Home Ventilation Workshop
Objectives

- Describe the circuit options, breath types, modes, alarms, features and troubleshooting.

- Review the unique mouthpiece ventilation mode.

- Review the unique AVAPS-AE mode.

- Review the unique dynamic parameters.
Trilogy Evo

Invasive and non-invasive positive pressure ventilation for the care of **patients ≥2.5 kg through adults.**

Measure, display, record, and alarm SpO₂, FiO₂, CO₂, respiratory rate, and pulse rate data when integrated with the appropriate accessories.

Suitable for use in institutional, home, and non-emergency transport settings; for example: wheelchair, personal vehicle, or ambulance.
Features

- Alarm indicator/alarm silence button
- On/off (standby) button
- Light bar
- Large 8” touch screen
Weight and power

Less than 13 lbs (5.8kg).

15 hours of battery.*

Hot swappable detachable battery provides uninterrupted therapy.**

*Nominal run time per method in International Electrotechnical Commission (7.5 hr/battery). Detachable battery charge time 0% to 80% is 2.5 hours, Internal battery charge time 0% to 100% is 3.5 hours. A/C-VC mode ActivePAP circuit, PEEP 3cmH₂O and Vt 800ml.

**When the internal battery is charged, batteries can be replaced without the ventilator pausing therapy.
Adaptable

FiO$_2$ sensor access on back panel

Up to 30Lpm low flow O$_2$

Oxygen Blending Module (optional)

AC power connector

DC power connector
Adaptable

- Accessory USB port
- Proximal pressure port
- Active exhalation valve line connection for ActivePAP and Active Flow circuits
- Flow sensor cable connector
Adaptable

Inspiratory port (to patient)

Dual Limb active exhalation valve connection (from patient)
Install filter
To install the air-inlet foam filter, pinch the filter as you press it into the filter cover as shown. Position it securely behind the top and bottom restraints.
Available circuit options

Passive circuit

- Tracheostomy tube
- Exhalation leak valve (exhalation port)
- Mask without integrated leak
- Mask with integrated leak
Available circuit options

**Active PAP circuit**

A. Connect the bacteria filter on the circuit to the inspiratory port.

B. Connect the proximal pressure line (wider diameter than active exhalation valve line) to the proximal pressure port.

C. Connect the active exhalation valve pressure line to the active exhalation valve line connection.

**Active exhalation valve**

**Proximal pressure port**
Available circuit options

Active Flow circuit

A. Connect the bacteria filter on the circuit to the inspiratory port.

B. Connect the proximal pressure line (wider diameter than active exhalation valve line) to the proximal pressure port.

C. Connect the active exhalation valve pressure line to the active exhalation valve line connection.

D. Attach the flow sensor cable to the flow sensor cable connector.

E. Attach the flow sensor to the active exhalation valve on the circuit.
Available circuit options
Dual Limb circuit

A. Connect the bacteria filter end of the colored inspiration tube to the inspiratory port.

B. Connect the proximal pressure line to the proximal pressure port.

C. Install the active exhalation valve into the recessed AEV port. Press until both sides click into place.

D. Attach the bacteria filter end of the clear expiration tube to the AEV.

E. Attach the flow sensor cable to the flow sensor cable connector.

F. Attach the flow sensor to the Y-shaped connector on the circuit.
Available circuit options

MPV circuit

A. Fully extend and straighten the circuit support arm.
B. Feed the circuit tube (15mm) through the center of the circuit support arm until it exits the other end.
C. Attach the clamp to a wheelchair if required.
D. Attach the reducer cuff and then the bacteria filter onto the device-end of the circuit tube.
E. Connect the bacteria filter on the circuit to the inspiratory port on the Trilogy Evo.
F. Attach the coupler and miniature flextube (optional) onto the circuit support arm before connecting patient interface.
Available circuit options

- Passive
- Active PAP
- Active Flow
- Dual Limb
- MPV
## Circuits overview

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Infant (9-13mm)</th>
<th>Pediatric (14-18mm)</th>
<th>Adult/Pediatric (19mm)</th>
<th>Adult (20-22mm)</th>
<th>Min Set Tidal Volume</th>
<th>External Flow Sensor Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>50 ml</td>
<td></td>
</tr>
<tr>
<td>ActivePAP</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>50 ml</td>
<td></td>
</tr>
<tr>
<td>Active Flow</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>35 ml</td>
<td>🟢</td>
</tr>
<tr>
<td>Dual Limb</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>35 ml</td>
<td>🟢</td>
</tr>
<tr>
<td>MPV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200 ml</td>
<td></td>
</tr>
</tbody>
</table>
Adaptable

Circuit selection

Trilogy Evo includes a default calibration providing automatic tubing compensation for the recommended circuits in the accessory guide.
Volume modes with the Passive Circuit

Provide equivalent therapy
- EPAP with Passive and PEEP with Active
  remove CO2
- Passive circuit with leak compensation delivers
  the prescribed tidal volume
- Noninvasive or invasive ventilation

Benefits
- Simpler circuit
- Ease of set up
- Leak compensation
Comparison

Traditional volume mode ventilation with valve circuit

Trilogy Evo with Passive Circuit

Vt = Preset Vt - Leak

Vt = Preset Vt
Volume mode in passive circuit

Leaks are compensated by:

A Estimating the leak at the end of each breath

B Compensating for that leak at the next breath

At the machine

B Compensating for that leak at the next breath

At the patient

Vt = Preset Vt – new leak

Vt = Preset Vt
Ventilation types and modes
## Modes

### Trilogy to **Trilogy Evo**

<table>
<thead>
<tr>
<th>Trilogy</th>
<th>Trilogy Evo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>A/C - VC</td>
<td><strong>Assist Control (Volume Control) mode</strong> provides volume-controlled mandatory or assist-control breaths. The set inspiratory time applies to all breaths.</td>
</tr>
<tr>
<td>CV</td>
<td></td>
<td>If you want to replicate <strong>CV mode</strong> where the ventilator triggers and cycles all breaths then set the trigger type to OFF.</td>
</tr>
<tr>
<td>PC</td>
<td>A/C - PC</td>
<td><strong>Assist Control (Pressure Control) mode</strong> provides pressure-controlled mandatory or assist-control breaths. The set inspiratory time applies to all breaths. Optional AVAPS.</td>
</tr>
<tr>
<td>T</td>
<td></td>
<td>If you want to replicate <strong>T mode</strong> where the ventilator triggers and cycles all breaths then set the trigger type to OFF.</td>
</tr>
<tr>
<td>S</td>
<td>PSV</td>
<td><strong>Pressure Support Ventilation mode</strong> is patient-triggered, pressure-limited, and flow-cycled. The patient determines the breath rate and timing so it is recommended to set back-up ventilation. Optional: AVAPS and Ti min/max.</td>
</tr>
</tbody>
</table>
## Modes

### Trilogy to Trilogy Evo

<table>
<thead>
<tr>
<th>Trilogy</th>
<th>Trilogy Evo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC-SIMV</td>
<td>SIMV-PC</td>
<td><strong>Synchronized Intermittent Mandatory Ventilation (Pressure Control) mode</strong> is a pressure control mode that provides a mixture of mandatory, assist-control and spontaneous breaths with optional pressure support. It guarantees one mandatory breath in each cycle. The breath rate determines the length of the cycle. <em>Optional: Inspiratory Time min/max. for the spontaneous breaths.</em></td>
</tr>
<tr>
<td>SIMV</td>
<td>SIMV-VC</td>
<td><strong>Synchronized Intermittent Mandatory Ventilation (Volume Control) mode</strong> is similar to SIMV-PC, but with volume control.</td>
</tr>
<tr>
<td>AC (MPV on)</td>
<td>MPV-VC</td>
<td><strong>Mouthpiece Ventilation (Volume Control)</strong> provides on-demand volume-control ventilation using a Kiss trigger® that detects when the patient engages with the mouthpiece. No exhalation valve is required.</td>
</tr>
<tr>
<td>PC (MPV on)</td>
<td>MPV-PC</td>
<td><strong>Mouthpiece Ventilation (Pressure Control)</strong> is similar to MPV-VC, but with pressure control.</td>
</tr>
</tbody>
</table>
# Modes

## Trilogy to Trilogy Evo

<table>
<thead>
<tr>
<th>Trilogy</th>
<th>Trilogy Evo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/T</td>
<td>S/T</td>
<td><strong>Spontaneous/Timed</strong> is a bi-level therapy mode where each breath is patient-triggered and patient-cycled, or ventilator-triggered and ventilator-cycled.</td>
</tr>
<tr>
<td>CPAP</td>
<td>CPAP</td>
<td>In <strong>Continuous Positive Airway Pressure mode</strong>, all breaths are spontaneous with the CPAP set pressure delivered in both inhalation and exhalation.</td>
</tr>
</tbody>
</table>
| AVAPS-AE | AVAPS-AE    | **AVAPS-Auto EPAP mode** automatically adjusts pressure support, to maintain the target tidal volume, and EPAP, to maintain a patent airway, within the set min/max ranges; and simplifies the set-up of the backup breath rate when set to auto. 
*Note: auto back-up rate maximum is 20bpm. Optional: Inspiratory Time min/max.* |
## Modes

### Trilogy to Trilogy Evo

<table>
<thead>
<tr>
<th>Trilogy</th>
<th>Trilogy Evo</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Inspiratory Time Min/Max</td>
<td>Once enabled, this setting treats inspiration time as a variable value for patient-initiated, patient-cycled breaths. It is available in S/T, PSV, SIMV-PC, SIMV-VC, and AVAPS-AE modes, under Advanced in the Prescription Settings window.</td>
</tr>
<tr>
<td>AVAPS Rate</td>
<td>AVAPS Speed</td>
<td>This sets the maximum rate of change in pressure between the min and max values while AVAPS is seeking a volume target.</td>
</tr>
<tr>
<td>-</td>
<td>PC Breath (AVAPS-AE)</td>
<td>Available in AVAPS-AE mode. When PC Breath is on, the set inspiratory time applies to all breaths.</td>
</tr>
<tr>
<td>Sigh</td>
<td>Sigh</td>
<td>In Trilogy Evo, available in A/C-VC mode under Advanced in the Prescription window. Sigh volume can be set between 1.5 – 2.5 times the set volume and the frequency between 50 – 250 breaths. While in Trilogy, sigh was fixed at 1.5 times the set volume every 100 breaths.</td>
</tr>
<tr>
<td>-</td>
<td>Back-up Ventilation</td>
<td>Available under Advanced in the Prescription window. When turned on an Apnea interval needs to be set in the alarm settings tab. Within the apnea interval; if no breaths are triggered by the patient, the vent delivers breaths at the set pressure of volume based on the Backup Rate and Backup Insp Time.</td>
</tr>
</tbody>
</table>
Waveform patterns

Ramp

Square
Using an active circuit, pressure and flow are moved proximal to the patient, limiting or eliminating several of the full features of the signal analysis.

<table>
<thead>
<tr>
<th>Feature</th>
<th>1 Passive circuit</th>
<th>2 Active circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarms</td>
<td>✓</td>
<td>?*</td>
</tr>
<tr>
<td>Auto-Trak</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Flow Trigger</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Auto EPAP</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>AVAPS</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Volume control</td>
<td>✓</td>
<td>?**</td>
</tr>
<tr>
<td>Auto backup rate</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Spirometry</td>
<td>✓</td>
<td>?***</td>
</tr>
</tbody>
</table>

* some alarms
** no leak compensation for volume
*** limited
# Triggering and cycling

## Flow Trigger
- Passive, Active PAP, Active Flow, or Dual Limb circuits
- Volume and Pressure modes
- Invasive and noninvasive
- Range: 0.5 – 9 L/min
- Cycle sensitivity: 10% – 90% of peak flow

## Auto-Trak
- Passive circuits only
- Volume and Pressure modes
- Invasive and noninvasive
- No Trigger adjustments required

*Monitors breathing patterns to accurately recognize when the ventilator should trigger inspiratory support or cycle to expiration.*

## Sensitive Auto-Trak
- Passive circuits only
- Volume and Pressure modes
- Invasive and noninvasive
- No Trigger adjustments required
- Suitable for patients with weaker inspiratory effort (pediatrics, neuromuscular)
What is Auto-Trak?

Auto-Trak signal analysis simplifies set-up, with a repeating automatic cycle that:

- Detects;
- Responds and;
- Tracks patient synchrony
What is Auto-Trak? How does Auto-Trak work? The components of Auto-Trak

**Triggering**

**Volume trigger**

The primary trigger for Auto-Trak measures inspired volume on positive flow. Once it detects an accumulated 6 ml volume above baseline flow, it will trigger inspiratory pressure.

1. Volume Trigger = 6 ml
The components of Auto-Trak

**Triggering**

**Shape signal trigger**
The Shape Signal functions dually to both trigger IPAP and cycle EPAP. It appears as a slightly delayed shadow image of the patient’s actual flow rate, which helps compensate for flow direction changes. When patient flow and the Shape Signal cross, trigger will occur automatically. When triggering inspiratory pressure, patient flow naturally increases.

Details of how the shape signal is calculated are covered in more detail within the cycling section.

1. Estimated patient flow
2. Shape Signal
3. Trigger to IPAP crossover point
What is Auto-Trak? How does Auto-Trak work? The components of Auto-Trak

**Triggering**

**Sensitive Auto-Trak**
This works as per Volume trigger but provides an enhanced triggering response for patients with minimal respiratory effort. Auto-Trak requires 6 ml of volume change to initiate a breath, whereas Sensitive Auto-Trak only requires 3 ml.

1. Sensitive Volume Trigger = 3 ml
2. Standard Volume Trigger = 6 ml
Sensitive Auto-Trak

- Provides an enhanced triggering response for patients with minimal respiratory effort
- Digital Auto-Trak requires 6 ml of volume change to initiate a breath
- Sensitive Auto-Trak requires 3 ml
What is Auto-Trak? How does Auto-Trak work? The components of Auto-Trak

Cycling

Spontaneous Expiratory Threshold (SET)
An electronic signal rises in proportion to the tidal volume of each breath. Once SET and actual patient flow are equal, expiration begins.

1. Spontaneous Expiratory Threshold
2. 6 ml accumulated to start SET
3. Cycle to Expiration
4. SET

The SET signal automatically adjusts based on the speed on the patient’s inspiratory flow.

5. 6 ml accumulated to start SET
6. Patient flow increases
7. Adjusted SET when patient flow increases
8. Cycle to Expiration
The components of Auto-Trak

Cycling

Shape Signal expiratory cycle
The Shape Signal functions dually to both trigger IPAP and cycle EPAP. It appears as a slightly delayed shadow image of the patient’s actual flow rate, which helps compensate for flow direction changes. When patient flow and the Shape Signal cross, cycle will occur automatically. When cycling to expiratory pressure, patient flow naturally decreases.

1. A Shape signal is created based on the breathing pattern of the patient.
2. This Shape Signal is then fractionally delayed and shifted to help compensate for flow direction changes.
3. When patient flow and the Shape Signal cross, trigger and cycle will occur automatically.
What is Auto-Trak? How does Auto-Trak work? The components of Auto-Trak

Cycling

Safety feature

If the patient remains in the inspiratory phase of the breathing cycle for three seconds, Digital Auto-Trak will cycle the device to the expiratory phase of pressure delivery.

1 Max inspiratory time of 3 seconds.
AVAPS-AE

AVAPS-AE is an 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 completely automatic
- Auto Pressure Support
- 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.
AVAPS-AE

Auto EPAP maintains patent upper airway at a comfortable pressure

- Auto adjusting EPAP to meet changing patient needs
- Maintains a patent airway
AVAPS-AE

Auto backup rate provides comfortable assistance when needed

- Auto backup rate is near resting rate
- No manual adjustments (auto-default setting)
Mouthpiece Ventilation (MPV)
Expanding ventilatory support

MPV

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

Respiratory muscle dysfunction

- Muscular dystrophies
- ALS
- Other myopathies: acide maltase deficiency, polymyositis, mitochondrial disorders
- Neurological disorders: spinal muscular atrophies (SMA I, II, III)
- Neuropathies: Guillain-Barre syndrome, multiple sclerosis
- Skeletal pathologies such as kyphoscoliosis, rigid spine syndrome
Is there a risk to using MPV?

- The MPV feature represents no more risk than any other form of NIV
- MPV may be used an entire lifetime by some neuromuscular patients and may extend the quality of life for patients who will eventually need invasive ventilation
“NIV via 15-mm angled mouthpiece is the most important method of daytime ventilatory support”

Kiss trigger and MPV support system

- The ‘kiss’ trigger with signal flow technology detects when the patient engages and disengages from the mouthpiece to deliver on-demand ventilation

- This feature combines with a mouthpiece ventilation (MPV) support system to enhance ease of use
MPV history

- MPV technique originated in 1950’s as a therapeutic adjunct for dyspnea in polio patients
- John E. Affeldt of Rancho Los Amigos Hospital
  - IPPV with a mouthpiece could relieve dyspnea in ventilator-dependent polio patients
  - Used when negative pressure was interrupted by transfers, nursing care, physical therapy
Evolution of MPV

• Traditionally performed on volume ventilators that were adapted and modified to allow for “sip breathing”.
  – Resistance added to the circuit
  – Prevented nuisance low pressure alarms
• In 1980’s the introduction of masks and pressure ventilators which allowed for compensation of leaks resulted in a shift in methods. (Ease of use etc.)

Disease state targets

- Neuromuscular disease
- Polio Myelitis
- Duchene Muscular Dystrophy (DMD)
- Quadriplegia (SCI)
- Amyotrophic Lateral Sclerosis (ALS)
- Multiple Sclerosis (MS)
- NIV dependent patients – breaks for activities of daily living
Daytime Ventilation via Mouthpiece: Clinical evidence

**Objectives**
Assess the impact of daytime MPV as an extension of nocturnal NIPPV

**Methods**
- 45 normocapnic patients at night on NIPPV
- Monitored TcCO₂ during night and day
- Assessed every 6 months

**Results**
- Daytime MPV provided a 50% survival
- Stabilized lung function for 5 years

**Conclusion**
- Daytime MPV as an extension to nocturnal NIPPV is safe
- Provides reliable survival
- Recommended use of cough assisting devices

Toussaint et al, Diurnal ventilations via mouthpiece: survival in end-stage Duchenne patients, ERJ, 2006.
Trilogy Evo
MPV

Optional time-based patient reminder
- MPV circuit disconnect alarm

Multiple prescription function
- Facilitates independent day and nighttime settings (i.e. MPV during day, mask ventilation at night)

Kiss trigger
- Unique algorithm for a normally disconnected state
- Eliminates issues with a traditional flow trigger:
  - no sensitivity to adjust (mitigates auto triggering)
  - does not require patient effort to generate a breath
  - important for progressively weaker respiratory muscles
Circuit configuration

MPV

MPV circuit support arm
- adjustable to fit most powered wheelchairs
- adjustable to optimize position of mouthpiece to patient
- no need to ‘engineer’ circuit and connection/support

Disposable MPV circuit
- includes small angled and dental straw-style mouthpieces
Research evidence

Mouthpiece ventilation

**Evaluation of ventilators for mouthpiece ventilation in neuromuscular disease**

<table>
<thead>
<tr>
<th>Aim</th>
<th>Methods</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>The aims of the study were to analyze the practice of mouthpiece ventilation and to evaluate the performance of ventilators for mouthpiece ventilation.</td>
<td><strong>Questionnaire:</strong> Subject-reported benefits <strong>Bench test:</strong> Performance of 6 home ventilators with mouthpiece ventilation.</td>
<td>n =30, mean age 33 ± 11 y, using NIV for 12 ± 7 y. Fifteen subjects used NIV for &gt; 20 h/day, and 11 were totally ventilator-dependent</td>
</tr>
</tbody>
</table>

**Questionnaire of subject-reported benefits:**
- Reduction in dyspnea (73%) and fatigue (93%)
- Improvement in speech (43%) and eating (27%)

**Bench test:**
Alarms were common with home ventilators, although less common in those with mouthpiece ventilation software.

**Conclusion:**
Subjects are satisfied with MPV

Understanding the Trilogy Evo
Simple

User-friendly platform

Patient-friendly performance

8” touchscreen

Note that the background images are only visible on screen while in limited access.
Simple

To prevent accidental therapy changes, use the **touchscreen lock**.

This is a temporary touchscreen lock, which can be changed back by tapping anywhere on the screen and following the onscreen instruction.

For automatic touchscreen lock, go to the Options screen then Device Options and select Automatic Touchscreen Lock On.
Simple Onscreen help

Entering a new prescription or placing a new circuit on the ventilator is simple thanks to the addition of onscreen help.

Simply tap the help icon for more information regarding that prescription setting or alarm situation.
Simple
Onscreen battery indicator

During ventilation you can check how much time remains on each battery, which is an estimate based on the current usage. This is done in one of two ways.

Option 1.
Tap the battery icons in the toolbar to see the time remaining on each battery.

Option 2.
Change the ventilation monitoring view to the large timer view for a constant reference to the remaining battery time.
Simple
Connected
Portable
Reliable
Adaptable
Connected Care Orchestrator

Cloud monitoring.

Proactive, targeted intervention.
Connected Care Orchestrator

Immediate Value

New possibilities for efficient resource management

- Identify and efficiently manage compliance issues
- Prioritize which patients require home visits – and which do not
- Potential to avoid wasted labor, time, and spending

Health Rules

Compliance Rules

Usage Rules
## Connected Care Orchestrator

### Example: Pediatric Neuromuscular Patient

<table>
<thead>
<tr>
<th>When</th>
<th>Then</th>
</tr>
</thead>
</table>
| **Minute Ventilation – Gross Change**                               | The % change between (n) 7 day baseline average and 3 day evaluation period average exceeds **25%** or is below **25%** | • Add a task to follow up with the patient  
  • With a priority of **Medium** |
| **Respiratory Rate – Threshold**                                     | The average respiratory rate is greater than **28** BPM or less than **18** BPM for the past 2 days | • Add a task to follow up with the patient  
  • With a priority of **Medium** |
| **% Patient Triggered Breaths – Gross Change**                       | The % change between (n) 7 day baseline average and 3 day evaluation period average exceeds **40%** or is below **20%** | • Add a task to follow up with the patient  
  • With a priority of **High** |
Simple
Connected
Portable
Reliable
Adaptable
Portable
Ultimate Portability

15 hours of battery.*

Hot swappable detachable battery provides uninterrupted therapy.**

*Nominal run time per method in International Electrotechnical Commission (7.5 hr/battery). Detachable battery charge time 0% to 80% is 2.5 hours, Internal battery charge time 0% to 100% is 3.5 hours. A/C-VC mode ActivePAP circuit, PEEP 3cmH₂O and Vt 800ml.

**When the internal battery is charged, batteries can be replaced without the ventilator pausing therapy.
Simple
Connected
Portable
Reliable
Adaptable
### Reliable

**Low Total Cost of Ownership**

<table>
<thead>
<tr>
<th>Trilogy Evo Service Solution</th>
<th>Trilogy Service Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. &lt;20 mins</td>
<td>Avg. 1 hour 40 mins FSA Test Station</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trilogy Evo</th>
<th>Trilogy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1,200 cycles</strong></td>
<td><strong>475 cycles</strong></td>
</tr>
<tr>
<td><strong>4 years</strong></td>
<td><strong>10,000 hours / 2 years</strong></td>
</tr>
</tbody>
</table>
Adaptable

Seamlessly transition across care environments utilizing the same clinical technology

Different care settings

Same clinical technology
<table>
<thead>
<tr>
<th>Adaptable</th>
<th>Evolution of ventilator technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅ Oxygen and FiO₂ cell</td>
<td>✅ Flow Trigger 0.5</td>
</tr>
<tr>
<td>✅ 5 prescriptions</td>
<td>✅ Rise Time 0</td>
</tr>
<tr>
<td>✅ 4 circuits: single and dual limb</td>
<td>✅ Dynamic Parameters</td>
</tr>
<tr>
<td>✅ Circuit Calibration</td>
<td>✅ AVAPS updates</td>
</tr>
<tr>
<td>✅ Tubing Compliance Compensation</td>
<td>✅ AVAPS-AE updates</td>
</tr>
<tr>
<td>✅ Ti min/max</td>
<td></td>
</tr>
</tbody>
</table>
Adaptable

**Five prescriptions**

Program up to 5 Prescriptions (presets) and select a name from the list of available prescription names.
Adaptable

Tubing compliance compensation

Trilogy Evo excludes any losses in tidal volume due to the circuit.

Trilogy Evo includes a default calibration providing automatic tubing compensation for the recommended circuits in the accessory guide.
Adaptable

Circuit calibration

Volume losses in circuit tubing can be calculated and programmed into the Trilogy Evo using the calibration method.
Adaptable

**Ti min/max**

Available in S/T, PSV, SIMV-PC, SIMV-VC, and AVAPS-AE modes

Access under Advanced

Applicable to spontaneous breaths only
Adaptable
Flow trigger

Flow trigger can be set to 0.5 L/min to offer increased sensitivity for your weakest patients.
Adaptable

Rise Time

Rise Time is now even faster than Trilogy, and can be set to 0 to adapt to the needs of your patients.

Note: You can tap on the Help icon whenever it is visible and a screen will appear for information concerning that section.
Adaptable

AVAPS
Available in A/C-PC, S/T, and PSV modes

AVAPS Speed
- Replaced AVAPS Rate (of change) on Trilogy

AVAPS Startup
- First minute not limited by Speed setting
- Next session starts with the previous sessions final inspiratory pressure
Adaptable

AVAPS
Available in A/C-PC, S/T, and PSV modes

Algorithm resets to pressure midpoint when:
- AVAPS restart icon is tapped
- Changing to another pre-set prescription, then changing back

Algorithm does not reset to pressure midpoint when:
- Changing the target tidal volume
- Changing the insp. pressure ranges
Adaptable

AVAPS-AE additional flexibility

PC Breath – On/Off
Adaptable
AVAPS-AE additional flexibility

PS Min/Max can go to 0

Please note that PS Min/Max will change to PC Min/Max when PC Breath is set to On.
Adaptable
AVAPS-AE additional flexibility

• AVAPS restarts at pressure midpoint
• EPAP returns to EPAPmin for 100 breaths
• AutoBUR (if enabled) restarts
Adaptable Dynamic parameters

**Dyn C**
Static Compliance of respiratory system (lungs + chest wall), measured dynamically. Ratio between the change in volume to the change in pressure.

**Dyn R**
Airway Resistance
Estimate of the change in pressure divided by the air flow through the airways.

**Dyn P_{plat}**
Plateau pressure is the maximum pressure applied to small airways and alveoli during positive-pressure mechanical ventilation.

**AutoPEEP**
Estimate of the pressure (above PEEP) that exists in the patient airway at the end of exhalation.
Adaptable

Dynamic parameters

Available with:
Passive, Active Flow, and Dual Limb
NOT available in ActivePAP

Available in modes:
A/C-PC, A/C-VC, SIMV-PC, SIMV-VC
on Mandatory and Assist Control breaths
(VIM and PIM breaths)
Adaptable

Pediatric Trached Patient Example:

Pediatric patient with tracheostomy tube on Trilogy Evo had an increase in resistance noted over a 300 second period that was resolved after suctioning.
<table>
<thead>
<tr>
<th></th>
<th>Trilogy Evo</th>
<th>Trilogy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intended Use (weight)</strong></td>
<td>&gt;2.5 kg patient intended use (15 mL pressure modes / 35 mL volume modes)</td>
<td>&gt;5 kg patient intended use</td>
</tr>
<tr>
<td><strong>Battery</strong></td>
<td>~7.5 internal + ~7.5 detachable</td>
<td>~3 internal + ~3 detachable</td>
</tr>
<tr>
<td><strong>Circuits</strong></td>
<td>Passive, Active PAP, Active Flow, Dual Limb, (MPV)</td>
<td>Passive, Active PAP, Active Flow, (MPV)</td>
</tr>
<tr>
<td><strong>Pre-sets</strong></td>
<td>5 pre-set prescriptions</td>
<td>2 pre-set prescriptions</td>
</tr>
<tr>
<td><strong>Prescription naming</strong></td>
<td>Prescription #, Nighttime, Mouthpiece, Transport, Exacerbation, Daytime, Exercise, Weaning, Emergency, Other</td>
<td>Primary Secondary</td>
</tr>
<tr>
<td><strong>Standby</strong></td>
<td>![Checkmark]</td>
<td>![Cross]</td>
</tr>
<tr>
<td><strong>AVAPS</strong></td>
<td>First minute not limited by speed setting</td>
<td>Always limited by rate of change setting</td>
</tr>
<tr>
<td><strong>Ti Min/Max</strong></td>
<td>Spont. breaths (S/T, PSV, SIMV-PC, SIMV-VC, and AVAPS-AE modes)</td>
<td>Only set Ti</td>
</tr>
<tr>
<td><strong>Flow Trigger</strong></td>
<td>0.5 – 9 Lpm</td>
<td>1 – 9 Lpm</td>
</tr>
<tr>
<td>Feature</td>
<td>Trilogy Evo</td>
<td>Trilogy</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>Rise Time</td>
<td>0 - 6</td>
<td>1 - 6</td>
</tr>
<tr>
<td>Backup Ventilation</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Dynamic lung parameters with no insp/exp hold</td>
<td>Dyn C, Dyn R, Pplat, autoPEEP</td>
<td>✗</td>
</tr>
<tr>
<td>FiO₂ sensor and EtCO₂ monitoring</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Enhanced monitoring</td>
<td>Waveforms</td>
<td>Waveforms</td>
</tr>
<tr>
<td>Memory/Data transfer</td>
<td>Internal Memory (2GB) Data Transfer via Bluetooth or USB</td>
<td>No internal memory Data Transfer via Bluetooth or SD card</td>
</tr>
<tr>
<td>Circuit compensation</td>
<td>Circuit and humidifier selection Circuit calibration (optional)</td>
<td>✗</td>
</tr>
<tr>
<td>Touch Screen GUI</td>
<td>Touch Screen GUI</td>
<td>Non-touch screen GUI</td>
</tr>
<tr>
<td>On screen Alarm Guidance</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Service/Maintenance</td>
<td>4 year interval</td>
<td>10,000; 17,500; (alternating every 10K and 7.5K blower hrs)</td>
</tr>
</tbody>
</table>
Simple
Easy-to-learn user interface, configurable to the care environment

Connected
Providing timely care information to the people who need it

Portable
15 hours of battery life, easily mounts on wheelchairs, and has a convenient carrying bag that lets you see the screen and alarms

Reliable
The most robust and durable device we’ve ever created

Adaptable
Stays with patients as their care settings and needs change
CEU certificate

• To obtain your CEU certificate log on to
  – Log in or create a log in if you are a new user
  – Complete the evaluation and print out your certificate.

• If you are claiming AARC credits, you **must** compete the evaluation within 30 days or you will **not** receive credit for the program.