

Veo-t / Veo-r Technical Specification

Product Overview

The Veo-t and Veo-r are turbine-driven transport ventilators designed to provide positive pressure ventilatory support to adult, pediatric, and neonatal patients. Both models share a common platform ensuring consistent performance across clinical environments.

Areas of use

| Model | Use |
|--------|---|
| Veot-t | In-hospital transport |
| Veot-r | Emergency transport (ambulance, helicopter, fixed wing) |

Ventilation Modes

| Mode form | Mode name | Mode | Adult/Ped | Neonatal |
|-----------------------------|-----------|---|-----------|----------|
| Volume-targeted | VCV | Volume controlled ventilation | ✓ | ✓ |
| | V-SIMV | Synchronized intermittent mandatory ventilation | ✓ | ✓ |
| Adaptive | PRVC | Pressure regulated volume control | ✓ | ✓ |
| | PRVC-SIMV | PRVC with SIMV | ✓ | ✓ |
| | AMV | Adaptive minute ventilation | ✓ | ✓ |
| Pressure-controlled | P-A/C | Pressure assist control | ✓ | ✓ |
| | P-SIMV | Pressure SIMV | ✓ | ✓ |
| | DuoPAP | Biphasic pressure ventilation | ✓ | ✓ |
| | APRV | Airway pressure release ventilation | ✓ | ✓ |
| Spontaneous / Support Modes | CPAP/PSV | Continuous positive airway pressure / support | ✓ | ✓ |
| Non-invasive | NIV-S | Spontaneous NIV | ✓ | ✓ |
| | NIV-ST | Timed NIV | ✓ | ✓ |

Functions

| Function | Adult/Ped | Neonatal |
|--|-----------|----------|
| Leakage compensation | ✓ | ✓ |
| Altitude compensation | ✓ | ✓ |
| Apnea ventilation | ✓ | ✓ |
| CPR mode | ✓ | ✓ |
| Suction support with oxygen boost | ✓ | ✓ |
| Manual breath | ✓ | ✓ |
| Inspiratory hold / Expiratory hold | ✓ | ✓ |
| O ₂ therapy | ✓ | ✓ |
| Dynamic Lung monitoring | ✓ | ✓ |
| AMV chart | ✓ | ✓ |
| Spontaneous Breathing Trial (SBT) | ✓ | ✓ |
| Pressure-Volume (PV) tool | ✓ | ✓ |
| Sustained Inflation (SI) | ✓ | ✓ |
| Nebulizer | ✓ | ✓ |
| Standby mode | ✓ | ✓ |
| CO ₂ monitoring (mainstream / sidestream) | o | o |
| SpO ₂ monitoring | o | o |

Technical Performance

Pressure & Ventilation Performance

| Parameter | Adult / Pediatric | Neonatal |
|--------------------------|--|--|
| Working pressure | 0 – 60 cmH ₂ O | 0 – 45 cmH ₂ O |
| Maximum pressure limit | 80 cmH ₂ O | 45 cmH ₂ O (functional limit) |
| Maximum inspiratory flow | 260 L/min (120 L/min @ 100% O ₂) | 260 L/min (120 L/min @ 100% O ₂) |
| Minute volume capability | Up to 60 L/min | Up to 60 L/min |
| Inspiratory time | 0.2 – 3 s | 0.2 – 3 s |
| Minimum expiratory time | ≥0.2 s (20% of cycle) | ≥0.2 s (20% of cycle) |

Volume Delivery

| Parameter | Adult / Pediatric | Neonatal |
|---------------------------------|-------------------|----------------|
| Tidal volume (V _t) | 20 – 2000 ml | 2 – 300 ml |
| Delivered tidal volume examples | ~500 ml typical | ~30 ml typical |

Gas Delivery & Mixing

| Parameter | Adult / Pediatric | Neonatal |
|---------------------------------|--|--|
| Delivered pressure (gas system) | 0 – 60 cmH ₂ O | 0 – 45 cmH ₂ O |
| Delivered flow | >260 L/min (≥200 L/min @ 100% O ₂) | >260 L/min (≥200 L/min @ 100% O ₂) |
| Flow accuracy | ±10% or ±300 ml/min | ±10% or ±300 ml/min |

Breathing Circuit Characteristics

| Parameter | Adult / Pediatric | Neonatal |
|------------------------|-----------------------------------|------------------------------------|
| Compliance | ≤ 10 ml/cmH ₂ O | ≤ 10 ml/cmH ₂ O |
| Inspiratory resistance | ≤ 6 cmH ₂ O @ 60 L/min | ≤ 12 cmH ₂ O @ 12 L/min |
| Expiratory resistance | ≤ 6 cmH ₂ O @ 60 L/min | ≤ 12 cmH ₂ O @ 12 L/min |
| Circuit volume | ~2.4 L | ~0.9 L |

Gas Supply

| Parameter | Specification |
|------------------------------|---------------------------------|
| High-pressure O ₂ | 280 – 600 kPa, max 120 L/min |
| Connector | DISS (CGA 1240) or NIST |
| Low-pressure O ₂ | <100 kPa, max 15 L/min |
| Connector | Quick coupling (CPC compatible) |
| Air supply | Integrated turbine |

Additional Performance Parameters

| Parameter | Specification |
|---|------------------------------|
| Nebulizer flow rate | ≤ 16 L/min |
| Safety valve pressure | ≤ 12.5 kPa |
| O ₂ boost / suction sequence | Automatic oxygenation cycles |
| Disconnect detection | Automatic |
| Reconnection detection | Automatic |

Control Settings and Ranges

| Parameter (units) | Adult / Pediatric | Neonatal |
|---|------------------------------|-------------------------------------|
| Tidal volume (ml) | 20 – 2000 | 2 – 300 |
| Respiratory rate (bpm) | 1 – 80 | 1 – 80 |
| Inspiratory time (s) | 0.2 – 3.0 | 0.2 – 3.0 |
| I:E ratio | Adjustable via Ti | Same |
| PEEP (cmH ₂ O) | 0 – 35 | 3 – 25 |
| FiO ₂ (%) | 21 – 100 | 21 – 100 |
| Inspiratory pressure (cmH ₂ O) | 0 – 60 | 0 – 45 |
| Max pressure limit (cmH ₂ O) | 80 | 45 |
| Pressure support (cmH ₂ O) | 0 – 60 | 0 – 45 |
| Flow trigger (L/min) | 0.5 – 20 | 0.1 – 5 |
| Trigger type | Flow trigger | Same |
| Minimum expiratory time (s) | ≥ 0.2 | ≥ 0.2 |
| Apnea time (s, default) | 30 | 5 |
| AMV target (MV) | Adjustable | Adjustable |
| SBT | Available | Available |
| SI (Sustained Inflation) | Adjustable | Adjustable (within neonatal limits) |
| Rise time / ramp | Adjustable | Adjustable |
| O ₂ therapy flow | Adjustable | Adjustable |
| O ₂ boost (O ₂ ↑) | 100% O ₂ (timed) | Same |
| Nebulization time | Adjustable (~30 min default) | Same |

Monitoring Parameters

| Parameter | Description |
|---|---|
| P _{peak} | Peak airway pressure during inspiration |
| PEEP | Positive end-expiratory pressure |
| P _{mean} | Mean airway pressure over the respiratory cycle |
| Plateau pressure (P _{plat}) | Pressure measured during inspiratory hold (alveolar pressure) |
| Tidal volume (V _t) | Delivered volume per breath |
| Expired tidal volume (V _{te}) | Volume exhaled by the patient |
| Minute volume (MV / M _{Ve}) | Total ventilation per minute |
| Respiratory rate (RR) | Number of breaths per minute |
| Flow (Insp/Exp) | Inspiratory and expiratory gas flow |
| Peak inspiratory flow | Maximum flow during inspiration |
| Peak expiratory flow | Maximum flow during expiration |
| FiO ₂ | Fraction of inspired oxygen |
| EtCO ₂ (optional) | End-tidal carbon dioxide concentration |
| FiCO ₂ (optional) | Inspired carbon dioxide concentration |
| Compliance (C) | Lung compliance (volume/pressure relationship) |
| Resistance (R) | Airway resistance |
| Leak / MVLeak | Estimated leakage in the system |
| Spontaneous tidal volume | Volume generated by spontaneous breaths |
| Spontaneous minute volume | Minute ventilation from spontaneous breathing |
| awRR | Airway respiratory rate (measured breathing frequency) |
| Pulse rate (PR) (optional) | Patient heart rate via SpO ₂ module |
| SpO ₂ (optional) | Oxygen saturation |
| Perfusion Index (PI) (optional) | Indicator of peripheral perfusion |

Alarms

Parameter-Based Alarms

| Alarm | Description |
|-------------------------------------|---|
| Ppeak high | Airway pressure above upper limit |
| Ppeak low | Airway pressure below lower limit |
| PEEP high | PEEP above upper limit |
| PEEP low | PEEP below lower limit |
| Minute volume high (MVe high) | Minute ventilation above set limit |
| Minute volume low (MVe low) | Minute ventilation below set limit |
| Tidal volume high (Vte high) | Exhaled tidal volume above limit |
| Tidal volume low (Vte low) | Exhaled tidal volume below limit |
| Respiratory rate high (Rtotal high) | Respiratory rate above limit |
| Respiratory rate low (Rtotal low) | Respiratory rate below limit |
| FiO ₂ high | Oxygen concentration above limit |
| FiO ₂ low | Oxygen concentration below limit |
| Apnea | No detected breathing within set apnea time |

System & Technical Alarms

| Alarm | Description |
|-----------------------|---|
| Disconnection | Patient circuit disconnected |
| Obstruction | Airway or circuit blockage |
| Oxygen supply failure | Insufficient or missing O ₂ supply |
| Flow sensor error | Sensor malfunction or invalid reading |
| Device failure | Internal system fault |
| Power failure | Loss of external power |
| Battery low | Battery level low |

Battery depleted

Battery critically low / empty

Monitoring Module Alarms (Optional)

| Alarm | Description |
|------------------------|---------------------------------------|
| EtCO ₂ high | End-tidal CO ₂ above limit |
| EtCO ₂ low | End-tidal CO ₂ below limit |
| FiCO ₂ high | Inspired CO ₂ above limit |
| SpO ₂ high | Oxygen saturation above limit |
| SpO ₂ low | Oxygen saturation below limit |
| Pulse rate high | Heart rate above limit |
| Pulse rate low | Heart rate below limit |
| Perfusion index low | Low peripheral perfusion |

Graphical User Interface

| Graphics type | Options |
|--------------------|---|
| Waveforms | Pressure, Flow, Volume |
| Loops | Pressure–Volume (PV), Flow–Volume (FV) |
| Trends | Parameter trends (time-based) |
| Waveform functions | Waveform freeze |
| Monitoring display | Real-time numerical values (pressure, volume, flow, FiO ₂ , etc.) |
| Optional waveforms | CO ₂ waveform (with module), SpO ₂ waveform (with module) |
| Event handling | Event marking (“Sign”) |
| Alarm display | Visual alarm indicators and messages |
| Indicators | LED alarm indicators (priority-based) |

Electrical Specifications

| Parameter | Specification |
|------------------------------|----------------------------------|
| AC input voltage | 100 – 240 V~ |
| AC frequency | 50 / 60 Hz |
| Power consumption | 150 VA |
| DC input voltage | 12 – 30.3 V |
| DC input current | 12.5 – 4.95 A |
| Battery type | Lithium-ion |
| Number of batteries | One or two |
| Battery voltage | 14.4 V DC |
| Battery capacity | ~6900 mAh |
| Operating time (1 battery) | Up to 4 hours |
| Operating time (2 batteries) | Up to 8 hours |
| Charging time | ≤ 5 hours (operating or standby) |

Additional Electrical / EMC Compliance

| Parameter | Specification |
|-------------------------|-------------------------|
| EMC standard | IEC 60601-1-2 |
| RF emissions (CISPR 11) | Group 1, Class B |
| Harmonic emissions | IEC 61000-3-2 Class A |
| Voltage fluctuations | IEC 61000-3-3 compliant |

Safety classification

| Item | Classification |
|---|--|
| Ingress Protection | IP34 |
| Applicable standards | EN 60601-1:2006+A1:2013+A2:2021, EN 60601-1-2:2015+A1:2021, EN 60601-1-8:2007+A1:2013+A2:2021, EN 60601-1-6:2010+A1:2015+A2:2021, EN 62366-1:2015+A1:2020, EN 62304:2006+A1:2015, EN 1789:2020, EN ISO 80601-2-84:2023, EN ISO 80601-2-12:2020, EN ISO 80601-2-55:2018+A1:2023, EN ISO 80601-2-61:2019, EN 60601-1-9:2008 + A1:2013 + A2:2020, EN ISO 80601-2-90:2021, RCTA-DO 160G, EN ISO 18562-1:2020 |
| Degree of safety for inflammable anesthetic gas | The equipment cannot be used with inflammable anesthetic gas mixed with air, oxygen or nitrous oxide. |
| Operating mode | Continuous operation |
| Classification of applied part | <p>The breathing tubing & veil, mask and nasal cannula are classified as type BF applied part with defibrillation-proof.</p> <p>The CO2 sampling line is classified as type BF applied part with defibrillation-proof.</p> <p>The SpO2 probe is classified as type CF applied part with defibrillation-proof.</p> |

Physical specifications

| Item | Size |
|------------------|---|
| Dimensions WxHxD | <p>Veo-r:</p> <p>Main unit:330 mm x 261 mm x 315 mm (including handle)</p> <p>Main unit:330mm x205mm x 256mm (excluding handle)</p> <p>Veo-t:</p> <p>Main unit:328 mm x 208 mm x 288 mm</p> |
| Weight | Main unit:6.5kg |
| Display | 10" |
| Resolution | 1280×800 pixels |
| Ports | USB2.0 and RJ45 |