



MUNRO

INSTRUMENTS

ANAEROBIC WORKSTATION

AW300SG

MANUAL



PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

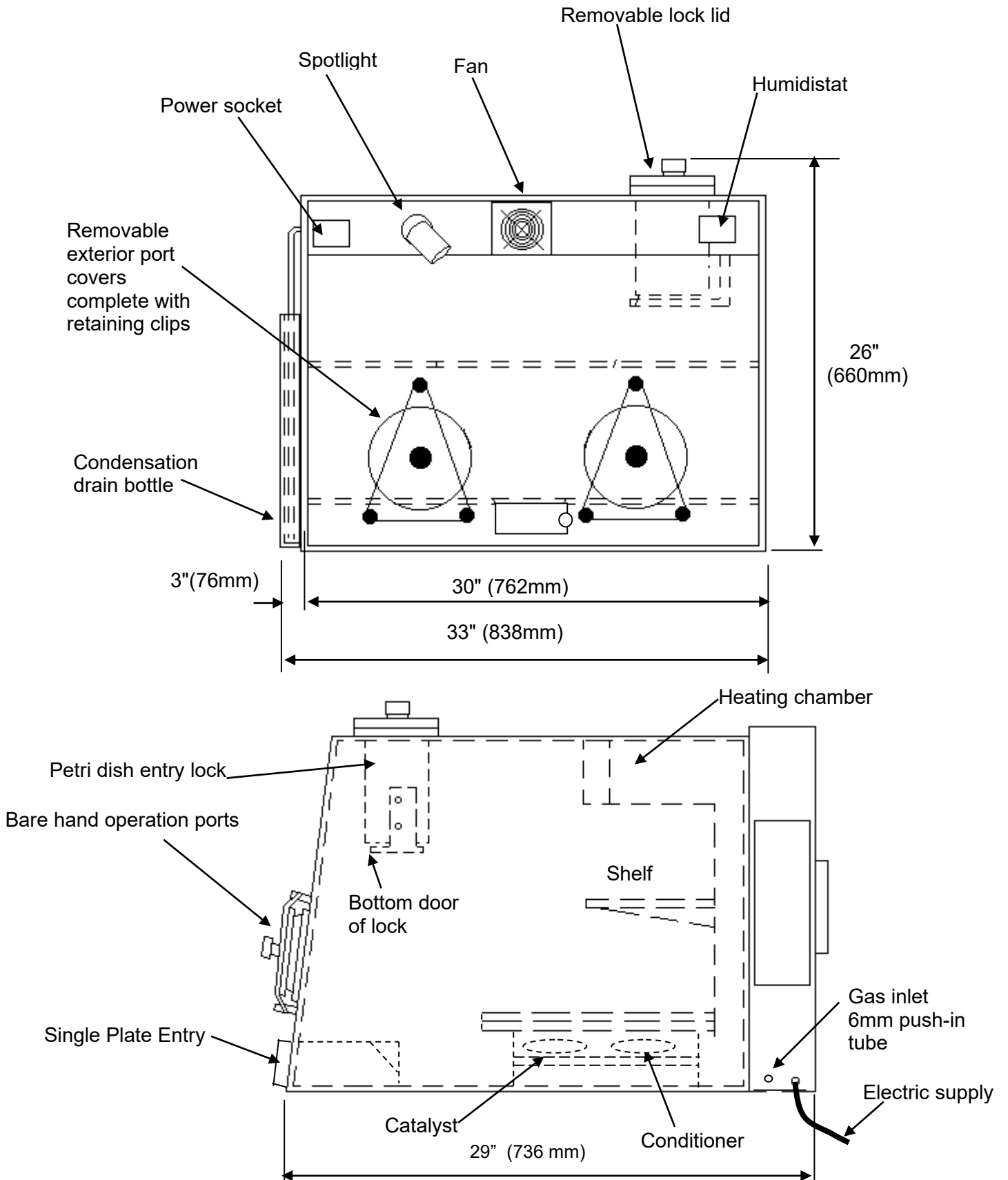
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GENERAL ARRANGEMENT OF AW300SG ANAEROBIC CABINET



GENERAL SPECIFICATION

MODEL	AW300SG
MAIN CHAMBER INCUBATION CAPACITY	300 Petri Dishes
DOOR SEALING	Manual
GAS	Mixed Gas (10% H ₂ + 10% CO ₂ + 80% N ₂)
OXYGEN REMOVAL FROM AIRLOCK	Positive Pressure flushing
FABRICATION MATERIAL	Acrylic
OVERALL DIMENSIONS	Length 33" 838mm Depth 29" 736mm Height 26" 660mm
ELECTRICAL SUPPLY	230 VAC 50/60Hz

GAS SUPPLIES

This Anaerobic Cabinet requires one gas cylinders fitted with a two stage regulator. The output side of the regulator should have a range of 0 - 50 p.s.i. (3.3 bar).

The gas cylinder should contain:

10% Hydrogen + 10% Carbon Dioxide + 80% Nitrogen

CAUTION: GAS CONTAINING MORE THAN 10% HYDROGEN SHOULD NOT BE USED UNDER ANY CIRCUMSTANCES

The gas pressure at the inlet to the cabinet should be approximately 30 psi (2 bar) with the gas flowing, and the gas flow is as follows:

MIXED GAS 35L/min

The diameter of the pipes connecting the cylinder to the cabinet should be selected according to the length of run to give a minimum pressure drop, this will give maximum gas utilisation.

The cabinet is fitted with a 6mm diameter "push in connector" for the gas.

ELECTRICAL SUPPLIES

VOLTAGE: 230 V.A.C.

CURRENT: 5 AMPS

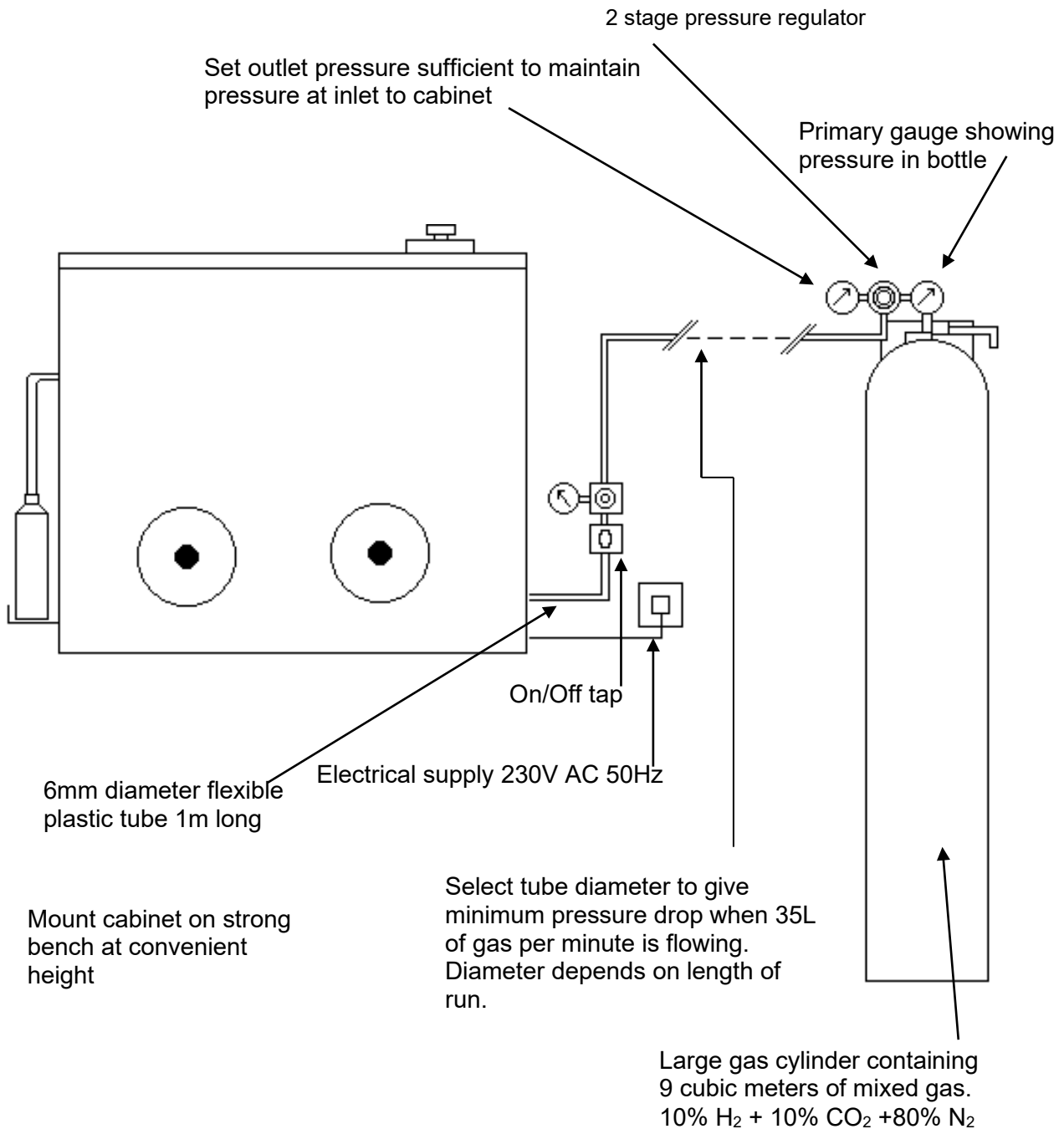
FREQUENCY: 50 Hz

CAUTION

Switching the Anaerobic workstation "OFF" before it has reached its working temperature can cause the "THERMAL FUSE" protecting the heater to rupture.

We recommend that the heater is switched off at the control panel if any work is being carried out on the unit requiring switching "OFF" and "ON" or during any commissioning tests.

INSTALLING THE GAS AND ELECTRICAL SUPPLY TO THE AW300SG WORKSTATION

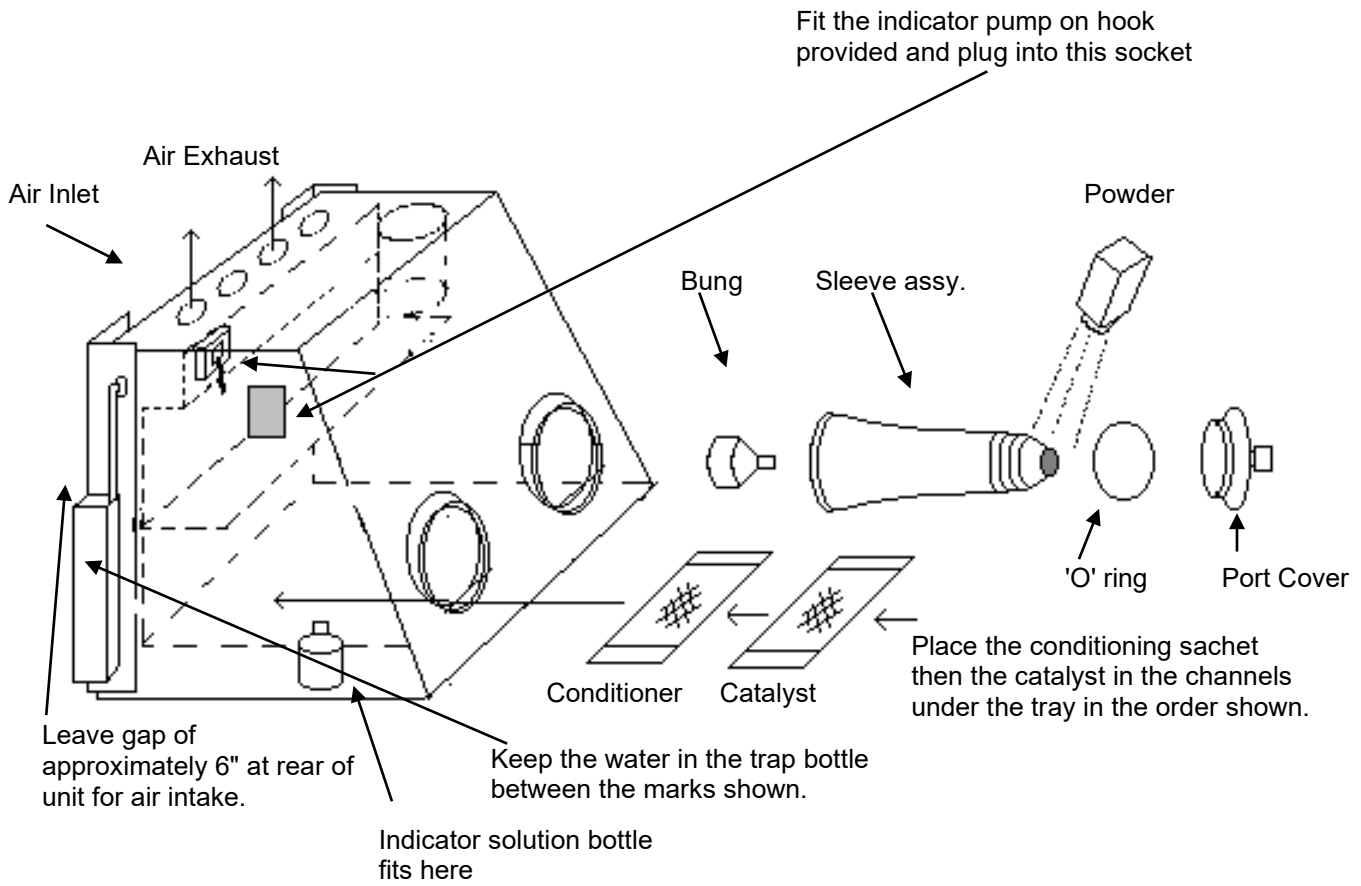


CAUTION:-

GAS CONTAINING MORE THAN 10% HYDROGEN MUST NOT BE USED UNDER ANY CIRCUMSTANCES

THE UNIT MUST BE INSTALLED IN A WELL-VENTILATED ROOM

AW300SG ASSEMBLY INSTRUCTIONS DRAWING



CHECKING THE INCUBATOR ATMOSPHERE FOR OXYGEN

The Anaerobic Indicator Solution will indicate traces of Oxygen in the incubator atmosphere by changing colour from being clear when the atmosphere is anaerobic to being blue when oxygen is present. The Indicator Solution is held in a small bottle located in the bottom of the incubator and is held in position by a plastic holder. The atmosphere from the cabinet is bubbled through the solution by a small aquatic pump. The pump is plugged permanently into an electrical socket. The atmosphere of the incubator can be checked for oxygen content by simply switching the socket "ON" on the Control Panel. It is usually sufficient to check the atmosphere perhaps once a day allowing the pump to run for about 2 minutes. If the pump is allowed to run continuously, the indicator solution tends to evaporate and requires replacing on a regular basis. This is not necessary.

PREPARING THE ANEROBIC INDICATOR SOLUTION

Make up the Anaerobic Indicator Solution from the two ingredients provided sufficient to fill the bottle about two-thirds full using nine parts of solution "A" and one part of solution "B"

Now place a cap lightly on the neck of the bottle and place it in a bath of water and bring it to the boil. The solution will change from being blue to colourless. Tighten up the cap and remove the bottle from the water allow it to cool and pass it into the cabinet. The cap can now be removed and the outlet pipe from the pump connected to the bottle. The bottle can now be placed in position inside the bottle holder where it will be in full view.

We recommend replacing the solution on a weekly basis.

COMMISSIONING THE CABINET

Check all the following points before starting to commission the workstation.

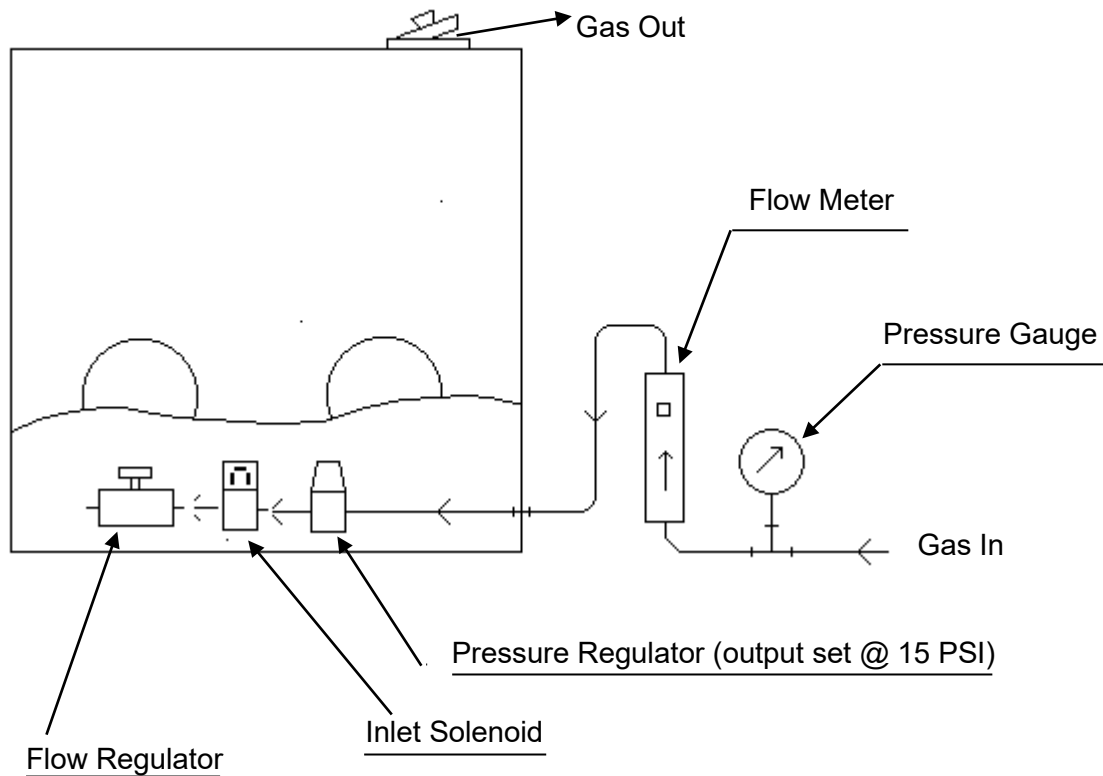
1. Switch "OFF" the cabinet at the Mains ELCB switch.
2. The gas flow has been set at the factory to 35 litres per minute. However during initial commissioning please check this gas flow as described on page 10 by placing a gas flow meter and pressure gauge in the gas line.
3. Open the mixed gas pressure regulator fitted to the gas bottle sufficiently high to maintain an inlet pressure to the cabinet of approximately 30 psi (2 Bar) with the gas flowing.
4. Ensure that the Gas Trap Bubble Bottle is filled up to the water level line and the gauntlets and bungs are both fitted to the cabinet. (Page 7)
5. Hang the Indicator Pump on the hook adjacent to the electrical socket, plug the pump into the socket and switch "ON".
6. Ensure that the bottom lid of the petri dish entry lock is in the closed position. Remove the top lid of the lock and place it at an angle over the top of the lock ensuring that there is a gap for the flushing gas to escape.
7. Check that the Atmospheric Conditioning Sachet and the Palladium Conditioning Sachet are in position underneath the shelf. The Atmospheric Conditioning Sachet should be put in first to the rear of the cabinet
8. Set the humidistat to 70% R.H.
9. The commissioning switch will be found on the control panel. This is held in the 'OFF' position by a small keeper. Slide the keeper and place the switch in the 'ON' position.
10. Now switch on the cabinet at the E.L.C.B.
11. Gas will begin to flow into the incubator and out of the lock. Adjust the gas flow if necessary (see page 10)
12. Leave the gas flowing for approximately 25 minutes then place the anaerobic indicator bottle in position filled to the appropriate level with indicator solution and connect it to the pump with the flexible tubing. (See the instructions regarding the preparation of the indicator solution on page 7)
13. If the indicator solution remains colourless the cabinet is anaerobic. If the solution turns blue, leave the gas flowing until it becomes colourless.
14. During this period, the inside of the cabinet will mist over, but eventually this condensation will clear. The catalyst sachet will also get quite warm.
15. Once the cabinet is anaerobic, switch the commissioning switch off on the control panel and replace the keeper to prevent accidental switching.
16. Replace the lid of the petri dish entry lock.
17. Now check all the functions are working.

CHECKING THE GAS FLOW

To check the Gas Flow into the Workstation the following equipment is required:

1. Gas Flow Meter (0 – 50 Litres per minute)
2. Pressure Gauge (0 – 3 Bar)

Connect up the equipment as shown and lift lid as shown.



$$\text{Gas Flow} = \text{Flow Meter Reading} \sqrt{\frac{1 + \text{Pressure Gauge Reading}}{1}}$$

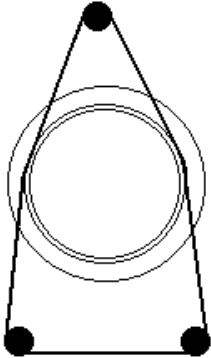
e.g.: Gas flow required = 35 L / minute

Pressure Gauge Reading shows 2 Bar

$$\text{Flow Meter Reading} = \frac{35}{\sqrt{\frac{1 + 2}{1}}} = \frac{35}{1.73} = 20.2 \text{ L/M}$$

Any adjustment to the gas flow should be made using the flow regulator situated behind the back cover.

WORKING INSIDE THE CABINET WITH BARE HANDS



The inside of the sleeve is always held at positive pressure by the Gas Pressure Switch, therefore if the Bung is removed from the Cuff, gas will flow out of the cabinet and no oxygen will enter.

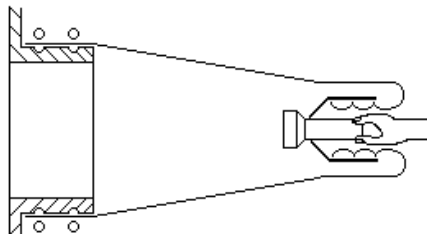
To insert the hand into the cabinet, firstly remove both port covers by placing the neoprene retainers on each side of the port as shown and put the covers in a safe place.

Feel inside the right hand sleeve, take hold of the bung with the right hand and pull the sleeve to the outside of the cabinet. Now hold the rigid cuff with the left hand and push the bung into the cabinet using the tips of the fingers only, followed by the hand.

(Note:- Do not grip the end of the bung with the fingers).

To insert the left hand, take hold of the left hand rigid cuff with the right hand (inside the cabinet). Insert the left hand into the left hand sleeve and push out the bung with the tips of the fingers. While still holding the rigid cuff with the right hand, push the left hand through the cuff.

To remove the hands from the cabinet, place the left hand bung in close proximity to the left hand port.



Take hold of the left hand rigid cuff with the right hand and withdraw the left hand. Place the left hand rigid cuff over the bung using the right hand. Press the cuff over the bung to form a seal. To remove the right hand, take hold of the right hand bung inside the cabinet with the right hand. Withdraw the bung and sleeve to the outside of the cabinet. Release the bung inside the sleeve and withdraw the right hand. Now lower the sleeve so that the bung falls through the rigid cuff into the wrist cuff. Holding the rigid cuff with both hands, apply light pressure through the sleeve to the back of the bung to squeeze the bung into the wrist cuff to produce a seal. Once finished, push the sleeve assembly into the glove port and re-fit the port covers, holding them in place with the neoprene o-rings.

Note:- To prevent oxygen entering through a glove port, the operator must never remove a bung from either sleeve until the sleeve has filled with gas.

If the hands and Cuffs are lightly dusted with talcum powder the operation becomes very simple.

If the Cuffs are too tight around the wrists they can be trimmed to a more comfortable fit with a sharp pair of scissors. However they must be sufficiently tight to prevent gas escaping whilst working inside the cabinet.

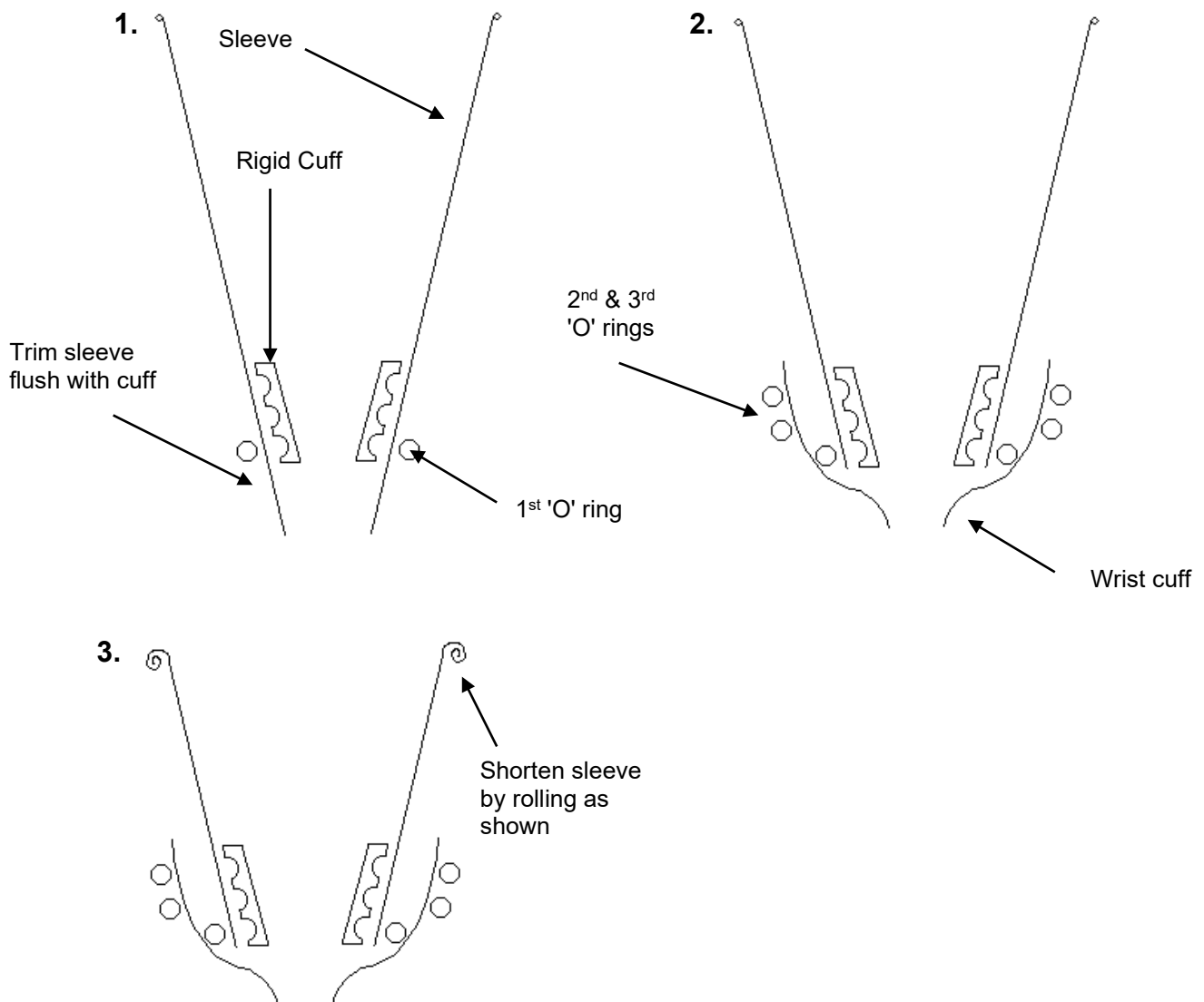
SLEEVE ASSEMBLY

The Most likely part of the sleeve assembly to suffer damage is the cuff. This can be replaced by following the diagrams shown below.

The assembly consists of four parts:-

1. The sleeve
2. The rigid cuff
3. The wrist cuff
4. The 'O' rings

The assembly fits together as shown in the following sketches:-



THE REMOVAL OF CONDENSATION FROM INSIDE THE INCUBATOR

Water vapour accumulates inside the incubator atmosphere from two sources, firstly from the evaporation of the media in the Petri dishes and secondly by the hydrogen and the traces of oxygen being linked together by the palladium catalyst. If this water vapour is not removed it will condense on the cooler surfaces of the incubator walls and form pools of water. The cabinet however is fitted with a large aluminium Condensation Plate which is kept a few degrees lower than the temperature inside the incubator by a fan which blows cool air from the room onto its outer surface. This reduction in temperature is sufficient to cause the excess water vapour inside the incubator to condense, run down its surface and collect at the bottom and finally fall via a one-way valve into the gas trap bottle.

The humidity inside the incubator is controlled by the humidistat which is situated inside the unit just behind the transfer lock. The humidistat switched the cooling fan on and off automatically as required.

THE WATER GAS TRAP TUBE

The water gas trap tube is situated on the outside of the unit at the rear of the left side. It has several functions.

Firstly, it is a safety device so that in the event of the gas inlet solenoid remaining open, the gas has a way of getting out of the inlet without doing any damage.

Secondly, it allows the operator to push their hands inside the cabinet without applying any undue pressure. It must be remembered that all the gas that escapes via the gas trap is wasted, therefore every effort must be made to minimise this wastage when working inside the incubator. If one arm is withdrawn as the other is pushed into the unit, gas wastage can be reduced.

Finally, the water gas trap tube is a collecting point for the condensation.

The water level should be checked daily. If the water level is too high it makes it difficult for the operator to insert their arms and if the water is too low, there is a risk that gas will start to escape.

TRANSFERRING ITEMS INTO THE INCUBATOR

The workstation is supplied with four aluminium petri dish holders, each capable of holding ten dishes. These are used for transferring dishes into and out of the cabinet and for stacking them whilst they are being incubated.

To insert the dishes into the incubator, simply do the following:-

Place the loaded petri dish holders in close proximity to the right hand side of the cabinet. Insert the left hand through the right hand glove port. Using the right hand, remove the lid from the transfer lock. Place the dish holder into the lock and replace the lid. Using the left hand inside the cabinet, open the bottom door of the transfer lock and lower the holder into the incubator. Close the bottom door and repeat for further holders.

TRANSFERRING ITEMS OUT OF THE INCUBATOR

To remove plates from the incubator, first collect all the dish holders to be removed and place them in the right half of the cabinet, within easy reach of the left hand (again inserted into the right hand glove port). Open the bottom door of the transfer lock, push the holder up into the lock and hold in place with the thumb of the left hand, while closing the door with the fingers. Now remove the top lid of the lock and withdraw the holder. Replace the lid and repeat for further holders.

THE HEATING SYSTEM

The heating system consists of a 400 Watt heater fixed directly behind the fan unit, mounted on a detachable plate on the top of the incubator. The fan runs continuously whilst the heater is burst fired.

THE TEMPERATURE CONTROLLER

An adjustable electronic temperature controller fitted in the control panel of the cabinet regulates the temperature. The controller has a temperature sensor in the right hand top corner of the heating chamber and the temperature of the incubator can be adjusted between 3 degrees C above ambient to 40 degrees C. There is a green led incorporated in the temperature controller which indicates when the heater is operating and a temperature display to give an accurate reading of the internal temperature of the cabinet. A data sheet covering the temperature controller is included with this documentation.

THE GAS CIRCULATION SYSTEM

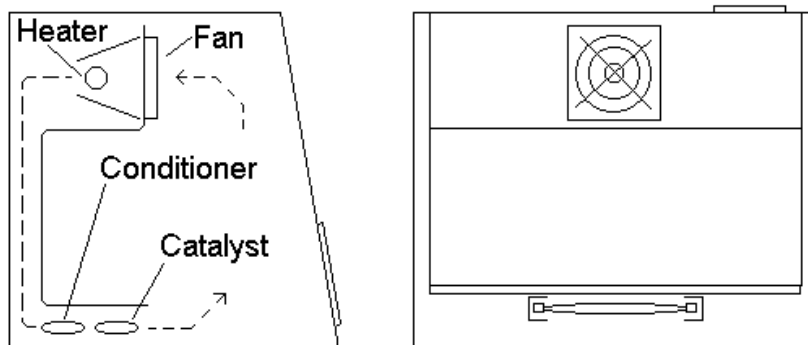
The fan units pick up the cooler incubator atmosphere which has been forced to the top of the incubator and first passes it over the warm heater. This warmer gas is now forced down the channel at the back of

the cabinet then it passes under the bottom shelf of the incubator where it first meets the sachets of Conditioner and then the sachets of Catalyst. The gas now gives up just sufficient of its heat to maintain the required temperature before finding its way back to the top of the incubator due to the suctional force of the fan.

CHANGING THE CATALYST AND CONDITIONER

The sachet of Catalyst and the sachet of Conditioner which are housed beneath the bottom shelf of the incubator will require replacing at a period in excess of one year. If for any reason the sachet of catalyst gets wet, the contents can be dried out by heating to a temperature of 160°C for a period of two hours. The sachet of conditioner can, if necessary, be dried at room temperature. The chemicals can then be returned to their respective containers for further use. .

When replacing the sachets, ensure that the sachet of Atmospheric Conditioner is at the REAR of the cabinet so that the gas passes over it first. (See sketch below)



Sachet placed in workstation through transfer lock

CLEANING

The inside of the cabinet can be swabbed out with a weak solution of general laboratory detergent and warm water, and dried with a soft cloth. In the event of a culture spillage, a 5% Hypochlorite solution should be applied to the area and left for half an hour. It should then be wiped and swabbed with a 1% solution of Sodium Thiosulphate. Remove the catalyst and conditioner from the unit while the Hypochlorite solution is being used.

TEST RECORD SHEET

MODEL	AW300SG
SERIAL NO	7390
CUSTOMER	PUNMICRO
MIXED GAS FLOW	35 L / MIN
MIXED GAS INPUT PIPE SIZE	6 mm DIA
INCUBATOR POSITIVE PRESSURE SETTING	6 mm WG
INCUBATOR LEAK NOT DETECTED	1 HOUR
TEMPERATURE SETTING	36.5 deg C
OVER TEMP SETTING OF THERMAL FUSE	98 deg C
SPOTLIGHT	
COMMISSIONING SWITCH	
HUMIDISTAT	
LOCK LID	
MIXED GAS FLOW	
DIGITAL THERMOMETER	
ELCB	

CHECKED BY DATE



Declaration of Conformity

Equipment	Anaerobic Incubator type AW300SG
Manufacturer	MUNRO Ltd
Address	urnt Mill, Elizabeth Way Harlow, Essex, CM20 2HU UK United Kingdom ,44-45
Description of Equipment	Incubator for the environmentally controlled incubation of anaerobic bacteria

I certify that the apparatus identified above conforms to the requirements of Council Directive 89/336/EEC

Signed _____ Date _____

Position/status Director