

# Protecting Every Breath and Improving Patient Comfort

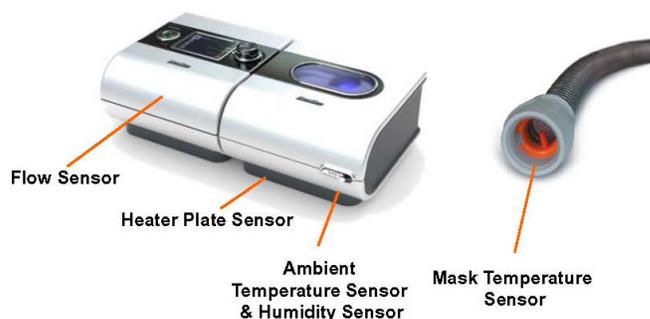
## S9™, VPAP™, Stellar™ and ResMed Interfaces

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The first segment of a presentation by Michael Madison, RRT, a representative from ResMed's Respiratory Care unit, on June 26, 2013, described three major features of the S9™, the base platform for many ResMed products.

*Climate control system:* Lungs work best if the air taken in is warm, moist and filtered. It is important to control absolute humidity, mask temperature and relative humidity.

The S9 measures the room air using the ambient temperature sensor and the humidity sensor and also the air that is delivered to a patient with the mask temperature sensor. (See below.) In between, the machine compensates to produce the most comfortable air for a user based on the settings dialed in.



The default settings are 80°F and 80% humidity. The ability to continually adjust to keep the humidity at the desired level eliminates rainout (moisture) that can appear in tubing, improving patient comfort.

*Noise reduction:* The S9 is reportedly 78% quieter than the S8, because conducted noise, i.e., noise such as in a stethoscope, has been reduced. The Enhanced Easy-Breathe motor reduces the conducted noise that could be transmitted to the cheekbones and noise at the mask in the form of vibration.

*Display capabilities:* The S9 has a display (See below.) that lets ventilator users track sleep quality by usage in hours, observe their apnea/hypopnea index (AHI) and mask fit. The system indicates a good mask fit by displaying a green smiley face (good), or if there is too large a leak, a red unhappy face (adjust).



### The S9 VPAP ST-A

Building on the platform described above, the letters of the S9 VPAP ST-A device stand for variable positive airway pressure with spontaneous timed mode and with apnea mode. Other possible modes include CPAP, S, T, PAC (pressure-assisted control) and iVAPS (intelligent volume-assured pressure support).

The breathing device is intended for respiratory insufficiency and obstructive sleep apnea. It is FDA approved for pediatric patients (greater than 30 pounds) and adults. It has user-settable alarms, climate control, a possible IPAP of 30 cm of H<sub>2</sub>O and 50 bpm backup rate. It also has TiControl™ for customization of breath length, an adjustable rise time and Vsync leak compensation to



customize breath delivery. For details, see the PowerPoint presentation at [www.ventusers.org/edu/call-Madisonnw.pdf](http://www.ventusers.org/edu/call-Madisonnw.pdf).

The iVAPS feature – intelligent volume-assured pressure support allows for automated adjustment of pressure created by the machine to achieve a target volume. Pressure is measured as delivered out of the machine and at patient interface and then iVAPS adjusts the pressure based on the patient's measured activity. If the target volume is 20 L/min and the patient respiratory effort only achieves 14 L/min, then iVAPS, within preset limits, ramps up delivery pressures until the patient returns to the target 20 L/min. The iVAPS targets alveolar ventilation – ventilation in that part of the lung that actively participates in gas exchange, thus compensating for the dead space in the lung anatomy that does not participate in gas exchange.

The S9 VPAP ST-A with the iVAPS feature is suitable for neuromuscular disease and restrictive conditions, obesity hypoventilation and COPD.

ResMed offers a device specifically for people with COPD discharged to the home, a number estimated to be more than 1 million patients in 2012. The VPAP™ COPD has pressure capability up to 30 cm H<sub>2</sub>O, and a ClimateLine<sup>MAX</sup>™ Oxy tubing which accommodates the addition of oxygen to the air delivered to the patient and controls humidity. The machine provides for a longer exhalation period to match the slower exhalation flows of individuals with COPD.

### The Stellar™

Madison next described the Stellar 150, which is another option for the survivors of polio, the target audience of the IVUN Educational Conference Calls.

The Stellar 150 is a pressure support device with the iVAPS feature. (The iVAPS is not on the Stellar 100.) It is small enough to be easily carried and a padded mobility bag is available. The device produces higher pressures and flows, so it can be used in the hospital and as a bridge to the home. It has a

two-hour internal battery and the capability to add two external batteries for another 16 hours.

It can be programmed for two different groups of settings for different patient activities, e.g., when someone is awake and alert and when someone is relaxing or asleep.

To assist clinicians, the device has preset options or “quick starts” for the following disease states: obstructive lung disease, restrictive lung disease, obesity hypoventilation and for normal lung mechanics, which then can be fine tuned.

The screen displays flow and pressure curves simultaneously, and these parameters: I:E ratio, minute ventilation, respiratory rate, leak, tidal volume and FiO<sub>2</sub> (oxygen being supplemented) when connected. There is also an option for measuring oxygen saturation (SpO<sub>2</sub>).

Lastly, at the request of ventilator users, Madison briefly outlined the mask options available from ResMed.

Full-face masks are ideal for those who experience mouth leak, those with a deviated septum or with seasonal allergies. An improvement in full-face mask technology (Quattro™ FX) is the dual-wall cushion. The thick inner cushion provides stability and a thin outer membrane enhances the seal. Ventilator users don't have to tighten the headgear as much resulting in less pressure on the skin, fewer problems with skin issues and greater comfort.

Various nasal masks have been around for many years. The mask was first used for treating obstructive sleep apnea and seals around the nose. ResMed offers a variety of nasal masks in their Mirage™ line. Nasal pillows design is minimal with small “pillows” inserted into the nares (nostrils). ResMed's Swift line of products has a dual wall, a thin outer membrane that conforms to the nares and a thicker inner membrane that provides structure.

To view the PowerPoint for this presentation, go to [www.ventusers.org/edu/call-Madisonnw.pdf](http://www.ventusers.org/edu/call-Madisonnw.pdf) ■

