

Trilogy100 Ventilation Workshop

Ron Hosp, MS, RRT



PHILIPS



**Congratulations for 30
years of Education 😊**

1986 Memorable Moments

- “Say You, Say Me,” Lionel Richie





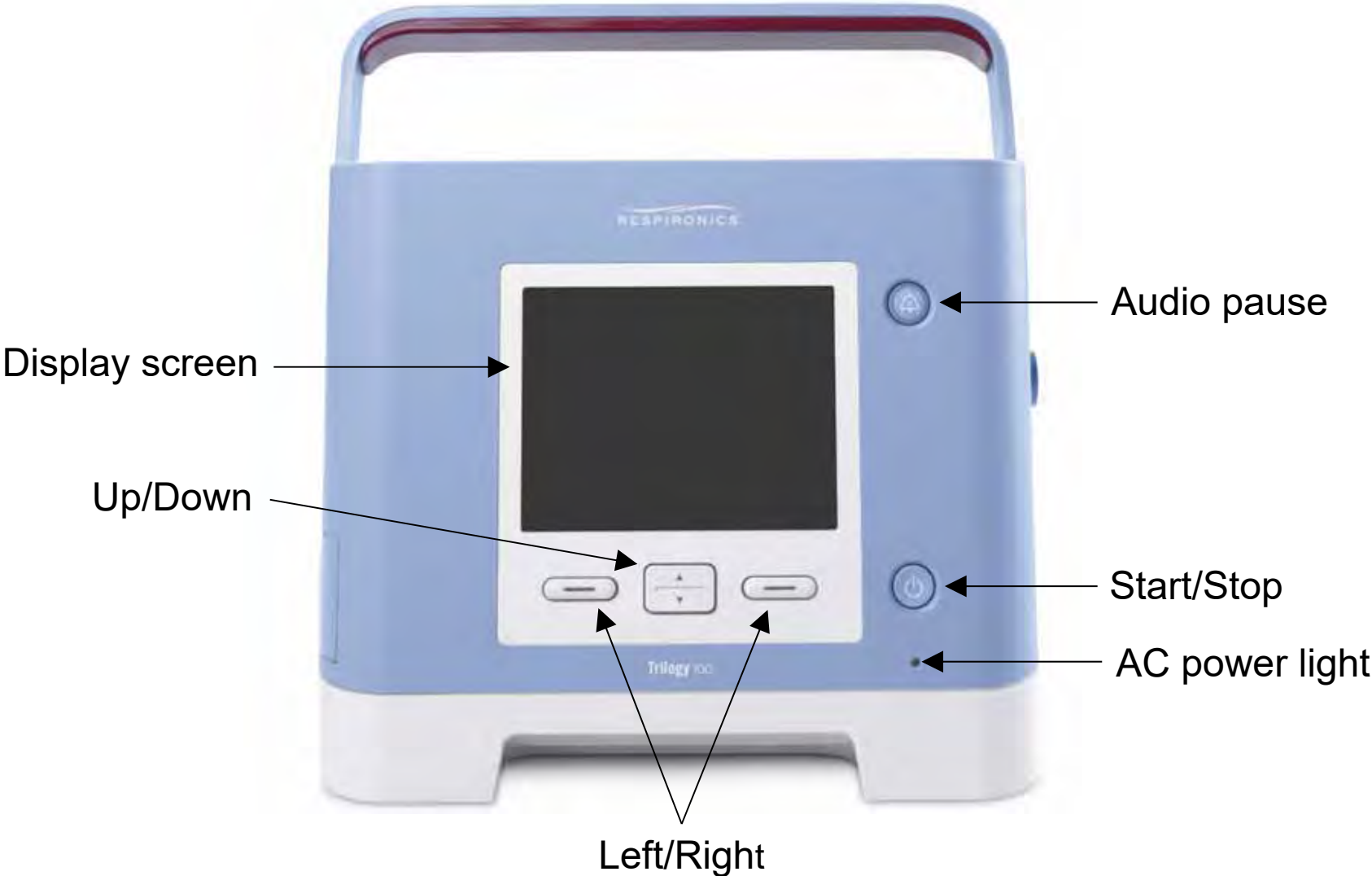
PHILIPS



PHILIPS

PHILIPS

Features



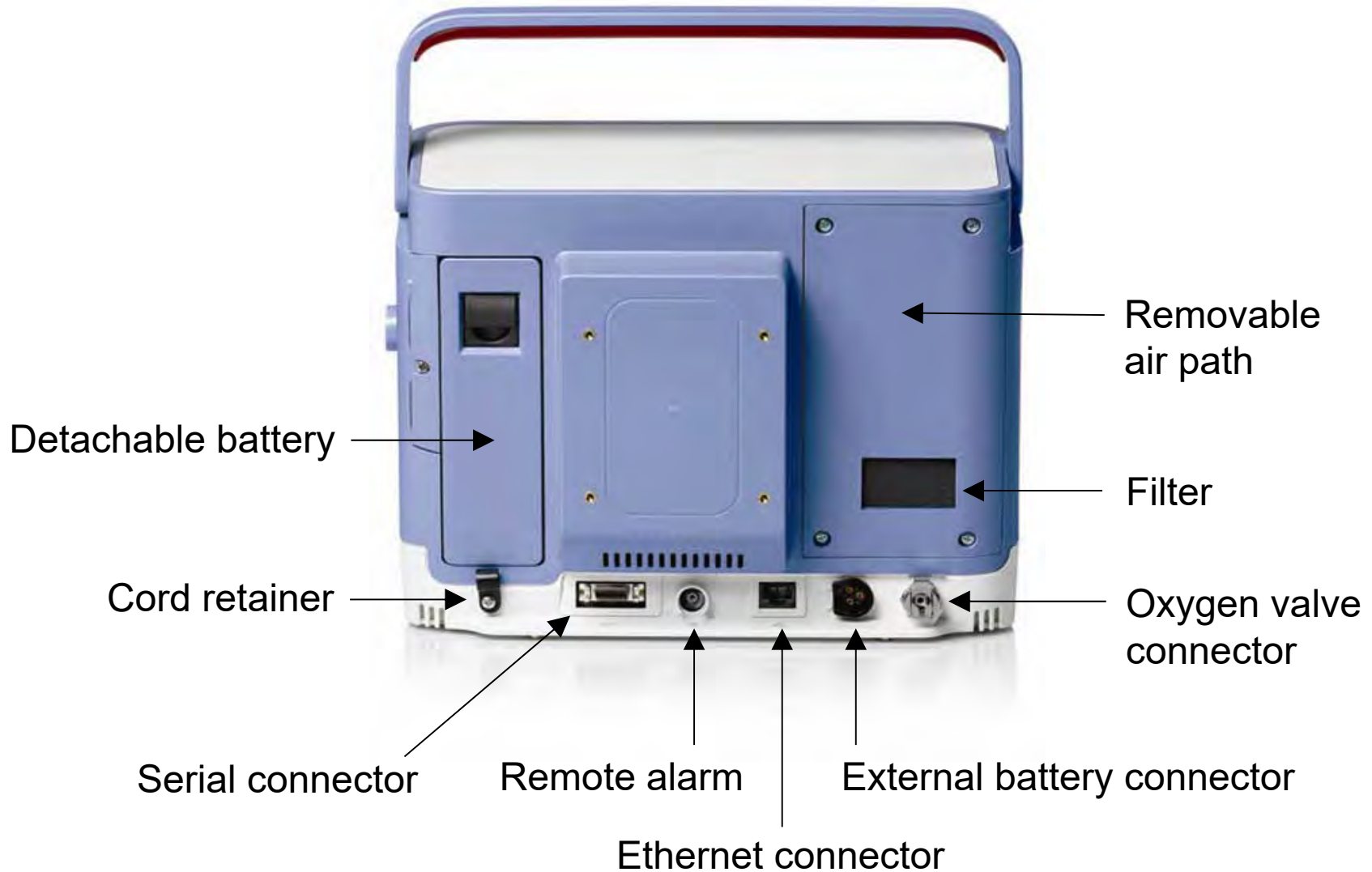
PHILIPS



SD Card Slot

PHILIPS

On the back

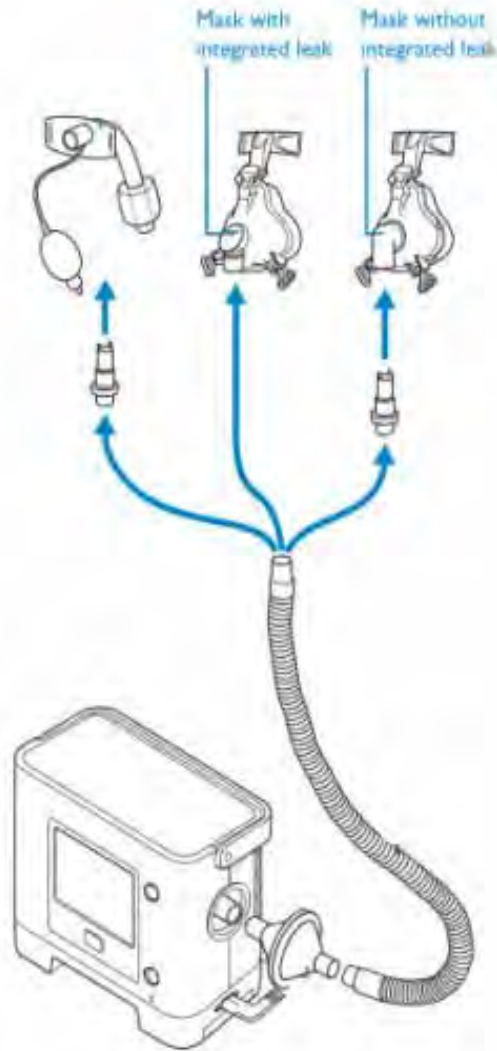


PHILIPS



PHILIPS

Trilogy100 Circuit Options – Passive



- Utilizes an Exhalation Port
 - Integrated into a mask
 - Whisper Swivel II

- Passive Porting Block



- Choose Passive in Set up Menu

PHILIPS

User Interface

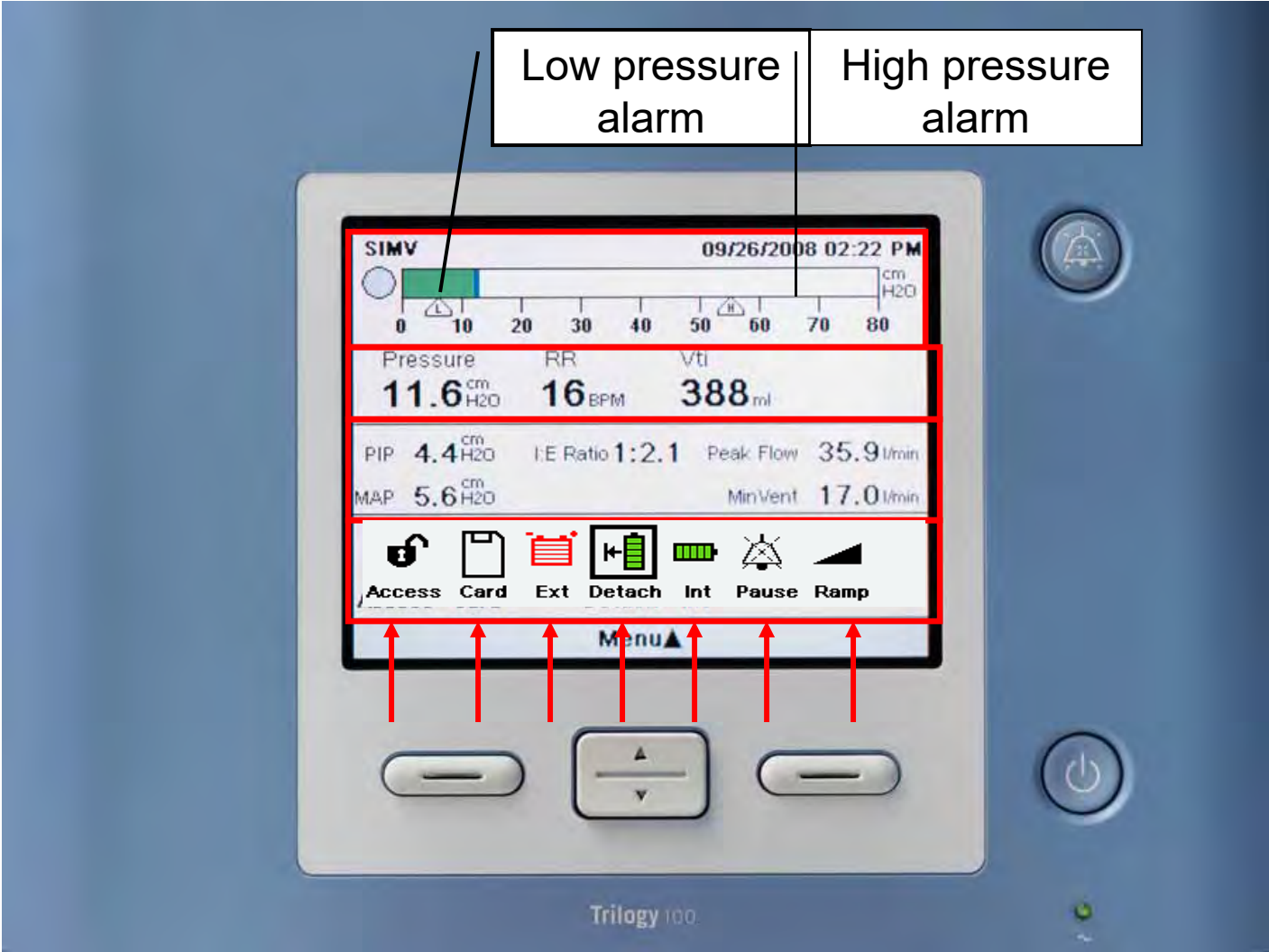
Viewing and Changing Settings



PHILIPS



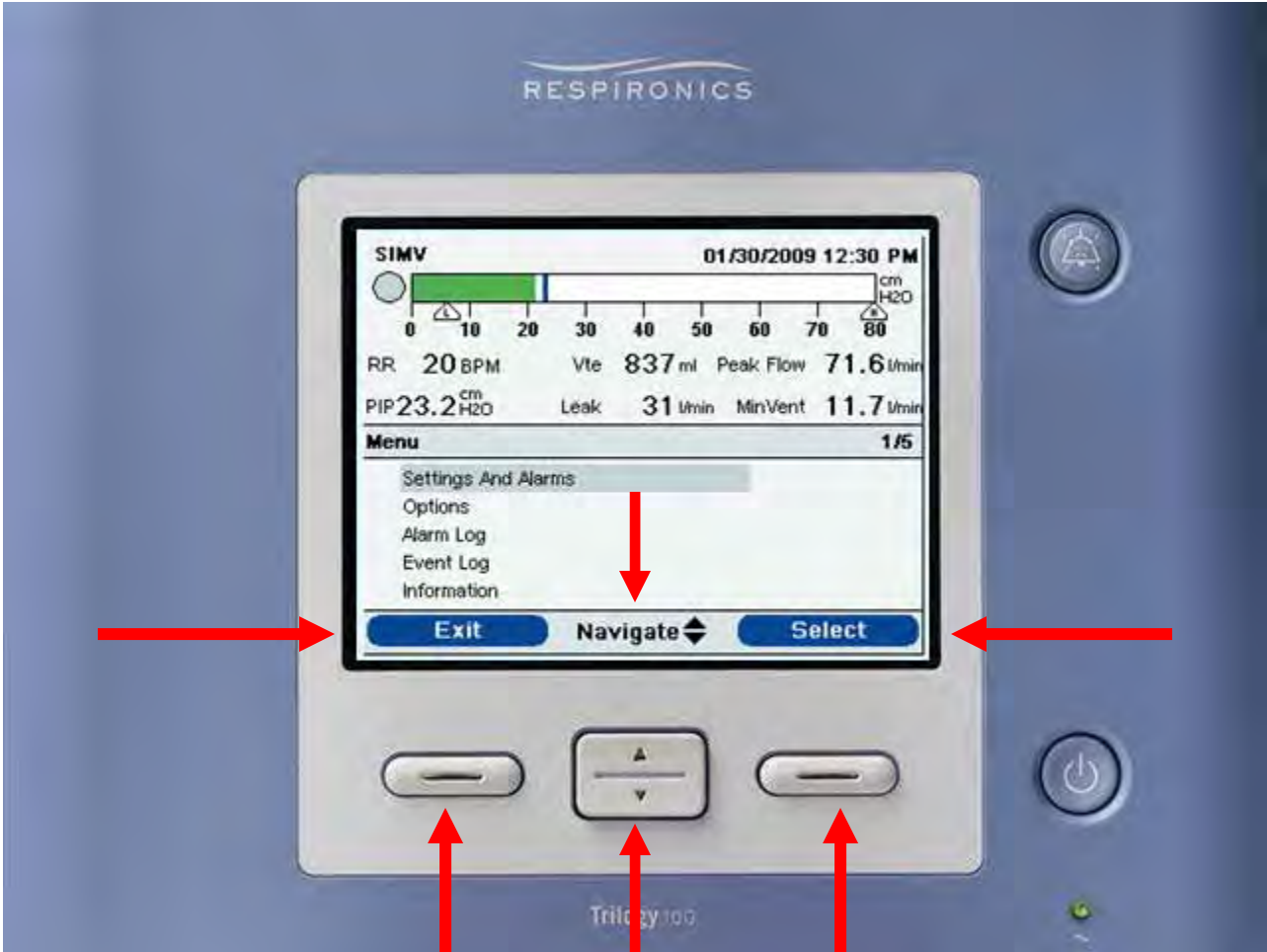
Simple Screen



Detailed Screen

PHILIPS

Control keys



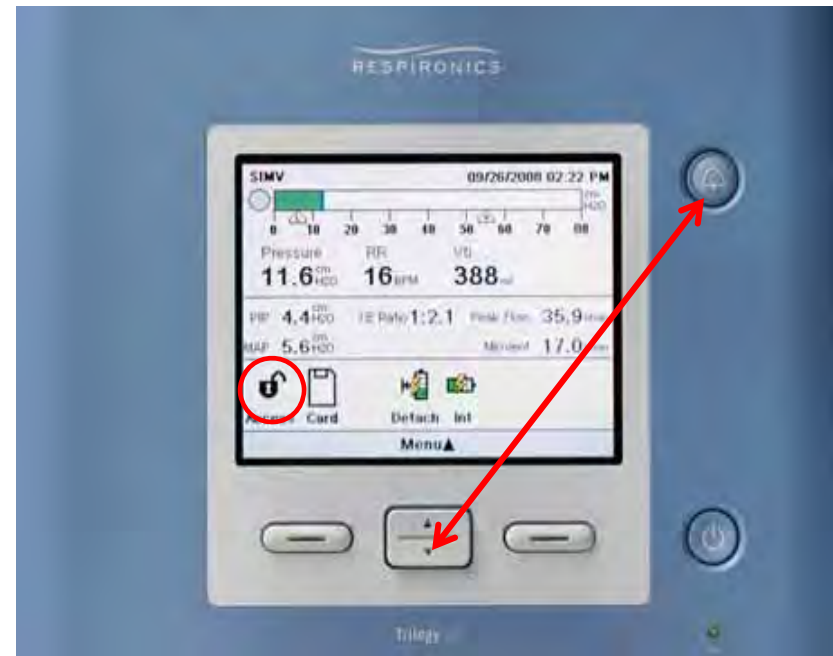
Accessing prescription setting screens

Two levels of Menu access

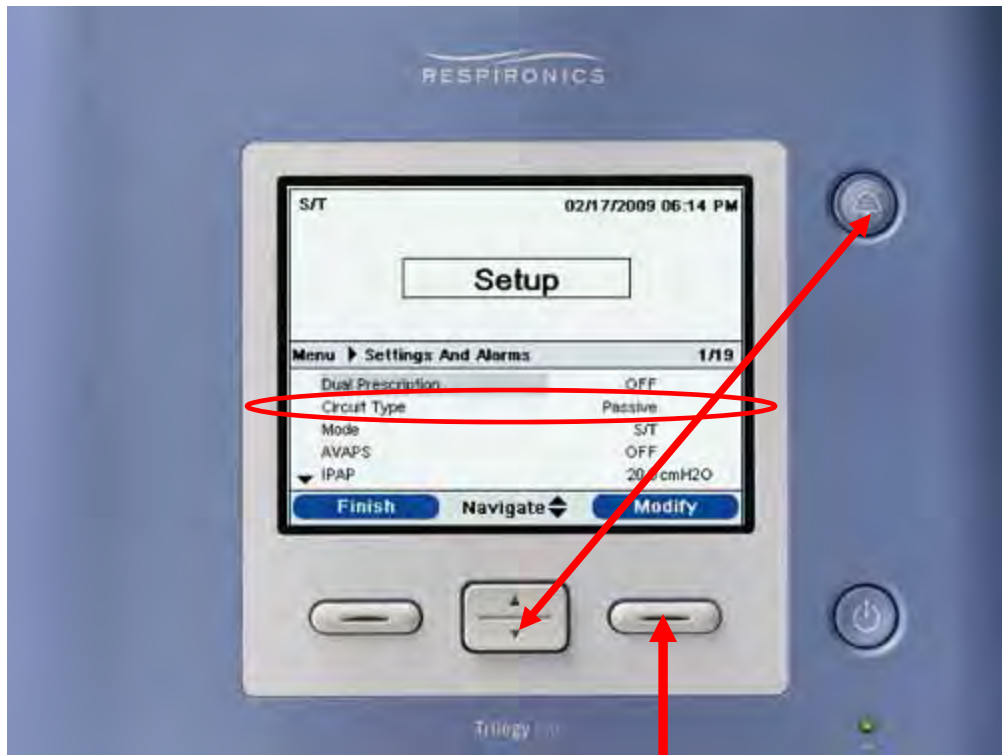
- Full
- Limited

To change prescription setting from limited access

- Hold Audio Pause and Down Arrow Keys



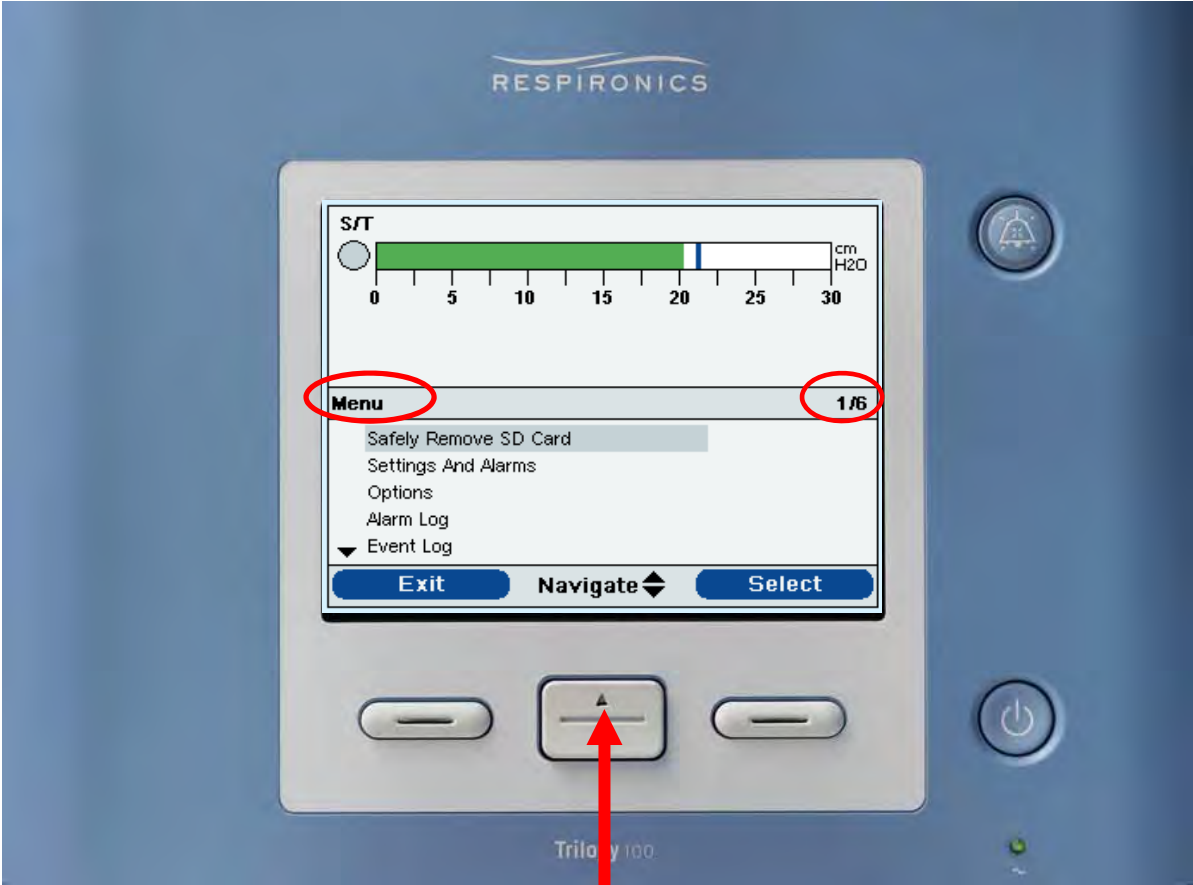
Accessing prescription setting screens



Setup Screen

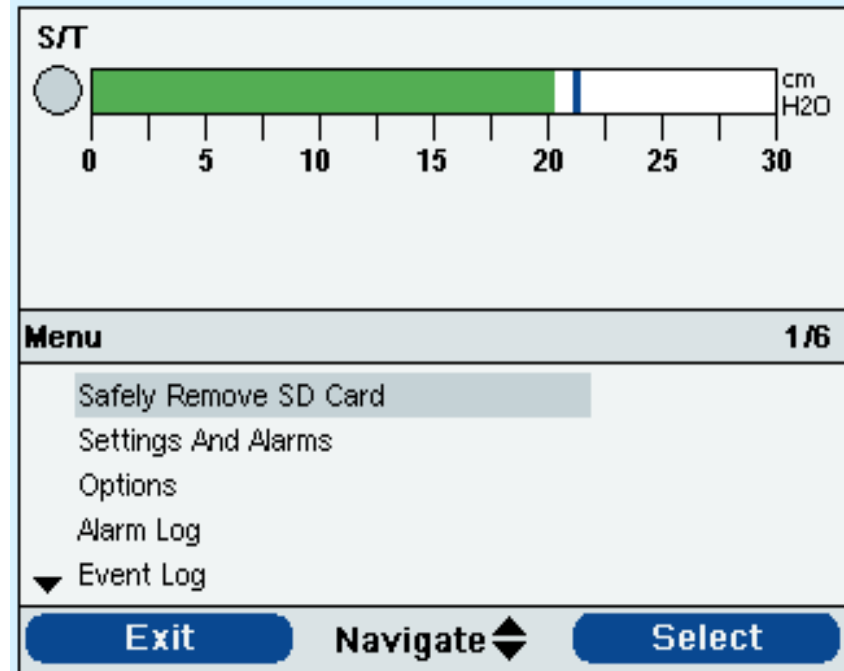
- Set-up Screen
- When airflow is off
- Hold Audio Pause and Down Arrow Keys
- Setting circuit type

Menu screen



Menu screen

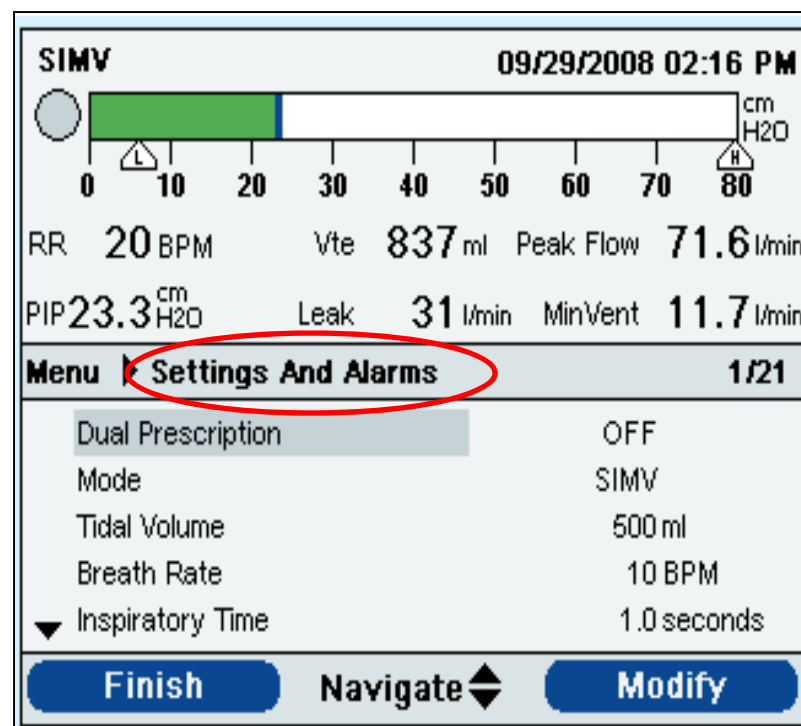
Safely Remove SD Card



Menu screen

Settings and Alarms

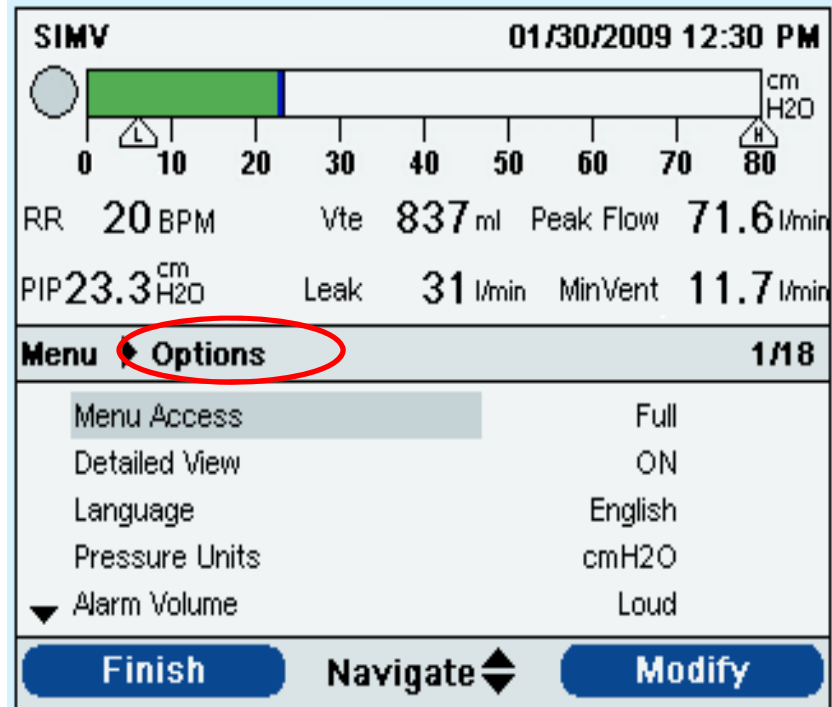
- Dual prescriptions
- Modes
- Settings for mode chosen
- Alarms



Menu screen

Options

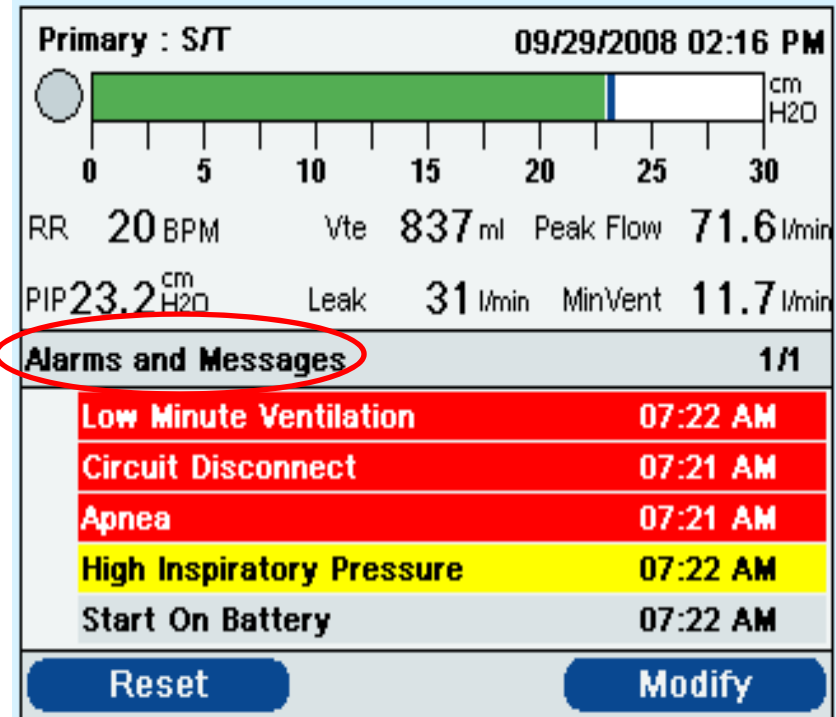
- Menu Access
- Detailed View
- Language
- Pressure Units
- Alarm Volume
- Keypad Backlighting
- LCD Brightness
- Screen Saver
- Date Format
- IP Address Mode
- Operational Hours



Menu screen

Alarm Log

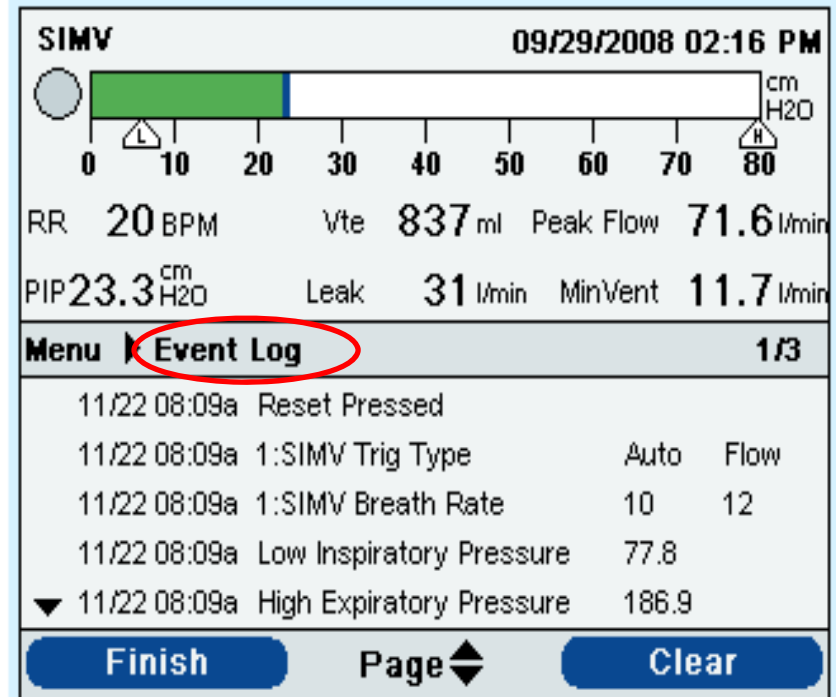
- Lists last 20 alarms
 - High priority appear in red
 - Medium priority appear in yellow
 - In Full and Limited Access
 - Alarm log can only be cleared in full access



Menu screen

Event Log

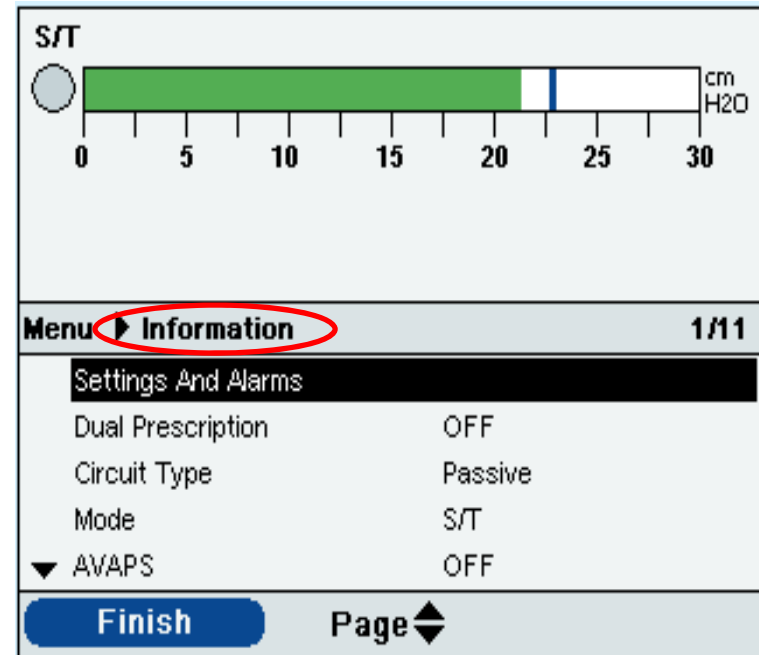
- Event Log – 12,000 events
 - Can only be viewed and cleared in full access



Menu screen

Information

- Summary of current
 - Prescription settings
 - Device settings
 - System settings
 - Can be viewed in full and limited access



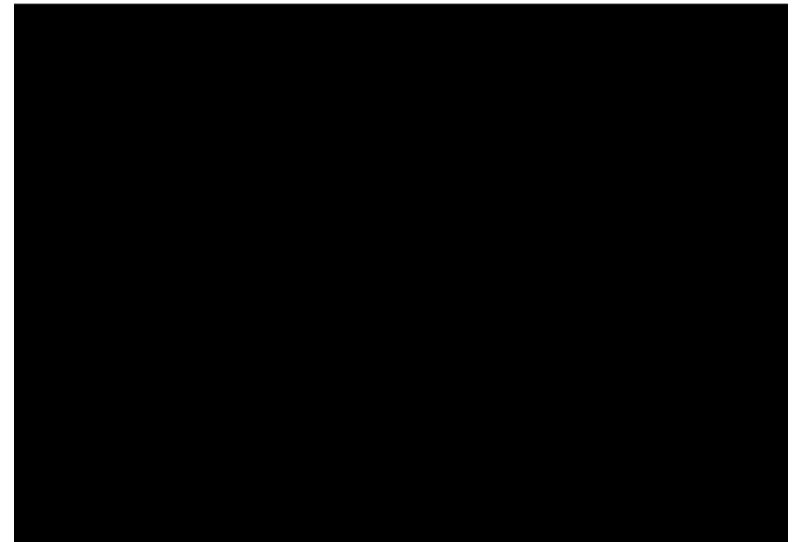
Screen saver option

- Reduce power consumption
- Dim in a darkened room
- Pressing any key, the occurrence of an alarm or informational message will exit screen

Breath



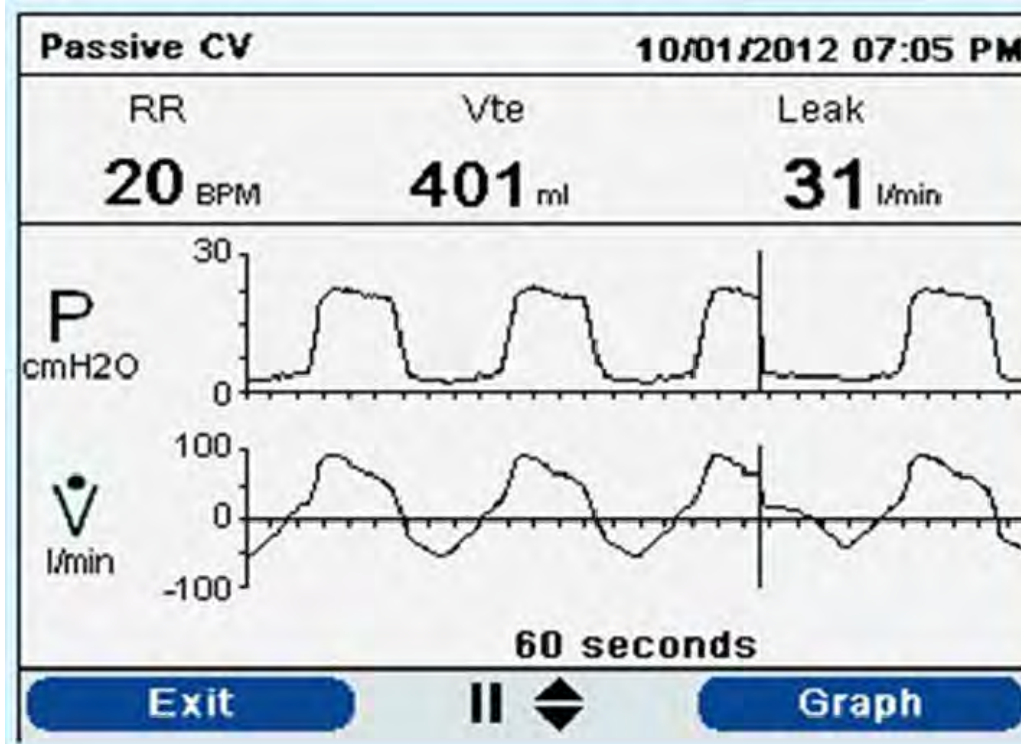
Black



Off and Dim Screen Savers are also available

On-screen waveforms allow clinicians to visually identify ...

- Triggering
- Cycling
- Synchrony



Additional features

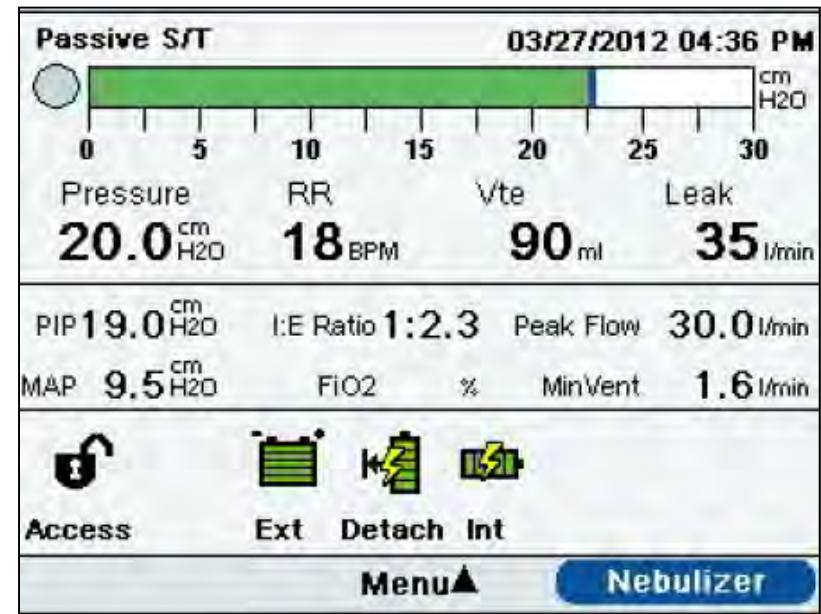
In-line nebulizer treatment feature

- Alarm sensitivity is adjusted for a 20-minute period in order to reduce nuisance alarms

Battery count/discharge on screen

- Allows clinicians to easily determine life of battery

Circuit type on screen



PHILIPS

Alarms



Types of alarms

System Alarms

- High/Low Pressure Alarms (BiPAP only)
- Circuit Occlusion
- Low Leak
- Power Alarms
- Ventilator Inoperative
- Check circuit

Patient Alarms

- High/Low Pressure Alarm (Volume only)
- High/Low RR
- High/Low Minute Ventilation
- Patient Disconnect
- Apnea

Alarms

- Alarm LED indicator on the audio pause button lights
- Audible alarm sounds
- Message appears on the screen describing the alarm

High Priority – Red

Medium Priority – Yellow

Informational – No Indication

PHILIPS

Power Options






Power options



1. Internal AC/DC Power Supply
2. External 12V/24V battery
 - Not recharged through vent
 - Automotive adapter
3. Detachable Lithium Ion Battery
 - 3 hours
 - Easily hot swapped
 - Recharges as long as it is plugged in
4. Internal Lithium Ion Battery
 - 3 hours
 - Recharges as long as it is plugged in

Battery charge indicator

Battery	Symbol
Internal Battery	
Detachable Battery	
External Battery	



LED Status	Battery Capacity
5 LEDs are lit	80-100% capacity
4 LEDs are lit	60-79% capacity
3 LEDs are lit	40-59% capacity
2 LEDs are lit	20-39% capacity
1 LED is lit	11-19% capacity
1 LED flashes	≤ 10% capacity
0 LEDs lit	0% capacity

- Battery Count/Discharge is now on the screen

Battery cycle times

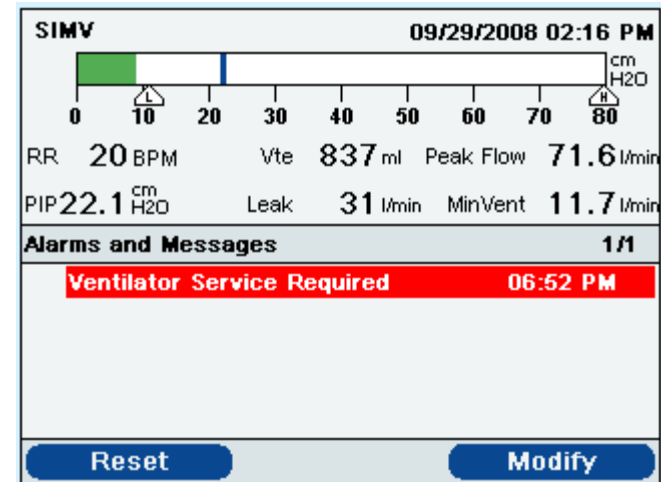
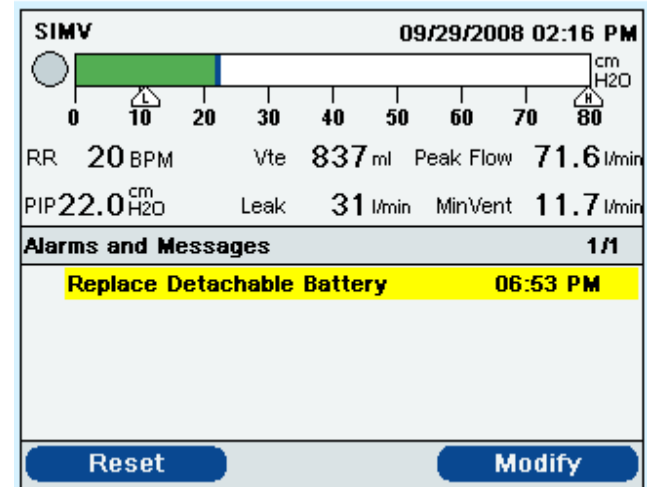
Trilogy 100 counts cycles

- Detachable battery ≥ 500 cycles

"Replace Detachable Battery" Low priority Alarm - Alarm repeats in 1 hour if Reset key is pressed

- Internal battery ≥ 500 cycles

"Ventilator Service Required" Urgent Service Alarm - Alarm repeats in 1 hour if Reset key is pressed



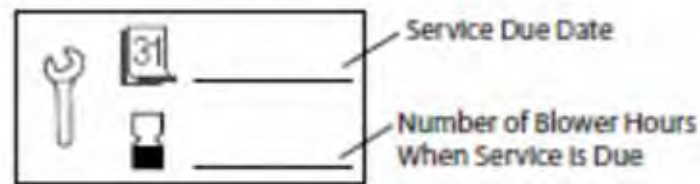
PHILIPS

Maintenance and Support



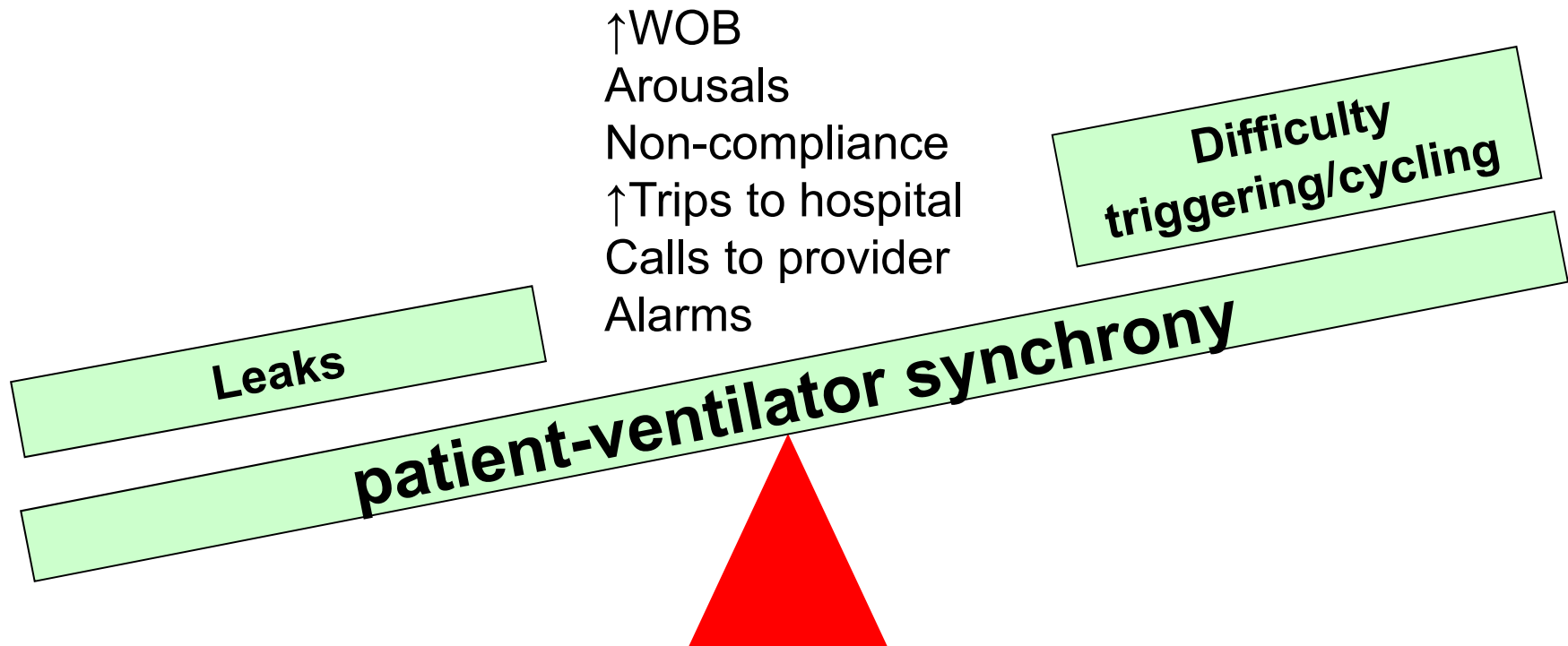
Maintenance

- Clean grey foam filter at least every 2 weeks
- Replace every 6 months
- Preventative maintenance 10,000 hrs or 2 years whichever come first
- Blowers hours are located in the information menu



Impact of leaks on therapy

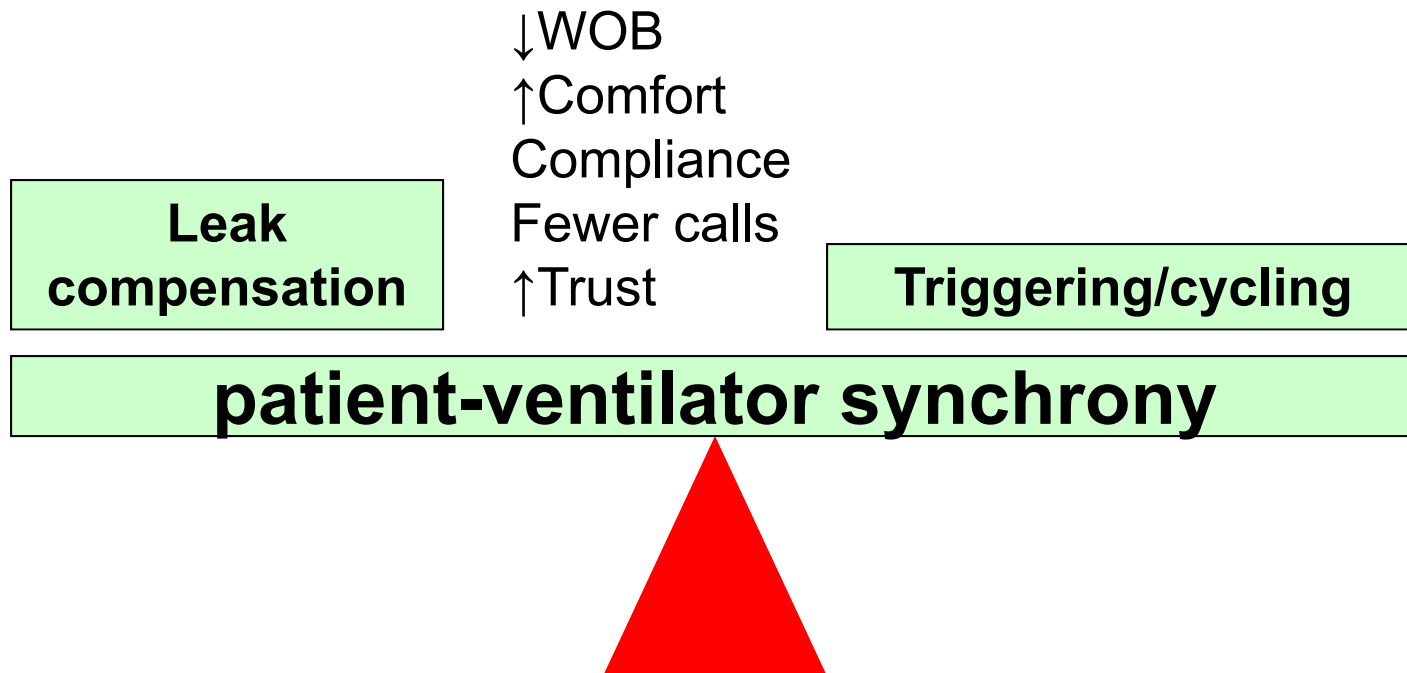
The “Critical Balance”



Most “triggering” problems are *really* leak estimation problems

Impact of leaks on therapy

The “Critical Balance”

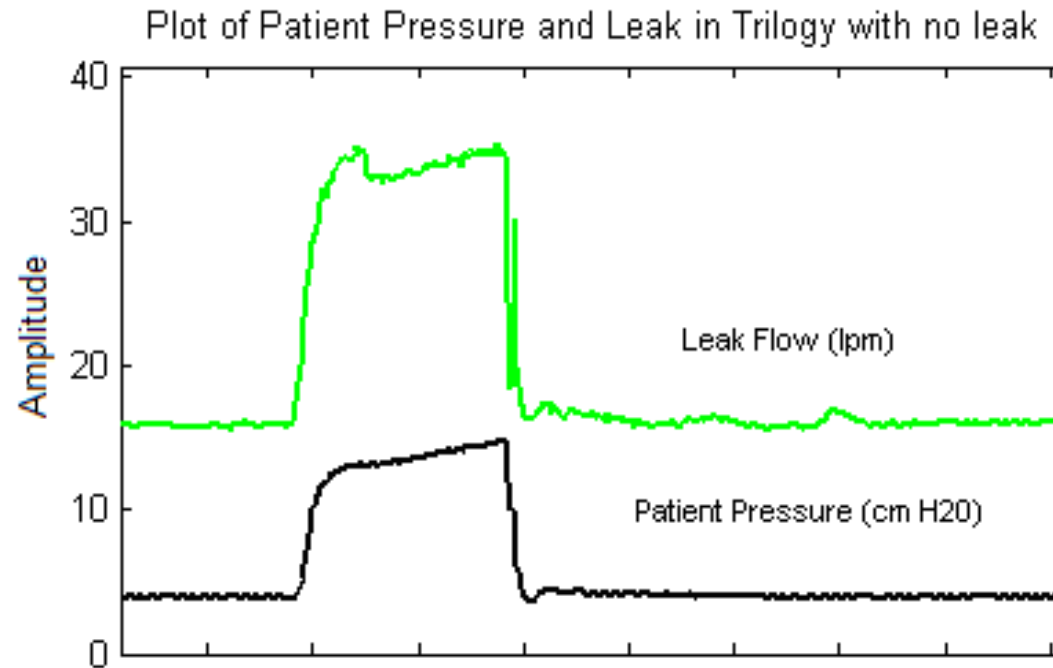


Passive volume and leak compensation

Where Respironics Excels

- The Trilogy100 is the first ventilator to offer volume mode therapy with a passive exhalation device
- Accurate delivery and measurement of patient flow and tidal volume is possible with a passive exhalation device through innovative control algorithms that compensate for circuit leak

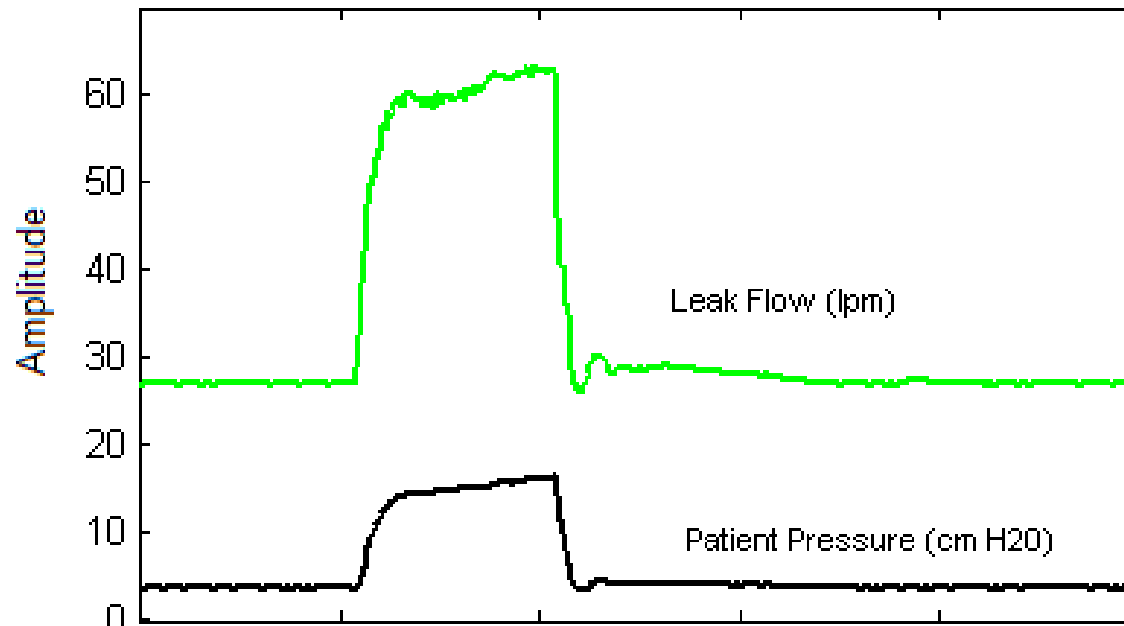
Trilogy100 with no leak



In pressure flow terms, the whisper swivel will leak about 16 standard liters per minute at a PEEP of 4 cm H2O

Trilogy100 with leak

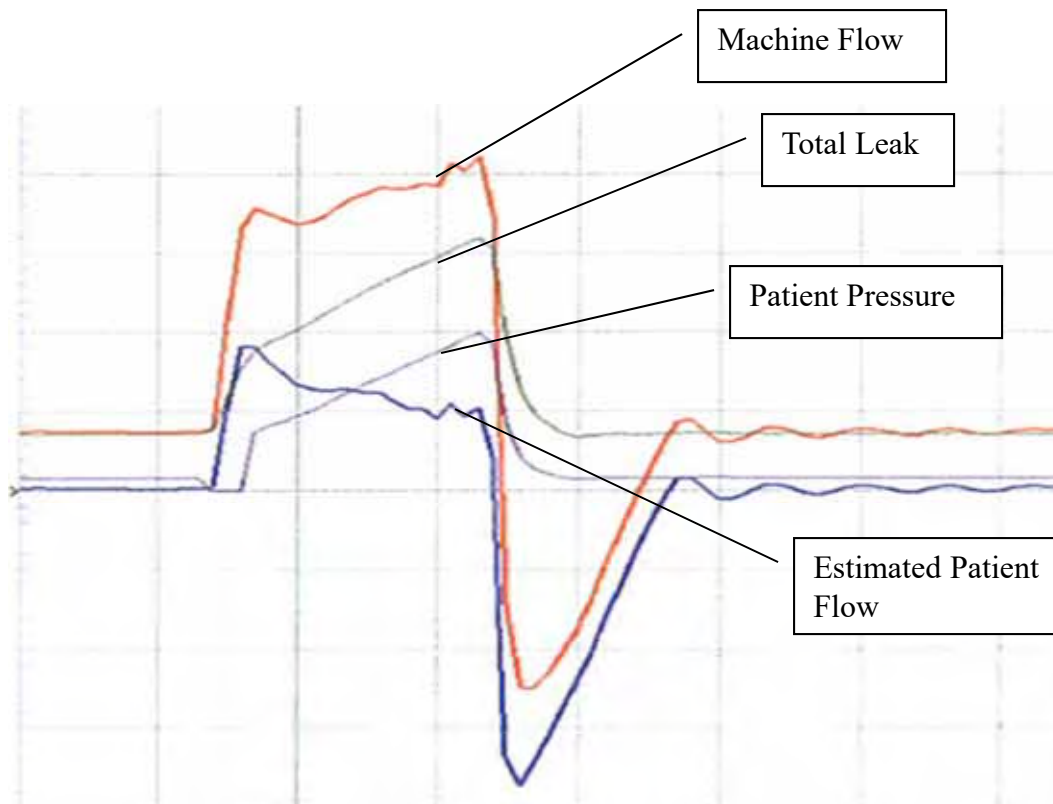
Plot of Patient Pressure and Leak in Trilogy when additional leak was introduced



Leak flow through the Whisper Swivel II changes with the pressure. As the pressure increases with the breath delivery, the control algorithms calculate the instantaneous leak

Patient flow is then calculated as the difference between machine flow and leak flow. The total machine flow is ***constantly adjusted*** to account for the leak to accurately deliver the proper patient flow for each breath.

$$\text{Machine flow} - \text{Leak flow} = \text{Estimated patient flow}$$



Trilogy will add the precise amount of flow to compensate for leaks based on the instantaneous pressure reading

Automatic leak detection and adjustment

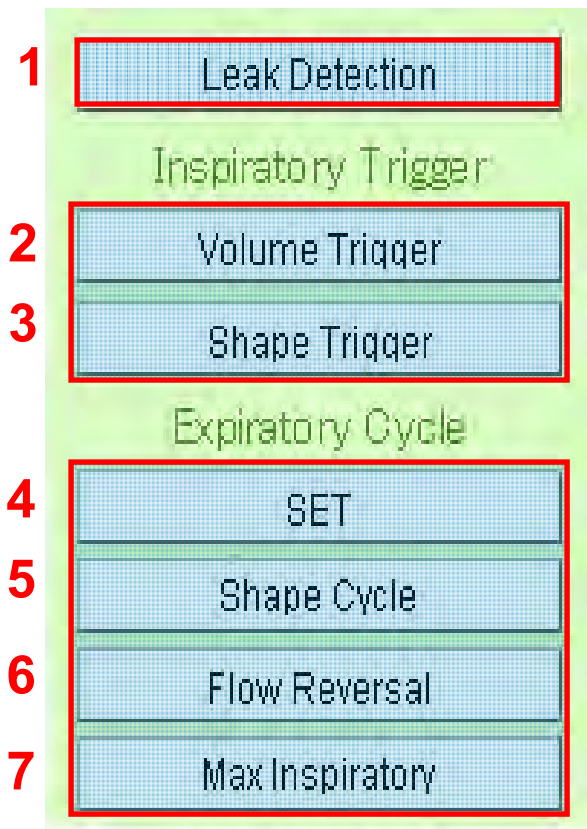
- Control algorithms use the patient flow waveform to calculate inspiratory and expiratory tidal volumes
- As unintentional leaks change, the automatic leak algorithms detect it and modify the control algorithms to deliver accurate tidal volumes on the next breath
- No Peak Flow setting—Trilogy *automatically adjusts* to meet demands of the patient



Digital Auto-Trak

- Recognizes and compensates for leak
 - Breath-by-breath sensitivity for optimal comfort
- Automatically adjusts to changing breathing patterns throughout the night

Seven components of Digital Auto-Trak



- Leak detection
- Two triggers (Volume Trigger, Shape Trigger)
- Four cycle determinants (SET, Shape Cycle, Flow Reversal, and Max Inspiratory Time)

Inspiratory trigger

Leak Detection

Inspiratory Trigger

Volume Trigger

Shape Trigger

Expiratory Cycle

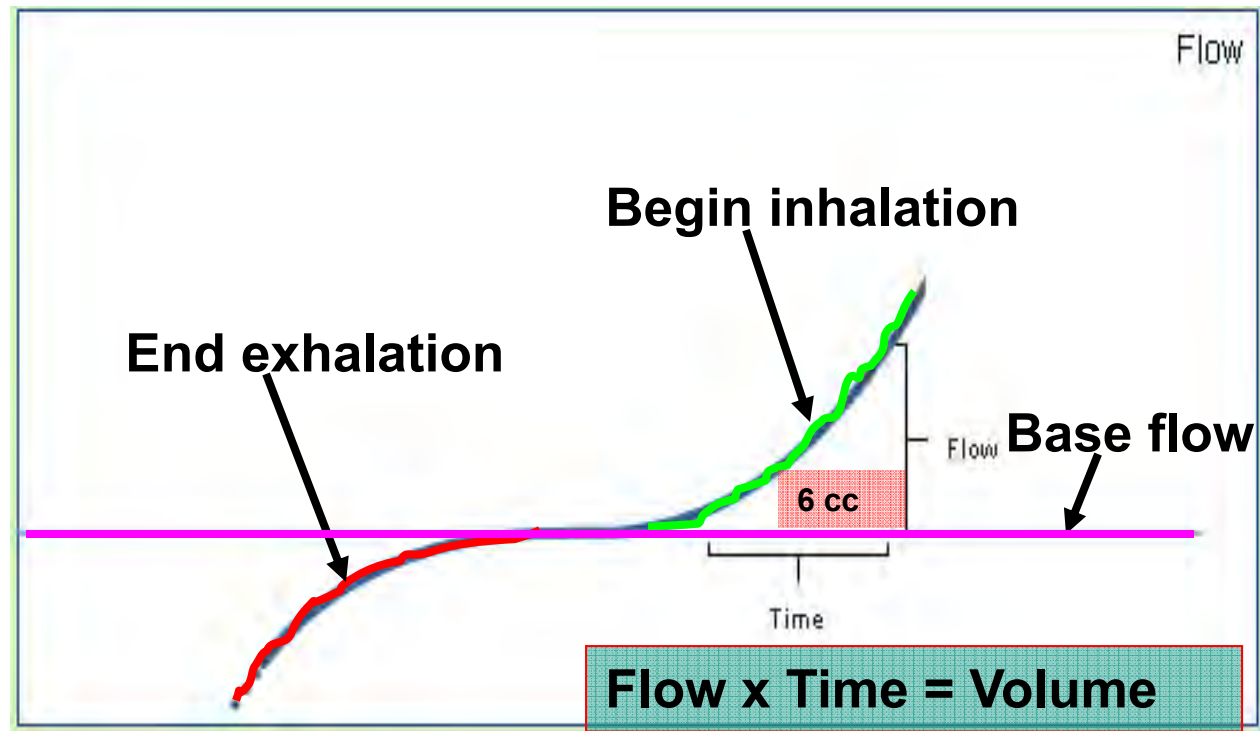
SET

Shape Cycle

Flow Reversal

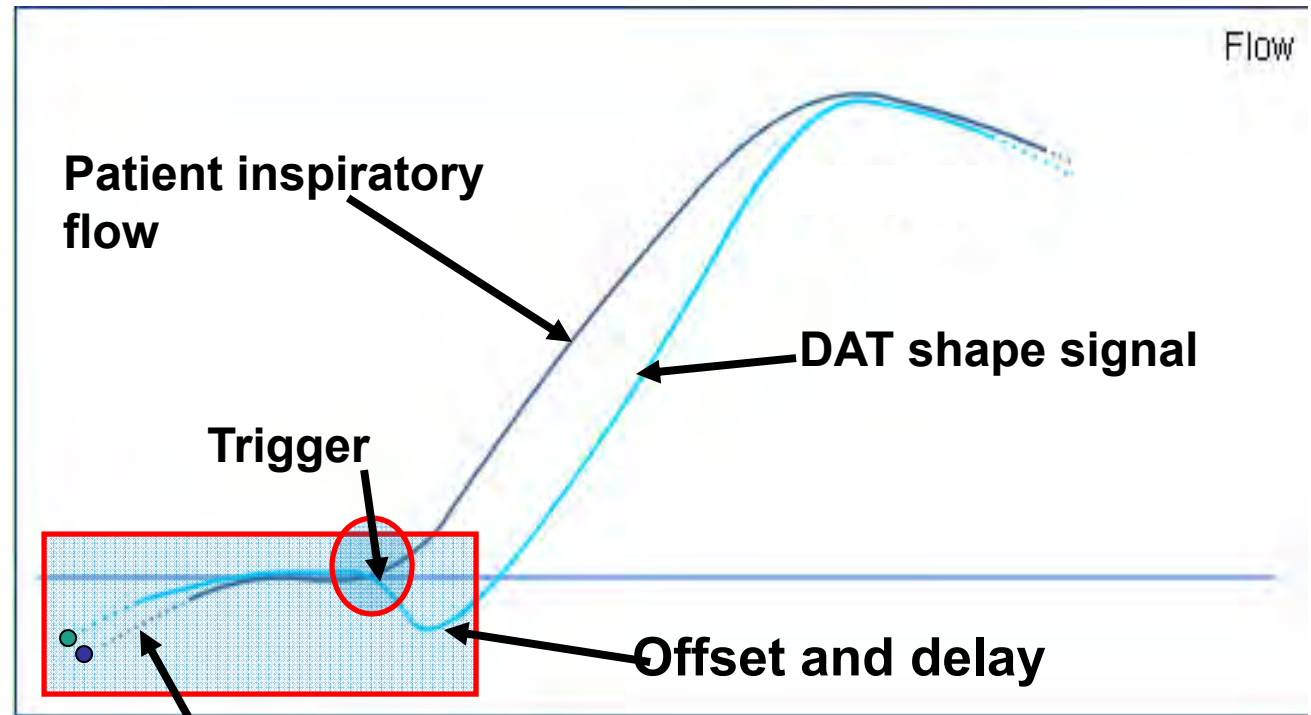
Max Inspiratory

6 cc volume accumulated above base flow



Shape trigger

- Leak Detection
- Inspiratory Trigger
- Volume Trigger
- Shape Trigger**
- Expiratory Cycle
- SET
- Shape Cycle
- Flow Reversal
- Max Inspiratory



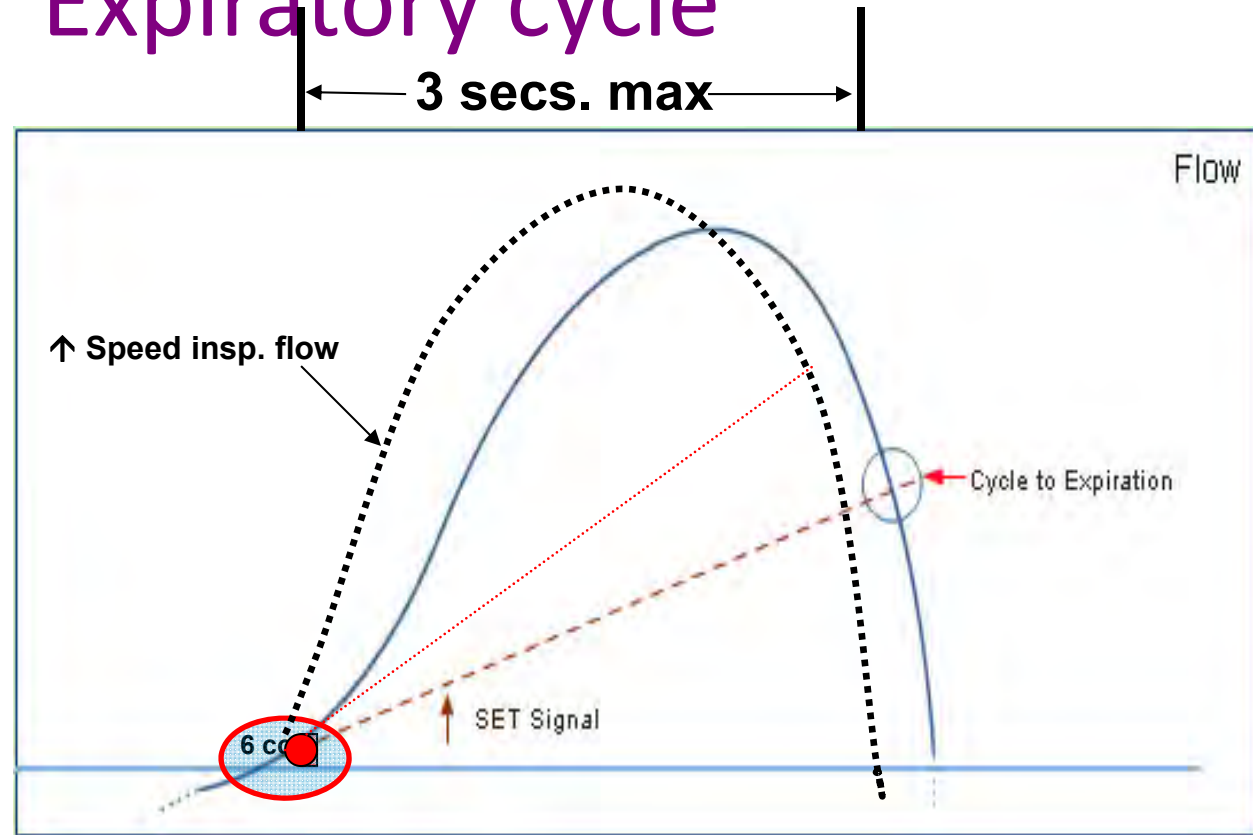
15 LPM and 200 mcs

Doesn't look at the value of flow, but at the shape of inspiratory effort

- Rapid change in the breath
- Exertional breathing (anxiety)

Expiratory cycle

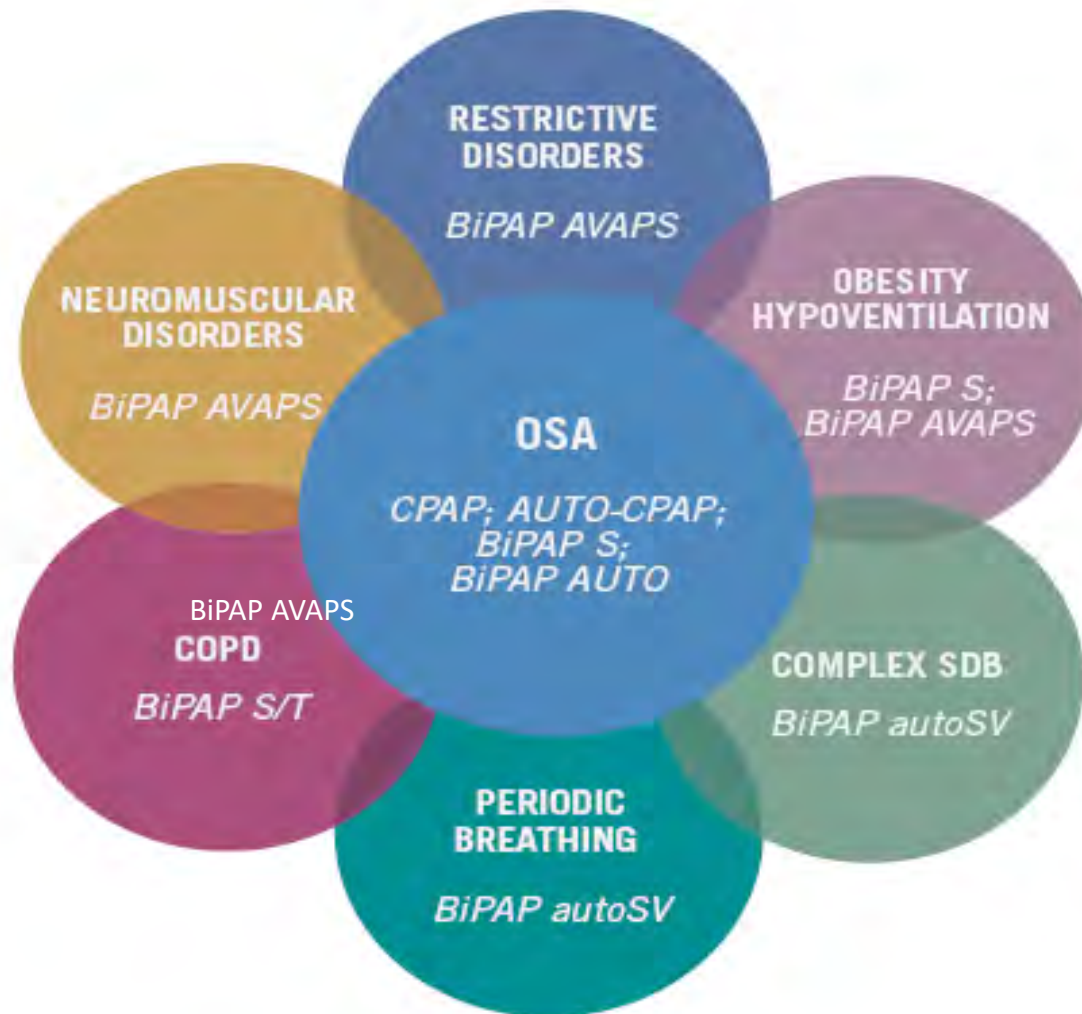
- Leak Detection
- Inspiratory Trigger
- Volume Trigger
- Shape Trigger
- Expiratory Cycle
- SET**
- Shape Cycle
- Flow Reversal
- Max Inspiratory



The SET rises in proportion to the inspiratory flow rate on each breath. When SET and actual patient flow are equal, expiration begins.

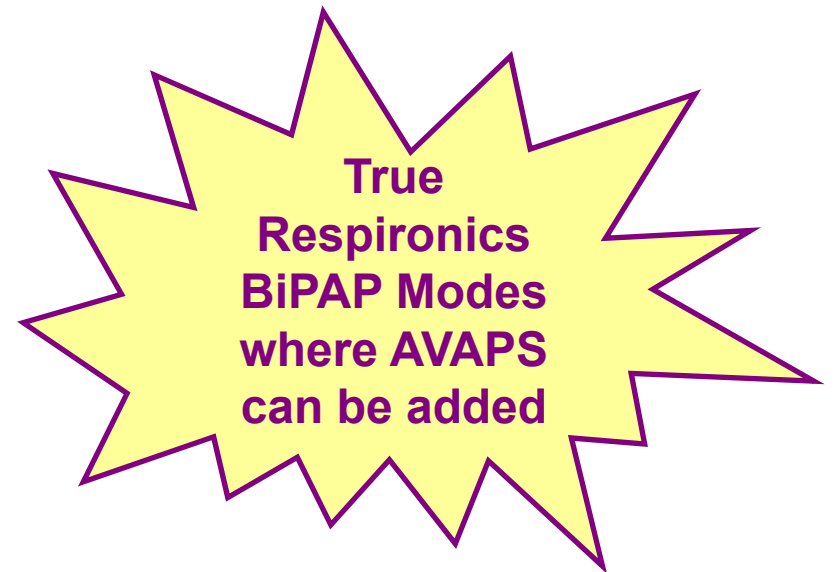
Not used in T, CV, AC, and SIMV

Matching the Right Therapy to the Right Product Just Got Easier



Ventilation types and modes

- Volume Control Ventilation
 - Assist Control (AC)
 - Synchronized Intermittent Mandatory Ventilation (SIMV)
- Pressure Control Ventilation
 - PC-SIMV
 - **Spontaneous Timed (S/T)**
 - **Pressure Control (PC)**
 - **AVAPS-AE**



AVAPS-AE: Auto EPAP proactive analysis

Theory of Operation

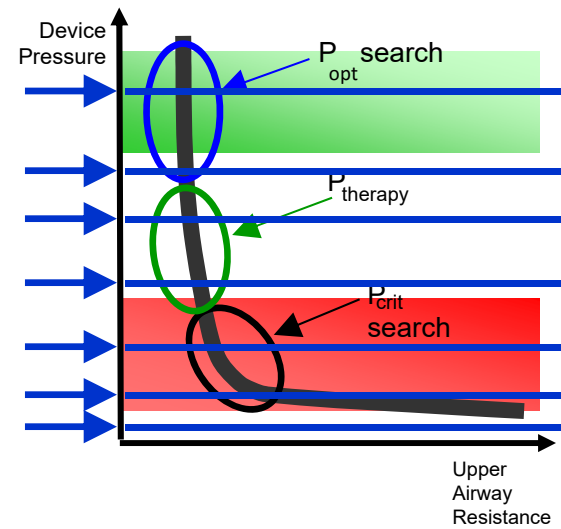
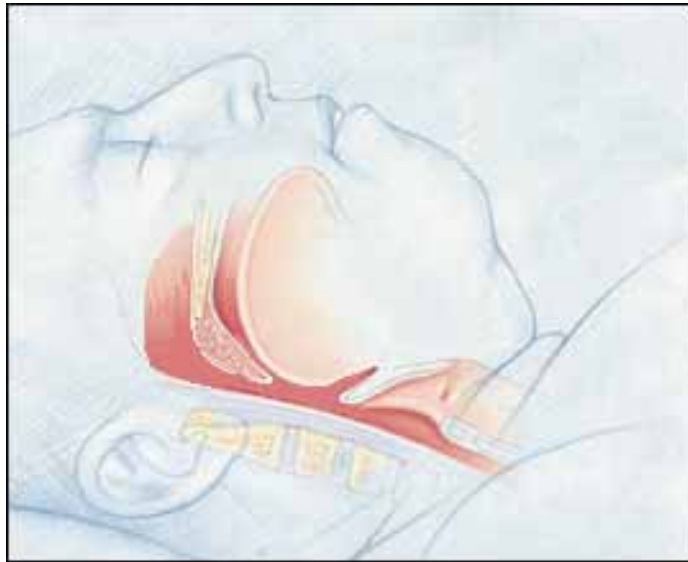
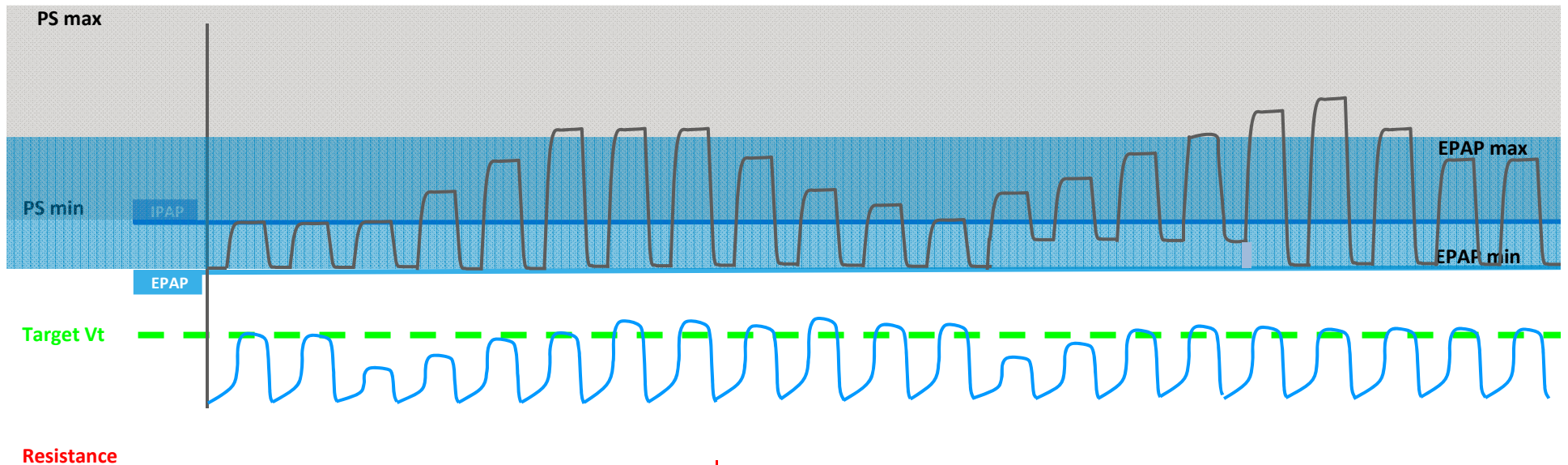


Illustration courtesy of Krames Medical Illustration.

AVAPS-AE

Maintaining tidal volume and airway patency



AVAPS-AE

AVAPS-AE is a auto-titration mode of noninvasive ventilation designed to better treat respiratory insufficiency patients (OHS, COPD and NMD) in the hospital and homecare environments

Achieving a targeted volume is now completely automatic

- Proven performance of AVAPS
- Auto EPAP
- Auto backup rate

Adjustable AVAPS

- Adjustable AVAPS allows you to adjust the maximum rate at which the pressure support automatically changes to achieve the target tidal volume
- It can be set from 1 cm H₂O per minute to 5 cm H₂O per minute
- Allows clinician to customize the setting to the patient's needs

PHILIPS

Mouthpiece ventilation (MPV)

MPV is a form of volume ventilation whereby the patient's normal state is disconnected from the ventilator and the patient initiates a breath, as needed, through an oral interface.



Demonstration



Questions and Discussion

Contacts

Ron Hosp, MS, RRT

Respiratory Sales Specialist/Regional Field Trainer

Email: ron.hosp@philips.com

Phone: 913.209.5576

Eric Bachman, BS, MBA

Account Manager

Email: eric.bachman@philips.com

Phone: 316.350.6099

Ryan Schmidt, BS, RRT

Clinical Specialist

Email: ryan.schmidt@philips.com

Phone: 402.680.4086