STEPS FOR SETTING UP A GENERATOR

STEP 1) RPM of the generator must be set first. This step is the most important step!!!!

STEP 2) Use a known accurate method of setting RPM to 1860 RPM no load (a digital laser tach available from us or a Kill-A-Watt Meter to check frequency)

STEP 3) If using a Kill-A-Watt Meter, (available on eBay) set for 62 HZ no load.

STEP 4) If using a Kill-A-Watt Meter, wire a 120 volt AC outlet to the side of the generator so the frequency can be monitored as you adjust RPM of the engine. For 480 volt 3 phase, connect the Kill-A-Watt Meter across one winding. (139 volts)

STEP 5) If the generator uses an AVR, set the voltage adjust pot for 240 volts (480 if 3 phase, 12 wire) while measuring the 240 (480 3 phase) output only after setting RPM or frequency.

STEP 6) The engine must have a good governor to maintain the RPM between 1860 no load and 1740 RPM fully loaded. This is a function of the governor and engine power. IF the engine has enough power, it can maintain this RPM.

STEP 7) WARNING!!! RED LINE ON THE 1800 RPM GENERATORS IS 2100 RPM. AT APPROXIMATELY 1950 RPM, THE AVR WILL EXPLODE!!!! AT 2100 RPM, THE ROTOR WIRE WILL START COMING APART. DO NOT LET THE ENGINE DRIVE THE GENERATOR ABOVE 1860 RPM.

STEP 8) See the enclosed diagram, (picture) on the correct way to wire generator. The strap that connects the two windings together is the neutral. The ground connection on the side is for **SAFETY ONLY!!!!** CONNECT THE GROUND CONNECTION TO A GOOD EARTH GROUND

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STEPS FOR INSTALLING A SINGLE BEARING

STEP 1) Remove case from generator by bending tabs down straight at bottom of box, **do no destroy box**

STEP 2) Keep generator level, do not let it tilt forward. The rotor may fall out when the shipping straps are removed.

STEP 3) Clean drive plate good with degreaser like acetone, FAILURE TO CLEAN DRIVE PLATE

AND FLYWHEEL WILL LEAD TO FAILURE OF DRIVE IN ABOUT 40 HOURS, THIS IS NOT COVERED BY WARRANTY!

STEP 4) Clean flywheel with acetone, make sure there is no rust on part where the drive plate bolts to. Clean flywheel thoroughly. On large generators, check the rear of the gen head for a shipping bolt under a hat like cover on the rear.

STEP 5) Install 2 (two) studs in the flywheel where the drive plate bolts. Put 180 degrees apart. Make sure you can remove them easily by hand

STEP 6) Use engine hoist or something similar to lift generator up and slide forward to engine slide drive plate over studs that you put in flywheel.

Install two bolts to the outside of generator at the top to hold generator to bell housing

STEP 7) Install the bolts that hold the drive plate to the flywheel and tighten the up snug by going side vents. **MAKE SURE THE DRIVE PLATE SEATS IN THE MACHINED OUT PART ON THE**

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OF THE FLYWHEEL. FAILURE TO MAKE SURE THIS IS DONE WILL DESTROY THE DRIVE PLATE This in turn will destroy the generator, there is no warranty if the drive plate is cracked

or broken.

STEPS FOR INSTALLING A SINGLE BEARING CONT.

STEP 8) Rotate engine by harmonic balance bolt in front of engine, **DO NOT USE THE FAN ON THE GENERATOR, THIS MAY BREAK THE FAN.** Install all the bolts making sure the drive plate seats all way properly in the flywheel. **THIS IS CRITICAL!!**

STEP 9) Mark the bolt head where you started installing and go all way around, removing the studs when you get to them and install one of the bolts.

STEP 10) Find out the torque specifications for the bolts that hold the drive plate to the flywheel torque the bolts that hold the drive plate to the flywheel in 3 steps.

for instance, 5, 10, 15 ft lbs or 10, 20, 30 ft lbs. USE THE TOURQUE REQUIRED FOR THAT BOLT. TURN THE ENGINE WITH HARMONIC BALANCE BOLT TO GET TO EACH BOLT. TORQUE IN A CROSS PATTERN LIKE TORQUING A HEAD ON AN ENGINE OR A WHEEL ON A CAR

THIS IS CRITICAL!!

STEP 11) After the drive plate is bolted down, then install the remaining bolts in bell housing. Torque to correct specifications **USE BLUE LOCKTITE ON ALL BOLTS!! DO NOT USE RED!!**

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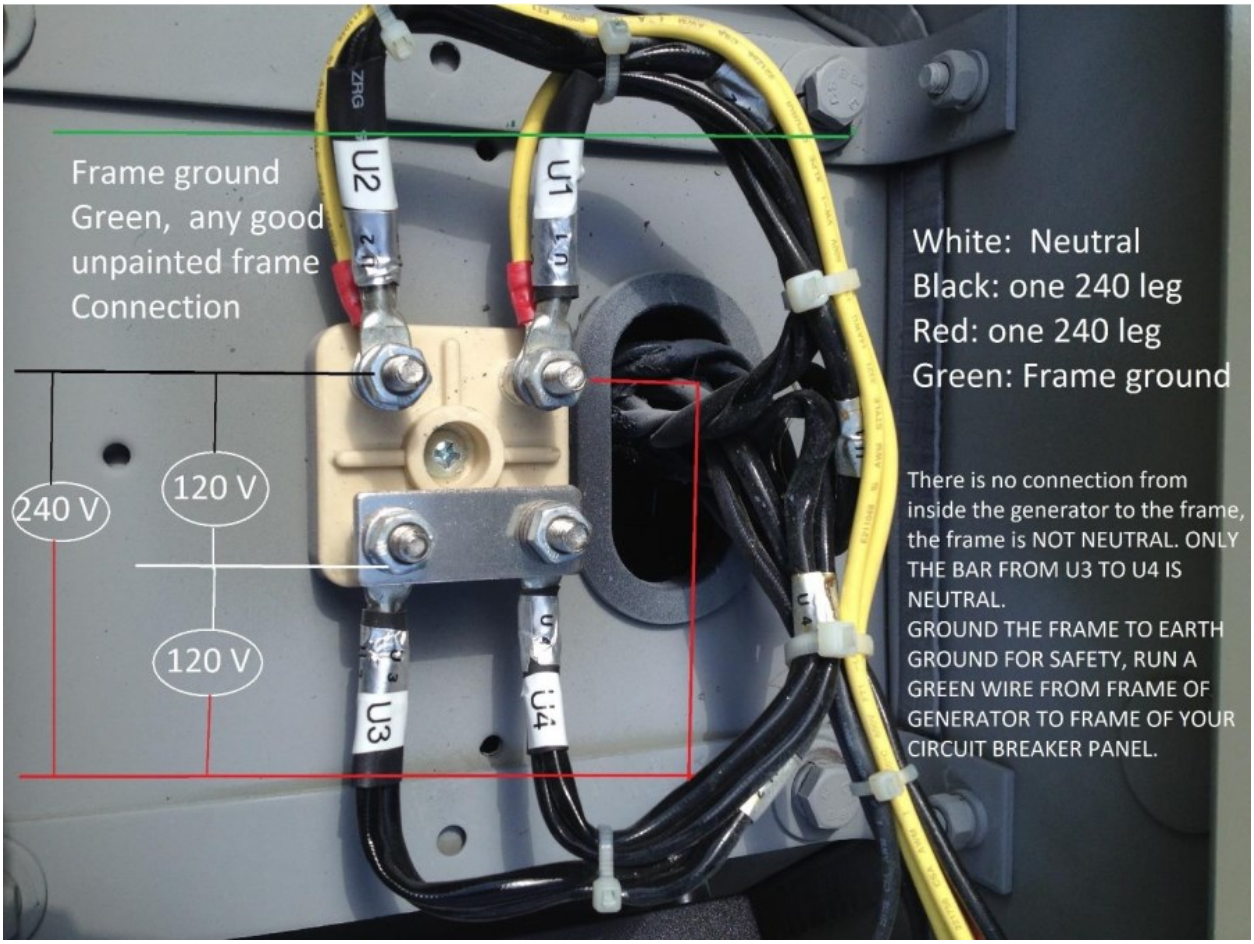
SINGLE PHASE WIRING DIAGRAM



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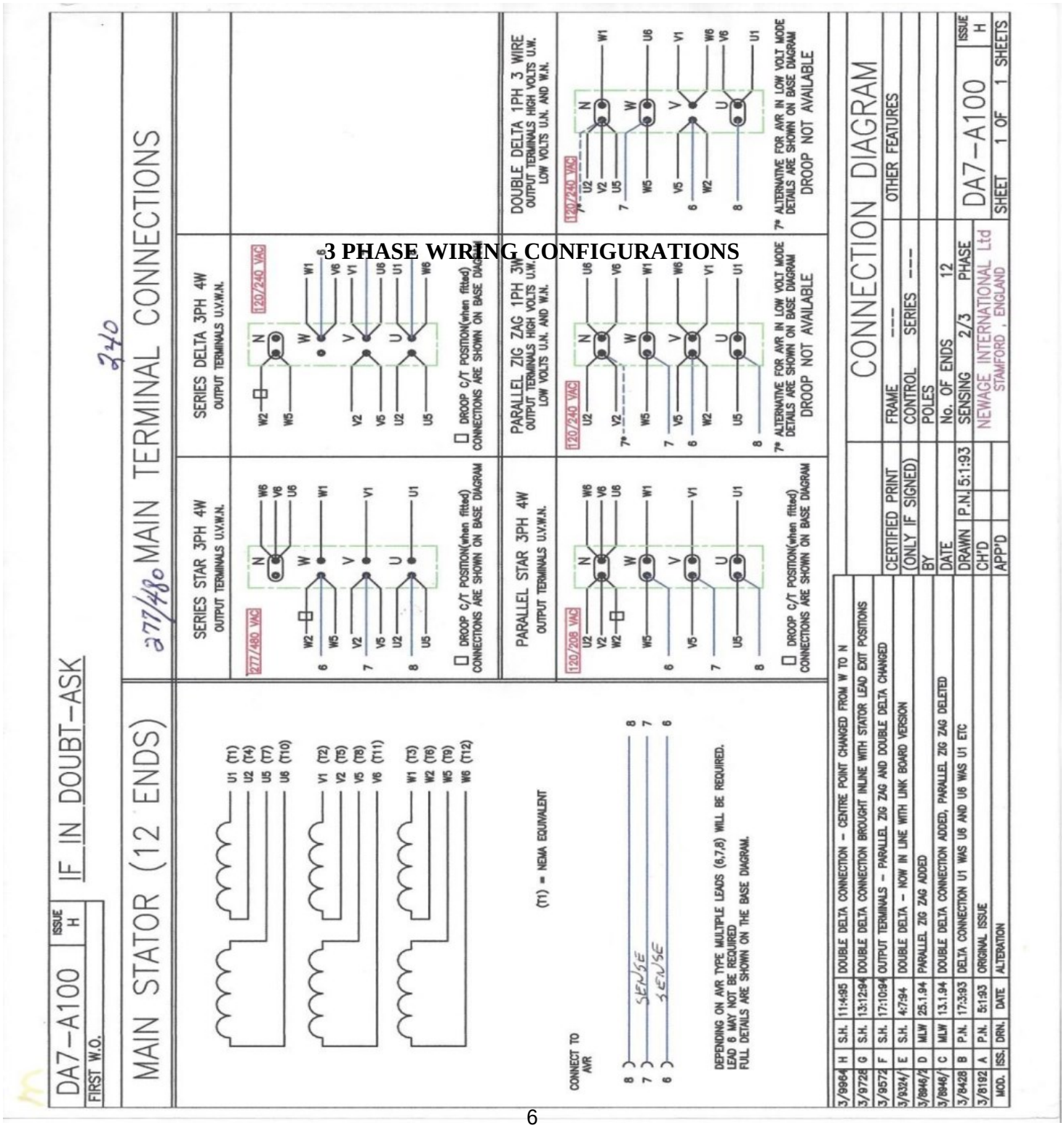
3 PHASE CONFIGURATIONS



3 PHASE WIRING CONFIGURATIONS

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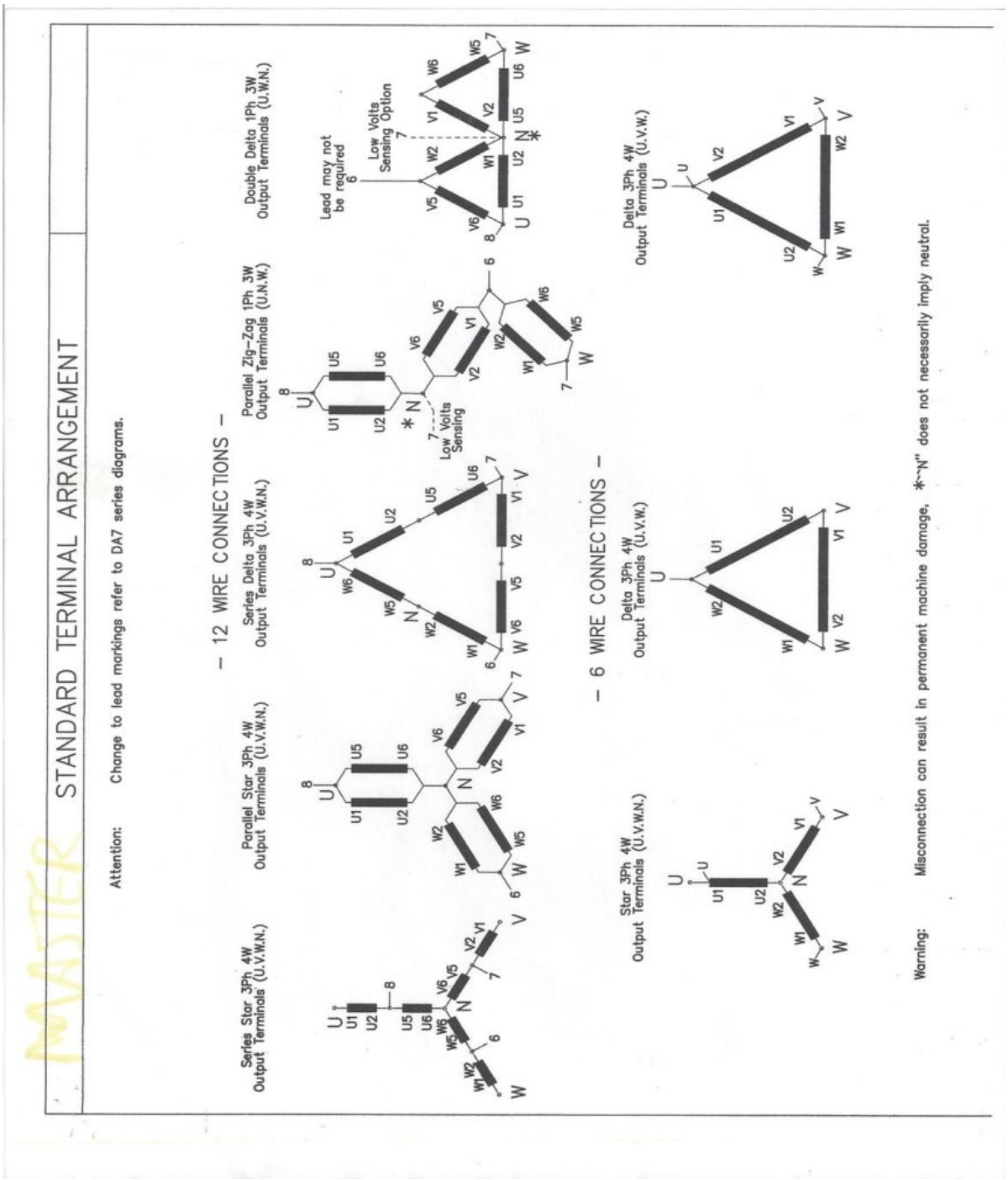
3 PHASE CONFIGURATIONS CONT.



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Brushless Generator Diagnostic and Repair Manual

Tools Required

Volt-Ohm Meter

- Ensure it reads accurately by testing on a known good AC outlet.

Steps for Diagnosis

Step 1: Initial Voltage Check

- **Start the Generator**
  - Use the voltmeter to check the output across the main terminals.
  - **Single-phase terminals**: U1 and U2.
  - **Three-phase terminals**: U, V, and W.
- **Voltage Ranges**:
  - Single-phase: **15–26 volts** (sometimes higher).
  - Three-phase: **18–30 volts** (sometimes higher).
- If voltage is **15–30 volts**, **proceed to Step 5** the issue is most likely in the exciter stator, AVR or diodes.
- If voltage is **zero** or abnormal, **STOP the generator** and continue below.

Troubleshooting Low/No Voltage

Step 2: Output Terminal Check

- Disconnect output leads from the generator to the load/breaker box.
- Inspect connections for:
  - **Poor neutral connections**.
  - **Shorted wires**.
  - **Make sure to check connections between breaker and load source as well**
  - **Do not remove the internal wires from terminal block at this stage**
- Re-tighten all nuts on internal wires
- Start the generator again. If all output returns to normal, then the problem is not with the generator.
- If you still do not have the required minimum voltage, stop the generator.

Step 3: Internal Resistance Check

- Set your meter to measure ohms (Ω), test for resistance between the output terminals and the generator frame.
  - Make sure not to touch the probes with your fingers, it will measure your body resistance
  - Resistance should be **wide open (OL)**.
  - Low resistance may indicate shorted stator wires.
- If there is any resistance from the output terminals to the frame, remove all wires from the terminal block of the generator (take pictures to make sure you put them back correctly)
- Measure each individual wire end to the frame and make sure there is no resistance (also make sure there are no fine wire strands shorting to the terminal block or frame)

Step 4: Stator Winding Check

- With all wires still disconnected, measure the ends of each winding
- For **single-phase**: Test 4 wires (2 windings). (U1,U2) (U3,U4)
- For **three-phase**: Test 12 wires (6 windings) Test across (U1,U2) (U5,U6) (V1,V2)(V5,V6)(W1,W2)(W5,W6)
- Each winding should have a low resistance of 1 ohm or less.
- If any of the windings do not show continuity, then the stator is open.

Exciter Stator and AVR Diagnosis

Step 5: Exciter Stator Check

- Remove **F+ (red)** and **F- (black)** wires from the AVR.
- Measure resistance between F+ and F-:
    - Should be **17–30 ohms**.
    - If resistance is incorrect, the exciter stator is faulty.
- Measure resistance of F+ and F- to the frame of the generator (should read **OL**).
- If there is any resistance, there is a short between the frame and windings and the excitor stator must be replaced

Step 6: Sense Wires

- Unplug the two sense wires (should be yellow or red wires) from the AVR and measure the unplugged ends across each other
- Resistance should be **low (<1 ohm)**.
- If resistance is correct plug the sense wires back in

Step 7: Auxiliary Windings

- Remove auxiliary winding wires from AVR (these will be the last two wires on AVR terminals 8 and Z2) measure these across each other
- Resistance should be **low (~1 ohm)**.
- Measure each wire end to the frame of the generator
- Meter should read OL or Open.
- If there is any resistance at all then the winding is shorted to the frame. To bypass the auxiliary windings, leave the wires unplugged and put a jumper between terminals 8 and Z2.

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Rotating Diodes Diagnosis

Step 8: Rotating Diodes

- Set your meter to the diode check scale (-►-)
- Remove a wire from at least one of the large screws on one of the diodes.
- Put one of the leads on the large screw on the diode pack and place the other lead on each one of the 3 smaller screws, then reverse the leads (put the lead from the large screw on one of the smaller screws and the lead from the smaller screw on the large screw)
  You should have two separate readings going one way you should be between .400 and .510 ohms, going the other way, you should get OL or Open. If this reading is correct move to the next step.

Rotor Winding Diagnosis

Step 9: Rotor Winding

- Measure the resistance of the rotor winding itself by taking the wire from one of the big screws and measuring it against the wire on the other screw. You should have low levels of resistance, around a couple of ohms
- If the above reading is good, measure resistance of the wire you took off the big screw to the end of the rotor shaft. You should get a reading of OL or Open. Make sure to measure only to the shaft of the rotor as you are checking to see if the rotor is shorted to itself.

Additional Notes

- Generator must run at **1800 RPM**. AVR shuts off below **1650 RPM** (red light will turn on).
- If all tests pass but voltage remains low, replace the AVR.

If there is still no output, contact us for further assistance!

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