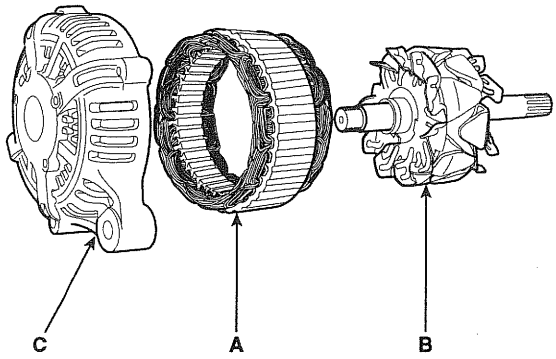
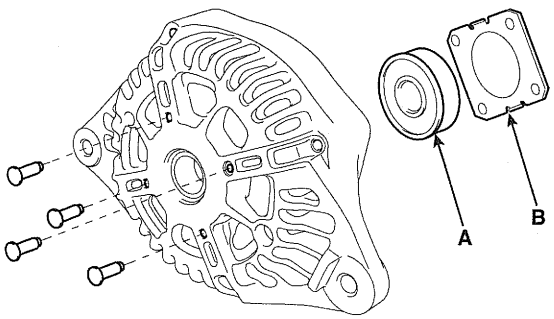
7. Disconnect the stator(A), rotor(B) and front bracket(C).



EBKD007G

8. Remove the rear bearing(A) and cover(B).



EBKD007H

9. Reassembly is the reverse or disassembly.

NOTE

Before the rotor is attached to the rear bracket, insert a wire through the small hole in the rear bracket to lock the brush. After the rotor has been installed, the wire can be removed.

Engine Electrical System

GENERAL

SPECIFICATION EEC7BAAD

IGNITION SYSTEM

Item			Specifications	
			2.7	2.0
Ignition coil	Type		Mold coil type	Mold coil type
	Primary resistance		0.74 ± 10%(Ω)	0.58 ± 10%(Ω)
	Secondary resistance		13.3 ± 15%(kΩ)	8.8 ± 15%(kΩ)
Spark plugs	Leaded	NGK	BKR5ES	
		CHAMPION	RC10YC	
	Unleaded	NGK	PFR5N-11	BKR5ES-11
		CHAMPION	RC10PYPB4	RC10YC4
	Gap		1.0 mm ~ 1.1 mm (Unleaded) 0.7 mm ~ 0.8 mm (Leaded)	

STARTING SYSTEM

Item			Specifications		
			2.7	2.0	DIESEL
Starter	Type		Reduction drive (with planetary gear)		
	Rated voltage		12V, 1.2KW	12V, 1.2KW	12V, 2.0KW
	No. of pinion teeth		8	8	9
	No-load charasteristics	Voltage	11V	11V	11.5V
		Amperage	90A, MAX	90A, MAX	120A, MAX
		Speed	3,000rpm, MIN	3,000rpm, MIN	4,000rpm, MIN
	Commutator diameter	Standard	29.4 mm (1.157 in.)		35 mm (1.378 in)
		Limit	28.4 mm (1.118 in.)		
	Undercut depth	Standard	0.5 mm (0.02 in.)		0.7 mm (0.028 in)
		Limit	0.2 mm (0.008 in.)		

CHARGING SYSTEM

Item		Specifications		
		2.7	2.0	DIESEL
Alternator	Type	Battery voltage sensing		
	Rated voltage	12V, 120A	13.5V, 90A	12V, 120A
	Speed	1,000 ~ 18,000 rpm		1,000 ~ 12,000 rpm
	Voltage regulator	Electronic built-in type		I.C regulator built-in type
	Regulator setting voltage	14.55 ± 0.2V	14.4 ± 0.3V	14.4 ± 0.3V
	Temperrature compensation	-3.5 ± 1mV/°C	-10 ± 3mV/°C	-10 ± 3mV/°C
Battery	Type	MF 70 AH	MF 60 AH	MF 90 AH
	Cold cranking amperage at-18°C (0°F)	600A	550A	720A
	Reserve capacity	113min	92min	160min
	Specific gravity at 20°C (77°F)	1.280 ± 0.01	1.280 ± 0.01	1.280 ± 0.01

NOTE

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

PREHEATING SYSTEM

Item		Specifications
Glow plug	Rated voltage	DC 11V
	Current	16A ± 1.5A after 4 seconds loading at rated voltage
Glow plug relay	Rated voltage	DC 12V
	Operating voltage range	DC 9V ~ DC 16V
	Operating temperature range	-40°C ~ 120°C
	Rated load current	DC 12V, 70A

AUTO CRUISE CONTROL SYSTEM

Items	Specification
Setting error	Within ± 1.5Km/h on level road
Vehicle speed memory variation	No variation
Setting time	0.1sec max.
Resuming time	0.1sec max.
Minimum operating speed	40 ± 2Km/h
Cancel speed range	15 ± 2Km/h
Maximum memorized speed	160 ± 2Km/h
Pulling force	127N(13Kgf)
Main switch serial resistance value	3.9kΩ ± 1%
Command switch serial resistance value	SET switch : 220Ω ± 1%
	RESUME switch : 910Ω ± 1%

TIGHTENING TORQUE

Items	Nm	kg·cm	lb·ft
Generator terminal (B+)	5 ~ 7	50 ~ 70	3.6 ~ 5.1
Starter motor terminal (B+)	10 ~ 12	100 ~ 120	7.3 ~ 8.8
Battery terminal	4 ~ 6	40 ~ 60	2.9 ~ 4.3
Spark plug	20 ~ 30	200 ~ 300	15 ~ 22
Glow plug	15 ~ 20	150 ~ 200	11 ~ 15
Glow plug plate attaching nut	0.8 ~ 1.5	8 ~ 15	0.6 ~ 1.1

TROUBLESHOOTING ED9ACB48

IGNITION SYSTEM

Symptom	Suspect Area	Remedy (See Page)
Engine will not start or is hard to start (Cranks OK)	Ignition lock switch Ignition coil Spark plugs Ignition wiring disconnected or broken Spark plug cable	See page EE-23 See page EE-21 See page EE-19 Inspect See page EE-19
Rough idle or stalls	Ignition wiring Ignition coil Spark plug cable	Inspect See page EE-21 See page EE-19
Engine hesitates/poor acceleration	Spark plugs and spark plug cable Ignition wiring	See page EE-19 Inspect
Poor mileage	Spark plugs and spark plugs cable	See page EE-19

CHARGING SYSTEM

Symptom	Suspect Area	Remedy (See Page)
Charging warning indicator does not light with ignition switch "ON" and engine off	Fuse blown Light burned out Wiring connection loose Electronic voltage regulator	Check fuses Replace light Tighten loose connections See page EE-29
Charging warning indicator does not go out with engine running (Battery requires frequent recharging)	Drive belt loose or worn Battery cables loose, corroded or worn Fuse blown Fusible link blown Electronic voltage regulator or generator Wiring	See page EE-28, 45 See page EE-48 Check fuses Replace fusible link See page EE-29 Repair wiring
Engine hesitates/poor acceleration Overcharge	Drive belt loose or worn Wiring connection loose or open circuit Fusible link blown Poor grounding Electronic voltage regulator or generator Worn battery Electronic voltage regulator Voltage sensing wire	See page EE-28, 45 Tighten loose connection or repair wiring Replace fusible link Repair See page EE-29 Replace battery See page EE-29 Repair wire

STARTING SYSTEM

Symptom	Suspect Area	Remedy (See Page)
Engine will not crank	Battery charge low Battery cables loose, corroded or worn out Transaxle range switch (Vehicle with automatic transaxle only) Fusible link blown Starter motor faulty Ignition switch faulty	Charge or replace battery Repair or replace cables See page TR group-automatic transaxle Replace fusible link See page EE-54 See page EE-23
Engine cranks slowly	Battery charge low Battery cables loose, corroded or worn out Starter motor	Charge or replace battery Repair or replace cables See page EE-54
Starter keeps running	Starter motor Ignition switch	See page EE-54 See page EE-23
Starter spins but engine will not crank	Short in wiring Pinion gear teeth broken or starter motor Ring gear teeth broken	Repair wiring See page EE-54 See page EM group-fly wheel

CRUISE CONTROL SYSTEM

NOTE

Before troubleshooting :

- *Check the ECM(10A), Horn(10A), ECU #3(10A) and ECU B+(15A) fuse in the under - hood fuse/relay box.*
- *Check that the horn sounds.*
- *Check the tachometer to see if it works properly.*

Symptom	Suspect Area	See Page
Cruise control cannot be set	Remocon switch Brake switch A/T gear position switch Cruise control unit	See page EE-73 See page EE-74 See page TR group-automatic transaxle See page EE-8
Cruise control cannot be set but indicator light does not go on	Dimming circuit in gauge Cruise control unit	See page EE-8 See page EE-8
Cruise speed is noticeably higher or lower than what was set	Vehicle speed sensor Cruise control unit and actuator cable deflection Cruise control unit	See page TR group-automatic transaxle See page EE-74 See page EE-8
Excessive overshooting or undershooting when trying to set speed	Cruise control unit and actuator cable deflection Vehicle speed sensor Cruise control unit	See page EE-74 See page TR group-automatic transaxle See page EE-8
Speed fluctuation on a flat road with cruise control set	Vehicle speed sensor Cruise control unit and actuator cable deflection Cruise control unit	See page TR group-automatic tranxaxle See page EE-74 See page EE-8
Vehicle does not decelerate or accelerate accordingly when SET/RESUME/CANCEL button is pushed	Remocon switch Cruise control unit	See page EE-73 See page EE-8

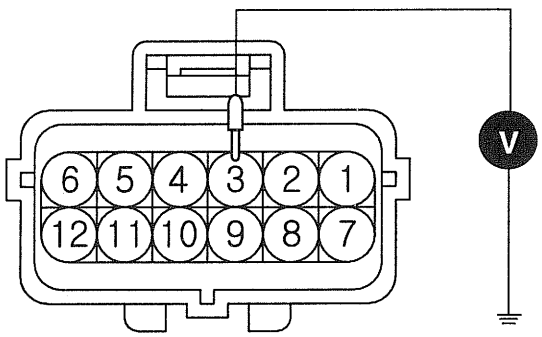
Symptom	Suspect Area	See Page
Cruise control does not cancel when shift lever is moved to N position (A/T)	A/T gear position switch Cruise control unit	See page TR group-automatic tranxaxle See page EE-8
Set speed is not cancelled when brake pedal is pushed	Brake switch Cruise control unit	See page EE-74 See page EE-8
Cruise control will not cancel when main switch is pushed OFF	Remocon switch Cruise control unit	See page EE-73 See page EE-8
Cruise control will not cancel when CANCEL button is pushed	Remocon switch Cruise control unit	See page EE-73 See page EE-8
Set speed will not resume when RESUME button (with main switch on, when set speed is temporarily cancelled)	Remocon switch Cruise control unit	See page EE-73 See page EE-8
The transmission shifts down slower than normal when going up a hill with the cruise control on (A/T)	Troubleshooting the cruise control communication circuit	See page EE-8

CRUISE CONTROL COMMUNICATION CIRCUIT TROUBLESHOOTING (A/T)

1. Start the engine.
2. Turn on the cruise control main switch, then drive the vehicle to speeds over 25 mph (40km/h) with the cruise control.

   Does the cruise control operate ?
   YES - Go to step 3.
   NO - Check the cruise control unit or cruise control actuator.
3. Measure the voltage between the O/D control terminal of the cruise control unit connector and ground.

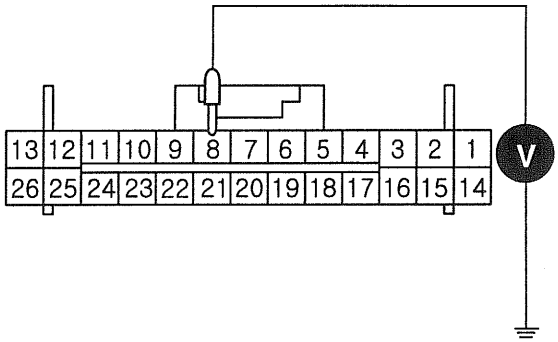
   Is there approx. 1V?
   YES - Go to step 4.
   NO - Replace the cruise control unit.



EBKE200C

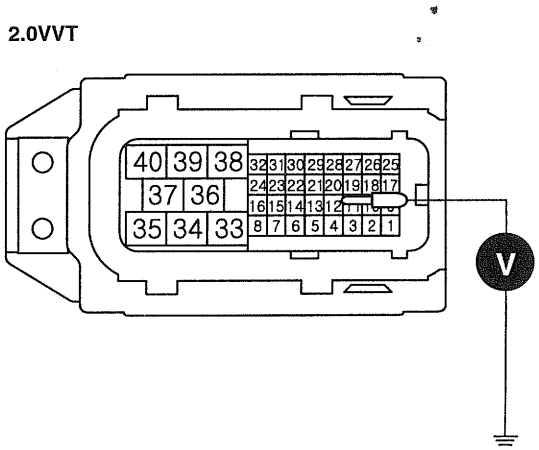
4. Measure the voltage between the cruise control terminal of the TCM(or PCM) connector and ground.

2.7/Diesel



EBKE200D

2.0VVT



EBKD200F

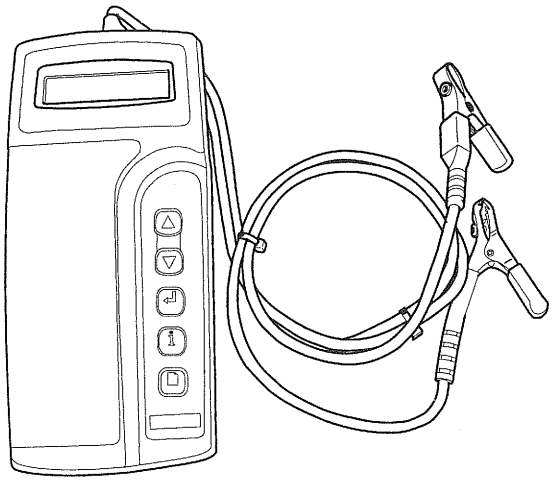
Is there approx. 1V?
YES - Check for loosen connectors. If necessary replace the TCM and recheck. (See Page TR group-automatic transaxle)
NO - Repair short or open in the wire between the TCM (or PCM) terminal and cruise control unit.

THE MICRO 570 ANALYZER EB27ECFA

The MICRO 570 Analyzer provides the ability to test the charging and starting systems, including the battery, starter and alternator.

CAUTION

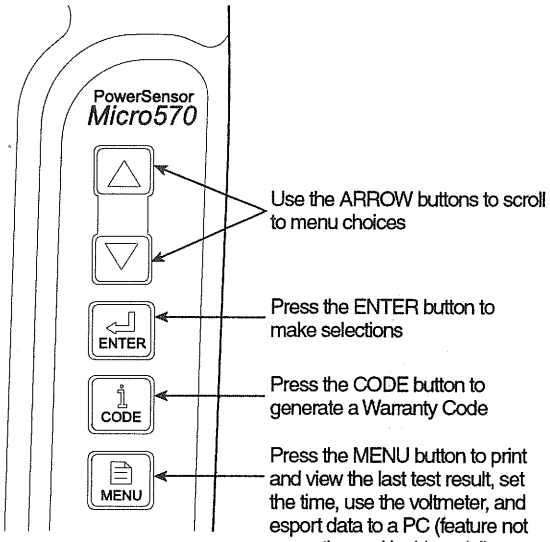
Because of the possibility of personal injury, always use extreme caution and appropriate eye protection when working with batteries.



EBKD001A

KEYPAD

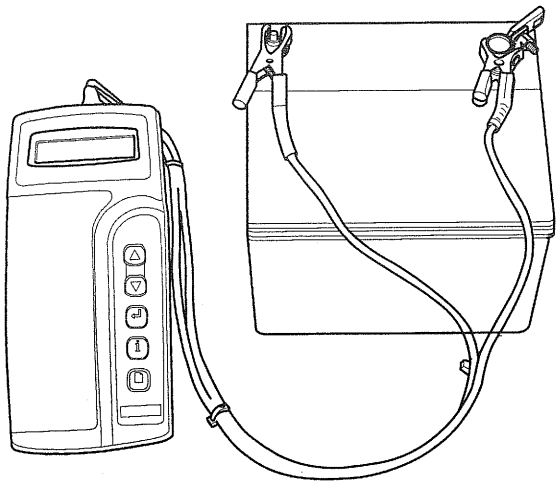
The MICRO570 button on the key pad provide the following functions :



EBKD001B

BATTERY TEST PROCEDURE

1. Connect the tester to the battery.
   - Red clamp to battery positive (+) terminal.
   - Black clamp to battery negative (-) terminal.

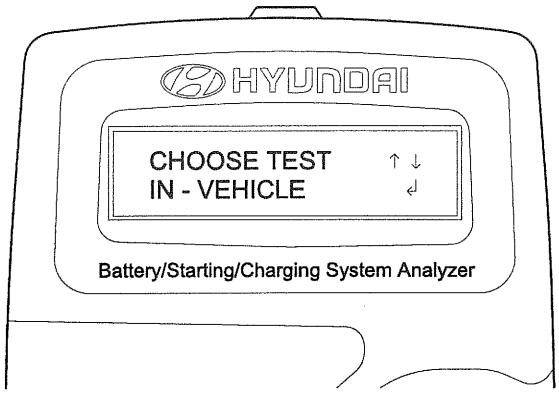


EBKD001C

CAUTION

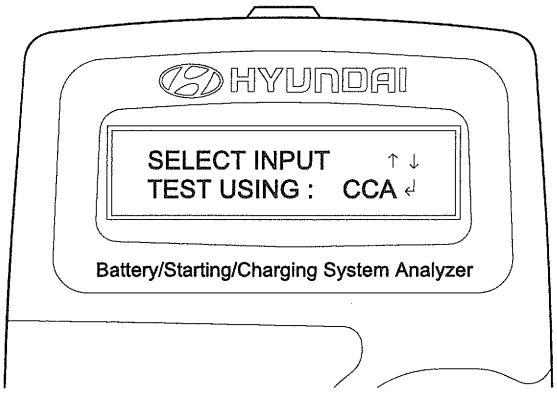
Connect clamps securely. If "CHECK CONNECTION" message is displyed on the screen, reconnect clamps securely.

2. The tester will ask if the battery is connected "IN A VEHICLE" or "OUT OF A VEHICLE".
   Make your selection by pressing the arrow buttons; then press ENTER.



EBKD001D

3. Choose either CCA or CCP and press the ENTER button.

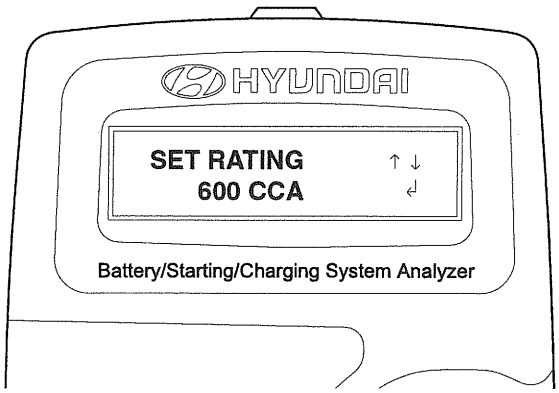


EBKD001E

NOTE

- *CCA : Cold cranking amps, is an SAE specification for cranking batteried at 0°F (-18°C).*
- *CCP : Cold cranking amps, is an SAe specification for korean manufacturer's for cranking batteried at 0°F (-18°C)*

4. Set the CCA value displayed on the screen to the CCA value marked on the battery label by pressing up and down buttons and press ENTER.

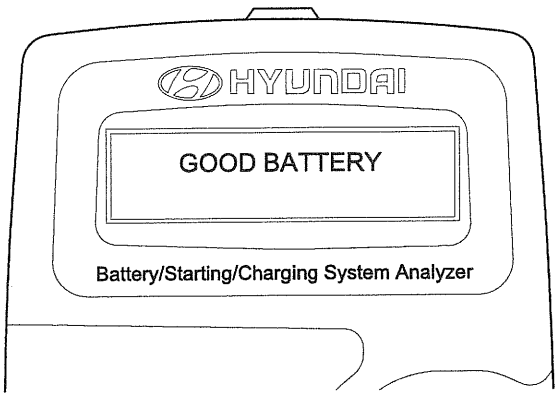


EBKE001F

NOTE

The battery ratings(CCA) displayed on the tester must be identical to the ratings marked on battery label.

5. The tester (Micro570) displays battery test results including voltage and battery ratings.
A relevant action must be given according to the test results by referring to the battery test results as shown in the table below.



EBKD001G

6. To conduct starter test, continuously, press ENTER.

BATTERY TEST RESULTS

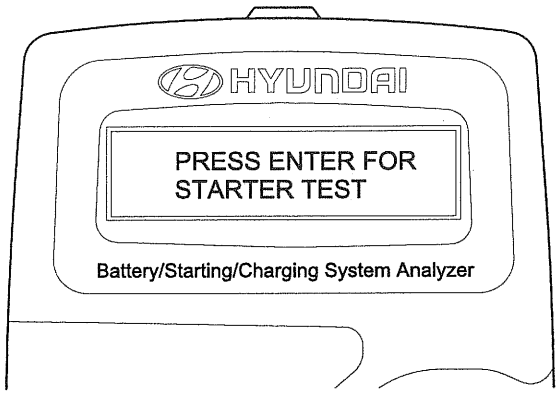
RESULT ON PRINTER	REMEDY
Good battery	No action is required
Good recharge	Battery is in a good state Recharge the battery and use
Charge & Retest	Battery is not charged properly ⇒ Charge and test the battery again (Failure to charge the battery fully may read incorrect measurement value)
Replace battery	⇒ Replace battery and recheck the charging system. (Improper connection between battery and vehicle cables may cause "REPLACE BATTERY", retest the battery after removing cables and connecting the tester to the battery terminal directly prior to replacing the battery)
Bad cell-replace	⇒ Charge and retest the battery. And than, test results may cause "REPLACE BATTERY", replace battery and recheck the charging system

WARNING

Whenever filing a claim for battery, the print out of the battery test results must be attached.

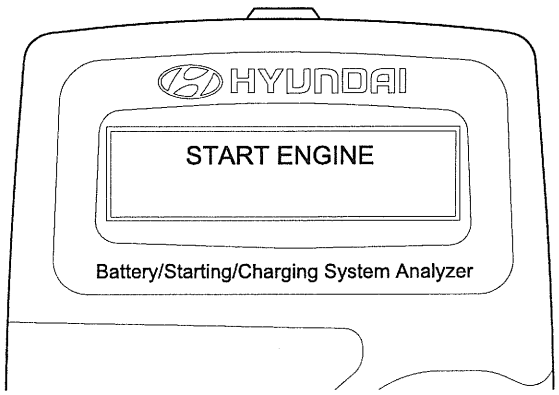
STARTER TEST PROCEDURE

1. After the battery test, press ENTER immediately for the starter test.



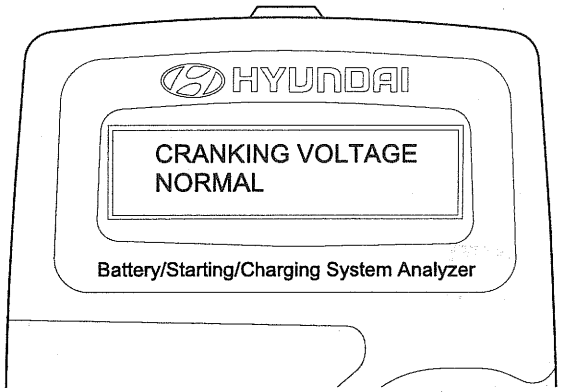
EBKD001H

2. After pressing ENTER key, start the engine.



EBKD001I

3. Cranking voltage and starter test results will be displayed on the screen.
Take a relevant action according to the test results by referring to the starter test results as given below.



EBKD001J

4. To continue charging system test, press ENTER.

STARTER TEST RESULTS

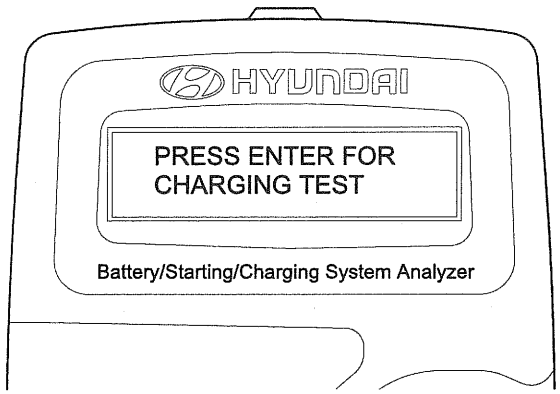
RESULT ON PRINTER	REMEDY
Cranking voltage normal	System shows a normal starter draw
Cranking voltage low	Cranking voltage is lower than normal level ⇒ Check starter
Charge battery	The state of battery charge is too low to test ⇒ Charge the battery and retest
Replace battery	⇒ Replace battery If the vehicle is not started though the battery condition of "Good and fully charged" is displayed. ⇒ Check wiring for open circuit, battery cable connection, starter and repair or replace as necessary. ⇒ If the engine does not crank, check fuel system.

NOTE

When testing the vehicle with old diesel engines, the test result will not be favorable if the glow plug is not heated. Conduct the test after warming up the engine for 5 minutes.

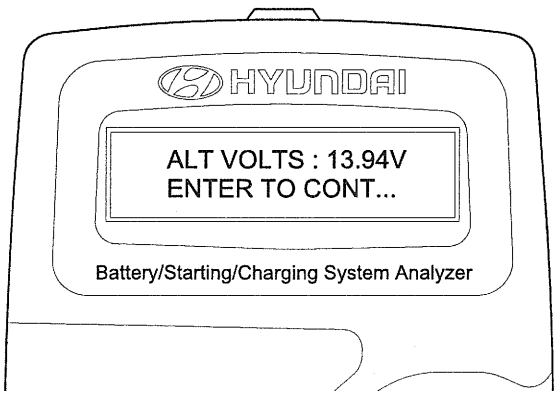
CHARGING SYSTEM TEST PROCEDURE

1. Press ENTER to begin charging system test.



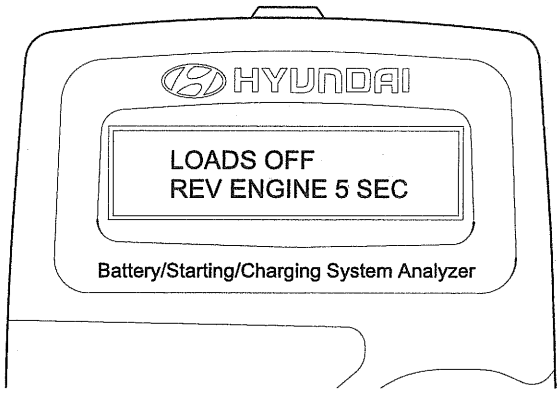
EBKD001K

2. If ENTER button is pressed, the tester displays the actual voltage of alternator.
   Press ENTER to test the charging system.



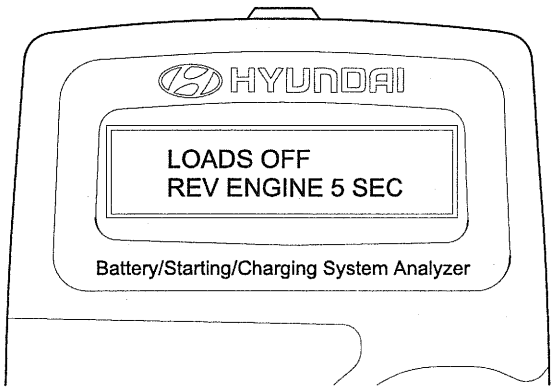
EBKD001L

3. Turn off all electrical load and rev engine for 5 seconds with pressing the accelerator pedal.



EBKD001M

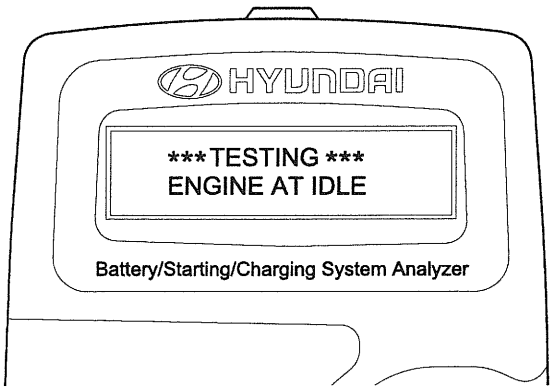
4. Press ENTER.



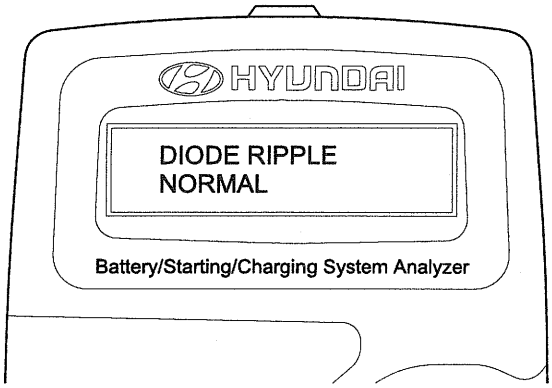
EBKD001N

5. The MICRO 570 analyzer charging system output at idle for comparision to other readings.

6. Take a relevant action according to the test results by referring to the table below after shutting off the engine and disconnect the tester clamps from the battery.



EBKD001O



EBKD001P

CHARGING SYSTEM TEST RESULTS

RESULT ON PRINTER	REMEDY
Charging system normal/Diode ripple normal	Charging system is normal
No charging voltage	Alternator does not supply charging current to battery ⇒ Check belts, connection between alternator and battery Replace belts or cable or alternator as necessary
Low charging voltage	Alternator does not supply charging current to battery and electrical load to system fully ⇒ Check belts and alternator and replace as necessary
High charging voltage	The voltage from alternator to battery is higher than normal limit during voltage regulating. ⇒ Check connection and ground and replace regulator as necessary ⇒ Check electrolyte level in the battery
Excess ripple detected	One or more diodes in the alternator is not functioning properly ⇒ Check alternator mounting and belts and replace as necessary

IGNITION SYSTEM

DESCRIPTION EFA97623

Ignition timing is controlled by the electronic control ignition timing system. The standard reference ignition timing data for the engine operating conditions are pre-programmed in the memory of the ECM (engine control module).

The engine operating conditions (speed, load, warm-up condition, etc.) are detected by the various sensors. Based on these sensor signals and the ignition timing data, signals to interrupt the primary current are sent to the ECM. The ignition coil is activated, and timing is controlled.

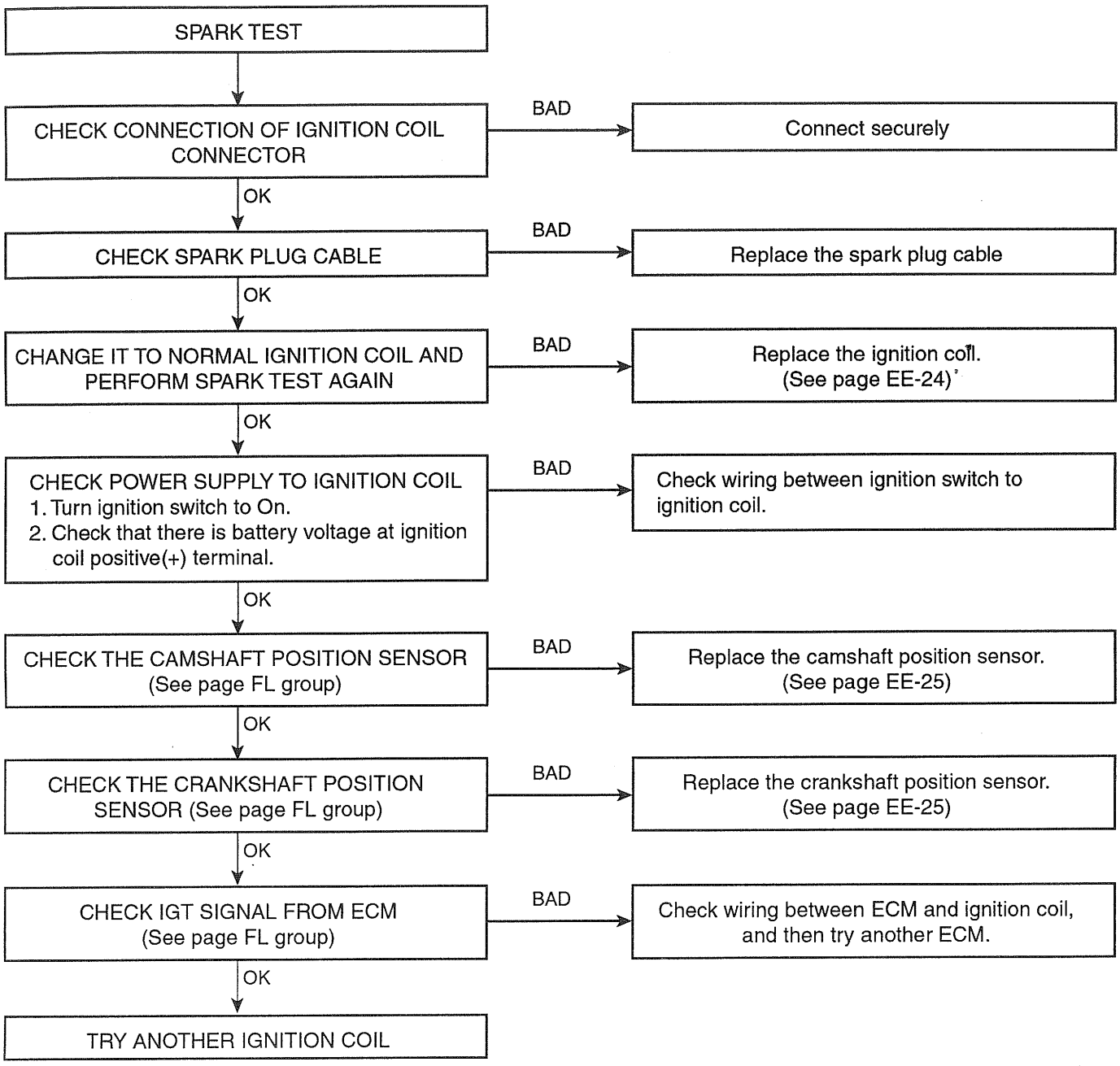
ON-VEHICLE INSPECTION EDF8D76C

INSPECT SPARK TEST

1. Remove the spark plug cable.
2. Using a spark plug socket, remove the spark plug.
3. Remove the ignition coil.
4. Install the spark plugs to each spark plug cable.
5. Ground the spark plugs.
6. Check is spark occurs while engine is being cranked.

NOTE

To prevent gasoline from being injected from injectors during this test, crank the engine for no more then 5~10 seconds at time.



EBKD002E

7. Using a spark plug socket, install the spark plugs.
8. Install the spark plug cable and ignition coil.

INSPECT SPARK PLUG AND SPARK PLUG CABLE

2.0

1. Remove the spark plug cable(A).

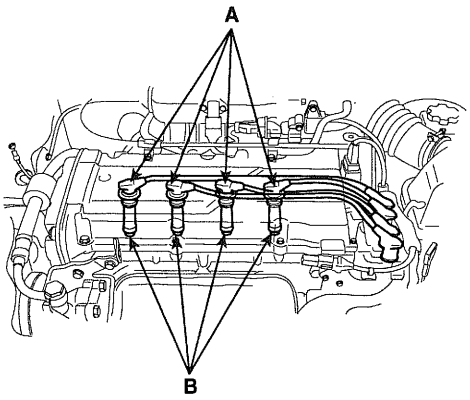
   NOTE

   When removing the spark plug cable, pull on the spark plug cable boot (not the cable), as it may be damaged.

2. Using a spark plug socket, remove the spark plug(B).

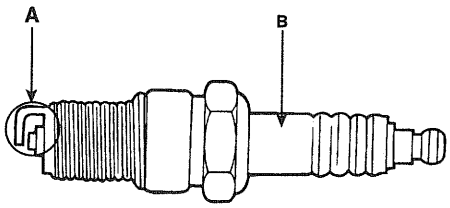
   CAUTION

   Be careful that no contaminats enter through the spark plug holes.



EBKD002A

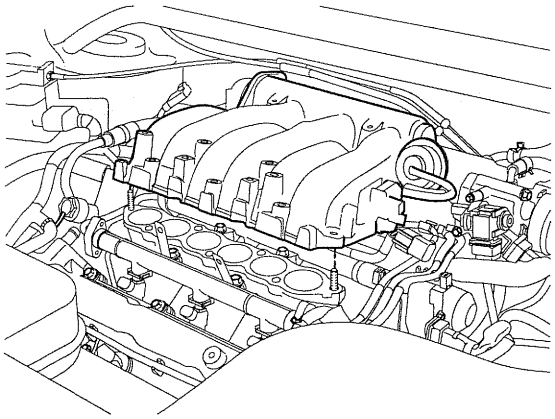
3. Inspect the electrodes(A) and ceramic insulator(B).



EBKD002K

2.7

1. Remove the engine cover.
2. Disconnect the VIS actuator connectors and injector connectors.
3. Remove the accelerator cable.
4. Remvoe surge tank sub assembly.



EBQF052A

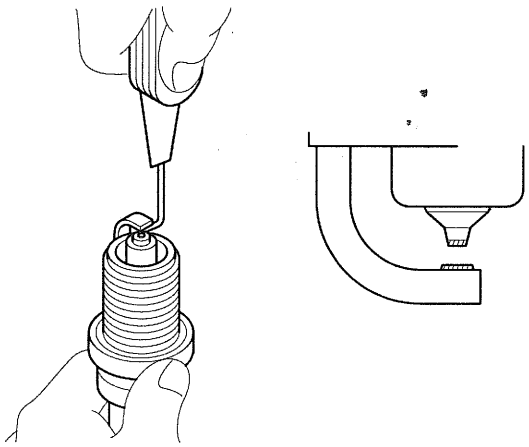
5. Remove the spark plug cable.
6. Remvoe the spark plug.
7. Inspect the electrodes and ceramic insulator.

INSPECTION OF ELECTRODES

CONDITION	DARK DEPOSITS	WITHE DEPOSITS
DESCRIPTION	- Fuel mixture too rich - Low air intake	- Fuel mixture too lean - Advanced ignition timing - Insufficient plug tightening

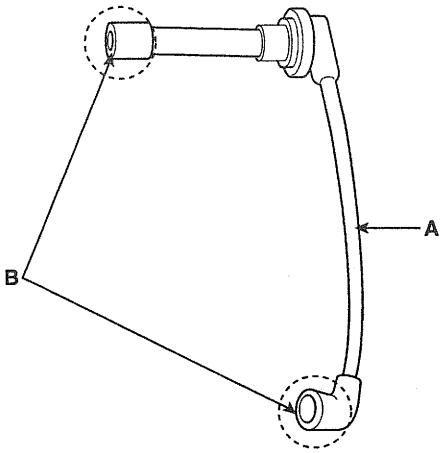
1. Check the electrode gap(A).

Standard (New)
1.0~1.1 mm (0.039~0.043 in.) - Unleaded
0.7~0.8 mm (0.028~0.031 in) - Leaded



EBKE002L

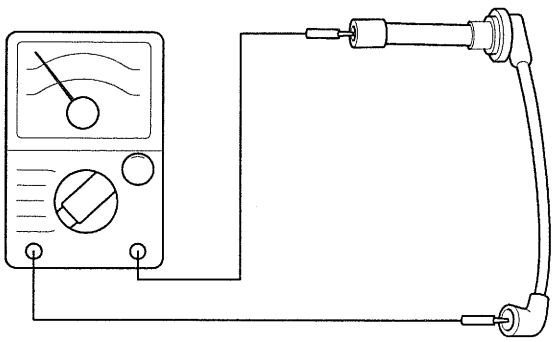
2. Carefully remove the spark plug cable by pulling on the rubber boots(A).
   Check the condition of the spark plug cable terminals(B), if any terminal is corroded, clean it, and if it broken or distorted, replace the spark plug cable.



EBKD002M

3. Connect the ohmmeter probes and measure resistance.

RESISTANCE : 5.6KΩ/m ± 20%

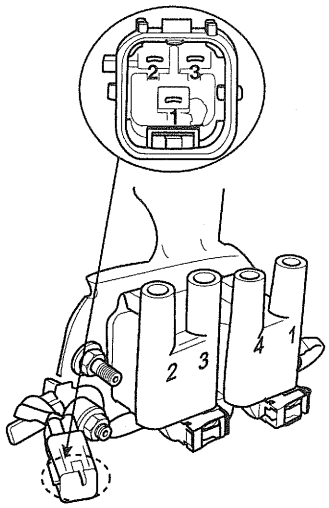


EBKE002P

4. Resistance should not be higher than 10KΩ per meter of cable.
   If resistance is higher, replace the cable.

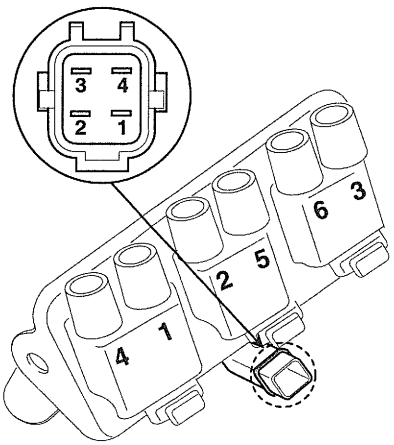
INSPECT IGNITION COIL

1. Measure the primary coil resistance between terminals 1-2 and 1-3.



EBKE002B

Measure the primary coil resistance between terminals 1-4, 2-4 and 3-4.



EBKE002G

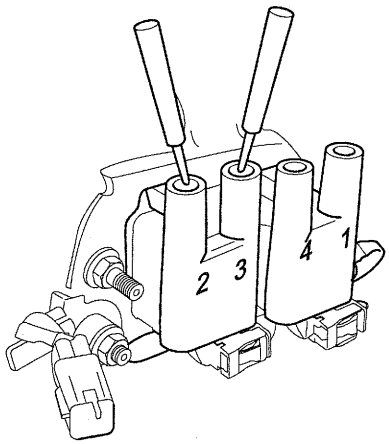
Standard value :
0.58Ω ± 10% (2.0)
0.74Ω ± 10% (2.7)

2. Measure the secondary coil resistance between the high-voltage terminal for the No.1 and No.4 cylinders, and between the high-voltage terminals for the No.2 and No.3 cylinders.

Standard value :
8.8kΩ ± 15% (2.0)
13.3kΩ ± 15% (2.7)

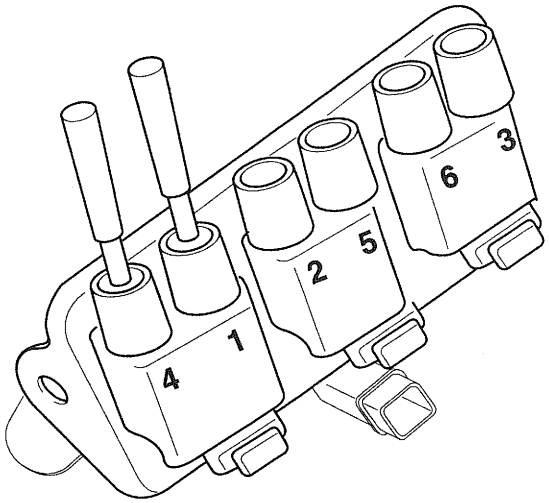
⚠ ***CAUTION***

Be sure, when measuring the resistnace of the secondary coil, to disconnect the connector of the ignition coil.



EBKD002C

Measure the secondary coil resistance between the high-voltage terminals for the No.1 and No.4 cylinders, No.2 and No.5 cylinders and No.3 and No.6 cylinders.



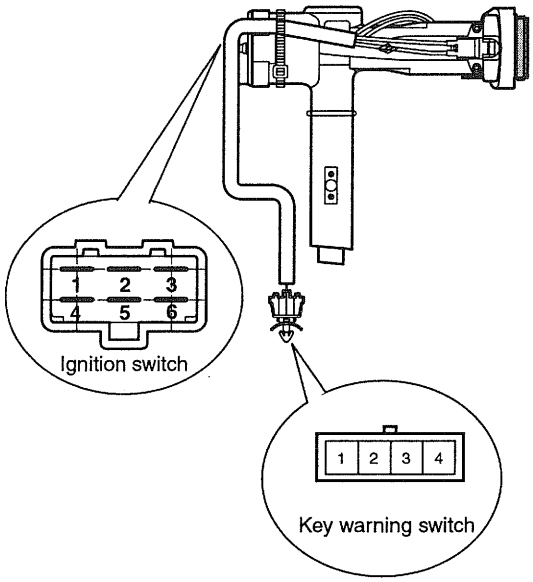
EBKE002C

INSPECT IGNITION SWITCH

1. Remove the connector located under the steering column.
2. Check for continuity between terminals.
   If there is no continuity, replace the ignition switch.

TERMINAL / POSITION / KEY		IGNITION SWITCH						STEERING		KEY WARNING SWITCH		KEY ILLUMINATION SWITCH	
		5	3	1	2	4	6	TRAVEL	TRAVEL	3	4	1	2
LOCK	REMOVAL							LOCK				○	○
	INSERT							LOCK	UNLOCK	○	○		
ACC		○	○					UNLOCK					
ON		○	○	○	○	○							
START		○	○	○	○	○	○						

EBKD002F

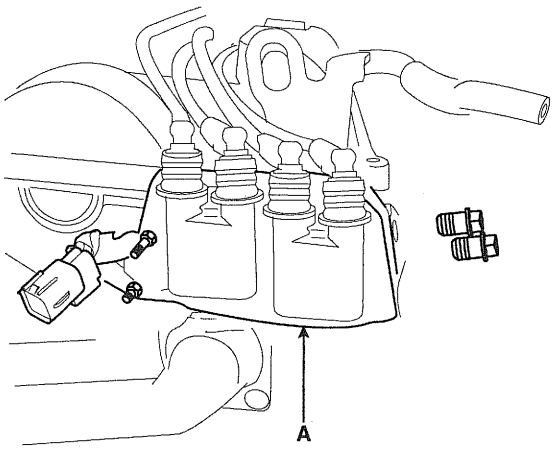


EBKD002D

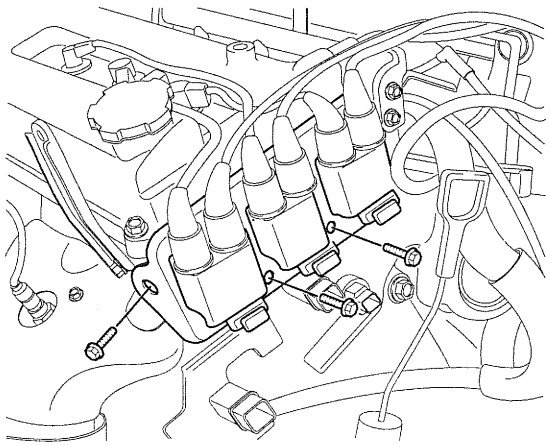
REPLACEMENT E94361B6

IGNITION COIL

1. Remove the engine cover.
2. Disconnect the spark plug cable and connector.
3. Remove the ignition coil(A).
4. Installation is the reverse of removal.



EBKD003A



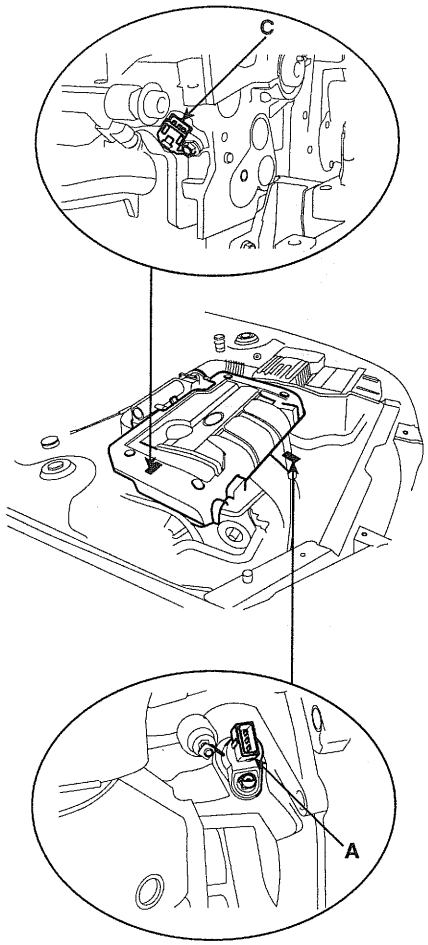
EDQF011A

CRANKSHAFT POSITION SENSOR

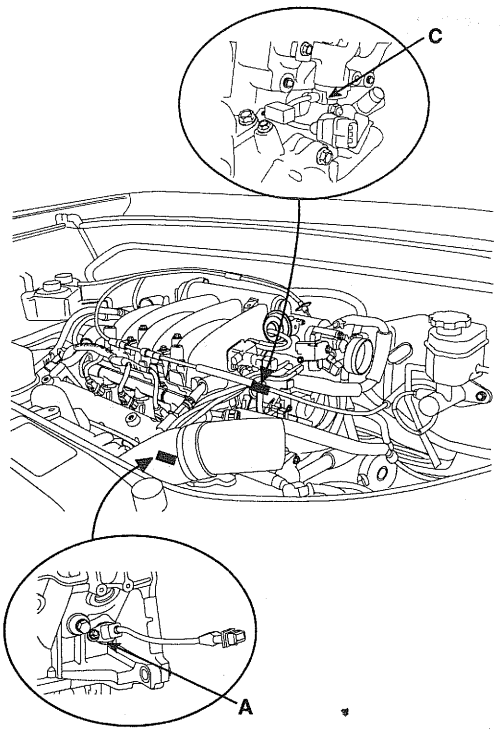
1. Disconnect the crankshaft position sensor connector.
2. Remove the crankshaft position sensor(A).

CAMSHAFT POSITION SENSOR

1. Remove the engine cover.
2. Disconnect the camshaft position sensor connector.
3. Remove the camshaft position sensor(C).



EBKD003B



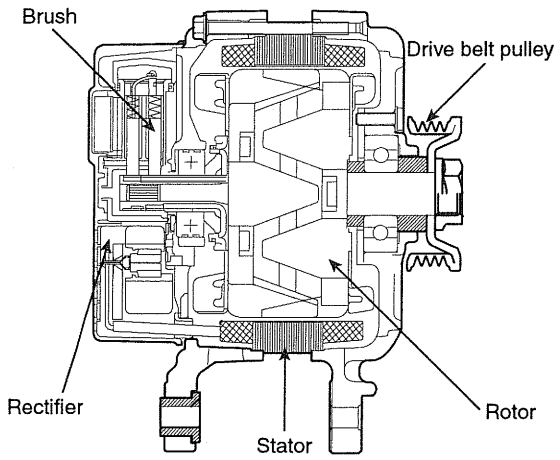
EBKE003B

CHARGING SYSTEM

DESCRIPTION EDCABFCE

GASOLINE

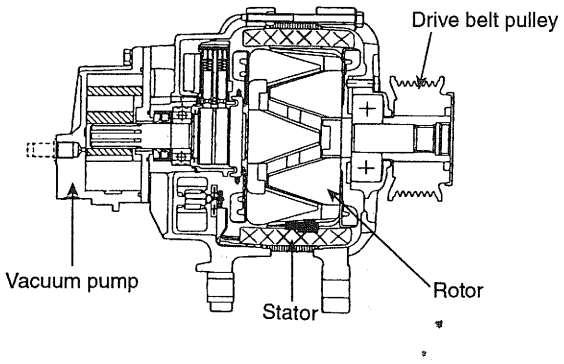
The charging system included a battery, an generator with a built-in regulator, and the charging indicator light and wire.
The generator has eight built-in diodes (four positive and four negtive), each rectifying AC current to DC current.
Therefore, DC curent appears at generator "B" terminal.
In addition, the charging voltage of this generator is regulated by the battery voltage detection system.
The generator is regulated by the battery voltage detection system. The main components of the generator are the rotor, stator, rectifier, capacitor brushes, bearings and V-ribbed belt pulley. The brush holder contains a built-in electronic voltage regulator.



EBKD004A

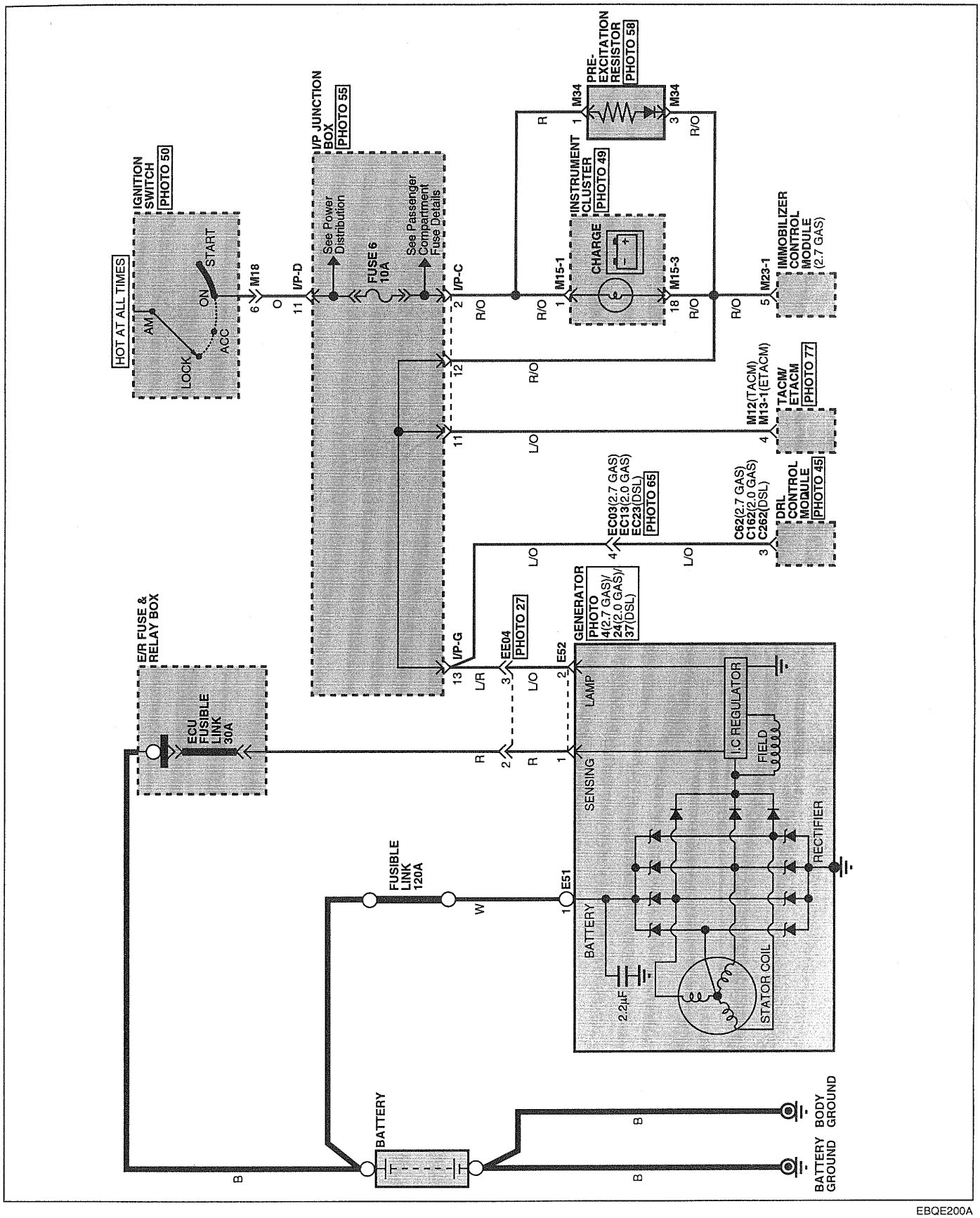
DIESEL

The conventional internal voltage detection type alternator controls the charging voltage regardless of the battery condition and according to the external load change so that it sometimes causes battery under or over charging or causes flickering of meters and lamps due to ripples of generated voltage resulting from load fluctuation. The figure below show the internal circuits of the alternator and voltage regulator.



EBKD240A

CIRCUIT DIAGRAM FOR CHARGING SYSTEM E533CFF5



EBQE200A

ON-VEHICLE INSPECTION EE8EC6C0

⚠ *CAUTION*

- ***Check that the battery cables are connected to the correct terminals.***
- ***Disconnect the battery cables when the battery is given a quick charge.***
- ***Do not perform tests with a high voltage insulation resistance tester.***
- ***Never disconnect the battery while the engine is running.***

CHECK BATTERY VOLTAGE

1. After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlamp, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.
2. Turn the ignition switch OFF and turn off the electrical systems.
3. Measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

Standard voltage : 12.5~12.9V at 20°C (68°C)

If the voltage is less than specification, charge the battery.

CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

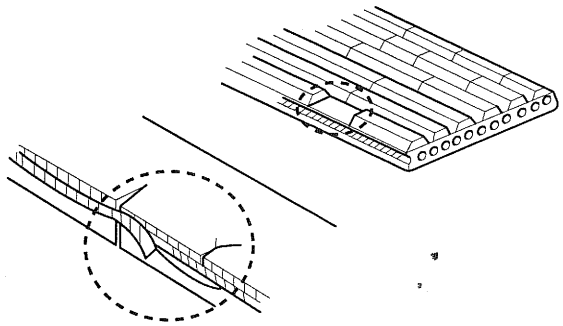
1. Check that the battery terminals are not loose or corroded.
2. Check the fusible link and fuses for continuity.

INSPECT DRIVE BELT

1. Visually check the belt for excessive wear, frayed cords etc.
   If any defect has been found, replace the drive belt.

📖 *NOTE*

Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



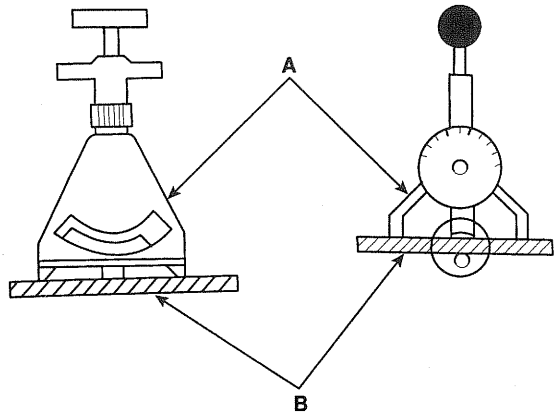
EBKD004B

2. Using a belt tension gauge(A), measure the drive belt(B) tension.

DRIVE BELT TENSION

New belt	540~640 N (121~143 lb)
Used belt	340~490 N (77~110 lb)

If the belt tension is not as specified, adjust it.



EBKD004C

NOTE

- *"New belt" refers to a belt which has been used less than 5 minutes on a running engine.*
- *"Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.*
- *After installing a belt, check that it fits properly in the ribbed grooves.*
- *Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.*
- *After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.*

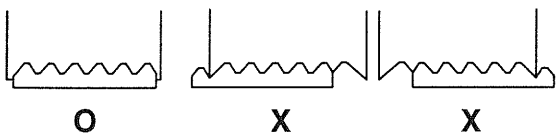
VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

1. Check that the wiring is in good condition.
2. Check that there is no abnormal noise from the alternator while the engine is running.

CHECK DISCHARGE WARNING LIGHT CIRCUIT

1. Warm up the engine and then turn it off.
2. Turn off all accessories.
3. Turn the ignition switch "ON". Check that the discharge warning light is it.
4. Start the engine. Check that the light goes off.

If the light does not go off as specified, troubleshoot the discharge light circuit.



EBKD004D

INSPECT CHARGING SYSTEM

VOLTAGE DROP TEST OF ALTERNATOR OUTPUT WIRE

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

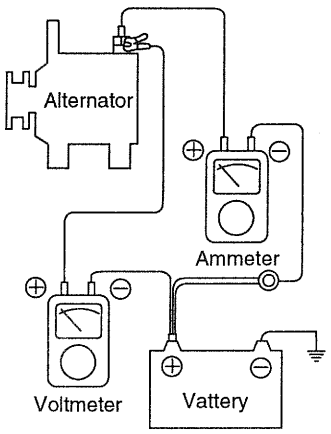
PREPARATION

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 alternator "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.



ABQE010A

CONDITIONS FOR THE TEST

1. Start the engine.
2. Switch on the headlamps, blower motor and so on. And then, read the voltmeter under this condition.

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 alternator "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 alternator gives an output current that is equivalent to the nominal output.

PREPARATION

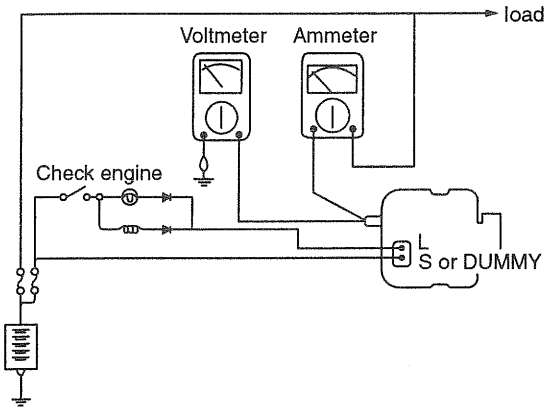
1. Prior to the test, check the following items and correct as necessary.
   Check the battery installed in the vehicle to ensure that it is in good condition. The battery checking method is described in "BATTERY".
   The battery that is used to test the output current should be one that has been partially discharged. With a fully charged battery, the test may not be conducted correctly due to an insufficient load.
   Check the tension of the alternator drive belt.
2. Turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Disconnect the alternator output wire from the alternator "B" terminal.
5. Connect a DC ammeter (0 to 150A) 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 alternator "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.



EBKD013H

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 alternator "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 headlights 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 alternator output wire is in good condition, remove the alternator from the vehicle and test it.

Limit value (90Aalternator): 63A min.

NOTE

- *The nominal output current value is shown on the nameplate affixed to the alternator body.*
- *The output current value changes with the electrical load and the temperature of the alternator 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 alternator itself or ambient temperature is too high.
  In such a case, reduce the temperature before testing again.

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

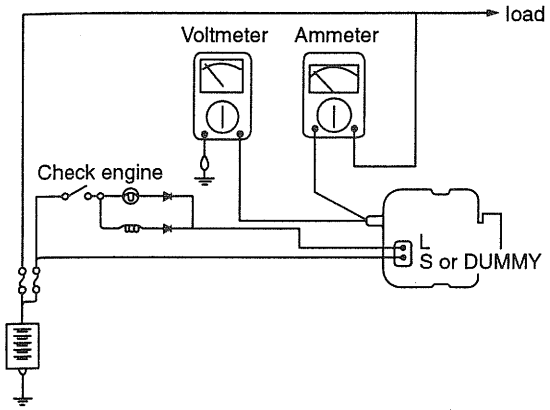
REGULATED VOLTAGE TEST

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.
   Check that the battery installed on the vehicle is fully charged. For battery checking method, see "BATTERY".
   Check the alternator drive belt tension.
2. Turn ignition switch to "OFF".
3. Disconnect the battery ground cable.
4. Connect a digital voltmeter between the "B" terminal of the alternator and ground. Connect the (+) lead of the voltmeter to the "B" terminal of the alternator. Connect the (-) lead to good ground or the battery (-) terminal.
5. Disconnect the alternator output wire from the alternator "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.



EBKD013H

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 alternator "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 alternator output current drops to 10A or less.

RESULT

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

REGULATING VOLTAGE TABLE

GASOLINE

Voltage regulator ambient temperature °C (°F)	Regulating voltage (V)
-20 (-4)	14.2 ~ 15.4
20 (68)	14.0 ~ 15.0
60 (140)	13.7 ~ 14.9
80 (176)	13.5 ~ 14.7

DIESEL

Voltage regulator ambient temperature °C (°F)	Regulating voltage (V)
-30 (-22)	14.1 ~ 15.2
20 (68)	14.1 ~ 14.7
120 (248)	13.3 ~ 14.7

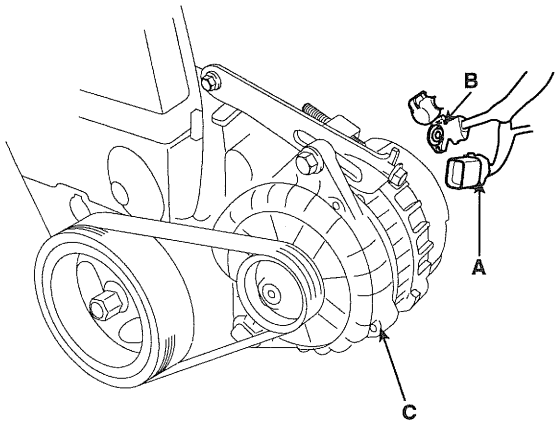
2. Upon completion of the test, reduce the engine speed to idle, and turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Remove the voltmeter and ammeter and the engine tachometer.
5. Connect the alternator output wire to the alternator "B" terminal.
6. Connect the battery ground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

ALTERNATOR

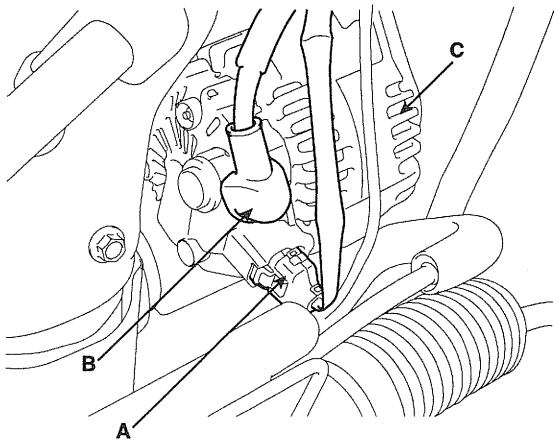
REPLACEMENT EB1AECC9

GASOLINE

1. Disconnect the battery negative terminal first, then the positive terminal.
2. Deisconnect the alternator connector(A) and "B" terminal cable(B) from the alternator(C).

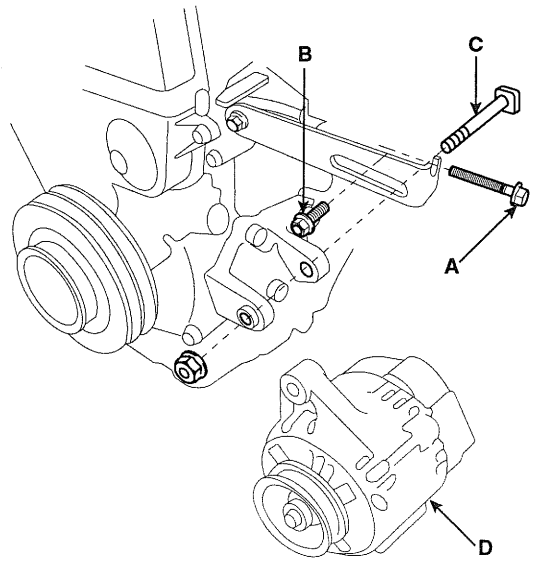


EBKD005A

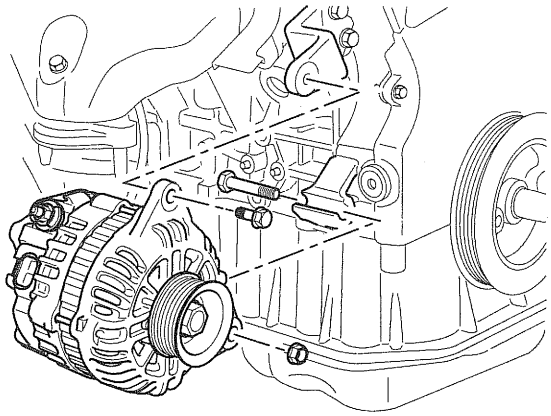


EBQF050A

3. Remove the adjusting bolt(A) and mounting bolt(B), then remove the alternator belt.
4. Pull out the through bolt(C), then remove the alternator(D).



EBKD005B

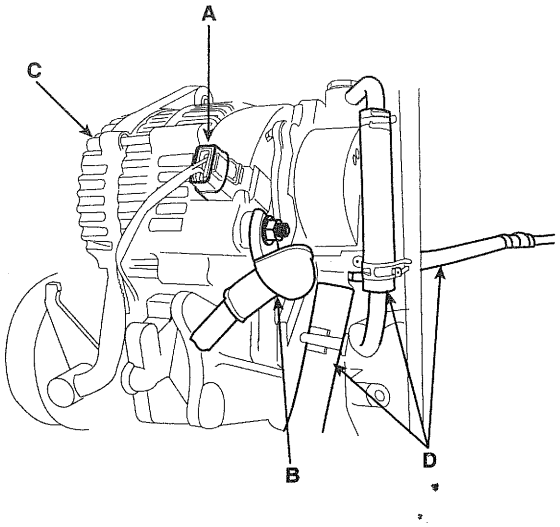


EDQF101A

5. Installation is the reverse of removal.
6. Adjust the alternator belt tension after installation (See page EE-40).

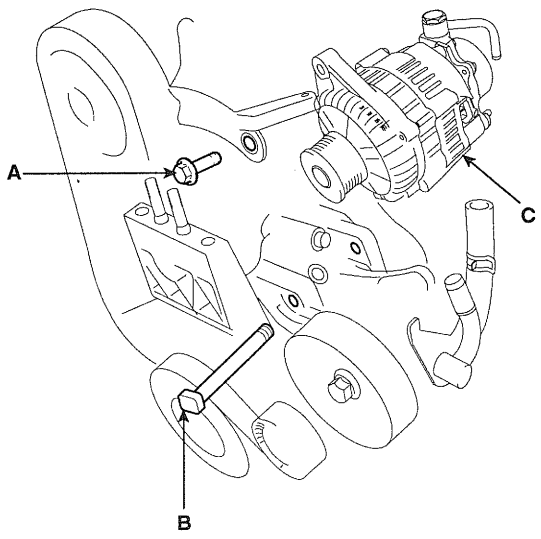
DIESEL

1. Disconnect the battery negative terminal frist, then the positive terminal.
2. Disconnect the alternator connector(A) and "B" terminal cable(B) from the alternator(C).
3. Disconnect the vacuum pump hose(D).



EBKD300A

4. Remove the mounting bolt(A) and through bolt(B), then remove the alternator(C).

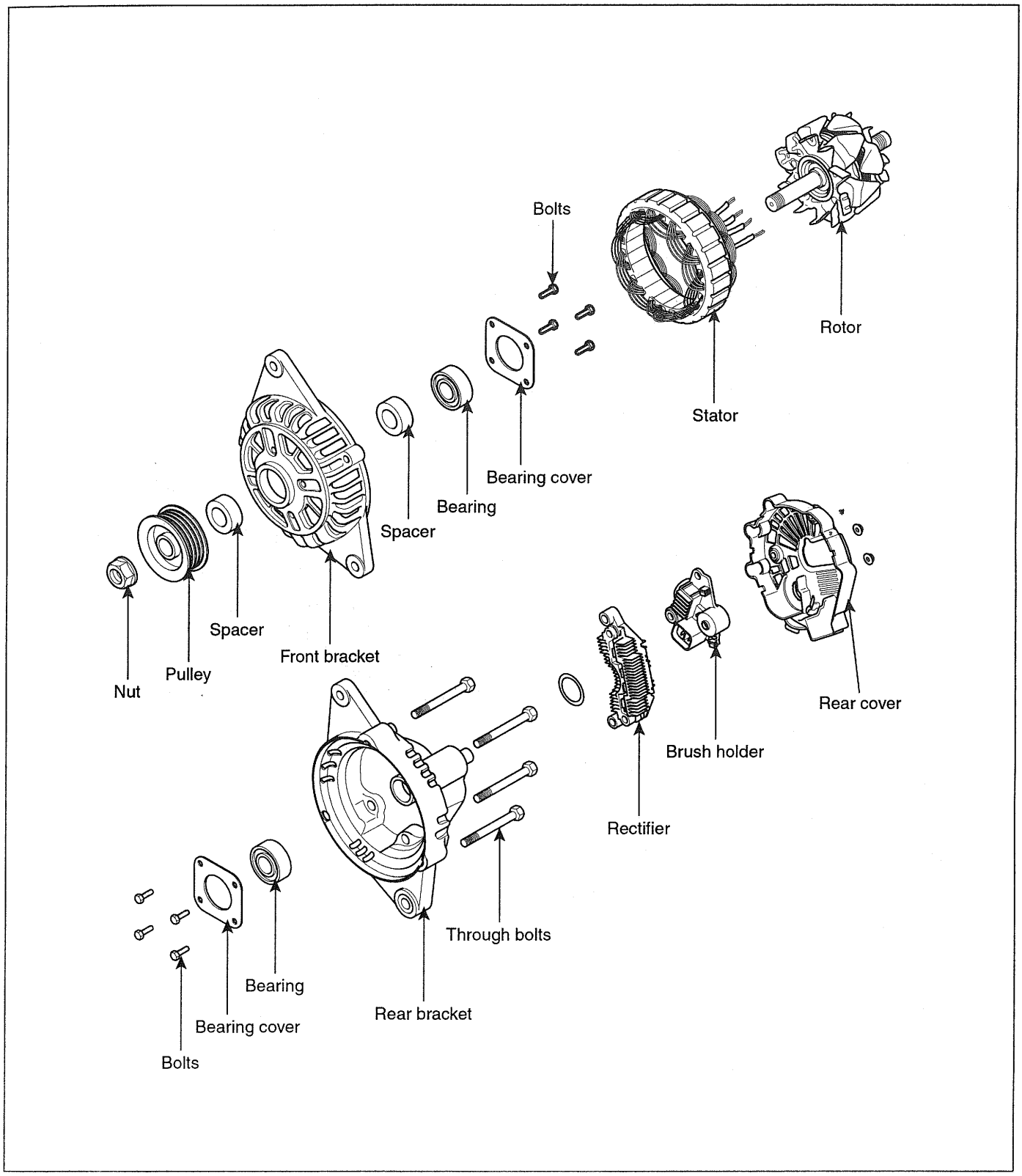


EBKD300B

5. Installation is the reverse of removal.

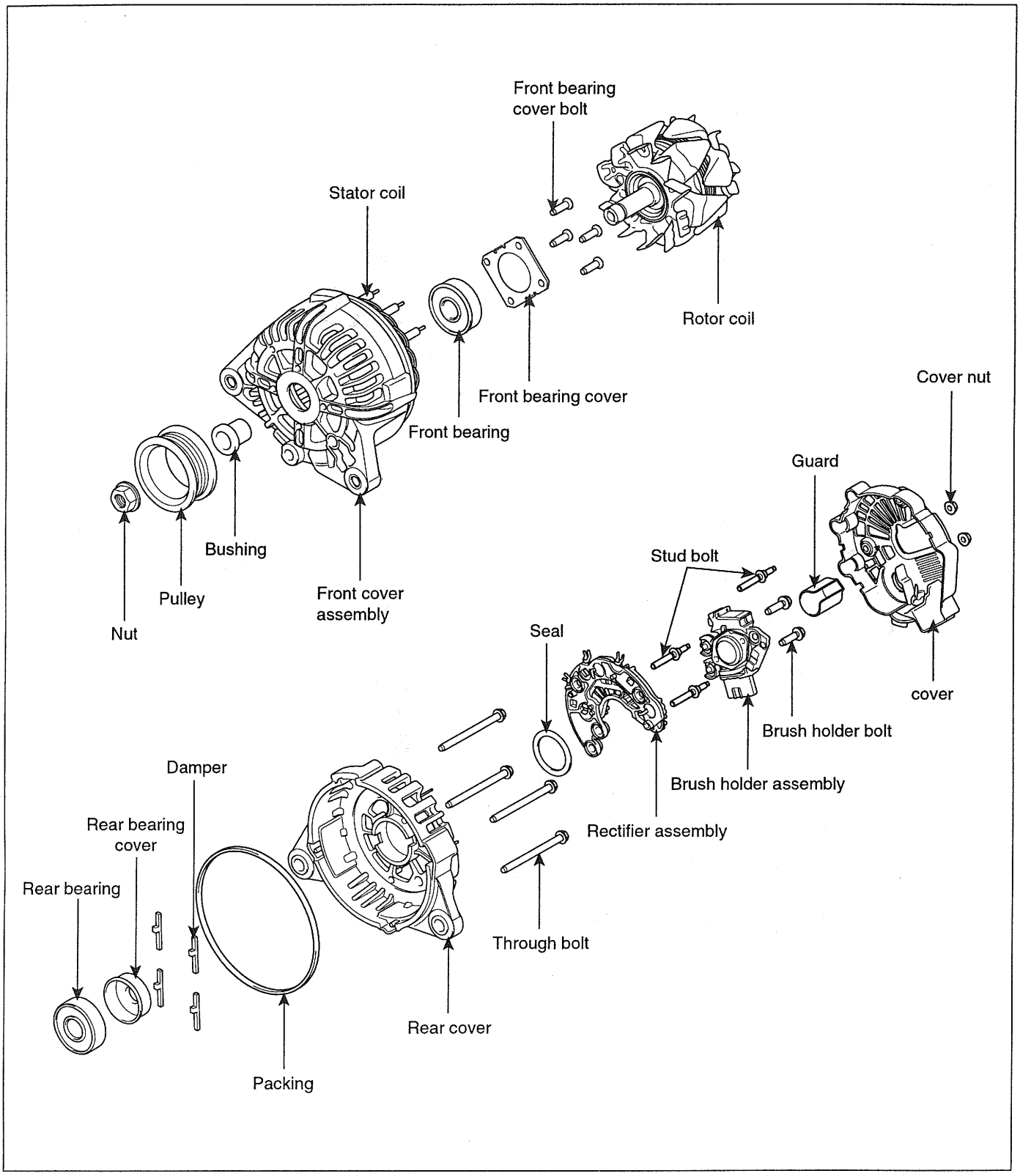
COMPONENTS E7BABA5C

GASOLINE (2.0)



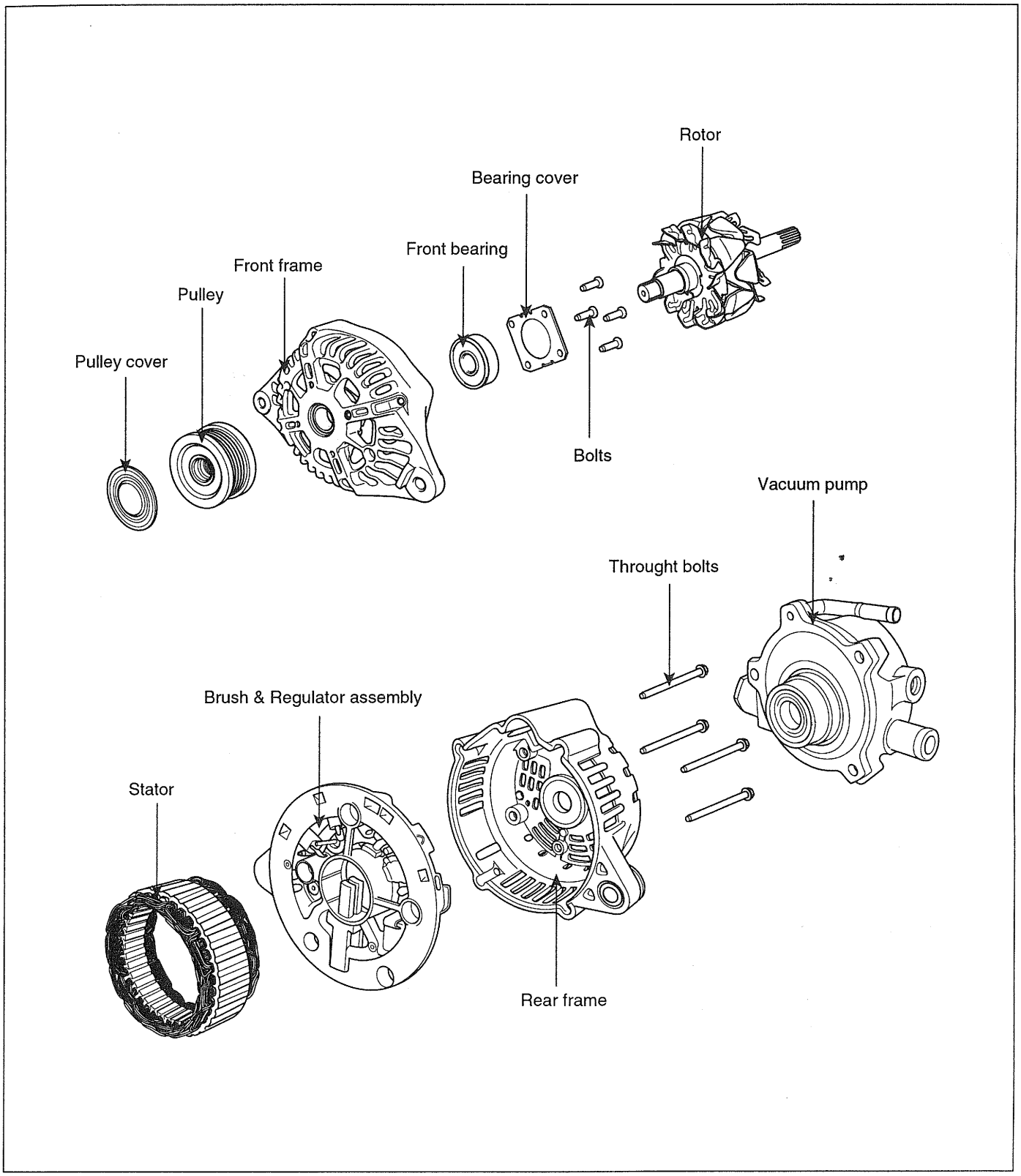
EBKD006A

GASOLINE (2.7)



EBJD004A

DIESEL

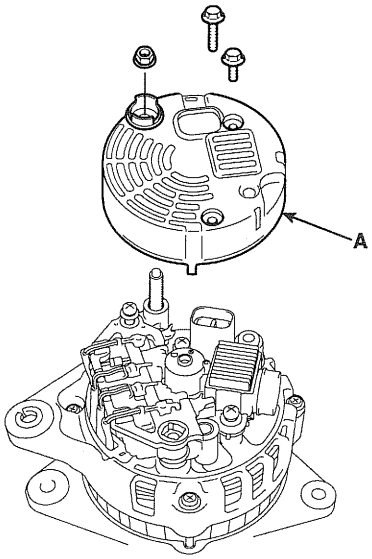


EBJD520A

DISASSEMBLY ECB8FF64

GASOLINE

1. Remove the rear cover(A).

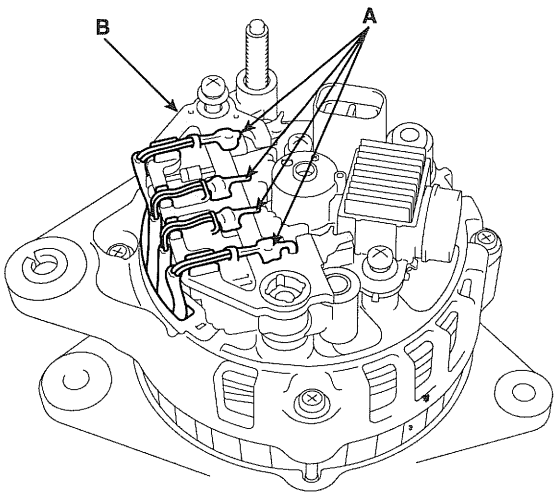


EBKD007A

2. Unsolder the 4 stator leads(A) to the main diodes on the rectifier(B).

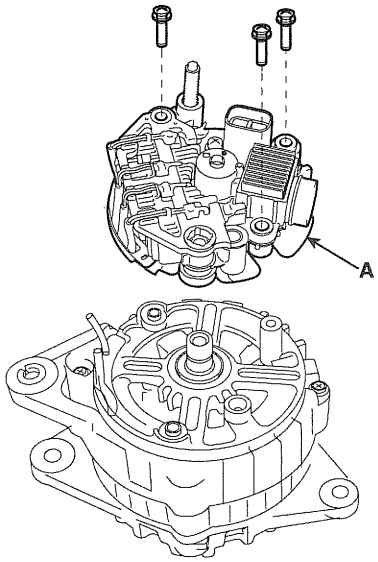
CAUTION

- ***When soldering or unsoldering, be careful not to heat the diodes for too long.***
- ***Be careful that excesive force is not exerted on the leads of the diodes.***



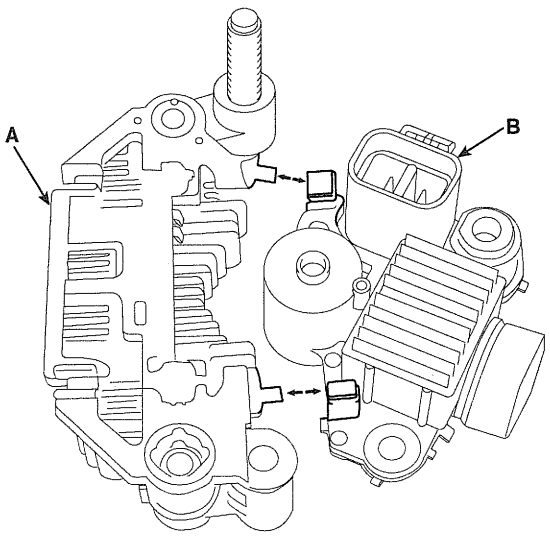
EBKD007B

3. Remove the rectifier assembly(A).



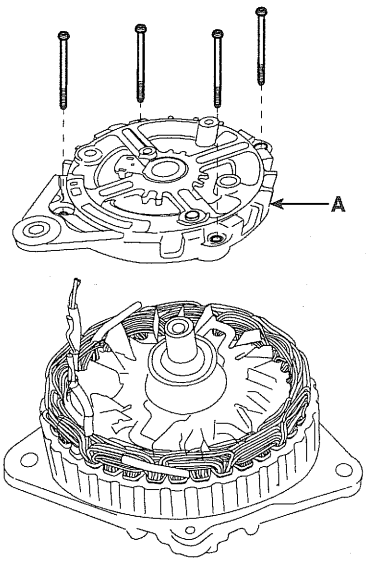
EBKD007C

4. Unsolder between rectifier(A) and brush holder(B).



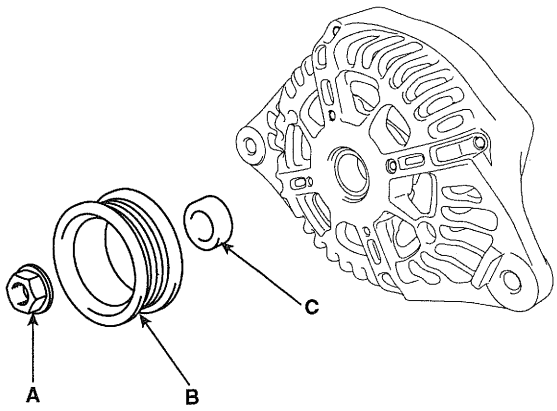
EBKD007D

5. Remove the rear bracket(A).



EBKD007E

6. Remove the nut(A), pulley(B) and spacer(C)..



EBKD007F