

MINDRAY MEDICAL INDONESIA
Anesthesia Machine
Wato Ex 65 Pro Standard

Physical Specifications

Ventilator Screen

Display type	: Color active matrix TFT touch screen
Display size	: 15 in diagonal
Pixel format	: 1024 x 768
Brightness	: Adjustable
Screen display	: configurable All setting and alarm parameters (including Breath rate, I/E ratio, Tidal volume, Minute volume, PEEP, MEAN, PEAK, PLAT, and O2 concentration, EtCO2, N2O, Aesthesia gas concentration)
Display parameters	: concentration)
Display waveforms	: P-T, F-T, V-T, CO2 , O2, Anesthetic gas, N2O
Timer	: On screen timer

Dimensions and Weight

Height	: 1370 mm
Width	: 780 mm (not including breathing system) 945 mm (including breathing system)
Depth	: 690 mm
Weight	: <145 kg (without vaporizers and cylinders)

Top Shelf

Weight limit	: 30 kg
Width	: 305 mm
Length	: 545 mm

Work Surface

Height	: 850 mm
Area	: 1635 cm ²

Drawer (3Xdrawers, Internal Dimension)

Height	: 130 mm
Width	: 415 mm
Depth	: 320 mm

Bag Arm

Height	: 1150 mm
Length	: 312 mm
Connection	: ISO 22mm OD, 15mm ID

Casters

Diameter	: 125mm
Brake	: Centre brake system with Lock / Unlock icons

Ventilator Specifications

Modes of Ventilation	: Manual/Spontaneous Ventilation/Bypass Volume Control Ventilation (VCV) with PLV function Pressure Control Ventilation (PCV)
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Compensation

Circuit gas leakage compensation and automatic compliance compensation

Ventilation Parameters Range

Patient Size	: Adult, Pediatric, Infant
Tidal volume	: 20~1500 mL ((Volume Mode) (increments of 1 mL) 5~1500 mL (Pressure Mode)
Pinsp	: 5~70 cmH ₂ O (increments of 1 cmH ₂ O)
Plimit	: 10~100 cmH ₂ O (increments of 1 cmH ₂ O)
ΔPsupp	: 3~60 cmH ₂ O (increments of 1 cmH ₂ O) off, 3~60 cmH ₂ O (CPAP/PS)
Respiration Rate	: 4~100 bpm (increments of 1 bpm)
I:E	: 4:1 - 1:8 (increments of 0.5)
Inspiratory pause (Tip:Ti)	: OFF, 5% - 60% (increments of 1%)
Tinsp	: 0.2 - 10.0 s (increments of 0.1 s)
Trigger window	: 5% - 90% (increments of 5%)
Flow trigger	: 0.2 ~ 15 L/min (increments of 0.1L/min)
Pressure trigger	: -20~ -1 cmH ₂ O (increments of 1 cmH ₂ O)
Expiration termination level	: 5% - 80% (increments of 1%)
Min Rate	: 2 - 60 bpm (increments of 1 bpm)
Tslope	: 0.0 - 2.0 s (increments of 0.1 s)
Apnea I: E	: 4:1~1:8 (increments of 0.5)

Δ Papnea	: 3 - 60 cmH2O (increments of 1 cmH2O)
<u>Positive End Expiratory Pressure (PEEP)</u>	
Type	: Integrated, electronic controlled
Range	: OFF, 3~30 cmH2O (increments of 1 cm H2O)
Ventilator Performance	
Driving pressure	: 280 kPa to 600 kPa
Peak gas flow	: 120 L/min + Fresh Gas Flow
Monitoring Parameters	
Minute volume	: 0 ~ 100 L/min
Tidal volume	: 0~3000 ml
Inspired oxygen (FiO2)	: 18% ~ 100%
Pressure (Peak,Mean,Plateau)	: -20 ~ 120 cmH2O
Mean pressure	: -20 ~ 120 cmH2O
Plateau pressure	: -20 ~ 120 cmH2O
I:E	: 4:1 ~ 1:10
Rate	: 0 ~120 bpm
PEEP	: 0 ~ 70 cmH2O
Resistance (R)	: 0 ~ 600 cmH2O/(L/s)
Compliance (C)	: 0 ~ 300 ml/cmH2O
Trend Graph	: Continuous trend information with time discrete events for the latest 48 hours
Trend Table	: Continuous trend information together with time discrete events for the latest 48 hours
Alarm Log Book	: 500 events storage, first in first out
<u>Alarm setting</u>	
Tidal volume	: Low: 0 ~ 1595 ml : High: 5 ~ 1600 ml
Minute volume	: Low: 0 ~ 99 L/min : High: 0.2 ~ 100 L/min
Inspired oxygen	: Low: 18% ~ 98% : High: OFF, 20% ~ 100%
Apnea alarm VTe	: < 10ml measured in 20s
Paw	: < (PEEP + 3) cmH2O in 20s
Airway pressure low	: 0 ~98 cmH2O
Airway pressure high	: 2 ~100 cmH2O
Sustained airway pressure alarm	: 15s
Subatmospheric pressure alarm	: Paw < -10 cmH2O
Alarm silence countdown timer	: 120 to 0 seconds
<u>Ventilator Components</u>	
Flow Sensor	
Type	: Variable orifice flow sensor
Location	: Inspiratory and expiratory port
Oxygen Sensor	
Type	: Galvanic fuel cell
<u>Vaporizers</u>	
Anesthetic agent delivery	
Vaporizer	: Mindray V60 Anesthetic Vaporizer : Isoflurane, Sevoflurane
<u>Modules</u>	
Anesthesia Gas (AG) Module	
Monitor gases	: CO2, N2O, Halothane, Enflurane, Isoflurane,Sevoflurane, Desflurane, MAC,
Warm-up time	: 45 s (ISO accuracy mode) : 10min (full accuracy mode) Adu/Ped: 150, 180, 200 ml/min Neo: 100, 110, 120 ml/min
Sample rate	
Agent Consumption Calculation	
Calculation range	: 0 to 3000 ml
<u>Electrical Specifications</u>	
Current Leakage	
100 ~ 240V	: < 500 μ A
Power And Battery Backup	
Power input	: 220-240 Vac, 50/60 Hz, 6A : 100-120 Vac, 50/60 Hz, 7A : 100-240 Vac, 50/60 Hz, 7A
Auxiliary electrical outlets	: Up to 4 outlets (3A for each, total 5A)

Battery backup	: 150 minutes for 2 standard pieces of battery (powered by new fully-charged batteries with 25°C ambient temperature)
Battery type	: Build-in Li-ion battery, 11.1 VDC, 4500 mAh
Safety feature	: In case of electricity and battery failure, manual ventilation, gas delivery and agent delivery are possible
Pneumatic Specifications	
ACGO (Auxiliary Common Gas Outlet, Integrated)	
Connector	: ISO 22 mm OD and 15 mm ID
Pipeline Supply	
Gas type	: O ₂ , N ₂ O and Air
Pipeline input range	: 280 to 600 kPa (40 to 87 psi)
Pipeline connections	: DISS or NIST
Pipeline Supply Pressure Gauges	
Display type	: Electronical or Mechanical
Ranges	: 0 to 1000kPa (0 to 140 psi)
O₂ Controls	
Method	: N ₂ O shut off with loss of O ₂ pressure
Supply failure alarm	: ≤ 220.6 kPa
O ₂ Flush	: 25 ~ 75 L/min
Auxiliary O₂ Flowmeter	
Flow Range	: For each meter 0 ~ 15 L/min
Indicator	: Flow tube
Electronic Flow control system (Electronic Mixer)	
Direct Flow Control Mode	
O ₂ flow range	: 0 to 15 L/min
Air flow range	: 0 to 15 L/min
N ₂ O flow range	: 0 to 12 L/min
Total Flow Control Mode	
Total flow range	: 0.2 to 18 L/min
O ₂ concentration	
Range	: 21% to 100% (The balance gas is Air) or 26% to 100% (The balance gas is N ₂ O)
<u>Breathing System Specification</u>	
Breathing system volume (Pre-pak)	
Automatic ventilation ^②	: 2850 ml
Manual ventilation ^②	: 1800 ml
Breathing system volume (Non Pre-pak)	
Automatic ventilation	: 2600 ml
Manual ventilation	: 1800 ml
System Components	
Carbon dioxide absorbent canister	
Absorbent capacity: 1500 mL	
Integrated expiratory limb water trap	
Capacity: 6 mL	
Breathing Circuit Parameters	
Compliance	: ≤4 mL/100Pa (bag mode)
	: Automatically compensates for
	: compression losses within the breathing
	: circuit in mechanical mode
Expiration resistance	: < 6.0 cm H ₂ O @60 L/min
Inspiration resistance	: < 6.0 cm H ₂ O @60 L/min
System Pressure Gauge	
Range	: -20 ~ 100 cmH ₂ O
Ports and Connectors	
Exhalation	: 22 mm OD / 15 mm ID conical
Inhalation	: 22 mm OD /15 mm ID conical
Manual bag port	: 22 mm OD /15 mm ID conical
Bag-to-Ventilator Switch	
Type	: Bi-stable
Control	: Switch between manual and mechanical ventilation
Integrated Adjustable Pressure Limiting (APL) Valve	
Range	: SP, 5 ~ 75 cmH ₂ O
Anesthetic Gas Scavenging System (AGSS)	
Size (H x W x D)	: 430 x 132 x 114 mm
Type of disposal system	: Active: High-flow or Low-flow

: Passive

Accessories

	: 2 Vaporizer (Isoflurane and Sevoflurane)
1 set	: Reusable Breathing Circuit accessory kit Adult
1 set	: Reusable Breathing Circuit accessory kit Child
1 pcs	: Test Lung
1 pcs	: Multi-Gas(Auto ID) Module
1 pcs	: Quik-Fil Adaptor for Sevoflurane
1 box	: DRYLINE II Water Trap
1 box	: Dryline airway adapter
1 box	: Sampling line, Adu/Ped
1 box	: Sampling line, Neo
5 pcs	: Disposable breathing filter
1 pcs	: T-piece system type