Physical Specifications

Dimensions

Height	1410mm
Width	920mm
Depth (without yoke)	760mm
Weight (basic unit)	Approximately 130kg

Top Shelf

Weight limit	25kg/55lb
Width	650mm
Depth	380mm

Work surface

Height	850mm
Width	630mm
Depth	320mm

Flip-up side tray

Height	850mm
Weight limit	12kg
Width	265mm
Depth	330mm

Drawers (internal dimensions)

Quantity	3
Height	130mm
Width	490mm
Depth	350mm

Casters

Diameter	125mm
Brakes	Individual locking front casters

Cylinder (optional)

Interface	PISS (Pin indexed)
Type	E
Number	Maximum 3 cylinders

Ventilator Operating Specifications

Modes of ventilation – Standard

Standby, Manual, VCV;
Demo

Modes of ventilation – Options

PCV, SIMV-VC, SIMV-PC, PCV-VG, PS(with apnea backup)

Ventilator parameter ranges

Tidal volume range	20 to 1500mL (volume control modes) 5 to 1500mL (pressure control modes)
Incremental settings	increments of 5mL(Set Vt below 100mL) or 10mL(when set Vt between 100 and 1000mL) or 50mL(when set Vt bigger than 1000mL)
Pressure (Pmax) range	10 - 70 cmH_2O (volume control modes)
Pressure (Δ P) range	3 to 50 cmH_2O (increments of 1 cmH_2O) (SIMV-VC, SIMV-PC, and PS modes)
Pressure (P_{TARGET}) range	5 to 70 cmH_2O (increments of 1 cmH_2O) (PCV and SIMV-PC vent modes)

Rate	4 to 100 breaths per minute for VCV, PCV, PCV-VG; 2 to 100 breaths per minute for SIMV-VC and SIMV-PC; 2 to 60 breaths per minute for PS (increments of 1 breath per minute)
Inspiratory/expiratory ratio	4:1～1:8 (increments of 0.5) (VCV, PCV and PCV-VG modes)
Inspiratory time	0.2s～5 seconds (increments of 0.1 seconds) (SIMV-VC and SIMV-PC modes)
Inspiratory Pause Time	OFF, 5%～60% (VCV and SIMV-VC vent modes)
Flow trigger	1 L/min～15L/min (SIMV-VC, SIMV-PC and PS modes)
T_{SLOPE} (Inspiratory Slope Time)	0s～2 seconds (increments of 0.1 seconds) (PCV, SIMV-VC, SIMV-PC and PS modes)

Positive End Expiratory Pressure (PEEP)

Type	Integrated, electronically controlled
Range	OFF, 3 to 30 cmH_2O (increments of 1 cmH_2O) (VCV, PCV, SIMV-VC, SIMV-PC, PCV-VG and PS modes)

Ventilator performance

Pressure range at inlet	280kPa to 600kPa/ 40.6psig to 87psig
Peak gas flow	≥90 L/min + fresh gas flow

Ventilator monitoring

Expiratory minute volume range	0L～30L
Expiratory tidal volume range	0 mL～3000mL
O_2%	18% ~ 100%
Peak pressure (P_{peak})	- 20cmH_2O ~ 99cmH_2O
Mean pressure (P_{mean})	- 20cmH_2O ~ 99cmH_2O
Plateau pressure (P_{plat})	- 20cmH_2O ~ 99cmH_2O
PEEP	- 20cmH2O ~ 9cmH2O
Frequency	0 ~ 110 breaths per minute

Trend chart

Continuous trend information together with time discrete events are stored and shown in the table, including Ppeak, Pplat, Pmean, PEEP, Freq, V_T, MV, FiO_2, $etCO_2$, $FiCO_2$, Agent1, Agent2, N_2O,

MAC, FG-O_2, FG-Air and FG-N_2O. The left page includes the 10 parameters and the remains are in the right page.

Trend table

The Setting includes the patient type, the vent mode and all the setting parameters.
The Monitor includes all the monitor parameters in the trend data.
The machine can remember the last 8 hours trend data, and the interval is 30 seconds.

Delivery/monitoring accuracy

Volume delivery	< 100 mL = better than 10 mL > 100 mL = better than 10%
Pressure delivery	±10% or ±3cmH_2O
PEEP delivery	±2cmH_2O or ±10%
Volume monitoring	< 100 mL = better than 10 mL > 100 mL = better than10%
Pressure monitoring	±10% or ±3cmH_2O

Alarm settings

Minute volume (MVexp)	Low: 0 to 20 L/min High:1 to 25 L/min
Low airway pressure	0～70cmH_2O
High pressure	10cmH_2O～80cmH_2O
High Breath Rate	8-60bpm
Inspired oxygen (FiO_2)	Low: 18 to 99% High: 21 to 100%
exhalant CO_2 ($etCO_2$)	Low: OFF, 0.1-9.8% or OFF, 1-74 mmHg High: 0.1-9.9% or 1-75mmHg
Inspired CO_2 ($FiCO_2$)	High: 0.1-1.4% or 1-10 mmHg
Insp. HAL	Low: OFF, 0.1-8.3% High: 0.1-8.4%
Insp. ISO	Low: OFF, 0.1-8.3% High: 0.1-8.4%
Insp. ENF	Low: OFF, 0.1-9.8% High: 0.1-9.9%
Insp. DES	Low: OFF, 0.1-21.8% High: 0.1-21.9%
Insp. SEV	Low: OFF, 0.1-9.8% High: 0.1-9.9%
Apnea alarm	Mechanical ventilation ON: Vt< 10 mL breath or Pmean<1 cmH_2O measured in 30 seconds when Frequency≥6 Vt < 10 mL breath or Pmean<1 cmH2O measured in 35 seconds when Frequency<6 Mechanical ventilation OFF: < 10 mL breath measured in 60 seconds
Sustained airway pressure	Mechanical ventilation ON: Paw>PEEP + 10 cmH_2O measured over

	15 seconds Continuously Mechanical ventilation OFF: Paw>10 cmH_2O measured over 15 seconds Continuously
Subatmospheric pressure	Paw < -2 cmH_2O
Alarm silence countdown timer	120 to 0 seconds

Ventilator components

Flow transducer

Type	fixed orifice (honeycomb)
Location	Installed in breathing system

Oxygen Sensor

Type	Galvanic fuel cell
Life Cycle	proximately 12 months (Dependent on usage)

Ventilator Screen

Display type	Color active matrix TFT with Touch screen
Display size	15 inch diagonal
Pixel format	1024×768
Display parameters	All settings and alarm parameters(including V_T, Freq., I:E, T_{INSP}, PEEP, $Freq_{MIN}$, T_P, Trigger, P_{TARGET}, ΔP, T_{SLOPE}, PEAK, MEAN,PLAT, FiO_2, $FiCO_2$, $etCO_2$, MAC, InspAgent1, ExpAgent1, InspAgent2, ExpAgent2)
Display graphics	Waveform of P-T, F-T, V-T, CO_2-T, Paw-V Loop, V-Flow Loop
Communication ports	RS-232 serial port(DB9); RJ45 connector, 100-Base-TX, support HL7 communication protocol; USB.

Integrated safety functions

In case of electricity and battery failure, manual ventilation, gas delivery and agent delivery are possible.

Positive pressure relief valve opens at about 85cmH_2O.

Anesthetic agent delivery

Delivery

Vaporizer	A9040/A9050
Type	Halothane, Enflurane, Isoflurane, Sevoflurane
Number of positions	2
Third parking position	Optional
Mounting	Selectatec® manifold with interlocks

Gas monitor (optional)

Type	main stream / side stream
Module	IRMA CO_2; IRMA AX+
Operating	ISA CO_2; ISA AX+
	IRMA CO_2: 0 to 40℃
	IRMA AX+: 10 to 40℃
	ISA CO_2: 0 to 50℃
	ISA AX+: 5 to 50℃
Storage	-20 to 70℃
Humidity	10 - 95%(operating, non-condensing), 5 - 100%(storage, non-condensing)
Atm.pressure.	525 - 1200 hPa(4572m)
Calibration	No routine calibration is required.
Warm-up time	20 sec, full specifications within 60s
Rise Time	< 350 ms, typically
Total system response time	< 3 sec
Breath detect	Adaptive threshold, minimum 1vol% change in CO_2 concentration.
Respiratory rate	0 - 150 bpm ± 1 bpm
Compensation	Automatic for atmospheric pressure, temperature and spectral interference

Airway adapters (main stream)

Adult/Pediatric	6 mL dead space
Infant	1 mL dead space

CO_2 Module

Monitor Gas	CO_2
Measurement range	0-15 vol%
Accuracy (Standard conditions)	0-15 vol% ± (0.2 vol% + 2 % of reading)

Anesthesia Gas Module

Monitor Gases	CO_2,N_2O,HAL,ISO,ENF SEV;DES
Measurement range	CO_2: 0-15 vol% N_2O: 0-100 vol% HAL, ISO, ENF: 0-8 vol% SEV: 0-10 vol% DES: 0-22 vol%

Accuracy (Standard conditions)

CO_2	0-10 vol% ±(0.2 vol% + 2 % of reading) 10-15 vol% ±(0.3 vol% + 2 % of reading)
N_2O	±(2 vol% + 2 % of reading)
HAL, ISO, ENF	±(0.15 vol% + 5 % of

	reading)
SEV	±(0.15 vol% + 5 % of reading)
DES	±(0.15 vol% + 5 % of reading)

Electrical specifications

Power and battery backup

Power input	100-240V, 50/60Hz, Max. 10A
Battery type	Internal re-chargeable, sealed lead acid, 24VDC, 4AH
Backup power	Demonstrated battery backup time under typical operating conditions is 120 minutes when fully charged
Charge time	Approximately 8hours(in running status or standby mode)
Power cord	5m/16.4ft
Outlets	4 outlets on back, 1.5A

Pneumatic specifications

Auxiliary common gas outlett~~(optional)~~

Connector	ISO 22mm OD and 15mm ID

Gas supply

Gas type	O2, N2O, Air
Pipeline input range	280kPa to 600kPa /41psi to 87psi
Pipeline connections	NIST/DISS
Cylinder input	O2, N2O, Air pin index yokes (PISS)
Primary regulator nominal output	250kPa/36psig

O_2 controls

Method	Proportionate decrease of N_2O with reduction in O_2 pressure
Supply failure alarm	Range: 185 to 215 kPa
O_2 flush	Range: 25 to 75 L/min

Flowmeter (Electronic)

O_2 ranges	0 to 10 L/min;
N_2O ranges	0 to 10 L/min
Air ranges	0 to 12 L/min

Integrated safety functions

O_2 and N_2O Ratio regulating valve guarantees a minimum O_2 concentration of 21% in an O_2/N_2O mixture.

N_2O cut-off if O_2 fresh gas valve is closed or if O_2 flow is less than 0.2 L/min.

Total flow tube

Range	0-15SLM

Air/O2 blender with flowmeter

Flow Range	1-15L/min
O2 concentration	21%-100%
Flow indicator	Flow tube

Auxiliary gas output~~(optional)~~

Gas	Oxygen

Pressure	280-600kPa
Flow rate	Max.90L/min

Breathing circuit specifications

CO_2 absorbent canister

Absorbent capacity	3000mL
CO_2 bypass	Standard

Ports and connectors

Exhalation	22mm OD ISO 15mm ID taper
Inhalation	22mm OD ISO 15mm ID taper
Bag port	22mm OD

Airway pressure gauge

Scale range	–20 to 100 cmH_2O

Bag-to-Ventilator switch

Type	Manual lever with signal feedback
Control	Controls ventilator and direction of breathing gas within the circuit

Integrated Adjustable Pressure Limit (APL) valve

Range	0 to 70 cmH_2O
Tactile knob indication at	10 cmH_2O and above
Adjustment range of rotation	0 to 30 cmH_2O (0 to 180°) 30 to 70 cmH_2O (180 to 288°)
Accuracy	< 30 cmH_2O:±3 cmH_2O; ≥30 cmH_2O:±15% of set value;

Breathing circuit parameters

Compliance in Bag mode	3.15 mL /cmH_2O
Mechanical ventilation mode	Automatically compensates for compression losses within the absorber and bellows assembly
Circuit volume	6.9 L Vent Mode (including absorber and bellows) 5.4 L Bag Mode
Expiratory resistance under manual condition	0.57 kPa
Inspiratory resistance under manual condition	0.36 kPa
Expiratory resistance under automatic	0.47 kPa
Inspiratory resistance under automatic	0.35 kPa

Note: According to ISO8835-2, test under peak flow 60L/min, fresh gas 10L/min.
With patient circuit and wye piece added

Heating system

Temperature	32－40℃

Materials

All materials in contact with exhaled patient gases are autoclavable, except mechanical pressure gauge and O_2 cell.
All materials in contact with patient gas are free of natural rubber latex.

Anesthetic gas scavenging System(AGSS)

Size	445×142×95 (height x width x depth)
Weight	2.25Kg
Type of disposal system	Low-flow disposal system
Extract flow	35L/min～50L/min
Pressure relief device	Pressure compensation opening to the atmosphere
Filter	Stainless screen with hole diameter of 150μm
Spillage	<100mL/min
Max. constant flow	50L/min
Max. intermittent flow	35L/min

Environmental specifications

System operation

Temperature	10 to 40℃
Relative Humidity	15 to 90% (non-condensing)
Barometric	53 to 106kPa

System storage

Temperature	－10 to 60℃
Relative Humidity	15 to 90% (non-condensing)
Barometric	50 to 106kPa

Electromagnetic compatibility

Immunity	Complies with all requirements of EN 60601-1-2
Emissions	CISPR 11 group 1 class B

CE 0123

Directive 93/42/EEC

Concerning Medical Devices

CE mark in this manual applies only to product with CE mark.

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