



**PT-8KW
PT-10KW
PT-12KW
Operators
Manual**

Power Technology Southeast, Inc.
634 State Road 44 Leesburg, FL 34748-8103
◆ (352) 365-2777 ◆ Fax (352) 787-5545 ◆

FORWARD

You are now the proud owner of a Power Technology Generator powered by a Kubota engine. This engine is a product of Kubota's quality engineering and manufacturing. The engine is made with fine materials and manufactured under the strictest quality control standards and will assure you long satisfactory service. To obtain the best use of your engine, please read this manual carefully. It will help you become familiar with the operation of the engine and contains many helpful hints regarding engine maintenance. Continuing improvements and advancements in product design may have caused changes to your engine, which are not included in this manual.

Please contact Power Technology's Customer Service Department for latest information on your Kubota engine or for the number of your local Kubota dealer.

TO OUR CUSTOMERS

Thank you for your purchase of a Power Technology Generator. The information contained in this manual applies to PT-8-10-12 generators. In the event you experience a problem with your generator please contact the sales dealer, one of our authorized service centers or Power Technology's Customer Service Department directly at 1-800-760-0027 from 8:00 a.m. to 5:00 p.m. EST. Please have the generator model and serial numbers available when you call. This will help expedite service and parts to you. Parts may be obtained directly through Power Technology and shipped the same day if ordered by 3:00 p.m. EST.

Generator Model Number _____

Generator Serial Number _____

POWER TECHNOLOGY SOUTHEAST, INC.
634 STATE RD. 44
LEESBURG, FL. 34748-8103
(352) 365-2777
FAX (352) 787-5545
www.PowerTech-Gen.com

POWER TECHNOLOGY SOUTHEAST, INC.

Limited Warranty on Power Technology Generators

Power Technology Southeast, Inc. warrants to you, the original purchaser, that each product of our manufacture is free from defects in materials, and workmanship. That each generator will deliver its rated output as indicated on the Power Technology Nameplate, if properly installed, serviced, and operated under normal conditions in accordance with Power Technology's instructions.

THE WARRANTY WILL BE IN EFFECT FOR THE FOLLOWING PERIOD

- 1) Units installed in recreational vehicles: 3 years from in service date or 42 months from date of manufacture or 2000 hours whichever comes first. Parts, and labor, including diagnostic labor, removal, and reinstallation are covered for the first 24 months from date in service or 1000 hours which ever comes first.
Parts and labor are covered on the following generator and engine parts for 3 years or 2000 hours whichever comes first.
Generator Parts: Main Rotor or Main Stator.
Engine Parts: Cylinder Block, cylinder head, crankshaft, pistons, rings, valves, valve lifters, manifolds (Only covered if Flex Pipe connector is used between the manifold and floor flange) and other major castings. See Engine Manufacturers Warranty guide.
- 2) Non RV, Commercial or Marine Use: 1 year or 2000 hours, whichever comes first.
- 3) Rental Units: 1 year or 2000 hours, whichever comes first.
- 4) Replacement Parts for Units Warranted: 90 days.

WHAT POWER TECHNOLOGY WILL DO

Power Tech will at our option, repair or replace any part covered by this Warranty which becomes defective, malfunctions or otherwise fails to conform with this Warranty under normal use and service during the term of this Warranty at no charge for parts or labor.

WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE

In order to obtain Warranty repairs you must deliver the product, together with proof of purchase to an authorized or recognized Power Technology Service facility or in the case of Engine Repairs you may use any Authorized dealer or distributor, or any RV or generator service facility considered competent by Power Technology.

PRIOR APPROVAL is REQUIRED for ANY WARRANTY SERVICE

THIS WARRANTY DOES NOT COVER

- 1) Defects, malfunctions or failure resulting from accidents, abuse, misuse, improper servicing, lack of performance of required maintenance service or normal wear.
- 2) Products which have been subjected to alteration, modification, neglect, or unauthorized repairs.
- 3) Replacement of filters, belts, antifreeze or lubricants.
- 4) Electrical items damaged by welding or jump-starting.
- 5) Damaged caused by contaminated oil, bad fuel, use of Ether or any starting fluid, rust contaminants in the fuel system or improper mixture of antifreeze and water.
- 6) The replacement of complete assembly (unless prior approval has been granted by Power Technology). Components must be disassembled and repaired as necessary.
- 7) Overtime labor requested by the customer.
- 8) Starting Batteries.
- 9) Damage caused by water entering the engine by any means.
- 10) Failure of fuel system components due to impurities in the fuel, routine fuel system maintenance and fuel filter replacement.
- 11) Any damage caused by overheating that is not a direct result of a defect in material or workmanship.
- 12) Any generator not application approved.
- 13) Any damage caused by failure to immediately correct a known or suspected engine, generator or accessory problem.
- 14) Travel time, mileage or labor for removal of a Power Technology Product from its application and reinstallation except as indicated below.
A) Removal and Reinstallation:
Power Technology will pay the following stated labor at straight time only for Warranty work requiring removal and reinstallation of Power Technology products in the following applications.
Provided such work is performed by a Power Technology authorized service center or designated service representative.

- B) On highway recreational and commercial vehicle applications, up to a maximum of two (2) hours.
- C) a) Marine generator installations (Below deck) up to a maximum of four (4) hours.
b) Travel time and mileage.
Marine, industrial standby generators, residential standby systems. Provided the set is permanently wired in a stationary installation. Power Technology will for 12 months from date of purchase, pay travel time up to five(5) hours and mileage up to 250 miles for related Warranty repairs provided such travel and repairs are performed by a Power Technology service center or designated service representative.
- 15) Loss of generator excitation due to prolonged storage.
- 16) Any damage attributed to an external Low Battery Control Monitoring or Auto-Generator Start System.

GENERAL CONDITIONS

- 1) This Warranty is the sole property of the original owner / user. A transfer of ownership shall terminate this Warranty.
- 2) This Warranty is only valid within the United States and Canada.
- 3) This Warranty does not cover any products or parts not purchased from Power Technology.
- 4) Problems arising from improper installation are the responsibility of the installer and are not covered by the Power Technology Warranty.
- 5) Power Technology reserves the right to make design improvements and model changes without any obligation to change units or parts previously manufactured.
- 6) Warranty registration card must be completed and mailed to Power Technology to validate the Warranty.

THIS IS THE ONLY EXPRESS WARRANTY ON POWER TECHNOLOGY PRODUCTS

No person, agent or dealer is authorized to give any Warranties on behalf of Power Technology Southeast, Inc., and not to assume for Power Technology Southeast, Inc. any other liability in connection with any of its products unless made in writing and signed by an officer of Power Technology Southeast, Inc.

LIMITATIONS ON OUR RESPONSIBILITY WITH RESPECT TO PRODUCTS PURCHASED AND USED FOR PERSONAL, FAMILY OR HOUSEHOLD USE

Our responsibility is to repair or replace defective parts as stated above. We will not be responsible for any other expenses, losses or inconvenience which you may sustain as a result of the purchase, use, malfunction or defective condition of our products. ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL BE LIMITED IN DURATION TO THE PERIOD SET FORTH ABOVE. Some states do not allow limitations on how long an implied Warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights and you may have other rights which vary from state to state.

LIMITATIONS ON OUR RESPONSIBILITY WITH RESPECT TO PRODUCTS USED FOR RENTAL OR FOR COMMERCIAL, INDUSTRIAL OR AGRICULTURAL PURPOSES

This Warranty is in lieu of all other Warranties, expressed or implied and of any other obligations or liability on our part. WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. Our responsibility for any and all losses and damages resulting from any cause whatsoever, including our negligence, alleged damaged or defective goods, whether such defects are discoverable or latent, shall be limited to the repair or replacement of defective parts as stated above.

IN NO EVENT WILL WE BE LIABLE FOR LOSS OF USE, LOSS OF PROFITS, INCONVIENCE, COMMERCIAL LOSS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER.

SECTION 1 “SAFETY”


SAFE OPERATION _____


1-4

Observe Safety Instructions
Wear Safety Clothing
Check Before Operating the Engine
Keep Area Around the Engine Clean
Safe Handling of Fuel and Lubricants
Exhaust Gases and Fire Prevention
Escaping Fluids
Cautions Against Burns and Battery Explosion
Keep Hands and Body Away From Rotating Parts
Anti-Freeze and Disposal of Fluids
Conducting Safety Checks and Maintenance



This symbol, the industry’s “Safety Alert Symbol”, is used throughout this manual and on labels attached the machine itself. It warns of the potential for personal injury. It is essential that you carefully read the instructions and safety regulations before you attempt to assemble or use this unit.

 **WARNING:** Indicates a potentially hazardous situation, which may possibly result in serious injury or possible death.

 **CAUTION:** Indicates a potentially hazardous situation, which may possibly result in minor injury.

IMPORTANT: Indicates that equipment or property damage may result if instructions are not followed.

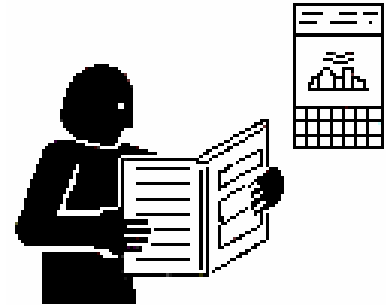
NOTE: Indicates helpful information.

SAFE OPERATION

Cautious operation is your best insurance against an accident. Read and understand this section carefully before operating the engine. All operators, no matter how knowledgeable they may be, should read this and other related manuals before operating the engine or any equipment attached to it. It is the owner's responsibility to instruct all operators in safe operation. Be sure to observe the following for safe operation.

OBSERVE SAFETY INSTRUCTIONS

- Read, understand and follow this “OPERATORS MANUAL” and “LABELS ON THE ENGINE” before starting and operating the engine.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the engine in good condition.
- Before allowing other people to use your engine, explain how to operate and have them read this manual before operation.
- DO NOT modify the engine. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and/or safety and affect engine life.



WEAR SAFETY CLOTHING

- DO NOT wear loose, torn or bulky clothing around machinery. Entanglement in rotating parts, controls or projections may cause personal injury.
- Use additional safety items, e.g. hardhat, eye protection, gloves, etc., as appropriate or required.
- DO NOT operate machinery or equipment while under the influence of alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating engine.



CHECK BEFORE OPERATING THE ENGINE

- If the engine is malfunctioning DO NOT operate until repairs are made.
- Be sure all guards and shields are in place before operating the engine. Replace any that are damaged or missing.
- Check to see that the area around the engine is clear of foreign objects before starting.
- Always keep the engine at least 3 feet (1 meter) away from buildings or other facilities.
- DO NOT allow children or livestock to approach the machine while in operation.
- DO NOT start the engine by shorting across starter terminals.



KEEP AREA AROUND THE ENGINE CLEAN

- Be sure to stop the engine before cleaning.
- Keep the engine clean and free of accumulated dirt, grease and trash.
- DO NOT stop the engine without idling; Temperatures around the engine rises suddenly. Keep the engine idling for about 5 minutes before stopping.



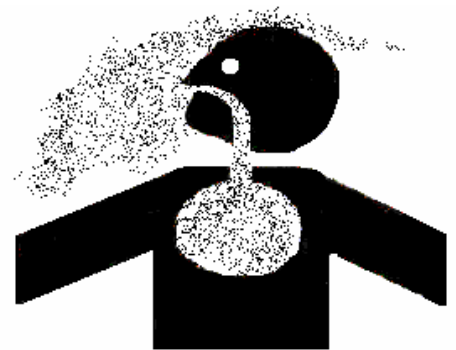
SAFE HANDLING OF FUEL AND LUBRICANTS

- Always stop the engine before refueling or lubricating.
- DO NOT smoke or allow flames or sparks in your working area. Fuel is extremely flammable and explosive. Never store flammable liquids in the engine compartment.
- Refuel at a well-ventilated and open place. If fuel or lubricants spill, clean up immediately and properly dispose of.
- DO NOT mix gasoline or alcohol with diesel fuel. The mixture can cause a fire.



EXHAUST GASES AND FIRE PREVENTION

- Engine exhaust fumes can be very harmful if allowed to accumulate. Be sure to run the engine in a well-ventilated area where there are no people or livestock near by.
- The exhaust gas from the muffler is very hot. To prevent a fire, do not expose dry grass, oil or any other combustible materials to exhaust gas. Keep the engine and mufflers clean all the time.
- To avoid a fire, be alert for leaks of flammables from hoses and lines. Be sure to check for leaks from hoses and pipes, such as fuel and hydraulic by following the maintenance check list.
- To avoid a fire, do not short across power cables and wires. Check to see that all power cables and wires are in good condition. Keep all power connections clean. Bare wire or frayed insulation can cause a dangerous electrical shock and personal injury.



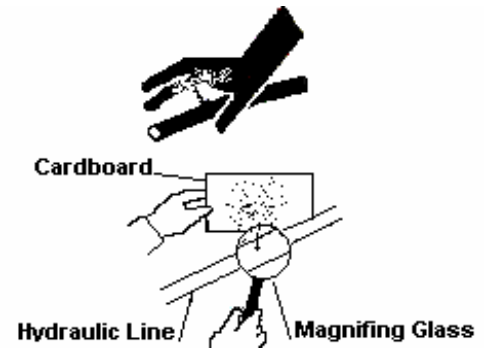
CALIFORNIA

Proposition 65 Warning

Diesel Engine Exhaust and some
of it's constituents are known by the
State of California
to cause
Cancer, Birth Defects and Other
Reproductive harm.

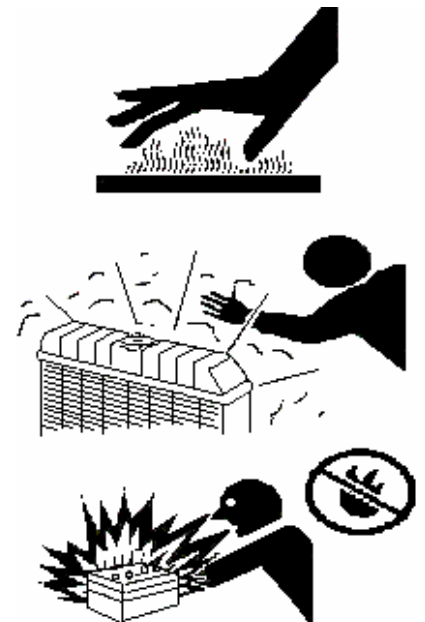
ESCAPING FLUIDS

- Relieve all pressure in the air, oil and cooling systems before any lines, fittings or related items are removed or disconnected.
- Be alert for possible pressure release when disconnecting any dev from a system that is pressurized. DO NOT check for pressure leaks with your hands. High-pressure oil or fuel can cause personal injury.
- Escaping hydraulic fluid under pressure has sufficient force to penetrate skin causing serious personal injury.
- Fluid escaping from pinholes may be invisible. Use a piece of cardboard or wood to search for suspected leaks: do not use hands and body. Use safety goggles or other eye protection when checking for leaks.
- If injured by escaping fluid, see a medical doctor immediately. This fluid can produce gangrene or severe allergic reaction.



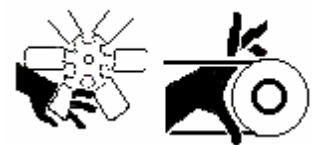
CAUTIONS AGAINST BURNS AND BATTERY EXPLOSION

- To avoid burns, be alert for hot components during operation and just after the engine has been shut off. Such as the muffler, muffler cover, radiator, piping, engine body, coolants, engine oil, etc.
- DO NOT remove the radiator cap while the engine is running or immediately after stopping. Wait approximately ten minutes for the radiator to cool before removing the cap.
- Be sure the radiator drain valve / petcock and hose clamps are tighten. Check radiator pressure cap and oil fill cap before operating the engine.
- The battery presents an explosive hazard. When the battery is being activated, hydrogen and oxygen gases are extremely explosive.
- Keep sparks and open flames away from the battery, especially during charging. DO NOT strike a match near the battery.
- DO NOT check a batteries charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.
- DO NOT charge a battery if frozen, it may possibly explode. Frozen batteries must be warm up to at least 61°F (16°C) before charging.



KEEP HANDS AND BODY AWAY FROM ROTATING PARTS

- Keep your hands and body away from all rotating parts, such as cooling fan, v-belts, pulleys and flywheel. Contact with these rotating parts can cause serious personal injury.
- Be sure to stop the engine before adjusting belt tension or checking the cooling fan.
- DO NOT run the engine without safety guards installed. Be sure the safety guards are properly aligned and securely fastened before operating the engine.



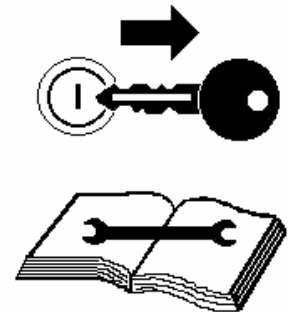
ANTI-FREEZE AND DISPOSAL OF FLUIDS

- Anti-freeze contains toxic chemicals. Wear rubber gloves when handling anti-freeze. In case of contact with skin, wash immediately to avoid personal injury.
- DO NOT mix different types of Anti-freeze. The mixture can produce a chemical reaction resulting in the formation of harmful substances. Only use anti-freeze that is recommended and approved by Caterpillar.
- Be mindful of the environment. Before draining any fluids, be prepared to dispose of them in a manner consistent with environmental protection regulations in your location.
- When draining fluids from the engine, use appropriate containers to hold the different fluids, do not mix fuel, oil or coolant together.
- Dispose of spent filter cartridges and batteries properly.
- DO NOT pollute the soil, or any water source. Never pour fluids down a drain.



CONDUCTING SAFETY CHECKS AND MAINTENANCE

- When performing safety checks or engine service, be sure the engine is level and well supported. Use approved stands designed for this type of service. DO NOT service an engine that is only supported by a lift jack or hoist.
- Detach the battery from the engine before conducting service. Put a “DO NOT OPERATE!” tag in the key switch to avoid accidental starting.
- To avoid sparks from an accidental short circuit always disconnect the 12V DC power at the battery.
- Be sure to stop the engine and remove the key when conducting daily and periodic maintenance, servicing and cleaning.
- Check or conduct maintenance after the engine, radiator, muffler, or muffler cover has cooled off completely.
- Always use the appropriate tools and jig-fixtured when performing any service work. Be sure to understand and follow the instructions included with these tools.
- Use ONLY correct engine barring techniques for manually rotating the engine. DO NOT attempt to rotate the engine by pulling or prying on the cooling fan and V-belt. Serious personal injury or damage to the cooling fan may occur.
- Replace fuel hoses and hose clamps every 2 years or earlier whether they are damaged or not. They are made of rubber and are aged gradually.
- When service is performed with two or more people present, take care to perform all work safely. Be aware of their location especially when starting the engine.
- Keep a first aid kit and fire extinguisher handy at all times.



SECTION 2

“ENGINE”

PRE-OPERATION CHECK _____	1
Engine Break-in Period	
Daily Check	
OPERATING THE ENGINE _____	2
Engine Starting Controls	
Starting the Engine	
Check Engine After Starting	
Stopping the Engine	
ENGINE SPECIFICATIONS _____	3
Kubota Models D1105-EBG1 and V1505-EBG1	
Service Parts	
ENGINE MAINTENANCE SERVICE SCHEDULE _____	4
ENGINE OIL MAINTENANCE _____	5
Checking Engine Oil Level	
Lubricating Oil Specifications	
Engine Refill Capacities	
Lubricating Oil Viscosity Recommendations	
ENGINE COOLANT MAINTENANCE _____	6
Coolant Recommendations	
Ethylene Glycol / Propylene Glycol	
Checking Radiator Coolant Level	
Coolant Service Life	
Checking Reservoir Tank Coolant Level	
Cleaning Radiator Core	
OPERATING HOURS AND SERVICE LOG _____	7
ENGINE TROUBLESHOOTING GUIDES _____	8-10
Engine Starts but Won't Run	
Engine Runs Rough or Slow	
Engine Will Not Start	

PRE-OPERATION CHECK

ENGINE BREAK-IN PERIOD

During the engine break-in period, observe the following recommendations:

1. Change the engine oil and oil filter cartridge after the first 50 hours of operation. (See “ENGINE OIL” in ENGINE MAINTENANCE SERVICE SCHEDULE).
2. In ambient temperature above 32°F (0°C) approximately 3-5 minutes without a load is sufficient for engine warm up. Allow additional warm up time when temperatures are below 32°F (0°C) before placing an operating load on the engine.

DAILY CHECK

To prevent future engine problems from occurring, it is important to know and keep track of the engines condition. Below are items to be Inspected and Checked on a daily basis.

CAUTION:

To avoid personal injury:

- Be sure all safety shields and guards are attached to the engine when operating.
 - To prevent a fire hazard, keep foreign materials, fuel and oil away from the battery, wiring, muffler and engine. Check and clear them daily. Be aware of the muffler and exhaust gas heat underneath the engine compartment, this heat may ignite grass or other flammable materials.
 - Follow all safety precautions as outlined in the “SAFE OPERATION” section.
1. For accurate readings the engine should be on level ground when checking engine fluids.
 2. Check fluids before starting the engine. (Cold Engine)
 - Lubrication System: Check Engine oil level
Check for Engine oil leaks
 - Cooling System: Check coolant level and condition
Check for coolant leaks
Check for proper installation of the radiator cap
 - Fuel System: Check for sufficient quantity of fuel
Check for fuel leaks
 3. Check engine after starting. (Warm Engine)
 - Proper Operation: Check for easy engine start
Check for fluid leaks
Check for abnormal engine noises
Check for abnormal exhaust gas

OPERATING THE ENGINE

ENGINE STARTING CONTROLS

- 1) Generator Main Switch must be in the ON position.
- 2) Hold Start/Stop Switch for 1 second and release.
- 3) Glow Plugs will preheat for 8 seconds. LED flashes slowly.
- 4) Preheating will cease during engine cranking cycle. LED continues flashing.
- 5) Engine begins an 8 seconds crank cycle, After 4 seconds of cranking the PT-ECU-63 will check for an AC signal from the generator. If an AC signal is verified the engine will start and the LED will remain ON during the normal run operation. If the AC signal is not verified the PT-ECU-63 will terminate the cranking cycle and LED will flash a fault code.
- 6) Starter disengages immediately after engine run is verified.
- 7) PT-ECU-63 deactivates the Low Oil Pressure and High Water Temperature Switches for 6 seconds, this will assure oil pressure build-up time. If oil pressure does not build-up the engine will immediately shut down and go into a fault mode. Likewise for a high temperature situation.
- 8) If engine will not start on the first attempt the PT-ECU-63 will initiate the start cycle 2 more times before going into a fault mode. Glow Plugs will preheat for 8 seconds per attempt. Engine will crank for 8 seconds per attempt.
- 9) To shut down the engine under normal operations, hold the Start/Stop Switch for 1 second and release.
- 10) If a fault occurs turn Generator Main Switch OFF and then ON to reset PT-ECU-63.

CHECKING ENGINE AFTER STARTING

- 1) Allow the engine to warm up 3 to 5 minutes before applying a load. In colder climates allow a few extra minutes longer.
- 2) Perform a visual inspection of all areas of the engine and generator.
- 3) Listen for any abnormal noises.
- 4) Check for any abnormal exhaust gases.

STOPPING THE ENGINE

It is recommended to disconnect or reduce the power load from the generator before shutting down the engine. Then follow the steps outlined above for normal shut down.

NOTE: The PT-ECU-63 is designed to operate on 12V DC power. In a low battery situation the PT-ECU-63 may not initiate the normal cranking cycle. To start the generator you can press and hold the Start/Stop Switch for approximately 10 seconds or until the engine starts. Once the engine starts the PT-ECU-63 will resume normal operations. If this situation re-occurs, charge or replace the battery.

IMPORTANT: Damage to the Starter Motor, Starter Solenoid, Run Solenoid or any generator component due to excessive or prolonged starting attempts attributed to an external Low Battery Control Monitoring or Auto-Start System will not be covered by the Power Technology Southeast, Inc. Limited Warranty.

ENGINE SPECIFICATIONS

<u>MODEL</u>	<u>Kubota D1105-EBG1</u>	<u>Kubota V1505-EBG1</u>
Continuous Output	13.6HP @ 1800 rpm	17.9HP @ 1800 rpm
Cubic Capacity	68.53 in ³ (1.123.L)	91.41in ³ (1.498L)
Bore and Stroke	3.07” x 3.09” (78.0 x 78.4mm)	3.07” x 3.09” (78.0 x 78.4mm)
Cylinder Arrangement	3 In-Line	4 In-Line
Firing Order	1-2-3	1-3-4-2
Compression Ratio	22:1	22:1
Engine Oil Capacity	5.38qts. (5.1L)	6.34 qts. (6.0L)
Coolant Capacity	3.27qts. (3.1L)	4.22qts. (4.0L)
Fuel and Type	Diesel No. 2-D 4 Cycle	Diesel No. 2-D 4 Cycle
Minimum Fuel Consumption	See Specification Chart	See Specification Chart

SERVICE PARTS

Power Technology Part

Filters:

Oil ----- 01FO05S
 Fuel ----- 08FF081
 Air ----- 04FA221

Belts:

With Alternator or Idler Pulley-----03BF1305
 Without Alternator or Idler Pulley-----03BF7305

Thermostat-----03THM0305NEW

Engine Maintenance Service Schedule

Maintenance Service Item	*See Note	Daily	Min. Every 25 Hours	Every 100 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Remarks
Engine Oil Level Deterioration & Leakage		X						
Engine Oil Change	*			X				Or Once a Year
Oil Filter Change				X				Or Once a Year
Coolant Level		X						
Coolant Leakage		X						
Coolant Change							X	Or Once a Year
Fuel Level		X						As Necessary
Fuel Leakage		X						
Fuel Filter Replacement						X		Or Once a Year
Air Filter Replacement	**					X		Or Once a Year
Damaged Worn Or Loose Belts		X						Or Every Two Years
Replace Fuel Hoses							X	Or Every Two Years
Check Radiator Hoses & Clamps						X		Once a Year
Abnormal Engine Noise		X						
Abnormal Generator Noise		X						
Muffler Condition		X						
Exhaust Gas Condition		X						

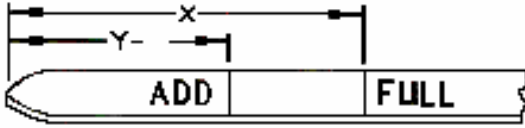
* Engine oil and filter must be changed after the first 50 hours of operation. Then every 100 hours or once a year whichever comes first.

** Air filter replacement interval will vary depending on operating conditions. Adverse conditions may require frequent service.

NOTE: Under normal operation items such as Belts, Hoses and Filters are not covered by Power Technology Southeast, Inc. Limited Warranty.

ENGINE OIL MAINTENANCE

CHECKING ENGINE OIL LEVEL



(Y) “ADD” mark. (X) “FULL” mark.

1. Maintain the engine oil level between “ADD” mark and “FULL” mark on oil level gauge. Do not fill crankcase above “FULL” mark.
2. Remove the oil filler cap and add oil, if necessary. Clean the oil filler cap. Install the oil filler cap.

The refill capacities for the engine crankcase reflect the approximate capacity of the crankcase or sump plus a standard oil filter. Auxiliary oil filter systems will require additional oil.

LUBRICATING OIL SPECIFICATION

Use only good quality lubricating oil, which meets or exceeds of the following Specification

API-CD
or
Higher

KUBOTA ENGINE REFILL CAPACITIES

	D1105-EBG1
Crankcase Oil Sump and Filter	5.38Qts. (5.1L)
	V1505-EBG1
	6.34Qts. (6.0L)

LUBRICATING OIL VISCOSITY RECOMMENDATIONS

The minimum ambient temperature during cold engine start-up and the maximum ambient temperature during engine operation determine the proper SAE viscosity grade of oil.

Refer to the Engine Oil Viscosity Table below (Minimum Temperature) in order to determine the required oil viscosity for starting an engine in cold conditions.

Refer to the Engine Oil Viscosity Table below (Maximum Temperature) in order to select the oil viscosity for engine operation at the highest ambient temperature that is anticipated.

Ambient Temperature	Oil Viscosity
Above 25°C (77°F)	SAE 10W-30 SAE 30 or SAE 10W-40
0 to 25°C (32° to 77°F)	SAE 10W-30 SAE 20 or SAE10W-40
Below 0°C (32°F)	SAE 10W-30 SAE 10W or SAE 10W-40

ENGINE COOLANT MAINTENANCE

COOLANT RECOMMENDATIONS

For optimum performance, Power Technology recommends a 1:1 mixture of water / glycol.

NOTE: Use a mixture that will provide protection against the lowest ambient temperature.

NOTE: 100 percent pure glycol will freeze at a temperature of -23°C (-9°F).

Most conventional heavy-duty coolant / antifreezes use Ethylene Glycol. Propylene Glycol may also be used in a 1:1 mixture with water. Ethylene and Propylene Glycol provide similar protection against freezing and boiling. See the tables below.

ETHYLENE GLYCOL

Concentration	Freeze Protection	Boil Protection
50 Percent	-36°C (-33°F)	106°C (223°F)
60 Percent	-51°C (-60°F)	111°C (232°F)

PROPYLENE GLYCOL

Concentration	Freeze Protection	Boil Protection
50 Percent	-29°C (-20°F)	106°C (223°F)

NOTE: Do not use Propylene Glycol in concentrations that exceed 50 percent glycol because of Propylene Glycol's reduced heat transfer capability. Use Ethylene Glycol in conditions that require additional protection against boiling or freezing.

CHECKING RADIATOR COOLANT LEVEL

Remove the radiator cap after the engine has completely cooled and check to see that coolant reaches the supply port.

1. Fill to the bottom of the fill neck and check after every 25 hours of operation.

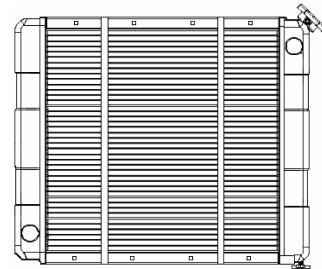
COOLANT SERVICE LIFE

<u>Coolant Type</u>	<u>Service Life</u>
Commercial Heavy-Duty Coolant/Antifreeze that Meets "ASTM D5345"	3000 Service Hours or Two Years
Commercial Heavy-Duty Coolant/Antifreeze that Meets "ASTM D4985"	3000 Service Hours or One Year

NOTE: Do not use a commercial coolant/antifreeze that only meets the ASTM D3306 or D4656 specification. This type of coolant/antifreeze is made for light duty automotive applications.

CHECKING RESERVOIR TANK COOLANT LEVEL

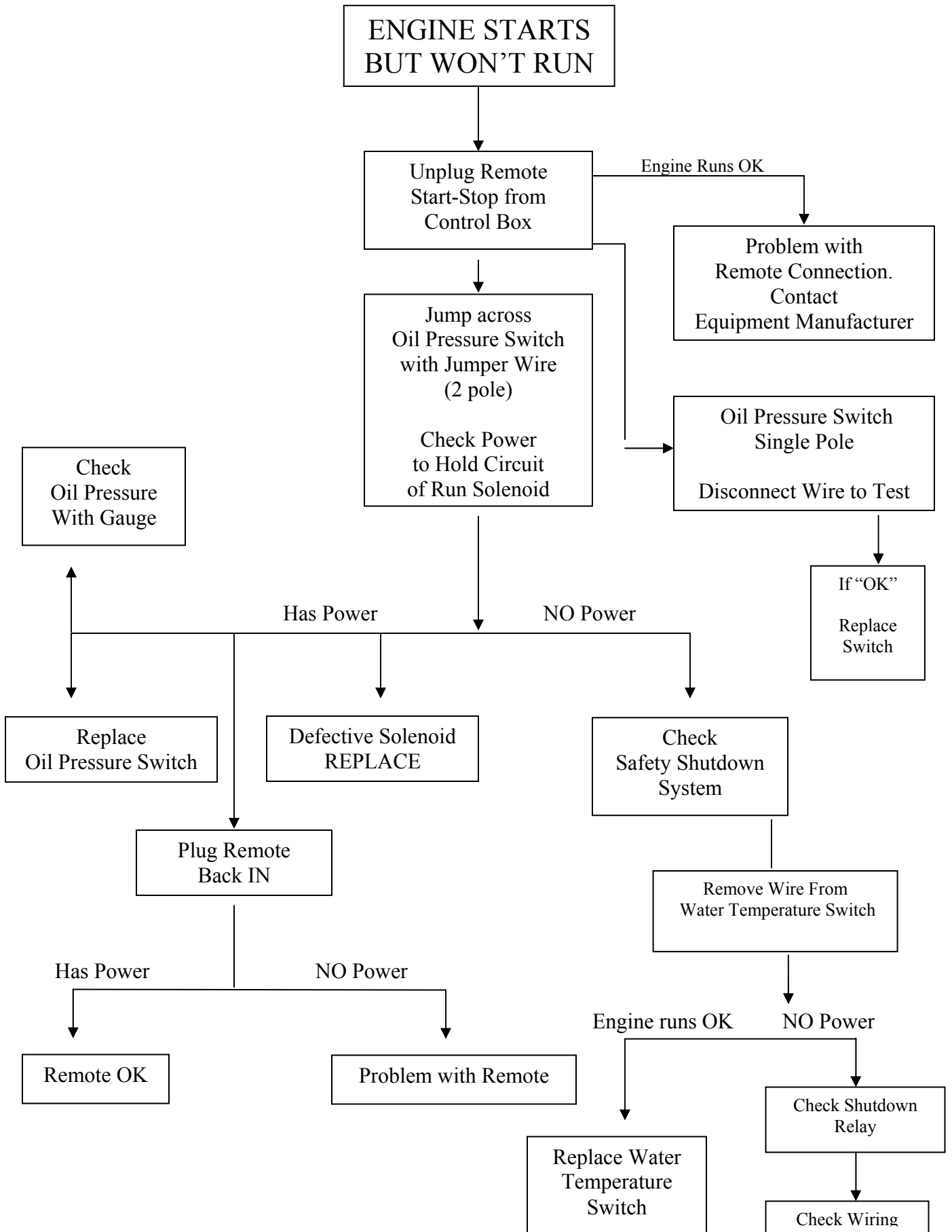
(At a Minimum of 25 Hours of Operation)
Ensure that the coolant level of the radiator reservoir tank is between the upper limit (FULL) and the lower limit (LOW) on the side of the reservoir tank.

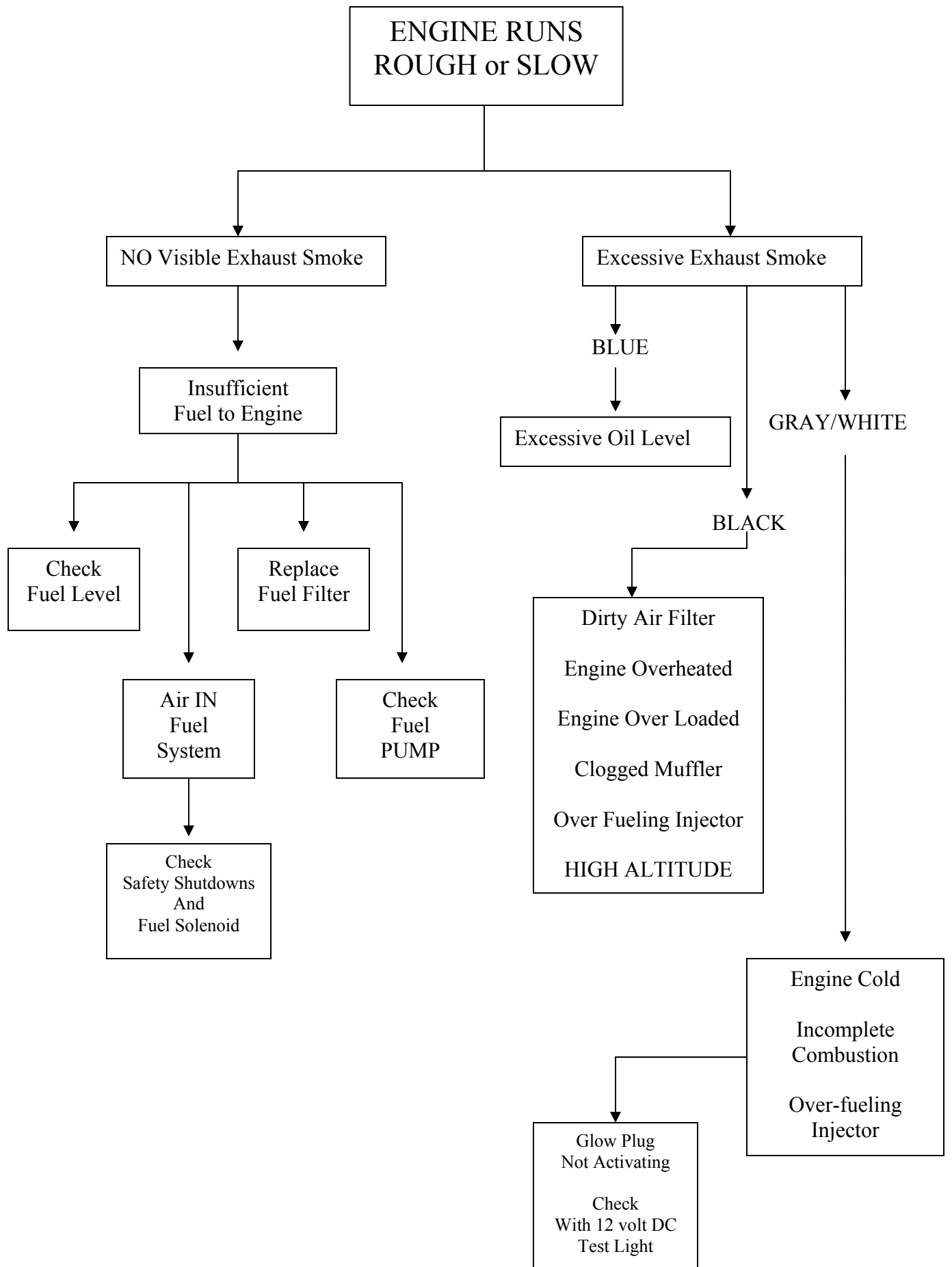


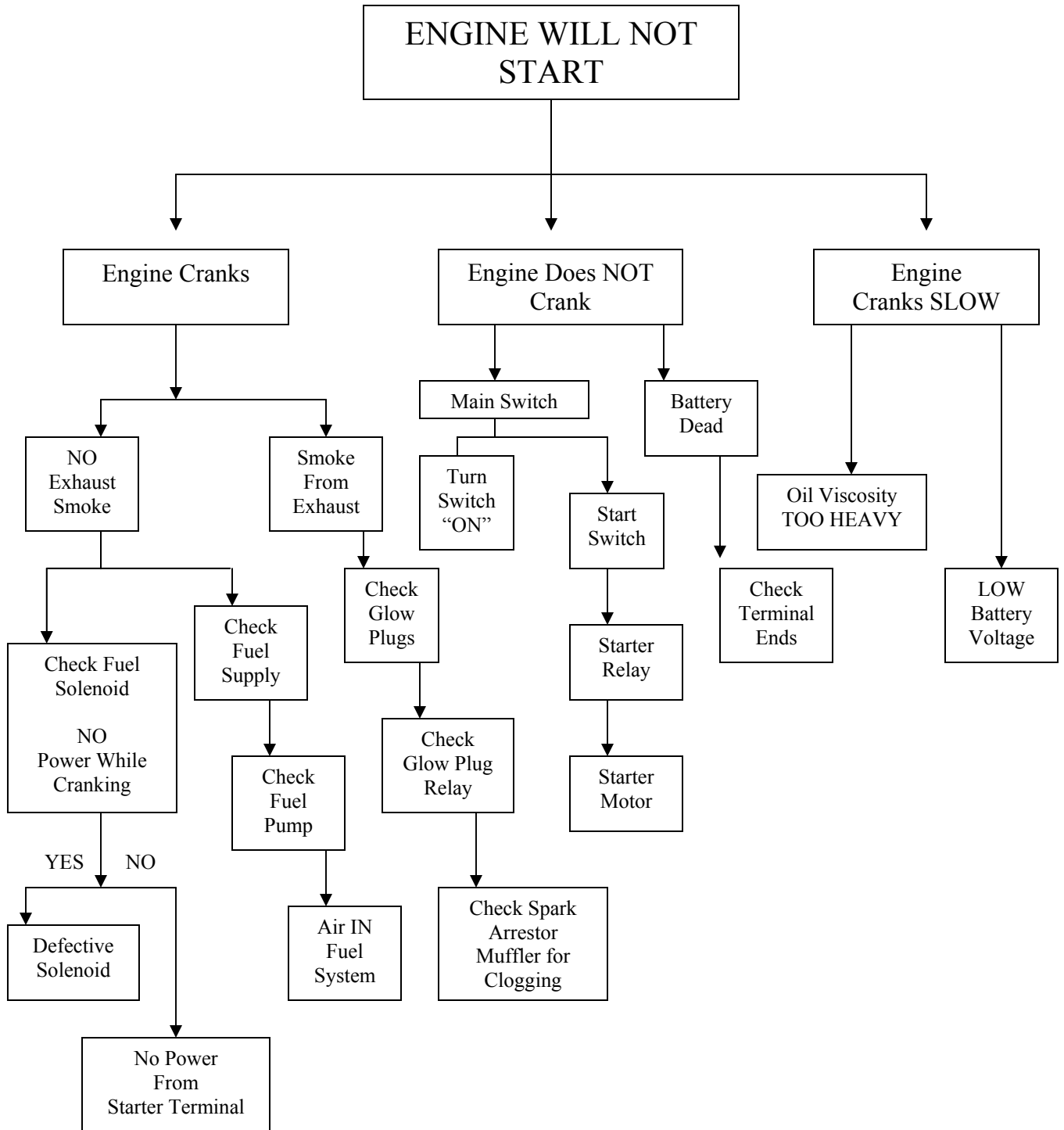
CLEANING RADIATOR CORE

Visually inspect the core for any obstructions such as dirt or debris. Use running water to clean particles from between fins.

IMPORTANT: Never use hard objects to clean radiator core, damage to core could result.







SECTION 3
“GENERATOR END”

GENERATOR ASSEMBLY INFORMATION _____	1-2
Brush Type	
Exciter Type	
Electronic Voltage Regulation	
Voltage Connection	
Field Coil Voltage Source (Exciter Type Only)	
Rotating Field Assembly (Rotor)	
Core Assembly	
Field Coil	
Balance	
Bearing	
Stator Assembly	
EXCITER TYPE “C” GENERATOR ASSEMBLY _____	3
BRUSH TYPE “C” GENERATOR ASSEMBLY _____	4
GENERATOR END TROUBLESHOOTING GUIDES _____	5-7
Zero or Low Voltage	
Voltage Test	
12-Volt Battery Test	
Overload Condition	
WIRING SCHEMATICS _____	8-15
120 Volt Connection “C” Series Exciter Type	
120 / 240 Volt Connection “C” Series Exciter Type	
120 Volt Connection “M” Series Brush Type	
120 / 240 Volt Connection “M” Series Brush Type	
120 Volt Connection “C” Series Brush Type, VR 2.1 Regulator. 8KW	
120/240 Volt Connection “C” Series Brush Type, VR 2.1A Regulator. 8KW	
120 Volt Connection “C” Series Brush Type, VR 2.1 Regulator 12KW (Prior to 10/7/04)	
120/240 Volt Connection “C” Series Brush Type, VR 2.1B Regulator. 12KW (After 10/7/04)	

GENERATOR ASSEMBLY INFORMATION

BRUSH and EXCITER TYPE GENERATOR

BRUSH TYPE

Brush Type generators use a set of carbon or graphite brushes that are set into a spring loaded brush holder, which house and support the brushes. This brush holder is mounted in such a way as to allow the brushes to maintain a sliding electrical contact between the stationary and rotating components of the generator. This connection enables DC current to flow from the Voltage Regulator through the Brushes and into the Rotor assembly.

EXCITER TYPE

The exciter pole pieces contain residual magnetism, which sets up lines of force across the air gap to the exciter armature. When the exciter begins to rotate a voltage is induced and current flow is initiated in the exciter armature AC windings. This voltage is fed to the rotating rectifier assembly, rectified and fed to the alternator field, which sets up lines of force across the air gap to the alternator stator windings and to the output circuit.

A static voltage regulator is connected to the generator output. The regulator will rectify part of the output voltage to provide a DC voltage to the exciter field coils. This will increase the density of the lines of force in the exciter, increasing the voltage induced into the exciter armature windings, and therefore, to the rotating rectifiers. The rotating rectifier output will increase which will increase the alternator field strength and generator output will build up its rated voltage. Adjustment of the generator output to the rated voltage level is accomplished by controlling the current fed to the exciter field coils. Regulation is automatic with the static type voltage regulator. An additional voltage adjustment range is provided if desired by turning the Voltage Adjust Rheostat.

ELECTRONIC VOLTAGE REGULATION

Electronic Voltage Regulator (EVR) also referred to, as an Automatic Voltage Regulator (AVR) is a very reliable device, which uses solid-state electronics to maintain voltage accuracy at $\pm 2\%$ of the regulated voltage. The Voltage Regulator is designed to automatically regulate and maintain the generated AC voltage through out the load range that is from no load to full load.

VOLTAGE CONNECTION

The generator may be connected at the terminal board to deliver 120/240 volts to a 3 wire grounded neutral system, or 120-volts only to a 2 wire distribution system. If any equipment requires 240-volts, then the 120/240-volt connection must be used. If all equipment requires 120-volts then the 120-volt connection is preferred, even if two lines leave the same switch box. The two lines at the inputs to the switch box are both connected to the un-grounded 120-volt lines from the generator. The 120-volt connection enables the Electronic Voltage Regulator (EVR) to hold the voltage very close to the 115 or 120 volts, as initially adjusted, regardless of the power distribution amount the different distribution lines. The 120-volt connection is recommended if the entire electrical load requires only 115 or 120 volts.

Although the 120/240-volt connection may also be used when all loads requires only 110 volts, it should be pointed out that this connection, the 240-volts, is regulated and the lightly loaded phase, or line, will deliver a high line to neutral voltage and the heavily loaded phase will deliver a low line to neutral voltage. The heavily loaded line may have such a low voltage that air conditioning will have more difficulty in starting, and long starting lines may overload generator and trip circuit breakers.

FIELD COIL VOLTAGE SOURCE (EXCITER TYPE ONLY)

Field coil DC voltage is obtained by rectifying the voltage from the phase to neutral line of the generator output, or either appropriate terminal to provide the needed voltage reference.

The rectifier bridge is an internal part of the static regulator. The static regulator senses a change in the generator output and automatically regulates current flow in the exciter field coil circuit to increase or decrease the exciter field strength. An adjustable rheostat sized to be compatible with the regulator is used to provide adjustment of the regulator sensing circuit.

ROTATING FIELD ASSEMBLY (ROTOR)

The rotating field assembly consists basically of four members: 1) the shaft assembly, 2) the core assembly, 3) the field coil damper windings, and 4) balance lugs to provide a high degree of static and dynamic balance.

CORE ASSEMBLY

The core assembly consists of a quantity of thin steel plates compressed and fastened together to form a single laminated assembly. The field windings are wound around this assembly.

FIELD COIL

Field coils of heavily insulated wire are “wet” wound directly onto the poles. Field coil leads are routed to the rectifier assembly for connection to the source of DC excitation voltage.

BALANCE

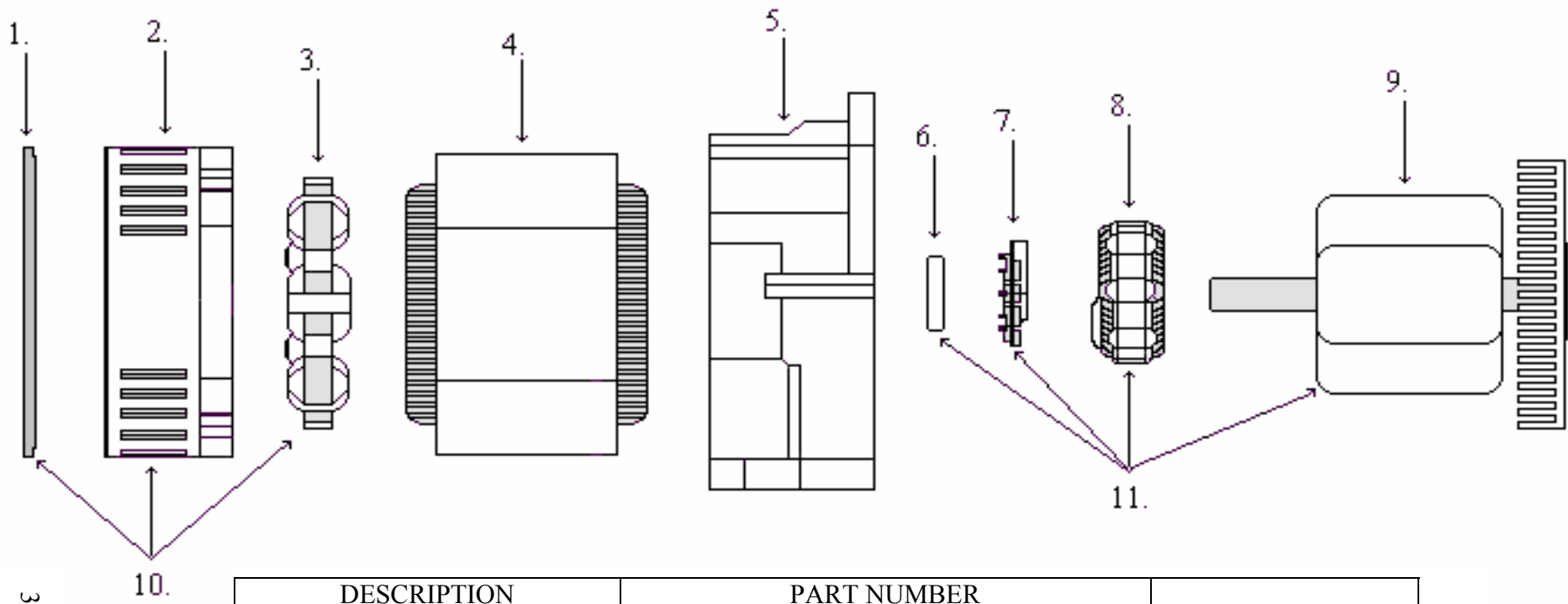
The rotor assembly is precision balanced to a high degree of static and dynamic balance. Although the balance will remain dynamically stable at speeds in excess of the design frequencies, the prime mover should be adequately governed to prevent excessive over speed. High centrifugal forces created by excessive over speed may damage the rotor windings and field coils.

BEARING

The generator rotor assembly is suspended on a shielded factory lubricated ball bearing. A visual inspection of the bearing is recommended at typical service intervals. If signs of abnormal wear or leakage are observed, the bearing should be replaced. Never use liquids of any kind to clean the generator end and bearing.

STATOR ASSEMBLY

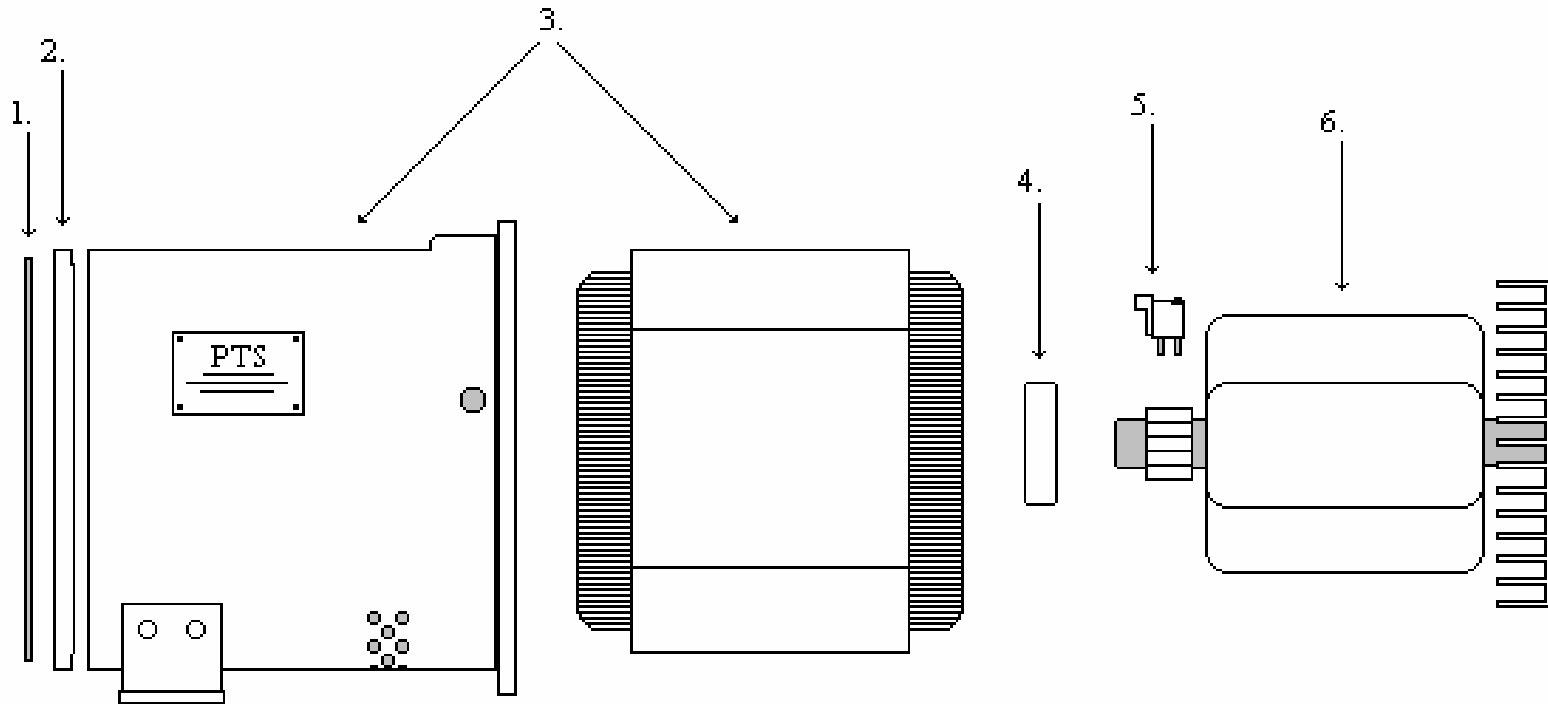
The stator assembly consists of laminations of steel mounted in a rolled steel frame. Random wound stator coils are fitted into the insulated slots.



DESCRIPTION	PART NUMBER		
	8KW	10KW	12KW
1. BEARING PLATE	02BR-CR	02BR-CR	02BR-CR
2. END BELL	02H7810	02H10KW-CR	02H10KW-CR
3. EXCITER STATOR	02STA8EXC	02STA10EXCR	02STA12EXCR
4. MAIN STATOR	02STAMNCD8	02STACI7210	02STAMN12
5. BELL HOUSING **	02BHTPU7	02BHTPU7	02BHTPU7
6. ROTOR BEARING	02BRG6206	02BRG6206	02BRG6206
7. DIODE PLATE	02PLD8CD	02PLD8CD	02PLD8CD
8. EXCITER ROTOR	02RTR8EXC	02RTR10EXCR	02RTR12EXCR
9. MAIN ROTOR	02RTRMN8EXC	02RTR10E	02RTR12E
10. END BELL ASSEMBLY	02EB8	02EB10	02EB12
11. MAIN ROTOR ASSEMBLY	02RTR8EXC-ASSY	02RTR10EXC-ASSY	02RTR12EXC-ASSY
12. END PLATE ASSEMBLY	02EP8	02EP10	02EP12
GENERATOR ASSEMBLY	02GENCD8E	02GEN10EXCR	02GEN12EXCR
VOLTAGE REGULATOR	06REG24	06REG24	06REG24

** NOTE: Item #5 BELL HOUSING is not part of the Generator End assembly.

8 - 10 - 12KW "C" EXCITER TYPE GENERATOR ASSEMBLY

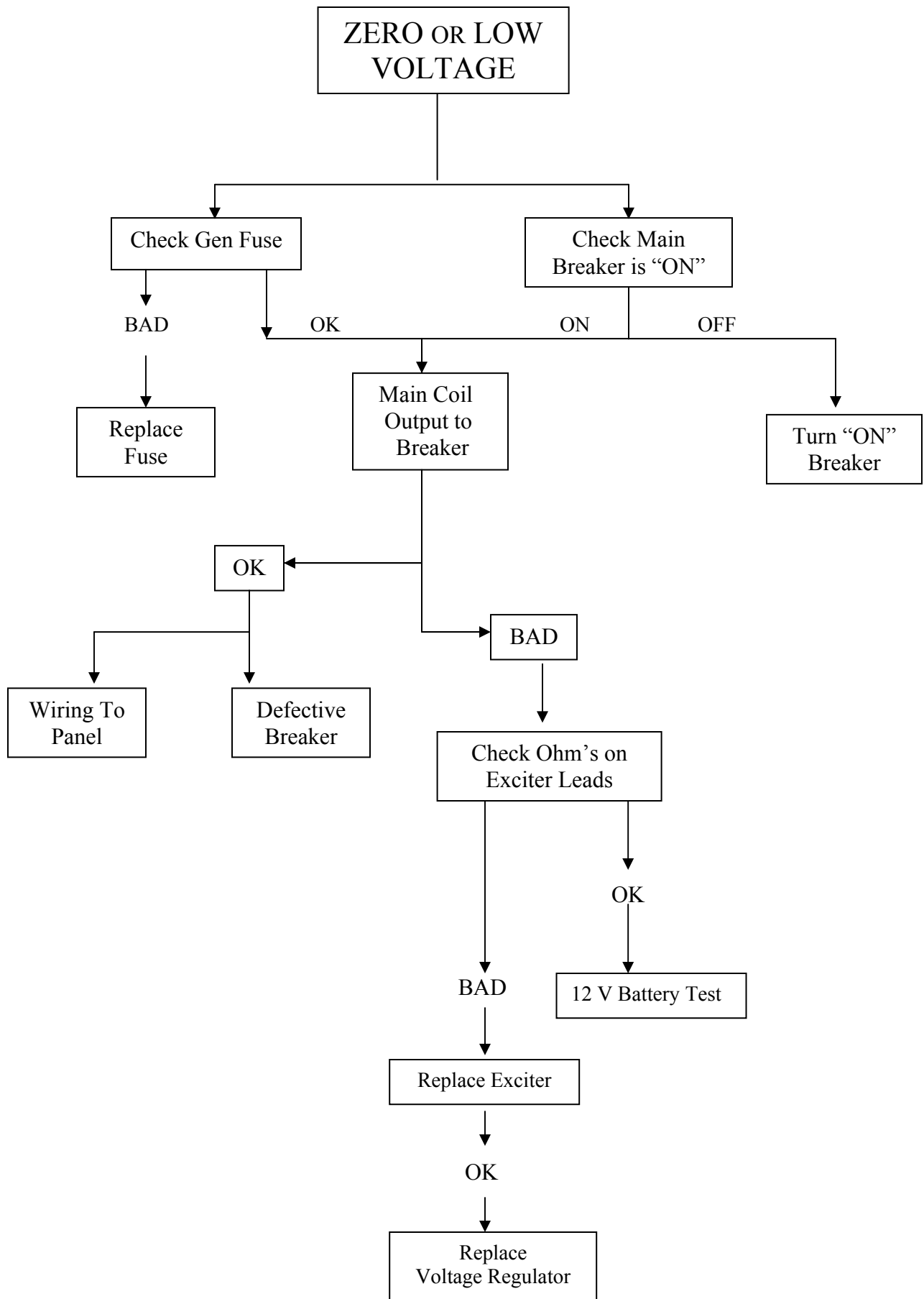


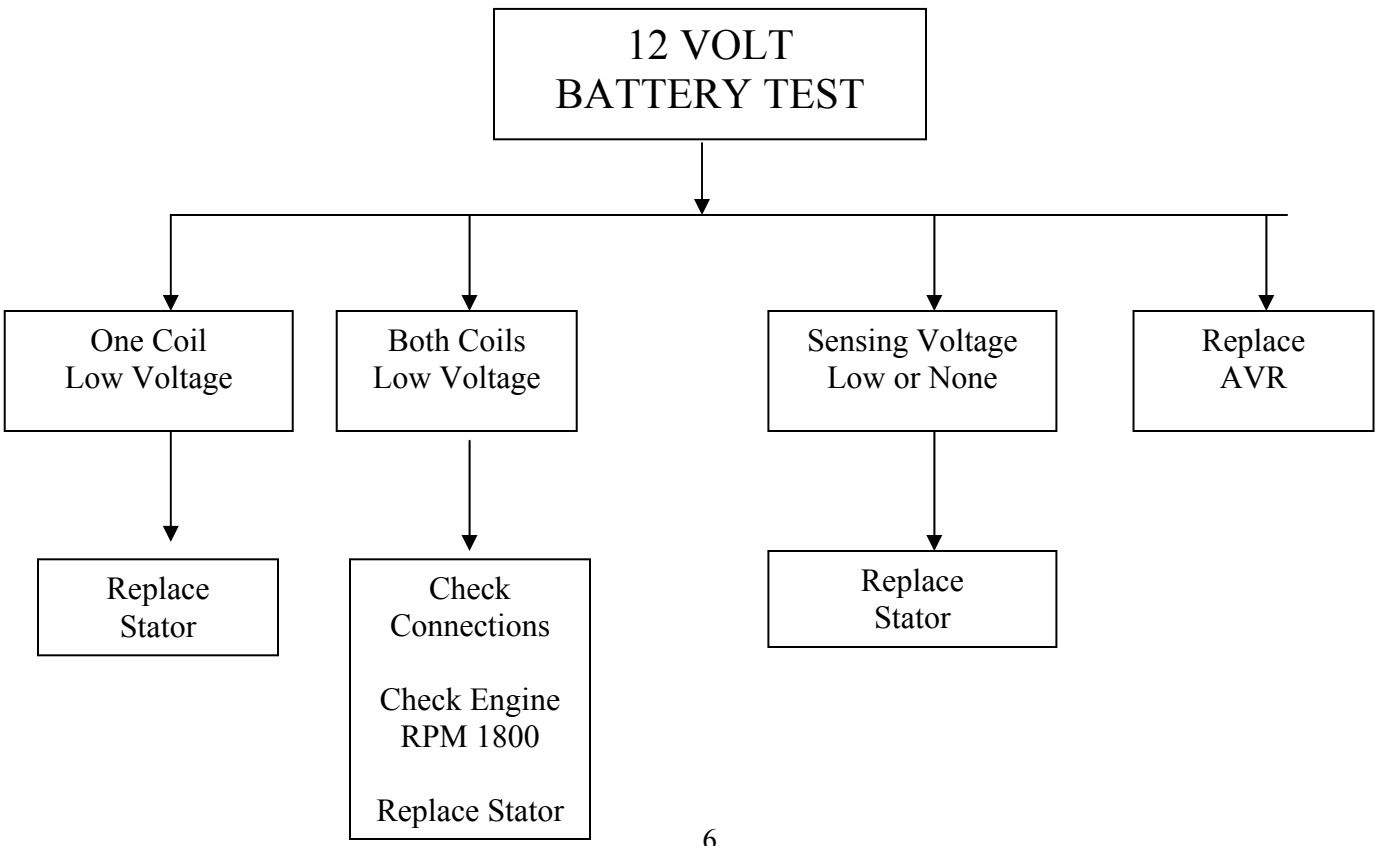
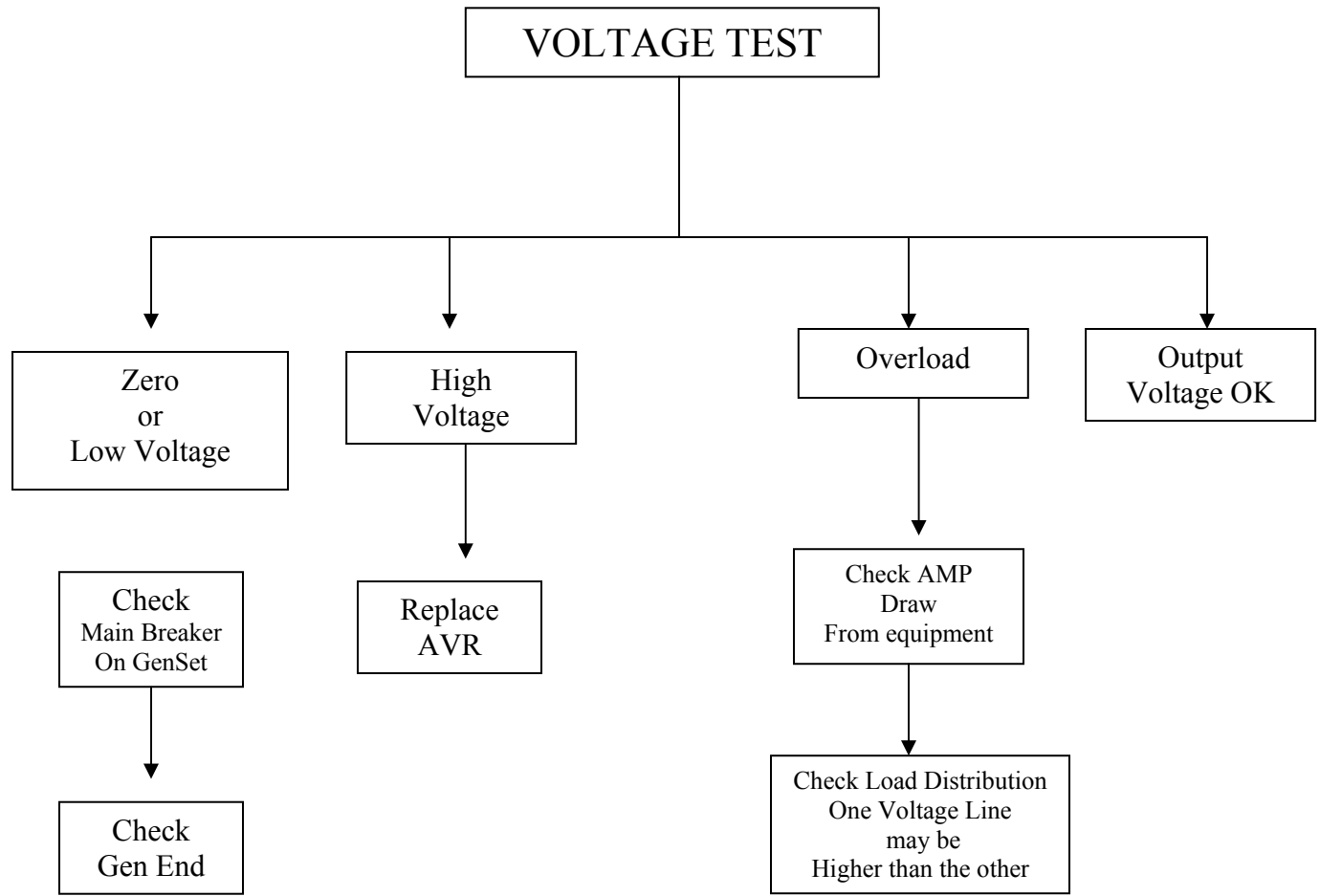
4

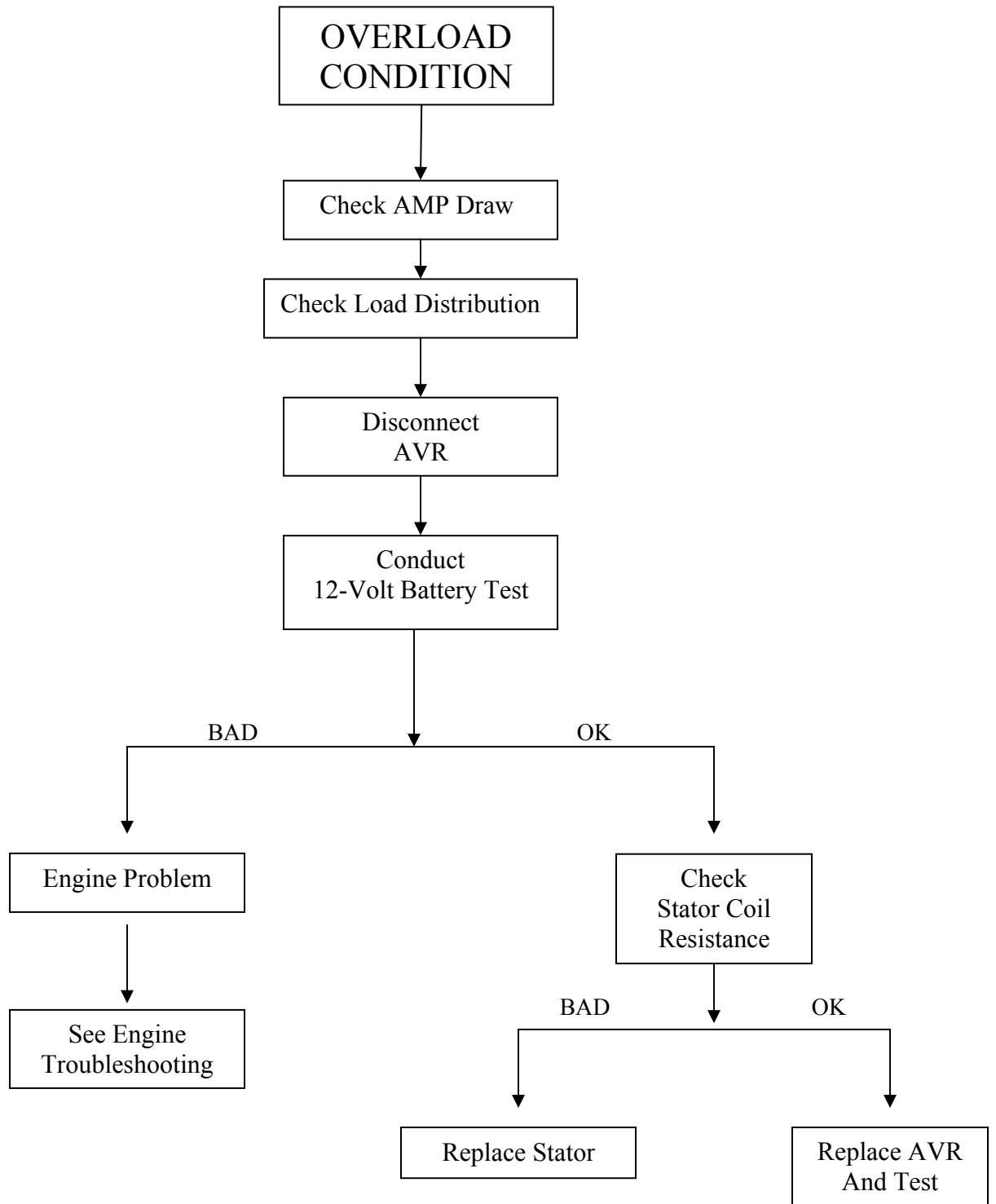
DESCRIPTION
1. COVER SCREEN
2. BEARING PLATE
3. STATOR ASSEMBLY **
4. ROTOR BEARING
5. BRUSH SET
6. ROTOR ASSEMBLY

**** NOTE:** Item #3 MAIN STATOR ASSEMBLY is a one-piece unit. The Stator cannot be separated from the Generator's outer housing.

8 – 10 - 12KW “C” or “M” BRUSH TYPE GENERATOR ASSEMBLY







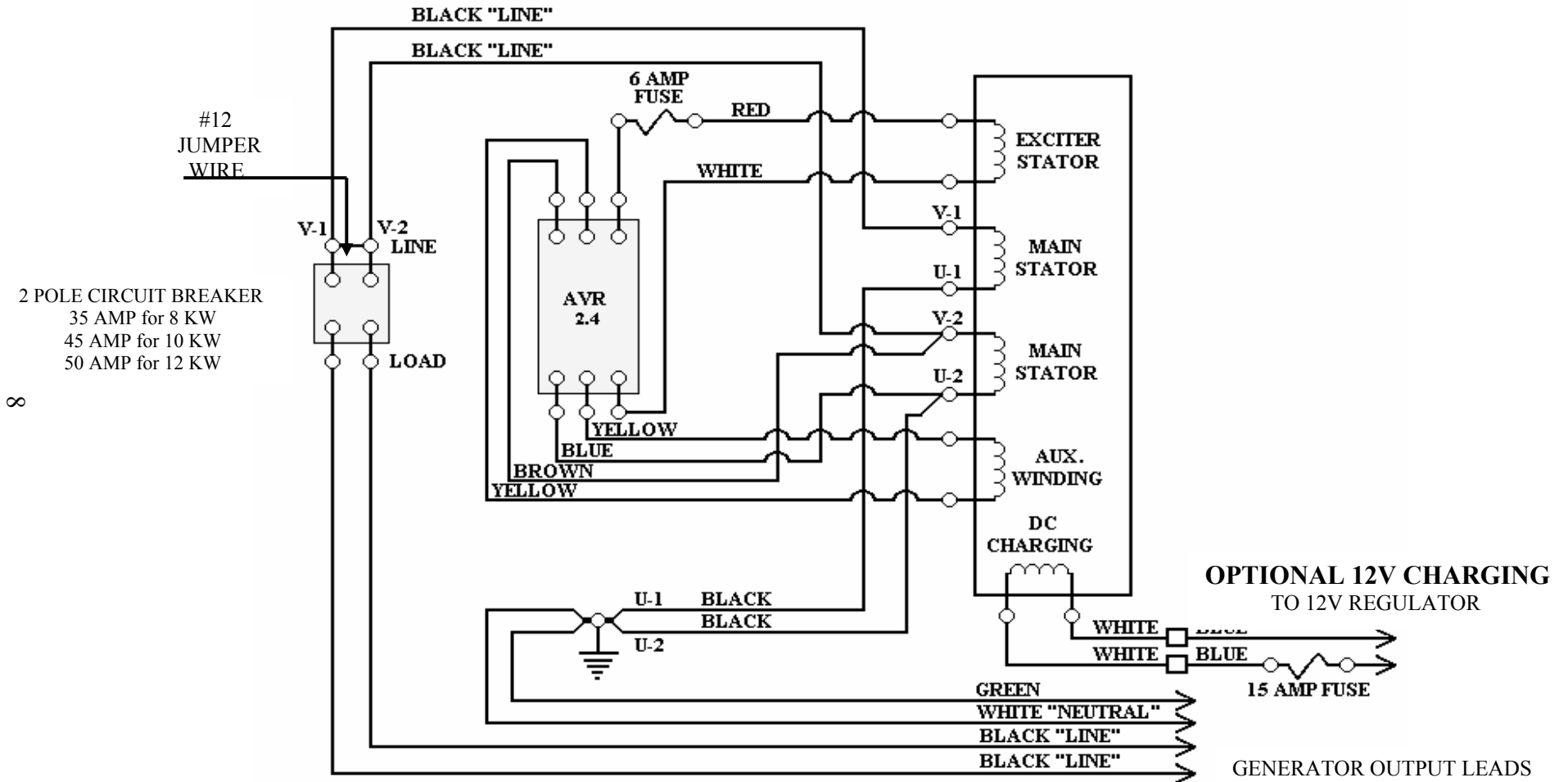


POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

KW	8	10	12	MARKS	COLOR
MAIN STATOR	0.5	0.5	0.5	U1-V1 or U2-V2	B-B
MAIN ROTOR	1.9	2.0	2.2	***	---
EXCITER STATOR	86.9	87.4	89.0	F1-F2	R-W
EXCITER ROTOR	33.8	33.8	34.0	***	---
AUX. WINDING	2.5	1.6	1.5	AW	Y-Y
BATT. CHARGE	0.5	0.5	0.5	CH W	W-W
SENSING WINDING	0.4	0.4	0.4	***	BLUE / BROWN

RESISTANCE CHART

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE



AC ELECTRICAL CIRCUIT FOR 8 - 10 - 12KW "C" GENERATORS 120 VOLTS LINE TO NEUTRAL



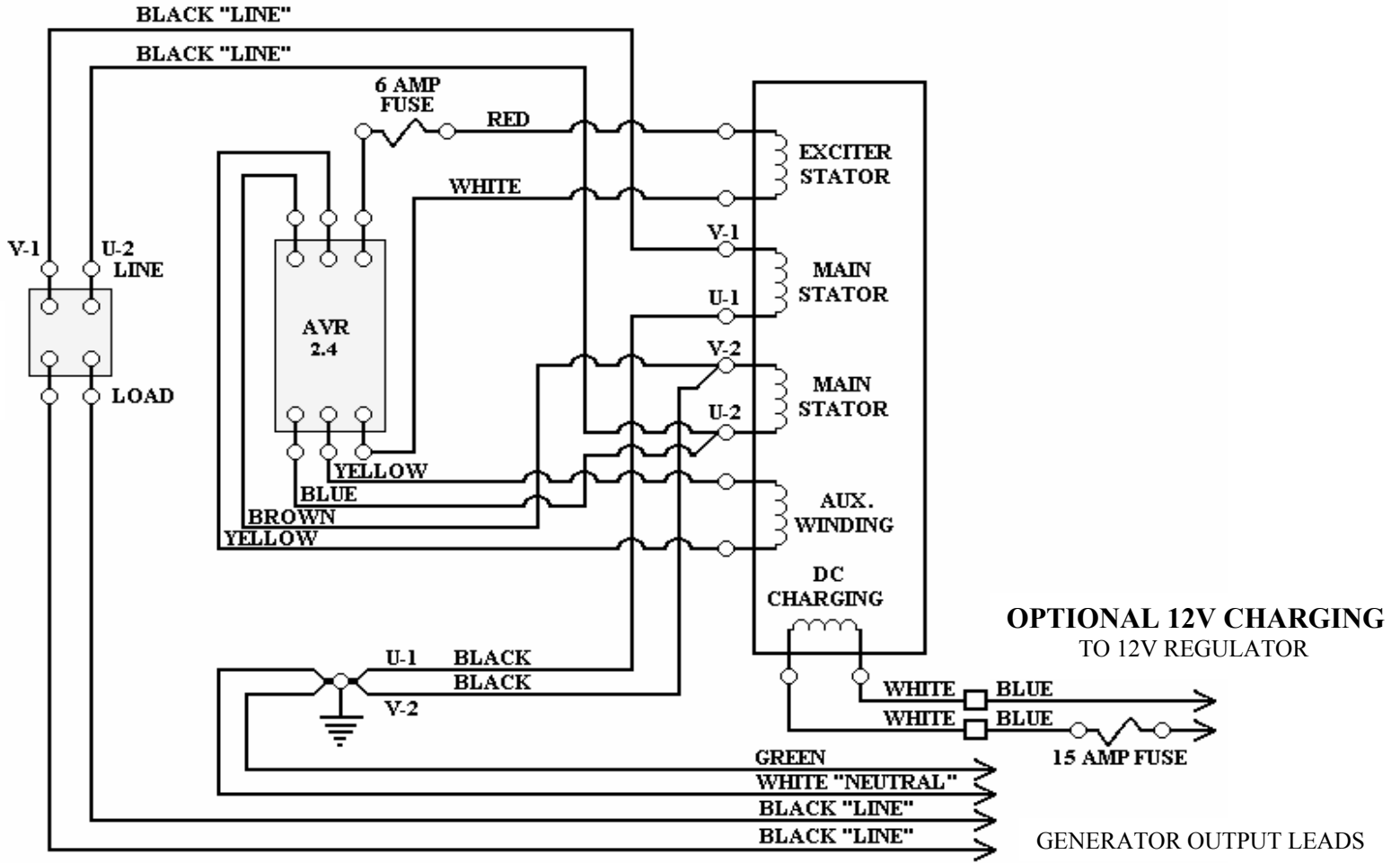
POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

KW	8	10	12	MARKS	COLOR
MAIN STATOR	0.5	0.5	0.5	U1-V1 or U2-V2	B-B
MAIN ROTOR	1.9	2.0	2.2	***	---
EXCITER STATOR	86.9	87.4	89.0	F1-F2	R-W
EXCITER ROTOR	33.8	33.8	34.0	***	---
AUX. WINDING	2.5	1.6	1.5	AW	Y-Y
BATT. CHARGE	0.5	0.5	0.5	CH W	W-W
SENSING WINDING	0.4	0.4	0.4	***	BLUE / BROWN

RESISTANCE CHART

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE

6



AC ELECTRICAL CIRCUIT FOR 8 - 10 - 12 KW "C" GENERATORS 120 VOLTS LINE TO NEUTRAL 240 VOLTS LINE TO LINE

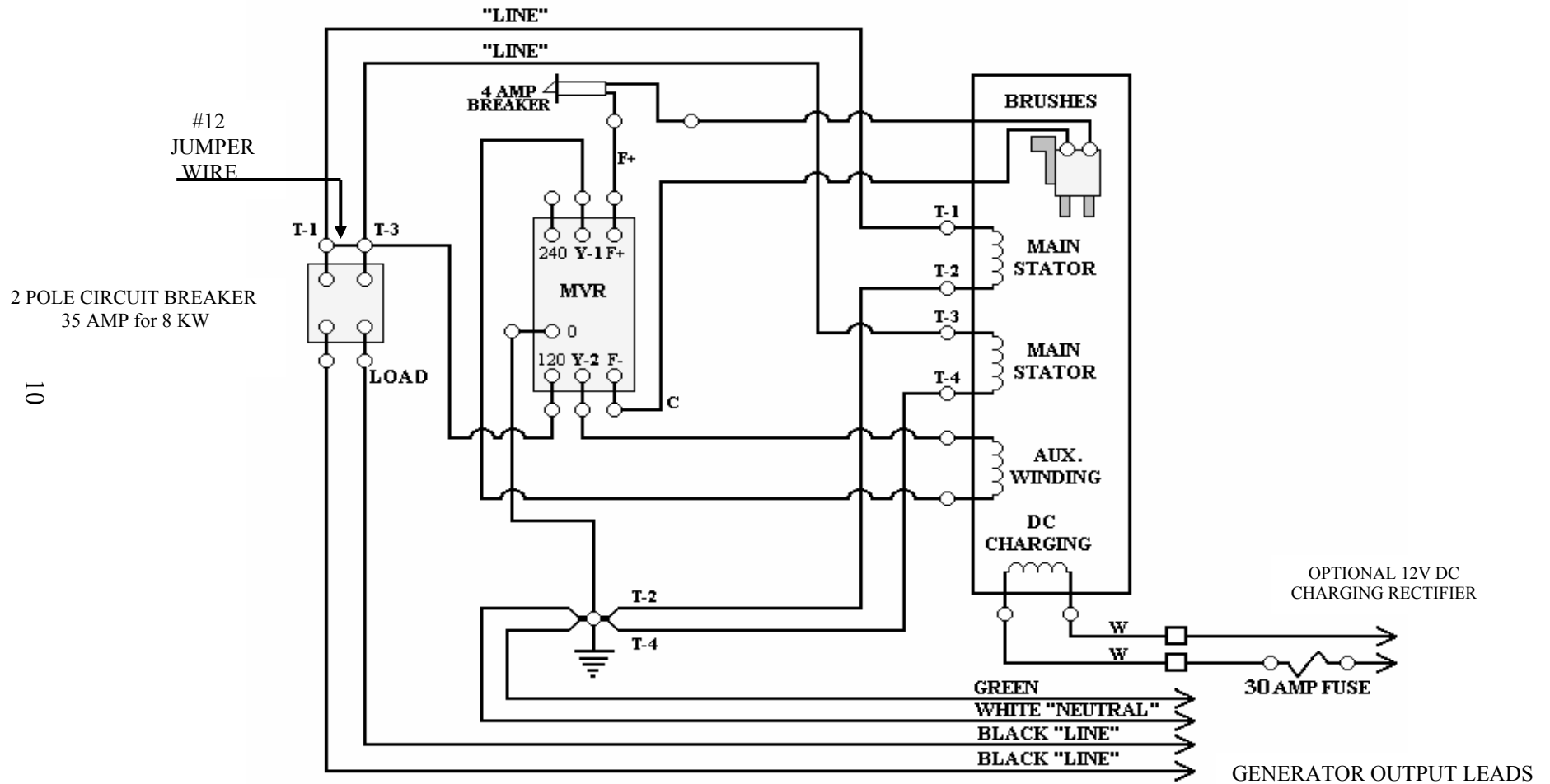


POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

RESISTANCE CHART

KW	8	MARKS	COLOR
MAIN STATOR	0.257	T-1 - T-2 : T-3 - T-4	W
MAIN ROTOR	83.1	***	---
AUX. WINDING	2.64	Y1 - Y2	W
BATT. CHARGE	0.159	---	W
SENSING WINDING	0.085	***	W

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE



AC ELECTRICAL CIRCUIT FOR "MB" GENERATORS 120 VOLTS LINE TO NEUTRAL

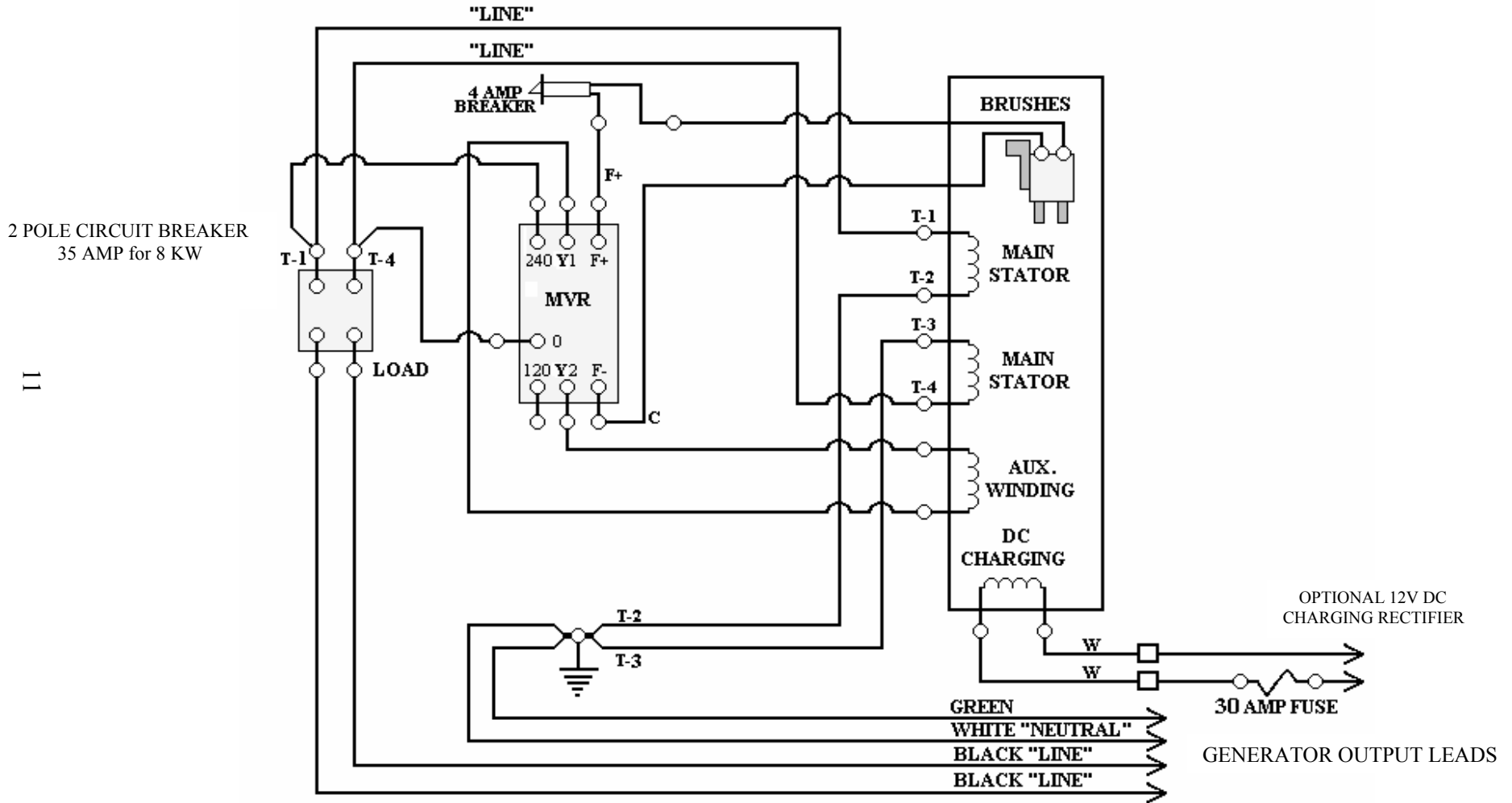


POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

RESISTANCE CHART

KW	8	MARKS	COLOR
MAIN STATOR	0.257	T-1 -T-2 : T-3 - T-4	W
MAIN ROTOR	83.1	***	---
AUX. WINDING	2.64	Y1 - Y2	W
BATT. CHARGE	0.159	---	W
SENSING WINDING	0.085	***	W

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE



AC ELECTRICAL CIRCUIT FOR "MB" GENERATORS 120 VOLTS LINE TO NEUTRAL 240 VOLTS LINE TO LINE

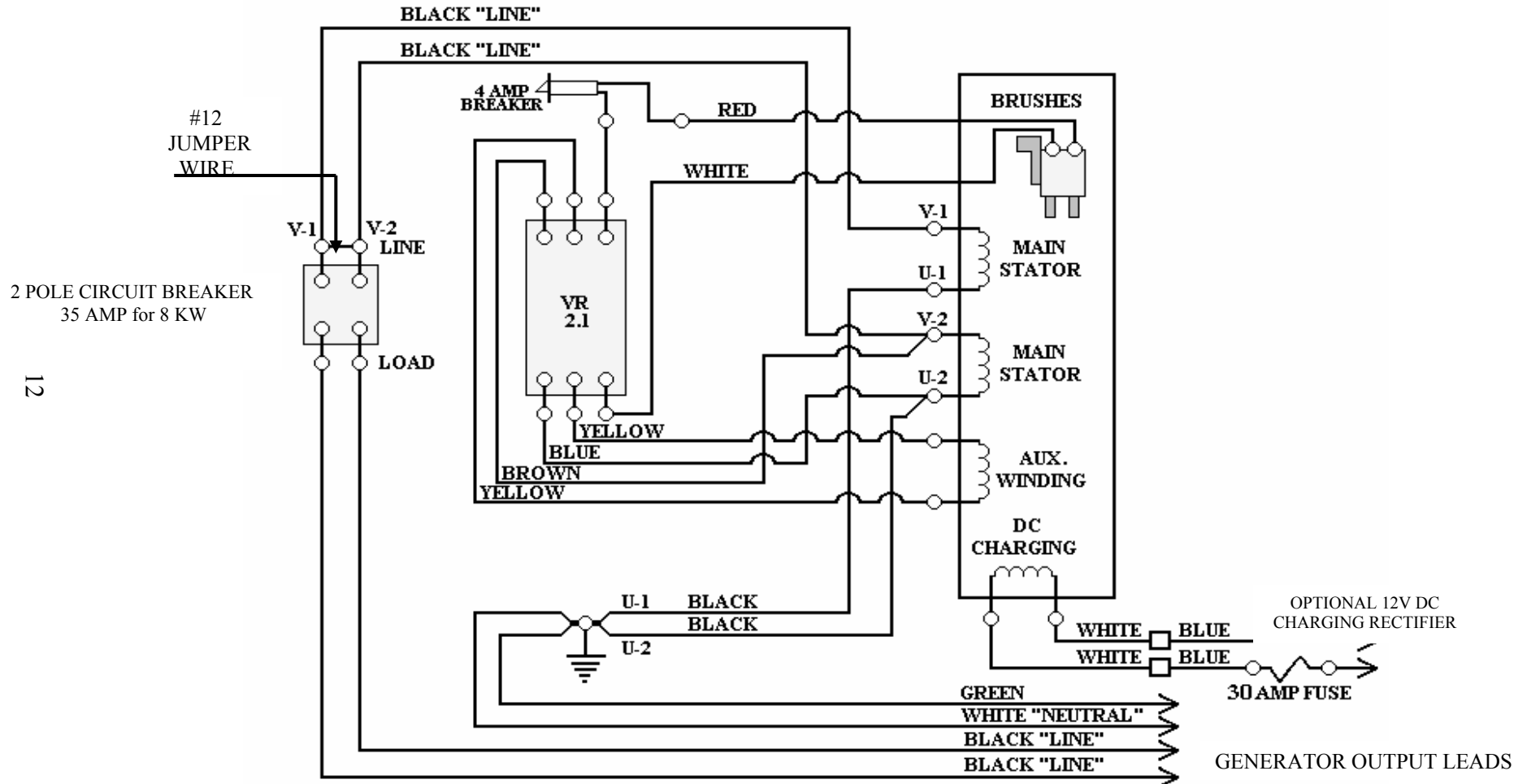


POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

RESISTANCE CHART

KW	8	MARKS	COLOR
MAIN STATOR	0.257	U1-V1 or U2-V2	B-B
MAIN ROTOR	83.1	***	---
AUX. WINDING	2.64	AW	Y-Y
BATT. CHARGE	0.159	CH W	W-W
SENSING WINDING	0.085	***	BLUE / BROWN

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE



AC ELECTRICAL CIRCUIT FOR 8KW "C" GENERATORS 120 VOLTS LINE TO NEUTRAL



POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

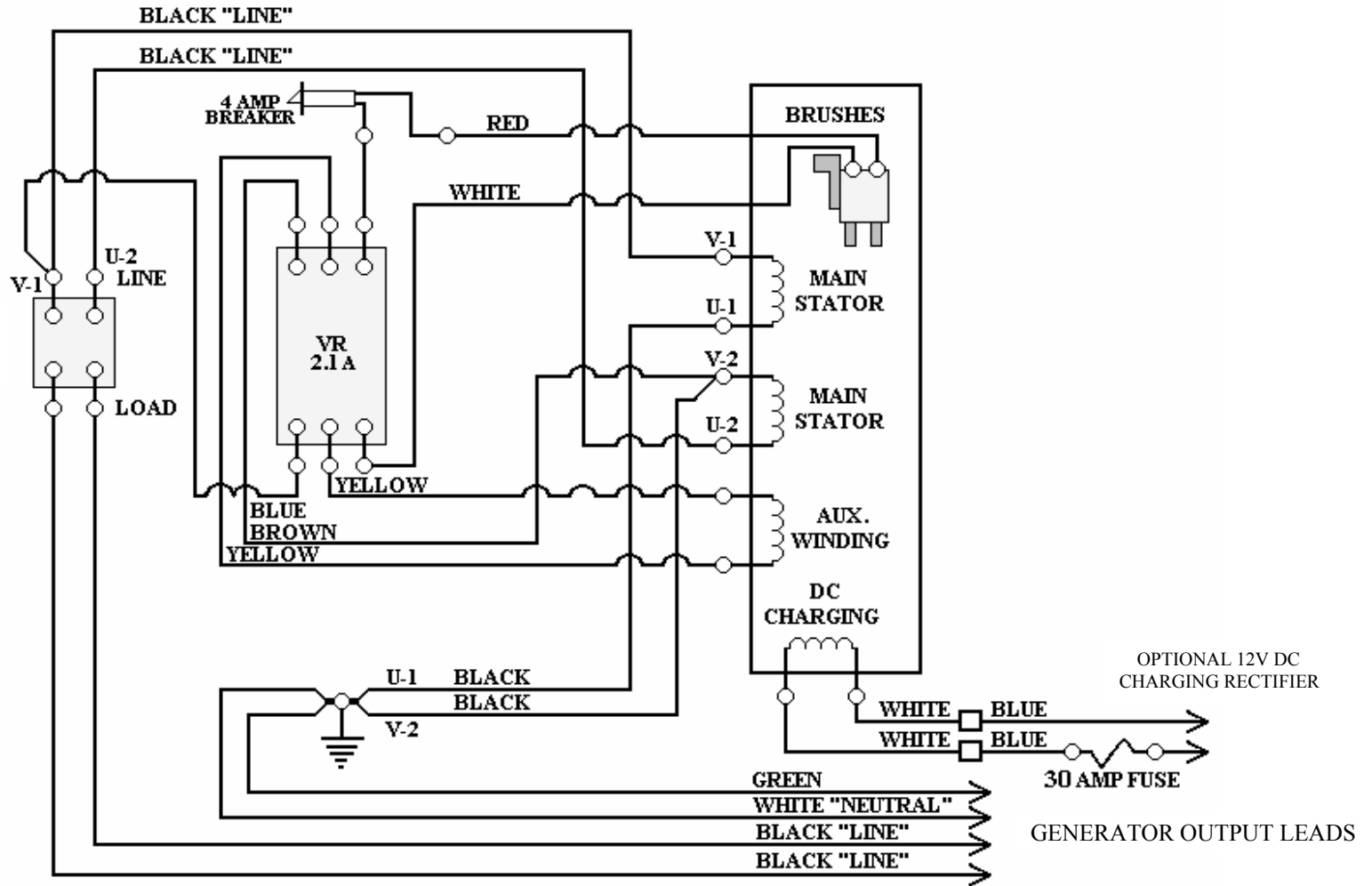
RESISTANCE CHART

KW	8	MARKS	COLOR
MAIN STATOR	0.257	U1-V1 or U2-V2	B-B
MAIN ROTOR	83.1	***	---
AUX. WINDING	2.64	AW	Y-Y
BATT. CHARGE	0.159	CH W	W-W
SENSING WINDING	0.085	***	BLUE / BROWN

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE

2 POLE CIRCUIT BREAKER
 35 AMP for 8 KW

13



AC ELECTRICAL CIRCUIT FOR 8KW "C" GENERATORS 120 VOLTS LINE TO NEUTRAL 240 VOLTS LINE TO LINE

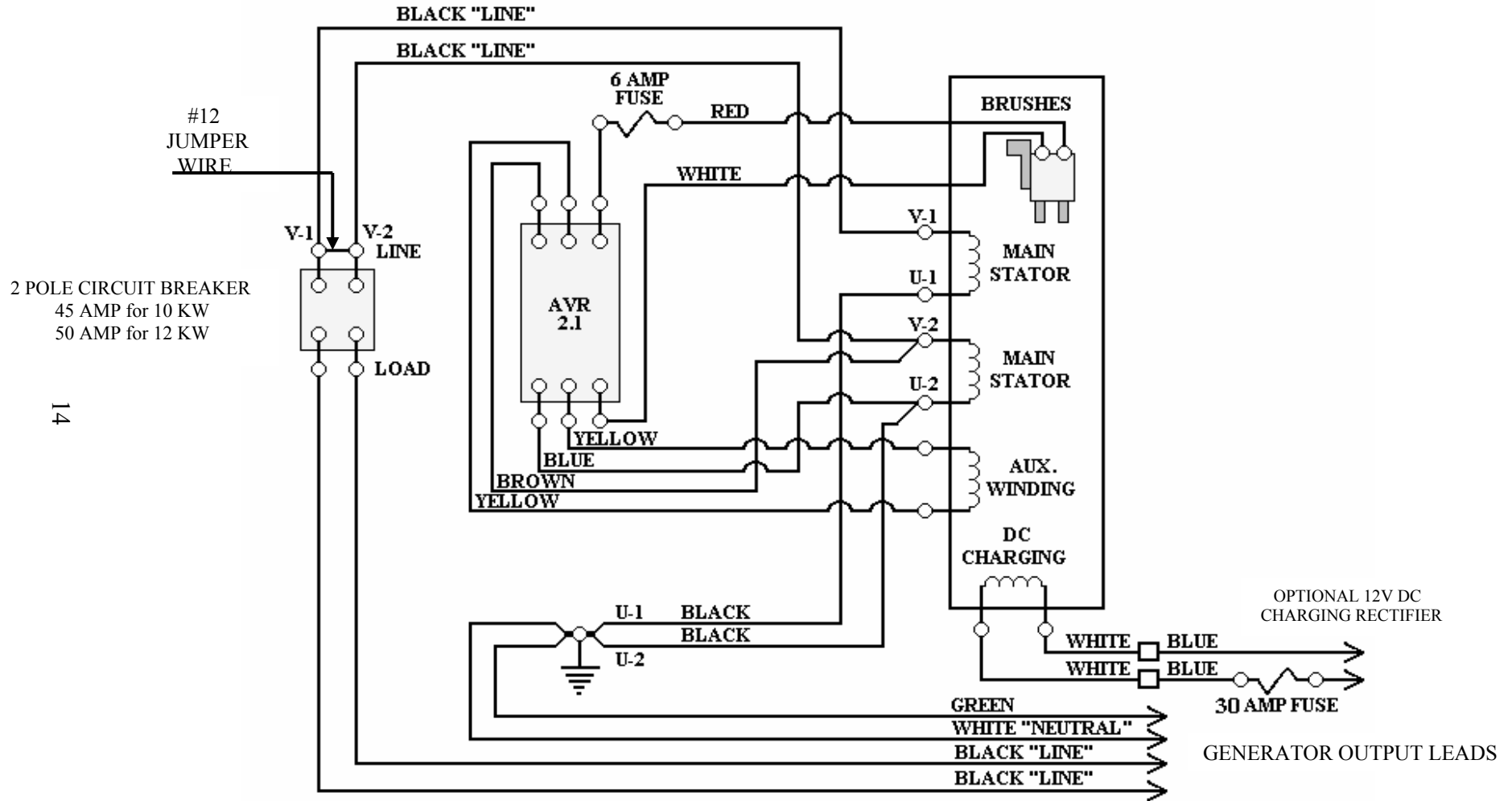


POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

RESISTANCE CHART

KW	10	12	MARKS	COLOR
MAIN STATOR	0.093	0.093	U1-V1 or U2-V2	B-B
MAIN ROTOR	72.5	72.5	***	---
AUX. WINDING	0.892	0.892	AW	Y-Y
BATT. CHARGE	0.082	0.082	CH W	W-W
SENSING WINDING	0.029	0.029	***	BLUE / BROWN

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE



**AC ELECTRICAL CIRCUIT FOR 10 -12KW "C" GENERATORS 120 VOLTS LINE TO NEUTRAL
 PRIOR TO 10/7/04**

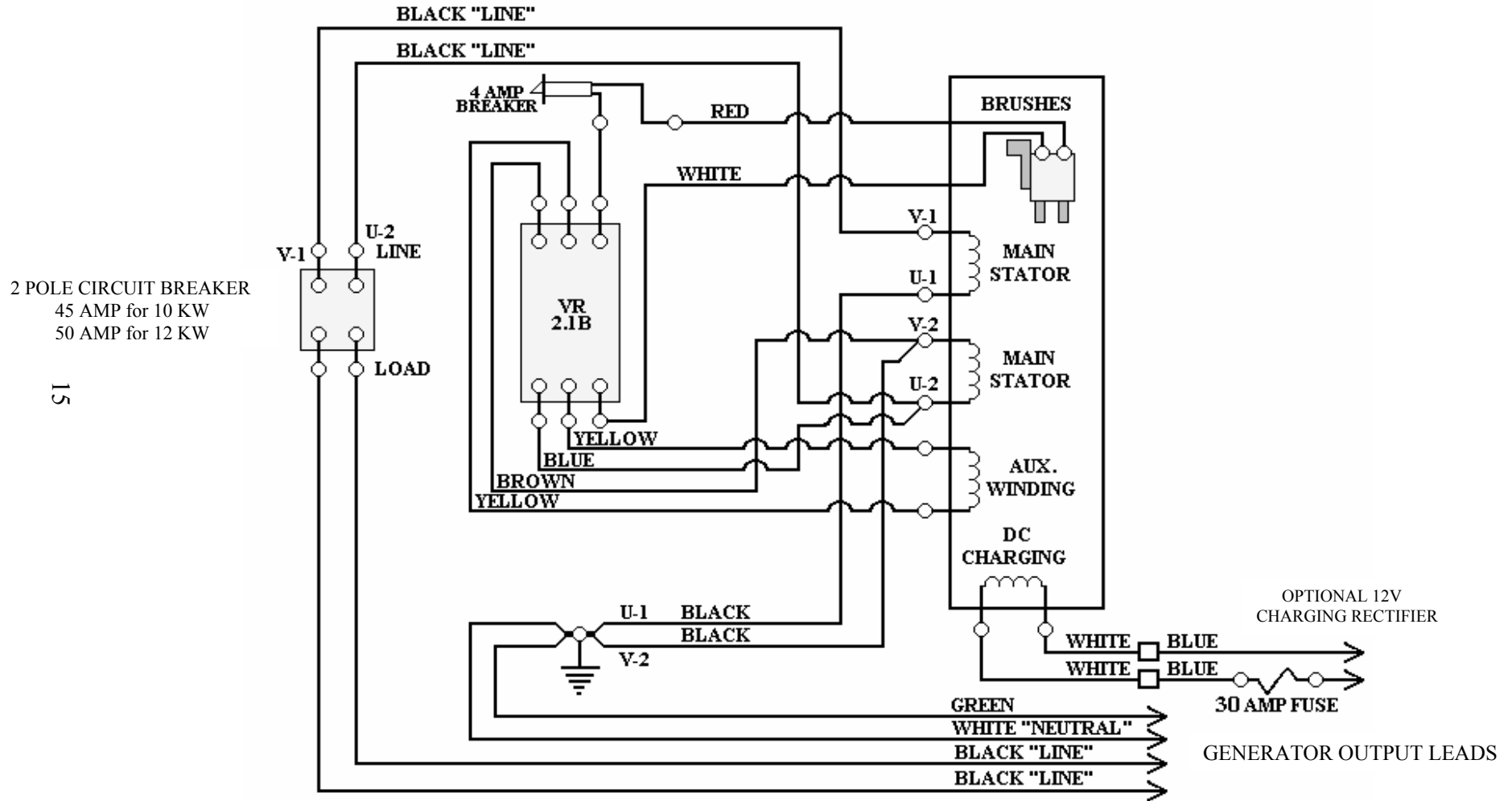


POWER TECHNOLOGY SOUTHEAST, INC.
 634 STATE ROAD 44
 LEESBURG, FL 34748-8103
 (352) 365-2777 FAX (352) 787-5545

RESISTANCE CHART

KW	10	12	MARKS	COLOR
MAIN STATOR	0.093	0.093	U1-V1 or U2-V2	B-B
MAIN ROTOR	72.5	72.5	***	---
AUX. WINDING	0.892	0.892	AW	Y-Y
BATT. CHARGE	0.082	0.082	CH W	W-W
SENSING WINDING	0.029	0.029	***	BLUE / BROWN

NOTE: THESE READINGS WILL VARY DEPENDING ON AMBIENT TEMPERATURE



AC ELECTRICAL CIRCUIT FOR 10-12KW "C" GENERATORS 120 VOLTS LINE TO NEUTRAL 240 VOLTS LINE TO LINE (AFTER PRODUCTION DATE 10/7/04 ONLY)