MOD L11: Replacement Procedure

Linear ActCont ER 2-Way Gas with Linebreak

05-03-11

Linear Actuator Control – Electric Remote 2-Way with Linebreak Feature

Replacement Procedure on a Linear Actuator with a System using Power Gas

The purpose of this procedure is to guide the replacement of an Actuator Control with standard features.

This procedure is to be used in conjunction with the following Maintenance and Service Manuals.

Shafer Linear Actuator Installation and Service Manual	Bulletin LSM-01102001
*Schematic Diagram	9608-S-SPECIAL

*Numbers in this document contained in [ ] will correspond to the Item Numbers on Schematic Drawing 9608-S and 9608-S-Special

NOTE: With pressure in the pipeline, installation should be done with the valve in the OPEN position. With no pressure in the pipeline, installation should be done with the valve in the CLOSE position.

WARNING: 1. Turn power gas off (bleed down the power storage tank if applicable).

Remove the Old Control Box and Hand Pump

1. Remove the piping to the power port and exhaust port (if existing) of the old control block.
2. Remove the two tube lines (OPEN and CLOSE) running from the control block to the top of the gas hydraulic tanks.
3. Remove the tube line going from the power storage tank to the control block, if applicable.
4. This should complete the pipe/tube connections freeing the old control box. Remove the old control box and set the parts aside.

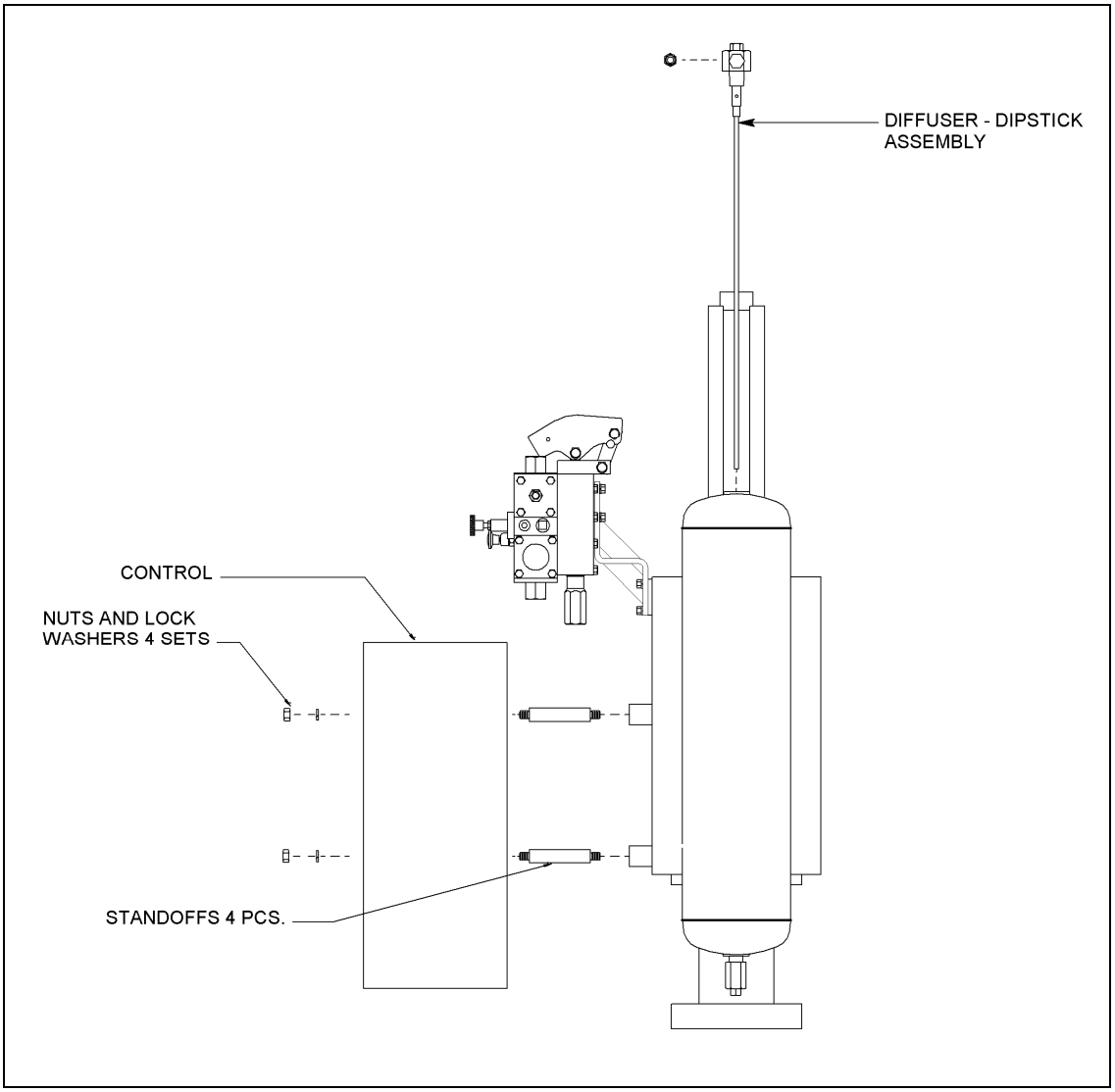


Figure 1: Install New Control

Install the New Control Box Assy.

The new control box mounts to the same holes in the bracket on the Actuator, as the old one, using 4" long standoffs. Look the new hardware over to enable identification of the parts.

1. Install the four standoffs to the mounting bracket. (See Figure 1)
2. Choose the mounting holes, in the Control, that will offer the best fit, probably the upper ones, and position the Control on the Standoffs. Fasten with nuts and lock washers. (See Figure 1 and Figure 3)
3. Assemble the dipsticks to the new Diffuser Assemblies. Apply an appropriate pipe sealant and install the Diffuser Assemblies in the top ports of the gas hydraulic tanks.

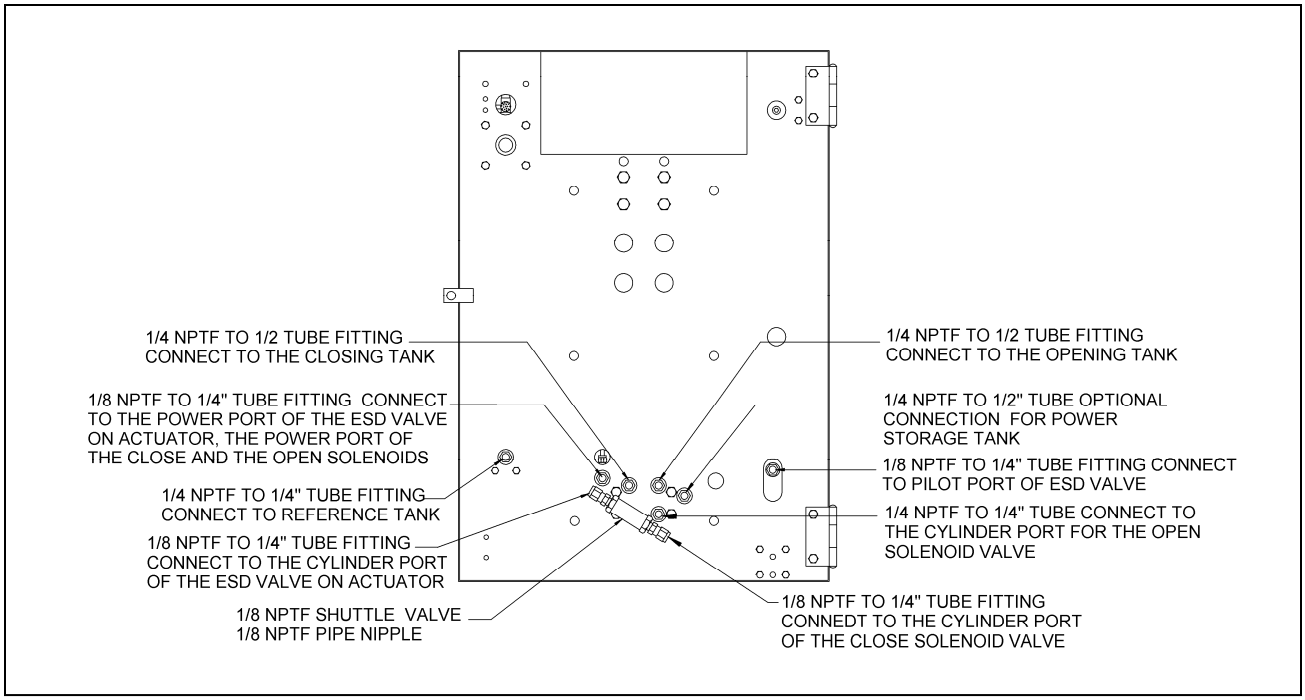


Figure 2: View of the New Control from the Back

4. Install new Swagelok® fittings in the back of the Control, top of the Tanks, Power Storage Tank and ESD valve. Apply Teflon® tape and an appropriate pipe sealant to the threads. (See Figures 2, 3 and 4)
5. Install 1/8 NPTF Nipple and 1/8" Shuttle Valve [31], with two 1/8 NPTF to ¼" tube fittings installed, in pilot port for the Control Close Pilot Piston [14]. (See Figure 2)
6. Run ¼" tube line from the 1/8" Shuttle Valve [31] to the cylinder port of the Close Solenoid Valve [32]. (See Figure 2)
7. Run ¼" tube line from the 1/8" Shuttle Valve to the cylinder port of the ESD Valve [19] mounted on the actuator. (See Figure 2 and Figure 4)

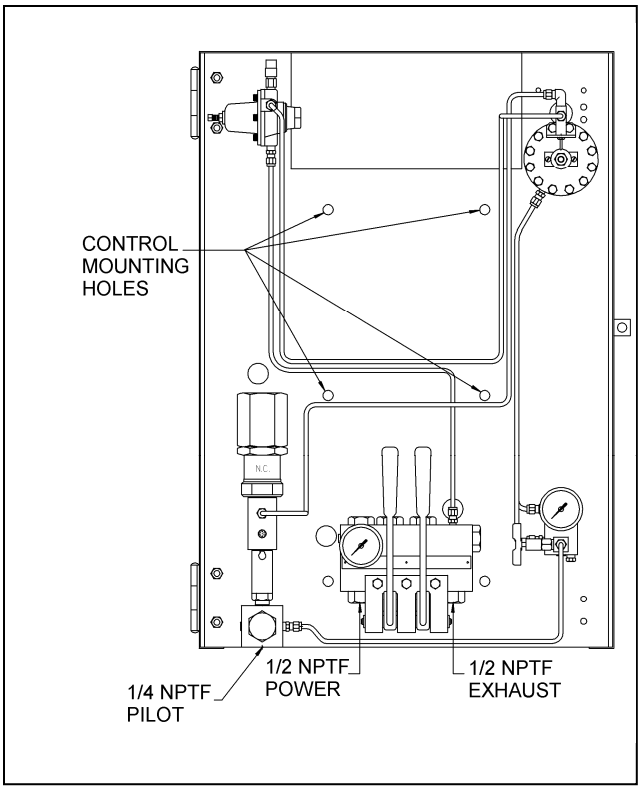


Figure 3: New Control Front View

8. Run ¼" tube line from the pilot port for the Control Open Pilot Piston [14] to the cylinder port of the Open Solenoid Valve [33]. (See Figure 2)
9. Run ¼" tube lines connecting power port on the back of the Control to power port of the ESD Valve [19] on the Actuator, the power port of the Close Solenoid Valve [32] and the power port of the Open Solenoid Valve [33]
10. Run ¼" tube line from the cylinder port of the Air Relay Valve [9], on the back of the Control, to the pilot port of the ESD Valve [19]. (See Figure 2)
11. Run ½" tube line from the Close port, on the back of the Control, to the top of the Close Tank [2]. (See Figure 2)
12. Run ½" tube line from the Open port, on the back of the Control, to the top of the Open Tank [1]. (See Figure 2)

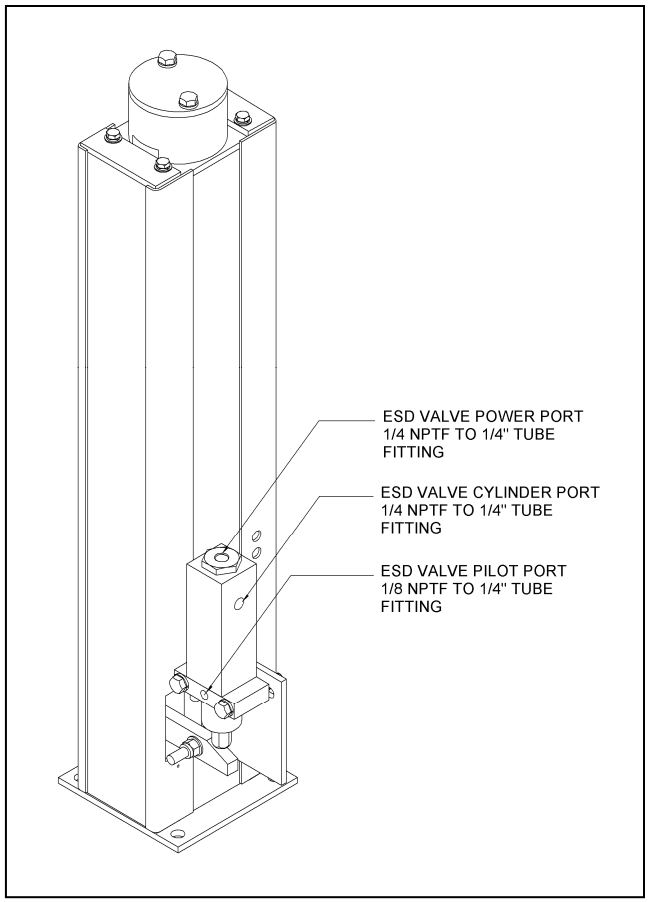
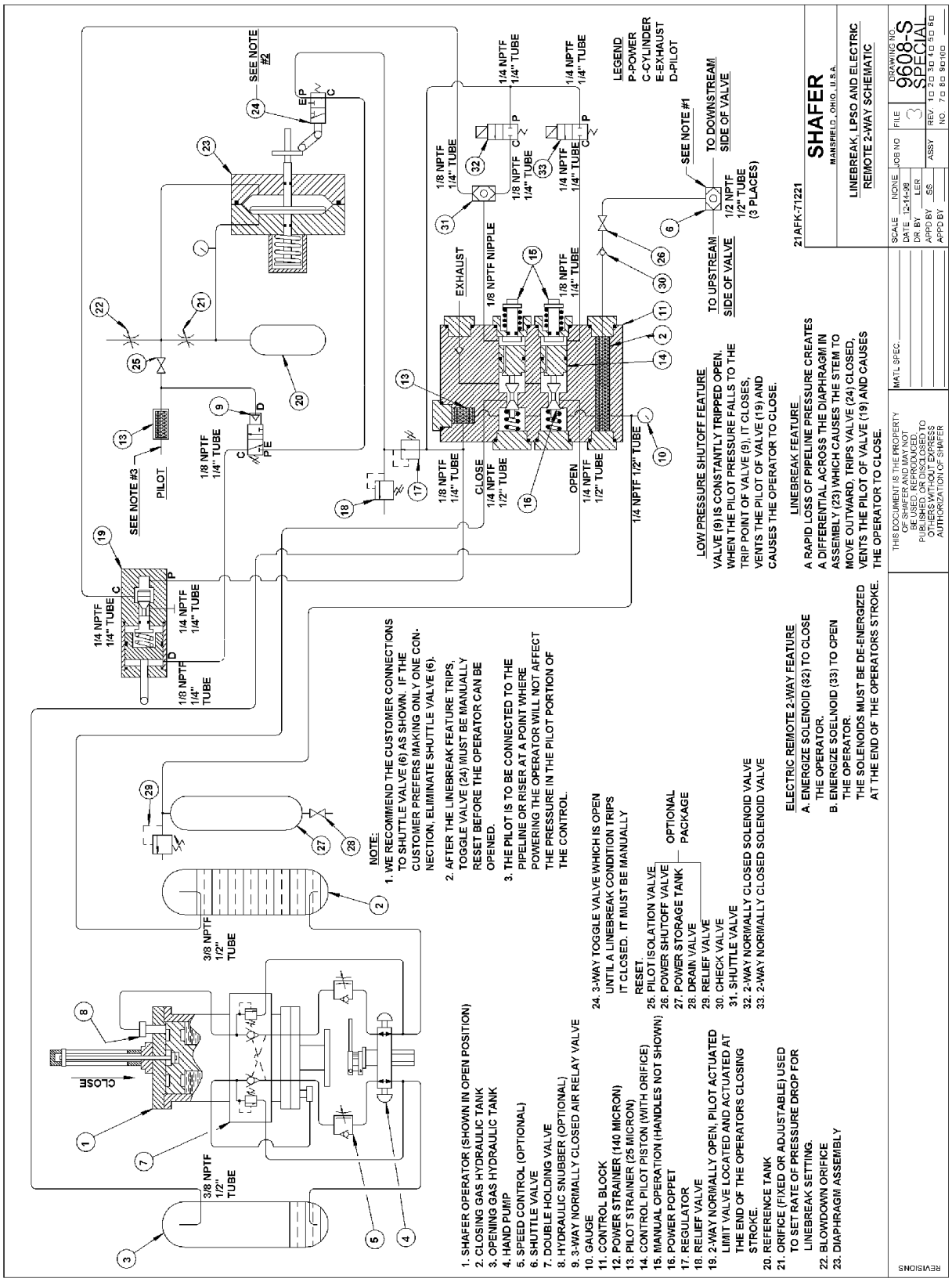


Figure 4: ESD Valve Mounted on Actuator

13. Run ½" tube line from the power port, on the back of the Control, to the Power Storage Tank [27], if applicable. (See Figure 2)
14. Run a ¼" tube from the pilot port, on the back of the Control, to the connection on the Reference Tank [20]. (See Figure 2)
15. Re-plumb the customer pilot connection, power connection and re-plumb the exhaust, or install muffler, on the poppet block control valve.


SHAFER
MANSFIELD, OHIO, U.S.A.
LINEBREAK, LPSO AND ELECTRIC
REMOTE 2-WAY SCHEMATIC
21AFK-71221
9608-S
SPECIAL
NOTE:
1. WE RECOMMEND THE CUSTOMER CONNECTIONS TO SHUTTLE VALVE (6) AS SHOWN. IF THE CUSTOMER PREFERS MAKING ONLY ONE CONNECTION, ELIMINATE SHUTTLE VALVE (6).
2. AFTER THE LINEBREAK FEATURE TRIPS, TOGGLE VALVE (24) MUST BE MANUALLY RESET BEFORE THE OPERATOR CAN BE OPENED.
3. THE PILOT IS TO BE CONNECTED TO THE PIPELINE OR RISER AT A POINT WHERE POWERING THE OPERATOR WILL NOT AFFECT THE PRESSURE IN THE PILOT PORTION OF THE CONTROL.
1. SHAFER OPERATOR (SHOWN IN OPEN POSITION)
2. CLOSING GAS HYDRAULIC TANK
3. OPENING GAS HYDRAULIC TANK
4. HAND PUMP
5. SPEED CONTROL (OPTIONAL)
6. SHUTTLE VALVE
7. DOUBLE HOLDING VALVE
8. HYDRAULIC SNUBBER (OPTIONAL)
9. 3-WAY NORMALLY CLOSED AIR RELAY VALVE
10. GAUGE
11. CONTROL BLOCK
12. POWER STRAINER (140 MICRON)
13. PILOT STRAINER (25 MICRON)
14. CONTROL PILOT PISTON (WITH ORIFICE)
15. MANUAL OPERATION (HANDLES NOT SHOWN)
16. POWER POPPET
17. REGULATOR
18. RELIEF VALVE
19. 2-WAY NORMALLY OPEN, PILOT ACTUATED LIMIT VALVE LOCATED AND ACTUATED AT THE END OF THE OPERATORS CLOSING STROKE.
20. REFERENCE TANK
21. ORIFICE (FIXED OR ADJUSTABLE) USED TO SET RATE OF PRESSURE DROP FOR LINEBREAK SETTING.
22. BLOWDOWN ORIFICE
23. DIAPHRAGM ASSEMBLY
24. 3-WAY TOGGLE VALVE WHICH IS OPEN UNTIL A LINEBREAK CONDITION TRIPS IT CLOSED. IT MUST BE MANUALLY RESET.
25. PILOT ISOLATION VALVE
26. POWER SHUTOFF VALVE
27. POWER STORAGE TANK
28. DRAIN VALVE
29. RELIEF VALVE
30. CHECK VALVE
31. SHUTTLE VALVE
32. 2-WAY NORMALLY CLOSED SOLENOID VALVE
33. 2-WAY NORMALLY CLOSED SOLENOID VALVE
OPTIONAL PACKAGE
ELECTRIC REMOTE 2-WAY FEATURE
A. ENERGIZE SOLENOID (32) TO CLOSE THE OPERATOR.
B. ENERGIZE SOELNOID (33) TO OPEN THE OPERATOR.
THE SOLENOIDS MUST BE DE-ENERGIZED AT THE END OF THE OPERATORS STROKE.
LINEBREAK FEATURE
A RAPID LOSS OF PIPELINE PRESSURE CREATES A DIFFERENTIAL ACROSS THE DIAPHRAGM IN ASSEMBLY (23) WHICH CAUSES THE STEM TO MOVE OUTWARD, TRIPS VALVE (24) CLOSED, VENTS THE PILOT OF VALVE (19) AND CAUSES THE OPERATOR TO CLOSE.
LOW PRESSURE SHUTOFF FEATURE
VALVE (9) IS CONSTANTLY TRIPPED OPEN. WHEN THE PILOT PRESSURE FALLS TO THE TRIP POINT OF VALVE (9), IT CLOSES, VENTS THE PILOT OF VALVE (19) AND CAUSES THE OPERATOR TO CLOSE.
LEGEND
P-POWER
C-CYLINDER
E-EXHAUST
D-PILOT
SEE NOTE #1
TO DOWNSTREAM SIDE OF VALVE
TO UPSTREAM SIDE OF VALVE
EXHAUST
SEE NOTE #2
SEE NOTE #3
PILOT
CLOSE
OPEN
1/8 NPTF 1/4" TUBE
1/4 NPTF 1/4" TUBE
1/4 NPTF 1/2" TUBE
1/2 NPTF 1/2" TUBE (3 PLACES)
3/8 NPTF 1/2" TUBE
1/4 NPTF 1/2" TUBE
1/8 NPTF NIPPLE
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MATL SPEC
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APPD BY SS
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NO. 7 8 9 10
REVISIONS

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Please visit our website for up to date product data. www.shafervalve.com