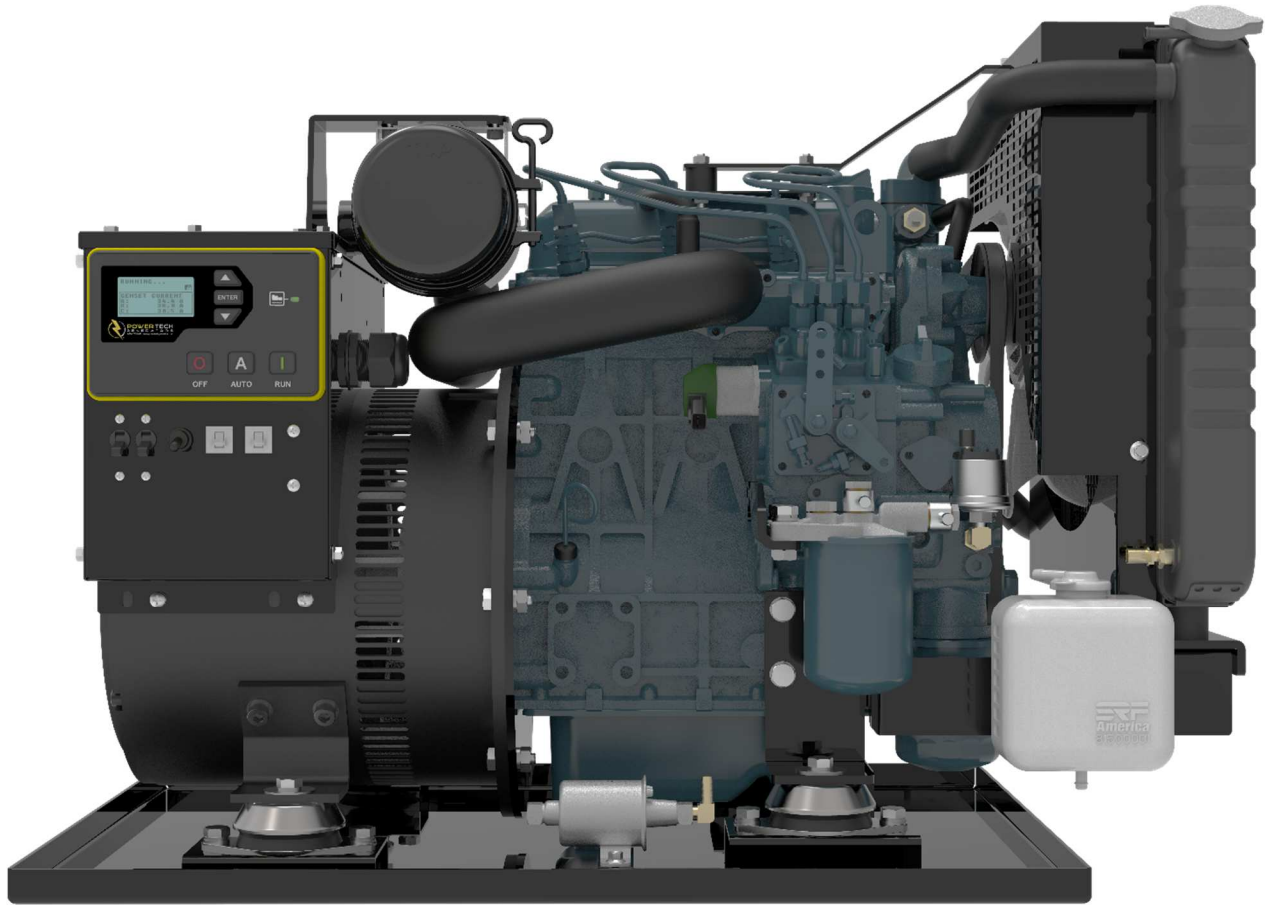




**POWERTECH**  
GENERATORS  
SOLUTIONS FOR MOBILE APPLICATIONS



# GENERAL INSTALLATION GUIDE



**⚠ WARNING:**

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to [www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel)

**⚠ WARNING:**

This product can expose you to chemicals including carbon monoxide and benzene, which are known to the State of California to cause cancer and birth defects or other reproductive harm.

For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

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# FOREWORD

Thank you for your purchase of a PowerTech generator set. It is engineered to the utmost quality standards, manufactured in a strict quality control environment, and will assure you a long, satisfactory service. To have the best performance from your PowerTech generator, please fully read and understand this manual.

This manual is written to provide you with the information required to safely install your generator for optimal performance and longevity. This manual was up to date at the time of printing/downloading, due to our continuous improvement of our products, we reserve the right to change the information contained in this manual without notice.

PowerTech recommends the use of only genuine PowerTech parts. Other parts may not perform as well, may damage the generator set, and may result in injury or death. In addition, the use of other parts may void your warranty.

For technical questions on your generator please contact your sales dealer, one of our authorized service centers or PowerTech's Customer Service Department at 1-800-760-0027. To expedite your call, please have the generator model and serial numbers available.

For service parts, please contact PowerTech's Parts Department at 1-800-760-0027 or order directly from our website at [www.powertechgenerators.com](http://www.powertechgenerators.com).

**634 SR 44 W.  
Leesburg, FL 34748  
Toll Free: 800-760-0027  
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[www.powertechgenerators.com](http://www.powertechgenerators.com)**

# SAFETY

## SAFETY NOTES



This symbol indicates a safety alert. It is used to indicate potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury and death.

This manual has several types of safety precautions and instructions: DANGER, WARNING, CAUTION, NOTICE, and Note.

### **DANGER**

Danger indicates the presence of a hazard that ***will cause severe personal injury, death, or substantial property damage.***

### **WARNING**

Warning indicates the presence of a hazard that ***can cause severe personal injury, death, or substantial property damage.***

### **CAUTION**

Caution indicates the presence of a hazard that ***will or can cause minor personal injury or property damage.***

### **NOTICE**

Notice communicates installation, operation, or maintenance information that is safety related but not hazard related.

### **Note**

Note indicates additional important or helpful information.

## OPERATING SAFETY

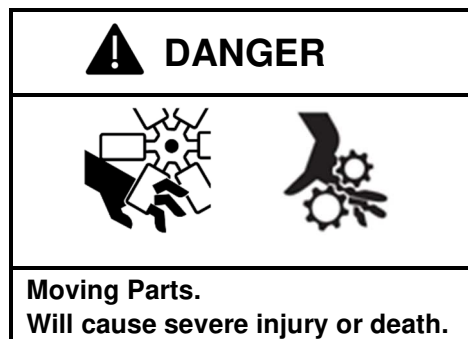
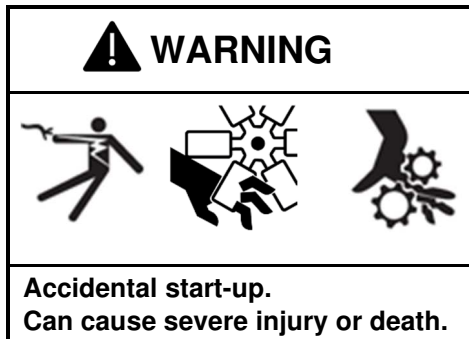


Before installing or operating this generator, be sure to read and understand all instructions. This generator set has been designed for safe operation in a specific application. **DO NOT** modify or use this generator set for any application other than that it has been designed for. Improper usage can cause damage, injury, or death. All installation and service work must be performed by properly trained and qualified personnel. Electrical installation, troubleshooting, and repair should only be performed by a qualified electrician.

The following guidelines should always be obeyed.

- Read, understand and follow all safety precautions and warnings before operating the generator set.
- Be sure to read and follow all safety decals affixed to the generator set.
- **DO NOT** modify the generator set. Unauthorized modifications may affect the life of the generator set; as well as, result in injury or death.
- The area around the generator set should be clean and free of debris.
- **DO NOT** operate machinery or equipment while under the influence of alcohol, medication, other drugs, or while fatigued.
- When connecting the generator set, be sure to follow any local, state, and National Electric Code (NEC) guidelines.

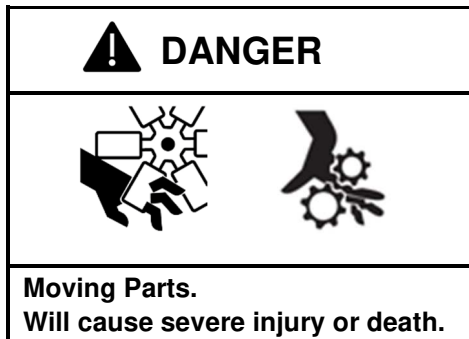
### ***Accidental Start-up***



This generator set may start without warning. While in operation, there may be exposed moving parts.

- Before working on the generator set or connected equipment, ensure the generator set is disabled. The genset may be disabled by first properly shutting down the generator set. Next, disconnect the battery cables, negative (-) lead first, and/or turn the battery disconnect switch (if equipped) to the OFF position.

## ***Moving Parts***



While in operation, there may be exposed moving parts.

- **DO NOT** wear loose, torn, or bulky clothing around the generator set.
- Be sure all guards and shields are in place before operating the generator set.
- Keep your hands and body away from all rotating parts, such as cooling fan, belts, pulleys, etc.
- Stop and disable the generator set before servicing.

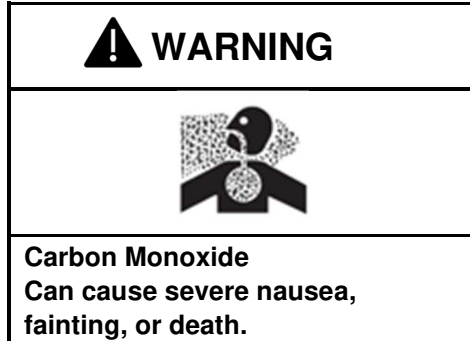
## ***Fire***



A fire can cause severe injury or death. To reduce the risk of fire:

- **DO NOT** smoke near the fuel system or fuel tank.
- **DO NOT** operate the generator set in the vicinity of spilled fuels or flammable vapors.
- **DO NOT** operate the generator set in the presence of fuel leaks, fuel accumulation, or other flammable materials.
- Keep the engine and engine bay clean and free of accumulated dirt, grease, and trash.
- Keep the genset idling for 5-6 minutes before stopping. Temperatures around the genset may increase suddenly.
- **DO NOT** fill the fuel tank near open flames or while smoking.
- Shut down the generator set and allow it to cool before fueling.
- **DO NOT** run the generator set with a damaged, loose, or missing fuel cap.
- If fuel or lubricants spill, clean up immediately and properly dispose of.
- **DO NOT** attempt to use ether or other starting aids. Doing so may cause a flash fire and/or damage the engine.
- Inspect and replace any damaged wiring if necessary.

## Engine Exhaust



During operation, the generator set will release engine exhaust into the surrounding atmosphere. This exhaust contains carbon monoxide, an odorless, colorless, tasteless, nonirritating gas. The inhalation of carbon monoxide, even for a short period, can result in death. To reduce the risk of carbon monoxide poisoning:

- Avoid breathing engine exhaust while working on or around the generator set.
- **DO NOT** run the generator indoors unless the exhaust is routed outside properly.
- Routinely inspect the exhaust system for leaks and repair if necessary.
- **DO NOT** operate the generator set where exhaust fumes can accumulate and/or leak into an occupied space.
- **DO NOT** operate the generator set without a properly functioning exhaust system.

Carbon monoxide poisoning symptoms include the following:

- Dizziness, Light Headedness
- Physical Fatigue
- Weakness in muscles and joints
- Sleepiness
- Inability to Concentrate
- Mental Fatigue
- Blurred Vision
- Inability to Speak Clearly
- Stomachache, Nausea, and/or Vomiting

If you experience any of these symptoms, immediately seek fresh air. Remain active and do not sit, lie down, or fall asleep. Seek immediate medical attention if the symptoms do not improve when breathing fresh air.

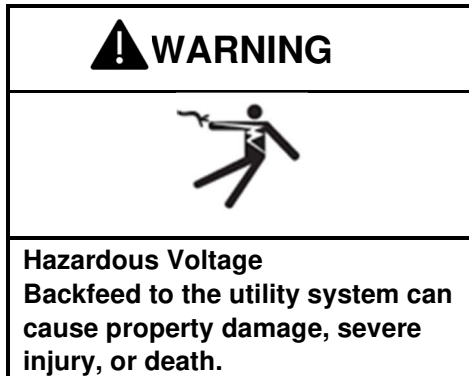


## ***Voltage Hazard***



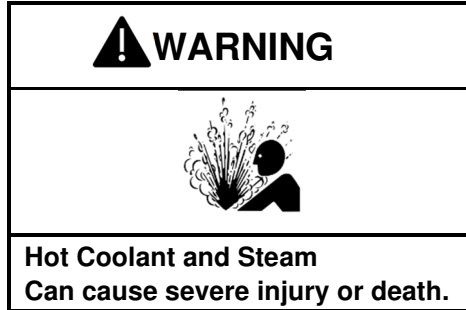
Whenever electricity is present, there is an electrocution risk. Following proper safety procedures can reduce the risk of electrocution.

- When connecting the generator set, be sure to follow any local, state, and National Electric Code (NEC) guidelines.
- Shut down the generator set and turn off all breakers before servicing the unit.
- Never make electrical connections while standing in water or on wet ground.
- Use extreme caution when testing voltage. It is advisable to have a trained and qualified person take the measurements.
- Inspect and replace any damaged wiring if necessary.
- Make sure all electrical covers are in place before operating the genset.



Whenever the generator set is connected as standby power, a transfer switch is required to prevent electrical backfeed into the utility electrical grid. Electrical backfeed is illegal and can result in the severe injury or death of utility company personnel working on power lines. The generator set must be installed following local, state, and National Electric Code (NEC) guidelines.

## **Burn Hazard**



During operation, some components of the generator set can become extremely hot. These parts include, but are not limited to, the engine, exhaust manifold and piping, muffler, generator end, and voltage regulator. In addition, the engine coolant can become extremely hot and cause pressure to build up in the cooling system. Removing the pressure cap, before allowing the generator set to cool down, could cause hot coolant and/or steam to be released, resulting in severe injury or death.

- **DO NOT** touch or lean against hot exhaust or engine components.
- Allow the generator set to cool down completely before servicing.

Never make electrical connections while standing in water or on wet ground.

# INTRODUCTION

## ABOUT THIS GUIDE

This General Installation Guide is intended to provide the basic information necessary to safely install a PowerTech generator set for optimal performance and longevity. Review and understand this manual in its entirety before beginning the installation.

Many of the requirements and guidelines in this guide reference the installation of the genset in a vehicle or trailer. For non-vehicle installations, use this guide as a reference, but adhere to local, state, or federal guidelines and requirements.

The installer of the generator set is responsible for choosing an appropriate generator set for the application and installing it per any applicable standards, requirements, codes, and regulations. Failure to do so may result in damage to the generator set not covered under warranty, damage to the location in which the generator set is installed, severe injury, or even death.

For information regarding operation and maintenance of the generator set, please refer to the appropriate Operation and Maintenance Manual.

## MARINE APPLICATIONS

Industrial and commercial generator sets do not comply with United States Coast Guard (USCG) requirements and regulations. **DO NOT** install an industrial or commercial generator set in a marine application. Use only generator sets certified for marine installations.

## ELECTROMAGNETIC INTERFERENCE

Generators emit and are affected by electromagnetic energy. If the generator set interferes with the operation of nearby devices or nearby devices interfere with the operation of the generator set, increase the distance between the offending devices.

## UNPACKING AND INSPECTING

The generator set was packaged and crated at the factory to avoid damage during shipping. Before uncrating, inspect the outside of the crate for any damage and report it to the carrier.

While opening the crate, use care to avoid damaging the generator set or any ship-loose components. After opening, inspect the generator set and any ship-loose components for concealed damage. Also verify that the order is complete, and no parts are missing.

Most generator sets are fastened to the pallet with lag screws through either the mounting risers, base pan, and/or mounting tabs. If mounting tabs were used, they may be discarded after removal.

## MOVING THE GENERATOR SET

Use extreme caution when moving the generator set. Generator sets are extremely heavy.

- Always use equipment that is rated to handle the weight of the genset.
- Never lift the generator set over top of any person or animal.
- On enclosed generator sets without an access hatch on the top, it is not recommended to lift the generator set by the lifting eyes on the engine. They may not be able to support the extra weight of the generator set.
- On open generator sets, use of a lifting bar is required to prevent damage to the generator set.
- When lifting with a forklift, ensure the generator set is lifted with the forks as close to directly under the engine and generator mounts as possible to adequately support the generator set and prevent tipping.
- **DO NOT** lift the generator set only by the edges of the base pan.
- **DO NOT** lift the generator set by the enclosure.

# LOCATION AND MOUNTING

It is important that the generator set is located such that it is protected from water, debris, fuel vapors, and vehicle exhaust. The generator set also needs to be installed in a location that provides easy access for inspection, operation, and maintenance.

## LOCATION

- Locate or shield the generator set to protect it from splashes, tire spray and road debris.
- **DO NOT** install the generator set in a compartment containing a fuel tank or battery. While operating, the generator set may ignite flammable vapors.
- Install the generator set in a location that allows for easy access for inspection, operation, and maintenance.
- The compartment housing the generator set **MUST** be sealed from the occupied spaces to prevent engine exhaust from entering them.
- **DO NOT** use genset cooling air to heat occupied spaces. It may contain engine exhaust gases.

**⚠ WARNING: Failure to seal the generator set from occupied spaced may allow engine exhaust to enter, resulting in injury or death.**

- The generator compartment **MUST** be lined with a fire-resistant barrier.
- Although enclosed generator sets have integrated sound insulation, it may be desirable to line the compartment with an acoustic material to reduce sound transmission. Ensure this material is fire resistant. **DO NOT** line the bottom of the compartment with insulation, as it may absorb spilled fluids and cause a fire hazard.

## STRUCTURE

- The mounting structure needs to be of sufficient strength to support the weight generator set, any accessories, and cyclical dynamic forces caused by motion of a vehicle. The dynamic forces caused by vehicle motion may be as high as  $\pm 3g$ 's.

**⚠ WARNING: A mounting structure or method of insufficient strength can allow the generator set to detach from the vehicle and cause injury or death.**

- The generator set needs to be supported as close to directly under the engine and generator mounts as possible. **DO NOT** support the generator set only by the edges of the base pan.
- Use only grade 8 or higher fasteners, of appropriate size, to mount the generator set.
- **DO NOT** weld the generator set to the structure or frame. Severe and unrepairable damage will occur.
- If possible, avoid the use of unsupported, cantilevered mounting rails. This style of mounting structure may cause undesirable vibration.
- Ensure there is enough clearance under the generator set and mounting structure to prevent striking the ground or road debris during vehicle operation.

# AIRFLOW

For proper operation, the generator set requires an adequate flow of air for cooling and combustion. Insufficient air flow may cause the generator set to perform poorly and/or overheat. For proper airflow, there needs to be at least 1-inch of clearance on all sides of the generator set, except the bottom and radiator end, as noted below.

Be aware that louvers, screens, grilles, and decorative treatments cause increased restriction and need to be accounted for when calculating the open area for the intake and discharge air. Contact the manufacturer of the treatment to determine its open area.

## INTAKE AIR

- Enclosed generator sets pull most of the cooling air through the bottom and rear of the enclosure. Open generator sets do not have air inlet openings; however, they still need the same amount of air inlet opening in the compartment.
- The inlet air opening into the compartment needs to be at least equal to the area of the radiator plus 25%.
- The floor of the compartment must not block off any air openings. If the compartment opening cannot align with the opening on the bottom of the generator set, the generator set can be mounted on the supplied risers to assist with airflow.
- Avoid positioning the intake air openings where they may allow water, debris, engine exhaust, fuel vapors, and/or heated air to enter.
- Care must be taken to avoid recirculating the generator set's discharge air.

## DISCHARGE AIR

- Discharge air from radiator needs to be exhausted from the compartment. The open area of the discharge air opening and any associated ducting needs to be at least the same as the area of the radiator.
- Discharge air will be hot. Avoid directing discharge air towards people, animals, and/or other heat sensitive items.
- **DO NOT** use genset discharge air to heat occupied spaces. It may contain engine exhaust gases.
- To prevent overheating, it is advisable to duct the air to the outside instead of discharging it directly inside the compartment. Various duct kits are available from the factory to aid in installation.
- Avoid directing the discharge air directly against a wall or other flat surface (deadheading). This causes additional restriction and can result in recirculation of the discharge air.

# ENGINE EXHAUST

The generator set is supplied from the factory with a connection for attaching the exhaust piping during installation. Additional exhaust accessories are available from the factory.

- Exhaust piping from the generator set must be of adequate size. Reducing the pipe size may result in reduced engine performance. If the correct size is not known, please contact the factory.
- Exhaust piping must be gas tight.
- Route the exhaust such that it will be protected from damage during vehicle operation
- The exhaust piping should be supported near its end and along its length in 3-foot intervals, using automotive style supports.
- **DO NOT** attach exhaust supports to combustible materials such as wood.
- Exhaust components will become extremely hot during operation. Maintain at least a 3-inch clearance from combustible materials, unless shielded or insulated. Nearby combustible materials must not exceed 117°F above ambient temperature during operation.
- Protect the exhaust opening through the compartment with heat and flame-resistant materials.
- **DO NOT** route the exhaust system near fuel lines, fuel tanks, transmission lines, electrical wiring, and/or any other components that may create a fire hazard.
- **DO NOT** interconnect the generator set and vehicle exhaust systems.
- Extend the exhaust piping to a minimum of 1 inch outside the perimeter of the vehicle. **DO NOT** terminate the exhaust under the vehicle.
- **DO NOT** terminate the exhaust piping within 6 inches of any door, window, vent, or opening to any occupied space.
- **DO NOT** direct engine exhaust towards occupied spaces.



# FUEL SYSTEM

Each generator set is supplied with the fuel pump and filters installed with provisions provided for easy connection. For enclosed generator sets, the connections provided are two 1/4" NPT bulkhead fittings installed in the base pan. Open units connect either directly to the fuel filter (supply) and engine (return) or to a fuel block mounted to the flywheel housing.

Recommended minimum supply line sizes:

8-12kW Diesel.....	5/16" ID
15-60kW Diesel.....	3/8" ID
12-20kW Gasoline.....	3/8" ID (EPA approved, Low-permeation)

Recommended minimum return line sizes:

8-12kW Diesel.....	3/16" ID
15-60kW Diesel.....	3/8" ID
12-20kW Gasoline.....	1/4" ID (EPA approved, Low-permeation)

The fuel pump provided on the generator set will be suitable in most installations. In applications with long fuel line runs or high lift from the fuel tank, an auxiliary pump may be required.

- It is required to use a separate pick-up tube in the vehicle tank or a separate fuel tank. **DO NOT** tee into the vehicle fuel system. Teeing into the high-pressure side of the vehicle fuel system could result in excessive fuel pressure that could cause damage to the generator set. Connecting to the low-pressure side could cause the generator set to be starved for fuel.
- To prevent running the vehicle out of fuel, ensure the fuel pick-up for the generator set does not extend as deep as the pick-up for the vehicle.
- The generator set may require the installation of a return line back to the tank. This return line should also be independent of the vehicle fuel system.
- Steel or copper fuel lines and high-quality fuel hose is recommended. Fuel lines must be capable of withstanding harsh road and climatic conditions.
- Gasoline generator sets require the use of EPA approved, low-permeation fuel line.
- Run the fuel lines above the top of the fuel tank to prevent syphoning in the event of a break in the fuel line.
- When rigid fuel lines are used, there must be a minimum of 6-inches of flexible line used to make the connection to the generator set.
- **DO NOT** run fuel lines in occupied spaces.
- Keep fuel lines clear of exhaust, electrical wiring, and moving components.
- Protect the fuel lines from sharp edges and chaffing.
- If the generator set is mounted on a slide, ensure fuel lines are long enough and secured such that they are not strained or damaged during slide operation.

Gasoline generator sets and fuel tanks are required to meet all applicable EPA and CARB regulations when installed. Installers are advised to refer to these requirements when installing the generator set.

# ELECTRICAL

The generator set electrical system is divided into two parts, AC line voltage and DC low voltage. The AC line voltage supplies power to the electrical load being powered by the generator set. The DC low voltage is used to supply power to start the generator set and for carrying communication signals for the generator set. Generator specific wiring diagrams are available from the factory.

## GENERAL

- Keep all electrical wiring clear of exhaust, fuel lines, and moving components.
- **DO NOT** route AC line voltage wiring and low voltage control wiring together. The line voltage wiring may cause interference in the control wiring, resulting in incorrect operation and/or damage to the generator controller.
- Seal all wiring openings into occupied spaces to keep out exhaust gases.
- All wiring should be encased in waterproof, protective conduit appropriate for the voltage and current being carried.

## AC LINE VOLTAGE

- When wiring the AC line voltage, always follow the National Electrical Code (NEC) and all other applicable regulations.
- Have a qualified electrician supervise and inspect the installation of all AC wiring.
- Various output lead lengths are available from the factory. If the output leads on the generator set need to be replaced with longer ones, ensure the ampacity of the replacement leads is adequate per the appropriate chart in the National Electric Code (NEC).
- It is recommended to terminate the AC line voltage wires in a breaker panel with individual circuit breakers for each circuit.
- All convenience outlets are required to be ground fault circuit interrupters (GFCI).
- When connecting the generator set to utility power (shore power), it **MUST** have an approved device to prevent the generator set and utility power from being interconnected.

**⚠ WARNING: Interconnecting the generator set and the utility or other power source can lead to the electrocution of personnel working on the utility lines, damage to equipment, and/or fire. An approved switching device must be used to prevent interconnection.**

- Bond the generator set, connected AC & DC equipment, and controls to a common ground, per all applicable codes.

**⚠ WARNING: Faulty grounding can lead to fire and electrocution, resulting in severe injury or death. Grounding must be performed per the National Electric Code (NEC) and applicable codes.**

## DC LOW VOLTAGE

### ***Battery Connections***

The generator set has a 12VDC, negative ground system for starting and controls. Battery Connections for the genset are located in different locations depending on your model. Enclosed generator sets generally have bulkhead connections integrated into the base pan. Open units have no bulkhead for battery connection. The battery connections must be made to the starter battery post for positive (+) and to the engine's cylinder block for ground (-). Some generator sets have an internal battery. There is no need for connections to be made on these generator sets.

To prevent accidental, start up during installation, battery cables should not be hooked up until the generator set is ready to be tested.

- It is recommended to install a battery disconnect device between the generator set and the battery.
- Unless the generator set is equipped with an internal battery, batteries should be installed in a separate vented compartment.
- Batteries should be located as to prevent acid spills from contacting fuel lines, wiring, and other components.
- Battery cables should be sized according to the distance from the generator set to the battery. Reference the following chart for guidance.

<b>BATTERY CABLE LENGTH (Feet)</b>	<b>BATTERY CABLE SIZE (AWG)</b>
0 to 20	2
21 to 30	0
31 to 40	00

- It is recommended to run a full length negative (-) cable from the genset back to the battery.
- Terminate battery cables with appropriately sized eyelet connectors.
- Cover battery cable connections with appropriately sized boots to prevent accidental contact and short circuits.

## Control Connections

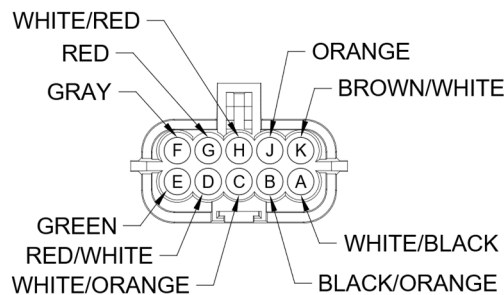
The generator set is equipped with an electronic generator controller. This generator controller can be configured to connect to various types of remote panels and start/stop methods.

A pigtail is supplied with the generator set for making control connections. In addition, various lengths of remote harnesses are available from the factory.

When making connections to the remote pigtail, reference the following:

Pin #	Colors	Function
A	White & Black	Analog Temp Sender
B	Black & Orange (Twisted Pair)	Can High
C	White & Orange (Twisted Pair)	Can Low
D	Red & White	+12VDC for Gauges
E	Green	Ground (Must be grounded to generator)
F	Gray	Ignition while running (+12VDC)
G	Red	Battery Power (+12VDC)
H	White & Red	Start /Stop Circuit
J	Orange	LED (Units with 3,4,7 in Sixth Character of S/N)
K	Brown & White	Analog Oil pressure sender

Generator Pigtail Pinout (viewed from wire insertion end of female plug)



If desired, the connectors and pins can be purchased from the factory for harness construction.

Part	PowerTech Part Number
Male Connector	06P38225
Male Pin	06P31076
Wire Seal	06P39008
Cavity Plug	06P39011

# REVISIONS

Revision	Date
Initial Release	3/4/2021