Critical Environment Technologies™

APPLICATION GUIDE

MRI and NMR Rooms

DCC-MRI Oxygen Sample Draw System

Peace of mind. Guaranteed.

Continuous monitoring of oxygen in MRI rooms in hospitals and clinics and NMR facilities and laboratories

Magnetic Resonance Imaging (MRI) machines use a powerful magnetic field to produce 2D or 3D images of the internal human body. Nuclear Magnetic Resonance (NMR) spectroscopy analyzes samples to identify their components at an atomic level. Compressed gases and cryogenic liquids (usually nitrogen, helium and sometimes carbon dioxide) are used to cool the superconducting magnets in both types of machines and also move samples in and out of NMR machines. If a coolant leak occurs, the hazardous gas can displace the oxygen (O_2) in the room, creating a dangerous situation for the people inside the room.

Continuous monitoring for potential oxygen deficiency levels ensures the health and safety of patients and staff.

Critical Environment Technologies' DCC-MRI Oxygen Sampling System is the solution. If a leak occurs and the O_2 level drops below the alarm threshold, an audible alarm will sound and the relay will trigger a switch to activate the exhaust fans.

By detecting leaks early, the danger to the occupants in the room from O_2 deficiency and additional costs due to inefficiencies in the MRI or NMR equipment can be reduced.

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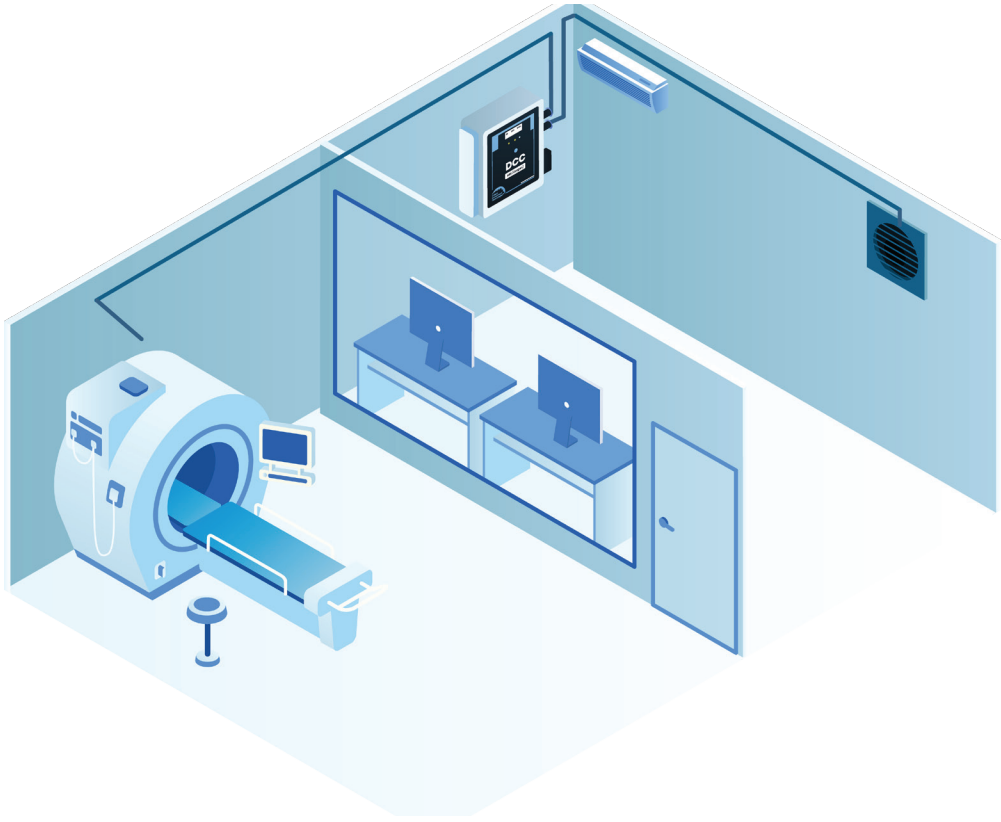
Critical Environment Technologies™

Continuous Monitoring of Oxygen (O_2) in Magnetic Resonance Imaging Rooms

MRI and NMR rooms have a strong magnetic field that can interfere with electronic equipment installed inside the room. The DCC-MRI gas detection system is designed to be installed outside the room, with sample tubing running from the monitoring system to the sampled environment. The tubing should be located in the area a leak is most likely to occur. The air in the area is continuously drawn into the DCC-MRI device by a 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 will constantly monitor the target area air, indicating the real time Oxygen levels on the LCD display. Normal Oxygen levels in a room with good air exchange are approximately 20.8% to 21.0% volume. The DCC-MRI can be configured with a low alarm and high alarm setpoint depending on the application requirements. The 4-20 mA output can be connected to the Building Automation System (BAS) which in turn can switch on the emergency ventilation system or exhaust fans and the relay can be configured to turn on a remote strobe inside the MRI room when an alarm is triggered. For example, if configured with a low alarm setpoint, when the Oxygen level drops below 19.5%, Channel 1 LED will turn amber, the loud side mounted buzzer will sound, a 4-20 mA signal will be sent to the BAS and Relay 1 will be de-energized, triggering the actuation of the remote strobe. The buzzer can be silenced by pressing the “Silence” push-button.

Once the Oxygen level stabilizes, the DCC-MRI will return 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 two times per year, with periodic bump tests in between. If the inlet tube becomes blocked and/or the filter becomes dirty, the display will show “Flow Alarm” and the Channel 2 LED will turn red, the buzzer will sound and the pump will shut off. After the blockage has been removed / the dirty filter replaced, press the “Silence” push-button to stop the buzzer, restart the pump and clear the latching.

If the exhausted sample air must be directed someplace else other than the room where the DCC-MRI is installed, additional flexible tubing can be connected to the outlet port fitting and exhausted as required.

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