

ALTERNATOR & REGULATOR

Article Text

1993 Mazda 929

For Techdoc Ltd.

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 Wednesday, March 24, 1999 11:34PM

ARTICLE BEGINNING

1993 ELECTRICAL  
 Mazda Alternators & Regulators - Mitsubishi  
  
 B2200, B2600i, Miata, MPV, MX-3,  
 MX-6, Protege, RX7, 323, 626, 929

DESCRIPTION

Alternator is a conventional 3-phase, self-rectifying type with 6 diodes (3 positive and 3 negative) that rectify current. See Fig. 1. Internal regulator is solid-state type.

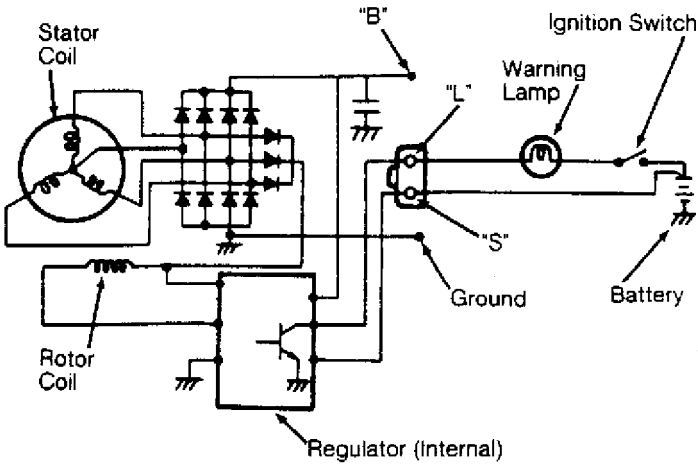


Fig. 1: Charging System Wiring Schematic  
 Courtesy of Mazda Motors Corp.

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 TABLE		
Application		
(1) Deflection - In. (mm)		
B2200		
New Belt	0.28-0.31	(7.0-8.0)
Used Belt	0.31-0.35	(8.0-9.0)
B2600i		
New Belt	0.39-0.47	(10.0-12.0)
Used Belt	0.43-0.51	(11.0-13.0)
Miata		
New Belt	0.31-0.35	(8.0-9.0)

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Used Belt	.....	0.35-0.39 (9.0-10.0)
MPV		
4-Cylinder		
New Belt	.....	0.39-0.47 (10.0-12.0)
Used Belt	.....	0.43-0.57 (11.0-13.0)
V6		
New Belt	.....	0.35-0.39 (9.0-10.0)
Used Belt	.....	0.39-0.47 (10.0-12.0)
MX-3		
4-Cylinder		
New Belt	.....	0.22-0.28 (5.5-7.0)
Used Belt	.....	0.24-0.30 (6.0-7.5)
V6		
With A/C		
New Belt	.....	0.22-0.26 (5.5-6.5)
Used Belt	.....	0.26-0.30 (6.5-7.5)
Without A/C		
New Belt	.....	0.24-0.28 (6.0-7.0)
Used Belt	.....	0.28-0.31 (7.0-8.0)
MX-6 & 626		
4-Cylinder		
New Belt	.....	0.26-0.28 (6.5-7.0)
Used Belt	.....	0.28-0.35 (7.0-9.0)
V6		
With A/C		
New Belt	.....	0.22-0.26 (5.5-6.5)
Used Belt	.....	0.26-0.30 (6.5-7.5)
Without A/C		
New Belt	.....	0.24-0.28 (6.0-7.0)
Used Belt	.....	0.28-0.31 (7.0-8.0)
Protege & 323		
New Belt	.....	0.31-0.35 (8.0-9.0)
Used Belt	.....	0.35-0.39 (9.0-10.0)
RX7		
New Belt	.....	0.24-0.31 (6.0-8.0)
Used Belt	.....	0.28-0.35 (7.0-9.0)
929		
New Belt	.....	0.39-0.47 (10.0-12.0)
Used Belt	.....	0.43-0.51 (11.0-13.0)

(1) - With 22 lbs. (10 kg) applied to belt.

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## TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING - BASIC PROCEDURES article in  
GENERAL INFORMATION section.

## TROUBLE SHOOTING PRECAUTIONS

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

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Miata

- \* Obtain code number and deactivate audio anti-theft system before disconnecting battery.

All Models

- \* DO NOT reverse battery cable connections. Rectifier will be damaged.
- \* DO NOT use high voltage type testers.
- \* Battery voltage is always present at terminal "B".
- \* DO NOT ground terminal "L" while engine is running.
- \* DO NOT start engine with connector disconnected from terminals "L" and "S".
- \* DO NOT apply battery voltage to terminal "L".

### ON-VEHICLE TESTING

NOTE: Check alternator 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 alternator terminal "B" does not contact ground.

### ALTERNATOR OUTPUT

1) Connect an ammeter (100-amp minimum) in-line between terminal "B" connector and wire. See Fig. 2, 3 or 4. Turn headlights and all accessories on. Depress brake pedal. Operate engine at 2500-3000 RPM.

2) If amperage is not as specified in ALTERNATOR MAXIMUM RATED OUTPUT table, repair or replace alternator as necessary. If amperage is as specified, turn off headlights and all accessories. Release brake pedal. Operate engine at 2500-3000 RPM. If amperage is not about 5 amps or more, repair or replace alternator as necessary.

3) If amperage is about 5 amps or more, measure voltage between ground and terminals "S" and "L" while operating engine at 2500-3000 RPM. If 14.1-14.7 volts is not present, repair or replace alternator as necessary. If 14.1-14.7 volts is present, alternator output is okay.

#### ALTERNATOR MAXIMUM RATED OUTPUT TABLE

AAA

Application	Amps
B2200 .....	55
B2600i .....	60
Miata	
A/T .....	65
M/T .....	60

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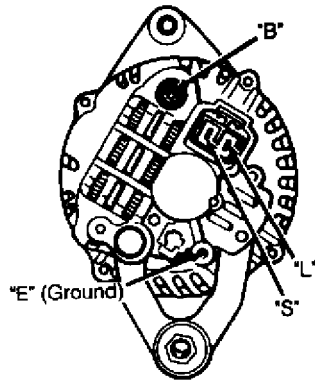
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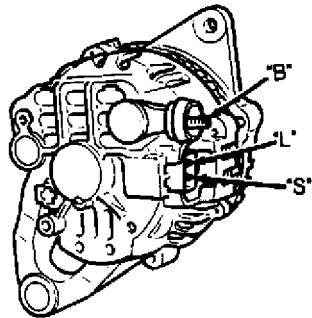
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MPV .....	70
MX-3	
4-Cylinder .....	70
V6 .....	90
MX-6 & 626	
4-Cylinder .....	80
V6 .....	90
Protege & 323 .....	65
RX7 .....	100
929 .....	90
AA	



93D00706

Fig. 2: Alternator Terminal ID (B2200, B2600i & MPV)  
Courtesy of Mazda Motors Corp.



93E00707

Fig. 3: Alternator Terminal ID (Miata, MX-3 4-Cyl., MX-6 4-Cyl.,  
Protege, 323, 626 4-Cyl. & 929)  
Courtesy of Mazda Motors Corp.

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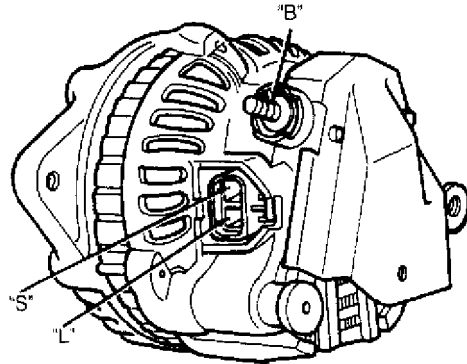
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Fig. 4: Alternator Terminal ID (MX-3 V6, MX-6 V6, RX7 & 626 V6)  
Courtesy of Mazda Motors Corp.

### BENCH TESTING

#### Rectifier/Diode Assembly

1) Using an ohmmeter, check continuity of each diode in both directions (polarity). See Figs. 5-9. 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, it 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. 10-14. If resistance is not within specification, replace rotor. See ROTOR RESISTANCE SPECIFICATIONS table. Check continuity between individual slip rings and rotor core/shaft. If there is continuity, replace rotor.

#### ROTOR RESISTANCE SPECIFICATIONS TABLE

Application		Ohms
B2200, B2600i, Miata, Protege & 323	.....	3.5-4.5
MPV	.....	2.7-2.9
MX-3 & RX7	.....	(1)
MX-6 & 626	.....	2.5-3.5

(1) - Information is not available from manufacturer.

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#### Stator

Check continuity between stator coil leads and stator core. See Figs. 10-14. If there is continuity, replace stator. Check continuity between leads of stator coil. If there is no continuity, replace stator.

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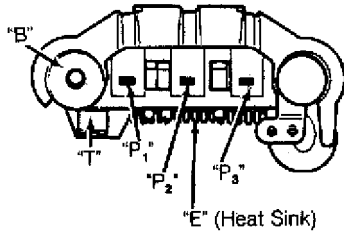
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#### Brushes

Replace brushes if worn to limit line. See Figs. 10-14.

Replace brush springs if corroded. For brush replacement procedure, see OVERHAUL.

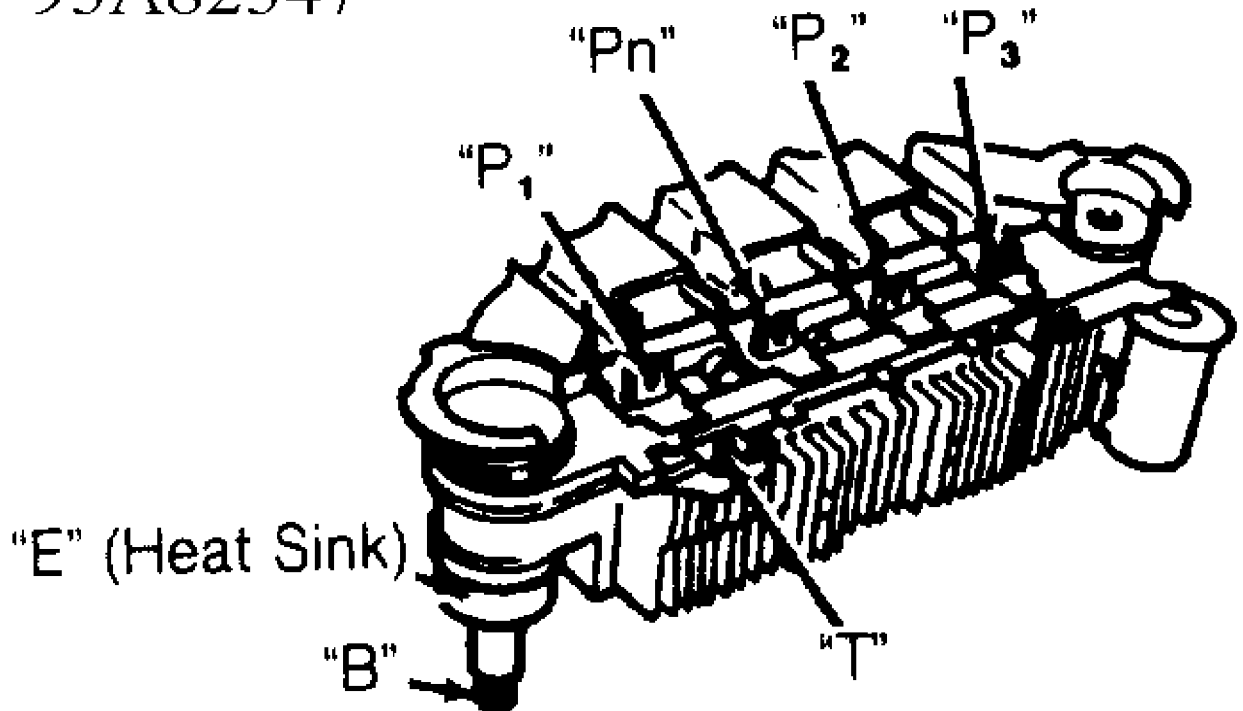


B2200, B2600I, MIATA & MPV

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Fig. 5: Testing Rectifier Diodes (B220, B2600I, Miata & MPV)  
Courtesy of Mazda Motors Corp.

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MX-3, MX-6, RX7, 626 & 929

Fig. 6: Testing Rectifier Diodes (MX-3, MX-6, RX7, 626, 929)  
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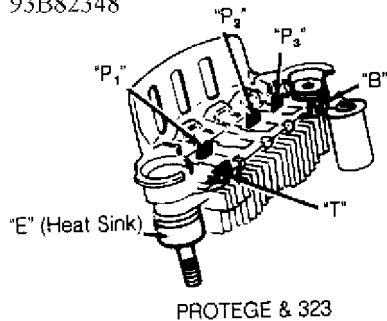
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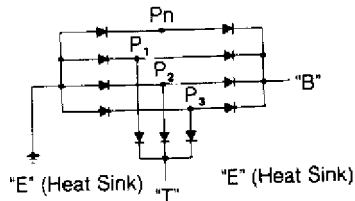
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PROTEGE & 323

Fig. 7: Testing Rectifier Diodes (Protege & 323)  
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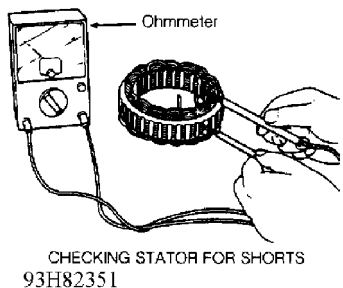
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Fig. 8: Testing Rectifier Diodes  
Courtesy of Mazda Motors Corp.

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. 9: Testing Rectifier Diodes  
Courtesy of Mazda Motors Corp.



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Fig. 10: Checking Stator For Shorts  
Courtesy of Mazda Motors Corp.

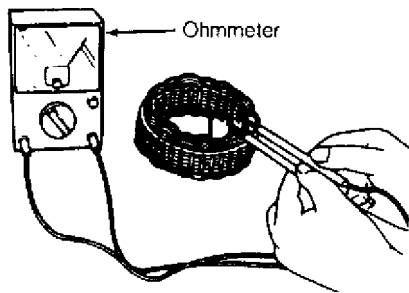
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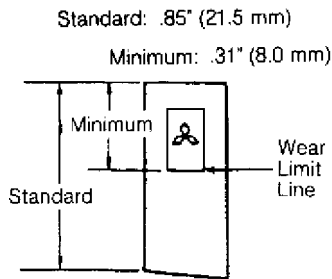
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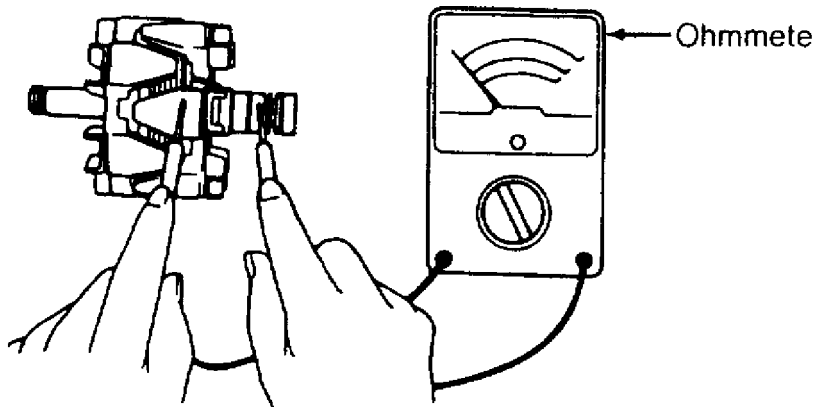
CHECKING STATOR WINDING CONTINUITY  
93I82352

Fig. 11: Checking Stator Winding Continuity  
Courtesy of Mazda Motors Corp.



MEASURING BRUSH WEAR  
93J82353

Fig. 12: Measuring Brush Wear  
Courtesy of Mazda Motors Corp.



CHECKING ROTOR FOR SHORTS  
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Fig. 13: Checking Rotor For Shorts  
Courtesy of Mazda Motors Corp.



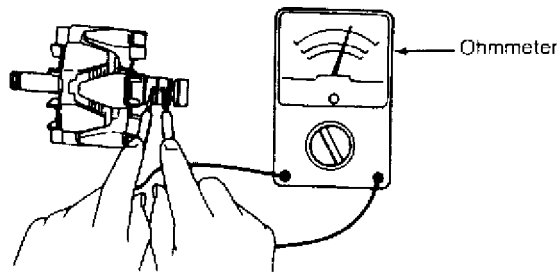
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CHECKING ROTOR RESISTANCE  
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Fig. 14: Checking Rotor Resistance  
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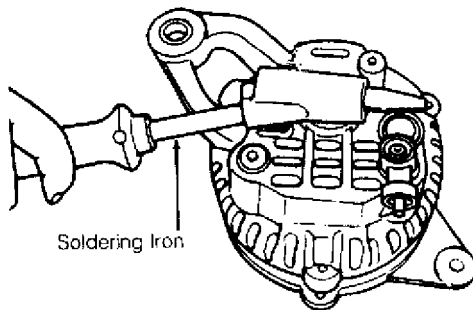
## OVERHAUL

### 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 Figs. 15-20 and 22-24.

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.



USING A SOLDERING IRON  
TO HEAT REAR BEARING HOUSING  
93C82356

Fig. 15: Overhauling Alternator  
Courtesy of Mazda Motors Corp.

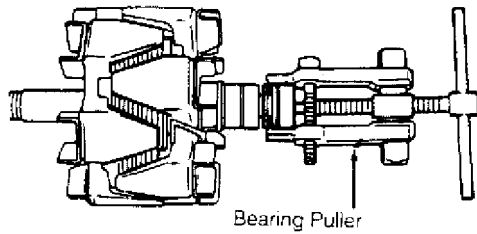
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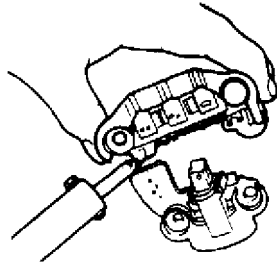
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REMOVING REAR BEARING

**93D82357**

Fig. 16: Overhauling Alternator  
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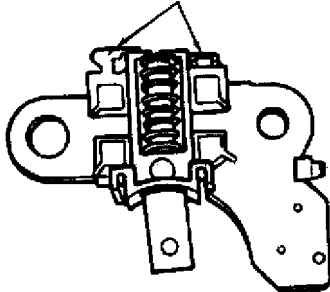


UNSOLDERING RECTIFIER FROM REGULATOR

**93E82358**

Fig. 17: Overhauling Alternator  
Courtesy of Mazda Motors Corp.

Unsoldering Points



REPLACING BRUSHES

**93F82359**

Fig. 18: Overhauling Alternator  
Courtesy of Mazda Motors Corp.

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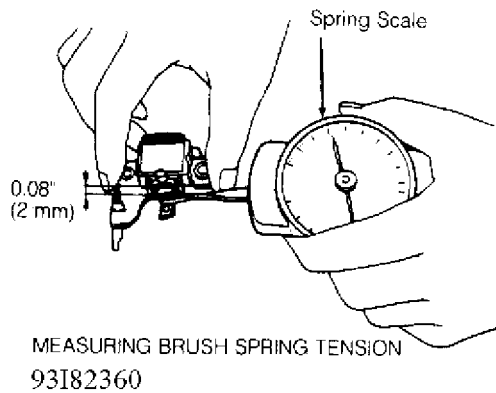
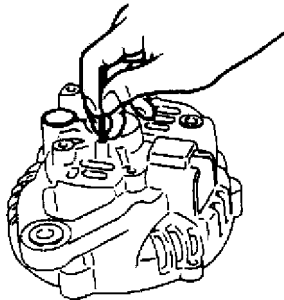


Fig. 19: Overhauling Alternator  
Courtesy of Mazda Motors Corp.



INSERTING WIRE TO HOLD  
BRUSHES FOR REASSEMBLY  
93J82361

Fig. 20: Overhauling Alternator  
Courtesy of Mazda Motors Corp.

## 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. 21. 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. 15-20. Note reading on spring scale. Replace spring if tension is not 5.6-15.5 ozs. (160-440 g).

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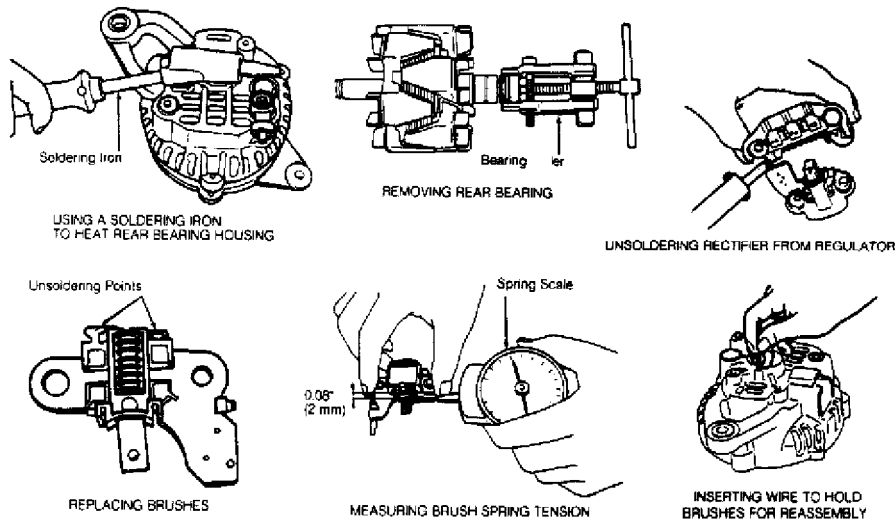


Fig. 21: Measuring Installed Depth Of Brush  
Courtesy of Mazda Motors Corp.

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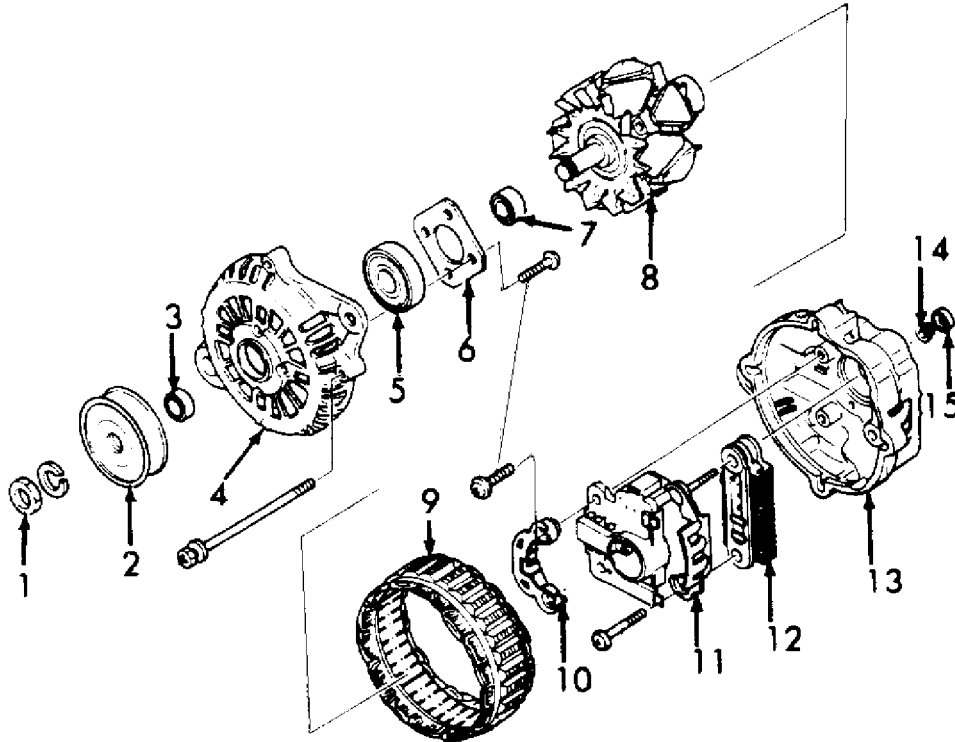
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1. Pulley Nut

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

Fig. 22: Exploded View Of Alternator (B2200, B2600i, Miata & MPV)  
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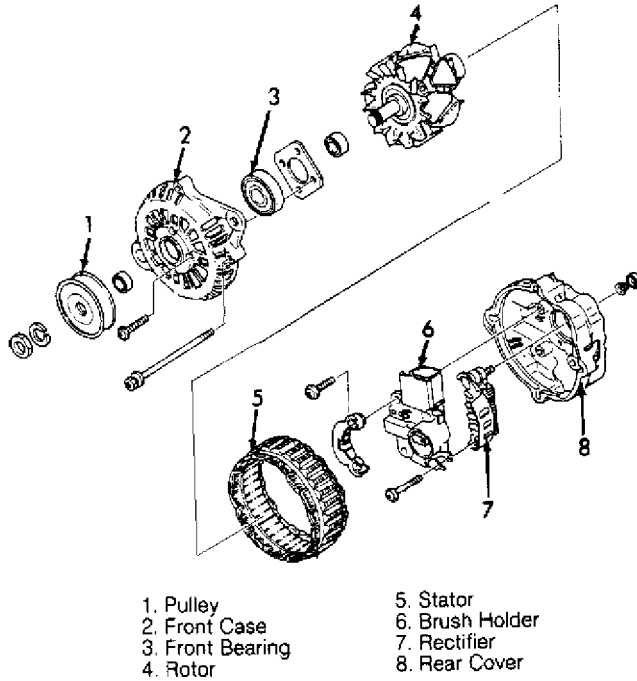


Fig. 23: View Of Alternator (MX-3 4-Cyl., MX-6 4-Cyl., Protege, 323, 626 4-Cyl. & 929)  
Courtesy of Mazda Motors Corp.

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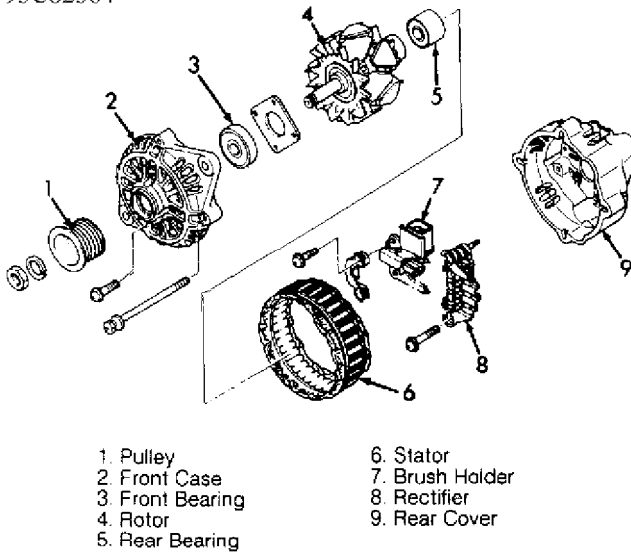


Fig. 24: Exploded View Of Alternator (MX-3 V6, MX-6 V6, RX7 & 626 V6)  
Courtesy of Mazda Motors Corp.

END OF ARTICLE