MORPHEUS LT/MRI

Anaesthesia Unit

compatible for Magnetic Resonance

code: OM3.A5s/RMN

rev. 4 : dated 01/06/2017

INTENDED USE

The MORPHEUS LT/MRI is an anaesthesia unit that can be used on adult, children and newborn patients.

The MORPHEUS LT/MRI is an anaesthesia machine compatible for Magnetic Resonance rooms from 1,5 T (15000 G) and from 3 T (30000 G) and positionable at a min. distance from the magnet corresponding to a field of 20 mT (200 G).

The MORPHEUS LT/MRI is suitable for administration of Oxygen - Air - Nitrous Oxide - Halothane - Enflurane - Isoflurane - Sevoflurane mixtures.

GENERAL DESCRIPTION

The MORPHEUS LT/MRI anaesthesia unit is completed with:

- mechanic gas mixing system
- electronic lung ventilator with dual colour display
- valves group: open, semi-closed, closed, heated, with soda lime absorber of 1 Kg. capacity
- SIARETEX rapid connection device, Selectatec compatible for 2 vaporizers
- gas supply group

TECHNICAL DATA

Structure	Light aluminium alloy and plastic moulds **(a magnetic material)**
Wheels	Pivoting antistatic wheels, diameter 100 mm (2 with brakes)
Cylinder support	Not supplied. **Use cylinder aluminium MRI compatible only.**
Support for 2 vaporizers	On horizontal guide (SIARETEX rapid connection device, Selectatec compatible for 2 vaporizers)
Auxiliary power supply outlets	No. 1 schuko 220 Vac outlet (max. 6 A)
Work shelf lighting	12Vdc by led
Dimensions	71 x 77 x 138 (L x P x H) cm
Weight	72 kg (without accessories)
Environmental conditions	• Temperature from 10 to 40°C • Relative humidity from 10 to 90% non-condensing

GAS MIXING SYSTEM

It has the function to regulate the capacity and the concentration of gas mixture (Air, O_2, N_2O) as well as to deliver it to the anaesthetic gas vaporizer.

It allows to select the mixture to be delivered (Air - O_2, or N_2O - O_2) and the O_2 enrichment for delivered mixture in case of emergency.

The anaesthesia module includes a device which guarantees a minimum concentration of 25% oxygen in all conditions (MIX-LIFE device).

The three pressure gauges on the front panel allow the continuous control of medical gas feeding pressure coming from the gas pipelines system.

Oxygen rotameter	Scale: 0.1 - 15 L/min. Resolution: 0.1 L/min up to 1 L/min and 1 L/min up to 15 L/min Accuracy: ± 10% of read value or: ± 1% of end scale whichever is the worse case.
Nitrous oxide rotameter	Scale : 0.2 - 12 L/min. Resolution: 0.1 L/min up to 1 L/min and 0.5 L/min up to 12 L/min Accuracy: ± 10% of read value or: ± 1% of end scale whichever is the worse case.
Air rotameter	Scale: 0.1 - 15 L/min. Resolution: 0.1 L/min up to 1 L/min and 1 L/min up to 15 L/min Accuracy: ± 10% of read value or: ± 1% of end scale whichever is the worse case.
Low flows oxygen rotameter	Scale 0.1 - 1 L/min. Resolution: 0.05 L/min Accuracy: ± 10% of read value or: ± 1% of end scale whichever is the worse case.
Low flow nitrous oxide rotameter	Scale: 0.1 - 1 L/min. Resolution: 0.05 L/min Accuracy: ± 10% of read value or: ± 1% of end scale whichever is the worse case.
Medical gas supply	OXYGEN • Pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) • Max. required flow 90 L/min.
	NITROUS OXIDE • Pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) • Max. required flow 15 L/min.
	MEDICAL COMPRESSED AIR • Pressure included between 280 kPa and 600 kPa (2,8 – 6 bar) • Max. required flow 90 L/min.
Gauges	No. 3 on front panel (O_2 - N_2O - AIR), scale 0 - 6 bar
Alarms	Lack or low oxygen pressure with consequent cut-off of nitrous oxide delivery

Safety devices	AGAINST THE ADMINISTRATION OF HYPOXIC MIXTURES MIX-LIFE: it always guarantees a minimum concentration of 25 % oxygen on mixtures which includes nitrous oxide. IN CASE OF LACK OR LOW OXYGEN PRESSURE CUT-OFF: audible alarm with immediate cut-off of nitrous oxide delivery. AGAINST OVERPRESSURE IN FLOWMETER BOX : safety valve calibrated at 0.8 bar for the protection of the glass rotameters. IN CASE OF LACK OR COMPRESSED AIR LOW PRESSURE : all the devices (gas feeding) supplied by compressed air are automatically supplied by oxygen. AGAINST THE SIMULTANEOUS DELIVERY OF AIR AND N_2O : selection by membrane key on the flowmeter front panel.
Control for activation of exit of fresh gas for manual ventilations.	Setting of MANUAL modality on ventilator (MAN) with automatic deviation of fresh gas to the manual system of anaesthesia unit valves group, or to a TO-AND-FRO circuit with visual indicator.
O_2 emergency by-pass	By apposite membrane key on the front shelf, max flow 35 L/min.
IN gas sockets on gas supply group	• No. 3 sockets for distribution system (O_2 - N_2O - AIR) • No. 2 sockets for cylinder (O_2 - N_2O)
OUT gas sockets on gas supply group	• No. 1 sockets for O_2 • No. 1 sockets O_2 - AIR for active scavenger feeding • No. 1 fresh gas connector for external use for ex. TO AND FRO (selectable by apposite membrane keyboard on the front shelf - AUX).
Other	• Socket for recycle of exhaust monitor gas • Connection for anaesthetic gas scavenging (optional device: active type, or passive type)

BREATHING SYSTEM

Compact system with automatic connections, easy dismountable and autoclavable

It allows the ventilation in modality: real open circuit, semi-closed circuit, closed circuit at low flows.

The system also allows the spontaneous and manual ventilation in case of anaesthesia unit breakdown or machine off.

Top special CO_2 absorber canister of 1 Kg with rapid connection: this allows canister replacement also during interventions (the canister is autoclavable and reusable).

The recycling system is a selective type, hence the soda lime and fresh gas consumption are reduced to the minimum.

The heated valves group reduces the condensation and heats the fresh gas.

The transition from one ventilation modality to another is completely controlled by the ventilator without any user's action on valves group.

LUNG VENTILATOR

User's interface	Dual colour display 165 x 145 mm with membrane keyboard and encoder
Control modality	Electronic by microprocessor
Dead space compensation system	Automatic
Automatic compensation of atmospheric pressure on measured pressure	Present (max. 5000 mt)
Respiratory parameters default setting	Present (newborn, children, adult)
Flow generation	Electronic system
Gas feeding	Medical compressed air or Oxygen with pressure included between 280 kPa and 600 kPa (2,8 – 6 bar)

Autotest	**Primary test:** at anaesthesia unit's start-up, a control test of medical gas supply, sensors operation, back-up battery, oxygen cell, integrity of the alarm audible indicator, led on CPU board. This test takes around 15 seconds. **Subtest:** this subtest permits to verify the dead space and losses or to perform the oxygen cell calibration.
Ventilation modalities	MANUAL, VC-VAC, PCV-APCV, P-SIMV, V-SIMV
Breathing rate	From 5 to 90 bpm (step 1 bpm)
Breathing rate (SIMV)	From OFF, 1 ÷ 89 bpm (step 1bpm)
I:E Ratio	1:4 ÷ 4:1
Inspiratory time	From 0.2 to 5 sec.
Tidal Volume	From 50 to 1500 ml
Minute Volume	From 1 ÷ 30 liters
PEEP	OFF, 3 ÷ 30 cmH_2O
Inspiratory Flow	From 1 ÷ 80 L/min.
Oximeter	Minimum resolution 1% / Automatic calibration procedure
High pressure limit	From 10 to 80 cmH_2O
Bronchomanometer	Electronic: from -10 ÷ 80 cmH_2O
Flow trigger	From OFF, 1 to 15 L/min (step 1 L/min)
Pressure trigger	From OFF, -1 to -9 cmH_2O under the PEEP level
Safety	Electronic and mechanical limit of airways pressure / Self-diagnosis system
Flow sensor	Pressure relief single patient sensor
Alarms	Fan Failure, Air Failure, High / Low Airways Pressure, Low O_2 concentration, O_2 cell into operation or not present, Apnoea, Expired Tidal Volume, Power Failure, Low Battery.
Measured parameters	PAW, FiO_2 , VM, Tinsp, RATE, Vte

ELECTRIC POWER SUPPLY

Electric power supply	100 - 240Vac / 50 - 60Hz
Maximum power	100 Watt
Back-up battery	12Vdc - 3 Ah Pb battery which guarantees an autonomy of around 120 minutes
Charging time	Around 10 hours

CONFORMITY TO DIRECTIVES

Class and type according with IEC 601-1	Class I Type B
Class according with 93/42/ EEC Dir.ve.	Class IIb

EN 60601-1:2006 , EN 60601-1-2:2007, IEC 601-1-6:2010, IEC 601-1-8:2007, EN 60601-2-13:2011, EN 62304:2006, EN ISO 5356-1:2015, EN ISO 4135:2001, DIR. 93/42/EEC, DIR. 2011/65/CE, D.Lgs 49/2014

ACCESSORIES

Standard accessories	• User's Manual • O_2 supply hose • N_2O supply hose • Air supply hose • Top Special CO_2 absorber canister of 1 kg (no. 1 / code 30900) • O_2 cell • Flow sensor (no. 2) • Adult PVC patient circuit (240cm) (No. 2) • Adult Mapleson C adult patient circuit • Manual ventilation KIT • Electric power supply cable
Other optional accessories	See current export price list

SIARE applies the UNI EN ISO 13485:2004 Quality System and 93/42 EEC Dir.ve.

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