THE UNIVENTOR 410 ANAESTHESIA UNIT

Univentor
HIGH PRECISION INSTRUMENTS

TABLE OF CONTENTS

Section 1 - WARRANTY & SERVICE

1.1. WARRANTY

Univentor Ltd guarantees all components of the 410 Anaesthesia Unit to be free from defects of material and workmanship for a period of two years after initial purchase. Univentor will repair or replace, at its discretion, all defective components during the aforementioned warranty period.

For warranty service or repair, all Univentor's products must be returned to Univentor or to an authorised Univentor representative. The client is responsible for shipping charges to Univentor.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the client, unauthorised modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

For any product expressly covered under this warranty, Univentor is liable only to the extent of replacement or repair of the defective items. Univentor shall not be liable for any personal injury, property damage, or consequential damages of any kind whatsoever. The foregoing warranty is in lieu of all other warranties of merchant ability and fitness for a particular purpose.

1.2. DAMAGED SHIPMENTS

Damage to any part of this instrument during shipping should be reported immediately to Univentor or an authorised representative. You must retain the original packing box and contents for inspection by the freight handler. Univentor will replace any new instrument damaged in shipping with an identical product as soon as possible after the claim filing date. Claims not filed within 30 days after the shipping date will be invalid. Do not return damaged goods to Univentor without first contacting Customer Service. All correspondence and returns must include the serial number of the instrument. Univentor refuses all unauthorised return shipments.

1.3. SERVICE

Univentor has a skilled service staff available to solve any technical problem. Following discussion of your specific difficulties, an appropriate course of action will be described and the problem resolved accordingly. Service is treated as a priority and turnaround time is kept as short as possible. All correspondence and shipments should be sent to Univentor Ltd or your Univentor representative and must include the serial number of the instrument. For further details contact Univentor or Univentorís representative.

Section 2 - INTRODUCTION

2.1. INTRODUCTION

The Univentor 410 Anaesthesia is a precision instrument designed to anaesthetise animals weighing between 20 and 500 grams.

Anaesthetic gas is generated by vaporising liquid anaesthetic in a syringe with air, or oxygen, with a precision that reduces consumption and minimises the risk to the animal. Although precalibrated for Isoflurane other anaesthetics such as Sevoflurane may be used taking the different properties into consideration.

The 410 Anaesthesia is compact and responsive with emphasis on safety and ease of use whilst every effort has been made to ensure that the 410 Anaesthesia is also reliable and durable.

Combined with the 2010 Scavenger and accessories the 410 Anaesthesia provides a flexible anaesthetic system that caters for most set ups.

Please read this manual before starting and we recommend continuous monitoring of the anaesthetised animal at all times.

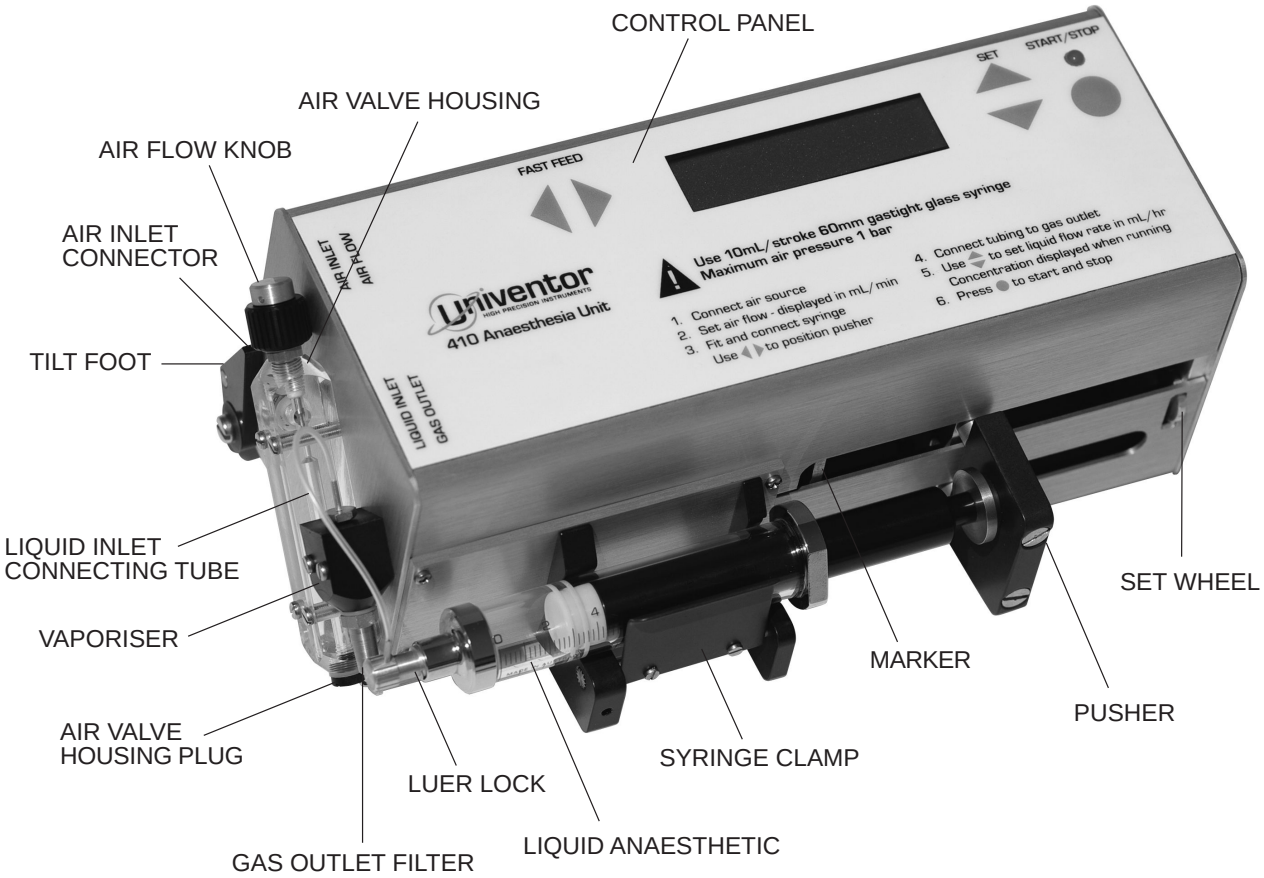


FIGURE 2.1. - The Univentor 410 Anaesthesia Unit

Section 3 - GENERAL

3.1. UNPACKING AND INSTALLATION

Remove the instrument from the shipping packaging and inspect both the instrument and the packaging for any signs of damage. If any damage is noted, contact the freight handler and your Univentor representative immediately, see section 1.2.

Missing Items?

The 410 Anaesthesia Unit is delivered with:

1. 1 10mL gastight glass syringe
2. 1m PVC tubing
3. Power supply
4. Mains lead

3.2. POWER SUPPLY

MAINS - Use an earthed wall plug and the power supply supplied with the 410 Anaesthesia Unit. The power supply can automatically handle input voltage in the range from 100V AC to 240V AC, 50 to 60 Hz.

BATTERY - 12V. Consumption: 400mA.

3.3. CONTROL PANEL

The following functions, together with brief instructions, are on the panel of the Univentor 410 Anaesthesia Unit. (See Figure 3.3.)

TEXT	FUNCTION
Fast Feed ◀▶	forward/reverse fast feed to position pusher
Set ▲▼	increasing/decreasing liquid flow rate/anaesthetic concentration %.
Start/Stop ●	starting/stopping liquid delivery. Lights green when delivering and red in case of alarm. (See safety features 3.5)

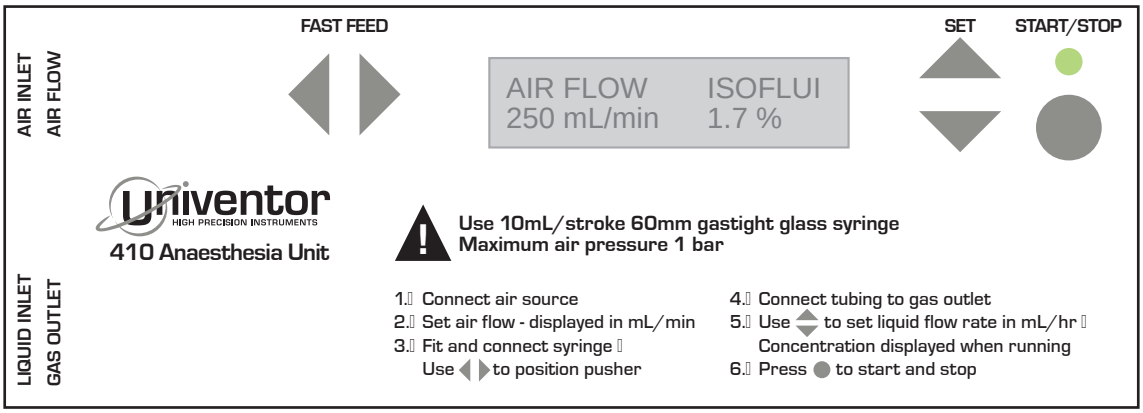


FIGURE 3.3. - The control panel of the Univentor 410 Anaesthesia Unit.

3.4. DISPLAY

1. AIR FLOW: current air flow in mL/min.
2. LIQUID:

a) when switched on and in standby mode the set liquid flow rate is displayed in mL/hour.

b) when switched on and running the current anaesthetic concentration is displayed in % as calculated.

3.5. SAFETY FEATURES

An audible alarm will be triggered should any one of the following occur:

1. The pusher has reached set stopping position.
2. The air flow is blocked.
3. The air flow is below 50mL/min.
4. The air flow is above 999mL/min.
5. The liquid delivery is stopped.

Section 4 - OPERATION

4.1. INSTRUCTIONS

FOLLOW THE ANAESTHETIC MANUFACTURER'S INSTRUCTIONS AS WELL AS REGULATIONS APPLICABLE TO YOUR COUNTRY.

USE A 2010 SCAVENGER OR WORK ON A VENTILATION BENCH TO HANDLE ANY SURPLUS GAS.

4.1.1. SETTING UP

Connect the instrument to the power supply and earthed mains.

4.1.2. AIR SUPPLY

Remove protective cover and connect air supply from source to the air inlet:

8323101 - tank fitted with precision pressure regulator set at 1 bar maximum and filters.

8323102 - pulse free air pump maximum 100l/h and 0.5 bar pressure.

NOTE: condensation and/or other liquids entering the system will damage the air flow sensor.

We recommend regular visual monitoring of the air valve housing and if liquids are visible stop using the instrument as soon as possible and refer to TROUBLE SHOOTING 5.6.

4.1.3. SYRINGE END AND AUTO-REVERSE

Due to tolerances and differences between syringes the plunger position of an empty syringe must be set the first time a new syringe is used:

a) turn set wheel downwards until the marker is in end position.

b) position the syringe plunger on approximately 0.5mL graduation line.

c) switch the unit and air on and set the air flow above 55mL/min.

d) use fast feed ◀▶ to move pusher and fit the syringe.

e) use fast feed ◀ until plunger is almost on the zero graduation line.

f) reverse the marker by turning the set wheel upwards until the alarm triggers - there will be three consecutive audible beeps and the start/stop indicator lights red and the pusher will automatically reverse.

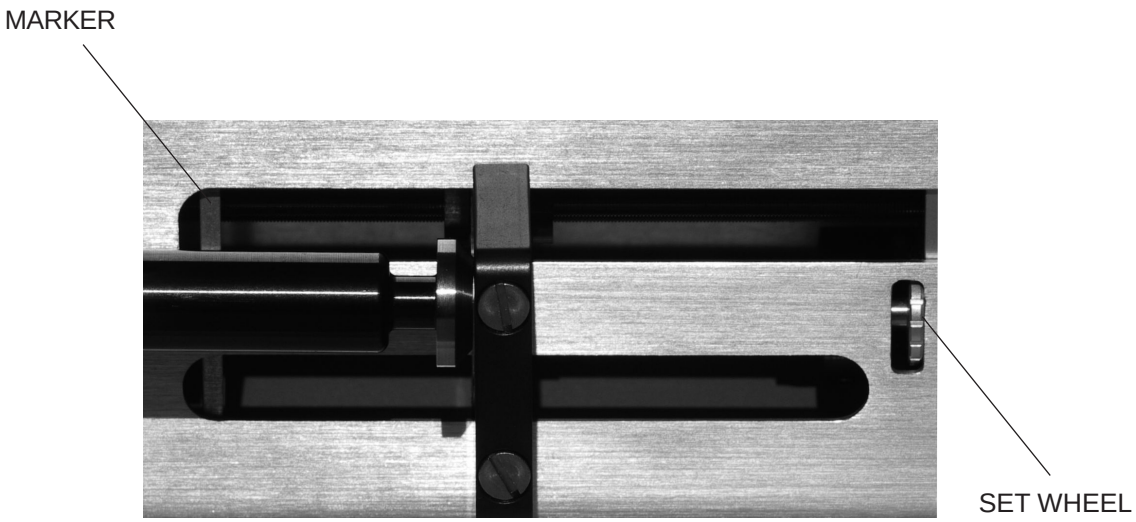


FIGURE 4.1.3. - Syringe end and auto-reverse

4.1.4. FILLING SYRINGE

Following the manufacturer's handling instructions fill the 10mL gastight syringe (stroke 60mm) with anaesthetic and make sure that there are no air bubbles. Connect the luer lock of the liquid inlet tubing to the syringe.

The syringe should periodically be tested for leakages. Ref. Trouble Shooting 5.4.a

4.1.5. FITTING SYRINGE

Switch air on and set air flow above 500mL/min and use fast feed to reverse/forward the pusher as necessary and fit the syringe. Move the pusher forward until the liquid in the connecting tube is visibly just about to enter the vaporiser.

DO NOT PUSH THE PLUNGER MANUALLY. Un-vaporised anaesthetic will damage the sensor.

NOTE: The fast feed forward will not work without air and must be pressed continuously.

4.1.6. GAS OUTLET

Connect one end of the supplied PVC tubing to the gas outlet and the other to the induction chamber or mask. If using a Gas Routing Switch refer to Section 9, figure 9.1 and if using a Scavenger Gas Routing Switch refer to figure 9.2.

Keep tubing as short as possible.

4.1.7. AIR FLOW

Set the air flow by turning the air flow knob. Air flow is displayed in mL/min.

Examples:

INDUCTION CHAMBER

Mice - approximately 400 - 500mL/min

Rats - approximately 700 - 800mL/min

MASK

Mice - approximately 150 - 250mL/min

Rats - approximately 400 - 500mL/min

4.1.8. LIQUID ANAESTHETIC

Set the anaesthetic concentration percentage - press start/stop to start the instrument, press set arrows to increase or decrease the concentration and then press start/stop again to stop the instrument to show the liquid flow rate, mL/ hour.

Examples:

INDUCTION CHAMBER

Mice and rats - 4%

MASK

Mice and rats - 1.7-2.5%

NOTE: the % concentration can also be increased or decreased during operation by adjusting the air flow.

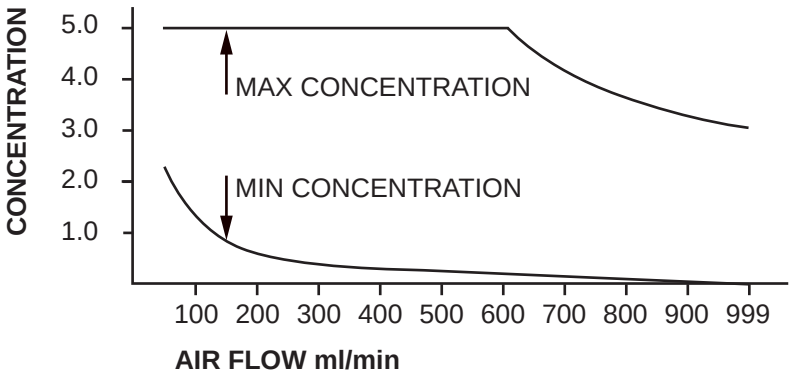


FIGURE 4.1.8. - Concentration/Air flow

4.1.9. OPERATING TIME

Calculate the operating time available by dividing the liquid volume of syringe with the liquid flow rate mL/hour and make sure that the time is adequate.

Liquid flow rate is displayed when the instrument is in stop mode.

Eg: with an air flow of 250mL/min and an anaesthetic concentration of 1.8% the consumption will be approximately 1.4mL/hour and a 10mL syringe will give just over 7 hours of continuous use.

4.1.10. START DELIVERY

Swivel the tilt feet to angle the instrument if necessary so as to maintain visual contact with the display and press start/stop to start delivery.

Depending on your set up and settings it may take a few minutes for the system to fill with gas.

Refer to Section 9, figure 9.3 to switch between chamber and mask using a Gas Routing Switch and figure 9.4 if also using a 2010 Scavenger and the Scavenger Gas Routing Switch.

NOTE: the unit will not operate without air!

4.1.11. MONITORING

Monitor the animal at all times and adjust the concentration percentage as necessary by pressing set arrows or by increasing/decreasing the air flow.

4.1.12. END DELIVERY

When ready press start/stop to stop the liquid delivery and allow the air flow to continue for a period of 15 minutes to clean the vaporiser.

Connect an air filled syringe and gently push the air through to clean the liquid inlet tubing and cannula.

DO NOT STORE ANAESTHETIC IN SYRINGE WHEN NOT IN USE.

NOTES:

1. All values are approximate due to animal and procedure variables.
2. Delivery can be instantly terminated by pressing start/stop to stop the instrument. However, in case of emergency remove the mask due to gas in outlet tubing.

When started again the previous settings will be displayed.

Section 5 - TROUBLE SHOOTING

5.1. UNIT DOES NOT START DELIVERY:

a) The air flow is below 50mL/min or above 999mL/min

- check settings ref. Section 4/INSTRUCTIONS
- check source and tubing.

5.2. THE LIQUID DELIVERY IS STOPPED:

a) Pusher has reached set auto reverse

- check if syringe is empty.
- check position of marker and reset if necessary.

5.3. DISPLAY SHOWS 'SLIP ERROR':

Occurs when force exceeds 100N due to:

a) Pusher is blocked - make sure clear.

b) Syringe and/or tubing blocked - check and replace as necessary.

c) Gearbox is slipping - contact your Univentor representative.

d) Cannula to vaporiser is blocked - to test fill syringe with air, connect to luer lock and try pushing plunger. If air passes easily it is not blocked. If very tough to push and plunger bounces back when released it is blocked.

To unblock remove gas outlet adaptor and the tubing from the luer lock to vaporiser and push a thin wire through the cannula to clean any dirt that may be blocking the liquid.

5.4. ANIMAL NOT BEING ANAESTHETISED:

a) Syringe no longer gastight - to test fill syringe with air, block outlet and press plunger. If plunger stops before reaching the end the syringe is still gastight and if it continues until the end it is leaking and must be replaced.

b) Faulty air sensor - contact your Univentor representative.

c) Cannula to vaporiser is blocked - to test fill syringe with air, connect to luer lock and try pushing plunger. If air passes easily it is not blocked. If very tough to push and plunger bounces back when released it is blocked.

To unblock remove gas outlet adaptor and the tubing from the luer lock to vaporiser and push a thin wire through the cannula to clean any dirt that may be blocking the liquid.

d) Stroke of 10mL syringe not 60mm - replace.

5.5. ANIMAL OVER ANAESTHETISED:

a) Faulty air sensor - contact your Univentor representative

b) Air leakage

- check air connections
- check internal tubing - contact your Univentor representative

c) Stroke of 10mL syringe not 60mm - replace

5.6. LIQUID IN AIR VALVE HOUSING

Cleaning/drying of air valve housing:

a) Make sure that the air supply is suitable and filtered as necessary.

b) Remove the black plug at the bottom of the air valve.

c) With the unit in standby mode set air flow on 999mL/min .

d) Pass clean air through until housing is dry.

e) Refit the plug.

5.7. ERROR CODES

DISPLAY	ERROR
‘Air 0’	air flow is zero
‘Air Low’	air flow less than 50mL/min
‘Air High’	air flow more than 999mL/min
‘Slip Error’	pusher movement force exceeds 100N
‘Out of Range’	set combination of flow rates not possible
‘Max Mixture’	maximum concentration of anaesthetic at that air flow
‘Min Mixture’	minimum concentration of anaesthetic at that air flow

Refer to Instructions and Trouble Shooting or contact your Univentor representative.

Section 6 - MAINTENANCE & SERVICE

6.1. LEAKAGES

We recommend that the unit is regularly checked for gas leakages.

1. Switch the unit on.
2. Set air flow on 500mL/min.

N.B. If air supply pressure exceeds 1 bar the unit will be damaged.

3. Block the gas outlet.
4. Reading on display should rapidly decrease to less than 10mL/min.

Should unit leak (i.e. more than 10mL/min on display) contact your Univentor representative.

6.2. REPLACING PARTS

We recommend that the gas outlet filter part number 2423017 is changed at least yearly or as necessary according to use.

6.3. STORAGE

If the Univentor 410 Anaesthesia Unit is not to be used for a significant length of time, it is recommended to clean the instrument, fit protective covers on air inlet and outlet and store it safely.

6.4. SERVICE

We recommend that the unit is sent for service every 12 months when in use daily and otherwise every 18-24 months depending on use.

Section 7 - SPECIFICATIONS

Power	POWER SUPPLY: 100 - 240V AC 50 - 60Hz.
	BATTERY: 12V 400mA.
Dimensions	120mm (w) x 285mm (l) x 95mm (h).
Weight	1.8kg.
Shipping weight	3kg.
Drive motor	Pulse free DC motor with variable speed setting.
Fast feed	Pusher movement of 45mm/min.
Syringe	1 glass and gastight 10mL syringe with 60mm stroke.
Min. liquid flow rate	0.4mL/hr.
Max. liquid flow rate	10mL/hr.
Min. air flow rate	50mL/min.
Max. air flow rate	999mL/min.
Min. air pressure/8323101	0.5 bar.
Max. air pressure/8323101	1.0 bar.
Min. air pressure/8323102	0.3 bar.
Max. air pressure/8323102	0.5 bar.
Max. pusher force	100N.
Pusher movement tolerance	+/- 0.01mm or +/- 1% of total distance.
Concentration tolerance	+/- 0.15 units of displayed % value.
Display	2x16 Characters.
Safety features	Audible alarm and red LED.

Section 8 - ORDERING INFORMATION

CAT. No.	DESCRIPTION
8323101	Univentor 410 Anaesthesia Unit.
8323102	Univentor 410 AP Anaesthesia Unit adapted for airpump.
2423017	Gas Outlet Filter.
7251001	Power Supply 110V - 240V.
7751001	10mL gastight glass syringe.
8338001	2010 Scavenger.
8433005	Gas Routing Switch.
8433020	Scavenger Gas Routing Switch.
8329001	Induction Chamber 0.8l.
8329002	Induction Chamber 1.4l.

Section 9 - DIAGRAMS

TUBING CONNECTIONS

Gas Routing Switch 8433005

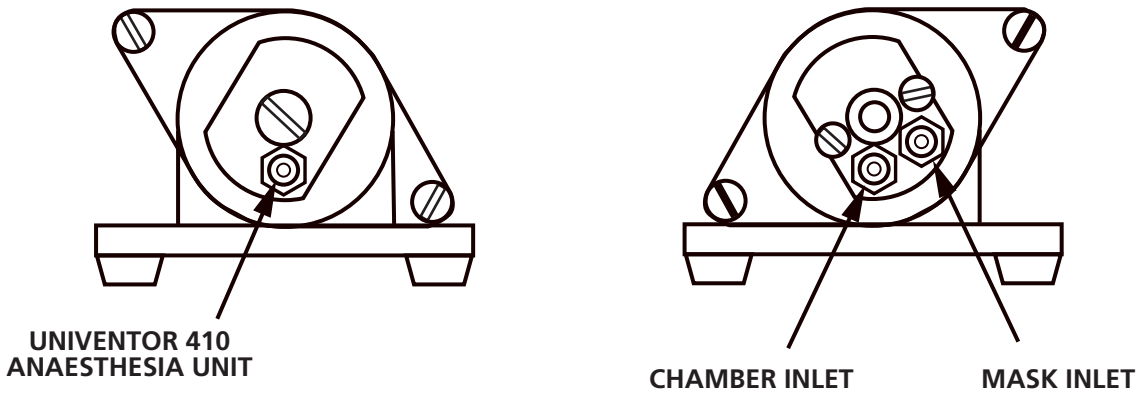


Figure 9.1

TUBING CONNECTIONS

Scavenger Gas Routing Switch 8433020

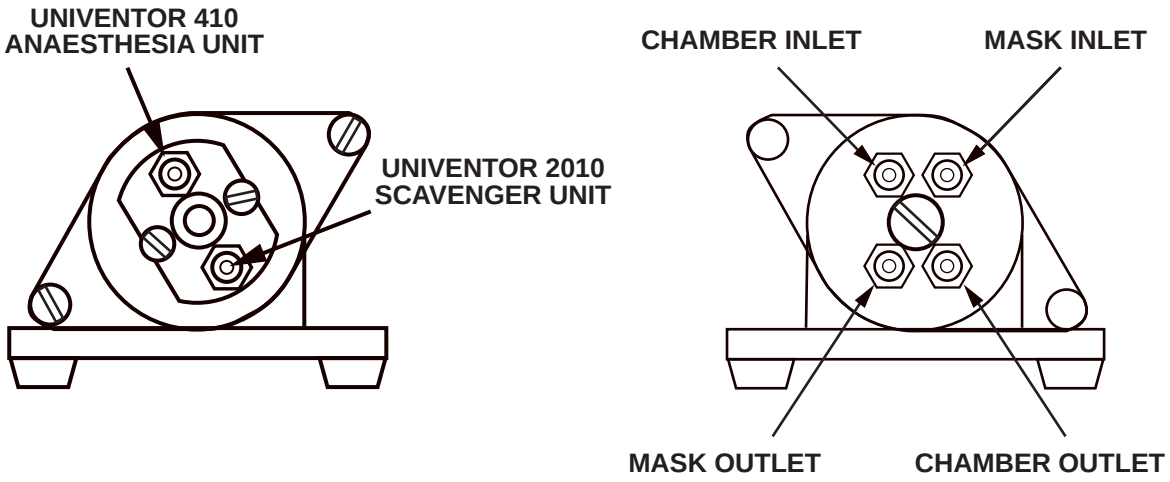
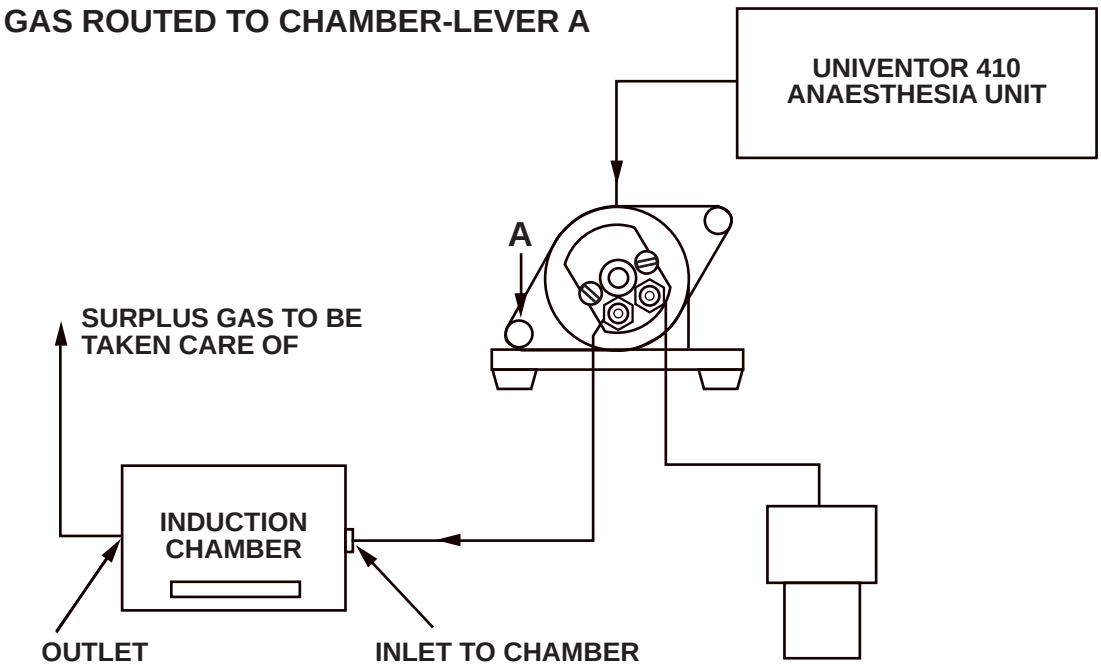


Figure 9.2

GAS FLOW DIAGRAM

Univentor 410 Anaesthesia Unit with Gas Routing Switch 8433005



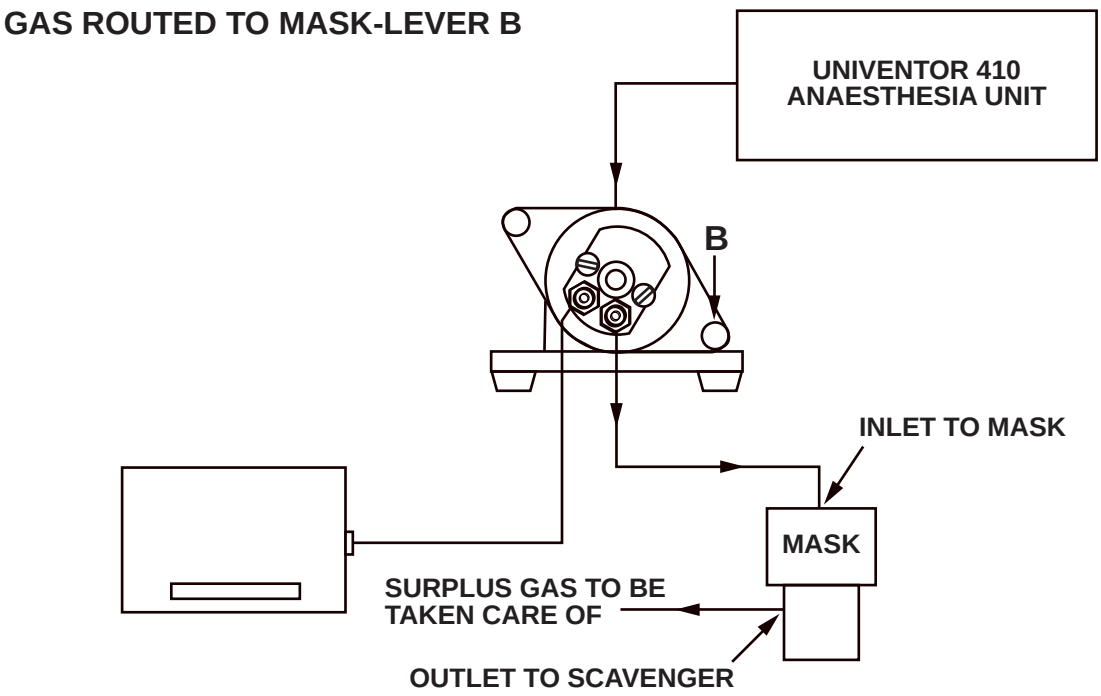
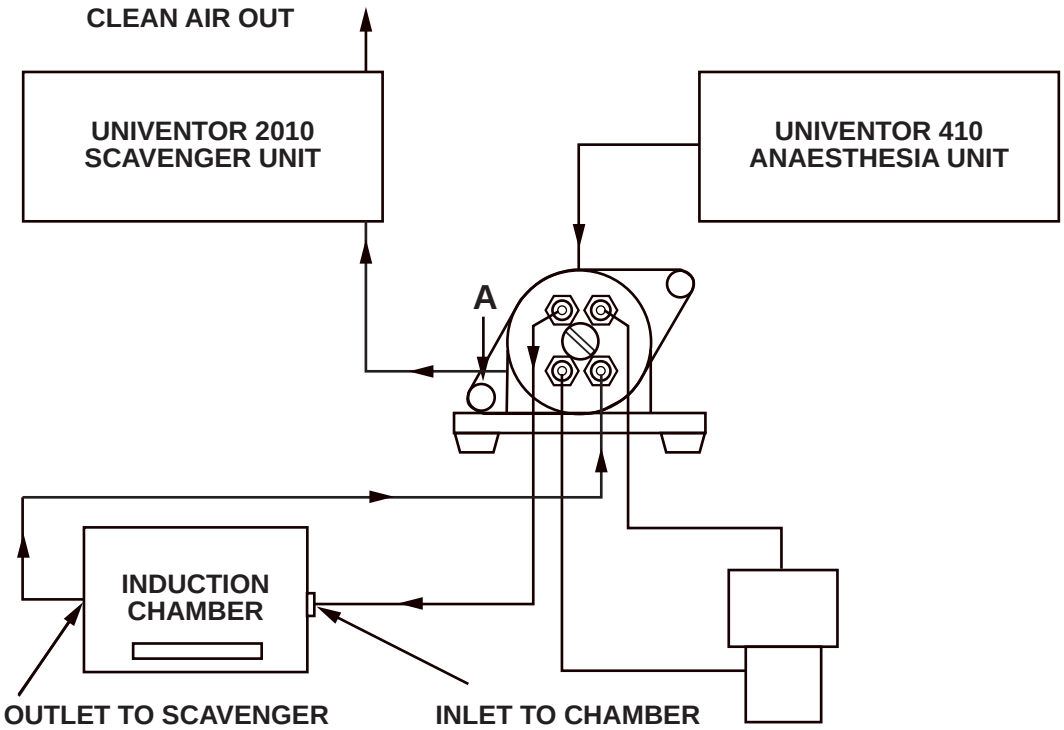


Figure 9.3

GAS FLOW DIAGRAM

Univentor Anaesthesia Unit, Scavenger 2010 and Scavenger Gas Routing Switch 8433020

GAS ROUTED TO CHAMBER-LEVER A



GAS ROUTED TO MASK-LEVER B

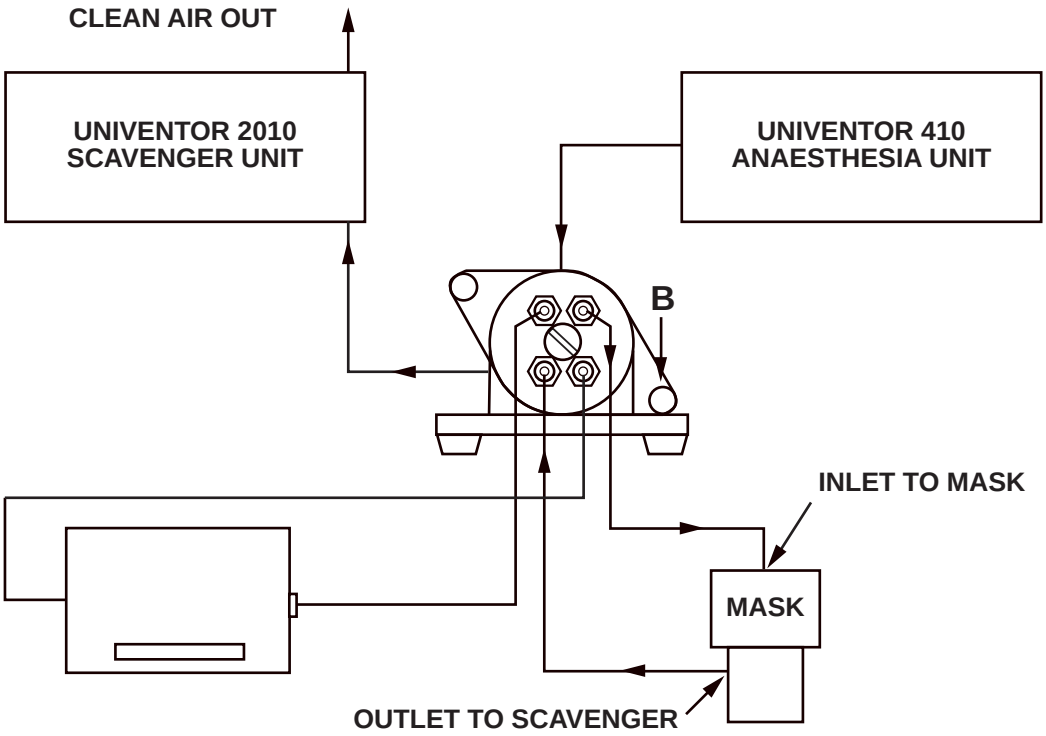


Figure 9.4

INDEX

BLB029, Bulebel Industrial Estate, Zejtun ZTN 3000, Malta.
Tel: (+356) 21 895824. Fax: (+356) 21 895835.
E-mail: info@univentor.com
Homepage: http://www.univentor.com