

# M-4 ACETYLENE & FUEL GAS MANIFOLDS

## CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for oxy-fuel gas equipment, we urge you to read our booklet "Precautions and Safe Practices for Welding, Cutting and Heating" Form 2035. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information.

The manifolds covered by these instructions are listed by Underwriter's Laboratories only when using parts manufactured to ESAB Welding & Cutting Products specifications on file with Underwriter's Laboratories, Inc., and when they are used in the gas service which they are designed and listed. The use of other parts that cause damage or failure to the equipment will void the manufacturer's warranty.

## INTRODUCTION

The M-4 Acetylene Manifold is designed to supply acetylene and LP Gases (not HP methane H<sub>2</sub> etc.) from cylinders to a distribution piping system. The basic manifold is supplied with connections for 4 cylinders and be enlarged (within certain limits) by addition of extension assemblies to each side.

The M-4 Fuel Gas Manifold (P/N 20425) is designed for 75 psig output for use with any fuel gas except acetylene.

### A. Capacity Limitations

1. The liquid seal flash arrestor and back pressure relief valve (H-2 hydraulic or H-2 FG) furnished as part of the manifold assembly has a rating of 500 cfh., acetylene at 15 psig. Regardless of the number of cylinders connected to the unit, the flow should not be allowed to exceed to the unit, the flow should not be allowed to exceed this rating by more than 10% (excess flow will entrain liquid and cause seal to be lost).
2. It has been commonly accepted throughout the industry that the maximum hourly rate of flow from an acetylene cylinder should not exceed 1/7 of the capacity of the cylinder. It is not recommended to withdraw at this rate for an extended period since the release of acetylene from solution cools the cylinder; thereby, reducing the rate of release of gas. If this rate of flow is maintained, the manifold pressure will drop until the regulator is unable to pass the required flow. This will give a false indication that

the manifold cylinders are empty when, in fact, there is ample gas remaining.

3. It is recommended that continuous hourly flow be limited to 5% of the capacity of the cylinders and that intermittent draws (10 Min. or less with at least equal off time to permit cylinders to warm up) be limited to 14% of the cylinder capacity. Table 1 lists the maximum recommended flows using "WK" approx. 300 ft.<sup>3</sup>) and "WTL" (approx. 390 ft.<sup>3</sup>) acetylene cylinders on the M-4.

*NOTE: Maximum withdrawal gases decrease with decreasing temperature and decreasing quantity of remaining gas.*

Table I - Maximum Recommended Flow Capacity/Acetylene

Total No. of Cylinders* m <sup>3</sup> /hr	Alternate Operation of Banks			
	"WK" Cylinders		"WTL" Cylinders	
	Cont. Flow (cfh) m <sup>3</sup> /hr	Intermit. Flow (cfh) m <sup>3</sup> /hr	Cont. Flow (cfh) m <sup>3</sup> /hr	Intermit Flow (cfh)
4	60 (1.70)	170 (4.81)	80 (2.27)	220 (6.23)
6	90 (2.55)	250 (7.08)	120 (3.40)	330 (9.34)
8	120 (3.40)	340 (9.63)	160 (4.53)	440 (12.40)
10	150 (4.25)	420 (11.89)	200 (5.66)	550 (15.5)
12	180 (5.10)	500 (14.16)	240 (6.80)	**

\* The Table assumes that half of the cylinders listed are on stand-by and the other half of the cylinders are in operation. The flow valves are doubled, if two M-4 manifolds are connected in parallel.

\*\* Exceeds recommended capacity of the manifold.

## CAUTION

All manifolds installations should be protected against mechanical injury and exposure to fire or excessive heat, and must conform with the latest National Fire Protection Association Standard No. 51.

**Be sure this information reaches the operator.  
You can get extra copies through your supplier.**

**Table I - Maximum Recommended Flow Capacity/Propane and Propylene**

Total No. of Cylinders*	Alternate Operation of Banks	
	Propane, 100# Cyl.	Propylene, 104# Cyl.
	Cont. Flow, cfh (m <sup>3</sup> /hr)	Cont. Flow, cfh (m <sup>3</sup> /hr)
4	130 (3.68)	220 (6.23)
6	195 (5.52)	330 (9.34)
8	260 (7.36)	440 (12.46)
10	325 (9.20)	550 (15.57)
12	390 (11.04)	660 (18.69)

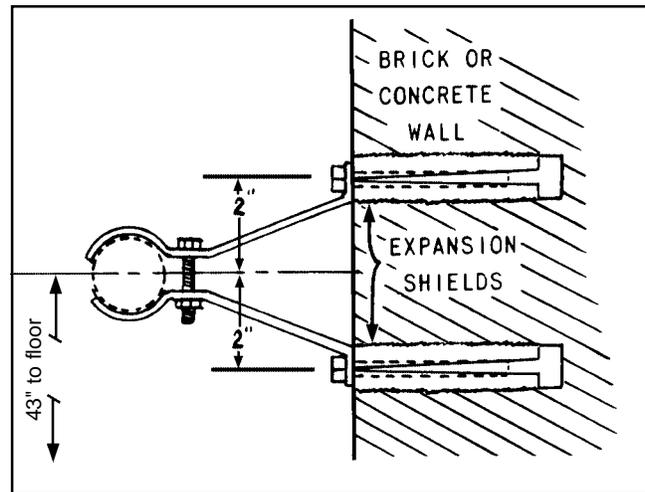
\*100 lb propane cylinder at 1/2 full, max. withdrawal rate is 65 cfh (1.84 m<sup>3</sup>/hr) at 70°F lower temperature will reduce withdrawal capacity of cylinder.

104 lb. propylene cylinder at 1/2 full, max. withdrawal rate should not exceed 110 cfh (3.11 m<sup>3</sup>/hr) at 70°F.

## I. INSTALLATION INSTRUCTIONS

### A. Fasten the manifold-header support-brackets to the wall (see Figures 1 & 2).

1. If the wall is of masonry construction, use 3/8-in. bolts or lag screws. Thread the bolts into expansion shields placed in holes drilled in the wall.
2. If the wall is hollow tile use bolts instead of lag screws. Extend them all the way through the wall and fasten them over a plate or toggle on the opposite side.
3. In setting up a manifold or in adding extension sections, it is important that the wall brackets be located so that all sections of the manifold header will be level and in true horizontal alignment. To prevent misalignment, in locating by measurement from sloping floors or uneven wall surfaces, one bracket should be installed and the other leveled and aligned with it. The manifold header should be level irrespective of the floor surface; any differences in elevation between the cylinder valve outlets and the cylinder connections on the header tees will be taken up by the flexible cylinder leads. Use shims or spacing blocks behind the brackets for correcting any horizontal misalignment to avoid straining the joints of the manifold header.



**Fig. 1 - Support Bracket Installed on a Wall of Masonry Construction**

### C. Attach the regulator and outlet pipe to the header.

1. Disconnect the outlet pipe assembly (includes relief valve) from the inlet of the H-2 hydraulic backpressure valve at the union tee.
2. Apply a single turn of Teflon tape to the 3/8 NPT male threads on the outlet pipe assembly and then assemble to the outlet connection of the regulator. The 5" long pipe nipple on the outlet pipe assembly should end up parallel to the inlet connection of the regulator.
3. Connect the regulator to the regulator connection on the header as illustrated in Fig. 3. Tighten connection nut firmly with a wrench.

### D. Install the hydraulic.

1. Place the hydraulic with its support brackets attached in the position it will occupy on the manifold and connect its inlet to the union tee of the regulator outlet pipe.
2. Place a temporary support under the hydraulic while it is in this position to support its weight.
3. Make sure the brackets are square with the axis of the hydraulic and that the feet of both legs are parallel to the surface of the wall. Mark the position of the bolt on the wall.
4. Disconnect the hydraulic from the regulator outlet pipe and drill the holes for the bracket bolts in or through the wall (see Section I-A-1).
5. Place the hydraulic with brackets attached in position for connection to the regulator outlet pipe. Bolt the support brackets to the wall using shims if necessary to keep the hydraulic connection union in alignment. Then make up the union connection joining the hydraulic inlet pipe to the regulator outlet pipe.

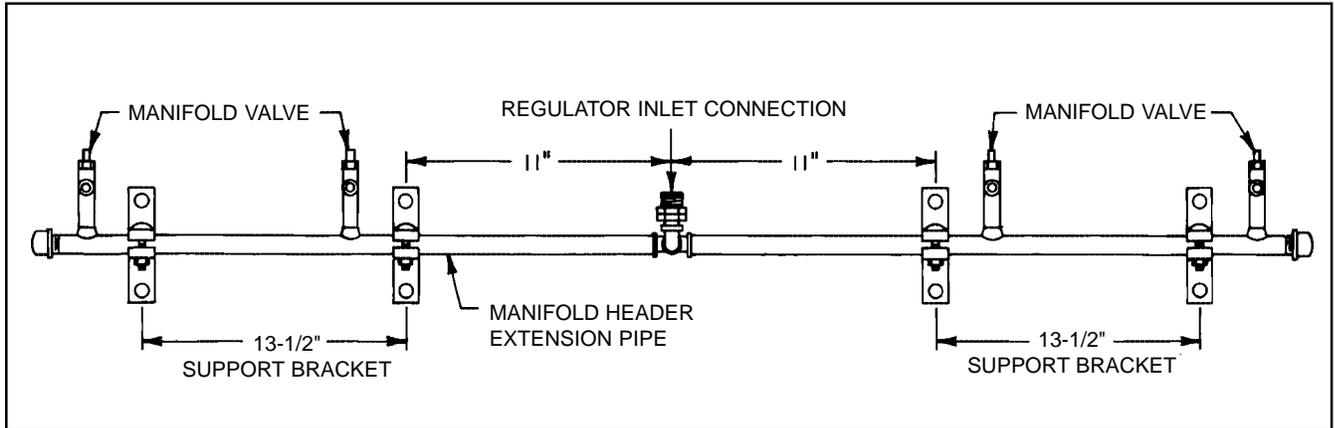


Fig. 2 - Header Installed on Support Brackets

E. Attach the cylinder leads to the manifold valves.

F. Place the manifold valve keys on the valves.

G. Connect the service and the two vent pipes. Each vent pipe must be run separately to a point outside of the building. This piping must be good quality, standard weight galvanized steel pipe with galvanized fittings; must be of the same size as the relief valve vent outlet connections for their entire length, must terminate not less than 12 feet above the ground at a location remote from windows or openings into building, and as far as possible from flue or chimneys. The ends must be fitted with return bends or elbows opening downward, preferably screened or otherwise protected from obstruction by snow, ice, birds and insects, and must be located at least 3 feet from combustible construction. The vent pipes must be installed without traps, and are not to be connected to each other or to any other piping. It is recommended that a long screw or malleable iron union be installed in each vent pipe.

H. Attach the warning sign to the header with the brackets provided (see Figure 3).

I. **Multiple Manifolds.** In setting up two or more manifolds in parallel it is necessary to remove the 3/4-in. plug (Part No. 6030-2275) from the banded cross (Part No. 6837-1275) on the outlet connection of the hydraulic back pressure valves. Use appropriate size schedule 40 seamless steel pipe and fittings for the piping system. Each manifold should be isolated by valves from the pipeline.

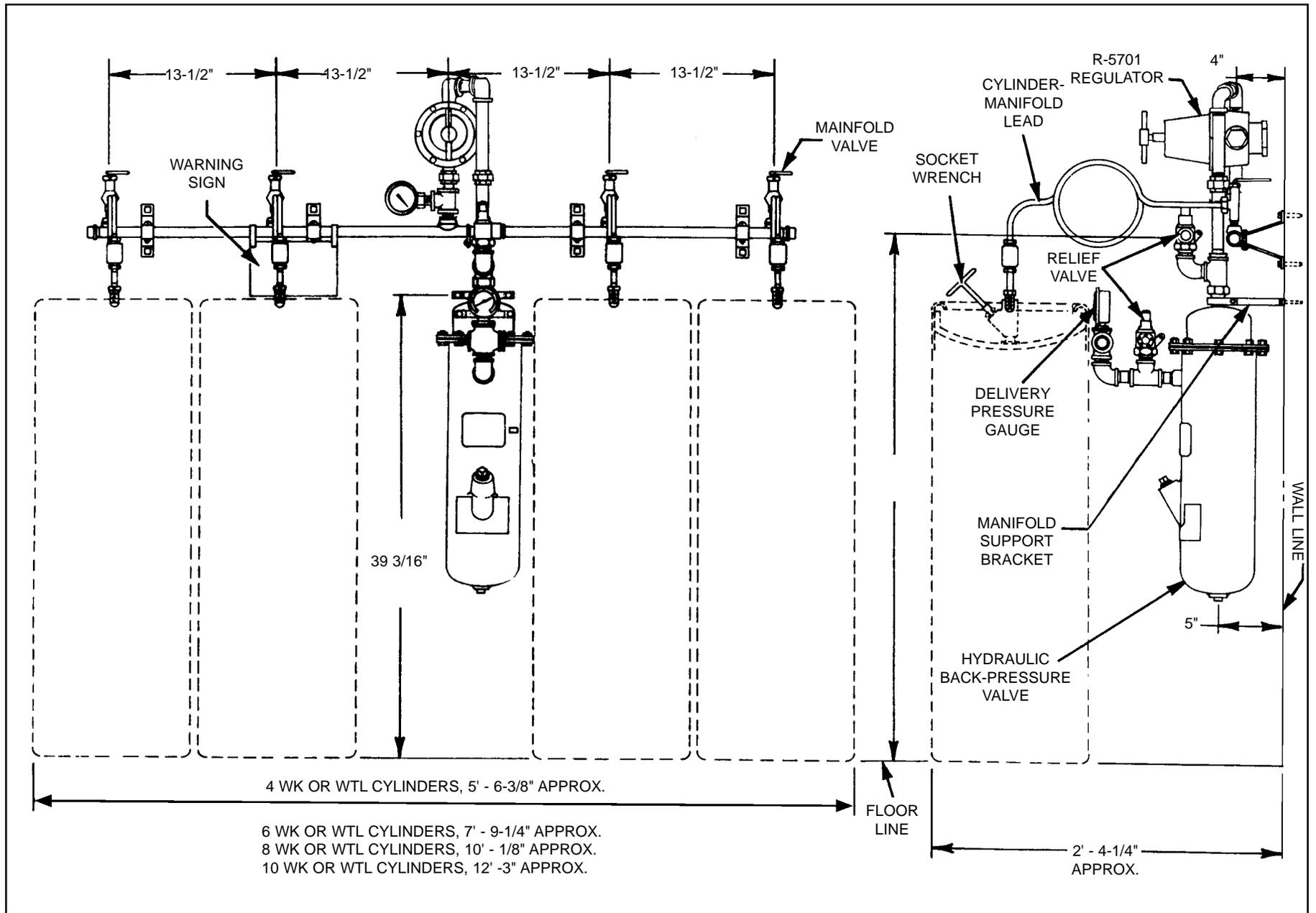
J. If all connections have been made in accordance with the instructions, all parts examined and found to be in first-class condition for service, the manifolds is **now to be tested and put into service**, as directed in the following section.

## II. TO PUT THE MANIFOLD INTO SERVICE

A. **Blow out the service line.** Use compressed air or nitrogen to clear it of all dirt, or welding scale. First hammer the pipe vigorously at all welding joints to loosen any scale adhering to the interior. Connect the supply of compressed air or nitrogen to the entrance end of the service line at the manifold and blow out each station drop separately starting at the station farthest from the manifold. To do this effectively, cap all other outlets and attach a used gate valve to the pipe end of the station concerned. Open and close this valve repeatedly, alternately blowing off and refilling the line until the compressed air or nitrogen discharge is clear of dirt and dust particles.

B. **Test all joints in the service line for leaks.**

1. Connect the station outlet valves and any branch line or station hydraulics that are to be provided on the service piping system. Cap the outlets of the station valves and open these valves.
2. Temporarily disconnect the vent piping from the relief valve outlets on the hydraulic back pressure valves and close these openings with pipe plugs. If the system contains branch line hydraulics see that the line shut-off valves at the inlet and outlet sides of these hydraulics are open. Where the stations are equipped with hydrau-



**Fig. 3 - Single M-4 Acetylene Manifold Showing Dimensions and Principal Parts  
 Single M-4 Fuel Gas Manifold Showing Dimensions and Principal Parts**

lics open the shutoff valve on the hydraulic inlet pipe and cap the hydraulic service outlet.

3. Fill the piping to a pressure of 20 psig with compressed air or nitrogen. Test all pipe joints, and all joints and outlets of valves and hydraulics for leaks with leak test solution (Part No. 998771) or a solution of soap and water. (Disregard any leakage around the valve lifting stem of the relief valves as this results from the valve being in an open position while its outlet is plugged.) If any leakage is disclosed by this test, relieve the pressure and remedy the leakage by rewelding or remaking the defective joint.
4. Remove the pipe plugs previously installed in the relief valve outlets and reconnect the vent piping.

### C. Check the pipe for leakage.

1. Fill the piping to a pressure of 20 psig. Close the service valve through which it was introduced and disconnect the compressed air or nitrogen supply from the piping.
2. Close the inlet valves of the station hydraulics, if used.
3. Close the shutoff valves on both sides of the branch line hydraulics, if used.
4. Test the piping on each side of the hydraulic separately. Allow the piping to stand under pressure at least five hours. Measure the pressure of the compressed air or nitrogen in the piping and the temperature of the atmosphere in the vicinity of the piping at the end of the first hour and again at the end of the test.

An increase in the temperature of the piping will cause the pressure of the compressed air or nitrogen in it to increase, and a decrease in temperature will cause it to decrease. The final pressure must be adjusted to correct for this temperature effect if the final temperature is more than 5°F. different than the temperature at the start of the test.

To make this correction adjustment, add 1 psig to the final pressure for each 15°F decrease in temperature or subtract 1 psig for 15° the temperature has increased.

If the final pressure, after making this adjustment, is more than 1 psig lower than the pressure at the start of the test, check the pipe and all joints, valves and outlets for leaks using leak test solution or a solution of soap and water. All leaks must be located and repaired before the manifold system is placed in service. After test-

ing, close the station valves and relieve the pressure in the piping.

### D. Fill the manifold hydraulic to the indicated liquid - level with PRESTONE brand anti-freeze\*.

E. Check the service line to make sure all station valves are closed. Fill all branch line and station hydraulics with PRESTONE brand anti-freeze\*.

F. Close the service valve. Then close ALL manifold valves.

G. Close the regulator by turning the pressure-adjusting screw to the left (counterclockwise), until it spins freely.

H. Select a full acetylene cylinder; "crack" it (see General Instructions, Sec. V-B.); and connect it to the extreme left-hand cylinder lead. Slowly open the cylinder valve one-half turn.

I. Remove the extreme right-hand cylinder lead from the manifold valve and open this manifold valve three turns.

J. Purge the header. Open slightly the manifold valve to which the cylinder is connected. As soon as the gas issuing from the right-hand manifold valve, which is open, smells strongly of acetylene, close this valve, and then close the cylinder valve and the manifold valve on the left of the manifold. Reattach the right-hand cylinder lead.

K. Purge the hydraulic back-pressure valve as follows:

1. Close the service valve.
2. Open the cylinder valve one-half turn.
3. Open the manifold valve to which the cylinder is connected three turns.
4. Turn the regulator pressure-adjusting screw handle to the right (clockwise) until the delivery pressure gauge on the hydraulic outlet shows 5 psig.
5. Open the relief valve on the hydraulic outlet by lifting the relief valve operating lever — then, after a minute, close the relief valve.

\* Use concentrated or undiluted PRESTONE brand anti-freeze unless the hydraulic may be exposed to temperatures below 5°F. Where anti-freeze protection at lower temperatures must be provided, use a water solution of PRESTONE (anti-freeze as directed in the booklet "Cold Weather Care of Acetylene Generating and Distributing Equipment," Form 3088.

- L. Test the manifold for leaks.** Allow the delivery pressure to build up to 15 psig. Close the manifold valve to which the cylinder is connected and then close the cylinder valve. Test all joints and connections for leaks with leak test solution or a solution of soap and water.

**NOTE:** *This test must be made with full cylinder pressure in the manifold header and a pressure of 15 psig in the hydraulic. After closing the manifold valve to which the cylinder is connected, watch the cylinder-pressure gauge on the regulator and the delivery-pressure gauge on the outlet of the hydraulic. If these gauges show any appreciable drop in pressure, locate the leakage causing it, relieve the pressure in the manifold through the relief valve on the hydraulic outlet and repair the leakage. Then refill the manifold to test pressure and test the repair and all other joints or connections.*

**M. Purge the service line.**

1. Attach full cylinders, after “cracking” (see Sect. V-B), to all the other cylinder leads on the manifold. Open the cylinder valves on the right-hand side of the manifold one and one-half turns. Open the corresponding manifold valves three turns.
2. Open the service valve slowly.
3. At the far end of each branch of the system, connect torches equipped with cutting nozzles or welding heads to one or more stations equipped with either regulators or hydraulic back-pressure valves.
4. Open the station valves and the torch acetylene valves and light the torches as soon as the issuing gas will burn. The flames will gradually increase in size and depth of color, (becoming a deeper yellow) as the acetylene concentration increases.
5. After the character or appearance of the flames remains constant for at least ten minutes, close the torch valves and the station valves.

- N. Close all manifold valves. Close the cylinder valves. Release the regulator pressure-adjusting screw — turn it to the left (counterclockwise) until it turns freely.**

### III. OPERATING PRECAUTIONS

- 1 **Keep all flames, sparks, and lights away from the acetylene manifold and acetylene cylinders.**

**Do NOT permit smoking in the vicinity of the acetylene manifold. NEVER use an open flame to test for leaks.**

2. **Do not attempt to operate the acetylene manifold with any cylinders other than type WK or WTL acetylene cylinder or other approved acetylene cylinders of equivalent size and capacity. Under no circumstances should a cylinder containing any fuel gas other than acetylene be connected to the acetylene manifold.**
3. **Do NOT operate the M-4 acetylene manifold without flash arresters in the cylinder leads. In case a cylinder lead becomes clogged, or subjected to any damaging force, the flash arrester or the entire lead should be replaced. Never attempt to make any repair to a cylinder lead or to the manifold valves or header. Never attempt to repair a flash arrester that has been clogged.**
4. **The relief valves on the inlet and on the outlet of the hydraulic are to vent at no more than 20 psig pressure for acetylene and 125 psig pressure for fuel gas and should be kept in good working order by lifting the operating levers of both relief valves each time that the hydraulic liquid level is checked. Always relieve the pressure in the hydraulic through the relief valve mounted on its outlet before opening the relief valve on the inlet of the hydraulic.**
5. **Acetylene and fuel gas piping systems must be kept absolutely gas-tight. If an odor of acetylene or fuel gas is noticed, open the windows to provide ventilation and then test for leaks with Oxy-Tec leak test solution or a solution of soap and water. The manifold should be shut down and the necessary repairs made to the system before regular operation is resumed.**
6. **Acetylene manifolds must be installed and operated in accordance with latest NFPA Standard No. 51.**

### IV. OPERATING INSTRUCTIONS

Continuous service, without interruption for replacing cylinders after they have become exhausted, can be obtained by operating the two sides of the manifold alternately. This is accomplished by operating one side at a time and replacing the exhausted cylinders from the other side before those on the operating side are exhausted. However, if the acetylene consuming operations are of intermittent occurrence, both sides of the manifold can be operated simultaneously. Thus all of cylinders on the manifold will supply the consumption load. This method of operation is an advantage in that it

extends the serviceability of the manifold by doubling its delivery capacity rate, or where increased capacity is not a factor, by decreasing its discharge rate per cylinder.

**A. Alternate operation of the two sides of the manifold for continuous service.**

1. Select one side of the manifold as the operating side. See that the valves of the cylinders attached to the other side, the reverse side of the manifold, are closed.
2. Open the cylinder valves on all cylinders attached to the operating side one and one-half turns — no more.
3. Open the manifold valves on the operating side to which these cylinders are connected three turns.
4. Turn the regulator pressure-adjusting screw to the right (clockwise) a few turns. Open the service valve slowly. Turn the pressure-adjusting screw to the right (clockwise) slowly until the delivery pressure gauge indicates the desired line pressure. The system is now ready for service use. As soon as usage at stations on the piping system develops a normal working load flow through the regulator, readjust the regulator to compensate for the drop in delivery pressure occasioned by the flow load.
5. When the cylinders are exhausted, close all of the manifold valves on the operating side of the manifold and then close the valves of all the cylinders connected to them. Near cylinder-exhaustion is evidenced by a low cylinder-pressure reading on the gauge of the regulator together with a continuous gradual lowering of the line pressure as shown by the gauge on the outlet of the hydraulic.
6. Put the reserve bank of cylinders into service immediately. First open the valves of all the cylinders on this side of the manifold and then open the manifold valves to which these cylinders are connected.
7. Disconnect the exhausted cylinders from the other bank and connect full cylinders from the other bank and connect full cylinders, after they have been “cracked,” in their place. This should be done before the cylinders of the bank now in operation are more than half exhausted.
8. When the bank of cylinders in operation is exhausted, repeat the cycle of operations described in preceding steps 5, 6, and 7.
9. Check the liquid level of the hydraulic as often as necessary to maintain a sufficient quantity of liquid for satisfactory operation of the hydraulic. (See Section V-F). The liquid level should be

checked during off hours — preferably in the morning before putting the manifold into operation. To check the liquid level, first close the regulator by turning the pressure-adjusting screw to the left until it turns freely; then close the service valve. Lift the operating lever of the relief valve. Remove the liquid level plug. After checking the liquid level plug, open the service valve, and turn the regulator pressure-adjusting screw to the right (clockwise) until the delivery pressure gauge indicates the desired delivery pressure.

**B. Simultaneous operation of both sides of the manifold for intermittent service.**

1. Connect full cylinders to all of the manifold valves.
2. Open the cylinder valves on all of the cylinders one and one-half turns — no more.
3. Open all of the manifold valves three turns.
4. Place the manifold in operation as described in Sect. IV-A-4.
5. When the cylinders are nearly exhausted, notify all operators using acetylene equipment that service will be temporarily discontinued. Close all manifold valves on the manifold and then close valves or all cylinders connected to them. Near cylinder-exhaustion is evidenced by a low reading of the cylinder pressure gauge on the regulator and by a continuous gradual decrease in the line pressure as shown by the gauge on the outlet of the hydraulic.
6. Disconnect all of the exhausted cylinders. Connect full cylinders, after “cracking,” in their place.
7. Repeat steps 2 and 3. Then notify all operators of acetylene equipment that the system is ready for service.
8. Check the liquid level of the hydraulic as often as necessary to maintain a sufficient quantity of liquid for satisfactory operation of the hydraulic. (See Section V-F.)

**C. To take the manifold out of service.** When the manifold is to be out of service for extended length of time (such as overnight, week-ends, or longer non-operating periods) adjust the manifold as follows:

1. Close all manifold valves and then close the valves of all cylinders connected to the manifold.
2. Lift the operating lever of the relief valve mounted on the outlet of the hydraulic momentarily. (Leaving the pressure in the manifold will

prevent its “breathing” in air if the temperature of the manifold should become lower.)

3. Close the service valve.
4. Leave the pressure-adjusting screw in the position to which it was adjusted so that it will support the diaphragm against the thrust of the pressure in the regulator.

## V. GENERAL INSTRUCTIONS

**A. To adjust the delivery pressure.** The delivery (or line) pressure may be adjusted to any pressure up to 15 psig.

1. To increase the delivery pressure, turn the regulator pressure-adjusting screw to the right (clockwise).
2. To decrease the deliver pressure, turn the regulator pressure-adjusting screw to the left (counterclockwise).

Pressures preferably should be adjusted when there is some flow through the regulator. Minor adjustments of the line pressure can be made when the system is supplying torch equipment in operation. Do not make any extensive change of pressure when the manifold is in operation without first notifying all persons operating acetylene equipment. Operators should be prepared for the change and ready to adjust their equipment for use of the new pressure.

To restore service to a service piping system from which all or most of the acetylene pressure has been discharged, turn the regulator pressure-adjusting screw to the right slowly. When the desired pressure is indicated by the line pressure gauge on the outlet of the hydraulic, the acetylene equipment can be placed in service. Then readjust the regulator as required as soon as the torches are lighted and a normal service load is established.

To reduce the pressure when there is no acetylene equipment in operation, lift the operating lever of the relief valve on the outlet of the hydraulic until the line pressure is reduced to a value slightly lower than wanted. Then increase the pressure to that desired.

**B. “Cracking” a cylinder clears the valve of dust or dirt.** To “crack” an acetylene cylinder, stand to one side of the cylinder outlet and open the valve very slightly (not more than 1/4 turn) for an instant and then close the valve immediately.

**CAUTION: Never “crack” a cylinder near an open flame or other possible source of igni-**

**tion; never “crack” the valve any wider nor leave it open any longer than is necessary to clear the valve of dust or dirt.**

**C. Before opening cylinder valves,** make sure that the manifold valves to which the cylinders are connected are closed. After the cylinder valves have been opened one and one-half turns, open the manifold valve three turns.

**D. When disconnecting cylinders,** always make sure the manifold valves to which the cylinders are connected are closed first. Then close the cylinder valves.

**E. Before connecting cylinders to the acetylene manifold,** always test the pressure of each cylinder by attaching an acetylene regulator with its pressure-adjusting screw in the released position to the cylinder valve. If the two sides of the manifold are operated alternately, do not connect cylinders which vary more than 50 psig in pressure to the same side of the manifold. If both sides of the manifold are to be operated simultaneously do not connect such cylinders to either side.

**F. Keep a sufficient quantify of liquid in the hydraulic.** The evaporation rate of concentrated (undiluted) PRESTONE brand anti-freeze for temperatures at which hydraulic back-pressure valves operate is extremely slow. Consequently, if the hydraulic is initially filled with concentrated PRESTONE brand anti-freeze, a check of the liquid level once every two weeks is sufficient providing that no unusual operating condition, such as an abnormal surge of flow that might have entrained and carried some of the liquid out of the hydraulic, has occurred. However, if a water solution of PRESTONE brand anti-freeze is used it will be necessary to check the liquid level at least twice a week to replenish the water which has been absorbed by the dry acetylene.

**G. After shutting down the manifold, or after closing the service valve,** always make sure all station valves on the service line are closed before turning acetylene or fuel gas back into the service line.

**H. When exhausted or partially exhausted acetylene or fuel gas cylinders are connected to one side of the manifold, and if full or nearly full cylinders are connected to the other side, always be doubly sure that the manifold valves and the cylinder valves on the exhausted or partially exhausted cylinders are closed.** This will prevent the possibility of acetylene from the full cylinders passing by the check valves in the cylinder leads and going to the ex-

hausted cylinders. It is for this reason that all the cylinders on one side of the manifold should be changed at the same time.

## **VI. INSTRUCTIONS FOR PURGING THE MANIFOLD OUT OF SERVICE**

- A. Purge the manifold assembly as follows:
1. Notify all operators using acetylene equipment that service will be temporarily discontinued.
  2. Close the service valve.
  3. Close all manifold valves and then close the valves of all cylinders connected to the manifold.
  4. Disconnect all cylinders connected to the manifold.
  5. Lift the operating lever of the relief valve mounted on the outlet of the hydraulic until the pressure is reduced to zero psig.
  6. Remove the 1/2" NPT cap on one end of the manifold and connect a cylinder of nitrogen or compressed air with a regulator to this point using appropriate fittings.
  7. Lift the operating lever of the relief valve mounted on the outlet of the hydraulic and bleed nitrogen or compressed air through the manifold and hydraulic back pressure valve for approximately ten minutes.
  8. Remove the pipe cap on the opposite end of the manifold and bleed nitrogen or compressed air through the manifold until there is no odor of acetylene present.

## **VII. INSTRUCTIONS FOR ADDING EXTENSIONS**

- A. **To accommodate additional cylinders, (refer to Table 1 for limitation) extensions may be added to the original manifold as follows:**

1. Purge the manifold in accordance with Sect. VI (Instructions for Purging the Manifold Out of Service).
2. Apply Teflon tape or plastic pipe joint compound to the male threads on the original manifold.
3. Assemble the extensions with couplings into the original manifold. Hold the end of the original manifold with a wrench to prevent it from turning. Assemble and tighten the extensions, making sure the manifold valves are left in the upright position. (If the wall clearance prevents turning the extensions, remove the extension manifold valves, assemble the extensions, and replace the manifold valves in their original position using Teflon tape or plastic pipe joint compound.)

4. Close all manifold valves.
5. Fasten the manifold-header support brackets to the wall in accordance with Sect. I (Installation Instructions) A and B.

### **B. Clean the Manifold Extensions as Follows:**

1. With the pipe cap removed from each end of the manifold, use compressed air or nitrogen to blow the manifold clear of all dirt and scale.
2. Replace the pipe cap on each end after applying Teflon tape or plastic joint compound on the male pipe threads.

### **C. Purge the Manifold for Service**

1. Attach the new cylinder leads to the manifold valves except for the extreme right hand valve.
2. Place the manifold valve keys on the valves.
3. Select a full acetylene cylinder, "crack it" (see General Instructions, Sect. V-B) and connect it to the extreme left hand cylinder lead. Slowly open the cylinder valve one-half turn.
4. Open the extreme right hand valve three turns.
5. Close the regulator by turning the pressure-adjusting screw to the left (counterclockwise) until it turns freely.
6. Open slightly the manifold valve to which the cylinder is connected. As soon as the gas issuing from the right-hand manifold valve, which is open, smells strongly of acetylene, close this valve and then close the cylinder valve and the manifold valve to which the cylinder is connected.
7. Attach the new lead on the right-hand manifold valve.
8. Open the cylinder valve one-half turn.
9. Open the manifold valve to which the cylinder is connected, three turns.
10. Turn the regulator pressure-adjusting screw handle to the right (clockwise) until the delivery pressure gauge on the hydraulic outlet shows 5 psig.
11. Open the relief valve on the hydraulic outlet by lifting the relief valve operating lever - then, after one minute, close the relief valve.
12. Test the manifold for leaks. Allow the delivery pressure to build up to 12 psig. Close the manifold valve to which the cylinder is connected and then close the cylinder valve. Test all joints and connections for leaks with leak test solution or a solution of soap and water.

**NOTE:** *This test must be made with full cylinder pressure in the manifold header and a pressure of 15 psig in the hydraulic. After closing the manifold valve to which the cylinder is connected watch the cylinder-pressure gauge on the regulator and the delivery-pressure gauge on the regulator and the delivery-pressure gauge on the outlet of the hydraulic. If these gauges show any appreciable drop in pressure, locate the leakage causing it, relieve the pressure in the manifold through the relief valve on the hydraulic outlet and repair the leakage. Then refill the manifold to test pressure and test the repair and all other joints or connections.*

13. Attach full cylinders, after "cracking" (see Sect. IV-B.) to all the other cylinder leads on the manifold.
14. The manifold may now be returned to service in accordance with Sect. III, Operating Instructions.

#### **RV-28 Relief Valve and R-5700 Series Regulators**

The RV-28 relief valve (11P63) shown in Figure 5 is covered in Form 9373 packed with the M-4 Manifold. If parts information is needed for the R-5701/R-5702 regulator, request Form 12-524.

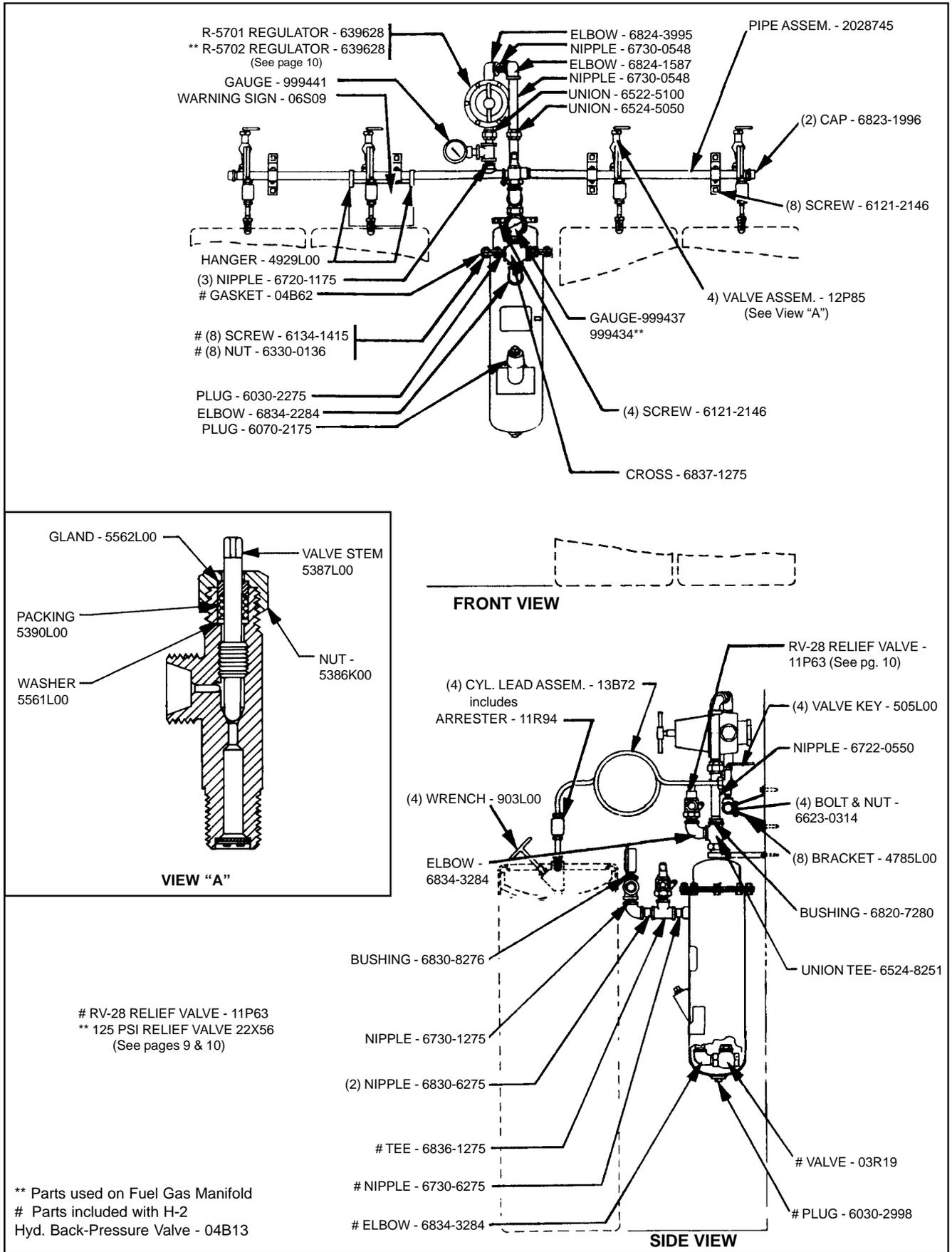
## **ACCESSORY**

### **Manifold Extensions**

<b>Extension</b>	<b>Part No.</b>
Single-Cylinder, R.H. ....	04B81
Single-Cylinder, L.H. ....	04B82
Two-Cylinder, R.H. ....	28R36
Two-Cylinder, L.H. ....	28R37
Three-Cylinder, R.H. ....	28R26
Three-Cylinder, L. H. ....	28R27

Each extension assembly is equipped with a manifold valve (12P85 - see View "A", Fig. 5) per cylinder and a 1/2-in. NPT coupling (6822-5996). Each extension assembly is supplied with the following per cylinder:

Lead Assembly .....	13B72
Valve Key .....	505L00
"T"-wrench .....	903L00
(2) Support Bracket .....	4785L00
Stove Bolt & Nut .....	6623-0314
(2) Lag Screw .....	6121-2146



**FIG. 5 - M4 OXWELD Acetylene Manifold  
M-4 OXWELD Fuel Gas Manifold**

- 4-Cylinder - 04B40 (Illustrated)
- 6-Cylinder - 04B85 (04B40 supplied with extensions 04B81 & 04B82)
- 8-Cylinder - 14P41 (04B40 supplied with extensions 28R36 & 28R37)
- 10-Cylinder - 14P40 (04B40 supplied with extensions 28R26 & 28R27)

## HARDWARE

Part No.	Description
6030-2275	3/4-in. Square Head Galvanized Pipe Plug
6030-2998	1/2-in. Square Head Galvanized Pipe Plug
6070-2175	1/2-in. Square Head Brass (Nickel Plated) Pipe Plug
6121-2146	3/8-in. x 2-in. Square Head Lag Screw
6134-1415	3/8-in. - 16 x 1-in. Hex Head Steel Cap Screw, Cad. Plated
6330-0136	3/8-in. - 16 Hex Steel Nut
6522-5100	1/2-in. Union Sch. 80
6524-5050	1/2-in. Union Sch. 40
6524-8251	3/4-in. Female Union Tee
6623-0314	3/8-in. x 2-in. Round Head Stove Bolt with Nut
6623-0146	3/8-in. x 1-3/4-in. Round Head Stove Bolt with Nut
6720-1175	1/2-in. Close Nipple Sch. 80
6722-0550	1/2-in. x 5-3/8-in. Sch. 40 Seamless Steel Pipe Nipple
6730-0548	1/2-in. x 2-1/2 Lg. Nipple Sch. 40
6730-0550	1/2-in. x 5 Lg. Nipple /Sch., 49
67301275	3/4-in. x Wrought Steel Pipe Close Nipple
6730-6275	3/4-in. x 2-in. Wrought Steel (Galv.) Pipe Short Nipple
6810-0176	1/2-in. x 3/8-in. Bushing
6820-3199	1/2-in. x 1/4-in. Bushing
6820-7280	3/4-in. x 1/2-in. Reducing Flush Bushing
6822-5996	1/2-in. Pipe Coupling
6823-1996	1/2-in. Pipe Cap
6824-1587	1/2-in. x 90 Elbow
6824-3995	1/2-in. x 90 Steel Elbow
6826-0650	1/2-in. x 1/2 x 1/2 Tee Sch. 80
6830-8276	3/4-in. x 1/2--in. Outside Hex Cast Iron (Galv.) Pipe Bushing
6834-2284	3/4-in. Malleable Iron (Galv.) Elbow
6834-3284	3/4-in. Street Elbow
6836-1275	3/4-in. Malleable Iron Banded Tee
6837-1275	3/4-in. Malleable Iron (Galv.) Banded Cross

### LITERATURE CHANGES

#### The "P" edition was printed to cover the following changes:

1. Capacity table revised to include operations from "WTL" cylinders and the recommended maximum withdrawal rates for continuous and intermittent operations.
2. Manifold pipe assembly (2028745) and the optional extensions are equipped with welded-on-fittings which replace a series of pipes and tees.
3. Piping assembly was revised between the R-66MFD regulators and the H-2 hydraulic.

The "Q" edition (10/92) covers the addition of manifolds for fuel gases other than acetylene. All manifolds are now listed by U.L.

