Life Support Products
by Allied

St. Louis, MO 63110
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Autovent® 4000CPAP

Pneumatically Powered Ventilator & CPAP Generator

Models L760CPAP, L761CPAP, L762CPAP, L763CPAP

Table of Contents:

Models:
L760CPAP   AutoVent4000CPAP (Basic Model)
L761CPAP   Autovent 4000CPAP with O2 Blender
L762CPAP   Autovent 4000CPAP with O2 Blender and Electronic Alarms
L763CPAP   AutoVent4000CPAP Basic Model with Electronic Alarms

CAUTION: Federal law restricts this device to sale by or on the order of a physician.

CAUTION: The Autovent 4000CPAP should not be used on children with a weight of 20 kg (44 lbs) or less.

1   Product Description:

The Autovent 4000CPAP is a pneumatically powered portable ventilator and CPAP generator. The Autovent 4000CPAP in Ventilation mode, delivers a time cycled constant flow breath. The inspiratory time is constant and the breath volume is varied by changing the flow rate into the patient. Various breaths per minute are achieved by varying the expiratory time.

The AutoVent CPAP models have all the functionality of the Autovent 4000 plus the added function of CPAP. The CPAP function delivers Continuous Positive Airway Pressure to the spontaneously breathing patient and is used in place of, and not in conjunction with, forced ventilation.

The Autovent 4000CPAP is intended to be used as a gas powered emergency ventilator which, in ventilation mode, is designed to provide emergency respiratory support by means of a face mask or tube inserted into the patient's airway.

2   Explanation of Warnings:

⚠ Warning: Potential injury to the patient or operator exists.

Caution: Potential damage to the ventilator, breathing circuit or other equipment may result.

Warnings and cautions should be read and understood before operating the Autovent.

3   Explanation of Abbreviations:

T_v	Tidal Volume
BPM	Breaths per Minute
I_t	Inspiratory Time
Psi	Pounds per Square Inch
CPAP	Continuous Positive Airway Pressure
cm H2O	Centimeters of Water
Kpa	kilopascal
Ml	Milliliters
LPM	Liters per minute
Mm	Millimeters
LED	Light emitting diode
CPR	Cardio Pulmonary Resuscitation
LPA	Low pressure alarm
HPA	High pressure alarm

4 Specifications:

Specifications:

Gas Supply Pressure: 280 kPa (40.6 psi) to 600 kPa (87.0 psi) Oxygen DISS

Breaths per Minute (BPM):   Accuracy: ±10%
      BPM Range: 1 sec Inspiratory Time = 8 to 30
      BPM Range: 2 sec Inspiratory Time = 8 to 20

Tidal Volume (Tv):   Accuracy: ±10% with 100% Oxygen
      Tidal Volume Range 1 Second Inspiratory Time = 200 ml to 600 ml
      Tidal Volume Range 2 Second Inspiratory Time = 400 ml to 1200 ml

Inspiratory Time (I_t):   Accuracy: ±10%
1 second or 2 second selection

Safety Pressure Relief: Adjustable from 20 to 80 cm H2O ±10%. The 60 cm H2O mark is a maximum regardless of setting.

Low Source Gas Alarm: Activates at 275 to 262 kPa (40 to 38 psi) source pressure.

Electronic Alarms:
      High Airway Pressure Alarm Range 15 to 80 cm H2O
      High Airway Pressure Alarm Accuracy 5 %
      Low Airway Pressure Alarm Range 0 to 30 cm H2O
      Low Airway Pressure Alarm Accuracy 5 %
      Alarm Sound Level is greater than 60 decibels

Battery Life: Greater than 40 hours at room temperature

Oxygen Inlet Filter: 65 Micron sintered bronze

Burst Pressure: 250 psig (1724 kPa) minimum

Leakage: The unit shall be designed so that oxygen is not allowed to leak through any seals or fittings.

Gauge: 0-100 cm H2O (0 – 9.8 kPa) accuracy ±(2% of the full scale reading +8% of the actual reading)

Inspiratory and Expiratory Resistance: 5 cm H2O (.5 kPa) maximum

Inadvertent PEEP: $\leq$ 2 cm H2O

Inadvertent Continuing Expiratory Pressure: $\leq$ 2 cm H2O

Dead Space: 14.8 ml

Peak Inspiratory Flow: 100 LPM for 2 seconds

Pressure for Initiation of Breath: -2 cm H2O maximum

Oxygen Blending: 65% ±12% oxygen with blender

CPAP Range: 4 to 20 cm H20

CPAP Airway Pressure Control: The airway CPAP pressure is controlled to within +/- 2 cm H20 for all treatment CPAP pressures with inhalation / exhalation flows up to 70 lpm. The airway CPAP pressure is controlled to within +/- 3 cm H20 for all treatment CPAP pressures with inhalation / exhalation flows between 70 and 100 lpm.

Weight: L760CPAP = 2.35 kg (5.187 lb)   L761CPAP = 2.57 kg (5.68 lb)
             L762CPAP = 2.81 kg (6.20 lb)   L763CPAP = 2.67 kg (5.88 lb)

Size: L760CPAP **=** L761CPAP = 73.6 x 203 x 244 mm (2.9 x 8.0 x 9.6 inches)
        L762CPAP = L760CPAP = 73.6 x 241.3 x 244 mm (2.9 x 9.5 x 9.6 inches)

Operating Conditions: -18 to 50°C (0 to 122°F)

Storage Conditions: -40 to 60°C (-40 to 140°F)

Shipping Conditions: -40 to 60°C (-40 to 140°F)

Latex Free: This product does not contain latex.

5   Features:
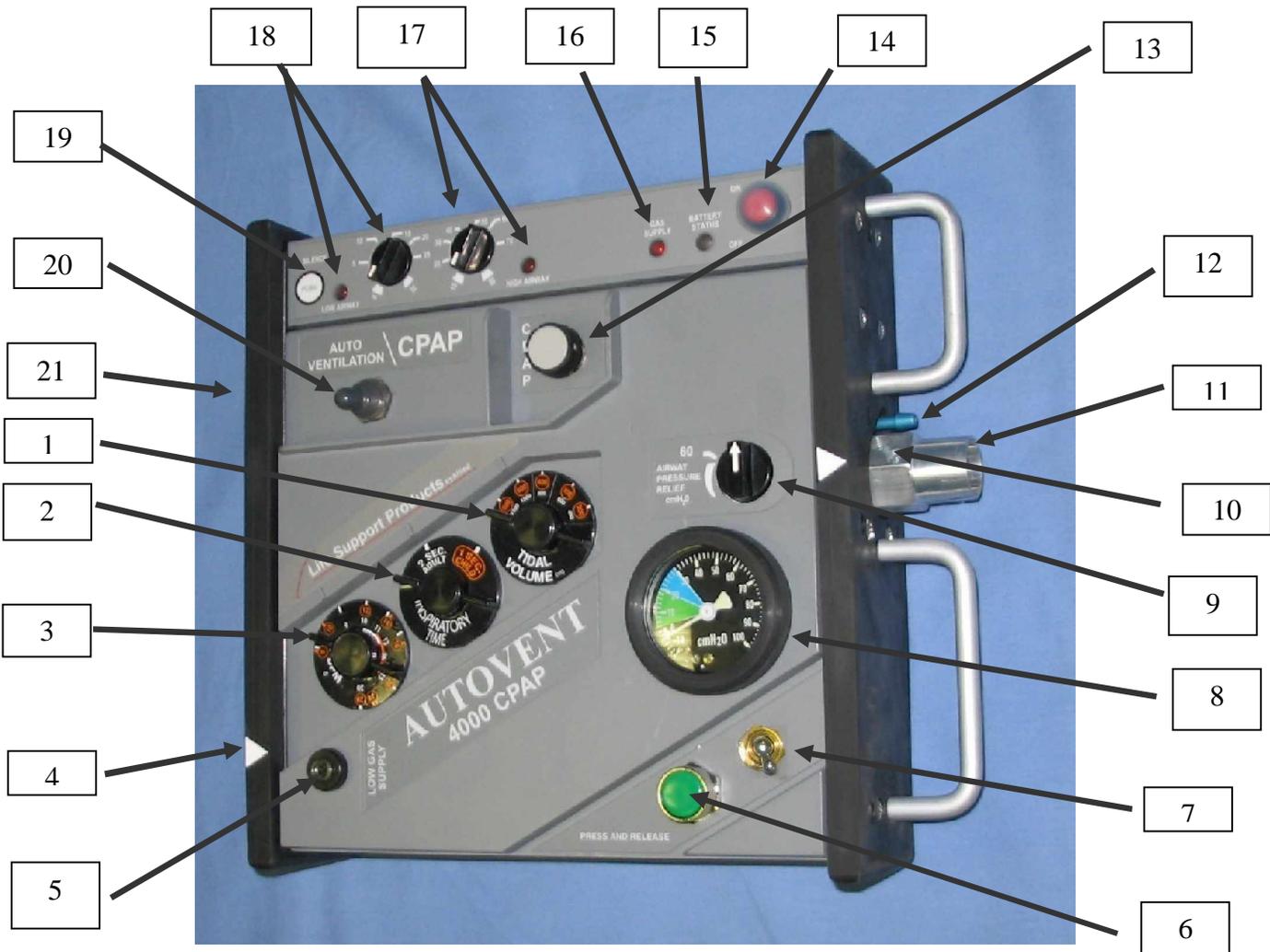
Item #	Description	Item #	Description
1	Tidal Volume Control	12	Patient Airway Pressure Line
2	Inspiratory Time Control	13	CPAP Control Knob
3	BPM Control	14	Alarm Module On/Off
4	Oxygen Inlet	15	Alarm Module Battery Status
5	Low Source Gas Indicator	16	Low Source Gas Alarm LED
6	Manual Breath Button	17	High Airway Pressure Alarm Adjustment and LED
7	O2 Concentration Selector	18	Low Airway Pressure Alarm Adjustment and LED
8	Airway Pressure Gauge	19	Alarm Silence Button
9	Adjustable Airway Pressure Relief	20	Ventilation Mode Switch
10	Anti-Suffocation Valve	21	Blender Ambient Air Filter
11	Patient Circuit Connection		

- ## 6   Patient Breathing Circuit

The AutoVent 4000CPAP uses a breathing circuit that allows the user to switch between ventilation mode and CPAP without having to change breathing circuits. The breathing circuit consists of a patient valve, corrugated hose (36 in) and a patient airway pressure line. The patient valve has been designed with a 22 mm OD patient port to fit a standard mask and a 15 mm ID patient port to fit the standard endotracheal tube.

The patient valve contains a pressure balance diaphragm and a one way check valve. The breath being delivered by the Autovent 4000CPAP is delivered through the corrugated tube to the patient valve. The breath passes through the one way check valve and is diverted to the patient. Prior to the check valve, a portion of the breath is diverted to the top side of the balance diaphragm. This action keeps the exhaust port of the patient valve closed during breath delivery and CPAP operation. Once the breath is delivered, the top of the diaphragm is vented and the patient can exhale. In the case of CPAP operation, the top of the diaphragm is kept at CPAP pressure level and anytime the patient side of the diaphragm exceeds the CPAP level, the diaphragm lifts and exhausts the patients' airway.

7a   Operating the Autovent: (Ventilation)

⚠	**Warning: This device should only be operated by qualified personnel under approved medical direction.**
⚠	**Warning: Use only as directed. Improper usage or unauthorized modification of this product may result in user or patient injury.**

- Set the Ventilation Mode switch to "Auto Ventilation" mode.

In the ventilation mode, the three breath control knobs are active and the patient will receive a ventilation cycle based on the setting of the three controls (BPM, Inspiratory Time, Tidal Volume). In addition, the Blender control and the Manual breath control are also active.

- Connecting to an Oxygen Source:

Located on the left side of the Autovent and marked with an arrow is a diameter index safety system (DISS) fitting. Connect a 50 psi oxygen source with a minimum of 40 LPM flow capacity to this fitting.

⚠	**Warning: Proper tidal volumes may not be provided with a gas source not meeting the specified requirements on page 4.**
⚠	**Warning: This device operates with medical gases under pressure, including oxygen. Do not use this device while smoking or near open flames. Do not use on this device or operate near flammable materials.**
	Caution: In order to provide optimal performance, check all gas supplies to assure only clean, dry gas is used, free of contaminants and/or liquids.

The gas source may also be a high flow air/oxygen blender meeting the flow and pressure requirements. Use only the 100% oxygen setting on the Autovent, if using an external blender.

- Connecting the patient breathing circuit:

> **Caution: Due to the dual functionality of the Autovent 4000CPAP, use only the recommended breathing circuit. The correct ventilator breathing circuit must be used. Using the incorrect breathing circuit may result in the unit not functioning properly.**

Located on the right side of the unit is a 22 mm connection for a patient breathing circuit and a connection for the patient airway pressure line. Install the corrugated tubing over the 22 mm connector so that it is on securely. Install the small airway pressure line over the connecting fitting. Both tubing will not pull off easily when properly installed.

- Select the proper inspiratory time:

The Autovent™ 4000CPAP has the options of a 2 second inspiratory time (this is used on adults with tidal volume requirements of more than 600 ml) and a 1 second

inspiratory time (this is used on children or adults). Turn the Inspiratory time knob to the desired selection.
This function operates in the Auto Ventilation mode only.

- Select the desired Breaths per Minute BPM:
The Autovent™ 4000CPAP has a BPM range of 8 to 15 with a 2 second inspiratory time and a BPM range of 8 to 30 with a 1 second inspiratory time.
The American Heart Association Guidelines 2005 recommend a BPM rate of 8 to 12 for an adult and 12 to 20 for a child. These are recommendations and you should always follow your physicians or medical directors' instructions.
This function operates in the Auto Ventilation mode only.

- Select the desired Tidal Volume:
The AutoVent 4000 provides a Tidal Volume range of 200 – 600 ml at an inspiratory time of 1.0 sec. and 400 – 1200 ml at an inspiratory time of 2.0 sec.

- Verify the Pressure Relief Setting:
This unit has a pressure relief range of 20 to 80 cm H2O. The 60 cm H2O setting is a maximum regardless of vent settings. The pressure relief setting will vary slightly with tidal volume setting. Always verify the pressure relief pressure after the vent settings have been selected. To check the actual relief pressure, block the end of the ventilator breathing circuit and observe the reading on the airway pressure gauge. This will be the maximum airway pressure. You should hear an audible alarm as this maximum pressure is reached.

⚠	**Warning: Preset tidal volumes may not be delivered when the maximum pressure limit is reached. Inspiratory times will remain constant, however no additional tidal volume will be delivered after the pressure limit is reached.**

- Select the desired Gas Mixture: (Models L761 and L762 only)
On models equipped with a blender you can select 100% oxygen or a 65% Oxygen gas supply. On the 65% oxygen setting the ventilator uses a venturi blending system to mix ambient air with the medical oxygen source.
This function operates in the Auto Ventilation mode only.

⚠	**Warning: Do not use the 65% Air/Oxygen mixture in areas where the ambient air is not safe for breathing.**

- Connect the patient breathing circuit to the Patient:
The patient breathing circuit has been design to fit with an oxygen mask (22 mm outside diameter) or endotracheal tube (15 mm inside diameter). Follow the established guidelines for maintaining the patient's airway.

- Verify the patient is receiving good ventilation:
Once the patient is connected to the ventilator the patient should be observed to make sure they have adequate chest rise and fall. The chest rise should be even

and should return to a normal position. If the patient does not have adequate chest rise check the tidal volume setting, patient connections and examine the patient for a possible obstruction of the airway or other injury. The patient should be monitored to make sure they are receiving proper ventilation.

The airway pressure gauge should be observed to make sure the patient is receiving adequate positive pressure ventilation. If the gauge reading is low during the delivery of a breath and the chest rise is also low, check the tidal volume setting, patient connections and examine the patient for a possible obstruction of the airway or other injury. The gauge reading should also be observed to make sure it is not too high. Common numbers used in practice are a maximum of 20 cm H2O for and unprotected airway and 30 cm H2O for a protected airway. Higher pressures may be required based on the patient's condition and you should always follow the physician's instructions. A high reading with pressure limit alarm may indicate a blocked airway or a stiff lung.

- Spontaneous Breathing by the Patient:

Should the patient begin to breathe spontaneously the Autovent 4000CPAP will sense this breath and deliver the set tidal volume at the set inspiratory rate. The breath timing will be reset based on the selected BPM rate. For example, if 10 BPM was selected the next breath will be delivered 6 seconds after the start of the spontaneous breath.

This function operates in the Auto Ventilation mode only.

The gas flow rate to the patient during a spontaneous breath is based on the tidal volume selection as shown in the following table. Should the patient demand exceed the gas flow rate, the addition demand will be supplied by ambient air. Ambient air is pulled in through an anti-suffocation valve located in the breathing circuit connection fitting.

Tidal Volume Setting		Flow (LPM)
I_t = 1 second	I_t = 2 second	
200	400	12
300	600	18
400	800	24
500	1000	30
600	1200	36

⚠	**Warning: Should a mechanical problem develop or the patient appears to be experiencing difficulty breathing while connected to the unit, disconnect the unit immediately and ventilate by other means.**
⚠	**Warning: Units that have been stored at temperatures below 32°F (0°C) may have a 20% shift in settings when they are operated at these low temperatures. The readings will return to normal when the unit warms up. Always monitor patients when the unit is used under these conditions.**

- Manual Breaths:

Manual breaths may be delivered using the manual breath button. Each time this button is pushed the ventilator will deliver one breath with the selected inspiratory time and tidal volume. This button can be used to deliver breaths during CPR. If this button is pushed during automatic ventilation, the ventilator will deliver the breath and then continue to deliver automatic breaths based on BPM rate selected. For example if you were delivering 10 BPM with a 2 second inspiratory time the manual breath button would trigger a breath to be delivered when pushed. This breath would have a 2 second inspiratory time, followed by a 4 second expiratory time. Automatic ventilation would then continue based on the 10 BPM setting.

This button should be pushed and released as soon as the desired breath starts. If the button is held down longer than the inspiratory time the tidal volume will be based on the time the button is held down and will exceed the set value. The pressure relief may trigger if this happens.

⚠	**Caution: Holding the manual breath button down for more than 1 second may trigger multiple breaths or increase the delivered tidal volume.**

This function operates in the Auto Ventilation mode only.

7b Operating the Autovent: (CPAP)

⚠	**Warning: This device should only be operated by qualified personnel under approved medical direction.**
⚠	**Warning: Use only as directed. Improper usage or unauthorized modification of this product may result in user or patient injury.**

⚠	**Warning: The CPAP function delivers Continuous Positive Airway Pressure to the spontaneously breathing patient and is used in place of, and not in conjunction with, forced ventilation.**

- Switch the Ventilation Mode switch to the "CPAP" mode.
  When the Operation Mode switch is set to the CPAP mode, the three breath setting controls , (BPM, Inspiratory Time, Tidal Volume), as well as the Manual Breath and Oxygen Concentration switch are no longer active. Changing these controls will have no effect on the CPAP operation.

- Connecting to an Oxygen Source:

Located on the left side of the Autovent and marked with an arrow is a diameter index safety system (DISS) fitting. Connect a 50 psi oxygen source with a minimum of 40 LPM flow capacity to this fitting.

⚠	**Warning: This device operates with medical gases under pressure, including oxygen. Do not use this device while smoking or near open flames. Do not use on this device or operate near flammable materials.**
	Caution: In order to provide optimal performance, check all gas supplies to assure only clean, dry gas is used, free of contaminants and/or liquids.

The gas source may also be a high flow air/oxygen blender meeting the flow and pressure requirements. The onboard AutoVent 4000CPAP blender is inactive when the unit is in the CPAP mode. Changing the oxygen concentration of the onboard blender will have no effect of the oxygen concentration being delivered to the patient during CPAP function.

- Connecting the patient breathing circuit:

> **Caution: Due to the dual functionality of the Autovent 4000CPAP, use only the recommended breathing circuit. The correct ventilator breathing circuit must be used. Using the incorrect breathing circuit may result in the unit not functioning properly.**

Located on the right side of the unit is a 22 mm connection for a patient breathing circuit and a connection for the patient airway pressure line. Install the corrugated tubing over the 22 mm connector so that it on securely. Install the small airway

pressure line over the connecting fitting. Both tubing will not pull off easily when properly installed.

- Airway Pressure Relief Control:

This unit has a used adjustable main airway pressure relief range of 20 to 80 cm H2O. During CPAP only, the unit also has an active internal 20 cm H20 CPAP pressure relief that will not allow the set CPAP pressure to exceed 20 cm H20. Due to the high gas flow rates of CPAP, the main airway pressure relief should be set higher than potential CPAP pressures (60 cm H2O).

- Preset the CPAP function prior to patient connection.
    - After the patient breathing circuit has been connected to the unit, turn the CPAP control full counter clockwise (lowest setting).
    - Turn on the inlet supply gas.
    - Adjust the CPAP control to achieve minimum gas flow.

- Connect the patient breathing circuit to the Patient:

Once the mask has been fitted to the patient, observe the patient and adjust the CPAP pressure to the desired CPAP pressure. The patient breathing circuit has been design to fit with an oxygen mask (22 mm outside diameter) or endotracheal tube (15 mm inside diameter).   Follow the established guidelines for maintaining the patient's airway.

- Verify the patient is receiving good ventilation:

Once the patient is connected to the ventilator, the patient should be observed to make sure they have adequate breathing.

⚠	**Warning: The CPAP function delivers Continuous Positive Airway Pressure to the spontaneously breathing patient and is used in place of, and not in conjunction with, forced ventilation.**

The airway pressure gauge should be observed to make sure the patient is receiving proper CPAP pressure. Always follow the physician's instructions. A high reading with pressure limit alarm may indicate a blocked airway.

⚠	**Warning: Should a mechanical problem develop or the patient appears to be experiencing difficulty breathing while connected to the unit, disconnect the unit immediately and ventilate by other means.**
⚠	**Warning: Units that have been stored at temperatures below 32°F (0°C) may have a 20% shift in settings when they are operated at these low temperatures. The readings will return to normal when the unit warms up. Always monitor patients when the unit is used under these conditions.**

- **8 Pneumatic Alarms:**

This ventilator contains several pneumatically operated alarms. These alarms are the pressure relief and low source gas alarms.

The pressure relief alarm is an audible alarm that is actuated when the safety pressure relief setting is reached. This alarm indicates that the maximum pressure setting has been exceeded and that gas has been released to prevent the pressure from reaching levels above this setting.

⚠	**Warning: Preset tidal volumes may not be delivered when the maximum pressure limit is reached. Inspiratory times will remain constant, however no additional tidal volume will be delivered after the pressure limit is reached.**

Low source gas alarm is an audible and visual alarm that activates when the source gas pressure drops below 40 to 35 psi. This is an indication that the unit will stop functioning soon and that the unit may not be delivering proper tidal volumes. This alarm will first sound only during breath delivery as a first indication and then sound continuously as the source gas pressure drops.

⚠	**Warning: Preset tidal volumes may not be delivered when the low source gas pressure is reached.**

- **9 Electronic Alarms:** (Models L762CPAP and L763CPAP only)

The optional electronic alarms module will give an audible and visual (flashing light) for the following alarms:
- Low Source Gas
- High Airway Pressure
- Low Airway Pressure

Low source gas alarm is an audible (intermittent tone) and a visual alarm that activates when the source gas pressure drops below 40 to 38 psi. This is an indication that the unit will stop functioning soon and may not be delivering proper tidal volumes. The alarm will clear when proper source gas pressure is restored for a minimum of 10 seconds. See low source gas alarm in section 6 for more information.

High airway pressure alarm is an adjustable alarm that will activate if the pressure exceeds the selected pressure. This alarm operates independently from the pressure relief alarm. This alarm can be set at a pressure of 15 to 80 cm H2O. This alarm may be used to monitor a change in the patient's condition such as fluid collecting in the lungs or a partial obstruction of the airway. This alarm is automatically cleared when 25 seconds pass without a high airway pressure being detected. This alarm has a flashing red LED and a continuous audible tone.

The low airway pressure alarm is an adjustable alarm that will activate if the airway pressure does not exceed a minimum value. A dial is used to set the LPA set point

from 0 to 30 cm H$_2$O. The airway pressure must exceed the low pressure set point at least once every 15 seconds or the LPA LED will turn on and the buzzer will sound an intermittent tone or "beep". The alarm will clear when the airway pressure goes above the set point. This is used to indicate a potentially insufficient tidal volume or a patient disconnect.

Alarm Module Battery Indicator LED – During normal operations the LED is green when the unit is on. When the battery reaches a low voltage point (about 2 or 3 hours before the alarm package will stop working) the Battery Indicator will turn yellow. When the battery reaches an even lower voltage point (about 1hour before the alarm package will stop working) the Battery Indicator will turn red. The alarm package does not have to be turned on for the ventilator to operate properly. The alarm module adds additional monitoring capability.

Silence Button – When there is an alarm the user may press the silence button. This will turn off the buzzer for 110 seconds as long as there are no other alarms. Pressing this button will not clear the alarm LED's.

- **10   Electronic Alarms Battery Replacement:**

Battery Door removed from back of alarm module.

Keyed Battery Connection
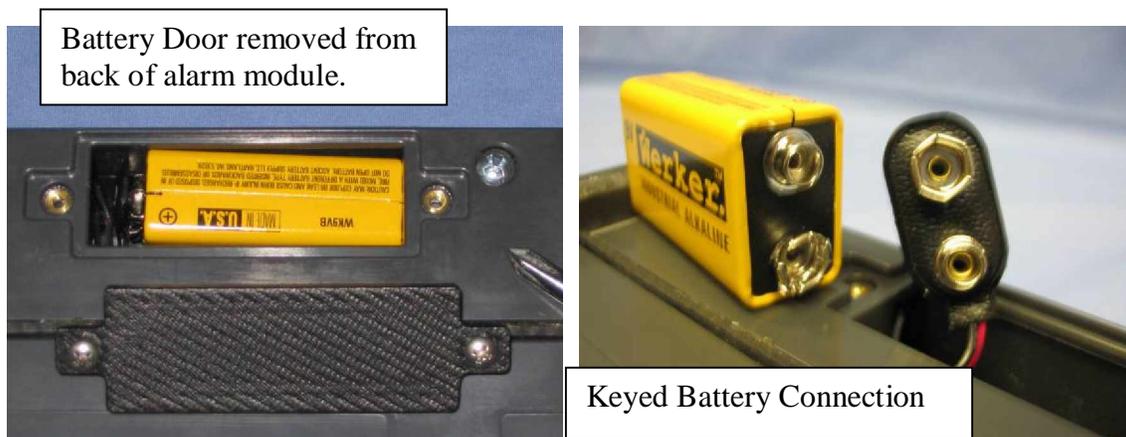
The Electronic Alarms battery is replaced by removing the 2 screws on the battery door located on the back of the alarm module. This will require a Phillips head screwdriver.   The battery should be removed from the connector by gently prying off the snaps on the battery connector. The old battery will then be replaced by a new 9 volt alkaline battery. The snaps are keyed for polarity by size and shape. The battery will go on only one way; do not modify the battery clip to make a battery fit the connection. Once the battery is installed on the connector turn the slide the battery and wires back into the battery compartment and replace the battery door.

Turn the alarm module on and verify the battery status light turns green. The low airway pressure alarm will sound if the airway pressure does not reach the set value in 15 seconds. The alarm module is now ready for use. Always turn the alarm module off when not in use. The alarm module does not turn off automatically.

⚠	**Warning: Do not try and recharge the battery.**

- **11   Cleaning:**

The Autovent 4000CPAP should be cleaned after each use. To clean the Autovent 4000CPAP keep the gas supply hose on the unit to prevent contamination of the oxygen circuit.

⚠	**Warning: Cleaning procedures should be performed in an environment free of oil and petroleum based products.**

The Autovent 4000CPAP has been designed to be water resistant but the unit cannot be submerged or sprayed down for cleaning.

Wipe the unit down with a damp rag containing a mild detergent to remove any residue from the surface. Once the residue has been removed the unit should be wiped with isopropyl alcohol or a cold disinfecting solution to kill bacteria. The unit should then be wiped down with water to remove any film left by the cold disinfecting solution. Make sure the unit is dry before putting the unit away.

The following is a list of tested cleaning solutions:

1. Isopropyl Alcohol :   70% IPA
2. Alconox: 1 Tablespoon Alconox to 1 Gallon H_2O
3. Cetylcide: 2 Tablespoon Cetylcide to 1 Gallon H_2O
4. Bleach: 10% Bleach in H_2O

⚠	**Warning: Do not attempt to clean and re-use single patient ventilation circuits as loss of performance may occur.**

Dispose of single patient use items per local biohazard standards.

The unit should be checked for proper operation before use. This can be done after cleaning to have the unit ready when needed.

- **12   Maintenance:**

The Autovent 4000CPAP contains a dust filter located on the left side of the unit. This filter cleans the ambient air used in the function of the blender. To replace or clean the filter, pry the filter cover off. Once the cover is removed the filter can be removed. Replace the filter into the cover housing and snap the cover back in place.

AutoVent 4000 Check Out Procedure

    1. Set the Autovent 4000 to the following settings:
BPM = 10
Inspiratory Time = 2 seconds
Tidal Volume = 800 ml
If you have a CPAP unit you must connect a CPAP vent circuit for testing. You do not need a vent circuit to test the units without CPAP.

2. Connect a 50 psi oxygen source to the unit and it should begin to cycle.

3. Using a watch count the number of breaths delivered in 1 minute (60 seconds). You should have 9 to 11 breaths. The inspiratory time will be 2 seconds and the expiratory time will be 4 seconds.

4. Set the pressure relief to 60 cm H2O and occlude the output fitting or vent circuit output if used. The pressure on the gauge cannot exceed 60 cm H2O (it can be lower). You should also hear an audible squeak to signal the pressure relief has actuated.

5. Unblock the output and push and release the manual breath button and a breath should be triggered.

Units with the Optional Alarm Package follow steps 6, 7 & 8
6. Set the low pressure alarm to 10 cm H2O and the high pressure alarm to 30 cm of H2O and turn the alarm module on.

7. With the ventilator output open you should get a low pressure alarm in about 15 seconds.

8. After the alarm sounds occlude the ventilator output, the low pressure alarm should clear and the high pressure alarm will sound. Remove the occlusion and high pressure alarm will clear in about 25 seconds.

Units with CPAP follow step 9.
9. Occlude the vent circuit output and adjust the CPAP pressure to the maximum setting by turning the knob clockwise. The max pressure should be approximately 20 cm H2O. Adjust the CPAP pressure to 10 cm H2O and the pressure should be stable.

Units with a blender follow step 10.
10. Switch the unit to 65% O2 and verify the unit is still delivering breaths.

All unit follow steps 11 and 12.
11. Turn the source gas off and you should see the low gas indicator turn red momentarily.

12. Visually inspect the anti-suffocation valve in the ventilator outlet fitting to verify that it is laying flat against the inside of the fitting.

The Autovent 4000CPAP should be checked for calibration annually.

If problems are noted with this product, contact the Allied Healthcare Products, Inc. technical support center for assistance at 800-411-5136.

- **13   Accessories:**

Part Number	Description	Qty per Package
800148	CPAP Ventilator Circuit	6
800149	Filter, CPAP	3
L270-220	Oxygen Regulator	1
L535026	Oxygen Hose 6ft W/ DISS fittings	1

- **14   Warranty:**

Limited One (1) Year Warranty

LSP warrants this product to be free from defects in material and workmanship for a period of one (1) year from the date of manufacture. This Warranty is expressly conditioned on compliance with all inspection and preventative maintenance requirements as set by applicable government agencies and as specified by LSP.

This Warranty is extended by LSP only to the first purchaser of this product from either LSP or from an authorized LSP distributor.

LSP'S OBLIGATIONS AND PURCHASER'S REMEDIES UNDER THIS WARRANTY ARE LIMITED AS FOLLOWS: In the event of a defect, malfunction or failure to conform to this Warranty, purchaser shall return this product to LSP, with shipping charges prepaid, within a reasonable time after discovery of such defect, malfunction or failure to conform. LSP shall repair or replace (at LSP's option) this product if it is defective, malfunctions or fails to conform to this Warranty, and shall return it to purchaser with shipping charges prepaid and without any additional charges due to costs of repair or replacement.

In the event the product returned by purchaser is not defective, has not malfunctioned and does conform to this Warranty, LSP shall not be obligated to repair or replace the product and shall not be obligated for shipping charges for return of the product to the purchaser.

LSP shall in no event be liable for any consequential damages, not for loss, damages or expenses directly or indirectly arising from the use of this product.

Disclaimer of Other Warranties

THIS WARRANTY IS IN PLACE AND IN LIEU OF ALL OTHER WARRANTIES OR REPRESENTATIONS, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A SPECIFIC PURPOSE, BY OPERAITON OF LAW OR OTHERWISE.

This Warranty does not apply to malfunction or damage resulting from accident, alteration, misuse, abuse of the product, improper preventative maintenance, storage at extreme temperatures or extreme environments beyond design limits, or where appropriate, improper use of the product by untrained persons. This Warranty does not apply to any plastic or rubber components since they can be affected adversely by undue exposures to heat, sun, water, ozone, or to other deteriorate elements.

LSP has not authorized any other firm or person to make any representations concerning this product nor to assume on LSP's behalf any liability in any way connected with the sale or use of this product.

This Warranty becomes void immediately should any repairs of, or alternations to this warranted product be made without authorization by LSP.

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15   Oxygen Cylinder Depletion Times:

These times are approximate and assume full cylinder capacity and .5 liters per minute usage for the pneumatic module. Always monitor the cylinder pressure and low pressure alarm to make sure you do not run out of oxygen.

E Cylinder   Capacity =   682

Breaths per Minute

	8	9	10	12	14	15	18	20	22	24	26	28	30
1200	67	60	54	46	39	37							
1000	80	72	65	54	47	44							
800	98	88	80	67	58	54							
600	127	115	104	88	76	72	60	54	50	46	42	39	37
500	149	135	123	104	90	85	72	65	59	54	50	47	44
400	180	163	149	127	111	104	88	80	73	67	62	58	54
300	225	206	189	163	143	135	115	104	96	88	82	76	72
200	293	274	256	225	200	189	163	149	137	127	119	111	104
Tidal Volume													

Jumbo D Cylinder   Capacity =   637

Breaths per Minute

	8	9	10	12	14	15	18	20	22	24	26	28	30
1200	63	56	51	43	37	34							
1000	75	67	61	51	44	41							
800	92	82	75	63	54	51							
600	119	107	97	82	71	67	56	51	46	43	40	37	34
500	139	126	115	97	85	79	67	61	55	51	47	44	41
400	168	152	139	119	104	97	82	75	68	63	58	54	51
300	210	192	177	152	134	126	107	97	89	82	76	71	67
200	274	256	239	210	187	177	152	139	128	119	111	104	97
Tidal Volume													

D Cylinder   Capacity =   414.6

Breaths per Minute

	8	9	10	12	14	15	18	20	22	24	26	28	30
1200	41	37	33	28	24	22							
1000	49	44	39	33	29	27							
800	60	54	49	41	35	33							
600	77	70	63	54	46	44	37	33	30	28	26	24	22
500	91	82	75	63	55	52	44	39	36	33	31	29	27
400	109	99	91	77	67	63	54	49	44	41	38	35	33
300	137	125	115	99	87	82	70	63	58	54	50	46	44
200	178	166	155	137	122	115	99	91	84	77	72	67	63

Tidal Volume

- **16   Symbols:**

	Degree of protection against electric shock: Type BF
	Caution, Consult accompanying documents
	% Relative Humidity: 0 to 90%
	Temperature Range: -20°F to 140°F
	On/Off
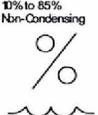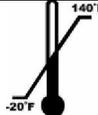
§ Internally powered device
§ IP20 degree of protection against ingress of water
§ Equipment not suitable for use in presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
§ Suitable for continuous operation

This equipment has been tested and found to comply with the EMC limits for the Medical Device Directive 93/42/ECN (EN 55011 and EN 60601-1-2). These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. The equipment generates, uses and can radiate radio frequency energy and, if not installed

and used in accordance with these instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- § *Reorient or relocate the receiving device*
- § *Increase the separation between the equipment*
- § *Connect the equipment into an outlet on a circuit different from that to which the other device(s) is connected.*

Consult the manufacturer or field service technician for help