

INTRODUCTION

Western manifold systems are cleaned, tested and prepared for the indicated gas service and are built following Compressed Gas Association guidelines. The manifold is specially designed to regulate and monitor vaporized gas from cryogenic liquid cylinders. When the gas from the service bank of cryogenic cylinders is depleted a manual valve can be opened to permit the gas to flow from the reserve cryogenic cylinders. The manifold consists of an adjustable cryogenic line regulator, 72" cryogenic flexible pigtails with check valves, rigid wall mounted headers, a port for optional pressure switch and complete mounting hardware.

CAUTION

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

- Never permit oil, grease, or any other combustible material to come in contact with cylinders, manifold, and connections. Oil and grease may react and ignite while 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 and ignite while 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 damage, or break off the cylinder valve, which may propel the cylinder with great force.
- Oxygen manifolds and cylinders should be grounded. Static discharges and lightning may ignite materials in an oxygen enriched atmosphere, creating a fire or explosion.
- Welding should not be performed near nitrous oxide piping. Excessive heat may cause the gas to dissociate, creating an explosive force.
- Carefully read and follow installation and operating instructions! Manifolds are designed for gas withdrawal from cryogenic liquids. Contact with a cryogenic gas or liquid with skin or eyes may cause a freezing injury.

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 INSTALLATION.....	4
PLUMBING	5
INSTALLATION OF OPTIONAL EQUIPMENT.....	6
PRESSURE SWITCH INSTALLATION	6
INSTALLING PIGTAILS AND ATTACHING CRYOGENIC CYLINDERS.....	6
REMOTE ALARM HOOKUP.....	7
START UP AND SYSTEM CHECKING PROCEDURES	8
MANIFOLD OPERATION	9
CRYOGENIC CYLINDER REPLACEMENT & HANDLING.....	10
GENERAL OPERATION.....	10
TROUBLE SHOOTING.....	11
MANIFOLD MAINTENANCE & REPAIR PARTS	12
REPLACEMENT PIGTAILS.....	12
REGULATOR 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, Compressed Gas Association, OSHA, Canadian Standards Associations, 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 manifolds for all other gases should not be placed in a location where the temperature will exceed 120° (49° C) or fall below -0° F (-18° C). A manifold placed in an open location should be protected against adverse weather conditions, including direct rain, snow, and heavy moisture. During winter, protect the manifold from ice and snow. In summer, shade the manifold and cylinders from continuous exposure to direct rays and heat 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.

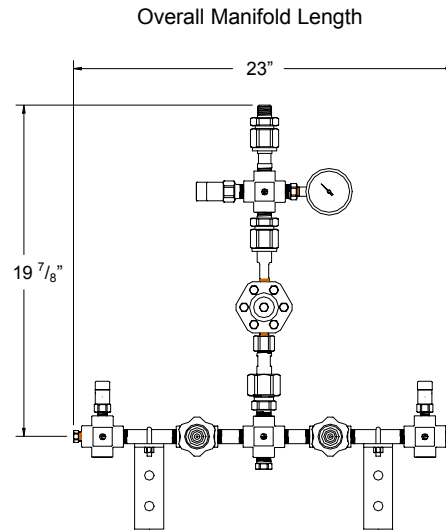


FIGURE 1

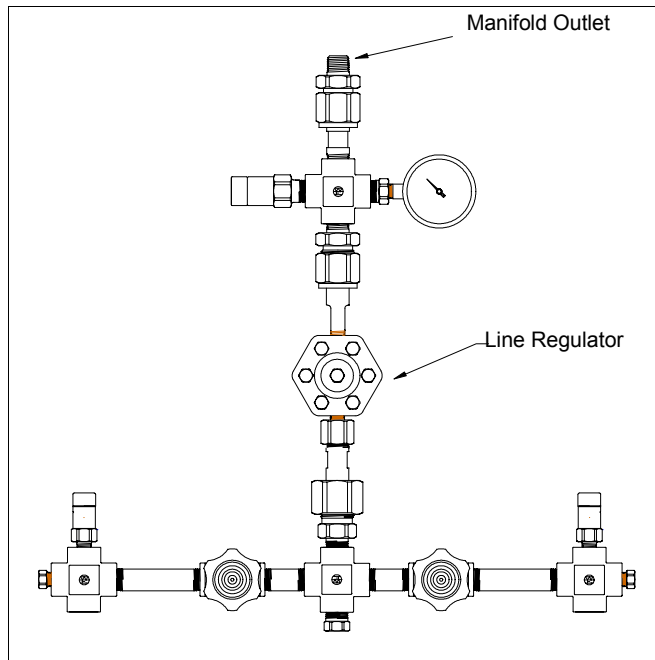


FIGURE 2

MANIFOLD INSTALLATION

1. Determine and mark the vertical center line for installation of the manifold (Figure 3). This centerline will indicate where the vertical portion of the manifold will be located.
2. Measure from the floor to a point 60" in height* on this vertical line. Using a level, mark a vertical line at this point extending approximately 7" to the right of the centerline.

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

3. Mark another vertical line 7" to the left of the center line.
4. Remove the U-bolt assemblies from the mounting brackets. Position the brackets so that the top of the brackets are aligned with the horizontal line and centered on the right and left vertical lines.
5. Mark the mounting holes and install fasteners suitable for the type of wall construction. (Figure 4)
6. Mount manifold by placing the header on the brackets. Fit the U-bolt over the header pipe and tighten the mounting nuts. (Figure 5).

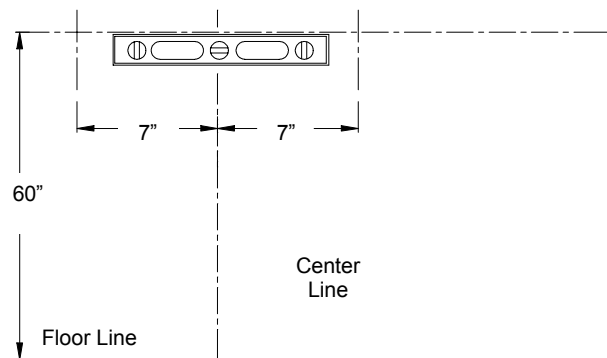


FIGURE 3

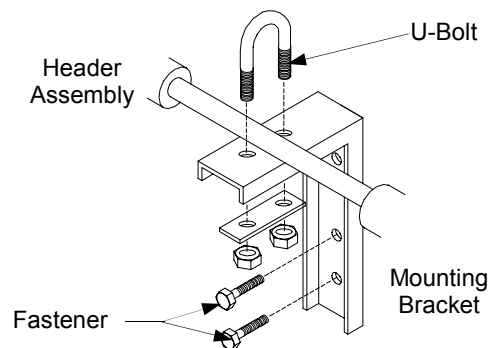


FIGURE 4

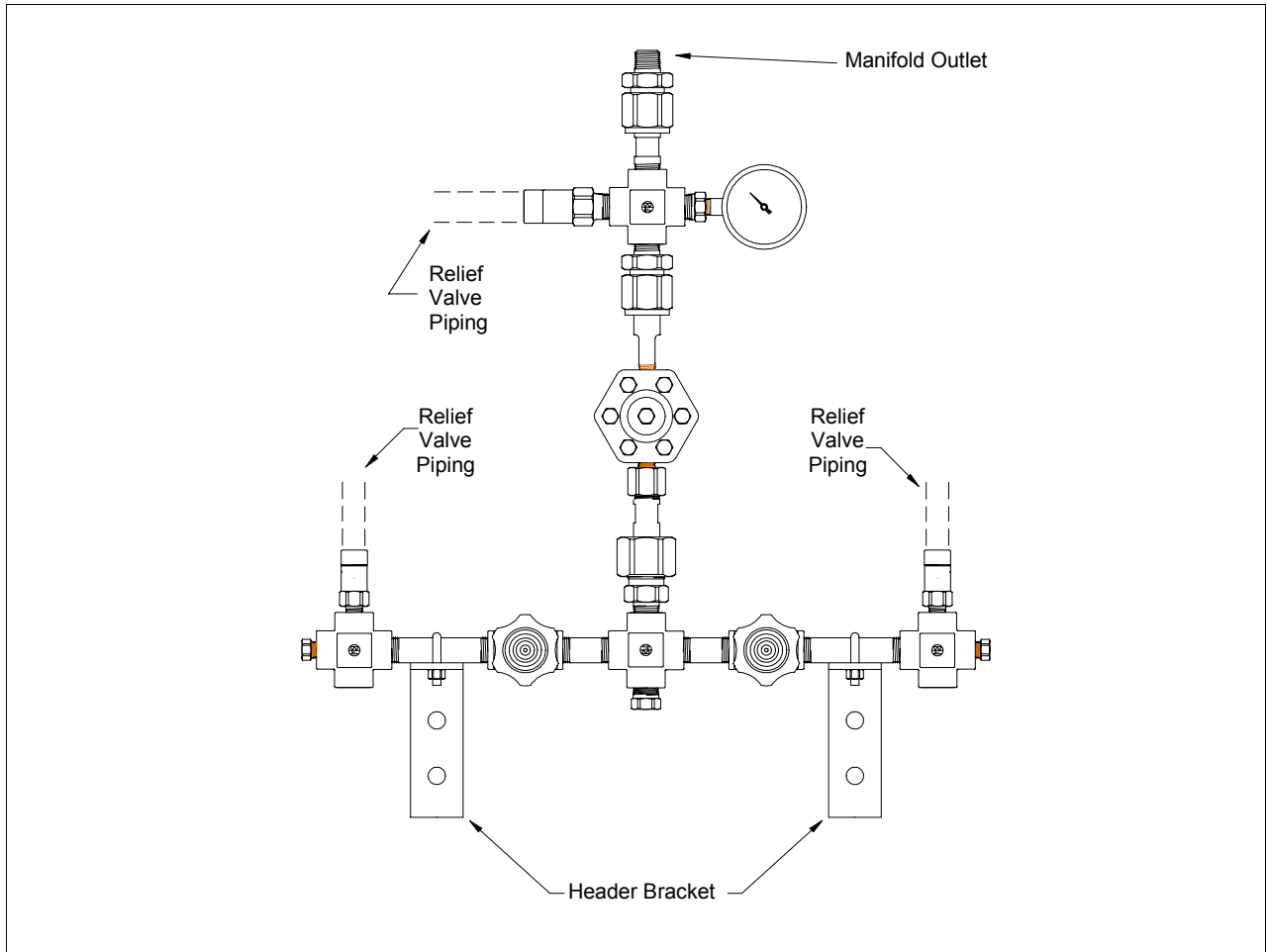


FIGURE 5

PLUMBING

1. A 1/2" NPT male union is supplied with the control and is located at the outlet of the manifold. Connect this union to the pipeline system. The union provided permits removal of the manifold for service. (Figure 5)
2. If the manifold is installed in an enclosed area, vent piping should be attached to the manifold relief valves. The vent connections are 1/2 NPT female.

INSTALLATION OF OPTIONAL EQUIPMENT

PRESSURE SWITCH

1. Install an orifice bushing into the 1/2 NPT cross (Figure 6).
2. Install the pressure switch onto the orifice bushing (Figure 6)

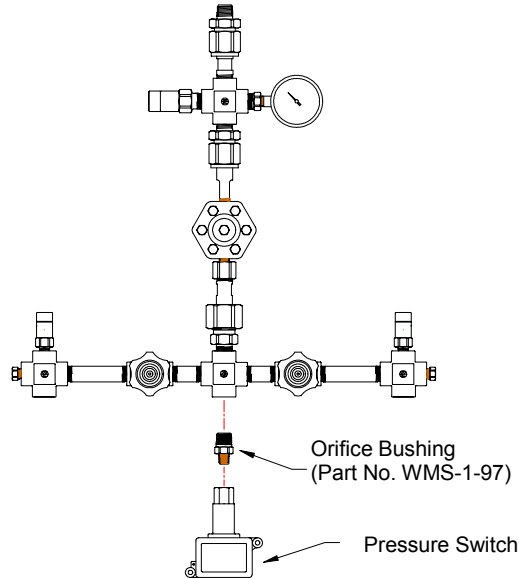


FIGURE 6

INSTALLING PIGTAILS AND ATTACHING CRYOGENIC CYLINDERS

1. Establish the inlet and the manifold ends of the pigtails. The flow direction stamped on the check valve will indicate the inlet and outlet ends of the pigtails.
2. Connect the manifold end of the pigtails to the manifold header cross.
3. Check the header valve to be certain it is open.
4. Back out the line regulator adjusting screw. This will protect the system from being overpressurized when opening cylinders.
5. Attach full cryogenic cylinders to the pigtail connections as explained in "Cryogenic Cylinder Replacement & Handling" on page 10.
6. S-L-O-W-L-Y turn all cylinders on fully (turn counter-clockwise to open). Check all cylinder and pigtail connections for leaks using Western leak detect LT-100 or an oxygen safe solution. (Any bubbles around connections indicate leakage.)

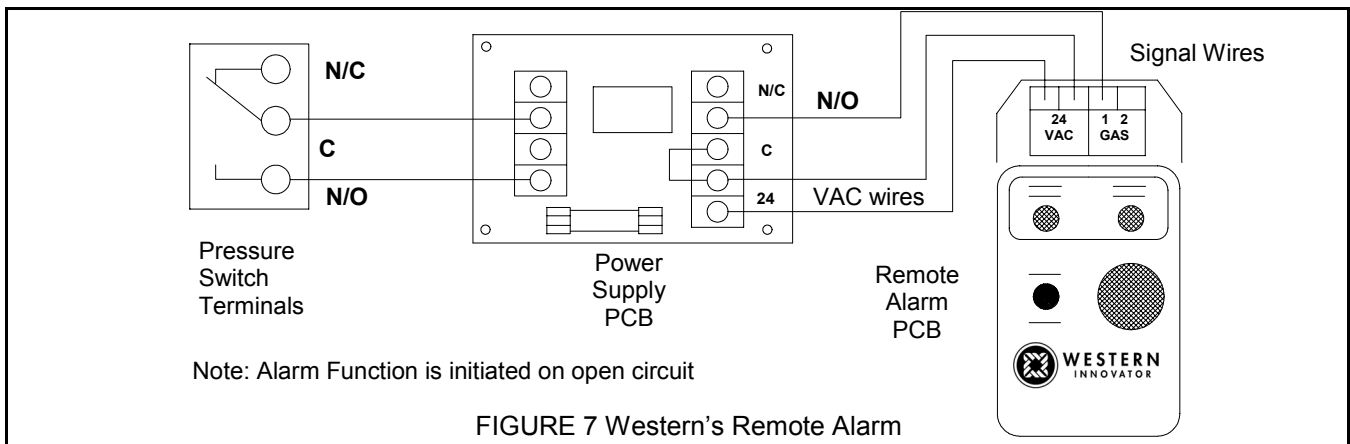


REMOTE ALARM HOOKUP

Western SDLA manifolds may be connected to an alarm system provided a pressure switch is installed into the manifold. The pressure switch provides isolated (dry) remote alarm contacts. Wiring diagrams for remote audio/visual alarms are included with the alarms. Listed below are three different remote alarm configurations.

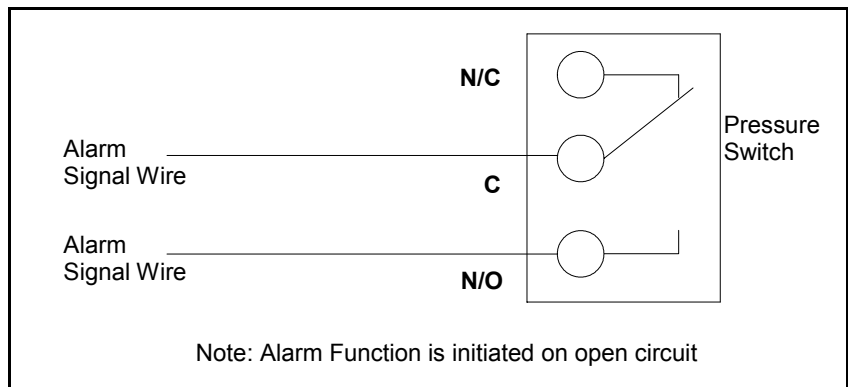
WESTERN'S ALARM

1. Western's alarms (BIA-1, BIA-2, and BIA-3) require a 14 VAC power supply (P/N WMS-9-25C).
2. Connect one 24 VAC wire from the right side of the circuit board in the power supply box to the first 24 VAC terminal on the remote alarm printed circuit board (PCB)
3. Connect the other 24 VAC wire from the right side of the power supply box to the second 24 BAC terminal on the remote alarm PCB.
4. Connect a jumper wire from the 24 VAC terminal used in step 3 to the common (C) terminal on the power supply.
5. Connect a signal wire from the normally open (N/O) terminal on the power supply to the GAS-1 terminal on the remote alarm PCB.
6. Connect the second terminal on the left side of the power supply to the common terminal on the pressure switch.
7. Connect the fourth terminal on the left side of the power supply to the normally open (N/O) terminal on the pressure switch.



In some instances the power supply for the remote alarm is normally a part of the electrical contract on proposed constructions and exist in any furnished hospital. The following procedure should be followed:

1. Two alarm signal wires requiring dry contacts should run to the manifold location.
2. Connect one signal wire to the common (C) terminal on the pressure switch. (Figure 8)
3. Connect the other signal wire to the normally open (N/O) terminal on the pressure switch.



If the remote alarm requires a power supply for operation, then connect the alarm as follows:

(Also see WESTERN'S ALARM section)

1. The power supply will be determined by the remote alarm operation voltage. If the remote alarm is designed for 115 VAC service then the existing 115 VAC power source can be utilized directly. (Figure 9) If the remote alarm is designed for other than the existing AC power source then it is necessary to install a transformer in the system to provide the proper operating voltage. (Figure 9)
2. Connect the positive lead (+) from the power supply to the common (C) terminal on the pressure switch.
3. Connect the ground wire from the alarm to the negative (-) lead from the power supply.
4. Connect the "reserve in use" signal wire from the alarm to the normally closed (N/C) terminal on the pressure switch.
5. If a "system normal" signal is also employed, connect that signal wire to the normally open (N/O) terminal on the pressure switch.

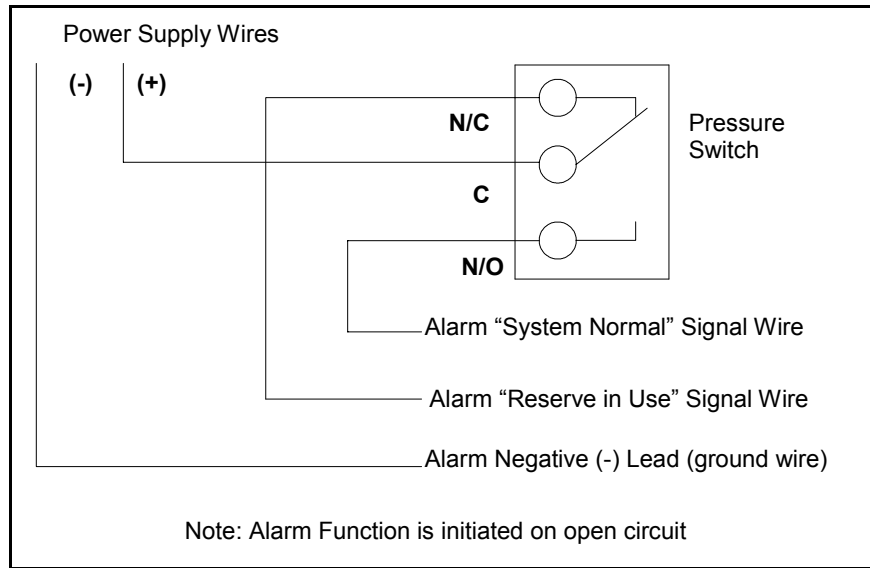


FIGURE 9 115 VAC Power

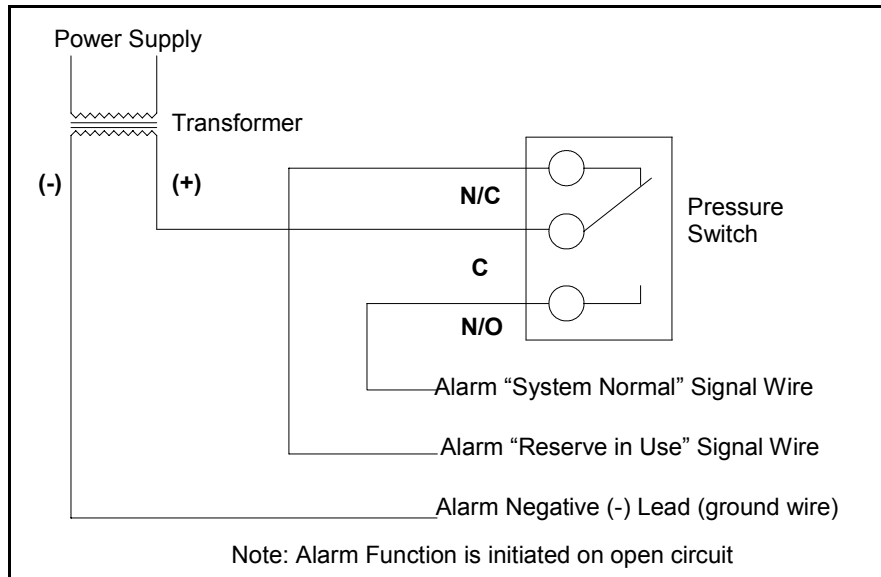


FIGURE 10 User Supplied Power

START UP AND CHECKING PROCEDURES

The SDLA 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 cryogenic cylinder, or to provide a manual changeover to a reserve cylinder.

1. S-L-O-W-L-Y open the cryogenic cylinder valve (turn counter-clockwise to open) (Figure 11)
2. Adjust the delivery pressure of the regulator to the designed 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 header valves and creating a flow of gas through the manifold. The pressure reading on the gauge will drop.
4. S-L-O-W-L-Y open the header valve (turn counter-clockwise to open) on the bank(s) that are to feed the system.
5. The manifold is now ready to supply your system.

MANIFOLD OPERATION

The manifold control includes the following components and features: regulator, flexible pigtails with check valves, header valves, and two header crosses.

Gas flows through the manifold to the header valve and then through the regulator. Final delivery pressure is controlled by the manifold regulator.

As the cryogenic cylinders deplete, the cryogenic cylinder pressure gauge along with any alarm system (if installed), will indicate that the bank of cylinders should be changed.

After replacing empty cryogenic 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 the primary bank header valve is fully opened.
4. Replace empty cryogenic cylinders as soon as practical after the manifold has depleted.

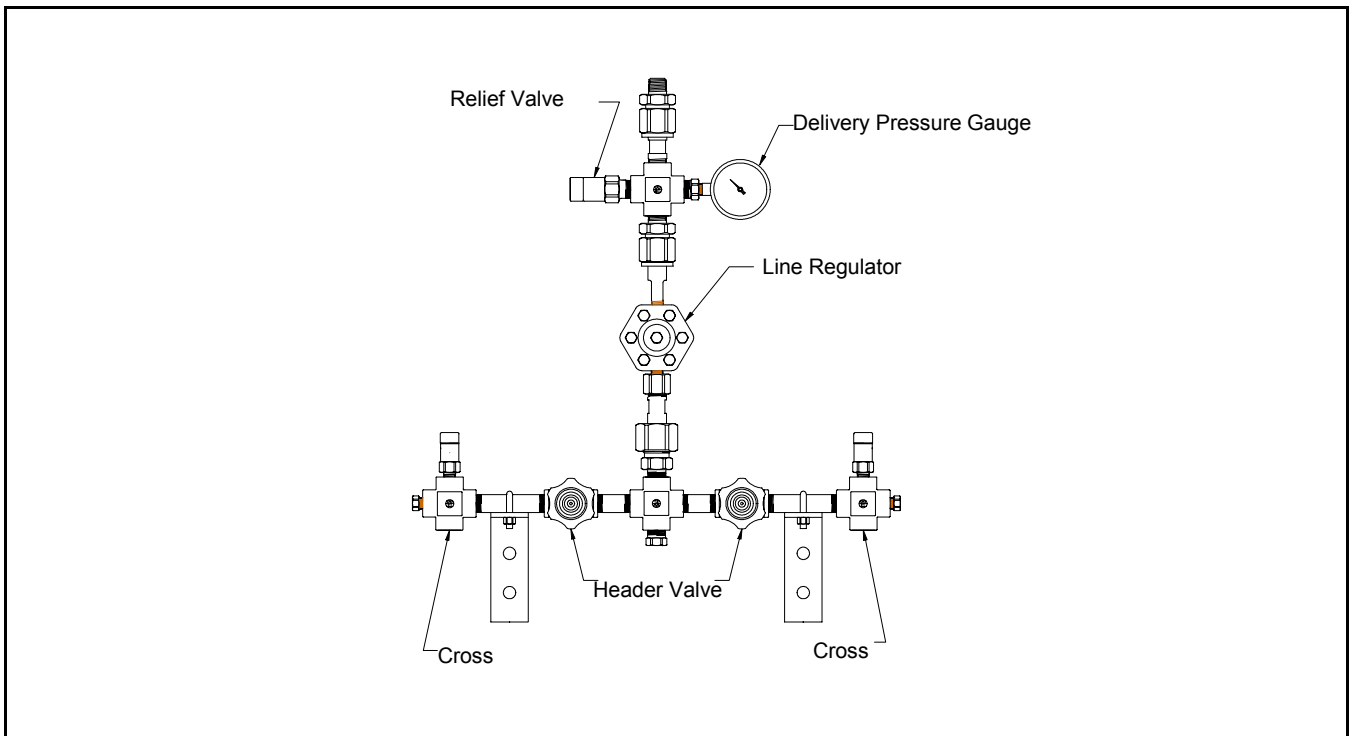


FIGURE 11

CRYOGENIC CYLINDER REPLACEMENT & HANDLING

1. Shut off all cylinder valves and the master valve on depleted cylinder bank.
2. S-L-O-W-L-Y loosen and remove the pigtail connection from the depleted cylinders.
3. Remove depleted cylinders.
4. With the valve outlet pointed away from you or anyone else, slowly open each full replacement cylinder valve slightly to blow out any dirt or contaminants which may have become lodged into the cylinder valve.
5. Place and secure full cylinders into position using chains, belts, straps, or cylinder stands.
6. Connect pigtails to cylinder valves and tighten securely.
7. S-L-O-W-L-Y turn each cylinder valve until each cylinder valve is fully open.

NOTE:

- All cylinders on a given bank shall have their pressure building regulators set at the same pressure.
- Connect vent lines together on Dewars that are located on the same bank.
- Keep master valve on reserve bank closed until needed.

8. Check all cylinder/pigtail connections for leaks using Western Leak Detector, LT-100 or an equivalent oxygen safe solution. Repair or replace any connections that show signs of bubbles which indicates leakage.
9. The manifold reserve bank is now replenished and is ready for use.

GENERAL MAINTENANCE

1. Manifold
 - a) Daily - record line pressure.
 - b) Daily - observe manifold for frosting or surface condensation. Should excessive condensation or frosting occur it may be necessary to increase manifold capacity.
 - c) Monthly
 - 1) Check regulators and valves for external leakage.
 - 2) Check valves for closure ability.
 - d) Annually - check relief valve pressure.
 - replace regulator seats.

Trouble-Shooting (Only qualified repair personnel should make make repairs)

SYMPTOM

**SYSTEM DEPLETES
PREMATURELY**

Both banks of cylinders
deplete at the same time.

Both master valves are open.

Close the reserve bank
master valve.

SYSTEM DOES NOT FLOW

Manifold does not flow and
delivery gauges drop down to
zero.

Line regulator set at 0 psig.

Reset the line regulator to
desired delivery pressure.

LOSS OF CYLINDER CONTENTS

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 header valve.

Replace valve.

Gauge leaks.

Reseal or replace.

Regulator leaks.

Repair or replace.

Venting at relief valve.

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.

Gas feeds from one cylinder
at a time instead of the
cylinders emptying at the same time.

Pressure building regulators
not at the same pressure.

Adjust pressure building
regulators and connect the
Dewar vent valves together.

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

72" Cryogenic Flexible Pigtails with Check Valve

WMH-2-5..... CGA 320 for Carbon Dioxide (CO₂) service
WMH-2-6 CGA 326 for Nitrous Oxide (N₂O) service
WMH-2-7..... CGA 540 for Oxygen (O₂) service
WMH-2-8..... CGA 580 for Nitrogen, Argon, and Helium (N₂, Ar, He) service

REGULATORS AND REGULATOR REPAIR KITS

WMR-6-4..... Cryogenic Line Regulator (LA and LAMP series)
WMR-6-6..... Cryogenic Line Regulator (LAMP series)
RK-1070..... Repair kit for WMR-6-4 and WMR-6-6

VALVES AND VALVE REPAIR KITS

WMV-2-69..... Cryogenic Header Valve
WMV-4C-450 Inlet Relief Valve
WMV-8-450 Line Relief Valve
WMV-4-7 Inlet Relief Pipe Away
WMV-8-7 Line Relief Pipe Away

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, 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: 440.835.8233
www.westernenterprise.com