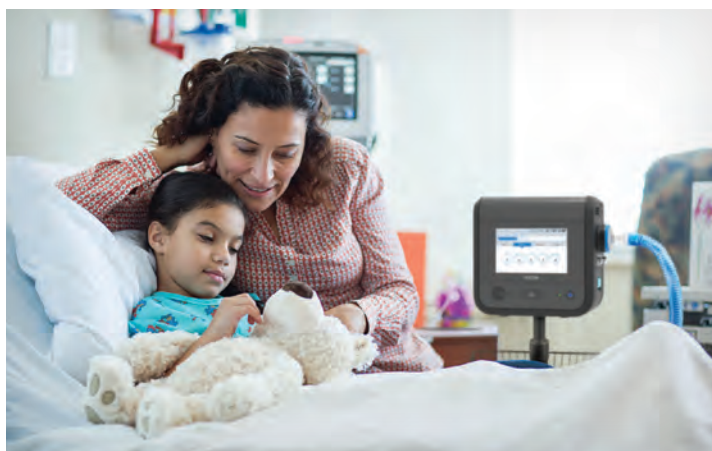


# VOCASN

## Technical Specifications







## VOCSN Tech Specs

### Five therapies. One device.

VOCSN integrates five separate devices including a ventilator, oxygen concentrator, cough assist, suction, and nebulizer, into one multi-function ventilator for hospital, institutional, transport, and home environments. VOCSN is controlled with an intuitive touchscreen operating system to deliver treatments in seconds instead of minutes.

#### Multi-View

VOCSN Multi-View is the first and only system to provide complete patient trending and monitoring for ventilator-dependent patients across multiple respiratory therapies including ventilation, oxygen, cough, suction, and nebulization and additional patient monitors.

#### CUSTOMIZABLE THERAPY CONFIGURATIONS

VOCSN is customizable to each patient. VOCSN can include all five therapies or just the mix of therapies needed, scaling with patient need.



#### Simple

- Ventec One-Circuit™
- Intuitive touchscreen operation
- Quick and easy setup



#### Mobile

- Five therapies in one device
- 70% lighter and smaller than five devices
- Up to 9 hours of on-board battery



#### Care Changing

- Touch Button Cough™
- Uninterrupted ventilation between therapies
- Designed to reduce risk of circuit misconnects

## VOCSN System Tech Specs

### Patients

- Invasive and non-invasive ventilation (including mouthpiece)
- Adult and pediatric patients greater than 5 kg

### Clinical Environments

#### Hospitals

- Emergency departments
- Step-down units
- Military hospitals

#### Institutions

- Long term acute care (LTAC)
- Skilled nursing facilities
- Long-term care/nursing homes

#### Transport

- Inter-hospital
- Intra-hospital
- Emergency medical services
- Military transport

#### Home Care

- Home healthcare
- Home based transport

### Alarm Volume

- 65 to 85 decibels

### Battery Power

- Up to 9 hours of continuous use (ventilation only)
  - 2 external hot swappable lithium-ion batteries (5,800 mAh each)
  - 1 Internal battery (3,900 mAh)
- Note: Simultaneous use of therapies will decrease battery operating time

### Clinician Lock to Restrict User Access to Settings

- On/Off
- Permissions feature can be enabled to allow certain settings to be adjusted

### Enable and Disable Therapies

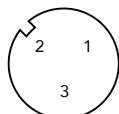
- Enable/Disable any of the five therapies based on patient needs

### Power Sources

- AC (wall plug-in)
- DC (wheelchair and external batteries)
- VOCSN Batteries (3 batteries: 15,500 mAh total)

### External Power Requirements

- AC Power:
  - Sine AC mains waveform
  - Rated Voltage: 100 to 240 VAC, 50 to 60 Hz
  - Power for V+O+C+S+N(+Pro) and V+C+S+N+Pro: ≤288 VA average, 420W peak
  - Power for V+C(+Pro) and V+Pro: ≤180 VA average, 240 VA peak
- DC Power:
  - 20.0 to 30.3 VDC, as measured at the connection to the device, through 0 to 350 W instantaneous loads
  - Power for V+O+C+S+N(+Pro) and V+C+S+N+Pro: ≤200 W average, 350W peak
  - Power for V+C(+Pro) and V+Pro: ≤150 W average, 200 W peak
  - Intended for connection to 24 V (27.2 VDC typical) batteries
  - Female XLR3 connection port with the following pin configuration:



- Pin 1 Signal: V+
- Pin 2 Signal: RTN
- Pin 3 Signal: N/A (Unused)

### Dimensions

- Width: 10.25 inch (26 cm)
- Height: 11 inch (28 cm)
- Depth: 7.5 inch (19 cm)

### User Interface

- 7 inch (17.75 cm) easy to use color LCD touchscreen

### Weight (w/batteries)

- V+O+C+S+N+Pro: 18.3 lbs (8.3 kg)
- V+O+C+S+N: 18.1 lbs (8.3 kg)
- V+C+S+N+Pro: 17.8 lbs (8.1 kg)
- V+C+Pro: 14 lbs (6.4 kg)
- V+C: 12.5 lbs (5.7 kg)
- V+Pro: 14 lbs (6.4 kg)

### Operating Environment

- Temperature: 5 °C to 40 °C
- Humidity: 15% to 90% (non-condensing)
- Atmospheric: 700 to 1060 hPa

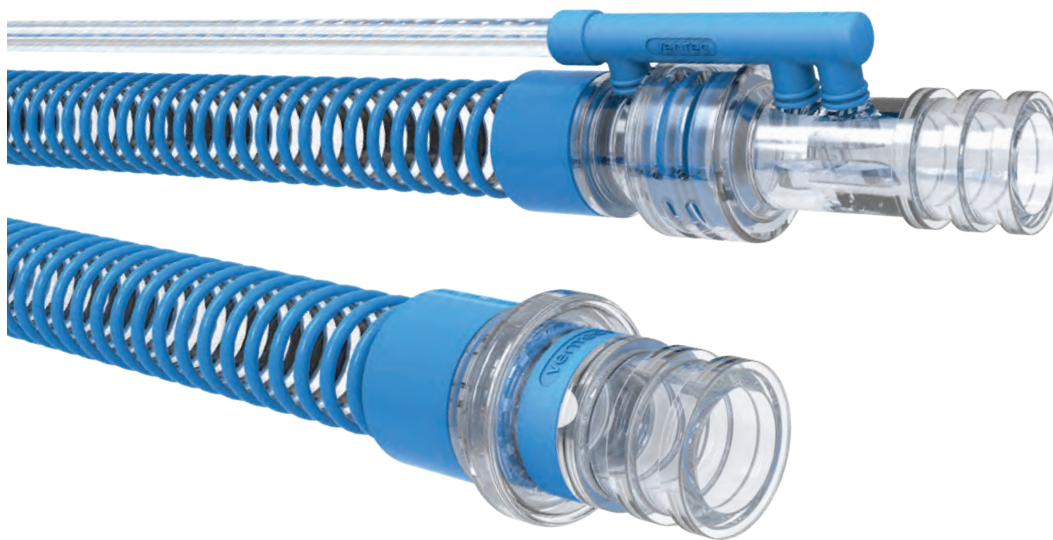
### Electromagnetic Compatibility and Protection

- IEC 60601-1-2
- Additional ESD levels: ±8 kV contact / ±15 kV air
- Additional Radiated RF Immunity level: 20 V/m
- Additional Magnetic Fields level: 30 A/m
- Tested for RFID immunity



# Ventec One-Circuit™

The Ventec One-Circuit™ allows patients to switch between therapies with the touch of a button. Rather than several cumbersome tubes connecting to separate devices, the Ventec One-Circuit™ eliminates clutter to create one easy-to-manage system for comfort and peace of mind.



## Ventec One-Circuit™ Specs

Circuits – Single Limb	Size	Circuit Options
<ul style="list-style-type: none"> <li>○ Active Circuit with integrated flow transducer, drive, and proximal flow sense lines and compatible with Touch Button Cough™</li> <li>○ Passive Circuit compatible with Touch Button Cough™</li> <li>○ Mouthpiece</li> <li>○ Valveless compatible for masks</li> </ul>	<ul style="list-style-type: none"> <li>○ 19 mm (adult)</li> <li>○ 15 mm (pediatric)</li> </ul>	<ul style="list-style-type: none"> <li>○ Humidifier Bypass (cough therapy)</li> <li>○ Secretion Trap (cough therapy)</li> <li>○ Integrated Oxygen Direct™ Tube (oxygen therapy)</li> <li>○ Heated circuit for use with humidifier</li> <li>○ VOCSN integrated bacterial filter</li> </ul>

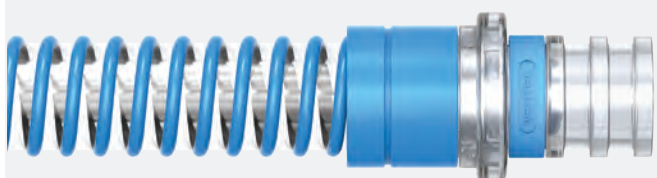


## Circuit Highlighted Technology



### ACTIVE CIRCUIT

The inline design and dual bellows of the active circuit provide the performance of an active valve with the size and convenience of a passive valve. The patent pending valve design supports cough and ventilation functions in a single circuit and combines the drive and sense lines into a single trillumen tube. Additionally, VOCSN uses advanced software technology to help prevent historical problems associated with condensation to optimize Vte sensing, accuracy, and triggering by purging condensation on every breath.

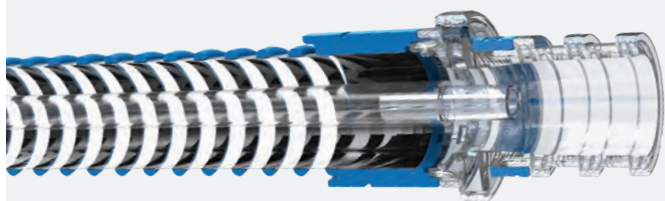


### PASSIVE CIRCUIT

The Ventec passive circuit is light, small, and easy to use. Our unique passive valve is designed to close the leak during cough exsufflation, thus making Touch Button Cough™ possible without changing circuits.



## Circuit Highlighted Technology



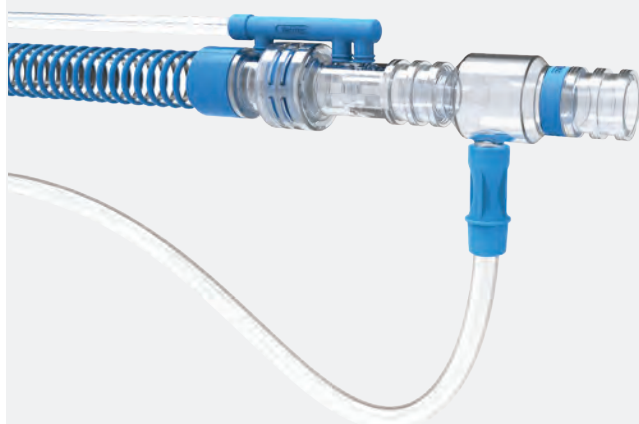
### OXYGEN DIRECT™

The Oxygen Direct™ system minimizes oxygen lost to leaks and dead space, improves battery life, and makes using supplemental oxygen easier. VOCSN includes advanced pulse dose technology and an independent O2 tube inside the patient circuit. The system delivers oxygen directly to the patient interface during the first two thirds of the patient's breath, when the patient needs oxygen most.



### VENTEC HUMIDIFIER BYPASS

The Ventec Humidifier Bypass allows the patient to remain connected to the humidifier while using the Touch Button Cough™ therapy. The bypass attaches to the humidifier water chamber to allow humidified air to reach the patient during ventilation and insufflation. Then, during exsufflation, check valves redirect the flow of air to bypass the water chamber of the humidifier.



### VENTEC SECRETION TRAP

The Secretion Trap is added to the circuit to capture mucus after the cough and helps to make the Touch Button Cough™ possible. As mucus enters the trap, the VOCSN suction system removes mucus from the circuit.

## Ventilation

**VOCSN brings next generation technology, breathing comfort, and ease of use to ventilator patients.**

The VOCSN critical care ventilator provides invasive, noninvasive, and mouthpiece ventilation. Designed to work in hospital, institutional, transport, and home environments, VOCSN delivers a comprehensive set of ventilation modes and settings to meet patient needs. The advanced unified respiratory system combines responsive leak and circuit compensation as well as precision flow trigger controls to enable comfortable breathing and accurate therapy.



### Highlighted Technology

#### READY FOR HOSPITALS, TRANSPORT, AND EMERGENCY APPLICATIONS

Using a customized radial blower and advanced software, VOCSN meets the rigorous ISO 80601-2-12 international standard for critical-care ventilators.

#### CIRCUIT COMPENSATION

Typically only found in critical care ventilators, circuit compensation helps overcome lost volume in the patient circuit. This technology improves airflow delivery accuracy during volume ventilation, which is especially important for pediatric patients.

#### MULTI-VIEW

VOCSN logs, graphs, and trends monitor values, frequency of therapy use, alarm activations, configuration changes, and more across all five therapies to facilitate actionable and informed treatment decisions and care plans, drive proactive interventions, control costs, and deliver seamless care across providers from hospital to home.

#### ADVANCED LEAK COMPENSATION

With Leak+ technology, VOCSN automatically compensates for high flows and large leaks up to 175 L/min at 20 cmH<sub>2</sub>O. This reduces nuisance alarms and allows the use of more comfortable noninvasive masks.

#### INTEGRATED OXYGEN BLENDING AND MONITORING

VOCSN includes an internal oxygen concentrator as well as inlets for low and high pressure oxygen sources. An onboard FiO<sub>2</sub> monitor displays and tracks oxygen delivery and together with the onboard oxygen blender, allows you to set precise high pressure oxygen delivery. If external oxygen becomes disconnected, VOCSN activates an alarm and allows you to easily switch to the internal concentrator, providing an emergency backup source of oxygen.

#### HIGH FLOW

VOCSN High Flow therapy provides a continuous flow of gas through a high flow nasal cannula or other interface.

# Ventilation Tech Specs

## Controls

### 9 Modes of Ventilation

- Spontaneous
- Bi-Level  
(with functionality similar to S/T, Timed, and BiPAP ventilation)
- Assist/Control-Pressure
- Assist/Control-Volume
- SIMV-Pressure (including CPAP)
- SIMV-Volume
- Vol. Targeted-PS  
(with functionality similar to AVAPS® and iVAPS)
- Vol. Targeted-PC  
(with functionality similar to PRVC)
- Vol. Targeted-SIMV  
(with functionality similar to SIMV+PRVC)

### Apnea Rate

- 4 to 60 BPM

### Breath Rate

- 0 to 60 BPM

### Circuit Compensation

- Automatic circuit compensation

### Customizable Ventilation Therapy Presets

- 3 presets, each with customizable names and settings

### EPAP/PEEP

- Active circuit: 0 to 25 cmH<sub>2</sub>O
- Passive circuit: 4 to 25 cmH<sub>2</sub>O

### FiO<sub>2</sub>

- 21 to 100%

### Flow

- 15 to 60 L/min when the Patient Type control is set to Adult
- 4 to 25 L/min when the Patient Type control is set to Pediatric

### Flow Cycle

- 10 to 90%

### Flow Trigger

- Active or Passive Circuit: 0.5 to 9.0 L/min
- Mouthpiece circuit: 0.5 to 3.0 L/min (breaths triggered by patient effort or by placing your mouth on the mouthpiece)

### High Flow

- On, Off

### Inspiratory Hold

- Reports Plateau Pressure, Static Compliance, and Pressure Waveform
- 6 seconds maximum

### Inspiratory Positive Airway Pressure (IPAP)

- 4 to 40 cmH<sub>2</sub>O above ambient

### Inspiratory Time

- 0.3 to 5.0 seconds

### Leak Compensation

- On/Off
- Automatic Leak+ compensation up to 175 L/min at 20 cmH<sub>2</sub>O

### Pres. Adj. Rate

- Slow, Fast

### Pres. Minimum

- 1 to [40-PEEP] cmH<sub>2</sub>O

### Pressure Control

- 1 to 50 cmH<sub>2</sub>O above PEEP (PEEP compensated)

### Pressure Control Flow Termination

- On/Off

### Pressure Support

- 0 to 40 cmH<sub>2</sub>O above PEEP (PEEP compensated)

### Rise Time

- 1 (100 ms) to 6 (600 ms) to target 67% of set pressure

### Sigh

- On/Off
- 150% of the prescribed volume is delivered once every 100 breaths

### Tidal Volume

- 50 to 1500 mL

### Time Cycle

- 0.3 to 3.0 seconds

## Monitors

### Airway Pressure Manometer

- 0 to 80 cmH<sub>2</sub>O

### Breath Rate

- 0 to 100 BPM

### Calculated FiO<sub>2</sub>

- 21 to 100%
- The calculated FiO<sub>2</sub> monitor calculates the delivered FiO<sub>2</sub> during pulse dose oxygen

### Exhaled Tidal Volume

- 0 to 2000 mL

### FiO<sub>2</sub> Monitor

- 15 to 95%, >95%

### Graphic Waveforms

- Pressure (-16 to 80 cmH<sub>2</sub>O)
- Flow (±120 L/min)
- Volume (0 to 2000 mL)

### I:E Ratio

- 9.9:1 to 1:9.9

### Leak

- 0 to 200 L/min

### Mean Airway Pressure

- 0 to 50 cmH<sub>2</sub>O

### Minute Volume

- 0 to 60 L

### Positive End Expiratory Pressure (PEEP)

- 0 to 45 cmH<sub>2</sub>O

### Peak Inspiratory Pressure (PIP)

- 0 to 85 cmH<sub>2</sub>O

### Plateau Pressure

- 0 to 85 cmH<sub>2</sub>O

### Static Compliance

- <10, 10 to 100, >100 mL/cmH<sub>2</sub>O



# Ventilation Tech Specs (continued)

## Alarms

### Apnea

- Off, 10 to 120 seconds

### Battery Alarms

- Battery Use Alarm
- Internal Battery Low
- Internal Battery Critically Low

### Circuit Integrity Alarms

- Check Patient Circuit
- Patient Circuit Disconnect

### Device Alarms

- Device Maintenance
- Inoperative Alarm
- System Fault

### High Breath Rate

- Off, 10 to 99 BPM

### High FiO2

- Off, 24 to 99%

### High Minute Volume

- Off, 1 to 59 L

### High PEEP

- Off, 3 to 20 cmH2O above set PEEP

### High Pressure

- 10 to 80 cmH2O

### High Pressure Alarm Delay

- None, 1 to 2 breaths

### Low Breath Rate

- Off, 4 to 80 BPM

### Low FiO2

- Off, 19 to 92%

### Low Inspiratory Pressure

- Off, 1 to 40 cmH2O

### Low Minute Volume

- Off, 0.1 to 50 L

### Low PEEP

- Off/On
- When on, automatically activates when monitored PEEP falls 5 cmH2O below the set PEEP

### Very Low FiO2

- FiO2 less than 18%

## Multi-View

- Logs, graphs, and trends
- Ventilation monitors (such as Vte), alarm activations, configuration changes, and more



## Oxygen

**The VOCSN internal oxygen concentrator and Oxygen Direct™ system deliver the equivalent of 6 L/min of oxygen. External oxygen sources can be connected when needed.**

VOCSN can deliver the equivalent of 6 L/min of oxygen using the onboard internal oxygen concentrator.

The Oxygen Direct™ system uses an independent oxygen tube inside the circuit. This enables oxygen to be delivered directly to the patient in pulse dose mode during the beginning part of the breath, precisely when the patient needs oxygen most.

The oxygen system is up to three times more efficient than stationary concentrators. This significantly decreases the size of the oxygen concentrator and maximizes battery life. Most importantly, it makes traveling and using oxygen easier.



### Highlighted Technology

#### INTERNAL OXYGEN CONCENTRATOR

The internal oxygen concentrator produces the equivalent of up to 6 L/min or up to 40 percent oxygen in adult patients. The redesigned pressure swing adsorption process and Oxygen Direct™ system mean more oxygen is generated using less battery power.

#### ONBOARD FIO2 MONITOR

The VOCSN onboard FiO2 monitor verifies accurate oxygen delivery.

#### EXTERNAL OXYGEN SOURCES

VOCSN may include low pressure and high pressure ports for external oxygen. If external oxygen becomes disconnected, VOCSN activates an alarm and allows you to switch to the internal concentrator, providing an emergency backup source of oxygen.

#### INTEGRATED OXYGEN BLENDER

VOCSN includes an integrated oxygen blender to set precise FiO2 delivery when using external high pressure sources.

## Oxygen Tech Specs

### Oxygen Source

#### Internal Concentrator

- Pulse Dose Mode equivalent of 0.5 to 6.0 L/min
- Oxygen bolus is delivered during the first 62% of breath volume

#### External Oxygen Sources

- Low Pressure port (external concentrators)
- High Pressure port (for tanks and in-wall oxygen)

### Oxygen Mode

- Pulse Dose (internal and external high pressure)
- FiO2 (external high pressure)

### Oxygen Monitors

- FiO2 Monitor (for use with FiO2 mode and with external high pressure)
- Calculated FiO2 Monitor (monitor appears when providing pulse dose oxygen)

### Oxygen Sensors

- Integrated oxygen sensor to check oxygen generation from the concentrator
- Integrated oxygen sensor to measure oxygen flowing into the circuit from external sources

### Battery Alarms

- Battery Use Alarm
- Internal Battery Low
- Internal Battery Critically Low

### Device Alarms

- O2 Concentration
- High/Low/Very Low FiO2
- Check O2 Source
- System Fault
- Inoperative Alarm

### Multi-View

- Logs, graphs, and trends Oxygen therapy monitors (such as FiO2), frequency of therapy use, configuration changes, and more





# Cough

**Touch Button Cough™ therapy can be activated in seconds, without changing the circuit.**

By unifying ventilation, cough, and suction into one system, it now takes seconds instead of minutes to administer cough therapy with Touch Button Cough™. The Ventec One-Circuit™ features a patent pending high flow valve design, allowing patients to use the same circuit for ventilation and cough. Using the Cough + Suction feature, the suction is activated during the cough therapy to clear secretions. Patients using invasive ventilation can use the Secretion Trap™ to easily clear secretions from the circuit. Once the set number of cough cycles is complete, ventilation automatically resumes.

**Touch Button Cough™:** The VOCSN cough is activated with the touch of a button to make airway clearance easy. Patients remain connected to the ventilator at all times, and there is no need to disconnect circuits between uses. The system is designed to reduce the gaps in ventilation, decrease the risk of patient misconnection, and minimize exposure to the patient's airway.



## Highlighted Technology

### ADVANCED COUGH RISE TIME

The VOCSN uses an advanced rise time algorithm during cough. The system is designed to reduce the amount of mucus going back to the patient.

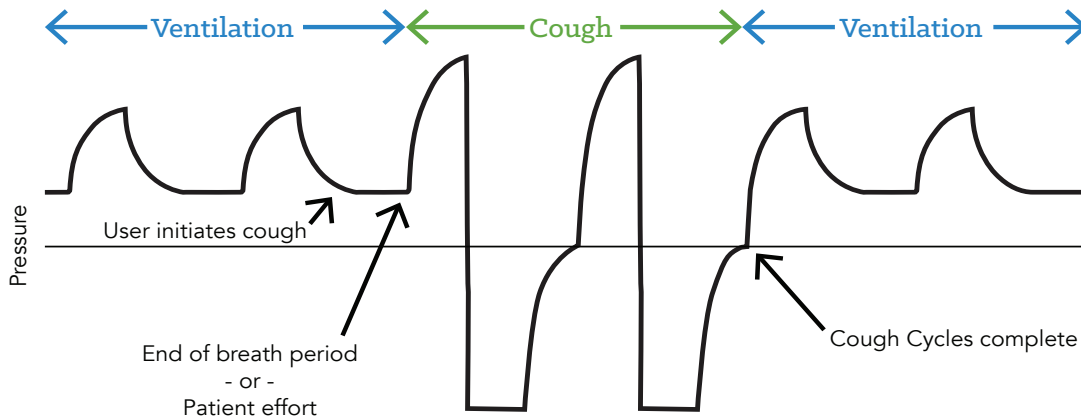
### COUGH + SUCTION

When the Cough + Suction feature is enabled, VOCSN will automatically activate the suction therapy to facilitate easy secretion clearance.

### BREATH SYNC

When Breath Sync is enabled, VOCSN monitors patient breathing and triggers a cough at a natural point in the breathing cycle. The technology allows the patient to transition gently in and out of the cough therapy and seamlessly return to ventilation.

## Transitions Between Ventilation and Cough Therapy



## Cough Tech Specs

### Controls

#### Cough Cycles

- 1 to 10

#### Cough + Suction

- On/Off

#### Exsufflation Pressure

- -10 to -70 cmH<sub>2</sub>O

#### Exsufflation Time

- 0 to 5.0 Seconds

#### Insufflation Pressure

- 10 to 70 cmH<sub>2</sub>O

#### Insufflation Rise Time

- 1 to 6

#### Insufflation Time

- 0 to 5.0 seconds

#### Pause Time

- 0 to 5.0 seconds

#### Cough Presets

- 3 customizable presets

### Monitors

#### Cough Airway Pressure Manometer

- -80 to +80 cmH<sub>2</sub>O

#### Cough Cycle Monitor

- 0 to 10

#### Cough Volume Monitor

- 0 to 4000 mL

#### Peak Cough Flow Monitor

- 0 to 350 L/min

### Multi-View

- Logs, graphs, and trends Cough therapy monitors, frequency of therapy use, configuration changes, and more

## Suction

**The quiet hospital grade suction system that is easy to transport.**

The VOCSN high flow suction provides quiet and effective airway clearance. Working in conjunction with the Secretion Trap, suction can be used to clear secretions from the patient's airway. VOCSN ensures consistent and precise vacuum pressure to quickly clear mucus. Plus, the suction system uses Ventec's unique sound muffler, making it more than three times quieter than traditional suction machines.



### Highlighted Technology

#### COUGH + SUCTION

VOCSN activates the suction system during the cough therapy. Caregivers can activate a cough, clear the mucus, and return to ventilation in less than one minute.

#### TRAVEL SUCTION CANISTER

The 300 mL detachable Travel Suction Canister allows suction on the go. This size also supports emergency responders and transport.

#### EXTERNAL SUCTION CANISTER ADAPTER

The external suction canister adapter connects to the side of VOCSN to enable suction therapy with VOCSN while connected to any third party external suction canister.

#### VENTEC SECRETION TRAP

The suction system removes mucus from the circuit simplifying mucus management. The system allows invasive patients to remain connected to the same circuit during ventilation, suction, and cough therapies.

#### CONSISTENT HIGH FLOW TECHNOLOGY

The three piston compressor pump provides consistent high flow suction. The VOCSN suction system is capable of generating 35 L/min of flow at 450 mmHg to easily manage the removal of difficult secretions.



## Suction Tech Specs

### Controls

#### Supported Suction Interfaces

- Suction tubing and oral care tools
- Open Suction Catheters
- Closed (in-line) Suction Catheters

#### Suction Canister

- 300 mL integrated travel canister
- 1200 mL canister for hospital and home use

#### Vacuum Control

- -95 to -450 mmHg
- Default setting

#### Vacuum System

- Customized three-cylinder piston pump

### Monitors

#### Vacuum Monitor

- 0 to -550 mmHg

### Multi-View

- Logs, graphs, and trends
- Suction therapy monitors, frequency of therapy use, configuration changes, and more



# Nebulizer

**VOCSN records each medication use and turns off the nebulizer when the therapy is complete.**

VOCSN provides an integrated 6 L/min nebulizer drive to make medication delivery seamless. VOCSN automatically compensates the airflow from the ventilator when the nebulizer drive is active to ensure accurate ventilation. Alternatively, External Nebulizer Compensation provides the same adjustment when used with an external nebulizer. The VOCSN nebulizer is battery operated for use on the go. Plus, VOCSN records data about each treatment and turns off the nebulizer (or nebulizer compensation) once the therapy is complete.



## Highlighted Technology

### NEBULIZER NOISE MUFFLER

The system uses Ventec's unique sound muffler technology and is half the noise of traditional nebulizer systems.

### MULTI-VIEW

Each use of the nebulizer, including frequency and duration, is recorded to help ensure medication compliance.

### PROGRAMMABLE AUTO-OFF

The nebulizer automatically turns off following completed use.

### EXTERNAL NEBULIZER COMPENSATION

In addition to providing internal Nebulizer therapy, VOCSN can compensate for the flow from an external nebulizer.

# Nebulizer Tech Specs

## Nebulizer Duration

- 5 to 60 minutes, 1 minute increments

## Nebulizer System

- Three piston pump for steady flow

## Multi-View

- Logs, graphs, and trends Nebulizer frequency and therapy duration, configuration changes, and more



## About Ventec Life Systems

Ventec Life Systems is defining integrated respiratory care to improve patient outcomes and reduce caregiver challenges in the hospital and home. Ventec's leading product, VOCSN, seamlessly integrates five separate devices including a ventilator, oxygen concentrator, cough assist, suction, and nebulizer into one unified respiratory system. The team's history of patient-centric design brings care changing innovations to life for patients, medical professionals, and caregivers.

**For questions about VOCSN:**



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MKT-00001 Rev J