TRUMP in the field of Medical industry

---------- Medical imaging system

Magnetic resonance imaging system

TRUMP 001 Super open permanent MRI system

Introduction：

Advanced design

- “Unique Flat Active Shield Gradient System” was designed to avoid the effects of the biggest problem of Eddy Current that seriously trouble most of the Permanent Magnet MRI System.
- Amorphous Eddy Current Prevent Material are used also to minimize the Eddy Current.
- “ C” Shape Super Open Permanent Magnet with magnet field up to 3600 Gauss provides maximum Permanent MRI Field Strength.
- High effective Flat-Type Quadrature Transmitting Coil with pulse RF power up to 5KW are provided.
- High sensitive Quadrature Receiving Coil increases the receiving efficient up by 40%.
- Low noise build-in preamplifiers are used to enhance the signal and increase the signal to noise ratio significantly .
- Auto Tuning keep the System working in the best possible condition.

Advanced manufacture technique with:

- History of more than 50 years
- High Image Quality
- Plenty of Image Sequences
- Powerful MR Imaging Software

Magnet

- The Magnetic Field of MRI System with up to 0.36T greatly improves Image Quality.
- MRI System introduces a "C" shape Open Magnet with Increased Patient Space which is obvious when compared with traditional ones.
- Designed by professional engineers and manufactured by advanced Technology, the Magnet has the advantages of High Homogeneity, Large Gap Space, small size and light weight.
- The Eddy Current is reduced to the minimum through the use of Special High Resistance Materials.

Gradient System

- The Advanced Design of the Inversion Method provides the Gradient System with Very High Linearity and Slew Rate, and insures the Highest Image Resolution.
- Unique design of the Active Shield Flat Gradient System decreases the Eddy Current to a very minimum and completely avoid the problem of Eddy Current that trouble most of the Permanent MRI Systems. Image quality is improved greatly over similar Open Magnet Systems.

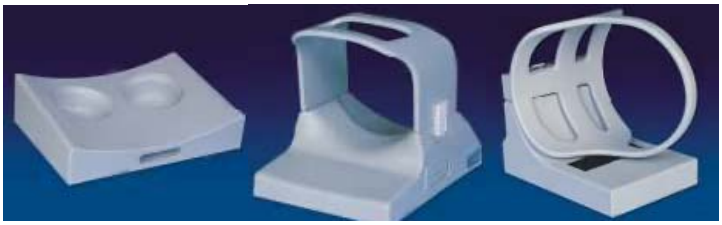
RF Transmitter System

- Quadrature Design of Flat Transmitter Coil has contributed to improved uniformity and efficiency of the System and makes the System Unique as a fully open type MRI.
- The pulse transmitting power is up to 6KW.

RF Receiving System

- The Special design of Quadrature Receiving Coil Greatly Improves the signal to noise ratio.
- Low noise build-in preamplifiers in the Coils reduce the signal attenuation, this in terms reduces the effect of noise greatly.
- Auto Tuning simplifies the System's operation and keeps the System working in the best condition.

Head coil Body coil Knee coil



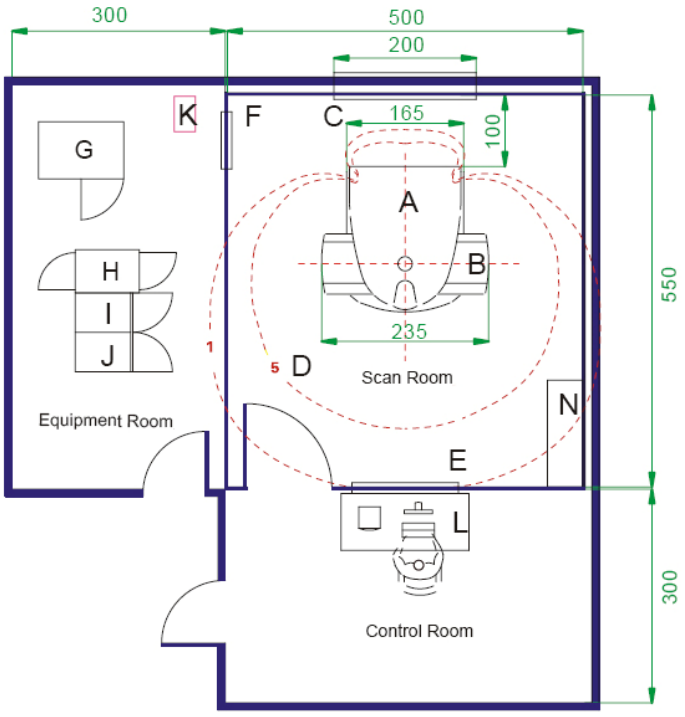
Galactophore coil Neck coil Shoulder coil

Powerful scanning software

- Scan Control Software is provided to help the customer easily set up Imaging Scans and Monitor the scans in a
- easy and friendly way:
- Easy and well designed menu are provided to set up scan parameters;
- Pilot scans allow you to precisely set slice positions;
- Easy menu also allows you to select Imaging Sequences:
- Auto adjustment of Resonance Frequency;
- Auto adjustment of Receiver and Transmitter Gain;
- Auto adjustment of Shimming;
- And Scan Process Monitoring in real time is also included.

Plenty of imaging processing functions

- MRI system provides the most powerful Image Display and Process Software available on any Present Open
- MRI: Multi-Window Display; Display Window Adjustment; Image Zoom; Image Rotating; Distance Measurement;
- Angle Measurement; Region of Interesting Process; Image Enhancement; Image Smooth; Background Noise
- Eliminating; Image Text Note; Image Parameter Display; DICOM 3.0 Interface; MIP and MPR of 3D Images.
- Software update: Free upgrading of Software are provided within Time Frame determined at Time of Purchase.



Configuration：

Magnet

Field strength	0.005T±0.36
Shimming	Passive + Digital shimming
Dimension	1.8m (L) × 1.3m (W) × 1.8m (H)
Net weight	16MT
Patient gap	400mm
Homogeneity	5ppm (V rms)/40cmDSV

Gradient system

Gradient strength	15mT/m
Slew rate	55mT/m/ms
Gradient linearity	<5%
Eddy current prevent	Active shield
Cooling mode	water

Receiving coils

Low noise build-in preamplifier

Noise figure	<0.5dB

High isolation and low insertion loss build-in combiner
Quadrature coil

RF system

Pulse transmitting power	6kw
Center frequency	0.25MHz±15.3MHz

High isolation and low insertion loss power splitter

Sequence

Spin-Echo (SE)
Gradient-Echo (GE)
Ivertion Recovery (IR)
Fast Spin-Echo (FSE)
Fast Gradient-Echo (FGE)
Magnetic Resonance Angiography (MRA)
Short Ivertion Time Recovery (STIR)
Flow Attenuation Ivertion Recovery (FLAIR)
Magnetization Transfer Contrast (MTC)
Magnetic Resonance Choleopancreatography (MRCP)

Image

T1\T2, Mixture Weighted, Proton Density , MRA, Water/Fat Imaging
Max Fov 400mm; Min Fov 20mm
Min 2Dslice thickness 1.5mm; Min 3D slice thickness 0.5mm
Max Square Matrix 1024 × 1024

Spectrometer and Electronics

Sampling rate	400MHz in 16bits

16 bits Gradient Wave Form and Digital Pre-emphasis
16 bits Arbitrary Wave Form
Standard TCP/IP Ethernet Connection

CPU	≥2.8g P4
Memory	≥1G
Hard disk	≥160G
Display	LCD Color MonitorTFT”18
Archives	WCD-R
Operating System	TM XPWindows

Space requirement

Scan Room	20m^2
Control Room	10m^2
Equipment Room	10m^2

Option

Advanced MRA Software Package
Advanced 3D MRI Software Package
Independent Medical Imaging Processing Workstation
Image Processing, Database, DICOM hardcopy, Documents

TRUMP 002 Super open permanent MRI system

Introduction

Key Features

Powerful Gradient System

Gradient field strength:26mt/m
Noise reduction technology

Higher Computer Configuration

Higher reconstruction speed
Larger storage capacity
Powerful and stable performance

Stronger RF System

Highest output power in low-field MRI systems: 6kw
Phase Array platform

Phase Array Multi-Channel Receiving Coils


Head Coil


Neck Coil


Shoulder Coil


Knee Coil


Wrist Coil


Medium Body Coil


Large Body Coil


Head&Neck Coil


Kinematic Joint Analysis Coil

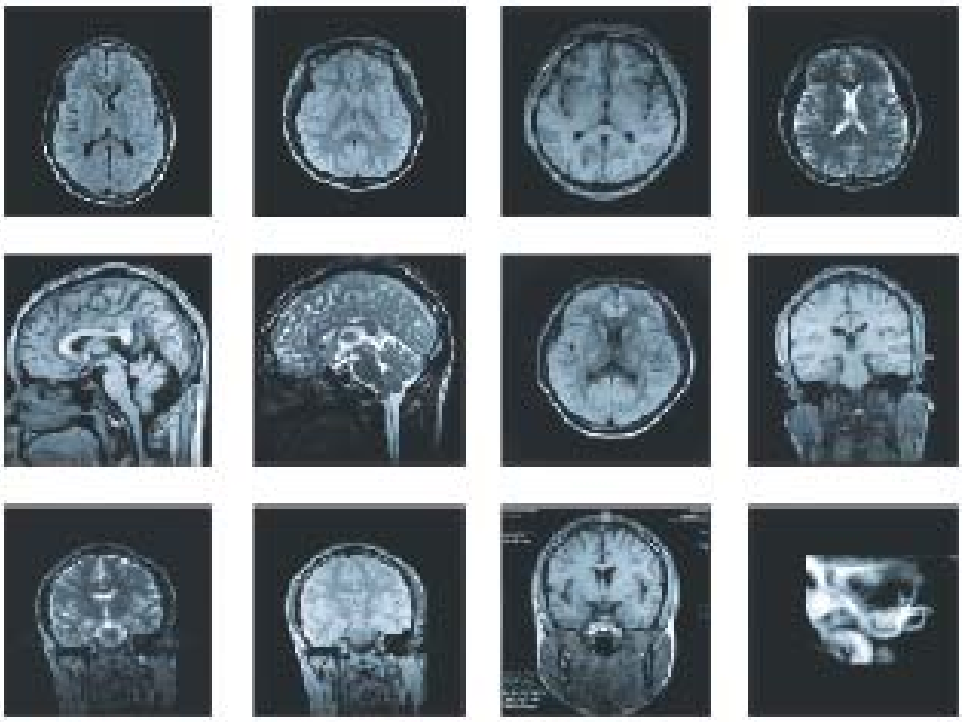

Small Body Coil

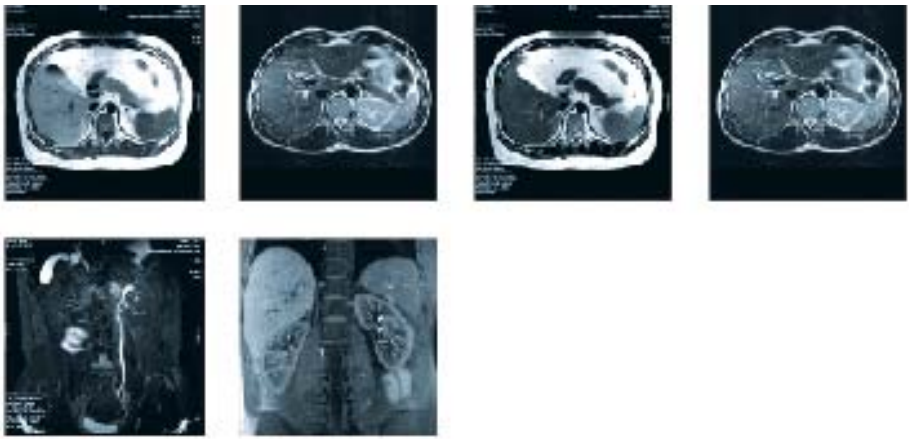
Spine Coil TMJ Coil 6-inch Flex Coil 9-inch Flex Coil Breast Coil

Comprehensive Scan Packages

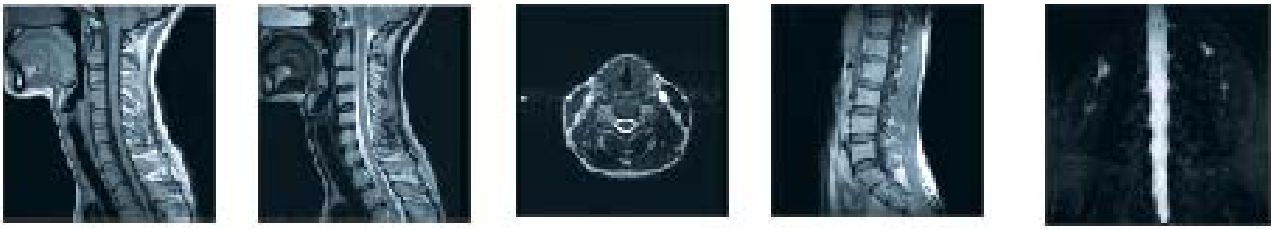
Dedicated scan packages for different body parts and various patients
Abundant application functions for diagnostic requirements
Default protocols making daily operation easier and faster
Capability for radiologists to establish local protocols for acquiring desired images

Good Image Quality





Spine

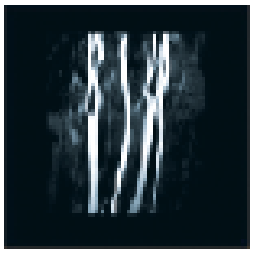


Cardic

Musculoskeletal

Vascular





Standard Configuration

Magnet 1 no.
0.35T Permanent Magnet

Gradient System 1 no.

RF System 1.no.

RF receiver coil 7 no.
Pa head coil
Pa large body coil
Pa medium body coil
Pa neck coil
Pa knee coil
Pa shoulder coil
Pa wrist coil.

Couch 1 no.

Console 1 no.

Operating software 1 no
Accessory kit 1 no.

Document
User Interface
Technical Manual
Application Guide

Technical Specification

Magnet

- **Magnet Field strength** : 0.346T ±0.001T
- **Homogeneity** : 1.8ppm in 36cm DSV Vrms
- **5GS line** : 2.5m from the center of magnet
- **Magnet camber size (Couch top to upper cover)** : 38 cm in Height

Operating software

- **Acquisition Techniques:**

Flow Compensation
Turbo Multislice
Presaturation
Dual band preset
Cardiac Gating
Half scan
Partial echo
Rect FOV
Scan percentage
Batch imaging
MTC
CENTRA

- **Image display**

Adjustment on window W/L
Scroll
Alignment
Pan
Zooming
Rotation
Multi-format of display(1,2,4)
Annotation

Statistics(ROI)
Cine display.

- **Image processing**

MIP (Maximum Intensity Projection)
Fat/Water separation
MPR
Full set of image analysis tools
Realtime zoom
Selection of image filters
ROI analysis tools
Batch mode processing.

- **DICOM 3.0**

Protocol package

- Spin echo 2D/3D
- Fast field echo(FFE)
- B-Fast field echo(B-FFE)
- Turbo spin echo(TSE)
- Inversion recovery(IR)
- Flair / Stir
- MR Angiography
- DWI
- Dual echo(DE)
- Dual fast field echo(DFFE)

General Image Parameters

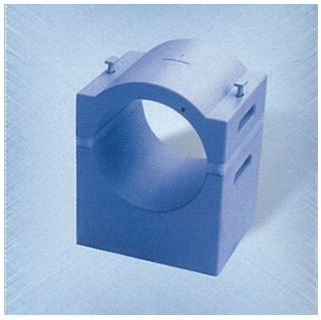
- **Scan orientation** : transverse，sagittal， coronal，oblique

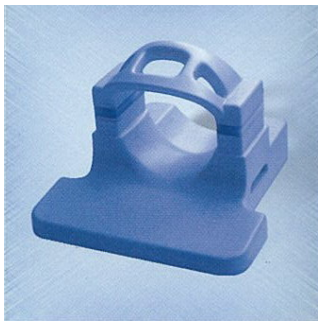
- **Acquisition Matrix** :1024 x 1024
- **Minimum TE (ms)**: (2.1)
- **Minimum TR (ms)**: (4.2)
- **Maximum Slice Number** : 256
- **FOV**:2mm x 2mm to 400mm x 400
- **Minimum Slice Thickness (2D)**: 0.2mm
- **Minimum Slice Thickness (3D)**:0.1mm

Permanent magnet Magnetic resonance imaging system

TRUMP 003
Permanent magnet 0.3T MRI

TRUMP 004
Permanent magnet 0.35T MRI





TRUMP 005
Permanent magnet 0.4T MRI

TRUMP 006
Permanent magnet 0.5T MRI


MODEL: TRUMP 003, TRUMP 004, TRUMP 005, TRUMP 006

Technical parameter:

MAGNET SUB-SYSTEM

Magnet type: open type permanent magnet (NdFeB) with vertical magnetic field
Operating field strength: 0.3/0.35/0.4/0.5T±0.005T
Homogeneity: Max. inhomogeneity on surface of a sphere with diameter of 400mm<20ppm (P-P)
Field stability: <1ppm/h
Patient space: 400mm
Eddy current: special eddy current resist device
Magnetic fringe field: because the fringe field is very low, no magnetic shielding is necessary.
The distance from the center of magnet to the 0.5mT line: ≤2.0m

GRADIENT SUB-SYSTEM

Gradient field: Max. 15/20mT/m
Rise time from 0 to 12/18 mT/m: <0.25/0.3ms
Slew rate: 50/66mT/m/ms

PATIENT MONITORING

ECG sensor patient monitoring
Microphone communication

DIGITAL SIGNAL PROCESSING SYSTEM

Computer controlled digital signal processing system for modulation and demodulation of radio frequency signals.
Singal sideband modulation with suppreassed carrier.
Arbitrary programmable pulse shape and phase
Quadrature demodulation
Transmitter power output: Max. 5kW

COMPUTER SYSTEM

CPU: double Pentium Ⅳ (≥2.4GHz)
Hard disk: ≥120GB
DVD-R/W
Operating system: Microsoft Windows 2000
Image display: monitor (21”) with 1280×1024 resolution

PULSE SEQUENCES

Spin echo (SE, 2D and 3D)
Multi echo spin echo (MESE)
Fast spin echo (FSE, 2D and 3D)
Inversion recovery (IR)
Gradient echo (GRE, 2D and 3D)
Steady state process gradient echo (SSPERE)
Short time inversion recovery (STIR)
Inversion recovery fast spin echo (IRFSE)
Fluid attenuation inversion recovery (FLAIR)
Magnetic resonance angiography (MRA, TOF, 2D and 3D)
Single shot fast spin echo (SSFSE)
Multi shot fast spin echo (MSFSE)
Echo planar imaging (EPI)

MEASUREMENT MATRIX

Square matrices: 64×64～512×512 variable

RESOLUTION

Body in 30cm FOV: 1.5mm
Head in 25cm FOV: 1mm

DIGITAL INTERFACE FOR LASER CAMERA
DICOM 3.0 interface