

Glostavent Additional Operating Advice

Modes of Operation The Glostavent has two principal modes of operation:

Drawover Mode: If the level of supplementary gas provided by the flowmeters is less than the patient's minute volume, the pressure in the reservoir becomes sub-atmospheric and room air is 'drawn' into the circuit to make up the shortfall. The negative pressure required is generated by the patient's own inspiration (when breathing spontaneously) or by the ventilator under IPPV.

Continuous Flow Mode: If the level of supplementary gas provided by the flowmeters is greater than the patient's minute volume then a continuous flow of gases is provided to the patient.

Pre-oxygenation

- Connect the Glostavent to electrical power, switch on the UPS, switch on the oxygen concentrator.
- Turn the oxygen flowmeter to 6-8 litres.
- Allow the reservoir bag to fill.
- Ask the patient to breathe through the face mask for 1 to 3 minutes.

Intravenous Induction

Following pre-oxygenation intravenous induction is carried out in the standard way, followed by use of inhalation agent as required. When procedure is over, turn off the vaporiser.

Gaseous Induction

If Halothane is being used gaseous induction can be achieved following pre-oxygenation. With a face mask connected to the patient valve and held firmly over the patient the concentration of halothane is gradually increased until induction has been achieved. The concentration of halothane can then be gradually reduced to provide the depth of anaesthesia required.

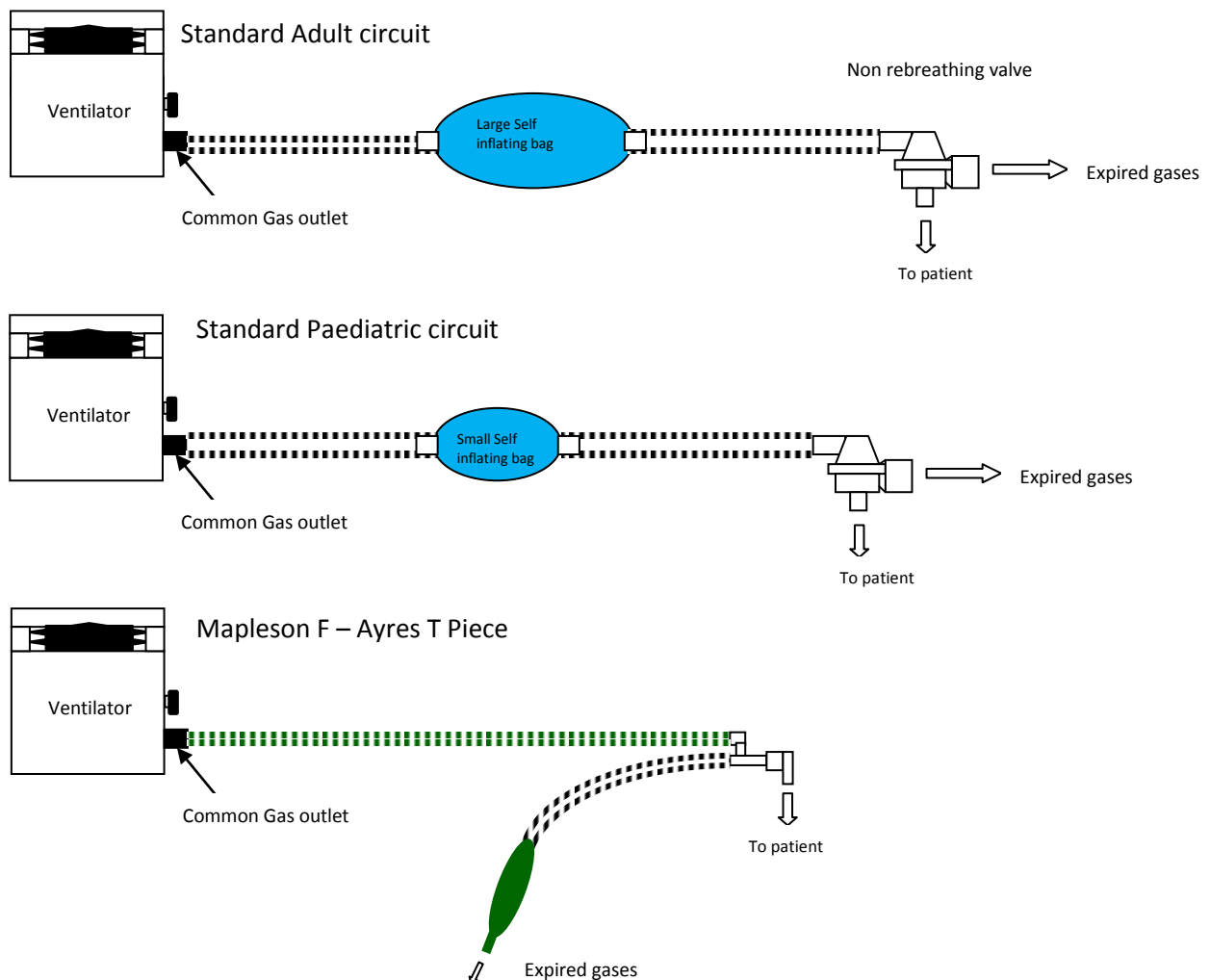
This procedure can be carried out using the standard circuits or the Ayres T Piece.
(See section on patient circuits).

Oxygen setting

Oxygen flow can be reduced following induction, usually 2 litres per minute is adequate to provide 50% oxygen in a patient breathing 6 L/min.

Increase the oxygen flow if higher levels of oxygen saturation are required.

Patient Circuits



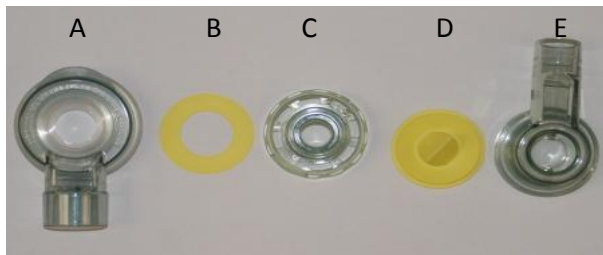
When using the Ayres T Piece the maximum pressure delivered can be set by adjusting the weights on the ventilator according to the scale. The pressure generated by the compression of the reservoir bag is displayed on the gauge on the ventilator. Flow rates for this circuit are usually advised as greater than 3 times the patient's minute volume. For paediatric patients, a mix of oxygen and air may be indicated, as high concentrations of oxygen (only) for long periods is contra-indicated.

Expired gases are removed from expiratory port of the patient valve on the first two circuits above using the 30mm blue tube provided. This can either be taken to ground level or connected to the scavenger on the right of the machine. The switch on the top of the scavenger operates a fan to assist the flow of expired gases.

The Patient Valve

The patient valve (Laerdal valve) supplied with the Glostavent will require cleaning periodically or after each use with an infected patient. Because of the design of the circuit only the valve will be contaminated, the rest of the circuit should remain clear.

The valve should be removed from the circuit and taken apart, see picture below.



Part A will pull off from the valve

The seal B can then be removed

Part C can be unscrewed from part E

The valve D can then be removed

After cleaning with a sterile solution, allow the valve to dry and then reassemble. Always test the valve after cleaning by replacing it in the patient circuit and ventilating the 1 litre green bag as a test lung using the blue self inflating bag.

Vaporiser & Setting

The vaporiser on the Glostavent is suitable for Halothane or Isoflurane and can hold a maximum of 150ml. The level should be visible through the sight glass on the front. If the level is not visible it is either empty or it has been overfilled. To fill the vaporiser, unscrew the filler cap on the front and pour in the agent to the desired level using the funnel supplied, then replace the filler cap.

The patient's general condition and medication will determine the level of agent required to provide clinical anaesthesia. However as a guide Halothane setting for maintenance of anaesthesia is likely to be between 0.7% and 1.5% (1 to 2 MAC) and Isoflurane setting between 1% and 2% (1 to 2 MAC). At a setting of 1% with Halothane approximately 15ml per hour are required.

If one agent is to be replaced by another, the vaporiser can be removed and emptied by tipping the agent back into its bottle. To remove the vaporiser, the fixing screw located inside the back panel should be removed allowing the vaporiser to be pulled forward off the front panel. Different agents should not be mixed together in the vaporiser.

NOTE: High levels of anaesthetic agent will suppress blood pressure. If blood pressure is too low it may be increased by reducing the concentration delivered by the vaporiser, and vice versa.

In an emergency – rapid discontinuation of the volatile agent may be required and 100% oxygen administered. To achieve this: turn the vaporiser off, disconnect the patient valve and depress the flush button for 10 seconds. Reconnect the patient valve and turn the oxygen flowmeter to maximum.

Ventilator User Suggestions

The ventilator has adjustable Tidal Volume (35-1200ml), adjustable Breathing Rate (4-40 BPM), and adjustable Airway Pressure (10-50cm H₂O).

The Tidal Volume control at the left of the ventilator can be adjusted when the ventilator is turned off. It is operated by pulling the control out; making the adjustment and pushing it back in to position. The outer brown scale is used with the large adult bellows and the inner pink scale is used with the smaller paediatric bellows (for changing the bellows see Glostavent Manual).

The Breathing Rate is controlled by adjusting the dial labelled BPM on the front of the ventilator.

Airway pressure is controlled by sliding the weights along the arm on the top of the ventilator. Moving the weights to the right increases the pressure, moving them to the left decreases it. To move the weights first depress the square button above them and slide the weights to the desired position. The scale can be read through the aperture on the front of the weights. When using the adult bellows both weights are connected allowing a viewing of the brown scale. When the paediatric bellows are in use the weights should be separated with the left weight being moved to the extreme left end of the ventilator. The pink paediatric scale is visible through the aperture.

Suggested Settings

For normal adult use the following settings are recommended: 12 BPM, 600ml Tidal Volume, and Patient Pressure of 30cm H₂O. If it is found that the bellows are not emptying completely during operation, the pressure can be increased in stages. If the bellows are closing sharply then the pressure can be reduced accordingly.

For children down to 20-25kg the same circuit can be used but the blue self inflating bag may need to be changed for the smaller blue paediatric bag. The recommended starting settings for the ventilator would be to use the adult bellows and weights with a breathing rate of 20-25 BPM, 20-25cm H₂O patient pressure and 310 ml/Kg tidal volume, depending on patient size.

Below 20kg the paediatric bellows, weights and scales should be used with levels and rates suitable for the patient. For the smallest patients, i.e. below 10kg, the paediatric circuit (Ayres T Piece) may be the preferred option, but if the ventilator is to be used then pressure ventilation using a maximum pressure of 15-20cm H₂O would be suggested with a higher respiratory rate and smaller tidal volume.

Oxygen Concentrator

Providing electricity is available, the oxygen concentrator will provide all the gases needed for the patient and pressure to drive the ventilator. The concentrator supplies up to 8 litres per minute of oxygen and up 8 litres per minute of air through the two flowmeters on the control panel. Oxygen to drive the ventilator is automatically taken from the concentrator when the ventilator is turned on.

If the electricity fails, the UPS (battery) will continue to provide electricity to drive the concentrator for a further 20 minutes. The UPS will signal that it is on battery mode with an intermittent alarm that will increase in frequency as the battery runs down.

The oxygen cylinder must be turned on at the start of the proceedings so that it can automatically take over the supply of oxygen both to the patient and pressure to drive the ventilator when the flow from the concentrator stops after failure. On the back of the machine there is a small reserve cylinder with two white oxygen hoses; one has a regulator to fit the cylinder or a large spare cylinder, the other has a Schroeder connector that can be used for any external supply. If the power fails and there is no reserve oxygen, anaesthesia can continue by manual compression of the blue self inflating bag in the circuit. This will use atmospheric air taken automatically and pulled through the vaporiser to the patient, providing 20% oxygen and anaesthetic gases.

If the patient is breathing spontaneously when there is a complete oxygen failure then anaesthesia can continue normally but it is recommended that breathing is assisted by hand ventilation.

Oxygen Cylinder

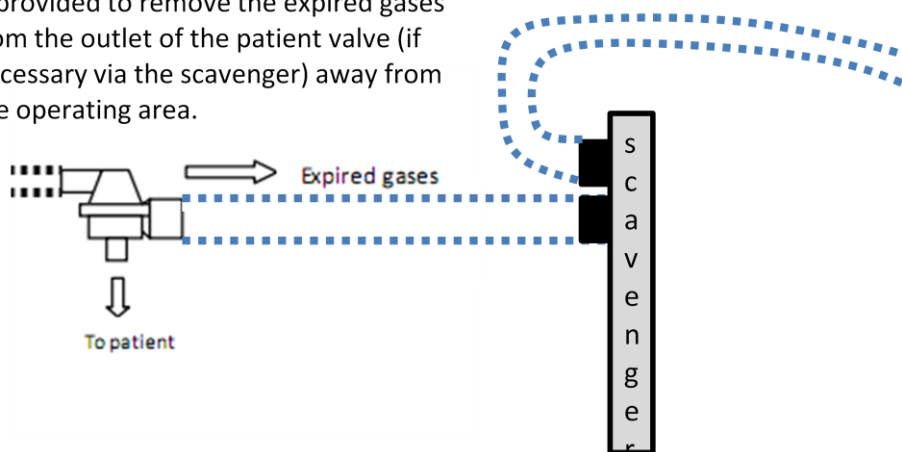
The oxygen cylinder supplied with the Glostavent is size D (420 litre). It will be supplied empty to comply with air transport regulations and is filled on arrival in the destination country. The ventilator will use approximately 1 litre per minute to drive the ventilator after which it is then available to supplement the inspired mixture to the patient. Therefore when using the D size cylinder with the oxygen flowmeter switched off it will last for at least 6 hours while also providing the patient with at least 30% oxygen. The flowmeter can be used to increase the oxygen supply if necessary but this will cause the cylinder to empty more quickly. This cylinder can be filled in the destination country though local provision. Provided it is used only as emergency backup it should last for a considerable period.

Cleaning and General Maintenance

The Glostavent requires minimal maintenance; general cleaning with a dry cloth is recommended and replacing the cap on the ventilator outlet when the patient circuit has been removed will keep insects from the machine. The important factor for the concentrator is to keep the air intake filter clean. This is a foam filter in the centre of the back of the concentrator. This should be cleared of dust each day, either by washing and drying or, if the dust is minimal, just shaking clear. The vaporiser should not require maintenance unless heavy usage with Halothane causes a build up of thymol. In this case the agent level lever may become stiff. The vaporiser should first be removed (see section on vaporiser). Then with a small amount of Halothane in the vaporiser, turn it upside down and shake while operating the lever. This will wash out the thymol; empty the vaporiser and replace.

Scavenging for Adult and standard Paediatric circuit

The lengths of 30mm diameter blue tube is provided to remove the expired gases from the outlet of the patient valve (if necessary via the scavenger) away from the operating area.



For Daily Set Up and Test: See separate instruction set