INSTRUCTIONS for OXWELD TRADE MARK

M-20
TWO-REGULATOR OXYGEN MANIFOLD
for
INDUSTRIAL AND HOSPITAL USE

IMPORTANT

This booklet contains instructions for installing and operating the OXWELD M-20 Oxygen Manifold. Read it and keep it for future use.

Use no oil or grease on this manifold. Oil and grease are easily ignited and burn violently in the presence of oxygen under pressure.


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

Purpose

The OXWELD M-20 Two-Regulator Oxygen Manifold is designed to furnish an uninterrupted supply of LINDE oxygen to distribution piping systems in either industrial or hospital installations.

The M-20 has two independent sets of controls, to permit either alternate or simultaneous operation of the two cylinder banks or "headers," or continued operation of one bank even if the other is cut out for repairs or maintenance.

In alternate operation, service can be maintained without interruption, since the reserve bank regulator can be set to cut in automatically when the operating bank can no longer supply oxygen at the desired pressure.

Simultaneous operation of both banks will provide higher oxygen flow rates than those obtainable from a single bank. However, service will be completely interrupted while the empty cylinders are replaced.

Description

A complete M-20 Manifold consists of:

a. A manifold control assembly, consisting of two independent sets of controls, one for each header. This assembly includes two regulators (less gauges), two header valves, two outlet valves, and four pressure gauges (two for header pressure; two for delivery pressure). These components and their interconnecting piping are mounted on a back plate which has slotted holes to fit over four mounting bolts.

The entire control assembly is fitted with an enameled steel cover on which only the gauges, regulator pressure-adjusting screws, and valve handwheels are visible. An inlet connection on each side of the control provides for the connection of one cylinder lead and also for the addition of extensions to increase the manifold's capacity as desired.

b. Two "headers," each consisting of a number of threaded extensions determined by the number of cylinders to be manifolded, and the type of layout desired. Each extension accommodates one cylinder lead; the last extension will also take another lead parallel to the mounting surface, but this requires careful rebending of the manifold-to-cylinder lead. If not used, the last connection is sealed with a plug assembly (provided).

Straight extensions are employed to build up rows of cylinders along the mounting surface; a curved extension is used to extend a header around a corner, as shown in Fig. 1. Where wall space is not available, a floor-type installation on an "A" frame of the type shown in Fig. 2 can be used. Note the "tee" extension used to establish a second row of cylinders parallel to the first.

c. Manifold to cylinder leads (one for each cylinder).

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**NOTE:**

**Installing the Oxygen Piping Distribution System**

This booklet does not include instructions for installing the oxygen piping distribution system. The contractor should be thoroughly familiar with NFPA Standards Nos. 51 and 585 and also with any applicable local regulatory codes. He should be qualified and experienced in installing pipelines for oxygen service.

Note that all piping or tubing and all components of the piping system, including all fittings, valves, alarm systems etc., must be scrupulously cleaned before assembling. It is strongly recommended that all such items be purchased "modified with special packing and degreased for oxygen service." They should be delivered on the job in sealed packages, ready for installation. Just prior to installation, all components must be carefully inspected for cleanliness by the contractor. Care must be taken to prevent contamination before and during installation.

Linde makes available two booklets containing detailed information on the installation of oxygen piping systems. They may be obtained without charge from any Linde sales office.

F-5110 -- for industrial piping systems. "Instructions for Design and Installation of Oxygen Distribution Piping Systems."


It should be noted that some states require hospital construction and alterations, including oxygen piping, to be supervised by a registered architect, engineer, or other qualified person.

The term OXWELD is a registered trade mark of Union Carbide Corporation.
I. Installation Procedure

NOTE: The procedure described here is for the simple wall mounting shown in Fig. 1. If sufficient wall space is not available, the floor-type installation shown in Fig. 2 can be used.

A. Mount the control assembly on the wall.
   1. Mark the position of the mounting bolts on the wall, as shown in Fig. 1. Work from floor level to establish the position of one bolt, and align the others with it, using a level.
   2. Drill holes of appropriate size in the wall for the mounting bolts. In concrete or brick walls, use 3/8-in. bolts and expansion shields. In hollow tile walls, use 3/8-in. bolts extended through the wall, each secured with a nut which bears against a steel plate on the far side of the wall. A Spacer (Part No. 82275) is slipped onto each bolt before it is inserted in the wall.
   3. Take up the slack in the bolts until a bolt length only slightly greater than the thickness of the manifold back plate remains between the spacers and the bolt heads.
   4. Carefully lift the control assembly into the position at which the enlarged portion of each of the slotted holes in the control back plate can pass cleanly over the bolt heads. Allow the control assembly to slide gently down into place so that the manifold control back plate is "sandwiched" between the bolt heads and the spacers. The mounting bolts should now be in the narrow part of the mounting slots, supporting the entire weight of the control assembly.
   5. Secure the control assembly firmly to the wall by inserting a wrench (supplied) through the slots in the sides of the control assembly cover and tightening each bolt.

B. Connect the manifold outlet block to the distribution piping system. A globe-type pipeline shutoff valve must be installed in the piping system at the manifold outlet. See Fig. 3. The relief valve assembly mounted in the manifold control must be fitted with an outlet or vent pipe which runs to a point outside the building. The relief valve assembly has an outlet near its base for threaded 1/4-in. pipe.
   The cover must be removed from the manifold control, as described in Sec. III-A-1 on page 9, to permit attachment of the vent pipe to the relief valve assembly. If the manifold is to be placed in service soon after installation, the cover may be left off to permit leak testing of the manifold connections (see note at bottom of this page).
   Keep the vent pipe close to the manifold back plate, and clear of the other components in the control assembly. The slot in the top of the control assembly cover which provides clearance for the manifold outlet pipe also furnishes a convenient exit for the relief valve vent pipe.

C. Mount the required extensions and manifold-to-cylinder leads.
   1. Insert the nippled end of the first wall extension in each header as far as it will go into the manifold inlet connection on the side of the control assembly. Tighten the connection nuts with a wrench. Mark the location of the extension mounting holes, and then disconnect the extensions.
   2. Drill mounting holes in the wall for the extension mounting bolts.
   3. Reassemble the extensions to the manifold control, and bolt them firmly to the wall.
   4. Follow the same procedure with all subsequent extensions; never connect another extension until the previous one has been firmly bolted to the wall. Seal the last extension in each header with the plug provided.
   5. Attach the manifold-to-cylinder leads to the connections on each header, and tighten the connection nuts with a wrench.

CAUTION: Do not use excessive force in tightening extension or cylinder lead connection nuts with a wrench. The connections have metal-to-metal seats; too much torque may distort their threads or seats.

NOTE: For hospital service, a line pressure alarm device (not included with the M-20 Manifold) should be connected into the system — Fig. 3 — to indicate line pressure too high or too low for satisfactory oxygen therapy service. See NFPA No. 565, Chapter 3. In some cities there are also local codes applying to alarms in specific hospital areas. All alarms must be specially cleaned for oxygen service — see Introduction, page 2.

LEAK TESTING of all manifold connections is carried out after the manifold-to-cylinder leads have been attached to the cylinders (see Sec. II-A-7). In addition, all cylinder connections in a bank are tested after each change of cylinders (see Secs. II-B-6 and II-C-10). A detailed description of leak testing procedure is included in the Maintenance Instructions (Sec. III-A, B).
NOTE "A" - 4 ft. 3½ in. for LINDE "K" cylinder. For other types of cylinders, this dimension is determined by subtracting: 1½ in. from the distance between the floor and the centerline of the cylinder valve outlet.

FIG. 1 - Wall Mounting of M-20 Two-Regulator Oxygen Manifold
NOTE 1: Linde will supply control panel, tee connections, cylinder extensions, leads and end plugs. The customer is to provide a suitable framework and hardware for mounting the control panel and cylinder extensions.

NOTE 2: 4 ft. 3-1/4 in. for "Linde" "K" Cylinder. For other types of cylinders, height of lower set of extension mounting bolts above floor is determined by subtracting 1-1/8-in. from the distance between the floor and the centerline of the cylinder valve outlet.

NOTE 3: 4 ft. 2-3/8 in. for "Linde" "K" Cylinder. For other types of cylinders, height of "A" frame is determined by subtracting 2 in. from the distance between the floor and the centerline of the cylinder valve outlet.

FIG. 2 – Alternate Floor-Type Mounting of M-20 Two-Regulator Oxygen Manifold "A" Frame
II. Operating Instructions for Alternate Operation of the Two-Manifold Banks (Refer to Figs. 3, 4)

Each bank of the manifold will discharge only through the regulator on its side of the manifold. These manifolds are designed primarily for alternate operation of the two banks, in which gas is supplied to the line first from one bank and then from the other, without any interruption of service during the changeover. This is accomplished by setting the reserve bank regulator to cut in automatically when the operating bank can no longer supply gas at the desired pressure.

The procedure described here is for alternate operation. The banks can be operated simultaneously to provide higher gas flow rates than those obtainable from a single bank, but the gas supply will be cut off completely while the empty cylinders are replaced.

A. Initial Starting

1. Before attaching the manifold-to-cylinder leads to the cylinders, open or "crack" each cylinder valve slightly for an instant to blow out any dirt which may be lodged in the cylinder valve outlet; then close the valve. Place the cylinders in position with their valve outlets facing outward.

2. Connect the cylinders to the extensions by means of the cylinder-to-manifold leads. Tighten the connection nuts at both ends of the leads with a wrench.

3. Release the pressure-adjusting screws of both regulators by turning them counter-clockwise until they turn freely.

4. Fully open both header valves.

5. Close both delivery valves.

6. Slowly open the valves of all cylinders in both banks of the manifold, starting with the cylinder valves nearest the regulators.

7. Test both banks of the manifold for leaks, as described in Maintenance Instructions, Secs. III-A and B. After you are sure that all connections are leak-tight, replace the control assembly cover, and make sure that the delivery valves in both banks are closed.

8. Slowly turn the pressure-adjusting screw of the regulator for one of the banks clockwise until its delivery-pressure gauge indicates a pressure of 5 lb. per sq. in. above the desired delivery pressure. This will be the operating bank. Since the regulator is adjusted with the delivery valve closed there is no oxygen flow through the regulator. When operating flow conditions begin, there will be a pressure drop to compensate for the 5 lb. per sq. in. oversetting of the regulator.

9. Slowly turn the pressure-adjusting screw on the regulator of the other bank clockwise until the delivery-pressure gauge indicates a pressure of 2 lb. per sq. in. below the desired delivery pressure. This will be the reserve bank.

10. Make sure all outlet valves on the distribution piping system are closed. Now open the delivery valve for the operating bank, and allow the service piping system to fill; then open the delivery valve for the reserve bank. (When the valve is opened, the higher pressure from the operating bank regulator keeps the regulating valve in the reserve bank regulator closed.)

The manifold is now ready to deliver an uninterrupted supply of oxygen. The operating bank will feed oxygen to the piping system until the pressure in its cylinders becomes insufficient to supply the piping system at the required pressure. The reserve bank will then cut in automatically.

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**Diagram:**

- **TO DISTRIBUTION PIPING SYSTEM**
- **LINE PRESSURE ALARM DEVICE**
- **FOR HOSPITAL INSTALLATIONS ONLY**
- **(NOT SUPPLIED WITH M-20, MUST BE SPECIALLY CLEANED FOR OXY. SERVICE)**
- **PIVOTAL SHUTOFF VALVE - GLOBE TYPE**
- **REGULATOR**
- **DELIVERY VALVES**
- **REEL VALVES**
- **HEADER VALVE**
- **CHECK VALVE**
- **CYLINDERS**
- **SUPPORTED BY CUSTOMER. SHOULD BE PURCHASED SPECIALLY CLEANED FOR OXYGEN SERVICE. SEE INTRODUCTION PAGE 2.**

**FIG. 3 - Schematic Diagram of M-20 Two-Regulator Oxygen Manifold**
B. Procedure After the Reserve Bank Has Cut In
(For Hospital and Industrial Service)

The procedure described in this section is strongly recommended for use in all hospitals.

1. Close the valves of all cylinders in the empty bank.

2. Turn the pressure-adjusting screw on the regulator for the empty bank counter-clockwise until it turns freely.

3. Disconnect and remove all cylinders in the empty bank.

4. Connect full cylinders to the cylinder-to-manifold leads, as described in Secs. II-A-1 and 2.

5. Slowly open the valves on the full cylinders, starting with the valves nearest the regulators.

6. Test all cylinder connections in the newly-connected bank for leaks, using OXWELD No. 23 Leak Test Solution or a solution of Ivory soap and water.

7. Reduce the delivery pressure of the operating bank by turning the pressure-adjusting screw of the regulator for the operating bank counter-clockwise one-eighth of a turn.

8. Adjust the regulator for the bank of newly-connected cylinders for reserve service by turning its pressure-adjusting screw clockwise until the delivery pressure gauge indicates a pressure 5 psi below the desired delivery pressure.

9. Readjust the operating bank by slowly turning the pressure-adjusting screw of the regulator for the operating bank clockwise until the delivery-pressure gauge indicates the normal delivery pressure.

FIG. 4 – Operating Controls of M-20 Two-Regulator Oxygen Manifold
C. Alternate Procedure After the Reserve Bank Has Cut In
(For Industrial Service Only)

1. Close the delivery valve on the reserve (full) bank. Oxygen will be supplied by the "empty" bank for a brief period of time.

2. Turn the pressure-adjusting screw of the regulator for the reserve (full) bank clockwise to increase the delivery pressure to 5 lb. per sq. in. above the desired delivery pressure.

3. Reopen the delivery valve on the full bank. The reserve bank is not the operating bank.

4. Close the delivery valve on the empty bank.

5. Close the valves of all the cylinders in the empty bank.

6. Remove the cylinders from the empty bank.

7. When the delivery pressure gauge of the regulator for the empty bank indicates little or no pressure, turn the pressure-adjusting screw counter-clockwise until it turns freely. (By the time all the empty cylinders are removed, the delivery pressure gauge should indicate very little pressure. If it has not dropped at least 15 lb. per sq. in., wait awhile.)

8. Connect full cylinders to the cylinder-to-manifold leads, as described in Secs. II-A-1 and 2.

9. Slowly open the valves of all these cylinders, starting with the valves on the cylinders nearest the regulator.

10. Test all cylinder connections in the newly-connected bank for leaks, using OXWELD No. 23 Leak Test Solution, or a solution of Ivory soap and water.

11. Slowly turn the pressure-adjusting screw of the regulator for this bank clockwise until its delivery pressure gauge indicates a pressure about two psi less than the desired delivery pressure. This is now the reserve bank.

12. Fully open the delivery valve for the new reserve bank. (After the delivery valve is opened, the reading on both delivery pressure gauges will be the same.)

D. Shutting Down the Manifold

1. Close the header valves. Leave the delivery valves open.

2. Leave the regulator pressure-adjusting screws in their normal operating positions. If the pressure-adjusting screws are released for a long period of time while the pressure remains in the chambers of the regulators, the regulator valve seats may become distorted.

3. Tag the operating bank so that it can be identified as the bank which is supplying oxygen, when service is resumed.

4. For long shutdowns (those over one day) close the cylinder valves.

E. Starting the Manifold Up Again

Before proceeding to place the manifold in service, make sure that all station outlet valves on the distribution piping system are closed, and that no one will attempt to supply oxygen-consuming equipment from them until normal operating conditions are re-established.

1. Be sure that the manifold delivery valves are open.

2. Slowly open the header valves to the full position.

3. Slowly open the valves on all the cylinders, starting with the ones nearest the manifold regulators.

4. When the piping system has been filled to normal pressure, give notice that the system is in operating condition.

5. After the use of oxygen has begun, check the reading on the delivery pressure gauge to make sure the operating bank regulator is adjusted to supply the piping system at the desired pressure. Disregard any small increase in delivery pressure, but if the delivery pressure has decreased, slowly turn the operating bank regulator pressure-adjusting screw clockwise until the gauge indicates the desired delivery pressure.

DO NOT TAMPER WITH PRESSURE GAUGES.
III. Maintenance Instructions

A. Checking the Manifold for Leaks

1. Remove the control assembly cover after withdrawing the four side screws, the four valve handwheels, and either one or two of the regulator pressure-adjusting screws.

2. Replace the valve handwheels and regulator pressure-adjusting screw(s).

3. Make sure the delivery valve is closed for the manifold bank which is to be tested.

4. Turn the pressure-adjusting screw of the regulator for this same bank clockwise.

5. With all the cylinder valves in this bank open, apply OXWELD No. 23 Leak Test Solution or Ivory soap and water solution to all connections on the cylinders, leads, extensions and to all connections in the manifold. Examine the connections closely for leaks.

7. If a leaking connection is found, release all pressure from the bank. Then tighten the connection without using excessive force. Retest. If the connection still leaks, disconnect the parts, and wipe the metal seating surfaces of each half of the connection with a clean, grease-free, lint-free rag. If either of the seating surfaces is scored, replace the damaged part. Make up the connection again and retest as described above.

B. Header Valves (Refer to Fig. 8)

1. Test both header valves for leakage by applying OXWELD No. 23 Leak Test Solution or a solution of Ivory soap and water to the threaded connections between the valve body and the stuffing box, between the stuffing box and the packing screw, and between the packing screw and the valve stem. Bubbling of the solution indicates leakage.

2. To disassemble a header valve, first back off the valve stem slightly by turning the handwheel counter-clockwise. Then remove the handwheel and unscrew the entire valve stem unit by unscrewing the stuffing box from the valve body.

3. Examine the gasket for defects, and replace it if necessary.

4. Now unscrew the packing screw from the stuffing box. The valve stem can now also be unscrewed from the stuffing box, thereby removing the packing. The packing will either consist of four pieces (packing set) or two washers and packing. Examine the packing (and washers, if used) and replace if necessary.

5. To reassemble a header valve, first seat the gasket in the valve body. Then screw in the stuffing box and tighten it in place.

6. Slip the packing onto the handwheel end of the valve stem. (If the packing comes with two washers, place the packing between them.) Now screw the valve stem into the stuffing box.

7. Slipping the packing screw onto the valve stem, screw it into the stuffing box, and tighten it in place.

8. Retest the header valves for leakage, as previously described in Step #1.

C. Removal of a Regulator for Repair

The procedure described here permits continued operation of one manifold bank while the regulator for the other bank is removed for repair.

1. Close the header and delivery valves only on the bank with the regulator to be removed, and remove the regulator pressure-adjusting screw for this regulator. Do not disturb the controls on the other bank.

2. Remove all four valve handwheels without changing the position of the valves. This is done by firmly holding the handwheel in position and backing off the locking nut with a wrench.

3. Withdraw the four screws which fasten the control cover to its back plate; these screws are located on the sides of the cover, near the wall.

4. Carefully remove the control cover without disturbing the setting of the regulator pressure-adjusting screw in the operating bank.

5. Replace the valve handwheels in the operating bank.

6. Replace the pressure-adjusting screw on the regulator to be repaired and turn it in clockwise as far as it will go.

7. "Break" the connection between the regulator and the tubing assembly from the delivery valve by backing off the connection nut and withdrawing the tubing connection.

8. "Break" the remaining connections on the regulator to the header valve and to the tubing.

DO NOT TAMPER WITH PRESSURE GAUGES.
assemblies from the pressure gauge blocks and relief valve. The regulator can now be easily removed.

D. To Replace a Regulator After It Has Been Repaired
1. Position the repaired regulator (without pressure-adjusting screw) so that the connections "broken" in Secs. III-C-7 and 8 can be rejoined. Tighten the connection nuts with a wrench.
2. Remove the valve handwheels on the operating bank without changing the valve positions.
3. Replace the control assembly cover by carefully slipping it over the regulator pressure-adjusting screw on the operating bank. Secure the cover in place with the four screws previously removed.
4. Replace the four valve handwheels without changing the position of the valves.
5. Replace the pressure-adjusting screw on the repaired regulator.
6. Open the header valve in the bank which has the repaired regulator, and make certain the delivery valve in this bank is closed.
7. Slowly turn the pressure-adjusting screw on the repaired regulator clockwise until its delivery pressure gauge indicates a pressure of 2 lb. per sq. in. below the desired delivery pressure, and open the delivery valve in this bank.

E. Safety Relief Valve (See Fig. 6)
1. Unscrew relief valve cap (31Z89) and remove "O" ring (85W81) from relief valve body.
2. Unscrew the smaller caps (31Z73) from bodies (80Z83), which are then unscrewed from relief valve body.
3. Remove seats (33Y56) and valve springs (29Z24 for 75-lb. valve, 29Z25 for 145-lb. valve) from bodies (80Z83).
4. Lift nozzles (32Z65) out of relief valve body with a small bent wire, pin, or paper clip.
5. Clean all parts, inspect them for damage, and make replacements where necessary.
6. Replace nozzles (32Z65) in relief valve body.
7. Reassemble seats and springs into bodies (80Z83) and screw on caps (31Z73). Screw the assemblies into relief valve body.
8. Tighten caps (31Z73) firmly but not excessively with a 7/32-in. Allen wrench.
9. Slip "O" ring on relief valve body and screw on relief valve cap (31Z89).

IV. General Precautions
1. NEVER, NEVER use oxygen for compressed air, or as a source of pressure. Oxygen should NEVER be used in pneumatic tools, in oil preheating burners, to start internal combustion engines, to blow out pipe lines, to "dust" clothing or work, as a substitute for air in ventilation, or for head pressure in a tank of any kind.
2. Always call oxygen by its proper name — "oxygen." Oxygen should never be called "air" and should never be confused with compressed air.
3. Never lubricate any part of the manifold. Oil and grease are easily ignited and burn violently in the presence of oxygen under pressure.
4. Do not attempt to operate an oxygen manifold that is in need of repair. For repairs and replacements other than those mentioned in the M-20 Instruction Booklet, send the apparatus to the nearest Linde repair station or to your Linde Distributor.
6. Do not tamper with high pressure gauges.
**FIG. 5 - M-20 Two-Regulator Oxygen Manifold Control Assembly**

*For packing use 1/16 in. John Crane Chemfloc Packing 2½-in. long (Part No. 86050006)*

**NOTE:** SILVER SOLDER ALL SOLDER JOINTS.

| Part No. 25X12 (145 lb. Relief Valve) | Part No. 25X24 (75 lb. Relief Valve) |
Replace Parts List

FOR "OXWELD" M-20 TWO-REGULATOR OXYGEN MANIFOLD (FIG. 5)

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<thead>
<tr>
<th>Control Assembly Part No.</th>
<th>Relief Valve</th>
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<td>25X12</td>
<td>145 lb.</td>
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<tr>
<td>25X24</td>
<td>75 lb.</td>
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### Description

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<th>Part No.</th>
<th>Description</th>
<th>Part No.</th>
<th>Description</th>
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<tr>
<td>04X74</td>
<td>R-64 MNS Regulator for Control Assembly 25X24 (2 used) (see page 14)</td>
<td>50Z783</td>
<td>Gauge (200 lb.) (25X12 only, 2 used)</td>
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<td>04X75</td>
<td>R-65 MNS Regulator for Control Assembly 25X12 (2 used) (see page 14)</td>
<td>50Z789</td>
<td>Gauge (4000 lb.) (2 used)</td>
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<td>Inlet Valve Assembly (2 used) (see Fig. 8)</td>
<td>05Z90</td>
<td>Directional Plate</td>
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<td>Includes: 4215 Packing Screw</td>
<td>24Z87</td>
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<td>637514 Packing Set</td>
<td>52Z77</td>
<td>Stuffing Box</td>
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<td>48263 Valve Stem Assembly</td>
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<td>Stuffing Box Gasket</td>
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<td>24287 Handwheel (2 used)</td>
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<td>25X01 Inlet Connection Assembly (2 used) (See Fig. 7)</td>
<td>71Z51</td>
<td>No. 85 Wrench</td>
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<td>Includes: 11Z25 Connection (R.H.)</td>
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<td>Spacer (4 used)</td>
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<td>8Z231 Connection Body (R.H.)</td>
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<td>11Y01 Dust Plug, Chain and Ring Assembly (2 used)</td>
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<td>Includes: 32A28 Dust Plug Nipple</td>
<td>6331-1122 5/16-in. x 24 Elastic Stop Nut Cat. No. 42E054 (12 used)</td>
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<td>45A25 Dust Plug Washer</td>
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<td>05Y06 Dust Plug Chain</td>
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<td>37Z72 Dust Plug Nut (R.H.)</td>
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<td>93Z04 Dust Plug Chan Ring</td>
<td>6130-1087 1/4-in.-20 x 1/2-in. lg. Round-Head Steel Machine Screw (4 used)</td>
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<td>6102-0847 #6 x 3/8-in. Parker-Kalon Type &quot;U&quot; Drive Screw</td>
<td>6430-0075 1/4-in. S.A.E. Plain Steel Washer (4 used)</td>
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<td>60Y03 Outl Block Assembly</td>
<td>6430-0110 5/16-in. S.A.E. Plain Steel Washer (16 used)</td>
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<td>65W77 Globe Valve (2 used)</td>
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<td>19Z36 &quot;C&quot; Size Connection (2 used)</td>
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<td>8Z37 Outl Block</td>
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<td>6710-0146 3/8-in. x 2-in. lg. Brass Pipe Nipple (2 used)</td>
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<td>60Y05 } Outl Tube Assemblies</td>
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<td>3380 &quot;B&quot; Size Oxygen Hose Connection Nut</td>
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<td>33A22 &quot;C&quot; Size Oxygen Hose Connection Nut</td>
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<td>03Z53 &quot;B&quot; Size Tube Connection Nipple</td>
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<td>60Y09 } Low-Pressure Gauge Tube Assemblies</td>
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<td>60Y10 } Block Assembly (4 used)</td>
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<tr>
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<td>Includes:</td>
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<tr>
<td></td>
<td>6819-0200 Inverted Male Connector (Brass) Weatherhead #200 x 4</td>
<td></td>
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<tr>
<td></td>
<td>502Z70 Gauge (100 lb.) (25X24 only, 2 used)</td>
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</table>

### PARTS FOR RELIEF VALVE ASSEMBLY (See Fig. 6)

| 85W81 | "O" Ring |
| 33Y56 | Relief Valve Seat (2 used) |
| 60Y21 | Tube Assembly |
| 60Y22 | Tube Assembly |
| 29Z24 | Valve Spring - 75 lb. (25X24 only, 2 used) |
| 29Z25 | Valve Spring - 145 lb. (25X12 only, 2 used) |
| 31Z73 | Cap (2 used) |
| 31Z95 | Relief Valve Cap |
| 32Z65 | Nozzle (2 used) |
| 83Z83 | Body (2 used) |

### HARDWARE

| 6331-1122 | 5/16-in.-x 24 Elastic Stop Nut Cat. No. 42E054 (12 used) |
| 6134-1168 | 5/16-in.-24 x 3/4-in. lg. Hex Head Steel Cap Screw (16 used) |
| 6134-1170 | 5/16-in.-24 x 7/8-in. lg. Hex Head Steel Cap Screw (2 used) |
| 6134-1173 | 5/16-in.-24 x 2-1/4-in. lg. Hex Head Steel Cap Screw (4 used) |
| 6130-1087 | 1/4-in.-20 x 1/2-in. lg. Round-Head Steel Machine Screw (4 used) |
| 6430-0075 | 1/4-in. S.A.E. Plain Steel Washer (4 used) |
| 6430-0110 | 5/16-in. S.A.E. Plain Steel Washer (16 used) |

### HEADER EXTENSIONS

| 25X03 | MX-1 Straight One-Cylinder Extension |
| 25X05 | MX-3 Curved (90-deg.) One-Cylinder Extension |
| 25X22 | MX-6 Tee Extension |

### MANIFOLD-TO-CYLINDER LEADS

| 25X09 | For U.S. Oxygen Cylinders (.903 in.-14 R.H. connection threads) |
| 25X42 | For LINDE Canadian Oxygen Cylinders (.850 in.-14 R.H. connection threads) |
Figure 6 - Relief Valve Assembly Parts for M-20 Two Regulator Oxygen Manifold - Part No. 21Y16 (75 lb.), 21Y17 (145 lb.).

Figure 7 - Inlet Connection Assembly - Part No. 25X01

Figure 8 - Inlet Valve Assembly - Part No. 21X59

Figure at left illustrates valve as supplied on M-20 manifolds since 1969. For valves equipped with stem having a ball seat, stem assembly 33Y84 is available. (Stem 48263 and seat 5278472 cannot be used in those valves, however, packing set 637514 may be used with stem 33Y84.) Diaphragm-type valves used on M-20 manifolds built in the 1950's can be modernized by installing stem 33Y84, packing 637514, gasket 94206, stuffing box 52277, and screw 4215.
Maintenance Instructions for R-64 MNS and R-65 MNS Oxygen Regulators (Refer to Fig. 9)

These are two-stage regulators provided with two independent diaphragms and valve units. The cylinder pressure is reduced in the first stage to an intermediate pressure, which is further reduced in the adjustable second stage to the desired delivery pressure.

For all repairs and replacements other than those mentioned below, send the apparatus to the nearest Linde repair station or Linde Distributor. The specific repair information shown on the drawing is provided for experienced and qualified persons engaged in the repair of this apparatus. Improperly repaired apparatus may be hazardous. Economical repair service is offered through Linde Region Offices or through the nearest Linde Distributor.

NOTE: Removal of the regulator to be repaired from the manifold and its subsequent reconnection after repairs is completed is described in Secs. III-C and D on page 9 and 10.

A. To Replace the Second-Stage Seat

1. Hold the regulator in a vise. (The flat pads on the body are provided for that purpose.)

2. Remove the pressure-adjusting screw (35Y18) from cap assembly (31Y03).

3. Remove cap assembly (31Y03). Diaphragm ring (53Z19) will be retained within it.

4. Remove spring washer (53Y01), spring (28Z10 for R-64, 28Z58 for R-65), and the diaphragm assembly, consisting of diaphragm (130Z78), diaphragm plate (30Z50), diaphragm screw (34Z52), and nut (37Z56).

5. Making sure that the header valve and all cylinder valves are closed in the header from which the regulator was removed, disconnect one cylinder lead from this header.

6. Connect the regulator to the open header connection, and tighten the regulator connection nut with a wrench.

7. Slowly open the valve on one full cylinder still connected to this header. Don't stand in front of the regulator while opening the valve.

8. Test the second-stage valve unit for leakage around the valve stem and the threads, using OXWELD No. 23 Leak Test Solution or a solution of water and Ivory soap. Close the cylinder valve opened in A-7. Loosen the regulator inlet connection nut just enough to permit the pressure in the regulator to escape, and disconnect the regulator from the header. Then proceed as follows:

(a) If no leakage was found, reassemble the regulator parts removed in A-1 to A-4, and reconnect the regulator in the control assembly.

(b) If leakage was detected, mount the regulator in a vise as described in A-1, and follow A-9 to A-12 below.

9. Using a socket 7/8-in. wrench, unscrew the valve unit, consisting of valve nozzle (32Z06) and the parts located within it.

10. Using a screwdriver in the slot provided, unscrew the seat (32Y48) from seat holder (33Z10).

11. Replace the valve seat with a new one. Wipe clean the seating surface and inside walls of the valve nozzle. Replace marred or damaged parts.

12. Reassemble in reverse order, and reconnect the regulator in the control assembly.

B. To Replace Second-Stage Diaphragm

1. Follow instructions in A-1 through A-4 above.

2. Unscrew nut (37Z36).

3. Lift off diaphragm plate (30Z56) and pull diaphragm (130Z78) off diaphragm screw (34Z92).

4. Wet both sides of the new diaphragm and reassemble, following instructions in B-2 and B-3 in reverse order. Tighten the nut until the diaphragm dishes (bows) about 1/8-in.

5. Place the assembled diaphragm unit in the regulator and push the edge of the diaphragm down so that it rests flat against the seating surface of the body at all points, and will not catch in the cap threads when the cap is screwed into position. This prevents buckling of the diaphragm, which would cause leakage and poor regulator operation.

6. Complete the reassembly of the regulator, following A-1 through A-4 in reverse order.

NOTE: The diaphragm ring (53Z19) retained in cap assembly (31Y03) seldom needs replacement. If replacement is necessary, be sure all three lugs are peened into the recess provided in the cap.

C. To Replace First-Stage Diaphragm

1. Hold the regulator in a vise as previously described.

2. Unscrew the cap (31Z06). Diaphragm ring (53Z20) will be retained within it.

3. Remove spring (28Z64 for R-64, 28Z67 for R-65).

4. Using a screwdriver in the slot provided, hold the diaphragm screw (34Z48) to keep it from turning, and unscrew the nut.

14
5. Remove the diaphragm plate (30Z23) and diaphragm (130Z77) from the screw.

6. Wet both sides of the diaphragm with clean water. Reassemble the diaphragm and the diaphragm plate on the diaphragm screw, pushing the edge of the diaphragm down so that it rests flat against the seating surface of the body at all points.

7. Replace the nut, the spring, and the regulator cap. **NOTE:** The diaphragm ring (53Z20) retained in the cap (31Z28) seldom needs replacement. When replacement is necessary, be sure that all three lugs are peened into the recess provided in the cap.

D. To Replace the First-Stage Seat

1. Proceed as in steps 1 through 5 in Section C.

2. Using a 13/16-in. socket wrench, unscrew the valve cage (35Z20).

3. Remove the sleeve (39Z34).

4. Hold the valve cage (35Z20) in a vise. Use one screwdriver to keep the diaphragm screw (34Z248) from turning and a second screwdriver to unscrew the valve stem (35Z12).

5. Remove the valve seat (32Z32) from the valve cage.

6. Wipe clean the inside of the cage and the seating surface of the stem. If either part is damaged, replace it with a new one.

7. Replace the valve seat with a new part, and reassemble the regulator, following steps D-2 through D-5 and C-1 through C-5 in reverse order.

E. To Replace the Inlet Filter

1. Remove the filter with a No. 1 "EZY-OUT," or a No. 6 wood screw about 2 in. long.

2. Place the new filter in the nipple, and press it into position against the shoulder with a 1/4-in. diameter metal rod.

F. To Test for Leaks

1. Connect the regulator to a header connection from which the manifold-to-cylinder lead has been removed, as described in A-5 to A-7 on page 14.

2. Turn the regulator pressure-adjusting screw **counter-clockwise** until it turns freely. Then place a film of OXWELD No. 23 Leak Test Solution or Ivory soap and water solution across the regulator outlet to test for valve leakage.

3. Blank off the regulator outlet. (Use a standard "B" size hose nipple, with the outlet plugged by soldering or welding, and a "B" size hose connection nut.) Turn the regulator pressure-adjusting screw **clockwise** as far as it will go, and test for leaks around the threads and vent holes of the regulator cap.

---

**Fig. 9**

- R-64 MNS Manifold Regulators – Part No. 04X74
- R-65 MNS Manifold Regulators – Part No. 04X75
Replacement Parts List
FOR
"OXWELD" R-64 MNS and R-65 MNS
MANIFOLD REGULATORS
(See Fig. 9)

Regulator

R-64 MNS (Part No. 04X74)--------- (Part No. 25X24)
R-65 MNS (Part No. 04X75)--------- (Part No. 25X12)

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<thead>
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<th>DESCRIPTION</th>
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<th>DESCRIPTION</th>
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<td>Ring, Inlet Connector nipple</td>
<td>30Z23</td>
<td>First-Stage Diaphragm Plate</td>
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<tr>
<td>18Y12</td>
<td>Adaptor Assembly</td>
<td>30Z56</td>
<td>Second-Stage Diaphragm Plate</td>
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<td>Includes: 18Z08 Body</td>
<td>31Z06</td>
<td>First-Stage Cap</td>
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<td>Includes: 19Z68 Connection</td>
<td>32Z06</td>
<td>Second-Stage Valve Nozzle</td>
</tr>
<tr>
<td></td>
<td>Includes: 31Y03 Second-Stage Cap Assembly</td>
<td>32Z32</td>
<td>First-Stage Valve Seat</td>
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<td>35Z06 Cap Bushing</td>
<td>33Z10</td>
<td>Second-Stage Valve Seat Holder</td>
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<td>35Y18 Pressure-Adjusting Screw</td>
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<td>53Y01 Second-Stage Pressure-Adjusting Spring Washer</td>
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<td>35Z42</td>
<td>First-Stage Valve Stem</td>
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<td>28Z16 Second-Stage Valve Spring</td>
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<td>28Z58 Second-Stage Pressure-Adjusting Spring (R-65)</td>
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<td>28Z64 First-Stage Pressure-Adjusting Spring (R-64)</td>
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ACCESSORY
78Z52 No. 54 Anti-Friction Compound (for use on Pressure-Adjusting Screw)

HARDWARE

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<tr>
<td>6819-0234</td>
<td>1/4-in. N.P.T. Male Connector (Brass) Weatherhead #234X4 (2 used)</td>
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LINDE DIVISION
GENERAL OFFICES: NEW YORK
OFFICES IN PRINCIPAL CITIES
In Canada
UNION CARBIDE CANADA LIMITED, TORONTO
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