

DCC-MRI Oxygen Sampling System



The DCC-MRI is a self-contained Oxygen (O_2) monitoring system is designed for use in rooms where compressed gases are used, such as in MRI and NMR rooms. Compressed gases and cryogenic liquids (usually nitrogen, helium and sometimes carbon dioxide) when dispensed, will displace Oxygen, creating an Oxygen deficient or hazardous atmosphere. Continuous monitoring of the Oxygen levels in these rooms is recommended to ensure the Oxygen levels remain safe and people inside the rooms are alerted in the case of a gas leak situation. In addition, the strong magnetic field inside MRI and NMR rooms can interfere with electronic equipment installed inside the room. The DCC-MRI system is designed to be installed outside the room, with sample tubing running from the monitoring system to the sampled environment. The air in the room is continuously drawn into the device by the sample draw pump, flowing over the sensor and is exhausted through the outlet port. If the Oxygen level drops below a specified set point, the DCC-MRI will go into alarm.

The DCC-MRI comes with an O_2 sensor (measurement range 0 - 25% volume), a flow detector, a sample draw pump and an internal adjustable flow meter. Features include one configurable 4 - 20 mA output, one alarm line voltage relay with field configurable time delays and trigger levels, a blocked flow alarm indicating a dirty filter or clogged tubing, a side mounted audible buzzer and an LCD digital display with LED indicators for channel alarm status and fault conditions.

This system is accurate enough to measure to government established exposure levels for O_2 deficiency for health and safety.

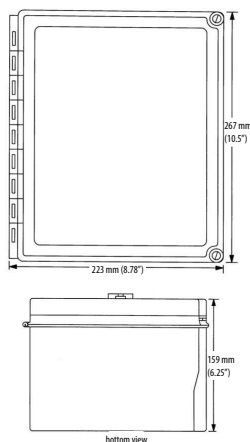
KEY FEATURES

- » 2x16 character LCD display with LED indicators
- » Loud side mounted buzzer
- » Blocked flow alarm
- » Sample draw pump
- » Adjustable flow meter
- » Oxygen sensor 0 - 25% volume (3 year lifespan)
- » One 5A SPDT dry contact relay
- » One configurable 4- 20 mA output
- » Thermal resetting fuses
- » RoHS compliant circuit boards
- » Standard water / dust tight, corrosion resistant enclosure (drip proof)

APPLICATIONS

- » Magnetic Resonance Imaging (MRI) Rooms
- » Nuclear Magnetic Resonance (NMR) Labs
- » Transmission Electron Microscope (TEM) Rooms
- » Freezer Farms (medical)

TECHNICAL DRAWING



SAMPLE ENGINEERING SPECIFICATIONS

Oxygen Monitoring System for MRI Rooms in Hospitals and Clinics

Supply a self-contained Oxygen monitoring system model DCC-MRI for the monitoring of Oxygen levels in MRI rooms in hospitals and clinics in a wall mount, water/dust tight, corrosion resistant polyester reinforced fiberglass enclosure with hinged, secured door. The DCC-MRI shall have an LCD display for indicating real time Oxygen values, LED indicators for channel alarm status and fault conditions, an audible alarm with silence push-button, one field adjustable alarm level, two analog outputs, internal sample pump and an adjustable flow meter.

DCC-MRI should be wall mounted outside of the MRI room with flexible tubing running from the inlet port fitting to the area to be monitored inside the MRI room. If the exhausted sample air must be directed somewhere else other than the room where the DCC-MRI is installed connect flexible tubing to the outlet port fitting. Internal flow meter must be adjusted for proper flow rate after installing tubing. Installing contractor should supply and connect 24 VAC (nominal) power to the instrument. The instrument should be powered up all the time to avoid warm up delays for the Oxygen sensor.

System operation shall be as follows. The DCC-MRI constantly monitors the target area air and indicates real time Oxygen levels on the display. Normal Oxygen levels in a room with good air exchange are approximately 20.8% to 21.0% volume. If the Oxygen level drops below 19.5%, Channel 1 LED will turn amber, the buzzer will sound and relay 1 will be de-energized. The buzzer can be silenced by pressing the "Silence" push-button. Once the Oxygen level stabilizes, the DCC-MRI returns to normal operation. The Oxygen sensor life span is approximately three years. If the Oxygen level drops dramatically low, and the system goes into full alarm and will not recover or reset, the Oxygen sensor may have expired.

Regular maintenance should be conducted at a frequency of twice per year. If the inlet tube becomes blocked and/or the filter becomes dirty, the display will show Flow Alarm, Channel 2 LED will turn red, the buzzer will sound and the pump will shut off. Remove the blockage or replace the dirty filter and press the "Silence" push-button to stop the buzzer, restart the pump and clear the latching.

Contractor shall provide all wiring, conduit and hose required for a successful installation. System should be on-site tested after installation and warm up. A service report should be generated for reference.

DCC-MRI Oxygen Sampling System

TECHNICAL SPECIFICATIONS CON'T

GAS SENSOR TYPE

Electrochemical Oxygen (O₂)

MECHANICAL

Enclosure	Water / dust tight corrosion resistant polyester reinforced fiberglass
Weight	7.5 lb (3.4 kg)
Size	223 x 267 x 159 mm (8.8 x 10.5 x 6.3 inches)
Tubing (not supplied)	1/4" OD Factory tested distance: 15.24 m (50 ft)

USER INTERFACE

Display	2x16 character LCD digital display with LED Panel indicating "CH1" state, "CH2" state, and FAULT"
"SILENCE" Push Button	Temporarily clears buzzer and latched relays

INPUT / OUTPUT

Output	One 4-20 mA analog output
Relays	One SPDT dry contact relay, rated 5 amps @ 240 VAC
Audible Alarm	Side mounted buzzer, rated 90 dB @ 30 cm (1 ft)
Flow	Normal operation: 1.0 LPM Flow alarm: less than 0.5 LPM

ELECTRICAL

Power Requirement	24 VAC nominal, 10 W, Class 2
Current Draw	400 mA RMS @ 24 VAC
Wiring	24 VAC two-conductor shielded
Fuses	Thermal, resetting

ENVIRONMENTAL (sensor dependant)

Operating Temperature	-20°C to 40°C (-4°F to 104°F)
Humidity	15 - 90% RH non-condensing

CERTIFICATION

Conforms to: CSA-C22.2 No. 205-12, UL508 (Edition 17):2007

Conforms to: EMC Directive 2004/108/EC

EN 50270:2006, Type 1, EN61010

Conforms to: FCC. This device complies with Part 15 of the FCC Rules.

For indoor use only.

PRODUCT CODES

DCC-MRI Oxygen (O₂) sensor (0 - 25% volume)

REMOTE DEVICES

RAA-90 Remote Audible Alarm
rated 90 dB @ 30 cm (1 ft)

RAA-90-W Remote Audible Alarm, water tight
rated 85 dB @ 60.96 cm (2 ft)

RSH-24VDC Remote Strobe and Horn combo, mounted, 24 VAC/
VDC, rated 100 dB @ 3 m (10 ft)

RSH-24V-A Remote Horn/Strobe Combo, unmounted, 24 VAC/
RSH-24V-B VDC, rated 99 dB @ 3 m (10 ft) (VAC), 97 dB @ 10 ft
RSH-24V-R (3 m) (VDC), choice of Amber, Blue or Red lense

ACCESSORIES

CET-715A-SDP Sample Draw Pump Calibration Kit for 17, 34, 58,
74, 103 L cylinders, 1.0 LPM demand flow
regulator & adapter to fit 17 L cylinder



Inside of the DCC-MRI showing the LPT-A with Oxygen sensor.

