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COMPACT DESIGN NON-SUPERCONDUCTING NMR-CT
FONAR BETA3000M
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The FONAR BETA3000M is compactly designed with a 3000 gauss non-superconducting magnet, with which the system fully realizes NMR scanning as a diagnostic tool in medicine. As compactly designed, it can be used at any hospital with limited space as well as on a mobile vehicle. It offers high resolution images plus non surgical biopsy of tissue by precise measurements of T1 values. With the FONAR magnet, there is a minimal fringe field and limited missile effect, so site selection is easy and less costly. Magnetic field doesn't affect gamma camera, image intensifier, X-ray CT, conventional X-ray system, artificial pace maker, TV-monitor, Magnetic tape which are located outside of the shielded room. The system is also not affected by steel beam, cars, elevator and truck. It utilizes no liquid helium and no liquid nitrogen since it's non-superconducting but low power consumption which helps saving running cost. Comparing power consumption of this system with resistive magnet, the former utilizes lower power consumption to generate 3000 gauss magnetic field, which is considered not to be practically possible with resistive magnet.

Gantry weight: 17t

Gantry size : 2.4m(w) x 1.5m(h) x 2.2m(d)

Power consumption: 75KVA (not including HVAC)

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CHEMICAL SHIFT IMAGING AND SPECTROSCOPY
WITH A HIGH FIELD STRENGTH (1.5T) MR SYSTEM
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The MR system developed by General Electric (GE) has the high field strength of 1.5T. The strength was selected for two reasons: (1) good image quality to be achieved through improved signal-to-noise ratio when compared with low field strength, and (2) the capability of performing imaging and spectroscopy utilizing chemical shift. GE's "Signa™" MR system has improved magnet design to produce better magnetic field homogeneity, which is another requirement for chemical shift. Chemical shift is caused by very small "shift" in resonance frequency induced by the surrounding environments. In the case of imaging, hydrogen nuclei in water, for example, can be discriminated from nuclei in fat to produce separate images. The spectroscopy of such nuclei as Phosphor 13 involved in metabolism is expected to help diagnose whether tissues are normal or not. The techniques and cases are discussed.