

## ALTERNATOR & REGULATOR

## 1991 Mazda Miata

## 1990-92 ELECTRICAL

## Alternators & Regulators - Mitsubishi

B2200, B2600i, Miata, MPV, MX-6, Protege,  
RX7, 323, 626, 929  
1992 MX-3

## DESCRIPTION

Alternators are conventional 3-phase, self-rectifying type units containing 6 diodes (3 positive and 3 negative) which are used to rectify current. See Fig. 1. An internally-mounted, Integrated Circuit (IC) regulator is used on all models.

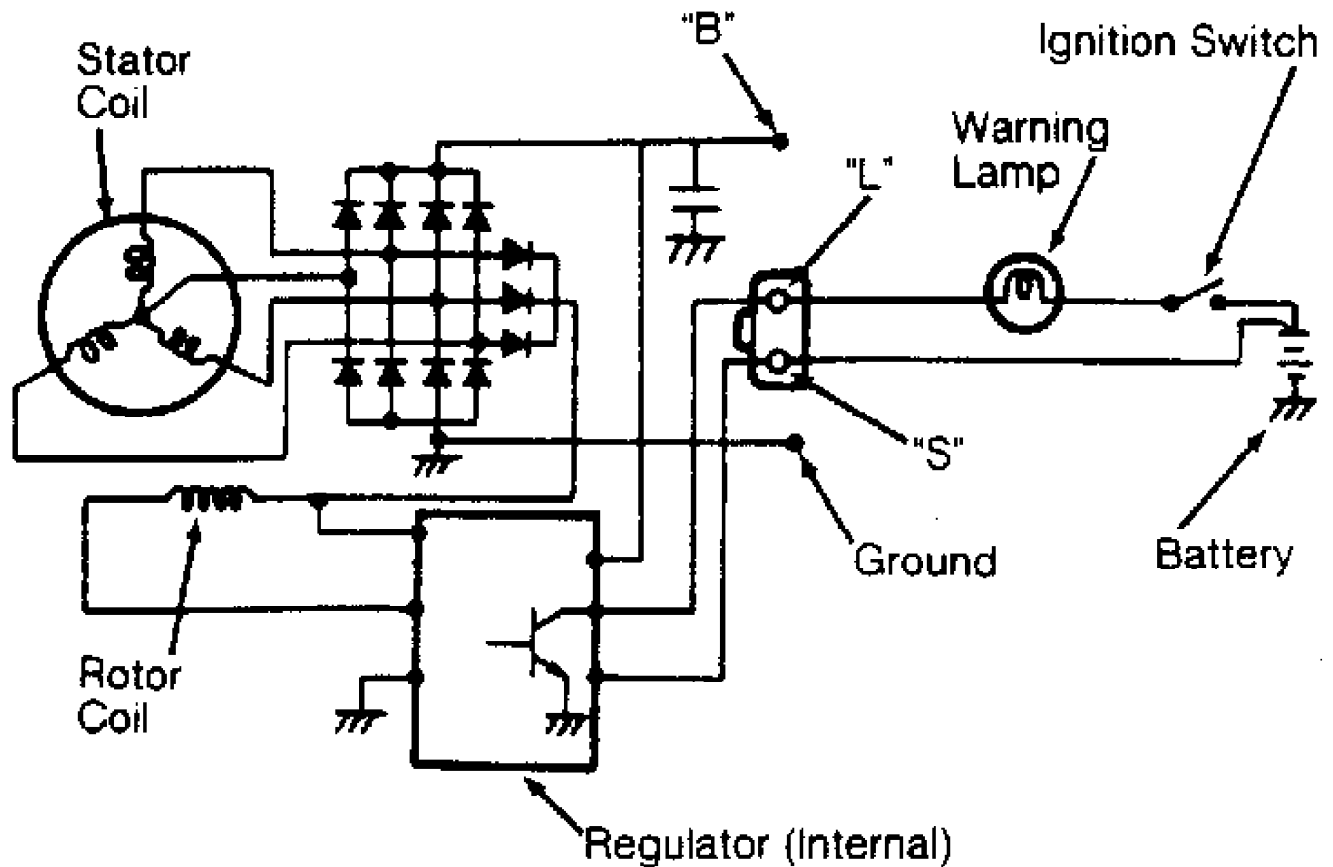


Fig. 1: Charging System Wiring Schematic  
Courtesy of Mazda Motors Corp.

## 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

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)
Used Belt .....	0.35-0.39 (9.0-10.0)
MPV	
4-Cylinder Engine	
New Belt .....	0.39-0.47 (10-12)
Used Belt .....	0.43-0.57 (11-13)
V6 Engine	
New Belt .....	0.35-0.39 (9-10)
Used Belt .....	0.39-0.47 (10-12)
MX-3	
4-Cylinder Engine	
New Belt .....	0.31-0.35 (8.0-9.0)
Used Belt .....	0.35-0.39 (9.0-10.0)
V6 Engine	
New Belt .....	0.24-0.28 (6.0-7.0)
Used Belt .....	0.28-0.31 (7.0-8.0)
MX-6 & 626	
New Belt .....	0.24-0.31 (6.0-8.0)
Used Belt .....	0.28-0.35 (7.0-9.0)
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 .....	0.47-0.59 (12.0-15.0)
Used Belt .....	0.55-0.67 (14.0-17.0)
929	
New Belt .....	0.35-0.39 (9.0-10.0)
Used Belt .....	0.39-0.47 (10.0-12.0)

(1) - With 22 lbs. (98N) applied to belt.

## TROUBLE SHOOTING

### CHARGING SYSTEM

#### CHARGING SYSTEM TROUBLE SHOOTING TABLE

PROBLEM	Action
Possible Cause	

#### NO START CONDITION

Dead Battery .....	Check/Replace Battery
Bad Cable Connections .....	Clean/Replace Cables
Ignition Switch/Circuit Fault .....	Check Switch/Circuit

#### CHARGING SYSTEM WARNING LIGHT STAYS ON

Loose/Worn Alternator Belt .....	Tighten/Replace Belt
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Loose Alternator Connections ..... Check/Repair Connections  
Warning Light Wiring ..... Check/Repair Wiring  
Faulty Stator/Diodes ..... Test/Repair Alternator  
Faulty Voltage Regulator ..... Test/Repair Regulator

#### WARNING LIGHT OFF WITH IGNITION SWITCH ON

Blown Fuse ..... Check/Replace Fuse  
Faulty Alternator ..... Test Alternator  
Bad Warning Light Bulb ..... Test/Replace Bulb

#### WARNING LIGHT ON WITH IGNITION SWITCH OFF

Alternator Wiring Short ..... Check/Repair Wiring  
Faulty Rectifier Bridge ..... Test/Repair Alternator

#### AMMETER INDICATES DISCHARGE

Loose/Worn Alternator Belt ..... Tighten/Replace Belt  
Loose Alternator Connections ..... Check/Repair Connections  
Faulty Ammeter ..... Test/Replace Ammeter  
NOISY Defective Battery ..... Replace Battery  
Defective Alternator ..... Test/Repair Alternator  
Defective Regulator ..... Test/Repair Regulator

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## TROUBLE SHOOTING PRECAUTIONS

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

#### 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 applied to 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".

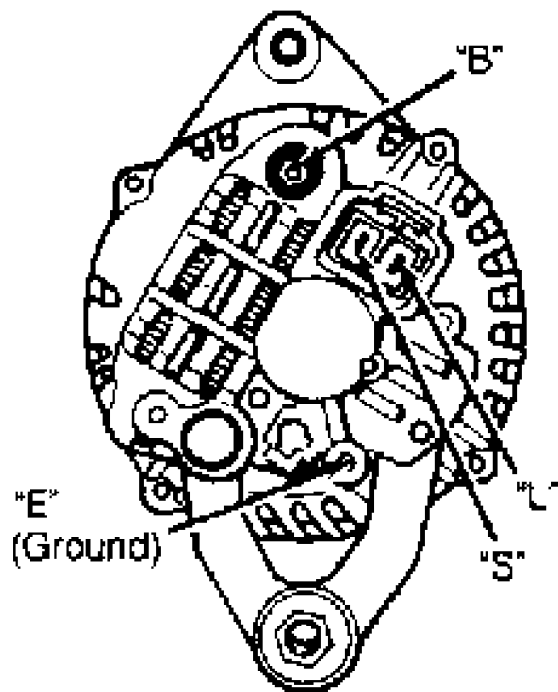
## ON-VEHICLE TESTING

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.

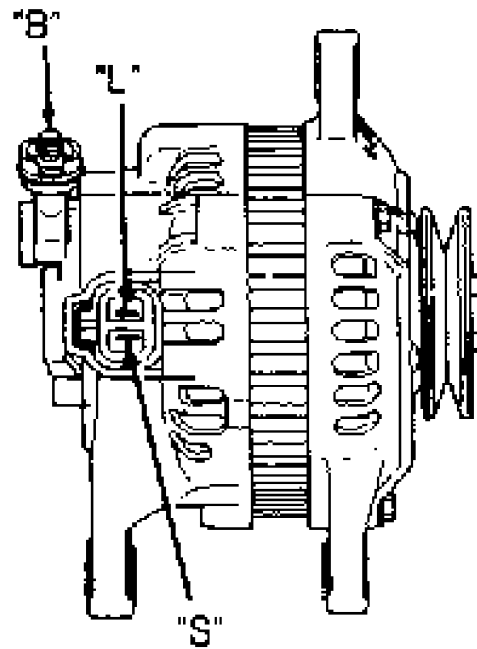
CAUTION: Ensure alternator terminal "B" does not contact ground.

## ALTERNATOR OUTPUT

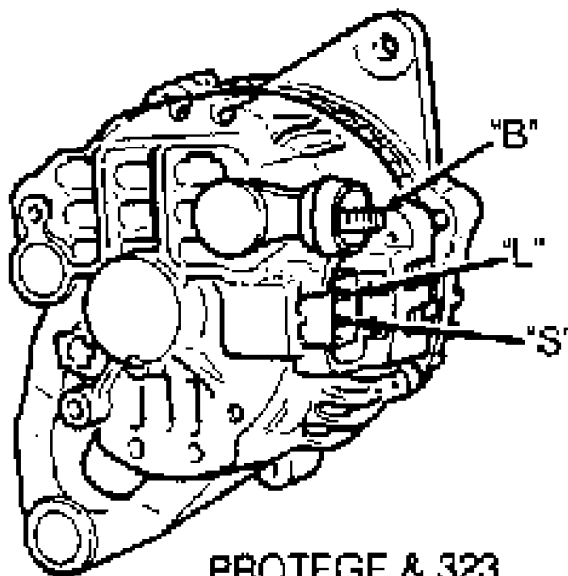
1) Connect an ammeter (80-amp minimum) in-line between terminal "B" connector and wire. See Figs. 2, 3 and 4. Turn all headlights and accessories on and depress brake pedal. With engine operating at 2500-3000 RPM, measure output amperage.



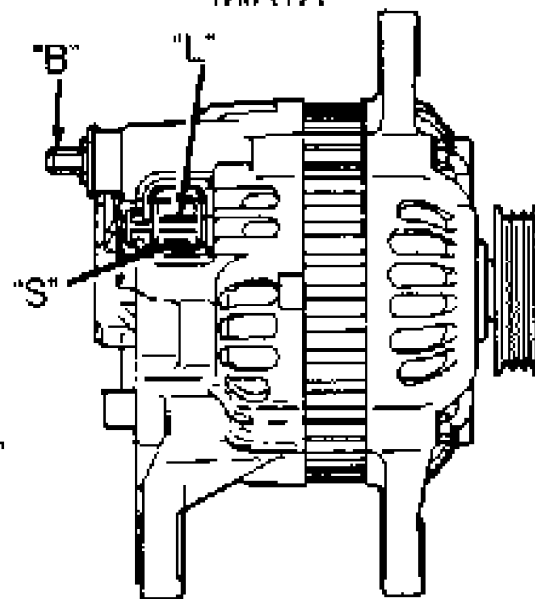
B2200, B2600i, MPV, RX7 & 929



MIATA

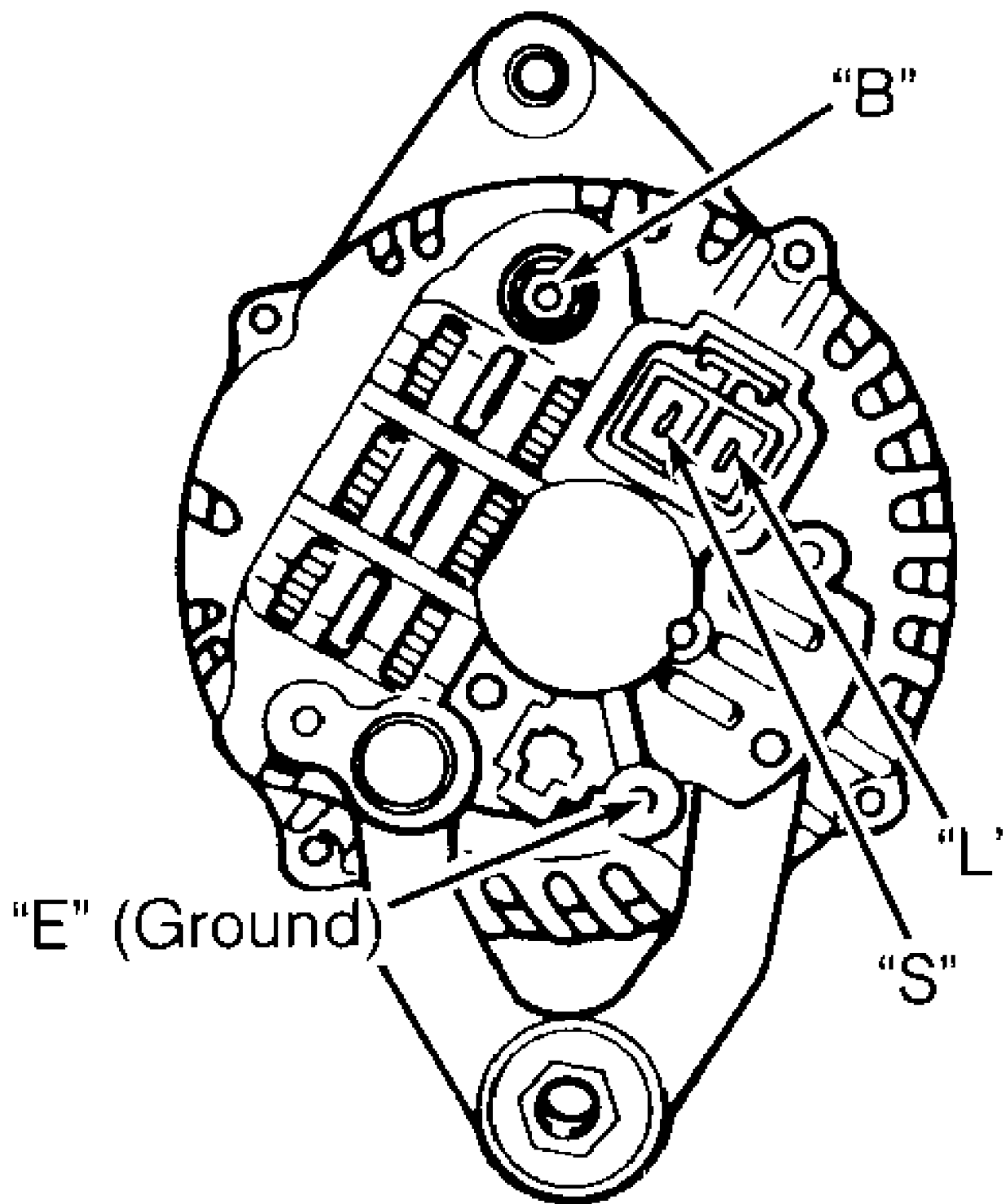


PROTEGE & 323



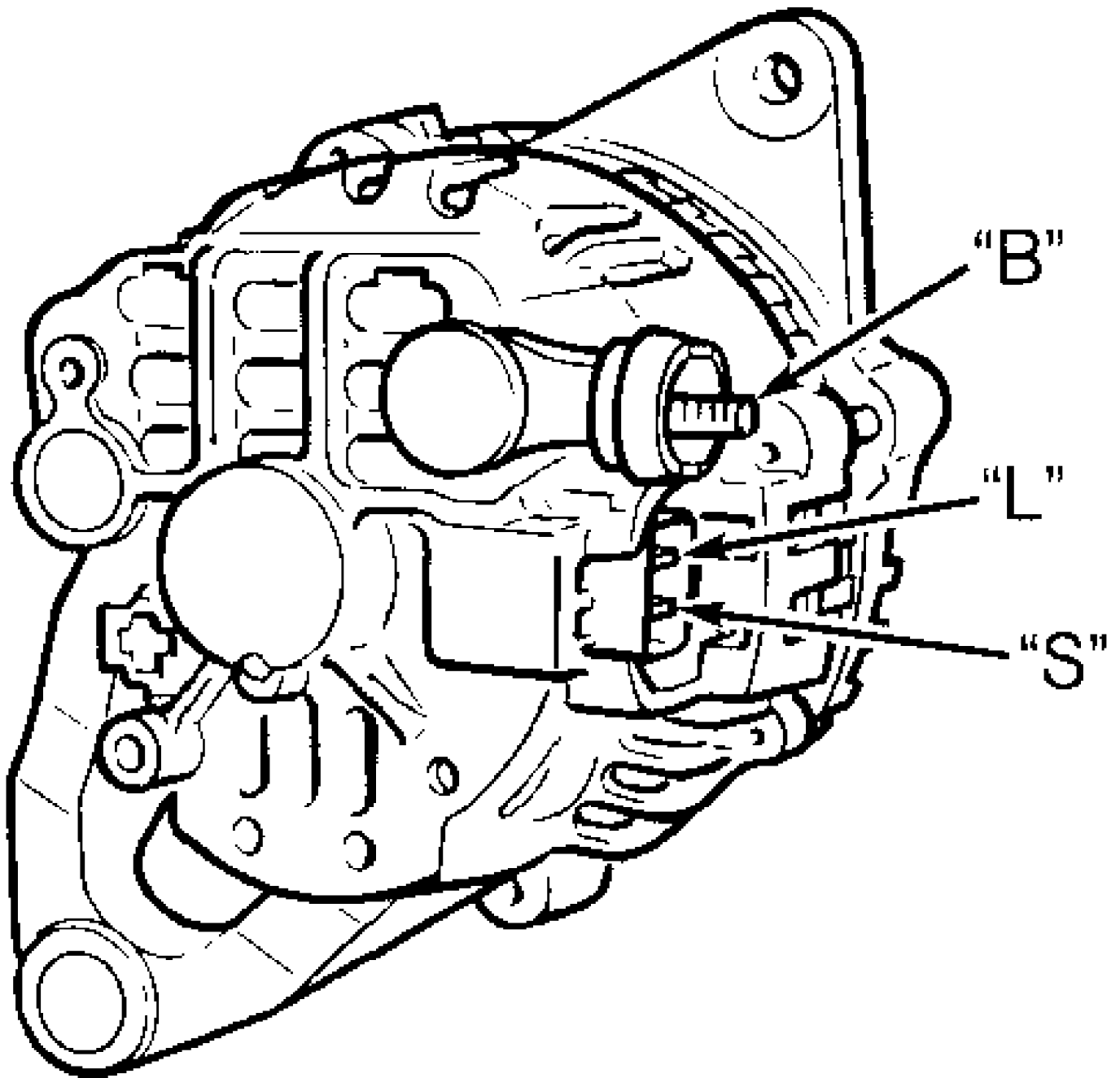
MX-6 & 626

Fig. 2: Identifying Alternator Terminals  
Courtesy of Mazda Motors Corp.



93D00706

Fig. 3: Identifying Alternator Terminals (1992 B2200, B2600i & MPV)  
Courtesy of Mazda Motors Corp.



93E00707

Fig. 4: Identifying Alternator Terminals (1992 All Other Models)  
Courtesy of Mazda Motors Corp.

2) If output amperage is not equal to or more than amount specified in ALTERNATOR OUTPUT table, repair or replace alternator as necessary.

3) Turn off all accessories and release brake pedal. With engine operating at 2500-3000 RPM, measure output amperage. If output amperage is not at least 5 amps, repair or replace alternator as necessary.

4) With engine operating at 2500-3000 RPM, measure voltage between terminal "S" and ground. If reading is not 14.1-14.7 volts, repair or replace alternator as necessary.

### ALTERNATOR OUTPUT

Application	Amps
B2200 .....	55
B2600i .....	60
Miata	
A/T .....	65
M/T .....	60
MPV .....	70
MX-6 & 626	
Non-Turbo .....	70
Turbo	
A/T .....	80
M/T .....	70
MX-3	
4-Cylinder .....	70
V6 .....	90
Protege & 323 .....	65
RX7 .....	80
929 .....	70

## BENCH TESTING

### Rectifier/Diode Assembly

1) Using an ohmmeter, check continuity of each diode in both directions (polarity). See Figs. 5 and 6. 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.

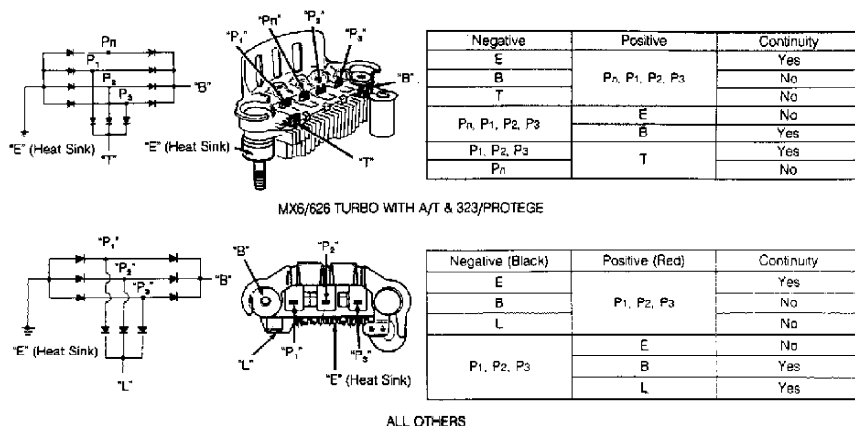


Fig. 5: Testing Alternator Rectifier & Diodes  
Courtesy of Mazda Motors Corp.

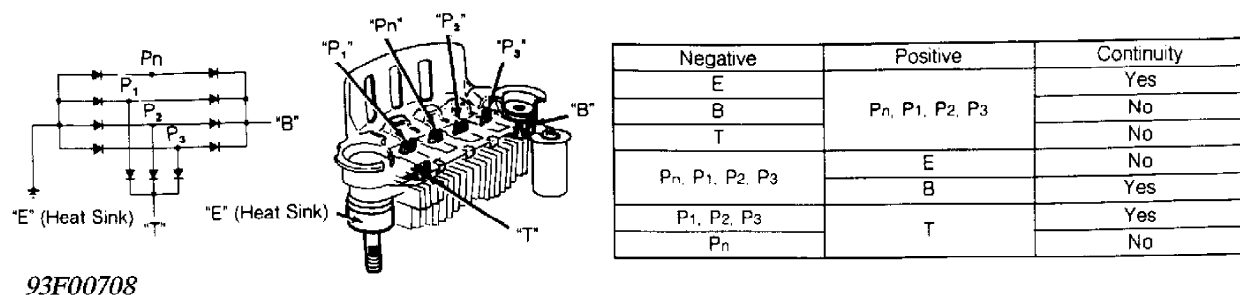


Fig. 6: Testing Alternator Rectifier & Diodes (1992)  
Courtesy of Mazda Motors Corp.

#### Rotor & Slip Rings

Measure resistance between rotor slip ring contacts. See Fig. 7. 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.

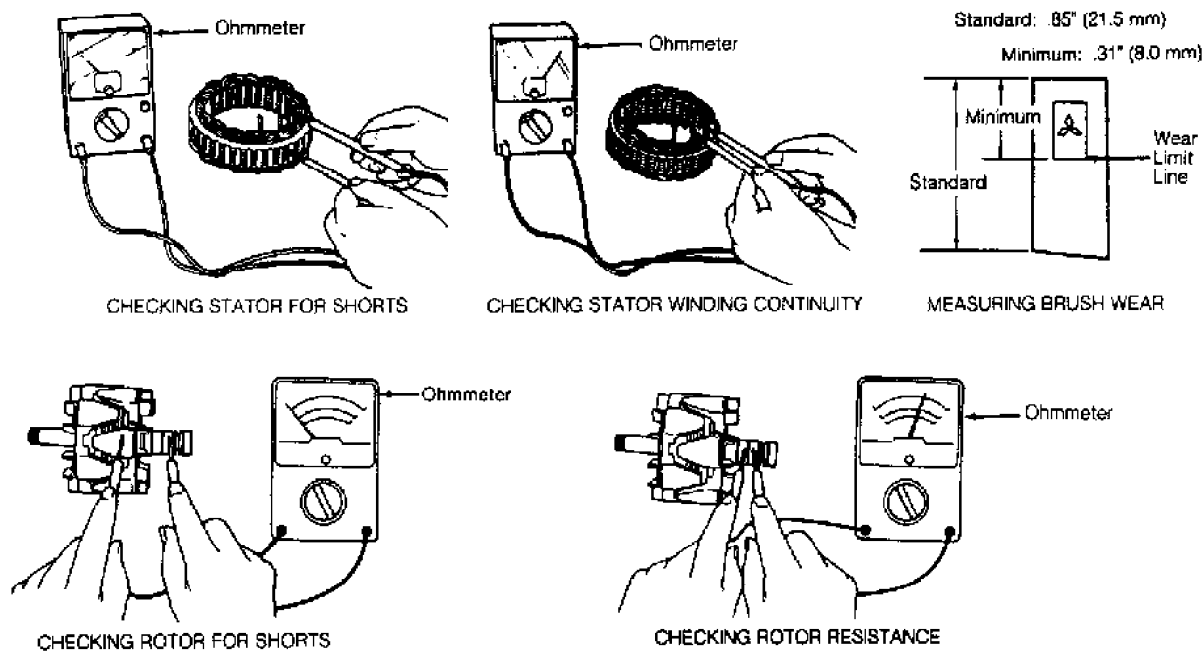


Fig. 7: Testing Alternator Stator, Rotor & Brushes  
Courtesy of Mazda Motors Corp.

#### ROTOR RESISTANCE SPECIFICATIONS

Application	Ohms
MPV .....	2.7-2.9
RX7 .....	2.0-4.0
All Others .....	3.5-4.5



### Stator

Check continuity between stator coil leads and stator core. See Fig. 7. If there is continuity, replace stator. Check continuity between leads of stator coil. If there is no continuity, replace stator.

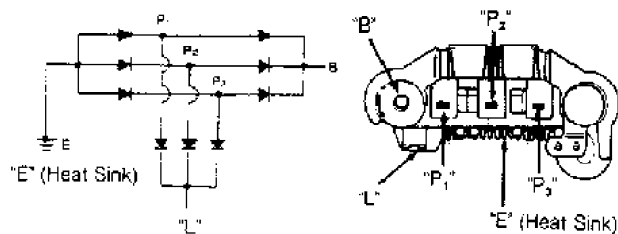
### Brushes

Replace brushes if worn to limit line. See Fig. 7. Replace brush springs if corroded. For brush replacement procedure, see OVERHAUL.

## OVERHAUL

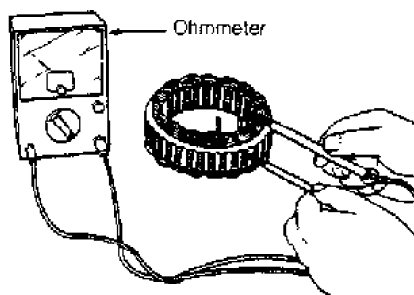
### DISASSEMBLY

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. 8, 10 and 11.

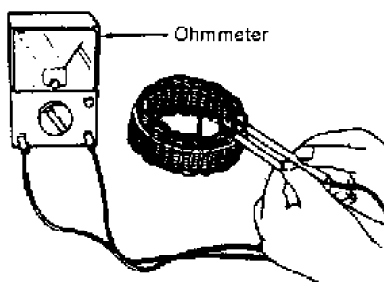


TESTING RECTIFIER DIODES

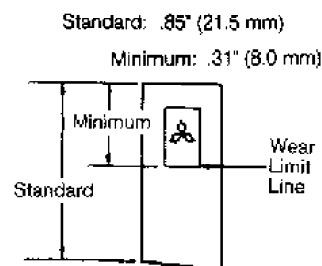
Negative (Black)	Positive (Red)	Continuity
E	P1, P2, P3	Yes
B		No
L		No
P1, P2, P3	E	No
	B	Yes
	L	Yes



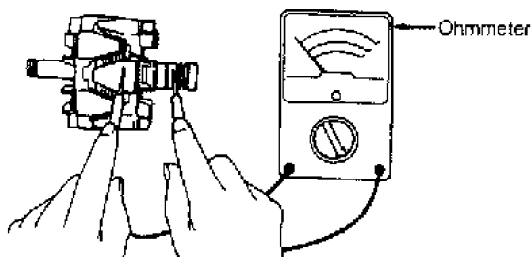
CHECKING STATOR FOR SHORTS



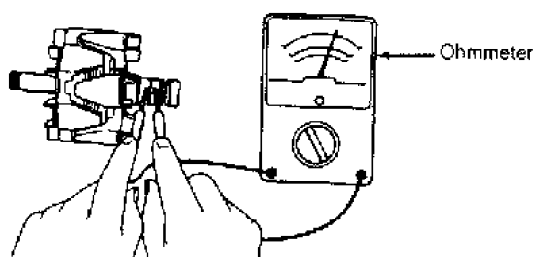
CHECKING STATOR WINDING CONTINUITY



MEASURING BRUSH WEAR



CHECKING ROTOR FOR SHORTS



CHECKING ROTOR RESISTANCE

Fig. 8: Overhauling Alternators  
Courtesy of Mazda Motors Corp.

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.

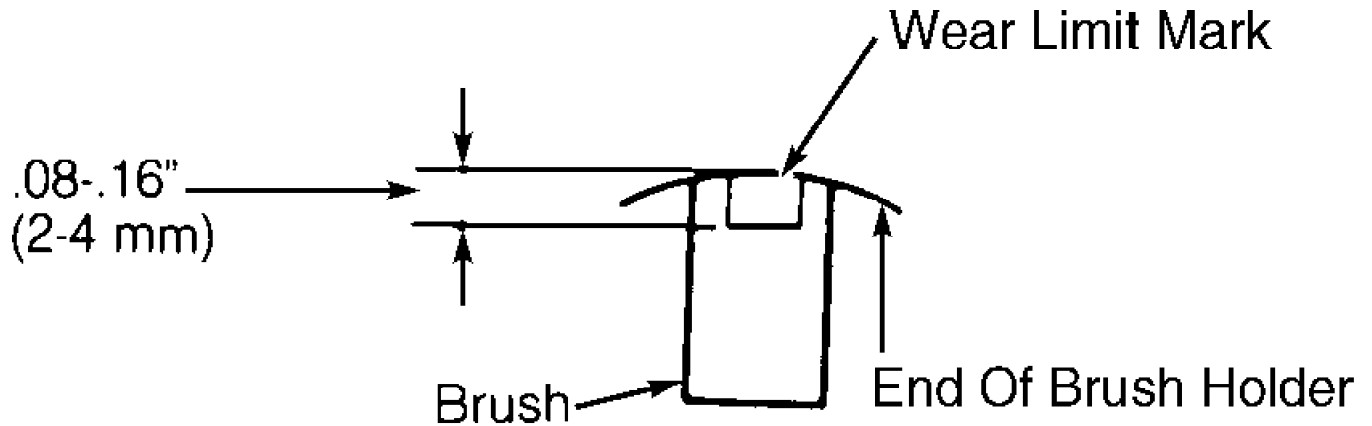
3) Remove "B" terminal nut and bushing from rear cover. Remove screws from brush holder and rectifier. Separate rear cover and stator. When unsoldering rectifier and stator leads, disconnect as quickly as possible (5 seconds maximum) to avoid damage to rectifier. To remove brushes from holder, unsolder 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. 9. 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. 9. Note reading on spring scale. Replace spring if tension is not 5.6-15.5 ozs. (160-440 g).



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Fig. 9: Measuring Installed Depth of Brush  
Courtesy of Mazda Motors Corp.

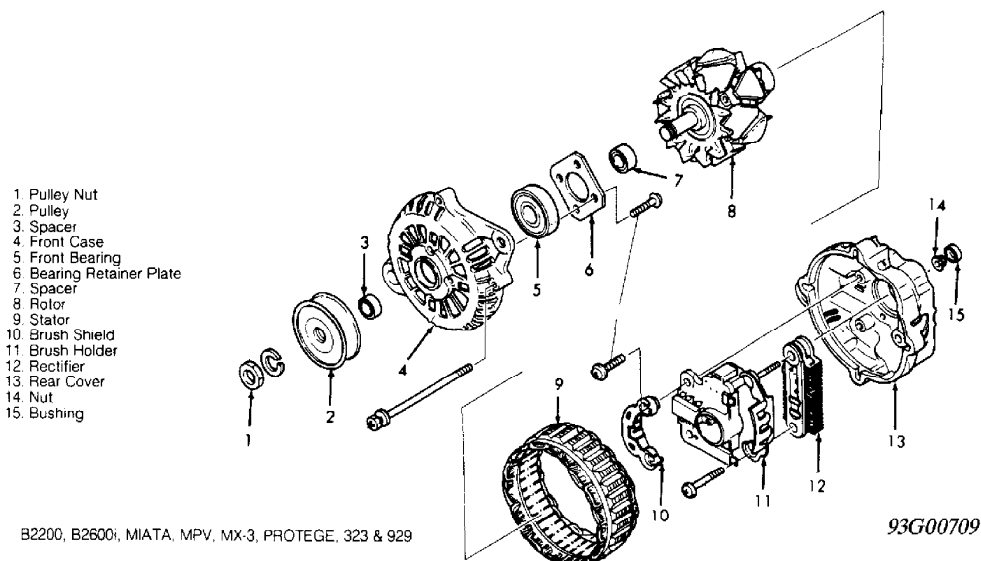
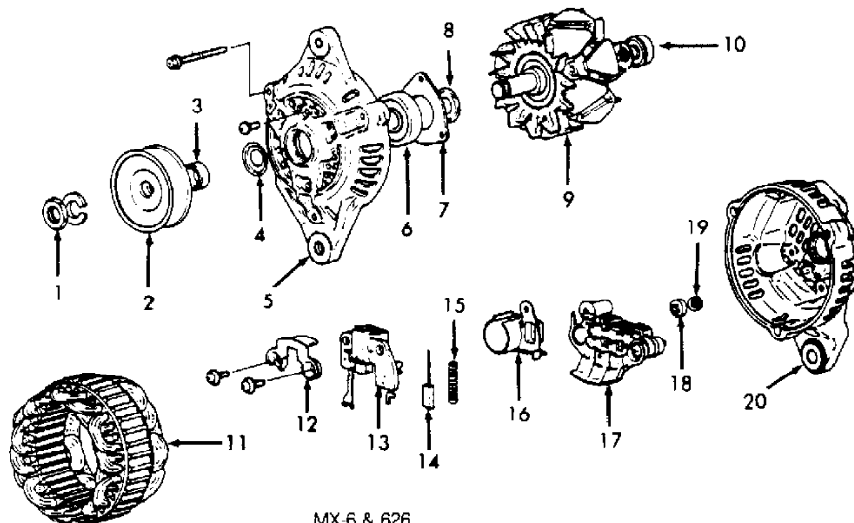


Fig. 10: Exploded View of Alternators  
Courtesy of Mazda Motors Corp.

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



MX-6 & 626

93J00710

Fig. 11: Exploded View of Alternators  
Courtesy of Mazda Motors Corp.