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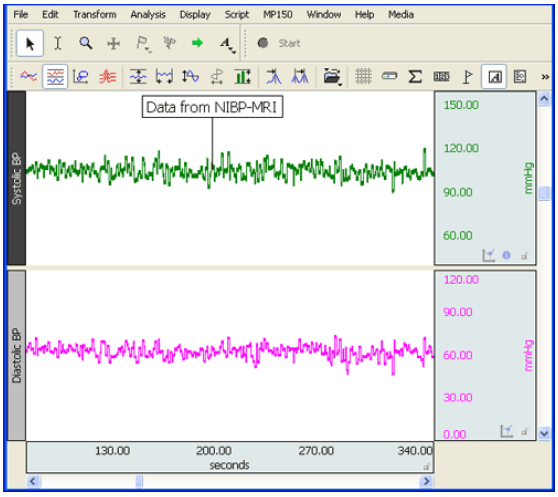
NIBP-MRI NONINVASIVE BLOOD PRESSURE SYSTEM



MRI Use: MR Conditional

Condition: The NIBP-MRI wireless amplifier module must remain in the MRI Control Room. Only the sensor and tubing is MR Safe and can be placed inside the MRI Chamber Room. Tubing should be passed through the waveguide back to the control room to connect to the wireless amplifier.

Sensor MRI Chamber Room Components only: Sensor, tubing and Velcro®: Polyurethane

The NIBP-MRI is a wireless and noninvasive physiological monitoring system that tracks blood pressure, using Pulse-Decomposition Analysis (PDA) technology, as well as heart rate.

NIBP-MRI operates passively at a low constant coupling pressure of 40 mmHg. After being provided a calibrated blood pressure reading, the device tracks blood pressure by analyzing the timing and amplitudes of the primary left ventricular ejection pulse as well as the arterial pulse reflections while attached to the thumb (recommended), middle flange of the middle finger, wrist or upper arm.

The system provides relative, real-time, beat-to-beat pressure measurement values during magnetic resonance imaging. The system includes NIBP-MRI Amplifier and Transducer (with 8mm tubing,) Bluetooth Dongle, USB DAQ Device (A/D or D/A Converter) and Cables, INISO Optically Isolated Input Adapter and Automatic Blood Pressure Calibration Unit. The system runs on a computer using Windows 7. The DAQ Device sends analog signals back to a BIOPAC MP Device; add an HLT100C to interface the INISO Optically Isolated Input Adapter to the MP150—this combination provides optimal isolation for improved subject safety.

The NIBP-MRI device is controlled from and streams data to the software running on a PC computer. Communication is wireless via Bluetooth transmission protocol. The device weighs ~114 grams and runs for about 12-hours on a single battery charge. Since the device tracks pulse reflections that stem from the central arteries, it is capable of tracking central blood pressure. Recent experiments furthermore suggest that the technology is particularly suitable as a hemorrhage detector. This is due to the fact that PDA is particularly adept at tracking pulse pressure, which is a sensitive and specific marker for central hypovolemia.

The digital sensor features a miniaturized design based on a piezo-electric sensor and proprietary pulsation-exteriorization as well as electronic filtering and amplification techniques.

The device's signal quality is sufficiently high as to allow detailed contour analysis of the radial or digital pulse shape, which is influenced by factors such as systolic and diastolic blood pressure, arterial distensibility and the pressure impedance effects of artery/arteriole interfaces. Specifically, it makes the resolution of the component pulse structure of the radial/digital pulse envelope possible.

Note NIBP-MRI is NOT FDA approved for clinical use.

NIBP-MRI Specifications

Includes:	NIBP-MRI Amplifier and Transducer with 8 m tubing, Bluetooth Dongle, USB D/A Converter and Cables, INISO Optically Isolated Input Adapter, Automatic Blood Pressure Calibration Unit
Device Dimensions:	78 x 55 x 27 mm
Weight:	114 Grams
Operating Temp:	0 to 40 °C
Operating Humidity:	0 to 95% non-condensing
Latency:	Two seconds for beat-by-beat blood pressure and other analysis; real time for pulse signal
Charge Time:	Two hours; works on charger whether charged or not
Charger Operating Voltages:	Input: 100-240 VAC, 50-60 Hz, 0.6A Output: 5 V, 3.2 A (switch mode power supply)
Charge Life:	Operates 12 hours after full charge
Tubing Length:	8 Meters
Measurement Technique:	Pulse-Decomposition Analysis
Software Compatibility:	Windows 7

Note The HLT100C high-level transducer module is required to interface the INISO Optically Isolated Input Adapter to the MP150 data acquisition unit. This combination provides optimal isolation for improved subject safety.

Splint Stabilizer for NIBP-MRI – NIBP-MRI-SPLINT

This is an acrylic splint to stabilize the arm for blood pressure measurements using the NIBP-MRI noninvasive BP monitoring system. This item can be used to add or replace splints.

If it becomes necessary to use the wrist or upper arm placement, NIBP-MRI splint can be used to hold the arm in optimal position. Splint is 7.6 cm x 61 cm with two straps, 26 cm for attachment at wrist and 50 cm for attachment at elbow.

MRI Use: MRI Safe

Components: Splint: Acrylic

Note The thumb is the preferred placement site for the blood pressure sensor. The wrist or elbow splint should only be used if a good signal can't be acquired using the thumb.

SYNCHRONIZATION

To synchronize an MRI System with the occurrence of the R-wave, record (high frequency) ECG data on an ECG100C-MRI amplifier and direct the output to an analog input channel on the MP100/150 Unit.

a) Connect the DTU100 RJ11 cable to the HLT100C channel that is sourcing the ECG analog signal. For example, if acquiring ECG waveform on Channel 2, connect DTU100 RJ11 to channel 2 on the HLT100C.

b) Use CBL100 cables to connect the Threshold, Trigger and/or Signal View to unused analog channel inputs on the UIM100C to monitor signals in Acq*Knowledge*.

c) Connect the Trigger Out (TTL) line to the MRI system requiring synchronization to the R-wave of the ECG.

d) If the R-Wave is a clearly defined peak, run the DTU100 in Normal mode. If the R-wave is not always predominant, consider operating the DTU100 in Auto Level mode, or change the location of ECG leads on the subject to obtain a better-defined R-wave peak.

e) Adjust the Trigger Level potentiometer to obtain a Trigger Signal. Change the Trigger Out polarity to Positive or Negative as required for the MRI equipment. Verify proper operation by noting the periodic lighting of the green Trigger LED. This LED should light briefly whenever the R-wave is detected.