

OXI-dive™ 1

CLOSED CIRCUIT OXYGEN RESUSCITATOR FOR DIVERS

OPERATING MANUAL



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This manual includes the features, operation and maintenance of the *OXI-dive™1* oxygen resuscitator. It is not a training manual for resuscitation and/or oxygen administration and must not be used as a substitute for such training. Only operators who have been trained in the use of oxygen should use the OXI-dive™1.



Medical Developments International Limited makes no claim that the information, practices and procedures given in this manual will warrant correct or adequate treatment.

See Appendix A for brief descriptions of the OXI-dive™2 and OXI-dive™3, which are alternative models.

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1 Introduction

It is important to administer high oxygen concentrations to divers with suspected decompression illness as soon as possible. Oxygen accelerates the removal of excess nitrogen from the body and increases the delivery of oxygen to damaged cells. In a minor injury this may be all that is required. However if the patient is to be transported to a recompression facility, oxygen administration must continue during transport to improve the chances of a complete recovery.

During breathing (in an adult) approximately about 250 ml of oxygen is metabolised per minute and 200 ml of carbon dioxide is produced. Most resuscitators delivering 100% oxygen use high flow rates of oxygen (8-15 L/min). The excess oxygen (i.e. the amount in excess of ¼ litre per minute) is exhaled together with the carbon dioxide. This wasted oxygen dramatically reduces the life of the oxygen cylinder. In the OXI-dive™1 the recommended flow rate is 0.5-2 L/min so that the amount of wasted oxygen is reduced significantly. An absorbent (soda lime) in the KAB™ absorber removes the carbon dioxide in the exhaled gas. This is known as a 'closed circuit' breathing system and is similar to the principle of ventilation used during anaesthesia. Also the gas in the closed circuit is warmed and humidified which in addition to the important medical advantages, is more comfortable to breathe.

The duration of oxygen supply is a fundamental concern in diving accidents, many of which may occur several hours from a medical facility. Divers should ensure that there is sufficient oxygen available to allow an injured diver to breathe oxygen from the site of a potential accident until reaching an appropriate medical facility.

The OXI-dive™1 is a portable, self-contained closed circuit resuscitator that provides facilities for simultaneous resuscitation and oxygen therapy. In the hands of a skilled operator, the OXI-dive™1, with one 320 litre cylinder, is capable of delivering inspired oxygen concentrations between 90-100% to a breathing or non-breathing casualty for 2 ½ to 3 hours. This compares with 25–30 minutes for high flow systems.

Larger boats or permanent sites may have the potential for storing large oxygen cylinders (capacity 3000-7000 litres). The OXI-dive™1 includes an oxygen hose-line assembly for connection to a regulator fitted to the larger cylinder. In other circumstances it may be preferable to have a number of smaller cylinders rather than a single large cylinder. Small cylinders are also required for the immediate supply of oxygen and for transportation of the casualty to the hospital or recompression facility.

The Handicant™ (optional) is a decanting tool that enables the small cylinder to be refilled from a large cylinder on site (Refer to Appendix B).

The OXI-dive™1 also includes a non-rebreathing therapy mask with a reservoir bag for use in a breathing casualty and the CPR-PRO™ resuscitation mask for use in non-breathing patients.

The MTV-100 Manually Triggered Ventilator is an optional extra (See Appendix C).

2 Components of the OXI-dive™1

- Pelican case #1520, optional #1600 for full size C cylinders
- KDK85 Autovalve™: combined regulator and flowmeter (range 0.5-8 L/min) with an 'Oxygen Flush' at all settings. Incorporates three self-sealing valves
- 8 L/min oxygen flow restrictor and handwheel assembly
- 2 m white oxygen tubing fitted with an oxygen handwheel at each end
- KAB™ carbon dioxide absorber. Disposable single patient use pre-filled with CO₂ absorber
- Universal twin hose, single patient use breathing circuit c/w 2 L latex-free breathing bag and size 5 mask
- CPR-PRO™ resuscitation mask with oxygen inlet and 1-way valve. Single patient use
- Non-rebreathing therapy mask with safety vent, reservoir bag and oxygen tubing. Single patient use
- MTV-100 manually triggered ventilator c/w 1.2 m white self-store oxygen hose and a diameter indexed oxygen handwheel (optional)
- Handicant decanting tool (optional)
- KDK™ regulator to fit to a large supply cylinder (optional)
- Operating manual
- Size 3 disposable mask (optional)
- OXI-Vac, Venturi suction device (optional)
- Guedel airways, set of 4

Does not include oxygen cylinder.

3 Description of Major Components

Oxygen Hoseline

The colour coded white oxygen hoseline is fitted with a diameter indexed oxygen handwheel at each end. One handwheel is attached to a regulator attached to an external oxygen supply cylinder if available. The other handwheel is fitted to a self-seal valve of the KDK85 Autovalve. This is used to provide oxygen from an outside source, thus conserving the contents of oxygen cylinder in the OXI-dive™1.

KDK85 Autovalve™

The KDK85 Autovalve is a combined regulator and flowmeter, manufactured by Medical Developments International Limited. The regulator reduces the cylinder pressure to approximately 400 kPa and the flowmeter has adjustable oxygen flow rate settings between 0.5 to 8 L/min. An Oxygen Flush valve is incorporated; when depressed it provides an instantaneous rapid flow of oxygen (in excess of 40 L/min) at all settings.

The KDK85 Autovalve incorporates three diameter indexed self-sealing valves that can be used as an inlet for an external oxygen supply, or as outlets for additional delivery devices. For example, the 8 L/min flow restrictor and handwheel assembly can be attached and used to connect oxygen to the CPR-PRO resuscitation mask or the non-rebreathing therapy mask with a safety vent. The MTV-100/Manually Triggered Ventilator (optional) is also fitted to a self seal valve.



The cylinder contents gauge has a range from 0 to 30,000 kPa and is clearly marked 1/4, 1/2, 3/4 and FULL. The scale at the lower and upper ends of the operating range is coloured red. The cylinder valve connects to the pin-index yoke of the KDK85 Autovalve (Australian Standard AS 2473 Valves for compressed gas cylinders).

Closed Circuit ‘Softbag’ Resuscitation System

The Closed Circuit ‘Softbag’ Resuscitation System consists of the KAB circular carbon dioxide absorber, the Universal Twin Hose lightweight single-patient use breathing circuit, an elbow fitting which attaches to the facemask and a 2 litre latex-free breathing bag with or without an extension hose.

Supplemental oxygen enters the breathing circuit through the ‘INHALE’ side of the KAB™ CO₂ absorber. Two, one-way silicone valves ensure that the fresh gas flows into the inspiratory limb of the twin hose and the expired gas flows out through the expiratory limb. The expired gas continues through the carbon dioxide absorbent in the right side of the KAB™ absorber into the rebreathing bag which inflates. During inspiration the gas passes from the breathing bag, through the remainder of the absorbent in the left side of the KAB absorber, to the inspiratory limb of the breathing circuit.

The movement of the breathing bag reflects the patient’s breathing and provides the operator with an immediate diagnosis of the respiratory pattern, safely and effectively.

KAB Carbon Dioxide Absorber

The KAB carbon dioxide absorber has design registrations and patents. It is transparent and single patient use only. Manufactured from tough medical grade polycarbonate it is further strengthened by the circular design. The integrated uni-directional silicone valves are vertically orientated and large in diameter to reduce resistance to breathing. The adjustable pressure limiting (APL) exhaust valve is also an integral part of the absorber and includes a 30 mm scavenging port. In accordance with Australian and International Standards, the exhaust valve CLOSSES by turning clockwise. When OPEN (one turn only anti-clockwise) the central spindle has free movement and excess gases in the breathing circuit are automatically vented. In breathing casualties, with the APL (exhaust) valve open, the spindle automatically maintains the volume of gas in the breathing bag without adjustment at all flowrates (0.5-8 L/min).



KAB

The KAB carbon dioxide absorber holds 400 g of soda lime lasting in excess of 2½ hours.

The asymmetrical divider and the fluted openings in the grates minimise 'channelling' to increase the efficiency of absorption. This can be verified by the even change of colour of the indicator in the soda lime during use. The silicone valves are arranged so that during expiration the gas flow is directed to the rebreathing bag through that part of the soda lime in the right side of the absorber. On inspiration the gas is drawn through the remainder of the soda lime producing an efficient DOUBLE absorption effect.

During operation the soda lime becomes warm and the indicator gradually changes colour. The soda lime will change from Pink to White as it becomes exhausted.

The 'INHALE' and 'EXHALE' ports of the KAB absorber have 22 mm male tapers for attachment of the breathing circuit. The breathing bag mount is a 22 mm female port* to conform to the Australian/New Zealand Standard (AS/NZS 2496). A 22 mm male/male elbow fitting is provided for connection to the rebreathing bag either directly or via an extension hose.

***NOTE:** In the corresponding International Standard the breathing bag mount is a 22 mm male port. In this case the 22/22mm male elbow provided should be permanently fitted to the breathing bag port of the KAB™ absorber.

WARNING: Do not force the control knob of the APL (exhaust valve) in either direction. The control knob rotates smoothly and easily.

Self-Sealing Valves

Three self-sealing oxygen valves are activated automatically by screwing the white oxygen handwheels into place.

1. Oxygen (400 kPa) from a wall outlet or a regulator fitted to a large cylinder, can be introduced into the KDK85 Autovalve through the self-sealing valve by the colour coded white hose line with diameter indexed oxygen handwheels at each end (supplied). The oxygen cylinder in the OXI-dive™1 must be turned off.
2. The nipple restrictor handwheel (marked with an '8') when attached to a self sealing valve provides 8 L/min of oxygen for use with an extra casualty, if required. The therapy tubing is connected to the non-rebreathing therapy mask or the CPR-PRO Resuscitation Mask.
3. Alternatively the self sealed outlet can be used for attachment of the optional MTV-100/Manually Triggered Ventilator.

Pelican Case

The Pelican Case is designed to be completely airtight and waterproof if it is closed properly and the dial is tightened[#]. If completely closed, no damage should occur to the enclosed equipment if the case becomes submerged in water. However, individual components may be damaged if submerged while not protected by the case. In this event, the exposed parts should be sent to an approved service centre for inspection, cleaning and servicing if required.

[#]**NOTE:** To reopen the case, loosen the dial.

4 Using the OXI-dive™1

Precautions When Using Oxygen Equipment

- Handle with care. Use this device in a responsible manner.
- Smoking or other sources of ignition should not be permitted in the vicinity of this device.
- Do not drop on hard surfaces.
- Avoid damaging the cylinder valve. If it is suspected that the valve is damaged, the device must be quarantined and specialist advice sought.
- Avoid moisture entering the cylinder by ensuring there is some residual pressure in the cylinder at all times when possible.
- Do not tamper with the valve assembly. The cylinder and valve assembly shall be returned to the manufacturer for service or repairs.
- Avoid contact with sources of heat. Cylinders shall never be exposed to sources of heat where the cylinder temperature could reach 65 °C.
- Where possible store cylinders away from solar and thermal radiation.
- If a cylinder is involved in a fire, warn all persons in the vicinity of the cylinder, of the danger of explosion. Once the fire danger is removed, refer to a certified gas cylinder test station.
- Never expose cylinder and valve to aggressive chemical or industrial environments that may affect the integrity of the cylinder.
- If the cylinder and valve requires cleaning due to contact with flammable or non-flammable contaminants, refer the cylinder to a certified gas cylinder test station for cleaning and inspection.

Check the Oxygen Supply

- Ensure the KDK85 Autovalve fitted to the oxygen cylinder is secure. Tighten the stirrup screw if necessary.
- Rotate the variable flow control of the KDK85 Autovalve to the 0.5 L/min setting (clockwise).
- Slowly turn the cylinder valve ON at least one full turn (anti clockwise).
- Check the contents gauge to determine how much oxygen is available.
- If there is a leak, check that the sealing washer ('Bodok' seal) is in place.



Check the Breathing Circuit

- Unwind the breathing hoses and free the breathing bag.
- Tighten any loose connections with a twisting motion.
- Slowly turn the oxygen cylinder valve ON one full turn (anti-clockwise) Check the contents gauge to determine how much oxygen is available.
- To check the breathing circuit, close the APL exhaust valve (clockwise), place a thumb over the Y-piece outlet and depress the Oxygen Flush cap to rapidly fill breathing bag. Squeeze the breathing bag firmly to check for leaks and rectify if necessary.

5 Operation of the Closed Circuit Breathing System

1. Set the KDK85 Autovalve to 2 L/min.
2. OPEN the APL (exhaust valve) by gently rotating the knob one (1) TURN ONLY in an ANTICLOCKWISE direction.
3. Position the size 5 face mask on the casualty's face with the narrow part between the casualty's eyes.
4. Depress the Oxygen Flush cap of the KDK85 Autovalve to rapidly fill the breathing bag until it is about 7/8 full and then release.

5. Observe the breathing bag:

IF THE BREATHING BAG RHYTHMICALLY FILLS AND EMPTIES the casualty is breathing. Maintain adequate head tilt and jaw support, monitor the casualty and continue to observe the breathing bag.

IF THE BREATHING BAG DOES NOT MOVE RHYTHMICALLY, close the APL exhaust valve one turn CLOCKWISE and squeeze the breathing bag. There are only three possibilities, all of which can be immediately diagnosed:

- (i) *IF THE BREATHING BAG WILL NOT COMPRESS* easily, the casualty's airway is obstructed (partially or completely).

Check head tilt and jaw support.

Check airway is clear.

Reposition the face mask, depress the cap to fill the bag, and try again:

- (ii) IF the breathing bag collapses, there is a leak, probably due to an inadequate seal of the face mask. Reposition the mask and push the Oxygen Bypass cap to refill the breathing bag. If necessary, increase the flow rate to compensate for leaks.
- (iii) If the breathing bag compresses readily and refills on release of pressure, the casualty is not breathing. Ventilate the casualty by compressing the breathing bag at the appropriate rate, just strongly enough until the chest starts to rise.

Management of A Spontaneously Breathing Casualty

To provide the highest oxygen concentration (90-100 %) to a breathing casualty, the closed circuit should be used whenever possible.

a) Using the Closed Circuit

1. Ensure that the casualty is breathing.
2. Explain to the casualty what is involved during the administration of Oxygen.
3. If practicable turn an unconscious, breathing patient into the left lateral position. However take special care if a spinal injury is suspected.
4. Ensure the face mask is positioned correctly and that a good mask seal is obtained.
5. Open the APL exhaust valve (1 full turn anti-clockwise).
6. Set the flow rate to 8 L/min. Depress the Oxygen Flush to rapidly fill the breathing bag.
7. After 5 minutes, reduce the flow rate to 2 L/min as long as the bag remains adequately inflated. For a diver with suspected

- decompression illness, the system should be flushed every 10-15 minutes by emptying the bag and then refilling by depressing the Oxygen Flush.
8. For a casualty who may have inhaled toxic gas, keep the flow rate at 8 L/min to assist in the excretion of toxic gas from the lungs and leave the APL exhaust valve open throughout the resuscitation.
 9. Ask a conscious casualty to breathe normally. Reassure further and advise that the mask may make them feel claustrophobic, but this is normal.
 10. Monitor the breathing by observing movements of the breathing bag.
 11. Adjust the flow rate as necessary to compensate for leaks. The APL exhaust valve in the open position automatically vents excess gas.
 12. Carefully monitor the casualty's condition and never leave the casualty unattended.
 13. Carefully monitor the oxygen supply and remove the mask prior to the supply becoming exhausted.

b) Using the Non-rebreathing therapy mask with the reservoir bag

Provides about 50 % oxygen. Used as an alternative to the closed circuit or if there is a second breathing casualty requiring oxygen therapy (in this case connect the oxygen tubing from the non-rebreathing mask to the 8 L/min nipple restrictor assembly). The mask incorporates a safety vent which enables the patient to entrain air from the atmosphere if the reservoir bag empties during inspiration.

1. Explain and reassure the patient what is involved during the administration of oxygen.
2. If practicable turn an unconscious, breathing patient into the left lateral position. Take special care if a spinal injury is suspected.
3. Turn the oxygen cylinder valve ON (anti-clockwise).
4. Ensure the oxygen tubing is not kinked and attach it firmly to the flow outlet on the KDK85 Autovalve. Set the flowrate to 8 L/min and press the Oxygen Flush to rapidly fill the reservoir bag.
5. Position the non-rebreathing therapy mask over the mouth and nose and mould the metal band over the bridge of the nose to achieve a better seal and comfortable position. Place the supporting elastic band around the patient's head above the ears and tighten until comfortable and secure. Observe the reservoir bag to ensure it remains inflated. However, if it does deflate, the patient will be able to entrain air through the safety vent.
6. Increase or decrease the oxygen flow to ensure the reservoir bag remains adequately distended (i.e. it should not completely empty after breathing in)
7. Carefully monitor the patient's condition: DO NOT leave the patient unattended.
8. Carefully monitor the oxygen supply. Replace the cylinder BEFORE it is completely exhausted.

Management of A Non-Breathing Casualty

To provide the highest oxygen concentration (90-100 %) to a non-breathing casualty, the closed circuit should be used whenever possible. Clear the patient's airway before commencing resuscitation.

a) Using the Closed Circuit to ventilate a non-breathing casualty:

NOTE: Unless an operator is skilled, ventilating a non-breathing casualty may require two operators - one to maintain the airway and mask seal, and the other to compress the breathing bag.

1. If practicable turn an unconscious, breathing patient into the left lateral position. Take special care if a spinal injury is suspected.
2. Ensure the mask is positioned correctly and that a good mask seal is obtained.
3. Gently close the APL exhaust valve (clockwise). DO NOT USE FORCE
4. Set the flow rate to 8 L/min. Depress the Oxygen Flush to rapidly fill the breathing bag.
5. Ventilate the casualty by rhythmically compressing the breathing bag at an appropriate rate, until the lower chest and abdomen starts to rise.
6. After 5 minutes, reduce the flow rate to 2 L/min as long as the breathing bag remains adequately inflated. The flow rate is increased or decreased as necessary to compensate for leaks or to avoid over inflating the bag. Intermittently open the APL exhaust valve if the breathing bag overfills. For a diver with suspected decompression illness, flush the system every 10-15 minutes by emptying the bag and then refill by depressing the Oxygen Flush.
7. For a casualty who has inhaled a toxic gas, set the flow rate to 8 L/min to assist in the excretion of the toxic gas from the lungs. Empty the breathing bag intermittently to flush the toxic gas from the breathing circuit. A tube can be attached to the 30 mm scavenging port to direct toxic gas away from the operator.
8. Tilt the casualty's head back and support the jaw to achieve an airway.
9. It is usually more effective for the rescuer to be positioned behind the casualty's head and to open the airway using the jaw thrust/chin lift technique.
10. Carefully monitor the casualty's pulse, colour, and general condition.
11. Monitor the oxygen supply and be prepared to revert to expired air resuscitation if the oxygen supply becomes exhausted.

b) Using the CPR-PRO Resuscitation Mask to ventilate a non-breathing casualty:

If an operator is having difficulty adequately ventilating a non-breathing casualty using the closed circuit, the CPR-PRO resuscitation mask can be used to provide mouth-to-mask ventilation with supplemental oxygen. This mask incorporates an oxygen port and head strap.

1. If practicable turn the patient into the left lateral position. Take special care if a spinal injury is suspected.
2. Ensure the green oxygen tubing is firmly attached to the CPR-PRO and to the flow outlet on the KDK85 Autovalve. Set the flow rate to 8 L/min. (Alternatively use the 8 L/min nipple restrictor assembly).
3. Position the CPR-PRO resuscitation mask over the mouth and nose, with the narrow end over the nose, ensuring the best seal possible.
4. With the operator positioned behind the patient's head, support the jaw and tilt the head back firmly. If necessary open the airway using jaw thrust.
5. Using a 'mouth to mask' technique, ventilate the patient at an appropriate rate.
6. When spontaneous breathing returns keep the CPR-PRO resuscitation mask in position or change to the non-rebreathing therapy mask and reservoir bag.
7. Continue to monitor the casualty's condition.

6 Cleaning and Decontamination

Single Patient Use Items

Discard single patient use items into a sealed container suitable for the collection of medical disposable items.

KDK™85 Autovalve

The body of the KDK85 Autovalve may be wiped clean with soap and water or alcohol. The unit must not be immersed in liquid.

Pelican case

Most scuffs and stains can be removed with a non-abrasive household cleaner and a sponge. Do not use any type of brush that will scratch the surface.

7 Storage and Servicing

- Ensure the cylinder is full and turned OFF. Check the *KDK85 Autovalve* is depressurised; the gauge reading must be zero.
- Store the OXI-dive™1 equipment in a clean, dry and well-ventilated area, away from sources of heat and combustible materials. **Never allow oil, grease or flammable substances to come into contact with the equipment.**
- Regularly check the contents of the cylinder and functioning of the equipment to ensure proper performance. The frequency of testing should be established according to usage, but at least every two (2) months.
- An appropriately trained technician should inspect the OXI-dive™1 oxygen resuscitation unit at yearly intervals.
- The KDK85 Autovalve should be serviced every three (3) years or more often if frequently in use. Contact Medical Developments International Limited.
- Ensure the cylinder is currently within the 10 year test period. The date is stamped on the neck of the cylinder. The oxygen cylinder must only be refilled at authorised filling stations. Cylinders must be visually examined regularly for signs of damage and hydrostatically tested at least every 10 years.
- Two spare sealing washers ('Bodok' seals) should be kept with the equipment.
- Since the Pelican case is airtight, moisture can sometimes be trapped inside and therefore it is recommended that silica-gel moisture absorbing packets are used to remove moisture if stored for long periods. Check the 'O'-ring grooves in the base and lid of the Pelican case for debris. Ensure the large 'O'-ring within the lid is free of cuts, abrasions and debris.

8 Dimensions

Case Number #1520	W 490 mm	H 385 mm	D 195 mm
Case Number #1600	W 616 mm	H 493 mm	D 220 mm

9 Spare Parts

BG-PEL1520	Pelican case #1520
AV-7560-85A3	KDK85 Autovalve with 3 Self Seal Valves
CY-7590-03	320 Litre medical oxygen cylinder C/W Integrated Valve
ST-NDS/149	'Bodok' seal
CY-7580-35	Oxygen cylinder key wheel with chain
CI-KAB-NTH	Disposable breathing circuit with size 5 mask
AC-7590-17	Non-rebreathing Therapy Mask c/w reservoir bag
AC-CPR-PRO	CPR-PRO Resuscitation Mask
SS-7595-38	8 L/min oxygen handwheel/nipple restrictor assembly
RS-7515-MTV	MTV-100 Manually Triggered Ventilator c/w Self Store Hose

10 References

1. AS 3848.1-1999 Australian Standard “Filling of portable gas cylinders Part 1: Decant filling of medical air and oxygen into portable cylinders – Safe procedures.”
2. AS 2030.1-2009 Australian Standard “Gas cylinders – general requirements.”
3. AS 2473.1-2006 Australian Standard “Valves for compressed gas cylinders Part 1: Specifications, type testing, and manufacturing tests and inspections.”
4. AS 2473.2-2007 Australian Standard “Valves for compressed gas cylinders Part 2: Outlet connections (threaded) and stem (inlet) threads.”
5. AS 2473.3-2007 Australian Standard “Valves for compressed gas cylinders Part 3: Outlet connections for medical gases (including pin-indexed yoke connections).”
6. AS 3840.1-1998 Australian Standard “Pressure regulators for use with medical gases Part 1: Pressure regulators and pressure regulators with flow-metering devices.”
7. AS 2902-2005 Australian Standard “Medical gas systems – Low pressure flexible hose assemblies.”
8. AS 2488-1995 “Resuscitators intended for use with humans.”

11 Warranty

Medical Developments International Limited (MDI) warrants to the original purchaser that any part or parts, which on examination by MDI, prove to be defective within 24 months from the date of delivery to the original purchaser, will be replaced free of charge. This warranty does not include freight costs, consumables, plastic and perishable items. MDI will not be responsible for labour or transportation charges incidental to the replacement of any part or parts. This warranty is in lieu of all other warranties, obligations or liabilities expressed or implied. MDI neither assume nor authorize any other person to assume liability in connection with the sale. This warranty will not apply to any product that has been subject to accident, abuse or misuse. The warranty is not applicable when unauthorized repairs or modifications have been attempted, or when entire units or parts are damaged by accident, misuse or improper handling procedures

When returning the product under warranty, please include the following details:

Manufactured by: **MEDICAL DEVELOPMENTS INTERNATIONAL LIMITED**
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Web: www.medicaldev.com Email: mdi@medicaldev.com

Purchaser:.....

Address:.....

Post Code:..... Country:

Model: Serial No:..... Date of Purchase:

Invoice No:..... Supplier:

APPENDIX A

Other OXI-dive™ Models

OXI-dive™2: Incorporates the *KDK150 Autovalve*, the MTV-100/Manually Triggered Ventilator, a small oxygen cylinder for the first 30-40 minutes of oxygen administration and fittings to attach to an external oxygen supply. Optional pin-indexed to bull-nose adapter (PIBN).

OXI-dive™3: Compact unit with similar features to the OXI-dive 2 but without the small oxygen cylinder. Operates from an external oxygen supply. The PIBN adapter is included as standard equipment to connect either pin-indexed small oxygen cylinders or large threaded oxygen cylinders. Incorporates the MTV-100/Manually Triggered Ventilator and the LSP regulator/flowmeter.



OXI-dive™2

OXI-dive™3

APPENDIX B

'Handicant' (Optional)

Pin Indexed Bull Nose Adaptor (PIBN)

OPERATING INSTRUCTIONS

WARNING: Oxygen vigorously supports combustion. Keep clear of flammable materials, particularly oil or grease. No smoking. Keep away from sources of ignition. Use in well-ventilated area. Cylinder contains high pressure. Open valve slowly. Use only with equipment designed for oxygen service. Do not use any of this equipment for purposes other than specified. Store all equipment in clean well-ventilated area.



1. Supply Cylinder:

Ensure the supply cylinder is labelled 'medical oxygen' and is colour-coded with white shoulders[^]. Check the cylinder valve for any sign of dirt or grease or damage. If in doubt refer to supplier.

[^]Note: oxygen cylinder colours vary in different countries

2. Cylinder to be Filled:

Do not fill any other cylinder than that owned by the user. Check the cylinder is not corroded nor has any dints or cuts, or any sign of fire exposure. Ensure that it is labelled "Medical Oxygen" and is colour-coded for oxygen. Check that 10 years have not elapsed since last test date, which is stamped on the cylinder shoulder. Check the cylinder valve is clean from oil or grease and has no signs of damage. If any of these conditions are not satisfied return the cylinder to the nearest Medical Gas Test Station for inspection.

3. Filling

- a. Fit "Handicant" to the supply cylinder and firmly hand tighten the white handwheel. Close the pressure release valve of the "Handicant".
- b. Fit small cylinder to "Handicant". Ensure the pins on the stirrup locate accurately and tighten the T-screw.
- c. Manually support the cylinder throughout the operation.
- d. Slowly open the valve of the cylinder to be filled.
- e. Slowly open valve of supply cylinder. Filling will take up to 3 or 4 minutes. Chattering may occur and indicates filling is almost complete. Filling is complete when pressure on gauge stops rising.
- f. Close supply cylinder valve. Check pressure on gauge. If the small cylinder is below 7000 kPa pressure it should be topped up from a fresh supply cylinder. Repeat steps 3a to e to top up small cylinder.
- g. Close small cylinder valve, open the pressure release valve of the "Handicant" and disconnect the small cylinder from "Handicant".
- h. Listen near the small cylinder valve outlet to detect any leakage.
- i. Remove "Handicant" from supply cylinder.

4 After Use

Ensure the "Handicant" is kept in a clean storage area.

APPENDIX C

MTV-100 Manually Triggered Ventilator (Optional)



The MTV-100 Manually Triggered Ventilator is an oxygen-powered breathing device which complies with the Australian Standard for 'Resuscitators intended for use with humans' AS 2488-1995. It is designed to deliver 100% oxygen to a breathing or non-breathing casualty. It is fitted with a self-store hose assembly that is **connected to the self-seal valve of the *KDK85 Autovalve*** by the diameter-indexed oxygen handwheel. The appropriate size facemask (provided) is attached directly to the MTV (alternatively, the CPR-PRO Resuscitation Mask can be attached to the MTV). With a good face seal, up to 100 % inspired oxygen is provided to a breathing or non-breathing patient.

In non-breathing patients, hold the MTV-100 Manually Triggered Ventilator and face mask in place and depress the manual control button until the patient's chest gently rises. Then release the button and allow the patient to exhale. Repeat this cycle about 12-14 times per minute for an adult and 20 times per minute for a child. If the patient begins to breathe spontaneously and triggers the MTV, maintain the mask seal and the flow of oxygen, but do not depress the manual control button. The patient will continue to receive up to 100% oxygen.

Note: If the airway is obstructed the MTV will stall. Clear the patient's airway and retry.

In breathing patients, inspiration triggers the MTV which provides flow rates up to 100 L/min. However the patient must be breathing sufficiently (as with any demand valve), to create a small negative inhalation pressure (-1 to -2.5 cm H₂O) to initiate oxygen flow. If the patient is breathing too rapidly or weakly to open the valve effectively, the operator must manually operate the MTV-100.