MARS OXYGEN RESUSCITATOR

With Direct Connection to the Regulator

User Instructions

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# MARS OXYGEN RESUSCITATOR
With Direct Connection to the Regulator

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*Sabre Medical* is a division of *GCE* group  
GCE Ltd Yew Tree Way, Stone Cross Park, Golborne,  
Warrington, Cheshire, WA 3JD, United Kingdom
WARNINGS
Please Read Carefully and Fully Understand

- Smoking, naked flames or other sources of ignition MUST NOT be permitted near the equipment whether in use or in storage.
- Ensure that the yoke clamp is firmly tightened and that there is no risk of leakage before use. Leakage is a potential source of explosion.
- DO NOT use oil or grease when maintaining the equipment.
- DO NOT drop or mishandle the cylinder.
- Cylinders must be stored at temperatures below 40°C.
- TURN OFF cylinders when not in use.
- USE ONLY brass or non-spark producing cylinder keys.
- There is an increased risk of fire or explosion when oxygen is used in inflammable or explosive atmospheres and extra care must be taken.

SPECIAL GUIDANCE

1. The resuscitator MUST ONLY be used by personnel who have received adequate training in Cardio Pulmonary Resuscitation (CPR) and the correct use of this resuscitator apparatus.
2. If ventilation is not achieved with the resuscitator, Expired Air Resuscitation (EAR) should be used, and the airway re-checked.
3. Over-inflation can occur, especially in children, if inflation is prolonged, sustained, where an endotracheal tube is in situ, or as a direct result of an inadequate airway.
4. Throughout resuscitation continuously monitor the casualty's pulse, pallor and pupils. Frequently monitor the cylinder contents gauge. When children under 20kg require resuscitation, operate the unit by gently depressing the manual trigger whilst watching the chest rise and fall. DO NOT prolong or sustain trigger operation because over-inflation may occur in extreme circumstances.
5. If too large a face mask is used for spontaneously breathing children, the dead air space will be excessive, which will adversely affect the performance of the unit.
6. The resuscitator may be used in toxic atmospheres, provided the operator is wearing suitable respiratory protective equipment.

DISCLAIMER:
Failure to comply with these instructions or misuse of the apparatus may result in death, injury or material damage and invalidate any resulting warranty or insurance claims.

COPYRIGHT:
This manual must not be copied in part or whole without written permission from GCE Ltd.
Set for resuscitator: control module, hose, patient valve, regulator and masks.

1. INTRODUCTION

1.1 GENERAL

The MARS Oxygen Resuscitator is an automatic gas powered time cycled system, with patient trigger and manual override. The unit provides medical oxygen for artificial respiratory ventilation and a breathing-on-demand. The system permits conscious patients to establish their own respiratory pattern.

The apparatus is classified as a Child/Adult resuscitator for the normal range of body masses from 20 to 60kg respectively. The CPR setting, however, may be used for heavier body masses, where appropriate.

The unit monitors patient breathing and automatically shuts-off artificial ventilation when spontaneous ventilation occurs, while continuing to provide oxygen therapy. The system also covers the reverse situation, where, should the respiratory rate drop below the pre-set level, the unit automatically starts artificial ventilation.

Once the operator has established an effective seal between the patient's face and mask, the unit is ideally suited for resuscitation in a toxic environment, because the system is totally sealed from the external environment.

The resuscitator's audible alarm sounds when there is an airway blockage or the casualty's lungs become over inflated. The audible alarm operates at approximately 45 centimetres of water pressure with any excess pressure being automatically 'dumped' by the system. This feature protects the casualty from over-inflation of the lungs or inadequate ventilation due to a blocked airway.

MARS can ventilate one casualty whilst providing oxygen therapy to another casualty.

At maximum adult setting, the system will support one ventilated and one oxygen therapy casualty for a period of 23 minutes when used with a 540 litre cylinder.

The 100% oxygen provided by MARS improves the quality of resuscitation and provides treatment to patients with specific ailments including Carbon Monoxide poisoning and decompression sickness.

All procedures given in this manual have been based on current UK first aid practices. However, the user's training and experience may vary from the information provided but the operating principles of the apparatus remains the same.

The MARS Oxygen Resuscitator conforms to the requirements of BS 6850. It is CE approved and meets the essential requirements of the European Medical Devices Directive.
1.2 CONTENTS OF APPARATUS

Figure 1 illustrates the typical composition of MARS equipment. Please note that not all items may be present and a barrel bag and box with carrying straps may replace the carrying case.

Please refer to Section 6. Spares and Accessories for full range of options available.

![Fig. 1: Typical composition of MARS.](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>User Instruction Manual</td>
</tr>
<tr>
<td>2</td>
<td>Head Harness</td>
</tr>
<tr>
<td>3</td>
<td>Airways (small, medium, large)</td>
</tr>
<tr>
<td>4</td>
<td>Face Masks (small, medium, large)</td>
</tr>
<tr>
<td>5</td>
<td>Oxygen Therapy Mask &amp; Tubing</td>
</tr>
<tr>
<td>6</td>
<td>Carrying Case with Foam Inserts</td>
</tr>
<tr>
<td>7</td>
<td>Oxygen Regulator</td>
</tr>
<tr>
<td>8</td>
<td>Demand Valve / Patient Valve</td>
</tr>
<tr>
<td>9</td>
<td>Control Module</td>
</tr>
<tr>
<td>10</td>
<td>Cylinder (275, 370, 400 or 540 litres) + cylinder valve (it is not supplied by GCE, s.r.o.)</td>
</tr>
</tbody>
</table>

Key to Fig. 1

2. PREPARATION FOR USE

2.1 STANDARD RESUSCITATOR

**WARNING:** Check yoke clamp is fully tightened before use.

![Fig. 2: Attaching the Pin Index Connector](image)

Preparation for use (Cylinder not connected).

1. Open case or bag and check that the Pin Index sealing washer (Fig. 2(B)) is in place, clean and undamaged.

2. Locate the Pin Index yoke (Fig. 2(A)) over the cylinder valve and secure firmly by hand using the T-bar.
2.2 STORAGE
The system can be stored in the READY FOR USE condition, but with the GAS SUPPLY TURNED OFF.

2.3 CHANGING THE CYLINDER
WARNING: While a cylinder is being changed, Expired Air Resuscitation must commence if the casualty is not breathing spontaneously.

This MUST NOT be attempted in toxic atmospheres.

It is important to monitor the cylinder contents when using the resuscitator. When the cylinder contents falls to mid position in the red sector it can be quickly changed as follows:

1. Close the cylinder valve clockwise with the key (Fig. 3(E)) provided. Depress the trigger on the demand valve to release any internal gas pressure.
2. Unscrew the regulator T-bar anti-clockwise until the regulator clears the pin index valve. DO NOT remove the T-bar from the regulator.
3. Ensure that the sealing washer (Fig. 2(B)) within the regulator yoke is in place, clean and undamaged.
4. Locate the regulator assembly (Fig. 2(A)) over the FULL cylinder’s pin index valve and secure by turning the T-bar clockwise until hand-tight.
5. Turn ON the supply two turns anti-clockwise, using the cylinder key provided. Check the contents gauge (Fig. 3(F)) to ensure that the new cylinder is FULL.

Fig. 3: Pin Index Regulator fitted to a Cylinder.

3. Open the cylinder valve two-turns anti-clockwise, with the key provided (Fig. 3(E)).
4. Check the contents gauge (Fig. 3(F)) to ensure that there is sufficient gas in the cylinder.
5. To check for leaks: close the cylinder valve using key (Fig. 3(E)) and monitor the gauge for 5 seconds. Check that the reading does not fall. If the gauge falls, fit a new seal and repeat the test. If the leak persists, return the apparatus for servicing.
6. Open the cylinder valve fully upon completion. The unit is now READY FOR USE.
3. OPERATING INSTRUCTIONS

3.1 USING RESUSCITATOR UNIT IN RESPIRATORY ARREST

WARNINGS:

- Throughout resuscitation, frequently monitor the casualty's pulse, pallor and pupils. Frequently monitor the cylinder contents gauge. When the pressure drops to the mid-position in the red sector, change the cylinder in accordance with Section 2.3.

- When resuscitating children under 20kg, gently press the trigger while watching the chest rise and fall. DO NOT prolong or sustain trigger operation as over-inflation may occur in extreme cases.

- DO NOT use a Guedal Airway unless trained in its use.

- Bring the resuscitator to the casualty as soon as possible.

- In normal, non-toxic, breathable air, Expired Air Resuscitation should be commenced immediately if no breathing is detected and continued until the resuscitator is ready for use.

On arrival at the scene of the incident, assess the situation for danger to yourself and the casualty, then:

1. Ensure that the casualty's mouth is clear of debris, vomit, and loose dentures.

2. Open and maintain the airway by extending the head and neck using a rolled blanket or coat to support the neck.

3. Check the casualty's breathing, pulse, pallor and pupils. Listen, feel and look for signs of respiration.

4. Loosen restrictive clothing at the neck, chest and waist.

5. Open the case using snap fasteners.

6. Ensure the cylinder is turned ON.

7. Take the Demand Valve from the MARS box and connect the appropriate face mask. Place adjacent to the casualty.

8. Check the airway is clear and place face mask over the casualty's face ensuring a tight seal round the nose and mouth (Fig. 4).

9. Give 2 inflations to saturate the lungs with oxygen using the manual trigger (Fig. 4) watching the rise and fall of the chest at the same time.

Note: Excess pressure caused by a blocked airway (possibly due to: patient position or vomit) will set off the relief valve and audible alarm on the demand valve.

RECTIFY IMMEDIATELY BY ESTABLISHING THE AIRWAY.

10. Re-check breathing, pulse, pallor and pupils. If no pulse is found, follow the procedure overleaf entitled: Using Resuscitator Unit in Cardiac Arrest

11. If a pulse is present, but no breathing is detected, select the appropriate mode on the ventilation unit (i.e. large adult, small adult or child). The unit will now ventilate automatically. When used in automatic mode, ensure that the airway is maintained and monitor casualty's pulse, pallor and pupils frequently.
12. When the casualty commences breathing, the unit switches to demand flow automatically, allowing the casualty to breathe unassisted through the unit. Should the casualty's respiratory rate drop below the pre-set levels, the unit reverts to automatic mode.

13. Having successfully ventilated the casualty and established a good respiratory rate, check the casualty for any further injuries, "medi alerts". Turn the casualty into the recovery position.

14. Treat the casualty for shock. Reassure the casualty and DO NOT LEAVE until the medical services arrive.

15. Use the head harness to maintain mask to face seal during transportation of the casualty.

16. If breathing and/or circulation cease, recommence resuscitation.

3.2 USING RESUSCITATOR UNIT IN CARDIAC ARREST

WARNINGS:

- Throughout resuscitation, frequently monitor the casualty's pulse, pallor and pupils. Frequently monitor the cylinder contents gauge. When the pressure drops to the mid position in the red sector change the cylinder (See Section 2.3).

- When resuscitating children under 20kg gently press the manual trigger whilst watching the chest rise and fall. Do not prolong or sustain trigger operation as over-inflation may occur.

- DO NOT use a Guedal Airway unless trained in its use.

- Bring the resuscitator unit to the casualty as soon as possible.

- In normal, non-toxic breathable air, if no breathing is detected, start Expired Air Resuscitation and continue until the resuscitator is ready for use.

On arrival at the scene of an incident, assess the situation for danger to yourself and the casualty, then perform the following checks on the casualty:

1. Ensure that the casualty's mouth is clear of debris, vomit, and loose dentures.

2. Open and maintain the airway by extending the head and neck using a rolled blanket or coat as support.

3. Loosen restrictive clothing at the neck, chest and waist.

4. Check breathing, pulse, pallor and pupils. Listen, feel and check for signs of respiration.

5. Open the case using snap fasteners.

6. Ensure cylinder valve is turned ON.

7. Take the demand valve from the MARS box and connect the appropriate face mask. Place adjacent to the casualty.

8. Select CPR mode on the control module.

9. Check the airway and place the face mask over the casualty's face ensuring a tight seal round the nose and mouth (Fig. 5).
10. Use the manual trigger to give 2 inflations that will saturate the lungs with oxygen (Fig. 5), whilst watching the rise and fall of the chest.

11. Check the carotid pulse in the neck (Fig. 6).

Note: The pulse at the wrist is unreliable. If a pulse is present but no breathing is detected, follow the procedure in Section 3.1 entitled: 
*Using Resuscitator Unit in Respiratory Arrest.*

12. If a pulse is not detected: place the heel of one hand two finger widths up from Solar Plexus at the junction of the rib margins at the bottom of the breast bone (Fig. 7), then place the heel of the other on top (Fig. 8).

13. Keep fingers off the chest, lock your arms at the elbows and apply firm controlled vertical pressure to compress the Sternum to a maximum of 40mm to 50mm (1.5 to 2 inches).

---

**3.2.1 One Man Operation**

**15 Compressions - 2 Ventilations - Check Pulse**

1. Complete 15 compressions at the rate of 80 per minute. The compressions should be regular and smooth, not jerky and jabbing.

2. Tilt the casualty's head back and check airway is clear.

**3.2.2 Two Man Operation**

**5 Compressions - 1 Ventilation - Check Pulse**

1. Complete 5 compressions at the rate of 80 per minute. The compressions should be regular and smooth, not jerky and jabbing.

2. Tilt the casualty's head back and check that the airway is clear.

3. Use the trigger to give ONE ventilation of the lungs (Fig. 4), continue with 5 compressions and again, 1 ventilation. Continue repeating the cycle as above.

4. After the first minute check the pulse and thereafter check the pulse every 3 minutes with minimum disruption to the resuscitation sequence.
3.2.3 Checking for Response

When resuscitation is successful the carotid pulse will return. Look at the casualty's face and lips - their colour will improve as oxygenated blood begins to circulate.

If the casualty is not breathing their normal colour will turn to blue, cyanosis.

Maintain this cycle until cardiac output is achieved or ordered to stop by a medically qualified person. When stable:

1. Place the casualty in the recovery position and treat for shock, continually reassuring the casualty throughout.
2. DO NOT LEAVE the casualty until the arrival of the medical services.
3. Use the head harness to maintain the mask to face seal during transportation of the casualty.
4. If breathing and/or breathing and circulation cease, recommence resuscitation.

3.3 USING RESUSCITATOR AS AN OXYGEN THERAPY UNIT

WARNING: Special care must be exercised when using oxygen therapy with casualties who have long standing chest conditions, such as bronchitis etc. Use low flow.

NOTE: An oxygen therapy unit and a resuscitator can be used at the same time.

On arrival at the scene of the incident, assess the situation for further danger to yourself or the casualty then perform the following checks on the casualty:

1. Ensure that the mouth is clear of debris, vomit and loose dentures.
2. Check pulse, if not present, refer to Section 3.1 entitled: Using Resuscitator Unit in Respiratory Arrest
3. Loosen restrictive clothing at: neck, chest and waist.
4. Open the case. Use the key to open the cylinder valve (2-turns anti-clockwise) and check cylinder contents.
5. When the contents gauge falls to mid position in the red sector change the cylinder for a FULL one. See Section 2.3.

3.3.1 Preparing Therapy Outlet

Take the oxygen therapy mask (Fig. 9) and push the hose connector (A) into the oxygen Firtree outlet (B): Select the flowrate on the Selector Knob most suitable for your application.

Fig. 9: Attaching the Mask to the Therapy Unit
3.3.2 Using Select Flow Therapy Head

Fit the end of the tube to the fir tree outlet (Fig. 10(1)) on the multiflow head.

1. Select the flow setting on the Selector Knob (Fig. 10(2)). Ensure that the head is correctly aligned.

2. Calmly explain to the casualty what you are doing and fit the mask, adjusting the elastic strap as necessary.

3. Assess the casualty and check for history and "medi alerts". Reassure and treat for shock.

4. Check the cylinder contents gauge frequently. When the contents gauge falls to mid position in the red sector change the cylinder for a FULL one. See Section 2.3.

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4. AFTER USE CLEANING AND TESTING

4.1 DISMANTLING AND CLEANING

**WARNING:** Disconnect the gas supply and depressurise the system before cleaning and dismantling.

**CAUTION:** DO NOT dismantle the apparatus beyond the instructions in this manual unless you are fully trained and in possession of the appropriate instructions.

1. Unscrew the patient valve housing incorporating the rubber lipped membrane and disc membrane from the demand valve body.

2. Immerse them in a warm solution of *TriGene™* and water for a minimum of 10 minutes to clean and disinfect. Follow instructions on container.

3. Rinse thoroughly in clean running water to remove all traces of disinfecting solution.

4. Clean the facemask by immersing in a warm solution of disinfectant and water then rinse thoroughly in clean running water.

5. Wipe off excess water with clean lint-free materials.

6. Allow the individual parts to dry thoroughly, DO NOT use direct heat. Assemble once dry.

7. Check cylinder contents, recharge or replace cylinder if the gauge reading is less than three quarters full.

**Notes:**

*TriGene™* cleansing and disinfecting solution is available from GCE Ltd in both 1 litre and 5 litre containers under Article Numbers 2008247 and 2008248 respectively.

Suitable pump dispensers are also available, under Article Numbers 1017672 (1 litre) and 1017670 (5 litres).
4.2 AFTER USE AND MONTHLY TESTS

1. Ensure that the pin index yoke seal is clean, in good condition and fully tightened.
2. Open the cylinder valve, two turns anti-clockwise, with the key provided.
3. Select CPR setting on the unit.
4. Check that the contents gauge reads more than three-quarters full. If it does not, refill or replace the cylinder.
5. Close the cylinder valve, watch the gauge and check that the reading has not changed after 5 seconds. If the equipment fails this leak test, return for servicing.
6. Select Large Adult setting on the unit. After a few moments the unit will operate at 18 - 22 cycles/min.
7. Block the patient port and flick the trigger. Check that the airway blockage alarm sounds.
8. Flick the trigger several times and ensure that there is a free flow of gas. Listen carefully for leaks. Release the trigger and note the time delay before ventilation resumes (approximately 4 to 6 seconds).
9. Close the cylinder valve and operate trigger to discharge pressurised gas.
10. Carefully pack unit and accessories, ready for use.
11. Record details of test in accordance with Section 5.4.

5. MAINTENANCE SCHEDULE

5.1 MONTHLY

Test the resuscitator as described in Section 4.2.

Inspect oxygen hose for damage and deterioration. Should damage or deterioration of any kind be evident, return the unit for servicing.

After excessive use or following a monthly inspection and testing, it may be necessary to replace the Lipped Membrane, Disc Membrane and Pin Index Seal to ensure the correct function of the resuscitator (please refer to Section 6 for part number details).

5.2 ANNUALLY

The resuscitator should be serviced annually, in accordance with the MARS Service Instructions, using the Sabre Resuscitator Test Kit. As part of the annual service, the oxygen hose should be inspected for damage and deterioration and replaced if damage or deterioration of any kind is evident. Servicing must only be completed by personnel trained to service Sabre resuscitation apparatus.

5.3 FIVE YEARLY

The oxygen hose must be replaced as part of the scheduled annual service.

Please contact Training and Technical Support Services for further details.

Training and Technical Support Services:

GCE Ltd
Warrington UK
WA3 3JD
Web: www.gceuk.com
Tel +44(0)1942 292966
Fax +44(0)1942 292977
5.4 MAINTENANCE REPORT

In the United Kingdom, this resuscitator must be maintained and examined at least once a month. A report of each examination must be signed by the person conducting the examination and the report kept available for inspection. Information recorded usually includes:

1. The name and address of the employer responsible for the apparatus.
2. Particulars of the type of apparatus and of the distinguishing number or mark, together with a description sufficient to identify the apparatus and the name of the maker.
3. The name of the person conducting the tests together with their signature or authentication mark.
4. The date of the examination.
5. The condition of the apparatus and the particulars of any defect found at the examination.
6. The pressure of oxygen in the supply cylinder.

A Breathing Apparatus Log Book, (Article Number 1034745), is available from GCE Ltd for recording this information.

5.5 LIFE TIME

Maximum life time of the product is 20 years.

6. SPARES AND ACCESSORIES

6.1 SPARES FOR OXYGEN REGULATOR

6.2 SPARES FOR PATIENT / DEMAND VALVE

6.3 ACCESSORIES
## 7. FAULT-FINDING

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect position of Regulator on Pin Index Valve.</td>
<td>Turn OFF Cylinder Valve. Adjust position of Regulator.</td>
<td></td>
</tr>
<tr>
<td>Cylinder Valve gland leaking.</td>
<td>Replace Cylinder. Return faulty Cylinder for servicing.</td>
<td></td>
</tr>
<tr>
<td>T-Screw loose.</td>
<td>Turn OFF Cylinder Valve. Tighten T-Screw (light hand pressure only).</td>
<td></td>
</tr>
<tr>
<td>Damaged Pin Index Valve face or damaged Regulator Seal.</td>
<td>Turn OFF Cylinder Valve. Remove Regulator. Check Valve sealing face for scratches or dents. Renew Cylinder if necessary. Check Seal for damage, renew if necessary.</td>
<td></td>
</tr>
<tr>
<td>Equipment does not function.</td>
<td>Cylinder not turned ON.</td>
<td>Open Cylinder Valve.</td>
</tr>
<tr>
<td>Cylinder empty.</td>
<td>Check Regulator Gauge. Replace Cylinder if empty.</td>
<td></td>
</tr>
<tr>
<td>Reduced gas flow / pressure</td>
<td>Cylinder Valve not fully open.</td>
<td>Open Cylinder Valve fully.</td>
</tr>
<tr>
<td>Filter partially blocked.</td>
<td>Return unit for servicing.</td>
<td></td>
</tr>
<tr>
<td>Demand Valve does not provide flow or patient cannot obtain gas.</td>
<td>Missing Inhale or Exhale Valve.</td>
<td>Turn OFF Cylinder Valve. Check to ensure that Inhale and Exhale Valves are fitted. Replace if necessary.</td>
</tr>
<tr>
<td>Unit does not pulse</td>
<td>Set on CPR</td>
<td>Turn Knob to correct setting</td>
</tr>
<tr>
<td>Knob between settings</td>
<td>Turn Knob to correct setting</td>
<td></td>
</tr>
<tr>
<td>Gas off</td>
<td>Open Cylinder Valve</td>
<td></td>
</tr>
<tr>
<td>Gas pressure low</td>
<td>Check Regulator Gauge. Replace Cylinder if empty.</td>
<td></td>
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</tbody>
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## 8. PERFORMANCE SPECIFICATIONS

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<tr>
<th>DEMAND VALVE (With MARS Regulator and Control Module)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXPIRATORY RESISTANCE:</strong></td>
<td>Less than 0.5kPa (51mm H2O) at 60L/min. (factory set).</td>
</tr>
<tr>
<td><strong>INSPIRATORY RESISTANCE:</strong></td>
<td>0.8kPa (82mm H2O) maximum at 100L/min. (factory set).</td>
</tr>
<tr>
<td><strong>RELIEF VALVE PRESSURE:</strong></td>
<td>4.5kPa (450mm H2O) maximum.</td>
</tr>
<tr>
<td><strong>AUDIBLE ALARM PRESSURE:</strong></td>
<td>3.4kPa (357mm H2O) nominal.</td>
</tr>
<tr>
<td><strong>GAS FLOW WITH MANUAL TRIGGER:</strong></td>
<td>0 to 120L/min maximum (100L/min typical) (Lower settings available on request)</td>
</tr>
<tr>
<td><strong>WEIGHT:</strong></td>
<td>0.4kg (0.9lbs)</td>
</tr>
</tbody>
</table>

### HOSE ASSEMBLY

| MATERIAL: | PVC, anti-static to BS2050 : 1978. |
| PRESSURE: | Nominal operating pressure: 400kPa (60psi) Test Pressure: 1000kPa (150psi) |
| WEIGHT: | 0.1kg (0.2lbs) |

### REGULATOR

| CYLINDER FITTING: | Oxygen, pin index to BS1319 : 1976. Other types of connection available on request |
| OXYGEN SUPPLY PRESSURE: | 20 to 207 bar |
| PRESSURE RELIEF VALVE: | Factory Set at 840kPa (120psi) |
| THERAPY OUTLET: | Selectable: 1 to 15L/min at 4.2 bar (60psi) |
| WEIGHT: | 0.7kg (1.6lbs) |

### NOTES:

- Specification values are approximate. The manufacturer reserves the right to change these values without prior notification.
- Specification values apply only when the demand valve is used with the MARS Control Module & Regulator.

### CONTROL MODULE (With MARS Regulator & Demand Valve)

<table>
<thead>
<tr>
<th>SETTING (BODY WEIGHT):</th>
<th>TIDAL VOLUMES (15ml/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Adult (60kg nominal)</td>
<td>900ml*</td>
</tr>
<tr>
<td>Small Adult (40kg nominal)</td>
<td>600ml*</td>
</tr>
<tr>
<td>Child (20kg nominal)</td>
<td>300ml*</td>
</tr>
</tbody>
</table>
* Nominal setting, as measured on Sabre Resuscitation Test Kit. |
| CPR SETTING: | 0 to 120L/min maximum (100L/min typical) |
| FREQUENCY RANGE: | 18 to 22 Cycles/min |
| INHALATION / EXHALATION RATIO: | 1 : 2 Nominal |
| PAUSE TIME RELEVANT TO REVERT TO AUTOMATIC VENTILATION: | 4 to 6 seconds approximately |
| WEIGHT: | 1.2kg (2.6lbs) |
# MARS OXYGEN

<table>
<thead>
<tr>
<th>CYLINDER + CYLINDER VALVE</th>
<th>Pin Index to BS 1319 : 1976 Oxygen</th>
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<tbody>
<tr>
<td><strong>VALVE TYPES:</strong></td>
<td><strong>Size (wcp)</strong></td>
</tr>
<tr>
<td></td>
<td>1.0L</td>
</tr>
<tr>
<td></td>
<td>1.7L</td>
</tr>
<tr>
<td></td>
<td>2.2L</td>
</tr>
<tr>
<td></td>
<td>2.7L</td>
</tr>
</tbody>
</table>

* Can supply more than 180L

<table>
<thead>
<tr>
<th><strong>SIZES:</strong></th>
<th><strong>TYPICAL DURATION:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D size cylinder (370L) on small</td>
</tr>
<tr>
<td></td>
<td>adult setting (10L/min) = 20 mins (approx)</td>
</tr>
<tr>
<td></td>
<td>LD size cylinder (540L) on large</td>
</tr>
<tr>
<td></td>
<td>adult setting = 23 mins (approx)</td>
</tr>
</tbody>
</table>

| **WEIGHT:**                | Less than 8.0kg (average)               |

## MEDICAL OXYGEN

<table>
<thead>
<tr>
<th><strong>PURITY:</strong></th>
<th>Minimum 99.5% vol.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MANUFACTURING STANDARDS:</strong></td>
<td>BS 2N3 : 1990, ISO 2046, DEF STAN 68.21, MIL-0-27210</td>
</tr>
<tr>
<td><strong>MOISTURE CONTENT:</strong></td>
<td>Less than 6ml/m³</td>
</tr>
</tbody>
</table>

## GENERAL

| **OPERATING ENVIRONMENTAL LIMITS:** | -10°C to +40°C |
| **STORAGE ENVIRONMENTAL LIMITS:**  | -20°C to +60°C |
| **DELIVERED OXYGEN CONCENTRATION:** | 99.5% |

## APPARATUS DIMENSIONS

| **MARS BOX:**               | 520mm x 370mm x 130mm (20.5 ins x 14.5 ins x 5.0 ins) |
|                            | 510mm x 270mm x 230mm (20.0 ins x 10.5 ins x 9.0 ins) |

## NOTE:

Specification values are approximate. The manufacturer reserves the right to change these values without prior notification.