

# MR-compatible Small Animal Monitoring and Gating System for Magnetic Particle Imaging

## Monitoring

- Respiration
- Fiber Optic Temperature

## Options

- Pulse Oximetry
- Heater to regulate temperature



## Gating

- Respiration
- Cardiac with Pulse Oximetry option
- Respiration and Cardiac

**Waveform & trend data acquisition**

The **Model 1040 monitoring and gating system** was designed specifically to meet the physiological monitoring and gating needs for rodents in MPI scanners, however it can also be used with other imaging systems including MRI. The Model 1040 consists of a Respiration/Temperature data acquisition module located just outside the magnet near the animal and a Control/Gating Module connected to a PC located near the operator console. The PC displays multiple waveforms, measured values, trends and gating pulses. The Model 1040 is MR and CT-compatible.

The Model 1040 Control/Gating Module sends and receives digitized data over three fiber optic cables to and from the Respiration/Temperature Module. It sends data to the PC for display and receives user instructions from the PC to control measurement and gating functions. Gates generated by the Control/Gating Module's microprocessor are sent to the Imaging system. Gate delay and width are user selectable.

The Control/Gating Module has the capability to control an air heating system which can regulate the temperature of animals undergoing MPI. The system has a MR-compatible Heater Module that is positioned near the magnet bore and a Fan Module located outside the magnet room.

Pulse oximetry can be added to provide heart rate, oxygen saturation, a cardiac waveform and cardiac gates. Minimal invasive fiber optic pressure is also optionally available for use with the Model 1040. Both pulse oximetry and fiber optic pressure use fiber optic sensors to monitor the rodent in the magnet.

### Specifications:

<b>Respiration/Temperature Module:</b>		
<b>Resp</b>	Range	15 - 300 bpm
	Accuracy	1 count
	Sensor	pneumatic pillow
<b>Temp</b>	Range	20 – 60 °C
	Accuracy	±0.2 °C
	Sensor	fiber optic, 1 mm OD
<b>Control/Gating Module:</b>		
<b>Gating</b>	Respiration & cardiac gate width and delay	user selectable - 1 ms step size
<b>Temp</b>	Heater control	fiber optic PWM
<b>Inputs</b>	Aux BNC & fiber optic	1 each
<b>Outputs</b>	BNC gate	2 each
	Fiber optic gate	1 each
<b>Pulse Oximetry Module:</b>		
<b>Rate</b>	Fiber optic sensor	tail, ankle
	Range	40 – 700 BPM
	Accuracy	±1%
<b>SpO2</b>	Range	0 – 100%
	Resolution	1 count

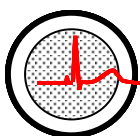
The modules above all operate with 12 VDC power and have size hwxwd of 3.8x13.3x12.5 cm.

### Air Heater System:

<b>Heater</b>	Power	<b>100/115/230 VAC</b>
	Size hwxwd cm	16.4x8.9x26.0
<b>Fan</b>	Power	100/115/230 VAC
	Size hwxwd cm	6.4x18.9x18.4

### PC requirements:

**Software:** any Windows including 10  
**Hardware:** >1 GHz processor, USB ports, display 1360 x 768 or greater



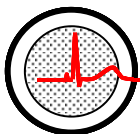
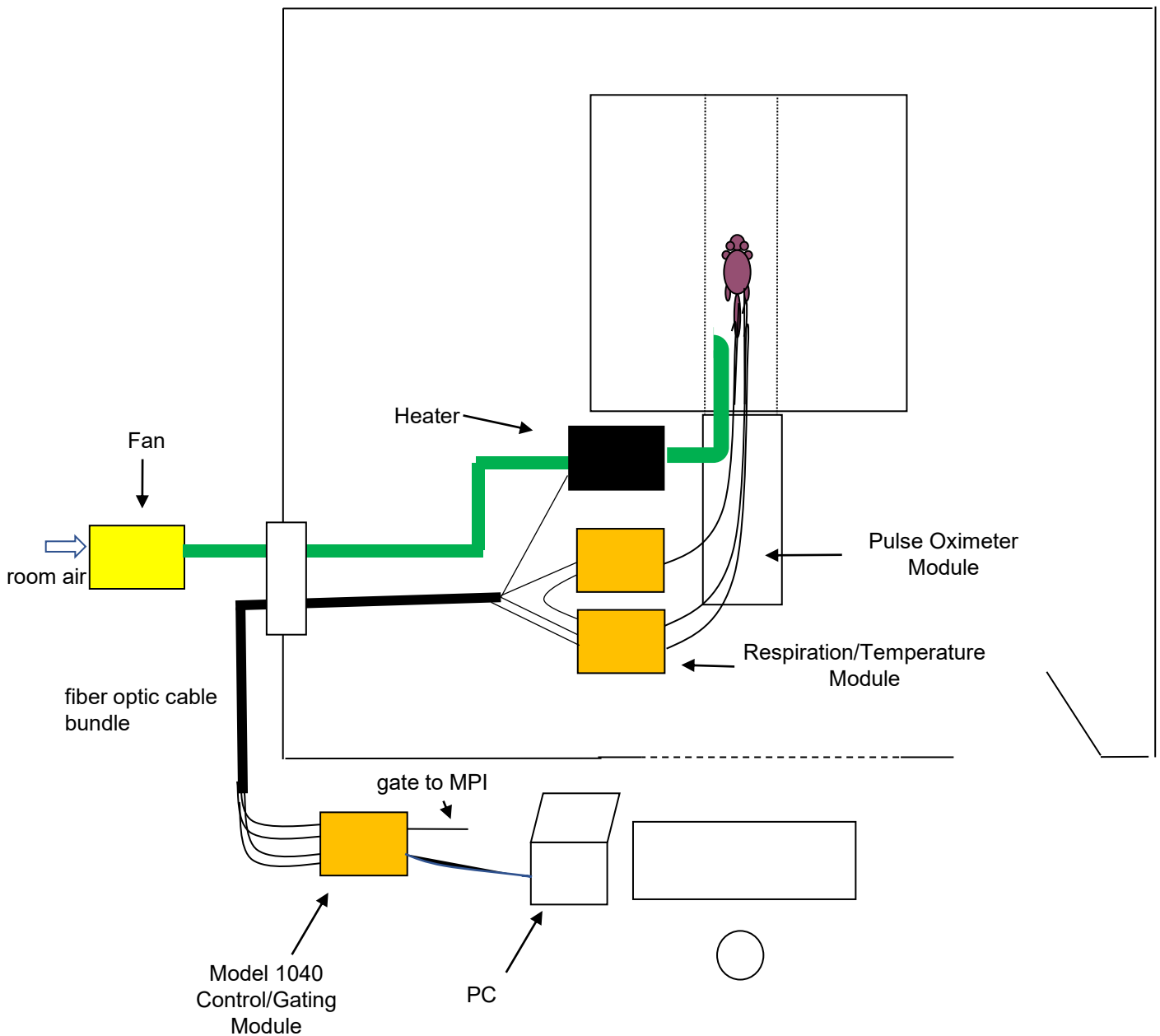
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