Technical Publication
PI-1108R6_EN

Pre-Installation

HF Series Generators

REVISION HISTORY

REVISION	DATE	REASON FOR CHANGE
0	APR 15, 2014	First edition.
1	SEP 14, 2015	Power line requirements updated.
2	NOV 29, 2019	CTSC Touch Screen Console and new PC Interface Box.
3	MAR 09, 2020	New Center of Gravity information, Electrical Requirements updated for 3-Phase Generators connected at 208 V~, Circuit Breaker information updated and new Fastening Plates.
4	SEP 14, 2020	Electrical Requirements updated for Generators connected at 208 V~.
5	JAN 12, 2022	New CTSC Console model.
6	FEB 01, 2024	Electrical Requirements updated.

This Document is the English original version, edited and supplied by the manufacturer.

The Revision state of this Document is indicated in the code number shown at the bottom of this page.

ADVISORY SYMBOLS

The following advisory symbols will be used throughout this manual. Their application and meaning are described below.

DANGERS ADVISE OF CONDITIONS OR SITUATIONS THAT IF NOT HEEDED OR AVOIDED WILL CAUSE SERIOUS PERSONAL INJURY OR DEATH.

ADVISE OF CONDITIONS OR SITUATIONS THAT IF NOT HEEDED OR AVOIDED COULD CAUSE SERIOUS PERSONAL INJURY, OR CATASTROPHIC DAMAGE OF EQUIPMENT OR DATA.

Advise of conditions or situations that if not heeded or avoided could cause personal injury or damage to equipment or data.

Note ☞

Alert readers to pertinent facts and conditions. Notes represent information that is important to know but which do not necessarily relate to possible injury or damage to equipment.

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SECTION 1 INTRODUCTION

1.1 OBJECTIVE OF THIS MANUAL

This Pre-Installation document provides the information and data needed to plan and qualify the customer site prior to equipment delivery and installation.

This document considers only the X-ray Generator and its associated components. Product information, environmental and electrical requirements are specified.

Note ☞ *For system-related requirements, such as room layout and system interconnections, refer to documentation provided with other subsystems.*

1.2 AVOIDING UNNECESSARY EXPENSES AND DELAYS

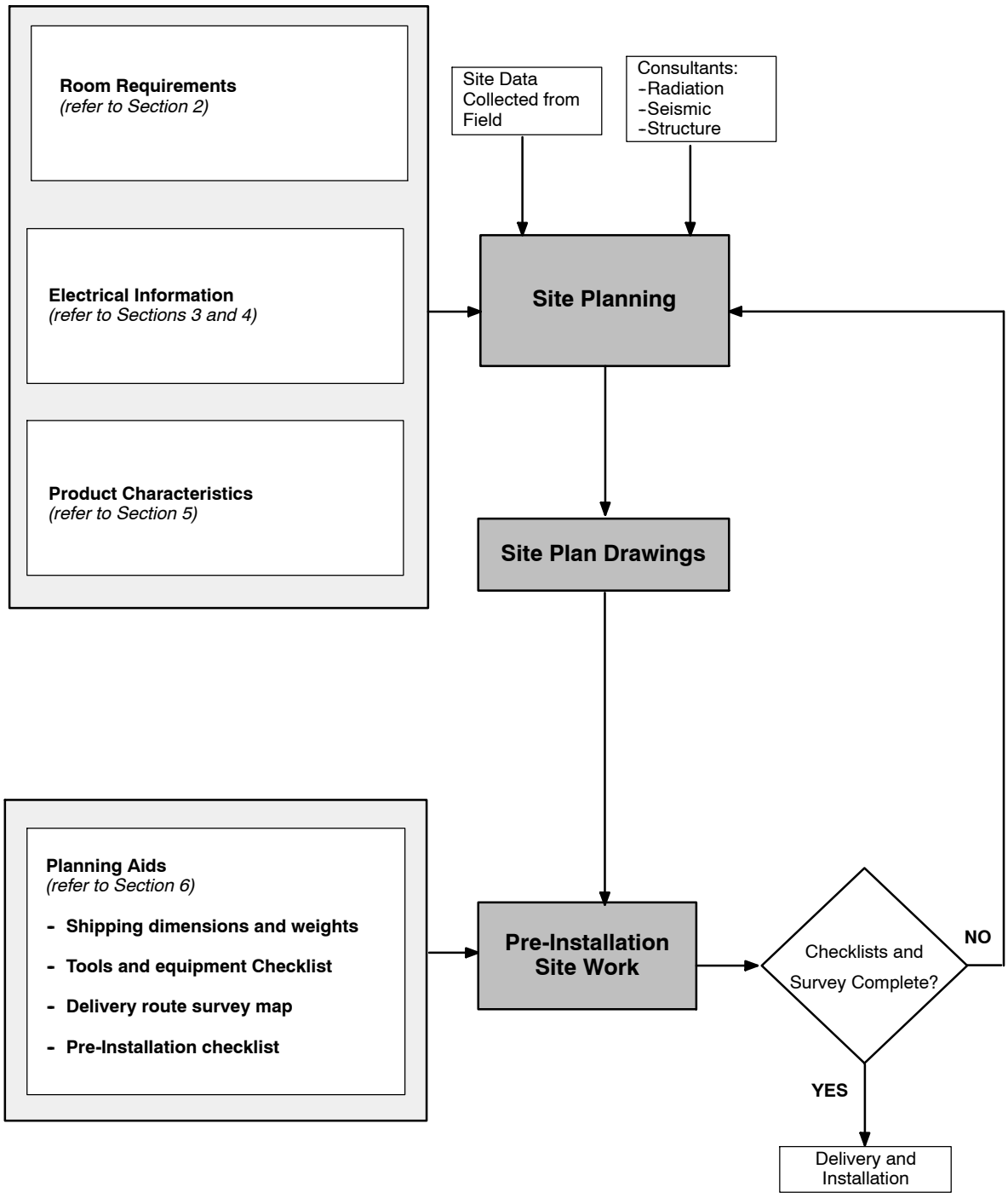
To avoid unnecessary expenses and delays use the "*Pre-installation Checklist*", located in Section 6.4, to determine if you are ready for the installation to begin. Once you believe that the room/location is ready for installation to begin, complete the "*Pre-installation Checklist*". The checklist is an important tool that helps verify that nothing has been missed. The checklist summarizes the preparations and allows you to permanently record the activities that have taken place.

1.3 AN OVERVIEW OF THE PRE-INSTALLATION PROCESS

Complete the checklists contained in this manual. They are an important part of the Pre-Installation process. The checklists summarize the required preparations and verify the completion of the Pre-Installation procedures.

Illustration 1-1 outlines the information in this document and its place in the Pre-Installation process.

Illustration 1-1
Pre-Installation Overview



1.4 RESPONSIBILITY OF PURCHASER / CUSTOMER

To ensure that the installation of the system meets the Purchaser or Customer expectations, it is important to determine who will take responsibility for various items in the course of the system installation process.

To determine these responsibilities, review the following checklists with the customer and assign responsibilities as appropriate:

- Tools and Equipment Checklist *(refer to Section 6.2)*
- Pre-Installation Checklist *(refer to Section 6.4)*

1.5 RESPONSIBILITIES OF THE PURCHASER

The purchaser is responsible for the completion of "*Pre-Installation*". This includes the procurement and installation of all required materials and services to get the room ready for the installation of the product. This responsibility includes providing:

- A clean and safe work environment for the installation of the product (finished floor, ceiling, walls, and proper room lighting).
- A location suitable for the installation of the product *(refer to Section 2 "Room Requirements").*
    - Suitable support structures in the floor and walls necessary for the mounting of the product and/or its components (*refer to Section 2.2 "Structural Requirements").*
    - Installation of conduit, ducts, and/or raceways necessary to route cables safely *(refer to Section 3 "Planning Electrical Connections", Section 4 "Electrical Requirements," and Section 5 "Product Characteristics").*
    - Electrical power and grounds of specified quality and reliability *(refer to Section 4, "Electrical Requirements").*
        - Electrical power of the required voltage output and adequate kVA rating, including the emergency-off safety switch(es) in the room. Power and ground cables to the Room Electrical Cabinet (Main Disconnect).

          Install all safety devices according to this document and Local Codes.
        - Properly installed and sized junction boxes, including covers and fittings, at locations required and called out in architectural drawings.

- A location suitable for operation of the product.
- Installation of non-electric services (if required).
- Current room dimensions plan, including hall way and entry door sizes.

Note ☞ *Complete and proper Pre-Installation will avoid delays and confusion.*

SECTION 2 ROOM REQUIREMENTS

2.1 ENVIRONMENTAL REQUIREMENTS

Note ☞ *STORAGE values only refer to equipment that is still in shipping containers. If the equipment is partially or completely installed, refer to IN USE values.*

2.1.1 RELATIVE HUMIDITY AND TEMPERATURE

COMPONENT	RELATIVE HUMIDITY (Non-Condensing)				TEMPERATURE			
	IN USE		STORAGE		IN USE		STORAGE	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Line Powered Generator	30%	75%	5%	95%	10 °C (50 °F)	40 °C (104 °F)	-10 °C (14 °F)	70 °C (158 °F)
Control Console	30%	75%	10%	100%	10 °C (50 °F)	40 °C (104 °F)	-40 °C (-40 °F)	70 °C (158 °F)
Touch Screen Console	0%	90%	0%	90%	0 °C (32 °F)	40 °C (104 °F)	-10 °C (14 °F)	50 °C (122 °F)
PC Interface Box	30%	75%	5%	95%	10 °C (50 °F)	40 °C (104 °F)	-10 °C (14 °F)	70 °C (158 °F)

2.1.2 ATMOSPHERIC PRESSURE

COMPONENT	ATMOSPHERIC PRESSURE			
	IN USE		STORAGE	
	MIN.	MAX.	MIN.	MAX.
Line Powered Generator	700 hPa	1060 hPa	500 hPa	1060 hPa
Control Console				
Touch Screen Console				
PC Interface Box				

2.1.3 HEAT OUTPUT

In normal environmental circumstances the maximum heat output of the equipment can reach:

- for Line Powered Generators 0.30 kW (1025 btu/hr)

Note ☞ *Overheating of components can cause system malfunction.*

2.1.4 RADIATION PROTECTION

Because X-ray equipment produces radiation, special precautions may need to be taken or special site modifications may be required. The manufacturer does not make recommendations regarding radiation protection. It is the purchasers responsibility to consult a radiation physicist for advice on radiation protection in X-ray rooms.

2.2 STRUCTURAL REQUIREMENTS

Prior to beginning installation, it is recommended to inspect the site and verify that the X-ray room complies with Pre-installation requirements for the X-ray system such as:

- Floor, wall and raceways for equipment installation.
- A plan distribution is strongly recommended prior equipment installation. Take into account dimensions, travels, operation and passing through areas.

2.2.1 DOOR SIZE REQUIREMENTS

Minimum door sizes also apply to the hallway and elevator.

The minimum door height must be 203 cm (80”) and door width must be 90 cm (35.4”) to take delivery and install system.

The elevator door must meet with the above door requirements and the minimum depth of the elevator measured from the back wall to the elevator door must be 140 cm (55”).

Note ☞ *The above dimensions are calculated as per dimensions of the shipping crates. For dimensions and weights of the crated and uncrated components refer to Table 2-1.*

Table 2-1
Component Crated and Uncrated

COMPONENT CRATED	DIMENSIONS			WEIGHT
	Length	Width	Height	
Line Powered Generator with Control Console and Cables	1070 mm (42.1”)	620 mm (24.4”)	740 mm (29.1”)	92 kg (203 lb)

COMPONENT UNCRATED	DIMENSIONS			WEIGHT
	Length	Width	Min. Height	
Line Powered Generator with Leveling Legs	445 mm (17.5”)	360 mm (14.2”)	562 mm (22.1”)	65 kg (143 lb)

2.2.2 FLOOR AND WALL REQUIREMENTS

The method of installing the system is:

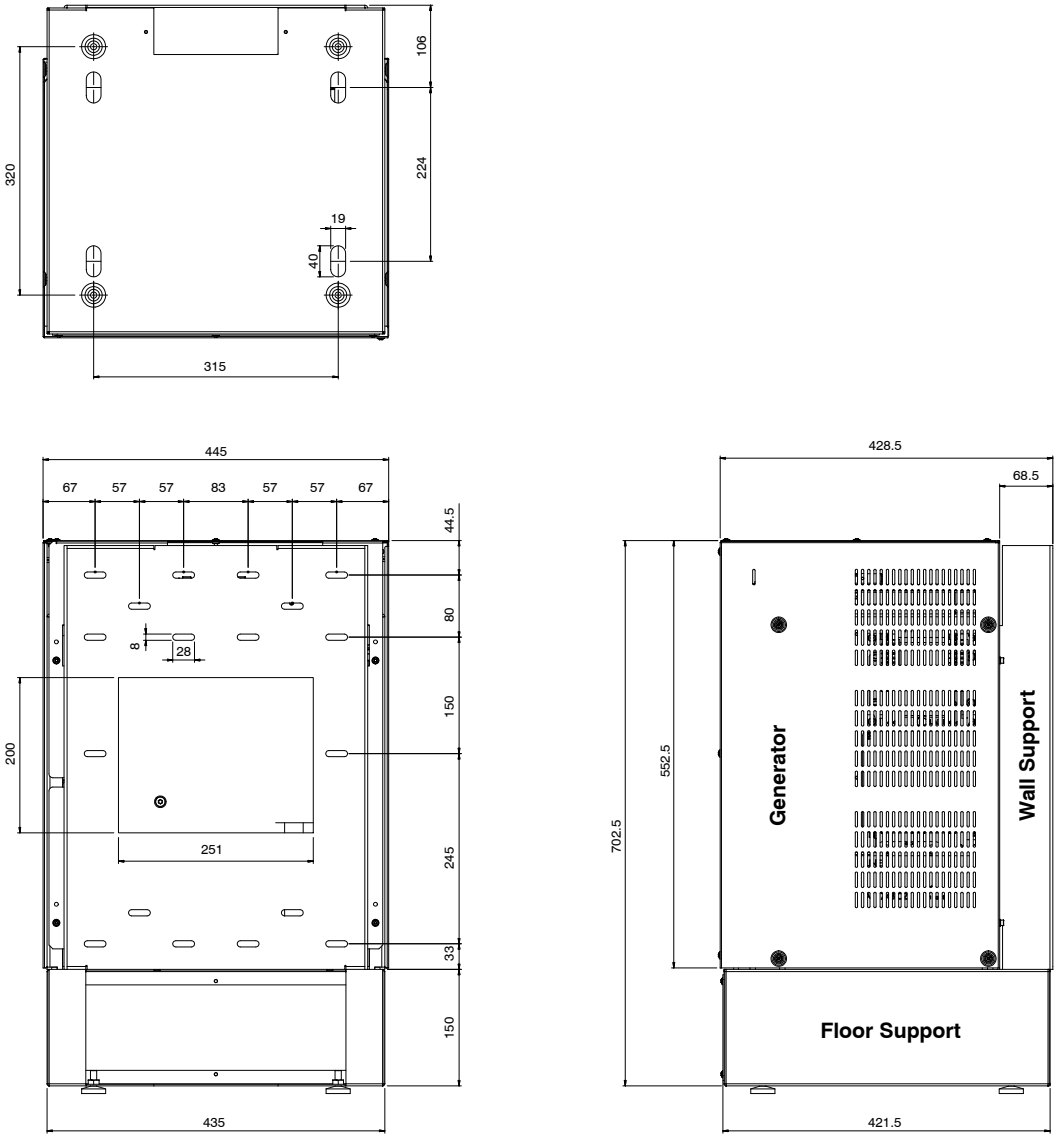
COMPONENT	NORMAL METHOD OF MOUNTING
GENERATOR CABINET	Floor freestanding, wall mounted (only for Line Powered Generators), or anchor to floor with four M10 (3/8") bolts.
RAD CONSOLE	Desk freestanding, wall mounted or anchor to an optional pedestal.
TOUCH SCREEN CONSOLE	Desk freestanding.
PC INTERFACE BOX	Desk freestanding or wall mounted.
Note: Anchoring hardware should be field supplied. For seismic areas all components must be anchored, Local Standards should be applied.	

The Drill Templates of the anchoring holes are shown in the next illustrations.

Potential for Injury and/or Equipment Damage: Floor anchors must be a minimum of 150 mm (6") from any concrete edge including ducts and cracks. In addition, the general condition of the concrete in the immediate mounting area should be inspected to ensure that anchors will be set in good quality concrete.

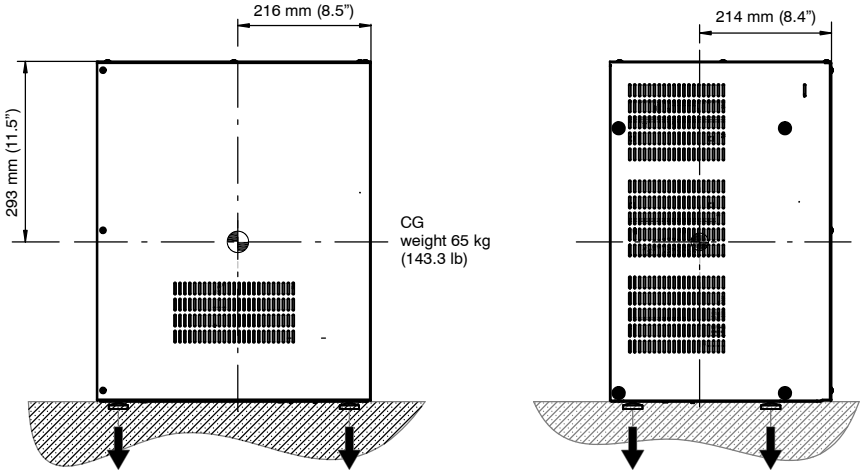
The floor bearing the Rad Room must be concrete and the thickness to be determined by a Structural Engineer to properly support the equipment loads. The anchors require a minimum embedment of 57.2 mm (2 $^{1}/_{4}$") into the concrete. If the floor thickness is less than 101.6 mm (4"), it is recommended that the unit be secured using a through-bolt method with a reinforcement plate on the back side.

Illustration 2-1
Drill Template of the optional Generator Supports



** Dimensions in mm*

Illustration 2-2
Center of Gravity of the Generator



2.3 CLINICAL ACCESS

Make sure that the room is planned with the following clinical access requirements:

- Provide easy access to the equipments.
- Clinicians at the patient examination area must be able to communicate with assistants in the control area.
- Operators in the control area must have easy access to the Operator Console. However, position the controls (including handswitches) so the operator cannot take exposures while looking around or standing outside the control booth's lead glass window.
- Consult customer on the number and location of nonelectrical lines (air, oxygen, vacuum, water, etc.) in the radiographic room.

2.4 FIELD SERVICE ACCESS

Allow appropriate space for service access of the equipment. The minimum recommended free area for service access is:

COMPONENT	SURFACE					
	Left Side	Right Side	Front	Rear	Top	Bottom
GENERATOR CABINET	50 cm (20")	50 cm (20")	100 cm (40")	- *(see note)*	Completely free	-
RAD CONSOLE & TOUCH SCREEN CONSOLE	10 cm (4")	10 cm (4")	Completely free	10 cm (4")	Completely free	-
Note: Ventilation conditions requires to keep a minimum free distance of 15 cm (6") from both lateral sides of the Generator Cabinet and at least 7.5 cm (3") from the rear side when the Generator is not installed with a Wall Support.						

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SECTION 3 PLANNING ELECTRICAL CONNECTIONS

3.1 ROUTING CABLES

3.1.1 GENERAL

High voltage and power cables must be separated from other cables. Use a separate through in the duct system or use a separate conduit. Minimize cable length as possible between the Electrical Cabinet (Main Disconnect) and the System Generator Cabinet to reduce voltage regulation problems and wiring costs.

3.1.2 CONDUIT

Separate conduits must be used for power and signal wires. These wires must be kept separated from each other for proper system operation.

Using conduit imposes some important considerations when used with this system. Of primary concern, the majority of cables used are pre-terminated. Pre-termination greatly simplifies interconnection but makes cable-pulling difficult because of the added dimensions of the connectors.

Conduit must be large enough to pass the cable and connector through with all other cables already in the conduit. Also, the size of the conduit chosen must allow for future growth. There is the possibility of additional cables being added later as the system is developed and options are added.

The use of conduit is recommended for cables running overhead between rooms, especially when a diagonal run provides the shortest cable path.

3.1.3 ELECTRICAL DUCTS

It is important that electrical ducts have separate compartments for power and signal wires. These wires must be kept separated from each other for proper system operation.

Electrical ducts have advantages when used with a single room or two (2) adjacent rooms. Electrical ducts combine cabling in a neat and functional appearance, with accessibility and room for expansion.

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SECTION 4 ELECTRICAL REQUIREMENTS

This Generator contains advanced circuitry which will maintain the selected X-ray techniques during adverse line conditions. However, there is a limit to the Generator's ability to correct for inadequate line power.

To ensure proper operation:

- Do not under-size the Distribution Transformer. The secondary of the Distribution Transformer can be a "WYE" ("Star") or "DELTA" wire configuration.
- Size feeder and ground wires as per this document.
- Ensure and maintain input mains voltage to specification. **Ensure that the earth ground resistance of the installation (hospital/clinic) is lower than 10 Ω.**

The electrical requirements in this document (wire sizes, etc.) relating to the Generator Cabinet power and the Power Line are the recommended specification.

TO AVOID THE RISK OF ELECTRIC SHOCK, THIS EQUIPMENT MUST ONLY BE CONNECTED TO A SUPPLY MAINS WITH PROTECTIVE EARTH.

THIS UNIT IS EQUIPPED WITH EMC FILTERS. THE LACK OF THE PROPER GROUNDING MAY PRODUCE ELECTRICAL SHOCK TO THE USER.

The installation should comply with all the electrical requirements indicated in this document. These requirements should be upgraded if Local Standards were more stringent.

4.1 LINE POWERED GENERATORS – POWER LINE REQUIREMENTS

- Factors:

FACTORS	GENERATOR MODEL *(Refer to Identification Label)*				
Maximum Power kW	**32 kW**	**40 kW**	**50 kW**	**65 kW**	**80 kW**
Maximum mA	400 mA (1)	500 mA (1)	630 mA (1 & 2)	630 mA (2)	800 mA *(or 1000 mA)*
Maximum kVp	125 or 150 kVp	125 or 150 kVp	125 or 150 kVp	125 or 150 kVp	150 kVp
Input Line Operation	Single-Phase Generator of 32 kW: 208, 230 V~ – 50 / 60 Hz. Single-Phase Generator from 40 to 50 kW: 208 (3), 230 V~ – 50/60 Hz. Three-Phase Generator from 32 to 40 kW: 208, 230, 380 (4), 400 / 415 / 440, 480 V~ – 50 / 60 Hz. Three-Phase Generator at 50 kW: 208, 230, 400 / 415 / 440, 480 V~ – 50 / 60 Hz. Three-Phase Generator from 65 to 80 kW: 400 / 415 / 440, 480 V~ – 50/60 Hz. Line voltage automatic compensation ±10% V~. Maximum line regulation for maximum kVA demand: 6%.				

NOTES:

(1) For Single-Phase Generators of 32 kW at 208 V~, the maximum mA are limited to 160 when the selected kVp are within 126 and 134; to 125 mA when the selected kVp are 135 or 136; and to 100 mA when the selected kVp are higher than 136.
For Three-Phase Generators from 40 to 50 kW at 208 V, the maximum mA are limited to 200 when the selected kVp are 140 or higher.
For Single-Phase Generators of 50 kW at 230 V, the maximum mA are limited to 250 when the selected kVp are 140 or higher.

(2) Configurable to 640 mA or 650 mA under requirement.

(3) For Single-Phase Generators from 40 to 50 kW operating with lines at 208 V~ or below, an auxiliary boost transformer is required to adequate the line voltage to 230 V~.
The Auxiliary Boost Transformer should be dimensioned 25% above the actual kVA requirement of the Generator
(e.g. for 40 kW Generator -> 72 kVA Minimum required -> Auxiliary Boost Transformer should be dimensioned to 90 kVA [72 x 1.25]).

(4) Only for generators with 380 V~ input available on the T2 transformer.

- I_{RMS} line current during an X-ray exposure, circuit breaker type and value, differential sensitivity (mA), minimum line power required (kVA), Generator stand-by consumption (W), should be:

	SINGLE-PHASE GENERATOR POWER					
	32 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
208 V~	260 A	1.4	100 A	63 A	32 A	150 A
230 V~	235 A	1.3	100 A	63 A	32 A	125 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	54 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ single\text{-}phase)}$ = VA / V~ *(I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).*
$I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ *(I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).*

(2) Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:
Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

	THREE-PHASE GENERATOR POWER					
	32 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
208 V~	150 A	0.8 A	63 A	40 A	20 A	80 A
230 V~	136 A	0.7 A	50 A	32 A	20 A	70 A
380 V~ (3)	82 A	0.5 A	32 A	20 A	20 A	45 A
400 V~	78 A	0.4 A	32 A	20 A	20 A	40 A
415 V~	75 A	0.4 A	32 A	20 A	20 A	40 A
440 V~	71 A	0.4 A	32 A	20 A	20 A	40 A
480 V~	65 A	0.4 A	25 A	20 A	20 A	35 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	54 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ single\text{-}phase)}$ = VA / V~ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).
$I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

(3) *Only for generators with 380 V~ input available on the T2 transformer.*

	SINGLE-PHASE GENERATOR POWER					
	40 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
208 V~ (3)	317 A	1.4 A	125 A	80 A	40 A	175 A
230 V~	287 A	1.3 A	125 A	80 A	32 A	150 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	66 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ single\text{-}phase)}$ = VA / V~ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).
$I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

	THREE-PHASE GENERATOR POWER					
	40 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
208 V~	183 A	0.8 A	80 A	50 A	25 A	100 A
230 V~	166 A	0.7 A	63 A	40 A	20 A	90 A
380 V~ (3)	100 A	0.5 A	40 A	25 A	20 A	60 A
400 V~	95 A	0.4 A	40 A	25 A	20 A	50 A
415 V~	92 A	0.4 A	40 A	25 A	20 A	50 A
440 V~	87 A	0.4 A	32 A	20 A	20 A	45 A
480 V~	79 A	0.4 A	32 A	20 A	20 A	40 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	66 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ single\text{-}phase)}$ = VA / V~ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).
$I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

(3) *Only for generators with 380 V~ input available on the T2 transformer.*

	SINGLE-PHASE GENERATOR POWER					
	50 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
208 V~ (3)	385 A	1.4 A	160 A	100 A	50 A	200 A
230 V~	348 A	1.3 A	160 A	80 A	40 A	175 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	80 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ single\text{-}phase)}$ = VA / V~ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).
$I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ (I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

	THREE-PHASE GENERATOR POWER					
	50 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
208 V~	222 A	0.8 A	100 A	50 A	25 A	125 A
230 V~	201 A	0.7 A	80 A	50 A	25 A	110 A
400 V~	115 A	0.4 A	50 A	32 A	20 A	60 A
415 V~	111 A	0.4 A	50 A	25 A	20 A	60 A
440 V~	105 A	0.4 A	40 A	25 A	20 A	60 A
480 V~	96 A	0.4 A	40 A	25 A	20 A	50 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	80 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ single\text{-}phase)}$ = VA / V~ *(I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).*
$I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ *(I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).*

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

	THREE-PHASE GENERATOR POWER					
	65 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
400 V~	143 A	0.4 A	63 A	32 A	20 A	80 A
415 V~	138 A	0.4 A	63 A	32 A	20 A	70 A
440 V~	130 A	0.4 A	50 A	32 A	20 A	70 A
480 V~	119 A	0.4 A	50 A	32 A	20 A	60 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	99 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ three\text{-}phase)}$ = VA / V~ / $\sqrt{3}$ *(I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).*

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

	THREE-PHASE GENERATOR POWER					
	80 kW					
LINE VOLTAGE	I_{RMS} (1)	Continuous Current (Stand-by)	CIRCUIT BREAKER TYPE (2)			
			IEC Standard			NEC Standard
			B	C	D	
400 V~	178 A	0.4 A	80 A	40 A	20 A	90 A
415 V~	171 A	0.4 A	63 A	40 A	20 A	90 A
440 V~	161 A	0.4 A	63 A	40 A	20 A	90 A
480 V~	148 A	0.4 A	63 A	40 A	20 A	80 A
Differential Sensitivity (Earth Leakage / Ground Fault)	30 mA					
Minimum kVA required	123 kVA					
Stand-by Consumption	300 W					

***Notes**:*

(1) $I_{RMS\ (for\ three\text{-}phase)} = VA / V\sim / \sqrt{3}$ *(I_{RMS} = maximum instantaneous current based on 100 ms X-ray exposure).*

(2) *Circuit Breaker (Differential, Thermomagnetic, Fuses and/or Contactor).*
The selected circuit breaker type must have a minimum tripping current of 1.1 x I_{RMS} @ 0.1 seconds.
For example:

Type "B" breaker: $M_B = (I_{RMS} \times 1.1) / 3$
Type "C" breaker: $M_C = (I_{RMS} \times 1.1) / 5$
Type "D" breaker: $M_D = (I_{RMS} \times 1.1) / 10$

Based on NEC Standard: The capacity of the selected Circuit Breaker must have at least 50% of the input required for the momentary rating of the X-ray equipment (I_{RMS}).

The selected circuit breaker should be equal or bigger than the calculated value. Minimum value should be 20 A.

IEC classification of circuit breakers: 20 A, 25 A, 32 A, 40 A, 50 A, 63 A, 80 A, 100 A, 125 A, 160 A, 200 A, 250 A.
NEC classification of circuit breakers: 20 A, 25 A, 30 A, 35 A, 40 A, 45 A, 50 A, 60 A, 70 A, 80 A, 90 A, 100 A, 110 A, 125 A, 150 A, 175 A, 200 A, 225 A, 300 A.

- The Maximum Impedance must be lower than the value indicated below:

LINE VOLTAGE	SINGLE-PHASE GENERATOR		
	32 kW	40 kW	50 kW
	Maximum impedance at the generator's input terminals		
208 V~	0.035 Ω	0.029 Ω	0.024 Ω
230 V~	0.043 Ω	0.035 Ω	0.029 Ω
NOTE: *The above values comply with the Standards IEC 60601-2-54:2009 and IEC 60601-2-54:2009+AMD1:2015+AMD2:2018.*			

LINE VOLTAGE	THREE-PHASE GENERATOR		
	32 kW	40 kW	50 kW
	Maximum impedance at the generator's input terminals		
208 V~	0.035 Ω	0.029 Ω	0.024 Ω
230 V~	0.043 Ω	0.035 Ω	0.029 Ω
380 V~ (1)	0.117 Ω	0.096 Ω	—
400 V~	0.130 Ω	0.106 Ω	0.088 Ω
415 V~	0.140 Ω	0.114 Ω	0.094 Ω
440 V~	0.157 Ω	0.129 Ω	0.106 Ω
480 V~	0.187 Ω	0.153 Ω	0.126 Ω
NOTES: *The above values comply with the Standards IEC 60601-2-54:2009 and IEC 60601-2-54:2009+AMD1:2015+AMD2:2018.* *(1) Only for generators with 380 V~ input available on the T2 transformer.*			

LINE VOLTAGE	THREE-PHASE GENERATOR	
	65 kW	80 kW
	Maximum impedance at the generator's input terminals	
400 V~	0.071 Ω	0.057 Ω
415 V~	0.076 Ω	0.061 Ω
440 V~	0.086 Ω	0.069 Ω
480 V~	0.102 Ω	0.082 Ω
NOTE: *The above values comply with the Standards IEC 60601-2-54:2009 and IEC 60601-2-54:2009+AMD1:2015+AMD2:2018.*		

RECOMMENDED WIRE SIZE

Correct sizing of the feeder wires is critical to proper Generator operation. Wire size is dependent on the Generator power, the line voltage and the distance from the Distribution Transformer to the Generator Cabinet. The maximum voltage drop during an exposure must not exceed 5% of the nominal mains value.

It is recommended that the Distribution Transformer (Hospital / Clinic) used as the power source have at least 25% more power than the maximum apparent power of the X-ray Generator.

The recommended wire sizing is indicated in Table 4-1 and the wire size conversion in Table 4-2. These lengths are measured from the Distribution Transformer to the Room Electrical Cabinet (Main Disconnect). **From the Room Electrical Cabinet to the Generator Cabinet, wire sizes should be consistent with those shown in Table 4-1 and based on the length of wires required to complete the run. The maximum wire size that can be connected to the Generator Cabinet (Input Line Fuse Holder) is 35 mm^2 (AWG 2).**

Table 4-1
Minimum Wire Size from Distribution Transformer to Room Electrical Cabinet

GENERATOR	LINE VOLTAGE	WIRE SIZE AT:							
		15 m (50 ft)		30 m (100 ft)		45 m (150 ft)		60 m (200 ft)	
32 kW, 1ϕ	208 V~	25 mm^2	AWG 2	50 mm^2	AWG 1/0	95 mm^2	AWG 3/0	120 mm^2	AWG 4/0
	230 V~	25 mm^2	AWG 4	50 mm^2	AWG 1	70 mm^2	AWG 2/0	95 mm^2	AWG 3/0
32 kW, 3ϕ	208 V~	16 mm^2	AWG 6	25 mm^2	AWG 2	50 mm^2	AWG 1	50 mm^2	AWG 1
	230 V~	10 mm^2	AWG 6	25 mm^2	AWG 4	35 mm^2	AWG 2	50 mm^2	AWG 1
	380 V~ (1)	4 mm^2	AWG 10	10 mm^2	AWG 8	16 mm^2	AWG 6	16 mm^2	AWG 4
	400 V~	4 mm^2	AWG 12	10 mm^2	AWG 8	10 mm^2	AWG 6	16 mm^2	AWG 6
	415 V~	4 mm^2	AWG 12	6 mm^2	AWG 8	10 mm^2	AWG 6	16 mm^2	AWG 6
	440 V~	4 mm^2	AWG 12	6 mm^2	AWG 8	10 mm^2	AWG 8	16 mm^2	AWG 6
	480 V~	4 mm^2	AWG 12	6 mm^2	AWG 10	10 mm^2	AWG 8	10 mm^2	AWG 6
40 kW, 1ϕ	208 V~	35 mm^2	AWG 2	70 mm^2	AWG 2/0	95 mm^2	AWG 4/0	120 mm^2	AWG 4/0
	230 V~	25 mm^2	AWG 2	50 mm^2	AWG 1/0	95 mm^2	AWG 3/0	120 mm^2	AWG 4/0

NOTE: *(1) Only for generators with 380 V~ input available on the T2 transformer.*

Table 4-1 (cont.)
Minimum Wire Size from Distribution Transformer to Room Electrical Cabinet

GENERATOR	LINE VOLTAGE	WIRE SIZE AT:							
		15 m (50 ft)		30 m (100 ft)		45 m (150 ft)		60 m (200 ft)	
40 kW, 3ϕ	208 V~	16 mm^2	AWG 4	35 mm^2	AWG 2	50 mm^2	AWG 1/0	70 mm^2	AWG 2/0
	230 V~	16 mm^2	AWG 6	25 mm^2	AWG 2	50 mm^2	AWG 1	50 mm^2	AWG 1/0
	380 V~ (1)	6 mm^2	AWG 10	10 mm^2	AWG 6	16 mm^2	AWG 4	25 mm^2	AWG 4
	400 V~	6 mm^2	AWG 10	10 mm^2	AWG 8	16 mm^2	AWG 6	25 mm^2	AWG 4
	415 V~	4 mm^2	AWG 10	10 mm^2	AWG 8	16 mm^2	AWG 6	16 mm^2	AWG 4
	440 V~	4 mm^2	AWG 10	10 mm^2	AWG 8	10 mm^2	AWG 6	16 mm^2	AWG 6
	480 V~	4 mm^2	AWG 12	6 mm^2	AWG 8	10 mm^2	AWG 8	16 mm^2	AWG 6
50 kW, 1ϕ	208 V~	50 mm^2	AWG 1	95 mm^2	AWG 3/0	N.A.	N.A.	N.A.	N.A.
	230 V~	35 mm^2	AWG 2	70 mm^2	AWG 2/0	95 mm^2	AWG 4/0	N.A.	N.A.
50 kW, 3ϕ	208 V~	25 mm^2	AWG 4	50 mm^2	AWG 1	70 mm^2	AWG 2/0	95 mm^2	AWG 3/0
	230 V~	16 mm^2	AWG 4	35 mm^2	AWG 2	50 mm^2	AWG 1/0	70 mm^2	AWG 2/0
	400 V~	6 mm^2	AWG 10	10 mm^2	AWG 6	16 mm^2	AWG 4	25 mm^2	AWG 4
	415 V~	6 mm^2	AWG 10	10 mm^2	AWG 6	16 mm^2	AWG 4	25 mm^2	AWG 4
	440 V~	6 mm^2	AWG 10	10 mm^2	AWG 8	16 mm^2	AWG 6	25 mm^2	AWG 4
	480 V~	4 mm^2	AWG 10	10 mm^2	AWG 8	16 mm^2	AWG 6	16 mm^2	AWG 4
65 kW, 3ϕ	400 V~	10 mm^2	AWG 8	16 mm^2	AWG 6	25 mm^2	AWG 4	35 mm^2	AWG 2
	415 V~	10 mm^2	AWG 8	16 mm^2	AWG 6	25 mm^2	AWG 4	25 mm^2	AWG 2
	440 V~	6 mm^2	AWG 8	16 mm^2	AWG 6	16 mm^2	AWG 4	25 mm^2	AWG 4
	480 V~	6 mm^2	AWG 10	10 mm^2	AWG 6	16 mm^2	AWG 4	25 mm^2	AWG 4
80 kW, 3ϕ	400 V~	10 mm^2	AWG 8	25 mm^2	AWG 4	25 mm^2	AWG 2	35 mm^2	AWG 2
	415 V~	10 mm^2	AWG 8	16 mm^2	AWG 4	25 mm^2	AWG 2	35 mm^2	AWG 2
	440 V~	10 mm^2	AWG 8	16 mm^2	AWG 6	25 mm^2	AWG 4	35 mm^2	AWG 2
	480 V~	6 mm^2	AWG 8	16 mm^2	AWG 6	25 mm^2	AWG 4	25 mm^2	AWG 2

NOTE: *(1) Only for generators with 380 V~ input available on the T2 transformer.*

Table 4-2
Wire Size Conversion and Ampacity

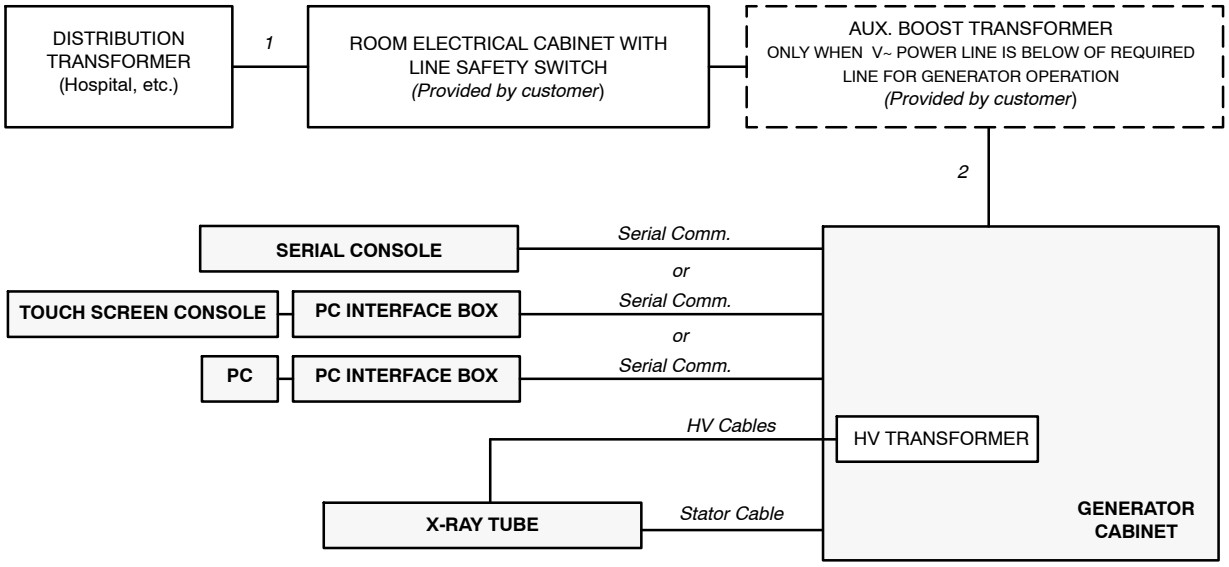
Wire Cross Section (mm^2)	IEC Standard		NEC Standard	
	Wire Size (mm^2)	Ampacity (A)	AWG Wire Size	Ampacity (A)
3.31			**12**	25
4	**4**	24		
5.26			**10**	35
6	**6**	39		
8.37			**8**	50
10	**10**	55		
13.3			**6**	65
16	**16**	70		
21.15			**4**	85
25	**25**	90		
33.6			**2**	115
35	**35**	115		
42.4			**1**	130
50	**50**	132		
53.5			**0 (1/0)**	150
67.4			**00 (2/0)**	175
70	**70**	170		
85			**000 (3/0)**	200
95	**95**	200		
107.2			**0000 (4/0)**	230
120	**120**	240		

The selected cable (copper) must have an Ampacity equal or greater than the Circuit Breaker.
Ampacity (A) values at Ambient Temperature of 30°C (86°F) and Cable Temperature rating of 75°C (167°F)
The smallest size used is 4 mm^2 or AWG 12.

4.2 INTERCONNECTION AND GROUNDING REQUIREMENTS

Note ☞ *For more information about interconnection and grounding refer to "Installation" document.*

Illustration 4-1
Interconnection Block Diagram for LINE POWERED GENERATORS



CABLE RUN	FUNCTION	REMARKS
1	Single or Three Phase Input Power Line.	Connect to Room Electrical Cabinet according to the indicated electrical requirements. *Customer supplied.*
	Ground.	
2	Single or Three Phase Input Power Line.	Connect to Generator according to the indicated electrical requirements. Install an Auxiliar Boost Transformer when it is required. *Customer supplied.*
	Ground.	

NOTES: - For wire size refer to Section 4.1. Consult to Local Standards for feeder and ground wire size requirements.
The system power ground point is located in the Room Electrical Cabinet.

4.3 SAFETY DEVICES

Every installation must be provided with a main line disconnect device (Circuit Breaker / Thermomagnetic Breaker) and the remote disconnect devices required at all Consoles that are not located next to the line safety switch.

Devices such as Safety Switch / Emergency Switch, Warning Light, and a Door Interlock Switch should be supplied and installed by the customer. *(Refer to Illustration 4-2).*

SAFETY SWITCH / EMERGENCY SWITCH

The main Safety Switch should be installed in the Room Electrical Cabinet (Main Disconnect) close to the Generator Cabinet and provided with light indicators for “Power On / Off”. It should be used for main disconnection of the whole System and located in an accessible place where it can be seen and controlled during operation and service.

Other Emergency Switches should be installed in accessible locations in the room (near the main entrance door or the Control Console) for use in an emergency. They should be connected to the Room Electrical Cabinet (Room Disconnect) so that they cut power to the Generator when they are activated.

The rating of these switches should be: 10 A, 500 V~, NC, and should have at least 3.42 mm as Creepage Distances and Air Clearances in accordance with Standards IEC 60601-1:2005, IEC 60601-1:2005+AMD1:2012+AMD2:2020 and IEC 61058-1:2000 requirements.

DOOR INTERLOCK SWITCH

The Door Interlock Switch indicates to the operator when Doorways to the X-ray room are open. It inhibits or not the X-ray generation, according to the Local Standards and customer preferences.

This switch should be installed in the entrance door(s) and its connecting cable should be routed to the Generator Cabinet.

WARNING LIGHT

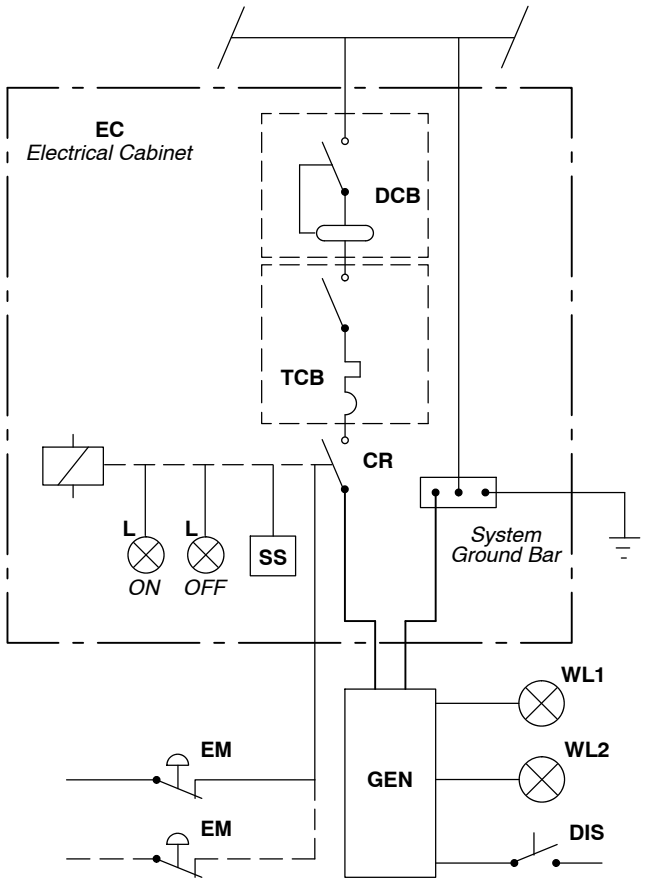
The Warning Lights are signal lamps installed outside of the X-ray room (near of the main entrance) that indicate:

1. The Generator/System is under voltage.
2. X-ray exposure in process *(for connection refer to Installation document.)*

The Warning Lights connection cables should be routed to the Generator.

Note ☞ *The installation must be in compliance with all local regulations.*

Illustration 4-2
Room Electrical Cabinet and Mains Connection



LEGEND

EC: Electrical Cabinet (Room Disconnect) for powering X-ray equipment. *(Customer supplied)*

DCB: Differential Circuit Breaker.

TCB: Thermomagnetic (or Fuses) Circuit Breaker.

CR: Contactor controlled by the Safety Switch **(SS).**

SS: Safety Switch used for Generator main disconnection, with ON/OFF positions.

L: ON / OFF Indicator Lamps located on the Electrical Cabinet.

EM: Emergency Switch near to Control Console and/or to the Room main entrance.

GEN: Generator Cabinet.

WL1: Warning Light of Generator/System under voltage, connected to the Generator Cabinet and located outside the X-ray Room (above the exam room entrance).

WL2: Warning Light of X-ray Emission, connected to the Generator Cabinet and located outside the X-ray Room (above the exam room entrance).

DIS: Door Interlock Switch located on the main entrance(s).

4.4 GENERATOR CABLE ACCESS

Illustration 4-3
Line Powered Generator (Without Floor or Wall Supports)

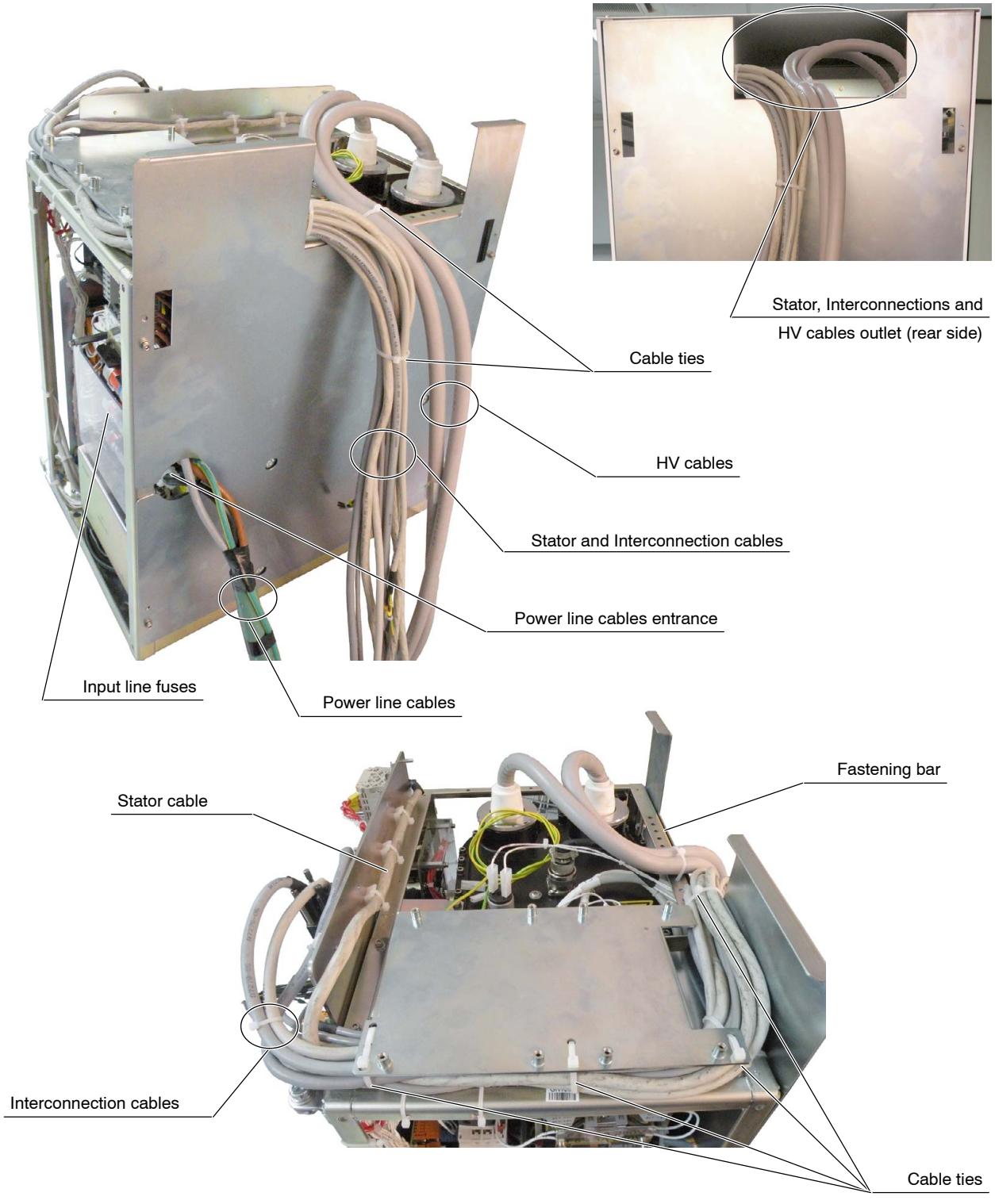
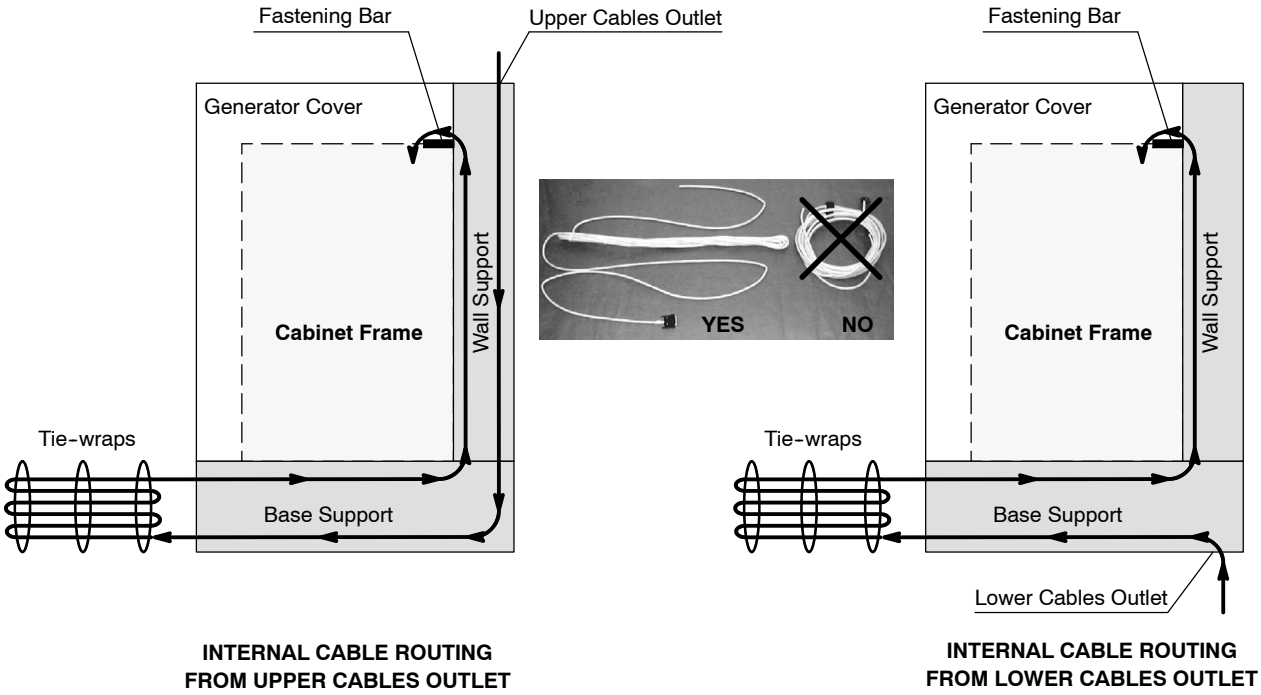


Illustration 4-4
Line Powered Generator (With Floor and Wall Support)



INTERNAL CABLE ROUTING FROM UPPER CABLES OUTLET

INTERNAL CABLE ROUTING FROM LOWER CABLES OUTLET

Cables routing from Cabinet to Base support (rear view)

Cables outlet (rear side of the Cabinet cover)

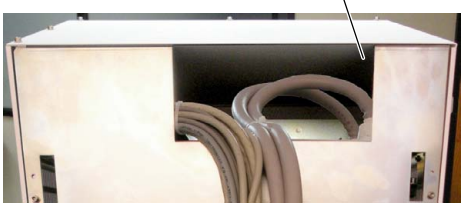
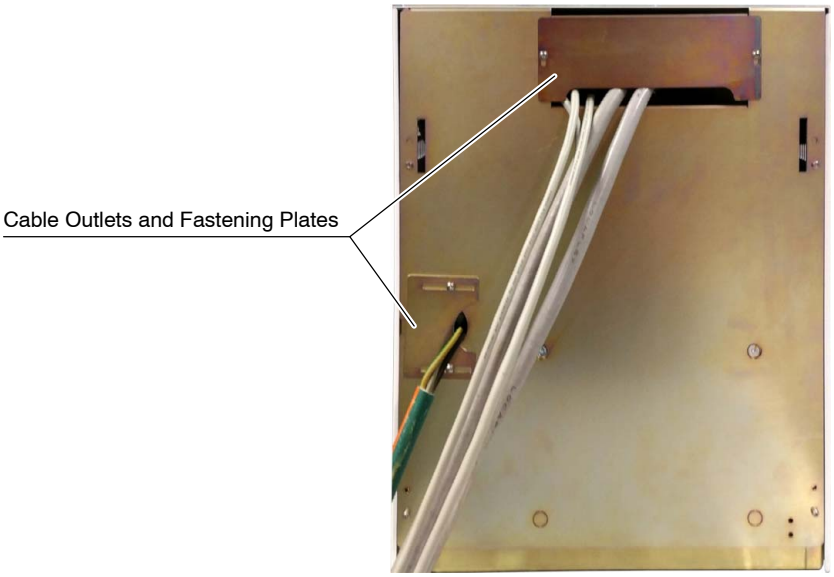


Illustration 4-5
Line Powered Generator with Fastening Plates on the rear cover



SECTION 5 PRODUCT CHARACTERISTICS

This section provides product information and illustrations showing physical dimensions, weight, mounting holes and cable access.

5.1 HIGH VOLTAGE CABLES

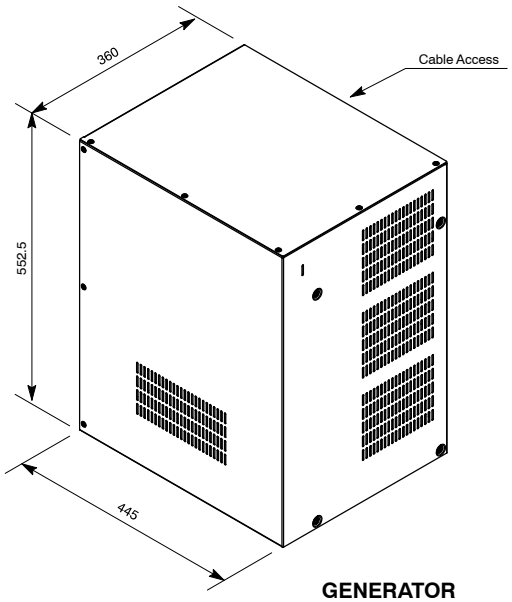
COMPONENT	LENGTHS			
High Voltage Cables	9 m (29.5 ft)	12 m (39.4 ft)	16 m (52.4 ft)	24 m (79 ft)

5.2 PHYSICAL CHARACTERISTICS

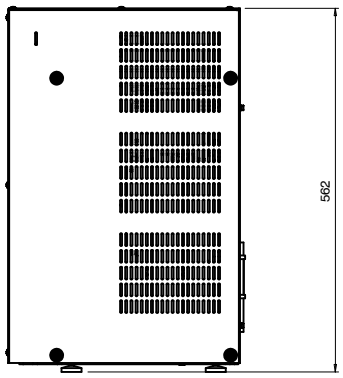
(Refer to Illustration 5-1)

COMPONENT	DIMENSIONS			WEIGHT
	Length	Width	Height	
LINE POWERED GENERATORS				
Generator Cabinet with Leveling Legs	445 mm (17.5”)	360 mm (14.2”)	min. 562 mm (22.1”)	65 kg (143 lb)
STANDARD CONTROL CONSOLES				
RAD Console Graphic Display	430 mm (16.9”)	290 mm (11.4”)	50 mm (1.9”)	6 kg (13.2 lb)
RAD Console Optional Pedestal	298 mm (11.7”)	236 mm (9.3”)	930 mm (36.6”)	10 kg (22 lb)
Touch Screen Console	351 mm (13.8”)	54 mm (2.1”)	319 mm (12.6”)	4.9 kg (10.8 lb)
Touch Screen Console Desk Stand	232 mm (9.1”)	190 mm (7.5”)	264 mm (10.4”)	1.3 kg (2.9 lb)
Note.- Dimensions for non-standard Consoles are not indicated in this document.				
PC INTERFACE BOX				
PC Interface Box	131 mm (5.2”)	165 mm (6.5”)	32 mm (1.3”)	0.5 kg (1.1 lb)

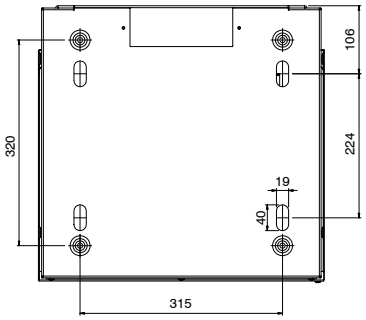
Illustration 5-1
Generator

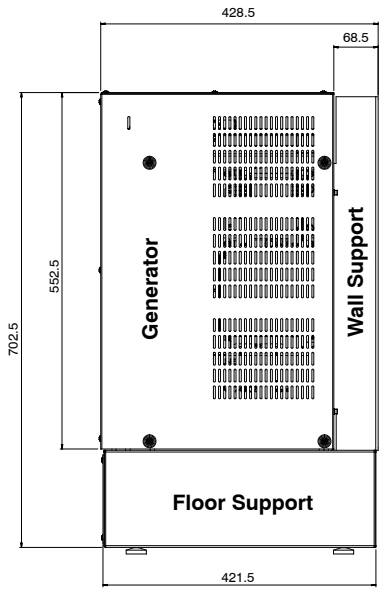


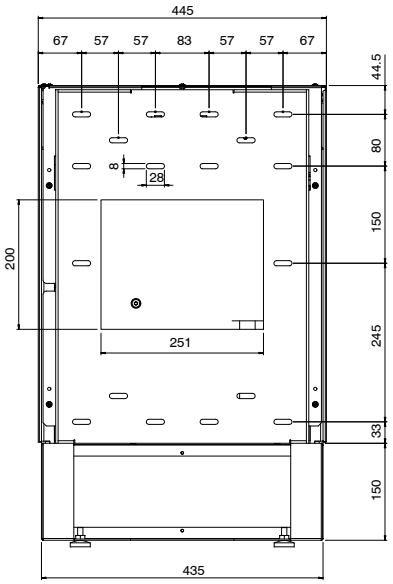
GENERATOR



GENERATOR WITH LEVELING LEGS



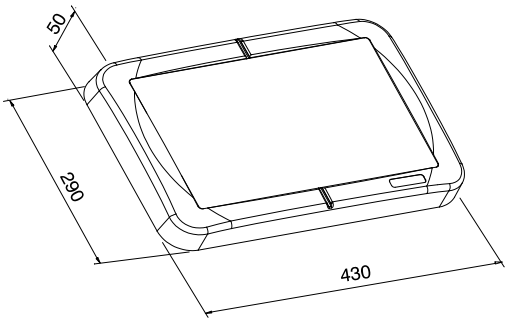




Wall and Floor Supports are options

Illustration 5-1 (cont.)
Consoles

RAD CONSOLE - GRAPHIC DISPLAY



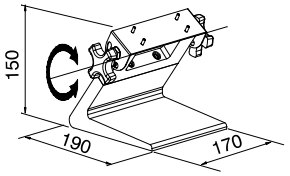
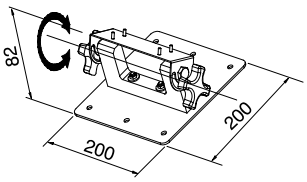
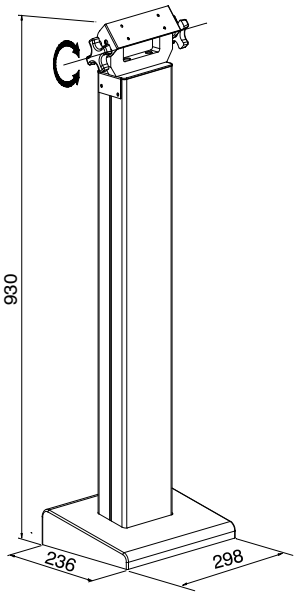


TABLE SUPPORT



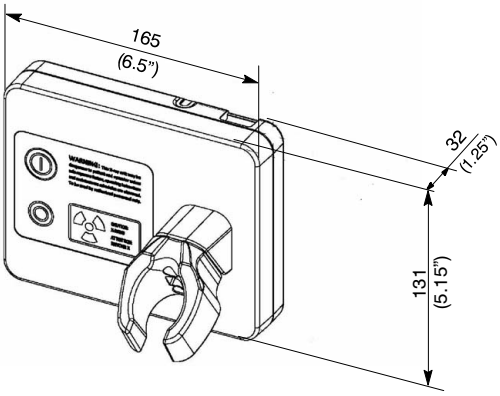
WALL SUPPORT



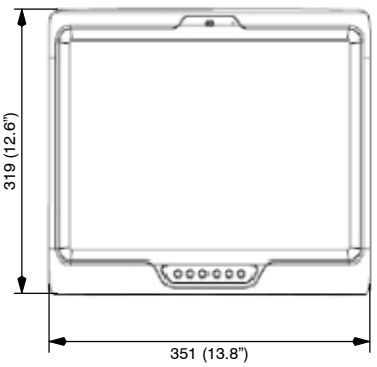
PEDESTAL

THIS CONSOLE CAN BE MOUNTED ON A TABLE SUPPORT, WALL SUPPORT OR PEDESTAL

PC INTERFACE BOX



TOUCH SCREEN CONSOLE



DESK STAND

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SECTION 6 PLANNING AIDS

6.1 SHIPPING DIMENSIONS AND WEIGHTS

COMPONENT CRATED	DIMENSIONS			WEIGHT
	Length	Width	Height	
Line Powered Generator with Control Console and Cables	1070 mm (42.1”)	620 mm (24.4”)	740 mm (29.1”)	92 kg (203 lb)

6.2 TOOLS AND EQUIPMENTS CHECKLIST

TOOLS AND EQUIPMENT CHECKLIST *The following tools and materials are needed for installation but are not shipped with the product.*	**COMPLETED**
Standard service engineer’s tool kit.	
Electric and hammer drill. Assorted masonry and high-speed bits in both metric and SAE sizes	
Assorted sizes of tongue and grove pliers, hammers, hex wrenches (metric and SAE), screw drivers, and metal files	
Wall and Floor anchoring hardware	
Assorted hardware for termination of electrical connections	
Assorted sizes of wire cutters and strippers, ratchet and standard crimpers, and a 75–watt soldering iron	
Tie wraps, heat and electrical tape, and wire markers	
Tags for labeling incomplete work according to regulatory requirements	
Movers, dollies, ladders, shop vacuum, and push-broom	

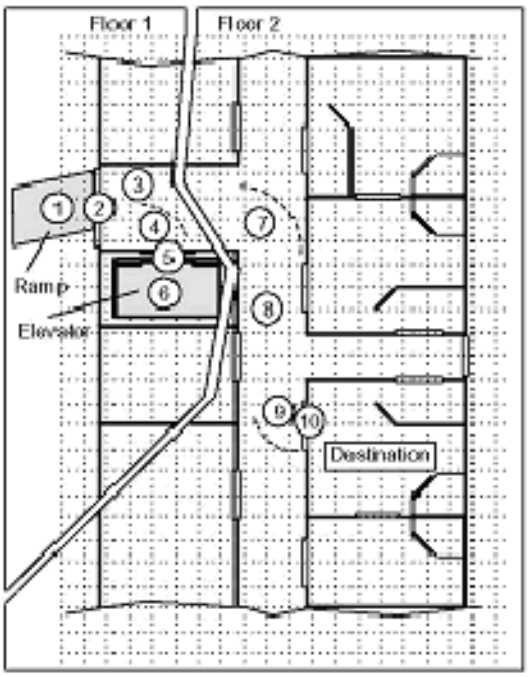
6.3 PREPARING THE DELIVERY ROUTE

Note ☞ *Refer to Section 2.2.1, "Door Size Requirements," for more information about the crated / uncrated dimensions and weights of the Components.*

1. **Sketch out the Route.**

   Begin preparing a Route Survey by sketching the area of the hospital or clinic which will receive the equipment. Include all areas on the delivery route from outside of the building to destination. See the sample sketch below.

Illustration 6-1
Sample Route



Reference Numbers:
Numbers in circles refer to the Route Survey data.
The Route Survey is a form on which site data is listed (step 2).

2. **Survey the Route.**

   Record all loading capacities, corridor widths, door openings, turning radius, flooring materials, elevator sizes, obstructions, and so on for reference.

3. **Check the Route.**

   Verify that the equipment can actually be transported via the route determined in step 1.

6.4 PRE-INSTALLATION CHECKLIST

Delivery Date:	
Sales Person:	
Customer:	
FDO No.:	
Room #	
Equipment:	

PHYSICAL REQUIREMENTS OF SITE	**COMPLETED**
1. Room size adequate for intended equipment configuration?	
2. Floor and walls are strong enough for intended equipment and mounting methods approved – seismic regulatory codes considered?	
3. Delivery route accommodates all intended equipment?	
4. Radiation physicist consulted?	
5. Necessary alterations made to circumvent obstructions?	
6. Modifications to room finished?	
7. Supports, platforms, wall materials have been provided?	
8. Support structures installed for floor, ceiling, and wall mounted equipment?	
9. Wall – ceiling supports leveled?	
10. Has floor been modified for cable ducts?	
11. Electrical service in place – at the ratings specified in Pre-Installation documentation?	
12. Power available to operate power tools?	
13. All non-electrical lines (air, water, oxygen, vacuum) installed?	

INTERCONNECTIONS	**COMPLETED**
1. Signal cable, power, and grounding plans produced?	
2. Necessary interconnection hardware, such as junction boxes, conduit or raceways, and fittings, provided?	
3. Interconnection hardware installed?	
4. System “feeder” power cables pulled and sufficient length available at disconnect box for connections?	
5. Interconnecting cables continuity checked, and labeled?	
6. All high voltage cable lengths verified?	
7. Interface information available for equipment?	

GENERAL	COMPLETED
1. Walls and floor clear of all obstructions?	
2. Walls finished?	
3. Finished floor installed?	
4. Room lights installed?	
5. Dust-creating work completed?	
6. Old equipment within room removed?	
7. Component positions clearly marked on floor?	
8. Space available to store equipment?	
9. Lock on door, or locked room available?	
10. Voice phone line connection provided?	
11. Have all fire/safety inspections for occupancy been completed?	

COMMENTS

INSPECTION DATE(S)

INSTALLATION PROJECT MANAGER SIGNATURE