

Strong. Intelligent. Safe.

MR400 arrives in
MRT from 1.5T-3.0T
at the Vital sign
monitoring for use

- During children's anesthesia in MRI
- In ventilated patients of the intensive care wards
- During stress heart tests
- In neurosurgical MRI
- In sedated patients

Increased MRI safety

4 W/kg SAR | 7.2 μ T B_{1rms} | 5,000 Gauss | 3.0 T

Wireless Workflow – Fast. Simple. Safe.

- Patient monitor in the MRI room
- 10 different network channels



- Daughter monitor with printer in the control room
- Wireless connection about the patient



PARAMETER

ECG WIRELESS Patient Interface Module	
Channels	2
Leads	I, II, III, aVL, aVF, aVR
Measuring range / resolution	30 - 300 /min $\pm$ 1 % or $\pm$ 1 /min
MRT gradient filter	Preset, Extended I and II, T-wave reduction
Defibrillator protection	Up to 5 kV
Alarm limit values Heart rate	30 - 250 /min

SpO2 WIRELESS Patient Interface Module	
Measurement method	Red infrared absorption spectroscopy
Measuring range saturation	1 - 100 %; $\pm$ 3 % (range 100 - 70 %)
Measuring range Pulse frequency	30 - 250 /min $\pm$ 2 % or 1 /min
Alarm limits Saturation	50 - 100 %
Alarm limit values Pulse frequency	30 - 250 /min

NIBP Non-invasive blood pressure	
Measurement method	Oscillometric
Measuring range blood pressure	0 - 300 mmHg, $\pm$ 5 mmHg
Starting pressure	Adult: 165 mmHg, Paed: 130 mmHg, Neo: 100 mmHg
Overpressure protection	Adult / Paed: 300 mmHg, Neo: 150 mmHg
Operating modes	Manual, automatic (interval: 1 min - 30 min)
Alarm limits NIBP	10 - 270 mmHg

CO2 EtCO2, FICO2, Respiration	
Measurement method	Infrared absorption spectroscopy (NDIR), Low flow bypass technology
Flow rate / Warm-up time	50 ml/min $\pm$ 10 ml/min / < 2 min
Measuring range EtCO2	0 - 76 mmHg $\pm$ 4 mmHg oder $\pm$ 12 %
Measuring range FICO2	3 - 60 mmHg $\pm$ 4 mmHg
Respiration measuring range	4 - 100 /min $\pm$ 1 /min
Zero calibration	Automatic; manual possible
Alarm limits EtCO2	5 - 80 mmHg
Alarm limits FICO2	0 - 20 mmHg
Alarm limit values Respiration	4 - 100 mmHg

Respiration	
Measurement method	Pneumatic
Readings recorders	Belly / chest strap
Respiration measuring range	0 - 60 /min $\pm$ 1 /min

Invasiv pressure		Option
Number of channels	2	
Measuring range pressure	-30 to +250 mmHg; $\pm$ 0,5 %	
Measuring range Pulse frequency	30 - 250 /min $\pm$ 2 %	
Sensitivity Pressure transducer	5 μ V/V/mmHg	
Alarm limit values Inv. pressure	-30 bis +250 mmHg	
Alarm limit values Pulse frequency	30 - 250 /min	

Anaesthetic agents (plus CO2, O2, N2O, respiratory rate)		Option
Measurement method	Infrared absorption spectroscopy (NDIR), bypass process	
Gas detection	Automatic	
Mixed gas detection	Any 2 gases: Sevoflurane, isoflurane, desflurane, enflurane, halothane	
Flow rate	Adult / Paed: 200 ml/min $\pm$ 20 ml/min Neo: 150 ml/min $\pm$ 15 ml/min	
Warm-up time	45 s	
Measuring range HAL / ISO / EN	0 - 6,0 Vol. %	
SEV	0 - 8,0 Vol. %	
DES	0 - 18,0 Vol. %	
N2O	0 - 100 Vol. %	
CO2	0 - 10 Vol. %	
O2	0 - 100 %	
Alarm limit values (insp. and exp.)	SEV, ISO, DES, ENF, HAL, CO2	
Alarm limit values (insp.)	N2O, O2	
Respiration measuring range	2 - 100 /min	

Temperatur		Option
Measurement method	Fluoroptical measurement of body temperature	
Sensor	Fiber optic sensor for multiple use	
Measuring range	20 - 44 °C $\pm$ 0,5 °C	
Alarm limits	20 - 44 °C	

TECHNICAL DATA

MRI compatibility	0,7 bis 3,0 Tesla
RF energy	$\approx$ 4 W/kg SAR und 7,2 μ T B1eff (all directions)
Installation in the Magnet Room	5.000 Gauss (= 0,5T / 500 mT)

Display unit	
Size / Type	15.6 "(39.5 cm) / colour LCD, anti-reflective
Resolution	1366 x 768 pixels
Handling	Touch Screen (Touch Screen)
Inclinability	5° to 35°

Curves and measured values	
Display	Max. 13 parameters
Parameter curves	6
Numerical measurements	10 parameter sections (measured values, units, alarm limits, warnings)
Curve speed	25 / 50 mm/sec for ECG, SpO2, inv. pressure
Method	Erase bar
Storage	Custom configurations (Patient, parameters, settings, alarms,...)

Alarms	
Types	Physiological and technical alarms
Classification	High, medium and low priority
Actions:	
acoustically	Different tones, variable volume
optically technical	Plain text message
physiologically	Red / red flashing, clear text message
Alarm suppression	2 min acoustic with visual warning

Trends	
Parameters (tabular)	12 hrs; HF, SpO2, NIBP, IP, CO2, N2O, O2, Temp.
Curves (graphic)	12 hours; in remote unit IP5
Short-term trends	Over selectable time periods

Power supply	
Monitor unit	
Type / Voltage / Capacity	Lithium ions / 14.4 V / > 8 hours
Charge	In monitor / 6 hours (90%)
Battery status indicator	Monitor display: Plain text display of the remaining operating time, Battery: LEDs
Battery alarm	Optically and acoustically

Wireless ECG and SpO2 module	
Type / Capacity	Lithium polymer / 3.7 V / 8 hours / user replaceable
Charge	External charger with maintenance mode / < 4 hours
Battery status indicator	Monitor display: Plain text display of the remaining operating time, Charger: LEDs
Battery alarm	Optically and acoustically

Gating (cardiac and peripheral)	
Interface cable for	Philips, Siemens, GE, Hitachi, Toshiba
Signals	Analog, digital (delay 10 ms)
Wells	ECG, SpO2

Interfaces	
USB	Software updates
Screw socket with cap	Gating output

Operating conditions	
Voltage / power consumption	100 - 240 V, 50/60 Hz / max. 65 W
Ambient conditions Operation	10 - 35 °C; 15 - 80 % n. cond.
Ambient conditions Storage	
Monitor unit	-20 - 50 °C
Monitor / module batteries	0 - 40 °C / -20 - 60 °C
ECG quadrodes / O2 cell	10 - 32 °C / -40 - 50 °C

Dimensions	
Monitor unit	128 x 48 x 56 cm (HBT) / 47 kg

Device classification	
Protection class	I, Type CF
Class of products	IIB
Degree of protection	IP21
Operating mode	Suitable for continuous operation
CE mark	0413
UMDMS / GMDN	33586
Compliances	+ ANSI / AAMI ES 60601-1:2012 93/42 / EEC in the version 2007/47/EEC, MPG Certified according to CAN/CSA C22.2 No. 60601-1-08; IEC 60601-1-2



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Your health is important to us!



Expression
MR400
MR Patient Monitor

status: 01/2018

Ready for the future



The future in MRI patient monitoring

The increasing importance of MRI for diagnostic purposes means that Elements of the intensive care unit and operating theatre increasingly finding their way into the MRI space.

The Expression MR400 is our most advanced MR-capable Patient monitoring system and the best solution for all those who want to use the take the next step into the future would like to.

Expression MR 400 patient monitoring system

With the MR400 expression you can satisfy the needs of your patients, including in view of the development of supply models.

Increase the potential of your monitor from MR level to performance level of a Bedside Monitor.



Quality for maximum reliability in all areas

15" Touchscreen

- Clearly arranged
- Coloured
- Intuitive



Expression MR400

- 2-channel wireless ECG
- Wireless SpO2
- NIBD
- Invasive pressures
- EtCO2
- Anaesthetic gases
- O2
- Fiber optic temp
- Cardiac Gating
- Recorder
- Wireless communication
- 8 h battery operation

ECG module (3rd generation)

- New design
- New cable
- New filters
- T-wave suppression
- Clear ECG curve
- Insensitive to interference



Expression IP5 - Information Portal



Expression IP5

- Daughter monitor, 19 „touch screen
- Wireless communication with MRT patient monitoring systems MR400
- The same touch screen user interface inside and outside the MRI room
- Extended graphic trends
- Wireless keyboard, mouse and printer
- Wireless MRT barcode scanner
- HL7 and serial data outputs for connection to KIS or PDMS
- Time synchronisation with HIS

