GENERATOR & REGULATOR

1997 STARTING & CHARGING SYSTEMS Mazda - Generators & Regulators

DESCRIPTION & OPERATION

Generator is a conventional 3-phase, self-rectifying type with 6 diodes (3 positive and 3 negative) that rectify current. Internal regulator is solid-state type.

ADJUSTMENTS

BELT DEFLECTION

Measure belt deflection in center of longest pulley-to-pulley span. See **BELT DEFLECTION SPECIFICATIONS** table. If belt deflection is not as specified, adjust as necessary.

BELT DEFLECTION SPECIFICATIONS

Application	(1) Deflection - In. (mm)
New Belt	0.22-0.28 (5.5-7.0)
Used Belt	0.24-0.30 (6.0-7.5)
(1) With 22 lbs. (10 kg) applied to belt.	

TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING article in GENERAL INFORMATION.

TROUBLE SHOOTING PRECAUTIONS

Observe the following precautions when trouble shooting or testing charging system:

- Obtain code number and deactivate audio anti-theft system before disconnecting battery (if equipped).
- DO NOT reverse battery cable connections. Rectifier will be damaged.
- DO NOT use high voltage type testers.
- Battery voltage should always exist at generator terminal "B".
- DO NOT ground generator terminal "L" while engine is running.
- DO NOT start engine with connector disconnected from generator terminals "L" and "S".
- DO NOT apply battery voltage to terminal "L".

ON-VEHICLE TESTING

*** PLEASE READ FIRST ***

NOTE: Check generator wiring harness connections and drive belt tension. Battery must be fully charged before testing. Wait at least 30 seconds after starting engine before measuring system voltage.

CAUTION: Ensure generator terminal "B" does not contact ground.

GENERATOR OUTPUT

1. Connect an ammeter (100-amp minimum) in-line between generator terminal "B" connector and terminal "B" of wiring harness connector. See **Fig. 1** . Turn headlights and all accessories on. Depress brake pedal. Operate engine at 2500-3000 RPM.
2. Measure and record generator output. See **GENERATOR MAXIMUM RATED OUTPUT** table. If amperage is as specified, go to next step. If amperage is not as specified, repair or replace generator.
3. Turn off headlights and all accessories. Release brake pedal. Operate engine at 2500-3000 RPM and measure amperage under no-load condition. No-load amperage should be 5 amps or greater. If amperage is as specified, go to next step. If amperage is not as specified, repair or replace generator.
4. Operate engine at 2500-3000 RPM. Measure voltage between ground and terminals "S" and "L". If 14.1-14.7 volts does not exist, repair or replace generator. If 14.1-14.7 volts exists, generator output is okay.

GENERATOR MAXIMUM RATED OUTPUT

Application	Amps
A/T	70
M/T	65

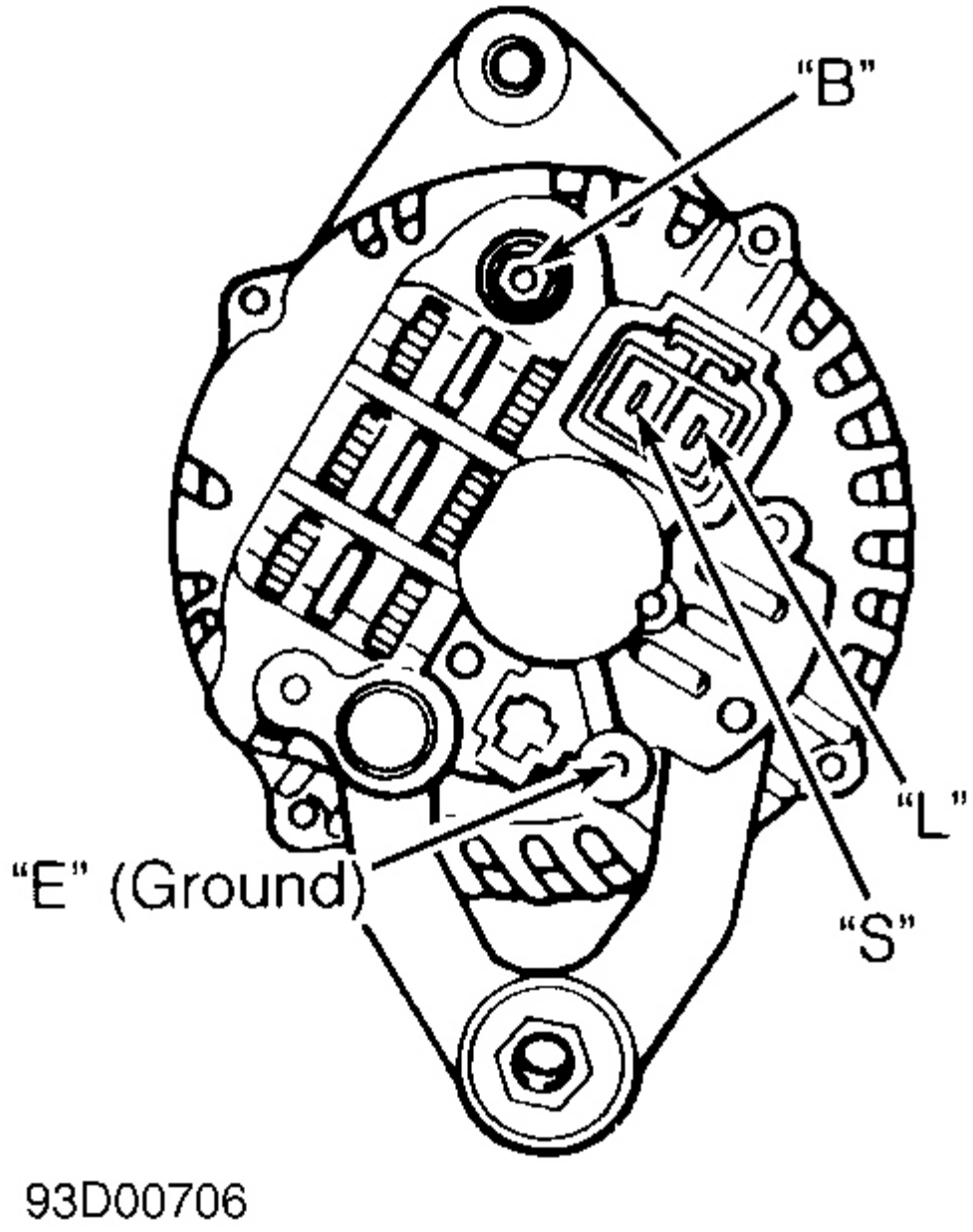

Fig. 1: Identifying Generator Terminals
Courtesy of MAZDA MOTORS CORP.

BENCH TESTING

RECTIFIER/DIODE ASSEMBLY

1. Using an ohmmeter, check continuity of each diode in both directions (polarity). See **Fig. 2** thru **Fig. 4** . If diode shows high resistance in one direction and low resistance in other direction, diode is okay.
2. If diode shows low resistance in both directions, diode is shorted. If diode shows high resistance in both directions, diode is open. If any diode is defective, replace rectifier assembly.

ROTOR & SLIP RINGS

Measure resistance between rotor slip ring contacts. See **Fig. 5** thru **Fig. 9** . If resistance is not within specification, replace rotor. See **ROTOR RESISTANCE SPECIFICATIONS** table. Check continuity between individual slip rings and rotor core/shaft. If continuity exists, replace rotor.

ROTOR RESISTANCE SPECIFICATIONS

Application	(1) Ohms
Miata	3.5-4.5
(1) If continuity does not exist, replace rotor.	

STATOR

Check continuity between stator coil leads and stator core. See **Fig. 5** thru **Fig. 9** . If continuity exists, replace stator. Check continuity between leads of stator coil. If continuity does not exist, replace stator.

BRUSHES

Replace brushes if worn to limit line. See **Fig. 5** thru **Fig. 9** . Replace brush springs if corroded. For brush replacement procedure, see **OVERHAUL** .

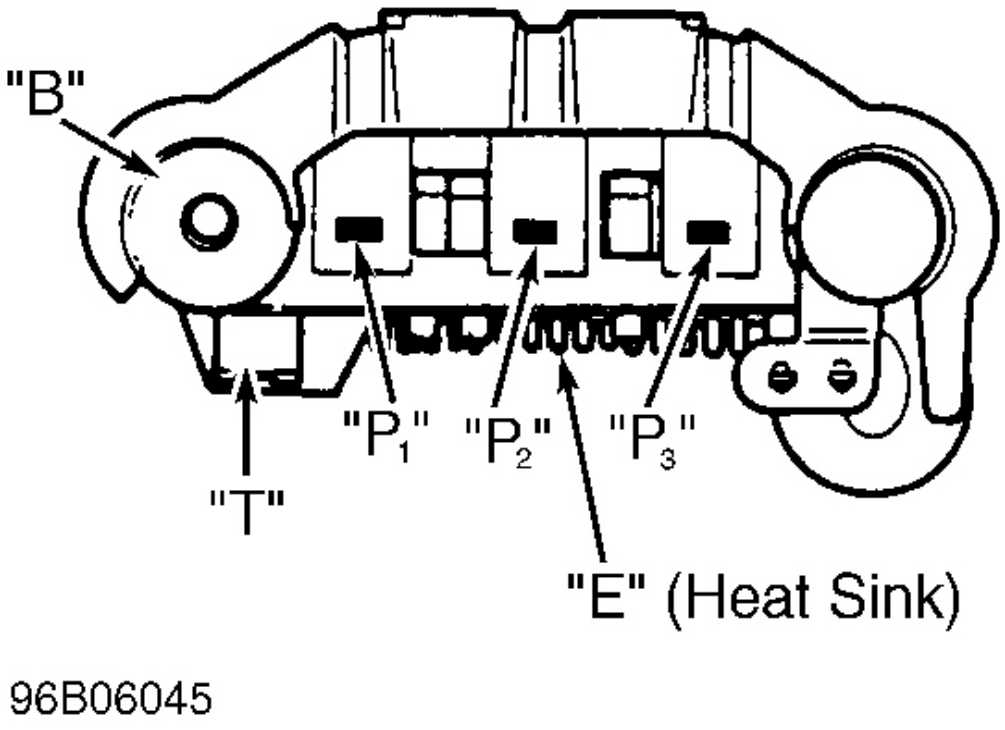

Fig. 2: Testing Rectifier Diodes
Courtesy of MAZDA MOTORS CORP.

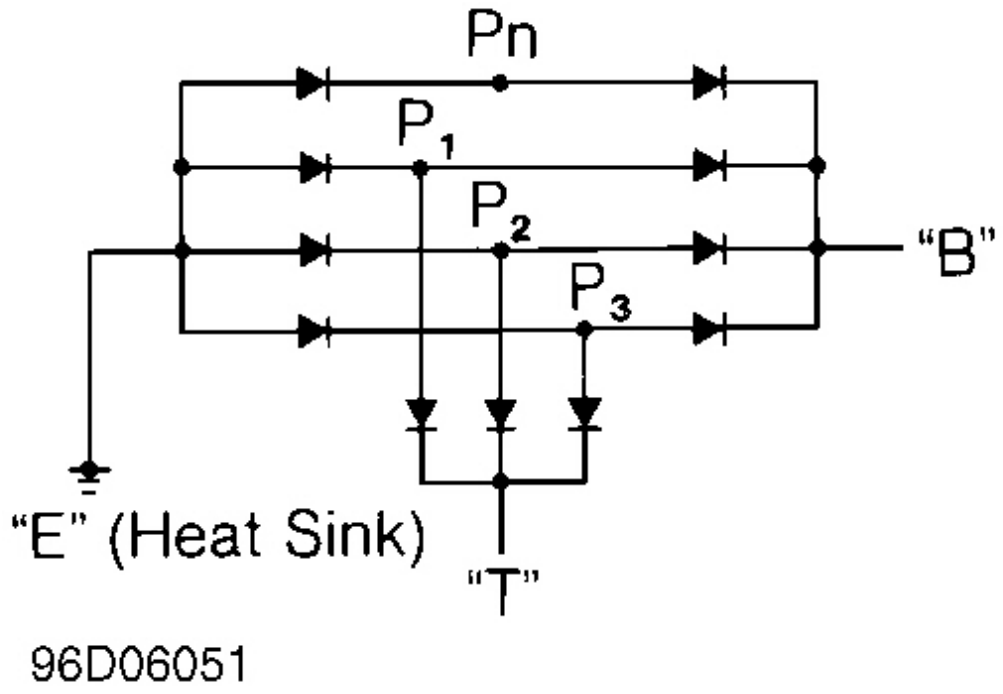

Fig. 3: Rectifier Schematic
Courtesy of MAZDA MOTORS CORP.

Negative	Positive	Continuity
E	Pn, P1, P2, P3	Yes
B		No
T		No
Pn, P1, P2, P3	E	No
	B	Yes
P1, P2, P3	T	Yes
Pn		No

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Fig. 4: Rectifier Continuity Test Chart
Courtesy of MAZDA MOTORS CORP.

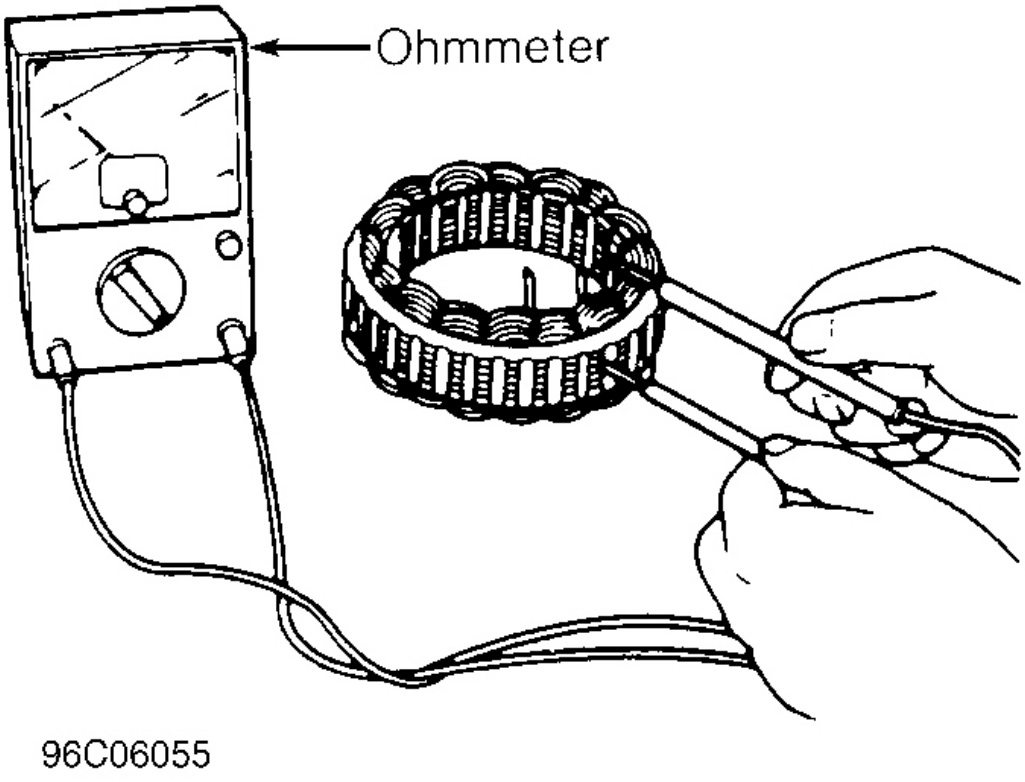


Fig. 5: Testing Generator Stator, Rotor & Brushes
Courtesy of MAZDA MOTORS CORP.

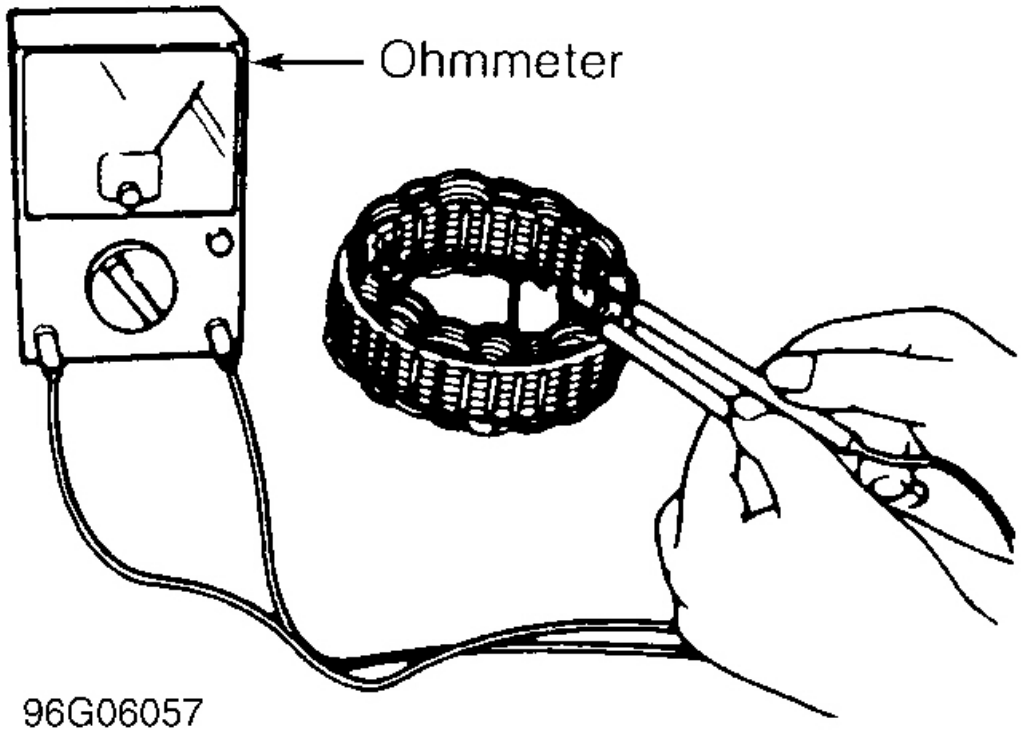


Fig. 6: Checking Stator Winding Continuity
Courtesy of MAZDA MOTORS CORP.

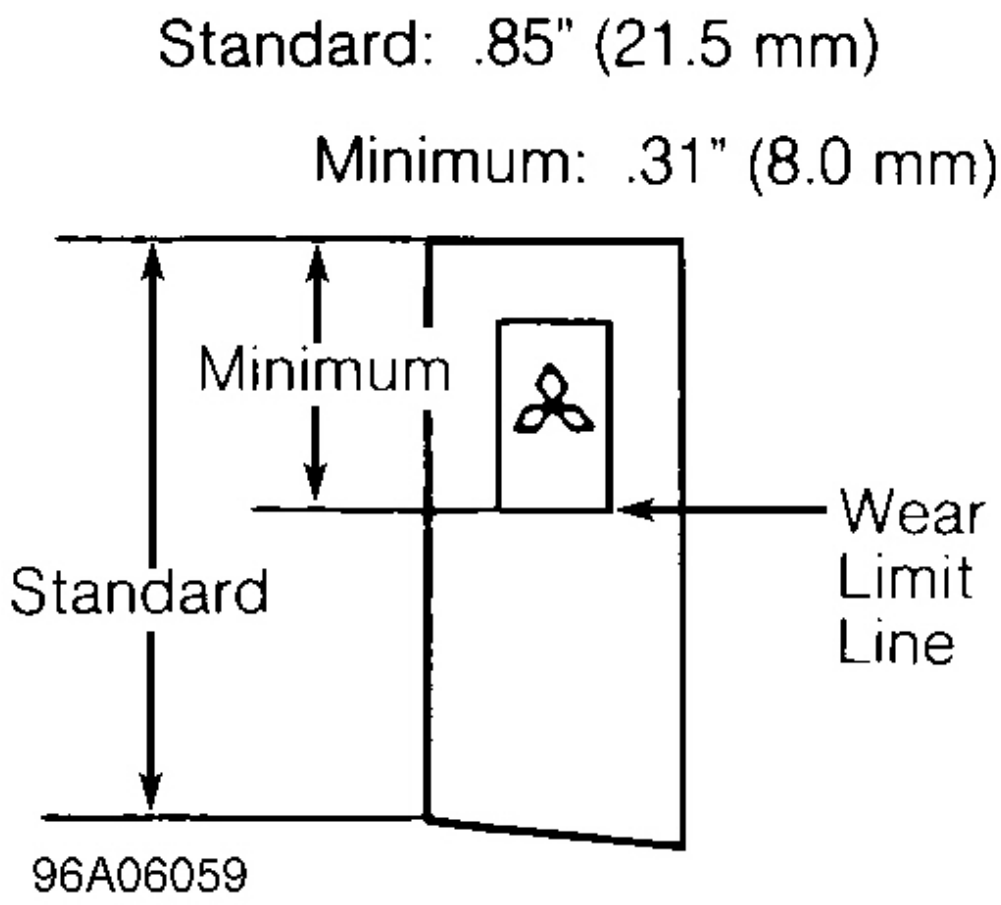


Fig. 7: Measuring Brush Wear
Courtesy of MAZDA MOTORS CORP.

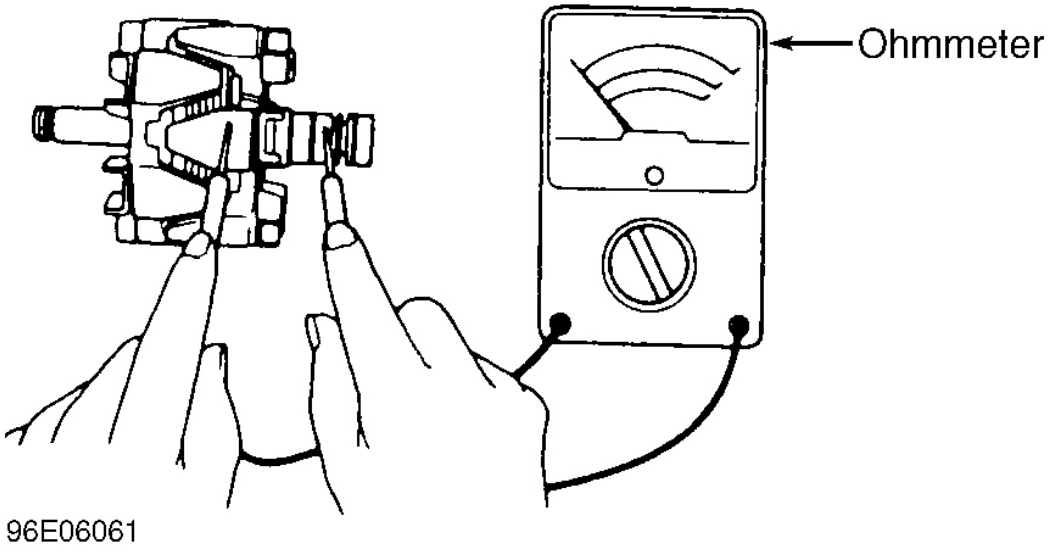


Fig. 8: Checking Rotor For Shorts
Courtesy of MAZDA MOTORS CORP.

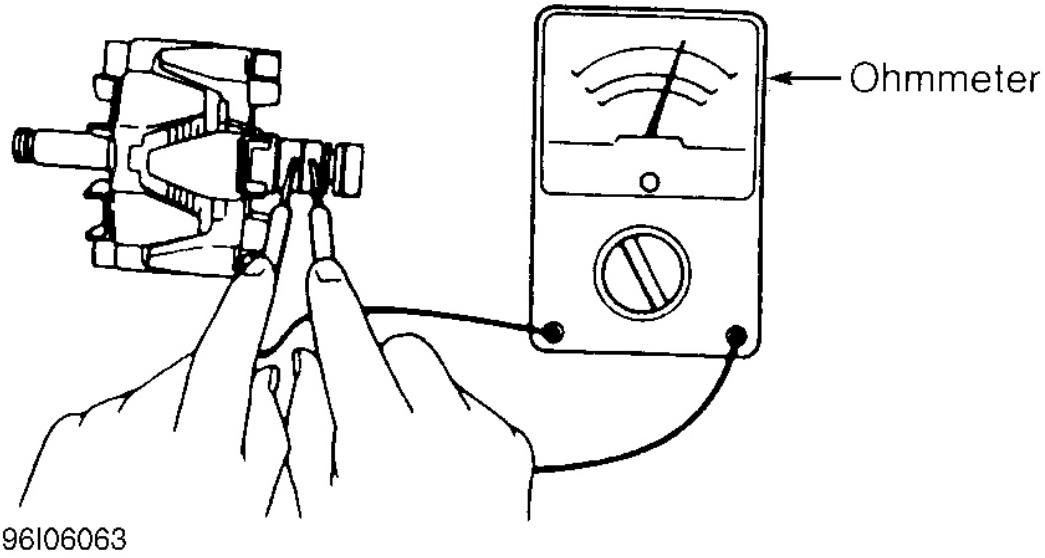


Fig. 9: Checking Rotor Resistance
Courtesy of MAZDA MOTORS CORP.

OVERHAUL

DISASSEMBLY

1. Place a 200-watt soldering iron against rear bearing for 3-4 minutes to heat rear cover to 122-140°F (50-60°C). Carefully separate front case and rotor from rear cover and stator. See **Fig. 10** thru **Fig. 15** and **Fig. 17** .
2. Position rotor in vise. Remove pulley. Disassemble pulley, rotor and front case. Remove front bearing from front case. Using a bearing puller, remove rear bearing.
3. Remove "B" terminal nut and bushing from rear cover. Remove screws from brush holder and rectifier. Separate rear cover and stator. When unsoldering rectifier and stator leads, disconnect as quickly as possible (5 seconds maximum) to avoid damage to rectifier. To remove brushes from holder, unsolder pigtail from terminal.

REASSEMBLY

Brush Installation

1. Install brush and spring into holder. Allow brush to extend out of holder until wear limit line extends .08-.16"(2-4 mm) beyond end of brush holder. See **Fig. 16** . Solder pigtail onto brush holder.
2. Insert spring and brush into brush holder. Using a spring scale, pull brush into holder until end of brush protrudes .08" (2.0 mm) from holder. See **Fig. 10** thru **Fig. 15** . Note reading on spring scale. Replace spring if tension is not 5.6-15.5 ozs. (160-440 g).

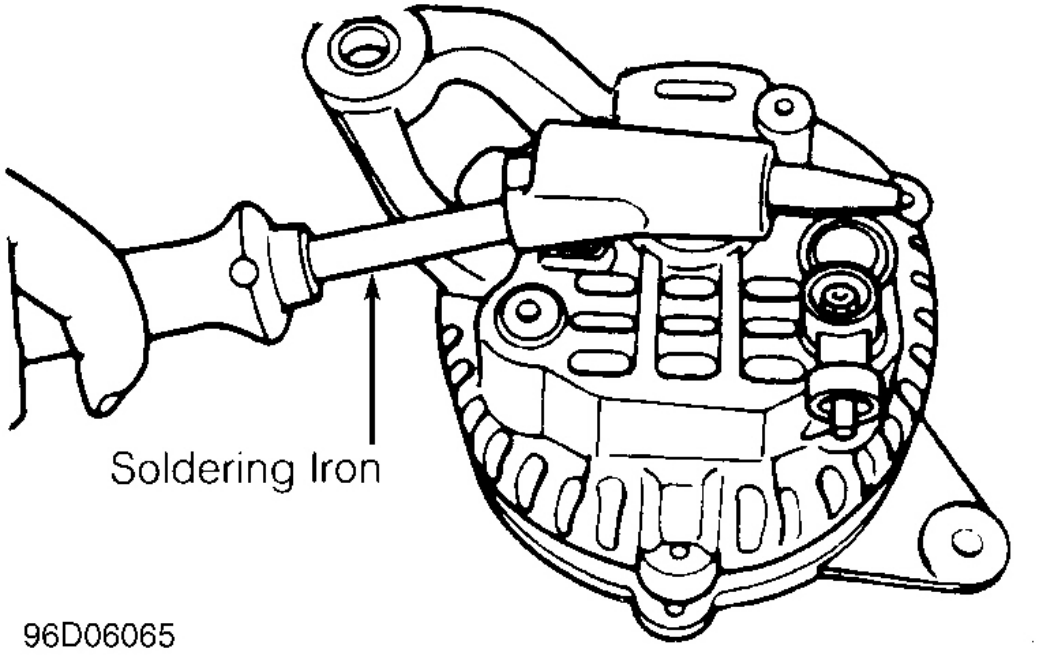


Fig. 10: Heating Rear Bearing Housing
Courtesy of MAZDA MOTORS CORP.

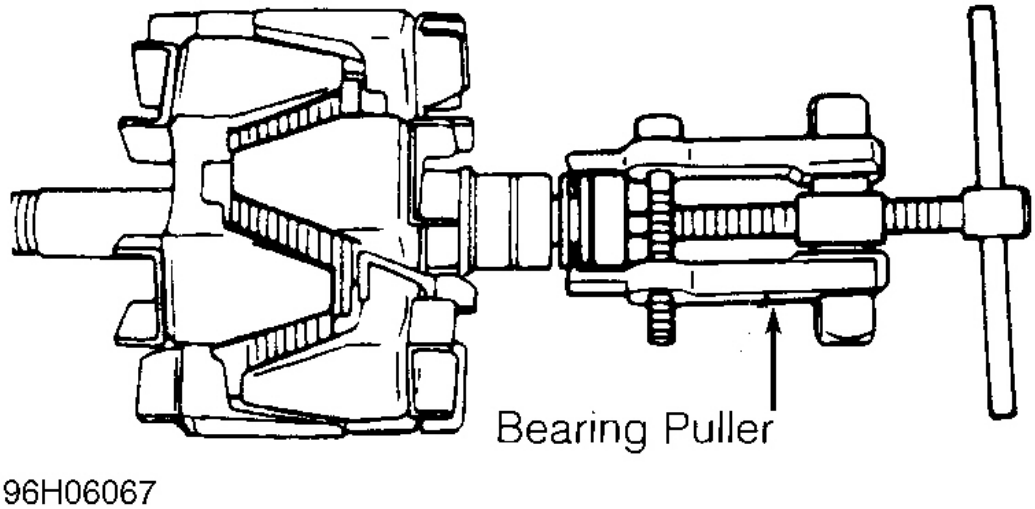


Fig. 11: Removing Rear Bearing
Courtesy of MAZDA MOTORS CORP.

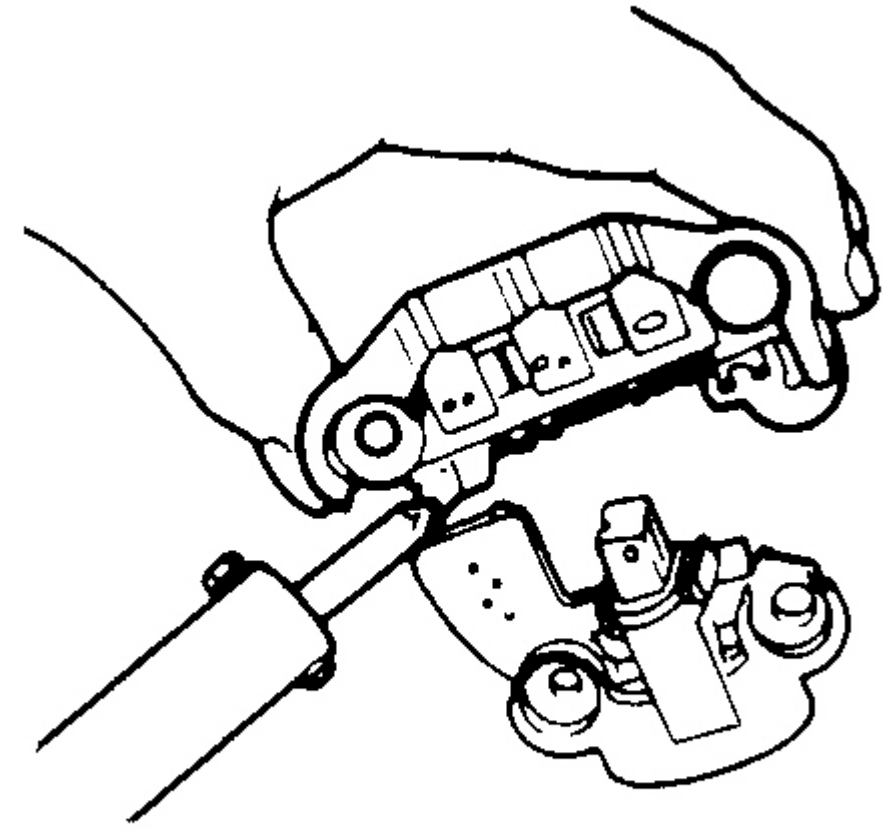


Fig. 12: Unsoldering Rectifier From Regulator
Courtesy of MAZDA MOTORS CORP.

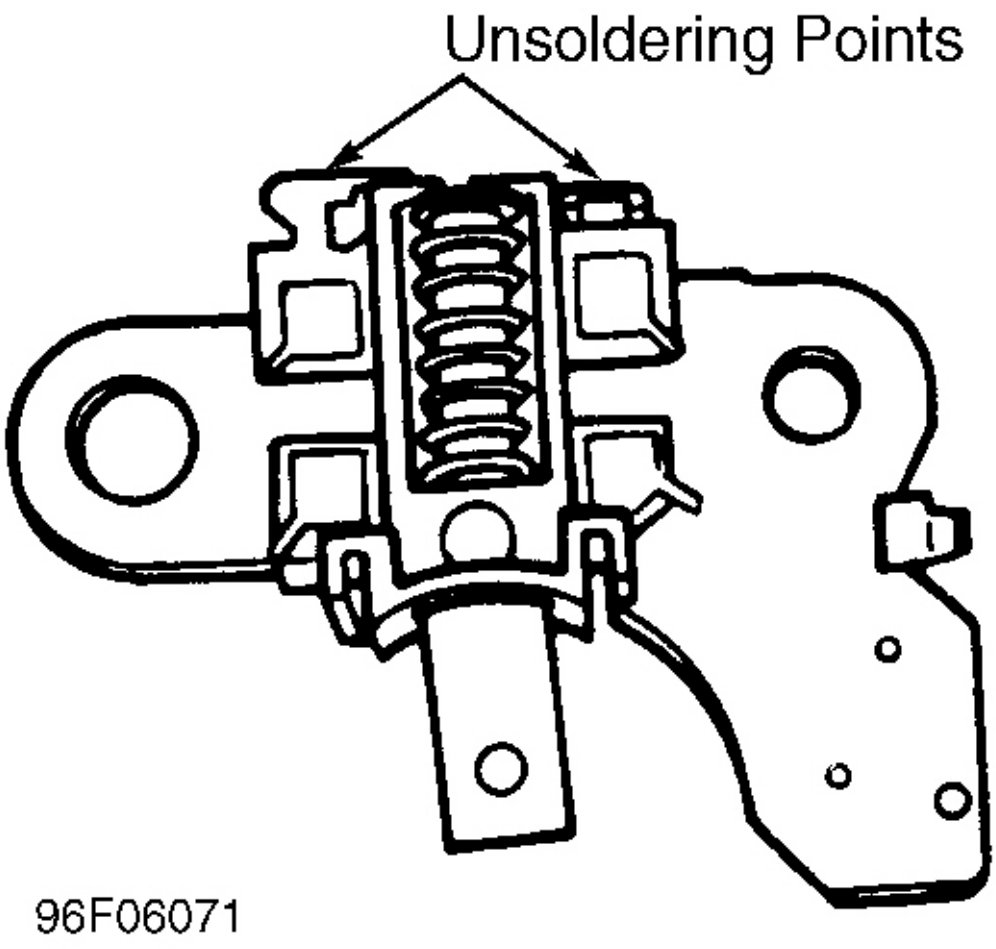


Fig. 13: Replacing Brushes
Courtesy of MAZDA MOTORS CORP.

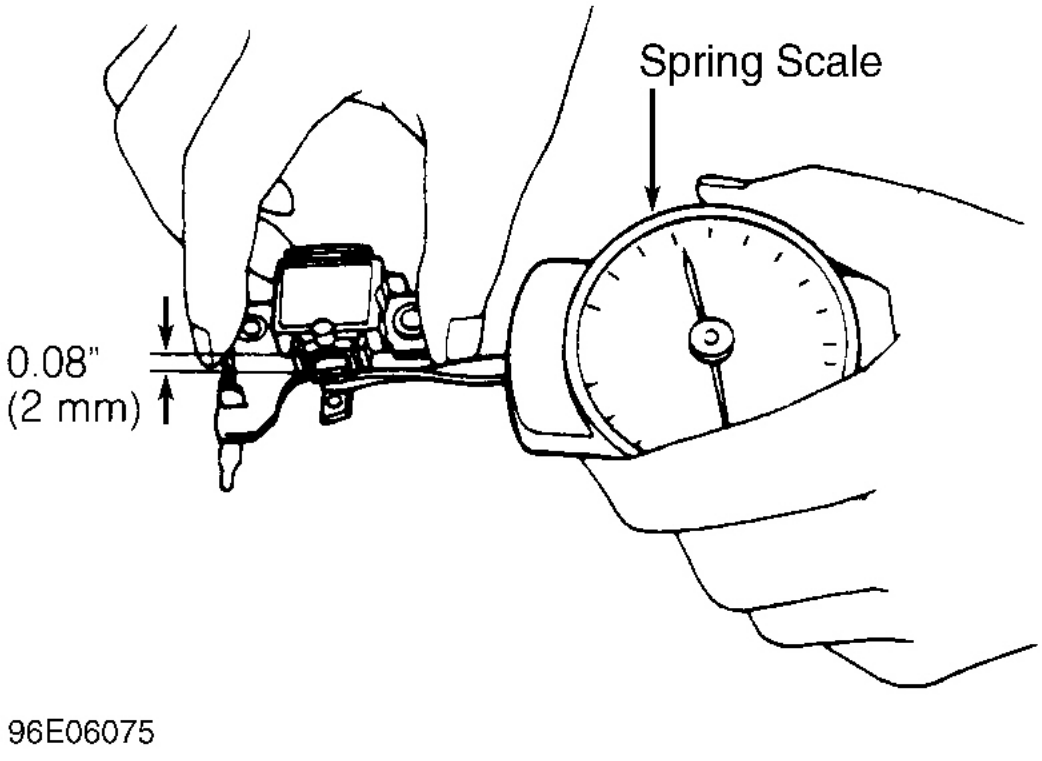


Fig. 14: Measuring Brush Spring Tension
Courtesy of MAZDA MOTORS CORP.

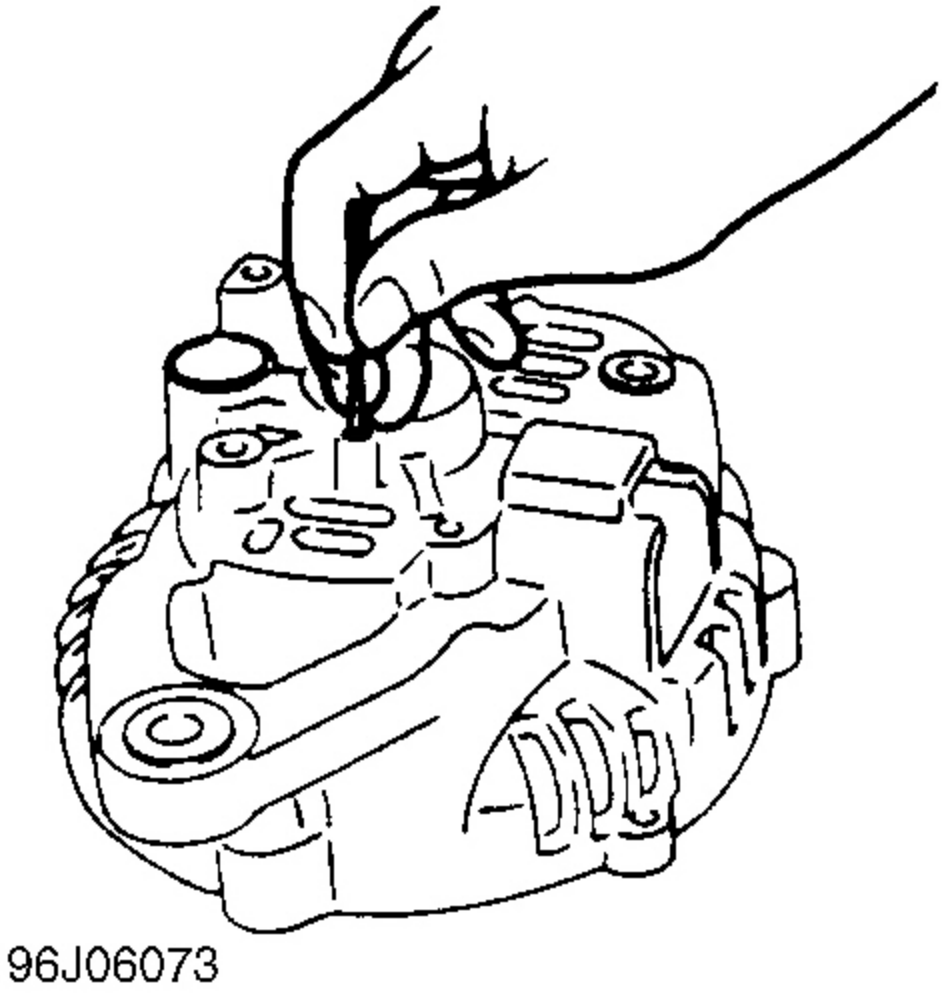


Fig. 15: Inserting Wire To Retain Brushes For Reassembly
Courtesy of MAZDA MOTORS CORP.

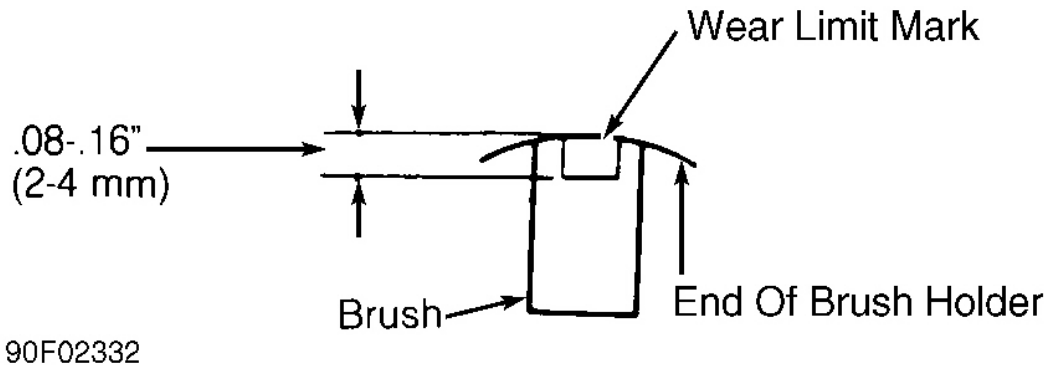
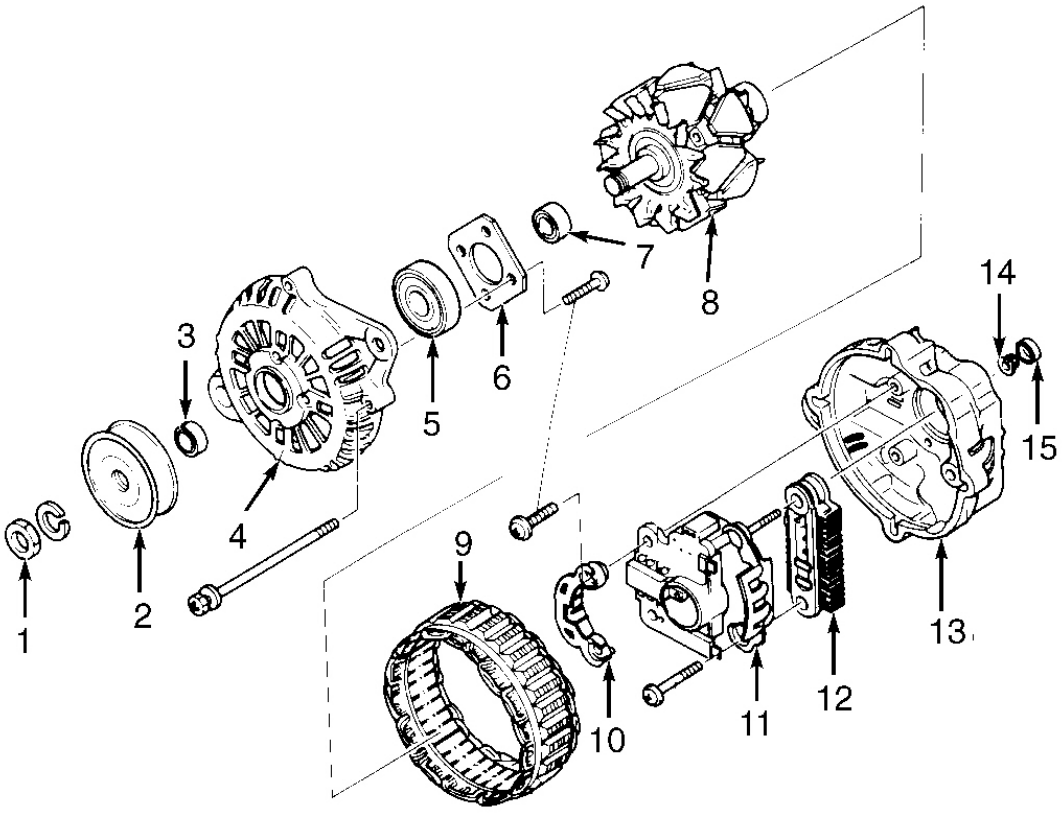


Fig. 16: Measuring Installed Depth Of Brush
Courtesy of MAZDA MOTORS CORP.



1. Pulley Nut
2. Pulley
3. Spacer
4. Front Case
5. Front Bearing
6. Bearing Retainer Plate
7. Spacer
8. Rotor
9. Stator
10. Brush Shield
11. Brush Holder
12. Rectifier
13. Rear Cover
14. Nut
15. Bushing

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Fig. 17: Exploded View Of Generator
Courtesy of MAZDA MOTORS CORP.

WIRING DIAGRAMS

1997 Mazda MX-5 Miata

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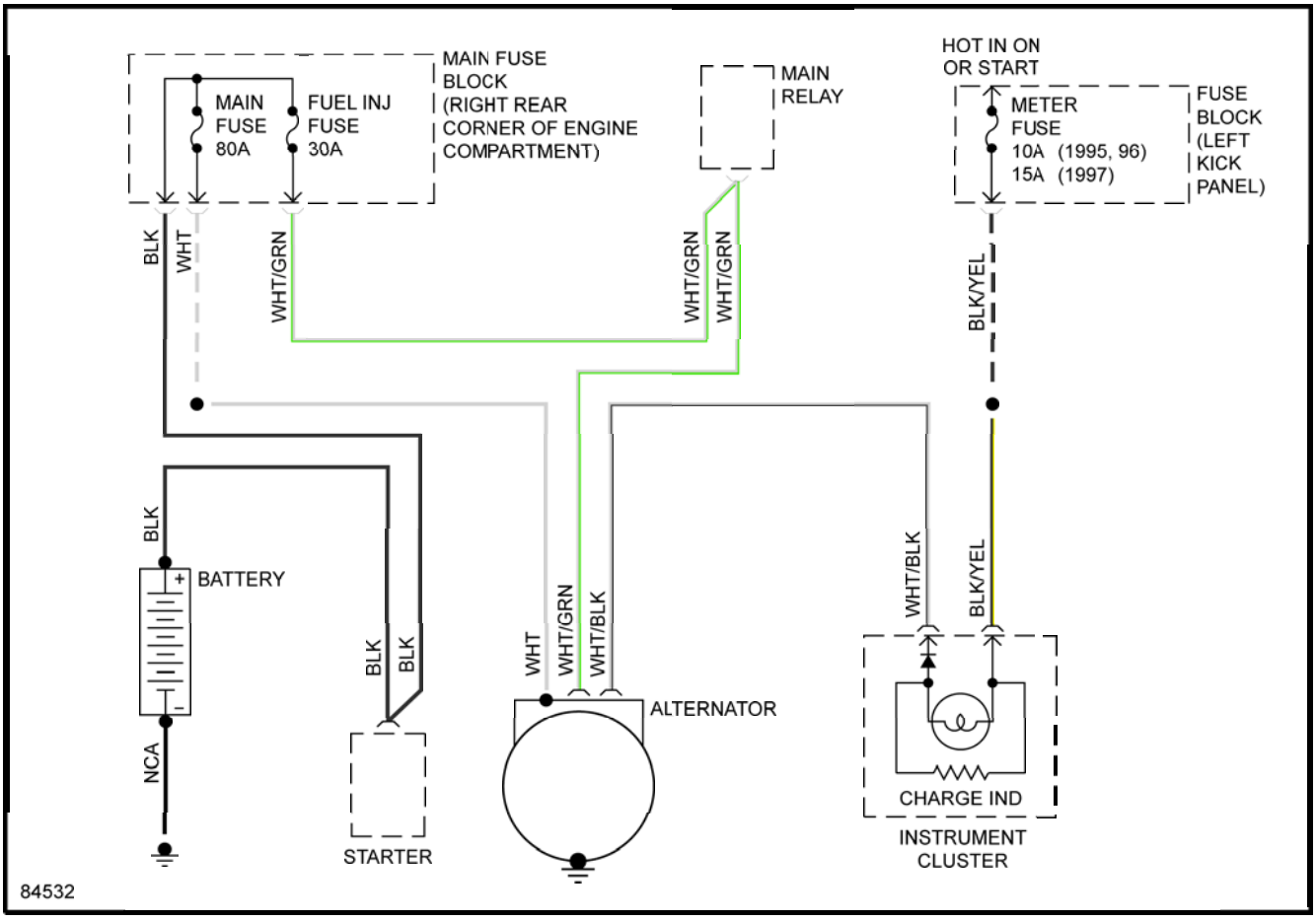

Fig. 18: Charging System Wiring Diagram