

INTRODUCTION

Western manifold systems are cleaned, tested and prepared for the indicated gas service and are built in accordance with the Compressed Gas Association guidelines. The manifold consists of a regulator and header, to provide an increased supply of gas for the specific gas application. Pressure gauges show system status and alert the need to replace depleted cylinders. Features of the manifold system include a regulator, flexible pigtails with check valves and complete mounting hardware.

CAUTION

Failure to follow the subsequent instructions can result in personal injury or property damage:

- Never permit oil, grease, or other combustible materials to come in contact with cylinders, manifold, and connections. Oil and grease may react and ignite when in contact with some gases—particularly oxygen and nitrous oxide.
- Cylinder, header, and master valves should always be opened very s-l-o-w-l-y. Heat of recompression may ignite combustible materials.
- Pigtails should never be kinked, twisted, or bent into a radius smaller than 3 inches. Mistreatment may cause the pigtail to burst.
- Do not apply heat. Some materials may react when in contact with some gases – particularly oxygen and nitrous oxide.
- Cylinders should always be secured with racks, chains, or straps. Unrestrained cylinders may fall over and damaged or break off the cylinder valve which may propel the cylinder with great force.
- Oxygen manifolds and cylinder should be grounded. Static charges and lightning may ignite material in an oxygen atmosphere, creating an explosive force.
- Welding should not be performed near nitrous oxide piping. Excessive heat may cause the gas to dissociate, creating an explosive force.

WARRANTY

All Western manifolds are warranted against defects in materials and workmanship for the period of one year from date of purchase. See back cover for details of limited warranty.

TABLE OF CONTENTS

GENERAL INSTRUCTIONS	3
MANIFOLD ASSEMBLY	4
MANIFOLD INSTALLATION	4
PLUMBING	6
INSTALLATION OF OPTIONAL EQUIPMENT	6
RELIEF VALVE INSTALLATION	6
FLASHBACK ARRESTORS	7
INSTALLING PIGTAILS AND ATTACHING CYLINDERS	8
MANIFOLD OPERATION	9
CYLINDER REPLACEMENT & HANDLING	10
GENERAL MAINTENANCE	10
TROUBLESHOOTING	11
MANIFOLD MAINTENANCE & REPAIR PARTS	12
REPLACEMENT PIGTAILS	12
REGULATORS AND REGULATOR REPAIR KITS	12
VALVES AND VALVE REPAIR KITS	12
WARRANTY	13

GENERAL INSTRUCTIONS

Manifolds should be installed in accordance with guidelines stated by the National Fire Protection Association, the Compressed Gas Association, the Occupational Safety and Health Administration, Canadian Standards Association, and all applicable local codes. The carbon dioxide and nitrous oxide manifolds should not be placed in a location where the temperature will exceed 120° F (49° C) or fall below 20° F (-7° C). The manifold for all other gases should not be placed in a location where the temperature will exceed 120° F (49° C) or fall below -20° F (-29° C). A manifold placed in an open location should be protected against weather conditions. During winter, protect the manifold from ice and snow. In summer, shade the manifold and cylinders from continuous exposure to direct rays of the sun.

Leave all protective covers in place until their removal is required for installation. This precaution will keep moisture and debris from the piping interior, avoiding operational problems.

CAUTION:

- Remove all protective caps prior to assembly. The protective cap may ignite due to heat of recompression in oxygen systems.

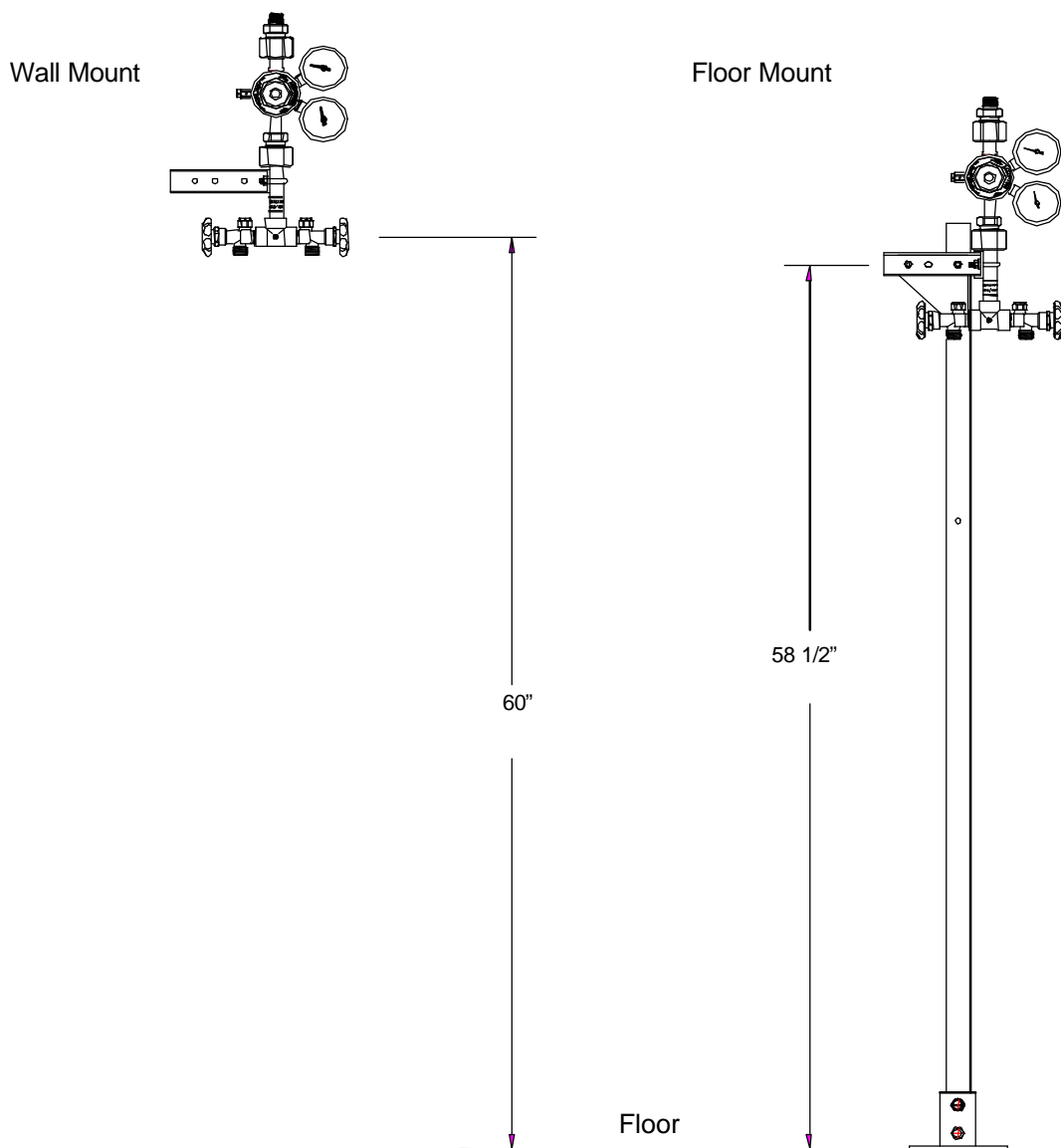


FIGURE 1

MANIFOLD ASSEMBLY

1. Assemble the manifold outlet fitting to the regulators outlet (Figure 2).
2. Assemble the header assembly to the regulator inlet oriented as shown in Figure 2.

MANIFOLD INSTALLATION - WALL MOUNT APPLICATION

1. Determine and mark the vertical center line for installation of the manifold. (Figure 2)
2. Measure from the floor to a point 60" in height* of this vertical line. Using a level, mark a horizontal line at this point extending approximately 3" to the left and 3" to the right of center.

(*Suggested manifold height. Wall mounting may vary from one installation to another depending on available space, cylinder height, etc.)

3. Remove the U-bolt assemblies from the mounting brackets. Position the bracket so that the top of the bracket is aligned with the vertical line.
4. Mark the mounting holes and install fasteners suitable for the type of wall construction. (Figure 4)
5. Mount the manifold by placing the header on the bracket. Fit the U-bolt over the header pipe and tighten the mounting nuts. (Figure 4)

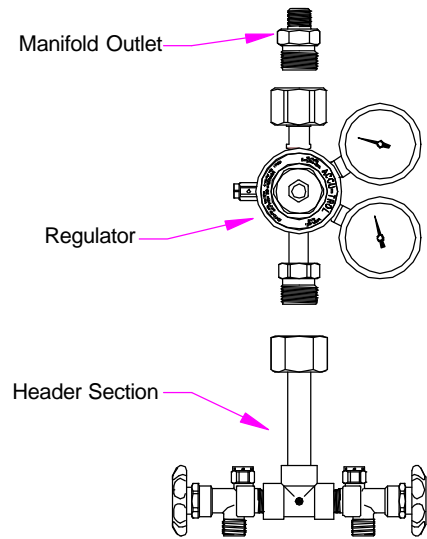


FIGURE 2

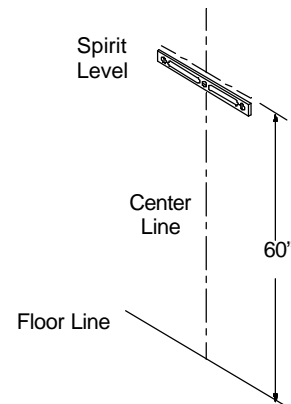


FIGURE 3

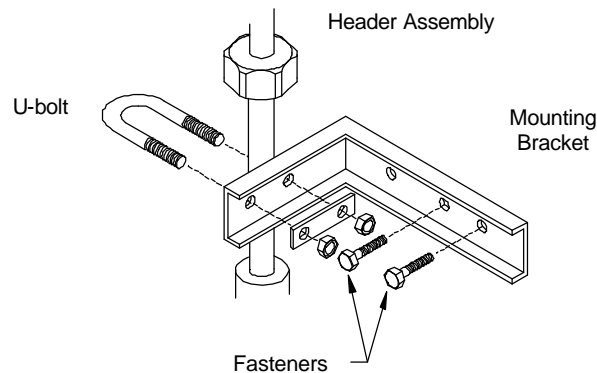


FIGURE 4

MANIFOLD INSTALLATION - FLOOR MOUNT APPLICATION

PART IDENTIFICATION

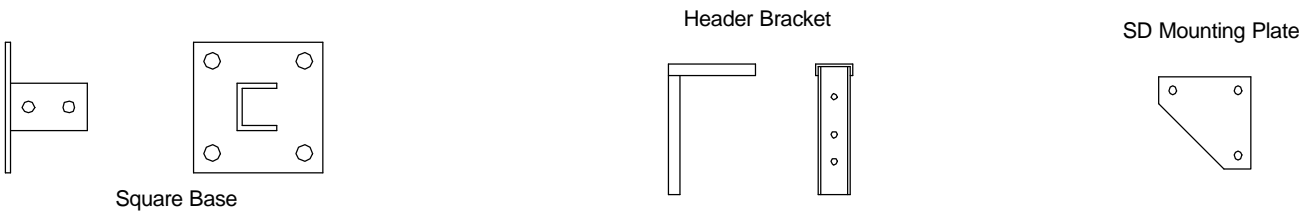
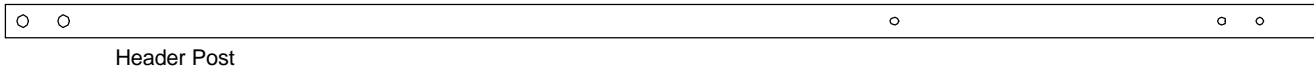


FIGURE 5

FLOOR STAND INSTALLATION

1. Mark two lines 4.25 inches apart.
2. Mark the center line of the manifold and two lines 2.125 inches on each side of the centerline per (Figure 6).
These marks will indicate where the square base for the header post will be bolted to the floor.
3. Orient the square base per Figure 7. Mount using fasteners suitable for the type of floor construction,

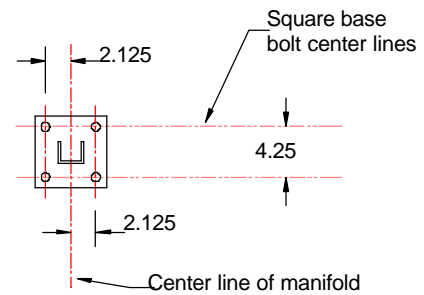


FIGURE 6

If mounting an Acetylene Manifold, proceed to step 7.

4. Mount the square tubing to the base using the supplied 1/2" locknuts and bolts. A spirit level should be used to ensure that the square tubes are level. (Figure 8)
5. Install the header bracket and SD mounting plate on the vertical riser using the supplied 5/16" locknuts and bolts. (Figure 9)
6. The manifold is now ready to be mounted to the floor stand. This should be done per the installation and operating instructions provided with your manifold.

Mount so that this side is toward the back of the manifold

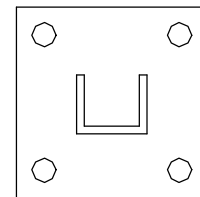


FIGURE 7

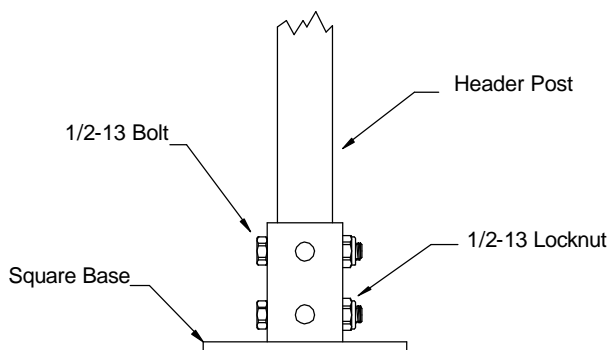


FIGURE 8

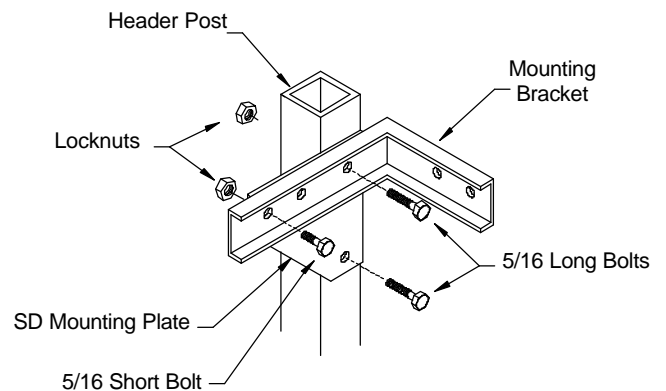


FIGURE 9

The following steps apply to Acetylene Manifolds with flash arrestors only.

7. Mount one header bracket to the square tubing using the pre-drilled holes. (Figure 10)
8. Mount the flash arrestor and piping shown in Figure 11.
9. Connect the regulator to the flash arrestor piping.
10. Locate and drill 2 holes to mount the SD mounting plate and header bracket to the square post.
11. The manifold is now ready to be mounted to the floor stand.

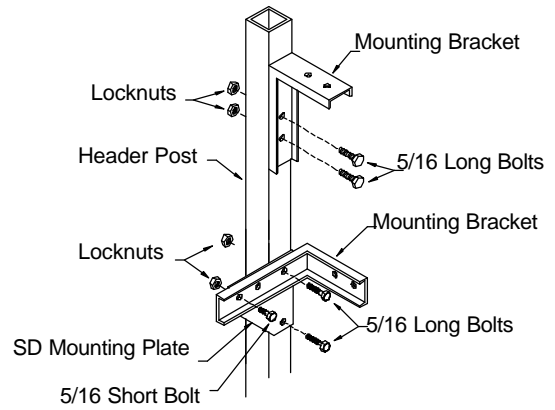


FIGURE 10

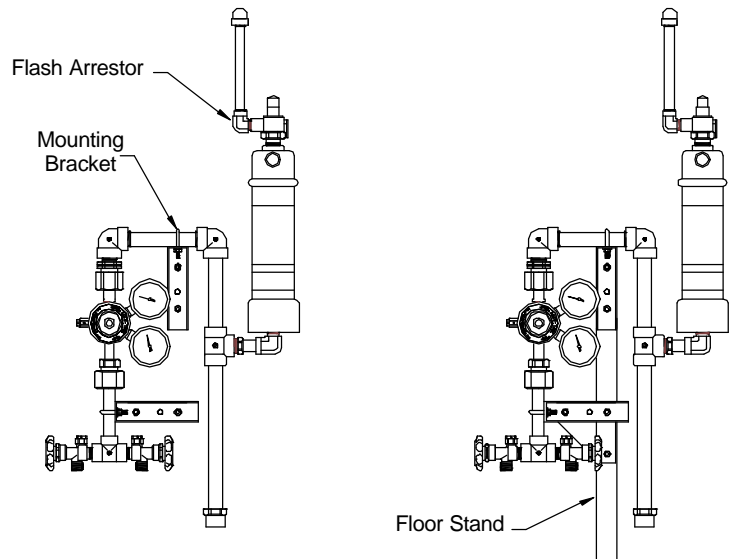
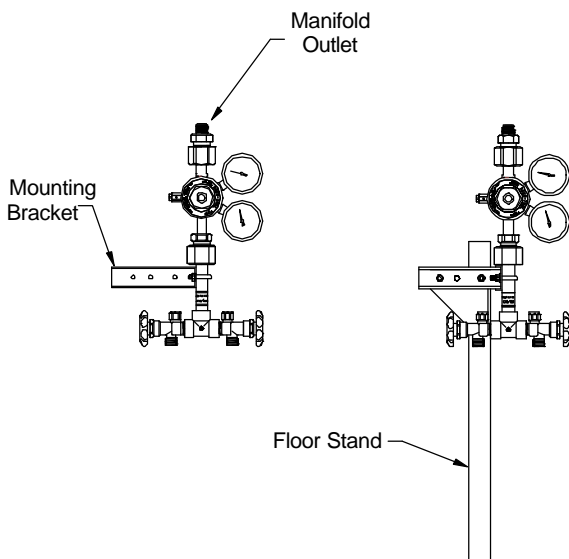


FIGURE 11

PLUMBING

1. The 1/2" NPT male union is supplied with the control and is located at the outlet of the pressure regulator. Connect this union to the pipeline system. The union provided permits removal of the manifold for service. (Figure 11)

INSTALLATION OF OPTIONAL EQUIPMENT

RELIEF VALVES

A relief valve may be installed into the manifold outlet as shown in Figure 12.

1. Install a 1/4 NPT female tee onto the manifold outlet using Teflon tape.
2. Install the relief valve into the tee.

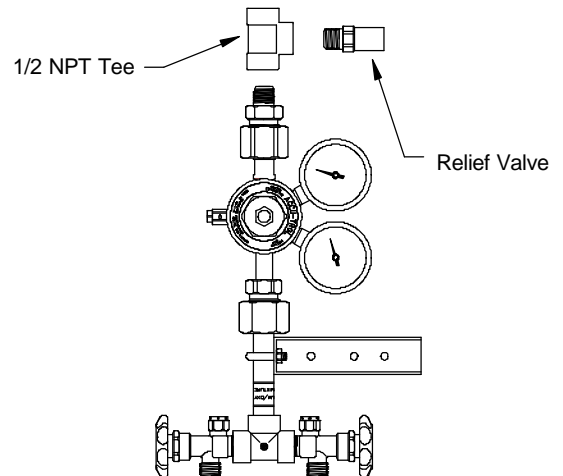


FIGURE 11

FUEL GAS MANIFOLDS - FLASHBACK ARRESTORS (OPTIONAL EQUIPMENT)

GENERAL

A flash arrestor shall also be used on all fuel gas manifolds (not provided with manifold) used in applications with oxygen. Installed in the main gas line or at the head of each branch line, the arrestor protects the main gas supply from dangers of reverse flow and flashbacks. The safety relief valve is installed on the outlet side of the flash arrestor. Should excessive pressure occur, the gas is then vented out and away to a safe location.

OPERATION

In normal flow, as shown (Figure 13), the flexible sleeve is not in contact with the mandrel. If back pressure occurs, the ball check closes and the sleeve is forced tightly against the ridges on the mandrel, creating what is in effect, a "multi-chamber" barrier. This effectively checks backflow and flashback. The excess pressure is vented through the relief valve.

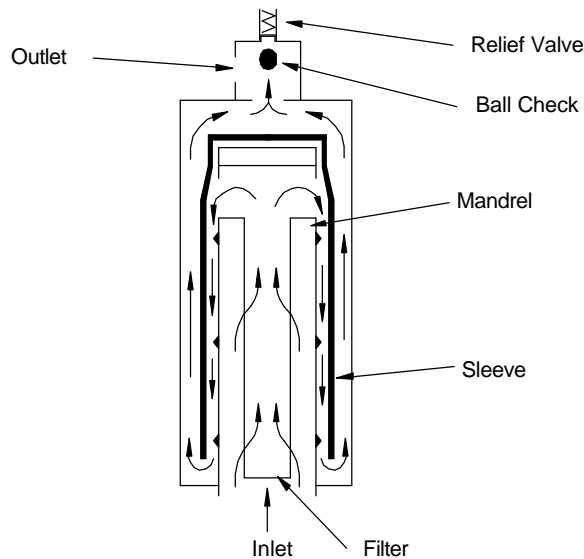


FIGURE 13

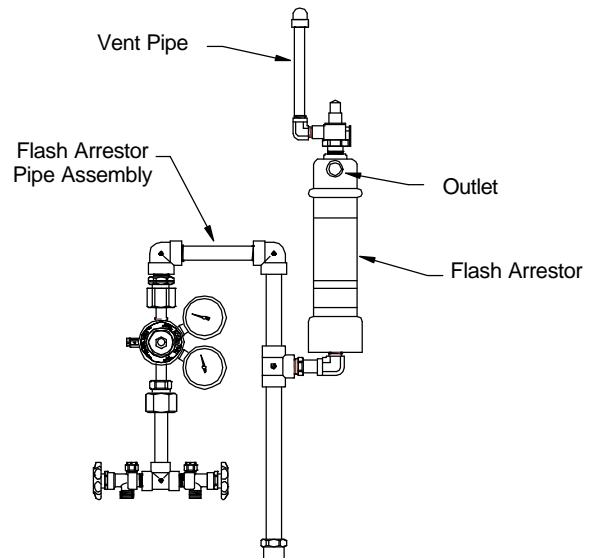


FIGURE 14

FLASH ARRESTOR INSTALLATION

1. Install the flash arrestor to the supplied flash arrestor piping using an approved pipe sealant.
2. Secure the flash arrestor pipe assembly to the manifold outlet. (Figure 14)
3. The vent piping must be galvanized and have galvanized fittings. It must be at least 3/4" pipe size. A 3/4" street elbows should be used to connect the vent pipe to the outlet on the side of the relief valve. The vent pipe must extend to the outside of the building and terminate not less than 12 ft. above the ground, remote from any windows or openings in the building, and as far as possible from sources of ignition such as flues or chimneys. Its end must be fitted with a return bend or elbow opening downward, preferably screened to prevent obstruction. The vent pipe must be installed without traps. The vent pipes from two or more back pressure check valves supplied through a common branch of the supply line may be connected to a common vent pipe header.
4. The piping from the "outlet" of the flash arrestor to the distribution system can now be completed. (The National Fire Protection Association in its bulletin, NFPA #51 outlines standards for the installation and operation of oxygen/fuel gas systems for welding and cutting).

TEST FOR LEAKS

1. Connect a torch to the service outlet of the flash arrestor.
2. Close the torch valves.
3. Be sure there is normal operating pressure in the supply line.
4. Open the station shut off valve.
5. Test for leaks around the flash arrestor joints and also the joint in the supply line. Use Western's leak test solution LT-100 or soapy water to test for leaks. **Never test for leaks with an open flame.**
6. Eliminate all leaks before equipment at the station is used.

MAINTENANCE

1. Periodically, lift the lever on the side of the relief valve slowly and release gas only for an instant. Allow the valve to close on its own spring force. This will assure that the valve is not sticking and will operate properly in cases of excess pressure.
2. Check all joints and connections for leakage periodically with leak test solution or any other solution suitable for oxygen service. Also apply a film of the leak solution over the opening of the outlet. Bubbling of the solution will indicate leakage. Do not continue operating until leakage is corrected. If leakage was noted around valve joints or at the outlet, the o-rings in the relief valve should be replaced.

INSTALLING PIGTAILS AND ATTACHING CYLINDERS

1. Establish the inlet and the manifold ends of the pigtails. The flow direction stamped on the check valve will indicate the inlet ends of the pigtails.
2. Connect the manifold end of the pigtails to the manifold header.
3. Check the header valve to be certain it is open.
4. Back out the regulator adjusting screw. This will protect the system from being over pressurized when opening cylinders.
5. Attach full cylinder to the pigtails connections as explained in "Cylinder Replacement & Handling" on page 9.
6. Open header valves (turn counter-clockwise to open). Note: Oxygen manifolds have check valves instead of header valves.
7. S-L-O-W-L-Y turn all cylinders of fully (turn counter-clockwise to open). Check all cylinders and pigtail connections for leaks using Western Leak Detector LT-100 or an oxygen safe solution. (Any bubbles around connection indicate leakage.)

START UP AND CHECKING PROCEDURES

The SD series manifolds are designed to operate in two ways; to provide an increased supply of gas as well as higher flow rates than can be achieved using a single cylinder, or to provide a manual changeover to a reserve cylinder.

1. S-L-O-W-L-Y open the cylinder valve (turn counter-clockwise to open). The high pressure gauge will show the pressure of the cylinder. (Figure 15)
2. Adjust the delivery pressure of the regulator to the desired pressure. The selection of the regulator set pressure may vary due to application requirements. If a pressure setting less than 20 psig is required then a line regulator must be installed at the manifold outlet.
3. Simulate a depleted bank by closing the cylinder valves and creating a flow of gas through the manifold. The pressure reading in the gauges will drop.
4. S-L-O-W-L-Y open the cylinder valves (turn counter-clockwise to open).
5. The manifold is now ready to supply your system.

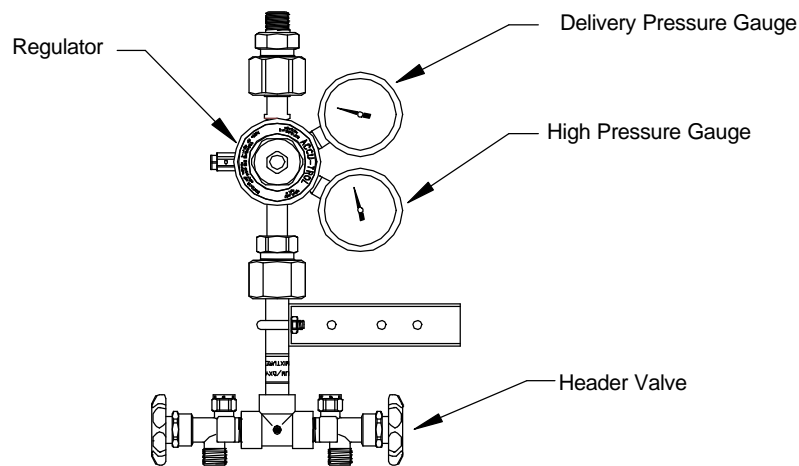


FIGURE 15

MANIFOLD OPERATION

The manifold includes the following components and features: regulator, flexible stainless pigtails with check valves, and a header. The manifold is designed to use a line regulator (optional item) which can be mounted on the manifold outlet for delivery pressures less than 20 psig.

Gas flows through the manifold to the primary regulator and then through the line regulator (if installed). Final delivery pressure is controlled by either the line regulator or by the primary regulator should the application not require a line regulator. A line regulator is not provided with the manifold.

As cylinders deplete the high pressure gauge on the regulator along with any alarm systems installed will indicate that the bank of cylinders should be changed.

After replacing empty cylinders, the manifold is immediately ready for service.

To insure proper operation, observe the following guidelines:

1. Carefully follow all instructions.
2. Establish proper flow direction of check valves.
3. Be sure header shut-off valves are fully opened.
4. Be sure cylinder valves are fully opened.
5. Replace depleted cylinders as soon as practical after the manifold has depleted.

CYLINDER REPLACEMENT AND HANDLING

1. Shut off all cylinder valve and header valve on depleted cylinder bank.
2. S-L-O-W-L-Y loosen and remove the pigtail connection from the depleted cylinder.
3. Remove depleted cylinders and replace protective cap.
4. Removed protective cylinder caps from full replacement cylinders. With the valve outlet pointed away from you or anyone else, slowly open each cylinder valve slightly to blow out any dirt or contaminations which may have become lodged into the cylinder valve.
5. Place and secure full cylinder into position using chains, belts, or cylinder stands.
6. Connect pigtails to cylinder valves and tighten with wrench.
7. Open the header valve. S-L-O-W-L-Y turn each cylinder valve until each cylinder is fully on.
8. The manifold supply bank is now replenished and may be put in service by following instructions on page 7. (START UP AND CHECKING PROCEDURES)

GENERAL MAINTENANCE

1. Main section
 - a) Daily - record line pressure.
 - b) Monthly
 - 1) Check regulators and valve for external leakage.
 - 2) Check valves for closure ability.
 - c) Annually
 - 1) Check relief valve pressures.
 - 2) Replace regulator seats.
2. Manifold header
 - a) Daily - observe nitrous oxide and carbon dioxide systems for cylinder or surface condensation.
Should excessive condensation or frosting occur it may be necessary to increase manifold capacity.
 - b) Monthly
 - 1) Inspect valves for proper closure.
 - 2) Check cylinders for cleanliness, flexibility, wear, leakage, and thread damage.
Replace damaged pigtails immediately.
 - 3) Inspect pigtail check valves for closure ability.
 - c) Every 4 years
 - 1) Replace all pigtails.

TROUBLESHOOTING**(Only qualified repair personnel should make repairs)**

SYMPTOM	PROBABLE CAUSE	REMEDY OR CHECK
SYSTEM DEPLETES PREMATURELY		
Alarms signaling empty bank actuate and system has not depleted.	The pressure setting of the pressure switch is too close to the supply primary regulator setting.	Increase the pressure differential between the primary regulator and the pressure switch.
SYSTEM DOES NOT FLOW		
Manifold does not flow and delivery gauges drop down to 0.	Primary regulator set a 0 psig.	Reset the primary regulator following instructions on page 9 (Start up and checking procedures).
LOSS OF CYLINDER CONTENT		
Audible or inaudible gas leakage (unknown origin).	Leakage at manifold piping connections.	Tighten, reseal or replace.
	Leakage in downstream piping system.	Repair as necessary.
	Leakage at cylinder valve.	Replace cylinder.
	Gauge leaks.	Reseal or replace.
	Regulator leaks.	Repair or replace.
Venting at relief valve. (optional item)	Regulator setting too high.	Set delivery pressure to specifications.
	Over pressure due to creeping or faulty regulation by regulator.	Replace regulator seat and nozzle components.
	Regulator freeze-up. (Nitrous Oxide or Carbon Dioxide)	Reduce the flow demand or increase the number of supply cylinders.
Gas leakage around regulator body or bonnet.	Loose bonnet.	Tighten bonnet.
	Diaphragm leak on regulator.	Replace diaphragm.

MANIFOLD MAINTENANCE & REPAIR PARTS

NOTE:

- Western manifold systems are designed and tested for optimal performance and adherence to safety specifications. We recommend the use of Western replacement components to maintain the standards of performance and the safety of the product.

REPLACEMENT PIGTAILS

24" Stainless Steel Inner Core Flexible Braid with Check Valves

PF-15CV-24R.....	CGA 510 for Liquid Fuel Gas Service
PF-15CVFA-24R.....	CGA 510 with flash arrestor for Acetylene Service
PF-16CVFA-24R.....	CGA 300 with flash arrestor for Acetylene Service
PF-63CV-24	CGA 540 for Oxygen (O ₂) Service
PF 83CV-24RV.....	CGA 350 for Argon/Methane Mixture Service
PF-92CV-24R.....	CGA 580 for Nitrogen (N ₂) Service
PF-93CV-24R.....	CGA 590 for Industrial Air Service
PF-320CV-24R.....	CGA 320 for Carbon Dioxide (CO ₂) Service
PF-326CV-24R.....	CGA 326 Nitrous Oxide (N ₂ O) Service

24" Synthetic Fiber Braid Hose with Check Valves

PFS-83CV-24R.....	CGA 350 for Hydrogen Service
PFS-92CV-24R.....	CGA 580 for Helium (He) Service

REGULATORS AND REGULATOR REPAIR KITS

RM-1-1	Primary Regulator Acetylene
RM-2-4	Primary Regulator for Compressed Air
RM-4-4	Primary Regulator for CO ₂
RM-6-4	Primary Regulator for Hydrogen
RM-7-4	Primary Regulator for Argon, Nitrogen, and Helium
RM-7A-4.....	Primary Regulator for Oil pumped Nitrogen
RM-8-4	Primary Regulator for N ₂ O
RDM-9-4.....	Primary Regulator for Oxygen
RM-10-2	Primary Regulator for LPG Fuel Gas
RDM-11-4.....	Primary Regulator for Medical Breathing Mixtures
RWC-3-59	Replacement Cartridge for RM-1-1 & RM-10-2
RWC-3-49	Replacement Cartridge for RM-2-4, RM-7-4, RM-4-4, RM-8-4, RM-6-4 & RM-7A-4
RWC-2-19	1st Stage Replacement Cartridge for RDM-9-4 & RDM-11-4
RWC-2-36	2nd Stage Replacement Cartridge for RDM-9-4 & RDM-11-4
RS-300-MAN	Primary Regulator for SDHP
RK-1020.....	Repair Kit for RS-300-MAN

VALVES AND VALVE REPAIR KITS

WMV-2-8.....	CGA 540 Header Valve
WMV-2-3.....	CGA 580 Header Valve
WMV-2-7.....	CGA 320 Header Valve
WMV-2-14.....	CGA 326 Header Valve
WMV-2-14.....	CGA 346 Header Valve

FLOOR STAND MAINTENANCE & REPAIR PARTS

WMC-6-85.....	1/2-13 Bolt 2.50" long
WMC-6-83.....	5/16-18 Bolt 2.25" long
WMC-6-88.....	1/2-13 Nylon Locknut
WMC-6-86.....	5/16-18 Nylon Locknut
WMC-6-89.....	Mounting Plate
WMC-6-82.....	Square Base
WMC-6-80.....	Header Post
WMC-6-2.....	Header Bracket
WMC-6-13.....	U-Bolt Assembly

LIMITED WARRANTY

WARRANTY: The Seller expressly warrants that the products manufactured by it will be free from defects in material, workmanship, and title at the date of shipment. This Warranty is exclusive and is IN LIEU OF ALL IMPLIED OR STATUTORY WARRANTIES (INCLUDING WITHOUT LIMITATION, WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ARISING FROM COURSE OF DEALING OF USAGE OR TRADE) or any other express or implied warranties or representations. All claims under this warranty must be made in writing and delivered to the Seller prior to the expiration of 1 year from the date of shipment from the factory, or be barred. Upon receipt of a timely claim, the Seller shall inspect the item or items claimed to be defective, and Seller shall, at its option, modify, repair, or replace free of charge, any item or items which the Seller determines to have been defective at the time of shipment from the factory, excluding normal wear and tear. Inspection may be performed at the Seller's plant and in such event, freight for returning items to the plant shall be paid by Buyer. Seller shall have no responsibility if such item has been improperly stored, installed, operated, maintained, modified and/or repaired by an organization other than the Seller. Adjustments for products not manufactured by Seller shall be made to the extent of any warranty of the manufacturer or supplied thereof. The foregoing shall be the Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for any breach of warranty or for any other claim based on any defect in, or non-performance of, the products whether based on breach of contract or in tort, including negligence or strict liability.



WESTERN
INNOVATOR

875 Bassett Road
Westlake, Ohio 44145-1142
(440) 871-2160
(800) 783-7890
FAX: (440) 835-8283