OPERATION AND MAINTENANCE MANUAL
(Including parts list)

UNIMATIC* MANIFOLDS
for High Pressure Oxygen and Nitrous Oxide Gas Cylinders
High Pressure Bulk Oxygen—AR-3 Liquid Oxygen Cylinders

*Registered Trademark

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Madisonville, LA 70447
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Ohio Medical Products
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Ohio Unimatic Duplex Manifold 12 Cylinder Model for Gaseous Oxygen and Nitrous Oxide — Wall Mounted.

Ohio Unimatic Duplex Manifold 14 Cylinder Model for Gaseous Oxygen and Nitrous Oxide — Free Standing.
INSTRUCTIONS FOR SET-UP, OPERATION, MAINTENANCE AND REPAIR OF UNIMATIC MANIFOLDS

1 / Description

There are four basic types of Unimatic Manifolds: one each for use with—

- High-pressure nitrous oxide cylinders
- High-pressure oxygen cylinders
- AR-3 liquid oxygen cylinders
- High-pressure bulk oxygen storage equipment

The specifications for the various types are tabulated in the chart (Fig. 7).

The Unimatic Manifold is designed primarily as a wall-mounted unit. However, it is also available with stands for floor mounting.

The bank of cylinders connected to the manifold on one side of the control cabinet operates in service while those on the other side are held in reserve. The Unimatic Manifold will automatically switch to the reserve bank when the in service bank is depleted.

A "Switch Over" knob located in the front center of the control cabinet, is provided for placing the former reserve bank in service when the empty bank has been replenished. Green and red lights at the top front of the control cabinet provide a visual signal which indicates that the in service bank of cylinders is empty and the reserve bank has automatically gone into service. The green light is "on" when the manifold is supplying gas from the in service bank, whereas the green light will go "out" and the red light will come "on" when the manifold is supplying gas from the reserve bank of cylinders. These lights operate simultaneously with the "switchover" portion of the remotely located alarm panels which monitor the piping system.

2 / Installation and Operation

Refer to current NFPA (National Fire Protection Association) pamphlet No. 565, "Non-flammable Medical Gas Systems", as well as any applicable local and state regulation before installing the manifold.

WALL-MOUNTED MANIFOLD

To install the Unimatic Manifold on a wall, refer to the applicable roughing-in drawing which was supplied to the contractor and to Fig. 1 or 1A whichever applies.

NOTE: The necessary anchor bolts, washers, etc., must be provided by the person making the installation to suit existing conditions for attaching the control cabinet and brackets to the wall.

GENERAL INSTRUCTIONS (Refer to Fig. 1 or 1A)

The Unimatic Control Cabinet, # 12 or # 15, and Header Brackets, # 5 and # 6, are intended for direct mounting to the building wall except on four, six, eight and ten cylinder models where Cabinet Mounted Brackets, # 8 or # 9, are utilized in lieu of wall brackets. Before starting installation, select and procure a sufficient quantity of anchor bolts of a type suitable for use with the wall construction on which the unit is to be mounted. Anchor bolts should be 3/8" diameter and in no case less than 5/16" diameter.

The alarm system in the control cabinet utilizes a pressure switch which must be level at all times; therefore, care should be taken in mounting the cabinet to make certain that it is level. Care must also be exercised in mounting the Header Extensions, # 10 and # 11, to make certain that there are no external strains due to misalignment of the wall brackets.

MOUNTING THE CABINET

Remove the four plug buttons at the rear of the cabinet and lay out the 22-9/16" x 16" mounting hole spacings on the wall. The cabinet should be mounted so the inlet connections on
Fig. 1
Exploded View of Unimatic Manifold — Wall-Mounted Model

Fig. 1A
Exploded View of Unimatic Manifold — Wall-Mounted Model
either side are positioned 5'-0'' above the finished floor. Do not remove the sides of the cabinet since removal of the sides may affect the adjustment of the regulators within the cabinet.

MOUNTING THE HEADER EXTENSIONS

For Manifolds of Ten Cylinders or Less: Remove the two 1/4'' diameter cap screws immediately below the inlet connection on one side of the cabinet and mount Angle Bracket, #8 or #9 whichever is provided, with the two bolts.

Note the difference in Header Extensions #10 and #11 or #16 and #17. Header Extensions #11 and #17 must be used only at the extreme ends of the completed right and left bank headers. These extensions contain three check valves in the header cross. (All other header extensions have only two check valves in each cross.) Attach the header extensions to the cabinet inlet connections. Draw up the union nuts finger tight before attaching, finger tighten the header crosses to the angle brackets with the 3/8'' dia. x 1/2'' long Cap Screws, #1, and Lock Washers, #2, which are provided. Tighten the union nuts on each header extension. Now tighten the cap screws which hold the headers to the angle brackets.

For Manifolds of Twelve Cylinders or More: Note the difference in Header Extensions #10 and #11 or #16 and #17. Header Extensions #11 and #17 have three check valves in the header cross. (All other extensions have only two check valves in each cross.) These extensions, #11 or #17, with the three check valves are only to be installed at the extreme ends of the completed right and left bank headers.

Select a pair of Header Extensions, #10, and connect them to the inlet on one side of the cabinet. The union nuts should only be finger tight until the Wall Bracket, #5, has been firmly mounted to the wall. Finger tighten the 3/8'' dia. x 1/2'' long Cap Screws, #1, and Lock Washers, #2, through the wall bracket into the underside of the cross on each header extension. Level the extensions and mount the bracket directly to the wall with suitable anchor bolts. Tighten the union nuts on each header extension. Finally, tighten the cap screws which hold the header to the bracket. Continue this procedure with another pair of header exten-
### PARTS LIST FOR

#### FREE STANDING CYLINDER MANIFOLDS

**MANIFOLDS**

(Refer to Figs. 2 & 24)

<table>
<thead>
<tr>
<th>No.</th>
<th>Stock No. &amp; Part</th>
<th>Manifold Stock #</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>C490M 1/8 333 Screw 1/8 x 1/2&quot;</td>
<td>221-740-582 2 CF Free Standing</td>
</tr>
<tr>
<td>2</td>
<td>C490M 7/32 333 Screw 7/32 x 1/2&quot;</td>
<td>221-740-582 2 CF Free Standing</td>
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<td>3</td>
<td>C550M 2 3/32&quot;</td>
<td>221-740-582 6 CF Free Standing</td>
</tr>
<tr>
<td>4</td>
<td>C550M 2 3/32&quot;</td>
<td>221-740-582 6 CF Free Standing</td>
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</table>

#### PARTS LIST FOR

#### AR-3 LIQUID O CYLINDER MANIFOLDS - WALL-MOUNTED & FREE-STANDING MODELS

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<th>Stock No. &amp; Part</th>
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<tbody>
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</tr>
<tr>
<td>2</td>
<td>C490M 7/32 333 Screw 7/32 x 1/2&quot;</td>
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<tr>
<td>3</td>
<td>C550M 2 3/32&quot;</td>
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<td>221-741-582 6 CF Free Standing</td>
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### PARTS LIST FOR UNIHATIC FREE STANDING CONTROL CABINET

FOR USE ON BULK GASEOUS OXYGEN INSTALLATIONS SUCH AS TRAILERS, DEMPSTERS, ETC.

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<thead>
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sions and brackets until all extensions on one side of the cabinet have been installed. Repeat this process for the other side of the manifold.

When there is an odd number of header extensions in any straight section of the manifold header, on either side of the manifold cabinet, an End Bracket, 36, is required at the end of each straight section to support the header extension.

Where it is necessary to make a corner connection, a Corner Connecting Coil, 18 and/or 19, is provided. (Right-hand coil 18 is illustrated in Fig. 1A). The first header extension, after making the corner connection, is one of the short extensions, 16 or 17. Corner connecting coils are right and left-hand, and should be mounted so the coil is above the header as illustrated in Fig. 1A.

PIGTAILS

Attach Pigtails, 7 or 14, Blind Glands, 13, and Nuts, 3, as required, to each inlet check valve on the cross fittings on the right and left header extensions. The handle end of the pigtails must be on the ends which connect to the cylinders. All pigtails are shaped alike and may require some initial bending before they are attached to the cylinders. The unit is now ready for connecting to the hospital main. Refer to instructions for "Hospital Main and Alarm".

FREE-STANDING MANIFOLD

To install the Unimatic Manifold (free-standing model), refer to the applicable roughing-in drawing which was furnished to the contractor and to Fig. 2 or 2A.

NOTE: The necessary anchor bolts and washers, etc., must be provided by the person making the installation to suit existing conditions for fastening control cabinet legs and header to the floor.

GENERAL INSTRUCTIONS (Refer to Fig. 2 or 2A)

The Unimatic Control Cabinet Legs, 11, and Mounting Legs, 12, for the header extensions must be firmly anchored to a solid floor. Before attempting the installation, be sure to select a suitable type of anchor bolt. Anchor bolts should not be smaller than 3/8" in diameter and must be of a length which will provide a secure mounting to the floor. Where the floor is uneven, extension feet should be shimmed to prevent strain on the header.

MOUNTING THE CABINET

Lay the Cabinet, 19 or 20, on its back and remove the "switchover" lever knob to provide access through the front door. Insert the Legs, 11, through the bottom openings and mount firmly to the angle frame of the cabinet. A Cap Screw (3/8" dia. x 7/8" long), 2, and lock washer should go up through the angle and through the lug on the end of the leg. The Cap Screw (3/8" dia. x 2½" long), 5, and lock washer are provided for mounting through the lug into the side of the angle. The screw should be installed from the back so the nut is toward the front of the cabinet. After firmly mounting the legs to the cabinet, place the cabinet in a vertical position and locate it properly on the floor. Position the anchors for the four bolts, plumb the legs, and fasten the legs securely to the floor. Be sure to level the cabinet before making the final draw-down of the anchor bolts.
MOUNTING THE HEADER EXTENSIONS

Remove the two 1/4" cap screws immediately below the inlet connection on one side of the cabinet and mount angle bracket, 15 or 16 whichever is provided, with the two bolts.

Note the difference in Header Extensions 17 and 18 or 22 and 23. Header Extension 18 or 23 must be used only at the end of the header. This extension contains three check valves in the header cross. Attach the header extensions to the cabinet inlet connections. Tighten the union nuts finger tight before attaching, finger tighten the header crosses to the angle brackets with the 3 8" dia. x 1 3/8" long Cap Screws, 1, and Lock Washers, 6, which are provided. A Header Channel, 14, and Tie Bar, 13, are provided for each additional two header extensions on either side of the manifold. Legs, 12, are furnished to give sufficient support for the extensions. Each header channel is provided with several hole locations for mounting the legs. The legs should be equally spaced along the entire header. In attaching additional header extensions, first mount the tie bar and channel securely. Next, mount the legs in their proper location. Be sure to level the header extension as you proceed. In attaching the remaining header extensions, finger tighten each union, mount the header cross to the channel finger tight, then tighten the union nuts and finally the cap screws.

Note that, where corner connections are required, a Corner Connecting Bracket, 26, and Coil, 24 or 25, are provided. (Right-hand Coil, 24, is illustrated in Fig. 2A). The bracket contains a number of holes for adjustment to best fit the available space. Corner connecting coils are right and left-hand and should be mounted so that the coil is above the header.

PIGTAILS

Attach Pigtails, 9 or 10, Blind Glands, 21, and Nuts, 7, as required to each inlet check valve on the cross fittings on the right and left header extensions. Note that the handle end of the pigtails must be on the ends which connect to the cylinders. All pigtails are shaped alike and may require some initial bending for attaching to the cylinders.

HOSPITAL MAIN AND ALARM

You are now ready to make the connection to the hospital main. Before doing so, however, ascertain what type of alarm system is to be installed. If no alarm system or a "switchover" alarm system only is required (Wiring Diagram Fig. 10 or Fig. 12), the connection to the hospital main may be completed.

NOTE: A Shut-off Valve, 13, should be installed in the main immediately downstream of the manifold as shown in Figs. 3, 4 and 5.

If a combination Switchover and Hi-Low Line Pressure Alarm (Wiring Diagram Fig. 11 or Fig. 13) is to be installed, the Hi-Low Pressure Switch, 14, and Orifice Nipple, 15, must be installed in the main downstream of the shut-off valve.

Extending downward from the Unimatic Cabinet, on the right as you face the cabinet, is the connections to the hospital main. A Reducing Bushing, 4 (Figs. 1 and 1A) or 8 (Figs. 2

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Fig. 4
Unimatic Manifold for AR-3 Liquid Oxygen Cylinders
and 2A), solder type, is provided for making the connection to the hospital main. To the left of the hospital main connection and extending downward is the safety valve. Remove the dust cap from the outlet end of the safety valve. Where regulations require it, a 3/8” I.D. vent line should be connected to the outlet end of the safety valve, and piping to the outside of the building, turned down, and screened to prevent contamination.

The electrical contractor should complete the alarm system wiring in accordance with the applicable wiring diagram.

PRESSURE TESTING
The Unimatic Manifold and its components have been factory pressure tested and adjusted. However, the completed assembly should be pressure tested independently of the hospital piping system. See section covering "Operation", for placing the manifold into service.

ADJUSTMENT OF ALARM SWITCHOVER TYPE
The Pressure Switch, #14 (Fig. 6), which controls the "switchover" portion of the alarm system is located inside the manifold. This switch actuates the red and green lights and remote alarms which indicate the Unimatic has reached a "switchover" condition. To adjust the pressure switch, refer to the Specifications Chart (Fig. 7).

NOTE: The Green Light, #7 (Fig. 3, 4 or 5), must go "off" and the Red Light, #8 (Fig. 3, 4 or 5), must go "on" as the pressure DROPS. Therefore, the pressure switch must be adjusted to the setting indicated on the Specifications Chart (Fig. 7) as the pressure DROPS— not on pressure rise. The Pressure Differential Screw, #21 (Fig. 6), must be set to indicate minimum differential. The Pressure Switch Adjustment Screw, #22 (Fig. 6), should be turned clockwise to increase the pressure needed to activate the pressure switch.

COMBINATION SWITCHOVER AND HI-LOW LINE PRESSURE TYPE
The switchover alarm pressure switch should be adjusted as outlined above. To adjust the Pressure Switch, #14 (Wiring Diagram Fig. 11 or Fig. 13) for the Hi-Low Pressure Alarm, proceed as follows:

1. Adjust the differential setting on the pressure switch to its maximum (above the calibration markings). This will give a differential of approximately 16 p. s. i.
2. Adjust pressure setting to close switch at 42 p. s. i. on pressure drop.
3. Check operation by slowly reducing line pressure to 42 p. s. i. In all remote alarm panels, the "Normal" light should go "off" and the "Low Line Pressure" light should go "on" along with sounding of the buzzers. If not, adjust the pressure switch setting slightly so the alarm circuit is activated as the pressure drops to 42 p. s. i. Do not decrease differential setting.
4. After arriving at the proper low pressure setting of the pressure switch, check the high pressure alarm setting by gradually increasing the line pressure regulator setting. The high pressure alarm circuit should be activated as the line pressure reaches 56-60 p. s. i.
5. Readjust the line pressure regulator to 50 p. s. i. as indicated in the Specifications Chart (Fig. 7).

NOTE: On all high pressure cylinder manifolds with a combined supply capacity of 1,500 cu. ft. or more and on all liquid oxygen cylinder manifolds, NFPA requires that the Safety Valve, #17 (Fig. 6), be vented to the outside atmosphere. Install a 3/8” I. D. copper tube from the safety valve outlet to a safe location outside of the building. Protect the end of the safety valve vent line from rain, frost, bugs, etc., by turning down and screening.

ADJUSTMENT OF REGULATORS
The bank and line pressure regulators were correctly adjusted at the factory. If the delivery pressures do not conform to those shown in Specifications Chart (Fig. 7), readjustment is required. All pressure regulators must be adjusted with Orifice Valve, #19 (Fig. 6), open. Refer to the Specifications Chart to determine
the proper supply pressure needed to adjust the regulators for the type of Unimatic Manifold being serviced.

1. The most convenient way to adjust the two bank pressure regulators is to adjust one regulator at a time, with the opposite bank closed, to the "Intermediate Reserve Bank Pressure" as indicated in the Specification Chart.

2. Close the appropriate header valve (1 or 1A) on the opposite side away from the bank regulator to be adjusted.

3. Move the switchover arm (#9, Fig. 3 or 4), to the extreme right or left position, away from the bank regulator to be adjusted. This will place the bank in use into the "Reserve" function.

4. Loosen the regulator adjusting screw crank on the switchover arm and adjust the regulator pressure to the figure given in the "Intermediate Reserve Bank Pressure" column of the Specification Chart. Secure the screw crank with the set screw provided.

5. Reopen header valve described in Step 2.

6. Adjust the other bank pressure regulator following Steps 2 through 5 above.

    CAUTION: To insure a constant supply of gas during the adjustment procedure, never close a header valve without first insuring that the opposite valve has been opened.

7. Upon completion of adjustments, insure that both header valves are open and the switchover arm is located toward the bank with the least quantity of gas. This will put the fullest supply in the reserve function.

**OPERATION**

The Unimatic Manifold is now ready for operation.

1. Attach gas supply to pigtail connections on manifold header.

    CAUTION: Smoking should not be permitted in the area where the manifold is located. Be sure all connections are free from dirt and grease or oil. "Crack" cylinder valves by momentarily opening and closing the valve before connecting cylinder to manifold header pigtail.

2. Set Switchover Arm, #9 (Fig. 3 or 4), to extreme right or left position. The switchover arm in the extreme right position will make the right bank of cylinders the in service supply and the left bank the reserve supply or vice versa.

3. With Header Valves, #1 and 1A (Fig. 3, 4 or 5) closed, S-L-O-W-L-Y open valves on gas supply cylinders or liquid oxygen containers. Always open valve on cylinder which is nearest manifold cabinet first.

4. After allowing at least 60 seconds for heat of recompression to dissipate, open Header Valves #1 and #1A (Fig. 3, 4 or 5).

    Leak test the system at this time with an oxygen approved testing solution.

5. The Bank Pressure Gauges, #4 and #4A (Fig. 3, 4 or 5), will indicate the actual pressure in the left and right banks. The Line Pressure Gauge, #5, will indicate the delivery pressure to the hospital main. Line pressure must be 50 p.s.i.

6. The Green Light #7 (Fig. 3, 4 or 5), will go "on" and remain "on" as long as the...
in service bank is supplying gas to the system.

7. The Red Light, #8 (Fig. 3, 4 or 5), will go "on" and remain on only when the active supply becomes exhausted and the reserve supply is automatically put into service. At this time it will be necessary to replace all empty cylinders and move the Switchover Arm, #9 (Fig. 3 or 4), toward the reserve bank. This will raise the delivery pressure of the former reserve supply, making it the in service supply. The red light will turn "off" and the green light will come "on" to indicate the switch-over has been accomplished.

NOTE: The Switchover Arm, #9 (Fig. 3 or 4), generally, is not necessary on Unimatic Control Units for bulk oxygen supply. To adjust the regulator, refer to "Adjustment of Regulators", and the Specification Chart, Fig. 7.

8. To replace empty bank—

a. Close header valve (1 or 1A) on the bank to be replaced.

b. Slightly loosen connection nut to bleed off any residual pressure, then disconnect empty cylinders.

c. Connect full cylinders after "cracking" cylinder valves as in Step 1.

d. Slowly open valves of full cylinders.

e. Repeat Step 4 above.

NOTE: Each pigtail header connection is equipped with a check valve as required by NFPA for this type of installation.

3 / Responsibilities of User

This manifold and its components will perform reliably only when operated, maintained, and repaired in accordance with the instructions contained in this manual. The manifold must be checked periodically and reset, repaired, and components replaced as necessary to insure that the same will operate reliably. Parts that are broken, missing, plainly worn, distorted, or contaminated should not be used, but should be replaced immediately with clean, genuine replacements, manufactured or sold by Ohio Medical Products. This manifold, or any of its parts, should not be modified without the prior written approval of an officer of Ohio Medical Products. The user of this manifold shall have the sole responsibility for any malfunction resulting from faulty operation, or from faulty maintenance or repair by anyone other than an authorized representative of Ohio Medical Products, as well as for any malfunction caused by any parts that are damaged or that are modified by anyone other than an authorized representative of Ohio Medical Products.
### SPECIFICATIONS FOR UNIMATIC CONTROL CABINET

#### TYPE OF UNIMATIC CONTROL

<table>
<thead>
<tr>
<th>Cylinder Manifold Nitrous Oxide</th>
<th>Cylinder Manifold Oxygen</th>
<th>Bulk Oxygen</th>
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<td>Metric</td>
<td>Avoirdupois</td>
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<tr>
<td></td>
<td>p.s.i.</td>
<td>p.s.i.</td>
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<td>Delivery Pressure</td>
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<td>50 p.s.i. (3.5 kg/cm²)</td>
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<td>50 p.s.i.</td>
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<tr>
<td>&quot;In Use&quot; Bank Pressure (Approximate)</td>
<td>10 p.s.i. (6.65 kg/cm²)</td>
<td>110 p.s.i. (6.65 kg/cm²)</td>
<td>110 p.s.i. (6.65 kg/cm²)</td>
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<td>Intermediate &quot;Reserve&quot; Bank Pressure (Actual, Pre-Set)</td>
<td>95 p.s.i. (5.60 kg/cm²)</td>
<td>95 p.s.i. (5.60 kg/cm²)</td>
<td>95 p.s.i. (5.60 kg/cm²)</td>
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<tr>
<td>Supply Pressure (Usual)</td>
<td>800 p.s.i. (56 kg/cm²)</td>
<td>2400 p.s.i. (168 kg/cm²)</td>
<td>2400 p.s.i. (168 kg/cm²)</td>
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<tr>
<td>Supply Pressure (Max)</td>
<td>1000 p.s.i. (70 kg/cm²)</td>
<td>3000 p.s.i. (210 kg/cm²)</td>
<td>3000 p.s.i. (210 kg/cm²)</td>
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</table>
| Flow Capacity                     | 1000 c.f.h. (28.30 m³/h) | 1500 c.f.h. (42.45 m³/h) | 2000 c.f.h. (56.80 m³/h) | * | *
| Adjust Pressure Switch on Pressure Drop | 97.99 p.s.i. (68.69 kg/cm²) | 97.99 p.s.i. (68.69 kg/cm²) | 97.99 p.s.i. (68.69 kg/cm²) | 72-74 p.s.i. (50.52 kg/cm²) |

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**Notes:**

1. All pressure settings for nitrous oxide are to be made with a supply pressure of 600 to 800 p.s.i.
2. All pressure settings for high pressure oxygen are to be made with a supply pressure of 1800 p.s.i. or more.
3. All pressure settings for liquid oxygen are to be made with a supply pressure of 85 to 95 p.s.i. and not over 110 p.s.i.
4. Flow capacity is limited by AR-3 liquid oxygen containers at 300 c.f.h. per container on a bank with peaks of 1000 c.f.h. per container for a limited time.

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Fig. 7
4 / Repair Procedure and Parts List

Any manifold in need of repair should not be used until all repairs have been made and the manifold has been properly tested to ascertain that it is functioning properly and is ready for use.

It is recommended that all repairs be performed by Ohio Medical service representatives to insure full reliability; however, if this cannot be done, simple repairs of damaged parts that are readily accessible may be undertaken by a competent individual having general experience in the maintenance and repair of devices of this nature, and having a full appreciation of the necessity of cleanliness with respect to usage with either oxygen or nitrous oxide. No repairs should ever be undertaken or attempted by anyone not having such qualifications. Such repairs should only be accomplished by replacing the damaged part with a genuine replacement part manufactured or sold by Ohio Medical Products, and the unit must then be tested to ascertain whether or not it is functioning properly and is fit for use.

Except for such simple repairs, all other repairs should be made by an authorized representative of Ohio Medical Products, as they may require special tools and test apparatus. Contact your nearest Ohio Medical branch or regional office and you will be advised as to whether:

1. A nearby Ohio Medical service representative can handle the repair job.
2. It will have to be sent to a branch repair shop.
3. It will have to be sent to the factory at Madison, Wisconsin.

If the unit will have to be sent to a branch or to the factory, it should be adequately packaged and shipped prepaid. A letter should then be mailed either to the branch or the factory providing details as to any difficulties you have experienced and the repairs you feel may be necessary. In all cases, repairs will be made for the price of replacement parts plus a nominal labor charge.

IMPORTANT: Detailed drawings and procedures for more extensive repairs are included herein solely for the convenience of users having proper knowledge, tools, and test equipment, and for service representatives especially trained by Ohio Medical Products.

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**REGULATOR REMOVAL AND REPLACEMENT**

The Unimatic Manifold is designed so that the hospital line regulator or bank pressure regulators can be removed and replaced by the following procedure while maintaining a constant supply of gas to the piping system.

Regulator repair should be attempted only by an authorized Ohio Medical service representative.

**BANK PRESSURE REGULATORS**

To remove a bank pressure regulator only from all models of the Unimatic, proceed as follows:

1. Close Header Valve, #1 or #1A (Fig. 3, 4 or 5), on the bank being serviced making sure that an adequate supply of gas from the "in service" bank will be available while the replacement bank regulator is installed.
2. Remove the slotted plate portion from the "switchover" slides. Note proper position of the stop plates. Remove the regulator. The Check Valve, #18 (Fig. 6), will prevent gas leakage at the manifold block.
3. Install the replacement bank regulator.
4. Adjust bank regulator as indicated in "Adjustment of Regulators" Section.
5. Replace the portion of the switchover arm which was removed in Step 2.

**NOTE:** The above steps can be accomplished for the liquid oxygen unit also. However, during the change, there may be a slight pressure leak from the "in service" bank through the back pressure regulator at the manifold cross when pressure exceeds 150 p. s. i. which is the bleed-off pressure of the liquid oxygen unit.
Fig. 8
Gas Flow Chart: Typical Flow Arrangement for Unimatic Manifold
Using High Pressure Oxygen or Nitrous Oxide Supply

Fig. 9
Gas Flow Chart: Typical Flow Arrangement for Unimatic Manifold
Utilizing Liquid Oxygen Cylinders
LINE PRESSURE REGULATORS

If it is necessary to remove the Line Pressure Regulator, #3 (Fig. 6), adjust the reserve bank regulator down to 45 p. s. i. and the in service bank regulator down to 50 p. s. i. Remove the rollers from the regulator cranks to facilitate normal readjustment of the bank regulators as indicated in Specifications Chart (Fig. 7). Adjustment of all regulators must be done with the Orifice Valve, #19 (Fig. 6), open. The 200 p. s. i. Gauge, #6 (Fig. 6), on the Pressure Switch, #10 (Fig. 6), will indicate the delivery pressure of the bank regulators. The response of this gauge may be slow as there is an orifice in the elbow at the control block for the line to this gauge. The purpose of this orifice is to enable the removal, if necessary, of the pressure switch and gauge assembly without shutting down the manifold.

The Green Light, #7 (Fig. 3, 4 or 5), will go "out" and the Red Light, #8 (Fig. 3, 4 or 5), will turn "on" to indicate low bank pressure. Silence audible alarm and proceed as follows:

1. There are two plug-type Valve Stems, #20 (Fig. 6), on the control block. The valve stem on the right is normally turned in (closed) and the valve stem on the left is turned out (open). To be sure the valve is open, turn the valve stem out until the index groove on the stem is flush with the surface of the manifold block. To close off the supply of gas to the Line Pressure Regulator, #3 (Fig. 6), it is necessary to first open the valve stem on the right side of the manifold block; then, close the valve stem on the left side of the manifold block. This will direct the flow of gas from the in service bank pressure regulator (which was adjusted to 50 p. s. i.) directly to the hospital main, thereby by-passing the line pressure regulator. It is now possible to disconnect the line regulator or the reserve bank regulator for service or replacement. Check Valves, #18 (Fig. 6), are mounted on the manifold block to prevent escape of gas when the copper tubes, which connect the line and bank regulators to the manifold block, are removed.

2. After repair or replacement of a line regulator is accomplished, open the valve stem on the left side of the manifold block. Before closing the valve stem on the right side of the manifold block, be sure that the line regulator has been adjusted at or near 50 p. s. i. Close (turn in) the valve stem on the right side of the manifold block.

NOTE: This valve must be closed tightly. A leak through this valve will result in bank regulator pressure in the hospital line.

Adjust the bank pressure regulators in accordance with the Specifications Chart (Fig. 7) and instructions for the adjustment of regulators, SECTION II.

BACK PRESSURE REGULATORS (AR-3 LIQUID OXYGEN CYLINDER MANIFOLDS ONLY)

NOTE: Liquid oxygen in AR-3 cylinders must be maintained at -297°F. in order to prevent vaporization and pressure build-up. AR-3 cylinders are, in themselves, a highly insulated type of "thermos" in which the amount of heat which enters the container, resulting in oxygen vaporization, is kept to a minimum. It is impossible, however, to prevent some vaporization with the resultant pressure build-up. AR-3 cylinders normally will deliver 75 p. s. i. continuously; but if oxygen consumption is too low or when an AR-3 cylinder is connected in reserve on a manifold, the heat entering permits a gradual build-up of pressure above 75 p. s. i. When this pressure reaches 235 p. s. i., the cylinder safety valve permits excess pressure to blow off to the atmosphere.

The AR-3 Unimatic Manifold is designed to prevent loss of oxygen to the atmosphere providing hospital consumption is sufficient to utilize the amount of oxygen normally vaporized by heat leak during stand-by conditions of a cylinder.

An AR-3 container must warm up for approximately 72 hours after refilling to reach approximately 75 p. s. i.
The Back Pressure Regulators, # 11 (Fig. 4), are utilized to provide a means of conducting the bleed-off oxygen of the reserve container, when the pressure reaches 150 p. s. i., into the in service side of the manifold rather than blowing it to the atmosphere. For this reason, the liquid level indicator on the reserve cylinder will not indicate "full" if allowed to stand for several days in reserve. The drop in liquid level in the reserve cylinder depends upon cylinder characteristics, cylinder pressure when connected to the manifold, reserve supply and hospital consumption. Normally, however, a reserve cylinder should be approximately three-fourths full after standing for seven days.

The Back Pressure Regulators, # 11 (Fig. 4), are factory adjusted at 150-160 p. s. i. and should not require readjustment. They can be removed, however, for checking and the connections on the manifold cross capped with a blind gland and nut to provide continued satisfactory manifold operation. If removed for malfunction or checking, they should be checked only by authorized service personnel.

**IMPORTANT:** Be sure that the flow of gas to the hospital main will not be interrupted while the back pressure regulator is removed. There must be a bank of gas "in service" while the other bank is temporarily closed down at the header valve. With the Header Valve, # 1 or # 1A (Fig. 4) closed, the back pressure regulator must be removed at the manifold cross. Do not disconnect the inter-connecting copper tubings from one back pressure regulator to the other. Now the manifold cross can be capped with a blind gland and nut. Then the header valve can be opened, thereby putting this bank back into service. The same procedure should be followed to remove the back pressure regulator from the opposite bank.

**SAFETY VALVES**

The Safety Valve, # 17 (Fig. 6), is pre-set to open at 75 p. s. i. In the event that it should develop a whisper of a leak, do not attempt to readjust or tamper with it. Instead, replace it with a new safety valve.

**DEAD END COMPRESSION CHAMBERS**

Dead End Compression Chambers, # 12 (Fig. 5), are a safety feature on Unimatic Manifolds and are recommended on high-pressure units which are connected to a volume of 8,200 cu. ft. or more.
UNIMATIC MANIFOLD CONTROL CABINET

ALARM WIRING DIAGRAM

SHOWING SWITCHOVER ALARM SYSTEM

Fig. 10

UNIMATIC MANIFOLD CONTROL CABINET

ALARM WIRING DIAGRAM

SHOWING SWITCHOVER ALARM SYSTEM
UNIMATIC MANIFOLD CONTROL CABINET
ALARM WIRING DIAGRAM,
SHOWING SWITCHOVER & HI-LOW ALARM SYSTEM

RECOMMENDED LOCATION OF ALARM CONTROL BOX ON WALL OF MANIFOLD ROOM IF NECESSARY, SUCH AS WITH OUTDOOR LOCATION, CONTROL BOX CAN BE MOUNTED UNDER MANIFOLD CONTROL CABINET.

NOTE:
ALL INTERCONNECTING WIRING IS BETWEEN TERMINALS OF IDENTICAL NUMBERS SUCH AS 1-1, 2-2, ETC.

INTERNAL WIRING DIAGRAM
OF CONTROL CABINET

Fig. 11
UNIMATIC MANIFOLD CONTROL CABINET ALARM WIRING DIAGRAM
Showing Switchover and Hi-Low Alarm System
UNIMATIC BULK CONTROL CABINET ALARM WIRING DIAGRAM

Fig. 12

Showing Switchover Alarm System

ALARM WIRING DIAGRAM

UNIMATIC BULK CONTROL CABINET

NOTE: ALL INTERCONNECTING WIRING IS INSIDE HOSPITAL.

ALL INTERCONNECTING WIRING IS INSIDE HOSPITAL.

Fig. 12

UNIMATIC BULK CONTROL CABINET ALARM WIRING DIAGRAM

Showing Switchover Alarm System

ALARM WIRING DIAGRAM

UNIMATIC BULK CONTROL CABINET
## 5 / Replacement Parts

<table>
<thead>
<tr>
<th>PART</th>
<th>STOCK NO.</th>
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<tbody>
<tr>
<td>Bar, Tie — free standing</td>
<td>221-5294-560</td>
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<tr>
<td>Bracket, Cabinet (single)</td>
<td>221-5298-510</td>
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<tr>
<td>Bracket, Cabinet (double)</td>
<td>221-5299-510</td>
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<tr>
<td>Bracket, Corner — free standing header</td>
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<tr>
<td>Bracket, Wall mounting — cylinder manifold</td>
<td>221-5245-510</td>
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<tr>
<td>Bracket, Wall mounting (end) — cylinder manifold</td>
<td>221-5246-510</td>
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<td>Bulb, 24-32 Volt — pilot light</td>
<td>408-2553-300</td>
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<tr>
<td>Chamber, Dead End Compression (# 12 in Fig. 5)</td>
<td>221-5265-701</td>
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<tr>
<td>Channel, Header</td>
<td>221-5297-510</td>
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<tr>
<td>Channel, Header — short</td>
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<tr>
<td>Coil, Corner Connection — right-hand</td>
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<tr>
<td>Coil, Corner Connection — left-hand</td>
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<tr>
<td>Gauge, 100 p. s. i. (# 5 in Figs. 3, 4 and 5)</td>
<td>841-0014-300</td>
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<tr>
<td>Gauge, 400 p. s. i. (# 4 and # 4A in Fig. 4)</td>
<td>841-0007-300</td>
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<tr>
<td>Gauge, 4000 p. s. i. (# 4 and # 4A in Figs. 3 and 5)</td>
<td>841-0102-300</td>
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<td>Gland, Blind — CGA 5^0^1^0^1 (to cap unused manifold; high pressure connections)</td>
<td>229-3469-300</td>
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<tr>
<td>Header, with two high pressure check valves (standard)</td>
<td>221-5525-800</td>
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<td>Header, with three high pressure check valves (standard)</td>
<td>221-5525-801</td>
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<tr>
<td>Header, with two high pressure check valves (short for corner)</td>
<td>221-5525-802</td>
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<td>Header, with three high pressure check valves (short for corner)</td>
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<td>Instruction Plate, Gauge</td>
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<td>Instruction Plate, Lever</td>
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<tr>
<td>Key, Door Lock</td>
<td>203-2414-300</td>
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<tr>
<td>Knob, Switchover</td>
<td>212-1885-300</td>
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<tr>
<td>Leg, Cabinet — free standing</td>
<td>221-5285-710</td>
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<tr>
<td>Leg, Extension — free standing</td>
<td>221-5292-710</td>
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<tr>
<td>Light Assembly, Pilot — red (# 8 in Figs. 3, 4 and 5)</td>
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<tr>
<td>Light Assembly, Pilot — green (# 7 in Figs. 3, 4 and 5)</td>
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<td>Nut, Gland — CGA 540 (To cap unused manifold high pressure connections)</td>
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<td>Pigtail, Oxygen — AR-3 (liquid)</td>
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<td>Pigtail, Oxygen — cylinder manifold</td>
<td>221-5282-701</td>
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<tr>
<td>Pigtail, Nitrous Oxide — cylinder manifold</td>
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<td>Regulator, Back Pressure — AR-3 liquid oxygen (# 11 in Fig. 4)</td>
<td>306-1129-800</td>
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<tr>
<td>Regulator, Bank Pressure — bulk oxygen (# 2 and # 2A in Fig. 5)</td>
<td>306-1140-800</td>
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<tr>
<td>Regulator, Bank Pressure — AR-3 liquid oxygen (# 2 and # 2A in Fig. 4)</td>
<td>306-1126-800</td>
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<tr>
<td>Regulator, Bank Pressure — high pressure cylinder for oxygen or nitrous oxide (# 2 and # 2A in Fig. 3)</td>
<td>306-1130-800</td>
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<td>Regulator, Line Pressure — AR-3 liquid oxygen, high pressure cylinders for oxygen and nitrous oxide (# 3 in Figs. 3 and 4)</td>
<td>306-1127-800</td>
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<td>Regulator, Line Pressure — bulk oxygen (# 3 in Fig. 5)</td>
<td>306-1122-800</td>
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<tr>
<td>Stem, Valve — manifold block (# 20 in Fig. 6)</td>
<td>207-3540-500</td>
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<td>&quot;O&quot; Ring for valve stem</td>
<td>210-0638-300</td>
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<td>Switch Assembly, Pressure — with 200 p. s. i. gauge (# 8 in Figs. 3, 4 and 5)</td>
<td>221-5252-700</td>
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<tr>
<td>Gauges, 200 p. s. i. (intermediate pressure) — for pressure switch (# 6 in Fig. 4)</td>
<td>205-8241-300</td>
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<td>Pressure Switch only (# 10 in Fig. 6)</td>
<td>408-1224-300</td>
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<tr>
<td>Valve, Check — high pressure — for headers</td>
<td>207-8025-800</td>
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<tr>
<td>Valve, Check — low pressure — for manifold block (# 18 in Fig. 6)</td>
<td>725</td>
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<tr>
<td>Valve, Safety — 75 p. s. i. (# 17 in Fig. 6)</td>
<td>207-5550-300</td>
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<tr>
<td>Valve, Shut-off — header (complete) (# 1 and # 1A in Figs. 3, 4 and 5)</td>
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<tr>
<td>Seat Holder Assembly — for shut-off valve</td>
<td>829-4730-300</td>
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<tr>
<td>Stem and Handwheel Assembly for shut-off valve</td>
<td>829-4762-300</td>
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