

**RAPHAEL** XTC

Intelligent Ventilation



Noninvasive and invasive ventilation

**HAMILTON**  
**MEDICAL**

# Superior noninvasive ventilation



Noninvasive positive pressure ventilation (NPPV) is increasingly used in a wide range of clinical situations. The RAPHAEL XTC represents a new vision of NPPV. This **Intelligent Ventilation** solution combines the advantages of:

- a flexible NPPV ventilator
- a full-featured invasive ventilator
- easy switching between NPPV and invasive ventilation.

The RAPHAEL XTC is a flexible and competitively priced solution for step-down or subacute care units, long-term care centers, ICUs, recovery rooms or transit.

## Full flexibility

With the new LiteCircuit single-limb breathing circuit (patent pending), noninvasive ventilation is easy, flexible and comfortable for the patient. As an alternative, a double-limb circuit can also be used. It offers maximum flexibility when changing from or to invasive ventilation.

## Adaptive trigger sensitivity

Changing breathing patterns or circuit leaks are a challenge in noninvasive ventilation. With the innovative IntelliTrig technology, the RAPHAEL XTC automatically responds to leak changes and adapts sensitivity thresholds for optimal response to the patient's breath.

## Easy switch to invasive ventilation

If you ever need to, you can start invasive ventilation with the RAPHAEL XTC in a matter of seconds. This saves time in critical situations.

## Superior ventilation technology

The RAPHAEL XTC is based on high-end ventilation technology - thus providing:

- quiet operation
- intuitive user-interface
- large, full color screen
- advanced monitoring and alarms
- precise, built-in oxygen control

# High performance invasive ventilation



In invasive ventilation, the RAPHAEL XTC ventilator gives you all the features of a high-end invasive ventilator at an affordable price. The RAPHAEL XTC features a compact, biphasic design that helps patients to breathe more freely in all modes and phases. Small enough to fit into almost any ICU environment, it covers the **full range** of clinical requirements and is appropriate for all patients from children to adults.

## Reliability and performance

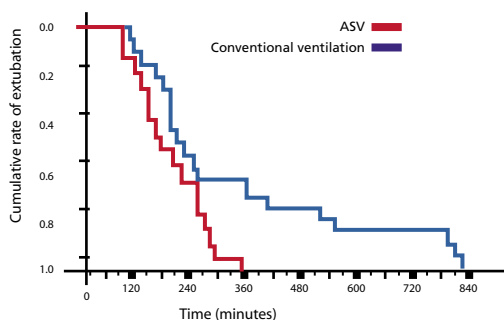
The RAPHAEL XTC combines reliability and **high performance** with advanced lung protective strategies and patient-adaptive modes. Biphasic ventilation encourages spontaneous activity right from the start of mandatory ventilation. The RAPHAEL XTC's fast set-up and easy management ensure the most appropriate treatment for every patient.

## ASV – One ventilation mode from intubation to weaning

Adaptive Support Ventilation (ASV) is HAMILTON MEDICAL's **Intelligent**  **Ventilation** mode, that delivers a unique combination of:

- superior performance in complex environments
  - improved patient outcomes
  - reduced costs of ownership
- ASV is an easy-to-use and safe mode of ventilation for the respiratory management of your intubated patients. ASV employs lung-protective rules and adjusts the ventilatory pattern based on the patient's pulmonary mechanics and spontaneous respiratory activity.

Studies<sup>1</sup> show that ASV facilitates shorter time on the ventilator, while at the same time less user interaction is required and fewer alarms occur.



1. Sulzer CF. Adaptive Support Ventilation for fast tracheal extubation after cardiac surgery: A randomized controlled study. Anesthesiology 2001, 95:1339-45

Controls	
Bodyweight	5 - 200 kg
Ventilation modes	(S)CMV+, SIMV+, PCV+, PSIMV+, SPONT
Special modes	NIV, ASV, DuoPAP, APRV
Mode additions	Tube resistance compensation (TRC) 0 - 100% compensation, ET tube, trach tube
Special functions	Manual breath, inspiratory hold, disconnection suppression, nebulizer, 100% O <sub>2</sub> , stand-by, sigh, bidirectional apnea backup, IntelliTrig leak compensation, last setup
(S)CMV+ rate	8 - 80 b/min
PCV+ rate	4 - 80 b/min
SIMV+, PSIMV+, DuoPAP rate	1 - 80 b/min
Tidal volume	50 - 2000 ml
PEEP/CPAP and P low	0 - 35 cmH <sub>2</sub> O
Oxygen	21 - 100%
I:E ratio	1:9 - 4:1 (I:E, TE, and TI are always visible)
Inspiratory time	0.1 - 9.6 s (PSIMV+, SIMV+)
T low (APRV)	0.2 - 30 s
T high (DuoPAP and APRV)	0.1 - 30 s
Trigger (flow)	Off, 1 - 10 l/min
Baseflow	0 - 10
ETS	5 - 70% of inspiratory peak flow
Pramp	50 - 200 ms
Pressure control	5 - 50 cmH <sub>2</sub> O above PEEP/CPAP
Pressure support	0 - 50 cmH <sub>2</sub> O above PEEP/CPAP
P high (DuoPAP and APRV)	0 - 75 cmH <sub>2</sub> O
Pasvlimit	5 - 70 cmH <sub>2</sub> O
% minute volume (ASV)	25 - 350%
Apnea time	15 - 60 s
Flow (automatic)	0 - 120 l/min typical, 180 l/min maximum
Patient monitoring	
Pressures	PEEP/CPAP, Ppeak, P <sub>insp</sub> , P <sub>mean</sub>
Volume	Spontaneous and total expiratory minute volume, VTE, leak in %
Flow	Inspiratory peak flow, expiratory peak flow
Time	I:E ratio, TI, TE, total and spontaneous
Others	Resistance, compliance, AutoPEEP, trigger, O <sub>2</sub> , RCexp

Real-time curves	Volume, flow, pressure
Loops	Pressure-volume, volume-flow, pressure-flow
Trends	1 h, 12 h, 24 h, of 19 monitored parameters
ASV graphics	Target and actual values for minute ventilation, tidal volume, and rate
Alarms	
Low/high ExpMinVol	0.1 - 50 l/min
Pmax	15 - 80 cmH <sub>2</sub> O
Low/high fTotal	0 - 99 b/min
O <sub>2</sub> %	± 5% of setting, 18% minimum, 105% maximum
Apnea	15 - 60 s
Other	Disconnection, pressure limitation, Flow Sensor, gas supply, electrical supply, battery low, exhalation obstructed, user messages, technical alarms
Event log	Storage and display of up to 1000 events with time stamp

### Electrical and gas supplies

Input voltage	100 to 125 and 200 to 240 V~, 50/60 Hz
Power consumption	40 VA typical
Backup battery time	Typically 60 minutes
O <sub>2</sub> and air supply	200 to 600 kPa (29 to 86 psi), 120 l/min

### Physical dimensions

W x D x H	33 x 53 x 42 cm (13 x 20.9 x 16.5 in.) 46 x 66 x 147 cm (18.1 x 28.0 x 57.9 in.) on trolley with compressor
Weight	18 kg (40 lb) ventilator only 47 kg (104 lb) ventilator on trolley 78 kg (172 lb) ventilator on trolley with compressor
Display	10.4 in., backlit, TFT color
Standards	IEC 601-1/EN 60601-1, IEC 601-1-2/ EN 60601-1-2, EN 794-1, SN EN 12598, EN 60601-2-12
Hardware options	Communications interface (RS-232, nurse call, I:E ratio)
Note	1 hPa = 1 mbar ≈ 1 cmH <sub>2</sub> O



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Quality