

# Drawing Index

These sheets are a document set and should not be separated. Electrical information and references are contained on all sheets.

SITE READINESS	C1
EQUIPMENT LAYOUT (Equipment locations, heat loads, component weights, environmental specs)	A1
STRUCTURAL LAYOUT (Structural support/mounting locations for floor/wall/ceiling, wall support elevations)	S1
STRUCTURAL DETAILS (Floor and Ceiling loading information)	S2
ELECTRICAL LAYOUT (Contractor supplied wiring, interconnect methods, junction point locations and descriptions)	E1
ELECTRICAL SPECIFICATIONS (Maximum wiring run lengths, interconnect diagram, system power specifications)	E2
ELECTRICAL DETAILS	E3
MECHANICAL LAYOUT (Chiller information)	M1
EQUIPMENT DETAILS	D1 THRU D2

These drawings indicate the placement and interconnection of the listed equipment components. These drawings are not construction or site preparation drawings. Customer remains ultimately responsible for preparing the site to accommodate the operation of such equipment in compliance with GE Healthcare's written specifications and all applicable federal, state, and/or local requirements.

## \* REQUIRED REFERENCE \*

Discovery MR750  
Pre Installation Manual  
5500101

A mandatory component of this drawing set is the GE Healthcare Pre Installation manual. Failure to reference the Pre Installation manual will result in incomplete documentation required for site design and preparation.

Pre Installation documents for GE Healthcare products can be accessed on the web at:

[www.gehealthcare.com/siteplanning](http://www.gehealthcare.com/siteplanning)

# GE Healthcare



## MRi Site Planning



imagination at work

## Customer Site Readiness Requirements

- Any deviation from these drawings must be communicated in writing to and reviewed by your local GE Healthcare Installation Project Manager prior to making changes.
- Make arrangements for any rigging, special handling, or facility modifications that must be made to deliver the equipment to the installation site. If desired, your local GE Healthcare Installation Project Manager can supply a reference list of rigging contractors.
- New construction requires the following; 1. Secure area for equipment, 2. Power for drills and other test equipment, 3. Capability for image analysis, 4. Restrooms.
- Provide for refuse removal and disposal (e.g. crates, cartons, packing)
- It is the customer's responsibility to contract a vibration consultant/engineer to implement site design modifications to meet the GE vibration specification. Refer to the system preinstallation manual for the vibration specification.

## GE Equipment Delivery Requirements

The items on the GE Healthcare Site Readiness Checklist are REQUIRED to facilitate equipment delivery to the IS site. Equipment will not be delivered if these requirements are not satisfied.

GE Healthcare Site Readiness Checklist Rev 21				
Before using this document ensure you have the latest Rev from MyWorkshop on DGC0422752				
GEHC Global Order # : _____		Customer: _____		
GEHC PMI Name: _____		FE / DOS Name: _____		
The customer is responsible for proper site preparation regardless of any GEHC measurements/inspections/assessments				
Inspection Date: _____				
GEHC Minimum Requirements	Storage is ready?	PMI is item ready?	FE is item ready?	Comments if "N", enter comments or action plan
1 MR Magnet Delivery Requirements: Ensure cryogen venting system is available for magnet connection as defined by GEHC Pre-Installation Manual (PMI) requirements, exhaust fan system is installed and operational, 480V power, and chilled water supply is available				
2 MR RF Screen Room Requirements: RF Screen Room is tested with copy of Test Report that it is compliant with GEHC specifications. Dock Bolt and magnet anchors (if applicable) installed using 2 part anchor. For HDx systems, blower box mount bolts installed				
State Regulatory Requirements: Facility registration number provided for states of IL, KY, HI, RI, SC, TX, 3 K-ray shielding plan and state acknowledgment letter provided to installer for AR, DC, NC, SC, CO, S.W.A. Site Drawing Requirements: Final version of				
4 Surface Penetration Requirements: Customer/Contractor scheduled to provide required drilling or cutting into floors, ceilings, and walls; OR surface penetration permit available and posted in the room when GEHC will perform the work.				
5 Pre-Delivery Route Requirements: The equipment delivery route from the truck to the final destination within the facility has been reviewed with all key stakeholders to safely meet the minimum requirements for equipment access, and all communications/route				
6 Finished Room Requirements: Rooms that will contain equipment, including storage areas not in scan suite, are dust free. Provisions taken to maintain a dust free room. Precautions must be taken to prevent dust from entering rooms containing equipment wh				
7 Electrical Requirements: Lockable (LOTO) Main Disconnect Panel (MDP) is installed per GE guidelines and system power is available. Conduits, electrical cable ducting/dividers/cable trays, and access flooring is installed in proper location and height. 5				
8 Power and Ground Audit: Workflow created				
9 HVAC Requirements: The HVAC/Chilled Water systems designed to maintain the environment per spec/PMI is at running state and appears to provide the desired environmental conditions including location of vents, temperature and humidity for system operation.				
10 Flooring Requirements: Floor is clean and prepared for final floor covering. Floor levelness/flatness is measured and within tolerance, and there are no visible defects per GEHC specifications. Confirm customer anchoring plan aligns with designed floor				
11 Ceiling Requirements: Unistrut (or equivalent) location, levelness and spacing is measured (or vendor confirmed) and consistent with the requirement of the installation drawings. Ensure unistrut and rails are not used as mounting surfaces. Ceiling grid				
12 Staging Requirements: Space has been identified to support the active installation process only. This area meets PMI/project book requirements. Storage space has been identified, if needed. This secured space would be used to store equipment indefinitely				
13 Network Connectivity: Hardwire for network connectivity(network drop) is in place prior to delivery with specified network firewall configuration where required. Site Surveys for wireless mobile XR units have been completed.				
14 Insite Readiness: Confirmation of VPN tunnel requested.				
15 Medical Gases Requirements: Systems (hard piped or portable) in place to allow testing and calibration of equipment (anesthetic, including ventilation.				

**GE Healthcare**  
Healthcare Project Implementation - Design Center  
Minneapolis, Wisconsin  
Copyright © 2009 General Electric Company - Proprietary to GE

SHEET TITLE: **SITE READINESS**  
MODALITY TYPE: **DISCOVERY MR750**  
THIS PLAN IS SUBMITTED TO SURVEY LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS. IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM DETAILS TO THE PROJECT'S INTENT AND TO THE USER'S INTENT. GE HEALTHCARE ACCEPTS NO LIABILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE:  
**8-222F**  
**TYPICAL LAYOUT**  
TYPICAL INSTALLATION DRAWINGS

PROJECT	REVISION
8-222F	00
DATE:	12.Dec.16
DRAWN BY:	PMM
CHECKED BY:	PMM

REVISION HISTORY:


SHEET  
**C1**

PIM RT3  
RQ - 166353

**GE EQUIPMENT LISTING**

EQUIPMENT ON ORDER FROM GE HEALTHCARE, INSTALLED BY GE HEALTHCARE, PER : NEITHER A QUOTE OR GON WAS ISSUED AT THE DATE OF THESE DRAWINGS

NOTE: LOCAL CONDITIONS MAY DICTATE THAT ITEMS IDENTIFIED IN THIS CATEGORY BE INSTALLED BY OTHERS.

ITEM NO.	QUANTITY ORDERED	REFER TO SHEET "D"	ITEM DESCRIPTION (* = EXISTING/REINSTALL)	WEIGHT	HEAT OUTPUT (PER HOUR)	DETAIL NO.	STRC PLAN	ELEC PLAN
1	1		SPT PHANTOM CABINET	350 lbs		M6115		
2	1		3.0 TESLA LCC ACTIVE SHIELD MAGNET	25083 lbs	8191 btu	M3015K M3030D M3015F M3015L	M66 30E	MAG C
3	1		REAR PEDESTAL	213 lbs				C
4	1		PATIENT TRANSPORT TABLE (DOES NOT INCLUDE PATIENT)	418 lbs		M2315A		S
5	1		MAGNET RUNDOWN UNIT	8 lbs		M1715C		MRU C
6	1		SHIELD COOLER CABINET	264 lbs	1706 btu	M3300A		CRY C
7	1		POWER, GRADIENT, RF CABINET	3143 lbs	20945 btu	M3015G		PGR S
8	1		PEN PANEL CABINET (EXAM ROOM SIDE)	639 lbs	10699 btu	M3015F		PEN S
9	1		RF PENETRATION PANEL	92 lbs		M3015P		SPW S
10	1		BLOWER BOX	1535 lbs		M3015J		S
11	1		HEAT EXCHANGER CABINET	1349 lbs	3412 btu	M3015B M3015D		HEC S
12	1		MAGNET MONITOR	11 lbs	819 btu	M1615C		MON S
13	1		OPERATOR WORKSPACE W/COLOR LCD MONITOR	26 lbs	4948 btu	M3015D		DW S
14	1		OPERATOR WORKSPACE CABINET	141 lbs		M0615E		C
15	1		PATIENT ALERT CONTROL BOX			M4815		PA S

THE FOLLOWING ITEMS, WHICH HAVE BEEN ORDERED FROM GE HEALTHCARE, ARE TO BE INSTALLED BY THE CUSTOMER OR HIS CONTRACTOR.

1	1		MAIN DISCONNECT PANEL	130 lbs	901 btu	M1715E		MDP C
---	---	--	-----------------------	---------	---------	--------	--	-------

**EQUIPMENT LAYOUT** RECOMMENDED CEILING HEIGHT = 8'-9"

SCALE: 1/4" = 1'-0"  
This equipment layout indicates the placement and interconnection of the indicated equipment components. There may be federal, state, and/or local requirements that could impact the placement of these components. It remains the Customer's responsibility for ensuring the site and final equipment placement complies with all applicable federal, state, and/or local requirements.

**MRI SITE PLANNING REMINDERS**

PLEASE REFER TO PRE-INSTALLATION CHECKLIST IN PRE-INSTALLATION MANUAL LISTED ON SHEET C1 FOR ITEMS CRITICAL TO IMAGE QUALITY.

- THE LAYOUT SHOULD BE ARRANGED SO THAT THE 5G LINE IS CONTAINED TO THE MAGNET ROOM. IF NOT POSSIBLE, A BARRIER IS RECOMMENDED TO PREVENT ENTRY TO THE 5G FIELD AREA.
- THE SPACES AROUND, ABOVE, AND BELOW THE MAGNET MUST BE REVIEWED FOR EFFECTS OF THE 5G, 3G, 1G, AND .5G FIELDS. REFER TO THE PROXIMITY LIMIT CHART IN THE MR PRE-INSTALLATION MANUAL REFERENCED ON C1.
- FOR MOVING METAL, THE RESTRICTION LINES TYPICALLY EXTEND OUTSIDE OF THE MRI SPACE. PLEASE CONFIRM THERE ARE NO MOVING METAL CONCERNS WITHIN THESE AREAS. AN EMI STUDY IS RECOMMENDED IF THE RESTRICTION LINES ARE VIOLATED.
- FOR VIBRATION, ANALYSIS IS TO BE COMPLETED AS REQUIRED PER PRE-INSTALLATION MANUAL.
- FOR EMI, REVIEW THE SITE FOR THE LOCATION OF THE MAIN ELECTRICAL FEEDERS, AC DEVICES, OR DISTRIBUTION SYSTEMS. AN EMI STUDY IS RECOMMENDED IF LARGE AC SYSTEMS ARE NEARBY.
- DETAILS OF THE FLOOR BELOW THE MAGNET MUST BE REVIEWED. THE STRUCTURAL ENGINEER MUST VERIFY THAT THE QUANTITY OF STEEL IN THE VOLUME 10FT [3.1M] X 10FT [3.1M] X 1FT [0.3M] DEEP (BELOW THE MAGNET) DOES NOT EXCEED THE ALLOWABLE STEEL CONTENT AS GIVEN IN THE MR PRE-INSTALLATION MANUAL REFERENCED ON SHEET C1.

RESPONSIBILITY FOR THE COORDINATION, DESIGN, ENGINEERING, AND SITE PREPARATION RESIDES WITH THE CUSTOMER AND THEIR PROJECT ARCHITECTS AND CONTRACTORS. GE DOES NOT, BY PROVIDING REVIEWS AND FURNISHING COMMENTS AND ASSISTANCE, ACCEPT ANY RESPONSIBILITY BEYOND ITS OBLIGATIONS AS DEFINED IN THE MR SYSTEM, SALE/PURCHASE AGREEMENT.

**IMAGE QUALITY CONSIDERATIONS**

BROADBAND RF NOISE IS A SINGLE TRANSIENT OR CONTINUOUS SERIES OF TRANSIENT DISTURBANCES CAUSED BY AN ELECTRICAL DISCHARGE. LOW HUMIDITY ENVIRONMENTAL CONDITIONS WILL HAVE HIGHER PROBABILITY OF ELECTRICAL DISCHARGE. THE ELECTRICAL DISCHARGE CAN OCCUR DUE TO ELECTRICAL ARCING (MICRO ARCING) OR MERELY STATIC DISCHARGE. SOME POTENTIAL SOURCES CAPABLE OF PRODUCING ELECTRICAL DISCHARGE INCLUDE:

- LOOSE HARDWARE/FASTENERS VIBRATION OR MOVEMENT (ELECTRICAL CONTINUITY MUST ALWAYS BE MAINTAINED)
- FLOORING MATERIAL INCLUDING RAISED ACCESS FLOORING (PANELS & SUPPORT HARDWARE) AND CARPETING
- ELECTRICAL FIXTURES (i.e. LIGHTING FIXTURES, TRACK LIGHTING, EMERGENCY LIGHTING, BATTERY CHARGERS, OUTLETS)
- DUCTING FOR HVAC AND CABLE ROUTING
- RF SHIELD SEALS (WALLS, DOORS, WINDOWS, ETC.)

FOR ADDITIONAL INFORMATION REGARDING IMAGE QUALITY, REFER TO THE PRE-INSTALLATION MANUAL LISTED ON SHEET C1.

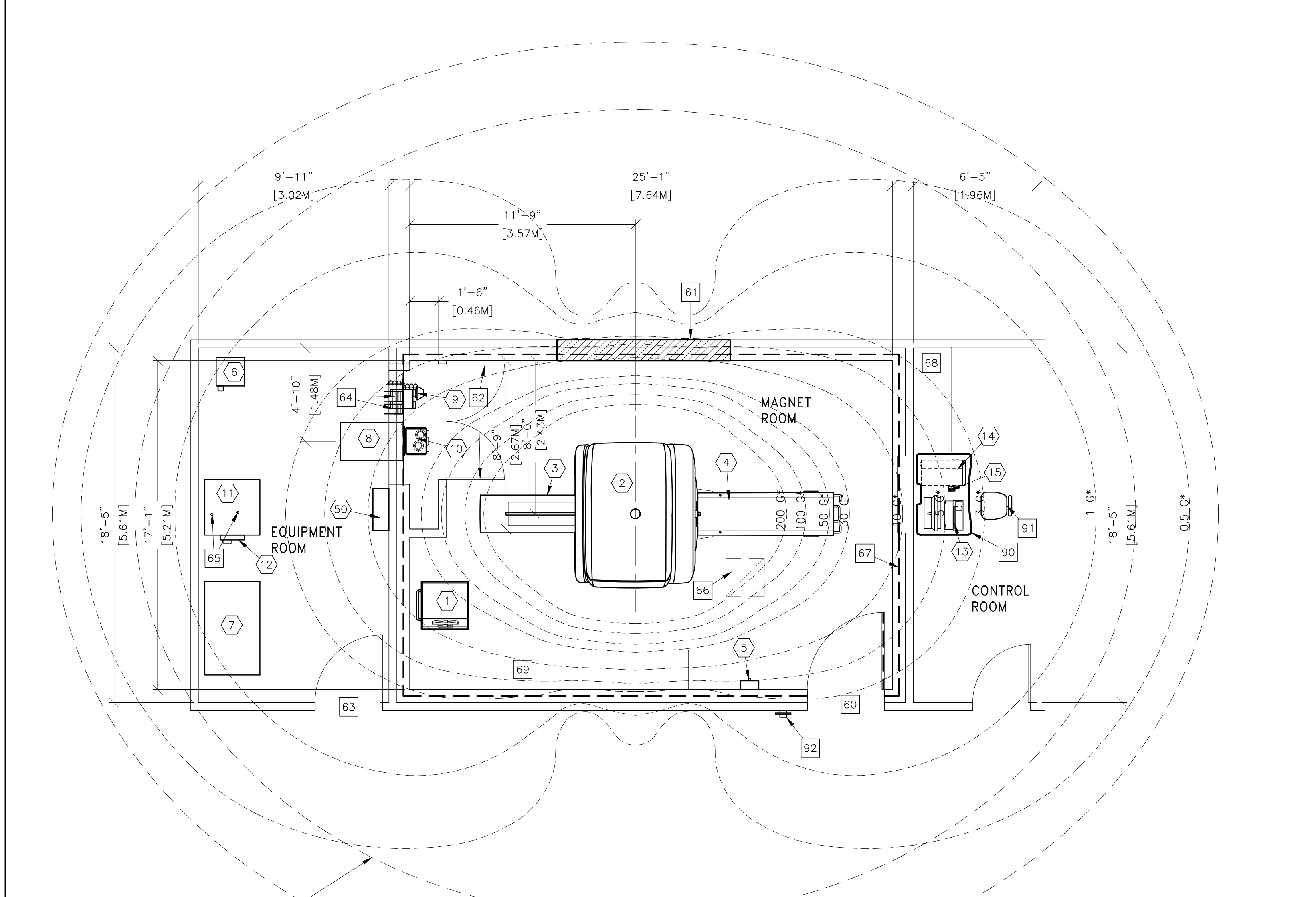
NOTE: VERIFY DELIVERY ROUTE FOR MAGNET, EQUIPMENT, AND SERVICE EQUIPMENT PRIOR TO DELIVERY.

**CRITICAL ITEMS FOR MAGNET DELIVERY**

- 24/7 CHILLED WATER AND 480V POWER FOR SHIELD/CRYO COOLER
- 24/7 120V POWER FOR THE MAGNET MONITOR
- PHONE LINES FOR MAGNET MONITORING AND EMERGENCY USE
- MAGNET ROOM EXHAUST FAN
- CRYOGEN VENTING (IF ROOF HATCH, COMPLETED WITHIN 24 HRS)
- MAGNET ANCHORS INSTALLED AND TESTED

THIS IS ONLY A PARTIAL LIST OF ITEMS REQUIRED FOR DELIVERY OF THE MAGNET. FOR A COMPLETE CHECKLIST REFER TO THE PRE-INSTALLATION MANUAL REFERENCED ON SHEET C1.

\* THE ISOGAUSS CONTOUR PLOTS DEPICTED ON THIS DRAWING REPRESENT MAGNETIC FRINGE FIELDS RESULTING FROM THE NORMAL OPERATION OF THE MAGNET PROVIDED WITH THE MR SYSTEM. THE ACTUAL MAGNETIC FIELD INTENSITY AT ANY POINT IN THE VICINITY OF THE MAGNET WHEN INSTALLED MAY VARY FROM THE CONTOUR PLOTS DUE TO FACTORS SUCH AS THE CONCENTRATING EFFECTS OF NEARBY FERROUS OBJECTS, AMBIENT MAGNETIC FIELDS, INCLUDING THE EARTH'S MAGNETIC FIELD. THEREFORE, THE CONTOURS SHOWN ARE ONLY APPROXIMATIONS OF ACTUAL FIELD INTENSITIES FOUND AT A CORRESPONDING DISTANCE FROM THE MAGNET'S ISOCENTER.



MOVING METAL SENSITIVITY LINE FOR CARS, MINIVANS, PICKUP TRUCKS, AND AMBULANCES.

NOTE: FERROUS OBJECTS MUST NOT MOVE INTO OR INSIDE OF THE MOVING METAL SENSITIVITY LINE DURING SCANS.

MOVING METAL SENSITIVITY LINE FOR BUSES AND TRUCKS (DUMP, TRACTOR TRAILER, UTILITY, FIRE TRUCKS)

**ANCILLARY ITEMS**

**CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS**

ITEM NO.	ITEM DESCRIPTION (* INDICATES EXISTING)
60	MINIMUM DOOR OPENING FOR EQUIPMENT DELIVERY IS 43 IN. W X 82 IN. H [1092mm X 2083mm]. CONTINGENT ON A 96 IN. [2438mm] CDRR/DOOR WIDTH
61	MINIMUM 9 FT.-0 IN. [2743 mm] X 9 FT.-0 IN. [2743 mm] REMOVABLE WALL SECTION FOR MAGNET DELIVERY/REMOVAL.
62	LOUVERED DOORS - REFER TO PREINSTALL FOR REQUIREMENTS
63	MINIMUM DOOR OPENING FOR EQUIPMENT DELIVERY IS 40 IN. W X 82 IN. H [1016mm X 2083mm]. CONTINGENT ON A 78 IN. [1980mm] CDRR/DOOR WIDTH
64	RF FILTERS - LOCATE WITHIN 40 IN. [1016 mm] OF THE RF COMMON GROUND STUD
65	PIPING FOR COOLING SYSTEM
66	MAGNET ROOM EXHAUST FAN
67	RF SCREEN, INCLUSIVE OF WALLS, FLOOR, DOOR, ETC. GROUND IMPEDANCE GREATER THAN 100 OHMS ATTENUATION 100dB AT 143MHz +/- 10MHz PLANEWAVE. COUNTERTOP WITH DRAWERS FOR MISCELLANEOUS ITEMS.
68	BASE CABINET FOR STORAGE OF: SURFACE COILS, PATIENT POSITIONING PADS, PHANTOMS, ETC.

THE FOLLOWING ITEMS ARE AVAILABLE FROM GE HEALTHCARE TECHNOLOGIES. CONTACT YOUR LOCAL GE HEALTHCARE SERVICE REPRESENTATIVE FOR PRICING AND AVAILABILITY.

90	WORKSTATION TABLE CAT. NO. M1000MW
91	OPERATOR'S CHAIR CAT. NO. E8803BE
92	METAL DETECTOR (HAND HELD)

**GENERAL SPECIFICATIONS**

- o THE REQUIRED CEILING HEIGHT INDICATED ON THESE PLANS IS TO ENSURE EQUIPMENT FUNCTION IS NOT INHIBITED. CONSULT WITH YOUR LOCAL GEHC SPECIALIST REGARDING ACCEPTABILITY OF OTHER CEILING HEIGHTS.
- o CHECK ALL DOOR OPENINGS AND HALLWAYS FROM DELIVERY LOCATION TO WHERE EQUIPMENT IS TO BE INSTALLED TO ENSURE THE ROUTE PHYSICALLY AND STRUCTURALLY WILL ACCOMMODATE THE EQUIPMENT AS SHIPPED.
- o RADIATION PROTECTION REQUIREMENTS ARE NOT INDICATED ON THIS PLAN. WHERE NEEDED PER NATIONAL OR LOCAL CODE THEY SHALL BE SPECIFIED BY A QUALIFIED RADIOLOGICAL PHYSICIST.
- o THE DEVELOPMENT OF THE EQUIPMENT LAYOUT, ROOM DIMENSIONS, MECHANICAL AND ELECTRICAL SUGGESTIONS IS PREDICATED UPON THE BEST INFORMATION OBTAINABLE FROM THE SITE, COUPLED WITH THE CUSTOMER'S KNOWN DESIRES. ARCHITECTURAL OR ELECTRICAL CHANGES INCLUDING RELOCATION OF EQUIPMENT ILLUSTRATED ON THIS DRAWING IS ALLOWED ONLY WITH NOTIFICATION, IN WRITING, AND REVIEW BY GEHC SERVICE DEPARTMENT. EQUIPMENT OPERATION, SERVICEABILITY, AND RESTRICTING CABLE LENGTHS, ETC., MAKE THIS ESSENTIAL FOR A PROPER INSTALLATION. GEHC RESERVES THE RIGHT TO MAKE ON THE JOB CHANGES BECAUSE OF CUSTOMER REQUIREMENTS AND/OR OBSTACLES IN CONSTRUCTION, ETC..
- o ALL WORK TO BE IN COMPLIANCE WITH NATIONAL AND LOCAL BUILDING SAFETY CODES.
- o DIMENSIONS ARE TO FINISHED SURFACES OF ROOM

**SITE ENVIRONMENT SPECIFICATIONS**

- o AMBIENT OPERATING TEMPERATURE: CONTROL AND EQUIPMENT ROOMS ARE 59-89.6 DEG (F) [15-32 (C)]. MAGNET ROOM IS 59-69.8 DEG (F) [15-21 (C)]. MAXIMUM ALLOWABLE TEMPERATURE CHANGE OF 5 DEG (F)/HR [3 (C)/HR]. MAXIMUM ROOM TEMPERATURE GRADIENT 5 DEG (F) [3 (C)].
- o HUMIDITY: CONTROL AND EQUIPMENT ROOMS ARE 30 TO 70 PERCENT NON-CONDENSING. MAGNET ROOM IS 30 TO 60 PERCENT NON-CONDENSING. MAXIMUM ALLOWABLE CHANGE OF 5 PERCENT/HOUR.
- o ENVIRONMENTAL RESTRICTIONS ABOVE MUST NOT BE EXCEEDED FOR THE ELECTRONICS
- o DO NOT RESTRICT THE AIR INTAKE OR AIR EXHAUST OF THE SYSTEM COMPONENTS.
- o ENVIRONMENTAL CONDITIONS LISTED ABOVE MUST BE MAINTAINED AT ALL TIMES INCLUDING FOR EXAMPLE OVERNIGHT, WEEKENDS, AND HOLIDAYS.
- o 24 HOUR POWER AND HVAC MUST BE AVAILABLE UPON MAGNET DELIVERY. [THIS WILL INCLUDE CHILLED WATER SUPPLY].
- o CRYOGEN VENTING AND EMERGENCY EXHAUST SYSTEMS MUST BE COMPLETED IN THE MAGNET ROOM PRIOR TO DELIVERY.
- o FLUORESCENT LIGHTING, SCR DIMMERS OR RHEOSTATS ARE NOT ALLOWED IN THE MAGNET ROOM.
- o PROVIDE FLOORING TO PREVENT THE BUILD UP TO 8KV

**MAGNETIC INTERFERENCE SPECIFICATIONS**

- o THE CUSTOMER MUST ESTABLISH PROTOCOLS TO PREVENT PERSONS WITH CARDIAC PACEMAKERS, NEUROSTIMULATORS, AND BIOSTIMULATION DEVICES FROM ENTERING MAGNETIC FIELDS OF GREATER THAN 5 GAUSS (EXCLUSION ZONE).
- o MAIN POWER TRANSFORMERS MUST REMAIN OUTSIDE THE 3 GAUSS FIELD. EMI < 17.1mG AC. EMI < 4.1mG DC.
- o POTENTIAL EXISTS UNDER FAULT CONDITIONS THAT THE 5 GAUSS LINE MAY EXPAND AXIALLY TO 24.61 FT. [7.5 m] AND RADIALLY TO 19.69 FT. [6.0 m] FOR 100 SECONDS OR LESS. IT SHOULD BE NOTED THAT NORMAL RAMPDOWNS WILL NOT CAUSE THE MAGNETIC FIELD TO EXPAND.
- o IT IS RECOMMENDED EVERY SITE CONSIDER THE EVENT OF A QUENCH AND PLAN ACCORDINGLY (SUCH AS PLACING 5 GAUSS WARNING SIGNS AT EXPANDED LOCATIONS).
- o THE FERROUS METAL OBJECTS LISTED BELOW MUST NOT MOVE INTO OR INSIDE OF THE MOVING METAL SENSITIVITY LINE DURING SCANS.

TYPICAL MOVING MAGNETIC MASS	DISTANCE RADIALLY	DISTANCE AXIALLY
FORKLIFTS, SMALL ELEVATOR, CARS, MINIVANS VANS, PICKUP TRUCKS, AMBULANCES (OBJECTS GREATER THAN 400 lbs [182 kg])	21.0 ft. [6.4 m]	26.0 ft. [7.92 m]
BUSES AND TRUCKS (DUMP, TRACTOR TRAILER, UTILITY, FIRE TRUCKS)	24.5 ft. [7.47 m]	30.3 ft. [9.25 m]

THIS SHEET IS PART OF THE DOCUMENT SET LISTED ON SHEET C1 AND SHOULD NOT BE SEPARATED

**GE Healthcare**  
Healthcare Project Implementation - Design Center  
Minneapolis

SHEET TITLE: **EQUIPMENT LAYOUT**  
MODALITY TYPE: **DISCOVERY MR750**

THIS PLAN IS SUBMITTED TO SURVEY LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS. IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM DETAILS TO ALL APPLICABLE REGULATORY REQUIREMENTS AND TO BE USED FOR ACTUAL CONSTRUCTION PURPOSES. GE HEALTHCARE AND THE COMPANY CANNOT ACCEPT RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE:  
**8-222F**  
**TYPICAL LAYOUT**  
**TYPICAL INSTALLATION DRAWINGS**

PROJECT	REVISION
8-222F	00

DATE: 12.Dec.16  
DRAWN BY: PMM  
CHECKED BY: PMM

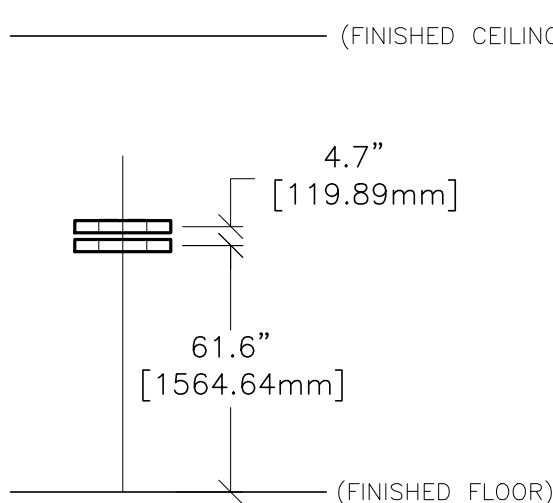
REVISION HISTORY:


SHEET  
**A1**

PIM R13  
RQ - 166353

TYPICAL WALL SUPPORT ELEVATIONS

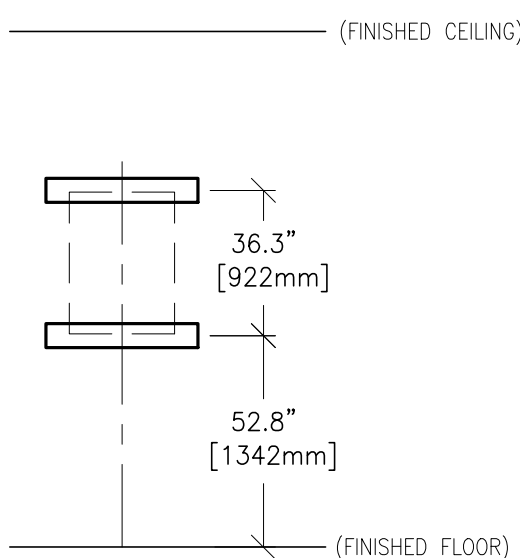
S63



SUPPORT FOR  
MAGNET RUNDOWN UNIT

(NOT TO SCALE)

S60



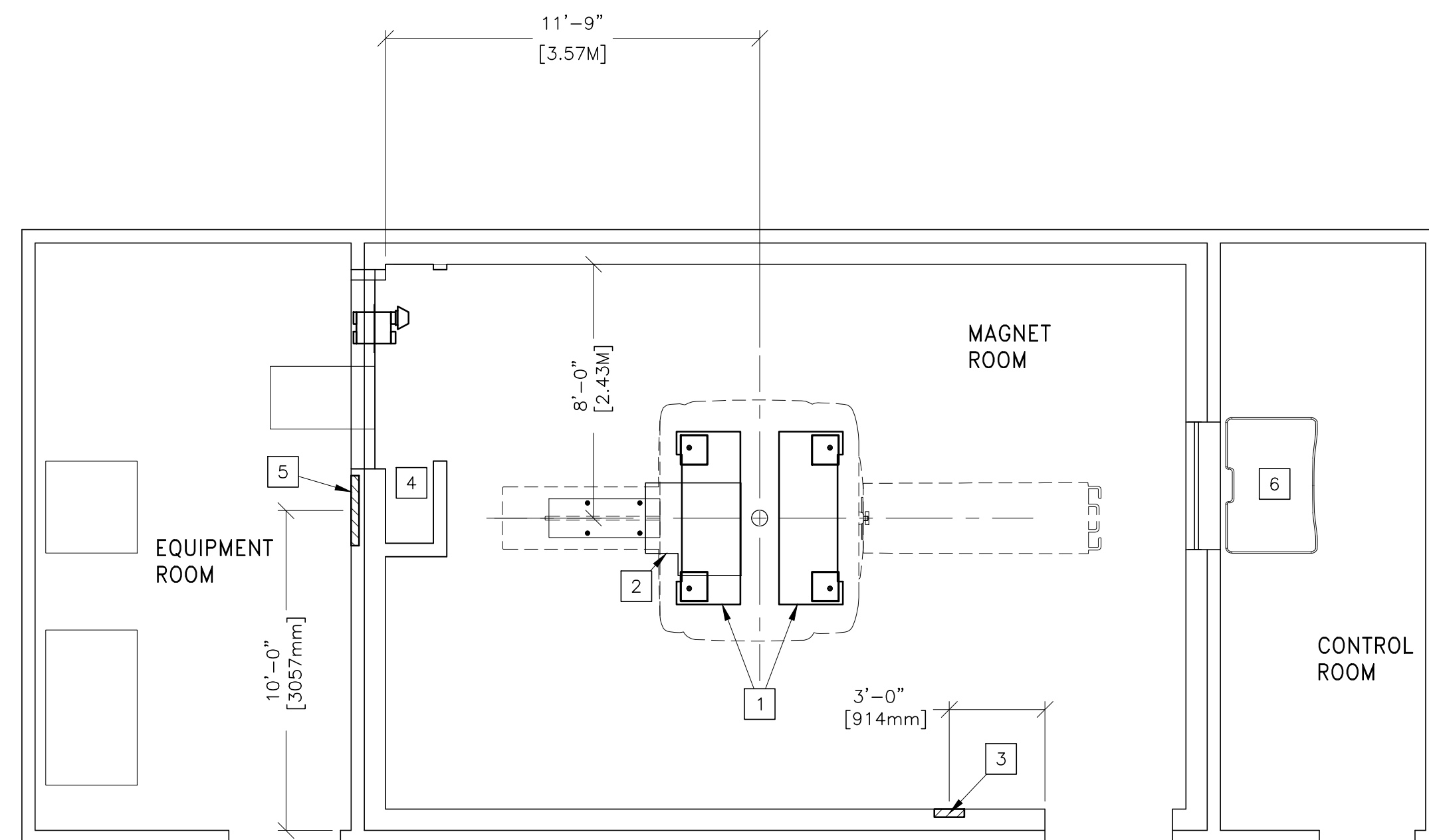
SUPPORT FOR  
MAIN DISCONNECT CONTROL

(NOT TO SCALE)

SCALE: 1/4" = 1'-0"

STRUCTURAL LAYOUT

RECOMMENDED CEILING HEIGHT = 8'-9"



STRUCTURAL SUPPORT METHODS

CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS

ITEM NO.	ITEM DESCRIPTION (* INDICATES EXISTING)
1	SEE MAGNET FLOOR MOUNTING DETAIL ON SHEET S2 FOR MORE INFORMATION.
2	CABLE ACCESS OPENING AND CONCEALMENT FRAME IN CEILING. SEE DETAIL ON SHEET S2.
3	SUPPORT BACKING. LOCATE AS SHOWN. REFER TO ELEVATION DETAIL S63, FOR MAGNET RUNDOWN UNIT.
4	SUITABLE WALL BACKING FOR CABLE STORAGE. CONSULT WITH FE OR PROJECT MANAGER.
5	SUPPORT BACKING. LOCATE AS SHOWN. REFER TO ELEVATION DETAIL S60, FOR MAIN DISCONNECT CONTROL.
6	SEE OPERATOR WORKSPACE FLOOR MOUNTING DETAIL ON SHEET S2.

STRUCTURAL NOTES

- ALL UNITS THAT ARE WALL MOUNTED OR WALL SUPPORTED ARE TO BE PROVIDED WITH SUPPORTS WHERE NECESSARY. WALL SUPPORTS ARE TO BE SUPPLIED AND INSTALLED BY THE CUSTOMER OR HIS CONTRACTORS. SEE PLAN AND DETAIL SHEETS FOR SUGGESTED LOCATIONS AND MOUNTING HOLE LOCATIONS.
- DIMENSIONS ARE TO FINISHED SURFACES OF ROOM.
- CERTAIN MR PROCEDURES REQUIRE AN EXTREMELY STABLE ENVIRONMENT TO ACHIEVE HIGH RESOLUTION IMAGE QUALITY. VIBRATION IS KNOWN TO INTRODUCE FIELD INSTABILITIES INTO THE IMAGING SYSTEM. THE VIBRATION EFFECTS ON IMAGE QUALITY CAN BE MINIMIZED DURING THE INITIAL SITE PLANNING OF THE MR SUITE BY MINIMIZING THE VIBRATION ENVIRONMENT. SEE MOUNTING DETAIL ON SHEET S2 FOR ADDITIONAL INFORMATION.
- STANDARD STEEL STUDS, NAILS, SCREWS, CONDUIT, PIPING, DRAINS AND OTHER HARDWARE ARE ACCEPTABLE IF PROPERLY SECURED. ANY LOOSE STEEL OBJECTS CAN BE VIOLENTLY ACCELERATED INTO THE BORE OF THE MAGNET. CAREFUL THOUGHT SHOULD BE GIVEN TO THE SELECTION OF LIGHT FIXTURES, CABINETS, WALL DECORATIONS, ETC. TO MINIMIZE THIS POTENTIAL HAZARD. FOR SAFETY, ALL REMOVABLE ITEMS WITHIN THE MAGNET ROOM SUCH AS FAUCET HANDLES, DRAIN COVERS, SWITCH BOX COVER PLATES, LIGHT FIXTURE COMPONENTS, MOUNTING SCREWS, ETC. MUST BE NON-MAGNETIC. IF YOU HAVE A SPECIFIC QUESTION ABOUT MATERIAL, BRING IT TO THE ATTENTION OF YOUR GE PROJECT MANAGER OF INSTALLATIONS.
- FLOOR LEVELNESS REFER TO MAGNET FLOOR MOUNTING DETAIL ON S2. THIS FLOOR LEVELNESS REQUIREMENT IS IMPORTANT FOR ACCURATE PATIENT TABLE DOCKING.
- NON-MOVABLE STEEL SUCH AS WALL STUDS OR HVAC COMPONENTS WILL PRODUCE NEGLIGIBLE EFFECT ON THE ACTIVE SHIELD MAGNET.
- CUSTOMERS CONTRACTOR MUST PROVIDE ALL PENETRATIONS IN POST TENSION FLOORS.
- CUSTOMERS CONTRACTOR MUST PROVIDE AND INSTALL ANY NON-STANDARD ANCHORING. DOCUMENTS FOR STANDARD ANCHORING METHODS ARE INCLUDED WITH GE EQUIPMENT DRAWINGS FOR GEOGRAPHIC AREAS THAT REQUIRE SUCH DOCUMENTATION.
- CUSTOMERS CONTRACTOR MUST PROVIDE AND INSTALL HARDWARE FOR "THROUGH THE FLOOR" ANCHORING AND/OR ANY BRACING UNDER ACCESS FLOORS. THIS CONTRACTOR MUST ALSO PROVIDE FLOOR DRILLING THAT CANNOT BE COMPLETED BECAUSE OF AN OBSTRUCTION ENCOUNTERED WHILE DRILLING BY THE GE INSTALLER SUCH AS REBAR ETC.
- CUSTOMERS CONTRACTOR TO PROVIDE AND INSTALL APPROPRIATE SUPPORTS FOR THE STORAGE OF EXCESS CABLES.
- IT IS THE CUSTOMER'S RESPONSIBILITY TO PERFORM ANY FLOOR OR WALL PENETRATIONS THAT MAY BE REQUIRED. THE CUSTOMER IS ALSO RESPONSIBLE FOR ENSURING THAT NO SUBSURFACE UTILITIES (E.G., ELECTRICAL OR ANY OTHER FORM OF WIRING, CONDUITS, PIPING, DUCT WORK OR STRUCTURAL SUPPORTS (I.E. POST TENSION CABLES OR REBAR)) WILL INTERFERE OR COME IN CONTACT WITH SUBSURFACE PENETRATION OPERATIONS (E.G. DRILLING AND INSTALLATION OF ANCHORS/SCREWS) PERFORMED DURING THE INSTALLATION PROCESS. TO ENSURE WORKER SAFETY, GE INSTALLERS WILL PERFORM SURFACE PENETRATION OPERATIONS ONLY AFTER THE CUSTOMER'S VALIDATION AND COMPLETION OF THE "GE SURFACE PENETRATION PERMIT"

**GE Healthcare**  
Healthcare Project Implementation - Design Center  
Milwaukee, Wisconsin

SHEET TITLE: **STRUCTURAL LAYOUT**  
MODALITY TYPE: **DISCOVERY MR750**  
THIS PLAN IS SUBMITTED TO SURGEST LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED APPARATUS. ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS. IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM TO ALL APPLICABLE REGULATIONS AND STANDARDS. GE HEALTHCARE DOES NOT ACCEPT ANY LIABILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE:  
**8-222F**  
**TYPICAL LAYOUT**  
TYPICAL INSTALLATION DRAWINGS

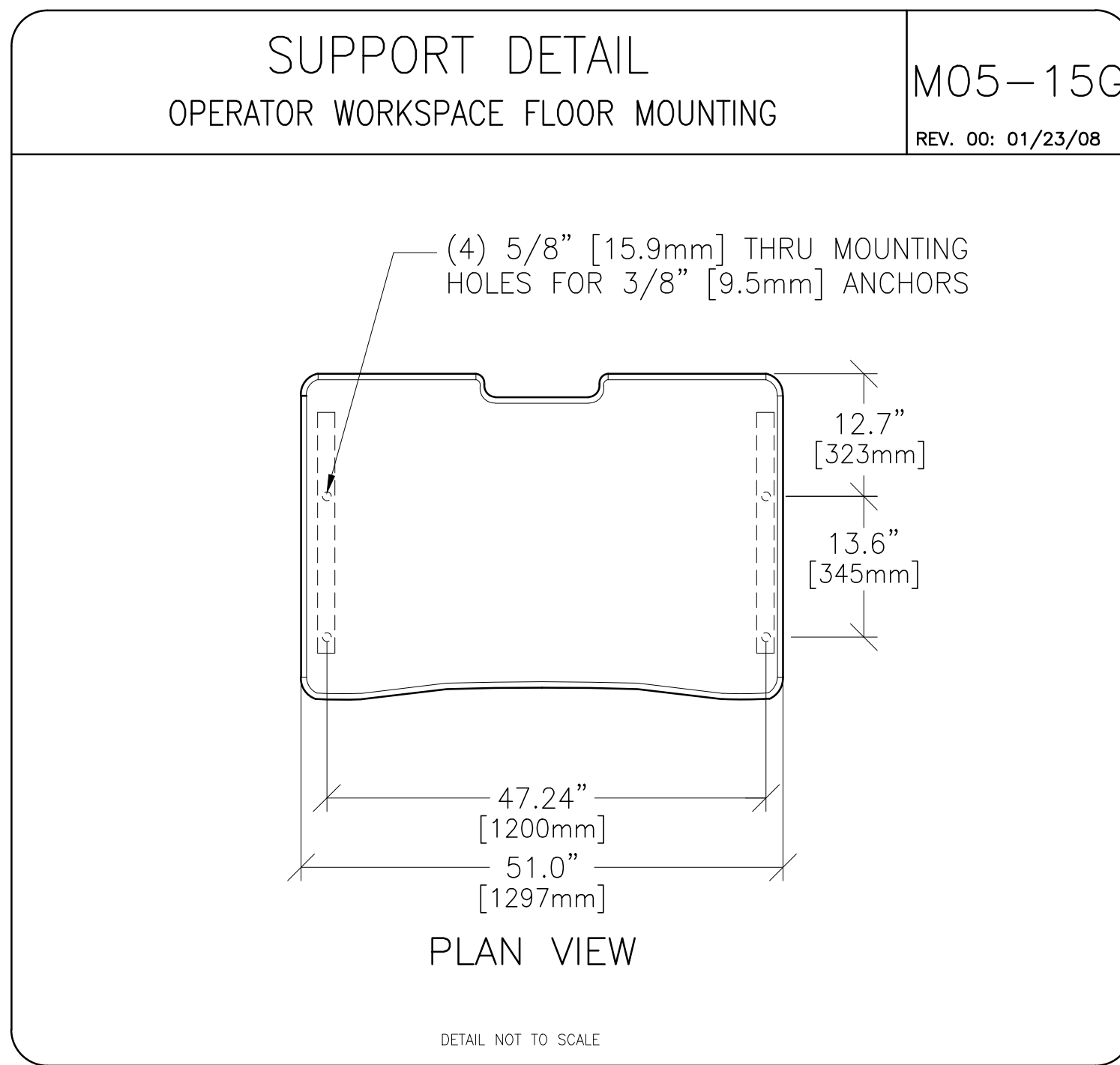
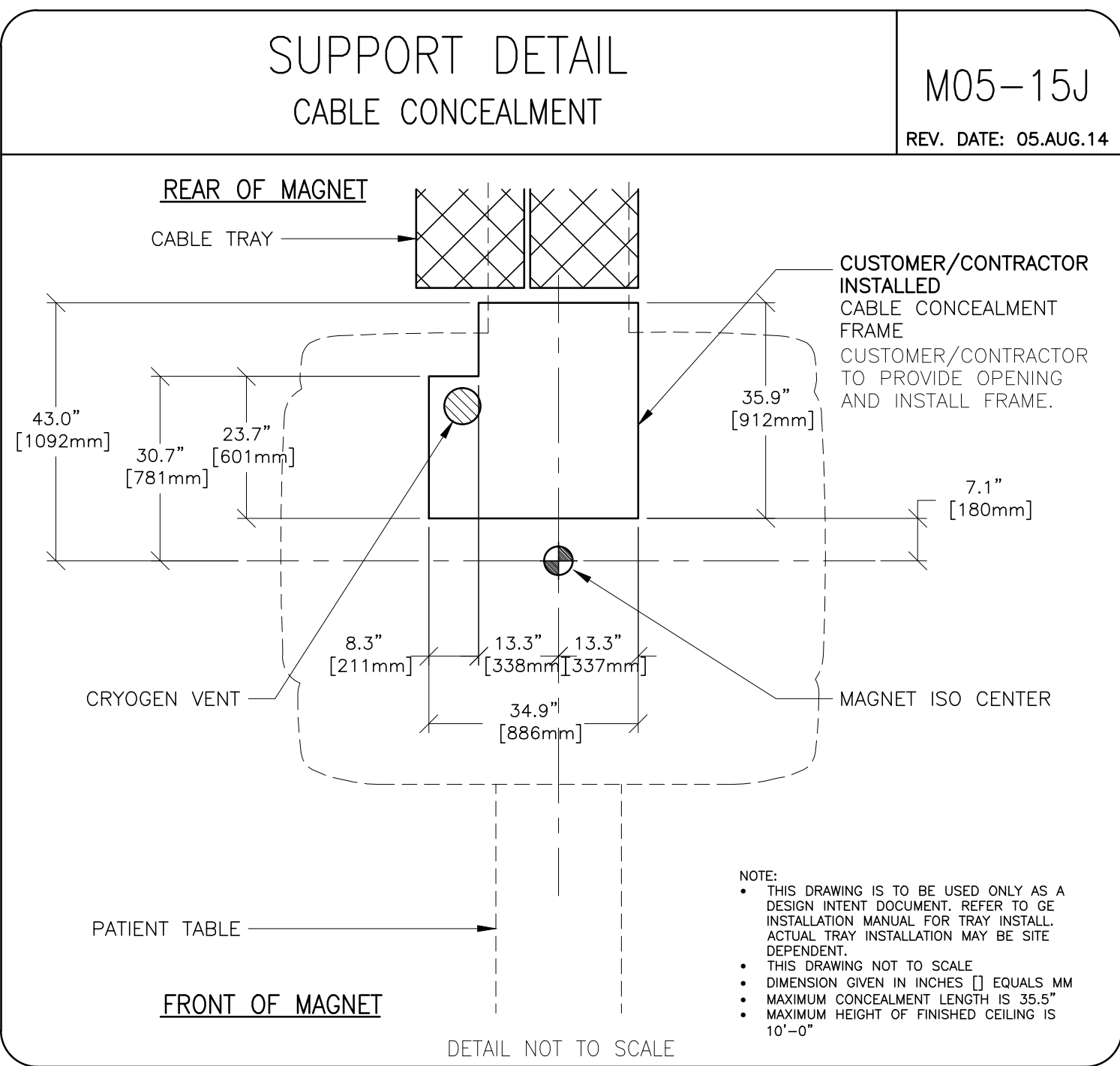
PROJECT	REVISION
8-222F	00

DATE: 12.Dec.16  
DRAWN BY: PMM  
CHECKED BY: PMM

REVISION HISTORY:


SHEET  
**S1**

RQ - 166353 PIM R13



### ACOUSTICS AND VIBRATION GUIDELINES: MAGNET

M66-30B  
REV. DATE: 27.APR.13

#### SYSTEM ACOUSTIC NOISE LEVELS

ANY GE FACTORY-INSTALLED PROTOCOL CAN BE MODIFIED BY OPERATORS, WHICH CAN INCREASE OR DECREASE ACOUSTIC SPL (SOUND PRESSURE LEVEL); OR OPERATORS MAY CREATE THEIR OWN PROTOCOL WHICH COULD PRODUCE A HIGHER OR LOWER ACOUSTIC SPL AS STATED UNDER OPERATING CONDITIONS CONDITION 1 BELOW. TYPICAL SCANS GENERATE ACOUSTIC LEVELS AS STATED UNDER OPERATING CONDITIONS CONDITION 2 BELOW. IN ADDITION, THE EXPOSURE TIMES ARE COMPLETELY UNDER OPERATOR CONTROL. CONSEQUENTLY, HEARING PROTECTION IS REQUIRED FOR ALL PEOPLE IN THE MAGNET ROOM DURING SCANS TO PREVENT HEARING IMPAIRMENT. ACOUSTIC LEVELS MAY EXCEED 99 dBA. AGAIN, FOR MORE INFORMATION ABOUT RECOMMENDED SAFETY PROCEDURES REGARDING PATIENT EXPOSURE TO MR-GENERATED ACOUSTIC NOISE, SEE THE MR SAFETY GUIDE INCLUDED IN THE USER MANUAL.

#### AMBIENT CONDITIONS

TO REDUCE ANY BACKGROUND NOISE DUE TO CABINET BLOWERS, ETC., ACOUSTICAL CEILINGS, WALLS, AND FLOORS ARE RECOMMENDED. THE FOLLOWING ARE TYPICAL NOISE LEVEL READINGS:

- o OPERATOR AREA ..... 62 dBA
- o EQUIPMENT ROOM ..... 80 dBA

#### OPERATING CONDITIONS

MR SCANNERS OPERATING CONDITIONS, COULD GENERATE ACOUSTIC LEVELS (AS MEASURED AT THE MAGNET ISO-CENTER) AS FOLLOWS:

AVERAGE SPL 127 dBA  
FREQUENCY RANGE 20 TO 20K Hz  
SPL = SOUND PRESSURE LEVEL

#### TEST MEASUREMENTS (1.1)

VIBRATION MEASUREMENTS ARE IN THE RANGE OF  $10^{-6}$ g. TEST EQUIPMENT MUST HAVE THE REQUIRED SENSITIVITY TO THESE LEVELS.

INSTRUMENTATION IS RECOMMENDED TO HAVE A LOW TOLERANCE TO TEMPERATURE EFFECTS AS MANY TIMES THE LOW FREQUENCY THERMAL DRIFT MAY INFLUENCE THE MEASUREMENTS.

IT IS HIGHLY RECOMMENDED ALL MEASURED DATA IS REAL TIME DATA ACQUISITION. RECORDING THE VIBRATION DATA WILL NOT ALLOW FOR A PROPER SITE SURVEY, SPECIFICALLY WHEN STUDYING TRANSIENT VIBRATION AND WHEN SEARCHING FOR SPECIFIC VIBRATION SOURCES.

ALL ANALYSES ARE TO BE NARROWBAND FAST FOURIER TRANSFORMS (FFTS) OVER THE FREQUENCY BANDS LISTED BELOW:

FREQUENCYBAND	FREQUENCY RESOLUTION
0.2 TO 50 HZ	$\Delta f = 0.125$ HZ

TIME HISTORIES OF THE VIBRATION MUST BE RECORDED AS ACCELERATION LEVELS VS. TIME. THE RESOLUTION OF THE TIME HISTORY MUST BE ADJUSTED TO CLEARLY CAPTURE THE TRANSIENT EVENT. THE ANALYZER SET-UP WILL BE SITE DEPENDENT AND, IN SPECIAL CASES, VIBRATION RESPONSE DEPENDENT. IT IS THE RESPONSIBILITY OF THE VIBRATION CONSULTANT TO STUDY THE TRANSIENT ENVIRONMENT, CAPTURE DATA TO CONFIRM TRANSIENT ACTIVITY EXCEEDS THE TRIGGER LEVEL, THEN EXPAND THE TIME HISTORY DATA TO EXHIBIT THE STRUCTURAL RESPONSE.

#### EQUIPMENT (SPECTRAL ANALYZER) SET-UP (1.2)

- o FREQUENCY AVERAGE A MINIMUM OF 20 LINEAR AVERAGES. DO NOT USE PEAK HOLD OR 1/3 OCTAVE ANALYSIS.
- o AVERAGE AND STORE A MINIMUM OF 10 PLOTS TO SUPPORT THE SITE VIBRATIONS CONSISTENCY.
- o HANNING WINDOW MUST BE APPLIED TO THE ENTIRE SPECTRA

SPECTRUM ANALYZERS CAPABLE OF THESE MEASUREMENTS ARE READILY AVAILABLE FOR PURCHASE OR RENTAL. MODELS SUCH AS THE HP 3560A, NICOLET PHASZER, B&K PULSE, AND HP 35670 ARE ALL CAPABLE OF MAKING THE SITE VIBRATION MEASUREMENTS. ACCELEROMETERS MUST HAVE THE CAPABILITY TO MEASURE FROM 0.2 HZ BEYOND 50 HZ. TIME HISTORIES CAN BE RECORDED USING ANY OF THE ANALYZERS LISTED ABOVE. PLEASE NOTE THAT THE EQUIPMENT MENTIONED ARE FOR EXAMPLE ONLY. IT IS THE RESPONSIBILITY OF THE ENGINEERING TEST FIRM TO PROVIDE EQUIPMENT THAT WILL ALLOW MEASUREMENTS COMPLIANT WITH THIS GUIDELINE.

#### DATA COLLECTIONS (1.3)

##### AMBIENT BASELINE CONDITION:

ALL OF THE MEASUREMENTS DEFINED IN 1.1 AND 1.2 (ABOVE) MUST BE MADE IN A 'QUIET' ENVIRONMENT, THAT IS, IN AREAS WHERE EXCESSIVE TRAFFIC, SUBWAY TRAINS, ETC. EXISTS. A VIBRATION MEASUREMENT MUST ALSO BE MADE DURING PERIODS WITHOUT TRAFFIC OR DURING PERIODS OF LIGHT TRAFFIC. MEASUREMENTS MUST DEFINE THE LOWEST LEVELS OF VIBRATION POSSIBLE AT THE SITE.

THE SOURCE OF ANY STEADY STATE VIBRATION WHOSE LEVELS EXCEED THE SPECIFICATIONS MUST BE IDENTIFIED AS TO THE SOURCE OF THE VIBRATION DISTURBANCE. A SECOND MEASUREMENT SHOULD BE MADE WITH ALL OF THE IDENTIFIED CONTRIBUTORS POWERED DOWN IF POSSIBLE. IN SITUATIONS WHERE IT IS NOT POSSIBLE TO POWER DOWN EQUIPMENT, VIBRATION DATA MUST BE COLLECTED TO IDENTIFY SPECIFIC SOURCE OF THE VIBRATION CONCERN. THE MAJORITY OF STEADY STATE VIBRATION PROBLEMS CAN BE NEGATED BY ISOLATING THE VIBRATION SOURCE.

##### NORMAL CONDITION

ALL OF THE VIBRATION MEASUREMENTS LISTED ABOVE MUST BE REPEATED DURING PERIODS OF 'NORMAL' ENVIRONMENTAL CONDITIONS INCLUDING THE FFTS AND TIME HISTORIES. THE TRANSIENT MEASUREMENTS MUST BE PROVIDED TO DEFINE THE DYNAMIC DISTURBANCES THE MR SYSTEM MIGHT BE EXPOSED TO. TRANSIENT ANALYSIS IS REQUIRED FOR A TRUE ASSESSMENT OF THE SITE.

SPECIAL ATTENTION MUST BE PAID TO THE SITE ASSESSMENT DURING THE ENTIRE ANALYSIS. SINCE TRANSIENT VIBRATION IS NOT EASILY ADDRESSED ONCE THE MR SUITE IS FULLY CONSTRUCTED, THE TEST CONSULTANT MUST FULLY UNDERSTAND THE NEEDS FOR THIS ANALYSIS. THE SOURCE OF ANY TRANSIENT MUST BE IDENTIFIED AND SUPPORTED WITH VIBRATION PLOTS. IF THE SOURCE OF ANY TRANSIENT IS NOT ABLE TO BE LOCATED, IT IS RECOMMENDED THAT THE CUSTOMER SHOULD HAVE AN ALTERNATE LOCATION IDENTIFIED AND VIBRATION STUDIED.

TRANSIENT VIBRATION IS DIFFICULT TO ASSESS IF THE DETAILS OF THE TRANSIENT VIBRATION IS NOT UNDERSTOOD. THE 0.0005 g, ZERO TO PEAK TRIGGER LEVEL IS A STARTING POINT TO BEGIN UNDERSTANDING THE VIBRATION STABILITY. THE TRANSIENT VIBRATION PEAK AMPLITUDE, STRUCTURAL (TIME VARIANT) RESPONSE, DECAY RATE AND AN ESTIMATE OF THE NUMBER OF EVENTS PER UNIT TIME WOULD CONSTITUTE A COMPLETE TRANSIENT ANALYSIS. ALL TRANSIENT FAILURES MUST BE SUPPORTED BY TIME HISTORY PLOTS. THE PLOTS MUST CLEARLY SHOW THE STRUCTURAL RESPONSE, THE FREQUENCY OF THE SIGNATURE AND THE DECAY RATE. FROM THIS DATA, GE CAN HELP DETERMINE COMPLIANCE TO THE VIBRATION GUIDELINES.

TEST CONSULTANT MUST PROVE DESIGN RECOMMENDATIONS FOR ALL SITES/BUILDING STRUCTURES WHICH ARE FOUND TO EXCEED THE SPECIFICATIONS.

#### PRESENTATION/INTERPRETATION OF RESULTS (1.4)

THE RECOMMENDED FORMAT FOR SITE VIBRATION DATA COLLECTION, PRESENTATION, AND ANALYSIS IS ILLUSTRATED IN THE EXAMPLES SHOWN IN ILLUSTRATIONS 1.1 THROUGH 1.4. IN THE PRE-INSTALLATION MANUAL. PRESENTATION OF THE DATA IN ANY OTHER FORMAT (LINEAR UNITS ONLY) MAY RESULT IN AN INCORRECT INTERPRETATION AND DIAGNOSIS OF THE SITE. ADDITIONAL DATA COLLECTION OR PRESENTATION METHODS IS AT THE OPTION OF THE VIBRATION TESTING SERVICE.

IT IS THE RESPONSIBILITY OF THE CUSTOMER'S VIBRATION TESTING SERVICE TO INTERPRET THE RESULTS AND DETERMINE IF THAT SITE MEETS GE'S SPECIFICATIONS. ILLUSTRATIONS A-1 AND A-2 ARE EXAMPLES PROVIDED TO ASSIST A TEST CONSULTANT IN THE USE OF GE STEADY STATE VIBRATION SPECIFICATIONS (VIBRATION SPECIFICATIONS ABOVE AMBIENT BASELINE). IF THE VIBRATION LEVELS ARE TOO HIGH, ADDITIONAL DATA ACQUISITION MAY BE NECESSARY TO:

- o DETERMINE THE SOURCE OF THE VIBRATION
- o PROPOSE A SOLUTION TO THE PROBLEM
- o FIND AN ALTERNATE SITE LOCATION.

ILLUSTRATIONS A-3 AND A-4 IN THE PRE-INSTALLATION MANUAL ARE EXAMPLES PROVIDED TO ASSIST A TEST CONSULTANT IN THE USE OF GE TRANSIENT VIBRATION SPECIFICATIONS. THE 500 MICRO-G, ZERO TO PEAK TRIGGER LEVEL IDENTIFIES DATA COLLECTION TO BEGIN ASSESSMENT OF THE SITE VIBRATION ANALYSIS. THE RESPONSE OF THE TRANSIENT MUST BE ASSESSED RELATIVE TO THE STEADY STATE VIBRATION SPECIFICATIONS IN SECTION SPECIFICATIONS.

ANY QUESTIONS REGARDING TEST EQUIPMENT REQUIREMENTS, TEST PARAMETERS, OR GENERAL QUESTIONS SHOULD BE DISCUSSED WITH YOUR GE PROJECT MANAGER.

#### VIBRATION

- o THE MAGNET MAY BE SENSITIVE TO VIBRATIONS IN THE FREQUENCY RANGE OF 0.5 TO 45 HZ DEPENDING ON THE AMPLITUDE OF THE VIBRATION. IN THE PHYSICAL AREA WHERE THE MR SYSTEM IS TO BE LOCATED, EVERY PRECAUTION MUST BE TAKEN TO ENSURE THAT THE VIBRATION IS MINIMIZED. IN THE MAGNET SITING AREA, THE STRUCTURAL STABILITY AND BEHAVIORAL CHARACTERISTICS CAN BE ASSESSED. THE VIBRATION TESTS OUTLINED CAN BE USED TO ASSESS THE VIBRATION ENVIRONMENT. SITES WHICH CURRENTLY PASS THE VIBRATION STABILITY CRITERIA MAY PROCEED WITH INSTALLATION. SITES WHICH HAVE MARGINAL VIBRATION STABILITY REQUIRE SOURCE ISOLATION OR STRUCTURAL MODIFICATIONS. THEN IT IS THE CUSTOMER'S RESPONSIBILITY TO CONTRACT A VIBRATION CONSULTANT OR QUALIFIED ENGINEER TO IMPLEMENT DESIGN MODIFICATIONS TO MEET THE SPECIFIED LIMITS. WITH THE VIBRATION CONSULTANT PRESENT, LOCAL GE FIELD SERVICE AND/OR INSTALLATION SPECIALIST MUST VERIFY THE ELIMINATION/REDUCTION OF ALL IDENTIFIED SOURCES DO IMPROVE THE VIBRATION ENVIRONMENT. GE CAN ASSIST IN INTERPRETING MARGINAL SITE TEST RESULTS AND PREDICTING THE IMPACT ON SYSTEM PERFORMANCE. ULTIMATELY IT REMAINS THE CUSTOMER/ARCHITECT/ENGINEER RESPONSIBILITY TO DESIGN SITE SOLUTION.
- o TO MINIMIZE THE INTERFERENCE, THE MAGNET SHOULD BE PLACED ON A SOLID FLOOR, LOCATED AS FAR AS POSSIBLE FROM THE VIBRATION SOURCES, SUCH AS PARKING LOTS, ROADWAYS, SUBWAYS, TRAINS, HALLWAYS, ELEVATORS, HELIPORTS AND HOSPITAL PHYSICAL PLANTS CONTAINING PUMPS, MOTORS, AIR HANDLING EQUIPMENT, OR AIR CONDITIONING EQUIPMENT.

PLEASE NOTE THAT OTHER ITEMS NOT LISTED COULD ALSO BE POTENTIAL SOURCES OF VIBRATION. VIBRATION ISOLATION IS RECOMMENDED AT FLOOR CONNECTION POINTS OF THE AIR CONDITIONING UNIT(S) TO BE INSTALLED FOR THE PURPOSE OF COOLING THE MR SUITE.

ISOLATION OF THE MR MAGNET IS NOT A RECOMMENDED SOLUTION FOR REDUCING ENVIRONMENTAL VIBRATION.

- o VIBRATION MEASUREMENTS SHOULD BE MADE WHEN THE PROPOSED SITE IS LOCATED NEAR ANY OF THE SOURCES LISTED HERE. MEASUREMENTS SHOULD BE MADE USING A SPECTRUM ANALYZER CAPABLE OF PERFORMING THE TEST GUIDELINES.

#### TRANSIENT VIBRATION

- o TIME HISTORY VIBRATION LEVELS (WITH ALL STEADY STATE VIBRATION SOURCES POWERED DOWN) EXCEEDING TRIGGER OF 0.0005 g, ZERO TO PEAK MUST BE FULLY ANALYZED TO ASSESS THE POTENTIAL IMPACT TO THE BUILDING STRUCTURE. THE BUILDING (SPECTRAL) RESPONSE IMMEDIATELY FOLLOWING THE 0.0005 g, ZERO TO PEAK TRIGGER LEVEL (ENDING AT THE DECAY OF THE VIBRATION SIGNAL) MUST NOT CAUSE THE SITE ENVIRONMENT TO EXCEED THE STEADY STATE VIBRATION LEVELS DEFINED BELOW.

#### STEADY STATE VIBRATION

THE MAXIMUM STEADY STATE VIBRATION TRANSMITTED THROUGH THE FLOOR MUST NOT EXCEED THE FOLLOWING (ABOVE AMBIENT BASELINE):

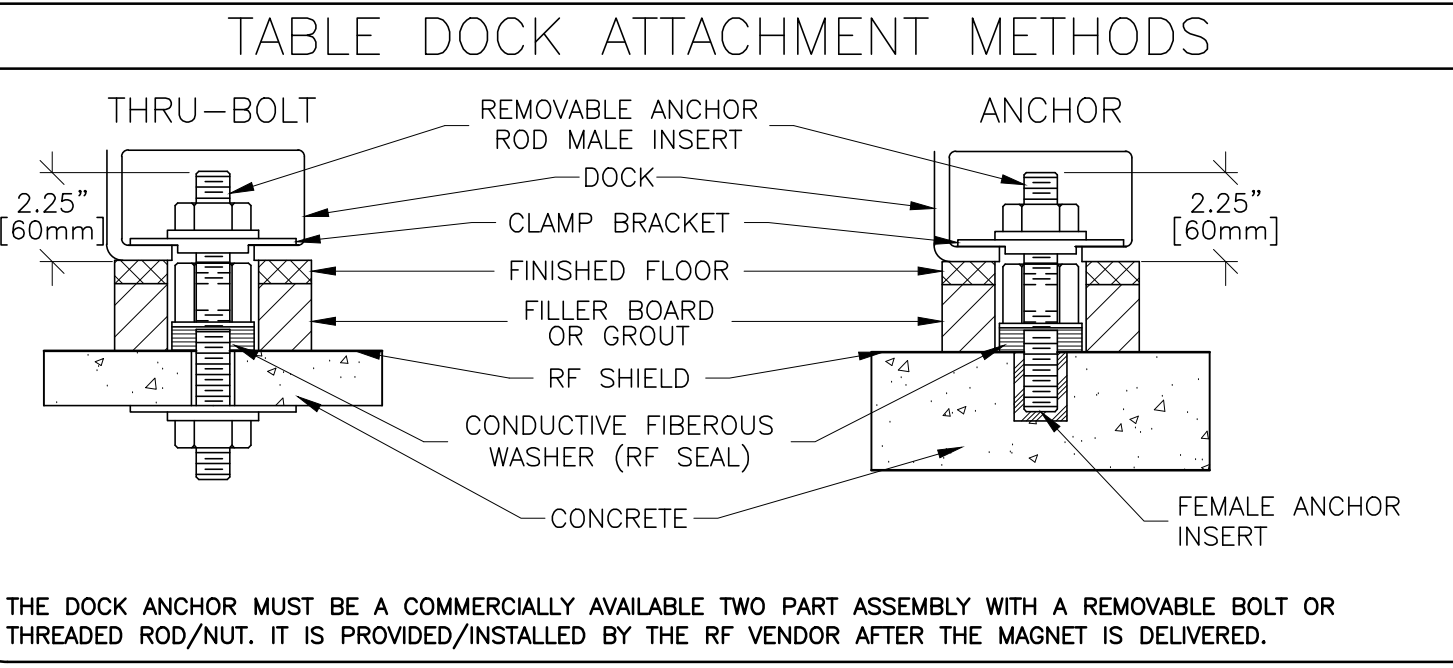
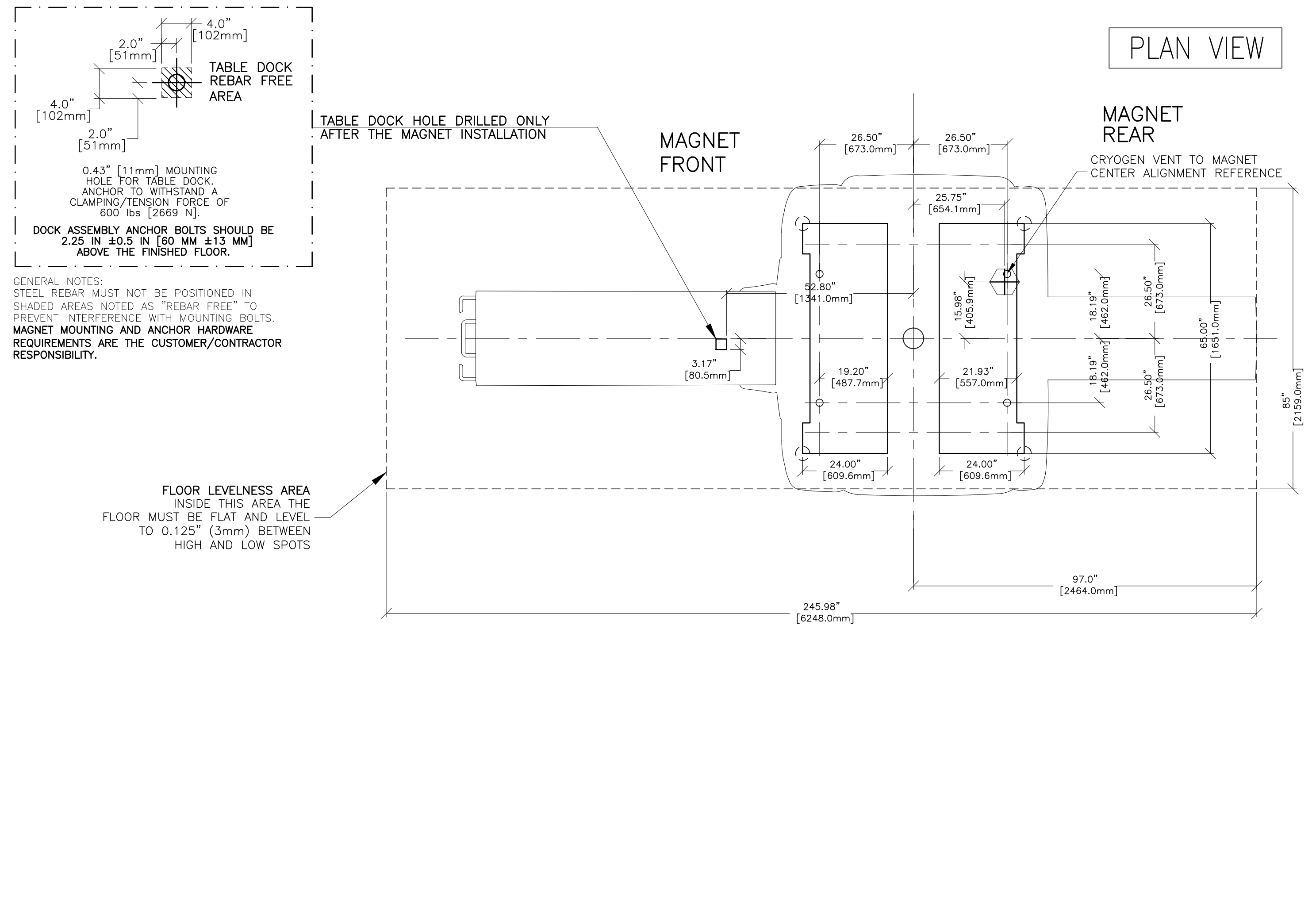
- o  $75 \times 10^{-6}$  g rms 0-26 Hz
- o  $500 \times 10^{-6}$  g rms 31-40 Hz
- o  $100 \times 10^{-6}$  g rms 26-31 Hz
- o  $750 \times 10^{-6}$  g rms 40-50 Hz

IN ORDER TO ENSURE THAT ANY DISCRETE SIGNAL REPRESENTS A REAL MECHANICAL VIBRATION SOURCE, THE SIGNAL MUST HAVE A BANDWIDTH THAT TYPIFIES DYNAMIC SYSTEM RESPONSE.

### FLOOR MOUNTING DETAIL: MAGNET

REFER TO SHEET A1 FOR ACTUAL MAGNET ORIENTATION

M6630E  
REV. DATE: 04.JUN.16



#### ENVIRONMENTAL STEEL LIMITS

A STATIC MAGNETIC FIELD EXTENDS IN A THREE-DIMENSIONAL SPACE AROUND THE MAGNET ISOCENTER. ENVIRONMENTAL STEEL WITHIN THE STATIC MAGNETIC FIELD AFFECTS THE UNIFORMITY (OR HOMOGENEITY) OF THE FIELD. FIELD UNIFORMITY IS CRITICAL TO BOTH IMAGE QUALITY AND CHEMICAL SHIFT ANALYSIS (SPECTROSCOPY). AN ANALYSIS OF THE ENVIRONMENTAL STEEL IS REQUIRED WITHIN A 5.0 FEET (1.524 METERS) SPHERICAL RADIUS OF THE MAGNET ISOCENTER. ENVIRONMENTAL STEEL INCLUDES PIPES, BEAMS, CONCRETE REBAR, OR ANY OTHER STRUCTURAL STEEL IN THE FLOORS, WALLS, OR CEILING.

MAGNET TYPE	LIMITS OF STEEL MASS LBS/SQ FT [KG/SQ M]	DISTANCE FROM MAGNET ISOCENTER IN [MM]	DISTANCE BELOW TOP SURFACE OF FLOOR IN [MM]
3.0T	0 [0]	0-45 [0-1143]	0-3 [0-76]
ACTIVE	2 [9.8]	45-47 [1143-1194]	3-5 [76-127]
SHIELD	3 [14.7]	47-52 [1194-1321]	5-10 [127-254]
SEE NOTES	8 [39.2]	52-55 [1321-1397]	10-13 [254-330]
	20 [98.0]	55+ [1397+]	15+ [380+]

NOTE THE FOLLOWING ITEMS MUST BE LIMITED PER THE ABOVE TABLE.  
1. NON-MOVABLE STEEL CONSTRUCTION MATERIAL SUCH AS WALL STUDS OR HVAC COMPONENTS.  
2. METALLIC PIPES AND DRAINS.  
3. STEEL IN THE FLOOR IN A 10 FOOT BY 10 FOOT (3.1 METER BY 3.1 METER) AREA DIRECTLY BELOW THE MAGNET.

THIS SHEET IS PART OF THE DOCUMENT SET LISTED ON SHEET C1 AND SHOULD NOT BE SEPARATED

**GE Healthcare**  
Healthcare Project Implementation - Design Center  
Milwaukee, Wisconsin

SHEET TITLE: STRUCTURAL DETAILS  
MODALITY TYPE: DISCOVERY MR750

THIS PLAN IS SUBMITTED TO SUPPORT LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS. IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM DETAILS TO ALL APPLICABLE CODES, REGULATIONS, AND STANDARDS. THE COMPANY ACCEPTS NO LIABILITY FOR ANY CONSTRUCTION ERRORS AND THE COMPANY CANNOT ACCEPT RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE:  
8-222F  
TYPICAL LAYOUT  
TYPICAL INSTALLATION DRAWINGS

PROJECT: 8-222F  
REVISION: 00

DATE: 12.Dec.16  
DRAWN BY: PMM  
CHECKED BY: PMM

REVISION HISTORY:

SHEET  
S2

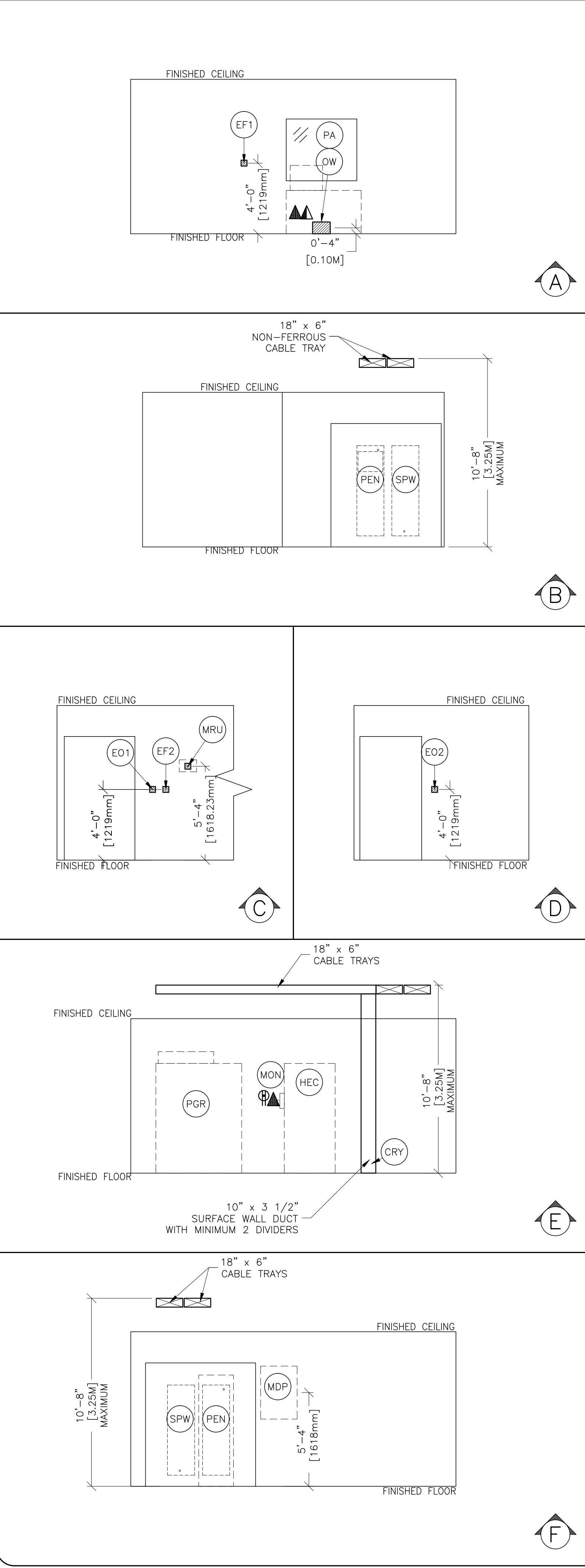
PIM R13  
RQ - 166353

SCALE: 1/4" = 1'-0"

ELECTRICAL PLAN

RECOMMENDED CEILING HEIGHT = 8'-9"

JUNCTION POINT DESCRIPTIONS



**FEEDER TABLE**

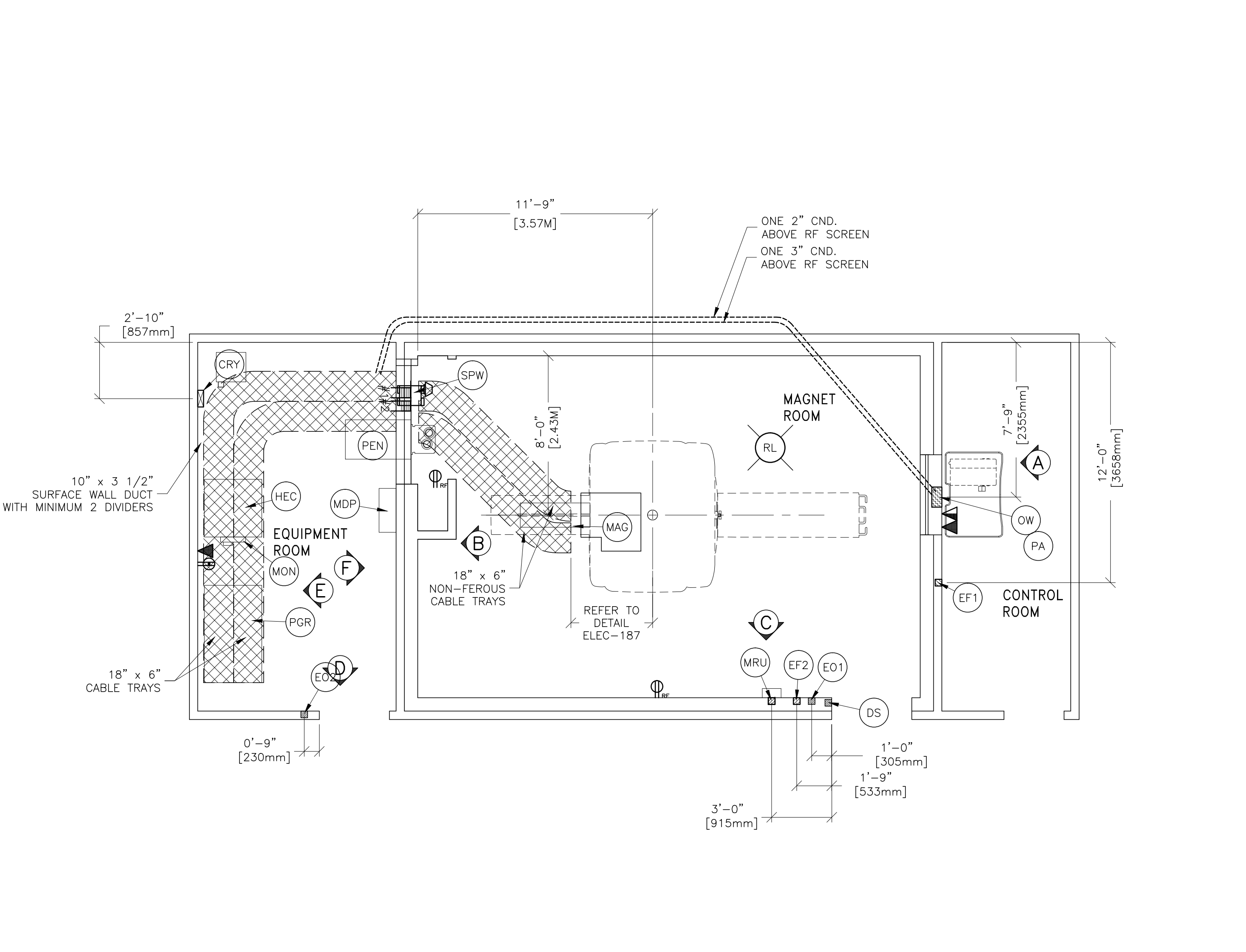
- CALCULATIONS BASED UPON NOMINAL VOLTAGE, WIRE SIZE IN AWG.
- RECOMMENDED FEEDER SIZES FROM DIST. TRANS. TO MDP, ALL CALCULATIONS BASED UPON A 20 FT. [6.1m] RUN FROM MDP TO PGR USING 1/0 AWG.
- THE GROUNDING CONDUCTOR ( ) SHALL BE COPPER AND WILL RUN IN THE SAME CONDUIT AS THE FEEDERS FROM EQUIPMENT BACK TO THE ROOM POWER SOURCE GROUNDING POINT.
- IF THE GENERAL ELECTRIC EQUIPMENT IS BEING FED BY A DELTA SECONDARY, IT IS RECOMMENDED THAT THE B PHASE ON THE SECONDARY BE CONNECTED TO GROUND TO PREVENT DAMAGE TO THE SYSTEM.
- NEUTRAL MUST BE TERMINATED PRIOR TO OR INSIDE THE MAIN DISCONNECT PANEL AND NOT BROUGHT INTO THE PGR OR HEC CABINET.
- MINIMUM WIRE SIZE FOR CIRCUIT BREAKER, BASED ON RECOMMENDED OVERCURRENT PROTECTION.
- FOR A FULL SYSTEM UPS REFER TO ELECTRICAL DETAILS FOR UPS FEEDER WIRES.

RUN LENGTH IN FEET	POWER SUPPLY VOLTAGE			
	342-418 380	360-440 400	372-456 415	432-528 480
100	3/0 (4)	3/0 (4)	3/0 (4)	3/0 (4)
150	3/0 (4)	3/0 (4)	3/0 (4)	3/0 (4)
200	3/0 (4)	3/0 (4)	3/0 (4)	3/0 (4)
250	4/0 (2)	3/0 (4)	3/0 (4)	3/0 (4)
300	250M (2)	4/0 (2)	4/0 (2)	3/0 (4)
350	300M (2)	300M (2)	250M (2)	3/0 (4)
400	400M (1/0)	350M (2)	300M (2)	4/0 (2)
450	500M (1/0)	400M (1/0)	350M (2)	4/0 (2)

REV. DATE: 13.NOV.14

- JUNCTION POINT NOTES**
- ALL JUNCTION BOXES, CONDUIT, DUCT, DUCT DIVIDERS, SWITCHES, CIRCUIT BREAKERS, CABLE TRAY, ETC., ARE TO BE SUPPLIED AND INSTALLED BY CUSTOMER'S ELECTRICAL CONTRACTOR.
  - CONDUIT AND DUCT RUNS SHALL HAVE SWEEP RADIUS BENDS
  - CONDUITS AND DUCT ABOVE CEILING OR BELOW FINISHED FLOOR MUST BE INSTALLED AS NEAR TO CEILING OR FLOOR AS POSSIBLE TO REDUCE RUN LENGTH.
  - CEILING MOUNTED JUNCTION BOXES ILLUSTRATED ON THIS PLAN MUST BE INSTALLED FLUSH WITH FINISHED CEILING.
  - ALL DUCTWORK MUST MEET THE FOLLOWING REQUIREMENTS:
    1. DUCTWORK SHALL BE METAL WITH DIVIDERS AND HAVE REMOVABLE, ACCESSIBLE COVERS.
    2. DUCTWORK SHALL BE CERTIFIED/RATED FOR ELECTRICAL POWER PURPOSES.
    3. DUCTWORK SHALL BE ELECTRICALLY AND MECHANICALLY BONDED TOGETHER IN AN APPROVED MANNER.
    4. PVC AS A SUBSTITUTE MUST BE USED IN ACCORDANCE WITH ALL LOCAL AND NATIONAL CODES.
  - ALL OPENINGS IN ACCESS FLOORING ARE TO BE CUT OUT AND FINISHED OFF WITH GROMMET MATERIAL BY THE CUSTOMER'S CONTRACTOR.
  - GENERAL CONTRACTOR TO INSERT PULL CORDS FOR ALL CABLE RUN CONDUITS BETWEEN THE EQUIPMENT ROOM AND THE OPERATORS CONTROL ROOM.
  - 10 FOOT PIGTAILS AT ALL JUNCTION POINTS.
  - ALL WIRING MUST BE THIN OR TFFN STRANDED COPPER THERMOPLASTIC 600 VOLT OR EQUIVALENT INSULATION. **ALUMINUM OR SOLID WIRES ARE NOT ALLOWED.**
  - GROUNDING IS CRITICAL TO EQUIPMENT FUNCTION AND PATIENT SAFETY. SITE MUST CONFORM TO WIRING SPECIFICATIONS SHOWN ON THIS PLAN.

DESCRIPTION	QTY.	HARDWARE	DETAIL NO., SHT. E3
CRY SHIELD COOLER CABINET	1	32 IN. OF GROMMET MATERIAL FOR AN 8" X 8 IN. OPENING IN DUCT COVER	
DS RF DOOR SWITCH	1	SINGLE GANG BOX	
EF1 RF EXHAUST FAN SWITCH	1	RF DOOR SWITCH RATED FOR 24 VOLTS AND 750 MILLIAMPERES, NORMALLY OPEN (OFF) WHEN DOOR IS OPEN	ELEC-55
EF2 RF EXHAUST FAN SWITCH	1	COVERPLATE SINGLE GANG BOX SINGLE POLE SWITCH	ELEC-55
EO1 EMERGENCY OFF BUTTON	1	SINGLE GANG BOX	ELEC-16
EO2 EMERGENCY OFF BUTTON	1	SINGLE GANG BOX	ELEC-16
HEC HEAT EXCHANGER CABINET	1	GROMMET MATERIAL 3/8 IN. FLEXIBLE POWER LINE SERVICE LOOPS	
MAG MAGNET	1	GROMMET MATERIAL	ELEC-187
MDP MAIN DISCONNECT	1	200-AMP PANEL INCLUDED IN ORDER PUSHBUTTONS AND COVERS INCLUDED	ELEC-152
MRU MAGNET RUNDOWN UNIT	1	FITTINGS AS REQUIRED	
OW OPERATOR WORKSPACE	1	COVERPLATE WITH 1 IN. KNOCKOUT IN CENTER 4 X 4 X 2 IN. BDX	
PA PATIENT ALERT CONTROL BOX	1	SPLIT COVERPLATE 3 1/2 IN. DIA. CHASE NIPPLE 12 IN. X 8 IN. X 6 IN. BDX	
PEN RF PENETRATION PANEL CABINET	1	SAME ROUTING AS OW	
PGR POWER GRADIENT, RF CABINET	1	GROMMET MATERIAL	ELEC-153
RL MAGNET ROOM LIGHTS	1	6 FT. LENGTH OF SUITABLE FLEXIBLE METAL CONDUIT GROMMET MATERIAL SUITABLE BUSHING & LOCKNUT	
SPW RF PENETRATION PANEL	1	LOCKNUT BOX AS REQUIRED INCANDESCENT LIGHT FIXTURE	
	1	GROMMET MATERIAL	ELEC-166



**ELECTRICAL OUTLET LEGEND**

CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS. HEIGHT ABOVE FLOOR DETERMINED BY LOCAL CODES UNLESS OTHERWISE SPECIFIED.

- ⊕ DUPLEX HOSPITAL GRADE, DEDICATED OUTLET 120-V EMERGENCY, SINGLE PHASE POWER, 15A
- ⊕<sub>RF</sub> DUPLEX HOSPITAL GRADE, DEDICATED OUTLET 120-V, SINGLE PHASE OUTLET ROUTED THROUGH RF FILTER
- ▲ NETWORK OUTLET
- ▲ DEDICATED TELEPHONE LINES/NETWORK CONNECTION

**ADDITIONAL CONDUIT RUNS (CONTRACTOR SUPPLIED AND INSTALLED)**

REV DATE: 01.Dec.15

CONDUITS REQUIRED FOR BASE SYSTEM	REVISION
MDP TO FEEDER	ONE CND. AS REQ'D
MDP TO PGR	ONE CND. AS REQ'D
MDP TO HEC	ONE CND. AS REQ'D
MDP TO EO2	ONE 1/2" CND.
EO2 TO SPW	ONE 1/2" CND.
DS TO PGR	ONE 3/4" CND.
EO1 TO SPW	ONE 3/4" CND.
MRU TO MAG	ONE 1" CND.
MRU TO RF #1 FILTER	ONE CND. AS REQ'D
RF #1 FILTER TO 120-V 16 POWER	CONDUIT AS REQ'D
RL TO RF #2 FILTER	ONE CND. AS REQ'D
RF #2 FILTER TO FACILITY EMERGENCY POWER	CONDUIT AS REQ'D

NOTE: SEE E2 PAGE FOR STANDARD RUN LENGTHS

**CONTRACTOR SUPPLIED AND INSTALLED WIRING**

ELECTRICAL CONTRACTOR SHALL RING OUT, TAG AND TERMINATE ALL WIRES AT BOTH ENDS.

WIRE RUN, FROM - TO	QUANTITY, WIRE SIZE/COLOR
120-V > RF FILTER	1-BLACK, 1-WHITE, 1-GREEN - <SIZE AS REQUIRED>
RF FILTER > RL	1-BLACK, 1-WHITE, 1-GREEN - <SIZE AS REQUIRED>
CONVERTER > RF FILTER	1-BLACK, 1-WHITE, 1-GREEN - <SIZE AS REQUIRED>
EMER PWR > CONVERTER	1-BLACK, 1-WHITE, 1-GREEN - <SIZE AS REQUIRED>
RF GND STUD > RF FILTER	1-GREEN <SIZE AS REQUIRED FOR EACH FILTER>
RF FILTER > MRU	1-BLACK, 1-WHITE, 1-GREEN - <SIZE AS REQUIRED>
MDP > PGR	3-ND. 1/0 BLACK, 1-ND. 1/0 GREEN
MDP > EO2	1-BLACK, 1-RED, 1-GREEN - <SIZE AS REQUIRED>
480-V > MDP	3-BLACK, 1-WHITE, 1-GREEN - REFER TO FEEDER TABLE
MDP > HEC	3-ND. 8 BLACK, 1-ND. 8 GREEN
RF FAN > EF1	1-BLACK, 1-WHITE - <SIZE AS REQUIRED>
EF1 > EF2	1-BLACK, 1-WHITE - <SIZE AS REQUIRED>

**GE Healthcare**

Healthcare Project Implementation - Design Center

Wisconsin

SHEET TITLE: ELECTRICAL LAYOUT

MODALITY TYPE: DISCOVERY MR750

THIS PLAN IS SUBMITTED TO SUGGEST LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED APPARATUS. ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM TO DETAILS AND SPECIFICATIONS OF THE CUSTOMER'S DRAWINGS AND THE COMPANY CANNOT ACCEPT RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE: 8-222F

TYPICAL LAYOUT

TYPICAL INSTALLATION DRAWINGS

PROJECT: 8-222F

REVISION: 00

DATE: 12.Dec.16

DRAWN BY: PMM

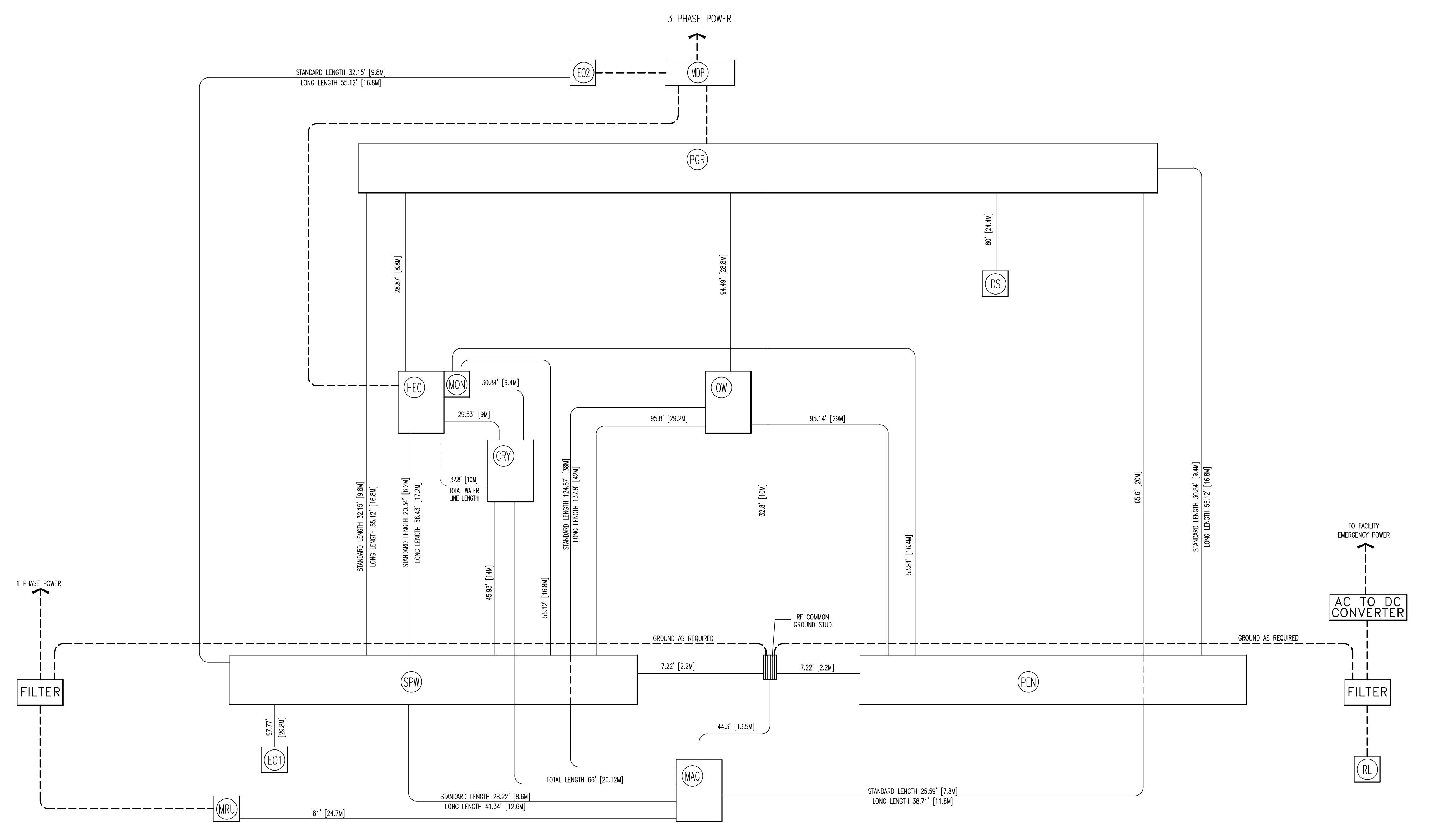
CHECKED BY: PMM

REVISION HISTORY:

SHEET E1

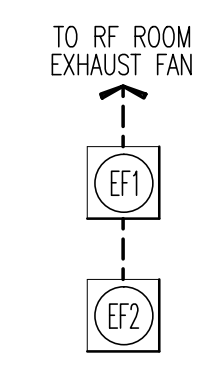
THIS SHEET IS PART OF THE DOCUMENT SET LISTED ON SHEET C1 AND SHOULD NOT BE SEPARATED

INTERCONNECT DIAGRAM



**NOTE: CABLE LENGTH DATA**  
PLEASE REFER TO THE PRE-INSTALLATION MANUAL LISTED ON SHEET C1 FOR THE LENGTHS OF CABLES AVAILABLE FOR THIS SYSTEM

MINIMUM BENDING RADIUS EXISTS FOR CERTAIN CABLE GROUPS. PLEASE REFER TO THE PREINSTALLATION MANUAL FOR SPECIFICATIONS FOR ALL CABLES.



POWER SPECIFICATIONS

SIGNA/DISCOVERY/OPTIMA (REV. DATE 01.JUN.16)

**VOLTAGE**  
PRIMARY SOURCE IS REQUIRED FOR ALL INSTALLATIONS. RANGE OF LINE VOLTAGES: NOMINAL LINE VOLTAGE OF 380 TO 480, 3 PHASE, 50 OR 60 HZ.  
RECOMMENDED POWER SUPPLY: WYE-WITH GROUND OR FLOATING DELTA WITH GROUND  
MAXIMUM DAILY VOLTAGE VARIATION MUST FALL WITHIN ONE OF THE RANGES IN TABLE A.

TABLE A ALLOWABLE INPUT VOLTAGES/CURRENT DEMAND

NOMINAL VOLTAGE	ABSOLUTE RANGE	CURRENT (AMPS)		MINIMUM STANDARD OVERCURRENT PROTECTION **
		MAX MOMENTARY	CONTINUOUS	
380	342-418	187	151	200-A
400	360-440	178	143	200-A
415	374-456	171	138	200-A
<b>480</b>	<b>432-528</b>	<b>148</b>	<b>119</b>	<b>200-A</b>

\*\* OVERCURRENT PROTECTION SIZED FOR 125% CONTINUOUS CURRENT. (CALCULATIONS BASED UPON NOMINAL VOLTAGE).

**PHASE-BALANCE.**

PHASE-TO-PHASE VOLTAGES MUST BE WITHIN 2 PERCENT OF THE LOWEST PHASE-TO-PHASE VOLTAGE. MAXIMUM ALLOWABLE TRANSIENT VOLTAGE EXCURSIONS ABOVE OR BELOW NOMINAL WAVEFORM NOT TO EXCEED 200V AT A MAXIMUM DURATION OF 1 CYCLE AND FREQUENCY OF 10 TIMES PER HOUR. VOLTAGE TRANSIENT OR IMPULSE ON THE INCOMING POWER MUST BE HELD TO A MINIMUM. TRANSIENTS CAUSED BY LIGHTNING SURGES, LOAD SWITCHING, STATIC ELECTRICITY ETC. CAN CAUSE SCAN ABORTS OR, IN EXTREME INSTANCES, COMPONENT FAILURE IN THE COMPUTER SUBSYSTEM.

**POWER DEMAND**

MAXIMUM POWER DEMAND AVERAGED OVER 5 SECONDS = 123 KVA.

SYSTEM EQUIPMENT	POWER DEMAND
PDU 5 SECOND POWER (IN PGR)	103 kVA
HEC CONTINUOUS POWER (INCLUDING CRY)	20 kVA
CRY COMPRESSOR CONTINUOUS POWER (CRY)	9 kVA

STANDBY (NO SCAN) POWER DEMAND = 17 KVA.

TABLE B MAXIMUM POWER DEMAND.

DEMAND	
kVa *	123
POWER FACTOR AT	0.9

\* DEMAND INCLUDES POWER FOR ENTIRE MR SYSTEM. LINE VOLTAGE REGULATION AT MAXIMUM POWER DEMAND MUST BE LESS THAN OR EQUAL TO 2 PERCENT OR 4 PERCENT FROM POWER SOURCE.

**DISTRIBUTION TRANSFORMER**

FOR A SINGLE UNIT INSTALLATION, THE MINIMUM TRANSFORMER SIZE IS 225 KVA. REGULATED TRANSFORMER IS NOT REQUIRED UNLESS VOLTAGE CHANGES EXCEED ±10% OVER A PERIOD OF 1 HOUR OR LONGER.

REFER TO PRE-INSTALLATION MANUAL FOR ADDITIONAL INFORMATION

ELECTRICAL NOTES

- NOTE 1: ALL WIRES SPECIFIED SHALL BE COPPER STRANDED, FLEXIBLE, THERMO-PLASTIC, COLOR CODED, CUT 10 FOOT LONG AT OUTLET BOXES, DUCT TERMINATION POINTS OR STUBBED CONDUIT ENDS. ALL CONDUCTORS, POWER, SIGNAL AND GROUND, MUST BE RUN IN A CONDUIT OR DUCT SYSTEM. ELECTRICAL CONTRACTOR SHALL RING OUT AND TAG ALL WIRES AT BOTH ENDS. WIRE RUNS MUST BE CONTINUOUS COPPER STRANDED AND FREE FROM SPLICES. **ALUMINUM OR SOLID WIRES ARE NOT ALLOWED.**
- NOTE 2: WIRE SIZES GIVEN ARE FOR USE OF EQUIPMENT. LARGER SIZES MAY BE REQUIRED BY LOCAL CODES.
- NOTE 3: IT IS RECOMMENDED THAT ALL WIRES BE COLOR CODED, AS REQUIRED IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
- NOTE 4: CONDUIT SIZES SHALL BE VERIFIED BY THE ARCHITECT, ELECTRICAL ENGINEER OR CONTRACTOR, IN ACCORDANCE WITH LOCAL OR NATIONAL CODES.
- NOTE 5: CONVENIENCE OUTLETS ARE NOT ILLUSTRATED. THEIR NUMBER AND LOCATION ARE TO BE SPECIFIED BY OTHERS. LOCATE AT LEAST ONE CONVENIENCE OUTLET CLOSE TO THE SYSTEM CONTROL, THE POWER DISTRIBUTION UNIT AND ONE ON EACH WALL OF THE PROCEDURE ROOM. USE HOSPITAL APPROVED OUTLET OR EQUIVALENT.
- NOTE 6: GENERAL ROOM ILLUMINATION IS NOT ILLUSTRATED. CAUTION SHOULD BE TAKEN TO AVOID EXCESSIVE HEAT FROM OVERHEAD SPOTLIGHTS. DAMAGE CAN OCCUR TO CEILING MOUNTING COMPONENTS AND WIRING IF HIGH WATTAGE BULBS ARE USED. RECOMMEND LOW WATTAGE BULBS NO HIGHER THAN 75 WATTS AND USE DIMMER CONTROLS (EXCEPT MR). DO NOT MOUNT LIGHTS DIRECTLY ABOVE AREAS WHERE CEILING MOUNTED ACCESSORIES WILL BE PARKED.
- NOTE 7: **ROUTING OF CABLE DUCTWORK, CONDUITS, ETC., MUST RUN DIRECT AS POSSIBLE OTHERWISE MAY RESULT IN THE NEED FOR GREATER THAN STANDARD CABLE LENGTHS (REFER TO THE INTERCONNECTION DIAGRAM FOR MAXIMUM USABLE LENGTHS POINT TO POINT).**
- NOTE 8: CONDUIT TURNS TO HAVE LARGE, SWEEPING BENDS WITH MINIMUM RADIUS IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.
- NOTE 9: A SPECIAL GROUNDING SYSTEM IS REQUIRED IN ALL PROCEDURE ROOMS BY SOME NATIONAL AND LOCAL CODES. IT IS RECOMMENDED IN AREAS WHERE PATIENTS MIGHT BE EXAMINED OR TREATED UNDER PRESENT, FUTURE, OR EMERGENCY CONDITIONS. CONSULT THE GOVERNING ELECTRICAL CODE AND CONFER WITH APPROPRIATE CUSTOMER ADMINISTRATIVE PERSONNEL TO DETERMINE THE AREAS REQUIRING THIS TYPE OF GROUNDING SYSTEM.
- NOTE 10: THE MAXIMUM POINT TO POINT DISTANCES ILLUSTRATED ON THIS DRAWING MUST NOT BE EXCEEDED.
- NOTE 11: PHYSICAL CONNECTION OF PRIMARY POWER TO GE EQUIPMENT IS TO BE MADE BY CUSTOMERS ELECTRICAL CONTRACTOR WITH THE SUPERVISION OF A GE REPRESENTATIVE. THE GE REPRESENTATIVE WOULD BE REQUIRED TO IDENTIFY THE PHYSICAL CONNECTION LOCATION, AND INSURE PROPER HANDLING OF GE EQUIPMENT.
- NOTE 12: GEHC CONDUCTS POWER AUDITS TO VERIFY QUALITY OF POWER BEING DELIVERED TO THE SYSTEM. THE CUSTOMER'S ELECTRICAL CONTRACTOR IS REQUIRED TO BE AVAILABLE TO SUPPORT THIS ACTIVITY.

DIAGRAM KEY

- CUSTOMER/CONTRACTOR SUPPLIED WIRING. ROUTE IN ADEQUATE CONDUIT OR RACEWAY.
- \_\_\_\_\_ GE FURNISHED CABLE RUNS. ROUTE IN EMPTY CONDUIT OR RACEWAY.
- 59' [18m] MAXIMUM RUN LENGTH BETWEEN JUNCTION POINTS. Feet, [Meters]

**GE Healthcare**  
Healthcare Project Implementation - Design Center  
Milwaukee, Wisconsin

SHEET TITLE: **ELECTRICAL SPECIFICATIONS**  
MODALITY TYPE: **DISCOVERY MR750**  
THIS PLAN IS SUBMITTED TO SURVEY LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED APPARATUS. ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM DETAILS TO THE ACTUAL CONSTRUCTION PURPOSES AND THE COMPANY CANNOT ACCEPT RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE:  
**8-222F**  
**TYPICAL LAYOUT**  
TYPICAL INSTALLATION DRAWINGS

PROJECT	REVISION
8-222F	00
DATE:	12.Dec.16
DRAWN BY:	PMM
CHECKED BY:	PMM

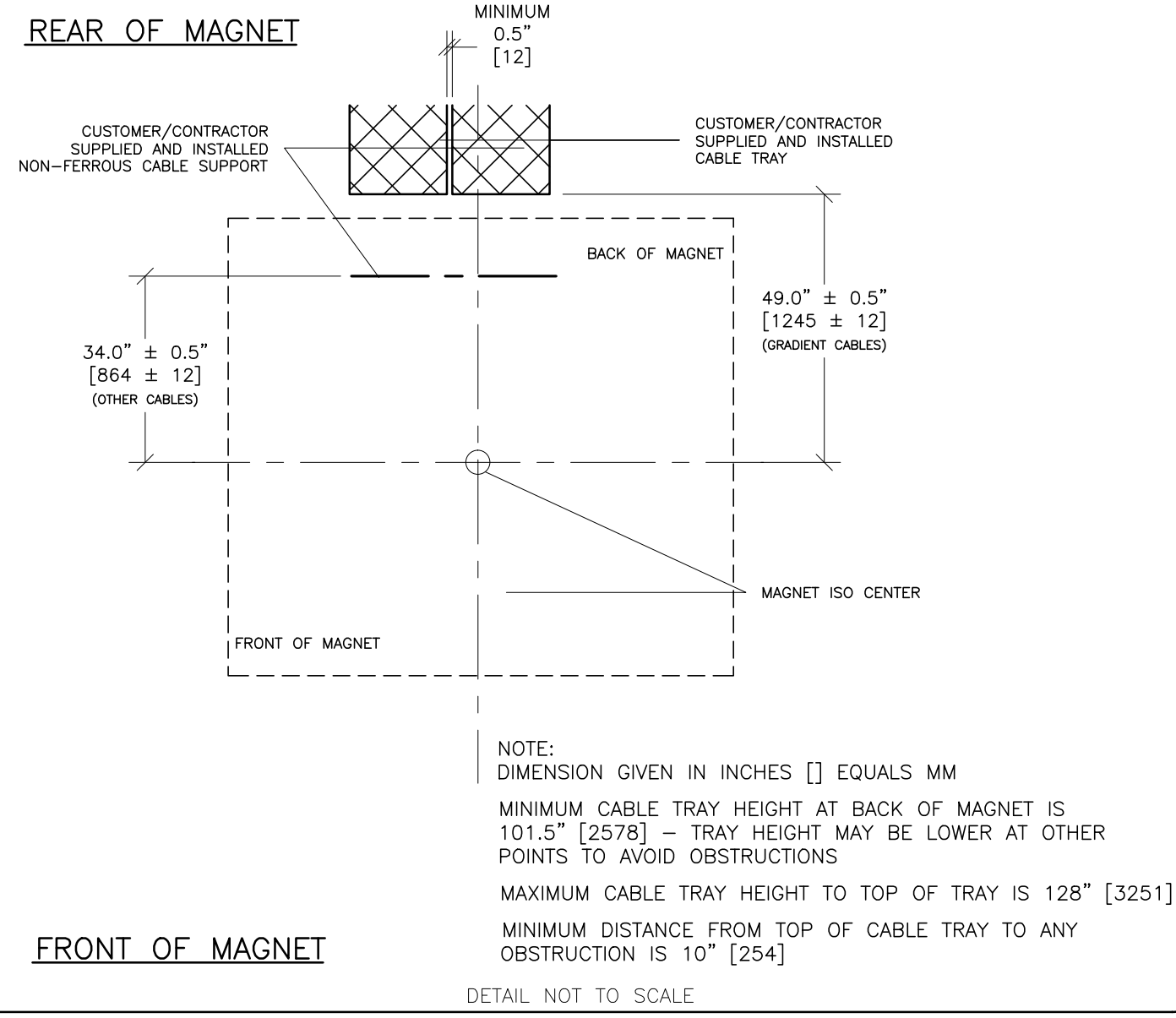
REVISION HISTORY:


SHEET  
**E2**

PIM R13  
RQ - 166353

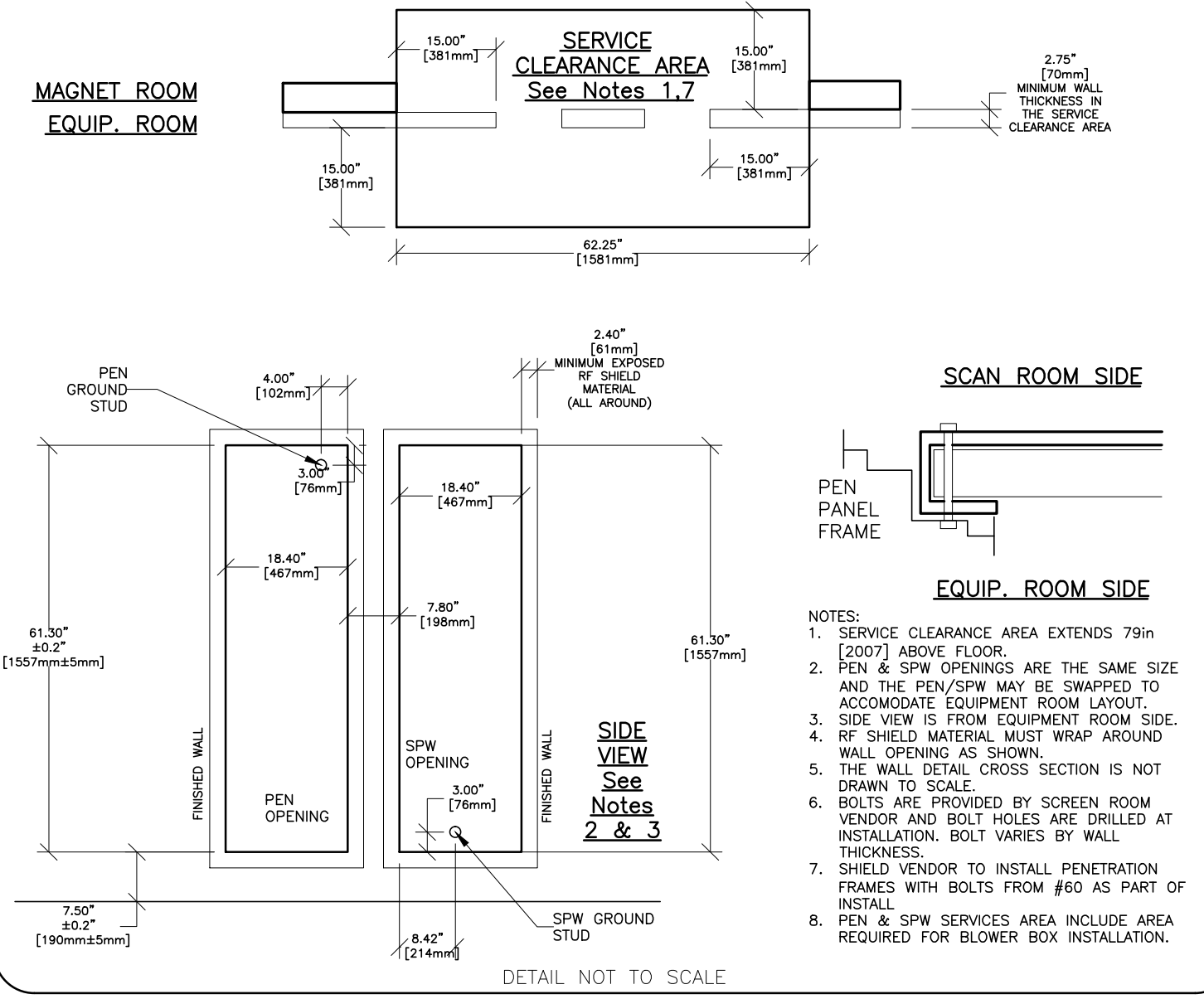
**ELECTRICAL DETAIL  
CABLE TRAY REQUIREMENTS**

**ELEC-187**  
REV. DATE: 19.JUN.15



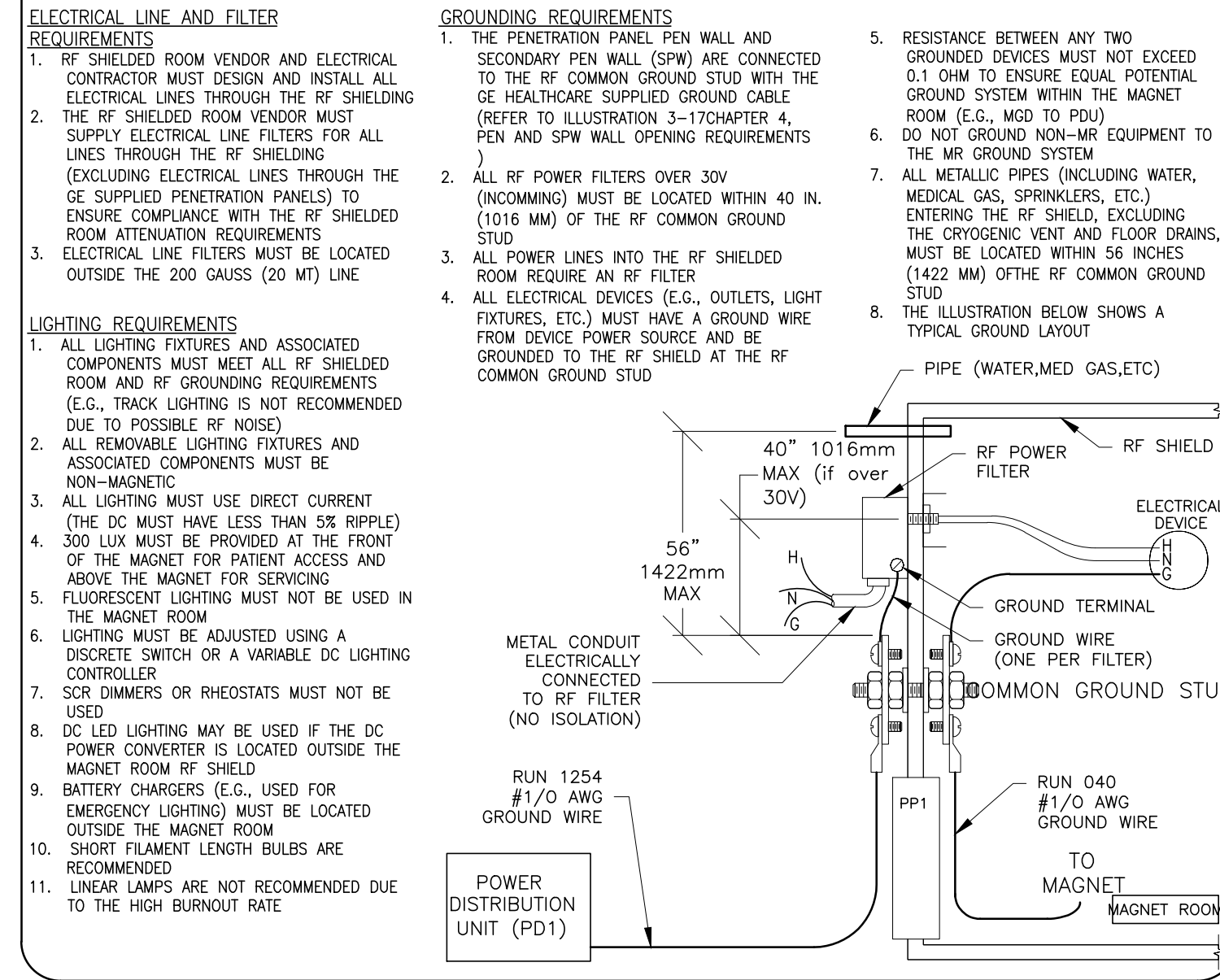
**ELECTRICAL DETAIL  
PENETRATION BRACKET INSTALL**

**ELEC-153**  
REV. DATE: 05.MAY.16



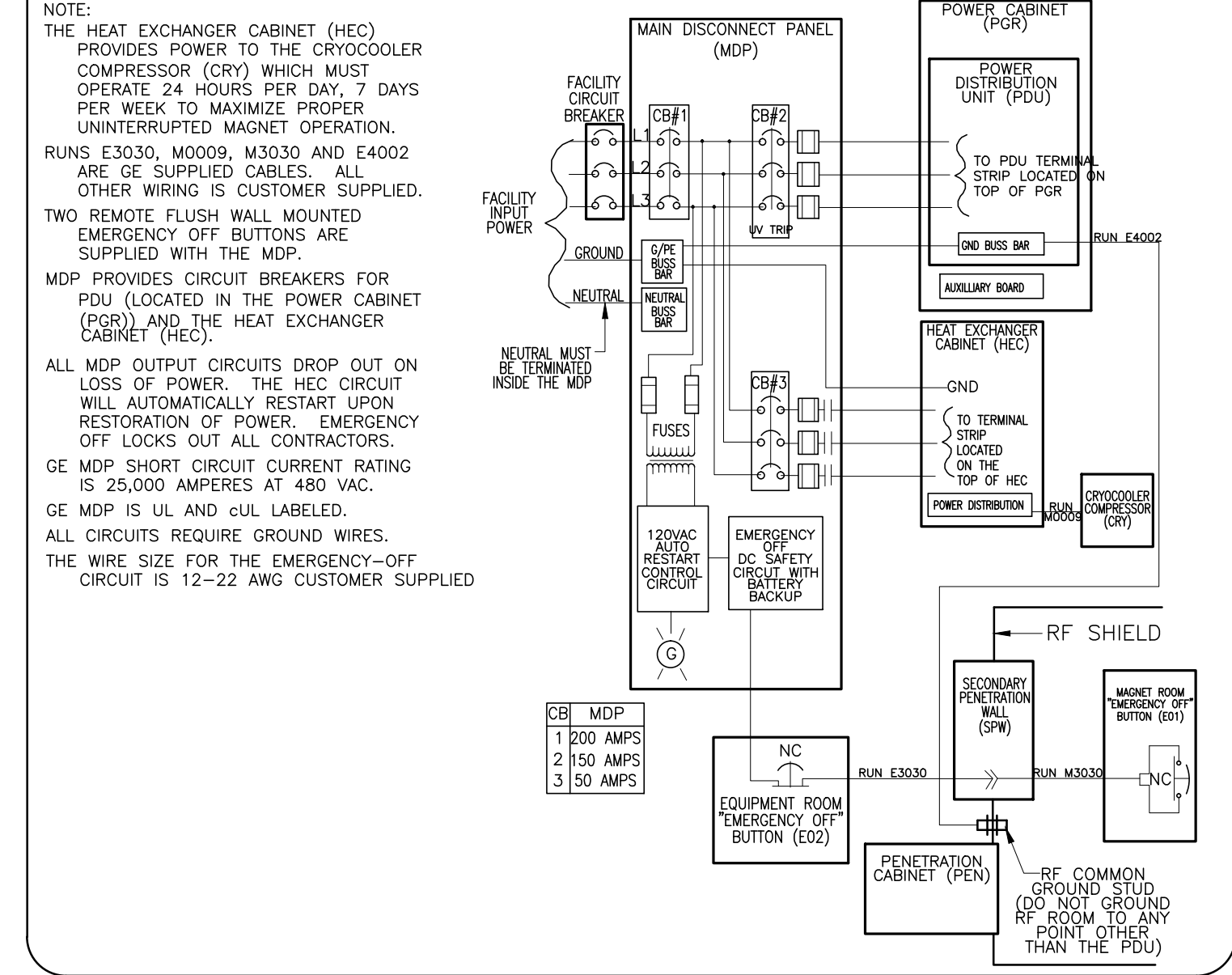
**ELECTRICAL DETAIL  
TYPICAL MAGNET ROOM GROUNDING**

**ELEC-166**  
REV. DATE: 05.JUN.13



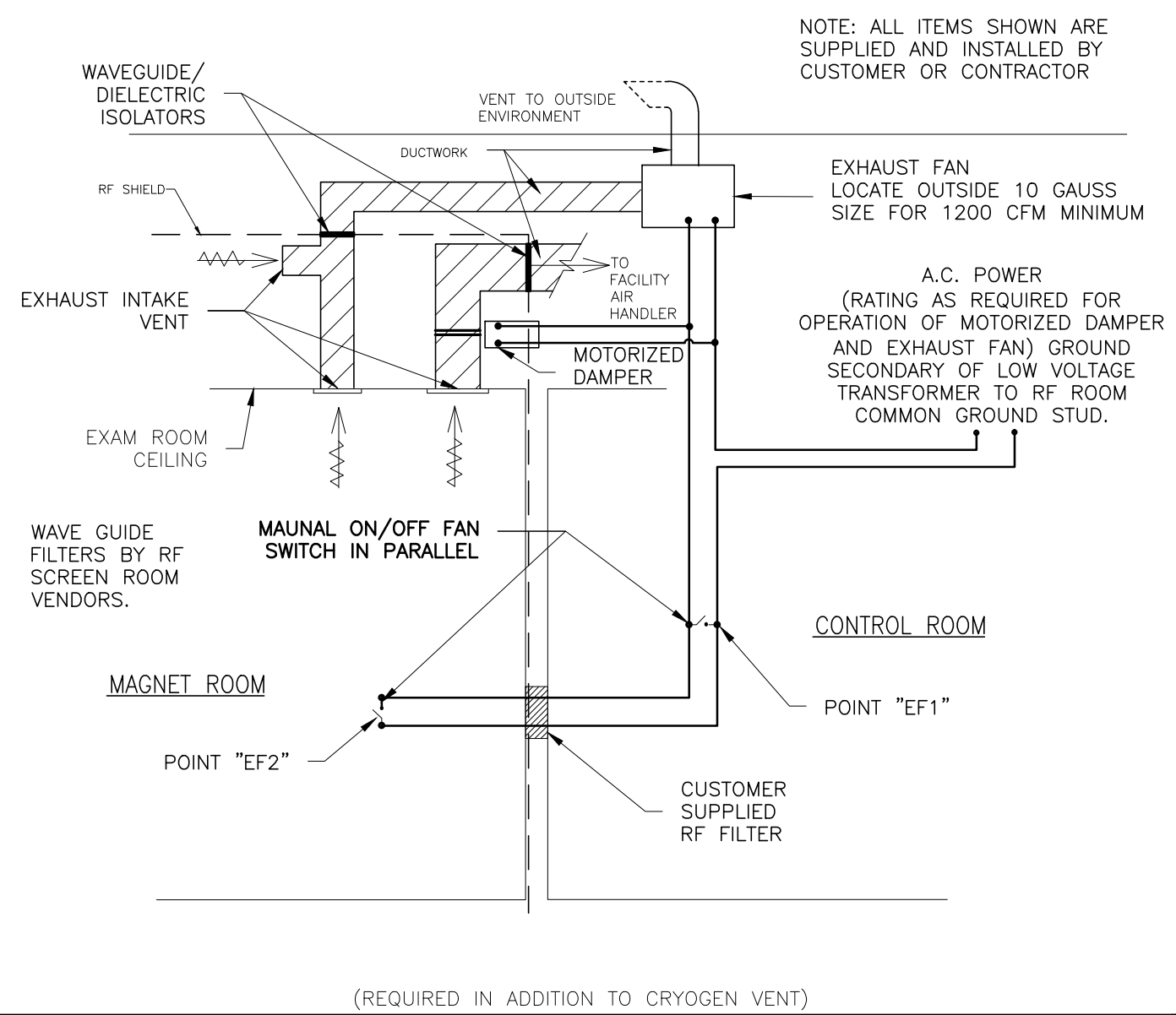
**ELECTRICAL DETAIL  
PROTECTIVE DISCONNECT SETUP**

**ELEC-152**  
REV. DATE: 22.JAN.14



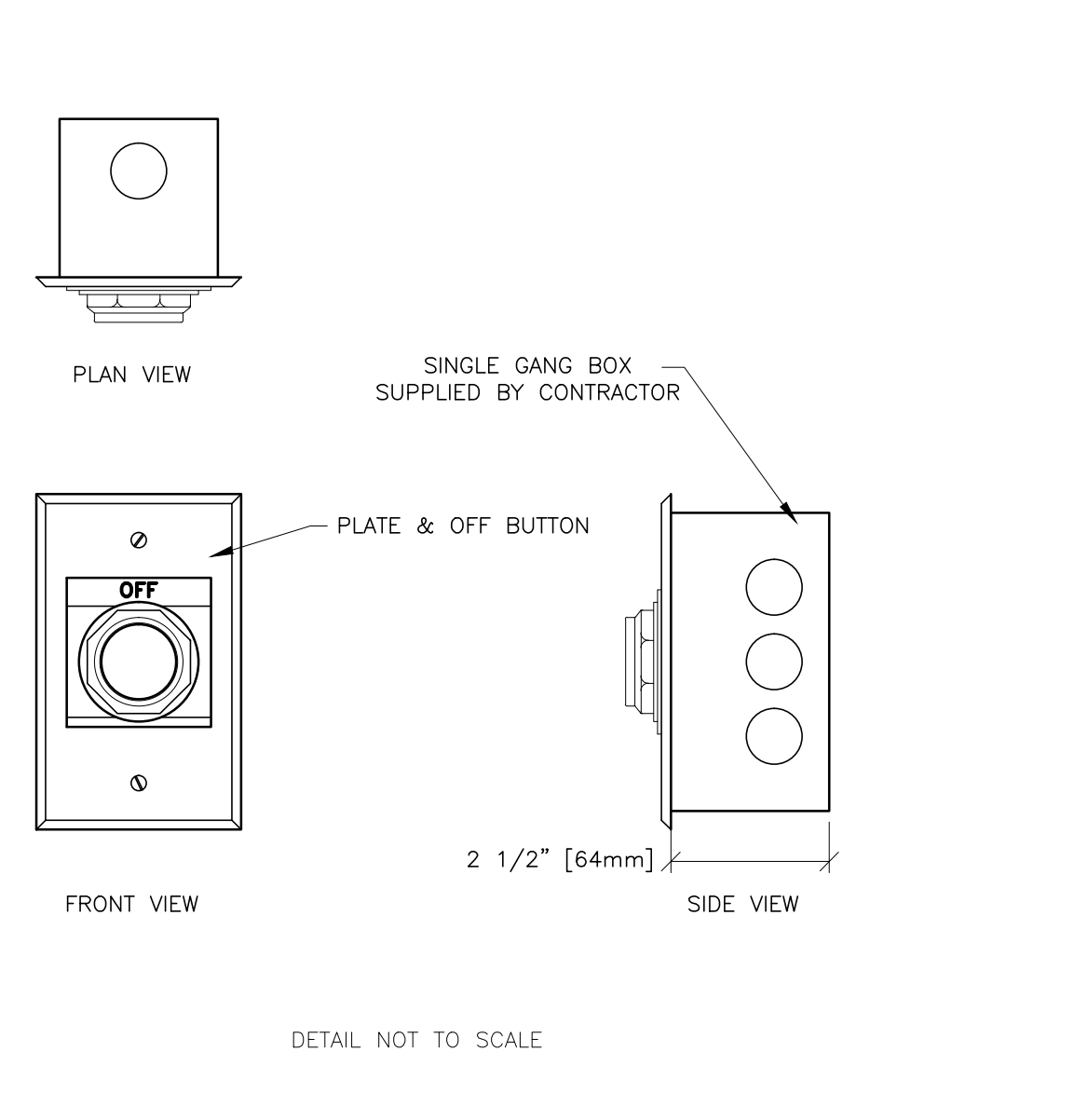
**ELECTRICAL DETAIL  
TYPICAL RF SCREEN ROOM EXHAUST FAN SET-UP**

**ELEC-55**  
REV. DATE: 15.APR.16



**ELECTRICAL DETAIL  
EMERGENCY OFF BUTTON**

**ELEC-16**  
REV. DATE: 05/14/09



**GE Healthcare**

Healthcare Project Implementation - Design Center

Minneapolis, Minnesota

SHEET TITLE: **ELECTRICAL DETAILS**

MODALITY TYPE: **DISCOVERY MR750**

THIS PLAN IS SUBMITTED TO SURVEY LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED APPARATUS. ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM TO DETAILS AND DIMENSIONS SHOWN ON THE CONSTRUCTION DOCUMENTS. HOWEVER, THE COMPANY CANNOT ACCEPT RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE:

**8-222F**

**TYPICAL LAYOUT**

TYPICAL INSTALLATION DRAWINGS

PROJECT	REVISION
8-222F	00

DATE: 12.Dec.16  
DRAWN BY: PMM  
CHECKED BY: PMM

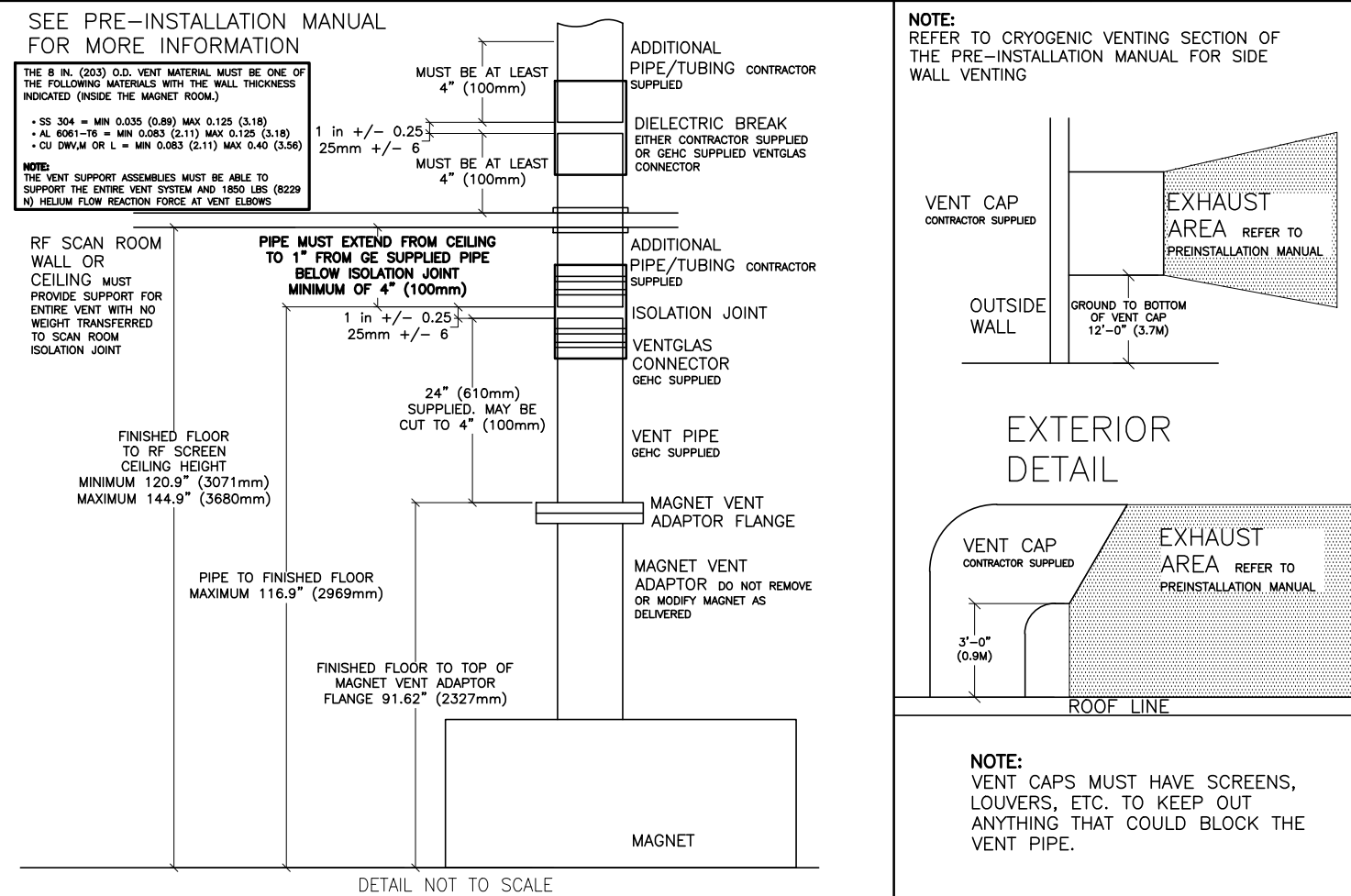
REVISION HISTORY:


SHEET

**E3**

TYPICAL CRYOGEN VENT PIPE DETAIL

MECH-01  
REV. DATE: 17.NOV.16



CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX

MECH-34  
REV. DATE: 06.JUN.16

(THIS TABLE MUST BE USED FOR CRYOGENIC VENT SYSTEM DESIGN)

INSIDE DIAMETER OF VENT PIPE	DISTANCE OF VENT SYSTEM COMPONENT FROM MAGNET	PRESSURE DROP PER ELBOW USED ANYWHERE WITHIN 20 FT. VENT SEGMENT												
		STRAIGHT VENT PIPE WITH SMOOTH INSIDE SURFACE		STANDARD SWEEP 45° ELBOW		STANDARD SWEEP 90° ELBOW		LONG SWEEP 90° ELBOW		90° ELBOW WITH BEND				
in./mm	feet/meters	psi/ft	KPa/m	psi	KPa	psi	KPa	psi	KPa	psi	KPa			
8 [203]	0-10	0-3.05	0.14	3.22	1.12	7.70	0.74	5.13	2.09	14.43	1.40	9.62	4.19	28.86
	10-20	3.05-6.10	0.24	5.49	1.83	12.63	1.22	8.42	3.43	23.67	2.29	15.78	6.87	47.34
	20-30	6.10-9.15	0.36	8.23	2.49	17.46	1.66	11.45	4.67	32.21	3.11	21.48	9.34	64.43
	30-40	9.15-12.20	0.47	10.55	3.11	21.42	2.07	14.26	5.82	40.11	3.88	26.74	11.54	80.23
	40-50	12.20-15.25	0.57	12.88	3.67	25.33	2.45	16.86	6.88	47.42	4.58	31.61	13.75	94.84
	50-60	15.25-18.30	0.65	14.68	4.20	28.93	2.79	18.26	7.44	51.17	5.24	36.11	15.71	108.33
10 [254]	0-20	0-6.1	0.06	1.280	0.62	4.29	0.41	2.86	1.17	8.04	0.78	5.36	2.33	16.07
	20-40	6.1-12.2	0.12	2.275	1.05	7.25	0.70	4.83	1.97	13.58	1.31	9.05	3.94	27.16
	40-60	12.2-18.3	0.17	3.904	1.43	9.86	0.95	6.56	2.67	18.44	1.78	12.29	5.35	36.88
	60-80	18.3-24.4	0.21	4.859	1.76	12.14	1.17	8.07	3.29	22.70	2.19	15.13	6.58	45.40
	80-100	24.4-30.5	0.25	6.626	2.05	14.14	1.36	9.40	3.63	26.43	2.62	17.67	7.07	52.86
12 [300]	0-20	0-6.1	0.020	0.441	0.26	1.78	0.17	1.19	0.48	3.34	0.32	2.22	0.97	6.67
	20-40	6.1-12.2	0.041	0.937	0.43	3.00	0.29	1.99	0.81	5.61	0.54	3.74	1.63	11.22
	40-60	12.2-18.3	0.060	1.552	0.59	4.08	0.39	2.72	1.11	7.64	0.74	5.09	2.22	15.27
	60-80	18.3-24.4	0.075	1.702	0.73	5.06	0.49	3.36	1.37	9.45	0.91	6.30	2.74	18.89
	80-100	24.4-30.5	0.088	1.991	0.86	5.82	0.57	3.93	1.60	11.06	1.07	7.37	3.21	22.12
14 [350]	0-20	0-6.1	0.008	0.180	0.123	0.85	0.082	0.57	0.231	1.59	0.154	1.06	0.462	3.18
	20-40	6.1-12.2	0.017	0.380	0.206	1.42	0.137	0.95	0.386	2.66	0.257	1.77	0.771	5.32
	40-60	12.2-18.3	0.024	0.652	0.281	1.84	0.187	1.29	0.525	3.62	0.350	2.42	1.051	7.25
	60-80	18.3-24.4	0.031	0.699	0.349	2.41	0.232	1.60	0.652	4.50	0.435	3.00	1.304	8.99
	80-100	24.4-30.5	0.036	0.824	0.411	2.83	0.272	1.88	0.766	5.28	0.511	3.52	1.533	10.57
16 [400]	0-20	0-6.1	0.004	0.083	0.065	0.45	0.043	0.30	0.122	0.84	0.081	0.56	0.244	1.68
	20-40	6.1-12.2	0.008	0.174	0.108	0.75	0.072	0.50	0.202	1.39	0.135	0.93	0.404	2.79
	40-60	12.2-18.3	0.011	0.253	0.148	1.02	0.098	0.68	0.275	1.90	0.184	1.27	0.551	3.80
	60-80	18.3-24.4	0.014	0.323	0.184	1.27	0.122	0.84	0.342	2.36	0.288	1.57	0.685	4.72
	80-100	24.4-30.5	0.017	0.383	0.217	1.49	0.144	0.99	0.404	2.78	0.269	1.86	0.807	5.97

NOTE 1: ELBOWS WITH ANGLES GREATER THAN 90° MUST NOT BE USED.

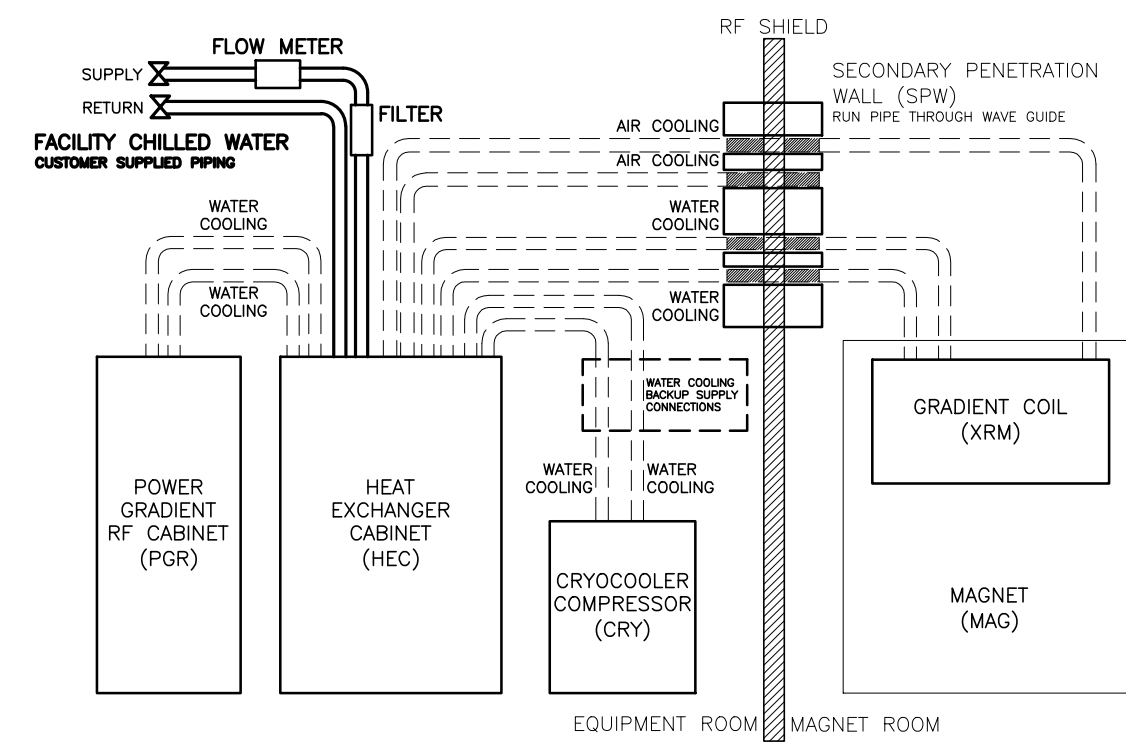
NOTE 2: THE TABLE DATA IS BASED ON THE FOLLOWING:  
 A. INITIAL FLOW CONDITIONS AT MAGNET INTERFACE  
 B. EM ENERGY (12MJ) IS DUMPED TO LHe DURING QUENCH AND RISES He TEMPERATURE TO 10 KELVIN.  
 C. GAS TEMPERATURE STARTS AT 10 KELVIN AND INCREASES WITH LENGTH DETERMINED BY THERMAL ENERGY BALANCE.  
 D. 90% He IS ASSUMED TO BE EVACUATED WITHIN 30 SEC. NO He LEFT AFTER QUENCH.  
 E. ABSOLUTE ROUGHNESS IS ASSUMED TO BE 0.25 μm.  
 F. R/D = 1.0 FOR STANDARD SWEEP ELBOWS, R/D = 1.5 FOR LONG SWEEP ELBOWS, WHERE D = INSIDE DIAMETER OF PIPE, R = RADIUS OF BEND.

NOTE 3: THE TOTAL PRESSURE DROP OF THE ENTIRE CRYOGENIC VENT SYSTEM MUST BE LESS THAN 20 PSI (138 KPa). THE CALCULATION STARTS AT THE MAGNET VENT INTERFACE AND ENDS AT THE TERMINATION POINT OUTSIDE THE BUILDING.

SYSTEM CHILLER PIPING

MECH-41  
REV. DATE: 28.MAR.16

PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE FACILITY WATER REQUIREMENTS



FACILITY WATER REQUIREMENTS

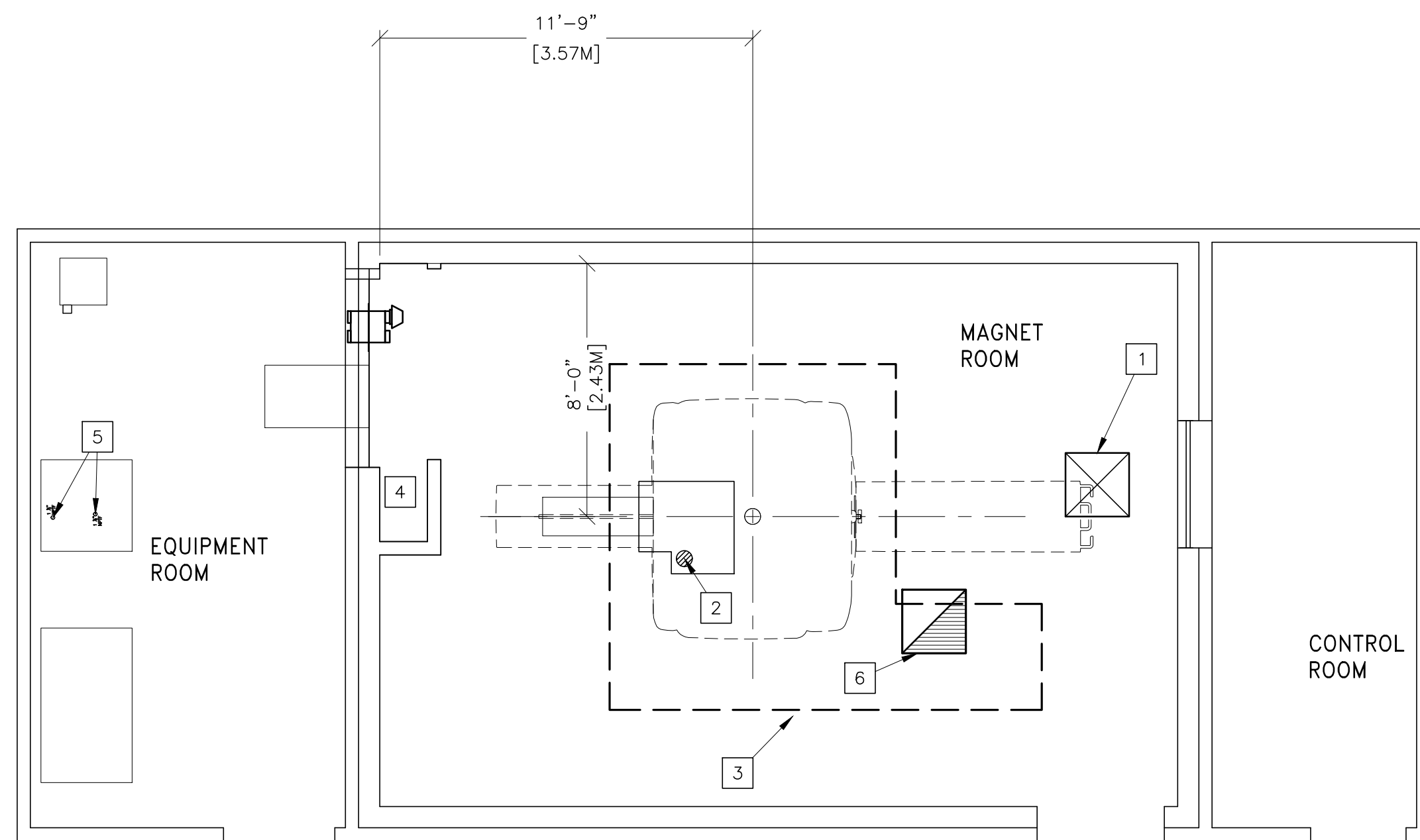
MECH-46  
REV. DATE: 06.FEB.14

PARAMETER	REQUIREMENTS
AVAILABILITY	CONTINUOUS
ANTIFREEZE	0-40% PROPYLENE GLYCOL
MINIMUM FLOW	30 GPM (114 L/MIN)
MAXIMUM FLOW	35 GPM (132 L/MIN)
MAXIMUM PRESSURE DROP IN HEC AT MINIMUM FLOW	34.8 PSI (2.4 BAR) WITH 40% PROPYLENE GLYCOL-WATER; 1021 KG/M3 DENSITY
MAXIMUM PRESSURE DROP IN HEC AT MAXIMUM FLOW	47.8 PSI (3.3 BAR) WITH 40% PROPYLENE GLYCOL-WATER; 1021 KG/M3 DENSITY
TEMPERATURE RISE AT MINIMUM FLOW	17.3°F (9.6°C) WITH 40% PROPYLENE GLYCOL-WATER; 3730 J/(KG K) SPECIFIC HEAT; 1021 KG/M3 DENSITY; 70 KW HEAT
TEMPERATURE RISE AT MAXIMUM FLOW	15.1°F (8.4°C) WITH 40% PROPYLENE GLYCOL-WATER; 3730 J/(KG K) SPECIFIC HEAT; 1021 KG/M3 DENSITY; 70 KW HEAT
MAXIMUM INLET PRESSURE AFTER THE FILTER	87 PSI (5.9 TO 6 BAR) MEASURED AT THE INLET TO THE HEC
MAXIMUM HEAT OUTPUT TO WATER	MINIMUM 70 KW
MINIMUM CONTINUOUS HEAT LOAD	7.5 KW
INLET TEMPERATURE	42.8 TO 53.6°F (6 TO 12°C) MEASURED AT THE INLET TO THE HEC
CUSTOMER SUPPLIED FEEDER HOSE (FROM MAIN WATER SUPPLY TO HEC)	1.5 INCH (38.1 MM) MINIMUM HOSE INSIDE DIAMETER
HOSE CONNECTIONS TO THE HEC	1.5 INCH (38.1 MM) MALE NPT
PH LEVEL	6.5 TO 8.2 AT 77°F (25°C)
HARDNESS	LESS THAN 200 PPM OF CALCIUM CARBONATE
SUSPENDED MATTER	LESS THAN 10 PPM
FACILITY FILTER	100 MICRON OR SMALLER WITH A FIELD-CHANGABLE FILTER
CONDENSATION PROTECTION	FACILITY PLUMBING TO THE HEC MUST BE PROPERLY ROUTED AND INSULATED TO PREVENT EQUIPMENT DAMAGE OR SAFETY HAZARDS.

SCALE: 1/4" = 1'-0"

MECHANICAL/PLUMBING LAYOUT

RECOMMENDED CEILING HEIGHT = 8'-9"



MECHANICAL/PLUMBING ITEMS

CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS

- | ITEM NO. | ITEM DESCRIPTION (* INDICATES EXISTING)  |
|----------|--|
| 1        | MINIMUM 2 FT. x 2 FT. (610mm x 610mm) PRESSURE EQUALIZING WAVEGUIDE VENT IN THE MAGNET ROOM CEILING.   |
| 2        | REFER TO PRE-INSTALLATION MANUAL FOR CRYOGEN VENT REQUIREMENTS.<br>SEE SHEET S-2 FOR CRYOGEN VENT LOCATION.<br>8" O.D. (203 mm) CRYOGEN VENT - TOLERANCE FOR VENT LOCATION +/-0.25" (6 mm). SEE CRYOGEN VENT DETAILS.<br>THE CUSTOMER'S DESIGNER IS RESPONSIBLE FOR SELECTING VENT MATERIALS AND HARDWARE CAPABLE OF SAFELY HANDLING THE PRESSURES AND COLD TEMPERATURE GENERATED WITHIN THE VENT AT EACH MRI SITE.<br>THE CUSTOMER'S CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING THE CRYOGEN VENT FROM THE MAGNET VENT ADAPTER TO THE BUILDING'S EXTERIOR.<br>FOR NON-STANDARD VENT CONFIGURATIONS (I.E. OFFSET CEILING EXITS, WALL EXITS, AND GEDDESIC DOME), THE CUSTOMER'S CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE CRYOGENIC VENT SYSTEM AND VENT SUPPORTS WITHIN THE MAGNET ROOM. |
| 3        | MINIMUM CEILING HEIGHT REQUIREMENT AREA REFER TO MAGNET EQUIPMENT DETAILS FOR MORE INFORMATION   |
| 4        | CLOSET MUST ALLOW FREE AIR EXCHANGE OF 400 CFM (680 M3/HR) BETWEEN MAGNET ROOM AND CLOSET  |
| 5        | TWO (2) 1 1/2 IN. (38MM) COPPER LINES (INSULATED) TWO (2) SHUT OFF VALVES. REFER TO SYSTEM CHILLER PIPING DETAIL.  |
| 6        | PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE FACILITY WATER REQUIREMENTS.<br>EXHAUST FAN AND AIR INLET MUST BE SIZED FOR A MINIMUM OF 1500 CFM (34 M3/MINUTE) AND A MINIMUM OF 12 AIR EXCHANGES PER HOUR.<br>SEE DETAIL ELEC-55 ON THE ELECTRICAL DETAIL SHEET(S).<br>MAGNET ROOM EXHAUST FAN INTAKE VENT MUST BE LOCATED AT THE HIGHEST CEILING PLANE NEAR THE MAGNET CRYOGEN VENT.   |

MECHANICAL/PLUMBING NOTES

- ALL PIPING, FITTINGS, SUPPORTS, HOSES, CLAMPS, VENTILATION SYSTEMS, ETC. ARE TO BE SUPPLIED AND INSTALLED BY THE CUSTOMER OR HIS CONTRACTORS.
- FOR COMPLETE DESIGN AND REQUIREMENTS, SPECIFICATIONS AND GUIDELINES REFER TO THE PRE-INSTALLATION MANUAL:  
MR SYSTEMS - SYSTEM COOLING, CRYOGEN VENTING, WAVEGUIDES AND EXHAUST VENTING.  
CYCLOTRON SYSTEMS - CHEMISTRY LINES, GAS LINES, AND SYSTEM COOLING.
- AN EMERGENCY WATER COOLING BACK-UP SUPPLY IS RECOMMENDED FOR CONTINUOUS CRYOGEN COMPRESSOR OPERATION.  
 IF USING AN OPEN LOOP BACK-UP DESIGN, ENSURE A DRAIN IS PROVIDED.  
 PLEASE REFER TO THE PRE-INSTALL MANUAL FOR OPTIONAL BACK-UP COOLANT SUPPLY REQUIREMENTS

GE Healthcare  
 Healthcare Project Implementation - Design Center  
 Milwaukee, WI

SHEET TITLE: MECHANICAL LAYOUT  
 MODALITY TYPE: DISCOVERY MR750

THIS PLAN IS SUBMITTED TO SURVEY LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED APPARATUS, ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS. IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM TO THE USAS/ASME Y14.100-2003 DIMENSIONING PRACTICES AND TO THE COMPANY'S POLICY ON ACCEPTING RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

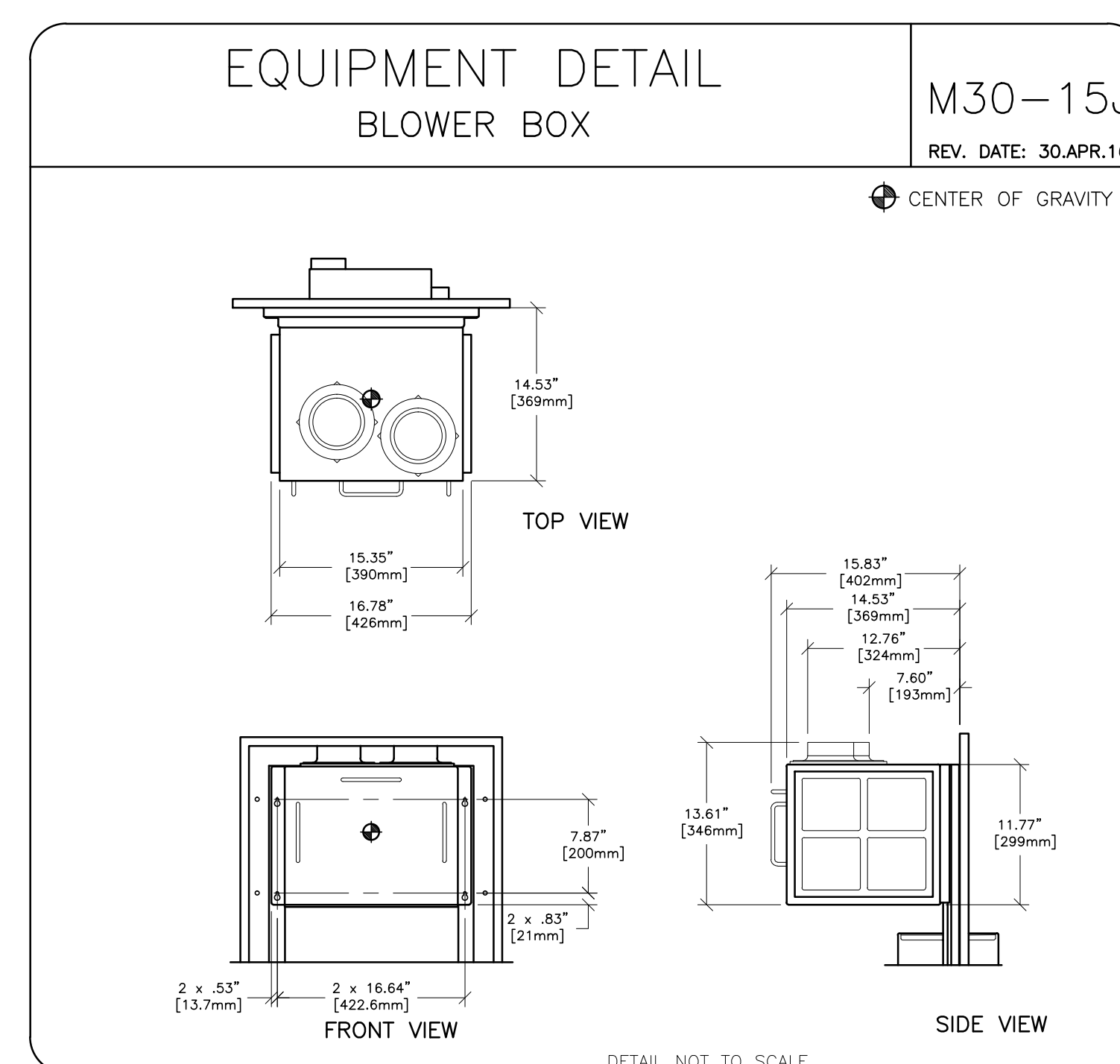
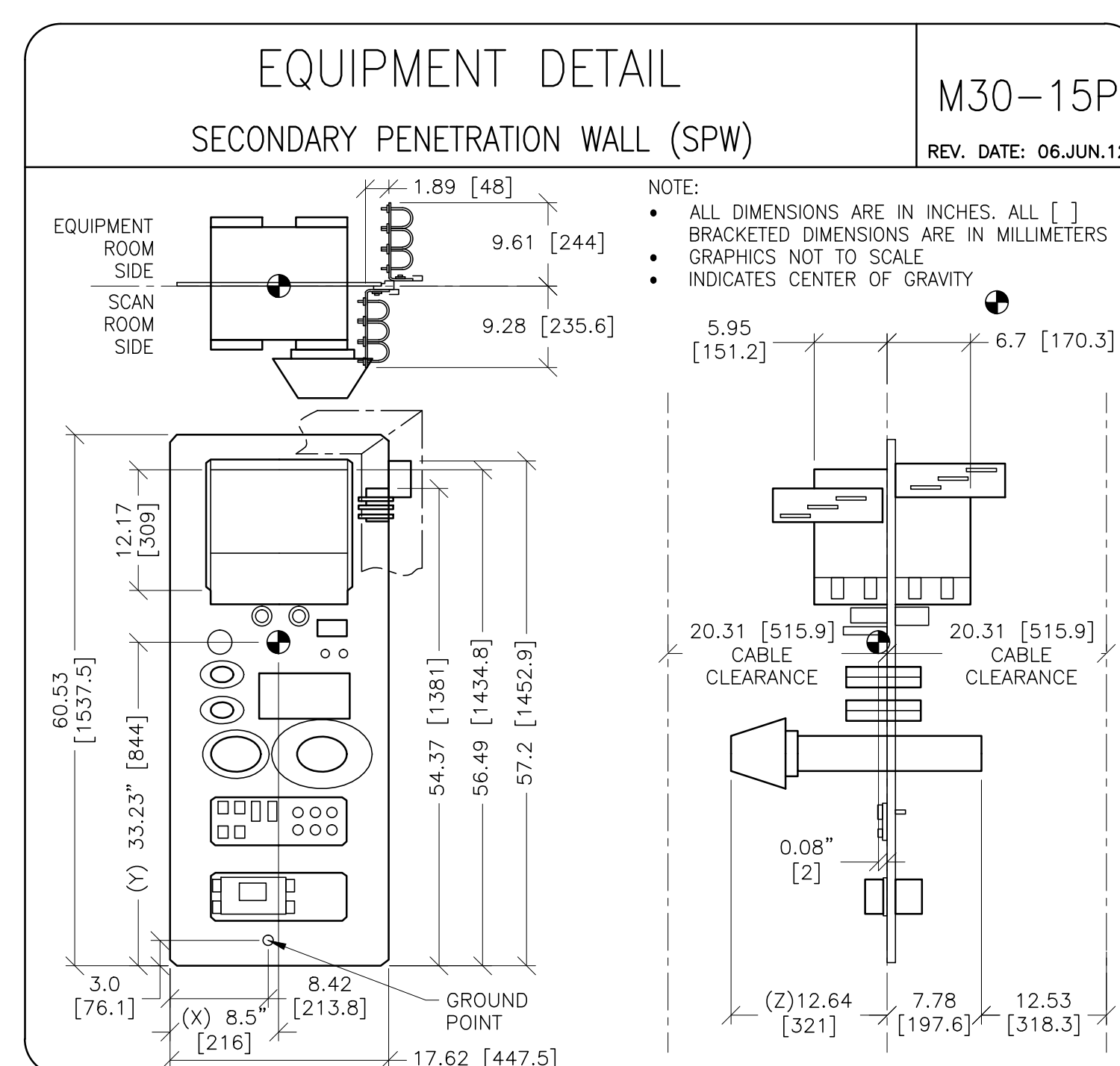
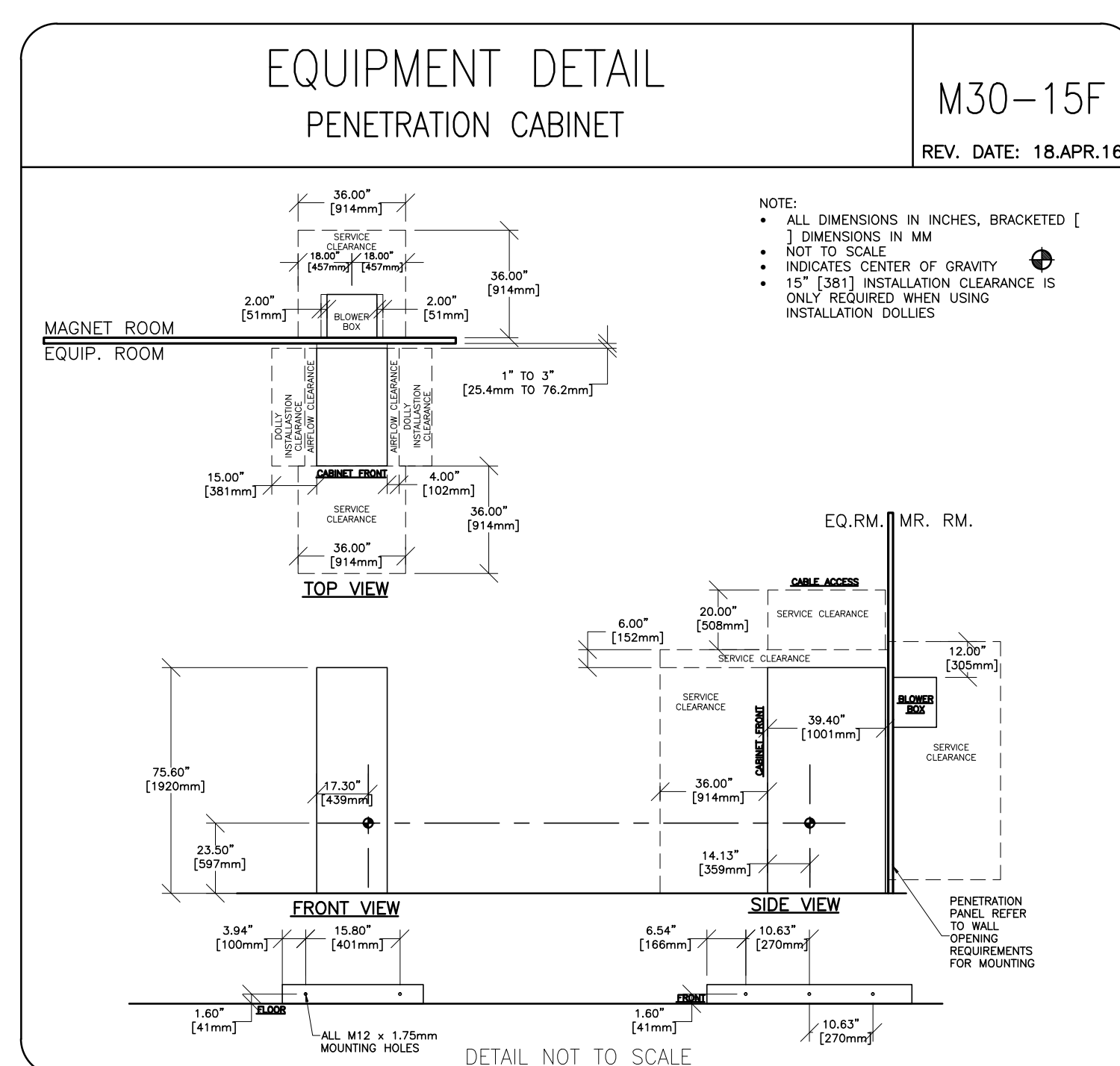
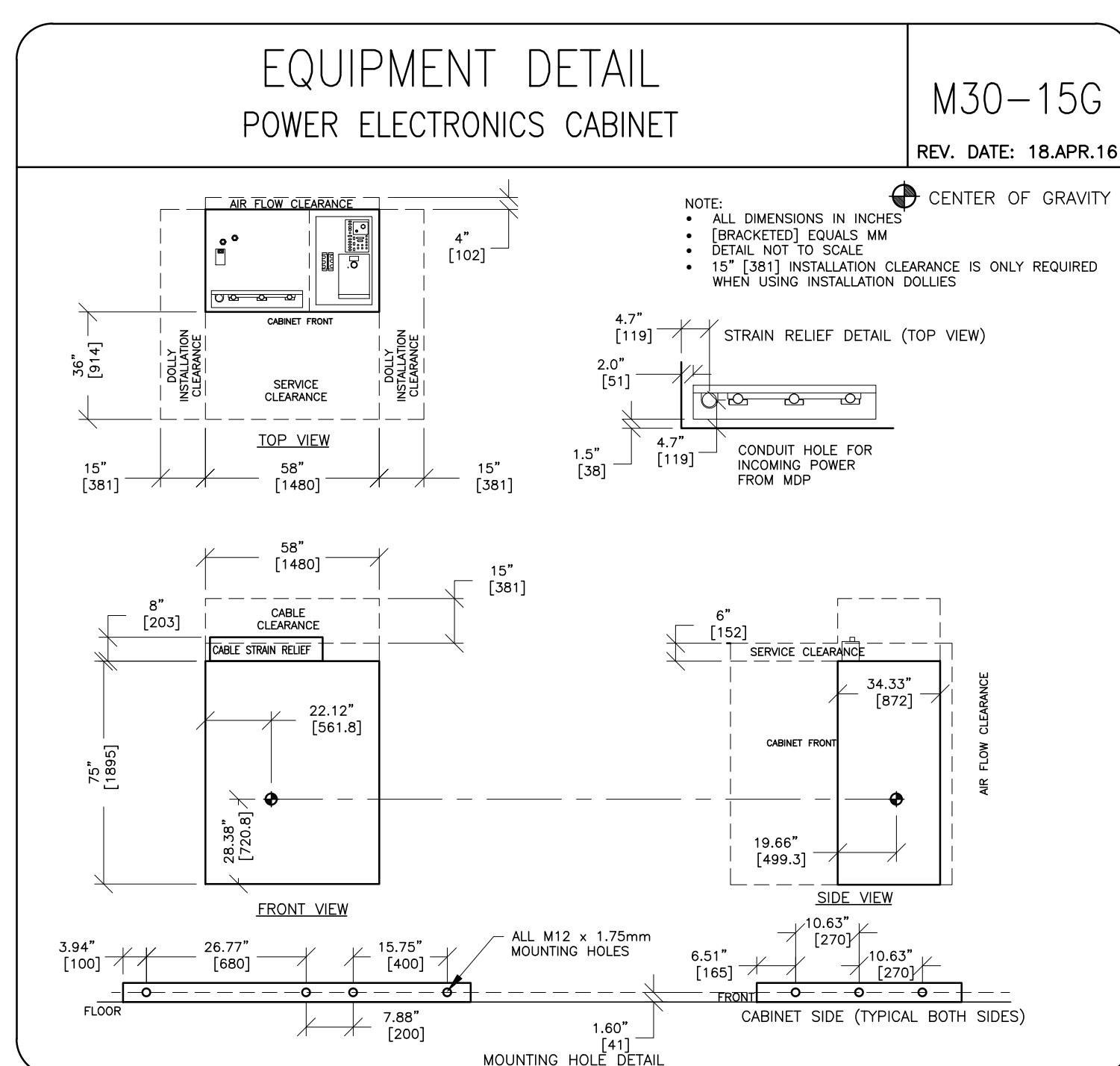
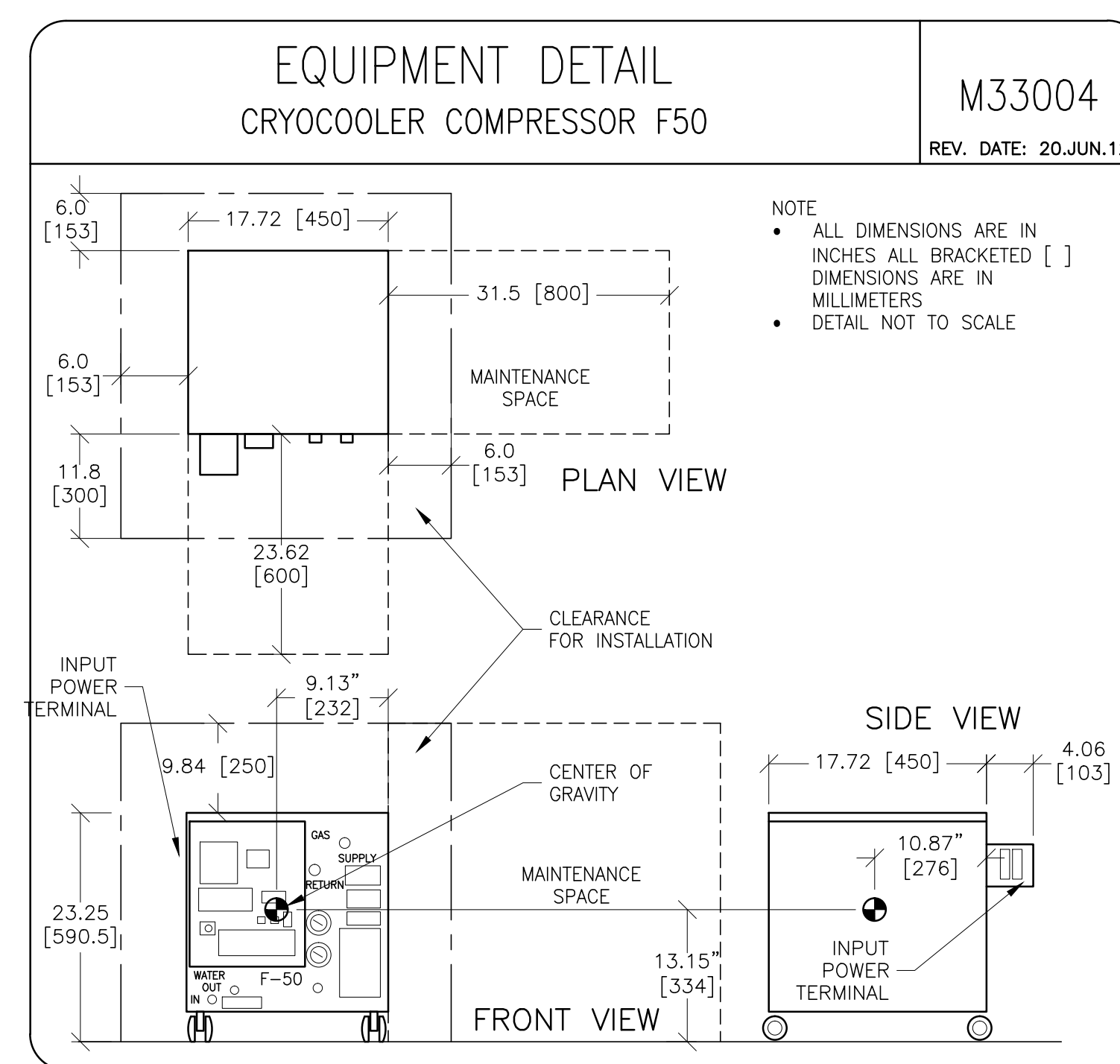
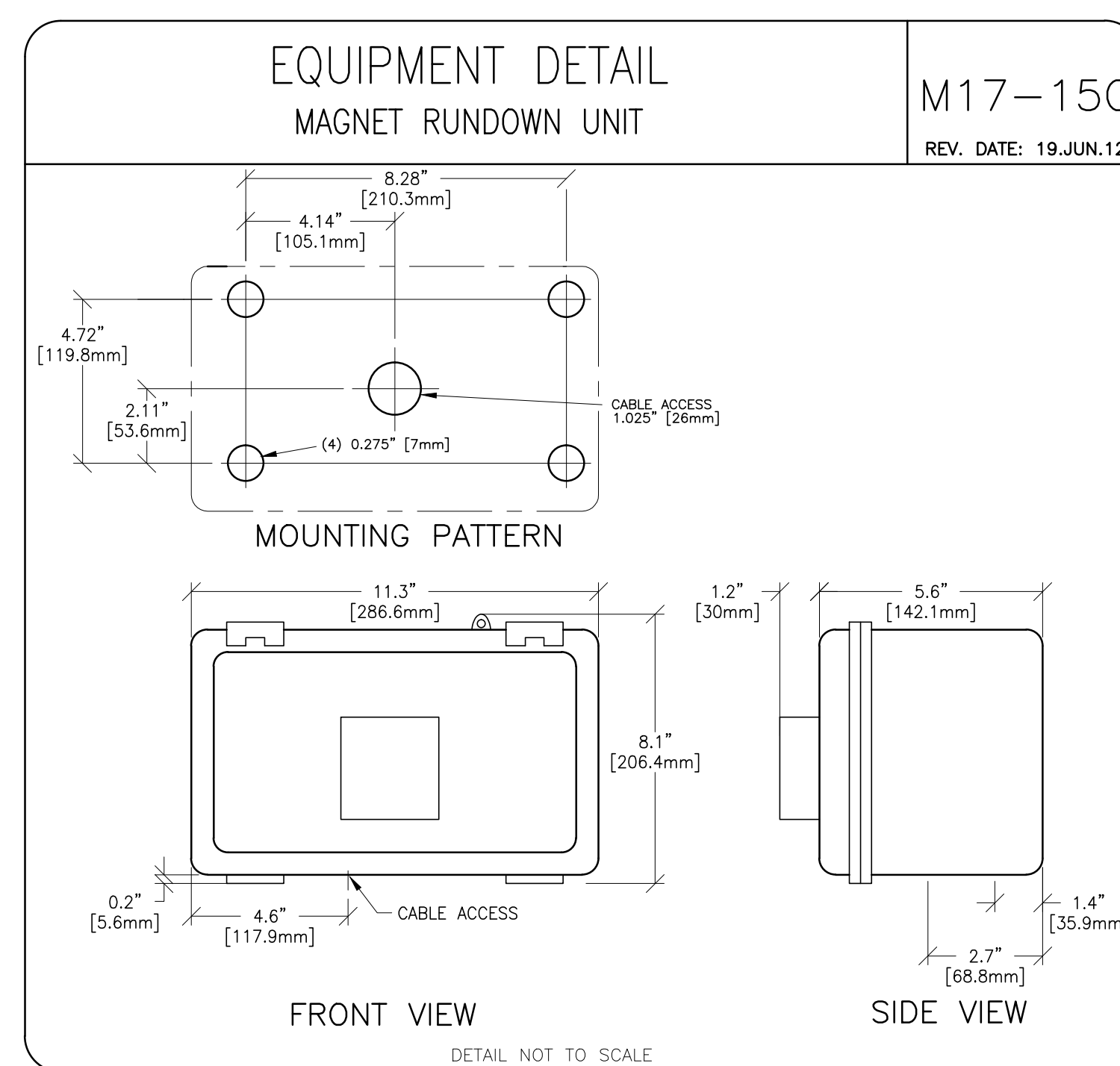
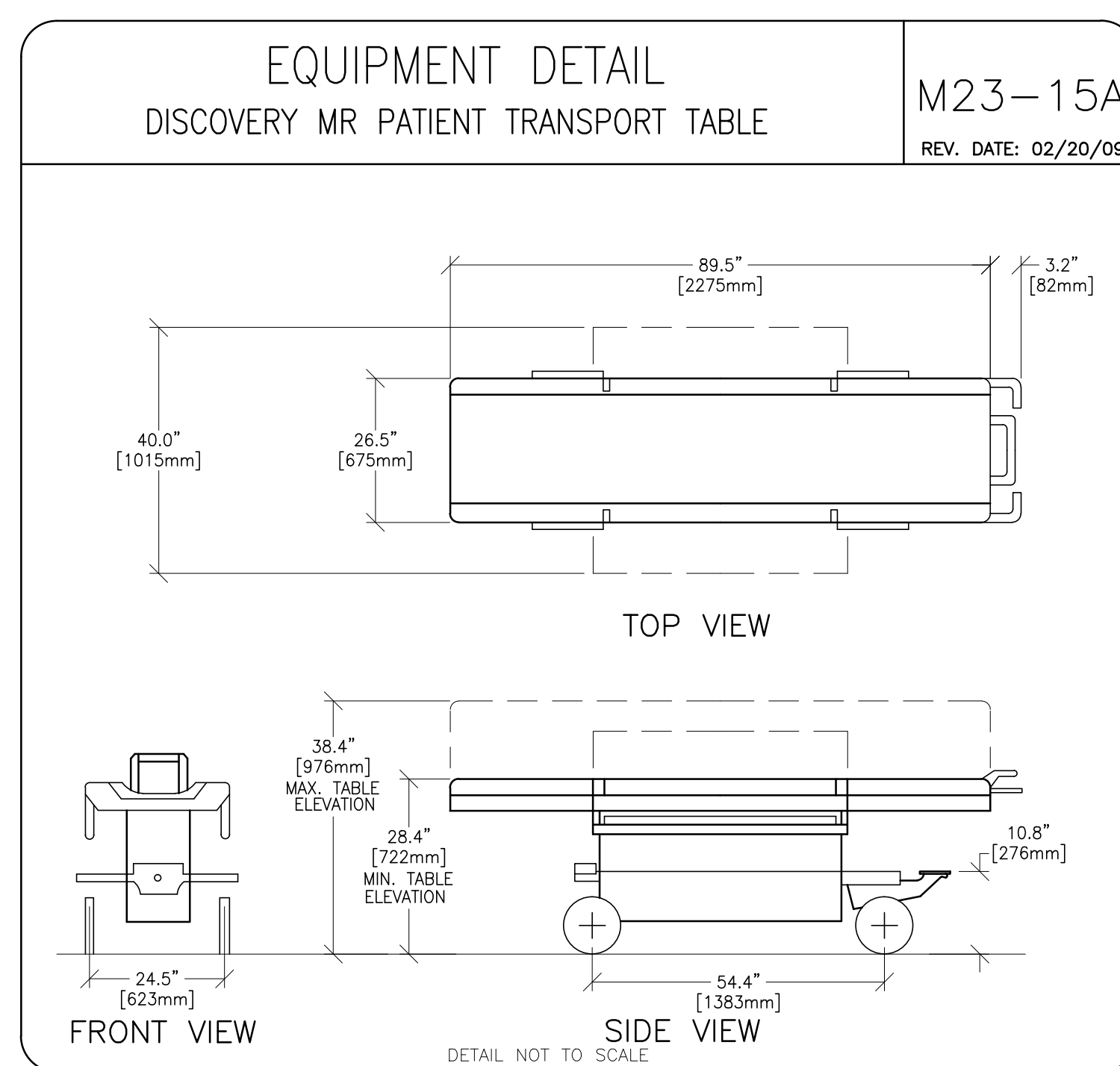
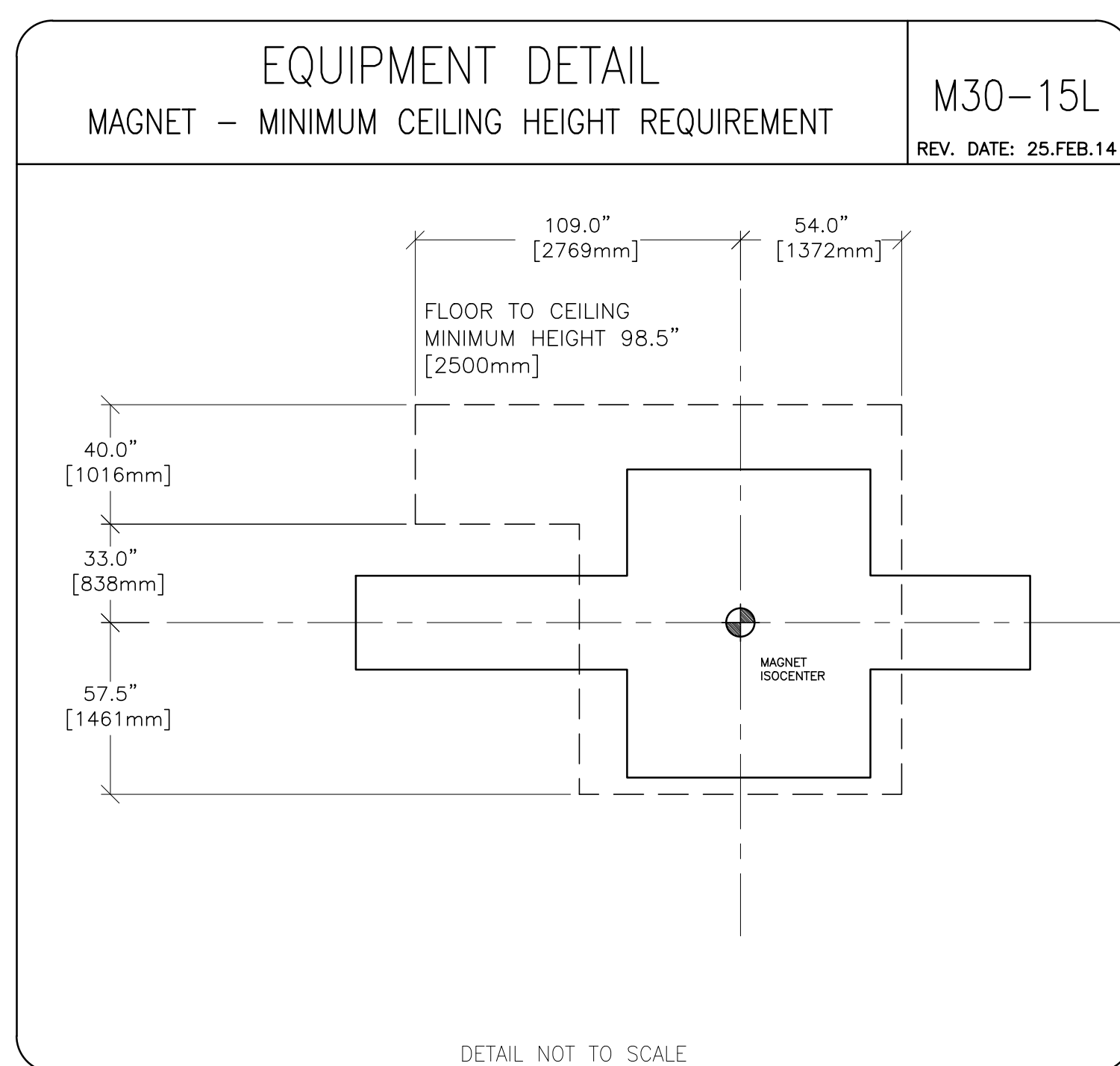
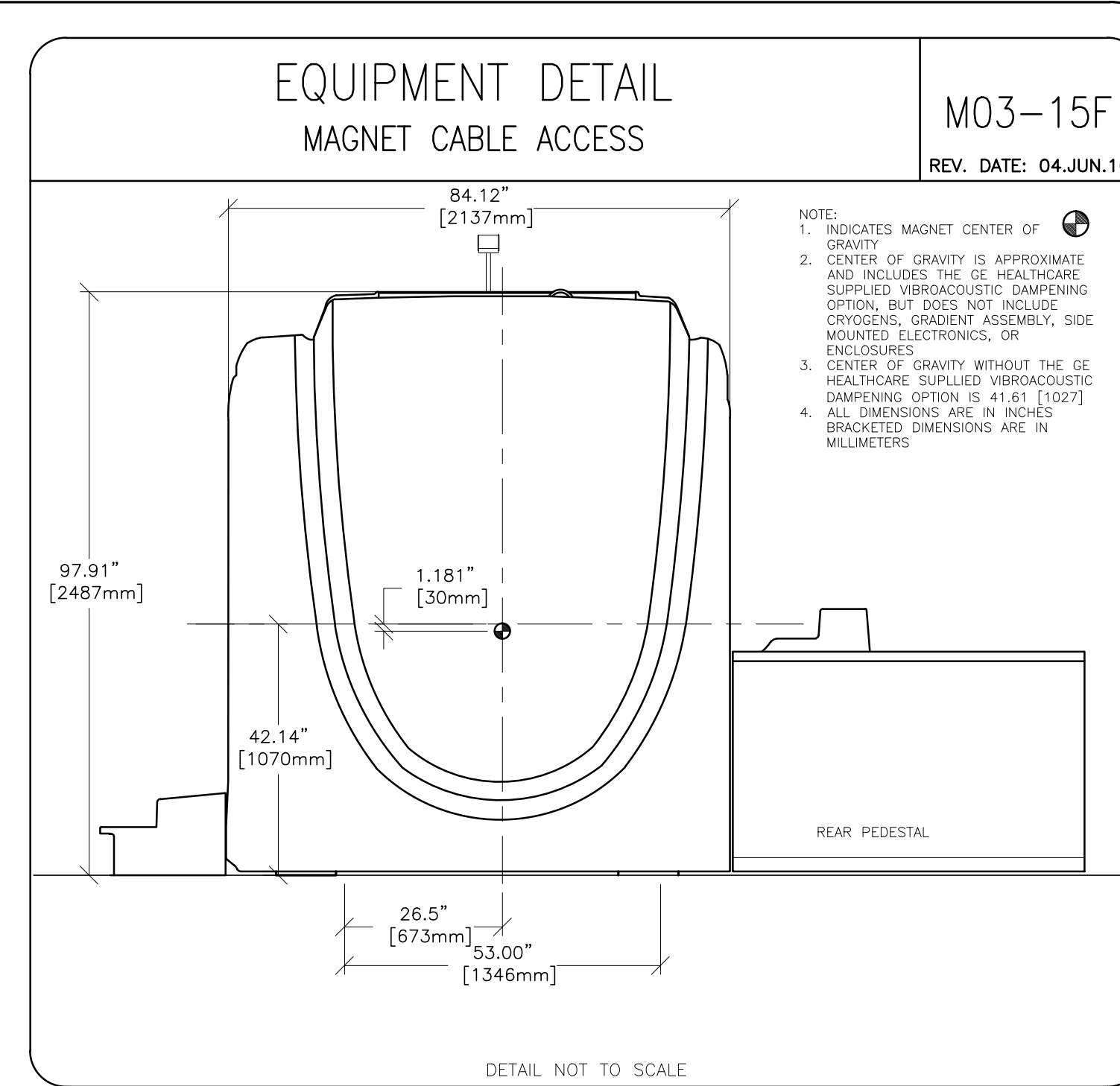
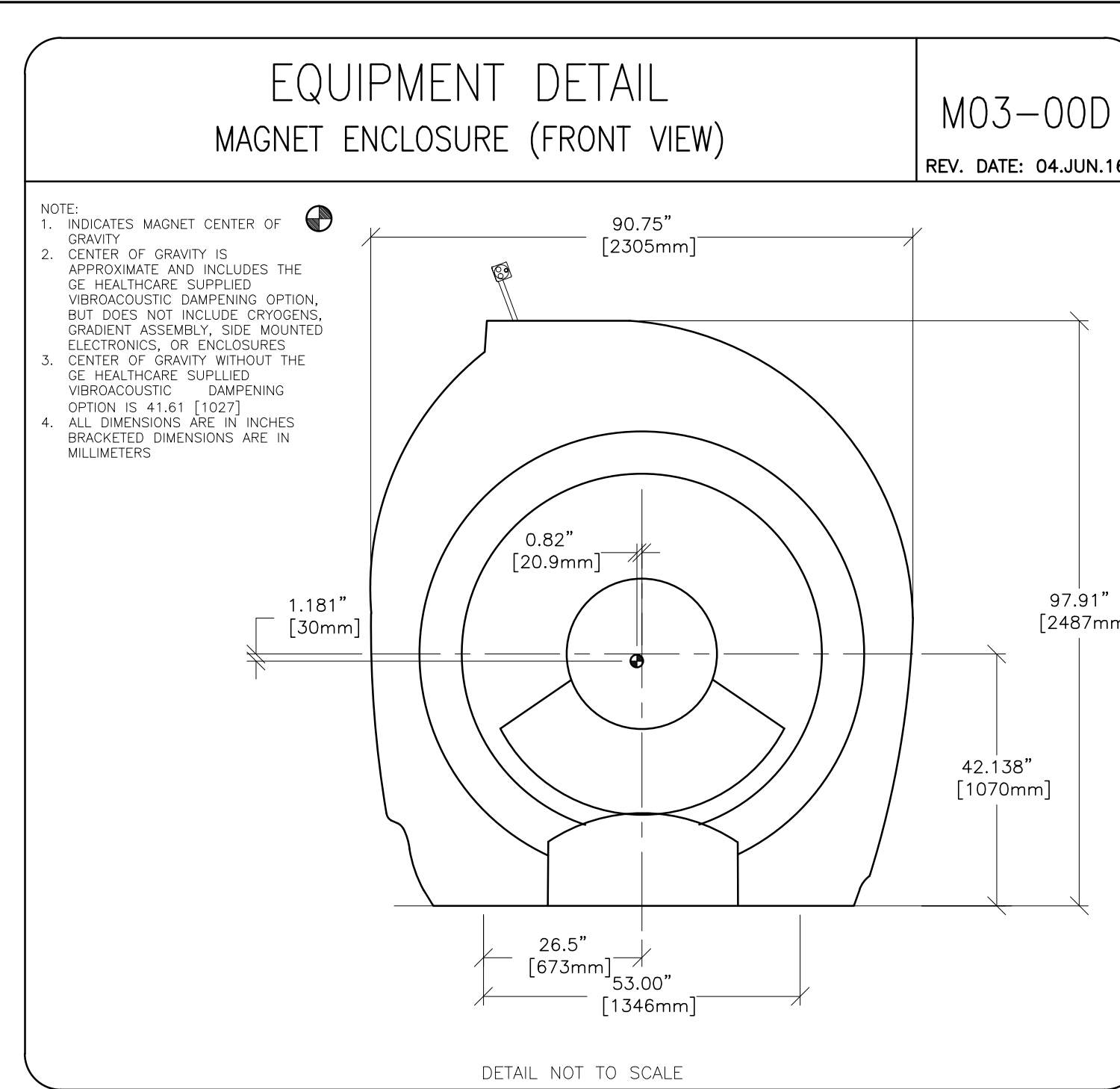
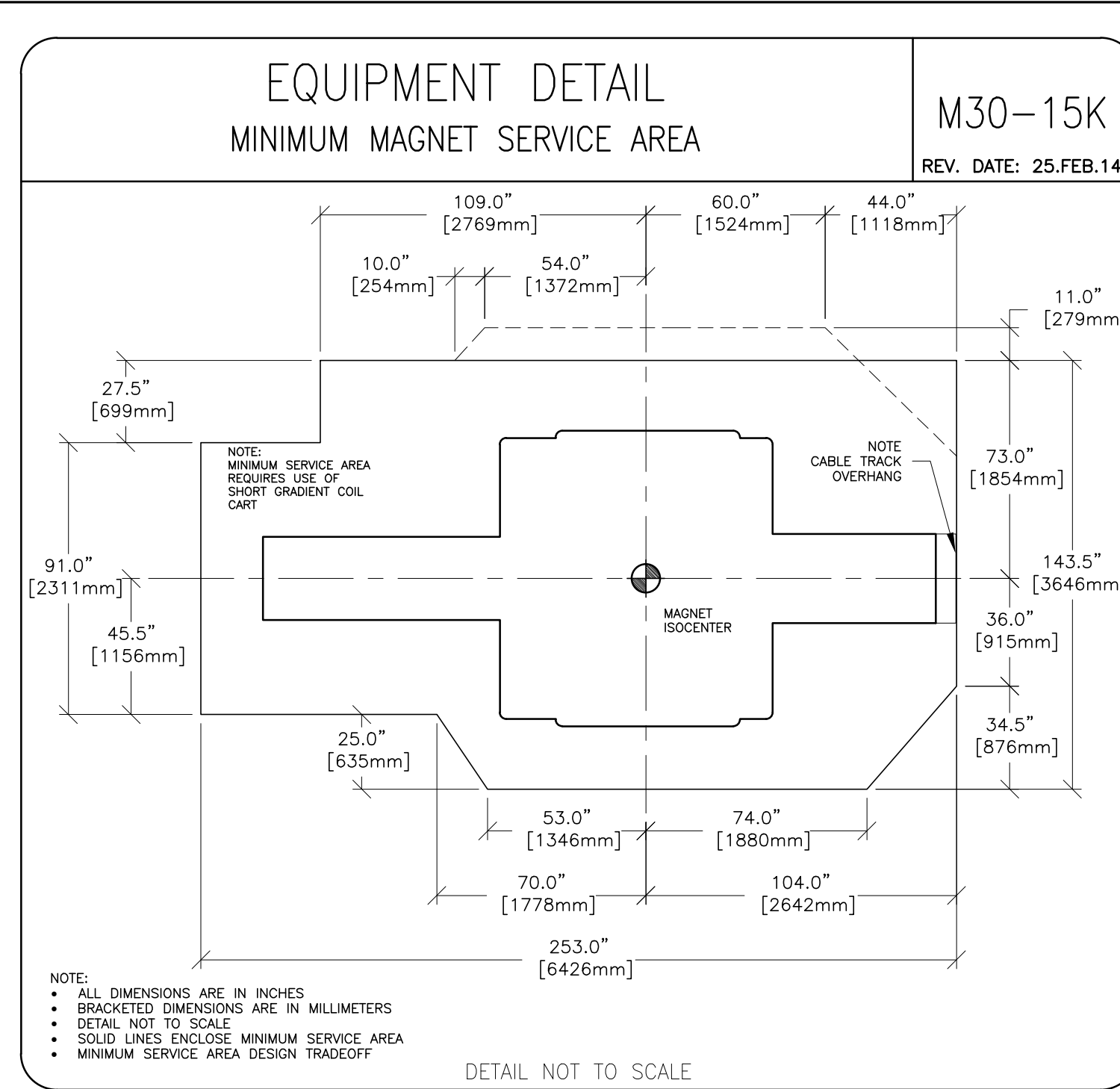
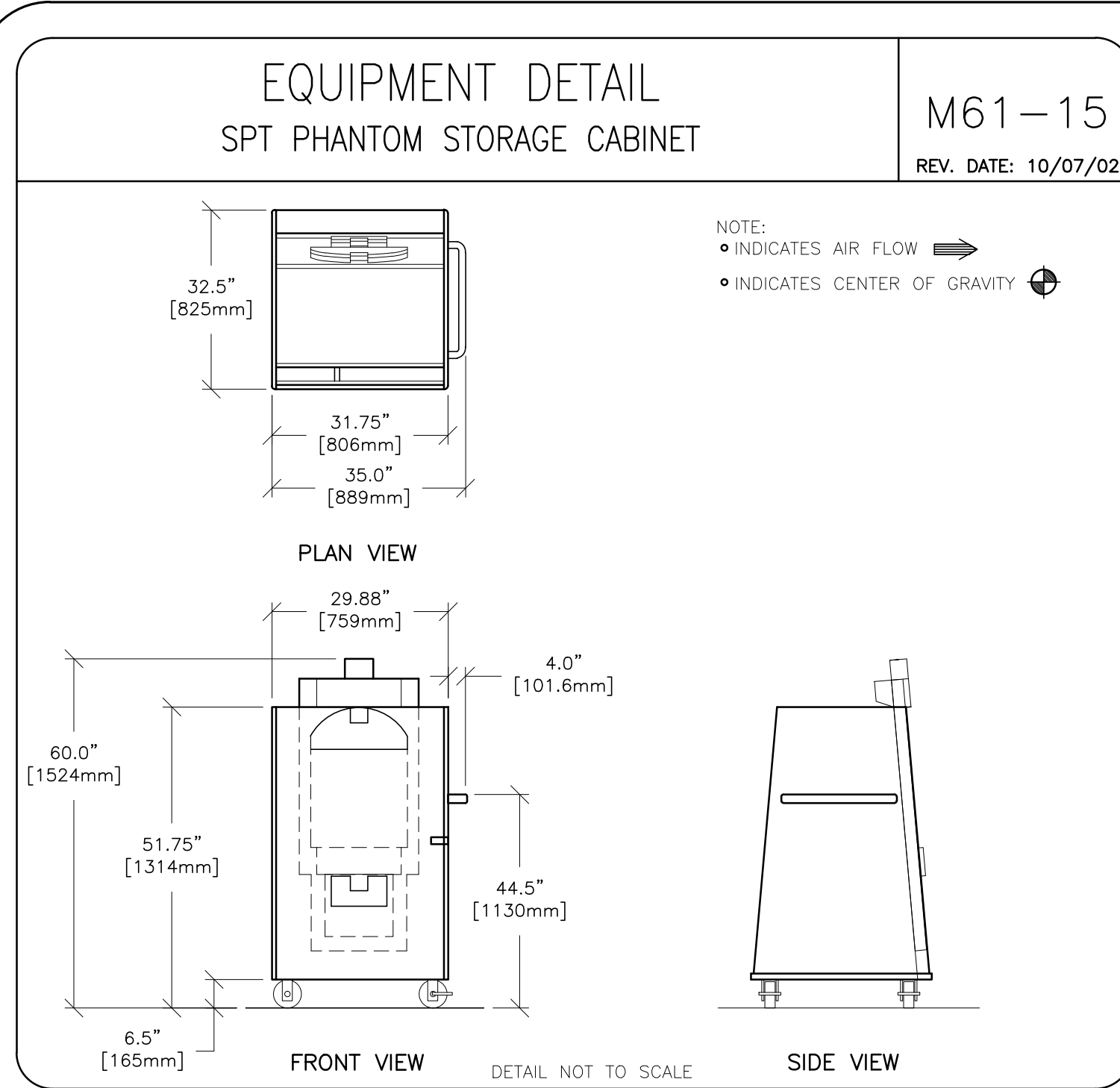
PROJECT TITLE:  
 8-222F  
 TYPICAL LAYOUT  
 TYPICAL INSTALLATION DRAWINGS

PROJECT	REVISION
8-222F	00
DATE:	12.Dec.16
DRAWN BY:	PMM
CHECKED BY:	PMM

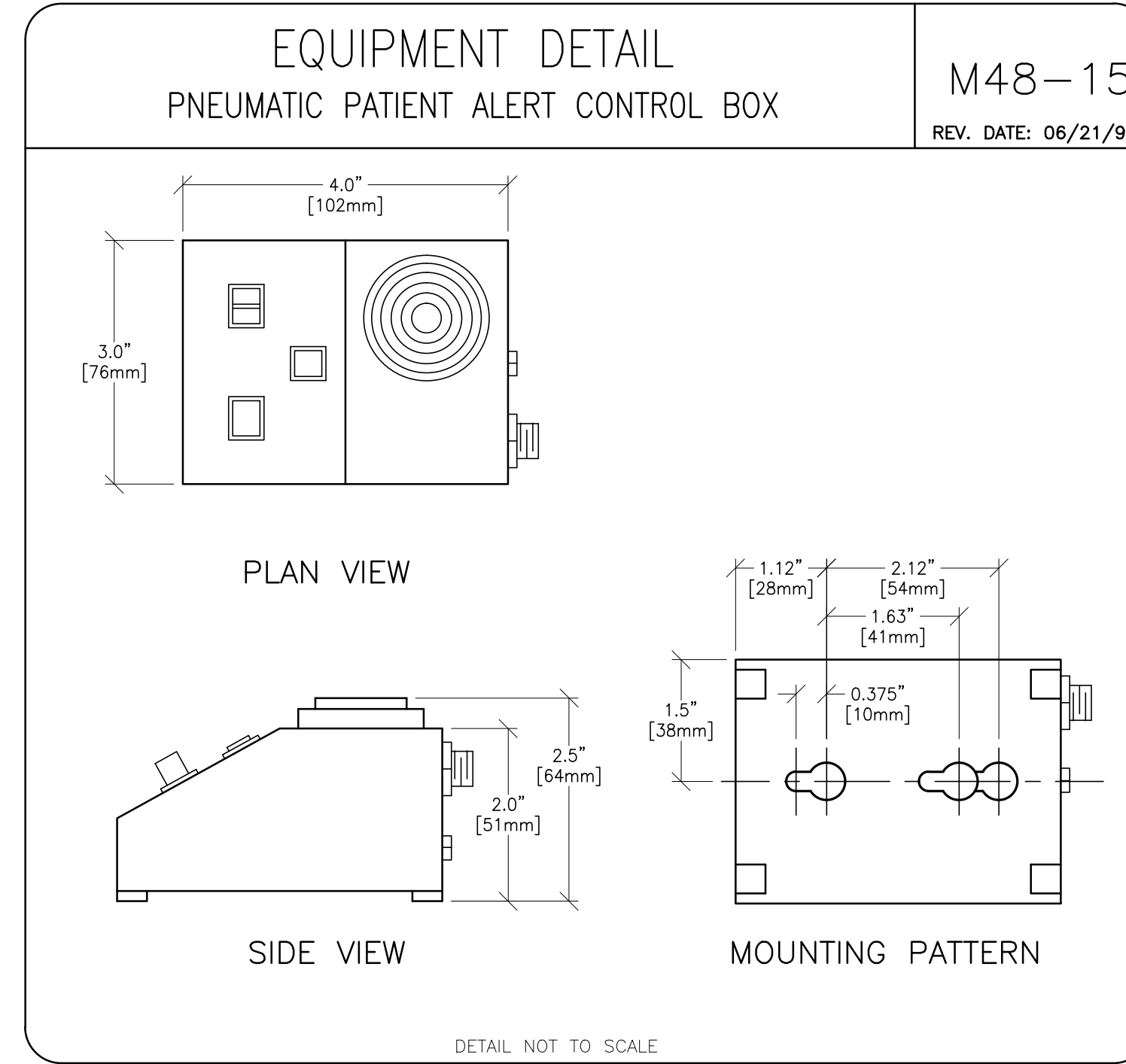
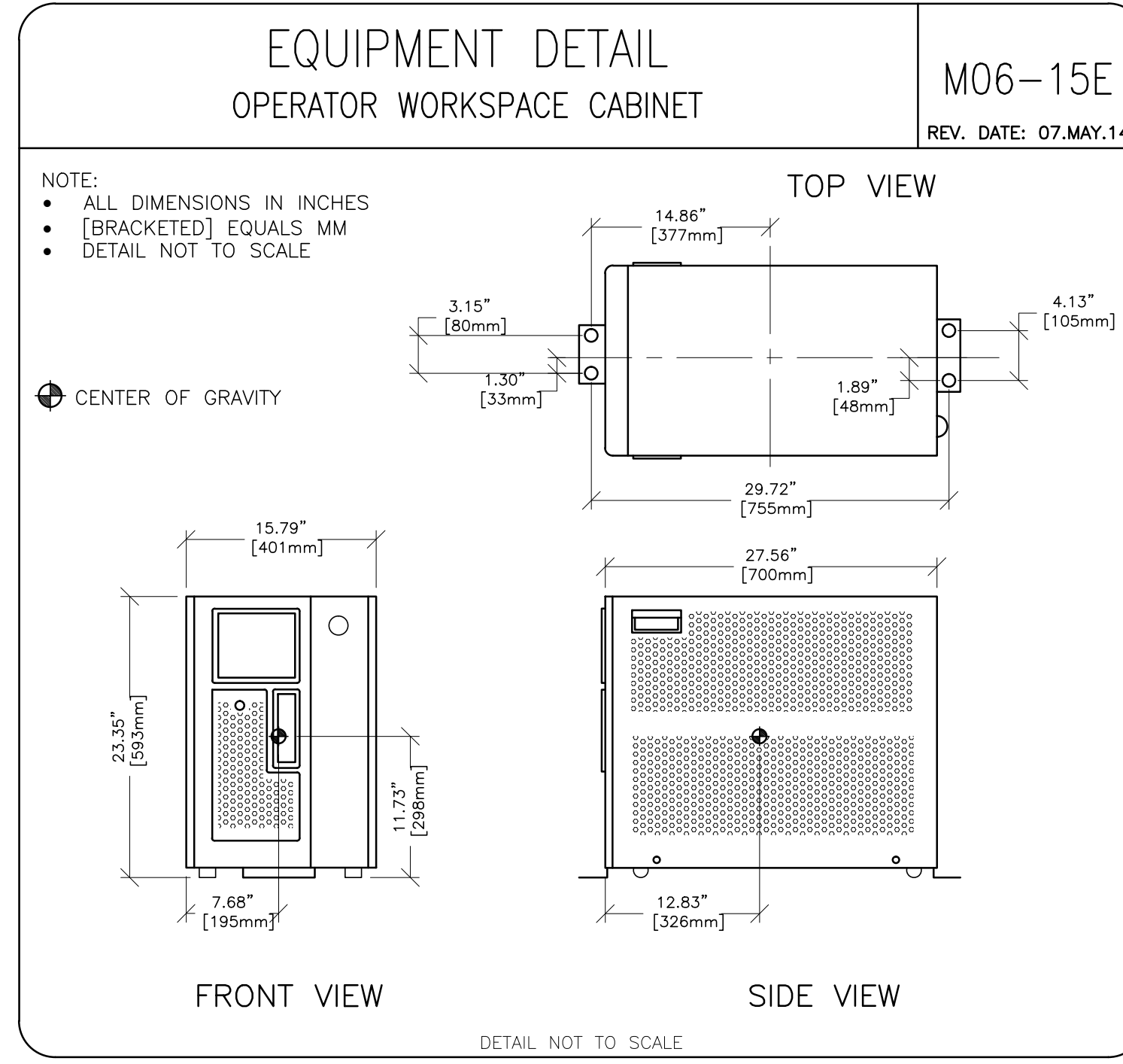
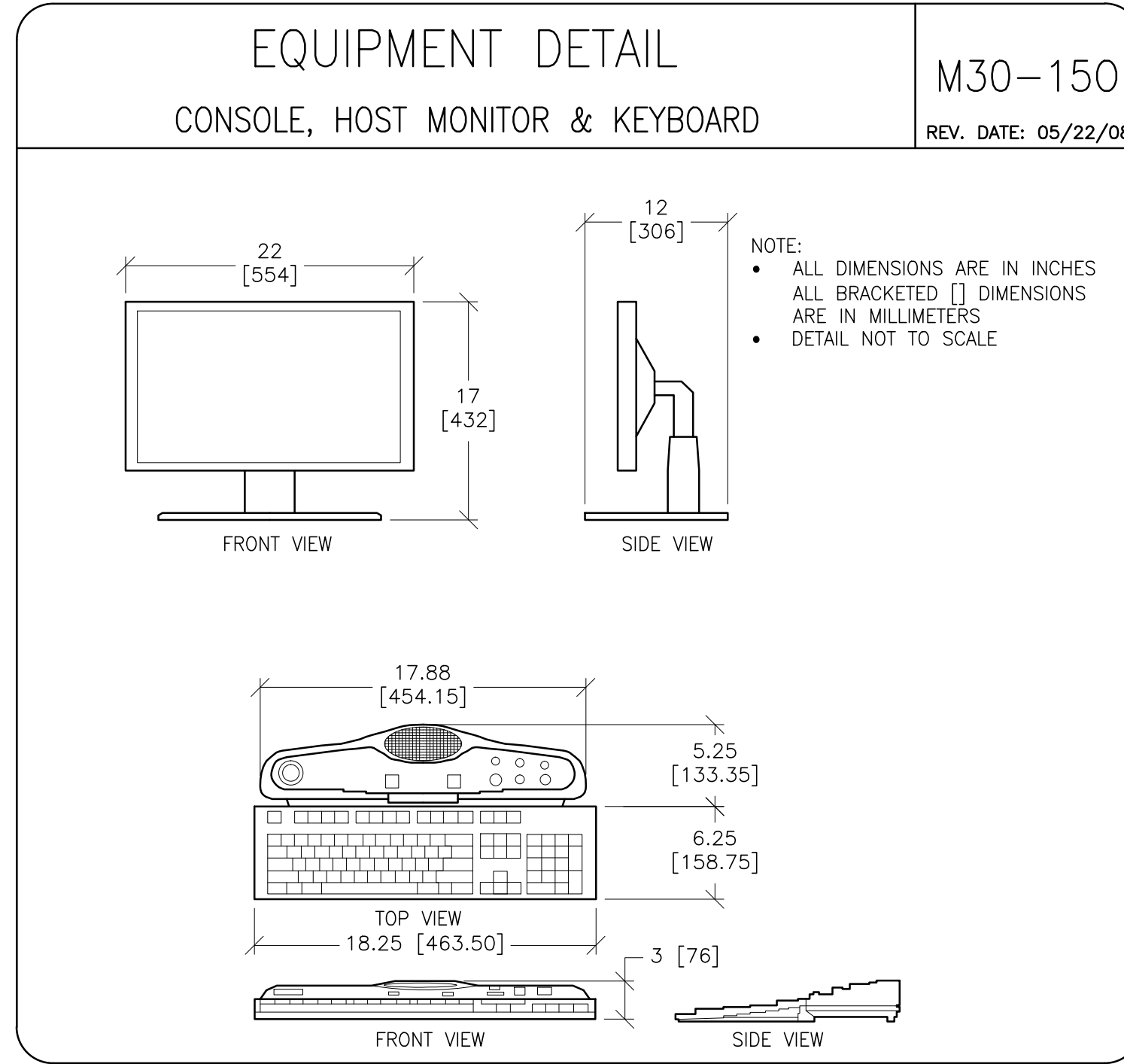
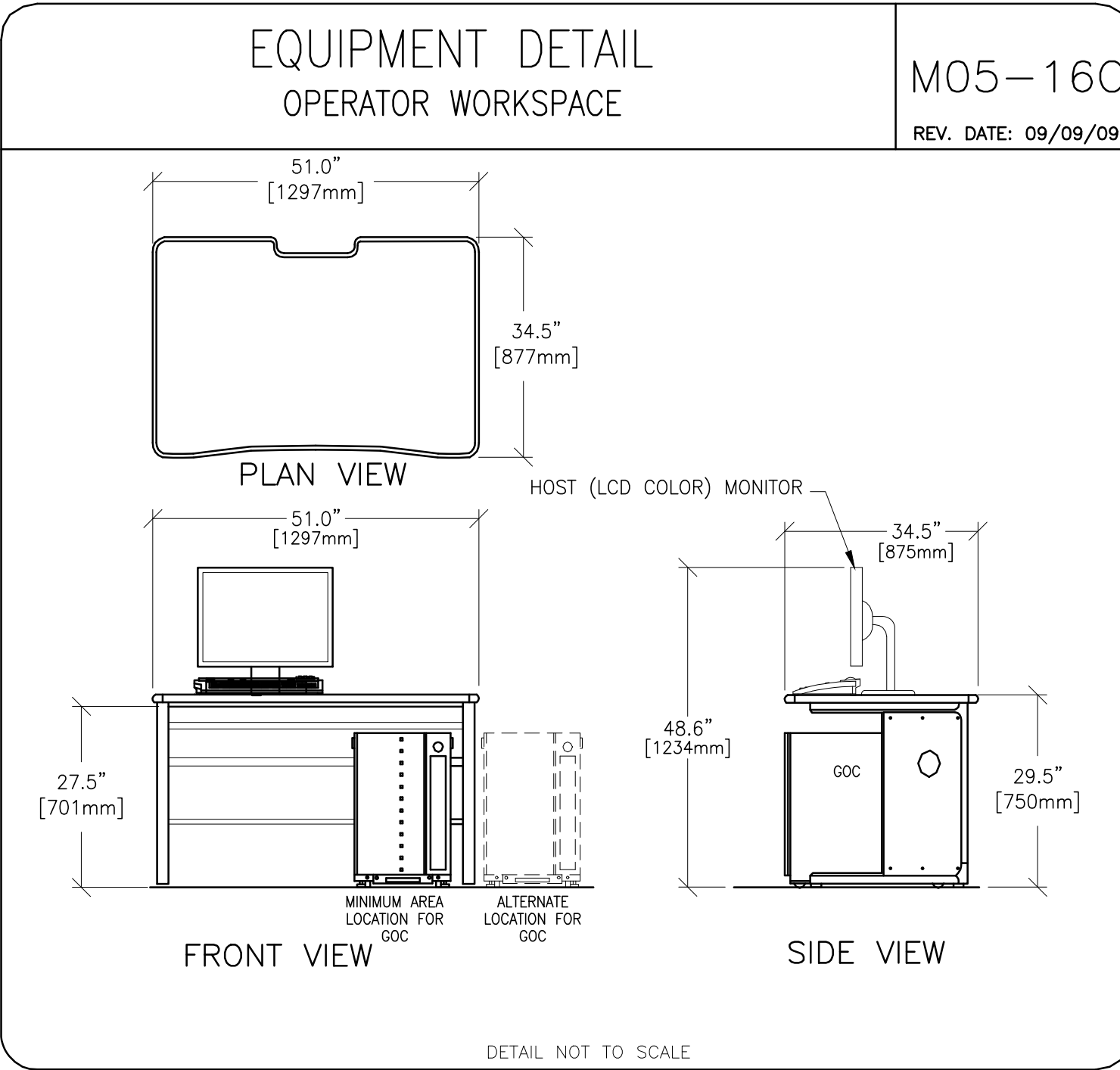
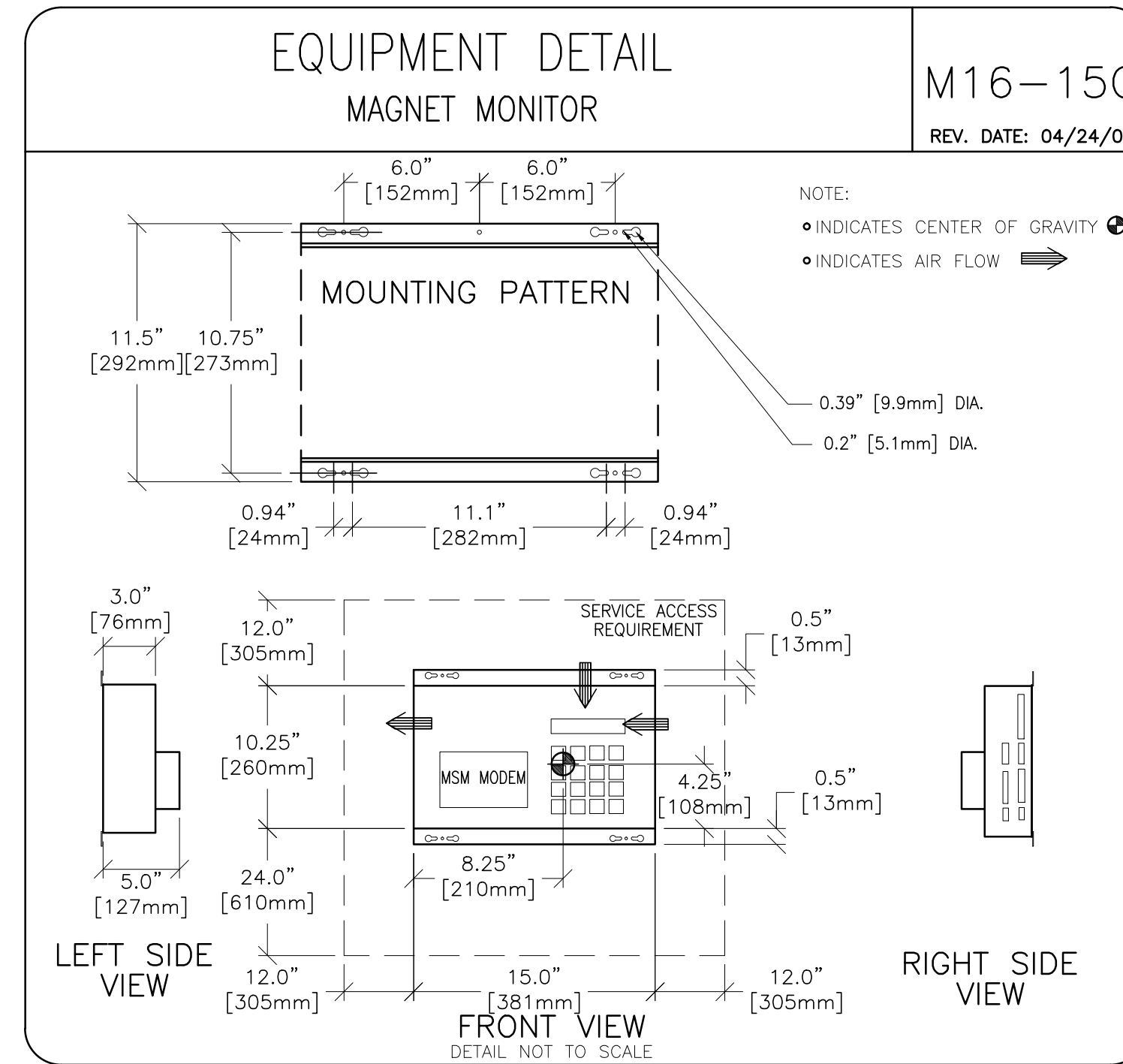
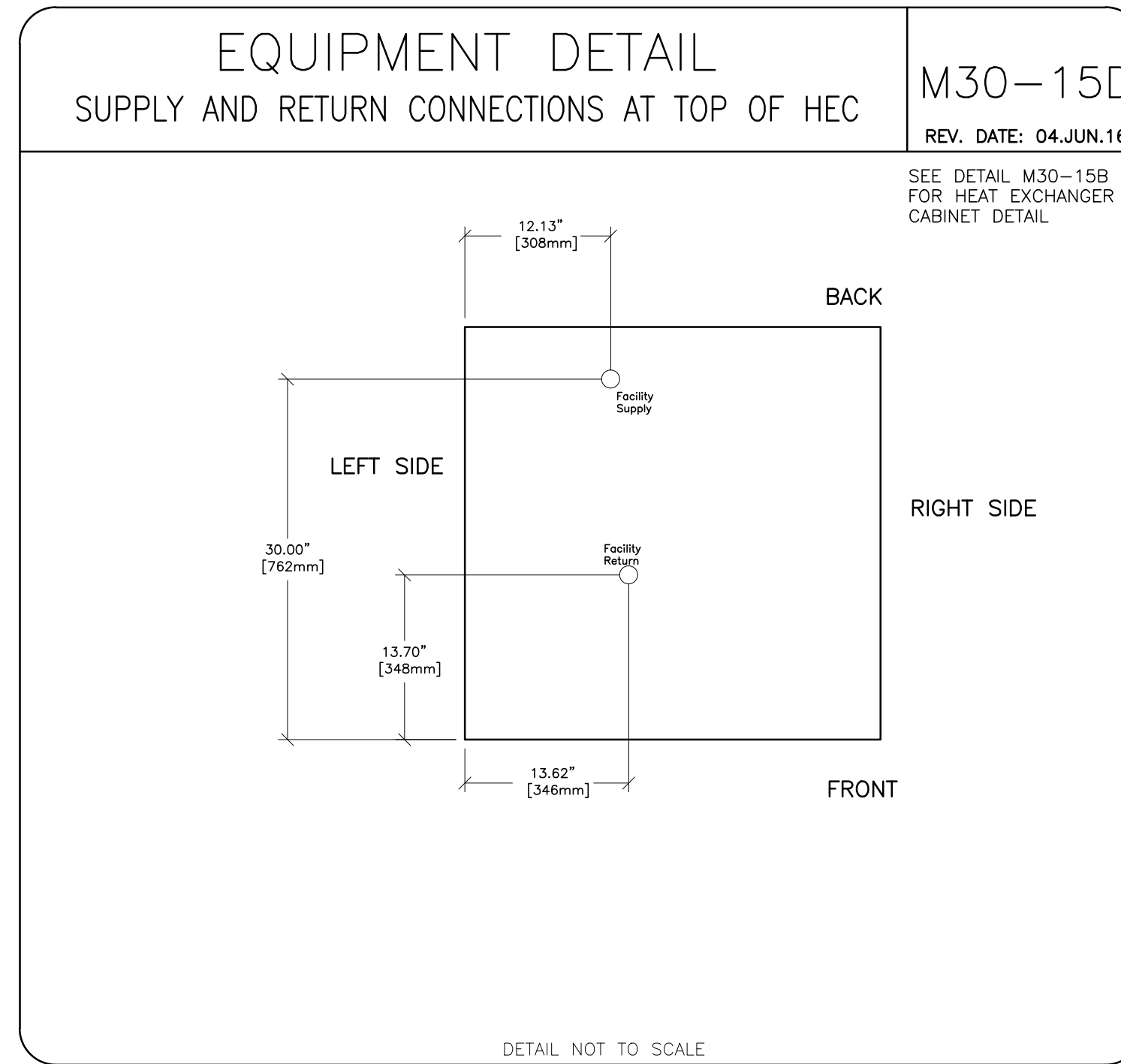
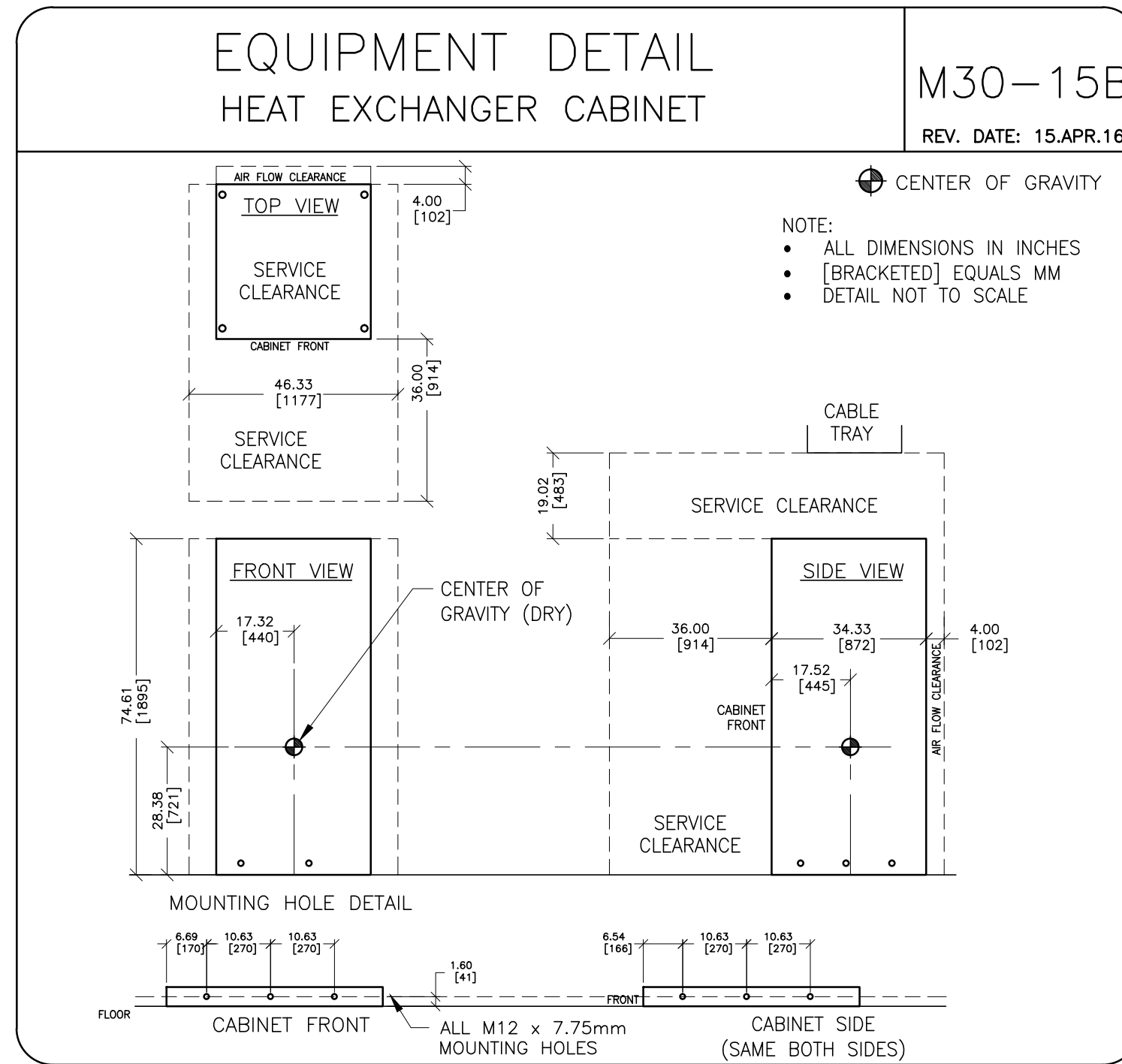
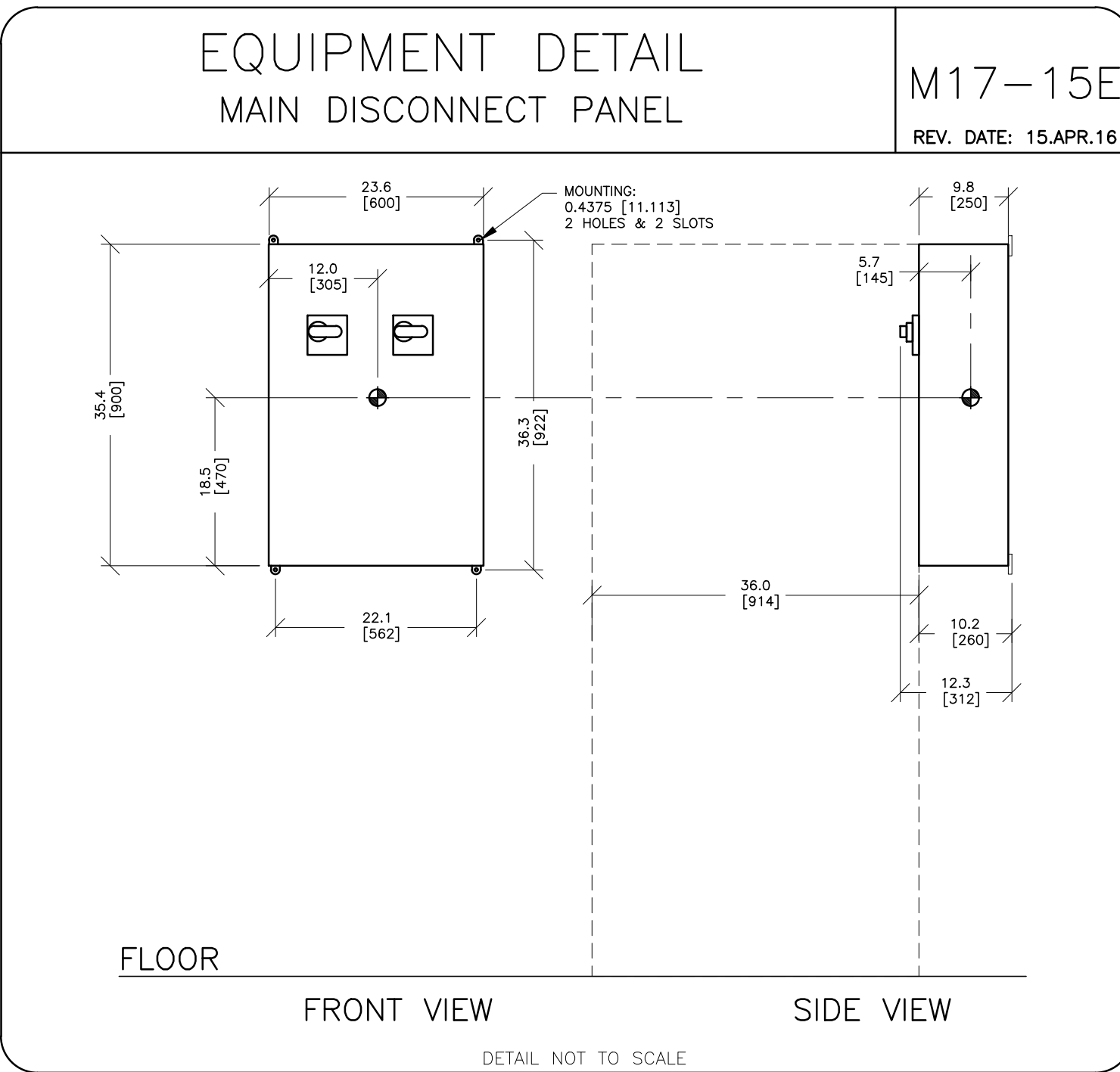
REVISION HISTORY:


SHEET  
 M1





PIM R13  
RQ - 166353



PROJECT	REVISION
8-222F	00
DATE:	12.Dec.16
DRAWN BY:	PMM
CHECKED BY:	PMM

REVISION HISTORY:
