BALDOR®

Automatic Emergency Generator

AE8, AE10, AE11 and AE25

Installation & Operating Manual

5/05 **MN2415**

WARNING:
CALIFORNIA PROPOSITION 65 WARNING:

Engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects and other reproductive harm.

WARNING:
CALIFORNIA PROPOSITION 65 WARNING:

Battery posts, terminals and related accessories are known to the state of California to cause cancer, birth defects and other reproductive harm.

Table of Contents

Continued on next page

Section 1
Product Safety Information

Safety Notice

Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury. Always disconnect all electrical loads before starting the generator.

Installation and repair procedures require specialized skills with electrical generating equipment and liquid cooled engine systems. Any person that installs or repairs this generator must have these specialized skills to ensure that this generating unit is safe to operate. Contact Baldor for repairs or any questions you may have about the safe installation and operation of this system.

The precaution statements are general guidelines for the safe use and operation of this generator. It is not practical to list all unsafe conditions. Therefore, if you use a procedure that is not recommended in this manual you must determine if it is safe for the operator and all personnel in the proximity to the generator and connected loads. If there is any question of the safety of a procedure please contact Baldor before starting or stopping the generator.

This equipment contains high voltages. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the start−up procedure or troubleshoot this equipment.

This equipment may be connected to other machines that have rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt the start−up procedure or troubleshoot this equipment.

- System documentation must be available to anyone that operates this equipment at all times.
- Keep non-qualified personnel at a safe distance from this equipment.
- Only qualified personnel familiar with the safe installation, operation and maintenance of this device should attempt start-up or operating procedures.
- Always stop engine before making or removing any connections.
- Always stop engine and allow it to cool before refueling.

Responsibility

When your generator is delivered, it becomes the responsibility of the owner/operator of the generator set to prevent unsafe conditions and operation of the equipment. Some responsibilities include (but are not limited to) the following:

1. It is the responsibility of the owner/operator of this generator to ensure that this equipment is correctly and safely installed.
2. It is the responsibility of the owner/operator of this generator to ensure that this equipment, when installed fully complies with all federal, state and local codes.
3. It is the responsibility of the owner/operator of this generator to ensure that any person operating this equipment has been properly trained.
4. It is the responsibility of the owner/operator of this generator to ensure that any person operating this equipment has access to all manuals and information required for the safe use and operation of this equipment.
5. It is the responsibility of the owner/operator of this generator to ensure that it is properly maintained and safety inspected at regular scheduled intervals.
6. It is the responsibility of the owner/operator of this generator to ensure that any person who has not been trained on the safe use of this equipment does not have access to this equipment.

Read This Manual Thoroughly

If you do not understand any concept, any procedure, any safety warning statement, any safety caution statement or any portion of this manual, contact Baldor or your nearest authorized Baldor representative. We are happy to make sure you understand the information in this manual so that you can safely enjoy the full use of this generator.

Symbols

This symbol is shown throughout the manual to indicate a connection to ground reference point.

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

Precaution Statements Used In This Manual

There are three classifications of precautionary statements used in this manual. The most critical is a **WARNING** statement, then the **Caution** statement and the least critical is the Note statement. The usage of each statement is as follows:

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in injury or death.

Caution: Indicates a potentially hazardous situation which, if not avoided, could result in damage to property.

Note: Additional information that is not critical to the installation or operation.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS – This manual contains important instructions for the generator that should be followed during installation, operation and maintenance of the generator.
For ease of reading, the Warning statements are divided into four categories: Operation, Burn, Installation, and Maintenance.

Operation

WARNING: Never operate this generator in a manner other than as described in this manual. Operation in any manner not described in this manual should be considered unsafe and should not be attempted. Never start the engine unless you have first verified that the installation and operation of the generator are as described in this manual.

WARNING: Be sure that you are completely familiar with the safe operation of this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury.

WARNING: Exhaust fumes/gases are extremely dangerous and can cause severe illness or death. Never breath exhaust fumes produced by a running engine. Only run the engine outdoors where ventilation is plentiful. Exhaust gases contain carbon monoxide, a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning include: dizziness, nausea, headaches, sleepiness, vomiting or incoherence. If you or anyone else experiences these symptoms, get out into fresh air immediately. Stop the engine and do not restart the engine until it has been inspected and if necessary repaired or reinstalled in a well ventilated area.

WARNING: Hot exhaust gasses must never be directed toward anything that may catch fire or explode.

WARNING: This generator must not be used on or near any forest covered, brush covered, or grass covered land unless the engine's exhaust system is equipped with a spark arrestor. The spark arrestor must be maintained in effective working order by the operator.

WARNING: Some parts of this generator rotate during operation. Rotating parts can present extreme danger if clothing or body extremities are caught by the rotating part and can cause serious or fatal injury. Never touch a part of the generator until the engine has been stopped and all rotating parts are completely stopped. Also, disconnect the spark plug wires and battery connection to prevent accidental engine rotation during servicing.

WARNING: Never move a generator set that is running. Loads should be connected and position secure before starting the engine. Hazards are caused by moving a generator set that is running.

Continued on next page.

Operation Warning Statements Continued

WARNING: Never connect or disconnect loads during operation. Always connect load circuits before starting the engine and use external branch disconnects etc. to switch loads On/Off.

WARNING: Be sure that you understand how to stop the engine quickly in case of an emergency situation. Become familiar with the controls and safety systems provided with this generator set.

WARNING: Always wear safety glasses with side shields and hearing protection when working near the generator.

WARNING: Improper operation may cause violent motion of connected equipment. Be certain that unexpected movement will not cause injury to personnel or damage to equipment.

WARNING: Never operate the generator set indoors or in a poorly ventilated area such as a tunnel or cave. Exhaust fumes are extremely dangerous to all personnel that are in or in contact with that area.

WARNING: Never permit anyone to operate the generator without proper instructions. Be sure to keep a copy of this manual with the generator so that all users can be properly informed of its safe operation.

WARNING: Never allow children or pets to be in the area where the generator is running. The generator and the equipment being powered by the generator may cause injury or death.

WARNING: Never operate the generator unless all guards, covers, shields and other safety items are properly installed.

WARNING: Do not put hands, feet, tools clothing or other objects near rotating parts such as drive shaft, pulley, belt etc. Rotating parts cause extremely dangerous situations because they can catch loose clothing or extremities and cause serious or fatal injury.

WARNING: When operating this generator remain alert at all times. Never operate machinery when physically or mentally fatigued, or while under the influence of alcohol, drugs or medication.

WARNING: Never operate the engine when the air cleaner is removed. An engine backfire can cause serious burns.

WARNING: Never "jump start" a generator to start the engine. If the battery charge is insufficient to start the engine, charge or replace the battery and try to restart. Jump starting a battery can cause the battery to explode and cause severe injury or death to anyone in the area.

WARNING: High voltage is present whenever engine is running. Electrical shock can cause serious or fatal injury. Never operate electrical equipment while standing in water, on wet ground or with wet hands, feet or shoes or while barefoot.

WARNING: High voltage is present whenever the engine is running. Electrical shock can cause serious or fatal injury. Always stop engine before connecting or disconnecting power cords or external devices.

WARNING: Do not smoke near generator during operation or when close to fuel source. LPG and natural gas fuels are flammable and can cause fire, explosions, injury or death.

WARNING: Keep generator at least three feet away from buildings and other structures.

WARNING: Keep generator away from flammable or hazardous materials (trash, rags, lubricants, explosives, paints etc.) and grass or leaf build up.

WARNING: Keep a fire extinguisher near the generator while generator is in use. An extinguisher rated "ABC" by the National Fire Protection Association is appropriate.

Burn

WARNING: Parts of this generator are extremely hot during and after operation. To prevent severe burns, do not touch any part of the generator until you have first determined if the part is hot. Wear protective clothing and after use allow sufficient time for parts to cool before touching any part of the generator.

WARNING: Do not touch the hot exhaust parts or the high voltage spark plug or coil terminals of the engine. Although spark plug voltages are not normally lethal, a sudden involuntary jerk of the hand or body part caused by contact with high voltage or a hot surface can result in injury to yourself or others.

WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

Continued on next page.

Warning Statements Continued

Installation

WARNING: Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

WARNING: An open bottom stationary engine generator set must be installed over noncombustible materials and shall be located such that it prevents combustible materials from accumulating under the generator set.

WARNING: Installation and repair procedures requires specialized skills with electrical generating equipment and small engine systems. Any person that installs or performs repairs must have these specialized skills to ensure that the generator set is safe to operate. Contact Baldor for installation or repairs.

WARNING: Be sure all wiring complies with the National Electrical Code (NEC) and all regional and local codes or CE Compliance. Improper wiring may cause a hazardous condition and exposure to electrical hazards can cause serious injury or death.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of generator systems.

WARNING: Never allow the exhaust outlet to be positioned so that the exhaust gases are directed towards any openings or air entry routes (doors, windows, vents, etc...) of an occupied building. When discharging the hot exhaust gases out of the building do not direct them towards anything that could catch fire or explode.

WARNING: Place protective covers over all rotating parts such as drive shaft, pulley, belt etc. Rotating parts cause extremely dangerous situations because they can catch loose clothing or extremities and cause serious or fatal injury.

WARNING: Unauthorized modification of a generator set may make the unit unsafe for operation or may impair the operation of the unit. Never start a generator set that has been modified or tampered with. Be sure that all covers and guards are properly installed and that the unit is safe before starting the engine. If you are unsure, contact Baldor before starting the engine.

WARNING: When moving the generator, use reasonable caution. Be careful where you place fingers and toes to prevent injury "Pinch Points". Never try to lift a generator without a hoist or lift means because they are heavy and bodily injury may result.

Warning: Never connect this generator to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. The national electrical code (NEC) requires that connection of a generator to any electrical circuit normally powered by means of an electric utility must be connected by means of approved transfer switch equipment to isolate the electrical circuit from the utility distribution system when the generator is operating. Failure to isolate the electrical circuits by such means may result in injury or death to utility power workers due to backfeed of electrical energy onto the utility lines.

WARNING: Circuit overload protection must be provided in accordance with the National Electrical Code and local regulations.

WARNING: Check Ground Fault Circuit Interrupt (GFCI) receptacles monthly by using the "Test" and "Reset" buttons.

WARNING: Only a professional experienced technician should install a fuel supply system. LPG and natural gas fuels are flammable and can cause fire, explosions, injury or death. Fuel supply lines should be kept away from sharp objects to prevent rupture. Comply with all NFPA regulations and local codes for shut–off valves, regulators, fuel line type, connectors etc.

WARNING: Have electrical circuits and wiring installed and checked by licensed electrician or qualified technician. Electrical shock can cause serious or fatal injury.

WARNING: Incorrect installation of this generator set could result in property damage, injury or death. Connection of the generator to its fuel source must be done by a qualified professional technician or contractor.

Continued on next page.

Warning Statements Continued

Maintenance

WARNING: Before servicing the generator set, be sure to disconnect the battery terminals to prevent accidental engine rotation or starting.

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

WARNING: Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

WARNING: A battery presents a risk of fire and explosion because they generate hydrogen gas. Hydrogen gas is extremely explosive. Never jump start a battery, smoke in the area around the battery or cause any spark to occur in the area around the battery.

WARNING: Do not mutilate the battery or dispose of a battery in a fire. The battery is capable of exploding. If the battery explodes, electrolyte solution will be released in all directions. Battery electrolyte solution is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

WARNING: A battery presents a risk of electrical shock hazard and high short circuit current. Electrical shock can cause serious or fatal injury. Never wear jewelry, watch or any metal objects when in the area around the battery.

WARNING: The battery electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. If electrolyte contacts the skin, flush the area immediately with water and wash it off using soap and water. If electrolyte contacts the eyes, immediately flush the eye thoroughly with water and seek medical attention quickly.

WARNING: Before cleaning, inspecting, repairing or performing any maintenance to the generator set, always be sure the engine has stopped and that all rotating parts have also stopped. After stopping, certain components are still extremely hot so be careful not to get burned. Before servicing the generator set, be sure to disconnect the spark plug wires and the battery terminals to prevent accidental engine rotation or starting.

WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

WARNING: Before servicing the generator set, be sure to disconnect the spark plug wires and the battery terminals to prevent accidental engine rotation or starting.

WARNING: Inspect all wiring frequently and replace any damaged, broken or frayed wiring or wires with damaged insulation immediately. Electrical shock can cause serious or fatal injury.

WARNING: Disconnect all electrical wires and load devices from generator power outlets before servicing the generator. Electrical shock can cause serious or fatal injury. Always treat electrical circuits as if they are energized.

WARNING: Check all fuel supply piping, and their connections monthly for fuel leaks. LPG and natural gas fuels are flammable and can cause fire, explosions, injury or death. If a leak is found, replace only with approved pipe or components.

Continued on next page.

Caution Statements

Caution: **Avoid installing the generator set beside heat generating equipment, or directly below water or steam pipes or in the vicinity of corrosive substances or vapors, metal particles and dust. Heat can cause engine problems to develop and unwanted substances can cause rust or generator failure over time.**

Caution: **Do not apply high voltage to windings (do not start the generator) in a moisture–saturated condition. Moisture can cause insulation breakdown, making it necessary to return the generator to the factory for repair, and consequent expense and loss of time.**

Caution: **Use only original equipment or authorized replacement parts. Using the correct parts will assure continued safe operation as designed.**

Caution: **Do not support the generator from the top of the frame or enclosure.**

Caution: **Do not tamper with or change the engine speed. Engine speed is factory set to produce the correct voltage and output frequency.**

Caution: **Never operate the engine without a muffler. The engine is designed to have the correct exhaust components installed and operating without these components can present a fire hazard, cause excessive exhaust gases and cause damage to engine. Inspect muffler periodically and replace if necessary.**

Caution: **The Programmable Output Contacts selection must agree with the external control wiring prior to energizing the controller. Failure to do so may cause severe equipment damage.**

Caution: **This generator must have a battery installed for operation. The battery is used during starting and during operation. If engine operation is attempted while the battery is removed, damage to the engine's electrical components may result.**

Section 2
General Information

Thank you for purchasing your Baldor Generator Set. This manual contains information you need to safely and efficiently install and operate your generator set. During the preparation of this manual every effort was made to ensure the accuracy of its contents. This manual describes only very basic engine information. A separate owner's manual for the engine is supplied with this unit for your use. Please refer to the engine manual for information relative to engine operation, maintenance, recommendations and additional safety warnings.

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Baldor Generators have earned the reputation of being high quality and dependable. We take pride in this fact and continue to keep our quality standards high on our list of priorities. We are also constantly researching new technological ideas to determine if they could be used to make our generator sets even better.

Baldor makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of fitness for any particular purpose. The information in this document is subject to change without notice. Baldor assumes no responsibility for any errors that may appear in this document.

Limited Warranty

Baldor Generators will replace or repair free of charge any part or parts of the generator of their manufacture that are defective in workmanship and materials for a period of time as set forth in the Warranty Period chart below. All Baldor products requiring warranty service shall be transported or shipped freight pre−paid, at the risk of the party requiring warranty service, to a Baldor Generator repair facility, or to Baldor Generators' Customer Service Department in Oshkosh, Wisconsin. Written notification of the alleged defect in addition to a description of the manner in which the Baldor generator is used, and the name, address and telephone number of the party requiring warranty service must be included. Baldor is not responsible for removal and shipment of the Baldor product to the service center or for the reinstallation of the Baldor product upon its return to the party requiring warranty service. Problems with Baldor products can be due to improper maintenance, faulty installation, non−Baldor additions or modifications, or other problems not due to defects in Baldor workmanship or materials. If a Baldor Generator repair facility determines that the problem with a Baldor product is not due to defects in Baldor workmanship or materials, then the party requesting warranty service will be responsible for the cost of any necessary repairs. EXCEPT FOR THE EXPRESSED WARRANTY SET FORTH ABOVE, BALDOR GENERATORS DISCLAIMS ALL OTHER EXPRESSED AND IMPLIED WARRANTIES INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. NO OTHER WARRANTY, EXPRESSED OR IMPLIED, WHETHER OR NOT SIMILAR IN NATURE TO ANY OTHER WARRANTY PROVIDED HEREIN, SHALL EXIST WITH RESPECT TO THE GOODS SOLD UNDER THE PROVISIONS OF THESE TERMS AND CONDITIONS. ALL OTHER SUCH WARRANTIES ARE HEREBY EXPRESSLY WAIVED BY THE BUYER. UNDER NO CIRCUMSTANCES SHALL BALDOR GENERATORS BE LIABLE OR RESPONSIBLE IN ANY MANNER WHATSOEVER FOR ANY INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR ANTICIPATED PROFITS RESULTING FROM THE DEFECT, REMOVAL, REINSTALLATION, SHIPMENT OR OTHERWISE. This is the sole warranty of Baldor Generators and no other affirmations or promises made by Baldor Generators shall be deemed to create an expressed or implied warranty. Baldor Generators has not authorized anyone to make any representations or warranties other than the warranty contained herein.

Warranty Period

Generator Series	Labor*	Parts
Portable Products (Premier, Powerchief, DG Series, K Series)	1 Year	3 Years
Towable Products (TS)	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first
POW'R LITE Light Towers	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first Excluded from any warranty coverage regardless of time period: Light Fixture, Lamps and Ballasts
3600 RPM Standby Systems (Some AE Models)	1 Year or 1,000 Hours Whichever comes first	3 Years or 1,000 Hours Whichever comes first
1800 RPM Standby Systems (Some AE Models, DLC, GLC)	1 Year or 3,000 Hours Whichever comes first	3 Years or 3,000 Hours Whichever comes first
Industrial Standby Systems	1 Year or 1,000 Hours Whichever comes first	2 Years or 1,000 Hours Whichever comes first
Industrial Prime Power Systems	1 Year or 1,000 Hours Whichever comes first	1 Year or 1,000 Hours Whichever comes first
International	1 Year or 1,000 Hours Whichever comes first	1 Year or 1,000 Hours Whichever comes first

*For products covered under labor coverage, travel expenses will be allowed up to 7 hours straight labor or 300 miles, whichever occurs first and only applies to permanently wired and mounted products (AE, DLC, GLC, IDLC).
No warranty registration card is necessary to obtain warranty on Baldor Generators.
You must save the purchase receipt. Proof of purchase, date, serial number and model number will be required for all portable and Towable products to qualify for any warranty consideration.
For all other products, a start−up inspection form/warranty registration must be completed in its entirety and submitted to Baldor Generators within 30 days of start−up to qualify for any warranty consideration.

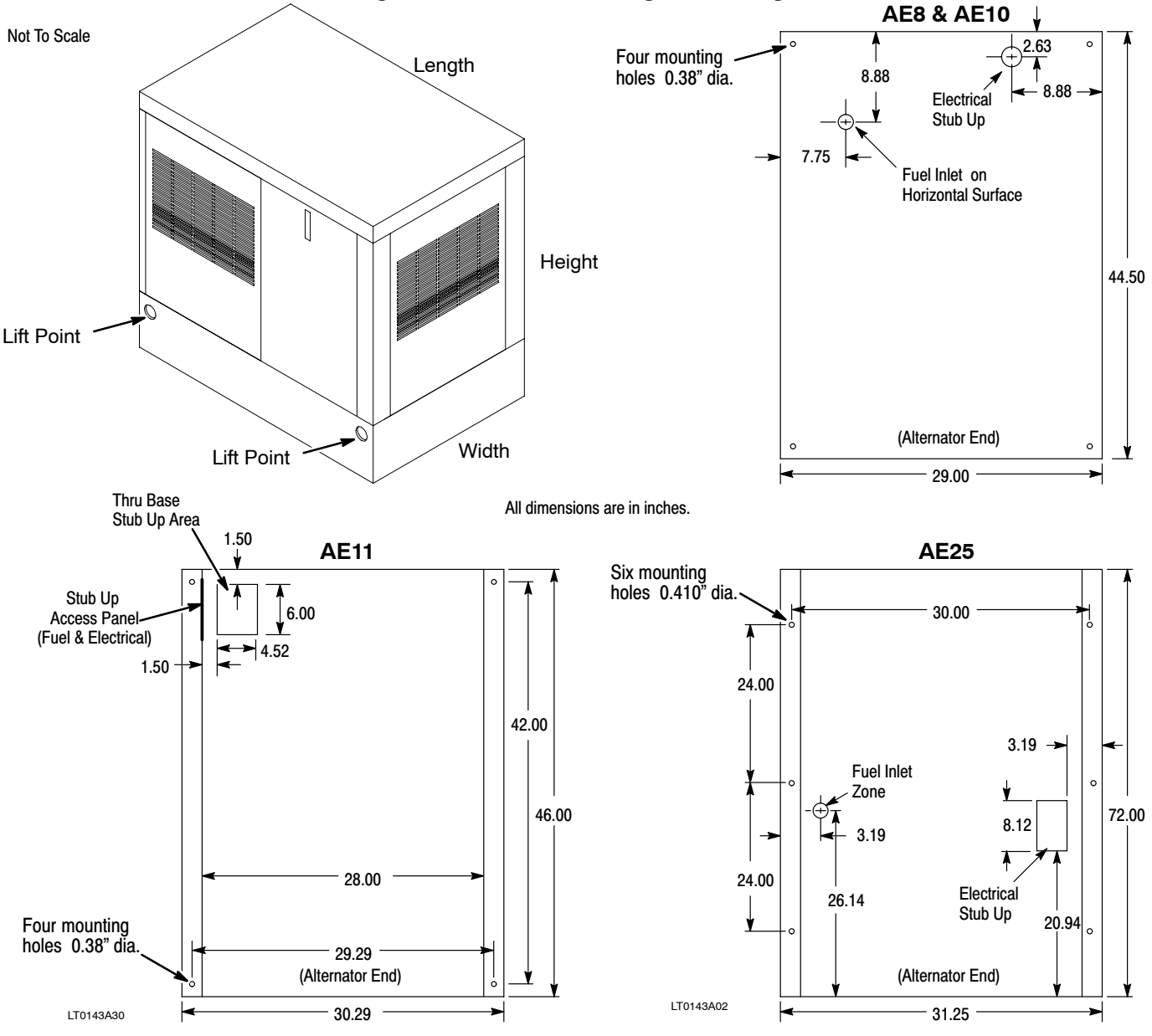
Section 3
Receiving & Installation

Receiving & Inspection When you receive your generator, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your system.
2. Verify that the part number of the system you received is the same as the part number listed on your purchase order.
3. If the system is to be stored for several weeks before use, be sure that it is stored in a location that conforms to published storage temperature and humidity specifications.

Lifting the Generator When lift or hoist equipment is used to lift the generator and move it to position, be careful not to contact overhead wires or other obstacles. The generator can weigh as much as 1,500 lbs. Be sure lift or hoist equipment has appropriate tires for the terrain to avoid becoming stuck or tipping over. If the shipping pallet is intact, use a fork lift to move the generator. If the shipping pallet has been removed, use two steel pipes through the "Lift Point" holes to lift the generator. See Figure 3-1.

Figure 3-1 Generator Lifting & Mounting



Physical Location The mounting location of the system is important. It should be installed in an area that is protected from direct harmful gases or liquids, dust, metallic particles, shock and vibration. It should be installed in an outdoor location so the exhaust fumes are vented to the atmosphere.

WARNING: An open bottom stationary engine generator set must be installed over noncombustible materials and shall be located such that it prevents combustible materials from accumulating under the generator set.

Outdoor Location with Baldor Supplied Enclosure

If the generator is installed outdoors there should not be a cooling problem. The factory installed enclosure is designed to keep out undesirable weather elements while providing cooling and ventilation. It should be installed on a concrete pad with at least thirty−six (36) inches clearance on all sides for air flow.

1. For effective cooling and maintenance, the system should be installed on a concrete pad with at least thirty−six (36) inches clearance on all sides for air flow and service access.
2. Installation should prevent water levels from reaching the generator. Drainage must be adequate to keep concrete pad free from standing water.
3. Installation should prevent obstructions by buildup of leaves, grass, sand, snow, etc. If these items pose a problem, consider building a small fence or other break to protect the unit from accumulation of debris.

Indoor Location Open Frame Configuration

When the Generator is installed in a building it is essential to provide:

1. Adequate control and exhausting of the heated air.
2. An adequate and constant supply of incoming cooling air.
3. Adequate control and discharge of the engine's hot exhaust gases.
4. Adequate ventilation of the building when the engine shuts down.

Several other factors should be carefully evaluated when selecting a location for installation:

1. For effective cooling and maintenance, the system should be mounted on a flat, smooth, non-flammable level surface. A concrete pad is ideal and provides a secure installation.
2. Installation should prevent water levels from reaching the generator. Drainage must be adequate to keep concrete pad free from standing water.
3. Installation should prevent obstructions by buildup of leaves, grass, sand, snow, etc. If these items pose a problem, consider building a small fence or other break to protect the unit from accumulation of debris.
4. Installation should place the generator as close as possible to the fuel supply and transfer switch.
5. At least forty−eight (48) inches clearance must be provided on all sides for air flow.
6. Maximum Ambient temperature is 122°F (50°C).

Engine Cooling

A sufficient flow of clean, cool air is required for combustion and to dissipate the heat produced by the engine. Approximately 60% of the heat value of the fuel used is given off as heat (cooling air and exhaust).

The air that will cool the engine must be brought in from outside the building. A sufficient air−flow of rate "Cubic Feet per Minute" (CFM) will allow the incoming fresh air to cool the engine. This requires a power ventilation system of sufficient CFM to be located at the highest possible point of the building to exhaust hot air and draw in cool fresh air. For 8−12KW we recommend an exhaust fan of at least 2000 CFM.

Note: The exhaust fan must not be located where it could easily become blocked by leaves, snow, water, debris, etc.

Indoor Location Continued

It is recommended that the cool air intake have at least three (3) times the cross−sectional area of the power ventilation system. It is also recommended that the cool air intake be located as close as possible to the top of the generator set.

The exhaust fan must be connected to the AC power terminals of the generator set so that when the generator set starts it will provide immediate cooling air flow. The fan will operate until the generator set stops.

Ventilation Test

To test the ventilation system, do the following:

1. Place a thermometer as close as you can to the cool air intake of the engine's blower housing but do not let the thermometer touch any material surface.
2. Place another thermometer outside the building or compartment in the open air. (Keep the thermometer out of direct sunlight or any other heat sources).
3. Run the engine under maximum load for an extended period of time (at least one hour).
4. The temperature difference between the two should not exceed 15 degrees F.

Note that opening any door, window or other opening can upset the air−flow pattern and result in a significant reduction in the cooling air−flow across the generator set. This may result in overheating, fire, or explosion. To find out if this is true with your specific application run the Ventilation Test with all doors and windows closed. Then repeat this test with different doors and windows open, and eventually with all the windows and doors open. If any of these tests result in a temperature difference in excess of 15° F, you must not run the generator set under those specific conditions.

Hot Exhaust Gasses

WARNING: Exhaust fumes/gases are extremely dangerous and can cause severe illness or death. Never breath exhaust fumes produced by a running engine. Only run the engine outdoors where ventilation is plentiful. Exhaust gases contain carbon monoxide, a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning include: dizziness, nausea, headaches, sleepiness, vomiting or incoherence. If you or anyone else experiences these symptoms, get out into fresh air immediately. Stop the engine and do not restart the engine until it has been inspected and if necessary repaired or reinstalled in a well ventilated area.

WARNING: Hot exhaust gasses must never be directed toward anything that may catch fire or explode.

WARNING: Never allow the exhaust outlet to be positioned so that the exhaust gases are directed towards any openings or air entry routes (doors, windows, vents, etc...) of an occupied building. When discharging the hot exhaust gases out of the building do not direct them towards anything that could catch fire or explode.

WARNING: Exhaust fumes/gases are extremely dangerous and can cause severe illness or death. Never breath exhaust fumes produced by a running engine. Only run the engine outdoors where ventilation is plentiful. Exhaust gases contain carbon monoxide, a colorless, odorless and extremely dangerous gas that can cause unconsciousness or death. Symptoms of carbon monoxide poisoning include: dizziness, nausea, headaches, sleepiness, vomiting or incoherence. If you or anyone else experiences these symptoms, get out into fresh air immediately. Stop the engine and do not restart the engine until it has been inspected and if necessary repaired or reinstalled in a well ventilated area.

It is extremely important to discharge engine exhaust gasses away from the engine and out of the building. The direction of the discharged hot air and hot exhaust gases is important as they have the potential to create brown spots on the lawn. In extreme cases this extremely hot air could cause dried grass or other debris to ignite.

Guidelines for Exhaust System

1. It is extremely important that you do not allow the hot exhaust gases to re−circulate into the engine's cooling air intake.
2. The exhaust system is subject to the engine's vibration and it must therefore be solidly secured to reduce mechanical stress and the potential for breakage.
3. The engine's exhaust system is the hottest component of the installation and extreme care and considerations must be given to it.

Indoor Location Continued

4. Keep all fuel and its associated piping away from all components of the engine exhaust system.
5. The exhaust system should be inspected on a regular basis to assure there are no toxic exhaust gas leaks. In some areas this inspection may be provided by your local public service.
6. A carbon monoxide tester may be installed to detect the presence of the deadly gas during times when you are in the building with the engine running (during testing or maintenance).

Installation

The generator is completely assembled, tested and adjusted at the factory before it is shipped to you. The procedures presented in this manual are suggestions and it is the responsibility of the Owner/Operator to arrange for these procedures to be performed by licensed contractors according to all applicable codes including local codes for your Municipality/City/County and State. Installation generally includes the following:

1. Secure Generator to concrete pad.
2. Connect Fuel Supply.
3. Electrical Connections – power wiring (optional transfer switch) and control wiring.
4. Battery (not included).
5. Ground Connection.

After installation, the post installation checks must be performed prior to starting the engine. After these checks have been performed and the system operation is verified to be good, refer to Section 6 Maintenance for periodic checks that must be performed at scheduled intervals to ensure continued operation with minimal problems.

Secure the Generator

Refer to Table 3-1 for the dimensions and weight of each generator. Mounting bolts in the base frame secure the generator to the shipping pallet. Remove these bolts, lift the generator and remove the shipping pallet.

Secure the generator to the concrete pad using anchor hardware (not provided). See Figure 3-1. Anchor bolts must be long enough to extend through the generator mounting frame.

Table 3-1 Physical Dimensions

Generator Model	Height	Width	Length	Weight	
				Open	Enclosed
AE8–E/O	36.75	29.00	44.5	255 lbs.	463 lbs.
AE10–E/O	36.75	29.00	44.5	316 lbs.	509 lbs.
AE11–E	30.50	30.375	46		468 lbs.
AE25–E–NG	34.00	31.5.0	72		1450 lbs.
AE25–E–LP	34.00	31.5.0	72		1450 lbs.

Fuel Connections

The AE Series generators will run on Natural Gas or LPG (Liquid Propane Gas). If natural gas supply is used, follow the "Natural Gas Connections" procedure. If LPG supply is used, follow the "LP Gas Connections" procedure. Table 3-2 defines the flow rate required for each fuel type.

Note: The AE25 must be ordered for use with Natural gas or LPG.

Table 3-2 Fuel Consumption Natural and LPG

Generator Model	Required Flow Rate (cubic feet per hour)		Pressure oz. (inches water column)
	Natural Gas	LPG	
AE8	160	64	6 oz (11)
AE10	200	72	6 oz (11)
AE11	200	72	4 oz. (7)
AE25	400	159	6 oz (11)

General Considerations

1. A generator set needs the engine to deliver 2 hp of energy to the alternator for every 1000 watts of electric output power (example: an 8000 watt generator needs the engine to deliver 16 hp of energy to the generator end).
2. An engine needs 10,000 BTU's of fuel energy per horsepower of engine power to provide a sufficient supply of fuel (example: a 16 Hp engine needs 160,000 BTU's of fuel energy for it to work properly). This fuel must be supplied to the regulator on the generator set at a pressure indicated in Table 3-2. To achieve this pressure in an L.P. System, you will normally have to reduce the tank pressure by means of a primary regulator or a regulator system of 2 or more regulators.
3. There are 2,516 BTU's in one cubic foot of Propane (LP Fuel).
   There are 1,096 BTU's in one cubic foot of Natural Gas.
4. There are 36.39 cubic feet in one gallon of Propane.
   There are 57.75 cubic feet in one gallon of Natural Gas.
5. There are 8.58 cubic feet per pound of Propane.
   There are 23.56 cubic feet per pound of Natural Gas.
6. When installing the piping for the gaseous fuel supply please refer to the pipe chart in Tables 3-3 and 3-4 to be sure you are using piping of significantly large size to deliver the necessary amount of fuel.
7. If copper tubing is used, it should be "K" or "L" having a minimum wall thickness of 0.032 inches. Black Iron Pipe is recommended but follow building codes for your area.

The following pamphlets are available from:

National Fire Protection Association (NFPA) P.O. Box 9101 Quincy, MA 02269

No. 37 – Combustion Engines
No. 54 – Gaseous Appliances and piping
No. 58 – Storage and handling LPG

Example: Determining Pipe Size for Natural Gas

An AE8 has a 16Hp engine. For Natural Gas fuel, determine the supply pipe size for 60 feet run.
16 x 10,000 = 160,000 BTU's / per hour for proper operation.

$$\frac{160,000}{1,096} = 146 \text{ cubic feet per hour.}$$

From Table 3-4, a 60 foot run requires a minimum 1" pipe at full engine load.

Natural Gas Connections

The incoming pressure must be as indicated in Table 3-2.

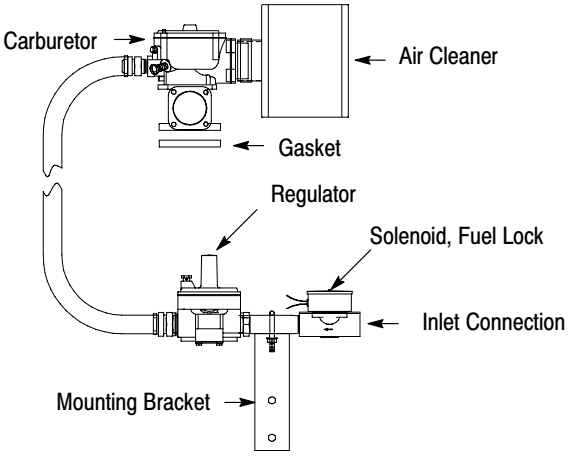
Note: Almost all operation problems are related to the installation techniques used.
Do Not guess, be sure pipe size is adequate for required flow rate.

Table 3-3 Natural Gas Flow Rate (Cubic Feet per Hour) per Pipe Length

Pipe Length (Feet)	Iron Pipe Size										
	1/2″	3/4″	1″	1–1/4″	1–1/2″	2″	2–1/2″	3″	4″	6″	8″
15	73	165	332	722	1174	2386	3704	6253	13352	37229	
30	50	115	232	515	818	1712	2646	4521	9331	26330	53728
45	41	95	191	418	673	1419	2213	3752	7600	22462	43867
60	37	83	166	366	587	1241	1924	3319	6542	18595	37999
75		74	149	332	524	1077	1684	2886	5772	16652	33959
90		67	137	298	433	962	1501	2597	5291	15200	31025
105		63	126	274	433	885	1376	2357	4906	14064	28715
120			115	260	404	827	1289	2213	4618	13160	26859
150			105	233	366	750	1174	2011	4185	11775	24050
180			96	216	337	693	1077	1876	3848	10736	21934
210			89	197	308	635	991	1712	3559	9937	20298
240				183	289	596	933	1616	3357	9235	18990
270				171	274	558	875	1520	3127	8658	17903
300				164	260	524	827	1433	2886	8177	16998

1. Connect the proper size gas pipe at the input to the Natural Gas regulator. Connect the Natural Gas pipe line shown in Figure 3-2 using the correct size pipe for the required flow rate and length of pipe. Refer to Table 3-3 for pipe size. Be certain that all connections are sealed and no leaks are present. The installer must ensure that all gas connections comply with all building codes.
2. Verify Fuel Supply Pressure
   Prior to initial operation of generator, verify that fuel system pressure is as indicated in Table 3-2 and fuel pipe sizes comply with Table 3-3.
3. Proceed to Electrical Connections.

Figure 3-2 Gas Line Connections



Note: Regulator shown for Natural Gas only.
For LPG, mount upside down.

Example: Determining Pipe Size for LPG

An AE8 has a 16Hp engine. For LP fuel, determine the supply pipe size for 60 feet run.
16 x 10,000 = 160,000 BTU's / per hour for proper operation.

$$\frac{160,000}{2,516} = 63.5 \text{ cubic feet per hour.}$$

From Table 3-4, a 60 foot run requires a minimum 1" pipe at full engine load.

LP Gas Connections (vapor withdrawal only)

The LPG connections should only be made if your generator is setup to run on LPG. If it is setup to run on Natural Gas, contact your Baldor representative and do not continue with installation.

The incoming pressure must be as indicated in Table 3-2.

Table 3-4 LP Gas Flow Rate (Cubic Feet per Hour) per Pipe Length

Pipe Length (Feet)	Iron Pipe Size										
	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"
15	48	109	218	475	772	1570	2437	4115	8786	24497	50007
30	33	76	153	339	538	1127	1741	2975	6140	17325	35353
45	27	63	126	275	443	934	1456	2469	5001	14781	28865
60	24	54	110	241	386	817	1266	2184	4304	12236	25004
75		49	98	218	345	709	1108	1899	3798	10957	22345
90		44	89	196	310	633	987	1709	3482	10001	20414
105		41	83	180	285	582	905	1551	3228	9254	18895
120			76	171	266	544	848	1456	3038	8659	17673
150			69	153	241	494	772	1323	2754	7748	15825
180			63	142	222	456	709	1234	2532	7064	14432
210			58	130	202	418	652	1127	2342	6439	13356
240				120	190	393	614	1063	2209	6077	12405
270				113	180	367	576	1000	2057	5697	11780
300				108	171	345	544	943	1899	5381	11179

Note: Almost all operation problems are related to the installation techniques used. Do Not guess, be sure pipe size is adequate for required flow rate.

1. Connect the proper size gas pipe at the input to the LP Gas regulator. Connect the LPG pipe line shown in Figure 3-2 using the correct size pipe for the required flow rate and length of pipe. Refer to Table 3-4 for pipe size. Be certain that all connections are sealed and no leaks are present. The installer must ensure that all gas connections comply with all building codes.
2. Verify Fuel Supply Pressure
   Prior to initial operation of generator, verify that fuel system pressure is as indicated in Table 3-2 and fuel pipe sizes comply with Table 3-4.
3. Proceed to Electrical Connections.

Electrical Connections Class 1 wiring methods must be used for field wiring connections to terminals of a class 2 circuit. It is the responsibility of the owner/operator to arrange for these procedures to be performed by a licensed electrical contractor and ensure conformance to all applicable codes including local codes peculiar to your municipality/city/county and state. Wire size and insulation type should be as required by NEC (National Electrical Code) and local codes.

Warning: Never connect this generator to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. The national electrical code (NEC) requires that connection of a generator to any electrical circuit normally powered by means of an electric utility must be connected by means of approved transfer switch equipment to isolate the electrical circuit from the utility distribution system when the generator is operating. Failure to isolate the electrical circuits by such means may result in injury or death to utility power workers due to backfeed of electrical energy onto the utility lines.

Warning: Incorrect installation of this generator set could result in property damage, injury or death. Connection of the generator to its fuel source must be done by a qualified professional technician or contractor.

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of generator systems.

Intended Use The intended purpose of this generator set is to provide emergency power when the main utility power supply is interrupted. Therefore, it is important that all the wiring that connects the generator set with your house, transfer switch, distribution box, battery charger, etc. be properly installed.

Circuit Protection Circuit protection is not provided with the generator. When connecting the generator output to an electrical load, a UL listed circuit breaker with the appropriate ratings shall be provided within 25 feet of the genset. Use only copper wires.

Generator Rating		Input Breaker			
Catalog No.	Kilowatt (kW) Rating	1 Phase VAC	1 Phase Amps	3 Phase VAC	3 Phase Amps
AE8	8	120/240		120/240/480	
AE10	10	120/240		120/240/480	
AE11	11	120/240		120/240/480	
AE25	25	120/240		120/240/480	

Transfer Switch Considerations

The following are general considerations for the safe use of a transfer switch:

1. The transfer switch should be located inside the building near the main breaker box or the disconnect box.
2. The transfer switch must be kept away from any location that might allow water to get on it.
3. If the transfer switch is mounted outside, it must be protected from the environment.
4. Do not mount the transfer switch on the generator set.
5. Do not mount the transfer switch where flammable liquids or vapors are present.

Battery Charger Considerations

1. Mount the battery charger on the generator or as close to the generator as possible.
2. If you mount the battery charger inside the building, mount it near the main breaker box or disconnect box.
3. If you mount the battery charger outside, you must protect it from the environment.
4. Do not mount the battery charger where flammable liquids or vapors are present.

General Wiring Considerations

1. Control wires and Power wires cannot be located in the same conduit (NEC Article 725).
2. When routing the interface wiring, do not route it up against anything that could cut or chafe the wiring. do not route the wire up against any hot or potentially hot object.
3. Make sure that all the electrical components (generator set, transfer switch, battery charger, etc.) share a common hardwired ground.
4. Check with your local building inspector to determine what you must do to comply with the local regulations for grounding of this type of permanent installation.

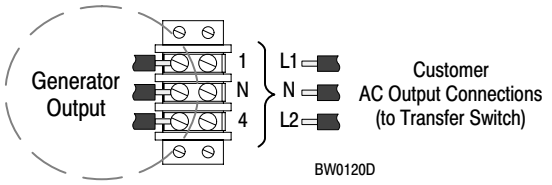
AE8 Electrical Connections Applies only to AE8 Enclosed and Open Series Generators

Single Phase Power Connections

The generator has a 240V single phase AC output. These connections are made at the power terminal box shown in Figure 3-3.

Figure 3-3 Single Phase Output Power Connections

AE8 with Enclosure or Open

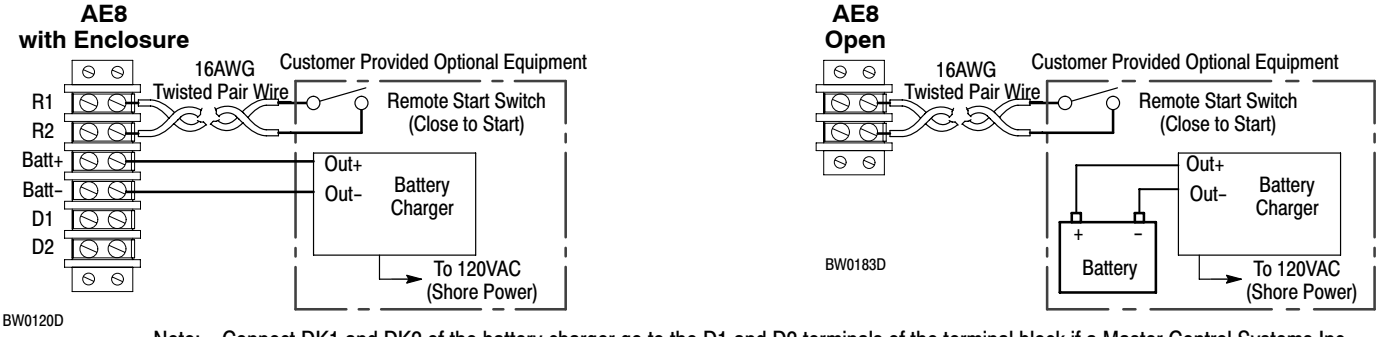


L1 to N	120VAC
L2 to N	120VAC
L1 to L2	240VAC

Remote Start and Battery Charger Connections

Figure 3-4 shows the connections for the battery charger and the remote start contacts of the transfer switch. When the Remote Start Switch is closed, the generator will start. The unit will remain running until this connection is opened. When the Remote Start Switch is opened, the control circuits allow the engine to run for approximately 60–90 seconds before it shuts off. This time delay allows the engine to run unloaded to cool down before stopping.

Figure 3-4 Remote Start & Battery Connections



Note: Connect DK1 and DK2 of the battery charger go to the D1 and D2 terminals of the terminal block if a Master Control Systems Inc. Battery charger is installed. DK1 and DK2 are not polarity sensitive.

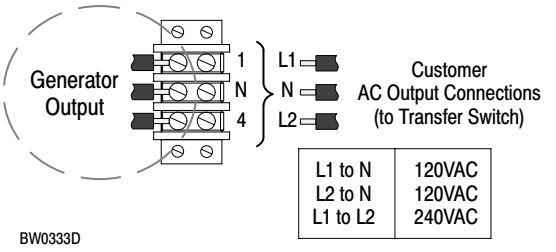
AE10 Electrical Connections Applies only to AE10 Enclosed and Open Series Generators

Single Phase Power Connections

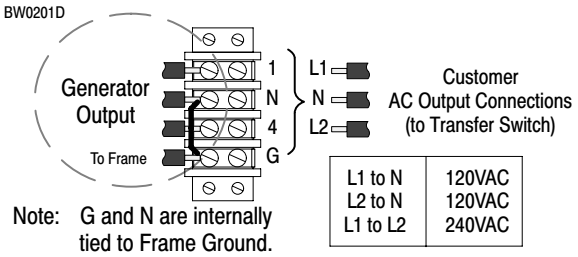
The generator has a 240V single phase AC output. These connections are made at the power terminal box shown in Figure 3-5.

Figure 3-5 Single Phase Output Power Connections

AE10 with Enclosure



AE10 Open



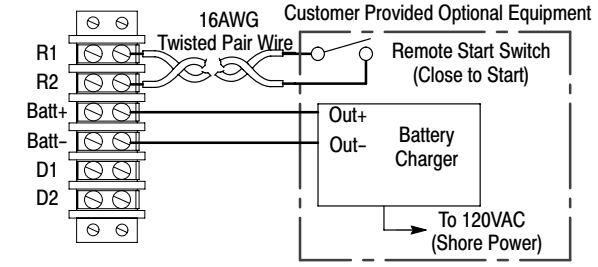
Note: G and N are internally tied to Frame Ground.

Remote Start and Battery Charger Connections

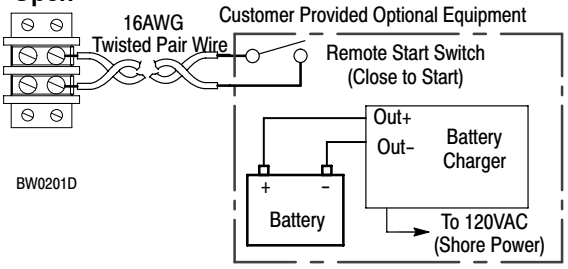
Figure 3-6 shows the connections for the battery charger and the remote start contacts of the transfer switch. When the Remote Start Switch is closed, the generator will start. The unit will remain running until this connection is opened. When the Remote Start Switch is opened, the control circuits allow the engine to run for approximately 60–90 seconds before it shuts off. This time delay allows the engine to run unloaded to cool down before stopping.

Figure 3-6 Remote Start & Battery Connections

AE10 with Enclosure



AE10 Open



Note: Connect DK1 and DK2 of the battery charger go to the D1 and D2 terminals of the terminal block if a Master Control Systems Inc. Battery charger is installed. DK1 and DK2 are not polarity sensitive.

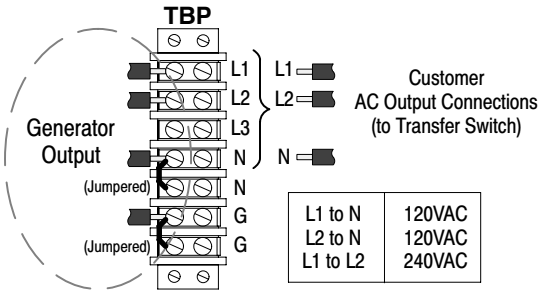
AE11 Electrical Connections Applies only to AE11 Enclosed Series Generators

Single Phase Power Connections

The generator has a 240V single phase AC output. These connections are made at the power terminal box shown in Figure 3-7.

Figure 3-7 Single Phase Output Power Connections

AE11 with Enclosure



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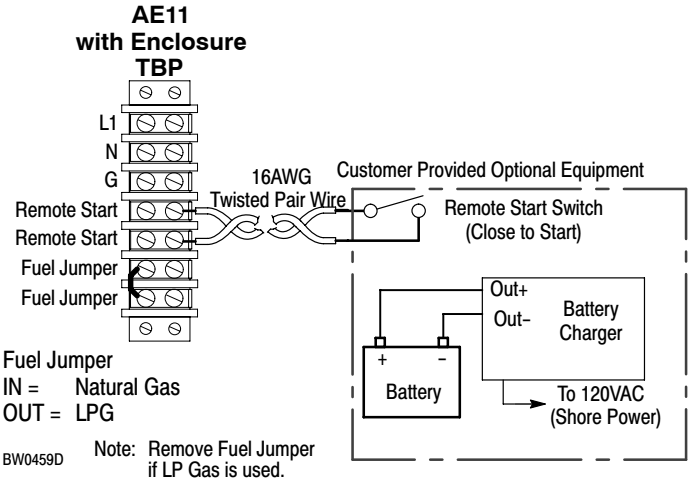
Remote Start and Battery Charger Connections

Figure 3-8 shows the connections for the battery charger and the remote start contacts of the transfer switch. When the Remote Start Switch is closed, the generator will start. The unit will remain running until this connection is opened. When the Remote Start Switch is opened, the control circuits allow the engine to run for approximately 60–90 seconds before it shuts off. This time delay allows the engine to run unloaded to cool down before stopping.

Figure 3-8 Remote Start & Battery Connections



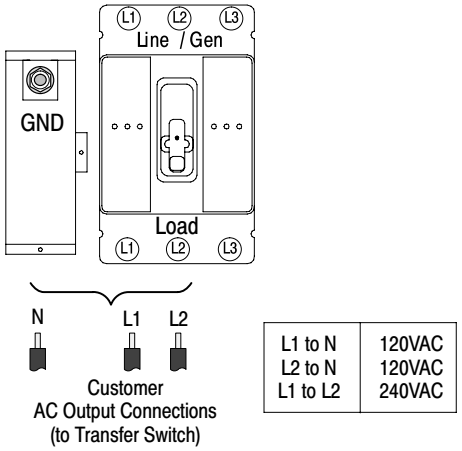
AE25 Electrical Connections Applies only to AE25 Enclosed Series Generators

Single Phase Power Connections

The generator has a 240V single phase AC output. These connections are made at the power terminal box shown in Figure 3-9.

Figure 3-9 Single Phase Output Power Connections

AE25 with Enclosure (Natural Gas or LPG)



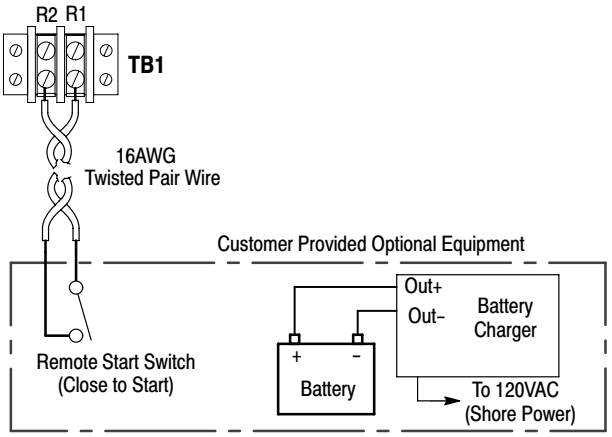
L1 to N	120VAC
L2 to N	120VAC
L1 to L2	240VAC

Remote Start and Battery Charger Connections

Figure 3-10 shows the connections for the battery charger and the remote start contacts of the transfer switch. When the Remote Start Switch is closed, the generator will start. The unit will remain running until this connection is opened. When the Remote Start Switch is opened, the control circuits allow the engine to run for approximately 60–90 seconds before it shuts off. This time delay allows the engine to run unloaded to cool down before stopping.

Figure 3-10 Remote Start & Battery Connections

AE25 with Enclosure (Natural Gas or LPG)



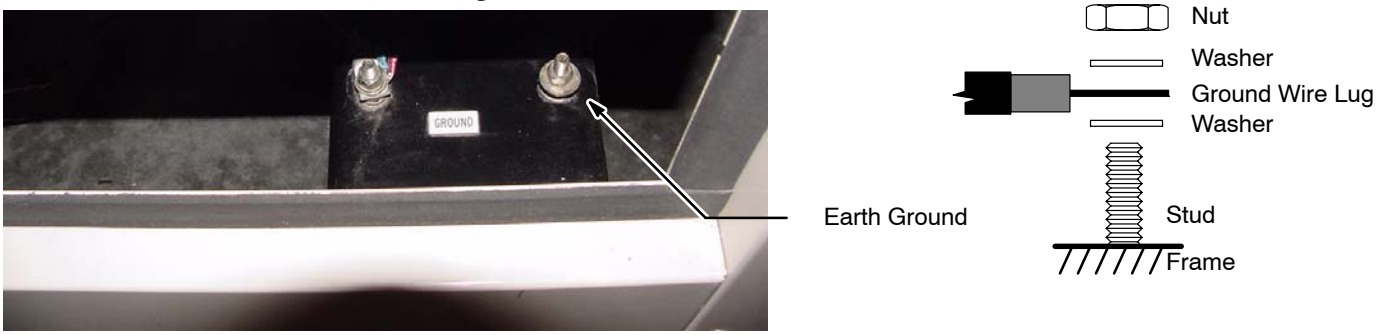
Frame Ground Connection

WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that grounds are connected. Electrical shock can cause serious or fatal injury. NEC requires that the frame and exposed conductive surfaces (metal parts) be connected to an approved earth ground. Local codes may also require proper grounding of generator systems.

It is important for safety reasons that the Generator set, transfer switch and battery charger share a common Ground and neutral.

The NEC requires that the frame and exposed metal surfaces be at local ground reference potential to avoid electrical shock hazard. A local ground reference may require a driven earth ground conductor at the generator installation site. Make the ground connection as shown in Figure 3-11. Use the appropriate size wire as required by NEC and local codes.

Figure 3-11 Frame Ground Connection



1. Open the enclosure access panel door 2 (Figure 3-1).
2. Connect the ground wire to the “earth ground” terminal shown in Figure 3-11. This ground is the local reference ground to ground the generator frame only.

Engine Oil Level AE8, AE10, AE11, and AE25

These generators are shipped dry, which means there is no oil in the engine and no battery installed.

1. Check the engine oil level, it should be empty.
2. See Table 3-5 and add the appropriate amount of oil to the engine crankcase.
3. Add a little at a time and check the oil level to ensure that you do not overfill the crankcase. Stop adding oil when the oil level reaches the full line.

Coolant Level AE25 only

1. Check the coolant level while the engine is cold, it should be full.
2. If the coolant level is low, add some coolant as recommended in the engine manual (usually a 50/50 mixture of antifreeze and water).

Caution: This generator must have a battery installed for operation. The battery is used during starting and during operation. If engine operation is attempted while the battery is removed, damage to the engine's electrical components may result.

Battery Connections AE8, AE10, AE11, and AE25. The generator is shipped with no battery installed.

WARNING: Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

WARNING: Do not dispose of battery or batteries in a fire. The battery is capable of exploding. If the battery explodes, electrolyte solution will be released in all directions. Battery electrolyte solution is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

WARNING: Do not mutilate the battery . The battery contains electrolyte solution which is caustic and can cause severe burns and blindness. If electrolyte contacts skin or eyes, immediately flush the area with water and seek medical attention quickly.

WARNING: A battery presents a risk of electrical shock hazard and high short circuit current.
The following precautions are to be followed when working on batteries:

1. Remove watches, rings, necklaces and all other metal objects.
2. Use tools with insulated handles.
3. Wear rubber gloves and boots.

WARNING: The battery electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive.
The following precautions are to be followed when working on batteries:

1. Wear full eye protection (safety glasses or goggles) and protective clothing.
2. Where electrolyte contacts the skin, flush the area immediately with water and wash it off using soap and water.
3. Where electrolyte contacts the eyes, immediately flush the eye thoroughly with water and seek medical attention quickly.
4. Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of one pound (500 grams) bicarbonate of soda to one gallon (four liters) of water. The bicarbonate solution is to be added until evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.

WARNING: A battery presents a risk of fire because they generate hydrogen gas. Hydrogen gas is extremely explosive. Never jump start a battery, smoke in the area around the battery or cause any spark to occur in the area around the battery.
The following precautions are to be followed when working on batteries:

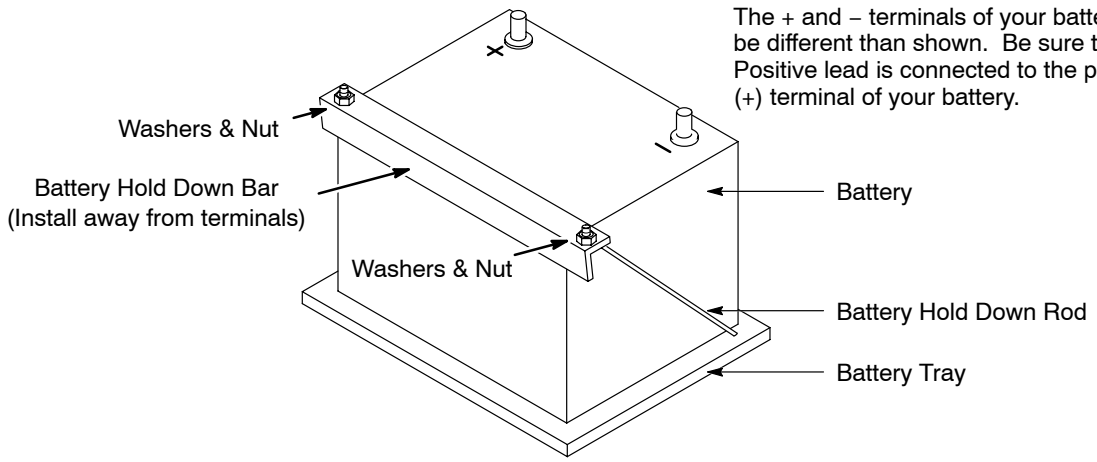
1. Do not smoke when near batteries.
2. Do not cause flame or spark in battery area.
3. Discharge static electricity from body before touching batteries by first touching a grounded metal surface.

WARNING: Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

Procedure: The correct type battery must be installed in the battery compartment provided, see Table 3-5. Installation and servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions.
Keep unauthorized personnel away from batteries.

1. Open access doors and locate battery tray.
2. Place the correct battery (see Table 3-5) on the tray.
3. Install the Battery Hold Down Bar and Rods as shown in Figure 3-12.
   a. Place the bent end of the Battery Hold Down Rod through the hole in the Battery Tray.
   b. Place the threaded end of the Battery Hold Down Rod through the hole in the Battery Hold Down Bar and secure with flat washer, lock washer and nut.
   c. Repeat steps 3a and 3b for the other Battery Hold Down Rod.

Figure 3-12 Battery Installation



4. Connect the positive lead to the positive (+) battery terminal.
5. Connect the negative lead to the negative (–) battery terminal.
6. Do not lay tools or metal parts on top of batteries.
7. Connect charging source to the battery terminals.
8. Disconnect the battery's ground terminal before working in the vicinity of the battery or battery wires. Contact with the battery can result in electrical shock when a tool accidently touches the positive battery terminal or wire. The risk of such shock is reduced when the ground lead is removed during installation and maintenance.

Recommended Engine Oil and Battery Type

When replacing batteries, use only the recommended battery for your generator, see Table 3-5.

Table 3-5 Recommended Engine Oil and Battery Type

MODEL	SUMMER OIL	WINTER OIL	OIL CAPACITY	RECOMMENDED BATTERY	(AMPS) COLD CRANKING
AE8	SAE. 30	5W/30	2.2 PTS	Interstate SP-40	340
AE10	SAE. 30	5W/30	2.2 PTS	Interstate SP-40	340
AE11	SAE. 30	5W/30	2.0 QTS	Interstate SP-40	340
AE25	SAE. 30	5W/30	4.5 QTS	BCI Group 24	750

Post Installation Checks

When the initial installation is complete, these checks must be performed before starting the engine. These checks are not required before each start, only after the initial installation.

Caution: Do not apply high voltage to windings (do not start the generator) in a moisture–saturated condition. Moisture can cause insulation breakdown, making it necessary to return the generator to the factory for repair, and consequent expense and loss of time.

Note: These precautions are especially necessary in locations such as seaboard installations and other high humidity areas. Some installations will be in atmospheres that are much more corrosive than others. Prevention of a failure is better than being forced to make a repair.

1. Generators that have been in transit or storage for long periods may be subjected to extreme temperature and moisture changes. This can cause excessive condensation, and the generator windings should be thoroughly dried before bringing the generator up to full nameplate voltage. If this precaution is not taken, serious damage to the generator can result.
2. Verify that the transfer switch is in Utility Power mode. No power must be present at the generator or transfer switch connections. Verify with a voltmeter.
3. Verify that the engine starting battery negative (–) lead) is disconnected so accidental starting is not possible.
4. Verify that the generator is securely mounted and anchored to its cement pad.
5. Verify that proper clearance exists on all sides and top of enclosure.
6. Verify that generator power is properly connected to the transfer switch.
7. Verify that generator and transfer switch are properly grounded.
8. Verify that the remote start wires are properly connected and tight between the generator and transfer switch terminals.
9. Assure that generator is a safe distance from any flammable or combustible material.
10. Verify that the generator and transfer switch load are voltage compatible.
11. Verify that no load is connected to the circuit breaker and/or transfer switch.
12. Inspect the engine and generator and verify that there are no loose wires or components. Tighten if necessary.
13. Verify that the ground conductor is of correct wire size and properly connected.
14. Verify engine oil level is full. Refer to engine manual if necessary.
15. Verify engine coolant level is full. Refer to engine manual if necessary.
16. Verify exhaust system to assure it is in properly connected and pointing away from combustible materials.
17. Verify that the Master Control Switch is still in the “Stop” position.
    Connect the engine starting battery negative (–) lead).
18. Verify the fuel source is ON and the pressure and flow rate are correct.
19. Remove all tools, rags, etc. from inside the generator enclosure. Close all enclosure doors and be sure no hands are inside the generator enclosure when it starts.

Post Installation Checks Continued

20. Verify all loads are disconnected.
21. Start the generator. (Refer to Section 4 Operation for details).
22. The engine should begin to crank and start when the fuel moves through the pipe to the carburetor. If the engine fails to start, refer to Section 5 Troubleshooting.
23. With the engine running, several checks must be made:
    a. Verify there are no fuel leaks. If a fuel leak is detected, stop the engine (move the Master Control Switch to the “Stop” position) immediately and repair the leak before proceeding.
    b. Verify there are no coolant or oil leaks. If a leak is detected, stop the engine (move the Master Control Switch to the “Stop” position) immediately and repair the leak before proceeding.
    c. Verify that operation is smooth. If belt squeals, vibrations or other sources of noise exist, stop the engine (move the Master Control Switch to the “Stop” position) immediately and repair before proceeding.
    d. Verify that the correct voltage exists (line−to−line and line−to−neutral) at the generator and at the transfer switch.

WARNING: Engine coolant is under pressure and is near the boiling point of water when engine is hot. Do not open the coolant system until the engine has completely cooled. Hot coolant can cause severe burns and other injuries. When engine is cool, coolant level can be checked.

24. After the operation checks are made, stop the engine (move the Master Control Switch to the “Stop” position) and wait at least 2 hours for the engine to cool. When the engine is cool, check engine oil and coolant levels as instructed in the engine operation manual.
25. Close all enclosure covers. The post installation checks are now complete.

Operator Control Panel

Each operator panel is slightly different, depending on features of the generator you purchased. The Operator Control Panel of Figure 4-1 is shown because it has most of the available features. This will be used to explain how the controls operate.

Figure 4-1 Operator Control Panel AE8 and AE10

Master Control Switch (Run Manual –Off – Remote Auto)
Run Manual – Immediately energizes the crank cycle to start the generator set and produce power.
Stop – Stops the Engine and generator set.
Remote Auto – The engine can only be started by making a connection across the remote start terminals of the control box. Allows normal automatic backup operation of the Generator Set under control of the Transfer Switch whenever utility AC power is lost.

Controller Fuse
Fuse for engine controller.

Lamp
This Red indicator light will come on when the engine shuts down due to a fault condition.

Circuit Breaker
Circuit Protection for AC power output.

Circuit Breaker – 2 pole Circuit Protection for the generator set output windings.

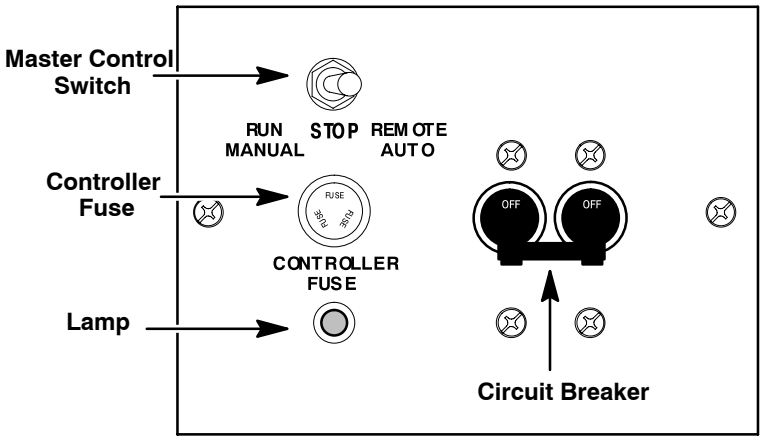
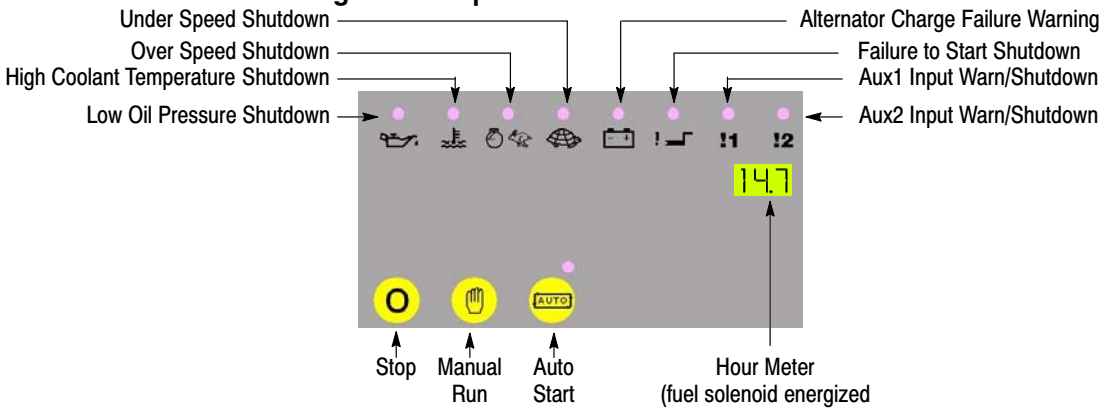


Figure 4-2 Operator Control Panel AE11



Shutdown Warning Indicators
Low Oil Pressure, High Coolant Temperature, Over Speed (Engine), Under Speed (Engine), Failure to Start Engine.

Warning (or Shutdown) Indicators
Alternator Failure (to Charge Battery), Auxiliary 1 Input Active, Auxiliary 2 Input Active.

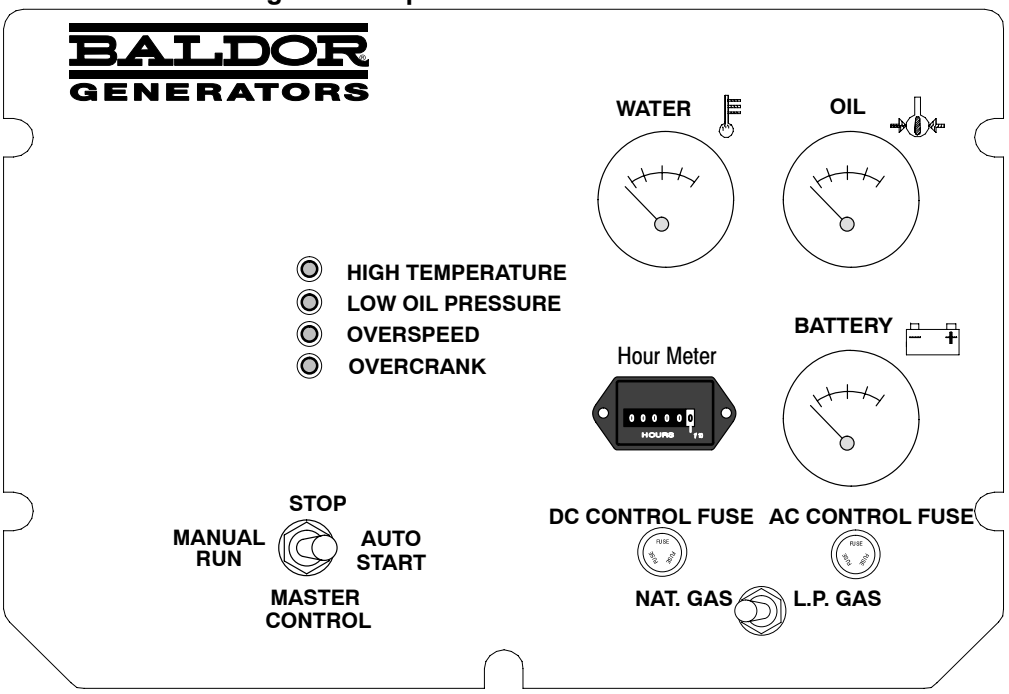
Hour Meter Displays total hours of operation based on power applied to Fuel Solenoid).

Stop Stops the Engine and generator set.

Manual Run Immediately energizes the crank cycle to start the generator set and produce power.

Auto Start The engine can only be started by making a connection across the remote start terminals of the control box. This allows normal automatic backup operation of the Generator Set under control of the Transfer Switch whenever utility AC power is lost.

Figure 4-3 Operator Control Panel AE25



Display Lamps High Temperature – Indicates excessive engine coolant temperature.
Low Oil Pressure – Indicates low engine oil pressure.
Overspeed – Indicates engine speed is greater than preset limit.
Overcrank – Failure of the engine to start by the end of the crank period results in an "overcrank" shutdown and alarm indication.

Hour Meter Displays total hours of operation based on power applied to Fuel Solenoid).

Meters Water – Displays the temperature of the engine coolant.
Oil – Displays the engines oil pressure.
Battery – Displays the battery voltage of the starting battery.

DC Control Fuse Fuse for engine controller.

AC Control Fuse Fuse for engine controller.

<u>Master Control</u> Switch

Stop Stops the Engine and generator set.

Manual Run Immediately energizes the crank cycle to start the generator set and produce power.

Auto Start The engine can only be started by making a connection across the remote start terminals of the control box. This allows normal automatic backup operation of the Generator Set under control of the Transfer Switch whenever utility AC power is lost.

<u>Natural/LP Gas</u> Selector Switch

Selects the correct fuel source: Natural Gas or L.P. Gas.

Operating Procedures The engine−generator controller is designed to start and stop an engine from either a local mode “Manual Run” or remote mode “Auto Start”. When a start command is issued, the controller issues a run and crank output signal. The controller then monitors engine speed and when crank disconnect speed is reached, the crank signal is terminated. While the engine accelerates to normal speed, the controller continuously monitors the engines speed signal. Should the engine speed exceed the maximum predetermined setpoint, the Overspeed shutdown fault circuit will activate, terminating the run signal.

In addition to Overspeed shutdown, other engine functions are also monitored and the engine will automatically stop for any shutdown fault. The engine will also stop, or when the remote start signal is removed or local Stop is pressed. The engine controller operation includes time delay circuits for normal operating conditions such as start delays, cool down and cranking periods.

Manual Start/Stop All models.

Push the Manual Run button to immediately initiate the engine crank cycle to start the engine and generate AC power. This mode does not require a start command from a remote device but operates immediately when the button is pushed. When pushed, the following happens:

1. The Engine Crank cycle begins.
2. When the engine starts and accelerates to nominal speed, the controllers speed sensor will terminate the Engine Crank cycle.

Manually Stop the Generator−Set at anytime by simply pushing the “Stop” button. The controllers RUN output will be immediately terminated which will initiate the engine stop sequence.

Automatic Start/Stop All models.

Push the “Auto−Start” push−button. The following happens:

1. The engine will automatically start upon activation of the remote start contact input. The remote device (transfer switch) initiates a start sequence when utility power fails.
2. When the remote start signal is activated, the engine will start.
3. The automatic stop sequence will be initiated by removal of the remote start signal.
4. When the start signal is removed, a cool down delay function will be initiated.
5. When the cool down time delay period expires (typically 5 minutes), the controllers RUN output will be immediately terminated which will initiate the engine to stop.

Manually Stop the Generator−Set at anytime by simply pushing the “Stop” button. The controllers RUN output will be immediately terminated which will initiate the engine stop sequence.

Automatic Fault Shutdown AE11 and AE25.

When a fault circuit is programmed as a **Shutdown**, the engine will immediately stop when the fault is activated. A specific shutdown fault can be programmed with a definite time transient delay period that must expire before the shutdown is activated. The stop sequence will cause the controllers RUN output to be immediately terminated which will cause the engine to stop.

A **Warning** lamp does not terminate generator set operation. It only warns that a condition exists. (alternator charge failure, etc.) but allows generator operation to continue.

AE11 Operating Procedures

The AE11 engine controller is programmable and it's internal workings is more complex than the other AE series generators.

Auto Start Operation

This mode is activated by pressing the Auto pushbutton, see Figure 4-2. An LED indicator beside the button lights in Auto mode. The start sequence is initiated when the remote start input from the transfer switch or other device is activated. To prevent a false remote start, the Start Delay timer is initiated. If the Remote Start signal is removed during the Start Delay timer, the unit returns to stand−by. After the Start Delay, if the pre−heat output option is selected, the pre−heat timer is starts, and the corresponding auxiliary output (if configured) will energize.

After these delays, the Fuel Solenoid is energized, then one second later, the Starter Motor is engaged. The engine is cranked for a 10−second period. If the engine fails to start, the starter motor is disengaged for a 10−second rest period. Should this sequence continue beyond the 3 starting attempts, the start sequence will be terminated and Fail to Start fault will be illuminated. When the engine starts, the starter motor is disengaged and locked out at 20 Hz measured at the Alternator output. (Rising oil pressure can also be used to disconnect the starter motor, however it cannot be used for under speed or over speed detection).

When the starter motor has disengaged, the Safety On timer starts. This timer is preset to 12 seconds and allows engine speed, Oil Pressure, High Engine Temperature, Under−speed, Charge Fail and Auxiliary fault inputs to stabilize without triggering a fault. Once the engine is running, the Warm Up timer starts (if selected). This allows the engine to stabilize before the load is switched on. After the Warm Up delay, the AC output is switched on to operate the load.

When the Remote Start signal is removed, the Stop Delay timer is initiated. After which the Load Transfer output (if configured) is deactivated, and the Cool Down Period is initiated. After the Cool Down Period has elapsed, the Fuel Solenoid is de−energized, bringing the generator to a stop.

Manual Operation There is no "Start Delay" in Manual Run.

This mode is activated by pressing the Manual Run pushbutton, see Figure 4-2. If the pre−heat output option is selected, the pre−heat timer is starts, and the corresponding auxiliary output (if configured) will energize. After this delay, the Fuel Solenoid is energized, then one second later, the Starter Motor is engaged. The engine is cranked for a 10−second period. If the engine fails to start, the starter motor is disengaged for a 10−second rest period. Should this sequence continue beyond the 3 starting attempts, the start sequence will be terminated and Fail to Start fault will be illuminated. When the engine starts, the starter motor is disengaged and locked out at 20 Hz measured at the Alternator output. (Rising oil pressure can also be used to disconnect the starter motor, however it cannot be used for under speed or over speed detection).

When the starter motor has disengaged, the Safety On timer starts. This timer is preset to 12 seconds and allows engine speed, Oil Pressure, High Engine Temperature, Under−speed, Charge Fail and Auxiliary fault inputs to stabilize without triggering a fault. Once the engine is running, the Warm Up timer starts (if selected). This allows the engine to stabilize before the load is switched on. After the Warm Up delay, the AC output is switched on to operate the load.

The generator will continue to run until the "Stop" or "Auto Start" mode is selected.

If Auto mode is selected, the Remote Stop Delay Timer starts. After this delay, the Fuel Solenoid is de−energized, to stop the generator.

Selecting Stop de−energizes the Fuel Solenoid is de−energized, to stop the generator.

Warnings and Shutdowns

Warnings

Warnings are used to warn the operator of a problem fault. Battery Charge Failure, if the module does not detect a voltage from engine mounted alternator, the lamp will illuminate. (Either 8 Volts or 16 Volts depending on the configuration of Nominal DC Voltage). Inputs 1 and 2 can be configured as warnings or shutdowns. The lamp will be illuminated when the input is active.

Shutdowns

Shutdowns are latching and stop the Generator. The alarm must be cleared, and the fault removed to reset the module. In the event of a shutdown the appropriate lamp is illuminated. The alarm condition must be corrected before a reset will take place. If the alarm condition remains it is not possible to reset the unit (except faults that occur during the "Safety On timer" period. These are delayed alarms, like oil pressure is low with the engine at rest).

Inputs 1 and 2 can be configured as warnings or shutdowns. The relevant lamp is illuminated when the input is active.

Shutdowns Continued

Fail To Start – if the engine does not start after 3 start cycles, a shutdown will be initiated and the Fail to Start Shutdown lamp is On.

Low Oil Pressure – if engine oil pressure is less than the low oil pressure limit (after the Safety On timer), a shutdown will occur and the Low Oil Pressure Shutdown lamp is On.

High Engine Temperature – if engine coolant temperature exceeds the high engine temperature limit (after the Safety On timer), a shutdown will occur and the High Engine Temperature Shutdown lamp is On.

Overspeed – if engine speed exceeds the pre–set limit (14% above the nominal frequency), a shutdown will occur and the Overspeed Shutdown lamp is On. The Overspeed shutdown is not delayed, shutdown is immediate.

Note: During start–up the Overspeed trip level is extended to 24% above the normal frequency for the duration of the safety timer to allow an extra trip level margin. This prevents nuisance tripping during start–up.

Underspeed – if engine speed goes below the pre–set trip (20% of the nominal frequency) after the Safety On timer delay, a shutdown will occur and the Underspeed Shutdown lamp is On.

Inputs 1 and 2 can be configured as warnings or shutdowns. The relevant lamp is illuminated when the input is active.

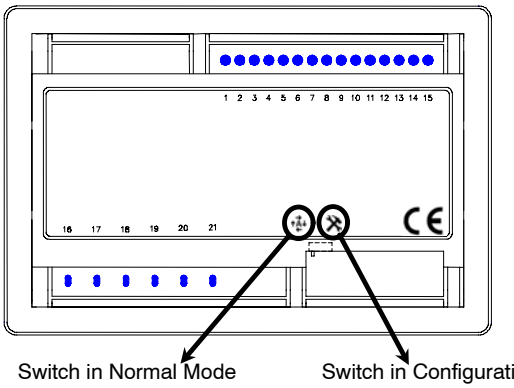
Editing the Configuration

The 4110 engine controller is fully configurable from the front panel. There is no requirement for a computer or software.

Access Configuration Editor Figure 4-4.

With the unit is in Stop mode, Configuration Mode is selected by a small switch on the rear, bottom edge of the printed circuit board. This is partially hidden to prevent accidental operation. When Configuration Mode is selected, the “Auto” LED will flash rapidly, and all normal operations are suspended.

Figure 4-4 Configuration Editor Access



Editing The Configuration

The **Stop** pushbutton is pressed to select the LED “code“ that corresponds to the function. The first is the “Pre–Heat Timer”. Pressing Stop again displays “Start Delay” etc. The 5 LED’s on the left display the code for each function. See Table 4-1.

The **Manual** pushbutton is pressed to change the value. The 3 LED’s on the right display the present value. See Table 4-1.

When the correct parameter value is displayed, press the **Auto Start** button to save the new setting. Repeat the process for each function value you want to change. When configuration is complete, return the Configuration Mode Selector Switch to the “Normal Mode” position.

Note: When configuration is complete, return the Configuration Mode Selector Switch to the “Normal Mode” position to resume normal operation.

Table 4-1 shows the programmable functions and values for this engine controller.

Table 4-1 Programmable Functions and Values

Function							! 1	! 2	Value **(Preset in Bold)**
Pre-Heat Timer	○	○	○	○	●	○	○	○	**0 Seconds**
						○	○	●	5 Seconds
						○	●	○	10 Seconds
						○	●	●	15 Seconds
						●	○	○	20 Seconds
						●	○	●	30 Seconds
						●	●	○	60 Seconds
						●	●	●	180 Seconds
Used to pre-heat the engine prior to cranking. The output is active for the duration of the setting, prior to cranking.									
Start Delay	○	○	○	●	○	○	○	○	0 Seconds
						○	○	●	**5 Seconds**
						○	●	○	10 Seconds
						○	●	●	15 Seconds
						●	○	○	20 Seconds
						●	○	●	30 Seconds
						●	●	○	60 Seconds
						●	●	●	180 Seconds
Provides a delay between activating the remote start input, or a mains failure, and actually starting the engine.									
Stop Delay	○	○	○	●	●	○	○	○	0 Seconds
						○	○	●	5 Seconds
						○	●	○	10 Seconds
						○	●	●	15 Seconds
						●	○	○	20 Seconds
						●	○	●	**30 Seconds**
						●	●	○	60 Seconds
						●	●	●	180 Seconds
Provides a delay between deactivating the remote start input and actually stopping the engine.									
Energize to Stop Hold Timer	○	○	●	○	○	○	○	○	0 Seconds
						○	○	●	5 Seconds
						○	●	○	10 Seconds
						○	●	●	15 Seconds
						●	○	○	20 Seconds
						●	○	●	30 Seconds
						●	●	○	60 Seconds
						●	●	●	180 Seconds
Controls of the engine stop solenoid. When the engine is to be stopped, the Energize To Stop output becomes active, closing the stop solenoid (fuel valve). When the engine comes to rest, the stop solenoid will remain energized for the period of the Energize To Stop Timer, to ensure the engine has come to a complete stop.									
Warm-up Timer	○	○	●	○	●	○	○	○	0 Seconds
						○	○	●	5 Seconds
						○	●	○	10 Seconds
						○	●	●	15 Seconds
						●	○	○	20 Seconds
						●	○	●	30 Seconds
						●	●	○	60 Seconds
						●	●	●	180 Seconds
Delay between the engine being available for use, and the closure of the generator load-switching device to allow time for the engine to warm before being loaded. This occurs after the 12 second safety on timer.									

Table 4-1 Programmable Functions and Values Continued

Function							1 !	2 !	Value **(Preset in Bold)**
Cooling Timer	○	○	●	●	○	○	○	○	0 Seconds
						○	○	●	5 Seconds
						○	●	○	10 Seconds
						○	●	●	15 Seconds
						●	○	○	20 Seconds
						●	○	●	30 Seconds
						●	●	○	60 Seconds
						●	●	●	180 Seconds
Delay between opening the generator load-switching device and stopping the engine to allow time for the engine to cool down before being stopped. This is particularly useful when used in conjunction with turbo-charged engines.									
Nominal Frequency	○	●	○	○	○	○	○	○	50Hz (O/S +14%) Overshoot 24%
						○	○	●	**60Hz (O/S +14%) Overshoot 24%**
The nominal line frequency. Either 50 Hz or 60 Hz									
Nominal DC Voltage	○	●	○	○	●	○	○	○	**12VDC (CF 8VDC)**
						○	○	●	24VDC (CF 16VDC)
The generator battery voltage. Either 12 Volts or 24 Volts. It is used for the charge alternator failure level.									
LOP Switch Contact	○	●	○	●	○	○	○	○	**Close on Fault**
						○	○	●	Open on Fault
Configuration for the oil pressure switch. Either to close to battery negative on a fault, or open on a fault.									
HET Switch Contact	○	●	○	●	●	○	○	○	**Close on Fault**
						○	○	●	Open on Fault
Configuration for the coolant temperature switch. Either to close to battery negative on a fault, or open on a fault.									
Crank Disconnect on Oil Pressure	○	●	●	○	○	○	○	○	**Disabled**
						○	○	●	Enabled (2 second delay)
If this is enabled, the starter motor will disconnect 2 seconds after the oil pressure switch detects oil pressure. NOTE:- Not suitable for all generators, due to the different monitoring points on lubrication systems.									
Under Speed Detection	○	●	●	○	●	○	○	○	Disabled
						○	○	●	**Enabled (U/S 20%)**
If this is enabled, the unit will shut down the generator if the frequency falls below 20% of the nominal frequency.									
Auxiliary Input 1	●	○	○	○	○	○	○	○	**Immediate Warning Close on Fault**
						○	○	●	Immediate Warning Open on Fault
						○	●	○	Immediate Shutdown Close on Fault
						○	●	●	Immediate Shutdown Open on Fault
						●	○	○	Delayed Warning Close on Fault
						●	○	●	Delayed Warning Open on Fault
						●	●	○	Delayed Shutdown Close on Fault
						●	●	●	Delayed Shutdown Open on Fault
See Note 1									
Auxiliary Input 2	●	○	○	○	●	○	○	○	**Immediate Warning Close on Fault**
						○	○	●	Immediate Warning Open on Fault
						○	●	○	Immediate Shutdown Close on Fault
						○	●	●	Immediate Shutdown Open on Fault
						●	○	○	Delayed Warning Close on Fault
						●	○	●	Delayed Warning Open on Fault
						●	●	○	Delayed Shutdown Close on Fault
						●	●	●	Delayed Shutdown Open on Fault
See Note 1									

Note 1:

Programmable input, can be configured to on of the following:

- Immediate warning close on fault – If the input is activated at any time the unit will alarm and energize the common warning and common alarm output.
- Immediate warning open on fault – If the input is deactivated at any time the unit will alarm and energize the common warning and common alarm output.
- Immediate shutdown close on fault – If the input is activated at any time the generator will be shutdown and energize the common warning and common shutdown output. The generator can not be started.
- Immediate shutdown open on fault – If the input is deactivated at any time the generator will be shutdown and energize the common warning and common shutdown output. The generator can not be started.
- Delayed warning close on fault – If the input is activated and the safety time has elapsed the unit will alarm and energize the common warning and common alarm output.
- Delayed warning open on fault – If the input is deactivated and the safety time has elapsed the unit will alarm and energize the common warning and common alarm output.
- Delayed shutdown close on fault – If the input is activated and the safety time has elapsed the generator will be shutdown and energize the common warning and common shutdown output.
- Delayed shutdown open on fault – If the input is deactivated and the safety time has elapsed the generator will be shutdown and energize the common warning and common shutdown output.

Table 4-1 Programmable Functions and Values Continued

Auxiliary Output 1	●	○	○	●	○	○	○	○	Not Used
						○	○	●	Pre-heat
						○	●	○	Load Transfer
						○	●	●	Common Warning
						●	○	○	Common Shutdown
						●	○	●	System in Auto
						●	●	○	Common Alarm
						●	●	●	Energize to Stop
See Note 2									
Auxiliary Output 2	●	○	○	●	●	○	○	○	Not Used
						○	○	●	Pre-heat
						○	●	○	Load Transfer
						○	●	●	Common Warning
						●	○	○	Common Shutdown
						●	○	●	System in Auto
						●	●	○	Common Alarm
						●	●	●	Energize to Stop
See Note 2									

Note 2:

Outputs are solid state, rated at 1.2 Amps and switch to battery negative when active.

Programmable output can be configured to one of the following:

- Pre-heat. – The output is energized for the period of pre-heat time prior to cranking, and between the cranking attempts.
- Load Transfer. – The output is active after the safety timer has elapsed.
- Common warning. – The output is active if there are any warning alarm active.
- Common shutdown – The output is active if there are any shutdown alarms active.
- System in auto. – The output is active when the system is in automatic mode.
- Common Alarm. – The output is active if there is any alarm condition.
- Energize to stop. – The output is energized when the engine is required to stop (normal or fault conditions), and will remain energized for the period of the Energize To Stop. Timer, to ensure the engine has come to a complete stop.

Electrical Connections

The engine controller is installed into the AE11 from the factory. The information provided here will help you connect external devices to the Auxiliary inputs and outputs.

Table 4-2 Engine Controller Terminal Identification

Pin No	Description	Cable Size	Notes
1	DC Plant Supply Input (–ve)	1.0mm	Connected to plant battery negative
2	DC Plant Supply Input (+ve)	1.0mm	Connected to plant battery positive (Recommended Fuse 2A)
3	Fuel Solid State Output	1.0mm	Used to operate the fuel relay.
4	Start Solid State Output	1.0mm	Used to operate the cranking relay.
5	Auxiliary Solid State Output	11.0mm	Configurable output.
6	Auxiliary Solid State Output	21.0mm	Configurable output.
7	Charge Fail Input/ Excitation Output	1.0mm	Must NOT be connected to plant supply negative if not used.
8	Low Oil Pressure Input	0.5mm	Switch to negative.
9	High Engine Temp Input	0.5mm	Switch to negative.
10	Auxiliary Input	10.5mm	Switch to negative.
11	Auxiliary Input	20.5mm	Switch to negative.
12	Automatic start Input	0.5mm	Switch to negative.
13	Not used		
14	Not used		
15	Functional Earth	1.0mm	Connect to a good clean earth point.
16	Not used		
17	Not used		
18	Not used		
19	Not used		
20	Alternator Input L1	1.0mm	Do not connect if not used. (2A Fuse)
21	Alternator Input N	1.0mm	Do not connect if not used.

Garretson Model KN Fuel Valve Considerations

General

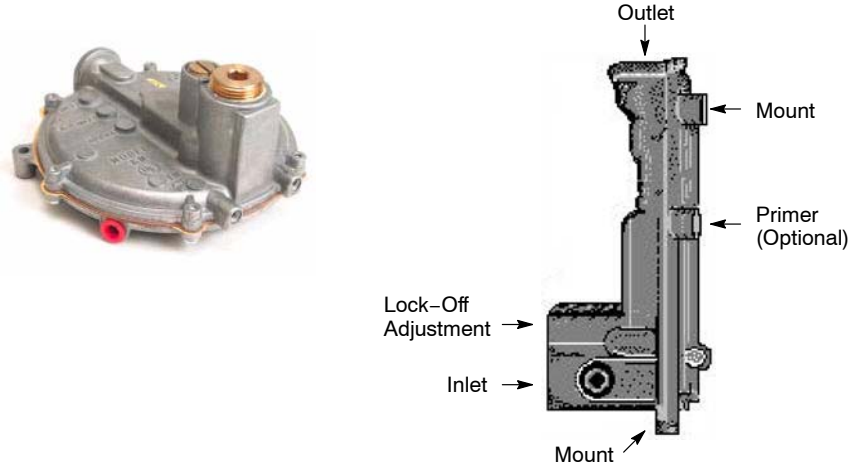
The KN is designed for sensitivity and simple operation. It is used with low–pressure vaporized gaseous fuels, where dependable starting is a requirement. Because of its extreme sensitivity, the KN offers excellent results in most remote starting applications (Standby power generators, etc.). With proper installation and maintenance, the KN will provide years of trouble–free service.

Operation

The KN is an atmospheric zero governor which acts like the float and needle valve in a gasoline carburetor. Air–flow through a venturi in the carburetor creates a vacuum, which acts through the outlet of the KN on the diaphragm. Atmospheric pressure then forces the diaphragm toward the vacuum, depressing the lever and pulling the valve seat away from the orifice, which allows fuel to flow as long as the demand persists. When the vacuum ceases, a spring force pushes on the lever and forces the valve seat against the orifice shutting off the fuel flow. It is important to remember that fuel should not flow through the KN when the engine is not running.

A properly adjusted KN requires a vacuum of only 0.25” to 0.35” of water column to start the opening sequence. Due to this sensitivity, most installations do not need priming to start unless low cranking speeds or restricted and lengthy piping are required. If priming is necessary and a manual primer is installed, use only 1 or 2 second bursts of fuel and immediately try to start the engine. If there is a choke on the carburetor, do not use it as this will probably cause flooding and hard starting. As you can see, the operation of this unit is simple and basic. If you are having trouble operating the engine, in most cases the fuel controller is not malfunctioning. There is generally a problem with the engine or fuel supply. so do not make adjustments or attempt to service the KN until you are sure it is needed.

Figure 4-5 Garretson KN Fuel Valve



Service

The KN should be periodically checked for leakage past the valve seat and the vents on the cover kept clean and free of obstructions. If the KN needs service we suggest you take it to a qualified serviceman. If that help is not available Garretson will furnish you a list of repair shops with the proper service information.

Installation

The KN should be mounted as close to the carburetor as possible with the arrow on the cover pointing up and the diaphragm in a vertical position. This helps to minimize the effects of gravity on diaphragm travel. This unit should also be placed for easy access to the primer if provided. There are two sets of mounting holes provided. either set of mounts will adequately support the KN. The bottom set of holes has a 1 3/4" bolt spacing for use with all Garretson universal mounting brackets. The mounting bosses on the cover are spaced (5 3/4") for 5/16 bolts.

Before installing the fuel supply line, be sure that the gas pressure is no more than the maximum inlet pressure shown on the front of the KN. If the pressure is greater, leakage could result in a fire hazard and or hard starting. The piping to the inlet should be of sufficient size to allow full flow to the KN. This is very important in natural gas installations as any restrictions can affect engine performance. If a solenoid is used ahead of the KN in the low– pressure line, it should have an orifice at least as big as the orifice in the KN. Flexible piping to the inlet should be used to prevent cracking from vibration if the KN is mounted on the engine or other vibrating surface.

Note: Thread sealing compound should be used on all pipe thread fittings between the KN and the fuel supply tank, being careful not to get any inside the inlet or fittings. Excess compound could collect on the seat and orifice and cause hazardous leakage, resulting in poor performance. After piping is complete, turn on the gas and use a soap solution to check all fittings for leaks.

If an electric solenoid primer is used, follow the wiring and adjusting instructions furnished separately. kit by connecting into a pressure line at a reduced pressure, call us. The KN outlet is 3/8 NPT and if an outlet fitting has not been provided, select and insert a suitable vapor fitting taking care not to allow any chips or dirt to enter the outlet. Use of street ells or conventional pipe fittings in the fuel line between the KN and the carburetor is not recommended as they may restrict the flow of fuel.

When installation of a properly sized fuel hose between the KN and carburetor is completed, if you are installing a complete conversion return to the instructions. For field replacement applications the unit is ready for service.

Section 5
Troubleshooting and Maintenance

Maintenance

This manual contains only very minimal engine maintenance instructions. Refer to the engine manufacturer's owner's manual for specific engine maintenance instructions for your generator set. Any maintenance instructions or recommendations in the engine owner's manual take precedence over any of the following general recommendations.

General:

1. Inspect the fuel system for leaks. Replace all defective components immediately.
2. Inspect and replace any fuel line that shows signs of deterioration.
3. Inspect all the fuel clamps to ensure they are tight.
4. Inspect and clean the battery posts and the associated battery cable terminals.
5. Inspect the external wire cables and connectors used with the generator set for cuts, fraying, or loose connections. Repair or replace any problems prior to using the unit.

Engine:

1. Clean and/or replace any fuel, oil, and/or air filters per the engine manufacturers' guidelines.
2. Check oil level regularly; at least every 5 to 8 operating hours. Maintain the proper oil level.
3. Change the oil as is recommended in the engine manufacturer's owner's manual.
4. Replace the spark plug(s) as is recommended by the engine manufacturer.
5. Clean the cooling fins on the engine to keep the engine's heat dissipation potential at it's maximum.
6. Inspect and clean all governor and carburetor linkages so they operate properly.

Alternator: (also called Generator End)

This generator set must be run at its proper speed to obtain the correct electrical power at its output. All engines have a tendency to slow down when a load is applied to it. The engine governor is designed to hold the operating speed as nearly constant as possible. When the electrical load is increased, the engine is more heavily loaded and engine speed drops slightly. This slight decrease in engine speed results in a slight decrease in generator voltage and frequency output. This voltage and frequency variation has no appreciable effect in the operation of motors, lights, and most appliances and tools. However, timing devices and clocks will not keep perfect time when used on this generator.

1. Clean the generator set and remove any and all dust, dirt, or other foreign material.
2. Inspect and clean the cooling air intake and exhaust louvers of the generator end. Make sure they are clean. Remove dirt or any buildup that may restrict the cooling air flow.
3. Clean the generator set and its components with a damp cloth or sponge. Never use a water hose or pressure washer as this may damage electrical components.
4. Inspect and replace any control panel components that are broken or not working properly (receptacles, circuit breakers, switches, etc.)

Problems and Solutions

Some of the more common problems are listed in Table 5-1. This information is intended to be a check or verification that simple causes can be located and fixed. It is not an exhaustive “how to” for all types of problems. Procedures that require in depth knowledge or skills should be referred to the Baldor Generator Service Department by calling (920) 236−4200.

Table 5-1 General Troubleshooting Guide

Problem	Possible Cause	Remedy
Engine cranks but will not start	No fuel.	Check that fuel valves are ON. Check fuel level in fuel tank.
	Low Oil Level	Low Oil Pressure Sutdown activated. Replensih oil to full.
	Restricted air flow.	Check/replace air filter.
	No spark.	Check/replace spark plug(s). Check that engine switch is in Start position.
	No engine speed during crank	The magnetic pickup must be correctly adjusted and operating.
Engine will not crank (electric start)	Dead battery.	Remove battery and trickle charge or replace with new battery. Never Jump Start.
	Emergency Stop LED is ON	Reset controller after an Emergency Stop.
Engine starts but will not run smoothly	Fuel or ignition problem	Refer to engine manual.
Engine overheats	Excessive load	Remove one or more electrical loads.
	Debris or dirt buildup on engine	Remove debris. Clean engine surfaces to allow cooling.
No output voltage	Ciruit Breaker tripped or failed.	Reset circuit breaker or replace if required.
	Internal failure of Alternator	Return to factory for repair.
Output voltage varies	Irregular speed (fixed speed mode)	Check engine for malfunction or load for fluctuation
	Fluctuating speed (fixed speed mode)	Stabilize load. The addition of a lamp load (resistance load) may compensate partially for load changes caused by intermittent motor operation. Do not overload.
	Loose terminal or load connections	Verify all connections and terminal tighness.
Low output voltage	Low engine speed	Verify engine RPM.
	Excessive load	Check engine for malfunction or system for overload. Reduce load.
	High resistance connections – connections will be warm or hot	Verify all connections and terminal tighness.
	Internal failure of Alternator	Return to factory for repair.
	Low power factor	Reduce inductive (motor) load. Some AC motors use about the same current regardless of load. Do not use motors of greater horsepower rating than is necessary to move the mechanical load.
High output voltage	Excessive speed (fixed speed mode)	Check engine for malfunction. Verify engine RPM.
Electrical shock when frame is touched	Static charge.	Ground generator frame at local reference ground (see Section 3).
	Grounded armature or field coil.	Return to factory for repair
Mechanical noise	Internal failure of Alternator	Return to factory for repair
	Loose or misaligned coupling	Tighten; align coupling and alternator shaft to engine shaft.

Table 5-2 Troubleshooting Guide (Digital Controller Only)

Problem	Possible Cause	Remedy
Controller does not power up even with correct DC power applied	Wiring Mistake Loss of DC Supply	Check the battery and wiring to the unit. Check the DC supply. Check the DC fuse. Check DC supply voltage is not above 35 Volts or below 9 Volts. Check the operating temperature is not above 70 °C.
Low Oil Pressure fault	Low Oil Pressure Defect in sender or wiring	Check engine oil pressure. Check oil pressure switch and wiring. Check switch polarity (i.e. Normally Open or Normally Closed).
High Engine Temperature fault	Excessive Temperature Defect in sender or wiring	Check engine temperature. Check switch and wiring. Check switch polarity (i.e. Normally Open or Normally Closed).
Shutdown fault	Fault Trip Failed switch or wiring	Clear trip condition and reset controller. Check switch and wiring of fault indicated by the LED. Check configuration of input.
Fail to Start is activated after pre-set number of attempts to start	No fuel No starting current to starter motor Engine fault	Check fuel solenoid is on and battery supply is present at solenoid. Check fuel. Check battery supply. Refer to engine manual.
Continuous starting of generator in AUTO	Remote Start circuit fault	Check that there is no signal present on the “Automatic start” input.
Generator fails to start at remote start command	No Remote Start Signal Wrong generator mode	Check the “Remote Start” input signal. Check that the “Auto Start” mode is selected.
Pre-heat inoperative		Check wiring to engine heater plugs. Check battery supply is present at the Pre-heat output of module. Check pre-heat has been selected in your configuration. NB all the outputs are negative switching.
Starter motor inoperative		Check wiring to starter solenoid. Check battery supply. Check battery supply is present on the Starter output of module. NB all the outputs are negativeswitching.
Fuel solenoid inoperative		Check wiring to fuel solenoid. Check battery supply. Check battery supply is present on the fuel output of module. NB all the outputs are negativeswitching.

Note: Table 5-2 is provided as a guide check–list only. It is possible for the module to be configured to provide a wide range of different features always refer to the source of your module configuration if in doubt.

Note: All the outputs are solid state, rated at 1.2 Amps and switch to battery negative when active.

Note: See Engine Controller manual for additional information.

Table 5-3 Troubleshooting Guide (Analog Controller Only)

Problem	Possible Cause	Remedy
Controller cannot be "Reset"	Engine not stopped	Verify the engine is at a complete stop before trying to reset.
	Controller not in OFF mode	Set the controller to the OFF mode before trying to reset.
Engine alarms are ON for high engine temperature or low oil pressure when engine is operating properly	Sending unit is disconnected (open circuit)	Verify the sending units wiring to controller terminals is not open or shorted.
	Defective sending unit	Verify the engine mounted senders have correct resistance values for corresponding input temperature or pressure.
Overspeed shutdown occurs at normal speed	Controller has failed or input from Magnetic pickup is incorrect.	Verify the adjustments. Replace controller if failed.

Service

Service for your generator can be obtained from Baldor Generators. Please have the following information available prior to contacting the factory:

The model number and serial number of the generator set.

A complete and accurate description of the problem.

Parts

Parts for your generator can be obtained from Baldor Generators. Please have the following information available prior to contacting the factory:

The model number and serial number of the generator set.

A complete and accurate description of the part (part number if known).

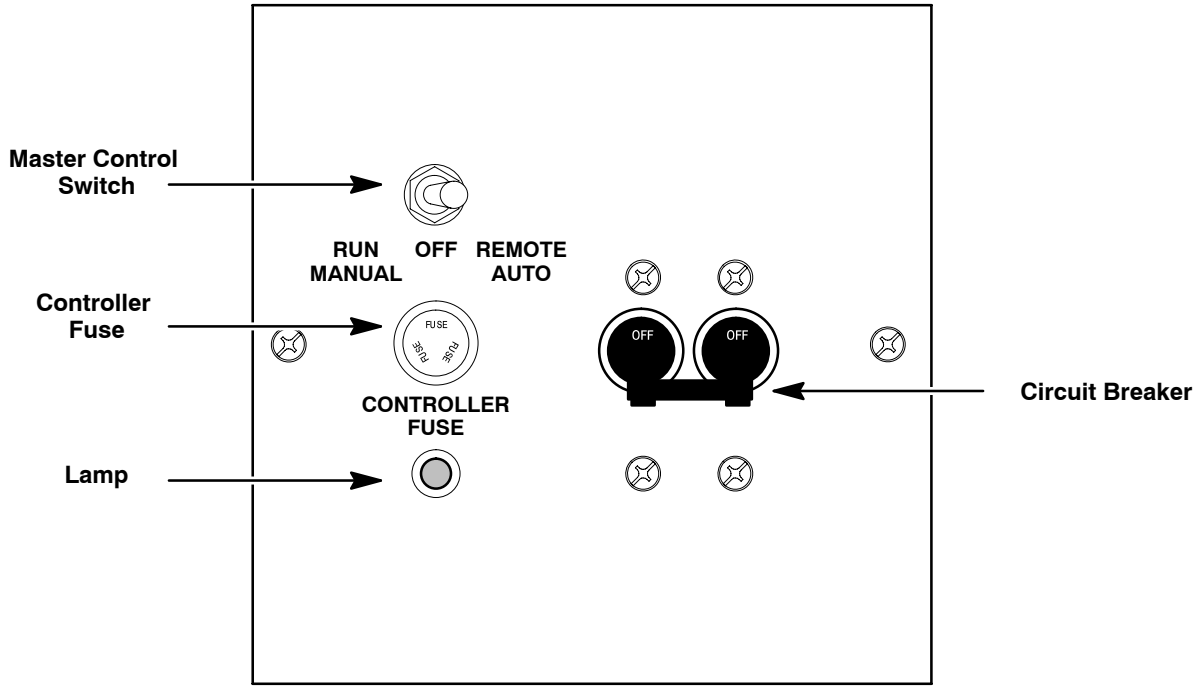
Note: Engine parts can usually be obtained from a local distributor by using the information in the engine manufacturer's owner's manual.

Appendix A
Series AE8

Information in this Appendix applies to the AE8 Generator.

Operator Panel Configuration

Figure A-1 AE8 Operator Panel



Master Control Switch – A three position switch allows choice of automatic or manual operating mode.

Run Manual – In this position the controller immediately energizes the crank cycle to start the generator set and produce power.

Off – off position, prevents engine from stating.

Remote Auto – The engine can only be started by making a connection across the remote start terminals of the control box. This allows normal automatic backup operation of the Generator Set under control of the Transfer Switch.

Controller Fuse – This fuse provides overload protection for the controller circuit board.

Lamp – This Red indicator light will come on when the engine shuts down due to a fault condition.

Circuit Breaker – The 2 pole Circuit Breakers provide overload protection (excessive AC current) for the generator set output windings.

Replacement Parts Replacement parts assembly views for the Generator set are shown in Figure A-2 and A-3. Parts information is provided in Table A-1. Engine parts are identified in the engine manual that was provided with your generator set.

Figure A-2 Alternator Assembly

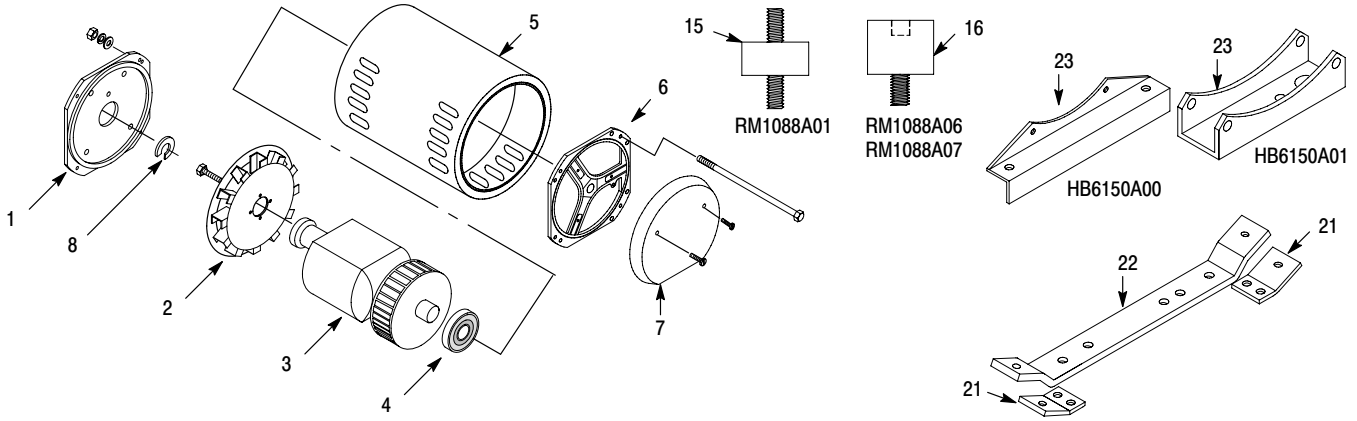


Figure A-3 Frame Assembly

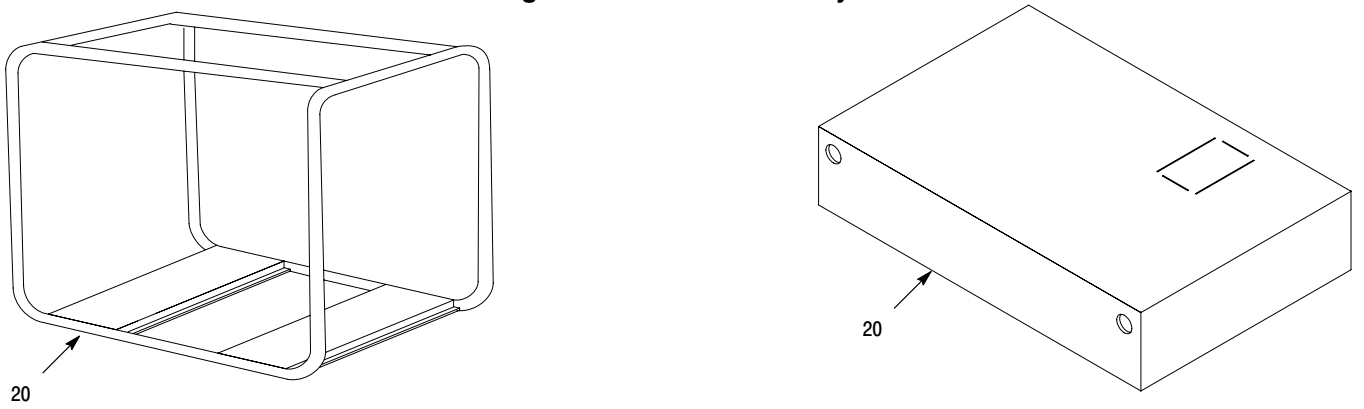


Table A-1 Generator Set Parts List

Ref No.	Part No.	Description	Open	Enclosed
1	HA9139A01	Adaptor, Engine	X	X
2	61FN3000	Fan	X	X
3	61RA0016A00	Rotor Assembly	X	X
4	BG6204H03	Rotor Bearing	X	X
5	61SA0015A03	Stator Assembly	X	
5	61SA0015A04	Stator Assembly		X
6	61EP3204A01	Bearing Bracket	X	
6	61EP3204A07	Bearing Bracket		X
7	EH0321A00	Cover	X	
8	HA1037A00	"C" Washer	X	X
15	RM1088A01	Isolator, Control Box	X	
16	RM1088A06	Isolator, Generator end	X	
16	RM1088A07	Isolator, Engine end	X	X
20	BA0191A00	Base Frame	X	
20	BA5000A00	Base Frame		X
21	HB7025A00	Engine Mounting Foot	X	X
22	HB7002A07	Engine end frame cross member	X	
22	HB7002A08	Engine end frame cross member		X
23	HB6150A00	Alternator end frame cross member	X	
23	HB6150A01	Alternator end frame cross member		X

Table A-1 Generator Set Parts List Continued

Ref No.	Part No.	Description	Open	Enclosed
Not Shown	EH0279A00	Enclosure, Top		X
Not Shown	EH0280A00	Enclosure, Door		X
Not Shown	EH0281A00	Enclosure, End Cap		X
Not Shown	EH0290A00	Enclosure, Right Side		X
Not Shown	EH0291A00	Enclosure, Left Side		X
Not Shown	HB2400A00	Enclosure, Latch		X
Not Shown	EH0308A00	Control Box		X
Not Shown	EB1243A00	Circuit Board, ARSS-3		X
Not Shown	EH0296A00	Control Box	X	
Not Shown	SP9094	Toggle Switch, Master Control	X	X
Not Shown	DI0181A00	Glo-Light	X	X
Not Shown	DI0176A00	Diode	X	X
Not Shown	OC6030F11	Capacitor, 30MFD / 370V, 90 degree	X	X
Not Shown	CK0070A04	Circuit Breaker 40Amp	X	
Not Shown	CK0070A27	Circuit Breaker 35Amp		X
Not Shown	FU066A02	Fuse, AGC1	X	X
Not Shown	EA5009A00	Muffler	X	
Not Shown	EA0008A08	Muffler		X
Not Shown	EA0008A08	Muffler Silencer		X
Not Shown	HB6116A00	Battery Tie Down	X	X
Not Shown	HA3187A12	Battery Tie Down Bolt	X	X
Not Shown	EA0010A04	Battery Charger, 12V, 2AMP	X	X
Not Shown	HB6146A00	Fuel Load Block, K-N	X	X
Not Shown	HB6147A00	Carburetor Adapter	X	X
Not Shown	EA0000A00	Regulator, K-N, Manual Prime	X	X
Not Shown	SE0052A00	Solenoid, Low Pressure	X	X

Wiring Diagrams Wiring diagrams for these generators are contained on the following pages of this appendix.

Figure A-4 AE8 Customer Connection Diagram

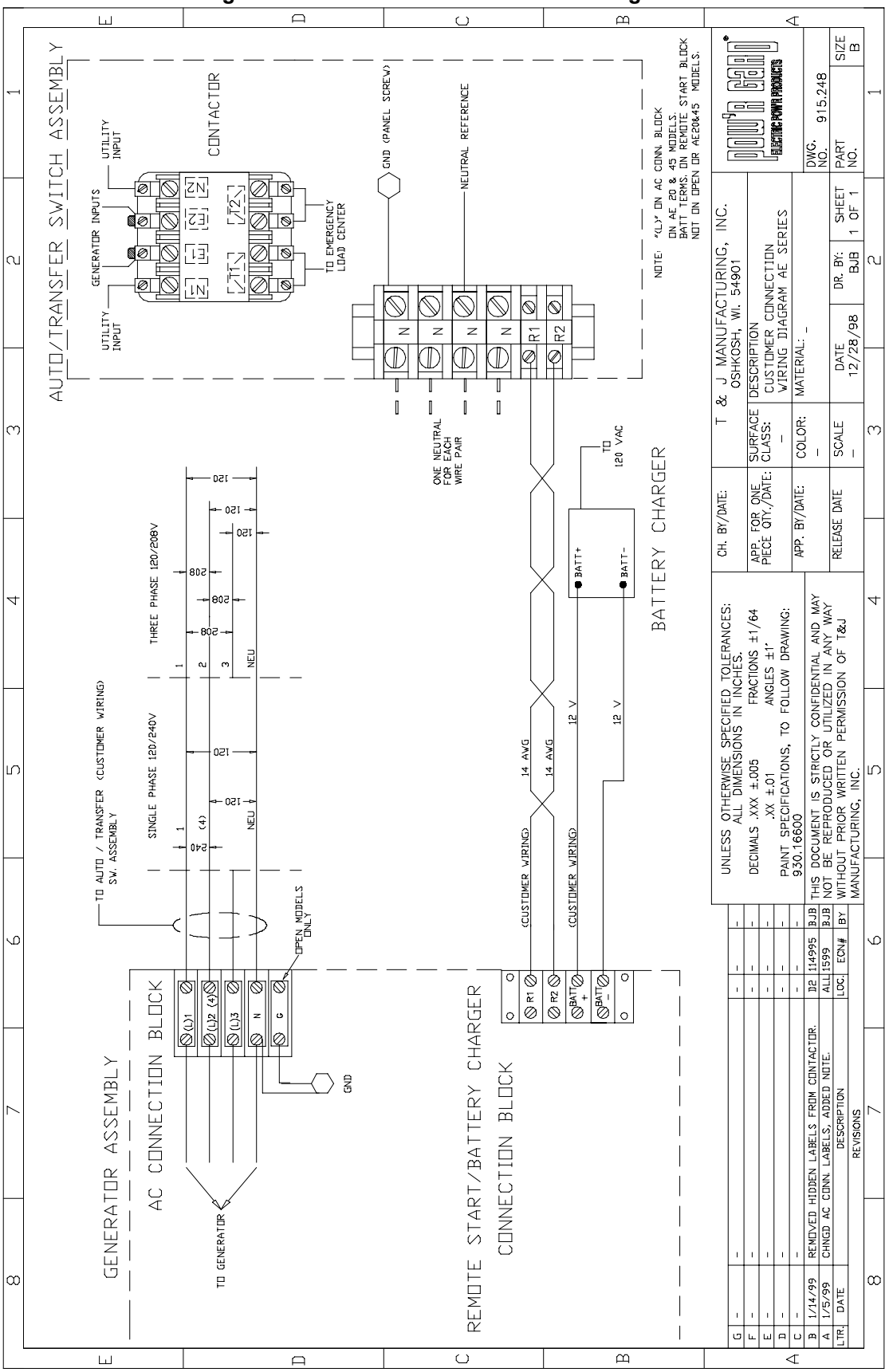


Figure A-5 AE8 Open Frame Wiring Diagram

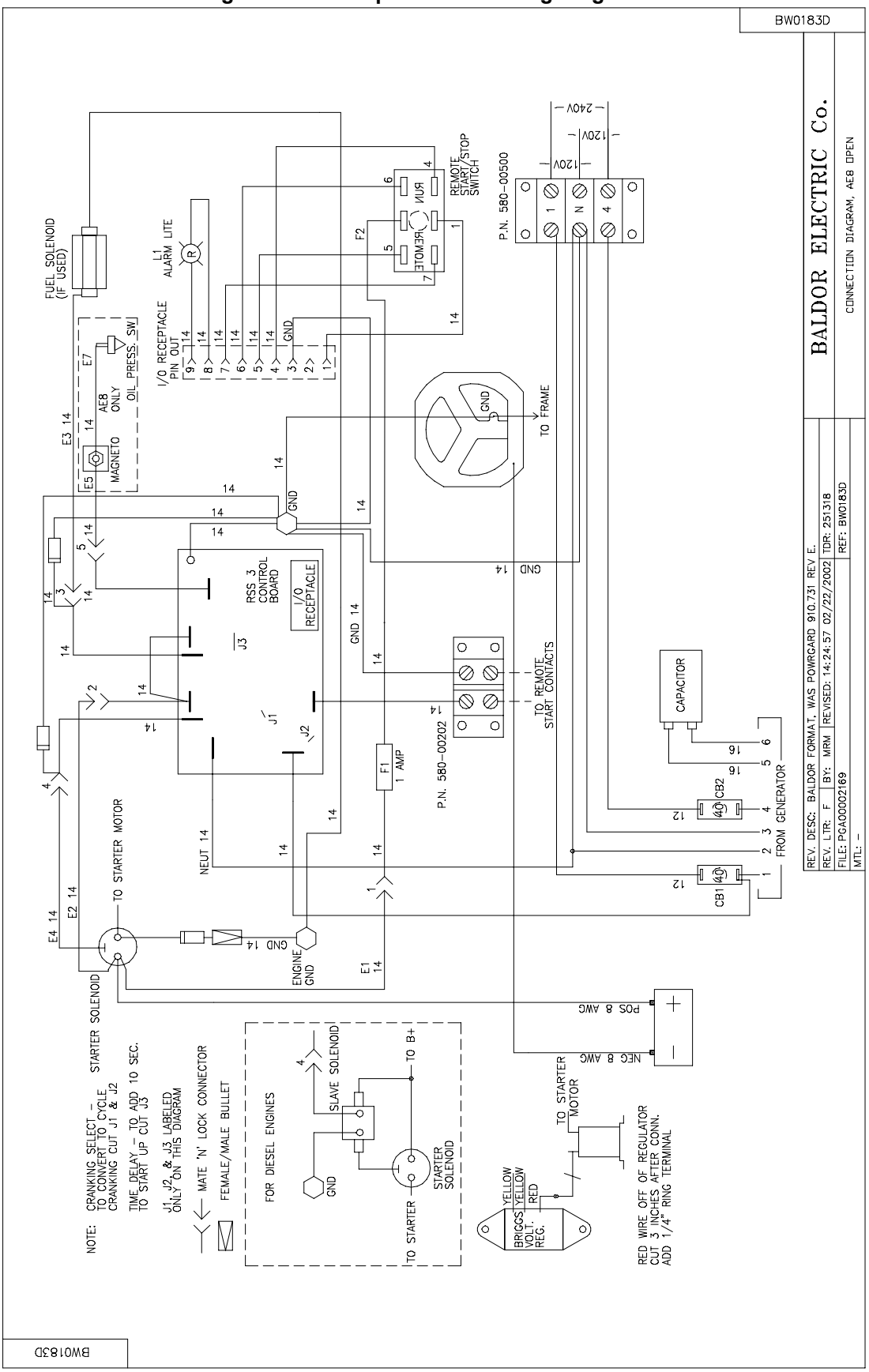
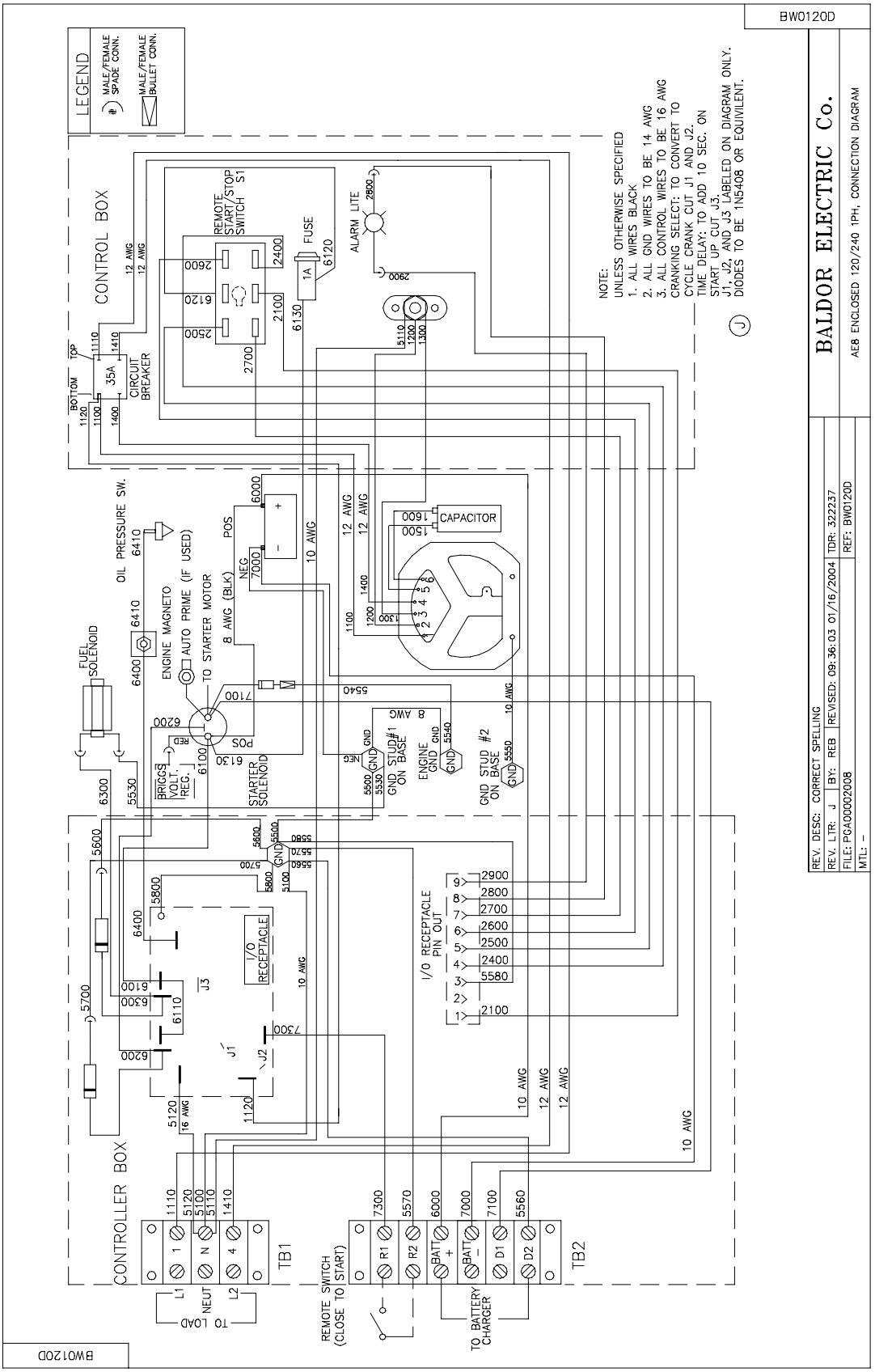


Figure A-6 AE8 Enclosed Wiring Diagram

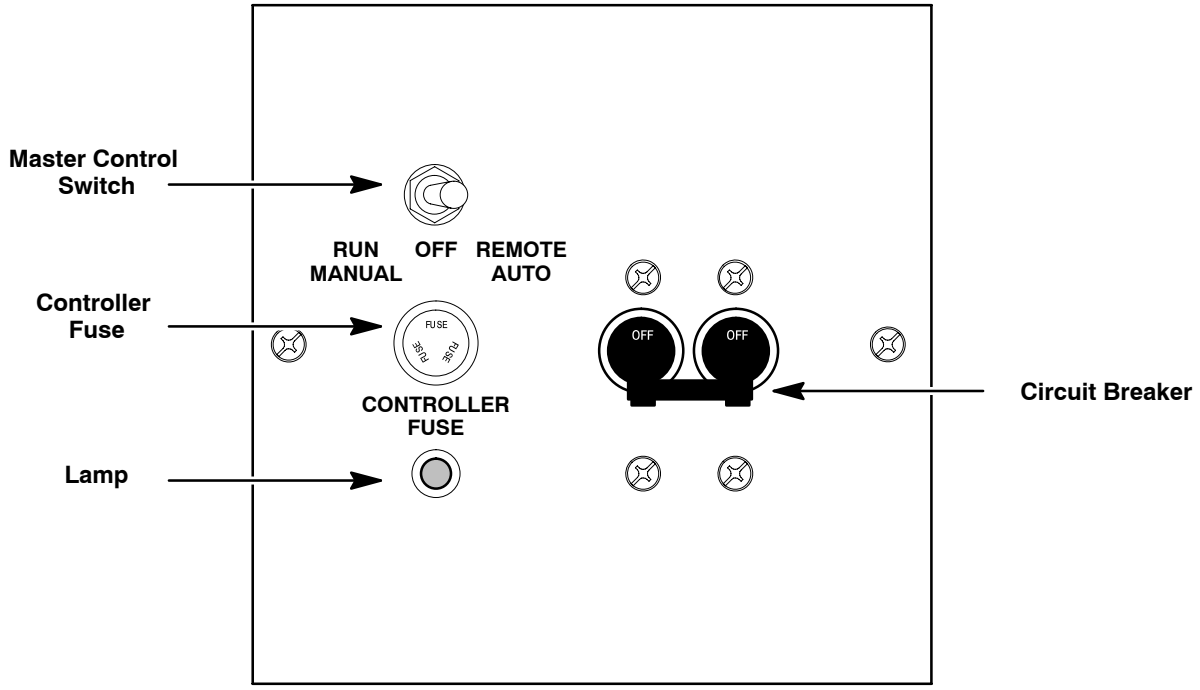


Appendix B
Series AE10

Information in this Appendix applies to the AE10 Generator.

Operator Panel Configuration

Figure B-1 AE10 Operator Panel



Master Control Switch – A three position switch allows choice of automatic or manual operating mode.

Run Manual – In this position the controller immediately energizes the crank cycle to start the generator set and produce power.

Off – off position, prevents engine from stating.

Remote Auto – The engine can only be started by making a connection across the remote start terminals of the control box. This allows normal automatic backup operation of the Generator Set under control of the Transfer Switch.

Controller Fuse – This fuse provides overload protection for the controller circuit board.

Lamp – This Red indicator light will come on when the engine shuts down due to a fault condition.

Circuit Breaker – The 2 pole Circuit Breakers provide overload protection (excessive AC current) for the generator set output windings.

Replacement Parts Replacement parts assembly views for the Generator set are shown in Figure B-2 and B-3. Parts information is provided in Table B-1. Engine parts are identified in the engine manual that was provided with your generator set.

Figure B-2 Alternator Assembly

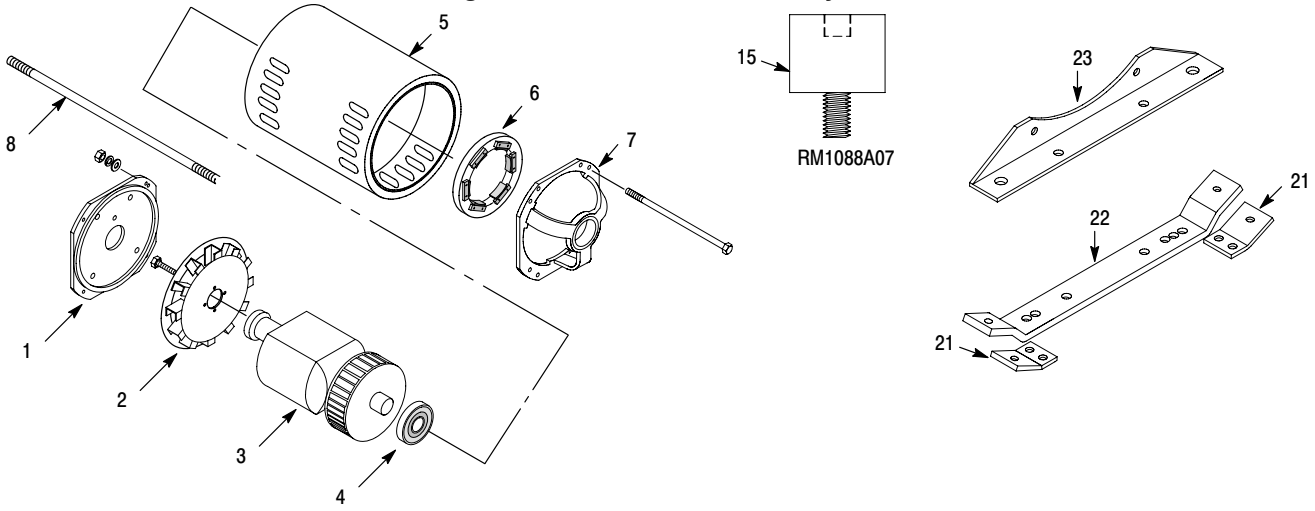


Figure B-3 Frame Assembly

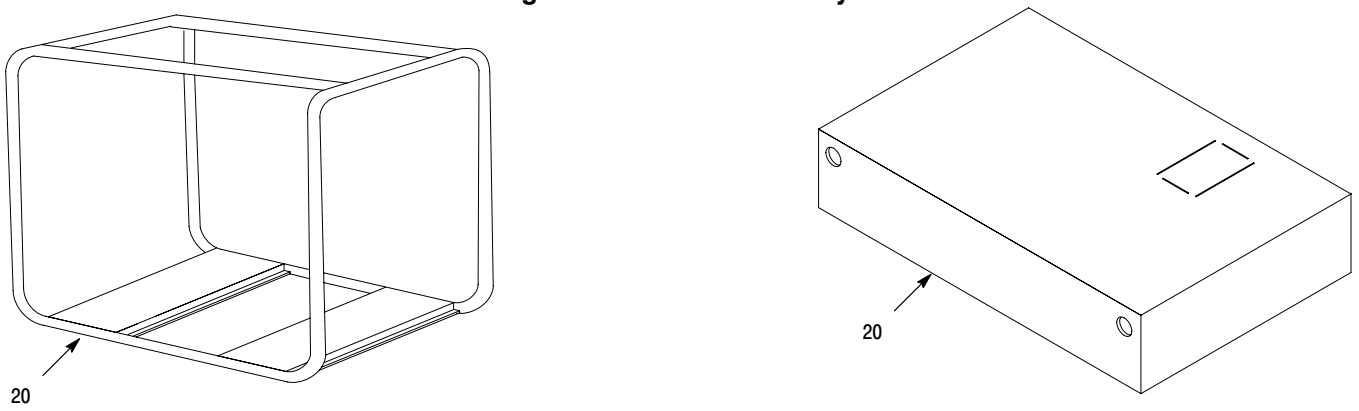


Table B-1 Generator Set Parts List

Ref No.	Part No.	Description	Open	Enclosed
1	HB6177A01	Adaptor, Engine	X	X
2	62FN4002	Fan	X	X
3	62RA014A00	Rotor Assembly	X	X
4	BG6207H03	Rotor Bearing	X	X
5	62SA0006A00	Stator Assembly	X	X
6	62EX5001A01	Exciter Assembly	X	X
7	62EP3202A01	Bearing Bracket	X	X
8	HA3188A00	Rotor Bolt (Rotor to Engine)	X	X
Not Shown	HB7023A00	Rotor End Plate		X
15	RM1088A07	Isolator	X	X
20	BA0198A00	Base Frame	X	
20	BA5000A00	Base Frame		X
21	HB7025A00	Engine Mounting Foot	X	X
22	HB7002A08	Engine end frame cross member	X	X
23	HB6068A00	Alternator end frame cross member	X	X

Table B-1 Generator Set Parts List Continued

Ref No.	Part No.	Description	Open	Enclosed
Not Shown	EH0279A00	Enclosure, Top		X
Not Shown	EH0280A00	Enclosure, Door		X
Not Shown	EH0281A00	Enclosure, End Cap		X
Not Shown	EH0290A00	Enclosure, Right Side		X
Not Shown	EH0291A00	Enclosure, Left Side		X
Not Shown	HB2400A00	Enclosure, Latch		X
Not Shown	BE0364A17	Control Box	X	
Not Shown	EH0296A02	Control Box		X
Not Shown	SP9094	Toggle Switch, Master Control	X	X
Not Shown	DI0181A00	Glo-Light	X	X
Not Shown	DI0176A00	Diode		X
Not Shown	CK0070A05	Circuit Breaker 50Amp	X	
Not Shown	CK0070A29	Circuit Breaker 50Amp		X
Not Shown	EB1243A00	Control Circuit Board	X	X
Not Shown	FU066A02	Fuse, AGC1	X	X
Not Shown	FU066A00	Fuse, MTH-5		X
Not Shown	EA5009A00	Muffler	X	
Not Shown	EA0008A08	Muffler Silencer		X
Not Shown	HB6116A00	Battery Tie Down	X	X
Not Shown	HA3187A12	Battery Tie Down Bolt	X	X
Not Shown	EA0010A04	Battery Charger, 12V, 2AMP	X	X
Not Shown	HB6146A00	Fuel Load Block, K-N	X	X
Not Shown	HB6147A00	Carburetor Adapter	X	X
Not Shown	EA0000A00	Regulator, K-N, Manual Prime	X	X
Not Shown	SE0052A00	Solenoid, Low Pressure	X	X

Wiring Diagrams Wiring diagrams for these generators are contained on the following pages of this appendix.

Figure B-4 AE10 Customer Connection Diagram

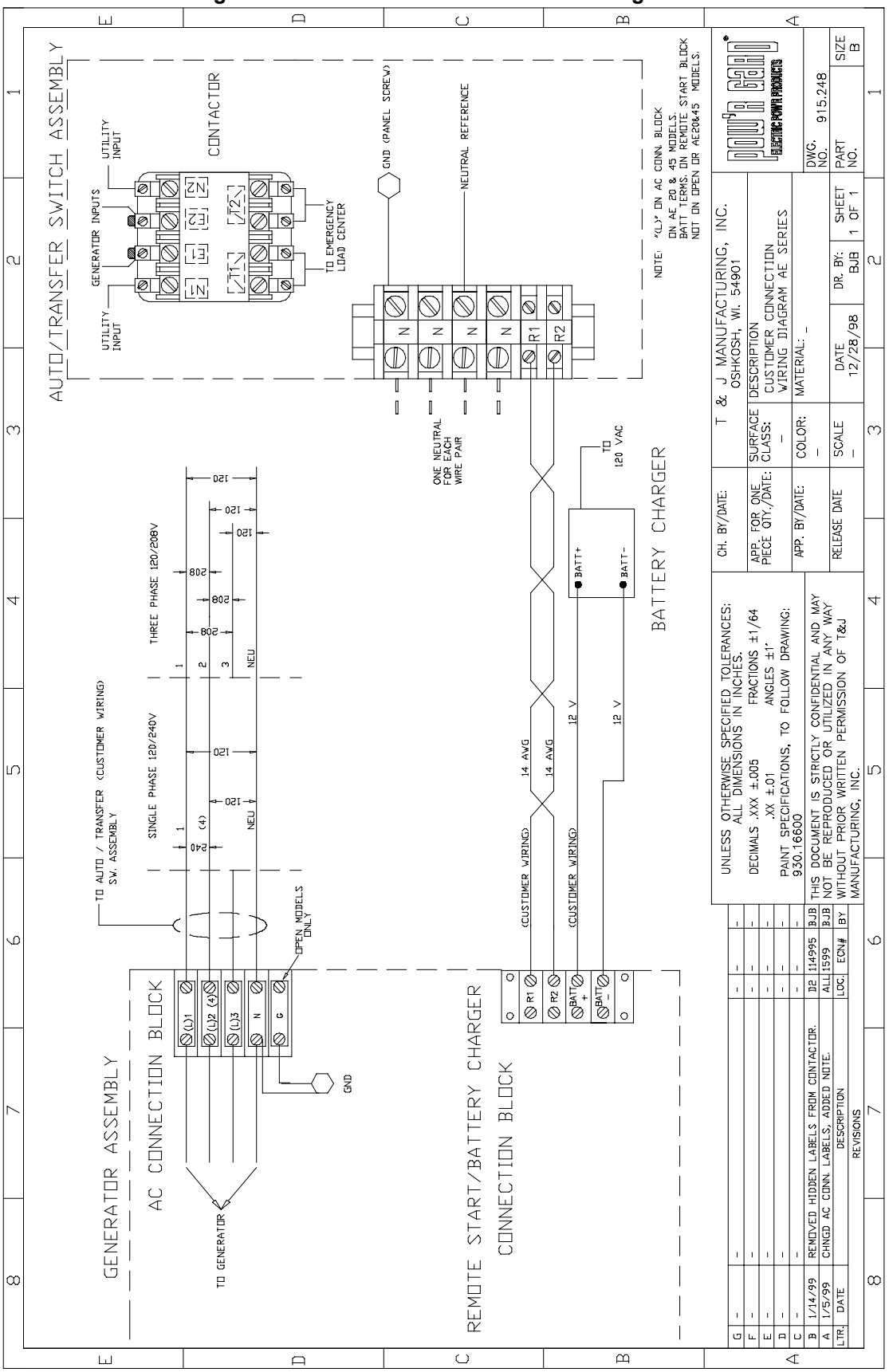


Figure B-5 AE10 Open Frame Wiring Diagram

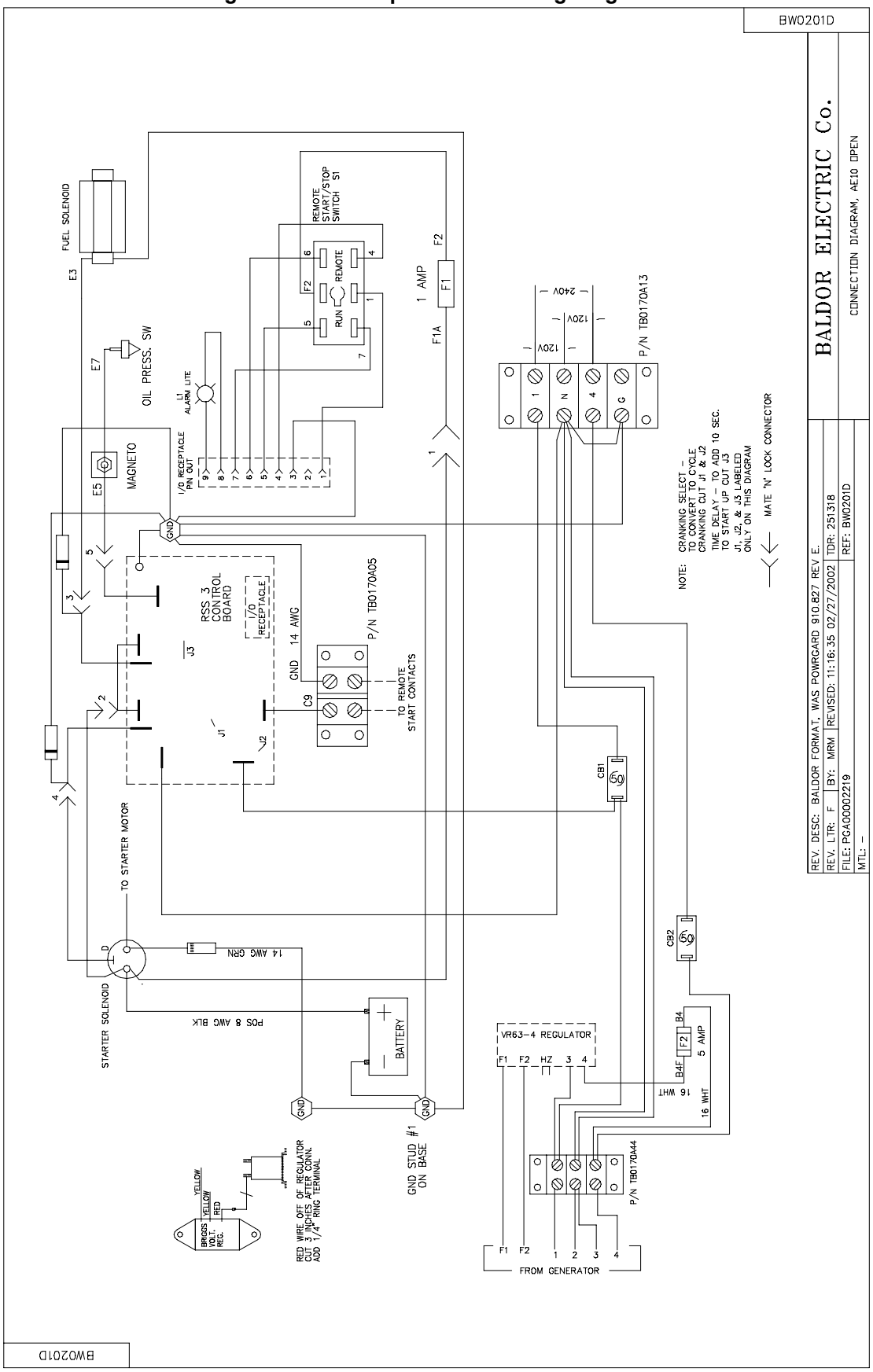
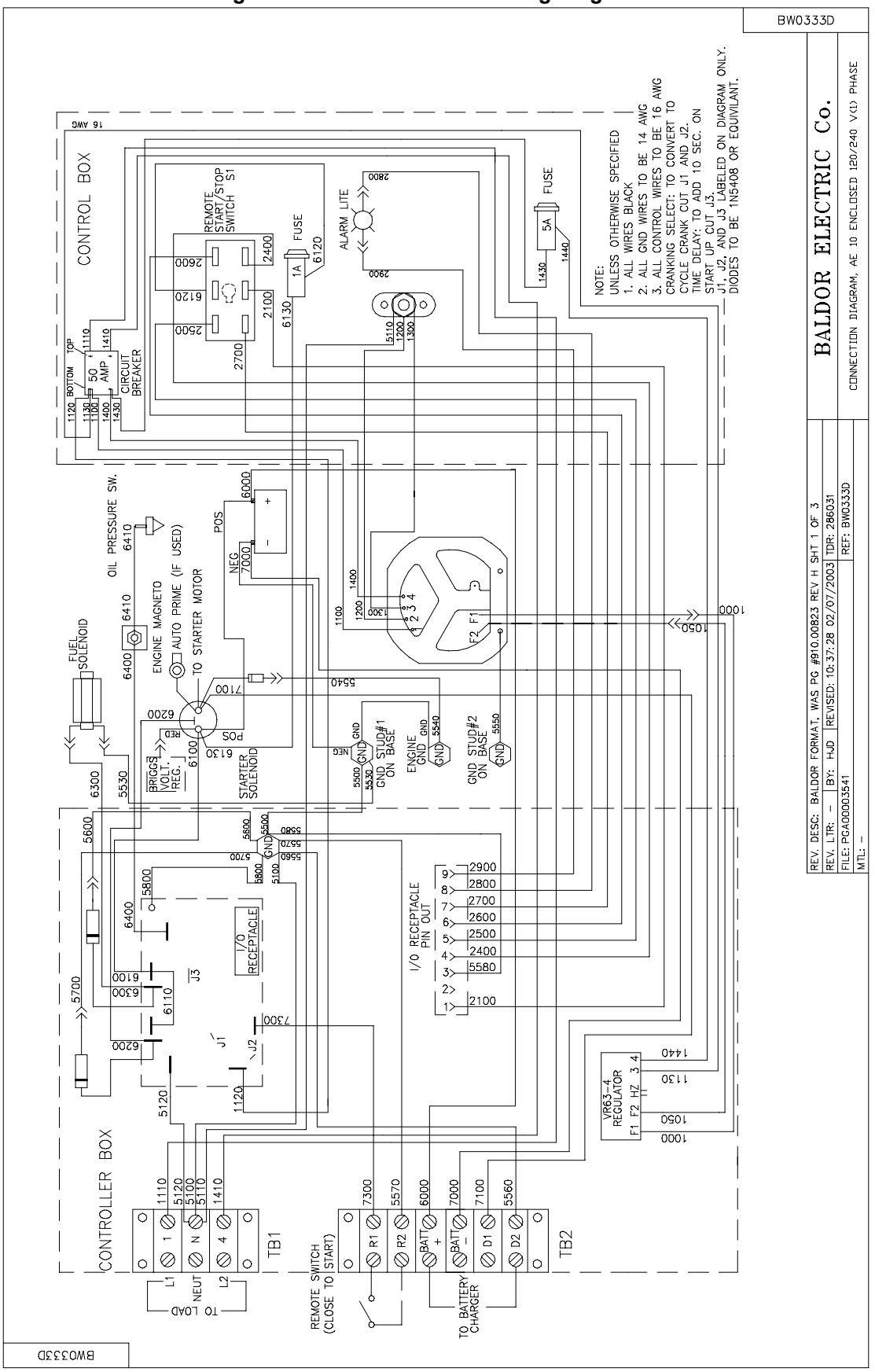


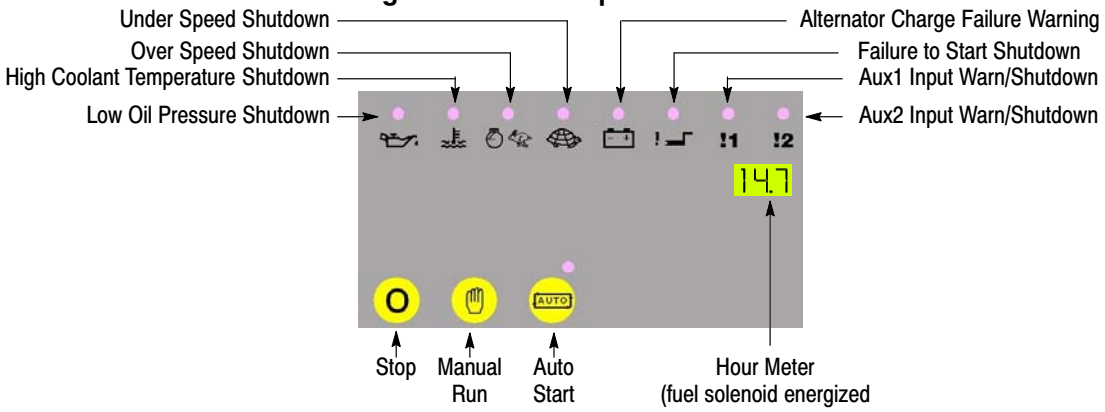
Figure B-6 AE10 Enclosed Wiring Diagram



Information in this Appendix applies to the AE11 Generator.

Operator Panel Configuration

Figure C-1 AE11 Operator Panel



Shutdown Warning Indicators
Low Oil Pressure, High Coolant Temperature, Over Speed (Engine), Under Speed (Engine), Failure to Start Engine.

Warning (or Shutdown) Indicators
Alternator Failure (to Charge Battery), Auxiliary 1 Input Active, Auxiliary 2 Input Active.

Hour Meter Displays total hours of operation based on power applied to Fuel Solenoid).

Stop Stops the Engine and generator set.

Manual Run Immediately energizes the crank cycle to start the generator set and produce power.

Auto Start The engine can only be started by making a connection across the remote start terminals of the control box. This allows normal automatic backup operation of the Generator Set under control of the Transfer Switch whenever utility AC power is lost.

Replacement Parts

Replacement parts assembly views for the Generator set are shown in Figure C-2 and C-3. Parts information is provided in Table C-1. Engine parts are identified in the engine manual that was provided with your generator set.

Figure C-2 Alternator Assembly

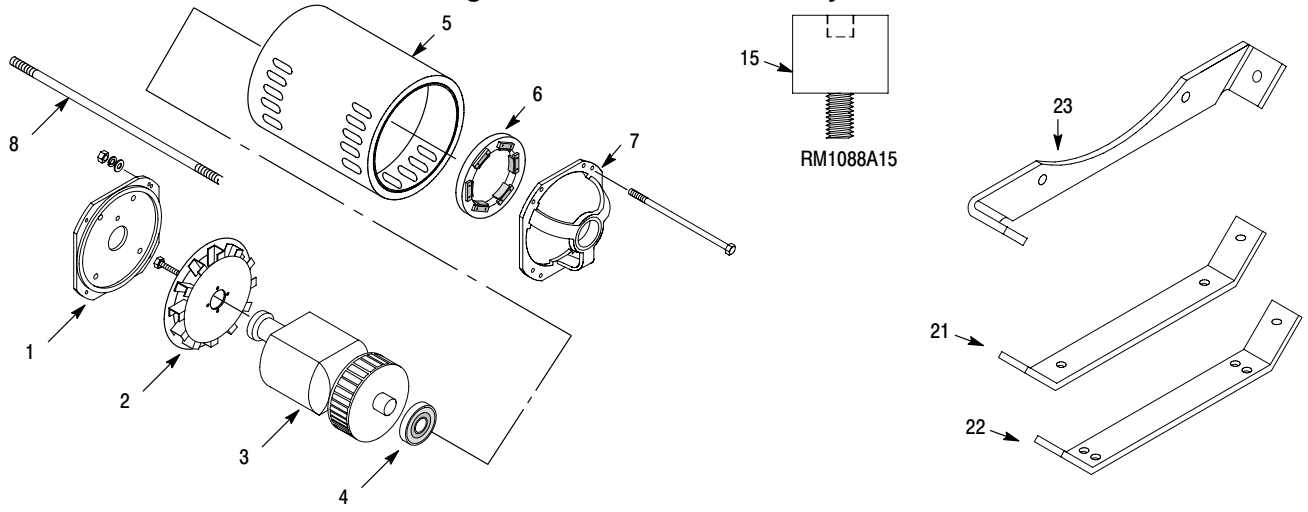


Figure C-3 Frame Assembly

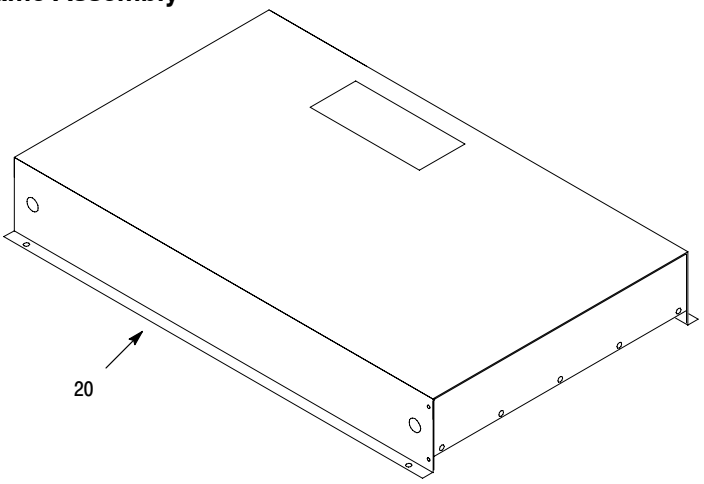


Table C-1 Generator Set Parts List

Ref No.	Part No.	Description
1	HB6177A02	Adaptor, Engine
2	62FN4002	Fan
3	62RA0016A00	Rotor Assembly
4	BG6207H03	Rotor Bearing
5	62SA0025A00	Stator Assembly
6	62EX5001A01	Exciter Assembly
7	62EP3202A01	Bearing Bracket
8	HA3188A00	Rotor Bolt (Rotor to Engine)
Not Shown	HB7023A00	Rotor End Plate
15	RM1088A15	Isolator
20	EH0491A09	Base Frame
21	HB6068A02	Engine Mount (Kohler CP23)
22	HB6068A16	Engine/Alternator Mount
23	HB6068A03	Alternator Mount

Table C-1 Generator Set Parts List Continued

Ref No.	Part No.	Description
Not Shown	EH0491A02	Enclosure, Top
Not Shown	EH0491A11	Enclosure, Access Panel
Not Shown	EH0491A01	Enclosure, Front
Not Shown	EH0491A10	Enclosure, Right Side (Hinge) & Rear
Not Shown	EH0491A13	Enclosure, Left Side (Latch) & Front
Not Shown	HB2414A05	Latch
Not Shown	HW2409A21	Hinge, Nylon
Not Shown	HW2409A22	Hinge, Nylon
Not Shown	HW2410A02	Gas Spring, 30 lb.
Not Shown	EH0309A02	Control Box
Not Shown	EM0046A00	Engine Controller, 4110 Auto Start
Not Shown	RE5031A01	Relay
Not Shown	EM0027A01	Voltage Regulator (AVC63-20.)
Not Shown	CK0070A29	Circuit Breaker 50Amp
Not Shown	FU066A02	Fuse, AGC1
Not Shown	FU066A00	Fuse, MTH-5
Not Shown	SE0057A02	Solenoid, Engine Starting 12V
Not Shown	EA5038A00	Muffler
Not Shown	HB6116A00	Battery Tie Down
Not Shown	HA3187A12	Battery Tie Down Bolt
Not Shown	EA0010A04	Battery Charger, 12V, 2AMP
Not Shown	EA0000A00	Regulator, K-N, Manual Prime
Not Shown	SE0071A00	Solenoid, Automatic Gas Valve

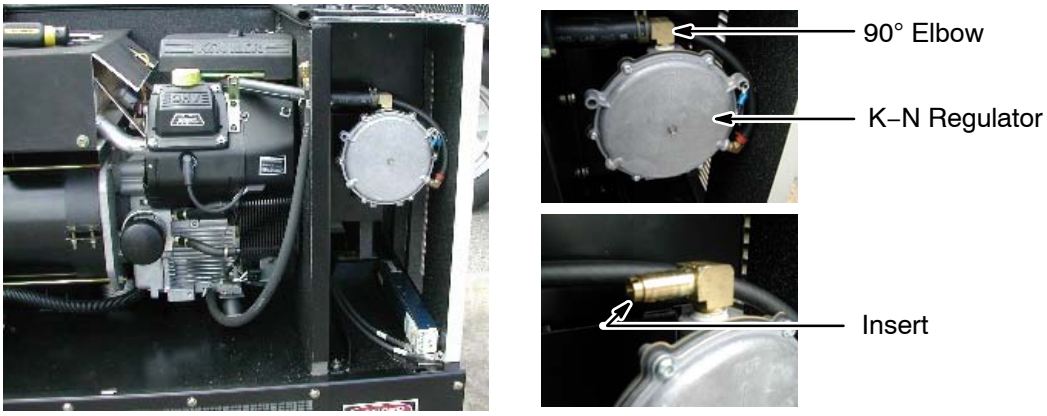
Conversion from LPG to Natural Gas Optional Procedure

If this is a new installation, begin with step 5.

If the generator has been installed, ensure that the following steps are performed:

1. Place the controller in the OFF position.
2. Place the circuit breaker in the OPEN position.
3. Turn off the LPG supply.
   Disconnect and remove the LPG equipment and hoses.
4. Disconnect the negative terminal from the starting battery.

Figure C-4



5. Open the lid and remove the front panel by removing the two 7/16” bolts along the top edge of the front panel.
6. Remove the hose that connects to the 90° elbow at the top of the demand (K–N) regulator, Figure C-4.

7. Remove the insert from the 90° elbow, Figure C-5.
8. Connect the hose and hose clamp to the 90° elbow.

Figure C-5

Insert

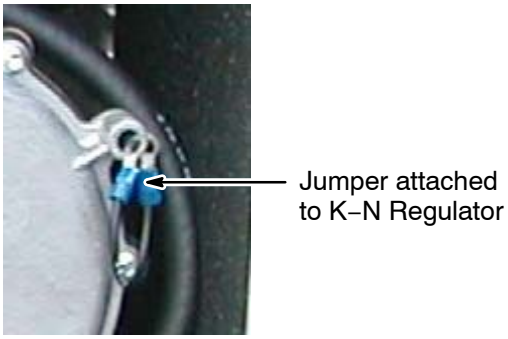
90° Elbow with LPG Insert removed.

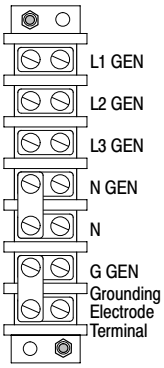
Hose (fuel line) and clamp installed

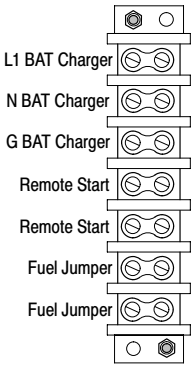
9. Remove the control box cover by removing the six 7/16” bolts. to gain access to the customer connection terminal strips.
10. Remove the jumper assembly attached to the demand regulator.
11. Locate the two terminals labeled FUEL JUMPER and connect the jumper assembly between them.
12. Install the control box cover and the front panel.

The unit has now been converted to operate on Natural Gas.

Figure C-6







Wiring Diagrams Wiring diagrams for these generators are contained on the following pages of this appendix.

Figure C-7 AE11 Customer Connection Diagram

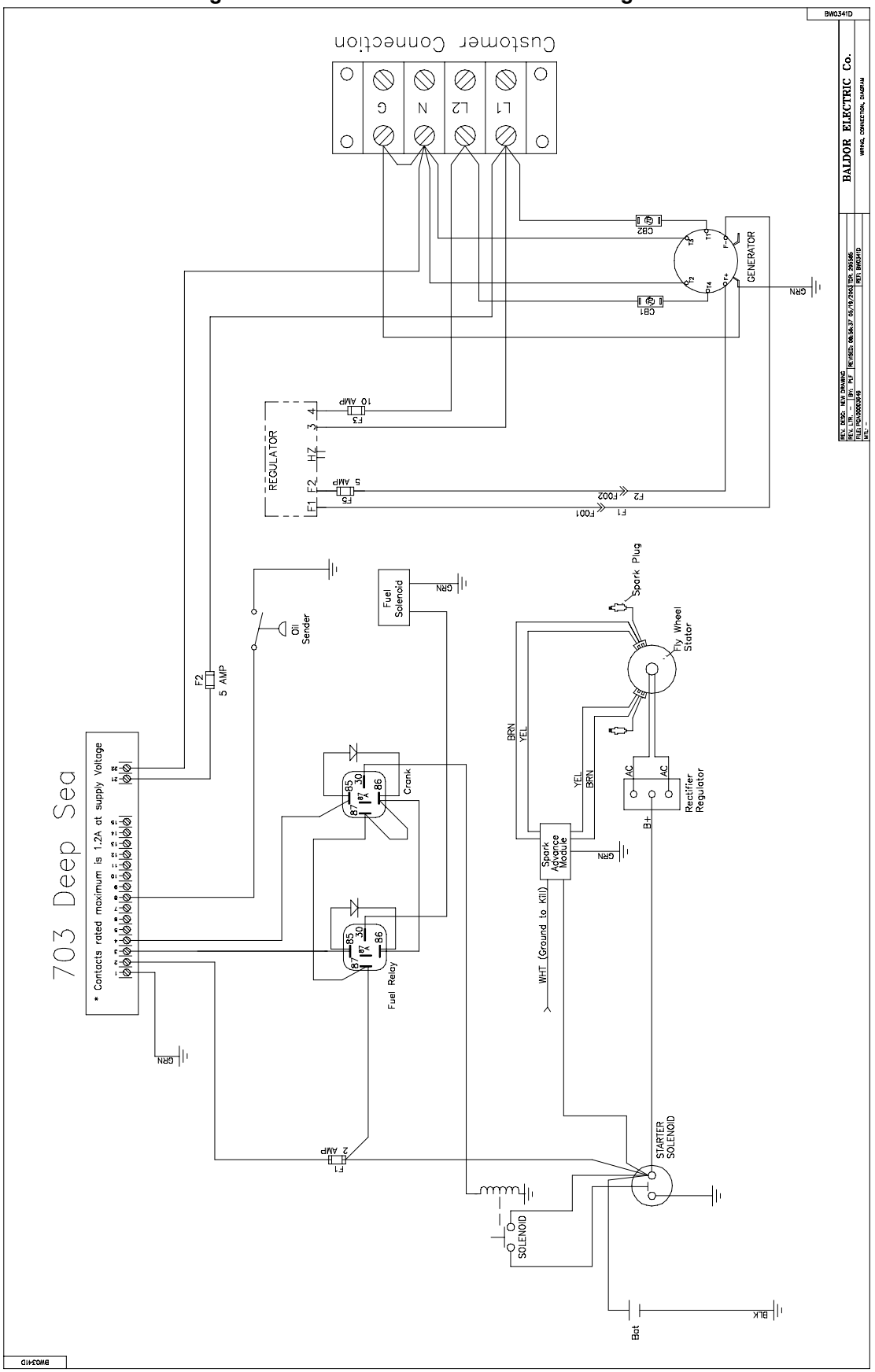


Figure C-8 AE11 Generator Connection Diagram

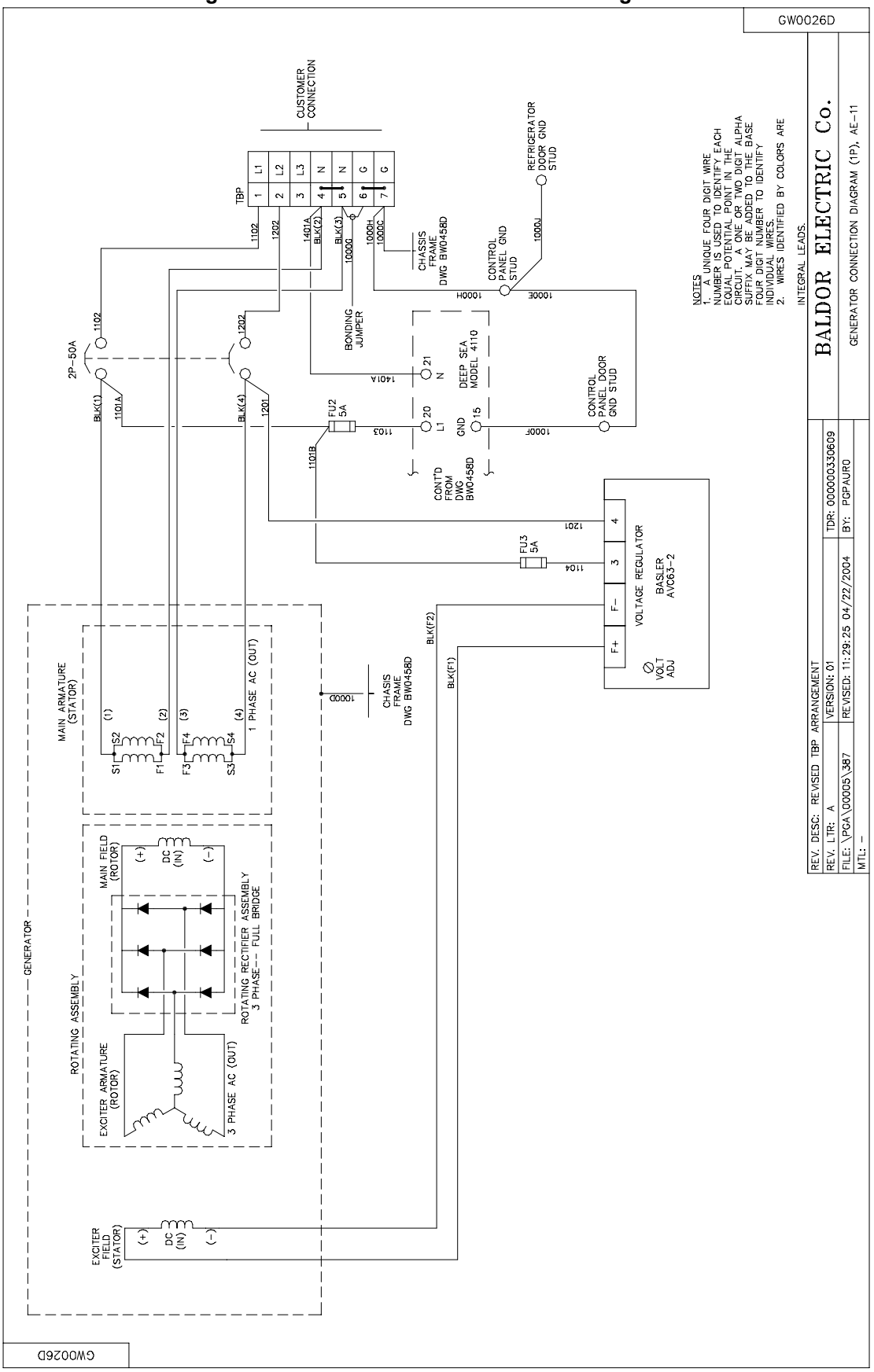


Figure C-9 AE11 Engine Connection Diagram

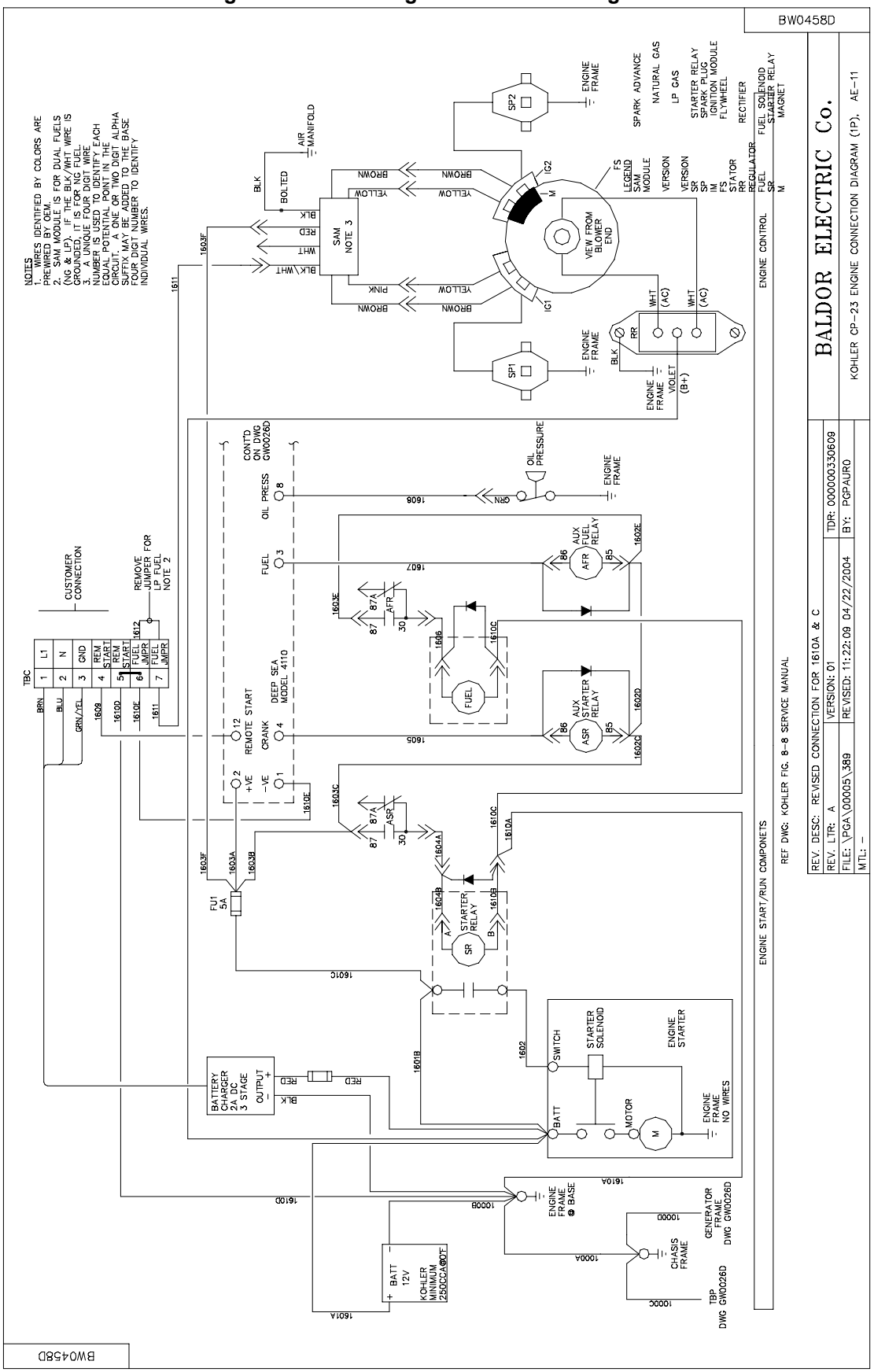


Figure C-10 AE11 Connection Diagram

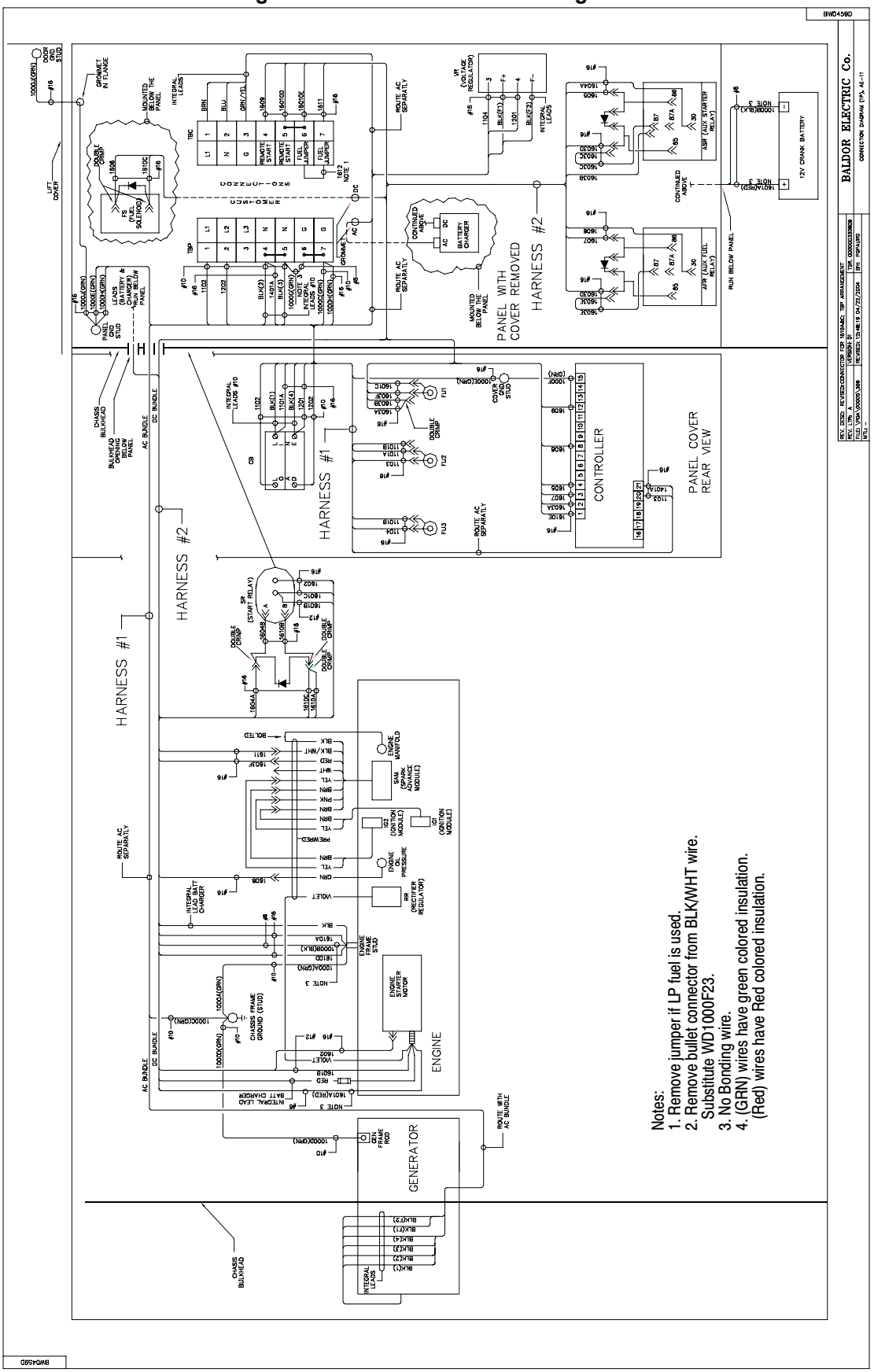
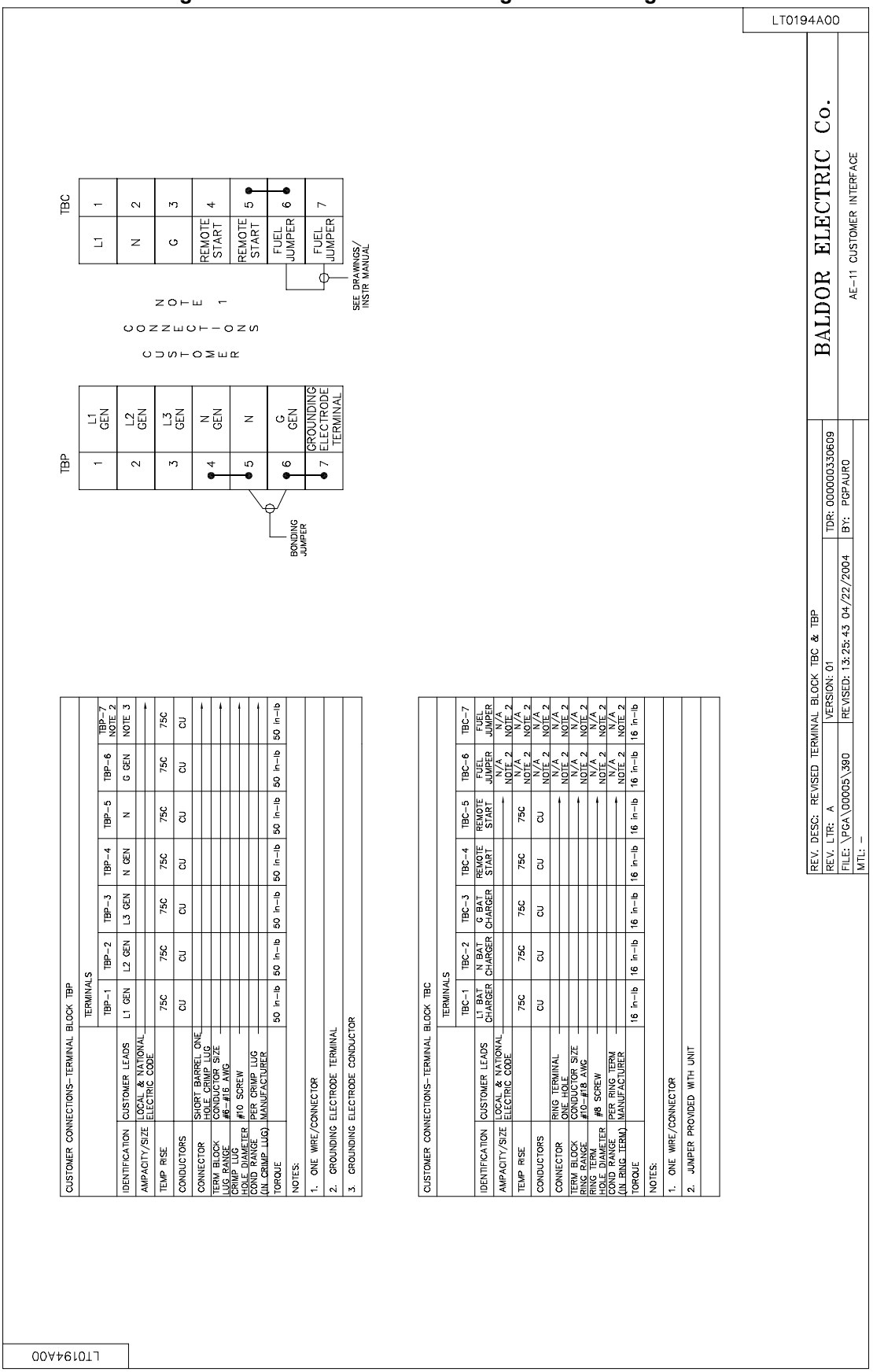


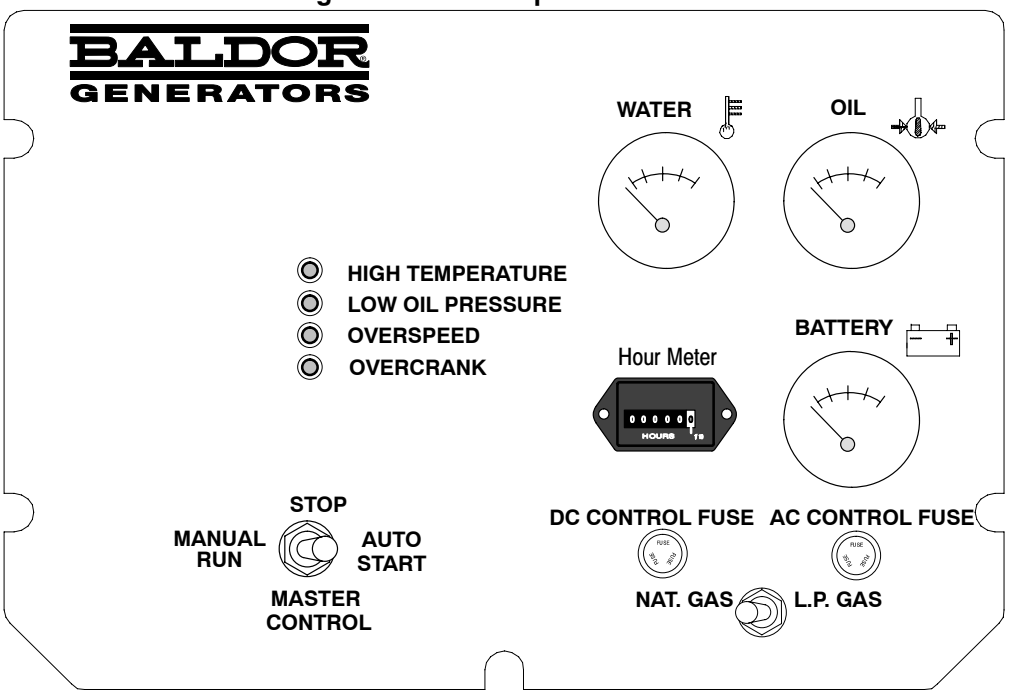
Figure C-11 AE11 Customer Wiring Interface Diagram



Information in this Appendix applies to the AE25 Generator.

Operator Panel Configuration

Figure D-1 AE25 Operator Panel



Display Lamps High Temperature – Indicates excessive engine coolant temperature.
Low Oil Pressure – Indicates low engine oil pressure.
Overspeed – Indicates engine speed is greater than preset limit.
Overcrank – Failure of the engine to start by the end of the crank period results in an "overcrank" shutdown and alarm indication.

Hour Meter Displays total hours of operation based on power applied to Fuel Solenoid).

Meters Water – Displays the temperature of the engine coolant.
Oil – Displays the engines oil pressure.
Battery – Displays the battery voltage of the starting battery.

DC Control Fuse Fuse for engine controller.

AC Control Fuse Fuse for engine controller.

Master Control Switch

Stop Stops the Engine and generator set.

Manual Run Immediately energizes the crank cycle to start the generator set and produce power.

Auto Start The engine can only be started by making a connection across the remote start terminals of the control box. This allows normal automatic backup operation of the Generator Set under control of the Transfer Switch whenever utility AC power is lost.

Natural/LP Gas Selector Switch

Selects the correct fuel source: Natural Gas or L.P. Gas.

Replacement Parts

Replacement parts assembly views for the Generator set are shown in Figure D-2 and D-3. Parts information is provided in Table D-1. Engine parts are identified in the engine manual that was provided with your generator set.

Figure D-2 Alternator Assembly

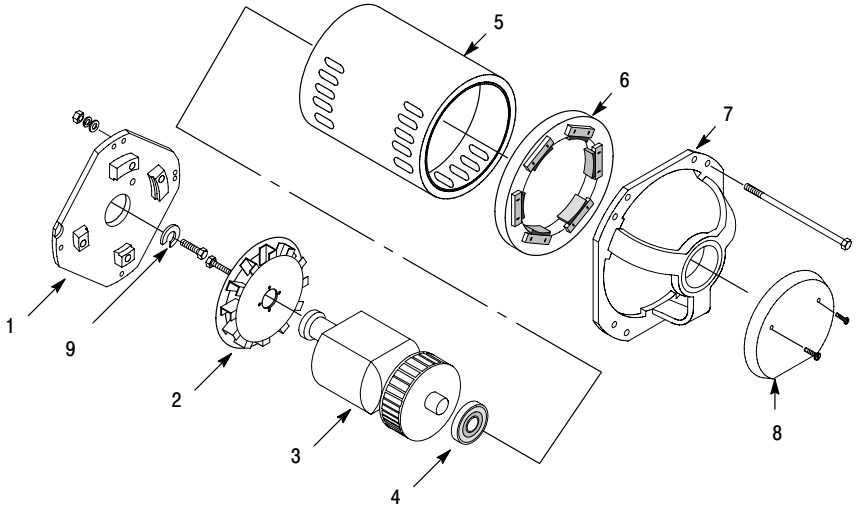


Figure D-3 Frame Assembly

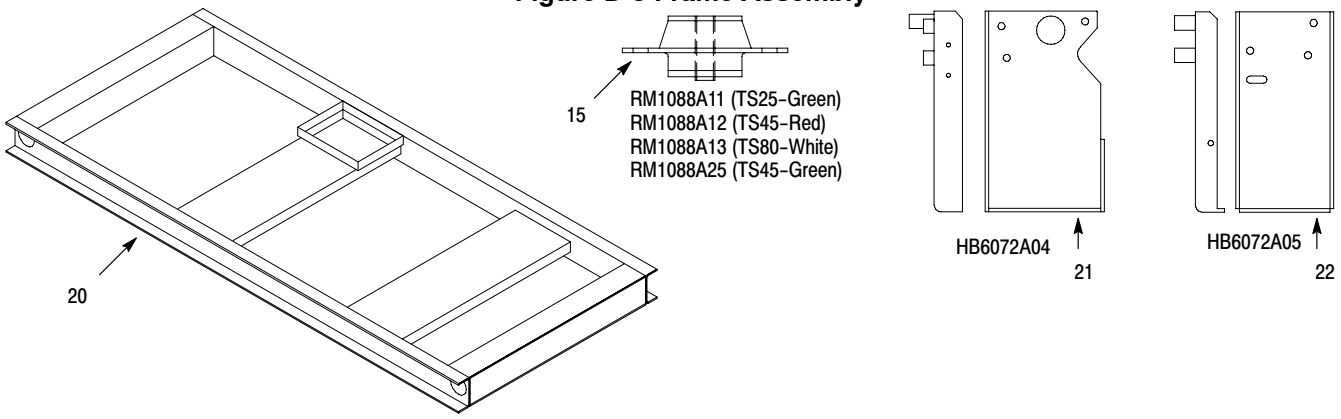


Table D-1 Generator Set Parts List

Ref No.	Part No.	Description
1	HB6179A00	Adaptor, Engine
2	62FN2000A02	Fan
3	62RA0025A00	Rotor Assembly
4	BG6207H03	Rotor Bearing
5	62SA0017A00	Stator Assembly
6	62EX5002A04	Exciter Assembly
7	62EP3200A02	Bearing Bracket
8	HB7023A00	Rotor End Plate
9	HA2444A02	Rotor Bolt (Rotor to Engine)
Not Shown	EM0027A01	Voltage Regulator, AVC63-2.0
15	RM1088A11	Isolator
20	BA0232A03	Base Frame
21	HB6072A04	Engine Mounting Foot, Right
22	HB6072A05	Engine Mounting Foot, Left

Table D-1 Generator Set Parts List Continued

Ref No.	Part No.	Description
Not Shown	EH0278A78	Enclosure, Top
Not Shown	EH0278B72	Enclosure, Door
Not Shown	EH0386A02	Enclosure, Front
Not Shown	EH0386A03	Enclosure, Rear
Not Shown	EA0006A08	Radiator
Not Shown	FN0027A00	Fan, Radiator Cooling
Not Shown	EA0005A08	Upper Radiator Hose
Not Shown	EA0005A38	Lower Radiator Hose
Not Shown	TA0000A07	Coolant Recovery Tank
Not Shown	TA0002A07	Cap, Coolant Recovery Tank
Not Shown	EA0044A07	Valve, Fumoto F-107-N
Not Shown	EA0044A00	Valve, Fumoto T-202N
Not Shown	EA0001A01	Sender, Water Temperature
Not Shown	EA0001A02	Sender, Oil Pressure
Not Shown	EA0007A05	Magnetic Pickup Assembly
Not Shown	EA0029A02	Fuel Actuator, Ford 2.5L
Not Shown	SE0052A00	Fuel Lock Solenoid
Not Shown	EA0000A02	Fuel Regulator
Not Shown	EA0015A08	Air FIlter
Not Shown	EA0029A03	Fuel Mixer, Ford 2.5L
Not Shown	EA0030A02	Diaphragm, Natural Gas
Not Shown	GS0091A00	Gasket, Throttle
Not Shown	GS0091A01	Gasket, Actuator to Mixer
Not Shown	BE0412A00	Control Box
Not Shown	EM0045A01	Engine Controller, Memory 09, 132 Tooth
Not Shown	EM0039A02	Controller LRG423 for Ford 2.5L
Not Shown	CK0070A59	Circuit Breaker, w/o shunt trip
Not Shown	RE5031A09	Relay, VF7-41F11
Not Shown	EA5034A02	Diode Kit with #10 & 1/4" Ring Terminals
Not Shown	HB6116A00	Battery Tie Down
Not Shown	HA3187A12	Battery Tie Down Bolt
Not Shown	EA0010A02	Battery Charger, 12VDC, 6AMP
Not Shown	SP9094	Switch, DPDT
Not Shown	SP9113	Switch, Nat. Gas/L.P. Gas
Not Shown	WD3203A00	Oil Pressure Gauge
Not Shown	WD3204A00	Water Temperature Gauge
Not Shown	WD3201A11	Volt Meter
Not Shown	WD3201A00	Elapsed Time Meter
Not Shown	FU066A07	Fuse, AGC15
Not Shown	FU066A00	Fuse, MTH-5
Not Shown	LB0094B19	Decal, Control Panel AE25
Not Shown	LB0100A22	Decal, Baldor Auto Emergency 20"
Not Shown	LB0100A02	Decal, Baldor Auto Emergency 12"
Not Shown	LB0100A03	Decal, Baldor Auto Emergency 39" (split)
Not Shown	LB0094A11	Decal, Danger-High Voltage
Not Shown	LB0094A30	Decal, Warning, Auto Start
Not Shown	LB0095A07	Placard, "Line"
Not Shown	LB0095A08	Placard, "Load"
Not Shown	LB0095A15	Placard, "Neutral"
Not Shown	LB0095A16	Placard, "L1"
Not Shown	LB0095A17	Placard, "L2"
Not Shown	LB0095A42	Placard, "Remote Start"
Not Shown	LB0095A51	Placard, "A.C. Connection"
Not Shown	LB0094A36	Decal, Danger Hot
Not Shown	LB0095A37	Placard, "Ground"

Wiring Diagrams Wiring diagrams for these generators are contained on the following pages of this appendix.

Figure D-4 AE25 Receptacle Connection Diagram

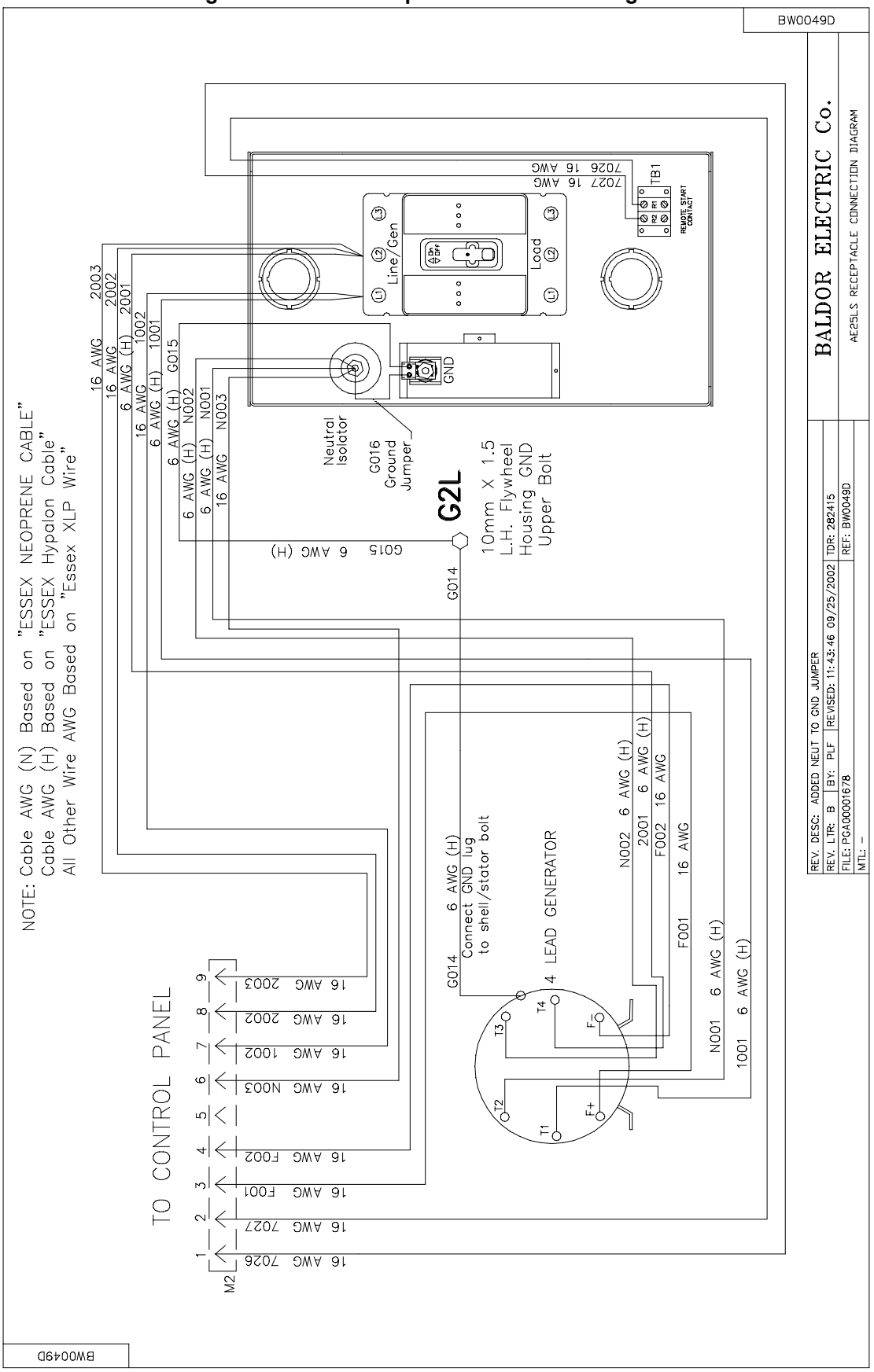


Figure D-5 AE25 Engine Compartment Connection Diagram

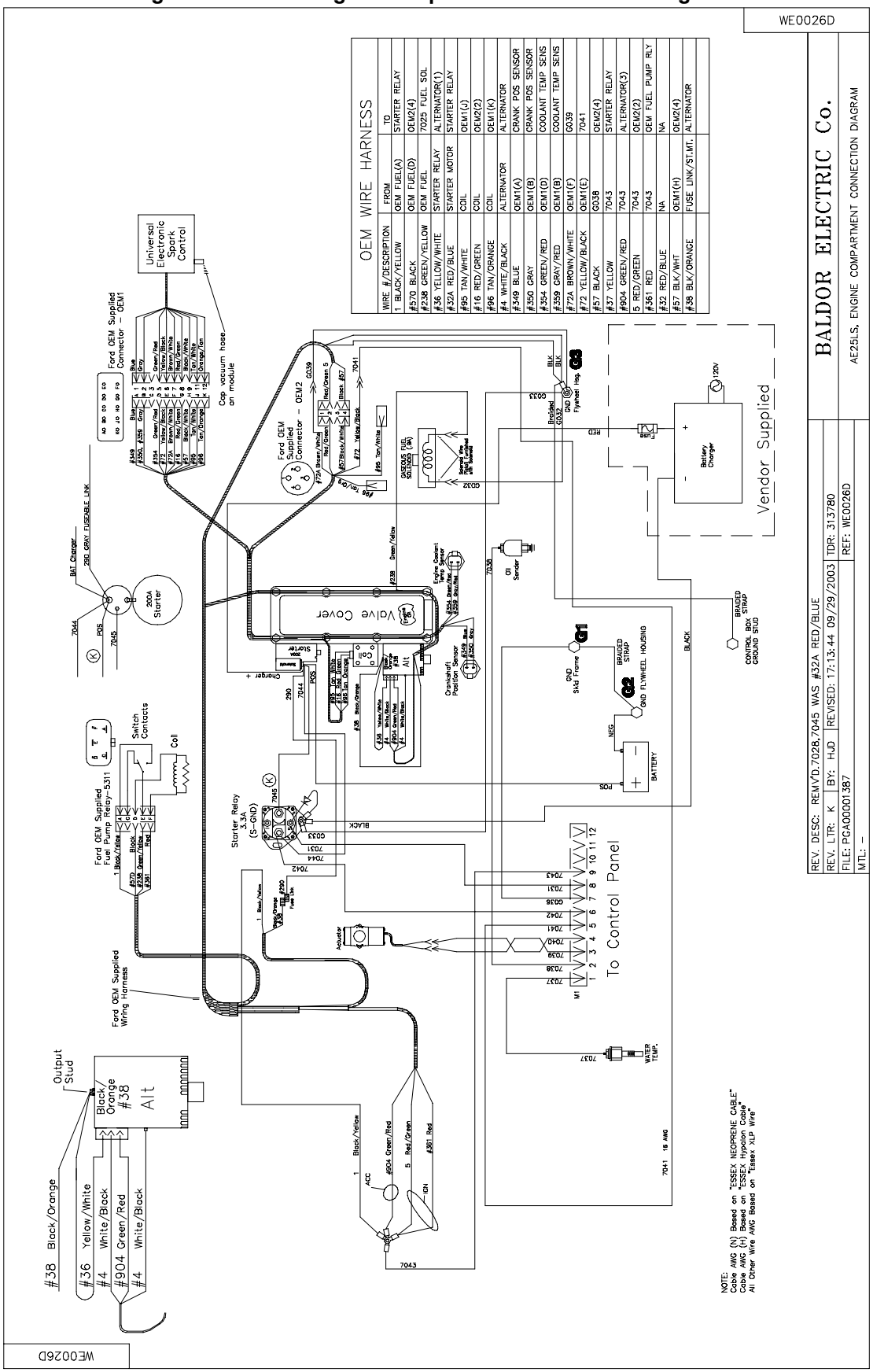
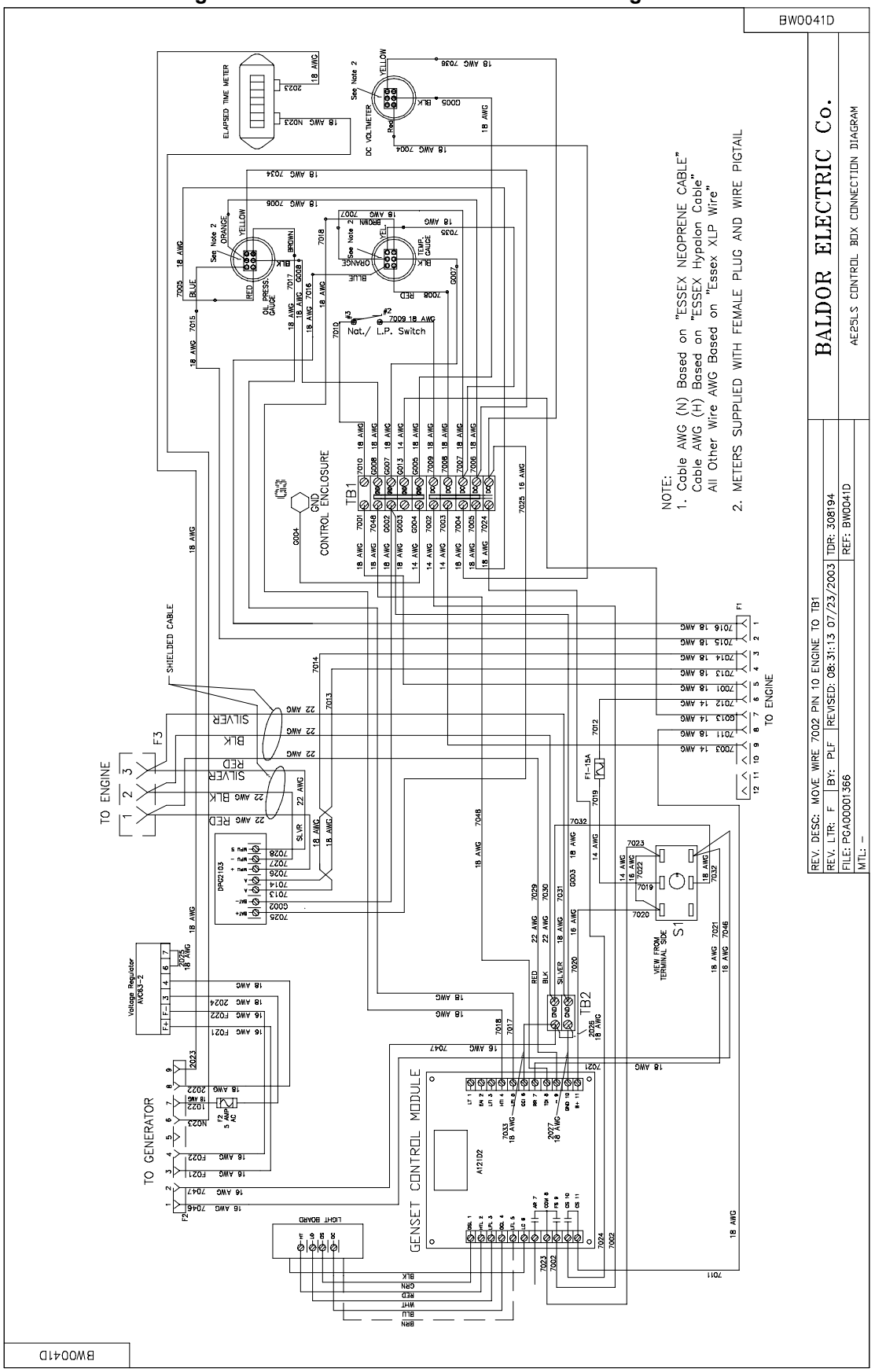


Figure D-6 AE25 Control Box Connection Diagram



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