TIME MEDICAL
SYSTEMS

PICA

***the* Whole Body MRI System**

SYSTEM DATA

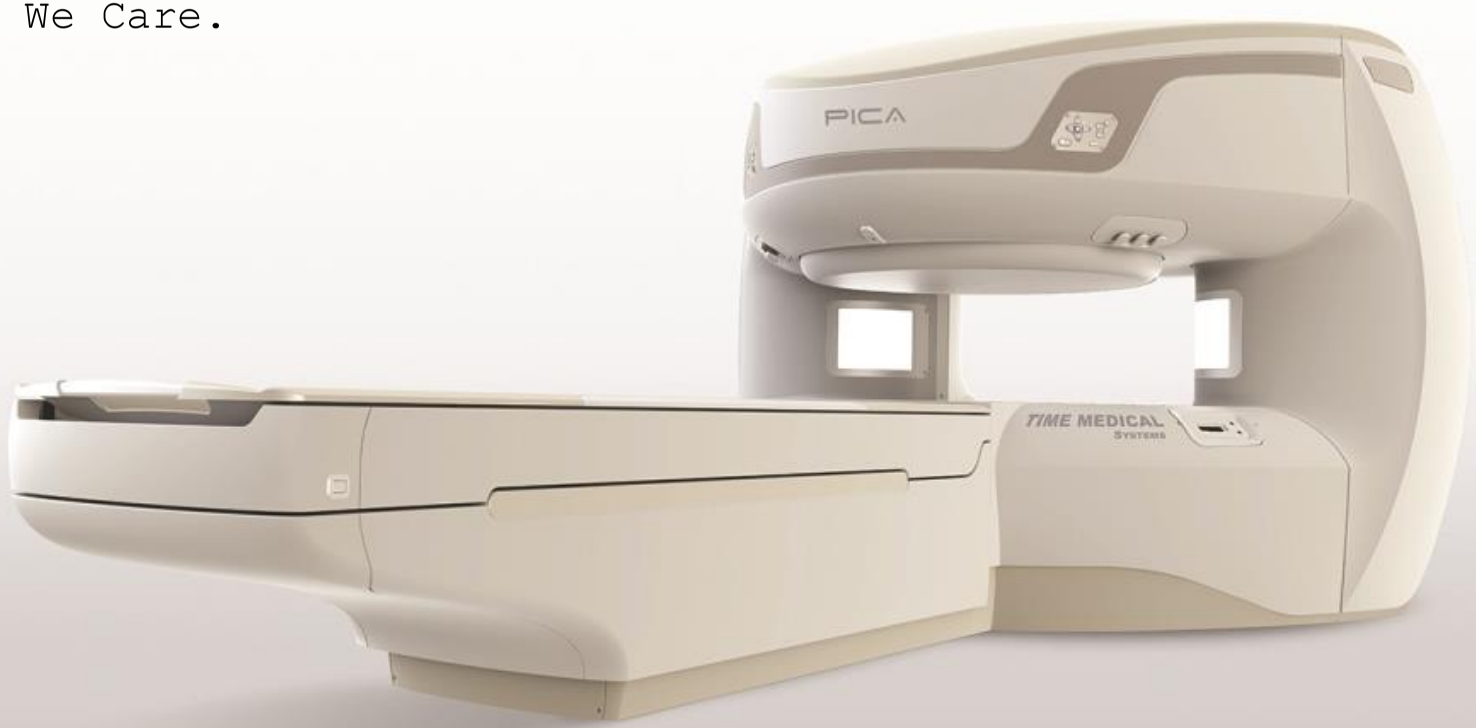
PICA

brings a new dimension to MR Imaging.

TIME MEDICAL SYSTEMS

Vision Beyond Imagination.

We See, We Care.



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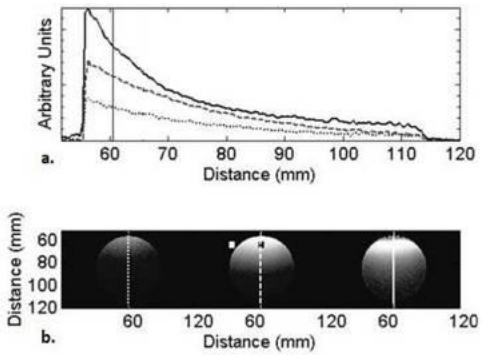
HTS Technology

For the past 30 years, MR technology has relied upon higher magnetic field strengths to achieve a higher Signal-to-Noise Ratio (SNR) in the MR Image. This trend has come to an end, driven mainly by the need for new cost containment strategies and regulatory constraints for imaging above 3 Tesla.

Overcoming the dominant source of noise in an MR Image remains the key challenge. The loss of SNR from the RF coil is large when compared with losses from the sample itself. If RF coils can be optimized to reduce coil loss, they can greatly improve the SNR.

High Temperature Superconducting (HTS) materials and methods have become the ideal approach to improving SNR. The HTS coil is made from YBCO thin film on sapphire substrate. HTS RF Coil technology was developed in the late 1990's by a research team at Columbia University, (New York, USA), led by Professor Q. Y. Ma, PhD.



Phantom image comparison: **(a)** signal intensity plot through the midline of images of a homogeneous cylindrical phantom. Each curve has been normalized such that the RMS noise is equal in all curves. The vertical lines indicate the range over which the ROI was taken on the images. **(b)** The corresponding images are shown in the lower panel. Room temperature copper (dotted line), cooled copper (dashed line), and HTS coil (solid line) images are shown from left to right, respectively. The ROI locations for signal and noise are indicated on the middle image.

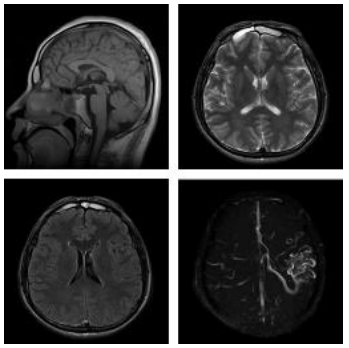
TIME MEDICAL SYSTEMS was founded by Professor Ma to bring HTS RF Coil technology to the MRI market. This breakthrough innovation led to the era of **low-cost, high-performance MRI Scanners**.

PICA

PICA is the first whole body MRI Scanner to take advantage of HTS RF Coil Technology. Operating in conventional mode, or HTS mode, the Hybrid PICA MRI Scanner enables the full range of clinical applications.

The 20 minute Brain MRI Exam is one of the best examples of Hybrid PICA's **value, performance & innovation.**

HTS Head Coil



Specifications

Magnet System

Type: Permanent, active shims
Material: Neodymium Ferrite Boron (**NdFeB)**
Field Strength: 0.35 Tesla
Opening: 400 mm
Fringe Field:
5 Gauss line 2.5 m axial x 2.5 m radial
See diagrams on page 14.
Size with chassis:
2260 x 2740 x 1996 mm (L x W x H)
Field Stability: < 0.2 ppm/hr
Magnet Weight: 17,200 kg / 37,840 lbs

Gradient System

Amplitude: 25 mT/m (PICA Standard)
Rise Time: 0.50 ms
Slew Rate: 50 T/m/s

** Upgradable to:*
Amplitude: 33 mT/m (PICA Advanced)
Rise Time: 0.37 ms
Slew Rate: 90 T/m/s

RF System

Frequency: 15 MHz ± 200 kHz
RF Power: 6000 W peak rms, 600 W average
Image BW: 4 kHz – 100 kHz
Preamp Noise Figure < 0.5 dB
Pre-amplifier integrated in all receiving coils
Automatic receiving coil recognition

RF Receive Coils

Quad Head Coil
Quad Neck Coil
Quad Shoulder Coil
Quad Wrist Coil
Quad Body / Spine Coil
Quad Knee Coil
Quad Foot/Ankle Coil

Pulse Sequences

SE 2D & 3D, GRE 2D & 3D, FLASH 2D & 3D, FSE 2D, FSE 3D / HASTE, STIR 2D, IR-FSE 2D (T2 STIR, PD-STIR), FLAIR 2D, Fast-FLAIR 2D, MRA-TOF 2D & 3D, MRV-TOF 2D, 3PT DIXON SE 2D, 3PT DIXON GRE 2D.

Computer System

Host Computer:
Dell™ Optiplex™ with Quad Core processors at 3.1 GHz, 4 GB RAM, 1 TB RAID hard drive
Operating System: Microsoft® Windows® Based
Imaging Software:
Prodiva™ MRI Platform
Data Archive:
DVD-RW (DL) 4.7 GB
Display: 24 inch HD 1080p LCD Monitor
Data Transfer & Handling (HIS/RIS): DICOM 3.0
Printing Support: DICOM Print, All Windows Printer & PDF

Patient Table

Size: 2600 x 800 x 767 mm (L x W x H)
IN/OUT movement – 2000 mm
LEFT/RIGHT movement – 120 mm each side
UP/DOWN movement – 200 mm
Min height from floor – 550 mm
Loading capacity – 200 kg / 440 lbs

Imaging Parameters

FOV: 5 cm – 42 cm, 0.1 mm increments
Slice Thickness:
2D: 1 mm – 10 mm, 0.1 mm increments
3D: 0.25 mm – 10 mm, 0.1 mm increments
Slice Spacing: 0.1 mm increment
Min / Max Phase Matrix: 64 / 512
Min / Max Frequency Matrix: 64 / 512
Bandwidth: 4 kHz – 100 kHz
Rectangular FOV (increment in % in full FOV): 0.1%
Types of Recon filters:
Ring Filter (On/Off), Histogram Equalization, Image Uniformity

Image Reconstruction

Multithreaded reconstruction
2D > 1000 images/s, 256 x 256
3D > 200 planes/s, 256 x 256 x 64

Image Visualization

Features: Visualization with auto Window & Level, pan, zoom, rotate, flip, multiple image display, ROI, annotation, measurements, cross series marker, color mapping, image analysis, real-time MIP, CINE multi viewport.

Site Planning

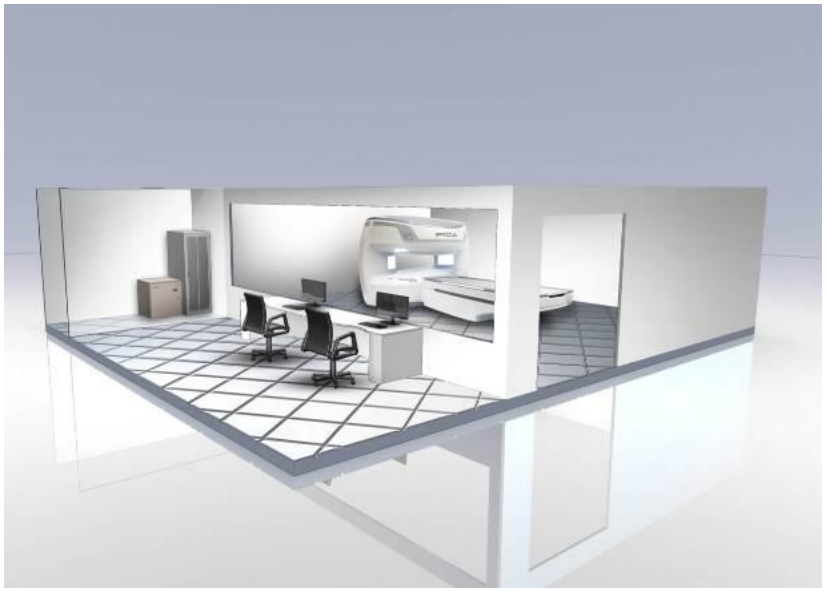
Room Requirements

Specification	Equipment Room	Magnet Room	Control Room
Recommended room size (inside dimensions) *	3000 x 3000 mm (9.8 × 9.8 ft)	6500 x 4500 mm (21.3 × 14.7 ft)	3000 x 4000 mm (9.8 × 13.1 ft)
Minimum ceiling height	2800 mm (9.2 ft)	3000 mm (9.8 ft)	no requirement
Floor requirements	antistatic	antistatic, level	antistatic
Total Floor Loading	-	20 kPa 417.7 lbs / sqft	-
Floor Leveling	-	5 mm / 3 m	-
RF shielding	not required	90 dB attenuation over 10 – 100 MHz	not required
Magnetic field shielding	not required	depends on site	not required
Power outlets	3 x 110 Vac or 220 Vac (depends on country) 1 x 380 Vac (3 phase)	3 x 110 Vac or 220 Vac (depends on country)	at least 6 x 110 Vac or 220 Vac (depends on country)
Air conditioning	3 kW	15 kW	3 kW
Humidity	40%-70% without condensation	40%-70% without condensation	40%-70% without condensation
Network outlets	1 (directly connected to Control Room)	No requirement	1 (directly connected to Equipment Room)

* Remarks:

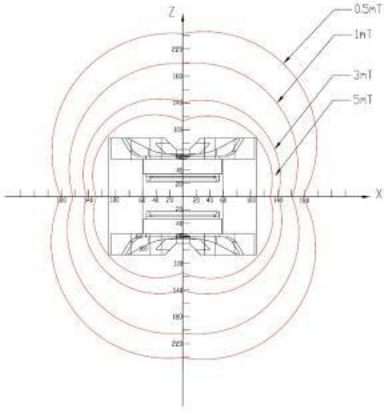
The minimum space requirements vary based on the specific site survey.

Typical MRI Floor Plan

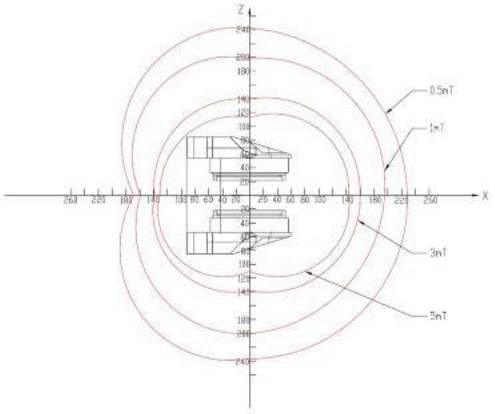


Chassis & Patient Table Dimensions

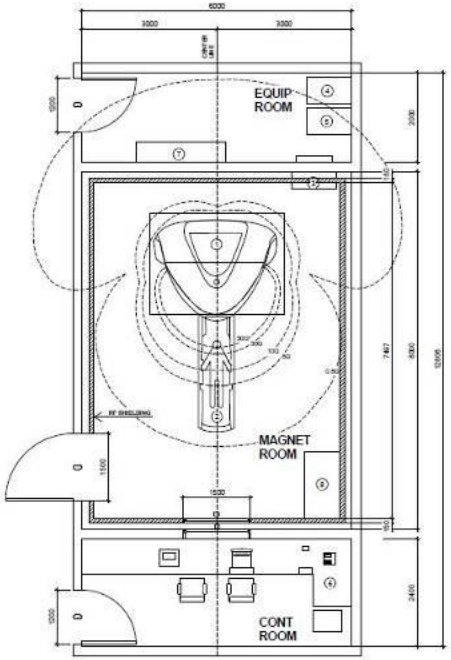
Magnetic Fringe Field



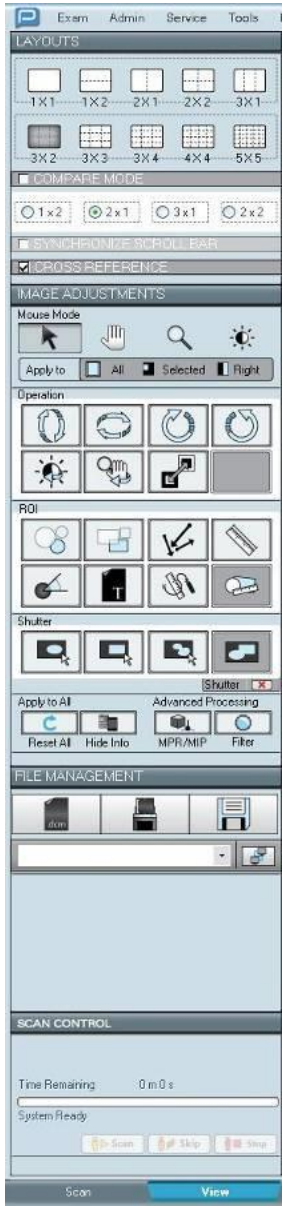
(Front)

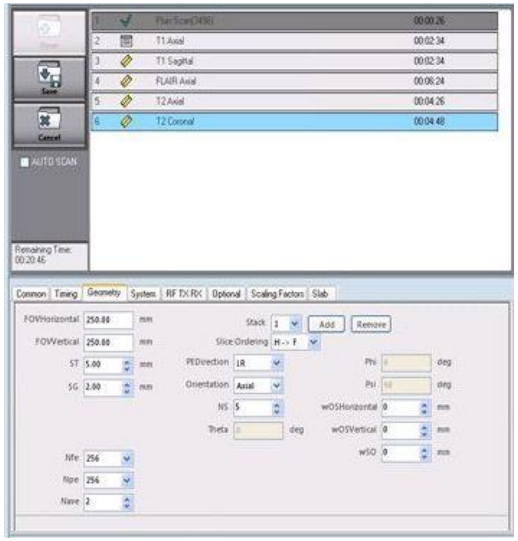


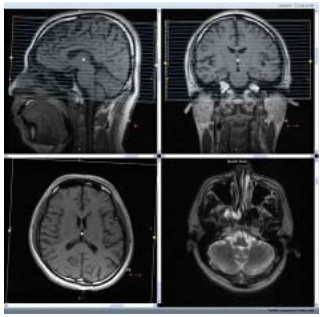
(Side)

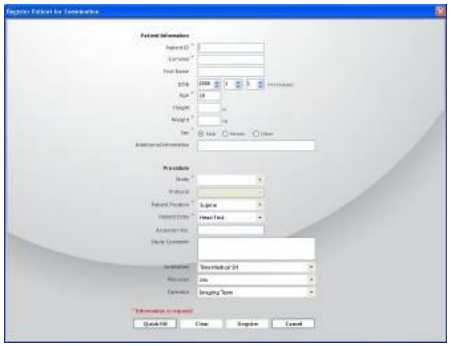


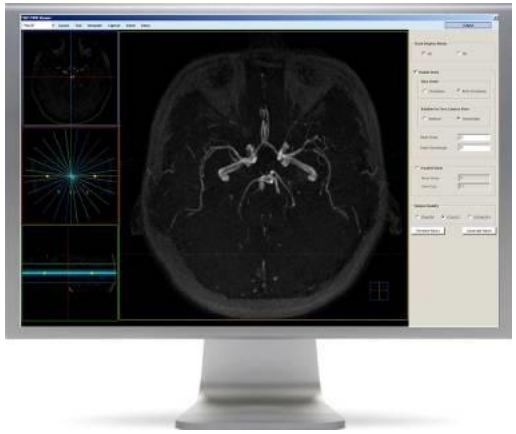
Performance Highlights



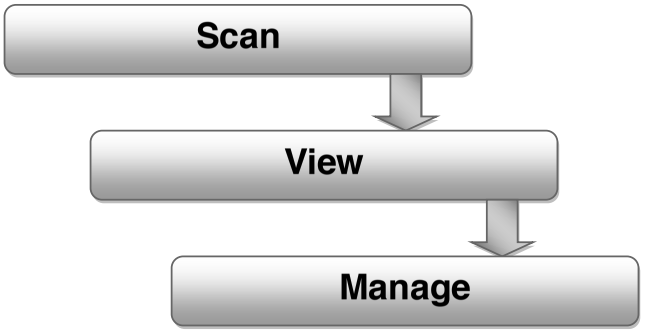








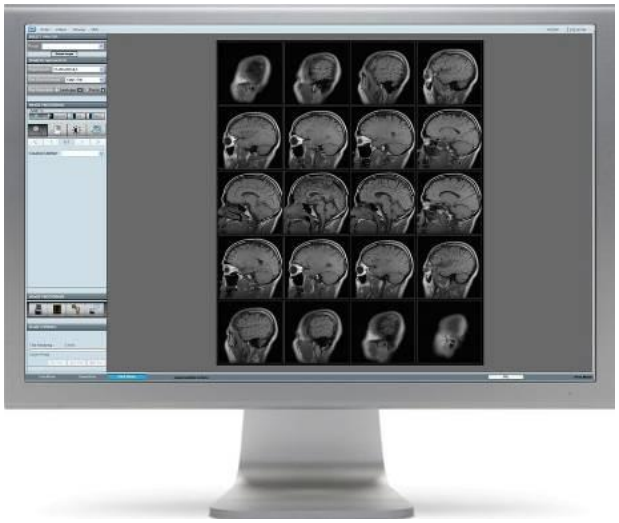
Staff Productivity



Scan Mode

View Mode

Print Mode



Patient Comfort

Six Direction Automated Patient Table

UP/DOWN travelling distance 200 mm

IN/OUT travelling distance 2000 mm

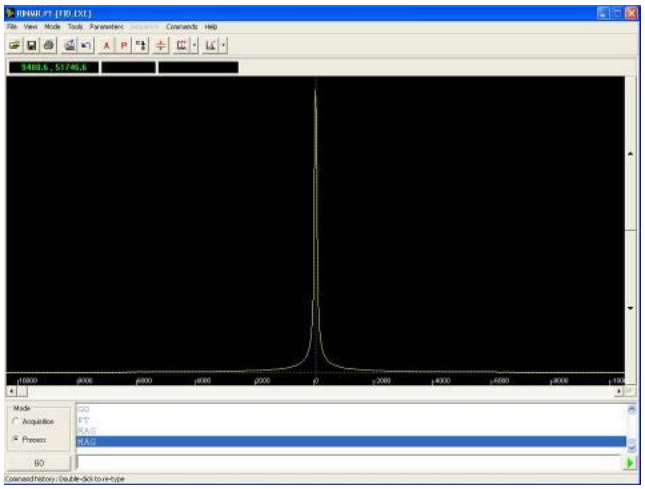
LEFT/RIGHT travelling distance ± 120 mm

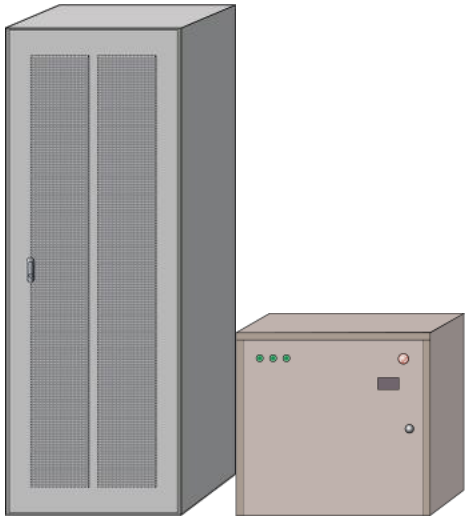
Laser Positioning Device ± 1 mm accuracy

Patient Table	
Cooling	Air
Coolant thermal loading	25 W Ambient (-10°C to +40°C)
Unit weight	450 kg (992 lbs)
Patient loading weight	200 kg (440 lbs)
Shipping weight	600 kg (1322.8 lbs)
Power Input	DC 24V - 40A

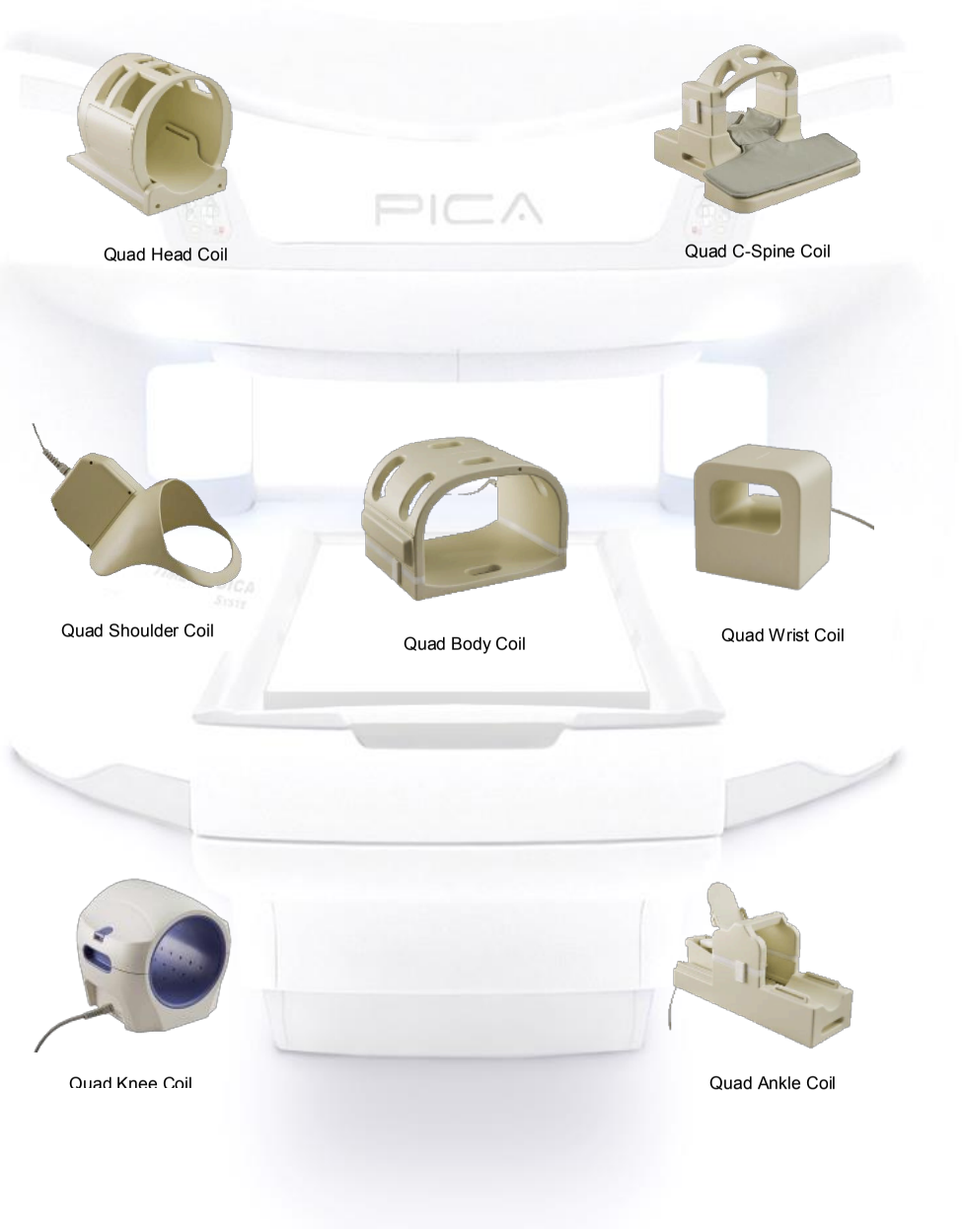
System Reliability

System / Power Supply Cabinets	
Cooling	Air cooled with internal fans
Coolant thermal loading	2.8 kW - 5.85 kW
Line voltage	380 Vac 3-phase, neutral ± 5%, 3N~ , 50/60 Hz Optional Power Supply: 400, 420 VAC 3-phase, ± 5% 440, 480 VAC 3-phase, ± 5%
AC power requirements	63 A / 42 kVA
Dimensions (LWH)	910 x 610 x 1735 mm / 670 x 820 x 970 mm
Unit weight	426 kg (939 lbs) / 390 kg (860 lbs)





Radio Frequency (RF) Coils



Item	Specification	Remark
1. Coil type	2 channel, Receive only	Integrated preamp
2. Tuning Method	Passive	
3. Decoupling	Passive & active	From transmission coil
4. Q Factor	>100	F = 15 MHz ± 200 kHz, loaded
5. Uniformity for Optimal IQ	>90%	
6. Connector	Mixed D type	

Coils		FOV (L x W x H mm)
1. Quad Head Coil		260 x 215 x 250
2. Quad Cervical Spine Coil		180 x 190 x 215
3. Quad Body Coil:	20” coil	300 x 550 x 325
	17” coil	300 x 420 x 280
	14” coil	300 x 350 x 240
4. Quad Knee Coil		250 x 180 x 180
5. Quad Foot / Ankle Coil		180 x 115 x 175
6. Quad Wrist Coil		130 x 115 x 70
7. Quad Shoulder Coil		195 x 200 x 215

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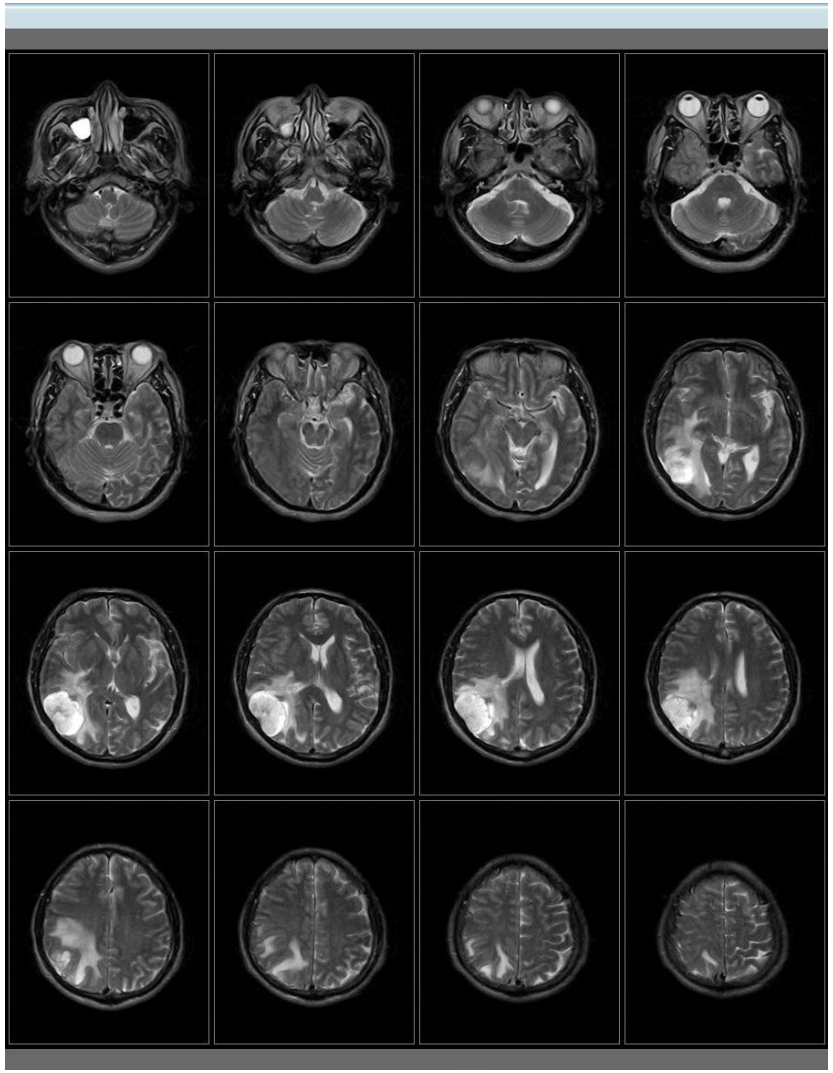

BRAIN T2 FSE Axial 224x256 FOV 24 cm

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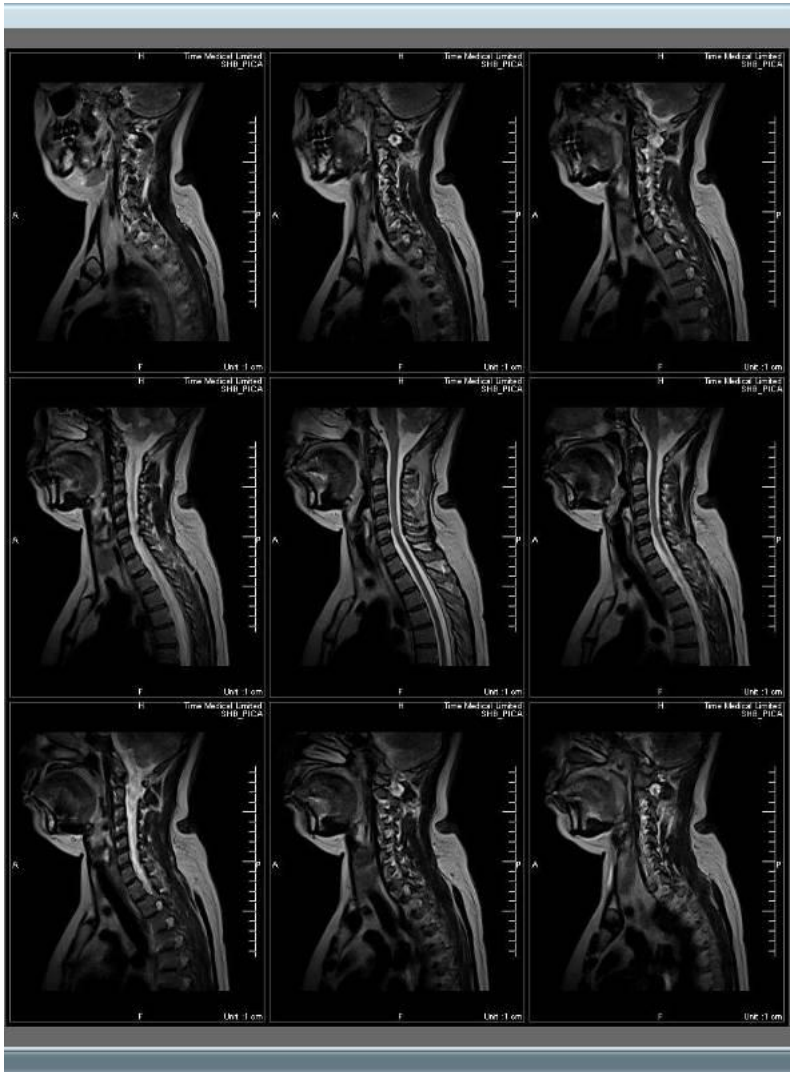

C-SPINE T2 FSE Sagittal 216x256 FOV 26 cm

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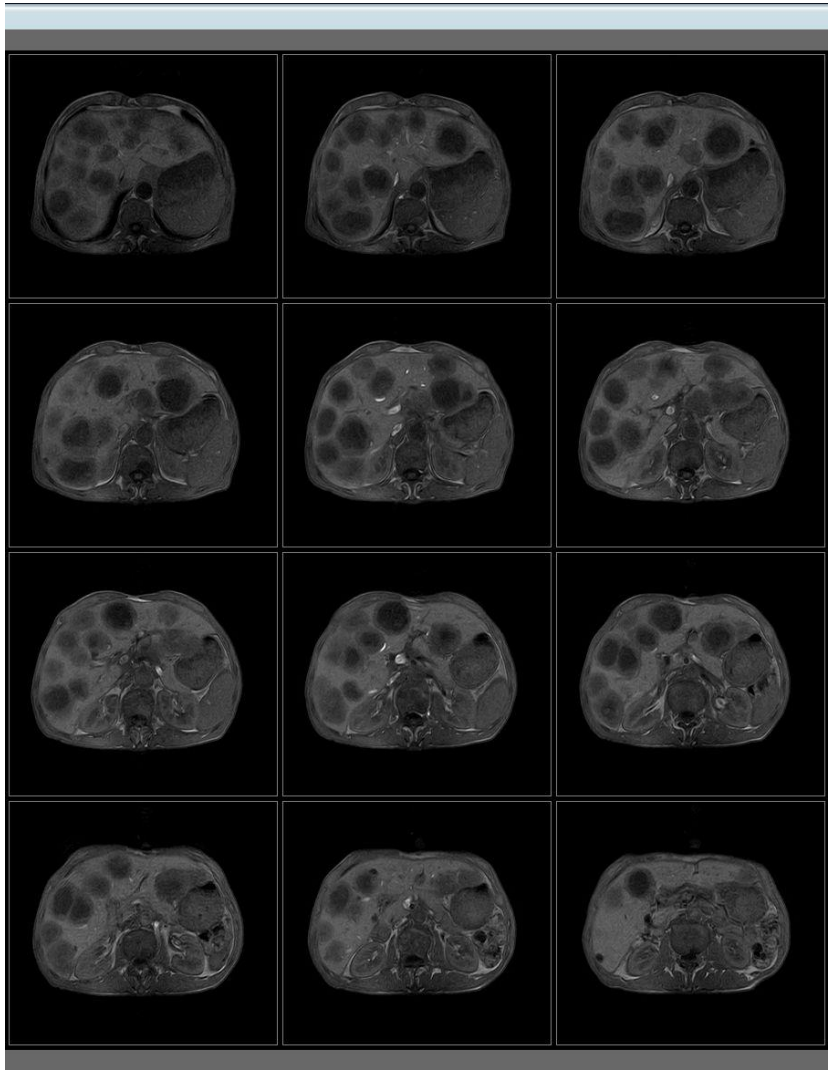

ABDOMEN T1 GRE Axial 160x256 FOV 32 cm

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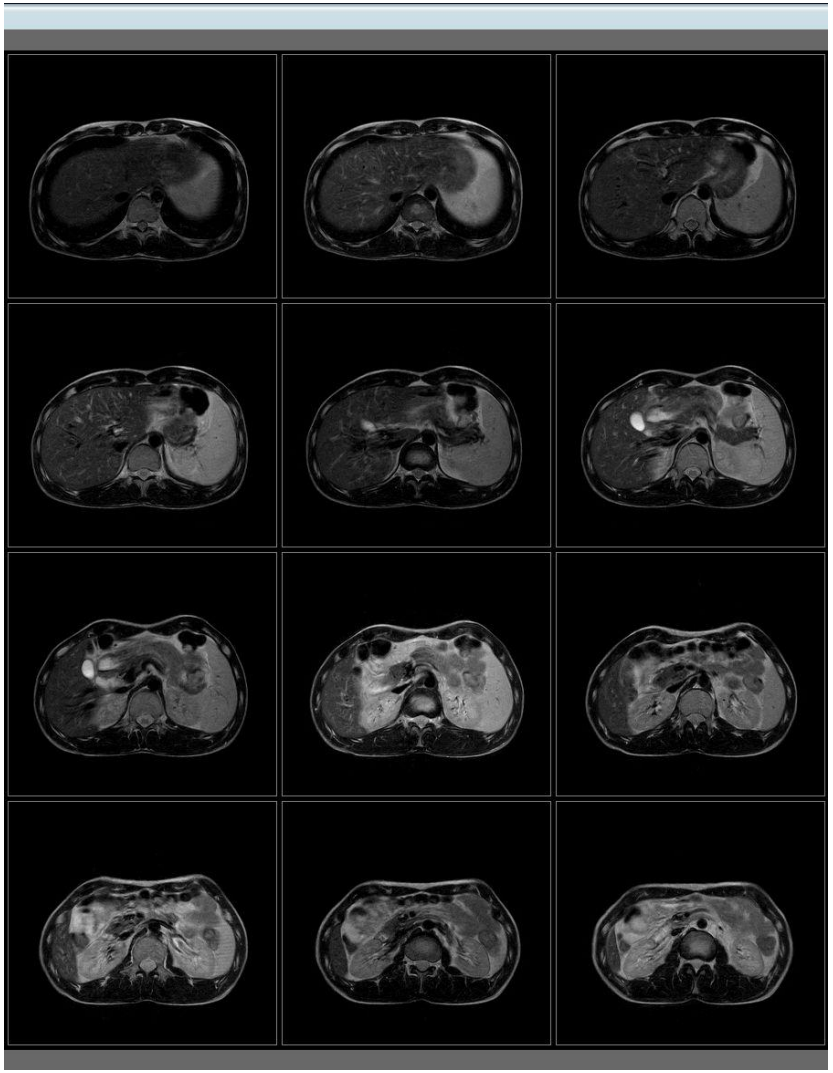

ABDOMEN T2 FSE Axial 192x256 FOV 32 cm

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T-SPINE T2 IR-FSE Sagittal 160x256 FOV 30 cm

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L-SPINE T1 SE Sagittal CE 192x256 FOV 26 cm

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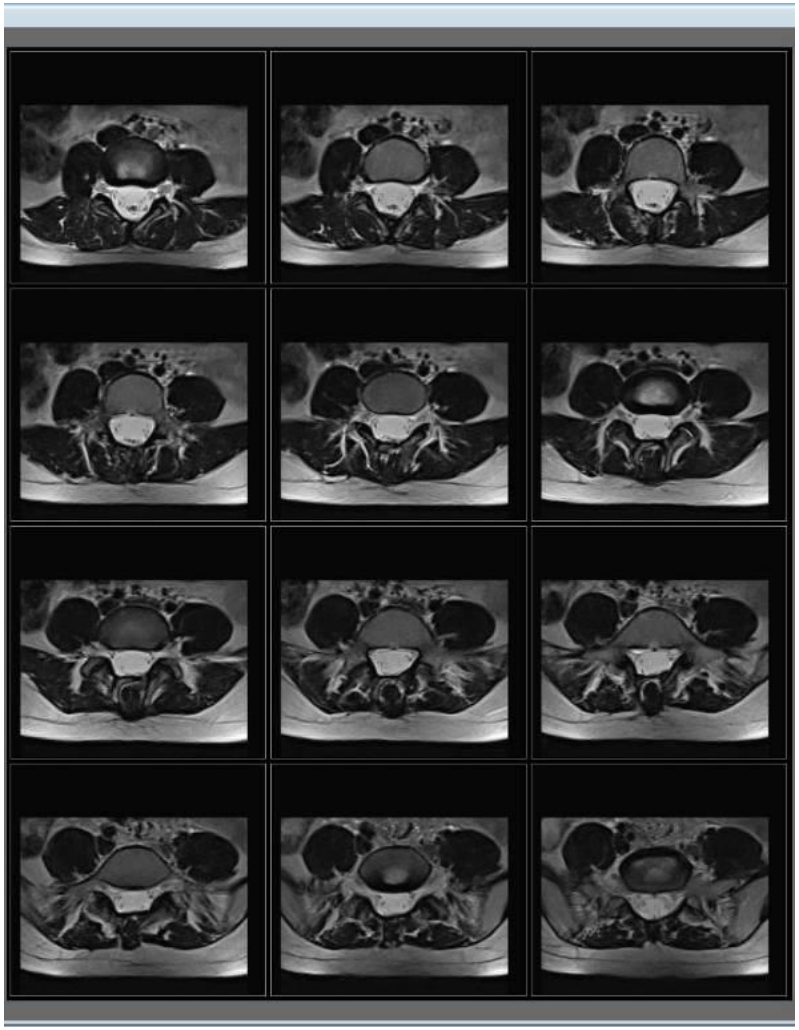

L-SPINE T2 FSE Axial 224x256 FOV 27 cm

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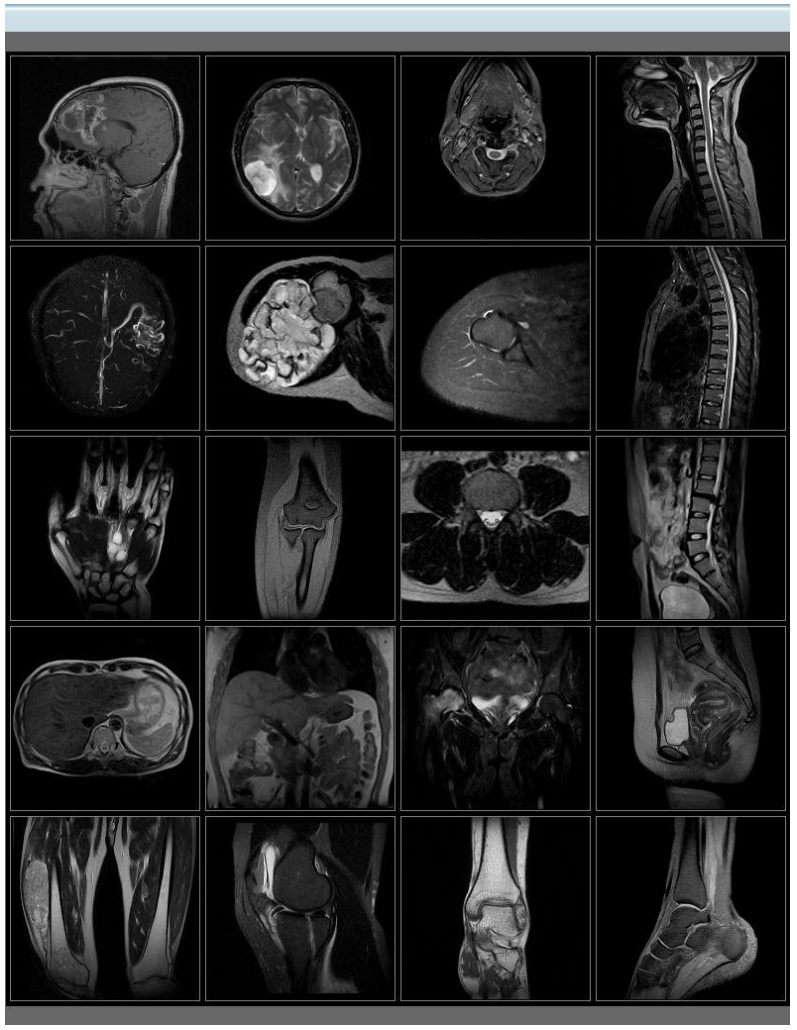

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