for elevated temperatures and features an integral metal seat.

Features and Benefits

- **Cost savings** when manifolding the instruments. This eliminates several parts used in conventional methods of 'piping up' resulting in cost reduction of 20-30 percent.
- **Compact design** requires minimum space for operation and installation.
- **Rolled threads**, stem and bonnet threads are rolled for increased strength. This prevents galling and adds years to the useful life of the valve.
- **Fewer leak points** reduce leakage by having fewer parts to assemble.
- **Teflon® and GRAFOIL® adjustable packing** is easily adjusted for leak-proof and long service life.
- **Stem threads are isolated from process fluid** (O-ring stem seal). This prevents galling and corrosion of the stem threads. The O-ring isolates the stem threads from the process.
- **Back seat stem** prevents stem blowout.

Static Pressure Manifolds – PTM Specifications

Dimensions, inches [mm]



Dimensions, inches [mm]

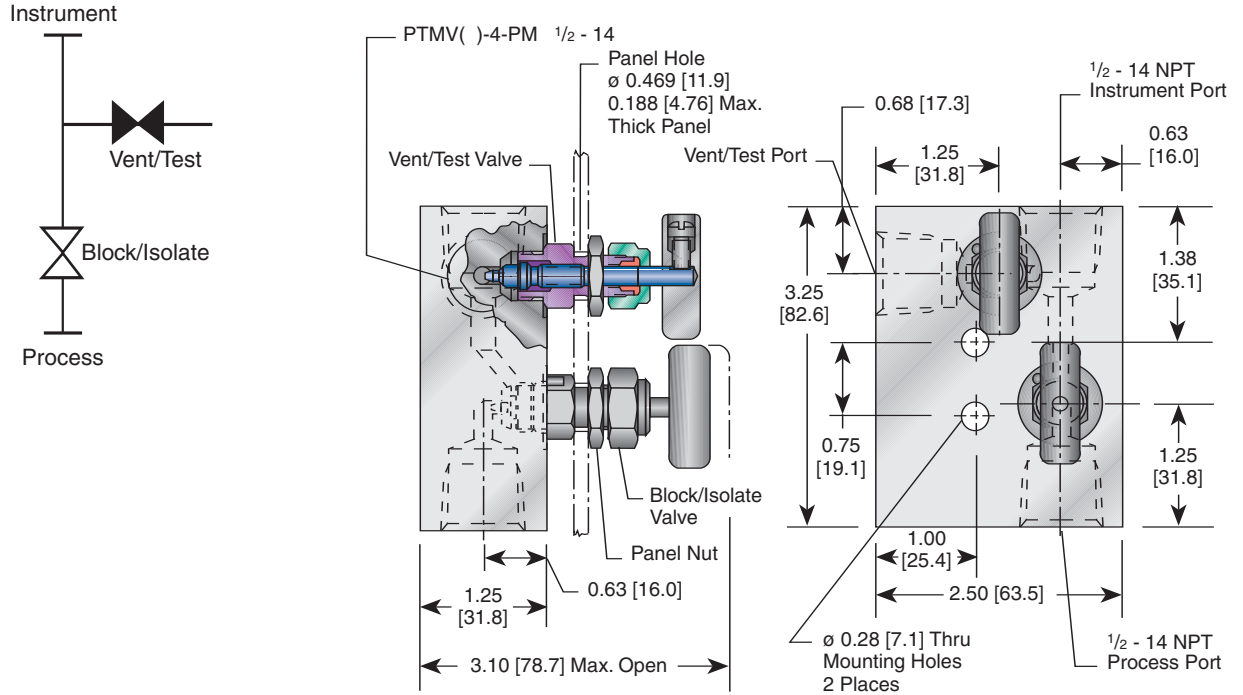
Packing	A	B
O-ring	2.50 [63.5]	3.75 [95.3]
Teflon®	3.10 [78.7]	4.35 [110.5]

Note

1. Approximate valve weight: 2.0 lb [0.9 kg].
 0.136-inch [3.5 mm] diameter orifice.
 Valve C_v Hard Seat 0.25 maximum.
 Valve C_v Soft Seat 0.24 maximum.

Static Pressure Manifolds – PTMV () – () – PM (Panel Mount) Specifications

Dimensions, inches [mm]



Standard Materials

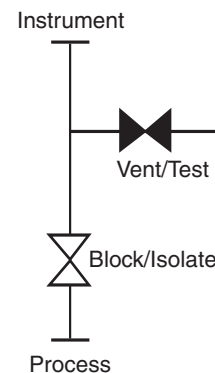
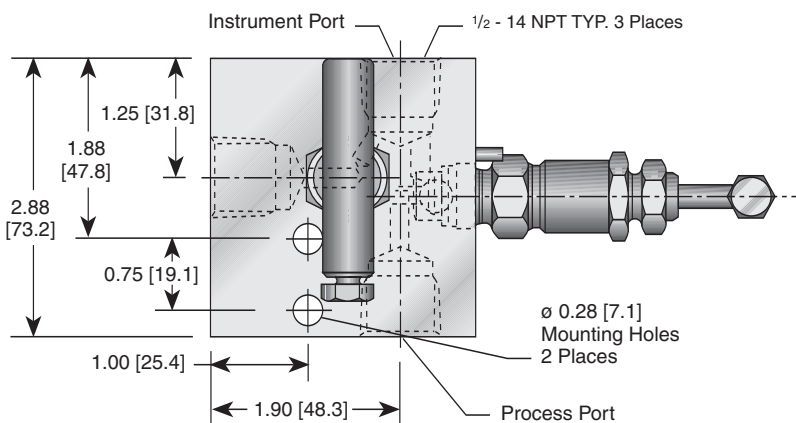
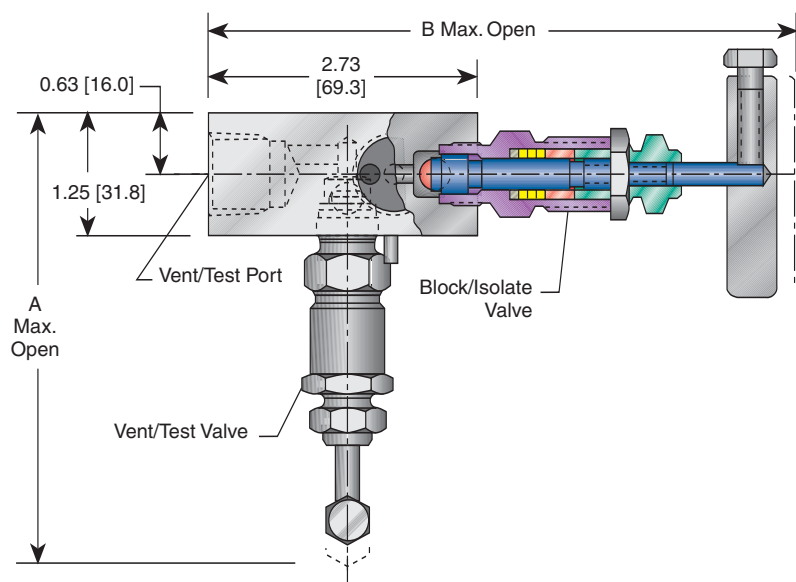
Valve	Body	Bonnet	Stem	Flow Washer ⁴
CS ²	A108	A108	A581-303	316
SS	A479-316	A479-316	A276-316	316
SG ³	A476-316	A479-316	Monel [®] R405	316
Monel [®]	Monel [®] 400	Monel [®] R405	Monel [®] R405	Monel [®] 400
SG3 ⁵	Hastelloy [®] C276	Hastelloy [®] C276	Hastelloy [®] C276	Hastelloy [®] C276

Notes

1. Approximate valve weight: 2.7 lb [1.2 kg].
0.136-inch [3.5 mm] diameter orifice.
Valve C_v Hard Seat 0.25 maximum.
Valve C_v Soft Seat 0.24 maximum.
2. CS is zinc cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. Soft seated valves only.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Static Pressure Manifolds – PT7 Specifications

Dimensions, inches [mm]



Dimensions, inches [mm]

Packing	A	B
Teflon®	3.85 [97.8]	5.33 [135.4]
GRAFOIL®	4.50 [114.3]	5.98 [151.9]

Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball	Packing
CS ²	A105	A108	A581-303	17-4 PH	Teflon®
CS ²	A105	A105	A581-303	17-4 PH	GRAFOIL®/ Low Emissions
Graphite					
SS	SS, A479-316	SS, A479-316	A276-316	316	Teflon®
SS	SS, A479-316	SS, A479-316	A276-316	316	GRAFOIL®/ Low Emissions
Graphite					
SG ³	SS, A479-316	SS, A479-316	Monel® 400	Monel® K500	Teflon®
SG ³	SS, A479-316	SS, A479-316	Monel® 400	Monel® K500	GRAFOIL®/ Low Emissions
Graphite					
SG3 ⁴	Hastelloy®	Hastelloy®	Hastelloy®	Elgiloy®	Teflon®

Notes

1. Approximate valve weight: 3.0 lb [1.4 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. CS is zinc cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Static Pressure Manifolds – PTM and PT7 Specifications

Notes

1. Approximate valve weight: 3.0 lb [1.4 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. CS is zinc cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

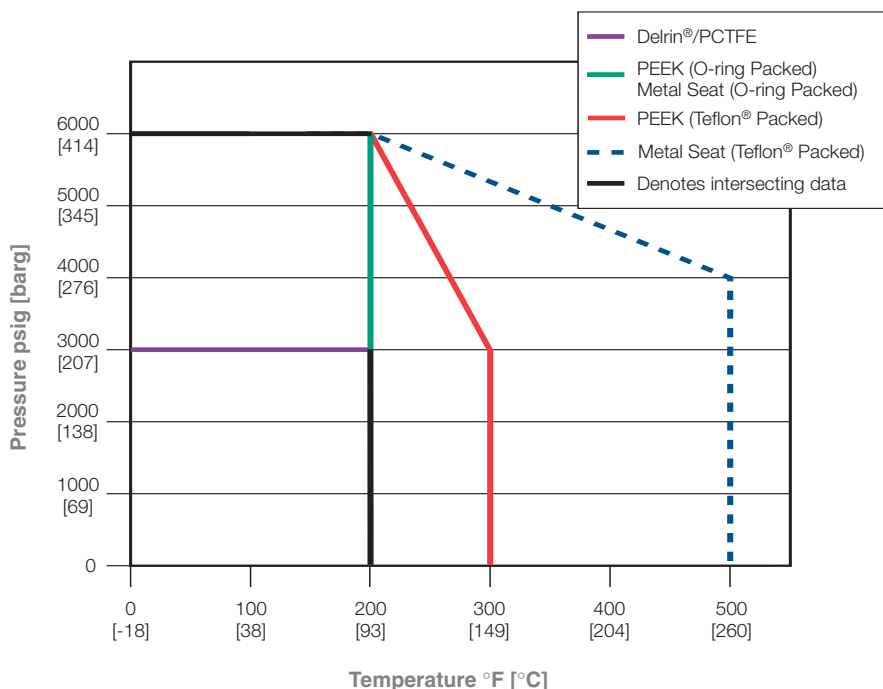
Pressure and Temperature Ratings - PTM

Packing	PCTFE/Delrin® Seat	PEEK Seat	Metal Seat
Teflon®	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig@ 200°F 3000 psig@ 300°F [414 barg @ 93°C] [207 barg @ 149°C]	6000 psig@ 200°F 4000 psig@ 500°F [414 barg @ 93°C] [276 barg @ 260°C]
	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig@ 200°F [414 barg @ 93°C]	6000 psig@ 200°F [414 barg @ 93°C]
O-ring	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig@ 200°F [414 barg @ 93°C]	6000 psig@ 200°F [414 barg @ 93°C]

Pressure and Temperature Ratings - PT7

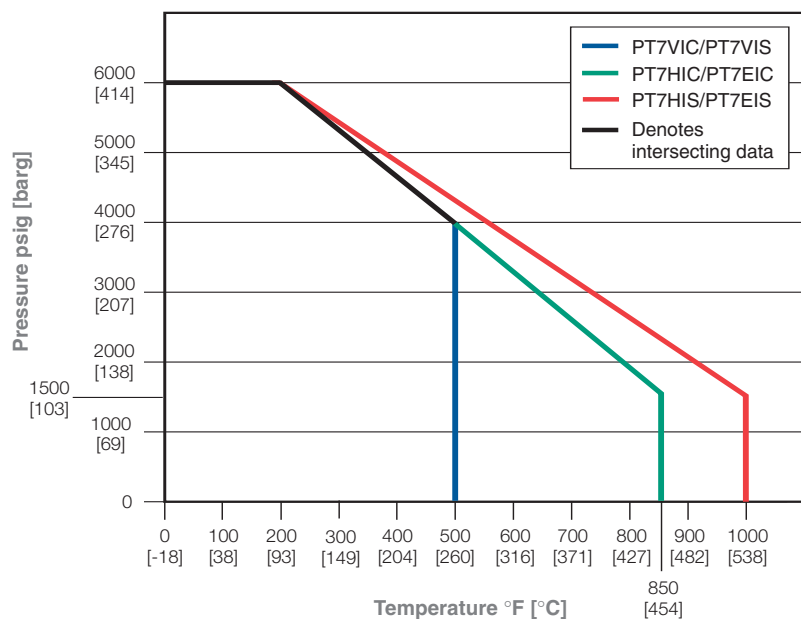
Valve ¹	Packing	Ratings	
CS ²	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]	4000 psig @ 500°F [276 barg @ 260°C]
CS ²	GRAFOIL®/Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]	1500 psig @ 850°F [103 barg @ 454°C]
SS	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]	4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL®/Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]	1500 psig @ 1000°F [103 barg @ 538°C]
SG ³ SG3 ⁴	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]	4000 psig @ 500°F [276 barg @ 260°C]
SG ³ SG3 ⁴	GRAFOIL®/Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]	1500 psig @ 1000°F [103 barg @ 538°C]

PTM Pressure vs. Temperature



Static Pressure Manifolds – PTM and PT7 Specifications

PT7 Pressure vs. Temperature



PTM – Ordering Information

PTM V D S - 4 - SG

Bonnet Packing

- V – Teflon®
- R – O-ring (SS - Viton®, CS - BUNA-N) (Soft Seat Only)

Seat Material

- D – Delrin® (standard)
- K – PCTFE
- E – PEEK
- I – Integral (body material)

Body Material

- C – A108
- W – 316L SS
- S – A479-316 SS
- J – Hastelloy®
- M – Monel® 400

Connections

- 4 – 1/2-inch FNPT

Options

- | | | |
|---|---|--|
| AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves | MS – Monel® Stem | Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 |
| AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (pg 38) | PHB – Phenolic Black Handle | SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]) |
| CL – Cleaned for Chlorine Service. | PHG – Phenolic Green Handle | SP – Special Requirements - please specify |
| OC – Cleaned for Oxygen Service. | PHR – Phenolic Red Handle | |
| HD – Hydrostatic Testing (100 percent) (MSS SP-61) | PM – Panel Mount (page 17) | |
| | PV – Plug Vent | |
| | SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 | |

Static Pressure Manifolds – PTM and PT7 Specifications

PT7 – Ordering Information

	PT7	V	I	S	- 4	- SG
Bonnet Packing						
V – Teflon®						
H – GRAFOIL®						
E – Low Emissions Graphite						
Seat Material						
I – Integral (body material)						
Body Material						
C – A105						
S – A479-316 SS						
W – 316L SS						
J – Hastelloy®						
Connections						
4 – 1/2-inch FNPT						
Options						

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 38)
- CL – Cleaned for chlorine service
- HD – Hydrostatic testing (100 percent)
- MS – Monel® Stem
- OC – Cleaned for oxygen service
- PO – Plug Outlet
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- SP – Special Requirements - please specify

Static Pressure Manifolds – PT7M ASME B31.1 or B31.3 Specifications Meets MSS SP-105³

PT7MHP – Ordering Information Power Industry Applications¹

PT7MHP	S	- 4	- XP	- AM
Body Material				
C	-	A105		
S	-	A479-316 SS		
J	-	Hastelloy®		
M	-	Monel®		
Connections (Process x Instrument x Vent)				
3	-	3/8-inch FNPT x 3/8-inch FNPT x 3/8-inch FNPT		
3TC	-	3/8-inch Tube Stub (6" x 0.065") - All Connections		
3TC4	-	3/8-inch Tube Stub (6" x 0.065") x 3/8-inch Tube Stub x 1/2-inch FNPT		
3TC44	-	3/8-inch Tube Stub (6" x 0.065") x 1/2-inch FNPT x 1/2-inch FNPT		
4	-	1/2-inch FNPT x 1/2-inch FNPT x 1/2-inch FNPT		
422	-	1/2-inch FNPT x 1/4-inch FNPT x 1/4-inch FNPT		
442	-	1/2-inch FNPT x 1/2-inch FNPT x 1/4-inch FNPT		
4B2	-	1/2-inch PSW x 1/4-inch FNPT x 1/4-inch FNPT		
4TC4	-	1/2-inch Tube Stub (6" x 0.095") x 1/2-inch Tube Stub x 1/2-inch FNPT		
4TC44	-	1/2-inch Tube Stub (6" x 0.095") x 1/2-inch FNPT x 1/2-inch FNPT		
Options				
AM	-	AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 38)		
PO	-	Plug Outlet		
SP	-	Special Requirements - please specify		

Notes

1. All Manifolds come standard with GRAFOIL[®] packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
2. Manifold ratings:
SST
6000 psig @ 100°F [414 barg @ 38°C]
3030 psig @ 1000°F [209 barg @ 538°C]
STL
6170 psig @ 100°F [425 barg @ 38°C]
3430 psig @ 800°F [236 barg @ 427°C]
Monel[®]
5000 psig @ 100°F [345 barg @ 38°C]
2911 psig @ 900°F [201 barg @ 482°C]
3. See page 156 for Code Requirements.

Static Pressure Manifolds – A30 2-Valve Manifold



Product Overview

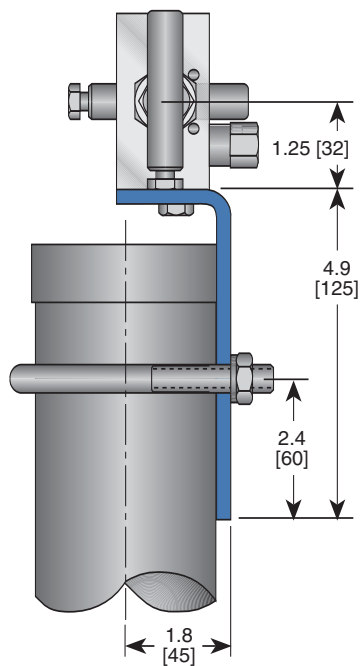
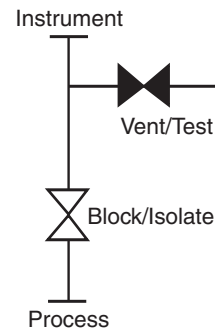
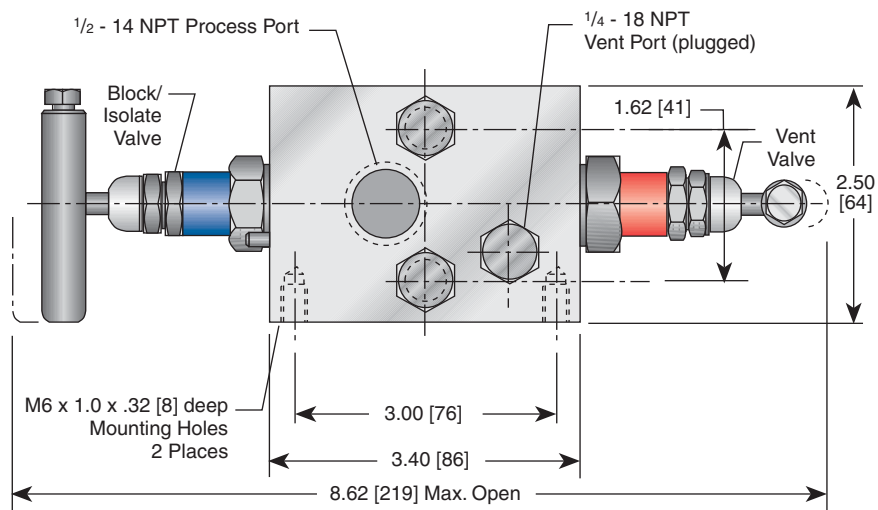
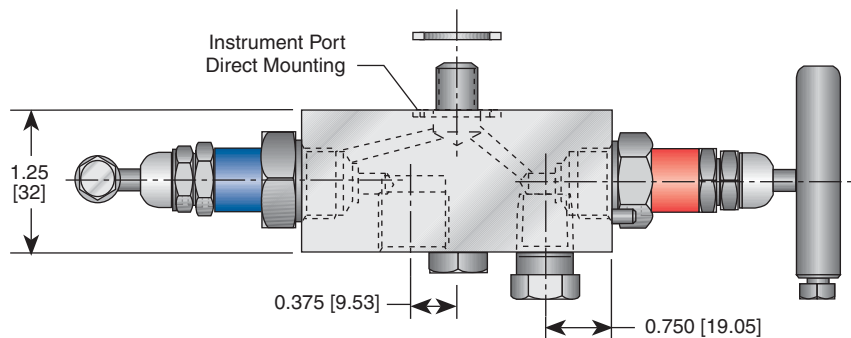
The A30 is a direct mounting two-valve manifold which combines an isolation valve and a vent/calibrate valve in a single unit. Standard process connections are 1/2-inch NPT threaded. The vent/calibrate port is threaded 1/4-inch NPT and provided with vent plug as standard. Suitable for pressures to 6000 psig [414 barg] and temperatures of up to 1000°F [538°C]. A30 has metal seated valves and is available with standard valve bonnets with Teflon® stem packing, or high temperature bonnets which have Graphite packing. All manifolds are supplied with two 7/16-inch UNF bolts and an instrument seal ring as standard.

Features and Benefits

- **Direct mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem** is free-swiveling which ensures perfect alignment, providing repetitive bubble-tight shutoff and long life.
- **Teflon® or Graphite packing below stem threads** prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allows vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, standard pipe bracket bolts directly to the manifold providing a rigid support for the transmitter. Instrument can be easily removed for service or repair.

Static Pressure Manifolds – A30 Specifications

Dimensions, inches [mm] Threaded x Flanged



AGCO Mount MB7

A30 is available with a mounting bracket suitable for 2-inch [50 mm] pipe stand. Supplied in zinc plated CS is standard. See options for AM Kit, page 38.

Static Pressure Manifolds – A30 Specifications

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

- White:* Standard bonnet assembly Teflon® packing.
- Green:* Sour Gas service Teflon® packing.

Ring Labels: The valve bonnets have color coded ring labels for service identification.

- Red:* Vent Valves
- Blue:* Isolate Valves

Special Severe Service Materials

- Duplex UNS S31803
- 6MO UNS S31254
- Hastelloy® C276
- Incoloy® 825

CS, SS and Monel® valves are suitable for most process applications, however for severe service, A30 valves are also available in the above exotic materials. For any other material requirements, please consult the factory.

Pressure and Temperature Ratings

Valve	Teflon® Bonnet (standard)
CS, SS, Monel®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Valve	High Temperature
CS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 850°F [103 barg @ 454°C]
SS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Connections

Standard Connections

- Process* Threaded 1/2-inch NPT to ANSI/ASME B1.20.1.
- Vent* Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.
- Instrument* Flanged for direct mounting to transmitters.

Other Connections

- Threaded* BSP Tr to BS21
BSP F to BS2779

Please consult the factory for availability.

Notes

- Threaded connection: vent supplied with blanking plug as standard.
- All manifolds are supplied with a seal ring and two 7/16-inch UNF HT steel mounting bolts. A Teflon® seal ring is supplied with the standard bonnet; a Graphite seal ring is supplied with the high temperature bonnet.

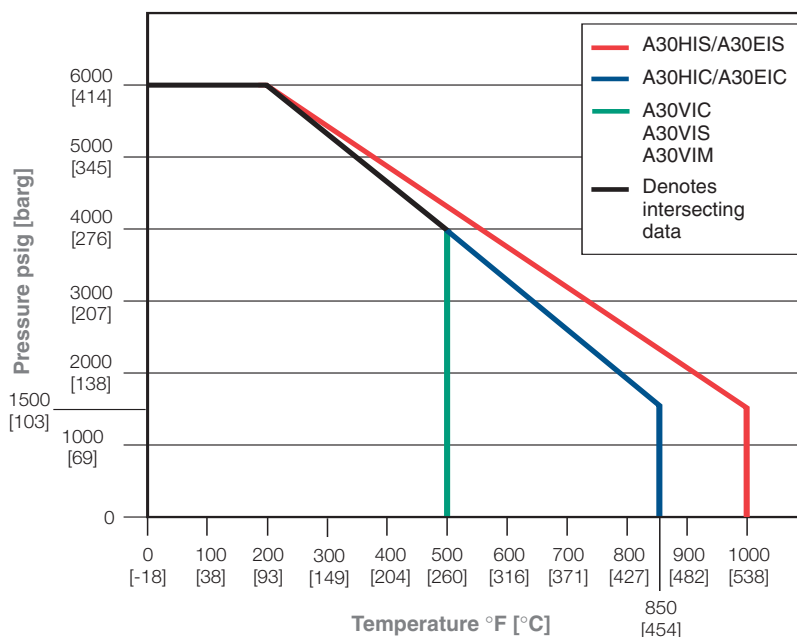
Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat ²
CS	A108	A108	303 SS	17-4PH
SS	SS, A479 316	316 SS	316 SS	316 SS
Monel®	Monel® 400	Monel® 400	Monel® 400	Monel® K500
SG ³	SS, A479 316	316 SS	Monel® 400	Monel® K500
SG ^{3,4}	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®

Notes

- Approximate valve weight: 3.5 lb [1.6 kg].
0.136-inches [3.5 mm] diameter orifice.
Valve C_v 0.25 maximum.
- Metal seats are integral with the body.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Pressure vs. Temperature



Static Pressure Manifolds – A30 Specifications

Ordering Information

A30T **V** **I** **S** **-4** **-SG**

Bonnet Packing

- V – Teflon®
- H – Graphite

Seat

- I – Integral

Body Material

- C – CS
- S – SS
- M – Monel®
- J – Hastelloy®

Process Connections

- 2 – 1/4-inch FNPT
- 4 – 1/2-inch FNPT

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AT – Tamper-proof Bonnet
- BL – Bonnet Lock Device (Accessories, page 154)
- K – Key for -AT
- LAT – Lockable Tamper-proof Bonnet
- MB7 – AGCO Mount Kit for 2-inch pipe stand mounting
- OC – Cleaned for oxygen service
- PD – Padlock for -LAT
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC¹ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Note

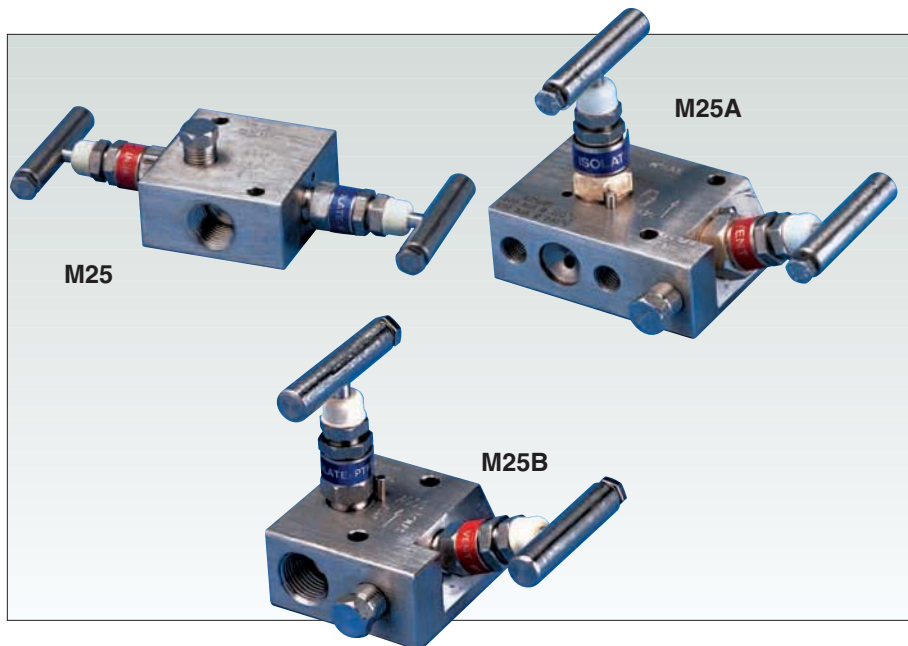
1. If SSC flange bolts are specified, manifold ratings are:
4500 psig @ 100°F [310 barg @ 38°C]

Static Pressure Manifolds – M25, M25A, M25B, M251 and M251B

Product Overview

The M25, M25A, M25B, M251 and M251B are versatile two-valve manifolds with a variety of inlet and outlet connections. Lightweight and with compact dimensions, M25/M251 manifolds enable isolation, calibration and venting in single unit.

Especially designed for use with pressure transmitter, gauges and switches, the versatile M25 two-valve manifold combines an isolation valve and vent/calibrate valve in a single unit. Process connections are either threaded or flanged. Instrument connections are available threaded with either NPT, BSP Tr or BSF threads. M25 has a threaded 1/4-inch vent/calibrate port, fitted with a plug as standard. Suitable for pressures up to 10,000 psig [689 barg] (for M251) and temperatures of up to 1000°F [538°C]. The M25/M251s are available with standard, high pressure or high temperature valve bonnets.



Applications

- Static pressure instrument mounting to threaded connection. (M25, M251 M25B and M251B)
- Gauge/instrument isolation.
- Vent or calibrate to separate threaded port.
- Liquid and vapor service.
- Static pressure instrument mounted to flanged/futbol process connection. (M25A)

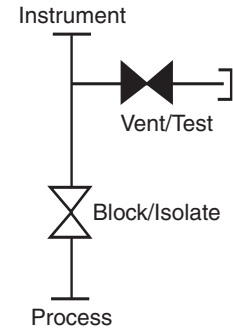
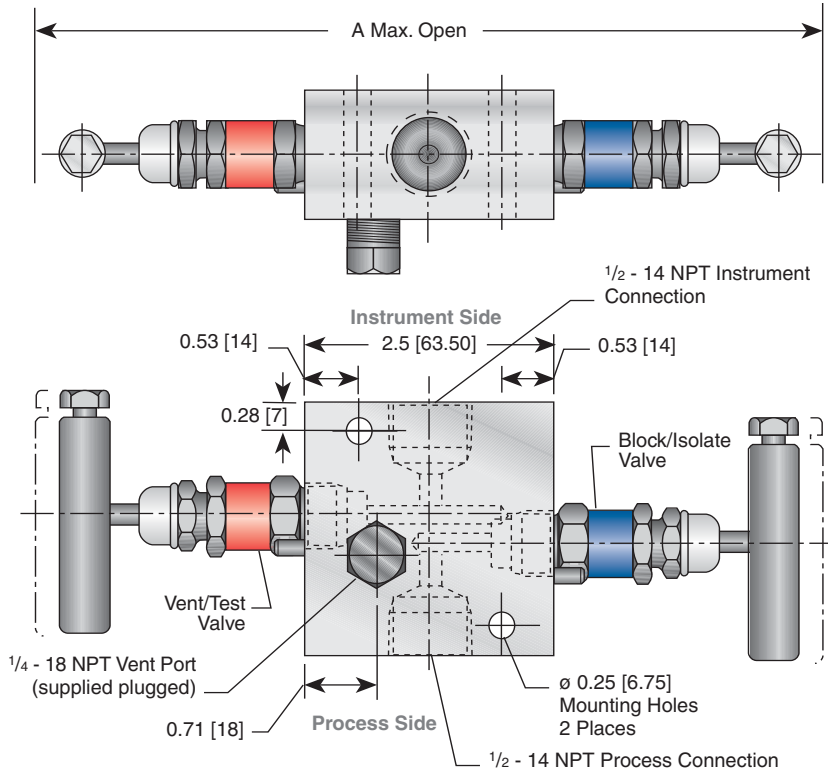
- **Teflon® or GRAFOIL® packing below stem threads** prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allows vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, all manifolds are supplied with mounting holes as standard to enable pipe bracket mounting.

Features and Benefits

- **Remote mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem** is free-swiveling which ensures perfect alignment, providing repetitive bubble-tight shutoff and long life.

Static Pressure Manifolds – M25 and M251 Specifications

M25 and M251 Dimensions, inches [mm] Female x Flange – Front Vent



Dimensions, inches [mm]

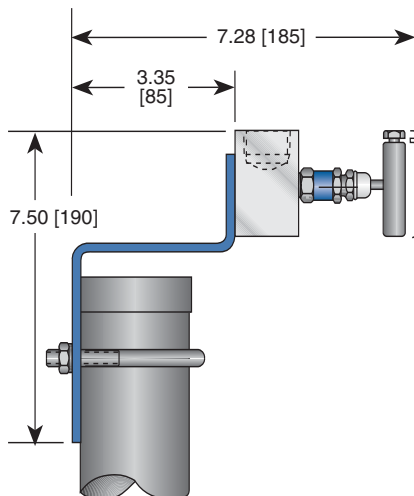
Packing	A
Teflon®	7.87 [200]
GRAFOIL®	8.98 [228]

Notes

1. Approximate valve weight: 2.2 lb [1.0 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. The M25 and M251 are supplied as standard with two 0.26-inch [6.7 mm] diameter mounting holes.

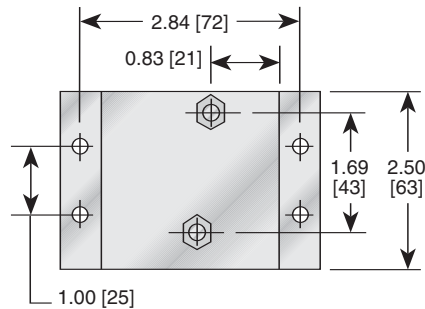
AGCO Mount MB51

The AGCO Mount principle is to mount the manifold not the instrument enabling easier loop installation and lower on-going maintenance costs. M25A, M25B and M251B are available with an MB51 AGCO Mount suitable for 2-inch NB pipe stand. Supplied in zinc plated CS as standard.



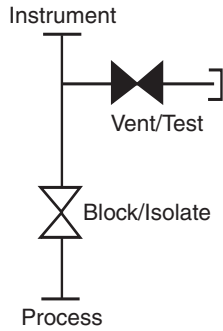
Wall Mounting Bracket BM3

A wall mounting bracket is available suitable for M25A, M25B, M251B.



Static Pressure Manifolds – M25A Specifications

M25A Dimensions, inches [mm] Flanged x Threaded (Bottom Vent)

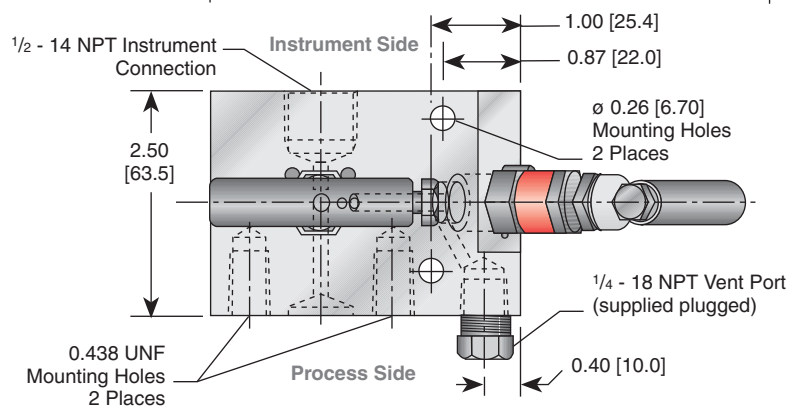
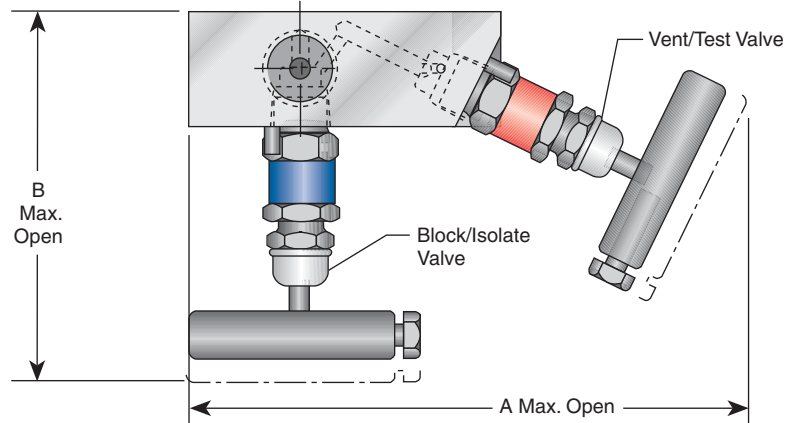


Dimensions, inches [mm]

Packing	A	B
Teflon®	6.26 [159]	3.95 [100]
GRAFOIL®	6.70 [170]	4.57 [116]

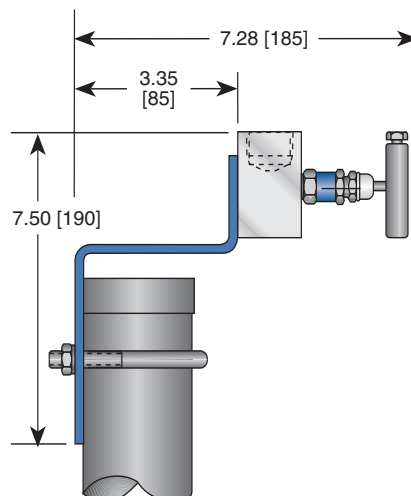
Notes

1. Approximate valve weight: 3.3 lb [1.5 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. The M25A is supplied as standard with two
0.26-inch [6.7 mm] diameter mounting holes.



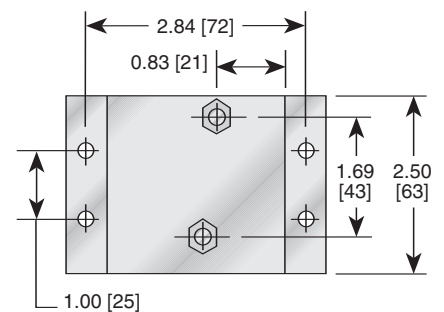
AGCO Mount MB51

The AGCO Mount principle is to mount the manifold not the instrument enabling easier loop installation and lower on-going maintenance costs. M25A, M25B and M251B are available with an MB51 AGCO Mount suitable for 2-inch NB pipe stand. Supplied in zinc plated CS as standard.



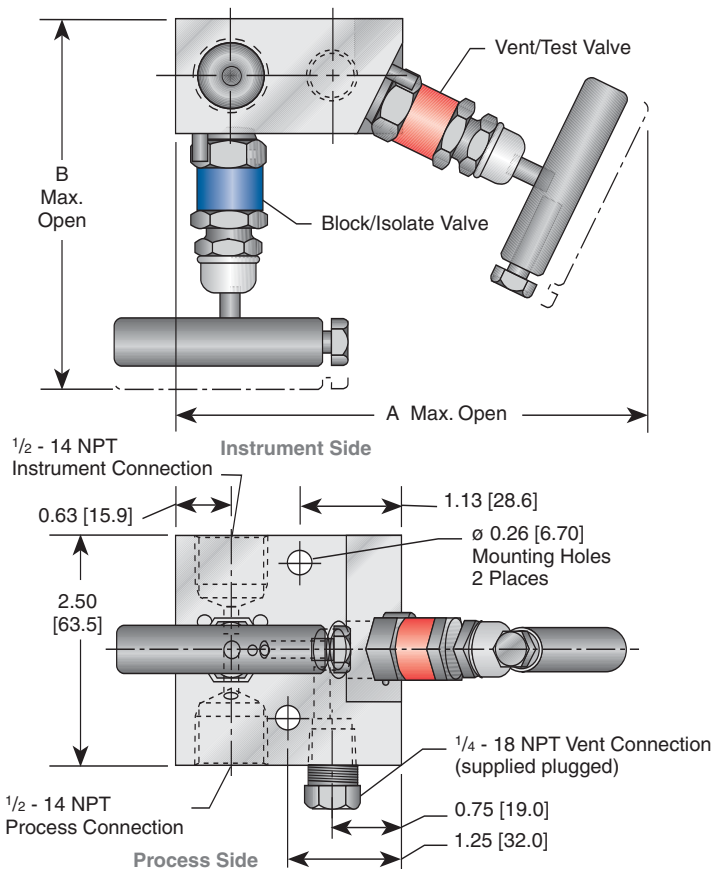
Wall Mounting Bracket BM3

A wall mounting bracket is available suitable for M25A, M25B, M251B.



Static Pressure Manifolds – M25B and M251B Specifications

M25B and M251B Dimensions, inches [mm] Threaded x Threaded (Bottom Vent)

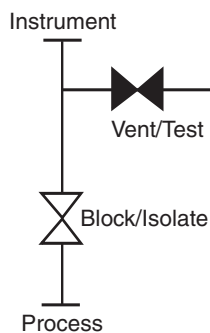


Dimensions, inches [mm]

Packing	A	B
Teflon®	5.38 [134]	3.95 [100]
GRAFOIL®	5.71 [145]	4.57 [116]

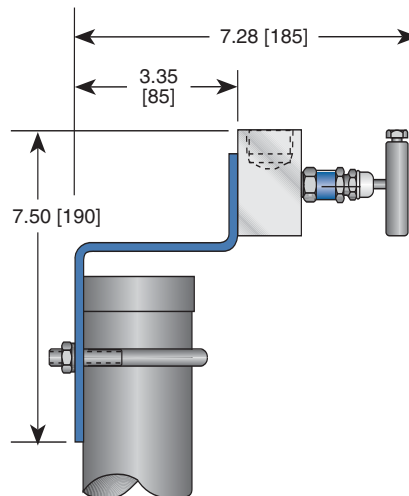
Notes

1. Approximate valve weight: 2.2 lb [1.0 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. The M25B and M251B are supplied as standard with two 0.26-inch [6.7 mm] diameter mounting holes.



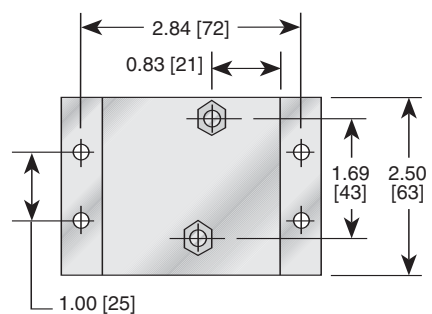
AGCO Mount MB51

The AGCO Mount principle is to mount the manifold not the instrument enabling easier loop installation and lower on-going maintenance costs. M25A, M25B and M251B are available with an MB51 AGCO Mount suitable for 2-inch NB pipe stand. Supplied in zinc plated CS as standard.



Wall Mounting Bracket BM3

A wall mounting bracket is available suitable for M25A, M25B, M251B.



Static Pressure Manifolds – M25, M25A, M25B, M251 and M251B Specifications

Notes

1. Threaded connection: vent supplied with blanking plug as standard.
2. Approximate valve weight: 3.3 lb [1.5 kg]. 0.187-inch [4.8 mm] diameter orifice. Valve C_v 0.52 maximum.
3. For CS valves with GRAFOIL® packing body and bonnet material is A105. For CS valves non-wetted parts are all CS.
4. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions \leq 50 mg/l [ppm]) and NACE MR0103-2005.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions $>$ 50 mg/l [ppm]).

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

- White:* Standard bonnet assembly Teflon® packing.
- Blue:* High pressure bonnet assembly Teflon® packing.
- Green:* Sour Gas service Teflon® packing.

Connections¹

Standard Connections

Process and instrument M25, M251 M25B and M251B:

Threaded 1/2-inch NPT to ANSI/ASME B1.20.1.

M25A has a flanged inlet connection.

Vent Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Other Connections

Threaded BSP Tr to BS21
BSP F to BS2779

Please consult the factory for availability.

Special Severe Service Materials

Duplex UNS S31803

6MO UNS S31254

Hastelloy® C276

Incoloy® 825

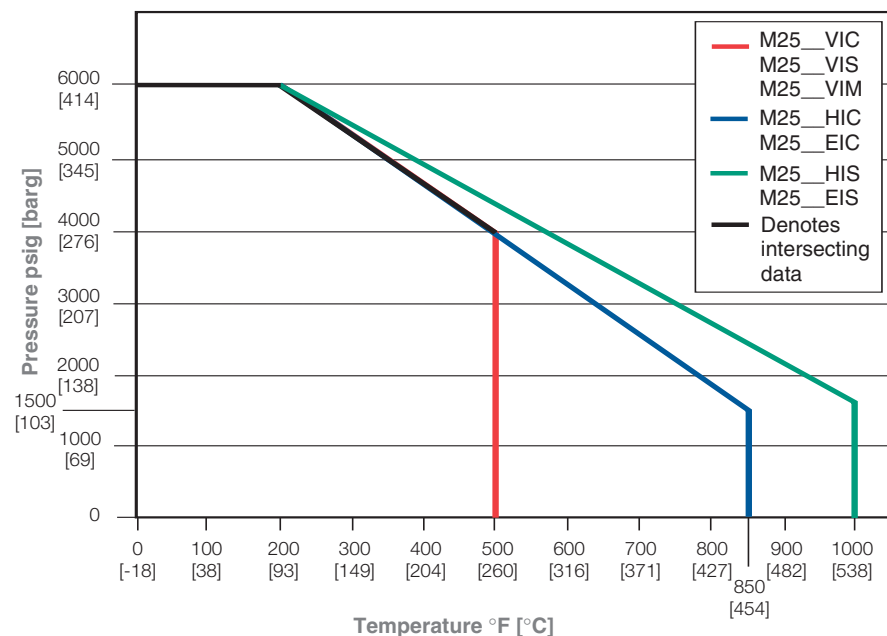
CS, SS and Monel® valves are suitable for most process applications, however for severe service, M25/M251 valves are also available in the above exotic materials. For any other material requirements, please consult the factory.

Standard Materials

Valve ²	Body	Bonnet	Stem	Ball Seat
CS ³	A108	A108	303 SS	17-4PH
SS	316 SS	316 SS	316 SS	316 SS
Monel®	Monel® 400	Monel® 400	Monel® 400	Monel® K500
SG ⁴	316 SS	316 SS	Monel® 400	Monel® K500
SG ⁵	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®

Static Pressure Manifolds – M25, M25A, M25B, M251 and M251B Specifications

Pressure vs. Temperature - M25, M25A and M25B

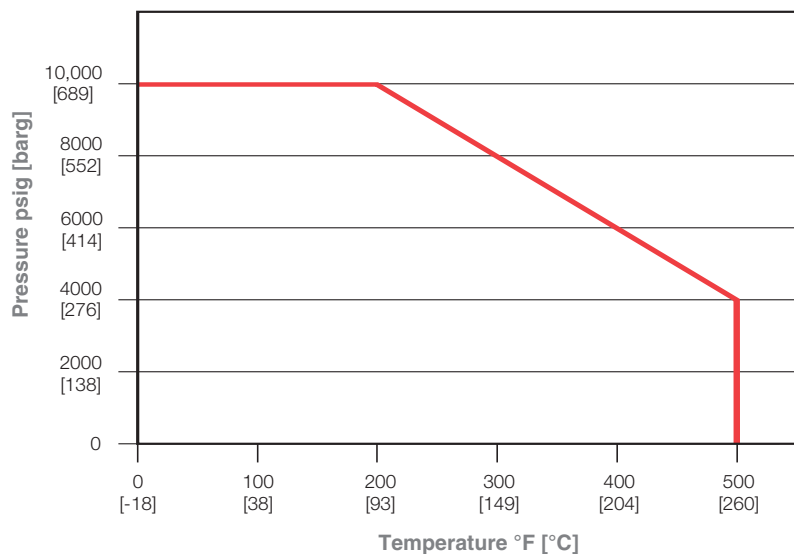


Pressure and Temperature Ratings
– M25, M25A and M25B

Valve	Teflon® Bonnet (standard)
CS, SS and Monel®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Valve	High Temperature
CS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 850°F [103 barg @ 454°C]
SS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Pressure vs. Temperature - M251 and M251B



Pressure and Temperature Ratings
– M251 and M251B

Valve	High Temperature
SS	10,000 psig @ 200°F [689 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Static Pressure Manifolds – M25, M25A and M25B Specifications

Ordering Information

	M25A	V	I	S	-4	-SG
Valve Type						
M25	– Threaded x Threaded (front vent)					
M25A	– Flanged x Threaded (bottom vent)					
M25B	– Threaded x Threaded (bottom vent)					
Packing						
V	– Teflon® (patented protected)					
H	– GRAFOIL®					
E	– Low Emissions Graphite					
Seat						
I	– Integral					
Body Material						
C	– CS					
S	– SS					
M	– Monel®					
J	– Hastelloy®					
Process Connections						
M25A – Inlet x Outlet						
4	– Flanged x 1/2-inch FNPT					
M25/M25B – Inlet x Outlet						
2	– 1/4-inch FNPT x 1/4-inch FNPT					
4	– 1/2-inch FNPT x 1/2-inch FNPT					
Options						
AL	– Arctic Lubricant (low temperature service -70°F) - not available for CS valves					
AT	– Tamper-proof Bonnet					
BL	– Bonnet Lock Device (Accessories, page 154)					
BM3	– Wall Mounting Bracket (M25A, M25B and M251B only)					
K	– Key for -AT					
LAT	– Lockable Tamper-proof Bonnet					
MB51	– AGCO Mount Kit for 2-inch pipe stand mounting (page 38)					
OC	– Cleaned for oxygen service					
PD	– Padlock for -LAT					
SG	– (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)					
SG3	– (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])					
ST	– Stellite Ball Ended Stem					
SP	– Special Requirements - please specify					

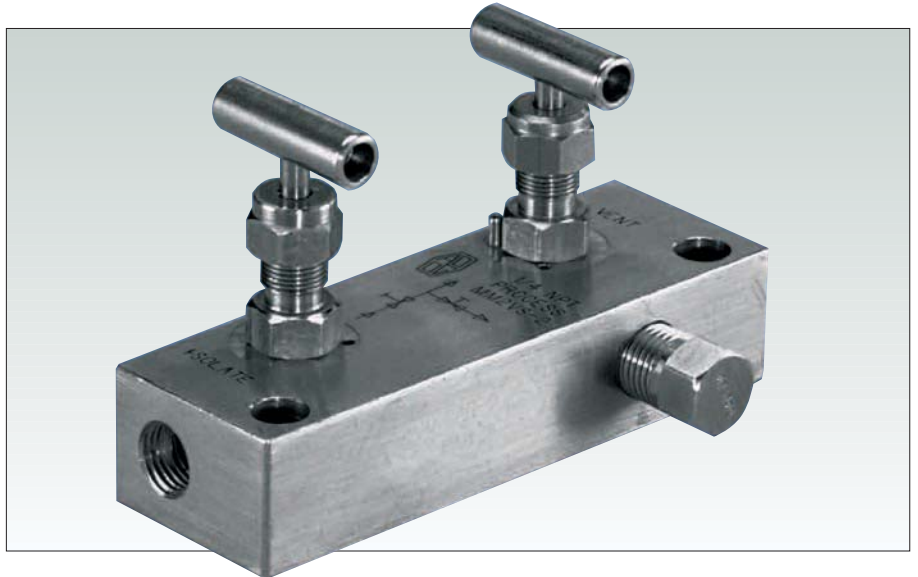
Static Pressure Manifolds – M251 and M251B Specifications

Ordering Information

	M251	V	I	S	-4	-SG
Valve Type						
M251	– Threaded x Threaded (front vent)					
M251B	– Threaded x Threaded (bottom vent)					
Packing						
V	– Teflon® (patented protected)					
Seat						
I	– Integral					
Body Material						
C	– CS					
S	– SS					
M	– Monel®					
J	– Hastelloy®					
Process Connections (Inlet x Outlet)						
2	– 1/4-inch FNPT x 1/4-inch FNPT					
4	– 1/2-inch FNPT x 1/2-inch FNPT					
Options						

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AT – Tamper-proof Bonnet
- BL – Bonnet Lock Device (Accessories, page 154)
- BM3 – Wall Mounting Bracket (M251B only)
- K – Key for -AT
- LAT – Lockable Tamper-proof Bonnet
- MB51 – AGCO Mount Kit for 2-inch pipe stand mounting (page 38)
- OC – Cleaned for oxygen service
- PD – Padlock for -LAT
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Static Pressure Manifolds – MM2 Specifications



Product Overview

Designed for remote mounting an instrument via 1/4-inch threaded process and instrument connections, the MM2 uses H5 miniature bonnets in a block and bleed configuration. Available in SS only and with metal or soft seats, this versatile design can be converted from a metal to a soft seated version simply by fitting a soft seat and flow washer. MM2 is suitable for pressures of up to 6000 psig [414 barg] and temperatures of up to 500°F [260°C]. The bonnet is supplied with Teflon® stem packing, and options include Delrin®, PCTFE or PEEK soft seats.

Applications

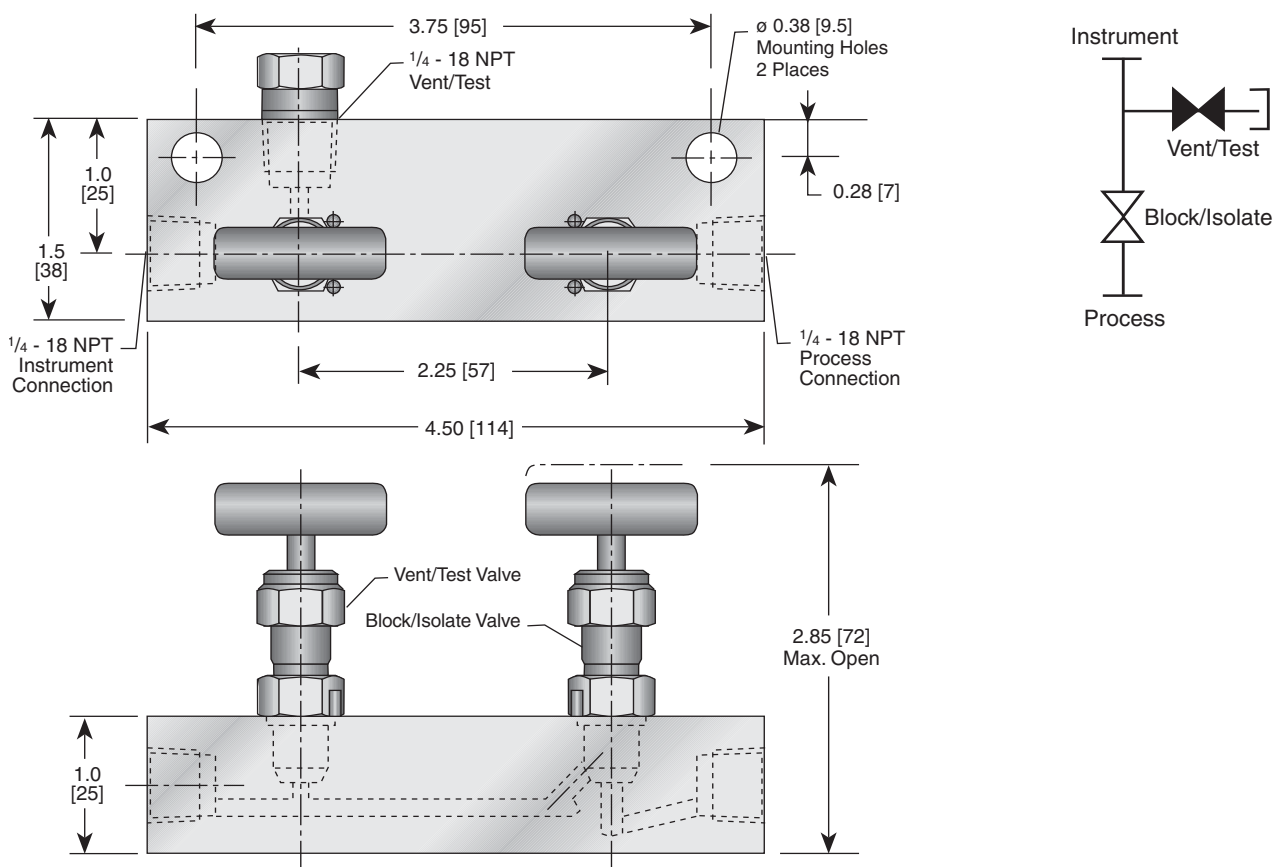
- Compact instrument control loops.
- Static pressure/gauge instruments.
- Control panels.
- Gas sampling equipment.

Features and Benefits

- **Remote mounting compact design** requires minimum space for operation and installation.
- **Installation costs reduced** by manifolding the valves. This eliminates several parts used in conventional methods of 'piping up.'
- **Metal or field replaceable soft seats.** This unique seat can be converted from metal to soft simply by fitting a soft seat and flow washer. Soft seats are field replaceable for easy maintenance, extending the useful life of the valve.
- **Extended valve life,** stem threads are rolled rather than cut for increased strength and smooth valve operation.
- **Back seat design** prevents stem blowout while under pressure, or during operation.
- **Threaded vent ports** allow the vent to be safely piped away; supplied plugged as standard.
- **Manifold mounting,** manifolds are supplied with mounting holes as standard to enable surface or cabinet mounting.

Static Pressure Manifolds – MM2 Specifications

Dimensions, inches [mm] Threaded x Threaded



Connections⁴

Standard Connections

Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Other Connections

Threaded 1/4-inch BSP Tr to BS21

Please consult the factory for availability.

Standard Materials

Valve ¹	Body	Bonnet	Stem	Soft Seat ²	Flow Washer	Packing
SS	SS, 316	316 SS	316 SS	PCTFE	316 SS	Teflon®
SG ³	SS, 316	316 SS	Monel® 400	PCTFE	316 SS	Teflon®
SG ^{3,5}	Hastelloy®	Hastelloy®	Hastelloy®	PCTM	Hastelloy®	Teflon®

Bonnet Assembly

The H5 bonnet assembly has a compact design with a one-piece rotating stem which is 'V' tipped for 'better' flow control. The stem threads are rolled and lubricated to prevent galling and reduce operating torque.

The SS bonnet is fitted with an adjustable Teflon® stem packing.

The H5 bonnets are assembled with a bonnet locking pin to prevent accidental removal in service.

Soft Seat

All miniature manifolds and valves feature a unique valve seat which may be converted from metal to soft simply by fitting a soft seat and flow washer. SS valves use PCTFE² soft seat as standard. Delrin® and PEEK seats are also available.

Notes

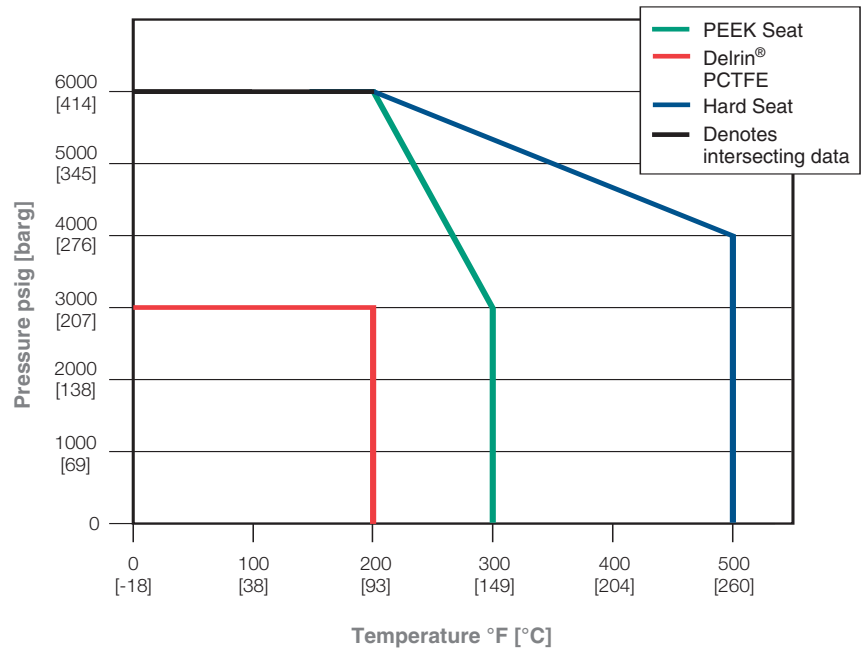
1. Approximate valve weight: 2.0 lb [.90 kg]. 0.136-inch [3.5 mm] diameter orifice. Valve C_v Hard seat 0.25 maximum. Valve C_v Soft seat 0.24 maximum.
2. PCTFE (Polychlorotrifluoroethylene) is exact equivalent of Kel-F®.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. Threaded connection: vent supplied with blanking plug as standard.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Static Pressure Manifolds – MM2 Specifications

Pressure and Temperature Ratings

Valve	Teflon® Packed
Metal	6000 psig @ 200°F [414 barg @ 93°C]
	4000 psig @ 500°F [276 barg @ 260°C]
	3000 psig @ 200°F [207 barg @ 93°C]
Delrin®/PCTFE	6000 psig @ 200°F [414 barg @ 93°C]
PEEK	3000 psig @ 300°F [207 barg @ 149°C]

Pressure vs. Temperature



Ordering Information

MM2 V D S -2 -SG

Bonnet Packing

V – Teflon®

Seat

- I – Integral (body material)
- D – Delrin®
- K – PCTFE (Polychlorotrifluoroethylene is the exact equivalent of Kel-F®)
- E – PEEK

Body Material

- S – SS, 316
- J – Hastelloy®

Connection

2 – 1/4-inch FNPT

Options

- BSP Tr – BSP Taper Thread
- OC – Cleaned for oxygen service
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- SP – Special Requirements - please specify

Static Pressure Manifolds - AGCO Mount Kits

AGCO Mount Kits for Static Pressure Manifolds

Manifold Style	Kit Part Number	Material	Description
M4TP	02.1639.501-AM	CS ¹	Standard Kit
	02.1639.508-AM		For bottom purge
	02.1639.500-AM		With steam block
M4TP	02.1639.505-AMS	SS	Standard Kit
	02.1639.509-AMS		For bottom purge
	02.1639.871-AMS		With steam block
MP1	—	—	Bracket included
MP2	—	—	Bracket included
PTM	02.1639.673-AM	CS ¹	Standard Kit
	02.1639.675-AMS	SS	Standard Kit
PT7M	02.1639.673-AM	CS ¹	Standard Kit
	02.1639.675-AMS	SS	Standard Kit
A30T	MB7-AM	CS ²	Standard Kit
A30T	MB7S-AMS	SS	Standard Kit
MM2	—	—	Surface mounted
M25A	MB51	CS ²	Standard Kit
M25A	MB51S	SS	Standard Kit
M25B/M251B	MB51-BM3	CS ²	Standard Kit
M25B/M251B	MB51S-BM3S	SS	Standard Kit
M25/M251	—	—	Surface mounted

Notes

1. Zinc cobalt plated.
2. Zinc plated.

Liquid Level Manifolds – M4TL 2-Valve Manifold



Product Overview

The M4TL is a single-flanged, two-valve manifold consisting of two block valves with no equalizer passage. The manifold is designed for use with ΔP – style pressure transmitters in liquid level service on pressurized vessels.

The two valves in the M4TL have free-swiveling ball end stems to ensure bubble-tight shutoff. The M4TL has 1/2-inch NPT process connections, and is designed to mount directly to the differential pressure transmitter.

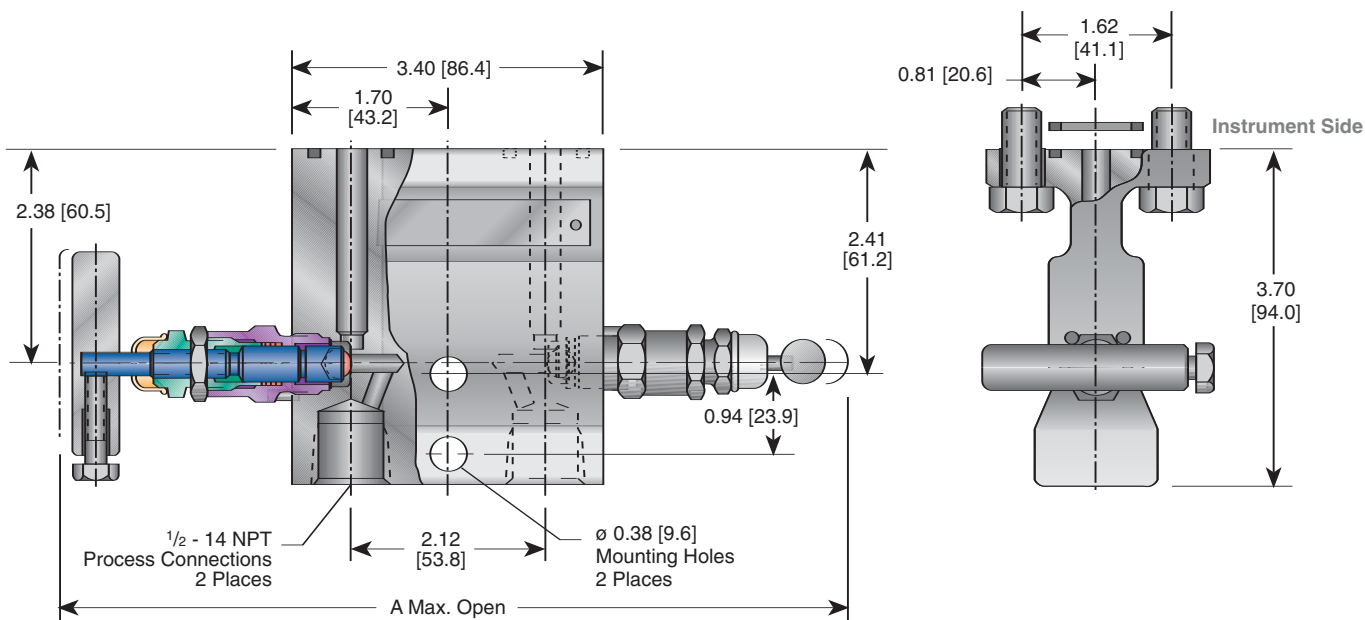
Like all the M4 manifolds, the M4TL may be mounted using the AGCO Mount option for easy assembly and maintenance.

Features and Benefits

- **Cost savings** when manifolding the instruments. This eliminates several parts used in conventional methods of 'piping up' resulting in cost reduction of 20-30 percent.
- **Compact design** requires minimum space for installation and operation.
- **Immediate installation** is allowed with the AGCO Mount. Steam block, bracket, and all associated piping can be installed without the instrument at the time of plant construction.
- **Less instrument damage** occurs when the instrument is safely warehoused until final 'loop' checkout, reducing the chances of damage during construction.
- **Secure mounting** is ensured by the AGCO Mount. Instrument piping stability is enhanced when directly supported by the pipe stand through the manifold.
- **Easy instrument removal** results from direct bolting to the manifold. Signal lines, purge lines, etc. left undisturbed. This facilitates repair, service, and calibration.
- **Free-swiveling ball end stem design** assures bubble-tight closure without seat galling.
- **Fewer leak points** reduce leakage by having fewer parts to assemble.
- **Valve packing** is below stem threads and seal is below body-to-bonnet threads, keeping corrosion to a minimum.

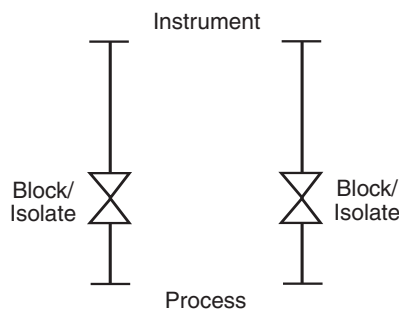
Liquid Level Manifolds – M4TL Specifications

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



Dimensions, inches [mm]

Packing	A
Teflon®	8.60 [218.4]
GRAFOIL®	9.90 [251.5]



Standard Materials

Valve ¹	Packing	Body	Bonnet	Stem	Ball	Bolts ⁵
CS ²	Teflon®	A576 10L18	A108	A581-303	17-4 PH	A193-B7
CS ²	GRAFOIL®/ Low Emissions Graphite	A576 10L18	A105	A581-303	17-4 PH	A193-B7
SS	Teflon®	A479-316	A479-316	A276-316	316	A193-B7
SS	GRAFOIL®/ Low Emissions Graphite	A479-316	A479-316	A276-316	316	A193-B7
SG ³	Teflon®	A479-316	A479-316	Monel® 400	Monel® K500	A193-B7
SG ³	GRAFOIL®/ Low Emissions Graphite	A479-316	A479-316	Monel® 400	Monel® K500	A193-B7
SG3 ⁴	Teflon®	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®	A193-B7

Notes

- Approximate valve weight: 5.0 lb [2.3 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.
- CS is zinc cobalt plated to prevent corrosion.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (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.

Liquid Level Manifolds – M4TL Specifications

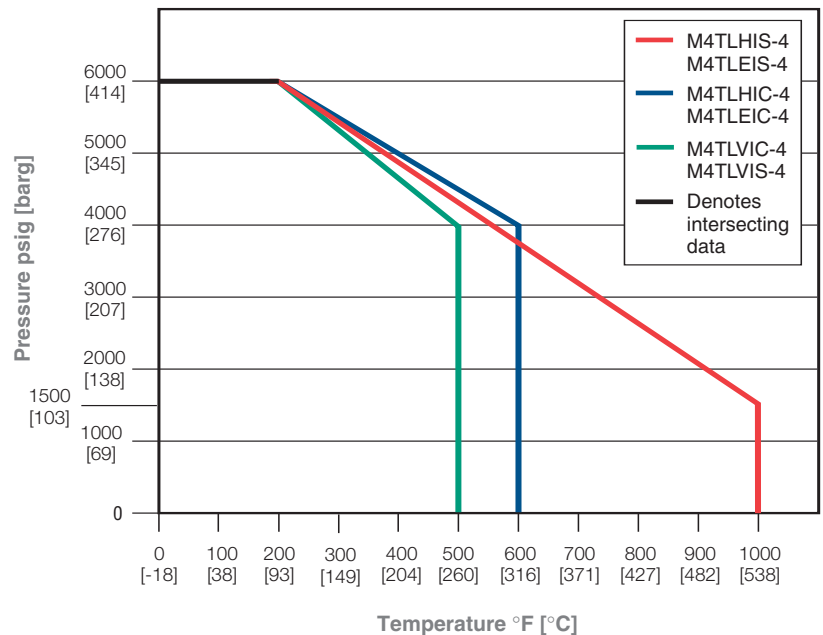
Notes

1. CS is zinc cobalt plated to prevent corrosion.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).
4. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Pressure and Temperature Ratings

Valve	Packing	Ratings ⁴	
CS ¹	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]
CS ¹	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 600°F	[276 barg @ 316°C]
SS	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]
SS	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F	[414 barg @ 93°C]
		1500 psig @ 1000°F	[103 barg @ 538°C]
SG ²	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
SG3 ³		4000 psig @ 500°F	[276 barg @ 260°C]
SG ²	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F	[414 barg @ 93°C]
SG3 ³		1500 psig @ 1000°F	[103 barg @ 538°C]

Pressure vs. Temperature



Liquid Level Manifolds – M4TL Specifications

Ordering Information

M4TL V I C – 4 – AM

Packing

- V – Teflon®
- H – GRAFOIL®

Seat Material

- I – Integral (body material)

Body Material

- C – CS, A576-10L18
- S – SS, A479-316
- W – 316L SS
- J – Hastelloy®

Process Connection

- 4 – 1/2-inch FNPT

Options

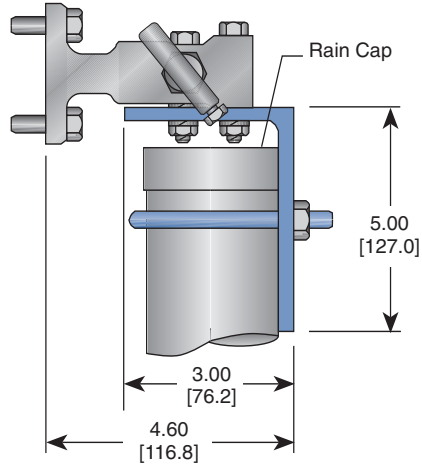
- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 43)
- BL – Bonnet Lock Device (page 154)
- CL – Cleaned for chlorine service
- HD – Hydrostatic testing (100 percent) (MSS SP-61)
- MS – Monel® Stem
- OC – Cleaned for oxygen service
- PHB – Phenolic Black Handle
- PT – Top Purge Ports (1/4-inch FNPT)
- SSA¹ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC¹ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Note

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Liquid Level Manifolds – AGCO Mount Kits

AGCO Mount Kits



AGCO Mount Kits are available for all manifolds where they apply. See AM Option for each manifold.

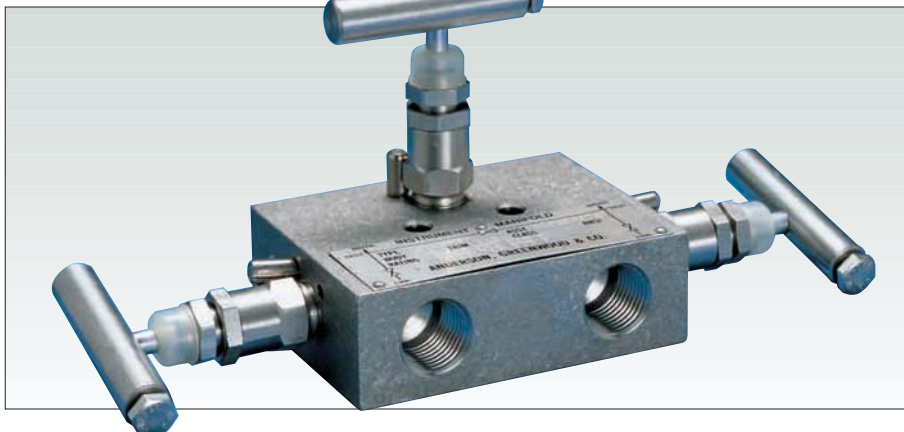
AGCO Mount Kits for Liquid Level Manifold

Manifold Style	Kit Part Number	Material	Description
M4TL	02.1639.501-AM	CS ¹	Standard Kit For bottom test ports With steam block
	02.1639.508-AM		
	02.1639.500-AM		
M4TL	02.1639.505-AMS	SS	Standard Kit For bottom test ports With CS steam block
	02.1639.509-AMS		
	02.1639.871-AMS		

Note

1. Zinc cobalt plated.

Differential Pressure Manifolds – M1 and M110 3-Valve Manifolds



Product Overview

For Applications Requiring Remote Mounting From Instrument

The M1 is a three-valve manifold designed to mount to the signal lines and instrument when the instrument has connections different than 2 $\frac{1}{8}$ -inches [54 mm] between signal taps such as recording orifice meters, small differential pressure indicators and some differential pressure switches. In these applications, the manifold is often supported by the signal lines but may be AGCO Mount supported (-AM).

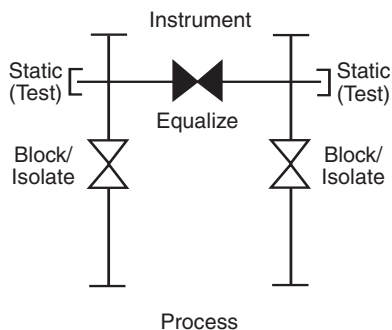
The M1 manifold is available with an integral metal seat or with various replaceable, roddable soft seats. The valve orifice is $\frac{3}{16}$ -inch [4.8 mm] diameter.

The M110 manifold is a high pressure version of the M1 and is available in 316 SS with integral seats.

Features and Benefits

- **Cost savings/less labor** results when unitizing the manifolding. It eliminates numerous parts used in conventional methods of 'piping up.' Results in cost reduction of 20-30 percent.
- **Roddability characterizes** the M1 with soft seats for services prone to plugging.
- **A protective bonnet cap** increases valve life by protecting against atmospheric contamination; reduces possibility of thread galling by containment of stem lubricant.
- **Fewer leak points** reduce the chances of leakage from a unitized design.
- **Packing is below stem threads.** Galling and corrosion of the stem threads due to exposure to the process fluid is prevented. The packing isolates the stem threads from the process.
- **Replaceable soft seat** design is bubble-tight with a $\frac{3}{16}$ -inch [4.8 mm] diameter orifice as standard.
- **Increased valve life** is obtained by rolling rather than cutting stem threads. This provides a stronger, more durable thread area.
- **Integral hard back seat** protects against stem blowout and provides a secondary packing seal.
- **Stem packing is adjustable** for leakproof and long service life.
- **Test ports** are $\frac{1}{4}$ -inch FNPT ports which may be used as test connections.

Differential Pressure Manifolds – M1 Specifications



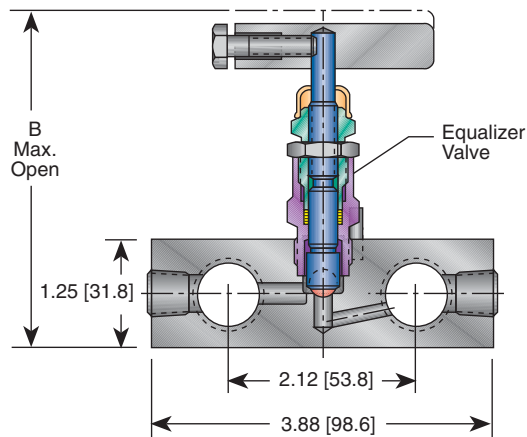
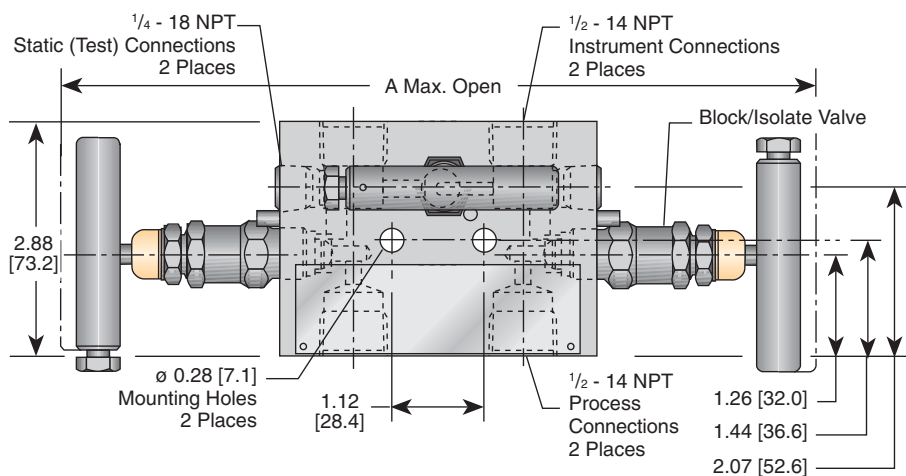
Dimensions, inches [mm]

Packing	A	B
GRAFOIL®/ Low Emissions Graphite	10.38 [263.7]	4.50 [114.3]
Teflon®	9.08 [230.6]	3.85 [97.8]

Notes

1. Approximate valve weight: 4.0 lb [1.8 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. CS parts are zinc cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Metal Seat Dimensions, inches [mm]



Standard Materials

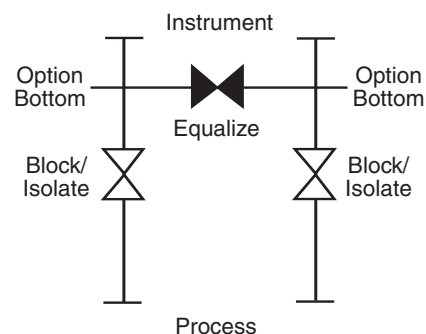
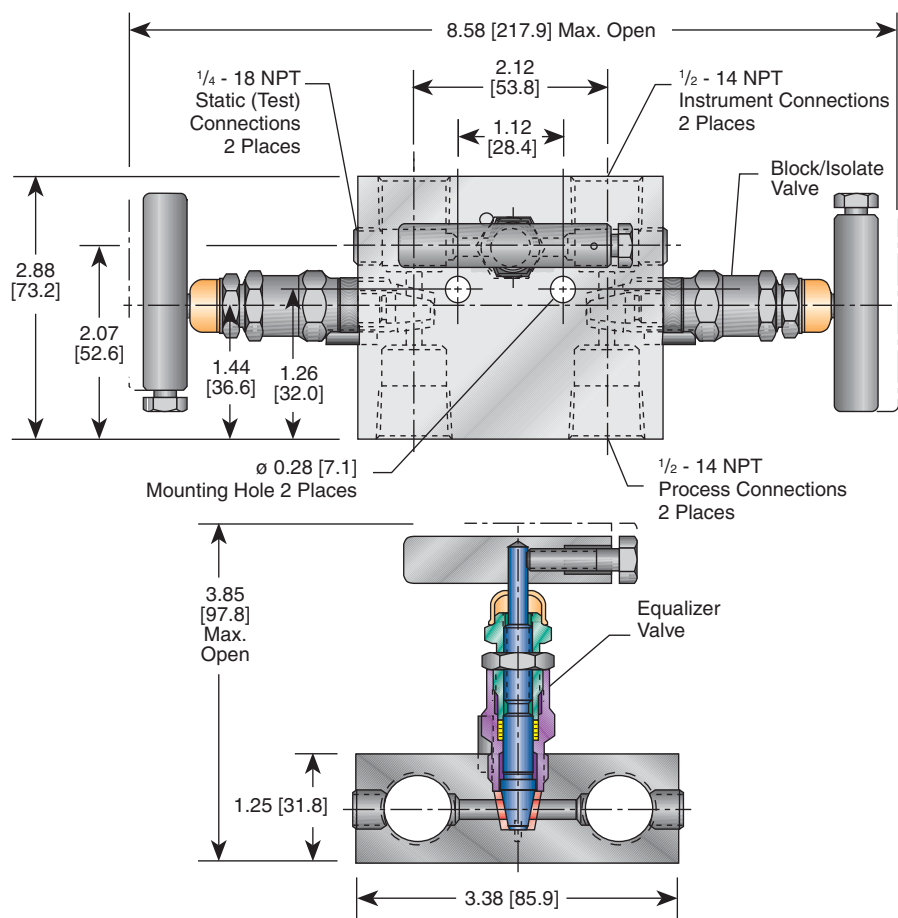
Valve ¹	Packing	Body/Bonnet	Stem/Ball
CS ²	Teflon® or O-ring	A108/A108	A581-303/17-4PH
CS ²	GRAFOIL®/ Low Emissions Graphite	A105/A105	A581-303/17-4PH
SS	Teflon® or O-ring	A479-316/A479-316	A276-316/316 SS
SS	GRAFOIL®/ Low Emissions Graphite	A479-316/A479-316	A276-316/316 SS
Monel®	Teflon®	Monel® 400/Monel® R405	Monel® 400/Monel® K500
Monel®	GRAFOIL®/ Low Emissions Graphite	Monel® 400/Monel® R405	Monel® 400/Monel® K500
SG ³ SG ³⁴	Teflon®	A479-316/A479-316 A479-316/Hastelloy® C276	Monel® 400/Monel® K500 Hastelloy® C276/Elgiloy®
SG ³ SG ³⁴	GRAFOIL®/ Low Emissions Graphite	A479-316/A479-316 A479-316/Hastelloy® C276	Monel® 400/Monel® K500 Hastelloy® C276/Elgiloy®

Pressure and Temperature Ratings

Ratings
6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 850°F [103 barg @ 454°C]
6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 800°F [103 barg @ 427°C]
6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Differential Pressure Manifolds – M1 Specifications

Soft Seat Dimensions, inches [mm]



Standard Materials

Valve ¹	Body and Bonnet	Stem	Packing	Seat
CS ²	A108 CS	A581-303	Teflon® or Viton® O-ring w/Teflon® backup	Delrin® ⁴
SS	A479-316	A276-316	Teflon® or Viton® O-ring w/Teflon® backup	Delrin® ⁴
SG ³	A479-316	Monel® 400	Teflon®	Delrin® ⁴
SG3 ⁵	Hastelloy® C276	Hastelloy® C276	Teflon®	Delrin® ⁴

Seat Pressure and Temperature Ratings

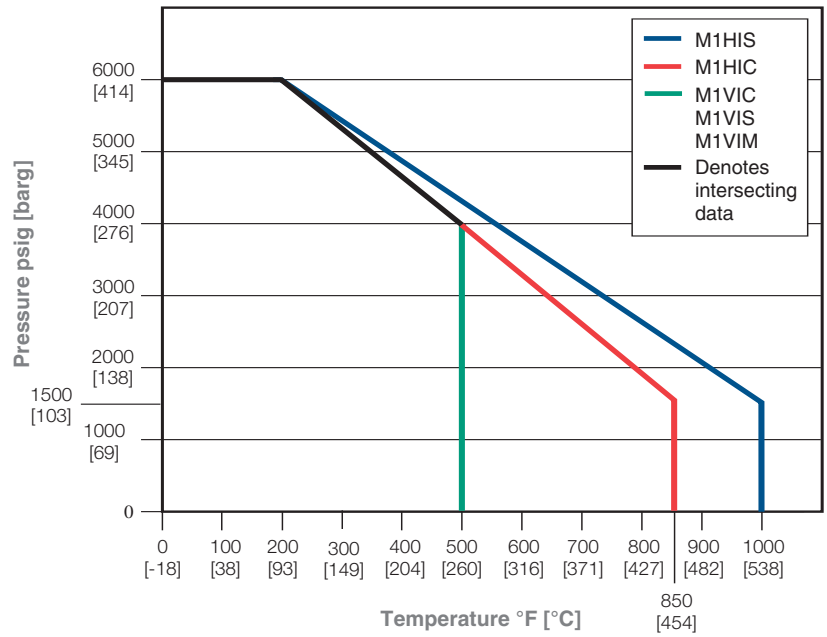
Seat	Pressure and Temperature Ratings
Delrin® and PCTFE ⁴	6000 psig @ 200°F [414 barg @ 93°C]
PEEK	6000 psig @ 200°F [414 barg @ 93°C] 2000 psig @ 400°F [138 barg @ 204°C]
Teflon®	1000 psig @ 150°F [69 barg @ 66°C] 200 psig @ 500°F [14 barg @ 260°C]

Notes

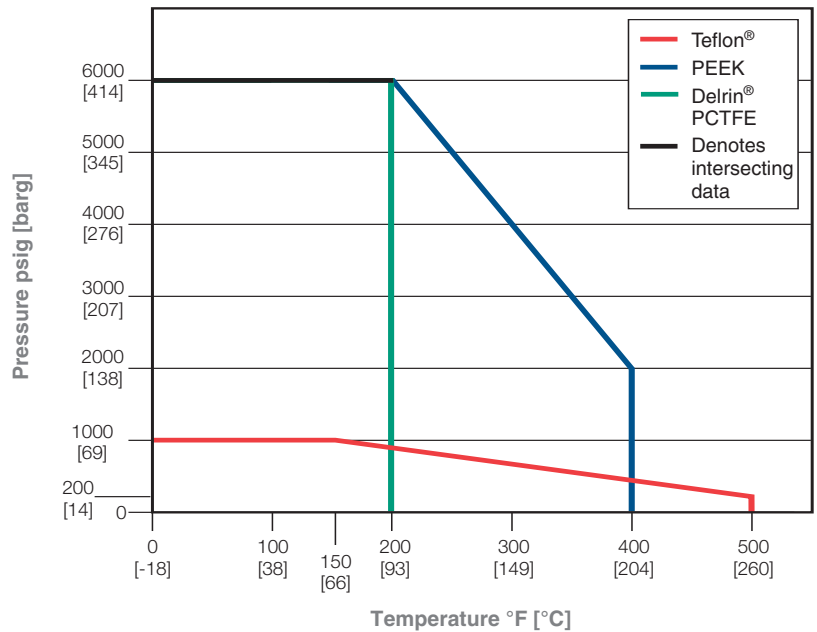
1. Approximate valve weight: 4.0 lb [1.8 kg]. 0.187-inch [4.8 mm] diameter orifice. Valve C_v 0.83 maximum.
2. CS parts are zinc cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. PCTFE (Polychlorotrifluoroethylene is exact equivalent of Kel-F®), PEEK, and Teflon® are also available.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Differential Pressure Manifolds – M1 Specifications

Pressure vs. Temperature – Metal Seat



Pressure vs. Temperature – Soft Seat



Differential Pressure Manifolds – M1 Specifications

Ordering Information Metal Seat; 3/16-inch [4.8 mm] Diameter Orifice

M1 H I S - 4 - SG

Packing

- V – Teflon®
- H – GRAFOIL®
- E – Low Emissions Graphite

Seat

- I – Integral (body material)

Body Material¹

- C – CS, A108 (Teflon® packed)
CS, A105 (GRAFOIL® and Low Emissions Graphite packed)
- S – SS, A479-316
- M – Monel®
- W – 316L SS
- J – Hastelloy®

Connection

- 4 – 1/2-inch FNPT

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)
- BC – Accessory Bracket - mount conduit with -AM
- BL – Bonnet Lock Device (page 154)
- BP – Accessory Bracket - mount purge meters with -AM
- CL – Cleaned for chlorine service
- HD – Hydrostatic testing (100 percent) (MSS SP-61)
- MS – Monel® Stem
- OC – Cleaned for oxygen service
- PHB – Phenolic Black Handle
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Note

1. Call factory for optional materials.

Differential Pressure Manifolds – M1 Specifications

Notes

1. Polychlorotrifluoroethylene is the exact equivalent of Kel-F®.
2. Call factory for optional materials.

Ordering Information Soft Seat Replaceable, Roddable; 3/16-inch [4.8 mm] Diameter Orifice

	M1	V	D	S	- 4	- SG
Packing						
V – Teflon®						
R – O-ring (Viton®)						
Seat						
D – Delrin®						
V – Teflon®						
E – PEEK						
K – PCTFE ¹						
Body Material²						
C – A108 CS						
S – A479-316 SS						
W – 316L SS						
J – Hastelloy®						
Connection						
4 – 1/2-inch FNPT						
Options						
AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves						
AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)						
BC – Accessory Bracket - mount conduit with AM						
BL – Bonnet Lock Device (page 154)						
BP – Accessory Bracket - mount purge meters with AM						
CL – Cleaned for chlorine service						
HD – Hydrostatic testing (100 percent) (MSS SP-61)						
MS – Monel® Stem						
OC – Cleaned for oxygen service						
PHB – Phenolic Black Handle						
SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves)						
SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])						
ST – Stellite Ball Ended Stem						
SP – Special Requirements - please specify						

Differential Pressure Manifolds – M1 ASME B31.1 or B31.3 Specifications Meets MSS SP-105⁵

Ordering Information – Power Industry Applications

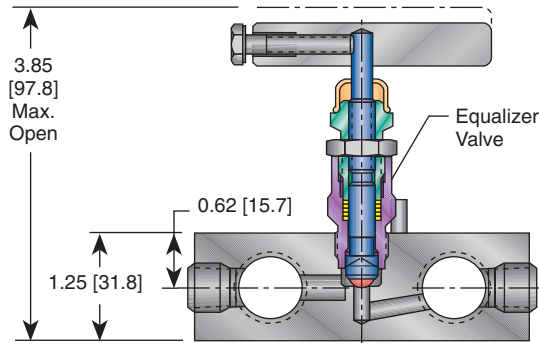
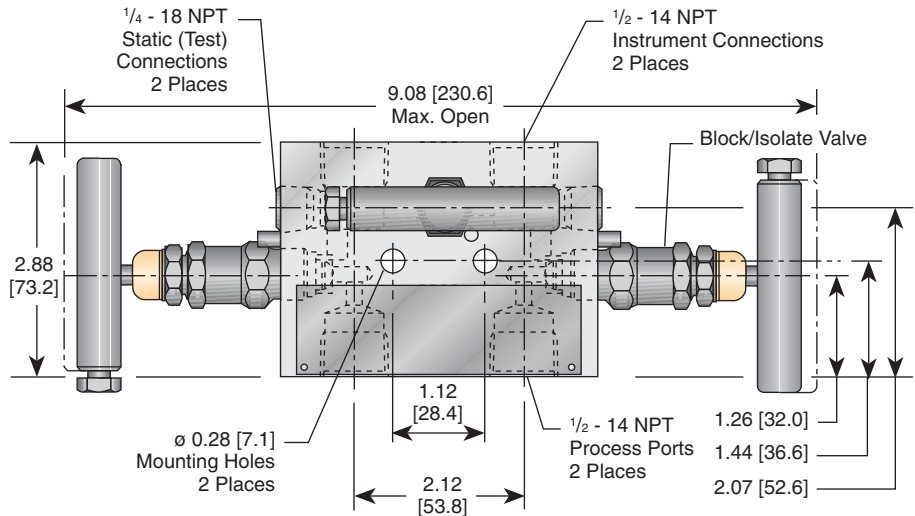
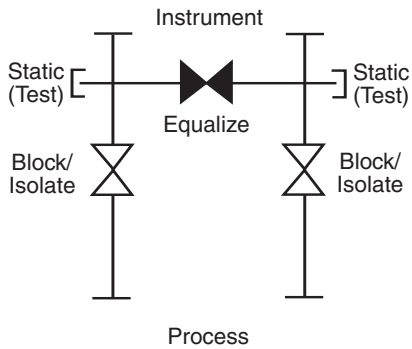
	M1HP	S	- 4	- XP	- AM
Valve Type	M1HP				
Body Material¹	C – CS, A105 S – SS, A479-316 W – 316L SS J – Hastelloy®				
Connection	4 – 1/2-inch FNPT x 1/2-inch FNPT x 1/2-inch FNPT 3TC4 – 3/8-inch Tube Stub x 1/2-inch FNPT x 1/2-inch FNPT ² 3TB4 – 3/8-inch Tube S.W. x 1/2-inch FNPT x 1/2-inch FNPT 4TC4 – 1/2-inch Tube Stub x 1/2-inch FNPT x 1/2-inch FNPT ³ 4TB4 – 1/2-inch Tube S.W. x 1/2-inch FNPT x 1/2-inch FNPT 4B – 1/2-inch FSW x 1/2-inch FSW				
Options	AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80) SP – Special Requirements - please specify				

Notes

- All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
- Tube Stubs are 6-inch long x 0.065-inch wall.
- Tube Stubs are 6-inch long x 0.095-inch wall.
- Manifold ratings:
SST
6000 psig @ 100°F [414 barg @ 38°C]
3030 psig @ 1000°F [209 barg @ 538°C]
STL
6170 psig @ 100°F [425 barg @ 38°C]
3430 psig @ 800°F [236 barg @ 427°C]
- See page 156 for Code Requirements.

Differential Pressure Manifolds – M110 Specifications

M110 Dimensions, inches [mm]



Notes

1. Approximate valve weight: 4 lb [1.8 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions \leq 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions $>$ 50 mg/l [ppm]).

Standard Materials

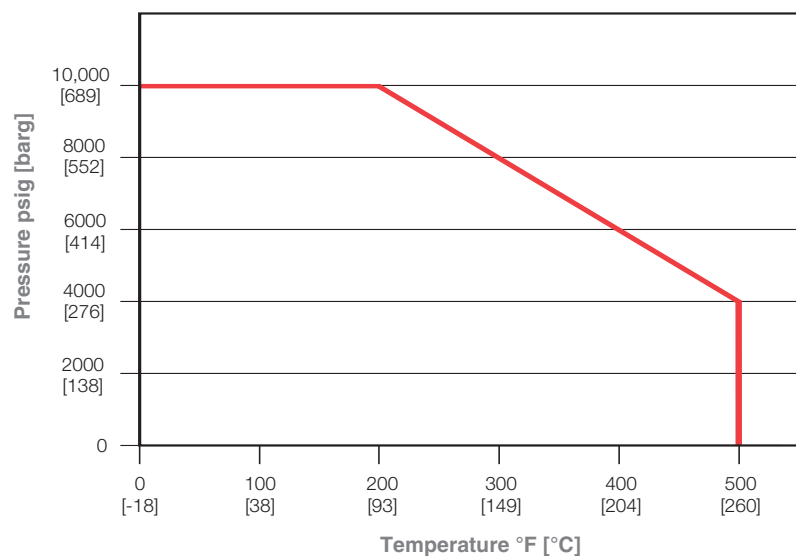
Valve ¹	Body and Bonnet	Stem and Ball	Packing
SS	A479-316 Body A479-316 Bonnet	A276-316 Stem 316 SS Ball	Teflon®
SG ²	A479-316 Body A479-316 Bonnet	Monel® 400 Stem Monel® K500 Ball	Teflon®
SG3 ³	Hastelloy® C276 Body Hastelloy® C276 Bonnet	Hastelloy® C276 Stem Elgiloy® Ball	Teflon®

Pressure and Temperature Ratings

Valve ¹	Packing	Pressure and Temperature Ratings	
SS	Teflon®	10,000 psig @ 200°F 4000 psig @ 500°F	[689 barg @ 93°C] [276 barg @ 260°C]
SG ² SG3 ³	Teflon®	10,000 psig @ 200°F 4000 psig @ 500°F	[689 barg @ 93°C] [276 barg @ 260°C]

Differential Pressure Manifolds – M110 Specifications

Pressure vs. Temperature



Ordering Information

M110 V I S - 4 - SG

Packing

V - Teflon®

Seat

I - Integral (body material)

Body Material

S - SS, A479-316

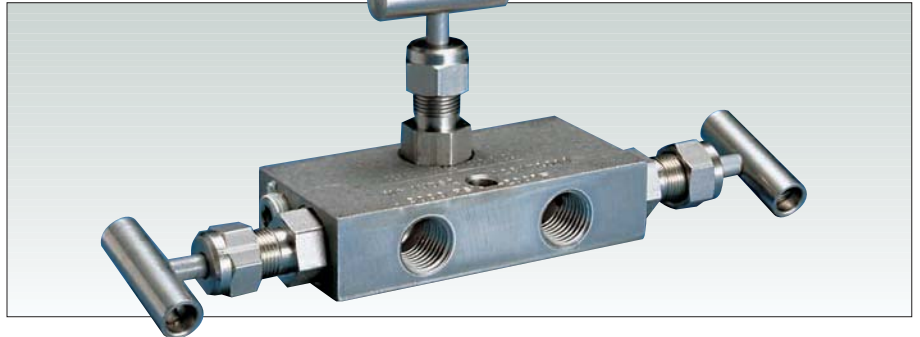
Connection

4 - 1/2-inch FNPT

Options

- AL - Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM - AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)
- BC - Accessory Bracket - mount conduit with AM
- BL - Bonnet Lock Device (page 154)
- BP - Accessory Bracket - mount purge meters with AM
- CL - Cleaned for chlorine service
- HD - Hydrostatic testing (100 percent) (MSS SP-61)
- MS - Monel® Stem
- OC - Cleaned for oxygen service
- PHB - Phenolic Black Handle
- SG - (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005
- SG3 - (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST - Stellite Ball Ended Stem
- SP - Special Requirements - please specify

Differential Pressure Manifolds – MM1 3-Valve Mini-Manifold



Product Overview

The MM1 is a miniature three-valve manifold for applications requiring remote mounting from the instrument. Made in CS, 316 SS, or brass, the MM1 features O-ring or packed bonnets with soft or metal seats.

This mini-manifold features a unique valve seat which can be converted from soft to hard by simply removing two insert washers. No other parts are required.

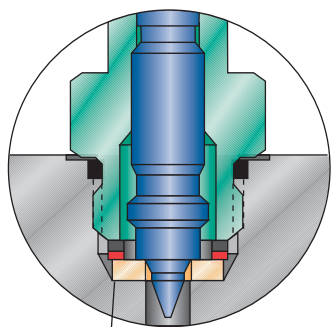
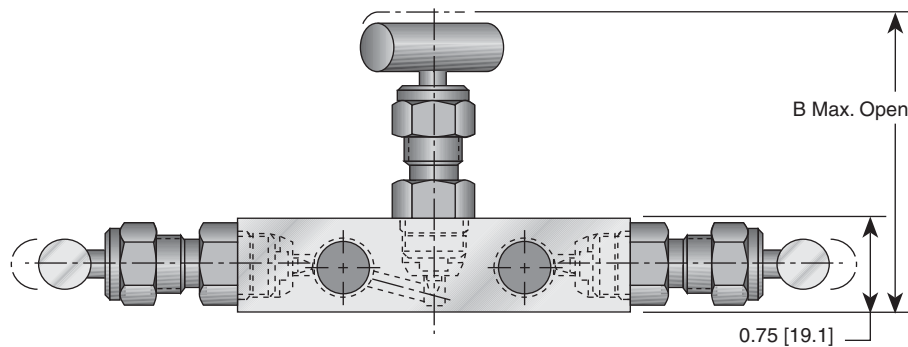
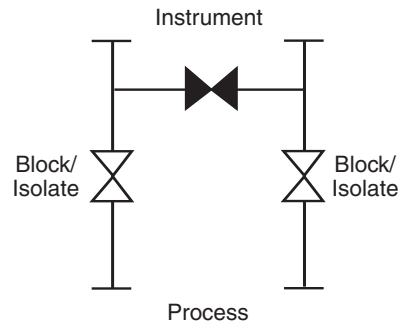
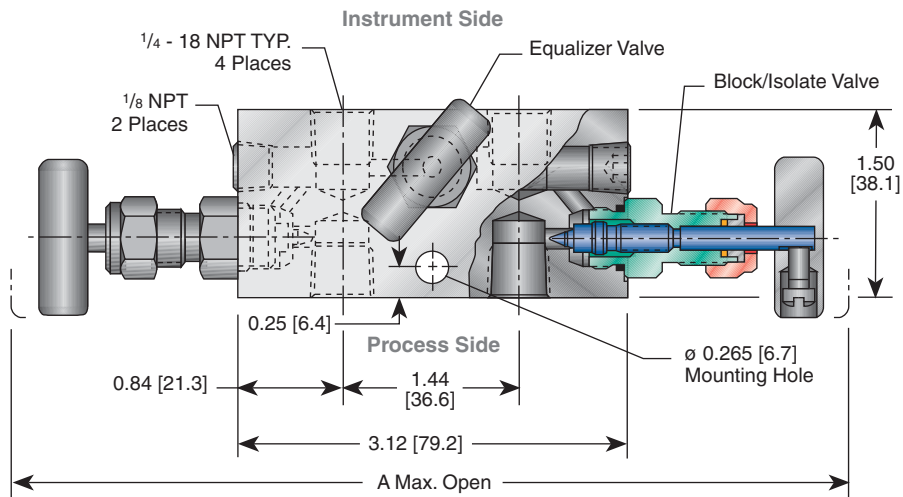
Used to set or reset differential pressure switches during initial plant start-up. Also used in assemblies for portable differential pressure test equipment used for any miniature differential pressure measuring device.

Features and Benefits

- **Cost savings in both materials and labor.** Manifolding the instruments eliminates several parts used in conventional methods of 'piping up.' Results in cost reduction of 20-30 percent.
- **Compact design** requires minimum space for operation and installation. Particularly useful for installations behind boards and in cabinets.
- **Back seat stem** feature prevents stem blowout.
- **Rolled threads** on stem and bonnet increase strength. This prevents galling and adds years to the useful life of the valve.
- **Fewer leak points** means reduced leakage by having fewer parts to assemble.
- **Teflon® packing (Teflon® Stem Seal)** is easily adjusted for leakproof and long service life.
- **Stem threads are isolated from process (O-ring Stem Seal).** This isolation prevents galling and corrosion of the stem threads due to exposure to the process fluid. The O-ring isolates the stem threads from the process.

Differential Pressure Manifolds – MM1 Specifications

Dimensions, inches [mm]



Optional Soft Seat

Dimensions, inches [mm]

Packing	A	B
O-ring	5.62 [142.7]	2.00 [50.8]
Teflon®	6.82 [173.2]	2.60 [66.0]

Note

1. Approximate valve weight: 1.0 lb [0.4 kg].
0.136-inch [3.5 mm] diameter orifice.
Valve C_v hard seat 0.25 maximum.
Valve C_v soft seat 0.24 maximum.

Differential Pressure Manifolds – MM1 Specifications

Pressure and Temperature Ratings				
Valve	Packing	Soft Seat Delrin®/PCTFE ²	Soft Seat PEEK	Metal Seat
CS ¹	BUNA-N O-ring	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C]
CS ¹	Teflon®	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C] 3000 psig @ 300°F [207 barg @ 149°C]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
Brass	BUNA-N O-ring	3000 psig @ 200°F [207 barg @ 93°C]	3000 psig @ 200°F [207 barg @ 93°C]	3000 psig @ 200°F [207 barg @ 93°C]
Brass	Teflon®	3000 psig @ 200°F [207 barg @ 93°C]	3000 psig @ 300°F [207 barg @ 149°C]	3000 psig @ 400°F [207 barg @ 204°C]
SS	Viton® O-ring	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C]
SS	Teflon®	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C] 3000 psig @ 300°F [207 barg @ 149°C]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³ SG3 ⁴	Teflon®	3000 psig @ 200°F [207 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C] 3000 psig @ 300°F [207 barg @ 149°C]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Notes

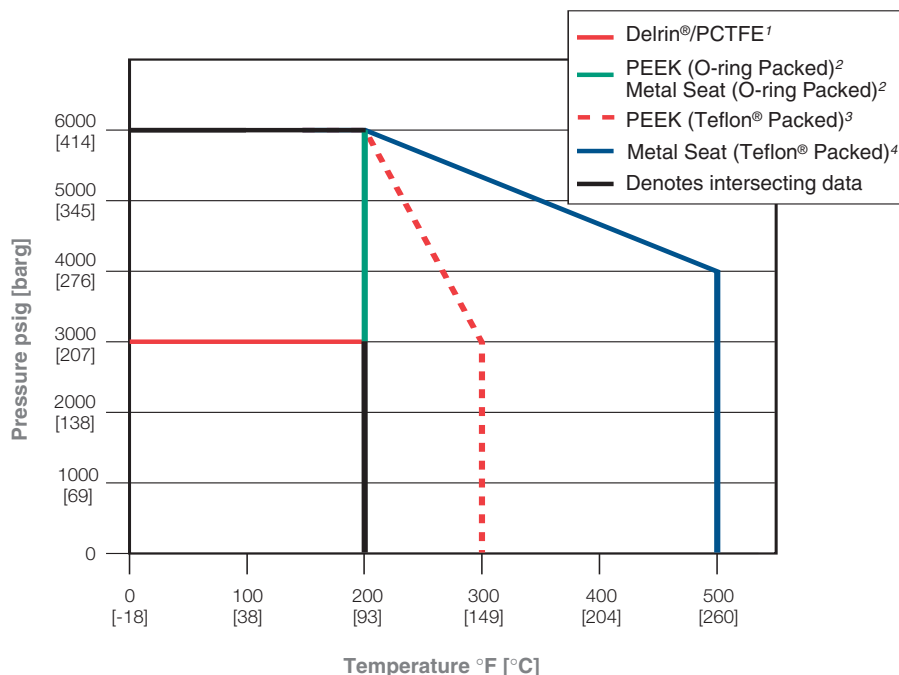
1. CS is zinc cobalt plated to prevent corrosion.
2. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. Soft seated valves only.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Standard Materials

Valve	Body	Bonnet	Stem	Flow Washer ⁴
CS ¹	A108	A108	A581-303	316
Brass	B16	B16	A581-303	316
SS	A276-316	A479-316	A276-316	316
SG ³	A276-316	A479-316	Monel® R405	316
SG3 ⁵	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276

Differential Pressure Manifolds – MM1 Specifications

Pressure vs. Temperature



Notes

1. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
2. Brass valve rating is 3000 psig @ 200°F [207 barg @ 93°C].
3. Brass valve rating is 3000 psig @ 300°F [207 barg @ 148°C].
4. Brass valve rating is 3000 psig @ 400°F [207 barg @ 204°C].

Ordering Information

MM1 V D S - 2 - SG

Packing

- V – Teflon®
- R – O-ring

Seat

- D – Delrin®
- K – PCTFE (Polychlorotrifluoroethylene is the exact equivalent of Kel-F®)
- E – PEEK
- I – Integral (body material)

Body Material

- C – CS, A108
- B – Brass B16
- S – SS, A276-316
- J – Hastelloy®

Connection

- 2 – 1/4-inch FNPT

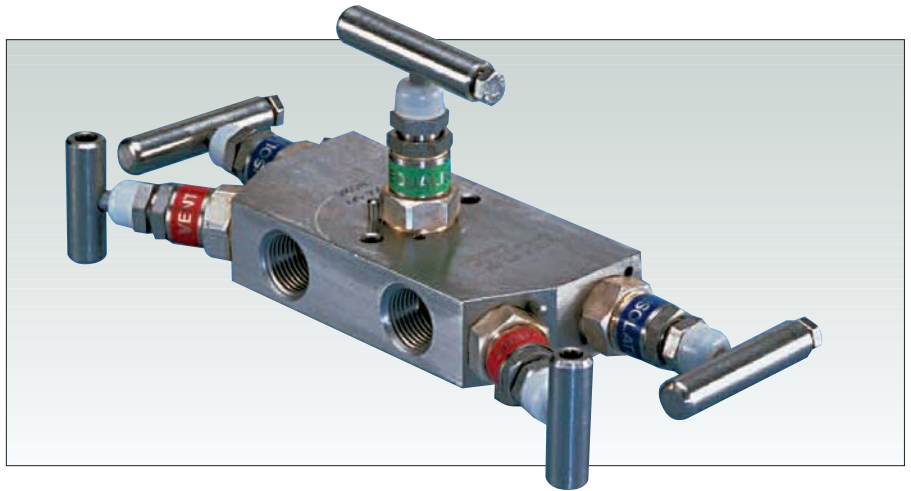
Options¹

- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 - (SS valves only) (not available for O-ring packed valves)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])

Note

1. Not available with AGCO Mount kit.

Differential Pressure Manifold – A22N



Product Overview

Designed for remote mounting an instrument via threaded process and instrument connections, the A22N has two block valves, an equalizer valve and two instrument side vent/calibrate valves. Process and instrument side connections are available either 1/4-inch or 1/2-inch threaded. Vent connections are threaded 1/4-inch on all manifolds and provided with blanking plugs. The instrument connections are positioned on 2 1/8-inch [54 mm] centers but can easily be adapted to suit instruments with other center-to-center dimensions via screwed fittings. Suitable for pressures of up to 6000 psig [414 barg] and temperatures of up to 1000°F [538°C].

Applications

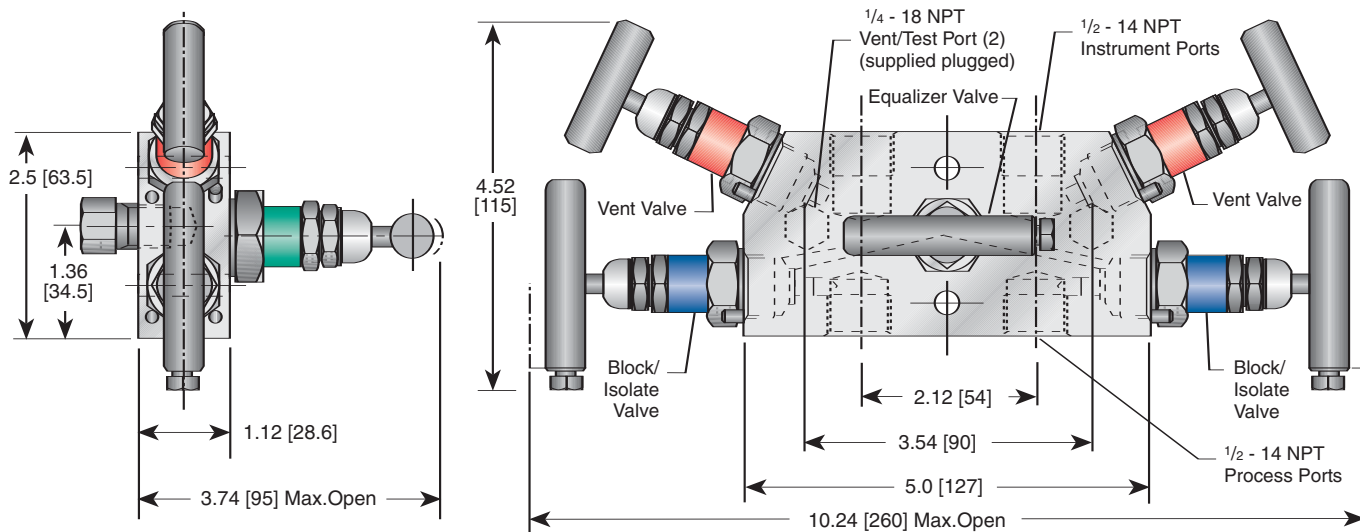
- Remote mounting differential pressure transmitters.
- Instrument isolation and zeroing.
- Instrument venting.
- Instrument calibration.
- Liquid and vapor service.
- Instruments with other than 2 1/8-inch [54 mm] centers.
- Differential Pressure changes.

Features and Benefits

- **Remote mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs are reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem is free-swiveling** which ensures perfect alignment, providing repetitive bubble-tight shutoff and long life.
- **Teflon® or Graphite packing** below the stem threads prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allow vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, all manifolds are supplied with mounting holes as standard to enable pipe bracket mounting.

Differential Pressure Manifold – A22N Specifications

Dimensions, inches [mm] Threaded x Threaded

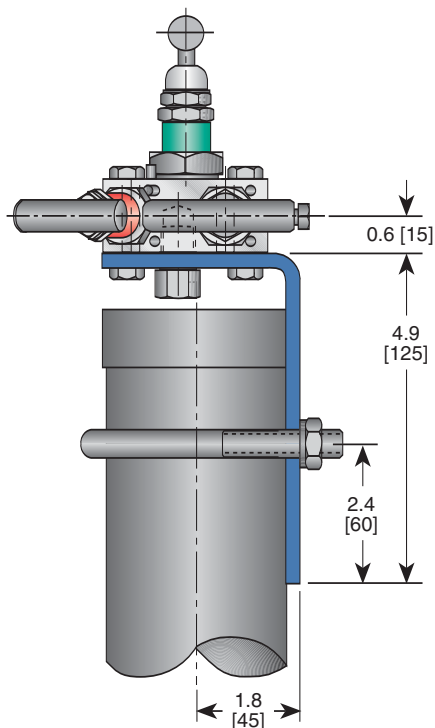


Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat
CS ²	A108	A108	303 SS	17-4PH
SS	SS, A479 316	316 SS	316 SS	316 SS
Monel®	Monel® 400	Monel® 400	Monel® 400	Monel® K500
SG ³	A479 316	316 SS	Monel® 400	Monel® K500
SG3 ⁴	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®

AGCO Mount MB8

A22N is available with a mounting bracket MB8 suitable for 2-inch [50 mm] pipe stand. Supplied in zinc plated CS as standard.



Special Severe Service Materials

Duplex UNS S31803

6MO UNS S31254

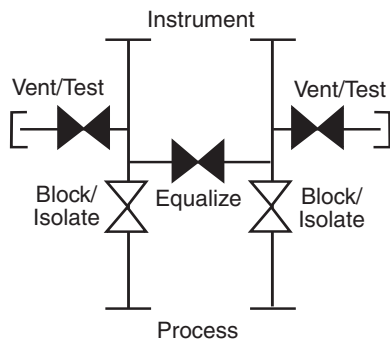
Hastelloy® C276

Incoloy® 825

For any other material requirements, please consult the factory.

Notes

1. Approximate valve weight: 6.0 lb [2.7 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. For CS valves, non-wetted parts are all CS zinc plated to resist corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).



Differential Pressure Manifold – A22N Specifications

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

White: Standard bonnet assembly Teflon® packing.

Green: Sour Gas service Teflon® packing.

Ring Labels: The valve bonnets have color coded ring labels for service identification.

Red: Vent Valves

Blue: Isolate Valves

Green: Equalize Valves

Connections¹

Standard Connections

Process Threaded 1/2-inch NPT to ANSI/ASME B1.20.1.

Instrument Threaded 1/2-inch NPT to ANSI/ASME B1.20.1.

Vent Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Other Connections

Threaded BSP Tr to BS21
BSP F to BS2779

Please consult the factory for availability.

Note

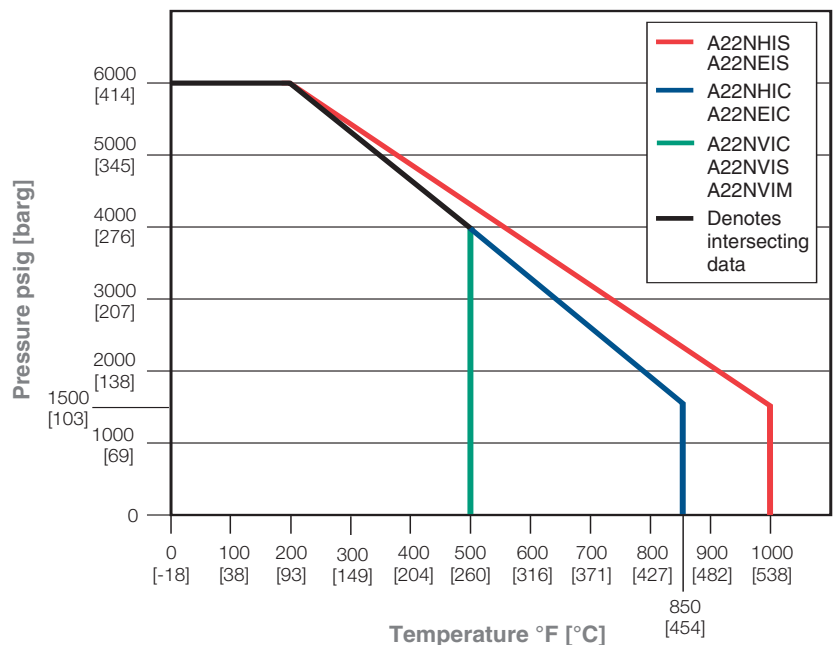
1. Threaded connection: vent supplied with blanking plug as standard.

Pressure and Temperature Ratings

Valve	Teflon® Bonnet	
CS, SS and Monel®	6000 psig @ 200°F [414 barg @ 93°C]	
	4000 psig @ 500°F [276 barg @ 260°C]	

Valve	High Temperature	
CS	6000 psig @ 200°F [414 barg @ 93°C]	
	1500 psig @ 850°F [103 barg @ 454°C]	
SS	6000 psig @ 200°F [414 barg @ 93°C]	
	1500 psig @ 1000°F [103 barg @ 538°C]	

Pressure vs. Temperature



Differential Pressure Manifold – A22N Specifications

Ordering Information

A22N **V** **I** **S** **- 4** **- SG**

Bonnet Packing

V – Teflon®
H – Graphite

Seat

I – Integral

Body Material

C – CS, A108
S – SS, 316
M – Monel® 400

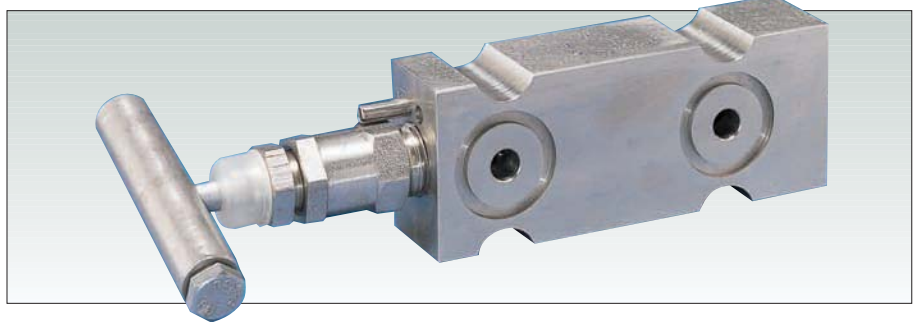
Process/Instrument Connections

2 – 1/4-inch FNPT
4 – 1/2-inch FNPT

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AT – Tamper-proof Bonnet
- BL – Bonnet Lock Device (Accessories, page 154)
- HP – 10,000 psig [689 barg]
- K – Key for -AT
- LAT – Lockable Tamper-proof Bonnet
- MB8 – AGCO Mount Kit for 2-inch pipe stand mounting (page 80)
- OC – Cleaned for oxygen service
- PD – Padlock for -LAT
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions \leq 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions $>$ 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Differential Pressure Manifolds – M3A Equalizer Manifold



Product Overview

The M3A Equalizer Manifold is designed for use with differential pressure transmitters where low-cost direct coupling is desired and piping specifications require individual block valves. The valve is Teflon® -packed and uses a self-aligning SS ball seat. This single valve serves to equalize the transmitter.

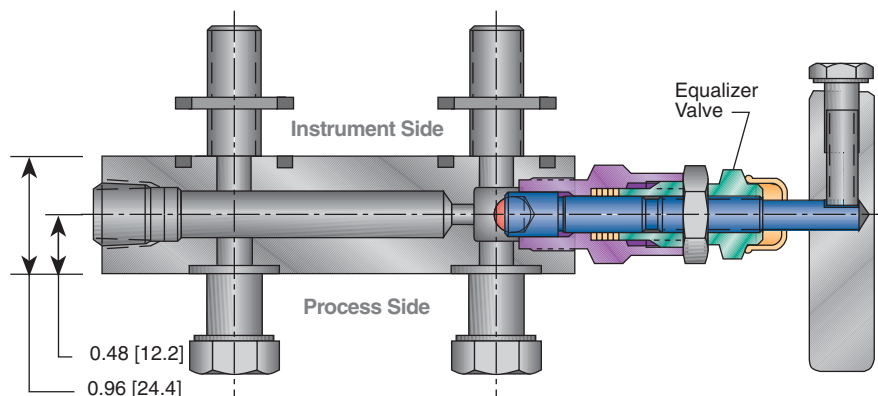
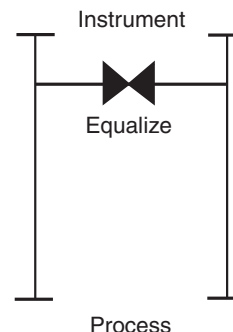
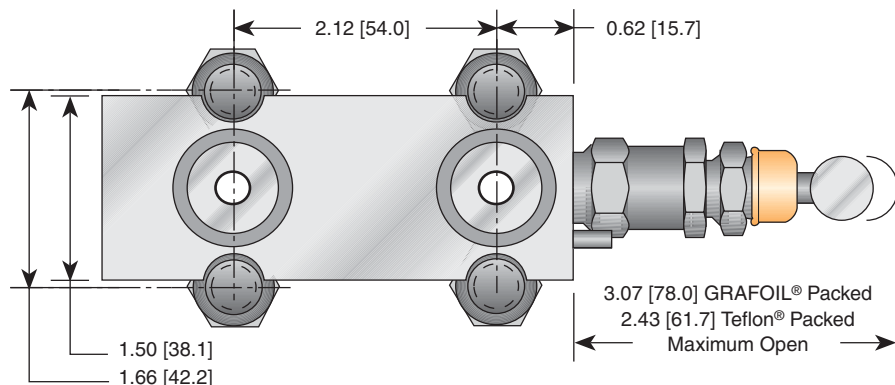
The M3A fits between the transmitter and the 2-bolt flanges (futbols). For complete mounting, each manifold package includes two Teflon® or GRAFOIL® gaskets and four 7/16-inch – 20 x 2 1/2-inch zinc cobalt plated alloy steel bolts.

Features and Benefits

- **Cost savings** are realized by manifolding the instrument, which eliminates several parts used in conventional methods of 'piping-up.' Construction savings of 20-30 percent may be realized.
- **Compact design** requires minimum space for operation and installation.
- **Fewer connections** reduces leakage by having fewer parts to assemble.
- **Adjustable stem packing** results in long, leak-proof service.
- **Increased valve life** results from rolled stem threads rather than cut, providing a stronger, more durable thread area.
- **Integral hard back seat** protects against stem blowout.
- **Free-swiveling ball end stem (metal seat)** provides bubble-tight, metal-to-metal valve closure without seat galling.
- **Packing below stem threads** prevents galling and corrosion of the stem threads exposed to process fluid.

Differential Pressure Manifolds – M3A Specifications

Dimensions, inches [mm]



Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball	Packing
CS ²	A108 CS	A105	A581-303 SS	17-4 PH	Teflon®
CS ²	A108 CS	A105	A581-303 SS	17-4 PH	GRAFOIL®
316 SS	A479-316 SS	A479-316 SS	A276-316 SS	316 SS	Teflon®
316 SS	A479-316 SS	A479-316 SS	A276-316 SS	316 SS	GRAFOIL®
SG ³	A479-316 SS	A479-316 SS	Monel® 400	Monel® K500	Teflon®
SG ³	A479-316 SS	A479-316 SS	Monel® 400	Monel® K500	GRAFOIL®
SG3 ⁴	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®	Teflon®

Notes

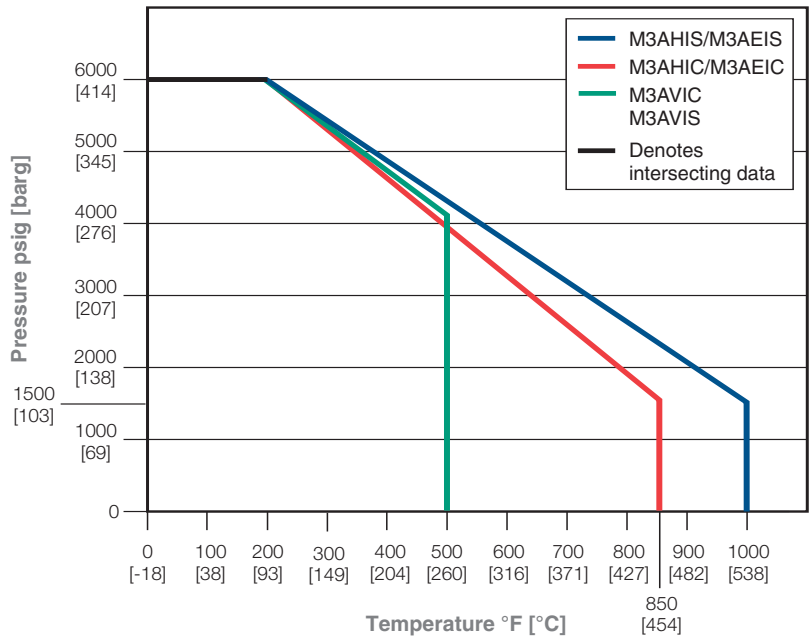
1. Approximate valve weight: 1.5 lb [0.7 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. CS parts are zinc cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Differential Pressure Manifolds – M3A Specifications

Pressure and Temperature Ratings

Valve	Teflon® Packed
CS	6000 psig @ 200°F [414 barg @ 93°C]
	4000 psig @ 500°F [276 barg @ 260°C]
316 SS	6000 psig @ 200°F [414 barg @ 93°C]
	4000 psig @ 500°F [276 barg @ 260°C]
SG SG3	6000 psig @ 200°F [414 barg @ 93°C]
	4000 psig @ 500°F [276 barg @ 260°C]
Valve	GRAFOIL® Packed
CS	6000 psig @ 200°F [414 barg @ 93°C]
	1500 psig @ 850°F [103 barg @ 427°C]
316 SS	6000 psig @ 200°F [414 barg @ 93°C]
	1500 psig @ 1000°F [103 barg @ 538°C]
SG SG3	6000 psig @ 200°F [414 barg @ 93°C]
	1500 psig @ 1000°F [103 barg @ 538°C]

Pressure vs. Temperature



Ordering Information

M3A V I S - SG

Packing

- V – Teflon®
- H – GRAFOIL®
- E – Low Emissions Graphite

Seat

- I – Integral (body material)

Body Material

- C – CS¹, A108
- S – SS, A479-316
- J – Hastelloy®

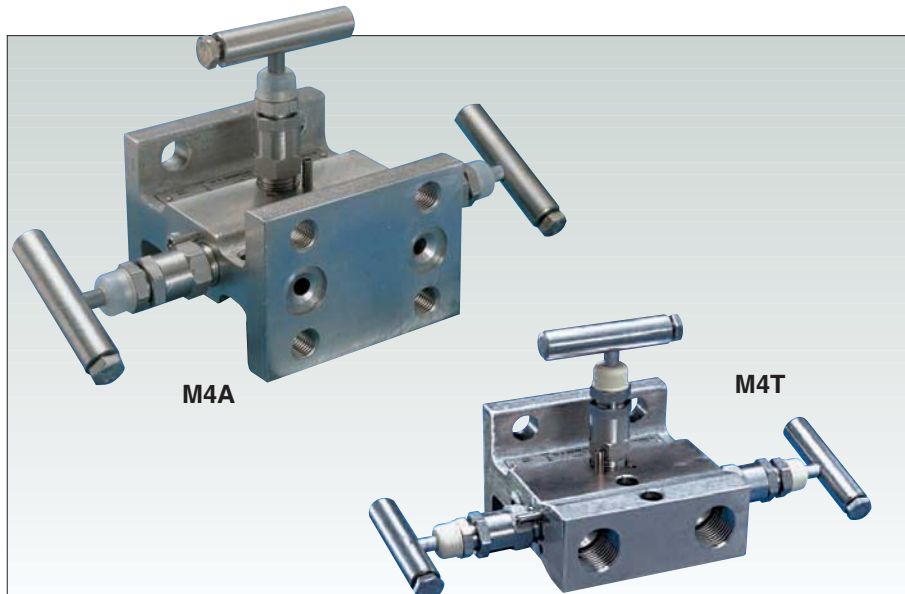
Options

- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- SP – Special Requirements - please specify

Note

1. CS parts are zinc cobalt plated to prevent corrosion.

Differential Pressure Manifolds - M4A and M4T 3-Valve Manifolds



Product Overview

Our M4 Manifold is a three-valve unit designed for mounting on differential pressure transmitters having 2 1/8-inch [54 mm] center-to-center connections.

For direct or remote mounting, the M4A permits the transmitter's flange to connect the process signal lines to the manifold directly, with either 1/2-inch pipe or tubing connections. It contains two main block valves and an equalizing valve.

For close or remote mounting, the M4T Manifold is used in applications where direct coupling to orifice flanges is not desired. On the instrument side, the M4T bolts directly to the transmitter. On the process side, two 1/2-inch NPT or AGCO-Tube connections are provided for piping or tubing into the flange taps.

General Mounting Techniques

The M4A mounts either directly at the orifice flange union or to a 2-inch pipe stand using the AGCO Mount kit.

The M4T is designed for remote mounting on a 2-inch pipe stand and using the AGCO Mount kit.

Features and Benefits

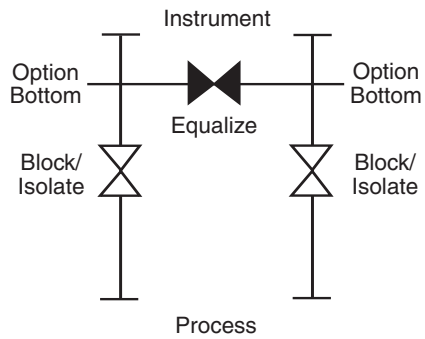
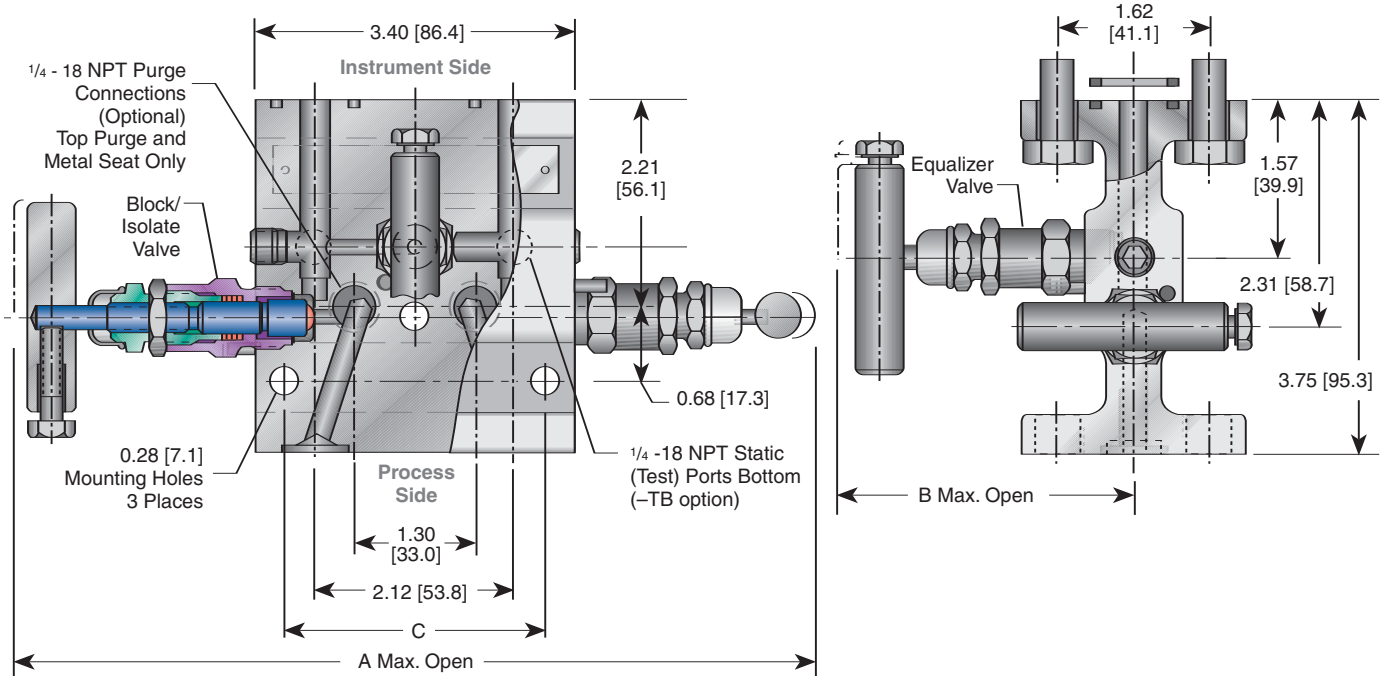
- **Cost savings/less labor** results when utilizing the manifolding. It eliminates numerous parts used in conventional methods of 'piping up.' Results in cost reduction of 20-30 percent.
- **Stem backout prevention** eliminates stem blowout, or accidental removal while in operation.
- **Bonnet-to-body seal** is metal-to-metal in constant compression below the bonnet threads. This prevents bonnet thread process corrosion, eliminates tensile breakage of bonnet, and creates a reliable seal point.
- **Roddability** of soft seated valves means impulse lines can be cleaned without using purge. Simplifies maintenance and helps ensure measurement accuracy.
- **Field-replaceable soft seats** allow replacement of seat inserts without removing the valve from the line.
- **Stem finish** is burnished to a 16 RMS mirror finish in the packing area. Enables smooth stem operation and extended packing life.
- **Rolled threads** provide additional thread strength because the stem and bonnet threads are rolled, not cut.

- **Fugitive emissions.** To meet low fugitive emissions requirements, special Graphite sealed bonnets are available.
- **Fewer parts** means fewer leak points which mean fewer fugitive emissions.
- **Manifold mounts directly to the pipe stand.** The AGCO Mount supports the transmitter and allows loop installation to be completed without the transmitter. Instrument removal for service or repair does not disturb installation.
- **Teflon®, GRAFOIL®, or Graphite packing** adjusts easily. Decreases downtime and increases valve life.
- **Integral hard back seat** protects against stem blowout and forms a secondary seal.
- **Protective bonnet cap** (Teflon® packed only) increases valve life by protecting against atmospheric contamination; reduces possibility of thread galling by containment of stem lubricant.



Differential Pressure Manifolds – M4A and M4T Specifications

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



Dimensions, inches [mm]

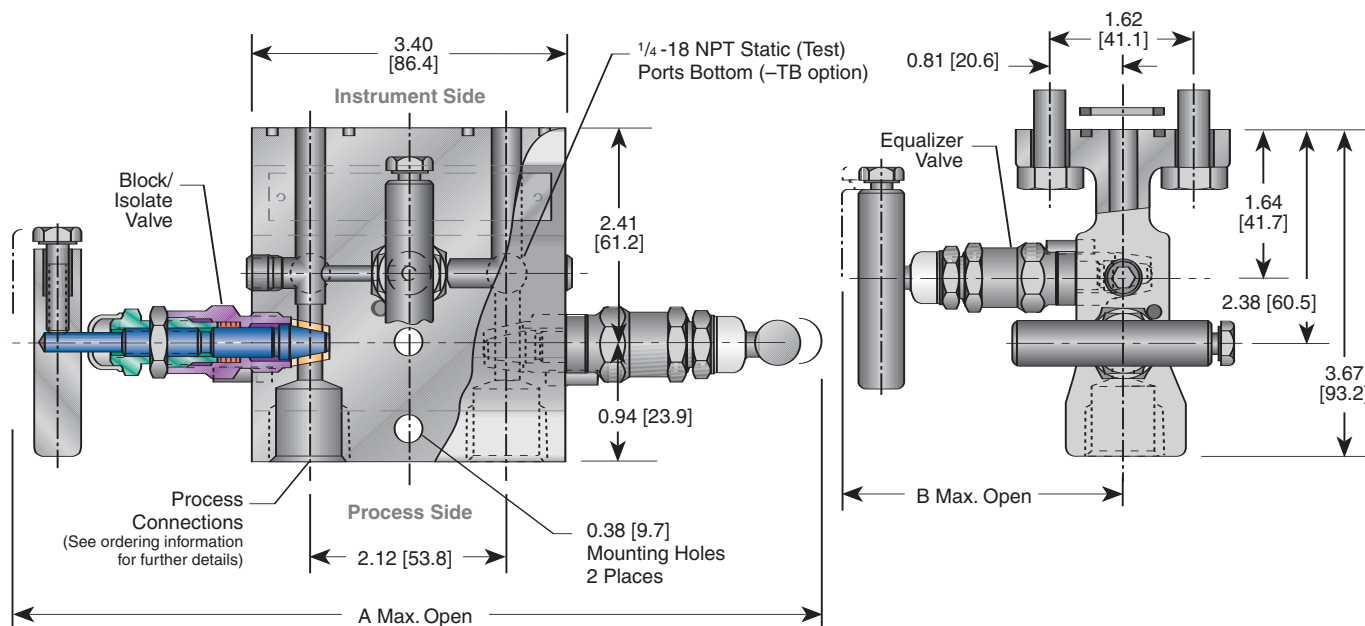
Valve ¹	A	B	C
Soft Seat – Teflon® Packed	8.60 [218]	3.20 [81]	1.06 [27]
Metal Seat – Teflon® Packed	8.60 [218]	3.20 [81]	2.80 [71]
Metal Seat – GRAFOIL® Packed	9.90 [251]	3.85 [98]	2.80 [71]

Note

1. 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.

Differential Pressure Manifolds – M4A and M4T Specifications

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

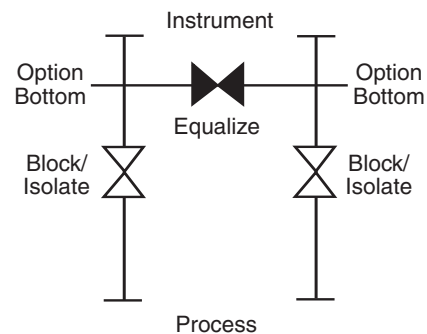


Dimensions, inches [mm]

Valve ¹	A	B
Soft Seat – Teflon® Packed	8.60 [218]	3.20 [81]
Metal Seat – Teflon® 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 C_v 0.36 maximum.
Soft Seat:
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.83 maximum.



Differential Pressure Manifolds – M4A and M4T Specifications

Notes

- Instrument mounting kit furnished with the M4 includes (4) A193-B7 bolts and (2) Teflon® or GRAFOIL® flange gaskets to match bonnet packing.
- CS parts are zinc cobalt to prevent corrosion.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (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.

Standard Materials

Metal Seat

Valve	Body ¹	Bonnet	Stem	Ball
CS ²	A576-10L18	A108 CS	A581-303	17-4 PH
CS ²	A576-10L18	A105 CS	A581-303	17-4 PH
SS	A479-316	A479-316	A276-316	316 SS
SG ³	A479-316	A479-316	Monel® 400	Monel® K500
Monel®	Monel® 400	Monel® R405	Monel® 400	Monel® K500
Hastelloy®	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®
SG3 ⁴	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Elgiloy®

Soft Seat

Valve	Body	Bonnet	Stem	Seat
CS ²	A576-10L18	A108 CS	A581-303	Delrin®
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®

Pressure and Temperature Ratings

Metal Seat

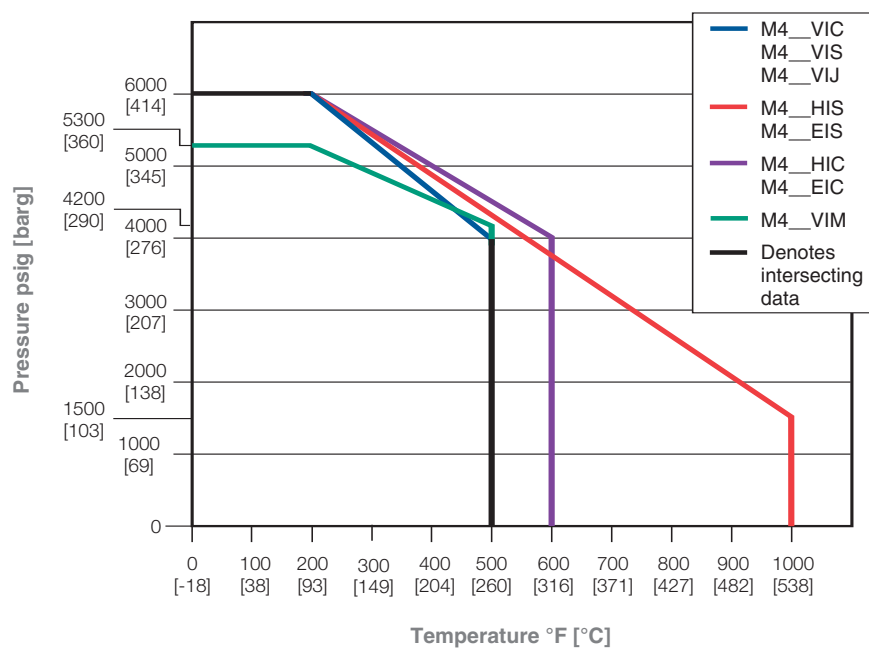
Valve	Packing	Ratings ⁵	
CS ²	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]
CS ²	GRAFOIL® Graphite	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 600°F	[276 barg @ 316°C]
SS	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]
SS	Graphite GRAFOIL®	6000 psig @ 200°F	[414 barg @ 93°C]
		1500 psig @ 1000°F	[103 barg @ 538°C]
SG ³ or SG3 ⁴	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]
SG ³ or SG3 ⁴	GRAFOIL®	6000 psig @ 200°F	[414 barg @ 93°C]
		1500 psig @ 1000°F	[103 barg @ 538°C]
Monel®	Teflon®	5300 psig @ 200°F	[360 barg @ 93°C]
		4200 psig @ 500°F	[290 barg @ 260°C]
Hastelloy®	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]

Soft Seat

Valve	Packing	Ratings ⁵	
CS ² SS	Teflon® Viton® O-ring with Teflon® back up ring	6000 psig @ 200°F	[414 barg @ 93°C]
SG ³ or SG3 ⁴	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]

Differential Pressure Manifolds – M4A and M4T Specifications

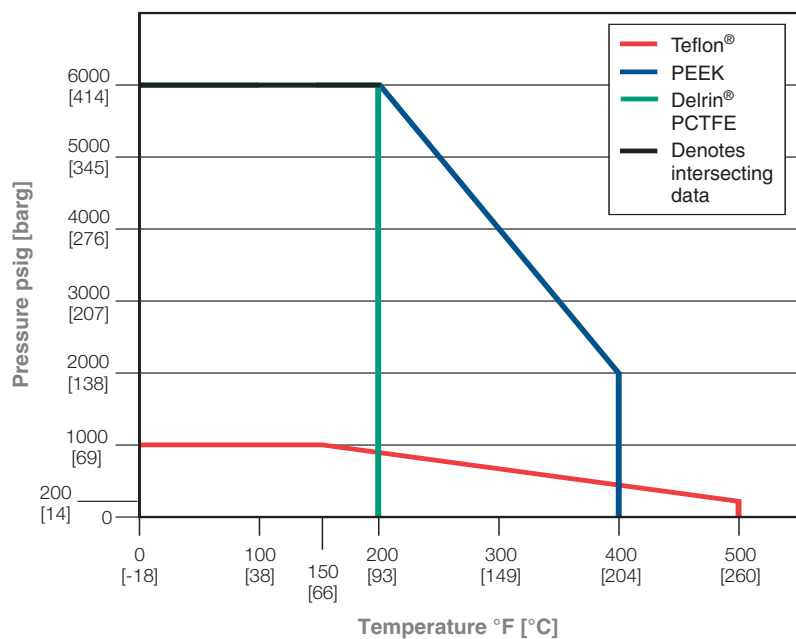
Pressure vs. Temperature – Metal Seat



Note

- 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Pressure vs. Temperature – Soft Seat



Differential Pressure Manifolds – M4A and M4T Specifications

Notes

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.
2. Integral tube fitting design, refer to page 75.
3. CS parts are zinc cobalt plated to prevent corrosion.

Ordering Information – Soft Seat

M4T V D S - 4 - SG

Valve Type

M4A – 3-Valve Manifold, Flange x Flange
M4T – 3-Valve Manifold, FNPT x Flange

Bonnet Packing

V – Teflon® R – O-ring (Viton®)

Seat

D – Delrin® K – PCTFE
E – PEEK V – Teflon®

Body Material

C – CS³, A576-10L18 W – SS, A479-316L
S – SS, A479-316 J – Hastelloy®

Process Connections (M4T only)

4 – 1/2-inch FNPT
AT² – Integral Single Ferrule Tube Fittings
- 4AT 1/2-inch, 316 SS
ATD² – Integral Dual Ferrule Tube Fittings
- 4ATD 1/2-inch, 316 SS

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)
- BC – Accessory Bracket - mount conduit with -AM
- BL – Bonnet Lock Device (page 154)
- BP – Accessory Bracket - mount purge meters with -AM
- CL – Cleaned for chlorine service
- HD – Hydrostatic testing (100 percent) (MSS SP-61)
- MS – Monel® Stem standard on Monel® and SG valves)
- OC – Cleaned for oxygen service
- PHB – Phenolic Black Handle
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SB – Steam Block (CS)
- SSA¹ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC¹ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- TB – Test Ports - bottom of manifold (1/4-inch FNPT) (option not available for M4A with -AM)
- SP – Special Requirements - please specify

Differential Pressure Manifolds – M4A and M4T Specifications

Ordering Information – Metal Seat

M4T V I S - 4 - SG

Valve Type

M4A – 3-Valve Manifold, Flange x Flange
M4T – 3-Valve Manifold, FNPT x Flange

Bonnet Packing

V – Teflon®
H – GRAFOIL®
E – Low Emissions Graphite (except M45A)

Seat

I – Integral (body material)

Body Material

C – CS, A576-10L18 W – SS, A479-316L
S – SS, A479-316 J – Hastelloy®
M – Monel® 400 (M4A and M4T only)

Process Connections (M4T only)

4 – 1/2-inch FNPT
AT² – Integral Single Ferrule Tube Fittings ATD² – Integral Dual Ferrule Tube Fittings
- 4AT 1/2-inch, 316 SS - 4ATD 1/2-inch, 316 SS

Options

AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves	SSA2 – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)	SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
BC – Accessory Bracket - mount conduit with -AM	SSC2 – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
BL – Bonnet Lock Device (page 154)	SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves)
BP – Accessory Bracket - mount purge meters with -AM	SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
CL – Cleaned for chlorine service	ST – Stellite Ball Ended Stem
HD – Hydrostatic testing (100 percent) (MSS SP-61)	TB – Test Ports - bottom of manifold (1/4-inch FNPT) (option not available for M4A with -AM)
LP – Street Elbows and Top Purge Ports	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)
MS – Monel® Stem (standard on Monel® and SG valves)	SP – Special Requirements - please specify
OC – Cleaned for oxygen service	
PB – Bottom Purge Ports (1/4-inch FNPT) (Metal Seat only) (option not available with -SB or M4A with -AM)	
PHB – Phenolic Black Handle	
PT – Top Purge Ports (1/4-inch FNPT) (Metal Seat only) (if elbows are required, specify -LP, not -PT)	
R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)	
SB – Steam Block (CS)	

Notes

1. Integral tube fitting design, refer to page 75.
2. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – M4A and M4T ASME B31.1 or B31.3 Meets MSS SP-105⁴

Ordering Information – Power Industry Applications²

M4THP S - 4 -XP - SG

Valve Type

M4AHP – 3-Valve Manifold, Flange x Flange
M4THP – 3-Valve Manifold, FNPT x Flange

Body Material

S – SS, A479-316³

Connections (Process x Instrument x Vent)

4 – 1/2-inch FNPT x Flange x 1/4-inch FNPT
4AT – 1/2-inch AGCO Tube x Flange x 1/4-inch FNPT
4B – 1/2-inch Pipe S.W. x Flange x 1/4-inch FNPT
4TB – 1/2-inch Tube S.W. x Flange x 1/4-inch FNPT

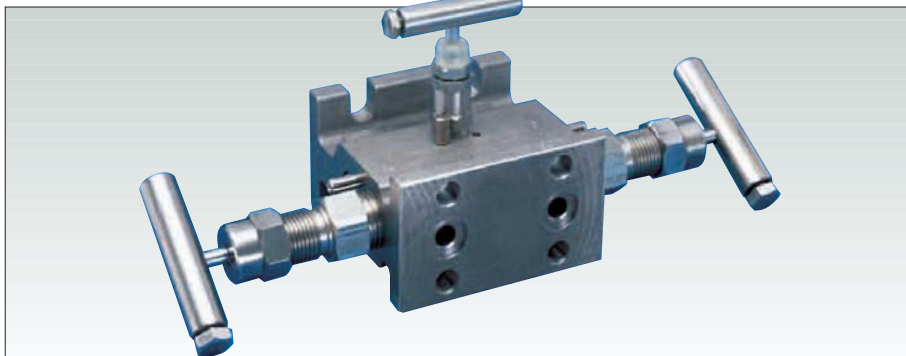
Options

AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (table, page 80)
SSA⁶ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
SSC⁶ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
TB – Test Ports - bottom of manifold (1/4-inch FNPT) (option not available for M4A with -AM)
SP – Special Requirements - please specify

Notes

- Integral tube fitting design, refer to page 75.
- All Manifolds come standard with GRAFOIL[®] packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
- Manifold ratings:
SST
6000 psig @ 100°F [414 barg @ 38°C]
3030 psig @ 1000°F [236 barg @ 538°C]
- See page 156 for Code Requirements.
- Test bottom ports standard.
- 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – M45A Specifications



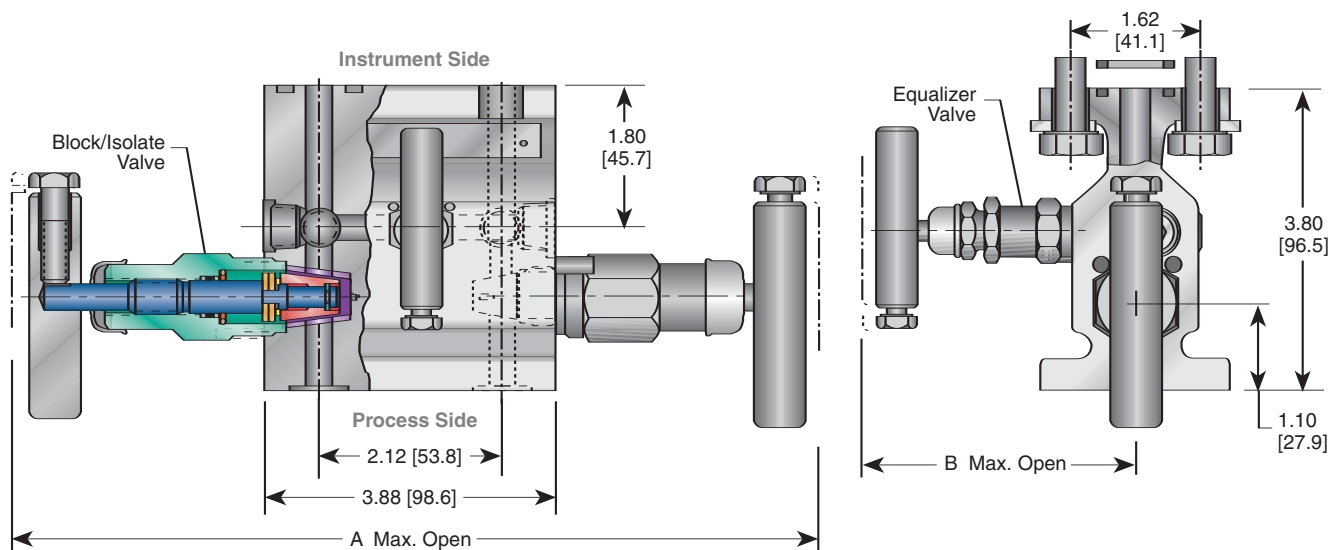
Product Overview

Our M45A manifold is a three-valve unit with $\frac{3}{8}$ -inch [9.5 mm] orifice block valves designed for mounting on differential pressure transmitters having $2\frac{1}{8}$ -inch [54 mm] center-to-center connections.

For direct or remote mounting, the M45A permits the transmitter's futbol flanges to connect the process signal lines to the manifold directly, with either $\frac{1}{2}$ -inch pipe or tubing connections. It contains two main block valves and an equalizing valve.

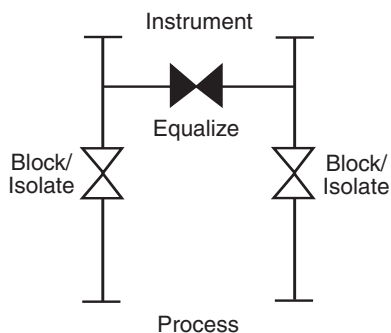
Same as M4A except bonnet to accommodate $\frac{3}{8}$ -inch [9.5 mm] orifice soft seat block valves and metal seat equalizer valve.

Dimensions, inches [mm]



Dimensions, inches [mm]

Packing	A	B
Teflon®	11.90 [302.3]	3.40 [86.4]
GRAFOIL®	11.90 [302.3]	4.05 [102.9]
O-ring	11.36 [288.5]	3.40 [86.4]



Note

1. Bottom static (test) connection available. See options, page 74.

Differential Pressure Manifolds – M45A Specifications

Notes

1. Approximate valve weight: 7.1 lb [3.2 kg]. 0.375-inch [9.5 mm] diameter orifice. Valve C_v 3.0 maximum.
2. Equalizer valve utilizes free-swiveling ball ended stem. Equalizer orifice size 0.187-inch [4.8 mm].
3. PCTFE (Polychlorotrifluoroethylene is exact equivalent of Kel-F®), PEEK and Teflon® also available.
4. CS is zinc cobalt plated to resist corrosion.
5. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
6. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).
7. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

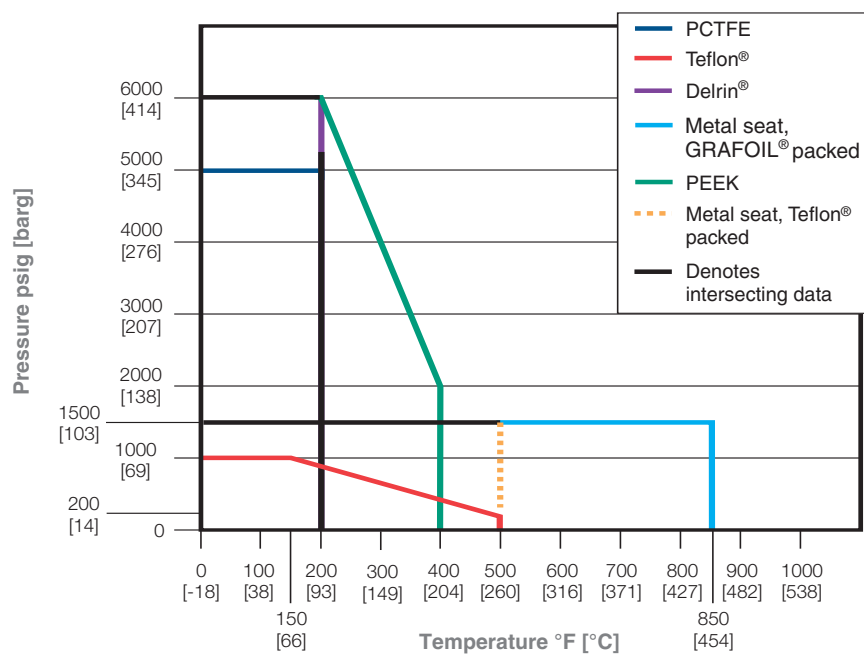
Standard Materials

Valve ¹	Body	Bonnet		Stem
		Block Valve	Equalizer Valve ²	
CS ⁴	A105	A108	A108	A582-303
CS ⁴	A105	A108	A105	A582-303
SS	A479-316	A479-316	316	A276-316
SS	A479-316	A479-316	316	A276-316
SG ⁵	A479-316	A479-316	316	Monel®
SG3 ⁶	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276	Hastelloy® C276

Pressure and Temperature Ratings⁷

Valve	Packing	Seat	Pressure and Temperature Ratings	
CS ⁴	Teflon®	Delrin® ³	6000 psig @ 200°F	[414 barg @ 93°C]
CS ⁴	GRAFOIL®	SS	1500 psig @ 850°F	[103 barg @ 454°C]
SS	Teflon®	Delrin®	6000 psig @ 200°F	[414 barg @ 93°C]
SS	GRAFOIL®	SS	1500 psig @ 1000°F	[103 barg @ 538°C]
SG ⁵ SG3 ⁶	Teflon®	Delrin® ³	6000 psig @ 200°F	[414 barg @ 93°C]

Pressure vs. Temperature



Differential Pressure Manifolds – M45A Specifications

Ordering Information – Soft Seat

	M45A	V	D	S	- SG
Valve Type	M45A – 3-Valve Manifold, Flange x Flange				
Bonnet Packing	V – Teflon® R – O-ring (Viton®) Block Valve only H – GRAFOIL®				
Seat	D – Delrin® S – 316 SS E – PEEK V – Teflon® K – PCTFE J – Hastelloy®				
Body Material	C – CS, A576-10L18 S – SS, A479-316 W – SS, A479-316L J – Hastelloy®				
Options	AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80) BC – Accessory Bracket - mount conduit with -AM BL – Bonnet Lock Device (page 154) BP – Accessory Bracket - mount purge meters with -AM CL – Cleaned for chlorine service HD – Hydrostatic testing (100 percent) (MSS SP-61) MS – Monel® Stem (standard on Monel® and SG valves) OC – Cleaned for oxygen service PHB – Phenolic Black Handle R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts) SSA ¹ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg] SSB – 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 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves) SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]) ST – Stellite Ball Ended Stem TB – Test Ports - bottom of manifold (1/4-inch FNPT) (option not available for M4A with -AM) SP – Special Requirements - please specify				

Note

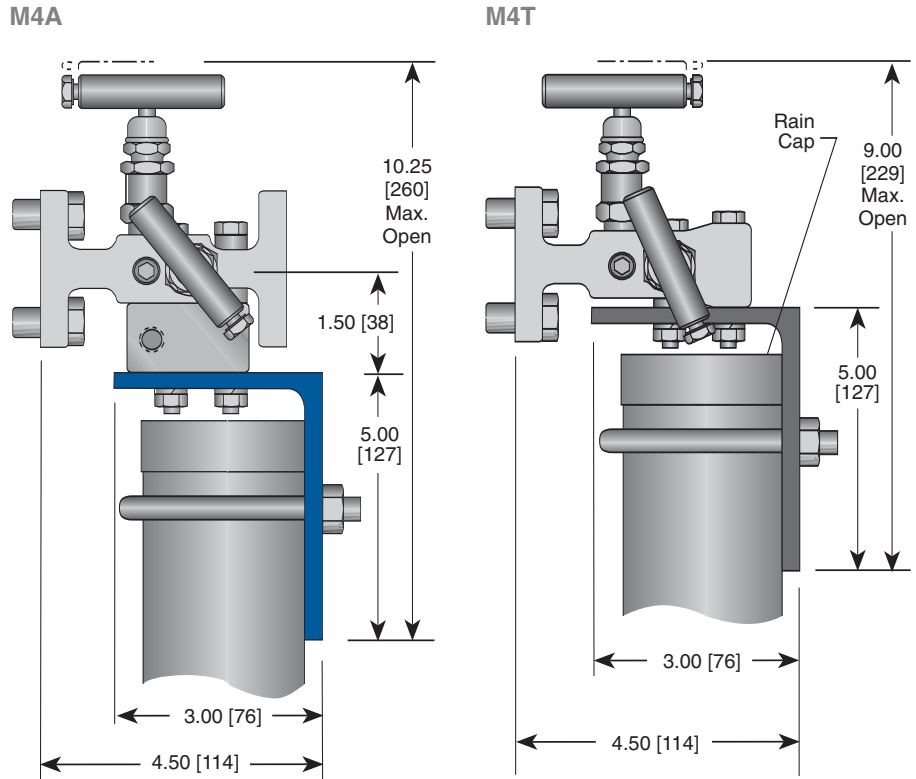
1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – M4, M4T and M45A Options

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 pipe stand corrosion** by using the bracket overhang and plastic rain hat to cover the pipe stand.
- **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 With M4 Manifold Dimensions, inches [mm]

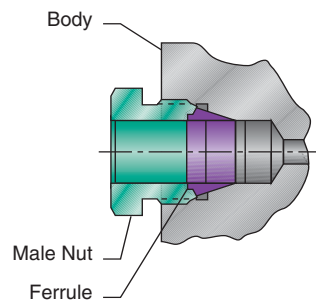


AGCO-Tube: Integral Tube Fitting Design

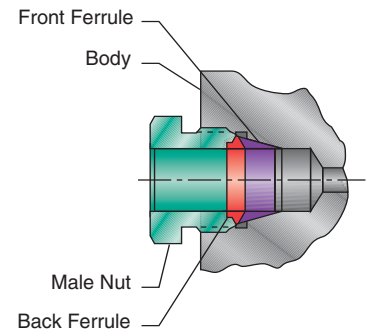
- Proven design performance.
- No tube twist on makeup.
- Low torque in assembly.
- Male Nut
 - Silver plated to prevent galling.
 - Threads are rolled for additional strength.
 - Gives superior tubing support for vibration resistance.
- Bubble-tight seal on make and remakes.
- Fitting will hold to the burst of the tubing.
- Makeup is industry standard 1 1/4 turns from finger tight.
- Remake is 1/2 turn from finger tight which brings you back to original position, then snug slightly to respring the ferrule(s) into a sealing position.

MA, M4T and M45A Options

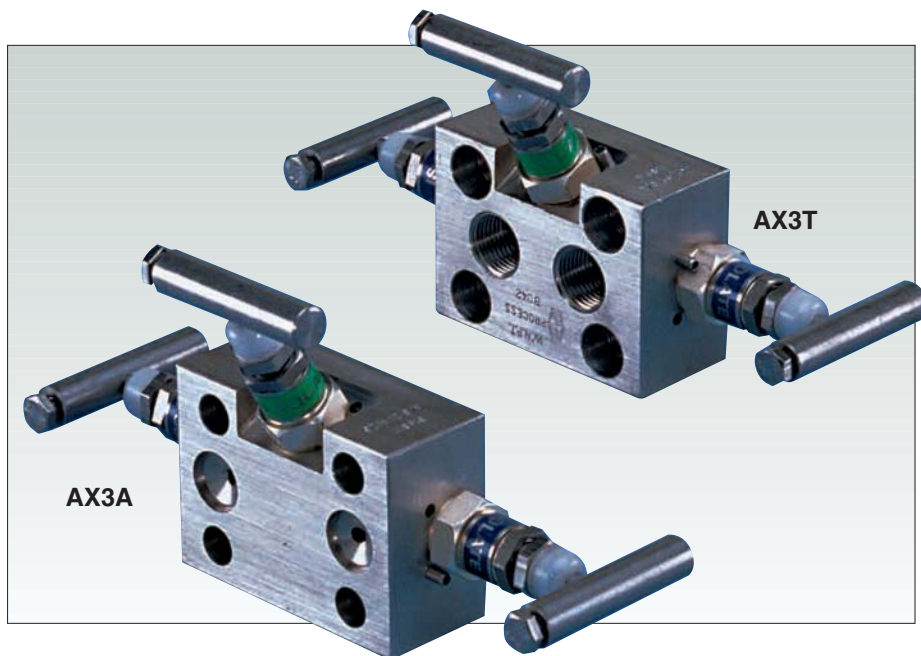
Single Ferrule 'Bowling' Design



Dual Ferrule 'Interlocking' Design



Differential Pressure Manifolds – AX3A and AX3T 3-Valve Manifolds



Product Overview

The AX3 is a three-valve manifold designed for direct mounting to standard differential pressure transmitters. Lightweight and compact, the manifolds enable instrument operation, isolation and zeroing in a single unit. Process connections are available either threaded 1/4- and 1/2-inch NPT or flanged to accept standard futbol flanges. Suitable for pressures of up to 6000 psig [414 barg] and temperatures of 1000°F [538°C]. AX3 is available metal seated with the option of Teflon® or Graphite stem packing.

Applications

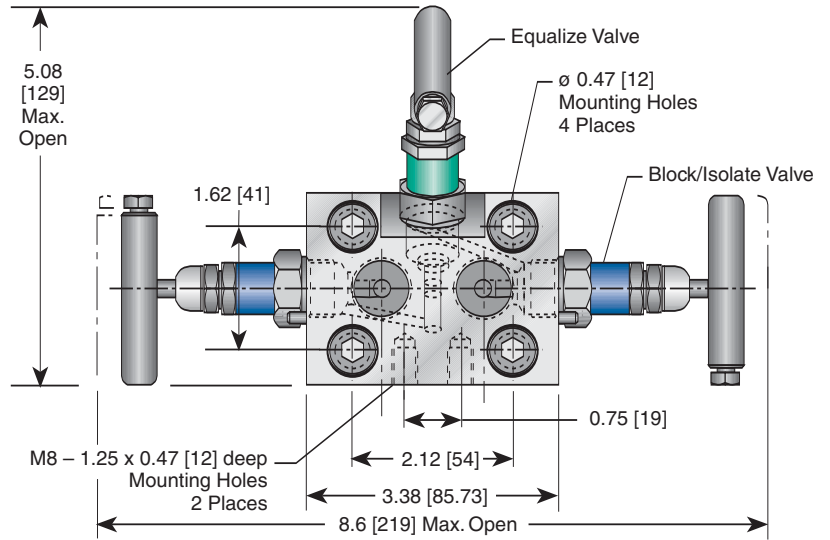
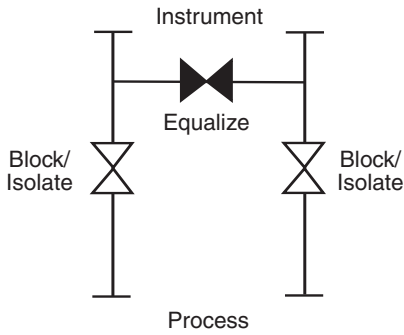
- Direct mounting differential pressure transmitters.
- Instrument isolation.
- Instrument zeroing.
- Liquid and vapor service.

Features and Benefits

- **Direct mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Free-swiveling ball end stem** ensures perfect alignment, providing repetitive bubble-tight shutoff and long life.
- **Packing below threads** Teflon® or Graphite packing below the stem threads prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Manifold mounting**, standard pipe bracket bolts directly to the manifold providing a rigid support for the transmitter. Instrument can be easily removed for service or repair.

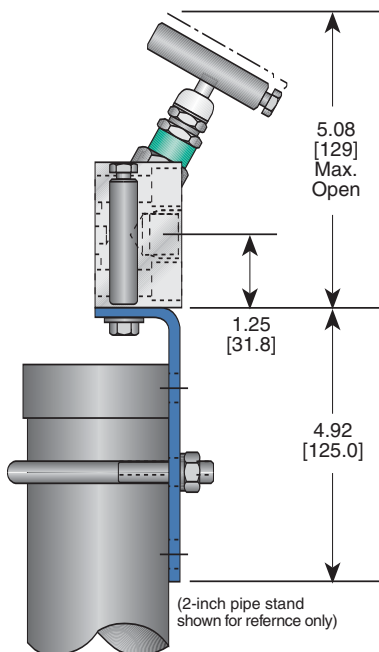
Differential Pressure Manifolds – AX3 Specifications

AX3T Dimensions, inches [mm] – Threaded x Flanged

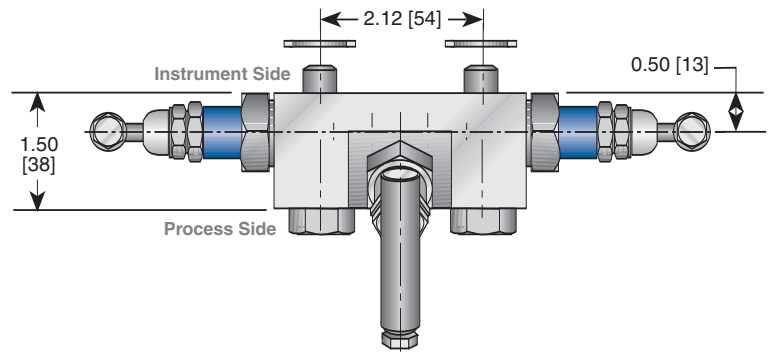
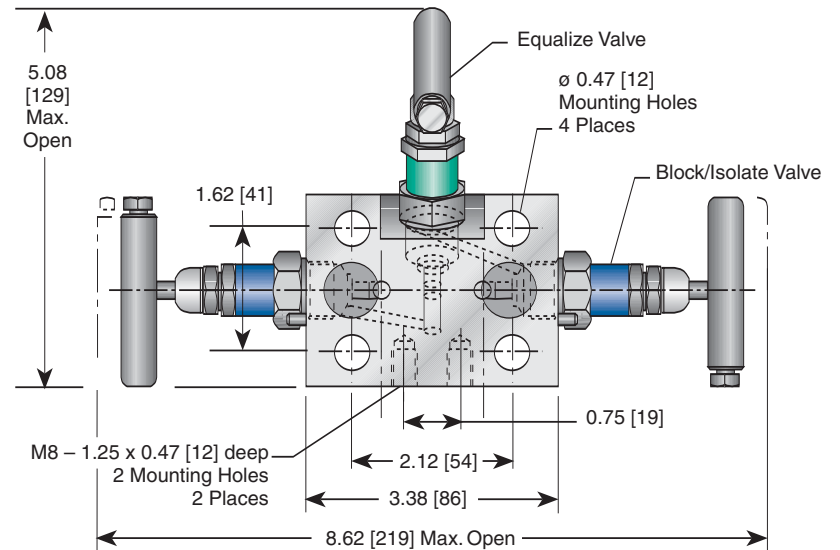


AGCO Mount MB7

The AGCO Mount principle is to mount the manifold, not the transmitter, enabling easier instrument loop installation and lower on-going maintenance costs. The transmitter is simply removed by releasing the four mounting bolts and disconnecting signal leads. AX3 is available with an AGCO Mount suitable for 2-inch [50 mm] pipe stand. Supplied in zinc plated CS as standard. See page 80.



AX3A Dimensions, inches [mm] – Flanged x Flanged



Differential Pressure Manifolds – AX3 Specifications

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

White: Standard bonnet assembly Teflon® packing.

Green: Sour Gas service Teflon® packing.

Ring Labels: The valve bonnets have color coded ring labels for service identification.

Blue: Isolate Valves

Green: Equalize Valves

Connections

Standard Connections

Process Threaded or flanged. The standard thread type is 1/2-inch NPT to ANSI/ASME B1.20.1.

Instrument Flanged for direct mounting to transmitters on 2 1/8-inch [54 mm] centers. Flanged connections are on 2 1/8-inch [54 mm] centers.

Other Connections

Process Threaded BSP Tr to BS21 and BSP F to BS2779 are also available.

Notes

1. Approximate valve weight: 3.7 lb [1.7 kg]. 0.187-inches [4.8 mm] diameter orifice. Valve C_v 0.52 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. Metal seats are integral with the body.
4. All manifolds are supplied with seal rings and four 7/16-inch UNF HT steel mounting bolts. Teflon® seal rings are supplied with the standard bonnet; Graphite seal rings are supplied with high temperature bonnet.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat ³
CS	A108	A108	303 SS	17-4PH
SS	SS, 316	316 SS	316 SS	316 SS
Monel®	Monel® 400	Monel® 400	Monel® 400	Monel® K500
SG ²	SS, 316	316 SS	Monel® 400	Monel® K500
SG3 ⁵	Hastelloy®	Hastelloy®	Hastelloy®	Elgiloy®

Special Severe Service Materials

Duplex UNS S31803

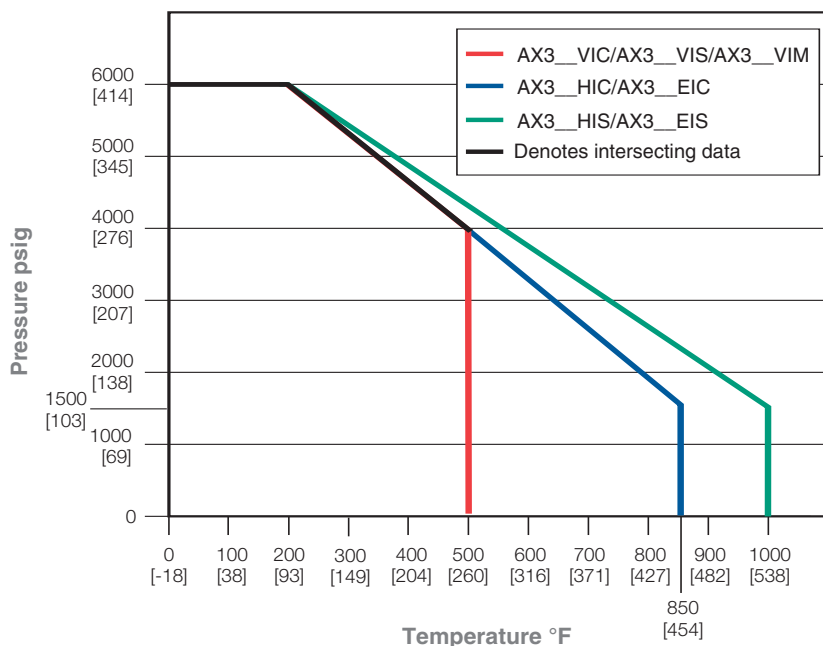
6MO UNS S31254

Hastelloy® C276

Incoloy® 825

CS, SS and Monel® valves are suitable for most process applications, however for severe service, AX3 valves are also available in the above exotic materials. For any other material requirements, please consult the factory.

Pressure vs. Temperature



Pressure and Temperature Ratings

Valve	Teflon® Bonnet
CS, SS and Monel®	6000 psig @ 200°F [414 barg @ 93°C] and 4000 psig @ 500°F [276 barg @ 260°C]

Valve	High Temperature
CS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 850°F [103 barg @ 454°C]
SS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Differential Pressure Manifolds – AX3 Specifications

Futbol Flanges

Futbol Flanges are available for bolting to the process side of a flanged manifold. This provides the ideal solution to welded connection requirements, allowing the flanges to be welded to process piping while keeping the flexibility to remove the manifold when required, for maintenance or repair.

Connection	CS	SS
1/2" NPT FNPT	KFC-4	KFS-4
1/2" NPT MNPT	KFC-4M	KFS-4M
1/2" Butt weld	KFC-4BW	KFS-4BW
1/2" Socket Weld	KFC-4B	KFS-4B

Ordering Information

AX3T V I S - 4 - SG

Valve Type

- AX3T – Threaded x Flanged
- AX3A – Flanged x Flanged

Bonnet Packing

- V – Teflon®
- H – Graphite

Seat

- I – Integral

Body Material

- C – CS¹
- S – SS, 316
- M – Monel® 400
- J – Hastelloy®

Process Connections (AX3T only)

- 2 – 1/4-inch FNPT
- 4 – 1/2-inch FNPT

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AT – Tamper-proof Bonnet
- BL – Bonnet Lock Device (Accessories, page 154)
- K – Key for -AT
- LAT – Lockable Tamper-proof Bonnet
- MB7 – AGCO Mount Kit for 2-inch pipe stand mounting (page 80)
- OC – Cleaned for oxygen service
- PD – Padlock for -LAT
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SSA² – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC² – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Notes

1. Zinc plated to prevent corrosion.
2. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – AGCO Mount Kits

AGCO Mount Kits for Differential Pressure Manifolds – 3-Valve

Manifold Style	Kit Part Number	Material	Description
M4T ¹	02.1639.501-AM	CS ²	Standard Kit
	02.1639.508-AM		For bottom purge
	02.1639.500-AM		With steam block
M4T ¹	02.1639.505-AMS	SS	Standard Kit
	02.1639.509-AMS		For bottom purge
	02.1639.871-AMS		With steam block
M4A ¹ (hard seat)	02.1639.541-AM	CS ²	Standard Kit
	02.1639.543-AM		With SS bolting
	02.1639.540-AM		With steam block
	02.1639.544-AM		With steam block and SS bolting
M4A ¹ (hard seat)	02.1639.545-AMS	SS	Standard Kit
M4A ¹ (soft seat)	02.1639.546-AM	CS ²	Standard Kit
	02.1639.547-AM		With steam block
M45A ¹	06.1375.003-AM	CS ²	Standard Kit
M45A ¹	06.1375.004-AMS	SS	SS components
MM4A	06.0954.001-AM	CS ²	Standard Kit
MM4A	06.0954.002-AMS	SS	Standard Kit
AX3A	MB7	CS ³	Standard Kit
AX3A	MB7S	SS	Standard Kit
AX3T	MB7	CS ³	Standard Kit
AX3T	MB7S	SS	Standard Kit

Notes

1. Vertical 2-way brackets are available.
2. Zinc cobalt plated.
3. Zinc plated.

AGCO Mount Kits for Differential Pressure Manifolds – 5-Valve

Manifold Style	Kit Part Number	Material	Description
A22N	MB8	CS ³	Standard Kit
	MB8S	SS	Standard Kit
A26T	MB6	CS ³	Standard Kit
	MB6S	SS	Standard Kit
M24A	MB55	CS ³	Standard Kit
	MB55S	SS	Standard Kit
M24T	MB55	CS ³	Standard Kit
	MB55S	SS	Standard Kit

Differential Pressure Manifolds – M20 Meter Manifold

Product Overview

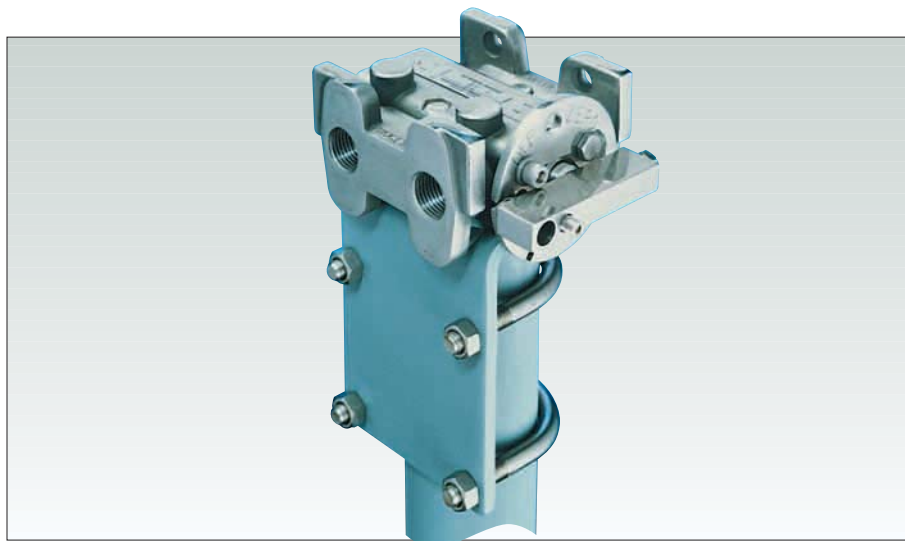
The M20 Manifold is a rotary-positioned differential pressure transmitter manifold. It uses a dual-rotary element with passages cut to perform the functions of a double-block-bleed manifold, with single handle actuation.

The M20 ensures correct valve sequencing every time the manifold is manipulated from RUN-to-ZERO-to-OFF, or from OFF-to-ZERO-to-RUN.

Manual

In its manual configuration, the M20 is virtually foolproof. An operator cannot mistakenly over-range the transmitter on the wrong side, leave the equalizer valve open, or forget to open the manifold block valve after zeroing.

The M20 is uniquely suited for applications having serious space limitations, such as winterizing enclosures, offshore oil production platforms, and power plant rack designs. For hazardous process fluids demanding special handling and caution, a dual locking and venting feature assures personnel safety.

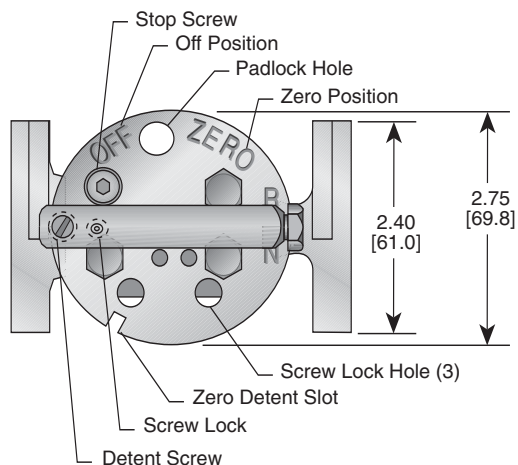
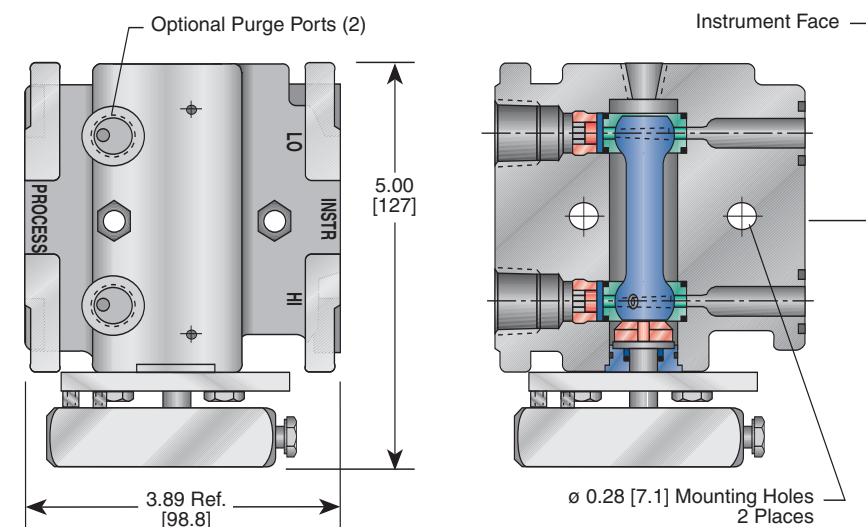


Features and Benefits

- **This unique manifold** has many desirable features not found in conventional manifolds. It is particularly useful in chemical process.
- **Instrument enclosures** utilize the single handle to externally zero the transmitter without opening the enclosure.
- **Handle is lockable.** It may be retained-screw locked in any position or padlocked in OFF position, promoting personnel safety.
- **Manifold mounts directly onto pipe stand.** The AGCO Mount supports the transmitter and allows loop installation to be completed without the transmitter. Instrument removal for service or repair does not disturb installation.
- **Double block-bleed valving** allows on-stream checking of seat tightness.
- **Correct valve sequence is fixed.** Transmitter is properly pressurized when commissioned. Zeroing from RUN or OFF is done correctly every time. Port sequencing always admits high side pressure to transmitter first, preventing possible zero shift from reverse over-ranging.
- **Safe venting** of both manifold and instrument cavities to a safe disposal point in the OFF position, reducing chances of injury during the maintenance procedure. When process fluid is toxic, carcinogenic, or otherwise dangerous, cavities can be flushed at transmitter backside taps before removing the transmitter.
- **Seal fluids** cannot be lost when manipulating the M20 to ZERO, RUN or OFF – big savings in down time and seal fluids.

Differential Pressure Manifolds – M20 Specifications

Dimensions, inches [mm]



Standard Materials

Body and Rotary Elements	Internals	Seat	Soft Goods ¹
A351 CF8M/A479-316	316 SS	PEEK	Viton®
A351 CF8M/A479-316	316 SS	Teflon®	Viton®

Notes

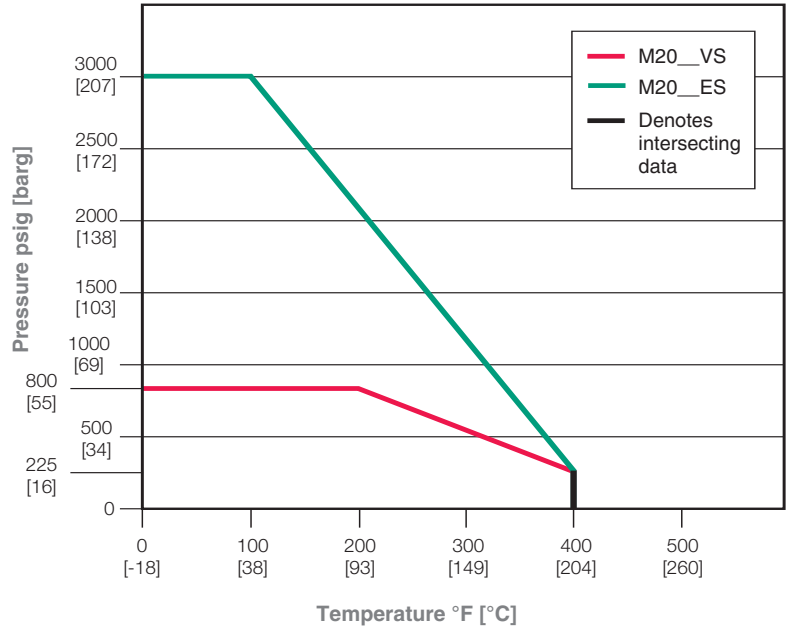
1. Other elastomers available. Consult factory.
2. Approximate valve weight: 5.9 lb [2.7 kg].

Pressure and Temperature Ratings

Body and Rotary Elements	Seat	Ratings	
A351 CF8M/A479-316	PEEK	3000 psig @ 100°F	[207 barg @ 38°C]
		225 psig @ 400°F	[16 barg @ 204°C]
A351 CF8M/A479-316	Teflon®	800 psig @ 200°F	[55 barg @ 93°C]
		225 psig @ 400°F	[16 barg @ 204°C]

Differential Pressure Manifolds – M20 Specifications

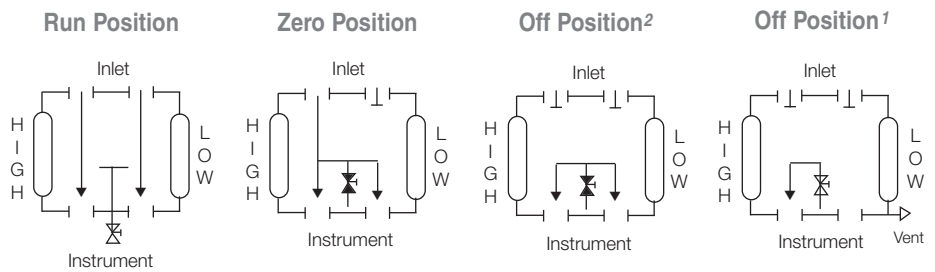
Pressure vs. Temperature



Operation Sequence

Field Calibration (must have M20 with -FC option):

- Manifold in 'OFF' position.
- Vent low side of instrument (use vent on low side of transmitter).
- Apply calibration pressure through Field Test Valve.



Notes

- Field calibration option (allows transmitter to be calibrated in the field).
- Also zero can vent to atmosphere to remove transmitter.

Differential Pressure Manifolds – M20 Specifications

Ordering Information

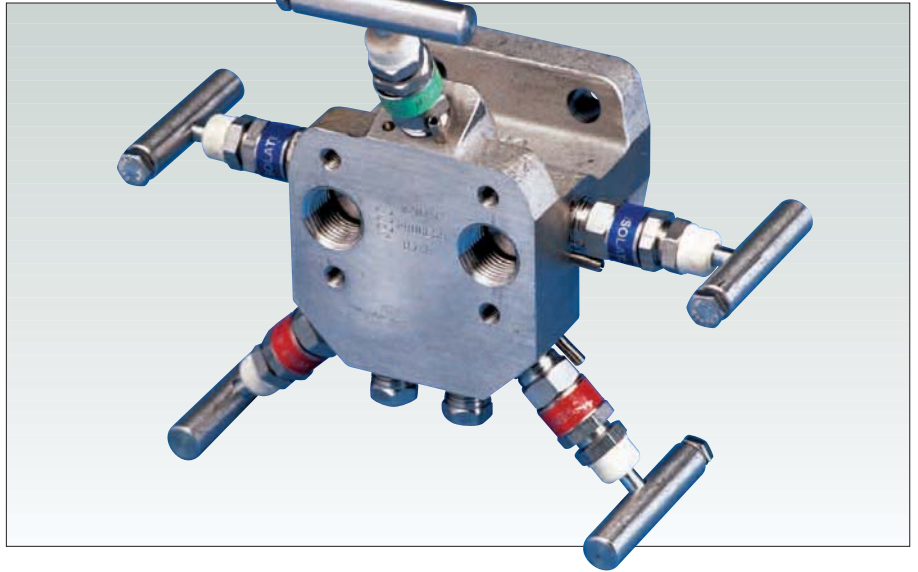
M20	T	E	S	- H1	- FC
Connection Style					
T – 1/2-inch NPT Taps x Flange					
A – Flange x Flange					
Seat					
E – PEEK					
V – Teflon®					
Body¹					
S – 316 SS					
Optional Drain Valve					
H1 – H1RDS-22					
H5 – H5VIS-22					
Other Options					

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)
- CL – Cleaned for chlorine service
- FC – Field Calibration Spindle
- HD – Hydrostatic testing (100 percent) (MSS SP-61)
- OC – Cleaned for oxygen service
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SSA² – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC² – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only) (not available for O-ring packed valves)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- SP – Special Requirements - please specify

Notes

1. For other materials of construction, consult factory.
2. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – M24 5-Valve



Product Overview

The M24 is a five-valve manifold designed for direct mounting to differential pressure transmitters. Lightweight and with compact dimensions, M24 manifolds enable instrument operation, isolation, zeroing and venting in a single unit.

Manufactured from a precision casting with two block valves, an equalize valve and two instrument vent/calibrate valves, the M24 is coupled directly to differential pressure transmitters via standard instrument flanged connections on 2 1/8-inch [54 mm] centers. (Non-standard instrument centers are also available). Process connections are available threaded or flanged to accept standard futbol flanges. Vent connections are threaded 1/4-inch on all manifolds and provided with vent plugs as standard. Suitable for pressures of up to 6000 psig [414 barg] and temperatures of up to 1000°F [538°C]. M24 is available with a metal seat and the option of Teflon® or GRAFOIL® stem packing.

Applications

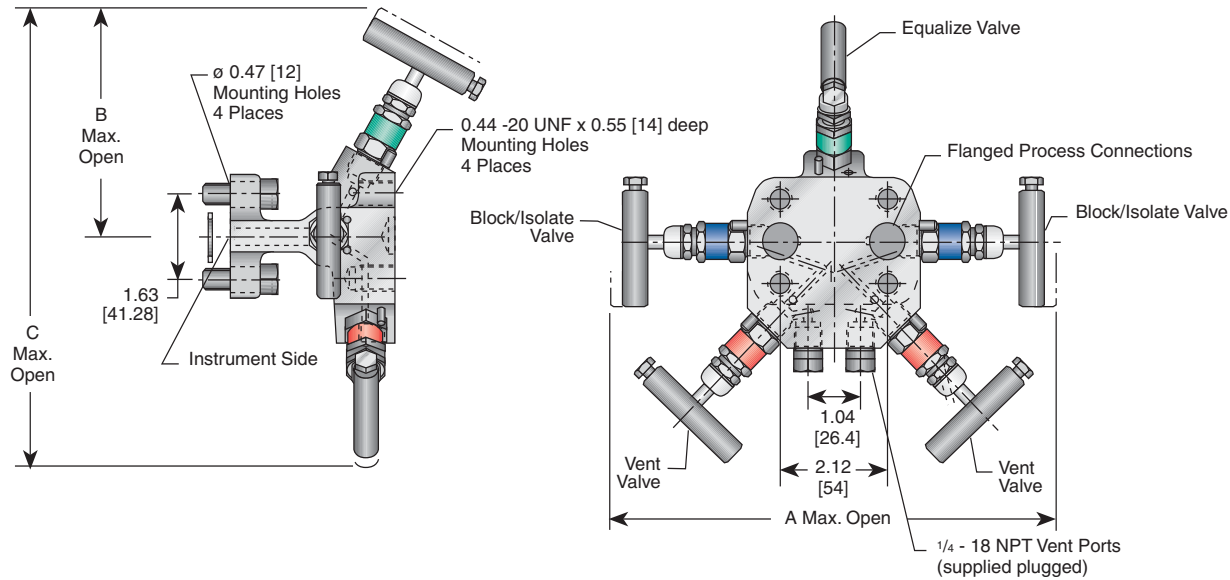
- Direct-mounting differential pressure transmitters.
- Instrument isolation and zeroing.
- Instrument venting to close system.
- Instrument calibration.
- Liquid and vapor service.

Features and Benefits

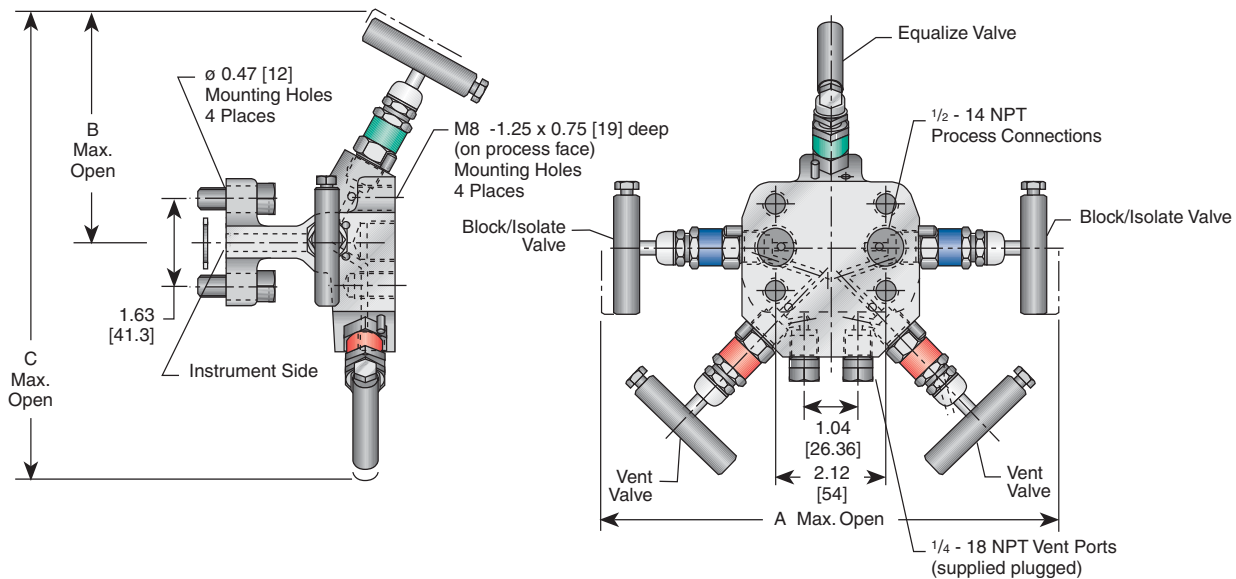
- **Direct mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem** free-swiveling ball-end stem ensures perfect alignment, providing repetitive bubble-tight shut-off and long life.
- **Packing below threads** Teflon® or GRAFOIL® packing below the stem threads prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allow vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, standard pipe bracket bolts directly to the manifold providing a rigid support for the transmitter. Instrument can be easily removed for service or repair.

Differential Pressure Manifolds – M24 Specifications

M24A Dimensions, inches [mm] – Flanged x Flanged

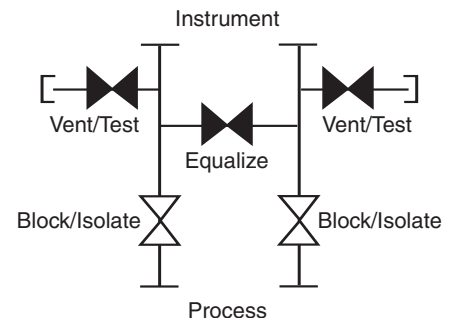


M24T Dimensions, inches [mm] – Threaded x Flanged



Maximum Dimensions, inches [mm]

Valve	A	B	C
Teflon® Packing	8.65 [220]	4.35 [110]	8.65 [220]
GRAFOIL® Packing	9.75 [248]	4.80 [122]	9.60 [244]



Differential Pressure Manifolds – M24 Specifications

Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat
SS	A351 CF8M	316 SS	316 SS	316 SS
Monel®	Monel® 400	Monel® 400	Monel® 400	Monel® K500
SG ²	A351 CF8M	316 SS	Monel® 400	Monel® K500

Notes

1. Approximate valve weight: 6.0 lb [2.7 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.

Special Severe Service Materials

Duplex UNS S31803

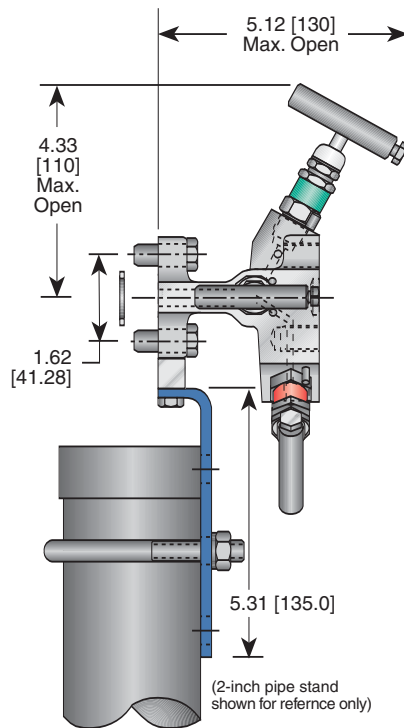
6MO UNS S31254

Hastelloy® C276

Incoloy® 825

For any other material requirements, please consult the factory.

AGCO Mount Dimensions, inches [mm]



AGCO Mount MB55

The AGCO Mount principle is to mount the manifold not the transmitter enabling easier instrument loop installations and lower on-going maintenance costs. The transmitter is simply removed by releasing the four mounting bolts and disconnecting signal leads. M24 utilizes a MB55 AGCO Mount, suitable for 2-inch [50 mm] NB pipe stand. Supplied in zinc plated CS as standard.

Differential Pressure Manifolds – M24 Specifications

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

White: Standard bonnet assembly Teflon® packing.

Green: Sour Gas service Teflon® packing.

Ring Labels: The valve bonnets have color coded ring labels for service identification.

Red: Vent Valves

Blue: Isolate Valves

Green: Equalize Valves

Connections¹

Standard Connections

Process Threaded 1/2-inch NPT to ANSI/ASME B1.20.1 on 2 1/8-inch [54 mm] centers.

Instrument Flanged for direct mounting to transmitters on 2 1/8-inch [54 mm] centers. Flanged connections are on 2 1/8-inch [54 mm] centers.

Vent Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Other Connections

Threaded BSP Tr to BS21
BSP F to BS2779

Please consult the factory for availability.

Futbol Flanges

Futbol Flanges are available for bolting to the process side of a flanged manifold. This provides the ideal solution to welded connection requirements, allowing the flanges to be welded to process piping while keeping the flexibility to remove the manifold when required, for maintenance or repair.

Connection	CS	SS
1/2" FNPT	KFC-4	KFS-4
1/2" MNPT	KFC-4M	KFS-4M
1/2" Butt weld	KFC-4BW	KFS-4BW
1/2" Socket Weld	KFC-4B	KFS-4B

Notes

1. Threaded connection: vent supplied with blanking plug as standard.
2. All manifolds are supplied with seal rings and four 7/16-inch UNF HT steel mounting bolts. Teflon® seal rings are supplied with the standard bonnet; Graphite seal rings are supplied with high temperature bonnet.

Pressure and Temperature Ratings

Valve Teflon® Bonnet

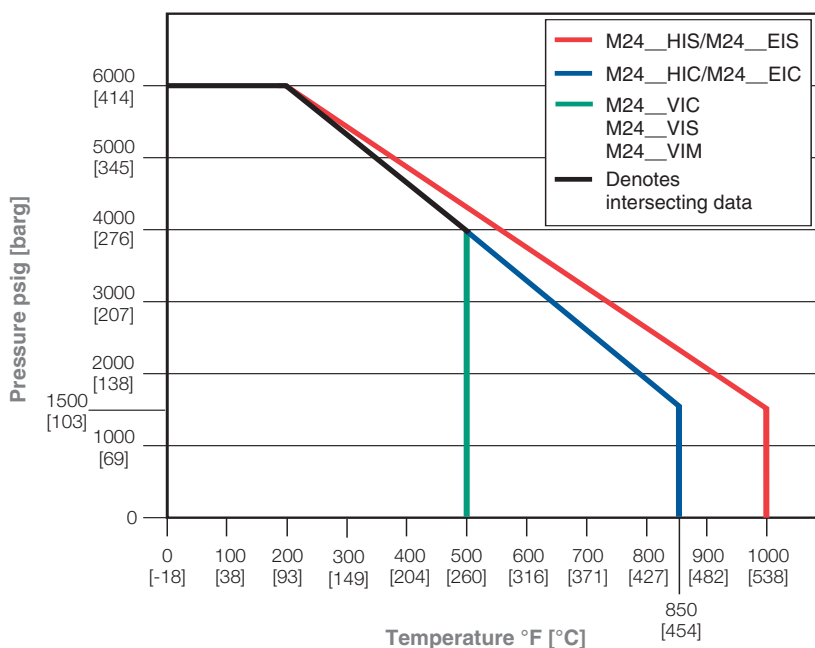
CS, SS and Monel® 6000 psig @ 200°F [414 barg @ 93°C]
4000 psig @ 500°F [276 barg @ 260°C]

Valve High Temperature

CS 6000 psig @ 200°F [414 barg @ 93°C]
1500 psig @ 850°F [103 barg @ 454°C]

SS 6000 psig @ 200°F [414 barg @ 93°C]
1500 psig @ 1000°F [103 barg @ 538°C]

Pressure vs. Temperature



Differential Pressure Manifolds – M24 Specifications

Note

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Ordering Information

	M24T	V	I	S	- 4	- SG
Valve Type	M24A (Flanged x Flanged) M24T (Threaded x Flanged)					
Bonnet Packing		V – Teflon® H – GRAFOIL® E – Low Emissions Graphite				
Seat			I – Integral (body material)			
Body Material				S – SS		
Process Connections (M24T only)					4 – 1/2-inch FNPT	
Options						
	AL	– Arctic Lubricant (low temperature service -70°F) - not available for CS valves				
	AT	– Tamper-proof Bonnet				
	BL	– Bonnet Lock Device (Accessories, page 154)				
	CB	– Ceramic Ball Ended Stem				
	K	– Key for -AT				
	LAT	– Lockable Tamper-proof Bonnet				
	MB55	– AGCO Mount Kit (page 80)				
	OC	– Cleaned for oxygen service				
	PD	– Padlock for -LAT				
	R3V	– Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)				
	SSA ¹	– SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]				
	SSB	– 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 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)				
	ST	– Stellite Ball Ended Stem				
	SP	– Special Requirements - please specify				

Differential Pressure Manifolds – M24 ASME B31.1 or B31.3 Specifications

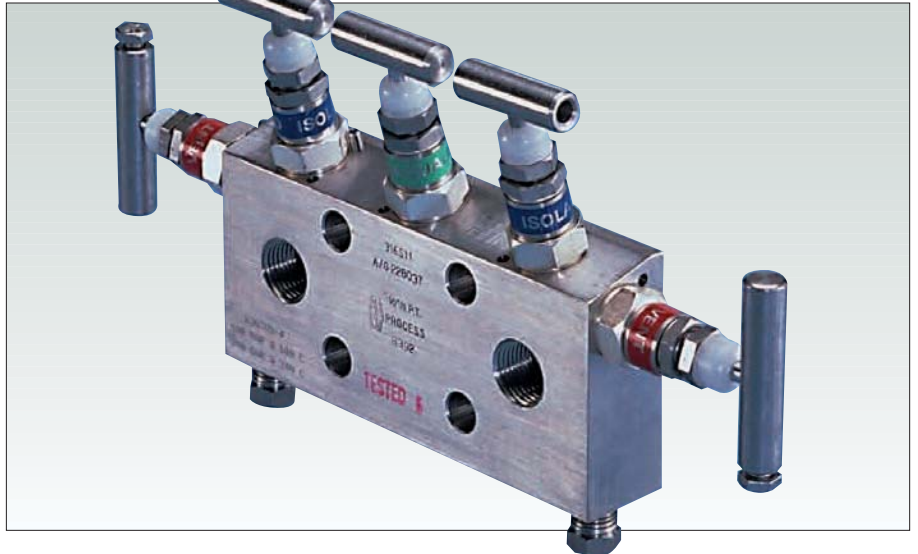
Ordering Information – Power Industry Applications¹

	M24THP	S	- 4	-XP	- SSB
Valve Type	M24AHP M24THP				
Body Material	S – SS				
Connections⁴ (Process x Instrument x Vent)	4 – 1/2-inch FNPT x Flange x 1/4-inch FNPT 4AT – 1/2-inch AGCO Tube x Flange x 1/4-inch FNPT				
Options	MB55 – AGCO Mount Kit (page 80) SSA ⁵ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg] SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating SSC ⁵ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg] SP – Special Requirements - please specify				

Notes

- All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
- Manifold ratings:
SST
6000 psig @ 100°F [414 barg @ 38°C]
3030 psig @ 1000°F [209 barg @ 538°C]
- See page 156 for Code Requirements.
- M24A connections are Flange x Flange x 1/4-inch FNPT.
- 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – A26 5-Valve



Product Overview

The A26 is a five-valve manifold designed for mounting to differential pressure transmitters. Lightweight and with compact dimensions, A26 manifolds enable instrument operation, isolation, zeroing and venting in a single unit.

The A26 is coupled directly to differential pressure transmitters via standard instrument side flanged connections on 2 1/8-inch [54 mm] centers. Process connections are available threaded 1/4-inch and 1/2-inch NPT. Vent connections are threaded 1/4-inch NPT on all manifolds and provided with vent plugs as standard. Suitable for pressures of up to 6000 psig [414 barg] and temperatures of up to 1000°F [538°C], A26 is available with a metal seat and the option of Teflon® or Graphite stem packing.

Applications

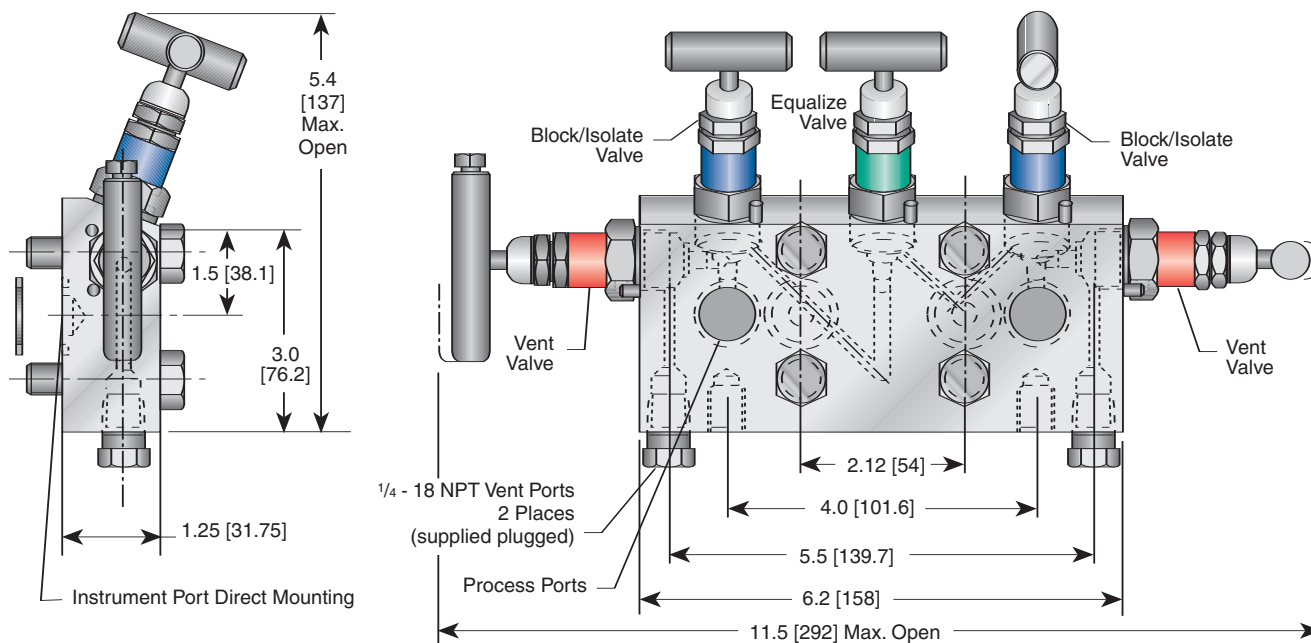
- Direct-mounting differential pressure transmitters.
- Instrument isolation and zeroing.
- Instrument venting to close system.
- Instrument calibration.
- Liquid and vapor service.

Features and Benefits

- **Direct mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem** free-swiveling ball-end stem ensures perfect alignment, providing repetitive bubble-tight shut-off and long life.
- **Packing below threads** Teflon® or Graphite packing below the stem threads prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allow vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, standard pipe bracket bolts directly to the manifold providing a rigid support for the transmitter. Instrument can be easily removed for service or repair.

Differential Pressure Manifolds – A26 Specifications

Dimensions, inches [mm]



Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat
CS ²	A108	A108	303 SS	17-4PH
SS	SS, A479 316	316 SS	316 SS	316 SS
Monel [®]	Monel [®] 400	Monel [®] 400	Monel [®] 400	Monel [®] K500
SG ³	A479 316 SS	316 SS	Monel [®] 400	Monel [®] K500
SG3 ⁶	Hastelloy [®] C-276	Hastelloy [®] C-276	Hastelloy [®] C-276	Elgiloy [®]

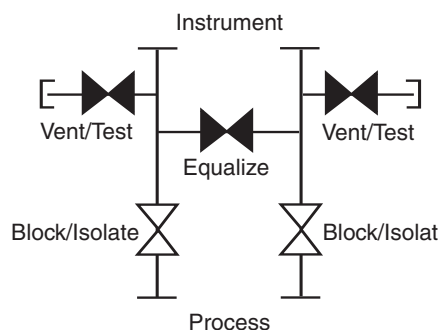
Notes

- Approximate valve weight: 6.0 lb [2.7 kg]. 0.187-inch [4.8 mm] diameter orifice. Valve C_v 0.52 maximum.
- For CS valves, non-wetted parts are all CS zinc plated to resist corrosion.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- Hastelloy[®] is a registered trademark of Haynes International.
- All manifolds are supplied with seal rings and four 7/16-inch UNF HT steel mounting bolts. Teflon[®] seal rings are supplied with the standard bonnet; Graphite seal rings are supplied with high temperature bonnet.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Special Severe Service Materials

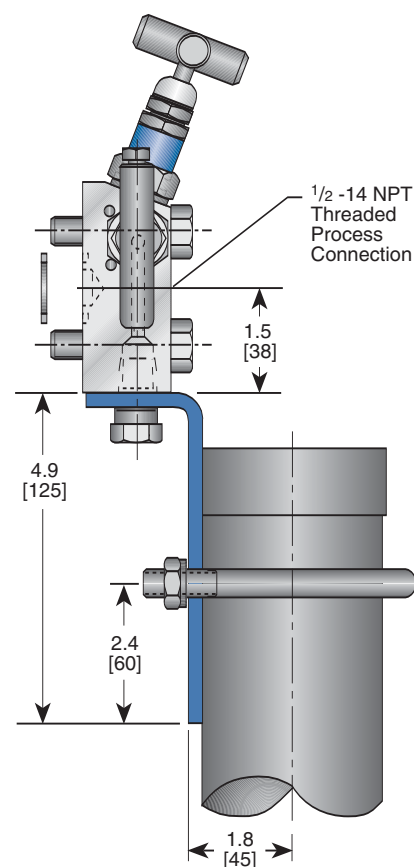
Duplex UNS S31803
6MO UNS S31254
Hastelloy[®] C276
Incoloy[®] 825

For any other material requirements, please consult the factory.



AGCO Mount MB6

A26 is available with a mounting bracket suitable for 2-inch pipe stand. Supplied zinc plated CS as standard, page 80.



Differential Pressure Manifolds – A26 Specifications

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

White: Standard bonnet assembly Teflon® packing.

Green: Sour Gas service Teflon® packing.

Ring Labels: The valve bonnets have color coded ring labels for service identification.

Red: Vent Valves

Blue: Isolate Valves

Green: Equalize Valves

Connections¹

Standard Connections

Process Threaded 1/2-inch NPT to ANSI/ASME B1.20.1.

Instrument Flanged for direct mounting to transmitters on 2 1/8-inch [54 mm] centers.

Vent Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Other Connections

Threaded BSP Tr to BS21
BSP F to BS2779

Please consult the factory for availability.

Note

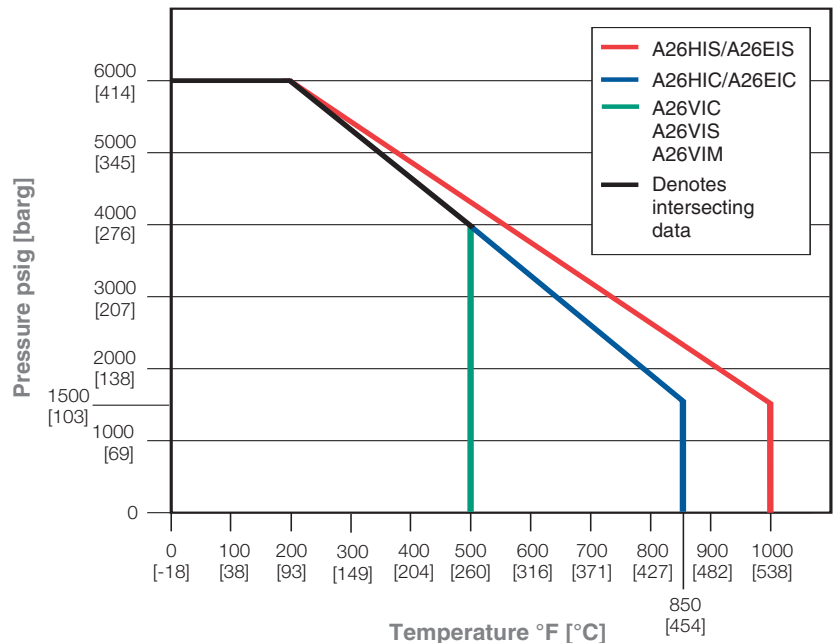
1. Threaded connection: vent supplied with blanking plug as standard.

Pressure and Temperature Ratings

Valve	Teflon® Bonnet
CS, SS and Monel®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Valve	High Temperature
CS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 850°F [103 barg @ 454°C]
SS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

A26 Pressure vs. Temperature



Differential Pressure Manifolds – A26 Specifications

Ordering Information

A26T **V** **I** **S** **- 4** **- SG**

Bonnet Packing

V – Teflon®
H – Graphite

Seat

I – Integral

Body Material

C – CS
S – SS
M – Monel®

Process Connections

4 – 1/2-inch FNPT

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AT – Tamper-proof Bonnet
- BL – Bonnet Lock Device (Accessories, page 154)
- CB – Ceramic Ball Ended Stem
- K – Key for -AT
- LAT – Lockable Tamper-proof Bonnet
- MB6 – AGCO Mount Kit (page 80)
- OC – Cleaned for oxygen service
- PD – Padlock for -LAT
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC7 – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Note

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – MDP 5-Valve

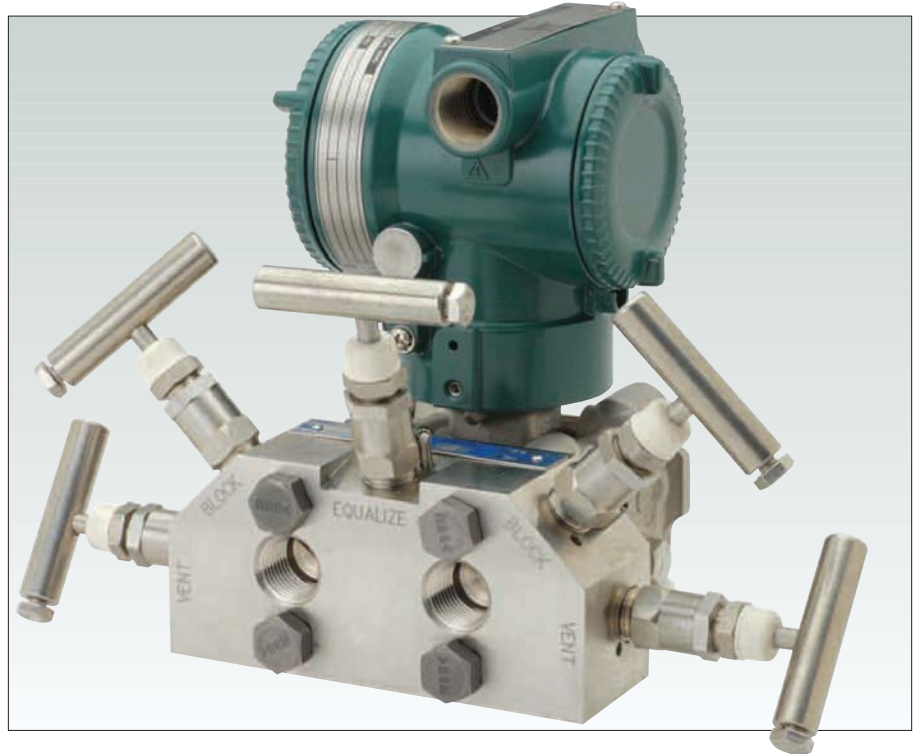
Product Overview

The MDP is a five valve manifold designed for direct mounting to differential pressure transmitters. Lightweight and with compact dimensions, MDP manifolds enable instrument operation, isolation, zeroing and venting in a single unit.

Manufactured with two block valves, an equalize valve and two instrument vent/calibrate valves, the MDP is coupled directly to differential pressure transmitters via standard instrument flanged connections on 2¹/₈-inch [54 mm] centers. (Non-standard instrument centers are also available). Process connections are available threaded or flanged to accept standard futbol flanges. Vent connections are threaded 1/4-inch on all manifolds and provided with vent plugs as standard. Suitable for pressures of up to 6000 psig [414 barg] and temperatures of up to 1000°F [538°C]. MDP is available with a metal seat and the option of Teflon® or GRAFOIL® stem packing.

Applications

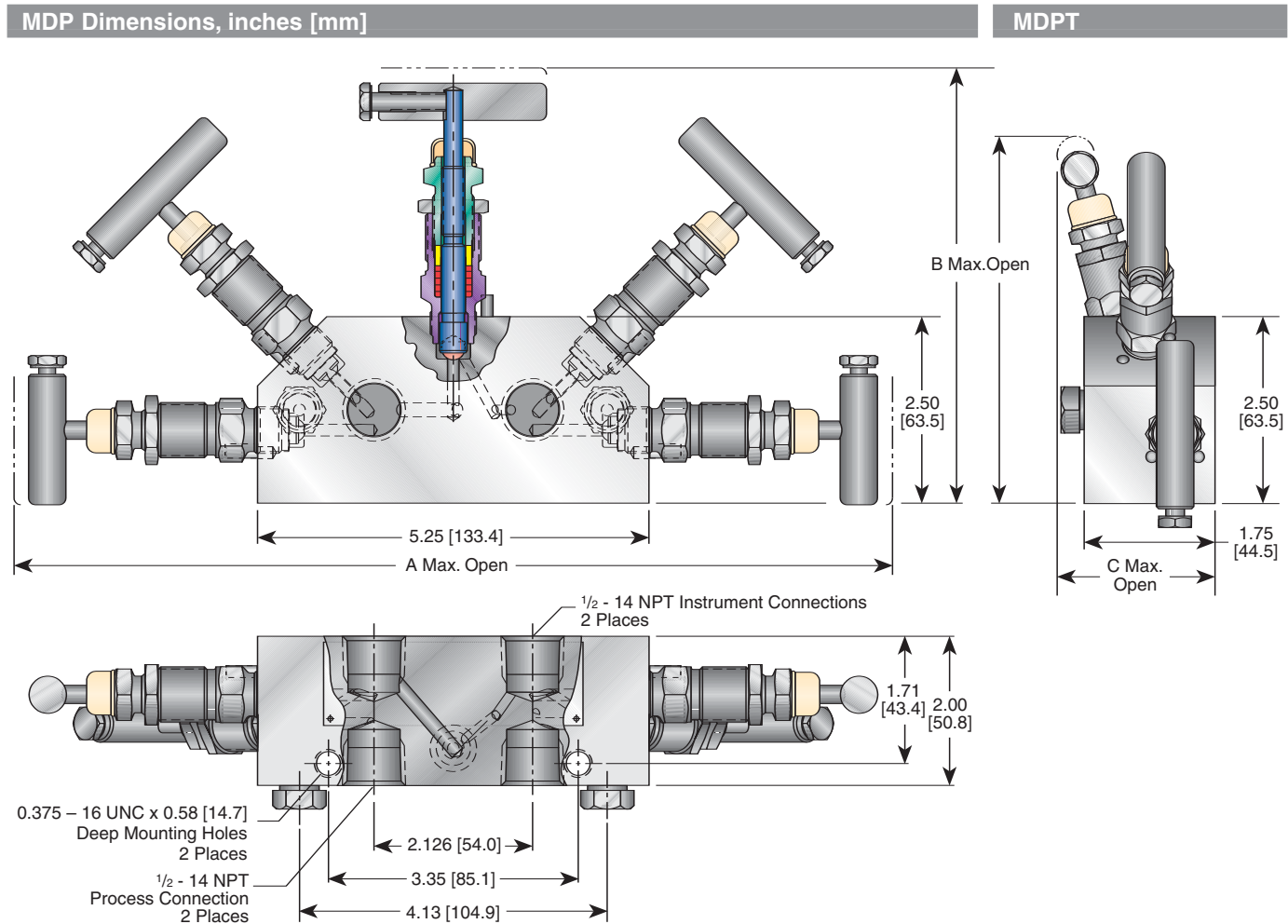
- Direct-mounting differential pressure transmitters.
- Instrument isolation and zeroing.
- Instrument venting to close system.
- Instrument calibration.
- Liquid and vapor service.



Features and Benefits

- **Direct mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem** free-swiveling ball-end stem ensures perfect alignment, providing repetitive bubble-tight shut-off and long life.
- **Packing below threads** Teflon® or GRAFOIL® packing below the stem threads prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blow-out or accidental removal while in operation.
- **Threaded vent ports** allow vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, standard pipe bracket bolts directly to the manifold providing a rigid support for the transmitter. Instrument can be easily removed for service or repair.

Differential Pressure Manifolds – MDP Specifications



MDP Dimensions, inches [mm]

Valve	A	B
Teflon® Packed	10.45 [265.4]	5.10 [129.5]
GRAFOIL®/ Low Emissions Graphite Packed	11.75 [298.5]	5.75 [146.1]

MDPT Dimensions, inches [mm]

Valve	A	B	C
Teflon® Packed	10.45 [265.4]	4.90 [124.5]	2.11 [53.6]
GRAFOIL®/ Low Emissions Graphite Packed	11.75 [298.5]	5.51 [140.0]	2.34 [59.4]

Special Severe Service Materials

Duplex UNS S31803

6MO UNS S31254

Hastelloy® C276

Incoloy® 825

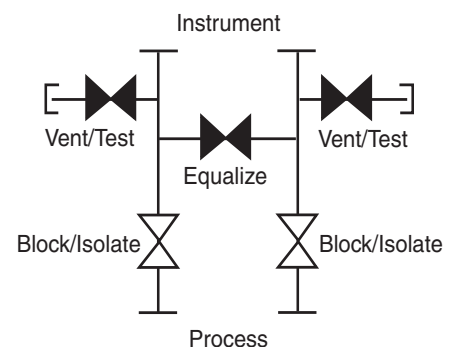
For any other material requirements, please consult the factory.

Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat
SS	SS, A479 316	316 SS	316 SS	316 SS
Monel®	Monel® 400	Monel® 400	Monel® 400	Monel® K500
SG ²	A479 316 SS	316 SS	Monel® 400	Monel® K500

Notes

1. Approximate valve weight: 6.7 lb [3.0 kg].
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.364 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.



Differential Pressure Manifolds – MDP Specifications

Valve Bonnet Identification

Dust Cap Coding: The valve bonnet dust caps are color coded to identify the gland packing/stem.

White: Standard bonnet assembly Teflon® packing.

Green: Sour Gas service Teflon® packing.

Connections

Standard Connections

Process Threaded 1/2-inch NPT to ANSI/ASME B1.20.1.

Instrument Flanged for direct mounting to transmitters on 2 1/8-inch [54 mm] centers. Flanged connections are on 2 1/8-inch [54 mm] centers.

Vent Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Notes

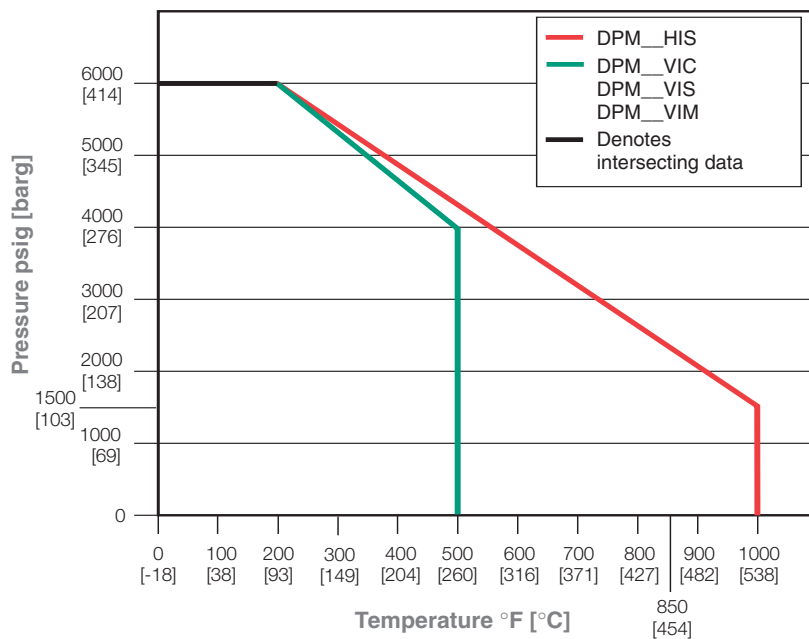
1. Threaded connection: vent supplied with blanking plug as standard.
2. All manifolds are supplied with seal rings and four 7/16-inch UNF HT steel mounting bolts. Teflon® seal rings are supplied with the standard bonnet; Graphite seal rings are supplied with high temperature bonnet.

Pressure and Temperature Ratings

Valve	Teflon® Bonnet
CS, SS and Monel®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Valve	High Temperature
SS	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

MDP Pressure vs. Temperature



Differential Pressure Manifolds – MDP Specifications

Ordering Information

MDP or MDPT V I S - 4 - SG

Bonnet Packing

V – Teflon®
H – Graphite

Seat

I – Integral

Body Material

C – CS
S – SS
M – Monel®

Process Connections

4 – 1/2-inch FNPT

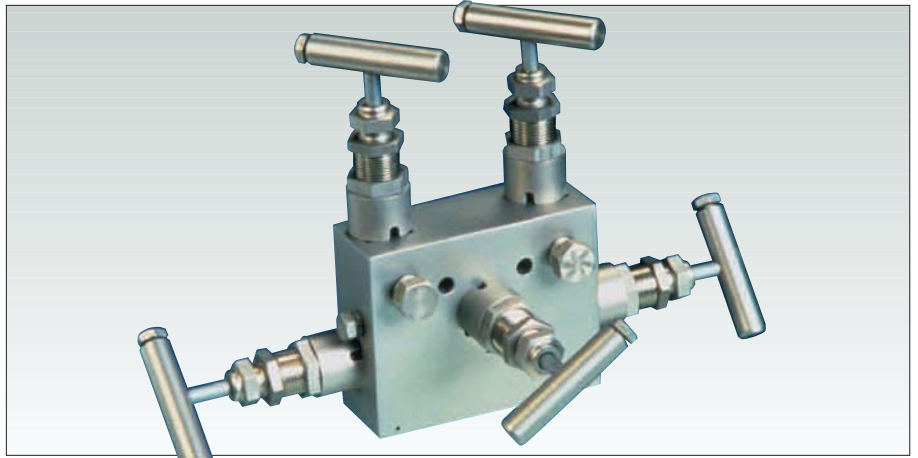
Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 80)
- AT – Tamper-proof Bonnet
- BL – Bonnet Lock Device (Accessories, page 154)
- CB – Ceramic Ball Ended Stem
- K – Key for -AT
- (2) LAT Lockable Tamper-proof Bonnet (Block Valves only)
- (3) LAT Lockable Tamper-proof Bonnet (Block Valves and Vent Valves only)
- (5) LAT Lockable Tamper-proof Bonnet (All Valves)
- OC – Cleaned for oxygen service
- R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts)
- SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating
- SSC1 – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Note

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Differential Pressure Manifolds – DPM 5-Valve ASME B31.1 or B31.3 Meets MSS SP-105



Product Overview

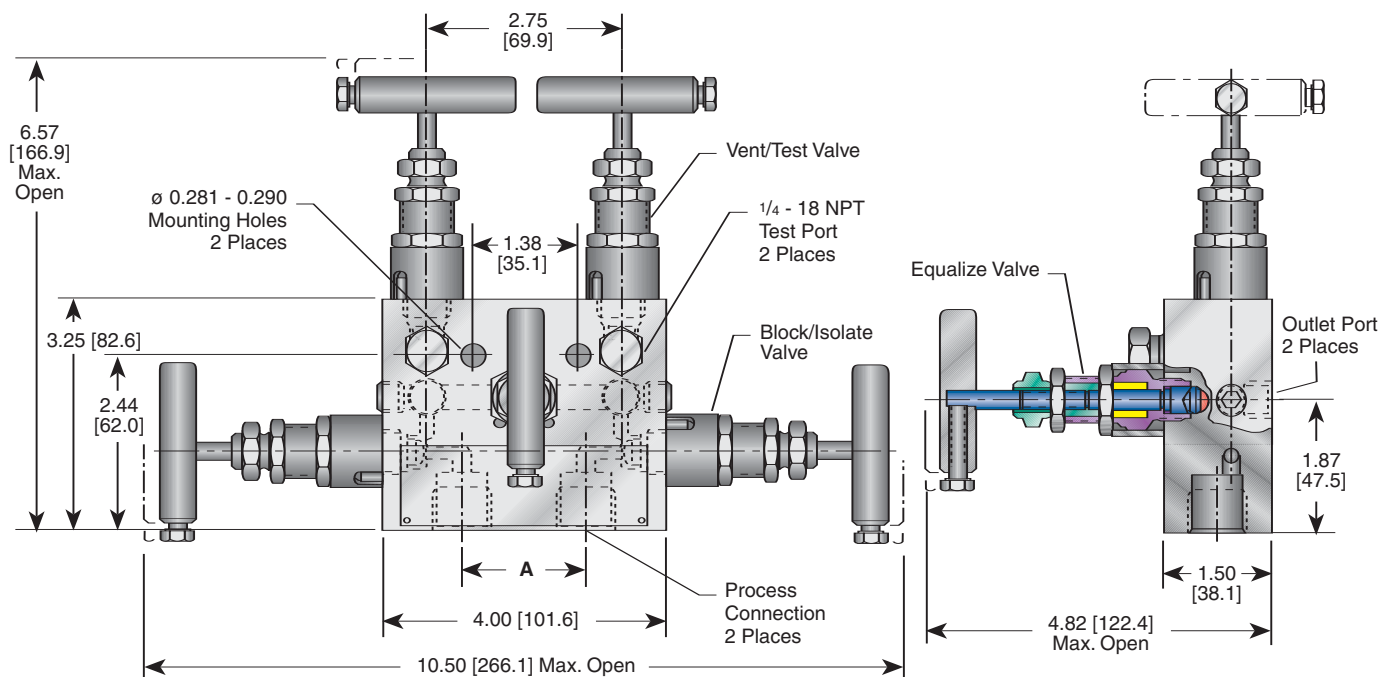
The DPM is a five-valve manifold designed for remote mounting to differential pressure transmitters. Lightweight and with compact dimensions, DPM manifolds enable instrument operation, isolation, zeroing and venting in a single unit. Two block valves, one equalizer valve and two vent/test valves are combined into a compact unit designed for rack or pipe-stand mounting. Two 1/4-inch FNPT vent/test ports are provided for ease of venting and field calibration of the instrument.

Features and Benefits

- **Direct mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves, thereby eliminating several components essential for 'piping-up.'
- **Ball end stem** free-swiveling ball-end stem ensures perfect alignment, providing repetitive bubble-tight shut-off and long life.
- **Packing below threads** Teflon® or GRAFOIL® packing below the stem threads prevents lubricant washout and thread corrosion.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allow vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, standard pipe bracket bolts directly to the manifold providing a rigid support for the transmitter. Instrument can be easily removed for service or repair.

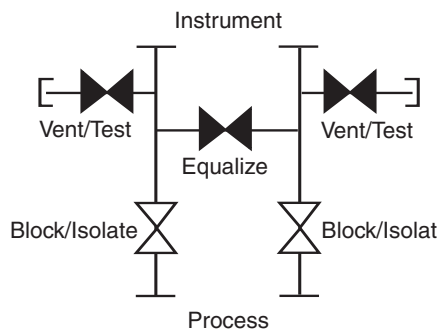
Differential Pressure Manifolds – DPM 5-Valve ASME B31.1 or B31.3

Dimensions, inches [mm]



Dimensions, inches [mm]

Process Connections	A
1/2-inch NPT	1.75 [44.4]
3/8-inch NPT	1.90 [48.3]
1/2-inch AGCO Tube	2.12 [53.8]
1/2-inch Pipe S.W.	
3/8-inch Tube S.W.	
1/2-inch Tube S.W.	
3/8-inch Tube Stub	
1/2-inch Tube Stub	



Standard Materials

Valve ¹	Body	Bonnet	Stem	Ball Seat	Packing
SS	A479-316	A479-316	A276-316	316	GRAFOIL®

Note

1. Approximate valve weight: 6.5 lb [2.9 kg].
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.

Pressure and Temperature Ratings

Valve Ratings

Valve	Ratings
SS	6000 psig @ 100°F [414 barg @ 38°C] 3030 psig @ 1000°F [209 barg @ 538°C]

Differential Pressure Manifolds – DPM ASME B31.1 or B31.3 Meets MSS SP-105⁵

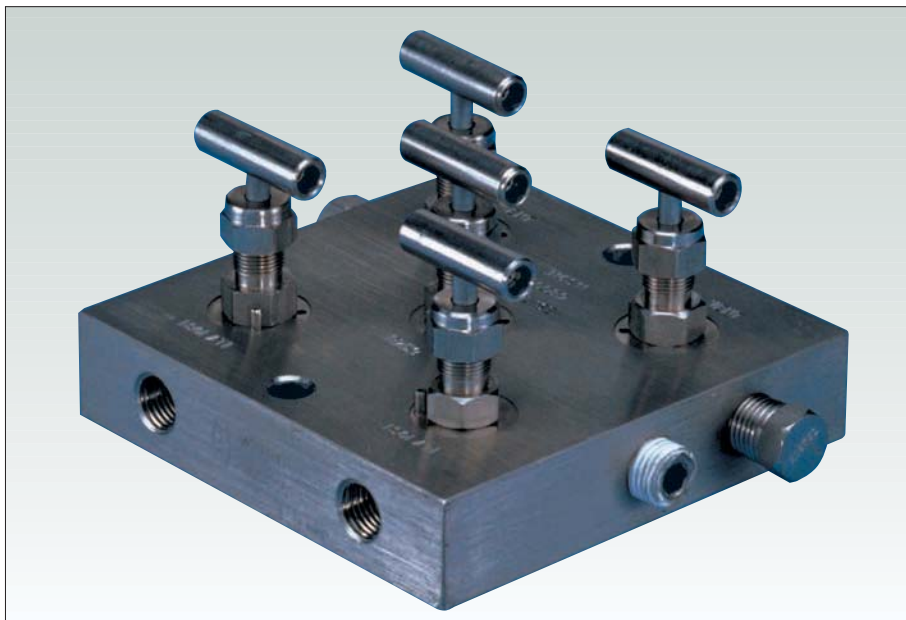
Ordering Information – Power Industry Applications⁴

	DPMHP	S	- 4 - 2	- XP	- SP
Valve Type					
DPMHP					
Body Material					
S – SS, A479-316					
Connections (Process x Instrument x Vent)					
3 - 2 – 3/8-inch FNPT x 1/4-inch FNPT x 1/4-inch FNPT					
4 - 2 – 1/2-inch FNPT x 1/4-inch FNPT x 1/4-inch FNPT					
4B2 – 1/2-inch Pipe S.W. x 1/4-inch FNPT x 1/4-inch FNPT					
4TB2 – 1/2-inch Tube S.W. x 1/4-inch FNPT x 1/4-inch FNPT ³					
3TC2 – 3/8-inch Tube Stub x 1/4-inch FNPT x 1/4-inch FNPT ¹					
4TC2 – 1/2-inch Tube Stub x 1/4-inch FNPT x 1/4-inch FNPT ²					
4AT2 – 1/2-inch AGCO Tube x 1/4-inch FNPT x 1/4-inch FNPT					
3TB2 – 3/8-inch Tube S.W. x 1/4-inch FNPT x 1/4-inch FNPT					
Options					
SP – Special Requirements - please specify					

Notes

1. AT = Single ferrule SS fitting for 1/2-inch tubing.
ATD = Double ferrule SS fitting for 1/2-inch tubing.
2. Tube Stubs are 6-inch long x 0.065-inch wall.
3. Tube Stubs are 6-inch long x 0.095-inch wall.
4. All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
5. See page 156 for Code Requirements.

Differential Pressure Manifolds – MM5 5-Valve



Product Overview

The MM5 is a five-valve miniature manifold designed for instrument installations where space is restricted. Lightweight and with compact dimensions, MM5 manifolds are designed for flow metering and differential pressure transmitters to enable instrument operation, isolation, zeroing and venting in a single unit.

Designed for remote mounting from the instrument via 1/4-inch NPT threaded instrument and process connections, the MM5 uses H5 miniature bonnets which are available with metal or soft seats. This versatile design can be converted to soft seats simply by fitting a soft seat and flow washer. Available in stainless steel only MM5 has two block valves, an equalizer valve and two vent valves. Suitable for pressure up to 6000 psig [414 barg] and temperatures of up to 500°F [260°C], MM5 has a Teflon® stem packing and the choice of Delrin®, PCTFE or PEEK soft seats.

Applications

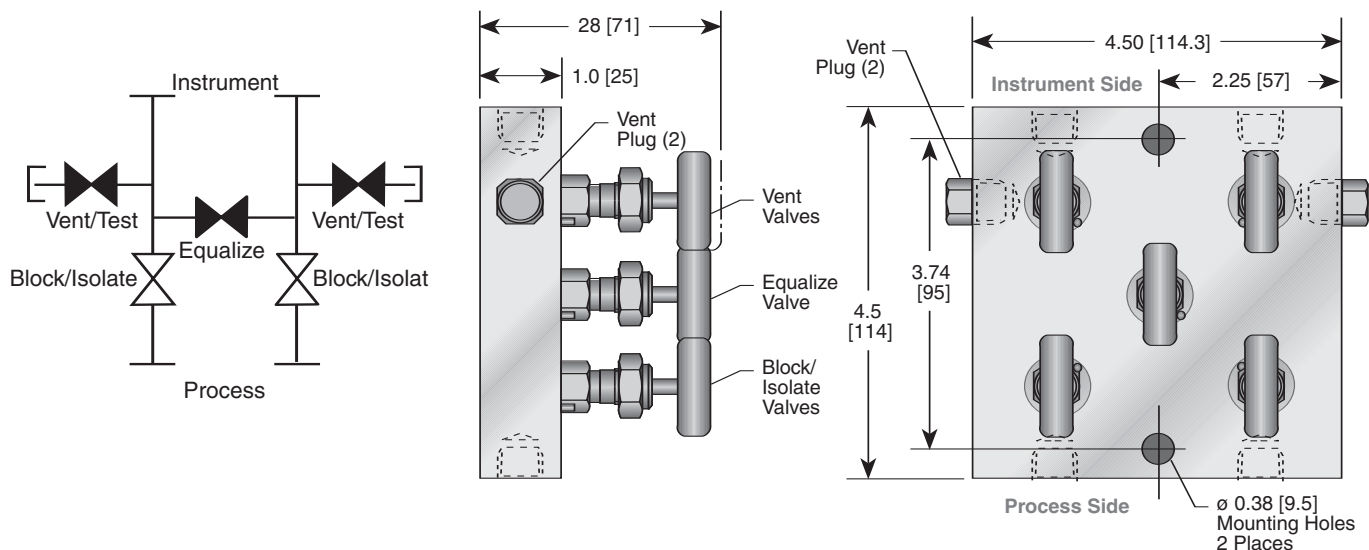
- Compact instrument control loops.
- Differential Pressure instruments.
- Control Panels.
- Gas sampling equipment.
- Differential Pressure changes.

Features and Benefits

- **Remote mounting compact design** requires a minimum of space for operation and installation with fewer potential leak points.
- **Installation costs reduced** by manifolding the valves. This eliminates several parts used in conventional methods for 'piping-up.'
- **Metal or field replaceable soft seats**, this unique seat can be converted from metal to soft simply by fitting a soft seat and flow washer. Soft seats are field replaceable for easy maintenance, extending the useful life of the valve.
- **Extended valve life** results from rolled stem threads rather than cut, providing a stronger, more durable thread area.
- **Back seat stem** prevents stem blowout or accidental removal while in operation.
- **Threaded vent ports** allow the vent to be safely piped away, supplied plugged as standard.
- **Manifold mounting**, manifolds are supplied with mounting holes as standard to enable surface or cabinet mounting.

Differential Pressure Manifolds – MM5 Specifications

MM5 Dimensions, inches [mm]



MM5 Standard Materials

Valve ¹	Body	Bonnet	Stem	Soft Seat ²	Flow Washer	Packing
SS	316 SS	316 SS	316 SS	PCTFE	316 SS	Teflon®
SG ³	316 SS	316 SS	Monel® 400	PCTFE	316 SS	Teflon®

Connections

Standard Connections

Threaded 1/4-inch NPT to ANSI/ASME B1.20.1.

Other Connections

Threaded 1/4-inch BSP Tr to BS21

Please consult the factory for availability.

Bonnet Assembly

The H5 bonnet assembly has a compact design with a one-piece rotating stem which is 'V' tipped for 'better' flow control. The stem threads are rolled and lubricated to prevent galling and reduce operating torque.

The SS bonnet is fitted with an adjustable Teflon® stem packing.

The H5 bonnets are assembled with a bonnet locking pin to prevent accidental removal in service.

Soft Seat

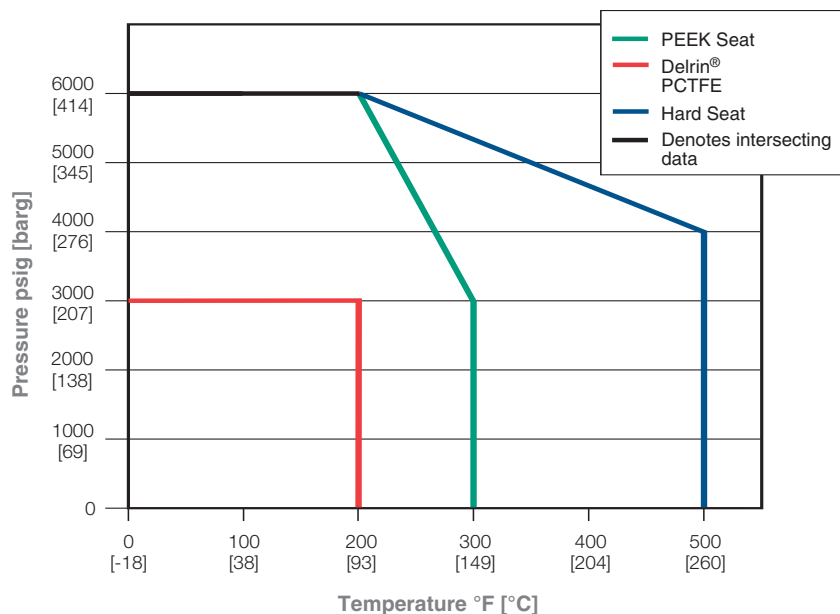
All miniature manifolds and valves feature a unique valve seat which may be converted from metal to soft simply by fitting a soft seat and flow washer. SS valves use PCTFE² soft seat as standard. Delrin® and PEEK seats are also available.

Notes

1. Approximate valve weight: 6.0 lb [2.7 kg].
0.136-inch [3.5 mm] diameter orifice.
Valve Cv hard seat 0.25 maximum.
Valve Cv soft seat 0.24 maximum.
2. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. Threaded connection – vent supplied with blocking plug as standard.

Differential Pressure Manifolds – MM5 Specifications

Pressure vs. Temperature



Pressure and Temperature Ratings

Valve	Teflon® Packed
Hard	6000 psig @ 200°F [414 barg @ 93°C]
	4000 psig @ 500°F [276 barg @ 260°C]
Delrin®/PCTFE	3000 psig @ 200°F [207 barg @ 93°C]
PEEK	6000 psig @ 200°F [414 barg @ 93°C]
	3000 psig @ 300°F [207 barg @ 149°C]

Ordering Information

MM5 V I S - 2 - SG

Valve Type

MM5

Bonnet Packing

V – Teflon®

Seat

Hard

I – Integral
(body material)

Soft

D – Delrin®
K – PCTFE
E – PEEK

Body Material

S – SS, A479-316

Process Connections

2 – 1/4-inch FNPT

Options

BSP Tr – BSP Taper Thread

OC – Cleaned for oxygen service

SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005

SP – Special Requirements - please specify

Integral Manifolds – MC and MT

Product Overview

Integral manifolds are those uniquely connected to the transmitter of a specific manufacturer's model and cannot be used on a different transmitter brand. This section is presently characterized by manifolds designed specifically for Rosemount® Transmitter Models 3051, 2024 and 3095.

The manifold/transmitter assembly has the advantage of small size, light weight and may be either 2-inch pipe stand or wall mounted. Plugged or valved vent/test ports are standard for field calibration checks.

This section has two parts:

1. Integral manifolds.
2. Integral manifolds for ASME B31.1 or B31.3 fossil fuel power plants.

Coplanar™ Compatible

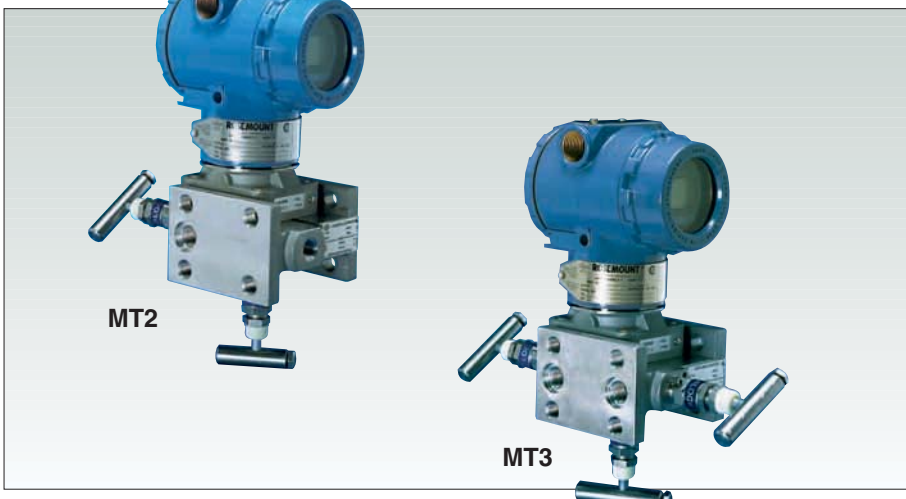
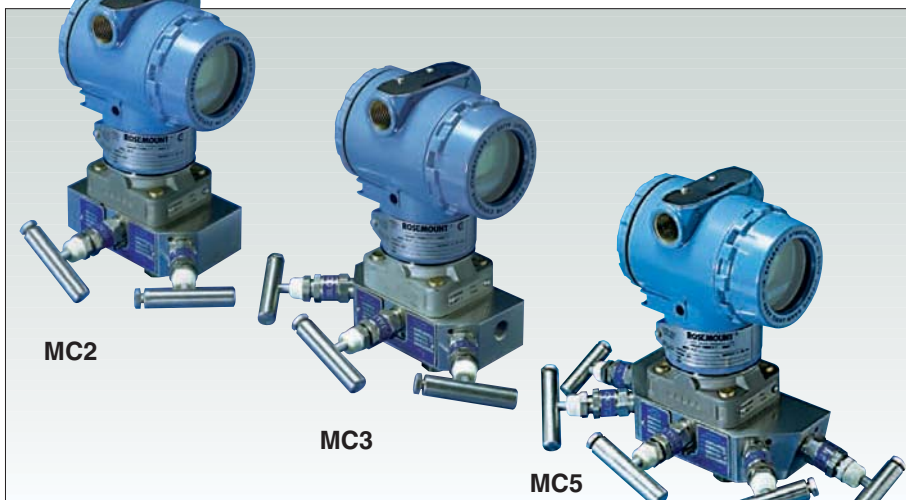
All the Anderson Greenwood Integral Manifolds are designed and thoroughly tested to be compatible with the Rosemount® Coplanar™ pressure transmitters including the Model 3051C, Model 3051P, Model 2024 and the Model 3095 Multivariable™ transmitters.

Coplanar™ Style Transmitters

Rosemount®'s unique Coplanar™ design (sense diaphragms are on the same plane) has allowed Anderson Greenwood to develop a new series of process instrument manifolds specifically designed to 'integrate' the manifold to the transmitter.

Bonnet Assembly Feature

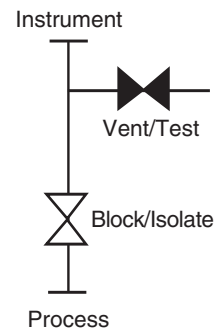
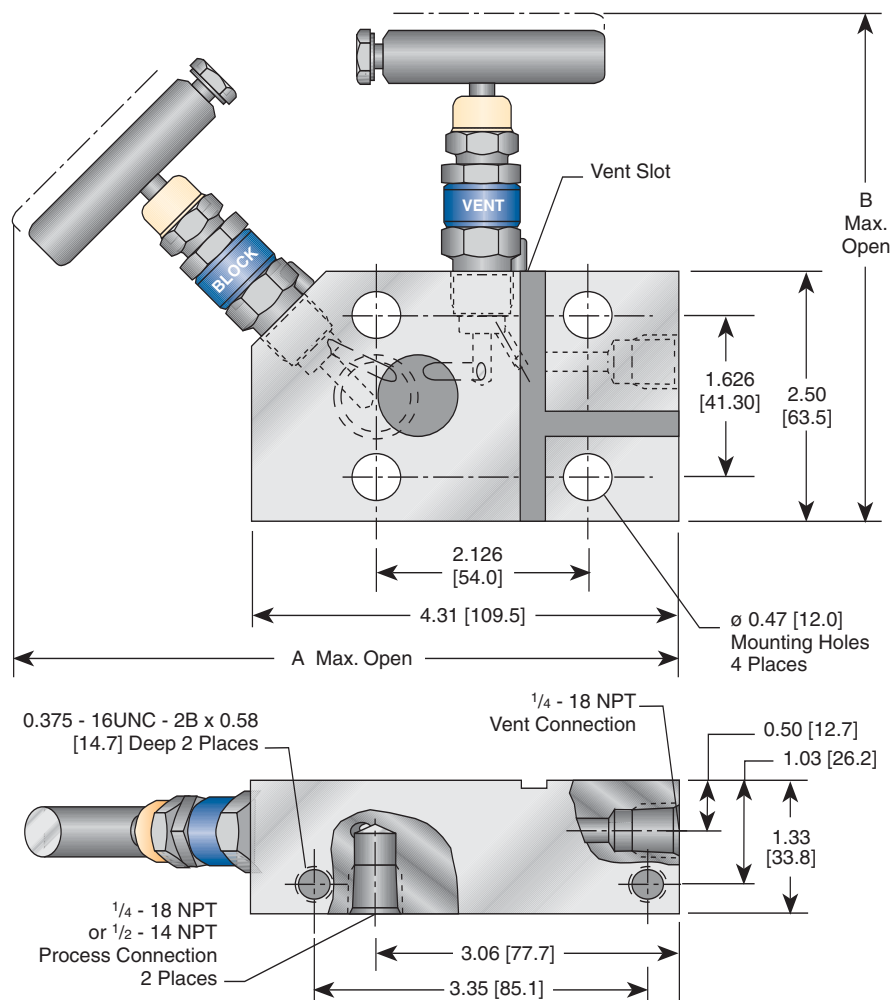
- **Ball end stem** eliminates seat galling, provides bubble-tight shutoff and long life. The hardened, non-rotating ball ensures perfect alignment, closure after closure.
- **Packing below threads** prevents lubricant washout, thread corrosion, and keeps solids from entering the thread area which can cause galling. Also prevents process contamination.
- **Adjustable packing** adjusts easily; loosen jam nut, tighten bushing slightly, then retighten jam nut. Decreases packing replacement downtime and increases valve life.



- **Dust cover** prevents lubricant washout and keeps contaminants (dirt, rain, etc.) out of bonnet assembly.
- **Safety back seating** prevents stem blowout or accidental removal while in operation. Also provides a metal-to-metal secondary stem seal while in the full open position.
- **Chrome plating of 316 SS stem** prevents galling or freezing of thread when similar metals mate. Rolled threads provide additional thread strength. The stem, bonnet, and male NPT threads are rolled, not cut.
- **Mirror stem finish** burnished to a 16 RMS finish in the packing area. Enables smooth stem operation and extends packing life.
- **Body-Bonnet seal** is in constant compression, below the bonnet threads. This prevents thread corrosion, eliminates possible tensile breakage of bonnet and gives a reliable seal point.
- **Bonnet lock pin** is another safety feature, which prevents the accidental separation of the bonnet from the body. However, normal valve maintenance and repair are still easily accomplished.
- **Ease of installation commissioning.** Patented porting design allows complete venting of process fluids before startup.

Integral Manifolds – MC2 2-Valve Manifold for Static Pressure

Dimensions, inches [mm]



Dimensions, inches [mm]

Valve ¹	A	B
Teflon® Packed	6.85 [174.0]	5.10 [129.5]
GRAFOIL®/ Low Emissions Graphite Packed	7.49 [190.2]	5.75 [146.1]

Notes

1. Approximate valve weight: 4.1 lb [1.9 kg].
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
2. Body face is slotted to assure atmospheric vent when a differential transmitter is used.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

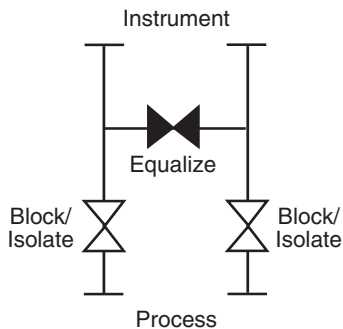
Pressure and Temperature Ratings

Valve	Packing	Ratings
SS	Teflon®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ³	Teflon®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ³⁴	Teflon®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³⁴	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Standard Materials

Valve	Body and Bonnet ²	Stem and Ball
SS	A479-316 316	A276-316 316
SG ³	A479-316 316	Monel® 400 Monel® K500
SG ³⁴	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®

Integral Manifolds – MC3 3-Valve Manifold with Optional Externally Valved Test Ports



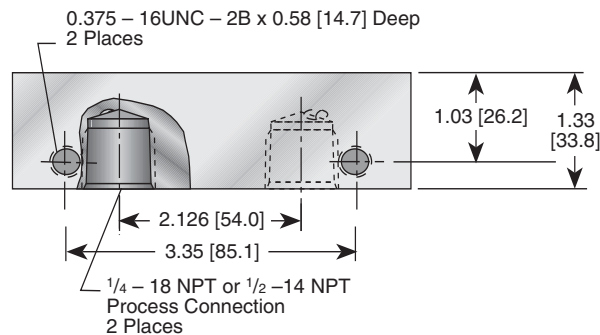
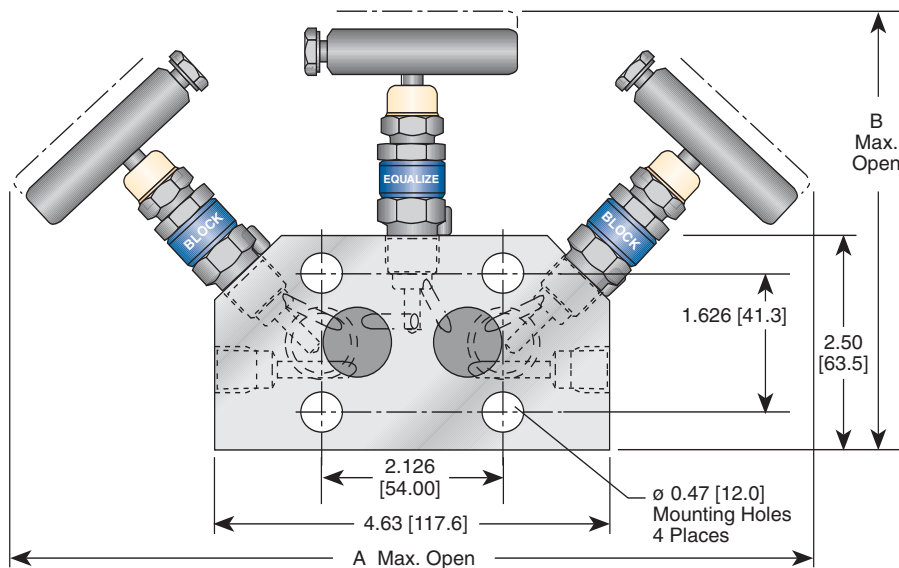
Dimensions, inches [mm]

Valve ¹	A	B
Teflon® Packed	9.60 [243.8]	5.10 [129.5]
GRAFOIL®/ Low Emissions Graphite Packed	10.98 [278.9]	5.75 [146.1]

Notes

- Approximate valve weight:
5.0 lb [2.3 kg] for MC3VI []-2-H5,
4.4 lb [2.0 kg] for MC3VI []-2
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
- Optional test port valves are H5VDS-22,
convertible soft-to-metal seat.
- SG (Sour Gas) meets the requirements of
NACE MR0175/ISO 15156-3 Corrigendum 2
(for Chloride conditions ≤ 50 mg/l [ppm]) and
NACE MR0103-2005.
- SG3 (Sour Gas) meets the requirements of
NACE MR0175/ISO 15156-3 Corrigendum 2
(for Chloride conditions > 50 mg/l [ppm]).

Dimensions, inches [mm]



Standard Materials

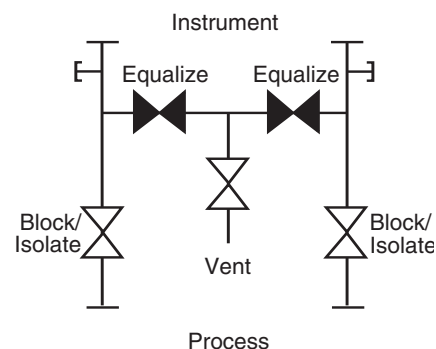
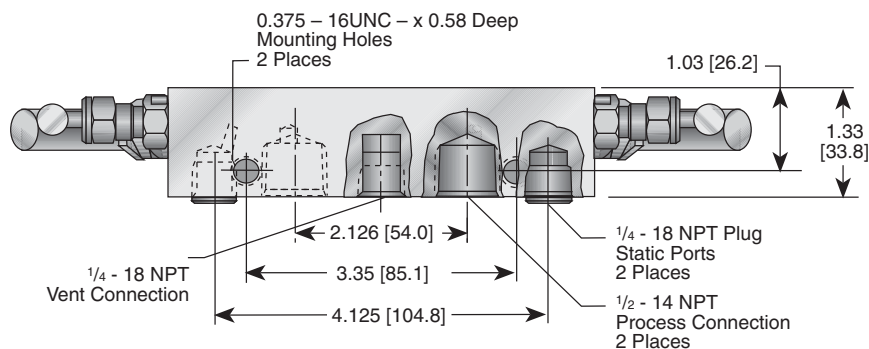
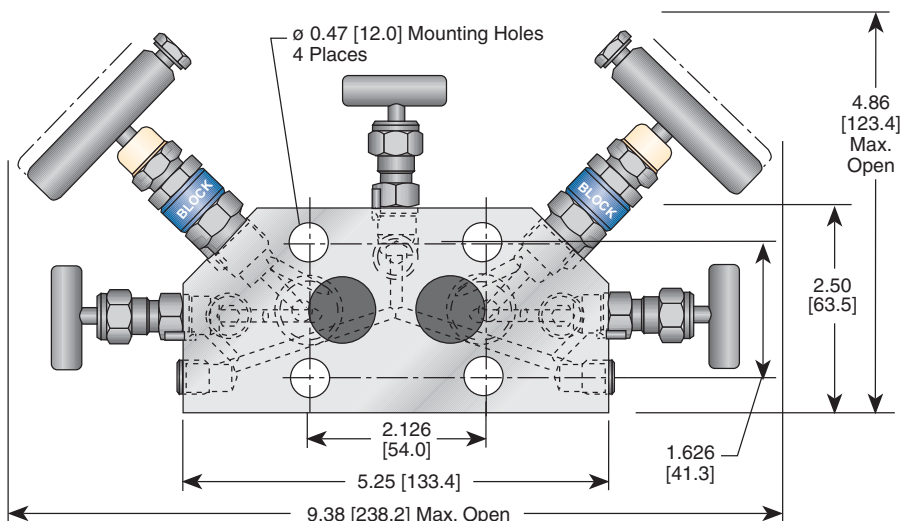
Valve ²	Body and Bonnet	Stem and Ball
SS	A479-316 316	A276-316 316
SG ³	A479-316 316	Monel® 400 Monel® K500
SG3 ⁴	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®

Pressure and Temperature Ratings

Valve	Packing	Ratings
SS	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]
		4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]
		1500 psig @ 1000°F [103 barg @ 538°C]
SG ³	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]
		4000 psig @ 500°F [276 barg @ 260°C]
SG ³	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]
		1500 psig @ 1000°F [103 barg @ 538°C]
SG3 ⁴	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]
		4000 psig @ 500°F [276 barg @ 260°C]
SG3 ⁴	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]
		1500 psig @ 1000°F [103 barg @ 538°C]

Integral Manifolds – MC5G 5-Valve Manifold for Gas Service (Patent Protected)

Dimensions, inches [mm]



Standard Materials

Valve ¹	Body and Bonnet	Stem and Ball	Packing
SS	A479-316 316	A276-316 316	Teflon®
SG ²	A479-316 316/Monel®	Monel® 400 Monel® K500	Teflon®
SG ³	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®	Teflon®

Notes

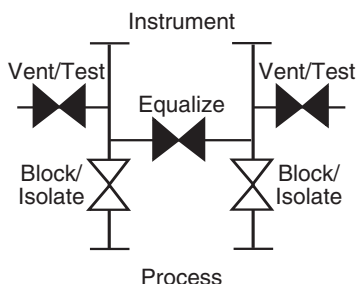
1. Approximate valve weight: 4.8 lb [2.2 kg]. 0.136-inch [3.5 mm] diameter orifice. Valve C_v 0.24 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Pressure and Temperature Ratings

Valve	Ratings	
SS, SG ² , SG ³	6000 psig @ 200°F 4000 psig @ 500°F	[414 barg @ 93°C] [276 barg @ 260°C]

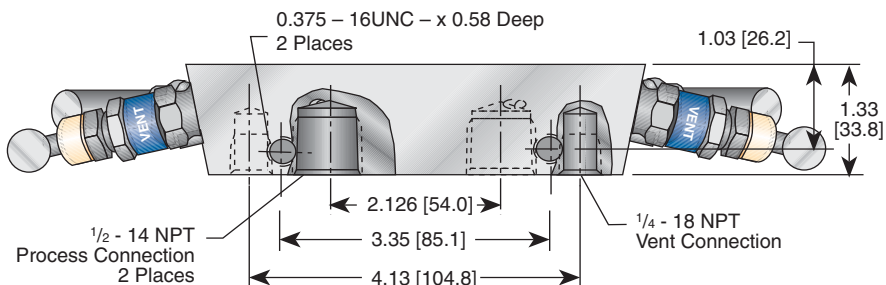
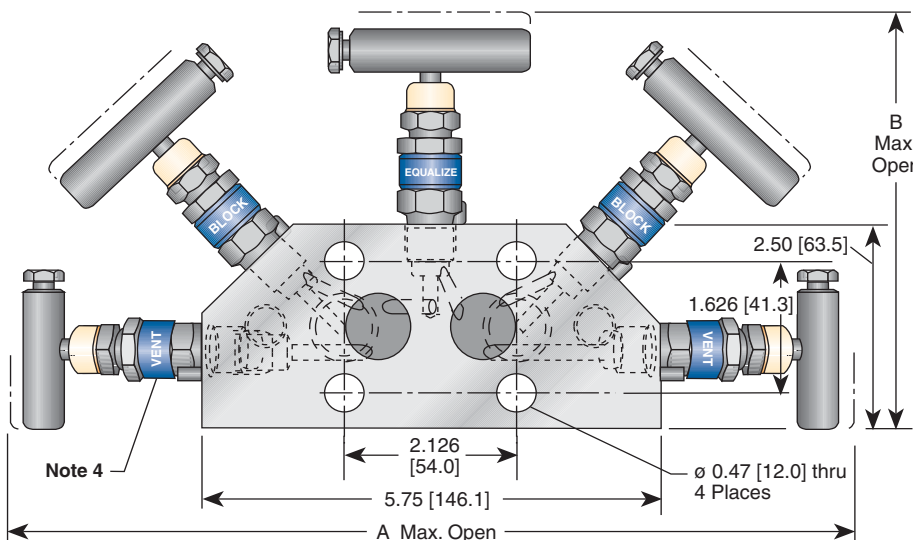
Integral Manifolds – MC5P 5-Valve Manifold with Two Integral Test Valves (Patent Protected)

Dimensions, inches [mm]



Dimensions, inches [mm]

Valve ¹	A	B
Teflon® Packed	10.95 [278.1]	5.10 [129.5]
GRAFOIL®/ Low Emissions Graphite Packed	12.40 [315.0]	5.75 [146.1]



Notes

1. Approximate valve weight: 5.3 lb [2.4 kg]. 0.156-inch [4.0 mm] diameter orifice. Valve C_v 0.36 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).
4. Valve Bonnet labels not supplied on GRAFOIL® packed bonnets due to temperature limitations.

Standard Materials

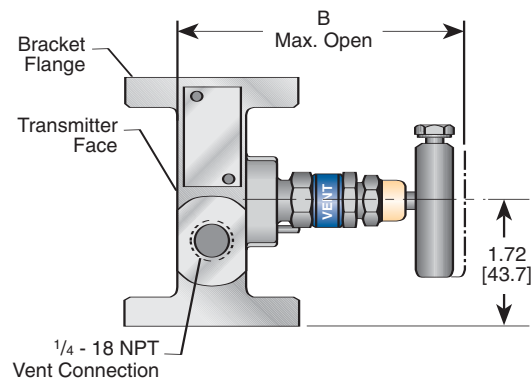
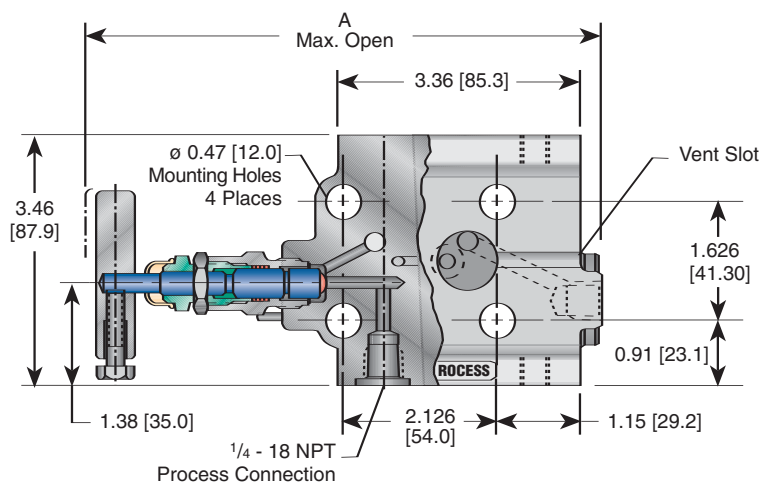
Valve ¹	Body and Bonnet	Stem and Ball	Packing
SS	A479-316 316	A276-316 316	Teflon®
SG ²	A479-316 316/Monel®	Monel® 400 Monel® K500	Teflon®
SG3 ³	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®	Teflon®

Ratings

Valve	Ratings
SS, SG ² , SG3 ³	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Integral Manifolds – MT2 2-Valve Manifold for Static Pressure

Dimensions, inches [mm]



Standard Materials

Valve	Body and Bonnet ²	Stem and Ball
SS	A351-CF8M SS 316	A276-316 316
SG ³	A351-CF8M SS 316	Monel [®] 400 Monel [®] K500
SG ³⁴	Hastelloy [®] C-276	Hastelloy [®] C-276 Elgiloy [®]

Dimensions, inches [mm]

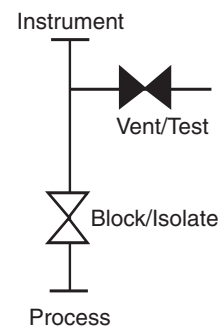
Valve ¹	A	B
Teflon [®] Packed	6.79 [172.5]	4.04 [102.6]
GRAFOIL [®] / Low Emissions Graphite Packed	7.44 [188.9]	4.69 [119.1]

Notes

1. Approximate valve weight: 4.6 lb [2.09 kg]. 0.156-inch [4.0 mm] diameter orifice. Valve C_v 0.36 maximum.
2. Body face is slotted to assure atmospheric vent when a differential transmitter is used.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

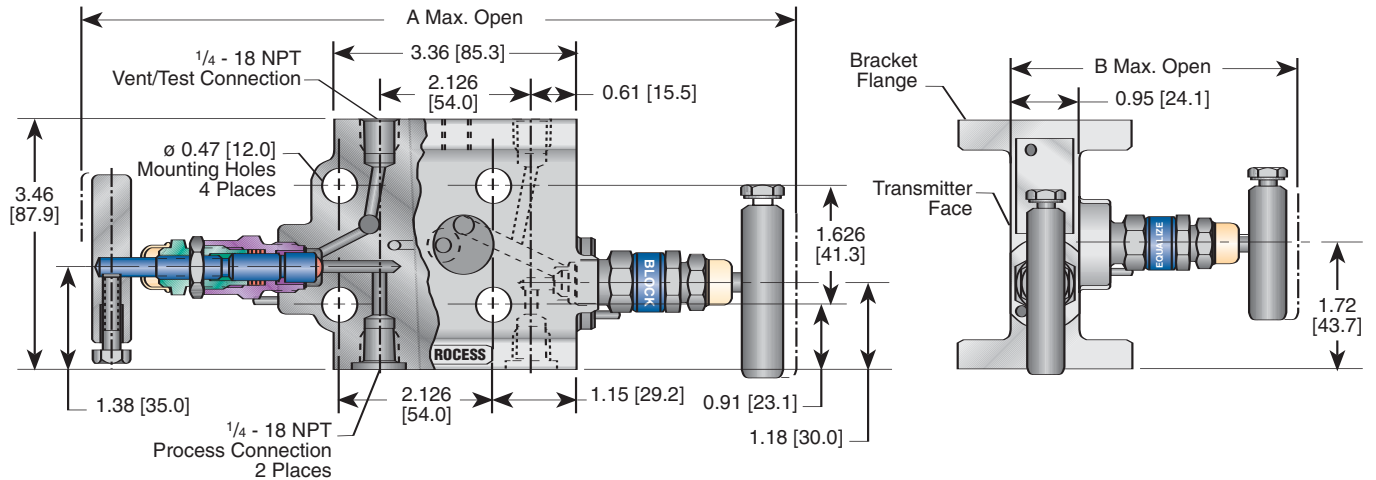
Pressure and Temperature Ratings

Valve	Packing	Ratings
SS	Teflon [®]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL [®] / Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ³	Teflon [®]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³	GRAFOIL [®] / Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ³⁴	Teflon [®]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³⁴	GRAFOIL [®] / Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]



Integral Manifolds – MT3 3-Valve Manifold with Test Ports

Dimensions, inches [mm]



Standard Materials²

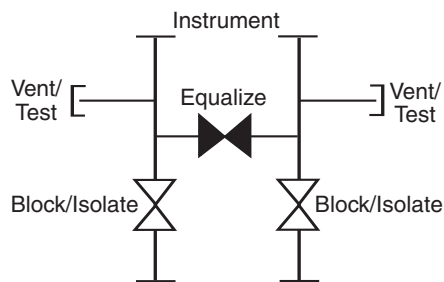
Valve	Body and Bonnet	Stem and Ball
SS	A351-CF8M SS 316	A276-316 316
SG ³	A351-CF8M SS 316	Monel [®] 400 Monel [®] K500
SG ³⁴	Hastelloy [®] C-276	Hastelloy [®] C-276 Elgiloy [®]

Dimensions, inches [mm]

Valve ¹	A	B
Teflon [®] Packed	9.72 [246.9]	4.04 [102.6]
GRAFOIL [®] / Low Emissions Graphite Packed	11.02 [279.9]	4.69 [119.1]

Notes

1. Approximate valve weight: 4.9 lb [2.22 kg].
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
2. Monel[®] and Hastelloy[®] are also available.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

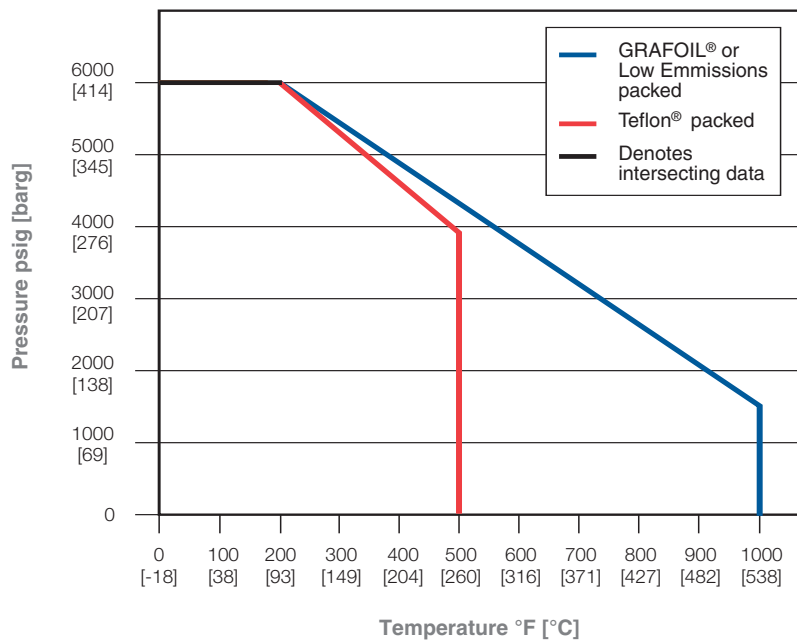


Pressure and Temperature Ratings

Valve	Body and Bonnet	Ratings
SS	Teflon [®]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL [®] / Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ³	Teflon [®]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³	GRAFOIL [®] / Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ³⁴	Teflon [®]	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ³⁴	GRAFOIL [®] / Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Integral Manifolds – MC and MT

Pressure vs. Temperature



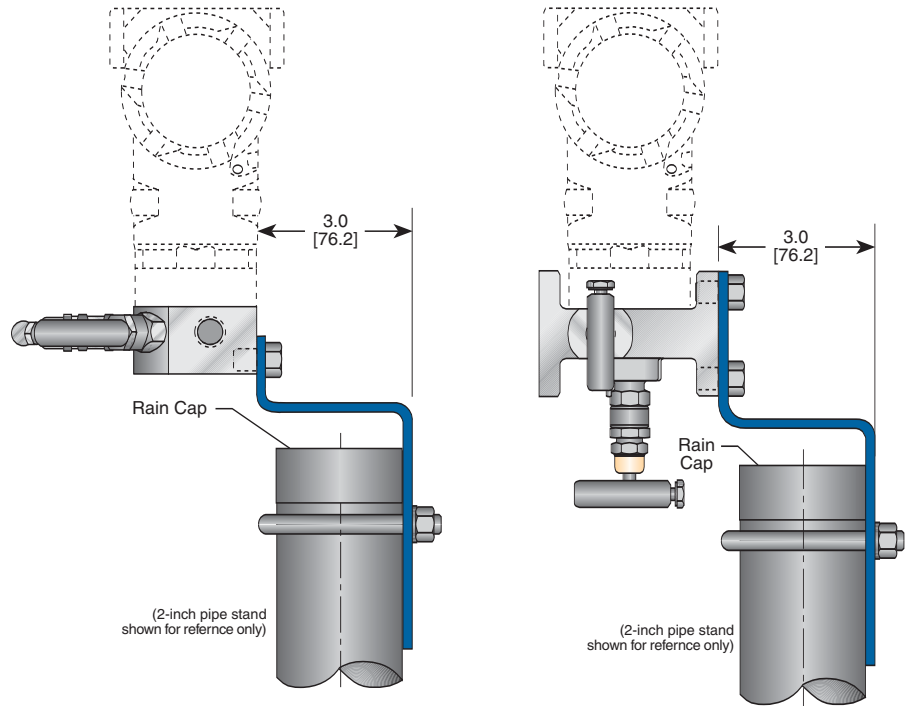
Integral Manifolds – MC and MT

MC/MT AGCO Mount Kits

Manifold Style	Kit Part No.	Material
MT	02.1639.971	CS ¹
MT	02.1639.972	SS
MC	06.1662.502	CS ¹
MC	06.1662.501	SS

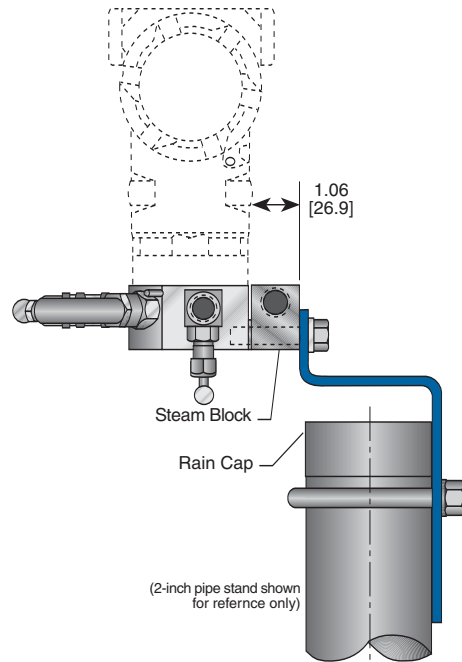
Note

1. Zinc cobalt plated.



MC Steam Block Option Kit

Manifold Style	Part No.	Material
MC	02.1639.901	SS



Integral Manifolds – MC (Rosemount® Coplanar™ only) Specifications

Ordering Information

	MC	3	V	I	S	-4	-PS ¹
Style	MC – Coplanar™						
Type		2 – 2-Valve (static pressure) 3 – 3-Valve (ΔP) 5G – 5-Valve (gas) (ΔP) 5P – 5-Valve (power) (ΔP)					
Packing			V – Teflon® H – GRAFOIL® (not available for MC5G) E – Low Emissions Graphite (not available for MC5G)				
Seat				I – Integral (body material)			
Material					S – 316 SS J – Hastelloy®		
End Connection						4 – 1/2-inch FNPT	
Options							

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 113)
- BK² – Optional Bolt and Gasket Kit - contact factory
- BL – Bonnet Lock Device (page 154) (standard on power plant manifolds)
- CB – Ceramic Ball Ended Stem
- CL – Cleaned for chlorine service
- H5 – H5VS-22 Vent Valve (2) (MC3 only)
- 1H5 – H5VS-22 Vent Valve (1) (MC2, MC3 only)
- HD – Hydrostatic testing (100 percent) (MSS SP-61)
- OC – Cleaned for oxygen service
- PS¹ – Required MC5G Static Test Ports only
- SB – Steam Block (MC only)
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005
- SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])
- ST – Stellite Ball Ended Stem
- SP – Special Requirements - please specify

Notes

1. Required on MC5G Static Test.
2. Bolts and gaskets are not included; contact factory if bolts or gaskets are required.

Integral Manifolds – MT (Rosemount® Coplanar™ only) Specifications

Ordering Information

	MT	3	V	I	S	- 2	- SG
Style							
	MT – Traditional (double flanged)						
Type							
	2 – 2-Valve (static pressure)						
	3 – 3-Valve (ΔP)						
Packing							
	V – Teflon®						
	H – GRAFOIL®						
	E – Low Emissions Graphite						
Seat							
	I – Integral (body material)						
Material							
	S – 316 SS						
	J – Hastelloy®						
End Connection							
	2 – 1/4-inch FNPT (use if futbol mounting to inlet)						
Options							
	AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves						
	AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 113)						
	BK ¹ – Optional Bolt and Gasket Kit - contact factory						
	BL – Bonnet Lock Device (page 154) (standard on power plant manifolds)						
	CB – Ceramic Ball Ended Stem						
	CL – Cleaned for chlorine service						
	HD – Hydrostatic testing (100 percent) (MSS SP-61)						
	OC – Cleaned for oxygen service						
	SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005						
	SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm])						
	ST – Stellite Ball Ended Stem						
	SP – Special Requirements - please specify						

Note

1. Bolts and gaskets are not included; contact factory if bolts or gaskets are required.

Integral Manifolds – MC and MT ASME B31.1 or B31.3 Specifications Meets MSS SP-105³

MC ASME B31.1 Ordering Information – Power Industry Applications¹

	MC	3HP	S	- 4	- XP	- SP
Style	MC – Coplanar™					
Type	2HP – 2-Valve (static pressure) 3HP – 3-Valve (ΔP) 5PHP – 5-Valve (power) (ΔP)					
Material	S – 316 SS					
End Connection	4 – 1/2-inch FNPT					
Options	AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 113) BK ⁴ – Optional Bolt and Gasket Kit - contact factory SP – Special Requirements - please specify					

Notes

1. All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
2. Manifold ratings:
SST
6000 psig @ 100°F [414 barg @ 38°C]
3030 psig @ 1000°F [209 barg @ 538°C]
3. See page 156 for Code Requirements.
4. Bolts and gaskets are not included; contact factory if bolts or gaskets are required.

MT ASME B31.1 Ordering Information – Power Industry Applications¹

	MT	3HP	S	- 2	- XP	- SP
Style	MT – Traditional (double flanged)					
Type	2HP – 2-Valve (static pressure) 3HP – 3-Valve (ΔP)					
Material	S – 316 SS					
End Connection	2 – 1/4-inch FNPT (use if futbol mounting to inlet)					
Options	AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 113) BK ⁴ – Optional Bolt and Gasket Kit - contact factory SP – Special Requirements - please specify					

Integral Manifolds – MB for Bottom Inlet, Low Profile Transmitters

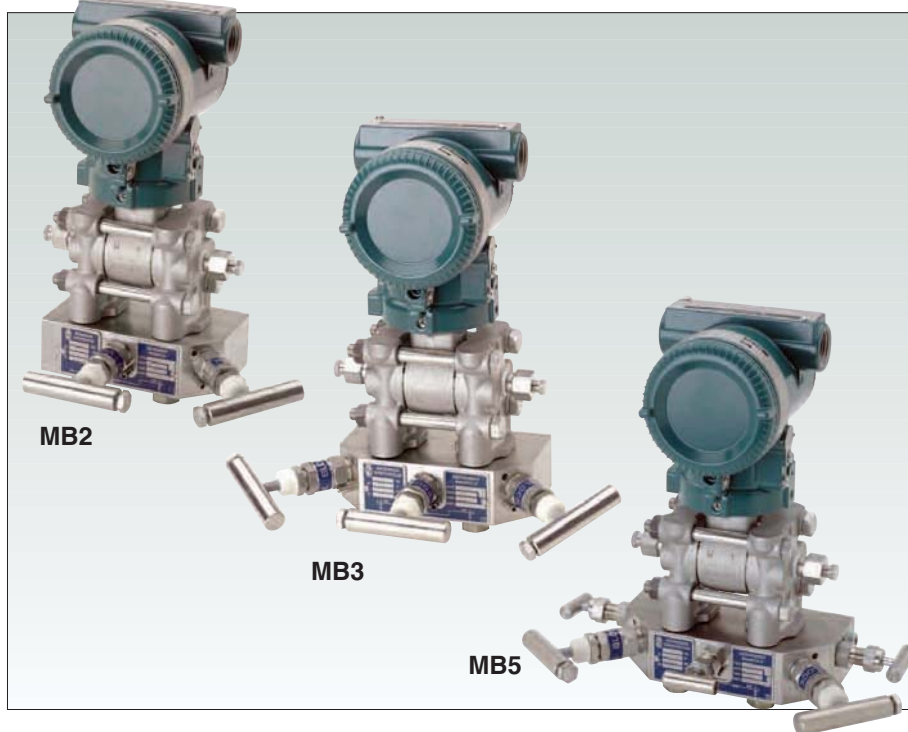
Product Overview

The MB integral manifold is uniquely connected to a low-profile transmitter with a flanged bottom inlet 2½-inches [54 mm] center-to-center connection.

The manifold/transmitter assembly has the advantage of small size, light weight and may be either 2-inch pipe stand or wall mounted. Plugged or valved vent/test ports are standard for field calibration checks.

This section has two parts:

1. Integral manifolds.
2. Integral manifolds for ASME B31.1 or B31.3 fossil fuel power plants.

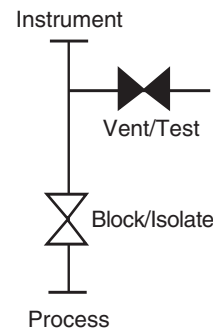
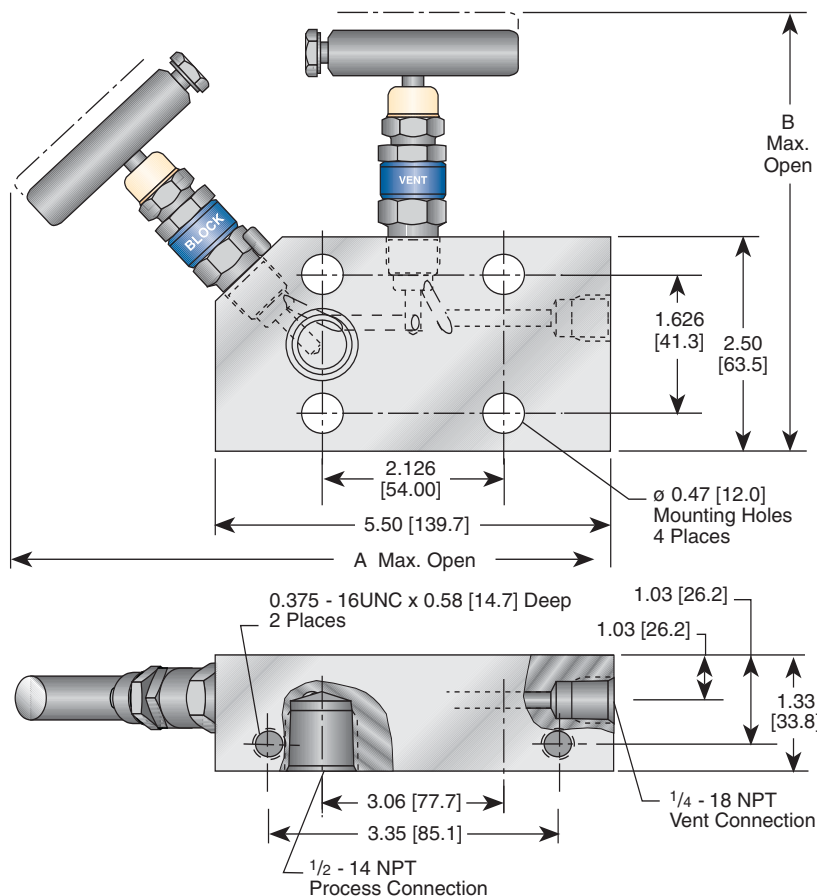


Bonnet Assembly Feature

- **Ball end stem** eliminates seat galling, provides bubble-tight shutoff and long life. The hardened, non-rotating ball ensures perfect alignment, closure after closure.
- **Packing below threads** prevents lubricant washout, thread corrosion, and keeps solids from entering the thread area which can cause galling. Also prevents process contamination.
- **Adjustable packing** adjusts easily; loosen jam nut, tighten bushing slightly, then retighten jam nut. Decreases packing replacement downtime and increases valve life.
- **Dust cover** prevents lubricant washout and keeps contaminants (dirt, rain, etc.) out of bonnet assembly.
- **Safety back seating** prevents stem blowout or accidental removal while in operation. Also provides a metal-to-metal secondary stem seal while in the full open position.
- **Chrome plating of 316 SS stem** prevents galling or freezing of thread when similar metals mate. Rolled threads provide additional thread strength. The stem, bonnet, and male NPT threads are rolled, not cut.
- **Mirror stem finish** burnished to a 16 RMS finish in the packing area. Enables smooth stem operation and extends packing life.
- **Body-Bonnet seal** is in constant compression, below the bonnet threads. This prevents thread corrosion, eliminates possible tensile breakage of bonnet and gives a reliable seal point.
- **Bonnet lock pin** is another safety feature, which prevents the accidental separation of the bonnet from the body. However, normal valve maintenance and repair are still easily accomplished.

Integral Manifolds – MB2 2-Valve Manifold for Static Pressure

Dimensions, inches [mm]



Dimensions, inches [mm]

Valve ¹	A	B
Teflon® Packed	6.85 [174.0]	5.10 [129.5]
GRAFOIL® and Low Emissions Graphite Packed	7.49 [190.2]	5.75 [146.1]

Notes

1. Approximate valve weight: 4.1 lb [1.9 kg].
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

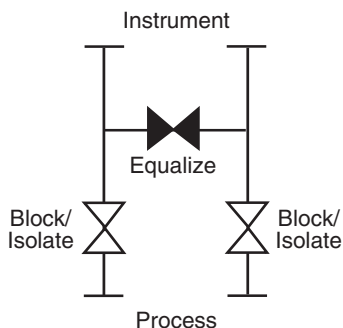
Pressure and Temperature Ratings

Valve	Packing	Ratings
SS	Teflon®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG ²	Teflon®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG ²	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]
SG3 ³	Teflon®	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SG3 ³	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Standard Materials

Valve	Body and Bonnet	Stem and Ball
SS	A479-316 316	A276-316 316
SG ²	A479-316 316	Monel® 400 Monel® K500
SG3 ³	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®

Integral Manifolds – MB3 3-Valve Manifold with Optional Externally Valved Test Ports



Dimensions, inches [mm]

Valve ¹	A	B
Teflon® Packed	10.95 [278.1]	5.10 [129.5]
GRAFOIL® and Low Emissions Graphite Packed	12.40 [315.0]	5.75 [146.1]

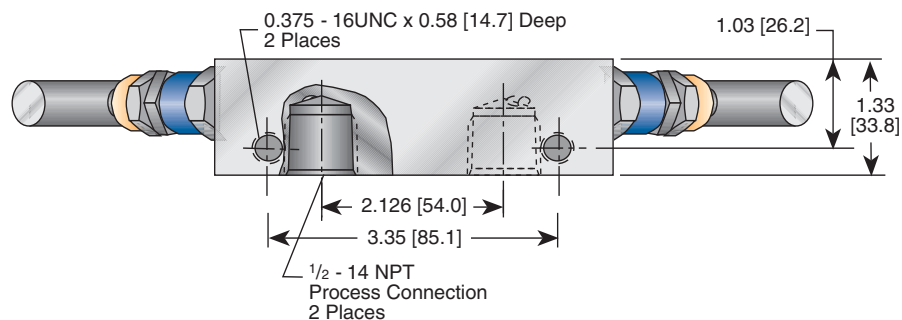
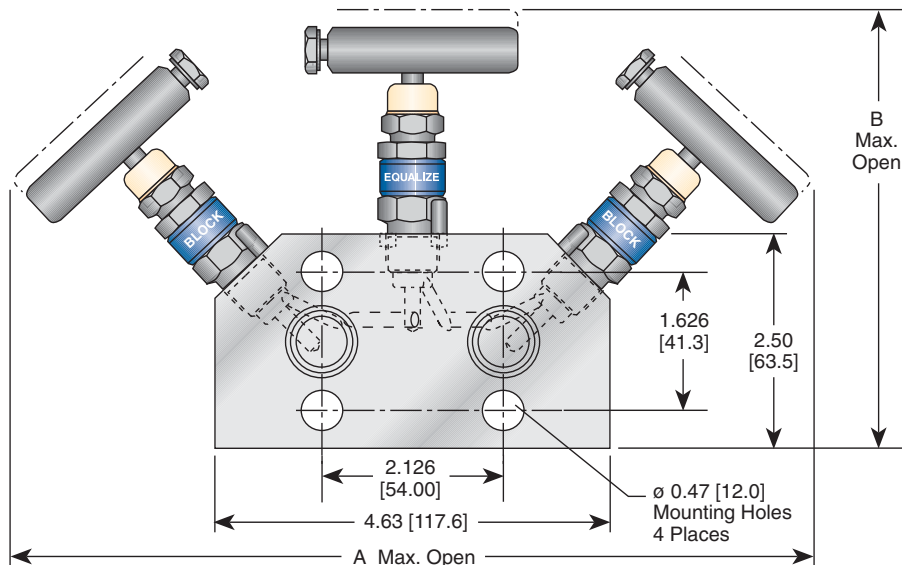
Notes

- Approximate valve weight:
5.0 lb [2.3 kg] for MC3VI []-2-H5,
4.4 lb [2.0 kg] for MC3VI []-2
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
- Optional test port valves are H5VDS-22, soft seat only.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Standard Materials

Valve ²	Body and Bonnet	Stem and Ball
SS	A479-316 316	A276-316 316
SG ³	A479-316 316	Monel® 400 Monel® K500
SG3 ⁴	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®

Dimensions, inches [mm]

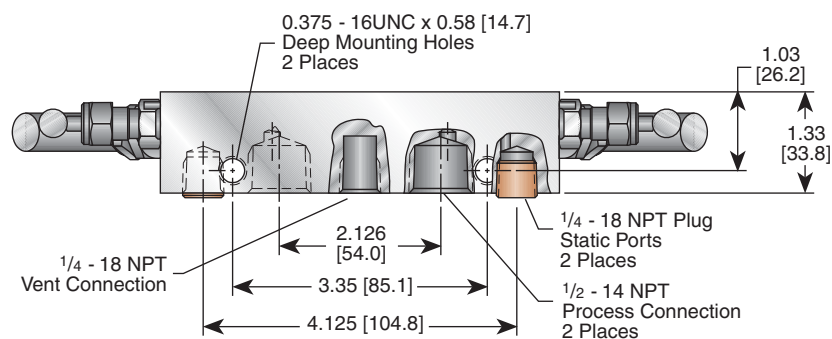
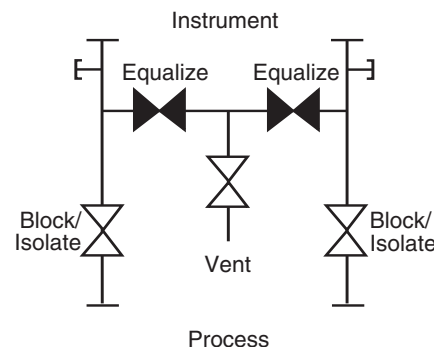
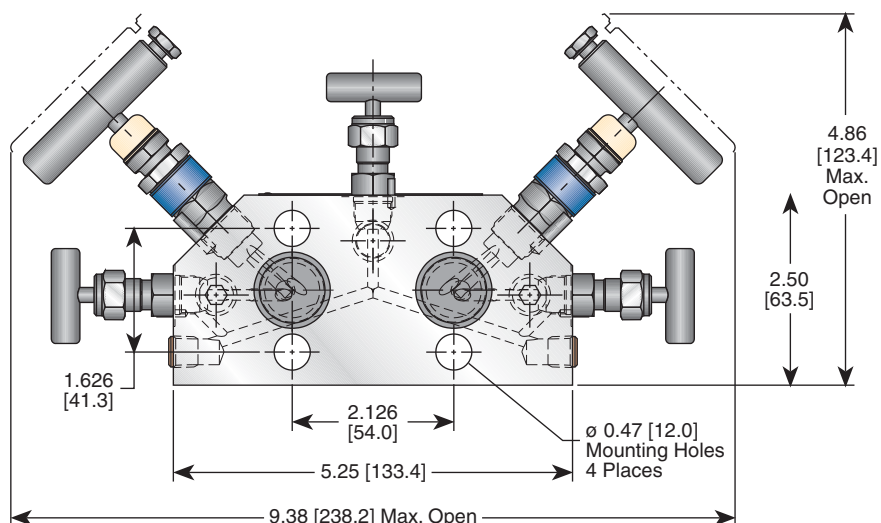


Pressure and Temperature Ratings

Valve	Packing	Ratings
SS	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]
		4000 psig @ 500°F [276 barg @ 260°C]
SS	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]
		1500 psig @ 1000°F [103 barg @ 538°C]
SG ³	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]
		4000 psig @ 500°F [276 barg @ 260°C]
SG ³	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]
		1500 psig @ 1000°F [103 barg @ 538°C]
SG3 ⁴	Teflon®	6000 psig @ 200°F [414 barg @ 93°C]
		4000 psig @ 500°F [276 barg @ 260°C]
SG3 ⁴	GRAFOIL®/ Low Emissions Graphite	6000 psig @ 200°F [414 barg @ 93°C]
		1500 psig @ 1000°F [103 barg @ 538°C]

Integral Manifolds – MB5G 5-Valve Manifold for Gas Service (Patent Protected)

Dimensions, inches [mm]



Standard Materials

Valve ¹	Body and Bonnet	Stem and Ball	Packing
SS	A479-316 316	A276-316 316	Teflon®
SG ²	A479-316 316/Monel®	Monel® 400 Monel® K500	Teflon®
SG3 ³	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®	Teflon®

Notes

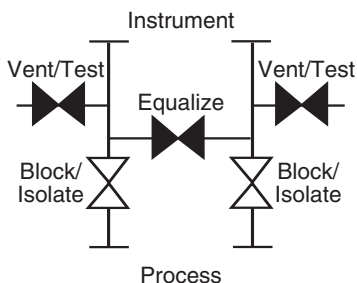
1. Approximate valve weight: 5.3 lb [2.4 kg].
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Pressure and Temperature Ratings

Valve	Ratings	
SS, SG ² , SG3 ³	6000 psig @ 200°F 4000 psig @ 500°F	[414 barg @ 93°C] [276 barg @ 260°C]

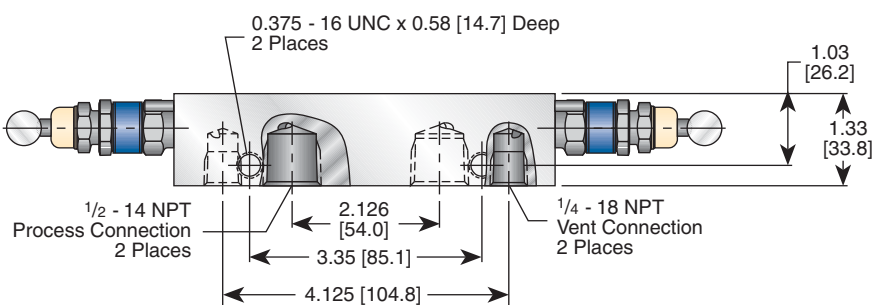
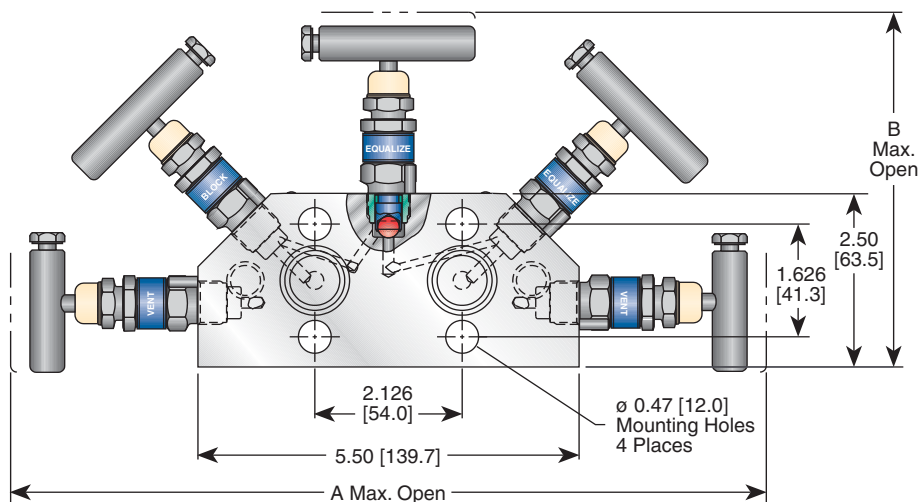
Integral Manifolds – MB5P 5-Valve Manifold with Two Integral Test Valves (Patent Protected)

Dimensions, inches [mm]



Dimensions, inches [mm]

Valve ¹	A	B
Teflon® Packed	10.95 [278.1]	5.10 [129.5]
GRAFOIL® or Low Emissions Graphite Packed	12.40 [315.0]	5.75 [146.1]



Notes

1. Approximate valve weight: 5.3 lb [2.4 kg].
0.156-inch [4.0 mm] diameter orifice.
Valve C_v 0.36 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).
4. Valve Bonnet labels not supplied on GRAFOIL® packed bonnets due to temperature limitations.

Standard Materials

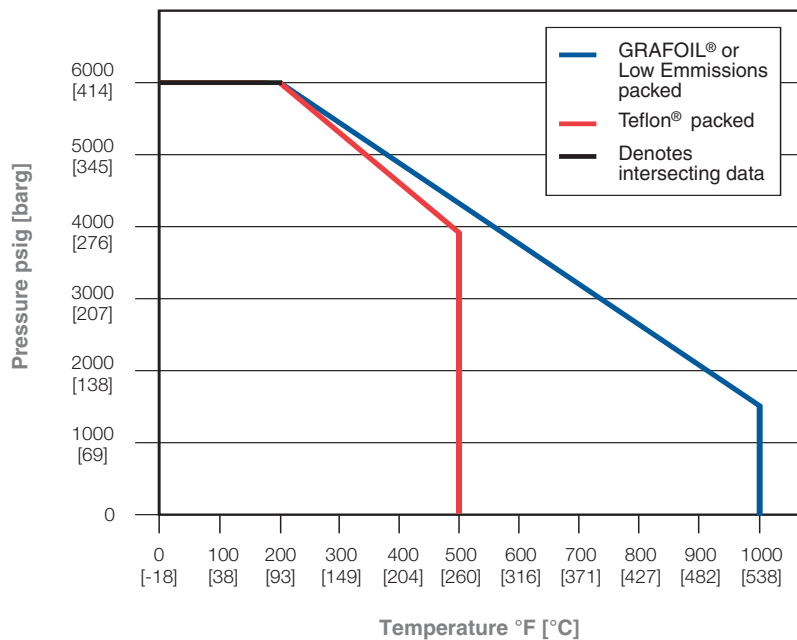
Valve	Body and Bonnet	Stem and Ball	Packing
SS	A479-316 316	A276-316 316	Teflon®
SG ²	A479-316 316/Monel®	Monel® 400 Monel® K500	Teflon®
SG3 ³	Hastelloy® C-276	Hastelloy® C-276 Elgiloy®	Teflon®

Ratings

Valve	Ratings
SS, SG ² , SG3 ³	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]

Integral Manifolds – MB Specifications

Pressure vs. Temperature

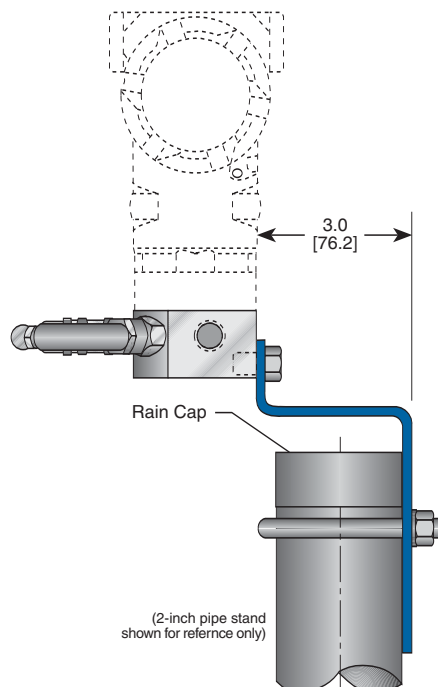


MC/MT AGCO Mount Kits

Manifold Style	Kit Part No.	Material
MB	06.1662.502	CS ¹
MB	06.1662.501	SS

Note

1. Zinc cobalt plated.



Integral Manifolds – MB Specifications

Notes

1. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.
2. Bolts and gaskets are not included; contact factory if bolts or gaskets are required.

Ordering Information

	MB	3	V	I	S	- 4	- AM
Style							
MB							
Type							
2 – 2-Valve (static pressure)							
3 – 3-Valve (ΔP)							
5G – 5-Valve (gas) (ΔP)							
5P – 5-Valve (power) (ΔP)							
Packing							
V – Teflon®							
H – GRAFOIL® (not available for MC5G)							
E – Low Emissions Graphite (not available for MC5G)							
Seat							
I – Integral (body material)							
Material							
S – 316 SS							
J – Hastelloy®							
End Connection							
4 – 1/2-inch FNPT							
Options							
AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves							
AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 122)							
BK ² – Optional Bolt and Gasket Kit - contact factory							
BL – Bonnet Lock Device (page 154) (standard on power plant manifolds)							
CB – Ceramic Ball Ended Stem							
CL – Cleaned for chlorine service							
H5 – H5VS-22 Vent Valve (2) (MB3 only)							
1H5 – H5VS-22 Vent Valve (1) (MB2, MB3 only)							
HD – Hydrostatic testing (100 percent) (MSS SP-61)							
OC – Cleaned for oxygen service							
SSA ⁷ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg]							
SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating							
SSC ⁷ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg]							
SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions \leq 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)							
SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions $>$ 50 mg/l [ppm])							
SP – Special Requirements - please specify							

Integral Manifolds – MB ASME B31.1 or B31.3 Specifications Meets MSS SP-105²

MC ASME B31.1 Ordering Information – Power Industry Applications¹

	MB	3HP	S	- 4	- XP	- SP
Style	MB					
Type	2HP – 2-Valve (static pressure) 3HP – 3-Valve (ΔP) 5PHP – 5-Valve (power) (ΔP)					
Material	S – 316 SS					
End Connection	4 – 1/2-inch FNPT					
Options	AM – AGCO Mount Kit for 2-inch pipe stand mounting of manifold (page 122) BK – Optional Bolt and Gasket Kit - contact factory SP – Special Requirements - please specify					

Notes

1. All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
2. See page 156 for Code Requirements.

IntelliMount Systems – IMSA and IMST

Product Overview

The IntelliMount™ System provides distinct advantages by providing the simplest and most effective means to install, calibrate and service your Coplanar™ style transmitters. Just what you've come to expect from the leader in process instrument manifold technology.

All the Anderson Greenwood IntelliMount™ System manifolds are designed and thoroughly tested to be compatible with the Rosemount® Coplanar™ style pressure transmitters including the Model 3051C, Model 3051P, Model 2024 and the Model 3095 Multivariable™ transmitters.

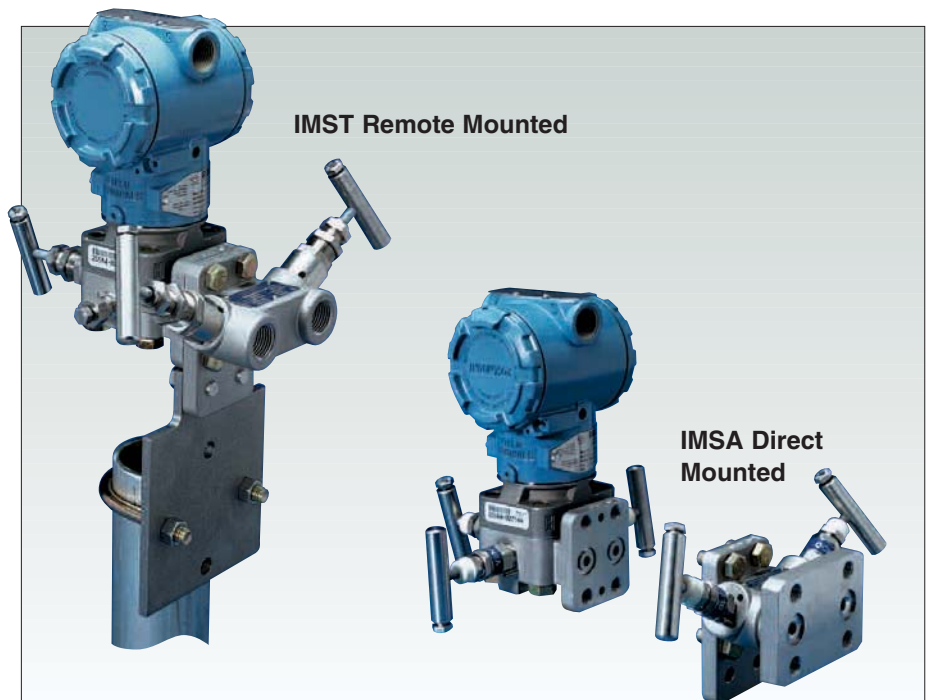
The design of the Coplanar™ style transmitters (process isolation diaphragms are on the same plane) has allowed Anderson Greenwood to develop a unique series of process instrument manifolds. The two-piece construction of the IntelliMount™ System has been designed to allow the block-valve module to remain connected to the orifice while the instrument module and transmitter assembly can be easily and safely removed for shop calibration or maintenance.

Two Models Available

- **Direct Mounted (Flange x Flange):**
Designed primarily for horizontal installations, the IntelliMount™ System provides true direct coupling to the primary element in the smallest possible space.
- **Remote Mounted (Pipe x Flange):**
Used in more traditional applications on gas, vapor or liquid service, the remote mounted IntelliMount™ System is designed for ease of installation and use.

Features and Benefits

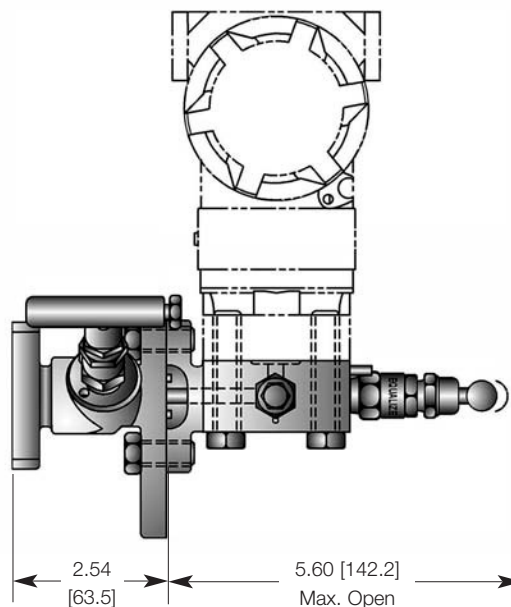
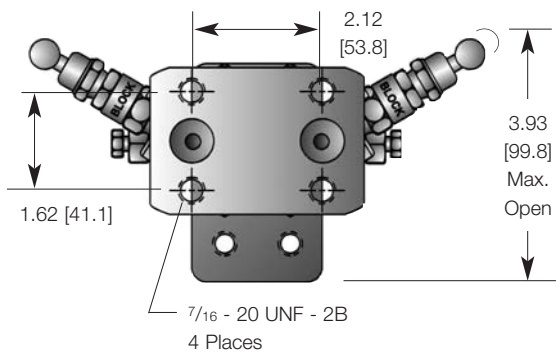
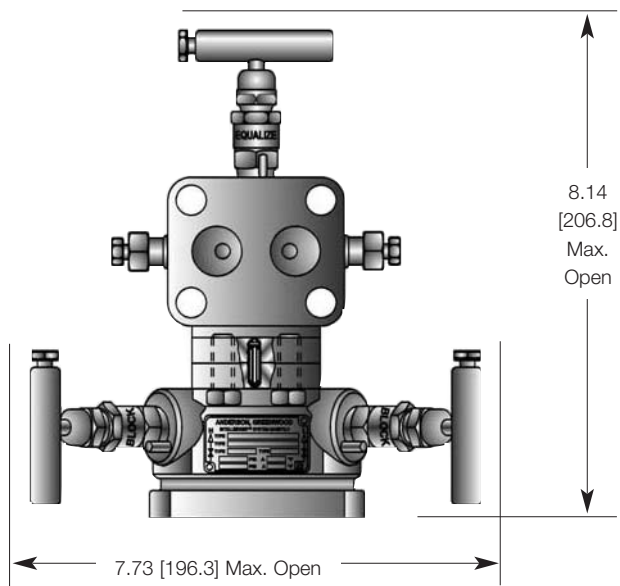
- **Two-Piece modular assembly** consisting of a block-valve module (containing two isolation valves) and the instrument module (containing the equalize and vent valves), which can be easily disassembled and reassembled in the field. The interface between the block valve and instrument modules is a gasket-sealed connection that can be readily remade and has been proof tested to beyond 25,000 psig [1724 barg].



- **Directly mounts** to the Coplanar™ style transmitter, eliminating the need for the Coplanar™ or traditional flange adapters that allow connection of Coplanar™ style transmitters to conventional manifolds.
- **Modular construction** allows field installation of the block-valve module independent of the instrument module and transmitter. The block-valve module remains in place during instrument calibration and potentially eliminates the need for separate isolation valves.
- **Maximum accuracy** potential is available by positioning the transmitter isolation diaphragms within 1/2-inch [13 mm] of the axis of the process taps. The instrument module has also been designed with large bore passages to promote accuracy and improve response time.
- **Modular design** allows the instrument module and transmitter to be easily removed in the field while the block valve module remains in place, facilitating both field service and shop calibration of the transmitter.
- **Designed to be smaller and more compact** than conventional manifolds for ease of installation, calibration, maintenance and accessibility for operation in cabinet systems.
- **Rated to 6000 psig [414 barg]** to meet the most demanding pressure applications.
- **Process connections** are available with 1/2-inch FNPT as standard or with an instrument flange connection for mounting with close-couple or stabilized futbols.
- **Transmitter venting** is accomplished by the use of standard vent plugs or with 1/4-inch NPT controlled vent outlets to allow capture of environmentally sensitive process fluids.

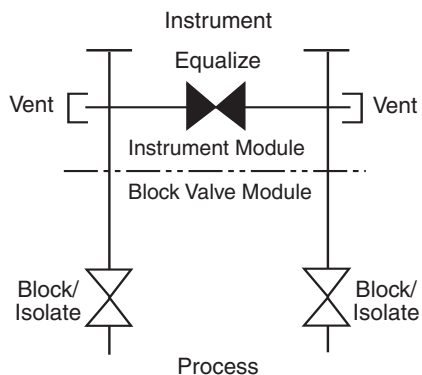
IntelliMount Systems – IMSA and IMST Specifications

IMSA Direct Mounted¹ – Dimensions, inches [mm]



Note

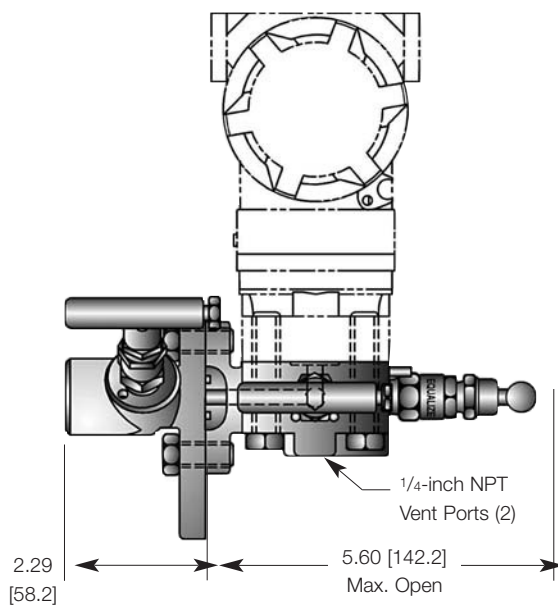
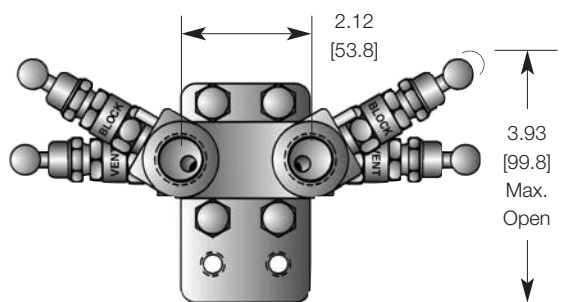
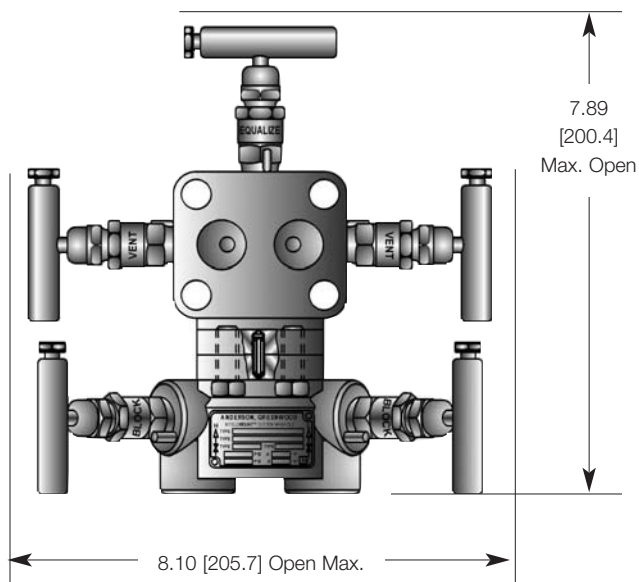
1. Three-valve dimensions and schematic shown. Two- and five-valve versions are available.



3-Valve Manifold

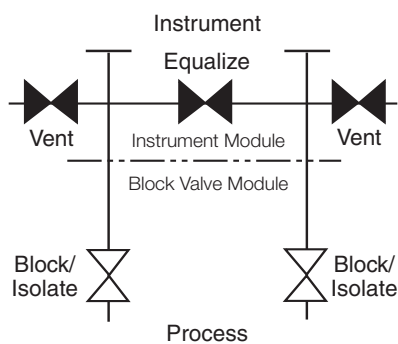
IntelliMount Systems – IMSA and IMST Specifications

IMST Remote Mounted – Dimensions, inches [mm]

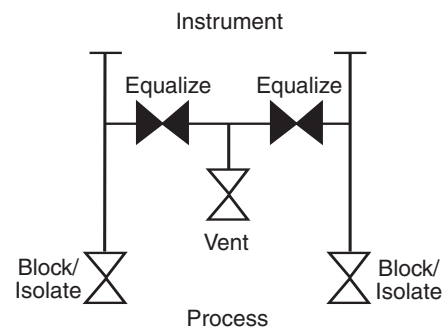


Note

1. Five-valve dimensions and schematic shown. Two- and three-valve versions are available.



5-Valve (Power/Vent) Manifold



5-Valve (Gas) Manifold

IntelliMount Systems – IMSA and IMST Specifications

Valve ¹	Seat	Packing	Body	Bonnet	Stem	Ball
SS	Soft	Teflon®	A351-CF8M	316	A276-316	N/A
SG ²	Soft	Teflon®	A351-CF8M	316	Monel® 400	N/A
SS	Integral ³	Teflon®	A351-CF8M	316	A276-316	316
SG ²	Integral ³	Teflon®	A351-CF8M	316	Monel® 400	Monel® 500
SS	Integral ³	GRAFOIL®/Low Emissions Graphite	A351-CF8M	316	A276-316	316
SG ²	Integral ³	GRAFOIL®/Low Emissions Graphite	A351-CF8M	316	Monel® 400	Monel® 500

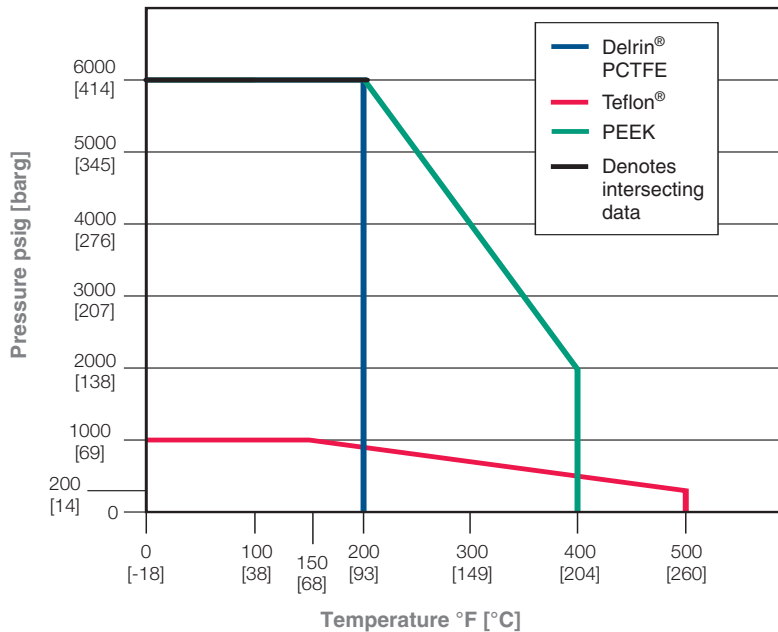
Valve	Packing	Seat	Ratings
SS, SG ²	Teflon®	Delrin®/PCTFE	6000 psig @ 200°F [414 barg @ 93°C]
SS, SG ²	Teflon®	PEEK	6000 psig @ 200°F [414 barg @ 93°C] 2000 psig @ 400°F [138 barg @ 204°C]
SS, SG ²	Teflon®	Teflon®	1000 psig @ 150°F [69 barg @ 66°C] 200 psig @ 500°F [14 barg @ 260°C]
SS, SG ²	Teflon®	Integral ³	6000 psig @ 200°F [414 barg @ 93°C] 4000 psig @ 500°F [276 barg @ 260°C]
SS, SG ²	GRAFOIL®/Low Emissions Graphite	Integral ³	6000 psig @ 200°F [414 barg @ 200°C] 1500 psig @ 1000°F [103 barg @ 538°C]

Notes

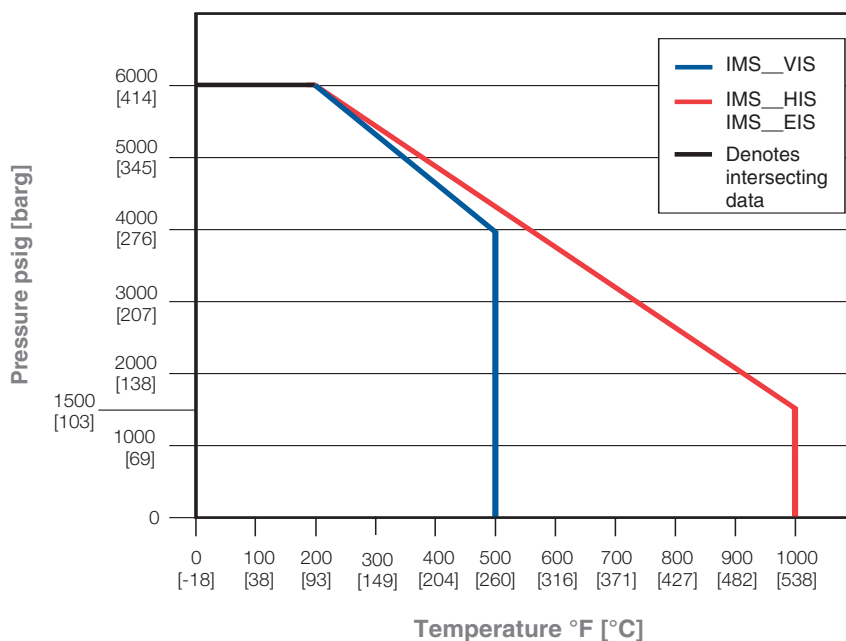
- Approximate valve weights:
2 valve - 6.8 lb [3.1 kg].
3 valve - 7.2 lb [3.3 kg].
5 valve - 8.2 lb [3.7 kg].
Metal Seat:
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum.
Soft Seat:
0.187-inch [4.8 mm] diameter orifice.
Valve C_v 0.83 maximum.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- Body Material.

IntelliMount Systems – IMSA and IMST Specifications

Pressure and Temperature Ratings – Soft Seat



Pressure and Temperature Ratings – Metal Seat



IntelliMount Systems – IMSA and IMST Specifications

Ordering Information

IMST 3 V I S - 4 - SG

Style

- IMSA – Direct Mount
(Flange x Flange)
- IMST – Remote Mount
(Pipe x Flange)

Type

- 2 – 2-Valve
- 3 – 3-Valve
- 5G – 5-Valve (Gas)
- 5P – 5-Valve (Power)

Packing

- V – Teflon®
- H – GRAFOIL®
- E – Low Emissions Graphite

Seat

- I – Integral
- V – Teflon®
- D – Delrin®
- E – PEEK

Material

- S – A351-CF8M

End Connection (IMST only)

- 4 – 1/2-inch FNPT x Flange

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- BL – Bonnet Lock Device (page 154)
- CL – Cleaned for chlorine service
- HD – Hydrostatic testing (100 percent) (MSS SP-61)
- OC – Cleaned for oxygen service
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005
- SP – Special Requirements - please specify

IntelliMount Systems – IMSA and IMST ASME B31.1 or ASME B31.3 Specifications Meets MSS SP-105³

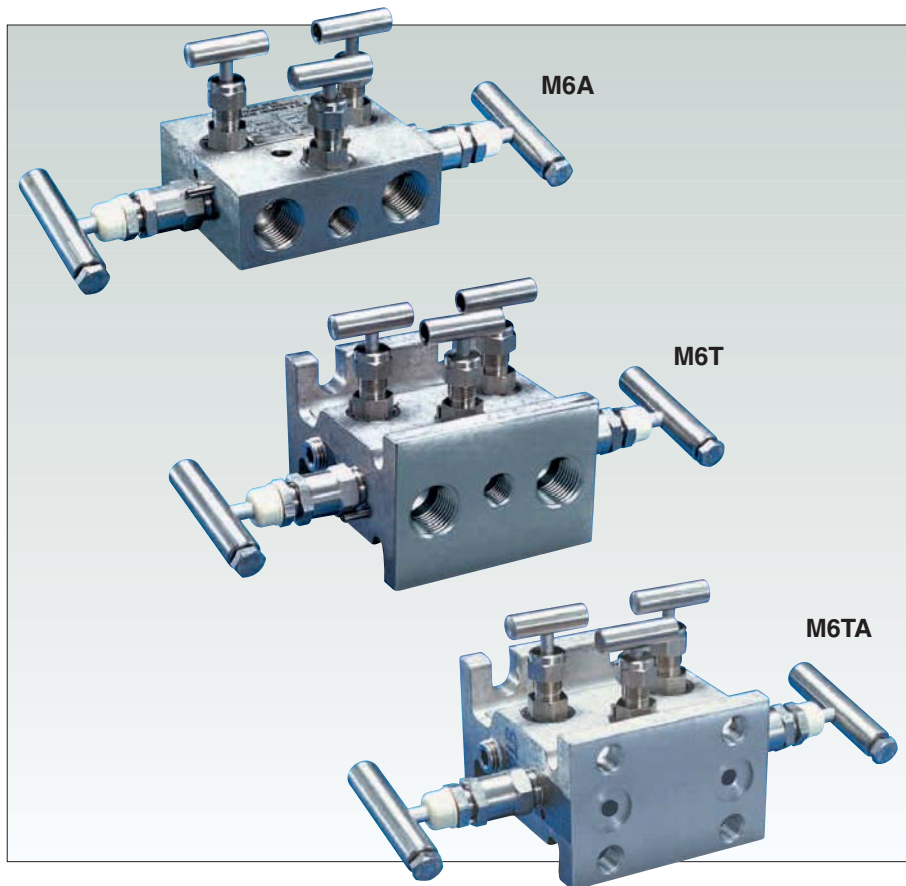
Ordering Information – Power Industry Applications¹

	IMST	3HP	S	-4	-XP	-SP
Style	IMSA – Direct Mount (Flange x Flange) IMST – Remote Mount (Pipe x Flange)					
Type	2HP – 2-Valve 3HP – 3-Valve 5PHP – 5-Valve (Power)					
Material	S – A351-CF8M					
End Connection (IMST only)	4 – 1/2-inch FNPT x Flange					
Option	SP – Special Requirements - please specify					

Notes

- All Manifolds come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
- Manifold ratings:
 SST
 6000 psig @ 100°F [414 barg @ 38°C]
 3030 psig @ 1000°F [209 barg @ 538°C]
- See page 156 for Code Requirements.

Natural Gas Manifolds – M6A, M6T, M6TA 5-Valve Manifolds



Product Overview

The M6A Five-Valve Manifold for natural gas applications was first designed and manufactured in 1960. It soon took over as the standard for recording orifice meters. Today, it is still widely used. The M6A is usually supported in the vertical meter tubing from the orifice flange union. Static pressure and calibration test connections are standard. The unit is available with integral tube fittings, if desired.

Differential pressure transmitter accuracy and stability have improved, resulting in their broader use for natural gas measurement in production and transmission applications.

To meet the requirements for differential pressure transmitter applications, the M6T (pipe x flange) and M6TA (flange x flange) were designed to provide the family of M6A, M6T, M6TA for various field applications.

Recent natural gas measurement field research has shown that better accuracy results when the transmitter is installed directly on the orifice flanges or orifice fitting. Anderson Greenwood has designed a family of manifolds and installation configurations to meet the more accurate installations and users' requirements.

For direct mount applications, please consult factory.

Features and Benefits

M6A

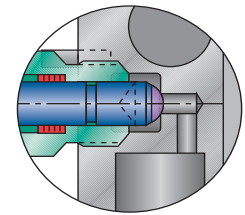
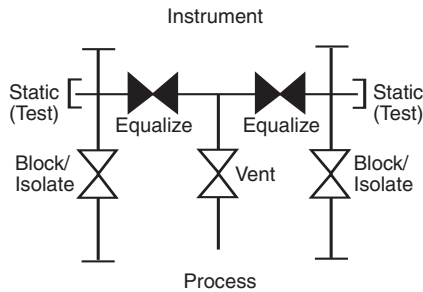
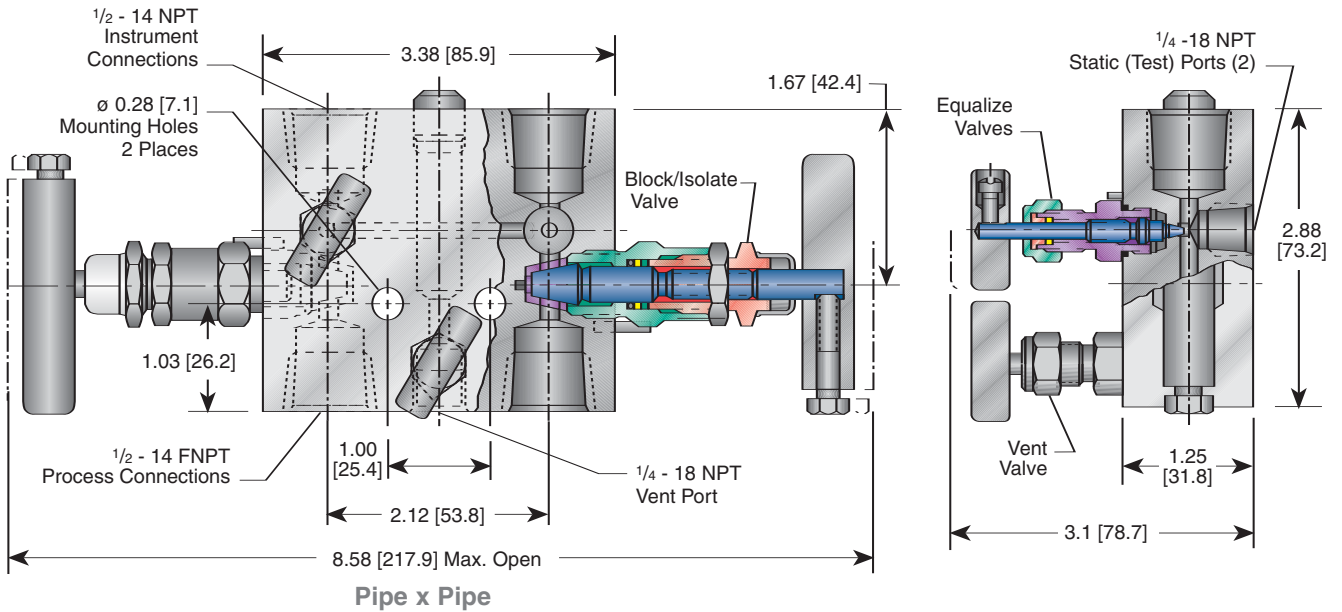
- **Easy Installation.** The lightweight M6A is easily installed in meter tubing. No additional support is generally required.
- **Upstream or downstream 1/4-inch FNPT ports** are standard for connecting the static pressure to the meter.
- **Available with soft or hard seats.** Soft seats are easily replaced in the field in the event of damage from hydrated or sand. Soft seats are tolerant to much abuse from sand, grit, etc. remaining bubble-tight.
- **Bonnet-to-body and stem threads** are isolated from process corrosion – important in sour gas applications.
- **Stem backout prevention** eliminates accidental removal while under pressure.
- **Stem packing** is standard Viton® O-ring with TFE back-up ring with long life assured by mirror finish on stem in the packing area.
- **Integral hard back seat** forms a secondary seal for the stem threads when valve is fully opened.
- **Stem threads** are rolled (not cut) to increase strength and longer life.
- **Either single or double ferrule tube fittings** are available integral to the body. This reduces potential leak points.

M6T and M6TA

- **Same features and benefits as the M6A** plus the following:
- **May be pipe stand mounted** using the appropriate AGCO Mount Kit. This allows the manifold to be mounted prior to receipt of transmitter. Makes it easier and quicker to remove the transmitter for servicing since it is attached only to the manifold and power source.

Natural Gas Manifolds – M6A Specifications

M6A Soft Seat (Metal Seat available) Dimensions, inches [mm]



Metal Seat

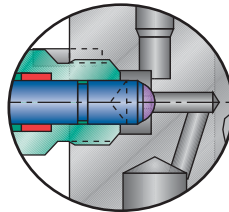
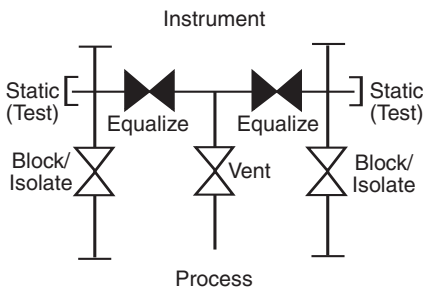
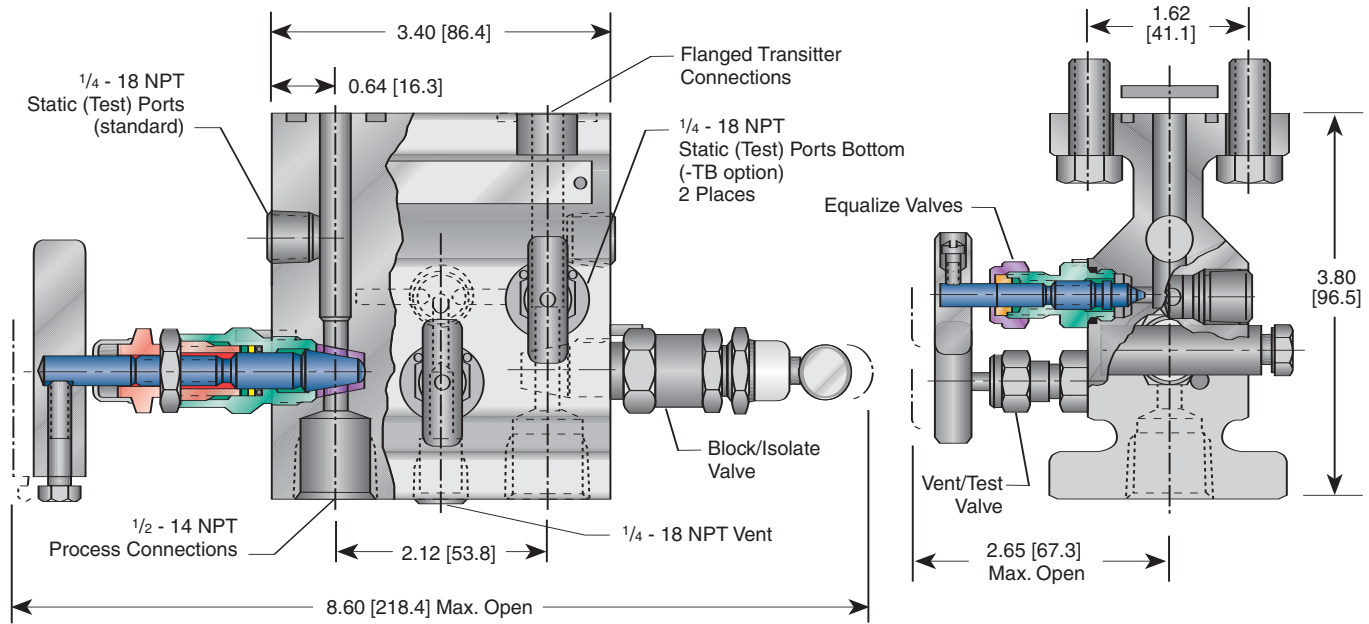
Note

- Approximate valve weight: 4.0 lb [1.8 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.

Natural Gas Manifolds – M6T Specifications

M6T Soft Seat (Metal Seat available) Dimensions, inches [mm]



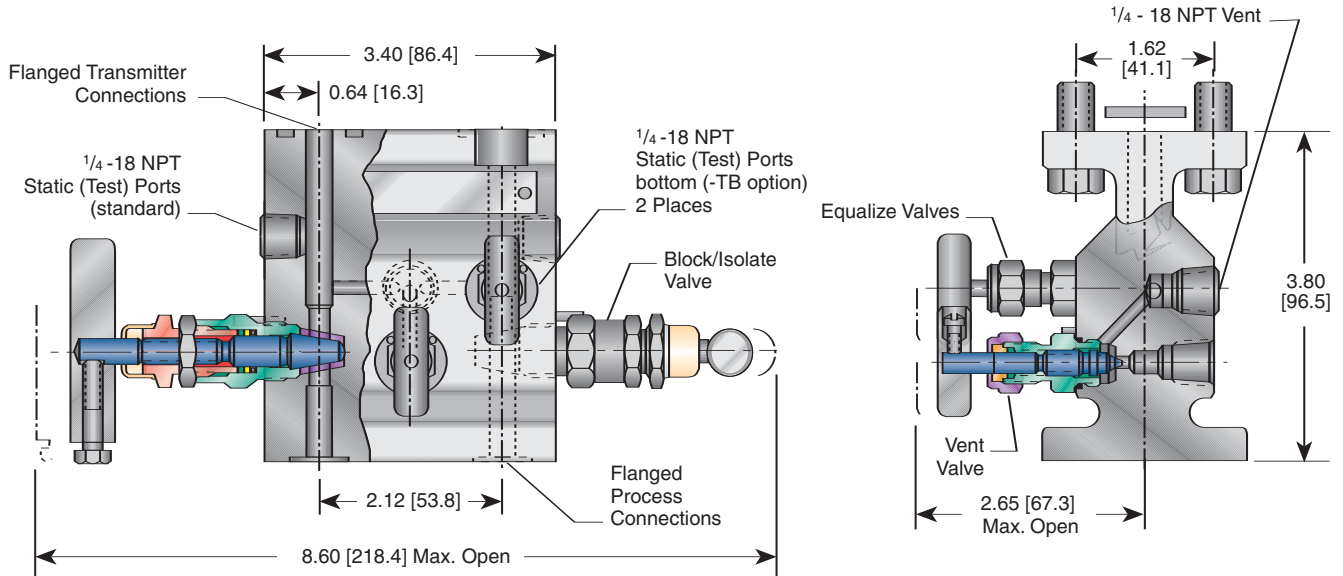
M6T and M6TA Metal Seat

Notes

- M6T Installation Kit consists of 4 bolts $7/16$ -inch -20 x 1-inch A193-B7, 4 washers, and 2 Teflon® gaskets.
- Approximate valve weight: 6.0 lb [2.7 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.

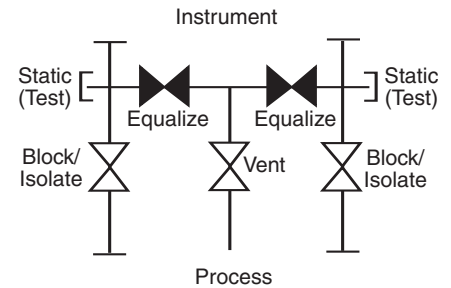
Natural Gas Manifolds – M6TA Specifications

M6TA Soft Seat (Metal Seat available) Dimensions, inches [mm]



Notes

- Approximate valve weight: 6.0 lb [2.7 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.
- M6TA Installation Kit consists of 4 bolts $7/16$ -inch -20 x 1-inch A193-B7, 4 washers, and 2 Teflon® gaskets.
- The M6TA high pressure extrusion has flanged (integral) instrument and process connections.



Natural Gas Manifolds – M6A, M6T, M6TA Specifications

Standard Materials

Valve	Seat	Body	Bonnet	Stem	Ball	Flow Washer
CS ¹	Soft	A105 ²	A108	A581-303	N/A	316
CS ¹	Integral	A105 ²	A108	A581-303	17-4PH	N/A
SS	Soft	A479-316	A479-316	A276-316	N/A	316
SS	Integral	A479-316	A479-316	A276-316	316	N/A
SG ⁶	Soft	A479-316	A479-316	Monel [®] 400	N/A	316
SG ⁶	Integral	A479-316	A479-316	Monel [®] 400	Monel [®] K500	N/A
SG3 ⁷	Hastelloy [®] C-276	Hastelloy [®] C-276	Hastelloy [®] C-276	Hastelloy [®] C-276	Elgiloy [®]	Hastelloy [®]

Pressure and Temperature Ratings

Valve	Packing	Seat Material	Standard Bolting		SS Bolting
CS ¹ , SS, SG ⁶ , SG3 ⁷ , Monel [®]	Teflon [®] O-ring	Delrin [®] PCTFE ³	3000 psig @ 200°F	[207 barg @ 93°C]	3000 psig @ 200°F [207 barg @ 93°C]
CS ¹ , SS, SG ⁶ , SG3 ⁷	Teflon [®] O-ring	PEEK	6000 psig @ 200°F 3000 psig @ 300°F	[414 barg @ 93°C] [207 barg @ 149°C]	4500 psig @ 100°F [310 barg @ 38°C] 3000 psig @ 300°F [207 barg @ 149°C]
Monel [®]	Teflon [®] O-ring	PEEK	5300 psig @ 200°F ⁴ 3000 psig @ 300°F	[365 barg @ 93°C] [207 barg @ 149°C]	4500 psig @ 100°F [310 barg @ 38°C] 3000 psig @ 300°F [207 barg @ 149°C]
CS ¹ , SS, SG ⁶ , SG3 ⁷ , Monel [®]	Teflon [®]	Teflon ^{®5}	1000 psig @ 150°F 200 psig @ 500°F	[69 barg @ 66°C] [14 barg @ 260°C]	1000 psig @ 150°F [69 barg @ 66°C] 200 psig @ 500°F [14 barg @ 260°C]
CS ¹ , SS, SG ⁶ , SG3 ⁷	Teflon [®] GRAFOIL [®] / Low Emissions Graphite	Body Material	6000 psig @ 200°F	[414 barg @ 93°C]	4500 psig @ 100°F [310 barg @ 38°C]
			4000 psig @ 500°F	[276 barg @ 260°C]	3000 psig @ 500°F [207 barg @ 260°C]
			5300 psig @ 200°F ⁴	[365 barg @ 93°C]	4500 psig @ 100°F [310 barg @ 38°C]
Monel [®]	Teflon [®] GRAFOIL [®] / Low Emissions Graphite	Body Material	5300 psig @ 200°F ⁴	[365 barg @ 93°C]	4500 psig @ 100°F [310 barg @ 38°C]
			4000 psig @ 500°F	[276 barg @ 260°C]	3000 psig @ 500°F [207 barg @ 260°C]

Notes

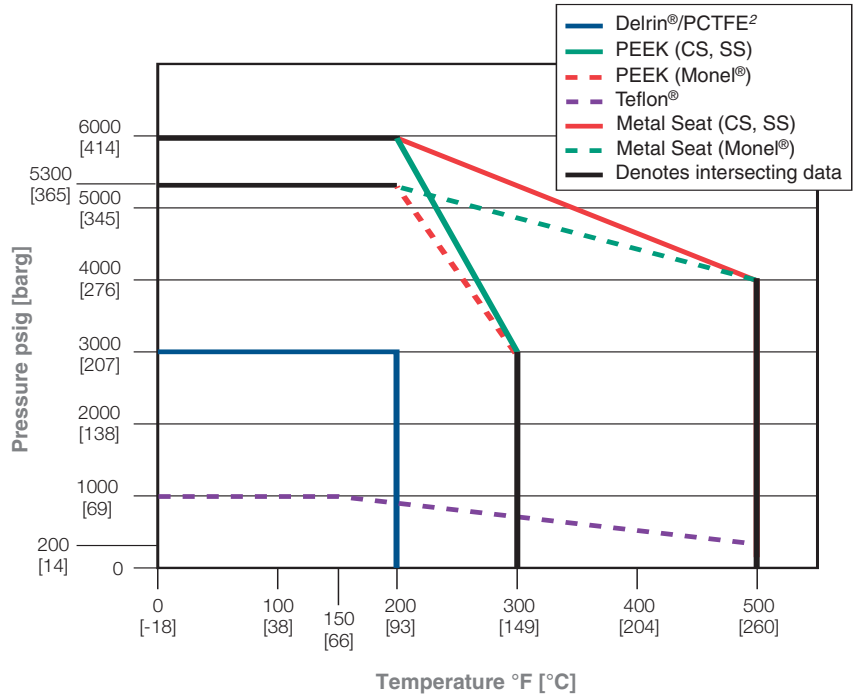
- CS parts are zinc cobalt plated to prevent corrosion.
- M6A body material is A108.
- PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F[®].
- M6A Monel[®] ratings are:
6000 psig @ 200°F [414 barg @ 93°C]
4000 psig @ 500°F [276 barg @ 260°C].
- Block valves only.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Natural Gas Manifolds – M6A, M6T, M6TA Specifications

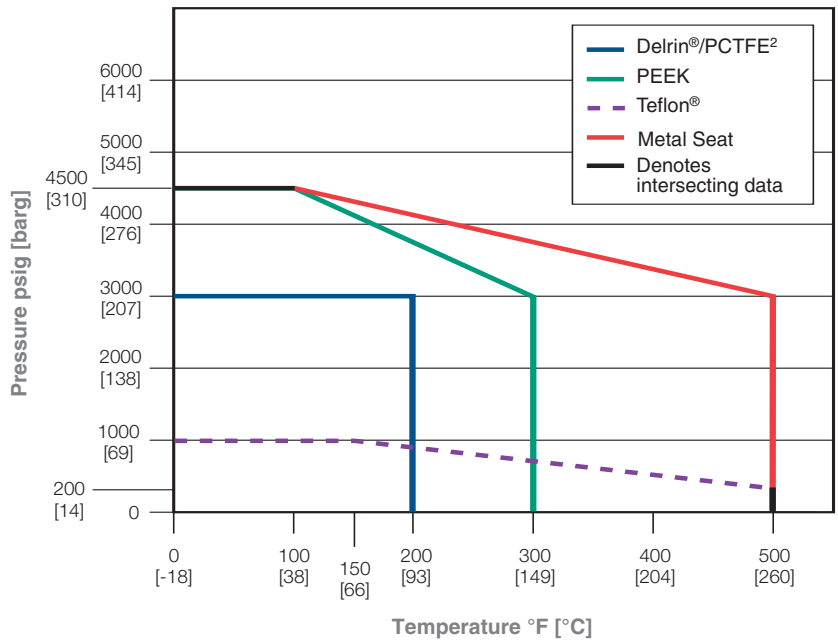
Notes

1. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
2. M6A Monel® ratings are:
6000 psig @ 200°F [414 barg @ 93°C]
4000 psig @ 500°F [276 barg @ 260°C].

Pressure vs. Temperature – Standard Bolting



Pressure vs. Temperature – SS Bolting



Natural Gas Manifolds – M6A, M6T, M6TA Specifications

Ordering Information¹

M6A V D S -4 -SG

Valve Type

3/16-inch [4.8 mm] orifice

- M6A – Pipe x Pipe
- M6T – Pipe x Flange
- M6TA – Flange x Flange

Packing

- V – Teflon® H – GRAFOIL®
- R – O-ring E – Low Emissions Graphite

Seat

- | | |
|---------------------------------|------------------------------|
| Soft: | Hard: |
| V – Teflon® (Block Valves only) | I – Integral (body material) |
| D – Delrin® | |
| E – PEEK | |
| K – PCTFE | |

Body Material

- C – CS, A105² M – Monel®
- S – SS, A479-316

Process Connections

- 4³ – 1/2-inch FNPT
- AT⁴ – Integral Single Ferrule tube fittings ATD⁴ – Integral Double Ferrule tube fittings
- 4AT 1/2-inch, – 4ATD 1/2-inch,
- 316 SS Ferrule and Nut 316 SS Ferrule and Nut

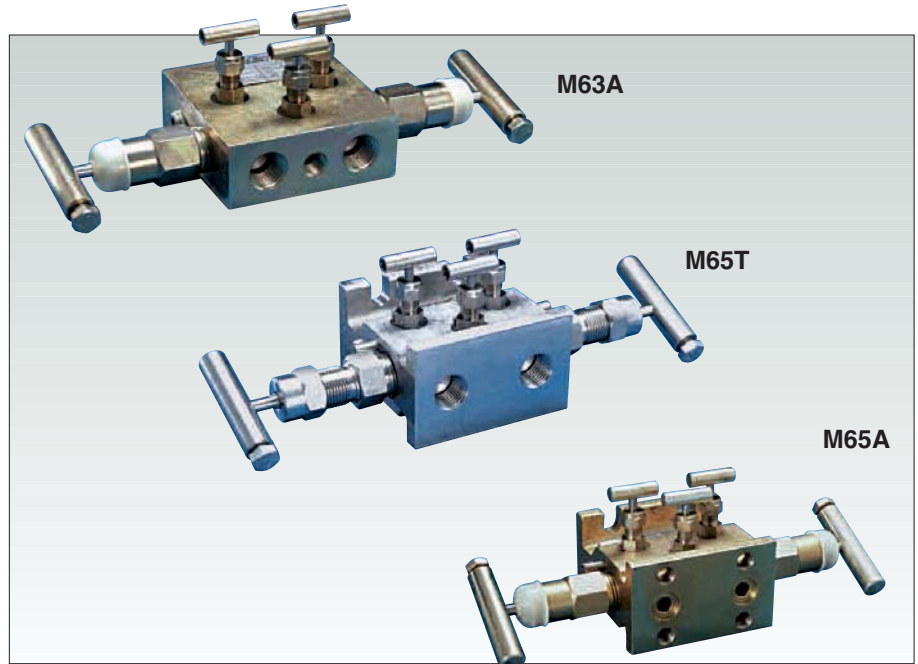
Options

- | | |
|--|---|
| AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves | SSC ⁵ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg] |
| AM – AGCO Mount Kit for 2-inch pipe stand (page 146) | SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 |
| BC – Accessory bracket for mounting conduit with AGCO Mount | SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 for Chloride conditions > 50 mg/l [ppm]) |
| BP – Accessory bracket for mounting purge meters with AGCO Mount | EL() – Installed street elbows in static test ports (M65T and M65A only) - Elbows provided with 1/4-inch NPT Plugs |
| CL – Cleaned for chlorine service | EL1 – Elbow facing bottom of manifold |
| HD – Hydrostatic testing (100 percent) (MSS SP-61) | EL2 – Elbow facing outlet of manifold |
| OC – Cleaned for oxygen service | EL3 – Elbow facing top of manifold |
| R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts) | SP – Special Requirements - please specify |
| SSA ⁵ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg] | |
| SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating | |

Notes

1. For Close Couple Futbols (NPT and Tube-Ended) and Adapter Kits, order by part number noted within respective tables or as part of ACCU-Mount™ Catalog.
2. M6A is A108-1018.
3. Available for M6A and M6T only.
4. Available for M6T only.
5. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Natural Gas Manifolds – M63A, M65T and M65A 5-Valve Manifolds



Product Overview

$\frac{3}{8}$ -inch [9.5 mm] Orifice

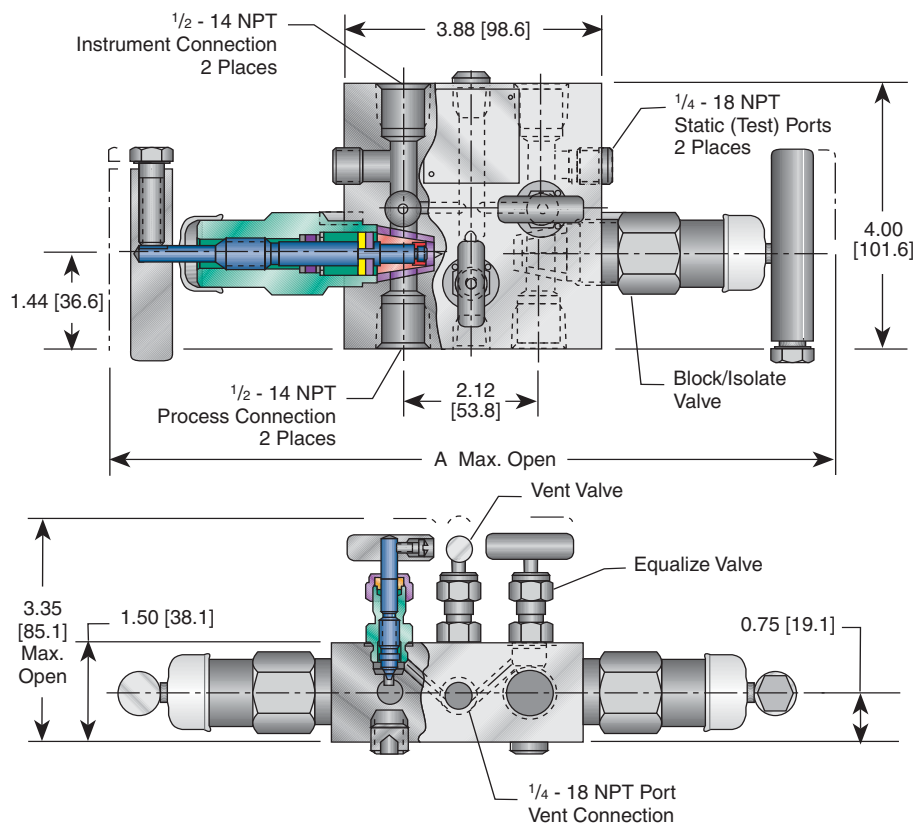
This product series parallels the M6A series but with the larger $\frac{3}{8}$ -inch [9.5 mm] orifices. The series was developed to answer two needs: 1) a larger valve orifice to assure positive line drainage where wet gas and hydrates are a problem; and 2) to match the flange tap drilling of $\frac{3}{8}$ -inch [9.5 mm] reducing signal variance when pulsating flow is experienced and the manifold (M65A) is mounted as close to the flange outlet as practical.

Features and Benefits

- **The valves are identical** for all three manifold configurations:
M63A - pipe x pipe
M65T - pipe x flange
M65A - flange x flange
- **As with the M6A series**, the M63A is generally mounted and supported by the $\frac{3}{8}$ -inch or $\frac{1}{2}$ -inch tubing lines for orifice meter applications.
- **The M65T and M65A may be pipe stand mounted** with the appropriate AGCO Mount Kit to support a differential transmitter. Advantages of AGCO Mount are: that installation may be made prior to availability of the transmitter; and, easier and faster removal of transmitter for maintenance since transmitter is supported only by the manifold.
- **Soft seats** are available in a variety of materials to suit sweet or sour gas.
- **The seats are field replaceable** without removing the manifold.
- **Bonnet assemblies have blowout-proof stems** that seal and isolate the packing when the valve is fully open.
- **Packing** is below the stem threads for corrosion protection.

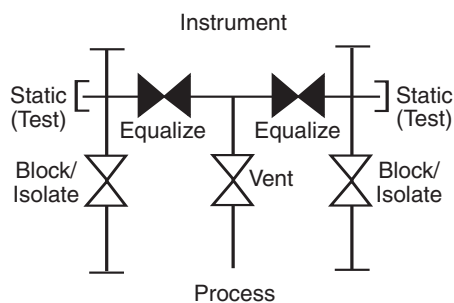
Natural Gas Manifolds – M63A Specifications

M63A Dimensions, inches [mm]



M63A Dimensions, inches [mm]

Packing	A
Teflon®	11.90 [302.3]
O-ring	11.36 [288.5]

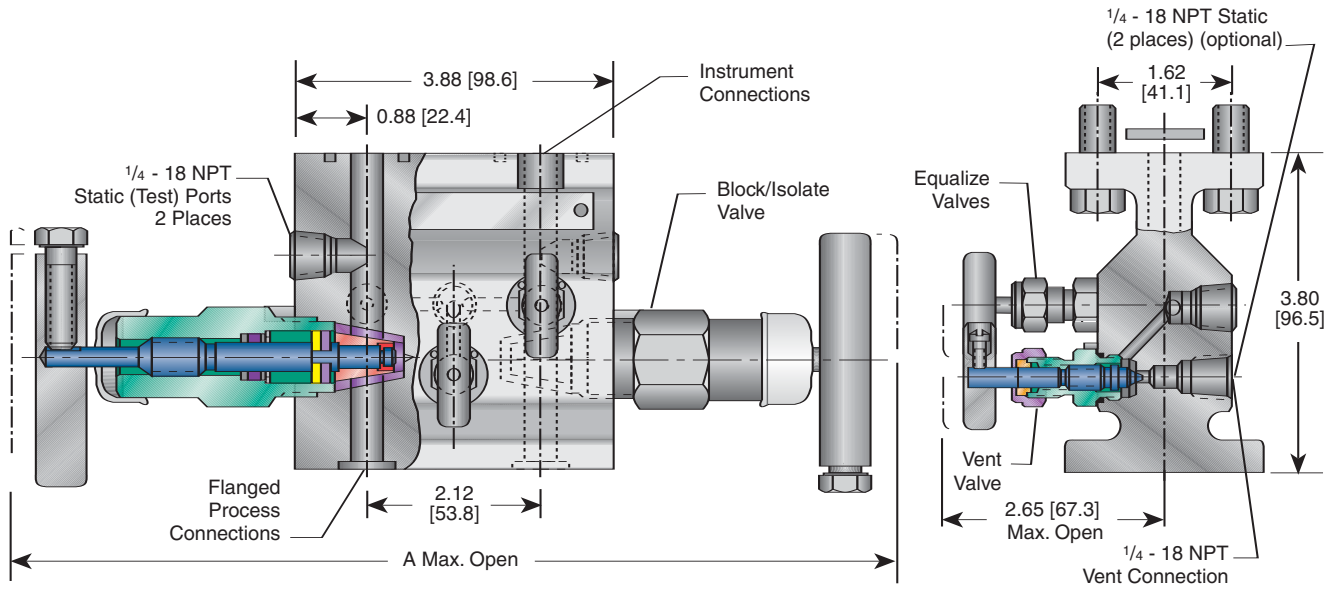


Notes

1. Approximate valve weight: 8.0 lb [3.6 kg].
0.375-inch [9.5 mm] diameter orifice.
Valve C_v 3.0 maximum.
2. Bottom static (test) connections available.
See options, page 145.

Natural Gas Manifolds – M65A Specifications

Dimensions, inches [mm]

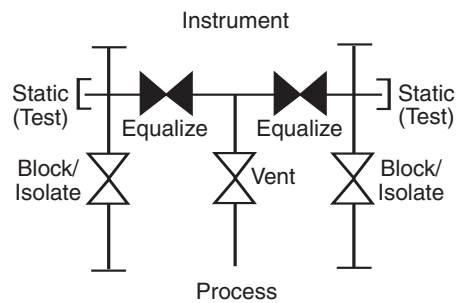


Dimensions, inches [mm]

Packing	A	
Teflon®	11.90	[302.3]
O-ring	11.36	[288.5]

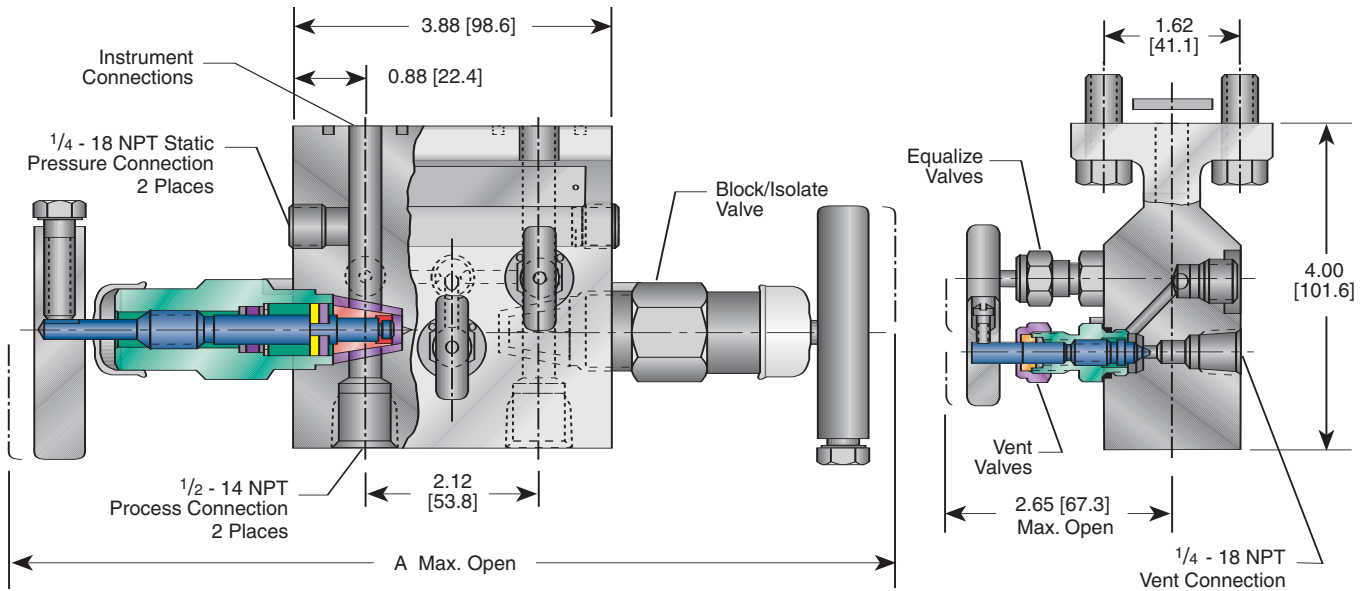
Notes

1. Approximate valve weight: 7.6 lb [3.4 kg]. 0.375-inch [9.5 mm] diameter orifice. Valve C_v 3.0 maximum.
2. Bottom static pressure connections 1/4-inch - 18 NPT available (see options page 145).
3. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
4. M65T Installation Kit consists of 4 bolts 7/16-inch-20 x 1-inch A193-B7, 4 washers, and 2 Teflon® gaskets.



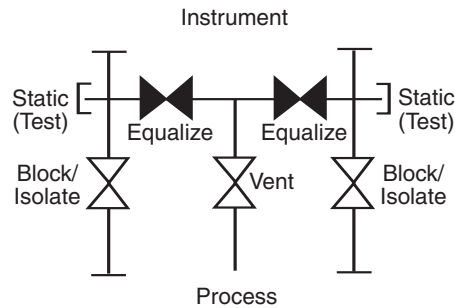
Natural Gas Manifolds – M65T Specifications

M65T Dimensions, inches [mm]



M65T Dimensions, inches [mm]

Packing	A
Teflon®	11.90 [302.3]
O-ring	11.36 [288.5]



Notes

1. Approximate valve weight: 7.6 lb [3.4 kg].
0.375-inch [9.5 mm] diameter orifice.
Valve C_v 3.0 maximum.
2. Bottom static pressure connections
1/4-inch - 18 NPT available (see options
page 145).
3. M65T Installation Kit consists of 4 bolts
7/16-inch-20 x 1-inch A193-B7, 4 washers,
and 2 Teflon® gaskets.

Natural Gas Manifolds – M63A, M65T and M65A Specifications

Pressure and Temperature Ratings

Packing	Seat Material	Seat	Standard Bolting		SS Bolting	
Teflon® or O-ring	Delrin® PCTFE ⁵	Soft	3000 psig @ 200°F	[207 barg @ 93°C]	3000 psig @ 200°F	[207 barg @ 93°C]
Teflon® or O-ring	PEEK	Soft	6000 psig @ 200°F 3000 psig @ 300°F	[414 barg @ 93°C] [207 barg @ 149°C]	4500 psig @ 100°F 3000 psig @ 300°F	[310 barg @ 38°C] [207 barg @ 149°C]
Teflon®	Teflon®	Soft	1000 psig @ 150°F 200 psig @ 500°F	[69 barg @ 66°C] [14 barg @ 260°C]	1000 psig @ 150°F 200 psig @ 500°F	[69 barg @ 66°C] [14 barg @ 260°C]
Teflon®	SS	Metal	1500 psig @ 500°F	[103 barg @ 260°C]	1500 psig @ 500°F	[103 barg @ 260°C]

Notes

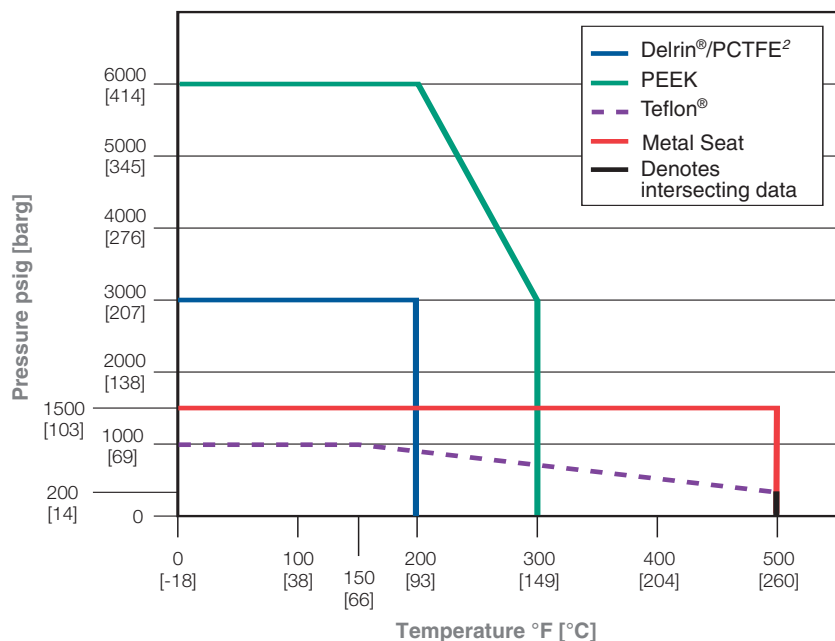
- CS parts are zinc cobalt plated.
- M63A body material is A108
- M63A body material is A240-316.
- SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.
- PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
- SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions > 50 mg/l [ppm]).

Standard Materials

Valve	Seat	Body	Bonnet	Stem	Flow Washer
CS ¹	Soft	A105 ²	A108	A582-303	316
SS	Soft	A479-316 ³	A479-316	A276-316	316
SG ⁴	Soft	A479-316	A479-316	Monel® R405	316
SG3 ⁶	Soft	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Hastelloy®

Natural Gas Manifolds – M63A¹, M65T and M65A Specifications

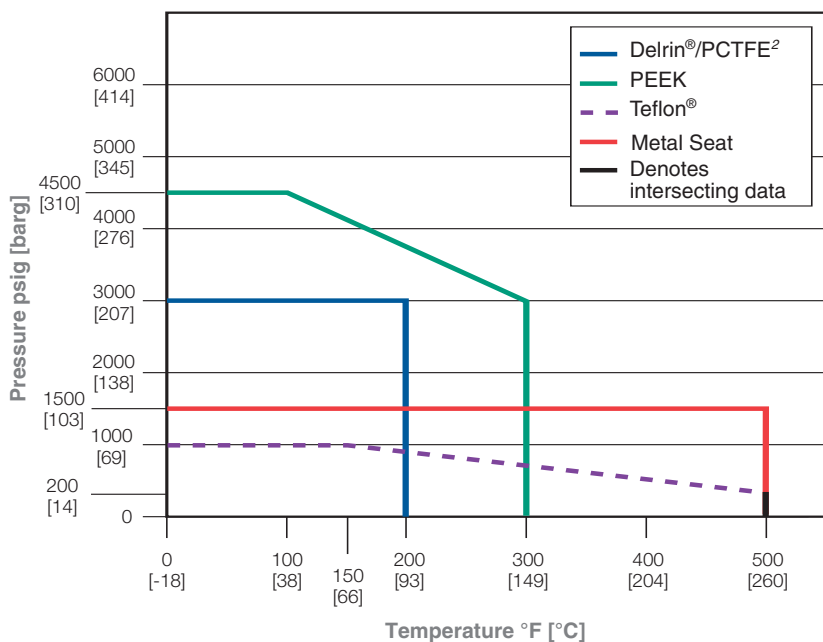
Pressure vs. Temperature – Standard Bolting¹



Notes

1. Use left Pressure Temperature Ratings column for M63A.
2. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
3. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Pressure vs. Temperature – SS Bolting³



Natural Gas Manifolds – M63A, M65T and M65A Specifications

Notes

1. CS is zinc cobalt plated to resist corrosion.
2. Equalizer valve is ball seated. Ball material is 316 SS for SS body, 17-4 PH for CS body.
3. M63A is A108-1018.
4. 316 SS bolts lower pressure ratings to a maximum of 4500 psi [310 barg]. Consult factory for full rating with 316 SS bolts.

Ordering Information

M6A V D S -4 -SG

Valve Type

3/8-inch [9.5 mm] orifice

- M63A – Pipe x Pipe
- M65T – Pipe x Flange
- M65A – Flange x Flange

Packing

- V – Teflon®
- R – O-ring

Seat (cone)

Soft (Block valves only)

- V – Teflon®
- D – Delrin®
- E – PEEK
- K – PCTFE

Hard²

- S – SS, A479-316
- M – Monel®

Body Material

- C – CS¹, A105³
- S – SS, A479-316
- J – Hastelloy®

Process Connections

M63A and M65T only

- 4 – 1/2-inch FNPT

Options Code

- | | |
|--|--|
| AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves | SSC ⁴ – 316 Flange Bolt (B8M) - maximum pressure rating 4500 psi [310 barg] |
| AM – AGCO Mount Kit for 2-inch pipe stand (page 146) | SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 for Chloride conditions ≤ 50 mg/l [ppm] and NACE MR0103-2005 |
| BC – Accessory bracket for mounting conduit with AGCO Mount | SG3 – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 for Chloride conditions > 50 mg/l [ppm] |
| BP – Accessory bracket for mounting purge meters with AGCO Mount | EL() – Installed street elbows in static test ports (M65T and M65A only) - Elbows provided with 1/4-inch NPT Plugs |
| CL – Cleaned for chlorine service | EL1 – Elbow facing bottom of manifold |
| HD – Hydrostatic testing (100 percent) (MSS SP-61) | EL2 – Elbow facing outlet of manifold |
| OC – Cleaned for oxygen service | EL3 – Elbow facing top of manifold |
| R3V – Add for use with Rosemount® Model 3051C (SS 18-8 Bolts) | SP – Special Requirements - please specify |
| SSA ⁴ – SS Flange Bolt (grade 18-8) - maximum pressure rating 4500 psi [310 barg] | |
| SSB – 316 SS Flange Bolt (B8M Class 2) - will provide full pressure rating | |

Natural Gas Manifolds – AGCO Mount Kits

Natural Gas Manifolds

Manifold Style	Kit Part Number	Material	Description
M6A/M1 ²	02.1639.678	CS ¹	Standard Kit
M6T	06.0472.003	CS ¹	Standard Kit
M6T	06.0472.004	SS	Standard Kit
M6TA	06.1375.003	CS ¹	Standard Kit
M6TA	06.1375.004	SS	Standard Kit
M65A	06.1375.003	CS ¹	Standard Kit
M65A	06.1375.004	SS	Standard Kit
M63A	—	—	Supported by tubing

Notes

1. Zinc cobalt plated.
2. Does not include nipples.

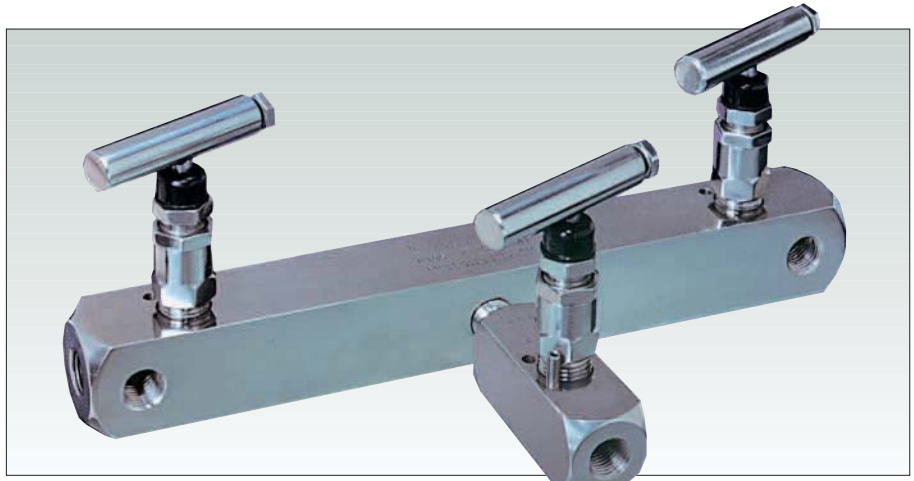
Natural Gas Manifolds – M19 Meter Manifold

Product Overview

The M19 Meter Manifold is a three- or five-valve manifold specifically designed for use with orifice meters. It is designed for repetitive bubble-tight closure, safety, and a long trouble-free life with easy maintenance. Field replaceable soft seats give premium tightness at closure, even in dirty service. The straight-thru rising plug design provides good regulation and is roddable for easy cleaning.

The five-valve assembly is indicated for orifice meters remote from the orifice flange union.

The three-valve manifold is used when the orifice meter is mounted adjacent to the orifice flange and the two process block valves provide convenient closure.

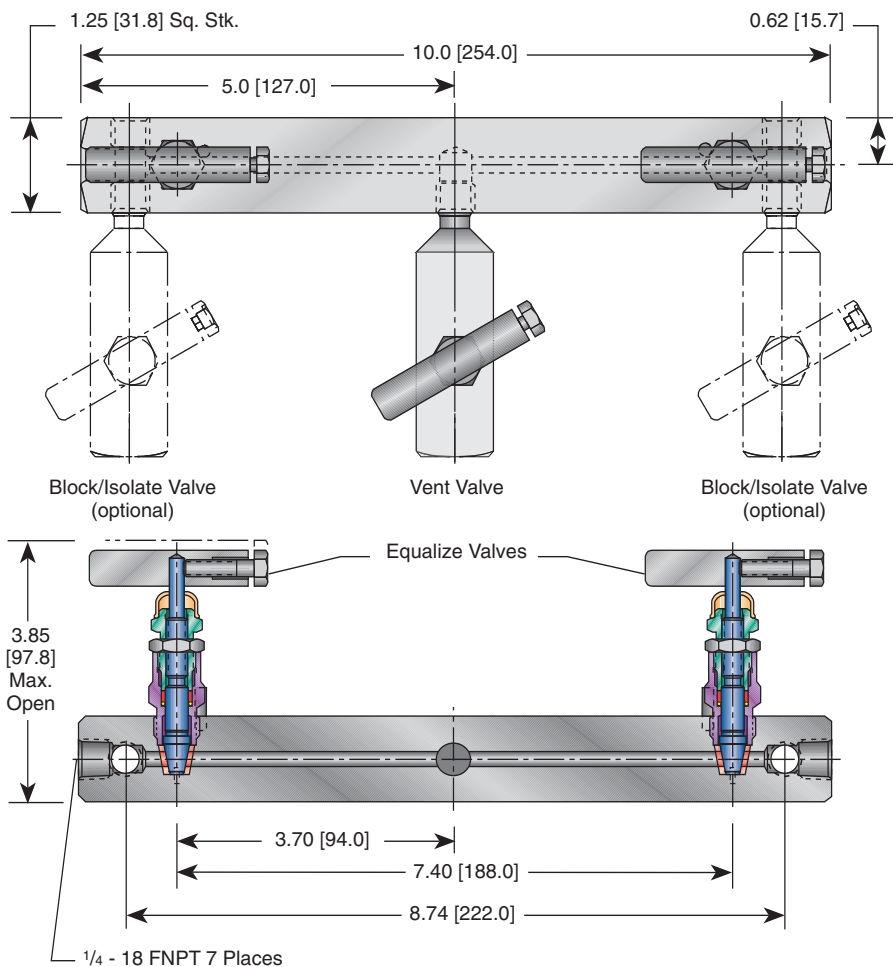


Features and Benefits

- **The M19 was designed** to overcome the leaking problems experienced with inexpensive valves and 1/4-inch pipe-fitting assemblies made-up under varying conditions.
- **Replaceable soft seats** allow replacement of the seat insert without removing the valve from the line. Operates in dirty service with repetitive bubble-tight shutoff.
- **Adjustable Teflon® packing** is easily changed by loosening the jam nut, tightening the bushing slightly, then retightening the jam nut. This feature reduces downtime in packing replacement, and provides for long valve life.
- **The O-ring packed design** for natural gas is self-adjusting.
- **Packing below threads** prevents lubricant washout, thread corrosion, and keeps solids from entering thread area causing galling. This also prevents process contamination.
- **Mirror stem finish** is burnished to a 16 RMS finish in the packing area. This ensures smooth operation and increases the life of the packing.
- **Straight-thru flow path.** High flow capacity and rodding capabilities.
- **Body-to-bonnet seal.** The seal is metal-to-metal in constant compression below the bonnet threads. This prevents bonnet thread corrosion, eliminates possible tensile breakage of bonnet, and gives a reliable seal point.
- **Rolled threads.** Stem and male NPT threads are rolled rather than cut, giving extra thread strength.
- **Chrome plating of 316 SS stem.** Hard chrome plating of stem threads prevents galling or freeze-up, which may occur when similar metals mate. CS valves are supplied with SS stems.
- **Safety back seating** prevents stem blowout or accidental removal while in operation.
- **Dust cover** protects stem from lubricant contamination.

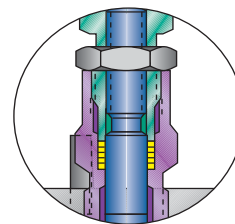
Natural Gas Manifolds – M19 Specifications

Dimensions, inches [mm]



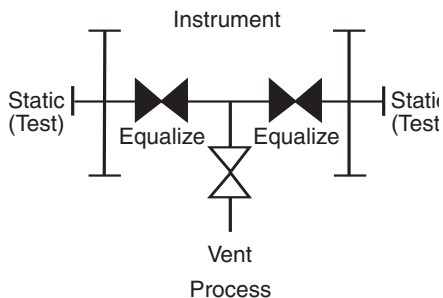
Note

1. Approximate valve weight: 5.5 lb [2.4 kg].
 8.0 lb [3.6 kg] with optional block valves.
 0.187-inch [4.8 mm] diameter orifice.
 Valve C_v 0.83 maximum.

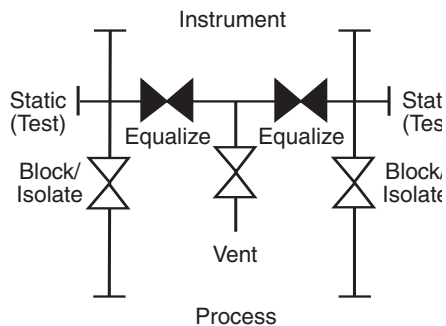


Optional Teflon® Packed
 (O-ring, standard)

3-Valve



5-Valve



Natural Gas Manifolds – M19 Specifications

Notes

1. PCTFE (Polychlorotrifluoroethylene is exact equivalent of Kel-F®), PEEK and Teflon® are available.
2. CS is zinc plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005.

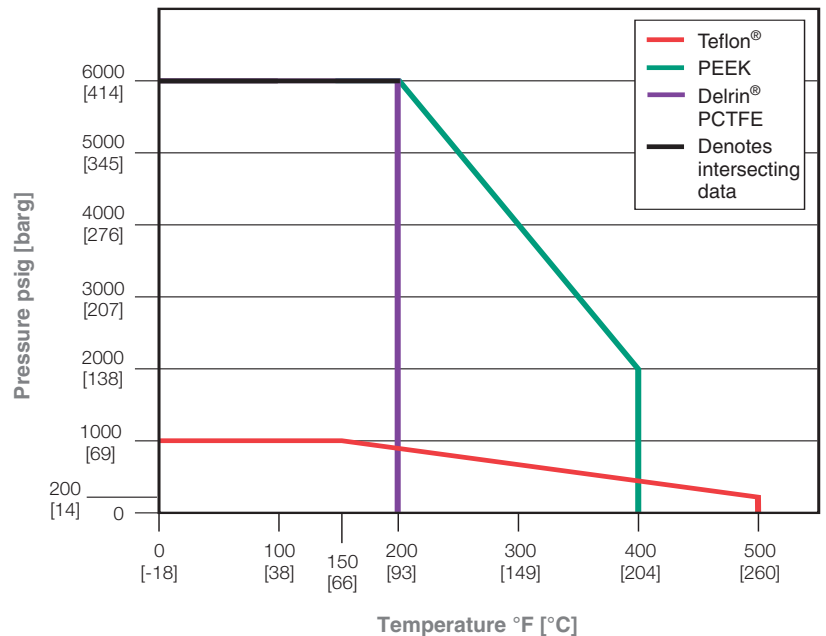
Standard Materials

Valve	Body	Bonnet	Stem	Packing	Seat ¹
CS ²	A108 CS	A108 CS	A581-303 SS	Viton® O-ring with Teflon® backup ring	Delrin®
SS	A479-316 SS	A476-316 SS	A276-316 SS	Viton® O-ring with Teflon® backup ring	Delrin®
SG ³	A479-316 SS	A479-316 SS	Monel® R405	Teflon®	Delrin®

Pressure and Temperature Ratings

Seat	Ratings	
Delrin® and PCTFE ¹	6000 psig @ 200°F	[414 barg @ 93°C]
PEEK	6000 psig @ 200°F	[414 barg @ 93°C]
	2000 psig @ 400°F	[138 barg @ 204°C]
Teflon®	1000 psig @ 150°F	[69 barg @ 66°C]
	200 psig @ 500°F	[14 barg @ 260°C]

Pressure vs. Temperature



Natural Gas Manifolds – M19 Specifications

Ordering Information

M19 C T -H1 -SG

Materials of Construction

- C – CS, A108
- S – SS, A479-316

Configuration

- T – 3-Valve
- F – 5-Valve

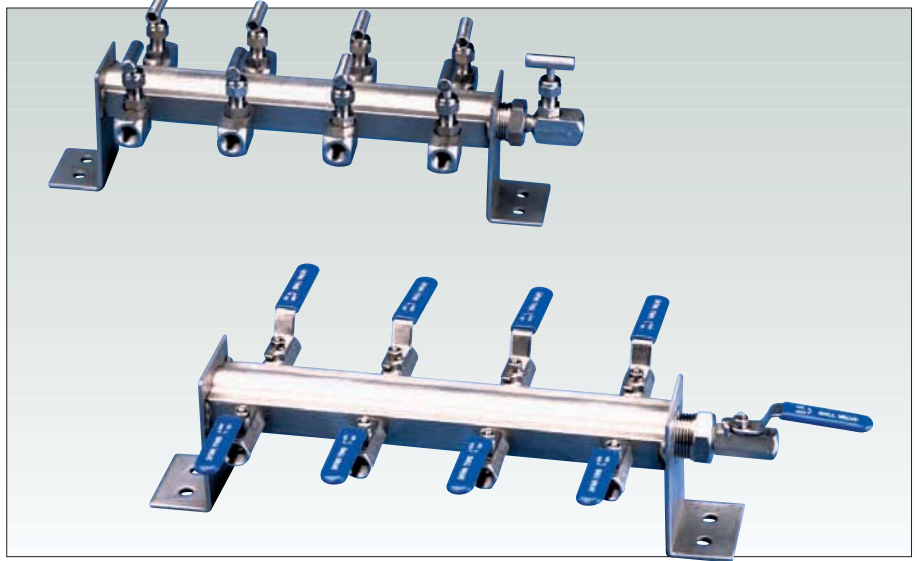
Vent Valve Type

- H1
- H5

Options

- AL – Arctic Lubricant (low temperature service -70°F) - not available for CS valves
- CL – Cleaned for chlorine service
- HD – Hydrostatic testing (100 percent)
- MS – Monel® Stem
- OC – Cleaned for oxygen service
- PHB – Phenolic Black Handle
- SG – (Sour Gas) meets the requirements of NACE MR0175/ISO 15156-3 Corrigendum 2 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103-2005 (SS valves only)
- SP – Special Requirements - please specify

Distribution Manifolds – ADME



Product Overview

Designed to distribute air for panel and cabinet instrumentation. Can easily be wall or pipe stand mounted.

The ADME is manufactured from an extruded section in either CS or SS and is available with either ball valves or H5-type miniature needle valves with soft or hard seats. These valves are suitable for pressures to 725 psig [50 barg], 3000 psig [207 barg] and 6000 psig [414 barg].

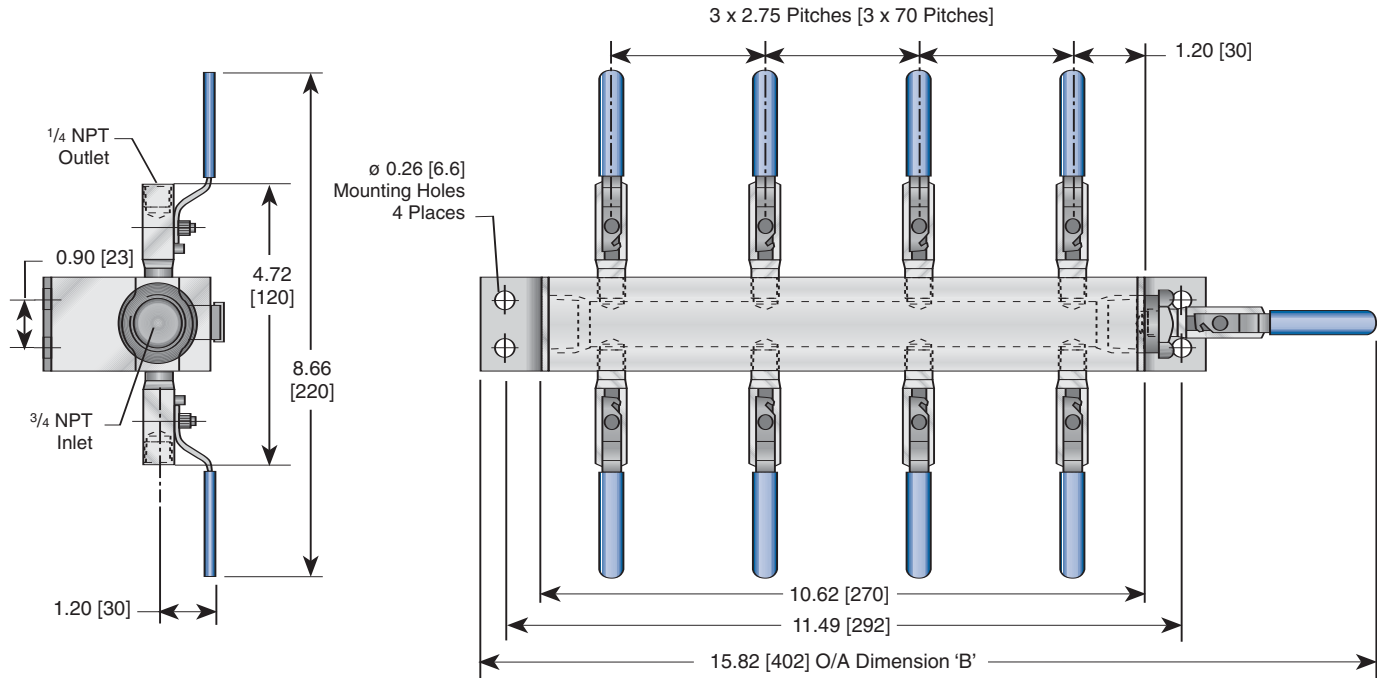
The ADME manifold body has $\frac{3}{4}$ -inch NPT end connections and $\frac{1}{4}$ -inch NPT side outlets. The manifold inlet can be supplied flanged in sizes up to 1-inch NB class 2500 lb. The manifold end outlet is fitted with a $\frac{3}{4}$ -inch NPT adaptor and drain valve as standard. Available from 2 x 2 to 2 x 10 outlets, the standard manifolds have equally spaced outlets on both sides of the body; the outlet ports may be positioned to meet specific requirements.

Features and Benefits

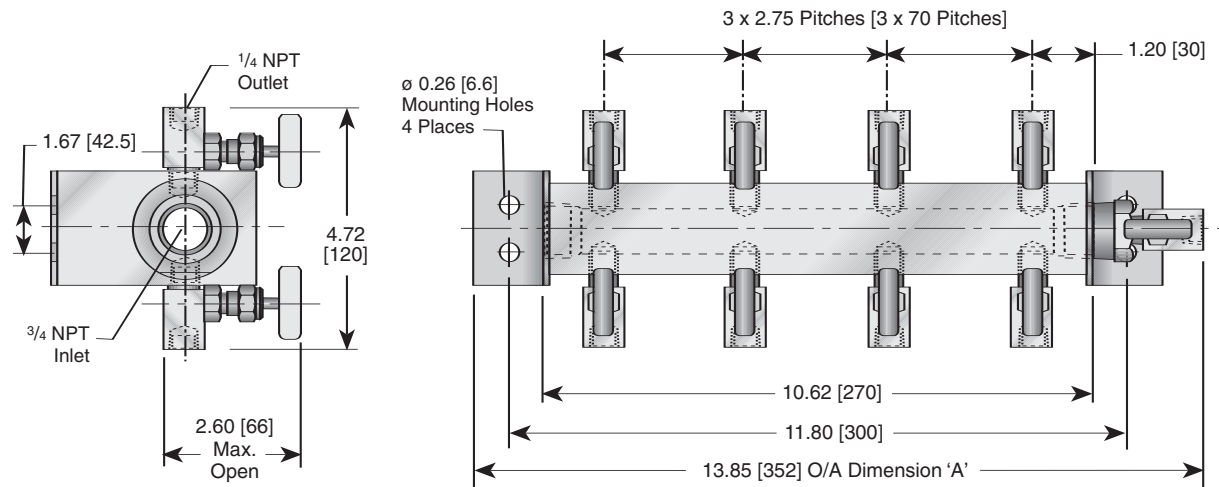
- **Compact design** enables lower installation costs and fewer potential leak points.
- **Choice of body materials** suitable for a range of process applications.
- **Choice of valve types;** ball valves or miniature needle valves with soft or hard seats can be specified.
- **Secure mounting** suitable for panels, walls and 2-inch [50 mm] NB pipe stand.
- **Threaded or flanged inlet** available with $\frac{3}{4}$ -inch threaded or flanged inlet, in sizes up to 1-inch NB class 2500 lb.

Distribution Manifolds – ADME Specifications

ADME.8.S.BVS-22 Dimensions, inches [mm] – Ball Valve Type



ADME.8.S.H5VIS-22 Dimensions, inches [mm] – Needle Valve Type



Overall Dimensions – inches [mm]

Number of Outlets	4 (2 x 2)	6 (2 x 3)	8 (2 x 4)	10 (2 x 5)	12 (2 x 6)	14 (2 x 7)	16 (2 x 8)	18 (2 x 9)	20 (2 x 10)
A (H5 Valves)	8.35 [212]	11.10 [282]	13.85 [352]	16.61 [422]	19.37 [492]	22.12 [562]	24.88 [632]	27.64 [702]	30.39 [772]
B (Ball Valves)	10.31 [262]	13.07 [332]	15.82 [402]	18.58 [472]	21.38 [542]	24.09 [612]	26.85 [682]	29.60 [752]	32.36 [822]

Distribution Manifolds – ADME Specifications

Pressure Rating – Valves

Valve Type	Pressure Rating		Model Number	
	psig	[barg]	SS	CS
Ball Valve	725 psig	[50 barg]	BVS-22	—
H5-Teflon®, Hard	6000 psig	[414 barg]	H5VIS-22	H5VIC-22
H5-Teflon®, Soft	3000 psig	[207 barg]	H5VKS-22	H5VKC-22

Technical Specifications

Standard Materials

CS - A108
SS - A479 316 SS

Pressure Rating

6000 psig [414 barg] maximum
= H5 hard seat.

3000 psig [207 barg] maximum
= H5 soft seat.

725 psig [50 barg] maximum
= ball valve.

6000 psig [414 barg] maximum
= special high pressure ball valve.

Standard Connections

Threaded NPT to ANSI/ASME B1.20.1.

Flanged Inlet connections are available flanged up to 1-inch NB class 2500 lb.

Ordering Information

ADME 6 S H5VIS-22 -PB

Number of Outlets

4, 6, 8, 10, 12, 14, 16, 18, 20

Material

C – CS
S – SS

Valves - Sold as assembled only

H5VIS-22 – Teflon® packed, SS, Metal Seat
H5VKS-22 – Teflon® packed, SS, PCTFE Seat
BVS-22 – Ball Valve, SS

Options Code

FI – Flanged Inset - specify size and rating
PB – 2-inch [50 mm] Pipe Bracket
SP – Special Requirements - please specify

Manifold Accessories

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.



GRAFOIL® Packed Bonnet Lock¹

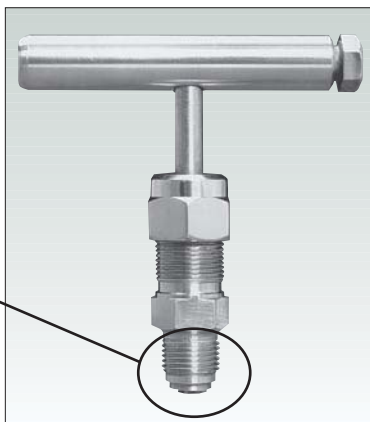
Note

1. Standard on power plant manifolds.

Seat Resurfacing Tool

Over time the seating surface of the body orifice may corrode or be damaged. The seat resurfacing tool will re-machine this surface and allow the valve to once again deliver bubble-tight shutoff. Available for H7 style, metal seated valves only.

Model Number/ Part Number	Description
SRT-1 02.2543.001	Seat Resurfacing Tool for 3/16-inch [4.8 mm] diameter orifice, H7 style metal seated valves

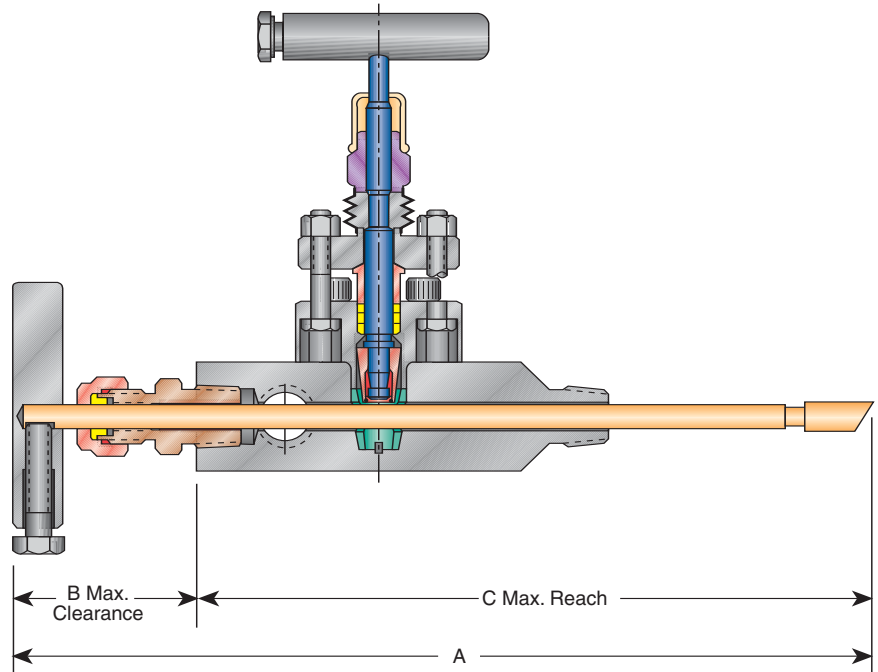


Manifold Accessories

Rod-Out Device

The Rod-Out is a device to rod-through passages that have become restricted. It is designed to be used while the valve is not under pressure. It can be left in place while the valve is under pressure. The centerless ground rod has a hardened cutting end larger than the shaft to prevent 'blowout' through the adjustable packing gland. The Rod-Out is available with a $\frac{3}{16}$ -inch [4.8 mm] or $\frac{3}{8}$ -inch [9.5 mm] diameter rod.

Dimensions, inches [mm]



Rod-Out Device with M5AK Gauge Valve

Notes

- Maximum recommended usage:
500 psig @ 100°F [34 barg @ 38°C].
100 psig @ 500°F [7 barg @ 260°C].
- Rod tip for $\frac{3}{8}$ -inch [9.5 mm] bore is
0.312-inch [7.9 mm] diameter.
Rod tip for $\frac{3}{16}$ -inch [4.8 mm] bore is
0.141-inch [3.6 mm] diameter.
- For special rod lengths, materials or
connections, consult factory.
- Teflon® packing.
- 2-bolt flanged connection is available.
- $\frac{3}{8}$ -inch [9.5 mm] diameter device is
1.0 lb [0.45 kg] each.
 $\frac{3}{16}$ -inch [4.8 mm] diameter device is
0.5 lb [0.23 kg] each.
- CS is zinc cobalt plated to resist corrosion.

Rod-Out Device Specifications¹, inches [mm]

Model Number	Max. Dia. ² Bore	Rod ³	Gland ⁴	Inlet ⁵ Connection	Dimensions ³		
					A	B	C
RTV3C-N4 ⁷	$\frac{3}{8}$ " [9.5]	A108 CS ⁷	A108 CS ⁷	$\frac{1}{2}$ " NPT	18.1 [460]	17.8 [452]	15.9 [404]
RTV3S-N4	$\frac{3}{8}$ " [9.5]	316 SS	316 SS	$\frac{1}{2}$ " NPT	18.1 [460]	17.8 [452]	15.9 [404]
RTV3M-N4	$\frac{3}{8}$ " [9.5]	Monel® R405	Monel® R405	$\frac{1}{2}$ " NPT	18.1 [460]	17.8 [452]	15.9 [404]
RTV1C-N4 ⁷	$\frac{3}{16}$ " [4.8]	4130 SS	A108 CS ⁷	$\frac{1}{2}$ " NPT	12.1 [307]	11.8 [300]	10.1 [256]
RTV1S-N4	$\frac{3}{16}$ " [4.8]	316 SS	316 SS	$\frac{1}{2}$ " NPT	12.1 [307]	11.8 [300]	10.1 [256]
RTV1M-N4	$\frac{3}{16}$ " [4.8]	Monel® R400	Monel® R405	$\frac{1}{2}$ " NPT	12.1 [307]	11.8 [300]	10.1 [256]

Code Requirements

ASME B31.1 or B31.3

Valve design criteria is described in Section 107. Important considerations from this section are as follows:

1. Valves require specific pressure and temperature ratings such as those found in ASME B16.34.
2. Material requirements must conform to listed ASTM specifications.
3. As a minimum, the valve body should be marked or tagged in accordance with specification MSS SP-25.
4. Valve design may include screwed, union, or OS&Y bonnets.

The requirements for instrument, control, and sampling systems are found in Section 122. Instrument piping, as defined by this section, includes that piping from the instrument root valve (or first valve off the main piping line) up to, but not including, the instrument, transmitter, or any other measuring and sensing device.

The instrument valve or manifold must be designed to withstand full system design pressure at the design temperature or the corresponding saturation temperature if the service is steam. Even though the instrument will never be subjected to the system temperature, manifold design requires this protection in the event that the root valve should fail under operating

conditions. If blowdown valves are used between the root valve and the manifold, then the manifold design temperature rating need only be 100°F [38°C]. However, in such cases, the pressure rating must be the lesser of 1.5 times the mainline design pressure or the rating of the blowdown valve. The utilization of commercial grade manifolds (without the manufacturer's certification to ASME B31.1 or if stamped WOG) which meet only the pressure ratings are prohibited unless all other code requirements have been met (such as Table 126.1 of ASME B31.1 for materials, compliance to testing requirements, etc).

The final section of the Code, Section I, 137, specifies the criteria for testing. All instrument manifold valves are required to be hydrostatically tested by the manufacturer to certify compliance with the Code. Hydrostatic testing is performed, as a minimum, in accordance with MSS SP-61. This testing includes the body cavity hydrostatic test at 1.5 times the design pressure rating and seat leakage test(s) at 1.1 times the maximum pressure rating.

In Table 126.1 of ASME B31.1 and in Appendix E of ASME B31.3, Instrument Valves and Manifolds qualified to MSS SP-105 are acceptable within the specified pressure/temperature rating

INSTRUMENTS • CONTROLS • VALVES

ARCO
Engineering, Inc.
SINCE 1954
www.arcoengineering.com

3317 Gilmore Industrial Blvd.
Louisville, KY 40213

Ph: (502) 966-3134

Fx: (502) 966-3135

ANDERSON GREENWOOD INSTRUMENTATION PRODUCTS

P.O. Box 944, Stafford
Texas 77497, USA

Telephone: 1-281-274-4400

Fax: 1-281-240-1800

Sharp Street, Walkden
Worsley
Manchester, M28 3NA
United Kingdom

Telephone: 44-161-790-7741

Fax: 44-161-703-1859

www.aginstrumentation.com
www.tycoflowcontrol.com



Tyco Flow Control (TFC) provides the information herein in good faith but makes no representation as to its comprehensiveness or accuracy. This data sheet is intended only as a guide to TFC products and services. Individuals using this data sheet must exercise their independent judgment in evaluating product selection and determining product appropriateness for their particular purpose and system requirements. TFC MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT(S) TO WHICH THE INFORMATION REFERS. ACCORDINGLY, TFC WILL NOT BE RESPONSIBLE FOR DAMAGES (OF ANY KIND OR NATURE, INCLUDING INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES) RESULTING FROM THE USE OF OR RELIANCE UPON THIS INFORMATION. Patents and Patents Pending in the U.S. and foreign countries. Tyco reserves the right to change product designs and specifications without notice.

