# TROUBLESHOOTING GUIDE

This troubleshooting guide is for **Rotating Field Design with Capacitor Excitation** generator ends manufactured by Winco under the brands ***DYNA, Winco and Home Power.***

**NOTE:** The following conditions are necessary for all tests that follow. Your life, your safety and the life of your test equipment depend on paying attention to these details.

1. All resistance checks are done with the unit STOPPED.
2. All voltage checks are done with the engine running.
3. Always start with the highest voltage scale on your VOM (volt/ohm meter).
4. Check for residual voltage before any disassembly.
5. Don't disassemble any more than necessary.
6. Mark wires for reassembly.
7. Disconnect loads before residual voltage checks.
8. Write down all your readings.
9. Record Model #, Serial #, and P/N for reference when calling Winco.

## NO OUTPUT FROM GENERATOR

1. Start the engine. Check the engine speed to see that the engine is operating at the correct speed. Use a tachometer to check engine speed @ 3750 RPM, without a load. Use a frequency meter to check for proper frequency. 62 hertz without a load.
2. Adjust engine speed If necessary. You can get assistance with this by contacting your local engine manufacturers' dealer.
3. Using a VOM (volt/ohm meter) check for residual output at receptacles with the engine running. Expect a minimum of 3-5 VAC at the 120 volt receptacles.


Model DL6000H/F used for this guide.

**Note:** If you read zero volts AC proceed with step 3, however it is likely that the diode(s) on the rotor are open or shorted.

3. With the engine running, flash the field with a 12 volt DC battery if output is below 5 volts.

## FIELD FLASHING PROCEDURES

**Material Required:**

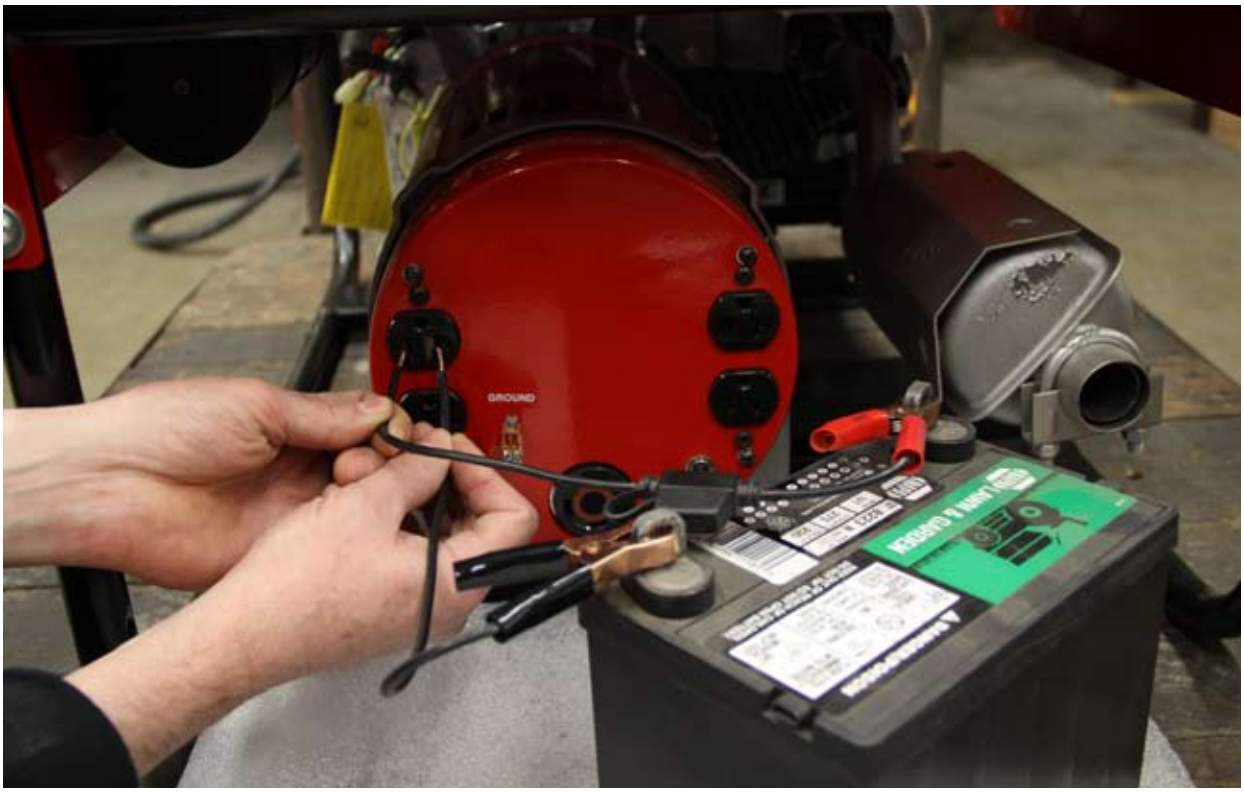
1. 12 Volt DC battery. If one is not available you can substitute a 9 Volt DC Transistor-type battery.
2. Jumper wires. 20 to 22 gauge wire is sufficient. Each wire should have clips on one end and be stripped on the other end back leaving approximately 3/8" of wire exposed.

**Procedure:**

**CAUTION: Insure there is no open or spilled fuel in the area of the unit when flashing the field. Insure the wires used to flash the field have no bare spots on them.**

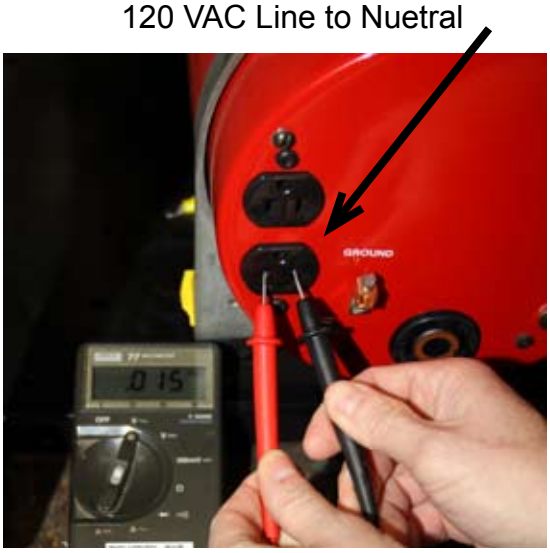
1. Clip jumper wires to the terminals of the battery.
2. Start the engine.
3. Locate a 120 volt duplex receptacle on the receptacle panel. (GFCI receptacles will not work). Identify the "hot (shorter)" slot on the receptacle and the "nuetral (longer)" slot on the receptacle.
4. Identify your battery Positive (+) lead and your battery Negative ( - ) lead.
5. You will be **briefly** inserting the battery positive lead into the hot slot and the battery negative lead into the nuetral slot of the receptacle.
6. **Caution:** Making sure not to touch the bare wires, **momentarily** insert the bare ends of the wires into the appropriate slots on the receptacle. **You are briefly poking the wires into the rececticle slots, DO NOT HOLD the wires in the receptacle.**

***WARNING: THIS RECEPTACLE WILL ENERGIZE TO 120 VOLTS IMMEDIATELY IF FLASING HAS BEEN SUCCESSFUL.***

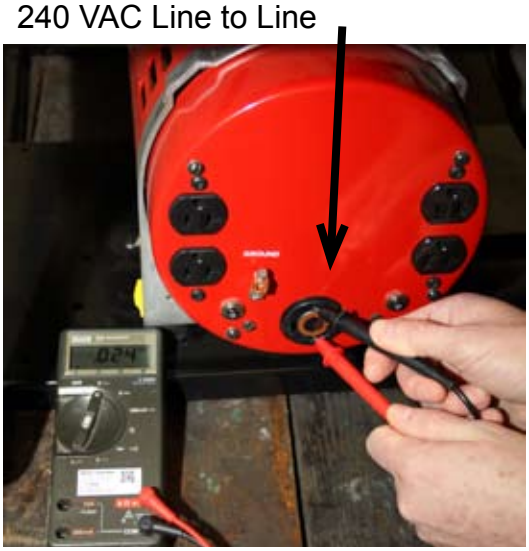


4. Re-check for output on all receptacles. If you read 120 VAC Line to Neutral on the 120 volt receptacles and 240 VAC Line to Line on a 240 volt receptacles you have successfully flashed the field.

120 VAC Line to Nuetral



240 VAC Line to Line



5. STOP the engine. You should be able to operate your generator normally at this time. If you do not read nominal voltage on the receptacles you will have to check for voltage at the stator leads of the generator.

6. Remove the screws holding the end cover to allow access to the generator wiring.

7. Locate and disconnect the G-1, G-3 and N wires from the end cover assembly.

8. Leave the capacitor leads attached to the capacitor(s) at this time. The wires have identification markings on them.

9. Check your output voltage. You can expect to see the following voltage if your generator is working properly.

G-1 to N = 120 volts AC
G-3 to N = 120 volts AC
G-1 to G-3 = 240 volts AC

G-1 to Nuetral

G-3 to Nuetral

10. If you read the proper voltage output from the stator leads and you did not read the same voltage from the receptacles, then your losing voltage somewhere in the receptacle assembly. Check for loose wires, defective receptacles or defective circuit breakers. Replace defective parts as nesessary and re-assemble. Test output after repairs are made.

11. If you do not have output from the stator leads then proceed to check the stator, capacitors and rotor.

## CHECK STATOR

1. Check stator output power leads G-1 to N and G-3 to N for continuity, resistance and grounding. Set your VOM to read Ohms resistance.
   a. There should be continuity between the leads.
   b. See the table at the end of this guide for resistance readings you should expect to read.
   c. There should not be any reading to ground (metal stator shell).
2. If the stator is out of specifications, open, or gounded then replace the stator.

3. Check stator capacitor leads for continuity, resistance and grounding. Set your VOM to read Ohms resistance.
   a. There should be continuity between the leads.
   b. See the table at the end of this guide for resistance readings you should expect to read.
   c. There should not be any reading to ground (metal stator shell).
4. If the stator is out of specifications, open, or gounded then replace the stator.

5. Check for continuity between the capacitor leads and the power output leads G-1 and G-3.
   a. There **should not** be continuity between those two leads.
   b. If you find continuity then the windings are shorted. Replace the stator.

## CHECK CAPACITORS

1. Remove capacitors for ease of tesing and inspecting.
2. Visually check capacitors for loose or burnt wires, bulging or leaking capacitors.
3. Discharge the capacitors by momentarily grounding the capacitor terminals to the metal capacitor case or metal part of the generator.

**VOM with setting to read capacitance:**

1. Set you VOM to the µF (micofarad) setting. The meter below has a CAP setting.
2. Check the capacitor markings and find the µF rating of the capacitor. 40 µF for example.
3. The capacitors +/- % will follow the 40 µF rating. For example 40 µF +/- 6%.
4. A 40 µF capacitor with a 6% range would have a low reading of 37.6 µF and a high reading of 42.4 µF. If the capacitor tests within the % range it is considered good. If the capacitor test falls outside of the % range it is considered out of spec (defective) and should be replaced.

**Note: Weak or low capacitors will have the effect of low voltage output. Capacitors can be checked using Ohms resistance readings, however this will not reveal a low or weak capacitor.**

## CHECK ROTOR

1. Remove the end bracket holding the stator assembly on. Slide the stator assembly off of the rotor. This allows ample room for testing the rotor and diodes.
2. Un-bolt the diode(s) from the rotor fan or mounting plate.
3. Check the diode(s) with your VOM. Some meters have a setting for testing a diode. If yours does not then use the Ω (ohms) setting.
   a. Meter leads should be placed either end of one diode (A). Check your VOM for current flow.
   b. Reverse meter leads (B). Check your VOM for current flow.
   c. Current flow (VOM ohms reading) should be detected in only one direction. If a diode reads current flow in both directions or neither direction it should be replaced.
   d. Depending on your model, repeat the process for the second diode.

***NOTE: All of the two diode rotors use one forward polarity diode and one reverse polarity diode.***

**A**

**B**

4. Check rotor leads for continuity and grounding. Place meter leads on solder end of diode(s). At least one of the diodes must be disconnected from the rotor to check continuity and resistance. There should be continuity between the leads and no reading to ground (metal shaft). The expected resistance values are listed in the table at the end of this guide. If rotor is out of specification or is grounded replace the rotor.

5. Replace defective parts and re-assemble the generator.
6. Flash the generator if neccessary after repairs.

# GENERATOR RESISTANCE (Ohms Ω) TABLE

**NOTE: If your model is not listed you can find the resistance values on the parts list for your model. The parts list are on the Winco website at Service Support / Winco Downloads.**

| MODELS | ROTOR | G-1 to N | G-3 to N | Q-1 to Q-2 Capacitor Leads | SS Winding Spec. |
|---|---|---|---|---|---|
| LC3000, LC3000H, D3000 | 0.83 - 0.92 | 0.52 - 0.57 | | 2.40 - 2.67 | SS1540 |
| HD3200, HD3200H, HP3300. HP3300H | 0.83 - 0.92 | 0.52 - 0.57 | | 1.68 - 1.87 | SS1530 |
| TF4500, DX4500, HP4500, HD4500, HP5000H, W4500, WC4500, WC5000H, W5000H | 0.95 - 1.05 | 0.17 - 0.19 | 0.34 - 0.375 | 0.53 - 0.58 | SS1531 |
| LC4500, LC5000H, LLC4500, LLC5000H, DLC4500, D4500, D5000, DL4500, DL5000H | 0.79 - 0.87 | 0.61 - 0.67 | 0.61 - 0.67 | 2.10 - 2.33 | SS1541 |
| LC6000, LLC6000, DLC6000, TFLC6000, HPS6000HE DL6000E, DL6000H, DL6000 | 0.95 - 1.05 | 0.21 - 0.23 | 0.22 - 0.25 | 0.53 - 0.58 | SS1543 |
| TFM6000, DXM6000, HDM6000, HDM6000H, HPM6000, HPM6000H | 10.9 - 12.1 | 0.10 - 0.11 | 0.17 - 0.19 | 0.76 - 0.84 | SS1544 |
| TF6000, DX6000, HP6000, HP6000H, | 1.87 - 2.08 | 0.12 - 0.14 | 0.25 - 0.28 | 0.34 - 0.39 | SS1533 |
| DX9000, HP9000, HP9500H, TF9000, LLC9000E, WC9000, TFLC9000E, DL9000E, W9500, DL9500HE/A, HPS9000E | 0.69 - 0.77 | 0.12 - 0.13 | 0.12 - 0.13 | 0.22 - 0.24 | SS1538 |
| DL6000IE/A, DL6000H/C, DL6000H/D, DL6000H/F, DL6000HE/D, DL6000HE/E | 0.95 - 1.05 | 0.21 - 0.23 | 0.22 - 0.25 | 0.53 - 0.58 | SS1532 |

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