

TRAC REGULATOR CO., INC.

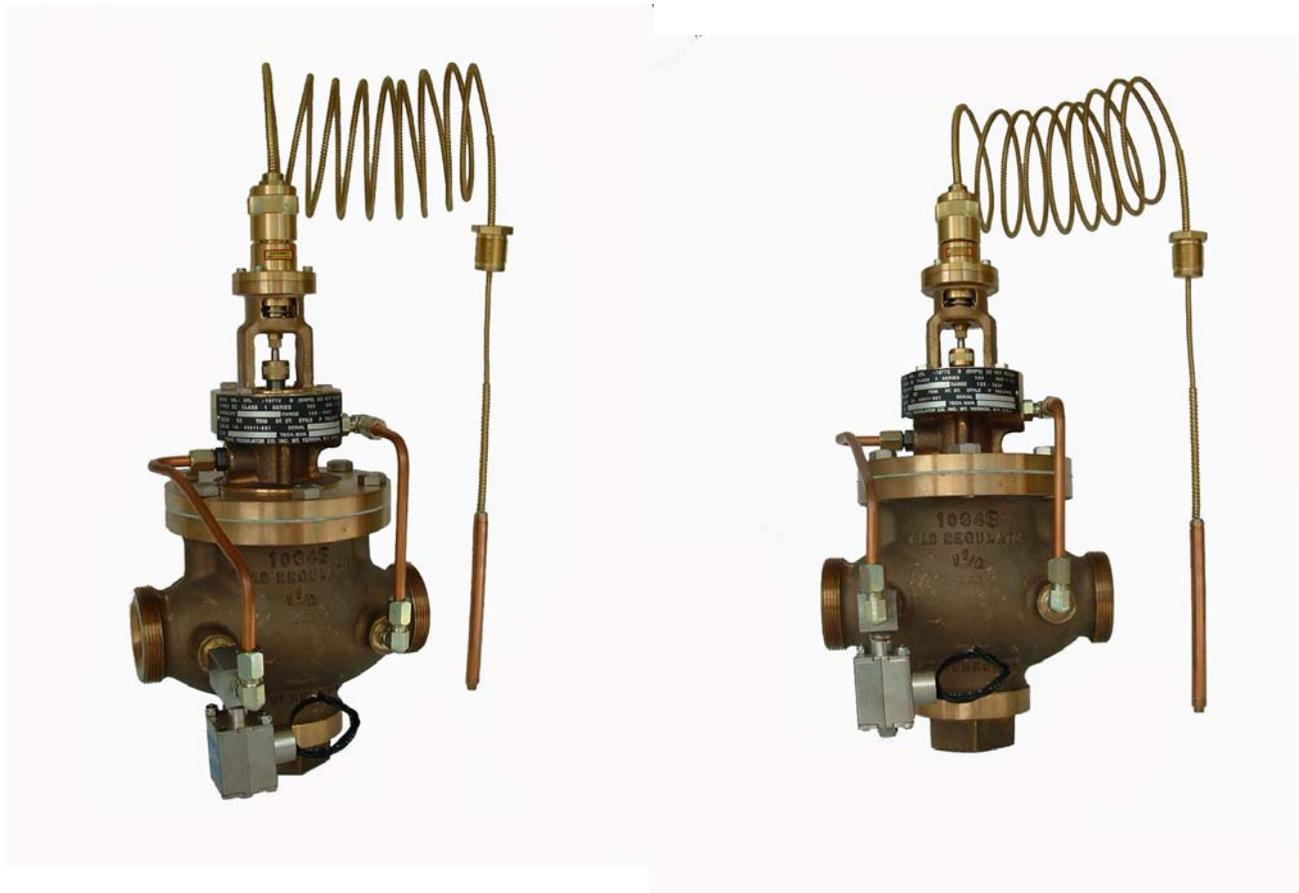
STYLE 'P'

THERMOSTATIC TEMPERATURE REGULATOR

MIL-DTL-19772B

TYPE III CLASS 1 SERIES 100 ELECTRICALLY FAILSAFE

SUITABLE FOR SHIPBOARD SERVICE
INSTANTANEOUS HEATERS



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GENERAL INFORMATION

INTRODUCTION

The Trac Regulator Co. Inc. Style 'P' Electrically Failsafe Temperature Regulator is a pilot operated valve specifically designed to control steam supply to shipboard instantaneous heater systems. The valve will automatically regulate steam flow to the heater coil in response to changes in hot water temperature at the heater outlet. To prevent overheating upon failure of the thermostatic element, the valve is provided with an electrically operated safety feature.

PRINCIPLES OF OPERATION

The regulator is operated by inlet pressure applied to an internal piston which is controlled by an adjustable thermostatic temperature pilot. The temperature pilot responds to changes in regulated temperature allowing more or less flow into the piston chamber. When the pilot opens wide enough to allow more flow to the piston chamber than can be bled through the outlet side pilot orifice, the main valve will open.

The equipment illustrated by figure 1 is Electrically Fail-Safe. A solenoid valve is incorporated on the inlet side pilot tube line. The solenoid provided is normally closed. In order to operate the temperature regulator the solenoid valve must be energized. Upon failure of the thermostatic element or loss of electric current to the solenoid- the solenoid valve will close, shutting off inlet pressure to the main valve piston, and thereby closing the temperature regulating valve.

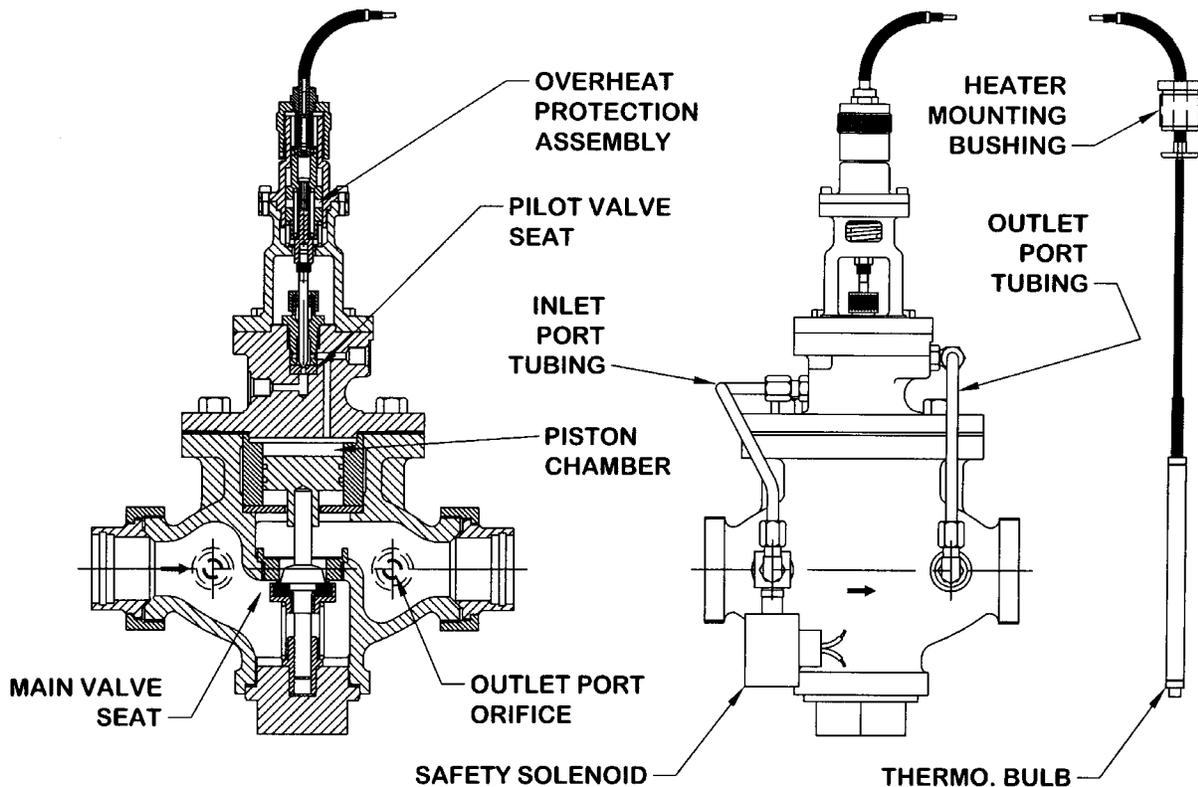


Figure 1 VALVE ASSEMBLY

OPERATING INSTRUCTIONS

TEMPERATURE ADJUSTMENT

The valve can be set to control at any temperature within the limits of the temperature range stamped on the nameplate, by making a simple adjustment to the valve. See Figure 2 for illustration of temperature adjustment mechanism.

Loosen Set Screw (3) and turn Adjustment Wheel (2) down by **HAND ONLY** (never use a wrench) until the Pilot Valve Stem (16) seats (when the Adjustment Wheel (2) becomes harder to turn by hand).

Slowly open all steam shutoff valves (not the bypass valve), so that you have steam to the Regulator.

Slowly open a hot water faucet or faucets to insure a flow of water through the Heater. Ideally, a water flow of 10% to 25% of Heater rating is desirable for adjusting the Pilot.

Back off the Adjustment Wheel (2) until the Regulator valve opens (when you hear a flow of steam through the Regulator).

Wait until the temperature at the Heater hot water outlet stabilizes at one steady reading. It may be necessary to adjust the Adjustment Wheel (2) a small amount (one full turn will change the water outlet temperature approximately 20°F) to obtain the desired hot water temperature at the Heater outlet.

When the Heater outlet holds steady at the desired temperature, tighten Set Screw (3) against the Pilot Valve Bonnet (7) to hold the Adjustment Wheel (2) in place.

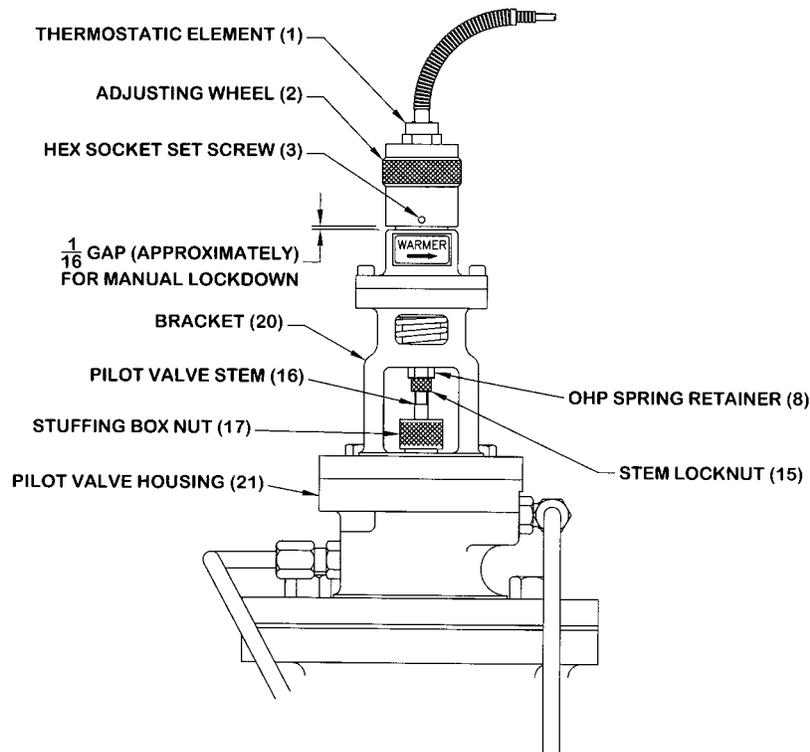


Figure 2 ADJUSTMENT

INSTALLATION

The temperature regulating 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.

The National Stock Number (NSN) description for many of the valves provided for U.S. Navy ships allow for the end to end dimension to be made with or without a "spool piece". Different manufacturers have met the end to end requirements in different ways. To accommodate the Trac Style 'P' valve in the hot water heater system a "spool piece" may have to be removed.

BYPASS INSTALLATION

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.

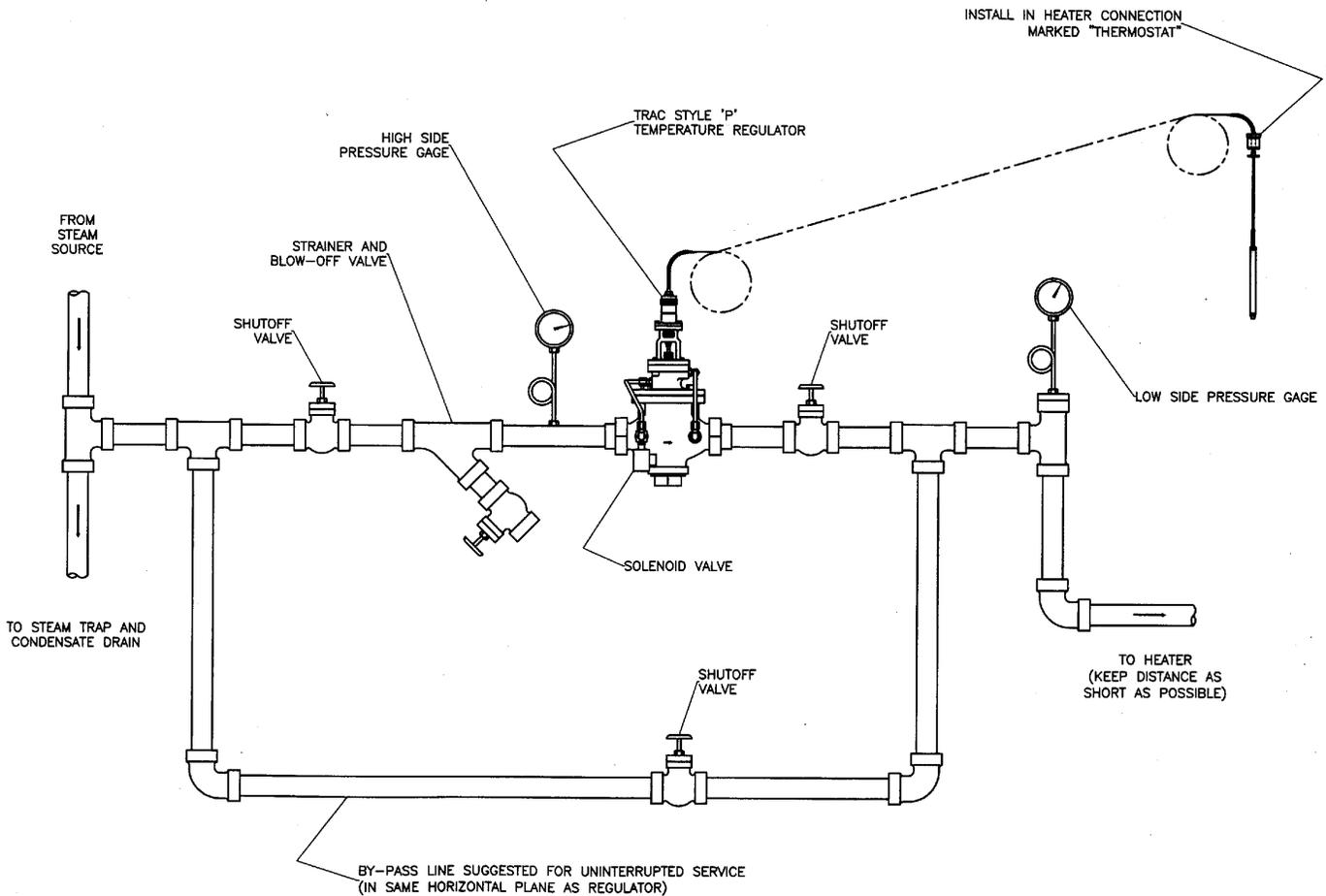


Figure 3 BYPASS INSTALLATION

DETAILED DESCRIPTION

CONSTRUCTION

The Regulator valve body is union end per MIL-F-1183. Pressure containing parts are cast bronze and valve trim is stainless steel. Pilot tubing connections are compression type, connections to the valve body and pilot valve housing are straight thread O-ring type per MS16142. A Rulon® seat is incorporated in the main valve and a PEEK® (thermoplastic) seat is incorporated in the pilot valve to ensure tight shutoff.

The valve is provided with overheat protection (over-range protection) which protects the bellows of the thermostatic element from damage if the heater hot water outlet temperature should rise above the highest temperature limit indicated by the temperature range stamped on the nameplate.

NORMAL POSITION

The Trac Style 'P' Electrically Failsafe Temperature Regulator is "normally closed". The valve is shipped in the closed position and it will remain closed until some other force opens it. With no steam pressure supplied to the piston chamber through the pilot valve, the load applied by the spring on the underside of the main valve disc will tend to keep the valve closed.

The pilot valve will remain open as long as the temperature at the thermal bulb is at or below the lowest temperature limit indicated by the temperature range stamped on the nameplate.

FAIL POSITION

Should the thermostatic element fail in operation, or any other valve malfunction cause the hot water outlet temperature to overheat, the valve will fail in the closed position.

A solenoid valve is incorporated on the inlet side pilot tube line. The solenoid provided is normally closed. In order to operate the temperature regulator the solenoid valve must be energized. The safety temperature controller (switch) should be set to operate at 15° to 20°F above the desired heater hot water outlet temperature setting of the regulator.

Upon failure of the thermostatic element, loss of electric current to the solenoid, or any other valve malfunction cause the hot water outlet temperature to overheat - the solenoid valve will close, shutting off inlet pressure to the valve piston, and thereby closing the temperature regulating valve.

HOW DOES IT WORK

The thermostatic element is a hermetically sealed system consisting of a thermal bulb connected by capillary tubing to a bellows. The thermostatic element is filled with a non-volatile liquid which expands with temperature increase at the thermal bulb. The force of liquid expansion is amplified by the bellows, which exerts a downward force on the pilot valve stem. This action tends to close the pilot valve and as steam supply through the pilot valve is reduced, the main valve will modulate towards the closed position.

The temperature pilot responds to changes in regulated temperature allowing more or less flow into the piston chamber. When the pilot opens wide enough to allow more flow to the piston chamber than can be bled through the outlet side pilot orifice, the main valve will modulate towards the open position.

ORDERING INFORMATION

MANDATORY INFORMATION

In order to correctly size a temperature regulating 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:

SET TEMPERATURE (REQUIRED TEMPERATURE RANGE) This is the temperature at the heater hot water outlet that is required during normal operation. The valve can be set to control at any temperature within the limits of the temperature range stamped on the nameplate. If the actual set temperature is not known, specify the range of expected temperature settings.

CAPILLARY LENGTH The capillary length from the temperature regulator to the heater connection marked "thermostat" should be kept to a minimum. Generally this length is specified between 8 and 15 feet. Capillary length over 15 feet is not recommended. The standard capillary length of the temperature regulating valves described herein is 10 feet.

MAXIMUM INLET PRESSURE This is the maximum pressure that the temperature regulating 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. The maximum inlet pressure rating of the temperature regulating valves described herein is 100 psig.

MINIMUM INLET PRESSURE It is of primary importance to know the minimum inlet pressure at the valve. This value is used in calculating the appropriate size of the temperature regulating valve. The required minimum inlet pressure to the temperature regulating valves described herein is 25 psig.

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

SAFETY SOLENOID VOLTAGE REQUIREMENTS The safety solenoid requires continuous current to remain open and allow the temperature regulator to maintain hot water temperature automatically. Voltage requirements for the safety solenoid are as follows:

115 Volts AC
60 Hz
21 Watts

REFERENCE DATA

TRAC VALVE ID / APL / NSN CROSS REFERENCE

The following table is provided for end user reference only. For specific information regarding a valve installed in a particular shipboard system consult the applicable certification data sheet or ship's drawing index.

STANDARD VALVE ORDERING INFORMATION					
VALVE SIZE	TEMP. RANGE	CAP. LENGTH	TRAC VALVE ID NUMBER	APL/ CID NUMBER	NSN NUMBER
1"	120-180°F	8 FT	40609-801	88A030673	4820-01-515-9492 (4820-01-087-7105)
1-1/4"	120-180°F	10 FT	40610-801	88A030674	4820-01-143-2864
1-1/2"	120-180°F	10 FT	40611-801	88A030675	4820-01-142-0257
2"	120-180°F	10 FT	40612-801	88A030676	4820-01-183-2336

NOTE: NSN NUMBERS IN PARENTHESES MAY OR MAY NOT DIRECTLY REFERENCE THE TRAC VALVE ID NUMBER, BUT THE TRAC VALVE IS A DIRECT REPLACEMENT.

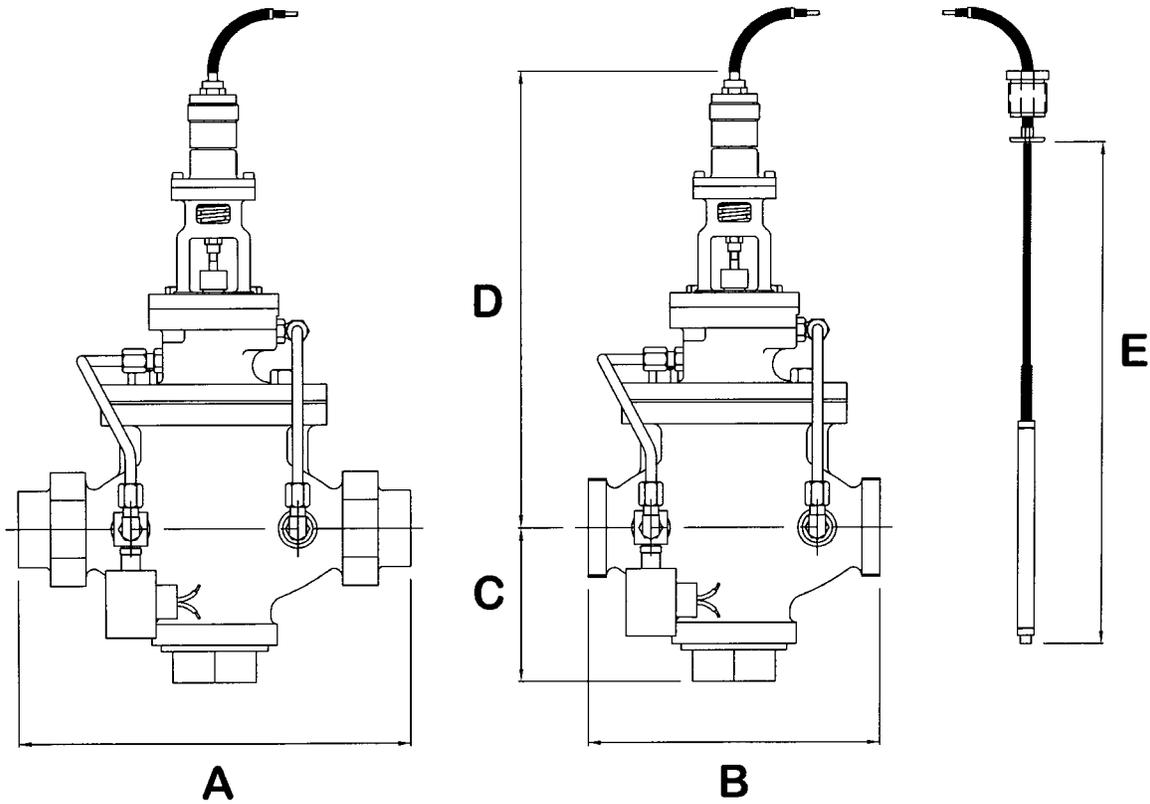
NAMEPLATE

For specific information regarding an installed Trac Style 'P' Electrically Failsafe Temperature Regulator, consult the nameplate (Figure 4) affixed to the pilot valve housing 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.

SPEC	<input type="text" value="MIL-DTL-19772B (SHIPS)"/>			DO NOT POLISH	
TYPE	<input type="text" value="III"/>	CLASS	<input type="text" value="1"/>	SERIES	<input type="text" value="100"/>
SIZE			SIZE	<input type="text"/>	
CAPACITY	<input type="text"/>			RANGE	<input type="text"/>
BODY	<input type="text" value="BZ"/>	TRIM	<input type="text" value="ST.ST."/>	STYLE	<input type="text" value="P (FAILSAFE)"/>
VALVE ID	<input type="text"/>			SERIAL	<input type="text"/>
CID	<input type="text"/>			TECH. MAN.	<input type="text"/>
TRAC REGULATOR CO. INC. MOUNT VERNON, NY USA					

Figure 4 NAMEPLATE

SPACE ENVELOPE DIMENSIONS



WITH UNION NUT AND TAILPIECE

WITHOUT UNION NUT AND TAILPIECE

UNION END MIL-F-1183					
VALVE SIZE	End to End 'A' DIM	Face to Face 'B' DIM	'C' DIM	'D' DIM	'E' DIM
1"	9-1/2	7-5/32	4-1/8	15 (MAX)	15 (MAX)
1-1/4"	10-3/4	8-1/16	4-1/4	15 (MAX)	15 (MAX)
1-1/2"	11-3/4	8-25/32	4-9/16	15 (MAX)	15 (MAX)
2"	12-3/4	9-5/16	4-9/16	15 (MAX)	15 (MAX)

