

Part 1 General

Scope of Work:

Provide all labor, materials, products, equipment and service to supply and install an Oxygen Depletion detection and control system indicated on the drawing and specified in this section.

Reference standards:

Units shall be certified to UL and CSA requirements. Manufacturer to be ISO 9002 accredited.

The gas monitor system shall consist of a monitor/readout unit with a sample draw system for remote detection of Oxygen Depletion within the patient area and any maintenance areas that may be affected by a leak of gases used within MRI system.

Upon alarm, provide audible and visual indicators within the MRI operator area and all HVAC systems to provide 100% ventilation to patient area and related spaces. Utilize gas detection system outputs to contact DDC systems and alert proper authorities within facility to potential hazard.

Contact Energy Improvement Products – Steve Duerkop – 847 241 5700.

Part 2 Products

Provide MSA TOXGARD II with Sample Draw Option-

Gas Monitor Configuration - The gas monitor shall be enclosed in a wall mount type enclosure.

Enclosure Type - The enclosure shall be designed to meet a NEMA 4X rating. Access to the inside of the enclosure, monitor front panel and wiring connections shall be through a front facing, full length door. The door shall have a shatterproof window of sufficient size to allow the viewing of the meter and indicator lights.

Enclosure Size - The enclosure shall be less than 12 inches in any dimension (mounting provisions excluded).

Mounting Provisions - Mounting brackets for the purpose of attaching the unit to a flat surface shall be provided.

External Controls - A switch accessible from the outside of the enclosure shall be provided for the purpose of alarm relay reset audible alarm silencing.

Oxygen Monitor Sensors

The oxygen monitor sensor will be the electrochemical fuel cell type. The sensor will not require the periodic addition of reagents.

The interconnect wiring for remote mounted oxygen sensor/transmitter to the monitoring instrument will be a 2 or 3 wire cable.

Monitor Unit Requirements

Readout Displays - A four digit LED readout shall be provided for the purpose of displaying the gas concentration. The value displayed shall be a direct reading of the gas concentration specified in Paragraph 1.2.1. System status indicators will also be provided with the LED display.

Alarm Set Point Levels - Three separate alarm set point levels shall be provided. The set points shall be independently adjustable for any value in the readout range. The set points shall provide drive signals to user interface relays. The alarm set points shall have the capability of providing the user a selection of latching or non-latching mode.

Visual Alarm Indicators - The monitor shall have separate indicating segments for three separate alarm levels. The lights shall indicate when the preset limits the “Caution”, “Warning”, and/or “Alarm” set points have been exceeded. Strobes shall be provided to indicate warning and/or alarm conditions.

Relays - One relay for each set point level shall be provided for each of the three alarm levels. One relay shall be provided for fault conditions. A horn relay will be provided and will work in conjunction with alarm set points.

Contact Rating - All alarm and fault relays shall be Form C, single pole, double throw. Contacts shall be rated for 5 amps resistive at 250 VAC or 30 VDC. The horn relay has form ‘A’ contacts and is always set as normally open and common.

Contact Selections - The contacts shall be capable of being selected normally open or normally closed.

Relay Configuration - The alarm relays shall be normally de-energized. The fault relay shall be normally energized.

Malfunction Indication Alarm - The readout shall display a separate unique character when an over range or under range condition exists, signal from the sensor is lost, there is a set point error or monitor memory failure.

Audible Alarm - An audible piezo buzzer shall be provided when an alarm condition occurs. Provisions to replace buzzer with optional horn shall be available.

Front Panel Horn/Alarm Acknowledge Switch - This push button switch shall silence audible alarm indicators when alarm points are exceeded. Visual alarms will remain on as long as alarms are exceeded. This switch will reset latched alarms if normal gas conditions exist.

System Power Requirements - The system shall operate on 115 or 220 VAC, 50 or 60 Hz. Power shall not exceed 40 Watts from its internal DC supply. An internal, push button, reset circuit breaker shall be provided.

Maximum System Maintenance Requirements - The system shall require no periodic maintenance other than periodic checking of sensor response to a known concentration of gas.

Approvals - As a minimum, the following parts of the system shall have approval by UL:
All primary AC components including connectors
All user relays

The monitor display will give an indication of when sensor is nearing the end of its useful life by means of the front panel display. This indication that the sensor is nearing its useful life will be based on the sensor output. It shall not be based on the time the sensor was in service.

The monitor unit will be capable of storing and displaying average, minimum and maximum gas concentrations of the sensor over selected periods of time.

Sensing elements of the sensor/transmitter will be mounted external to the main enclosure. All sensing elements can be replaced without opening main enclosure. No tools will be required for replacement of the oxygen sensing elements.

Sensing Element Warranty - All sensing elements (sensors) will have a minimum useful life of one year. The supplier will provide replacement sensors at no charge for any sensor that does not meet the minimum requirement.

Gas Sampling System

A DC pump Gas Sampling option for the Gas Monitor System will be provided.

The Gas Sampling system must be installed in the monitor enclosure.

Signal - To eliminate radio frequency interference (RFI) and electromagnetic interference (EMI), the signal to the sensor from the Gas Sampling system will be in digital communication format.

Operating Voltage - The Gas Sampling system will be able to operate on voltage from 7 up to 30 VDC at less than 5 Watts of power.

The Gas Sampling system will have a flow sensor which will activate a relay when the gas sample falls below the acceptable flow rate to the gas sensor. There also will be an indication of the loss of gas flow on the front panel of the unit. A .6 Amps @ 110 Volts AC single pole, single throw relays will be provided for alarm indication.

Introduction of the calibration gas to the gas sensor will be via an integral push button valve on the Gas Sampling system. This push button valve must return the Gas Sampling system to monitoring the sampled area when released.

The Gas Sampling system will be able to pull a gas sample from up to 100 feet.

'Flow Block Only' option for gas sampling shall be provided to add a flow block to sensor configuration (side mount, bottom mount, or remote mount). This flow block will provide plumbing connections for flow stream sample and a flow switch to connect calibration gas to the sensor.