ETS-LINDGREN
An ESCO Technologies Company

MACS™ Systems
Beth Israel

Novel MACS Installation Ensures Optimal MRI Performance

The Beth Israel Medical Center has provided comprehensive inpatient and outpatient services to the New York community for more than 100 years. Its Phillips Ambulatory Care Center (PACC) is a modern facility offering a full range of services from primary care to specialty care with more than 50 different on-site diagnostic services and a state-of-the-art ambulatory surgery center with seven operating rooms. PACC is known for its comprehensive Magnetic Resonance Imaging (MRI) suites which expedite patient diagnosis.

Unfortunately, PACC is located directly over an extensive subway system in the heart of New York's bustling Manhattan neighborhood. Disturbance from the moving vehicles underground generated significant electromagnetic interference (EMI) - in excess of 300mG at times - that adversely affected the quality of the images produced in the MRI suite. This limited the types of scans they could perform for patients. Administrators were frustrated that the expensive MRI system purchased for PACC could not be fully used as intended.

To address the interference and return the MRI system to optimal functionality, ETS-Lindgren installed its Magnetic Active Compensation System (MACS). The MACS protects the MRI system from these sources of interference by providing a high performance, reliable concept in environmental shielding.

Applications

In a big city environment, there are many potential sources of interference that may cause an adverse effect on an MRI system, such as the subways near the Beth Israel Medical Center, or transformers, elevators and moving vehicles. The MACS product was designed to correct the negative impact caused by these interference sources. The system provides the user with greater flexibility in MRI site selection and the ability to use any magnet – from 0.2T to 3T and higher - to its full potential regardless of the sources of AC/DC magnetic interference.

Performance

Using a set of Helmholtz coils, a feedback loop and 3-axis sensing magnetometer installed in the room, the MACS monitors the external magnetic field environment and drives current through the coils to create an equal, but opposite, magnetic field. This produces a net effect of near zero magnetic field fluctuation experienced by the MRI system.

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Technical Specifications

• Installation of a maintenance-free, dynamic method for shielding the Beth Israel MRI system from low frequency environmental AC/DC magnetic interference.

• Reduction of EMI disturbance to less than 1mG over the length of the MRI bore.

• Dual probe measurements (at least 2 meters apart centered on isocenter) confirm the maximum bore direction – DC simultaneous gradient – is less than 1 mG.

• RF interference in the 0-100 MHz range from the MACS is certified as less than 1 dB uV/m inside the magnet room.

• Works seamlessly, with 24 hour continuous operation, with the existing 1.5T magnet

System Installation

• Three days for installation and calibration with support provided by the magnet vendor.

• Entire system is located inside the MRI suite, eliminating the need for additional filtering.

• The control/amplifier unit is secured in the forward end of the room while the sensing probe is positioned in an optimum, yet unobtrusive location, behind the magnet.

• Coils are installed in a neat and inconspicuous manner, ensuring that the intended appearance of the MRI suite is not compromised.

About ETS-Lindgren

ETS-Lindgren is an international manufacturer of components and systems that measure, shield, and control electromagnetic and acoustic energy. The company's products are used for electromagnetic compatibility (EMC), microwave, wireless and Magnetic Resonance Imaging (MRI) testing, electromagnetic field (EMF) measurement, radio frequency (RF) personal safety monitoring, and control of acoustic environments.

Headquartered in Cedar Park, Texas, ETS-Lindgren has manufacturing facilities in North America, Europe and Asia. The company is a wholly owned subsidiary of ESCO Technologies, a leading supplier of engineered products for growing industrial and commercial markets. ESCO is a New York Stock Exchange listed company (symbol ESE) with headquarters in St. Louis, Missouri. Additional information about ETS-Lindgren is available at www.ets-lindgren.com. Additional information about ESCO and its subsidiaries is available at www.escotechnologies.com.

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