

## INTRODUCTION

Western manifold systems are cleaned, tested and prepared for the indicated gas service and are built following National Fire Protection Association and Compressed Gas Association guidelines. The manifold consists of a manifold control, and two supply bank headers, one service and one reserve supply to provide an uninterrupted supply of gas for the specific gas application. The control unit is designed and built with features providing automatic changeover from the depleted "Service" supply bank to the "Reserve" supply with no loss or drop in delivery pressure. Pressure gauges, alarm signal connections and lights show system status and alert the need to replace depleted cylinders. Features of the automatic system include integral adjustable line regulators, stainless steel braided flexible pigtails with check valves, rigid wall-mounted headers, and complete mounting hardware.

### CAUTION

**Failure to follow the subsequent 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.
- Do not use leak test solution that contains ammonia. Solutions containing ammonia may cause brass tubing to crack.

## 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.

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**GENERAL INSTRUCTIONS**

Manifolds should be installed in accordance with guidelines stated by the National Fire Protection Association, Compressed Gas Association, Occupation Safety Health Administration, 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 -20° F (-29° 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. The manifold should be located in a clean, well ventilated area which is free of oil and combustible materials

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.

All safety relief valves including those on flash arrestors (BI series for fuel gas) shall be piped/vented to the outside.

**CAUTION:**

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

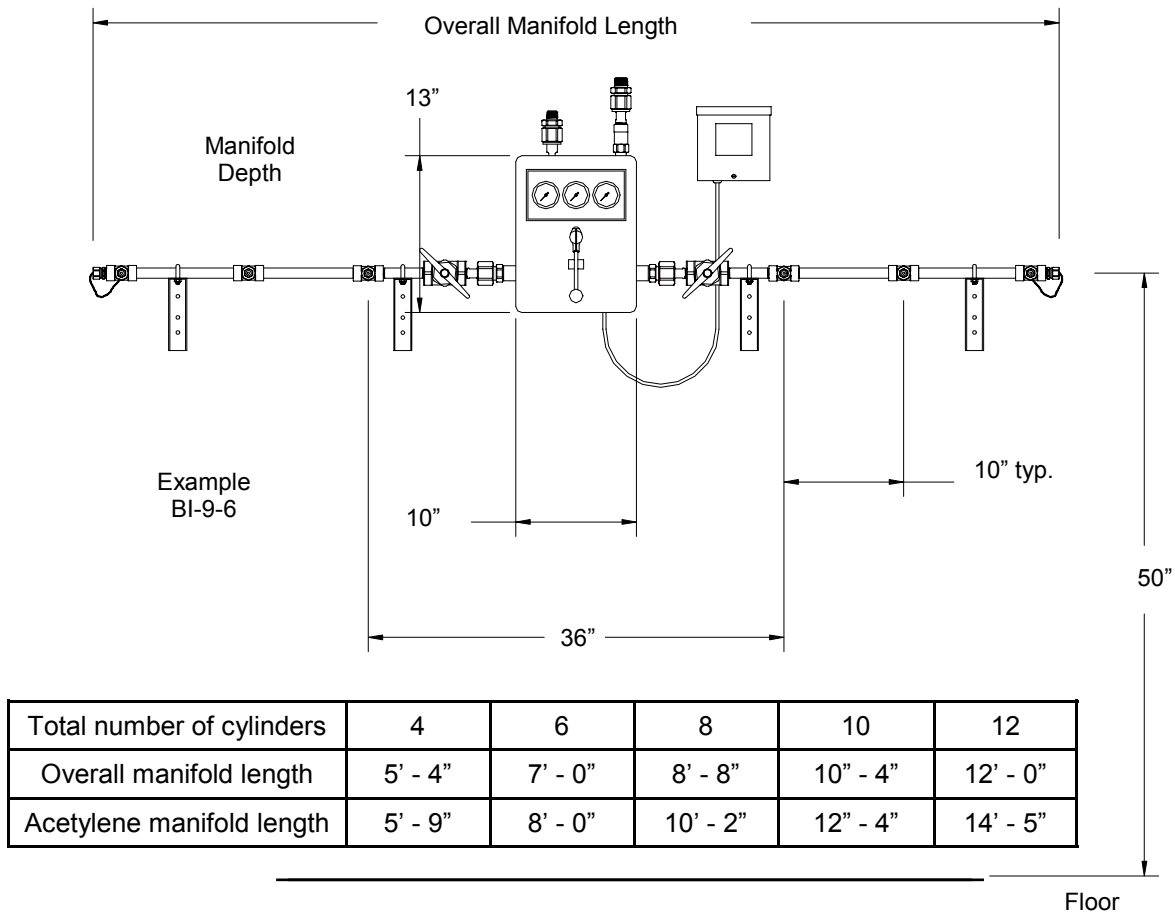


Figure I

## CONTROL SECTION INSTALLATION

1. Determine and mark the vertical center line for installation of the manifold control unit. (Figure 2).
2. Measure from the floor to a point 57" in height\* of this vertical line. Using a level, mark a horizontal line at this point extending approximately 10" to the left and 10" to the right of center.

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

3. Remove the mounting bracket from the back of the manifold control removing the nut at the bottom of the bracket. Place the upper edge of the "tee" mounting bracket on the marker horizontal line and centered with the vertical line.

Holding the bracket with the slotted extensions away from the wall, mark the locations for three mounting bolts. (Figure 3).

4. Anchor the mounting bracket to the wall. Selection of mounting fasteners will depend upon wall construction. (Figure 3).

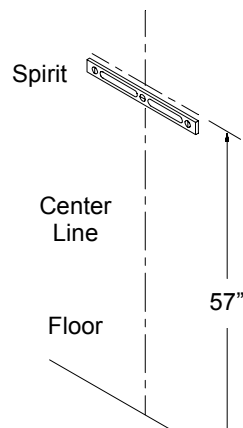


Figure 2

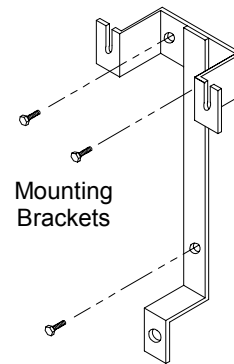


Figure 3

5. Secure the manifold control in place by sliding the round retainers on the back of the cabinet into the slots on the bracket. Replace the nut on the bolt which protrudes from the case and tighten lightly. This bolt only stabilizes the bottom of the unit and is not load-bearing. (Figure 4)

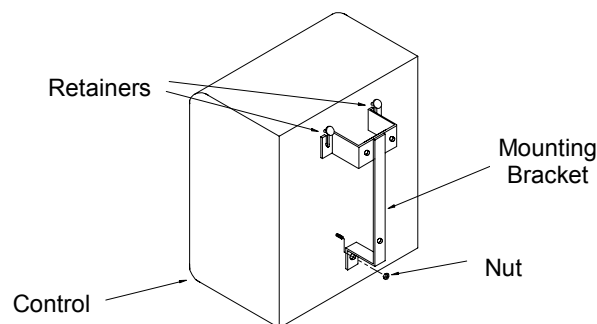


Figure 4

## HEADER INSTALLATION

1. Attach the headers to the union on each side of the manifold control. Using a level, mark the placement of mounting brackets while keeping the header on a horizontal plane (Figure 5).

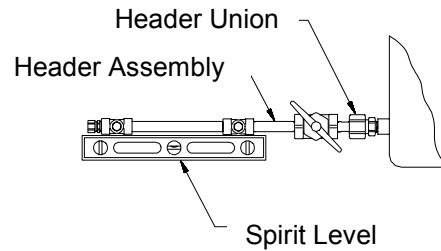


Figure 5

2. Remove the U-bolt assemblies from the header mounting brackets. Position the brackets so that the top of the bracket is aligned with the bottom of the headers and is centered between the cylinder connections. The end bracket should be placed as close to the last cylinder as possible to provide the most support and stability. (Figure 6)
3. Mark the mounting hole and install fasteners suitable for type of wall construction. (Figure 6)
4. Fit the U-bolt over the header piping and tighten the two mounting nuts. (Figure 6)

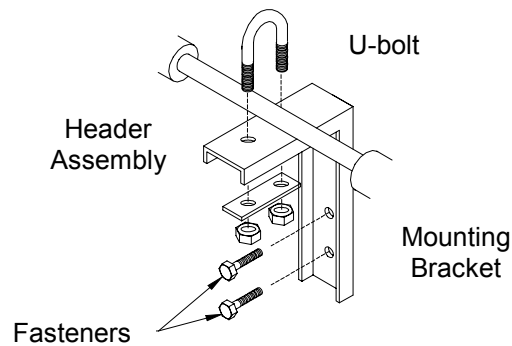


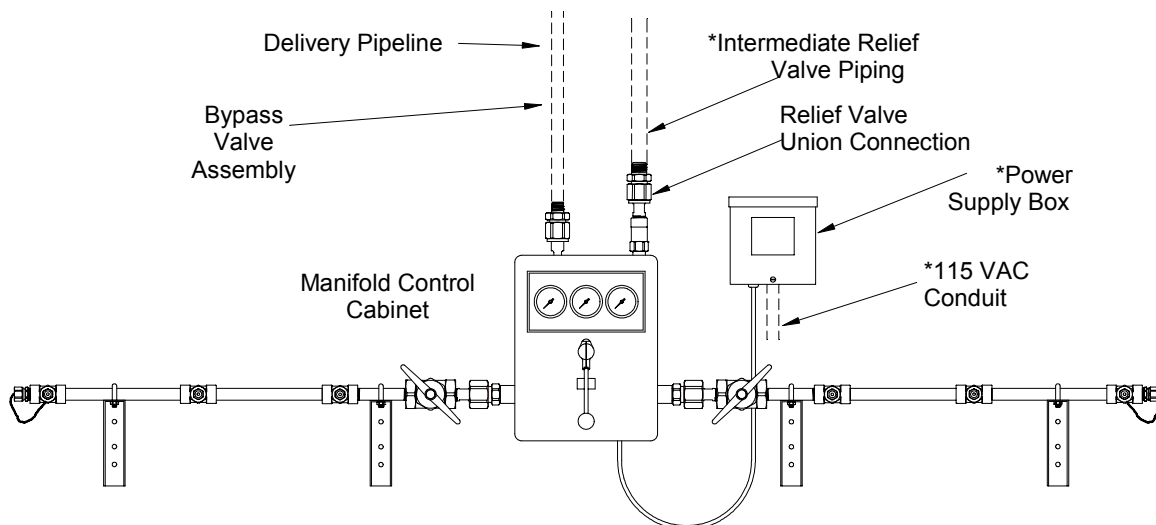
Figure 6

## PLUMBING

1. A 1/2" NPT male union is supplied with the control and is located at the upper left side of the manifold control. Connect this union to the pipeline system. Sweat joints must be silver soldered. Use BAg series specification silver solder (DO NOT USE SOFT SOLDER). Heat the entire joint evenly. Apply enough heat favoring heavy sections, so that solder flows freely around the joint leaving no pin holes. (See National Fire Protection Association Pamphlet Number 99). The union provided permits removal of the manifold control for service. (Figure 7)

### CAUTION:

- Braze piping shall be properly cleaned prior to pressurizing. Unclean piping may react and ignite when in contact with some gases - particularly oxygen and nitrous oxide.
2. If the manifold is installed in a closed area, vent piping must be attached to the manifold relief valves located at the top right of the manifold control. The vent connection is 3/4 NPT male. The union provided permits removal of the manifold control for service
  3. Installation of a shut-off valve to isolate and bypass the pipeline during service to the manifold is recommended.



\*Not applicable to  
BI-1, -1A & -10 Manifolds

Figure 7

## FUEL GAS MANIFOLDS—FLASHBACK ARRESTORS

### GENERAL

A dry flash arrestor is provided with all Western acetylene manifolds. 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 the 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 to a safe location.

### OPERATION

In normal flow, as shown (Figure 8), 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.

## 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 9).
3. The vent piping must be galvanized and have galvanized fittings. It must be at least 3/4 inch pipe size. A 3/4 inch street elbow should be used to connect the vent pipe to the outlet on the side of the relief valve. The vent pipe must be extended 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.)

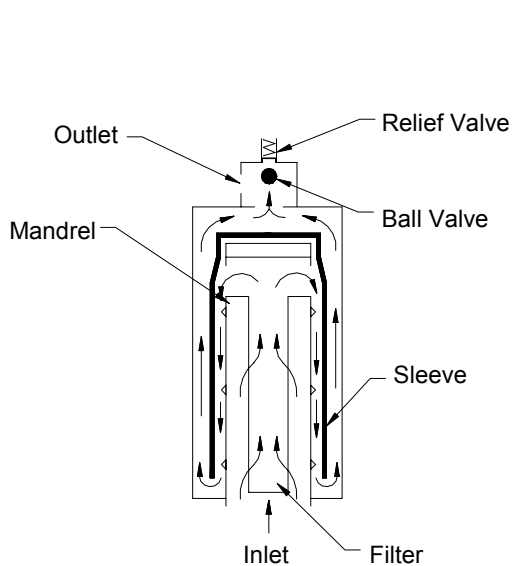


Figure 8

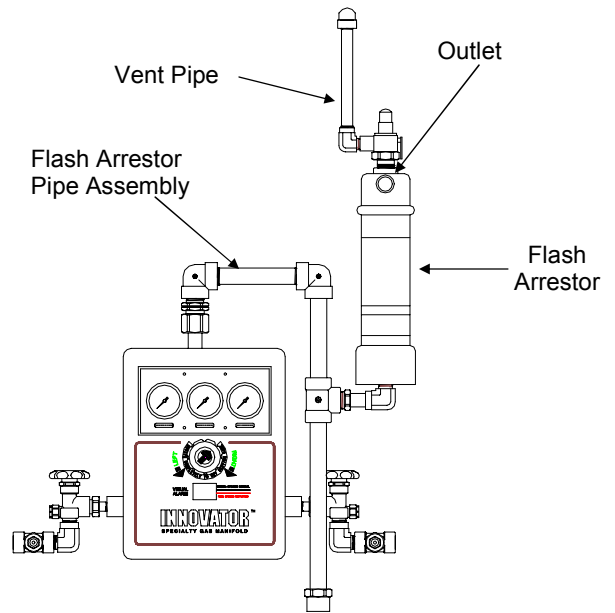


Figure 9

## 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 a 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 joints 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 case of excess pressure.
2. Check all joint 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 operation 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.

## **ELECTRICAL**

**NOTE:** Fuel Gas Manifolds DO NOT include any electrical components.

1. A 24 VAC power supply transformer is furnished with the control unit. Mount the box on the wall with the bottom edge approximately at the top of the control cabinet. The attached control cable terminates in a 4-way plug matching a receptacle on the bottom of the control panel. (Figure 7)
2. After mounting the power supply box to the wall, plug the cable into the control cabinet receptacle.
3. One hole on the underside of the power supply box provides access for conduit and connection of 115 VAC power to the black primary leads. Remove 115 VAC power prior to making connections. The other hole on the underside of the power supply transformer box provides access for remote alarm connections.
4. After completing the 115 VAC connections, the power supply should be completed and functional and 115 VAC power can be restored.

## **FUEL GAS ALARM KITS**

1. Installation should be per instructions provided with the kit.

## REMOTE ALARM HOOKUP

A five terminal remote alarm terminal strip is on the right side of the circuit board in the power supply box for remote alarm interfacing. The top three terminals on this strip (N/C, N/O, and C) provide dry contacts for remote alarm hookup. Wiring diagrams for remote audio/visual alarms are included with the alarms. Listed below are five different remote alarm configurations. Terminals identified as N/O and N/C have been marked in the unactuated state.

**In some instances the power supply for the remote alarm is normally a part of the electrical contact on proposed constructions and should 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 and the other signal wire to the normally open (N/O) terminal on the terminal strip on the right side in the power supply box. (Figure 10)

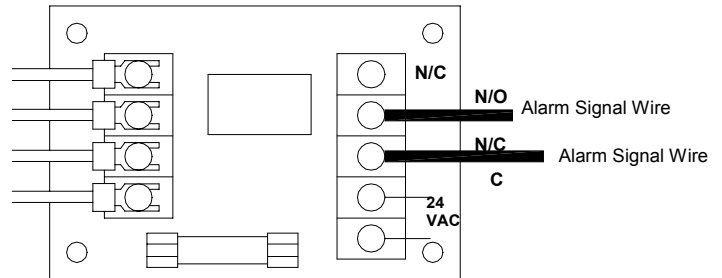


Figure 10

Note: Alarm function is initiated on an open circuit.

**If the remote alarm designed for 24 VAC operation then connect the alarm as follows:**

(Also see WESTERN'S ALARM section below.)

1. Connect the ground wire from the alarm to one 24 VAC terminal on the right side of the circuit board in the power supply box. (Figure 11)
2. A jumper wire is connected between the other 24 VAC terminal and the common (C) terminal.
3. Connect the "reserve in use" signal wire to the normally closed (N/C) terminal.
4. In a "system normal" signal is also employed, connect that signal wire to the normally open (N/O) terminal.

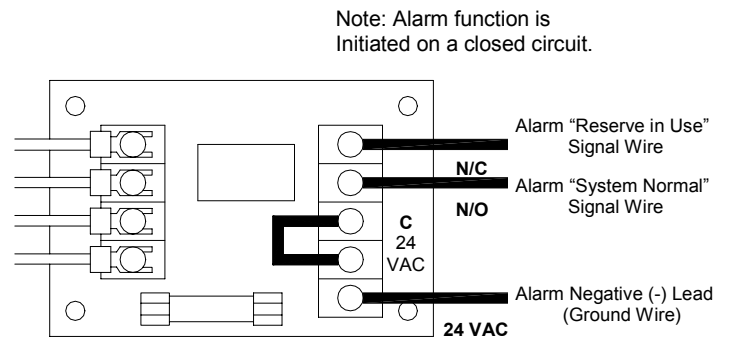


Figure 11

Note: Alarm function is initiated on a closed circuit.

**If the remote alarm designed for voltages other than 24 VAC then connect the alarm as follows:**

1. Connect the ground wire from the alarm to the negative (-) connection at the power source. (Figure 12)
2. There should be NO connections to the 24 VAC terminal on the right side of the circuit board.
3. Connect the positive (+) connection from the power source to the common (C) terminal on the circuit board.
4. Connect the "reserve in use" signal wire to the normally closed (N/C) terminal.
5. If a "system normal" signal is also employed, connect that signal wire to the normally open (N/O) terminal

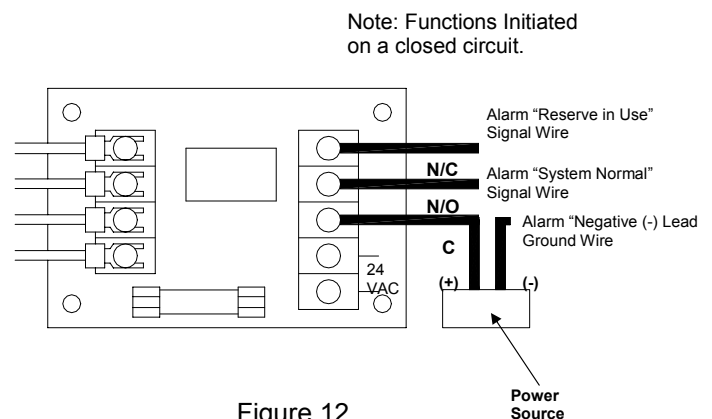
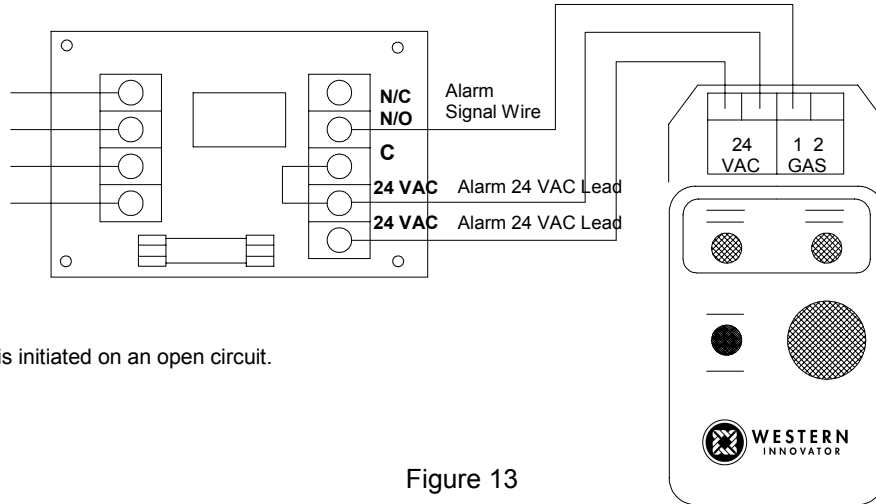


Figure 12

Note: Functions Initiated on a closed circuit.

## WESTERN'S ALARM

1. Connect one 24 VAC lead from the alarm to one 24 VAC terminal on the right side of the circuit board in the power supply box. (Figure 13)
2. Connect the other 24 VAC lead from the alarm to the other 24 VAC terminal.
3. A jumper wire is connected between one 24 VAC terminal and the common (C) terminal.
4. Connect the alarm signal wire to the normally open (N/O) terminal.



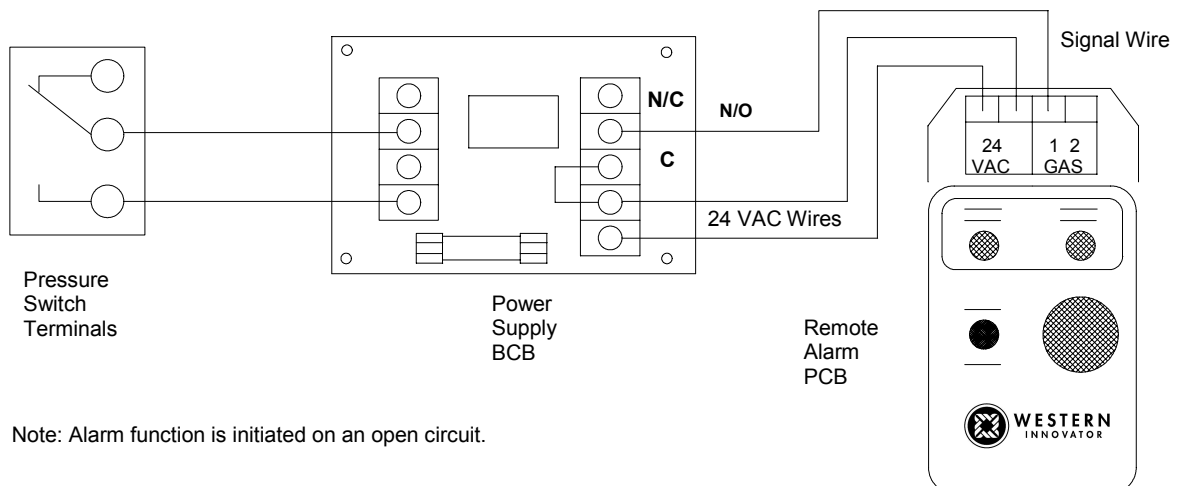
Note: Alarm function is initiated on an open circuit.

Figure 13

## Wiring Schematic for Western Alarm and Fuel Gas Manifolds

(For further information see instructions provided with the alarm kit.)

1. Connect one 24 VAC wire from the right side terminal strip in the power supply box to the first 24 VAC terminal on the left of the remote alarm printed circuit board (PCB).
2. Connect the other 24 VAC wire from the right side terminal strip in the power supply box to the second 24 VAC terminal on the left of the remote alarm PCB.
3. Connect a jumper wire from the 24 VAC terminal used in step 2 to the common terminal on the power supply.
4. 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.
5. Connect a wire to the second terminal on the left terminal strip on the power supply to the common terminal on the pressure switch.
6. Connect the bottom terminal on the left terminal strip to the (N/O) terminal on the pressure switch.



Note: Alarm function is initiated on an open circuit.

Figure 14

## **INSTALLING PIGTAILS AND ATTACHING CYLINDERS**

1. Establish flow direction of check valves in pigtails.
2. Connect pigtails to header valve\* with direction of check valve flow from cylinder to manifold end of pigtail.
3. Check header valves and master valves to be certain they are closed.
4. Attach full cylinders to the pigtails connections as explained in “Cylinder Replacement & Handling” on page 13.
5. Open header valves\* (turn counter-clockwise to open).
6. S-L-O-W-L-Y turn all cylinders on 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 connections indicate leakage.)
7. Turn power on to the 24 V power supply transformer box. The red “Replace Depleted Bank” light on the control cabinet should be activated.

## **START UP AND CHECKING PROCEDURE**

1. Turn the control indicator knob fully to the right. S-L-O-W-L-Y open the right master valve (turn counter-clockwise to open). S-L-O-W-L-Y open one cylinder valve on the right bank. The right bank pressure gauge should show the full pressure of the right bank cylinder. The green “System Normal” light comes on, extinguishing the red “Replace Depleted Bank” light.
2. S-L-O-W-L-Y open the left master valve fully. S-L-O-W-L-Y open one cylinder valve on the left bank. The left bank pressure gauge will show the full pressure of the left bank cylinder.
3. Create a slight flow of gas in the delivery pipeline system. Close the right cylinder valve to simulate a depleting right bank. Observe the following:
  - The right bank gauge pressure slowly falls and the control automatically switches over to the left bank.
  - Delivery pressure remains constant.
  - Green “System Normal” light is extinguished.
  - Red “Replace Depleted Band” light comes on.
  - Any remote alarms should be activated at this time.
4. S-L-O-W-L-Y reopen the right cylinder valve. Observe the following:
  - Right bank pressure gauge returns to full pressure.
  - Green “System Normal” light is extinguished.
  - Any remote alarms should be canceled.
5. Turn the control indicator knob fully to the left and repeat procedures 3 and 4 to simulate an empty left bank.

\*NOTE: Oxygen manifolds do not incorporate header valves. Manifolds without header valves are constructed utilizing check valve outlet bushing.

## MANIFOLD OPERATION

The manifold control unit includes the following components and features: green “System Normal” and red “Replace Depleted Bank” indicator lights”, cylinder pressure gauges, a line pressure gauge, intermediate safety relief valve, supply bank control indicator knob, and automatic bank switching. Supply banks consist of a header with 24” stainless steel flexible pigtails with check valves, individual header valves\*, master shut off valves, and union connections for attachment to the control unit.

The cylinder bank that supplies the piping system is known as the “Service” supply, while the cylinders on stand-by are referred to as the “Reserve” supply. On the “service” side, gas flows into the manifold control to first the primary regulator and then through the line regulator. On the “reserve” side, gas flows through the manifold control to first the primary regulator and then through intermediate regulator before entering the line regulator. Delivery pressure is controlled by the line regulator and is adjustable via the access hole in the upper left hand side of the cabinet. (See Line Delivery Pressure Adjustment—page 13).

Changeover from the “Service” to “Reserve” side is accomplished by a pressure differential between the primary and intermediate regulators. As cylinder contents are depleting, the pressure passing through the primary regulator will drop. When this pressure drops to the set pressure of the intermediate regulator, a pressure switch is actuated causing the green “System Normal” light to go out and a red “Replace Depleted Bank” light to come on. The “reserve” bank will automatically begin to flow without any interruption in service line delivery pressure.

There are two definite indicators as to which bank should be changed; (1) the arrow on the control indicator knob in conjunction with the red “Replace Depleted Bank” light and (2) the cylinder bank pressure gauge.

After replacing empty cylinders, open the cylinder valves. Because the cylinder pressure will actuate the pressure switch, the red “Replace Depleted Bank” light will be extinguished and the knob indicator must be turned to its opposite position to indicate the new cylinder bank is now in service. Rotating the indicator knob to its new position after replacement of an empty bank is the only action that must be taken to reset the manifold. The indicator knob must always be in the extreme right or left position.

To insure proper operation, observe the following guidelines:

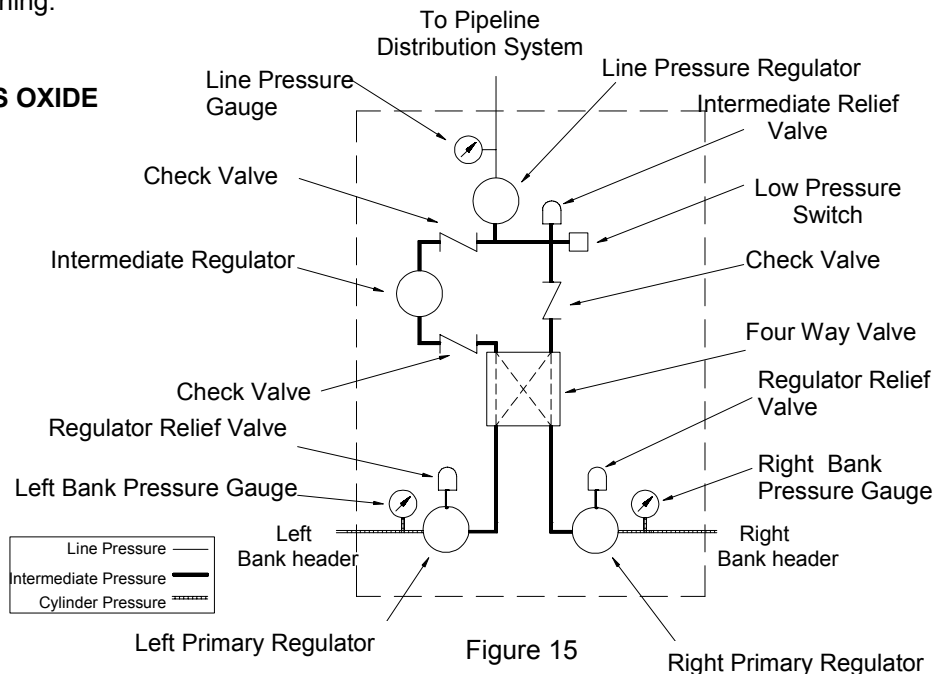
1. Carefully follow all instructions.
2. Establish proper flow direction of check valves.
3. Be sure header shut-off valves are fully opened.
4. Be sure cylinder valves are fully opened.
5. Replace depleted cylinders as soon as practical after the red “replace depleted cylinders” light comes on.

\* NOTE: Oxygen manifolds do not incorporate header valves. Manifold without header valves are constructed utilizing a check valve outlet bushing.

### BIHL - MODEL FOR USE WITH CARBON DIOXIDE AND NITROUS OXIDE

Nitrous Oxide and Carbon Dioxide systems include a 500 SCFH capacity heater. The thermostatically controlled heater warms the gas before entering the regulator, preventing “freeze-up”. The control is supplied with a 6-foot cord and plug for 115 VAC power and draws approximately four amperes.

BI Series Manifold Piping Schematic



## CYLINDER REPLACEMENT & HANDLING

1. Shut off all cylinder valves and header valves as well as 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 and replace protective caps.
4. Remove 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 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 with wrench.
7. Open header valves and master valves. S-L-O-W-L-Y turn each cylinder valve until each cylinder is fully on.
8. Observe the following conditions:
  - A red "Replace Depleted Bank" light goes out, and the green "Service Normal" light comes on.
9. The manifold supply bank is now replenished. Turn the control indicator knob fully to the opposite bank to indicate the service bank. This will place the new cylinders in "reserve".

## LINE DELIVERY PRESSURE ADJUSTMENT

The delivery pressure (center gauge) has been factory set. If adjustment is required, carefully proceed according to the following instructions.

1. Leave the manifold in full operational status.
2. Create a flow condition in the delivery pipeline system.
3. Locate the line pressure adjustment access hole on the left side of the manifold unit.
4. Adjustment: Using a flat blade screwdriver, turn clockwise to "increase" pressure, turn counterclockwise to "decrease" pressure.

## GENERAL MAINTNEANCE

### CAUTION:

- Do not use leak test solution that contains ammonia. Solution containing ammonia may cause brass tubing to crack.

1. Main Section
  - a) Daily – record line pressure
  - b) Monthly
    - 1) Check regulators and valves for external leakage.
    - 2) Check valves for closure ability.
  - c) Annually
    - 1) Check relief valve pressure.
    - 2) Check regulator seats.
2. Manifold header
  - a) Daily – observe nitrous oxide and carbon dioxide systems for cylinder frosting 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 cylinder pigtails 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.

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

<b>SYMPTOM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY CHECK</b>
<b>ELECTRICAL SYSTEM</b>		
No indicator lights on front panel come on when power is hooked up.	Power input.	Check electrical power supply.
	Bulb burned out.	Replace bulb or lamp assembly.
	Internal wiring disconnected.	Check all wiring connections.
Red indicator light is on but both banks are full.	Master valve, header valves, or cylinder valves on bank are closed.	Slowly open valves.
	Faulty connection to operating alarm unit.	Check input from alarm unit terminal strip.
	Internal wiring not correct.	Check internal leads to terminal strip.
Red indicator light does not come on when one bank is empty and changeover occurs.	Control knob was rotated to select new "service" side without changing empty cylinders.	Replace depleted cylinders.
	Bulb burned out.	Replace bulb or lamp assembly.
	Pressure switch wiring disconnected.	Check connections.
	Pressure switch set below the intermediate pressure regulator.	Adjust pressure switch or return factory unit for factory setting.
Red indicator light does not come on when one bank is empty. Changeover does not occur.	Control knob was rotated to select new "service" side without changing empty cylinders.	Replace depleted cylinders
	Faulty connection to operating alarm unit.	Check input from alarm unit to terminal strip.
	Internal wiring incorrect.	Check internal leads to terminal strip.
	Pressure switch set at too low a pressure.	Adjust pressure switch or return unit for factory setting.
Green indicator light does not come on even though both banks are full.	Control knob was rotated to select new "service" side without changing empty cylinders.	Replace depleted cylinders.
	Bulb burned out.	Replace bulb or lamp assembly.
	Pressure switch wiring disconnected.	Check wiring connections.
	Pressure switch set at too high a pressure.	Adjust pressure switch or return faulty unit for factory setting.

<b>SYMPTOM</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY CHECK</b>
<b>PRIMARY REGULATOR</b>		
Venting at relief valve.	Overpressure due to creeping or faulty regulation of primary regulators.	Replace or rebuild regulator.
Gas leakage around primary pressure regulator body and bonnets.	Loose bonnet(s).	Tighten bonnet(s).
	Diaphragm leakage on regulator.	Replace diaphragm.
<b>FOUR-WAY VALVE</b>		
Gas leakage around joint in valve body halves.	Body halves not joined tightly enough.	Tighten screws.
	O-rings worn.	Replace valve.
Gas leakage through body wall.	Porosity holes developed in casting.	Tighten screws.
Both banks feeding.	Four-way valve seats leaking heavily.	Replace valve.
<b>INTERMEDIATE PRESSURE REGULATOR</b>		
Gas leakage around regulator body/bonnet.	Loose bonnet.	Tighten bonnet.
	O-ring worn.	Replace valve.
Required gas flow not available after change-over occurs	Intermediate regulator not set correctly.	Adjust intermediate regulator per specifications.
Both banks feeding.	Intermediate regulator set at too high delivery pressure.	Adjust intermediate regulator per specifications.
	Flow demand too high.	Reduce flow demand.
<b>LINE PRESSURE REGULATOR</b>		
Gas leakage around regulator body/bonnet.	Loose bonnet.	Tighten bonnet.
Pipeline not at desired pressure.	Line regulator not set correctly.	Set delivery pressure per specifications.
Required gas flow not available	Line regulator not set correctly.	Set delivery pressure per specifications.
	Flow demand too high.	Reduce flow demand.

## 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 Flexible Braid with Check Valves

PF-16CVFA-24R.....	CGA 300 with flash arrestor for Acetylene Service
PF-320CV-24R.....	CGA 320 for Carbon Dioxide (CO <sub>2</sub> ) Service
PF-326CV-24.....	CGA 326 for Nitrous Oxide (N <sub>2</sub> O) Service
PF-15CVFA-24R.....	CGA 510 with flash arrestor for Acetylene Service
PF-15CV-24R.....	CGA 510 for Liquid Fuel Gas Service
PF-63CV-24.....	CGA 540 for Oxygen (O <sub>2</sub> ) Service
PF-92CV-24.....	CGA 580 for Nitrogen (N <sub>2</sub> & Ar) Service (not for Helium Service)
PF-93CV-24R.....	CGA 590 for Industrial Air Service
PF-83CV-24RV.....	CGA 350 for Argon/Methane Mixture Service

#### 24" Synthetic Fiber Braid Hose with Check Valve

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

### INDICATOR LAMP REPLACEMENT

#### Square Style

WME-8-41.....	Bulb Receptacle
WME-8-40.....	Red/Green Lens
WME-8-42.....	Light Bulb

### PANEL MOUNT GAUGES – 2" Diameter, 1/4" NPT Back Port

WMG-3-3.....	100 psi
WMG-3-14.....	300 psi
WMG-3-4.....	400 psi
WMG-3-2.....	200 psi
WMG-3-8.....	2000 psi
WMG-3-12.....	4000 psi
WMG-3-7.....	30 psi

### VALVES AND VALVE REPAIR KITS

WMS-1-53.....	CGA 540 Spud check Valve
WMV-2-16.....	Master Valve
WMS-1-4.....	Four Way Valve
WMV-2-14.....	CGA 326 Header Valve
WMV-2-4.....	CGA 346 Header Valve
WMV-2-3.....	CGA 580 Header Valve
RK-1085.....	Repair kit for WMV-2-16
RK1041.....	Repair kit for low pressure check valves

### PRESSURE SWITCHES

WME-4-4.....	Pressure Switch (all gases except Fuel Gas and Oxygen)
WME-4-4C.....	Pressure Switch (Oxygen)

## MANIFOLD MAINTENANCE & REPAIR PARTS

### POWER SUPPLY REPLACEMENT PARTS

8570D.....	Power Supply Assembly (transformer, PCB, case, and cable)
WME-8-1.....	Power Supply PCB (includes dry contacts for remote alarms)
9103002.....	2.5 Amp fuse for in line fuse holder.

### REMOTE ALARMS - 24 VAC Service

BIA-1.....	Visual - 1 Gas
BIA-2.....	Audio/Visual - 2 Gases
BIA-3.....	Audio/Visual - 1 Gas
WMS-9-25C.....	Optional 115 to 24 VAC Power Supply for above alarms

### FUEL GAS ALARM KITS

FGAK-H.....	Hydrogen Fuel Gas Alarm Kit (BI & BIHP-6)
FGAK-A.....	Acetylene & Mapp Gas Alarm Kit (BI-1, -1A, 10)
(Both FGAK-H & FGAK-A include switch, BIA-3, & power supply)	
WME-4-5.....	Replacement Switch for FGAK-H
WME-4-6.....	Replacement Switch for FGAK-A

### BI SERIES REGULATORS AND REGULATOR REPAIR KITS

#### BI Series Primary Regulators

WMS-1-120.....	Primary Regulator for BIHL (CO <sub>2</sub> & N <sub>2</sub> O)
WMS-1-119.....	Primary Regulator for BI (O <sub>2</sub> only)
WMS-1-118.....	Primary Regulator for BI (Air, He, Ar, N <sub>2</sub> , H <sub>2</sub> )
WMS-1-121.....	Primary Regulator for BIHP (Air, He, N <sub>2</sub> , Ar, H <sub>2</sub> )
WMS-1-117.....	Primary Regulator for BI Fuel Gas Manifolds
WMS-1-122.....	Primary Regulator for BIHP-9 (O <sub>2</sub> )
RK-1036.....	Repair Kit for WMS-1-117 Primary Regulator
RK-1037.....	Repair Kit for WMS-1-118, WMS-1-120, & WMS-1-121 Primary Regulator
RK-1038.....	Repair Kit for WMS-1-119 and WMS-1-122

#### BI Series Intermediate Regulators

WLR-2-5.....	Intermediate Regulator for BI & BIHL (Air, He, Ar, CO <sub>2</sub> , N <sub>2</sub> O, H <sub>2</sub> , N <sub>2</sub> )
WLR-2-7.....	Intermediate Regulator for BIHP (All gases)
WLR-8-12.....	Intermediate Regulator for BI Acetylene and Fuel Gas Manifolds
RK-1160.....	Repair Kit for WLR-2-5 & WLR-2-7
RK-1161.....	Repair Kit for WLR-8-12

#### BI Series Line Regulators

WLR-2-6.....	Line Regulator for BI & BIHL (Air, He, Ar, CO <sub>2</sub> , N <sub>2</sub> O, H <sub>2</sub> , N <sub>2</sub> )
WLR-5-3.....	Line Regulator for BIHP (All gases)
WLR-8-13.....	Line Regulator for BI Acetylene Manifolds
WLR-8-14.....	Line Regulator for BI-10
RK-1160.....	Repair Kit for WLR-2-6
RK-1161.....	Repair Kit for WLR-8-13, WLR-8-14, & WLR-5-3

## 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.



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