INSTRUCTIONS
and
PARTS LIST
for
Oxweld
Trade-Mark

M-11, M-11-3,
M-12 and M-12-3

FUEL GAS MANIFOLDS
Approved and Listed by Factory Mutual Laboratories

M-11 and M-12
FORM 9078
M.D. 2
CONTENTS

DESCRIPTION
INSTALLATION INSTRUCTIONS
TEST FOR LEAKS
OPERATING INSTRUCTIONS
Initial Starting
Alternately Operating the Two Banks of the Manifold
Simultaneously Operating the Two Banks of the Manifold
To Take the Manifold Out of Service
GENERAL INSTRUCTIONS
OPERATING PRECAUTIONS
EXTENSIONS
MAINTENANCE INSTRUCTIONS
PARTS LIST FOR M-11 AND M-11-3
PARTS LIST FOR M-12 AND M-12-3

ILLUSTRATIONS
Fig. 1-A M-11 and M-11-3 — Dimensions and Location of Principal Parts
Fig. 1-B M-12 and M-12-3 — Dimensions and Location of Principal Parts
Fig. 2 Support-Bracket Installation
Fig. 3 Regulator Connections
Fig. 4 Parts Drawing for M-11 and M-11-3
Fig. 5 Parts Drawing for M-12 and M-12-3
Fig. 6 Parts Drawing for H-12-3M Hydraulic Back-Pressure Valve
Fig. 7 Parts Drawing for V-4 Valve
Fig. 8 Parts Drawing for RV-28 Relief Valve

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The terms "Linde," "Oxweld," and "Prestone" are registered trade-marks of Union Carbide and Carbon Corporation or its Units.
FIG. I-A  M-11 AND M-11-3 FUEL GAS MANIFOLDS - DIMENSIONS AND LOCATION OF PRINCIPAL PARTS
FIG. 1-B - M-12 AND M-12-3 FUEL GAS MANIFOLDS - DIMENSIONS AND LOCATION OF PRINCIPAL PARTS
IMPORTANT

This booklet contains instructions for installing and operating the OXWELD M-11, M-11-3, M-12, and M-12-3 Fuel Gas Manifolds. Read it and keep it for future use. If you are not familiar with the general principles of operation and safe practices, which should be understood before using oxy-fuel gas equipment, we recommend your reading the OXWELD Instruction Manual (in addition to these instructions) which you can obtain without charge from any LINDE Office.

Fuel Gas Manifolds should be installed and operated in accordance with the “Standards of the National Board of Fire Underwriters for the Installation and Operation of Gas Systems for Welding and Cutting,” NBFU pamphlet No. 51.

DESCRIPTION

The M-11, M-11-3, M-12, and M-12-3 Manifolds consist of two five-cylinder high-pressure headers, ten cylinder leads and two OXWELD R-67-MFD Regulators. In addition, they are equipped as follows:

<table>
<thead>
<tr>
<th>Hydraulic Manifold</th>
<th>Back-Pressure Valve</th>
<th>Shut-off Valve</th>
<th>Block</th>
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<tr>
<td>M-11........................X</td>
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<td>M-11-3....................X..........................X</td>
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<td>M-12-3......................X..........................X</td>
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CAUTION: The M-12 and M-12-3 Manifolds are “for use only where an oxy-gas or air-gas mixture, together with an ignition source, cannot occur in the supply line.” This means the M-12 and M-12-3 Manifolds should be used only where oxygen or air cannot back up into the fuel gas supply line and only where the combination of an oxy-gas or air-gas mixture in the fuel gas line, together with a possible ignition source, cannot occur.

The manifold headers are mounted on a supporting rail, which is furnished with brackets for mounting on a wall as shown in Figs. 1 and 2. The capacity of these manifolds can be increased to accommodate additional groups of cylinders by five-cylinder extension sections. The extensions attach to both ends of the original unit.

The two headers are separated by a blind fitting and are provided with separate regulators so that each header may be operated independently. The usual procedure is to operate the two sides of the manifold alternately, so that while one side with its bank of cylinders is in service supplying fuel gas, the bank of cylinders on the other side can be removed and replaced with full cylinders. If desired, however, both sides of the manifold may be operated simultaneously for unusually heavy demands.

I. INSTALLATION INSTRUCTIONS

(Refer to Figs. 1-A and 1-B for dimensions and location of principal parts.)

A. FASTEN THE MANIFOLD HEADER SUPPORT BRACKETS TO THE WALL

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 (Fig. 2).

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 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 others 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

FIG. 2 - SUPPORT BRACKET INSTALLED ON A WALL OF MASONRY CONSTRUCTION
shims or spacing blocks behind the brackets for correcting any horizontal misalignment to avoid straining the joints of the manifold header.

B. BOLT THE ANGLE IRON HEADER SUPPORT RAIL TO THE BRACKETS See Figs. 1 and 2.

C. CONNECT THE REGULATORS

Use the adaptors supplied to connect the regulators to the regulator-connection tees on the yoke as illustrated in Fig. 3. Connect the outlet of each regulator to the outlet block (shutoff valve block on the M-11-3 and M-12-3) by means of the adaptor and the regulator lead.

D. ATTACH THE HYDRAULIC BACK-PRESSURE VALVE TO THE M-11 AND M-11-3

1. Place the hydraulic in the position it will occupy on the manifold. Connect the hydraulic inlet to the manifold outlet pipe.

2. Place a temporary support under the hydraulic while it is in this position to support its weight.

3. Make sure that the hydraulic support bracket is parallel with the wall.

4. Mark the position of the bolt holes on the wall.

5. Disconnect the hydraulic from the outlet pipe and drill the holes for the bracket bolts in or through the wall (see paragraphs A-1 and A-2).

6. Place the hydraulic in position for connection to the manifold 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 to the manifold outlet pipe.

E. CONNECT THE VENT PIPES

Connect separate vent pipes to each of the relief valves on the manifold, low-pressure shutoff valve block and hydraulic. Each of the vent pipes must be run separately to a point outside of the building. This piping must be of good quality, standard weight, galvanized steel pipe with galvanized fittings; must be of the same size as the relief valve vent outlets for their entire length; must terminate not less than 12 feet above the ground at a location remote from windows or openings into buildings, and as far as possible from flues or chimneys. The ends must be fitted with a return bend or elbow opening downward, preferably screened or otherwise protected from obstruction by snow, ice, birds, and insects, and 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 the vent pipes just above the relief valves.

F. FILL THE HYDRAULIC ON THE M-11 AND M-11-3

Fill it to the indicated liquid-level with PRESTONE brand anti-freeze. Use undiluted PRESTONE brand anti-freeze unless the hydraulic may be exposed to temperatures below 50°F. Where anti-freeze protection at lower temperatures must be provided, use a water solution of PRESTONE brand anti-freeze as directed in the booklet "Cold Weather Care of Acetylene Generating and Distributing Equipment," Form 3088. This booklet is packed with the hydraulic and additional copies are available from any LINDE Office.

II. TEST FOR LEAKS

A. TEST THE MANIFOLD FOR LEAKS

1. Install a pipe plug in the manifold outlet (in the hydraulic outlet on the M-11 and M-11-3).

2. Close all header valves except the extreme left-hand and right-hand valves furthest from the regulators. On the M-11-3 and M-12-3, open the service valves on the shutoff valve block.

3. Close the manifold valves.

4. Connect a full fuel gas cylinder to each extreme right-hand and left-hand header valve. Use the same gas the manifold will carry in service. Before attaching the cylinders, "crack" each cylinder valve (open the valve slightly for an instant, then close) to blow any dust or dirt from the cylinder-valve outlet. DO NOT "CRACK" HYDROGEN CYLINDER VALVES.

Connect the cylinders to the header inlet tees by means of the cylinder connection leads.
Tighten the connection nuts at both ends of the lead firmly with a wrench.

5. Release the pressure-adjusting screws (turn left—counter-clockwise—until they turn freely) on both regulators.

6. Open the manifold valves slowly to avoid a sudden surge of pressure into the regulators.

7. Test all joints up to the regulator for leaks with soapy water.

B. TEST THE RELIEF VALVES AND CONNECTIONS

Relief valves should blow-off at approximately 50% above the normal line working pressure and they should reseat tightly at normal working pressure. To adjust relief valves, see the RV-26 instruction booklet (F-6978) packed with the manifold. Make all necessary adjustments after all parts of the manifold and service piping have been tested.

1. M-11-3 relief valves—Close both service valves on the shutoff valve block. Turn in the pressure-adjusting screw (turn right—clockwise) of the regulator for the right-hand bank. Observe the pressure at which the relief valve relieves. Back off (turn left—counter-clockwise) the pressure-adjusting screw until the relief valve reseats itself. Repeat this operation for the left-hand regulator and relief valve.

   Now open the right-hand service valve on the shutoff valve block. Turn in the pressure-adjusting screw of the regulator for the right-hand bank and observe the pressure at which the hydraulic relief valve relieves. Back off the pressure-adjusting screw of the regulator until the relief valve reseats itself.

2. M-11 relief valves—Turn in the pressure-adjusting screw (turn right—clockwise) of the regulator for the right-hand bank. Observe the pressure at which the manifold and hydraulic relief valves relieve. Back off (turn left—counter-clockwise) the pressure-adjusting screw until the relief valves reseats themselves.

3. M-12-3 relief valves—Close both service valves on the shutoff valve block. Turn in the pressure-adjusting screw (turn right—clockwise) of the regulator for the right-hand bank. Observe the pressure at which the relief valve relieves. Back off (turn left—counter-clockwise) the pressure-adjusting screw until the relief valve reseats itself. Repeat this operation for the left-hand regulator and relief valve.

4. M-12 relief valve—Turn in the pressure-adjusting screw (turn right—clockwise) of the regulator for the right-hand bank. Observe the pressure at which the manifold relief valve relieves. Back off (turn left—counter-clockwise) the pressure-adjusting screw until the relief valve reseats itself.

5. Test the connections between the regulators and the manifold or hydraulic outlet with soapy water. If any leakage is disclosed by this test, relieve the pressure, remedy the leakage, and retest the joints for leaks.

6. Close the cylinder valves. Close the header valves to which the cylinders are attached and remove the cylinders.

7. Open the manifold relief valve to release the pressure in the manifold. On the M-11-3 open both relief valves on the shutoff valve block. Open the relief valve on the hydraulic on the M-11 and M-11-3 to release the pressure in the hydraulic.

8. Release the pressure-adjusting screw of the regulator (turn left—counter-clockwise—until it turns freely).

C. TEST THE SERVICE LINE FOR LEAKS

The piping should first be tested for leaks with compressed air. A second leak test using the fuel gas to be manifolded also must be performed. The advantage of using compressed air for the first test is that any major leaks can be detected and repaired without purging the piping. The second testing is necessary because hydrogen and other gases lighter than air will leak through small apertures that do not show up when compressed air is used.

1. Fill the hydraulic back-pressure valves to the indicated level with PRESTONE brand anti-freeze.

2. Temporarily disconnect the relief valves on all hydraulic back-pressure valves and close the openings with pipe plugs. If the system contains branch line hydraulics see that the line shutoff valves at the inlet and outlet sides of these hydraulics are open.

3. Cap the outlets of the station valves and open these valves. Where the stations are equipped with hydraulics, cap the hydraulic service outlet and open the shutoff valve on the hydraulic inlet pipe.

4. Fill the piping with compressed air to a pressure equal to 1-1/2 times the normal line working pressure. Test all joints in the piping and all joints in valves or hydraulics for leaks with soapy water. Note the pressure of the air in the piping and the temperature of the atmosphere in the vicinity of the piping about 1 hour after filling and again after the pressure has been in the piping at least 5 hours.

5. If the final temperature is more than 5-deg. F. different from the temperature at the start of the test, adjust the final pressure to correct it for this temperature change as instructed in step 11 following. If the final pressure after making this adjustment is more than 2 psi lower than the pressure at the start of the test, check the pipe itself for leaks using soapy water. Release the air pressure and repair all leaks in the pipe or joints. Retest the repaired joints with air at 1-1/2 times the normal working pressure as described in steps 1 to 5 above.
6. Drive the air out of the piping system and fill it with fuel gas.

(a) Connect a hose to the end of the service line that is to be joined to the manifold. Connect the other end of the hose to a fuel gas cylinder provided with a regulator designed to deliver the fuel gas used.

(b) At the far end of each branch of the piping system connect to a station valve a length of clean 1/4-in. hose of ample strength to stand 1-1/2 times the normal working pressure. This hose must be long enough to extend to a location out-of-doors, remote from all doors, windows, chimneys, flames or fire. The end that is out-of-doors should be left open. If there is a second station valve near the end of the line, connect to it a fairly short hose to lead to an oxy-acetylene welding blowpipe equipped with a welding tip, or to a laboratory type Bunsen burner provided with a valve. If a second station is not near the end of the line, then arrange so that both hose lines can be connected to the one station at the far end of the branch line.

(c) Adjust the cylinder regulator to deliver a pressure of not more than 5 lb. per sq. in.

(d) Open the station valve to allow flow through the hose leading to out-of-doors. Using a clock or watch, note the time at which the valve is opened. At intervals of about two minutes, open the blowpipe or Bunsen burner valve and try to light the gas issuing from the tip. The blowpipe or burner valve should be opened to give only a gentle stream of gas from the tip. No oxygen should be used.

NOTE: (1) Hydrogen is odorless and, therefore, cannot be detected by smelling. Because of this, extreme precautions must be taken so that the gas issuing from the out-of-doors hose does not drift toward windows, doors, chimneys or fires, (2) hydrogen burns with a practically colorless flame.

(e) When it is possible to light the gas issuing from the blowpipe or Bunsen burner, note the time. Calculate the elapsed time from the starting of the flow to the lighting of the flame. Divide this by 4 and allow the flow to continue for this much longer. Then close the station valves.

(f) Repeat operations (b) through (e) at the far end of each branch of the piping system.

7. Fill the piping with fuel gas to a pressure equal to 1-1/2 times the normal line working pressure.

8. Wait at least two hours, then test all hydraulic back-pressure valve joints for leaks with soapy water.

9. Close the inlet valves of the station hydraulics.

10. Close the shutoff valves on both sides of the branch line hydraulics.

11. Test the piping on each side of the hydraulic separately. Allow the piping to stand under pressure at least 5 hours. Measure the pressure of the fuel gas 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 fuel gas to increase, and a decrease in temperature will cause the pressure to decrease. The final pressure must be adjusted to correct the 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 lb. per sq. in. to the final pressure for each 5°F decrease in temperature or subtract 1 lb. per sq. in. for each 5°F the temperature has increased.

If the final pressure, after making the adjustment, is more than 2 lb. per sq. in. lower than the pressure at the start of the test, check the pipe and all joints, valves and outlets for leaks using soapy water. All leaks must be located and repaired before the manifold system is placed in service. After testing, close the station valves, open the shutoff valves on both sides of all branch line hydraulics and relieve the pressure in the piping through the hoses that lead out-of-doors.

12. If the repair of any leak requires the use of high temperatures for welding, brazing, or soldering, the fuel gas must be purged from the line before such work is performed.

(a) First see that all branch line shutoff valves are open. Then relieve the pressure in the piping system through the purging hose lines leading to the out-of-doors. Then close the valves.

(b) Disconnect the fuel gas hose and cylinder from the manifold end of the piping system. Replace it with a hose and cylinder to introduce either nitrogen or clean dry compressed air.

(c) Allow nitrogen or air to flow into the line at a pressure of not more than 5 lb. per sq. in. Open the blowpipe or Bunsen burner valve and light the flame. Also open the valve to allow gas to flow through the purging hose to the out-of-doors.

(d) Note the time or a watch. When the gas is issuing from the blowpipe or Bunsen burner will no longer burn, shut off the valve and note the time.

(e) Calculate the elapsed time from the starting of the flow to when the flame went out for each branch of the piping system. Divide this by 4 and allow the flow to continue through each branch this much longer.

(f) Repeat steps (c) and (d) for each branch of the piping system.
(g) Make the needed repairs to overcome the leaks in the piping system.

(h) Repeat steps II-C-6 and II-C-7, and test the repaired joints using soapy water.

(i) Relieve the pressure in the piping through the hoses that lead out-of-doors.

13. Remove the pipe plugs previously installed in

the line and station hydraulics and reconnect the relief valves.

14. Remove the pipe plug from the manifold or manifold hydraulic outlet. Connect the service line to the outlet. Test this connection and joints made in reconnecting the relief valves to the line and station hydraulics, for leaks using soapy water after the normal operating pressure is turned into the service line.

III. OPERATING INSTRUCTIONS

Each bank of the manifold will discharge only through the pressure regulator on its side of the manifold yoke. This duplex construction allows the two sides to be operated (a) alternately where an uninterrupted supply of fuel gas is required; or (b) simultaneously where the supply can be interrupted to allow replacing the cylinders after their contents have been discharged.

Refer to Figs. 1-A and 1-B for location of the parts mentioned in the following instructions.

A. INITIAL STARTING OF THE MANIFOLD

1. Release the pressure-adjusting screw (turn left — counter-clockwise — until it turns freely) of the regulators for both banks of cylinders.

2. Close all header valves. Close both manifold valves.

3. Connect full cylinders to all cylinder connections on both headers of the manifold after “cracking” each cylinder valve. DO NOT “CRACK” HYDROGEN CYLINDER VALVES. Connect the cylinders to the header inlet tees by means of the cylinder connection leads. Tighten the connection nuts at both ends of the lead firmly with a wrench.

4. Open the cylinder valves of all cylinders on both banks of the manifold.

5. Open all header valves on both sides of the manifold slowly, one by one. Open the valves nearest the manifold regulators first.

6. Open both manifold valves slowly.

B. ALTERNATELY OPERATING THE TWO BANKS OF THE MANIFOLD

NOTE: When the manifold regulators are adjusted as described in these instructions, the manifold will operate in such a manner that one bank of cylinders will act as a reserve while the other bank supplies fuel gas to the service line. When the fuel gas in the operating bank of cylinders is exhausted, the reserve bank will automatically supply the service line.

1. Adjust the left bank of cylinders for reserve service. Turn the regulator pressure-adjusting screw to the right (clockwise) until the line pressure gauge of the regulator registers a pressure of 5 lb. per sq. in. below the desired normal line pressure. This will now be the reserve bank.

2. Adjust the right bank of cylinders for the desired delivery pressure. Turn the regulator pressure-adjusting screw to the right (clockwise) until the line pressure gauge of the regulator indicates normal operating pressure.

This operating bank will then continue to deliver fuel gas to the line at the desired pressure as long as there is sufficient pressure in the cylinders to supply the fuel gas at its required output. When the pressure of the cylinders on the service bank is depleted so that the line pressure decreases to the pressure at which the reserve bank regulator is set, the reserve bank will come into operation to supply fuel gas to the line.

3. Replace the empty cylinders.

(a) Adjust the operating bank of cylinders to the normal line pressure. Turn the regulator pressure-adjusting screw to the right (clockwise) slowly until the line pressure gauge of the regulator indicates the desired normal line pressure.

(b) Close the manifold header valves and cylinder valves on the empty bank.

(c) Release the pressure-adjusting screw of the regulator for the empty bank. Turn it to the left (counter-clockwise) until it turns freely.

(d) Disconnect the empty cylinders from the cylinder connection leads. Connect full cylinders to the leads. (See paragraph III-A-3.)

(e) Open the cylinder valves on the new cylinders. Open the header valves slowly, starting with the valves nearest the manifold regulator first.

(f) Reduce the pressure from the operating bank to two or three lb. per sq. in. below the reserve setting. There should be some consumption flow through the regulator when the pressure-adjusting screw is turned to the left (counter-clockwise) to reduce the pressure.
(g) Open the manifold valve on the reserve bank slowly to avoid a sudden surge of pressure into the regulator.

(h) Adjust the recharged bank of cylinders for reserve service as described in paragraph B-1.

(i) Readjust the operating bank of cylinders to the normal line pressure. Turn the regulator pressure-adjusting screw to the right (clockwise) slowly until the line pressure gauge of the regulator indicates the desired normal line pressure.

C. SIMULTANEOUSLY OPERATING BOTH BANKS OF THE MANIFOLD

1. Perform steps A-1 to A-6, "Initial Starting of the Manifold."

2. Turn the pressure-adjusting screw of the regulator for one of the banks of cylinders to the right (clockwise) slowly until the delivery pressure gauge indicates the desired line pressure.

3. Turn the pressure-adjusting screw of the regulator for the other bank of cylinders to the right (clockwise) slowly until the pressure indicating needle on the delivery pressure gauge just starts to move upwards.

   The system is now ready for service use. However, since the adjustment of the regulators was necessarily made before there was any appreciable flow through them, it will be necessary to readjust the regulators as soon as the use of fuel gas starts and a normal operating flow through the regulators develops. Make this adjustment by simultaneously turning the pressure-adjusting screws of both regulators slowly to the right until the desired line pressure is reached.

4. When the pressure within the cylinders will no longer maintain the desired line pressure, proceed as follows to shut down the manifold, replace the cylinders, and resume operations:
   (a) Notify all operators using equipment that service will be temporarily discontinued.
   (b) Close the manifold valves of both banks. Turn the pressure-adjusting screws of both regulators to the left (counter-clockwise) until they turn freely.

(c) Close all manifold header valves and close the valves of all the cylinders connected to the manifold.

(d) Disconnect the empty cylinders from the cylinder connection leads by backing off the lead connection nuts from the cylinder valve outlets.

(e) Connect full cylinders to both manifold headers. Connect the cylinders to the header valves by means of the cylinder connection leads, tightening the connection nuts at both ends of the leads firmly with a wrench.

(f) Open the cylinder valves of all cylinders. Open the header valves on both banks of the manifold, starting with those nearest the manifold regulators.

(g) Slowly open the manifold valves for both banks of the manifold.

(h) Adjust the regulators for both banks of the manifold as described in paragraphs C-2 and C-3.

D. TO TAKE THE MANIFOLD OUT OF SERVICE

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

1. Close both manifold valves, all header valves, and the cylinder valves of all cylinders connected to the manifold.

2. Close the service line shutoff valve.

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

   When work is stopped and the manifold is to remain idle with pressure in the piping system for shorter periods of time, close only the manifold valves and cylinder valves. Leave the pressure-adjusting screw of each regulator in its normal operating position.

IV. GENERAL

A. TO ADJUST THE DELIVERY PRESSURE

1. To increase the delivery pressure, turn the regulator pressure-adjusting screw to the right (clockwise).

2. To decrease the delivery pressure, turn the regulator pressure-adjusting screw to the left (counter-clockwise).

   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 equipment in operation.

   To reduce the pressure when there is no equipment in operation, open the manifold relief valve until the line pressure is reduced to a value slightly lower than that wanted. Then increase the pressure to that desired.

   Do not make any extensive change of pressure when the manifold is in operation without first notifying all persons operating equipment. Operators should be prepared for the change and ready to adjust their equipment for use of the new pressure.

B. CYLINDERS

1. When connecting cylinder leads, make sure that the correct ends of the cylinder leads are connected to the header valves. Look for the ends marked "connect this end to manifold."

2. Before opening cylinder valves, make sure that the header valves to which the cylinders are
connected are closed. After the cylinder valves have been opened, open the header valves.

3. When disconnecting cylinders, first close the header valves to which the cylinders are connected. Then close the cylinder valves.

C. TO FILL THE HYDRAULIC BACK-PRESSURE VALVE

Keep a sufficient quantity 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 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 fuel gas.

The liquid level should be checked during off hours—preferably in the morning before putting the manifold into operation. To check the liquid level:

1. Close the regulator by turning the pressure-adjusting screw to the left (counter-clockwise) until it turns freely.
2. Close the service line shutoff valve.
3. Lift the cap at the top of the hydraulic outlet relief valve to relieve all pressure within the hydraulic.
4. Remove the liquid level plug.
5. After checking the liquid level, and adding liquid if necessary, replace the plug.
6. Open the service line shutoff valve.
7. Turn the regulator pressure-adjusting screw to the right (clockwise) until the delivery pressure gauge indicates the desired delivery pressure.

D. RELIEF VALVES

Relief valves should be operated at least once a week to keep them in good working order. Lift up the caps for an instant to open the valves and permit gas to escape through the vent pipes.

V. OPERATING PRECAUTIONS

A. Keep All Flames, Sparks, and Lights Away from the manifold and cylinders; do not permit smoking in the vicinity of the manifold.

B. Hydrogen Has No Characteristic Odor to Warn of Its Escape. Therefore, if the manifold should be subject to any force that might damage it, immediately test the manifold for leaks with soapy water. The manifold should be shut down and the necessary repairs made to the system before regular operation is resumed.

C. Never "Crack" a Cylinder Near an Open Flame or Other Possible Source of Ignition. Never "crack" the valve any wider nor leave it open any longer than is necessary to clear the valve of dust or dirt. DO NOT "CRACK" HYDROGEN CYLINDER VALVES.

VI. EXTENSIONS

To extend a manifold header in the same direction along a wall, use a five-cylinder extension assembly and the bracket furnished with it. To extend a manifold at right angles, use a five-cylinder extension assembly and a curved header tube.

A. TO ADD AN EXTENSION ASSEMBLY

1. Disconnect all cylinders from the manifold.
2. Purge the manifold with nitrogen or compressed air to remove all traces of fuel gas.
3. Locate the support bracket on the wall as described in Part I, paragraph A.
4. Disconnect the manifold valve from the yoke assembly (see Fig. 4 or Fig. 5) on the side of the manifold to which the extension is to be added. Unscrew the swivel nut with a wrench.
5. Remove the header assembly from the angle iron support on that side of the manifold and take it outdoors or to a place where welding and cutting are regularly done.

6. Remove the handwheel, adjusting screw and all the internal parts of the header valve next to the joint being made.
7. Remove the plug from the end of the header by heating the sweated joint carefully to avoid melting the joint at the other end of the fitting. Hold the fitting firmly with a wrench while unscrewing the plug. Remove the loose solder from the threads in the tee connection of the end header valve.
8. Retin the threads in the tee connection and tin the threads on the extension tube. Assemble the joint. Hold the fitting with a wrench to avoid straining other joints when screwing the extension header into the tee connection of the header valve. Reflow soft silver solder on both ends of the tee connection after the joint is made.
9. Reassemble the header valve.
10. Reassemble the header on the angle iron support. Check the position of the header to be sure that
no strain will be placed on the joints when the U-bolts are tightened. Connect the manifold valve to the yoke assembly. Bolt the extension angle iron support to the wall brackets.

11. Test the manifold for leaks as described in Part II, paragraph A.

B. TO EXTEND THE MANIFOLD ALONG AN INTERSECTING WALL

1. Remove the manifold header from the angle iron as described in VI-A, paragraphs 1 to 5 above.

2. Remove the handwheel, adjusting screw and all the internal parts of the header valve next to the joint being made.

3. Screw and soft solder the curved tube into the end tee of the manifold header. Replace the manifold header on the angle iron.

4. Remove the piece of header tubing from the tee connection of the end header valve on the extension. Screw and soft solder this end of the extension, with the header valves upright, on to the curved header.

5. Before replacing the U-bolts, check the position of the manifold header to be sure that no strain will be placed on the joints when the U-bolts are tightened.

6. Reassemble the header valves.

7. Test the manifold for leaks as described in II-A.

IMPORTANT: It is extremely important that header valve connections be held rigid while tubing or plugs are being added or removed.

VII. MAINTENANCE

INSTRUCTIONS

B. TO REMOVE A REGULATOR FOR REPAIR FROM THE M-11-3 OR M-12-3 WHILE THE MANIFOLD IS IN OPERATION

1. Close the header valves and valves of all cylinders on the bank controlled by that regulator. Close the manifold valve.

2. Close the service valve nearest the regulator on the shutoff valve block.

3. Relieve the pressure through the relief valve on the valve block.

4. Disconnect and remove the regulator.

C. TO REMOVE A REGULATOR FOR REPAIR FROM THE M-11 OR M-12

1. Close the service line shutoff valve.

2. Close the manifold valves of both banks. Leave the pressure-adjusting screws for both regulators in their normal operating position.

3. Relieve the pressure through the relief valve and vent pipes.

4. Disconnect and remove the regulator. The adjusting screw of this regulator should now be released (turn left — counter-clockwise — until it turns freely).

5. Attach the dust plug to the outlet block where the regulator lead was removed.

Service may now be resumed with the other bank of cylinders as follows:

6. Release the regulator pressure-adjusting screw (turn left — counter-clockwise — until it turns freely). Open the manifold valve for this bank slowly to avoid a sudden surge of pressure into the regulator.

7. Turn the pressure-adjusting screw of the regulator to the right (clockwise) slowly until the delivery-pressure gauge indicates the desired line pressure.
8. Open the service line shutoff valve. Readjust the line pressure if necessary (see Part IV, paragraph A).

To reinstall a regulator on the bank from which one was removed, proceed as follows:

9. Close the service line shutoff valve and both manifold valves.

10. Release the pressure through the relief valve and vent pipe. Then remove the dust plug from the outlet block.

11. Install the regulator by attaching it to the yoke assembly (refer to Fig. 3). Connect the regulator lead and lead adaptor to the regulator outlet and to the outlet block.

12. Release the pressure-adjusting screw of the regulator just installed (turn left — counterclockwise — until it turns freely). Then open the manifold valve for this bank slowly to avoid a sudden surge of pressure into the regulator. Test the joints for leaks with soapy water.

13. Repeat steps C-7 and C-8 for the regulator just installed.

14. Close the manifold valve for this bank but leave the regulator pressure-adjusting screw in its normal operating position.

The manifold is now ready to resume operation as outlined in Part III.

D. TO CLEAN THE FILTER ASSEMBLY

The filters are on the manifold to remove particles of scale or rust that may be carried from the cylinders to the regulator seats and cause faulty regulation due to seat damage. Occasionally it may become necessary to replace a filter unit that has become clogged (the filter unit cannot be cleaned — it must be replaced). This condition will be indicated by a gradual drop in line pressure when the consumption rate of fuel gas is high. If this occurs, observe the cylinder pressure gauge. When the consumption rate is being increased the gauge reading will probably decrease quite rapidly. When the consumption is decreased the gauge reading will probably increase slightly.

To replace the filter unit, remove the body plug, sealing gasket, spacer and spring. Carefully pull out the filter and replace it with a new unit. Replace the spring and spacer, install a new filter body gasket and retighten the body plug. Test the plug for leaks, using soapy water.

E. TO REPACK THE MANIFOLD VALVES

1. Dismantle the Valve (See Fig. 7)

(a) Loosen the packing screw and open the valve stem (turn the handwheel to the left) fully.
(b) Unscrew the stuffing box from the valve body.
(c) Screw in the valve stem until the valve tip can be removed. Then remove the tip.
(d) Unscrew the packing screw from the stuffing box.
(e) Unscrew the valve stem from the stuffing box.
(f) Remove the cap nut, washer, and handwheel.
(g) Slide the packing screw, packing and washers off the valve stem.
(h) Remove the gasket from the valve body.

2. Reassemble the Valve

(a) Place the valve packing between the packing washers and install this assembly and the packing screw on the valve stem.
(b) Attach the handwheel, washer, and cap nut to the valve stem.
(c) Screw the valve stem into the stuffing box and push the washers and packing into the stuffing box.
(d) Loosely screw the packing screw into the stuffing box.
(e) Insert a new gasket in the recess in the valve body. Always replace the gasket you remove with another of the same type. (See Fig. 7.)
(f) Attach the valve tip to the valve stem and back out the valve stem as far as possible.
(g) Assemble the stuffing box and valve stem assembly to the valve body.
(h) Tighten the packing screw very tight with a crescent or monkey wrench; then back it off just enough so that the valve handle turns readily. After this is done, there is no further need to adjust the packing screw unless tests show leakage.

3. Test the Valve

With normal pressure at the valve, and with the valve open, test for leakage around the threads of the stuffing box and the packing nut. Also test for leakage around the valve stem. Use only a water solution of grease-free soap (such as Ivory) applied with a new or clean brush.

Usually the initial adjustment will serve for the life of the valve. Where the valve is subject to wide temperature variations, it may be necessary to tighten the packing nut under colder conditions to effect a seal, or to release the packing nut slightly so that the handle may be readily turned under warmer conditions.
**Fig. 4 - Principal Parts for "Oxweld" M-11 and M-11-3 Fuel Gas Manifolds Part Nos. 07X68 and 07X71**

**Replacement Parts List**

For M-11 and M-11-3
10-Cylinder Wall Type Fuel Gas Manifolds
Part Nos. 07X68 and 07X71

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35008</td>
<td>Cap Nut (16 Used) (2 also included in 4306)</td>
<td>4661</td>
<td>Pipe Plug (Included in 9046 and 9047)</td>
</tr>
<tr>
<td>41003</td>
<td>Header Yoke Elbow (Included in 9046 and 9047)</td>
<td>4673</td>
<td>Coupling (Included in 9049)</td>
</tr>
<tr>
<td>41111</td>
<td>Union Stud Nut (4 Used) (Included in 9046, 9047 and 2 in 9049)</td>
<td>9041</td>
<td>T-Inlet Connection (5 Included in 9046 and 9047)</td>
</tr>
<tr>
<td>41112</td>
<td>Union Stud (4 Used) (Included in 9046, 9047 and 2 in 9049)</td>
<td>9046</td>
<td>Right-Hand.Header Assembly (Includes 4100, 4111, 4112, 4169, 4365, 4661, 5041, 54424, 53452, 70A17, 8D-PK-U-15 and 8SS-C-48)</td>
</tr>
<tr>
<td>41201</td>
<td>Manifold Outlet Block (M-11 only)</td>
<td>9047</td>
<td>Left-Hand Header Assembly (Includes 4108, 4111, 4112, 4169, 4309, 4661, 5041, 54424)</td>
</tr>
<tr>
<td>41330</td>
<td>Safety Cross Plug (Included in 4175)</td>
<td>9048</td>
<td>T-Outlet Connection (2 Used) (Included in 9049)</td>
</tr>
<tr>
<td>41360</td>
<td>Safety Cross Plug Nut (Included in 4175)</td>
<td>9049</td>
<td>Yoke Assembly (Includes 4111, 4112, 4169, 4365, 4661, 5041, 54424, 53452, 70A17 and 50Y48)</td>
</tr>
<tr>
<td>41595</td>
<td>Safety Cross Plug Chain (Included in 4175)</td>
<td>38A72</td>
<td>Lead Locking Screw (Included in 71A53)</td>
</tr>
<tr>
<td>41640</td>
<td>Safety Cross Plug Chain Ring (Included in 4175)</td>
<td>40A44</td>
<td>Lead Spring (Included in 71A53)</td>
</tr>
<tr>
<td>41650</td>
<td>Safety Cross Plug and Chain Support Ring (Included in 4175)</td>
<td>44A24</td>
<td>Header Valve (5 Included in 9046 and 9047)</td>
</tr>
<tr>
<td>41690</td>
<td>Header and Header Yoke Tube (Included in 9046, 9047 and 2 in 9049)</td>
<td>53A52</td>
<td>Plate Holder (2 Used) (Included in 9046)</td>
</tr>
<tr>
<td>41750</td>
<td>Safety Cross Plug and Chain Assembly (Includes 4155, 4156, 4158, 4164 and 4165)</td>
<td>53A61</td>
<td>Lead Ball (Included in 71A53)</td>
</tr>
<tr>
<td>42100</td>
<td>V-4 Manifold Valve (2 Used) (See Valve Illustration for Parts)</td>
<td>70A17</td>
<td>Warning Plate (Included in 9046)</td>
</tr>
<tr>
<td>43058</td>
<td>Header Tube (4 Included in 9046 and 9047)</td>
<td>71A53</td>
<td>Straight Manifold to Cylinder Lead Assembly for Hydrogen (10 Used) (Includes 38A72, 40A44, 53A61, 2002 R-30-3C (Supplied))</td>
</tr>
<tr>
<td>43060</td>
<td>U-Bolt Assembly (4 Used) (Includes 3508 and 73A240)</td>
<td>72A53</td>
<td>U-Bolt (Includes 2 N-H-40)</td>
</tr>
<tr>
<td>43070</td>
<td>U-Bolt Liner (4 Used)</td>
<td>72A54</td>
<td>U-Bolt Liner</td>
</tr>
</tbody>
</table>
Part No. | Description
--- | ---
\(\times 73\) A20 | U-Bolt (Included in 4306)
\(\times 08\) P67 | H-12-3M P-O-L Hydraulic Back Pressure Valve (Supplied) (See Hydraulic Illustration for Parts)
\(\times 18\) R73 | RV-26 Relief Valve (One used on M-11 and two included in 07X78) (See Relief Valve Illustration for Parts)
\(\times 10\) Y08 | Left-Hand Regulator to Service Line Lead (M-11 only) (Supplied)
\(\times 10\) Y09 | Right-Hand Regulator to Service Line Lead (M-11 only) (Supplied)
\(\times 10\) Y18 | Left-Hand Regulator to Service Line Lead (M-11-3 only) (Supplied)
\(\times 10\) Y19 | Right-Hand Regulator to Service Line Lead (M-11-3 only) (Supplied)
\(\times 50\) Y46 | Manifold Porex Filter Adaptor Assembly (2 Used) (Includes 28285, 31265, 71274, 77279, 77280 and 80253) (Included in 9049)
\(\times 05\) Z04 | 1-1/4-in. x 5-1/4-in. Lg. Pipe Nipple
\(\times 28\) Z85 | Filter Spring (Included in 50Y46)
\(\times 31\) Z65 | Manifold Filter Adaptor Cap (Included in 50Y46)
\(\times 38\) Z20 | Snap Ring (2 Used) (Included in 71A53)
\(\times 49\) Z20 | Bracket (4 Used) (Supplied)
\(\times 71\) Z74 | Manifold Filter (Included in 50Y46)
\(\times 77\) Z79 | Manifold Filter Adaptor Gasket (Included in 50Y46)
\(\times 77\) Z80 | Manifold Filter Adaptor Spacer (Included in 50Y46)
\(\times 80\) Z33 | Manifold Filter Adaptor Body (Included in 50Y46)

**NOT ILLUSTRATED**

- Adaptor Washer (2 Req'd) (Included in 18X23)
- R-67-MFD Hydrogen Manifold Regulator (2 Used) (Supplied)
- Low Pressure Shutoff Valve Block Assembly (Includes (2) 16R73, (2) 33Y06, 70267 and (2) M-N-P-C-5) (M-11-3 only) (Supplied)
- Fuel Gas Regulator Outlet to Service Line Lead Adaptor (2 Used) (Includes 2) 6985) (Supplied)
- Fuel Gas Manifold to Regulator Inlet Adaptor (2 Used) (M-11 only) (Supplied)
- Fuel Gas Manifold to Regulator Inlet Adaptor (2 Used) (M-11-3 only) (Supplied)
- Low Pressure Shutoff Valve Block Valve Stem Assembly (2 Used) (Included in 07X78) (Includes Part No. 78204)
- Low Pressure Shutoff Valve Block Body (Included in 07X78)
- #6 Wrench (Supplied)
- #74 Wrench (2 Supplied)
- Valve Packing Washer (Included in 33Y06)

**ACCESSORIES**

- 9058 | 5-Cylinder Right-Hand Extension (Included in 21X35)
- 9241 | 5-Cylinder Left-Hand Extension (Included in 21X35)
- 20X76 | Manifold Regulator Filter Adaptor
- 21X35 | 5-Cylinder Right-Hand Extension Assembly (Includes (5) 71A53 and 9058)
- 21X36 | 5-Cylinder Left-Hand Extension Assembly (Includes 9241 and (5) 71A53)
- 23218 | Manifold Lead Handle

**HARDWARE**

All the items which follow are either:

a. Standard hardware (screws, bolts, nuts, washers, pipe fittings, etc.) made by many manufacturers, which can be purchased locally by the description given, or

b. Standard parts or assemblies which we purchase complete from specific manufacturers. For these we give the manufacturer's name, catalog number, etc.

It will save you time and money to purchase these items through local outlets, or directly from the specified manufacturer. If no other source of supply is available, you may order these from us.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-N-P-7 (2-in.)</td>
<td>1-1/4-in. x 2-in. Lg. Pipe Nipple Wrought Steel</td>
</tr>
<tr>
<td>M-N-P-7 (5-in.)</td>
<td>1-1/4-in. x 5-in. Lg. Pipe Wrought Steel (2 Used)</td>
</tr>
<tr>
<td>M-N-P-7 (6-1/2-in.)</td>
<td>1-1/4-in. x 5-1/4-in. Lg. Pipe Nipple Wrought Steel</td>
</tr>
<tr>
<td>M-N-P-C-5</td>
<td>3/4-in. Close Nickel Standard Wrought Steel (M-11 only) (2 also included in 07X78)</td>
</tr>
<tr>
<td>M-U-N-6</td>
<td>1-1/4-in. Malleable Iron Extra Heavy Navy Union (with Brass Seat)</td>
</tr>
<tr>
<td>M-U-R-8</td>
<td>2-in. Malleable Iron 250 lb. Railroad Union (with Brass Seat)</td>
</tr>
<tr>
<td>M-BU-P-15</td>
<td>1-1/4-in. to 3/4-in. Bushing, Malleable Iron</td>
</tr>
<tr>
<td>M-BU-P-23</td>
<td>2-in. to 1-1/4-in. Flush Bushing Brass</td>
</tr>
<tr>
<td>M-EL-X-7</td>
<td>1-1/4-in. Extra Heavy Malleable Iron Elbow (3 Used)</td>
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<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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<tbody>
<tr>
<td>M-PP-B-5</td>
<td>3/4-in. Brass Plug (M-11-3 only)</td>
</tr>
<tr>
<td>M-TE-X-7</td>
<td>1-1/4-in. x 1-1/4-in. Extra Heavy Malleable Iron Tee</td>
</tr>
<tr>
<td>N-H-3</td>
<td>3/8-in.-16 U.S.S. Hex Steel Nut (2 Used)</td>
</tr>
<tr>
<td>N-H-40</td>
<td>5/16-in.-18 U.S.S. Hex Steel Nut (2 Used) (Included in 72A53)</td>
</tr>
<tr>
<td>S-D-PK-U-15</td>
<td>#6 x 3/8-in. Lg. Parker-Kalon Type &quot;U&quot; Hardened Metallic Drive Screw (4 Used) (Included in 9046)</td>
</tr>
<tr>
<td>S-H-65</td>
<td>3/8-in.-16 x 1-in. Lg. U.S.S. Hex Head Steel Cap Screw (2 Used)</td>
</tr>
<tr>
<td>SSS-S-C-48</td>
<td>1/4-in.-20 x 1-1/2-in. Square Head Cup Point Setscrew (2 Used) (Included in 9049)</td>
</tr>
</tbody>
</table>
FIG. 5 - PRINCIPAL PARTS FOR "OXWELD" M-12 AND M-12-3 FUEL GAS MANIFOLDS PART NOS. 07X69 AND 07X73

REPLACEMENT PARTS LIST

FOR
M-12 AND M-12-3
10-CYLINDER WALL TYPE FUEL GAS MANIFOLDS
PART NOS. 07X69 AND 07X73

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>3508</td>
<td>Cap Nut (16 Used) (2 also included in 4306)</td>
</tr>
<tr>
<td>4108</td>
<td>Header Yoke Elbow (Included in 9046 and 9047)</td>
</tr>
<tr>
<td>4111</td>
<td>Union Stud Nut (4 Used) (Included in 9046, 9047 and (2) in 9049)</td>
</tr>
<tr>
<td>4112</td>
<td>Union Stud (4 Used) (Included in 9046, 9047 and (2) in 9049)</td>
</tr>
<tr>
<td>4120</td>
<td>Manifold Outlet Block (M-12 only)</td>
</tr>
<tr>
<td>4135</td>
<td>Safety Cross Plug (Included in 4175)</td>
</tr>
<tr>
<td>4136</td>
<td>Safety Cross Plug Nut (Included in 4175)</td>
</tr>
<tr>
<td>4159</td>
<td>Safety Cross Plug Chain (Included in 4175)</td>
</tr>
<tr>
<td>4164</td>
<td>Safety Cross Plug Chain Ring (Included in 4175)</td>
</tr>
<tr>
<td>4165</td>
<td>Safety Cross Plug and Chain Support Ring (Included in 4175)</td>
</tr>
<tr>
<td>4169</td>
<td>Header and Header Yoke Tube (Included in 9046, 9047 and (2) in 9049)</td>
</tr>
<tr>
<td>4175</td>
<td>Safety Cross Plug and Chain Assembly (Includes 4135, 4136, 4159, 4164 and 4165)</td>
</tr>
<tr>
<td>4210</td>
<td>V-4 Manifold Valve (2 Used) (See Valve Illustration for Parts)</td>
</tr>
<tr>
<td>4305</td>
<td>Header Tube (4 Included in 9046 and 9047)</td>
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<table>
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<tr>
<th>Part No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>4306</td>
<td>U-Bolt Assembly (4 Used) (Includes 2)</td>
</tr>
<tr>
<td>4307</td>
<td>U-Bolt Liner (4 Used)</td>
</tr>
<tr>
<td>4652</td>
<td>Header Yoke Tube (2 Used) (Included in 9049)</td>
</tr>
<tr>
<td>4661</td>
<td>Pipe Plug (Included in 9046 and 9047)</td>
</tr>
<tr>
<td>4673</td>
<td>Coupling (Included in 9049)</td>
</tr>
<tr>
<td>9041</td>
<td>T-Inlet Connection (5 Included in 9046 and 9047)</td>
</tr>
<tr>
<td>9046</td>
<td>Right-Hand Header Assembly (Includes 4108, 4111, 4112, 4109, (4) 4305, 4661, (5) 9041, (5) 44A24, (2) 53A52, 70A17, (4) S-D-PK-U-15 and (2) SS-S-C-48)</td>
</tr>
<tr>
<td>9047</td>
<td>Left-Hand Header Assembly (Includes 4108, 4111, 4112, 4109, (4) 4305, 4661, (5) 9041 and (5) 44A24)</td>
</tr>
<tr>
<td>9048</td>
<td>T-Inlet Connection (2 Used) (Included in 9049)</td>
</tr>
<tr>
<td>9049</td>
<td>Yoke Assembly (Includes 2)</td>
</tr>
<tr>
<td>38A72</td>
<td>Lead Locking Screw (Included in 71A53)</td>
</tr>
<tr>
<td>40A44</td>
<td>Lead Spring (Included in 71A53)</td>
</tr>
<tr>
<td>Part No.</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>44A24</td>
<td>Header Valve (5 Included in 9046 and 9047)</td>
</tr>
<tr>
<td>53A52</td>
<td>Plate Holder (2 Used) (Included in 9046)</td>
</tr>
<tr>
<td>53A61</td>
<td>Lead Ball (Included in 71A53)</td>
</tr>
<tr>
<td>70A17</td>
<td>Warning Plate (Included in 9046)</td>
</tr>
<tr>
<td>71A53</td>
<td>Straight Manifold to Cylinder Lead Assembly for Hydrogen (10 Used) (Includes 38A72, 40A44, 53A61 and 2) 38Z29)</td>
</tr>
<tr>
<td>72A53</td>
<td>U-Bolt (Includes (2) N-H-40)</td>
</tr>
<tr>
<td>72A54</td>
<td>U-Bolt Liner</td>
</tr>
<tr>
<td>73A20</td>
<td>U-Bolt (Included in 4306)</td>
</tr>
<tr>
<td>16R73</td>
<td>RV-26 Relief Valve (One used on M-12 and two included in 07X78) (See Relief Valve Illustration for Parts)</td>
</tr>
<tr>
<td>10Y08</td>
<td>Left-Hand Regulator to Service Lead (M-12 only)</td>
</tr>
<tr>
<td>10Y09</td>
<td>Right-Hand Regulator to Service Lead (M-12 only)</td>
</tr>
<tr>
<td>10Y12</td>
<td>Left-Hand Regulator to Service Lead (M-12-3 only)</td>
</tr>
<tr>
<td>10Y19</td>
<td>Right-Hand Regulator to Service Lead (M-12-3 only)</td>
</tr>
<tr>
<td>50Y46</td>
<td>Manifold Porex Filter Adaptor Assembly (Includes Part Nos. 28285, 31265, 71Z274, 77279, 77280 and 80253) (2 Used) (Included in 9049)</td>
</tr>
<tr>
<td>28285</td>
<td>Filter Spring (Included in 50Y46)</td>
</tr>
<tr>
<td>31265</td>
<td>Adaptor Cap (Included in 50Y46)</td>
</tr>
<tr>
<td>38Z29</td>
<td>Snap Ring (2 Used) (Included in 71A53)</td>
</tr>
<tr>
<td>48Z25</td>
<td>Bracket (4 Used) (Supplied)</td>
</tr>
<tr>
<td>71Z274</td>
<td>Porex Filter (Included in 50Y46)</td>
</tr>
<tr>
<td>77279</td>
<td>Filter Adaptor Gasket (Included in 50Y46)</td>
</tr>
<tr>
<td>77280</td>
<td>Filter Adaptor Body Spacer (Included in 50Y46)</td>
</tr>
<tr>
<td>80Z53</td>
<td>Filter Adaptor Body (Included in 50Y46)</td>
</tr>
</tbody>
</table>

**ACCESSORIES**

- 9058  5-Cylinder Right-Hand Extension (Included in 21X85)
- 9241  5-Cylinder Right-Hand Extension Assembly (Included in 21X36)
- 20X76 Manifold Regulator Filter Adaptor
- 21X35 5-Cylinder Right-Hand Extension Assembly (Includes (5) 71A53 and 9058)
- 21X36 5-Cylinder Right-Hand Extension Assembly (Includes (5) 71A53 and 9241)
- 7Z218 Manifold Lead Handle

**HARDWARE**

All the items which follow are either:

a. Standard hardware (screws, bolts, nuts, washers, pipe fittings, etc.) made by many manufacturers, which can be purchased locally by the description given, or

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<th>Symbol</th>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-PP-B-5</td>
<td>3/4-in. Brass Plug (M-12-3 only)</td>
<td>S-D-PK-U-15/</td>
<td>No. 6 x 3/8-in. Parker-Kalon Type &quot;U&quot; Hardened Metallic Drive Screw (4 Used) (Included in 9046)</td>
</tr>
<tr>
<td>M-N-P-7</td>
<td>1-1/4-in. x 6-1/2-in. Lg. Nipple Wrought Steel</td>
<td>S-H-35</td>
<td>5/16-in.-18 x 1-in. U.S.S. Hex Head Cap Screw (16 Used)</td>
</tr>
<tr>
<td>(6-1/2-in.)</td>
<td>3/4-in. Close Nipple Standard Wrought Steel (Also (2) included in 07X78)</td>
<td>S-H-65</td>
<td>3/8-in.-16 x 1-in. U.S.S. Hex Head Cap Screw (2 Used)</td>
</tr>
<tr>
<td>M-N-P-C-5</td>
<td>1-1/4-in. x 1-1/4-in. x 3/4-in. Extra Heavy Malleable Iron Tee</td>
<td>SS-S-C-48</td>
<td>1/4-in.-20 x 1/2-in. Square Head Cup Point Setscrew (2 Used) (Included in 9046)</td>
</tr>
<tr>
<td>M-TE-R-X-26</td>
<td>3/8-in.-16 U.S.S. Hex Steel Nut (2 Used)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-H-3</td>
<td>15/16-in.-18 U.S.S. Hex Head Steel Cap Screw (16 Used)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N-H-40</td>
<td>15/16-in.-18 U.S.S. Hex Head Steel Cap Screw (16 Used)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FIG. 6 - H-12-3W HYDRAULIC BACK-PRESSURE VALVE PART NO. 06P67
FIG. 7 - V-4 MANIFOLD VALVE PART NO. 4210

* NOTE: Earlier models of the V-4 Valve have a tinned copper gasket. The tinned copper gasket must be replaced with a like gasket, part number 4219.

** NOTE: On old style valves having a spoked packing screw, it is desirable to replace the spoked packing screw with the new hexagonal screw. This should be done so that a wrench can be used to tighten the screw sufficiently to compress the new packing material.

FIG. 8 - RV-26 RELIEF VALVE PART NO. 16R73
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INDUSTRIAL GASES
LINDE Oxygen, Nitrogen, Argon, Hydrogen
PREST-O-LITE Acetylene
LINDE Rare Gases:
Argon, Neon, Helium, Krypton, Xenon

CALCIUM CARBIDE
UNION Carbide
CARBIC Processed Carbide

OXY-ACETYLENE EQUIPMENT
OXWELD Apparatus for:
Welding, Cutting, Descaling, Hard-Facing,
Heating, Forming, Flame-Hardening,
Flame-Softening, Flame-Strengthening,
Flame-Priming, Flame-Descaling, and
Flame-Gouging
Low Temperature Stress Relieving
Acetylene Generators
Manifolds, Regulators and Valves
Welding Rods and Supplies

PREST-O-WELD Welding and Cutting Apparatus
PUROX Welding and Cutting Apparatus
PREST-O-LITE Air-Acetylene Apparatus and Small Tanks
CARBIC Acetylene Flood Lights
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LINDE Plate-Edge Preparation Equipment
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LINDE Argon Metal Arc Welding Equipment

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Synthetic Calcium- and Cadmium Tungstates
Fine Alumina Abrasive

ORGANOSILICONES
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Polyisoxazane Polymers and Resins

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation

IN CANADA
DOMINION OXYGEN COMPANY, LIMITED, TORONTO

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