HEINEN + LÖWENSTEIN

Life Saving Medical Technology

leon mri

Technical Specifications

The leon mri is an anaesthesia workstation for adults, children, infants and premature infant care, which can be used in MR environments with 1.5T - 3.0T magnets in a maximum field line strength of 40mT (400 Gauß)

Base specification, weight and dimensions	
Mobile Cart	Cart with 4 antistatic rollers
	All rollers have brakes
	Base weight 115 kg (without vaporiser)
	Dimensions (h x b x d) 146 x 85 x 69 cm
	Min. Width required for carrier=70cm
	Pull-out writing shelf: 25 x 32 cm
	3 drawers 8 x 25 x 24 cm / 1 Storage
Sensors	
Tesla sensor	Installation height in the equipment:
	approx. 90 cm, left + right side
	Measuring range: 35mT to 45mT
Ambient conditions - during operation	
Ambient temperature	+15°C – +35°C
Relative humidity	20 – 80% below the dew point
Air pressure	700 – 1060 Pa*100
Electromagnetic compatibility	
Complies with	EN 60601-1-2
Mains voltage/powersupply	
Mains voltage	240 V_{AC} (115 V_{AC}) +10%/-15%, 50 – 60 Hz
Battery life	> 60 minutes (fully charged)
Gas connections	
Central gas supply	Connections for O_2, N_2O and AIR
Reserve gas bottles *(only to be used with mri-compatible bottles)*	Connections for O_2, N_2O (optionally without N_2O)
	Manometer for displaying pressure
	Permissible range for supply pressure:
	O_2, N_2O: < 5 – 200 kPa*100 (bar)
	NIST + PIN Index
Supply pressure	2.8 – 6.0 kPa*100 (bar)
	Monitoring of supply pressures via onscreen display
Connection type	Standard NIST
Aspiration	Integrated vacuum source for bronchial
	aspiration with vacuum display
Gas management	
Fresh gas management	Flow meter block for 3 gases
Settings	O_2: 0.1 - 1 / 1.5 - 10 l/min
	when N_2O is carrier gas 25–100 Vol.% O_2 (ratio system)
	N_2O :0.1 - 1 / 1.5 - 10 l/min
	AIR: 0.1 - 12 l/min
O_2 –Flush	> 35 l/min
Other connections	Bronchial aspiration (vacuum driven)
	Freshgas outlet
	22 external / 15 mm internal ISO cones
Anaesthetic vaporizer holder	
Connection type	Selectatec® or Dräger-compatible anaesthetic vaporizer
	connections for two interlocking vaporizers

Patient module	
Complies with	ISO 8835–2
Closed loop system	Fresh gas decoupled, heated
	Complete, with CO_2–absorber container (replaceable
	during operation)
	Inspiratory and exspiratory flow monitor, decoupled APL
Breathing system	All parts completely latex-free
Patient connectors	22 external / 15 mm internal ISO cones
APL–valve	
Range	Spontaneous ventilation and ventilation pressures
	configurable up to a minimum of 90 Pa*100 (closed
	position) with touch-sensitive settings
	Accuracy ±5 %
CO_2 absorber	
Material specification for	SofnoLime: 3 % sodium hydroxide by weight
recommended absorbent	> 75 % calcium hydroxide by weight
	White or coloured solid, pH value 12 – 14
	Sodasorb: 2 % sodium hydroxide by weight
	> 80 % calcium hydroxide by weight
	White or coloured solid, pH value 12 – 14
	Spherasorb: > 2 % sodium hydroxide by weight
	75 – 80 % calcium hydroxide by weight
	White, solid balls - pH value is alkaline in solution
	CO_2 absorber adapter available for disposable absorber
Absorber volume	2000 ml (fill limit 1750 ml)
Material/Weight/Dimensions	Polisulfon / 550 g / Ø 140 mm, height 265 mm
Guarantee	1 year or max. 52 cleaning cycles
Anaesthesia Ventilator	
Complies with	ISO 8835–2
Ventilator	Pneumatically driven and electronically controlled
	Hanging bellows-pressure limited-Compliance compensated
Display	12" TFT display, touch screen
Graphics	Simultaneous display of up to 4 real–time graphs
	Comprehensive data management with trend display
Real–time graphs	Pressure · Flow · Volume
	O_2, CO_2, N_2O
	Volatile anaesthetics
Drive gas consumption	≥ minute volume MV
Ventilator settings	2 volume–controlled ventilation modes (IMV, S–IMV)
	2 pressure–controlled ventilation modes (PCV, S-PCV)
	1 pressure–/flow–controlled ventilation modes (PSV)
	1 ventilation mode Heart–Lung Machine (HLM) (optional)
	1 manual respiration/spontaneous ventilation mode
Inspiratory flow of the ventilator	Maximal 180 l/min

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Volume controlled ventilation IMV	
Tidal volume V_{Ti}	20 – 400 ml (pediatric) 300 – 1,600 ml (adult)
Respiration rate	14 – 80 1/min (pediatric) 4 –40 1/min (adult)
I:E ratio	4:1 - 1:4 (increments of 0.1)
PEEP	OFF, 1 – 20 Pa*100 (mbar)
Plateau	OFF, 10 – 50% (increments of 10%)
Pressure limit (P_{Max})	10 – 80 Pa*100 (mbar)
Synchronized volume-controlled ventilation S-IMV	
Tidal volume V_{Ti}	20 – 400 ml (pediatric) 300 – 1,600 ml (adult)
Inspiration time T_{Insp}.	0.2 – 2.9 s (pediatric) 0.3 – 10 s (adult) 4:1 - 1:49
Respiration rate	6 – 60 1/min (pediatric) 4 – 40 1/min (adult)
PEEP	OFF, 1 – 20 Pa*100 (mbar)
Plateau	OFF, 10 – 50% (increments of 10%)
Pressure limit (P_{Max})	10 – 80 Pa*100 (mbar)
Trigger threshold	0.1 – 10 l/min
Pressure controlled ventilation PCV	
Respiration rate	14 – 80 1/min (pediatric) 4 – 40 1/min (adult)
I:E ratio	4:1 - 1:4 (increments of 0.1)
Plateau	10 – 90% (increments of 5%)
Airway pressure $P_{Insp.}$	10 – 60 Pa*100 (mbar)
PEEP	OFF, 1 – 20 Pa*100 (mbar)
Synchronized pressure controlled ventilation S-PCV	
Airway pressure PInsp.	10 – 60 Pa*100 (mbar)
Inspiration time TInsp	0.2 – 2.9 s (pediatric) 0.3 – 10 s (adult) 4:1 - 1:49
Respiration rate	6 – 60 1/min (pediatric) 4 – 40 1/min (adult)
PEEP	OFF, 1 – 20 Pa*100 (mbar)
Plateau	10 – 90% (increments of 5%)
Trigger threshold	0.1 – 10 l/min
Pressure supported ventilation PSV (ASSIST)	
Support pressure $P_{Insp.}$	5 – 60 Pa*100 (mbar) (adult and pediatric)
PEEP	OFF, 1 – 20 Pa*100 (mbar)
Trigger threshold	0.1 – 10 l/min
Backup	4, 6, 8, 10, 15, 30, 45 seconds
Manual ventilation	
Manual ventilation bag	Manual respiration is generated with the breathing bag used as reservoir

Safety equipment	
O_2 minimum concentration	Ratio function so that in a O_2/N_2O gas blend a minimum O_2 concentration of 25% is guaranteed If O_2 central gas supply pressure fails no dosage of N_2O is possible
Safety valves	Valves with configurable release values Automatic safety valve that prevents positive hazardous pressure Automatic safety valve that prevents hazardous negative pressure
Respiratory monitoring	
Airway pressure	Peak, Mean, PEEP, Plateau piezoresistive, -4 – 100 Pa*100 (mbar)
Tidal volume V_T	0 – 5000 ml
Minute volume	0 – 50 l
Frequency	0 – 150 1/min
Flow sensor	Hot wire anemometry, -200 – 200 l/min
Lung function	C20/C Static/dynamic Compliance Resistance
Gas measurement	
FiO_2	Fuel cell inspiratory (standard)
Side stream measurement	optional
O_2	Measurement with fuel cell, inspiratory/end tidal Response time < 12sec. to 90 % of final value
CO_2	Measurement with infrared spectrometry inspiratory/end tidal - Response time 250 ms
N_2O	Measurement with infrared spectrometry inspiratory/end tidal - Response time 250 ms
Anesthetic agents	Measurement with infrared spectrometry Concentrations: halothane, enflurane, isoflurane, sevoflurane and desflurane inspiratory / end tidal - Response time 300- 350 ms
Flow	70 – 200 ml/min ±10%
Accuracy	ISO (11196) after 45 s, full after 10 min
MAC	Determination of minimum alveolar concentration
Interfaces	
Serial	COM1, COM2 - Standard pin assignment
Ethernet	IEE 802.3, 100BaseT, CAT5

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