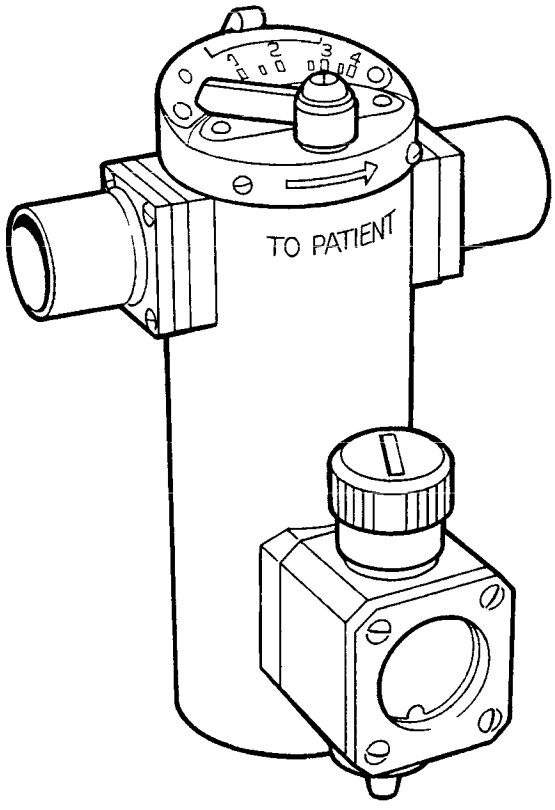
InterMed Penlon

OMV 50
Triservice OMV
Service Manual



Quality and Assurance in Anaesthesia

OMV Tri - Service & OMV 50

Service Manual

The following differences between the OMV Tri - Service and OMV 50 vaporizer should be noted.

1. OMV 50 does not have folding feet as fitted to the OMV Tri-Service and is not supplied as standard with a rail attachment hook.

2. OMV 50 does not have the 'Clip-on' scale configuration.
The scale is secured with screws.

3. OMV 50 is supplied with 23 mm cagemount tapers, male inlet, female outlet, in accordance with ANSI Z79.8 1979
Tri-Service OMV for US military use has 22 mm taper connections, female inlet, male outlet, for draw-over use only, in accordance with ANSI Z79.8 1979

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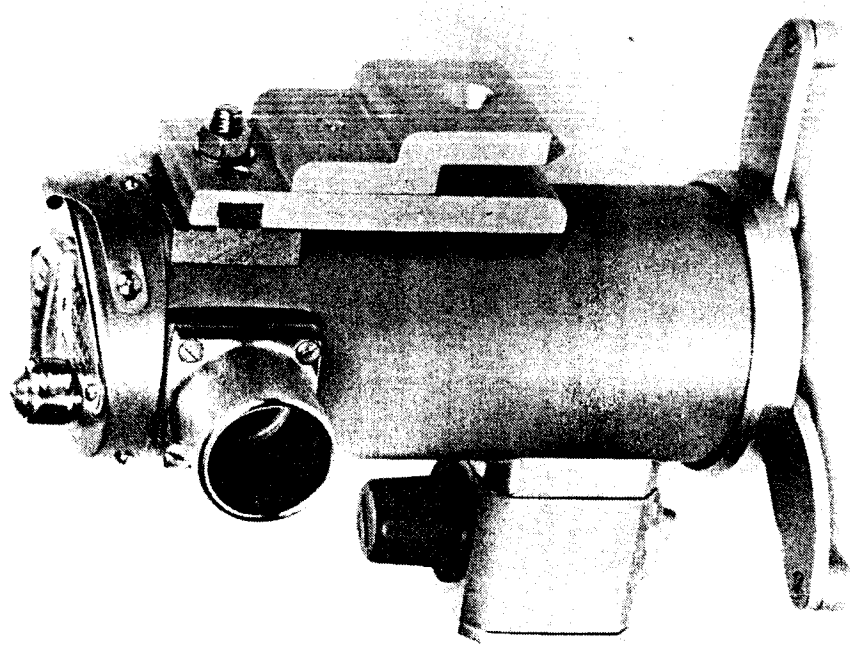


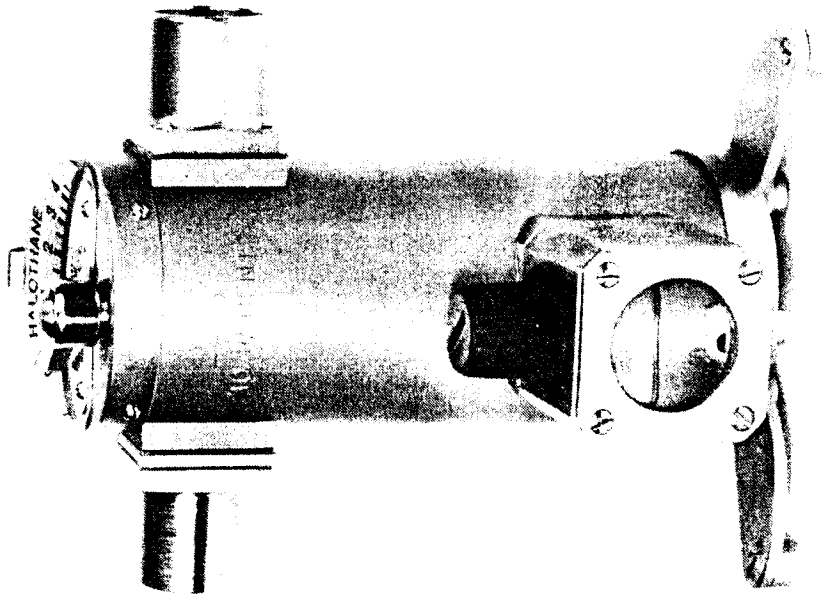


FIG 1.0

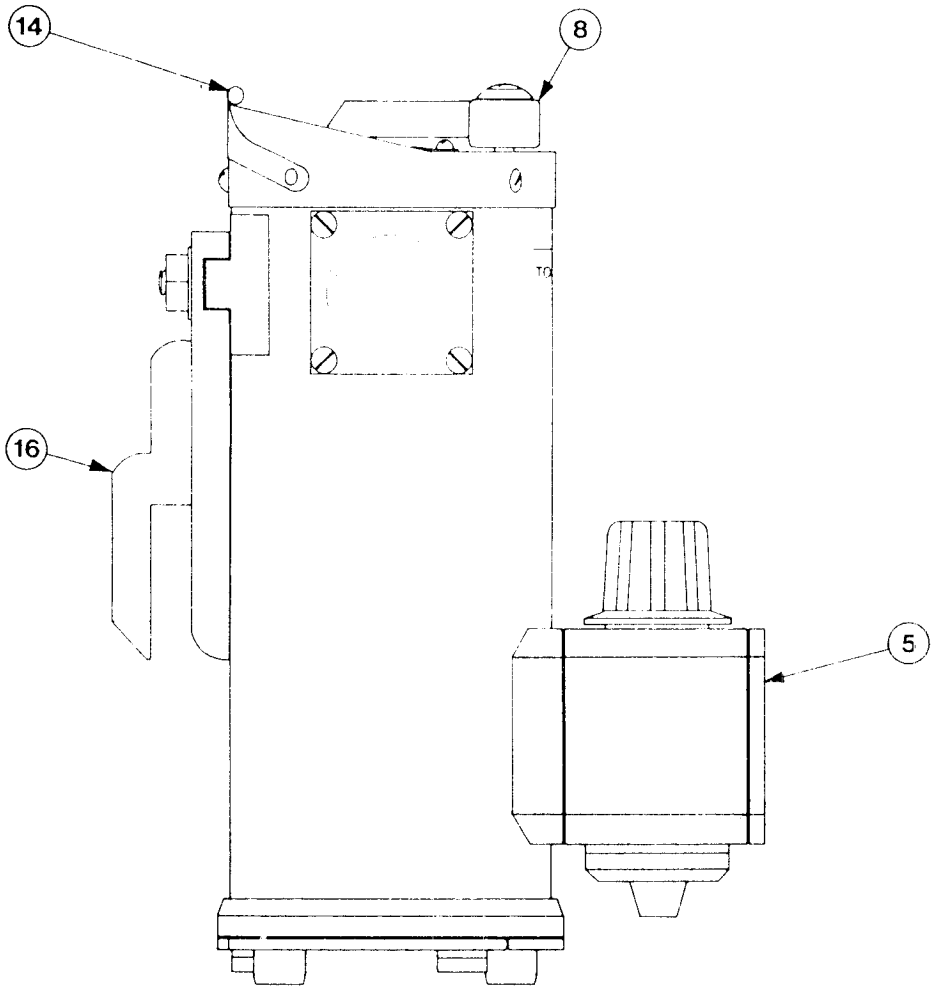


FIG 1.2
SIDE VIEW

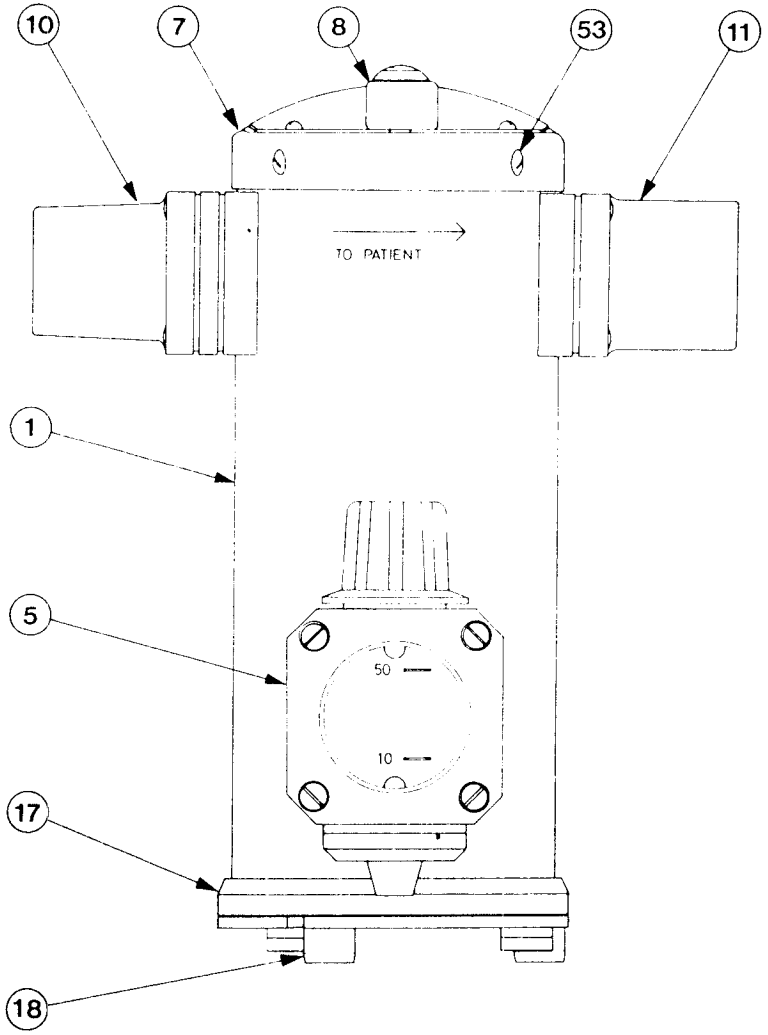


FIG 1.1
FRONT VIEW

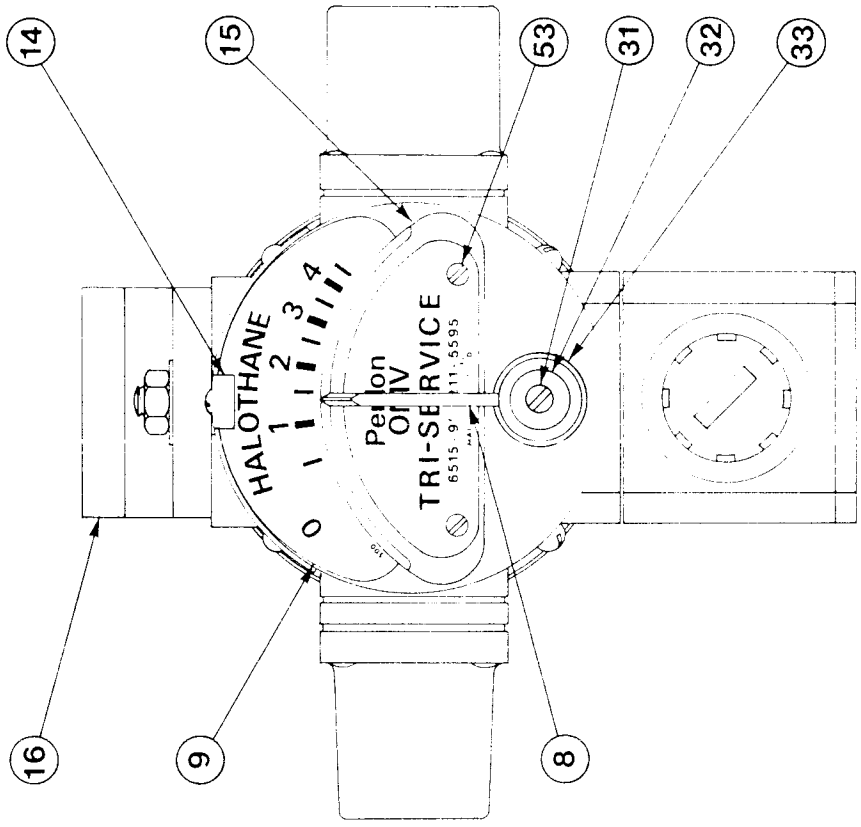


FIG 1.4

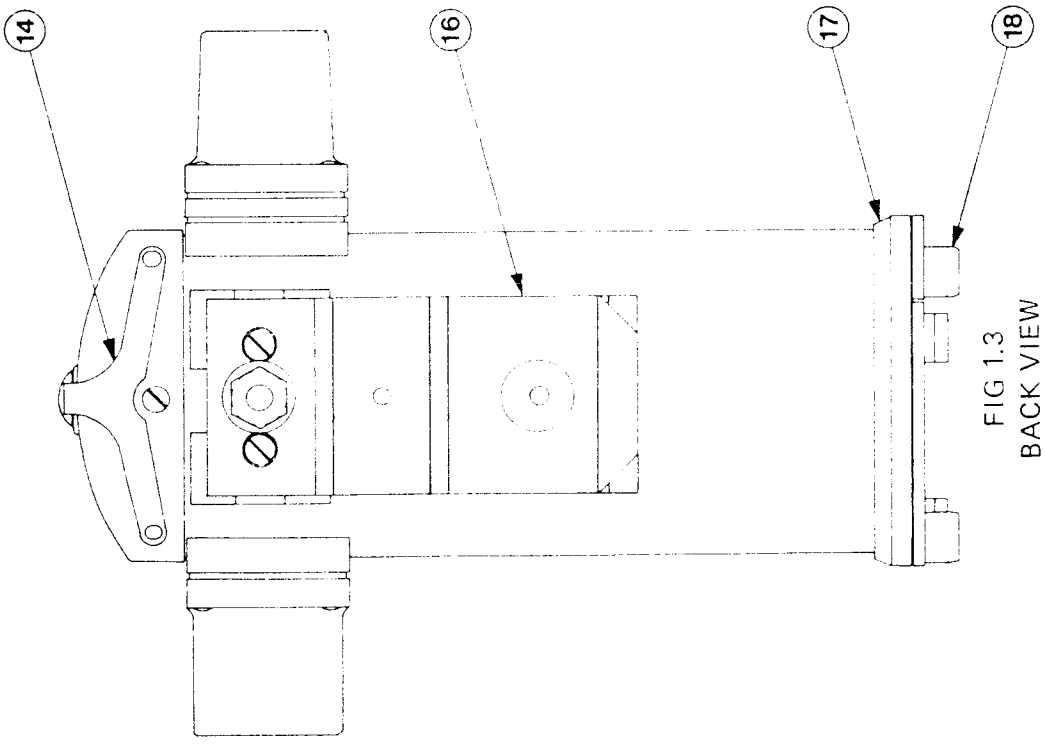


FIG 1.3
BACK VIEW

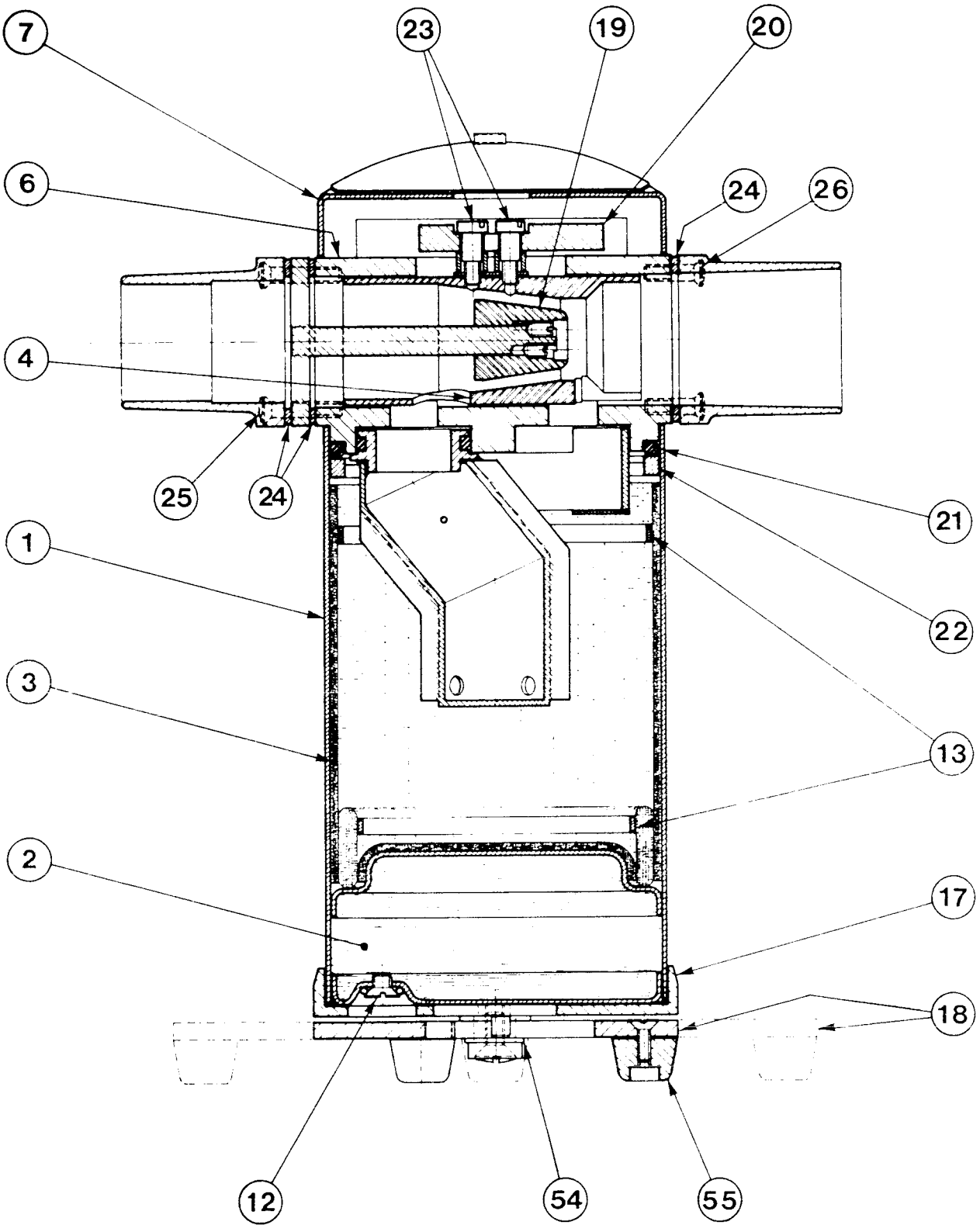


FIG 1.5

1.1. Construction of Vaporizer (see Fig 1.1 to 1.5)

The OMV is almost entirely constructed of stainless steel, to avoid corrosion troubles from contact with "halothane" and to produce a robust but leightweight unit.

It consists of a tubular body (1) with a chamber in the base (2). The body is lined with wicks (3) and provided with a level indicator and filling device (5). In the top of the body is mounted the concentration regulator assembly (6) and the lid (7) carries the control pointer (8) and scale (9). Each end of the concentration regulator assembly carries a detachable taper connector (10 and 11).

The base (2) is filled with water + 30% glycol antifreeze fluid through a filler screw (12) to provide a high thermal mass which delays reduction in temperature due to the evaporation of the anaesthetic agent. It extends upwards inside the body to form an annulus in which the anaesthetic agent is contained. This reduces the volume of the agent which is required to fill the vaporizer and ensures good heat conduction to the agent.

The **Wicks** (3) are woven from fine stainless steel wire, to give good heat conduction and reduce to a minimum the quantity of liquid needed to "wet" them. They are held in close contact with the outside walls and the water container by clips (13) and the annulus containing the liquid is filled with compressed stainless wool to prevent splashing and further assist heat conductivity.

Filler Unit (5) has a threaded sealing cap and a simple sight glass with maximum and minimum working level markings. A drain screw is incorporated internally, operated by a socket in the top of the filler cap.

The Concentration Regulator Assembly (6) comprises a stainless steel housing containing a tubular slide valve (4). The valve controls the opening and closing of inlet and outlet ports to the vapour chamber and thus the concentration of vapour delivered.

Supported in the centre of the slide valve is a fixed obturator (19) which controls the size of the bypass passage.

The slide valve is connected to a rack mounted on the top face of the regulator housing.

The Pointer (8) projects through the lid (7) and indicates the output on the scale (9). The pointer is secured by a square shaft to a pinion which engages with a rack attached to the Regulator assembly. An idler gear is interposed to reverse the relative movement of the pointer and control slides.

The top face of the lid, underneath the scale, is marked permanently with a scale of degrees, used during calibration.

The Scale (9) is retained by a spring clip (14) and correctly located by a projection formed on the lid and a scale retaining plate (15). The scale is printed on both sides, one side for halothane and the other for Trilene (Trichloroethylene I.C.I. Ltd.), and is reversible so that either side may be used. (Scales for chloroform and other agents can be supplied).

The vaporizer has three **folding legs** (18) on the base (17). These are opened out to give stability when the apparatus is used free standing, and folded back to reduce the space required for packing, or when used attached to an apparatus rail.

On the back of the body is attached a **hook** (16) to enable the vaporizer to be fitted to the Triservice apparatus rail or to the Penlon offline mounting block (item 52280) attached to a hospital anaesthesia machine.

2. SERVICING INSTRUCTIONS

2.1. Notes for the User

Observance of the simple points listed will assist in keeping the vaporizer in good condition between servicing procedures.

- Keep the exterior clean and free of dust, but do not attempt to apply disinfectants of any sort.
- Store upright if filled with anaesthetic agent, but drain as soon as possible after use and store empty when possible.
- Store or transport with pointer at 'O' position.
- If the vaporizer has to be transported filled with anaesthetic agent, stand upright for 2-3 minutes before commencing to use, to allow the liquid to drain to the normal parts of the body.
- Keep upright during use if possible, although exceptionally an inclination of up to 30° from vertical will not affect the output. Always fill only when standing upright.
- In hot climates, avoid exposing the vaporizer to full sun.
- In very cold climates, vaporization may be assisted by holding the body in the hand, or by immersing in water at 18 – 25°C up to the connectors.

2.2 Servicing Procedure

Servicing is divided into four sections

2.2.1. Preventive Maintenance schedule.

2.2.2. Cleaning procedure and reassembly.

2.2.3. Checks and repairs to be carried out by workshop.

2.2.4. Repairs to be carried out by manufacturers.

2.2.1. Preventive Maintenance

Normal interval:– 12 months (units in store)
6 months (units in service)

Equipment required:—

Screwdrivers 3mm, 6mm blades.

Spanner for M6 nut.

Setting gauge (Append 1).

Cleaning fluid (ether or alcohol).

Pin spanner for drainplug (Append 1).

Leak testing equipment (Append 1).

3mm Tommy Bar

Draw screws (Append 1) (2 required)

2.2.1. **Schedule** — see table overleaf.

Units in store should receive operations 1 — 10 only

Units which have been in service should in addition receive operations 11 — 13.

All units should be returned to the manufacturer for operation 14 at intervals not longer than 2 years.

2.2.2. **Cleaning Procedure**

The volatile liquids used to give anaesthesia contain non-volatile substances such as thymol. These accumulate inside the vaporizer and will adversely affect the performance if present in excessive quantitites. Removal of these deposits is therefore an essential part of the bi-annual P.M. and involves dismantling the vaporizer.

Op. 1. Remove Pointer — Remove Screw (31) and Washer (32), lift off pointer and abutment washer (33) remove scale.

Op. 2. Remove Lid — take out 3 screws (53), lever lid off body.

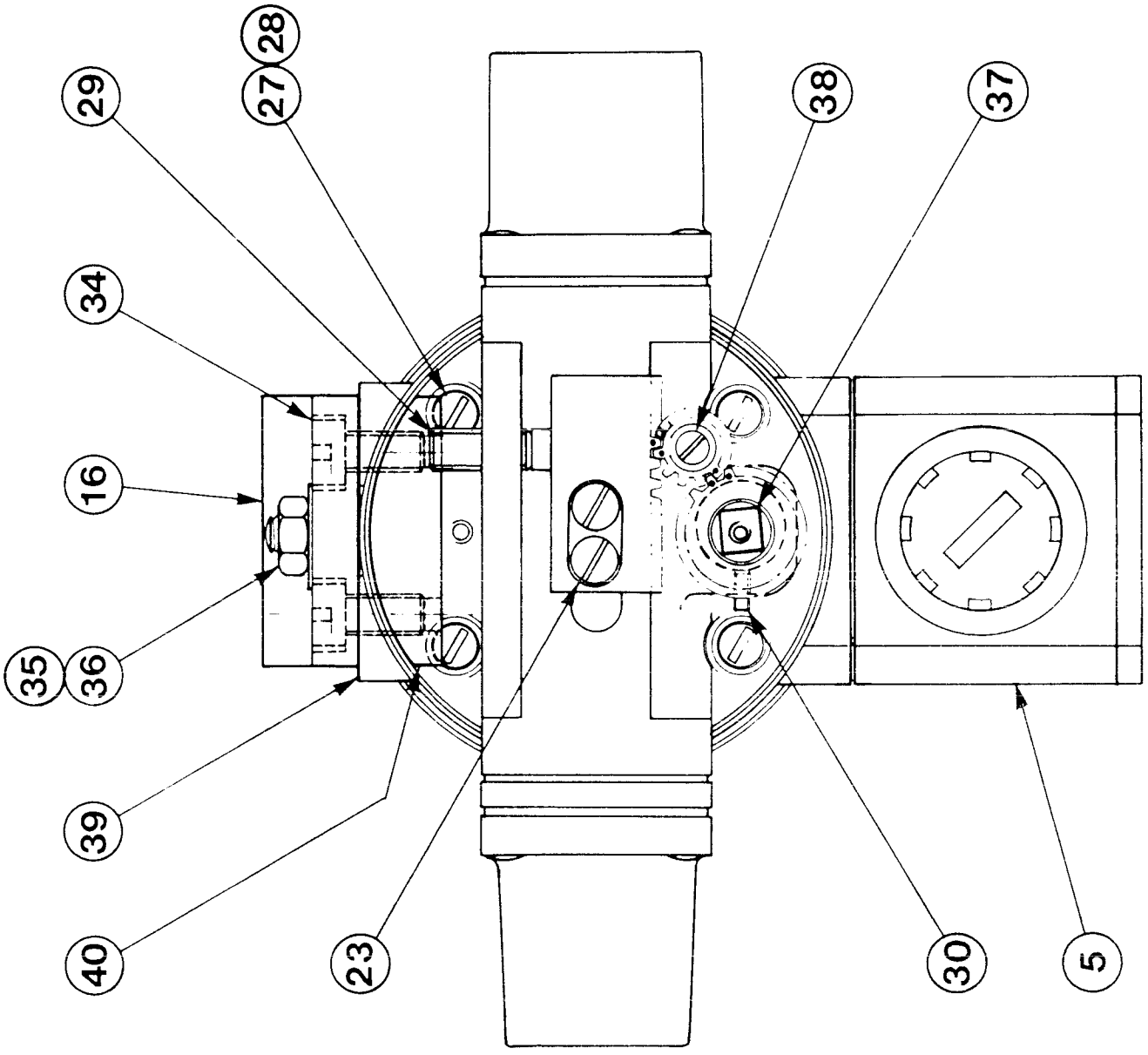
Op. 3. Remove M6 nut (35), washer (36) and take off off-line hook (16). Remove 2 screws (34), take off tenon block (39) and clamp (40).

Op. 4. Remove 4 screws (27) and washers (28). Lift out regulator assembly (6), O seal (21) and clamp ring (22).

MAINTENANCE SCHEDULE 2.2.1

Ref	Operation & Component	Observation	Rectification
1	Record serial No. and date		
2	Inlet & Outlet cone joints	Tapers free of burrs or damage	Replace
3	All screws on exterior	Tight	Use screwdriver
4	Level Indicator	(a) Glass not cracked or broken (b) Interior clean	If broken, replace (see 2.2.3) Clean (see 2.2.2. op 6)
5	Filler Plug	Not damaged	Replace
6	Folding feet	Smooth action from open to closed.	If too loose, replace friction washer (see 2.2.3) If bent, straighten or replace (see 2.2.3)
7	Scale	Legible and intact	Replace
8	Pointer	Straight, retaining screw tight. Backlash not to exceed 2° Moves freely over complete scale.	If bent return to manufacturer. Adjust gear train (see 2.2.2. op 9) If stuck, clean regulator (see 2.2.2 op 8)
9	Offline hook	Gap to be 6.38/6.45mm	If bent, forge cold or replace.
10	Water Chamber	Completely full.	Replenish (use 30% glycol antifreeze)
11	Internal parts	Clean	(see 2.2.2.)
12	Pointer assembly	Check position	(see 2.2.2.2)
13	Leak Test		(see 2.2.2.3)
14	Check Calibration		Return to Manufacturer.

FIG 2.1



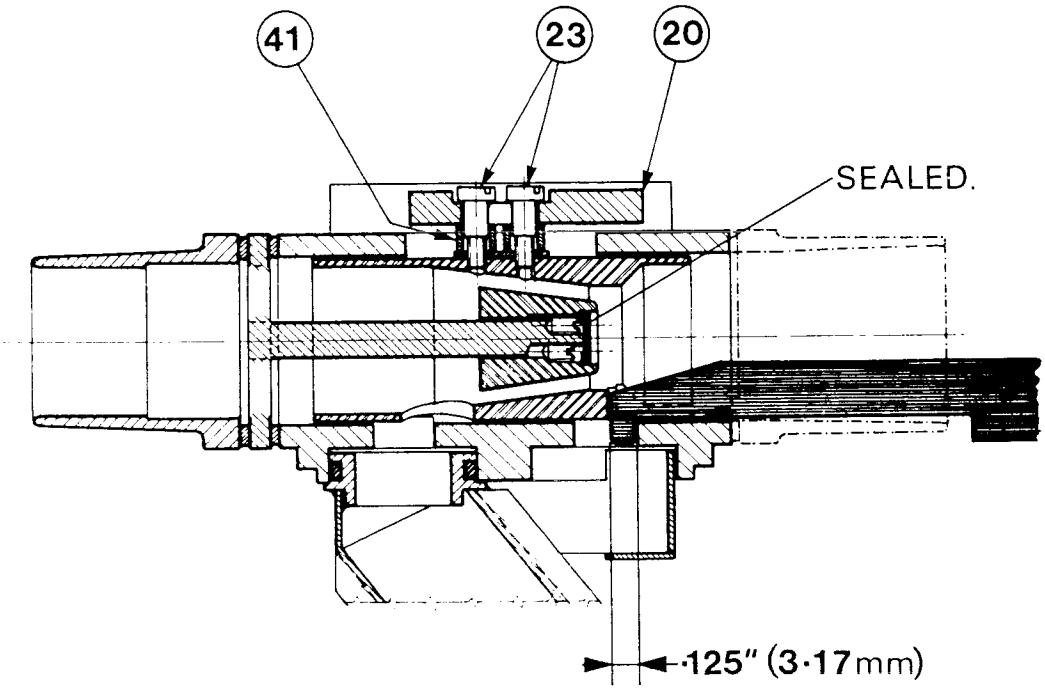
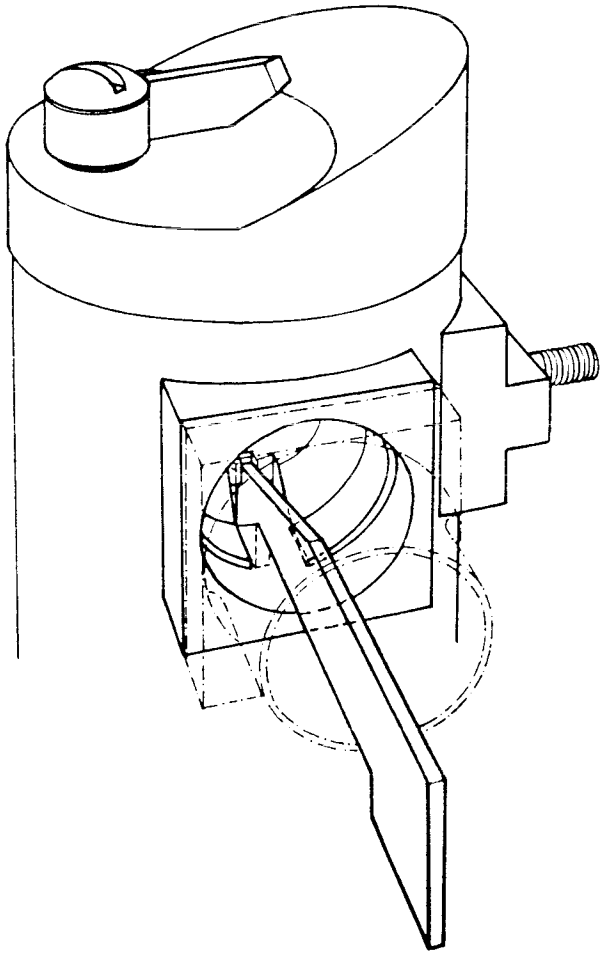


FIG 2.2



Op. 5 Part fill the vaporizing chamber with cleaning liquid, (ether or alcohol), agitate gently to wet all parts of the wicks. Allow to soak for 2-3 minutes repeating agitation several times. Discard liquid. Repeat process until discarded liquid appears clean. Invert chamber and allow to dry completely.

Op. 6 If the indicator glass is still dirty after the above process, remove 4 screws (42) securing it, lift out glass and wipe clean. Replace ensuring that seals (44) and centring ring (45) are also replaced in correct position (see Fig. 3).

Op. 7 If after cleaning the wicks, corrosion is present on the wick, e.g. rusty patches, assemble vaporizer and return to manufacturer for replacement of wicks.

Op. 8 Regulator Assembly – dismantle.
Remove inlet and outlet cones (4 screws each 25 and 26) gaskets (24) and obturator assembly (19). Remove two screws (23) securing the rack (20). Lift off rack and spacers. Note that the plastic sleeves inside spacers must be retained.
Note the relative positions of the ports and direction of cone of the slider.
Remove slide valve by pushing from outlet end of regulator housing. If stiff, use a wooden or plastic drift, metal will damage the machined surfaces.
Soaking the assembly in ether or alcohol will usually dissolve the deposits causing stiffness.
Wash slide valve and regulator housing in cleaning liquid and dry off with clean cloth paying particular attention to the sliding surfaces.
NEVER clean these with emery or other abrasives.
Metal polish may be used to remove stubborn dirt, if the residues are carefully removed before assembly. Lightly lubricate the slide valve with Fomblin and refit to housing.
Check for smooth motion from end to end of housing. Check location of ports, direction of cone, and reassemble rack with spacers and screws, lining marked tooth rack between two marked teeth on idler pinion, and at the same time the marked teeth on the idler and the pointer pinion (see Fig. 2.1)

Op. 9 Backlash and adjustment.
Backlash can develop between rack and idler or between idler and pinion. A tappet screw (29) is provided to adjust the engagement of the former. The pinion (37) is mounted in an eccentric bush and engagement with the idler is adjusted by slackening lock screw (30) rotating the eccentric bush using a 3mm bar in the hole provided, until the engagement is correct and then tightening the lock screw.

Op. 10 Re-assemble regulator assembly to body

The special ptfe coated O ring (21) which seals the assembly must be examined for damage and replaced if necessary. Separate the clamp ring and regulator housing by removing 4 screws (27) and washers (28). Insert the clamp ring into the body with the 4 screw holes at 45° to the regulator housing in plan. Immerse the O ring in warm (40–50°C) water for a few minutes to soften it. Place the O ring on top of the clamp ring. Insert the regulator housing assembly using the 3mm tommy bar to line up the screw holes in clamp ring and regulator housing, insert the draw screws into 2 diagonally opposite holes to draw the clamp ring onto the body. (Hand tight only). Insert 2 screws (27) and washers (28) remove draw screws, insert remaining 2 screws (27) and washers (28). Tighten all 4 screws evenly and fully, making sure that regulator is pressed fully home onto body without gaps beneath inlet or outlet square section.

Op. 11 Leak test main body seal. Ensure slide valve is open, block outlet connector, pressurise to approx. 30 kPa (180mm Hg) through the inlet connector. Run a small quantity of cleaning liquid (ether or alcohol) into the joint between the regulator assembly and body. Check for bubbles. Tighten screws or replace O ring if necessary to obtain leak free joint. Tip out surplus liquid, allow to dry completely.

Op. 12 Examine obturator assembly to ensure that adjustment screws are sealed. If seal is broken, return complete vaporizer to manufacturer. Assemble gaskets (24), obturator assembly and inlet connector with 4 screws (25) to regulate housing. Check that the obturator is concentric within slide valve.

Op. 13 Reassemble tenon block, clamp, offline mounting block, lid and pointer (reverse Op. 4 to 1). Do not fit scale.

2.2.2.2.

Check pointer setting by inserting setting gauge OMV 1 through outlet side into valve port, (see Fig. 2.2.), with pointer between "50" and "60" on engraved scale on lid. Move pointer towards left until no further movement is possible. The pointer should then indicate "35" on the engraved scale. A positional error of ± 1 mm is acceptable. If the gear train has been wrongly assembled, an error of 7½° will be introduced per tooth so that errors are easy to detect.

Remove setting gauge, assemble outlet connector and gasket (24) with 4 screws (26). Fit scale.

2.2.2.3.

Leak Testing

(This procedure should also be carried out if a vaporizer is reported to give low concentrations or is using excessive quantities of halothane or trichloroethylene).

The vaporizer is connected to the reservoir, pressure gauge and compressed air source, as shown in Append Fig. A2. Air is pumped into the system until a pressure reading of approx 210mm Hg is reached and the air supply line is then clamped off with forceps. The pressure in the system will fall slowly and the time taken for it to fall from 200mmHg to 190mm Hg is recorded on a stop watch.

NOTE: The reservoir used in the leak test must have a capacity of 4 litres.

The check is carried out:–

(a) with the control pointer in the "OFF" position to test the connectors and the top of regulator housing.

(b) with the control pointer in the " 3½ " position to test the vapour chamber joints generally.

(c) with the control pointer in the "OFF" position and the filler held open to test the vapour seals.

Acceptance values:–

(a) 30 secs or more
(b) 30 secs or more
(c) 10 secs or more

If a vaporizer does not pass this test the position of the leak is best found by brushing soap solution over suspected joints while maintaining pressure internally. Leaks will show by the formation of bubbles. DO NOT APPLY SOAP SOLUTION TO THE OPENING ROUND THE RACK, WHERE IT COULD ENTER THE SLIDE VALVE.

NOTE:– there is always a certain amount of leakage from the slide valve but this can be ignored if the test figures above are obtainable.

2.2.3.

Specific Repair

2.2.3.1.

Level Indicator & Filler Unit

To fit new level indicator glass.

Remove 4 screws (42) take off retainer, old glass, seals and centring ring. When fitting a new glass always use new seals. Glasses vary a little in thickness. Three seals are supplied in the spare part kit and sufficient seals should be used to obtain good compression on the glass when the retainer is screwed back in place. Leak test.

To fit new drain seal.

Remove drain screw. Use pin spanner (A1–3) to unscrew old drain seat assembly (49) from filler block. Discard old assembly and seal. Fit new assembly and seal (52). Tighten securely. Leak test.

To fit new back seal (48)

If leakage develops between the filler block and body, remove retaining level indicator glass and seals. With a screwdriver lever out the engraved back plate of the level indicator, this will expose the heads of two socket head screws (47). If tightening these does not cure the leak, remove screws, lift off filler block and fit new seal (48) between block and body.

Reassemble all parts. Leak Test (see 2.2.2.3.)

2.2.3.2.

Folding Feet

To replace complete leg

Remove screw securing leg to base, replace with new leg and new friction washer (54)

Legs are made of malleable material and will withstand flattening with soft faced mallet.

To tighten loose leg

Remove screw securing leg to base, replace friction washer (54)
Reassemble.

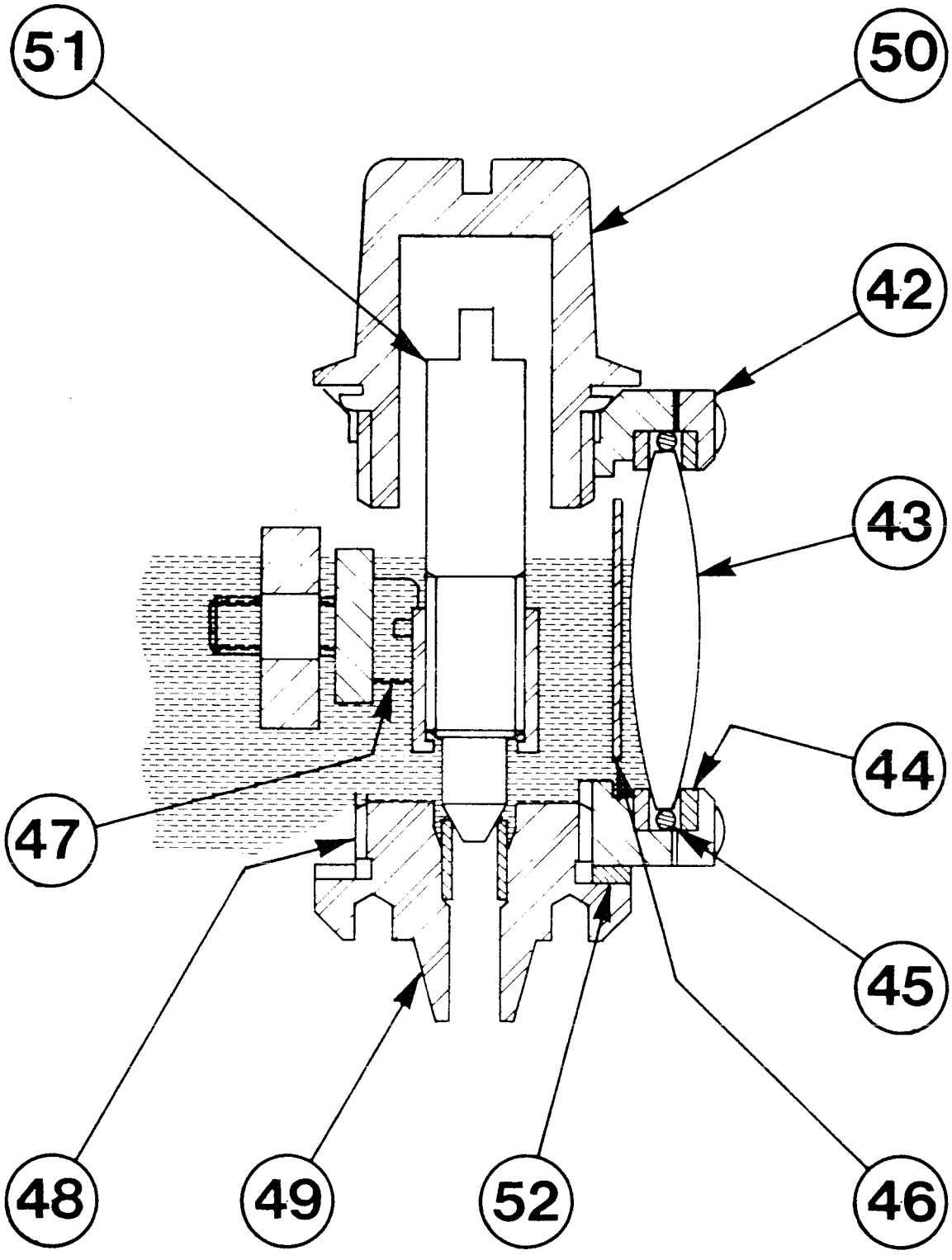


FIG 3

To replace complete base

The complete base assembly with feet is fixed to the body using Araldite 100 adhesive. If this joint should be broken due to a fall, the same adhesive may be used to refix the base. Clean off all old adhesive before refixing and ensure that recess in base is aligned with water filling screw (12)

2.2.4.

Faults requiring return to manufacturer

1. Leak test failure due to damaged joints.
2. Broken pointer.
3. Corroded Wicks.
4. Broken seal on obturator.

2.2.4.1.

Checks to be performed by manufacturers

Vaporizer should be recalibrated at intervals of two years.
Unless equipment is available in service centre, vaporizers should be returned to the manufacturer at 2 year intervals for recalibration by physical test.

SPARE PARTS LIST

* indicates spare part to be held

# indicates included in Preventive Maintenance Kit, Part No. 68519

Fig. No.	Item No.	Qty.	Description	Penlon Part No.
1.1/1.5	1	1	Body assembly	68527
1.5	2	1	Water/glycol chamber	N/A
1.5	3	1	Main wick	#68545
		1	Ring wick	#68546
		1	Bottom wick	#68845
1.5	4	1	Slide valve	N/A
1.1/1.2	5	1	Filler assembly	See Fig. 3
1.5	6	1	Regulator assembly	68518
1.1/1.7	7	1	Top cover	68818
1.1/1.4	8	1	Pointer	68827
1.4	9	1	Scale - Halothane	*68861
1.4	9	1	Scale - Chloroform	*68862
1.1	10	1	Inlet taper connector	68570
1.1	11	1	Outlet taper connector	68571
1.5	12	1	Filler screw - water/glycol chamber	*0141
1.5	13	1 set	Clips for wick	68547/8
1.2/1.4	14	1	Scale retention clip	68874
1.4	15	1	Scale retainer	68873
1.2/1.3	16	1	Hook for rail mounting	52284
1.1/1.3	17	1	Triservice base	68815
1.1/1.3	18	3	Legs	68855
1.5	19	1	Obturator assembly	N/A
1.5/2.1	20	1	Rack	68575
1.5	21	1	O seal	#*0433
1.5	22	1	Clamp ring	68541
1.5/2.1	23	2	Rack retaining screw	68563
			Polythene tube	#462040
1.5	24	3	Gasket	#*68562
1.5	25	4	Screw (inlet)	*0511
1.5	26	4	Screw (outlet)	*093
2.1	27	4	Screw	*0366
2.1	28	4	Washer	#*68542
2.1	29	1	Tappet screw	68568/9
2.1	30	1	Grub screw	0703

1.4	31	1	Pointer retaining screw	0509
1.4	32	1	Washer	68540
1.4	33	1	Abutment washer	68537
2.1	34	1	Screw	099
2.1	35	1	Nut (M6)	01012
2.1	36	1	Washer (M6)	01015
2.1	37	1	Pinion	68566
2.1	38	1	Idler pinion	68574
2.1	39	1	Tenon block	68835
2.1	40	1	Clamp block	68837
2.2	41	2	Rack spacer collar	68564
3	42	4	Screw	0509
3	43	1	Level indicator glass	*0386
3	44	2/3	Seal washer	‡*68544
3	45	1	Centring ring	*462002 (3.75 inch length)
3	46	1	Level indicator disc	68839
3	47	2	Screw	0409
3	48	1	Back seal	22567
3	49	1	Drain screw seating	22428
3	50	1	Filler cap	‡*22729
3	51	1	Drain screw	68865
3	52	1	Drain seating seal	*22446
1.1/1.4	53	5	Screw	*0550
1.5	54	3	Friction washer	*68853
1.5	55	3	Foot	68856
		A/R	Epoxy adhesive	057060
			Preventive Maintenance Kit	68519

APPENDIX

Equipment required for leak testing and servicing

(a) Leak Testing (Fig A2–1)

(1) Source of compressed air at about 200mmHg. This may be provided by a hand bulb or the Oxford Inflating Bellows in the absence of a mechanical pump.

(2) Rubber corks to fit the inlet and outlet of the vaporizer, one with a ¼" (6mm) tube through it.

(3) A reservoir of 4 litre capacity capable of withstanding 200mmHg.

(4) A pressure gauge to read to 200mmHg. (A sphygmomanometer is suitable)

(5) Liquid soap solution (e.g. 5% Teepol) and small brush.

(6) Ether or methylated spirits.

(7) Stop watch.

(8) Forceps or laboratory clamp.

(9) Rubber or plastic tubing to fit ¼" (6mm) tube.

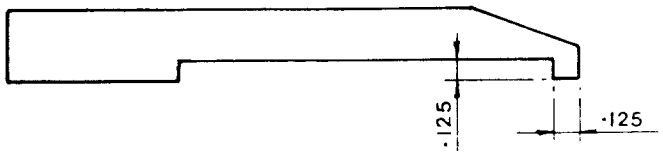
(b) General Servicing

(1) Special gauge (Fig. A1–2)

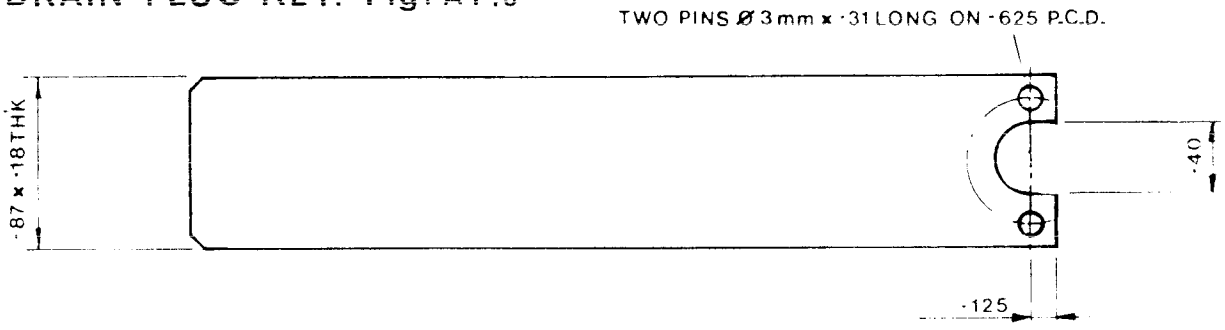
(2) Spanner for drain plug (Fig. A1–3)

(3) Draw Screws (Fig. A1–4)

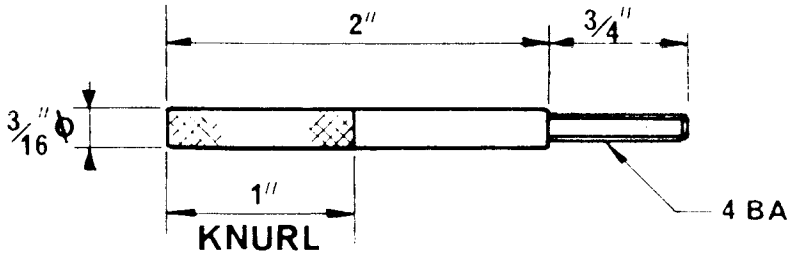
SETTING GAUGE. Fig: A1.2



DRAIN PLUG KEY. Fig: A1.3



DRAW SCREW. Fig: A1.4



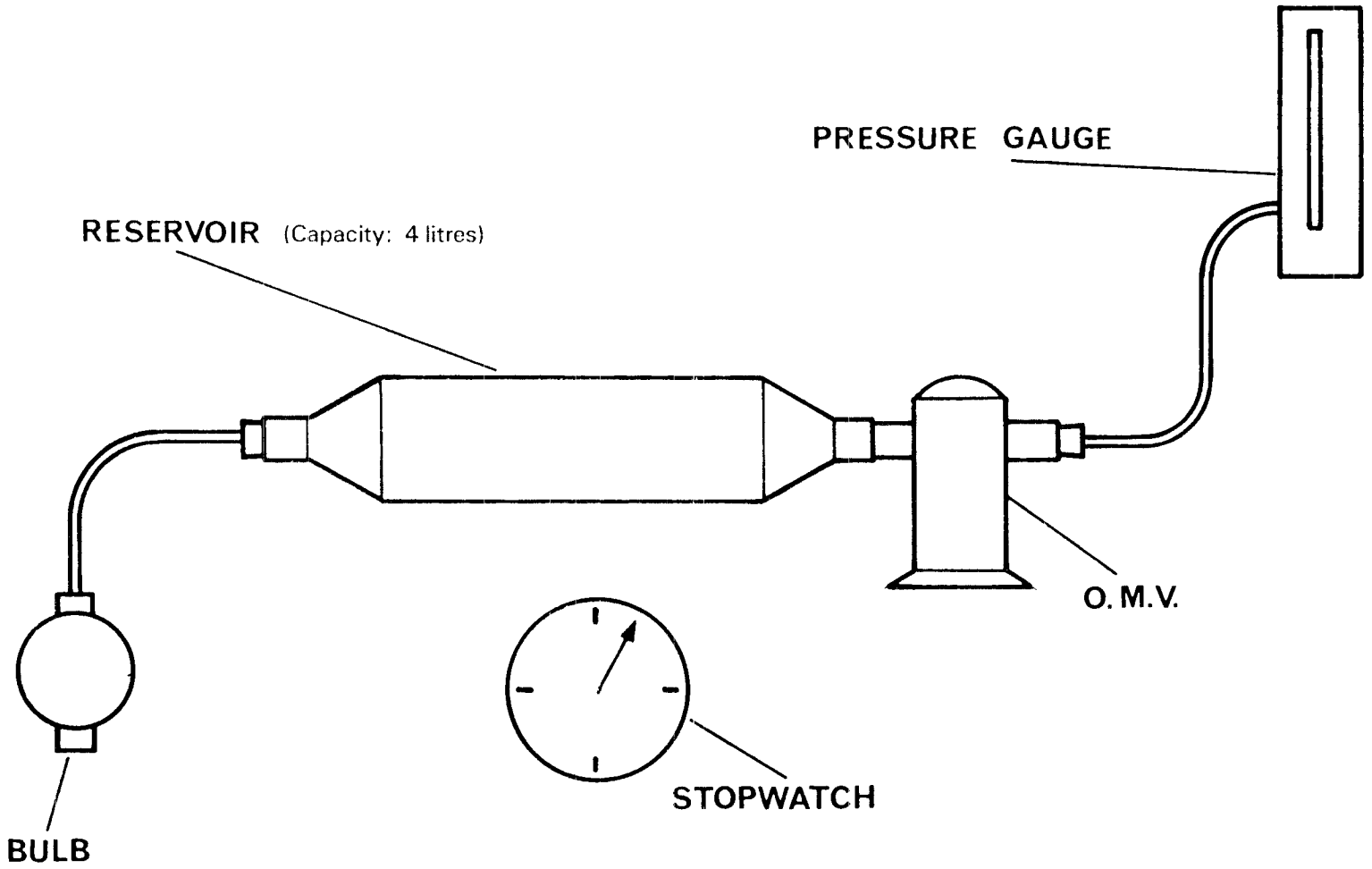


FIG A.2.

LEAK TEST LAYOUT

Calibration Procedure

These instructions are for use only by trained personnel using the equipment listed below.

WARNING **Inhalation of anaesthetic vapours, even in low concentrations, may be hazardous to health. Waste gases produced during calibration procedures must be scavenged and exhausted to fresh air away from all personnel, or absorbed by suitable filters.**

Equipment

1. A supply of dry, clean compressed air, with a pressure regulating system producing 15-45 psig.
2. A flowmeter with a needle valve control to produce a measured flow of 4-6 l/min with ±5% accuracy
3. A fresh gas supply tube to connect the flowmeter outlet to a cagemount female taper connector to fit the vaporizer inlet.
4. A mixing chamber with a cagemount inlet to fit to the vaporizer outlet, with an exhaust port for 22 mm tubing and sampling outlet for 6 mm tubing (Part No. MH561).
5. 22 mm exhaust tubing to the disposal system.
6. A Riken Gas Analyser, Model 18, calibrated 0-6% halothane in air.

CAUTION The sampling tube between 4 and 6 must be of nylon, PTFE, or similar material which does not absorb anaesthetic vapours. The use of rubber or other elastomers may cause large errors in measurement. Short lengths of rubber may be used to join nylon tubing to the analyser and the sampling tee.

Choice of agent

If the vaporizer is known to be dedicated to a specific agent, it should be calibrated with that agent.

If the vaporizer is used with a variety of agents it should be calibrated using halothane, as that agent gives the highest numerical scale values and therefore maximum accuracy of measurement. The design features of the vaporizer which determine the relative output of the various agents at a specific setting of the control are dependent on agent, temperature and pressure. These three factors can be considered individually as follows:

1. Riken Conversion Factors

The halothane in air Riken analyser can be used for other agents by multiplying the readings by the factors given below to give true vol%. These factors are determined by the relative refractive indices of the vapour.

Agent	Factor	Agent	Factor
Halothane	1.00	Trichloroethylene	0.88
Enflurane	1.05	Methoxyflurane	0.86
Isoflurane	1.06	Di ethyl ether	0.92
Chloroform	1.14		

2. Temperature

Calibration should be carried out at 20°C ± 2°C. Within this range a temperature correction factor is not required, given the accuracy of measurement available.

3. Pressure

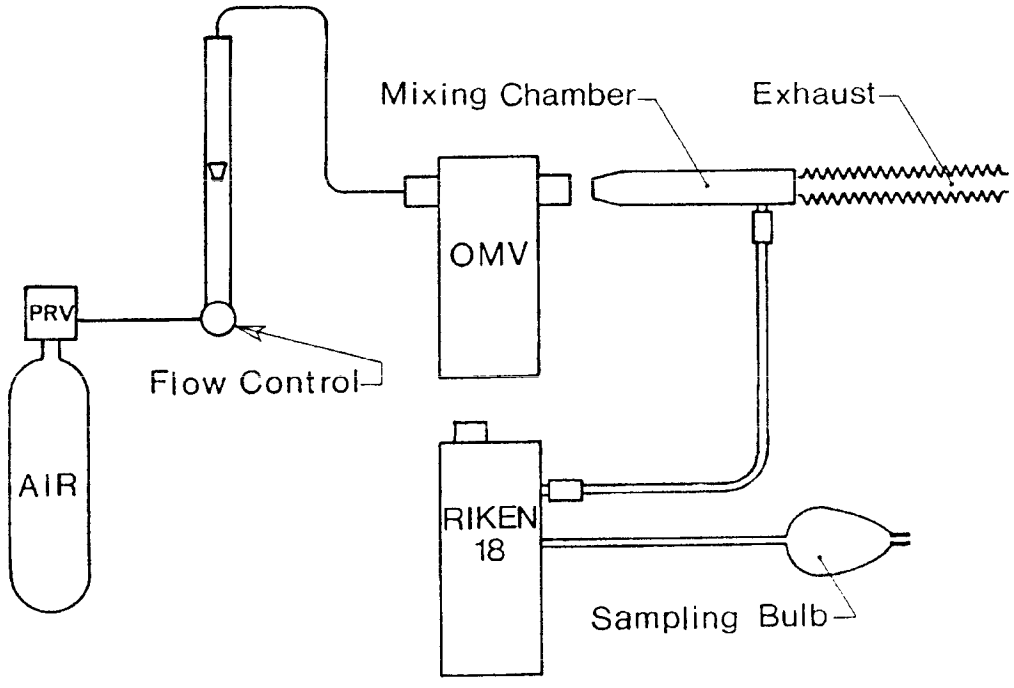
Normal variations in barometric pressure due to weather changes are not significant given the accuracy of measurement available, but altitude may produce significant effects, as shown below.

Altitude	Correction factor	Barometric pressure
610 m (2000 ft)	x 0.9	910 mbar
1220 m (4000 ft)	x 0.84	850 mbar
1830 m (6000 ft)	x 0.8	813 mbar

Calibration Procedure

1. Connect the fresh gas direct to the mixing chamber (bypass the vaporizer).
2. Set a flow of 4 l/min and take several readings with the Riken to establish a true and consistent zero.
3. If necessary, flush the reference cell of the Riken with air and ensure that this cell is equilibriated to atmospheric pressure.

NOTE This is most important if the Riken analyser has itself been moved from one altitude to another.



4. Fill the vaporizer approximately threequarters full with the selected agent (see **Choice of Agent**, above) and attach the appropriate scale.
5. Allow the vaporizer to stand with the control at zero for 30 minutes to ensure all temperatures are equilibriated.
6. Connect the vaporizer to the fresh gas inlet and the mixing chamber.
7. Turn on an air flow of 4 l/min and allow the vaporizer to stand for 4-5 minutes with the control at zero.
8. Take a series of readings and record the results on the record sheet with the Riken at the various control settings. Each time squeeze the sample bulb a minimum of three times, starting at the given time as shown.

NOTE Acceptance Figures:

The readings, when corrected, should be within ± 20% of scale. A greater degree of depression than the above indicates that the wick system is incorrectly assembled.

9. After calibration, drain the vaporizer chamber and connect the unit to an air supply.
10. With the control set full on and the exhaust system attached, blow air through until the smell of the anaesthetic agent has been removed.

NOTE Halothane contains thymol as an additive and it is not possible to get rid of the smell of this substance.

11. Close the vaporizer control to zero before passing the unit for use or storage.

Serviced at:					
Date	Signature				
OMV 50/Tri-Service serial no.					
Agent	Riken no.				
Setting	4	3	2	1	0
Time (minutes)	0	1	2	3	4
Riken reading					
Correction factor (Agent)					
Vol%					

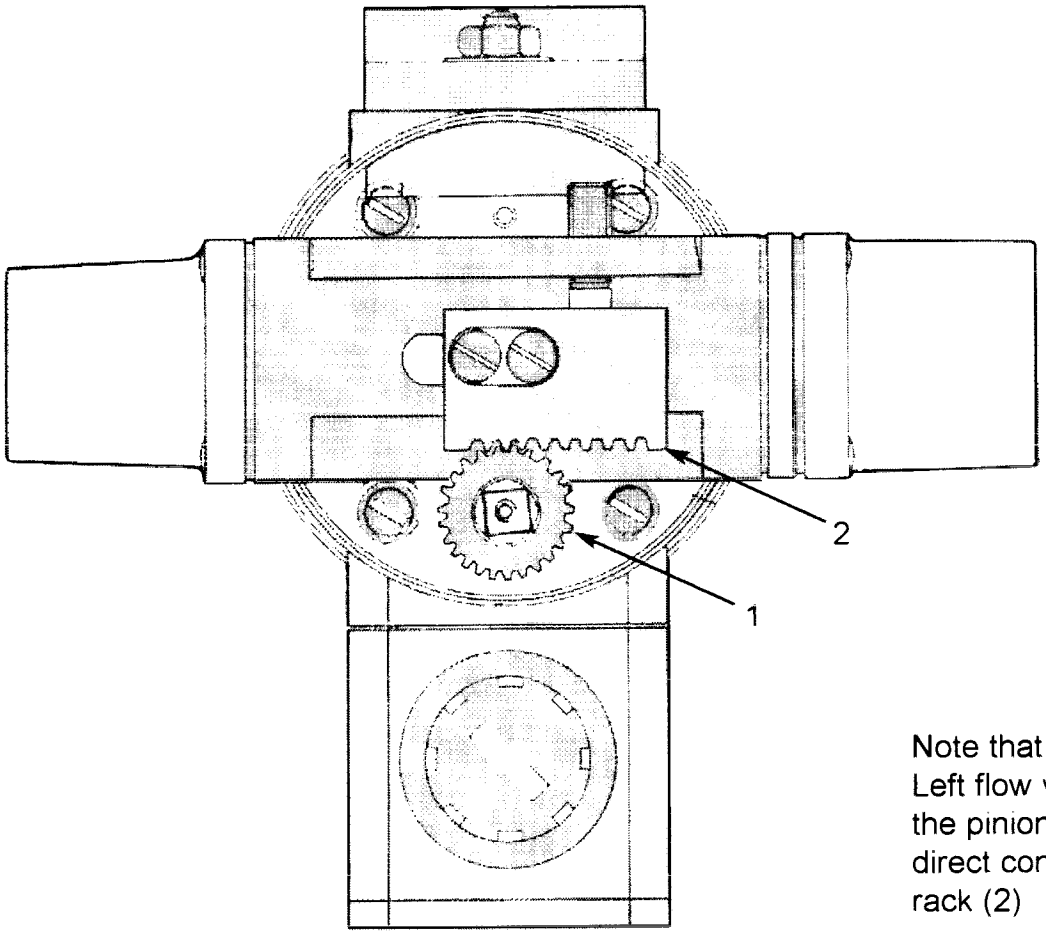
Serviced at:					
Date	Signature				
OMV 50/Tri-Service serial no.					
Agent	Riken no.				
Setting	4	3	2	1	0
Time (minutes)	0	1	2	3	4
Riken reading					
Correction factor (Agent)					
Vol.%					

Serviced at:					
Date	Signature				
OMV 50/Tri-Service serial no.					
Agent	Riken no.				
Setting	4	3	2	1	0
Time (minutes)	0	1	2	3	4
Riken reading					
Correction factor (Agent)					
Vol.%					

Serviced at:					
Date	Signature				
OMV 50//Tri-Service serial no.					
Agent	Riken no.				
Setting	4	3	2	1	0
Time (minutes)	0	1	2	3	4
Riken reading					
Correction factor (Agent)					
Vol.%					

OMV 50
Right to Left Flow

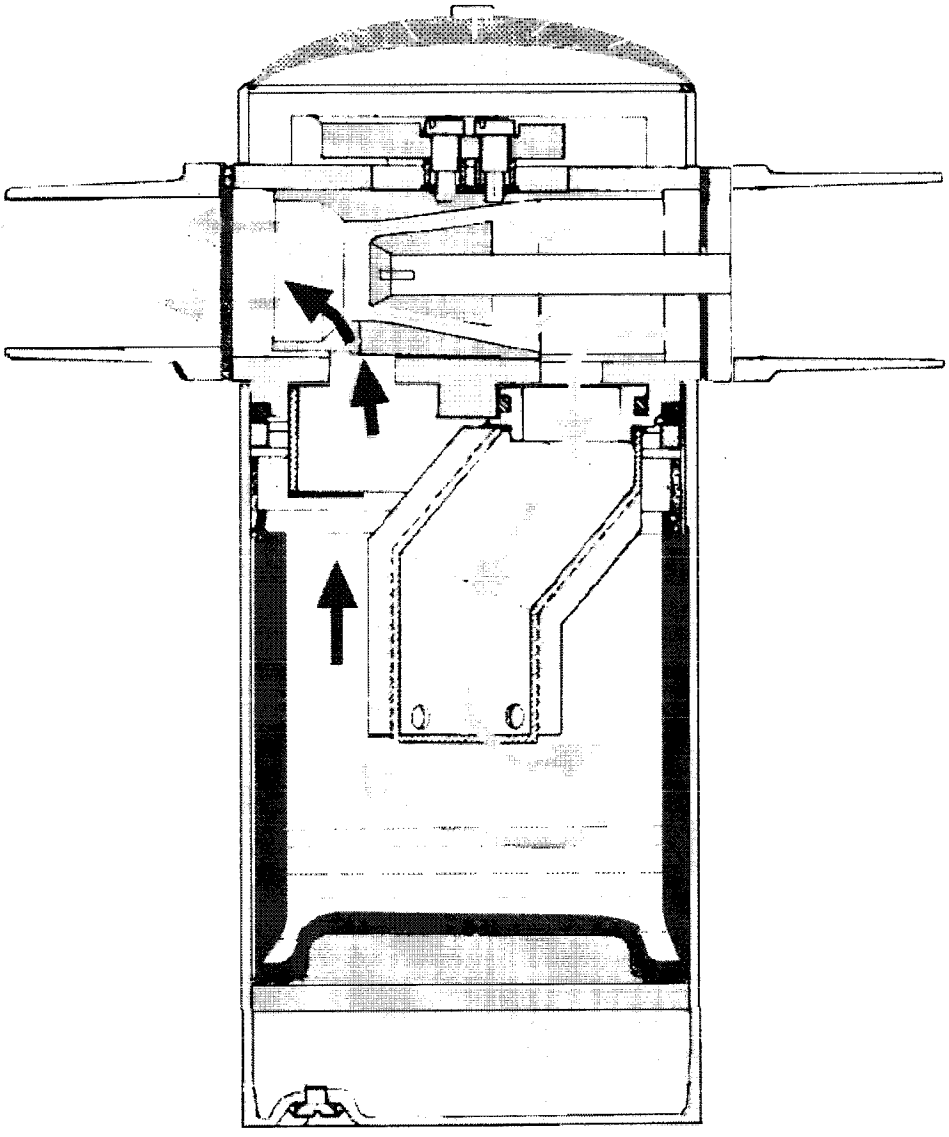
Plan View

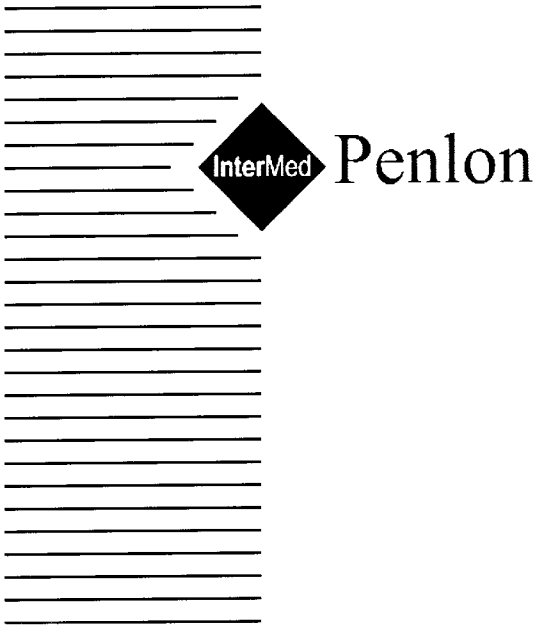


Note that on Right to Left flow vaporizers, the pinion (1) is in direct contact with the rack (2)

OMV 50
Right to Left Flow

Flow Diagram





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