TRAC REGULATOR CO.,INC.

STYLE ‘H’

WATER PRESSURE REDUCING VALVE

MIL-V-2042B MIL-V-2042D MIL-V-2042E ASTM-F-1370

TYPE I and TYPE II, SERIES 150, 250, and 700

SUITABLE FOR SHIPBOARD SEAWATER SERVICE

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GENERAL INFORMATION

INTRODUCTION

The TRAC Style ‘H’ pressure reducing valve is a self-contained, spring loaded, direct operated device for regulating and reducing high pressure water to any desired operating pressure within its adjustable range. The design, construction, and materials utilized for the TRAC Style ‘H’ pressure reducing valve are ideally suited for shipboard seawater systems service.

PRINCIPLES OF OPERATION

Fluid enters the pressure reducing valve assembly (Figure 1) in the direction of the arrow cast in the body and passes downward through the seat to the outlet side of the valve. The outlet pressure is exerted on the underside of the diaphragm, indicated in the figure as the diaphragm chamber. The downstream pressure is obtained through an internal sensing line connected to outlet side port of the body. The spring is adjusted by turning the adjusting screw to balance the outlet pressure at any desired point within the range stamped on the nameplate. The pressure reducing valves will open or shut whenever this balance is changed due to any change in downstream pressure. The purpose of the O-ring on the valve stem is to form a piston seal to balance the pressure reducing valve. The seal ensures that variations in the inlet pressure will not affect the downstream-regulated pressure.

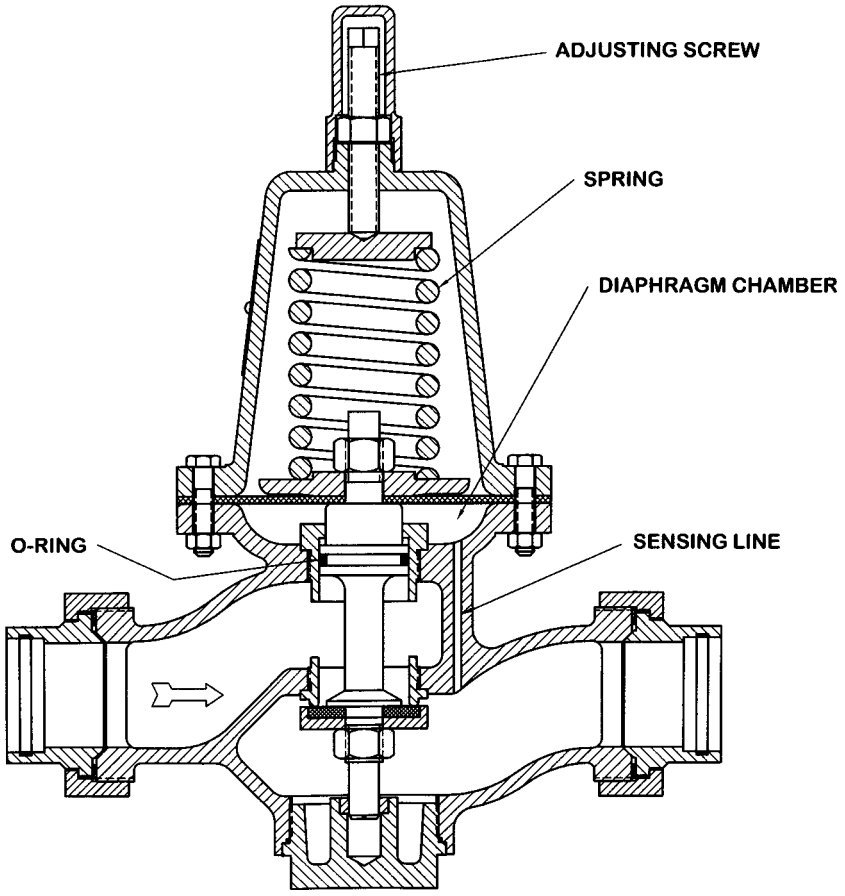


Figure 1 VALVE ASSEMBLY

OPERATING INSTRUCTIONS

PRESSURE ADJUSTMENT

The TRAC Style 'H' pressure reducing valve can be set to control at any pressure within the limits of the pressure stamped on the nameplate. The valve will maintain the outlet set pressure, within specification requirements, regardless of changes in inlet pressure.

CHANGING PRESSURE SETTING

The valve can be set to control at any pressure within the limits of the pressure stamped on the nameplate. This type of valve is provided with spring adjustment. More or less tension of spring will cause the valve to control at a higher or lower pressure. See Figure 2 for pressure adjustment illustration.

To increase pressure, remove Cover (1), loosen Locknut (2) and turn Adjustment Screw (17) clockwise.

To decrease pressure, remove Cover (1), loosen Locknut (2) and turn Adjustment Screw (17) counter-clockwise.

After pressure setting adjustment has been made, always lock Adjustment Screw (17) to prevent rotation with Locknut (2) and replace Cover (1).

IN SERVICE OPERATION

Once the valve has been set to design requirements, operation of the pressure reducing valves is automatic to control a preset downstream pressure. There is no in-service operator action required.

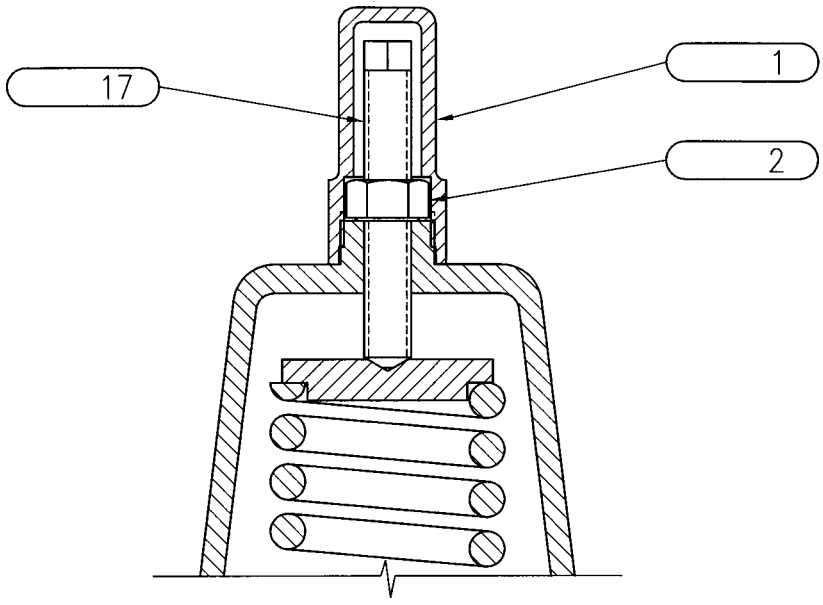


Figure 2 ADJUSTMENT

INSTALLATION

The pressure reducing valve must be clean and free from packing material and other foreign matter before installing into a clean pipeline. Connect the valve into the pipe line so that the flow is in the direction indicated by the arrow cast on the body. The valve will work equally well in any position, but it is preferable to install the valve with the adjusting spring vertically upward. This will minimize wear on all moving parts.

BYPASS INSTALLATION

Although not always required, it is a good engineering practice to install a hand operated bypass around any automatic control valve, permitting uninterrupted service during necessary servicing of automatic devices. A typical installation diagram incorporating a bypass line is provided in Figure 3.

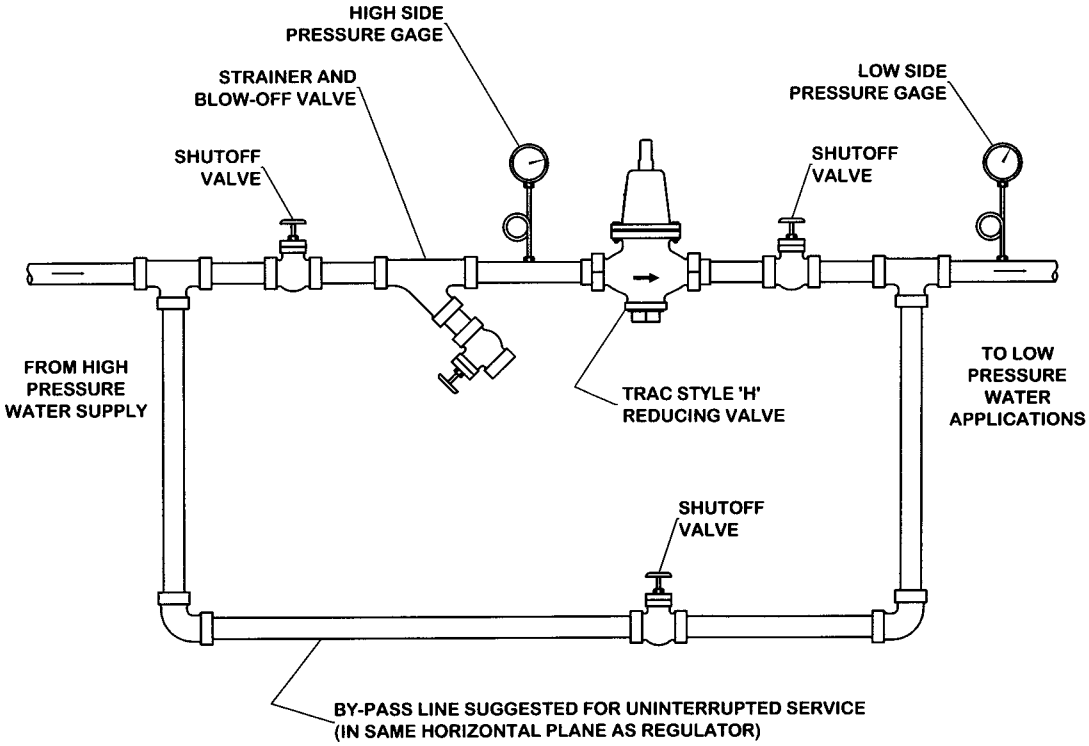


Figure 3 BYPASS INSTALLATION

DETAILED DESCRIPTION

NORMAL POSITION

The TRAC Style 'H' pressure reducing valve design is "normally open". The valve is shipped in the open position and it will remain open until some other force closes it. With no pressure under the diaphragm, the load applied on the spring by the adjusting screw will force the main disc off the valve seat to the open position.

FAIL POSITION

Should the diaphragm fail in operation, the valve will fail in the open position. With equal pressure under and over the diaphragm, the load applied on the spring by the adjusting screw will force the main disc off the valve seat to the open position. It is strongly advised that a relief valve be installed on the downstream side of the pressure reducing valve to prevent damage to low pressure side equipment and piping.

HOW DOES IT WORK

For the purposes of this example, let us assume that we have installed a pressure reducing valve in a system that will deliver seawater with an inlet supply pressure of 150 gpm and the valve is set to lock-up at 20 psig.

Condition 1- No Flow

As inlet pressure is introduced into the system, the seawater will flow through the open reducing valve, into the diaphragm chamber, and continue throughout the downstream piping. With no demand downstream, the pressure on the outlet side of the reducing valve begins to build. Pressure on the outlet side of the reducing valve is transmitted through the sensing line and under the diaphragm. The pressure in the diaphragm chamber opposes the downward force of the spring and the valve begins to close. When the pressure on the outlet side reaches 20 psig the pressure reducing valve closes tightly.

This condition is described as the "lock-up" or "no-flow" condition.

Condition 2- Flowing

By gradually increasing demand downstream of the pressure reducing valve and observing the low pressure side gauge, it will be immediately noted that as flow through the valve increases- the outlet pressure decreases. As the downstream demand increases, the pressure under the diaphragm decreases, which in turn allows the spring to force the seat opening wider in an effort to satisfy the flow demand. This process could continue until the pressure reducing valve reached its maximum capacity and conceivably, the outlet pressure dropped to zero.

In practice, a valve is sized so that the rated capacity of the valve would supply enough flow under minimum inlet pressure conditions to prevent an unacceptable variation in outlet pressure from lock-up to rated flow.

The variation in outlet pressure from lock-up to rated flow is typically described as the "droop" pressure or "set pressure deviation".

ORDERING INFORMATION

MANDATORY INFORMATION

It should be readily understood, that where flow requirements and regulator performance are critical, the selection of a pressure reducing valve should not be based on the size of existing inlet piping. In order to correctly size a pressure reducing valve for a particular application, the user must have a complete understanding of the conditions at the valve. As a minimum, the user should know the following conditions:

OUTLET SET PRESSURE (AT LOCKUP) This is the maximum pressure that downstream equipment and piping will be subjected to during normal operation. This value is used to choose the adjustable outlet pressure range of the valve.

STANDARD RANGES			
1/4" TO 3/4"	1" TO 2"	2-1/2" TO 3"	3-1/2" TO 4"
5-60 PSI	5-30 PSI	5-30 PSI	5-30 PSI
	25-60 PSI	25-60 PSI	25-60 PSI
50-150 PSI	50-125 PSI	50-100 PSI	50-100 PSI
	100-200 PSI	100-150 PSI	100-150 PSI

MAXIMUM INLET PRESSURE This is the maximum pressure that the pressure reducing valve will be subjected to under any operating conditions. This value is used to choose the appropriate pressure rating of the valve and to establish the end connection rating. Be sure to specify whether union end or flanged end connections are preferred.

PRESSURE RATINGS AND AVAILABLE END CONNECTIONS		
RATED PRESSURE (PSIG)	UNION END	FLANGED END
150 (Military)	MIL-F-1183	MIL-F-20042
250 (Military)	MIL-F-1183	MIL-F-20042
400 (Military)	MIL-F-1183	MIL-F-20042
700 (Military)	NAVSEA 803-1385946	NAVSEA 803-1385947
150 (Commercial)	NPT Tailpiece Available	ANSI-B16.24 or ANSI-B16.5
300 (Commercial)	NPT Tailpiece Available	ANSI-B16.24 or ANSI-B16.5

MINIMUM INLET PRESSURE It is of primary importance to know the minimum inlet pressure at the valve. Often the minimum inlet pressure is estimated from a pump performance chart or given as a reading from a remote location, ignoring all frictional losses of upstream piping and fittings. This value is used in the calculating the appropriate size of the pressure reducing valve.

REQUIRED CAPACITY (AT MINIMUM INLET PRESSURE) In most cases inlet pressure varies widely from maximum to minimum inlet pressure values. To correctly size a pressure reducing valve for a particular application, the required flow at minimum inlet pressure must be known.

ORDERING INFORMATION

OTHER CONSIDERATIONS

VALVE TYPE Determine the valve type requirements based on the following descriptions. If no valve type is specified on an order, or if the purchaser has no preference, Type II will be provided.

Type I valves shall be valves in which the spring chamber in combination with the body and bottom cap forms a pressure containing envelope capable of withstanding the full proof pressure rating. These valves shall be specified for special applications where it is necessary to contain the line media in the event of a failure which subjects the spring chamber to full inlet pressure. The spring chamber assembly need not be leak-proof; however, it shall contain line media at proof pressure without structural failure and shall limit external leakage to a small weepage (in drip form) past the adjusting screw threads and spring chamber joint.

Type II valves shall be valves in which the spring chamber does not form part of the pressure containing envelope. There is a small weep hole in the spring chamber which will indicate a diaphragm failure.

CHOKE FEATURE Type I valves may also incorporate a choke feature on the poppet to limit capacity in the event of a diaphragm failure, if specified in the ordering data. It is generally not necessary or recommended to incorporate a choke feature. It should be understood by the purchaser that limiting or choking the flow of a standard pressure reducing valve will increase velocity across the valve seat and may result in premature erosion of valve trim.

In applications where it is absolutely necessary to incorporate a choke feature, it is recommended to utilize a valve designed specifically for severe service conditions. Pressure reducing valves developed by Trac Regulator for severe services may incorporate wrought monel or composite trim and/or a contoured port arrangement.

REFERENCE DATA

For specific information regarding a particular valve, consult the nameplate (Figure 4) affixed to the spring chamber of each production valve. For operating characteristics of a valve installed in a particular shipboard system consult the applicable certification data sheet or ship's drawing index. When contacting Trac Regulator Co.,Inc. regarding troubleshooting, repair, or replacement, please have the following nameplate information available: Valve ID Number and Serial Number.

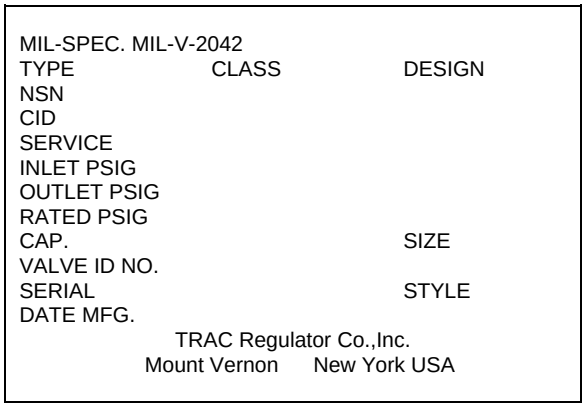
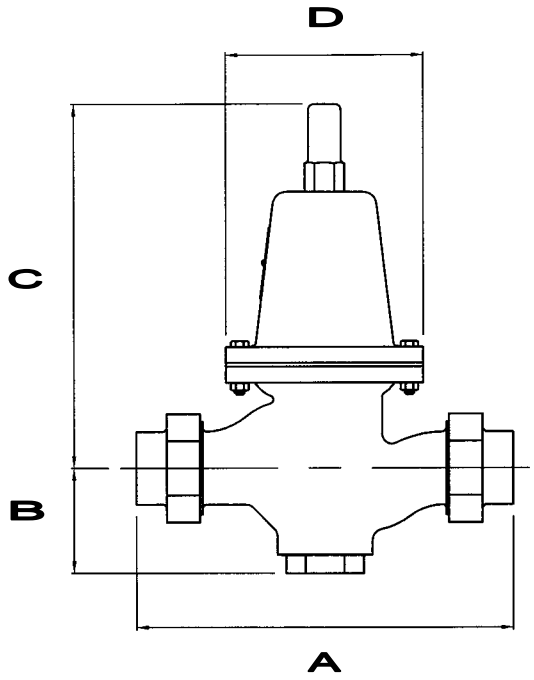
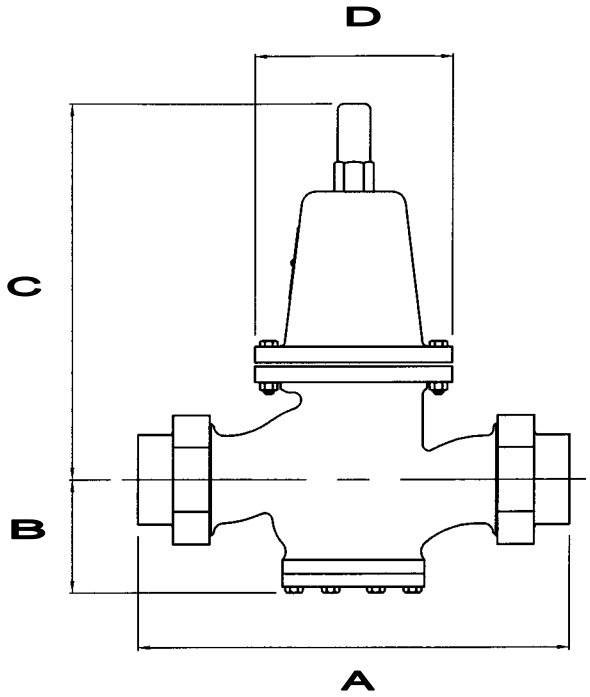


Figure 4 NAMEPLATE

SPACE ENVELOPE DIMENSIONS



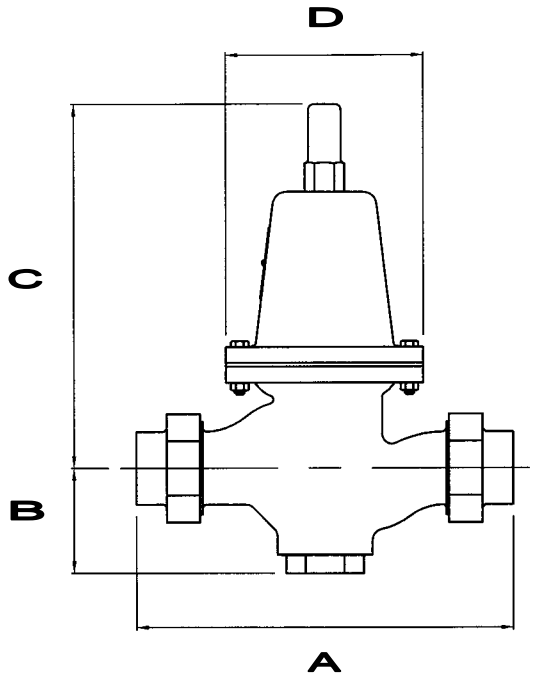
1/2” TO 1-1/2” UNION



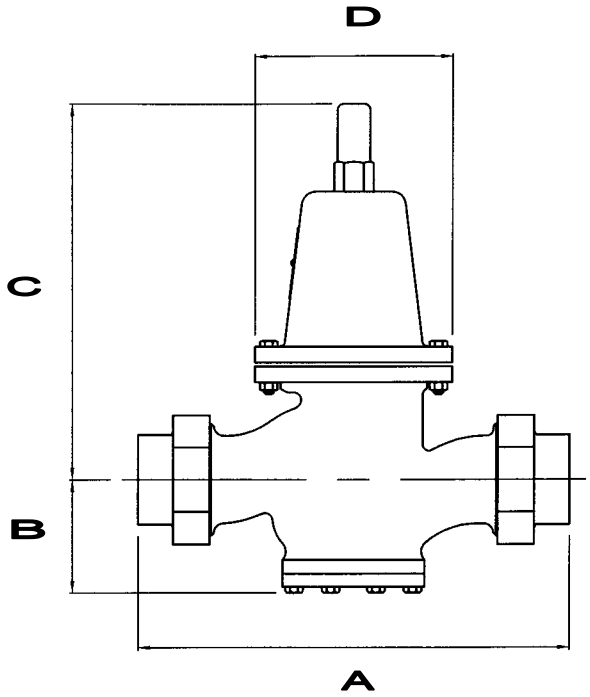
2” UNION

UNION END MIL-F-1183 150# AND 250#				
VALVE SIZE	‘A’ DIM	‘B’ DIM	‘C’ DIM	‘D’ DIA
1/4”	8-13/16	2-5/16	9-1/4	5
3/8”	9	2-5/16	9-1/4	5
1/2”	9-3/16	2-5/16	9-1/4	5
3/4”	9-5/8	2-5/16	9-1/4	5
1”	9-7/8	3-1/8	11-5/8	6-1/4
1-1/4”	10-7/8	3-1/8	11-5/8	6-1/4
1-1/2”	11-15/16	3-1/4	11-5/8	6-1/4
2”	13-13/16	3-1/2	12	6-1/4

SPACE ENVELOPE DIMENSIONS



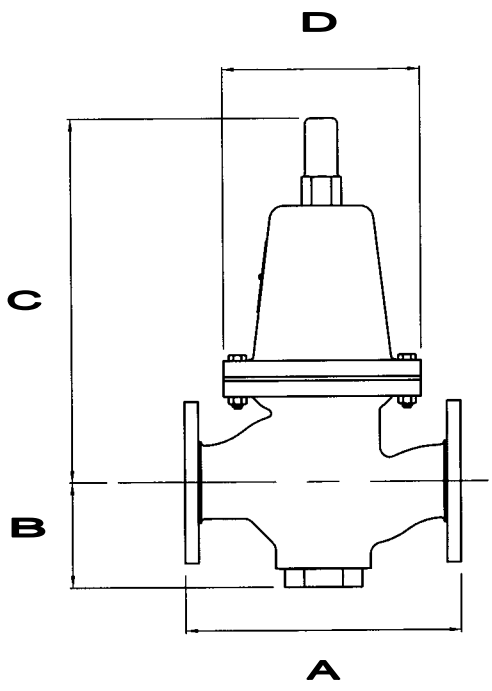
1/2” TO 1-1/2” UNION



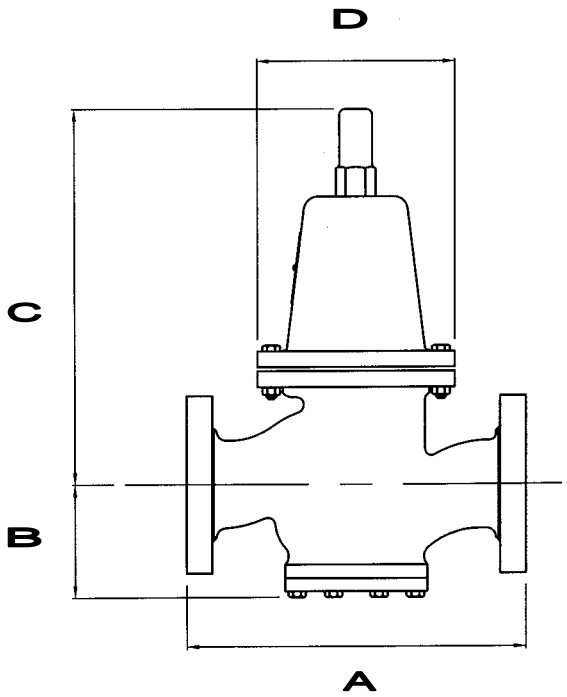
2” UNION

UNION END NAVSEA 803-1385946 700#				
VALVE SIZE	‘A’ DIM	‘B’ DIM	‘C’ DIM	‘D’ DIA
1/4”	9-11/32	2-5/16	9-1/4	5
3/8”		2-5/16	9-1/4	5
1/2”	9-13/32	2-5/16	9-1/4	5
3/4”		2-5/16	9-1/4	5
1”	10	3-1/8	11-5/8	6-1/4
1-1/4”		3-1/8	11-5/8	6-1/4
1-1/2”	12-3/32	3-1/4	11-5/8	6-1/4
2”		3-1/2	12	6-1/4

SPACE ENVELOPE DIMENSIONS



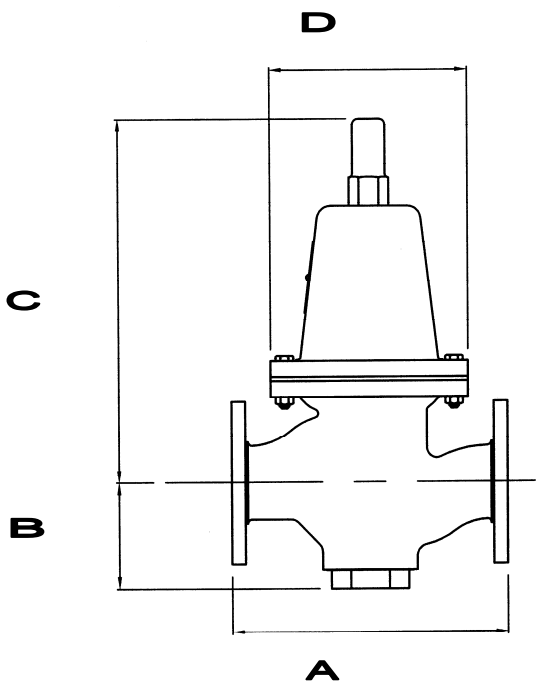
1/2” TO 1-1/2” FLANGE



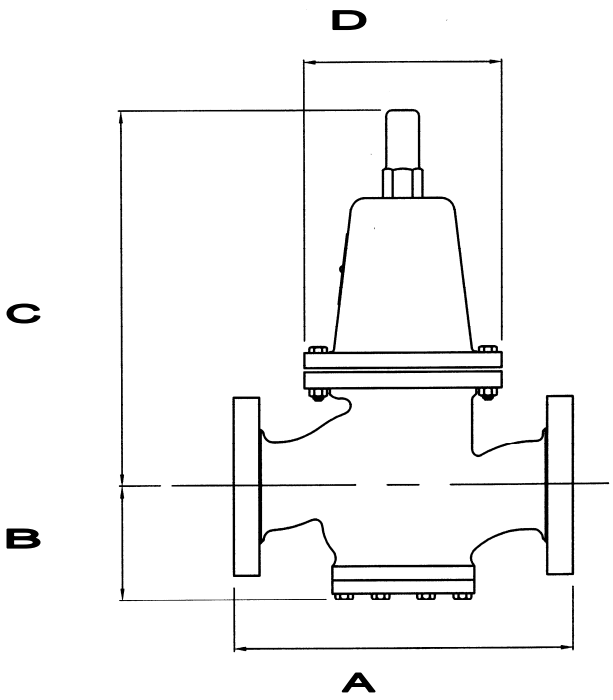
2” TO 6” FLANGE

FLANGED END MIL-F-20042 150# AND 250#					
VALVE SIZE	‘A’ DIM 150#	‘A’ DIM 250#	‘B’ DIM	‘C’ DIM	‘D’ DIA
1/4”	7-1/4	7-7/8	2-5/16	9-1/4	5
3/8”	7-1/4	7-7/8	2-5/16	9-1/4	5
1/2”	7-1/4	7-7/8	2-5/16	9-1/4	5
3/4”	7-3/8	7-7/8	2-5/16	9-1/4	5
1”	7-3/8	8	3-1/8	11-5/8	6-1/4
1-1/4”	7-15/16	8-11/16	3-1/8	11-5/8	6-1/4
1-1/2”	8-3/4	9-1/2	3-1/4	11-1/2	6-1/4
2”	10	10-3/4	3-1/2	12	6-1/4
2-1/2”	10-7/8	11-3/4	3-3/4	16-1/8	8-1/16
3”	11-5/8	12-1/2	4-3/4	16-3/4	8-1/16
3-1/2”	11-5/8	12-5/8	5-5/8	18-7/8	9-1/2
4”	13-1/2	14-1/2	5-5/8	18-7/8	9-1/2
5”		17	7-5/16	26-15/16	13-1/4
6”		17-1/4	8-1/8	27-3/4	13-1/4

TRAC Style 'H' SPACE ENVELOPE DIMENSIONS



1/2" TO 1-1/2" FLANGE



2" TO 6" FLANGE

FLANGED END ANSI-B16.24 150# AND 300#					
VALVE SIZE	'A' DIM 150#	'A' DIM 300#	'B' DIM	'C' DIM	'D' DIA
1/4"	--	--	2-5/16	9-1/4	5
3/8"	--	--	2-5/16	9-1/4	5
1/2"	7-1/4	--	2-5/16	9-1/4	5
3/4"	7-7/8	--	2-5/16	9-1/4	5
1"	7-3/8	8-11/16	3-1/8	11-5/8	6-1/4
1-1/4"	7-15/16	--	3-1/8	11-5/8	6-1/4
1-1/2"	8-3/4	--	3-1/4	11-1/2	6-1/4
2"	10-3/16	--	3-1/2	12	6-1/4
2-1/2"	11	--	3-3/4	16-1/8	8-1/16
3"	11-5/8	12-1/4	4-3/4	16-3/4	8-1/16
3-1/2"	12	--	5-5/8	18-7/8	9-1/2
4"	13-7/8	14-5/8	5-5/8	18-7/8	9-1/2
5"	--	--	7-5/16	26-15/16	13-1/4
6"	--	--	8-1/8	27-3/4	13-1/4