

## Physical Specifications

### Dimensions

Height	1420mm
Width	770mm
Depth (without YOKE)	760mm
Weight (basic unit)	135kg

### Top Shelf

Weight limit	25kg
Width	650mm
Depth	380mm

### Work surface

Height	850mm
Width	440mm
Depth	300mm
Material	stainless steel

### Flip-up side tray

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

### Drawers (internal dimensions)

Quantity	3
Height	120mm
Width	355mm
Depth	340mm

### Casters

Diameter	125mm
Brakes	Central control brake

### Cylinder YOKE(optional)

Interface	Pin Index Safety System (PISS)
Type	E
Number	Optional 2 cylinders Maximum 4 cylinders

## Ventilator Operating Specifications

### Modes of ventilation – standard

Manual; IPPV PCV  
STANDBY; Demo

### Modes of ventilation – Options

SIMV-VC, SIMV-PC  
PCV-VG, SIMV-VG  
PS/CPAP  
BIVENT, APRV

### Ventilator parameter ranges

Tidal volume range	20 to 1500 mL Optional 10 to 1500 mL (Volume Control and SIMV modes) 5 to 1500 mL (Pressure Control Vent Mode)
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Tidal volume 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)
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Pressure (P <sub>MAX</sub> ) range	10 to 100 cmH <sub>2</sub> O (increments of 1 cmH <sub>2</sub> O) (IPPV, SIMV-VC and PCV-VG vent modes)
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Pressure (P <sub>support</sub> ) range	3 to 60 cmH <sub>2</sub> O (increments of 1 cmH <sub>2</sub> O) (SIMV-VC/PC/VG,
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	PS/CPAP, BIVENT and APRV vent modes)	Pressure trigger ( $P_{SENS}$ )	-20 to -1 cmH <sub>2</sub> O (increments of 1 cmH <sub>2</sub> O)
Pressure ( $P_{TARGET}$ ) range	5 to 70 cmH <sub>2</sub> O (increments of 1 cmH <sub>2</sub> O) (PCV and SIMV-PC vent modes)		(SIMV-VC/PC/VG, PS/CPAP, BIVENT and APRV vent modes)
		$E_{SENS}$	5 to 70% (increments of 5%) (SIMV-VC/PC/VG, PS/CPAP, BIVENT and APRV vent modes)
Freq.	2 to 100 breaths per minute (SIMV-VC, SIMV-PC and SIMV-VG vent modes)		
	2 to 60 breaths per minute for $Freq_{MIN}$ in PS/CPAP vent modes.	$I_{SENS}$	5 to 70% (increments of 5%) (APRV vent modes)
	4 to 100 breaths per minute (Other mode) (increments of 1 breath per minute)	$P_{HIGH}$	5 to 70 cmH <sub>2</sub> O (increments of 1 cmH <sub>2</sub> O) (BIVENT and APRV vent modes)
Inspiratory/expiratory ratio	4:1 to 1:8 (increments of 0.5) (IPPV, PCV and PCV-VG vent modes)	$P_{LOW}$	3 to 50 cmH <sub>2</sub> O (increments of 1 cmH <sub>2</sub> O) (BIVENT and APRV vent modes)
Inspiratory time	0.2 to 5 seconds (increments of 0.1 seconds) (SIMV-VC/PC/VG vent modes)	$T_{HIGH}$	0.2s to 30s (increments of 0.1s) (BIVENT and APRV vent modes)
Inspiratory Pause Time	OFF, 5% to 60% (increments of 5%) (IPPV and SIMV-VC vent modes)	$T_{LOW}$	0.2s to 30s (increments of 0.1s) (BIVENT and APRV vent modes)
Flow trigger ( $V_{SENS}$ )	0.5 L/min to 15L/min (increments of 1L/min) (SIMV-VC/PC/VG, PS/CPAP, BIVENT and APRV vent modes)	$T_{SLOPE}$ (Inspiratory Slope Time)	0.2s to 2.0 seconds (increments of 0.1 seconds)

	(PCV,PCV-VG, SIMV-VC/PC/VG, PS/CPAP, BIVENT and APRV vent modes)	PAW	minute	-20cmH <sub>2</sub> O to 110cmH <sub>2</sub> O
		FiCO <sub>2</sub>		0 to 10 vol%
		EtCO <sub>2</sub>		0 to 10 vol%
<b>Positive End Expiratory Pressure (PEEP)</b>		DP (Driving airway pressure)		0 to 120 cmH <sub>2</sub> O
Type	Integrated electronically controlled	SI (Stress index)		0.1 to 5
Range	OFF, 3 to 50 cm H <sub>2</sub> O (increments of 1 cm H <sub>2</sub> O)	V <sub>Ti</sub>		0 to 3000mL
<b>Ventilator performance</b>				
Pressure range at inlet	280 kPa to 600kPa	V <sub>TE</sub>		0 to 3000mL
Peak gas flow	≥90 L/min + fresh gas flow	I:E		4:1 to 1:8
		Rsys		0 to 300cmH <sub>2</sub> O/(L/S)
		Csys		0 to 300mL/(L/S)
<b>Ventilator monitoring</b>				
Minute volume range	0 to 30L	VO <sub>2</sub>		Real time calculation
Tidal volume range	0 to 3000mL	CO <sub>2</sub> -T		Real time calculation
FiO <sub>2</sub>	18% to 100%	<b>Trend table</b>		
Peak pressure(P <sub>peak</sub> )	-20cmH <sub>2</sub> O to 99cmH <sub>2</sub> O	Continuous trend information together with time discrete events are stored and shown in the table, including P <sub>peak</sub> , P <sub>plat</sub> , P <sub>mean</sub> , PEEP, Freq, V <sub>T</sub> , MV, FiO <sub>2</sub> , etCO <sub>2</sub> , FiCO <sub>2</sub> , Agent1, Agent2, N <sub>2</sub> O, MAC, FG-O <sub>2</sub> , FG-Air and FG-N <sub>2</sub> O. The left page shall include the 10 parameters and the remains shall be in the right page.		
Mean pressure(P <sub>mean</sub> )	-20cmH <sub>2</sub> O to 99cmH <sub>2</sub> O	The machine shall remember maximum 30 days trend data, and the interval shall be 5 minutes, the interval is adjustable		
Plat pressure(P <sub>plat</sub> )	-20cmH <sub>2</sub> O to 99cmH <sub>2</sub> O			
PEEP	-20cmH <sub>2</sub> O to 99cmH <sub>2</sub> O			
Frequency	0 to 110 breaths per			

Trend chart	Continuous trend information are stored and shown in the chart, including Pressure, CO <sub>2</sub> , Agent, MV, VT, O <sub>2</sub> . The machine shall remember the 72 hours trend chart	Inspired oxygen (FiO <sub>2</sub> )	Low: 18 to 99% High: 21 to 100%
Stories alarms	All the alarm messages can be viewed from the log menu. Click on the alarm message bar the detail information of the corresponding alarm appears on the screen. The machine shall remember the lastest 500 alarm messages,	exhalant CO <sub>2</sub> (etCO <sub>2</sub> )	Low: OFF, 0.1 to 9.8% or OFF, 1 to 74 mmHg High: 0.1 to 9.9% or 1 to 75mmHg
Delivery/monitoring accuracy	Volume delivery < 100 mL = better than 10 mL > 100 mL = better than 15%	Inspired CO <sub>2</sub> (FiCO <sub>2</sub> )	High: 0.1 to 1.4% or 1 to 10 mmHg
Pressure delivery	± 10% or ± 3 cm H <sub>2</sub> O	Insp. HAL	Low: OFF, 0.1 to 8.3% High: 0.1 to 8.4%
PEEP delivery	± 2cmH <sub>2</sub> O or ± 15%	Insp. ISO	Low: OFF, 0.1 to 8.3% High: 0.1 to 8.4%
Volume monitoring	< 100 mL = better than 10 mL > 100 mL = better than 15%	Insp. ENF	Low: OFF, 0.1 to 9.8% High: 0.1 to 9.9%
Pressure monitoring	± 5%	Insp. DES	Low: OFF, 0.1 to 21.8% High: 0.1 to 21.9%
Alarm settings	Minute volume (Mvexp) Low: 0 to 20 L/min High: 1 to 25 L/min	Insp. SEV	Low: OFF, 0.1 to 9.8% High: 0.1 to 9.9%
Low airway pressure	0 to 70 cmH <sub>2</sub> O	Apnea alarm	Mechanical ventilation ON: Vt < 10 mL breath or P <sub>mean</sub> < 1 cm H <sub>2</sub> O or P <sub>mean</sub> = 1 cm H <sub>2</sub> O and PEEP ≤ 0 cmH <sub>2</sub> O measured in 30 seconds when Frequency ≥ 6 Vt < 10 mL breath or P <sub>mean</sub> < 1 cm H <sub>2</sub> O or P <sub>mean</sub> = 1 cm H <sub>2</sub> O and PEEP ≤ 0 cmH <sub>2</sub> O measured in 35 seconds when
High pressure	10 to 110 cmH <sub>2</sub> O		
High Breath Rate	8 to 60 bpm		

	Frequency < 6		
	Manual mode:		
	Vt < 10 mL measured in 60 seconds	<b>Ventilator Screen</b>	
Sustained airway pressure	Mechanical ventilation ON: Paw > PEEP add 10 cm H <sub>2</sub> O measured over 15 seconds Continuously Mechanical ventilation OFF: Paw > 10 cm H <sub>2</sub> O measured over 15 seconds Continuously	Display type	Color active matrix TFT Touch screen
Subatmospheric pressure	Paw < -2 cm H <sub>2</sub> O	Display size	15 inches diagonal
Alarm silence countdown timer:	120 to 0 seconds	Pixel format	1024 × 768
		Color	LVDS 24 bit, 16777216 colors
		Display parameters	All setting and alarm parameters (including Vt, Freq., I:E, T <sub>INSP</sub> , PEEP, Freq <sub>MIN</sub> , T <sub>P</sub> , Trigger, P <sub>TARGET</sub> , ΔP, T <sub>SLOPE</sub> , PEAK, MEAN, PLAT, FIO <sub>2</sub> , DP, SI, VTI, VTE, I:E, R <sub>sys</sub> , C <sub>sys</sub> VO <sub>2</sub> , CO <sub>2</sub> -T

## Ventilator components

### Flow transducer

Type	Mass type Measure mass flow in bypass application
Location	Installed in breathing system

Display graphics	Wave of P-T, F-T, V-T, CO <sub>2</sub> -T (option), Paw-V Loop, V-Flow Loop, Paw -Flow Loop
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### Oxygen Sensor

Type1	Galvanic fuel cell
Life Cycle	proximately 12 months (Dependent on usage)
Type2	Paramagnetic oxygen
Life Cycle	8 years

Communication ports	RS-232C compatible serial interface (DB 9 connector); RJ45 connector 100-Base-TX support HL7 communication license; USB 2.0 interface
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### 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  $110 \pm 1 \text{ cmH}_2\text{O}$ .

## Anesthetic agent delivery

### Delivery

Vaporizer	VP300
Type	Halothane, Enflurane, Isoflurane, Sevoflurane,

Number of positions 2

Mounting Selectatec<sup>R</sup> manifold interlocks

### Dimensions

Height	23 cm
Width	12 cm
Depth	21 cm
Weight	6.2 kg
Agent capacity	250ml

### Accuracy

Flow range	0.2-15L/min
Operation temperature	15-35°C
Accuracy	$\pm 20\%$ of setting or $\pm 5\%$ of the maximum scale

### Agent setting range

Sevoflurance: :  
 OFF , 0.2% , 0.5% ,  
 1% , 2% , 3% , 4% ,  
 5% , 6% , 7% , 8% ;  
 Halothane,Enflurane,  
 Isoflurane:OFF ,  
 0.2% , 0.5% , 1% ,  
 2% , 3% , 4% , 5% ;

## Gas mornitor(optional)

Type	main stream/side stream
Moudle	IRMA CO <sub>2</sub> ; IRMA AX+ ISA CO <sub>2</sub> ; ISA AX+
Operating temperature	IRMA AX+: 10 to 40 °C (50 to 104 °F) IRMA CO <sub>2</sub> : 0 to 40 °C (32 to 104 °F) ISA CO <sub>2</sub> : 0 to 50 °C (32 to 122 °F) ISA AX+: 5 to 50 °C (41 to 122 °F)
Storage temperature	IRMA AX+: -20 to 75 °C (-4 to 167 °F) IRMA CO <sub>2</sub> : -40 to 75 °C (-40 to 167 °F) ISA CO <sub>2</sub> : -40 to 70 °C (-40 to 158 °F) ISA AX+: -40 to 70 °C (-40 to 158 °F)
Operating humidity	< 4 kPa H <sub>2</sub> O (non-

	condensing) (95 %RH at 30 °C)	Infant.	
Operating atmospheric pressure	525 - 1200 hPa (<4572 m)	ISA Nomoline	Sampling line with proprietary water removal tubing. 2 m±0.1m versions
Warm-up time	IRMA AX+/ISA AX+: < 20 sec IRMA CO <sub>2</sub> /ISA CO <sub>2</sub> : < 10 sec	<b>Carbon Dioxide (CO<sub>2</sub>) Moudle (IRMA/ISA CO<sub>2</sub>)</b>	
		Monitor Gas	CO <sub>2</sub>
Rise Time	IRMA CO <sub>2</sub> / AX+: CO <sub>2</sub> ≤90ms N <sub>2</sub> O≤300ms HAL, ISO, ENF, SEV, DES≤300ms ISA CO <sub>2</sub> : CO <sub>2</sub> ≤200ms ISA AX+ : CO <sub>2</sub> ≤300ms N <sub>2</sub> O, O <sub>2</sub> , ENF, ISO, SEV, DES ≤400ms HAL ≤500ms	Measurement range	0-15 vol%
		Accuracy	0-15 vol% ± (0.2 vol% + 2 % of reading)
		<b>Anaesthesia Gas Moudle(IRMA/ISA AX+)</b>	
		Monitor Gases	CO <sub>2</sub> ;N <sub>2</sub> O;HAL;ISO;EN F;SEV;DES
ISA sampling flow rate	50 ± 10 ml/min	Measurement range	CO <sub>2</sub> : 0-15 vol% N <sub>2</sub> O: 0-100 vol% HAL, ISO, ENF: 0-8 vol% SEV: 0-10 vol% DES: 0-22 vol%
Breath detect	Adaptive threshold, minimum 1 % CO <sub>2</sub> change.		
Respiratory rate:	0 - 150 bpm ± 1 bpm	<b>Accuracy</b>	
		CO <sub>2</sub>	0-15 vol% ± (0.2 vol% + 2 % of reading)
Compensation:	Automatic for atmospheric pressure, temperature and spectral interference	N <sub>2</sub> O	±(2 vol% + 2 % of reading)
<b>Airway adapters</b>			
IRMA Airway Adapter Adult/Paediatric	6 ml dead space	HAL, ISO, ENF	±(0.15 vol% + 5 % of reading)
IRMA Airway Adapter	1 ml dead space		reading)

SEV	$\pm(0.15 \text{ vol\%} + 5 \% \text{ of reading})$	Battery type	Internal rechargeable sealed lead acid 24VDC,5.0AH
DES	$\pm(0.15 \text{ vol\%} + 5 \% \text{ of reading})$	Backup power	Demonstrated battery backup time under typical operating conditions is 120 minutes when fully charged
<b>Paramagnetic oxygen module</b>		Charge time	< 8 hours (in running status or standby mode)
Range	0-100%	Power code	5m/16.4ft
Accuracy	$< \pm 0.2\% \text{ O}_2$	Outlets	4 outlets on back
Response Time (T10 –T90)	8 to 20 seconds dependent on application and filter selection (biological filter on request)	Maximum output valve of auxiliary AC power plug	1.5A(single plug); 6A(in total)
Operation Temperature	5 °C to 50 °C (41°F to 122°F)	<b>Pneumatic specifications</b>	
Storage Temperature	-30°C to 70°C (-22°F to 158°F)	<b>Auxiliary common gas outlet(optional)</b>	
Storage Pressure	10kPa-200kPa(1.5psi-30psi)	Connector:	ISO 22 mm OD and 15 mm ID
Ambient Humidity	0 to 95% non-condensing	Security	Anti-misconnection switch and prominent prompts on the screen
RoHS	ROHS Directive 2002/95/EC	<b>Gas supply</b>	

## Electrical specifications

### Power and battery backup

Power input	100-240V,50/60Hz, Max. $\leq 8\text{A}$
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### Gas supply

Gas type	O <sub>2</sub> ,N <sub>2</sub> O,Air
Pipeline input range	280 kPa to 600 kPa/41 psi to 87 psi
Pipeline connections	NIST/DISS



Cylinder input Pin-index yokes

Primary regulator nominal output 250 kPa/36psig

### O<sub>2</sub> controls

Method Proportionate decrease of N<sub>2</sub>O with reduction in O<sub>2</sub> pressure

Supply failure alarm Range: 185 to 215 kPa

O<sub>2</sub> flush Range: 25 to 75 L/min

### Electronic control Flowmeter (Electronic Mixer)

O<sub>2</sub> ranges 0 to 10 L/min

N<sub>2</sub>O ranges 0 to 10 L/min

Air ranges 0 to 12 L/min

Total Flow Control Mode Total flow range: 0.2 to 18 L/min  
O concentration range: 21% to 100%

### Integrated safety functions

Guarantees a minimum O<sub>2</sub> concentration of 25% in an O<sub>2</sub>/N<sub>2</sub>O mixture.

N<sub>2</sub>O cut-off if O<sub>2</sub> pressure is less than 200kPa

### Driven gas auto-switch(optional)

Use compressed air as the driving gas.

When the compressed air supply is disrupted, the machine will automatically switch to O<sub>2</sub> driving gas.

### Auxiliary oxygen inhalation

Range 1-15L/min

Pressure 400kPa

Flow indicator Flow tube

### Auxiliary gas output

Gas Oxygen

Pressure 280-600kPa

Flow rate Max.90L/min

## Breathing circuit specifications

### Carbon dioxide absorbent canister

Absorbent capacity 1500ml

CO<sub>2</sub> bypass Optional

### Ports and connectors

Exhalation 22 mm OD ISO 15 mm ID taper

Inhalation 22 mm OD ISO 15 mm ID taper

Bag port 22 mm OD

### Pressure gauge

Scale range -20 to 100 cm H<sub>2</sub>O

### Bag-to-Ventilator switch

Type Key switch

Control Controls ventilator and direction of breathing gas within the circuit

### Integrated Adjustable Pressure Limiting (APL) valve

Range	0 to 70 cm H <sub>2</sub> O
Tactile knob indication at	30 cm H <sub>2</sub> O and above
Adjustment range of rotation	0 to 30 cm H <sub>2</sub> O (0 to 180°) 30 to 70 cm H <sub>2</sub> O (180 to 288°)
Accuracy	< 30 cm H <sub>2</sub> O: ±3 cm H <sub>2</sub> O; ≥30 cm H <sub>2</sub> O: ±15% of set value;

### Breathing circuit parameters

Compliance (Bag mode)	4.5ml/ cm H <sub>2</sub> O
Compliance (Mechanical Mode)	Automatically compensates for compression losses within the absorber and bellows assembly
Circuit volume	3.9 L Vent Mode (including absorber; bellow) 2.4 L Bag Mode

Expiratory resistance under manual condition	0.51 kPa
Inpiratory resistance under manual condition	0.39 kPa

Expiratory resistance under automatic	0.57 kPa
Inpiratory resistance under automatic	0.22 kPa

Note: According to ISO 80601-2-13, test under peak flow 60L/min, fresh gas 10L/min.

### Heating system(optional)

Temperature	32 - 40°C
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### Materials

All materials in contact with exhaled patient gases are autoclavable, except mechanical pressure meter and O<sub>2</sub> 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

Maximum constant flow 50L/Min

Maximum intermittent flow 35L/Min

## Environmental specifications

### System operation

Temperature 10 to 40°C

Humidity Less than 95% relative humidity, non-condensing.

Atmospheric pressure 70-106kPa

### System storage

Temperature - 20 to 55°C

Humidity Less than 95% relative humidity, non-condensing.

Barometric 70-106kPa

### Electromagnetic compatibility

Immunity Complies with all requirements of EN 60601-1-2

Emissions CISPR 11 group 1 class A



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

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