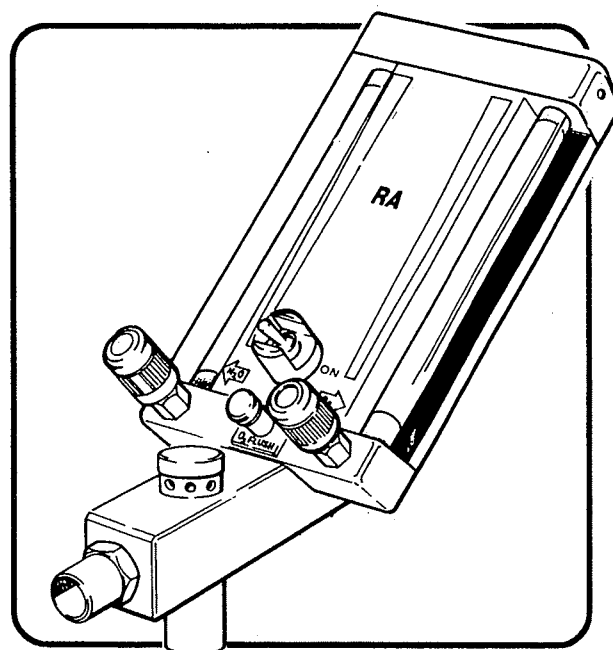


Matrix

**RA[®] Relative Analgesia
Nitrous Oxide - Oxygen Mixer
For Dental Analgesia**

Installation Manual



Matrix
145 Mid County Drive
Orchard Park, New York 14127
716 662 6650
800-847-1000
Tech Support 888-279-1260

1004 9700 Rev. H

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WARNINGS

The RA® and its accessories are designed to perform in accordance with the product specifications when installed, operated and maintained as instructed in this manual. This manual should be carefully read and understood prior to the operation and use of the RA.

This equipment is designed for use with an oxygen supply assuring 100% oxygen concentration. The use of oxygen concentrators could result in an unsafe condition to the patient.

The RA and its accessories are FACTORY adjusted and calibrated. Any alteration to these adjustments may alter the accuracy and operation specified by the factory.

The RA and its accessories, in need of repair, should be repaired ONLY by an Authorized MATRX Dealer.

Replacement parts used to restore an RA to its specified operation should be genuine MATRX manufactured parts or MATRX recommended equivalent parts.

The RA and its accessories are a specialized medical device and should be operated ONLY by medical personnel trained in their use.

MATRX may apply technical advances whenever it is desirable. Therefore, specifications of this product are subject to change WITHOUT NOTICE. MATRX should be contacted for current information.

We cannot over stress the importance of the user performing their own test independent of the dealer or contractor to verify that ALL gas pipelines are connected correctly. Properly connected pipelines are essential to PATIENT SAFETY. Please refer to Page 31 of this manual for a simple test procedure. This test procedure is NOT intended to replace any other test procedures required by NFPA 99c or local building codes. It is intended for the user as an additional safety measure.

EXAMINATION

Examine shipping carton for signs of external damage. Remove the contents from the carton and inspect for visible damage or missing parts. If damage is discovered or suspected and/or parts are missing, notify the Matrx dealer immediately.

DESCRIPTION AND MECHANICAL ASSEMBLY

This manual covers the installation and operation of the RA Nitrous Oxide/Oxygen mixer and it's mounting configurations including wall mounted, under counter mounted, and mobile stand mounted with and without 2 or 4 cylinder gas yoke assembly. The RA is a mechanical mixer for regulating the flow of nitrous oxide and oxygen from a gas supply to a conscious patient for the purpose of conscious sedation analgesia.

RA AS SUPPLIED WITH CONVENTIONAL RUBBER GOODS

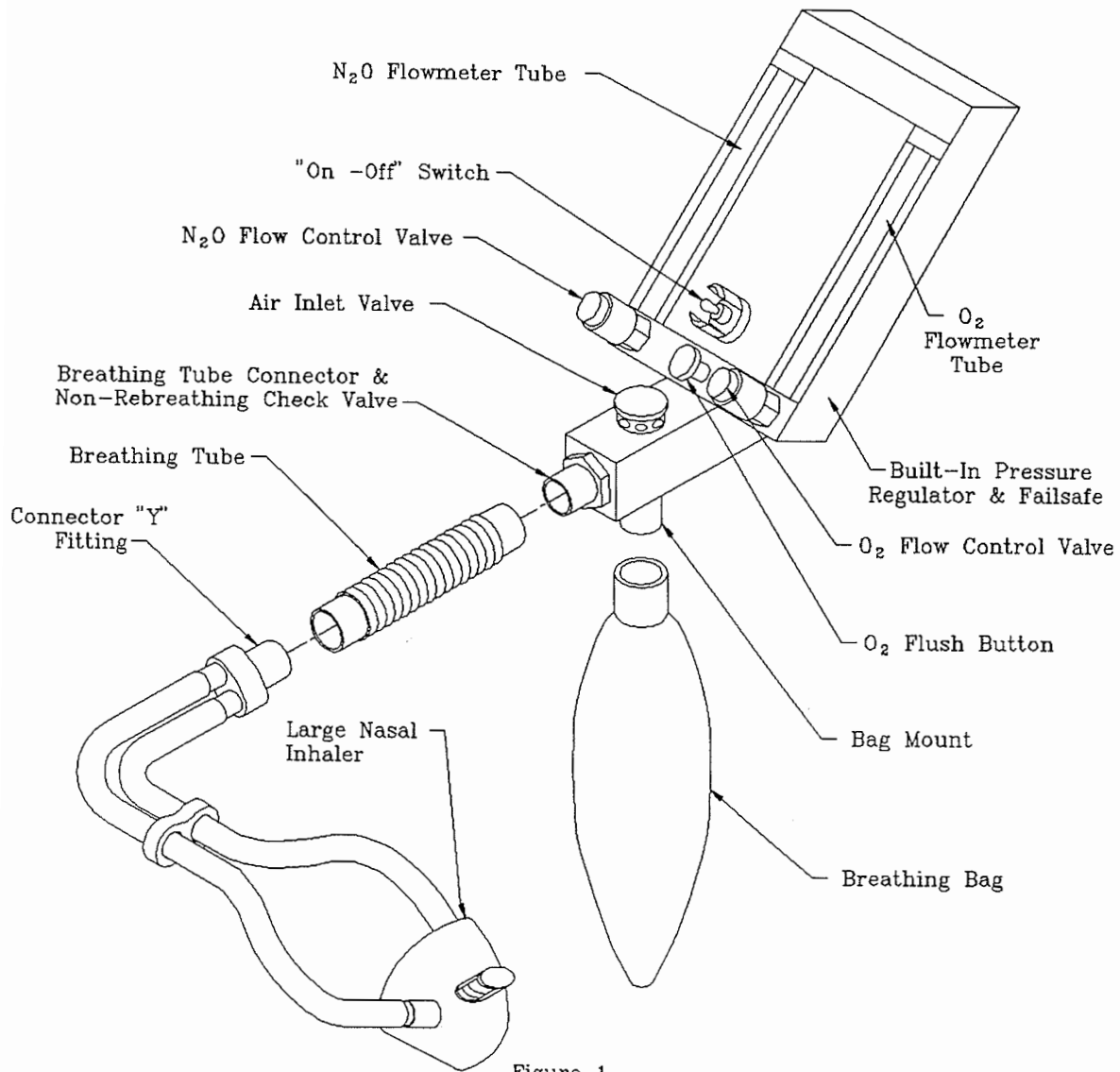


Figure 1

The following assembly procedure is common for all RA models supplied with conventional rubber goods (see fig 1):

1. Position the breathing bag as shown and slide the opening in the breathing bag over the outside diameter of the bag mount.
2. Slide one end of the 40" breathing tube over the outside diameter of the breathing tube connector.
3. Slide the connector "Y" fitting of large the nasal inhaler into the free end of the 40" breathing tube.

RA AS SUPPLIED WITH NITROUS OXIDE - OXYGEN SCAVENGER

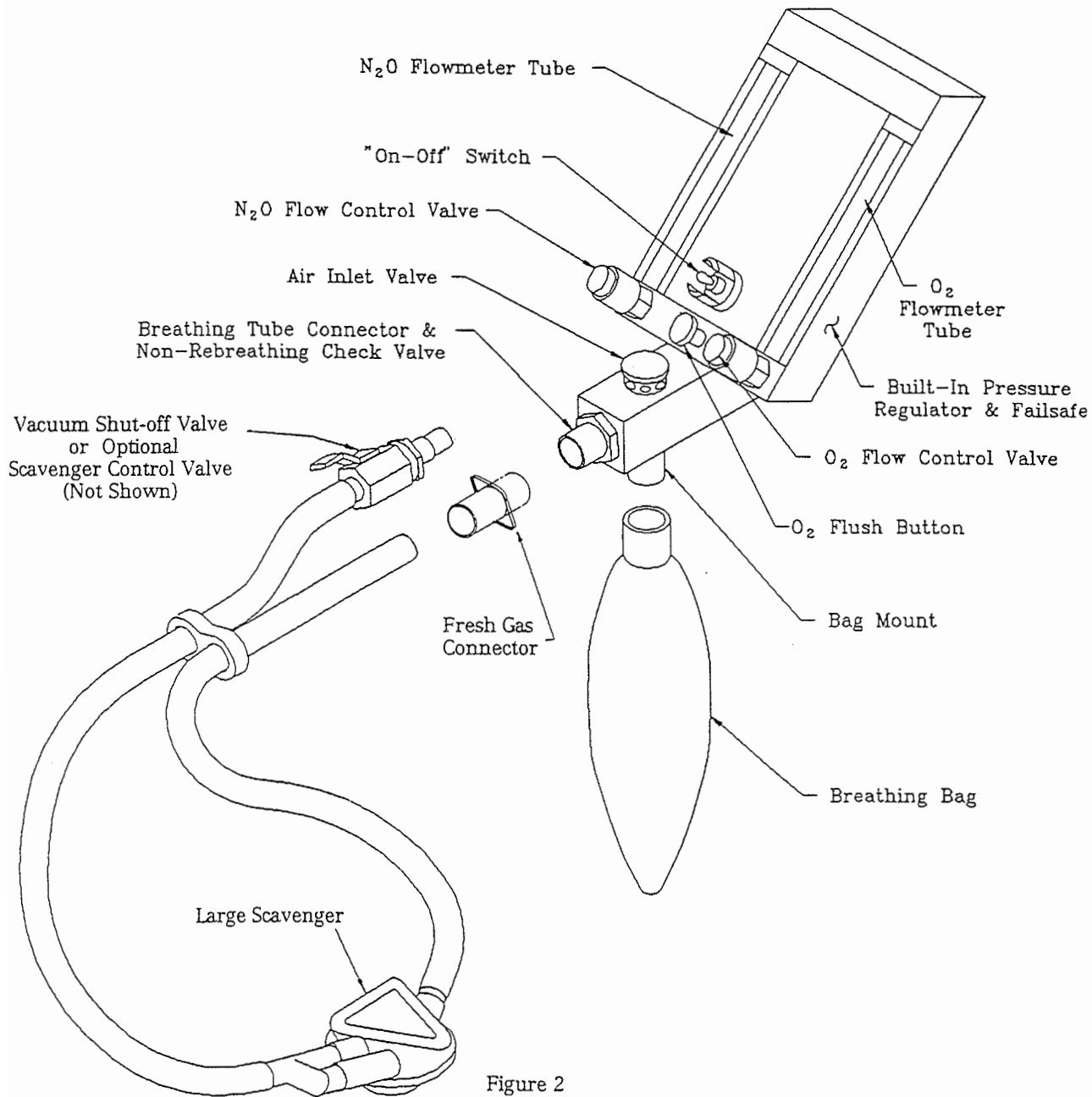


Figure 2

The following assembly procedure is common for all RA models supplied with the dental scavenger (see fig 2):

1. Position the breathing bag as shown and slide the opening in the breathing bag over the outside diameter of the bag mount.
2. Slide the 22mm hose cuff of the scavenger over the breathing tube connector.
3. Refer to the scavenging nasal inhaler instructions for methods of connecting the vacuum shut-off valve.

The following mounting adaptations, method of assembly, and installation are for all MATRX Analgesia Heads.

For Top Mounting Wall Mounted Units (see fig 3)

1. Remove the two 10-32 x $\frac{1}{4}$ " screws from the rear, top of the head and assemble the mounting bracket to the rear top of the analgesia head by aligning the bracket with the bevel side to the head and the 10-32 tapped holes in the head with the screw holes in the bracket.
2. Screw the two 10-32 x 1" screws (included with bracket) into the tapped holes through the clearance holes in the bracket. Thread in screws until they are tight.

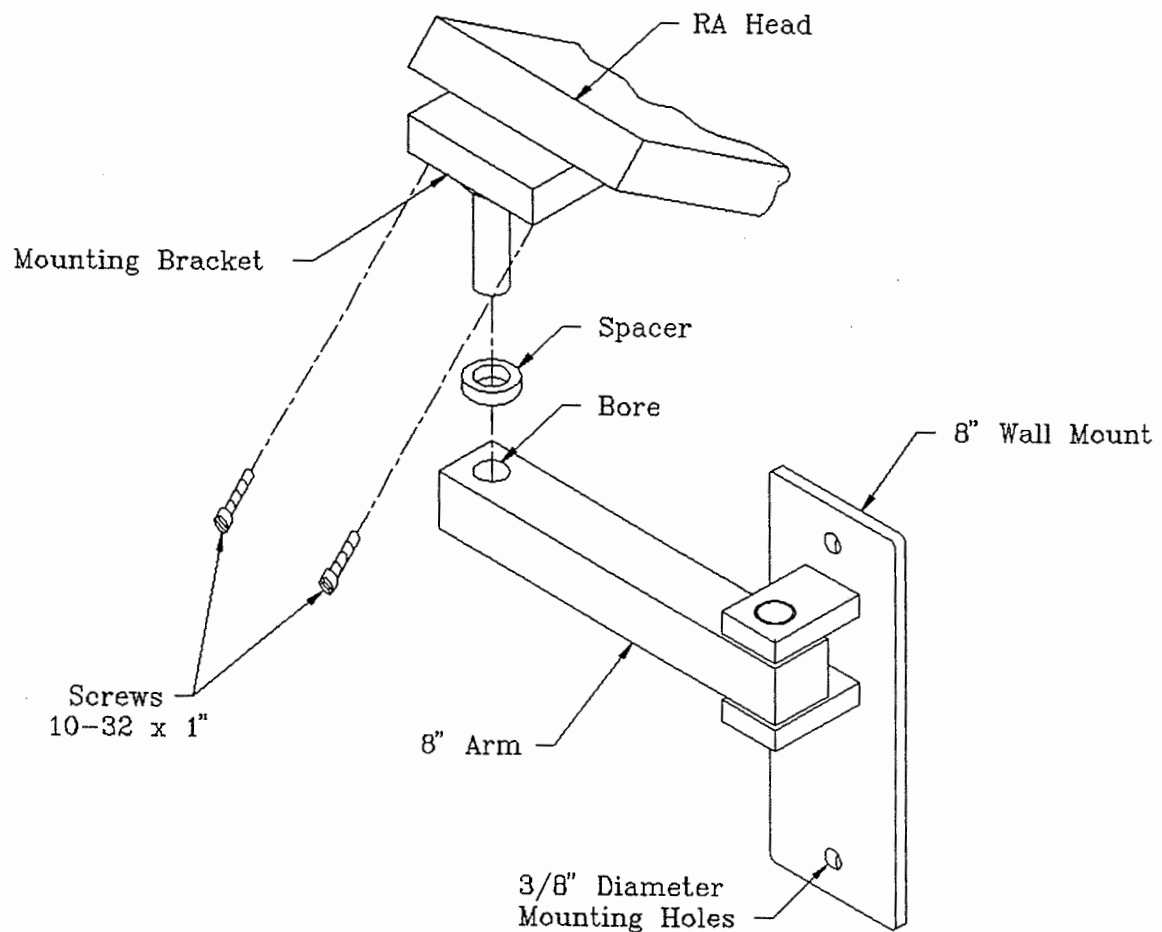


Figure 3

MOUNTING THE EIGHT INCH WALL MOUNT

A) Wood Stud Mount

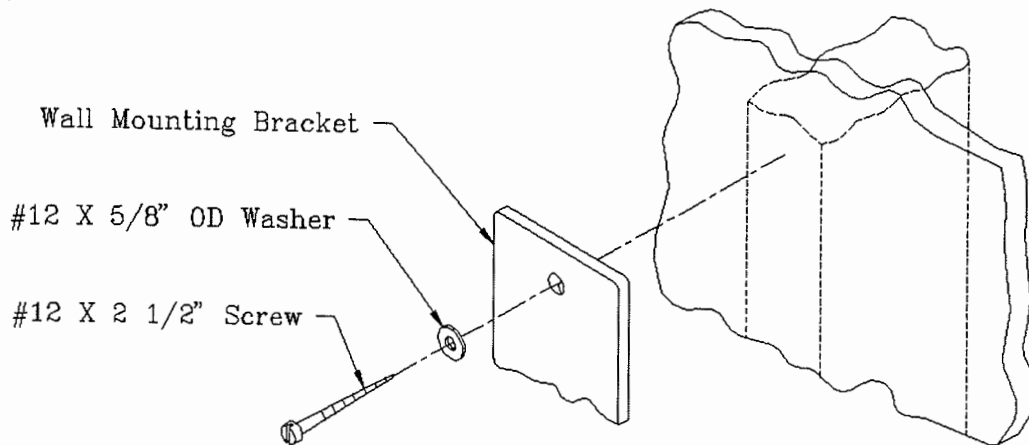


Figure 4

Note: Mounting hardware is not supplied with the mount.

Using a minimum wood screw size of #12 x 2 1/2" long and flat washer #12 x 5/8" minimum outside diameter, mount the wall bracket directly to a wood wall stud through a maximum 5/8" dry-wall. One screw required for each mounting hole.

B) Concrete Wall Mounting

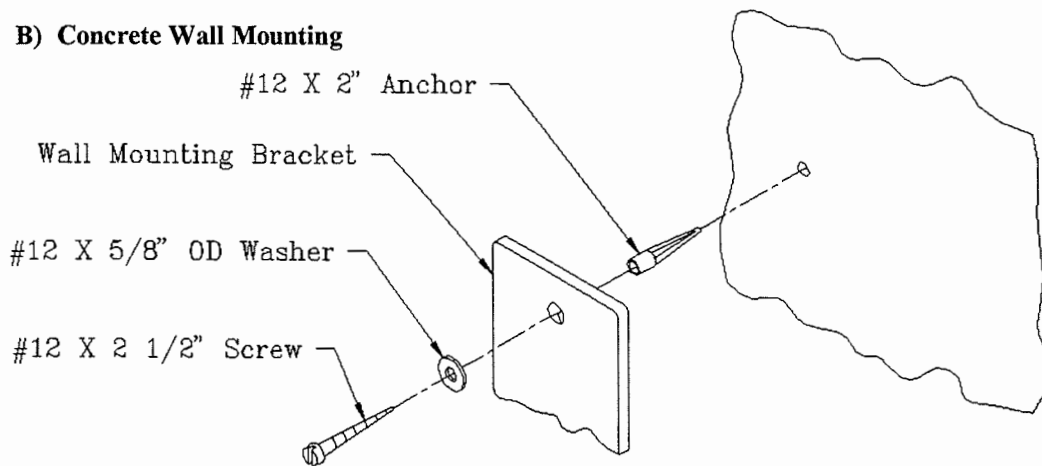


Figure 5

Note: Mounting hardware is not supplied with the mount.

1. Drill a hole in the concrete wall as instructed by the anchor manufacturer. Drive in the anchor. Insert the screw through the washer then through the wall bracket. Thread the screw into the anchor until it is tight. One screw is required for each mounting hole (see fig 5).
2. Slide the stud on the mounting bracket (attached to analgesia head) in the bore located in the end of the 8" arm. (See fig 3).
3. Attach rubber goods as per Figure 1 and 2.

THE UNDER-COUNTER MOUNT

- A) Remove the two 10-32 X $\frac{1}{4}$ " screws from the rear top of the head. Assemble the washer and spacer to the 10-32 X $\frac{3}{4}$ " screw. Thread the screw into the tapped hole (10-32) on the rear top of the analgesia head. Turn the screw until it is tight. Repeat for the other screw.
(See fig 6).

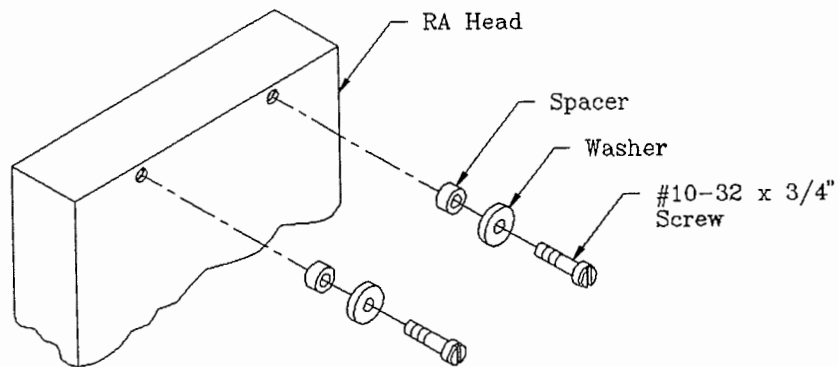


Figure 6

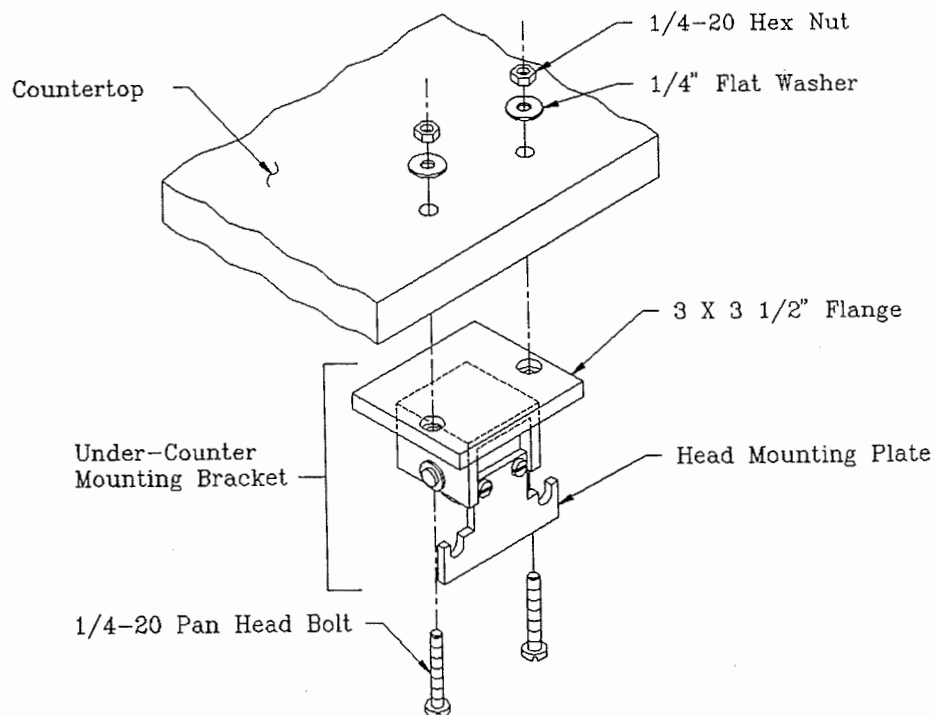


Figure 7

THE UNDER-COUNTER MOUNT (cont.)

- B) The under counter hinge mounting bracket is designed to mount within a cabinet or underneath a counter top. Specific mounting instructions and mounting hardware cannot be defined as each installation will be different. All mounting hardware must be user-supplied.

In all cases, the bracket must be mounted with the 3 x 3 1/2" flange in a horizontal plane.

Figures 7 and 8 illustrate possible mounting configurations.

CAUTION

Use pan head screws or bolts only. Make sure the head of the screw does not protrude above the surface of the flange.

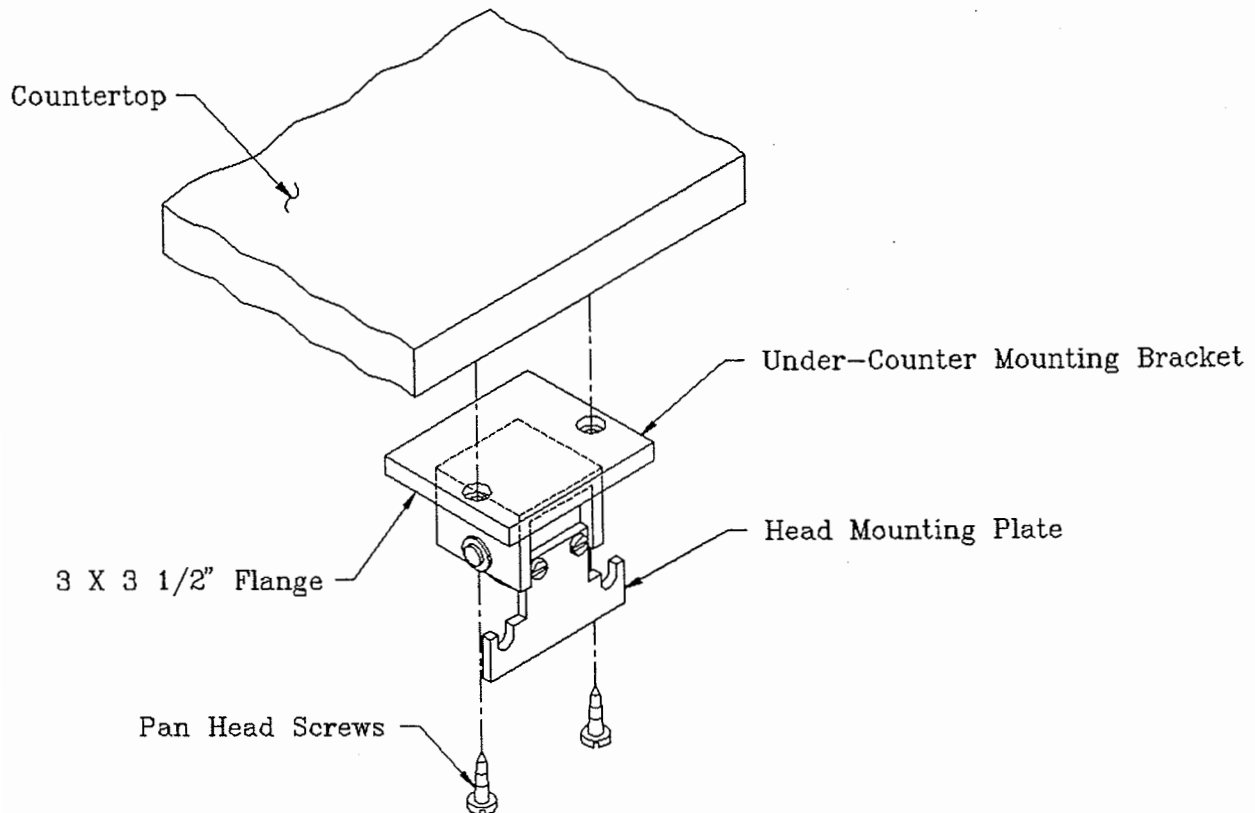


Figure 8

THE UNDER-COUNTER MOUNT (cont.)

C) Once the under counter mounting bracket is mounted, check its operation as follows (see fig 9):

1. The complete bracket (except the flange) should rotate, in a horizontal plane, through 360°.
2. By pulling the bottom of the release lever outward, thus releasing the pin that holds the head mounting plate in position, the head mounting plate is free to swing downward.

When the analgesia head is mounted to the head mounting plate (see step D) and the release lever is pulled, the complete head can swing into the cabinet or under the counter until the pin locks into the storage position.

NOTE

Minimum clearance to use this mount is 17" high x 6" wide.

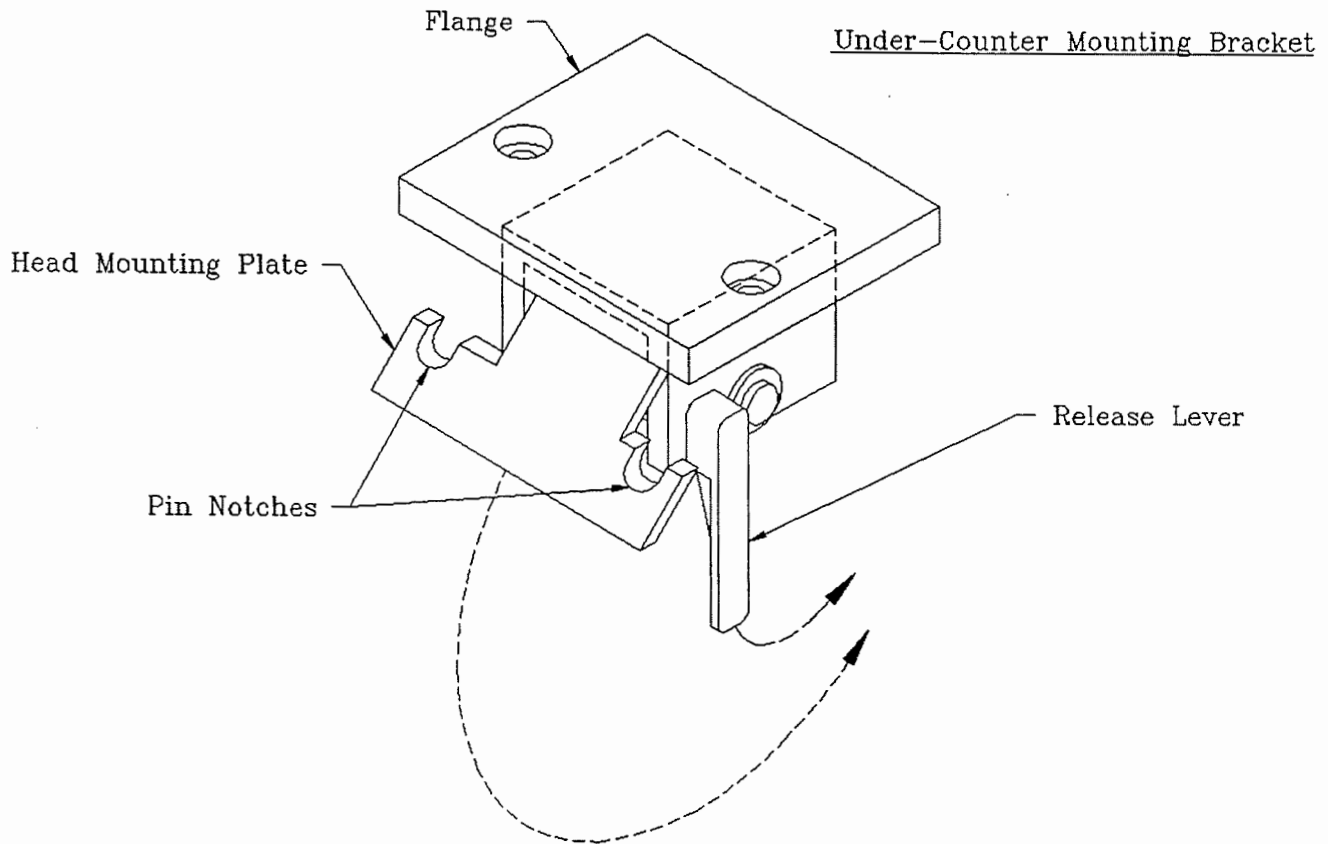


Figure 9

THE UNDER-COUNTER MOUNT (cont.)

- D) Position the back of the analgesia head parallel with the head mounting plate. Slide the head downward until the spacers, installed in step "A", are engaged in the pin notches. (See fig 10).

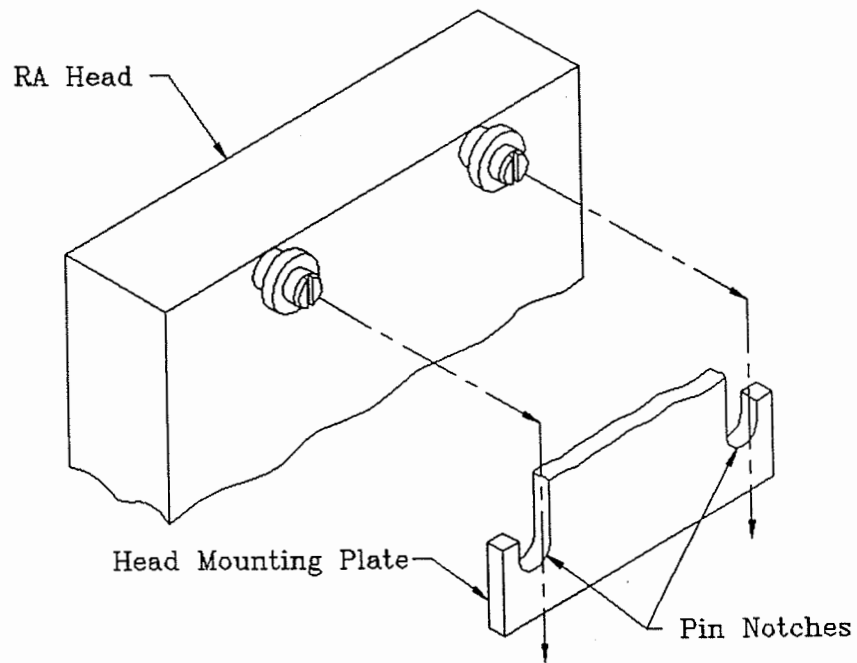


Figure 10

- E) Attach rubber goods as per fig. 1 and 2 of this section.

THE MOBILE STAND UNIT

- A) Thread hex nut onto mounting stud until at least $\frac{3}{4}$ " of thread is exposed above nut on stud. (See fig 11).
- B) Thread stud into $\frac{5}{8}$ - 18 tapped hole located on bottom of the outlet housing of the analgesia head. Thread in until nut is reached. (See fig 11).
- C) Using an adjustable wrench or the appropriate box wrench, firmly rotate the nut clockwise (looking towards the bottom of the head) until it stops against the RA.
- D) Slide the tapered nose of the pole mount assembly into the bore of spider stand until it comes to a stop. (See fig 12).
- E) Slide the mounting stud through the post spacer (if supplied) and into the stud bore of the pole mounting stud. When the head is at the desired working height, rotate the stud lock clockwise until the stud is locked in place. (See fig 12).
- F) Connect rubber goods as per figures 1 and 2.

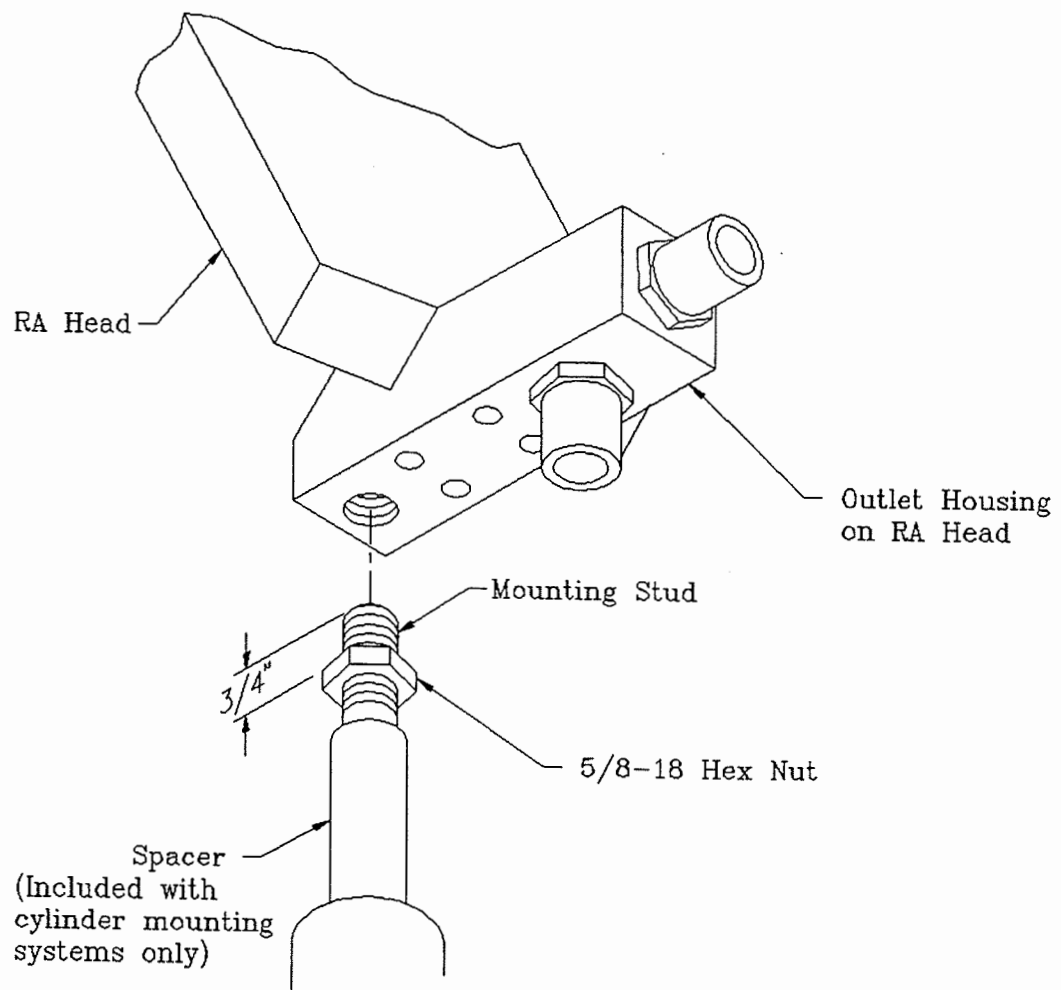


Figure 11

THE MOBILE STAND UNIT (cont.)

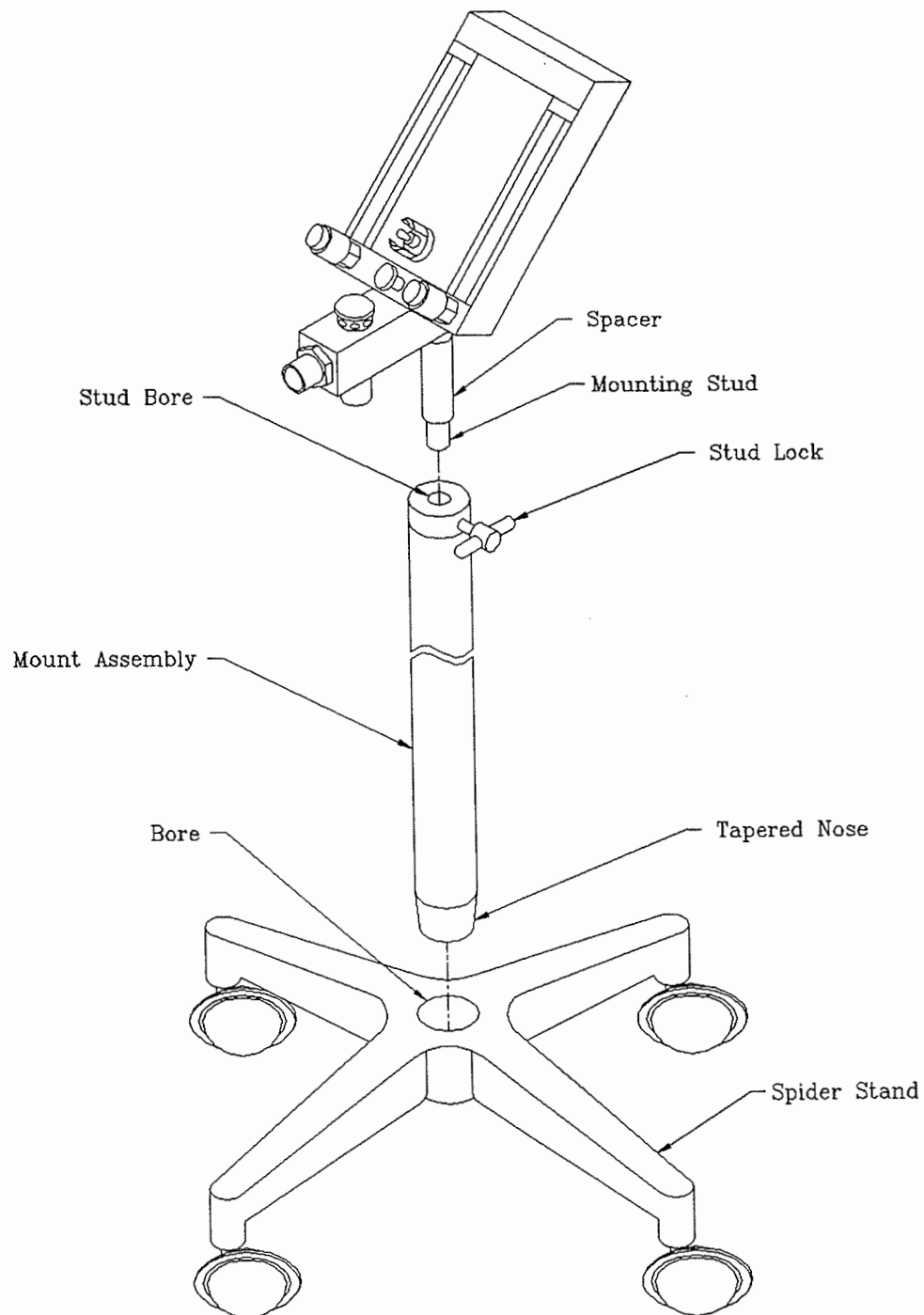


Figure 12

THE PORTABLE UNIT (for use with small cylinders)

- A) Assemble mobile stand unit as outlined in Figure 12.
- B) Assemble head to stud as outlined in Figure 11 and set this assembly aside.

NOTE

- C) Screws and cylinder mount are included in the yoke block assembly. The assembly procedure for either a 2 cylinder or 4 cylinder mount is the same. Refer to Figure 13 for 2 cylinder mount and figure 14 for 4 cylinder mount. Looking at the mobile stand from the top, orient the legs as shown in Figure 13 or 14.

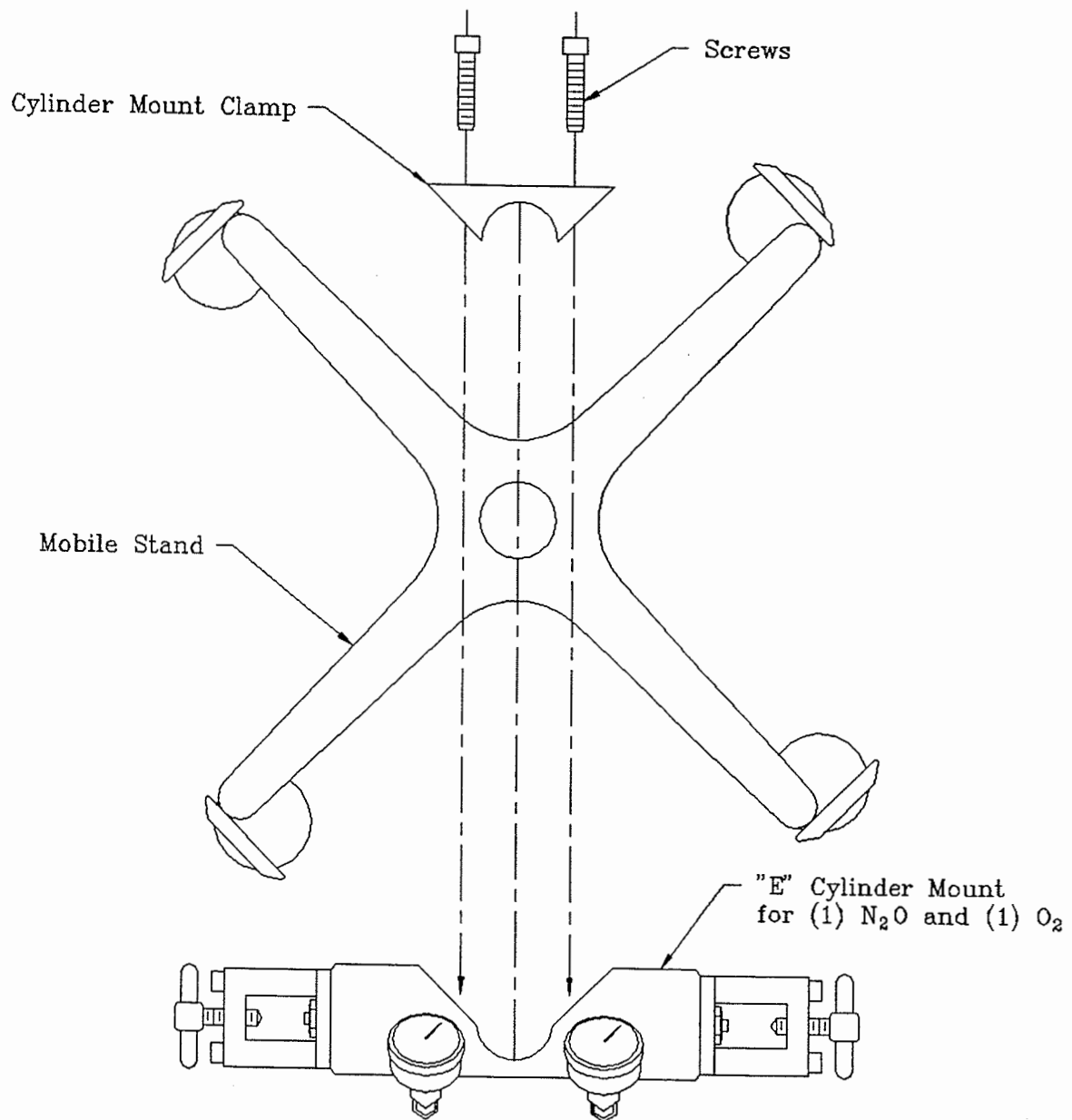


Figure 13

THE PORTABLE UNIT (for use with small cylinders) cont.

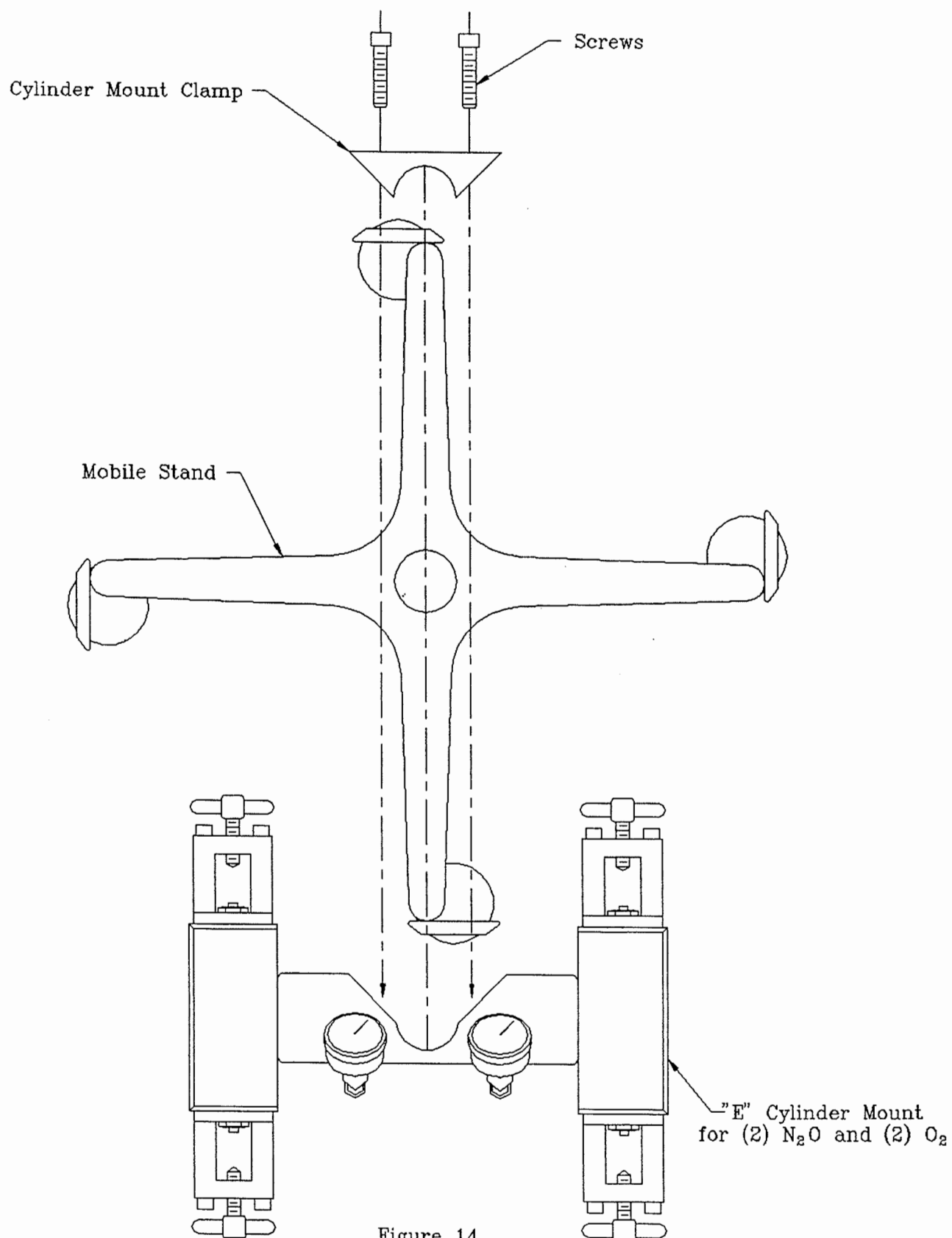


Figure 14

THE PORTABLE UNIT (for use with small cylinders) cont.

- D) Cylinder mounts must be mounted a maximum of 29 1/2" to a minimum of 29" from the floor. See Figure 15.
- E) Looking from the top, locate the oxygen side of the mount as indicated in Figure 13 and Figure 14.
- F) Place the mount on the pole (at the proper height) such that the semi-circular cut-out on the mount fits around the pole.
- G) Add the cylinder mount clamp such that it fits the pole opposite the cylinder mount and the tapped holes in the cylinder mount line up with the clearance holes in the cylinder mount clamp.
- H) Pass the socket head cap screws through the clearance holes and thread into the tapped holes and tighten them securely. See Figure 16.
- I) Refer to Fig. 11 and mount head/stud unit. Refer to Figures 1 and 2 and Figures 13 and 14 and rotate head/stud assembly such that the oxygen flow tube of the head is on the oxygen side of the cylinder mount assembly.

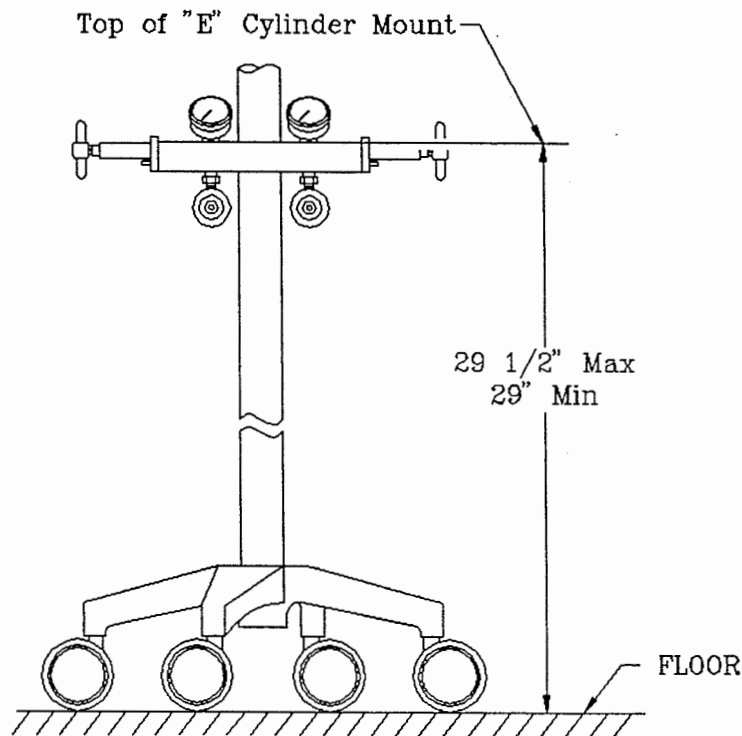


Figure 15

THE PORTABLE UNIT (for use with small cylinders) cont.

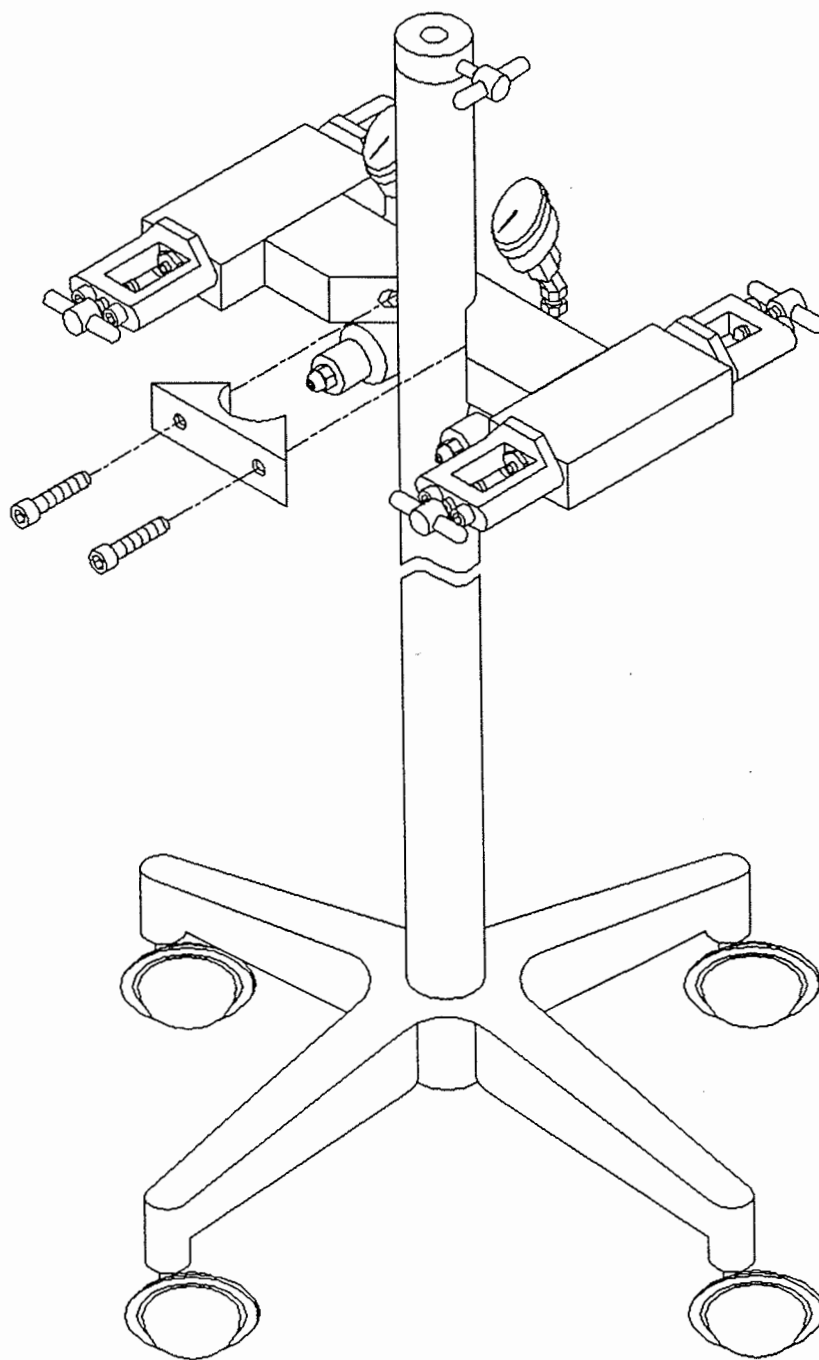


Figure 16

HEAD ONLY WITH RUBBER GOODS

A) Refer to Figure 1 and 2 and attach rubber goods as required.

CONNECTION AND ACTIVATION OF GAS SUPPLY TO MACHINE

Hoses are not supplied as standard equipment with analgesia heads, except for portable units, and must be ordered separately, specifying hose lengths.

Gas connections to the Matrix analgesia heads are accomplished by using color-coded and mechanically indexed hose assemblies.

CAUTION

1. Only oxygen hoses can be used for oxygen connections.
2. Only nitrous oxide hoses can be used for nitrous oxide connections.

A) HOSE IDENTIFICATION (for hoses requiring quick connect fittings)

Oxygen Hose Assembly

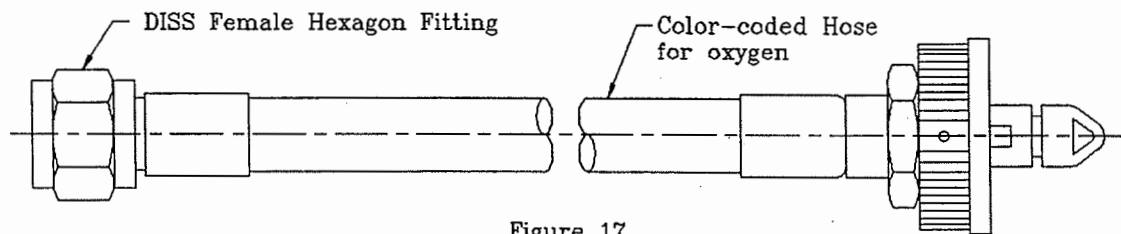


Figure 17

Nitrous Oxide Hose Assembly

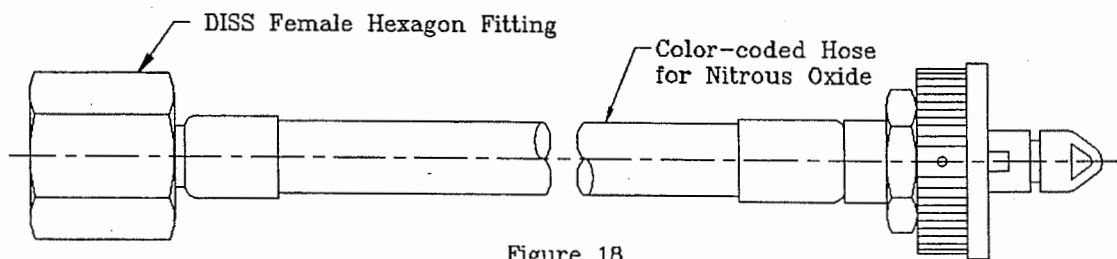


Figure 18

CONNECTION AND ACTIVATION OF GAS SUPPLY TO MACHINE (cont.)

B) HOSE CONNECTION TO THE ANALGESIA HEAD

1. Connect DISS female hexagon fitting (see fig 18) of the nitrous oxide hose to male DISS fitting on the back of the analgesia head (see fig 19). The fitting is labeled N₂O. Accomplish this connection by screwing female hexagon fitting onto the male threaded fitting. Hand tighten and **then** finish tighten with 7/8 open end wrench just enough to prevent leaks. **Do not over tighten.**
2. In the same fashion, connect the oxygen hose to the male oxygen fitting (see fig 19). Finish tightening the female hexagon fitting with an 11/16 open end wrench just enough to prevent leaks. **Do not over tighten.**

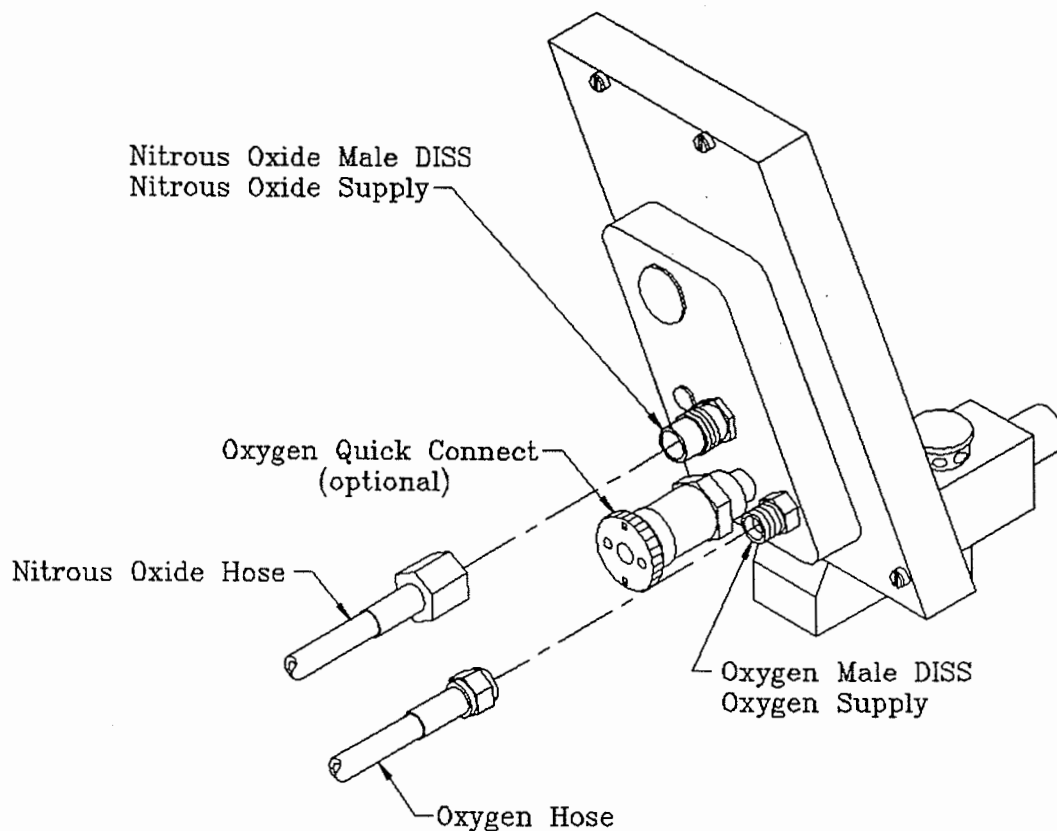


Figure 19

CONNECTION AND ACTIVATION OF GAS SUPPLY TO MACHINE (cont.)

C) HOSE CONNECTION TO MEDICAL GAS SOURCE

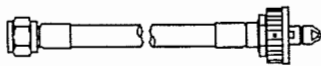
CAUTION

Before connecting the hoses to a medical gas source, complete section "A" of Pre-Operation Section.

Hoses are manufactured for connection to the medical gas source in two configurations:

1. DISS to Quick connect male fitting hoses (oxygen hoses only shown, see fig 20).

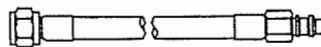
These fittings are designed for rapid "no tool" connection to corresponding female quick-connect fittings (by the same manufacturer) or outlet stations. Follow individual manufacturer's instructions for connection procedure.



OHIO (MATRX)

Oxygen Hose Assembly - DISS Female/Ohio Quick Connect

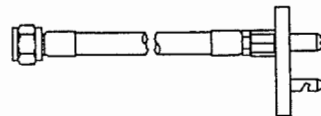
Nitrous Oxide Hose Assembly - DISS Female/Ohio Quick Connect



PURITAN (FRASER HARLAKE)

Oxygen Hose Assembly - DISS Female/Puritan Male

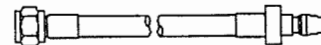
Nitrous Oxide Hose Assembly - DISS Female/Puritan Male



CHEMTRON (NCG)

Oxygen Hose Assembly - DISS Female/NCG Male

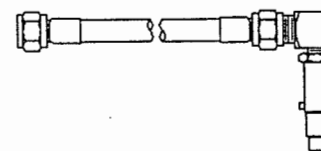
Nitrous Oxide Hose Assembly - DISS Female/NCG Male



SCHRADER

Oxygen Hose Assembly - DISS Female/Schrader Male

Nitrous Oxide Hose Assembly - DISS Female/Schrader Male



OXEQUIP

Oxygen Hose Assembly - DISS Female/Oxequip Male

Nitrous Oxide Hose Assembly - DISS Female/Oxequip Male

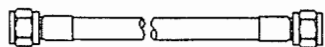
Figure 20

2. DISS to DISS hoses (oxygen hoses only shown, see fig 21).

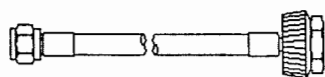
These hoses are designed to be used with portable units or DISS outlet stations. Connection to the cylinder mount will be made in the same manner as in Figures 19 & 22. Hoses are included with yoke blocks.

CONNECTION AND ACTIVATION OF GAS SUPPLY TO MACHINE (cont.)

C) HOSE CONNECTION TO MEDICAL GAS SOURCE (cont.)



DISS - for direct connections to regulators or flowmeter heads
Oxygen Hose Assembly - DISS Female/DISS Female
Nitrous Oxide Hose Assembly - DISS Female/DISS Female



OHIO (MATRX) - with "hand tight" nut for DISS Outlet Stations
Oxygen Hose Assembly - DISS Female/Ohio DISS Female
Nitrous Oxide Hose Assembly - DISS Female/Ohio DISS Female

Figure 21

D) HOSE CONNECTION TO CYLINDER MOUNT

The hoses will be connected to the cylinder mount as shown in Figure 22. A male DISS fitting is located on the underside of the regulators on the cylinder mount block. Connect the nitrous oxide hose to its male fitting and connect the oxygen hose to its male fitting.

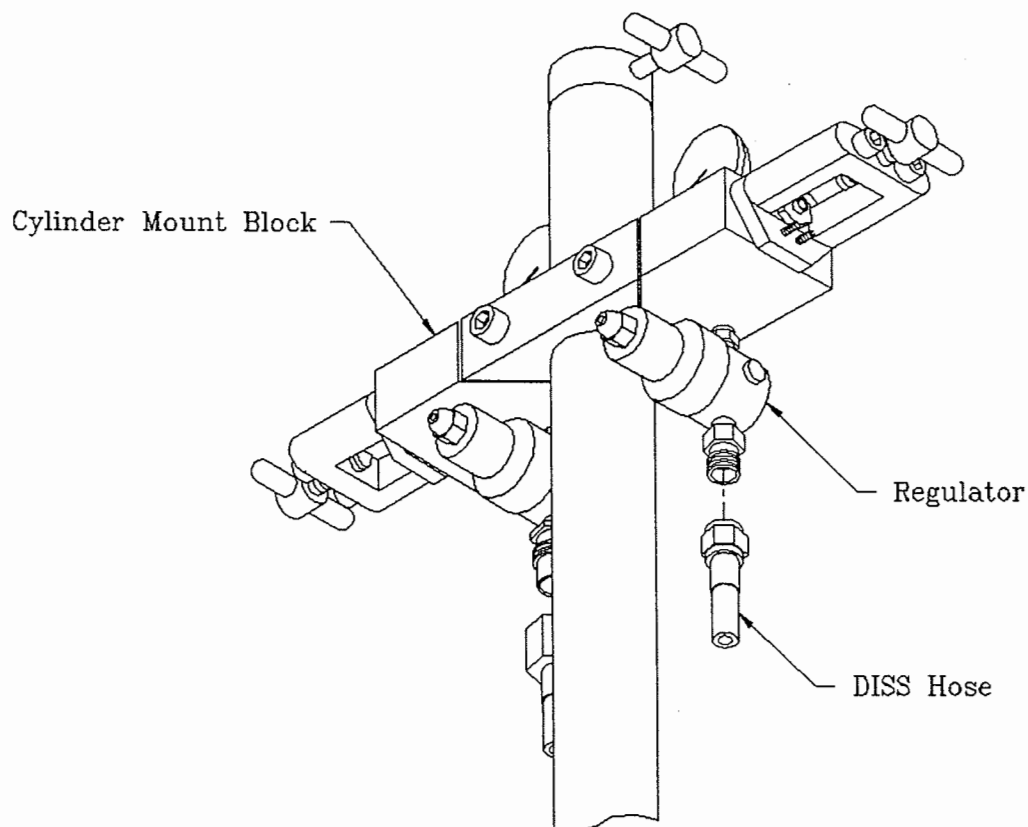


Figure 22

**ASSEMBLY OF "E" SIZE CYLINDERS TO PORTABLE UNITS
WITH CYLINDER MOUNTS**

A) CYLINDER IDENTIFICATION AND PIN INDEX SYSTEM

Nitrous Oxide cylinders and oxygen cylinders are identified by their label and color code.

Pin index system is a method of pins accurately located on the face of the cylinder yoke and holes accurately located on the cylinder shut-off valve, assuring that cylinders of a specific gas will fit the cylinder yoke for that specific gas. See Figures 23 and 24.

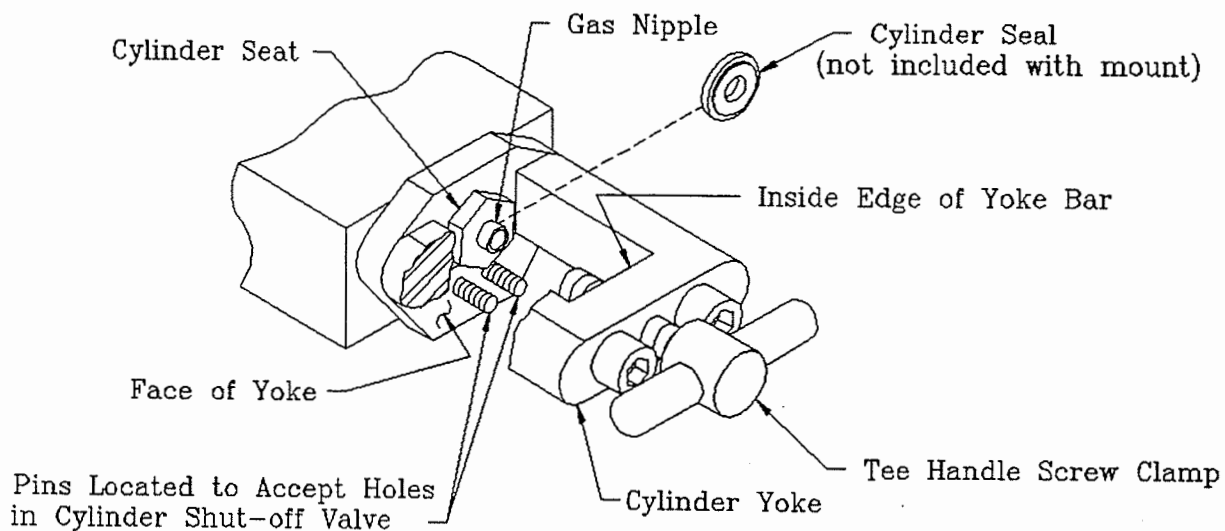


Figure 23

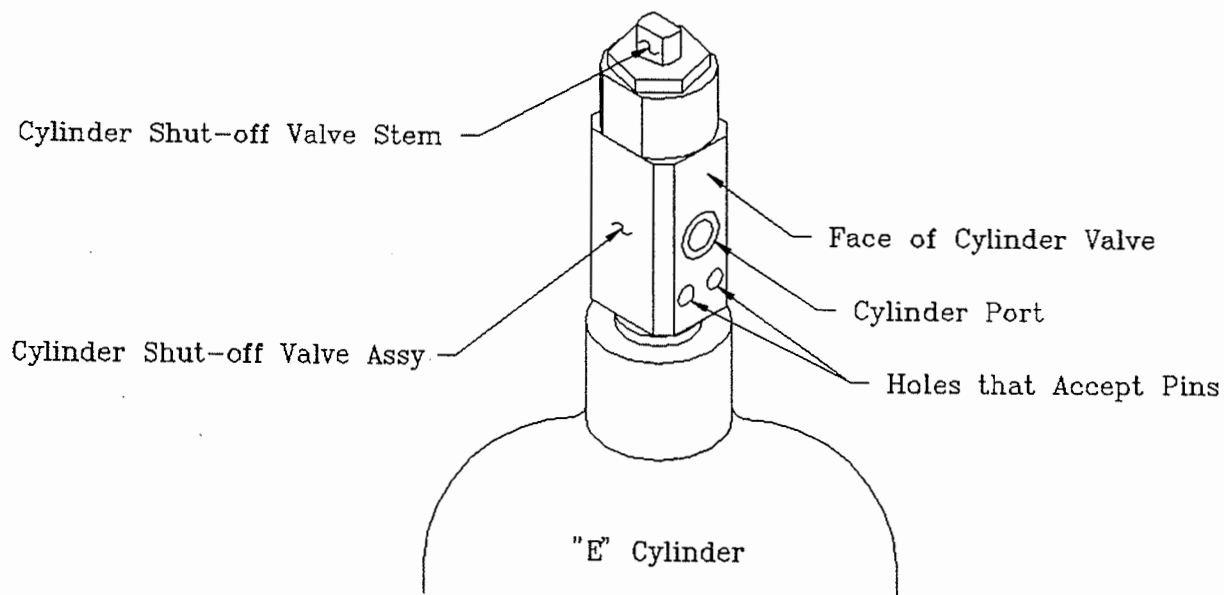


Figure 24

ASSEMBLY OF "E" SIZE CYLINDERS TO PORTABLE UNITS
WITH CYLINDER MOUNTS

B) CYLINDER MOUNTING (see fig 25)

NOTE

This cylinder mounting procedure will be typical for either nitrous oxide or oxygen cylinders.

CAUTION

- Do not attempt to assemble nitrous oxide cylinder to oxygen yoke or oxygen cylinder to nitrous oxide yoke.
 - Do not remove pins from yoke assembly.
 - Use "E" or "D" size **cylinders** only.
1. Rotate the tee handle screw clamp in a counter-clockwise direction until the point of the screw is flush with the inside edge of the yoke bar.
 2. Remove the cylinder seal from the captive strap on the cylinder. Dispose of the captive strap.
 3. Place the cylinder seal on the cylinder seat such that gas nipple goes through the hole in the center of the cylinder seal. See Figure 23.
 4. Locate the "E" cylinder directly underneath the cylinder with the cylinder shut-off valve located towards the cylinder yoke and such that the face of the cylinder valve will face the face of the yoke. See Figure 23 and 24.
 5. Lift the cylinder shut-off valve through the yoke block and align the yoke pins with the pin holes and the gas nipple with the cylinder port.
 6. Move the cylinder towards the face of the yoke so that the pins and gas nipple engage with the pin holes and cylinder port.
 7. Rotate the Tee handle screw clamp clockwise until the point on the screw engages the countersink on the cylinder shut-off valve post.
 8. Hand tighten (do not use tools) the tee handle screw clamp until it is very tight.

**ASSEMBLY OF "E" SIZE CYLINDERS TO PORTABLE UNITS
WITH CYLINDER MOUNTS**

B) CYLINDER MOUNTING (cont.)

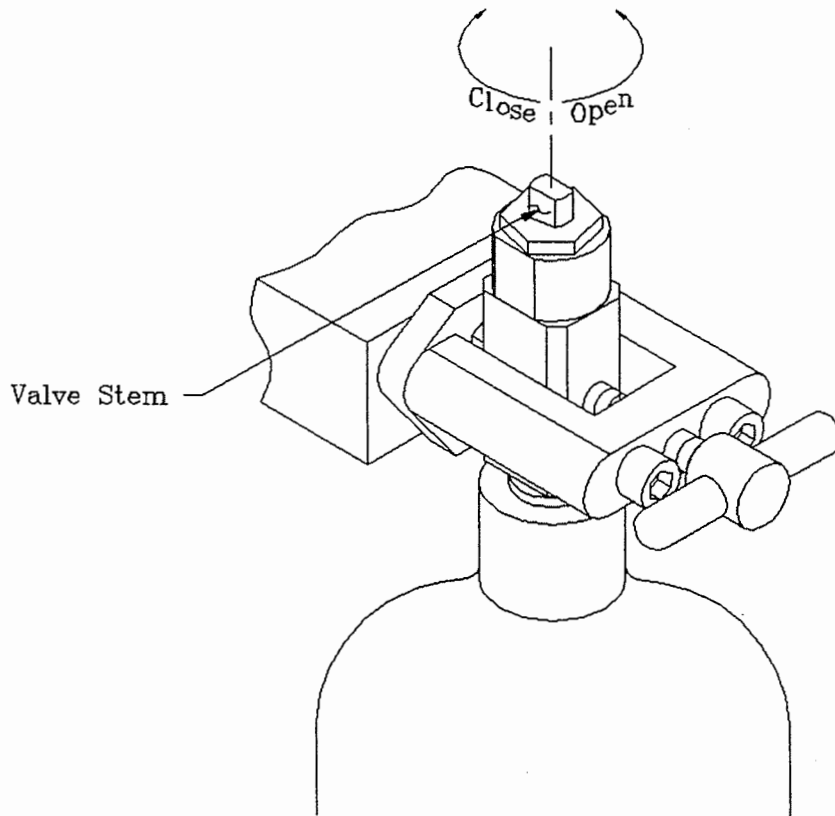


Figure 25

NOTE

Close the valve stem when the cylinder is not in use.
This completes the assembly of the analgesia unit.

SPECIFICATIONS

A) Standard RA Flowmeter Heads (See fig 26)

Physical Size: 5" wide x 9 3/4" high x 12 1/4" deep
Weight: 7 lb.

Fresh Gas Outlet Size: 15mm I.D. x 22 mm O.D.

Nitrous Oxide Inlet: Male DISS

Oxygen Inlet: Male DISS

Maximum Oxygen Flow Rate: 10 LPM @ 50 PSIG Inlet

Maximum Nitrous Oxide Flow Rate: 7 LPM @ 50 PSIG Inlet

Oxygen Adjustable: 3 L - 10 L

Nitrous Oxide Adjustable: 1 L - 7 L

Oxygen and Nitrous Oxide Flow Tube

Accuracy (Full Scale) 1/2 L

Inlet Oxygen Pressure Maximum 50-55 PSIG

Inlet Nitrous Oxide Pressure Maximum 50-55 PSIG

B) RA Portable Stand Mounted Unit (see fig 27)

Maximum Height: 53 inches

Minimum Height: 40 inches

Floor Area: 22 1/2" sq. Maximum

C) RA Wall Mounted (see fig 28)

Maximum Distance from Wall: 26 inches, approximately

Minimum Distance from Wall: 5 inches, approximately

Maximum Working Width: 48 3/4 inches, approximately

Maximum Working Width: 22 inches, approximately

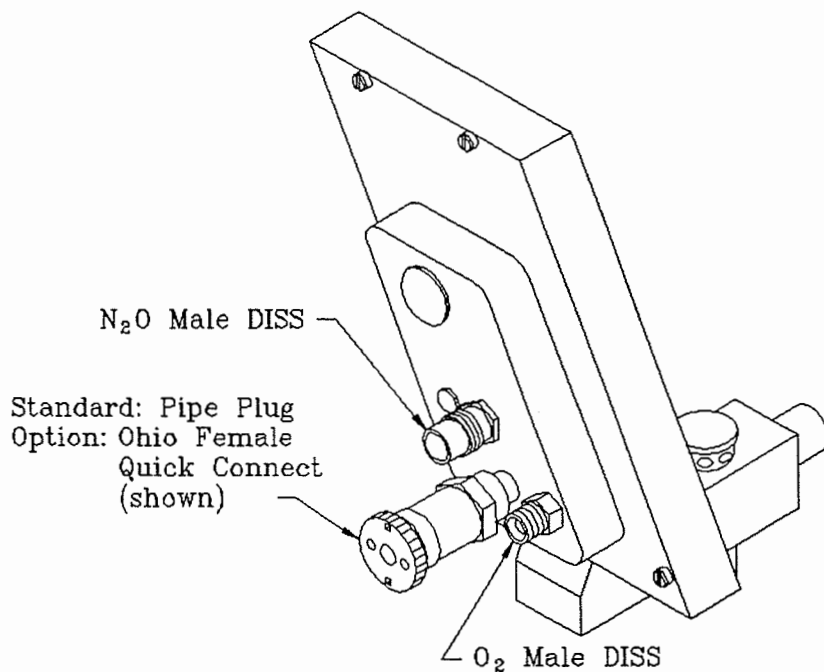
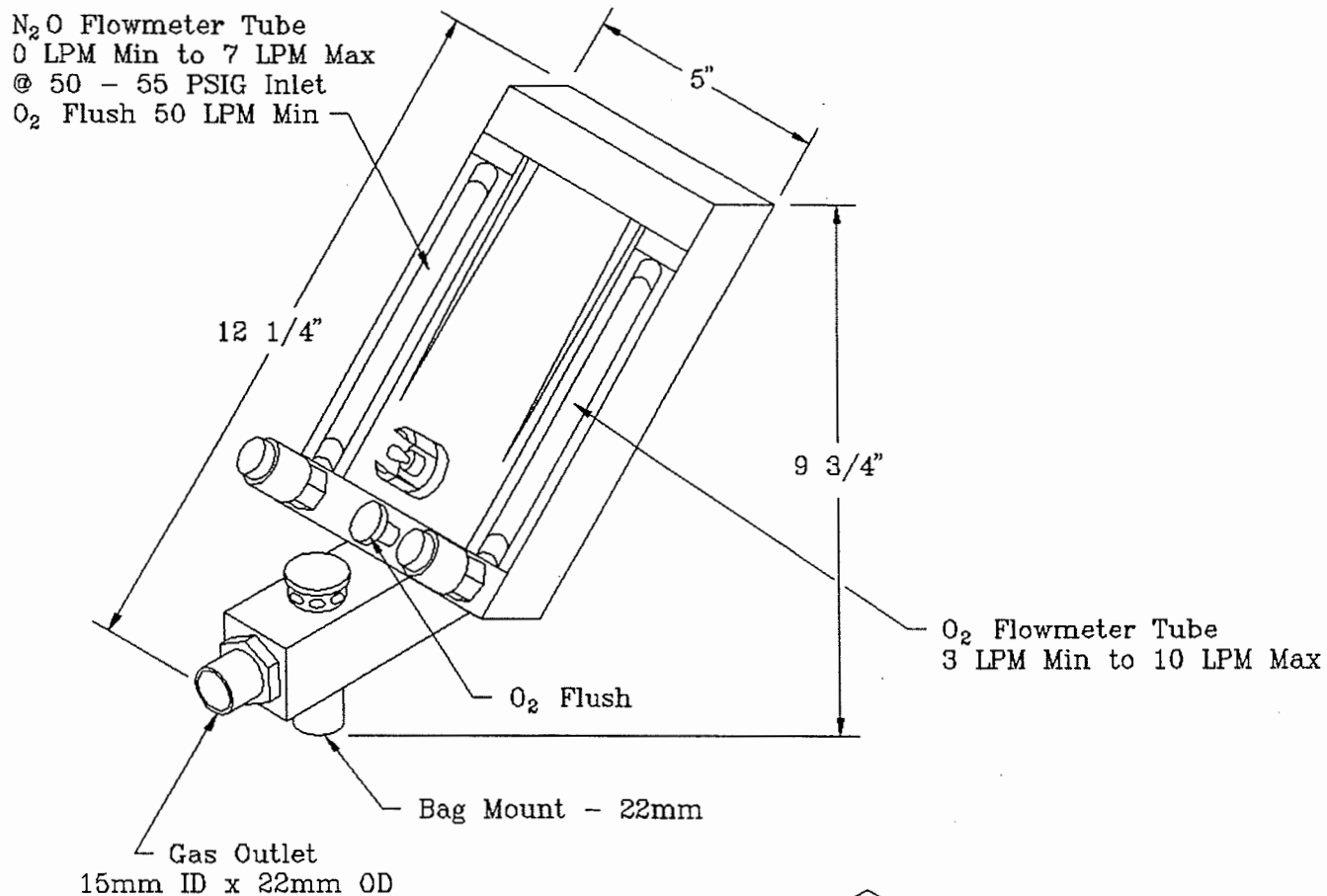
D) RA Cabinet Mounted (see fig 29)

Minimum Cabinet Opening: 6 inches

Minimum Swing Radius: 17 inches

NOTE: All specifications subject to manufacturing tolerance.

RA SPECIFICATION DIAGRAMS



Estimated Weight 7 Pounds

Figure 26

RA SPECIFICATION DIAGRAMS (cont.)

B) RA PORTABLE STAND MOUNTED UNIT

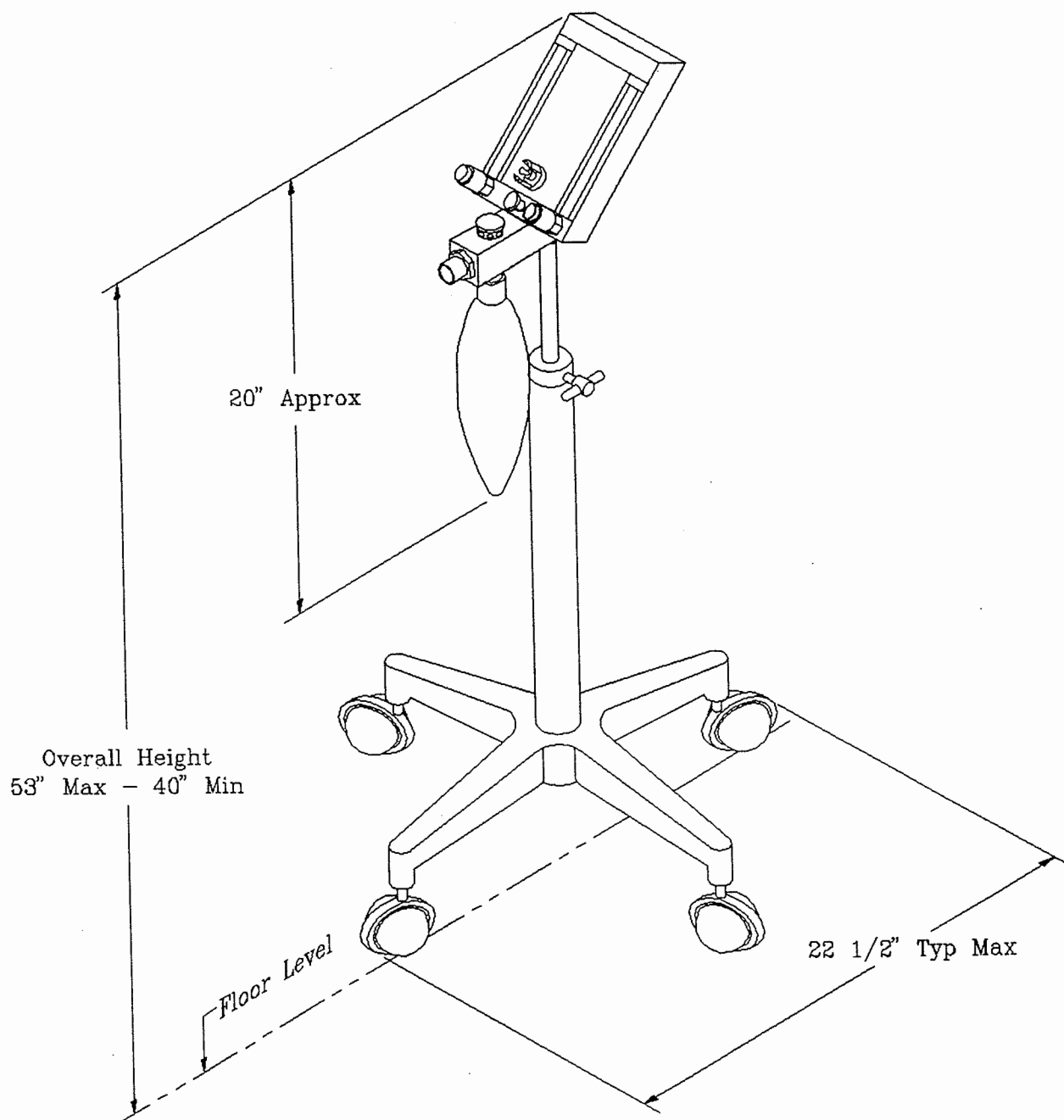


Figure 27

RA SPECIFICATION DIAGRAMS (cont.)

C) RA WALL MOUNTED

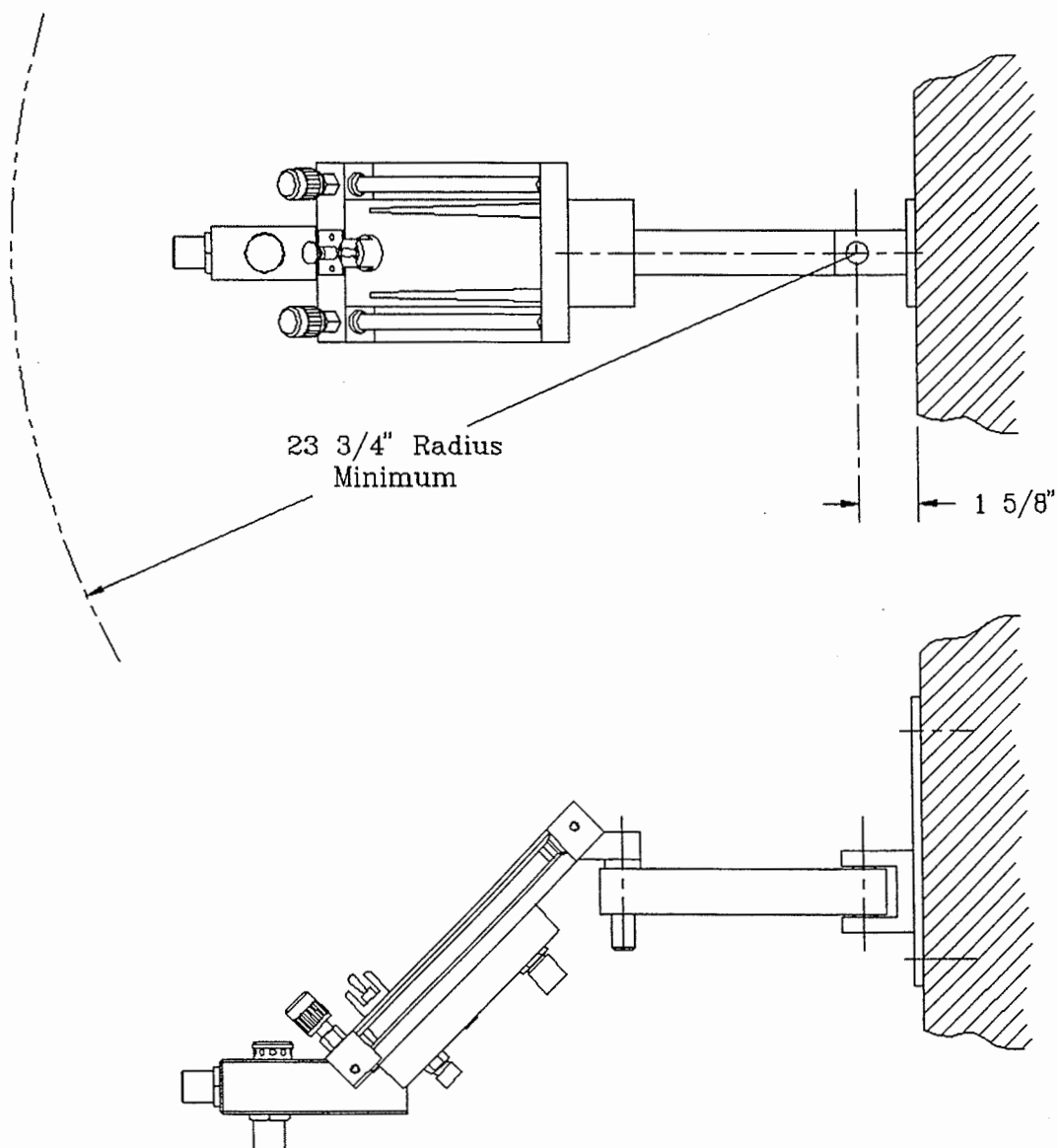


Figure 28

RA SPECIFICATION DIAGRAMS (cont.)

D) RA UNDER COUNTER MOUNTED

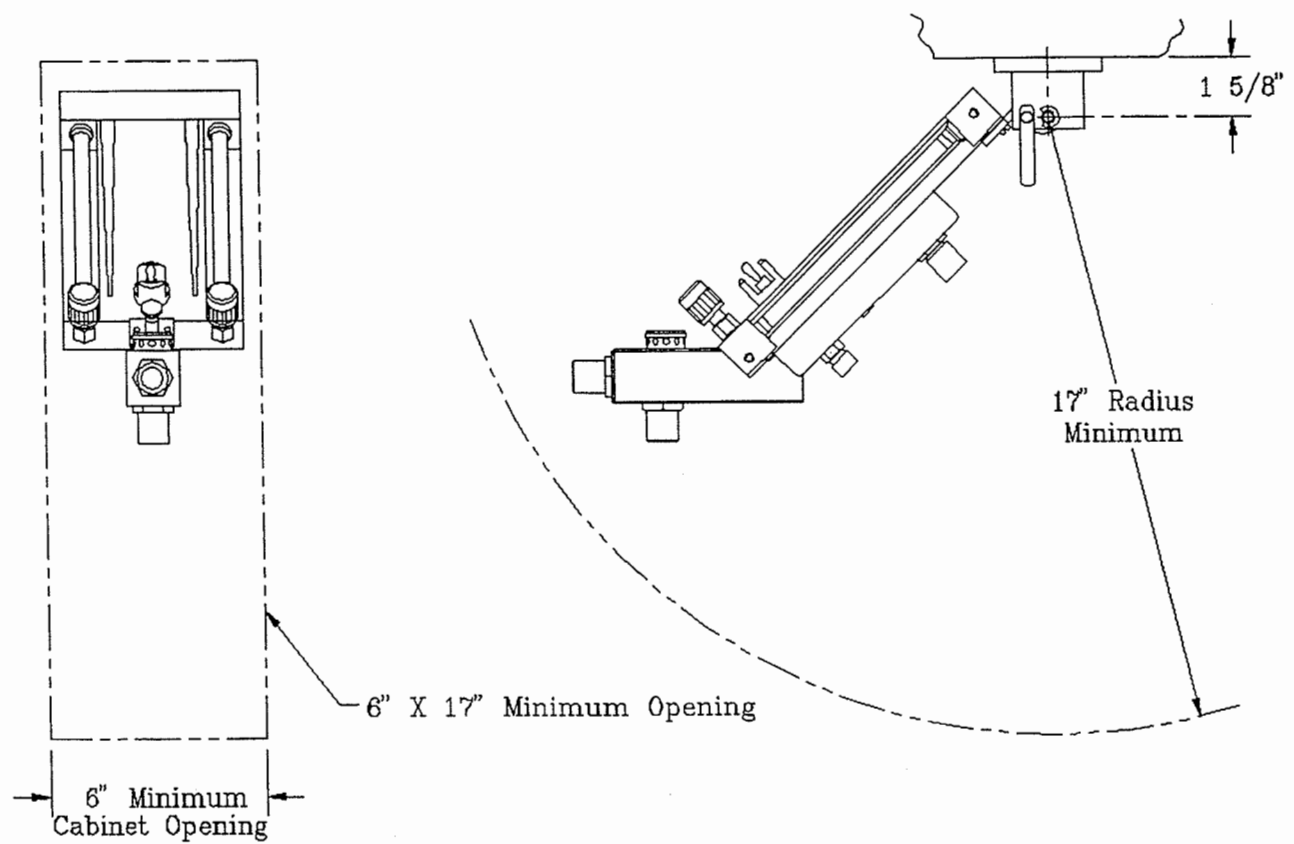


Figure 29

PRE-OPERATION

- A) Position the on - off switch in the off position. See figure 30.
- B) Rotate both nitrous oxide and oxygen flow control valves fully clockwise until they stop. See figure 30.

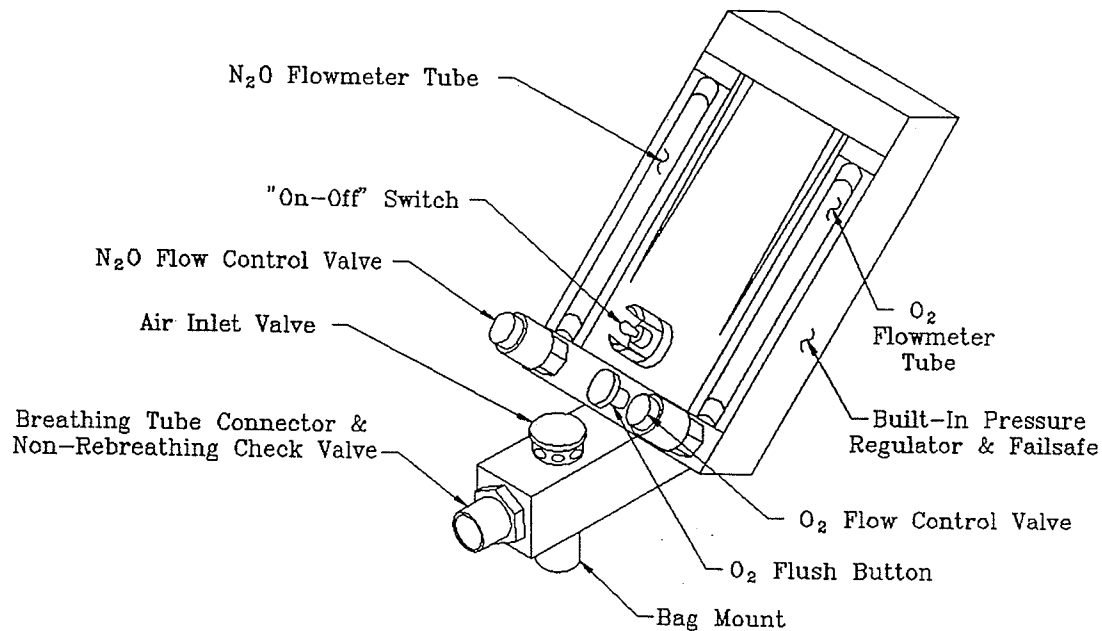


Figure 30

- C) Connect hoses to the medical gas source as outlined in figures 19 & 22 of the Description and Mechanical Assembly section.
- D) Activate the medical gas source.

NOTE

For initial start up of analgesia head, always have a medical gas source shut-off. For multiple outlet station manifold systems utilizing quick-connect fittings, the analgesia unit can be moved from station to station without shutting off the medical gas source once pre-operation and functional tests are completed.

1. Turn on manifold medical gas system as per manufacturer's instructions. Adjust line pressures as instructed. Pressure must be 50-55 PSIG.
2. For portable systems utilizing "E" cylinder tanks, refer to Figure 25.

PRE-OPERATION (cont.)

D) Activate the medical gas source (cont.)

NOTE

The following procedure applies for both nitrous oxide and oxygen gases:

- a. Turn on gas cylinders by rotating the valve stem on the cylinder counter-clockwise slowly two full rotations. Use customer-supplied cylinder wrench or use wrench available through your MATRX dealer.
- b. Examine reading on pressure gauges located on regulators. For a full tank of oxygen, the pressure should be about 2000 PSIG. For a full tank of nitrous oxide, the pressure should be about 750 PSIG.
- c. The regulators are factory set to 50-55 PSIG. If you think the output pressure is outside this range, adjust the regulator output pressure by the following steps 1-5.
 1. Install a low pressure gauge capable of monitoring 50-55 PSIG into the low pressure outlet of the regulator. This may be accomplished as shown below:

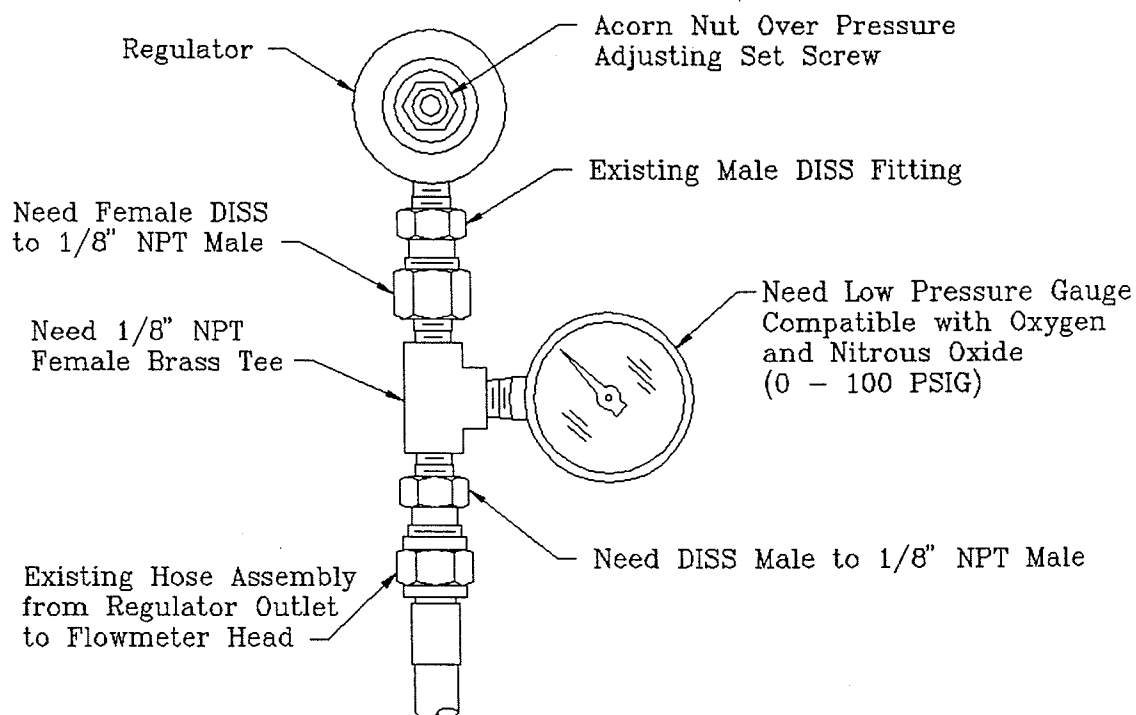


Figure 31

PRE-OPERATION (cont.)

D) Activate the medical gas source (cont.)

2. Install supply cylinder into “E” cylinder mount and open cylinder valve slowly.
3. Remove acorn nut from the end of regulator and install 3/16” hex key into now exposed set screw.
4. Adjust flow control at flowmeter head to approximately 3 LPM.
5. Adjust 3/16” hex key set screw until 50-55 PSIG is obtained on Low Pressure gauge.

CAUTION

Although your analgesia machine is designed for the maximum safety conditions of not allowing the two gases to be interchanged, it is the responsibility of the user to determine that only oxygen flows into oxygen connection (see Figure 19) and only nitrous oxide flows into the nitrous oxide connection (see Figure 19) located on the back of the analgesia head.

CROSS PIPELINE TEST (Nitrous Oxide and Oxygen Systems Only)

The customer is advised to refer to the following test procedures as an additional step to assure that the gas lines have not been crossed during installation. The customer should perform this test prior to using the system in clinical situations. The customer has the ultimate responsibility. This test is not intended to be used in place of any other pipeline system test required by N.F.P.A. 99C or any local building codes.

STANDARD MANIFOLD

- A) With the cylinders turned off, exhaust the gas from the entire pipeline system by sequentially connecting an indexed gas hose to each outlet station.

CAUTION

Always hold the free end of the hose or hose whip may result in an injury.

- B) Open ONLY the oxygen cylinder post valves WITH REGULATORS connected to the manifold. Verify all nitrous oxide cylinder sources are closed.

STANDARD MANIFOLD (cont.)

- C) Verify the following:
- All gas cylinders are chained to the wall.
 - All primary oxygen gauges read pressure.
 - All secondary oxygen gauges read 50 to 55 PSIG
 - All nitrous oxide gauges read O.
- D) Test for crossed gas lines by connecting an indexed gas hose on each outlet station in each area connected to the system and:
- Verifying oxygen gas flow at each oxygen outlet station using an oxygen hose.
 - Verifying NO nitrous oxide gas flow at each nitrous oxide outlet station using a nitrous oxide hose.
- E) **CLOSE** all oxygen cylinder post valves. **OPEN** only the nitrous oxide cylinder post valves with regulators connected to the manifold.
- F) Exhaust all oxygen gas from the entire manifold and pipeline system by sequentially connecting an indexed oxygen gas hose to each oxygen outlet station.

CAUTION

Always hold the free end of the hose or hose whip may result in an injury.

- G) Verify the following:
- All primary nitrous oxide gauges read pressure.
 - All secondary nitrous oxide gauges read 50 to 55 PSIG
 - All oxygen gauges read O.
- H) Test for crossed gas lines by connecting an indexed gas hose on EACH outlet station in EACH area connected to the system and:
- Verifying NO oxygen gas flow at EACH oxygen outlet station using an oxygen hose.
 - Verifying nitrous oxide gas flow at EACH nitrous oxide outlet station using a nitrous oxide hose.

CAUTION

Always hold the free end of the hose or hose whip may result in an injury.

- I) Close nitrous oxide cylinder post valves. Connect analgesia equipment.

CAUTION

- Nitrous oxide and oxygen should only be administered by or under the supervision of a medical professional.
- Not all patients should receive nitrous oxide -oxygen sedation. The following contraindications have been extracted from the referenced medical literature:

STANDARD MANIFOLD (cont.)

I) (cont.)

Nitrous oxide - oxygen sedation should not be used with dental patients when the patient:

1. Has a common cold
2. Has tuberculosis or other pulmonary conditions
3. Has been undergoing psychiatric treatment
4. Has multiple sclerosis

References:

Langa, H. (1968) "Relative Analgesia in Dental Practice"
- W.B. Sanders Company

Parbrook, G.D. (1968) "Therapeutic Uses of Nitrous Oxide"
- British Journal of Anesthesia 40K 365

This list does not include all possible contraindications. Therefore, it is the decision and responsibility of the medical professional to determine whether or not to use nitrous oxide - oxygen sedation for the patient.

FUNCTIONAL TESTS

The failure of any one of the following tests will require the analgesia unit to be returned for service. These tests must be conducted periodically to insure that your analgesia unit is performing optimally (see fig 30).

1. **Oxygen Flow Control Valve**
With the "on - off" switch "ON" adjust valve knob through full range of 3 LPM to 10 LPM.
2. **Nitrous Oxide Flow Control Valve**
With "on - off" switch "ON", adjust valve knob through full range of 0 to 7 LPM.
3. **Fail safe Test**
Turn off and disconnect from wall outlet oxygen gas supply to RA and observe that nitrous oxide flowmeter float falls at the same rate as oxygen flowmeter float.
4. **Non-Rebreathing Valve Test**
Blow into breathing tube adapter. Exhaled air must not pass through the gas outlet into analgesia head.

FUNCTIONAL TESTS (cont.)

5. Air Inlet Valve Test

Temporarily plug the breathing bag mount and inhale through breathing tube adapter. Room air must enter through the inlet valve. (Remove temporary plug).

Then temporarily plug the breathing tube adapter and blow into breathing bag port. Exhaled air must not escape through air inlet valve. (Remove temporary plug).

6. Oxygen Flush Test

Depress and release oxygen flush button to assure that breathing bag can be inflated.

OPERATION

A) The Controls and Indicators (Refer to figure 30)

1. **On-Off Switch** - The "off" position precludes gas flow. The "on" position opens the circuitry to permit gas flow.
2. **Oxygen Flow Control Valve** - Controls total flow rate of oxygen from 3 L/M to 10 L/M.
3. **Nitrous Oxide Control Valve** - Controls the flow rate of Nitrous Oxide from 0-7 L/M.
4. **Oxygen Flush** - When manually pressed, provides rapid, inflation of the breathing bag and circuit with oxygen.
5. **Nitrous Oxide and Oxygen Flowmeter Tubes** - The amount of gas flowing is indicated by reading the mid-point (maximum diameter) of the ball (see fig 32)

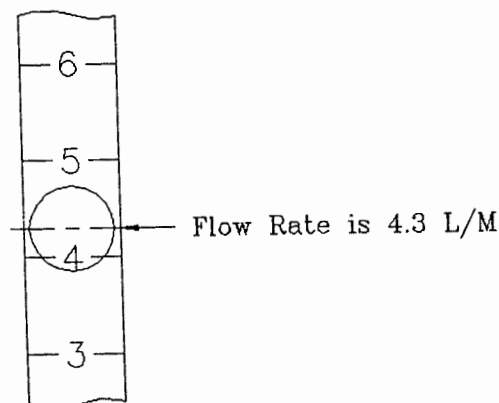


Figure 32

OPERATION (cont.)

B) Determining Mix ratio of the delivered Gas

The RA Analgesia Mixer delivers specific amounts of nitrous oxide and oxygen gas as per indicated on the respective flow tubes. The following formulas would give the gas mixture ratio:

For percentage of Nitrous Oxide:

$$100\% \times \frac{N_2O (L/M)}{N_2O(L/M) + O_2(L/M)} = \% N_2O$$

For percentage of Oxygen:

$$100\% \times \frac{O_2(L/M)}{N_2O (L/M) + O_2 (L/M)} = \% O_2$$

MAINTENANCE

The following routine maintenance procedures should be followed to insure long-lasting and trouble-free service from your Matrx analgesia machine.


- A) Inspect machine, hoses, and connections for damage, wear, and leaks, daily.
- B) Perform functional tests as described on page 33 periodically.
- C) For cleaning the outside of the machine and accessories, we recommend the use of a germicide containing glutaraldehyde. Follow the manufacturer's directions for use.

SERVICE

All warranty service (one year from date of delivery to the customer) must be accomplished at Matrx. Have your dealer return the unit to our factory and arrange for a loaner unit for yourself.

For out-of-warranty service, contact your dealer for dealer repair or return to Matrx.

CE NOTICE

The  Symbol on this product indicates compliance with the Medical Device Directive of the European Community. A "Declaration of Conformity" in accordance with the Directive has been made and is on file. Direct inquiries may be made to the following address:

**Matrx Regulatory Affairs
145 Mid County Drive
Orchard Park, NY 14127
USA
(716) 622-6650**

**Matrx EU Representative
Heatherside
Carron Lane, Midhurst
West Sussex GU29 9LE
United Kingdom
Tel: +44 (0) 1730-815811**



Matrx

***145 Mid County Drive
Orchard Park NY 14127
716-662-6650
800-847-1000
Tech Support 888-279-1260***