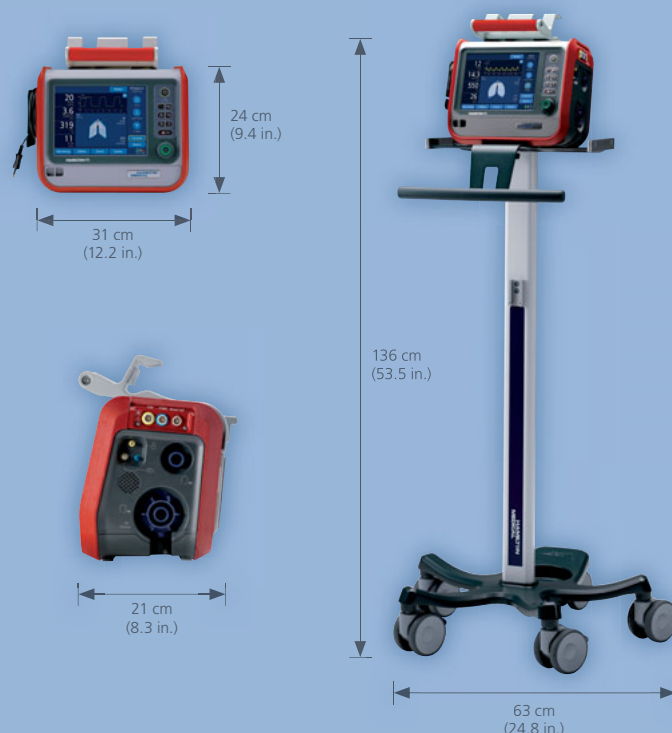


# HAMILTON-T1

## Technical Specifications

| Ventilation Cockpit                   |   |
|---------------------------------------|---|
| Dynamic Lung                          | Real-time visualization of the lungs with representations of tidal volume, lung compliance, resistance and patient activity   |
| Vent Status                           | Visual representation of ventilator dependency, grouped into oxygenation, CO <sub>2</sub> elimination, patient activity   |
| ASV target graphics                   | Graphic display of target and actual parameters for tidal volume, frequency, pressure, patient activity and minute ventilation  |
| Monitoring                            | 41 monitoring parameters can be displayed (see monitoring parameters)   |
| Real-time waveforms                   | Paw, Flow, Volume   |
| Others                                | Optional: Volumetric CO <sub>2</sub> , sidestream CO <sub>2</sub><br>Optional: Loops: P-V, V-Flow, P-Flow, V-CO <sub>2</sub><br>Optional: Trends: 1h, 6h, 12h, 24h  |
| Controls                              |   |
| Ventilation modes                     | ASV, (S)CMV+/APVcmv, SIMV+/APVsimv, PCV+ , SPONT, PSIMV+<br>Optional: APRV, DuoPAP, NIV, NIV-ST   |
| Special functions                     | Manual breath, O <sub>2</sub> enrichment, standby, sigh, screen-lock, apnea backup ventilation, inspiratory hold, screen-shot, suctioning tool, dimmable screen, configurable Quickstart-Settings, start-up over body height and IBW, nebulizer |
| Patient types                         | adult/pediatric   |
| Patient height                        | adjustable  |
| (S)CMV+/APVcmv, PCV+                  | 4 to 80 b/min   |
| SIMV+/APVsimv, DuoPAP, PSIMV+, NIV-ST | 1 to 80 b/min   |
| APRV                                  | 1 to 200 b/min  |
| Tidal volume                          | 20 to 2000 ml   |
| PEEP/CPAP                             | 0 to 35 cmH <sub>2</sub> O  |
| Oxygen                                | 21 to 100 %   |
| I:E ratio                             | 1:9 to 4:1 (DuoPAP 1:599 to 149:1)  |
| %MinVol (ASV)                         | 25 to 350 %   |
| Inspiratory time (TI)                 | 0.1 to 12 s   |
| Flow trigger                          | off, 1 to 20 l/min  |
| Pressure control                      | 3 to 60 cmH <sub>2</sub> O, added to PEEP/CPAP  |
| Pressure support                      | 0 to 60 cmH <sub>2</sub> O, added to PEEP/CPAP  |
| Pressure ramp                         | 0 to 2000 ms  |
| P high (APRV/DuoPAP)                  | 0 to 60 cmH <sub>2</sub> O  |
| P low (APRV)                          | 0 to 35 cmH <sub>2</sub> O  |
| T high (APRV/DuoPAP)                  | 0.1 to 40 s   |
| T low (APRV)                          | 0.2 to 40 s   |
| Expiratory trigger sensitivity (ETS)  | 5 to 80 % of inspiratory peak flow  |
| Peak flow                             | Spontaneous > 210l/min  |
| 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 <sub>2</sub> <sup>1)</sup>   |
| Special alarms                        | Oxygen concentration, disconnection, loss of PEEP, exhalation obstruction, flow sensor, power supply, battery, gas supply   |
| Loudness                              | Adjustable (1 – 10)   |
| Event log                             |   |
|                                       | Storage and display of up to 1000 events with date and time stamp   |



| Standards | IEC 60601-1, IEC 60601-1-2, IEC 60601-2-12, CAN/CSA-C22.2 No. 601.1, UL 60601-1, EN 794-1 EN 794-3, EN 1789 for ambulances, EN 13718-1, RTCA/DO-160F for air transport, MIL-STD-461E control of electromagnetic interference |
|-----------|--|
|-----------|--|

| Physical dimensions |   |
|---------------------|---|
| Size                | See above (without handle)  |
| Weight              | 6.5 kg (14.3 lb) with 1 battery and a handle                      |
| Display             | 8.4 in., TFT color, backlit, touchscreen, night vision capability |
| Main patient outlet | ISO 5356-1; 22M/15F   |
| Oxygen inlet        | DISS or NIST male   |
| Low oxygen inlet    | CPC quick coupling, 3.2 mm ID                                     |

| Electrical and gas supplies |   |
|-----------------------------|---|
| Input voltage               | 100 to 240 V ~ ±10%, 50/60 Hz AC or 10 to 30.3 V DC               |
| Power consumption           | 50 W typical, 150 W maximum                                       |
| Backup battery time         | 5.5 hours typical with one internal and one hot swappable battery |
| Oxygen supply               | 280 to 600 kPa (41 to 87 psi), 120 l/min                          |
| Low pressure oxygen         | ≤15 l/min, max. 600 hPa for low pressure                          |
| Air supply                  | Integrated turbine  |
| Degree of protection        | IPX4  |

| Environment |  |
|-------------|--|
| Temperature | -15 to 40 °C (operating), -20 to 70 °C (storage) |
| Humidity    | 10 to 95 % non condensing (operating & storage)  |
| Altitude    | Up to approx. 4600 m (15,081 ft) 1100 to 570 hPa |

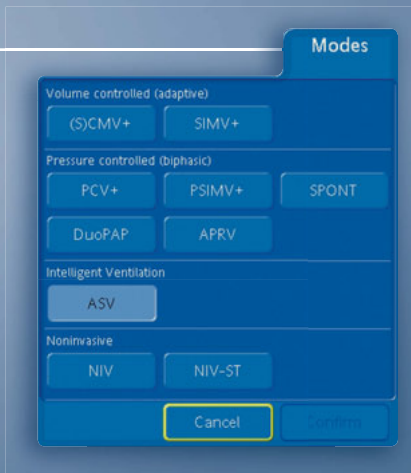
| Interface connectors | USB; optional RS-232, nurse call, CO <sub>2</sub> |
|----------------------|---|
|----------------------|---|



### Ventilation modes

| Type                | Mode           | Description  | Adult/Pediatric |
|---------------------|----------------|--|-----------------|
| Closed-loop control | ASV            | Adaptive Support Ventilation. Guaranteed minute volume based on user setting and application of lung-protective rules. | ✓               |
| Pressure            | PCV+           | Pressure-controlled ventilation. Biphasic breathing  | ✓               |
|                     | PSIMV+         | Pressure-controlled synchronized intermittent mandatory ventilation  | ✓               |
|                     | SPONT          | Pressure support ventilation   | ✓               |
|                     | APRV           | Airway pressure release ventilation: optional  | ✓               |
|                     | DuoPAP         | Duo positive airway pressure: optional   | ✓               |
| Volume              | (S)CMV+/APVcmv | (Synchronized) controlled mandatory ventilation  | ✓               |
|                     | SIMV+/APVsimv  | Synchronized intermittent mandatory ventilation  | ✓               |
| Non-invasive        | NIV            | Non-invasive ventilation: optional   | ✓               |
|                     | NIV-ST         | Spontaneous / timed non-invasive ventilation: optional   | ✓               |

# Configurations



|                    |  |
|--------------------|--|
| <b>IntelliTrig</b> | Automatic response to varying leaks and adaption of trigger sensitivity in NIV modes   |
| <b>Trolley</b>     |  |
| <b>Accessories</b> | Humidifier support, cylinder holder, tubing support arm  |
| <b>Options</b>     | Volumetric mainstream capnography<br>Sidestream capnography<br>DuoPAP/APRV; NIV/NIV-ST; Trend/Loops  |
| <b>Accessories</b> | 2 handles available: one with jet/ambulance mounting option and one with bed rail mounting option<br>T1 carrying unit for bedside transport with O <sub>2</sub> cylinder |



| Type                         | Parameter              | Unit                        | Description  | Numeric monitoring           | Waveforms | Vent Status | Dynamic Lung (visual) |
|------------------------------|------------------------|-----------------------------|--|------------------------------|-----------|-------------|-----------------------|
| Pressure                     | Paw                    | cmH <sub>2</sub> O;mbar;hPa | Real-time airway pressure  |                              | ✓         |             |                       |
|                              | Ppeak                  | cmH <sub>2</sub> O;mbar;hPa | Peak airway pressure   | ✓                            |           |             |                       |
|                              | Pmean                  | cmH <sub>2</sub> O;mbar;hPa | Mean airway pressure   | ✓                            |           |             |                       |
|                              | Pinsp                  | cmH <sub>2</sub> O;mbar;hPa | Inspiratory pressure   |                              |           | ✓           |                       |
|                              | PEEP/CPAP              | cmH <sub>2</sub> O;mbar;hPa | Positive end expiratory pressure/<br>continuous positive airway pressure | ✓                            |           | ✓           |                       |
|                              | Ptrachea               | cmH <sub>2</sub> O;mbar;hPa | Real-time tracheal pressure  |                              | ✓         |             |                       |
|                              | Pplateau               | cmH <sub>2</sub> O;mbar;hPa | 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                    | 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,<br>Leakage minute volume           | ✓                            |           |             |                       |
|                              | Leak/MV Leak           | %;l/min                     | Leakage percentage at the airway   | ✓                            |           |             |                       |
|                              | 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 <sub>2</sub> O       | Static compliance  | ✓                            |           |             | ✓                     |
|                              | AutoPEEP               | cmH <sub>2</sub> O;mbar;hPa | AutoPEEP or intrinsic PEEP   | ✓                            |           |             |                       |
|                              | RCexp                  | s                           | Expiratory time constant   | ✓                            |           |             |                       |
|                              | Rinsp                  | cmH <sub>2</sub> O*s/l      | Inspiratory flow resistance  | ✓                            |           |             | ✓                     |
|                              | RSB                    | 1/l*min                     | Rapid shallow breathing index  |                              |           | ✓           |                       |
|                              | PTP                    | cmH <sub>2</sub> O*s;mbar*s | Pressure time product  | ✓                            |           |             |                       |
|                              | P0.1                   | cmH <sub>2</sub> O;mbar;hPa | Airway occlusion pressure  | ✓                            |           |             |                       |
| Oxygen                       | O <sub>2</sub>         | %                           | Airway oxygen concentration (FiO <sub>2</sub> )                          | ✓                            |           | ✓           |                       |
| Carbon dioxide <sup>1)</sup> | CO <sub>2</sub>        | mmHg;%;kPa                  | Real-time CO <sub>2</sub> measurement                                    |                              | ✓         |             |                       |
|                              | FetCO <sub>2</sub>     | %                           | Fractional end-tidal CO <sub>2</sub> concentration                       | ✓                            | ✓         |             |                       |
|                              | PetCO <sub>2</sub>     | mmHg;Torr;kPa               | End-tidal CO <sub>2</sub> partial pressure                               | ✓                            | ✓         |             | ✓                     |
|                              | SlopeCO <sub>2</sub>   | %CO <sub>2</sub> /l         | V/Q status of the lung   | ✓                            |           |             |                       |
|                              | VTalv                  | ml                          | Alveolar tidal ventilation   | ✓                            |           |             |                       |
|                              | VTalv/min              | ml                          | Alveolar minute ventilation  | ✓                            |           |             |                       |
|                              | V'CO <sub>2</sub> /min | ml/min                      | CO <sub>2</sub> elimination  | ✓                            |           |             |                       |
|                              | VDaw                   | ml                          | Airway dead space  | ✓                            |           |             |                       |
|                              | VDaw/VTE               | %                           | Dead space fraction measured at the<br>airway opening                    | ✓                            |           |             |                       |
|                              | VeCO <sub>2</sub>      | ml                          | Exhaled volume of CO <sub>2</sub>  | ✓                            |           |             |                       |
|                              | ViCO <sub>2</sub>      | ml                          | Inspired volume of CO <sub>2</sub>                                       | ✓                            |           |             |                       |

<sup>1)</sup> With CO<sub>2</sub> option installed



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