

**SITE PLANNING
AND
INSTALLATION
FOR
GENERAL ELECTRIC
1.0T & 1.5T CXK4 SIGNA EXCITE & TWIN
TRUE MOBILE
E&W MODEL VF9XX
REV. 0 USED ON VF901 AND UP**

LIST OF AFFECTED PAGES

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Rev. 0 9/1/05

* Asterisk reflects pages with actual content change:

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SECTION 1 **INTRODUCTION**

- 1.1 The following is set up to assist in the preparation of a site for the Ellis & Watts Model VF9XX. For additional instructions on set-up, transport, operation and maintenance, please refer to the Ellis & Watts Operator/Service Manual, Document #93J_.OS1.

Site Planning includes that portion of the MR project in which the location and orientation of the Mobile MR System is selected. Also referenced are the concrete pad, power, telephone, water, and cryogen storage requirements necessary prior to installation.

Installation looks at all activities which take place once the Mobile MR System has been prepared for shipment, through power hook up at the site.

1.2 **Division of Responsibilities**

The following shows the division of responsibilities between Ellis & Watts and the customer. Any exceptions should be communicated to Ellis & Watts in writing as early in the planning stages as possible to avoid delays in the schedule.

Ellis & Watts will provide:

- Service Technician to familiarize owner/operator with features and operation of unit.
- Standard price does not include transportation from Ellis & Watts to site, but Ellis & Watts can provide this service for additional cost.

Customer to provide:

- Transportation of unit to site including required permits.
- Foundation constructed in compliance with this document and attached drawings including plumbing and electrical. Depth of foundation below grade shall meet applicable local, state and national codes. A local structural engineer must design the pad.
- A reasonable means of entry and exit for the unit. Approximate total length of Mobile MR System transport trailer and its tractor is sixty-six feet (66').
- Labor to connect plumbing, telephone and electrical power.

- Any local and state permits (example: building, electrical, plumbing etc.). (For both the Pad & the Mobile Unit)
- Any local and state code issues.
- Storage area for GE cryogen dewars needed to refill magnet. This area requires a 138" high ceiling in at least a 24" x 24" area for inserting transfer line into helium dewar. Contact General Electric Service for more information if required.
- Any connecting corridor or walkway.

Note:

To power up and operate your Mobile MR System, consult the Operator/Service Manual, Ellis & Watts Document #93J_.OS1.

Please contact our Mobile MR System Site Planner at (513) 752-9000 for any questions that you may have.

SECTION 2 SITE PLANNING

2.1 **Location**

Locating your Mobile MR System is a function of the criteria you have developed for your operation, the magnet field strength, and location of vehicular traffic relative to the unit. A list of criteria might include:

- A) Length of walkway to hospital or other facility.
- B) Access to cryogen storage.
- C) Side of building for best patient access.
- D) Impact of magnet field to surrounding areas such as parking lots or buildings.
- E) Adaptability to landscaping.
- F) Compatibility between air conditioners and surrounding facility.
- G) Acceptable clearances and ventilation for generator airflow.
- H) Impact of moving metal and vibration.
- I) Flat level areas for patient lift operation, and for personnel stairs set-up. (See Illustration 3.1)

The Mobile MR System houses a MRI magnet at one end (above the wheels) with a patient door towards the front (see Illustration 3.2, Exterior Mobile layout). The chosen orientation of the magnet end should include consideration for iron in surrounding structures or vehicles and equipment that produces vibration. These items can degrade image quality.

Also refer to Illustration 3.1 for pad dimensions required.

The following list specifies the minimum distance from the Mobile MR System for various **stationary** items to prevent the magnetic gauss field from affecting the items and conversely, having the items affect magnetic field homogeneity. For the exclusion zone of the 1.0T & 1.5T SIGNA Horizon magnet, see paragraph 3.9.

**8 feet from unit walls
(less than .5 gauss):**

- Nuclear Cameras

**6 feet from unit walls
(less than 1 gauss):**

- PET Scanner
- Cyclotrons
- Accurate Measuring Scales
- Image Intensifiers
- CT Scanner
- Ultrasound Equipment
- Electron Microscope
- Linear Accelerators
- Color Television

Moving metal objects near the magnet can affect magnetic field homogeneity. Moving metal objects should be held a minimum of **9 feet** from the unit walls and **12 feet** from the top and bottom of the unit. Refer to G.E. for more details on moving metal restrictions. The following items are examples of such objects:

- Passenger & Freight Elevators
- Power Transformer
- Buses
- Emergency Vehicles
- Electric Transport Carts
- Escalators
- Helicopter Landings
- Forklift Trucks
- Automobile Traffic
- Dumb Waiter

The MR van is constructed with Radio Frequency Interference shielding in the scan room. The shielding is installed to meet the minimum G.E. shielding effectiveness requirement of 85 Db @ 100 MHz, with MR system installed.

The air suspension on the trailer is designed for normal highway service. Do not operate the trailer off-road, over the breaks at the beginning and end of steep inclines or on otherwise irregular surfaces. The pneumatic leveling and load compensation system is limited and excessive displacements can cause severe axle/suspension overloading.

It is wise to consider the approach of a 65'-75' tractor and trailer combination will have to make in order to reach the designated parking site or service site. (See Illustration 3.3)

2.2 Support Pad

It is necessary to consult with the architect designing the job with regard to soil conditions and local building codes prior to designing the support pad.

Under the magnet a maximum of 20 lb./sq. ft. of steel is allowed for active shield magnets in mobiles.

Pad to be level within 1/8" over 10 ft.

The recommended concrete pad size is 28' wide x 75' long. The minimum concrete pad size is 10' wide x 50' long (does not allow for stairs, lift and service access). (See Illustration 3.1.)

The top of the patient access doorsill is located 49.25" (the finished floor is 48.5") from the ground when the trailer is in the sited position. Walkways, if any, should be structured accordingly (see paragraph 2.8). A patient lift is available as well as stairs for patient/operator access. (See Illustration 3.1.)

Refer to GE Site Planning Direction for vibration specifications and testing requirements and moving metal location restrictions.

2.3 Power

The Mobile MR System utilizes 125 amp, 480 volt, 3 phase, 5 wire wye power (A,B,C configuration) for the MRI system, chiller and HVAC system.

A standard 35' shore power cable is located in the rear belly compartment (see Illustration 2.1). This cable can be accessed from either the roadside or curbside. One end is already hardwired into the trailer's electrical system. The free end of this cable has a Russellstoll connector attached for compatibility with the site's 480 volt, 3-phase receptacle. **Connection of shore power is to be performed by local, qualified electricians only.**

2.3.1 Power Distribution Requirements

In Ellis & Watts continuing efforts to establish compatibility at all hospitals and to have instant interchangeability with the many systems we now offer in the mobile medical fields, it is our recommendation that all sites supply 480 WYE, 150 kVA dedicated power. However, the following are the actual power requirements for General Electric 1.0T & 1.5T SIGNA Excite Mobile Systems:

Receptacle Voltage (Nominal)	480 VAC, 3-phase, 5-wire WYE with ground and neutral
Maximum Allowable Daily Line Voltage Variations	414 to 517 VAC
kVA Dedicated Power (Note: nothing else is to be connected to this circuit)	112.5 kVA
Supply Circuit Breaker/Fuses	150 AMPS
Line Voltage Balance	All lines within 2% of lowest line voltage.
Frequency	60 Hertz \pm .5 Hz
Regulation	4% Max at 112.5 kVA max power demand
Feeder Size	Less than 2% voltage drop at max power demand of 112.5 kVA.
Transients	Transients, other than those created by the 1.0T & 1.5T SIGNA Horizon System, shall not be more than 800 volts peak (on a 480V line) with a duration of less than 75 micro seconds.
Ground Conductor	An insulated copper ground conductor, sized in accordance with national and local codes, but not less than AWG #1/0, shall be installed between the facility vault and the Russellstoll receptacle. This ground shall not have a resistance to earth of more than 2 ohms.

2.3.2 Installation of Mobile MR Imaging System To Existing Hospital Power Distribution System

For installation of a Mobile General Electric SIGNA Imaging Unit at a hospital where the mobile unit will be furnished electrical power from an existing hospital power distribution system through a power distribution panel, the Mobile MR Imaging unit must be provided power through a dedicated branch circuit having no less than 112.5 kVA available power (refer to Illustrations 2.3 and 2.4 for electrical hook-up and phase rotation).

2.3.3 Installation of Mobile MR Imaging System To
 Dedicated Hospital Power Distribution Transformer

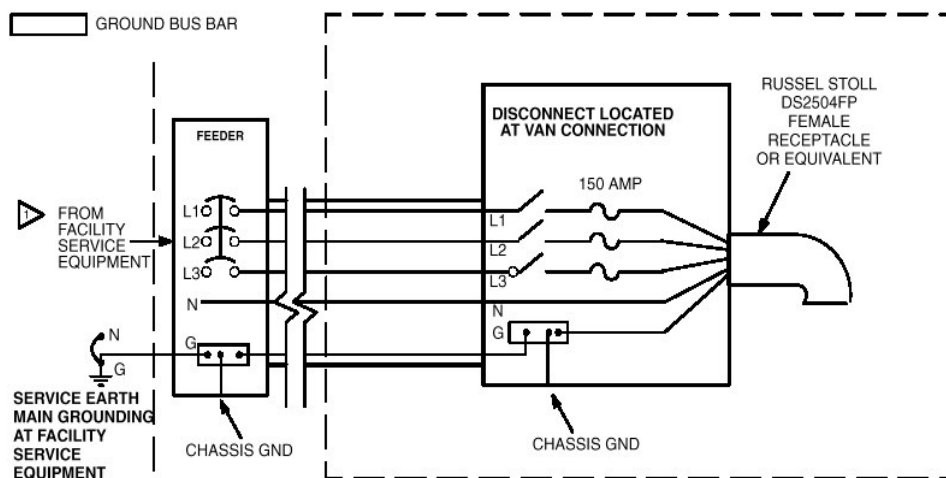
For installation of a Mobile General Electric SIGNA Imaging Unit, where the hospital power distribution transformer will feed only the Mobile Unit System, the minimum recommended size power distribution transformer is 112.5 kVA. Refer to Illustration 2.3 and 2.4 for electrical hook-up and phase rotation.

2.3.4 Mobile Grounding Requirements

Note:

- All work to be done in accordance with national and local electric codes. Information shown here is only a recommendation and must be verified for site national and local codes.
- Ground wires inside enclosures to be taped green for entire visual length for identification.

▷ Main bonding jumper between grounded (neutral) conductor and equipment grounding conductor to be provided in facility service equipment and downstream at separately derived system transformer secondary as shown.



GROUNDING

The ground for our system shall originate at the system power source, i.e., transformer or first access point of power into a facility, and be continuous to our 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 grounding block with the incoming and outgoing ground in this same grounding block, which is then connected to the steel panel. Never use the steel panel or other material of the panel as the block.

The connection at the power source shall be at the grounding point of the "Neutral-Ground" of a "Wye" transformer, or typical grounding points of a separately derived system.

In the case of an external facility, it shall be bonded to the facility ground point at the service entrance.

GROUND WIRE

The ground wire shall be copper wire with a minimum size 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 is 500 MCM with a secondary feeder to our system of AWG 1/0 wire, the ground to the distribution panel shall be 500 MCM with an AWG 1/0 to our system. The ground wire impedance from our 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.

Special Notes:

It is also recommended that a separate (#6 minimum copper) grounding conductor be installed from the main trailer ground lug in the rear curbside belly compartment to a driven ground rod as a supplemental grounding conductor for the trailer. When running (scanning) on generator (NOT RECOMMENDED) the copper wire from the earth ground rod to the trailer ground lug must be installed and used at all times per the NEC.

All specifications apply to measurements at the receptacle pins. Line voltage drops from the facility mains to the receptacle must be included in all power calculations.

Instantaneous fluctuations in the line voltage caused by loads other than this Mobile MR Imaging Unit must not exceed $\pm 5\%$, have a duration in excess of five (5) cycles, and frequency of their occurrence must not be more than ten (10) times per hour.

Power lines from the site source to the trailer are not to be run underneath or above the magnet. If it is necessary to run the wires underneath or above the unit, route them so as to avoid the area underneath or above the scan room.

Customer must install a label stating: "SERVICE DISCONNECT FOR MOBILE MRI UNIT" at hospital power source.

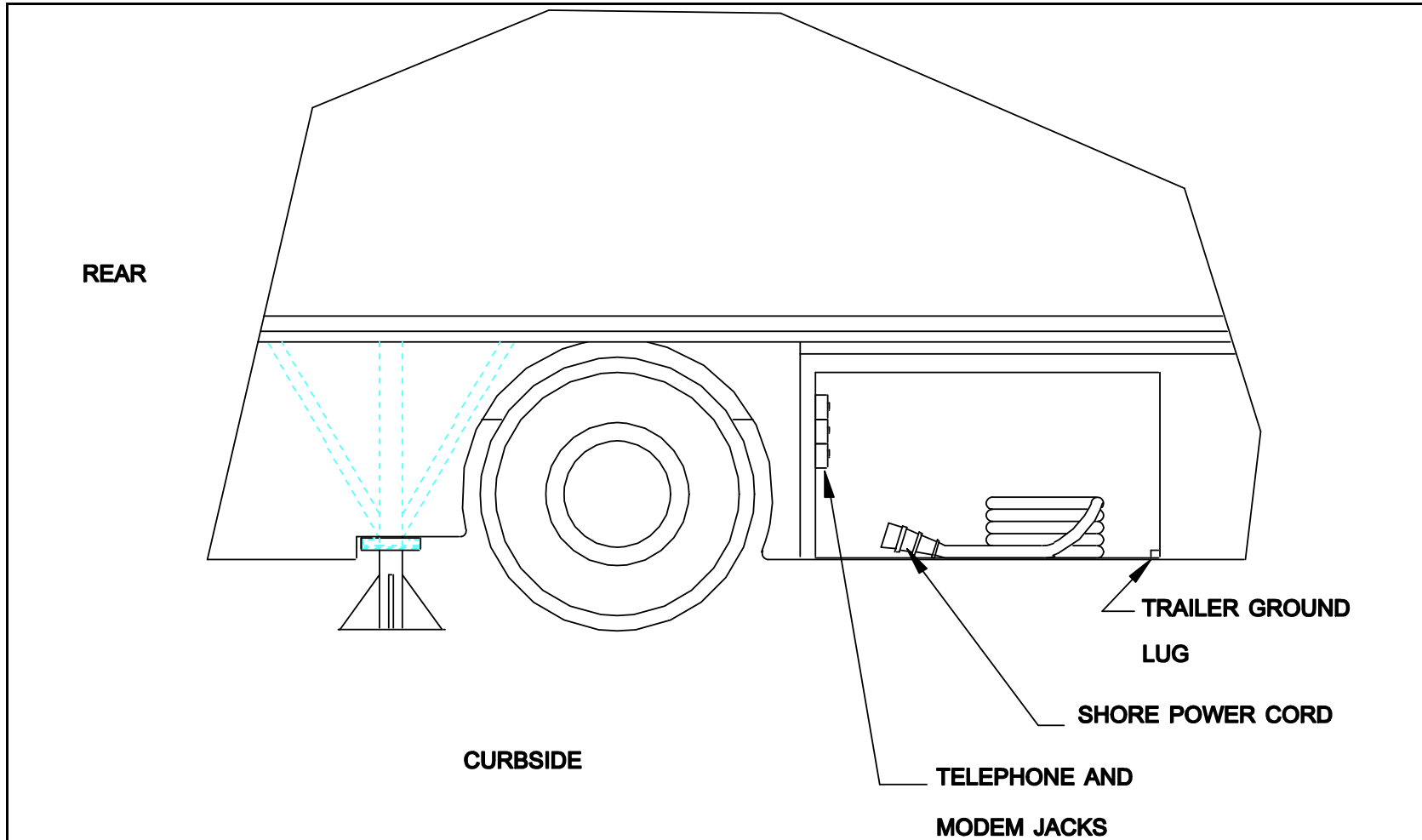


Illustration 2.1
Shore Power Cable & Telephone Line Receptacles

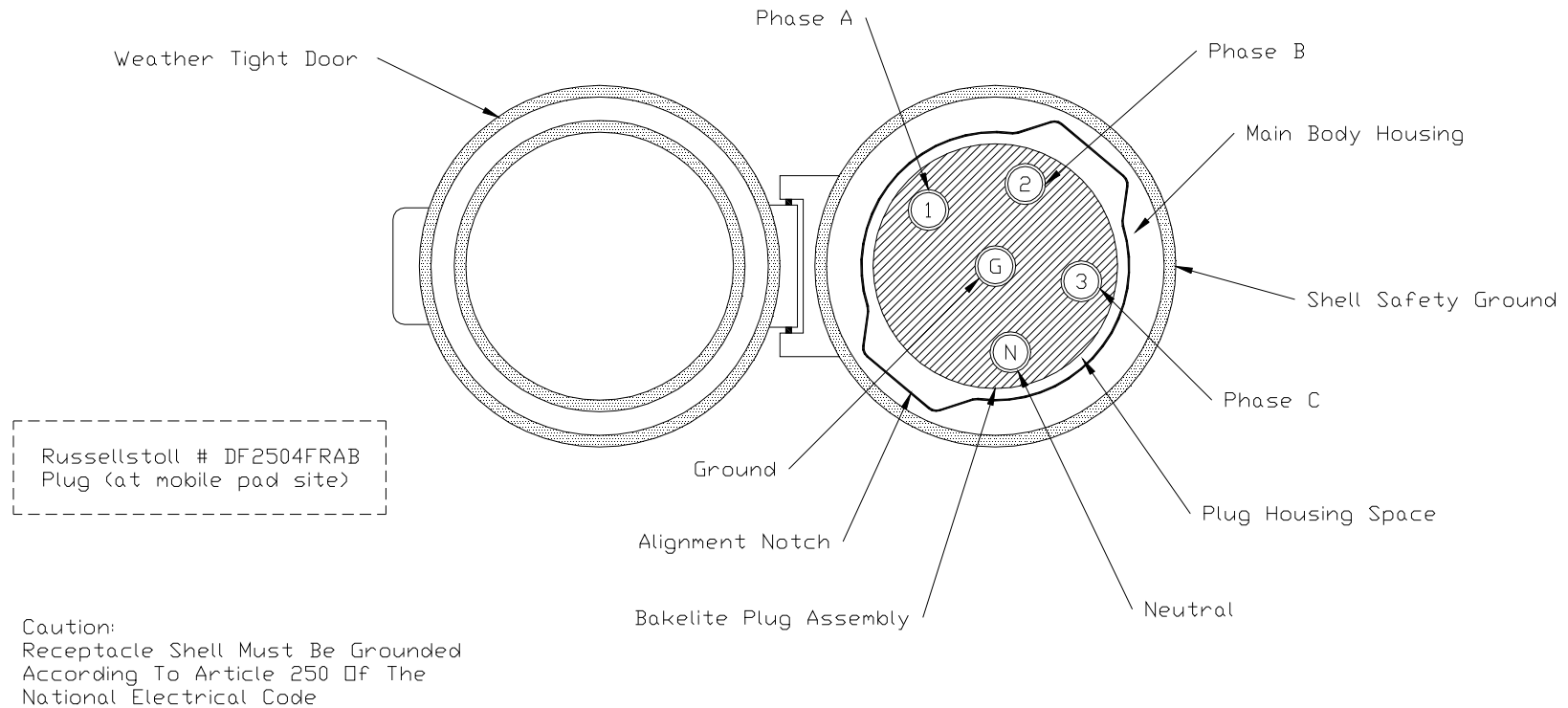


Illustration 2.3
Hospital Receptacle Wiring Configuration

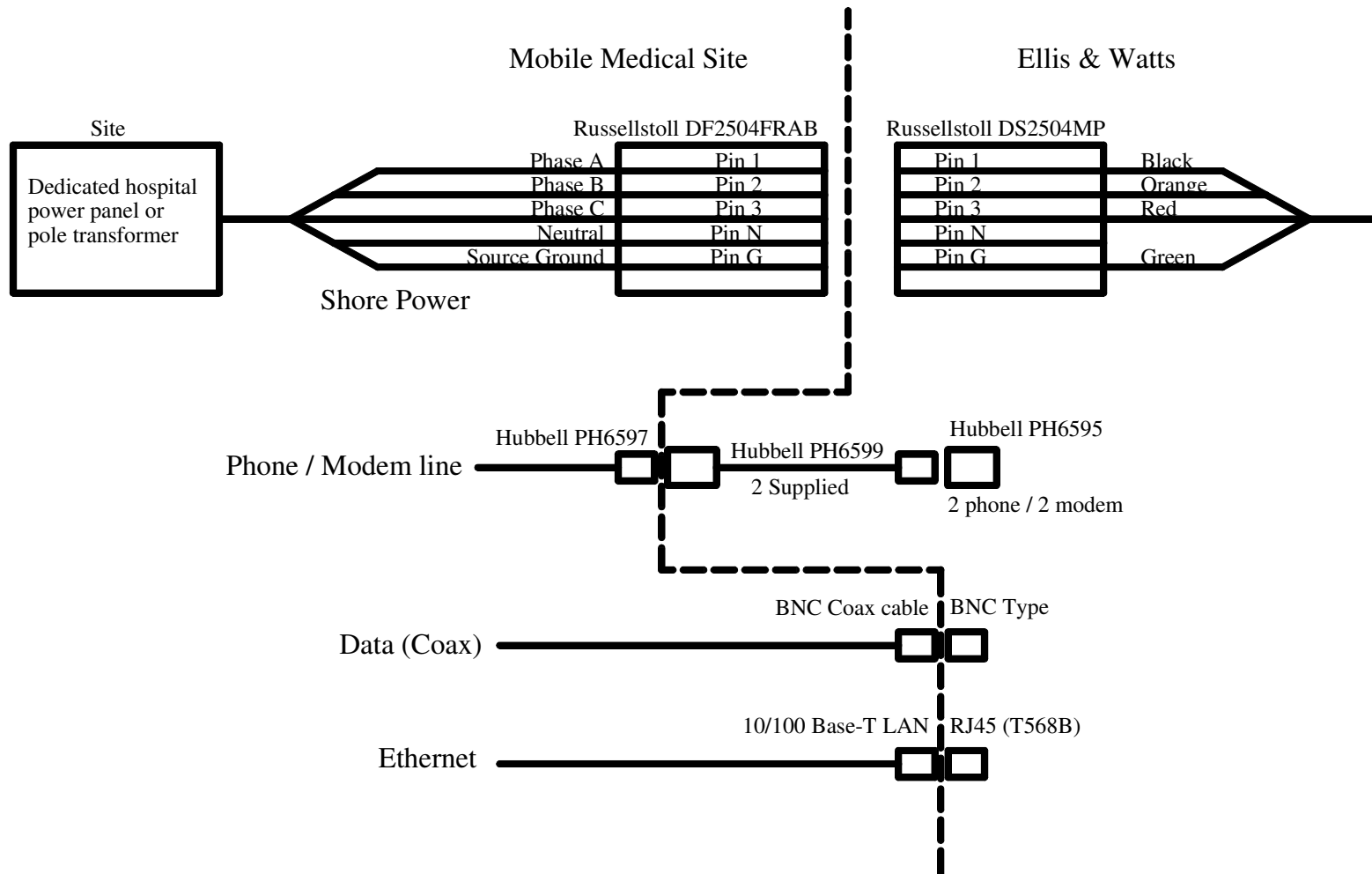


Illustration 2.4
Hospital & Van Cable Configuration

2.4 **Water (optional sink)**

Supply water is necessary for the optional sink. The optional water supply tank is located in a roadside belly compartment. There is a standard 3/4" hose connection on the outside of the belly compartment door as a direct supply to the sink for convenience; however, this will not fill the water tank. Opening and closing specific valves will redirect the flow of water and fill the tank.

Note:

In cold weather conditions, an optional heated water hose is required.

2.5 **Telephones/Data**

Two separate telephone lines, two modem lines and one cat 5 data line are terminated in a rear curbside belly compartment (see Illustration 2.1). The two telephone and two modem receptacles are Hubbell PH6595. There is one 50' Hubbell PH6599 cables supplied with the trailer. The customer must install Hubbell receptacle's PH6597. The cat 5 receptacle is a Leviton 41108-RWS.

Hospital and local phone lines are to be brought to these lines by the local phone service company.

The category 5 jacks in the trailer are wired to meet T568B color code wiring pattern.

2.6 **Air Conditioners & Chiller**

The air conditioning/heating system is mounted to the front of the trailer and the chiller is mounted in the roadside belly. The air grilles in the belly doors around the chiller unit must remain clear of obstructions to permit adequate air flow. See illustration 3.1 for the required area.

2.7 Local Codes

Although the Mobile MR System is manufactured according to stringent quality engineering standards, it is wise to consult local and/or state building code authorities well in advance of installation to avoid any unnecessary delays in the event that special permits are required. Ellis & Watts can produce structural and schematic drawings when necessary, for these cases. In many states and localities, approval has already been granted.

2.8 Ancillary Space Modules

When connected to the MRI Mobile System, the use of ancillary space modules or weather seals require special consideration.

To prevent vibration of any sort being transmitted to the trailer from the ancillary space module, no hard connection should be made between the two "Soft" connections. "Soft" connections must ensure safe passage from one space to the other, and allow movement of support materials such as cryogen dewars. Weather protection around the doors must be taken into consideration as well. Consult with your architect and/or Ellis & Watts before proceeding with such a design.

SECTION 3 **INSTALLATION**

3.1 **General**

The Mobile MR System represents a substantial investment and should be handled with a representative amount of care and expertise. Therefore, Ellis & Watts offers a service option which accounts for all aspects of installation from obtaining permits to leveling the unit on its final resting pad. For those who prefer to manage these details, the following subsections are indicative of the steps to be taken for a successful installation.

3.2 **Packaging**

The Mobile MR System is released from the factory only after it has met the MR system manufacturer's and Ellis & Watts' specifications. All portions of the MR system are in place - computers, consoles, tables, etc. No articles are loose in the unit. Therefore, once installation of the Mobile MR System is complete, only activities typically associated with system start up at a fixed site remain.

3.3 **Tractor**

An air ride tractor **MUST** be used with the trailer. Tractor weights range from 12,000 - 20,000 pounds, depending on capacity, and are usually provided by the shipper.

3.4 **Permits**

As with other forms of ground transportation, certain local, state and federal permits may be required to move the Mobile MR System.

It is the responsibility of the trucking firm involved to obtain such permits, and a confirmation prior to the move is recommended to avoid unnecessary delays.

Approximate weight of system (without tractor) is 59,600 pounds.

Sited: Approximately 31,000 pounds on rear stanchions, 1,800 pounds on each axle (3,600 pounds total suspension deflated) and 25,000 pounds on front jack support legs.

Transport: Approximately 21,000 pounds on kingpin and 38,600 pounds on rear axles.

3.5 Locating the Mobile MR System

When the trailer arrives on site, the driver will view the particular access situation. The driver will then be able to determine the best possible approach strategy to the designated parking site for the Mobile MR System.

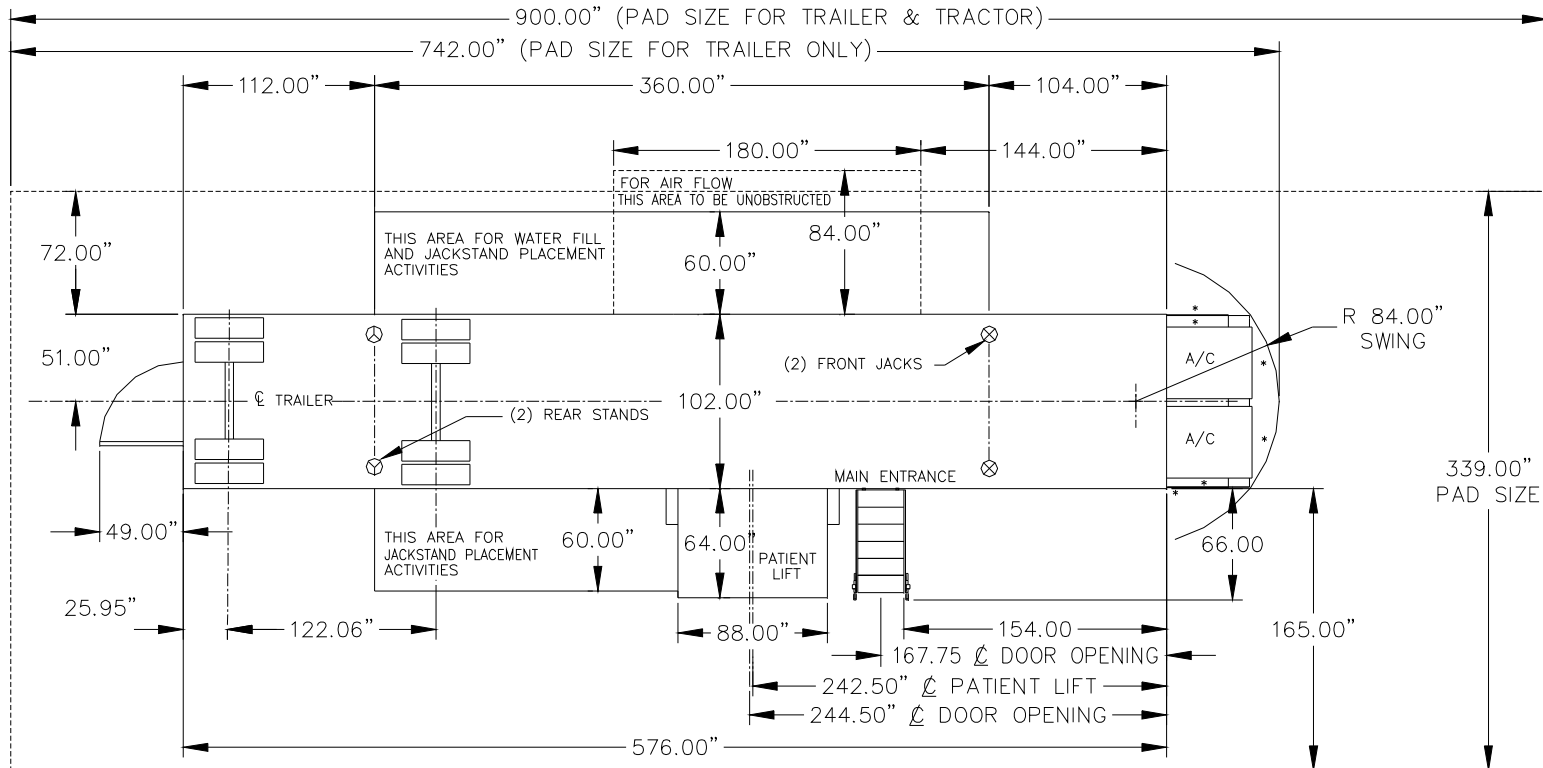
The trailer will usually be backed into place. Depending on the length of the approach and number of turns, this can be done in an hour; or require several hours. Painted or taped markings on the pavement help to guide the driver. Refer to Illustration 3.1 for clearances required.

The air suspension on the trailer is designed for normal highway service. Do not operate the trailer off-road, over the breaks at the beginning and end of steep inclines or on otherwise irregular surfaces. The pneumatic leveling and load compensation system is limited and excessive displacements can cause severe axle/suspension overloading.

It is wise to consider the approach of a 65'-75' tractor and trailer combination will have to make in order to reach the designated parking site. (See Illustration 3.3)

If the pad is not within the levelness requirements of 1/8" over 10', aluminum shims may be necessary at the rear stands. Note that wood or steel is not to be used for shims.

Refer to the Ellis & Watts Operator/Service Manual #93J_OS1 for details on system set-up.



NOTE: 1
 LOUVERS LOCATED AT FRONT MOUNTED GENERATOR
 AND HVAC UNITS (AS SHOWN BY *) MUST BE
 FREE OF OBSTRUCTION TO WITHIN 3 FEET
 TO ALLOW AIR FLOW.

NOTE: 2
 REAR STANCHIONS TO BE LOCATED WITH
 SINGLE LEG POINTED AWAY FROM CENTER OF TRAILER

NOTE: 3
 THE RECOMMENDED PAD SIZE IS 900" (75') LONG
 x 336" (28') WIDE. THIS PAD SIZE WILL ALLOW
 FOR SERVICE CLEARANCE AND PATIENT HANDLING.

NOTE: 4
 THE RECOMMENDED MINIMUM PAD SIZE IS 600" (50')
 LONG x 120" (10') WIDE. THIS PAD SIZE WILL NOT
 ALLOW FOR SERVICE CLEARANCE AND PATIENT HANDLING.
 THE CUSTOMER MUST ALLOW FOR THESE SERVICES.

Illustration 3.1
Site Clearances Required

REQUIREMENTS 180° TURN

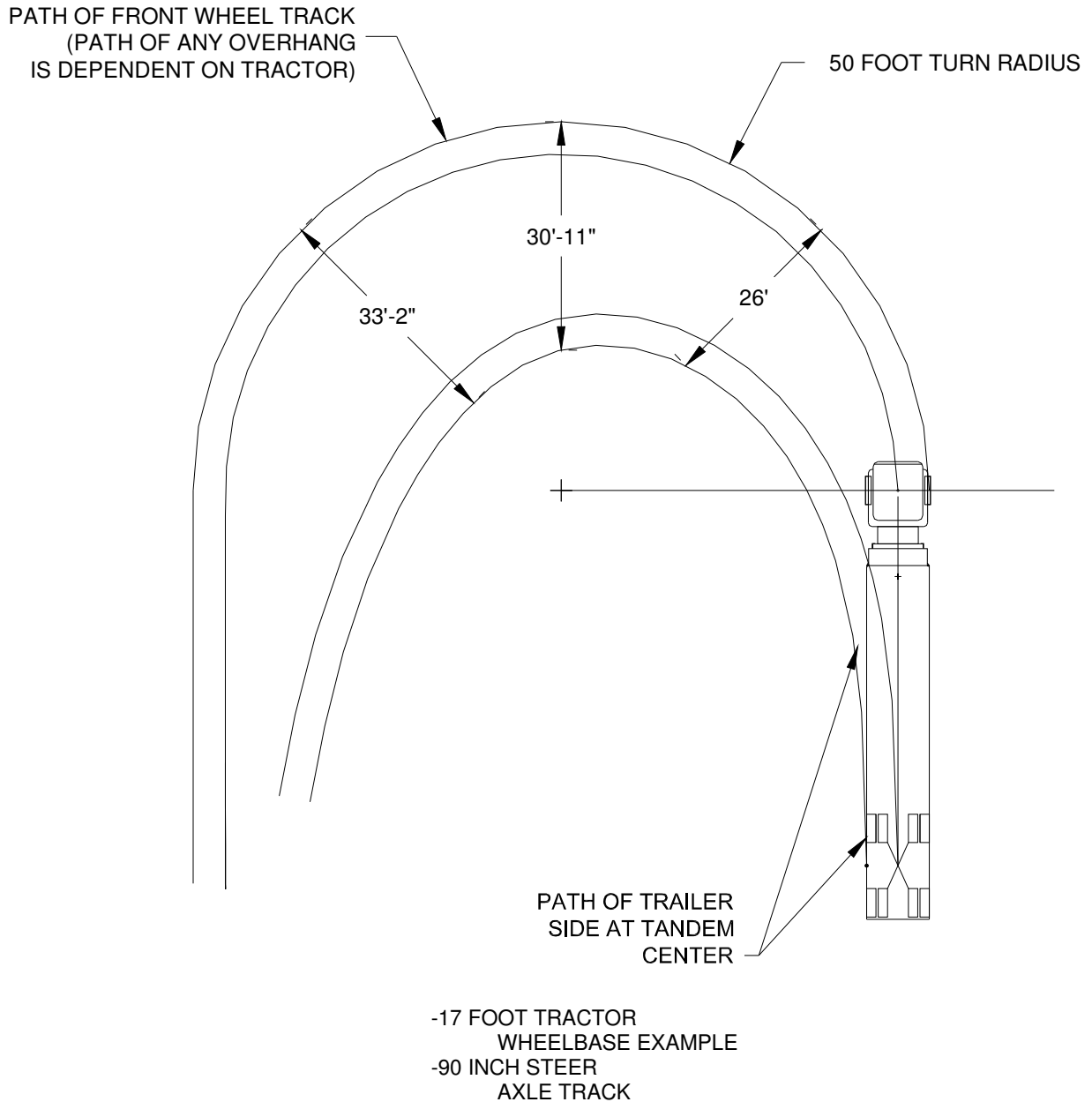


Illustration 3.3

3.6 Power Hook-up

The 35' shore power cord is located in the rear belly compartment and can be accessed from either the roadside or curbside. The free end of this cable is to be attached to the site's 480V, 3-phase receptacle. **Connection of shore power is to be done by a qualified electrician.** (See Section 2.3.4)

3.7 Telephone Hook-Up

The two telephone lines, two modem lines and one cat 5 data line for the Mobile MR System are terminated in the rear curbside belly compartment. The two telephone and two modem receptacles are Hubbell PH6595. There is one 50' Hubbell PH6599 cable supplied with the trailer. The customer must install Hubbell receptacle's PH6597. The cat 5 receptacle is a Leviton 41108-RWS. The hospital and local phone service company should determine the best route and connection location for the incoming service.

3.8 Water Hook-Up (optional sink)

Optional Sink Plumbing The plumbing contractor will bring the incoming water and drain to the Mobile MR System alongside the water supply tank located in a roadside belly compartment.

Note:

In cold weather conditions, an optional heated water hose is required.

The waste water tank (with sink option) can be drained by connecting a garden hose to the drain tank valve with the other end connected to an approved sewage system.

3.9 Magnetic Field Warnings

It is important that the MR system manufacturer is consulted for magnetic field warning information prior to energizing the magnet.

The Exclusion Zone for cardiac pacemakers, neurostimulators, and other biostimulation devices is recommended at 5 gauss (.5mT). Signs, provided by General Electric, must be posted to alert all who approach of this requirement. The 1.0T & 1.5T magnet systems Exclusion Zone does not extend to normally accessible locations exterior to the van. The appropriate warning signs are permanently attached to the Scan Room doors. The 3 gauss (.3mT) line is located approximately 3 feet from the van walls. The 1 gauss (.1mT) line is located approximately 6 feet from the van walls. The .5 gauss (.05mT) line is located approximately 8 feet from the van walls.