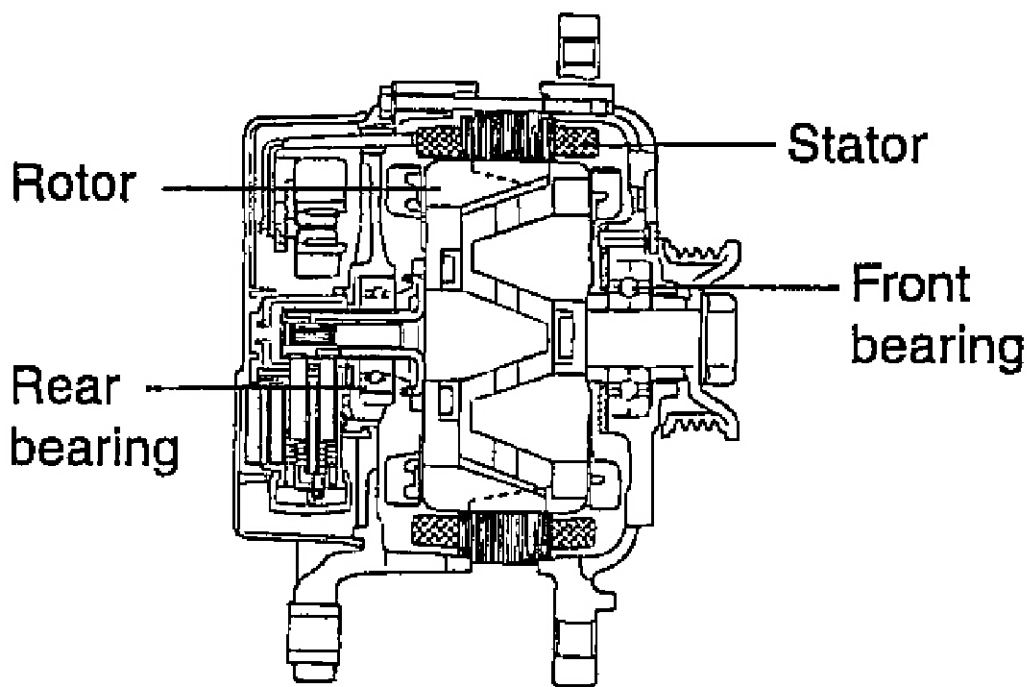


2004-05 ELECTRICAL**Charging System - Sedona****GENERAL****GENERAL INFORMATION**

The charging system includes a battery, an generator with a built-in regulator, and the charging indicator light and wire. The generator has eleven built-in diodes (four positive, four negative and three exciter diodes), each rectifying AC current to DC current. Therefore, DC current appears at generator "B" terminal.

In addition, the charging voltage of this generator is regulated by the battery voltage detection system. The generator is regulated by battery voltage detection system. The main components of the generator are the rotor, stator, rectifier, capacitor brushes, bearing and V-ribbed belt pulley. The brush holder contains a built-in electronic voltage regulator.



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Fig. 1: Illustrating Generator Components
Courtesy of KIA MOTORS AMERICA, INC.

SPECIFICATIONS

Type	Battery voltage sensing
Rated output	13.5V / 120A
Voltage regulator type	Electronic built-in type
Regulator setting voltage	14.4 \pm 0.3 V
Temperature compensated	-10 \pm 3 mV/ $^{\circ}$ C

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Fig. 2: Generator Specifications
Courtesy of KIA MOTORS AMERICA, INC.

2005 Kia Sedona EX

2004-05 ELECTRICAL Charging System - Sedona

BATTERY

Type	55-26 FL (MF)
Ampere hours 20HR	70AH
Cold cranking [at -18°C (0°F)]	600A
Reverse capacity	113 min.
Specific gravity [at 25°C (77°F)]	1.280 ± 0.01

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Fig. 3: Battery Specifications

Courtesy of KIA MOTORS AMERICA, INC.

NOTE: COLD CRANKING AMPERAGE is the amperage a battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 or greater at a specified temperature. REVERSE CAPACITY RATING is the amount of time a battery can deliver 25A and maintain a minimum terminal of 10.5 at 26.7°C (80°F).

INSPECTION

VOLTAGE DROP TEST OF GENERATOR OUTPUT WIRE

This test determines whether or not the wiring between the generator "B" terminal and the battery (+) terminal is good by the voltage drop method.

PREPARATION

1. Turn the ignition switch to "OFF".

NOTE: To find abnormal conditions of the connection, actions should not be taken on the two terminals and each connection during the test.

2. Connect a digital voltmeter between the generator "B" terminal and battery (+) lead wire to the battery (+) terminal. Connect the (+) lead wire of the voltmeter to the "B" terminal and the (-) lead wire to the battery (+) terminal.

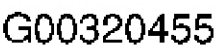


Fig. 4: Voltage Drop Test Preparation
Courtesy of KIA MOTORS AMERICA, INC.

CONDITIONS FOR THE TEST

1. Start the engine.
2. Switch on the head lamps, blower motor and so on. And then, read the voltmeter under this connection.

RESULT

1. The voltmeter may indicate the standard value.

Standard value: 0.2V max.

2. If the value of the voltmeter is higher than expected (above 0.2V max), poor wiring is suspected. In this case check the wiring from the generator "B" terminal to the fusible link to the battery (+) terminal. Check for loose connections, color change due to an overheated harness, etc. Correct them before testing again.
3. Upon completion of the test, set the engine speed at idle. Turn off the head lamps, blower motor and the ignition switch.

OUTPUT CURRENT TEST

This test determines whether or not the generator gives an output current that is equivalent to the nominal output.

PREPARATION

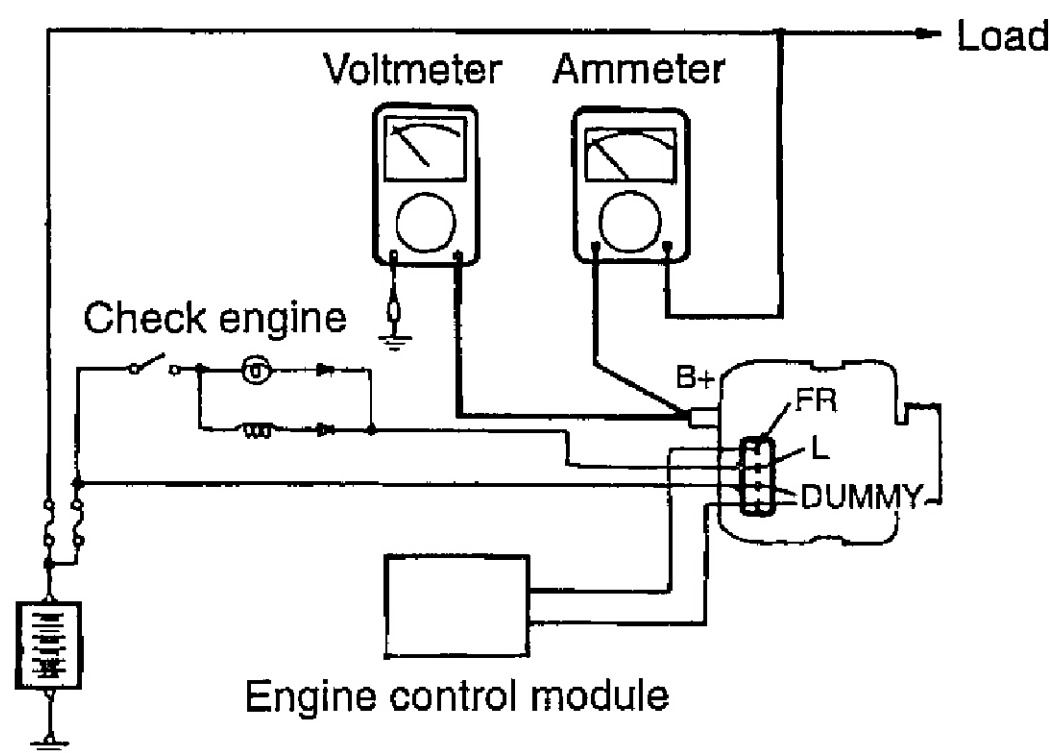
1. Prior to the test, check the following items and correct as necessary.
 1. Check the battery installed in the vehicle to ensure that it is good condition. The battery checking method is described in **BATTERY**.

NOTE: The battery that is used to test the output current should be one that has been partially discharged. With a fully charged battery, the test may not be conducted correctly due to an insufficient load.

2. Check the tension of the generator drive belt. See **DRIVE BELT ROUTING**.
2. Turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Disconnect the generator output wire from the generator "B" terminal.
5. Connect a DC ammeter (0 to 150 A) in series between the "B" terminal and the disconnected output wire. Be sure to connect the (-) lead wire of the ammeter to the disconnected output wire.

NOTE: Tighten each connection securely, as a heavy current will flow. Do not rely on clips.

6. Connect a voltmeter (0 to 20V) between the "B" terminal and ground. Connect the (+) lead wire to the generator "B" terminal and (-) lead wire to a good ground.
7. Attach an engine tachometer and connect the battery ground cable.
8. Leave the engine hood open.



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Fig. 5: Output Current Test Preparation
 Courtesy of KIA MOTORS AMERICA, INC.

TEST

1. Check to see that the voltmeter reads as the same value as the battery voltage. If the voltmeter reads 0V, and the open circuit in the wire between the generator "B" terminal and battery (-) terminal, a blown fusible link or poor grounding is suspected.
2. Start the engine and turn on the headlights.
3. Set the headlight to high beam and the heater blower switch to HIGH, quickly increase the engine speed to 2,500 RPM and read the maximum output current value indicated by the ammeter.

NOTE: After the engine starts up, the charging current quickly drops. Therefore, the above operation must be done quickly to read the maximum current value correctly.

RESULT

1. The ammeter reading must be higher than the limit value. If it is lower but the generator output wire is in good condition, remove the generator from the vehicle and test it.

Limit value (120A generator): 84 A min.

NOTE:

- The nominal output current value is shown on the nameplate affixed to the generator body.
- The output current value changes with the electrical load and the temperature of the generator itself. Therefore, the nominal output current may not be obtained. If such is the case, keep the headlights on the cause discharge of the battery, or use the lights of another vehicle to

increase the electrical load.

The nominal output current may not be obtained if the temperature of the generator itself or ambient temperature is too high.

In such a case, reduce the temperature before testing again.

2. Upon completion of the output current test, lower the engine speed to idle and turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Remove the ammeter and voltmeter and the engine tachometer.
5. Connect the generator output wire to the generator "B" terminal.
6. Connect the battery ground cable.

REGULATED VOLTAGE TEST

The purpose of this test is to check that the electronic voltage regulator controls voltage correctly.

PREPARATION

1. Prior to the test, check the following items and correct if necessary.
 1. Check that the battery installed on the vehicle is fully charged. For battery checking method, see **BATTERY**.
 2. Check the generator drive belt tension. See **DRIVE BELT ROUTING**.
2. Turn ignition switch to "OFF".
3. Disconnect the battery ground cable.
4. Connect a digital voltmeter between the "B" terminal of the generator and ground. Connect the (+) lead of the voltmeter to the "B" terminal of the generator. Connect the (-) lead to good enough or the battery (-) terminal.
5. Disconnect the generator output wire from the generator "B" terminal.
6. Connect a DC ammeter (0 to 150A) in series between the "B" terminal and the disconnected output wire. Connect the (-) lead wire of the ammeter to the disconnected output wire.
7. Attach the engine tachometer and connect the battery ground cable.

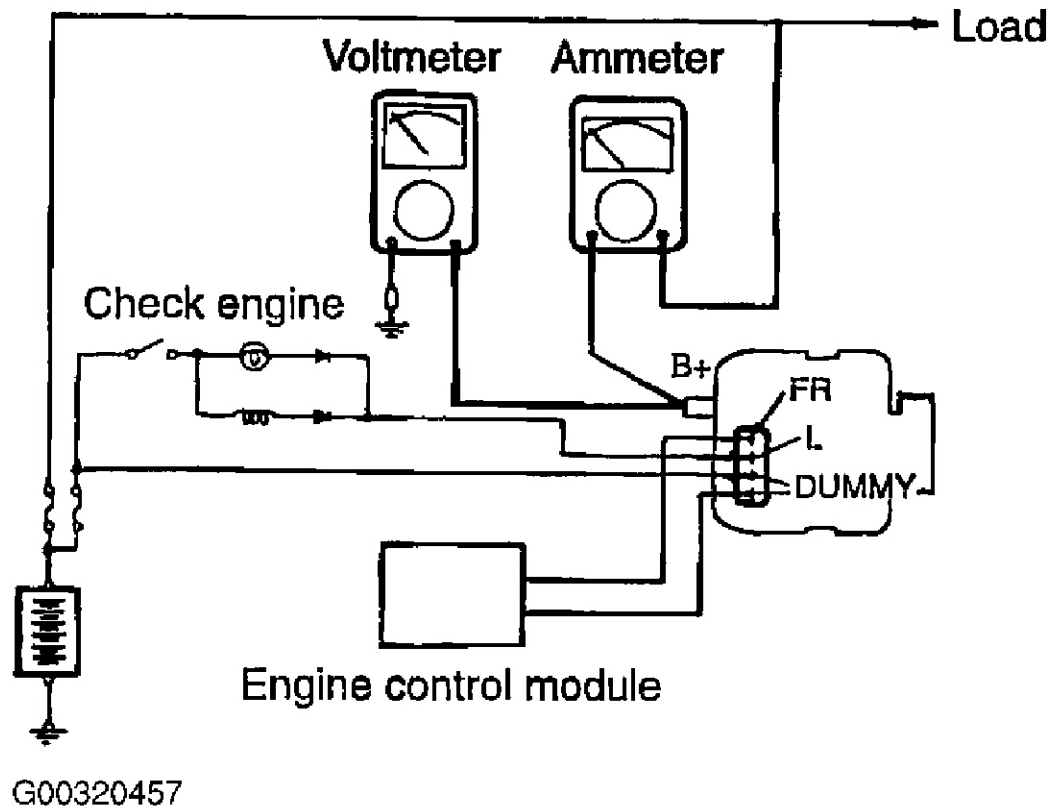


Fig. 6: Regulated Voltage Test Preparation
 Courtesy of KIA MOTORS AMERICA, INC.

TEST

1. Turn on the ignition switch and check to see that the voltmeter indicates the following value.

Voltage : Battery voltage

If it reads 0V, there is an open circuit in the wire between the generator "B" terminal and the battery and the battery (+), or the fusible link is blown.

2. Start the engine, keep all lights and accessories off.
3. Run the engine at a speed of about 2,500 RPM and read the voltmeter when the generator output current drops to 10A or less.

RESULT

1. If the voltmeter reading agrees with the value listed in the Regulating Voltage Table shown in illustration, the voltage regulator is functioning correctly. If the reading is other than the standard value, the voltage regulator or the generator is faulty.

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Voltage regulator ambient temperature °C (°F)	Regulating voltage (V)
-20 (-4)	14.2 - 15.4
20 (68)	13.9 - 14.9
60 (140)	13.4 - 14.6
80 (176)	13.1 - 14.5

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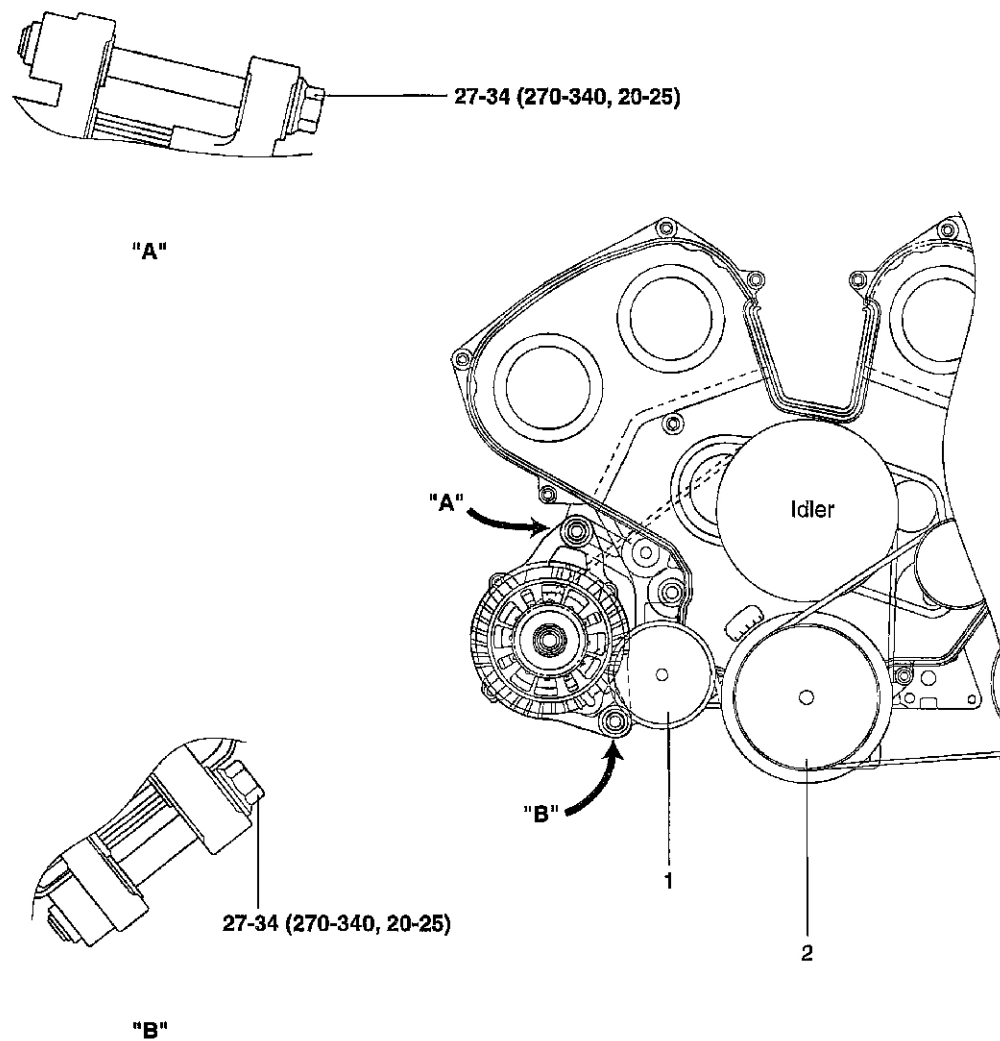
Fig. 7: Regulated Voltage Test Specification Chart
Courtesy of KIA MOTORS AMERICA, INC.

2. Upon completion of the test, reduce the engine speed to idle, and turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Remove the voltmeter and ammeter and the engine tachometer.
5. Connect the generator output wire to the generator "B" terminal.
6. Connect the battery ground cable.

GENERATOR**REMOVAL**

2005 Kia Sedona EX

2004-05 ELECTRICAL Charging System - Sedona



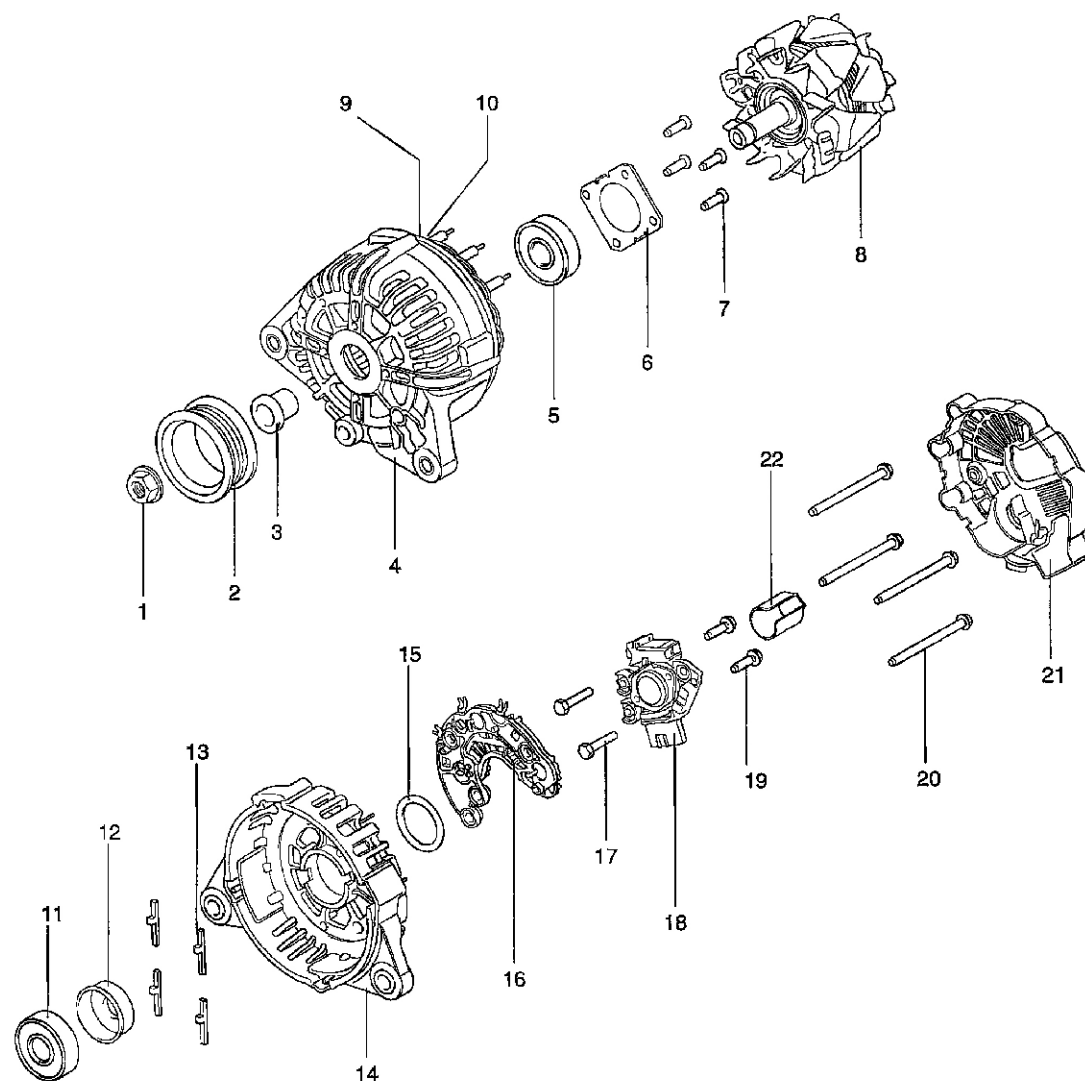
TORQUE : N·m (kg·cm, lb·ft)

1. Generator tensioner
2. Crankshaft pulley

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Fig. 8: Removing & Installing Generator
Courtesy of KIA MOTORS AMERICA, INC.

DISASSEMBLY & REASSEMBLY



- 1. Hex nut
- 2. Pulley
- 3. Bushing
- 4. Front cover assembly
- 5. Front bearing
- 6. Bearing cover
- 7. Bearing bolt

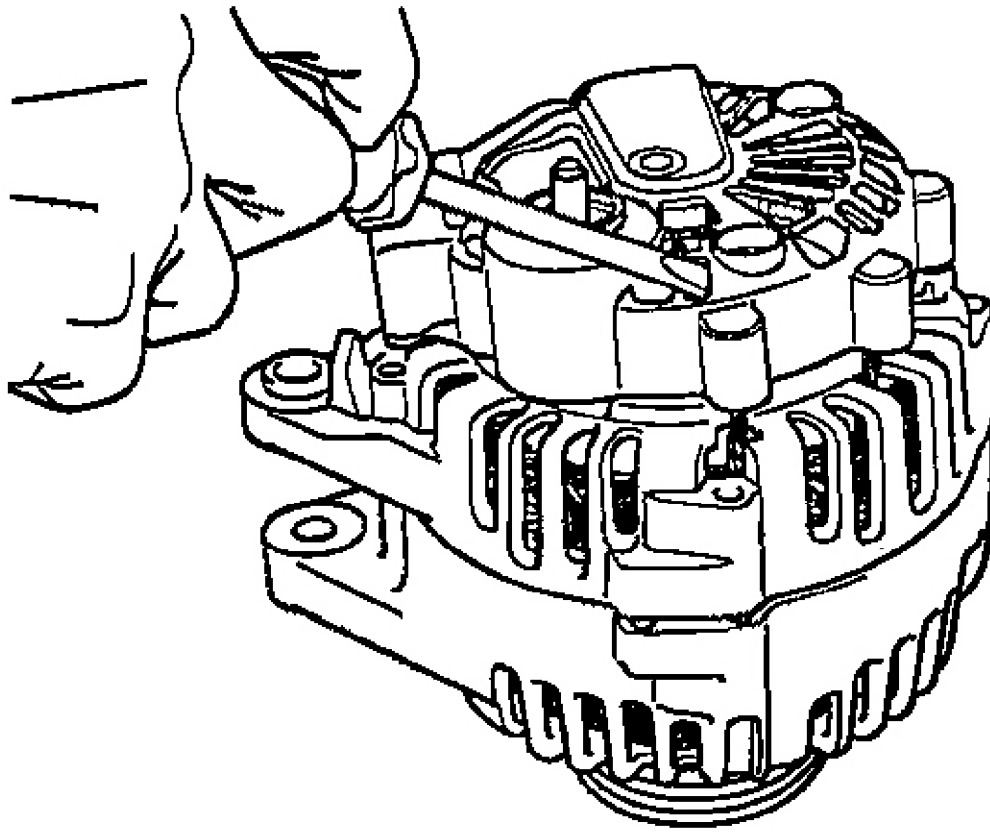
- 8. Rotor coil
- 9. Silicon injection
- 10. Stator coil
- 11. Rear bearing
- 12. Bearing cover
- 13. Damper
- 14. Rear cover

- 15. Seal
- 16. Rectifier
- 17. Bolts
- 18. Brush holder assembly
- 19. Brush holder bolt
- 20. Bolts
- 21. Cover
- 22. Guard

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Fig. 9: Exploded View Of Generator
 Courtesy of KIA MOTORS AMERICA, INC.

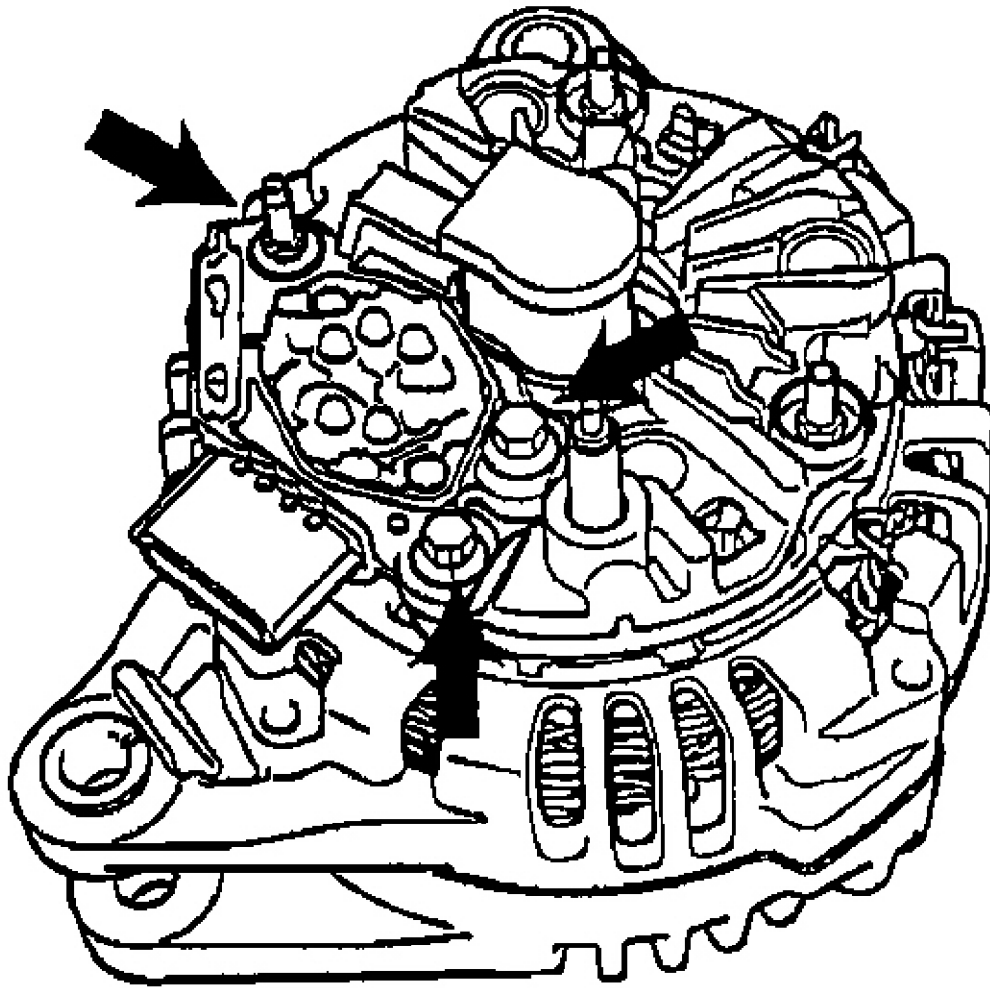
1. Remove the generator cover using a screwdriver or equivalent.



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Fig. 10: Removing The Generator Cover
Courtesy of KIA MOTORS AMERICA, INC.

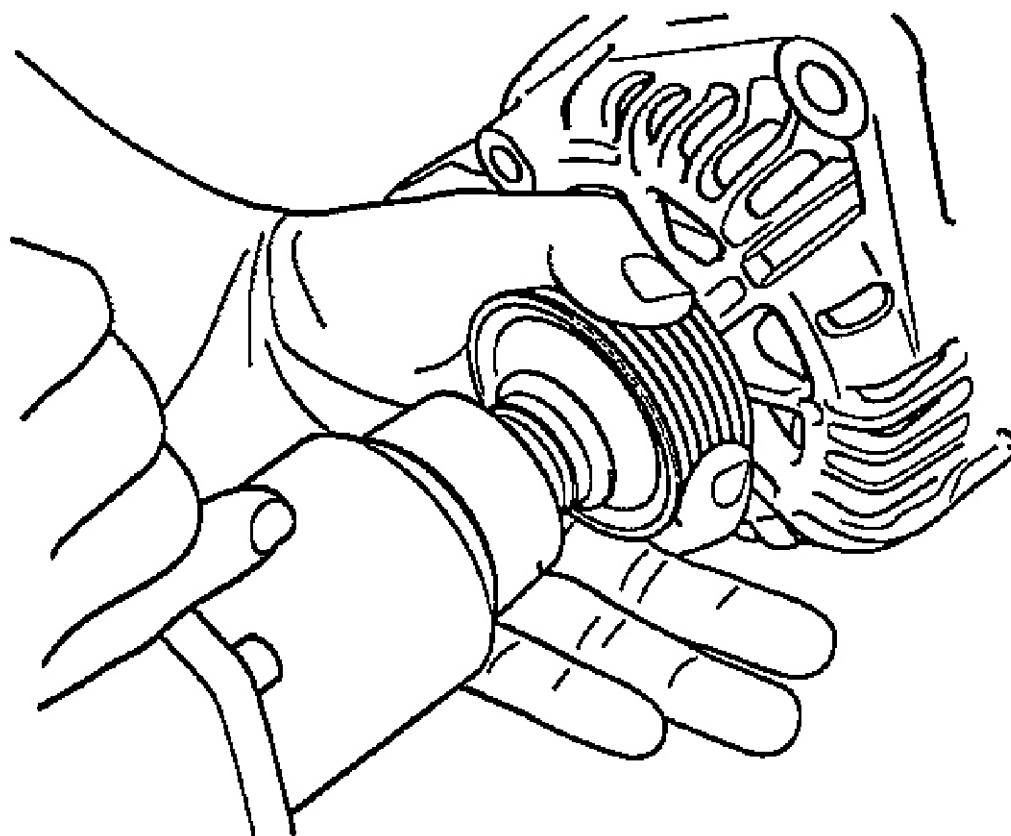
2. After loosening the 3 mounting bolts, detach the brush holder assembly.



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Fig. 11: Detaching The Brush Holder Assembly
Courtesy of KIA MOTORS AMERICA, INC.

3. Remove the nut, pulley and spacer.

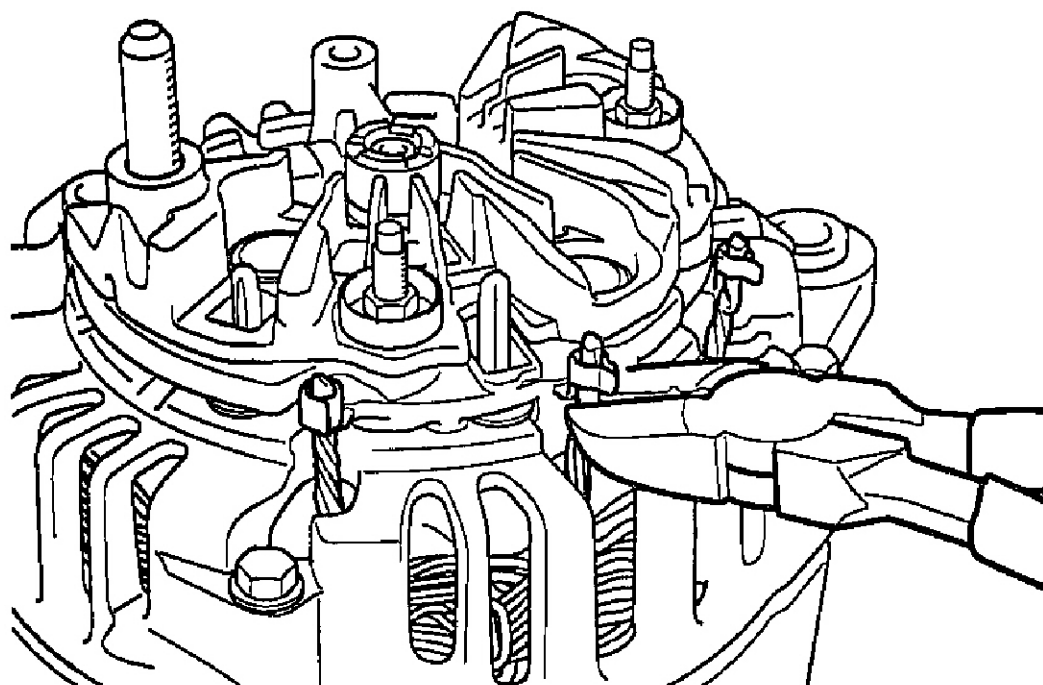


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Fig. 12: Removing The Nut, Pulley And Spacer
Courtesy of KIA MOTORS AMERICA, INC.

NOTE: Put on gloves to protect hands during working.

CAUTION: Cutting the stator coil lead line connecting to the rectifier may damage the generator because the rectifier and the stator coil lead line are soldered together. So, do not disassemble further. See Fig. 9 for further disassembly.



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Fig. 13: Cutting The Stator Coil Lead Line
Courtesy of KIA MOTORS AMERICA, INC.

4. Reassembly is the reverse of disassembly.

INSTALLATION

1. Place the alternator and insert a support bolt (Do not insert a nut this time.)
2. After pushing the alternator forward, count that how many spacers (a spacer thickness : 0.198 mm) should be inserted between the alternator front leg and front case as shown in "A".
3. After inserting spacers, insert and tighten a nut securely.

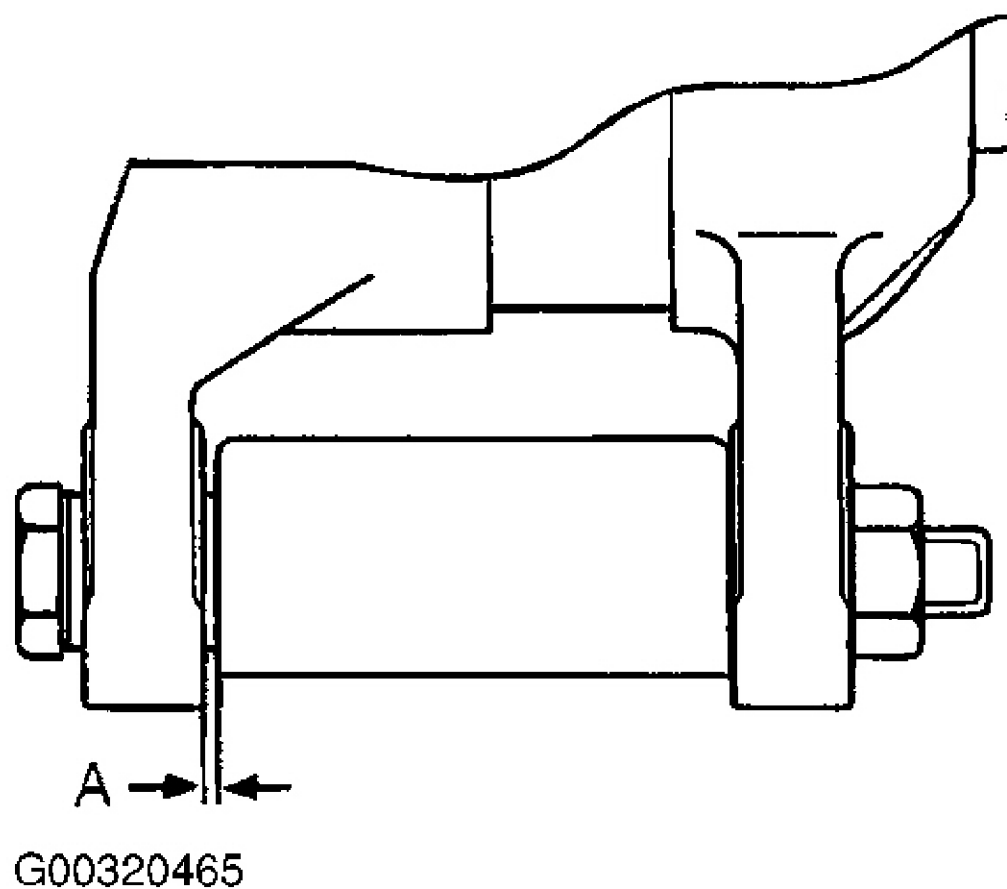


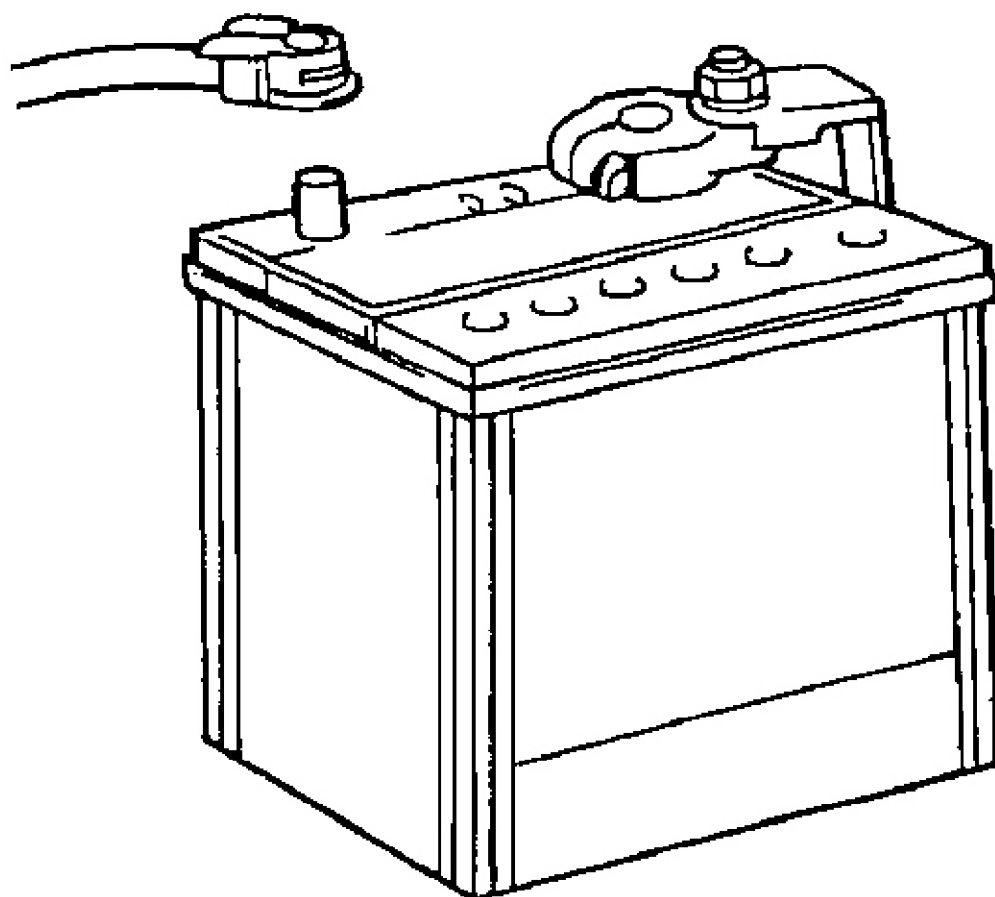
Fig. 14: Measuring For Spacers
Courtesy of KIA MOTORS AMERICA, INC.

BATTERY

BATTERY SERVICE

1. Make sure the ignition switch and all accessories are in the OFF position.
2. Disconnect the battery cables (negative first).
3. Remove the battery from the vehicle

CAUTION: Care should be taken in the event the battery case is cracked or leaking, to protect your skin from the electrolyte. Heavy rubber gloves (not the household type) should be worn when removing the battery.



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Fig. 15: Removing Battery Terminals**Courtesy of KIA MOTORS AMERICA, INC.**

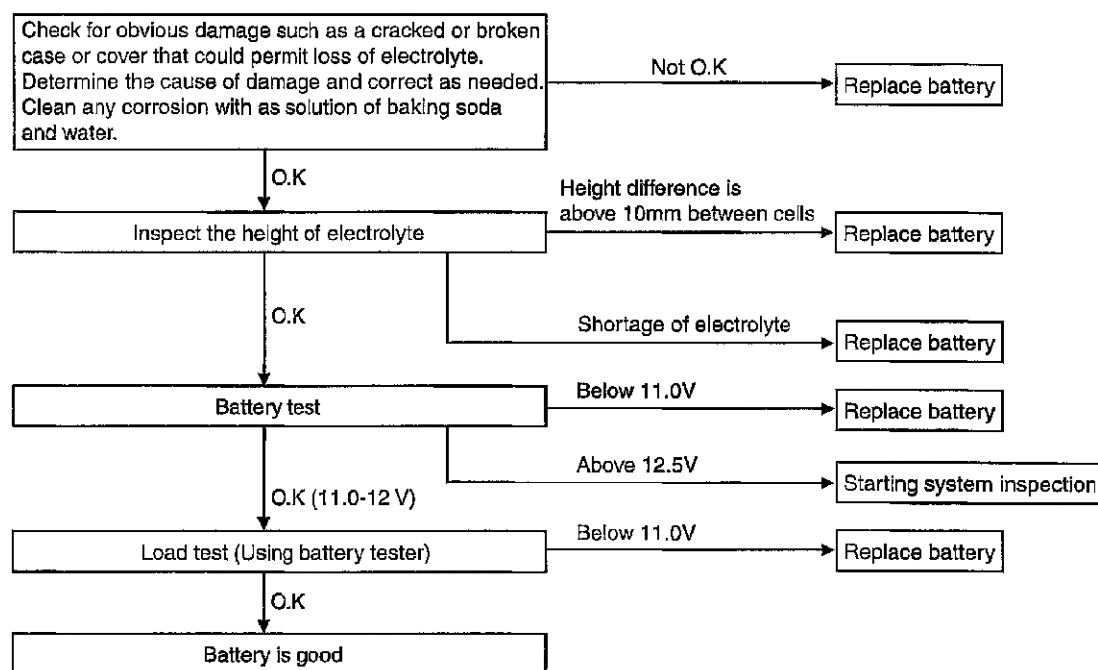
4. Inspect the battery carrier for damage caused by the loss of electrolyte. If acid damage is present, it will be necessary to clean the area with a solution of clean warm water and baking soda. Scrub the area with a stiff brush and wipe off with a cloth moistened with baking soda and water.
5. Clean the top of the battery with the same solution as described in Step (4).
6. Inspect the battery case and cover for cracks. If cracks are present, the battery must be replaced.
7. Clean the battery posts with a suitable battery post tool.
8. Clean the inside surface of the terminal clamps with a suitable battery cleaning tool. Replace damaged or frayed cables and broken terminal clamps.
9. Install the battery in the vehicle.
10. Connect the cable terminals to the battery post, making sure the tops of the terminals are flush with the tops of the posts.
11. Tighten the terminal nuts securely.
12. Coat all connections with light mineral grease after tightening.

CAUTION: When batteries are being charged, an explosive gas forms beneath the cover of each cell. Do not smoke near batteries being charged or which have recently been charged. Do not break live circuits at the terminals of batteries being charged. A spark will occur when the circuit is

broken. Keep open flames away from the battery.

BATTERY INSPECTION

1. TESTING SHEET



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Fig. 16: Battery Testing Sheet

Courtesy of KIA MOTORS AMERICA, INC.

2. CHECK SHEET

Item	Trouble	Cause	Remedy	Responsibility	
				User	Manufacturer
1. Visual inspection	* Battery terminal damage	* Carelessness * Over tightening the battery cable	Replace	<input type="radio"/>	
	Cover Breakage	* Carelessness	Replace	<input type="radio"/>	
	* Electrolyte leakage- Cover breakage - Cover leakage	* Carelessness * Bad cover seal	Replace Replace	<input type="radio"/>	<input type="radio"/>
2. Electrolyte height inspection	* Electrolyte height between cells is over 10mm	* Cell shorted electrically * Vaporization caused by excessive temperature	Replace Replace	<input type="radio"/>	<input type="radio"/>
	* Shortage of electrolyte	* Electrolyte loss caused by over-charge	Replace	<input type="radio"/>	
3. Voltage inspection	1. Battery voltage >13.2V	1. Over charge	Replace * Check the electric system	<input type="radio"/>	
	2. 12.5V < Battery voltage < 12.9V	2. Normal			
	3. 12.0V < Battery voltage < 12.4V (Simple discharge)	1. Insufficient charge	* Battery Load Test (Refer to Load Test below)	<input type="radio"/>	
	4. 11.0 V < Battery voltage < 12.0V (Over discharge)	2. Internal failure		<input type="radio"/>	
	5. Battery voltage : 11.0V or less	1. Charge condition failure 2. Battery discharged for a long period 3. Internal circuit open	Replace	<input type="radio"/> <input type="radio"/>	<input type="radio"/>

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Fig. 17: Manufacturers Responsibility Sheet

Courtesy of KIA MOTORS AMERICA, INC.

3. LOAD TEST

1. When discharging the battery during 15 seconds at half currency of Cold Cranking Power (CCP), the voltage of the battery should be as shown in illustration below.

Ambient Temperature	Voltage
above 20°C	9.6V
~ 18°C	9.5V
~ 10°C	9.4V
~ 4°C	9.3V
~ -1°C	9.1V
~ -7°C	8.9V
~ -12°C	8.7V

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Fig. 18: Regulating Voltage Table

Courtesy of KIA MOTORS AMERICA, INC.

2. When the voltage is not within specification, repeat the load test again, and recharge.
3. If the battery is left alone for 2 hours after recharging and its output is over 12.5V, and the voltage after a load test is over the standard value, the battery can be used.

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