GENERAL TROUBLESHOOTING

MODELS WMD & TWG 3 KW - 12.5KW 60 Hertz

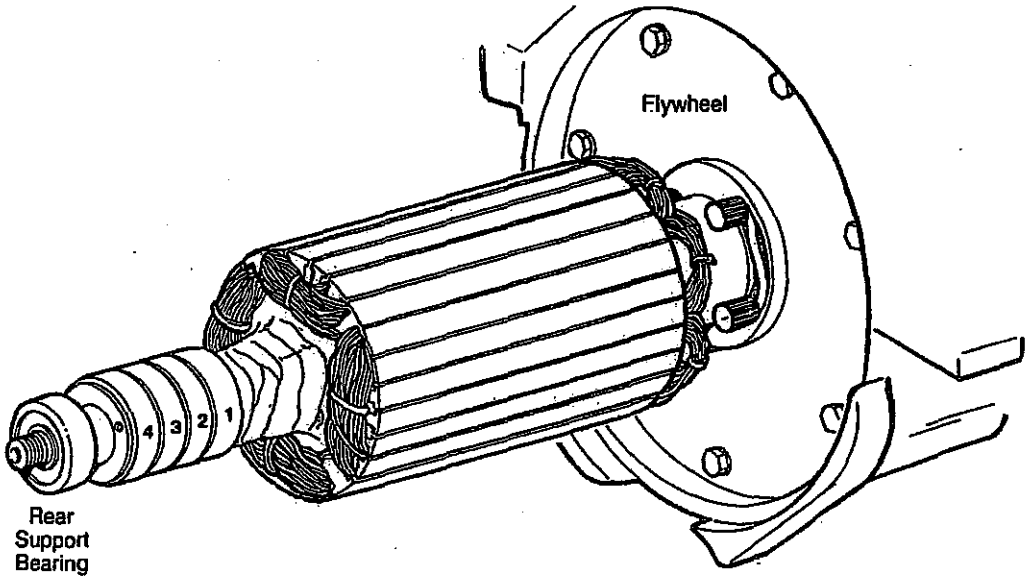
2.4 KW - 9.4KW 50 Hertz

No Electrical Output

1. Remove load from generator and verify no output directly at generator output leads with voltmeter.

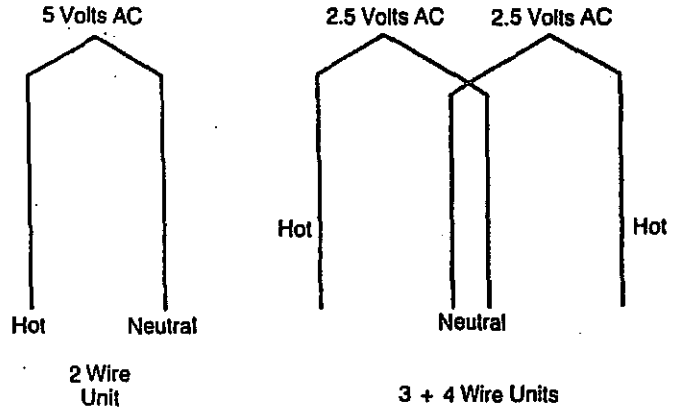
2. Check for proper electrical connections. Refer to Internal Wiring diagrams.

   NOTE: Generator armature slip rings and brush rigs are numbered from inboard at the windings or flywheel end outward toward the rear support bearing.



2A. RESIDUAL VOLTAGE CHECK

Disconnect the two field leads from the bridge rectifier (Note the position of the leads on the rectifier. (+) to (+) and (-) to (-). Operate the generator and check AC voltage output (no amperage load on the generator). Measure AC voltage between the Neutral leg and the Hot leg(s).



REVISION 1
JANUARY 2019

2-wire unit	5 Volts AC (Hot lead to neutral)
3 and 4 wire unit	2.5 volts AC (each hot lead to neutral approximate)

Residual Voltage checks O.K. You can assume the rotating armature and brush rig are O.K. The generator problem lies in the rectifier and/or field coils.

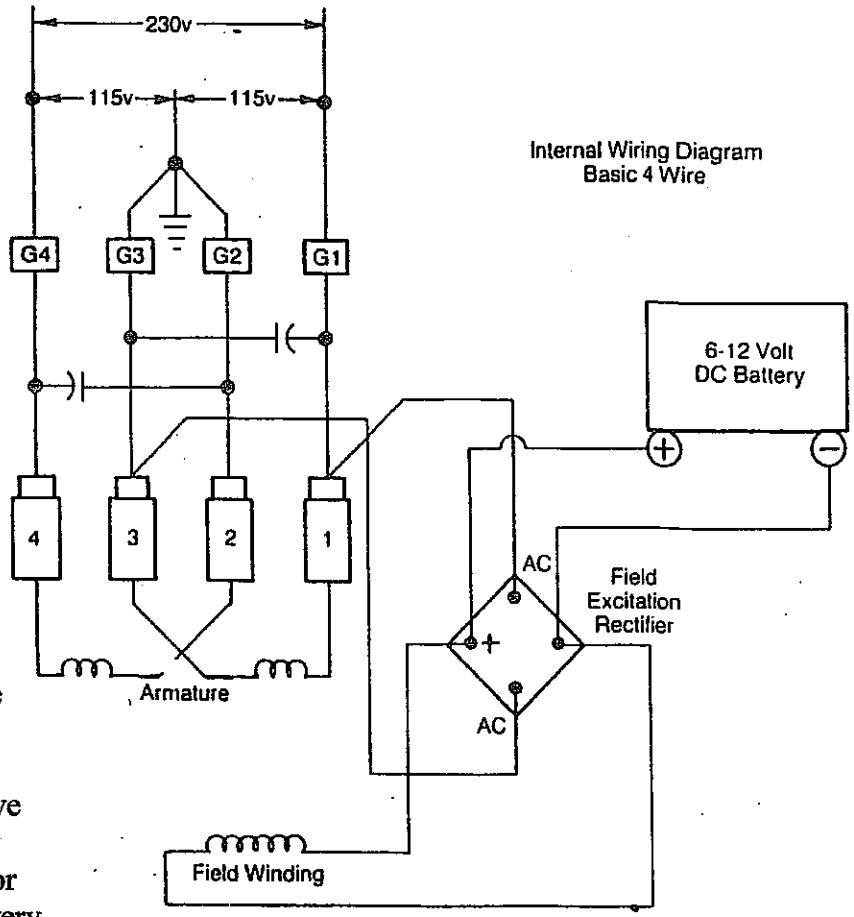
Residual voltage not present. Check brush rig and static capacitors. Check rotating armature resistance values and continuity check found elsewhere in this manual.

3. Test operation of generator by by-passing bridge rectifier. Apply 12 volts DC to field leads on bridge rectifier (+) to (+) and (-) to (-). Run generator (no load). Measure voltage output at generator leads. Generator output with 12 volts DC excitation to the field coils should be 50 to 70 Volts AC. If 50 to 70 volts AC is produced, this should indicate that the generator is O.K., and that the bridge rectifier is defective.

4. If no voltage is produced, check the static capacitor(s) that it is not shorted to ground. If found faulty, remove connection from output terminal at brush rig and repeat Step #3.

5. **FLASHING THE FIELD COILS**

Units may lose their residual magnetism from extended storage, rough handling during transportation, installation, disassembly for installation, etc., requiring the field coils to be excited with 6 – 12 volts DC to restore residual magnetism in the coils. This is done in the following manner:



Stop the generator and remove the end bell cover. This will expose the cooling fan, brush rig assembly and bridge rectifier. View Internal Wiring Diagram to the right. The positive (+) lead from the field coils is connected to the positive marked terminal on the rectifier and the negative (-) lead from the field coils is connected to the opposite **UNMARKED** negative terminal on the rectifier. Using jumper leads with insulated alligator clips, connect 6 to 12 volts DC battery positive to the positive of the rectifier

and negative to the **UNMARKED** terminal of the rectifier for approximately 10 -15 seconds. This should restore residual magnetism to the stationary field coils. (Be careful not to connect DC voltage to the AC terminals on the rectifier, as this will damage the rectifier).

Remove the alligator clip connections; replace the generator's end bell cover and operate the generator and check AC voltage output. If no-load AC voltage is still not present, repeat the procedure.

6. Check for a short or open in the rotating armature or in the stationary field coils.

ROTATING ARMATURE (RESISTANCE VALUES)

3.0 & 4.4KW (2-wire)	1 ohm or less slip ring to slip ring
3.0 & 4.4KW (3-wire)	1 ohm or less between slip rings 1 and 3

NOTE: Continuity should be found between slip rings (1 & 2) and (2 & 3) on the 3-wire unit. The ohms value should be approximately one half that found between slip rings 1 & 3.

6.0, 6.5, 7.7, 8.0, 11.0, and 12.5KW	1 ohm or less between slip rings (1 & 3) and (2 & 4).

NOTE: 4-wire units: There should be no continuity found between slip rings (1 & 2), (2 & 3) and (3 & 4). If continuity is found, an internal short exists between these windings and the armature should be replaced.

NOTE: All units: There should be no continuity found between any of the slip rings and the armature's central steel shaft. If continuity is found, the windings are shorted to the shaft and the armature should be replaced.

Rotating armature slip rings are numbered from inboard of the generator flywheel end outward to the rear support bearing. When referring to 2, 3 and 4-wire units, these are the number of generator output leads being connected to the load. You will find on the 11.0 and 12.5KW units that there are 8 leads coming from the brush rig and are combined for a total of 4 output leads. The number of wires can also be related to the number of slip rings on the rotating armature.

FIELD COIL RESISTANCE (TOTAL)

3.0 & 4.4KW	32.5 Ohms	+/- 5%
6.0 & 6.5KW	31.5 Ohms	+/- 5%
7.7 & 8.0KW	22.5 Ohms	+/- 5%
11.0 & 12.5KW (Alum Coils)	14.2 Ohms	+/- 5%
11.0 & 12.5KW(Copper Coils)	22.6 Ohms	+/- 5%

NOTE: There should be no continuity found between the field coils and the generator body.

7. Replacement of Field Coil(s)

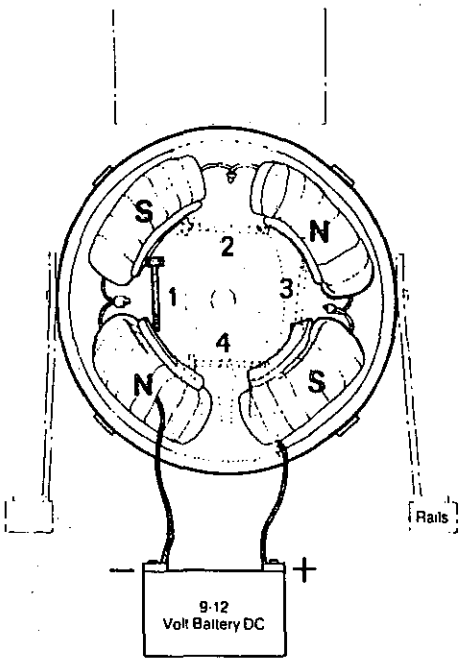
Field coils are connected in series and the reisitance value given in this text is the total of the four field coils. To determine the resistance value of one, divide by four. Each field coil has a mounting position on the generator housing and cannot be interchanged with another field coil.

When installing a replacement field coil(s), the installer must insure that the coil is correct for the mounting position in the housing and will have the correct polarity when excited with 9 - 12 volts DC.

The field coil shoes that hold the coil securely to the generator housing are held in palce by bolts that must be properly tightened when the coil and shoe are installed to the generator housing. When connecting the coils in series insure the butt connections are good and secure and positioned away from rotating parts.

To insure the field coils have been positioned properly in the generator housing and will have the correct polarity, the following test must be made before reassembly of the generator.

(1) Connect a 9 - 12 volt DC battery to the leads off the coils that would normally be connected to the (+) and (-) connectors of the bridge rectifier. These leads are unmarked and the polarity in their connection to the DC battery is not important. NOTE: When removing the leads from the battery and reconnecting them to the bridge rectifier, you should maintain the same polarity as used in this test, plus lead to (+) on rectifier and negative to unmarked (-) connection on rectifier.



(2) With a 3 inch iron bolt or its equivalent, place this bolt between each adjoining field coil shoe. It should be held in place by the magnetic attraction set up between the coil/shoes by the 9 - 12 volts excitation of the field coils. Should this fail to happen between any of the four adjoining coils/shoes, then an incorrect coil is installed and must be removed and the correct one installed; otherwise the generator when assembled will not produce proper voltage.

Low Voltage Output

1. Verify voltage output at generator output leads with load applied to generator; check no load condition also. Check voltage at the load. Check rating for generator and verify load with amp probe at output leads. Check all connections to insure they are clean and secure. Insure that the wire size carrying the voltage to the load is of sufficient size so as not to produce a voltage drop.

   NOTE: Beware of motor starting loads and the amperage draw placed on the generator from these types of loads. Generally, the amperage draw of a motor at start up will be 3 - 5 times the amperage needed when running.

2. Check generator with Hertz meter:

No Load Hertz	61 - 61.5 (51 - 51.5)
No Load Voltage	130 - 132 Volts (Generator Cold)
No Load Voltage	126 - 130 Volts (Generator Hot)

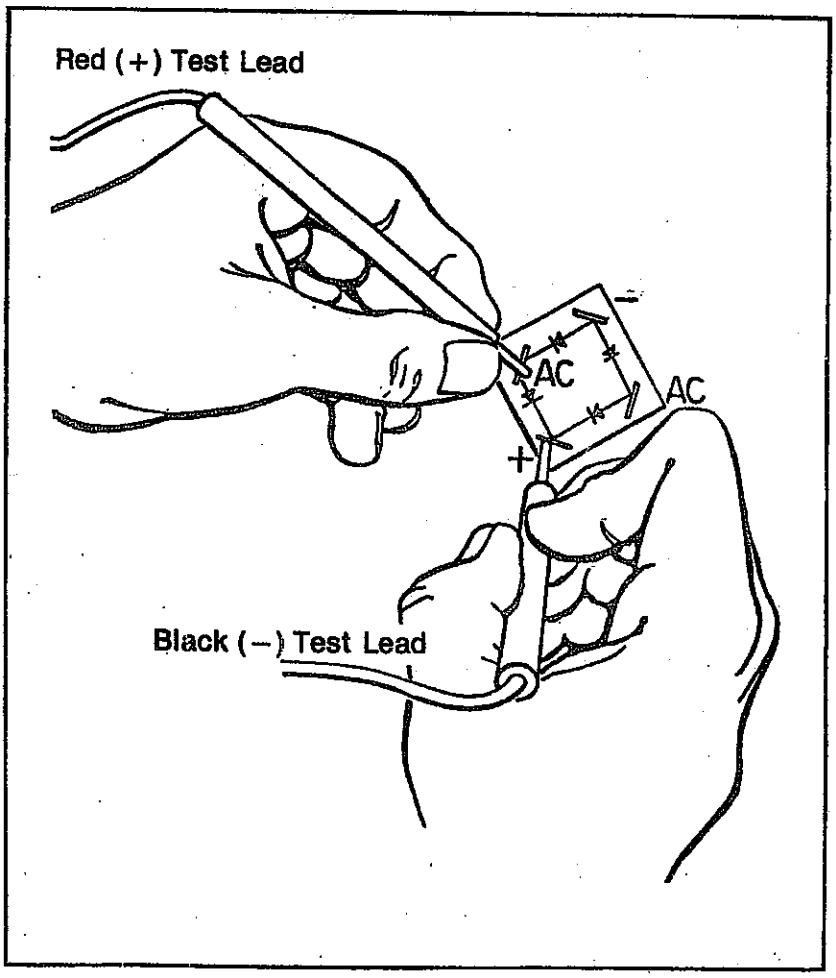
3. Test Bridge Rectifier:

   Bridge rectifier may be faulty and should be checked as follows.

Test done using a ANALOG meter.

The illustration shows the direction current passes through each of the 4 diodes in the rectifier.

Check each diode one at a time. In the direction of current flow through the diode. They all should have the same resistance. In the blocking direction it should be infinite (no resistance). Any diode that fails this test. The rectifier is faulty.



4. Check field coil resistance as per specification given in A-6.

5. Insufficient cooling of the generator. Ambient air entering the generator should not exceed 104°F (40°C).
Operating efficeincy of the generator decreases as the ambient air temperature entering the generator end bell increases above 104°F. Generators in confined areas may require the ducting of cool outside air into the compartment and directed toward the inlet at the generator end bell.

6. Check condition of brushes for wear and contact with slip rings on armature. Insure brushes are not sticking in holders.

High Voltage Output

1. Verify voltage at generator output leads.

   No load voltage 126 - 130 volts (Generator Hot)

   61 - 61.6 Hertz

   (51 - 51.5 Hertz) (225 – 230 volts)

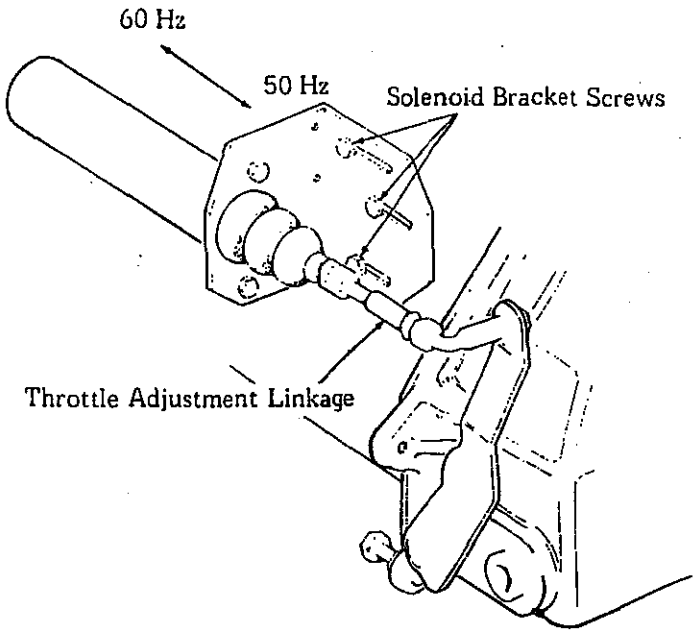
2. Check internal wiring of generator leads attached to brush rig and leads from brush rig feeding AC to bridge rectifier. Refer to Internal wiring schematics. These internal wiring diagrams are applicable to related 50 Hertz units as well.

Illustrated Solenoid with Throttle Linkage

(Reference Service Bulletin #127 when adjusting throttle linkage to produce correct No Load voltage and Hertz.)

NOTE: The solenoid plunger MUST move smoothly and rapidly into the solenoid when the solenoid is electrically energized, drawing with it the engine throttle arm into the set speed run position.

Failure of the solenoid plunger to bottom in the solenoid will result in a failed solenoid.

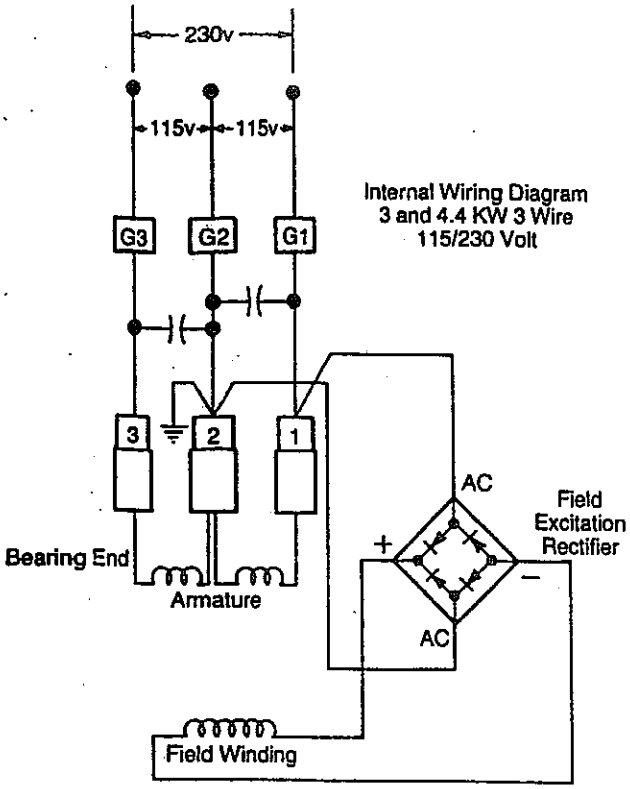


3.0 KW	115 VAC	25.0 AMP at 115 VAC
4.4 KW	115 VAC	34.7 AMP at 115 VAC
6.0 KW	115 or 115/230 VAC	25.7 AMP at 230 VAC
6.5 KW	115 or 115/230 VAC	27.0 AMP at 230 VAC
7.7 KW	115 or 115/230 VAC	33.5 AMP at 230 VAC
8.0 KW	115 or 115/230 VAC	34.0 AMP at 230 VAC
11.0KW	115 or 115/230 VAC	46.0 AMP at 230 VAC
12.5KW	115 or 115/230 VAC	52.0 AMP at 230 VAC

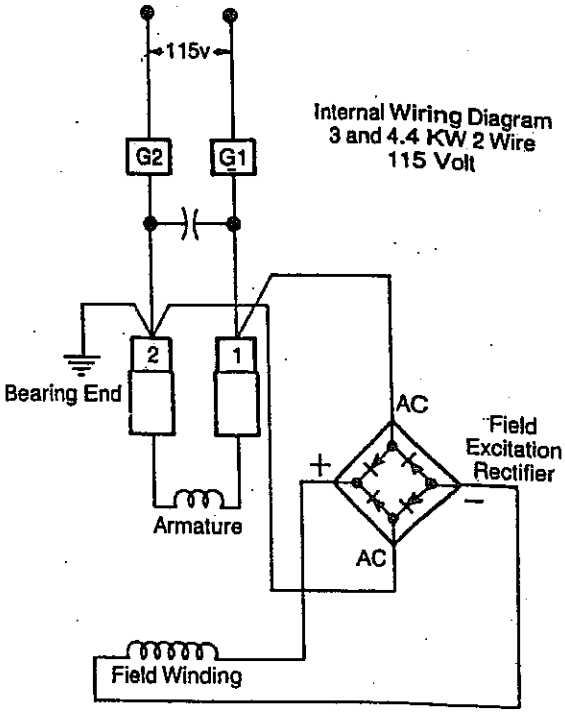
Frequency	60 Hertz Standard	
	(50 Hertz available at reduced rating)	
RPM	1800 - 60 Hertz	
	1500 - 50 Hertz	
Voltage		
Normal	115 VAC	230 VAC
Maximum - No load	132 VAC	264 VAC
Minimum - Full load	108 VAC	216 VAC
Excitation Voltage	115VAC (output voltage supplied to rectifier)	
Field Excitation Voltage	190VDC (approximate)	

NOTE: If a hertz meter is not available to use to set engine speed. Monitor the AC no-load voltage.

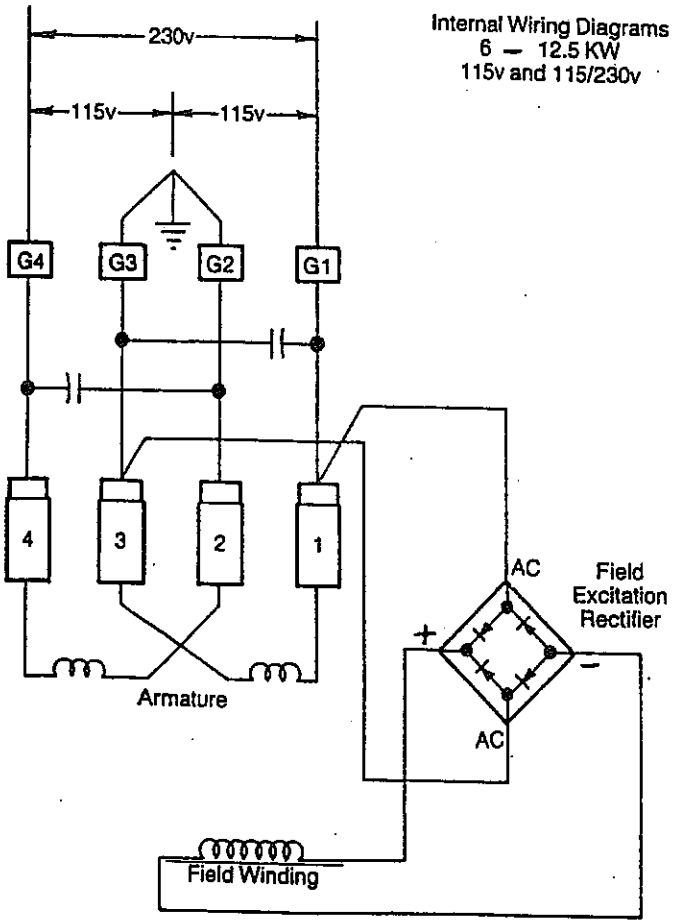
Set the engine speed to get close to the maximum no-load to achieve good AC voltage ouput from no-load to full rated amperage load.
Keep in mind engine speed (hertz) relates to voltage output. Engine speed is the primary factor in AC voltage output for this brush style generator



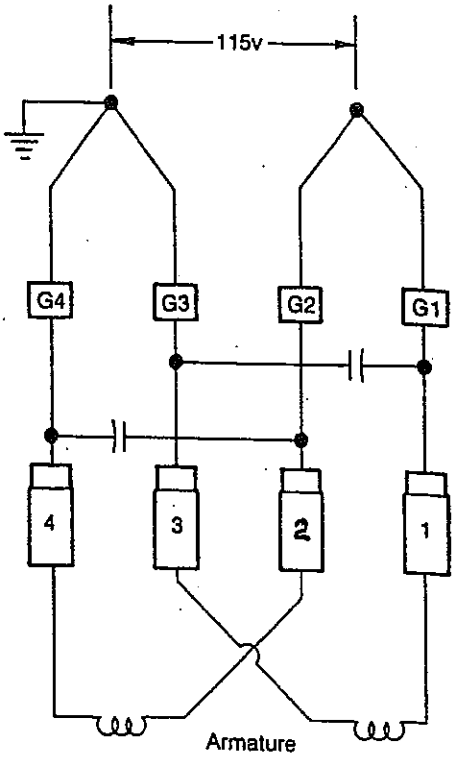
Internal Wiring Diagram
3 and 4.4 KW 3 Wire
115/230 Volt



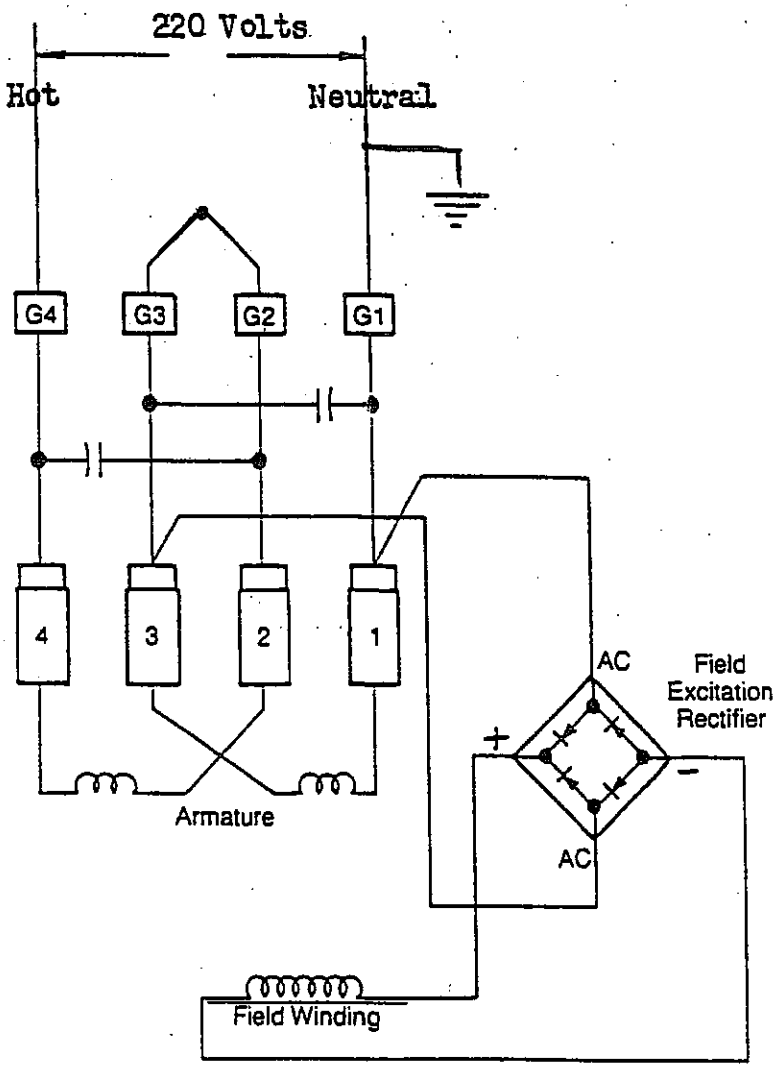
Internal Wiring Diagram
3 and 4.4 KW 2 Wire
115 Volt



Internal Wiring Diagrams
6 — 12.5 KW
115v and 115/230v



Field Excitation
Rectifier Wiring
Same as for 230v


220 Volts
Hot
Neutral
G4
G3
G2
G1
4
3
2
1
Armature
AC
Field
Excitation
Rectifier
+
−
AC
Field Winding