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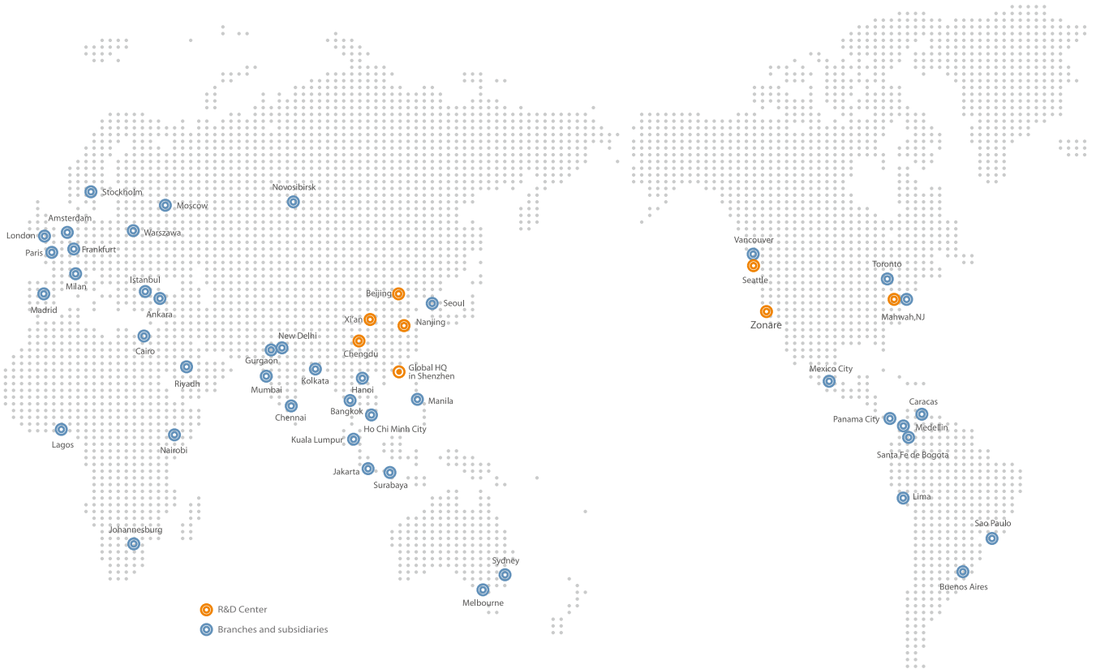

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A7 NEW

Anaesthesia Workstation

Technical Specifications (Ver. 2016-07-08)

Physical Specification	
Dimensions and Weight	
Height:	1400 mm ± 25 mm
Width:	1050 mm ± 25 mm (including breathing system)
Depth:	805 mm ± 25 mm
Weight:	185 kg ± 5 kg (with AG module, Auxiliary work surface and 3 yokes, without vaporisers and gas cylinders)
Top Shelf	
Width:	616 mm ± 25 mm
Depth:	362 mm ± 25 mm
Weight limit:	40 kg
Work Surface (Stainless steel)	
Height:	850 mm ± 25 mm
Width:	616 mm ± 25 mm
Depth:	380 mm ± 25 mm
Auxiliary Work Surface	
Height:	750 mm ± 25 mm
Width:	450 mm ± 25 mm
Depth:	330 mm ± 25 mm
Weight limit:	10 kg
Side mounting Rails	
Supporting weight:	27 kg at a maximum distance of 0.41 m
Drawer (Internal Dimensions)	
Numbers:	3
Height:	135 mm ± 10 mm
Width:	440 mm ± 10 mm
Depth:	385 mm ± 10 mm
Weight limit:	5 kg
Bag Arm	
Height:	1150 mm ± 10 mm
Length:	312 mm ± 10 mm
Swiveling angle:	150 ± 10 degrees
Casters	
Diameter:	15 cm
Brakes:	central brake with lock/unlock indicator
Cable pusher:	cable pusher with each caster
Handle	
Length:	650 mm ± 25 mm
Work Light	
Settings:	Off, Low, High

Screen	
Display:	Colour LCD, 15 inch, 4:3 ratio diagonal TFT with touch screen
Display parameters:	All setting and alarm parameters
	(including Breath rate, I:E ratio, Tidal volume, Minute volume, PEEP, Pmean, Ppeak, Pplat, and O_2 concentration)
Graphic waveforms:	Pressure, flow, volume, CO_2, BIS
Spirometry Loops:	Pressure-Volume, Flow-Volume
Timer:	Display on the screen
Screen Control:	Touch pad/Touch screen/Mouse control
Ventilator Specifications	
Modes of ventilation	
Manual/Spontaneous Ventilation/Bypass	
Volume Control Ventilation (VCV) with PLV function	
Pressure Control Ventilation (PCV) with/without volume guarantee (VG)	
Pressure Support Ventilation (PS) with apnea backup	
Synchronised Intermittent Mandatory Ventilation (SIMV-Volume Controlled and SIMV-Pressure Controlled)	
Synchronised Intermittent Mandatory Ventilation Volume Guarantee (SIMV-VG)	
Continuous Positive Airway Pressure (CPAP)	
Patient Size	
Patient size:	Adult, Paediatric, Infant
Compensation	
Circuit gas leakage compensation and automatic compliance compensation	
Ventilation Parameters Ranges	
Tidal Volume Range:	20 - 1500 mL (increments of 1 mL) (VCV, SIMV-VC,SIMV-VG)
Pressure (Pinsp) Range:	5 - 70 cmH_2O (increments of 1 cmH_2O) (PCV, SIMV-PC)
Pressure (Plimit) Range:	10 - 100 cmH_2O (increments of 1 cmH_2O) (VCV, SIMV-VC)
Pressure support (ΔP) Range:	3 - 50 cmH_2O (increments of 1 cmH_2O) (SIMV-VC, SIMV-PC, PS,CPAP)
Respiration Rate Range:	4 - 100 bpm (increments of 1 bpm) (VCV, PCV,SIMV-VC, SIMV-PC,SIMV-VG, CPAP)
Minimum Rate Range:	2 - 60 bpm (increments of 1 bpm) (PS,CPAP)
I:E Range:	4:1 - 1:8 (increments of 0.5) (VCV, PCV)
Tpause Range:	OFF, 5 - 60% (increments of 1%) (VCV, SIMV-VC)
Tinsp Range:	0.2 - 5 sec (increments of 0.1 s) (SIMV-VC, SIMV-PC,SIMV-VG)
Trigger Range:	F-trig: 0.2 to 15 L/min (SIMV-VC, SIMV-PC, CPAP/PS, PS, SIMV-VG), Step: 0.1 L/min P-trig: -20 cmH_2O to -1 cmH_2O (SIMV-VC, SIMV-PC, CPAP/PS, PS,SIMV-VG), Step:1 cmH_2O
Tslope Range:	0.0 - 2.0 sec (increments of 0.1 s) (SIMV-VC, SIMV-PC, PCV, PS,SIMV-VG, CPAP)
VtG Range:	OFF, 20 - 1500 mL (increments of 1 mL) (PCV)
PlimVG Range:	5 - 100 cmH_2O (increments of 1 cmH_2O) (PCV)
Apnea Ti Range:	0.2 - 5 sec (increments of 0.1 s) (PS,CPAP)
Positive End Expiratory Pressure (PEEP)	
Type:	Integrated, Electronically controlled
Range:	OFF, 3 to 30 cmH_2O (increments of 1 cm H_2O) (VCV, PCV, SIMV-VC, SIMV-PC, PS,SIMV-VG, CPAP)
Ventilator Performance	
Drive Pressure Range:	280 to 600 kPa
Inspiratory flow range:	2.4 to 110 L/min
Peak Gas Flow:	110L/min + Fresh Gas Flow
Ventilator Monitoring	
Minute Volume Range:	0 - 100 L/min
Tidal Volume Range:	0 - 3000 mL
Inspired Oxygen (FiO_2):	18 - 100%
Peak Pressure (Peak):	-20 - 120 cmH_2O
Mean Pressure (Pmean):	-20 - 120 cmH_2O
Plateau Pressure (Pplateau):	-20 - 120 cmH_2O
PEEP Range:	0 - 70 cmH_2O
Rate Range:	0 - 120 bpm
Control/Monitoring Accuracy	
Volume Control:	< 60 mL, ± 10 mL
	≥ 60 mL and ≤ 210 mL, ± 15 mL
	≥ 210 mL, ± 7% of the set value
Pressure Control:	Pinsp: ± 2.5 cmH_2O or ± 7% of the set value, whichever is greater
	Plimit: ± 10% of the set value
PEEP Control:	3 to 30 cmH_2O: ± 2 cmH_2O or ± 10% of the displayed value, whichever is greater
	OFF: not defined
Respiration Control:	± 1 bpm or 10% of the set value, whichever is smaller
Volume Monitoring:	< 60 mL, ± 10 mL
	≥ 60 mL and ≤ 210mL, ± 18 mL
	≥ 210 mL ± 9% of the set value
Airway Pressure Monitoring:	± 2 cmH_2O or ± 5% of the set value, whichever is greater
PEEP Monitoring:	0 to 30 cmH_2O: ± 2 cmH_2O or ± 10% of the displayed value, whichever is greater
	≥ 30 cmH_2O: not defined
Respiration Monitoring:	± 1 bpm or 10% of the set value, whichever is smaller
Minute Volume Monitoring:	0 to 30 L/min: ± 15% of the displayed value, repeatable to ± 5% over a 1 hour period
Alarm limits	
Paw High:	The greater of 10 and (Paw Low + 1) to 100 cmH_2O
Paw Low:	0 to the lesser of 70 and (Paw High – 1) cmH_2O
MV High:	The greater of 0.2 and (MV Low + 0.1) to 25 L/min
MV Low:	0 to the lesser of 20 and (MV High – 1) L/min
FiO_2 High:	The greater of 21 and (FiO_2 Low + 1) to 100%, Off
FiO_2 Low:	18 to the lesser of 98 and (FiO_2 High – 1)%
Lung Recruitment Tool	
Lung Recruitment Maneuver :	Increasing PEEP progressively (with a maximum of 7 stages)
Monitoring Parameters Sourced From Patient Monitor :	Arrhythmias Hemodynamic parameters: SpO2, HR, CO, IBP
Monitoring Parameters Sourced From Anaesthesia System:	Ventilation parameters: PEAK, PEEP, Vt, Compl Real-time pressure waveforms
Adjustable Ventilation Parameters for Lung Recruitment:	ΔP, PEEP, Breaths, I:E, Rate
Data Storage (Non-Volatile) and Recording	
Configuration Storage:	One group of factory configuration, one group of user configuration
Patient types:	Adult, Paediatric and Infant for each Configuration
Log Storage:	500 entries of alarm log/500 entries of activity log/500 entries of error log/500 entries of service log
History trend:	48 hours of continuous trend data (BIS, Fresh Gas, Ventilation, etc.)
Pneumatic Specifications	
Pipeline Supply	
Gas Configuration:	O_2, N_2O and Air
Pipeline input range:	280 to 600 kPa (40 to 87 psi)
Pipeline connections:	DISS or NIST
Cylinder Supply	
Cylinder Supply:	E Cylinder (American and UK style)
O_2Cylinder Input Range:	6.9 to 15.5 MPa (1000 to 2250 psi)
N2O Cylinder Input Range:	4.2 to 6 MPa (600 to 870 psi)
Air Cylinder Input Range:	6.9 to 15.5 MPa (1000 to 2250 psi)
Cylinder Connections:	Pin-Index Safety System (PISS)

Yoke Configuration:	O_2, N_2O, Air
N_2O Automatic Cutoff	
An N_2O automatic cutoff stops the flow of N_2O when O_2 flow is less than 200 mL/min.	
O_2 Controls	
O_2 supply failure alarm:	185.5 to 254.5 kPa (27 to 36 psi)
Auxiliary Common Gas Outlet	
Control type:	Electronical or Mechanical
Safety Pressure:	A relief valve limits fresh gas pressure at ACGO outlet port to not more than 125 cmH_2O
Fresh gas flow:	0.2 to 18 L/min
Auxiliary O_2 and Air Flow meter	
Flow range:	For each meter 0 to 15 L/min
Indicator:	Flow tube
Auxiliary O_2 Gas Power Outlet	
Pressure range:	280 to 600 kPa
Maximum flow:	≥ 90 L/min
O_2 Flush	
Flow rate:	35 to 50 L/min
Built-in Suction device	
Continuous Suction Regulator	
Supply	External vacuum
Maximum vacuum	517.5 mmHg to 540 mmHg (69 kPa to72 kPa) with externalvacuum applied of 540 mmHg and 40 L/min free flow
Maximum Flow	39 L/min to 40 L/min with external vacuum applied of 540 mmHg and 40 L/min free flow
Venturi Suction Regulator	
Supply	Air from system gas supply
Maximum vacuum	•72 kPa (540 mmHg) with pipeline drive gas at 280 kPa ≥ 73 kPa (547.5 mmHg) with pipeline drive gas at 600 kPa
Maximum Flow	•25 l/min with pipeline drive gas at 280 kPa
	•32 l/min with pipeline drive gas at 600 kPa (without suction bottle and filter)
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_2O flow range:	0 to 12 L/min
Electronic Encoders Rotations:	< 4 (from minimum flow to maximum flow)
O_2 flow accuracy:	± 50 ml/min or ± 5% of setting value, whichever is greater
Balance gas (Air/N_2O) flow accuracy:	± 50 ml/min or ±5% of setting value, whichever is greater
Total Flow Control Mode	
Total flow range:	0.2 to 18 L/min
Total flow accuracy:	± 100 ml/min or ± 5% of setting value, whichever is greater
	Leakage from one gas inlet to another gas inlet is less than 10 ml per hour.
O_2 concentration	
O_2 concentration range:	21% to 100% (The balance gas is Air) or/26% to 100% (The balance gas is N_2O)
O_2 concentration accuracy:	± 5% V/V for flows < 1 L/min or/5% setting for flows ≥ 1 L/min
Compensation	
Temperature and atmospheric pressure compensated to standard conditions of 20°C and 101.3 kPa (14.7 psi)	
Backup Flow Control System	
Control Type	
Mechanical (Control Needle Valve and Knob)	
Flow Range	
Control Range (O_2):	1 +/- 0.25 to 15 L/min
Control Range (Air):	0 to15 L/min
Flow meter order	
O_2, Air (left to right, viewing front of unit)	
O_2 concentration	
Oxygen concentration:	Not lower than 21%
Total flow meter	
Range:	0 to10 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	
Total volume:	2850 ml ± 100 ml (without bellows)
CO_2 Absorber Assembly	
Absorber capacity:	1 Pre-Pak or 1500 ml ± 100 ml
Absorber Canister Contents:	1 Pre-Pak canister or Loose Fill absorbent
Water Collection Cup	
Detachable with 6 mL of capacity	
Inspiratory Airway Pressure Gauge	
Range:	-20 to 100 cmH_2O
Accuracy:	± (2% of full scale reading + 4% of actual reading)
Flow sensor	
Type:	Variable orifice flow sensor
Dimensions:	22 mm OD and 15 mm ID
Location:	Inspiratory and expiratory port
Oxygen sensor	
Type:	Galvanic fuel cell
Breathing system connections	
Exhalation connection:	22 mm OD ISO/15 mm ID ISO conical
Inhalation connection:	22 mm OD ISO/15 mm ID ISO conical
Manual bag port:	22 mm OD ISO/15 mm ID ISO conical
Connections to a Gas Scavenger:	30 mm OD ISO
Adjustable Pressure Limiting (APL) valve	
APL Type:	Manually control with quick relief function
Control Range:	SP, Approximately 0 to 75 cmH_2O
Adjustable Range of Motion:	330 ± 10 degrees
Tactile Knob Indication:	≥ 30 cmH_2O
Bag-to-Ventilator Switch	
Type:	Bi-stable
Control:	The switch between manual ventilation and mechanical ventilation
Breathing System Temperature Controller	
Breathing System Temperature Maintained to: 35°C typical at 20°C ambient temperature	
Materials	
All materials in contact with exhaled patient's gas are autoclavable up to a maximum temperature of 134°C, except flow sensors, O_2 cell, and mechanical pressure gauge.	
All materials in contact with patient's gas are latex-free.	
Breathing circuit parameters	
System Compliance:	≤ 2 mL/cmH_2O Volume of gas lost due to internal compliance (manual ventilation mode only)
Internal Compliance:	≤ 4 mL/cmH_2O
Impedance in Manual Mode:	≤ 6 cmH_2O (the gas under test is a bi-directional sine wave at a frequency of 20 with tidal volume of 1 L)

Impedance in Automatic Ventilation Mode: ≤ 6 cmH_2O (the gas under test is a semi-sine wave at a frequency of 20 with tidal volume of 1 L)		
Leakage:	≤ 150 mL @ 3 kPa	
System Safety Pressure on Patient Circuit: 110 ± 10 cmH_2O @ 10 - 110 L/min		
Vaporiser		
Anaesthetic agent delivery		
Vaporiser:	Mindray V60 Anaesthetic Vaporiser or Penlon Sigma Alpha/Delta	
Type:	Halothane, Enflurane, Isoflurane, Sevoflurane, Desflurane	
Vaporiser positions:	3 positions (2 active, 1 inactive)	
Mounting mode:	Selectatec® with interlocking function	
Anaesthetic Prediction		
Patient Type:	Height: 150 to 200 cm Weight: 40 to 140 kg Age: 18 to 90 years old	
Anaesthetic Agents (AA):	Desflurane, Enflurane, Isoflurane, Sevoflurane and Halothane	
Prediction trend and waveform:	The system displays 8 waveforms: dynamic short trend waveforms of FiAA, EtAA, FiO_2 and EtO_2 in the last 10 min and prediction trend waveforms of FiAA, EtAA, FiO_2 and EtO_2 in the next 20 min.	
Prediction deviation:	EtAA=0: less than volume fraction of 0.05 % EtAA≠0: - 20 % to 30 % of the measured EtAA, or - 5 % to 7.5 % of the vaporiser maximum setting, whichever is greater EtO_2: - 10 % to 15 % of the measured EtO-, or volume fraction of - 5 % to 7.5 %, whichever is greater	
Monitor Module		
Anaesthesia Gas (AG) Module		
Measurement mode:	Infrared absorption, Sidestream	
Monitor gases:	Co_2, O_2 (Paramagnetic O_2 module), N_2O, and any of the five anaesthetic agents: DES, ISO, ENF, SEV and HAL	
Warm-up time:	45 s (ISO accuracy mode) 10 min (full accuracy mode)	
Sample rate:	Adu/Pead: 120, 150, 200 ml/min Neo: 70, 90, 120 ml/min	
Range:	CO_2: 0% ~ 30% AA: 0% ~ 30% O_2/N_2O: 0 ~ 100%	
BIS Module		
Measured parameters:	EEG	
BIS:	0 ~ 100	
Sweep speed:	6.25 mm/s, 12.5 mm/s, 25 mm/s or 50 mm/s	
Input impedance:	> 50 Mohm	
Noise (RTI):	< 0.3 uV (0.25 ~ 50 Hz)	
Input signal range:	± 1 mv	
EEG Brandwidth:	0.25 ~ 100 Hz	
Patient leakage:	< 10 uA	
Alarm limit:	BIS high: 2 ~ 100	
	BIS low: 0 ~ 98	
Calculated parameters:	SQI, EMG, SR, SEF, TP	
Impedance range:	0 ~ 999 Kohm	
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 k @ 60 mA, 5 k @40 mA
Block Recovery:	OFF, 1,2, 3, 4, 5 %, 10 %, 20 %, 30 %, 40 %. 50 %, 60 %, 70 %,80 %, 90 %, 100 %	
TOF (Train Of Four) mode:	TOF-Ratio (response percentage) 5 % to 160 %	

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	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
Agent Consumption Calculation		
Calculation range:	0 to 3000 ml	
Accuracy:	± 2 mL, or ± 15% of the displayed value, whichever is greater.	
Anaesthetic Gas Scavenging System (AGSS)		
Type of the Applicable Disposal System: Low flow		
Size:	430 mm × 132 mm × 114 mm	
Extract Flow:	25 to 50 L/min	
Type of the Applicable Disposal System: High flow		
Size:	430 mm × 132 mm × 114 mm	
Extract Flow:	75 to 105 L/min	
Type of the Applicable Disposal System: Passive		
Electrical specifications		
Main Electrical Power		
Power Supply Input Voltage:	100 - 240 VAC, 50/60 Hz (7 A max for A7 unit, 5 A max for A7 auxiliary outlet)	
	220 - 240 VAC, 50/60 Hz, (6 A max for A7 unit, 5 A max for A7 auxiliary outlets)	
Power Cord:	5 m (length)	
Battery Power		
Battery type:	Sealed Lithium-ion, 11.1 V, 4.5 Ah (2 batteries)	
Battery Run-time:	New battery: minimum 90 minutes under typical operating conditions	
Time to Shutdown from Lower Battery Alarm: 5 minutes minimum (new fully-charged battery)		
Battery Charge Time:	8 hours max from an initial charge of 10%. Charging occurs whenever AC is applied to the A7 System (New Battery)	
Auxiliary Electrical Outlets		
Number of Outlets:	4	
Output Current:	3 A for each outlet, 5 A for total	
Environmental specifications		
Operating Temperature:	+10 to +40°C, +50 to 104°F	
Storage Temperature:	-20 to +60°C, -4 to 140°F, Oxygen sensor: -20 to +50°C	
Humidity (Operating and Storag0e): 15 to 90% RH, non-condensing		
Atmospheric Pressure (Operating): 70 kPa to 106.7 kPa		
Atmospheric Pressure (Storage): 50 kPa to 106.7 kPa		
Resistance to Ingress of Fluids:		
Complies with the requirements of clause 44.3 in IEC 60601-1 and also the requirements in IEC 60529 for non-protective equipment (IPX0)		
Interface Specification		
Communication Port (Sp1):	RS-232C compatible serial interface (DB9)	
Network Port (Cs1):	RJ-45 network port	
USB Ports (SB1, SB2):	Two USB ports	
Data Port (DP1):	One test port for connection of calibration equipment by a Mindray-authorised service representative	