

**A8**

Anestezijos sistema

**Anesthesia system****Physical Specifications****Dimensions and Weight**

Height	1490 mm
Width	910 mm
Depth	705 mm
Weight	160 kg (with AG module and 3 yokes, without vaporizers and gas cylinders)

**Work Surface**

Height	850 mm
Width	590 mm
Depth	325 mm
Weight limit	30 kg

**Drawer (3 drawers, Internal Dimension)**

Height	140 mm
Width	420 mm
Depth	315 mm
Weight limit	5 kg

**Bag Arm**

Height	1130 mm
Length	312 mm
Swiveling angle	120 degrees

**Casters**

Diameter	12.5 cm
Brake	Centre brake with Lock / Unlock icons
Cable pusher	Cable pusher for each caster

**Side mounting GCX Rails**

Upper left length	130 mm
Upper right length	130 mm
Lower right length	485 mm
Supporting weight	27 kg at a maximum distance of 0.41 m

**Work Light**

Settings	OFF, Low, High
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**Main Screen**

Display size	18.5 inch	46,99 cm.
Display type	Color LCD with capacitive touch screen	
Resolution	1920 x 1080	LCD su tūriniu lietimui
Rotated	pasukamas	360 degrees
Tilted	paliankiamas	60 degrees
Display parameters	All setting and alarm parameters (including Breath rate, I/E ratio, Tidal volume, Minute volume, PEEP, MEAN, PEAK, PLAT, and O <sub>2</sub> concentration, EtCO <sub>2</sub> , N <sub>2</sub> O, Aesthesia gas concentration, BIS)	

Graphic waveforms Pressure, Flow, Volume, CO<sub>2</sub>, O<sub>2</sub>, Anesthetic gas, N<sub>2</sub>O, BIS, Pes, Ptp

2.1.29 Up to 5 waveforms display simultaneously

2.1.30 Spirometry loops Pressure-Volume, Flow-Volume and Pressure-

Flow	2.1.32.3.
Timer	Display on screen timer

**System status display**

Display size	8.4 inch
Display type	Color LCD
Resolution	800 x 600
Display content	Volume exchanger indicator, gas supply pressure, AGSS status

**Ventilator Specifications****Modes of Ventilation**

Manual/Spontaneous ventilation/Bypass

2.1.13.1 Volume Control Ventilation (VCV) with PLV function

**Mechaninė plaučių ventilacija valdoma**

2.1.13.2.

slėgiu  
Pressūre Control Ventilation (PCV)

slėgiu palaikoma  
ventiliacija su apnėjos  
atsarginiu režimu

Pressure Control Ventilation with volume guarantee (PCV-VG)

2.1.13.3

Continuous Positive Airway Pressure/Pressure Support Ventilation with

2.1.13.5

apnea backup (CPAP/PS)

Pressure Support Ventilation (PS) with apnea backup

2.1.13.4

Synchronized Intermittent Mandatory Ventilation

(SIMV-Volume Controlled and SIMV-Pressure Controlled)

synchronizuota

ventiliacija valdoma

tūriu

Synchronized Intermittent Mandatory Ventilation Volume Guarantee

(SIMV-VG)

Airway Pressure Release Ventilation (APRV)

Adaptive Minute Ventilation (AMV)

**Compensation**

Circuit gas leakage compensation and automatic compliance compensation

Vienkartinio įpūtimo  
tūris: nuo 10 iki 2000 ml

**Ventilation Parameters Range**

Patient type	Adult, Pediatric, Neonate
Tidal volume	10 to 2000 mL ( VCV, SIMV-VC)
	5 to 2000 mL (PCV-VG, SIMV-VG)
	With TV/IBW indicator

5 to 90 cmH<sub>2</sub>O

Pinsp

Plimit 5 to 100 cmH<sub>2</sub>O

nuo 5 iki 100 cmH<sub>2</sub>O

ΔPsupp 0, 3 to 60 cmH<sub>2</sub>O (CPAP/PS)

Respiration rate 2 to 100 bpm

I:E 4:1 to 1:8

Tpause OFF, 5% to 60%

Tinsp 0.2 to 10.0 s

Trigger window 5% to 90%

Flow trigger 0.2 to 15 L/min

Pressure trigger -20 to -1 cmH<sub>2</sub>O

Exp% 5% to 80%

Min rate 2 to 60 bpm

Tslope 0.0 to 2.0 s

Apnea I: E 4:1 to 1:8

ΔPapnea 3 to 60 cmH<sub>2</sub>O

Phigh 3 to 90 cmH<sub>2</sub>O

Plow 3 to 50 cmH<sub>2</sub>O

Thigh 0.2 to 10.0 s

Tlow 0.2 to 10.0 s

MV% 25% to 350%

**Positive End Expiratory Pressure (PEEP)**

Type Integrated, electronic controlled

Range 0 to 50 cmH<sub>2</sub>O

reguliuojamas diapazonas

**Monitoring Parameters**

Tidal volume	0 to 3000 ml
Minute volume	0 to 100 L/min
Minute volume leakage	0 to 10.0 L/min
Peak pressure	-20 to 120 cmH <sub>2</sub> O
Mean pressure	-20 to 120 cmH <sub>2</sub> O
Plateau pressure	-20 to 120 cmH <sub>2</sub> O
I:E	50:1 to 1:50

Integruotas elektroninio valdymo  
PEEP

2.1.19.

Mechaninė plaučių ventilacija

valdoma tūriu

Rate	0 to 150 bpm
PEEP	0 to 70 cmH <sub>2</sub> O
Resistance (R)	0 to 600 cmH <sub>2</sub> O/(L/s)
Compliance (C)	0 to 300 ml/cmH <sub>2</sub> O
Driving Pressure	0 to 120 cmH <sub>2</sub> O

2.1.3

dujų tipas

Plaučių  
elastingumo  
monitoravimas  
ir rezultatų  
atvaizdavimas

2.1.25.2.

<b>Elastance (E)</b>	0.003 to 10 cmH <sub>2</sub> O/mL
Mechanical Power	0.00 to 100.00 J/min
Inspired oxygen (FiO <sub>2</sub> )	18% to 100%
<b>Control Accuracy</b>	
Volume delivery	≤60 ml: ± 10 ml >60 ml and ≤ 210 ml: ±15 ml >210 ml: ±7 % of the set value
Pressure delivery	± 2.0 cmH <sub>2</sub> O or ± 7% of the set value, whichever is greater
PEEP	± 2.0 cmH <sub>2</sub> O or ± 7% of the set value, whichever is greater
MV%	± 10% or ± 10% of the set value, whichever is greater

**Monitoring Accuracy**

Volume monitoring	≤60 mL: ± 10 mL >60 and ≤210 mL: ± 15 mL >210 mL: ± 7% of the reading
Pressure monitoring	± 2.0 cmH <sub>2</sub> O or ± 4% of the reading, whichever is greater
Rate	± 1bpm or ± 5% of the reading, whichever is smaller
MV	± 0.1L/min or ± 8% of the reading, whichever is greater

**Alarm Setting**

Paw High	2 to 100 cmH <sub>2</sub> O
Paw Low	0 to (Paw High – 2) cmH <sub>2</sub> O
TV High	5 to 2200 mL
TV Low	OFF, 0 to 2195 mL
MV High	0.2 to 100 L/min
MV Low	0 to 15 L/min: 0 to (MV High-0.2) L/min 15 to 100 L/min: 15 to (MV High – 1) L/min
FiO <sub>2</sub> High	20% to 100%, OFF
FiO <sub>2</sub> Low	18% to (FiO <sub>2</sub> High – 2) %
Apnea alarm	No breath has been detected within the apnea time.
Apnea delay time	5 to 60 s (by volume or pressure) 10 to 40 s (by CO <sub>2</sub> waveform)

**Lung Recruitment Tool**

Multi-step recruitment	(Increasing PEEP progressively) a maximum of 7 steps
Control parameters	Δpsupp, PEEP, Breaths, I:E, Rate PEEP on exit
Preset procedure	up to 5
One-step recruitment (sustain inflation)	
Control parameters	Pressure Hold, Hold Time, PEEP on exit
Cycle Interval	OFF, 1 - 180 min

**Insp Hold & Exp Hold**

Insp Hold Measurement	Cstat, Pplat, Ri
Exp Hold Measurement	PEEPi, PEEPtot

**Auxiliary Pressure Monitoring**

Monitor waveform	Ptp, Pes
Monitor parameter	PtpI, PtpE, ΔPtp, PesI, PesE, ΔPes

**Data Storage and Recording**

Configuration storage	up to 10 customized profiles
Log storage	10000 entries of alarm and activity logs
History trend	48 hours of continuous trend data
Screenshot	up to 50

**Pre-use system check**

Fully automatic performed by system, including hardware, flowmeter, gas supply, power supply, module, breathing circuit leakage and compliance, AGSS

**Pneumatic Specifications****Pipeline Supply** Magistralinis vamzdynas

Gas type	O <sub>2</sub> , N <sub>2</sub> O and Air
Pipeline input range	280 to 600 kPa (40 to 87 psi)
Pipeline connections	DISS or NIST

**Pipeline Supply Pressure Monitoring**

Display type	Electronic
Ranges	0 to 1000kPa (0 to 140 psi)
Accuracy	± (4% of the full scale reading + 8% of the actual reading)

**Cylinder Supply**

Cylinder supply	E Cylinder (American style or UK style)
O <sub>2</sub> input range	6.9 to 20 MPa (1000 to 2900 psi)
N <sub>2</sub> O input range	4.2 to 6 MPa (600 to 870 psi)
Air input range	6.9 to 20 MPa (1000 to 2900 psi)
Cylinder connections	Pin-Index Safety System (PISS)
Yoke configuration	O <sub>2</sub> , N <sub>2</sub> O, Air

**Cylinder Supply Pressure Gauges**

Display type	Mechanical or Electronic
Air range	0 to 25 MPa (0 to 3500 psi)
O <sub>2</sub> range	0 to 25 MPa (0 to 3500 psi)
N <sub>2</sub> O range	0 to 10 MPa (0 to 1400 psi)
Accuracy	± (4% of the full scale reading+8% of the actual reading)

**Ventilator Performance**

2.1.21

Peak gas flow	180 L/min + Fresh Gas Flow	maksimalus įpūtimo srautas
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**ACGO (Auxiliary Common Gas Outlet)**

Control type	Mechanical
Safety pressure	A relief valve limits fresh gas pressure at ACGO outlet port to not more than 12.5 kPa

2.1.9. **O<sub>2</sub> Flush**Greitas O<sub>2</sub> padavimas

Flow rate	35 to 50 L/min
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2.1.35 **Auxiliary O<sub>2</sub> & Air Flowmeter**papildomas O<sub>2</sub> ir oro srauto matuoklis

Flow range	0 to 15 L/min
Oxygen concentration	21 % to 100 %
Indicator	Glass tube and LED display

**High Flow Nasal Cannula**

Flow range	2 to 100 L/min
Oxygen concentration	21 % to 100 %
Indicator	Glass tube and LED display

**Auxiliary High Pressure O<sub>2</sub> Outlet**

Pressure range	280 to 600 kPa
Maximum flow	≥ 90 L/min

**O<sub>2</sub> Controls**

Supply failure alarm	≤ 220 kPa
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2.1.33.

**Anesthetic Gas Scavenging System (AGSS)**

Aktyvi atidirbusių dujų pašalinimo sistema

Type of disposal system	Passive Active: High-flow or low-flow
Pump rate	75 to 105 L/min (High-flow) 25 to 50 L/min (Low-flow)
Management	Scavenging flow rate monitoring and alarm Automatically switch off when standby

**Venturi Suction Regulator**

Supply	Air, from system gas source
Maximum vacuum	≥72 kPa at supply gas pressure of 280 kPa ≥73 kPa at supply gas pressure of 600 kPa
Maximum flow	≥25 L/min with pipeline gas at 280 kPa ≥32 L/min with pipeline drive gas at 600 kPa

**Continuous Suction Regulator**

Supply	External vacuum
Maximum vacuum	517.5 mmHg to 540 mmHg (69 kPa to 72 kPa) with external vacuum applied of 540 mmHg and 40 L/min free flow
Maximum flow	39 L/min to 40 L/min with external vacuum applied of 540mmHg and 40 L/min free flow

2.1.25.1.

Vienkartinio tūrio užlaikymas

**2.1.5. Electronic Flow control system (Electronic Mixer)****Direct Flow Control Mode** Paduodamų dujų srauto diapozonas deguonis**2.1.8. O<sub>2</sub> flow range** 0, 0,2 to 15 L/min**2.1.4. Air flow range** 0 to 15 L/min oras 2.1.8N<sub>2</sub>O flow range 0 to 12 L/minO<sub>2</sub> flow accuracy ± 50 ml/min or ± 5% of setting value, whichever is greaterBalance gas (Air/N<sub>2</sub>O) flow accuracy

± 50 ml/min or ± 5% of setting value, whichever is greater

**Total Flow Control Mode**

Total flow range 0, 0,2 to 20 L/min

Total flow accuracy ± 100 ml/min or ± 5% of setting value, whichever is greater

**O<sub>2</sub> concentration**Range 21% to 100% (The balance gas is Air)  
26% to 100% (The balance gas is N<sub>2</sub>O)Accuracy ± 5% V/V for flows < 1 L/min  
± 5% of setting for flows ≥ 1 L/min**Optimizer**

Available when AG module is loaded

**Flow Pause**

The fresh gas flow and ventilation will be paused for 1 minute at default. (Maximum 2 minutes)

**Backup Flow Control System****Control Type**

Mechanical (Control needle valve and knob)

**Flow Range**Control range (O<sub>2</sub>) 1 to 15 L/min

Control range (Air) 0 to 15 L/min

**Total flow meter**

Range 0 to 15 L/min

Indicator Flow tube

Indicator accuracy ± 10% of the indicated value for flows (between 10% and 100% of full scale with oxygen)

**Breathing System Specification****Breathing system volume**

Automatic ventilation 1800 ml

Manual ventilation 1950 ml

**CO<sub>2</sub> Absorber Assembly****2.1.12. Absorber capacity** 1500 ml Absorberio indo tūrisAbsorber type 1 Pre-Pak canister or  
Loose Fill absorbent**Inspiratory Airway Pressure Gauge**Range -20 to 100 cmH<sub>2</sub>O

Accuracy ± (2% of the full scale reading + 4% of the actual reading)

**Flow Sensor**

Type Variable orifice flow sensor

Location Inspiratory and expiratory port

**Oxygen Sensor**

Type Galvanic fuel cell

FiO<sub>2</sub> displayed 18% to 100%

Accuracy ± (volume fraction of 2.5 % + 2.5 % gas level)

Response time ≤ 20 seconds

**Breathing System 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

**2.1.14 Adjustable Pressure Limiting (APL) Valve**

Type Manually control with quick relief function and illumination

Range Approximately 0 (SP), 5 to 70 cmH<sub>2</sub>O 2.1.14Tactile knob indication ≥ 30 cmH<sub>2</sub>O**Breathing Circuit Parameters**System compliance ≤ 2 mL/cmH<sub>2</sub>O

Volume of gas lost due to internal compliance

Impedance in manual mode ≤ 6 cmH<sub>2</sub>OImpedance in automatic ventilation mode ≤ 6 cmH<sub>2</sub>O

Leakage ≤ 50 mL @ 3 kPa

System safety pressure on patient circuit 110 ± 10 cmH<sub>2</sub>O**Breathing System Temperature Controller**

Breathing system temperature maintained at least 31°C typical at 20°C ambient temperature in normal condition

**Materials**All materials in contact with exhaled patient gases are autoclavable up to a maximum temperature of 134°C, except O<sub>2</sub> sensor and mechanical pressure gauge.

All materials in contact with patient gas are latex free.

**2.1.6****Vaporizers Garintuvas****Anesthetic agent delivery**

Vaporizer Mindray V60 Anesthetic Vaporizer

Support agents Halothane, Isoflurane,

Sevoflurane, Desflurane

Position Max.3 positions (2 active, 1 inactive)

Mounting mode Selectatec®, with interlocking function

**Monitor Modules****Anesthesia Gas (AG) Module**

Conformity with standard ISO 80601-2-55

Measurement mode Infrared absorption, sidestream

**2.1.32.1 Monitor gases** CO<sub>2</sub>, O<sub>2</sub> (Paramagnetic O<sub>2</sub> module), N<sub>2</sub>O, and monitoruojamos dujos any of the five anesthetic agents: DES, ISO, ENF, SEV and HAL

Warm-up time &lt; 45 s (ISO accuracy mode)

&lt; 10min (full accuracy mode)

Sample rate Adu/Ped: 150, 180, 200 ml/min

Neo: 100, 110, 120 ml/min

Monitoring range CO<sub>2</sub>:

0% to 30% (0.0 to 30 kPa, 0.0 to 226 mmHg)

O<sub>2</sub>/N<sub>2</sub>O: 0% to 100%

HAL, ISO, ENF: 0% to 30.0%

SEV: 0% to 30.0%

DES: 0% to 30.0%

**BIS/BISx4 Module**

Conformity with standard IEC 60601-2-26

BIS, BIS L/ BIS R 0 to 100

Sweep speed 6.25 mm/s, 12.5 mm/s, 25 mm/s or 50 mm/s

Alarm limit BIS high: 2 to 100

BIS low: 0 to (BIS high -2)

Calculated parameters SQI/SQI L, SQI R; EMG/EMG L, EMG R; SR/SR L,

SR R; SEF/SEF L, SEF R; TP/TP L, TP R; BC/BC L,

BC R; sBIS L, sBIS R; sEMG L, sEMG R; ASYM

**NMT Module**

Conformity with standard IEC 60601-2-10

Stimulation output

Pulse width: 100, 200, or 300 μs; monophasic rectangle pulse; Accuracy: ± 10 %

Stimulation current range: 0 to 60 mA in increments of 5 mA

Accuracy: ± 5 % or ± 2mA, whichever is greater

Maximum skin resistance: 3 kΩ @ 60 mA, 5 kΩ @ 40 mA

Block recovery OFF, 1,2, 3, 4, 5 %, 10 %, 20 %, 30 %, 40 %.

**2.1.34 Paramagnetinė deguonies konc. matavimo techn.**

	50 %, 60 %, 70 %, 80 %, 90 %, 100 %
TOF (Train Of Four) mode	
TOF-Ratio (response percentage) :	5 % to 160 %
TOF-Count (number of responses) :	0 to 4
TOF-T1% (response to the first stimulus as percentage of the reference value) :	0 % to 200 %
ST (Single Twitch) mode	
ST-Ratio (response percentage) :	0 % to 200 %
DBS (Double-Burst Stimulation) 3.2/3.3 mode	
DBS-Ratio (response percentage) :	5 % to 160 %
DBS-Count (number of responses):	0 to 2
PTC (Post-Tetanic Count) mode	
PTC-Count (number of responses) :	0 to 20

## 2.1.2.2.

### Anesthesia Function

#### Anesthetic Prediction

Patient type	Height: 150 to 200 cm Weight: 40 to 140 kg Age: 18 to 90 years old
Anesthetic agents	Desflurane, Isoflurane, Sevoflurane and Halothane
Prediction trend and waveform	Dynamic short trend waveforms of F <sub>I</sub> A <sub>A</sub> , EtA <sub>A</sub> , F <sub>i</sub> O <sub>2</sub> and EtO <sub>2</sub> in the last 10 min and prediction trend waveforms of F <sub>I</sub> A <sub>A</sub> , EtA <sub>A</sub> , F <sub>i</sub> O <sub>2</sub> and EtO <sub>2</sub> in the next 20 min.
Prediction deviation	EtA <sub>A</sub> =0: less than volume fraction of 0.05 % EtA <sub>A</sub> ≠0: - 20 % to 30 % of the measured EtA <sub>A</sub> , or - 5 % to 7.5 % of the vaporizer maximum setting, whichever is greater EtO <sub>2</sub> : - 10 % to 15 % of the measured EtO <sub>2</sub> , or volume fraction of - 5 % to 7.5 %, whichever is greater

#### Agent Consumption Calculation

Usage speed range	HAL, ISO: 0 mL/h ~ 250 mL/h SEV: 0 mL/h ~ 450 mL/h DES: 0 mL/h ~ 900 mL/h
Accuracy	± 2 mL/h, or ± 15% of the reading, whichever is larger
Total usage range	0 to 3000 ml
Accuracy	± 2 mL, or ± 15% of the reading, whichever is larger

### Electrical Specifications

#### Main Electrical Power

2.1.2.1. Power input	220-240 Vac, 50/60 Hz, 10A max	maitinimo šaltinis
	100-240 Vac, 50/60 Hz, 10A max	

Power cord	100-120 Vac, 50/60 Hz, 10A max 5 m (length)
<b>Battery Power</b>	
Battery type	Lead-acid, 12 VDC, 32 Ah (2 batteries) 12 VDC, 16 Ah (1 battery)

**Run-time** One new battery: minimum 90 minutes under typical operating conditions

vienos baterijos veikimo laikas 90 min

Time to shut down from the first Lower Battery Alarm  
5 minutes minimum  
(new fully-charged battery)

Battery charge time <12 hours

#### Auxiliary Electrical Outlets

Number of outlets	4
Output current	3 A for each outlet, 5 A for total

#### Communication Port

Communication port	RS-232 compatible serial interface (DB9)
Network port	Two RJ-45 network ports
USB port	Four USB ports
Video signal port	One VGA port for inputting the VGA video signal of the main to external display

### Environmental Specifications

#### Operating

Temperature	10 to 40°C
Relative humidity	15% to 95% (noncondensing)
Barometric (Kpa)	70 to 106.7 kPa

#### Storage

Temperature	-20 to 60°C for main unit, -20 to 50°C for O <sub>2</sub> sensor
Relative humidity	10% to 95% (noncondensing)
Barometric	50 to 106.7 kPa

#### Resistance to Ingress of Fluids

Complies with the requirements of clause 11.6.3 in IEC 60601-1 and also the requirements in IEC 60529 for protection against vertically falling water drops equipment (IPX1)

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Not all features are for sale in all countries.

Please contact your local Mindray sales representative for the most current information.