MR-compatible Monitoring Options for Large Animals

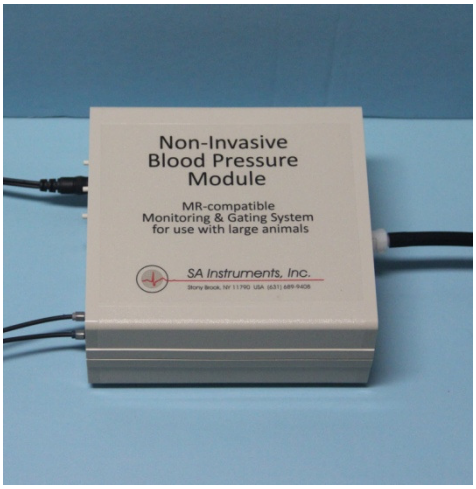
SA Instruments has expanded our products to include non-invasive blood pressure, pulse oximetry and capnography for animals larger than rodents.

We decided to make options available for large animals after Sultan the dog became ill with lung cancer. Sultan had been a member of our team for 12 years. He was a favorite with all the employees. He had a terrific nose and could locate food in any desk drawer.

Sultan was ill for more than 5 months. He underwent a remarkable surgery where florescent dye guided the surgeon to his lung tumors. During Sultan's illness we became aware that specialty veterinarians with MR scanners had a need for improved and less expensive physiological monitoring and gating equipment. Thanks to Sultan that equipment is now available for veterinarians and for medical research.

Non-Invasive Blood Pressure

The oscillometric method of blood pressure measurement is a non-invasive method that monitors the amplitude of cuff pressure changes during cuff deflation to determine arterial blood pressure. The cuff pressure is first elevated above the patient's systolic blood pressure level and the cuff begins to deflate at a certain rate. The initial rise in amplitude of these pressure fluctuations during cuff deflation corresponds closely to the systolic blood pressure. As the cuff is further deflated, these pressure fluctuations increase in amplitude until a peak is reached which is usually referred to as the mean arterial pressure (MAP). As cuff deflation continues, the diastolic pressure can be determined based upon the rapidly diminishing amplitude of the pressure fluctuations. Thus systolic, MAP and diastolic blood pressures can be accurately obtained by supervising the pressure fluctuations while controlling the cuff deflation rate.



Specifications

Blood pressure range	Systolic	40 – 265 mmHg
	MAP	27 – 222 mmHg
	Diastolic	20 – 200 mmHg
Pulse rate range	25 – 300 BPM	
Initial inflation pressure	Large animal	variable 120 – 280 mmHg
	Small animal	variable 60 – 280 mmHg
Pressure transducer accuracy	± 3 mmHg between 0 and 300 mmHg	
Cuffs	7 sizes from 3.3 cm to 33 cm circumference	
Cuff hose	3 m length	

SA Instruments, Inc.
65 Main Street, Stony Brook, NY 11790 www.i4sa.com
(631) 689-9408
FAX: (631) 689-9410

Pulse Oximetry

Pulse Oximetry provides noninvasive monitoring of heart rate and arterial blood oxygen saturation. Fiber optic oximetry sensors are used to transmit pulses of red and infrared light through the animal's peripheral vascular region. Oxygen saturation is determined by measuring the differential absorption of the red and infrared light. In addition to oxygen saturation, the module provides the cardiac plethysmogram waveform, generates a plethysmogram gate, measures pulse distension and the animal's heart rate.

The sensor incorporates interchangeable clips and forms for attachment to the animal. Small, large and extra large clips are available along with universal Y forms that can be attached using pre-punched foam tape strips.

Useful monitoring locations for large animals include the ear, tongue, Achilles tendon, toe webbing and tail. .

Specifications

Probe length	6' (1.8 m) and 10' (3.0 m)
Heart rate	40 – 700 BPM
Rate accuracy	±1.7%
SpO2 range	70 – 100%
resolution	1 count

Capnography

Capnography continuously monitors carbon dioxide (CO_2) concentration in respiratory gases. The CO_2 waveform is analyzed to determine respiration rate, end-tidal CO_2, inspired CO_2, inspiration and expiration times.

A small sample of respiratory gas is continuously taken from the patient and passed through a CO_2 sensor. The sensor consists of an infrared light source and a photodetector. CO_2 molecules absorb infrared light so as the CO_2 concentration changes as the animal breaths so does the signal from the photodetector.

End-tidal CO_2 is the maximum concentration of CO_2 at the end of an exhaled breath. It can be expressed as a percentage of the total gas volume or as a partial pressure. The normal values are 5% to 6% CO_2, which is equivalent to 35-45 mmHg.

CO_2 may be the single most important vital signs parameter for sedated animals. It can give a warning that the patient is in trouble within just a few breaths.

Specifications

CO_2 range	0 - 13%
CO_2 accuracy	0 – 38 mmHg ± 2 mmHg
	39 – 76 mmHg 5% of actual
	77 – 99 mmHg 8% of actual
Breath rate	2 – 150 breaths per minute

SA Instruments, Inc.
65 Main Street, Stony Brook, NY 11790 www.i4sa.com
(631) 689-9408
FAX: (631) 689-9410