Simplified Automated Ventilator Training Slides

Export Department:
J.D. Honigberg International, Inc.
155 N. Pfingsten Road, Suite 150
Deerfield, IL 60015 USA
Tel: 847-412-0200
Email: medical@jdhintl.com
www.jdhmedical.com

AutoMedx
MEDICAL SUPPORT TECHNOLOGY

SAVe Ventilation Kit with Hard Case

(Part 70000H | NSN 6515-01-581-8155)

AutoMedx
MEDICAL SUPPORT TECHNOLOGY

SIMPLIFYING TACTICAL MEDICINE

Combat Medical Systems

SAVe – Simplified Automated Ventilator

SAVe Simplified Automated Ventilator
(Part 70000H | NSN 6515-01-581-8155)

- Designed for use far forward environment in lieu of BVM
- Removes guesswork and operator error associated with bagging in high stress environment
- Reduces likelihood of hyperventilating the patient or causing gastric insufflating
- Improves triage capabilities of the medic by permitting him/her to hold the seal of the mask, apply a tourniquet, start fluids, assist with evac, help another patient, etc.

Where should the SAVe be fielded?

SAVe Simplified Automated Ventilator
(Part 70000H | NSN 6515-01-581-8155)

- Any place there is a BVM
- With all forward deployed medics and corpsmen
- On CASEVAC Platforms / Vehicles of Opportunity
- Battalion Aid Stations
- As a backup at forward surgical hospitals
- Third World Hospitals that lack ventilators
- General quarter's stations, fast boats, LCUs and LCACs

Where does the SAVe belong in the Chain of Care?

The SAVe is meant to improve the standard of care and triage capabilities of the medics operating in the far forward environment by providing more consistent and safer ventilation with less effort.

The SAVe is designed to bridge the gap between BVMs and sophisticated ventilators.

	BVM	SAVe	Transport or Hospital Vent
Mission	Ventilate patient in far forward environment	Improve the standard of care and triage capabilities of the medic in the far forward environment by providing more consistent and safer ventilation with less effort than a BVM	Targeted longer term therapy administered by individual with high level of training usually at a Level II or III facility

When should the SAVe be used?

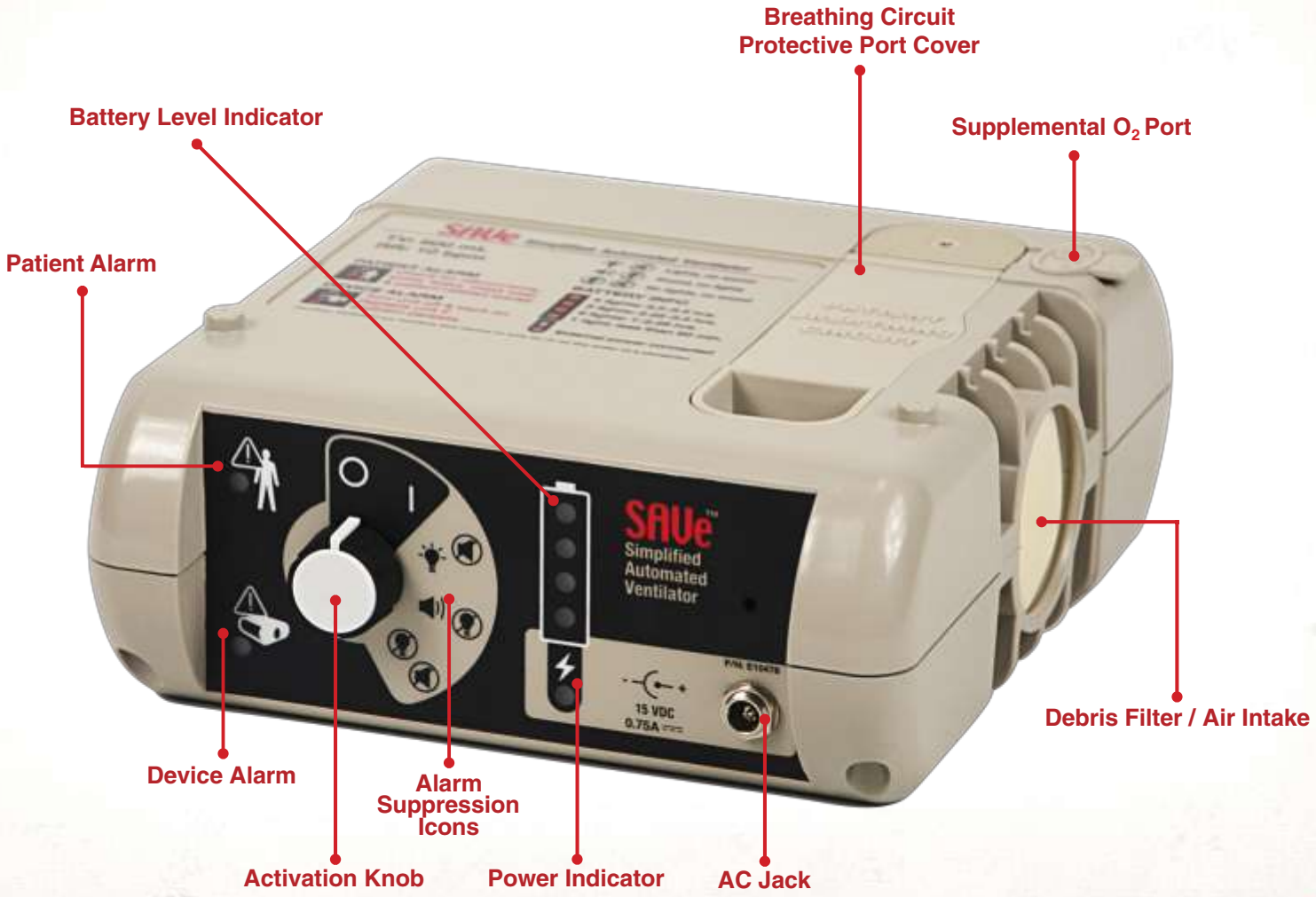
The SAVe should be used:	The SAVe should not be used:
▪ When size, weight and ease of use are an important consideration	▪ When the patient is trying to breathe spontaneously
▪ When the provider does not have the requisite training to operate a more sophisticated device	▪ When the patient has non-compliant lungs like those found in ARDS patients[1] or when PEEP is indicated[2]
▪ When a provider would otherwise be using a BVM	▪ When there is more sophisticated equipment available and personnel with the requisite training to operate it

SAVe Ventilator Specifications

- Weight: 3.1lbs
- Ventilator Dimensions: 6.75” x 6.25” x 2.5”
- Battery Life: up to 5.5 hours
- Respiratory Rate: 10BPM
- Tidal Volume: 600 ml [1]
- Peak Inspiratory Pressure - 38 cmH2O
- Detects and alarms for disconnects, high pressure / blockage and low battery
- On / Off switch enables user to suppress visual and audible alarms
- Inspiratory time 2.25 seconds; Expiratory time 3.85 seconds

1 Tidal volume will vary slightly depending on lung compliance. Please see manual for more details.

SAVe Overview



SAVe Overview

SETUP INSTRUCTIONS

1. Determine patient isn't breathing.
2. Verify airway isn't blocked. Clear any debris excess fluid from patient's mouth.
3. Open cover labeled " Patient Breathing Circuit" and connect patient circuit and pressure tubes to the ports in the well. See FIGURE 1.
4. Insert airway device. If using mask skip to step 5.
5. Connect other end of patient circuit to airway or mask.
6. Turn knob from the OFF (O) position to ON (I).

Do not turn past the ON (I) position unless you want to suppress the alarms.

7. If using a mask use the "head tilt chin lift" or "jaw thrust maneuver" to open the airway and use two hands to seal the mask. Verify adequate chest rise, feel for leaks and listen for exhale.
8. Verify battery life and that there are no alarms (1 or 2 beeps in the first 10 seconds is normal).
9. If desired, up to six liters per minute of supplemental Oxygen or medical grade air can be used. See FIGURE 2. Connect oxygen tube to the port under the cover labeled "O_2".

Do not exceed six liters per minute.

These instructions can be found on the bottom of the device. These instructions have been updated as of October 2011.

Setup – Step 1

Look, listen and feel for breathing and pulse.

Setup – Step 2

Verify the airway isn't blocked.

Clear any debris or excess fluid the patient's mouth.

Setup – Step 3

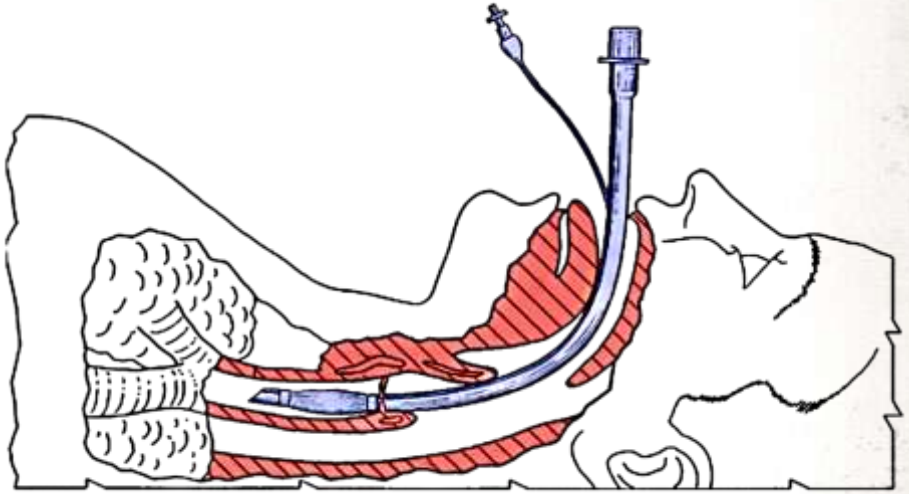
Open cover labeled "Patient Breathing Circuit" and connect patient circuit in the well as pictured.

Tip:
Practice until you can pull out and fully deploy the SAVe with a mask in less than 30 seconds.

Setup – Step 4

Insert airway device

The use of an ET tube or other airway device is preferred over using a mask. This will help reduce the risk of airway collapse or leakage around the seal of the mask. If this can't be done immediately ventilate with a mask until an airway can be inserted.



Setup – Step 5

Connect the other end of the patient circuit to the airway device or mask.

⚠ Make sure the 90 degree elbow of the circuit is pushed firmly into the mask.

Setup – Step 5

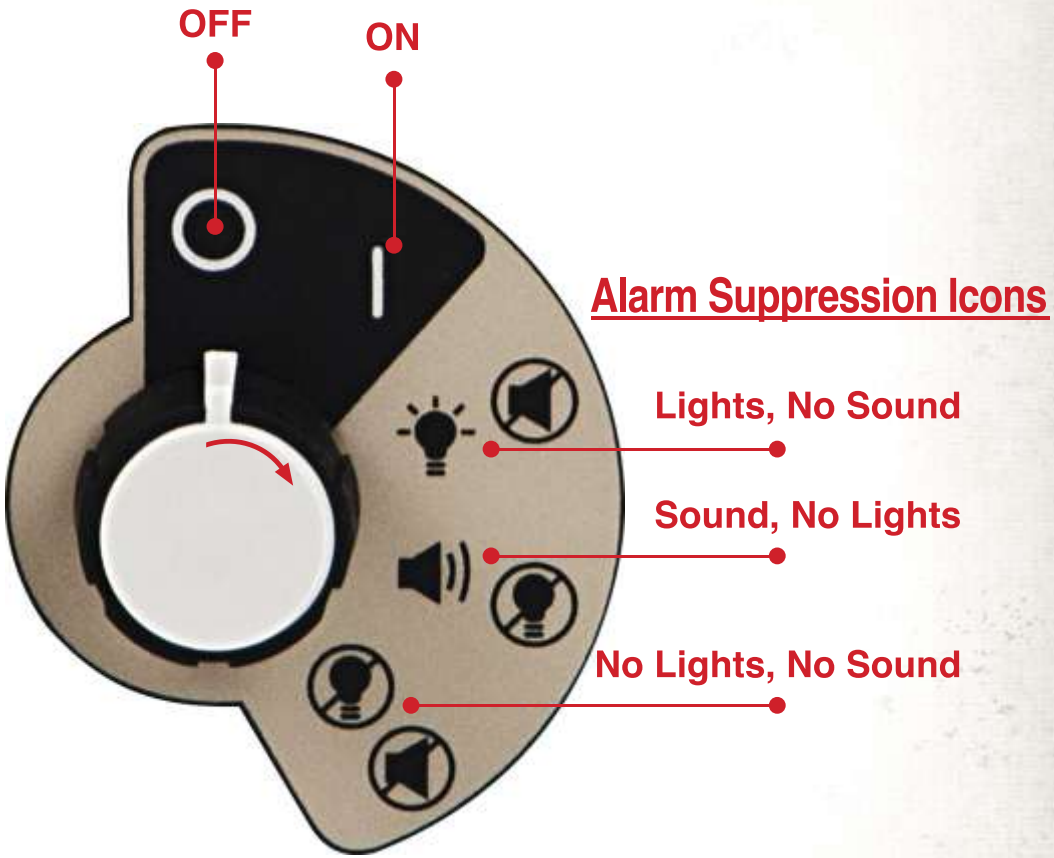
Connect the other end of the patient circuit to the airway device or mask.

Do not use masks that contain a filter. These filters will restrict the volume of air to the patient. You should only use the mask provided by AutoMedx, Combat Medical Systems or authorized SAVe distributor.

Turning the SAVe On – Step 6

To engage the SAVe rotate the knob one position from the (O) to the (I).

All Subsequent positions are to suppress alarms while the device is running.



Do not turn the dial past the (I) position unless you want to suppress alarms.

Setup – Step 7

If using a mask use the “head tilt chin lift” or “jaw thrust maneuver” to open and maintain the airway.

It is important to maintain this position while ventilating with a mask. The “jaw thrust maneuver should be performed when a spinal injury is suspected.

Setup – Step 7

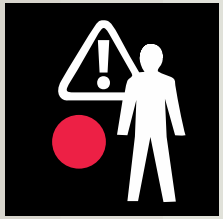
Use two hands to maintain the seal of the mask. Verify adequate chest rise, feel for leaks and listen for exhale at the valve.

Practice maintaining the seal of the mask. Remember any air delivered to the patient will be exhaled through the valve. If possible, listen for air to be exhausted through the valve when the patient exhales.

Setup – Step 8

Verify battery life and that there are no alarms
(One or two beeps within the first 10 seconds is normal)

PATIENT ALARM

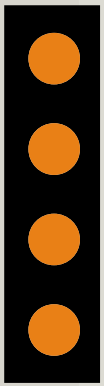


Check for disconnects, kinks, leaks, mask seal, and patient-related issues.

DEVICE ALARM

Turn unit off and back on. Replace the unit if problems persists.

BATTERY INFORMATION



4 Lights: 3.5 - 5.5 hours

3 Lights: 2.25 - 3.5 hours

2 Lights: 1 - 2.25 hours

1 Light: Less than 60 minutes

External power connected

Setup – Step 9

If desired, up to six liters per minute of supplemental oxygen or medical grade air can be used.

Connect oxygen tube to the port under the cover labeled "O_2".

Setup – Step 9

Chart for FIO_2

Chart is located on the bottom of the device.

FLOW RATE (L/min)	FIO_2 (%)
0	21
1	33
2	40
4	51
6	62

⚠ When using supplemental oxygen, do not exceed 6 liters per minute. This may inadvertently cause breaths to stack which may harm the patient.

Airway Management Safety Review

- The patient should be monitored at all times.
- Alarms should only be suppressed if absolutely necessary.
- An advanced airway device is strongly preferred over using a mask.
- If a mask is used, use two hands to help maintain the desired head tilt / chin lift position and the seal of the mask to the patient's face.
- A pulse oximeter should be used to verify adequate oxygenation. Remember, there is a lag with pulse oximeters.

After Use Maintenance

- The single-use patient breathing circuit, including the valve and fitting, should be disposed of properly.
- The debris filter should be replaced. The patient mask should be disposed of properly.
- The port on the SAVe should be wiped with damp, soapy cloth and thoroughly dried with lint-free cloth between patient uses.
- Dirt and debris should be cleaned from the unit using a soapy cloth and then dried with a lint-free cloth.
- The SAVe should be visually inspected for any damage that may affect operation. Do not use a damaged ventilator. Return it to AutoMedx for service.
- The SAVe should be fully charged for at least 14 hours.
- A new breathing circuit, ET-Tube and a patient mask should be packaged and stored with the SAVe.

Storage

- Ensure that the unit is fully charged after every use. Storing the unit in a discharged state may be detrimental to the internal battery.
- The unit should be stored together with all of the necessary accessories in either the hard or soft case.
- The best storage temperature is between 50 to 80 degrees Fahrenheit. If at all possible the SAVe should not be stored in temperatures below freezing.
- Recharge schedule is predicted on storage temperature.

Temperature	Recharge schedule
Below 68°F	9 months
68°F to 86°F	6 months
86°F to 104°F	3 months

⚠ Warnings and Cautions ⚠

- WARNING: Do not operate the SAVe prior to reading instructions contained within this manual.
- WARNING: Electric shock hazard, do not open the enclosure casing.
- WARNING: The exact power supply provided must be used with the SAVe. (Manufacturer: Reliance; Model Number: MPP30-15-M-ROW-US-77-CP).
- CAUTION: Federal law restricts this device to sale by or on the order of a physician.
- CAUTION: Do not get water, oil, grease, sand or other particulates in the ports.
- CAUTION: Service is to be performed by qualified biomedical equipment technicians only.
- CAUTION: Do not allow oil and grease to enter the SAVe.
- CAUTION: Internal components are susceptible to damage from static discharge.
- CAUTION: The device may deliver less than its stated tidal volume for several minutes if stored in temperatures at or below freezing.
- CAUTION: Less than the stated tidal volume will be delivered if an adequate seal is not maintained.
- CAUTION: Potential electromagnetic interference at levels greater than 20 V/m. Avoid use of the device in unknown environments that may have high electromagnetic levels.

SAVe™

Simplified Automated Ventilator

Troubleshooting

SIMPLIFYING TACTICAL MEDICINE

Alarm Types

Patient	Device	Battery
		**BATTERY INFORMATION** 4 Lights: 3.5 - 5.5 hours 3 Lights: 2.25 - 3.5 hours 2 Lights: 1 - 2.25 hours 1 Light: Less than 60 minutes External power connected
Patient alarms can be fixed by the operator	**Device alarms can NOT be fixed by the operator**	**When there is only one battery LED left, the device will alarm with approximately 45-60 minutes of battery life remain**

PROBLEM:

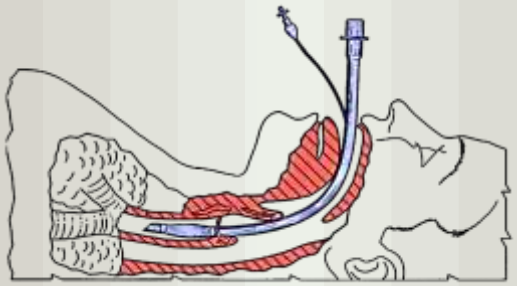
If motor repeatedly tries to start but then stops, there is a blockage. Patient alarm will be activated.

Issue	Action
There is blockage	Ensure the intake area is NOT blocked.
	Ensure patient tubing is NOT kinked.
Patient alarm is sounding or flashing	Ensure there is no debris in the circuit, valve, mask, or patient's mouth. Check for tension pneumothorax.

PROBLEM:

If motor repeatedly tries to start but then stops, there is a blockage. Patient alarm will be activated.

Issue	Action
There is blockage	If using a mask, make sure the patients head is tilted back.
	If using an ET Tube, ensure tube is properly in the trachea.
Patient alarm is sounding or flashing	If $ETCO_2$ detector is in place, ensure that proper gas exchange is occuring, if not, the tube may be placed in the stomach.



PROBLEM:

If motor repeatedly tries to start but then stops, there is a blockage. Patient alarm will be activated.

Issue	Action
There is blockage	If problem is not identified, replace the patient circuit.
 Patient alarm is sounding or flashing	If problem persists, ventilate by other means or begin rescue breathing.

PROBLEM:

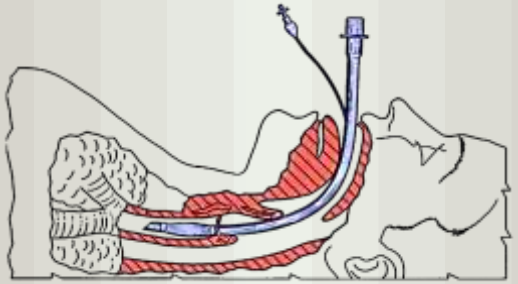
Aside from the patient alarm, the device seems to be operating normally. The device is on for a few seconds while breath is delivered and then off for another few seconds during exhale. There is likely a leak or disconnect.

Issue	Action
There is a leak or a disconnect	Ensure both tubes going to the patient are properly connected to the ventilator and to airway or mask.
 Patient alarm is sounding or flashing	If using a mask, ensure there is a good seal.

PROBLEM:

Aside from the patient alarm, the device seems to be operating normally. The device is on for a few seconds while breath is delivered and then off for another few seconds during exhale. There is likely a leak or disconnect.

Issue	Action
There is a leak or a disconnect	If using an airway device, make sure that it has not become dislodged.
 Patient alarm is sounding or flashing	Ensure patient tubing is connected to ET tube or mask and that the valve is properly connected to 90 degree elbow.



PROBLEM:

Aside from the patient alarm, the device seems to be operating normally. The device is on for a few seconds while breath is delivered and then off for another few seconds during exhale. There is likely a leak or disconnect.

Issue	Action
There is a leak or a disconnect	Ensure there is no hole or leak in the patient circuit. If a leak is found, replace patient circuit immediately.
 Patient alarm is sounding or flashing	If problem persists, ventilate patient by other means or begin rescue breathing.

PROBLEM:

If device cuts off for 10 seconds or more while patient alarm is activated then the exhaust valve is malfunctioning.

Issue	Action
The exhaust valve is malfunctioning	Replace patient circuit immediately.
 Patient alarm is sounding or flashing	

PROBLEM:

If the patient alarm activates intermittently then breaths may be stacking. Verify that the patient is able to exhale during the exhalation cycle.

Issue	Action
Stacking is occurring	Ensure the exhaust valve is not occluded.
 Patient alarm is sounding or flashing	If condition persists, replace patient circuit immediately or begin rescue breathing.

PROBLEM:
The Device Alarm Sounds.

Issue	Action
Several reasons may be causing the device alarms  Device alarm is sounding. These items typically can not be fixed in the field.	Turn off device for a few seconds and then turn back on. Plug into an electric outlet if possible.
	If the problem persists, ventilate by other means or begin rescue breathing.

PROBLEM:

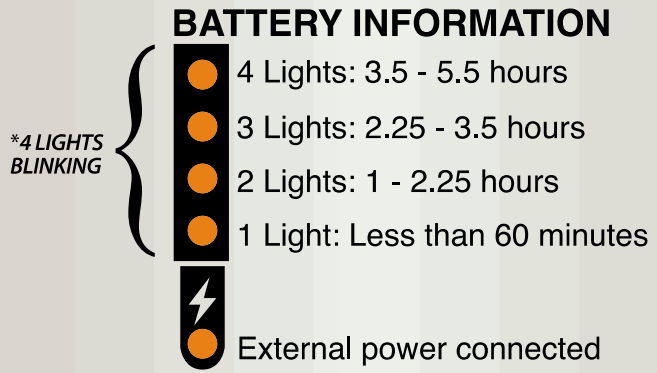
The Battery Alarm is sounding and light is blinking.

Issue	Action
LOWER POWER: Once the bottom battery light begins to blink and the audible alarm begins to sound, venitlator has approx. 45-60 minutes of battery life left.	**Plug in the device or be prepared to ventilate by other means.**
If the device alarm is triggered while low battery alarm is sounding the device is delivering significantly less than stated tidal volume.	

PROBLEM:

All four Battery Lights are Blinking.

Issue	Action
The internal temperature is too high and the device may not behave as intended	**Take measures to cool the ventilator.** **In the meantime, ventilate by other means or begin rescue breathing.**



SAVe is powered by a rechargeable SLA (Sealed Lead Acid) battery or an AC adapter. The battery is medical-grade and accepts input voltages ranging from 100-240 VAC and operating frequencies of 50-60 Hz.

THANK YOU