

ENGINE DRIVEN GENERATOR SET OWNER'S MANUAL GASOLINE AND DIESEL

CONTRACTOR SERIES

LR30 THROUGH LR180 (WITH IDLER SYSTEMS)

DIESEL SERIES

LR50 THROUGH LR130 (NO IDLER SYSTEMS)

STANDARD DUTY SERIES

A25 THROUGH A60 SERIES (NO IDLER SYSTEMS)

LA50 THROUGH LA60 SERIES (NO IDLERS SYSTEMS)

LR70 THROUGH LR105 SERIES (NO IDLERS SYSTEMS)

THREE PHASE SERIES

LR50 THROUGH LR180 SERIES (GASOLINE AND DIESEL NO IDLER SYSTEMS)

LIQUID PROPANE(LP) AND NATURAL GAS(NG) SERIES

LR105 THROUGH LR150's SERIES

SAFE GEN SERIES


LR70 THROUGH LR150's SERIES


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Safety Precautions


Before operating the generator set, read the Owner's Manual and become familiar with it and your equipment. Safe and efficient operation can be achieved only if the equipment is properly operated and maintained. Many accidents are caused by failure to follow fundamental rules and precautions.

The following symbols found throughout this manual, alert you to potentially dangerous conditions to the operator, service personnel or the equipment.

 **DANGER** *This symbol warns of immediate hazards, which if not avoided, will result in severe personal injury or death.*

 **WARNING** *This symbol refers to a hazard or unsafe practice, which if not avoided, could result in severe personal injury or death.*

 **CAUTION** *This symbol refers to a hazard or unsafe practice, which if not avoided, might result in minor or moderate injury or product or property damage.*

 **DANGER** *The engine exhaust from this product contains chemicals known to the state of California to cause Cancer, Birth Defects or other reproductive harm.*

Fuels, electrical equipment batteries, exhaust gases and moving parts present potential hazards that could result in severe personal injury. Take care in following these recommended procedures.

FUELS AND FUMES ARE FLAMMABLE:

Fire, explosion and severe personal injury can result from improper practices. When transporting generator set, always close the fuel shut off valve located beneath the bottom of the fuel tank.

- DO NOT fill fuel tanks with the engine running. Fuel contact with the engine or exhaust is a potential fire hazard. Let the engine cool down before removing gas cap.
- DO NOT SMOKE OR ALLOW AN OPEN FLAME near the generator set or fuel tank.
- DO NOT store or transport the generator wet without first removing the fuel from the tank.
- DO NOT SMOKE while servicing batteries. Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.
- DO NOT mix lubricating oil with gasoline.
- When refueling always wait until the unit has cooled down before opening/removing the fuel cap.

EXHAUST GASES ARE DEADLY

- Engine exhaust contains CARBON MONOXIDE, a dangerous, invisible gas that you cannot smell that is potentially lethal. Avoid carbon monoxide inhalation by operating the generator set outdoors where exhaust gases can be discharged directly into the open air. Use a battery-powered carbon monoxide detector when running generator.
- Do not operate the generator set in any type of enclosure that could allow exhaust gases to accumulate such as inside garages, crawl spaces or inside vehicles of any type. Using a fan and opening doors or windows does NOT provide enough fresh air. Direct exhaust gas away from areas where people are gathered and away from building or enclosures. If you start to feel sick, dizzy or weak while using generator, shut it off and get fresh air immediately. See a doctor. You may have carbon monoxide poisoning.
- Do not operate the generator set in an enclosed compartment such as found in recreational vehicles or enclosed trucks (even with the tail gate open). All warranties are voided if the unit is operated in an enclosed area. Operate only in well-ventilated area.

MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Before performing any maintenance on the generator set, disconnect the spark plug wire (and the starting battery negative cable on electric start models) to prevent accidental starting.
- Keep hands away from moving parts
- Do not wear loose clothing or jewelry while servicing any part of the generator set. Loose clothing and jewelry can become caught in moving parts. Jewelry can short out electrical contacts and cause shock or burning.
- Make sure that fasteners on the generator set are secure. Tighten supports and clamps, keep guards in position over fans, drive belts and heat shields, etc.
- If adjustment must be made while the generator set is running, use extreme caution around hot manifolds and moving parts, etc.

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Disconnect starting battery before removing protective shields or touching electrical equipment. Use rubber insulated mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear wet damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling electrical equipment.
- Use extreme caution when working on electrical components. High voltages can cause injury or death. DO NOT tamper with interlocks.
- Follow all applicable state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician. Tag open switches to avoid accidental closure.
- DO NOT CONNECT GENERATOR SET DIRECTLY TO ANY BUILDING ELECTRICAL SYSTEM. Hazardous voltages can flow from the generator set into the utility line. This creates a potential for electrocution or property damage. Connect only through an approved device and after building main switch is open. The National Electrical Code and Canadian Standards Association require an approved switch device between the generator set and the utility power. Consult a licensed electrician in regard to emergency power use.
- DO NOT use the generator set in rain, snow, sleet or wet ground conditions.

GENERAL SAFETY PRECAUTIONS

- Have a fire extinguisher nearby. Maintain extinguisher properly and become familiar with its use. Extinguisher rated ABC by the NFPA is appropriate for all applications. Consult the local fire department for the correct type of extinguisher for various applications.
- Benzene and lead, found in some gasoline, have been identified by some state and federal agencies as causing cancer or reproductive toxicity. When checking, draining or adding gasoline, take care not to ingest, breathe the fumes, or contact gasoline.
- Used engine oils have been identified by some state or federal agencies as causing cancer or reproductive toxicity. When checking or changing engine oil, take care not to ingest, breathe the fumes or contact used oil.
- Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and engine damage and present a potential fire hazard.
- DO NOT store anything on the generator set such as oil-cans, oily rags, chains, wooden blocks etc. A fire could result or operation could be adversely affected. Keep the generator set clean and dry at all times.
- DO NOT work on this equipment when mentally or physically fatigued, or after consuming alcohol or any drugs.
- Never remove radiator cap or radiator reservoir cap while engine is hot or running. Severe burns or injury can occur by escaping steam or hot engine coolant.

PRESTART OPERATION

Before starting the engine, read the engine manual for the proper type oil type and volume and fuel type.

FUEL AND FILLING FUEL

On all gasoline powered models use unleaded gasoline of at least 87 octane rating. On all diesel powered units fill with diesel fuel No2 (DF2) in normal ambient temperatures or NO1 (DF1) in cold weather. JP5 or JP8 turbine fuel may be used on diesel powered units only with slight engine de-ratings. The fuel shut off valve is located on the bottom of the fuel tank. Be sure that the valve is turned counter clockwise (the open position) to permit the flow of fuel from the tank.

OIL FILLING INSTRUCTIONS

Fill the oil sump or to the full mark on the dipstick (if applicable). (Figure 1) Pour slowly to avoid air bubbles. To avoid engine damage always check for full oil level before starting engine. Crankcase pressure can blow hot engine oil out the fill tube causing severe burns, always stop the engine before removing the oil cap. Do not overfill the oil level on 13, 16, 18, 20, 23, 25 and 31 HP gasoline engines and all diesel engines, as damage will occur. Engine damage due to low oil level is NOT covered by the engine manufacturer's warranty. For gasoline engine refill with API Class SG or SH oil (also SG/CD, SG/CE, SH/CD or SH/CE) having an SAE viscosity grade appropriate for the temperatures as indicated below. For diesel engines, see the engine manual for the proper oil selection.

OIL VISCOSITY VS. TEMPERATURE

EXPECTED AMBIENT TEMPERATURES	SAE Viscosity Grade
32° F (0° C) and Higher	30
10° F to 100° F -12° C to 38° C	15W-40
0° F to 80° F -18° C to 27° C	10W-30
	10W-40
-20° F to 50° F -28° C to 10° C	5-W30

OIL FILLING FOR DIESELS

Fill the oil sump with lubricating oil with 15W30 multigrade for warm weather and 5W30 for cold weather. Oil capacity for the LR50/60EL models with the 15LD400 engine is 1.26 quarts and for the LR130EL with the 25LD425 engine is 1.9 quarts (without filter). Check the dipstick each time fuel is added to maintain the proper levels of lubricating oil. IMPORTANT Do not overfill with oil or damage will occur to the engine. Maintain the oil level within the minimum/maximum lines of the dipstick. Engines overfilled MUST be drained until the oil level is at the above noted levels.

LOW OIL SHUT DOWN

All contractor diesel welder/generators and three phase and some medium duty units are equipped with either low oil volume or low oil pressure shut down systems. Insufficient oil volume or pressure will cause the engine to stop. See engine manual for complete details.

BREAK IN PROCEDURE

Controlled break in with the proper grade of lubricating oil helps to ensure satisfactory service from the generator set. During the first 2-3 hours of operation, do not apply heavy electrical loads to the generator. Oil should be changed after the first 3 hours of operation. The oil changes should then be scheduled at the recommended times shown in the engine manual. Two cylinder air cooled diesel powered units MUST be run with at least 25% load at all times or damage to the engine may occur. Oil should be drained when the engine is still slightly warm.

For units operating on liquid propane L/P or natural gas N/G, see addendum instruction sheets for proper installation and operation.

BREAK IN & CONTINUOUS OPERATION/LOAD

APPLICATION FOR DIESELS ONLY

After the engine operates properly, it is strongly recommended to ALWAYS have an electrical load of at LEAST 25% of the nameplate rating on the generator when operating the unit. Operating the engine without an electrical load for prolonged periods of time (one hour or more) will eventually cause damage to the diesel engine (sometimes called wet stacking which is NOT covered by the engine manufacturer's warranty) or damage to the rings, fuel oil entering the lubricating oil and excessive vibration. Breaking in the diesel engine can require 5 to 10 hours of operation. It is extremely important to have electrical loads of at least 25% to 50% of the rated capacity of the generator's nameplate rating to have the valves properly seat. Be sure to change the oil and oil filter after several hours of initial operation. All oil and fuel filters should be changed every 250 hours of operation and air filters as often as necessary depending on the environment. Dirty filters WILL cause erratic operation, dark exhaust fumes and erratic voltage from the generator. Consult the engine owner's manual for complete engine operation. If the diesel engine does not stop when the start/stop switch is turned off, the oil in the engine sump has been over filled and the engine is using over pressurized sump oil as fuel. To stop the engine with this condition you must block the air intake flow which will stop the engine. Eventually the engine will consume the excess sump oil and stop on it's own but this could take some time. If this situation has occurred, you must check the air filter as pressurized oil has gone through the engine breather and saturated the air filter. The air filter MUST be replaced before restarting the engine.



CAUTION

This generator set should only be operated by a responsible adult.

To start the engine:

1. Disconnect all loads to start the engine.
2. Fully open the fuel valve if the engine is so equipped. The valve is located under the unit-mounted fuel tank of the engine or under the fuel tank on all LR units.
3. Adjust the carburetor choke as necessary for temperature conditions. Cold starting requires a full choke. L/P and N/G fueled engines do not require a choke. There is no choke on all diesel powered generator sets.
4. The engine may be equipped with a rope recoil starter or electric starter. Start the engine by referring to the paragraph in the engine manual for the applicable starter.

STARTING ELECTRIC START DIESELS WITHOUT A BATTERY

The models LR50EL and LR60EL are electric start models with auxiliary recoil starters. If a battery is not available, the red or black lever near the fuel pump MUST be in the up position to start and to stop the engine turn the red or black lever to the down position. Without a battery, the key start/stop switch will NOT stop the engine and you MUST use the red or black lever. When using the electric start switch to start and stop the engine and a 12 volt battery is installed, the red or black lever MUST be in the down position at all times.

INITIAL STARTING OR UNIT RUN OUT OF FUEL ON DIESELS ONLY

Air pockets in the fuel line will cause difficulty in engine starting and normal operation when fueling the unit for the first time or the unit is run out of fuel. It is strongly recommended to manually pump the pump lever 20 plus times before starting to release the air pockets. Models LR50EL and LR60EL have clear fuel filters and air pockets can be visually observed. Even one air bubble will cause erratic engine operation. ALL air pockets must be pumped out to operate properly. The model LR130EL has a solid metal fuel filter and air pockets cannot be observed in this model. Always avoid running a diesel out of fuel or near the bottom of the fuel tank as air pockets may be induced causing erratic operation of the engine. Once all diesels have been initially started and the engine runs smoothly, there is no need to bleed out air pockets in future starting of the unit.

DUST, DIRT, RAIN AND SNOW

Operating the generator set in extreme dusty or dirty conditions will seriously affect the life of the engine.

Keep the unit clean and do not allow snow, rain, dust or dirt to accumulate on the unit. Remove all oil deposits and accumulated dirt. When operating the unit, protect it from the elements. Do not use this product in rain, snow or wet locations.

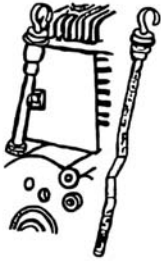
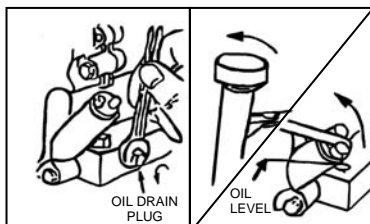
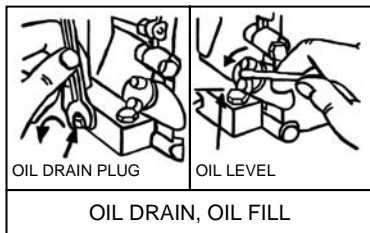


FIGURE 1 11HP 20HP TWIN
16HP TWIN 23HP TWIN
18HP TWIN 31HP TWIN



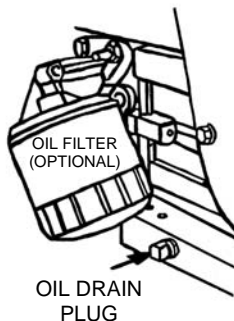
5HP



5HP

8,11 &13HP

OIL DRAIN, OIL FILL



16HP, 18HP, 20HP
23HP, 25HP, 31HP

WET CONDITIONS



DANGER Use extreme care to avoid a lethal shock hazard if this unit is operating outdoors during periods of visible moisture (rain or snow) or near standing water. Service the air cleaner at least every 25 to 30 hours if operating in extremely dusty or dirty conditions. Change the oil in the crankcase at least every 50 hours of operations (see engine manual for more details).



DANGER **MUFFLER** The muffler on this generator is only designed for outdoor portable applications. Do not operate indoors under any conditions. Never operate a generator set with a worn or defective muffler or exhaust manifold. A defective muffler and manifold must be replaced. Never operate the generator set without a muffler. Do not touch the muffler when hot or severe burns will occur. Do not extend exhaust lines or use other than the engine manufacturers recommended muffler.

SPARK ARRESTER REQUIREMENTS

Some generator sets have either internal or external spark arresters. Some units are not equipped with spark arresters.



WARNING If the generator set is used in a National Park, any forest covered land, grass covered land, or the state of California, a spark arrester **MUST** be installed and in working order to comply with California Section 4442 and 4443. A USDA Forestry Department approved spark arrester kit is offered as optional by the engine manufacturer. When installed, the spark arrester must be firmly attached to the muffler and the screen must be kept clean and unplugged for proper operation. Contact your local engine manufacturer's distributor for more information. Engine company distributors are listed in the yellow pages under engines gasoline or gasoline engines. Even with the spark arrester installed, extreme care must still be used if the engine is operated in an area of dry forest covered brush or dry grass, which could catch fire from the engine heat or an accidental spark.



WARNING Avoid touching hot engine parts and rotating or moving parts of the unit. All fan guards and protective covers must be kept in place. Loose jackets, neckties, shirtsleeve etc should not be worn while starting or operating this generator because of the danger of being caught in moving parts. Hot engine parts and mufflers/manifolds can cause severe burns.



DANGER **UNIT GROUNDING** All generator sets must be externally grounded. All generator sets are grounded internally to an external ground on the frame. OSHA, the National Electrical Code and most state and local codes require an additional external ground rod pounded into the soil and securely connected to the external ground on the generator set. Only three or four prong plugs must be used with each receptacle on the unit. Use only 3 prong extension cords. It is recommended to use #10 copper stranded wire from the generator to the external ground rod. The ground rod and wire are not provided with the generator set.

GENERAL OPERATION MANUAL RECOIL START MODELS

1. With the choke engaged, grasp the starter and pull out the cord rapidly.
2. Repeat if necessary with the choke slightly opened. Do not pull the recoil starter out too far or let it snap back or damage to the recoil starter may occur. When the engine starts, close the choke.

ELECTRIC START MODELS

On all gasoline engines, engage the choke and turn the key until the engine starts. Close the choke once the engine starts. Diesel powered and LP/NG units do not have chokes. Do not keep cranking the engine for more than 15 seconds at a time if the engine does not start. All electric start models have a charging circuit for the battery.

BATTERY

The customer must supply the starting battery. Battery cables and a battery tray are installed on the generator set. All batteries must be 12 volts DC. For all gasoline models through and including LR150's a type U1 300 cold cranking amps battery is required (5.0" max width). For the model series LR180 and all diesel models a type 24BCI, 26BCI or 34/78 12 volt DC battery of at least 400 or more cold cranking amps is required (6 7/8" max width).



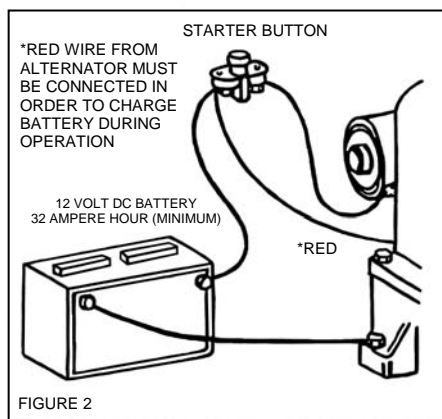
WARNING Use extreme care not to tilt the generator set with the battery installed. Tipping could cause severe eye damage and skin burns.

⚠ DANGER

When connecting battery cables, the negative (green) cable must not be connected and should not be touching anything. First connect the positive (red) cable and then connect the negative (green). When disconnecting battery cables, first disconnect the negative (green) cable making sure it is not touching anything and then disconnect the positive (red) cable.

⚠ DANGER

Battery installation and service – Be sure battery connections are of the correct polarity. All electric start units use negative ground. The Red cable is positive and the green cable is negative. Battery acid will cause severe eye damage and skin burns. Safety glasses, gloves and an apron must be worn when servicing lead acid batteries. Flush immediately with water and call a physician if contact with battery acid occurs. When connecting or disconnecting battery cables, the engine must not be running or cranking. Batteries give off an explosive gas when being charged. A spark or open flame could result in an explosion. The charging circuit is operational during engine cranking and running. The charging circuit is not designed to recharge a dead battery but only maintain the charge in the battery. Provisions must be made to keep the battery fully charged if the generator will not be frequently run as in a permanent installation or if the battery is to be stored for a long period of time or if it is located in an unheated room to prevent the battery from freezing. If a trickle charger is going to be used during periods of no generator operation, be sure to disconnect the trickle charger before starting the generator set. Check the battery cells with a hydrometer. The specific gravity reading should be approximately 1.280 at 80 degrees F. If one or more cells are low on water, add distilled water, not electrolyte and recharge. Do not use hydrant or well water. Keep the battery case clean and dry. An accumulation of moisture will lead to more rapid discharge and battery failure. Keep the battery terminals clean and tight. After making connections, coat the terminals with a light application of petroleum jelly or grease to retard corrosion. Accidental ground out of the battery terminal by tools, gasoline cans or when installing or removing battery cables could cause a spark, which might result in a battery gas explosion or fire. An open flame or lit cigarette will have the same effect. Battery terminals and connections must be tight. When installing the battery cables, always connect the negative cable last. When disconnecting the battery cables, always disconnect the negative cable first. (Figure 2)



Proper storage and care is necessary to insure proper engine starting. Never allow the battery to remain discharged.

STOPPING THE ENGINE

For all models gradually remove the load from the generator. To stop the engine, turn off the key or switch off until the engine comes to a complete stop. On all diesel models you must keep pressure on the stop lever until the engine comes to a complete stop.

APPLYING ELECTRIC LOADS

Allow the engine to reach normal operating temperature (2 – 3 minutes) before connecting any load to the generator. Connect the load by inserting the plugs into the proper receptacles. The load should be applied gradually. If the load consists of large electric motors, they should be individually started with the largest motor first. Smaller loads can then be applied.

⚠ CAUTION

Keep generator load within the receptacle and generator nameplate rating. Overloading may shorten generator life and could cause internal generator damage. Do not exceed the receptacle ampere rating. The complete ratings of the generator can be found on the nameplate of the generator. The total output ampere rating on the generator nameplate refers to the highest voltage the unit is equipped to produce. On 120/240 volt units, this would be 240 volts. To determine the 120 volt amperage rating double the amperage provided in the nameplate. The nameplate ampere rating on load items to be powered by this generator can be misleading if they are large power tools or electric motors. These items will require 2-3 times the ampere rating shown on their nameplates to get them started. Do not increase engine speed to get more output from the generator. Engines operate at 3600 RPM (for 60 hertz) and 3000 RPM (for 50 hertz). Racing the engine could cause damage to the generator with excessive voltage and damage to items being powered.

⚠ CAUTION

Disconnecting the load

The generator set is inherently self-regulating and its output automatically adjusts to the load. The generator will not be damaged if it is operated at no load condition except air-cooled diesel powered units. The engine governor will compensate for load variations. It is desirable to gradually reduce the load if possible. Voltage sensitive items such as TV's, computers, amplifiers, etc should be removed first.

⚠ CAUTION

RECEPTACLE UTILIZATION

Do not exceed the amperage rating on the outlet receptacles. This will cause receptacles burnouts and could cause internal damage to the generator. The operator must realize that this generator is not an unlimited source of power and heed generator and receptacles ratings. The nameplate ratings can be obtained through a combination of the receptacles or a single receptacle if the generator and/or the receptacle ampere rating is not exceeded. Some 125 volt plugs on items to be powered from the generator must be of the 3 prong grounded type. Only 3 wire extension cords and 3 wire or double insulated power tools should be used with the generator. Do not overload the generator. Some straight blade 125 volt receptacles are ground fault circuit interrupter protected. Twist lock receptacles are not ground fault circuit interrupter equipped. Consult the National Electrical Code, Underwriters Laboratories and/or the Canadian Standards Association Code for ground fault protection requirements for temporary installations or usage.

FULL POWER SWITCH (LR50/55/60 MODELS)

Always place the full power toggle switch on the control panel in the up (120 volt) position when only using 120 volt devices to obtain the full power of the generator. When the full power switch is in the up position (marked 120 volts), the generator windings are connected in a parallel mode making all of the output of the generator 120 volts and the 240 volt receptacle is not functional. If 240 volts is required, place the switch in the down position (120 and 240 volts). The 240 volt receptacle now has the full power of the generator. Each 120 volt receptacle has only ½ of the normal power. It is recommended to remove all electrical loads before changing the switch to either position. The position of the switch affects the reading of the voltmeter. In the up position the volt-meter will read 120 volts and in the down position the meter will read 240 volts.

⚠ DANGER

GENERATOR VENTILATION OPERATION

Adequate ventilation must be provided for safe efficient operation. The exhaust products of the engine contains invisible carbon monoxide which is poisonous and can cause death. Operate only outdoors and NEVER indoors. Operation in small compartments will cause the engine to over heat, generator windings will over heat and all warranties are voided. Mounting the generator in an enclosed compartment such as an RV or in the back end of a truck is prohibited and can cause death and damage to the equipment.

HIGH TEMPERATURE OPERATION

Be sure airflow to and from generator is not obstructed. Keep the generator as free from dirt as possible. Engine housing must be properly installed and undamaged.

LOW TEMPERATURE OPERATION

To aid in cold weather starting, use the correct SAE oil. Use only fresh unleaded gasoline. Diesel engine use No2 diesel in normal weather and No1 in cold weather. If possible, keep the generator set in a warm location until needed and they move the unit outside and immediately start the engine.

IDLER OPERATION

All LR Contractor units feature an easy idle that slows the engine speed down when there is no electrical load on the generator. Diesel powered units, medium duty A, LA and LR units and three phase units do not have a low idling system. The generator set should be started with the idler switch in the off position. After the engine has warmed up (2-3 minutes), turn the idler switch to the on position. The engine speed will decrease if there is no load on the generator. On some models there is a time delay of about 10 to 12 seconds before the engine will idle down. When an electrical load is applied, the engine speed will automatically return to normal operation and produce the rated voltage. A battery **MUST** be connected to the engine for the idler to work on all 7000, 8000, 10000, 12000, 15000 and 18000 watt models.



CAUTION

OPERATING SAFE GENS

Start the engine and verify that the volt meter reads 240 volts. The ground fault sensing module on the control panel should have a green light illuminated. All receptacles 120 and 240 volts will be operating. If a ground fault occurs on any receptacles, a red light will be illuminated on the ground fault sensing module and the main circuit breaker will trip showing a red switch with all the power to all receptacles cut off. To correct the ground fault, with the engine running, remove all loads to all receptacles, push reset on the ground fault sensing module and push the main circuit breaker to ON (red should not be showing on the main circuit breaker). If the ground fault continues with no load on the generator, consult an authorized service station. If the ground fault occurs again with a load plugged into any receptacle, disconnect the load, reset the ground fault sensing module and the main circuit breaker and try a different load into any receptacle. With this other load and no ground fault occurring the ground fault is in the original extension cord or load and must be corrected or replaced before using this generator set.

It is recommended to regularly, at least once a month, start the engine, press test on the ground fault sensing module and then press reset and push the main circuit breaker to ON.

LP AND NG OPERATION



CAUTION

Liquid propane(LP) and natural gas(NG)operation **OUTDOOR OPERATION**

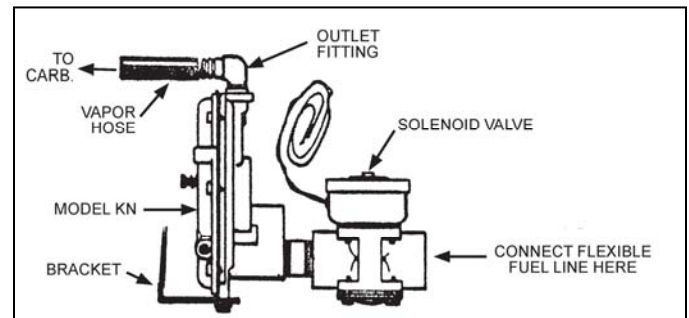
ONLY, all installations must be done by a qualified electrician or contractor and **MUST** comply with all national and local codes, standards and regulations. This is not a do it yourself project! All units have a special vapor fuel carburetor for LP or NG operation with a vacuum safety shut down and an electric solenoid fuel shut down. All incoming fuel supplies, both LP and NG must have a primary fuel regulator with output of 11 inches of water column pressure. The regulator on the generator is a secondary regulator. Fuel pressures too high or too low will cause problems with the generator set. There must be a manual fuel shut off valve within sight of the generator set. The flexible fuel line included with the generator set **MUST** be used as vibration occurs and will cause solid fuel pipe connections to break if the flexible fuel line is not used. The incoming fuel line is recommended to be 1.0 inches. The actual fuel connections on the generator set are 3/4" NPT. Do not have the incoming fuel line near the engine muffler or manifold for safety.

After all fuel line connections have been made but before the flexible fuel connection is connected to the hard fuel pipe connections, ventilate the area, be sure there are no open flames, no smoking, no pilot lights and turn on the fuel line for about 5 to 10 seconds to blow out any pipe tape or pipe dope out of the lines. Be sure to wear protective glasses. This will prevent dirt from entering the fuel regulator on the generator set. Do not remove the cover from the solenoid valve until you are ready to make pipe connections.

The mounting of the LP and NG generators are identical to the gasoline units.

There is no need to use a choke to start either the LP or NG units. **DO NOT** adjust the KN regulator as it has been preset. Be sure to check all connections for leaks with soap and water and stop any leaks. All LP and NG units are derated as the LP or NG fuel reduces engine out put slightly versus gasoline.

Operate only in well ventilated area. LP gas is heavier than air and may settle in low places. Avoid cutting or welding near fuel lines or tanks. When servicing shut off all fuel lines, eliminate all possible outside sources of ignition and utilize qualified LP and or NG personnel. See connection drawing for the location for the flexible fuel line.



CAUTION

INSTALLATION

Indoor installations are prohibited. The generator does not have output capacity to power your entire home. Most home utility commercial electric service is in excess of 100 amps at 240 volts, which is in excess of the generator set. Because of this, only key items can be powered during a utility power outage up to the ampere rating of the generator. Installing and wiring a stand by generator is **NOT** a do it yourself project. Consult a licensed electrician or electrical contractor.

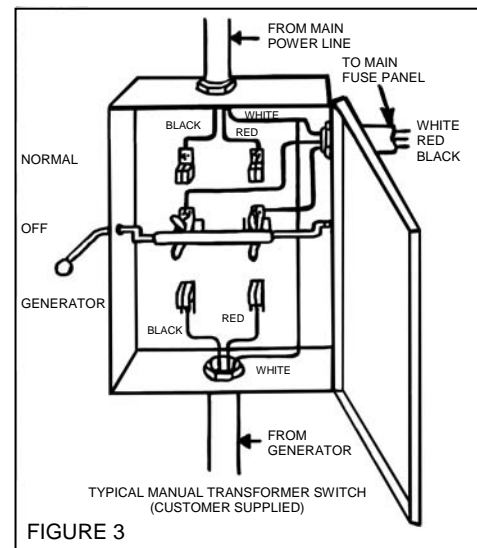


FIGURE 3

GENERATOR AND UTILITY POWER ISOLATION METHODS



DANGER

If utilizing existing home circuits to power the emergency load provide a positive means of insuring that the commercial power and portable generator is never fed to the load at the same time. Never connect the generator output to any live home electric circuit(s). The usual means of providing this isolation is to incorporate a suitably rated double pole double throw manual transfer switch UL listed. Figure 3 The National Electrical Code, the state of California, most state and local codes and Canadian Hydro requires an isolation switch between the generator and the utility line. A potential hazard exists during a power outage if the generator output is connected to the dead home circuits and no means is provided to isolate the home circuits from the commercial

utility power source. Repair personnel working to restore service to normal will open a switch between the main power supply and the location they are working. The repairman has every reason to believe that the line he is working on is electrically dead. If the home circuits are not isolated, the generator output will back feed through the home circuit up to the utility line and the repairman will be electrocuted when he attempts repairs. If normal power and the generator are not isolated and the normal power is suddenly restored while the generator is operating, severe damage to the generator will occur and possibly damage and or a fire to the home.

INFREQUENT SERVICE

If the generator set is used infrequently, extended shut down periods can result in difficult engine starting. If let to stand in the engine for a long time (over 6 months) gasoline will tend to form a varnish like substance which will clog up to the fuel system and the carburetor. The result will be a hard start engine. Check with your local engine manufacturer dealer for their recommendation of a gasoline additive to prevent varnish formation. To eliminate hard starting, run the generator at least 10 minutes every 4 to 6 weeks. This will insure that the engine seals will not dry out and cause oil leaks and compression problems. The use of a fuel additive such as Sta-Bil or any other equivalent will minimize the formation of gum deposits. Capacitors tend to slowly discharge over prolonged periods of time. See the web site www.voltmaster.com for flashing capacitors.

OUT OF SERVICE PROTECTION

If the generator set will be out of service for 6 months or longer, the following is recommended:

- Run the unit until it reaches normal operating temperature (about 10 minutes) and shut it down
- Drain the fuel from the carburetor bowl
- Drain the oil from the engine base while the engine is still warm. Fill with fresh oil.
- Remove the spark plug(s), pour 1 oz of engine oil into the cylinder(s), crank the engine slowly and replace the spark plug(s) but do not tighten
- Service the air cleaner
- Plug the exhaust outlet to prevent moisture, bugs and dirt.
- Clean off dirt and grease
- Put a cover over the unit and store avoiding extreme heat or cold.
- Before restarting, remove protective cover, remove spark plug(s), crank the engine slowly, replace the spark plug(s) and tighten them.

WATTAGE REQUIREMENTS

When determining the generator load, it is critical for you to decide what equipment and or appliances you want to run at the same time. The following steps will help you determine what size load this generator can power. Electric motors present a special problem when figuring the proper generator size.

- Make 2 lists, one of the electric motors and the other of all lights, small appliances etc that must be powered by the generator. For stand by emergency service you should include only essential equipment (refrigerator, sump pump, water pump, heat) that must be kept in service.
- Enter the watts required to operate each item (except motors). This wattage can usually be found on the appliance nameplate. If the wattage is not listed, you can determine the wattage by multiplying the voltage times the amperage, which equals wattage for single-phase equipment.
- Electric motors usually require 3 – 4 times nameplate rating to start (locked rotor current). For example, if the electric motor nameplate states 10 amps at 120 volts the $10 \text{ A} \times 120 \text{ V} = 1200$ running watts. This would mean that you would need about 30 amps on one 120 volt circuit to start this motor. Electric motors will require different starting amps depending on the application. $\text{VOLTS} \times \text{AMPS} = \text{WATTS}$
- Air compressors, circular saws, $\frac{1}{2}$ " drills, submersible pumps, well pumps, inverters, air conditioners, hot air roof welders etc require very heavy electric motor starting amperage. These devices require at least 3 times nameplate ratings or more to start. Some motors such as hair dryers, food mixers, etc require very little above the nameplate ratings to start.

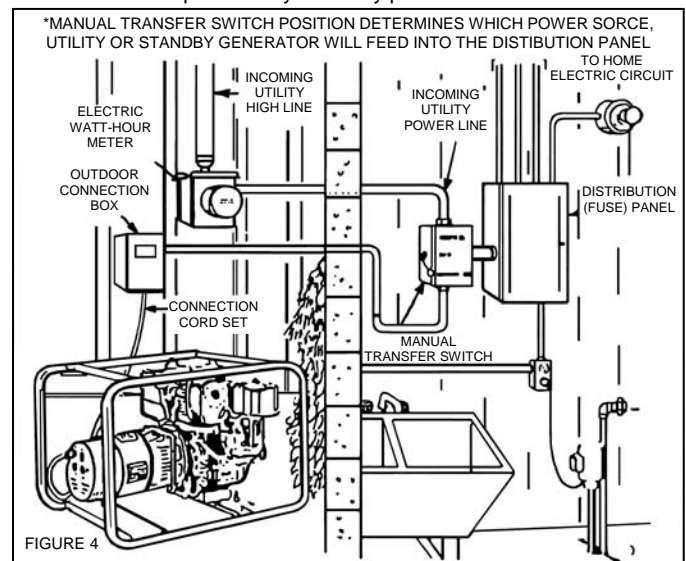
- Add the watts required for starting electric motors with the watts required for all other loads and you now know the size generator you need to operate your loads. Always start the largest size motor first and then the next smallest.

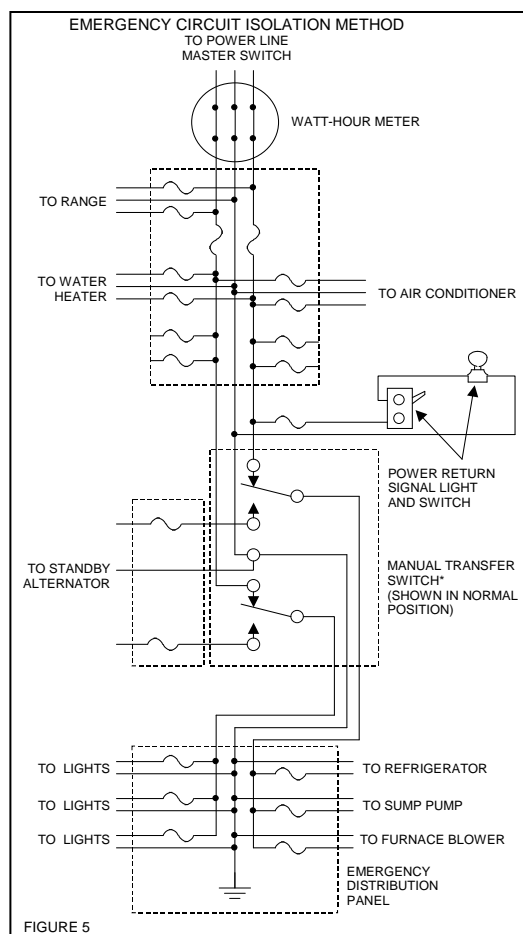
SUGGESTED HOME STANDBY INSTALLATION

A typical installation with an outdoor connection box, cord set and manual transfer switch is shown in figure 4. The installation of the outdoor connection box and manual transfer switch must be performed by a licensed electrician or contractor. Store the generator in a warm and dry location. During a utility power failure, carry the generator outdoors to a flat, dry location such as a driveway or walk way. Use a connection box and cord set as shown to connect your 240 volts from the generator to the home. Turn off the lights and appliances that were on before the utility failure. This prevents a possible overloading of the generator. Start the engine, wait 2-3 minutes for the engine to warm up and then throw the manual transfer switch to the generator position. You may then apply various electrical loads being careful not to exceed the capacity of the generator. When the utility power is restored, throw the manual transfer switch to the normal position. Your home circuits are now being powered by the utility. Disconnect the cord set from the generator and shut the generator down. Service the engine as required.

EMERGENCY CIRCUIT ISOLATION METHOD

- One method is to have the emergency circuits (important items to be powered in a power outage) grouped together and rewired into a separate junction box (this emergency circuit must not exceed the ampere rating of the generator) and connected to the generator by a cord set or directly wired to the generator. The manual transfer switch with an ampere rating equal to the ampere rating of the emergency circuit, would then be connected between the home load center panel and the emergency circuit junction box figure 5. With this method it will be difficult to accidentally over load the generator. During a power outage, start the generator (with no load) and then place the manual transfer switch in the generator position. The generator will now power the emergency circuit. When the normal power is restored the manual transfer switch should be placed in the normal position after the generator is shut down. The emergency circuit will now be powered by the utility power.
- Another method is the TOTAL CIRCUIT ISOLATION METHOD. If the emergency circuit are not or cannot be rewired together in a separate junction box (figure 6) you will have to select the circuits and appliances to be powered by the generator. Caution must then be used to prevent the overload of the generator. The manual transfer switch ampere rating must be equal to the ampere rating of the normal incoming utility service. During a power outage start the generator with no load. All items in the home should be turned off. Place the manual transfer switch in the generator position. Selected emergency items can then be turned on. Be sure these items don't overload the generator. The emergency items left on home circuits will now be powered by the generator. When the normal power is restored, the manual transfer switch is placed in the normal position and the generator is shut down. The home electric circuits will now be powered by the utility power source.

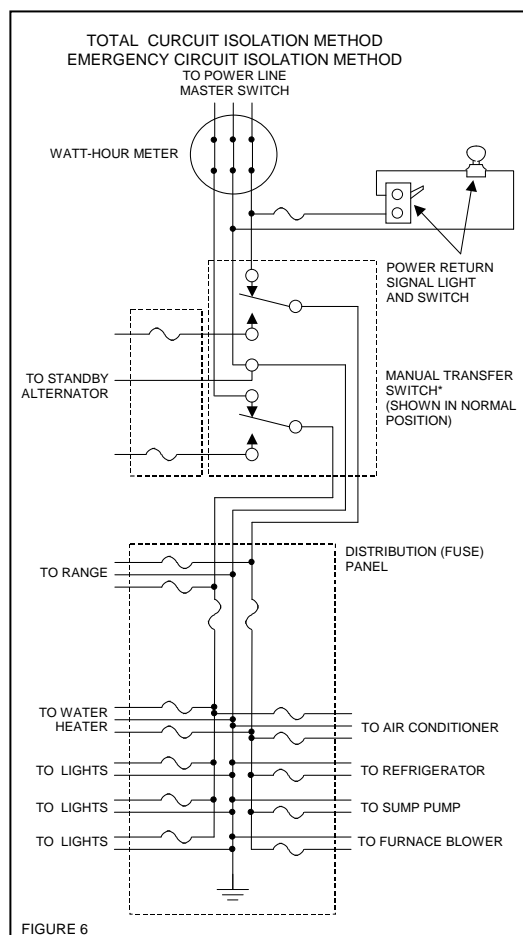




* AMPERE RATING MUST EQUAL OR EXCEED THE AMPERE RATING OF THE EMERGENCY DISTRIBUTION PANEL

** AMPERE CAPACITY NOT TO EXCEED THE GENERATOR RATING. ONLY THESE ITEMS WILL BE POWERED BY STANDBY GENERATOR. IF ELECTRICIAN SIZES THE LOAD PROPERLY, THE GENERATOR CAN'T BE OVERLOADED. ALL WIRING MUST CONFORM TO NATIONAL ELECTRIC CODES AND ALL STATE AND LOCAL CODES. CONSULT A QUALIFIED, LICENSED ELECTRICIAN. THE ILLUSTRATION TO THE SIDE ASSUMES 120/240 VOLT SINGLE PHASE ELECTRIC SERVICE IS BEING SUPPLIED BY THE UTILITY.

FIGURE 5



NOTE:

WITH THIS SYSTEM, CAUTION MUST BE USED TO PREVENT OVERLOAD OF THE GENERATOR DURING UTILITY POWER FAILURE, ALL LOADS IN THE DISTRIBUTION PANEL MUST BE INDIVIDUALLY TURNED OFF. ONLY CERTAIN ITEMS CAN BE TURNED BACK ON DURING GENERATOR OPERATION. THESE ITEMS SHOULD BE SPECIFIED BY YOUR ELECTRICIAN SO AS NOT TO OVERLOAD THE GENERATOR. ALL WIRING MUST CONFORM TO THE NATIONAL ELECTRIC CODE AND ALL STATE AND LOCAL CODES. CONSULT A QUALIFIED, LICENSED ELECTRICIAN. THE ILLUSTRATION TO THE SIDE ASSUMES 120/240 VOLT SINGLE PHASE ELECTRIC SERVICE IS BEING SUPPLIED BY THE UTILITY.

FIGURE 6

TYPICAL MOTOR WATTAGE

The following chart gives examples of various types of motors in both running amps and starting amps. These charts are guides but always check the actual nameplate of your motors.



CAUTION

EXTENSION CORDS

When using extension cords, voltage drops can cause damage to equipment being run by the generator. #12 wire is rated at 20 amps maximum and with a 100 foot extension cord, there will be at least a 7 volt decrease. Extension cords longer than 100 feet will have even larger voltage decreases. It is strongly recommended to always use #10 wire extension cords which are rated at 30 amps. The useful life of your generator and the equipment you operate will decrease when using #12 extension cords. See the extension cord chart.

RECEPTACLES AND PLUGS 120 VOLTS

RECEPTACLE	REQUIRED PLUG	PART NO.
5-15R	5-15P	5266
5-20R	5-20P or 5-15P	-
L5-15R	L5-30P	6004
CS6370	CS6361	3498

240 VOLTS

RECEPTACLE	REQUIRED PLUG	PART NO.
L14-20R	L14-20P	2454
L14-30R	L14-30P	6005
CS6369	CS6365	3262
6-15R	6-15P	2020
6-20R	6-20P	-
14-50R	14-50P	2746
14-60R	14-60P	3901

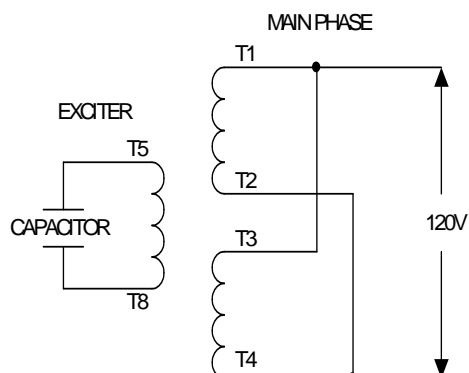
3 PHASE

RECEPTACLE	REQUIRED PLUG	PART NO.
15-15R	15-50P 208/250 VOLTS	3563
L16-20R	16-20P 480 VOLTS	3561

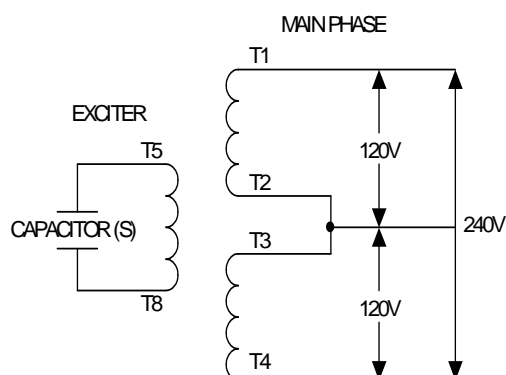
RECEPTACLE	REQUIRED PLUG	PART NO.
CS81-65 CS81-65C	15-50P 480 VOLTS, 50A	3908
14-60R	14-60P 208/240 VOLTS, 60A	3909

SCHEMATIC DIAGRAMS

LR30 SERIES, A25 SERIES, A30 SERIES



LR50 SERIES, LR55 SERIES, LR60 SERIES, LR70 SERIES,
LR80 SERIES, LR105 SERIES, LR150 SERIES, LR180 SERIES
A50/55/60 SERIES, LA50/55/60 SERIES



ELECTRIC MOTOR CHART

Approximate current requirements

HORSE-POWER	RUNNING WATTS	STARTING WATTS			
		UNIVERSAL MOTOR (sm. appliance)	INDUCTION MOTOR	CAPACITOR MOTOR	SPLIT PHASE MOTOR
1/6	275	400	600	850	1200
1/4	400	500	850	1050	1700
1/3	450	600	950	1350	1950
1/2	600	750	1300	1800	2600
3/4	850	1000	1900	2600	X
1	1000	1250	2300	3000	X
1 1/2	1600	1750	3200	4200	X
2	2000	2350	3900	5100	X
3	3000	X	5200	6800	X
5	4800	X	7500	9800	X

NOTE: For pumps, air compressors, air conditioners, inverters add at least 25% to starting current.

EXTENSION CORD CHART

CONTINUOUS LOAD (use either Amps or Watts below)			MINIMUM GAUGE (AWG)		
AMPS	WATTS		0-50 feet	50-100 feet	100-150 feet
	@ 120 volts	@ 240 volts			
2	240	480	22	20	18
3	360	720	22	18	16
4	480	960	20	16	16
5	600	1200	18	16	14
6	720	1440	18	16	14
8	960	1920	16	14	12
10	1200	2400	16	12	12
12	1440	2880	16	12	10
14	1680	3660	14	12	10
16	1920	3840	14	10	10
18	2160	4320	14	10	8
20	2400	4800	12	10	8
22	2640	5280	12	10	8
25	3000	6000	12	10	6
30	3600	7200	10	8	6
35	4200	8400	10	8	4
40	4800	9600	8	6	2
50	6000	12000	6	4	2
60	7200	14400	4	2	

THREE PHASE OPERATION

All three phase generators operate similarly as single phase units. Please note that when checking the no load voltage on any three phase generator, the voltage will be about 10% below nameplate rating. When a load is placed on the three phase generator, the reactor transformer inside the generator activates and the voltage immediately increases to the proper rated voltage of the three phase generator. If an optional automatic voltage regulator is installed the voltage regulation is +/- 1½%. The automatic voltage regulator is required if relays, electric controls, etc. are used with a 3-phase motor. A three phase plug is included with each unit.

When applying load to the generator, if the electric motor runs in reverse direction than the motor is supposed to operate, you must stop the generator, remove the electric load from the generator and then reverse two of the electric motor leads on the terminal strip of the motor. Restart the generator, apply the electric motor load and the direction of the electric motor should be operating properly.

On all three phase generators there is a three phase circuit breaker rated to the amperage load of each unit. If the circuit breaker trips under load, you must remove some of the load to prevent over loading the generator. All three phase circuit breakers are designed for motor load starting permitting momentary over load conditions associated with three phase motors.

NATIONAL ELECTRICAL CODE, ALL STATE AND LOCAL CODES. IN CANADA, ALL CONNECTIONS MUST CONFORM TO CSA AND HYDRO REQUIREMENTS. CONSULT A LICENSED ELECTRICIAN. THE ILLUSTRATION TO THE SIDE ASSUMES 120/240 VOLT SINGLE PHASE ELECTRIC SERVICE IS BEING SUPPLIED BY THE UTILITY.

SINGLE PHASE

THE FORMULA FOR WATTAGE IS:
VOLTS X AMPERAGE = WATTAGE

EXAMPLE: 120(VOLTS X 10(AMPS) = 1200 (WATTS)

THREE PHASE

THE FORMULA FOR WATTAGE IS:

VOLTS X AMPERAGE X 1.732 X POWER FACTOR(USUALLY .8) = WATTAGE
VOLTS X AMPERAGE X 1.732 X = VOLT AMPERAGE

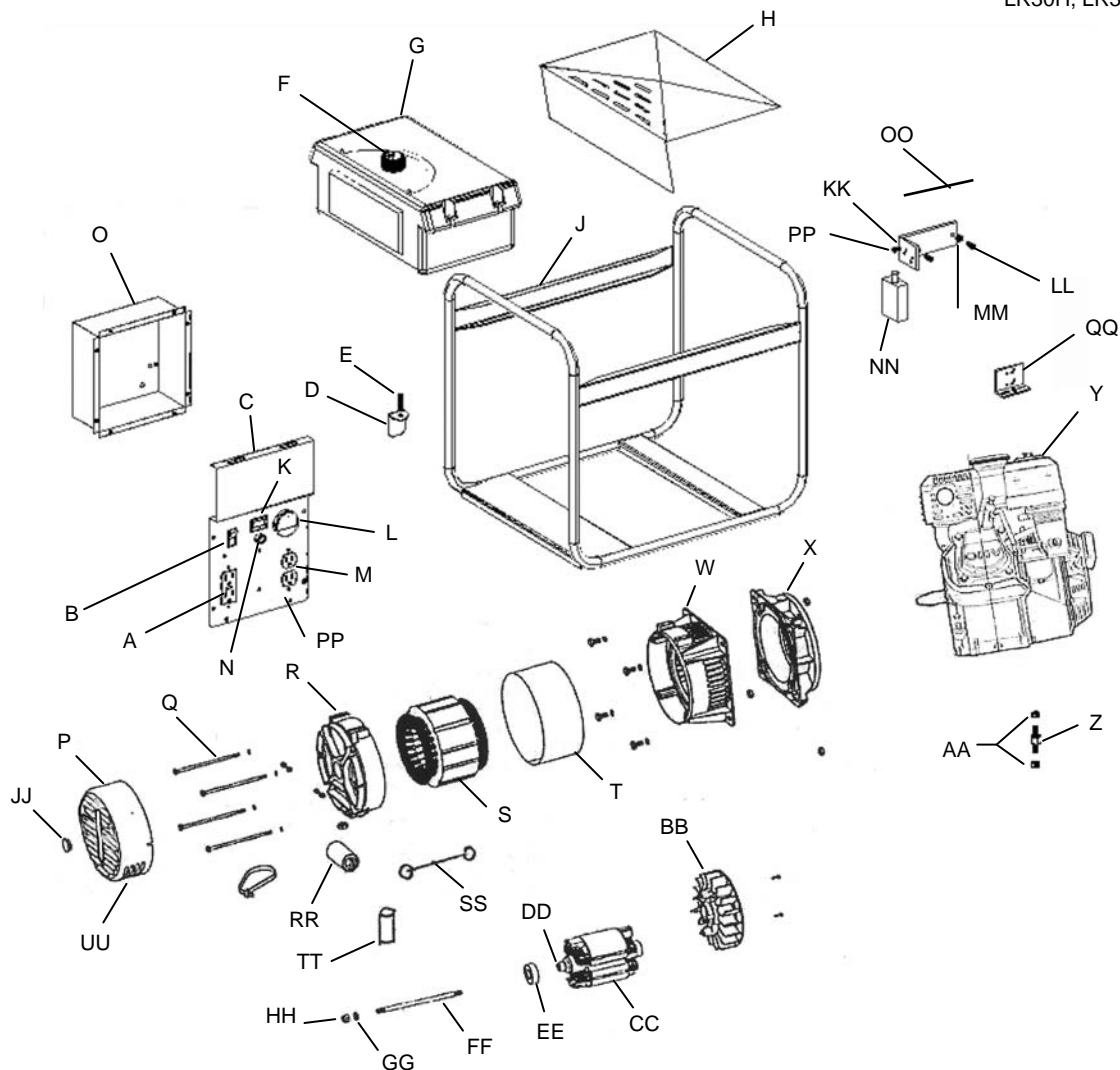
**CAUTION****TRANSPORTING UNITS**

All models with an "L" as the first letter have fuel tanks with a shut-off valve located on the bottom of the tank. When moving the unit, it is always recommended to turn the shut-off valve (clockwise). This will prevent accidental spillage of fuel from the tank to the carburetor float. Some "A" series models with fuel tanks mounted directly on the engines do not have shut-off valves.

APPROXIMATE POWER**Requirements for Equipment**

	WATTAGE REQUIREMENTS	
	Starting	Running
Battery charger, 10 amps	-	200
Compressor (see motor charts) -3/4 HP	1900	850
-1 HP	2500	1100
-2 HP	3600	1800
-3 HP	4800	2400
Drill -1/4"	400	300
-3/8"	650	475
-1/2"	900	750
-1"	1250	1000
Welder 100 amps DC	-	3600
Floodlight	--	1000
Grain cleaner, 1/4 HP	1000	650
Grain elevator, 3/4 HP	3000	1400
Grinders (by motor size)		
Heater radiant portable	--	1300
Heater portable liquid fuel -50,000 btu	675	225
-100,000 btu	1260	420
-150,000 btu	1875	625
Impact wrench -1/2"	750	600
-3/4"	900	750
-1"	1400	1200
Milk cooler	1800	1100
Mixer, 3 ½ cubic feet	2300	1000
Motors-		
Belt sander	2600	1200
Disc sander	2600	1200
Orbital sander	2600	1200
Chain saw	3400	1200
6" circular saw	2200	950
7 ¼" circular saw	2600	1200
8 ½" circular saw	3000	1500
10" circular saw	3900	2000
Jig saw	400	300
Cutoff saw	3500	2500
Screwdriver	800	550
Soldering iron or gun	-	150
Sump pump	1300	400
Water pump submersible -3000 gph	1750	500
-5000 gph	2500	650
-10000 gph	3750	1000
-15000 gph	5000	1500
Water pump non submersible -3000 gph	2250	600
-5000 gph	2850	750
-10000 gph	4100	1100
-15000 gph	5250	1600

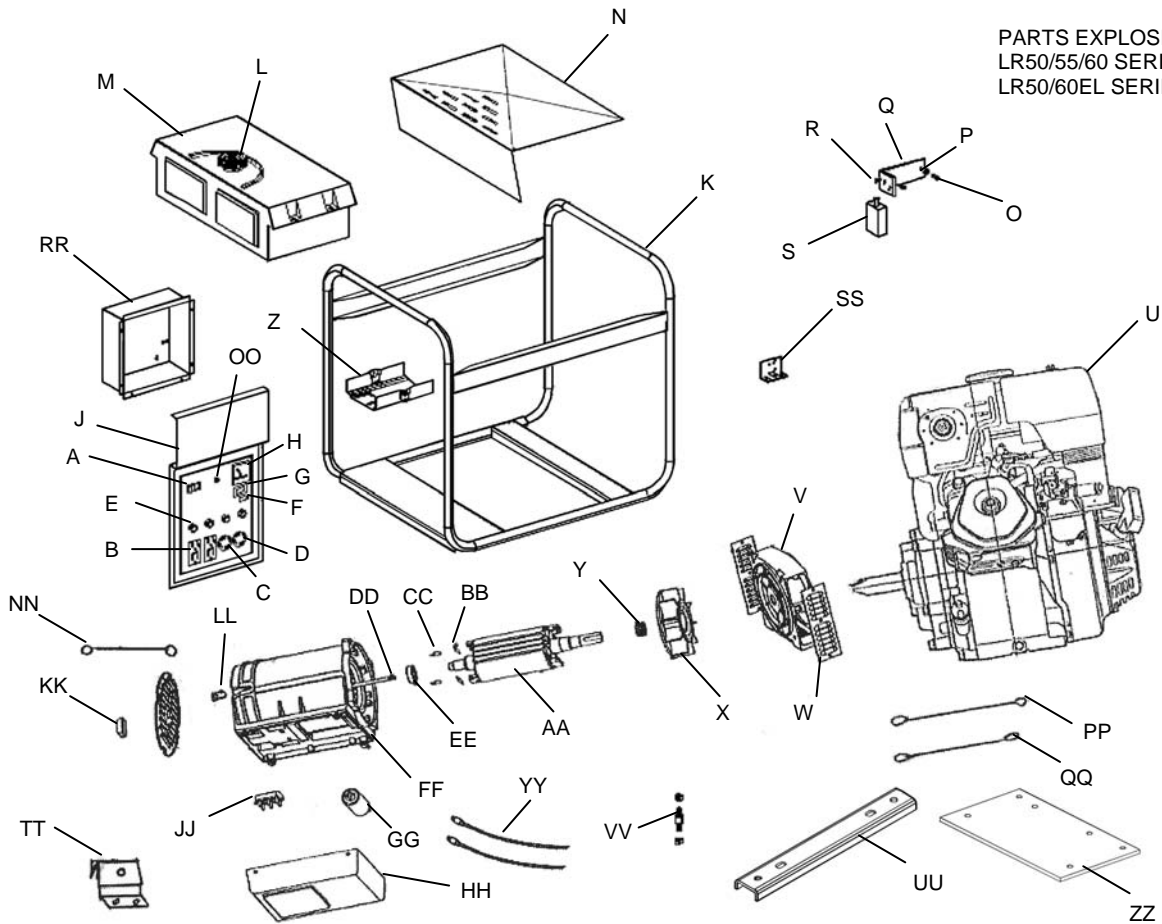
PARTS EXPLOSION
LR30H, LR30K, LR30R



ITEM	PART#	DESCRIPTION	QTY
A	2333	120V, 20A DUPLEX GFI	1
B	2034	IDLER SWITCH	1
	3274-E	IDLER MODULE	1
C	3528	FRONT PANEL	1
D	2368	ASSEMBLY RETAINER	4
E	1028	1/4-20 X 1-1/2 SCREW	6
F	3298	GAS CAP	1
G	3267	FUEL TANK 3 GALLON	1
H	3312	HEAT SHIELD	1
J	3308	FRAME	1
K	3326	HOUR METER	1
L	2024	VOLTMETER	1
M	1011	RECPT DUPLEX 120V 20A	1
N	1069	CIRCUIT BREAKER 20A	1
O	3310	CONTROL BOX BACK	1
P	2604	END COVER	1
Q	2605	STATOR BOLT	4
R	2607	BEARING BRACKET	1
S	2620	STATOR	1
T	2609	COVER	1
U		SCREW	4
V		WASHER	4
W	2610	FAN BRACKET	1
X	2611	ENGINE BRACKET	1
Y	2148	ENGINE 5.5 HP HONDA	1
		ENGINE 6 HP ROBIN	1

ITEM	PART#	DESCRIPTION	QTY
Y	3371	ENGINE 6 HP KOHLER	1
Z	2216	BUMPER WITH STUD	3
AA	1020	5/16-18 KEPS NUT	6
BB	2612	FAN	1
CC	2614	ROTOR	1
DD	3190	DIODE WITH VARISTER	2
EE	3287	BALL BEARING	1
FF	2613	ROTOR SCREW	1
GG		ROTOR WASHER	1
HH		ROTOR NUT	1
JJ		CUP	1
KK	3316	IDLER BRACKET	1
LL	2899	1/4-20 X 1/2 SCREW	2
MM	1027	1/4-20 KEPS	4
NN	2980	IDLER SOLENOID	1
OO	3081	PIANO WIRE	1
PP	1024	GROUND LUG	1
QQ	3313	CONTROL BOX BRACKET	1
RR	2641	CAPACITOR 10mf	1
	2145	CAPACITOR 25mf	1
SS	2178	GROUNDING STRAP	1
TT	2567	MOUNTING FOOT (SMALL)	1
UU	2938	COVER (DUPLEX)	1

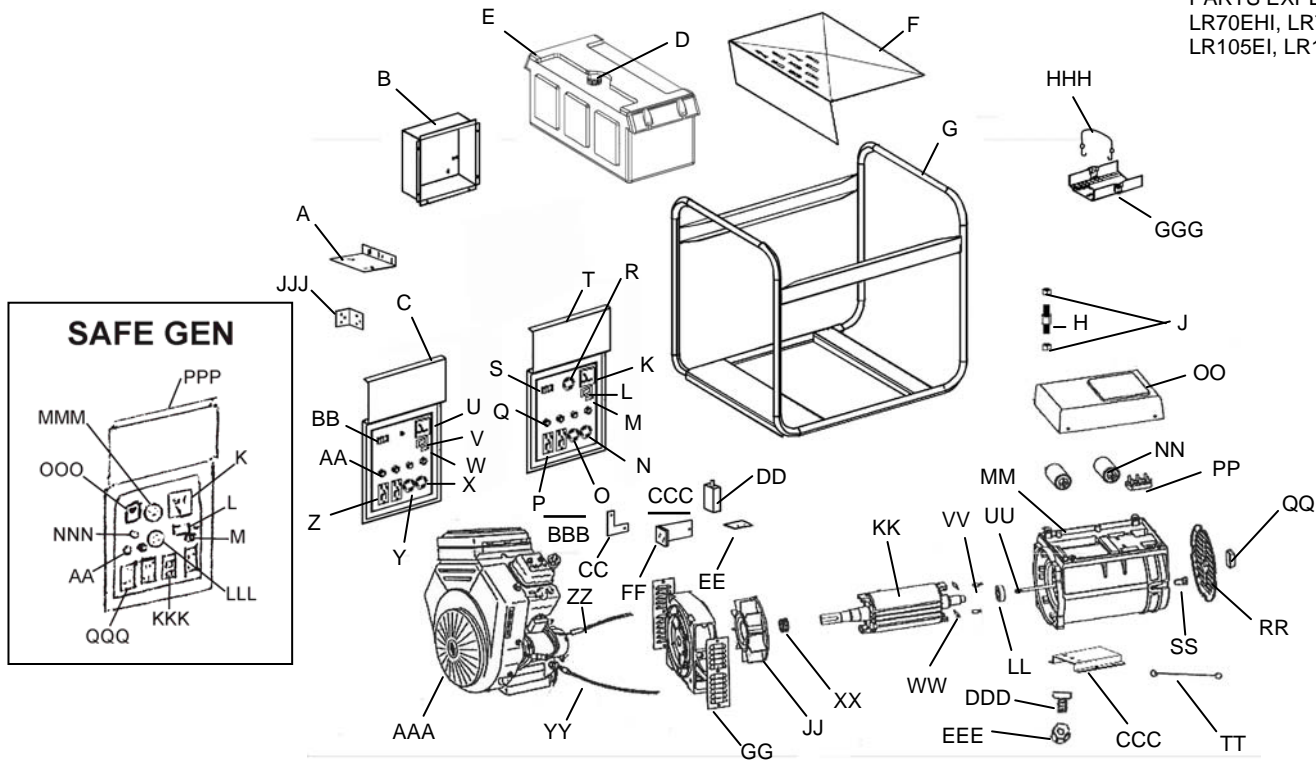
PARTS EXPLOSION
LR50/55/60 SERIES
LR50/60EL SERIES



ITEM	PART#	DESCRIPTION	LR50/60	LR50/60EL	ITEM	PART#	DESCRIPTION	LR50/60	LR50/60EL
			QTY	QTY				QTY	QTY
A	2034	IDLER SWITCH	1	-	Z**	2937-B	BATTERY TRAY	1	-
	3274-E	IDLER MODULE (RECOILS)	1	-	Z	3538	BATTERY TRAY	-	1
	2182	IDLER MODULE (ELEC. ST.)	1	-	AA	3333	ROTOR	1	1
B	2333	120V 20A GFI DUPLEX	2	2	BB	3190	DIODE WITH VARISTER	2	2
C	1117	120V, 30A T/L	1	1	CC		SEE BB	2	2
D	1100	240V, 20A T/L	1	1	DD	3338	ROTOR SCREW	1	1
E	1069	CIRCUIT BREAKER 20A	4	4	EE	3337	BALL BEARING 40MM	1	1
	1112	CIRCUIT BREAKER 30A	1	1	FF	3347	STATOR	1	1
F	1024	GROUND LUG	1	1	GG	2145	CAPACITOR 25mf	1	1
G	3326	HOUR METER	1	1		1134	CAPACITOR 31.5mf	1	-
H	2024	VOLT METER	1	1	HH	3281	TOP COVER	1	1
J	3319-PH	FRONT PANEL	1	1	JJ	3184	TERMINAL STRIP	1	1
K	3309	FRAME	1	1	KK	3344	ROTOR SCREW COVER	1	1
L	3298	GAS CAP	1	-	LL	3282	RUBBER GROMET	1	1
	3481	DIESEL CAP	-	1	MM	3342	END COVER	1	1
M	3268	FUEL TANK 5 GALLONS	1	1	NN	2178	GROUND STRAP	1	1
N	3319-H	HEAT SHIELD	1	1	OO	2035	FULL POWER SWITCH	1	1
O	1028	1/4-20X1-1/2 ALLEN SCREW	2	-	PP**	2315	BATTERY CABLES, GREEN	1	1
P	1027	1/4-20 KEPS NUT	2	-	QQ**	2314	BATTERY CABLES, RED	1	1
Q	3226	IDLER BRACKET (HONDA)	1	-	RR	3319-B	CONTROL BOX BACK	1	1
	3549	IDLER BRACKET (ROBIN)	1	-	SS	3319-R	CONTROL BOX BRACKET	1	1
R	2810	8-32X1/2 ALLEN SCREW	2	-	TT	3319-F	MOUNTING FOOT	1	1
S	2980	IDLER SOLENOID	1	-	UU	1002	CHANNEL	1	-
T	3081	PIANO WIRE	1	-		3404	MOUNT SET	-	1
U*		ENGINE	1	1	VV	2216	BUMPER	2	4
V	3327	FAN BRACKET	1	1	WW	2903	SHOCK MOUNT	1	1
W	3329	FAN COVER	1	1	XX	1094	HOLD DOWN STRAP	1	1
X	3331	FAN	1	1	YY	3530	12 VOLT BATTERY CABLES	-	1
Y		SHIM	1	1	ZZ	3546	MOUNTING PLATE	-	1
						3538	DC PLUG	-	1

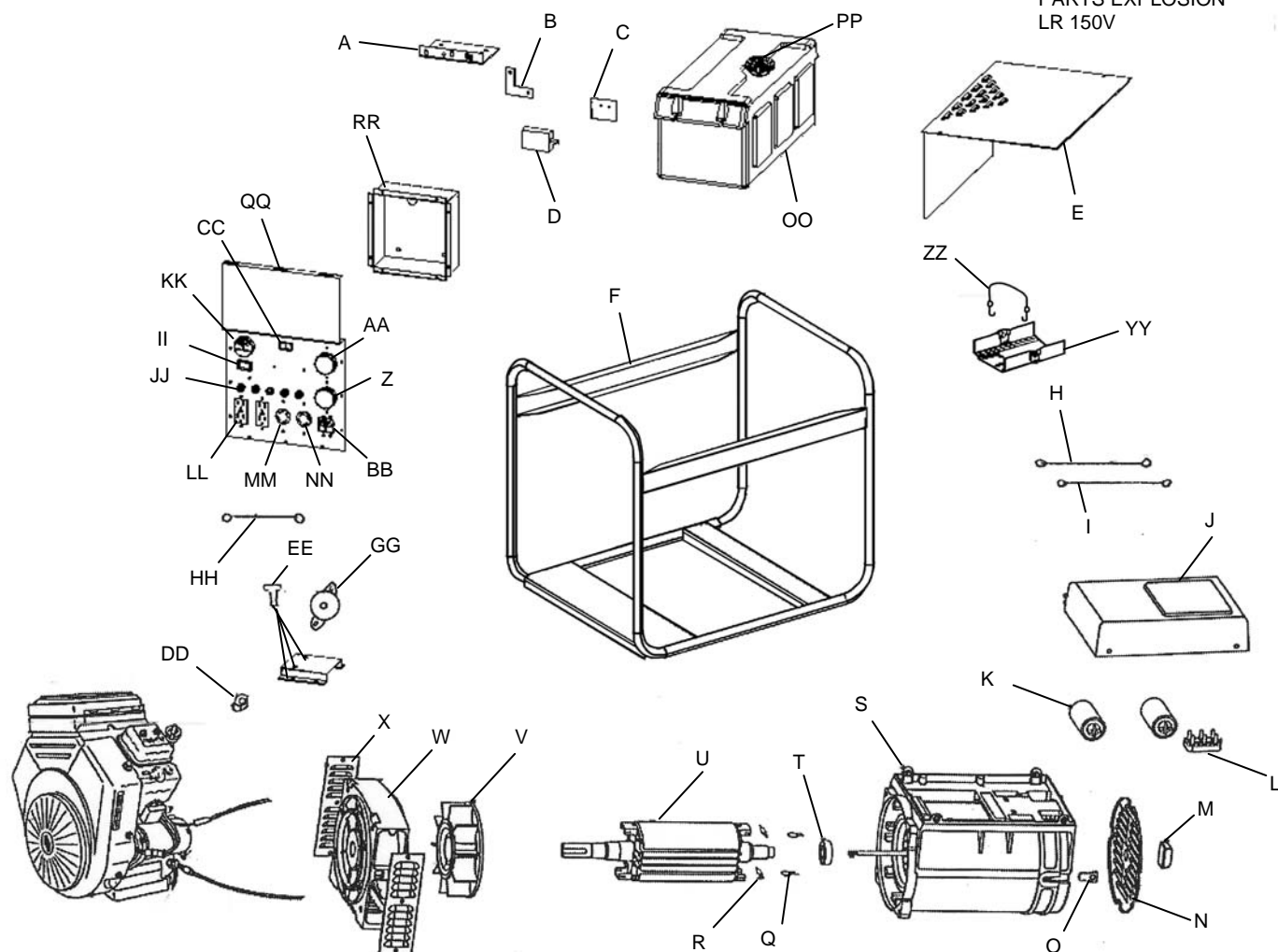
* ENGINE WILL VARY DEPENDING ON MODEL
** ELECTRIC START MODELS ONLY

PARTS EXPLOSION
LR70EHI, LR70REI, LR80EI,
LR105EI, LR105EHI, LR105KE



ITEM	PART#	DESCRIPTION	QTY	SAFE GEN	ITEM	PART#	DESCRIPTION	QTY	SAFE GEN
A	3289-B	BRACKET	1		JJ	3332	FAN 105	1	
B	3329-B	CONTROL BOX	1		KK	3334	ROTOR 7&8	1	
C	3285	FRONT PANEL 70&80	1			3335	ROTOR 105	1	
D	3298	GAS CAP	1		LL	3337	BALL BEARING 40MM 70&80	1	
E	2922	FUEL TANK 8 GALLONS	1			2615	BALL BEARING 52MM 105	1	
F	2937D	DEFLECTOR	1		MM	3348	STATOR 70&80	1	
G	2937	ROLL CAGE FRAME	1			3345	STATOR 105	1	
H	2476	BUMPER 70D	4		NN	2145	CAPACITOR 25mf 7&8	2	
J	1020	5/16-18 KEPS NUT	12			1134	CAPACITOR 31.5mf 105	2	
K	2024	VOLTMETER	1	1	OO	3281	TOP COVER	1	
L	3326	HOUR METER	1	1	PP	3184	TERMINAL STRIP	1	
M	1024	GROUND LUG	1	1	QQ	3344	ROTOR SCREW COVER	1	
N	1101	RECPT 240V 30A T/L	1		RR	3342	END COVER 70&80	1	
O	1117	RECPT 120V 30A T/L	1			3343	END COVER 105	1	
P	2333	RECPT 120V 20A GFI	2		SS	3282	RUBBER GROMMET	1	
Q	1069	CIRCUIT BREAKER 20A	2		TT	2178	GROUND WIRE	1	
	1112	CIRCUIT BREAKER 30A	2		UU	3339	ROTOR SCREW 70&80	1	
	2882	CIRCUIT BREAKER 40A	2			3340	ROTOR SCREW 105	1	
R	3220	RECPT 240V, 50A	1		VV		VARISTER SEE WW	2	
S	2034	SWITCH	1		WW	3190	DIODE WITH VARISTER	2	
T	3632	FRONT PANEL 105	1		XX		FAN INSERT	1	
U	2024	VOLT METER	1		YY	2315	BATTERY CABLE GREEN	1	
V	3326	HOUR METER	1		ZZ	2314	BATTERY CABLE RED	1	
W	1024	GROUND LUG	1		AAA	2544	ENGINE HONDA 13HP	1	
X	1101	RECPT 240V 30A T/L	1			2539	ENGINE VANGUARD 18HP	1	
Y	1117	RECPT 120V 30A T/L	1			2852	ENGINE HONDA 20HP	1	
Z	2333	RECPT 120V 20A GFI	2		BBB	3081	LINKAGE WIRE	1	
AA	1069	CIRCUIT BREAKER 20A	2	2	CCC		MOUNTING FOOT 70&80	1	
	1112	CIRCUIT BREAKER 30A	2			3281	MOUNTING FOOT 105	1	
BB	2034	SWITCH	1		DDD		HEX SCREW	1	
	2182	IDLER MODULE	1		EEE		KEPS NUT	1	
CC		LINKAGE ARM	1		FFF	2903	SHOCK MOUNTS	1	
DD	2980	SOLENOID	1		GGG	2937-B	BATTERY TRAY	1	
EE	3007	SOLENOID BRACKET	1		HHH	1094	HOLD DOWN STRAP	1	
FF	3270	IDLER BRKT HONDA 18	1		JJJ	3028	DEFLECTOR (HONDA)	1	
	2665	IDLER BRKT VANGUARD 18	1		KKK	3827	GFI SENSOR	1	1
	3266	IDLER BRKT HONDA 13	1		LLL	1100	RECPT 20A , 240V	1	1
GG	3330	FAN GUARD 10	1		MMM	3506	RECPT 50A, 240V,	1	1
GG	3329	FAN GUARD 70&80	1		NNN	3812	CIRCUIT BREAKER 20A, 2P	1	1
HH	3327	FAN BRACKET 70&80	1		OOO	3864	CIRCUIT BREAKER 30A, 2P(LR70)	1	1
	3328	FAN BRACKET 105	1		OOO	3825	CIRCUIT BREAKER 40A, 2P(LR105)	1	1
JJ	3331	FAN 70&80	1		OOO	3826	CIRCUIT BREAKER 50A, 2P(LR150)	1	1
					PPP	3828	FRONT PANEL	1	1
					QQQ	3850	RECPT 120V, 20A	3	3

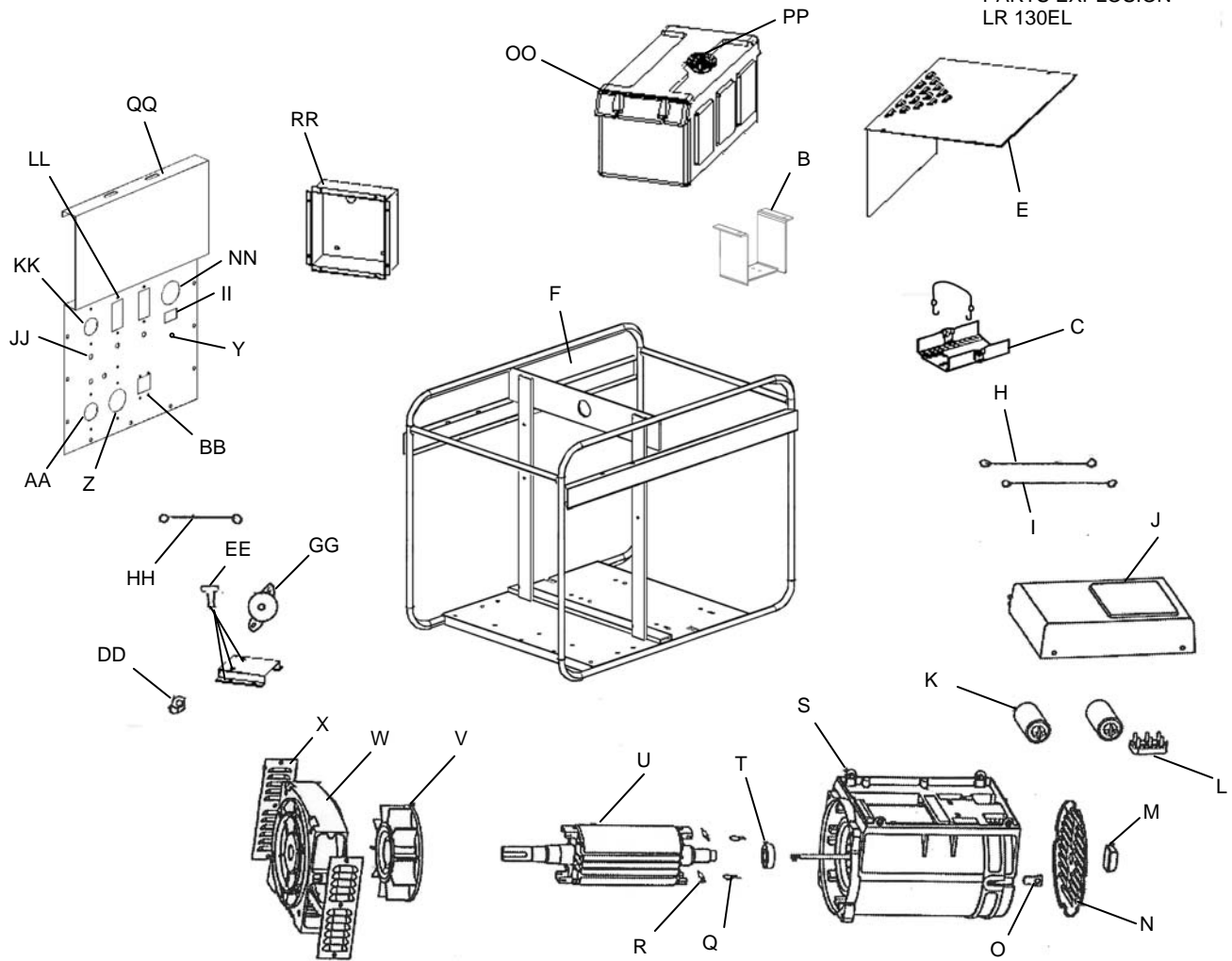
PARTS EXPLOSION
LR 150V



ITEM	PART#	DESCRIPTION	QTY
A	3295	IDLER BRACKET	1
B	3296	SUPPORT BRACKET	1
C		SOLENOID BRACKET	1
D	2980	SOLENOID	1
E	2937-D	HEATSHIELD	1
F	2937	FRAME	1
G	3490	ENGINE	1
H	2314	BATTER CABLE RED	1
I	2315	BATTERY CABLE GREEN	1
J	3281	TOP COVER	1
K	1135	CAPACITOR 35mf	1
L	3184	TERMINAL STRIP	1
M	3344	ROTOR SCREW COVER	1
N	3343	END COVER	1
O	3282	RUBBER GROMMET	1
P	3341	ROTOR SCREW	1
Q&R	3190	DIODE WITH VARISTER	2
S	3346	STATOR	1
T	2615	BALL BEARING 52MM	1
U	3336	ROTOR	1
V	3332	FAN	1
W	3328	FAN BRACKET	1
	1002	CHANNEL	2
X	3330	FAN GUARD	1
Y	1024	GROUND WIRE	1
Z	3497	RECPT 120V 50A	1

ITEM	PART#	DESCRIPTION	QTY
AA	3220	RECPT 240V 50A	1
BB	3015	CIRCUIT BREAKER 50A	1
CC	2034	SWITCH	1
	2182	IDLER MODULE	1
DD		KEPS NUT	1
EE		HEX SCREW	1
FF	3289	MOUNTING FOOT	1
GG	2476	SHOCK MOUNT	4
HH	2178	GROUND STRAP	1
II	3326	HOUR METER	1
JJ	1069	CIRCUIT BREAKER 20A	2
	1112	CIRCUIT BREAKER 30A	3
KK	2024	VOLT METER	1
LL	2333	RECPT 120V 20A GFI	2
MM	1117	RECPT 120V 30A T/L	1
NN	1101	RECPT 240V 30A T/L	1
OO	2922	FUEL TANK 8 GALLON	1
PP	3298	FUEL CAP	1
QQ	3492	FRONT PANEL	1
RR	3491	CONTROL BOX BACK	1
	3289	CONTROL BOX BRACKET	1
SS	3257	LIFTING HOOK	1
TT	2340-H	BAR CLAMP	8
UU	2383	5/16-18 X 2 HEX SCREW	8
VV	1020	5/16-18 KEPS NUT	8
WW	2536	5/16 WASHER	8
XX	3257	LIFTING HOOK	1
YY	2937	BATTERY TRAY	1
ZZ	1094	HOLDN DOWN STRAP	1

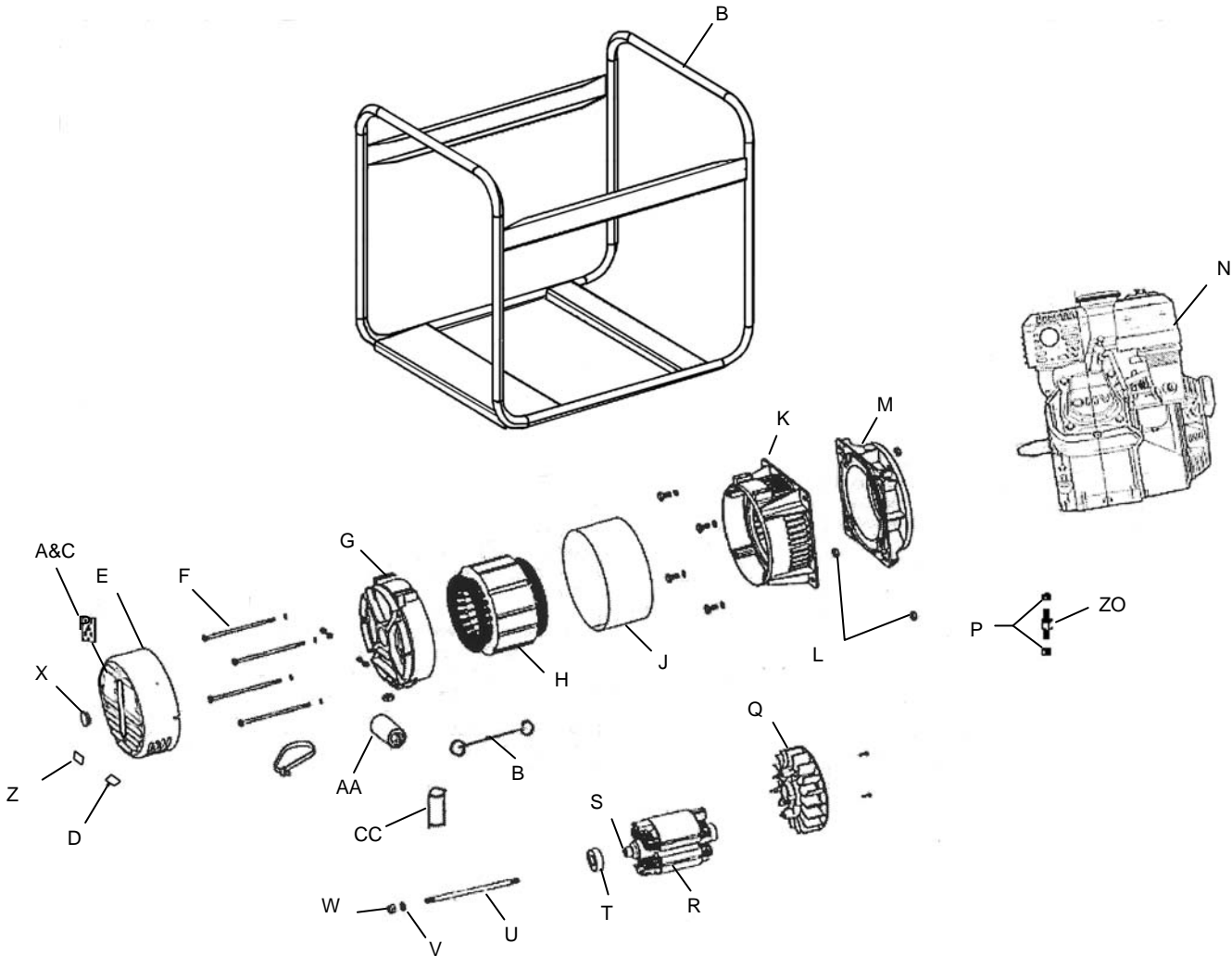
PARTS EXPLOSION
LR 130EL



ITEM	PART#	DESCRIPTION	QTY
A	3678	SHOCK MOUNT	2
B	3446	SWITCH BRACKET	1
C	3538	BATTERY TRAY ASSY	1
E	2937-D	HEAT SHIELD	1
F	3290-F	FRAME	1
G	3685	ENGINE	1
H	2314	BATTER CABLE RED	1
I	2315	BATTERY CABLE GREEN	1
J	3281	TOP COVER	1
K	1135	CAPACITOR 35mf	1
L	3184	TERMINAL STRIP	1
M	3344	ROTOR SCREW COVER	1
N	3343	END COVER	1
O	3282	RUBBER GROMMET	1
P	3341	ROTOR SCREW	1
Q&R	3190	DIODE WITH VARISTER	2
S	3346	STATOR	1
T	2615	BALL BEARING 52MM	1
U	3336	ROTOR	1
V	3332	FAN	1
W	3328	FAN BRACKET	1
X	3330	FAN GUARD	2
Y	1024	GROUND LUG	1
Z	3497	RECPT 120V 50A	1

ITEM	PART#	DESCRIPTION	QTY
AA	3220	RECPT 240V 50A	1
BB	3015	CIRCUIT BREAKER 50A	1
DD		KEPS NUT	1
EE		HEX SCREW	1
FF	3289	MOUNTING FOOT	1
GG	3635	SHOCK MOUNT	2
HH	2178	GROUND STRAP	1
II	3326	HOUR METER	1
JJ	1069	CIRCUIT BREAKER 20A	2
KK	1112	CIRCUIT BREAKER 30A	3
LL	2024	VOLT METER	1
MM	2333	RECPT 120V 20A GFCI	2
NN	1101	RECPT 240V 30A T/L	1
OO	2922	FUEL TANK 8 GALLON	1
PP	3481	CAP DIESEL	1
QQ	3518-F	FRONT PANEL	1
RR	3518-B	CONTROL BOX BACK	1
	2900	CONTROL BOX BRACKET	1
UU	2383	5/16-18 X 2 HEX SCREW	8
VV	1020	5/16-18 KEPS NUT	8
WW	2536	5/16 WASHER	8

PARTS EXPLOSION
A25, A25RC,
A30H-GFI, A30R-GFI

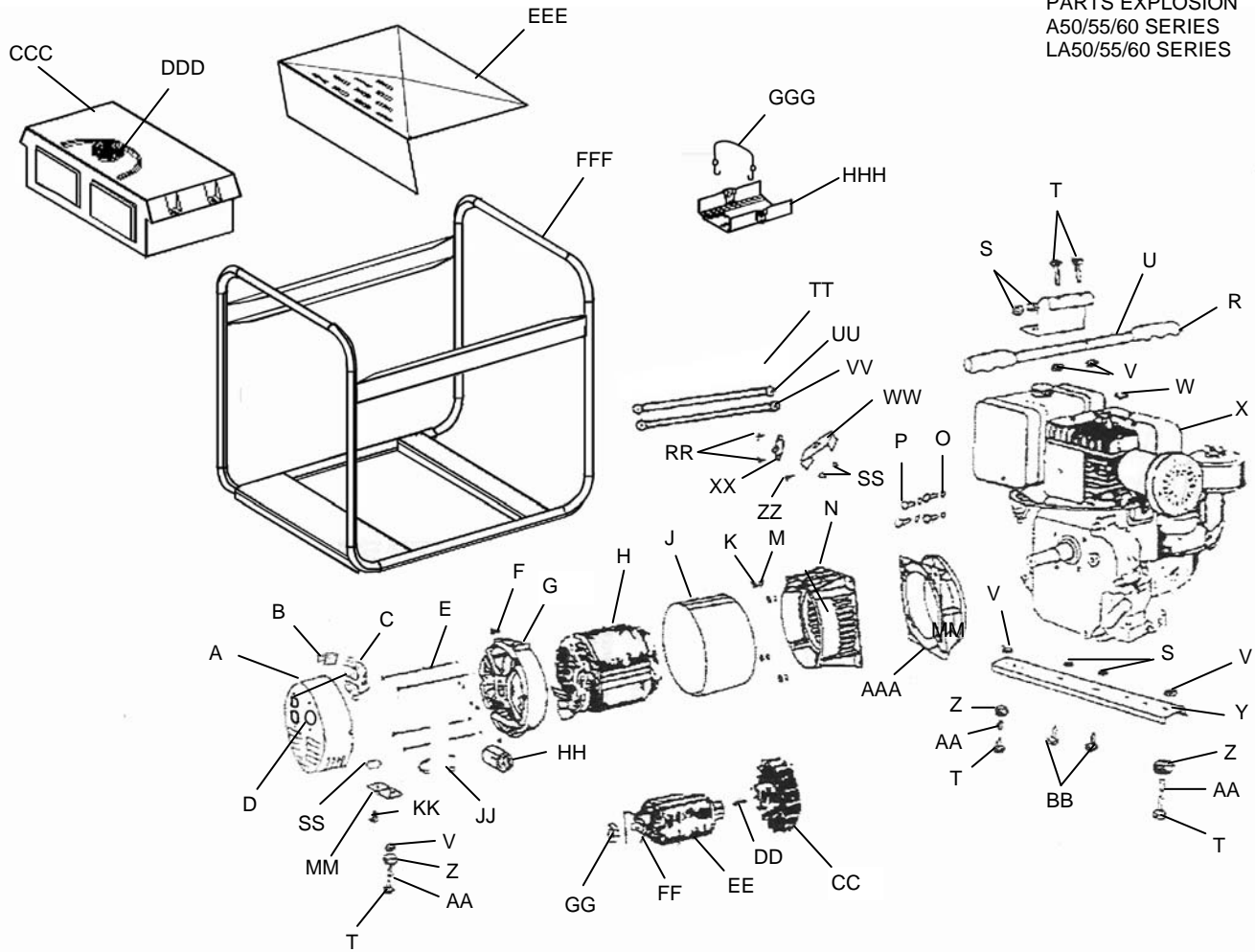


ITEM	PART#	DESCRIPTION	QTY
A	2333	120V, 20A DUPLEX *	1
B	3308-NR	FRAME	1
C	1011	RECPT, DUPLEX 120V, 20A	1
D	1069	CIRCUIT BREAKER, 20A	1
E	2604	END COVER	1
F	2605	STATOR BOLT	1
G	2607	BEARING BRACKET	1
H	2620	STATOR	1
J	2609	COVER	1
K	2610	FAN BRACKET	1
L		WASHER	4
M	2611	ENGINE BRACKET	1
N		ENGINE 5.5 HP HONDA	1
O	2216	BUMPER W/STUD	3
P	1020	5/16-18 KEPS NUT	6

ITEM	PART#	DESCRIPTION	QTY
Q	2612	FAN	1
R	2614	ROTOR	1
S	3190	DIODE W/VARISTER	2
T	3287	BALL BEARING, 40MM	1
U	2613	ROTOR SCREW	1
V		ROTOR WASHER	1
W		ROTOR NUT	1
X		CUP	1
Y		SCREW	4
Z	1024	GROUND LUG	1
AA	2641	CAPACITOR 10mf	1
BB	2178	GROUND STRAP	1
CC	2567	MOUNTING FOOT	1

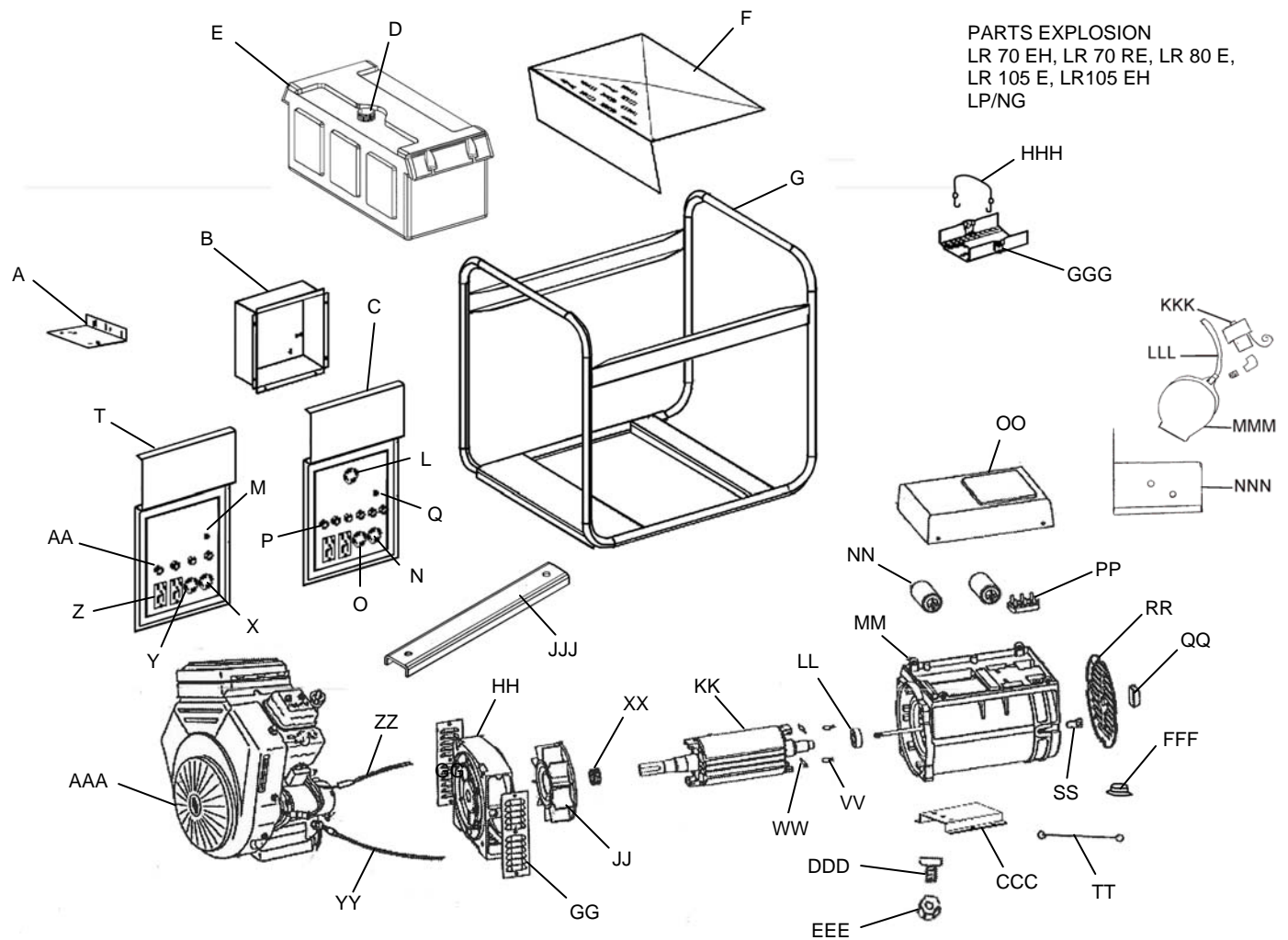
* ON A30H-GFI AND A30R-GFI ONLY

PARTS EXPLOSION
A50/55/60 SERIES
LA50/55/60 SERIES



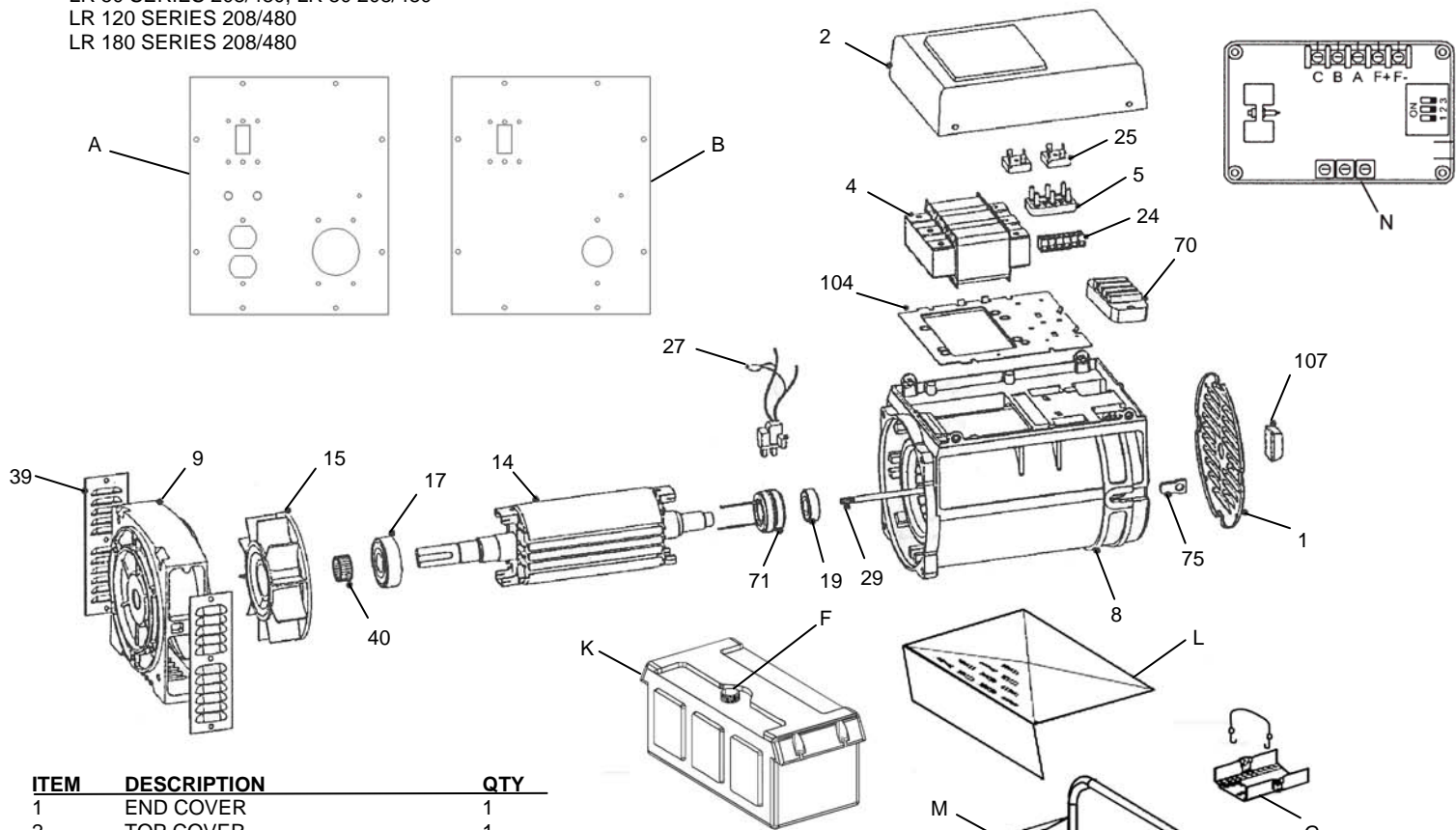
ITEM	PART#	DESCRIPTION	A50 LA50 QTY	A60 LA55/60 QTY	ITEM	PART#	DESCRIPTION	A50 LA50 QTY	A60 LA55/60 QTY
A	2621	COVER	1	1	BB	1102	5/16-18 HEX SCREW	2	2
B	1069	CIRCUIT BREAKER 20A	2	2	CC	2612	FAN	1	1
C	1011	RECPT 120V 20A	1	1	DD	2613	ROTOR SCREW	1	1
D	1100	RECPT 250v 20A T/L	1	1	EE	2628	ROTOR A50	1	-
E	2622	STATOR BOLT A50	4	-		2629	ROTOR A60	-	1
	2623	STATOR BOLT A60	-	4	FF	3190	DIODE W/VARISTER	2	2
F	2606	GROUND SCREW	1	1	GG	3287	BALL BEARING 40MM	1	1
G	2607	BEARING BRACKET	1	1	HH	2145	CAPACITOR 20mf	1	-
H	2624	STATOR SCREW A50-60HZ	1	-		1134	CAPACITOR 31.5mf	-	1
	2625	STATOR SCREW A60-60HZ	-	1	JJ	2617	TY RAP	1	1
	2630	STATOR SCREW A50-50HZ	1	-	KK	1182	5/16-18 X 3/4 HEX SCREW	1	1
	2631	STATOR SCREW A60-50HZ	-	1	MM	2668	MOUNTING FOOT	1	1
J	2626	COVER FOR STATOR A50	1	-	NN	3309	FRAME	1	1
	2627	COVER FOR STATOR A60	-	1	PP	2216	BUMPER WITH STUD	3	3
K		WASHER	4	4	QQ	1020	5/16-18 KEPS NUT	7	7
M		NUT	4	4	RR	1018	8-32 X 1/2 PHILLIPS	6	6
N	2610	FAN BRACKET	1	1	SS	1072	8-32 KEPS NUT	6	6
P	2627	3/8-16 X 1-1/8 SCREW	4	4	UU	2315*	BATTERY CABLE GREEN	1	1
Q	1022	3/8 LOCKWASHER	4	4	VV	2314*	BATTERY CABLE RED	1	1
R	1010	FINGER GRABBER	2	2	WW	1027	1/4-20 KEPS NUT	1	1
S	1020	5/16-18 KEPS NUT	5	5	XX	1009	STARTER SWITCH	1	1
T	1028	1/4-20 X 1-1/2 HEX NUT	5	5	YY	1001	SWITCH BRACKET	1	1
U	1043	HANDLE	1	-	ZZ	1046	1/4-20 X 1 HEX SCREW	1	1
V	1027	1/4-20 KEPS NUT	5	5	AAA	2635	ENGINE BRACKET	1	1
W	1041	3/8 NUT	1	-	BBB	1042	HANDLE BRACKET	1	-
X	1017	ENGINE	1	1	CCC	3268	FUEL TANK	1	1
Y	1002	CHANNEL	1	1	DDD	3298	GAS CAP	1	1
Z	1008	BUMPER	3	3	EEE	3319-H	HEAT SHIELD	1	1
AA	1007	SPACER	3	3	FFF	3309	FRAME	1	1
					GGG	1094*	HOLD DOWN STRAP	1	1
					HHH	2937*	BATTERY TRAY	1	1

* ELECTRIC START MODELS ONLY



ITEM	PART#	DESCRIPTION	LR70EH LR70RE LR80E	LR105E LR105EH	ITEM	PART#	DESCRIPTION	LR70EH LR70RE LR80E	LR105E LR105EH	LP/ NG
A	3282-B	BRACKET	1	1	MM	3348	STATOR	1	-	
B	2879	CONTROL BOX	1	1		3345	STATOR 105	-	1	
C	3280	FRONT PANEL 105	-	1	NN	2145	CAPACITOR 25mf	2	-	
D	3298	GAS CAP	1	1		1134	CAPACITOR 31.5mf 105	2	-	
E	2922	FUEL TANK 8 GALLONS	1	1	OO	3281	TOP COVER	1	-	
F	2937-D	DEFLECTOR	1	1	PP	3184	TERMINAL STRIP	1	1	
G	2937	ROLL CAGE	1	1	QQ	3344	ROTOR SCREW COVER	1	1	
H	2476	BUMPER 70D	4	4	RR	3342	END COVER	1	-	
J	1020	5/16-18 KEPS NUT	12	12		3343	END COVER 105	-	1	
L	3506	RECPT 240V 30A T/L	-	1	SS	3282	RUBBER GROMMET	1	1	
M	1024	GROUND LUG	1	1	TT	2178	GROUND WIRE	1	1	
N	1101	RECPT 240V 30A T/L	1	1	UU	3344	ROTOR SCREW 70	1	-	
O	1117	RECPT 120V 30A T/L	1	1		3339	ROTOR SCREW 80	1	-	
P	1011	RECPT 120V 20A	2	2		3340	ROTOR SCREW 105	-	1	
Q	1069	CIRCUIT BREAKER 20A	2	2	VV		SEE WW	2	2	
	1112	CIRCUIT BREAKER 30A	2	2	WW	3190	DIODE W/VARISTER	2	2	
	2882	CIRCUIT BREAKER 40A	2	2	XX		FAN INSERT	1	1	
T	3284	FRONT PANEL	1	-	YY	2315	BATTERY CABLE GREEN	1	1	
X	1101	RECPT 240v 30 T/L	1	1	ZZ	2314	BATTERY CABLE RED	1	1	
Y	1117	RECPT 120V 30A T/L	1	1	AAA		ENGINE	1	1	
Z	1011	RECPT 120V 20A	2	2	CCC	3282-B	MOUNTING FOOT	1	-	
AA	1069	CIRCUIT BREAKER 20A	2	2		3281-M	MOUNTING FOOT 105	-	1	
	1112	CIRCUIT BREAKER 30A	2	2	DDD		HEX SCREW	4	4	
GG	3275	FAN GUARD	-	2	EEE		KEPS NUT	4	4	
	3330	FAN GUARD 105	-	2	FFF	2903	SHOCK MOUNT	1	1	
HH	3327	FAN BRACKET	1	-	GGG	2937-B	BATTERY TRAY	1	1	
	3328	FAN BRACKET 105	-	1	HHH	1094	HOLD DOWN STRAP	1	1	
JJ	3331	FAN	1	-	JJJ	1002	U CHANNEL	1	2	
	3332	FAN 105	-	1	KKK	3776	SOLENOID 12V DC			1
KK	3334	ROTOR	1	-	LLL	3708	FUEL LINE			1
	3335	ROTOR 105	-	1	MMM	2478-K	REGULATOR			1
LL	3337	BALL BEARING 40MM	1	1	NNN	3744	REGULATOR BRACKET			1
	3287	BALL BEARING 52MM 105	1	1						

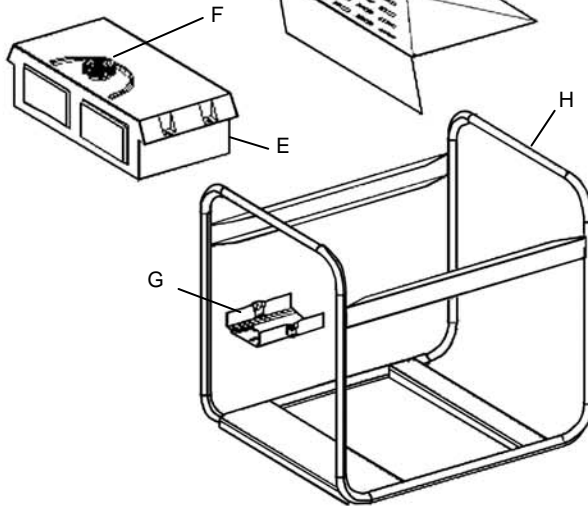
PARTS EXPLOSION THREE PHASE
LR 50 SERIES 208/480, LR 80 208/480
LR 120 SERIES 208/480
LR 180 SERIES 208/480

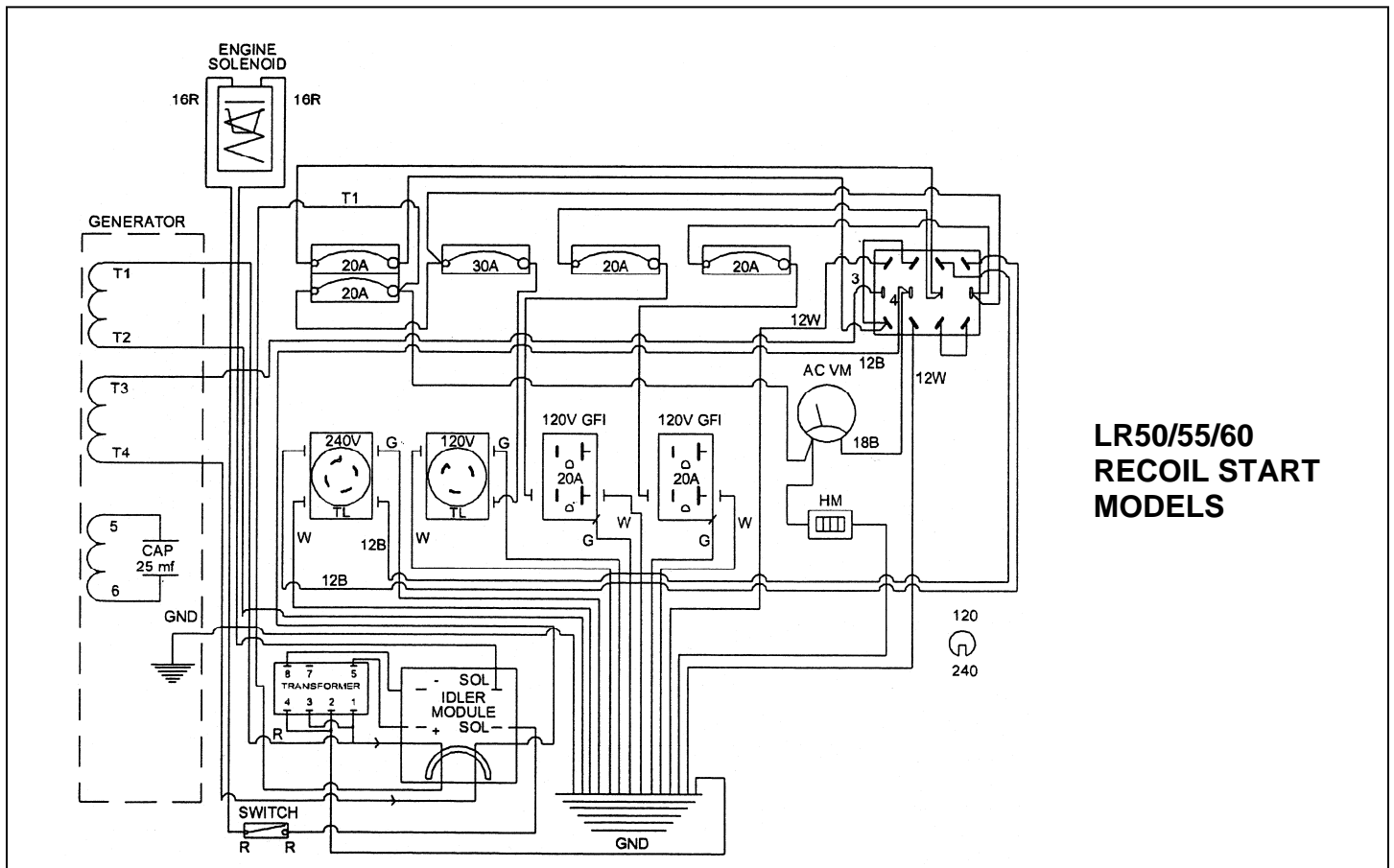
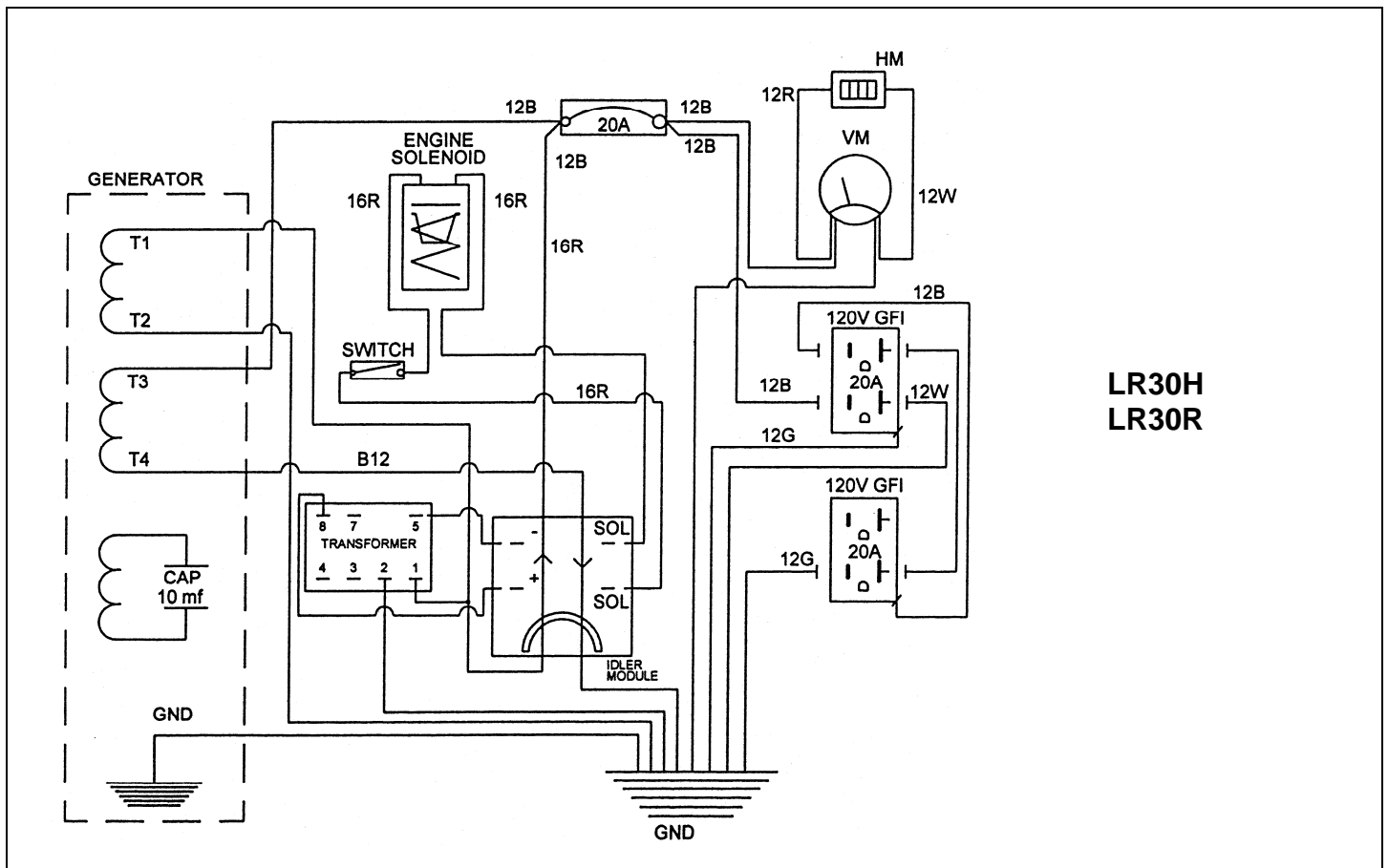


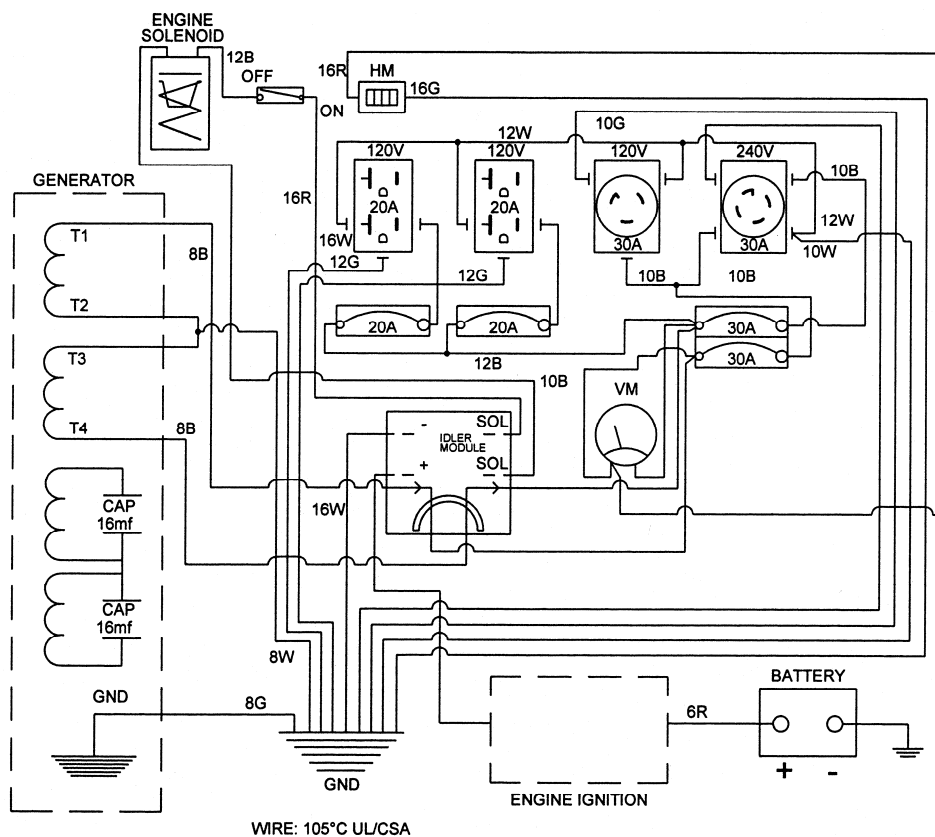
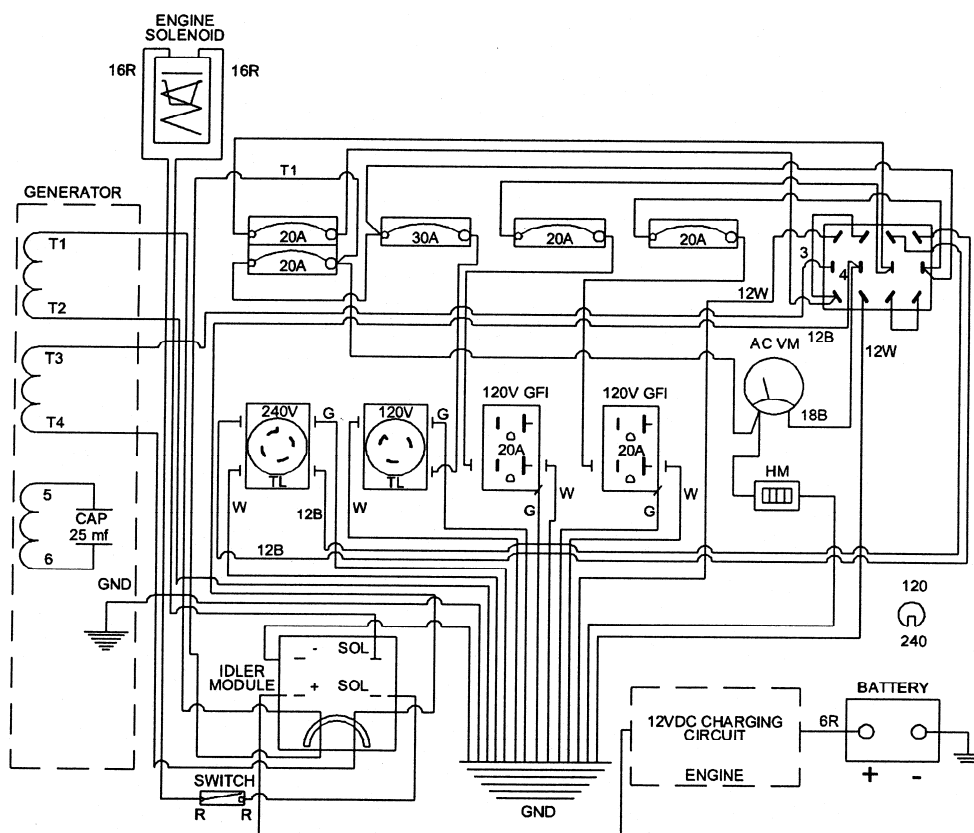
ITEM	DESCRIPTION	QTY
1	END COVER	1
2	TOP COVER	1
4	TRANSFORMER	1
5	TERMINAL STRIP	1
8	STATOR	1
9	FAN BRACKET	1
14	ROTOR	1
15	FAN	1
19	BALL BEARING 6203-2Z-C3	1
24	AUXILIARY TERMINAL STRIP	1
25	RECTIFIER	1
27	VARISTER	1
29	ROTOR SCREW	1
39	FAN GUARD	2
40	FIXING RING	1
41	BRUSH HOLDER W/BRUSHES	1
71	SLIP RING	1
75	RUBBER GROMMET	1

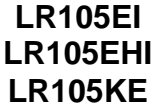
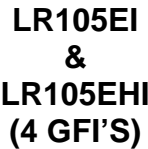
SPECIFY THE EXACT MODEL OF THE GENERATOR TO OBTAIN CORRECT PART NUMBER.

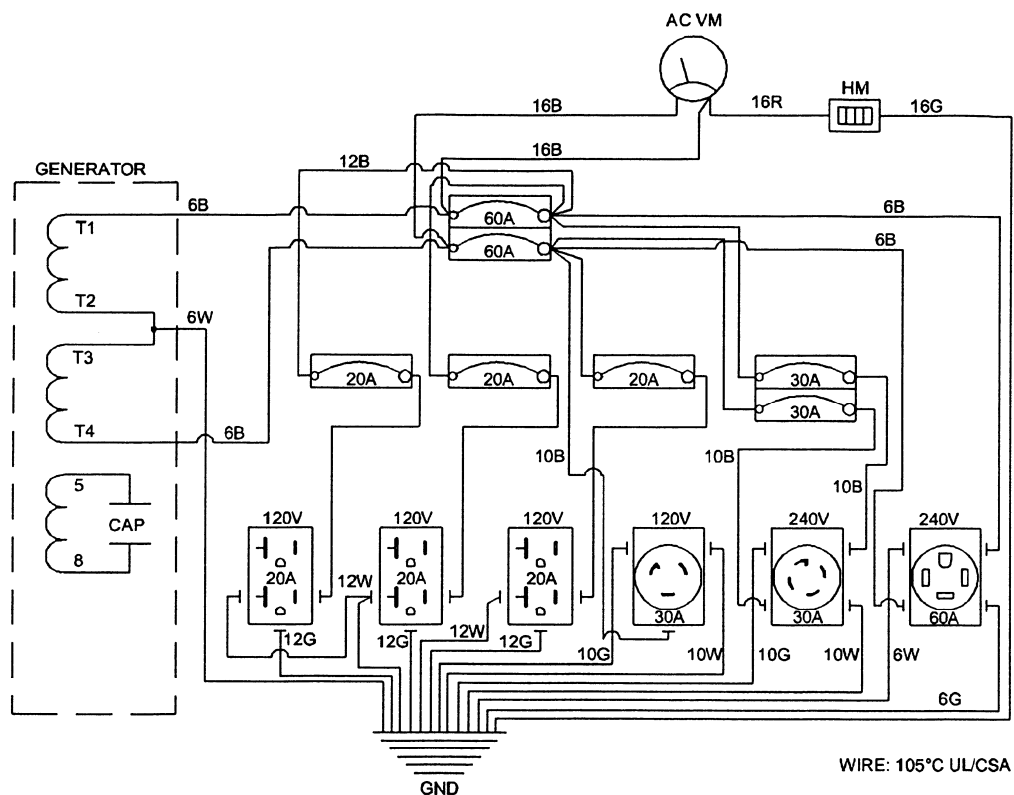
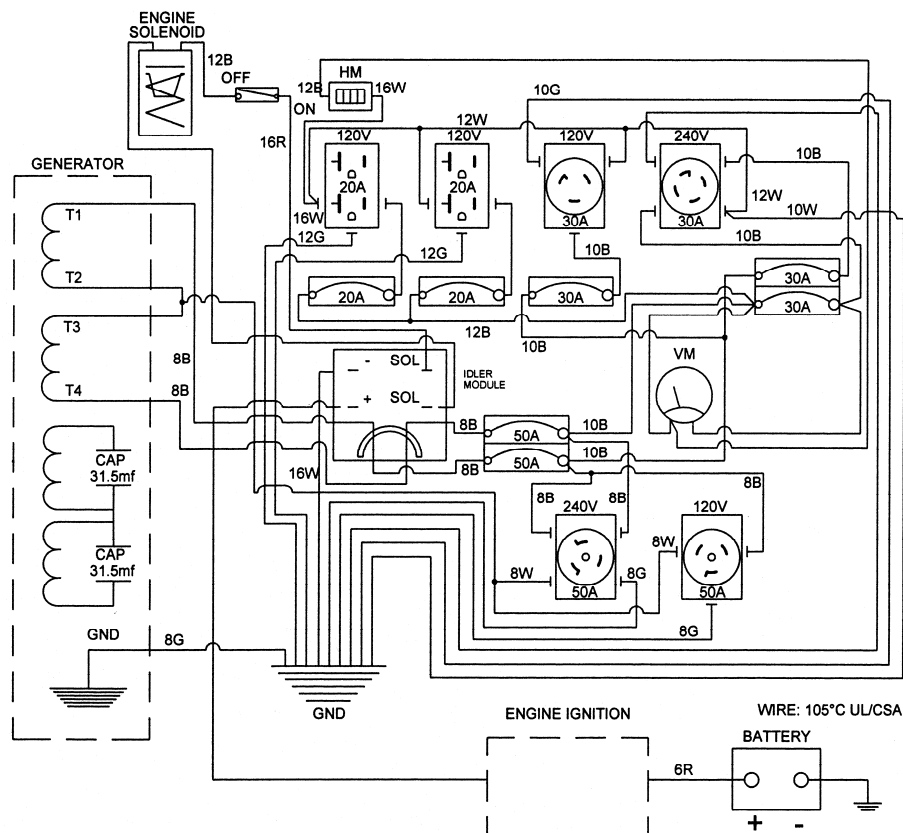
ITEM	PART #	DESCRIPTION	QTY
A	3540	FRONT PANEL 208V	1
B	3541	FRONT PANEL 480V	1
C	3289	ANGLE BRACKET	1
D	3319-H	CONTROL BOX BACK	1
E	3268	FUEL TANK 5 GALLON (LR50 SERIES)	1
F	3289	GAS CAP	1
	3481	DIESEL CAP	1
G	2937-B	BATTERY TRAY (GAS)	1
	3538	BATTERY TRAY (DIESEL)	1
H	3309	FRAME (LR50 SERIES)	1
J	3319	HEAT SHIELD (LR50 SERIES)	1
K	2922	FUEL TANK 8 GALLON (LR80/120 SERIES)	1
L	2937-D	DEFLECTOR (LR 80/120 SERIES)	1
M	2937	FRAME (LR 80/120 SERIES)	1
N	3762	AUTOMATIC VOLTAGE REGULATOR(OPTIONAL EXCEPT ON 240V)	1

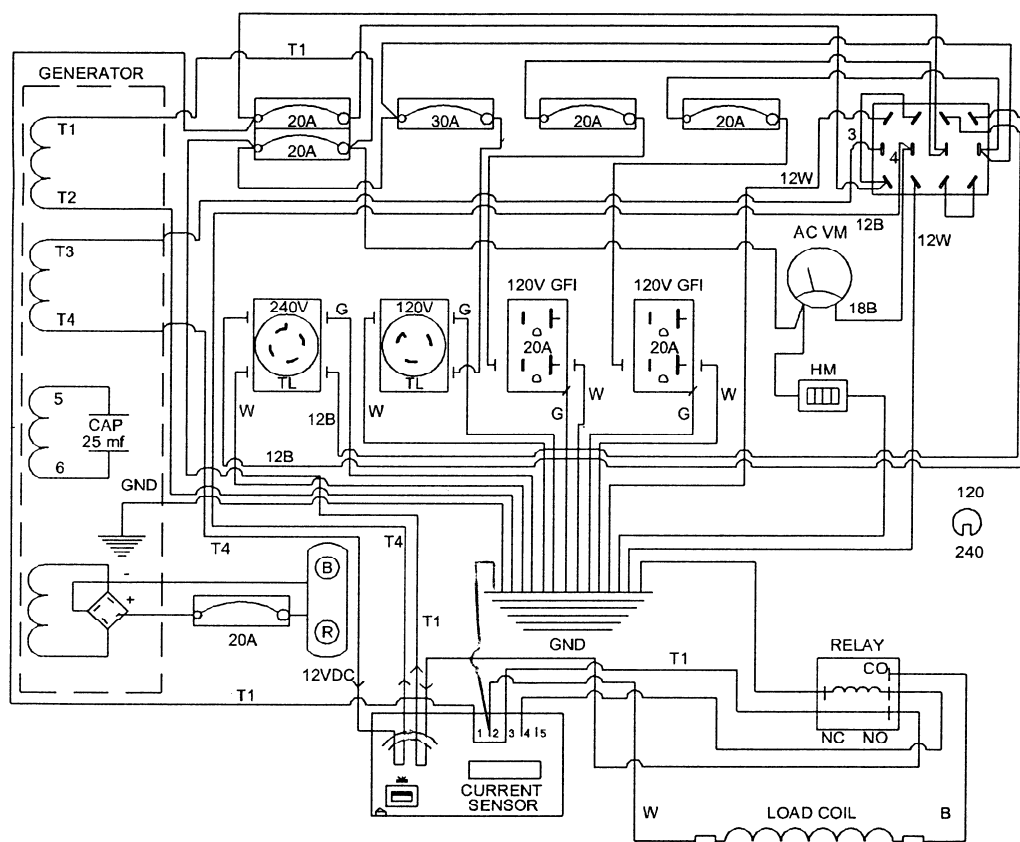
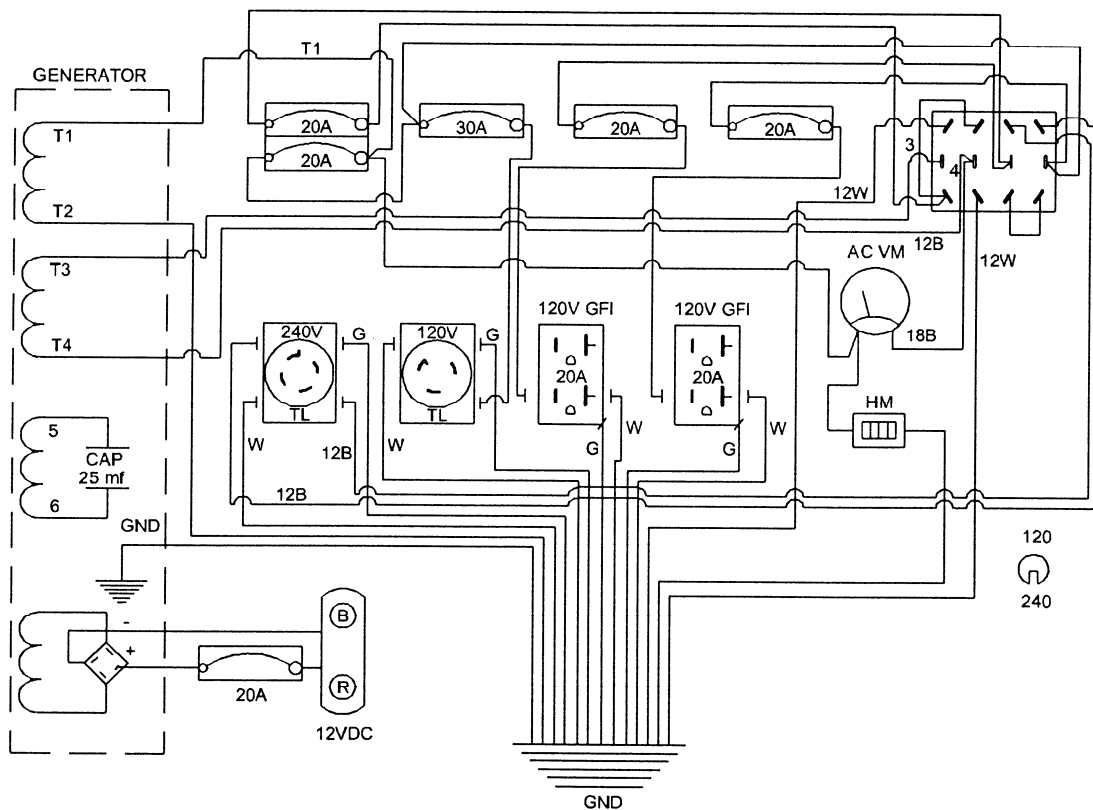


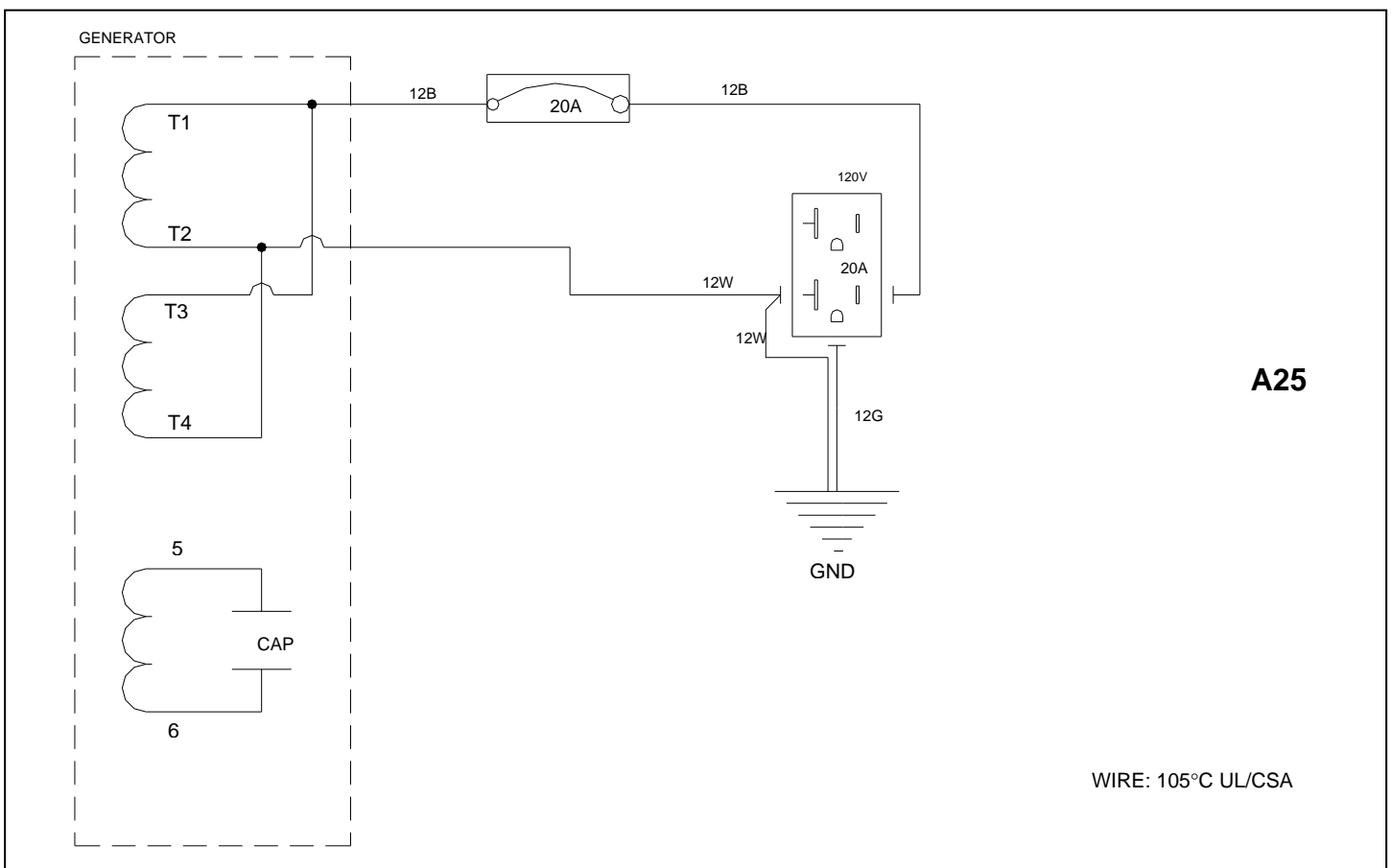
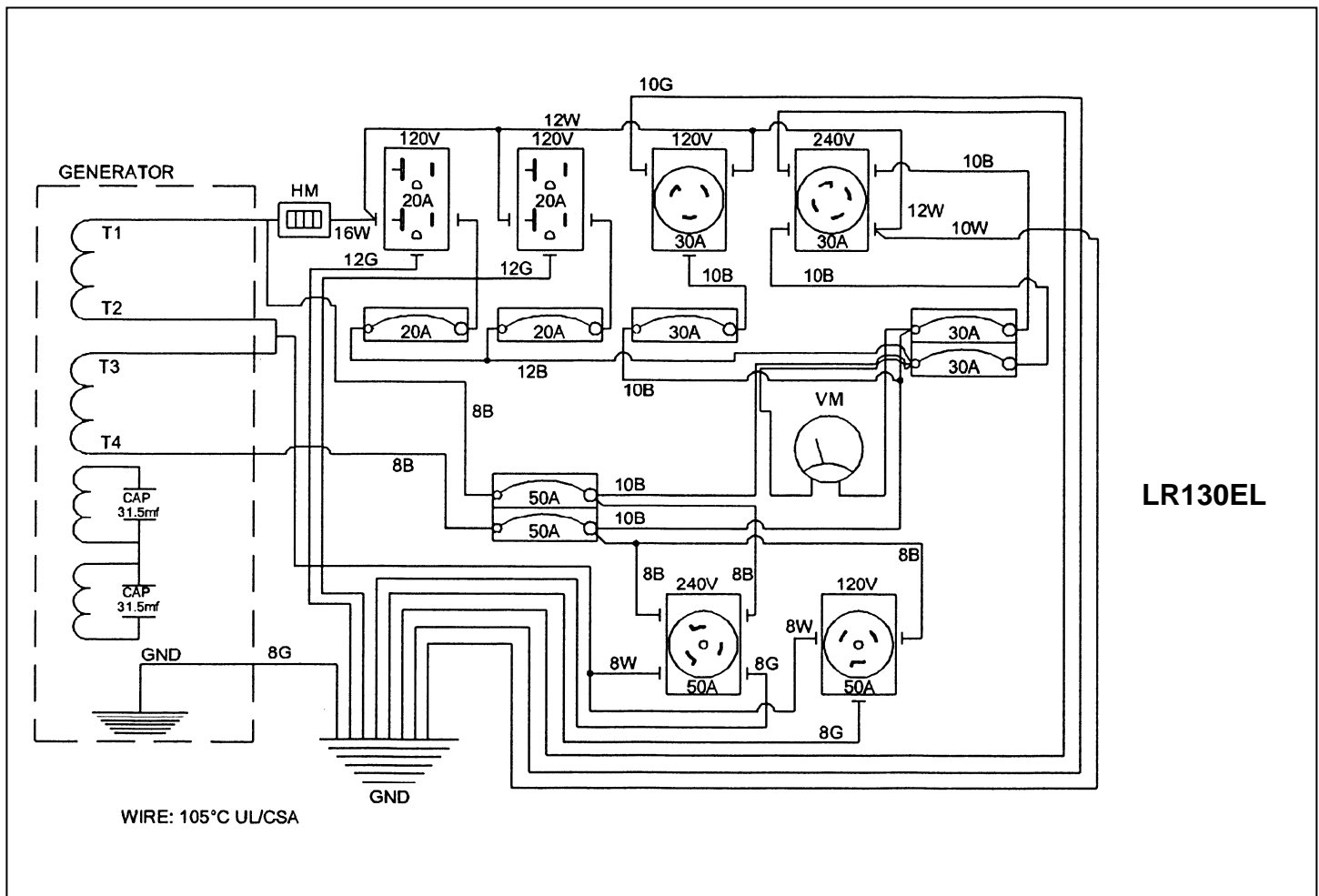




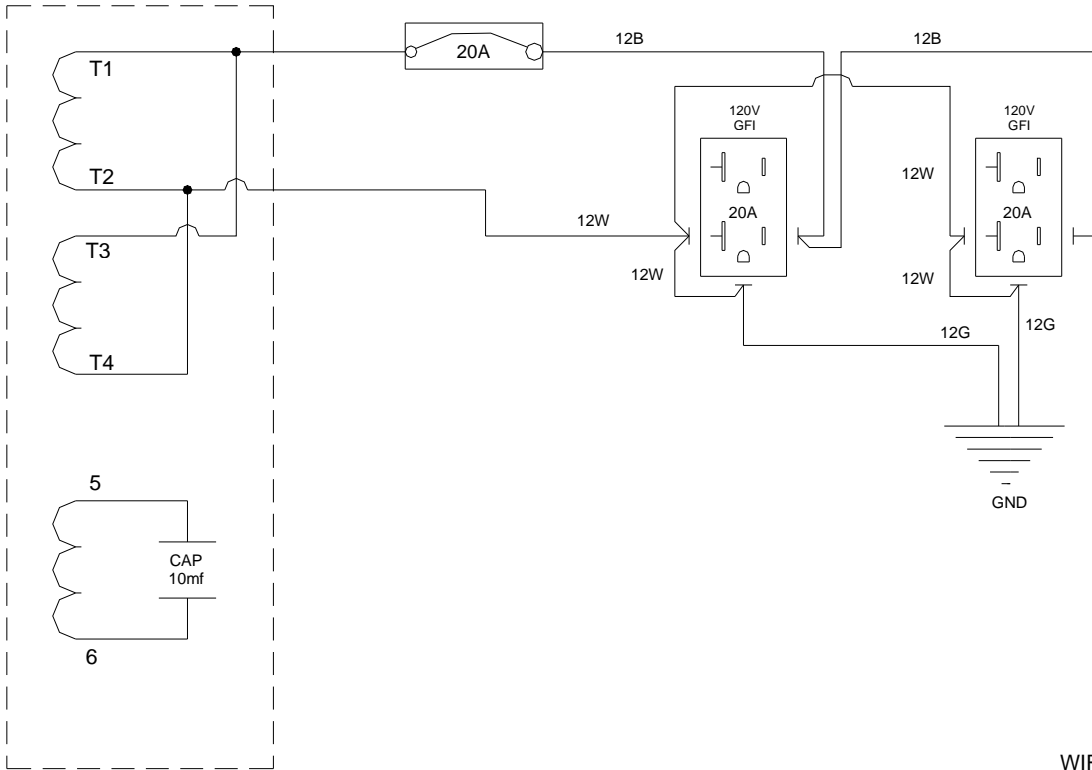








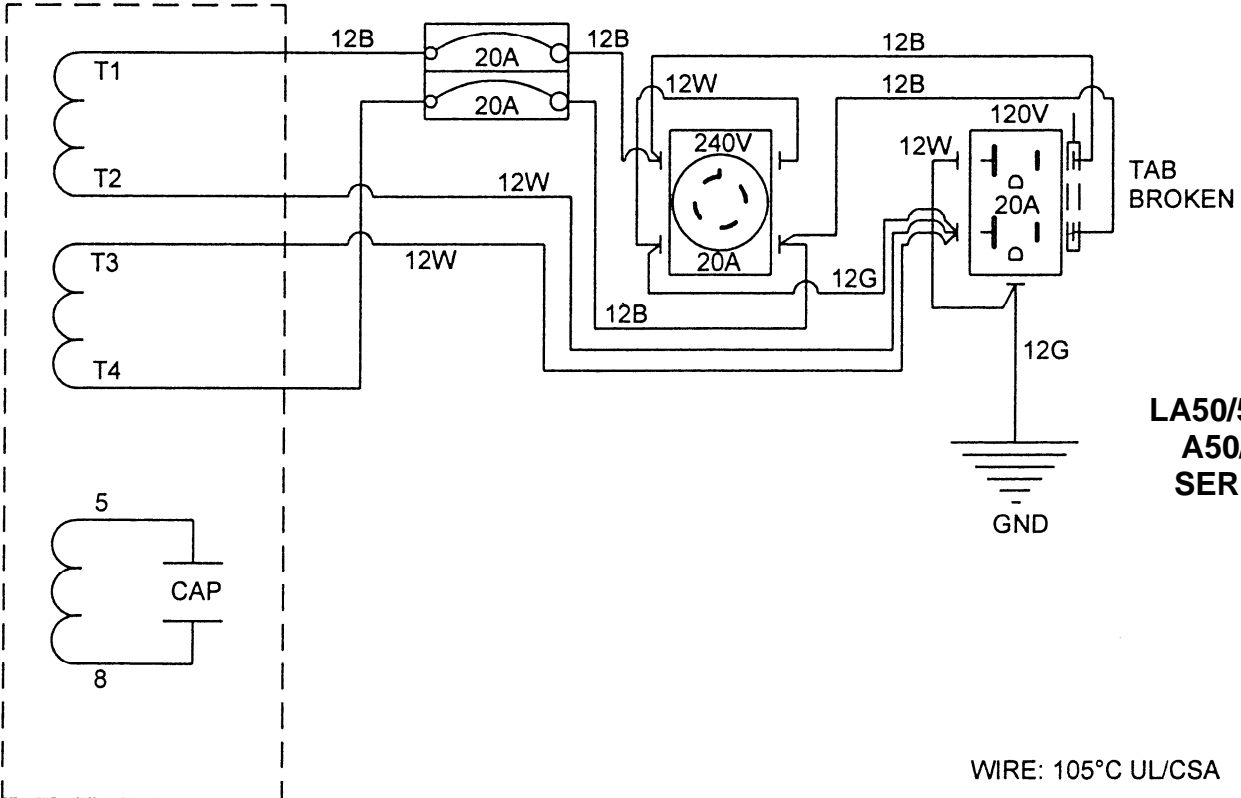
GENERATOR



**A30H-GFI
A30R-GFI**

WIRE: 105°C UL/CSA

GENERATOR



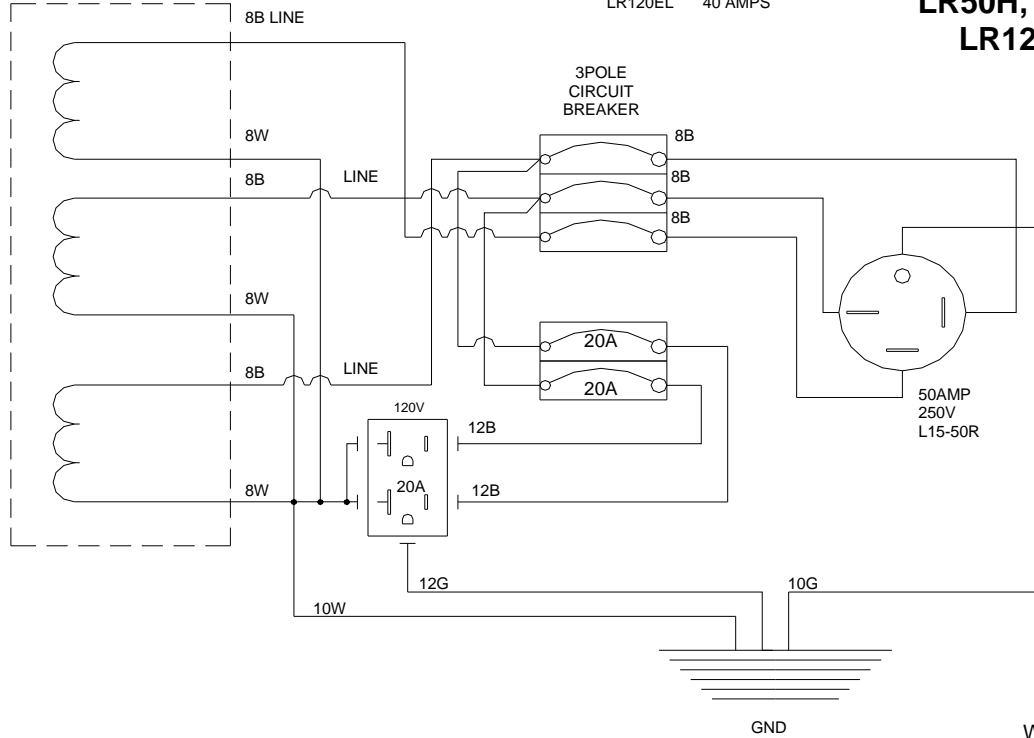
**LA50/55/60
A50/60
SERIES**

WIRE: 105°C UL/CSA

GENERATOR

CIRCUIT BREAKERS	
LR50H	18 AMPS
LR50L	18 AMPS
LR80E	30 AMPS
LR120E	40 AMPS
LR120EL	40 AMPS

THREE PHASE 120/208 VOLT
LR50H, LR50L, LR80E
LR120E, LR180V



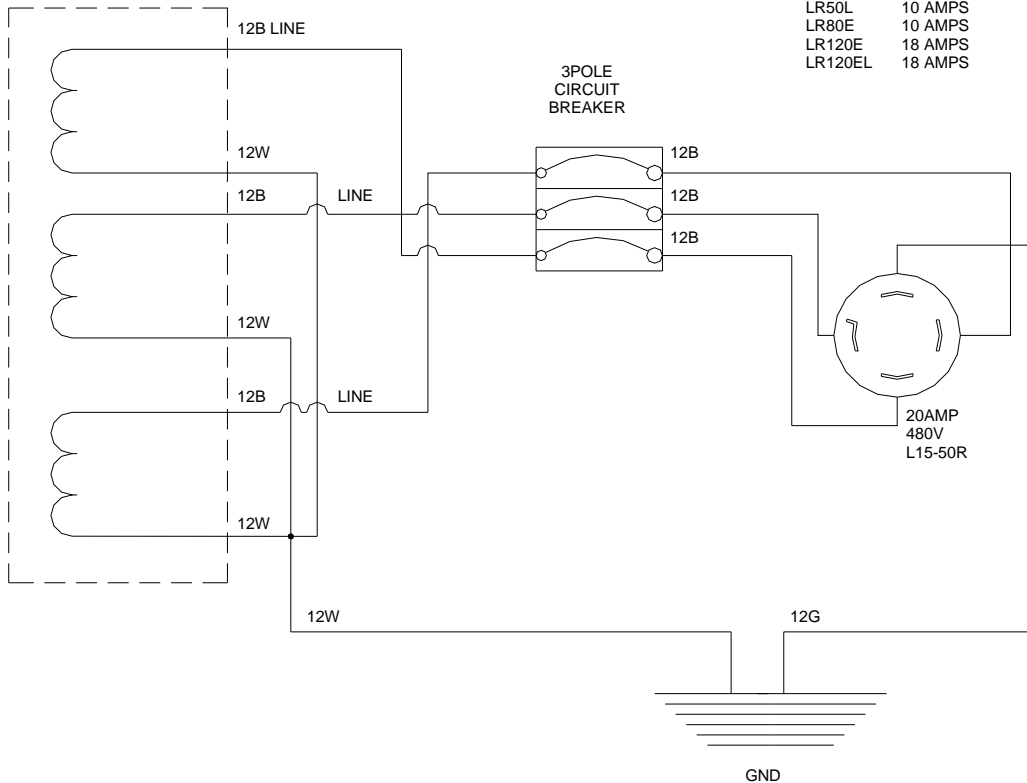
WIRE: 105°C UL/CSA

GENERATOR

CIRCUIT BREAKERS	
LR50H	10 AMPS
LR50L	10 AMPS
LR80E	10 AMPS
LR120E	18 AMPS
LR120EL	18 AMPS

THREE PHASE
480 VOLTS

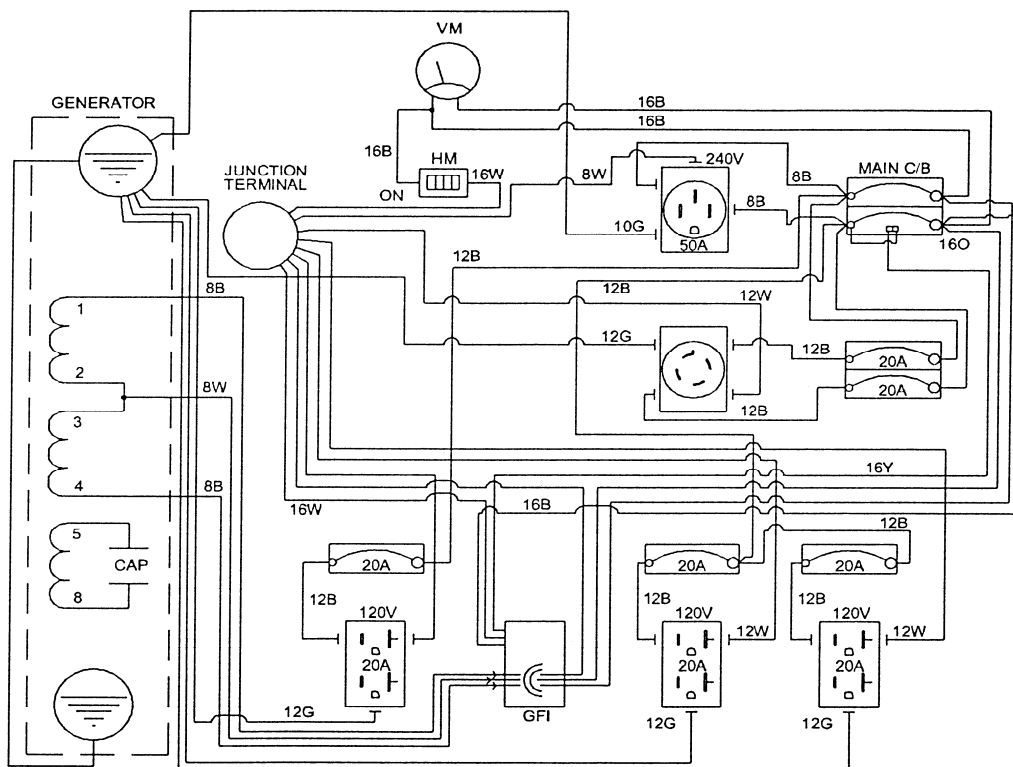
LR50H, LR50L
LR80E, LR120E
LR120EL
LR180V
 (480V-50A, CS8169)



WIRE: 105°C UL/CSA

ON

1 2 3



LR70EH-SG
LR105E-SG
LR105EH-SG
LR150V-SG
LR150EH-SG

GENERAL INFORMATION

Instructions for ordering parts

For parts or service, contact either the factory or the dealer/distributor from whom you purchased this equipment for the name of the nearest authorized Service Station.

1. To avoid errors or delay in filling parts orders, always use part numbers and description along with the model and serial number on the unit.
2. Do not order by reference number or group number.
3. Give the part number, description and quantity.
4. State definite shipping instructions. Any claim for loss or damage to your unit in transit should be filed promptly against the transportation company making the delivery. Shipments are complete unless the packing list indicates items are back ordered.

Prices are not listed in the owner's manual but are on the web site www.voltmaster.com. This product is equipped with an engine that is not covered by the warranty. This engine is covered by the engine manufacturer's warranty. Your nearest engine service center is listed in the Yellow pages under "Engines-Gasoline" or "Gasoline Engines"

FOR SERVICE OR PARTS CONTACT THE FACTORY AT:

Wanco/Voltmaster
5870 Tennyson Street
phone 800 730 3927 or 303-427-5700
fax 303-427-5725
www.voltmaster.com

TWO YEAR LIMITED WARRANTY

LR CONTRACTOR UNITS WITH IDLING SYSTEMS, DIESEL SERIES, SAFE GENS, WELDERS AND THREE PHASE SERIES

This warranty extends to the original purchaser only. The generator sold is warranted to the original purchaser for a period of two (2) years from the original purchase date. The manufacturer warrants the generator sold to be free from defects in material and workmanship if properly installed, serviced and operated within the name plate rating under normal conditions according to the manufacturer's instructions.

DISCLAIMERS

This warranty does not apply to any items which must be repaired or replaced due to normal wear, which have been subject to misuse, negligence, accident or which have been repaired, altered by others outside of the manufacturer's factory unless authorized in writing by the manufacturer. The manufacturer makes no warranty with respect to the engine components not of its manufacture. They are subject to the warranties of their manufacturers. Under no circumstances will the manufacturer be liable for any consequential damage or expense of any kind, including loss of profits not for the fitness of the product for any specific application or purpose. Any implied warranties are limited in duration to the above two (2) year period. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

PERFORMANCE

The manufacturer's obligation under this warranty is limited to correcting without further charge at its factory or authorized service station any part or parts which shall be returned transportation charges prepaid, and which upon examination shall disclose to the manufacturer's satisfaction to have been originally defective. Other than transportation charges, no charge will be made for such repair, adjustment and or replacement. This remedy is expressly in lieu of all other remedies, and is the purchaser's sole and exclusive remedy hereunder. **NO WARRANTY REGISTRATION CARD IS NECESSARY TO OBTAIN WARRANTY. YOU MUST SAVE THE ORIGINAL PURCHASE RECEIPT. A PROOF OF PURCHASE DATE WILL BE REQUIRED TO OBTAIN WARRANTY.**

ONE YEAR LIMITED WARRANTY

ALL MEDIUM DUTY A, LA AND LR UNITS (NO IDLER SYSTEMS)

This warranty extends to the original purchaser only. The generator sold is warranted to the original purchaser for a period of one (1) year from the original purchase date. The manufacturer warrants the generator sold to be free from defects in material and workmanship if properly installed, serviced and operated within nameplate rating under normal conditions according to the manufacturer's instructions.

DISCLAIMERS

This warranty does not apply to any items which must be repaired or replaced due to normal wear, which have been subject to misuse, negligence, accident or which have been repaired, altered by others outside the manufacturer's factory unless authorized in writing by the manufacturer. The manufacturer makes no warranty with respect to the engine components not of its manufacture. They are subject to the warranties of their manufacturers. Under no circumstances will the manufacturer be liable for any consequential damage or expense of any kind, including loss of profits not for the fitness of the product for any specific application or particular purpose. Any implied warranties are limited in duration to the above one (1) year period. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

PERFORMANCE

The manufacturer's obligation under this warranty is limited to correcting without further charge at its factory or authorized service station any part or parts which shall be returned transportation charges prepaid, and which upon examination shall disclose to the manufacturer's satisfaction to have been originally defective. Other than transportation charges, no charge will be made for such repair, adjustment and or replacement. This remedy is expressly in lieu of all other remedies, and is the purchaser's sole and exclusive remedy hereunder. **NO WARRANTY REGISTRATION CARD IS NECESSARY TO OBTAIN WARRANTY. YOU MUST SAVE THE ORIGINAL PURCHASE RECEIPT. A PROOF OF PURCHASE DATE WILL BE REQUIRED TO OBTAIN WARRANTY.**