

Date: Oct 26,2001
To: Holders of DIRECTION 2275665
Subject: **DIRECTION 2275665**
Enclosed are the REV 3 update pages.

SUMMARY OF CHANGES

- General Update

UPDATE INSTRUCTIONS(This revision can only be inserted in Rev 2 manual);
To properly update your manual, perform the update instructions on the list below.

| TAB | REMOVED PAGES | INSERTED PAGES |
|------------|---------------------------------|---------------------------------|
| – | Title Page A to B i to iv | Title Page A to B i to iv |
| 1 | 1–7 to 1– 8 | 1–7 to 1– 8 |
| 2 | 2– 21 to 2–44 | 2– 21 to 2–44 |
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| 7 | 7–19 to 7–20 | 7–19 to 7–20 |
| 11 | – | 11–1 to 11–28 |

Yutaka Masumo

GEYMS TP GROUP–MR



GE Medical Systems

Technical Publications

Direction 2275665

Revision 3

Signa[®] Ovation Pre-Installation

Architectural/Installation Planning Use Only

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Operating Documentation

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent, have notation of "bad order" placed by the delivering driver on all copies of freight or express bill. If damage is of a concealed nature, notify transportation agent as soon as possible to make an "inspection report of damage" but in any event not later than 15 days after delivery. A transportation company usually will not pay a claim for concealed damage if an inspection is not requested within this 15 day period. Complete instructions regarding claim procedure are found in section "S" of the Policy & Procedure Bulletins.

If shipment was handled by moving van service – uncrate – call Traffic – Milwaukee immediately when any damage is found. Do not attempt to call any local agent. At this time be ready to describe type of damage, type of equipment, serial numbers and if possible the order number.

The above paragraph is in regard to equipment requiring installation only, and does not apply to supply items. The F.O.B point for these items is as shown in the Price Book.



GE Medical Systems

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REVISION HISTORY

| REV | DATE | PRIMARY REASON FOR CHANGE |
|------------|--------------|---|
| 0 | Oct 11, 2000 | Initial release |
| 1 | Dec 28, 2000 | Product Name was changed to Signa Ovation. Added Cooling Cabinet Information. Miscellaneous Correction. |
| 2 | May 18, 2001 | Update the Magnet Load Pattern. Miscellaneous Correction. |
| 3 | Oct 26, 2001 | Added the Swing Table Style B ware plate location in Sec 2. Added MDP Document in Sec 11. Miscellaneous Correction. |

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| d | blank | | | 4-15 to 4-22 | 1 | 7-2 | blank | 9-3 to 9-10 | 1 |
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1-2 BASIC SYSTEM (Continued)

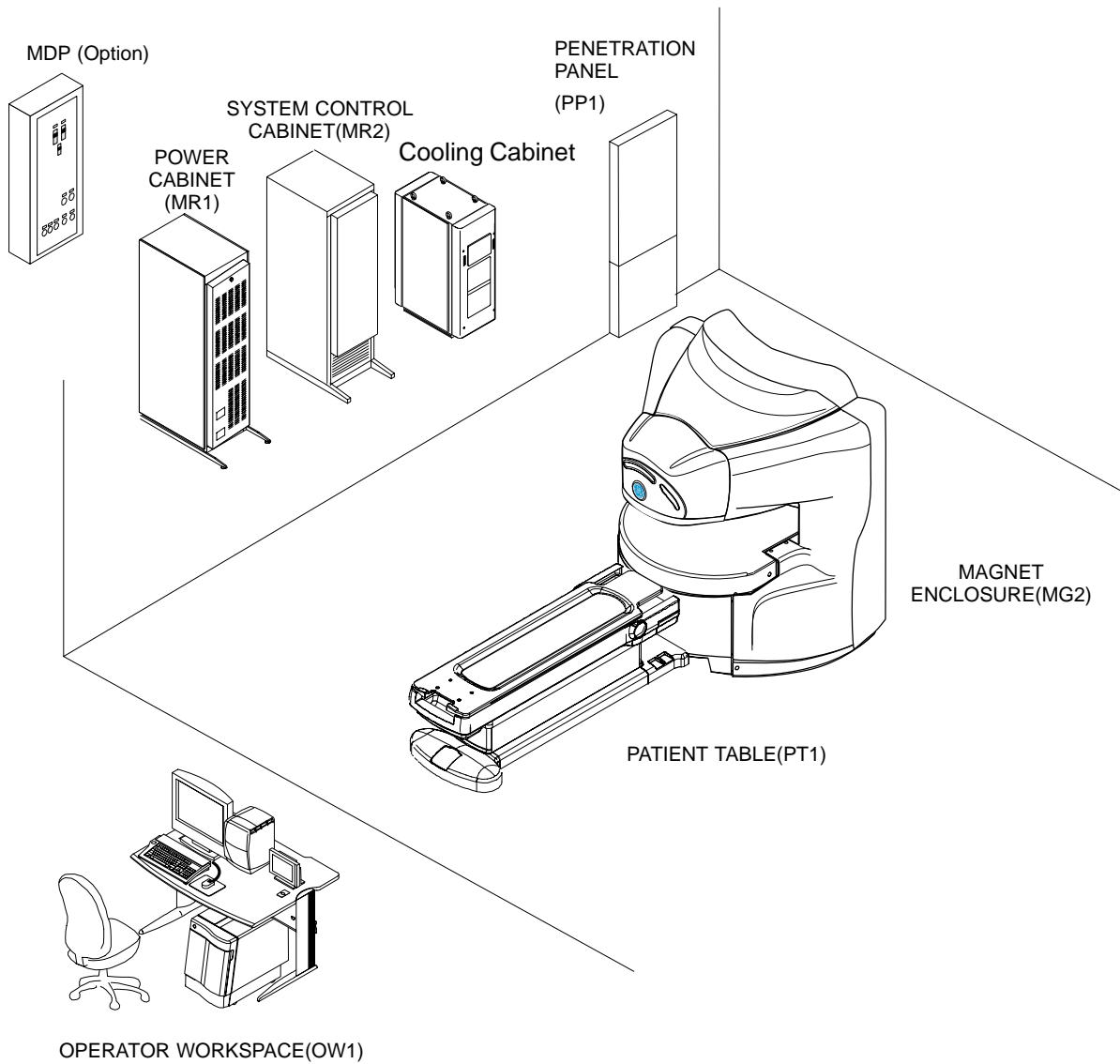
TABLE 1-14
STANDARD PHASED ARRAY COIL PACKAGE (REQUIRE ONE)

| CATALOG | DESCRIPTION |
|---|---|
| M20112BC | C/T/L Array Coil Torso Array Coil (L) and (XL) Extremity/Foot Array (L) and (M) 9 inch 6 inch |
| Note 1 Head Coil and T/R Body coil are included in the System. | |

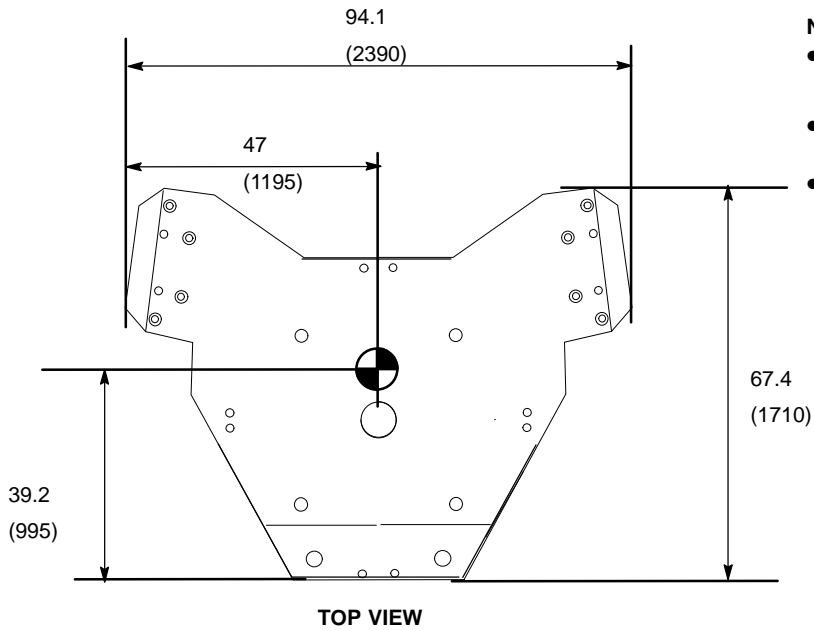
TABLE 1-15
SCANTOOL (REQUIRE ONE)

| CATALOG | DESCRIPTION |
|----------|---|
| M20002BP | Scan Tool : MEMP, FSE, STIP, FLAIR, Cine, GRE/SPGR, Fast GRE/SPGR, SSFSE, 3 Plan, efgre3d, IVI, 3D/VOX Tool |
| M20012BP | MFO Tools : 2D/3D FRFSE, T1 FLAIR, SSFP, New Image Filter with SCIC |

1-2 Basic System (Continued)



SIGNA Ovation SYSTEM MAJOR EQUIPMENT
ILLUSTRATION 1-1

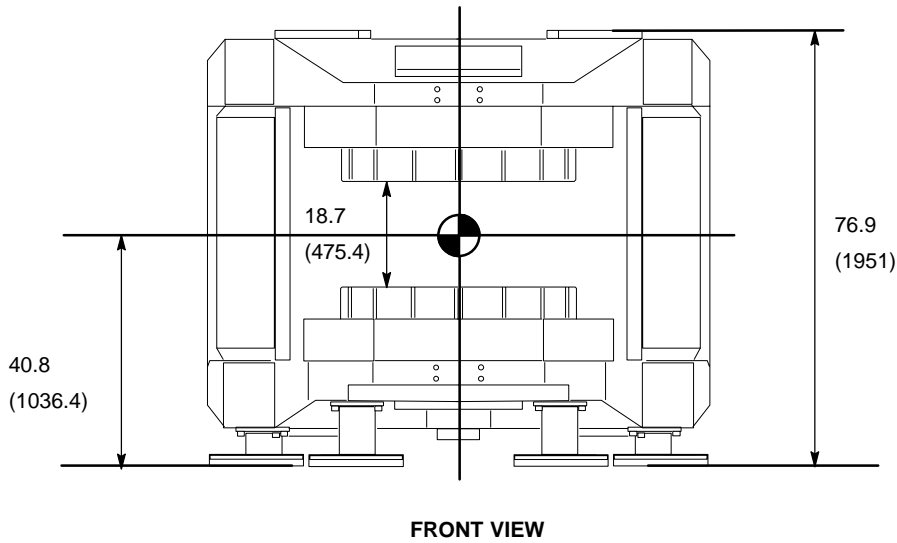


NOTE:

- ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

- APPROX. WEIGHT 19000 kg

-  INDICATES Magnet Isocenter



0.35T MAGNET WITHOUT ENCLOSURE
ILLUSTRATION 2-8


Note

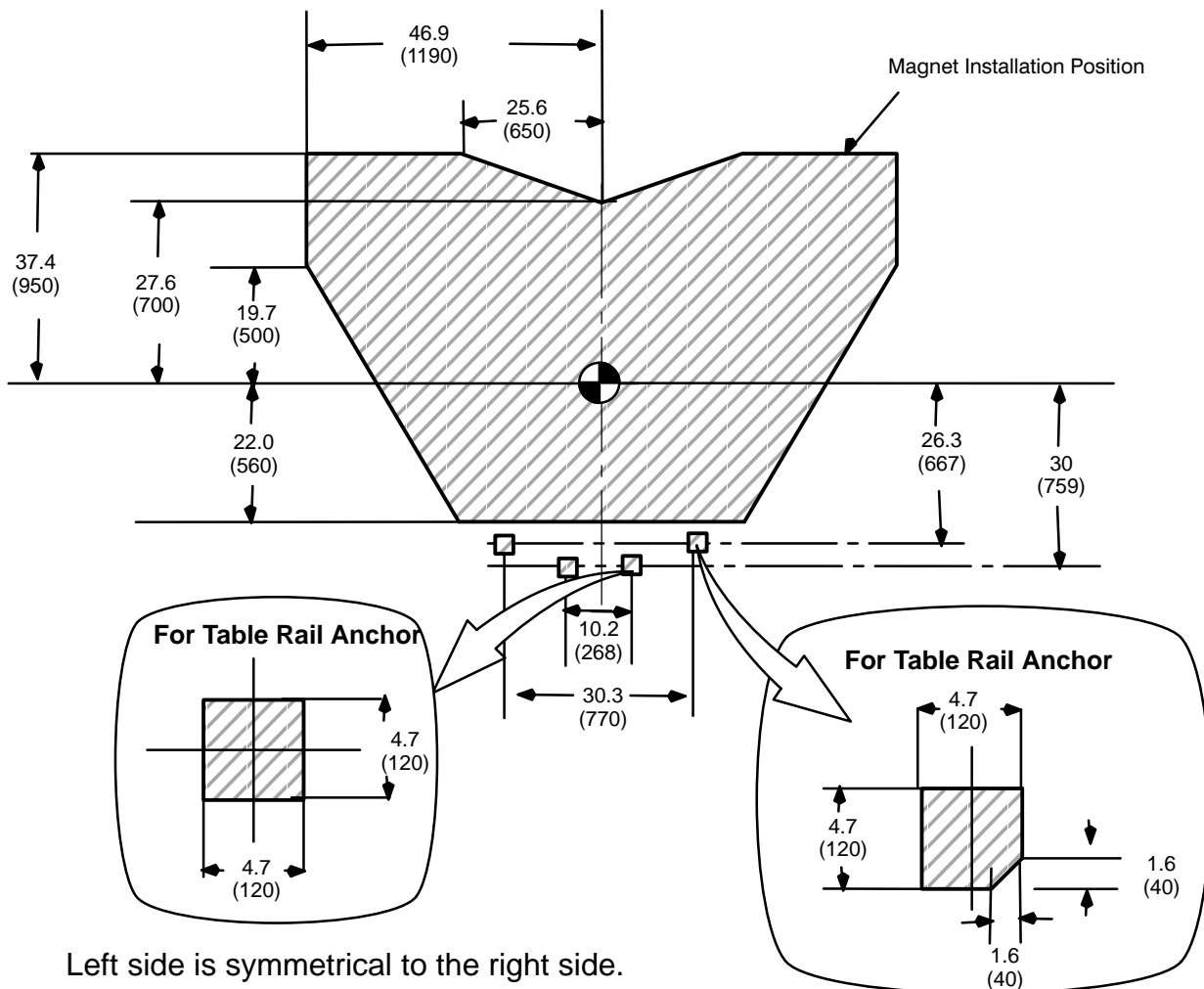
The following procedure from Page 2-22 to page 2-26 must be performed before Magnet Installation. If not performing this procedure before the Magnet installation, it will cause problem of whole installation process.

1. Draw the line for magnet and table anchor according to the following illustration.
Then, cut the floor along the line and peel the finished floor.

NOTE:

ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

 INDICATES Magnet Iso-center



Left side is symmetrical to the right side.

MAGNET LOAD PATTERN (1)
ILLUSTRATION 2-9

For Style B Table

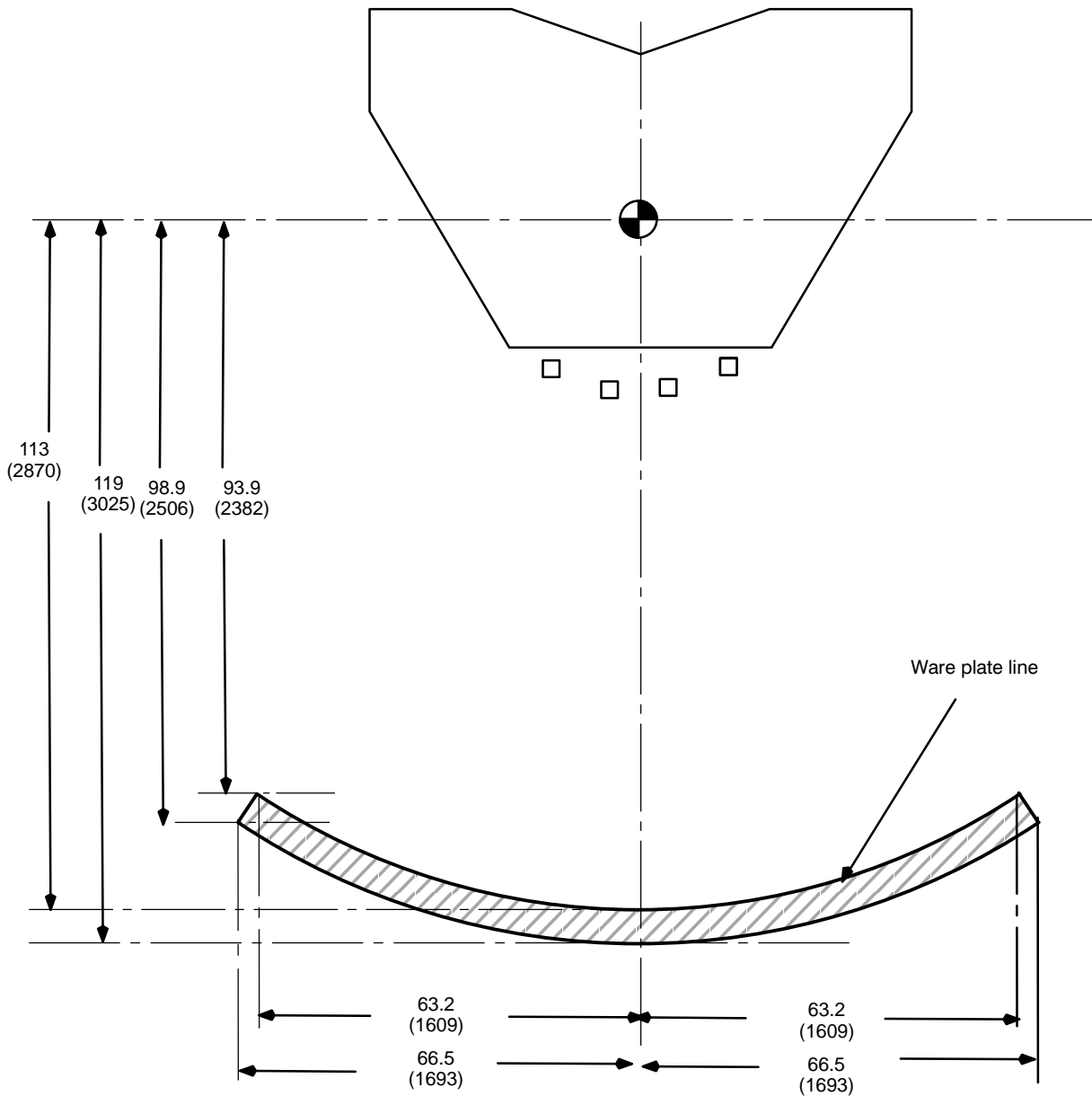
Note

Style B Table is shipped from 3Q of 2001.

2. Draw the ware plate line according to the following illustration.
Cut the floor along the line and peel the finished floor.

NOTE:
ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

•  INDICATES Magnet Isocenter



MAGNET LOAD PATTERN (2)
ILLUSTRATION 2-10

For Style A Table

Note


Style A Table is shipped before 3Q of 2001.

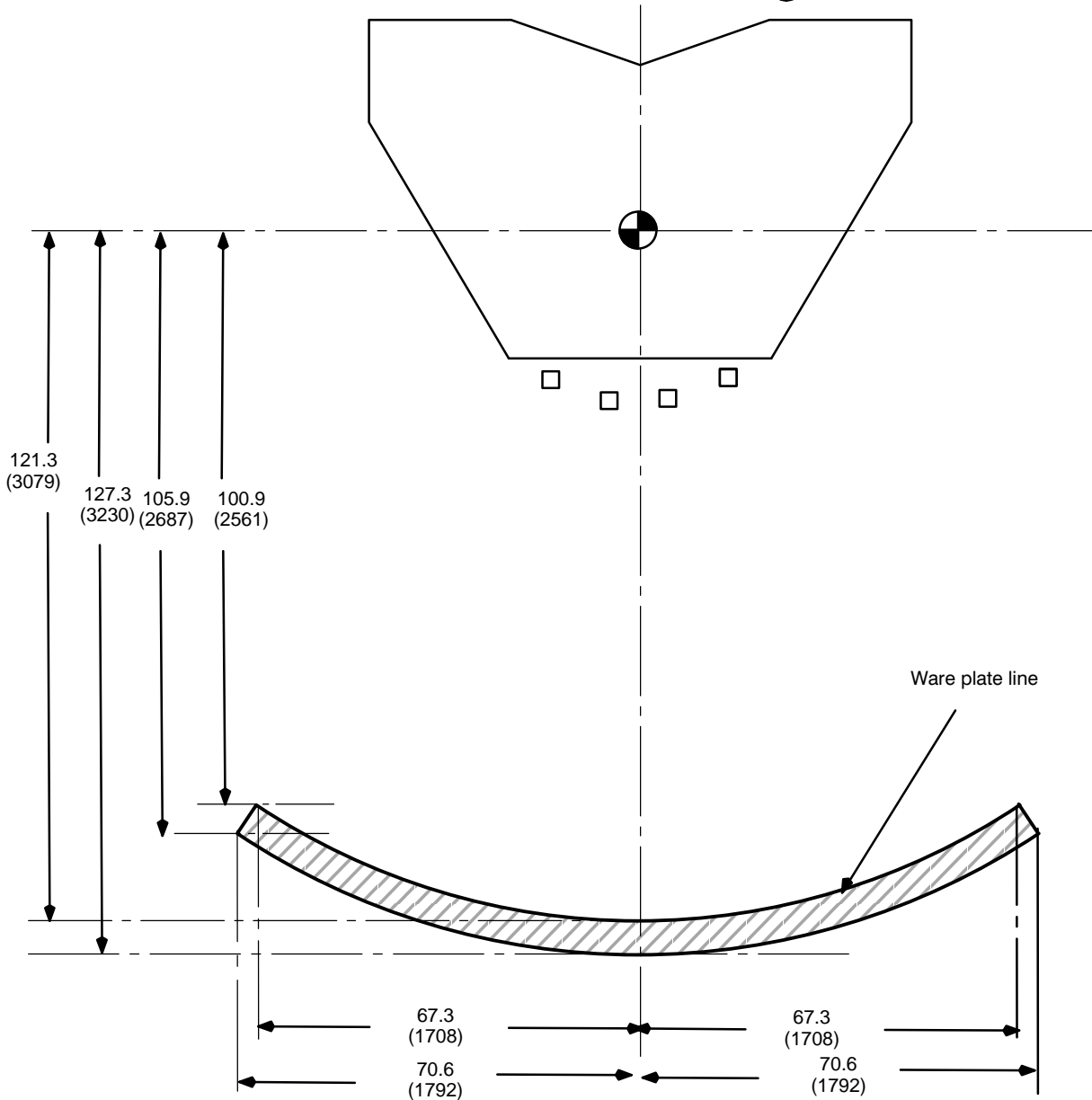


NOTE:

ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

2. Draw the ware plate line according to the following illustration.

Cut the floor along the line and peel the finished floor. •  INDICATES Magnet Isocenter



MAGNET LOAD PATTERN (2)

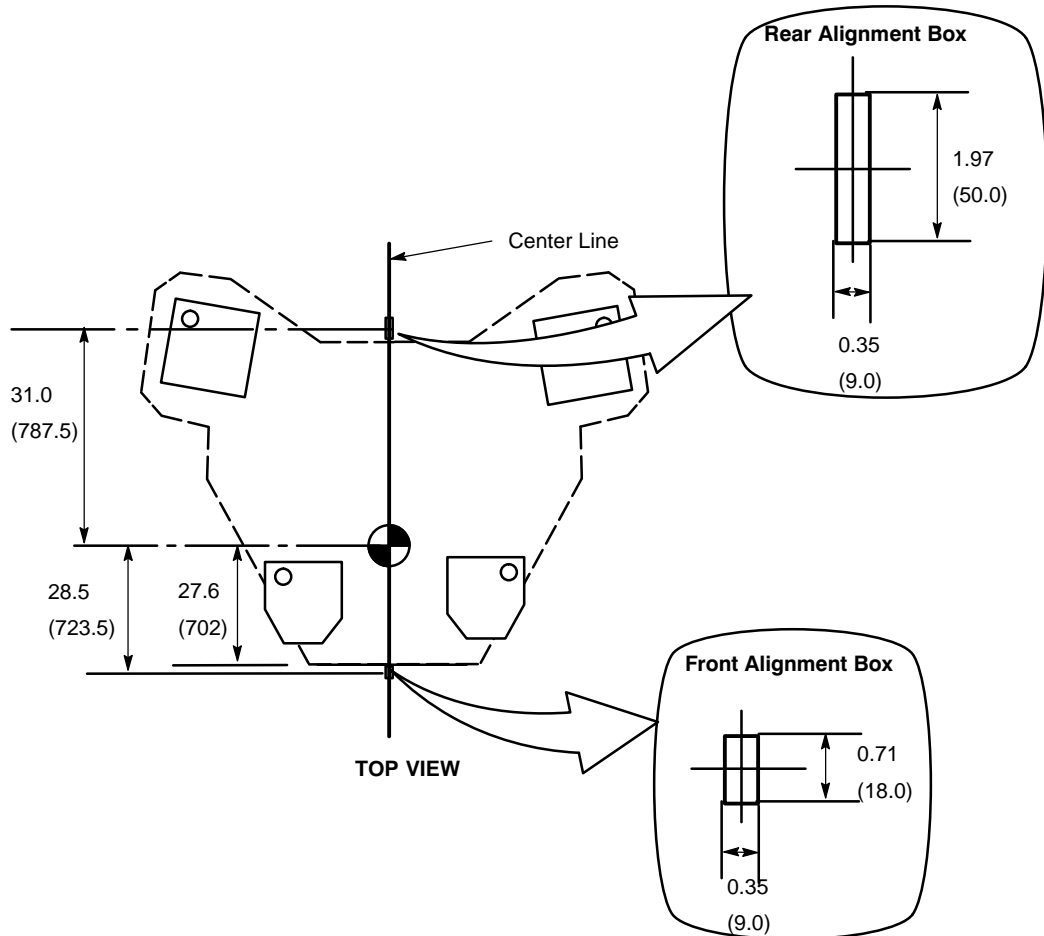
ILLUSTRATION 2-11

- 3. Draw Magnet Center line.
- 4. Draw Magnet Alignment box (Front and Rear).

NOTE:

ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

 INDICATES Magnet Isocenter



MAGNET LOAD PATTERN (3)


ILLUSTRATION 2-12

Note

It is necessary to anchor all Magnets even though Magnet is installed in non-seismic areas.

5. Draw the anchor position.

6. Make anchor hole for Magnet leg and Table rail.

•  INDICATES Magnet Isocenter

NOTE:
ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

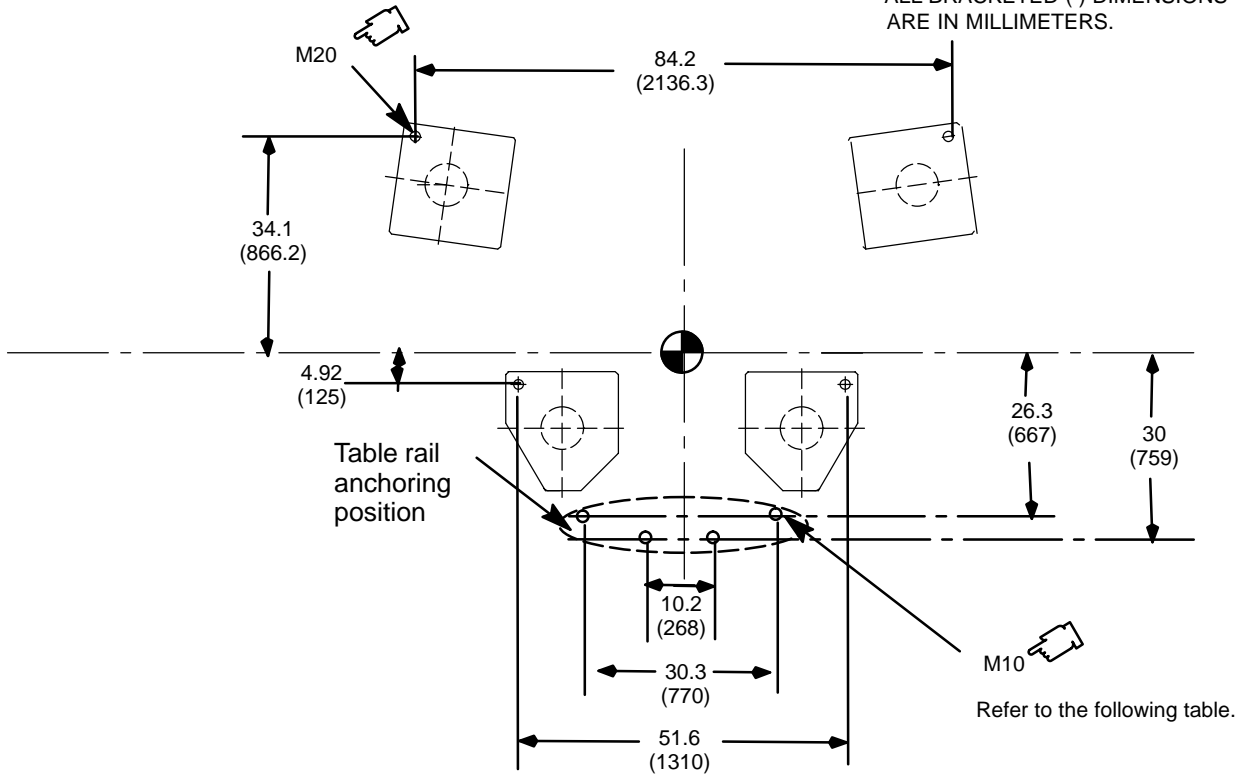



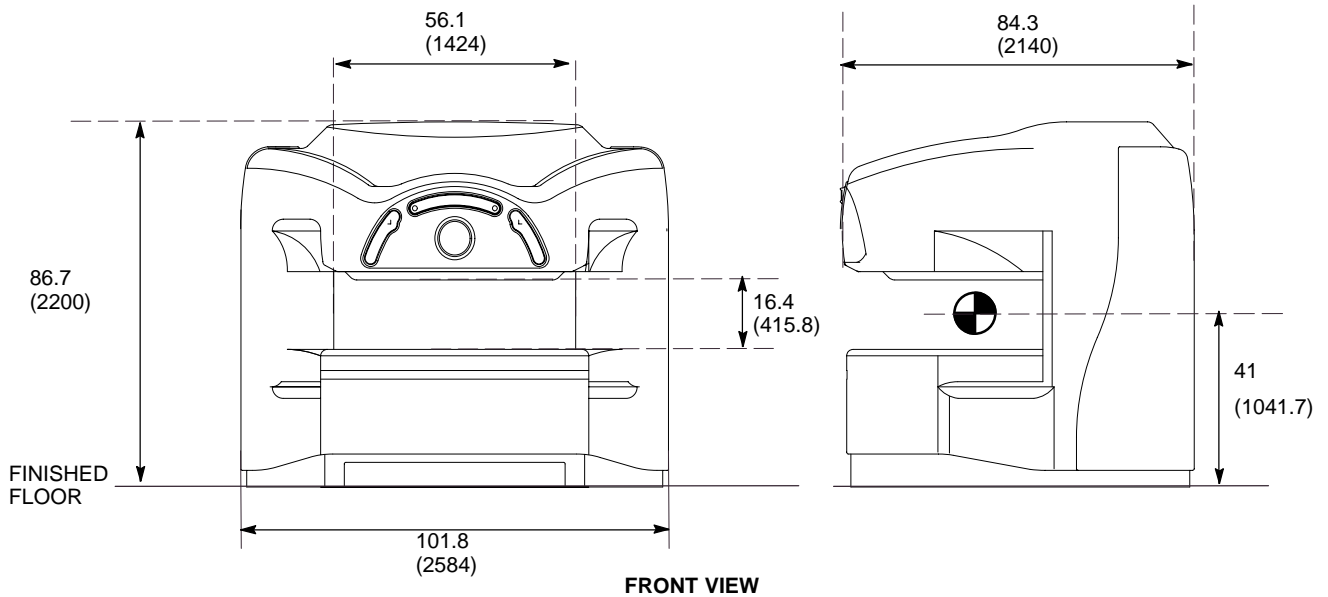
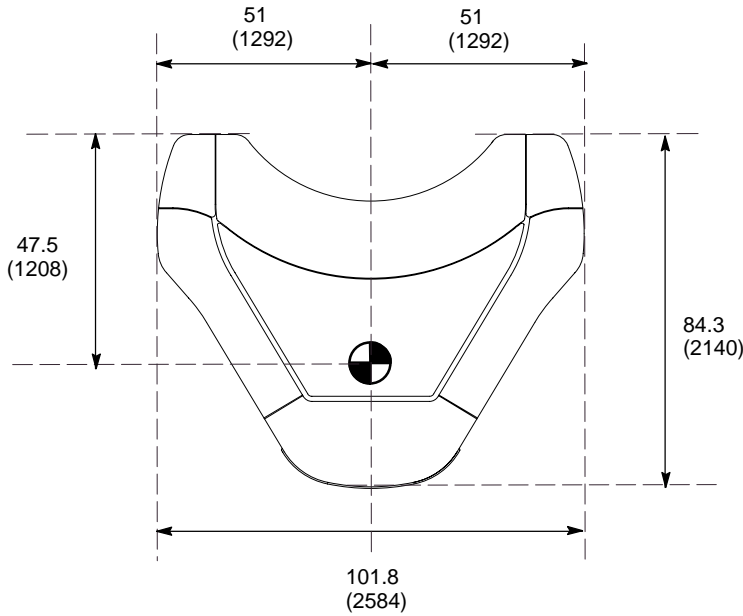
Table Rail Anchor Information

| USED FOR | QUANTITY | DROP IN ANCHOR P/N | THREAD | HOLE/BIT DIAMETER | GAUGE DEPTH SETTING | SETTING TOOL P/N |
|--------------------------|----------|--------------------|--------|---------------------|----------------------|------------------|
| BOLT TABLE RAIL TO FLOOR | 4 | 2295359 | M10 | 0.5 IN. (12.7 MM) | 1.6 IN. (41.0 MM)* | 46--252065P139 |

MAGNET LOAD PATTERN (4)
ILLUSTRATION 2-13

NOTE:
ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

 INDICATES Magnet Isocenter




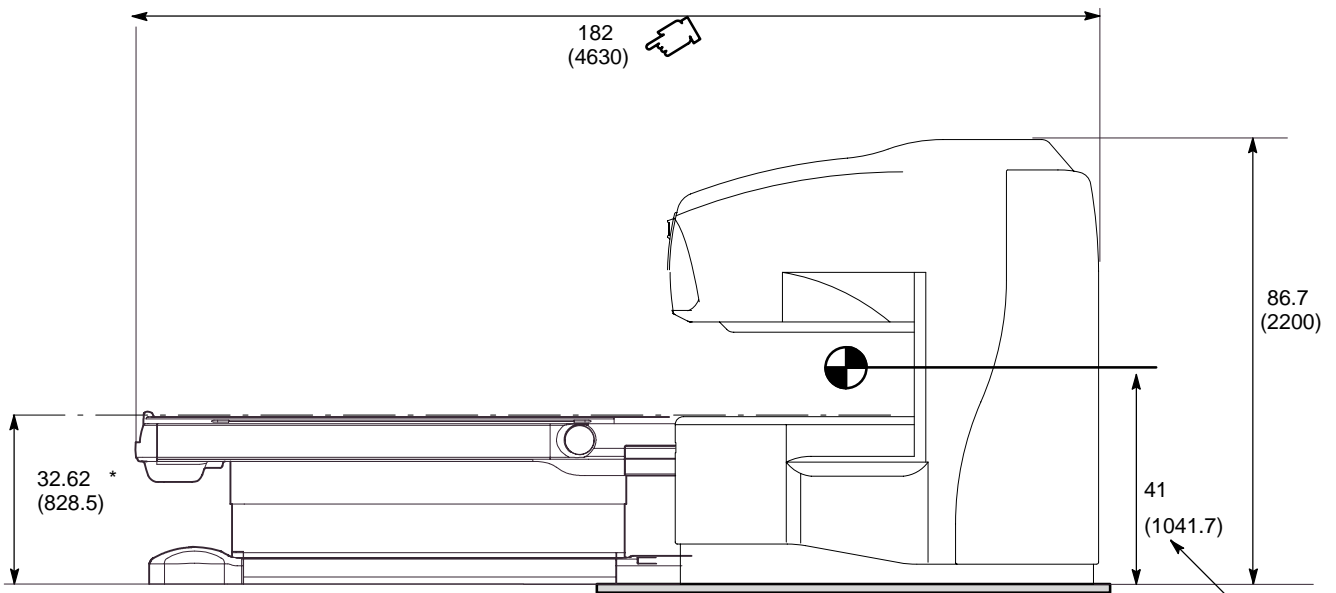
0.35T MAGNET, ENCLOSURE
ILLUSTRATION 2-14

M4530A

NOTE:

- ALL DIMENSIONS ARE IN INCHES. ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- THE CRITICAL DIMENSION OF 1041.7 MM +/- 3MM TO VERTICAL CENTER OF THE MAGNET AND PATIENT SWING TABLE REAR WHEEL PLATE MUST BE MAINTAINED. THIS WILL ALLOW THE PATIENT SWING TABLE TO SWING WITHOUT OBSTRUCTION FROM THE FLOOR. REFER TO **SECTION 7-6-2 FLOORS.**

 INDICATES Magnet Isocenter



* :
Maximum Table height: 32.62 Inch (828.5mm)
Minimum Table height: 24.0 Inch (610 mm)


See Critical Dimension Note.

SIDE VIEW

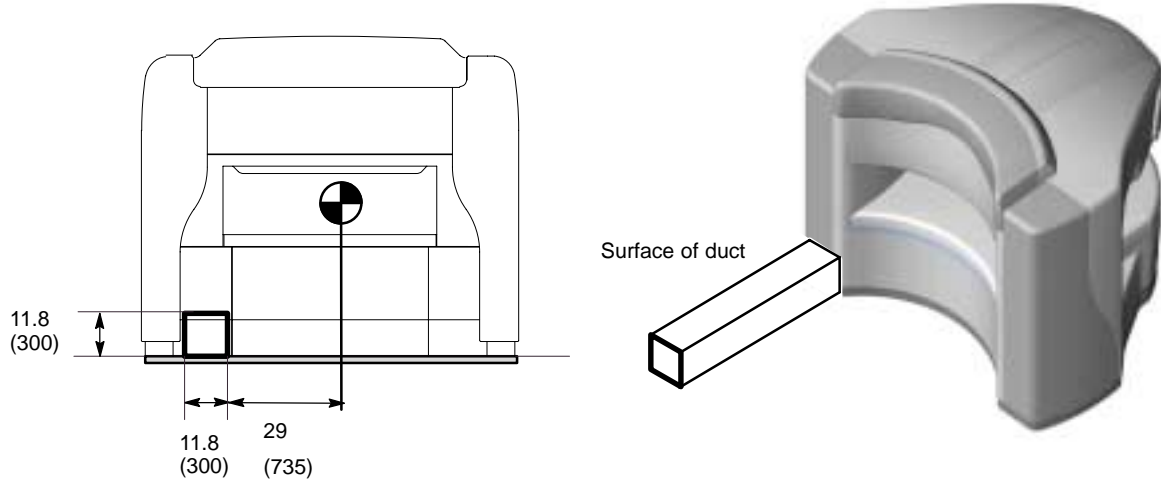
0.35T MAGNET, ENCLOSURE, & PATIENT TABLE
ILLUSTRATION 2-15

NOTE:

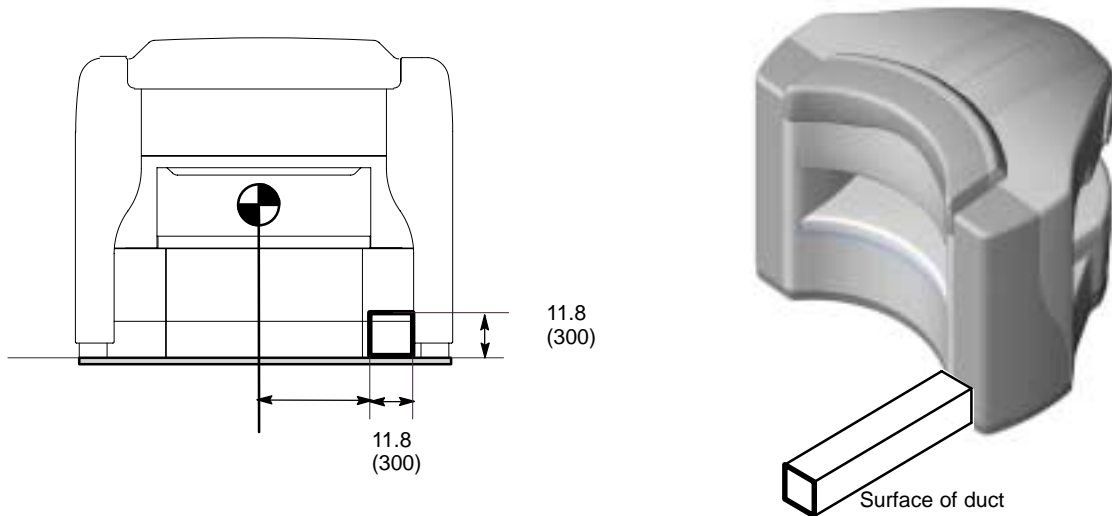
ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.

 INDICATES Magnet Isocenter

Case 1: Cable duct is installed at left side of magnet rear cover.



Case 2: Cable duct is installed at right side of magnet rear cover.

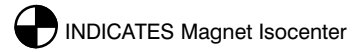


0.35T MAGNET ENCLOSURE CABLE ACCESS (DUCT)

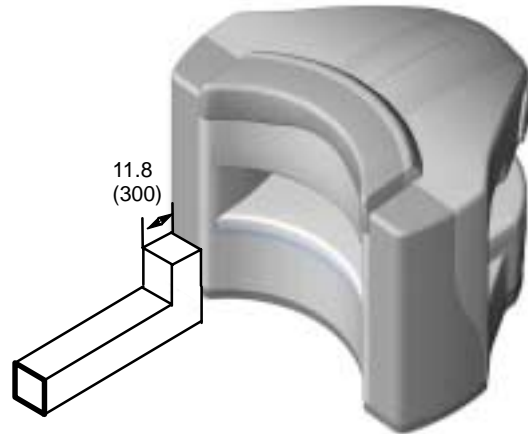
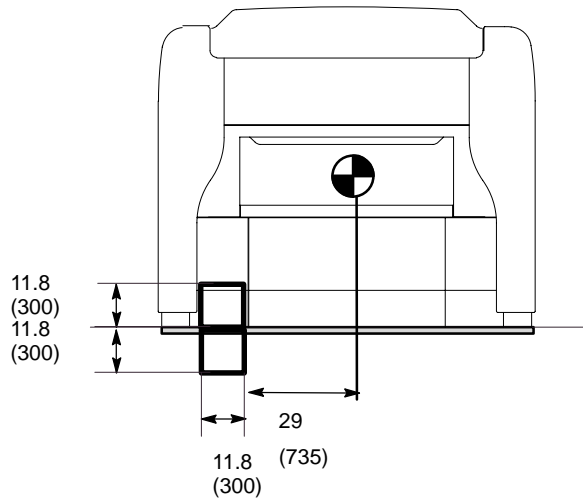
ILLUSTRATION 2-16

NOTE:

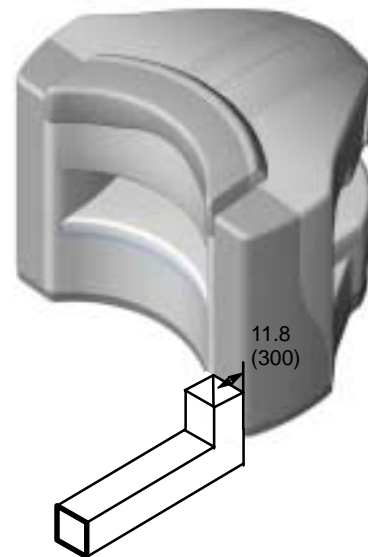
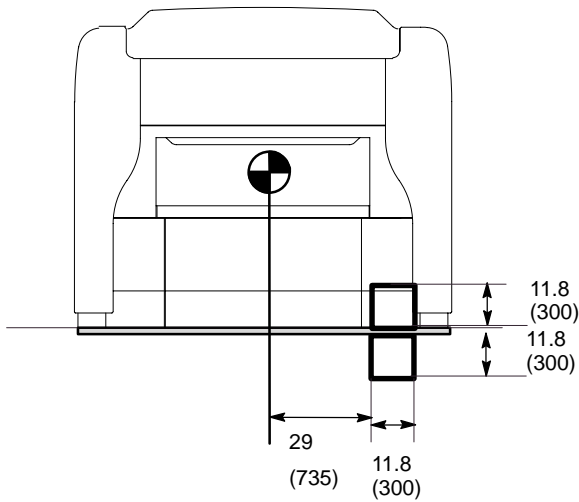
ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS
ARE IN MILLIMETERS.



Case 1: Cable pit is located at left side of magnet rear cover.

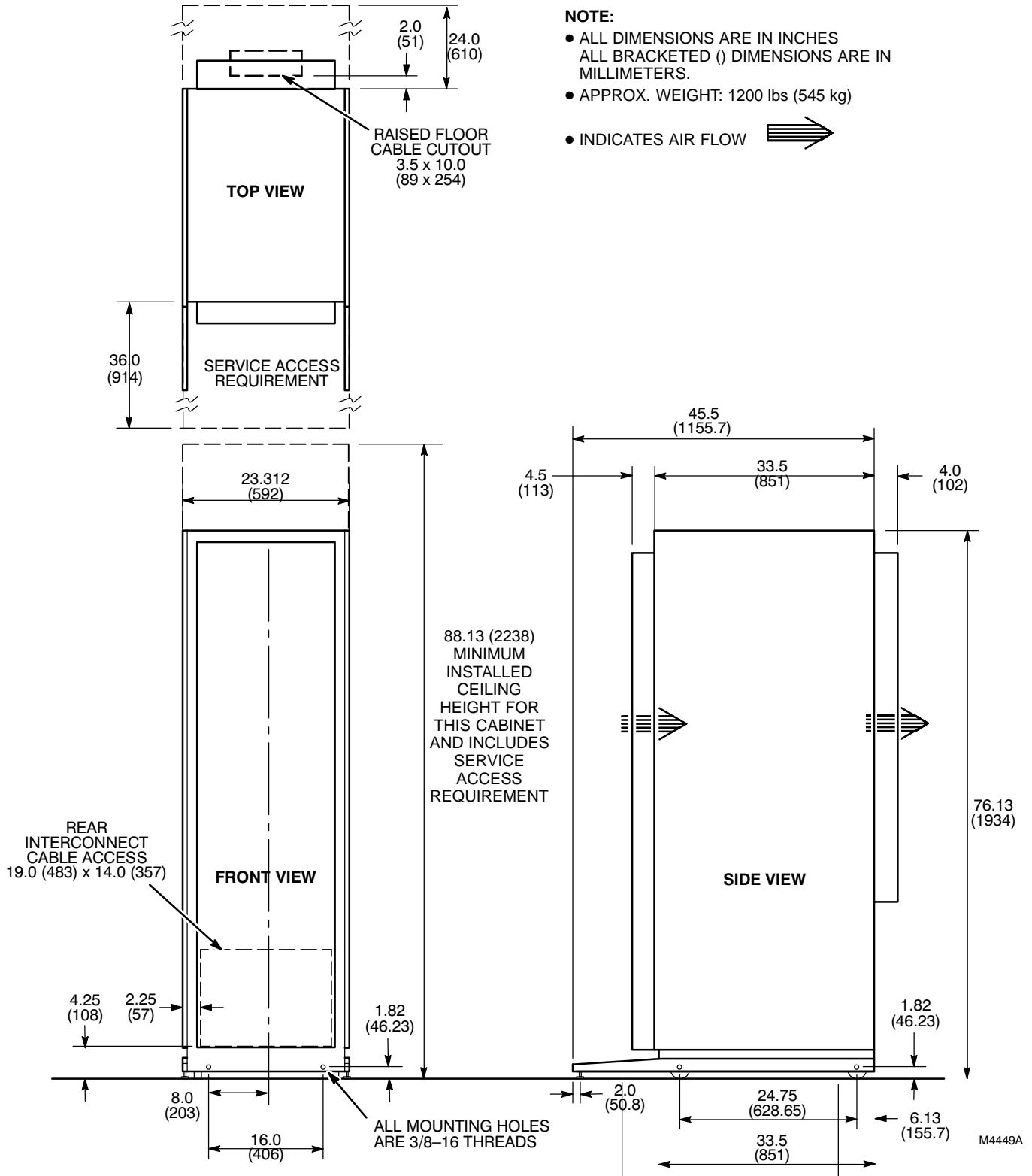


Case 2: Cable pit is located at right side of magnet rear cover.

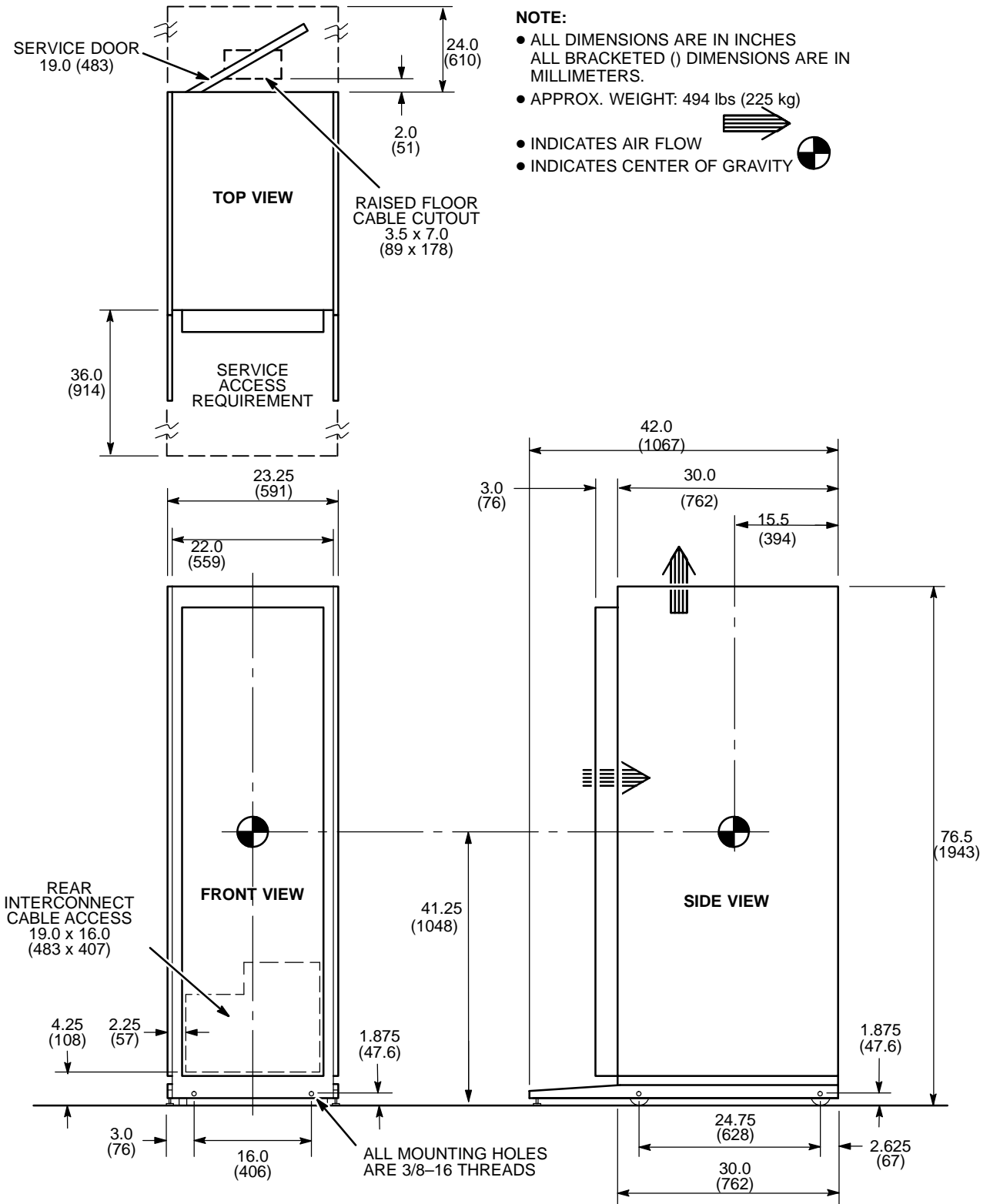


0.35T MAGNET ENCLOSURE CABLE ACCESS (PIT)

ILLUSTRATION 2-17

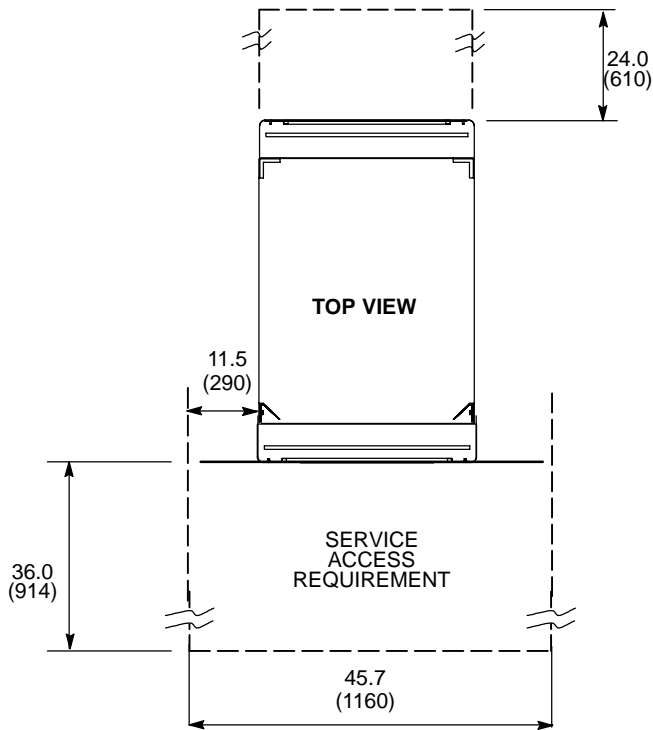


POWER CABINET (MR1)
ILLUSTRATION 2-18



SYSTEM CABINET (MR2)

ILLUSTRATION 2-19



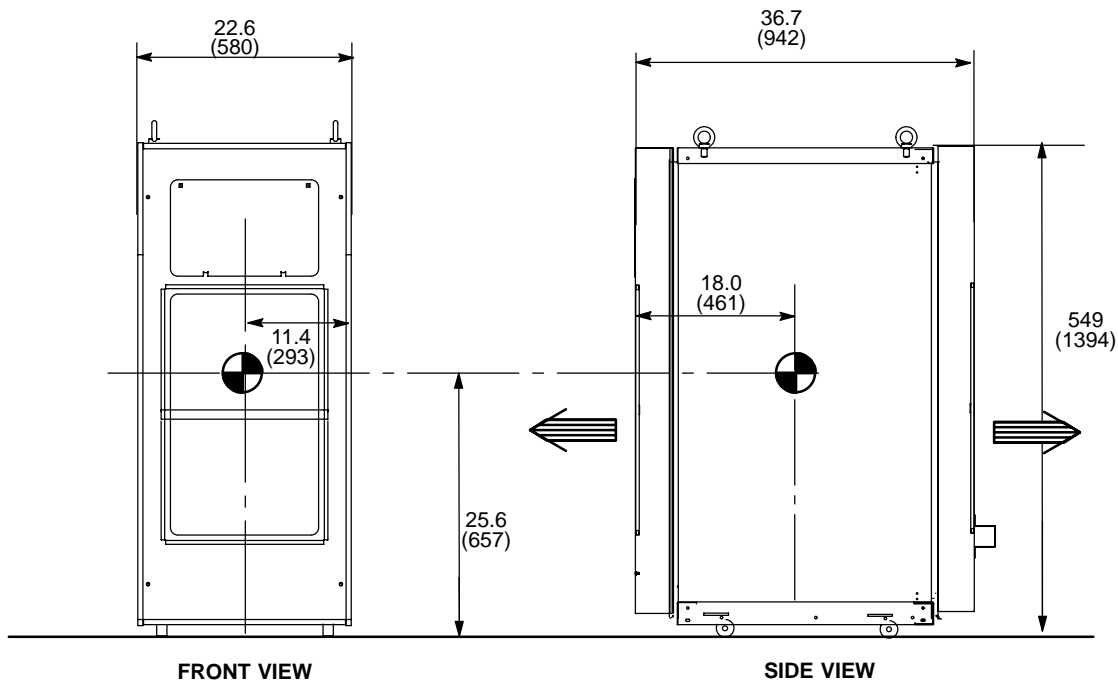
NOTE:

- ALL DIMENSIONS ARE IN INCHES
ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHT: 425 lbs (194 kg)

• INDICATES AIR FLOW



• INDICATES CENTER OF GRAVITY

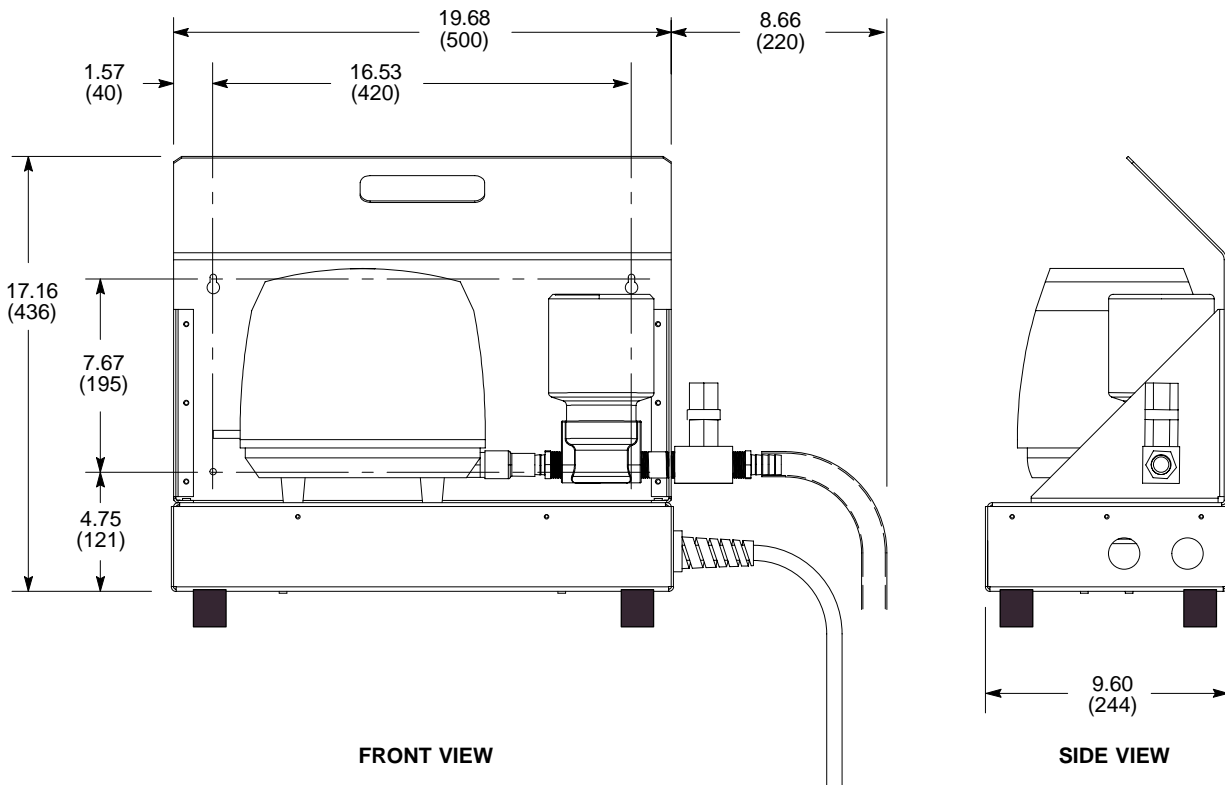


COOLING CABINET
ILLUSTRATION 2-20

This Unit is placed on the floor.
Please Consider the area of this unit.

NOTE:

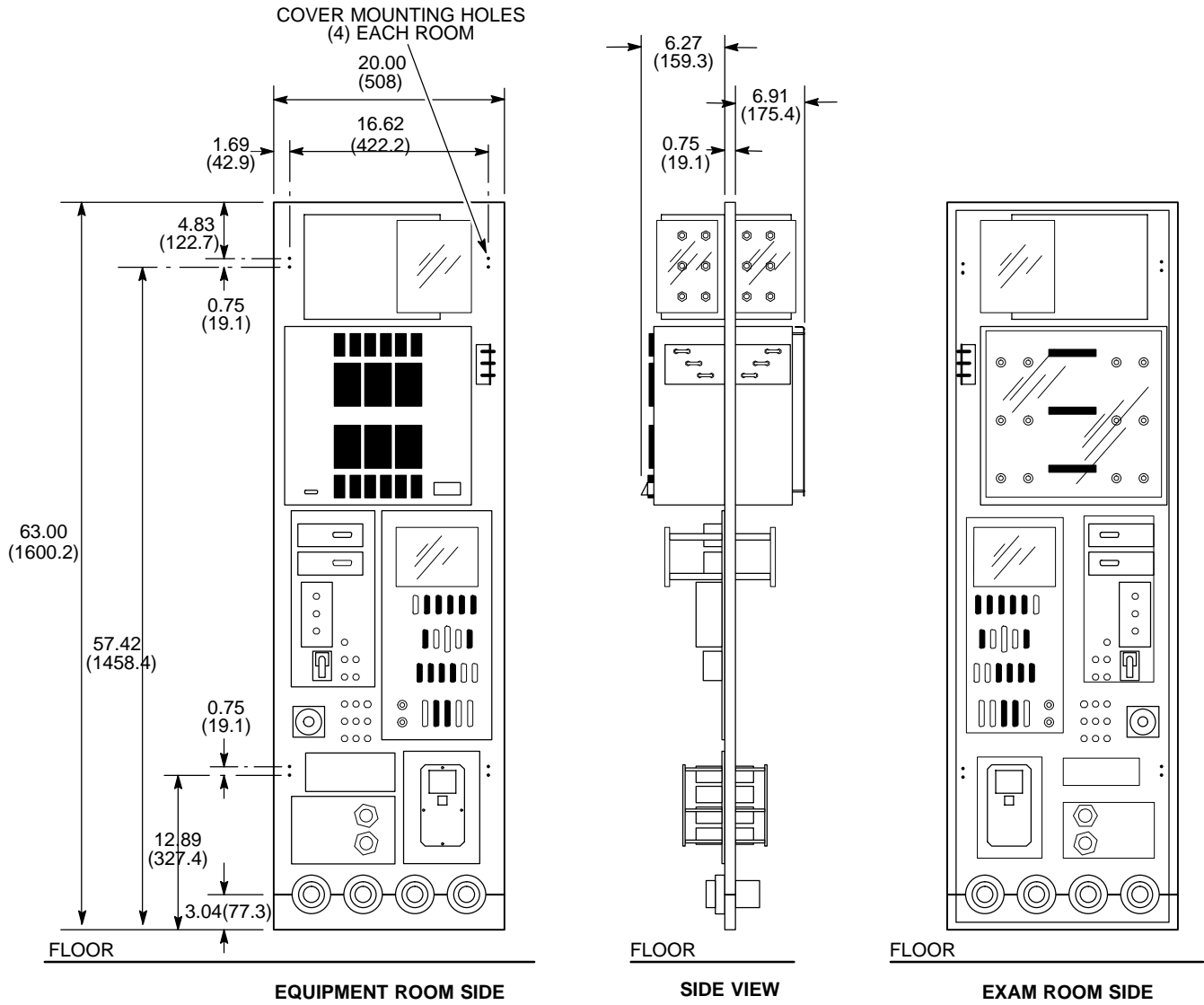
- ALL DIMENSIONS ARE IN INCHES
- ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHT: 45 lbs (20.5 kg)



PATIENT COOLING COMPRESSOR
ILLUSTRATION 2-21

NOTE:

- ALL DIMENSIONS ARE IN INCHES. ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHT: 52 lbs (23.6 kg)

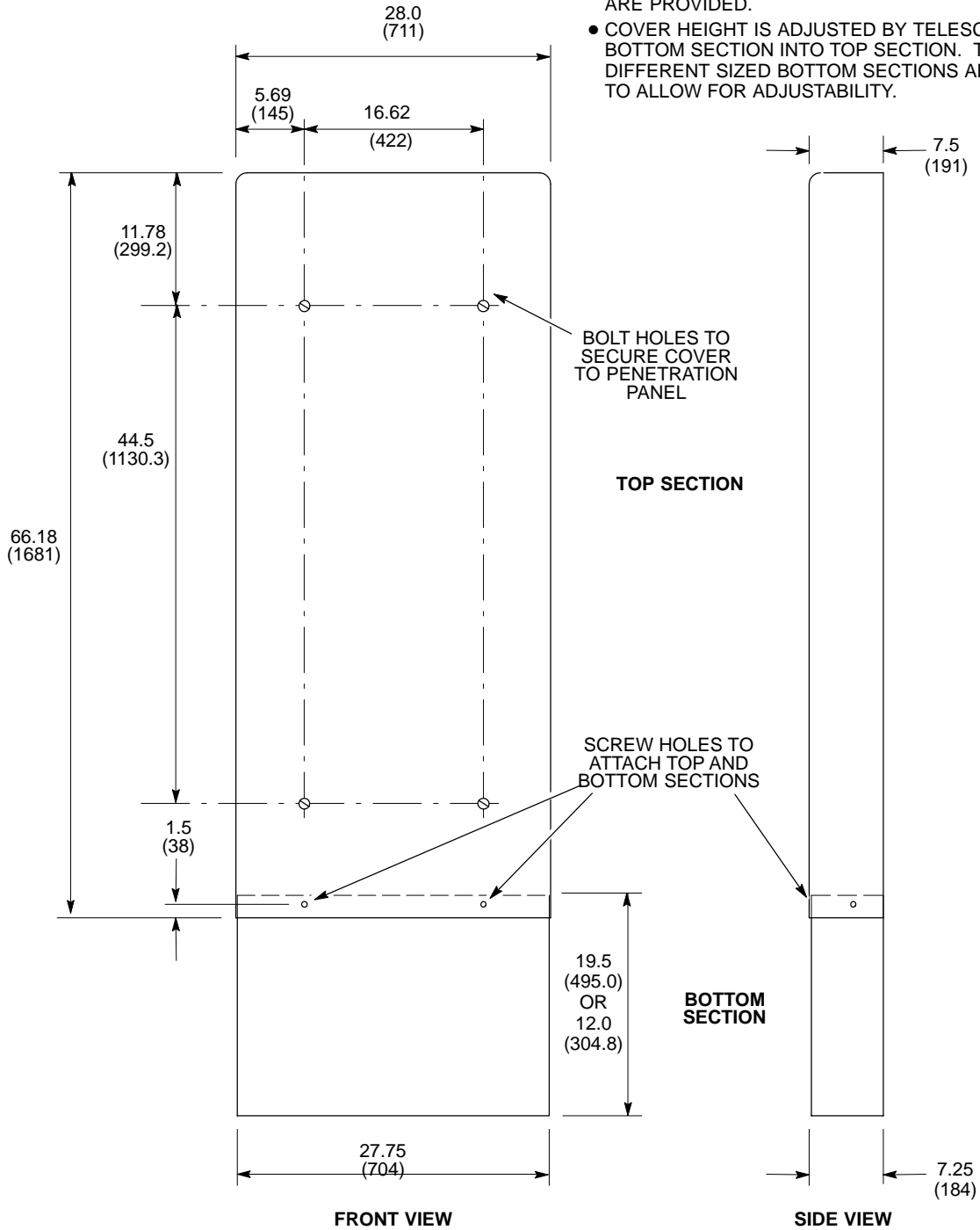


M4528A

PENETRATION PANEL (PP1)
ILLUSTRATION 2-22

NOTE:

- ALL DIMENSIONS ARE IN INCHES
ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- COVER USED ON BOTH EXAM ROOM AND EQUIPMENT ROOM SIDES OF PENETRATION PANEL. TWO COVERS ARE PROVIDED.
- COVER HEIGHT IS ADJUSTED BY TELESCOPING BOTTOM SECTION INTO TOP SECTION. TWO DIFFERENT SIZED BOTTOM SECTIONS ARE PROVIDED TO ALLOW FOR ADJUSTABILITY.

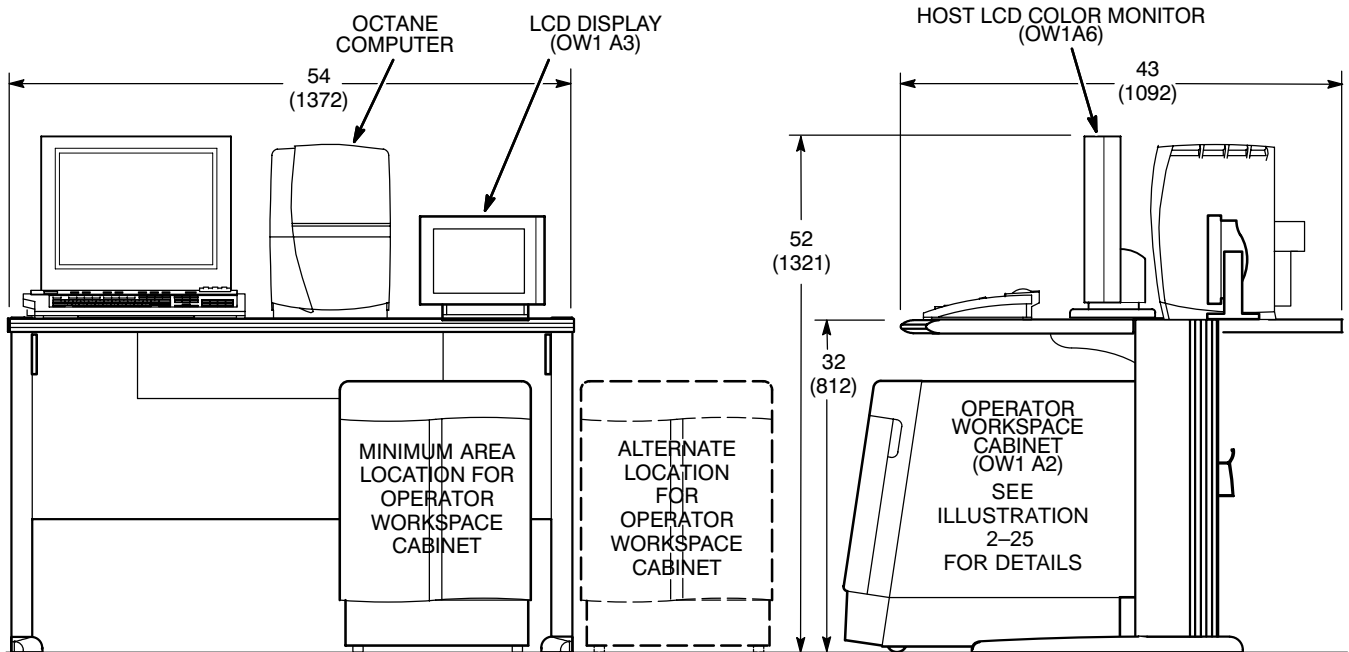
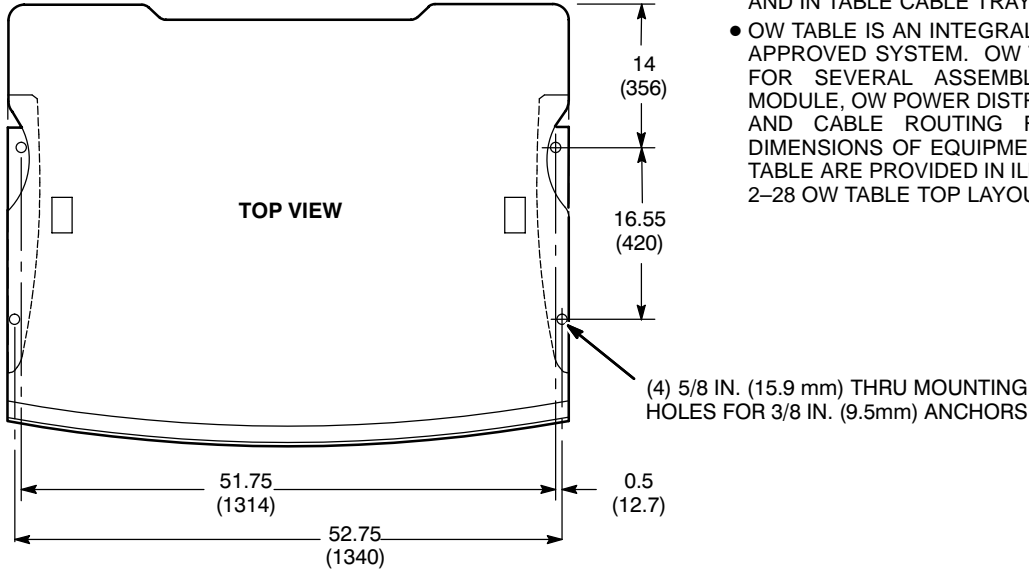


PENETRATION PANEL COVER
ILLUSTRATION 2-23

M4009A1M

NOTE:

- ALL DIMENSIONS ARE IN INCHES. ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- ASSEMBLIES WHICH MOUNT TO UNDERSIDE OF TABLE AND IN TABLE CABLE TRAY ARE NOT SHOWN.
- OW TABLE IS AN INTEGRAL PART OF THE REGULATORY APPROVED SYSTEM. OW TABLE PROVIDES MOUNTING FOR SEVERAL ASSEMBLIES (E.G. OW INTERFACE MODULE, OW POWER DISTRIBUTION BOX, MODEM, DASM) AND CABLE ROUTING FOR OW INTERCONNECTS. DIMENSIONS OF EQUIPMENT LOCATED ON TOP OF OW TABLE ARE PROVIDED IN ILLUSTRATIONS 2-26 THROUGH 2-28 OW TABLE TOP LAYOUT PLANNING PURPOSES.





FRONT VIEW

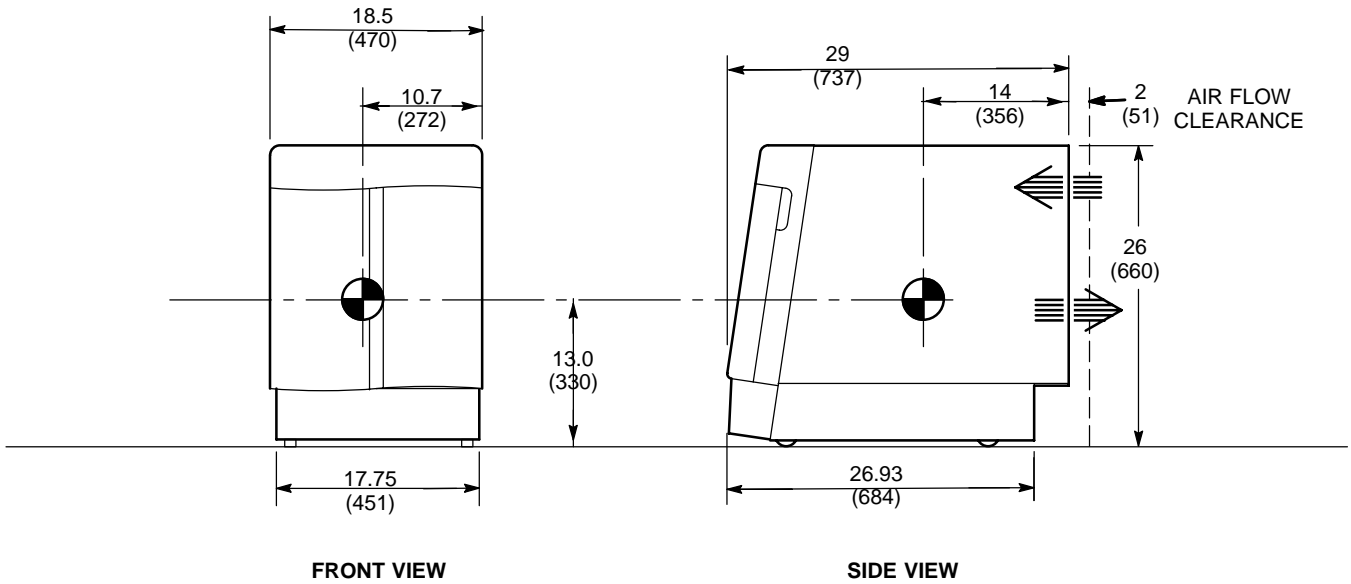
SIDE VIEW

OPERATOR WORKSPACE (OW1)
ILLUSTRATION 2-24

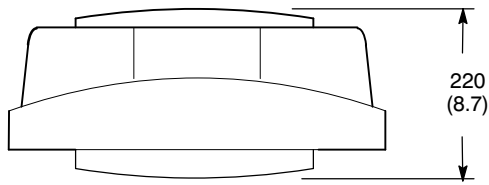
NOTE:

- ALL DIMENSIONS ARE IN INCHES
ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHT: 192 lbs (87 kg)

- INDICATES AIR FLOW 
- INDICATES CENTER OF GRAVITY 



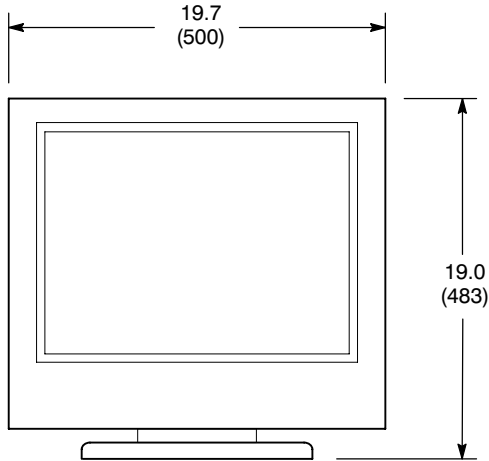
OPERATOR WORKSPACE CABINET (OW1 A2)
ILLUSTRATION 2-25



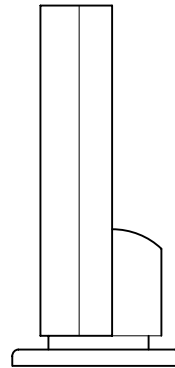
TOP VIEW

NOTE:

- ALL DIMENSIONS ARE IN INCHES
- ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.

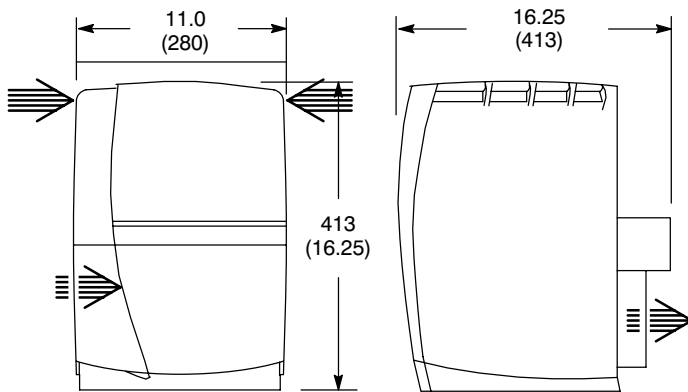


FRONT VIEW



SIDE VIEW

OPERATOR WORKSPACE COMPONENTS POSITIONED ON TABLE TOP – LCD COLOR MONITOR
ILLUSTRATION 2-26



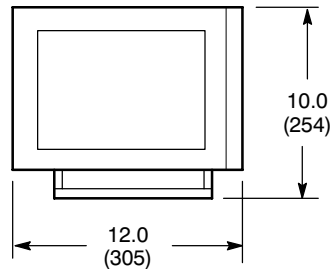
FRONT VIEW

SIDE VIEW

OCTANE COMPUTER

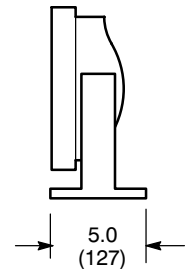
NOTE:

- ALL DIMENSIONS ARE IN INCHES
- ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- INDICATES AIR FLOW →



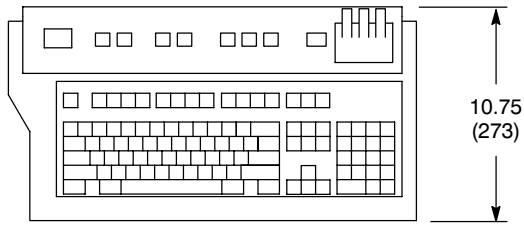
FRONT VIEW

LCD DISPLAY



SIDE VIEW

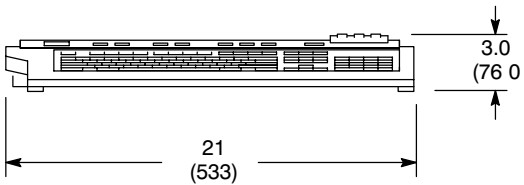
OPERATOR WORKSPACE COMPONENTS POSITIONED ON TABLE TOP – OCTANE COMPUTER
ILLUSTRATION 2-27



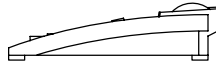
TOP VIEW

NOTE:

- ALL DIMENSIONS ARE IN INCHES
ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.

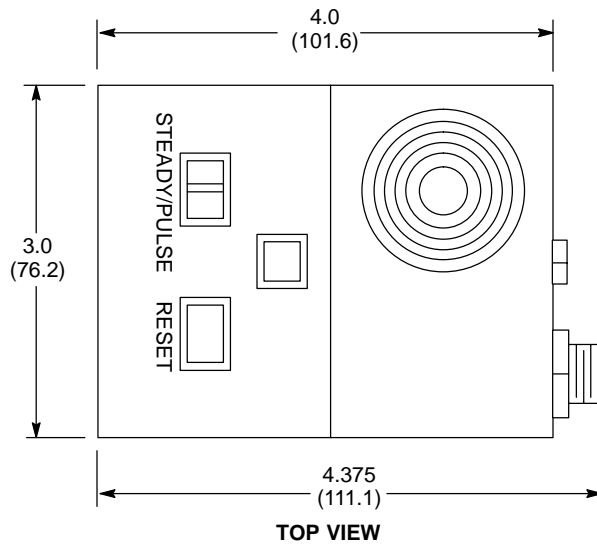


FRONT VIEW



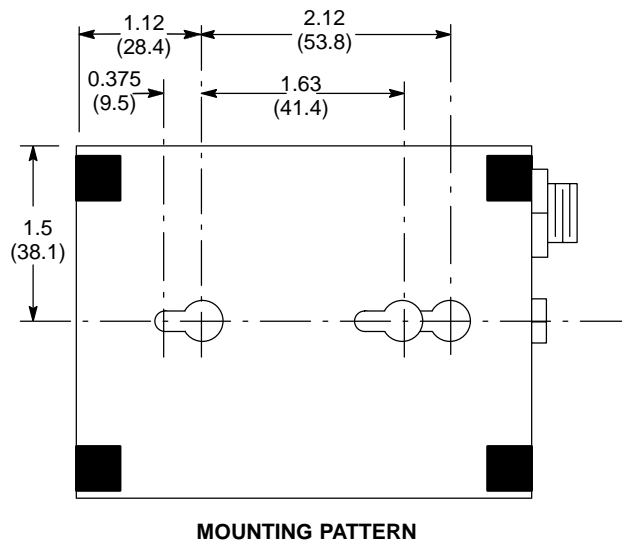
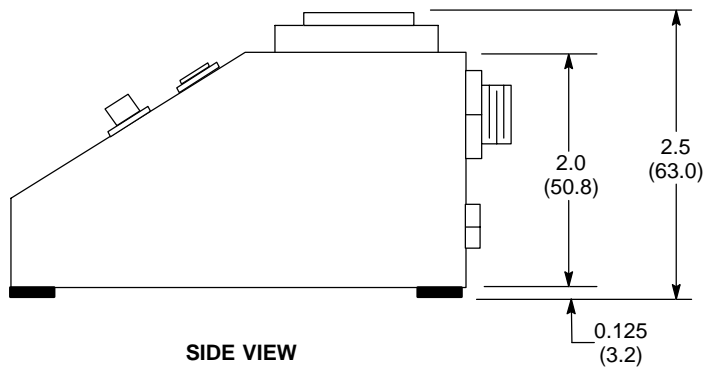
SIDE VIEW

OPERATOR WORKSPACE COMPONENTS POSITIONED ON TABLE TOP – KEYBOARD
ILLUSTRATION 2-28



NOTE:

- ALL DIMENSIONS ARE IN INCHES. ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHT: 0.5 lbs (0.2 kg)



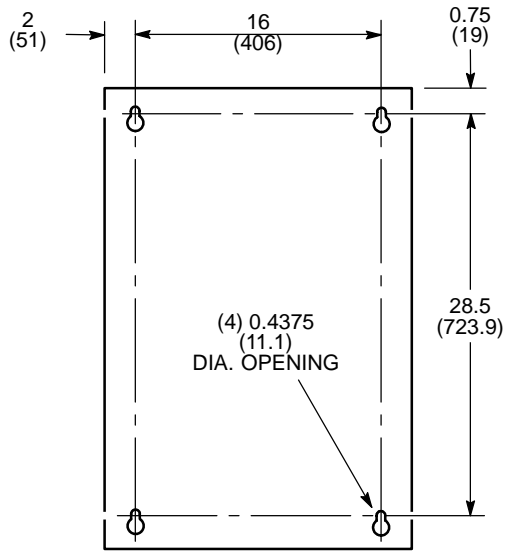
PNEUMATIC PATIENT ALERT CONTROL BOX (PA1)

ILLUSTRATION 2-29

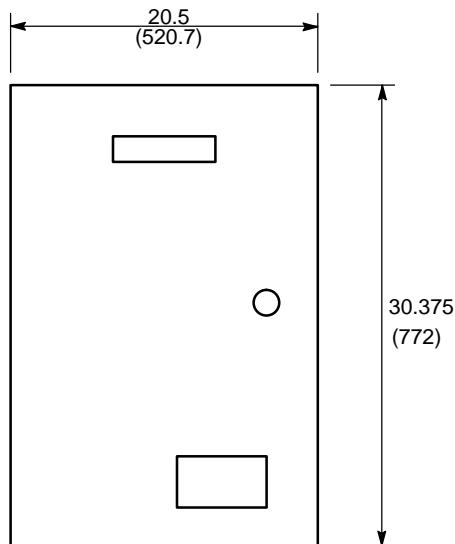
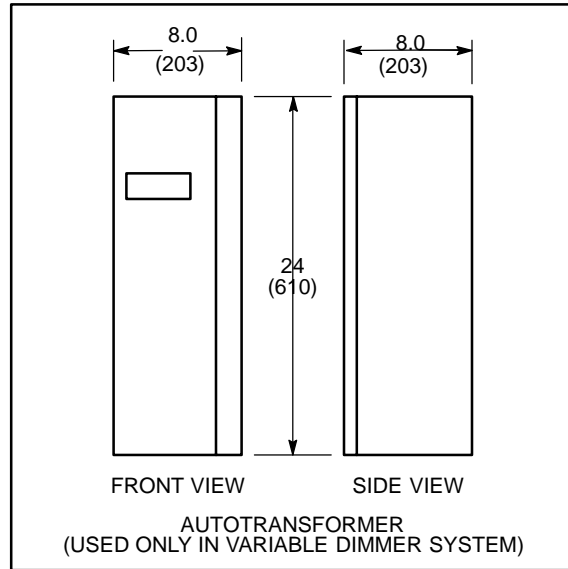
M4263A1

NOTE:

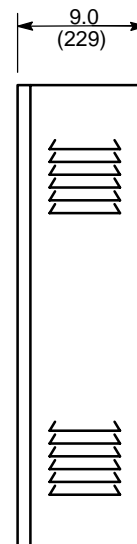
- ALL DIMENSIONS ARE IN INCHES. ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHTS:
CONTROL PANEL: 155 lbs (70 kg)
AUTOTRANSFORMER: 60 lbs (27 kg)



MOUNTING PATTERN
(CONTROL PANEL)



FRONT VIEW
(CONTROL PANEL)



SIDE VIEW
(CONTROL PANEL)

M1519A3M

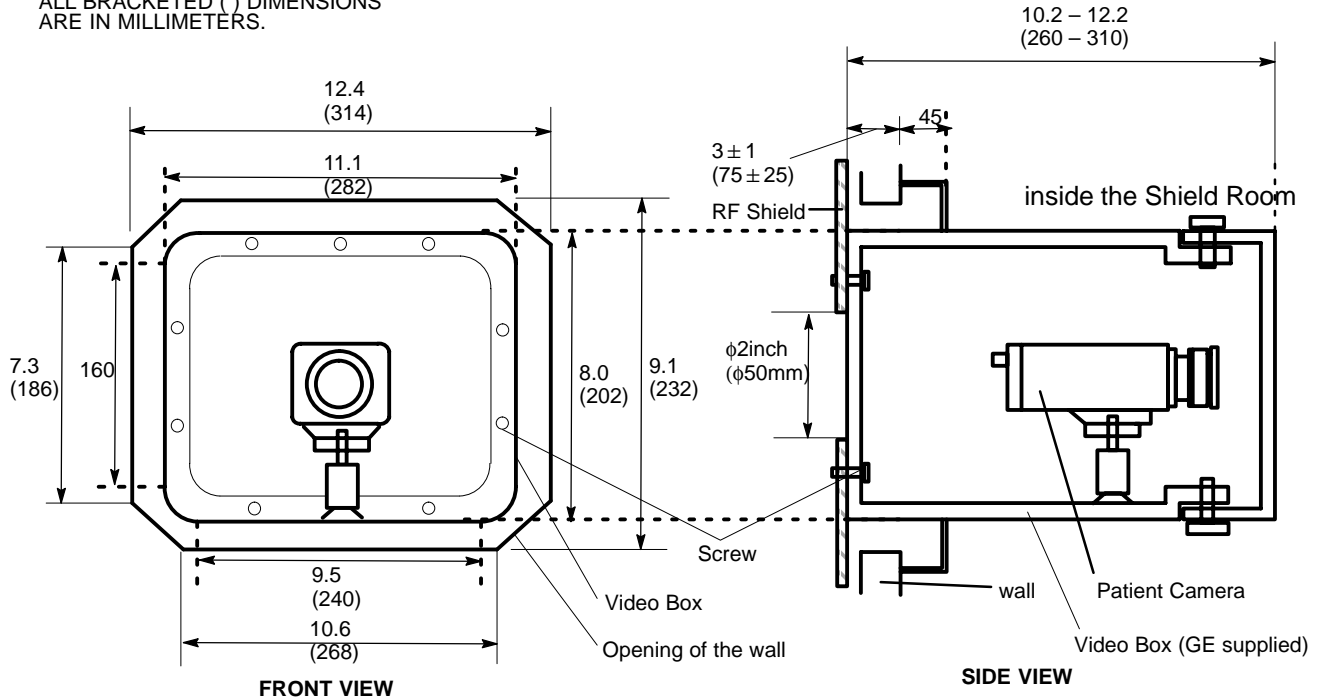
DC LIGHTING CONTROLLER – OPTIONAL

ILLUSTRATION 2-30

2-11 COMPONENT DIMENSIONS (continued)

NOTE:

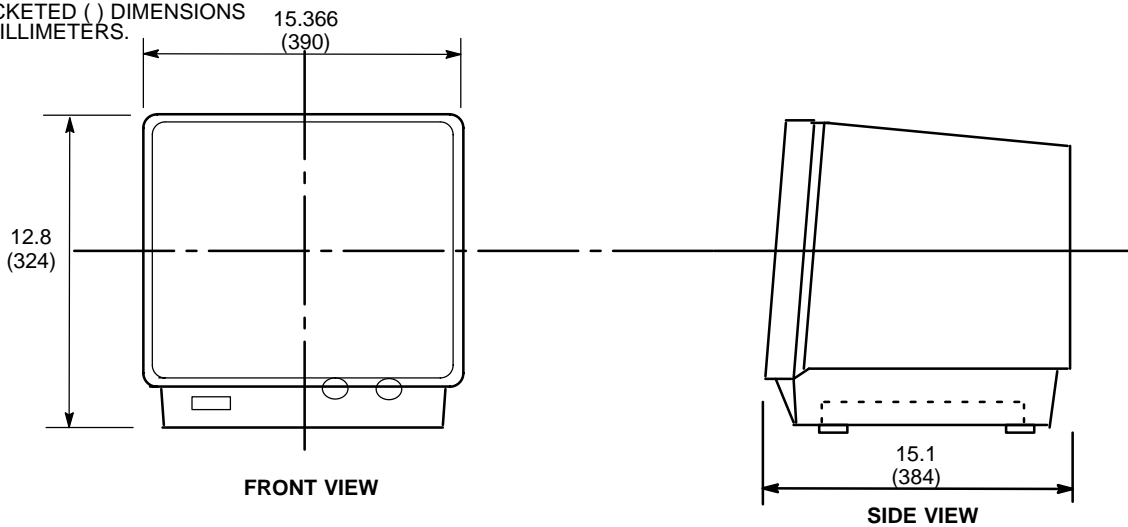
- ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.



PATIENT MONITOR CAMERA AND VIDEO BOX(OPTION)
ILLUSTRATION 2-31

NOTE:

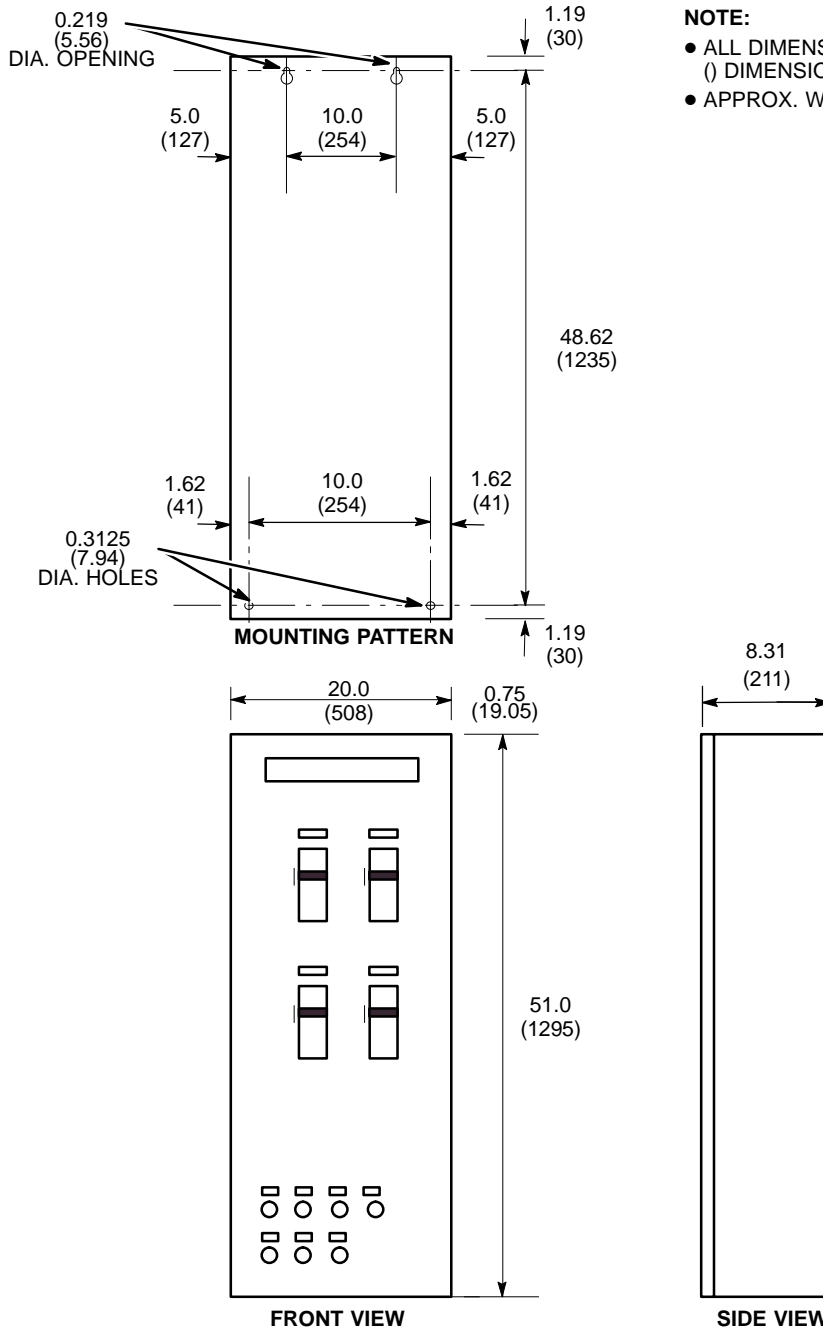
- ALL DIMENSIONS ARE IN INCHES.
ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.



PATIENT MONITOR (OPTION)
ILLUSTRATION 2-32

Note

Main Disconnect Panel (MDP) is NOT used for Low Voltage Areas(200 or 208 Vrms).



NOTE:

- ALL DIMENSIONS ARE IN INCHES ALL BRACKETED () DIMENSIONS ARE IN MILLIMETERS.
- APPROX. WEIGHT: 190 lbs. (86 kg)

MAIN DISCONNECT PANEL
ILLUSTRATION 2-33

SECTION 5 – POWER REQUIREMENTS

TABLE OF CONTENTS

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| 5-2 | CRITICAL POWER REQUIREMENTS | 5-3 |
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5-1 INTRODUCTION

The MR system includes a Power Distribution Unit (PD1) module in the lower portion of the Power Cabinet (MR1) which distributes power to MR system components. Refer to Section 5-2, CRITICAL POWER REQUIREMENTS, for specifications of required facility input to the MR System. Refer to Table 5-1 for required customer power.

Customers should carefully consider the advantages and disadvantages of raised flooring, conduits, floor ducts, and surface raceways for running cables in accordance with local codes. If used, conduits should be large enough to pass any cable and its connector through with all other cables in the conduit.

To reduce voltage regulation problems and wiring costs, minimize the cable length between the primary power source and the Power Distribution Unit. When routing cables, keep all phase conductors and ground for a circuit in the same trough. Whenever possible, keep power cables away from signal and data cables. Use separate trough or dividers in duct. Recommended minimum wires sizes for each of the Main Disconnect Panel circuits are indicated in Tables 5-5 .

5-2 CRITICAL POWER REQUIREMENTS

Note

Main Disconnect Panel (MDP) is NOT used for Japan.

The system includes a Main Disconnect Panel (MDP) with Low Voltage Low Energy local and multi-point remote control capability in the feeder lines that supply input power to the Power Distribution Unit (PD1) and Temperature Control Unit (TCU). All work is to be done in accordance with national and local electrical codes.

Refer to Section 5-3, POWER DISTRIBUTION SYSTEM, for Main Disconnect Panel set up. Main Disconnect Panel consists of the following:

- A three-pole, 600 VAC circuit breaker rated for the current of the PDU circuit. The short-circuit current interrupting rating of the breaker is 25K Amperes to accommodate available fault current.
- A two pole, 600VAC circuit breaker rated for the current of the TCU. The short circuit current interrupting rating of the breaker is 3 K Amperes to accomodate available fault current.

Main Disconnect Panel is to be located so the top of the upper circuit breaker handle when in the ON position do not exceed 78 inches (1981 mm) from the floor and visible to Power Distribution Unit (PD1) and the service personnel.

Refer to Table 5-3 for the requirements for facility inputs to the MDP PDU circuit and Table 5-3 for the requirements for facility essential power to the MDP TCU.

5-2 CRITICAL POWER REQUIREMENTS (Continued)

TABLE 5-1
REQUIRED CUSTOMER POWER (Japan Only)

| MR COMPONENT | VOLTAGE (VAC) | FREQUENCY | PHASE | MAX. AMPS | COMMENTS |
|---|--|--------------|--|-----------------------------|--|
| Facility Power for Power Distribution Unit (PD1) power circuit (See Note 1) See Illustration 5-1 | 200 | 50/60 ± 3 Hz | 3 phase conductors (L1, L2, L3 +G) See Comments | See Note 2 See Table 5-3 | Recommend input configuration: 3 phase Grounded WYE with Neutral and Ground (5 wire system). Note, Neutral must be terminated prior to or inside the Main Disconnect Panel and not brought to the Power Cabinet. Optional input configuration: 3 phase DELTA with Ground (4 wire) input, recommend corner Grounded Delta configuration. |
| | 380, 400, 415, 480 | | | | |
| Service Receptacle in Magnet Room | 110-120 local voltage and portable transformers for voltages values | 50/60 Hz | 1 | 2.0 | Receptacle required for small power tools |
| Note | | | | | |
| <ol style="list-style-type: none"> 1 PDU Module is located in the lower portion of the Power Cabinet (MR1). 2 Maximum amps dependent on voltage selected. Refer to Section 5-2, CRITICAL POWER REQUIREMENTS, Tables 5-3 and Table 5-4 for configuration and allowable input voltages/current demand. 3 TCU power are required immediately upon magnet arrival. If permanent site power is not ready, temporary power drop line must be made available. If site voltage is not any of the voltages listed above, customer must provide transformer and secondary circuit breaker to provide correct voltage and/or configuration. | | | | | |

5-2 CRITICAL POWER REQUIREMENTS (Continued)

TABLE 5-2
REQUIRED CUSTOMER POWER (Onside of Japan)

| MR COMPONENT | | VOLTAGE (VAC) | FREQUENCY | PHASE | MAX. AMPS | COMMENTS |
|---|--|--|----------------------------------|--|-----------------------------|--|
| Main Disconnect Panel (MDP) | Facility Power for Power Distribution Unit (PD1) power circuit See Illustration 5-1 | 380, 400, 415, 480 (See Note below this table for 200/208 VAC) ㉔ | 50/60 ± 3 Hz 50/60 ± 3 Hz | 3 phase conductors (L1, L2, L3 +G) See Comments | See Note 2 See Table 5-3 | Recommend input configuration: 3 phase Grounded WYE with Neutral and Ground (5 wire system). Note, Neutral must be terminated prior to or inside the Main Disconnect Panel and not brought to the Power Cabinet. Optional input configuration: 3 phase DELTA with Ground (4 wire) input, recommend corner Grounded Delta configuration. |
| | Essential Power for Temperature Control Unit (TCU) power circuit See Illustration 5-1 | 460, 480 380, 400, 415 | 60 Hz 50 Hz | 1+GND | See Note 2 See Table 5-4 | Facility Essential Power (24 hours/day, 7 days per week) is required for the TCU. Also see Note 2. Hard wired at MDP TCU mounts on Penetration Panel (PP1). |
| Service Receptacle in Magnet Room | | 110-120 local voltage and portable transformers for voltages values | 50/60 Hz | 1 | 2.0 | Receptacle required for small power tools |
| Note | | | | | | |
| <ol style="list-style-type: none"> 1 PDU Module is located in the lower portion of the Power Cabinet (MR1). 2 Maximum amps dependent on voltage selected. Refer to Section 5-2, CRITICAL POWER REQUIREMENTS, Tables 5-3 and 5-4 for configuration and allowable input voltages/current demand. 3 TCU power are required immediately upon magnet arrival. If permanent site power is not ready, temporary power drop line must be made available. If site voltage is not any of the voltages listed above, customer must provide transformer and secondary circuit breaker to provide correct voltage and/or configuration. | | | | | | |

Note

If the site has 200 or 208 incoming power, a step up 75KVA (480Y277) transformer is required. The transformer can be purchased from GE Industrial Systems. Also if using a step up transformer and the MDP is placed further then 10 feet from the transformer, an addition breaker must be installed between the secondary 480 volt output and the MDP. This is a code requirement.

5-2 CRITICAL POWER REQUIREMENTS (Continued)

TABLE 5-3
MDP PDU CIRCUIT FACILITY INPUT POWER REQUIREMENTS
 (Refer to Table 5-3 for MDP TCU Circuit Requirements and Illustration 5-1 for configuration)

| PARAMETER | REQUIREMENTS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------------------------|--------------------------|----------------|--|--|--|--------------|-----|---------|-----|----|---------|-----|---------|-----|----|---------|-----|---------|----|----|---------|-----|---------|----|----|---------|-----|---------|----|----|---------|-----|---------|----|----|---------|
| CONFIGURATION | PDU MODULE LOCATION IN LOWER PORTION OF POWER CABINET: <ul style="list-style-type: none"> ● Recommend input configuration 3 phase Grounded WYE with Neutral and Ground (5 wire system). Note, Neutral must be terminated prior to or inside the Main Disconnect Panel and not brought to the Power Cabinet. ● Optional input configuration 3 phase DELTA with Ground (4 wire) input, recommend corner Grounded Delta configuration. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| INPUT VOLTAGE | <ul style="list-style-type: none"> ● 380, 400, 415, or 480 Vrms for PDU circuit of High Voltage MDP ● 200 or 208 Vrms for PDU (PD1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FREQUENCY | 50 ± 3 Hz or 60 ± 3 Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALLOWABLE INPUT VOLTAGES/CURRENT DEMAND See Note 1 | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">NOMINAL VOLTAGE (Vrms)</th> <th rowspan="2">NORMAL RANGE ±10 PERCENT</th> <th colspan="2">CURRENT (AMPS)</th> <th rowspan="2">RECOMMENDED MINIMUM STANDARD OVERCURRENT PROTECTION FOR ROOM FEED DISCONNECT</th> </tr> <tr> <th>A MAXIMUM MOMENTARY</th> <th>B CONTINUOUS</th> </tr> </thead> <tbody> <tr> <td>200</td> <td>180-220</td> <td>112</td> <td>64</td> <td>90 Amps</td> </tr> <tr> <td>208</td> <td>187-229</td> <td>108</td> <td>62</td> <td>80 Amps</td> </tr> <tr> <td>380</td> <td>342-418</td> <td>59</td> <td>34</td> <td>50 Amps</td> </tr> <tr> <td>400</td> <td>360-440</td> <td>56</td> <td>32</td> <td>50 Amps</td> </tr> <tr> <td>415</td> <td>374-456</td> <td>54</td> <td>31</td> <td>40 Amps</td> </tr> <tr> <td>480</td> <td>432-528</td> <td>47</td> <td>27</td> <td>40 Amps</td> </tr> </tbody> </table> <p>NOTE: A Calculated at 35 KVA system Peak Instantaneous Power Demand & minimum voltage. B Calculated at 20 KVA system Continuous Power Demand & minimum voltage. C Overcurrent protection sized for 125% continuous current per National Electrical Code NEC 1999 Article 210-20 or NEC 1996 Article 220-3.</p> | NOMINAL VOLTAGE (Vrms) | NORMAL RANGE ±10 PERCENT | CURRENT (AMPS) | | RECOMMENDED MINIMUM STANDARD OVERCURRENT PROTECTION FOR ROOM FEED DISCONNECT | A MAXIMUM MOMENTARY | B CONTINUOUS | 200 | 180-220 | 112 | 64 | 90 Amps | 208 | 187-229 | 108 | 62 | 80 Amps | 380 | 342-418 | 59 | 34 | 50 Amps | 400 | 360-440 | 56 | 32 | 50 Amps | 415 | 374-456 | 54 | 31 | 40 Amps | 480 | 432-528 | 47 | 27 | 40 Amps |
| NOMINAL VOLTAGE (Vrms) | NORMAL RANGE ±10 PERCENT | | | CURRENT (AMPS) | | | RECOMMENDED MINIMUM STANDARD OVERCURRENT PROTECTION FOR ROOM FEED DISCONNECT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | A MAXIMUM MOMENTARY | B CONTINUOUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 180-220 | 112 | 64 | 90 Amps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 208 | 187-229 | 108 | 62 | 80 Amps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 380 | 342-418 | 59 | 34 | 50 Amps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 360-440 | 56 | 32 | 50 Amps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 415 | 374-456 | 54 | 31 | 40 Amps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 480 | 432-528 | 47 | 27 | 40 Amps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PEAK INSTANTANEOUS POWER DEMAND <5 SECONDS | 35 KVA (See Notes 1 and 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CONTINUOUS SUSTAINED POWER (> 5 seconds) | 20 KVA (See Note 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AVERAGE POWER DEMAND (Based On Typical 30 Minutes Per Hour Patient Scan Time) | 16 KVA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SYSTEM IDLE QUIESCENT | 9 KVA at 0.9 lagging Power Factor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TRANSIENTS | Maximum transient voltage above nominal waveshape not to exceed 200 V for the nominal voltages 380, 400, 415, or 480 Vrms. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PHASE IMBALANCE | Difference between the highest phase line-to-line voltage and the lowest phase line-to-line voltage must not exceed 2%. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LOAD REGULATION AT LINE FREQUENCY | Wires to be sized such that the line voltage drop from power source to PDU is less than 2% of the nominal voltage for rated load of system. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUNDING | <ul style="list-style-type: none"> ● Main facility ground wire to be minimum 1/0 AWG copper or same size as power feeder wire, which ever is larger. ● Main facility ground wire to be insulated. ● Ground impedance to earth at power source to be 2 ohms or less. ● Main facility ground wire to be bonded at every distribution box in an approved grounding block. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Note 1 Breaker feeding system to be sized for Continuous Sustained Power. 2 Feeders must be sized for Peak Instantaneous Power Demand.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

5-2 CRITICAL POWER REQUIREMENTS (Continued)

TABLE 5-4
MDP TCU CIRCUIT FACILITY ESSENTIAL POWER REQUIREMENTS
 (Refer to Table 5-3 for MDP PDU Circuit Requirements & Illustration 5-1 for configuration)

| PARAMETER | REQUIREMENTS | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|---|---|---|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|
| CONFIGURATION | TCU MODULE LOCATION ON PENETRATION PANEL(PP1): <ul style="list-style-type: none"> ● Recommend input configuration 1 phase and Ground (3 wire system). Note, Neutral must be terminated prior to or inside the Main Disconnect Panel and not brought to the Power Cabinet. | | | | | | | | | | | | | | | | | | | | | | | | |
| INPUT VOLTAGE / FREQUENCY | <ul style="list-style-type: none"> ● 460, 480 Vrms at 60 ± 3 Hz ● 380, 400, 415 Vrms at 50 ± 3 Hz | | | | | | | | | | | | | | | | | | | | | | | | |
| ALLOWABLE INPUT VOLTAGES/CURRENT DEMAND | <table border="1"> <thead> <tr> <th align="center">NOMINAL VOLTAGE (Vrms)</th> <th align="center">NORMAL RANGE ±10 PERCENT</th> <th align="center">CURRENT (AMPS) ^ACONTINUOUS</th> <th align="center">^B RECOMMENDED MINIMUM STANDARD OVERCURRENT PROTECTION FOR ROOM FEED DISCONNECT</th> </tr> </thead> <tbody> <tr> <td align="center">380</td> <td align="center">342-418</td> <td align="center">8.8</td> <td align="center">15 Amps</td> </tr> <tr> <td align="center">400</td> <td align="center">360-440</td> <td align="center">8.3</td> <td align="center">15 Amps</td> </tr> <tr> <td align="center">415</td> <td align="center">374-456</td> <td align="center">8.0</td> <td align="center">15 Amps</td> </tr> <tr> <td align="center">460</td> <td align="center">414-506</td> <td align="center">7.2</td> <td align="center">10 Amps</td> </tr> <tr> <td align="center">480</td> <td align="center">432-528</td> <td align="center">6.9</td> <td align="center">10 Amps</td> </tr> </tbody> </table> <p>NOTE: A Calculated at 21 KVA system Continuous Power Demand & minimum voltage. B Overcurrent protection sized for 125% continuous current per National Electrical Code NEC 1999 Article 210-20 or NEC 1996 Article 220-3.</p> | NOMINAL VOLTAGE (Vrms) | NORMAL RANGE ±10 PERCENT | CURRENT (AMPS) ^A CONTINUOUS | ^B RECOMMENDED MINIMUM STANDARD OVERCURRENT PROTECTION FOR ROOM FEED DISCONNECT | 380 | 342-418 | 8.8 | 15 Amps | 400 | 360-440 | 8.3 | 15 Amps | 415 | 374-456 | 8.0 | 15 Amps | 460 | 414-506 | 7.2 | 10 Amps | 480 | 432-528 | 6.9 | 10 Amps |
| NOMINAL VOLTAGE (Vrms) | NORMAL RANGE ±10 PERCENT | CURRENT (AMPS) ^A CONTINUOUS | ^B RECOMMENDED MINIMUM STANDARD OVERCURRENT PROTECTION FOR ROOM FEED DISCONNECT | | | | | | | | | | | | | | | | | | | | | | |
| 380 | 342-418 | 8.8 | 15 Amps | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 360-440 | 8.3 | 15 Amps | | | | | | | | | | | | | | | | | | | | | | |
| 415 | 374-456 | 8.0 | 15 Amps | | | | | | | | | | | | | | | | | | | | | | |
| 460 | 414-506 | 7.2 | 10 Amps | | | | | | | | | | | | | | | | | | | | | | |
| 480 | 432-528 | 6.9 | 10 Amps | | | | | | | | | | | | | | | | | | | | | | |
| CONTINUOUS POWER | Continuous Operation For TCU: 3 KVA at 0.9 lagging Power Factor. | | | | | | | | | | | | | | | | | | | | | | | | |
| GROUNDING | <ul style="list-style-type: none"> ● Main facility ground wire to be minimum 1/0 AWG copper or same size as power feeder wire, which ever is larger. ● Main facility ground wire to be insulated. ● Ground impedance to earth at power source to be 2 ohms or less. ● Main facility ground wire to be bonded at every distribution box in an approved grounding block. | | | | | | | | | | | | | | | | | | | | | | | | |

5-3 POWER DISTRIBUTION SYSTEM

5-3-1 Main Disconnect Panel (MDP)

Note

Main Disconnect Panel (MDP) is NOT used for Japan.

The Signa Ovation system (high voltage configuration) includes a Main Disconnect Panel with multi-point remote control capability is shown in Illustration 5-1. The design of the MDP supplied with the system allows for power feed connection to meet the requirements of **SECTION 5-2 CRITICAL POWER REQUIREMENTS** of facility power for the PDU circuit and facility essential power for the TCU circuit.

Note

Loss of power automatically trips PDU circuit PD1 contactor in the MDP. Manual restart is required for the PDU circuit after restoration of power.

Note

The MDP circuit for TCU provides auto restart upon return of normal power. The MDP Emergency Off circuit for TCU auto restart function is controlled by the Emergency Off pushbuttons.

Check local and national codes to determine if an interlock to the air-conditioning unit in the Computer/Equipment Room is required in the protective disconnect set-up.

The emergency off buttons are to be mounted in the Magnet Room near each exit 60 in. (1524 mm) from the floor and connected to the protective disconnect device in order to disable the power to the PDU in emergency situations. The emergency off button is to be clearly labeled "Emergency Off" and visible to personnel in the Magnet Room. It is important that the button be labeled "off" and not "stop" since there exists an "Emergency Stop" button in the Signa system which powers down different equipment than the emergency off button installed by the facility. An additional emergency off button should be mounted in the equipment room near the exit door.

Note

The emergency off circuit disconnects power to the PDU and TCU. Power can be restored to the PDU by pressing the PDU ON pushbutton. Power can be restored to the TCU by pressing the common ON push button for TCU

The Main Disconnect Panel (MDP) is lockable to meet OSHA requirements for power Lockout/Tagout requirements. The MDP provides for the disconnection of the facility power to the PDU and disconnection of essential facility power to the TCU. Individual branch circuits for the PDU consisting of padlockable GE Spectra circuit breakers are provided. The MDP also provides the 2 emergency off buttons and contacts for an interlock to the air-conditioning units in the equipment room.

5-3-1 Main Disconnect Control (MDP) (Continued)

Note

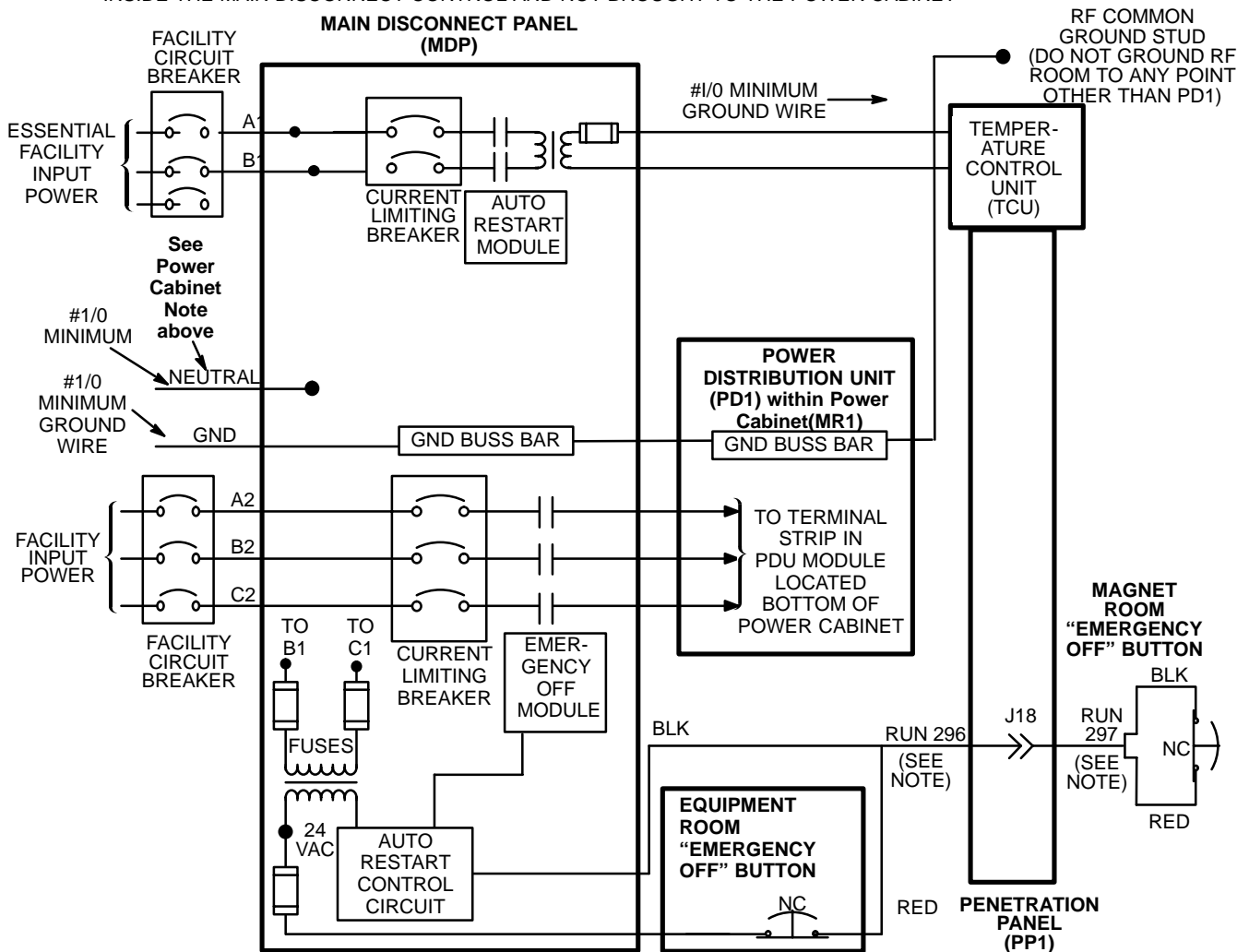
Main Disconnect Panel (MDP) is NOT used for Japan.

Note

Refer to Section 11 Main Disconnect Panel for more detail information.

Dual Feed

- NOTE:**
- RUNS 296 AND 297 ARE GE SUPPLIED CABLES. ALL OTHER WIRING IS CUSTOMER SUPPLIED.
 - TWO EMERGENCY "OFF" BUTTONS ARE SUPPLIED WITH SYSTEM MDP.
 - CIRCUIT BREAKERS ARE PROVIDED FOR PDU, CIRCUITS.
 - LOSS OF POWER AUTOMATICALLY TRIPS PD1 CONTACTOR.
 - IF 3 PHASE WYE WITH NEUTRAL AND GROUND (5 WIRE SYSTEM) INPUT USED THEN NEUTRAL MUST BE TERMINATED INSIDE THE MAIN DISCONNECT CONTROL AND NOT BROUGHT TO THE POWER CABINET

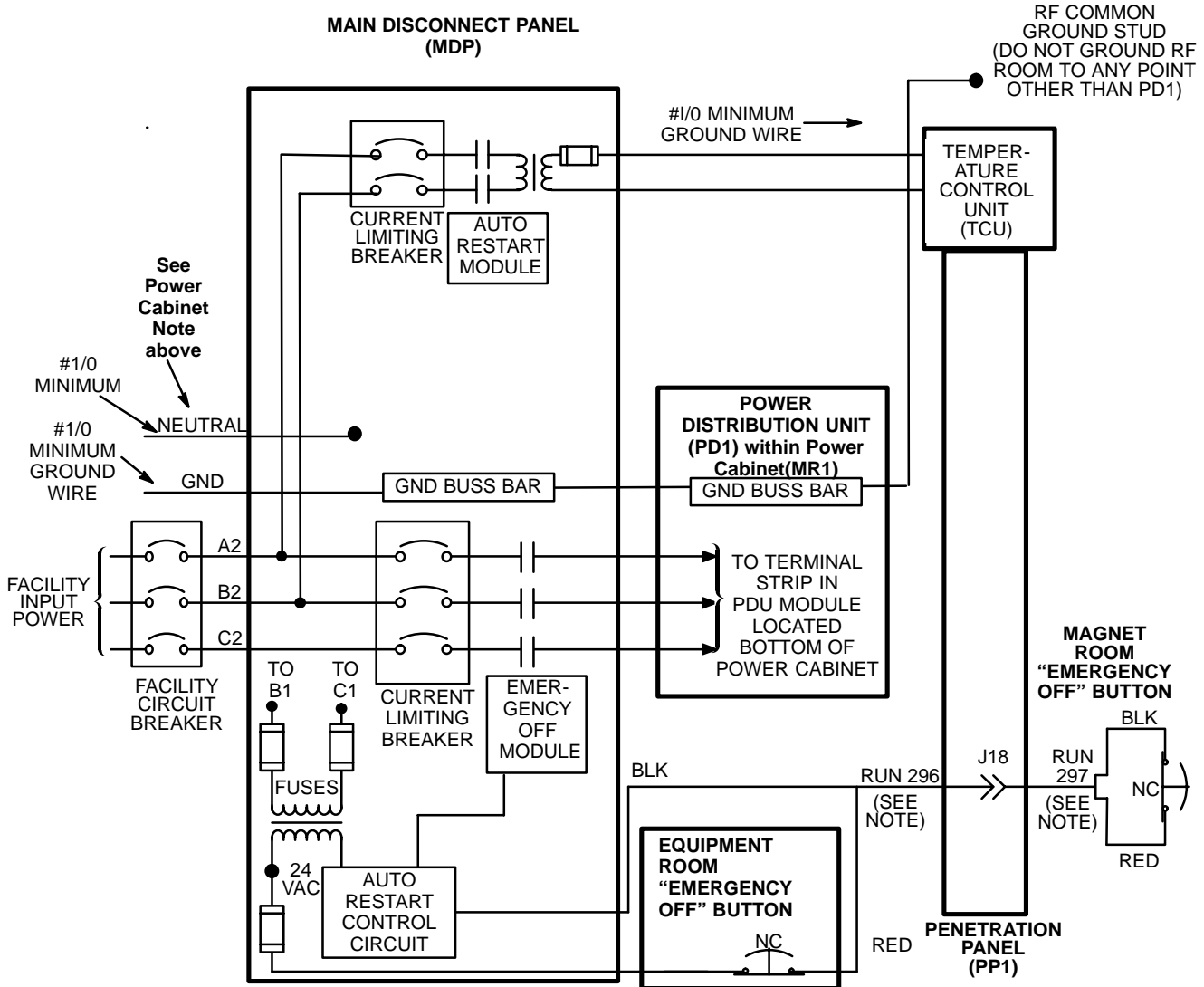


PROTECTIVE DISCONNECT SET-UP
ILLUSTRATION 5-1

5-3-1 Main Disconnect Control (MDP) (Continued)

Single Feed

- NOTE:**
- RUNS 296 AND 297 ARE GE SUPPLIED CABLES. ALL OTHER WIRING IS CUSTOMER SUPPLIED.
 - TWO EMERGENCY "OFF" BUTTONS ARE SUPPLIED WITH SYSTEM MDP.
 - CIRCUIT BREAKERS ARE PROVIDED FOR PDU, CIRCUITS.
 - LOSS OF POWER AUTOMATICALLY TRIPS PD1 CONTACTOR.
 - IF 3 PHASE WYE WITH NEUTRAL AND GROUND (5 WIRE SYSTEM) INPUT USED THEN NEUTRAL MUST BE TERMINATED INSIDE THE MAIN DISCONNECT CONTROL AND NOT BROUGHT TO THE POWER CABINET



PROTECTIVE DISCONNECT SET-UP
ILLUSTRATION 5-2

5-3-2 Feeder Size

The recommended facility feeders conductors shall be copper and the minimum size are listed in Table 5-5 for PDU circuit. Where the appropriate wire size listed in Tables 5-5 is not readily available use the next convenient wire size larger from that specified with 1/0 AWG (50 mm²) being the largest allowable phase conductor the PD1 will accept. Larger feeder wires can be connected to the MDP with 1 AWG (50 mm²) between the MDP and PD1.

Note

Tables 5-5 feeder minimum size is in AWG (mm²). Feeder size is based on Table 310-16 of National Electrical Code and the conductors listed have an insulation rating of 75°C (167°F) or higher for maximum 2% voltage drop. Calculations are based on using Peak Power Demand for each system configuration and the lowest daily variation of -10%. If daily variations are not this large the feeder size can be recalculated for 2% voltage drop by facility engineer.

Note

The ground and neutral conductors shall be minimum size of 1/0 AWG copper or the same size as the feeder wire, which ever is larger. Lug connector for the ground wire is to be provided by the contractor, recommended Amp Inc. number 36919 lug.

TABLE 5-5
PDU RECOMMENDED FACILITY FEEDER SIZES*
(Refer to Table 5-5 for PDU Circuit Recommendation)

| RUN LENGTH TO MDP ft (m) | ALL CONFIGURATIONS INPUT VOLTAGE (See Note 1) | | | | | |
|---|---|-----------------------------------|----------------------------------|--------------------------------|--------------------------------|--------------------------------|
| | 200V [RANGE 180V – 220V] | 208V [RANGE 187V – 229V] | 380V [RANGE 342V – 418V] | 400V [RANGE 360V – 440V] | 415V [RANGE 374V – 456V] | 480V [RANGE 432V – 528V] |
| 0-50 (0-15.2) | 0 AWG (50 mm ²) | 1 AWG (42 mm ²) | 4 AWG (25 mm ²) | 4 AWG (25 mm ²) | 6 AWG (16 mm ²) | 6 AWG (16 mm ²) |
| 51-100 (15.2-30.5) | 0 AWG (50 mm ²) | 1 AWG (42 mm ²) | 4 AWG (25 mm ²) | 4 AWG (25 mm ²) | 6 AWG (16 mm ²) | 6 AWG (16 mm ²) |
| 101-150 (30.5-45.7) | 3/0 AWG (83 mm ²) | 2/0 AWG (70 mm ²) | 4 AWG (25 mm ²) | 4 AWG (25 mm ²) | 6 AWG (16 mm ²) | 6 AWG (16 mm ²) |
| 151-200 (46.0-61.0) | 4/0 AWG (105 mm ²) | 4/0 AWG (105 mm ²) | 4 AWG (25 mm ²) | 4 AWG (25 mm ²) | 4 AWG (25 mm ²) | 6 AWG (16 mm ²) |
| 201-250 (61.3-76.2) | 350MCM (174 mm ²) | 350MCM (174 mm ²) | 3 AWG (35 mm ²) | 3 AWG (35 mm ²) | 4 AWG (25 mm ²) | 4 AWG (25 mm ²) |
| 251-300 (76.5-91.4) | 500MCM (250 mm ²) | 400MCM (200 mm ²) | 2 AWG (35 mm ²) | 2 AWG (35 mm ²) | 3 AWG (35 mm ²) | 4 AWG (25 mm ²) |
| 301-350 (91.4-106.7) | 600MCM (300 mm ²) | 500MCM (250 mm ²) | 1 AWG (50 mm ²) | 2 AWG (35 mm ²) | 2 AWG (35 mm ²) | 4 AWG (25 mm ²) |
| 351-400 (106.7-121.9) | 700MCM (105 mm ²) | 600MCM (300 mm ²) | 1/0 AWG (50 mm ²) | 1 AWG (50 mm ²) | 1 AWG (50 mm ²) | 3 AWG (50 mm ²) |

Notes * Minimum wire size is calculated at maximum rating of 35 KVA for PDU circuit . All calculations use 2 AWG (35 mm²) from MDP placed 20 feet (6.1 meters) from PD1. If MDP is located more than 20 feet (6.1 meters) from the PD1 then a facility/electrical engineer should recalculate wire size losses to ensure that losses do not exceed 2% for total run length from facility transformer to PD1.

1 The maximum conductor the Main Disconnect Control (MDP) can accept is #3/0 AWG (83 mm²). For feeders larger than 3/0 AWG (83 mm²) the wires must be reduced (ie. splice, junction box, etc.) to 3/0 AWG (83 mm²) within 10 feet (3 meters) of MDP. It is important to note the maximum cable wire from the MDP to the PD1 must not be larger than 1/0 AWG (50 mm²). PDU Module (PD1) is located in lower portion of the Power Cabinet (MR1).

5-3-2 Feeder Size (Continued)

TABLE 5-6
TCU RECOMMENDED FACILITY FEEDER SIZES*
 (Refer to Table 5-6 for MDP PDU Circuit Recommendations)

| RUN LENGTH TO MDP ft (m) | | ALL CONFIGURATIONS INPUT VOLTAGE (See Note 1) | | | | |
|-----------------------------|---------------|---|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| | | 380V [RANGE 342V – 418V] | 400V [RANGE 360V – 440V] | 415V [RANGE 374V – 456V] | 460V [RANGE 414V – 506V] | 480V [RANGE 432V – 528V] |
| 0-50 | (0-15.2) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) |
| 51-100 | (15.2-30.5) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) |
| 101-150 | (30.5-45.7) | 12 AWG (3.3 mm ²) | 12 AWG (3.3 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) | 14 AWG (2.1 mm ²) |
| 151-200 | (46.0-61.0) | 10 AWG (5.3 mm ²) | 12 AWG (3.3 mm ²) | 12 AWG (3.3 mm ²) | 12 AWG (3.3 mm ²) | 14 AWG (2.1 mm ²) |
| 201-250 | (61.3-76.2) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 12 AWG (3.3 mm ²) | 12 AWG (3.3 mm ²) |
| 251-300 | (76.5-91.4) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 12 AWG (3.3 mm ²) |
| 301-350 | (91.4-106.7) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) |
| 351-400 | (106.7-121.9) | 8 AWG (8.4 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) | 10 AWG (5.3 mm ²) |

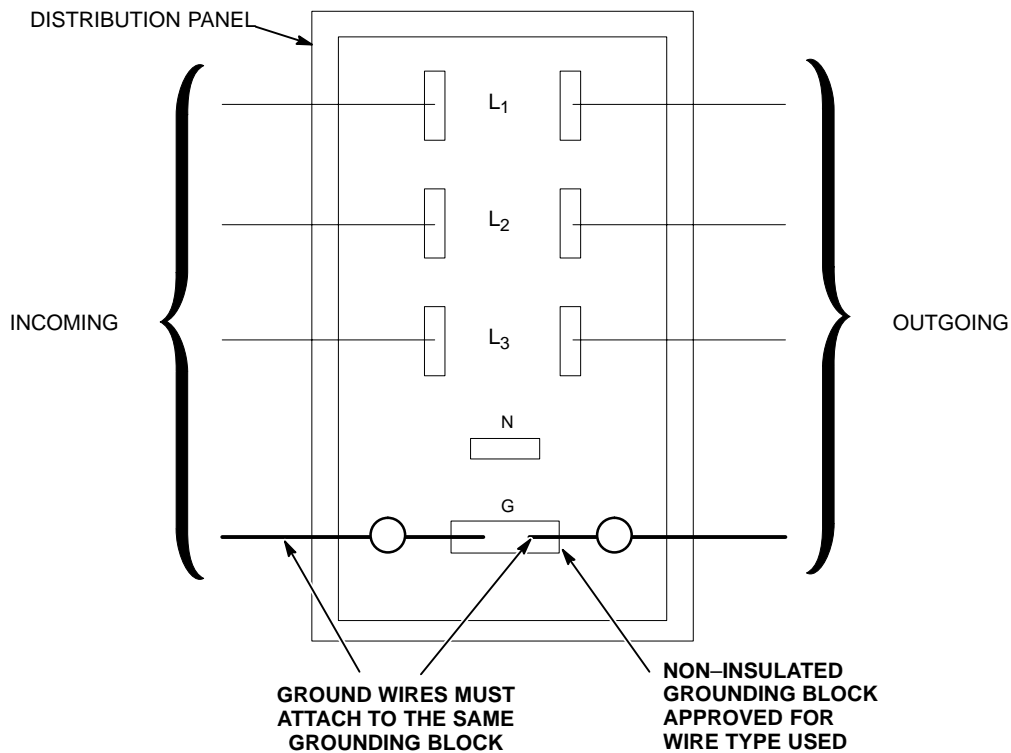
Notes * Minimum wire size is calculated at continuous rating of 21 KVA for Shield/Cryo Cooler Compressor Cabinets and TCU circuit.
 1 The maximum conductor the Main Disconnect Control (MDP) can accept is #3/0 AWG (83 mm²). For feeders larger than 3/0 AWG (83 mm²) the wires must be reduced (ie. splice, junction box, etc.) to 3/0 AWG (83 mm²) within 10 feet (3 meters) of MDP.

5-4 GROUNDING

5-4-1 Facility Ground

The ground for the MR system shall originate at the system power source, ie. transformer or first access point of power into a facility, and be continuous to the MR system power disconnect in the room. This ground can be spliced with "High Compression Fittings" and should be terminated at each distribution panel it passes through. When it is broken for a connection to a panel, it shall be connected into an approved non-insulated grounding block with the incoming and outgoing ground in this same grounding block, which is then connected to the steel panel, never using the steel or other material of the panel as the block. See Illustration 5-3.

The connection at the power source shall be at the grounding point of the "Neutral - Ground" if a "Wye" transformer is used, or typical grounding points of separately derived system. In the case of an external facility, it shall be bonded to the facility ground point at the service entrance.



GROUND CONNECTION AT DISTRIBUTION PANEL
ILLUSTRATION 5-3

M4301A

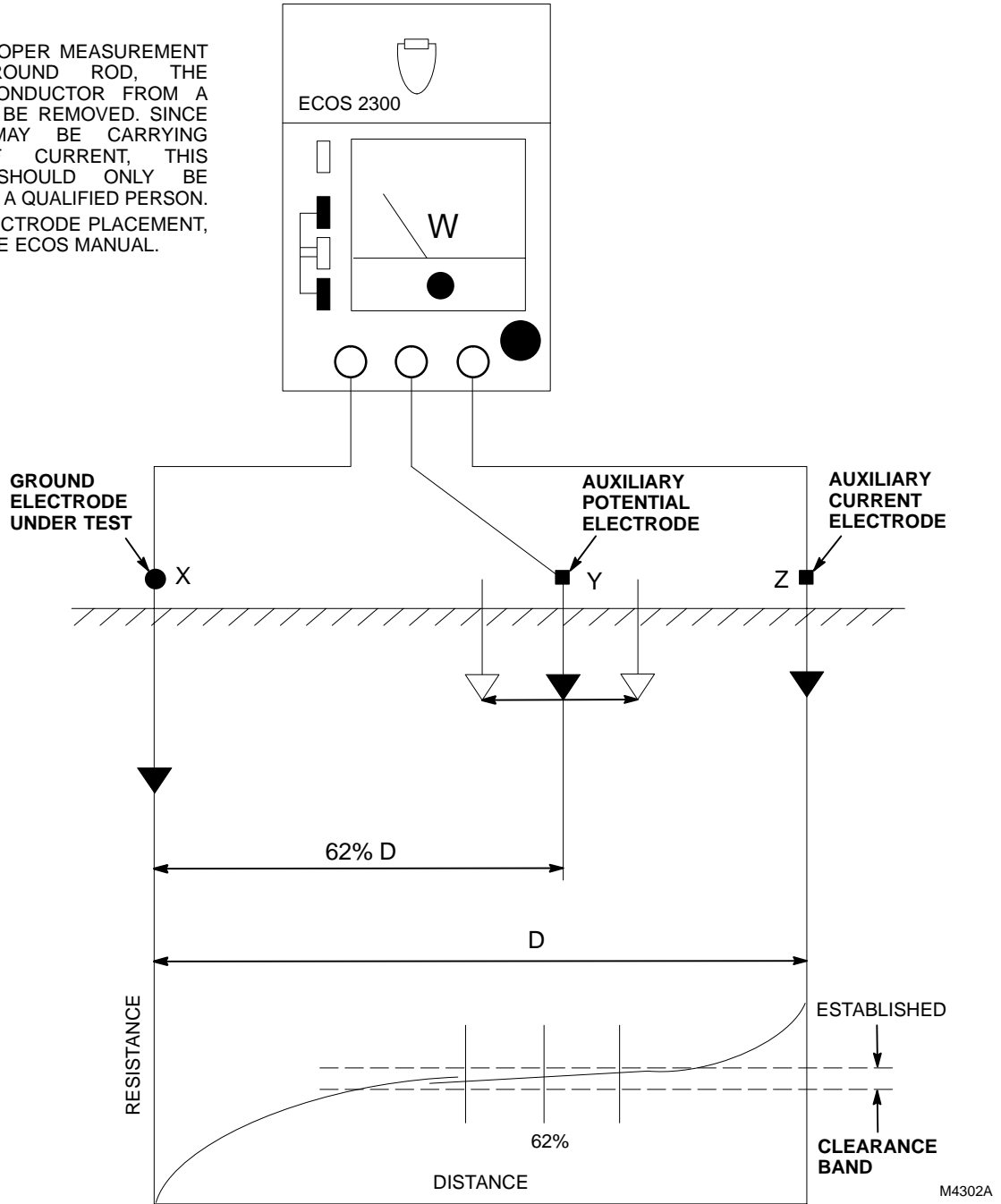
Ground Wire

The ground wire shall be copper wire with a minimum of AWG 1/0 or the same size as the power feeders whichever is larger. This means that if there is a primary feeder to a distribution panel of 500 MCM with a secondary feeder to the MR system of AWG 2 wire, the ground to the distribution panel shall be 500 MCM with an AWG 1/0 to the MR system. The ground wire impedance from the MR system disconnect, including the ground rod, shall not have an impedance greater than 2 ohms to earth as measured by one of the applicable techniques described in Section 4 of ANSI/IEEE Standard 142 - 1982. Refer to Illustration 5-4 for typical equipment and methods to measure the different portions of the 2 ohm impedance.

5-4-1 Facility Ground (Continued)

NOTE:

- TO ENSURE PROPER MEASUREMENT OF THE GROUND ROD, THE GROUNDING CONDUCTOR FROM A FACILITY MUST BE REMOVED. SINCE THIS WIRE MAY BE CARRYING AMOUNTS OF CURRENT, THIS PROCEDURE SHOULD ONLY BE PERFORMED BY A QUALIFIED PERSON.
- DETAILS OF ELECTRODE PLACEMENT, ETC., ARE IN THE ECOS MANUAL.



STANDARD HOOK-UP TO SYSTEM UNDER TEST FOR GROUND ROD IMPEDANCE
ILLUSTRATION 5-4

5-4-2 System Ground

The MR system is designed with minimum ground loops to prevent noise currents and natural disturbances from flowing through the low-level signal reference path.

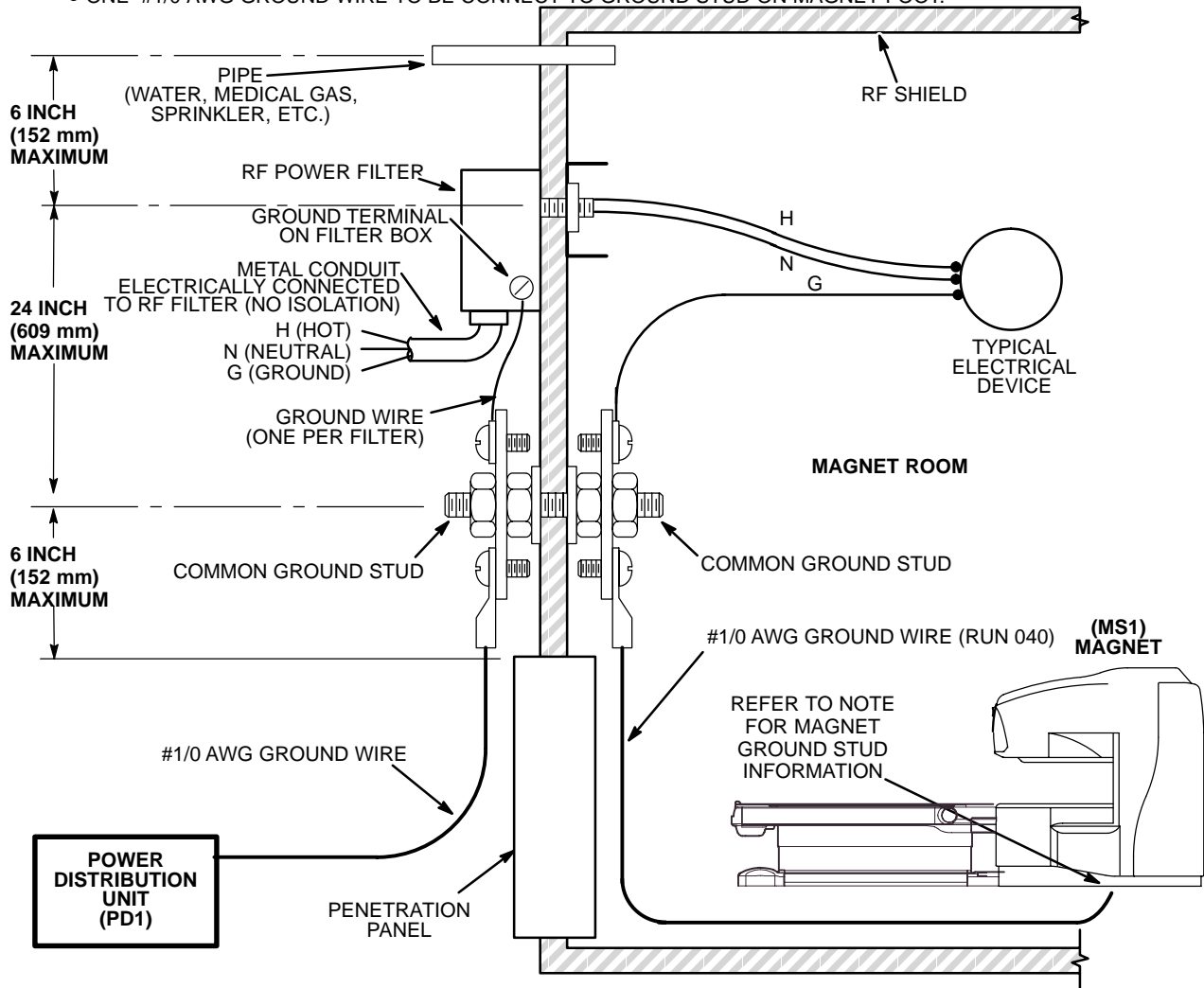
The three major grounding points in the MR system are: the system ground point (bus) in the System PDU (PD1), the enclosure ground points (ground studs located in each cabinet or enclosure), and the RF shielded room common ground point. **This RF shielded room common ground point is to be located within 6 in. (152 mm) of the GE supplied Penetration Panel.** Refer to Section 7, RF SHIELDED ROOM, for a further description of the RF shielded room common ground point.

To ensure patient safety and system performance, the conditions defined in Illustration 5-5 must be met when running power lines into the Magnet Room.

Any modifications or non-MR equipment grounds added to the MR ground system must be approved by your GE Service Representative in order to ensure safety and performance.

5-4-2 System Ground (Continued)

- NOTE:**
- ALL ITEMS SHOWN ARE CUSTOMER SUPPLIED EXCEPT POWER DISTRIBUTION UNIT, MAGNET, AND TWO #1/0 AWG GROUND WIRES BETWEEN MAGNET GROUND STUD AND RF COMMON GROUND POINT.
 - RESISTANCE BETWEEN ANY TWO GROUNDED DEVICES *MUST NOT EXCEED 0.1 OHM* TO ENSURE EQUAL POTENTIAL GROUND SYSTEM WITHIN MAGNET ROOM.
 - LOCATE FILTERS WITHIN 2 FEET (600 mm) OF RF COMMON GROUND STUD WHICH MUST BE LOCATED WITHIN 6 INCHES (152 mm) OF PENETRATION PANEL.
 - ALL EXTERNAL CONDUIT MUST BE METAL AND ELECTRICALLY CONNECTED TO THE RF POWER FILTERS (IE. NO ISOLATION) UNLESS THE FILTERS ARE LOW VOLTAGE (<30 VOLTS).
 - RF POWER FILTERS OF 30 VOLTS OR LESS MAY BE LOCATED ANYWHERE ON THE RF SHIELD PROVIDED THE INCOMING CONDUIT IS NON-METALLIC OR IS DIELECTRICALLY ISOLATED AND WITH NO GROUND WIRE. IF THE INCOMING CONDUIT IS METALLIC AND/OR HAVE A GROUND WIRE, THESE FILTERS MUST ALSO BE LOCATED WITHIN 24 INCHES (609 mm) OF THE RF COMMON GROUND STUD.
 - ALL CONDUITS IN THE RF ROOM MUST BE METAL. STEEL IS ACCEPTABLE PROVIDED IT IS ADEQUATELY ANCHORED.
 - ALL ELECTRICAL DEVICES (IE. OUTLETS, LIGHT FIXTURES, ETC.) MUST HAVE A GROUND WIRE FROM ITS POWER SOURCE AND BE GROUNDED TO RF ROOM SHIELD AT THE RF COMMON GROUND STUD AS SHOWN BELOW.
 - ALL METALLIC PIPES ENTERING THE RF ROOM, EXCLUDING CRYOGENIC VENT AND FLOOR DRAINS, MUST BE LOCATED WITHIN 30 INCHES (762 mm) OF THE RF COMMON GROUND.
 - ONE #1/0 AWG GROUND WIRE TO BE CONNECT TO GROUND STUD ON MAGNET FOOT.



MR MAGNET ROOM GROUNDING REQUIREMENTS AND TYPICAL DIAGRAM

ILLUSTRATION 5-5

5-5 POWER SOURCE MONITORING

The facility input power for the proposed system should be checked using a power line disturbance monitor for average line voltage, surges-sags, impulses, and frequency. Some of the recommended line analyzers which are designed for unattended monitoring are the Dranetz Models 656A or 658 and RPM Models 1651, 1656, or 1658.

Analysis should span a period to include two weekends so as to cover several days of normal use. The possibility of "brown-out" conditions which may be experienced in summer must be considered. Any existing power problems with large power consuming systems (x-ray units, CT scanners, etc.) or other computer installations at the proposed site should be reviewed as they may affect the MR system. Results of this analysis should be reviewed with your GE representative to determine if line conditioning is needed.

5-6 EMERGENCY POWER

5-6-1 Equipment Room

Facility emergency power (24 hours/day, 7 days/week) is required for the Temperature Control Unit.

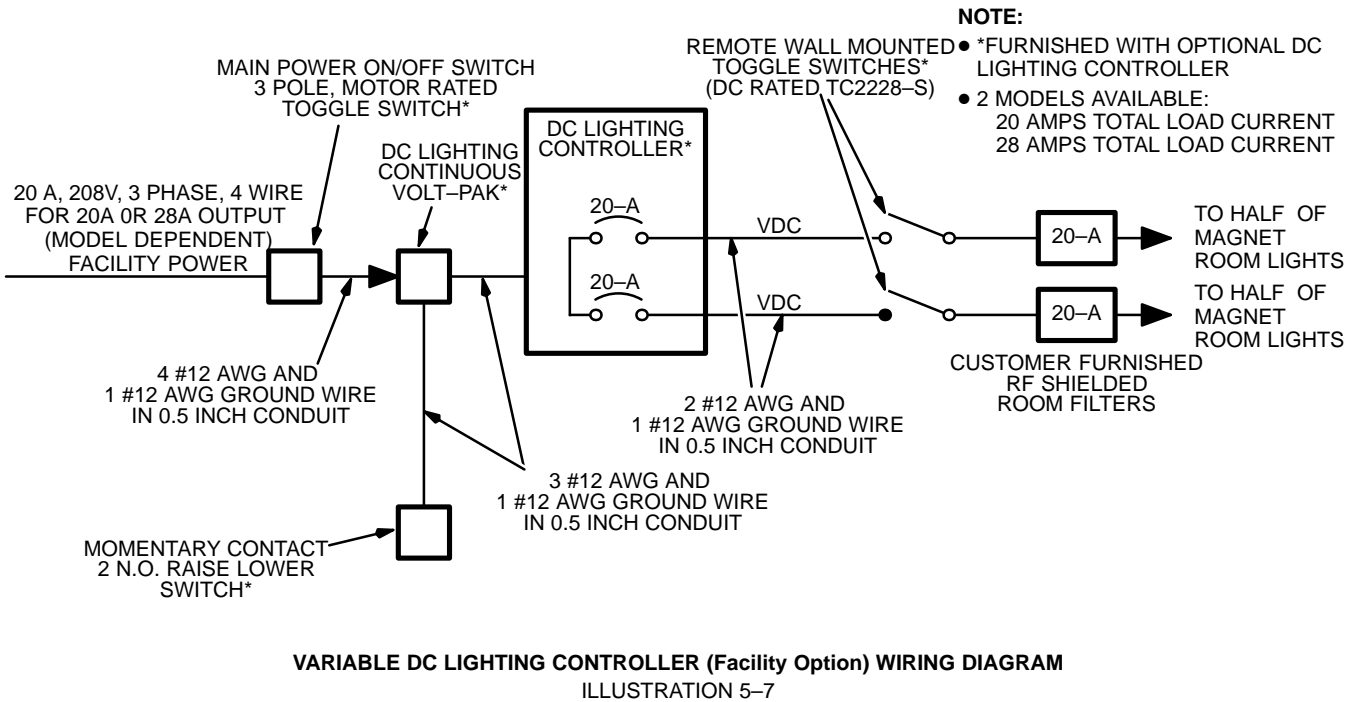
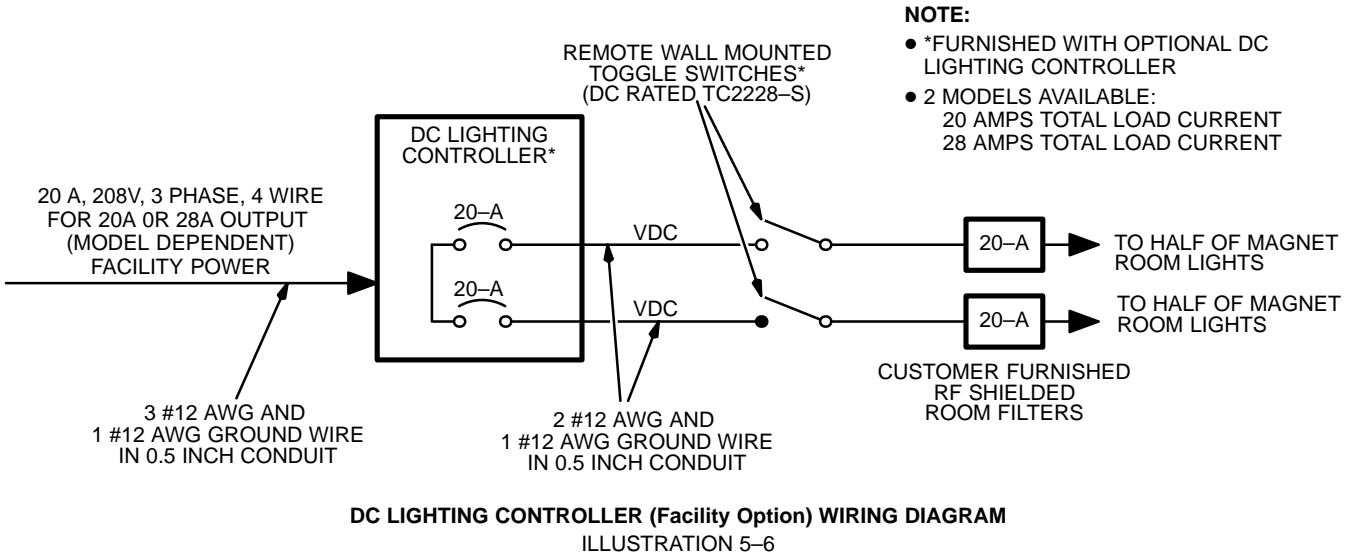
5-6-2 Magnet Room

Primary power should be distributed from the customer's emergency life-safety power branch to an emergency lighting source in the Magnet Room. All input power lines must be filtered upon entrance into the RF shielded room (Magnet Room) and grounded according to the requirements listed in Section 5-4-2, SYSTEM GROUND. Always check national and local codes for other emergency power requirements.

5-7 DC LIGHTING CONTROLLER (Facility Option)

Direct current (DC) powered lighting is recommended in the Magnet Room per Section 4-5 LIGHTING. A DC light controller is available from GE as well as a variable DC lighting controller system. The wiring diagrams for these units are shown in Illustrations 5-6 and 5-7. The input power, interconnect cabling, RF shielded room filters, and conduit are customer furnished.

5-7 DC LIGHTING CONTROLLER (Facility Option) (Continued)



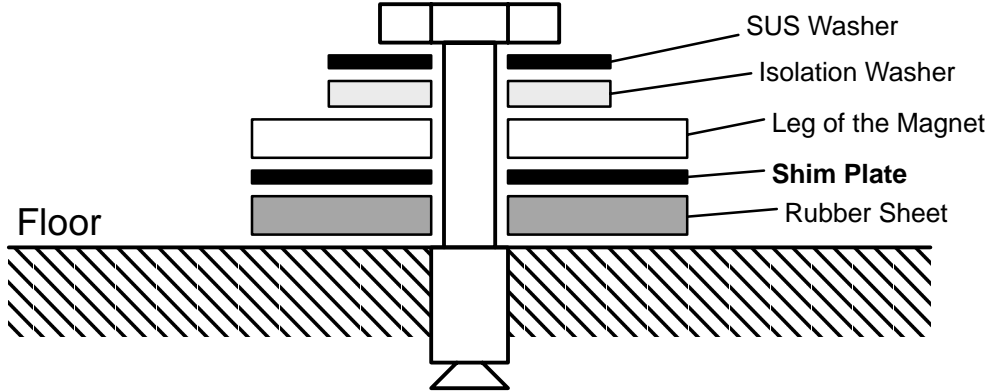
7-5 MAGNET ANCHORING

Note

It is necessary to anchor all Magnets even though Magnet is installed in non-seismic areas.

1. Conduct the Leveling of the Magnet. Use the Shim Plate(2mm thickness X 4 pieces, 1mm X 4) included with the Magnet. See *Signa Ovation Magnet Delivry & Installation Manual* attached to Magnet. (Customer prepared)

LEVELING OF THE MAGNET



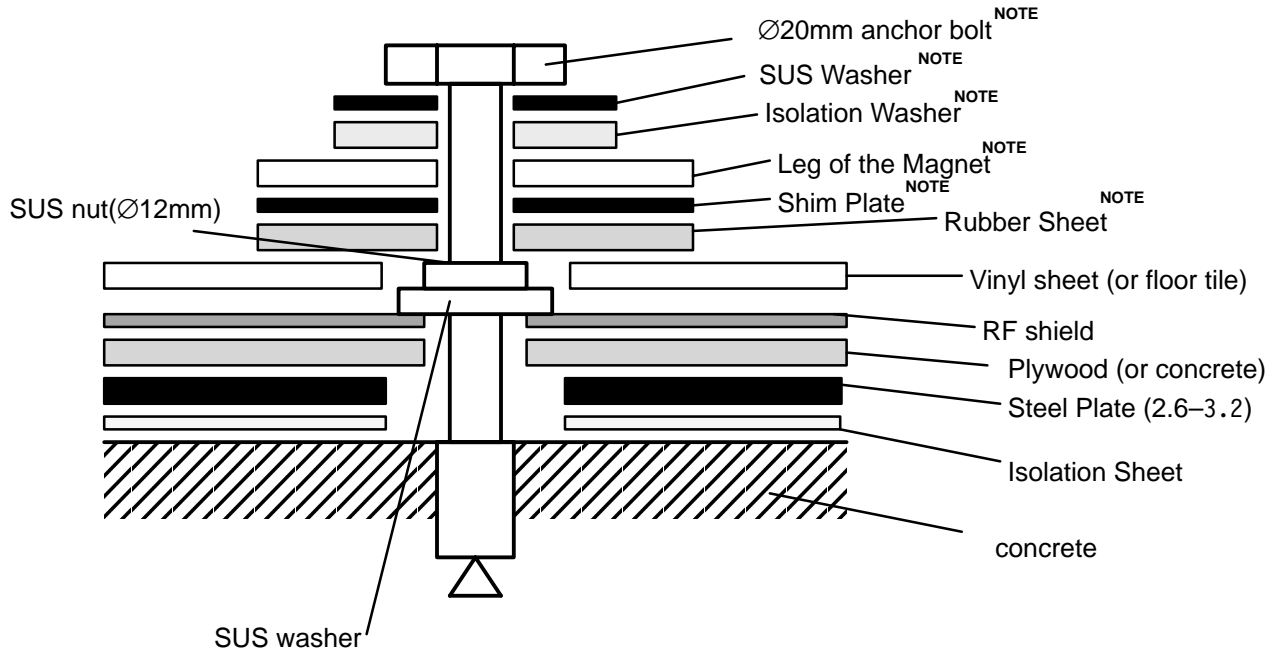
- NOTE 1: In case there is floor raising construction after the anchoring of the bolt, there may be a case that the drill may not be long enough. In this case, the Anchor Bolt needs to be anchored beforehand.
- NOTE 2: If the strength of the anchored part is not strong enough, this needs to be considered by the customer.

LEVELING OF THE MAGNET
ILLUSTRATION 7-14

7-5 MAGNET ANCHORING(continued)

- Fix the leg of the Magnet to the floor.

SAMPLE ILLUSTRATION:
WHEN STEEL PLATE IS LAID UNDER THE RF SHIELD



NOTE: GE Supplied (M20/75mm bolt size).

If not long enough, this needs to be supplied by the customer/RF Vendor.

NOTE 1: In case there is floor raising construction after the anchoring of the bolt, there may be a case that the drill may not be long enough. In this case, the Anchor Bolt needs to be anchored beforehand.

NOTE 2: If the strength of the anchored part is not strong enough, this needs to be considered by the customer.

MAGNET ANCHOR BOLT (1)

ILLUSTRATION 7-15

SECTION 11 – MAIN DISCONNECT PANEL

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Troubleshooting and servicing should be performed by qualified electrician.



AC and DC control power is present when the breakers are in the open position. AC power may originate from two separate sources. De-energize both prior to servicing this panel. UPS power is present when breakers are open.

This panel has been wired for use at 480V/60HZ, the panel can be converted for use at 380-400-415V/50HZ by changing the two transformer primary wiring connections from 480V to 400V. Refer to Page 11.

1- THEORY OF OPERATION

This panel incorporates a number of features desirable by MR installations to minimize down time, protect PDU (Power Distribution Unit) electronics, reduce operating costs, and reduce operational delays after a power outage. The panel comes wired for a common feed for the PDU and TCU (Temperature Control Unit). The panel can easily be field re-configured for dual feeds. Dual feeds consist of normal power feed for the PDU and a separate essential power source feed for the TCU.

The PDU branch circuit is controlled by an electrically held contactor, which opens on any loss of power. The TCU power circuits utilize a time-delayed automatic restarting control circuit, which restores power after a power outage. The time delay protects the TCU's sensitive electronic equipment from sags and surges which immediately follow power loss from black outs, storms, utility reclosure operations and out of phase Automatic Transfer Switch operations. The panel has a TCU contactor which is controlled by an autostart DC control circuit. DC battery control circuit protection time is based upon the condition of the battery but is expected to hold for at least 48 hours. The DC Battery has a life of 5 years at which time the battery and charger must be replaced to assure auto-restart capability.

PDU and TCU power Emergency Off disconnection is also provided by this panel. Two remote emergency off pushbuttons included with this panel and the cover-mounted emergency off pushbutton provide immediate shutdown for the entire system. Additional remote emergency off pushbuttons may be ordered from GE Supply 1-800-200-9760, if required for a particular installation. Remote emergency off pushbuttons are listed on page 27 of this manual. Restoration of power after an emergency off operation is accomplished by first pressing the Main Power ON pushbutton on the cover of the panel and subsequently pressing the PDU ON pushbutton.

Circuit breaker CB3 provides power for the TCU as indicated on the attached wiring diagram.

1-1 SPECIFICATIONS

1-1-1 ELECTRICAL SPECIFICATIONS

3 Phase, 3 Wire + Ground

UL 489 & CSA C 22.2

Interrupting Rating 25,000 AIC Symmetrical 50/60 Hertz

IEC 947-2 Interruption Capacity

380-415V, Ue, Icu 15,000 RMS Symmetrical AMPS 50/60 Hertz

380-415V, Ue, Ics 10,000 RMS Symmetrical AMPS 50/60 Hertz

1-1-2 ENVIRONMENTAL SPECIFICATIONS

FOR INDOOR USE ONLY

Temperature 59-86F (15-30C)

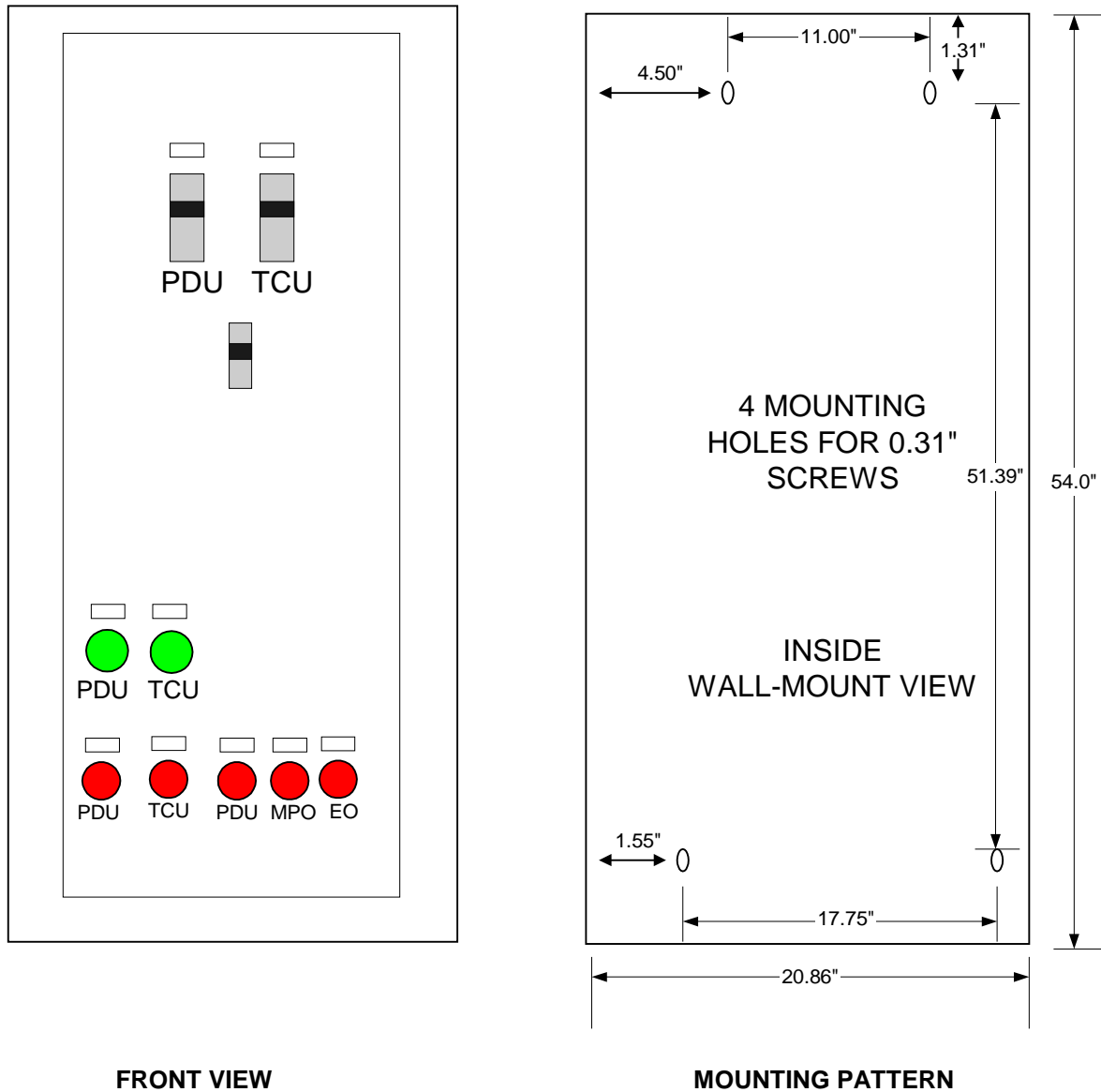
Humidity 30-75% NON CONDENSING

1-2 Panel Dimensions

Refer to Table 1-1 and Illustration 1-1 for the physical dimensions of the panel. The panel may be recessed approximately 6.95 inches (176.5 mm) into the wall for semi-flush installations. See Illustration 1-1 for the front view and mounting pattern of the Main Disconnect Panel.

TABLE 1-1
PANEL EXTERNAL PHYSICAL DIMENSIONS

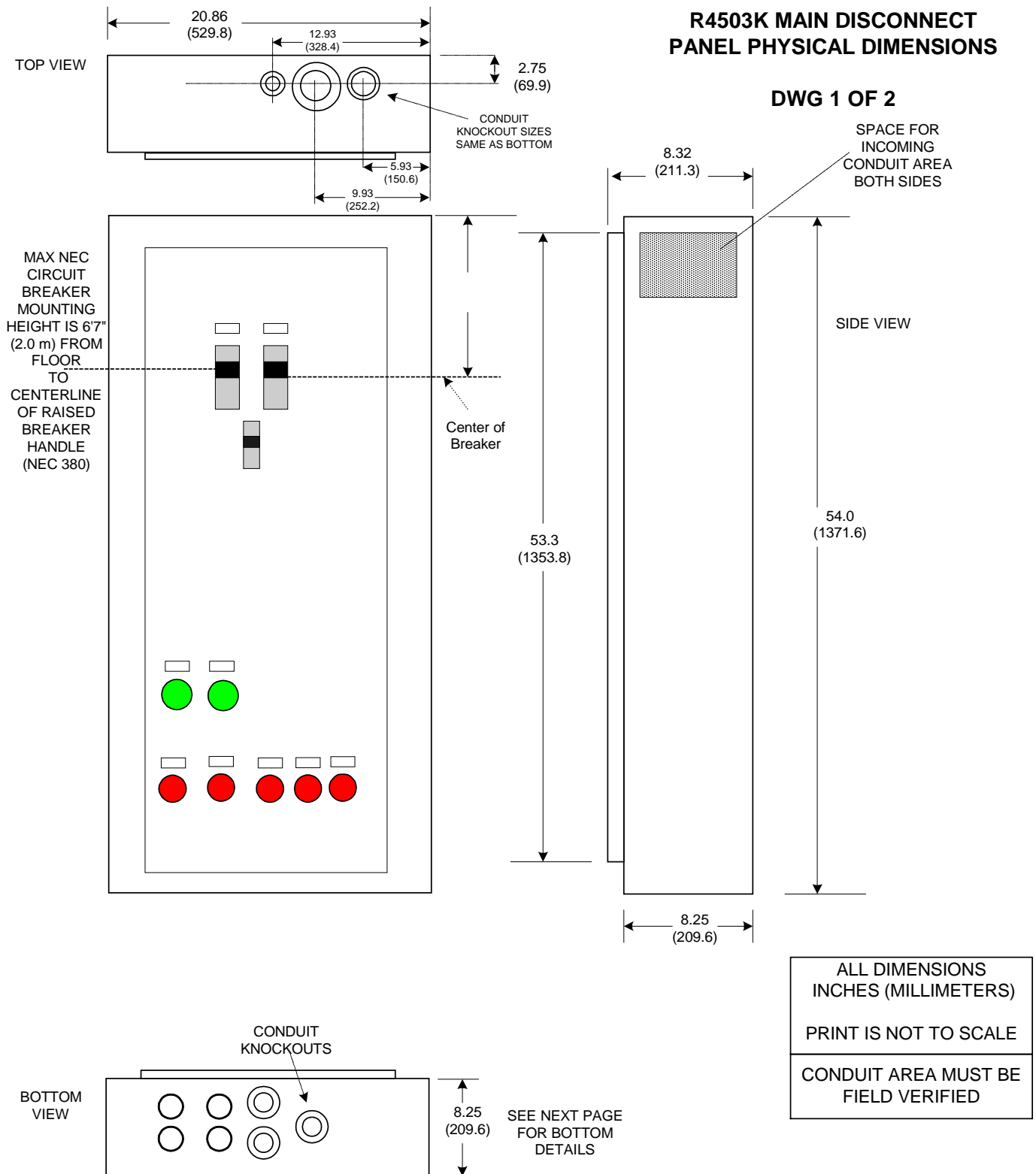
| PARAMETER | DIMENSIONS | |
|-------------------|------------|-----------|
| Height | 54.0 in. | 1371.6 mm |
| Width | 20.86 in. | 508.0 mm |
| Depth | 8.32 in. | 211.33 mm |
| Weight | 230 lbs | 104.33 kg |
| Door Swing Radius | 19.75 in. | 501.65 mm |



**FRONT AND INTERIOR VIEW OF MAIN DISCONNECT PANEL
ILLUSTRATION 1-1**

1-3 PANEL LAYOUT AND FULL PHYSICAL DRAWINGS

See Illustrations 1-2 and 1-3 for panel layout and full physical drawings including cable access holes and conduit knockout positions.

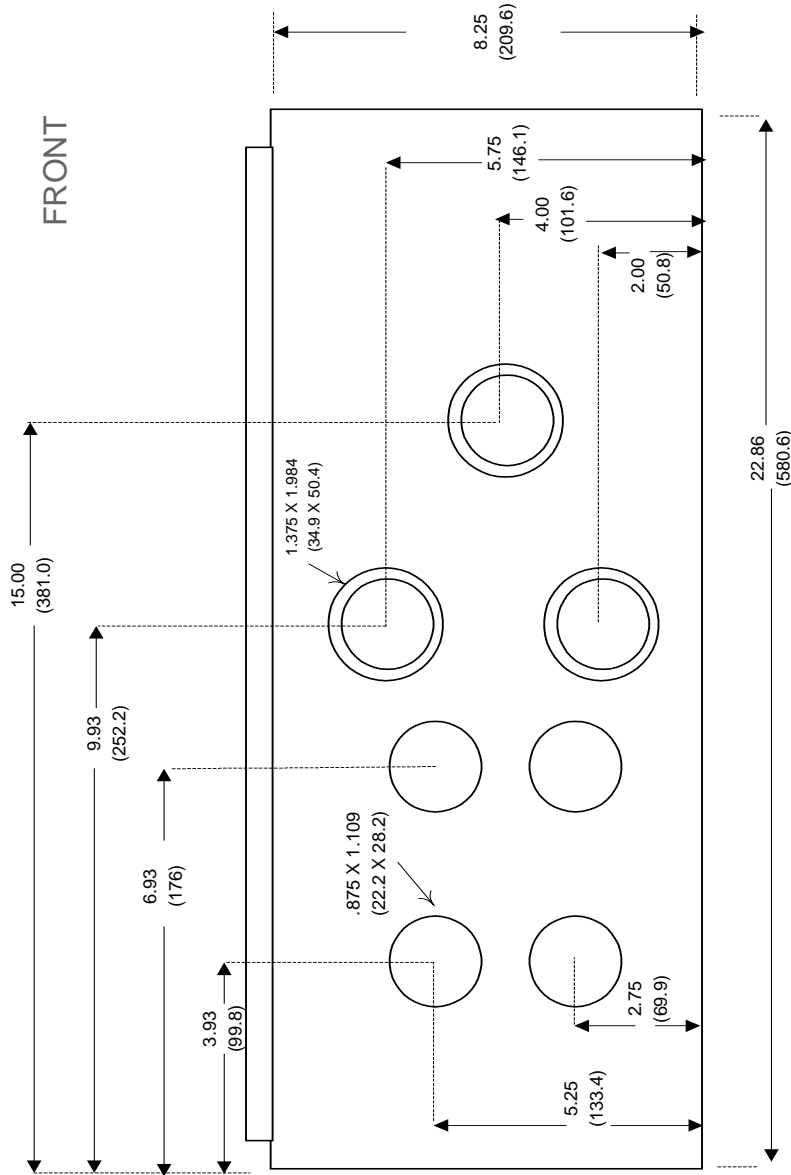


**FULL PHYSICAL DRAWINGS
ILLUSTRATION 1-2**

ALL DIMENSIONS
ARE INCHES
(MILLIMETERS)

DRAWING NOT TO
SCALE

DWG 2 OF 2
BOTTOM VIEW



FRONT

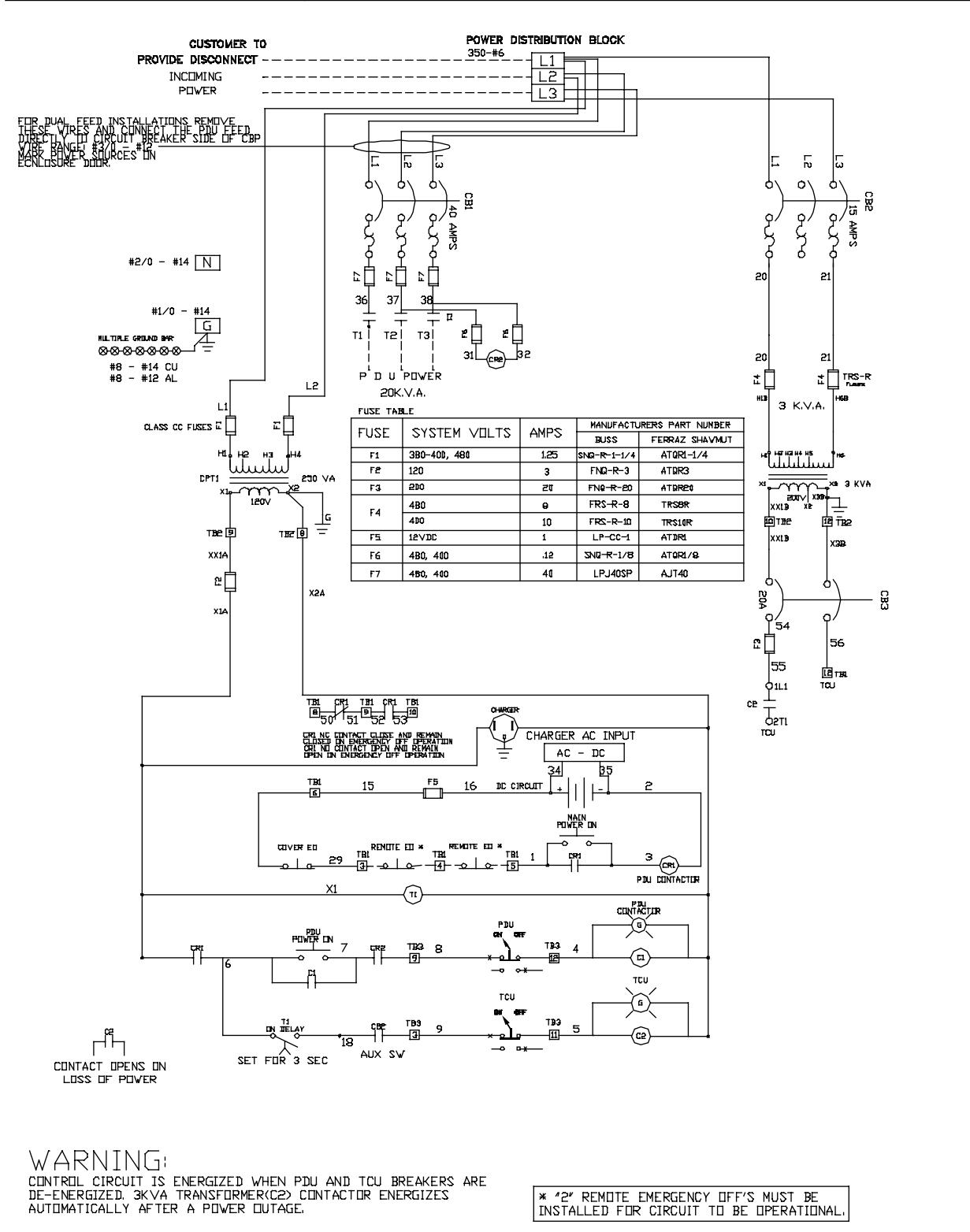
DETAILED BOTTOM VIEW
ILLUSTRATION 1-3

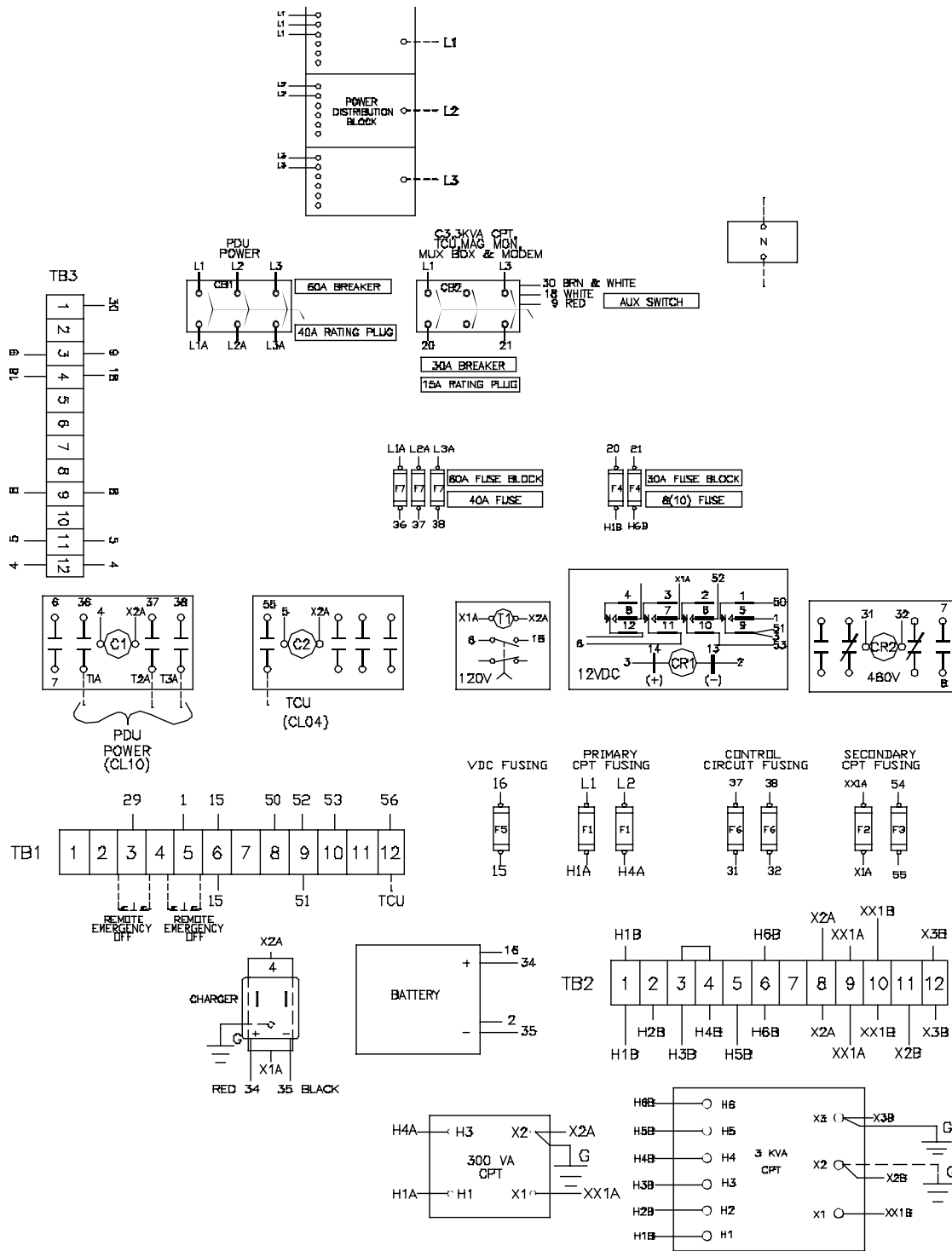
R4503K MAIN DISCONNECT PANEL
DIMENSIONAL DRAWING

1-4 WIRING DIAGRAM

See illustration 1-4 (page 8) for the Main Disconnect Panel wiring diagram.

CONT ON SHEET FL SH NO. 1 FIRST MADE FOR CR243B10438 GE MEDICAL SYSTEMS SIGNA OVATION MDC





OUTLET MUST BE ORIENTED AS SHOWN

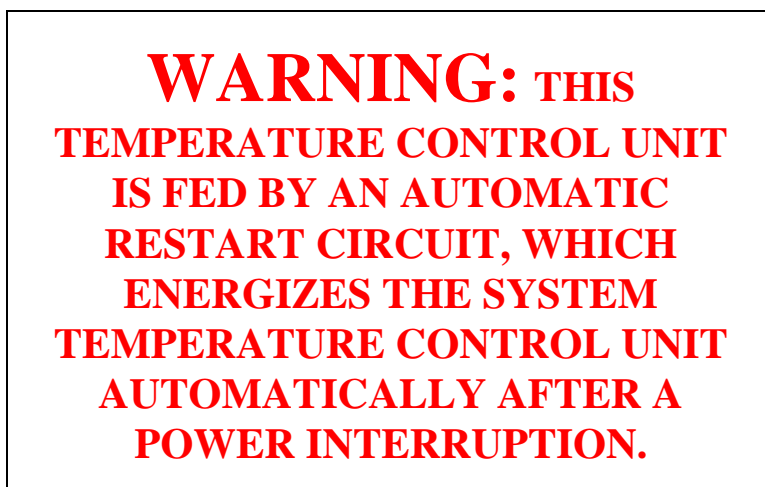
R4503K MAIN DISCONNECT PANEL WIRING DIAGRAM ILLUSTRATION 1-5

1-5 Warning Labels

Warning labels shown in this section are provided with the MDP and are to be affixed to the Signa Ovation system equipment as indicated.

1-5-1 TCU

Two TCU labels are provided with the MDP. Illustration 1-6 shows the TCU warning label which is to be affixed to or near the TCU located on the system Penetration Panel. A TCU label should be affixed in both the Equipment Room and Magnet Room.



TCU WARNING LABEL
ILLUSTRATION 1-6

2 INSTALLATION

2-1 Installation Single Feed

- Incoming power is connected to the main lugs located at the top of the Main Disconnect Panel. The main lug may be rotated 180 degrees to aid connection.
- The PDU is connected directly to the load side of contactor C1- terminals T1A, T2A, T3A.
- TCU connections are made at contactor C2 and circuit breaker CB3.
- Black, plastic, strain relief devices are shipped with the panel and must be installed on the TCU cable.
- Mounting height of the centerline of the top breakers must not exceed 6ft-7in. (2m) above the floor per National Electric Code (NEC # 380-8).
- Complete the label on the cover of the panel indicating the location and circuit of the power source providing power to this panel.
- Two labels are supplied indicating "Warning of automatic restart OF THE TCU" must be installed on the TEMPERATURE CONTROL UNIT. See section 1-5 "Warning Labels".

The control circuit wiring must be completed by installing the two remote emergency off pushbuttons as shown on the wiring diagrams on the inside of the door. The PDU contactor and TCU contactor will not close unless the remote emergency off pushbuttons are installed or temporarily jumpered.

- ◆ **For warranty parts or technical assistance contact GE SUPPLY – Milwaukee, WI (414) 527-6600, CST.**

2-2 Installation Dual Feed

- Re-configuring the panel for a normal feed for the PDU and an essential feed for the TCU 3 KVA transformer is accomplished by removing the cables between main lug terminal block and the PDU breaker, CB1. These wires are identified on the wiring diagram located on page 8 and inside the panel cover.
- The incoming normal power feed is connected directly to the top of CB1, PDU circuit breaker line side lugs.
- The TCU transformer input power and control power transformer, incoming power is terminated on the power distribution terminal block, which also supplies power to the control circuit.
- The primary of the control transformer control circuit must be fed from the same source as the TCU transformer to provide power for emergency shut down and automatic restarting.
- The PDU is connected directly to the load side of the contactor C1- terminals T1A, T2A, T3A.
- TCU connections are made at contactor C2 and circuit breaker CB3.
- Black, plastic, strain relief devices are shipped with the panel and must be installed on the TCU cable.
- Mounting height of the centerline of the top breakers must not exceed 6ft-7in. (2 m) above the floor per National Electric Code (NEC).
- Complete the label on the cover of the panel indicating the location and circuit of each power source providing power to this panel.
- Two labels are supplied indicating "Warning of automatic restart OF THE TCU" must be installed on the TEMPERATURE CONTROL UNIT. See section 1-5 "Warning Labels".

The control circuit wiring must be completed by installing the two remote emergency off pushbuttons as shown on the wiring diagram on the inside of the door. The PDU and TCU contactors will not close unless the remote emergency off pushbuttons are installed or temporarily jumpered.

2-3 480V TO 400V CONVERSION

THIS PANEL HAS BEEN WIRED FOR USE AT 480V/60HZ, THE PANEL CAN BE CONVERTED FOR USE AT 380-400-415V/50HZ BY CHANGING THE TWO TRANSFORMER PRIMARY WIRING CONNECTIONS FROM 480V TO 400V. MAKE SURE POWER FEED(S) TO THE MDP ARE DISCONNECTED AND LOCKED OFF.

.250KVA Control Transformer CPT1

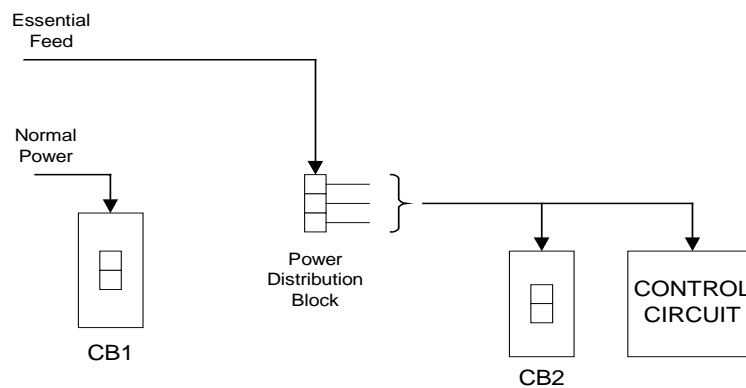
1. Open two pole fuse holder F1.
2. Remove wire originally connected to transformer terminal H4.
3. Connect wire from Step 2 to transformer terminal H3.
4. Close fuse holder F1.

3KVA Transformer

1. Verify that 15 Ampere CB3 is open.
2. Remove two dead front covers for fuse block F4.
3. Remove two TRS8R fuses.
4. At terminal block TB2 remove the wire or metal jumper connecting terminal 3 to terminal 4.
5. Connect a wire jumper between terminals H2 and H4 only.
6. Move wire from the top of terminal block 2, terminal 6, and reconnect to adjacent terminal 5.
7. Replace fuses in terminal block 4 with spare 10A, TRS10R fuses shipped with the panel.
8. Replace the dead front fuse holders.

2-4 DUAL FEED SYSTEM CONFIGURATION

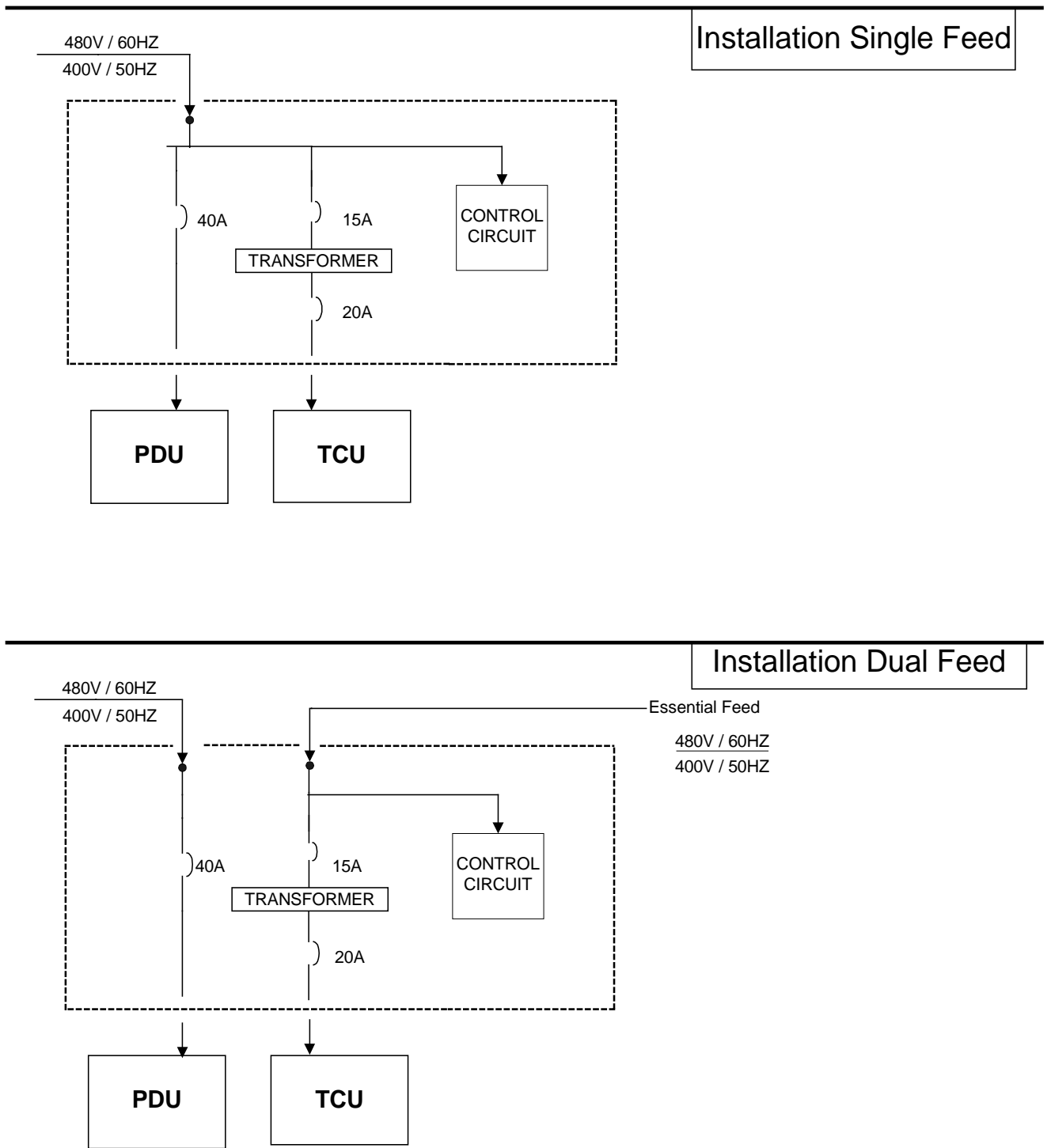
See illustration 2-1 for the Dual Feed System Configuration.



DUAL FEED SYSTEM CONFIGURATION
ILLUSTRATION 2-1

2-5 INCOMING POWER CONFIGURATION

See illustration 2-2 for the incoming power configuration.



INCOMING POWER CONFIGURATION
ILLUSTRATION 2-2

2-6 TESTING SINGLE FEED PANELS**WARNING!**

AC AND DC CONTROL POWER IS PRESENT WHEN THE BREAKERS ARE IN THE OPEN POSITION. MAKE SURE NO ONE IS WORKING ON THE EQUIPMENT WHICH THIS PANEL FEEDS PRIOR TO TESTING THE PANEL.

TESTING ACTION

1. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON.
2. Press any emergency off pushbutton.
3. Press the main power ON pushbutton and PDU ON pushbutton. Verify the PDU selector switches are all set to ON and repeat for all other emergency off pushbuttons.
4. Press the main power ON pushbutton and PDU ON pushbutton. Verify the PDU selector switches are all set to ON.
5. Press any emergency off pushbutton.
6. Starting with the de-energized state of #5, turn OFF incoming power from the breaker feeding power to this panel.
7. With incoming power OFF from step 6, now restore incoming power to panel (switch to ON).

VERIFY

1. Two green pilot lights should be on indicating proper contactor operation.
2. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF. Verify that the TCU power is disconnected and the PDU power is disconnected.
3. All contactors must de-energize and stay de-energized after an emergency OFF operation. All pilot lights must be OFF when emergency OFF is pressed.
4. All two green pilot lights should be ON indicating proper contactor operation.
5. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF.
6. The two lights must be OFF indicating loss of power.
7. Upon restoration of power all contactors must remain OFF. All pilot lights must be OFF. This demonstrates emergency off function remains disabled during a loss of power. No auto restart after any emergency OFF operation.

TESTING ACTION

8. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON.
9. Individually rotate each on-off selector switch for the PDU, TCU to OFF then ON.
10. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON. Turn OFF incoming power from the breaker feeding power to this panel and restore power to the panel.

VERIFY

8. The two green pilot lights should be ON.
9. Each green indicating light should turn OFF and the respective contactor should open in OFF. Each green pilot light should turn on and its respective contactor close when turned ON as the selector switch is switched to ON.
10. Both green pilot lights must be ON. PDU and TCU green indicating lights should turn OFF with loss of power. The TCU contactor and TCU green indicating light must turn ON with the restoration of power indicating the proper operation of the automatic restart feature.
PDU pilot light turns off on any loss of power and remains off with restoration of power. PDU contactor opens and does not close upon power restoration. PDU does not automatically restart after a power loss.
This demonstrates the DC supervisory circuit is operating properly and the TCU auto restart feature is operational.

2-7 TESTING DUAL FEED PANELS**WARNING!**

AC AND DC CONTROL POWER IS PRESENT WHEN THE BREAKERS ARE IN THE OPEN POSITION. POWER ORIGINATES FROM TWO SEPARATE SOURCES. DE-ENERGIZE BOTH PRIOR TO SERVICING THIS PANEL. MAKE SURE NO ONE IS WORKING ON THE EQUIPMENT WHICH THIS PANEL FEEDS PRIOR TO TESTING THE PANEL.

TESTING ACTION

1. Press the main power ON pushbutton and PDU ON pushbutton. Rotate the TCU and PDU selector switches to ON.
2. Press any emergency off pushbutton.
3. Press the main power ON and PDU ON pushbuttons. Verify TCU and PDU selector switches are all set to ON and repeat for all other emergency off pushbuttons.
4. Press the main power ON pushbutton and PDU ON pushbutton. Verify TCU and PDU selector switches are all set to ON. Individually rotate each on-off selector switch for the PDU and TCU to off then on.
5. Press any emergency off button.
6. Start with the de-energized state of #5, turn OFF both incoming power feeds from the normal power breaker and the essential power breaker feeding power to this panel.
7. Restore both the normal and essential power feeds to the panel.

VERIFY

1. Two green pilot lights should be ON indicating proper contactor operation.
2. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF.
3. All contactors must de-energize and stay de-energized. All three pilot lights must be OFF when emergency off is pressed.
4. Two green pilot lights should be ON indicating proper contactor operation. Each green indicating light should turn OFF and the respective contactor should open in OFF and close when switch is ON.
5. All contactors must de-energize and stay de-energized. All two pilot lights must be OFF.
6. All pilot lights must be OFF indicating system is de-energized.
7. Upon restoration of power all pilot lights and contactors must remain OFF. This demonstrates auto restart does not work after emergency off operations.

TESTING ACTION

8. Press the main power ON pushbutton and PDU ON pushbutton. Verify the TCU and PDU selector switches are all set to ON.
9. De-energize power to the PDU breaker only from its source breaker.
10. Restore power to PDU breaker from source breaker.
11. Press main power ON push button. Press PDU power on pushbutton.
12. De-energize TCU essential source breaker feeding this panel.
13. Restore TCU essential source breaker feeding power to this panel.
14. Press the main power ON pushbutton and PDU on pushbutton. Verify the TCU and PDU selector switches are all set to ON.
15. De-energize both normal PDU source power and essential source power to the panel and restore power to the panel.

VERIFY

8. Both pilot lights should be ON.
9. PDU light and contactors C1 will turn OFF as it indicates system's actual state. TCU light will remain ON.
10. PDU breaker green pilot remains OFF and contactor C1 remains open. TCU green pilot light should remain ON.
11. PDU breaker pilot light turns ON. TCU green pilot light should be ON.
12. All pilot lights should be OFF and all contactors open as the AC control power is obtained from the essential power feed.
13. PDU pilot light remains off. TCU pilot light turns on with power restoration. Contactor C2 should close.
14. Two green pilot lights should be ON.
15. Both green pilot lights must be ON. The PDU and TCU green pilot lights should turn OFF during the power outage. Upon restoration of power PDU pilot light and PDU contactor remains open. TCU pilot light turns on. Restoration of power must initiate "ON" operation of TCU pilot light and contactor C2 for the TCU.
This demonstrates the DC supervisory circuit is operating properly and the TCU auto restart feature is operational.

4-MAINTENANCE

4-1 General Maintenance

Note

The auto restart circuit requires the 7 Ah DC battery to be functional. Semi-annually verify that the 12V DC charging circuit is operational.

Battery and Charger Test

1. Unplug battery charger from receptacle.
2. Remove the (+) wire from the charger.
3. Plug in charger and measure DC voltage of charger.
DC voltage must be between 12 and 13.65 volts. If less than 11 volts, replace charger.
4. With charging circuit de-energized, measure the DC battery voltage. If battery voltage is less than 11 volts replace battery. Whenever a battery is replaced the charger must also be replaced.

Normal operation of DC circuit is from DC charger with battery fully charged in float stage. If battery is suspect or questionable, replace immediately as this is an insignificant maintenance cost. The manufacturer of the battery is B & B Battery and the manufacturer for the charger is EDS, Inc. Contact GE Supply or BatteryStuff.com for battery replacement.

Battery# BP7-12

Charger# 11027

Specific battery maintenance and recharge/discharge information can be found in attached B & B documents and on the B & B web site (below).

Battery life is 5 years at which time it must be replaced. Initial date code on top of battery is read as (mm/dd/y/c). Where c = Q.C. inspector code.

B & B Battery can be located at: www.batterystuff.com

GE Supply
12221 W. Feerick St.
Milwaukee, WI 53222
Phone 414-527-6600
Fax 414-527-6652

GE Supply
National Service Center
9100 Purdue Road Suite 300
Indianapolis, IN 46268
Phone 1-800-243-7313

See illustration 4-1 and 4-2 for battery manufacturer's main data sheet.



Maintenance-Free Rechargeable Sealed Lead-Acid Battery



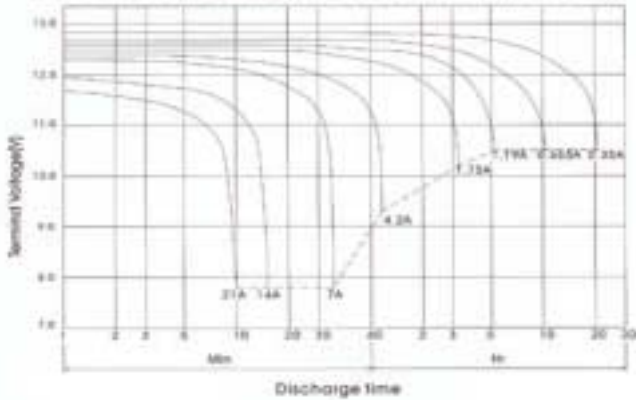
BP7-12

The battery is constructed by plates, separators, safety valves and container. Since the electrolyte is held by a glass-mat separator and plates, the battery can use in any direction and position without leakage.

PERFORMANCE SPECIFICATIONS

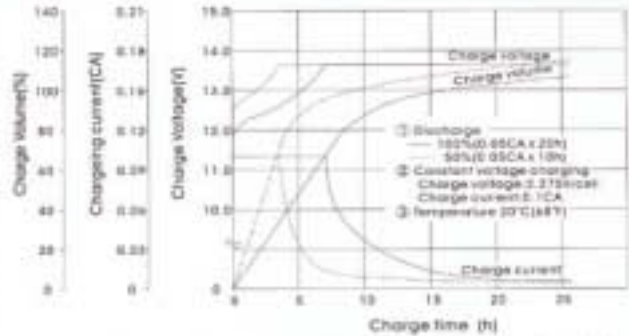
| | |
|--|---|
| Nominal Voltage(V) | 12 volts(6cells in series) |
| Nominal Capacity(AH) | |
| 20 hour rate F.V.(1.75V/cell) (350mA to 10.50volts) | 7.0A.H. |
| 10 hour rate F.V.(1.75V/cell) (665mA to 10.50volts) | 6.65A.H. |
| 5 hour rate F.V.(1.75V/cell) (1190mA to 10.50volts) | 5.95A.H. |
| 1 hour rate F.V.(1.55V/cell) (4200mA to 9.30volts) | 4.2A.H. |
| Approximate Weight | 2600g(5.73lbs.) |
| Terminal | |
| Standard | Type T2 |
| Optional | Type T1 |
| Internal Resistance (Fully Charged Battery) | <25m Ω |
| Maximum Discharge Current For 5 sec.(A) | 105A |
| Maximum Charge Current(A) | 2.1A |
| Ambient Temperature | |
| Charge | 0°C(32°F)-40°C(104°F) |
| Discharge | -20°C(-4°F)-50°C(122°F) |
| Storage | -20°C(-4°F)-40°C(104°F) |
| Vibration test: | |
| Frequency: | 10.7HZ |
| Amplitude: | 4mm |
| Vibrate the battery horizontally or vertically for 60 minutes.The battery have no abnormality. | |
| Case | ABS |
| Dimension(mm/inch) | |
| Length ± 1.5mm | 151/5.95 |
| Width ± 1.5mm | 65/2.56 |
| Container Height ± 1.5mm | 93/3.66 |
| Total Height ± 2mm | 98/3.86 |
| Application | UPS,Laboratory Equipment,Toy-Cars,Power Packs,Fishing Lights. |

BP7-12 Battery discharge characteristics (25°C/77°F)



BATTERY CHARGING CHARACTERISTICS

(Typical example of charge characteristics for the standby use)

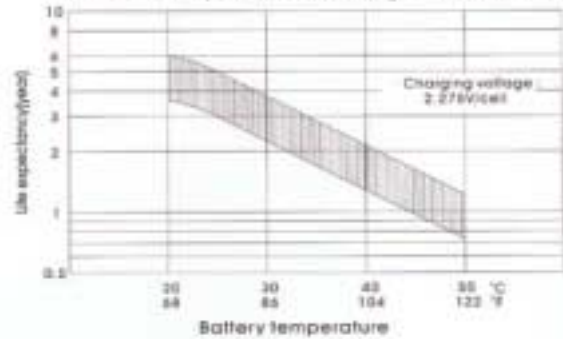


Charging Procedure

| Application | Charging method | Charge voltage at 25°C (V/cell) | Temperature compensation coefficient of charging voltage (mV/°C/cell) | Max. charging current (CA) | Charging time @ 1CA, 25°C (h) | | Temp. (°C) |
|--------------------------|--|---------------------------------|---|----------------------------|-------------------------------|---------------|-----------------|
| | | | | | 100% discharge | 50% discharge | |
| for standby power source | Constant voltage & Constant current charging (both current restricted) | 2.25-2.30 | -0.5 (1.6mV/°C/cell) | 0.3 | 34 | 20 | 0-40 (32-104°F) |
| for cyclic service | | 2.40-2.45 | 0 (2.8mV/°C/cell) | 0.3 | 16 | 10 | |

*Temperature compensation of charging voltage is not needed when using the batteries within 0°C to 35°C range.

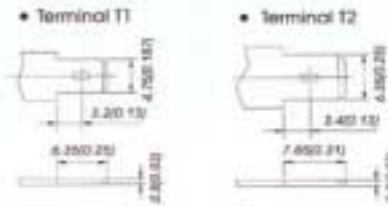
Effect of Temperature on Long Term Float Life



OUTER DIMENSIONS



TERMINAL TYPE mm(inch)



TERMINAL POSITION



B.B. BATTERY CO., LTD.

USA :
B&B BATTERY (USA) INC.
6415 RANDOLPH ST. CITY OF
COMMERCE, C.A. 90040 U.S.A.
TEL: 1-323-278-1800
FAX: 1-323-278-1258, 1-800-278-8599
Web Site: <http://www.bb-battery.com>

CHINA FACTORY:
CHENG DONG TRIAL AREA,
HUANG GANG, RAOPING
GUANG DONG, CHINA, 515700
TEL: 86-766-7601001-2
FAX: 86-766-7601469
E-mail: bbchina@pub.chinahouse.net.cn

UK:
B & B BATTERY (UK) CO. LTD.
32 MOOR FIELD
WHALLEY, CLITHEROE
LANCS, ENGLAND BB7 8BA
TEL: 44-(0)1254-824720
FAX: 44-(0)1254-823225

HONG KONG OFFICE:
NATIONAL TRADING LTD.
6D HILTON TOWER, 96
GRANVILLE RD, TSIMSHATSUI
EAST, KLN, HONG KONG.
TEL: 852-2301-3600
FAX: 852-2735-1162
E-mail: bbhk@hkase.com

JAPAN:
B & B BATTERY (JAPAN) CO. LTD.
1375-11 NARAHARA-MACHI
HACHIOJI, TOKYO 193-0803, JAPAN
TEL: 81-426-256-537
FAX: 81-426-256-537

TAIWAN OFFICE:
B & B BATTERY CO. LTD.
TEL: 886-2-22990887, 22990890
FAX: 886-2-22999702



MH15884



4-2 Battery Manufacturer's Application Notes

BB BP batteries are highly efficient maintenance free electrochemical systems designed to provide years of trouble free electrical energy. The performance and service life of these batteries can be maximized by observing the following guidelines:

1. Heat kills batteries. Avoid placing batteries in close proximity to heat sources of any kind. The longest service life will be attained where the battery temperature does not exceed 20°C. (also see notes 3 & 8 hereunder) . When calculating the correct float voltage setting, whether or not temperature compensation is required, full consideration must be given to the temperature of the battery and room ambient. For the purpose of the calculation, consider the temperature of a battery on float to be 1°C. above local ambient. Also, if the battery is used in an enclosure, the temperature gradient of the enclosure itself must be included in the calculation, i.e. The operating temperature of the battery is given by: -Room temperature + enclosure temperature + 1°C.
2. Since a battery may generate ignitable gases, do not install close to any equipment that can produce electrical discharges in the form of sparks.
3. When the battery is operated in a confined space, adequate ventilation should be provided.
4. The battery case is manufactured from high impact ABS plastic resin. It should not be placed in an atmosphere of, or in contact with organic solvents or adhesive materials.
5. Correct terminals should be used on battery connecting wires. Soldering is not recommended but if unavoidable please refer to us for further guidance.
6. Avoid operating at temperatures outside the range -15 to +50°C. for float/standby applications and +5 to +35°C. for cyclic use.
7. When there is a possibility of the battery being subjected to heavy vibration or mechanical shock, it should be fastened securely and the use of shock absorbent material is advisable.
8. When connecting the batteries, free air space must be provided between each battery. The recommended minimum space between batteries is 0.02 inches (5mm) to 0.04 inches (10mm) . In all installations due consideration must be given to adequate ventilation for the purposes of cooling.
9. When the batteries are to be assembled in series to provide more than 100V, proper handling and safety procedures must be observed to prevent accidental electric shock. (See note #15 below) .
10. If 2 or more battery groups are to be used, connected in parallel, they must be connected to the load through lengths of wires, cables or busbars that have the same loop line resistance as each other. This makes sure that each parallel bank of batteries presents the same impedance to the load as any other of the parallel banks thereby ensuring correct equalization of the source to allow for maximum energy transfer to the load.
11. To obtain maximum life, the ripple current flowing in the battery, from any source, should not exceed 0.1C Amps R.M.S.
12. When cleaning the battery case, ALWAYS use a water soaked wet or dampened cloth but NEVER use oils, organic solvents such as petrol, paint thinners etc. DO NOT even use a cloth that is impregnated or has been in contact with any of these or similar substances.
13. Do not attempt to dismantle the battery. If accidental skin/eye contact is made with the electrolyte, wash or bathe the affected area/part straight away with liberal amounts of clean fresh water and seek IMMEDIATE medical attention.
14. DO NOT INCINERATE batteries as they are liable to rupture if placed into a fire. Batteries, that have reached the end of their service life, can be returned to us for safe disposal.
15. Touching electrically conductive parts might result in an electric shock. Be sure to wear rubber gloves before inspection or maintenance work.
16. The use of mixed batteries with different capacities, that may have been subjected to different uses, be of different ages and are of different manufacturers is liable to cause damage to the battery itself and/or the associated equipment. If this is unavoidable please consult us beforehand.
17. To obtain maximum life, batteries should never be stored in a discharged state.
18. In order to obtain maximum working life, when the batteries are used in an UPS system, the following is advised:-
 - (a) Where the D.C. Input exceeds 60 volts, each battery should be insulated from the battery stand by using suitable polypropylene or polyethylene material.
 - (b) In high voltage systems the resistance between battery and stand should always be greater than 1 Megohm. An appropriate alarm circuit could be incorporated to monitor any current flow.

4-3 Battery Manufacturer's Material Safety Data Sheet

B & B Battery (U.S.A.), Inc.

6414 Randolph Street, City of Commerce, CA 90040 (323) 278-1900 Fax (323) 278-1268

MATERIAL SAFETY DATA SHEET

PRODUCT NAME: Sealed Maintenance free Lead Acid Batteries

DATE: 7/1/00

ISSUED BY: ENGINEERING

TELEPHONE NO: (323) 278-1900

HAZARDOUS COMPONENTS

| COMPONENTS | % WEIGHT | TLV | LD50 ORAL | LC50 INHALATION | LC50 CONTACT |
|------------------------------------|-----------|---------------------|---------------|-----------------|--------------|
| Lead (Pb, PbO ₂ , PbSo) | About 70% | N/A | (500) mg/Kg | N/A | N/A |
| Sulfuric Acid | About 20% | 1 mg/m ³ | (2.140) mg/Kg | N/A | N/A |
| Fiberglass Separator | About 5% | N/A | N/A | N/A | N/A |
| Styron R 478 (Polystyrene) | About 5% | N/A | N/A | N/A | N/A |

PHYSICAL DATA

| COMPONENTS | DENSITY | MELTING POINT | SOLLUBILITY (H ₂ O) | ODOR | APPEARANCE |
|-----------------|-----------|-----------------------|--------------------------------|---------|------------------------|
| Lead | 11.34 | 327.4°C (Boiling) | None | None | Silver-Gray Metal |
| Lead Sulfate | 6.2 | 1070°C (Boiling) | 40 mg/l (15°C) | None | White Powder |
| Lead Dioxide | 9.4 | 290°C (Boiling) | None | None | Brown Powder |
| Sulfuric Acid | About 1.3 | About 114°C (Boiling) | 100% | Acidic | Clear Colorless Liquid |
| Fiberglass Sep. | N/A | N/A | SLIGHT | TOXIC | WHITE FIBROUS GLASS |
| 478 Polyslyrene | N/A | N/A | NONE | NO ODOR | SOLID |

FLAMMABILITY DATA

| COMPONENTS | FLASHPOINT | EXPLOSIVE LIMITS | COMMENTS |
|-----------------|------------|------------------|--|
| Lead | None | None | |
| Sulfuric Acid | None | None | |
| Hydrogen | | 4% - 74.2% | Sealed batteries can emit hydrogen only if over charged (float voltage > 2.4 VPC) |
| Fiberglass Sep. | N/A | N/A | Toxic vapors may be released. In case of fire: wear self-contained breathing apparatus. |
| 478 Polyslyrene | None | N/A | Temperatures over 300 °C (572°F) may release combustible gases. In case of fire: wear positive pressure self-contained breathing apparatus. |

FIRST AID**SULFURIC ACID PRECAUTIONS****SKIN CONTACT:** Flush with water, see physician if contact area is large or if blisters form.**EYE CONTACT:** Call physician immediately and flush with water until physician arrives.**Ingestion:** Call physician. If patient is conscious, flush mouth with water, have the patient drink milk or sodium bicarbonate solution.**DO NOT GIVE ANYTHING TO AN UNCONSCIOUS PERSON.**

**B & B MATERIAL SAFETY DATA SHEET FOR BP7-12 BATTERY
ILLUSTRATION 4-3**

REACTIVITY DATA

| | |
|------------------------|--|
| COMPONENT | Sulfuric Acid |
| STABILITY | Stable at all temperatures |
| POLYMERIZATION | Will not polymerize |
| INCOMPATIBILITY | Reactive metals, strong bases, most organic compounds |
| DECOMPOSITION PRODUCTS | Sulfuric dioxide, trioxide, hydrogen sulfide, hydrogen |
| CONDITIONS TO AVOID | Prohibit smoking, sparks, etc. from battery charging area. Avoid mixing acid with other chemicals. |

SPILL OR LEAK PROCEDURES

STEPS TO TAKE IN CASE OF LEAKS OR SPILLS

If sulfuric acid is spilled from a battery, neutralize the acid with sodium bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime).

Flush the area with water discard to the sewage systems. Do not allow unneutralized acid into the sewage system.

WASTE DISPOSAL METHOD:

Neutralized acid may be flushed down the sewer. Spent batteries must be treated as hazardous waste and disposed of according to local state, and federal regulations. A copy of this material safety data must be supplied to any scrap dealer or secondary smelter with battery.

PROTECTION

| EXPOSURE | PROTECTION | COMMENTS |
|-------------|-----------------------------|---|
| SKIN | Rubber gloves, Apron | Protective equipment must be worn if battery is cracked or otherwise damaged. |
| RESPIRATORY | Respirator (for lead) | A respirator should be worn during reclaim operations if the TLV exceeded. |
| EYES | Safety goggles, Face Shield | |

ELECTRICAL SAFETY

Due to the battery's low internal resistance and high power density. High levels of short circuit can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only.

Follow all installation instruction and diagrams when installing or maintaining battery systems.

HEALTH HAZARD DATA

LEAD: The toxic effects of lead are accumulative and slow to appear. It affects the kidneys, reproductive, and central nervous system.

The symptoms of lead overexposure are anemia, vomiting, headache, stomach pain (lead colic), dizziness, loss of appetite, and muscle and joint pain. Exposure to lead from a battery most often occurs during lead reclaim operations through the breathing or ingestion of lead dusts and fumes.

THIS DATA MUST BE PASSED TO ANY SCRAP OR SMELTER WHEN A BATTERY IS RESOLD.

SULFURIC ACID: Sulfuric acid is a strong corrosive. Contact with acid can cause severe burns on the skin and in the eyes. Ingestion of sulfuric acid will cause GI tract burns. Acid can be release if the battery case is damaged or if the vents are tampered with.

FIBERGLASS SEPARATOR: Fibrous glass is an irritant of the upper respiratory tract, skin and eyes. For exposure up to 10F/CC use MSA Comfoll with type H filter. Above 10F/CC up to 50F/CC use Ultra-Twin with type H filter. This product is not considered carcinogenic by NTP or OSHA.

**B & B MATERIAL SAFETY DATA SHEET FOR BP7-12 BATTERY
ILLUSTRATION 4-4**

4-4 BATTERY FEATURES

The following is a list of features of the B & B batteries.

SEALED CONSTRUCTION

BB unique construction and sealing technique ensures that no electrolyte leakage should occur from the terminals or case of any BP battery. This feature provides for safe and efficient operation of BP batteries in any orientation. BB BP batteries are classified as "Non-Spillable" and meet all requirements of the International Air Transport Association. (I.A.T.A. Dangerous Goods Regulations).

ELECTROLYTE SUSPENSION SYSTEM

All BB BP batteries utilize an electrolyte suspension system consisting of a glass fiber separator material. This suspension system helps to achieve maximum service life, by fully retaining the electrolyte and preventing its escape from the separator material. No silica gels or other contaminants are used.

GAS GENERATION

BP batteries incorporate a unique BB design that effectively recombines over 99% of the gas generated during normal usage.

MAINTENANCE FREE OPERATION

During the life of BP batteries, there is no need to check their specific gravity or add water etc. In fact, there are no provisions for such maintenance functions to be carried out.

OPERATION IN ANY ORIENTATION

The combination of sealed construction and BB's electrolyte suspension system permits operation of BP batteries in any orientation without loss of capacity, electrolyte, or service life.

LOW PRESSURE VENTING SYSTEM

BB BO batteries are equipped with a safe, low pressure venting system, which is designed to release excess gas and reseal automatically in the event of the internal gas pressure rising to an unacceptable level. This low pressure venting system, coupled with the significantly high recombination efficiency, make BB BP batteries one of the safest valve regulated lead acid batteries available.

HEAVY DUTY GRIDS

The heavy duty lead calcium alloy grids in BP batteries provide an extra margin of performance and service life in both float and cyclic applications, even in conditions of deep discharge.

CYCLIC SERVICE LIFE

Depending upon the average depth of discharge, over 1,000 discharge/recharge cycles can be expected from BP batteries.

FLOAT SERVICE LIFE

The expected service life of BP batteries used in standby applications is typically 5 years; however, experience has shown that their service life often exceeds 6 years, if the BP batteries are operated strictly within specification.

4-5 General Battery and Charger Specifications

Refer to Tables 4-1 and 4-2 for manufacturer’s general specifications for the B & B BP7-12 battery and the EDS 11027 charger.

TABLE 4-1
GENERAL BATTERY SPECIFICATIONS

| B&B Model # | Nominal Voltage (V) | Nominal Capacity 20 hr rate (mA) | Discharge Current 20 hr rate (mA) | Dimensions | | | | | | | | Approx. Weight | | Standard Terminal Type |
|-------------|---------------------|----------------------------------|-----------------------------------|------------|-----|-------|-----|--------|-----|--------|-----|----------------|-----|------------------------|
| | | | | Length | | Width | | Height | | H.O.T. | | lbs. | kg. | |
| | | | | in. | mm. | in. | mm. | in. | mm. | in. | mm. | | | |
| BP7-12 | 12 | 7.0 | 350 | 5.95 | 151 | 2.56 | 65 | 3.7 | 94 | 3.86 | 98 | 5.7 | 2.6 | T2 |

GENERAL CHARGER SPECIFICATIONS

TABLE 4-2

| EDS Model# | Nom. Voltage (V) | Voltage Range (V) | Nominal Current (A) | Type of Charger |
|------------|------------------|-------------------|---------------------|-------------------|
| 11027 | 12 | 13.6- 14.70 | 0.70 | Dual Voltage Auto |

| Charger Dimensions | | | | | | | |
|--------------------|------|--------|------|--------|-------|----------------|------|
| Length | | Width | | Height | | Approx. Weight | |
| Inches | mm | inches | mm | inches | mm | lbs | kg |
| 3.4 | 86.4 | 2.8 | 71.1 | 2.3 | 58.42 | 1.3 | 0.59 |

5 PARTS LIST**5-1 Renewable Parts**

See Table 5-1 for renewable parts for the Ovation main disconnect panel.

Table 5-1
LIST FOR RENEWABLE PARTS

| Part | Volts | Amps | Manufacturer Part Number | |
|---|----------|------|--------------------------------|---------------|
| | | | Buss | Gould-Shawmut |
| Fuse F1 | 380,480 | 1.25 | SNQ-R-1-1/4 | ATQR1-1/4 |
| Fuse F2 | 120 | 3 | FNQ-R-3 | ATQR3 |
| Fuse F3 | 200 | 20 | FNQ-R-20 | ATQR20 |
| Fuse F4 | 480 | 8 | FRS-R-8 | TRS8R |
| | 400 | 10 | FRS-R-10 | TRS10R |
| Fuse F5 | 12VDC | 1 | LP-CC-1 | ATDR1 |
| Fuse F6 | 480, 400 | 0.12 | SNQ-R-1/8 | ATQR1/8 |
| Fuse F7 | 480,400 | 40 | LPJ40SP | AJT40 |
| Red PB Operator* | | | CR104PBG00R1 | |
| Contact Block* | | | CR104PXC01F | |
| Name Plate* | | | CR104PXN2RP009 "Emergency Off" | |
| SS Wall Plate* | | | CR2940BD201D | |
| Selector Switch | | | P9SSMD0V | |
| Pilot Lamp (Green) | | | 080BA9S6LV | |
| Battery | 12 DC | - | BP7-12 | |
| Battery Charger | 12 DC | 0.80 | 11027 | |
| * = Component parts of additional remote emergency OFF pushbutton | | | | |

All of the above parts are in stock at GE Supply Milwaukee (414)-527-6600.

5-2 Replacement Parts

See Table 5-2 for replacement parts for the Openspeed System main disconnect panel.

Table 5-2
LIST FOR REPLACEMENT PARTS

| Part | Manufacturer Part Number | | |
|--|--------------------------|-------------|-------------|
| Power Distribution Block | 4000N51P062 | | |
| Neutral Block | 4000N51P059 | | |
| CB1 | SEHA36AT0060 | | |
| 40 AMP Plug | SRPE60A40 | | |
| CB2 | SEHA36AT0030 | | |
| 15 AMP Plug | SRPE30A15 | | |
| CB3 | V07220 | | |
| F1 and F6 Fuse Blocks | 3007N36P002 | | |
| F2 and F3 Fuse Blocks | 3007N36P001 | | |
| F5 Fuse Block | 3007N38P001 | | |
| F4 Fuse Block | 3007N39P009 | | |
| F4 Dead Front Cover | 3007N39P010 | | |
| F7 Fuse Block | 3007N39P006 | | |
| F7 Dead Front Cover | 3007N39P007 | | |
| C1 | CL10A311MJS | | |
| C2 | CL04A310MJ | | |
| CPT1 | 9T58E0506 | | |
| 3KVA Transformer | 5000N53P001 | | |
| CR1 | 4001N42P001 | | |
| CR2 | RL4RA022TU | | |
| T1 | RL4RA040TJ | BTLF30C | |
| Charger-Recepticle, Box, and Cover | 3009N13P003 | 3009N14P001 | 3009N14P004 |
| Main Power and PDU Power "ON" PB's | P9SPNVG | | |
| PDU "ON-OFF" Selector Switches | P9SSMD0V | | |
| PDU Light Operators and Power Supply MOD's | P9SLVD | P9PTNVJLV | |