

HAMILTON-C3

Technical specifications

The HAMILTON-C3 mechanical ventilator is a modular high-end ventilation solution for all patient groups. With a number of unique features, it is one of our first ventilators featuring the "Ventilation Autopilot" INTELLiVENT-ASV®. The HAMILTON-C3's compact design and independence from compressed air allow maximum mobility throughout the hospital. The integrated high-flow turbine guarantees an optimal pneumatic performance even in the presence of leakage (NIV).

- Automated control of the patient's ventilation and oxygenation with INTELLiVENT-ASV
- P/V Tool Pro: Protective Ventilation tool for lung assessment and recruitment
- High flow oxygen therapy
- High-performance NIV ventilation
- Compact and independent from compressed air
- Adult, pediatric, and neonatal ventilation

For more information, visit our website: www.hamilton-c3.com



Technical specifications

Ventilation Cockpit

| | |
|---------------------|--|
| Dynamic Lung | Real-time visualization of the lung with representations of tidal volume, lung compliance, resistance, and patient activity |
| Vent Status | Visual representation of ventilator dependence grouped by oxygenation, CO ₂ elimination, and patient activity |
| ASV target graphics | Graphic display of target and current values for tidal volume, frequency, pressure, patient activity, and minute ventilation |
| Monitoring | Display of 48 monitoring parameters |
| Real-time waveforms | Paw, Flow, Volume, Ptrachea, CO ₂ ¹⁾ , SpO ₂ ¹⁾ |
| Others | Loops: P-V, V-Flow, P-Flow, V-FCO ₂ ¹⁾ , V-PCO ₂ ¹⁾ , Trends: 1, 6, 12, 24, and 72 hours, INTELLiVENT-ASV panels |

Alarms

| | |
|---------------------|---|
| Operator adjustable | Low/high minute volume, low/high pressure, low/high tidal volume, low/high rate, apnea time, low/high oxygen, low/high PetCO ₂ ¹⁾ , low/high SpO ₂ ¹⁾ , low/high pulse ¹⁾ , low/high PI ¹⁾ , low/high PVI ¹⁾ , low/high SpCO ¹⁾ , low/high SpMet ¹⁾ , low/high SpHb ¹⁾ , oxygen message (INTELLiVENT-ASV) ¹⁾ |
| Special alarms | O ₂ cell, disconnection, exhalation obstructed, loss of PEEP, pressure not released, flow sensor, pressure limitation, battery, power supply, gas supply, oxygen concentration, ASV, INTELLiVENT-ASV, check patient interface (HiFlowO ₂ only), Oxygenation / Ventilation controller at limit (INTELLiVENT-ASV) |
| On-screen help | Integrated on-screen help for troubleshooting alarms |
| Loudness | Adjustable (1 – 10), configurable minimum loudness |

Ventilation modes

| Type | Mode | Description | Adult/Ped. | Neonatal ¹⁾ |
|---------------------|------------------------------------|---|------------|------------------------|
| Closed-loop control | ASV | Adaptive Support Ventilation. Guaranteed minute volume based on user settings and application of lung-protective rules. | ✓ | |
| | INTELLiVENT-ASV ¹⁾ | Automated adjustment of the patient's ventilation and oxygenation | ✓ | |
| Pressure | PCV+ | Pressure-controlled ventilation. Biphasic breathing. | ✓ | ✓ |
| | PSIMV+ | Pressure-controlled synchronized intermittent mandatory ventilation | ✓ | ✓ |
| | SPONT | Pressure support ventilation | ✓ | ✓ |
| | APRV | Airway pressure release ventilation | ✓ | ✓ |
| | DuoPAP | Duo positive airway pressure | ✓ | ✓ |
| Volume | APVcmv/(S)CMV+ | (Synchronized) controlled mandatory and adaptive ventilation | ✓ | ✓ |
| | APVsimv/SIMV+ | Synchronized intermittent mandatory and adaptive ventilation | ✓ | ✓ |
| | (S)CMV | (Synchronized) controlled mandatory ventilation, flow controlled | ✓ | |
| | SIMV | Synchronized intermittent mandatory ventilation, flow controlled | ✓ | |
| Noninvasive | NIV | Noninvasive ventilation | ✓ | ✓ |
| | NIV-ST | Spontaneous / timed noninvasive ventilation | ✓ | ✓ |
| | nCPAP-PS ¹⁾ | Nasal continuous positive airway pressure - pressure control | | ✓ |
| | HiFlowO ₂ ¹⁾ | High flow oxygen therapy | ✓ | ✓ |

Maintenance

| | |
|-----------------|--|
| Blower lifetime | Dynamic lifetime surveillance; 20,000 operating hours, 5 year warranty |
|-----------------|--|

¹⁾ Optional - not available in all markets

Technical specifications

Standards IEC 60601-1:2005/A1:2012, IEC 60601-1-2:2007, ISO 80601-2-12:2011 + Cor.:2011, CAN/CSA-C22.2 No. 60601-1:14, ANSI/AAMI ES60601-1:2005(R)2012

Configurations

Options ¹⁾ Neonatal ventilation, nasal CPAP, volumetric mainstream capnography, sidestream capnography, SpO₂, INTELLiVENT-ASV, HiFlowO₂, P/V Tool Pro

Electrical and gas supplies

| | |
|----------------------|---|
| Input voltage | 100 to 240 VAC, 50 / 60 Hz, or 12 to 24 VDC |
| Power consumption | 50 VA typical, 150 VA maximum |
| Backup battery time | 7 h typical with 2 Li-Ion batteries / hot swappable |
| Oxygen supply | 280 to 600 kPa (41 to 87 psi), V max 200 l/min |
| Low pressure oxygen | ≤15 l/min, max. 600 kPa for low pressure |
| Air supply | Integrated ultra-quiet turbine |
| Degree of protection | IP21 |

Environment

| | |
|-------------|--|
| Temperature | Operating: 5°C to 40°C (41°F to 104°F) Storage: -20°C to 60°C (-4°F to 140°F) |
| Humidity | 10% to 95%, noncondensing (operating and storage) |
| Altitude | Up to approx. 4,000 m (13,123 ft), 600 to 1,100 hPa |

Interface connectors USB, RS-232, nurse call, CO₂¹⁾, SpO₂¹⁾

Event log Storage and display of up to 1,000 events with date and time

IntelliTrig

Leak compensation Automatic response to varying leaks and configurable trigger sensitivity in all modes
Inspiratory leakage up to 85 l/min, expiratory leakage up to 30 l/min

PSync Guaranteed rate ventilation

¹⁾ Optional - not available in all markets

Technical specifications

Controls

| Type | Adult/Pediatric | Neonatal ¹⁾ |
|--------------------------------|---|--|
| Special functions | Manual breath, O ₂ enrichment, standby, sigh, screen lock, apnea backup ventilation, inspiratory hold, print screen, suctioning tool, dimmable screen, configurable quick-start settings, startup settings based on patient height and gender, integrated pneumatic nebulizer, tube resistance compensation (TRC), reference loops, adjustable timescale, expiratory hold, P/V Tool Pro, Patient tab, on-screen help, auto-recruitment (INTELLiVENT-ASV), Quick Wean (INTELLiVENT-ASV), spontaneous breathing trial (INTELLiVENT-ASV), ventilation timer | Manual breath, O ₂ enrichment, standby, screen lock, apnea backup ventilation, inspiratory hold, print screen, suctioning tool, dimmable screen, configurable quick-start settings, startup settings based on patient weight and gender, integrated pneumatic nebulizer, tube resistance compensation (TRC), reference loops, adjustable timescale, expiratory hold, P/V Tool Pro, Patient tab, on-screen help, ventilation timer |
| Ventilation modes | See page 2, Ventilation modes | See page 2, Ventilation modes |
| Patient groups | adult/pediatric | neonatal |
| Patient height | 30 to 250 cm | - |
| Patient gender | male/female | - |
| Patient weight | - | 0.2 to 30 kg |
| Respiratory rate | | |
| APVcmv/(S)CMV+ | 4 to 80 b/min | 15 to 150 b/min |
| APVsimv+/SIMV+ | 1 to 80 b/min | 1 to 150 b/min |
| PCV+ | 4 to 80 b/min | 15 to 150 b/min |
| NIV-ST | 5 to 80 b/min | 15 to 150 b/min |
| (S)CMV | 4 to 80 b/min | - |
| SIMV | 1 to 80 b/min | - |
| PSIMV+ | 5 to 80 b/min | 15 to 150 b/min |
| DuoPAP | 1 to 80 b/min | 1 to 150 b/min |
| APRV | 1 to 80 b/min | 1 to 150 b/min |
| nCPAP-PS ¹⁾ | - | 5 to 150 b/min |
| Tidal volume | 20 to 2,000 ml | 2 to 300 ml |
| PEEP/CPAP | 0 to 35 cmH ₂ O | 0 to 25 cmH ₂ O |
| Oxygen | 21% to 100% | 21% to 100% |
| I:E ratio | 1:9 to 4:1 (DuoPAP 1:599 to 149:1) | 1:9 to 4:1 (DuoPAP 1:599 to 149:1) |
| %MinVol (ASV, INTELLiVENT-ASV) | 25% to 350% | - |
| Inspiratory time (TI) | 0.1 to 12 s | 0.1 to 12 s |
| Flow trigger | off, 1 to 20 l/min off only in PCV+, APVcmv, (S)CMV | off, 0.1 to 5 l/min off only in PCV+, APVcmv |
| Pressure trigger | off, -0.1 to -15 cmH ₂ O off only in PCV+, APVcmv, (S)CMV | off, -0.1 to -15 cmH ₂ O off only in PCV+, APVcmv |
| Pressure control | 5 to 60 cmH ₂ O, added to PEEP/CPAP | 3 to 60 cmH ₂ O, added to PEEP/CPAP |
| Pressure support | 0 to 60 cmH ₂ O, added to PEEP/CPAP | 0 to 60 cmH ₂ O, added to PEEP/CPAP |
| PSync | on/off | on/off |

¹⁾ Optional - not available in all markets

Technical specifications

Controls

| Type | Adult/Pediatric | Neonatal ¹⁾ |
|---|---|------------------------------------|
| Pressure ramp | 0 to 2,000 ms | 0 to 600 ms |
| P high (APRV/DuoPAP) | 0 to 60 cmH ₂ O | 0 to 60 cmH ₂ O |
| P low (APRV) | 0 to 35 cmH ₂ O | 0 to 25 cmH ₂ O |
| T high (APRV/DuoPAP) | 0.1 to 40 s | 0.1 to 40 s |
| T low (APRV) | 0.2 to 40 s | 0.2 to 40 s |
| Expiratory trigger sensitivity (ETS) | 5% to 80% of peak inspiratory flow | 5% to 80% of peak inspiratory flow |
| Peak flow | up to 240 l/min | up to 240 l/min |
| Flow pattern ((S)CMV, SIMV) | Square, 50% decel., 100% decel., Sine | - |
| Peak flow ((S)CMV, SIMV) | 1 to 195 l/min | - |
| Pause ((S)CMV, SIMV) | 0 to 70% | - |
| Inspiratory time pause ((S)CMV, SIMV) | 0.0 to 8.0 s | - |
| Flow (HiFlowO ₂) | 2 to 80 l/min | 2 to 12 l/min |
| Patient condition (INTELLiVENT-ASV) | ARDS, Brain Injury, Chronic Hypercapnia, None | - |
| Lower Oxygen limit (INTELLiVENT-ASV) | 21% to 30% | - |
| PEEP limit control (INTELLiVENT-ASV) | 5 to 24 cmH ₂ O | - |
| Pasvlimit (ASV, INTELLiVENT-ASV) | 5 to 60 cmH ₂ O | - |
| Target shift SpO ₂ (INTELLiVENT-ASV) | -5% to 5% | - |
| Target shift CO ₂ (INTELLiVENT-ASV) | -20 to 10 mmHg | - |
| Quick Wean (INTELLiVENT-ASV) | on/off | - |
| Auto-recruitment (INTELLiVENT-ASV) | on/off | - |
| P support max (Quick Wean) | 6 to 25 cmH ₂ O | - |
| Rate (Quick Wean) | 25 to 65 b/min | - |
| Ramp speed (P/V Tool) | 2 to 5 cmH ₂ O | - |
| Pstart (P/V Tool) | 0 to 20 cmH ₂ O | - |
| EndPEEP (P/V Tool) | 0 to 20 cmH ₂ O | - |
| Ptop (P/V Tool) | 25 to 60 cmH ₂ O | - |
| Tpause (P/V-Tool) | 0 to 30 s | - |
| TRC expiration | on/off | on/off |
| TRC tube type | ET tube, Trach tube, Disable TRC | ET tube, Trach tube, Disable TRC |
| TRC tube size (ID) | 3 to 10 mm | 2.5 to 5 mm |
| TRC compensation level | 0 to 100% | 0 to 100% |
| Display brightness | 10% to 100% | 10% to 100% |

¹⁾ Optional - not available in all markets

Technical specifications

Monitoring parameters

| Type | Parameter | Unit | Description | Numeric monitoring | Wave-forms | Vent Status | Dynamic Lung |
|------------------------------|------------------------------------|----------------------------------|--|-------------------------|------------|-------------|--------------|
| Pressure | Paw | cmH ₂ O ²⁾ | Real-time airway pressure | | ✓ | | |
| | Ppeak | cmH ₂ O ²⁾ | Peak airway pressure | ✓ | | | |
| | Pmean | cmH ₂ O ²⁾ | Mean airway pressure | ✓ | | | |
| | Pinsp | cmH ₂ O ²⁾ | Inspiratory pressure | | | ✓ | |
| | PEEP/CPAP | cmH ₂ O ²⁾ | Positive end expiratory pressure/ continuous positive airway pressure | ✓ | | ✓ | |
| | Ptrachea | cmH ₂ O ²⁾ | Real-time tracheal pressure | | ✓ | | |
| | Pplateau | cmH ₂ O ²⁾ | Plateau or end inspiratory pressure | ✓ | ✓ | | |
| Flow | Flow | l/min | Real-time inspiratory flow | | ✓ | | |
| | Insp Flow | l/min | Peak inspiratory flow | ✓ | | | |
| | Exp Flow | l/min | Peak expiratory flow | ✓ | | | |
| Volume | Volume | ml | Real-time tidal volume | | ✓ | | |
| | VTE/VTE NIV | ml | Expiratory tidal volume | ✓ | | | ✓ |
| | VTI/VTI NIV | ml | Inspiratory tidal volume | ✓ | | | |
| | ExpMinVol/MinVol NIV | l/min | Expiratory minute volume | ✓ | | ✓ | |
| | MVSpont/MVSpont NIV | l/min | Spontaneous expiratory minute volume Leakage minute volume | ✓ | | | |
| | Leak/MV Leak | %; l/min | Leakage percentage at the airway | ✓ | | | |
| | Vt/IBW (adult only) | ml/kg | Tidal volume/IBW ratio | ✓ | | | |
| Vt/weight (neonatal only) | ml/kg | Tidal volume/weight ratio | ✓ | | | | |
| Time | I:E | | Inspiratory-expiratory ratio | ✓ | | | |
| | fTotal | b/min | Total breathing frequency | ✓ | | | |
| | fSpont | b/min | Spontaneous breathing frequency | ✓ | | | |
| | TI | s | Inspiratory time | ✓ | | | |
| | TE | s | Expiratory time | ✓ | | | |
| | %fSpont | % | Percentage of spontaneous breathing rate | | | ✓ | |
| Lung mechanics | Cstat | ml/cmH ₂ O | Static compliance | ✓ | | | ✓ |
| | AutoPEEP | cmH ₂ O ²⁾ | AutoPEEP or intrinsic PEEP | ✓ | | | |
| | RCexp | s | Expiratory time constant | ✓ | | | |
| | Rinsp | cmH ₂ O/l/s | Inspiratory flow resistance | ✓ | | | ✓ |
| | RSB | 1/l*min | Rapid shallow breathing index | | | ✓ | |
| | PTP | cmH ₂ O*s | Pressure-time product | ✓ | | | |
| | P0.1 | cmH ₂ O ²⁾ | Airway occlusion pressure | ✓ | | | |
| Oxygen | O ₂ | % | Airway oxygen concentration (FiO ₂) | ✓ | | ✓ | |
| Carbon dioxide ¹⁾ | CO ₂ | mmHg% | Real-time CO ₂ measurement | | ✓ | | |
| | FetCO ₂ | % | Fractional end-tidal CO ₂ concentration | ✓ | ✓ | | |
| | PetCO ₂ | mmHg | End-tidal CO ₂ partial pressure | ✓ | ✓ | | ✓ |
| | SlopeCO ₂ | %CO ₂ /l | V/Q status of the lung | ✓ | | | |
| | VTalv | ml | Alveolar tidal ventilation | ✓ | | | |
| V'alv | V'alv | l/min | Alveolar minute ventilation | ✓ | | | |
| | V'CO ₂ | ml/min | CO ₂ elimination | ✓ | | | |
| | VDaw | ml | Airway dead space | ✓ | | | |
| | VDaw/VTE | % | Dead space fraction measured at the airway opening | ✓ | | | |
| | VeCO ₂ | ml | Exhaled volume of CO ₂ | ✓ | | | |
| | ViCO ₂ | ml | Inspired volume of CO ₂ | ✓ | | | |
| | SpO ₂ ¹⁾ | Plethysmogram | - | Real-time plethysmogram | | ✓ | |
| SpO ₂ | | % | Arterial oxygen saturation in blood | ✓ | | | ✓ |
| Pulse | | 1/min | Heart rate | ✓ | | | ✓ |
| Perfusion index (PI) | | % | Pulse signal strength | ✓ | | | |
| | SpO ₂ /FiO ₂ | - | Calculated approximation of PaO ₂ /FiO ₂ | ✓ | | | |

¹⁾ Optional - not available in all markets | ²⁾ Available in mbar and hPa

Technical specifications

Accessories

| | |
|----------------------------|--|
| Trolley accessories | Cylinder holder, humidifier support, tubing support arm, infusion pole |
| Compact transport solution | Bed mount and wall mount available |
| Adapter plate | Quick-lock adapter plate for various applications |

Physical dimensions

| | |
|------------------------------|---|
| Size | See illustrations below |
| Weight | 9.5 kg (21 lb) without trolley |
| Display | 12.1 in, TFT color 1280 x 800 pixel, touch screen with dimmable backlight |
| Main patient outlet | EN ISO 5356-1:2004, 22M/15F |
| Oxygen inlet (high pressure) | DISS or NIST male |
| Oxygen inlet (low pressure) | CPC quick coupling, 3.2 min ID |



Hamilton Medical

Intelligent Ventilation since 1983

In 1983 Hamilton Medical was founded with a vision: To develop intelligent ventilation solutions that make life easier for patients in critical care and for the people who care for them. Today, Hamilton Medical is a leading manufacturer of critical care ventilation solutions for a wide variety of patient populations, applications, and environments.

The right ventilation solution for every situation

The ventilators from Hamilton Medical ventilate all of your patients; in the intensive care unit, during an MRI procedure and in all transport situations, from the neonate to the adult. Each of these ventilators is equipped with the same standardized user interface and uses the same Intelligent Ventilation technologies. This enables Hamilton Medical ventilators to help you to

- Increase the comfort and safety of your patients
- Make life easier for the caregivers
- Increase efficiency

