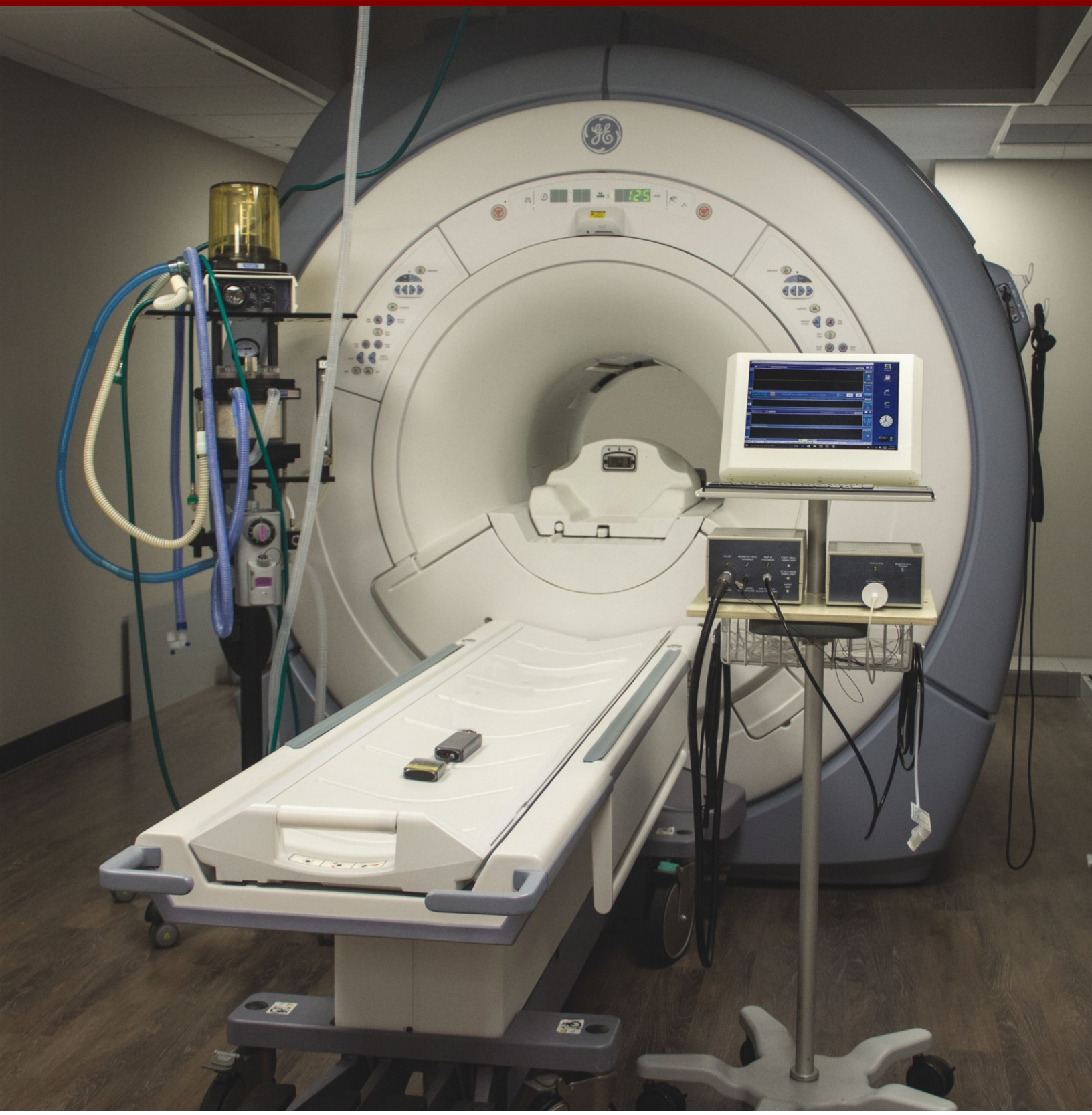
# MR-compatible
# Large Animal Monitoring Systems



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# MR-compatible Monitoring and Heating Systems for Large Animals

## Monitoring

- **Fiber Optic ECG**
- **Respiration**
- **Fiber Optic Temperature**
- **Fiber Optic Pulse Oximetry**
- **Blood pressure**
  - **Non-invasive**
  - **Invasive**
- **Capnography**

## Heater system with temperature control

## Alarms

## Record waveform & trend data

The **Model 1035 monitoring and gating system** is a modification to a 3rd generation MR-compatible system in use for more than a decade with mice and other animals in every major medical school in the world. The equipment is now available to meet the physiological monitoring needs for medical research using large animals in the MR environment. The Model 1035 consists of data acquisition modules located on a roll stand near the magnet bore and a Control/Gating Module connected to a PC located either in the magnet room or near the operator console. The PC displays multiple waveforms, measured values, trends and gating pulses. Data is also displayed on a remote monitor.

The **Multi-parameter Module** includes non-invasive blood pressure (NIBP) measuring heart rate, systolic, diastolic and mean arterial pressure, pulse oximetry (SpO2) using fiber optic sensors to measure oxygen saturation, heart rate and pulse distension and fiber optic temperature (FOT) measuring rectal temperature.

The **Capnograph Module** displays the CO2 waveform, respiration rate, end-tidal and minimally inspired CO2.

The **ER Module** measures ECG using three leads with needle (shaving not required) or surface electrodes and respiration from a pneumatic sensor. A rechargeable battery provides module power.

The **Control/Gating Module** receives data from the data acquisition modules. It sends data to the PC for recording and display. It also receives user instructions from the PC to control measurement and gating functions. Gates from ECG, respiration or ECG and respiration generated by the module's microprocessor are sent to the MR system. The module also has the capability to control animal temperature around a user defined set point.

Options include a fluid heating system which can regulate the temperature of the animal and invasive blood pressure measuring the cardiac waveform, heart rate, systolic, diastolic and mean arterial pressure.

**Compatible with magnets up to 3T.**

**Multi-parameter Module:**

| | | |
|---|---|---|
| **NIBP** | Display range | 0 – 300 mmHg |
| | Cuffs (7) | for multiple limbs |
| | Heart rate | 25 – 300 BPM |
| **SpO2** | Range | 70 – 100% |
| | Heart rate | 25 – 700 BPM |
| **Temp** | Range | 20 – 60 ºC |
| | Channels | 1 or 2 |

**Capnograph Module**

| | | |
|---|---|---|
| **CO2** | End-tidal range | 0 -13.0% |
| | Respiration rate | 2 – 150 BPM |

**ER Module:**

| | | |
|---|---|---|
| **ECG** | Range: | 25 - 900 BPM |
| | Accuracy: | ±1% |
| | Input range: | -2.50 mV to 2.5mV |
| | Input Impedance | >10 MΩ @ 10 Hz |
| | CMRR: | 100 dB @ 60 Hz |
| **Resp** | Range | 10 - 300 BPM |
| | Accuracy | 1 count |
| | Sensor | pneumatic pillow |
| **Module** | Power - battery | rechargeable |
| | Battery life: | >15 hours |
| | Time to full charge | <2 hours |
| | Size: hxwxd cm | 2.1x5.1x14.0 |

**Control/Gating Module:**

| | | |
|---|---|---|
| **Gating** | R-wave to gate delay | user selectable |
| | Expiration gate width and delay | user selectable - 1 ms step size |
| **Module** | Size: hxwxd cm | 3.8x13.3x12.5 |

**PC:**

**Software**: SAII's PC-SAM & Windows operating system

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