

# GENERATOR QUICK REFERENCE

## WHAT SIZE GENERATOR IS REQUIRED?

Hoist Specifications					Generator Output <i>per Hoist</i> *	
Capacity	Hp	Phase	Voltage AC	Amperage	Kilowatts (kW)	Voltage AC
1000	1.2	1	208	7.5	5	177-229
1500	1.8	1	208	12	5	177-229
1500	1.8	3	208	7.5	5	188-229
2200	3	3	230	11	7.6	207-253

### THINGS TO REMEMBER WHEN CHOOSING A GENERATOR

- Verify the voltage operating range of the hoist BEFORE plugging it into the generator. Voltage that is too high or too low will damage the hoist. Consult the hoist operator's manual.
- Generator output voltage may be adjusted to meet hoist specifications with a buck or boost transformer, if necessary. Verify that the generator is wired for the desired buck or boost function.
- Generator capacity must be able to accommodate ALL the hoists connected to it.\*
- When 3 or more hoists will be used on a platform, consult Product Support at ProductSupport@SafeWorks.com for correct generator capacity specifications.
- A larger capacity generator must be used when ANY of the following conditions is present:
  - Ambient temperature is over 100° F
  - Relative humidity is over 50%
  - Site elevation is above 5,000 feet
  - Cord length is greater than 250 feet and no transformer is used
  - Hoists are run continuously for longer than 10 minutes at a time

### DEFINITIONS OF COMMON TERMS

<b>1-phase Power</b>	Single-phase power utilizes only one of the three circuits coming from the grid. It is used for most tools and devices.
<b>3-phase Power</b>	Electrical power is provided by the grid in 3 phases or separate lines. It is used for equipment with high startup loads.
<b>Ambient Conditions</b>	Air temperature, humidity and elevation above sea level affects gen-set ratings.
<b>Amprobe</b>	Measures amperage, and can also read voltages.
<b>Frequency (Hz)</b>	The number of times per second the AV voltage and current go from maximum to minimum and back to maximum.

### DEFINITIONS OF COMMON TERMS, CONTINUED

<b>Gen-set</b>	An engine-driven generator.	
<b>Generator Ratings</b>	The amount of power a gen-set can produce over a period of time without damage. <b>Intermittent:</b> Highest output available for a short period of time <b>Standby:</b> Use when utilities go out; run no more than 60 hours a year <b>Continuous:</b> Power level produced continuously with a steady load <b>Prime:</b> Used as primary source of power; 24 hours a day; varying loads	
<b>Governor</b>	Adjusts engine throttle position to maintain engine speed and output frequency as loads change	
<b>Inline Meter</b>	Measures start, line and run voltage and amp draw. Also called a multi-meter.	
<b>Inverter</b>	Converts DC power to AC power. Inverter generators consist of a DC generator connected to an inverter to create AC power.	
<b>Line Voltage</b>	Measured at the power source or outlet without any equipment running.	
<b>Run Voltage</b>	Best measured with an inline meter. Just after the hoist has reached full speed, the voltage will come up to run voltage, which will be +/-10% of hoist nameplate rating.	
<b>Start Voltage</b>	Best measured with an inline meter. This voltage registers on the meter for only a split second after the hoists are started.	
<b>Startup/Run Factor</b>	Power required when an electric motor is started already under load, such as a hoist supporting a platform. Power required for a scaffold hoist motor may be as much as 3 times the run voltage.	
<b>Power Cord</b>	Orientation of connector pins and sockets on each wire must be correct or the voltage and/or phase will be incorrect and hoist damage may result.	
<b>Voltage Regulator</b>	Controls the output voltage as the load changes. Usually not adjustable on portable units.	

## TROUBLESHOOTING POOR HOIST PERFORMANCE

Possible Cause	Solution
Low Speed or Output Frequency	Output frequency measured with a multi-meter at the power outlet or end of power cord must measure between 58 and 62 Hz. If reading is different, consult gen-set operator's manual or contact the gen-set's authorized service provider.  Verify gen-set is NOT in "energy saver" mode. This mode idles the engine until a load is applied. High startup loads on the hoist motor can damage the gen-set when in this mode and impact hoist performance.
Incorrect Voltage	If output voltage at the gen-set gauge panel or measured with a multi-meter at the gen-set outlet is less than the rated hoist voltage with no load, DO NOT USE THE GEN-SET TO POWER THE HOIST. Consult the gen-set operator's manual for instructions on how to adjust the output voltage, or contact the gen-set's authorized service provider.  If the voltage at the opposite end of the cord is lower than the rated hoist voltage or no voltage is detected, check for incorrect socket/plug alignment of the cord, plug and socket.  Orientation of the connector pins and sockets (x to x, y to y, etc.) must be correct for each wire or the voltage and/or phase will be incorrect.
Low Fuel Level	Low fuel supply affects gen-set speed and causes voltage and power supply surges that can damage the hoist. Consult the gen-set operator's manual for fuel consumption rates and ensure enough fuel is available for each operating shift. Consult the gen-set operator's manual for safety considerations during refueling and restarting after refueling.
Intake, Exhaust or Cooling System Blockage	Restricting the gen-set air intake, exhaust or cooling system will result in low power output, overheating and damage. <b>The gen-set must be in an open area with plenty of room around it so it can draw in enough air and to allow exhaust gases to dissipate.</b>
Blown Start Capacitor	Caused by low voltage from the generator. Verify that the generator capacity is adequate to serve all the hoists. Use a booster transformer if necessary. Turn off "auto idle". See also "Incorrect Voltage" above.  Can also be caused by frequent starting and stopping of the hoists. Make system changes to avoid frequent starting and stopping.
Blown Run Capacitor	Either can be caused by high voltage. Correct voltage at generator. Use a buck transformer if necessary.
Overheated Motor	Caused by overloading hoist. Verify hoist brake is functioning correctly. Change platform/rigging configuration to reduce load.

## HOW TO DETERMINE WHETHER THE HOIST IS RECEIVING CORRECT VOLTAGE

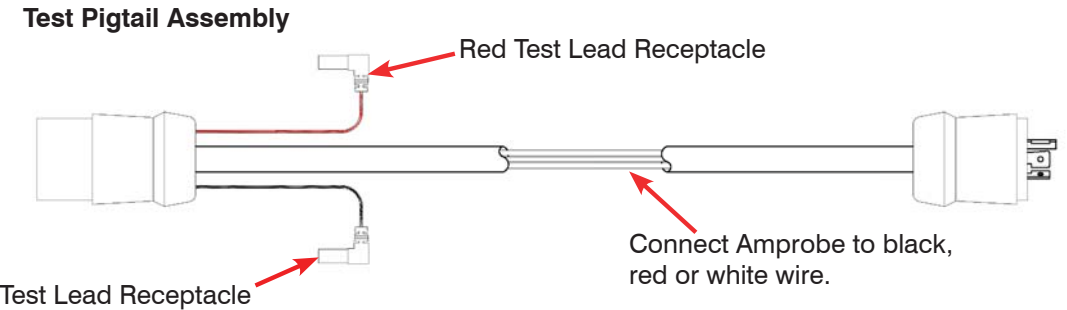
To do this you will need two items:

- Inline Volt-Ohm meter (multi-meter), OR Amprobe



Amprobe Inline Meter

- One of the following test pigtail assemblies:
  - Part No. 709656-1 for 250 Volts, 1-phase
  - Part No. 709656-3 for 250 Volts, 3-phase



Procedure:

1. Choose test pigtail assembly based on maximum voltage and phase of hoists.
2. Connect test pigtail to power supply cable either at an individual hoist, or before the yoke in order to test both hoists at once.
3. If using an inline meter, insert the inline meter's red test lead into the red test lead receptacle attached to the test pigtail assembly. Insert the meter's black test lead into the test pigtail assembly's black test lead receptacle.
4. If using an Amprobe, carefully open the Amprobe pincers and close them around one of the test pigtail assembly's wires (red, white or black, but NOT the green wire), as shown below, to measure amps.

