

# HAMILTON·G5

# Technical Specifications

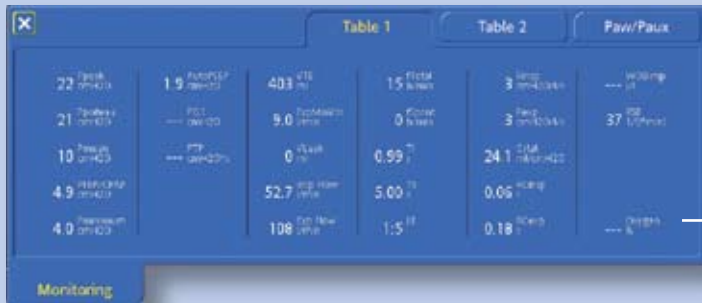
Ventilation Cockpit	
Dynamic Lung	Real-time visualization of the lungs with representations of tidal volume, lung compliance, resistance, and patient activity
Vent Status	Visual representation of ventilator dependency, grouped into oxygenation, CO <sub>2</sub> elimination, and patient activity
ASV target graphics	Graphic display of target and actual parameters for tidal volume, frequency, pressure, and minute ventilation
Numeric monitoring	37 monitoring parameters can be displayed (see Monitoring parameters)
Real-time waveforms/loops	Simultaneous display of up to 4 waveforms or 2 loops based on: volume, flow, airway pressure, auxiliary pressure, or CO <sub>2</sub>
Trending	Simultaneous display of up to 4 parameter trends, selected from all 37 monitoring parameters, for 1, 12, or 24 hours
Others	Graphic freeze and cursor function, inspiratory/expiratory hold Layout can be configured with combinations of the graphic displays described above
Controls	
Ventilation modes	(S)CMV, SIMV, SPONT, ASV, P-CMV, P-SIMV, APVcmv, APVsimv, DuoPAP, APRV, NIV
Special functions	Nebulizer, manual breath, 100% O <sub>2</sub> , standby, sigh, apnea backup ventilation, tube resistance compensation (TRC), optional heliox application
Patient types	Adult, pediatric, neonatal
Patient gender	Male, female
Patient height	Adult (130 to 250cm), pediatric (40 to 150cm)
(S)CMV and P-CMV rate	5 to 120 b/min
SIMV, P-SIMV, DuoPAP rate	1 to 60 b/min
Tidal volume / target tidal volume*	2 to 2000 ml (10 to 2000 ml in volume controlled modes)
PEEP/CPAP (P low)	0 to 50 cmH <sub>2</sub> O (DuoPAP and APRV)
Oxygen	21 to 100%
I:E ratio	1:9 to 4:1
Inspiratory time	0.1 to 10 s (10 to 80% of cycle time)
Pause time	0 to 8 s (0 to 70% of cycle time)
Peak flow	1 to 180 l/min
T low (APRV)	0.2 to 30 s
T high (DuoPAP and APRV)	0.1 to 30 s
Pressure trigger	0.5 to 10 cmH <sub>2</sub> O below PEEP/CPAP
Flow trigger	0.5 to 15 l/min
Automatic base flow	4 to 30 l/min, depending on flow trigger setting
Pressure control	5 to 100 cmH <sub>2</sub> O, added to PEEP/CPAP
Pressure support	0 to 100 cmH <sub>2</sub> O, added to PEEP/CPAP



P high (DuoPAP and APRV)	0 to 50 cmH <sub>2</sub> O
Pressure ramp	25 to 200 ms
Expiratory trigger sensitivity (ETS)	5 to 70% of inspiratory peak flow
% minute volume (ASV)	25 to 350%
Flow patterns	Sine, square, 100% decelerating, 50% decelerating
<b>Flow Sensor dead space</b>	9 ml (pediatric/adult), 2 ml (infant)
Pulmonary function assessment	
P/V Tool	Automatic maneuver for static compliance assessment and lung recruitment
Alarms	
Operator-adjustable	Low/high minute volume, low/high pressure, low/high tidal volume, low/high rate, apnea time, low/high PetCO <sub>2</sub> , %leak
Special alarms	Oxygen concentration, disconnection, loss of PEEP, exhalation obstruction, check settings, Flow Sensor alarms, ASV/APV, CO <sub>2</sub> , power supply, batteries, gas supplies
Loudness	Adjustable (1-10)
<b>Event log</b>	Storage and display of up to 1000 events with date and time stamp
<b>Standards</b>	IEC 60601-1, IEC 60601-1-2, IEC 60601-2-12, EN 794-1, C22.2 No. 601.1, UL 60601-1
<b>Others</b>	Automatic leakage compensation
<b>Options</b>	CO <sub>2</sub> sensor, heliox application, communications interface including 2 x RS-232C ports, remote nurse call and I:E ratio, integrated power strip, extended batteries

\*Tidal volume delivered in pressure-based ventilation modes depends on both the applied inspiratory pressure and lung mechanics. In the HAMILTON-G5 infant application, this volume may be as low as 2 ml. This is different from HAMILTON-G5 APV modes, where the smallest tidal volume setting is 10 ml.

# HAMILTON-G5



## Ventilation modes

Type	Mode	Description	Neonatal capability
Closed-loop control	ASV	Adaptive Support Ventilation. Guaranteed minute volume based on user setting and application of lung-protective rules.	
Adaptive	APVcmv	Adaptive pressure ventilation + CMV	✓
	APVsimv	Adaptive pressure ventilation + SIMV	✓
Pressure	P-CMV	Pressure-controlled mandatory ventilation	✓
	P-SIMV	Pressure-controlled synchronized intermittent mandatory ventilation	✓
	SPONT	Pressure support ventilation	✓
	DuoPAP	Dual positive airway pressure (Biphasic Positive Airway Pressure)	✓
	APRV	Airway pressure release ventilation	✓
Volume	(S)CMV	(Synchronized) controlled mandatory ventilation	
	SIMV	Synchronized intermittent mandatory ventilation	
Noninvasive	NIV	Noninvasive ventilation	

## Configurations and dimensions



### Physical dimensions

Size	See above (right)
Weight	57 kg (125.6 lb) with standard trolley, 42 kg (92.6 lb) with shelf mount
Display (detachable)	15 in., TFT color, backlit, touchscreen, 3m (10 ft) cable
Main patient outlet	ISO 22M/15F
Air and oxygen inlets	DISS male, NIST (option), adapter for heliox
<b>Electrical and gas supplies</b>	
Input voltage	100 to 240 V ~ ±10%, 50/60 Hz
Power consumption	210 VA maximum

Backup battery time	1 hour typical with internal battery. 1 hour per each optional hot-swappable extended battery
Oxygen and air supplies	200 to 600 kPa (29 to 86 psi)
<b>Environment</b>	
Temperature	10 to 40 °C (operating), -10 to 60 °C (storage)
Humidity	30 to 75% noncondensing (operating), 5 to 85% noncondensing (storage)
Altitude	Up to 3000 m (11,483 ft), automatically adjusted
<b>Interface connectors</b>	
	USB and CompactFlash for screenshots, DVI with VGA output, RJ45

Monitoring parameters				Numeric monitoring/ Trending	Waveform/ Loops	Vent Status	Dynamic Lung (visual)
Type	Parameter	Unit	Description				
Pressure	Paw	cmH <sub>2</sub> O/mbar	Real time airway pressure		✓		
	Paux	cmH <sub>2</sub> O/mbar	Real time auxiliary pressure		✓		
	Ppeak	cmH <sub>2</sub> O/mbar	Peak airway pressure	✓			
	Pmean	cmH <sub>2</sub> O/mbar	Mean airway pressure	✓			
	Pminimum	cmH <sub>2</sub> O/mbar	Minimum airway pressure	✓			
	Pplateau	cmH <sub>2</sub> O/mbar	Plateau airway pressure	✓			
	PEEP/CPAP	cmH <sub>2</sub> O/mbar	Positive-end expiratory pressure / continuous positive airway 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	✓			
	ExpMinVol	ml	Expiratory minute volume	✓		✓	
	VLeak	ml	Leakage volume 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	✓			✓
	Vari. Index	%	Variability index			✓	
	%SpontRate	%	Percentage of spontaneous breathing rate			✓	
Lung mechanics	Cstat	ml/cmH <sub>2</sub> O	Static compliance	✓			✓
	P01	cmH <sub>2</sub> O/mbar	Airway occlusion pressure	✓		✓	
	AutoPEEP	cmH <sub>2</sub> O/mbar	AutoPEEP or intrinsic PEEP	✓			
	PTP	cmH <sub>2</sub> O*s	Pressure time product	✓			
	RCexp	s	Expiratory time constant	✓			
	RCinsp	s	Inspiratory time constant	✓			
	Rexp	cmH <sub>2</sub> O//s	Expiratory flow resistance	✓			
	Rinsp	cmH <sub>2</sub> O//s	Inspiratory flow resistance	✓			✓
	RSB	1/l*min	Rapid shallow breathing index	✓		✓	
	WOBimp	J/l	Imposed work of breathing	✓			
Oxygen	Oxygen	%	Airway oxygen concentration (FiO <sub>2</sub> )	✓		✓	
CO <sub>2</sub> (option)	CO <sub>2</sub>	mmHg/%	Real time CO <sub>2</sub> measurement		✓		
	FetCO <sub>2</sub>	%	Fractional end-tidal CO <sub>2</sub> concentration	✓	✓		
	PetCO <sub>2</sub>	mmHg	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	✓			
	Vds	ml	Series dead space	✓			
	VeCO <sub>2</sub>	ml	Exhaled volume of CO <sub>2</sub>	✓			
	ViCO <sub>2</sub>	ml	Inspired volume of CO <sub>2</sub>	✓			

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