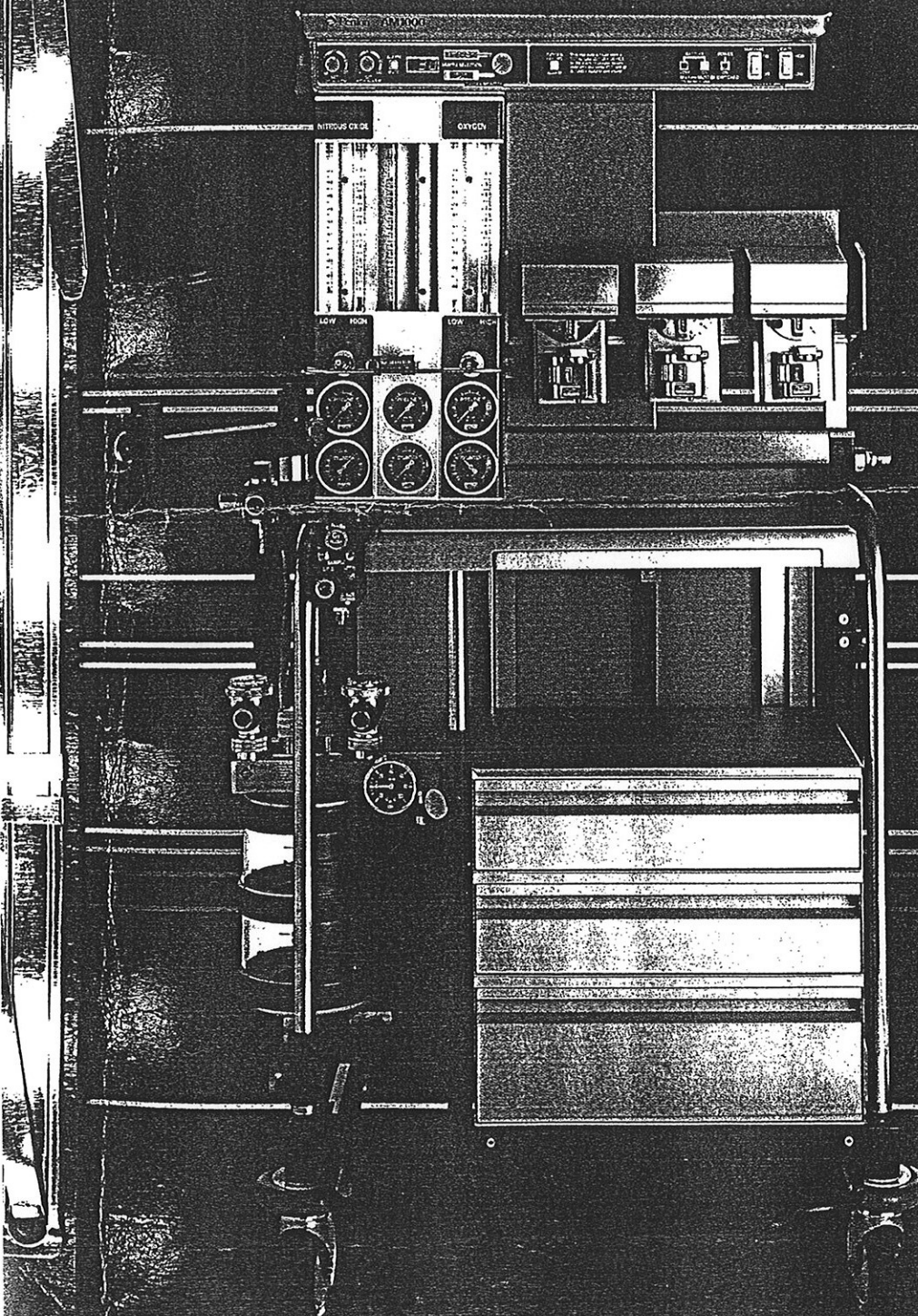


# Penlon introduces . . . The AM 1000 Anesthesia Machine



**Penlon**  
Inter Med





AM1000

ANAESTHETIC MACHINE

USER'S INSTRUCTION MANUAL

Doc. No. A0186UI

ACG/SMB

Nov.'85/Revised Dec'85/Aug'86/Sept'86/Oct'86/Nov'86

## FOREWORD

This manual has been produced to provide authorised personnel with information on the function, routine performance and maintenance checks applicable to the AM1000 Anaesthetic Machine.

Information contained in this manual is correct at the date of publication. The policy of Penlon Ltd. is one of continued improvement to their products. Because of this policy Penlon Ltd. reserve the right to make any changes, which may affect instructions in this Manual, without giving prior notice.

Personnel must make themselves familiar with the contents of this Manual before using the apparatus.

### Trademarks and Copyright

Reference is made to the following:

'Tec', 'Ohio', 'Ohmeda' and 'Cyprane' are registered trade marks of the Medishield Corporation.

'Rotameter' is a registered trade mark of KDG Ltd.

'Modura' is a registered trade mark of Simonsen & Weel Ltd.

Produced by Penlon Ltd.



## IMPORTANT

### Servicing and Repairs

In order to ensure the full operational life of this machine, servicing by a Penlon trained engineer should be undertaken periodically. For normal usage, the recommended service interval is 4 months.

For any enquiry regarding the servicing or repair of this machine, contact the nearest accredited Penlon agent\*, or communicate directly with:

Service and Repair Department  
Penlon Limited  
Abingdon  
Oxfordshire  
OX14 3PH  
England  
Telephone: Abingdon (0235) 24042  
Telex: 837129  
Cables: Penlon, Abingdon  
Fax: 0235 27184

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\*Agent's name and address:

*Eas1*

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Always give as much of the following information as possible:

1. Type of equipment
2. Product name
3. Serial number
4. Approximate date of purchase
5. Apparent faults

### Maintenance records

Section 10 of this manual is for the use of clinical staff and service engineers, and it is important that notes be made under the relevant headings of any problems encountered and work undertaken.

Please keep this manual in a convenient place on or near the anaesthetic machine.

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**WARNING : IMPORTANCE OF PATIENT MONITORING**

Anaesthetic machines are required to be able to deliver to the patient mixtures of gases and vapors which could cause injury or death unless properly controlled by a qualified anaesthetist.

There is a considerable variation in the effect of anaesthetic drugs on individual patients so that the observation of control settings on the anaesthetic machine does not in itself ensure patient safety.

The use of monitoring apparatus to analyse the inspired gas composition (e.g. oxygen concentration) whilst a very desirable aid is again not a true clinical monitor, as the condition of the patient is also dependent on his respiration and the function of his cardio-vascular system.

IT IS ESSENTIAL THAT THE VITAL SIGNS OF THE PATIENT ARE MONITORED REGULARLY AND FREQUENTLY AND THAT THESE OBSERVATIONS ARE GIVEN PRECEDENCE OVER MACHINE CONTROL PARAMETERS IN JUDGING THE STATE OF A CLINICAL PROCEDURE.

Conventional recommendation for patient monitoring are:

- (a) cardiac monitoring
- (b) colour observation
- (c) muscular condition
- (d) nervous reflex
- (e) oximetry
- (f) respiratory CO<sub>2</sub> monitoring
- (g) respiratory volume and pressure monitoring
- (h) sphygmomanometer
- (j) thermometer

The clinician should select from the above the most appropriate to a particular procedure.



## 1. SPECIFICATION

### 1.1 Physical:

Overall size: 60" x 27" x 24" (1524 x 690 x 610)  
Weight: 300lbs (136 kg) typical model  
Work surface height: variable 28" - 36" (711 - 915)  
Work surface size: 21" x 15" (536 x 386)  
Writing tablet: 15" x 11" (386 x 300)  
Monitor shelf: 26" x 16" (650 x 400)  
Loading: 60lbs (27.2 kg)  
Drawers: 2", 4" and 6" to customer's requirements.  
Castors: 5" (127) Anti Static  
Absorber post: 10" swivel radius round hand rail:  
Height adjustment 12" to 30"  
Ventilator post: Bushed to accept 1" (25.4mm) or 7/8"  
(22mm) poles

Gas Scavenging fixing: Dovetail Clip on Ventilator post.

Common gas outlet connection: 22mm male taper with co-axial  
15mm female taper  
Safelock fitting

Oxygen flush: 50 - 70 l/min when fully depressed

Gas supplies:  
cylinders: E size pin-indexed maximum of 5 : 2 oxygen,  
2 nitrous oxide, plus  
1 optional 3rd gas (see 1.3)

Pipeline: DISS indexed, maximum of 4: oxygen, nitrous  
oxide, air and vacuum

Throughout the machine the following colour codes apply for  
medical gases:-

Oxygen	-	Green	
Nitrous Oxide	-	Blue	
Medical air	-	Yellow	)
Carbon dioxide	-	Green	)
Helium	-	Brown	)
Nitrogen	-	Black	)

when provided

#### Flowmeters

Oxygen: dual flow 1 100 ml/min - 1000 ml/min  
2 1 l/min - 10 l/min  
Nitrous Oxide: dual flow 1 100 ml/min - 1000 ml/min  
2 1 l/min - 10 l/min  
Air: (optional) 1 l/min - 15 l/min

## Flowmeter Accuracy

In accordance with CSA Z305.3 M1979, the accuracy of the flowmeter tubes is

± 2.5% of full scale reading

Tubes and floats are matched and carry identifying serial numbers. Flowmeter tubes have anti-static coatings.

Tubes are length indexed:

Oxygen	10.24"	(260mm)
Nitrous Oxide	9.84"	(250mm)
Third Gas	9.45"	(240mm) (see 1.3)

Scale length (all tubes) min. 6.0" (152mm)

### Electrical Supply

(for machine only)

1 amp 100-120v 60Hz  
(0.5 amp 220-240v 50Hz)

(Incl. accessory outlets)

6 amp 110-120v 60Hz  
(5.5 amp 220-240v 50Hz)

Permanently attached 3 metre lead.

Stowage hooks for cable on rear

### Auxiliary electrical power outlets:

4 outlets

Max. total current 5A

### Battery back-up:

12v 1.9AH rechargeable sealed lead acid battery  
provides 20 minutes operation of oxygen monitor  
and safety devices.

### Gas pressures:

Design basis: 50 psig (340kPa) pipeline supplies.

Supply pressure variation + 10%

Reduced pressure from regulator. 45 psig (310 kPa) + 10%.

Regulator diaphragm bursting pressure 410 psig (2800kPa)

Reduced pressure system safety valve 75 psig (510kPa)

Safety valve on CGO block to protect flowmeter, vaporizer  
etc. 4.5 psig (30kPa)

### Auxiliary outlets:

Oxygen (2) on CGO block

D.I.S.S. self sealing connections

Oxygen supply at pipeline pressure 50 psig (340kPa)

Flow rate not less than 100 l/min to free air

80 l/min against 36 psig resistance

70 l/min against 40 psig resistance

50 l/min against 44 psig resistance

Oxygen failure warning devices: Ritchie Whistle and visual  
indicator (direct pressure operated)



## Oxygen monitor:

paramagnetic principle

Range: 0 - 100% oxygen

Accuracy: + 1%

Drift: Zero  $\pm$  0.1% per hour

Range  $\pm$  0.1% per hour

(Readings are proportional to absolute barometric pressure and a sudden change in this ambient condition may result in greater values of drift).

Sampling time: better than 5 seconds when sampling from the fresh gas supply.

The use of long sampling lines may increase sampling time when monitoring direct from a breathing system, this is normally approximately 10 seconds with the standard sampling lines.

### Alarm:

Low alarm adjustable 25 - 100%

High alarm adjustable 25 - 110%

An N<sub>2</sub>O cut off valve is activated at the low alarm set point.

Alarm is both audible and visible.

Audible alarm may be muted for 30 seconds by pressing

Alarm Mute control.

Sampling selection control enables monitor to measure O<sub>2</sub> in fresh gas or in breathing system.

## 1.2 Environmental

Temperature

Storage - 23° to 140°F ( - 5° to 60°C)

Operating ambient 50° to 100°F ( + 10° to 38°C)

Altitude 8000ft maximum

Humidity 10 - 95% R.H.

Cleaning Wipe external surfaces with dry or damp cloth. Use mild soap solution if necessary.

## 1.3 Third Gas option

Any of the following options are available on request:

### U.S. Model

1.3.1 Air with selection valve, so that either nitrous oxide or air, but not both, can be used with oxygen.

Selector valve operated by lever on flowmeter panel.

Air flowmeter range: 1 - 15 l/min

1-Cylinder yoke pin-indexed for medical air.

Pipeline inlet for air.

Cylinder contents and pipeline pressure gauges.

Air pipework is colour coded at each junction.

### Non-U.S. Models

1.3.2 Air without selector valve, enabling oxygen, air and nitrous oxide to be used together.

Air flowmeter range: 1 - 15 l/min.

1-Cylinder yoke pin-indexed for medical air.

Pipeline inlet for air.

Cylinder contents gauge.

Pipeline pressure gauge.

Air pipework is colour coded at each junction.

Non-U.S. Models

- 1.3.3 Carbon Dioxide enabling oxygen, carbon dioxide and nitrous oxide to be used together.  
CO<sub>2</sub> Flowmeter range 20ml/min - 700ml/min.  
1-Cylinder yoke pin-indexed for CO<sub>2</sub>.  
Cylinder contents gauge.  
CO<sub>2</sub> pipework is colour coded at each junction.

Non-U.S. Models

- 1.3.4 Helium, enabling oxygen, helium and nitrous oxide to be used together.  
Helium Flowmeter range 1 - 10 l/min.  
1-Cylinder yoke pin-indexed for He.  
Cylinder contents gauge.

Non-U.S. Models

- 1.3.5 Nitrogen, enabling oxygen, nitrogen and nitrous oxide to be used together.  
Nitrogen Flowmeter range 1 - 10 l/min.  
1-Cylinder yoke pin-indexed for N<sub>2</sub>.  
Cylinder contents gauge.

Non-U.S. Models

- 1.3.6 Nitrogen, additional option:  
A pipeline inlet for nitrogen can be provided in place of an air pipeline to special order. As nitrogen pipelines sometimes operate at higher pressure, than other medical gas, an additional pressure regulating valve is incorporated within the machine.



## 2. DESCRIPTION

### 2.1 Framework and General construction

The machine is made from welded steel construction, and is finished in a high quality durable plastic coating. A soft bumper is provided above each castor to protect walls, doors and the machine from damage while it is moved from one location to another. Mobility is provided by four 5" dia stainless steel and anti-static rubber castors. Two stainless steel hand rails are provided in convenient positions, to allow the machine to be easily manoeuvred. The adjustable absorber post is mounted on the left hand handrail at the front of the machine. By releasing the locking screw, the absorber can be swung round and stored, largely within the confines of the framework.

Fig.1

Fig.2

A ventilator mounting post can be attached to the left hand main frame upright member and pivots in the same manner as the absorber post allowing storage of the ventilator above the work surface.

The gas scavenging system can be mounted on the dovetail included on the ventilator mounting post.

A suction unit can be mounted on the right hand main frame upright and is protected from damage by a steel guard.

The machine may be supplied with a combination of 2", 4" and 6" drawer units.

A footrest is available which attaches to the structural framework below the drawer assemblies.

The work surface has an anti-glare stainless steel removable tray with raised edges to prevent instruments, vials etc. from rolling off - a drain trap in the work surface edge allows spilled liquids to be mopped up easily. The tray is made removable to enable it to be stocked with necessary equipment and drugs pre-operatively.

A pull-out writing tablet is mounted under the work surface and contains slots for holding pens and pencils.

The whole of the work surface assembly is finely balanced by a gas spring to provide a comfortable height adjustment for the user, over the range from sitting to standing positions.

Adjustment of the work surface is performed by releasing the clamp screw on the left hand corner and pressing down to lower surface or permitting it to rise to a higher level.

The stainless steel monitor shelf 26" x 16" (650 x 400) has two strap anchors to enable monitors etc. to be securely held to the shelf.

The shelf inclines slightly downwards at the front to align with the operator's eye-line.

## 2.2 Gas Circuit

Various models provide for the simultaneous delivery of either two or three gases, supplied from up to 5 gas cylinders, 2 oxygen, 2 nitrous oxide, 1 third gas, and up to 3 pipeline supplies: Oxygen, Nitrous Oxide and Air, plus vacuum pipeline.

Fig.11

The five rear-mounted cylinder yokes conform with the C.G.A. and I.S.O. standards for pin-index fittings, and the pillars are dimensioned to ensure the retaining latch cannot be moved to the cylinder retaining position unless the index pins are fully engaged; this ensures that only cylinders of the appropriate gas may be installed.

Fig.3

Each cylinder yoke contains a filter to prevent dirt entering the pipework system.

All machines are equipped for pipeline gas supplies and have pipeline blocks mounted on the rear of the left hand frame upright and hoses are connected by non-interchangeable, threaded unions.

Fig.3

Each pipeline block is fitted with a filter to prevent dirt entering the pipework system and a non-return valve to prevent back flow of gas.

Pipelines are to be at a nominal supply pressure of 50 psig (345 kPa).

Each gas supplied from compressed gas cylinders is reduced to working pressure by a diaphragm pressure regulator, reducing outlet gas pressure to a nominal 45 psig (310 kPa).

For oxygen only, a second stage regulator reduces the pressure supplied to the flowmeter controls to 37 psig (250kPa).

A relief valve set at 75 psig (510 kPa) prevents any pressure build up under the diaphragm should any leakage develop across the reducing valve seat. High pressure gauge tapings are made from the high pressure side of the regulators.

The cylinder pressure reducing valves house filters at their inlets to prevent any possibility of dirt entering the valve and reducing their efficiency.

### Gas Supply Safety Devices

#### A1/ U.S. models

The oxygen supply is fed to a pneumatic relay valve which permits nitrous oxide and the third gas to flow only when the oxygen supply pressure rises above 30 psig (206 kPa).

Fig.

Conversely, the supply of these gases is cut off when the oxygen pressure falls below 25 psig (170 kPa).

**CAUTION** Needle valves are designed to seal with light torque and may be damaged if tightened excessively.

The gas mixing chamber and fresh gas mode oxygen monitor sample point is mounted on the rear of the flowmeter assembly.

Oxygen enters the chamber at the point nearest to the outlet. High or low illumination of flowmeter tubes may be selected by operating a switch on the panel. Multiple low voltage lamps are provided; however, whilst in the battery back-up mode, two bulbs only will be illuminated in each flowmeter assembly to prolong battery operating times.

## 2.5 Vaporizers

Fig.1

Vaporizers for the administration of volatile anaesthetic agents are fitted to customer's requirements. The AM 1000 can be built to accept either up to three back-entry Penlon PPV vaporizers or two vaporizers with 23mm cagemount taper connections to ISO 5358 of the Ohio, or Tec 3 types.

Fig.5

Covers partially mask the vaporizers leaving visible the level indicators, which enables the user to check the level of anaesthetic agent prior to bringing a vaporizer into service. An interlocking assembly in the lid mechanism prevents the selection of a second vaporizer whilst any one is in service.

**CAUTION** A blanking plate must be fitted to any vaporizer station which is not occupied by a vaporizer to prevent discharge of anaesthetic gases to the atmosphere if the lid on the empty station is lifted.

The action of lifting a vaporizer cover, which is then self-sustaining in the upright position, operates two valves in the mixed gas system to divert gas flow through that particular vaporizer.

When the cover is lowered over the vaporizer these valves permit gas to bypass the vaporizer and seal the inlet and outlet connection tubes to that vaporizer.

The covers have interlocking mechanical devices between them so that only one cover can be raised at any time.

In all cases, the valve units "make" the new port connection before "breaking" the existing connection, therefore ensuring that gas supply to the patient cannot be accidentally cut off.

To complete the vaporizer interlock system, each cover is provided with a plate which prevents it being closed unless the vaporizer below it is in the 'O' (OFF) position. Details of this plate vary with the type of vaporizer used.

Fig.6

- Type (a) covers - Penlon PPV unit  
(b) covers - Tec\* 3 vaporizers (Cyprane\* Ltd.,  
Ohmeda\*)  
and Ohio\* vaporizer (Ohio Medical ; Ohmeda)

\* Trade Marks of the Medishield Group

#### 2.5.1 Back Entry System

Attachment of a vaporizer is by the retained bolt protruding through the rear panel of the machine, directly behind each vaporizer. Face mounting pegs and seals automatically locate and seal the inlet and outlet connections to the vaporizer when it is mounted on the quick fit bar. The pegs and seals are designed to ensure that, during mounting the vaporizer, the seals cannot get damaged by misalignment of the vaporizer.

The fixing bolt is designed to be operated with a gas cylinder key.

#### 2.5.2 Cage Mount Taper Vaporizers

Fig.5a

Existing cagemount taper vaporizers can be adapted to fit the AM 1000 system by attaching an adaptor to the vaporizer.

Adaptors are available as follows:-

for Fluotec 3

for Ohio vaporizers

The adaptor is attached to the vaporizer by removing one of the taper connector blocks from the adaptor, placing the adaptor at the rear of the vaporizer and securing both taper connectors to the vaporizer as the second block is re-fixed. The use of a small quantity of ptfte based lubricant (eg Fomblin) on the taper makes it easier to obtain a leak free fit.

The back surface of the adaptor contains the two gas ports and attachment bolt for the AM1000 vaporizer mounting system and an adapted vaporizer is attached to the machine exactly as in 2.5.1 above, except:-

**CAUTION:** Adapted Cage Mount Vaporizers occupy more space on the machine than Back Entry Vaporizers. The two-station mounting system (Models 58312, 58313, 58316, 58317) will accommodate two Adapted Cage Mount vaporizers, two Back Entry vaporizers, or one of each type. The three-station mounting system (Models 58310, 58311, 58314, 58315) will accommodate only one Adapted Cage Mount vaporizer at a time in the centre position. Both end positions must be blanked off and only one vaporizer will be available on the machine.



#### A2/ Non-USA models

The oxygen supply is fed to a pneumatic relay valve which permits nitrous oxide to flow only when the oxygen supply pressure rises above 30 psig (206 kPa). Conversely, the supply of nitrous oxide is cut-off when the oxygen pressure falls below 25 psig (170 kPa). (See 2.9 for details of third-gas safety devices).

#### B/ Oxygen supply failure warning whistle

Fig.11

The Ritchie Whistle gives an audible warning of reduction of oxygen supply pressure. It is operated solely by the remaining oxygen in the machine system. To prolong the warning, an oxygen reservoir is built into the gas circuit, allowing a minimum warning whistle of 10 seconds duration.

The whistle will start to sound when the pressure falls to approximately 20 psig (206 kPa), and will continue to sound until the pressure falls to approximately 10 psig (70 kPa).

Oxygen consumption of the Ritchie Whistle is approximately 2 l/min when sounding and nil at other times.

#### C/ O<sub>2</sub> Supply visual indicator

Fig.8

A pressure operated visual indicator is located in the pod below the monitor shelf and provides a visual indication of oxygen supply failure. It will show "green" above 28 psig (190 kPa) rising pressure and "red" at 24 psig (165 kPa) falling pressure.

#### D/ Fresh Gas pressure relief valve

Fig.11

A pressure relief valve is mounted on the rear of the C.G.O. block and is designed to prevent fresh gas being delivered to the breathing system at pressures exceeding 4.5 psig (30 kPa).

This valve also protects machine components against excessive pressure in the event of a total blockage of the C.G.O.

### 2.3 Pressure Gauges

63mm dia pressure gauges are located behind the front panel on the left hand side and are viewed from the front of the machine. Oxygen gauges are positioned on the right hand side of the gauge panel and nitrous oxide to the left. The pressure gauges for the third gas are positioned centrally between oxygen and nitrous oxide. This corresponds directly with the flowmeter configuration above the gauges.

All pressure gauges are labelled for the gases whose pressures they are indicating. Cylinder contents are marked "cylinder" and pipeline pressure gauges are marked "pipeline".

The gauges are calibrated in kPa x 100 in accordance with ISO 5358 (Minimum performance and safety requirements for components and systems of continuous flow anaesthetic machines).

On machines that have facilities for pipeline gas and also two emergency reserve cylinders, the two supplies from the cylinder yokes are tee'd together with high pressure non-return valves and a single feeder supply taken to the pressure reducing valve.

**CAUTION** When checking cylinder contents, care must be taken to ensure that either the lower pressure is read first, or that the oxygen system is discharged before reading the pressure in the second cylinder. This is to ensure that an empty cylinder is not 'mistakenly' assumed full because of the pressure still trapped in the system from the full cylinder.  
Unused gauge positions are blanked-out.

## 2.4 Flowmeters

Fig.1

The flowmeters, mounted behind the panel on the left hand side of the machine, are Rotameter flowtubes, length-indexed to prevent inadvertent, erroneous installation. Dual low and high flow tubes are provided for oxygen and nitrous oxide.

Fig.4

The oxygen flowmeter is located on the right hand side of the flowmeter assembly and nitrous oxide is located on the left hand side.

When required, an optional third gas is always installed in the centre position on the flowmeter assembly which is blanked out when only two gases are available.

See Section 2.9 for available options.

Tubes and floats are matched and bear identifying serial numbers.

All floats indicate flow in line with the upper surface as shown in the diagram: which is repeated on the flowmeter cover.

Each flow control valve is positioned directly underneath the flow tube assembly to which it corresponds, and is colour-coded for the gas which it controls.

The oxygen flow control knob is made physically distinguishable from the other flow controls for identification by touch in accordance with ISO 5358.

Flow control of each gas is achieved by a needle valve comprising a polished stainless steel needle mounted concentrically in a common manifold block. To minimise wear and material pick-up the needle seat is manufactured from silver. The flow control is turned counter-clockwise to increase the gas flow.

**WARNING:** BEFORE USE, THE USER MUST CHECK THAT THE VAPORIZER IS MOUNTED CORRECTLY ON THE ADAPTOR AND ENSURE THAT INSTRUCTIONS PROVIDED WITH EACH ADAPTOR KIT ARE CARRIED OUT. THIS INCLUDES CHECKING THE OPERATION OF THE "VAPORIZER OFF" INTERLOCK.

**WARNING:** VAPORIZERS MUST ALWAYS BE MOUNTED ON THE VAPLOK BACK ENTRY SYSTEM AND NEVER USED FREE-STANDING OR CONNECTED BETWEEN THE COMMON GAS OUTLET AND THE BREATHING SYSTEM.

(a) Free-standing vaporizers may be accidentally tipped resulting in liquid anaesthetic drug entering the breathing system.

(b) The oxygen flush flow must not pass through a vaporizer, or severe overdosage may result).

## 2.6 Common Gas Outlet Block (CGO)

The CGO block is mounted on the handrail on the front left hand side of the machine and is clearly labelled.

Located on the front face of the block is the fresh gas outlet connection with 22mm male taper and concentric 15mm female taper. The male taper incorporates the Penlon Safelock system designed to prevent accidental disconnection of the breathing system. An aneroid sphygmomanometer can be connected to its cuff and inflator by the nipple connection provided on the front of the block.

The oxygen monitoring sample and return lines are connected to the fittings as indicated, situated above the CGO connection.

An emergency oxygen flush valve is mounted on the top front of the CGO block and is marked "O<sub>2</sub> flush". Depressing the button provides a delivery of between 50 - 70 l/min of oxygen into the common gas outlet. Releasing the button allows the spring-loaded valve to return to its normal position.

## 2.7 Oxygen Monitor

Fig.8

The oxygen monitor mounted in the pod below the monitor shelf is capable of monitoring oxygen concentrations drawn from either the fresh gas supply mixing chamber within the AM 1000 or from the breathing system external from the machine. The oxygen concentration is displayed on a green L.E.D.

When monitoring from either the breathing system or the fresh gas system, an audible and visual alarm will activate if the oxygen concentration exceeds or falls below the concentrations set up by the high and low alarm set points.

In addition, a hypoxic control cut-off device for other gases is operative at a fixed setting of 25%.

An automatic reset is incorporated in the alarm circuitry which will cancel the alarm when the oxygen concentration in the gas sample returns to the correct level. The audible alarm can be muted for 30 seconds by pressing the "Alarm Mute" control.

A visual warning indicator is incorporated in the oxygen monitor panel which will activate should the oxygen sampling system fail.

The oxygen sample selector change-over valve is positioned adjacent to the oxygen display. Operating the valve highlights legends stating which sample is being monitored.

The oxygen monitor is a paramagnetic device which does not require regular replacement.



Power is fed to the machine via the main circuit breaker on the rear of the machine directly behind the vaporizer mounting rail.

The machine on-off switch is situated on the control panel on the pod below the monitor shelf.

Charging of the back-up battery power supply will continue whilst the power supply and circuit breaker is switched on, irrespective of the position of the on-off switch

Should the electrical power supply to the machine fail, the emergency battery supply comes into action automatically and the machine will operate normally, but with the yellow "Battery On" indicator lit, for approximately 20 minutes.

If power supplies are not restored the red "Battery Low" indicator will be lit and an audible warning given when the minimum safe level of voltage is reached. The machine should then be switched off to avoid permanent damage to the battery.

When the machine is switched off, no nitrous oxide supply can be obtained. 100% Oxygen can be provided and the vaporizer can be used.

NOTE: The stated battery back-up period will only be available if the internal back-up power supply is kept fully charged. The back-up power supply is automatically charged whilst the machine is in use. After the back-up power supply has been run down several hours re-charge will be necessary to bring to full charge.

(Battery care is described in Appendix 2)

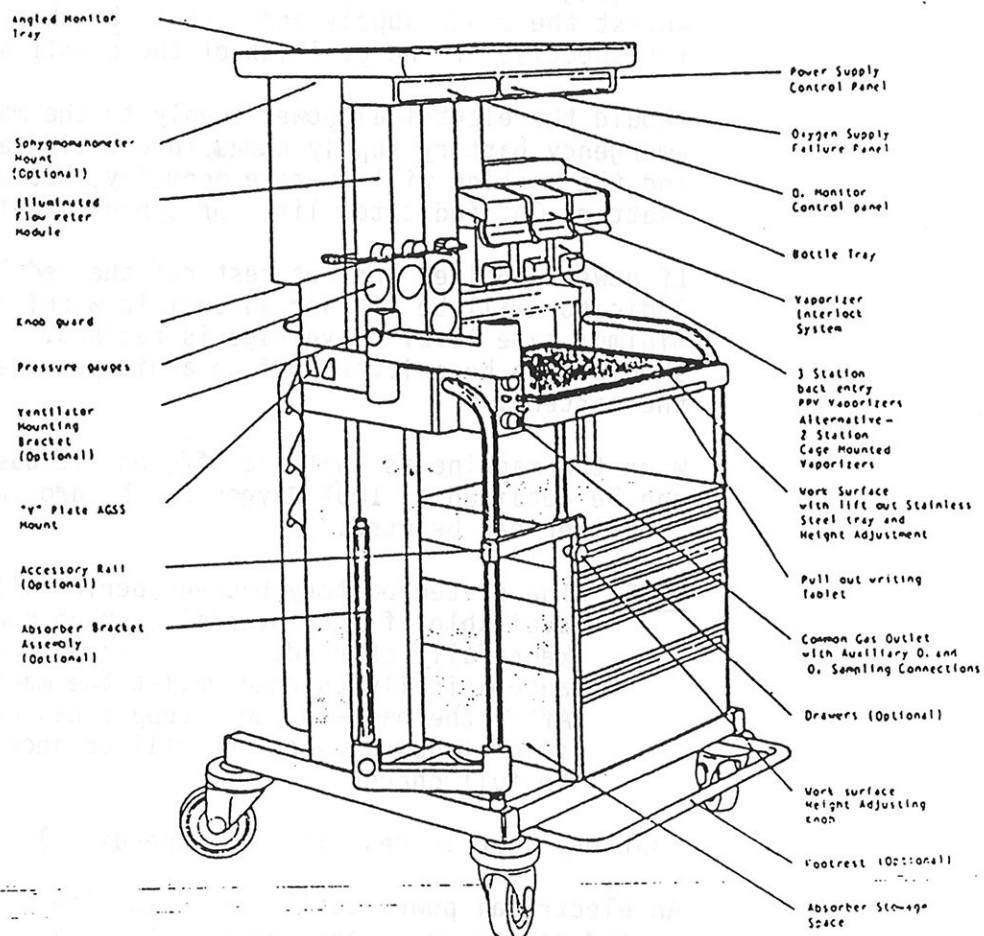
An electrical power outlet manifold with 4 sockets is fitted on the rear panel next to the main circuit breaker. The power supply to these outlets is controlled by a separate circuit breaker.

Fig.9

NOTE: It is the user's responsibility to ensure that the total sum of leakage currents from additional equipment plugged into the manifold plus the leakage current from the AM 1000 does not exceed values as laid down in relevant standards.

During an earth leakage current acceptance test of the machine, all additional equipment must be disconnected from the available sockets.

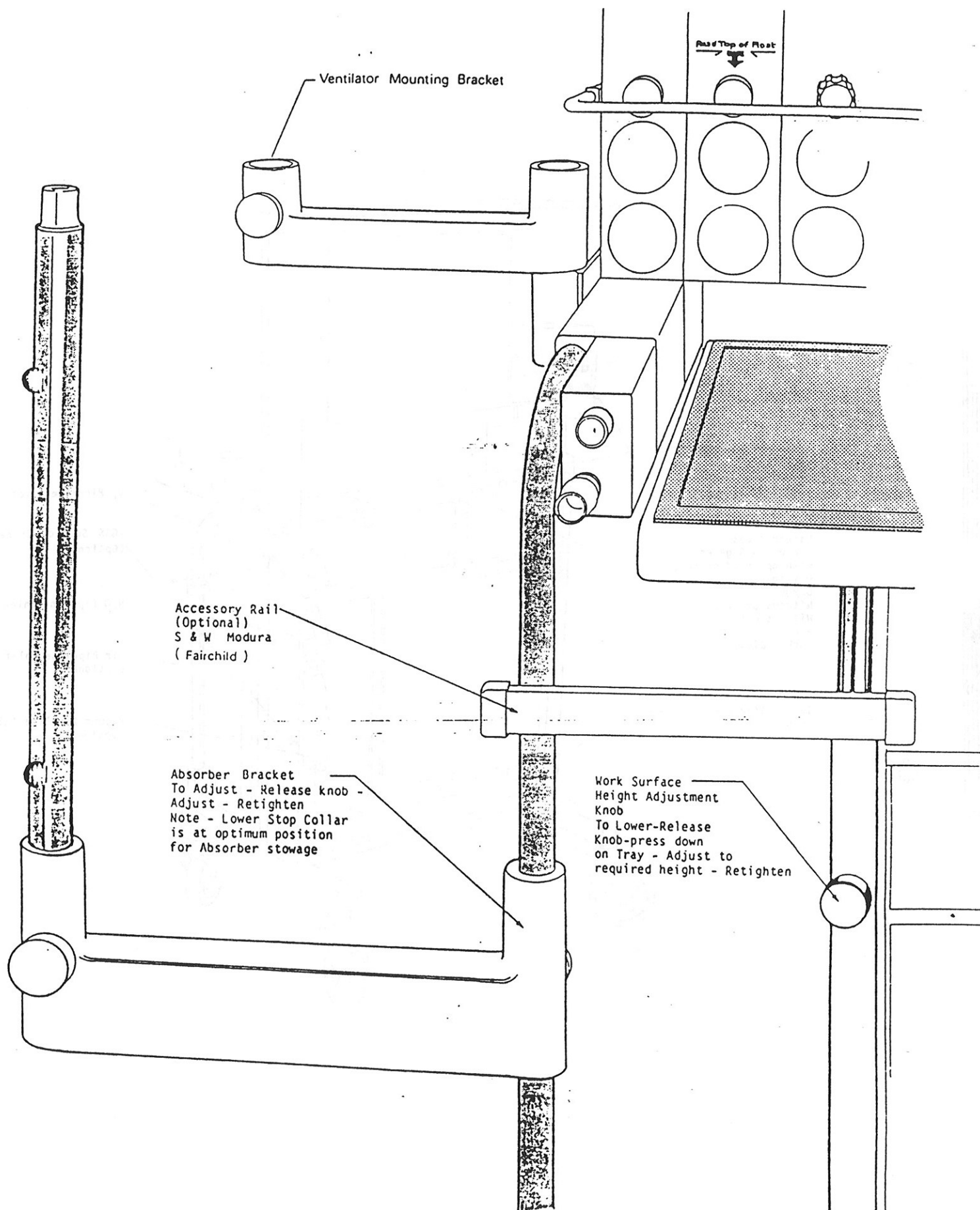
## AM 1000 FRONT VIEW



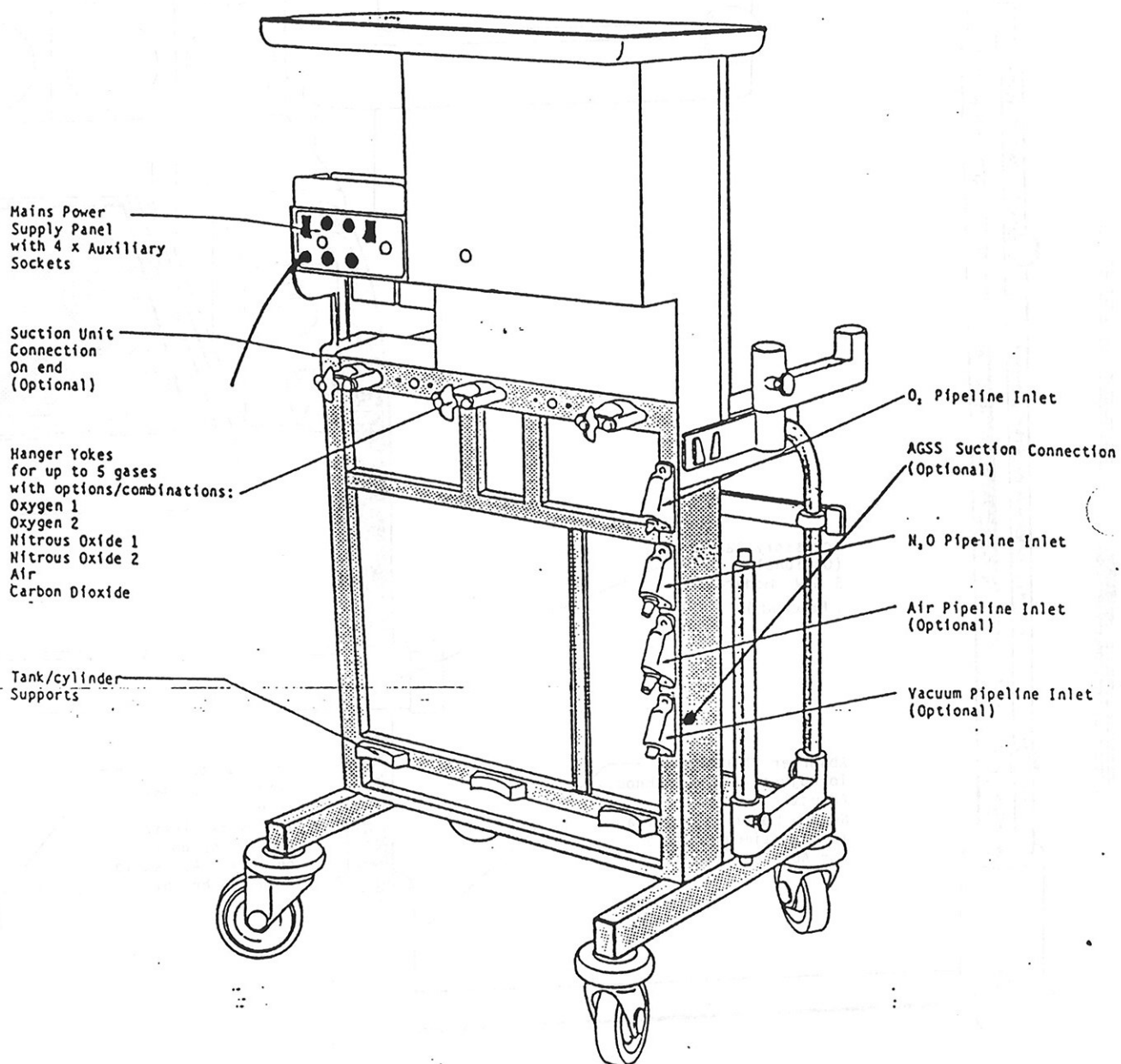
Note: Illustrations in this manual show a typical configuration of the machine. Variations in specifications may modify the appearance.

# ABSORBER WORK SURFACE & VENTILATOR MOUNTS

FIG. 2.

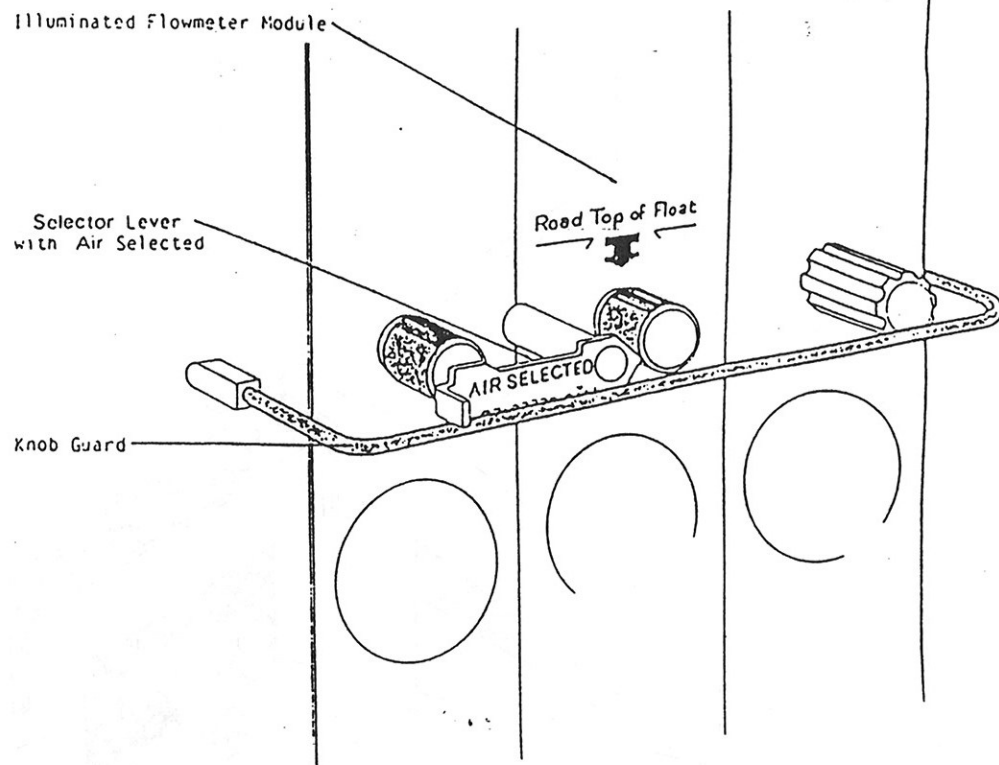


## AM1000 REAR VIEW



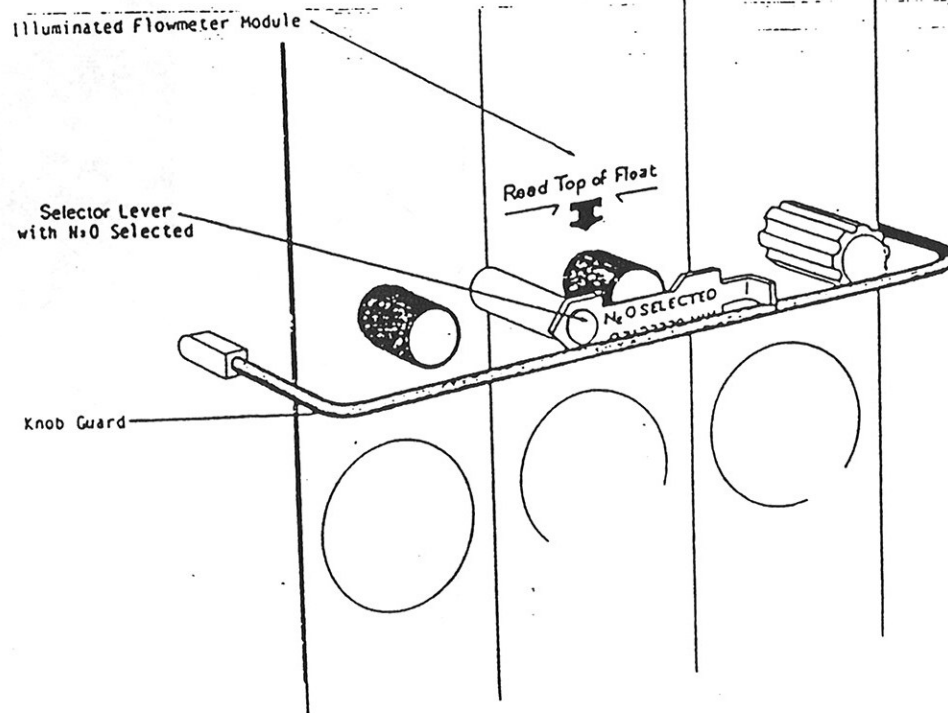


# N<sub>2</sub>O/AIR INTERLOCK (OPTIONAL)



VIEW OF FLOWMETER CONTROLS WITH AIR SELECTED (CENTER CONTROL IN USE)

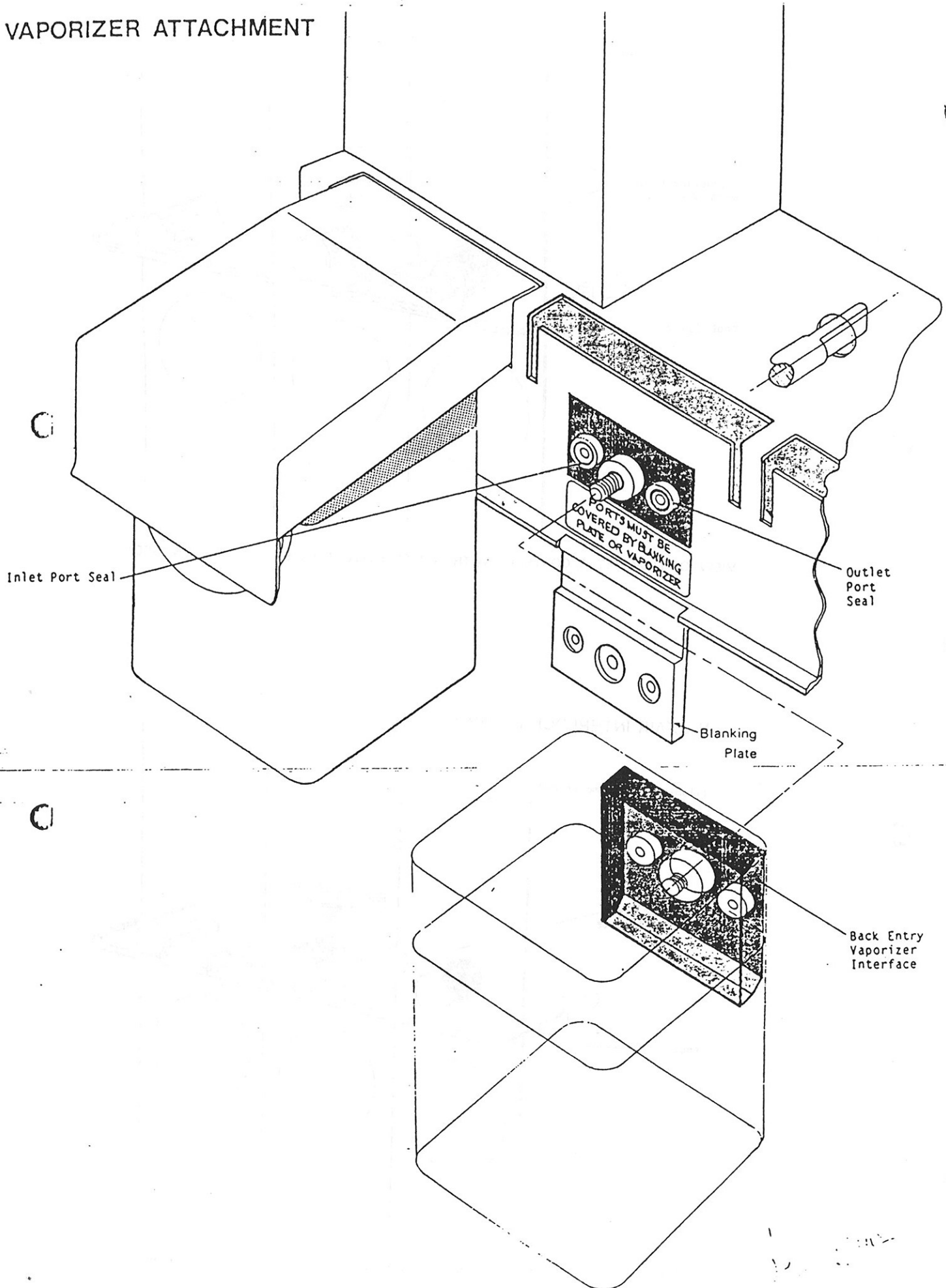
# N<sub>2</sub>O/AIR INTERLOCK (OPTIONAL)



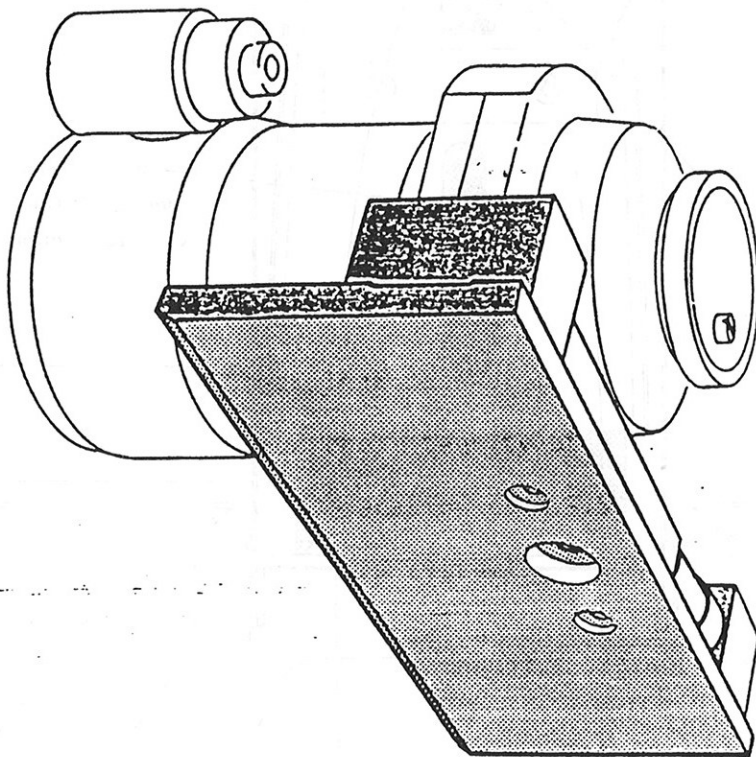
VIEW OF FLOWMETER CONTROLS WITH N<sub>2</sub>O SELECTED (LEFT HAND CONTROL IN USE)

FIG. 5.

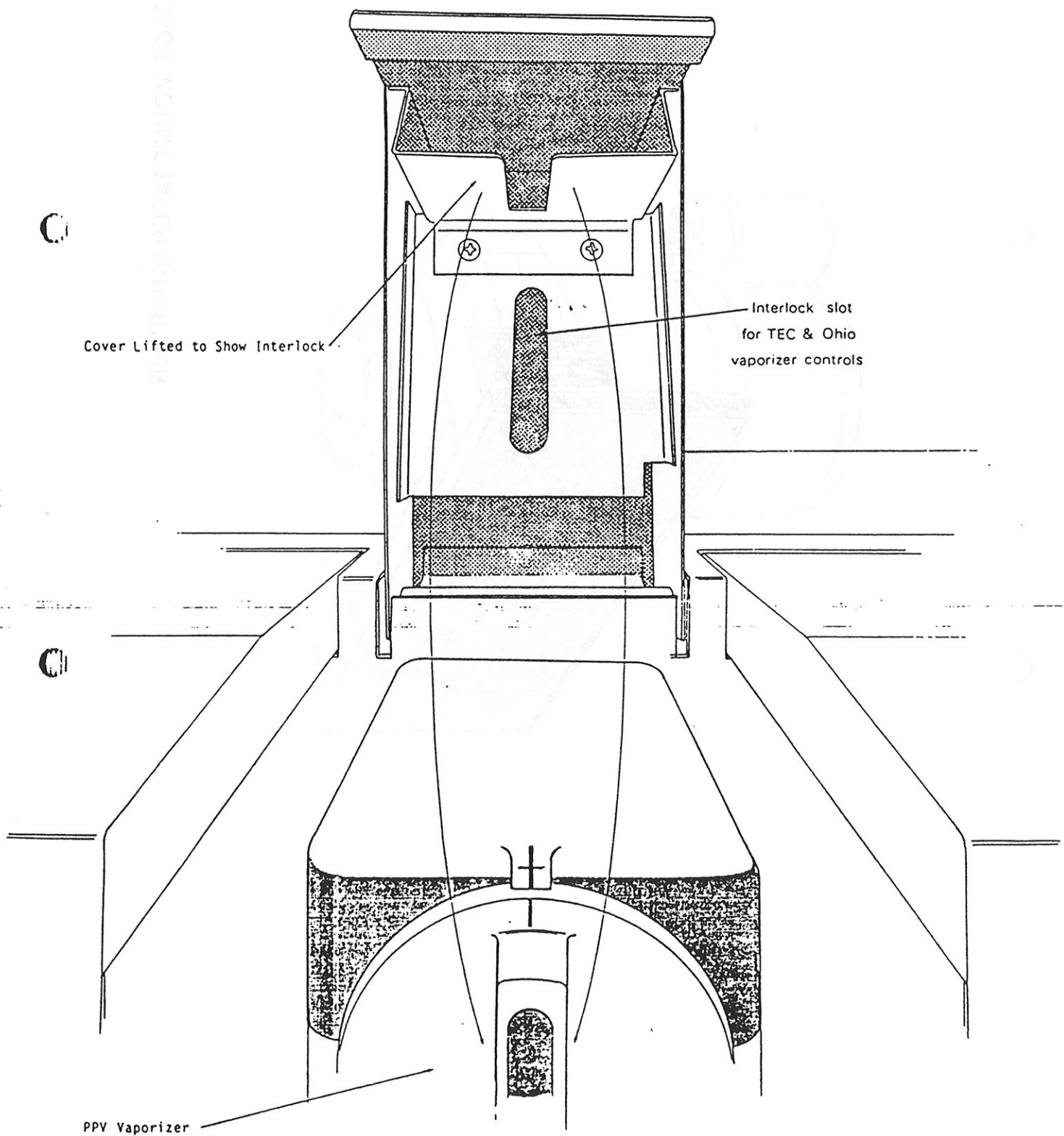
# VAPORIZER ATTACHMENT



ADAPTOR FOR CAGE MOUNT TAPER VAPORIZER



## PPV VAPORIZER COVER INTERLOCK





## COMMON GAS OUTLET (C.G.O.)

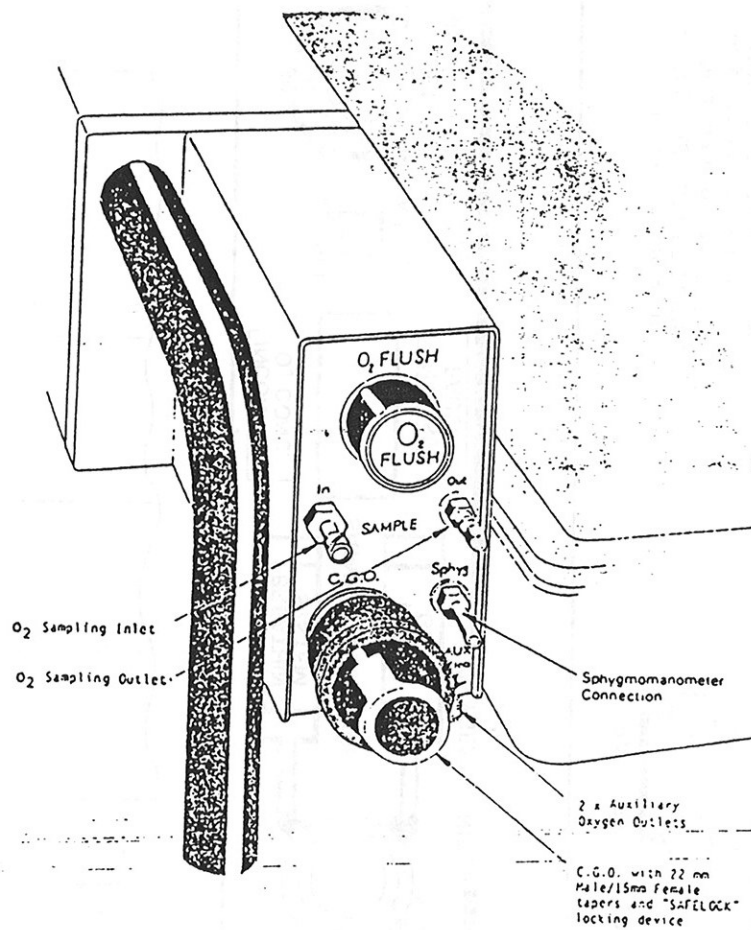
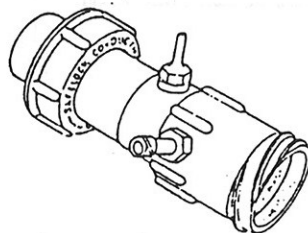
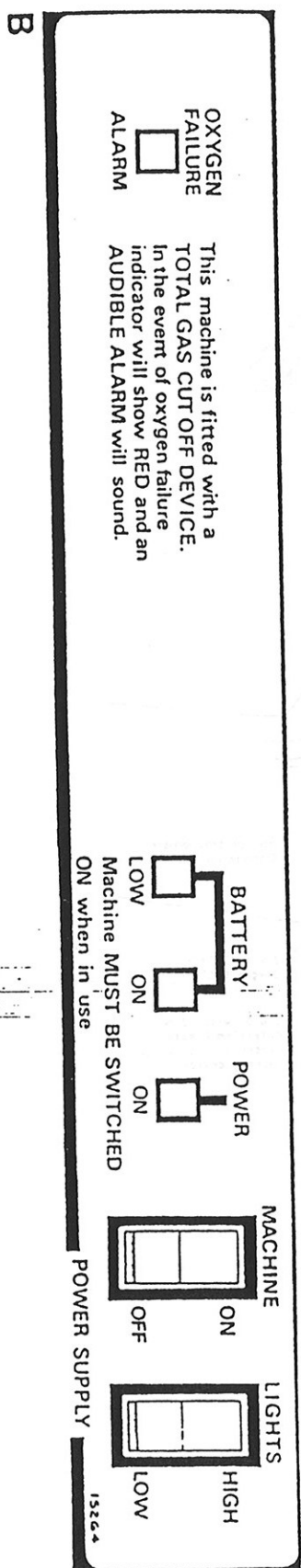
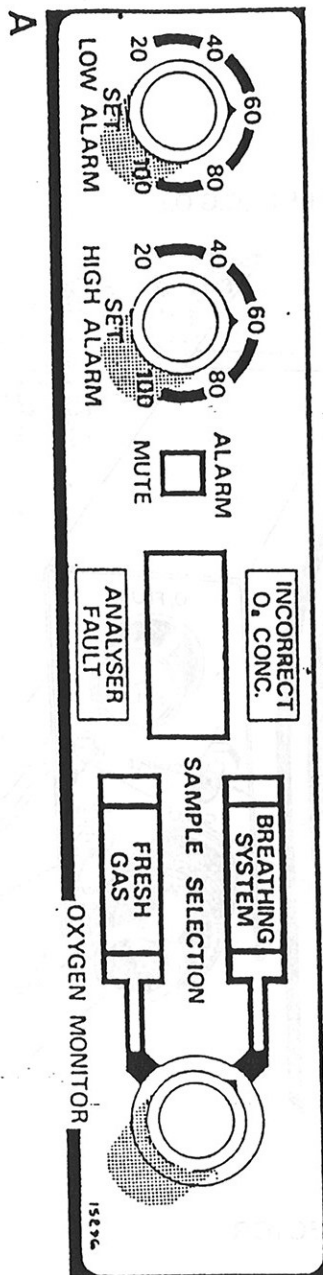
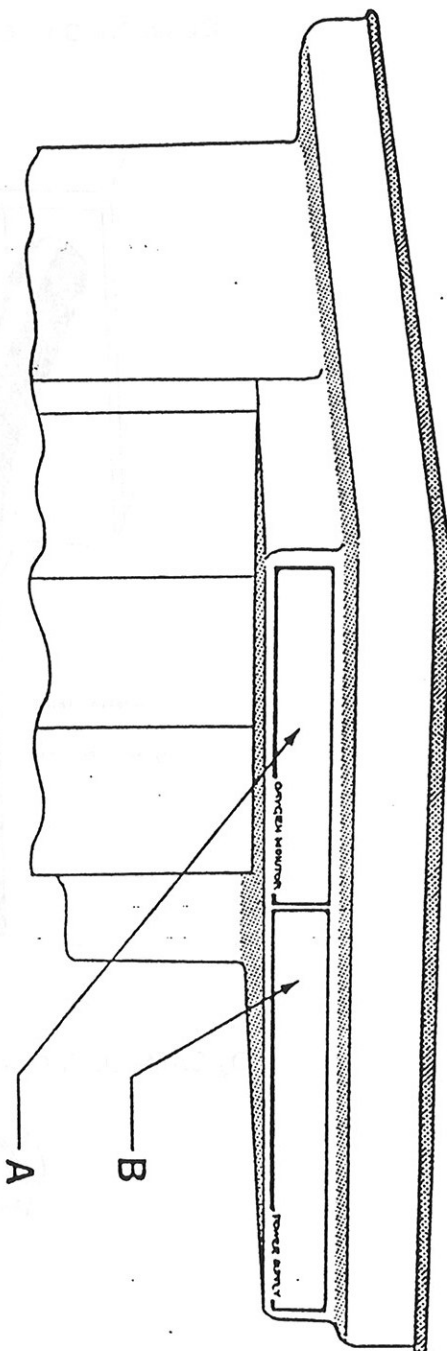
O<sub>2</sub> SAMPLING CONNECTOR

FIG.8



[illegible]

Signed

10. USER'S NOTES

Date

Event

Signed

