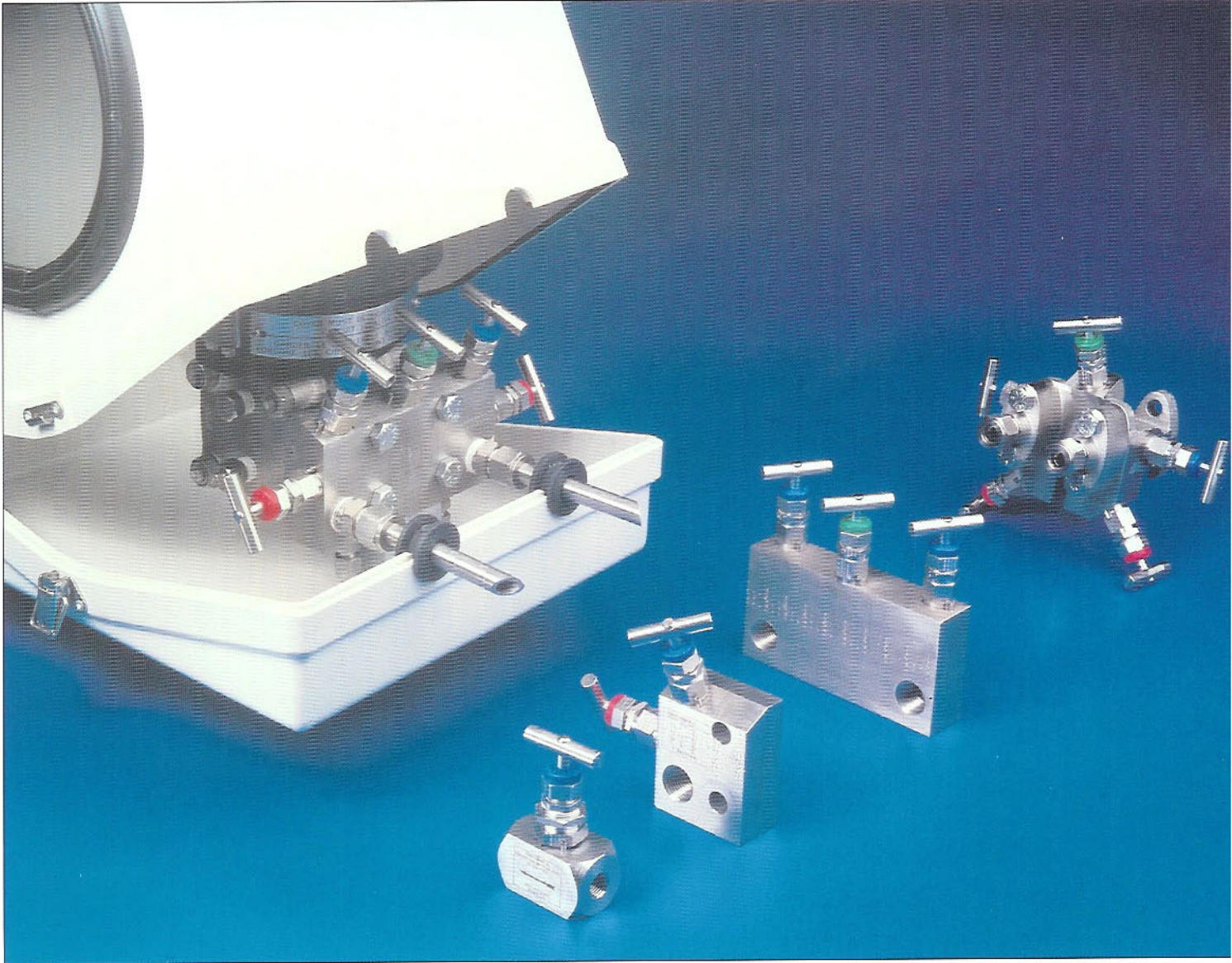


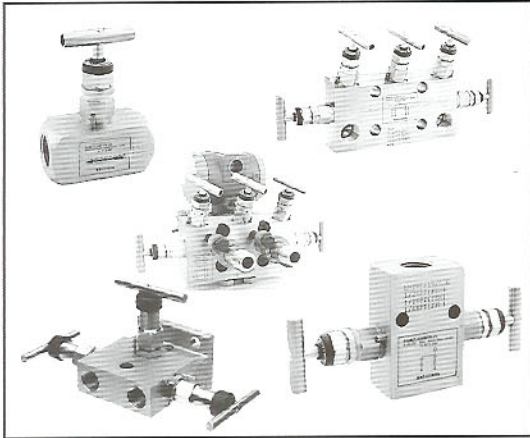
Instrument Manifolds and Enclosures

*Catalog 4256
Revised, December 1999*



Manifold Valves and G.R.P. Enclosures

Manifolds



Manifold Product Index	page 3
Material Specifications	page 20
Pressure, Temperature & Test Ratings	page 20
Certification, Heat Code Traceability, Identification, Welding, Cv and Thread Standards	page 21
Manifold Ordering Procedures	page 21

G.R.P. Enclosures



G.R.P. Enclosure Index	page 26
G.R.P. Enclosures	pages 27-30
Enclosure Mounting Supports, Facilities and Options	pages 31-36
G.R.P. Order Form	page 37

WARNING

FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale









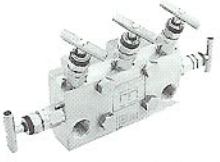






The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".



Barnstaple, UK

© Copyright 1999, Parker Hannifin Corporation. All Rights Reserved.

Manifold Product Index

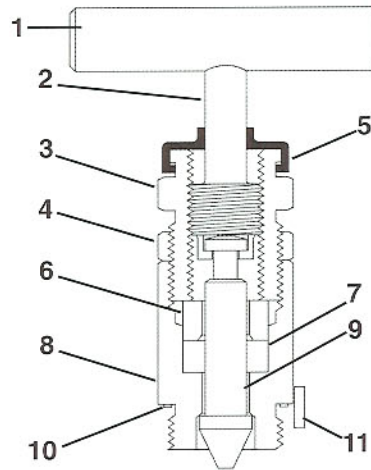
	Bar stock needle valve page 5		Multi-port gauge valves page 5
	Two valve manifolds horizontal port orientation page 6&7		Two valve manifolds vertical port orientation page 7&8
	Three valve manifolds for direct mounting page 9		Three valve manifolds for line mounting remote from instrument page 10
	Five valve manifolds for direct mounting page 11		Five valve manifolds for line mounting remote from instrument page 11
	Five valve fiscal metering manifolds for direct or line mounting page 12		Three valve manifolds for flange to flange mounting page 13
	Five valve manifolds for flange to flange mounting page 13		Variflange three and five way manifolds for direct mounting page 15
			Three way roddable manifolds page 16-18

Bonnet Assembly Detailspage 4
Roddable Manifoldspage 16-18
Bellows Manifoldspage 19
Standard Optionspage 23
Spares, Accessories and
Swivel Gauge Connectorspage 24
Air Distribution Manifoldspage 25

Manifolds

Standard bonnet assembly (stainless steel)

1. T bar handle for low torque operation.
- 2, 9 & 9a Stem actuator and 9, separate lower stem (needle) provides two piece non-rotating spindle arrangement for metal/metal seating. This results in better sealing and longer life. Needle has ground 16 RMS finish for 100% shut off and sealing. **(For gaseous/low density fluids a lower spindle with Kel-F seating is recommended).** Both spindles incorporate back stop design.
3. & 4. Gland adjuster for in-service adjustment and 4, lock nut
- *5. Dust cap with color coded function label – protects operating threads from outside contamination.
6. Thrust bush.
7. P.T.F.E. adjustable packing installed below operating threads to prevent media contamination or lubricant washout of operating threads. Grafoil alternative available as option.
8. Bonnet.
10. Stainless steel bonnet to body sealing washer.
11. Bonnet locking pin, prevents detachment of the bonnet from the body.



Kel-F soft tip option 9a (see page 23)



Kel-F soft tipped non-rotating stem for low density fluids and gases. Shut off torque should not exceed 70lb.in (7.90Nm).

Closed height from valve body = 54mm
 Open height from valve body = 57mm
 Standard 'T' bar length = 44mm
 HP 'T' bar length = 65mm



Color coded valve function labels

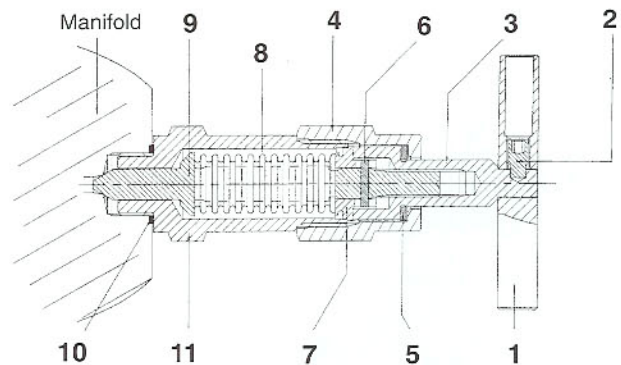
Items 1, 2, 3, 4, 6 and 11 are classed as non-wetted, i.e. parts which are never in contact with the process media. Unless otherwise specified with overall material requirements, non-wetted parts will be supplied in stainless steel.

*Manufactured from low density polyethelene (L.D.P.)

Optional Bellows Head Assembly

Bellows Head Assembly (optional)

- 1 Non-rising T bar handle for low torque operation
- 2 T-bar handle retainer screw
- 3 Spindle actuator
- 4 Bonnet nut
- 5 Thrust washer
- 6 Locking pin
- 7 Anti-torque ring
- 8 Bellows
- 9 Bellows spindle
- 10 Joint washer
- 11 Bellows body



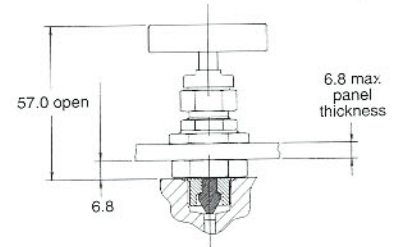
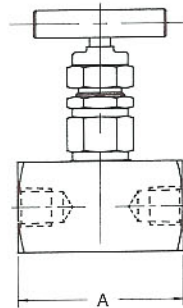
The Bellows head assembly option is available for fitting into any of the manifolds and valves shown in this catalog (except roddable types)

Full details are shown on page 19

Forthcoming environmental legislation will, for many applications, demand a new approach to ensuring that harmful liquids and gases are prevented even in very small amounts from leaking to atmosphere. In applications found in the Nuclear and Semiconductor Industries, this demand has existed for many years and, to achieve this for instrument sized valves, the bellows principal has been used as a standard.

Due to the demanding requirements of these industries and sometimes limited volumes, these units have been very expensive. Adopting the principal for general instrument applications involving environmentally and ozone damaging mediums, has been our priority resulting in this bellows manifold design offering a commercially acceptable unit incorporating high-tech ideas.

Bar stock needle valve



Clearance hole in panel 22.6

Panel mount option

Description

Hand operated valves for isolation of medium, with a variety of inlet and outlet port connections. Cv = 0.3 imperial gallons.

Part No.	Inlet	Outlet	Dimension A (millimeters)
NV★4FF	1/4" NPT female	1/4" NPT female	55.0 (31.7 x 31.7 mm body)
NV★6FF	3/8" NPT female	3/8" NPT female	55.0 (31.7 x 31.7 mm body)
NV★8FF	1/2" NPT female	1/2" NPT female	65.0 (31.7 x 31.7 mm body)
NV★4M4F	1/4" NPT male	1/4" NPT female	55.0 (31.7 x 31.7 mm body)
NV★8M8F	1/2" NPT male	1/2" NPT female	72.0 (31.7 x 31.7 mm body)
NV★4A	1/4" o.d A-LOK®	1/4" o.d A-LOK®	67.5 (25.4 x 25.4 mm body)†
NV★8A	1/2" o.d A-LOK®	1/2" o.d A-LOK®	76.0 (25.4 x 25.4 mm body)†
NV★M6A	6mm o.d A-LOK®	6mm o.d A-LOK®	67.5 (25.4 x 25.4 mm body)†
NV★M12A	12mm o.d A-LOK®	12mm o.d A-LOK®	76.0 (25.4 x 25.4 mm body)†

† Finger tight nuts and ferrules.
 † Cannot be offered to NACE.
 † For 10,000 psi A-LOK® ends refer to A-LOK® catalog for tube pressure ratings.

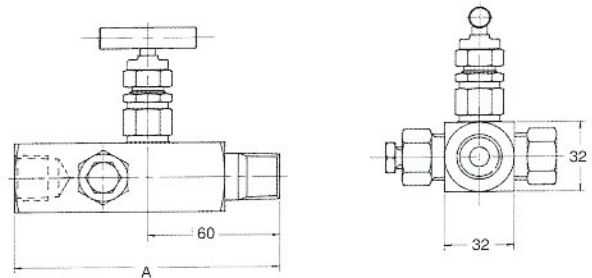
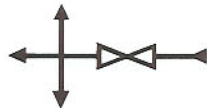
Panel mounting option - add suffix PM to part number

Bar stock needle valve – with downstream vent



Part No.	Inlet	Outlet	Dimension A (millimeters)
NV★4M4FV	1/4" NPT male	1/4" NPT female	87.5 (28.5 x 28.5mm body)
NV★8M8FV	1/2" NPT male	1/2" NPT female	97 (28.5 x 28.5mm body)

Multi-port gauge valve



Description

The multi-port gauge valve has three female outlets giving the user positional options for pressure gauge installation. The standard gauge valve is supplied complete with vent valve and blanking plug (these items can also be purchased separately, see page 20).

Part No.	Inlet	Outlet	Dimension A (millimeters)
GV★8	1/2" NPT male	3 x 1/2" NPT female	120
GV★12	3/4" NPT male	3 x 1/2" NPT female	120
GV★6K	3/8" BSP Taper male	2 x 1/4" BSP Taper female 1 x 3/8" BSP Taper female	110

Additional options
 Lagged inlet extensions
 Swivel gauge connectors

Part No. suffix state length A see page 20

Note: Gauge valves with BSPP threads will have the male inlet thread and the female outlet thread (opposite the inlet) prepared for use with male sealing washer (not supplied) and side female outlet ports prepared to use with female 'A' form sealing washer (not supplied).

*Insert material indicator into part no. ie: **S**-stainless steel, **C**-carbon steel, **M**-monel, **A**-6Mo, **N**-hastelloy, **H**-high duty bronze. Other materials available upon request.

Manifolds

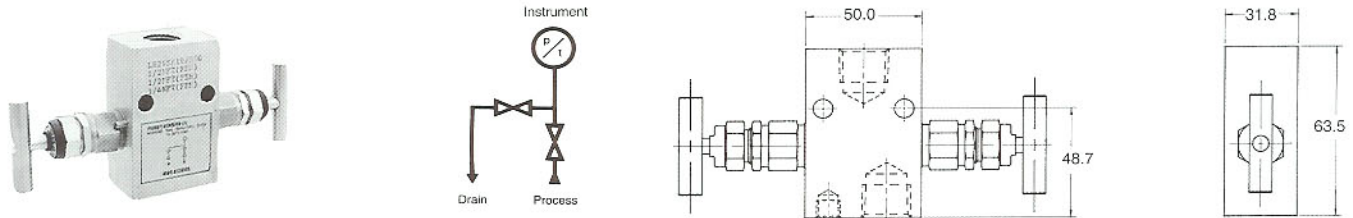
Two valve manifolds

Purpose

Two valve manifolds combine facilities for isolation, calibration, test and venting of instruments. By incorporating all these functions in one block, considerable material and installation cost savings will be made.

The manifold is designed for use with pressure gauges, pressure transmitters, pressure switches and similar pressure measurement equipment. The manifold is available in a number of configurations to suit every type of installation. Port connections are standard in NPT and BSP Taper. A variety of manifold mounting/support methods are possible.

Two valve manifold – with vertical port inlet, outlet and drain/test connections.

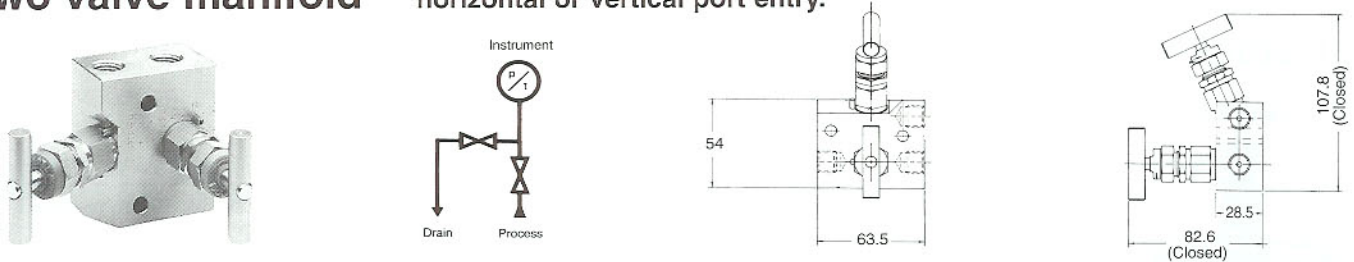


Description

For line installation with all female ports and suitable for wall mounting using 2 off M8 bolts (not supplied).

Part No.	Inlet	Outlet	Drain/test
L*2V	1/2" NPT female	1/2" NPT female	1/4" NPT female

Two valve manifold – horizontal or vertical port entry.

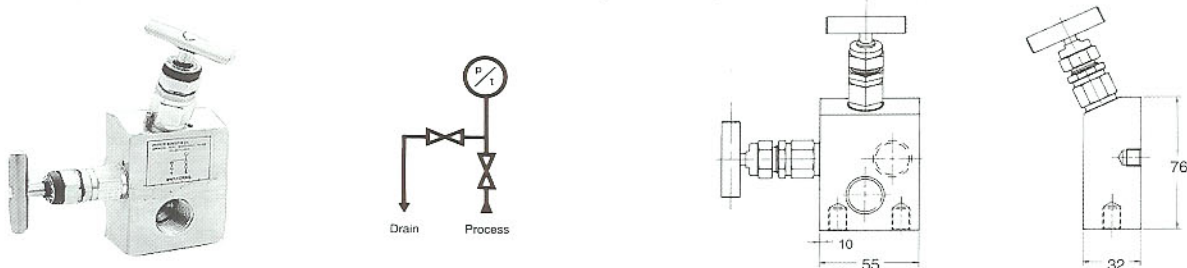


Description

This manifold has been designed for compact installation inside control panels where space is at a premium. Mounting holes are provided and are suitable for M6 bolts (not supplied).

Part No.	Inlet	Outlet	Drain/test
AL*2V4N	1/4" NPT female	1/4" NPT female	1/4" NPT female
AL*2V	1/2" NPT female	1/2" NPT female	1/4" NPT female

Two valve manifold – with horizontal port inlet, outlet and drain/test connections



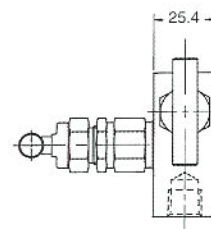
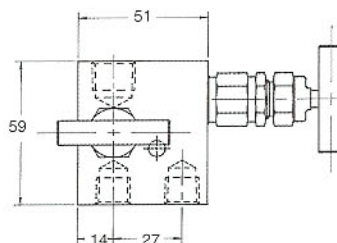
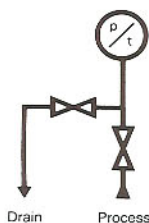
Description

Having the drain bonnet positioned on the left hand side this arrangement can be selected when space is limited, i.e. in control panels and small enclosures. Base mounting holes are provided and are suitable for M10 x 1.5 bolts (not supplied).

Part No.	Inlet	Outlet	Drain/test
L*2HLH	1/2" NPT female	1/2" NPT female	1/8" NPT female

Bellows assemblies are available for any of the manifolds shown in this catalog; see page 19

Two valve manifold – with reduced body dimensions

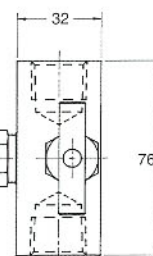
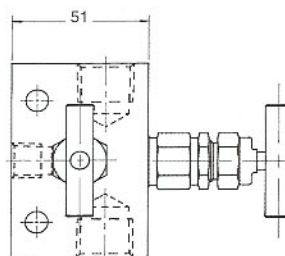
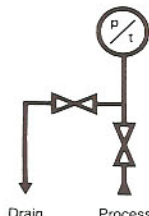


Description

This manifold is provided with smaller port connections in BSP taper or parallel threads and is particularly suited for installation in confined spaces. Reducing the thread sizes has resulted in an overall reduction in body size. With a broad selection of A-LOK® couplings, connections to a large range of inch or metric tubes is possible. Fixing hole diameter 6.5mm.

Part No.	Inlet	Outlet	Drain/test
L★2HV4K	1/4" BSP Taper female	3/8" BSP Taper female	1/4" BSP Taper female
L★2HV4R	1/4" BSP Parallel female	3/8" BSP Parallel female	1/4" BSP Parallel female

Two valve manifold – with side test port

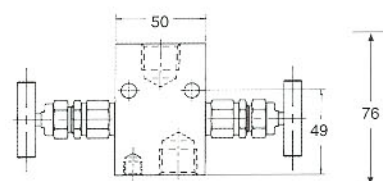
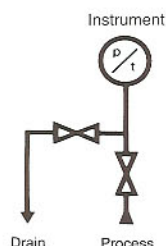


Description

This manifold adds flexibility to the range, the main features being the side position of the drain/test port. Fixing hole diameter 8.5mm.

Part No.	Inlet	Outlet	Drain/test
L★2HVSDLH	1/2" NPT	1/2" NPT	1/4" NPT

Two valve manifold – for oxygen service



Description

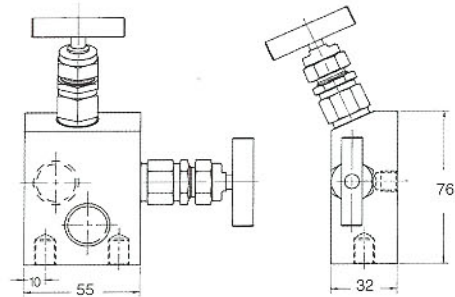
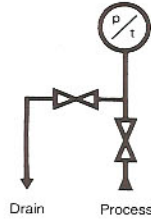
This manifold was designed at the request of producers of gaseous and liquid oxygen. While it maintains a high pressure rating, it avoids the use of stainless steel in wetted areas. The body is produced from high duty bronze with bonnet wetted parts in monel; the remaining parts are in stainless steel. The drain is provided with a high duty bronze plug and the manifold is cleaned to Parker I.P.D. standard ESS52 for suitability for oxygen service. Fixing hole diameter 8.5 mm. These manifolds have a maximum working pressure of 6000 psi (413 bar).

Part No.	Inlet	Outlet	Drain/test
LH2VSA19DEG	1/2" NPT female	1/2" NPT female	1/4" NPT female

★Insert material indicator into part no. ie: **S**-stainless steel, **C**-carbon steel, **M**-monel, **A**-6Mo, **N**-hastelloy, **H**-high duty bronze. Other materials available upon request.

Manifolds

Two valve manifold – horizontal port inlet, outlet and drain/test connections

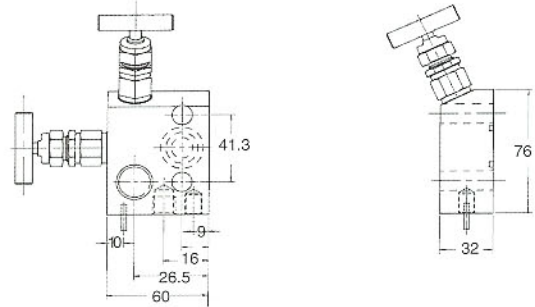
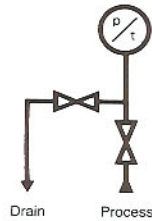


Description

Having the drain bonnet positioned on the right hand side, this arrangement can be selected when space is limited, i.e. in control panels and small enclosures. Base mounting holes are provided and are suitable for M10 x 1.5 bolts (not supplied).

Part No.	Inlet	Outlet	Drain/test
L*2HRH	1/2" NPT female	1/2" NPT female	1/8" NPT female

Two valve manifold – horizontal port entry with instrument flange outlet and drain/test port on base



Description

Suitable for direct mounting to gauge transmitters or one cell of a differential pressure transmitter. 1 off P.T.F.E. manifold to instrument sealing ring together with 2 off 7/16" UNF high tensile zinc plated carbon steel bolts are included with the manifold. This manifold is standard with left hand drain valve position and can be base mounted using locating pin and M10 x 1.5 bolt (not supplied).

Part No.	Inlet	Outlet	Drain/test
D*2HLH	1/2" NPT female	flanged	1/4" NPT female

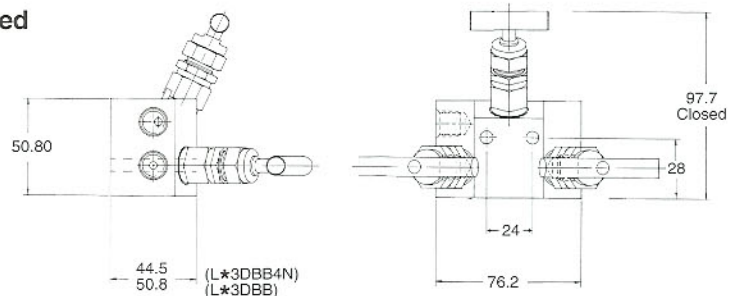
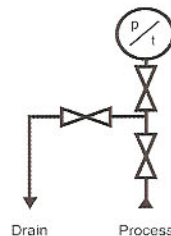
Additional options

DIN 19213 sealing grooves.
2 – 316 stainless steel 7/16" UNF bolts

Part No. suffix

DIN
SSB.

Three valve manifold – double block and bleed



Description

Critical service manifold for isolating/testing of pressure transmitters, gauges, switches etc. The manifold is provided with two isolating valves to ensure total isolation of the measuring device during maintenance. Designed for panel installation, the compact nature of the block makes it a popular selection when space is at a premium and connections are easy to access. Mounting holes are provided for 2 off M6 bolts (not supplied).

Part No.	Inlet	Outlet	Drain/test
L*3DBB4N	1/4" NPT female	1/4" NPT female	1/4" NPT female
L*3DBB	1/2" NPT female	1/2" NPT female	1/4" NPT female

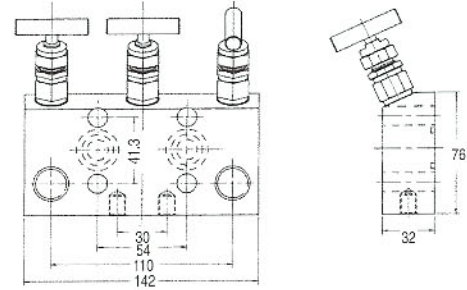
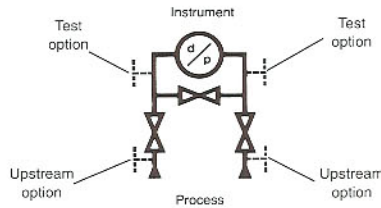
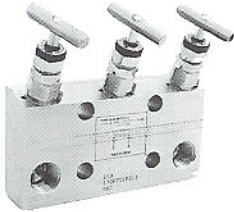
Bellows assemblies are available for any of the manifolds shown in this catalog, see page 19

Three valve manifolds

Purpose

Three valve manifolds are used in conjunction with differential pressure transmitters, they combine instrument isolation and equalizing in one block resulting in lower installation costs. The manifold designs have facilities for direct mounting to differential pressure transmitters or remote mounting from transmitters. Most designs incorporate base mounting holes, mounting brackets and blocks are also available (see page 22).

Three valve manifold – for direct mounting



Description

This manifold is suitable for direct mounting to a differential pressure transmitter which has inlet and flanged tapped holes on 54mm/2 1/8" centers. Optional upstream or downstream test ports are available. Manifolds are supplied with 2 off P.T.F.E. manifold to instrument sealing rings and 4 off 7/16" UNF high tensile zinc plated carbon steel bolts. Base mounting holes are provided and are suitable for M10 x 1.5 bolts.

Part No.	Inlet	Outlet
D*3	1/2" NPT female	flanged

Additional options

1/4" NPT female downstream test connections on bottom face. Plugs supplied
 1/4" NPT female upstream connections on bottom face. Plugs supplied

Part No. suffix

SA10
SA7

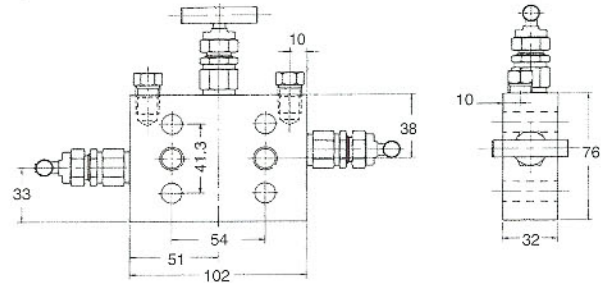
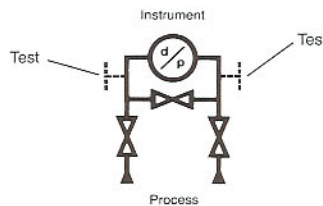
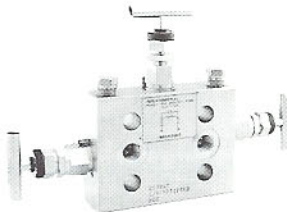
Additional options

4 – 316 stainless steel 7/16" UNF bolts
 DIN 19213 sealing grooves
 56 mm mounting hole and outlet centers (Rosemount range 6&7)
 57 mm mounting hole and outlet centers (Rosemount range 8)

Part No. suffix

SSB
DIN
56
57

Three valve manifold – for direct mounting



Description

For direct mounting to a differential pressure transmitter with 54mm/2 1/8" centers. This manifold incorporates standard test connections including plugs, all connections are BSP Taper. The manifold can be installed with the equalizing valve pointing up or down. Manifolds are supplied with 2 off P.T.F.E. manifold to instrument sealing rings and 4 off 7/16" UNF high tensile zinc plated carbon steel bolts.

Part No.	Inlet	Outlets	Test
D*3V4N	1/4" NPT female	flanged	1/4" NPT female
D*3V4K	1/4" BSP Taper female	flanged	1/4" BSP Taper female
D*3V4R	1/4" BSP Parallel female	flanged	1/4" BSP Parallel female

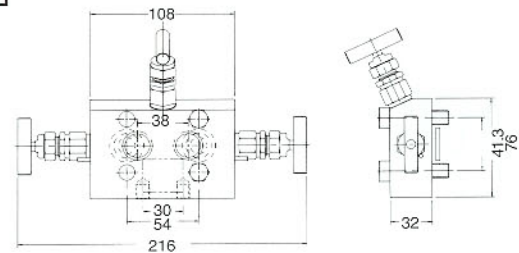
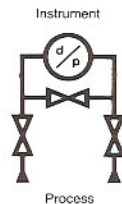
Additional options

4 – 316 stainless steel 7/16" UNF bolts

Part No. suffix

SSB

Three valve manifold – for direct mounting



Description

New compact manifold for direct mounting to a differential pressure transmitter with 54mm/2 1/8" centers. Manifolds are supplied with 2 off P.T.F.E. manifold to instrument sealing rings and 4 off 7/16" UNF high tensile zinc plated carbon steel bolts.

Part No.	Inlet	Outlet
D*3M	1/2" NPT female	flanged

Additional options

4 – 316 stainless steel 7/16" UNF bolts

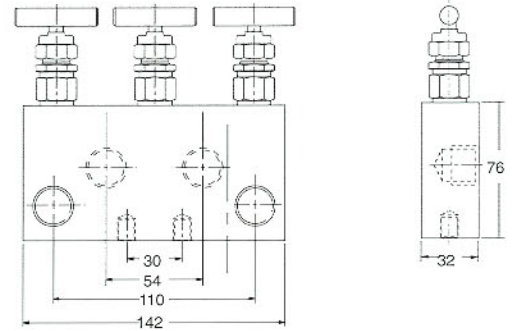
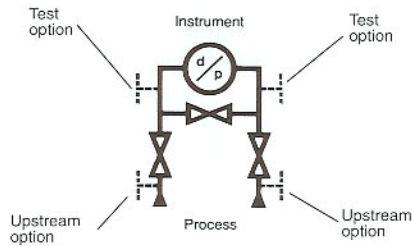
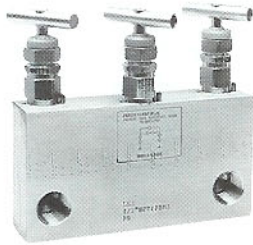
Part No. suffix

SSB

* Insert material indicator into part no. ie: **S**-stainless steel, **C**-carbon steel, **M**-monel, **A**-6Mo, **N**-hastelloy, **H**-high duty bronze, other materials available upon request.

Manifolds

Three valve manifold – for line or remote installation



Description

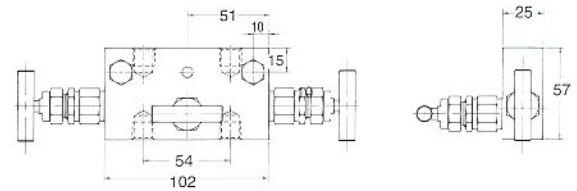
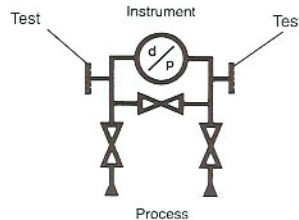
This manifold is designed for remote mounting from the differential pressure transmitter. This is made possible by including threaded outlet connections which are on 54mm/2 1/8" centers to suit the inlet center connections of the instrument. The manifold provides two instrument isolating valves and one equalizing valve for instrument zeroing. Base mounting holes are provided and are suitable for M10 x 1.5 bolts.

Part No.	Inlet	Outlet
L*3	1/2" NPT female	1/2" NPT female

Additional options
 1/4" NPT female upstream connection on bottom face. Plugs supplied
Part No. suffix SA9

Additional options
 1/4" NPT female downstream test connections on bottom face. Plugs supplied
Part No. suffix SA8

Three valve manifold – for line or remote installation

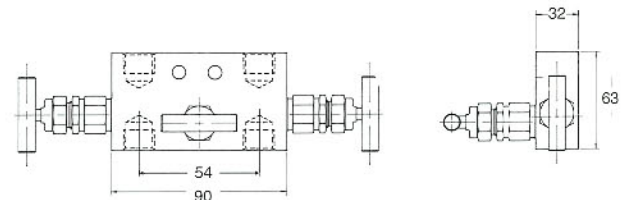
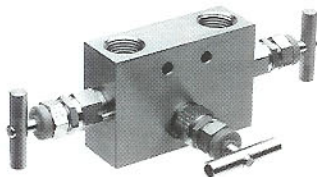


Description

This manifold has been designed with smaller threaded connections enabling a large reduction in overall dimensions. Downstream test connections are included as standard and plugs are provided. The standard thread form is BSP Taper with both inlet and outlet connections on 54mm/2 1/8" centers. Mounting hole is provided for M6 bolt.

Part No.	Inlet	Outlet	Test
L*3H4N	1/4" NPT female	1/4" NPT female	1/4" NPT female
L*3H4K	1/4" BSP Taper female	1/4" BSP Taper female	1/4" BSP Taper female
L*3SA6	1/4" BSP Parallel female	1/4" BSP Parallel female	1/4" BSP Parallel female

Three valve manifold – for line or remote installation



Description

New compact manifold body for limited space installations, 1/2 NPT female inlet and outlet ports are both on 2 1/8" / 54mm centers.

Part No.	Inlet	Outlet
L*3M	1/2" NPT female	1/2" NPT female

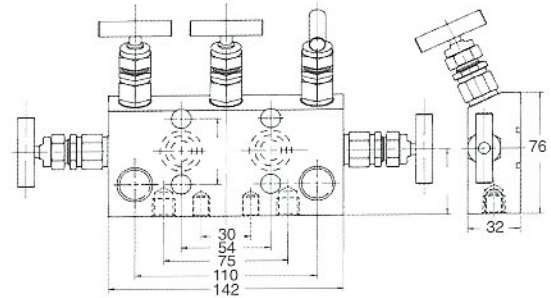
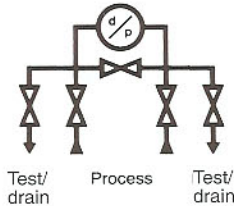
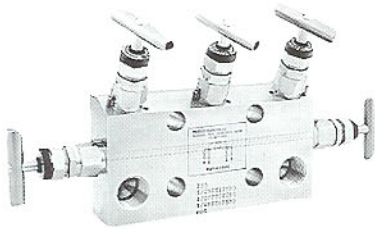
Refer to price list for stocked items and standard options.

Five valve manifold

Purpose

Five valve manifolds are used in combination with differential pressure transmitters providing isolation, equalizing and drain/test functions. The manifold allows operators to isolate, zero adjust the instrument and safely drain any trapped medium. The drain ports have a dual function, they can also be used as test or calibration connections after the draining operation has been completed. Manifold designs cover both direct mount and remote installation. All designs incorporate base mounting holes suitable for M10 x 1.5 bolts. Mounting brackets are available (see page 22).

Five valve manifold – for direct mounting



Description

This manifold is suitable for direct mounting to a differential pressure transmitter which has flanged tapped holes on 54mm/2 1/8" centers. Manifolds are supplied with 2 off P.T.F.E. manifold to instrument sealing rings and 4 off 7/16" UNF high tensile zinc plated carbon steel bolts.

Part No.	Inlet	Outlet	Drain/test
D*5	1/2" NPT female	flanged	1/4" NPT female

Additional options

1/8" NPT female drain/test ports on rear face.
DIN 19213 sealing grooves
4 – 316 stainless steel 7/16" UNF bolts

Part No. suffix

BD1/8N
DIN
SSB

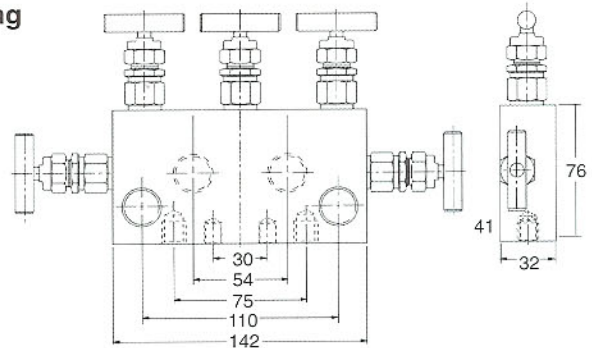
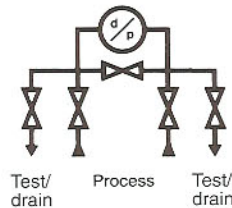
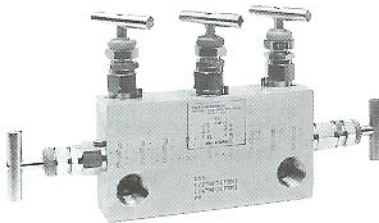
Additional options

56 mm mounting hole and outlet centers (Rosemount range 6&7)
57 mm mounting hole and outlet centers (Rosemount range 8)

Part No. suffix

56 (1/8" NPT drains)
57 (1/8" NPT drains)

Five valve manifold – for line or remote mounting



Description

The manifold is designed for remote mounting from the differential pressure transmitter. This is made possible by including threaded outlet connections which are on 54mm/2 1/8" centers to suit the inlet connections on the instrument. The manifold provides two instrument isolating valves, one equalizing valve for zeroing and two drain/test facilities.

Part No.	Inlet	Outlet	Drain/test
L*5	1/2" NPT female	1/2" NPT female	1/4" NPT female

Additional options

1/8" NPT female drain/test on rear face.

Part No. suffix

BD1/8N

*Insert material indicator into part no. ie: **S**-stainless steel, **C**-carbon steel, **M**-monel, **A**-6Mo, **N**-hastelloy, **H**-high duty bronze, other materials available upon request.

Manifolds

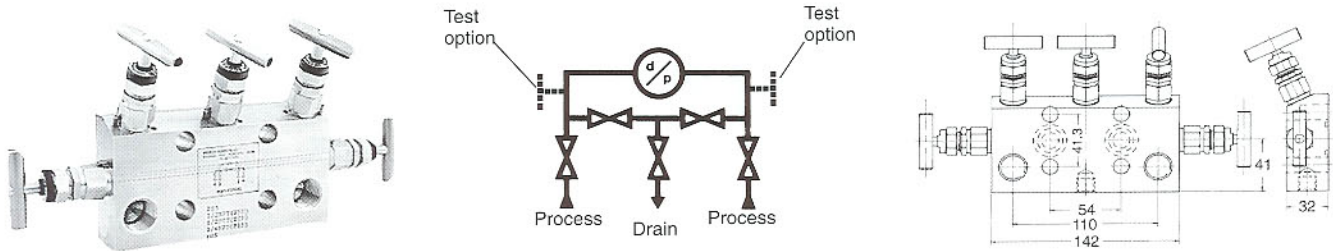
Fiscal metering manifolds

Purpose

For fiscal metering systems or critical gas flow measurements the five valve metering manifold is available. The manifold includes 2 equalizing valves to prevent leakage which might otherwise affect the accuracy of the instrument. Designed with a single drain/vent valve the manifold incorporates two isolating valves to facilitate instrument removal. With a simple adaptation the standard direct mount type can be converted into a remote type.

An option which is becoming increasingly popular is to include two 1/4" NPT test connections on the front face of the block. This allows the fitting of valved quick couplings which then enables instrument calibration/test to take place without removing the instrument from the manifold. These manifolds have a maximum working pressure of 6000 psi (413 bar).

Five valve fiscal metering manifold – for direct mounting



Description

This manifold is suitable for direct mounting to a differential pressure transmitter (which has inlet and tapped bolt holes on 54 mm/2 1/8" centers). Manifolds are supplied with 2 off P.T.F.E. manifold to instrument sealing rings and 4 off 7/16" UNF high tensile zinc plated carbon steel bolts.

For gas applications add suffix 9 to part number for Kel-F soft seating

Part No.	Inlet	Outlet	Drain
D★5DBB	1/2" NPT female	flanged	1/4" NPT female

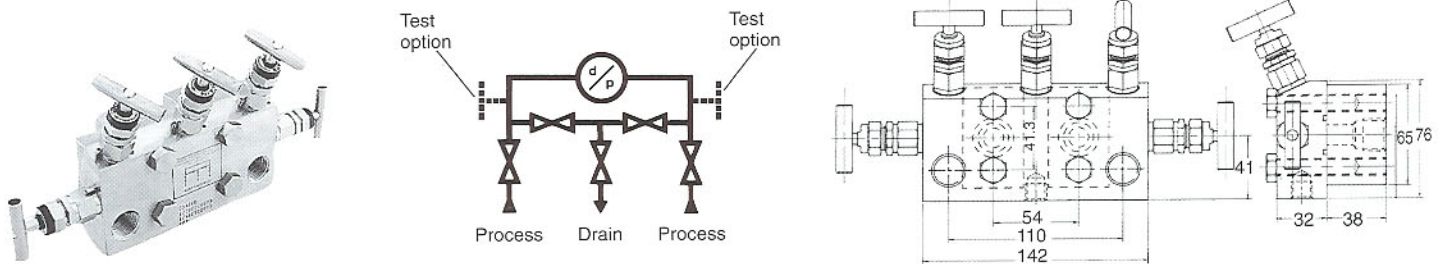
Additional options

- 1/4" NPT calibration ports
- 4 – 316 stainless steel 7/16" UNF bolts

Part No. suffix

- SA2
- SSB

Five valve fiscal metering manifold – for remote mounting



Description

Using two unique connectors the direct mount fiscal metering manifold can be simply converted into a remote/line mount type. This gives the user the distinct advantage of selecting one type of manifold which, during installation, can be changed to suit specific needs.

For gas applications add suffix 9 to part number for Kel-F soft seating

Part No.	Inlet	Outlet	Drain
L★5DBB	1/2" NPT female	1/2" NPT female	1/4" NPT female

Additional options

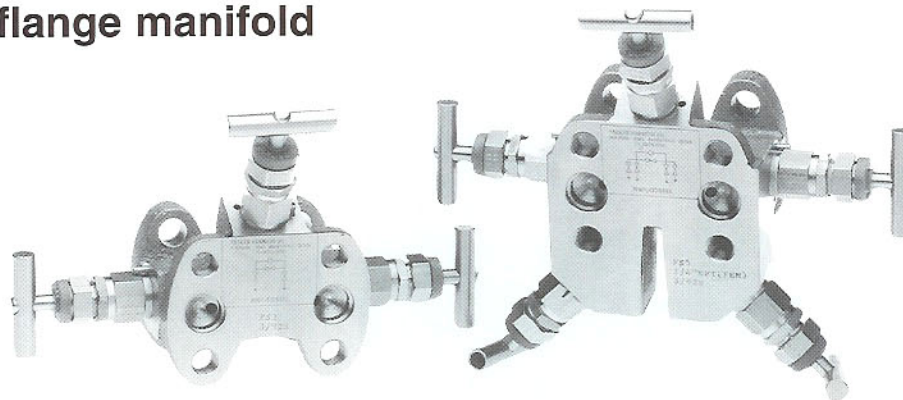
- 1/4" NPT calibration ports

Part No. suffix

- SA1

Refer to price list for stocked items and standard options

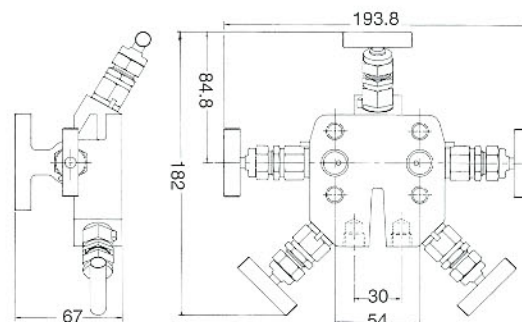
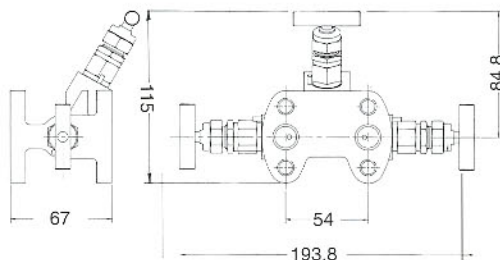
Flange to flange manifold



Purpose

The flange to flange manifolds have been designed to be mounted directly to differential pressure transmitters. The process/inlet side of the manifold (on 54mm centers) has the option of being provided with machined surfaces suitable for the mounting of transmitter ovals/kidney flanges or, 1/2" threaded connectors.

For instrument installation, the manifold is provided with 2 off P.T.F.E. sealing rings and 4 off 7/16" UNF high tensile, zinc plated, carbon steel bolts. The kidney flange/instrument ovals, bolts and sealing rings are not provided for the manifolds listed here (see page 14). For both 3 and 5 valve manifolds brackets are available for manifold mounting. The 3 valve manifold can also be offered with optional downstream test ports upon request. Another option which is available on these manifolds is an integral 1/8" NPT inlet and outlet steam connection with 1/4" (6.4mm) clear hole.



Part No.	Process connection	Instrument connection
FS3	flanged	flanged
FS38N	1/2" NPT female	flanged

Additional options
 DIN instrument outlets
 Integral 1/8" NPT steam heating connections

Part No. suffix
 DIN
 SH

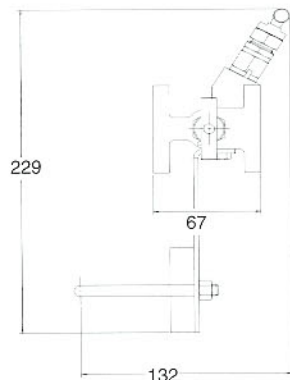
Part No.	Process connection	Instrument connection
FS5	flanged	flanged
FS58N	1/2" NPT female	flanged

Additional options
 DIN instrument outlets
 Integral 1/8" NPT steam heating connections

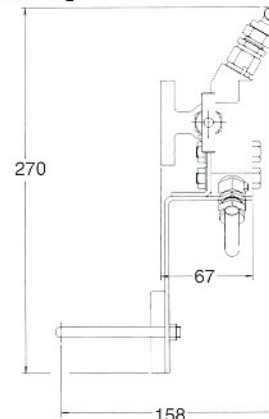
Part No. suffix
 DIN
 SH

The standard body material is 316L stainless steel to ASTM A351 – CF3M, other materials available upon request.

Bracket for 2" NB standpipe mounting



Part No. AAGM0435

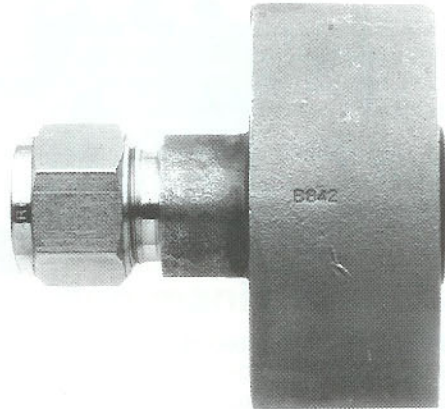


Part No. AAGM0440

Brackets are in carbon steel and include U bolt and nuts.

Manifolds

Instrument oval/kidney flange specification

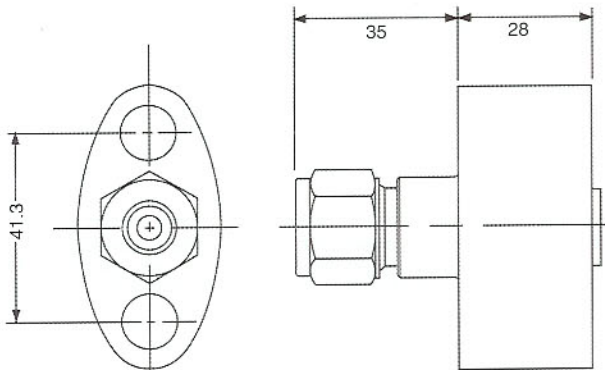


Purpose

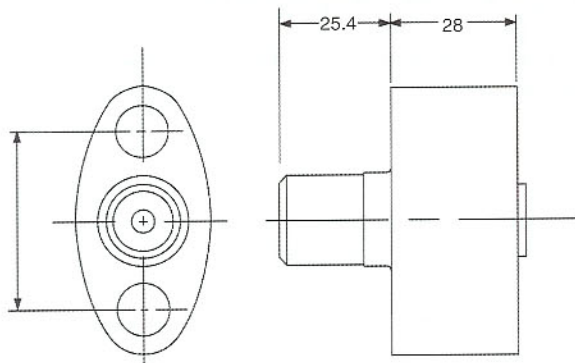
In response to the demands of engineers in certain industries, we have developed a series of standard instrument ovals/kidney flanges which include integrally machined A-LOK® twin ferrule connections. For the first time, engineers are now able to select standard flange to flange manifolds together with a range of compression fittings, avoiding the use of tapered thread connectors and reducing leak paths.

The integral A-LOK® instrument oval/kidney flanges can be supplied with connections for up to 12mm or 1/2" o.d. tube. Butt weld connections are also available for pipe sizes up to 1/2".

The oval/kidney flanges are supplied complete with 2 off 7/16" UNF x 1 3/4" high tensile zinc plated carbon steel bolts and 1 off P.T.F.E. sealing ring. For alternative bolt and seal materials please refer to page 23.



12mm OD A-LOK® kidney flange



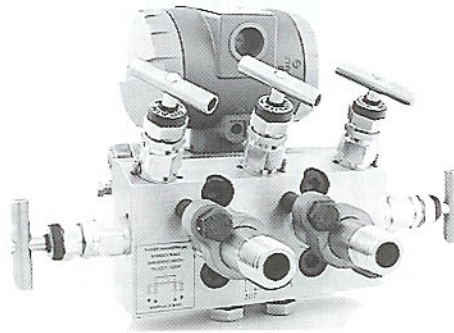
1/4" or 1/2" NB Butt weld kidney flange

Part No.	Process connection	Schedule
KFSM12A	12mm OD A-LOK®	Tube
KFS8A	1/2" OD A-LOK®	Tube
KFSBW4NB4	1/4" NB pipe	Sch 40
KFSBW8NB4	1/2" NB pipe	Sch 40
KFSBW8NB8	1/2" NB pipe	Sch 80
KFSBW8NB16	1/2" NB pipe	Sch 160
KFSBW8NBXX	1/2" NB pipe	Sch XXS

For A-LOK® pressure ratings and technical data see catalog 4236. The standard material is 316L stainless steel. Other materials available upon request.

Refer to price list for stocked items and standard options.

Variflange manifold



Patent pending

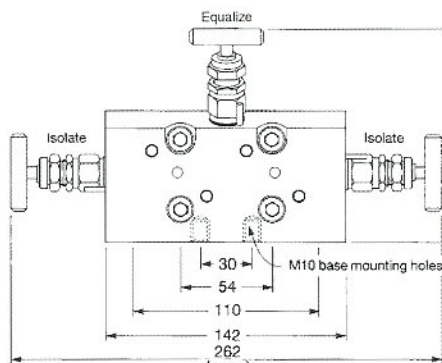
Purpose

The variflange manifold eliminates the need for transmitter kidney flanges replacing these with nipple connectors. The unique Parker design eliminates the problems in achieving kidney flange flat face alignment and allows infinite process connections of between 54 and 58mm centers.

This design considerably reduces the risk of overstressing connector threads and makes a valuable contribution in reducing installation costs. The manifold is more compact than flange to flange designs, allows for simple manifold support bracketing and enables inlet connections to suit customers requirements without changing the manifold.

The manifold to instrument assembly has been fully pressure tested in an unsupported condition with stress assimilations being applied. Full test results are available.

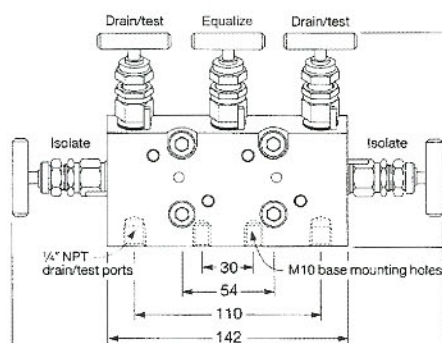
These manifolds are only recommended for a maximum working pressure of 6000 psi (413 bar).



Variflange 3 way manifold

Part No.	Description
D★3VF	Manifold with P.T.F.E. packing and seals, SS spindle
D★3VF3	Manifold with Grafoil packing and seals, SS spindle
D★3VF9	Manifold with P.T.F.E. packing and seals, Kel-F tip

Above manifolds supplied with manifold seals and 4 socket head cap screws.



Variflange 5 way manifold

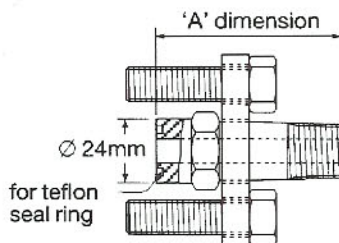
Part No.	Description
D★5VF	Manifold with P.T.F.E. packing and seals, SS spindle
D★5VF3	Manifold with Grafoil packing and seals, SS spindle
D★5VF9	Manifold with P.T.F.E. packing and seals, Kel-F tip

Above manifolds supplied with manifold seals and 4 socket head cap screws.

Nipple Assemblies

Part No.	Connection	'A' Dimension
VF★8A	1/2 OD A-LOK®	63mm
VF★M12A	12 mm OD A-LOK®	64mm
VF★8SWOD	1/2 OD Socket weld	54mm
VF★8BWNB	1/2 NB butt weld	54mm
VF★8NM	1/2 NPT male	68mm
VF★8KM	1/2 BSP Taper male	67mm
VF★4RM	1/4 BSP Parallel male	55mm

The above assemblies comprise 2 connectors, 2 clamps, 2 P.T.F.E. seal rings, 4 - 3/8 UNF x 1 3/4" hexagon head bolts, plastic hexagon bar, set of assembly instructions. For grafoil seals suffix part number with 3. Standard bolts are supplied in high tensile steel. For 316 stainless steel suffix part number with SSB.



All dimensions shown in this catalog are approximate.

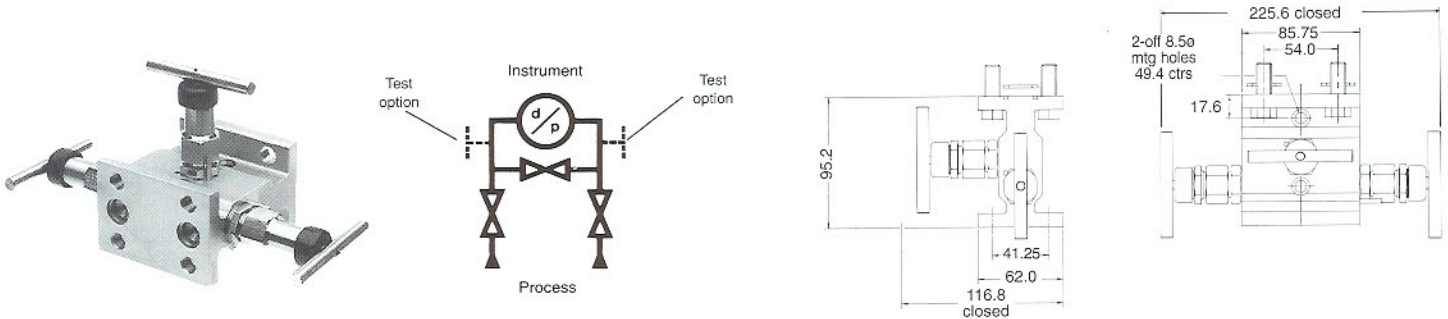
Manifolds

Roddable three-way soft seat manifolds

Purpose

Roddable manifolds incorporating a plug style design are recommended for applications involving gaseous or liquid fluids likely to be found in the offshore and hydrocarbon industries, petrochemical and gas producing industries, where reliable and long term trouble free operation are essential. With the standard Delrin seating they are particularly effective in maintaining positive seat sealing even when the medium, gas or liquid, is heavily contaminated with solids.

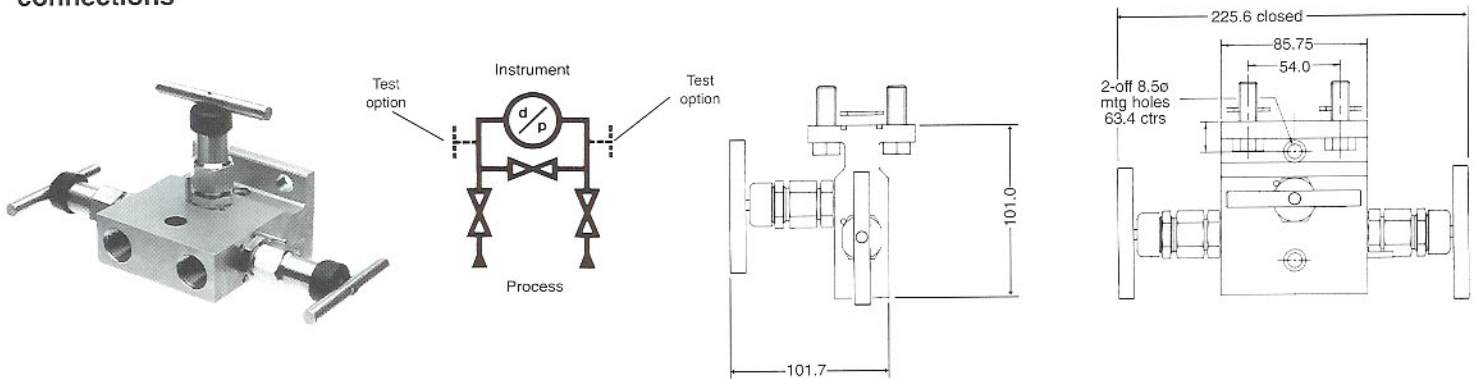
Three valve manifold – with flange to flange connections



Description

This manifold is suitable for direct bolting to a differential pressure transmitter which has center line bolting features of 54mm / 2.1/8 centers. Process connections are by means of kidney flanges/ovals transferred from the instrument to the manifold inlet face. Kidney flanges incorporating integral A-LOK®/CPI™ fittings are also available (see page 14), tapped holes on inlet face 4 x 7/16 UNF.

Three valve manifold – with threaded inlet process connections to flanged outlet instrument connections

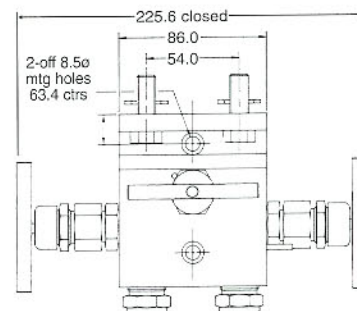
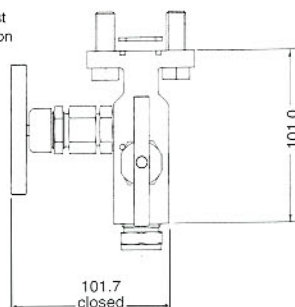
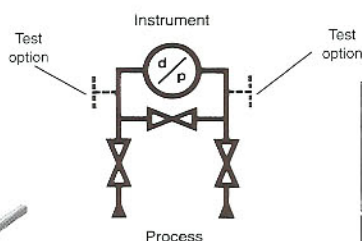
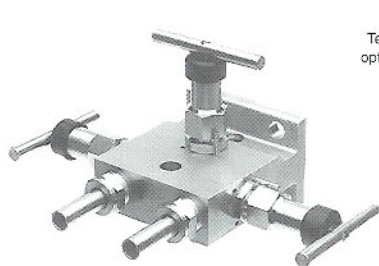


Description

This manifold is suitable for direct bolting to a differential pressure transmitter which has center line bolting features of 54mm / 2.1/8 centers. Process connections are of 1/2 NPT female.

Roddable three-way soft seat manifolds

Three valve manifold – with A-LOK®/CPI™ inlet process connections to flanged outlet instrument connections.



Description

This manifold is suitable for direct bolting to a differential pressure transmitter which has center line bolting features of 54mm / 2.1/8 centers. Process connections are 1/2" or 12mm inverted A-LOK® or CPI™ connections.

Part No (Roddable)	Inlet	Outlet
F★3RP	Flanged (54mm/2.1/8")	Flanged (54mm/2.1/8")
F★3RP8N	1/2 NPT female	Flanged (54mm/2.1/8")
F★3RP8AI	1/2 A-LOK®	Flanged (54mm/2.1/8")
F★3RPM12AI	12mm A-LOK®	Flanged (54mm/2.1/8")

For 1/8" NPT downstream test port connections suffix the part number DP.

Other optional packing and seat requirements should then be added to the part No.

For CPI™ replace A in part No with Z.

All the above manifolds include downstream plugged roddable ports for the equalize position.

All manifolds are supplied with 2 off PTFE manifold sealing rings and 4 off 7/16" UNF high tensile zinc plated carbon steel bolts (Stainless steel bolts are available; see page 23)

Manifolds incorporate holes which allow for pipestand mounting of the manifold block. This permits impulse line connections without the need to pre-mount the instrument. Also, in the event of subsequent instrument removal, the manifold is fully supported and not stressing the impulse lines. Brackets can be supplied to facilitate mounting.

The following options are available by suffixing the valve part number with the appropriate reference:

1st Suffix – packing 2nd Suffix – seat material

- | | |
|---------------|-----------|
| BN – Buna-N | PK – Peek |
| NE – Neoprene | K – Kel-F |
| KZ – Kalrez | |

Part number example:

Flanged to flange 3 way manifold in stainless steel with Kalrez O-ring seal and Kel-F seat part number will be FS3RPKZK.

The standard packing – (Viton) and standard seat – (Delrin) do not require any part number indicators.

The roddable style extruded block manifolds can also be fitted with conventional head assemblies.

Part No (Conventional)	Inlet	Outlet
EFS3	Flanged (54mm/2.1/8")	Flanged (54mm/2.1/8")
EFS38N	1/2 NPT female	Flanged (54mm/2.1/8")
EFS38AI	1/2 A-LOK®	Flanged (54mm/2.1/8")
EFS3M12AI	12mm A-LOK®	Flanged (54mm/2.1/8")

For 1/8" NPT downstream test port connections suffix the part number DP.

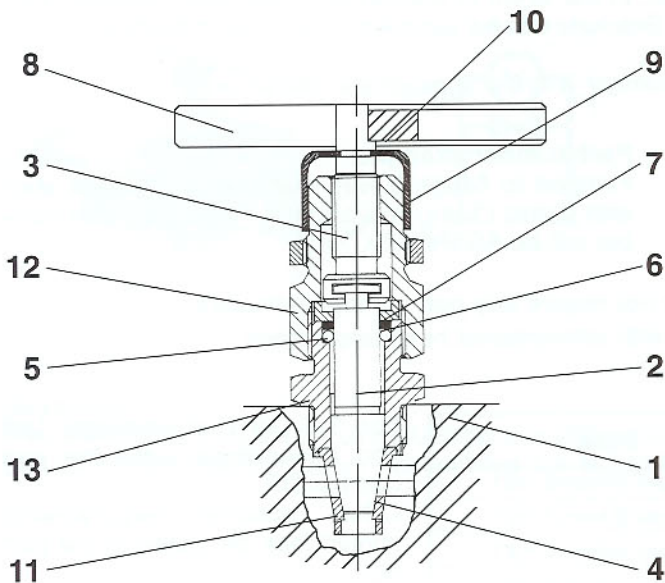
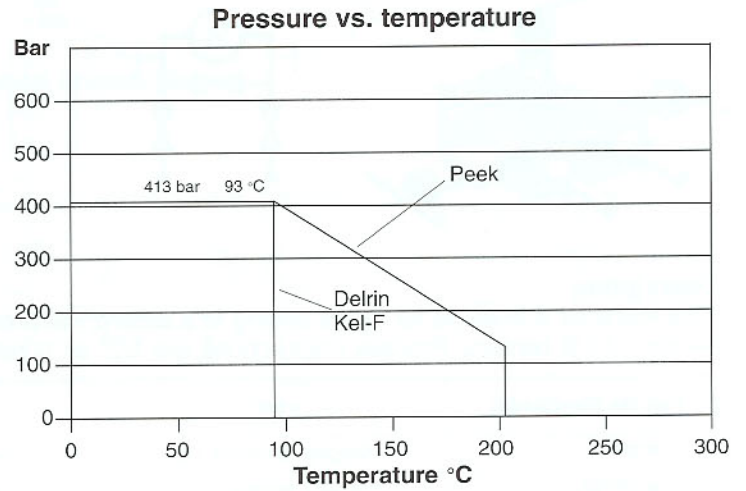
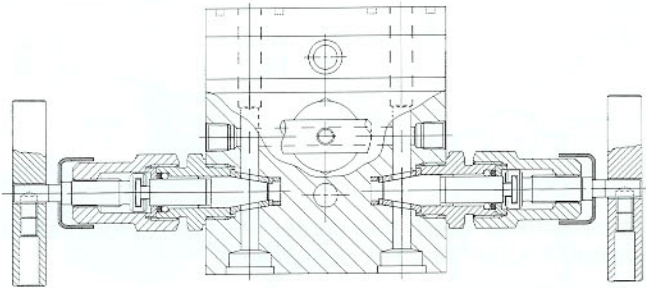
Other optional requirements should then be added to the part No.

For CPI™ replace A in part No with Z.

★Insert material indicator into part no., ie: **S**-stainless steel, **C**-carbon steel, **M**-monel, **A**-6Mo, **N**-hastelloy, **H**-high duty bronze, other materials available upon request.

Manifolds

Roddable three-way soft seat manifold



Part description and materials

1	Body	AISI 316 stainless steel
2	Plug	AISI 316 stainless steel
3	Operating spindle	AISI 316 Silver plated thread
4	Seat	Delrin
5	Gland seal	Viton
6	Back up ring	P.T.F.E.
7	Seal retainer	AISI 316 stainless steel
8	T bar handle	AISI 316 stainless steel
9	Dust cap	L.D.P.
10	Grub screw	AISI 316 stainless steel
11	Seat retainer	AISI 316 stainless steel
12	Bonnet nut	AISI 316 stainless steel
13	Stud	AISI 316 stainless steel

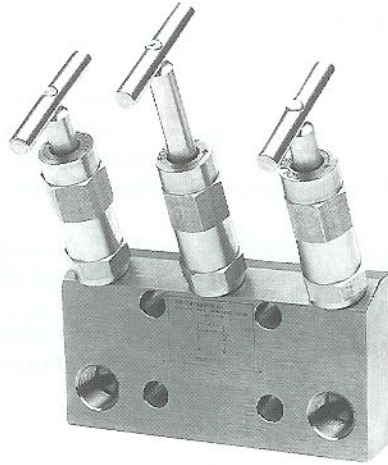
For seat and gland seal options see page 17.

For other materials please contact our sales desk

Bellows manifold

Purpose

To give total assurance against leakage to atmosphere in normal pressure measurement applications and fulfilling the requirements of environmental legislation.



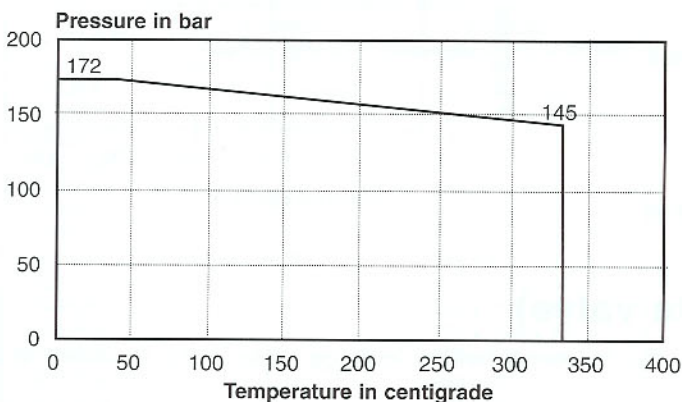
Specifications

- Standard material : 316 stainless steel
- Bellows material: 321
- Pressure rating: 2500 psi (172 bar)
- Maximum temperature: 330°C
- Orifice: 4.8mm

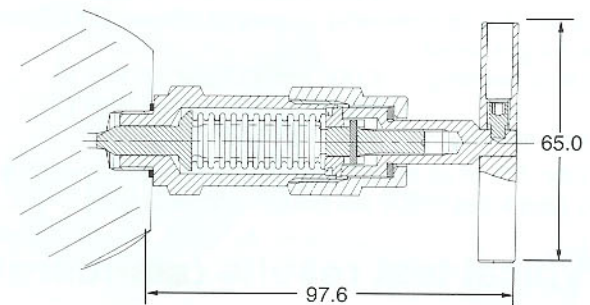
Features

- Will fit into any standard manifold body
- Metal/metal seat
- Orbital TIG welded bellows unit
- Bellows weld helium leakage tested
- Valve assembly to manifold body seal achieved with stainless steel washer and lock pin
- Optional valve assembly to manifold body weld seal available
- 100% strength and seat tested
- Function identification

Pressure/ temperature graph Bellows valve



Dimensions



How to order

Select any of the manifolds shown in this catalog, ie: DS3, suffix the part number BH, ie: DS3BH. If the bellows valve assembly is to be seal welded into the manifold body add W, i.e.: DS3BHW. Any other options which are required should have their part number suffix selected and added.

Note: While the bellows unit has been designed to fit existing manifold units, the locking pin positioning has had to be changed. The existing locking holes for the standard bonnet will still be slightly visible. The bellows are not suitable for roddable manifolds.

Manifolds

Material specification

When the appropriate material designator has been included in the part number the materials used will conform to the chemical requirements of one or more of the specifications listed below. (see page 4 for bellows details)

Material (designator)	Specification
Stainless steel (S)	BS970-S13 Werkstoff 1.4404 AISI 316L
Monel 400 (M)	BS 3076 NA13 ASTM B164
★Carbon steel (C)	BS970 part 1 230MO7 ASTM A108 grade 12L14
6Mo (stainless steel 6% molybdenum (A))	ASTM S31254
† High duty bronze (H)	DGS 1043 grade 2
Hastelloy C276 (N)	ASTM B575/ASTM B574

★ When specifying carbon steel manifolds the complete bonnet assembly will be supplied in stainless steel.

Carbon steel body is zinc plated and passivated.

† High duty bronze is not recommended for 10,000 psi/690 bar rating.

Carbon steel bolts to BS 1768 are supplied with direct mount manifolds

It is normal to supply non-wetted parts (see page 4 for details) in stainless steel, please specify if other materials are to be used for these parts.

Testing

Manifolds shown in this catalog, unless otherwise stated, have a maximum pressure rating of 6,000 psi/413 bar.

All manifolds are subject to a hydrostatic strength test of 9,000 psi/620 bar and 6,000 psi/413 bar seat test.

Manifolds and valves offered to 10,000 psi/690 bar are tested to 15,000 psi/1,035 bar and 10,000 psi/690 bar accordingly.

Pressure/temperature ratings (-55°C to 450°C).

P.T.F.E. packing – 6,000 psi/413 bar @ 100°C.

– 4,000 psi/275 bar @ 200°C.

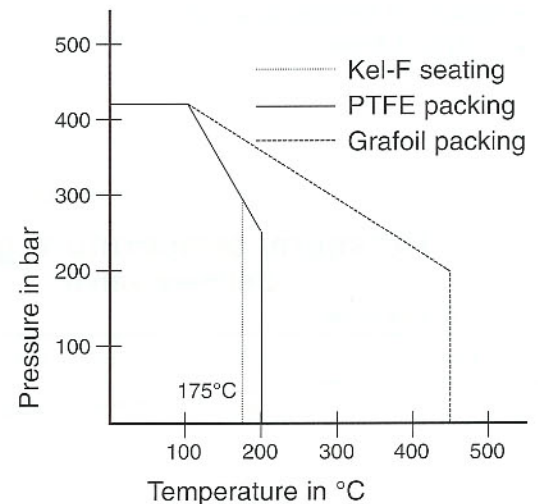
We do not recommend operation above 200°C unless Grafoil packing is used.

Grafoil packing – 6,000 psi/413 bar @ 100°C.

– 3,000 psi/207 bar @ 450°C.

Kel-F seating – 55°C to +175°C

(Note: 5% of all manifolds produced with Kel-F tip are subject to an additional 6,000 psi pneumatic seat test).



Typical test results (standard needle valve)

In tests performed on a standard bar stock needle valve, the following helium leakage rates were recorded at a vacuum level of 10^{-5} torr.

External at gland packing (P.T.F.E.) < 1×10^{-9} cc/sec.

External at gland packing (grafoil) < 1×10^{-9} cc/sec.

Seat leakage (metal/metal) < 1×10^{-9} cc/sec.

Seat leakage (Kel-F tip) < 1×10^{-9} cc/sec.

Standard manifolds are assembled with the same design of bonnet, with seat dimensions and surface finish tolerances similar to those tested.

Refer to price list for stocked items and standard options.

Additional features

Certification

All manifolds are dispatched with a standard certificate of compliance. **Test certificates can only be supplied if requested at order stage.**

Heat code traceability

This is standard to all manifolds and should be requested after receipt of the product by calling out the appropriate H.C.T. numbers on the body and bonnet.

Identification

All manifolds are electro chemically etched to provide permanent identification. Information provided includes an arrow (where appropriate, to indicate the preferred direction of flow), maximum working pressure, valve line diagram, test reference, test code, manifold part number and connecting thread sizes and form.

Welding

Connections for butt or socket welding can be provided. When requesting a quotation or placing an order for buttweld connections please state clearly the appropriate welding standard to be applied, together with N.D.T., inspection and certification requirements. Always clearly state whether weld connections are to be suitable for pipe (N.B.) or tube (O.D.)

Coefficient value (Cv)

This normally is only appropriate to the bar stock needle valves and is 0.3.

Thread details

The thread size designators used are denominations of 1/16th of an inch, i.e. DS38K the 8 = 1/2". Threads are produced to the following standards:

N = NPT	ANSI B1.20. 1.
K = BSP taper	BS21, ISO7/1.
R = BSP parallel	BS2779, ISO228/1.

How to order

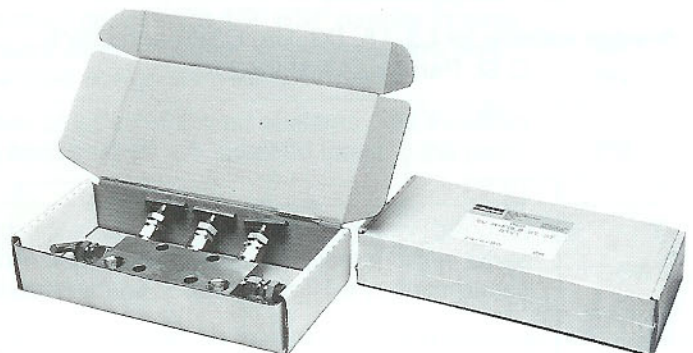
To order, specify the part number shown in the section for each manifold ensuring that the appropriate material indicator is included. Add the suffix shown for any additional/optional requirements. Should more than one addition/option be required, refer to sales department for part number.

Continuous product development may from time to time necessitate changes in the details contained in this catalog. Parker Hannifin reserves the right to make such changes at their discretion and without prior notification. All dimensions shown in this catalog are approximate.

Packing and protection

Weights and packed dimensions

Part No.	Packed weight (kilo's)	Packed dimensions (millimeters)
NVS4FF	0.5	125 x 97 x 33
NVS6FF	0.5	125 x 97 x 33
NVS8FF	0.5	125 x 97 x 33
NVS4M4F	0.6	125 x 97 x 33
NVS8M8F	0.6	125 x 97 x 33
GVS6K	0.7	125 x 97 x 33
GVS8	0.8	125 x 97 x 33
GVS12	0.9	125 x 97 x 33
LS2V	1.1	170 x 77 x 33
LS2HLH	1.3	155 x 125 x 50
LS2HRH	1.3	155 x 125 x 50
DS2HLH	1.4	155 x 125 x 50
LS2HVSDLH	1.1	108 x 86 x 71
LS2HV4K	0.8	108 x 86 x 71
LH2VSA19DEG	1.0	170 x 77 x 33
DS3	2.8	155 x 125 x 50
DS3V4K	2.1	218 x 135 x 32
LS3	2.7	155 x 125 x 50
LS3H4K	1.4	218 x 90 x 70
DS5	3.0	260 x 125 x 50
LS5	3.0	260 x 125 x 50
DS5DBB	3.0	260 x 125 x 50
LS5DBB	3.2	260 x 125 x 50

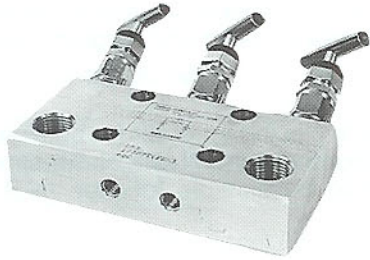


After assembly and test each manifold is carefully packed into an appropriately sized packing box, and shrink wrapped.

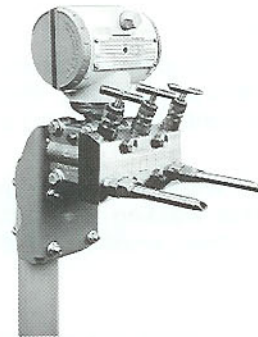
Manifolds

Manifold support

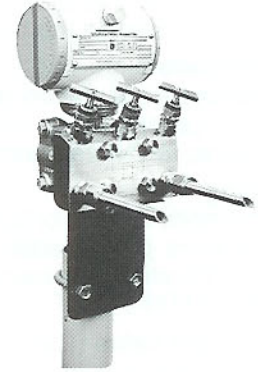
Manifold support brackets and blocks are recommended when an instrument is to be directly mounted to the manifold. Most manifolds are suitable for base/bracket mounting and can be supplied with the necessary mounting supports. By mounting the manifold, the user will ensure that when/if the instrument is to be removed the manifold remains fully supported. Another advantage of the "mount the manifold" philosophy is that the installation piping can proceed without the need to assemble the instrument.



Base bracket mounting holes

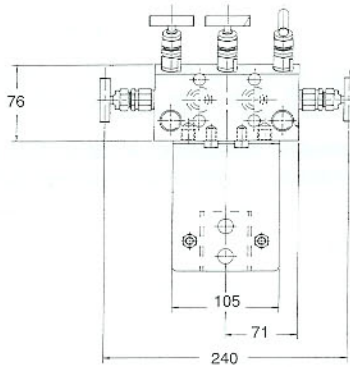


Incorrect assembly
(Bracket mounted instrument)

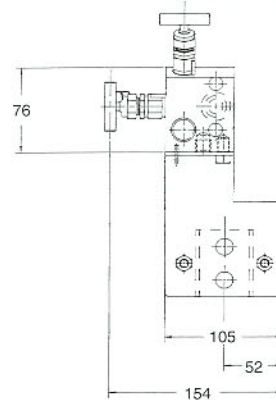
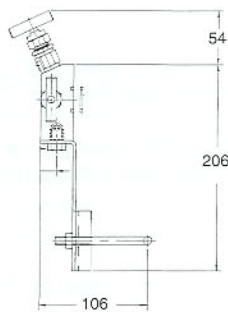


Correct assembly
(Bracket mounted manifold)

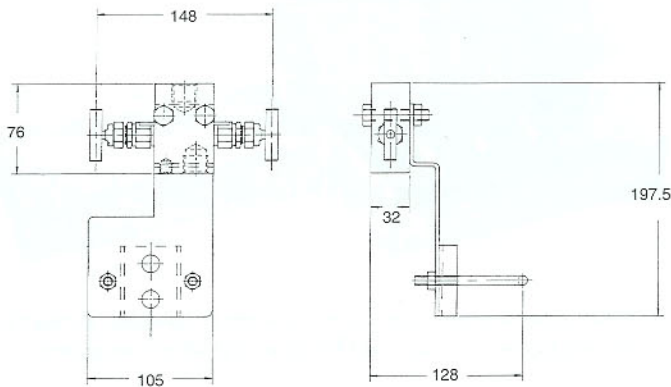
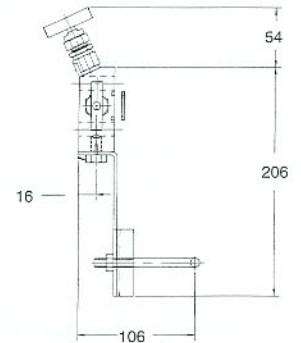
Manifold base support/bracket kits can be supplied in either shot blasted and zinc sprayed carbon steel or, stainless steel upon request. Each kit includes appropriate bracket, U bolt nuts and bracket nuts/pins. Brackets are suitable for 2" NB standpipe or uni-strut mounting.



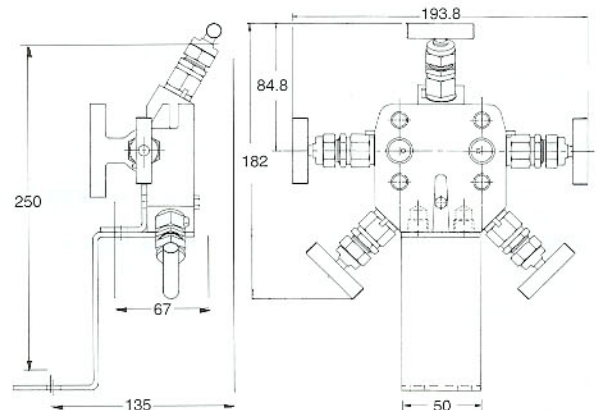
Bracket suitable for L3, L5, D3, D5, D3VF and D5VF
C.St. Part No. AAGM0420/1



Bracket suitable for D2HLH.
C.St. Part No. AAGM0410/1







Bracket suitable for L2V style manifold.
C.St. Part No. AAGM0430/1



Bracket suitable for FS5 manifold (enclosure mounted)
C.St. Part No. AAGM0432/1

Refer to price list for stocked items and standard options.

Options

Part	Description	Part No. suffix
 T bar handle locking device	Manufactured in stainless steel, the device can be used to lock the T bar in the open or closed position. Padlocks are not included.	HL
 Anti-tamper bonnets	To prevent accidental operation of the manifold. These bonnets can be installed in any position. For selected position only, add functional code after AT, ie. Equalize Isolate Drain (See page 20 for operating key).	AT ATEQ ATIS ATDR
 Kel-F soft seating	For applications up to 6,000 psi/413 bar involving gaseous mediums it is recommended that soft tips be used to ensure positive shut off. The needle incorporates a crimped Kel-F tip which is back sealed preventing any possibility of tip blow out.	9
 Grafoil seals	For elevated temperatures grafoil gland packings and manifold sealing rings should be selected. (Grade GTK)	3
17-4PH lower spindle	For more rigorous applications	17
*Socket weld	To suit 1/2" N.B. pipe	SW8NB
*Butt weld	1/2" N.B. pipe x 150mm long.	BW8NB
NACE	Standard manifolds can be supplied to conform to the NACE specification MR0175-1991.	NACE
Bolts	316 stainless steel bolts for direct mounted manifold	SSB
†Threads	For standard manifold design with 1/2" BSP parallel threads, suitable for stainless steel or copper sealing washers only. For standard manifold design with 1/2" BSP taper.	8R 8K
Plugged drains	Due to the number of types of thread sealants now available and users preferences, plugs are supplied loose in the packing box.	PD
Cleaning for oxygen service	Degreased and cleaned suitable for oxygen service. Manifolds will be supplied with a certificate, only when requested at the order stage. Cleaning will be in accordance with ESSF52.	DEG
High Pressure	Unless otherwise indicated, all valves and manifolds can be offered for 10,000 psi (690 bar) operation. For adding this option to other options, for example Kel-F tip, add HP suffix at the end, ie: 9HP (Equalize H.P height = 77mm open on D3, D5, L3 and L5 blocks).	HP

* Grafoil packing will be automatically fitted when specifying these options.




† For certain configuration of manifolds the thread suffix need not apply please contact your local distributor for part number confirmation.

Manifolds


Accessories and spares

Description	Part No.	Box quantity
T bar locking device (excludes padlock)	PH749316/1	1
P.T.F.E. gland packings	PH671FLUON/10	10
Grafoil gland packings	PH671GRAFOIL/10	10
P.T.F.E. manifold/instrument seals (D manifold style)	PH573FLUON/10	10
Grafoil manifold/instrument seals (D manifold style)	PH573GRAFOIL/10	10
P.T.F.E. manifold/instrument seals (F manifold style)	PH576/FLUON/10	10
Grafoil manifold/instrument seals (F manifold style)	PH576/GRAFOIL/10	10
Instrument mounting bolts in carbon steel	PH582/8	8
Instrument mounting bolts in stainless steel	PH582SS/4	4
Spares kit containing 5 spindles, 5 P.T.F.E. gland packings, 5 stainless steel washers, 5 bonnet lock pins	KIT650316L	1 set
Spares kit containing 5 spindles, 5 grafoil gland packings, 5 stainless steel washers, 5 bonnet lock pins	KIT6503316L	1 set
Spares kit containing 5 Kel-F spindles, 5 P.T.F.E. packings, 5 stainless steel washers, 5 bonnet lock pins	KIT6509316L	1 set
Bonnet assemblies Isolate with P.T.F.E. gland packing Equalize with P.T.F.E. gland packing Drain with P.T.F.E. gland packing	PH650316LIS/1 PH650316LEQ/1 PH650316LDR/1	1 1 1
Isolate with grafoil gland packing Equalize with grafoil gland packing Drain with grafoil gland packing	PH6503316LIS/1 PH6503316LEQ/1 PH6503316LDR/1	1 1 1
Isolate with soft tip spindles Equalize with soft tip spindles Drain with soft tip spindles	PH6509316LIS/1 PH6509316LEQ/1 PH6509316LDR/1	1 1 1
For high pressure bonnet add HP before 316, ie: for equalize PH650HP316LEQ/1		
For anti-tamper bonnet assemblies add AT before 316, ie: for Isolate PH650AT316LIS/1		
Anti-tamper key	PHATKEY/1	1

Plugs and connectors

	Vent valves 1/2" NPT	W79742HC/1	1
	Drain plugs 1/4" NPT	4PHSS	20
	Conversion connector for LS5DBB	PH755316/2	2

Swivel gauge connectors standard in stainless steel. For use with pressure gauges allowing the orientation of the gauge face to any position.

	Part No.	Inlet	Outlet (gauge)
	6-8F6GASS 8-8F6GASS W80400HC	1/2" NPT 1/2" NPT 1/2" NPT	3/8" BSP Parallel 1/2" BSP Parallel 1/2" NPT

Lapped joint tube connectors for instrument process lines 1/2"NB(DN15)

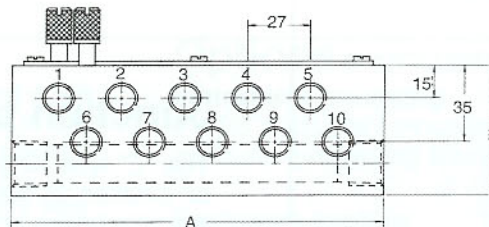
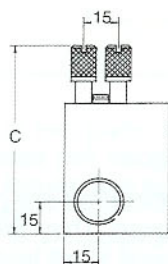
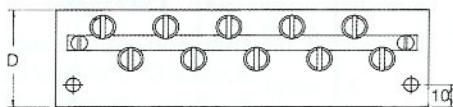
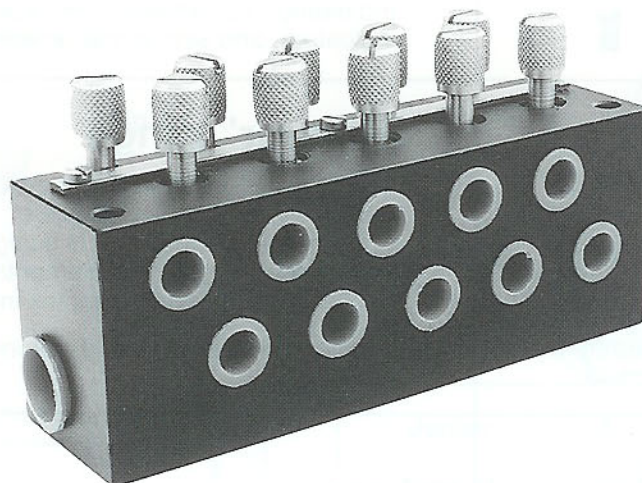
	A-LOK® Part No.	Tube size	Finish	CPI™ Part No.	Tube size	Finish
	M10LJF-5-★	10mm	Smooth	LJFBZ10-5-★	10mm	Smooth
	M10LJF-9-★	10mm	Serrated	LJFBZ10-9-★	10mm	Serrated
	6LJF-5-★	3/8 o.d	Smooth	6LJFBZ-5-★	3/8 o.d	Smooth
	6LJF-9-★	3/8 o.d	Serrated	6LJFBZ-9-★	3/8 o.d	Serrated

★ Insert material indicator into part no., ie: 316-stainless steel, M-monel, 6Mo-6Mo, HC-hastelloy, HDB-high duty bronze.

Air distribution manifold

This design of manifold replaces many single unit valve assemblies which would normally be operating from one common pressure source. These miniature manifolds consist of up to 10 isolating valves integral to one manifold distribution block. The block has a large bore to maximize flow and is internally drilled to connect it to each isolating valve. Installation costs and space savings are considerable when this design of manifold is used.

Primarily designed for instrument air supplies in the pneumatics industry, the distribution manifolds are now available for gaseous and other media and are suitable for many applications in the offshore, gas, petro-chemical and chemical industries. In addition, they do of course continue to maintain their place in general industries.



Specification

- Standard material AISI316 stainless steel.
- Maximum working pressure 21 bar (300 p.s.i.)
- Maximum operating temperature 100 degrees C (212 degrees F).





Features

- Inlet connection 1/2" NPT female.
- Outlet connection 10 x 1/4" NPT female.
- Numerical outlet identification.
- 5 or 10 way manifold bodies.
- 1/2" NPT female outlet connection for adding further blocks.
- Mounting holes 2 x 6.25mm diameter.
- Teflon tip spindles for positive shut-off.
- Spindle blow out prevention bar.
- Low operating torque.
- Valve spindles knurled and slotted for easy operation.
- Easy system extension.

Part No.	Material	No. of Outlets	Dimensions			
			A	B	C	D
ADMS5	SS	5	92	60	85	45
ADMS10	SS	10	160	60	85	45

All dimensions in millimeters

Index

	<p>“Junior” range</p> <p>The “Junior” enclosures are designed in conjunction with the “instru-mount” system to provide a range of compact instrument enclosures with 100% accessibility to instrument, manifold and services. Designed principally for flow, level and pressure transmitters, these enclosures also house indicating controllers, recorders, differential pressure indicators, and similar instruments.</p> <p style="text-align: right;">Page 27</p>
	<p>“Senior” range</p> <p>The “Senior” enclosure offers a new concept in enclosure design by offering the choice of either “flip-top” or front/rear doors in one enclosure. It is designed to enclose “large case” instruments and is complementary to the “Junior” range in applications involving complex instrument services.</p> <p style="text-align: right;">Page 28</p>
	<p>“S” range</p> <p>Two enclosures with hinged tops comprising single S and double S. The double S is particularly useful for mounting two or more instruments in the same enclosure together with associated manifolds.</p> <p style="text-align: right;">Page 29</p>
	<p>Junction boxes</p> <p>The “E” type hinged door enclosures are primarily designed as junction or marshalling boxes. They are also suitable as terminal boxes and for enclosing small instruments.</p> <p style="text-align: right;">Page 30</p>

All Parker G.R.P. enclosures are designed and manufactured to meet IEC 144 IP56/65 standard.

Material

Parker enclosures are manufactured from glass reinforced polyester and are offered as a standard in grey color to BS4800 10-A-03.

In addition to the smooth finish of glass reinforced polyester the material offers the following performances:

- impact absorption to BS5501
- fire retardant and self extinguishing (oxygen index = 30 to BS5734 part 1 method 4).
- working temperature: -55 to +80°C
- non absorption of hydrocarbons
- anti-static to BS5501 (option)
- good thermal insulation

How to order and create part number — read page 36, photocopy pages 37 and 38, complete, and forward to your local distributor.

“Junior” range

Purpose - The Junior enclosures are designed in a two piece arrangement with a straight/horizontal joint line which is essential for maximizing installation and maintenance access. The enclosures are recognized as the finest design for accommodating a differential pressure transmitter and associated manifold. With a basic lift off or hinged top, connection entries are possible through the front, side, bottom or back.



Fig. 1

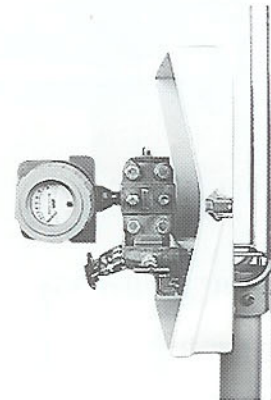
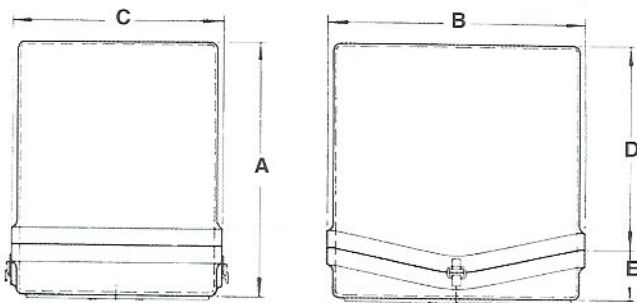


Fig. 2

Junior enclosures for maximum access and flexible installations



Junior	A	B	C	D	E
Type J1	380	380	310	305	75
Type J2	420	380	310	305	115
Type J3	480	380	310	405	75
Type J4	520	380	310	405	115

Dimensions given in millimeters

Description

The enclosure is made of two parts: a bottom and a “lift off” top. A recessed closed cell neoprene gasket in the top half renders the enclosure dust tight, waterproof and ensures minimal heat loss.

Closing of the two parts is achieved with two heavy duty stainless steel toggle fasteners. The enclosure is constructed with a reinforced web section at the joint line for rigidity.

The support plate can be supplied for either horizontal mounting (Fig. 1) or vertical mounting (Fig. 2).

To order: see pages 36-38 and complete section A.

Material

Hot pressed glass reinforced polyester with the following characteristics: impact absorption, self extinguishing, etc . . .

See page 26 for details.

Options

Enclosure mounting

Full size 5mm base support plate with stub suitable for 2" N/B standpipe. Stub fitted with 3 stainless steel pinch-bolts for assembly to 2" N/B standpipe.

Full height mounting stand.

Options (continued)

Instrument mounting

2" N/B instrument mounting pillar
Instrument mounting bracket

Enclosure heating

Steam heating coil
Electric heater for hazardous areas, thermistor controlled with modulating output.
Electric heater for non-hazardous areas, thermistor controlled modulating output.
Thermal insulation

Instrument viewing and inspection

Stainless steel rear hinges with top half of enclosure retained in open position by folding stainless steel stay.
High impact laminated glass window

Enclosure entries

Membrane grommets
Gland plates

See pages 31, 32, 33 and 34 for details of options.

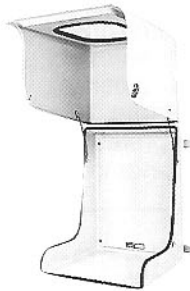
G.R.P. Enclosures

“Senior” range

Purpose - The “Senior” enclosure is designed to give maximum access to larger enclosed instruments. Inlet connections can enter through any position i.e: side, front, top or back. Total flexibility is added by the possibility of fitting front and back doors, plus many other accessories. (see below)



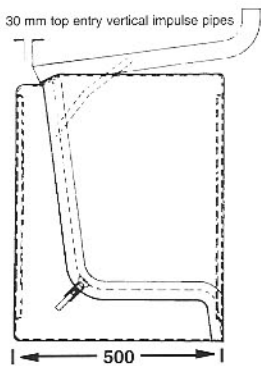
With “lift off” or “flip” top



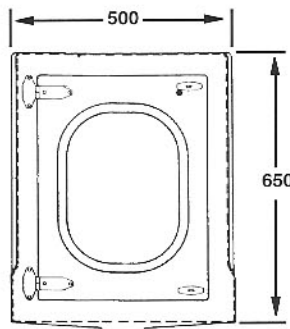
Wall or base mounting



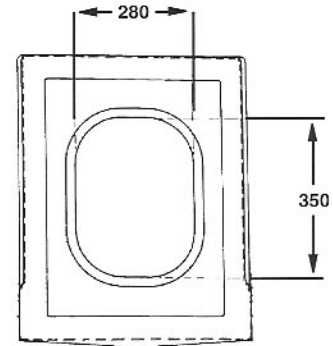
Front and/or rear doors



With “flip” top



With door and window in front panel



With window in front panel

Dimensions given in millimeters.

Description

The enclosure is made of two parts, a bottom and a “lift off” top. An inverted “U” section rubber seal with flexible “skirt” renders enclosure dust tight, waterproof and ensures minimal heat loss.

Closing of the two halves is achieved with two heavy duty stainless steel toggle fasteners (fitted on inside when enclosure is supplied with doors).

The enclosure is constructed with reinforced web section at joint line for rigidity.

To order: see pages 36-38 and complete section A.

Material

See page 26 for details.

Options

Enclosure mounting

Base enclosure mounting plate and pinchbolts for either 2" or 4" N/B standpipe.

Full height mounting stand, up to 4" N/B pipe.

Mounting straps, horizontal or vertical (for wall mounting).

Stainless steel rear hinges with top half of enclosure retained in open position by two locking stainless steel props.

Options (continued)

Instrument mounting

2" N/B instrument mounting pillar.

Instrument mounting bracket.

Rear mounting plate bolted to inside rear panel of enclosure.

Vertical mounting plate, bolted to base of enclosure, for surface mounted instruments.

Enclosure heating

Steam heating coil.

Electric heater for hazardous areas, thermistor controlled with modulating output.

Electric heater for non-hazardous areas, thermistor controlled modulating output.

Thermal insulation.

Instrument viewing and inspection

Front and/or rear doors (size 450 x 400mm). (Toggle fasteners are located inside the enclosure when fitted with door).

Window in front panel or in either door(s).

Stainless steel rear hinges with top half of enclosure retained in open position by two folding stainless steel props.

Enclosure entries

Membrane grommets.

Gland plates.

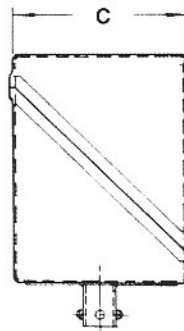
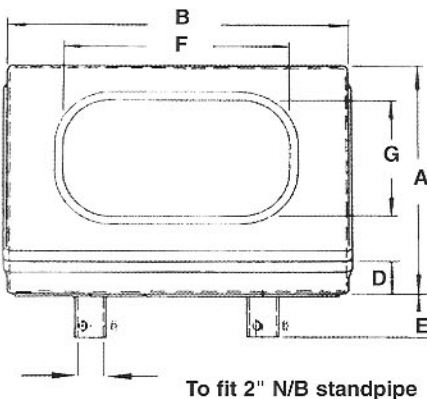
See pages 31, 32, 33 and 34 for details of options.

“S” range

Purpose - The ‘S’ range of enclosures have been developed to enable a series of pressure and differential pressure transmitters to be installed in one unit. Associated manifolds can also be fitted and the enclosure can comfortably house up to three transmitters with manifolds.



Dimensions



Dim ref.	Single S	Double S
A	750	535
B	500	760
C	500	380
D	75	75
E	100	100
F	360	540
G	480	310

Dimensions given in millimeters

Description

The enclosure is made of two parts. Rear hinging of the top half is a standard fitting with stainless steel hinges and top half retained in open position by two locking stainless steel props with locking over center action.

Closing of the two halves is achieved with two heavy duty stainless steel toggle fasteners.

A recessed closed cell neoprene gasket in top half renders enclosure dust tight, waterproof and ensures minimal heat loss.

The enclosure is constructed with reinforced web section at joint line for rigidity.

To order: see pages 36-38 and complete section A.

Material

See page 26 for details.

Options

Enclosure mounting

Base enclosure mounting plate and pinchbolts for either 2" or 4" N/B standpipe.

Full height mounting stand up to 4" N/B pipe.

Mounting straps, horizontal (for wall mounting).

Options (continued)

Instrument mounting

2" N/B instrument mounting pillar.

Instrument mounting bracket.

Rear mounting plate bolted to inside rear panel of enclosure.

Vertical mounting plate, bolted to base of enclosure for surface mounted instrument.

Enclosure heating

Steam heating coil.

Electric heater for hazardous areas, thermistor controlled with modulating output.

Electric heater for non-hazardous areas, thermistor controlled modulating output.

Thermal insulation.

Instrument viewing and inspection

Window.

Enclosure entries

Membrane grommets.

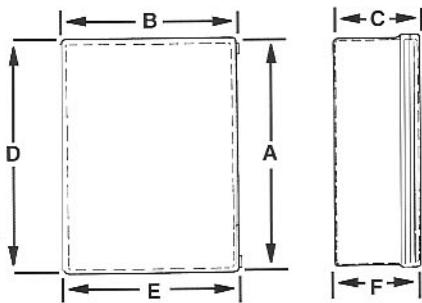
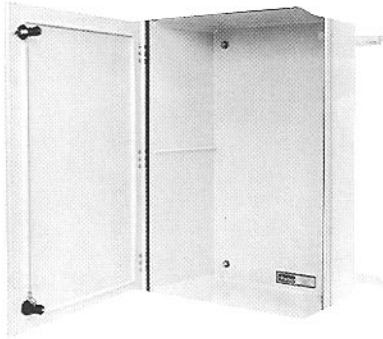
Gland plates.

See pages 31, 32, 33 and 34 for details of options.

G.R.P. Enclosures

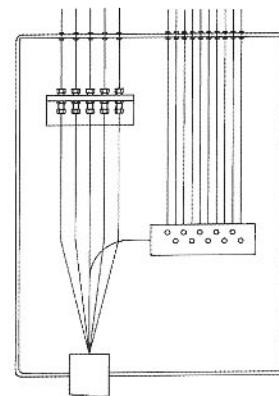
Junction boxes

Purpose - The two J.B.'s offer facilities for either electrical or pneumatic terminations. For pneumatic systems, terminations can be accommodated internally by the use of custom designed bulkhead mounting plates. Entry of cables or pneumatic lines, can be achieved through the installation of rubber grommets, cable glands or bulkhead couplings. Entries can be arranged in the side, top, bottom or back of the boxes.



Part No.	Dimensions					
	Outside			Inside		
	A	B	C	D	E	F
8/2/6/E	450	300	150	435	280	130
4/8/9/E	610	460	230	585	435	210

Dimensions given in millimeters.



Typical pneumatic terminations

Description

Glass reinforced polyester enclosure fitted with a removable hinged door. Standard hinges are of stainless steel and enclosure sealing is achieved by a closed cell neoprene gasket. Secure door fastening is by means of two chrome plated 'Pawl' latches.

To order: see page 36-38 and complete section A.

Material

See page 26 for details.

Options

Enclosure mounting

Base plate mounting for 2" N/B standpipe.
Full height mounting stand, comprising 2" N/B pipe.
Mounting straps, horizontal or vertical (for wall mounting).

Instrument mounting

Instrument mounting bracket.
Rear mounting plate, bolted to inside rear panel of enclosure.

Options (continued)

Enclosure heating

Steam heating coil.
Electric heater for hazardous areas, thermistor controlled with modulating output.
Electric heater for non-hazardous areas, thermistor controlled modulating output.
Thermal insulation.

Instrument viewing and inspection

Locking facility on door.
Window.
"Lift-off" door.

Enclosure entries

Membrane grommets.
Gland plates.
Bulkhead connector internal mounting plates.

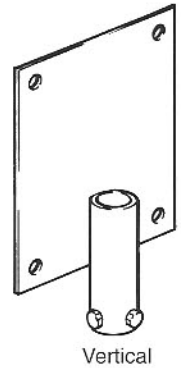
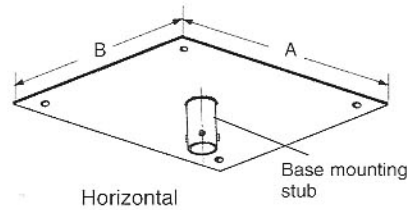
See pages 31, 32, 33 and 34 for details of options.

Enclosure mounting supports

Support plates

The enclosure mounting plate is constructed from 5mm thick carbon steel. Base mounting stubs are suitable for 2" or 4" NB mounting stands. The base mounting stub welded to the plate is fitted with 3 stainless steel pinchbolts M8 x 1.25. Carbon steel mounting facilities are shot blasted and zinc sprayed.

Note: Support plates cover almost the full base area of our enclosures giving maximum support and minimizing potential wind damage.



Dimensions

	Enclosure	Junior	Senior	Single S	Double S	8/2/6/E	4/8/9/E
Horizontal	A dimension	255	460	460	710	260	410
	B dimension	330	460	460	330	100	160
Vertical	A dimension	255	n/a	n/a	n/a	n/a	n/a
	B dimension	330					

Dimensions given in millimeters.

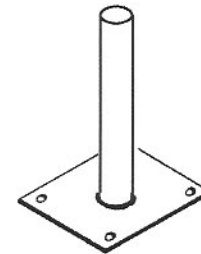
Note: Standpipe mounting for the double S enclosure is equipped with twin stubs of 380mm pitch.

To order: see pages 36/38 and complete section B.

Full height mounting stand (stand pipe)

Manufactured from shot blasted and zinc sprayed carbon steel, the mounting stand comprises a 5mm thick base plate (305 x 305mm) with either 2" or 4" NB schedule 40 pipe centrally welded to the base plate. Height of mounting stand = 1.5m.

To order: see pages 36-38 and complete section B.



Mounting straps

For the senior, "S" range and junction boxes when wall fixing is required.

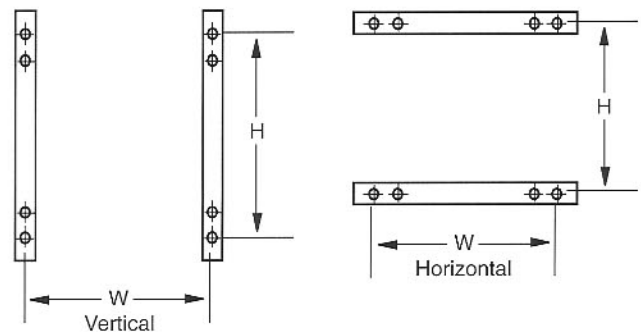
Available for horizontal or vertical fitting to walls by means of 4 pre-drilled holes 8.5mm diameter. Material is of shot blasted and zinc sprayed carbon steel.

Enclosure	Vertical		Horizontal		Strap
	H	W	H	W	
Junction box 8/2/6/E	530	220	360	360	6 x 25
Junction box 4/8/9/E	680	360	500	530	6 x 25
Senior	670	450	500	550	6 x 38
Double S			325	810	6 x 50
Single S			500	570	6 x 50

Dimensions given in millimeters.

To order: see pages 36-38 and complete section B.

Enclosure mounting can be made from other materials eg. stainless steel and a variety of paint spray or protective finishes can be provided. All nuts and bolts are standard in stainless steel.



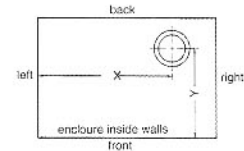
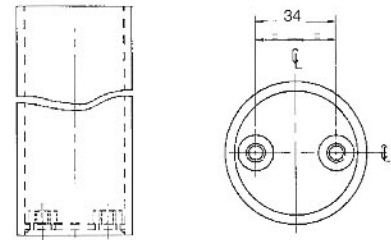
Instrument mounting facilities

2" NB pipe mounting pillar

Manufactured from shot blasted and zinc sprayed carbon steel, the 2" NB pillar has a welded internal blank bottom with two M8 x 1.25 bushes for bolting to enclosure base plate. The pillar can be supplied loose (with bolts) for customer fitting or can be factory fitted after specifying positional dimensions. If positioning dimensions cannot be provided and factory fitting is required then instrument specification eg. make and model number should be provided.

To order: see pages 36-38 and complete section H.

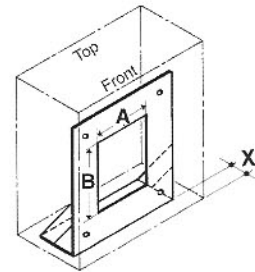
Standard pillar height is 350mm for Junior and 500mm for 'S' and Seniors, X and Y dimensions should be taken from enclosure inside wall.



Vertical mounting plate

The plate is of a welded "L" construction 3mm thick carbon steel, shot blasted and zinc sprayed. It is suitable for both surface and panel mounted instruments fitted into either the Senior or "S" range of enclosures, cut outs are to customer requirements.

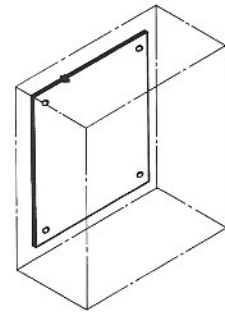
To order: see pages 36-38 and complete section H.



Rear mounting plate

To facilitate the support and surface mounting of instruments inside enclosures.

The plate is produced from 5mm thick shot blasted and zinc sprayed carbon steel and is mounted to the inside rear wall of the enclosure.



Enclosure	Height	Width
Senior	530	380
Single S	600	410
Double S	400	710
Junction box		
8/2/6/E	410	260
Junction box		
4/8/9/E	560	410

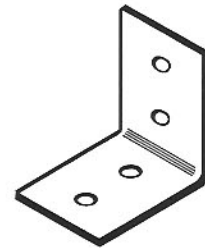
Dimensions given in millimeters.

To order: see pages 36-38 and complete section H.

Instrument mounting bracket

Supplied as an alternative to the mounting pillar and maximizing space inside the enclosure. Most instruments are capable of being bracket mounted and the utilization of brackets reduces the space needed inside an enclosure. To correctly manufacture and position the bracket please supply instrument specifications, i.e make and model numbers etc.

To order: see pages 36-38 and complete section H.



Bulkhead Connector mounting plates (BCMP)

For pneumatic terminations inside junction boxes, BCMP's can be internally fitted. Plates are designed for 7, 12 or 19 bulkhead fittings. Fittings can be provided in brass or stainless steel.

To order: see pages 36-38 and complete section G.



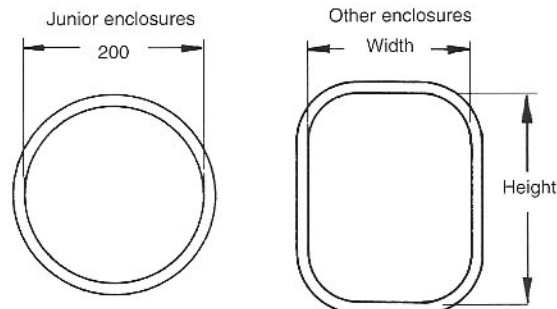
Instrument viewing, inspection and access

Window

Standard window material is 6mm thick high impact laminated glass to BS6206 category B. The window is retained by a watertight rubber moulding.

Enclosure	Senior	Single S	Double S	Junction boxes	
				8/2/6/E	4/8/9/E
Height	350	480	310	250	350
Width	280	360	540	200	280

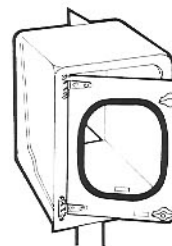
To order: see pages 36-38 and complete section D.



Door

This option is available for Senior enclosures only. A front and/or rear door, made from glass reinforced polyester, can be fitted to the enclosure by two stainless steel hinges. When requesting the Senior enclosure with doors, the stainless steel toggle fasteners are fitted inside the enclosure. Doors are fitted with two lockable "T" bar handles.

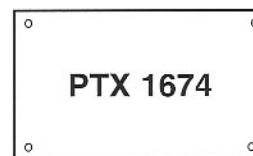
To order: see pages 36-38 and complete section E.



Information plates

Engraved plates in stainless steel or traffolyte are available for inscription with instrument references, instructions or warnings.

To order: see pages 36-38 and complete section L.



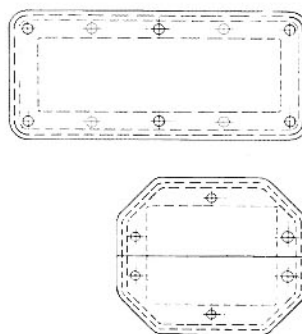
Gland plates

Used for pre-preparation of enclosure entries and particularly useful with junction boxes. The type GP and GPS are made from mild steel, shot blasted and zinc sprayed. Other sizes and materials are available.

The moldings are supplied with a complete "O" section neoprene seal to ensure prevention of water and dust ingress. Stainless steel retaining bolts are supplied with individual "O" ring seals.

The type GPS are manufactured in two halves and are designed to provide a neat weatherproof seal for capillary entries, impulse pipes with welded flanges and similar applications.

To order: see pages 36-38 and complete section G.



Part No.	Aperture size	Overall size	No. of bolt holes
GP1	200 x 75	250 x 120	10
GP2	355 x 75	400 x 120	12

Dimensions given in millimeters.

Part No.	Aperture size	Overall size
GPS	85 x 65	120 x 100

Dimensions given in millimeters.

Hinges, props and toggle fasteners

Produced in stainless steel, hinges are fixed to the lid of the enclosure with Monel rivets and, for simple removal, stainless steel screws are retained by nylon thumb nuts on the enclosure base. Props and toggle fasteners are also produced from stainless steel. Toggle fasteners are available for padlock locking (padlocks not supplied).

To order: see pages 36-38 and complete section C.

Note: all enclosures are fitted with toggle fasteners, where applicable as standard. The "S" and junction box range have hinges fitted as standard.

All dimensions shown are approximate.

Internal options

Electrical heating for hazardous areas

Electrical heater with protection rating to EExd 11C with power rating of 100W/200W at 220/240V/50Hz and certified to PTB No. Ex-80/1092. Installation should be in vertical position with cable up or down (cable length = 1m). Panel heaters produced from self limiting tape can also be offered for hazardous areas. Self limiting tape carries B.A.S.E.E.F.A. approval.

To order: see pages 36-38 and complete section K.

Electrical heater for non-hazardous areas

up to 240 volts.

To order: see pages 36-38 and complete section K.

Steam heating

The heating coil is manufactured from 3/8" OD copper tubing with bulkhead connectors suitable for 1/4" OD copper tracing inputs.

Alternative sizes and materials are available.

To order: see pages 36-38 and complete section K.

Thermal insulation

For winterized application in sub-zero temperatures enclosures can be additionally insulated to reduce heat loss by up to 80%. The insulation is isocyanurate foam, aluminum faced to reduce heat loss with k factor 0.02W/M²K and thickness of 19mm.

To order: see pages 36-38 and complete section K.

Membrane grommets

A range of rubber membrane grommets to suit all enclosure panels and joint lines and provide a dry seal for process and service entries up to 16mm OD.

Temporary removal of the grommets enables early process pipework alignment to be achieved.

Other types of entries such as cable glands and bulkhead connections can also be provided.

To order: see pages 36-38 and complete section G.

Manifold installation

For inclusion of any of the manifolds shown in the manifold section of this catalog we will install these to your specification.

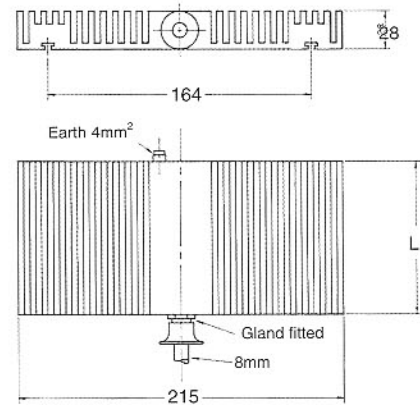
Grommets can be installed and positioned to allow easy connection of instrument measurement lines.

To order see pages 36-38 and complete section J.

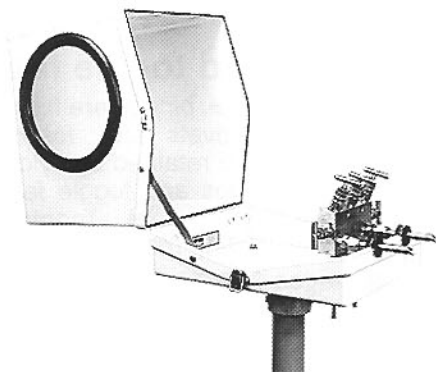
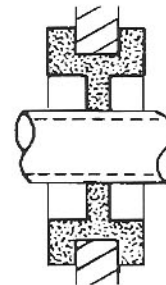
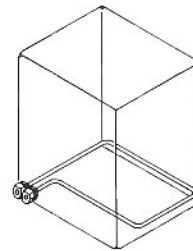
Inspection certification, drawing and approval requirements

Full details of the above must be given at inquiry/order stage. Certificates will not be provided retrospectively.

To request see page 38 and complete section M.



L = 100mm for 100 watt
L = 200mm for 200 watt



Mount enclosure on to 2" NB standpipe, and secure with pinchbolts

Customized enclosures

Enclosures

Most enclosures are mechanically produced using special and expensive moulding tools. This often leads to difficulties when special sizing of enclosures is required for limited spaces or non-standard instruments.

At Parker we have many years of experience in handling such needs and we have an extensive range of customized enclosures which we are able to offer in addition to those shown in this catalog.

To order/inquire for customized enclosures simply provide details of instruments to be enclosed or the dimensions of the enclosure required.

Options

Details in this catalog of options such as windows, hinges and props are also available for customized enclosures.

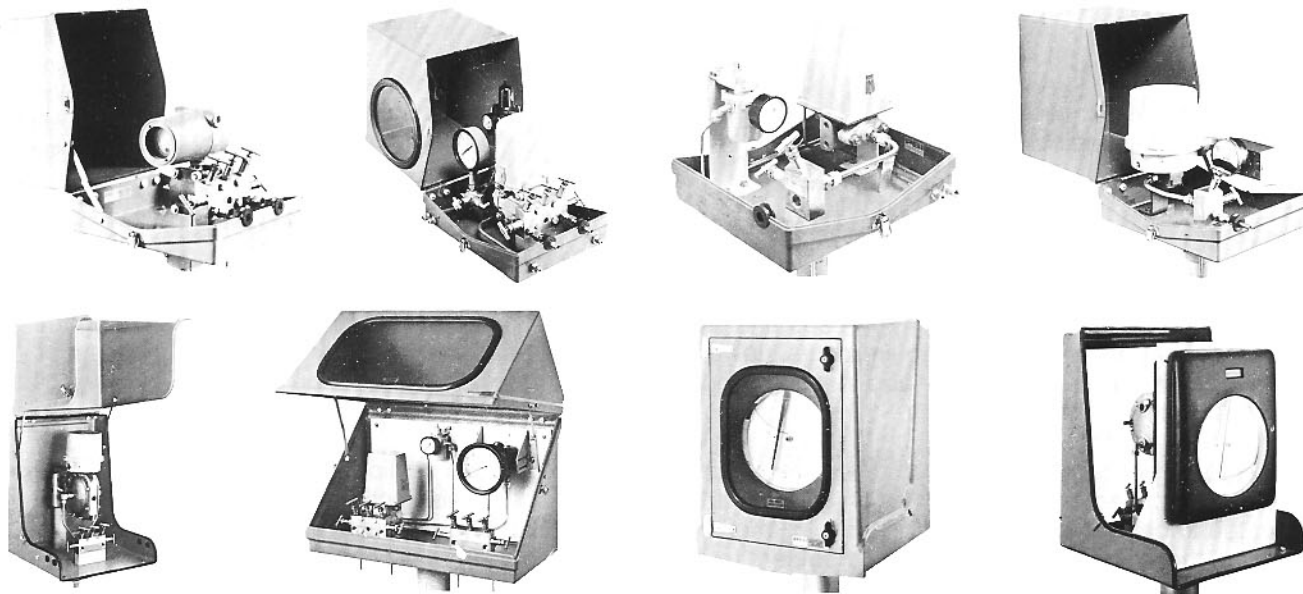
Colors

For customized enclosures or for large quantities of standard enclosures, it is possible to supply these in specified colors to match construction designs.

Assembly

Enclosures are often used to protect field mounted instruments from weather and potential mechanical damage. They are also used to maintain permanent conditions such as temperature and of course protect against environmental pollutants. Most enclosures will be connected to electrical or pneumatic services and some may involve internal pipe connections to possibly valves or manifolds. Site installation of these arrangements can often be difficult and expensive. Having to receive the enclosure, instrument, valves and manifolds in separate consignments and then assemble, can be avoided. At Parker we have considerable experience of such packages and we are happy to install equipment inside enclosures to customers specifications. In addition we do of course offer our Instru-Mount system (see page 36).

Assembly examples

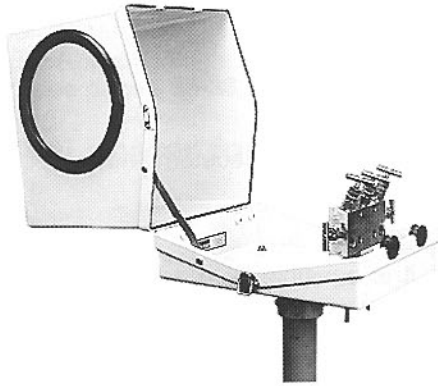


G.R.P. Enclosures

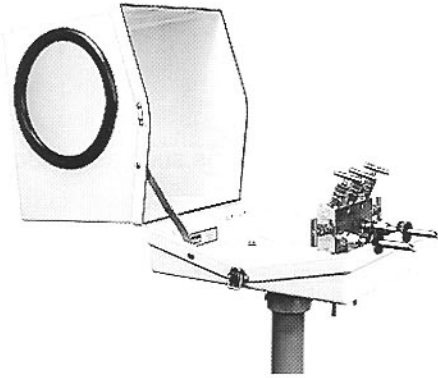
Instru-Mount system

The Instru-Mount system provides a GRP enclosure with a base mounted instrument manifold. It is supplied as an assembly, ready for installation, including instrument services and heating when required. The transmitter is not required for piping installations.

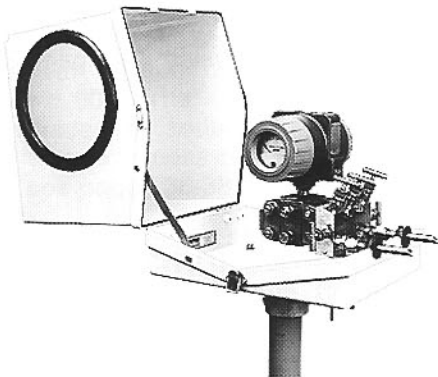
This system simplifies site hook-up and substantially reduces labor and maintenance costs.



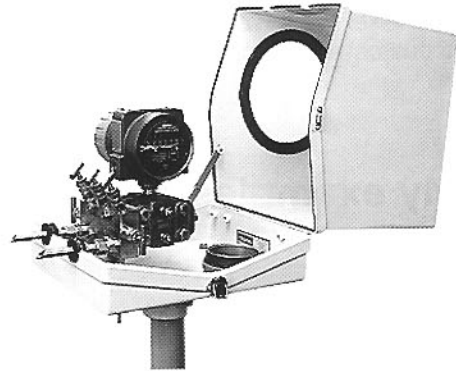
1 Mount enclosure on to 2" NB standpipe, and secure with pinchbolts



2 Complete instrument measurement line connections



3 Mount 54mm center differential pressure transmitter



4 Connect supply/signal cable to instrument junction box

How to order

The next two pages are for order/inquiry purposes and should be photocopied before completion. By drawing the part reference, which is applicable to your requirements, upward into the enclosure part number box, you can construct your own part number and use this for order and inquiry purposes. Certain options require further details and these can be included on the second of the two pages.

In the event of you not being able to match your requirements with the various sections then "special features" F section should be completed and details given on the second of the two pages. This section also enables the part number to be dedicated to one design of enclosure and will make it unique to that requirement. On completion, the photocopied forms should be sent to your ICD distributor.

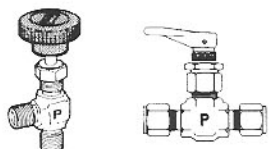
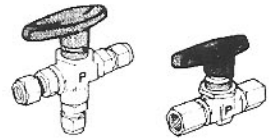
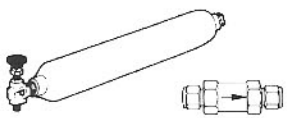
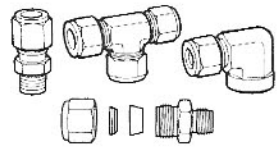
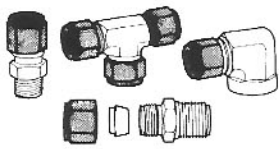
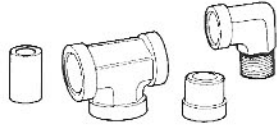

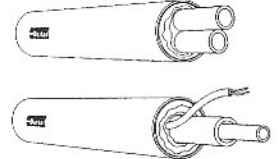
In addition to the manifolds and enclosures shown in this catalog, Parker Hannifin produce a full range of valves, including needle, 2 and 3 way ball, check, filters, sample cylinders. A comprehensive range of stainless steel CPI™ and A-LOK® twin ferrule fittings are also available. Contact your local distributor for full details.

G.R.P. Enclosures

Enclosure features	Information required
Section F Special features	Fit free issue instrument: maker..... Model No Make piping connections: state equipment details..... Non-standard window material: specification Non-standard enclosure size: dimensions..... Non-standard enclosure option requirements Colored enclosure: Color Special metalwork painting: Specification Other special materials
Section G Enclosure connection entries	Grommets: Quantity Entry Position..... Size Cable gland: Quantity Entry Position Size Material Connector fitting: Quantity Entry Position Size Material Gland plates: Position Required Entry Details..... Bulkhead connector mounting plate: 7-way..... 12-way..... 19-way..... Combinations: State details as above for each type of connector
Section H Instrument mounting facilities	2" N/B pipe mounting pillar: fitted position X = mm. Y = mm. Supply Loose Fit to suit instrument maker..... Model No. Vertical mounting plate: Fitted position X = mm. Cut Outs A = mm B = mm Instrument mounting bracket: Instrument Maker Model No..... Combinations: State Requirements
Section J Manifold installation	Manifold Part No. Position of manifold to suit..... Drain Sizes
Section K Heating and insulation	Electrical Heater: Volts..... Watts Hertz Type Junction Box Requirements: Entry Specification..... Heating Coil: Material Diameter..... Entry/Exit Fitting Type and Position..... Other Types of Heating: State Details
Section L Information plates	Text Details Size of Characters
Section M Inspection, certification drawing and approvals	Inspection Details Certification Requirements Drawing Requirements Approval Stipulations

Please use this section if further details are needed to be given.

The following catalogs are also available, please contact your local distributor.

Title	Cat. No.	
Instrument needle valves Porter fine control needle valves	Cat 4250-N Cat 4250 PMV	
Ball and plug valves Swing out ball valves	Cat 4250-B BUL 4125	
Check valves, filters, sampling cylinders.	Cat 4250-C	
A-LOK® twin ferrule tube fittings (inch) A-LOK® twin ferrule tube fittings (metric)	Cat 4236-IN Cat 4256-MM	
CPI™ single ferrule tube fittings (inch) CPI™ single ferrule tube fittings (metric)	Cat 4230-IN Cat 4230-MM	
Instrument pipe and weld fittings	Cat 4260-P/W	
Instrument quick couplings	Cat 4220	
Multitube	Cat 4200-T	

Notes

Offer Of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such items, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that items sold hereunder shall be free from defects in material or workmanship. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.**

NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and not withstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

11/98-P

About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service. A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our company has the largest distribution network in its field, with over 7,500 distributors serving nearly 400,000 customers worldwide.

Parker's Charter

To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods. More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

Product Information

North American customers seeking product information, the location of a nearby distributor, or repair services will receive prompt attention by calling the Parker Product Information Center at our toll-free number:

1-800-C-PARKER (1-800-272-7537).

In Europe, call 00800-C-PARKER-H (00800-2727-5374).

The Aerospace Group is a leader in the development, design, manufacture and servicing of control systems and components for aerospace and related high-technology markets, while achieving growth through premier customer service.



The Climate & Industrial Controls Group designs, manufactures and markets system-control and fluid-handling components and systems to refrigeration, air-conditioning and industrial customers worldwide.



The Fluid Connectors Group designs, manufactures and markets rigid and flexible connectors, and associated products used in pneumatic and fluid systems.



The Seal Group designs, manufactures and distributes industrial and commercial sealing devices and related products by providing superior quality and total customer satisfaction.



The Hydraulics Group designs, produces and markets a full spectrum of hydraulic components and systems to builders and users of industrial and mobile machinery and equipment.



The Filtration Group designs, manufactures and markets quality filtration and clarification products, providing customers with the best value, quality, technical support, and global availability.



The Automation Group is a leading supplier of pneumatic and electromechanical components and systems to automation customers worldwide.



The Instrumentation Group is a global leader in the design, manufacture and distribution of high-quality critical flow components for worldwide process instrumentation, ultra-high-purity, medical and analytical applications.





Catalog 4256, 10M, CG, 04/02

Parker Hannifin plc

Instrumentation Products Division
Riverside Road
Pottington Business Park
Barnstaple
Devon EX31 1NP England
Telephone: +44 (0)1271 313131
Telefax: +44 (0)1271 373636

Parker Hannifin GmbH

Geschäftsbereich
Instrumentation Products
Paderborner Str. 19
D-44143 Dortmund
Deutschland
Telefon: 0231/515106
Telefax: 0231/515132

Parker Hannifin S.A.

Instrumentation Group
Bâtiment F
7, rue du Fossé Blanc
92238 Gennevilliers Cedex
France
Telephone: +33 (0) 1 41 11 53 90
Telefax: +33 (0) 1 41 11 01 19