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## OASIS Mark II - Standard Details

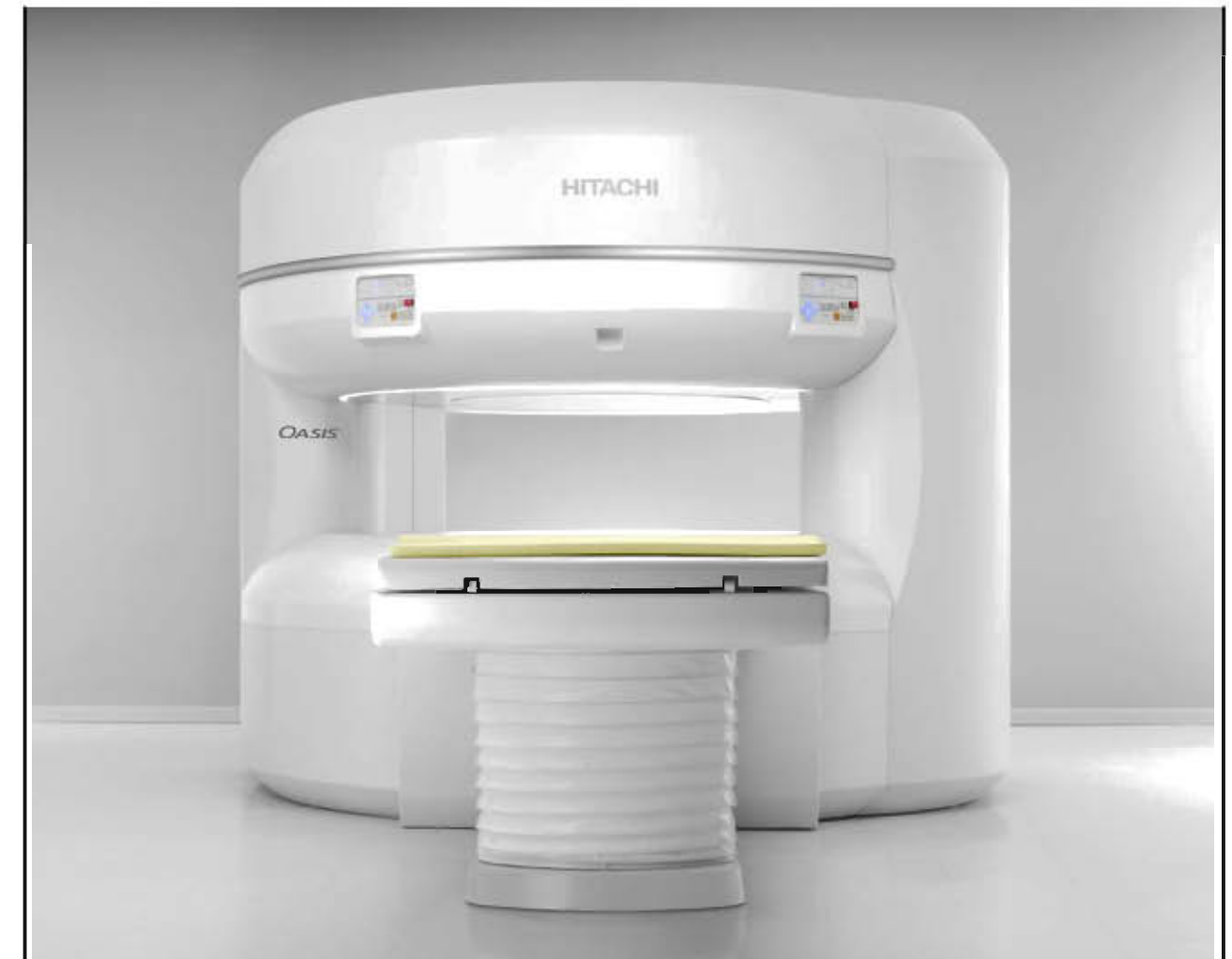
**REVISED: 5/18/2012**

It is the customer's responsibility to ensure that all appropriate design and construction personnel receive this document along with the HMSA site specific drawing for their project. This document contains information which is critical to the proper design and construction of a suite for the Hitachi OASIS system. The information contained herein is to be used in conjunction with the site specific drawing provided by HMSA. Contact the Site Planning Department with questions regarding this guide.

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DOCUMENT ESTABLISHED - 04/30/2012  
SPD-GDE-OAS2-1 DM# 84149 v2



# OASIS Mark II REVISIONS

PREVIOUS REVISION - INITIAL RELEASE 04/30/2012

THIS REVISED OASIS STANDARD DETAIL SET CONTAINS UPDATED INFORMATION TO BE USED IN THE PLANNING OF A SUITE TO ACCOMMODATE THE HITACHI OASIS MRI SYSTEM. SOME PAGES HAVE BEEN REFORMATTED TO MORE CLEARLY PRESENT THIS INFORMATION. BELOW, PLEASE NOTE THOSE SPECIFIC MODIFICATIONS THAT SHOULD BE REVIEWED BY THE CUSTOMER'S DESIGN AND CONSTRUCTION PERSONNEL. THE CUSTOMER IS RESPONSIBLE FOR ENSURING THEIR OASIS SUITE IS BUILT TO THE REQUIREMENTS AND SPECIFICATIONS CONTAINED IN THIS DOCUMENT. THE MOST RECENT VERSION OF THIS DOCUMENT MAY BE FOUND AT [www.hitachimed.com](http://www.hitachimed.com). CONTACT THE SITE PLANNING DEPARTMENT AT 800-800-3106 TO OBTAIN APPROPRIATE USER NAME AND PASSWORD.

## MAY 18, 2012:

- PG 6 OF 27: GENERAL SUITE CRITERIA
  - 1) CORRECTED GANTRY WEIGHT
- PG 7 OF 27: FLOOR LOADING STRUCTURAL
  - 1) CORRECTED MAGNET WEIGHT PER FOOT AND TOTAL IN CHART
- PG 10 OF 27: CHILLER REQUIREMENTS
  - 1) REVISED NOTE 2b UNDER CUSTOMER/ GENERAL CONTRACTOR RESPONSIBILITIES
- PG 27 OF 27: PRE-DELIVERY CHECKLIST
  - 1) ADDED SITE NAME AND ADDRESS TO PG 3 OF CHECKLIST

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OASIS MARK II STANDARD DETAILS			REVISIONS

# TYPICAL PLANNING PROCESS

## SITE SELECTION AND EVALUATION (3 WEEKS)

### A) SITE SELECTION (1 WEEK)

- 1) **SALES:**
  - a. SUBMITS COMPLETED/PARTIALLY COMPLETED SITE SELECTION SURVEY WITH CUSTOMER INFORMATION
  - b. PROVIDES A SCALED DRAWING OR A DIMENSIONED SKETCH
  - c. REQUESTS EVALUATION ASSISTANCE FROM SITE PLANNING
  - d. PROVIDES AN OPPORTUNITY NUMBER
- 2) **SITE PLANNING:**
  - a. RECORDS DATA AND ASSIGNS OPPORTUNITY TO A REGIONAL SITE PLANNER
  - b. PROVIDES STANDARD DETAILS TO CUSTOMER AS REQUIRED
  - c. PREPARES A PRELIMINARY EQUIPMENT LAYOUT WITH CLEARLY IDENTIFIED ISO-CENTER
  - d. REVIEWS PRELIMINARY DATA FOR SITING CONCERNS
  - e. SCHEDULES A SITE VISIT WITH THE CUSTOMER AND SALESPERSON, INCLUDING SITE TESTING

### B) SITE EVALUATION (1 WEEK)

- 1) **SITE PLANNING:**
  - a. VISITS SITE AND VERIFIES PREVIOUSLY SUBMITTED INFORMATION
  - b. PREPARES A SITE EVALUATION REPORT WITH RECOMMENDATIONS AND FORWARDS IT TO THE SALESPERSON TO PRESENT TO THE CUSTOMER
  - c. CONFIRMS SUITE DIMENSIONS, MODIFY AS NEEDED
  - d. ASSISTS CUSTOMER / CONTRACTOR IN IDENTIFYING A 600 SF AREA TO BE DESIGNATED FOR CLEAN AND SECURE STORAGE OF COVERS AND ANCILLARY EQUIPMENT AT TIME OF DELIVERY
  - e. COORDINATES AND COMPLETES SITE TESTING
  - f. DISCUSSES CONCERNS WITH THE CUSTOMER (AND DESIGN TEAM / CONTRACTOR IF AVAILABLE)
  - g. ASSIST IN IDENTIFYING POSSIBLE ALTERNATE LOCATIONS IF APPROPRIATE
  - h. REVIEW STANDARD DETAILS WITH CUSTOMER (AND DESIGN TEAM / CONTRACTOR IF AVAILABLE)

#### NOTE:

- 1) **ALL TESTING MUST BE DONE DURING PERIODS OF TYPICAL ACTIVITY IN THE SURROUNDING AREA**
- 2) **ACTIVITY IN THE IMMEDIATE AREA OF THE PROBE MUST BE RESTRICTED DURING THE TEST**
- 3) **THERE ARE LIMITATIONS TO THE AMOUNT OF INTERFERENCE THAT THE OASIS MARK II SYSTEM CAN CORRECT FOR. IF THE INTERFERENCE(S) EXCEED CORRECTABLE LEVELS, THE FOLLOWING MAY BE REQUIRED.**
  - a. DETERMINE AND ELIMINATE SOURCE OF INTERFERENCE
  - b. INSTALL MAGNETIC SHIELDING
  - c. SELECT NEW SITE

### C) INFORMATION CONSOLIDATION (1 WEEK)

- 1) **SITE PLANNING:**
  - a. REVISES PRELIMINARY DRAWING/SKETCH AS NEEDED
  - b. SUBMITS TEST RESULTS AND CONFIRMED SITE DATA TO TECH SUPPORT FOR REVIEW
  - c. PREPARES SITE EVALUATION REPORT AND VIA TELEPHONE, DISCUSS ACTIONS AND RECOMMENDATIONS WITH SALESPERSON

## CUSTOMER REVIEW AND PRELIMINARY PLANS (VARIES)

### A) SITE EVALUATION REPORT

- 1) **SALES:**
  - a. REVIEWS THE REPORT WITH THE CUSTOMER (SITE PLANNING IS AVAILABLE VIA TELEPHONE IF NECESSARY)
  - b. REVIEWS REVISED LAYOUT WITH THE CUSTOMER

### B) SITE DRAWING AND DETAILS

- 1) **SITE PLANNING:**
  - a. PREPARES A FINAL LAYOUT AND FOLLOWS UP ON THE SITE CONCERNS. THAT MAY INCLUDE:
    - 1. REQUESTING A MAGNETIC SHIELD DESIGN FOR FRINGE FIELD CONTROL
    - 2. REQUESTING A MAGNETIC SHIELD DESIGN TO CONTROL INTERFERENCE
    - 3. PROVIDING THE CUSTOMER WITH A CONTACT TO ADDRESS VIBRATION ISSUES

### C) ON SITE MEETING (SCHEDULED BY CUSTOMER)

- 1) **SALES AND SITE PLANNING:**
  - a. MEET WITH THE CUSTOMER AND THEIR DESIGN TEAM TO:
    - 1. REVIEW AND FINALIZE THE EQUIPMENT LAYOUT
    - 2. REVIEW STANDARD DETAILS
    - 3. ADDRESS OUTSTANDING QUESTIONS OR CONCERNS
    - 4. IDENTIFY PRELIMINARY DELIVERY SCHEDULE

## PRE-CONSTRUCTION (VARIES)

### A) ARCHITECT PREPARES CONSTRUCTION DRAWINGS

- 1. INPUT MUST BE COORDINATED WITH VARIOUS CONSULTANTS
  - a. HMSA
  - b. ENGINEERS (STRUCTURAL, HVAC, ELECTRICAL)
  - c. RF SHIELDING VENDOR (REQUIREMENTS VARY WITH DIFFERENT VENDORS)

### B) HMSA REVIEW OF ARCHITECTURAL DRAWINGS

- 1. IT IS HIGHLY RECOMMENDED THE ARCHITECT SEND BID OR PERMIT DOCUMENTS TO HMSA SITE PLANNING FOR GENERAL REVIEW TO HELP AVOID ERRORS OR OMISSIONS PRIOR TO CONSTRUCTION

**NOTE: THIS IS A REVIEW AND NOT AN APPROVAL. HMSA ACCEPTS NO LIABILITY FOR ERRORS OR OMISSIONS. IT IS THE RESPONSIBILITY OF THE CUSTOMER AND THEIR DESIGN TEAM TO PREPARE THE SUITE TO MEET THE GUIDELINES PRESENTED IN THIS DOCUMENT**

## PRE-CONSTRUCTION (CON'T)

### C) SELECTION OF CONTRACTOR

- 1. THE DRAWINGS GO OUT TO BID AND A GENERAL CONTRACTOR WILL BE CHOSEN BY THE CUSTOMER. THE CUSTOMER/ARCHITECT MUST PROVIDE SITE PLANNING WITH A CONTACT AND TELEPHONE NUMBER. THE ARCHITECT OR GENERAL CONTRACTOR IS RESPONSIBLE FOR SECURING THE BUILDING PERMITS DURING THIS TIME.

### D) PRE-CONSTRUCTION MEETING (SCHEDULED BY CUSTOMER/ARCHITECT)

- 1. PLANS ARE REVIEWED AND OUTSTANDING QUESTIONS ARE ADDRESSED. A CONSTRUCTION SCHEDULE SHOULD BE AGREED UPON AT THIS MEETING AND A DELIVERY DATE IDENTIFIED. THE HMSA FIELD SERVICE ENGINEER WILL ALSO BE INTRODUCED TO THE CUSTOMER AND CONTRACTOR AT THIS MEETING.

## SITE CONSTRUCTION (6-8 WEEKS)

### A) ON SITE EVALUATION

- 1) **FIELD SERVICE ENGINEER:**
  - a. VISITS SITE ON A ROUTINE BASIS TO VERIFY PROGRESS
  - b. ADVISES SITE PLANNING OF SITE STATUS AND ANY CONCERNS
- 2) **SITE PLANNING:**
  - a. ADDRESSES CONCERNS WITH ARCHITECT OR CONTRACTOR AS NEEDED
  - b. COORDINATE AND SCHEDULE DELIVERY OF CHILLER IF PROVIDED BY HMSA

### B) PRIOR TO DELIVERY

- 1. CUSTOMER CONTRACTED RIGGER PERFORMS ON-SITE INSPECTION 1-4 WEEKS PRIOR TO THE DELIVERY TO VERIFY OFF LOAD CONDITIONS.
- 2. CUSTOMER/CONTRACTOR INSTALLS R1200 CHILLER UNIT, COMPLETES INSTALLATION CHECKLIST AND RETURNS IT TO HASKRIS (SEE PG 11) AND SCHEDULES CHILLER STARTUP PRIOR TO DELIVERY DATE.
- 3. FINISH FLOORING MUST BE COMPLETELY INSTALLED. IT IS THE CUSTOMER/CONTRACTOR'S RESPONSIBILITY TO PROVIDE A PROTECTIVE COVERING (MASONITE IS RECOMMENDED) DURING THE INSTALLATION. IF FLOORING IS NOT INSTALLED PRIOR TO DELIVERY, IT MAY NOT BE LAID UNTIL AFTER THE OASIS MARK II INSTALLATION IS COMPLETE. FLOORING INSTALLED AFTER THE INSTALLATION, MUST BE TRIMMED AROUND THE BOTTOM OF THE SYSTEM COVERS AND MAY NOT BE SLID UNDER THEM. THE MAGNET WILL BE LIVE AND AT FIELD AT THAT TIME. NON FERROUS TOOLS WILL BE REQUIRED.
- 4. THE CUSTOMER OR THEIR AUTHORIZED REPRESENTATIVE IS RESPONSIBLE FOR ENSURING THE PRE-DELIVERY CHECKLIST IS FILLED OUT AND ALL ITEMS ARE EITHER COMPLETED OR SCHEDULED FOR COMPLETION PRIOR TO DELIVERY OF THE SYSTEM. THE CHECKLIST MUST BE SUBMITTED TO HMSA 14 DAYS PRIOR TO THE REQUESTED SYSTEM DELIVERY DATE. IF THE CHECKLIST ITEMS ARE NOT COMPLETED AS REQUIRED, THE DELIVERY MAY HAVE TO BE DELAYED.

**NOTE: THE OASIS MARK II SYSTEM IS DELIVERED PRE-FILLED WITH CRYOGENS. THIS REQUIRES THAT THE CHILLER AND ELECTRICAL POWER BE OPERATIONAL AND READY FOR CONNECTION TO THE OASIS MARK II SYSTEM TO AVOID A POTENTIAL AND COSTLY BOIL-OFF.**

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#### TYPICAL PLANNING PROCESS

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TYPICAL PLANNING PROCESS (CON'T)

SYSTEM DELIVERY AND INSTALLATION (3 WEEKS)

A) SYSTEM DELIVERY (1.5 WEEKS)

- 1) DAY 1
- a. RIGGER DELIVERS AND SETS ALL MAJOR COMPONENTS. ANCILLARY COMPONENTS PLACED IN A SECURE STORAGE AREA DESIGNATED AND PROVIDED BY CUSTOMER (600 SF OF STORAGE AREA REQUIRED)

b. SYSTEM IS INVENTORIED BY RIGGER AND HMSA PERSONNEL

c. RIGGER DISPOSES OF CRATING AND PACKING MATERIAL IN CUSTOMER PROVIDED DUMPSTER (40 YARD REQUIRED. MUST BE EMPTIED MORNING OF DAY AFTER DELIVERY FOR ADDITIONAL DEBRIS DISPOSAL.)

d. RF VENDOR CLOSES DELIVERY OPENING IN SHIELD AND MOUNTS FILTER PANELS (TYPICALLY MID/LATE AFTERNOON). PERFORMS FINAL TEST TO VERIFY SHIELD INTEGRITY AND PERFORMANCE.

e. BUILDING CONTRACTOR MAY BEGIN CLOSING MAGNET DELIVERY OPENING (END OF DAY)

- 2) DAY 2
- a. BUILDING CONTRACTOR CLOSES AND SEALS MAGNET DELIVERY OPENING AND RF SHIELD

b. ELECTRICIAN ON SITE TO CONNECT BUILDING POWER TO RFIP CABINET IN EQUIPMENT ROOM

c. ELECTRICIAN INSTALLS ANY REMAINING WIREWAYS IN SCAN ROOM

d. SYSTEM CABLING BEGINS IN EQUIPMENT AND CONTROL ROOM

e. RUN OVERHEAD CABLES AND HELIUM LINES IN SCAN ROOM

f. START COLD HEAD OPERATION (FUNCTIONAL USE OF CHILLER)

- 3) DAY 3
- a. COMPLETE EQUIPMENT ROOM CABLING

b. BEGIN SCAN ROOM CABLING

c. BUILDING CONTRACTOR COMPLETES REMAINING SCAN ROOM CLOSURE ITEMS

- 4) DAY 4
- a. COMPLETE SCAN ROOM AND CONTROL ROOM CABLING

b. TOP OFF HELIUM IN MAGNET IN PREPARATION FOR RAMPING

c. NO FURTHER BUILDING CONTRACTOR WORK MAY BE PERFORMED ONCE MAGNET RAMP-UP BEGINS

- 5) DAY 5
- a. BEGIN RAMP-UP (MAGNETIC FIELD NOW ACTIVE)

b. BEGIN MAGNET SHIM

- 6) DAY 6
- a. COMPLETE MAGNET SHIM

b. INSTALL GRADIENTS

- 7) DAY 7
- a. INSTALL SYSTEM (GANTRY) COVERS

- 8) DAY 8
- a. TURN OASIS MARK II SYSTEM OVER TO TECHNICAL TEAM

B) TECHNICAL INSTALLATION (1.5 WEEKS)

- 1) COIL TUNING
- 2) SOFTWARE INSTALLATION AND TESTING
- 3) IMAGE QUALITY TESTING

APPLICATIONS TRAINING (2 WEEKS)

- 1) AN HMSA APPLICATIONS SPECIALIST WILL WORK WITH THE SITE'S TECHNOLOGISTS TO FAMILIARIZE THEM WITH THE OPERATION AND PROTOCOLS OF THE OASIS SYSTEM. TWO WEEKS ARE SCHEDULED FOR INITIAL APPLICATIONS TRAINING WHICH INCLUDES A LIMITED SCHEDULE OF SCANNING VOLUNTEERS AND PATIENTS.

TYPICAL PROJECT SCHEDULE

TYPICAL PROJECT SCHEDULE																														
ACTIVITY	MONTH1				MONTH2				MONTH3					MONTH4				MONTH5				MONTH6					MONTH7			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W5	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W5	W1	W2	W3	W4
SITE SELECTION AND EVALUATION BY SALES																														
PRELIMINARY DRAWING BY SITE PLANNING																														
SITE TESTING BY HMSA																														
TEST EVALUATION BY HMSA																														
SALES REVIEW OF EVALUATION WITH CUSTOMER																														
HMSA PREPARES DETAIL SITE SPECIFIC DRAWINGS																														
ON SITE MEETING W/ KEY CUSTOMER PERSONNEL																														
CUSTOMER’S ARCHITECT PREPARES CONSTRUCTION DRAWINGS																														
HMSA REVIEW OF CONSTRUCTION DOCUMENTS																														
OBTAIN AND AWARD CONSTRUCTION BID (BY CUSTOMER)																														
SUBMISSION OF DRAWINGS TO CITY FOR PERMITS (VARIES)																														
SITE CONSTRUCTION WORK (VARIES)																														
DELIVERY CHECKLIST COMPLETED AND E-MAILED TO HMSA																														
OASIS MARK II DELIVERY, ASSEMBLY AND RAMP-UP																														
TECHNICAL INSTALLATION																														
APPLICATIONS																														

NOTE:

- 1) SITE PLANNING IS AVAILABLE FOR TELEPHONE CONSULTATION AT ALL TIMES THROUGHOUT THIS PROCESS.
- 2) STANDARD DETAILS WILL BE PROVIDED AT ANY TIME AND ARE AVAILABLE AT [WWW.HITACHIMED.COM](#).  
CONTACT THE SITE PLANNING DEPARTMENT FOR CURRENT ACCESS CODES.
- 3) THE ABOVE ESTIMATED TIME FRAME SHOULD BE AMPLE TIME TO COMPLETE THE PROJECT AND ENSURE A TROUBLE FREE DELIVERY AND INSTALLATION. THIS TIME FRAME WILL VARY FROM SITE TO SITE. THIS IS AN ESTIMATE ONLY. HMSA WILL NOT BE HELD ACCOUNTABLE FOR ANY CONSTRUCTION DELAYS DUE TO CONTRACTORS NOT SUPPLIED BY HMSA. PLEASE NOTE THAT SOME STEPS CAN OCCUR CONCURRENTLY AS INDICATED ON THE GANT CHART ABOVE.

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TYPICAL PLANNING PROCESS (CONT)

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# GENERAL SITING CRITERIA

## SITE SELECTION

- A. COORDINATION WITH THE ARCHITECT, ENGINEER, CONTRACTOR AND HMSA SITE PLANNING DEPARTMENT SHOULD BEGIN EARLY IN THE SITE PLANNING PROCESS.
- B. FOR PROPER EVALUATION OF A SITE, A SET OF DRAWINGS OF THE PROPOSED OASIS MARK II LOCATION AND THE SURROUNDING AREA, ACCOMPANIED BY A COMPLETED SITE SELECTION SURVEY AND CONTACT LIST, SHOULD BE SENT TO HMSA SITE PLANNING FOR REVIEW.
- C. THE FOLLOWING ITEMS SHOULD BE DISCUSSED WITH THE HMSA SITE PLANNING DEPARTMENT FOR A THOROUGH EVALUATION OF THE PROPOSED LOCATION.

1. LOCATION OF ANY MEDICAL IMAGING EQUIPMENT (CT, X-RAY, MAMMOGRAPHY, ULTRASOUND, NUCLEAR EQUIPMENT) OR COMPUTER EQUIPMENT IMMEDIATELY ADJACENT TO OR ABOVE / BELOW THE PROPOSED MRI SCAN ROOM.
2. LOCATION OF FRINGE FIELDS, PARTICULARLY THE 1.0 GAUSS FIELD OF ANY EXISTING OR FUTURE MRI SYSTEMS.
3. LOCATION OF ANY LARGE FERROUS MATERIAL (STRUCTURAL STEEL BEAMS, PIPES, DOORS, COLUMNS, ETC.) WITHIN 10 FEET IN ALL DIRECTIONS OF THE PROPOSED MAGNET ISOCENTER.
4. LOCATION OF EXISTING OR FUTURE AIR CONDITIONING UNITS, AIR HANDLERS, CHILLERS, CONDENSERS, OR ELECTRICAL SERVICE (50 AMPS OR HIGHER) WITHIN 20 FEET OF PROPOSED MAGNET ISOCENTER.
5. LOCATION OF ELECTRICAL SERVICE (200 AMP OR HIGHER), ANY ELECTRICAL OR MECHANICAL ROOMS, OR ANY ELEVATORS WITHIN 40 FEET OF THE PROPOSED MAGNET ISOCENTER.
6. LOCATION OF ANY HIGH VOLTAGE LINES IN THE AREA LESS THAN 200 FEET FROM PROPOSED MAGNET ISOCENTER.
7. LOCATION OF ANY VEHICULAR TRAFFIC, INCLUDING PARKING, WITHIN 40 LINEAR FEET OF THE PROPOSED MAGNET ISO-CENTER (NO MOVING STEEL WITHIN THE 1 GAUSS FIELD)
8. LOCATION OF ANY LARGE MOVING FERROUS OBJECTS (TRAINS, SUBWAYS, LOADING DOCK, ETC.) IN THE AREA.
9. LOCATION OF ANY ITEMS THAT COULD POTENTIALLY CAUSE VIBRATION AT THE SITE TO EXCEED THE OASIS MARK II VIBRATION SPECIFICATION. A VIBRATION TEST IS REQUIRED TO VERIFY SITE CONDITIONS.
10. THE ABILITY OF THE SELECTED LOCATION TO MEET THE VIBRATION AND INTERFERENCE REQUIREMENTS FOR AN MRI SUITE INTO THE FORESEEABLE FUTURE (TYPICALLY 8-10 YEARS)
11. SITE MUST MEET HMSA MAGNETIC FLUCTUATION SPECIFICATIONS FOR BOTH AC AND DC INTERFERENCE

## PLANNING

- A. TO MAXIMIZE THE PERFORMANCE OF THE OASIS MRI SYSTEM, CAREFUL PLANNING SHOULD TAKE PLACE FROM THE INITIAL SITE SELECTION STAGE, THROUGH DESIGN AND CONSTRUCTION, AND THROUGHOUT THE FINAL DELIVERY AND INSTALLATION PROCESS. PROPER PLANNING WILL HELP TO ENSURE HIGH SYSTEM PERFORMANCE STANDARDS, COMFORTABLE PATIENT HANDLING, AN EFFICIENT WORKING ENVIRONMENT, AND SUFFICIENT STORAGE SPACE. IT IS THE RESPONSIBILITY OF THE CUSTOMER'S DESIGN PROFESSIONALS TO ENSURE THAT THE FACILITY WILL COMPLY WITH BOTH RECOMMENDED AND GOVERNING REGULATIONS IN REGARD TO PATIENT PRIVACY AND SAFETY ISSUES.

- B. IN GENERAL, THE FOLLOWING SHOULD BE CONSIDERED WHEN DESIGNING AN MRI SUITE:

1. THE 5 GAUSS FIELD MUST BE RESTRICTED FROM PUBLIC ACCESS. ACCESS RESTRICTIONS AND SIGNAGE MUST BE IN PLACE AS REQUIRED BY FDA REGULATIONS.
2. THE MRI SCAN ROOM SHOULD BE LOCATED NEAR THE EXTERIOR OF THE BUILDING WHEN POSSIBLE TO FACILITATE DELIVERY. REFER TO THE RIGGING AND DELIVERY PAGE FOR ADDITIONAL DETAILS.
3. A MINIMUM 3'-6"W X 7'-0"H FLAT ACCESS PATH TO THE OASIS MARK II SUITE MUST BE PROVIDED FOR THE DELIVERY OF CRYOGEN DEWARs. THIS PATH WILL BE USED THROUGHOUT THE LIFE OF THE SYSTEM AS PART OF ITS ROUTINE MAINTENANCE.
4. ALL DOORS MUST BE A MINIMUM OF 36" WIDE (34 1/2" CLEAR OPENING STOP TO STOP). THE DOOR MUST BE ABLE TO BE OPENED IN SUCH A MANNER THAT A STRAIGHT PATHWAY THROUGH THE DOOR FRAME IS NOT OBSTRUCTED IN ANY WAY BY THE DOOR'S HANDLE, PUSH BAR, HINGES, OTHER ACCESSORIES OR THE DOOR SLAB ITSELF.
5. FULL HELIUM DEWARs AND OTHER SERVICE EQUIPMENT (RAMP POWER SUPPLY, GRADIENT LOADER) CAN WEIGH UP TO 800 LBS. DEWARs AND OTHER SIMILARLY HEAVY COMPONENTS WILL OCCASIONALLY BE REQUIRED TO SERVICE THE SYSTEM OVER ITS LIFETIME. CONSIDERATION SHOULD BE GIVEN TO SELECTING FLOORING MATERIAL IN THE SCAN ROOM AND ALONG ALL ACCESS PATHS THAT WILL NOT BE AFFECTED BY THE POINT LOADS GENERATED BY SMALL WHEELS ON SUCH COMPONENTS BEING ROLLED ACROSS IT.
6. CONVENIENCE OUTLETS MUST BE LOCATED IN THE MRI SCAN ROOM AND THROUGHOUT THE SUITE FOR SERVICE.
7. IT IS THE CUSTOMER'S RESPONSIBILITY TO MEET THE HMSA SPECIFICATIONS REGARDING THE ELECTRICAL SERVICE TO THE SYSTEM. IN REVIEWING POWER FOR THE SUITE, CONSIDERATION SHOULD BE GIVEN TO THE OPERATION OF THE SUPPORT FUNCTIONS. REFER TO THE ELECTRICAL SECTION OF THIS GUIDE FOR ADDITIONAL SPECIFICATIONS.
8. THE ROOMS MUST BE SUFFICIENTLY SIZED TO ACCOMMODATE WORK ACTIVITIES AND SERVICE ACCESS FOR ALL EQUIPMENT.
9. ALTHOUGH IT MAY BE LOCATED REMOTELY, A LASER IMAGER SHOULD BE LOCATED NEAR THE OPERATOR FOR CONVENIENCE. THE LASER IMAGER IS CUSTOMER PROVIDED AND MUST BE ACCESSIBLE VIA THEIR NETWORK.

## OPERATIONS

- A. STRONG VISUAL CONTACT BETWEEN THE OPERATOR AND THE PATIENT MUST BE MAINTAINED.
- B. SUFFICIENT AND CONVENIENT WORK SURFACES AND STORAGE MUST BE INCLUDED IN AND NEAR THE MRI SCAN AND CONTROL ROOMS. VIEW BOXES SHOULD BE CONSIDERED IN THE CONTROL ROOM.
- C. A SINK SHOULD BE LOCATED NEARBY, BUT IS NOT RECOMMENDED IN THE MRI SCAN ROOM UNLESS REQUIRED BY CODE. SINKS PLACED IN THE MRI SCAN ROOM MUST BE COORDINATED WITH THE RF VENDOR.
- D. THE ENVIRONMENT WITHIN THE SCAN SUITE MUST BE MAINTAINED 24 HOURS PER DAY, 7 DAYS PER WEEK. REFER TO THE ENVIRONMENTAL SECTION OF THIS GUIDE FOR SPECIFICATIONS REGARDING ALLOWABLE RANGES FOR TEMPERATURE AND HUMIDITY.

## PATIENT COMFORT AND HANDLING

- A. TO FACILITATE PATIENT HANDLING AND PROVIDE FOR PATIENT SAFETY, THE FOLLOWING SHOULD BE CONSIDERED IN THE DESIGN OF THE MRI SUITE:
1. THE PATH FOR PATIENT ACCESS INTO THE MRI SCAN ROOM SHOULD ACCOMMODATE A STRETCHER OR GURNEY.
  2. THERE SHOULD BE SUFFICIENT AREA AROUND THE PATIENT TABLE IN THE MRI SCAN ROOM FOR COMFORTABLE PATIENT HANDLING.
  3. ANCILLARY FUNCTIONS (DRESSING ROOMS, TOILETS, HOLDING AREAS, PREP ROOMS, ETC.) SHOULD BE LOCATED NEAR THE MRI SCAN ROOM.
  4. THE OPERATOR SHOULD HAVE DIRECT ACCESS TO THE PATIENT.

## FLOOR SPACE

- A. THE HMSA OASIS MARK II SYSTEM HAS BEEN SPECIFICALLY DESIGNED TO BE SITED WITHIN AN EXISTING FACILITY. THE STANDARD SYSTEM (EXCLUDING THE CHILLER) CAN BE EASILY SITED WITHIN THE 702 SQUARE FOOT AREA SHOWN.

## MAGNETIC FIELDS

- A. AS WITH ALL MRI SYSTEMS, A MAJOR CONCERN IN PLANNING IS ACCOMMODATING THE SYSTEM'S MAGNETIC FIELD. THIS FIELD WILL AFFECT MAGNETICALLY SENSITIVE INSTRUMENTS AND CAN BE AFFECTED BY FERROMAGNETIC MATERIALS IN THE SURROUNDING AREA. THE SIZE OF THE FRINGE FIELD IS DETERMINED BY THE STRENGTH AND TYPE OF THE MAGNET.
- B. MAGNETIC SHIELDING CAN BE DESIGNED TO REDUCE THE DISTANCE THE GAUSS FIELDS EXTEND FROM THE OASIS MARK II GANTRY OR TO DAMPEN FLUCTUATIONS CREATED BY THE ENVIRONMENT SURROUNDING THE SCAN ROOM. HMSA WILL PROVIDE A DESIGN FOR THE MAGNETIC SHIELDING IF IT IS NECESSARY AND FORWARD THE SPECIFICATIONS TO THE CUSTOMER'S RF SHIELDING VENDOR. CONTACT HMSA SITE PLANNING DEPARTMENT FOR FURTHER INFORMATION.

## COMMUNICATIONS

- A. TELEPHONES WITH ACCESS TO AN OUTSIDE LINE MUST BE LOCATED IN THE EQUIPMENT AND CONTROL ROOMS TO FACILITATE APPLICATIONS / SERVICE SUPPORT.
- B. TELEPHONE AND NETWORK CONNECTIONS ARE NOT PERMITTED IN THE SCAN ROOM
- C. A DATA PORT WITH A BROAD BAND CONNECTION TO THE INTERNET MUST BE LOCATED AT THE OPERATOR CONSOLE AREA. THIS CONNECTION WILL BE USED FOR REMOTE DIAGNOSTICS AND MONITORING OF THE OASIS MARK II SYSTEM ( SEE HITACHI SENTINEL REMOTE, BELOW). THE CONNECTION MAY BE THROUGH THE SITE'S NETWORK, ASSURING THE OASIS MARK II IS ADDRESSABLE VIA THE INTERNET.
- D. IN ORDER TO MAINTAIN A TIMELY INSTALLATION SCHEDULE, **THE FOLLOWING INFORMATION MUST BE SENT TO: [InstallChecklistGroup@hitachimed.com](mailto:InstallChecklistGroup@hitachimed.com) PRIOR TO THE DELIVERY OF THE OASIS MARK II SYSTEM.**

1. MANUFACTURER AND SOFTWARE REVISION LEVEL FOR THE PACS SYSTEM
2. MANUFACTURER, MODEL AND SOFTWARE REVISION LEVEL FOR THE DICOM PRINTER
3. MANUFACTURER AND SOFTWARE REVISION LEVEL FOR RIS/MODALITY WORKLIST SERVER
4. SITE ADDRESS
5. NAME AND TELEPHONE NUMBER FOR THE SITE'S NETWORK ADMINISTRATOR.

## HITACHI SENTINEL REMOTE

- A. HITACHI SENTINEL REMOTE IS USED TO MONITOR, ACCESS AND REMOTELY DIAGNOSE THE OASIS MARK II MRI SYSTEM. FOR A COMPLETE AND UP TO DATE DESCRIPTION OF ALL OF THE SENTINEL REMOTES FUNCTIONS AND FEATURES, CONTACT A HITACHI SALES REPRESENTATIVE.
1. **SECURITY** - SENTINEL SERVERS ARE INSTALLED AT EXCLUSIVE DATA CENTERS THAT ARE MONITORED 24/7 BY SECURITY CAMERAS AND REQUIRE BIOMETRIC IDENTIFICATION FOR ENTRY.
    - a. COMMUNICATION IS ENCRYPTED USING SSL (SECURE SOCKET LAYERING) TO PROVIDE SECURITY
    - b. POLLING BETWEEN THE MRI SYSTEM AND THE SENTINEL SERVER IS PERFORMED REGULARLY. ONLY DEVICES THAT COMPLETE TWO WAY AUTHENTICATION ARE ABLE TO COMMUNICATE WITH THE OASIS MARK II SYSTEM.
    - c. THE OASIS MARK II SYSTEM WILL ATTEMPT TO AUTHENTICATE ONLY WHEN IT HAS INITIATED THE COMMUNICATION.
  2. **REQUIREMENTS** - THE FOLLOWING CUSTOMER SUPPLIED AND INSTALLED ITEMS ARE REQUIRED TO INTERFACE THE OASIS MARK II MRI SYSTEM WITH SENTINEL REMOTE
    - a. INTERNET: T1 LINE OR FASTER
    - b. ETHERNET CABLE CONNECTION: CATEGORY 5, 100Base-TX OR CATEGORY 6, 1000Base-T
    - c. FIREWALL: THE FIREWALL ROUTER MUST BE CAPABLE OF CONFIGURING NETWORK ADDRESSES AND PORTS TO SPECIFIC IP ADDRESSES FOR INBOUND AND OUTBOUND INFORMATION EXCHANGE.
      - i. ONLY DEVICES THAT COMPLETE TWO WAY AUTHENTICATION ARE ABLE TO COMMUNICATE WITH THE OASIS SYSTEM
      - ii. THE OASIS MARK II MRI SYSTEM IS ONLY PERMITTED TO ESTABLISH EXTERNAL SESSIONS WITH THE SENTINEL SERVER
      - iii. ONLY HTTPS AND HTTP PROTOCOLS ARE PERMITTED
      - iv. NETSCREEN-5GT IS THE RECOMMENDED FIREWALL (OR SIMILAR)

### HITACHI MEDICAL SYSTEMS AMERICA

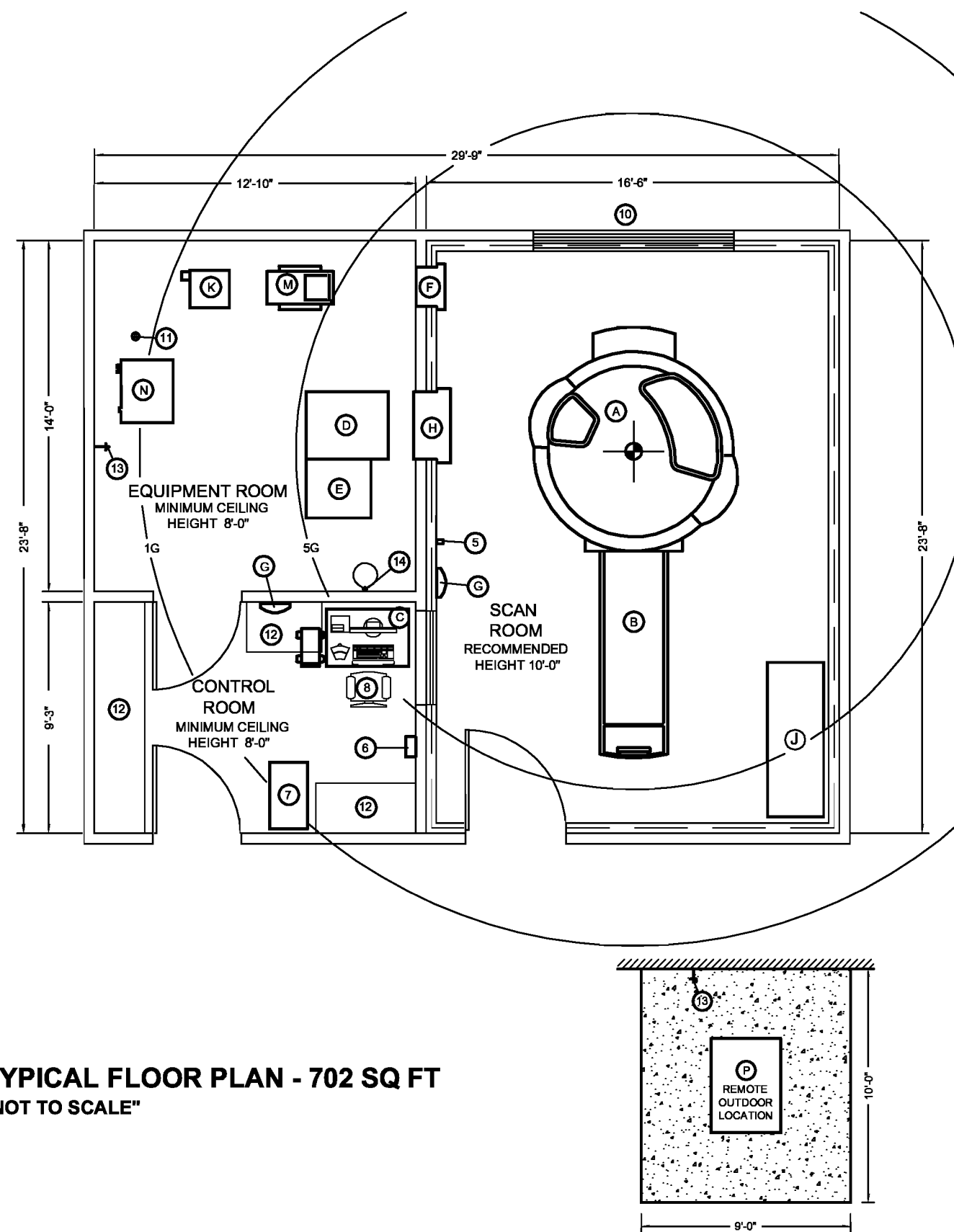
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### GENERAL SITING CRITERIA

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OASIS MARK II STANDARD DETAILS PAGE 03 OF 27

# REPRESENTATIVE SUITE LAYOUTS



**TYPICAL FLOOR PLAN - 702 SQ FT**  
"NOT TO SCALE"

## LEGEND

- RF SHIELD. ARCHITECT TO VERIFY WALL CONSTRUCTION WITH RF VENDOR. (TYPICAL 5" RF WALL THICKNESS REFLECTED.)
- RF VIEW WINDOW, TYPICALLY 4'w X 3'h (TYP 36" AFF)
- EQUIPMENT ACCESS PANEL FOR DELIVERY OF THE SYSTEM. MINIMUM 8'-6"w X 8'-6"h.
- JUNCTION BOX FOR AC POWER.
- 480V, 30A, 3PH, 4 WIRE, NEMA L16-30R FOR USE WITH RAMP-UP TOOL
- 120V, 20 AMP CONVENIENCE OUTLETS, AT LEAST ONE PER WALL REQUIRED FOR SERVICE AND MAINTENANCE.
- PHONE LINES - ONE (1) REQUIRED IN EQUIPMENT ROOM AND ONE (1) REQUIRED IN THE CONTROL ROOM.
- DATA PORT FOR BROAD BAND NETWORK CONNECTION TO A STANDARD 1G BASE-T LINE. MAY BE THROUGH CUSTOMER'S IN-HOUSE NETWORK.
- 6" X 24" ON-WALL WIREWAY WITH REMOVABLE COVER AND THREE (3) DIVIDERS. METAL ONLY. MUST BE NON-FERROMAGNETIC IN SCAN ROOM.
- 6" X 24" ON-FLOOR WIREWAY WITH REMOVABLE COVER AND THREE (3) DIVIDERS. METAL ONLY. MUST BE NON-FERROMAGNETIC IN SCAN ROOM.
- 6" X 3" OVERHEAD CABLE TRAY (WALKER SPMA-A-6-3S OR EQ). MUST BE NON-FERROMAGNETIC.
- MAGNET ISOCENTER

## EQUIPMENT BY HMSA

- (A) OASIS MARK II GANTRY
- (B) PATIENT TABLE
- (C) OPERATOR'S WORKSTATION
- (D) RFIP CABINET
- (E) GCPA CABINET
- (F) MCU FILTER PANEL
- (G) EMERGENCY RUN-DOWN BUTTON (ERDU)
- (H) RFIP FILTER PANEL
- (J) COIL STORAGE CABINET
- (K) HELIUM COMPRESSOR
- (M) SENSE UNIT
- (N) HEAT EXCHANGER
- (P) R1200 OUTDOOR CHILLER

## EQUIPMENT/ACCESSORIES BY OTHERS

- (2) 6" X 24" ON-WALL WIREWAY
- (3) 6" X 24" ON-FLOOR WIREWAY
- (4) A.C.POWER PANEL (SIZED PER CODE)
- (5) OXYGEN PROBE
- (6) OXYGEN MONITOR
- (7) LASER IMAGER
- (8) CHAIR
- (9) 1 3/4" WAVE GUIDES
- (10) DELIVERY ACCESS PANEL
- (11) FLOOR DRAIN
- (12) CASEWORK
- (13) HOSE BIBB
- (14) HELIUM TANK RESTRAINT
- (15) 3 1/2" x 6" OVERHEAD CABLE TRAY

NOTE: - SOME EQUIPMENT/ACCESSORIES BY OTHERS MAY NOT BE SHOWN ON TYPICAL LAYOUTS

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## REPRESENTATIVE SUITE LAYOUTS

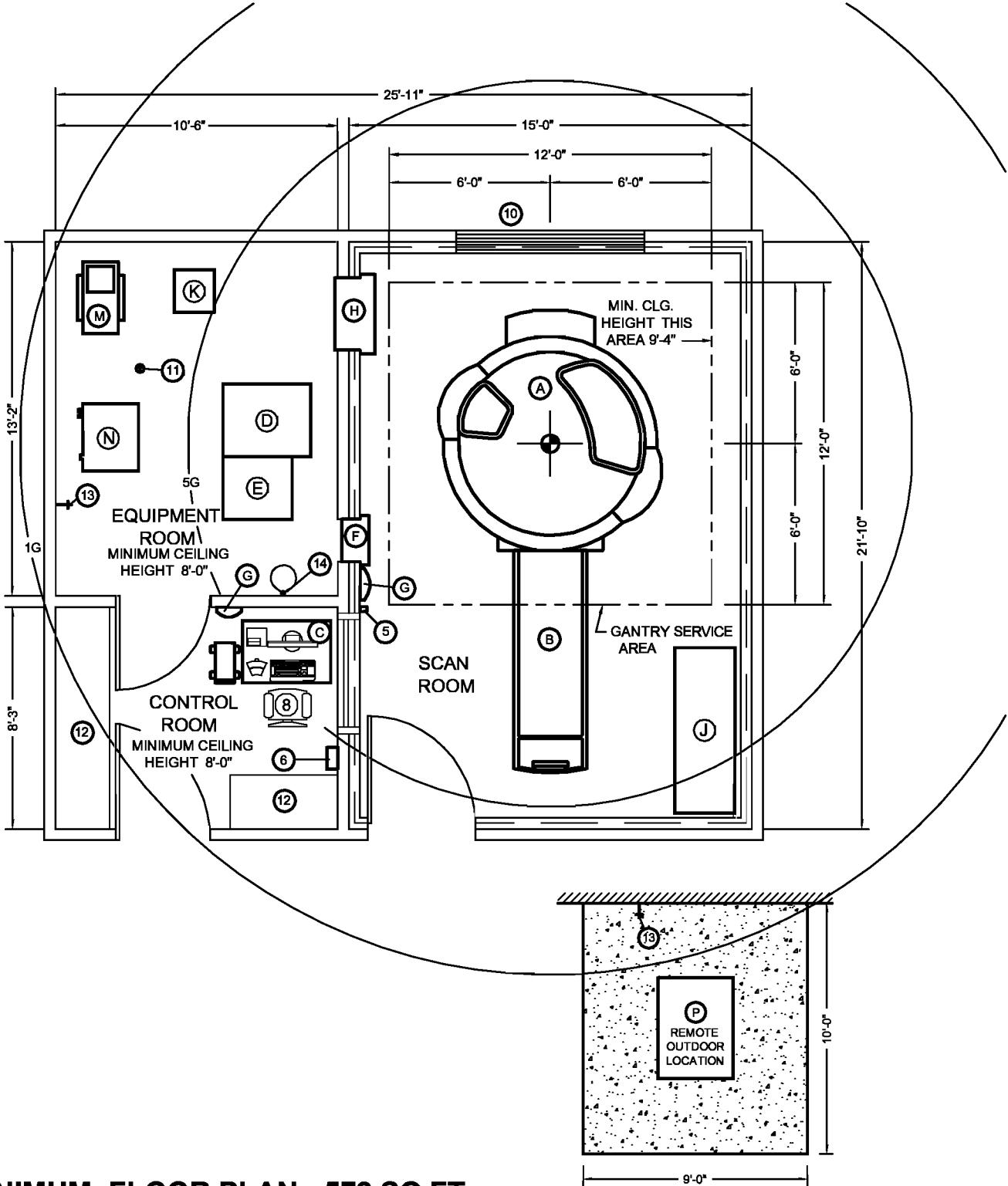
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OASIS MARK II STANDARD DETAILS PAGE 04 OF 27

# REPRESENTATIVE SUITE LAYOUTS

## NOTES

1. 480V, 30A, 3PH, 4 WIRE, NEMA L16-30R RECEPTACLE FOR USE WITH RAMP-UP TOOL TO INITIALIZE MAGNETIC FIELD. OASIS SYSTEM DRAWS ONLY MINIMAL POWER DURING INITIALIZATION OF FIELD. RAMP-UP TOOL LOAD SHOULD NOT BE INCLUDED WHEN CALCULATING TOTAL LOAD ON PANEL FROM WHICH THE OASIS MRI SYSTEM DRAWS ITS POWER.
2. IN ORDER TO ENSURE ADEQUATE CLEARANCE TO INSERT THE TRANSFER LINE INTO THE HELIUM DEWARs, A 2'x2' AREA WITH A MINIMUM CLEAR HEIGHT OF 10'-6" MUST BE PROVIDED EITHER IN, OR IN CLOSE PROXIMITY TO THE SCAN ROOM. THIS CLEARANCE MAY BE OBTAINED VIA THE REMOVAL OF A DROP-IN CEILING TILE. UNDER NORMAL OPERATING CONDITIONS, AFTER THE INITIAL MAGNET FILL, HELIUM REPLENISHMENT OCCURS ONLY ONCE EVERY 12-24 MONTHS.
3. OUTSIDE OF THE GANTRY SERVICE AREA MARKED "MIN. CLG HEIGHT THIS AREA 9'-4\"", THE MINIMUM SCAN ROOM CEILING HEIGHT IS 8'-0". ANY CEILING OR OTHER OBSTRUCTION WITH A HEIGHT OF LESS THAN 8'-6" ALONG THE DELIVERY PATH WILL NEED TO BE REMOVED FOR THE DELIVERY OF THE OASIS GANTRY
4. ALL DOORS IN THE DEWAR AND SERVICE EQUIPMENT DELIVERY PATH MUST BE A MINIMUM OF 36" WIDE (34 1/2" CLEAR OPENING STOP TO STOP). THE DOORS MUST BE ABLE TO OPEN IN SUCH A MANNER THAT A STRAIGHT PATHWAY THROUGH THE DOOR FRAME IS NOT OBSTRUCTED IN ANY WAY BY THE HANDLE, PUSH BAR, HINGES, OTHER ACCESSORIES OR THE DOOR SLAB ITSELF.
5. A CLEAN AND SECURE STORAGE AREA OF APPROXIMATELY 600 SF (20' X 30') IS REQUIRED FOR SYSTEM COVERS AND ANCILLARY EQUIPMENT AT THE TIME OF DELIVERY. THIS AREA SHOULD BE NEAR AND HAVE CONVENIENT ACCESS FROM THE OASIS SUITE. THIS STORAGE AREA IS TYPICALLY EMPTIED OF HMSA MATERIALS BY THE END OF THE SECOND WEEK OF THE SYSTEM INSTALLATION. ADDITIONALLY, SECURE STORAGE, EITHER INDOOR OR OUTDOOR, WILL BE NEEDED FOR UP TO SIX (6) HELIUM DEWARs DURING THE FIRST TWO WEEKS AFTER DELIVERY. A LEVEL ACCESS PATH FROM THIS STORAGE AREA TO THE SCAN ROOM IS REQUIRED.
6. CUSTOMER'S ARCHITECT IS RESPONSIBLE FOR VERIFYING ALL POWER AND HVAC SPECIFICATIONS FOR EQUIPMENT NOT SUPPLIED BY HMSA.
7. THIS DRAWING IS NOT FOR CONSTRUCTION PURPOSES. CUSTOMER IS RESPONSIBLE FOR HIRING QUALIFIED DESIGN PROFESSIONALS TO PREPARE CONSTRUCTION DOCUMENTS. CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS.
8. HMSA RESERVES THE RIGHT TO HOLD THE APPROVAL OF A SITE PENDING AN ON-SITE REVIEW AND APPROPRIATE QUALIFICATION TESTING BY HMSA PERSONNEL.
9. CONSTRUCTION DRAWINGS ARE TO BE SUBMITTED TO THE HMSA SITE PLANNING DEPARTMENT FOR REVIEW PRIOR TO CONSTRUCTION.
10. THE LAYOUTS ON THESE PAGES ARE REPRESENTATIVE OF A TYPICAL AND MINIMUM SIZE OASIS SUITE. FINAL SUITE CONFIGURATION IS DEPENDENT ON PHYSICAL SITE CONDITIONS AND MAY VARY FROM THOSE SHOWN. CONTACT THE SITE PLANNING DEPARTMENT AT 800-800-3106 FOR ASSISTANCE.
11. THESE DRAWINGS ARE THE PROPERTY OF HITACHI MEDICAL SYSTEMS AMERICA, INC. (HMSA) AND ARE NOT FOR CONSTRUCTION PURPOSES. THE DRAWINGS IN THESE STANDARD DETAILS ARE TO BE USED BY THE CUSTOMER'S DESIGN PROFESSIONALS TO PREPARE APPROPRIATE CONSTRUCTION DOCUMENTS. HMSA RESERVES THE RIGHT TO REFUSE TO INSTALL ANY OR ALL EQUIPMENT WHEN THE ROOM PREPARATION DOES NOT MEET SPECIFICATIONS. THE CURRENT STANDARD DETAILS MAY BE OBTAINED ON LINE AT [www.hitachimed.com](http://www.hitachimed.com). CONTACT THE HMSA SITE PLANNING DEPARTMENT FOR THE CURRENT ACCESS CODES.



**MINIMUM FLOOR PLAN - 572 SQ FT**  
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### MINIMUM SUITE LAYOUT

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OASIS MARK II EQUIPEMENT LEGEND					
COMPONENT		WIDTH	DEPTH	HEIGHT	WEIGHT (lbs)
A	GANTRY	8'-4"	9'-0"	7'-11"	31,600
B	PATIENT TABLE	2'-9"	8'-3"	1'-8" - 3'-0"	1,619*
C	OPERATORS CONSOLE **	4'-0"	2'-6"	2'-6"	75
	CPU	1'-1"	1'-6"	1'-7"	44
	SWITCH UNIT	9"	8"	2"	7
	MONITOR	1'-11"	9"	1'-7"	33
	KEYBOARD	1'-8"	10"	2"	5
	MULTIPLE TAP UNIT	9"	8"	3"	7
D	RFIP CABINET	2'-8"	4'-0"	6'-2"	1,654
E	GCPA CABINET	2'-4"	2'-8"	6'-2"	1,158
F	MCU FILTER PANEL	1'-11"	1'-1"	2'-1"	67
G	ERDU	6"	3"	6"	5
H	RFIP FILTER PANEL	3'-0"	1'-6"	5'-1"	440
J	COIL CABINET	7'-0"	2'-3"	4'-3"	100
K	HELIUM COMPRESSOR	1'-6"	1'-11"	1'-9"	265
M	SENSE UNIT	2'-8"	1'-4"	3'-6"	111
N	HEAT EXCHANGER	2'-6"	2'-1"	2'-10"	420
P	R1200 OUTDOOR CHILLER <sup>a</sup>	3'-0"	4'-1"	6'-5"	2,000
COMPONENTS LISTED BELOW BY CUSTOMER-EQUIPMENT WILL VARY					
5	OXYGEN PROBE <sup>b</sup>	3"	2"	6"	1
6	OXYGEN MONITOR <sup>b</sup>	8"	7"	11"	30
7	LASER IMAGER <sup>c</sup>	2'-2"	2'-9"	5'-10"	550

a WEIGHT WHEN FILLED. SHIPPING WEIGHT - 1,750 LBS.  
b EXAMPLE-TELEDYNE MODEL 3350 WITH BATTERY BACK-UP  
c EXAMPLE-KODAK DRY VIEW MODEL # 8700/8500  
\* INCLUDES MAXIMUM PATIENT WEIGHT - CAPACITY 660 LBS. (WHEN OPERATED MANUALLY)  
\*\* SEE NOTE 13

# GENERAL SUITE CRITERIA

- 1) CARE MUST BE TAKEN TO ENSURE THE OPERATOR'S WORKSTATION, RFIP CABINET, GRADIENT AMPLIFIER, AND HELIUM REFRIGERATOR ARE LOCATED MORE THAN 9'-0" FROM THE MAGNET ISOCENTER.
- 2) SOME COMPONENTS ARE FIXED IN PLACE. CARE MUST BE TAKEN TO ENSURE SUFFICIENT SERVICE AREA IS PROVIDED.
- 3) CLEAR ACCESS TO THE FILTER PANELS AND POWER PANELS MUST BE MAINTAINED IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE (NEC) AND LOCAL CODES.
- 4) POWER CONDITIONERS/UPS UNITS, AIR CONDITIONERS AND CHILLERS ARE POTENTIAL SOURCES OF INTERFERENCE. THESE SHOULD BE REMOTELY LOCATED AND MOUNTED ON VIBRATION DAMPENING PADS AS REQUIRED.
- 5) FDA REGULATIONS REQUIRE RESTRICTED/LIMITED ACCESS TO AREAS WHERE THE MAGNETIC FIELD IS 5 GAUSS OR GREATER. IT IS THE RESPONSIBILITY OF THE CUSTOMER AND THEIR DESIGN PROFESSIONALS TO ENSURE THAT THE FACILITY IS IN COMPLIANCE WITH THIS REGULATION. HMSA WILL PROVIDE A SITE SPECIFIC MAGNETIC SHIELD DESIGN TO REDUCE THE SIZE OF THE MAGNETIC FIELDS TO THE EXTENT POSSIBLE BASED ON THE FINAL LAYOUT.
- 6) CUSTOMER PROVIDED COMPONENTS (i.e. LASER IMAGER) SHOWN IN THE TYPICAL LAYOUT CAN GREATLY AFFECT THE ACCEPTABILITY OF YOUR PLANS AND THE SYSTEM OPERATION. COMPONENT SELECTIONS AND THEIR PLACEMENT MUST BE VERIFIED WITH SITE PLANNING PRIOR TO FINALIZATION OF THE DESIGN.
- 7) CONSTRUCTION MATERIALS (CEILING GRID, LIGHTS, STUDS, ETC.) SHOULD BE CHOSEN TO MINIMIZE THE FERROUS MATERIALS IN THE SCAN ROOM.
- 8) THE MINIMUM FINISH CEILING HEIGHT FOR THE SCAN ROOM IS 9'-4" (10'-0" RECOMMENDED) IN A 12'-0" x 12'-0" AREA CENTERED ABOVE ISO-CENTER. THE MINIMUM CEILING HEIGHT IN THE REMAINDER OF THE SCAN ROOM AND ALL OTHER ROOMS IS 8'-0".
- 9) HMSA WILL PROVIDE A COIL STORAGE CABINET FOR THE CONVENIENCE OF THE CUSTOMER. THE CUSTOMER MAY CHOOSE TO HAVE CUSTOM STORAGE AND CASEWORK DESIGNED.
- 10) AN INTERCOM BETWEEN THE OPERATOR AND PATIENT IS PROVIDED INTERNALLY AS PART OF THE OASIS MARK II SYSTEM. A FACILITY INTERCOM, IF DESIRED, SHOULD BE LINKED ONLY TO THE CONTROL ROOM.
- 11) DUE THE THE RISK OF STATIC SHOCK AND ISSUES REGARDING DUST, CLEANLINESS, AND SERVICEABILITY, CARPET SHOULD NOT BE USED IN THE MRI SUITE.
- 12) COMPUTER FLOORING MAY BE USED AS AN ALTERNATIVE TO WIREWAYS IN THE EQUIPMENT ROOM. THIS PROVIDES ADDITIONAL FLEXIBILITY IN EQUIPMENT PLACEMENT. IF COMPUTER FLOORING IS USED, A MINIMUM OF 8" CLEAR MUST BE AVAILABLE UNDER THE FLOOR. THE UNDER FLOOR SPACE MAY ALSO BE USED AS A SUPPLY PLENUM FOR THE HVAC SYSTEM.
- 13) A TABLE FOR THE OPERATOR'S WORKSTATION IS TYPICALLY PROVIDED WITH THE SYSTEM. CUSTOM CASEWORK WITH A BUILT-IN DESK FOR THE MONITOR, KEYBOARD AND CPU BELOW IS RECOMMENDED TO IMPROVE WORK AREA FUNCTIONALITY, ADD STORAGE SPACE AND ENHANCE SUITE AESTHETICS.
- 14) A MINIMUM 3'-6"W X 7'-0"H FLAT ACCESS PATH MUST BE DESIGNED INTO THE SUITE FOR DELIVERY OF THE CRYOGEN DEWARs AND GRADIENT LOADER. THIS PATH WILL BE USED THROUGHOUT THE LIFE OF THE SYSTEM AS PART OF ITS ROUTINE MAINTENANCE (SEE NOTES "PLANNING" B-4 ON PG 3 AND 4 ON PG 5 REGARDING DOORWAYS)

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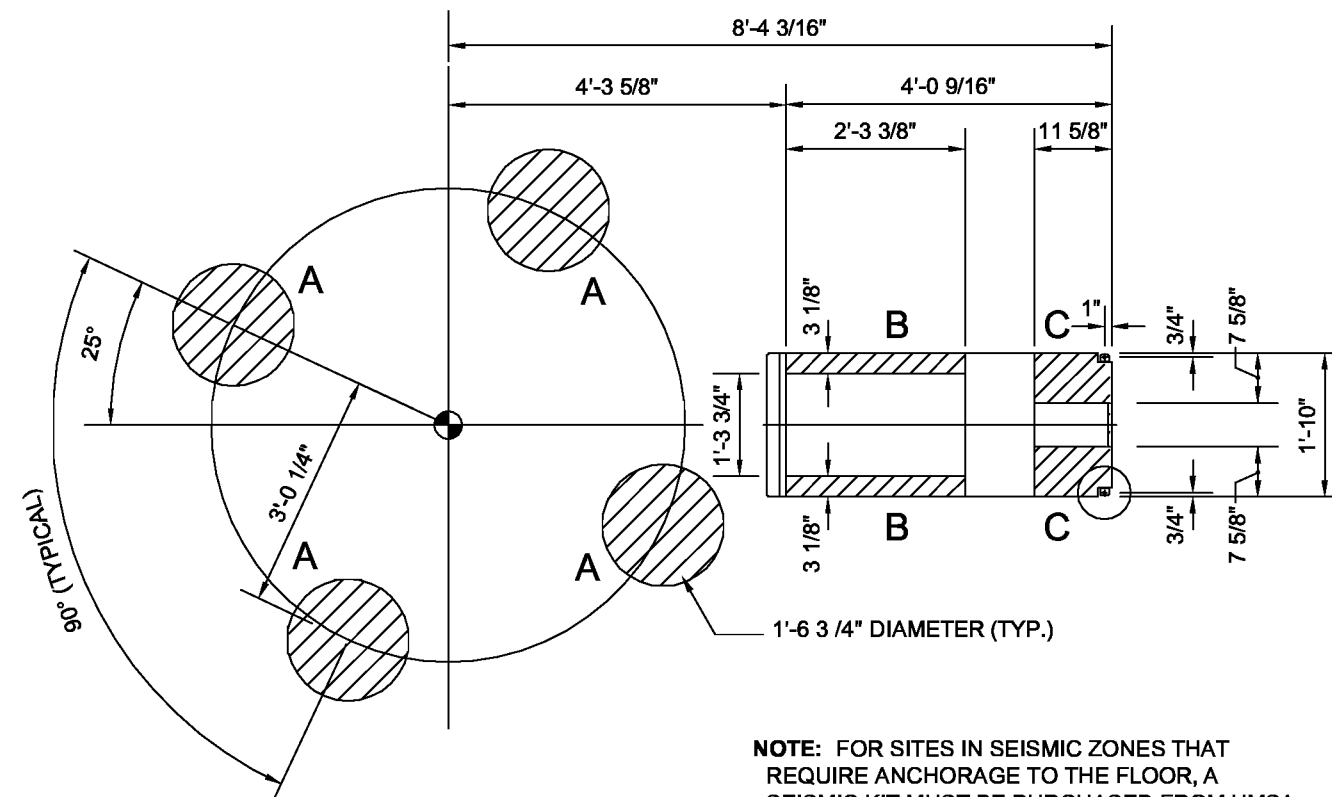
### GENERAL SUITE CRITERIA

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## FLOOR LOADING STRUCTURAL



## GANTRY / PATIENT TABLE FEET

NOT TO SCALE

WEIGHT DISTRIBUTION			
COMPONENT	FEET	WEIGHT (lbs)	TOTAL
MAGNET	A	7,900	31,600
PATIENT TABLE	B	663*	1,619*
	C	956*	

\*INCLUDES MAXIMUM WEIGHT PATIENT (660 LBS)

THIS CHART AND DRAWING SHOULD BE USED IN CONJUNCTION WITH THE FINAL APPROVED FLOOR PLAN FOR PROPER PLANNING AND DESIGN

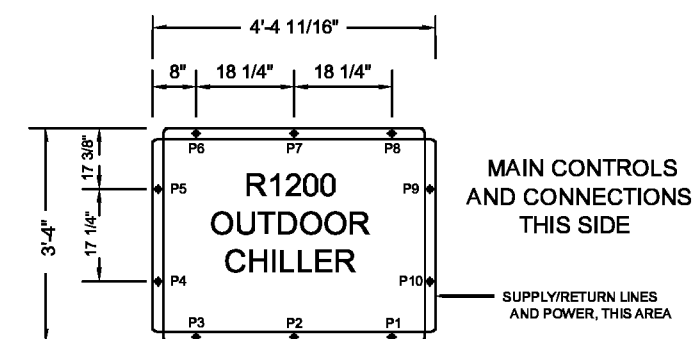
## STRUCTURAL NOTES

ALL STRUCTURAL SUPPORT IS THE CUSTOMER'S RESPONSIBILITY. A QUALIFIED PROFESSIONAL MUST REVIEW BOTH THE SCAN ROOM SLAB AND THE DELIVERY ROUTE TO ENSURE THE FOLLOWING HMSA SPECIFICATIONS ARE MET:

- 1) THE SCAN ROOM SHOULD BE SLAB ON-GRADE WHENEVER POSSIBLE. WHEN THE FLOOR IS NOT SLAB ON GRADE, THE STRUCTURAL SUPPORT MUST BE DESIGNED TO LIMIT VIBRATION AS NOTED BELOW.
- 2) THE FLOOR SLAB MUST BE DESIGNED TO BEAR THE WEIGHT OF THE GANTRY DISTRIBUTED THROUGH THE FOUR (4) FEET AS SHOWN.
- 3) THE MAXIMUM AMOUNT OF FERROUS REINFORCEMENT MATERIALS ALLOWED WITHIN FIVE FEET OF ISO-CENTER IS FIVE POUNDS PER SQUARE FOOT (5LB / SF), LOCATED AT A MINIMUM OF THREE AND ONE HALF INCHES (3 1/2") BELOW THE TOP OF THE SCAN ROOM FLOOR SLAB. REINFORCEMENT OR OTHER STEEL STRUCTURE IN EXCESS OF THIS AMOUNT MUST BE SUBMITTED TO HMSA FOR REVIEW.
- 4) AN ISOLATED FLOOR SLAB FOR THE SCAN ROOM IS RECOMMENDED BY HMSA. DUE TO UNFORESEEN FUTURE CONDITIONS, THE SCAN ROOM SLAB SHOULD BE ISOLATED VERTICALLY FROM THE MAIN BUILDING SLAB. VIBRATION ABSORBENT MATERIAL SHOULD BE PLACED ALONG THE JOINT BETWEEN THE SLABS.
- 5) THE SLAB MUST BE DESIGNED TO ENSURE THAT VIBRATION CRITERIA IS MET NOW AND IN THE FORESEEABLE FUTURE.
  - a. ALL VIBRATION INDUCING COMPONENTS IN THE AREA OF THE MAGNET SHOULD BE MOUNTED WITH VIBRATION ISOLATORS OR OTHER MEANS OF VIBRATION ISOLATION/DAMPENING.
- 6) HMSA WILL PERFORM TESTING AT THE SELECTED SITE TO IDENTIFY THE EXISTING CONDITIONS. IF THE SITE FAILS TO MEET THE HMSA SPECIFICATIONS, THE FOLLOWING IS REQUIRED:
  - a. ESCALATE TESTING TO A VIBRATION/STRUCTURAL ENGINEER FOR MITIGATION.
  - b. SELECT AN ALTERNATE SITE.
- 7) THE SCAN ROOM FLOOR MUST BE FLAT AND LEVEL TO 1/8" +/- OVER 10' IN THE ENTIRE AREA OF THE MAGNET AND PATIENT TABLE.
- 8) REFER TO OASIS EQUIPMENT LEGEND (PG 6 OF 27) FOR ANCILLARY EQUIPMENT WEIGHTS.
- 9) FOR ROOF TOP INSTALLATION OF CHILLER, MOUNTING CURB IS TO BE DESIGNED, SUPPLIED AND INSTALLED BY CUSTOMER'S ENGINEERS AND CONTRACTOR. IF DESIRED, A COPY OF THE HASKRIS R1200 ROOF CURB ILLUSTRATION MAY BE REQUESTED FROM THE HMSA SITE PLANNING DEPARTMENT.

**NOTE: HMSA WILL PERFORM AN INITIAL VIBRATION TEST FOR THE CONVENIENCE OF THE CUSTOMER AT THE SAME TIME THAT THE MAGNETIC FLUCTUATION TEST IS PERFORMED, THIS WILL HELP TO IDENTIFY SITES WHERE A CONCERN ABOUT VIBRATION EXISTS. IF THERE IS A CONCERN, THE CUSTOMER WILL NEED TO HAVE A QUALIFIED CONSULTING/ENGINEERING FIRM THAT SPECIALIZES IN VIBRATION CONTROL PERFORM A SEPARATE TEST AND PROVIDE A REPORT WITH RECOMMENDATIONS FOR REMEDIATION THROUGH THE SLAB/ FOUNDATION/STRUCTURAL SUPPORT DESIGN.**

THE TEST THAT HMSA (AND THE INDEPENDENT CONSULTING/TEST FIRM IF REQUIRED) PERFORMS CAN ONLY MEASURE EXISTING CONDITIONS. AS MODIFICATIONS ARE MADE TO THE BUILDING IN THE FUTURE (ADDITION OR EXCHANGE OF HVAC EQUIPMENT, CHILLERS, ETC.), THE CHANGES MUST BE REVIEWED TO ENSURE THAT ANY COMPONENT THAT MAY INDUCE VIBRATION IS PROPERLY MOUNTED ON SHOCK ABSORBING MOUNTS TO PREVENT POTENTIAL INTERFERENCE.



## OUTDOOR CHILLER BASE

NOT TO SCALE

CHILLER BOLT POINT LOAD	
BOLT	LOAD IN LBS.
P1	189
P2	210
P3	195
P4	198
P5	202
P6	204
P7	222
P8	198
P9	193
P10	189

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FLOOR LOADING STRUCTURAL

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## OASIS MARK II STANDARD DETAILS

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# RF AND MAGNETIC SHIELDING

## RF SHIELDING

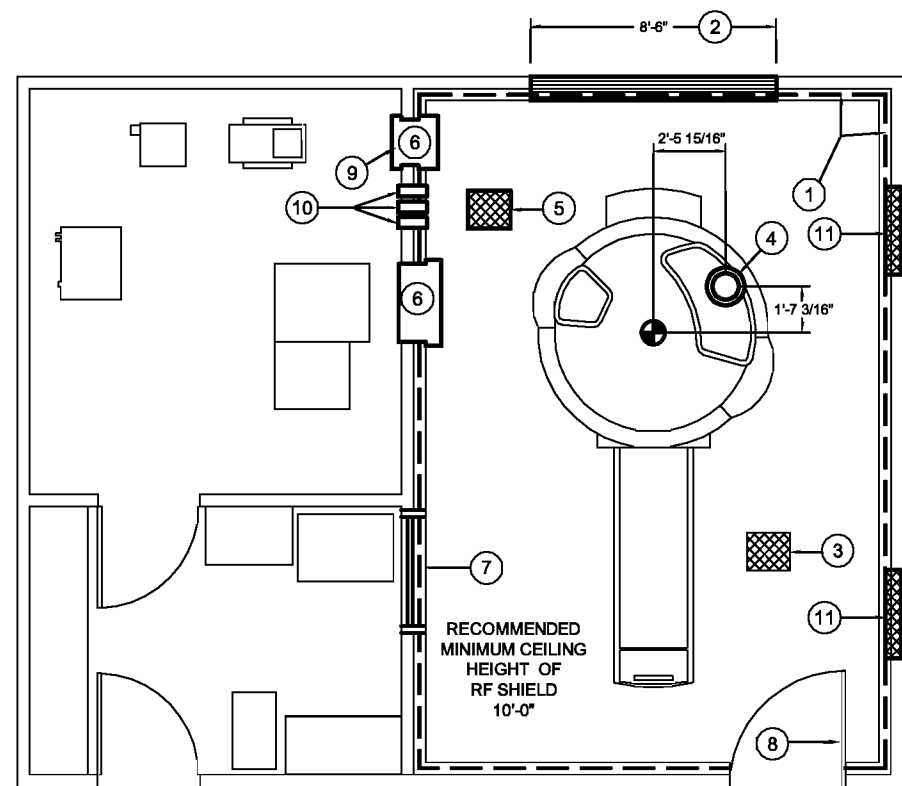
A RADIO FREQUENCY (RF) SHIELD IS REQUIRED FOR THE OPERATION OF THE OASIS MARK II SYSTEM AND IS NOT PROVIDED BY HMSA. THIS SIX (6) SIDED SHIELD IS REQUIRED FOR ALL MRI SYSTEMS. COORDINATION WITH THE SHIELDING VENDOR IS OF THE UTMOST IMPORTANCE. CONTACT SITE PLANNING FOR A LIST OF RF VENDORS. THE FOLLOWING IS A LISTING OF SOME OF THE DESIGN REQUIREMENTS AND CRITERIA WHICH MUST BE CONSIDERED.

- 1) THE RF SHIELDED ROOM MUST HAVE AN INSULATION RESISTANCE OF MORE THAN 1000 OHMS (AS MEASURED WITH A 500 V-DC MEGGER), WITH RESPECT TO THE BUILDING GROUNDING FACILITY AND OTHER EQUIPMENT INSTALLED IN THE BUILDING.
- 2) THE RF SHIELD MUST PROVIDE 80 dB ATTENUATION OR BETTER FROM 1.0-80 MHz.
- 3) IF A SPRINKLER SYSTEM IS REQUIRED, THE DESIGN AND CONSTRUCTION MUST BE COORDINATED WITH THE RF VENDOR TO ENSURE ITS ISOLATION FROM THE SHIELDING. HMSA RECOMMENDS THAT ANY PORTION OF THE SPRINKLER SYSTEM THAT PENETRATES THE RF SHIELD BE DRY. FINAL DESIGN APPROVAL AND ACCEPTANCE IS THE RESPONSIBILITY OF THE RF VENDOR.
- 4) SINKS AND OTHER PLUMBING FIXTURES SHOULD BE AVOIDED IN THE SCAN ROOM UNLESS REQUIRED BY CODE. IF A SINK IS REQUIRED, THE PLUMBING MATERIALS, ROUTING AND INSTALLATION MUST BE COORDINATED BETWEEN THE PLUMBING CONTRACTOR AND RF SHIELDING VENDOR TO ENSURE THAT THE INTEGRITY OF THE RF SHIELD IS MAINTAINED.
- 5) THE RF VENDOR WILL BE RESPONSIBLE FOR PROVIDING THE FOLLOWING:
  - a. INSTALLATION OF THE HMSA RFIP AND MCU FILTER PANELS (REFER TO PG. 17 OF 27; WIREWAYS FOR MOUNTING HEIGHTS)
  - b. SUPPLY AND INSTALL AN RF DOOR (4'-0" W X 7'-0" H MIN.)
  - c. SUPPLY AND INSTALL AN RF WINDOW (4'-0" W X 3'-0" H TYP.)
  - d. SUPPLY AND INSTALL WAVEGUIDES FOR HVAC SUPPLY AND RETURN DUCTS
  - e. SUPPLY AND INSTALL WAVEGUIDES FOR HMSA WATER AND HELIUM LINES (SIX (6) @ 1'-3/4" ). FOUR (4) LOCATED AT FLOOR LEVEL FOR WATER LINES AND TWO (2) LOCATED ABOVE MCU PANEL FOR HELIUM LINES WHERE INDICATED ON CUSTOMER SITE SPECIFIC DRAWING.
  - f. SUPPLY AND INSTALL WAVEGUIDE FOR THE EMERGENCY EXHAUST VENT
  - g. SUPPLY AND INSTALL WAVEGUIDE TO SERVE AS A PRESSURE RELIEF
  - h. SUPPLY AND INSTALL HIGH PERFORMANCE EMI ELECTRICAL FILTERS FOR ELECTRICAL OUTLETS AND LIGHTING
  - i. SUPPLY AND INSTALL A CRYOGEN VENT PIPE (WAVEGUIDE) WITH NON-CONDUCTIVE HARDWARE (I.E. NUTS, BOLTS, WASHERS). THE COMPONENTS MUST BE NON-FERROUS STAINLESS STEEL AND MAINTAIN THE RF ROOM INTEGRITY.
  - j. SUPPLY, INSTALL AND TEST HIGH PERFORMANCE ELECTRICAL FILTERS AND WAVEGUIDES FOR NON-HMSA EQUIPMENT
  - k. INITIAL AND FINAL RF SHIELD VERIFICATION TESTS
  - l. DETAILED RF SHIELD INSTALLATION DRAWINGS FOR APPROVAL BY ARCHITECT OR CONTRACTOR
  - m. ENSURE FILTER FOR OXYGEN MONITOR REMOTE PROBE (SUPPLIED BY CUSTOMER) IS INSTALLED PER MONITOR MANUFACTURER SPECIFICATIONS
  - n. A 8'-6" W X 8'-6" H ACCESS PANEL IN THE SHIELD FOR DELIVERY OF THE SYSTEM
  - o. REINSTALLATION OF THE ACCESS PANEL AND PERFORMING A FINAL TEST OF COMPLETED ROOM THE DAY OF DELIVERY
  - p. MAGNETIC SHIELDING AS DIRECTED BY CUSTOMER AND TO SPECIFICATIONS PROVIDED BY HMSA
  - q. VERIFICATION THAT THE FINISH SUB-FLOOR OF THE RF SHIELD (SCAN ROOM) MEETS HMSA'S SPECIFICATION FOR LEVELNESS AND FLATNESS IN THE AREA OF THE GANTRY AND PATIENT TABLE
- 6) THE RF SHIELDING VENDOR MUST BE CONTACTED FOR ADDITIONAL WALL PENETRATIONS, WAVE GUIDES AND/OR EMI FILTERS AS REQUIRED IF A SOUND SYSTEM IS DESIRED (SOUND SYSTEM IS AVAILABLE FROM HMSA AS AN OPTION)
- 7) WHEN POSSIBLE, THE CONCRETE SLAB SHOULD BE RECESSED TO ACCOMMODATE THE RF SHIELD'S FLOOR THICKNESS. THIS AMOUNT WILL VARY BY VENDOR. IF THE SLAB CANNOT BE RECESSED, A SMALL RAMP THAT EXTENDS OUT FROM THE DOOR THRESHOLD IS TYPICALLY SUPPLIED BY THE RF VENDOR.
- 8) METHODS OF RF ROOM CONSTRUCTION VARY. THE VENDOR SHOULD BE SELECTED PRIOR TO THE FINAL PLANNING OF THE ROOM. CONTACT HMSA SITE PLANNING FOR A LIST OF VENDORS EXPERIENCED WITH HITACHI MRI SYSTEMS.
- 9) IF OXYGEN OR OTHER MEDICAL GAS LINES ARE DESIRED IN THE SCAN ROOM, THE PENETRATIONS MUST BE INTEGRATED INTO THE RF SHIELD AND OCCUR WITHIN FOUR (4) FEET OF THE RFIP FILTER PANEL. CONSULT WITH THE RF SHIELD VENDOR.
- 10) ADDITIONAL AND OPTIONAL CONCERNS SUCH AS (OUTSIDE WINDOWS, EXTRA DOORS, ETC. SHOULD BE DISCUSSED WITH THE RF VENDOR AND REVIEWED BY HMSA PRIOR TO FINALIZATION OF THE PLANS.
- 11) IF NECESSARY, IT IS THE CUSTOMERS RESPONSIBILITY TO COORDINATE SUITE CONSTRUCTION, THE RF VENDOR AND DELIVERY TIMING TO ACCOMMODATE AN INDIRECT DELIVERY PATH.

## MAGNETIC SHIELDING

MAGNETIC SHIELDING IF NECESSARY, IS TYPICALLY PROVIDED BY THE RF VENDOR AND IS INCORPORATED INTO THE RF SHIELD AS IT IS CONSTRUCTED.

- 1) HMSA WILL PROVIDE A DESIGN FOR THE MAGNETIC SHIELDING TO MEET SITE SPECIFIC NEEDS AND FORWARD THE SPECIFICATIONS TO THE CUSTOMER AND RF VENDOR.
- 2) IF MAGNETIC SHIELDING IS USED, CONSULT WITH THE RF VENDOR TO DETERMINE THE WEIGHT AND ANY ADDITIONAL STRUCTURAL SUPPORT REQUIREMENTS.



- 1) RF SHIELD-FOUR (4) WALLS, CEILING AND FLOOR REQUIRED TO PROVIDE 80dB ATTENUATION FROM 1-80MHz. TYPICAL 5" WALL THICKNESS SHOWN, WILL VARY WITH VENDOR.
- 2) ACCESS PANEL: 8'-6" W X 8'-6" H MINIMUM CLEAR OPENING RECOMMENDED. LOCATION MAY VARY.
- 3) WAVE GUIDE FOR EMERGENCY EXHAUST VENT FAN. SIZED BY ARCHITECT, PROVIDED BY RF VENDOR. LOCATION MAY VARY.
- 4) CRYOGEN VENT (WAVEGUIDE). CONNECTED TO GANTRY AS PART OF THE DELIVERY PROCESS.
- 5) WAVEGUIDE TO SERVE AS PRESSURE RELIEF. SIZE AND LOCATION MAY VARY. SIZED BY ARCHITECT
- 6) FILTER PANEL FOR SYSTEM INTERCONNECTION. PROVIDED BY HMSA AND INSTALLED BY RF VENDOR PRIOR TO FINAL ROOM TEST.
- 7) RF WINDOW: 4'-0" W X 3'-0" H (TYP.), MOUNTED AT 36" AFF
- 8) RF DOOR: 4'-0" W X 7'-0" H (REQ.)
- 9) SIX (6) 1 3/4" WAVE GUIDES PROVIDED AND INSTALLED BY RF VENDOR FOUR (4) LOCATED IN LOWEST SECTION OF WIREWAY, TWO (2) LOCATED ABOVE MCU PANEL. MOUNTED FLUSH WITH SCAN ROOM WALL
- 10) HIGH PERFORMANCE EMI ELECTRICAL FILTERS BY RF VENDOR QUANTITY AND LOCATION MAY VARY
- 11) WAVEGUIDE FOR HVAC SUPPLY AND RETURN DUCTS. SIZE AND LOCATION MAY VARY.

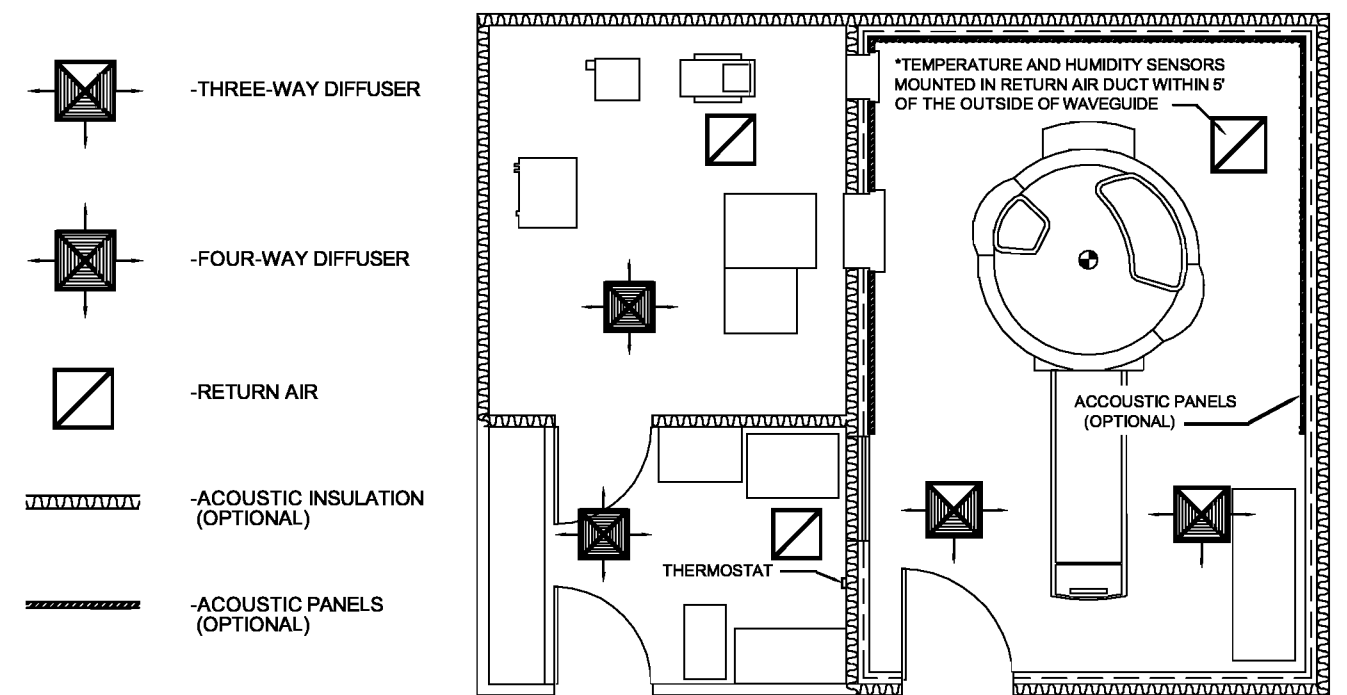
**NOTE: VERIFY ALL ROUGH-IN OPENINGS WITH RF VENDOR.**

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# ENVIRONMENTAL

## HVAC NOTES

- 1) THE MRI SCAN ROOM TEMPERATURE MUST BE MAINTAINED BETWEEN 68-75 DEGREES F. WITH A MAXIMUM ALLOWABLE FLUCTUATION OF (+/-) 2-1/2 DEGREES PER HOUR.
- 2) ALL ROOMS MUST BE MAINTAINED AT THE RELATIVE HUMIDITY (NON-CONDENSING) LISTED BELOW.
- 3) CHANGES TO THE SCAN ROOM TEMPERATURE WILL AFFECT THE SYSTEM IMAGING. THEREFORE, THE ENVIRONMENT MUST BE MAINTAINED AT ALL TIMES (24HRS/DAY; 7DAYS/WEEK).
- 4) THERMOSTATS MAY NOT BE USED IN THE SCAN ROOM. A REMOTE SENSOR IN THE RETURN AIR DUCT OUTSIDE OF THE RF SHIELD MUST BE UTILIZED FOR CONTROLLING THE SCAN ROOM ENVIRONMENT. THE REMOTE SENSOR MUST BE LOCATED WITHIN FIVE FEET (5') OF THE OUTSIDE OF THE WAVEGUIDE. THE THERMOSTAT SHOULD BE LOCATED IN THE CONTROL AREA.
- 5) IT IS THE RESPONSIBILITY OF THE HVAC DESIGNER TO ENSURE THERE IS ADEQUATE AIRFLOW ACROSS THE REMOTE SCAN ROOM SENSOR TO MAINTAIN PROPER ENVIRONMENTAL CONDITIONS. THIS TYPICALLY REQUIRES CONTINUOUS AIR CIRCULATION ACROSS THE REMOTE SCAN ROOM SENSOR TO MAINTAIN PROPER ENVIRONMENTAL CONDITIONS 24/7.
- 6) AC UNITS, CONDENSERS, AND AIR HANDLERS MUST BE LOCATED OUTSIDE OF 20 FEET FROM MAGNET ISO-CENTER AS SHOWN ON THE SITE SPECIFIC DRAWING AND SHOULD BE MOUNTED ON VIBRATION ISOLATORS.
- 7) A FLEXIBLE, NON-CONDUCTIVE BOOT PROVIDED BY THE HVAC CONTRACTOR MUST BE USED TO CONNECT DUCTWORK TO THE EXTERIOR SIDE OF HVAC WAVEGUIDES TO PREVENT GROUNDING OF THE RF SHIELD BY THE EXTERNAL DUCTWORK.
- 8) DUCTWORK AND DIFFUSER GRILLS WITHIN THE SCAN ROOM MUST BE NON-FERROMAGNETIC.
- 9) CARE SHOULD BE TAKEN TO ENSURE THE SUPPLY AIR IS DIRECTED AWAY FROM THE GANTRY AND PATIENT TABLE. DIFFUSER PLACEMENT SHOULD BE DESIGNED TO ENSURE EVEN AIR DISTRIBUTION.
- 10) IF A FLOOR MOUNTED COMPUTER ROOM HVAC SYSTEM IS USED, PLEASE NOTIFY HMSA SITE PLANNING TO ENSURE ADEQUATE SERVICE SPACE IS AVAILABLE FOR THIS UNIT AS WELL AS THE OASIS MARK II COMPONENTS IN THE EQUIPMENT ROOM.
- 11) COMPUTER FLOORING IN THE EQUIPMENT ROOM MAY BE USED FOR A SUPPLY PLENUM.
- 12) IT IS THE CUSTOMER'S RESPONSIBILITY TO ENSURE THAT A PROPER ENVIRONMENT IS CONTINUOUSLY MAINTAINED FOR THE OASIS MARK II SYSTEM. THE CHART BELOW MUST BE USED BY THE ARCHITECT/ENGINEER DESIGNING THE HVAC SYSTEM. CUSTOMER SUPPLIED AND OPTIONAL COMPONENTS MUST BE IDENTIFIED. THE HVAC DESIGNER IS RESPONSIBLE FOR VERIFYING THE LOADS BASED ON ACTUAL UNITS TO BE USED. OTHER LOADS (i.e.: PEOPLE, LIGHTS, OUTSIDE CONDITIONS, ETC...) MUST ALSO BE CONSIDERED IN THE DESIGN. ALTHOUGH THE DESIGN OF THE HVAC SYSTEM IS THE RESPONSIBILITY OF THE CUSTOMER, HMSA STRONGLY SUGGESTS THE USE OF A ZONED SYSTEM DUE TO THE LARGE VARIANCE OF HEAT LOADS FROM ROOM TO ROOM.



## ACOUSTICAL NOTES

- 1) SIMILAR TO OTHER MR IMAGING SYSTEMS, THE OASIS MARK II PRODUCES NOISE LEVELS (WHILE SCANNING) THAT ARE GENERALLY CONSIDERED UNACCEPTABLE FOR A NORMAL OFFICE ENVIRONMENT. DAILY PERMISSIBLE NOISE EXPOSURE LEVELS SHOULD BE CONSIDERED WHEN PLANNING A FACILITY. THE ADJACENT CHART PROVIDES THE MAXIMUM NOISE LEVELS CREATED DURING THE SCAN PROCESS.
- 2) ACOUSTICAL DAMPENING FOR BOTH THE SCAN AND EQUIPMENT ROOM IS HIGHLY RECOMMENDED FOR THE COMFORT OF OCCUPANTS OF SURROUNDING AREAS INCLUDING THE TECHNICIAN. SOUND INSULATION IN THE WALLS AND THE ADDITION OF ACOUSTICAL DAMPENING PANELS TO THE SCAN ROOM WALLS ARE TWO MEANS OF LIMITING NOISE TRANSMISSION. SCAN ROOM SOUND PANELS SHOULD BE CONSTRUCTED OF NON-FERROUS MATERIALS (WOOD FRAMES, VELCRO HANGING SYSTEMS). THE ARCHITECT MAY WISH TO CONSULT AN ACOUSTICAL ENGINEER FOR ADDITIONAL METHODS OF SOUND DAMPENING.
- 3) IF SURFACE MOUNTED ACOUSTIC PANELS ARE SPECIFIED IN THE SCAN ROOM, HMSA RECOMMENDS THAT FINAL FIELD MEASUREMENTS BE DELAYED UNTIL AFTER THE FILTER PANELS HAVE BEEN INSTALLED TO ENSURE PROPER FITMENT. THE EXTENT OF WALL COVERAGE MAY VARY FROM THAT SHOWN ABOVE DEPENDENT ON ROOM LAYOUT, PANEL CONSTRUCTION AND AMOUNT OF ACOUSTIC DAMPENING DESIRED.
- 4) SOME RF SHIELDING VENDORS OFFER OPTIONS THAT INTEGRATE SOUND REDUCTION MATERIALS INTO THE RF SHIELD ITSELF. CONTACT THE RF SHIELDING VENDOR FOR FURTHER INFORMATION.

LOCATION	COMPONENT		HEAT LOAD	TEMP. (F)	HUMIDITY	dB LEVEL (MAX)
SCAN ROOM	Ⓐ OASIS MARK II GANTRY		8,750 BTUH	68-75° MAXIMUM CHANGE 2.5° PER HOUR	45-60%	112
	Ⓑ PATIENT TABLE					
CONTROL ROOM	Ⓒ OPERATOR'S WORKSTATION		3,405 BTUH	68-82°	20-60%	55
	Ⓓ LASER IMAGER		BY CUSTOMER			
EQUIPMENT ROOM	Ⓔ RFIP	21,707 BTUH	39,816 BTUH	65-78°	20-60%  (IF TEMP IS ABOVE 77° 20-53%)	86
	Ⓕ GCPA	6,495 BTUH				
	Ⓖ MCU	1,389 BTUH				
	Ⓗ RFIP FILTER PANEL	1,468 BTUH				
	Ⓚ HELIUM COMPRESSOR	5,556 BTUH				
	Ⓜ SENSE UNIT	218 BTUH				
	Ⓝ HEAT EXCHANGER	2983 BTUH				

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# CHILLER REQUIREMENTS

THE OASIS MARK II MRI SYSTEM REQUIRES CHILLED WATER FOR COOLING OF THE CRYOGEN COMPRESSOR, GRADIENT AMPLIFIER AND COILS. WITH EACH OASIS MARK II SYSTEM HMSA WILL PROVIDE A HEAT EXCHANGE UNIT LOCATED IN THE OASIS MARK II EQUIPMENT ROOM. TWO OPTIONS ARE AVAILABLE TO PROVIDE COOLING WATER TO THE OASIS MARK II HEAT EXCHANGER AND MRI SYSTEM.

- OPTION 1: SELF CONTAINED OUTDOOR CHILLER (HASKRIS R1200) PROVIDED BY HMSA, DETAILS OUTLINED BELOW  
OPTION 2: CUSTOMER SUPPLIED CHILLED WATER SOURCE, I.E. BUILDING CHILLED WATER SYSTEM

CONTACT THE SITE PLANNING DEPARTMENT FOR ADDITIONAL DETAILS ON OPTION 2.

## HMSA SUPPLIED OUTDOOR CHILLER (OPTION 1):

THE INSTALLATION AND CONNECTION OF THE HASKRIS R1200 CHILLER SUPPLIED BY HMSA IS A RESPONSIBILITY SHARED BETWEEN THE CUSTOMER, GENERAL CONTRACTOR AND HMSA.

## CUSTOMER / GENERAL CONTRACTOR RESPONSIBILITIES:

- 1) IDENTIFY AN OUTDOOR LOCATION FOR THE R1200 CHILLER AND PAD THAT WILL ALLOW UNOBSTRUCTED AIRFLOW AROUND THE SIDES AND TOP OF THE UNIT.
- 2) RECEIVE AND UNLOAD CHILLER SYSTEM AT DESIRED LOCATION AND SET IT IN PLACE AT THE SITE
  - a. CHILLER CAN BE DELIVERED TO MRI SITE OR CONTRACTOR FACILITY, IF DELIVERED TO LOCATION OTHER THAN MRI SITE, CONTRACTOR IS RESPONSIBLE FOR TRANSPORTING EQUIPMENT TO FINAL LOCATION
  - b. CHILLER IS DELIVERED VIA A LIFT GATE TRUCK. CONTRACTOR IS RESPONSIBLE FOR PROVIDING NECESSARY EQUIPMENT (FORKLIFT, PALLET JACK, ETC...) AND MOVING UNITS INTO PLACE.
- 3) PROVIDE AND INSTALL ELECTRICAL POWER AS REQUIRED FOR THE R1200 CHILLER AND HEAT EXCHANGER.
- 4) PROVIDE AND INSTALL A HOSE BIBB AND FLOOR DRAIN IN THE EQUIPMENT ROOM. DRAIN MUST BE LOCATED SO THAT IT IS NOT DIRECTLY UNDER ANY SYSTEM COMPONENT.
- 5) PROVIDE ANY FACILITY CONSTRUCTION / UPGRADE REQUIRED FOR CHILLER INSTALLATION
- 6) PROVIDE SUB-CONTRACTOR(S) TO PERFORM INSTALLATION OF THE R1200 INCLUDING ALL PLUMBING, WIRING AND STARTUP ITEMS LISTED UNDER INSTALLING CONTRACTOR RESPONSIBILITIES ON PAGE 11 OF 27.
- 7) INSTALL, FILL, TEST AND HAVE CHILLER OPERATIONAL PRIOR TO THE DELIVERY OF THE OASIS MARK II SYSTEM.
- 8) PROVIDE AND INSTALL A TEMPERATURE GAUGE, PRESSURE GAUGE AND FLOW METER AS LIST UNDER CUSTOMER/INSTALLING CONTRACTOR RESPONSIBILITIES ON PG. 11 OF 27.
- 9) PROVIDE AND INSTALL A 12' LONG LOOP OF 1 1/2" OPAQUE FIBER REINFORCED HOSE BETWEEN SUPPLY AND RETURN OUTLETS IN EQUIPMENT ROOM TO ALLOW FOR START-UP AND NO LOAD TESTING OF R1200 CHILLER. HOSE WILL BE USED BY HMSA FOR CONNECTION OF HEAT EXCHANGER AT TIME OF INSTALLATION.

## HMSA RESPONSIBILITIES

- 1) COORDINATE WITH THE CUSTOMER / CONTRACTOR TO ARRANGE DELIVERY DATE AND ADDRESS FOR THE R12000 CHILLER AT THE APPROPRIATE TIME DURING THE CONSTRUCTION PHASE OF THE PROJECT.
- 2) PROVIDE AND INSTALL ALL PLUMBING AND CONNECTIONS BETWEEN THE HEAT EXCHANGER AND THE OASIS MARK II MRI SYSTEM.
  - a. HEAT EXCHANGER TO SENSE UNIT
  - b. SENSE UNIT TO HELIUM COMPRESSOR
  - c. GRADIENT POWER AMPLIFIER LOOP
  - d. GRADIENT COIL LOOP
  - e. HELIUM LINES

SUPPLY AND RETURN WATER LINES BETWEEN CHILLER AND HEAT EXCHANGER BY HVAC CONTRACTOR. TOTAL MAXIMUM LENGTH PER CALCULATIONS PAGE 12

EXTERIOR WATER LINES w/ BALL VALVES, FLEX PIPE, HEAT TRACE AND INSULATION AS REQUIRED

MAIN CONTROLS THIS SIDE

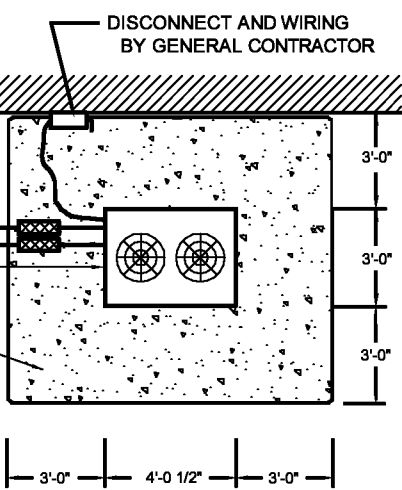
CONCRETE PAD AS REQUIRED BY GENERAL CONTRACTOR (MIN. SERVICE AREA SHOWN)

NOTES: SEE PG 7 OF 27: FLOOR LOADING STRUCTURAL, FOR CHILLER FOOTPRINT.

PAD MUST BE LEVEL IN AREA DIRECTLY UNDER CHILLER

## OUTDOOR CHILLER PLAN

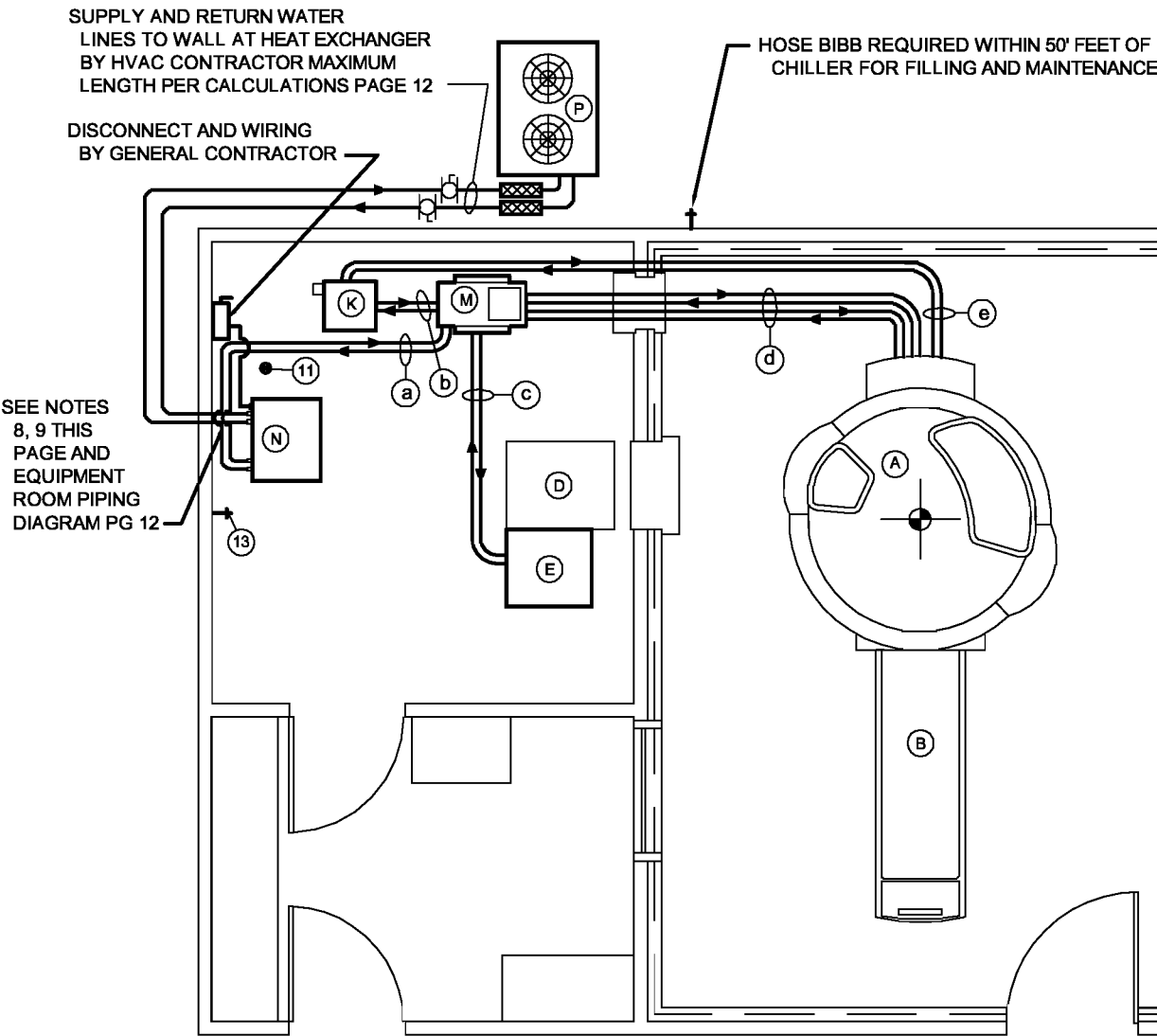
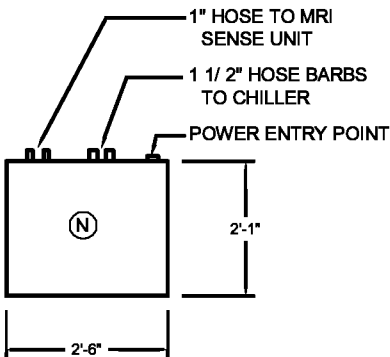
NOT TO SCALE



NOTE: MINIMUM CLEARANCES: FRONT - 36" RIGHT - 24", LEFT - 6", REAR - 12", ABOVE - 36"

## HEAT EXCHANGER PLAN

NOT TO SCALE



## CHILLER CONNECTION SCHEMATIC

NOT TO SCALE

NOTE: RUNS SHOWN ARE SCHEMATIC ONLY AND DO NOT INDICATE ACTUAL CONNECTION POINTS

## POWER REQUIREMENTS

### R1200 OUTDOOR CHILLER:

480V (+5%, -10%), 3 PH, 60 Hz, 4 WIRE, 31.7 MCA\*, 40 MOCP\*\* w/ TIME DELAY BREAKER

### HEAT EXCHANGER:

480V (+/- 10%), 3 PH, 60 Hz, 4 WIRE, 3 MCA\*, 15 MOCP\*\*

\* MINIMUM CIRCUIT AMPACITY  
\*\* MAXIMUM OVER CURRENT PROTECTION

## SPECIAL AMBIENT REQUIREMENTS:

### HIGH AMBIENT:

AMBIENT AIR TEMPERATURE EXCEEDS 120° F

### LOW AMBIENT:

AMBIENT AIR TEMPERATURE FALLS BELOW -20° F

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## CHILLER REQUIREMENTS

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# CHILLER INSTALLATION CHECKLIST

## CHILLER CHECKLIST REQUIREMENTS

THE START UP OF THE CHILLER MUST BE PERFORMED BY AN AUTHORIZED AGENT OF HASKRIS IN ORDER TO ENSURE IT IS DONE PROPERLY AND TO MAINTAIN THE FACTORY WARRANTY. HAVING THE CHILLER INSTALLED AND OPERATIONAL WHEN THE HITACHI OASIS MARK II ARRIVES ON SITE IS ESSENTIAL FOR A SUCCESSFUL DELIVERY BECAUSE IT IS SHIPPED WITH ITS CRYOSTAT PRE-COOLED (FILLED WITH CRYOGENS). THE FOLLOWING STEPS MUST BE PERFORMED IN ORDER TO ENSURE THAT THE CHILLER IS READY FOR CONNECTION TO THE OASIS MARK II.

### CUSTOMER/ INSTALLING CONTRACTOR RESPONSIBILITIES

- 1) INSTALL ALL WATER PIPING RUNS AND COMPONENTS USING THE FOLLOWING GUIDELINES:

a. CARE MUST BE TAKEN TO MAINTAIN THE INTERNAL CLEANLINESS OF THE PIPE. EXCESSIVE PARTICLES IN THE WATER SYSTEM CAN REDUCE THE EFFICIENCY OF, OR CAUSE DAMAGE TO THE SYSTEM.

b. INSTALL TYPE "L" HARD COPPER PIPING IN AS SHORT AND DIRECT A PATH AS POSSIBLE TO MINIMIZE THE PRESSURE DROP ACROSS THE PIPING. REFER TO THE PIPE SIZING CHART ON THE FOLLOWING PAGE (12 OF 27).

c. INSTALL PIPE VIBRATION ISOLATORS AT THE R1200 CHILLER (P) ON BOTH SUPPLY AND RETURN LINES.

d. INSTALL A DRAIN AT THE BASE OF EVERY RISE TO ALLOW FOR COMPLETE DRAINAGE OF PIPING.

e. INSTALL AIR VENTS AT ALL HIGH POINTS IN THE SYSTEM TO ELIMINATE AIR FROM THE SYSTEM.

f. PROPERLY SUPPORT ALL PIPING WHERE REQUIRED.

g. INSTALL HEAT TRACE ON ALL PIPING EXPOSED TO LOW AMBIENT TEMPERATURES (34°F [1°C] OR BELOW) AND COVER WITH A SUITABLE THICKNESS OF CLOSED-CELL, UV RESISTANT INSULATION. ROUTE POWER FOR HEAT TRACE FROM A SEPARATELY FUSED DISCONNECT. IDENTIFY DISCONNECT AS HEAT TRACE POWER SOURCE WITH A WARNING THAT POWER MUST NOT BE TURNED OFF EXCEPT WHEN UNIT IS BEING SERVICED.

h. PROPERLY SLEEVE AND INSULATE PIPE PENETRATIONS THROUGH ALL ROOF AND/OR WALL PENETRATIONS TO PROTECT PIPE FROM POTENTIAL DAMAGE.

j. PROVIDE AND INSTALL A 12' LONG LOOP OF 1 1/2" OPAQUE FIBER REINFORCED HOSE BETWEEN SUPPLY AND RETURN OUTLETS IN EQUIPMENT ROOM TO ALLOW FOR START-UP AND NO LOAD TESTING OF R1200 CHILLER. HOSE WILL BE USED BY HMSA FOR CONNECTION OF HEAT EXCHANGER AT TIME OF INSTALLATION.
- 2) PROVIDE AND INSTALL A BALL VALVE ON BOTH THE THE SUPPLY AND RETURN LINES AT THE HEAT EXCHANGER (N) UNIT TO ALLOW ISOLATION FOR SERVICE OR UNIT REPLACEMENT IF NECESSARY. THE R1200 CHILLER INCLUDES FACTORY INSTALLED ISOLATION VALVES AT BOTH THE SUPPLY AND RETURN CONNECTIONS.
- 3) PROVIDE AND INSTALL A PRESSURE GAUGE (0-100 PSI) AND A TEMPERATURE GAUGE (0-100° F) ON THE SUPPLY SIDE BETWEEN THE BALL VALVE AND HEAT EXCHANGER (N) TO MEASURE SUPPLY PRESSURE AND TEMPERATURE AT THE UNIT.
- 4) PROVIDE AND INSTALL A TEMPERATURE GAUGE (0-100° F) AND AN IN-LINE FLOW METER (5-25 GPM) ON THE RETURN SIDE BETWEEN THE HEAT EXCHANGER (N) AND BALL VALVE TO MEASURE RETURN TEMPERATURE AND FLOW. A BLUE-WHITE SERIES F-420N VARIABLE AREA FLOW METER SIZED TO MATCH THE PIPING LINE SIZE IS RECOMMENDED. PROVIDE A MOVEABLE SLEEVE OVER THE FLOW METER TO PREVENT EXPOSURE TO LIGHT WHEN METER IS NOT BEING READ. PROLONGED EXPOSURE TO LIGHT MAY PROMOTE BIOLOGICAL GROWTH IN THE WATER LINES.
- 5) COMPLETE THE INSTALLATION OF THE R1200 CHILLER PER THE REQUIREMENTS IN THE R1200 INSTRUCTION MANUAL PROVIDED WITH THE SYSTEM.
- 6) CLOSE ISOLATION VALVES ON R1200 AND FLUSH PIPING WITH CITY WATER UNTIL STREAM BECOMES CLEAR. FLUSH FOR AN ADDITIONAL 20 MINUTES. CLOSE DRAIN AND PERFORM LEAK CHECK FOR A MINIMUM OF 30 MINUTES AT CITY WATER PRESSURE. IT IS RECOMMENDED TO FILL THE SYSTEM THROUGH A WATER METER TO HELP ESTABLISH THE CORRECT QUANTITY OF GLYCOL SOLUTION REQUIRED AT FILL. OPEN ALL DRAINS (INCLUDING DRAINS INSTALLED AT THE BASE OF EVERY RISE) AND DRAIN ALL PIPING RUNS. USE COMPRESSED DRY AIR OR DRY NITROGEN TO DRY PIPING PRIOR TO CHARGING SYSTEM WITH GLYCOL SOLUTION.
- 7) FILL 30 GALLON TANK AND ENTIRE WATER PIPING LOOP WITH A MIXTURE OF PROPYLENE GLYCOL (35% BY VOLUME) AND POTABLE DISTILLED WATER. PURGE ALL AIR FROM THE LINES. **DO NOT USE AUTOMOTIVE ANTIFREEZE. USE OF AUTOMOTIVE ANTIFREEZE WILL DAMAGE SYSTEM.** THE USE OF AN EXTERNAL PUMP MAY BE REQUIRED TO PROPERLY FILL THE SYSTEM WITH GLYCOL SOLUTION. IF CITY WATER IS USED IN PLACE OF POTABLE DISTILLED WATER, IT MUST BE RUN THROUGH A DE-IONIZATION FILTER. DO NOT ENERGIZE R1200 CHILLER. DO NOT USE THE PUMP ON THE R1200 TO FILL THE SYSTEM. SEE THE LIST OF ACCEPTABLE PROPYLENE GLYCOL VENDORS ON FOLLOWING PAGE (12 OF 27).
- 8) PROVIDE ADDITIONAL PROPYLENE GLYCOL (35% BY VOLUME) AND DISTILLED WATER MIXTURE FOR USE BY START-UP AGENT TO TOP OFF SYSTEM WHEN NO LOAD START-UP IS PERFORMED. ADDITIONAL GLYCOL/WATER MIXTURE (APPROXIMATELY 5 GALLONS) WILL ALSO BE REQUIRED FOR USE BY HITACHI WHEN THE MAGNET IS DELIVERED.
- 9) COMPLETE AND FAX THE INSTALLER'S PRE-STARTUP CHECKLIST (INCLUDED WITH SYSTEM DOCUMENTATION, ADDITIONAL COPY AT RIGHT) TO HASKRIS COMPANY NO LESS THAN 5 BUSINESS DAYS PRIOR TO DESIRED NO LOAD START-UP DATE FOR CHILLER.
- 10) SCHEDULE NO LOAD START-UP WITH LOCAL HASKRIS AUTHORIZED START-UP AGENT AT LEAST 5 DAYS IN ADVANCE. NO LOAD START-UP SCHEDULING IS SUBJECT TO TECHNICIAN AVAILABILITY.
- 11) THE R1200 CHILLER MUST BE INSTALLED AND STARTED NO MORE THAN SIXTY (60) DAYS AFTER DELIVERY. FAILURE TO DO SO WILL RESULT IN ADDITIONAL EXPENSE TO THE END USER FOR REPLACEMENT OF PUMP SEALS.

# INSTALLER'S CHECKLIST

## HASKRIS OUTDOOR CHILLER R1200

## FOR THE HITACHI OASIS MRI

Installer's Checklist for Haskris R1200, S/N HB\_\_\_\_\_

Project Name\_\_\_\_\_ Location\_\_\_\_\_



**Note:** Checklist *MUST* be completed for "No Load" Start-up to be scheduled. R1200 cannot be started until completed checklist has been returned via fax to Haskris no less than 5 business days prior to no load start-up.

Chiller must be installed and started no more than thirty (30) days after delivery.  
Failure to do so will result in additional expense to the end user for replacement of pump seals

**Directions:** Fax completed checklist to Haskris (Fax#: 847-956-6595) no less than 5 business days prior to desired R1200 No Load Start-Up date. Haskris will notify the Installer of the Haskris Authorized Start-Up Agent. Installer will contact Haskris Authorized Start-Up Agent at least 2 business days in advance. No Load Start-Up subject to Technician availability. Start-Up will be done during normal working hours. Installer will issue a Credit Card Purchase Order to Haskris Start-Up Agent if any items are found incomplete and resulting in delay of system start-up.

**Checklist:**

Unit is securely mounted and level.

No Refrigeration Service Contractor labels have been affixed to the interior or exterior of the R1200

Clearances for service, ventilation, and access to control panel are adequate per R1200 Instruction Manual

Electrical service to R1200 per table below (Record inlet Voltage and Branch Circuit Rating):

Nominal Power: 480V (+5%,-10%)-3Ø-60Hz, MCA: 31.7A, MOCP 40A				
Record Voltage at Disconnect (V)	L1-L2		Confirm and Record Size of Time Delay Breaker (Fusing) Supplying Chiller (A)	
	L2-L3			
	L1-L3			

- Remove the rubber plug from inside wall of the 30 gallon tank

Confirm proper phase by verifying the red 'FAULT' LED is NOT lit on phase monitor. (See sect. 2.5.1)

Hard copper piping with vents/drains as required and properly supported

Vibration Isolators installed at R1200 on both water supply and return lines

Separately fused heat trace covered with suitable thickness of closed-cell, UV resistant insulation on all piping exposed to low ambient temperatures, as required.

Supply/Return lines labeled over insulation.

12' long loop of 1-1/2" reinforced opaque hose between supply and return outlet in equipment room provided.

Supply and return ball valves provided at indoor WW3

Supply side temperature (0-100° F) and pressure (0-100 psig) gauges provided at indoor heat exchanger (WW3)

Return side temperature (0-100° F) and flow (5-25 gpm) gauges provided at indoor heat exchanger

All external piping flushed with water and dried per R1200 Instruction Manual.

Leak check performed and no leaks in external piping loop per R1200 Instruction Manual.

System (30 gallon tank & entire piping loop) is filled with \_\_\_\_\_ gallons of glycol/distilled water solution

Reservoir is at tank full level

Lines air purged per R1200 Instruction Manual

Glycol solution \_\_\_\_\_% (Record actual measurement here).

Install has provided an additional 10 gallons of propylene glycol/distilled water (35% by volume) to top off system when no-load start-up is performed.

### Install Completed By:

Company:\_\_\_\_\_ Phone:\_\_\_\_\_ Fax:\_\_\_\_\_

Installer Name:\_\_\_\_\_ Title:\_\_\_\_\_

Signature: \_\_\_\_\_

Requested Start-Up Date: \_\_\_\_\_ Time: \_\_\_\_\_

Please contact Haskris Co. if you have any questions.

Haskris Co.  
100 Kelly Street  
Elk Grove Village, IL 60007

Phone: 847-956-6420

Fax: 847-956-6595



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### CHILLER INSTALLATION CHECKLIST

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OASIS MARK II STANDARD DETAILS

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CHILLER INSTALLATION SPECIFICATIONS

PIPE SIZE CALCULATION

THE CUSTOMER'S ARCHITECT/ENGINEER IS RESPONSIBLE FOR UTILIZING THE FOLLOWING INFORMATION TO CALCULATE THE APPROPRIATE NOMINAL SIZE OF THE COPPER WATER LINES BETWEEN THE R1200 OUTDOOR CHILLER UNIT AND THE HEAT EXCHANGER LOCATED IN THE EQUIPMENT ROOM.

PIPE CALCULATION FACTORS				
NOMINAL PIPE SIZE	PIPE FACTOR	90° ELBOW	90° LONG RADIUS ELBOW	45° ELBOW
1 1/2"	3.72	4.2	2.1	2.9
2"	0.95	5.1	2.6	3.6
2 1/2"	0.32	5.4	2.7	3.8
3"	0.13	6.7	3.4	4.7

1. CALCULATE THE ENTIRE APPARENT LENGTH OF THE PIPING FROM THE LOCATION OF THE R1200 (OUTDOOR CHILLER) TO THE HEAT EXCHANGER LOCATED IN THE EQUIPMENT ROOM. THE "TOTAL RUN" USED FOR THESE CALCULATIONS IS THE SUM OF THE SUPPLY AND RETURN LINE LENGTH (i.e.: A 50' RUN EACH WAY BETWEEN UNITS WOULD BE A 100' TOTAL RUN). STARTING WITH 1 1/2" PIPE AND LONG RADUS 90° ELBOWS WHERE POSSIBLE, CALCULATE THE FOLLOWING:

TOTAL RUN (FT.) \_\_\_\_\_ X FACTOR FROM CHART \_\_\_\_\_ = \_\_\_\_\_ (A)

2. FIND THE TOTAL NUMBER OF FITTINGS (LONG RADIUS 90° ELBOWS SHOULD BE USED WHERE POSSIBLE)

90° ELBOWS \_\_\_\_\_ X FACTOR FROM CHART \_\_\_\_\_ = \_\_\_\_\_ (B)  
90° LR ELBOWS \_\_\_\_\_ X FACTOR FROM CHART \_\_\_\_\_ = \_\_\_\_\_ (C)  
45° ELBOWS \_\_\_\_\_ X FACTOR FROM CHART \_\_\_\_\_ = \_\_\_\_\_ (D)

3. ADD (A) + (B) + (C) + (D) = \_\_\_\_\_ (E)

4. MULTIPLY (E) BY 1.26 (GLYCOL FACTOR) = \_\_\_\_\_ (F) (MAXIUM ALLOWABLE VALUE: 335)

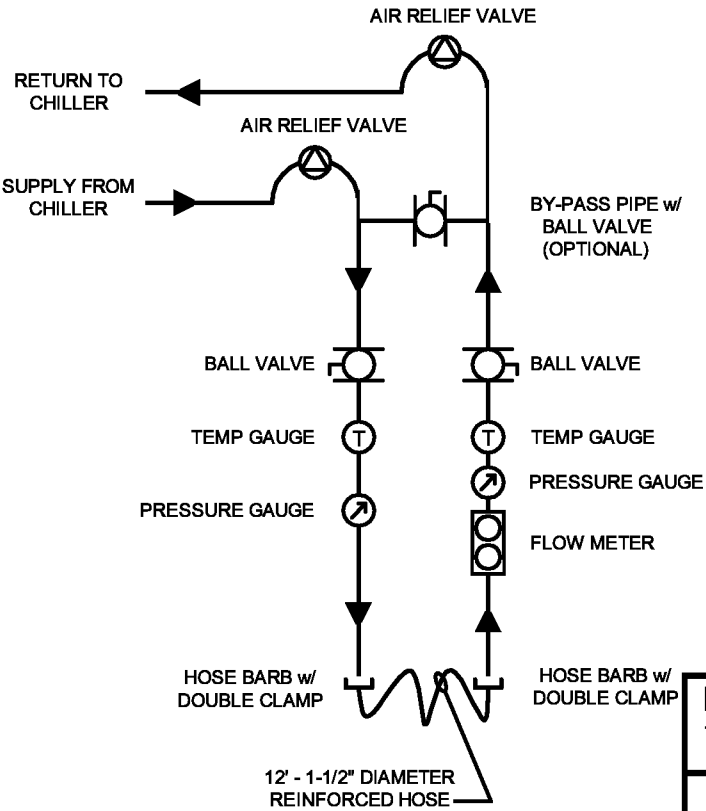
5. IF "F" IS LESS THAN OR EQUAL TO 335, THEN YOUR PIPE SIZE IS 1 1/2". IF "F" IS GREATER THAN 335, REPEAT THE CALCULATIONS AGAIN USING THE NEXT LARGER NOMINAL PIPE SIZE. CONTINUE IN THIS MANNER UNTIL "F" IS LESS THAN OR EQUAL TO 335 TO FIND THE REQUIRED PIPE SIZE.

APPROXIMATE VOLUME OF PIPE RUNS	
NOMINAL SIZE (INCHES)	GALLONS/ 100 FEET
1 1/2"	9.5
2"	16.75
2 1/2"	26
3	36.5

CHILLER ANTI-FREEZE

IT IS CRITICAL THAT THE R1200 CHILLER BE FILLED WITH A PROPER MIXTURE PROPYLENE GLYCOL ANTI-FREEZE AND DISTILLED WATER (35% PROPYLENE GLYCOL BY VOLUME). AN IMPROPERLY MIXED SOLUTION WILL HAVE A NEGATIVE IMPACT ON THE EFFICIENCY OF THE CHILLER. **ONLY APPROVED BRANDS MAY BE USED (SEE CHART BELOW). DO NOT USE AUTOMOTIVE ANTIFREEZE. USE OF AUTOMOTIVE ANTIFREEZE WILL DAMAGE THE SYSTEM.**

PROPYLENE GLYCOL SUPPLIER LIST	
SUPPLIER	BRAND NAME
DOW CHEMICAL (RECOMMENDED)	DOWFROST
HOUGHTON CHEMICAL	SAFE-T-THERM
INTERSTATE CHEMICAL CO	INTERCOOL NFP
HUNTSMAN PETROCHEMICAL	JEFFCOOL P-155
NOBLE COMPANY	NO-BURST-100



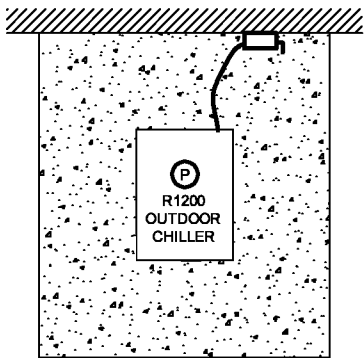
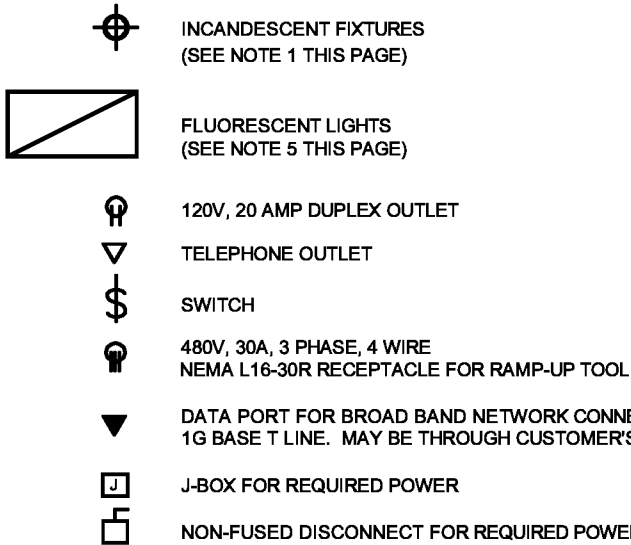
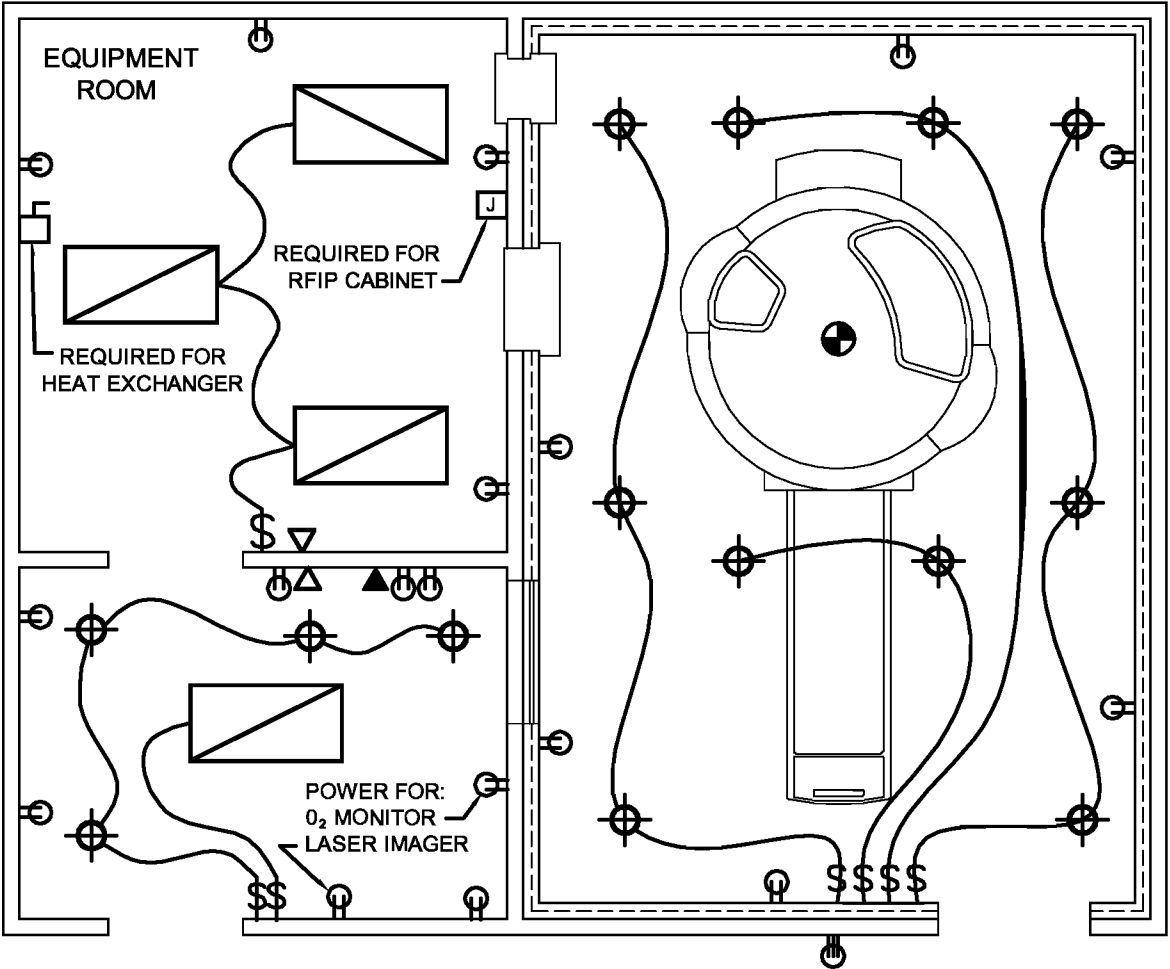
EQUIPMENT ROOM PIPING

SEE CUTOMER/INSTALLING CONTRACTOR'S RESPONSIBILITIES (PG11 OF 27) FOR COMPLETE DETAILS.

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# ELECTRICAL - LIGHTING



## LIGHTING NOTES

THE LIGHTING IN THE SUITE SHOULD BE DESIGNED TO ALLOW MULTIPLE LEVELS OF BRIGHTNESS. THE FOLLOWING POINTS MUST BE REVIEWED TO ENSURE THE PROPER DESIGN OF THE LIGHTING AND ELECTRICAL SYSTEMS FOR THE SUITE.

- 1) RECESSED CANS AND/OR WALL SCONCES ARE RECOMMENDED. WALL SCONCES SHOULD HAVE THE MINIMAL AMOUNT OF FERROUS MATERIALS POSSIBLE. REMOVABLE ACCESSORIES (SHADES, GRILLS, BAFFLES) MUST BE NON-FERROMAGNETIC. WHEN USING RECESSED CAN LIGHTS, **ONLY HMSA APPROVED UNITS MAY BE USED**. SEE OEM VENDOR PAGE (BACK COVER OF THIS DOCUMENT) FOR APPROVED UNITS. THESE FIXTURES MAY BE ORDERED THROUGH ANY ELECTRICAL SUPPLY HOUSE.
- 2) WALL SCONCES MAY BE HELPFUL WHEN THE CEILING HEIGHT IS A CONCERN OR TO OBTAIN LOW LEVEL AMBIENT LIGHT.
- 3) CARE SHOULD BE TAKEN WHEN LOCATING LIGHT FIXTURES. LIGHTS SHOULD NOT BE POSITIONED DIRECTLY ABOVE THE MAGNET GANTRY OR OVER THE TABLE WHERE THEY MIGHT SHINE DIRECTLY INTO THE PATIENT'S EYES.
- 4) TRACK LIGHTING IS NOT PERMITTED IN THE SCAN ROOM. REMOVABLE LIGHT FIXTURES CAN CREATE A SAFETY RISK. ADDITIONALLY, FIXTURES TEND TO LOOSEN SLIGHTLY IN THE TRACK OVER TIME, ALLOWING MINOR VIBRATIONS THAT MAY CAUSE IMAGE QUALITY ISSUES.
- 5) FLUORESCENT LIGHTS (INCLUDING COMPACT FLUORESCENT BULBS) ARE NOT PERMITTED IN THE SCAN ROOM. USE ONLY INCANDESCENT OR MRI RATED L.E.D. LIGHTING. REDUCED INCANDESCENT BULB LIFE CAN BE EXPECTED DUE TO THE PULSING OF THE MAGNETIC FIELD IN THE SCAN ROOM. ROUGH USAGE BULBS ARE RECOMMENDED. FLUORESCENT LIGHTS IN THE CONTROL AND EQUIPMENT ROOMS SHOULD NOT BE ON WHEN SCANNING.
- 6) IF L.E.D. LIGHTS ARE USED, THEY MUST BE TRUE 120V UNITS AND NOT HAVE ANY TYPE OF INTERNAL TRANSFORMER IN EITHER THE BULB OR FIXTURE. WHEN CONFIGURING LIGHTING SCHEMES UTILIZING L.E.D. LIGHTING, CARE MUST BE TAKEN TO ENSURE THE NUMBER OF FIXTURES AND THEIR LOCATION WILL PROVIDE THE LUMEN LEVELS DESIRED. EXTERNAL/REMOTE TRANSFORMERS FOR LED LIGHTING FIXTURES MUST BE LOCATED OUTSIDE OF THE SCAN ROOM AND ELECTRICAL LINES INTO THE SCAN ROOM MUST PASS THROUGH AN EMI FILTER.
- 7) STANDARD INCANDESCENT RHEOSTAT TYPE AC DIMMERS ARE NOT PERMITTED IN THE MRI SUITE (SCAN, CONTROL AND EQUIPMENT ROOMS). A MULTI-SWITCH DESIGN SHOULD BE USED TO ADJUST LIGHTING LEVELS IN THE SCAN ROOM. LIGHTING NEEDS RANGE FROM LOW LEVELS FOR PATIENT COMFORT DURING SCANNING (BELOW 20 LUMENS/SF), TO MID LEVELS (20-30 LUMENS/SF) FOR PATIENT TRANSFER AND HOUSEKEEPING FUNCTIONS, TO HIGHER LEVELS (40+ LUMENS/SF) FOR PATIENT INJECTIONS AND EQUIPMENT MAINTENANCE, PER THE RECOMMENDATIONS OF THE ILLUMINATION ENGINEERING SOCIETY OF NORTH AMERICA (IESNA).
- 8) LIGHTING CIRCUITS MUST NOT CREATE A PERIPHERAL LOOP AROUND THE MAGNET. THIS WILL CAUSE INTERFERENCE TO THE SYSTEM WHEN IMAGING.
- 9) EQUIPMENT ROOM LIGHTING SHOULD BE A MINIMUM OF 40 LUMENS/SQ.-FT.
- 10) THE ELECTRICAL POWER FOR THE LIGHTING AND RECEPTACLES IN THE SUITE IS TO BE DERIVED FROM THE MRI SUB PANEL AND SHARE A COMMON GROUND (SEE THE ELECTRICAL SHEETS FOR FURTHER DETAILS). THE ELECTRICAL CONTRACTOR MUST COORDINATE BOTH THE NUMBER AND LOCATION OF EMI FILTERS WITH THE RF VENDOR.
- 11) WHILE SPECIFIC COMPONENTS MAY REQUIRE OUTLETS AS NOTED, ADDITIONAL CONVENIENCE OUTLETS ARE REQUIRED IN THE SUITE (MINIMUM ONE PER WALL) FOR SERVICING AND MAINTENANCE.
- 12) OUTLETS LOCATED ON WALLS WITH SURFACE MOUNTED WIREWAYS MUST BE INSTALLED HIGH ENOUGH TO ENSURE THEY WILL NOT BE COVERED BY THE WIREWAY (TOP AT 24" A/FF).
- 13) LOCATION OF NETWORK CONNECTIONS, TELEPHONE LINE JACKS, REQUIRED OUTLETS, ETC. WILL VARY. NETWORK CONNECTIONS AND TELEPHONE LINE JACKS ARE NOT PERMITTED IN THE SCAN ROOM. REFER TO SITE SPECIFIC DRAWING FOR ACTUAL PLACEMENT.
- 14) REQUIREMENTS FOR ALL NON HITACHI SUPPLIED COMPONENTS MUST BE VERIFIED WITH EQUIPMENT VENDOR OR MANUFACTURER FOR ACTUAL PLACEMENT.

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### ELECTRICAL - LIGHTING

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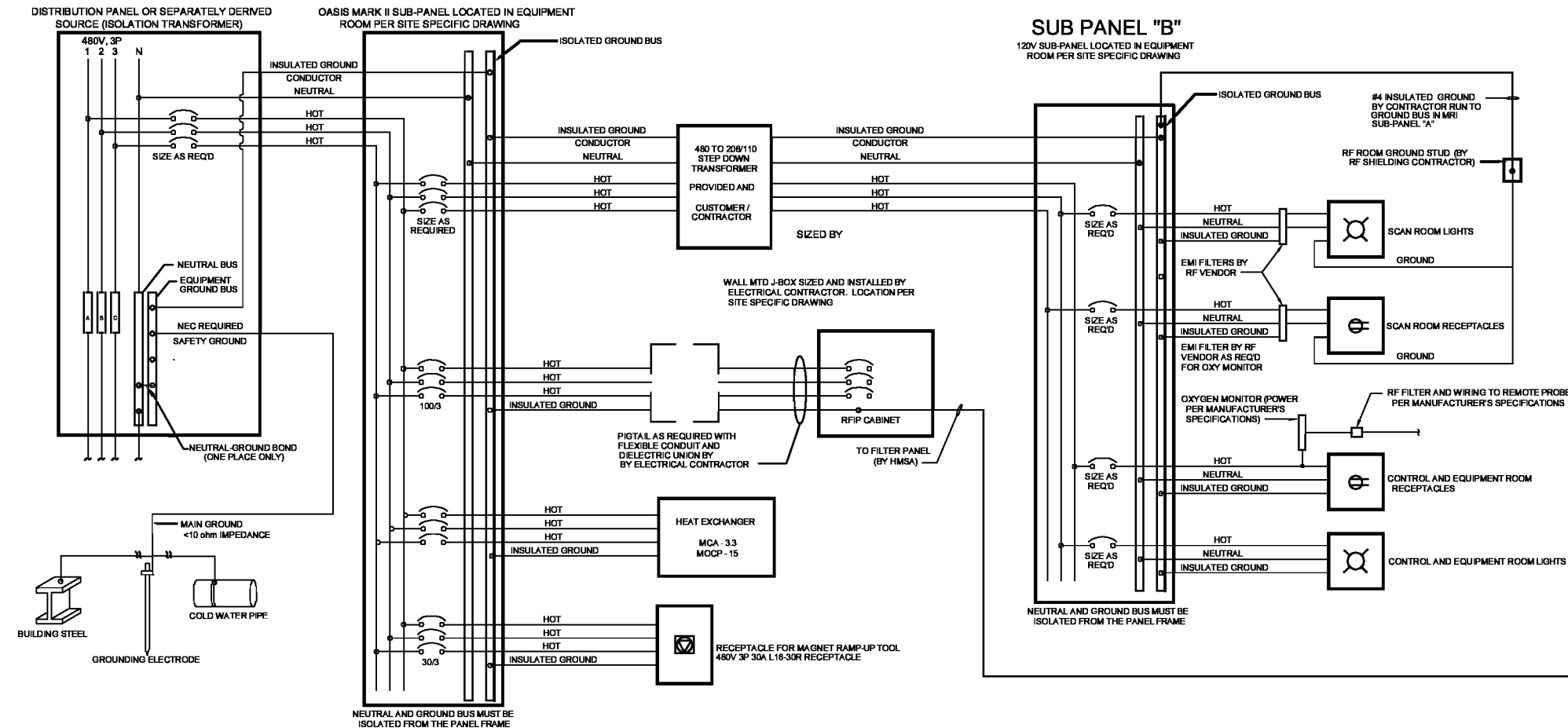
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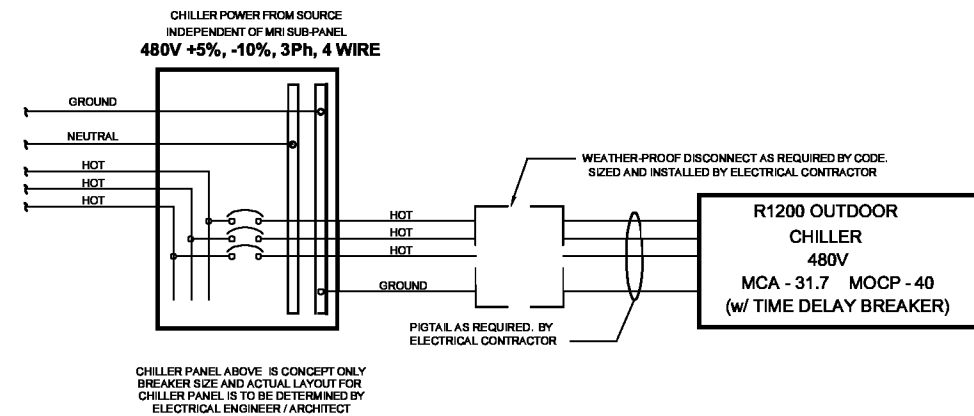


# ELECTRICAL - PANEL SCHEMATIC

## OASIS MRI SUITE

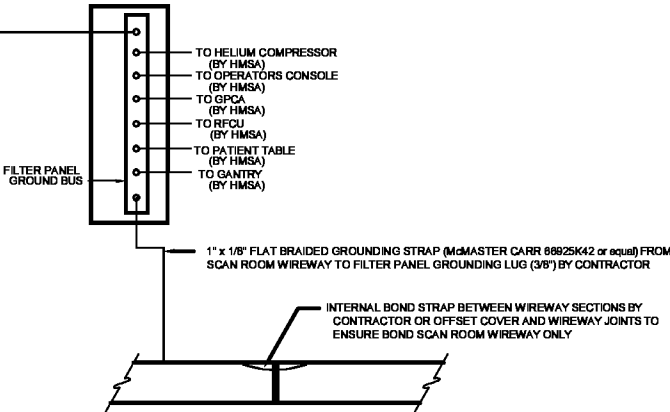


## CHILLER SYSTEM WHEN SUPPLIED BY HMSA



### NOTE:

- 1) CUSTOMER'S ELECTRICAL ENGINEER IS RESPONSIBLE FOR SIZING PANELS, CIRCUITS AND WIRE SIZE AS REQUIRED.
- 2) IF A UPS SYSTEM IS TO BE INSTALLED, FOR THE OASIS MARK II, THE AMPACITY OF THE CIRCUIT MUST BE ADJUSTED TO COMPENSATE FOR THE POWER CONSUMPTION OF THE UPS. CONTACT SITE PLANNING DEPARTMENT FOR MORE INFORMATION.
- 3) QUANTITY AND LOCATION OF RF FILTERS FOR CIRCUITS TO SCAN ROOM TO BE COORDINATED BETWEEN THE CONTRACTOR AND RF SHIELDING VENDOR
- 4) ALL WORK SHALL CONFORM TO APPLICABLE BUILDING CODES.
- 5) ALTHOUGH THE MRI SUB-PANEL SHOWN ON THIS PAGE MAY BE LOCATED IN CLOSE PROXIMITY TO THE GANTRY, IT DOES NOT EFFECT SYSTEM PERFORMANCE. OTHER THREE PHASE PANELS OR WIRING WITHIN THE 20' RESTRICTED AREA ON THE SITE SPECIFIC PLAN MAY HAVE AN ADVERSE EFFECT ON IMAGE QUALITY. REFER TO PROXIMITY CHARTS FOR FURTHER INFORMATION.
- 6) THE USE OF STANDARD FERROUS RIGID CONDUIT AND WORK BOXES WITHIN THE SCAN ROOM IS ACCEPTABLE. **WHIPS TO AND BETWEEN LIGHT FIXTURES WITHIN THE SCAN ROOM SHOULD BE FLEXIBLE ENT IF PERMISSIBLE**. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SECURING ALL CONDUITS (INCLUDING FLEXIBLE WHIPS) TO PREVENT CONTACT WITH OTHER METALLIC ITEMS (I.E.: CEILING GRID, RF SHIELD) OR MOVEMENT CAUSED BY THE PULSATION OF THE MAGNETIC FIELD.
- 7) IF A FACILITY'S ONLY POWER IS 208V, 3 PHASE, AN ALTERNATE PANEL SCHEMATIC UTILIZING 208V, 3 PHASE AS THE PRIMARY POWER IN CONJUNCTION WITH STEP-UP TRANSFORMERS IS AVAILABLE. CONTACT THE SITE PLANNING DEPARTMENT TO OBTAIN A COPY.



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### ELECTRICAL - PANEL SCHEMATIC

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# ELECTRICAL - GENERAL NOTES

## OASIS MARK II POWER REQUIREMENTS:

**VOLTAGE:** 480V, 3 PHASE, 4 WIRE, DELTA or WYE  
**REGULATION:** +/- 5% REGULATION NO LOAD TO FULL LOAD  
**FREQUENCY:** 50/60 HZ +/- LESS THAN 1%  
**LOAD CAPACITY:** 75 KVA  
**CIRCUIT BREAKER SIZE:** 100 AMPS

**NOTE:** THIS IS THE LOAD FOR THE OASIS MARK II SYSTEM ONLY. THE LOADS FOR THE CHILLER, HEAT EXCHANGER AND SUITE LIGHTS/OUTLE MUST BE CALCULATED SEPARATELY. TOTAL ELECTRICAL SERVICE REQUIREMENTS FOR THE SUITE AND EQUIPMENT MUST BE DETERMINED BY AN ELECTRICAL ENGINEER OR OTHER QUALIFIED INDIVIDUAL.

POWER CONFIGURATION MUST BE A TRUE 3 PHASE SYSTEM. 3 WIRE CORNER GROUNDED TRANSFORMERS ARE NOT ALLOWED

## OASIS MARK II POWER CONSUMPTION:

**IN RUSH AT POWER ON:** 31 KW  
**SYSTEM "OFF" AT NIGHT:** 8.3 KW  
**SYSTEM "ON" AT IDLE:** 11KW  
**LOW LEVEL SCAN (S/N SCAN):** 20 KW  
**HIGH LEVEL SCAN (GC MAX SEQUENCE):** 75 KW

## PROVIDED BY HITACHI MEDICAL SYSTEMS AMERICA:

**HMSA WILL BE RESPONSIBLE FOR THE FOLLOWING:**

- 1) AC POWER WIRING AND CONNECTIONS FROM THE RFIP CABINET TO ALL SYSTEM COMPONENTS EXCEPT THE HEAT EXCHANGER.
- 2) GROUNDING CONDUCTORS FROM RFIP CABINET TO ALL SYSTEM COMPONENTS EXCEPT HEAT EXCHANGER.
- 3) PROVIDING AND INSTALLING ALL SYSTEM INTERCONNECT CABLES. THIS BECOMES THE CUSTOMER'S RESPONSIBILITY SHOULD UNION LABOR OR OTHER FACTORS PROHIBIT INSTALLATION BY HMSA PERSONNEL.

## PROVIDED BY THE ELECTRICAL CONTRACTOR:

**THE ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR SUPPLYING AND INSTALLING THE FOLLOWING:**

- 1) CIRCUIT BREAKER PANEL (MRI SUB-PANEL) TYPICALLY LOCATED IN THE EQUIPMENT ROOM. THIS PANEL SHALL ONLY SERVE LOADS AS SHOWN ON THE WIRING SCHEMATIC (PG. 14 OF 27). THE MRI SUB-PANEL SHALL BE PROVIDED WITH BOLT-ON BRANCH CIRCUIT BREAKERS AND AN ISOLATED GROUND BUS.
- 2) THE MRI SUB-PANEL FEEDER SHALL BE COPPER CONDUCTOR, SIZED AS REQUIRED BY NEC AND AS REQUIRED TO PROVIDE NECESSARY VOLTAGE LEVEL AT RFIP CABINET. THE FEEDERS SHALL BE FROM A CIRCUIT BREAKER OR FUSED SWITCH SIZED PER NEC IN A DISTRIBUTION PANEL AT THE SERVICE ENTRANCE OR THE SOURCE OF THE SEPARATELY DERIVED SYSTEM.
- 3) BRANCH CIRCUIT WIRING FROM THE MRI SUB PANEL TO THE RFIP CABINET AS SHOWN ON THE SCHEMATIC (PG14 OF 27), A PIGTAIL LONG ENOUGH TO ALLOW THE RFIP TO BE MOVED 6' PLUS AN ADDITIONAL 5' FOR USE INTERNAL TO THE CABINET IS REQUIRED. A 2" FLEXIBLE CONDUIT FROM THE JUNCTION BOX TO THE CABINET WITH A DIELECTRIC UNION AT ONE END IS ALSO REQUIRED.
- 4) INSTALL CRIMP TERMINAL LUGS ON POWER WIRING TO RFIP CABINET. SIZE AS APPROPRIATE FOR WIRE GAUGE AND MOUNTING TO 3/8" ATTACHMENT STUD IN RFIP CABINET.
- 5) IF THE MRI SUB PANEL IS NOT LOCATED IN THE EQUIPMENT ROOM, A SURFACE MOUNTED DISCONNECT SWITCH (NON-FUSED) IS REQUIRED IN CLOSE PROXIMITY TO THE RFIP CABINET. SIZE AS REQUIRED BY CODE.
- 6) BRANCH CIRCUITS AND WIRING TO BOTH THE OUTDOOR COMPONENT OF THE CHILLER SYSTEM (TYPICALLY SUPPLIED BY HMSA) AND THE HEAT EXCHANGER IN THE EQUIPMENT ROOM (PG 14 OF 27).
- 7) L16-30R RECEPTACLE FOR MAGNET RAMP UP TOOL. LOCATION AS SHOWN ON SITE SPECIFIC DRAWING.
- 8) LIGHTING AND CONTROLS IN MRI SCAN, CONTROL, AND EQUIPMENT ROOMS (PG. 13 OF 27).
- 9) 120V RECEPTACLES WITH ISOLATED GROUND TERMINALS IN MRI SCAN, CONTROL, AND EQUIPMENT ROOMS.
- 10) ISOLATED GROUNDING SYSTEM FOR ALL LOADS FED BY MRI SUB-PANEL (SEE GROUNDING NOTES).
- 11) RF SHIELD GROUNDING WITH AN INSULATED #4 AWG COPPER GROUNDING CONDUCTOR FROM RF SHIELD GROUND STUD TO THE FILTER PANEL OR TO ISOLATED GROUND BUS IN MRI SUB-PANEL.
- 12) 1" x 1/8" FLAT BRAIDED GROUND STRAP FROM FILTER PANEL TO SCAN ROOM WIREWAY AND BONDING BETWEEN WIREWAY SECTIONS IN SCAN ROOM.
- 13) CONDUIT AND ENCLOSURE GROUNDING FOR ALL FEEDER AND BRANCH WIRING PER NEC REQUIREMENTS (SEE GROUNDING NOTES).
- 14) CONFIGURATION AND INSTALLATION OF ANY POWER CONDITIONING OR UPS EQUIPMENT. SEE NOTE BELOW AND CONTACT THE SITE PLANNING DEPARTMENT FOR FURTHER INFORMATION.
- 15) BRANCH CIRCUIT WIRING FROM BUILDING DISTRIBUTION SYSTEM FOR LASER IMAGER AND EMERGENCY EXHAUST FAN PER MANUFACTURER'S SPECIFICATION AS REQUIRED PER NEC REQUIREMENTS.
- 16) WIREWAYS AS SPECIFIED ON HMSA SITE SPECIFIC DRAWING. WIREWAYS MUST BE NON-FERROUS METAL AND ARE TYPICALLY 6 " X 24" WIREWAY WITH THREE (3) DIVIDERS (FOUR [4]- 6" X 6" SECTIONS) WITH REMOVABLE COVERS.
- 17) OUTLETS, CONDUITS, JUNCTION BOXES AS NOTED ON HMSA SITE SPECIFIC DRAWING.
- 18) **THE USE OF STANDARD FERROUS RIGID CONDUIT AND WORK BOXES WITHIN THE SCAN ROOM IS ACCEPTABLE. WHIPS TO AND BETWEEN LIGHT FIXTURES WITHIN THE SCAN ROOM SHOULD BE FLEXIBLE ENT (ELECTRICAL NON-METALIC TUBING) IF PERMISSIBLE. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SECURING ALL CONDUITS (INCLUDING FLEXIBLE WHIPS TO PREVENT CONTACT WITH OTHER METALLIC ITEMS (I.e.: METAL STUDS, CEILING GRID, RF SHIELD) OR MOVEMENT CAUSED BY THE PULSATION OF THE MAGNETIC FIELD.**

**NOTE:** SHOULD A UPS SYSTEM BE REQUIRED, ONLY SYSTEMS THAT HAVE BEEN TESTED AND FOUND ACCEPTABLE BY HMSA ARE RECOMMENDED. RECOMMENDED MINIMUM CAPACITY, 112.5 KVA. CONTACT THE SITE PLANNING DEPARTMENT FOR ADDITIONAL INFORMATION.

## R1200 CHILLER POWER REQUIREMENTS:

**VOLTAGE:** 480V, 3 PHASE, 4 WIRE, DELTA or WYE  
**REGULATION:** + 5%, -10%  
**FREQUENCY:** 50/60 HZ +/- LESS THAN 1%  
**CIRCUIT BREAKER SIZE:** MCA 31.7 AMPS, MOCP 40 AMPS

## PROVIDED BY THE RF SHIELDING VENDOR:

**THE RF VENDOR WILL BE RESPONSIBLE FOR SUPPLYING AND INSTALLING THE FOLLOWING:**

- 1) EMI FILTERS AT EACH LOCATION WHERE AN ELECTRICAL FEED PASSES THROUGH THE RF SHIELDING. THE LOCATION AND NUMBER OF THESE FILTERS MUST BE COORDINATED WITH THE ELECTRICAL CONTRACTOR.
- 2) EMI FILTER AS REQUIRED TO MOUNT OXYGEN MONITOR PROBE IN SCAN ROOM WITH MONITOR IN REMOTE LOCATION.
- 3) RF WAVEGUIDES AT EACH LOCATION WHERE AN HVAC DUCT OR AIR INLET PASSES THROUGH THE RF SHIELDING. THE LOCATION AND NUMBER OF THESE WAVEGUIDES MUST BE COORDINATED WITH THE HVAC CONTRACTOR
- 4) A GROUND STUD ON THE RF SHIELD. THIS GROUND STUD SHALL BE CONNECTED TO THE GROUND BUS OF THE FILTER PANEL (OR ISOLATED GROUND BUS IN THE MRI SUB-PANEL) WITH AN INSULATED #4 AWG COPPER GROUNDING CONDUCTOR AS NOTED IN THE ELECTRICAL CONTRACTOR SECTION.

## GROUNDING NOTES

**AN ISOLATED GROUNDING SYSTEM SHALL BE PROVIDED FOR ALL LOADS CONNECTED TO THE MRI SUB-PANEL AS FOLLOWS:**

- 1) AN ISOLATED GROUND BUS SHALL BE PROVIDED IN THE MRI SUB-PANEL. THIS BUS SHALL BE INSULATED FROM THE PANEL ENCLOSURE.
- 2) AN INSULATED COPPER CONDUCTOR SHALL BE RUN FROM THE SYSTEM MAIN GROUND BUS (THE POINT WHERE THE NEUTRAL CONDUCTOR OF THE ELECTRICAL SERVICE OR SEPARATELY DERIVED POWER SOURCE IS BONDED TO THE GROUNDING ELECTRODE CONDUCTOR) TO THE ISOLATED GROUND BUS IN THE MRI SUB-PANEL. THIS CONDUCTOR SHALL BE SIZED AS A NEUTRAL CONDUCTOR AND SHALL BE RUN IN CONDUIT ALONG WITH THE FEEDER CONDUCTORS SUPPLYING THE PANEL.
- 3) AN INDIVIDUAL INSULATED COPPER CONDUCTOR SHALL BE RUN FROM THE ISOLATED GROUND BUS FOR EACH CIRCUIT ORIGINATING IN THE MRI SUB-PANEL TO THE GROUND TERMINAL OF THE LOAD SERVED. GROUNDING CONDUCTORS SHALL BE THE SAME SIZE AS CIRCUIT CONDUCTORS AND RUN IN CONDUIT WITH BRANCH CIRCUIT CONDUCTORS.

**RACEWAY AND ENCLOSURE GROUNDING SHALL BE PROVIDED AS REQUIRED BY NEC FOR ALL FEEDER AND BRANCH CIRCUIT WIRING AS FOLLOWS:**

- 1) ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE INSTALLED IN STEEL CONDUIT AND BOXES TO SHIELD CONDUCTORS FROM MAGNETIC INTERFERENCE. ALL CONDUITS SHALL BE SECURED IN SUCH A MANNER AS TO PREVENT POTENTIAL MOVEMENT AND ENSURE PROPER GROUNDING.
- 2) METALLIC CONDUIT AND BOXES SHALL BE BONDED TOGETHER BY MEANS OF APPROVED CONNECTORS INSTALLED IN ACCORDANCE WITH NEC REQUIREMENTS WITH BONDING JUMPERS WHERE NECESSARY TO PROVIDE A CONDUCTIVE GROUNDING PATH FROM EACH OUTLET BACK TO MAIN SYSTEM GROUND AT ELECTRICAL SERVICE OR SOURCE OF SEPARATELY DERIVED SYSTEM.
- 3) GROUNDED METALLIC RACEWAY SYSTEM SHALL BE ISOLATED FROM THE RFIP CABINET AND OTHER SYSTEM COMPONENTS AS WELL AS EMI FILTERS BY COUPLING WITH DIELECTRIC CONNECTORS OR NON-METALLIC CONDUIT. THE GROUNDING OF EQUIPMENT ISOLATED FROM METALLIC RACEWAY SYSTEM SHALL BE BY MEANS OF ISOLATED GROUNDING SYSTEM CONDUCTOR.
- 4) RF SHIELD GROUNDING SHALL BE PROVIDED BY INSTALLATION OF AN INSULATED #4 AWG COPPER CONDUCTOR RUN FROM RF ROOM GROUND STUD TO THE ISOLATED GROUND BUS IN THE MRI SUB-PANEL. GROUNDING OF THE BUS IN FILTER PANEL TO RFIP CABINET WILL BE PROVIDED BY HMSA.
- 5) ELECTRICAL SYSTEM GROUNDING SHALL BE VERIFIED BY ELECTRICAL CONTRACTOR. THE SYSTEM NEUTRAL SHALL BE GROUNDED AT ONE POINT ONLY. THE NEUTRAL MAY BE GROUNDED AT EITHER THE SERVICE ENTRANCE OR AT THE SOURCE OF THE SEPARATELY DERIVED SYSTEM BY CONNECTION TO A NEC REQUIRED GROUNDING ELECTRODE SYSTEM.
- 6) GROUNDING ELECTRODE SYSTEM SHALL BE VERIFIED AND SUPPLEMENTED IF NECESSARY BY THE ELECTRICAL CONTRACTOR. THE GROUNDING ELECTRODE SYSTEM SHALL BE PROVIDED AS REQUIRED BY NEC AND SHALL INCLUDE THE FOLLOWING (WHERE AVAILABLE) AND BONDED TOGETHER: METAL UNDERGROUND WATER SERVICE PIPE, METAL FRAME OF BUILDING AND OTHER ELECTRODES REQUIRED BY NEC. IF NOT EXISTING, THE ELECTRICAL CONTRACTOR SHALL PROVIDE ONE OR MORE DRIVEN GROUND ROD OR PLATE ELECTRODES BONDED TO THE EXISTING GROUNDING ELECTRODE SYSTEM BY MEANS OF A CONDUCTOR SIZED PER NEC. THE RESISTANCE TO GROUND OF THE MAIN ELECTRODE SHALL BE NO MORE THAN 10 OHMS.

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### ELECTRICAL - GENERAL NOTES

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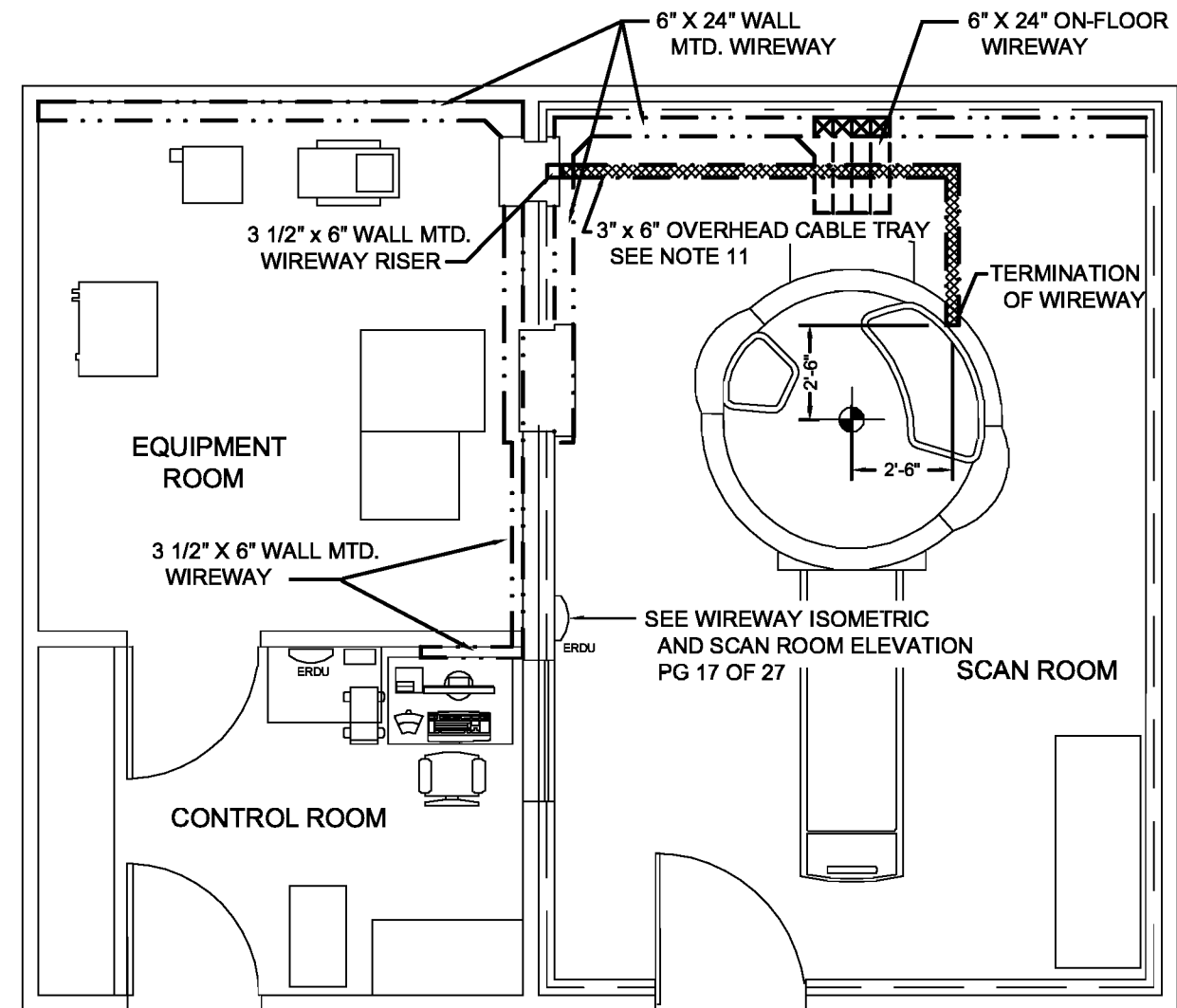
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# WIREWAYS

## WIREWAY NOTES

- ALL WORK IS TO CONFORM TO APPLICABLE BUILDING CODES. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL WIREWAYS, JUNCTION BOXES, AND CONDUITS AS INDICATED IN THESE STANDARD DETAILS AND AS SHOWN ON THE CUSTOMER'S SITE SPECIFIC HMSA DRAWING.
- 1) THE WIREWAYS PROVIDE THE METHOD AND MEANS TO HOUSE AND PROTECT THE SYSTEM INTERCONNECTION CABLING. EACH WIREWAY COMPARTMENT HOUSES CABLES THAT PERFORM DIFFERENT SPECIFIC FUNCTIONS. FOR THE EXACT RUNS REQUIRED, REFER TO YOUR HMSA SITE SPECIFIC DRAWING.
  - 2) THE WIREWAYS FOR THE SYSTEM MUST BE METALLIC AND PROVIDE FOR RF SEPARATION OF THE CABLES. WOOD AND PVC WIREWAYS ARE NOT ACCEPTABLE. NON-FERROMAGNETIC (ALUMINUM OR STAINLESS STEEL) WIREWAYS MUST BE USED IN THE SCAN ROOM. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THE MATERIAL CHOSEN COMPLIES WITH APPLICABLE BUILDING CODES.
  - 3) THE WIREWAY MUST PROVIDE FOUR (4) INDIVIDUAL COMPARTMENTS. THIS MAY BE ACCOMPLISHED USING A SINGLE 6" x 24" DUCT WITH THREE (3) DIVIDERS. THE DIVIDERS MUST BE CAPABLE OF SUPPORTING FOUR POUNDS PER LINEAR FOOT. AT THE DIRECTION OF THE HMSA INSTALLER, THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR CUTTING OUT DIVIDERS OR DUCTS FOR ALL CABLE TRANSITION AREAS. ELECTRICAL CONTRACTOR SHALL ALSO PROVIDE GROMMET MATERIAL FOR ALL OPENINGS CUT IN WIREWAY.
  - 4) THE WIREWAY MUST HAVE A REMOVABLE COVER. THE DIVIDERS MUST MAKE CONTACT WITH THE COVER TO FORM RF TIGHT COMPARTMENTS. **NOTE: SCREWS USED TO SECURE COVER MUST BE AS SHORT AS POSSIBLE AND SELF TAPPING SCREWS ARE NOT ALLOWED. CAUTION MUST BE USED WHEN SECURING COVERS TO ENSURE SCREWS DO NOT PENETRATE CABLES, WATER LINES OR HELIUM LINES.**
  - 5) ALL WIREWAYS MUST BE BONDED TO THE RF SHIELD. A FLAT GROUND STRAP (MIN. 1") TO THE HMSA FILTER PANEL MUST ALSO BE PROVIDED.
  - 6) AN ON-FLOOR OR IN-FLOOR WIREWAY WITH REMOVABLE COVER TO THE REAR OF THE GANTRY IS REQUIRED FOR SYSTEM INTERCONNECT CABLES.
  - 7) A WIREWAY WITH A REMOVABLE COVER AND ONE (1) DIVIDER (MIN. 3 1/2" X 6") IS REQUIRED FROM THE EQUIPMENT ROOM WIREWAY TO THE OPERATOR WORKSTATION LOCATION (REFER TO SITE SPECIFIC DRAWING FOR EXACT CONFIGURATION). MOUNTING HEIGHT MUST BE BETWEEN 3 1/2" A/FF (MIN.) AND 24" A/FF (MAX.). FOR SITES WHERE THE EQUIPMENT ROOM IS REMOTE FROM THE CONTROL ROOM, A 4" CONDUIT WITH MINIMUM 3'-0" RADIUS BENDS MAY BE UTILIZED. THE CONDUIT IS RUN FROM THE EQUIPMENT ROOM WIREWAY AND MUST TERMINATE IN A 8" X 8" X 6"d (MINIMUM, LARGER AS REQ'D BY CODE) JUNCTION BOX AT THE OPERATOR WORKSTATION LOCATION. THE JUNCTION BOX MOUNTING HEIGHT IS AS SPECIFIED ABOVE FOR WIREWAY. MAXIMUM CABLE LENGTH AVAILABLE FOR A CONDUIT RUN IS 39' BETWEEN THE REAR OF THE RFIP CABINET AND THE OPERATOR WORKSTATION LOCATION. A FISH LINE MUST BE PROVIDED BY THE ELECTRICAL CONTRACTOR IF CONDUIT IS USED.
  - 8) **THE ROUGH OPENING FOR THE FILTER PANEL IS BASED ON THE TOP OF THE WIREWAY BEING AT 24" A/FF** (SEE PG. 17 OF 27). DIFFERENCES BETWEEN WIREWAY MANUFACTURERS MAY EFFECT ACTUAL HEIGHT. AFTER SELECTING AND DESIGNING WIREWAY BASED ON CUSTOMER'S SITE SPECIFIC HMSA DRAWING, CONFIRM AND ADJUST FILTER PANEL ROUGH OPENING HEIGHT ABOVE FLOOR AS REQUIRED. COORDINATE ROUGH OPENING LOCATION WITH RF VENDOR.
  - 9) A COMPUTER FLOOR MAY BE UTILIZED IN THE EQUIPMENT ROOM IN LIEU OF WIREWAYS. IN SOME INSTANCES, A COMPUTER FLOOR MAY BE REQUIRED DUE TO INTERCONNECTING CABLE LIMITATIONS (SEE CUSTOMER'S SITE SPECIFIC HMSA DRAWING). IF A COMPUTER FLOOR IS USED, A MINIMUM CLEAR HEIGHT OF 8" BELOW THE FLOOR IS REQUIRED. ADDITIONALLY, IT IS THE CUSTOMER'S/CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE NECESSARY KNOCKOUTS (WITH PROTECTIVE GROMMET MATERIAL) AT ALL EQUIPMENT LOCATIONS, AS DIRECTED BY THE HMSA INSTALLER. THE CONTRACTOR, OR HIS REPRESENTATIVE MUST BE AVAILABLE DURING THE FIRST WEEK OF SYSTEM INSTALLATION.
  - 10) ALL WIREWAYS, JUNCTION BOXES, CONDUITS, AND COMPUTER FLOOR MUST BE IN PLACE AND COMPLETE PRIOR TO DELIVERY OF THE SYSTEM.
  - 11) A 3" X 6" OVERHEAD CABLE TRAY (WALKER WIREMOLD SPMA-A-6-3S OR EQ.) IS REQUIRED INSIDE THE SCAN ROOM, SUSPENDED 6" OR MORE BELOW THE RF CEILING. 3 1/2" X 6" WIREWAY RUNS FROM THE MCU PANEL, UP THE WALL TO THE CABLE TRAY ABOVE THE CEILING, WHICH TERMINATES ABOVE THE GANTRY BEHIND THE CRYOGEN VENT CONNECTION. THIS OVERHEAD CABLE TRAY MUST FOLLOW THE PATH INDICATED ON THE SITE SPECIFIC LAYOUT TO PREVENT THE MAGNETIC FIELD FROM CAUSING INTERFERENCE. TWO 1 3/4" WAVEGUIDES FOR THE HELIUM LINES ARE ALSO REQUIRED FROM THE EQUIPMENT ROOM TO THE OVERHEAD CABLE TRAY AT THE HEIGHT OF ITS HORIZONTAL RUN TO THE GANTRY. IF SCAN ROOM HAS A HARD (DRYWALL) CEILING RATHER THAN DROP CEILING, A CHANGE TO THE OVERHEAD TRAY SPECIFICATION MAY BE REQUIRED. CONSULT WITH SITE PLANNING DEPARTMENT.
  - 12) THE WIREWAY FOR CUSTOMER SITES WILL VARY FROM THAT SHOWN ON THESE PAGES. REFER TO THE SITE SPECIFIC HMSA OASIS MARK II DRAWING FOR FURTHER CLARIFICATION AND EXACT REQUIREMENTS. REFER TO THE ELECTRICAL SECTION OF THESE STANDARD DETAILS FOR THE OASIS MARK II A.C. POWER WIRING SPECIFICATIONS.
  - 13) THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL WORK CONFORMS TO APPLICABLE BUILDING CODES.
  - 14) REFER TO HMSA DRAWING FOR SITE SPECIFIC WIREWAY LAYOUT.

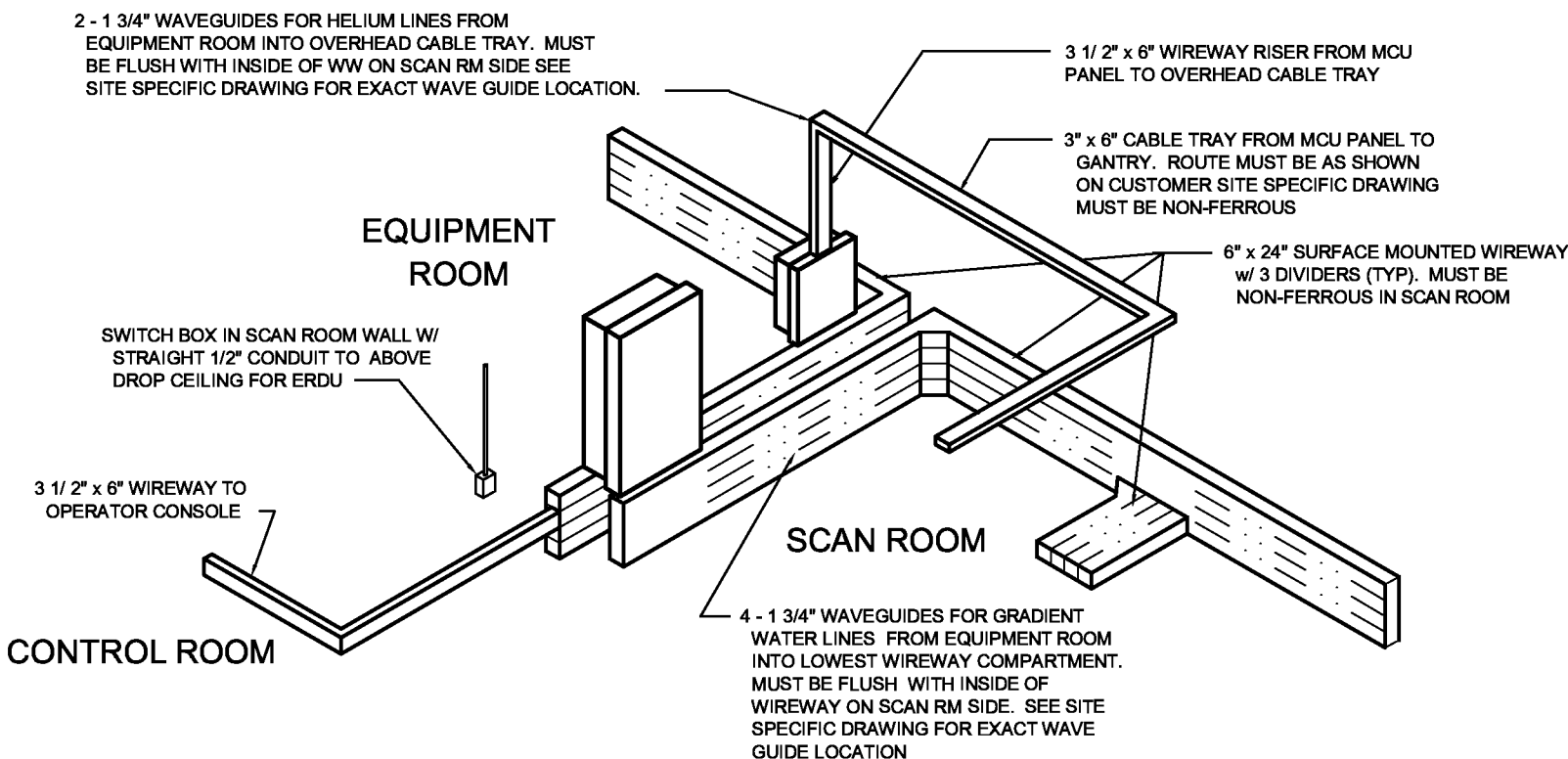


## WIREWAY PLAN

NOT TO SCALE

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<b>WIREWAYS</b>			
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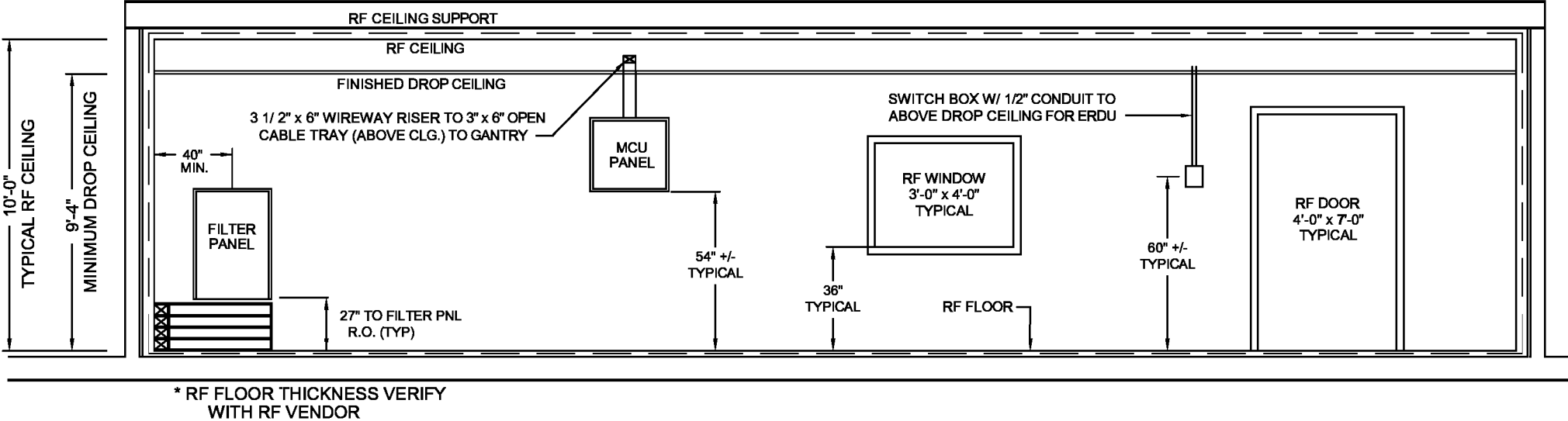
# WIREWAYS (CONT)



## WIREWAY ISOMETRIC

### FILTER PANEL NOTES

- 1) THE FILTER PANEL SHOULD BE SURFACE MOUNTED ON THE SCAN ROOM FINISHED WALL. THIS ASSURES THE CABLES WILL DROP CLEANLY INTO THE WIREWAY.
- 2) THE FILTER PANEL SHOULD BE MOUNTED SO THAT AN RF TIGHT SEAL IS PROVIDED AROUND THE PERIMETER. THE RF VENDOR MUST EXTEND THE RF SHIELD TO THE FINISHED SIDE OF THE SCAN WALL TO ENSURE A PROPER SEAL IS POSSIBLE.
- 3) THE FILTER PANEL SHOULD BE MOUNTED USING NON-CONDUCTIVE FRAMING TO MAINTAIN THE GROUNDING INTEGRITY.
- 4) IF METAL STUDS ARE USED, ROUGH OPENING (R.O.) MUST BE FRAMED IN WOOD ON BOTH SCAN AND EQUIPMENT ROOM SIDES.
- 5) FILTER PANEL ROUGH OPENING HEIGHT AFF SCAN ROOM FLOOR IS BASED ON TOP OF WIREWAY BEING 24" AT AFF. IF TOP OF WIREWAY IS DIFFERENT, ADJUST OPENING ACCORDINGLY. 3" GAP BETWEEN TOP OF WIREWAY AND FILTER PANEL ROUGH OPENING MUST BE MAINTAINED TO ENSURE FILTER PANEL COVER FITS PROPERLY.
- 6) FILTER PANELS MUST BE PLACED AS INDICATED ON THE SITE SPECIFIC DRAWING IN ORDER TO ENSURE PROPER FUNCTIONING OF THE SYSTEM
- 7) WIREWAYS MUST BE RUN AS SHOWN ON THE SITE SPECIFIC DRAWING IN ORDER TO ENSURE PROPER FUNCTIONING OF THE SYSTEM



## SCAN ROOM ELEVATION

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### WIREWAYS (CONTINUED)

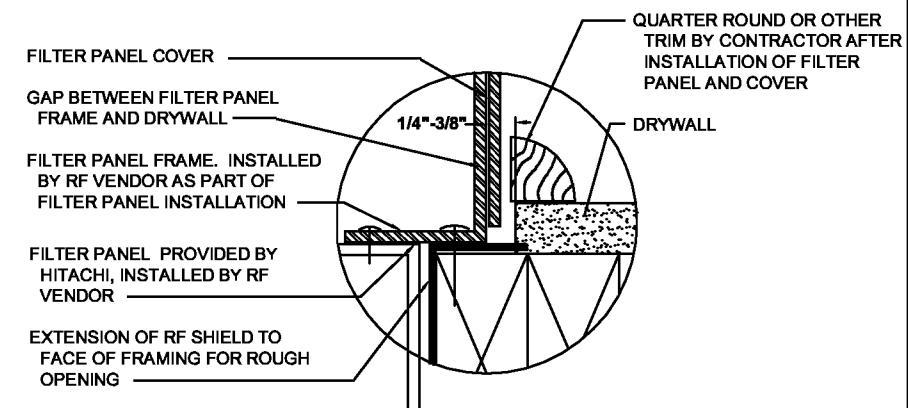
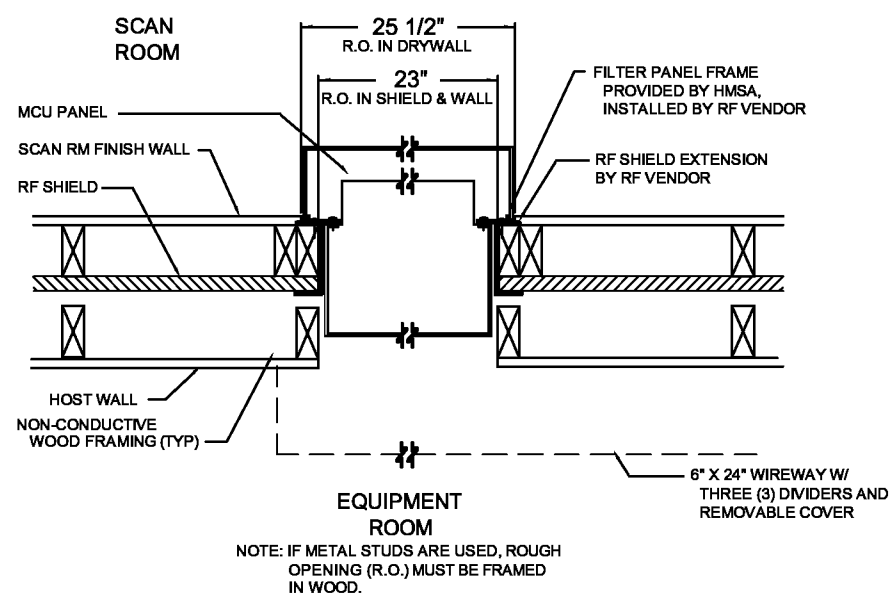
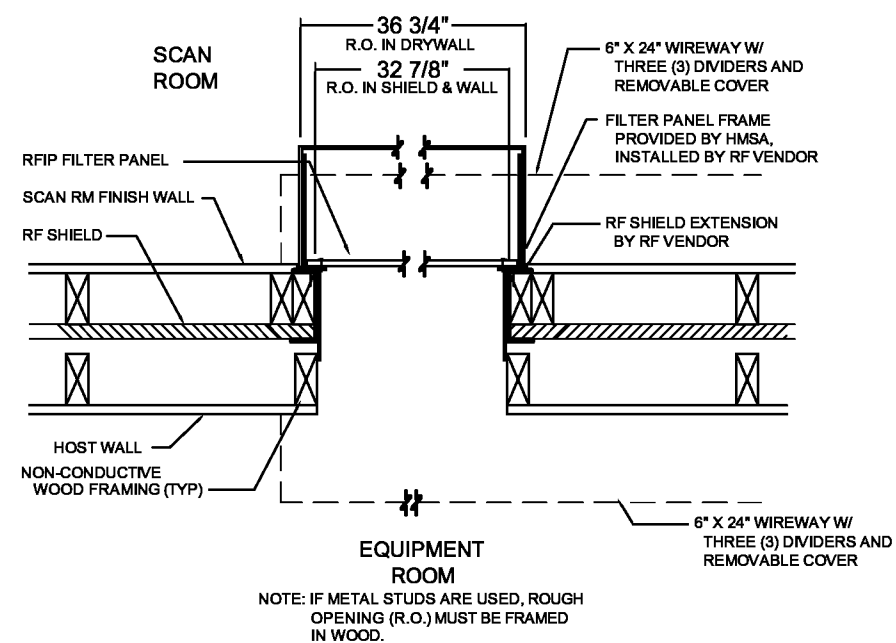
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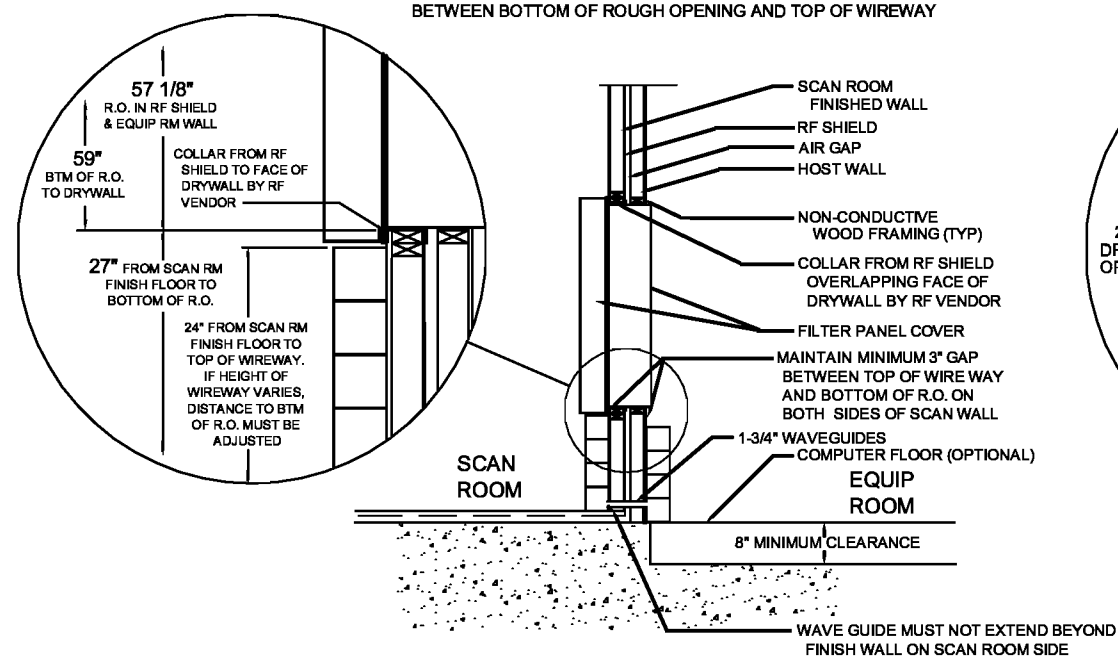
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## WIREWAYS (CONT)

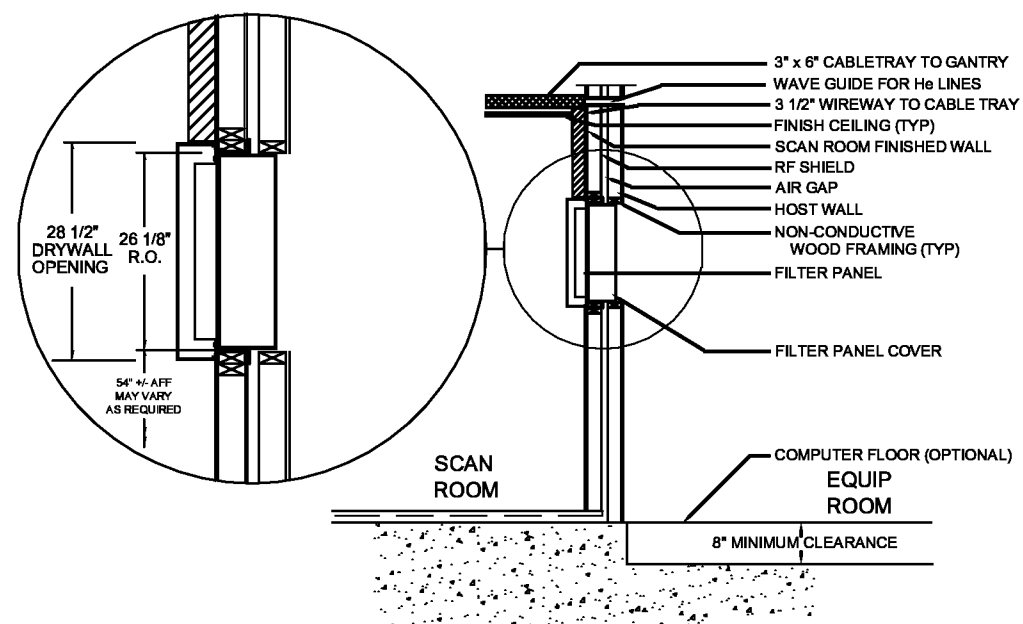


### TYPICAL FINISH DETAIL AT BOTH PANEL OPENINGS

**NOTE:** - DRYWALL TO BE HELD BACK 1 7/8" ABOVE ROUGH OPENING AT TOP  
- DO NOT INSTALL DRYWALL BELOW ROUGH OPENING  
BETWEEN BOTTOM OF ROUGH OPENING AND TOP OF WIREWAY



**SECTION: MAIN FILTER PANEL @ SCAN / EQUIP ROOM WALL**



**SECTION: MCU FILTER PANEL @ SCAN / EQUIP ROOM WALL**

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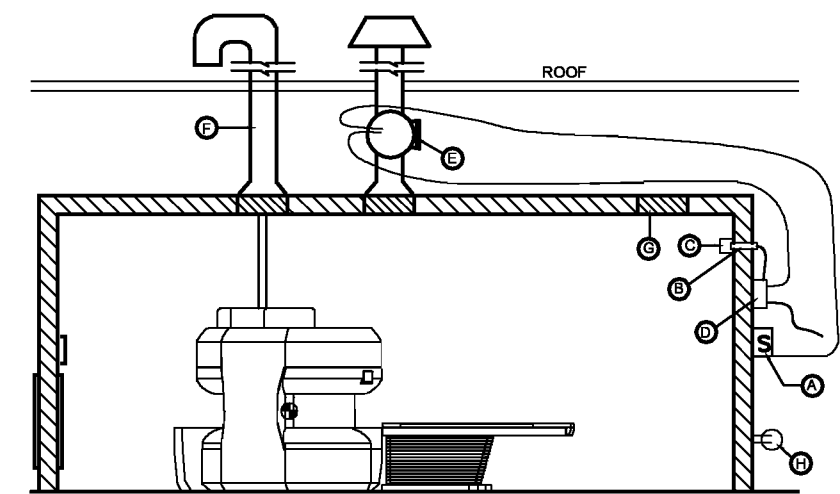
## OASIS MARK II STANDARD DETAILS

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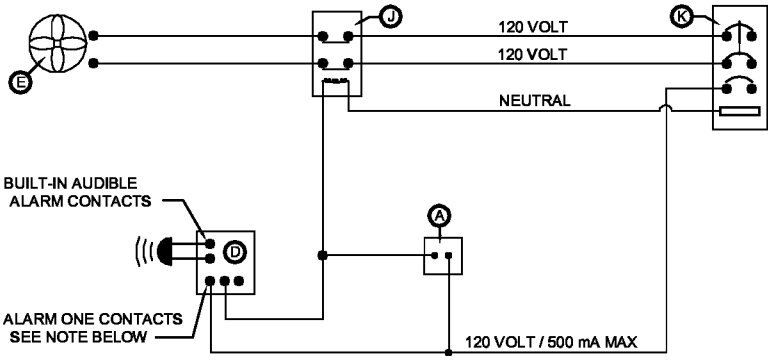
SAFETY

THE OASIS MARK II SYSTEM IS A HIGH FIELD SUPER CONDUCTIVE MAGNET THAT USES CRYOGENS FOR OPERATION. THE FOLLOWING MUST BE REVIEWED BY THE ARCHITECT OR ENGINEER, AND THE APPROPRIATE DESIGN SOLUTIONS INCORPORATED INTO THE SUITE.

- 1) A CRYOGEN VENT PIPE TO THE OUTSIDE MUST BE PROVIDED. THE VENT IS A MULTI-RESPONSIBILITY ITEM TO BE CONSTRUCTED AS FOLLOWS:
  - a. HMSA WILL PROVIDE AND INSTALL THE CONNECTION TO THE MAGNET WITH FLEXIBLE VENT PIPE.
  - b. THE RF VENDOR WILL PROVIDE A WAVE GUIDE (A PIPE WITH FLANGES) TO MAKE THE PENETRATION THROUGH THE RF ROOM FOR ATTACHMENT TO THE VENT.
  - c. THE CONTRACTOR WILL CONNECT TO THE WAVE GUIDE USING NON-CONDUCTIVE FASTENERS AND TAKE THE VENT TO THE OUTSIDE.
  - d. REFER TO THE SIZING CALCULATIONS ON PAGES 20 AND 21 FOR SIZE REQUIREMENTS.
- 2) FILLING THE OASIS MARK II WITH CRYOGEN (LIQUID HELIUM) IS ACCOMPLISHED USING "DEWARs" DELIVERED TO THE SITE. THESE DEWARs, BOTH FULL AND EMPTY, PRESENT A SAFETY CONCERN WHILE ON SITE. THE AMOUNT OF TIME ON SITE WILL VARY WITH LOCATION AND THE CUSTOMER MUST IDENTIFY A SECURE AND SAFE CRYOGEN STORAGE AREA. THIS MUST BE ADDRESSED DURING THE PLANNING STAGES OF THE PROJECT. A CLEAR AND LEVEL DELIVERY ROUTE (3'-6"w X 7'h) FROM THE STORAGE AREA TO THE SCAN ROOM MUST BE PROVIDED.
- 3) FOR PROTECTION OF ALL OCCUPANTS AND IN ACCORDANCE WITH OSHA REGULATIONS, HMSA REQUIRES AN EMERGENCY EXHAUST FAN IN THE SCAN ROOM. THE DUCT MUST EXTEND TO THE FINISHED CEILING. USE OF A CEILING PLENUM IS NOT ACCEPTABLE. THIS FAN SHALL BE CONTROLLED BY A MANUAL SWITCH LOCATED OUTSIDE OF THE SCAN ROOM. AN AIR INLET MUST ALSO BE INSTALLED IN THE RF SHIELD TO MAINTAIN A BALANCED ROOM PRESSURE WHEN THE FAN IS OPERATING AND WHEN THE SCAN ROOM DOOR IS OPENED OR CLOSED.
- 4) HELIUM IS CONSIDERED A SIMPLE ASPHYXIANT BY OSHA. IN ORDER TO ENSURE A FACILITY'S COMPLIANCE WITH OSHA REGULATIONS, HMSA HIGHLY RECOMMENDS THAT AN OXYGEN MONITOR CAPABLE OF AUTOMATICALLY OPERATING THE EXHAUST FAN BE INSTALLED IN ADDITION TO THE MANUAL SWITCH. IF AN OXYGEN MONITOR IS INSTALLED, THE CONTRACTOR WOULD BE RESPONSIBLE FOR SUPPLYING AND INSTALLING ALL OF ITS COMPONENTS. THE OXYGEN MONITOR SHOULD HAVE A BATTERY BACK-UP. THE CONTRACTOR MUST WORK WITH THE RF VENDOR TO COORDINATE THE PROPER RF ROOM PENETRATIONS.
- 5) **THE ONLY APPROVED OXYGEN MONITORS ARE A TELEDYNE 3350 OR MSA TOXGARD II.** THE OXYGEN MONITOR REFLECTED IN THESE PLANS IS A TELEDYNE 3350. THIS UNIT PROVIDES AN AUDIBLE ALARM AND TWO (2) CONTACTS FOR INTERCONNECT. ONE CONTACT WILL BE USED TO ACTIVATE THE EMERGENCY EXHAUST FAN. THE SECOND CAN BE USED TO ACTIVATE OTHER ALARMS TO ENSURE APPROPRIATE PERSONNEL ARE NOTIFIED IF A LOW OXYGEN ATMOSPHERE EXISTS. ONLY THE SENSOR PORTION OF THE OXYGEN MONITOR MAY BE MOUNTED IN THE SCAN ROOM. THE CONTROL PORTION OF THE OXYGEN MONITOR MUST BE MOUNTED IN THE CONTROL ROOM OR OTHER SPACE. CHECK TOTAL LENGTH OF CABLE NEEDED BEFORE ORDERING UNIT.
- 6) THE EMERGENCY STOP/QUENCH BUTTONS (ERDU) ARE INSTALLED AS PART OF THE OASIS MARK II SYSTEM. ONE IS LOCATED IN THE CONTROL ROOM, THE OTHER IN THE SCAN ROOM (REFER TO THE SITE SPECIFIC DRAWING FOR EXACT LOCATION). ACTIVATION OF EITHER SWITCH WILL RESULT IN A CRYOGEN RELEASE (VIA THE CRYOGEN VENT PIPE) DROPPING THE MAGNETIC FIELD TO .2 GAUSS IN UNDER 60 SECONDS. IF A CRYOGEN RELEASE OCCURS, THE MAGNET CAN NOT BE BROUGHT BACK UP TO FIELD WITHOUT SERVICING AND REFILLING THE SYSTEM.
- 7) IF CODE REQUIRES A SPRINKLER SYSTEM, THE DESIGN MUST BE COORDINATED WITH THE RF VENDOR TO ENSURE THE INTEGRITY OF THE RF SHIELD IS NOT COMPROMISED.
- 8) GUIDELINES SUCH AS THOSE PUBLISHED BY HMSA, CONCERNING THE PROXIMITY OF FERROUS OBJECTS TO THE MAGNET SHOULD BE OBSERVED. THE MAGNET'S FIELD IS CAPABLE OF RAPIDLY ACCELERATING UNRESTRAINED FERROUS ITEMS. THE GREATER THE MASS OF AN ITEM, THE STRONGER THE ATTRACTION CLOSE TO THE MAGNET. HUMAN STRENGTH MAY BE INSUFFICIENT TO RESTRAIN LARGER OBJECTS SUCH AS OXYGEN BOTTLES, CRASH CARTS AND PATIENT GURNEYS. SUCH ITEMS WILL BE DRAWN INTO (OR ONTO) THE MAGNET, POTENTIALLY CAUSING SEVERE INJURY OR DEATH TO PEOPLE IN THE ROOM AND DAMAGE TO THE MRI SYSTEM. SUCH OBJECTS MUST NOT BE ALLOWED INTO THE SCAN ROOM. SPECIAL NON-FERROUS EQUIPMENT SHOULD BE OBTAINED AND IDENTIFIED AS SAFE FOR USE IN THE SCAN ROOM.
- 9) IT IS THE CUSTOMER'S RESPONSIBILITY TO DISCUSS WITH AND ORIENT THEIR CLINICAL / MAINTENANCE STAFFS AND LOCAL EMERGENCY PERSONNEL TO MAGNET SAFETY.



- |  |  |
|--|--|
| <b>A</b> MANUAL FAN SWITCH (OUTSIDE SCAN ROOM DOOR)  | <b>F</b> CRYOGEN VENT  |
| <b>B</b> RF FILTER FOR TELEDYNE 3350 (9 PIN, D CONNECTOR BY RF VENDOR OR SUPPLIER REQUIRED) OR 1/2" WAVE GUIDE FOR MSA TOXGARD II (BY RF VENDOR) | <b>G</b> AIR INLET   |
| <b>C</b> OXYGEN PROBE (IF INSTALLING OPTIONAL OXYGEN MONITOR): 7'-0" A/F/F MINIMUM   | <b>H</b> 120V, 20A, REQUIRED POWER                                   |
| <b>D</b> OXYGEN MONITOR (OPTIONAL) - OPEN CONTACT FOR CUSTOMER USE   | <b>I</b> CONTACTOR/RELAY - 120V CONTACTOR WITH 120V COIL FOR PULL IN |
| <b>E</b> EMERGENCY EXHAUST FAN (1765 FT <sup>3</sup> /MIN OR GREATER RECOMMENDED)  | <b>K</b> MAIN PANEL  |



NOTE: WHEN LOW O<sub>2</sub> LEVEL OR A POWER FAIL OCCURS, ALARM ONE CONTACTS CLOSE. ALARM 1 CONTACTS ARE ONLY RATED FOR 500mA @120V. **DO NOT RUN FULL PURGE FAN AMPERAGE THROUGH O<sub>2</sub> SENSOR.** THE DIAGRAM ABOVE REFLECTS THE SCHEMATIC FOR THE TELEDYNE 3350 OXYGEN MONITOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE INSTALLATION OF THE OXYGEN MONITOR AND ALARM CIRCUIT CONFORMS WITH THE MANUFACTURER'S SPECIFICATION WHICH MAY VARY FROM WHAT IS SHOWN HERE.

Oasis Mark II Safety Information for Police, Fire, Emergency Service and Cleaning/Maintenance Personnel

All Magnetic Resonance Imaging (MRI) equipment operates using a large magnet. MRI magnets are very powerful and pose a serious danger for police, firefighters and EMS, as well as cleaning and maintenance personnel.

Warning

Obey the warning signs posted at the entry of the magnet scan room to avoid potential injury.

MRI systems pose a serious danger for personnel carrying metallic objects into the scan room. These objects can be **uncontrollably** attracted to the magnetic field. The force is stronger the closer the object is to the magnet and the larger the object.

Warning

Do not enter the scan room with metallic objects. Such objects become "missil es" that could cause serious injury.

Firefighters' equipment containing iron, such as axes, tools, oxygen bottles, fire extinguishers, ladders, and even smaller objects will be forcefully pulled into the magnet if they get too close.

Police firearms, handcuffs, and other metallic equipment may similarly become missiles by the attractive force of the MR magnet.

Large equipment, such as floor sweepers, waxers, vacuum cleaners, and pails will be drawn toward and into the magnet with such force that they

cannot be held back nor removed from the magnet. Standard tools containing iron, such as hammers, pipe, screwdrivers, knives, pliers, nails, screws, and staples, will similarly be drawn into the magnet.

Electronic equipment not specifically made for use in a MRI environment may not work properly if brought close to the magnet. This includes pacemakers or other implanted devices.

Warning

Do not enter the magnet room if you have a pacemaker or other implanted device. The implanted device may fail and cause a serious injury.

This facility has a MRI system that uses a super-conducting magnet containing liquid helium. Because it is super-conducting, the magnet is **difficult to turn off**. In some cases, the liquid helium can escape the magnet. The helium turns to gas that can cause severe burns on skin contact.

Warning

Do not enter the scan room if alarms are activated. Escaping helium can displace the air in the room, creating an asphyx - iation hazard.

As an emergency or service person, you must become acquainted with the safety precautions and procedures associated with this equipment. See the facility administrator for more information.

Warning

No Pacemakers

Warning

No Metal Implants

Warning

No Fire Extinguishers

Warning

No Wheelchairs

Warning

No Metallic Carts

Warning

No Metallic Objects

Warning

No Tools

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SAFETY

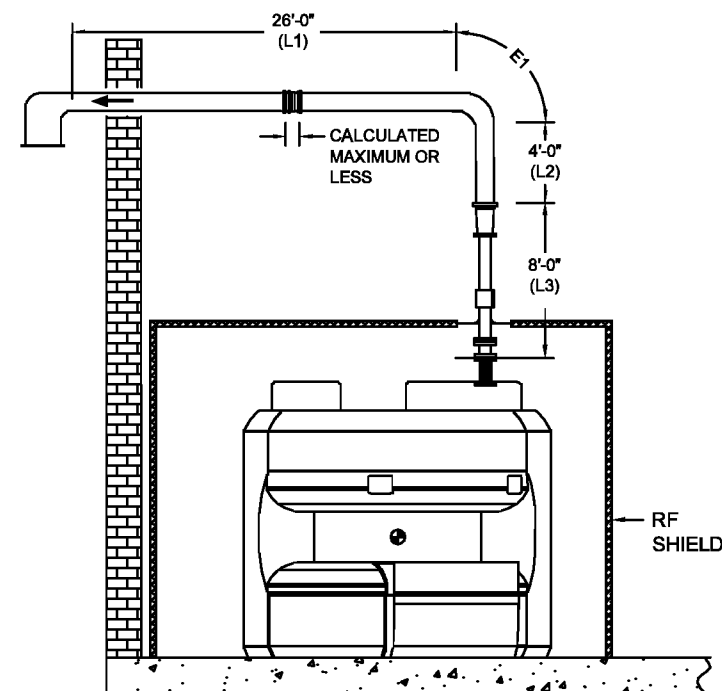
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# QUENCH VENT SIZING

## CALCULATING PIPE LENGTH AND DIAMETER :

THE CUSTOMERS ARCHITECT / ENGINEER IS RESPONSIBLE FOR UTILIZING THE FOLLOWING INFORMATION TO CALCULATE AND DESIGN THE CRYOGEN VENT LINE.

- 1) CALCULATE THE TOTAL APPARENT LENGTH OF THE QUENCH VENT. START THE CALCULATION ASSUMING A SMOOTH ELBOW (SEE TABLE 2) AND 4" ID PIPE.  
A.  $L1 + E1 + (L2 + L3) = LA$   $(26'-0") + (3'-9" \text{ (FROM TABLE 2)}) + (12'-0") = 41'-10"$
- 2) APPARENT LENGTH (LA) = 41'-10". FROM TABLE 1, 6" ID PIPE IS REQUIRED.
- 3) PIPE SIZES MAY BE MIXED.  
A. THE PERCENTAGE OF ACTUAL TO ALLOWABLE LENGTH FOR EACH DIAMETER OF PIPE MUST BE CALCULATED.  
B. THE COMBINED TOTAL OF PERCENTAGES MUST NOT EXCEED 100%.  
C. WHEN CHANGING PIPE SIZES, A DIFFUSER IS REQUIRED (SEE DIFFUSER SIZING DIAGRAM THIS PAGE).  
D. THE LENGTH OF THE DIFFUSER IS INCLUDED IN THE LENGTH OF THE SMALLER DIAMETER PIPE TO WHICH IT IS ATTACHED.
- 4) FROM THE MAXIMUM PERMISSIBLE LENGTH CHART, THE ALLOWABLE LENGTH OF 4" PIPE IS 18'.  
A. THE 8' SECTION SHOWN IN THE ADJACENT DIAGRAM ACCOUNTS FOR  $8/18 = 44.44\%$  OF THIS ALLOWABLE LENGTH.
- 5) THE REMAINING LENGTH OF 6" PIPE MUST BE LESS THAN 55.56% OF THE ALLOWABLE 6" LENGTH.  
A.  $77' \times 55.56\% (.5556) = 42'-9"$ .
- 6) THE APPARENT LENGTH OF 6" PIPE IS:  
A.  $L1 + E1 + L2 = LA$   $(26'-0") + (5'-8" \text{ (FROM TABLE 2)}) + (4'-0") = 35'-7"$   
B. THIS IS LESS THAN THE ALLOWED 42'-9" (55.56% OF 77") OF 6" PIPE SO THE VENT PIPE AS SHOWN IN THE DIAGRAM IS ACCEPTABLE.
- 7) THE TOTAL LENGTH OF THE VENT PIPE EXCEEDS 30'; THEREFORE A BELLOWS (EXPANSION JOINT) SECTION IS REQUIRED TO ALLOW FOR CONTRACTION AND MOVEMENT OF THE PIPE.  
A. THE MAXIMUM LENGTH OF A BELLOWS SECTION MUST BE LESS THAN 2% OF THE ALLOWABLE PIPE LENGTH.  
B. IN THE EXAMPLE ABOVE MAXIMUM LENGTH IS  $8'-0" + 42'-9" = 50'-9"$   
C.  $50'-9" (609") \times .02 = 12"$



MAXIMUM PERMISSABLE VENT LENGTHS	
(a) SMOOTH PIPE	
DIAMETER OF PIPE	MAXIMUM LENGTH OF PIPE
INCHES	FEET
4	18
5	40
6	77
7	135
8	226
9	374
10	602

(b) FLEXIBLE CONVOLUTED TUBE	
DIAMETER OF PIPE	MAXIMUM LENGTH OF PIPE
INCHES	FEET
4	5
5	11
6	22
7	41
8	75

TABLE 1.  
MAXIMUM PIPE LENGTHS

EFFECTIVE LENGTH OF BENDS (TOTAL FRICTION LOSS OF BEND)					
PIPE DIAMETER	EFFECTIVE LENGTH PER ELBOW				
INCHES	90° SMOOTH	90° SEGMENTED	45° SMOOTH	45° SEGMENTED	MITERED
4	3'-9"	6'-8"	2'-6"	4'-4"	22'-2"
5	4'-9"	8'-3"	3'-2"	5'-6"	27'-10"
6	5'-8"	9'-11"	3'-9"	6'-8"	33'-5"
7	6'-10"	11'-11"	4'-6"	7'-7"	39'-1"
8	8'-0"	13'-11"	5'-2"	9'-1"	44'-4"
9	8'-9"	15'-3"	5'-9"	9'-11"	50'-11"

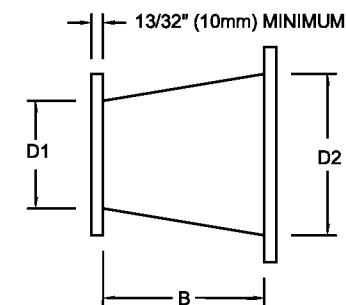
TABLE 2.  
EFFECTIVE LENGTH OF BENDS

NOTE: INTERPOLATE FOR VALUES BETWEEN 0° - 45° AND 45° - 90°.

DATA ONLY TO BE USED FOR BENDS WHERE THE RADIUS TO DIAMETER RATIO IS IN THE RANGE OF 1.5 TO 5.0, EXCEPT FOR RIGHT ANGLE MITERED JOINTS.

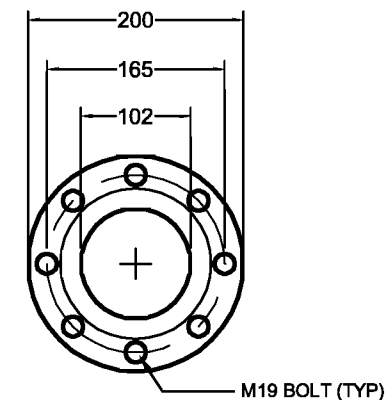
VIBRATION DECOUPLING TUBE AND QUENCH VALVE 90° ELBOW (DELIVERED AS PARTS OF THE MAGNET) HAVE BEEN ACCOUNTED FOR IN THESE CALCULATIONS.

NOTE THAT A SECOND QUENCH VALVE ELBOW WOULD TAKE 17% OF THE MAXIMUM PERMISSABLE LENGTH



## QUENCH PIPE DIFFUSER

A DIFFUSER IS USED WHENEVER AN INCREASE IN PIPE DIAMETER IS REQUIRED.  
DESIGN CRITERIA: DISTANCE "B" MUST BE GREATER THAN  $2.5 \times (D2 - D1)$



\*DIMENSIONS SHOWN IN MILLIMETERS

## CRYOGEN VENT FLANGE

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## CRYOGEN VENT SIZING

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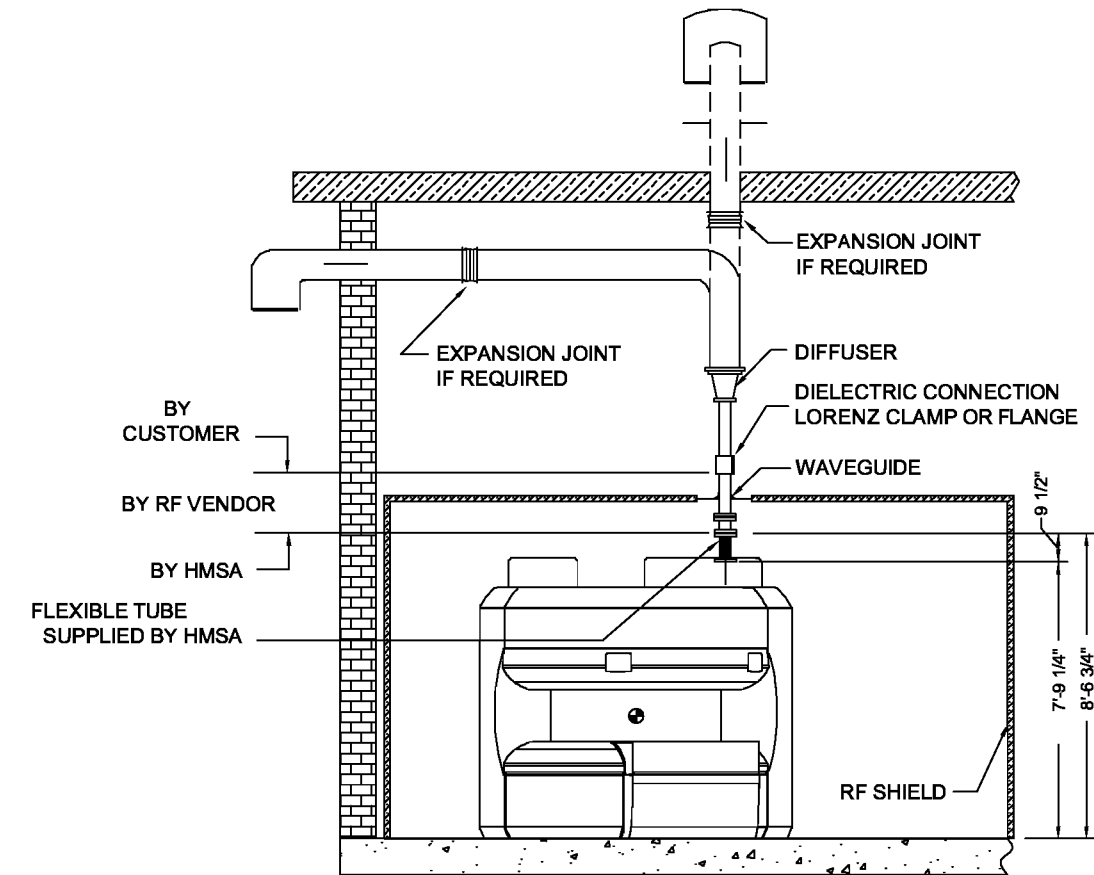
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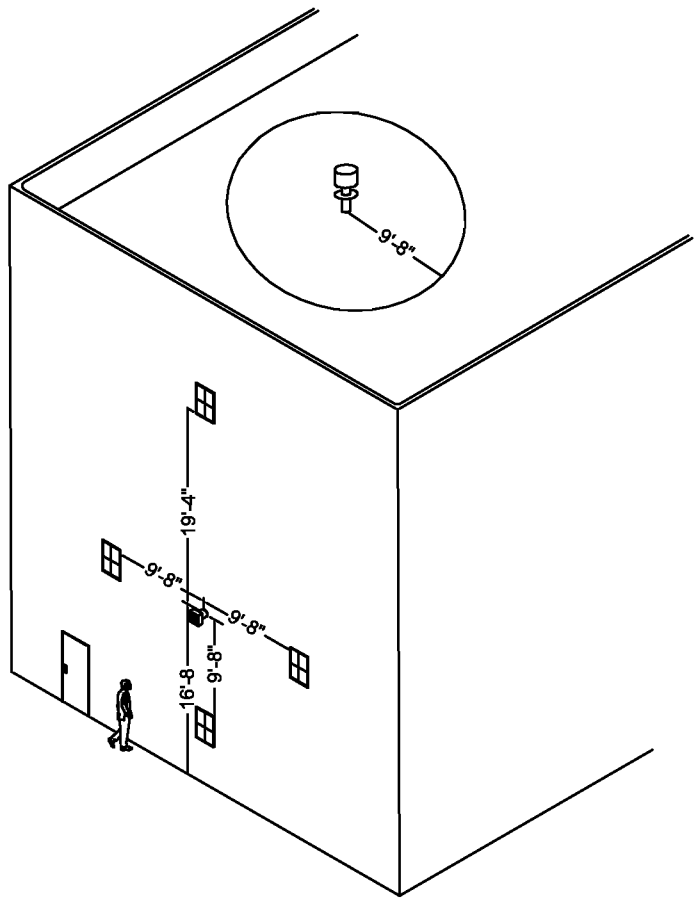
# CRYOGEN VENT NOTES

THE VENT PIPE IS CRITICAL TO THE SAFE OPERATION OF THE SYSTEM. HELIUM GAS, WHICH IS EXHAUSTED IN THE EVENT OF A QUENCH IS EXTREMELY COLD AND DISPLACES OXYGEN. THE POSSIBILITY OF ASPHYXIATION EXISTS IF IT IS NOT PROPERLY VENTED. CONSIDERATION MUST BE GIVEN NOT ONLY TO THE DESIGN OF THE VENT PIPE ITSELF, BUT ALSO THE LOCATION OF ITS END POINT. **THE VENT PIPE MUST BE DESIGNED BY THE CUSTOMERS ARCHITECT / ENGINEER** IN ACCORDANCE WITH THE INFORMATION PROVIDED IN THIS SECTION OF THE OASIS MARK II STANDARD DETAILS.

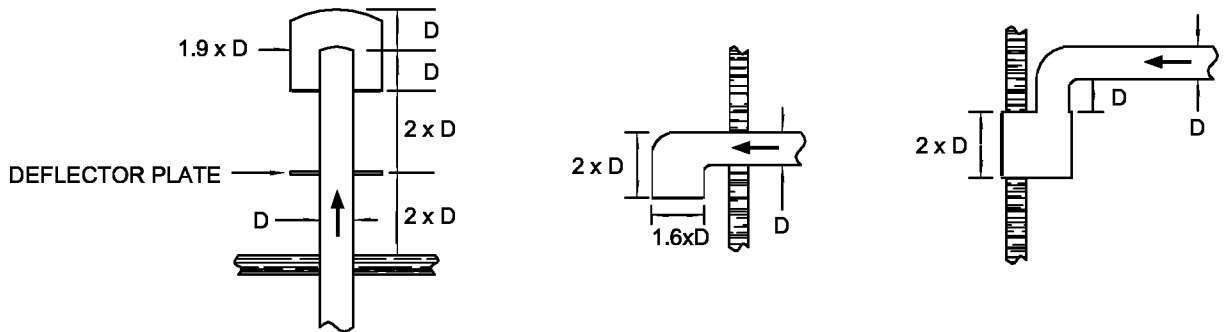
- 1) THE QUENCH VENT WAVEGUIDE MUST BE CONSTRUCTED OF NON-MAGNETIC STAINLESS STEEL ONLY. THE MINIMUM WALL THICKNESS FOR STRAIGHT TUBE IS 22 GAUGE (.0299"). ACCEPTABLE GRADES ARE: AISI 304, 309, 316 AND 321 OR THEIR EN EQUIVALENTS. NO OTHER MATERIALS ARE ALLOWED DUE TO EXTREME TEMPERATURES. FROM THE DIELECTRIC UNION TO THE EXTERIOR OF THE BUILDING, EITHER STAINLESS STEEL OR 6061-T6 ALUMINUM MAY BE USED FOR THE VENT PIPE.
- 2) DETERMINING THE ROUTING OF THE VENT TO THE OUTSIDE IS THE RESPONSIBILITY OF THE ARCHITECT/CONTRACTOR. THE LENGTH OF THE VENT RUN TO THE OUTSIDE WILL DICTATE ITS REQUIRED DIAMETER. REFER TO THE FORMULA FOR DETERMINING THE EFFECTIVE LENGTH OF THE VENT AND DIAMETER (PG 20 OF 27).
- 3) THE CRYOSTAT CONTAINS 1000 LITERS OF LIQUID HELIUM WHEN FILLED. IN THE EVENT OF A QUENCH, APPROXIMATELY 754 CUBIC METERS (26,625 FT<sup>3</sup>) OF HELIUM GAS WILL BE EXHAUSTED THROUGH THE VENT PIPE OVER A PERIOD OF 20-30 MINUTES. THE HELIUM GAS RELEASED IS AN ASPHYXIANT IN ADDITION TO BEING EXTREMELY COLD.
- 4) EXPANSION TO A LARGER DIAMETER PIPE REQUIRES THE USE OF A DIFFUSER (REFER TO PG 20 OF 27). PIPE DIAMETER MAY NOT BE REDUCED IN THE DOWNSTREAM DIRECTION.
- 5) THE VENT PIPE DESIGN CALCULATIONS ARE FORMULATED TO ALLOW A MAXIMUM INTERNAL PRESSURE OF 0.1 BAR ABOVE ATMOSPHERE, HOWEVER, THE MAXIMUM DESIGN PRESSURE NEEDS TO BE 0.45 BAR.
- 6) THERMAL CONTRACTION (APPROXIMATELY 1/16" PER FOOT FOR STAINLESS STEEL, GREATER FOR ALUMINUM) MAY OCCUR. A BELLOW MUST BE FITTED AT A MINIMUM OF EVERY 30' TO ALLOW FOR THIS. THE TOTAL LENGTH OF ALL BELLOWS MAY NOT EXCEED 2% OF THE MAXIMUM ALLOWED PIPE LENGTH. THE MATERIAL USED TO SUSPEND THE PIPE MUST BE FLEXIBLE ENOUGH TO ACCOMMODATE THIS MOVEMENT. ADDITIONALLY, THROUGH WALL PENETRATIONS SHOULD NOT BE HARD ATTACHED TO THE WALL.
- 7) ALL BENDS MUST HAVE A CENTERLINE RADIUS TO INTERNAL DIAMETER RATIO BETWEEN 1.5 AND 5.0. ALL BENDS MUST BE SMOOTH WALLED. IF A SMOOTH WALL BEND IS NOT POSSIBLE, ELBOWS MAY BE FABRICATED FROM STRAIGHT PIPE PROVIDED THAT A MINIMUM OF 4 SECTIONS ARE USED FOR A 90 DEGREE ELBOW.
- 8) JOINTS MAY ONLY BE MADE BY WELDING OR FLANGES. FLANGES MUST BE A MINIMUM OF 13/32" (10MM) THICK AND SHALL BE CONTINUOUSLY WELDED ON THE INSIDE WITH A MINIMUM 50% STITCH WELD ON THE OUTSIDE. ROTARY FLANGES ARE PERMITTED. GASKET MATERIAL MUST BE UHMW-PE, PTFE OR FIBER.
- 9) THE VENT PIPE IS TO BE INSULATED ITS FULL INDOOR LENGTH. MINERAL FIBER INSULATION NOT LESS THAN 1" THICK AND COVERED WITH A VAPOR BARRIER IS RECOMMENDED. IF INSULATION IS USED ON OUTDOOR PORTIONS OF THE VENT PIPE (RECOMMENDED) IT MUST BE WEATHER-PROOF. WITHIN THE SCAN ROOM, AN ADDITIONAL 1" THICK LAYER OF CLOSED CELL FOAM INSULATION (ARMAFLEX CLASS "O" OR EQUAL) IS DESIRED.
- 10) THE TERMINATION OF THE VENT MUST BE DESIGNED TO PREVENT THE INTRUSION OF WEATHER (RAIN, SNOW OR DRIFTING SNOW), ANIMALS OR OTHER FOREIGN OBJECTS. IF MESH IS USED IT SHOULD BE 1/2" WITH 3/64" ROUND WIRE. THE **GROSS AREA** COVERED BY MESH MUST BE AT LEAST 2.5 TIMES THE CROSS SECTION OF THE VENT PIPE. FLAT SHEET STOCK WITH 3/8" ROUND OR SQUARE HOLES MAY ALSO BE USE AS MESH, HOWEVER DUE TO A GREATER FLOW RESISTANCE, THE **TOTAL FREE FLOW AREA** OF MESH MUST BE 2.5 TIMES THE CROSS SECTION OF THE VENT.
- 11) A SIDE WALL CRYOGEN VENT OUTLET MUST BE MOUNTED NO LESS THAN 16'-8" ABOVE A SIDEWALK. ADDITIONALLY, OPERABLE WINDOWS OR AIR INLETS MUST BE RESTRICTED FROM AN AREA 9'-8" TO THE SIDES OR BELOW AND 19'-3" ABOVE A SIDE WALL EXIT OF THE VENT PIPE. WHERE A VERTICAL EXHAUST EXITS THROUGH A FLAT ROOF, ACCESS SHOULD BE RESTRICTED OR WARNING SIGNS POSTED IN A 9'-8" RADIUS AROUND THE VENT. THE VENT PIPE INTERNAL TO THE BUILDING SHOULD ALSO BE MARKED WITH WARNINGS STATING ITS FUNCTION. IT IS THE ARCHITECT/CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE OUTLET AND WARNING SIGNS MEET ALL APPLICABLE CODES.



CRYOGEN VENT CONNECTION DIAGRAM  
NOT TO SCALE



RESTRICTED AREA SURROUNDING CRYOGEN VENT  
NOT TO SCALE



## TYPICAL CRYOGEN VENT OUTLETS

NOTE: -ULTRA COLD GAS FROM THE VENT MAY CAUSE THERMAL SHOCK AND DAMAGE TO BUILDING MATERIALS CLOSE TO THE EXIT  
-EPDM OR OTHER MEMBRANE ROOFING MATERIALS SHOULD BE PROTECTED FROM VENTED GAS  
-DIMENSIONS SHOWN ARE MINIMUMS

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## CRYOGEN VENT NOTES

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OASIS MARK II STANDARD DETAILS

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# MAGNET PROXIMITY

DEVICES AFFECTED BY MAGNETIC FIELDS	
1 GAUSS	NUCLEAR CAMERAS, PET SCANNER, COLOR MONITORS, IMAGE INTENSIFIER, LINEAR ACCELERATOR, ULTRASOUND, CT SCANNER, MRI SCANNER, ELECTRON MICROSCOPE
3 GAUSS	MULTI FORMAT CAMERA (LASER IMAGER), COMPUTER HARD DRIVES, ELECTRONIC MEMORY CARD, FERROUS CARD, WATCH
5 GAUSS	PACE MAKER, CREDIT CARDS, ANALOG CELLULAR PHONE, DEFIBRILLATORS, IMPLANTS

REQUIRED DISTANCE FROM ISOCENTER TO ITEMS THAT MAY AFFECT MAGNET	
10'	LARGE FERROUS OBJECTS OVER 400 LBS., MAJOR STRUCTURAL STEEL, FERROUS CART
20'	AUTOMOBILES, SMALL TRUCKS, HVAC AIR HANDLERS, HVAC CONDENSERS, WATER CHILLERS, ELECTRICAL SUB-PANELS OVER 50 AMP, LARGE MOTORS (GAS AND ELECTRIC)
40'	LARGE TRUCKS AND BUSES, ELEVATORS, ESCALATORS, LARGE ELECTRICAL TRANSFORMERS, LARGE ELECTRICAL PANELS (OVER 200 AMP), MAIN ELECTRICAL FEEDER LINES (INCLUDING UNDERGROUND)
200'	HIGH TENSION ELECTRICAL LINES, RAILROAD TRACKS, HELICOPTER PAD

**NOTE:**  
THE ABOVE CHARTS ARE INTENDED SOLELY AS A GUIDELINE AND NOT AS AN ALL-INCLUSIVE CHECKLIST. IT MAY BE POSSIBLE TO DAMPEN THE EFFECT OF SOME OF THE DC TYPE INFLUENCES (CAUSED BY MOVING OBJECTS) THROUGH THE USE OF MAGNETIC SHIELDING. THE EFFECT OF MAGNETIC SHIELDING AGAINST A.C. TYPE INTERFERENCE (ELECTRICAL POWER) IS SIGNIFICANTLY LESS THAN FOR D.C. TYPES. CONSULT WITH THE HMSA SITE PLANNER FOR FURTHER INFORMATION.

## MAGNET PLACEMENT

THE AREA COVERED BY THE MAGNET'S FRINGE FIELDS IS OF PRIME CONCERN WHEN SELECTING AN MRI SITE. CONSIDERATION MUST BE GIVEN TO THE FOLLOWING CONCERNS:

- 1) USE OF THE SURROUNDING AREAS, INCLUDING SPACE ABOVE AND ADJACENT TO THE MAGNET. IT MAY BE POSSIBLE TO REDUCE THE INFLUENCE OF THE MAGNETIC FIELD ON ADJACENT SPACES WITH THE USE OF MAGNETIC SHIELDING. CONSULT WITH THE SITE PLANNING SPECIALIST FOR FURTHER INFORMATION.
- 2) TYPE OF CONSTRUCTION MATERIALS USED IN THE EXISTING STRUCTURES, PARTICULARLY COLUMNS, BEAMS, JOISTS, REINFORCEMENT STEEL, AND CAST IRON PIPES.
- 3) LOCATION OF MECHANICAL EQUIPMENT AND OTHER MEDICAL MODALITIES.
- 4) LOCATION OF ELEVATORS, LOADING DOCKS, PARKING LOTS, DRIVEWAYS, AND ELECTRICAL SERVICES (INCLUDING BURIED UTILITIES).
- 5) A MAGNETIC FLUCTUATION TEST MUST BE PERFORMED AT ALL SITES TO ASSIST IN IDENTIFYING POSSIBLE SOURCES OF INTERFERENCE. A SITE CANNOT RECEIVE FINAL APPROVAL BY HMSA SITE PLANNING WITHOUT THIS TEST.

## MAGNETIC SHIELDING

RF SHIELDING (PG 8 OF 27) WHICH ELIMINATES RADIO SIGNALS FROM REACHING THE SYSTEM IS DIFFERENT THAN MAGNETIC SHIELDING AND IS REQUIRED FOR AN OASIS MARK II MRI SYSTEM WHETHER MAGNETIC SHIELDING IS USED OR NOT. MAGNETIC SHIELDING PROVIDES A MEANS OF LIMITING THE DISTANCE THE GAUSS FIELDS EXTEND OUT FROM AN OASIS MARK II SYSTEM'S ISO-CENTER OR DAMPING THE EFFECTS THE SURROUNDING ENVIRONMENT (SEE CHART THIS PAGE) MAY HAVE ON IT.

MAGNETIC SHIELDING IS CONSTRUCTED OF FERROUS METAL AND IS TYPICALLY MOUNTED TO THE EXTERIOR OF THE RF SHIELD. IT IS NORMALLY SUPPLIED AND INSTALLED BY THE RF SHIELDING VENDOR AT THE TIME THE RF SHIELD IS INSTALLED. LIKE ANY OTHER FERROUS OBJECT, ITS MAGNETIC PROPERTIES AFFECT THE SHIM OF THE MAGNET (SEE MAGNETIC SHIMMING THIS PAGE)

## MAGNET SHIMMING

ONCE THE MRI SYSTEM IS INSTALLED, THE MAGNETIC FIELD IS SHIMMED TO COUNTERACT THE EFFECT OF ANY PERMANENT FERROMAGNETIC OBJECTS AROUND IT. THE WEIGHT OF THE OBJECT AND ITS DISTANCE FROM THE ISO-CENTER OF THE GANTRY DETERMINE THE INFLUENCE IT WILL HAVE ON THE MAGNETIC FIELDS. IN ORDER TO PROPERLY EVALUATE A SITE AND DETERMINE THE AFFECT OF SUCH OBJECTS ON THE ABILITY TO SHIM THE MAGNET, THE FOLLOWING INFORMATION MUST BE PROVIDED:

- 1) THE SIZE (I.E.: W24 X 76) AND LOCATION OF STRUCTURAL STEEL COLUMNS AND BEAMS ADJACENT TO THE SCAN ROOM. THIS INFORMATION IS NORMALLY FOUND ON THE STRUCTURAL DRAWINGS FOR A BUILDING.
- 2) THE THICKNESS AND LOCATION OF MAGNETIC SHIELDING THAT WILL REMAIN IN PLACE IF THE OASIS MARK II IS TO BE INSTALLED IN AN EXISTING MRI SCAN ROOM. THIS INFORMATION CAN BE NORMALLY BE FOUND ON THE RF SHIELD DRAWINGS OR BY CONTACTING THE RF SHIELDING VENDOR WITH THE SERIAL NUMBER OF THE ROOM.
- 3) THE WEIGHT OF ANY OTHER LARGE PERMANENT FERROUS OBJECTS (I.E. WALK-IN SAFE) ADJACENT TO THE SCAN ROOM.

## MAGNET AFFECT ON LOOSE OBJECTS

ATTRACTION OF LOOSE FERROMAGNETIC OBJECTS IS OF CONCERN WITHIN THE MRI SCAN ROOM. THE MAGNET'S FIELD STRENGTH IS CAPABLE OF ACCELERATING UNRESTRAINED FERROUS OBJECTS. THE GREATER THE MASS OF THE OBJECT AND THE CLOSER IT GETS TO THE MAGNET, THE STRONGER THE ATTRACTION. NEAR THE MAGNET, HUMAN STRENGTH MAY NOT BE SUFFICIENT TO RESTRAIN FERROUS OBJECTS SUCH AS OXYGEN TANKS AND CRASH CARTS. SUCH OBJECTS WILL BE DRAWN INTO (OR ONTO) THE MAGNET, POTENTIALLY CAUSING INJURY OR DEATH TO PERSONS AND DAMAGE TO THE MRI SYSTEM. SUCH OBJECTS MUST NOT BE ALLOWED IN THE SCAN ROOM. SPECIAL NONFERROUS EQUIPMENT SHOULD BE OBTAINED AND IDENTIFIED FOR USE IN THE SCAN ROOM.

## ACCESS RESTRICTION

FDA REQUIREMENT RESTRICTS PUBLIC ACCESS WITHIN THE 5 GAUSS FIELD UNLESS INDIVIDUALS HAVE BEEN PROPERLY SCREENED.

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### MAGNET PROXIMITY

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# RIGGING AND DELIVERY

DURING THE INITIAL PLANNING OF THE OASIS MARK II SUITE, A SYSTEM DELIVERY PATH MUST BE IDENTIFIED. THE DESIGN TEAM SHOULD REVIEW THE INFORMATION PRESENTED ON THIS PAGE TO ENSURE A STAGING AREA AND A CLEAR DELIVERY PATH IS AVAILABLE. WHILE THE MAGNET IS THE MAJOR CONCERN, CLEARANCES MUST ALSO BE ASSURED FOR THE DELIVERY OF ANCILLARY SYSTEM COMPONENTS, SERVICE / INSTALLATION TOOLS AND THE ONGOING REQUIREMENT OF HELIUM DEWARs. SITE PLANNING WILL ASSIST IN IDENTIFYING THE MOST APPROPRIATE DELIVERY PATH.

## THE DELIVERY PROCESS IS AS FOLLOWS:

1. SITE PLANNING AND THE DESIGN TEAM WILL IDENTIFY A STAGING AREA AND A DELIVERY PATH.
2. AN INITIAL DELIVERY DATE WILL BE SCHEDULED USING INPUT FROM THE DESIGN TEAM. (CONSTRUCTION SCHEDULE)
3. TIMELY VISITS WILL BE MADE BY THE LOCAL HMSA FIELD SERVICE ENGINEER (FSE) CONFIRMING THE SITE PROGRESS.
4. THE CONTRACTOR AND FSE WILL REVIEW THE OASIS MARK II PRE-DELIVERY CHECKLIST AGAINST THE ACTUAL SITE STATUS. SITE PLANNING IS TO BE CONTACTED WITH ANY CONCERNS THAT MAY AFFECT THE DELIVERY.
5. FOURTEEN (14) DAYS PRIOR TO THE SCHEDULED DELIVERY, THE CUSTOMER WILL SUBMIT A COMPLETED CHECKLIST TO SITE PLANNING NOTING THE STATUS OF THE SITE.
  - a. IF COMPLETION OF THE CHECKLIST REQUIREMENTS CANNOT BE GUARANTEED BY THE CUSTOMER, THE DELIVERY WILL BE RESCHEDULED.
  - b. IF THE CUSTOMER CAN VERIFY THAT THE SITE IS ON SCHEDULE AND THAT ALL CHECKLIST REQUIREMENTS WILL BE COMPLETE, THE DELIVERY DATE WILL BE SET WITHIN 10 DAYS OF THE SUBMITTAL.
6. SITE PLANNING WILL CONFIRM ADMINISTRATIVE APPROVAL.
7. SITE PLANNING WILL CO-ORDINATE SCHEDULING OF THE SYSTEM DELIVERY WITH THE APPROPRIATE PARTIES, ADJUSTING THE DELIVERY DATE TO MEET EVERYONE'S SCHEDULE.
8. THE CUSTOMER CONFIRMS THE RIGGERS SCHEDULE AT THIS TIME.

## RESPONSIBILITIES:

### HMSA RESPONSIBILITIES:

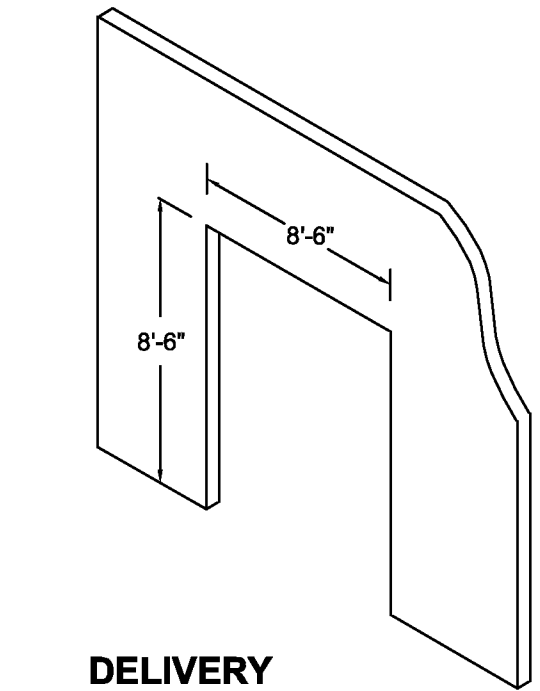
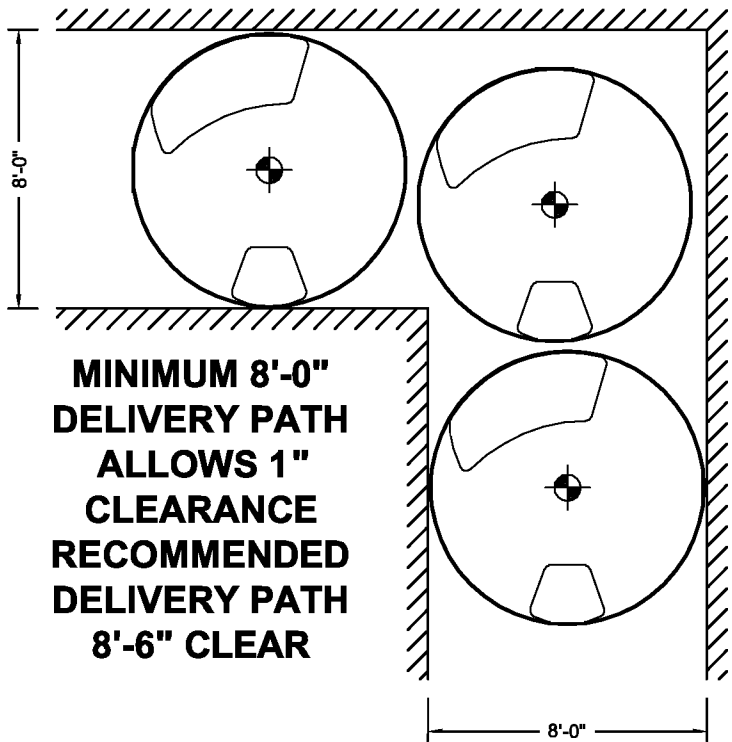
1. ASSIST THE CUSTOMER / CONTRACTOR IN IDENTIFYING A DELIVERY STAGING AREA (TRUCK PARKING, CRATE UNPACKING).
2. ASSIST THE CUSTOMER / CONTRACTOR IN IDENTIFYING A DELIVERY PATH FROM THE STAGING AREA TO THE SUITE.
3. ASSIST THE CUSTOMER / CONTRACTOR IN LOCATING AN ADEQUATE / ACCESSIBLE STORAGE SPACE (600 SF)
4. COORDINATE THE DELIVERY DATE WITH THE CUSTOMER / CONTRACTOR AND APPROPRIATE PARTIES.
5. INSPECT AND APPROVE THE SITE PRIOR TO DELIVERY TO CONFIRM THE ADEQUATE ACCESS IS AVAILABLE.
6. INSTALL THE OASIS MARK II SYSTEM.

### CUSTOMER / CONTRACTOR / RIGGERS RESPONSIBILITIES:

1. ARRANGE WITH HMSA FOR DELIVERY OF THE CHILLER SYSTEM PRIOR TO SYSTEM DELIVERY.
2. HAVE THE CHILLER SYSTEM INSTALLED AND TESTED PRIOR TO DELIVERY OF THE SYSTEM.
3. PROVIDE AN OBSTRUCTION FREE DELIVERY PATH MEETING THE DELIVERY REQUIREMENTS.
4. PROVIDE AN OBSTRUCTION FREE STAGING AREA.
5. HAVE A FACILITY REPRESENTATIVE AVAILABLE AT THE TIME OF DELIVERY TO SIGN SHIPPING DOCUMENTS.
6. SECURE INSURANCE COVERAGE FOR THE SYSTEM, EFFECTIVE UPON DELIVERY.
7. PROVIDE AN ADEQUATE / ACCESSIBLE STORAGE AREA WITHIN THE FACILITY, IF REQUIRED.
8. ARRANGE FOR THE DISPOSAL OF ALL PACKING AND CRATING MATERIALS (40 YARD DUMPSTER REQUIRED, WILL ALSO REQUIRE BEING EMPTIED DURING THE FIRST DAY)
9. CONTRACT A RIGGER TRAINED IN HANDLING THE OASIS MARK II MAGNET TO PERFORM THE DELIVERY INCLUDING THE FOLLOWING.
10. TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE FACILITY AND EQUIPMENT.
11. IDENTIFY AND PROVIDE NECESSARY EQUIPMENT FOR THE DELIVERY (I.E. CRANE, FORKLIFT, MANPOWER, TOOLS)
12. UNLOAD AND UNCRATE ALL OF THE EQUIPMENT AND PLACE IT IN THE SUITE.
13. SET MAGNET AND ANCILLARY EQUIPMENT PER THE HMSA SITE PLAN.

NOTE: SITE PLANNING WILL NOT CONFIRM A SCHEDULED DELIVERY DATE WITHOUT:

1. A SUBMITTED PRE-DELIVERY CHECKLIST
2. ADMINISTRATIVE APPROVAL



OASIS MARK II COMPONENT LIST					
CRATE #	COMPONENT	LENGTH (CRATED)	WIDTH (CRATED)	HEIGHT (CRATED)	WEIGHT (CRATED)
	MAGNET	8'-7"	8'-3"	9'-7"	31,600 lbs
1	COVERS	9'-1"	7'-5"	3'-0"	772 lbs
2	COVERS	9'-1"	7'-5"	3'-0"	772 lbs
3		5'-1"	4'-9"	3'-9"	948 lbs
4		9'-1"	3'-8"	3'-11"	1345 lbs
5	GRADIENT AMP	3'-6"	2'-10"	7'-0"	1323 lbs
6	RFIP CABINET	4'-0"	3'-4"	7'-1"	1434 lbs
7		3'-4"	2'-2"	4'-3"	276 lbs
8	FILTER BOX	5'-7"	3'-7"	2'-8"	331 lbs
9	CABLES & HOSES	5'-3"	4'-1"	3'-1"	982 lbs
10	GRADIENT	4'-0"	4'-0"	24"	1367 lbs
11	GRADIENT COILS	4'-1"	4'-1"	1'-7"	342 lbs
12		7'-1"	3'-6"	3'-6"	651 lbs
13	PHANTOMS, MISC	7'-1"	3'-6"	3'-8"	816 lbs
14		5'-3"	2'-10"	3'-7"	254 lbs
15	HEAT EXCHANGER	3'-8"	3'-6"	3'-7"	345 lbs
ITEMS SHIPPED SEPARATELY PRIOR TO MAGNET DELIVERY					CHILLER MUST BE DELIVERED AND INSTALLED PRIOR TO MAGNET DELIVERY
	CHILLER OPTIONAL OUTDOOR UNIT	TBD	TBD	TBD	

### DELIVERY ACCESS OPENING

1. RECOMMENDED DELIVERY ACCESS OPENING IS 8'-6" (H) X 8'-6" (W)
2. MINIMUM RECOMMENDED HEIGHT FOR ACCESS OPENING IS 8'-2" WHEN USING 4" HIGH MOVING SKATES. 4" HIGH SKATES PROVIDE +/-1/2" OF GROUND CLEARANCE FOR GANTRY FEET. THIS IS THE MINIMUM ACCEPTABLE LIFT.
3. IF THE MINIMUM OPENING HEIGHT CAN NOT BE ACHIEVED, EXTENSIVE SITE EVALUATION AND COORDINATION BETWEEN CONTRACTOR, RIGGER, RF VENDOR AND SITE PLANNING WILL BE NECESSARY TO DETERMINE IF DELIVERY IS POSSIBLE.

### ROOF HATCH ACCESS OPENING

1. IF A ROOF HATCH IS TO BE USED FOR DELIVERY OF THE OASIS MARK II GANTRY, THE MINIMUM REQUIRED OPENING IS 9'-0" X 9'-0", RECOMMENDED OPENING IS 10'-0" X 10'-0"

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### RIGGING AND DELIVERY

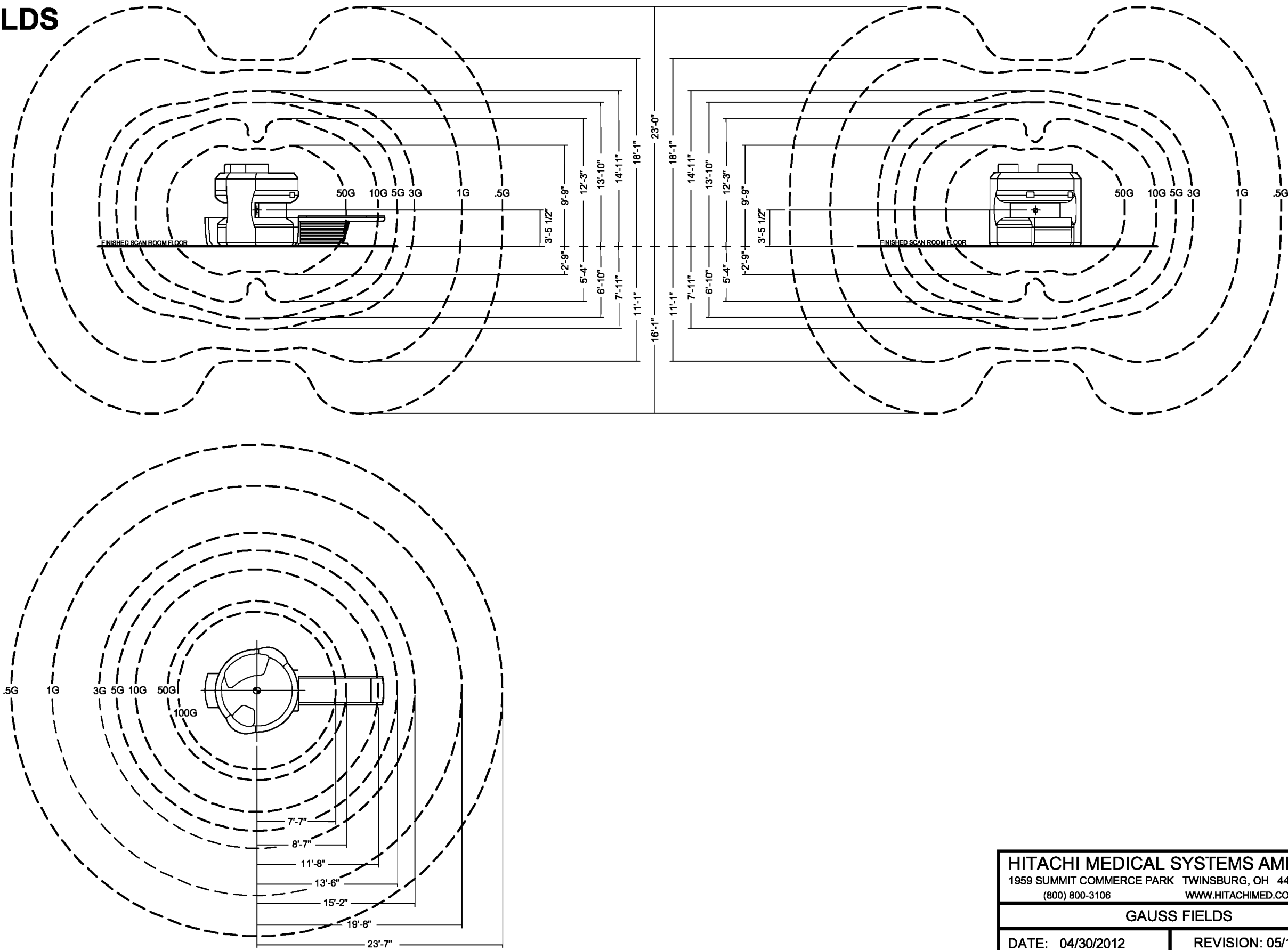
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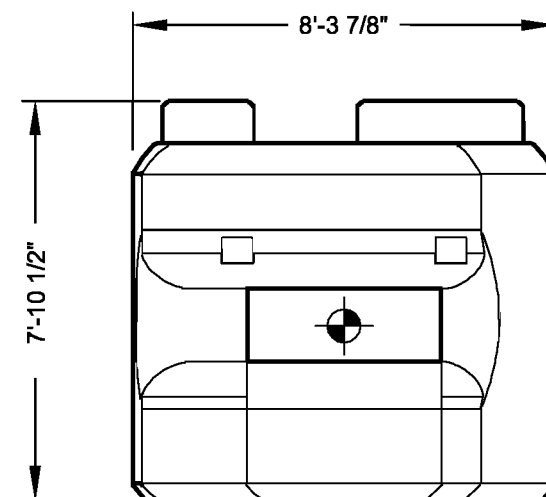
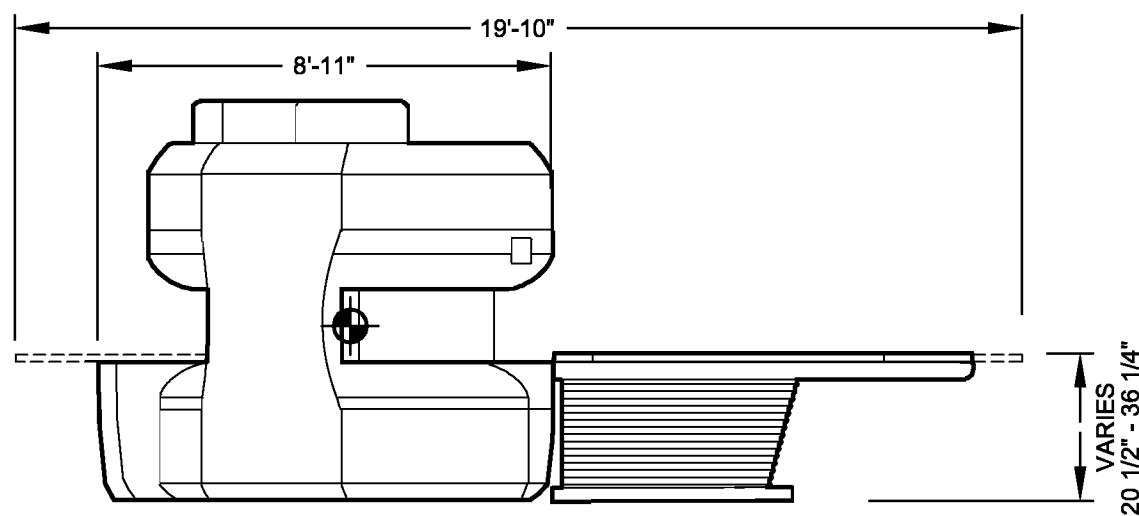
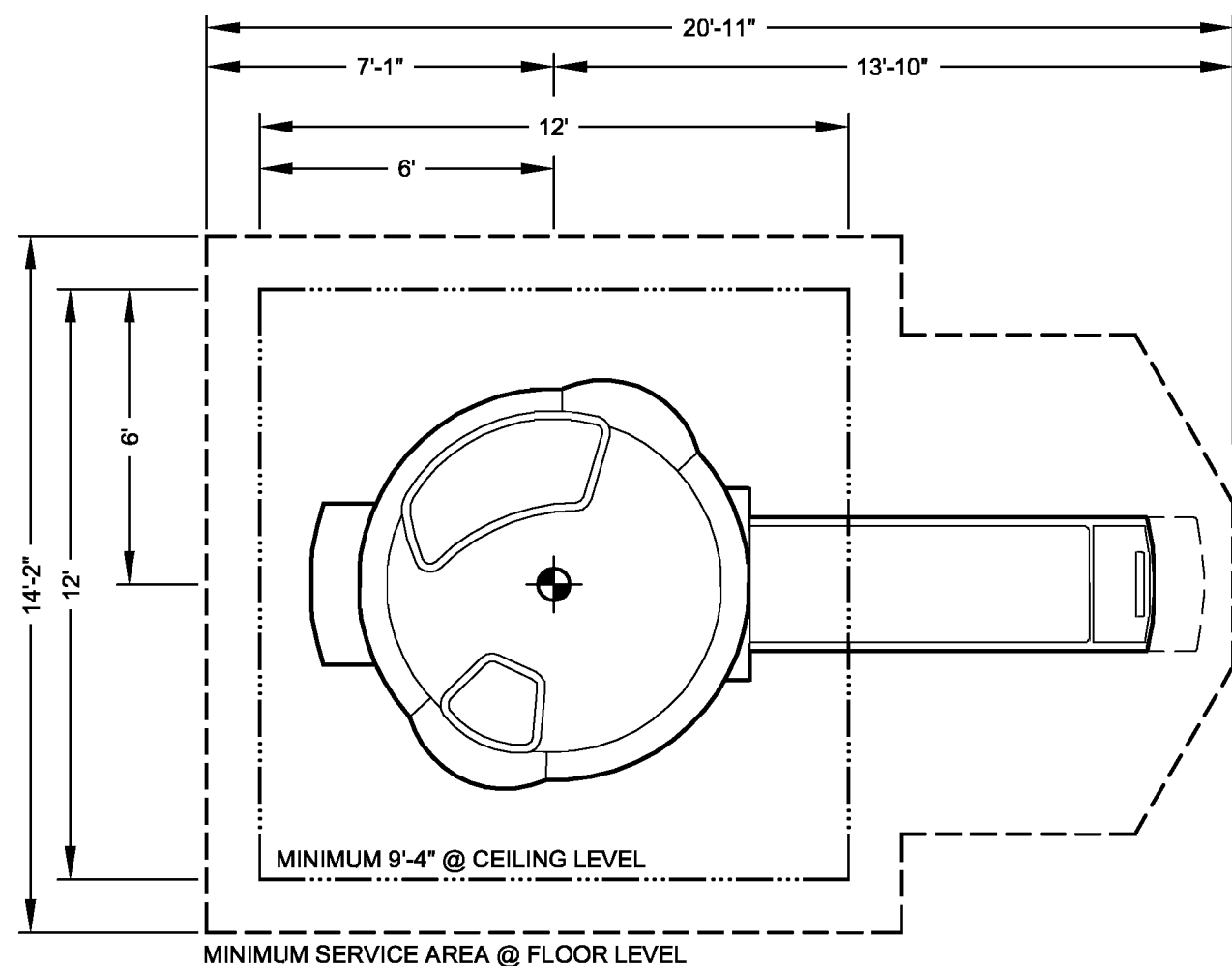
OASIS MARK II STANDARD DETAILS

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GAUSS FIELDS



# SYSTEM COMPONENTS



## OASIS MARK II GANTRY AND PATIENT TABLE

MULTIPLE CABLE CONNECTIONS AT REAR AND SIDE OF GANTRY.  
SERVICE AREA MUST BE MAINTAINED WHEN SITING.

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### SYSTEM COMPONENTS

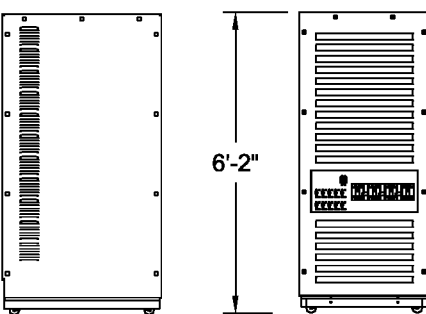
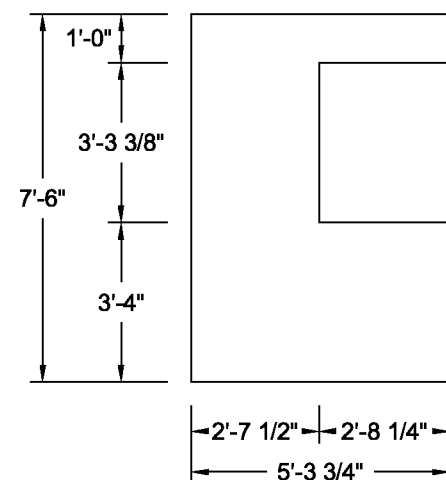
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## SYSTEM COMPONENTS (CONT)

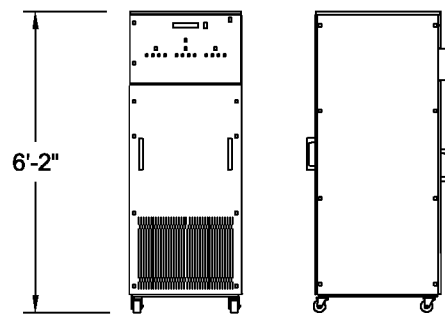
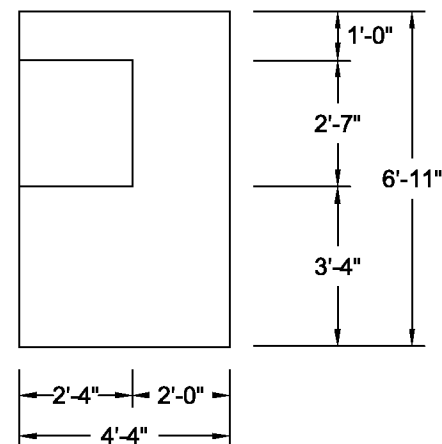


SIDE VIEW

FRONT VIEW

### RFIP CABINET

MULTIPLE CABLE CONNECTIONS AND MAIN POWER CONNECTION WILL LIMIT CABINET MOVEMENT FOR SERVICING. SERVICE AREA MUST BE MAINTAINED WHEN SITING.

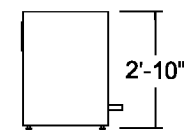
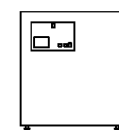
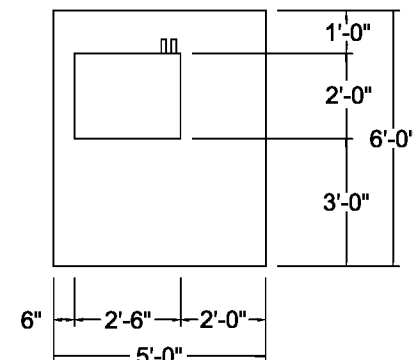


FRONT VIEW

SIDE VIEW

### GRADIENT AMPLIFIER CABINET

MULTIPLE CABLE CONNECTIONS, GRADIENT CABLE CONNECTIONS, AND WATER HOSE CONNECTIONS WILL LIMIT CABINET MOVEMENT FOR SERVICING. SERVICE AREA MUST BE MAINTAINED WHEN SITING.

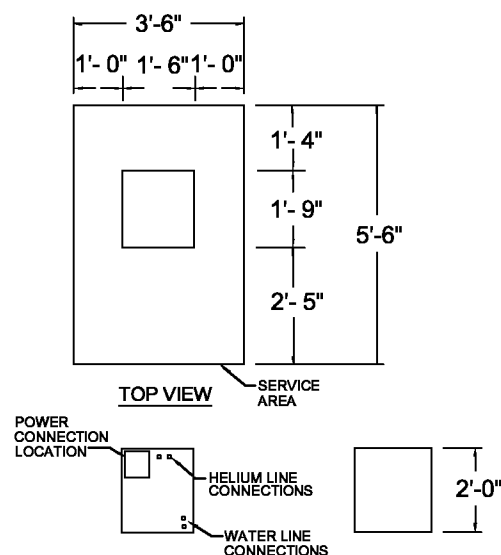


FRONT VIEW

SIDE VIEW

### HEAT EXCHANGER

WATER HOSE CONNECTIONS FROM R-1200 CHILLER AND TO SENSE UNIT. SERVICE AREA MUST BE MAINTAINED WHEN SITING.

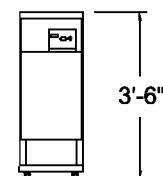
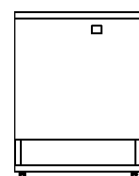
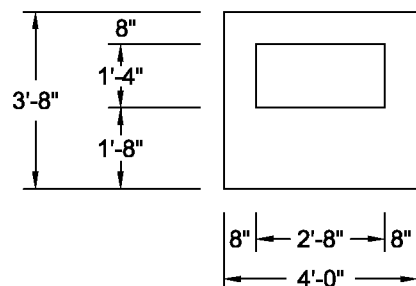


FRONT VIEW

SIDE VIEW

### HELIUM COMPRESSOR UNIT

MULTIPLE CABLE CONNECTIONS, HELIUM AND PLUMBING LINES RESTRICT ALLOWABLE MOVEMENT FOR THIS UNIT. SERVICE AREA MUST BE MAINTAINED WHEN SITING.

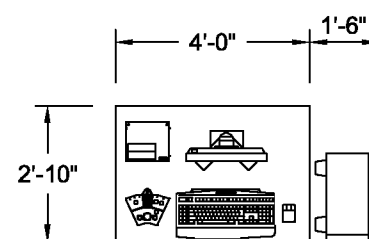


FRONT VIEW

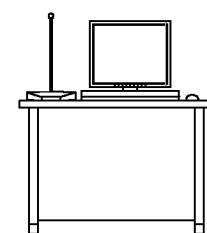
SIDE VIEW

### SENSE UNIT

MULTIPLE CABLE CONNECTIONS, HELIUM AND PLUMBING LINES RESTRICT ALLOWABLE MOVEMENT FOR THIS UNIT. SERVICE AREA MUST BE MAINTAINED WHEN SITING.



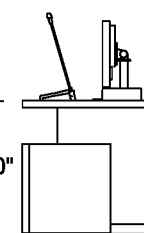
TOP VIEW



FRONT VIEW

### OPERATOR CONSOLE

MULTIPLE CABLE CONNECTIONS. COMPONENTS ARE SEPARATE AND MAY BE PLACED ON CASEWORK/COUNTERTOP SUPPLIED AND INSTALLED BY CUSTOMER.



SIDE VIEW

NOTE: OTHER SUPPORT COMPONENTS MAY NOT BE LOCATED WITHIN THE EQUIPMENT ROOM WITHOUT APPROVAL OF THE SITE PLANNING DEPARTMENT. REQUIRED EQUIPMENT SERVICE AREAS MAY NOT BE COMPROMISED.

HITACHI MEDICAL SYSTEMS AMERICA

1959 SUMMIT COMMERCE PARK TWINSBURG, OH 44087-2371  
(800) 800-3106 WWW.HITACHIMED.COM

### SYSTEM COMPONENTS

DATE: 04/30/2012

REVISION: 05/18/2012

OASIS MARK II STANDARD DETAILS

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HITACHI OASIS MARK II PRE-DELIVERY CHECKLIST

The successful delivery of the Hitachi OASIS MARK II with the cryostat pre-cooled (filled with cryogens) requires that certain items and systems **MUST** be completed and/or operational prior to the unit arriving on site. The items in this checklist **MUST** be completed in order to ensure a proper environment for maintaining the system once it is on site. The magnet, though filled with cryogens, will not be at field until later in the installation process. A clear schedule with a suite completion plan must also be in place to ensure a smooth room closure process during installation. **ALTHOUGH ITEMS ON THIS CHECKLIST DO NOT NEED TO BE COMPLETED AT THE TIME IT IS FILLED OUT, THEY MUST BE COMPLETED PRIOR TO DELIVERY OF THE SYSTEM.**

THIS CHECKLIST MUST BE COMPLETED AND RETURNED TO HMSA TWINSBURG A MINIMUM OF FOURTEEN (14) CALENDAR DAYS AND TEN (10) WORKING DAYS PRIOR TO DELIVERY

	Done	To be completed by
GENERAL CONSTRUCTION		
All Rooms are clean of construction dust and debris (broom clean)		
Contractor / Customer advised no construction may take place during shimming process (days 4 - 7 after delivery)		
Contractor advised and prepared for system delivery/room closure schedule (see pg 2 of 27 OASIS Standard Details)		
RF SHIELD		
Preliminary test completed and shield verified ground free		
Floor levelness verified by RF vendor: +/- 1/8" over entire area of gantry and patient table		
3'+ distance from top of wireway to bottom of filter panel rough opening on scan room side		
Wave Guides (4) installed in btm. wireway compartment. Must be flush to inside face of wireway on scan room side		
Wave Guides (2) installed above MCU. Must connect to (flush to inside face on scan rm side) overhead ww to gantry		
Filter Panel frames installed and ready for panel installation		
RF Vendor scheduled by contractor for access panel and filter panel installation and final test on 1 <sup>st</sup> day of delivery		
SCAN ROOM		
All walls complete, sanded and painted (except access opening)		
Flooring complete. Protection to be provided by contractor and ready at start of delivery day 1		
Ceiling complete		
Lighting and power outlets installed and functioning		
Wireway on-site and available for installation (electrician to complete any remaining wireway day after delivery)		
Cryogen vent flange at 8'-6 3/4" AFF and vent pipe run to exterior, complete and ready for connection to magnet		
Emergency exhaust fan (w/wall switch) operational (switch may be located in equipment or control rooms)		
Oxygen monitor installed		

	Done	To be completed by
CONTROL and EQUIPMENT ROOMS		
Walls sanded and painted (except access opening if required)		
Flooring complete		
Ceiling Installed		
Cabinetry installed		
Wireway installed (with min 3" distance from top of ww to btm of filter panel rough opening on scan room side)		
Customer/contractor advised that only pre-approved punch list items may be addressed after delivery		
Floor drain in equipment room (located so it will NOT be directly under a system cabinet)		
CHILLER AND HEAT EXCHANGER		
Chiller installed (hard-wired, plumbed and ready for no-load startup)		
Chiller checklist completed and returned to Haskris (fax 847-956-6595)		
No load start-up scheduled with Haskris (completed chiller checklist required) 847-956-6420 prior to magnet delivery		
ELECTRICAL		
480 V, 30 Amp, 3 phase receptacle for Magnet Ramp supply (NEMA L16-30R outside of scan room door)		
480 V, 100 Amp, 3 phase supply line pulled to planned location of RFIP cabinet		
480 V, 3MCA, 15 MOCP, 3 phase supply line pulled to planned location of Heat Exchanger		
Single Point ground has been verified for MRI sub-panel		
Electrician scheduled to connect power to RFIP cabinet on 2 <sup>nd</sup> day of delivery		
ENVIRONMENTAL		
HVAC operational in all rooms		
COMMUNICATIONS		
Phone lines available in control and equipment rooms for use by service personnel Phone #		
Network interface information sent to <a href="mailto:installchecklistgroup@hitachmed.com">installchecklistgroup@hitachmed.com</a> (pg 3 of 27 Oasis Standard Details)		
Network connections in place and functional with access to internet Network contact name:		
FACILITIES		
HMSA has 24 hour access		
Functional restroom facilities available in work area		
Empty 40 yd. dumpster on site morning of delivery with empty scheduled for 2 <sup>nd</sup> morning		
Storage area for 6 cryogen dewars (36" x 48" each) available with unrestricted path to the Scan Room (42" width)		
Storage area approximately 600 sq. ft. (20'x30') available near scan room for misc. equipment and parts		

PRE-DELIVERY CHECKLIST

**NOTE:**  
Please be advised that the site preparations as outlined in Site Planning Standard Details and related checklists are essential for delivery and installation. Because all arrangements for the delivery of your system must be completed two weeks in advance of delivery, any delay caused by incomplete site preparation will result in unavoidable additional cost related to scheduling and transportation of Riggers, delivery and installation personnel, cryogens, re-filling costs, storage costs, rescheduling fees, etc. These additional charges could exceed \$25,000.

Planned Delivery Date:\_\_\_\_\_

Site Name:\_\_\_\_\_

Address:\_\_\_\_\_

- NOTE:**
1. Planned delivery date must be no less than fourteen (14) calendar days and ten (10) working days after this document is received by HMSA

2. The delivery date will be confirmed only after the signed checklist is received/accepted by HMSA and the availability of the rigging and installation teams is established.

3. By signing you acknowledge your acceptance of the requirements and responsibilities as explained above.

Key On-Site Contact Name: \_\_\_\_\_ Title:\_\_\_\_\_

Phone: \_\_\_\_\_

Date:\_\_\_\_\_ HMSA FSE Signature: \_\_\_\_\_

Name printed\_\_\_\_\_

Date:\_\_\_\_\_ Customer Signature:\_\_\_\_\_

(or authorized representative)

Name printed\_\_\_\_\_

- Notes:
1. Scan and e-mail PDF file to: [InstallChecklistGroup@HitachiMed.com](mailto:InstallChecklistGroup@HitachiMed.com)

2. Contact assigned Site Planner with any questions

3. If MedRad injector has been purchased (optional), **customer/contractor** must schedule installation with MedRad for day 4 or 5 of Oasis installation

HITACHI OASIS MARK II PRE-DELIVERY CHECKLIST (REV 06/18/12) DM# 84477 v2

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**NOTE:** A COPY OF THE PRE-DELIVERY CHECKLIST CAN BE PROVIDED IN PDF FORMAT BY THE SITE PLANNING DEPARTMENT. A COPY IS ALSO PROVIDED WHEN DOWNLOADING THE OASIS STANDARD DETAILS FROM [www.hitachimed.com](http://www.hitachimed.com), CONTACT THE SITE PLANNING DEPARTMENT FOR THE CURRENT ACCESS CODE.

HITACHI MEDICAL SYSTEMS AMERICA	
1959 SUMMIT COMMERCE PARK TWINSBURG, OH 44087-2371	
(800) 800-3106 WWW.HITACHIMED.COM	
PRE-DELIVERY CHECKLIST	
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OASIS MARK II STANDARD DETAILS	PAGE 27 OF 27

OEM PRODUCTS AND SERVICES

OEM PRODUCT AND SERVICE VENDORS ARE KEY TO YOUR SUITE PREPARATION. THEY SHOULD BE INVOLVED EARLY IN THE PLANNING PROCESS WHEN POSSIBLE. WHILE VENDORS LISTED BELOW HAVE DEMONSTRATED ACCEPTABLE CUSTOMER SERVICE IN THE PAST, THIS IN NO WAY IS TO BE CONSTRUED AS AN ENDORSEMENT OR A GUARANTEE OF FUTURE SERVICE. THIS LISTING IS PROVIDED AS A CONVENIENCE ONLY AND IS BY NO MEANS ALL-INCLUSIVE. THE CUSTOMER IS RESPONSIBLE FOR CHOOSING THEIR VENDORS.

UPON IDENTIFYING YOUR VENDORS, PROVIDE CONTACT INFORMATION TO HMSA SITE PLANNING.

RF VENDORS:

MULTIPLE VENDORS. CONTACT YOUR SITE PLANNER FOR VENDORS IN YOUR REGION.

OXYGEN MONITOR SYSTEMS

BAKER INDUSTRIAL EQUIPMENT INC.  
(TELEDYNE REPRESENTATIVE)

PHONE: (412) 264-8271

NOTE: BAKER IS AN AUTHORIZED TELEDYNE REPRESENTATIVE. WHEN CALLING FOR A PRICE QUOTE, INFORM THEM THAT IT IS FOR A HITACHI MRI SYSTEM. THEY WILL PROVIDE THE APPROPRIATE FORMS TO ORDER SITE SPECIFIC LENGTH CABLES BETWEEN THE SENSOR AND MONITOR ALONG WITH THE REQUIRED RF FILTERS. THIS SERVICE MAY OR MAY NOT BE AVAILABLE FROM OTHER TELEDYNE REPRESENTATIVES.

MSA TOXGARD II  
PHONE: (800) 672-4678  
www.MSAnet.com

HELIUM VENT CONNECTOR MATERIAL

VENT FABRICS-VENT GLASS  
PHONE: (773) 775-4477

LORENZ CLAMP  
PHONE: (905) 372-2240

HELIUM VENT

ERNIES WELDING AND FABRICATING, INC  
PHONE: (727) 536-6661  
(888) 394-2754  
WWW.QUENCHLINE.COM

MECHANICAL EQUIPMENT ISOLATION

MATERIAL AND MOUNTINGS:

HAMMOND KINETICS - DUBLIN, OH  
PHONE: (614) 889-0480  
WWW.KINETICSNOISE.COM

SORBOTHANE, INC. - KENT, OH  
PHONE: (330) 678-9444  
WWW.SORBOTHANE.COM

UNISORB INSTALLATION TECHNOLOGIES  
PHONE: (517) 764-6060  
WWW.UNISORB.COM

MASON INDUSTRIES, INC.  
PHONE: (631) 348-0282  
WWW.MASON-IND.COM

VIBRATION ATTENUATION:

STS CONSULTANTS, LTD. - VERNON HILLS, IL  
PHONE: (847) 279-2500  
CONTACT: BERNARD HERTLEIN

GEOVISION - CORONA, CA  
PHONE: (909) 549-1234

WIREWAYS:

WIREMOLD / WALKER  
PHONE: (800) 621-0049 EXT. 4  
CONTACT: WALKER WIREMOLD INFLOOR AND PRE-WIRE PROJECT TEAM

SOUND ATTENUATION:

MPC, INC  
PHONE: (440) 835-1405  
CONTACT: CHRIS HOLICK  
WWW.MPCSILENTWALL.COM

RIGGERS:

NORCAL RIGGING & INSTALLATIONS  
PHONE: 877-995-8840  
CONTACT: CHRIS McCOWIN

JC DUGGAN, INC  
PHONE: 718-384-3260  
CONTACT: JOHN CEREGHINO

DIAMOND RIGGING CORPORATION  
PHONE: 630-879-6500  
CONTACT: MAX MAYER

AMBROSE RIGGING  
PHONE: 215-674-9232  
CONTACT: FRAN AMBROSE

HWP  
PHONE: 314-865-0100  
CONACT: JOSH CUMMINGS  
BOB DEUTSCH

ABLE MACHINERY MOVERS  
PHONE: 800-856-1914  
CONTACT: MIKE ALIANELL

ATLAS INDUSTRIAL CONTRACTORS  
PHONE: 800-562-8322  
CONTACT: RAY BUDD

BURTON TRUCKING AND RIGGING  
PHONE: 916-806-4800  
CONTACT: RICHARD BURTON

BELGERS RIGGING  
PHONE: 816-472-0000  
CONTACT: MIKE SCOTT

CONTACT HMSA SITE PLANNING FOR THE MOST CURRENT LIST OF TRAINED RIGGERS  
PHONE: 800-800-3106

APPROVED RECESSED CAN LIGHTS:

CONTACT THE SITE PLANNING DEPARTMENT AT 800-800-3106 FOR THE LATEST LIST OF APPROVED VENDORS

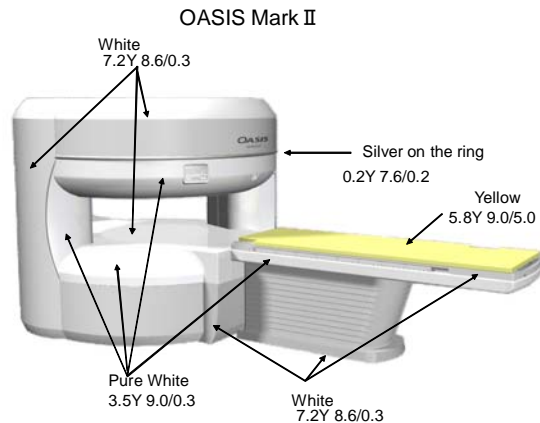
OASIS MARK II SYSTEM COLORS

COMPONENTS: SIDE, BOTTOM AND TOP COVERS, TABLE BELOW, AND TABLE BASE, UPPER FRAME  
COLOR: WHITE  
MUNSELL VALUE: 7.2Y 8.6/0.3

COMPONENTS: BORE COVERS, TABLE TOP SUPPORT  
COLOR: PURE WHITE  
MUNSELL VALUE: 3.5Y 9.0/0.3

COMPONENTS: TABLE TOP  
COLOR: YELLOW  
MUNSELL VALUE: 5.8Y 9.0/5.0

COMPONENTS: ACCENT RING  
COLOR: SILVER  
MUNSELL VALUE: 0.2Y 7.6/0.2



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OEM PRODUCTS AND SERVICES

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OASIS MARK II STANDARD DETAILS

OEM ADDENDUM