

This troubleshooting guide is for **Rotating Field Design with Brush Excitation** generator ends manufactured by Winco.

**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.

120 Volt Receptacle



Model WC6000HE/E used for this guide.

**Note:** If you read zero volts AC proceed with step 3, however it is likely that the diode(s) in the bridge rectifier 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. Turn on all circuit breakers.
2. Clip jumper wires to the terminals of the battery.
3. Start the engine.
4. Locate a 120 volt receptacle on the receptacle panel. **(GFCI receptacles will not work)**. Identify the "hot (shorter)" slot on the receptacle and the "neutral (longer)" slot on the receptacle.
5. Identify your battery Positive (+) lead and your battery Negative (-) lead.
6. You will be **briefly** inserting the battery positive lead into the hot slot and the battery negative lead into the neutral slot of the receptacle.
7. **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 receptacle 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 Neutral



240 VAC Line to Line

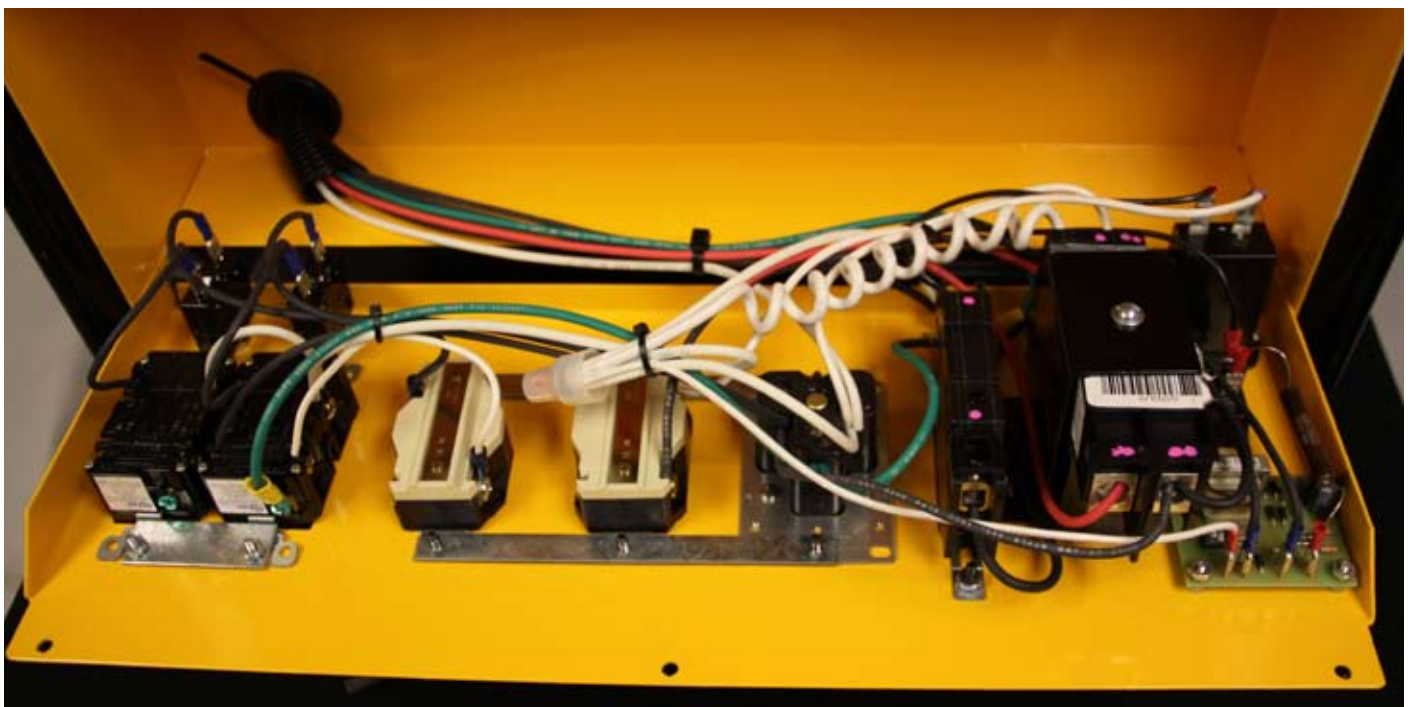


5. STOP the engine. You should be able to operate your generator normally at this time.

6. If you do not read the correct voltage on the receptacles continue to trace the voltage back to the stator leads of the generator end to see if there is a fault in the wiring, receptacles or circuit breakers.

7. Gain access to the back side of the receptacle panel. Dis-assembly will vary depending on your model. On the model shown in this guide there are three black torx screws holding the panel in place.

8. Inspect wiring and check voltage to breakers and receptacles. Follow the wiring diagram for your particular model when checking individual circuits. Repair wiring and replace defective parts as necessary.

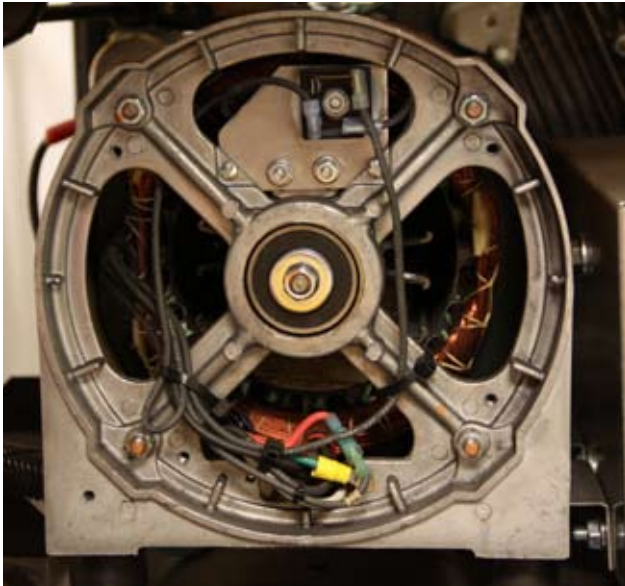


9. Remove the three torx screws holding the receptacle panel in place. This will allow access to the end cover on the generator.

10. Remove the four screws holding the end cover on and remove the end cover.



11. Cut the zip-ties holding the wires in place. Make note of routing of wires for re-assembly.



12. Locate and check voltage on the G-1, G-3 and N wires from the receptacle panel wiring harness. G-1 and Neutral leads have wire nuts on them. Disconnect the G3 lead for testing.

13. 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 Neutral





G-3 to Neutral



G-3 to G-1

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

15. If you do not have output from the stator leads then proceed to check the bridge rectifier, brush holder assembly, stator and rotor.

## CHECK THE BRIDGE RECTIFIER

1. Disconnect and mark the wires from the rectifier. You can test this component in place.
2. Test the rectifier following the procedures below.

**Note: The rectifier positive (+) terminal has the corner missing.**

Using your VOM, set to Ohms ( $\Omega$ ), check the following:

**Expected reading**

1. Black - meter lead on + terminal; Red + meter lead on AC #1.
2. Red + meter lead on + terminal; Black - meter lead on AC #1.

Resistance Value  
Open

1.

2.

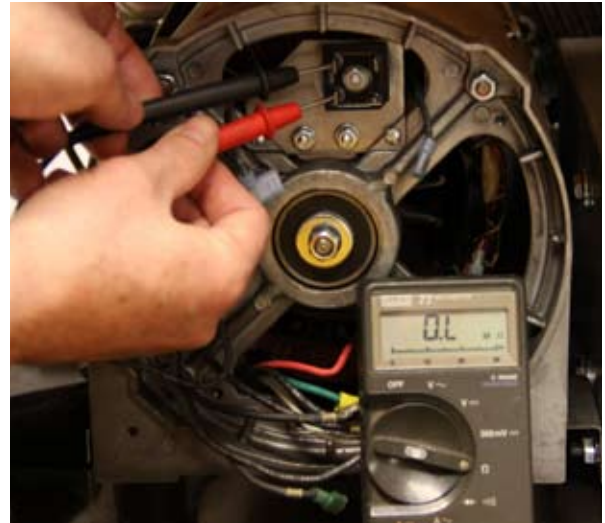


- 3. Black - meter lead on AC#1 terminal; Red + meter lead on - terminal. Resistance Value
- 4. Red + meter lead on AC#1 terminal; Black - meter lead on - terminal. Open

3.



4.



- 5. Black - meter lead on - terminal; Red + meter lead on AC#2 terminal. Open
- 6. Red + meter lead on - terminal; Black - meter lead on AC#2 terminal Resistance Value

5.



6.



- 7. Black - meter lead on AC #2; Red + meter lead on + terminal. Open
- 8. Red + meter lead on AC #2; Black - meter lead on + terminal. Resistance Value

7.



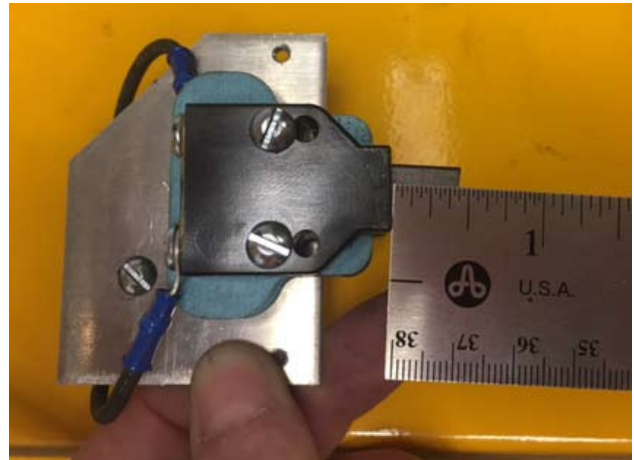
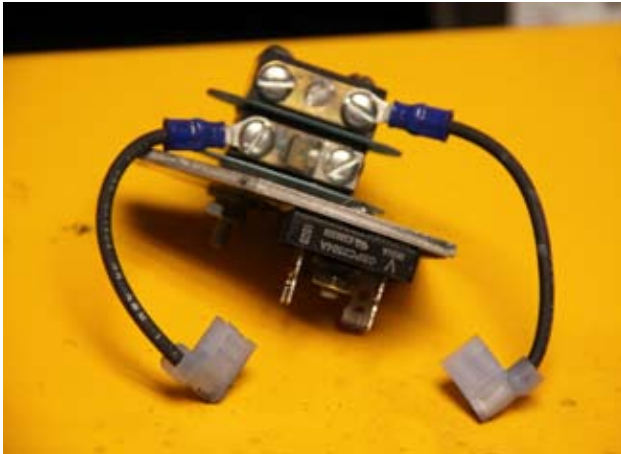
8.



If the bridge rectifier fails any of the above tests, it should be considered defective and replaced.

## CHECK BRUSH HOLDER ASSEMBLY

1. Remove the two screws holding the assembly in place and remove the brush assembly.
2. Inspect the brushes for damage, misalignment and wear to less than  $\frac{3}{8}$ " with brush removed from holder. With brush in holder, a new brush is  $\frac{7}{16}$ ".
3. Replace brush(s) if necessary.



## 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 grounded then replace the stator.

G-1 to Neutral



G-3 to Neutral



3. Check stator excitation leads for continuity, resistance and grounding. Set your VOM to read Ohms resistance. One wire terminates on the rectifier, one wire terminates on the brush holder.
  - 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 grounded then replace the stator.



5. Check for continuity between the exciter 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 ROTOR

1. Remove the end bracket holding the stator assembly on. This allows ample room for testing the rotor. Continuity test on slip rings can be done with the end bracket in place. See picture below.
2. Check rotor slip rings for wear and corrosion.
3. Check rotor slip rings for continuity and grounding.
  - a. There should be continuity between the slip rings.
  - b. The resistance values are shown in the table at the end of this guide.
  - c. There should not be any reading to ground.
4. Replace defective parts and re-assemble the generator.
5. Flash the generator if necessary after repairs.



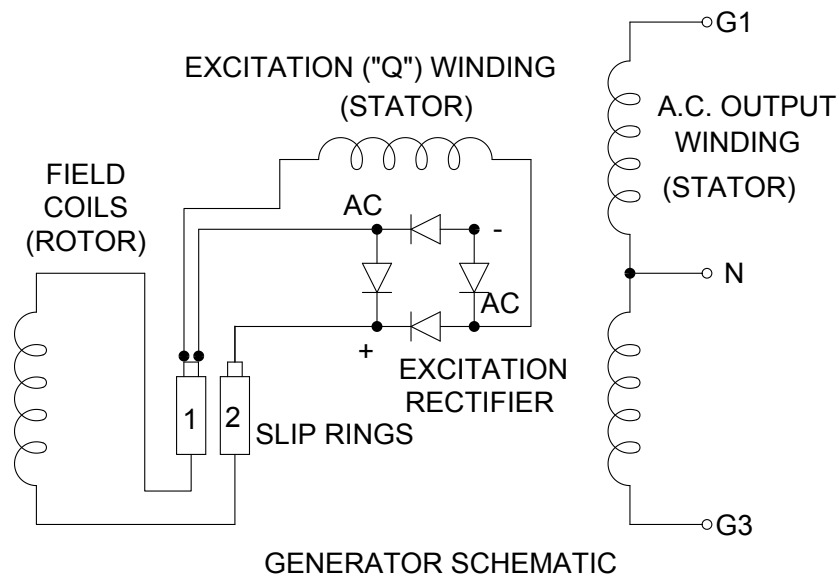


# GENERATOR RESISTANCE (Ohms $\Omega$ ) TABLE

**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	SS Winding Spec.
W6000/A, W6000H/A, WC6000E/A, WC6000H/A, WC6000HE/A, W6000E/A, W6000H/A, W6000E/B, W6010DEG, WC6000E/D, WC6000H/C, WC6000HE/C, WC6000H/D, WC6000HE/D, WC6000HE/E	10.9 - 12.1	0.10 - 0.11	0.17 - 0.19	0.76 - 0.84	SS1544
TFM6000E/N, TFM6000E/P, TFM6000E/Q, TFM6000E/R, HPM6000, HPM6000E DXM6000E/N, DXM6000E/P	10.9 - 12.1	0.10 - 0.11	0.17 - 0.19	0.76 - 0.84	SS1544

## AC SCHEMATIC



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