

# ENGINE ELECTRICAL SYSTEM

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## GENERAL SPECIFICATIONS

### Crank angle sensor

<b>Type</b>	Contact pointless type
Advance mechanism	Controlled by electronic control unit
Ignition order	1-3-4-2

### Ignition coil

<b>Type</b>	Mold single-coil
Primary coil resistance	$0.86 \pm 0.09 \Omega$
Secondary coil resistance	$12.1 \pm 1.8 K\Omega$

### Spark plug

<b>Type</b>	BUR6EA-11
NGK	BPR6ES-11
Champion	RN9YC4
Plug gap	1.0-1.1 mm (0.039-0.043 in.)

### Starter motor

<b>Type</b>	Reduction drive (with planetary gear)
Voltage	12V
output	1.2KW
<b>No-load characteristics</b>	
Terminal voltage	11V
Amperage	90 A
Speed	3,000 RPM
Number of pinion teeth	8
Pinion gap	052.0 mm (0.0197-0.079 in.)

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**Alternator**

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<b>Type</b>	Battery voltage sensing
Rated output	13.5 V
Voltage regulator type	Electronic built-in type
Regulator setting voltage	14.4 ± 0.3V
Temperature compensation	-10 ± 3 mV/°C

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**Battery**

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<b>Type</b>	MF 60AH-B (Maintenance-free battery)
Ampere hours (5HR)	48 Ah or more
(20HR)	60 Ah or more
Cold cranking [at -17.8°C(0°F)]	420 A or more
Reserve capacity	92 min.
Specific gravity [at 25°C(77°F)]	1.270 ± 0.01

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**NOTE**

**COLD CRANK 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.

**RESERVE CAPACITY RATING** is the amount of time a battery can deliver 25A and maintain a minimum terminal voltage of 10.5 at 26.7°C (80°F).

## IGNITION SYSTEM

### GENERAL INFORMATION

Ignition timing is controlled by the electronic control ignition timing system. The ignition timing data for the engine operation conditions are programmed in the memory of the electronic control unit (ECU). The engine conditions (rpm, load, warm-up condition, etc.) are detected by the various sensors. Based upon these sensor signals and the ignition timing data, signals to interrupt the primary current are sent to the power transistor. The ignition coil is activated, and timing is controlled at the optimum point.

### TROUBLESHOOTING

Probable condition	Probable cause	Remedy
Engine will not start or is hard to start. (Crank OK)	Incorrect ignition timing	Adjust ignition timing
	Ignition coil faulty	Inspect ignition coil
	Power transistor faulty	inspect power transistor
	Crank angle sensor faulty	Replace crank angle sensor
	High tension cable faulty	Inspect high tension cable
	Spark plugs faulty	Replace plugs
	Ignition wiring disconnected or broken	Inspect wiring
Rough idle or stalls	Spark plugs faulty	Replace plugs
	Ignition wiring faulty	Inspect wiring
	Incorrect ignition timing	Adjust ignition timing
	Ignition coil faulty	Inspect ignition coil
	Power transistor faulty	Inspect power transistor
Engine hesitates/poor acceleration	Spark plugs faulty	Replace plugs
	Ignition wiring faulty	Inspect wiring
	Incorrect ignition timing	Adjust timing
Poor mileage	Spark plugs faulty	Replace plugs
	Incorrect ignition timing	Adjust ignition timing
Engine overheats	Incorrect ignition timing	Adjust ignition timing

## IGNITION TIMING

### Adjustment conditions:

- Coolant temperature: 80-95°C (170-205°F)
- Lamps, cooling fan, and all accessories: Off
- Transaxle : Neutral (N or P for A/T)
- Parking brake : ON
- Steering wheel : Neutral position

### Adjustment Procedures

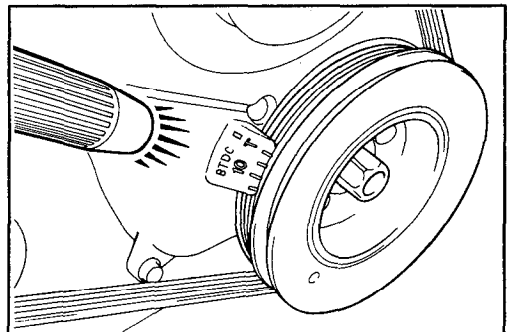
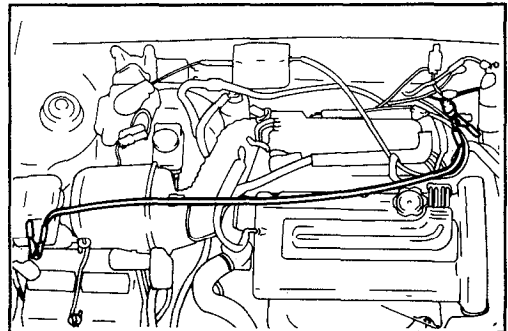
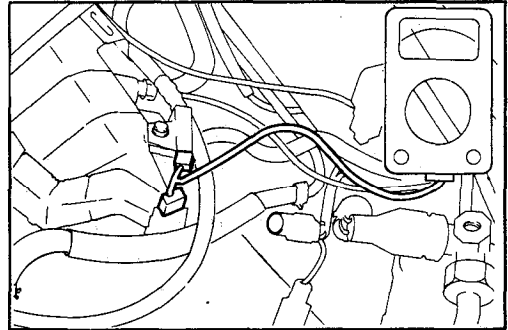
1. Install a tachometer and a timing light.
2. If multi use tester is used, connect the MUT to self diagnosis connector.
3. With the engine stopped, connect a lead wire with alligator clips to the terminal for ignition-timing adjustment (located in the engine compartment), and ground it.
4. Start and run the engine at curb idle speed.
5. Check basic ignition timing and adjust if necessary.

#### Basic ignition timing : $5^{\circ} \pm 2^{\circ}$ BTDC

6. If the timing is incorrect, loosen the crank angle sensor mounting nut, and rotate the crank angle sensor until the timing is correct.

#### NOTE

The ignition timing will be retarded, if the crank angle sensor is turned to the left and advanced if it is turned to the right.



7. After adjustment, securely tighten the mounting nut.  
Tightening torque : 10-13Nm (100-130 kg.cm, 7-9 lb.ft)

**NOTE**

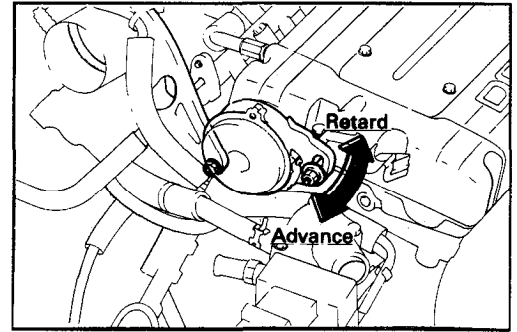
**Be careful, when tightening the nut, that the crank angle sensor does not move.**

8. Stop the engine.
9. Disconnect the lead wire connected at step 4.
10. Start and run the engine at curb idle speed.
11. Check to be sure that the idling ignition timing is the correct timing.

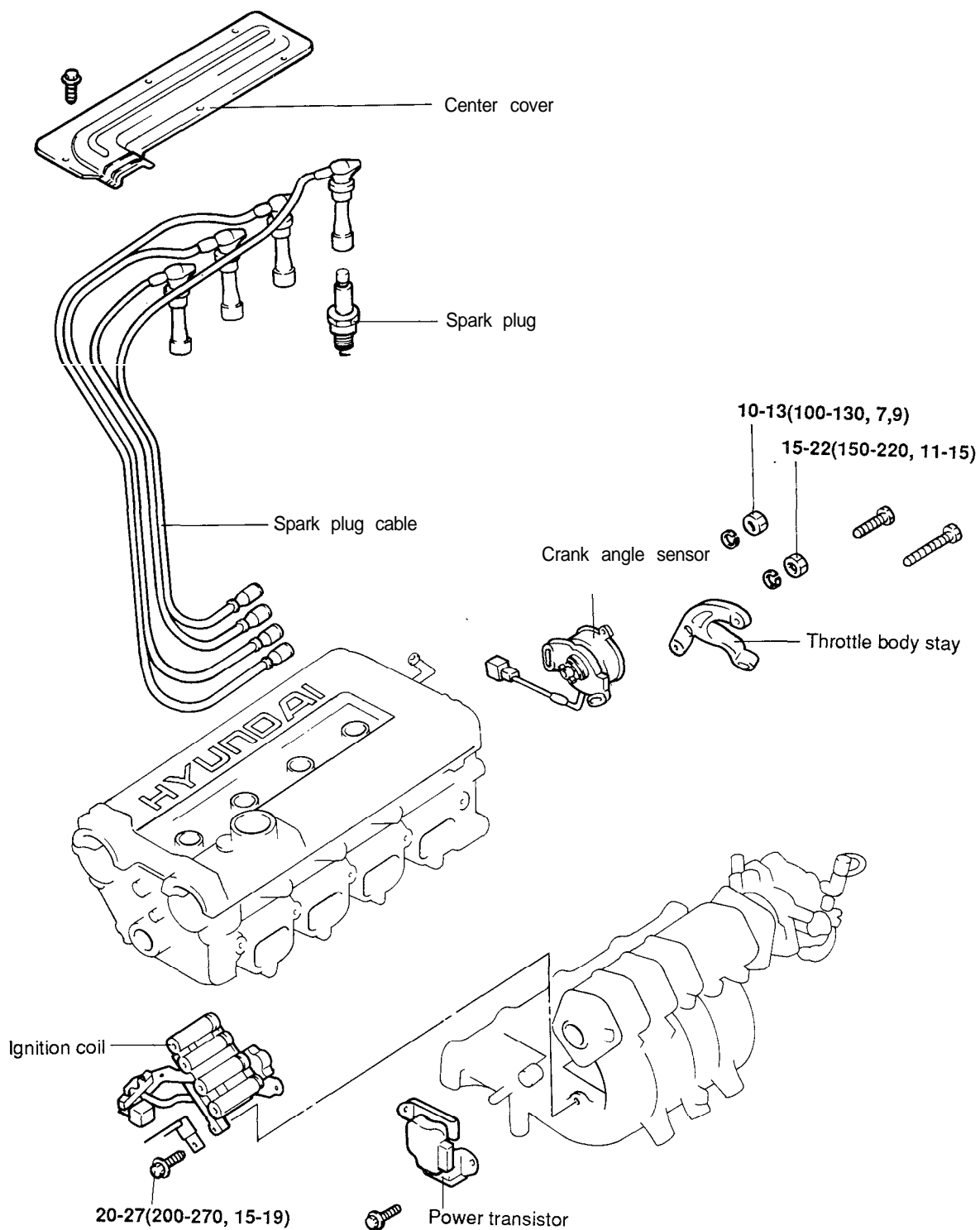
**Actual ignition timing : 8° BTDC**

**NOTE**

1. Actual ignition timing may vary, depending on the control mode of the engine control unit. In such a case, re-check the basic ignition timing. If there is no deviation, the ignition timing is functioning normally.
2. At high altitudes more than approximately 700 m (2,300 ft.) above sea level, the actual ignition timing is farther advanced to ensure good combustion.



REMOVAL AND INSTALLATION

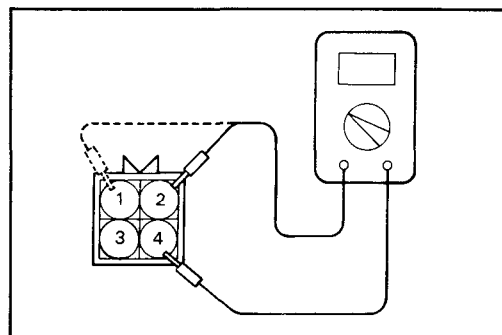


**TORQUE : Nm (kg.cm, lb.ft)**

**IGNITION COIL**

1. Measurement of the primary coil resistance.
2. Measure the resistance between connector terminals 3 and 1 (the coils at the No. 1 and No. 4 cylinder sides) of the ignition coil, and between terminals 3 and 2 (the coils at the No. 2 and No. 3 cylinder sides).

**Standard value: 0.77 - 0.95  $\Omega$**

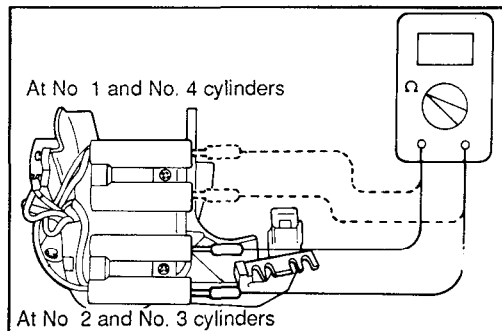


3. Measurement of the secondary coil resistance.
4. Measure the resistance between the high-voltage terminal for the No. 1 and No. 4 cylinders, and between the high-voltage terminal for the No. 2 and No. 3 cylinders.

**Standard value: 10.3 - 13.9 K $\Omega$**

**CAUTION**

**Be sure, when measuring the resistance of the secondary coil, to disconnect the connector of the ignition cil.**

**POWER TRANSISTOR****NOTE**

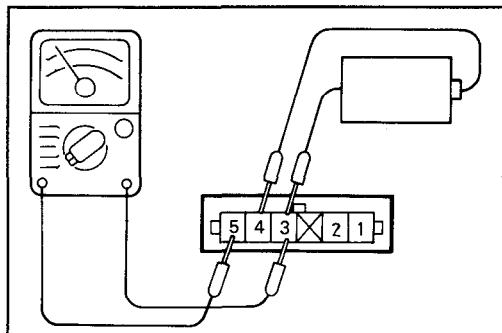
**An analog-type ammeter should be used.**

Power transistor for coil No. 1 and No. 4 cylinders.

1. Connect the negative (-) terminal of the 1.5V power supply to terminal No.3 of the power transistor; then check whether there is continuity between terminal No.5 and terminal No.3 when terminal No.4 and the positive (+) terminal are connected and disconnected.

**NOTE**

**Connect the negative (-) probe of the ammeter to terminal No.5.**



Terminal 4 and (+) terminal	Terminal 5 and terminal 3
Connected	Continuity
Disconnected	No continuity

Power transistor for coil No.2 and No.3 cylinders.

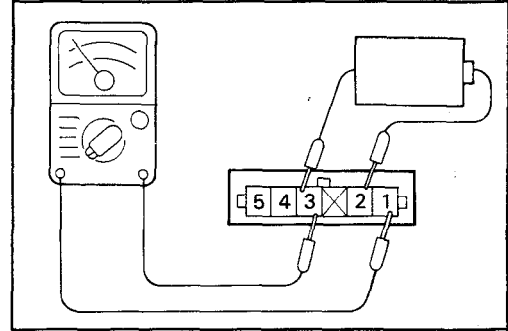
1. Connect the negative (-) terminal of the 1.5V power supply to terminal No.3 of the power transistor; then check whether there is continuity between terminal No.1 and terminal No.3 when terminal No.2 and the positive (+) terminal are connected and disconnected.

**NOTE**

Connect the negative (-) probe of the ammeter to terminal No.1.

Terminal 2 and (+) terminal	Terminal 1 and terminal 3
Connected	Continuity
Unconnected	No continuity

If the problem is still evident after checking as described above, replace the power transistor.



## CHECKING SPARK PLUG

### Inspection and Cleaning

1. Disconnect the spark plug cable from the spark plug.

**NOTE**

Pull on the spark plug cable boot when removing the spark plug cable, not the cable, as it may be damaged.

2. Using spark plug wrench, remove all of the spark plugs from the cylinder head.

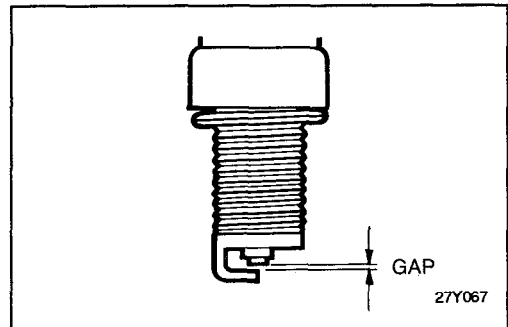
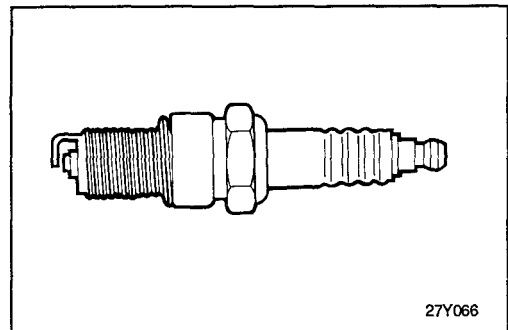
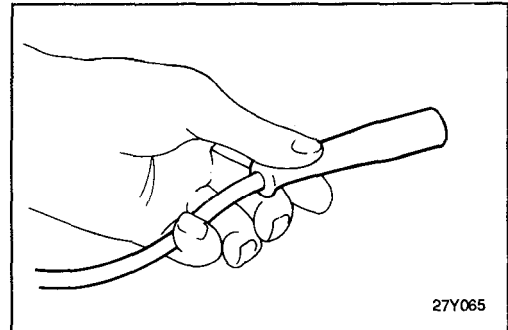
**NOTE**

Take care not to allow contaminants to enter through the spark plug holes.

3. Check the spark plugs for the following:
  - 1) Broken insulator
  - 2) Worn electrode
  - 3) Carbon deposits
  - 4) Damaged or broken gasket
  - 5) Condition of the porcelain insulator at the tip of the spark-plug

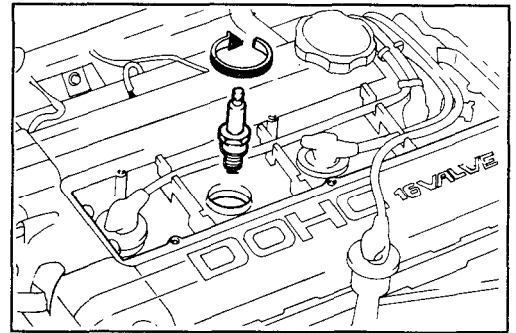
4. Check the spark plug gap using a wire gap gauge, and adjust if necessary.

**Standard value: 1.0-1.1 mm (0.039-0.043 in.)**



5. Re-insert the spark plug and tighten to the specified torque. If it is over torqued, damage to the threaded portion of cylinder head might result.

**Spark plug: 20-30 Nm (204-306 kg.cm, 15-21 lb.ft)**



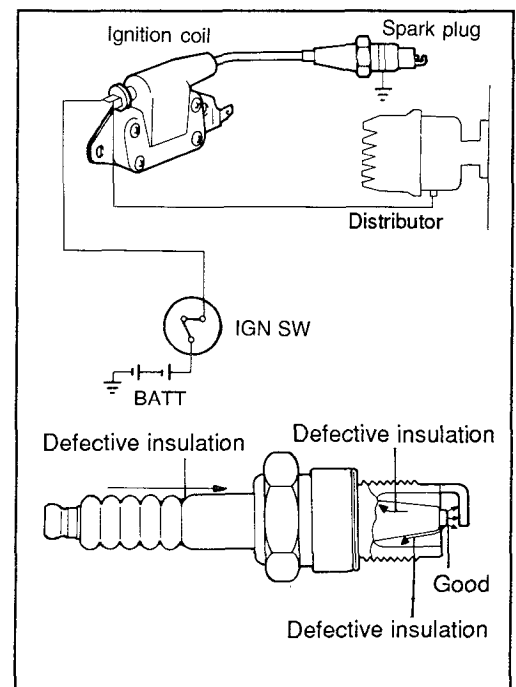
### Analyzing Spark Plug

Engine conditions can be analyzed by the tip deposits near the electrode.

Condition	Dark deposits	White deposits
Description	<ul style="list-style-type: none"> <li>o Too rich a fuel mixture</li> <li>o Low air intake</li> </ul>	<ul style="list-style-type: none"> <li>o Too lean a fuel mixture</li> <li>o Advanced ignition timing</li> <li>o Insufficient plug tightening</li> </ul>

### SPARK PLUG TEST

1. Remove the spark plug and connect to the spark plug cable.
2. Ground the spark plug outer electrode, and crank the engine.
3. Check to be sure that there is an electrical discharge between the electrodes at this time.



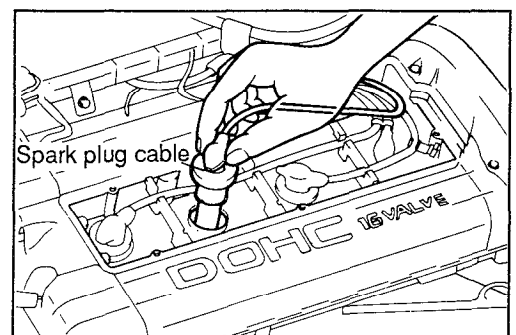
### SPARK PLUG CABLES TEST

1. Disconnect, one at a time each of the spark plug cables while the engine is idling to check whether the engine's running performance changes or not.

#### Caution

**Wear rubber gloves while doing so.**

2. If the engine performance does not change, check the resistance of the spark plug, and check the spark plug itself.
3. Check the cap and outer shell for cracks.



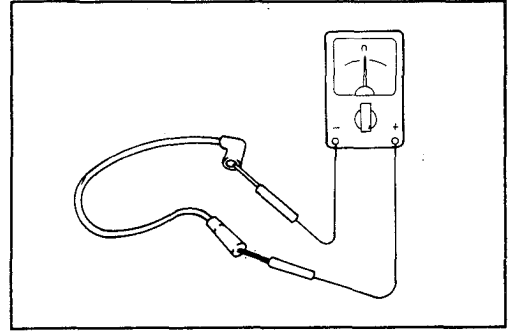
4. Measure the resistance.

Unit :  $k\Omega$

Spark plug cable			
No. 1	No. 2	No. 3	No. 4
5.8	8.4	10.6	9.7

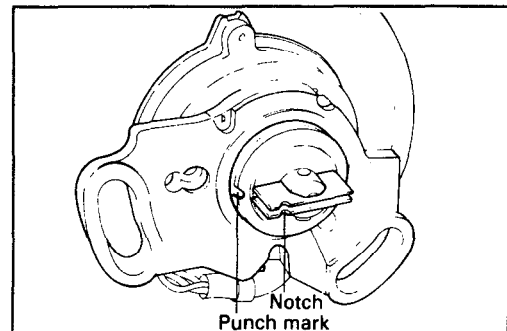
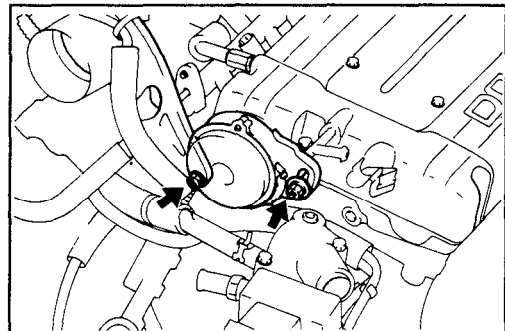
**NOTE**

Resistance should not be higher than  $10,000 \Omega$  per foot of cable. If resistance is higher, replace the cable.



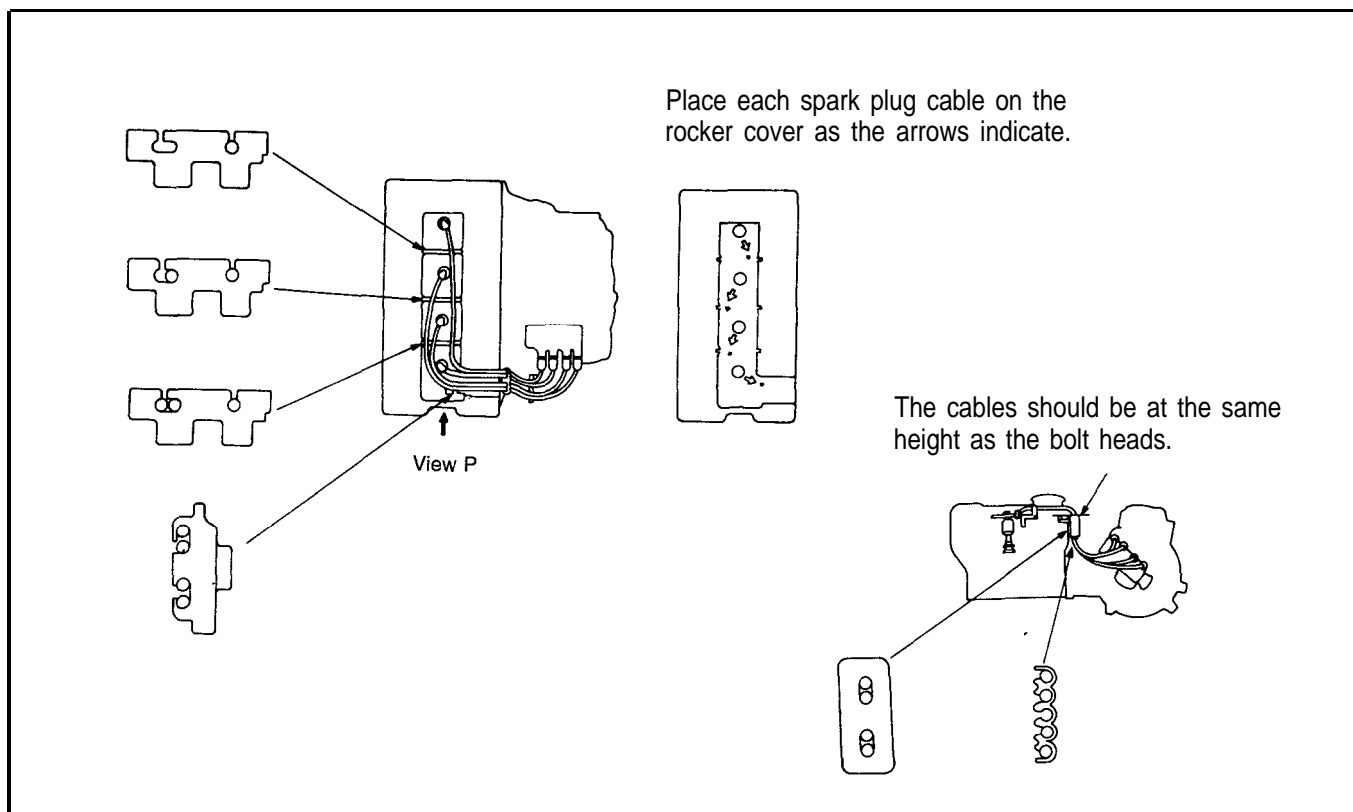
**CRANK ANGLE SENSOR**

1. Remove the battery ground cable
2. Remove the crank angle sensor mounting bolt (2 EA).
3. Pull out the crank angle sensor from cylinder head.
4. Turn the crankshaft so that the No. 1 cylinder is at top dead center.
5. Align the punch mark on the crank angle sensor housing with the notch in plate.
6. Install the crank angle sensor on the cylinder head.

**INSTALLATION OF SPARK PLUG CABLE**

Improper arrangement of spark plug cables will induce voltage between the cables, causing miss firing and developing a surge at acceleration in high-speed operation.

Therefore, be careful to arrange the spark plug cables properly as shown in the illustration.

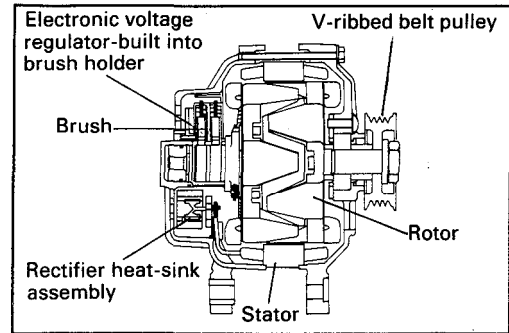


## CHARGING SYSTEM

### GENERAL INFORMATION

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

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



### TROUBLESHOOTING

Symptom	Probable cause	Remedy
Charging warning indicator does not light with ignition switch "ON" and engine off.	Fuse blown.	Check fuses.
	Light burned out.	Replace light.
	Wiring connection loose.	Tighten loose connections.
	Electronic voltage regulator faulty.	Replace voltage regulator.
Charging warning indicator does not go out with engine running. (Battery requires frequent recharging).	Drive belt loose or worn.	Adjust tension or replace drive belt.
	Battery cables loose, corroded or worn.	Repair or replace cables.
	Fuse blown.	Check fuses.
	Fusible link blown.	Replace fusible link.
	Electronic voltage regulator or alternator faulty.	Test alternator.
	Wiring faulty.	Repair wiring.
Discharge battery.	Drive belt loose or worn.	Adjust tension or replace drive belt.
	Wiring connection loose or open circuit.	Tighten loose connection or repair wiring.
	Fusible link blown.	Replace fusible link.
	Poor grounding.	Repair.
	Electronic voltage regulator or alternator faulty.	Test alternator.
	Worn battery	Replace battery.
Overcharge	Electronic voltage regulator faulty	Replace voltage regulator.
	Voltage sensing wire faulty	Repair wire.

**INSPECTION OF 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.

**Preparation**

1. Turn the ignition switch to "OFF".
2. Disconnect the battery ground cable.
3. Disconnect the alternator output lead from the alternator "B" terminal.
4. Connect a DC ammeter (0 to 100A) in series to the "B" terminal and disconnected the output lead. Connect the (+) lead of the ammeter to the "B" terminal and the (-) lead to the disconnected output wire.

**NOTE**

**Using a clamp type ammeter is the best method of measuring current. It will allow you to check the system without disconnecting any of the terminals.**

5. Connect a voltmeter between the alternator "B" terminal and battery (+) terminal. Connect the (+) lead wire of the voltmeter to the "B" terminal and the (-) lead wire to the battery (+) terminal.
6. Connect the battery ground cable.
7. Leave the hood open.

**Test**

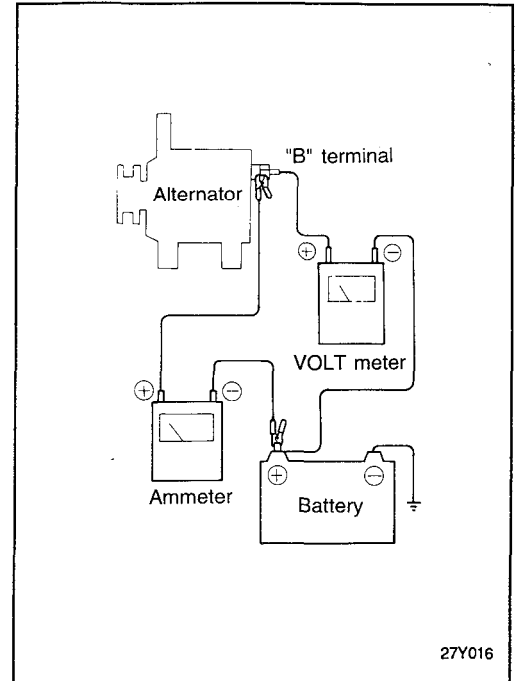
1. Start the engine.
2. Turn on the headlamps and adjust the engine speed so that the ammeter reads 20A and then read the voltmeter.

**Result**

1. It is okay if the voltmeter indicates the standard value.

**Standard value: 0.2V max.**

2. If the voltmeter indicates a value that is larger than the standard value, 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 and the ignition switch.
4. Disconnect the battery ground cable.
5. Disconnect the ammeter and voltmeter that have been connected for testing.
6. Connect the alternator output wire to the alternator "B" terminal.
7. Connect the battery ground cable.

## OUTPUT CURRENT TEST

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

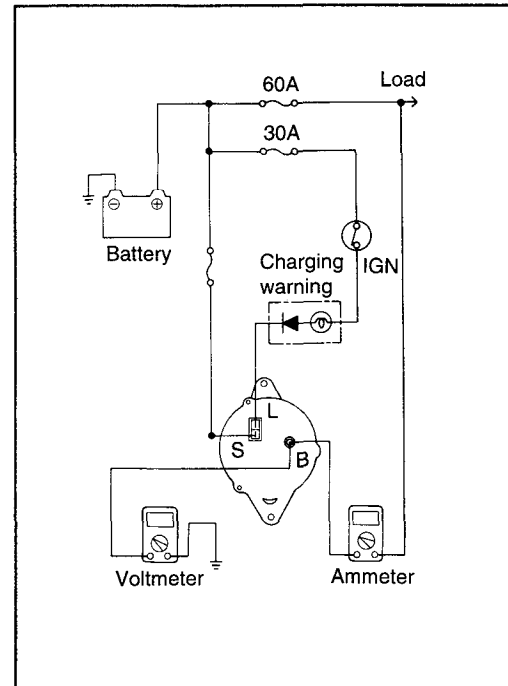
### Preparation

1. Prior to the test, check the following items and correct as necessary.
  - 1) Check the battery installed in the vehicle to ensure that it is in 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 alternator drive belt. The belt tension check method is described in the section "COOLING".



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 100A) 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.

**Test**

1. Check to see that the voltmeter reads the same value as the battery voltage.  
If the voltmeter reads 0 V, and open circuit in the wire between the alternator "B" terminal and battery (-) terminal, a blown fusible link or poor grounding is likely.
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 start 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:**

**52.5 A ..... 75 A alternator**

**NOTE**

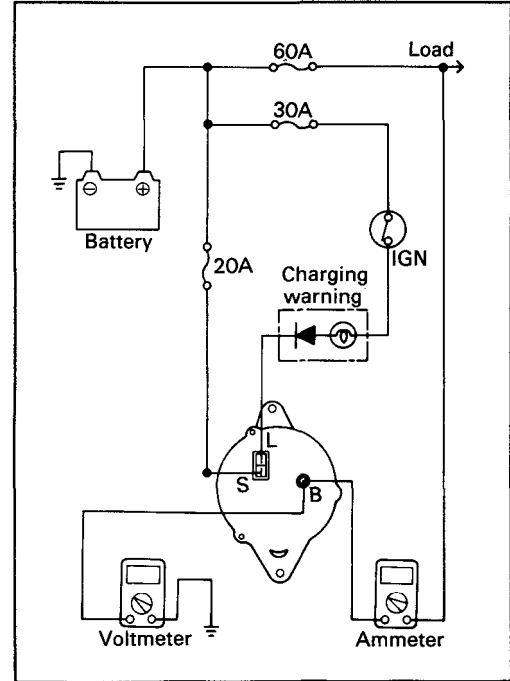
- 1) The nominal output current value is shown on the nameplate affixed to the alternator body.
  - 2) The output current value changes with the electrical load and the temperature of the alternator itself.  
Therefore, the nominal output current may not be obtained. If such is the case, use a carbon pile to increase the load on the alternator.  
The nominal output current may not be obtained if the temperature of the alternator itself or ambient temperature is too high.
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 alternator output wire to the alternator "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 the battery installed on the vehicle to see that it is fully charged. For battery checking method, see "BATTERY".
  - 2) Check the alternator drive belt tension. For belt tension check, see section, "COOLING".
2. Turn ignition switch to "OFF".
3. Disconnect the battery ground cable.
4. Connect a digital voltmeter between the "S" terminal of the alternator and ground. Connect the (+) lead of the voltmeter to the "S(L)" 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 100A) 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.



### Test

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

#### Voltage: Battery voltage

If it reads 0 V, there is an open circuit in the wire between the alternator "S" terminal 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 10 A or less.

**Result**

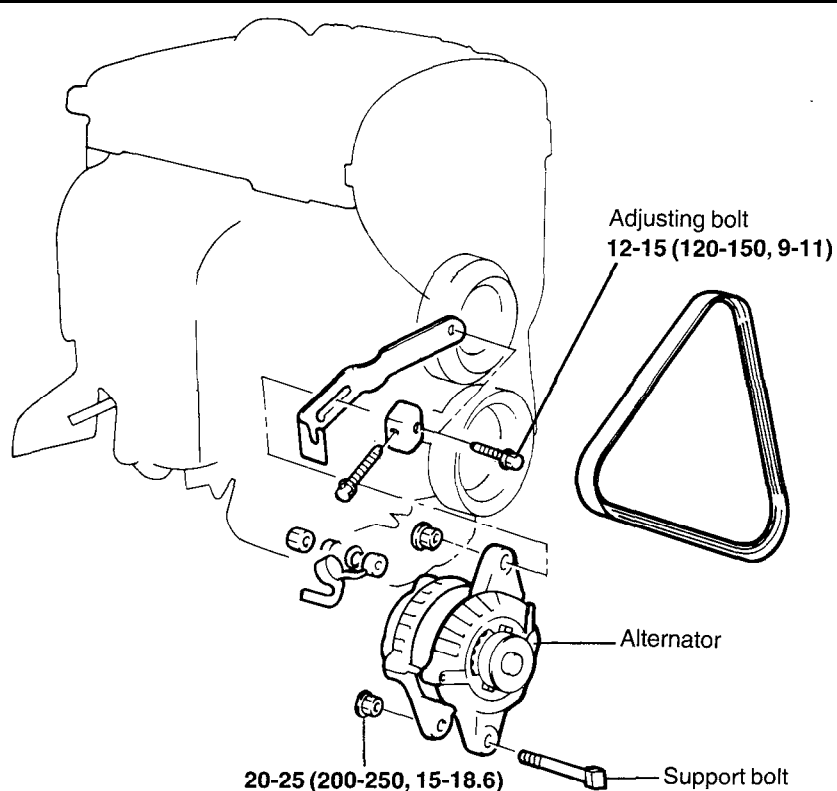
1. If the voltmeter reading agrees with the value listed in the Regulating Voltage Table below, the voltage regulator is functioning correctly. If the reading is other than the standard value, the voltage regulator or the alternator is faulty.

**Regulating Voltage Table**

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

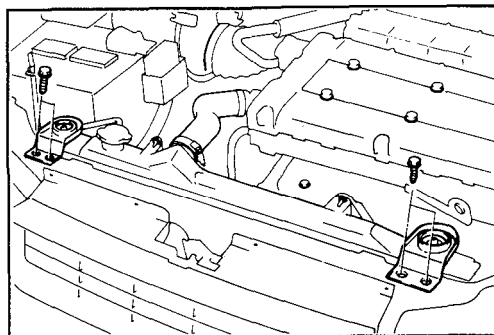
2. Upon completion of the test, reduce the engine speed to idle, and turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Remove the voltmeter and ammeter and the engine tachometer.
5. Connect the alternator output wire to the alternator "B" terminal.
6. Connect the battery ground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

## ALTERNATOR REMOVAL AND INSTALLATION

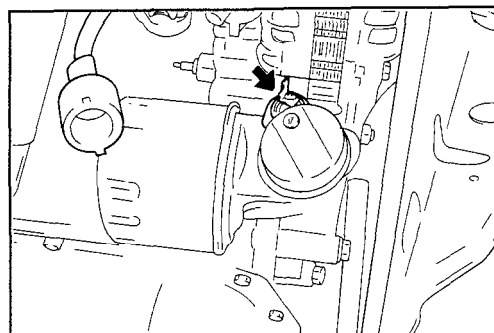


**TORQUE : Nm (kg.cm, lb.ft)**

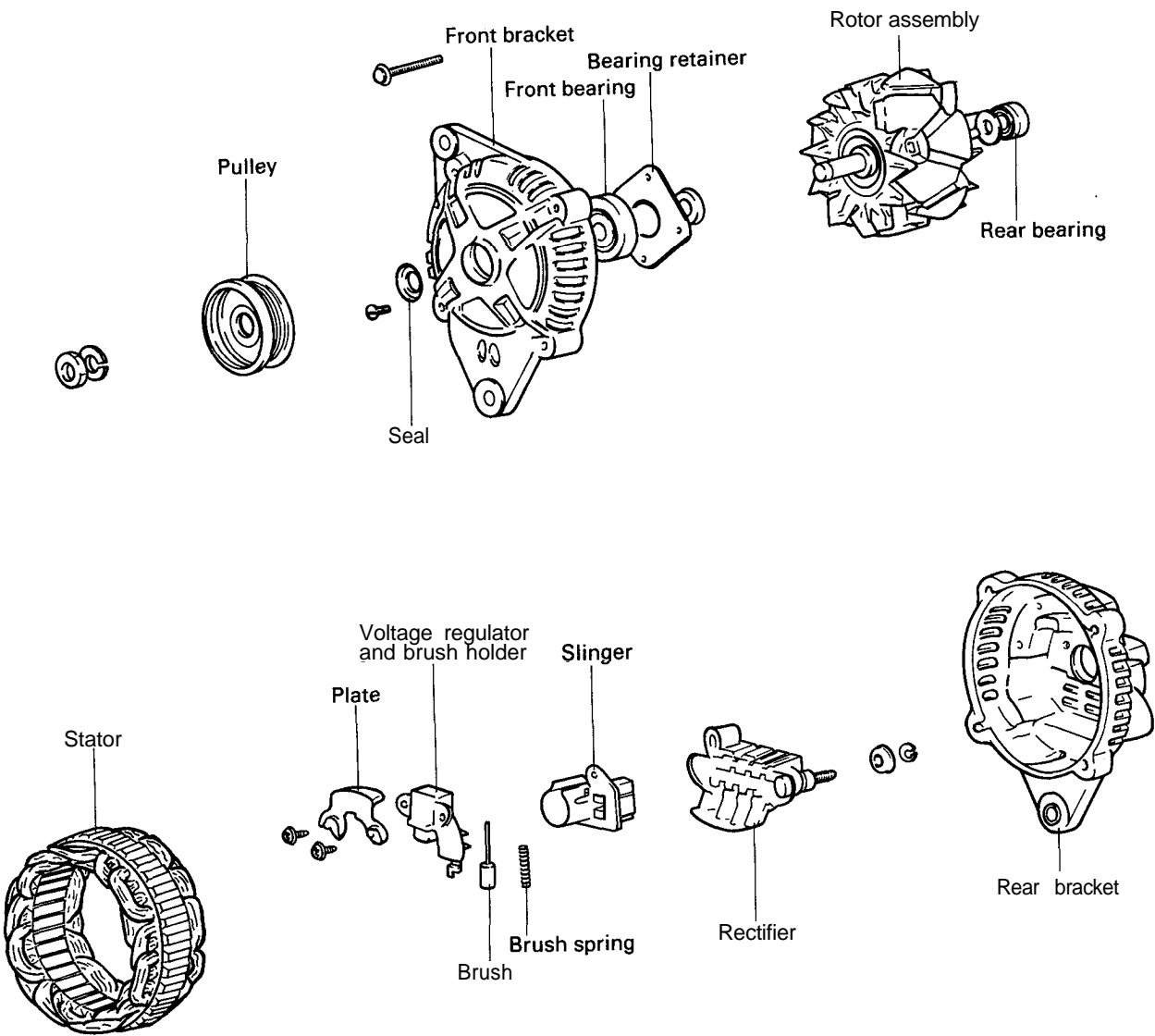
1. Disconnect the negative terminal from the battery.
2. Remove the radiator mounting bolt.
3. Disconnect the reservoir hose and fan motor connectors.
4. Raise the vehicle.
5. Remove the mud guard-LH.



6. Disconnect the connector pin of oil pressure switch.
7. Loosen the belt tension and remove the belt.
8. Remove the terminal nut and the wire from the B terminal.
9. With lifting up the radiator, remove the alternator.
10. Installation is the reverse of the removal procedure.



COMPONENTS (75A)



**DISASSEMBLY**

1. Remove the three through bolts.
2. Insert a flat screwdriver between the front bracket and stator core, and pry downward.

**NOTE**

- 1) Do not insert the screwdriver too deeply, as there is a danger of damaging the stator coil.

- 2) The rear cover may be hard to remove because a ring is used to lock the outer race of the rear bearing. To facilitate removal of rear cover, heat just the bearing box section with a 200-watt soldering iron. Do not use a heat gun, as it may damage the diode assembly.

3. Secure the rotor in a vise with the pulley side up.

**NOTE**

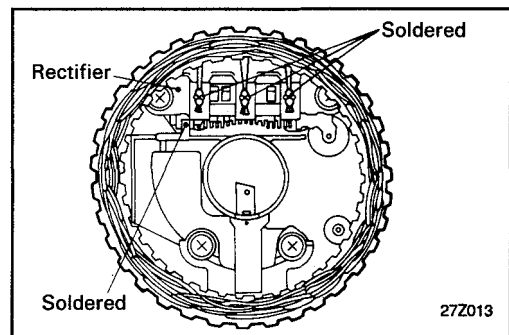
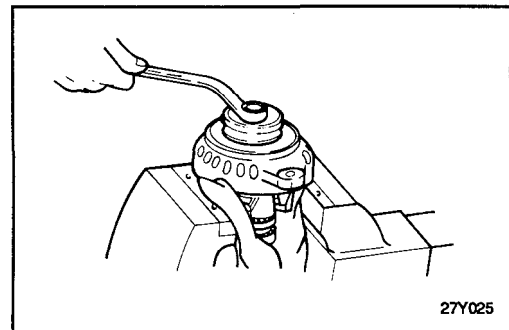
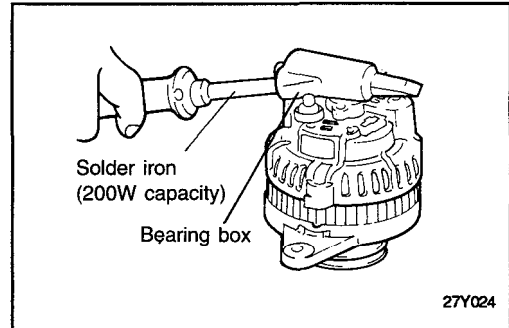
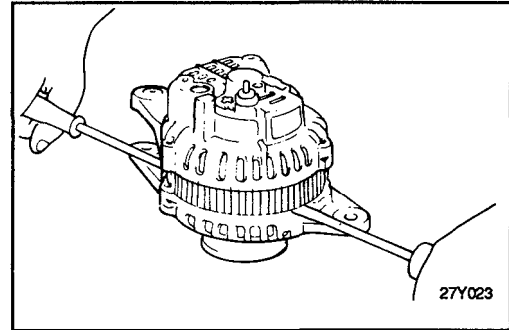
Be careful that the vise jaws do not damage the rotor.

4. Remove the pulley nut, then remove the spring washer, then the pulley, and then the spacer.
5. Remove the front bracket and two seals.
6. Remove the rotor from the vise.
7. Remove the brush holder screws, the rectifier screws, and the nut from the B terminal.
8. Remove the stator assembly from the rear bracket.
9. Detach the slinger from the brush holder.
10. When the stator is to be removed, unsolder the three stator leads to the main diodes on the rectifier.

**NOTE**

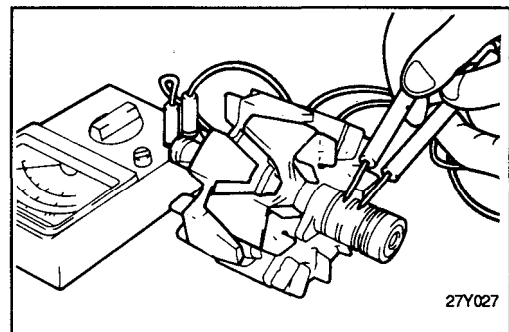
- 1) When soldering or unsoldering, use care to make sure that heat of soldering iron is not transmitted to the diodes for a long period.
- 2) Use care that excessive force is not exerted on the leads of the diodes.

11. When separating the rectifier from the brush holder, unsolder the two plates soldered to the rectifier.

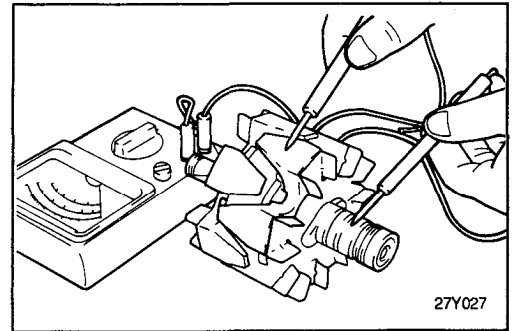
**INSPECTION****Rotor**

1. Check the rotor coil for continuity. Check to make sure that there is continuity between the slip rings. If resistance is extremely low, it means that there is a short. If there is no continuity or if there is a short circuit, replace the rotor assembly.

Resistance value: Approx. 3.1  $\Omega$

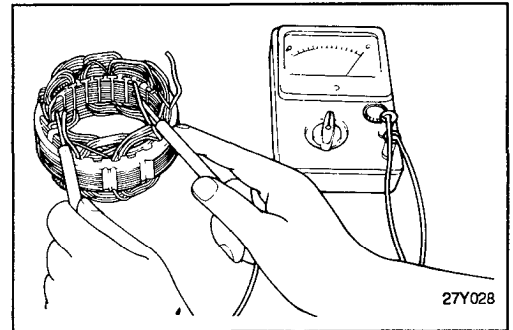


2. Check the rotor coil for a ground. Check to make sure that there is no continuity between-slip the ring and the core. If there is continuity, replace rotor assembly.

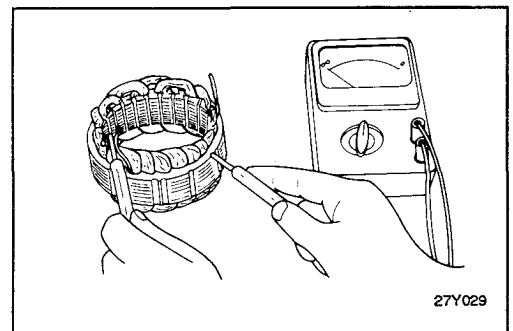


### Stator

1. Make a continuity check on the stator coil. Check to make sure that there is continuity between the coil leads. If there is no continuity, replace stator assembly.



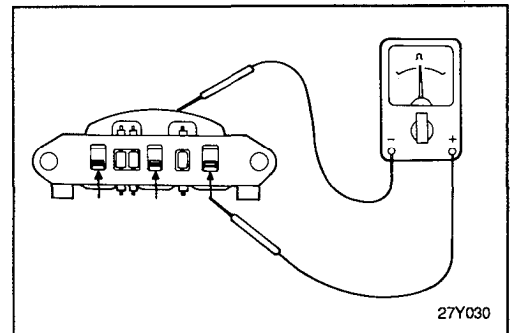
2. Check the coil for grounding. Check to make sure that there is no continuity between the coil and the core. If there is continuity, replace the stator assembly.



### Rectifiers

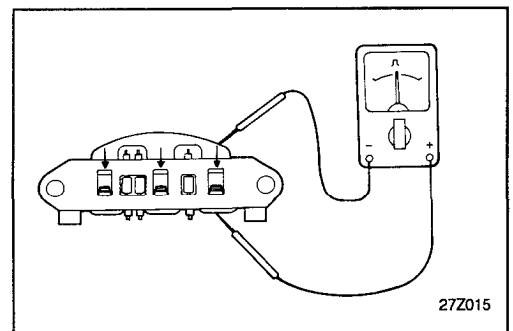
#### Positive rectifier test

Check for continuity between the positive rectifier and stator coil lead connection terminal with an ohmmeter. The ohmmeter should read continuity in only one direction. If there is continuity in both directions, a diode is shorted. Replace the rectifier assembly.



#### Negative rectifier test

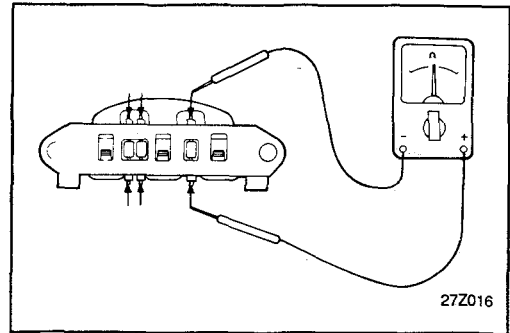
Check for continuity between the negative rectifier and the stator coil lead connection terminal. The ohmmeter should read continuity in only one direction. If there is continuity in both directions, a diode is shorted, and the rectifier assembly must be replaced.



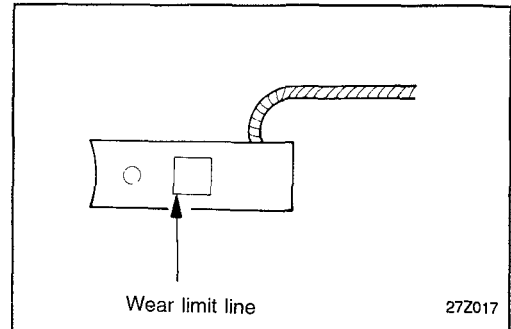
**Diode trio test**

Check the three diodes for continuity by connecting an ohmmeter to both ends of each diode. Each diode should have continuity in only one direction.

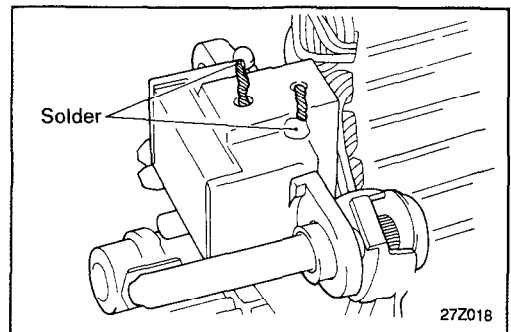
If continuity is present in both directions, a diode is defective and the heatsink assembly must be replaced.

**BRUSH REPLACEMENT**

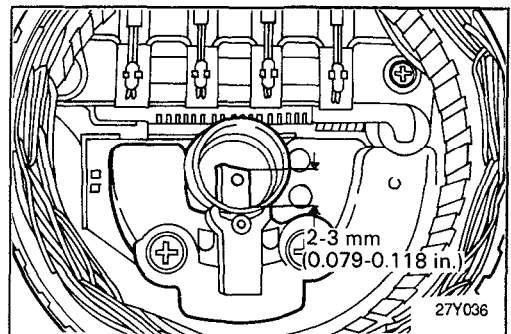
Replace the brushes if they are worn to limit line.



1. Unsolder the pigtail and remove the old brush and spring.

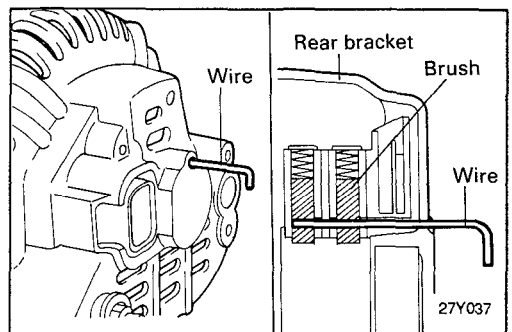


2. Install the brush spring and a new brush in the brush holder.
3. Insert the brush to where there is a space 2 to 3 mm (0.079 to 0.118 in.) between the limit line and the end of the brush holder.
4. Solder the pigtail to the brush holder.

**REASSEMBLY**

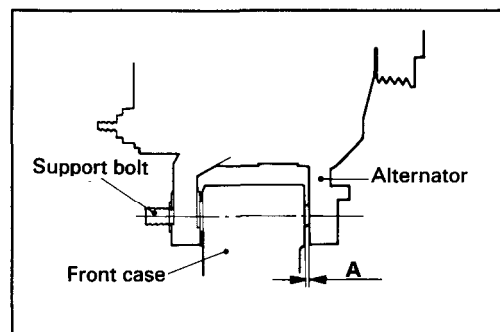
Perform reassembly in the reverse procedure of disassembly. Pay attention to the following:

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.



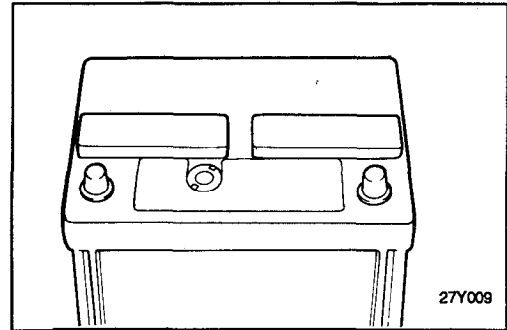
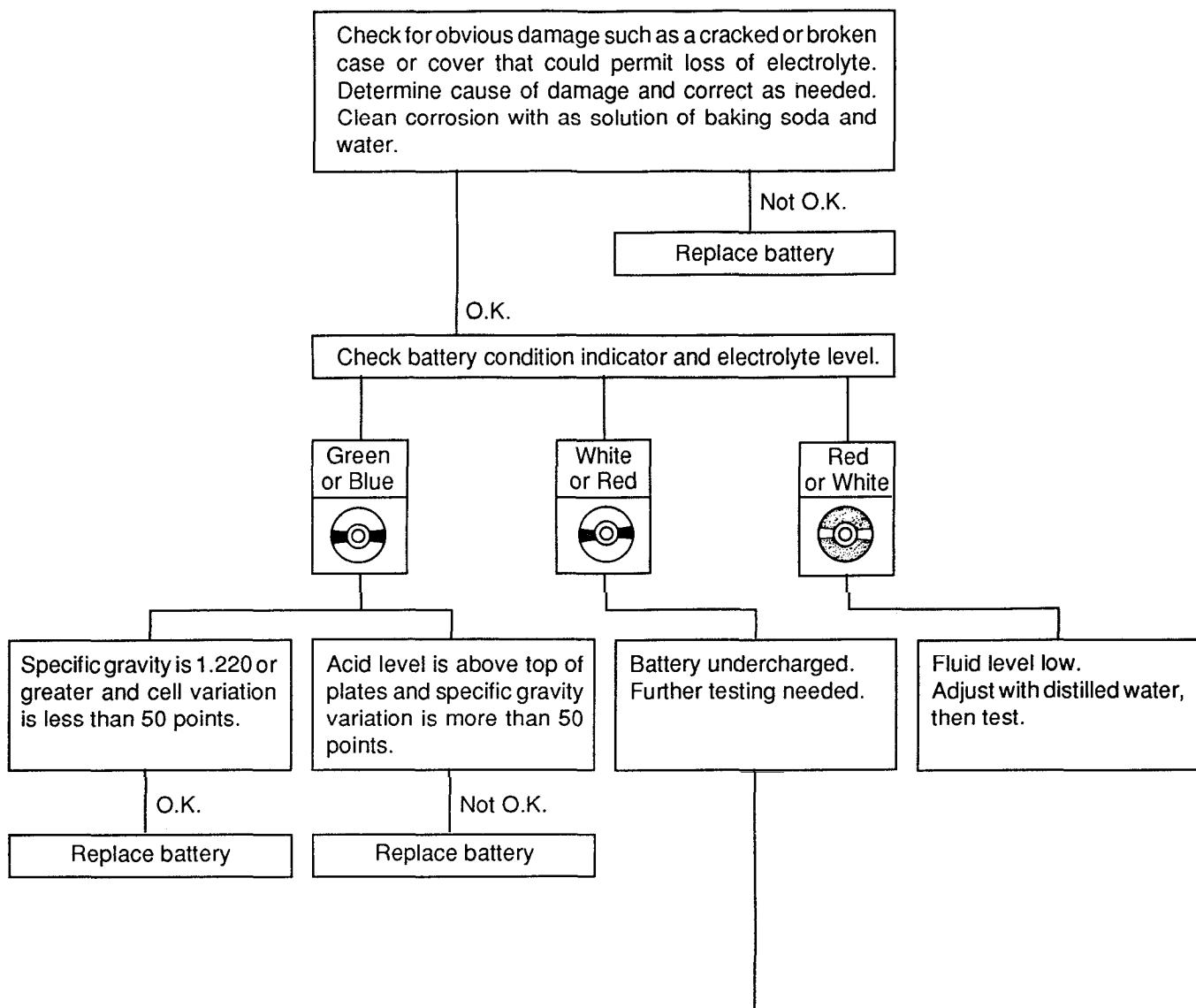
**INSTALLATION**

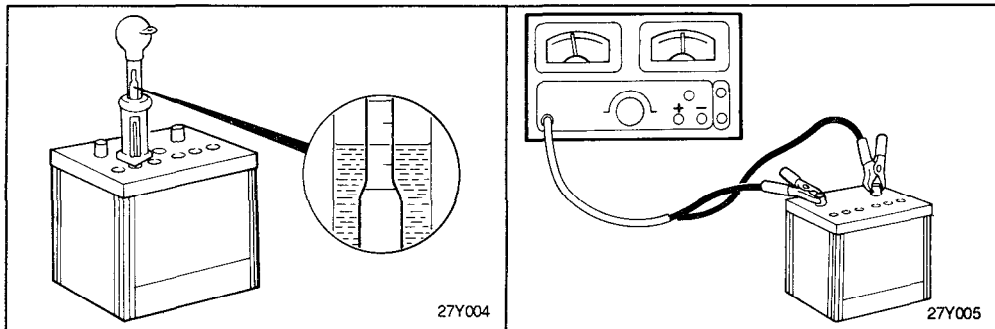
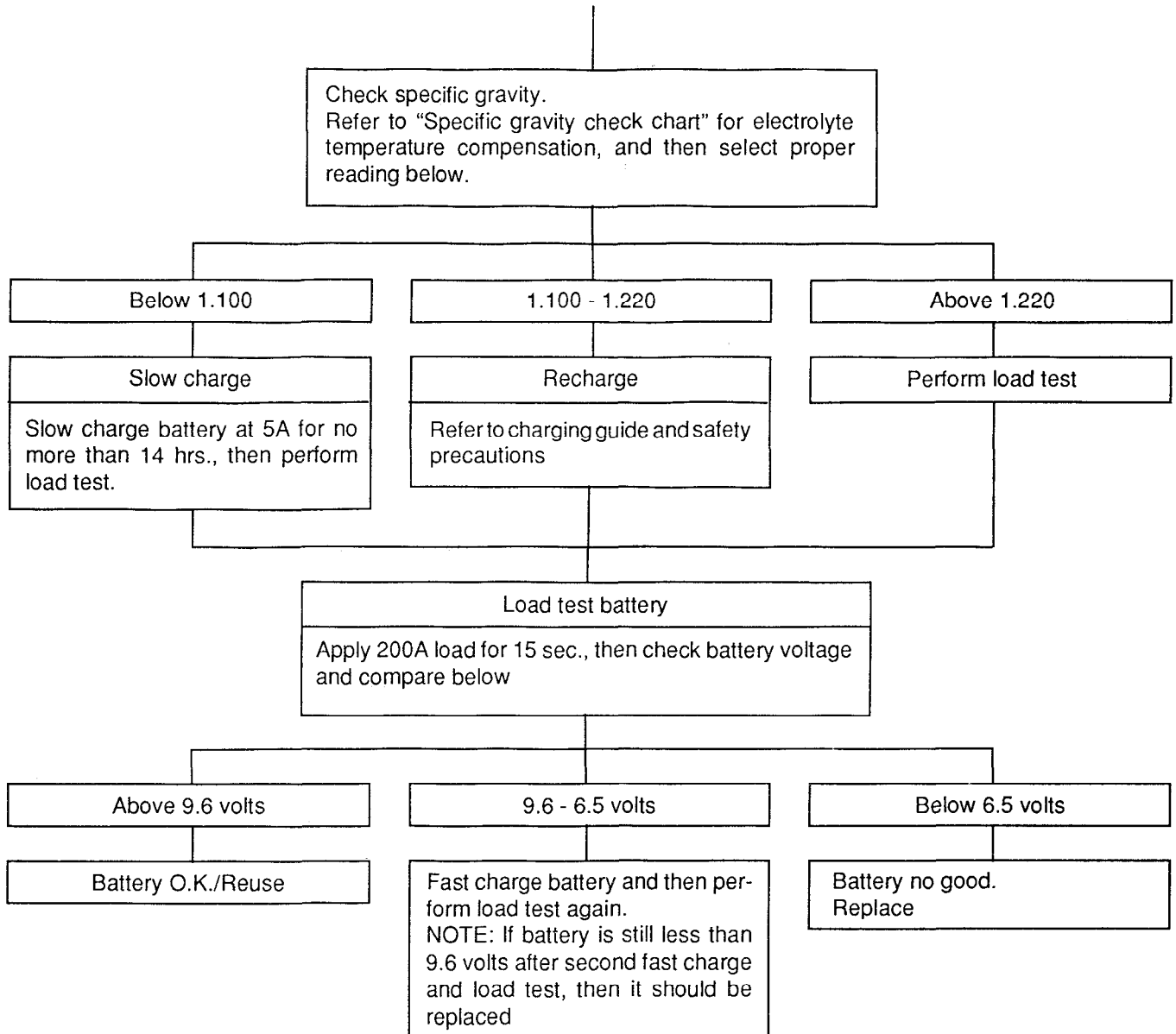
1. Position the alternator and insert the support bolt. (Do not attach the nut.)
2. Push the alternator forward and determine how many spacers (thickness: 0.198mm) should be inserted between the front leg of the alternator and the front case (space A in the illustration). (There should be enough spacers so that they do not fall out when you let go of them.)
3. Insert the spacers (space A in the illustration), attach the nut, and complete the installation.



**BATTERY (MAINTENANCE FREE TYPE)**

1. The maintenance-free battery is, as the name implies, totally maintenance free and has no removable battery cell caps.
2. Water never needs to be added to the maintenance-free battery.
3. The battery is completely sealed, except for small vent holes in the cover.
4. The battery contains a visual inspection indicator.

**BATTERY VISUAL INSPECTION (1)**



### SPECIFIC GRAVITY CHECK CHART

The specific gravity of battery electrolyte changes with temperature. Heat thins the solution and lowers the specific gravity. Cold thickens the solution and raises the specific gravity.

A fully charged battery should have a specific gravity between 1.260 and 1.280, with the electrolyte temperature at 80°F, the specific gravity reading must be corrected by adding 4 points (.004) for each 10° above 80°F or subtracting 4 points for every 10° below 80°F.

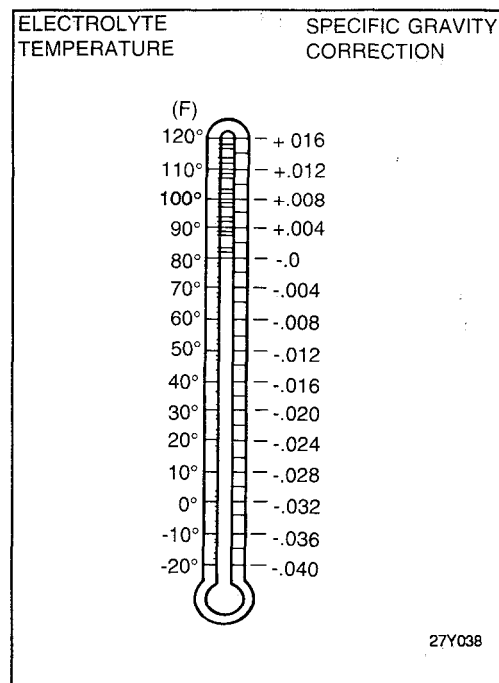
For example : The hydrometer reading is 1.280, and the electrolyte temperature reading is 10°F. By using the chart, the specific gravity must be lowered by 0.028 points. The true corrected reading is 1.252.

$$1.280 - 0.028 = 1.252$$

You should never take a hydrometer reading immediately after water has been added. The water and electrolyte must be mixed by either charging for a few minutes at a low rate or by allowing the battery to sit for an hour.

#### NOTE

A difference of 50 points (0.050) or more between one or more cells indicates a defective battery. It should be replaced.



### BATTERY CHARGE RATE

Charge method Specific gravity	Slow charge (5A)	Fast charge (20A)
Below 1.100	14 hours	4 hours
1.100 - 1.130	12 hours	3 hours
1.130 - 1.160	10 hours	2.5 hours
1.160 - 1.190	8 hours	2.0 hours
1.190 - 1.220	6 hours	1.5 hours
Above 1.220	4 hours	1.0 hours

**BATTERY VISUAL INSPECTION (2)**

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

**CAUTION**

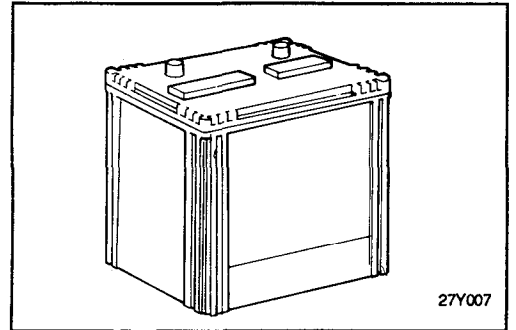
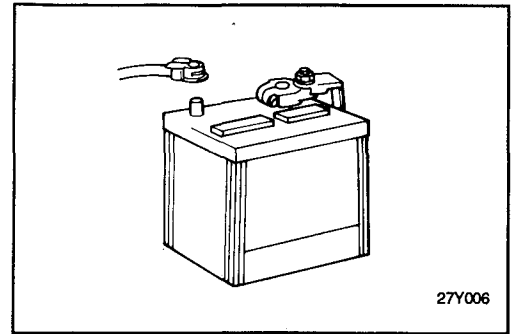
Care should be taken in the event the battery case is cracked or leaking, to protect your skin from the electrolyte. A suitable pair of rubber gloves (not household type) should be worn when removing the battery.

4. Inspect the battery carrier for damage caused by the loss of acid from the battery. 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 bristle 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 cleaner.
8. Clean the inside surface of the terminal clamps with a suitable battery terminal 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 top of the terminals are flush with the top of the post.
11. Tighten the terminal nut 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 the batteries being charged. A spark will occur where the circuit is broken.

Keep all open flames away from the battery.



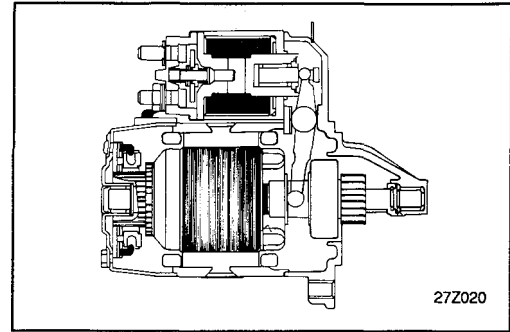
## STARTING SYSTEM

### GENERAL INFORMATION

The starting system includes the battery, starter motor, solenoid switch, ignition switch, inhibitor switch (A/T only), connection wires, and the battery cables.

When the ignition key is turned to the start position, current flows and energizes the coil of the starter motor's solenoid. When this happens, the solenoid plunger and the clutch shift lever are activated, and the clutch pinion engages the ring gear. The contacts close and the starter motor cranks.

In order to prevent damage caused by excessive rotation of the starter armature when the engine starts, the clutch pinion gear overruns.



### TROUBLESHOOTING

Probable condition	Probable cause	Remedy
Engine will not crank.	Battery charge low	Charge or replace battery.
	Battery cables loose, corroded or worn	Repair or replace cables.
	Inhibitor switch faulty (Vehicle with automatic transaxle only)	Adjust or replace switch.
	Fusible link blown	Replace fusible link.
	Starter motor faulty	Repair starter motor.
	Ignition switch faulty	Replace ignition switch.
Engine cranks slowly.	Battery charge low	Charge or replace battery.
	Battery cables loose, corroded or worn	Repair or replace cables.
	Starter motor faulty	Repair starter motor.
Starter keeps running.	Starter motor faulty	Repair starter motor.
	Ignition switch faulty	Replace ignition switch.
Starter spins but engine will not crank.	Short in wiring	Repair wiring.
	Pinion gear teeth broken or starter motor faulty	Repair starter motor.
	Ring gear teeth broken	Replace flywheel ring gear or torque converter.

**SERVICE ADJUSTMENT PROCEDURES****PINION GAP ADJUSTMENT**

1. Disconnect the field coil wire from the M-terminal of the solenoid.
2. Connect a 12V battery the S-terminal and the M-terminal.
3. The pinion will move out.

**NOTE**

**This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.**

4. Check the pinion to stopper clearance (pinion gap) with a feeler gauge.

**Pinion gap : 0.5-2.0 mm (0.02-0.079 in.)**

5. If the pinion gap is out of specification, adjust by adding or removing gaskets between the solenoid and the front bracket.

**MAGNETIC SWITCH PULL-IN TEST**

1. Disconnect the field coil wire from the M-terminal of the magnetic switch.
2. Connect a 12V battery between the S-terminal and the M-terminal.

**NOTE**

**This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.**

3. If the pinion moves out, then the pull-in coil is good. If it doesn't, replace the magnetic switch.

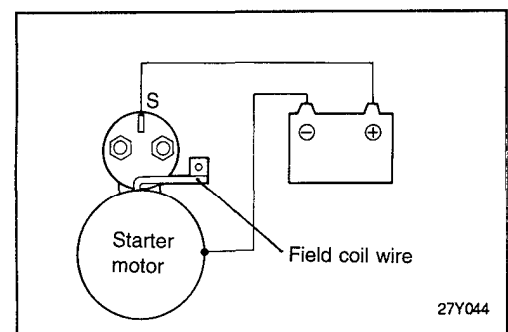
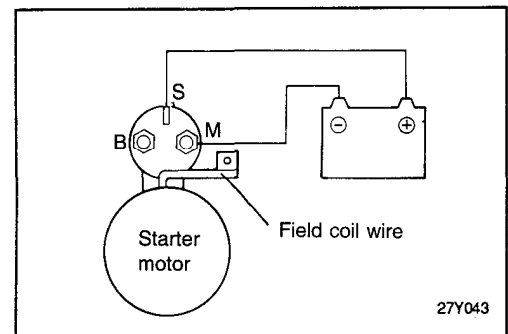
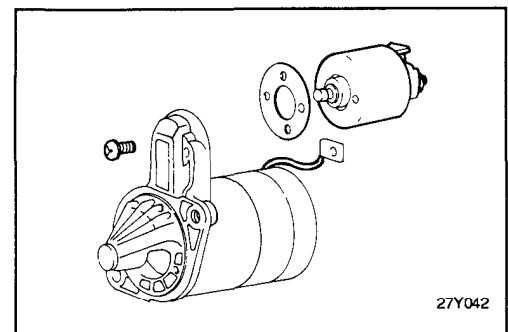
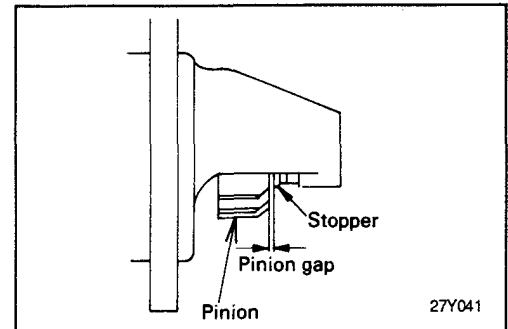
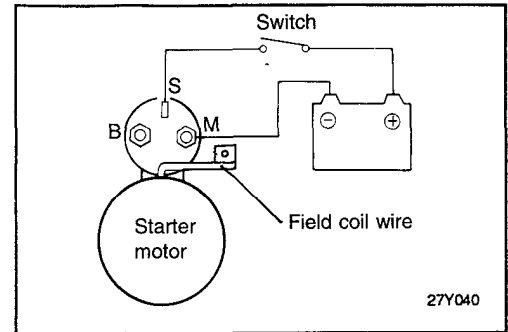
**MAGNETIC SWITCH HOLD-IN TEST**

1. Disconnect the field coil wire from the M-terminal of the magnetic switch.
2. Connect a 12V battery between the S-terminal and the body.

**NOTE**

**This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.**

3. If the pinion moves out, everything is in order. If the pinion moves, the hold-in circuit is open. Replace the magnetic switch.

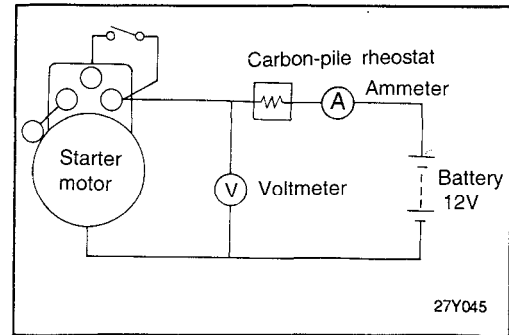


**FREE RUNNING TEST**

1. Place the starter motor in a vise equipped with soft jaws and connect a fully-charged 12-volt battery to starter motor as follows:
2. Connect a test ammeter (100-ampere scale) and carbon pile rheostat as shown in the illustration.
3. Connect a voltmeter (15-volt scale) across starter motor.
4. Rotate carbon pile to the off position.
5. Connect battery cable from battery negative post to starter motor body.
6. Adjust until battery voltage shown on the voltmeter reads 11 volts.
7. Confirm that the maximum amperage is within the specifications and that the starter motor turns smoothly and freely.

**Current: Max. 90 Amps (reduction drive type)**

**Speed: Min. 3,000 rpm**

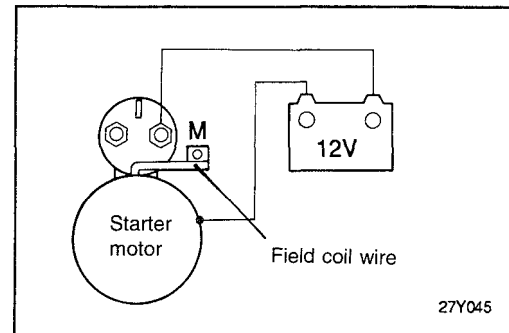
**MAGNETIC SWITCH RETURN TEST**

1. Disconnect field coil wire from the M-terminal of the magnetic switch.
2. Connect a 12V battery between M-terminal and the body.

**NOTE**

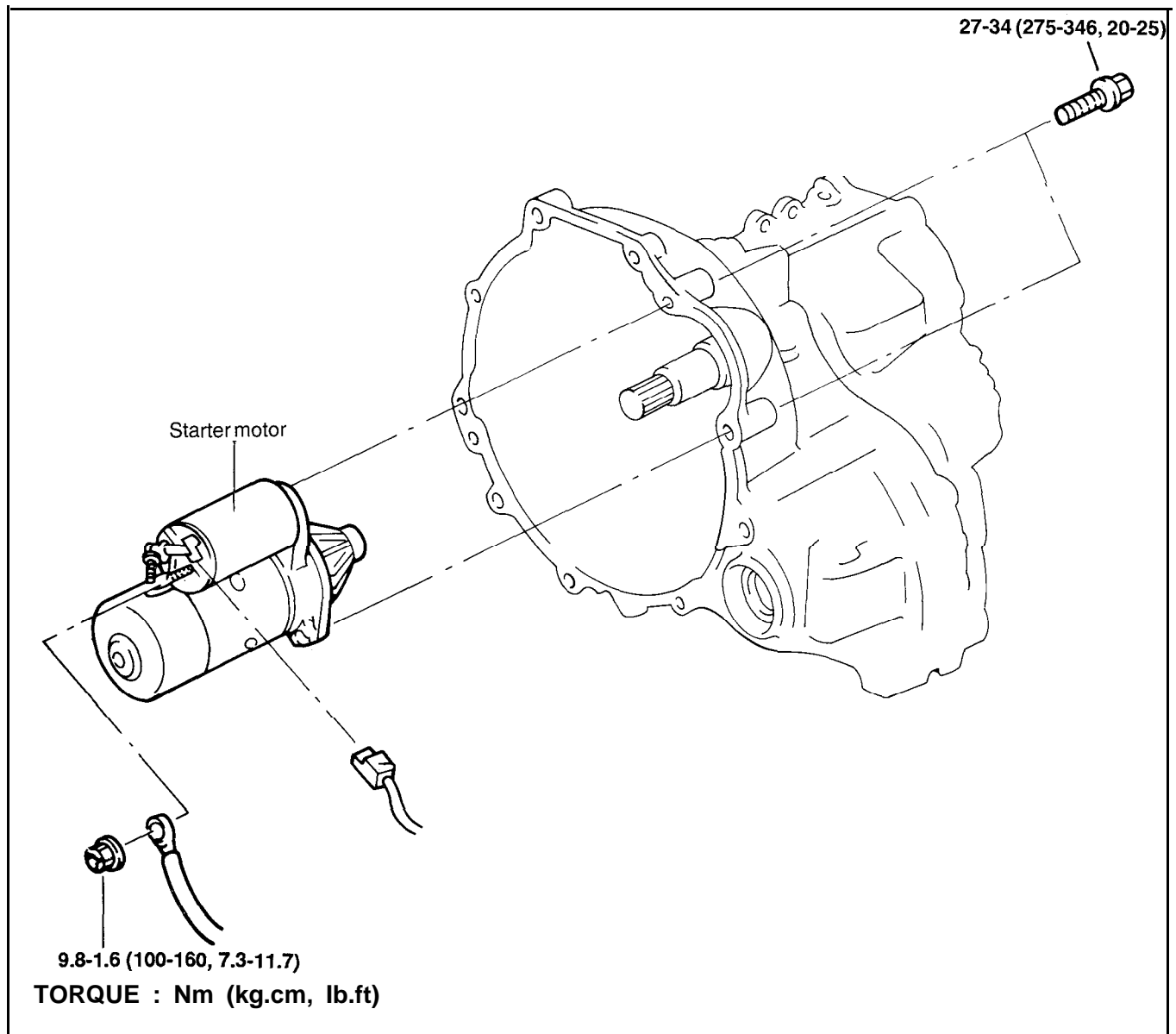
**This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.**

3. Pull pinion out and release. If pinion returns quickly to its original position, everything is in order. If it doesn't, replace the magnetic switch.

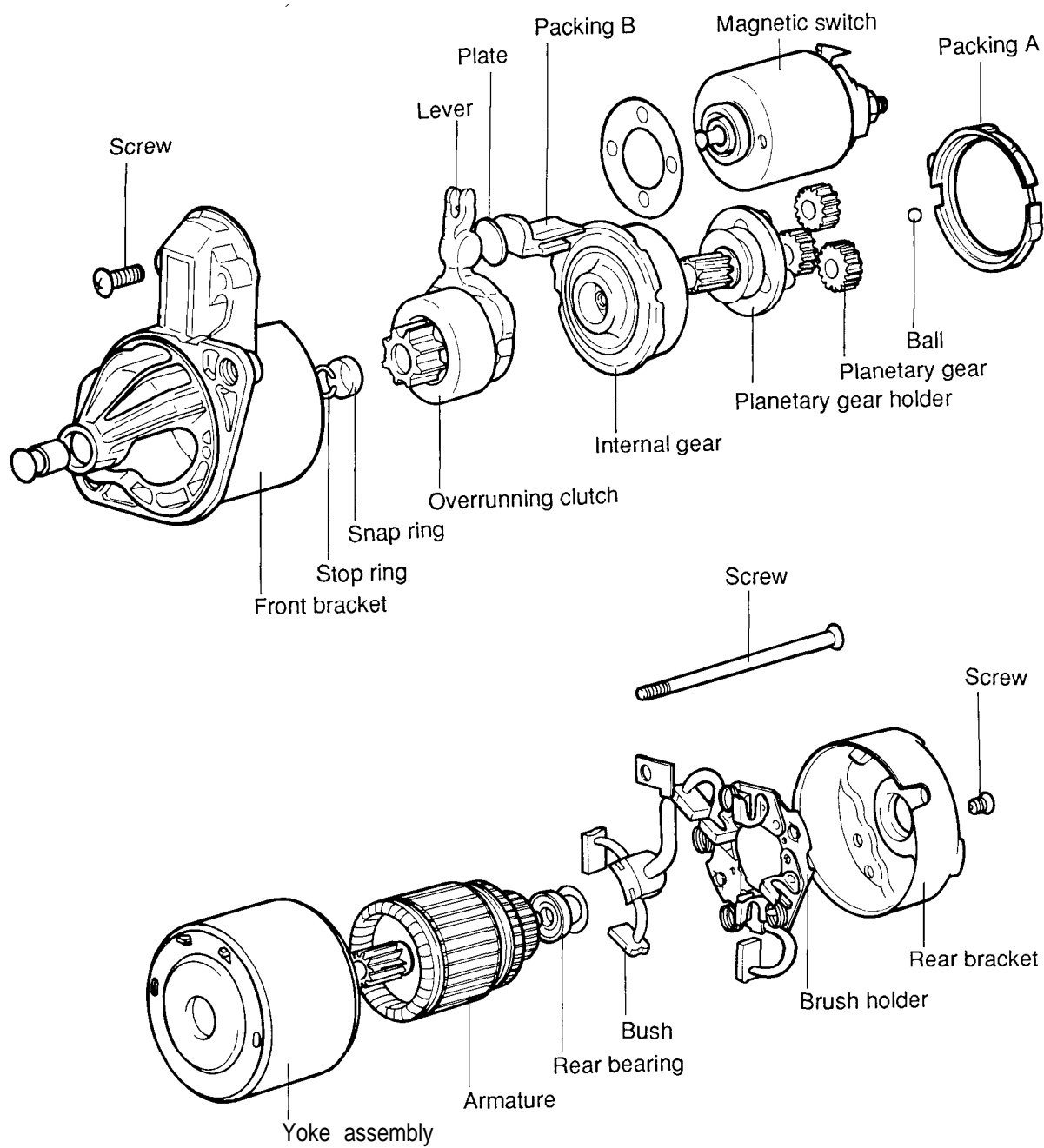


## STARTER MOTOR

## REMOVAL AND INSTALLATION

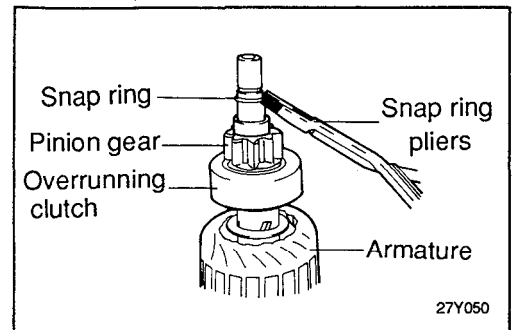
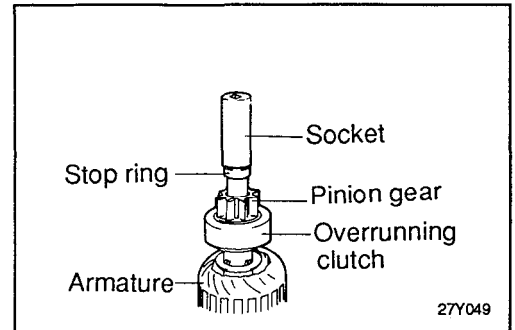


## COMPONENTS (REDUCTION DRIVE TYPE)



**DISASSEMBLY****REMOVAL OF SNAP RING AND STOP RING**

1. Press the stop ring, by using an appropriate socket wrench, to the snap ring side.
2. After removing the snap ring (by using snap-ring pliers), remove the stop ring and the overrunning clutch.

**CLEANING STARTER MOTOR PARTS**

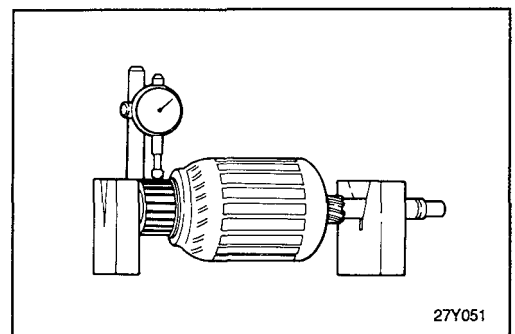
1. Do not immerse parts in cleaning solvent. Immersing the yoke and field coil assembly and/or armature will damage insulation. Wipe these parts with a cloth only.
2. Do not immerse drive unit in cleaning solvent. Overrunning clutch is pre-lubricated at the factory and solvent will wash lubrication from clutch.
3. The drive unit may be cleaned with a brush moistened with cleaning solvent and wiped dry with a cloth.

**INSPECTION****CHECKING THE COMMUTATOR**

1. Place the armature on a pair of V-blocks, and check the deflection by using a dial gage.

**Standard value: 0.05 mm (0.002 in.)**

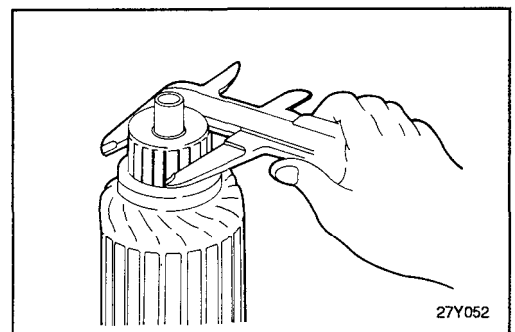
**Limit: 0.1 mm (0.0039 in.)**



2. Check the outer diameter of the commutator.

**Standard value: 29.4 mm (1.157 in.)**

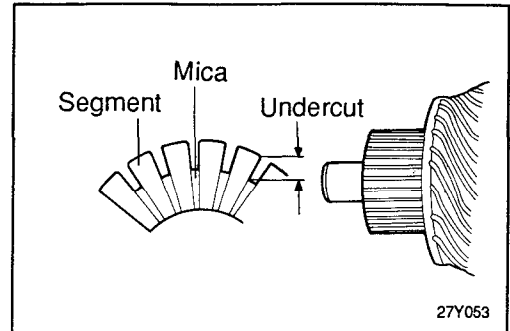
**Limit: 28.4 mm (1.118 in.)**



3. Check the depth of the undercut between segments.

**Standard value: 0.5 mm (0.020 in.)**

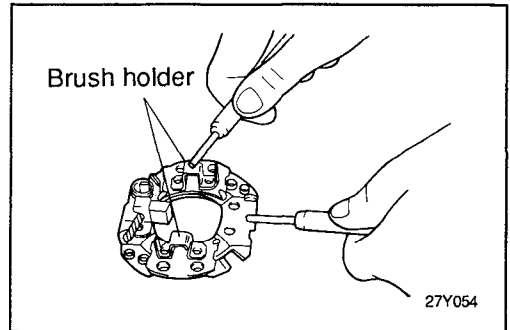
**Limit: 0.2 mm (0.0079 in.)**



### BRUSH HOLDER

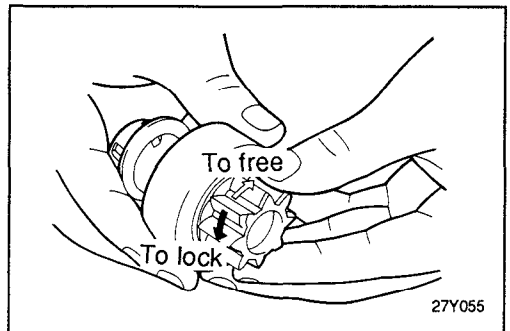
Check for continuity between the brush holder plate and the brush holder.

The normal condition is no continuity.



### OVERRUNNING CLUTCH

1. While holding clutch housing, rotate the pinion. Drive pinion should rotate smoothly in one direction, but should not rotate in opposite direction. If clutch does not function properly, replace overrunning clutch assembly.
2. Inspect pinion for wear or burrs. If pinion is worn or burred, replace overrunning clutch assembly. If pinion is damaged, also inspect ring gear for wear or burrs.

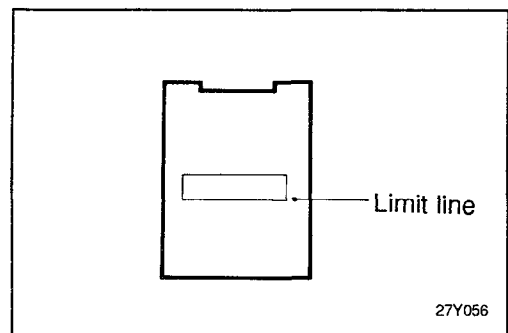


### FRONT AND REAR BRACKET BUSHING

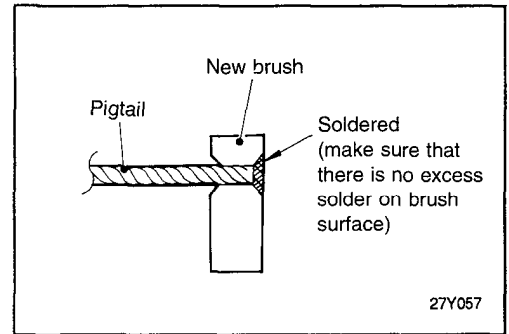
Inspect bushing for wear or burrs. If bushing is worn or burred, replace front bracket assembly or rear bracket assembly.

### REPLACEMENT OF BRUSHES AND SPRINGS

1. Brushes that are worn beyond wear limit line, or oil-soaked, should be replaced.
2. When replacing field coil brushes, crush worn brush with pliers, taking care not to damage pigtail.



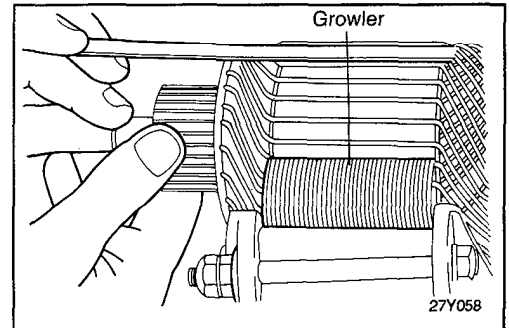
3. Sand pigtail end with sandpaper to ensure good soldering.
4. Insert pigtail into hole provided in new brush and solder it. Make sure that pigtail and excess solder do not come out onto brush surface.
5. When replacing ground brush, slide the brush from brush holder by prying retaining spring back.



## TESTING ARMATURE

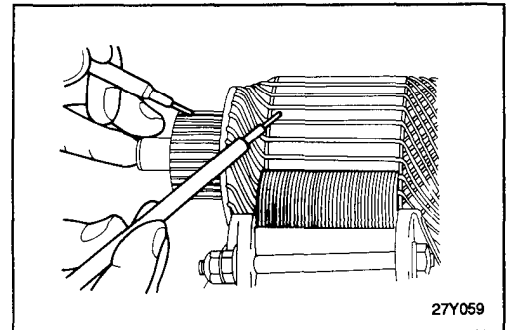
### TESTING ARMATURE FOR SHORT-CIRCUIT

1. Place armature in a growler.
2. Hold a thin steel blade parallel and just above while rotating armature slowly in growler. A shorted armature will cause blade to vibrate and be attracted to the core. Replace shorted armature.



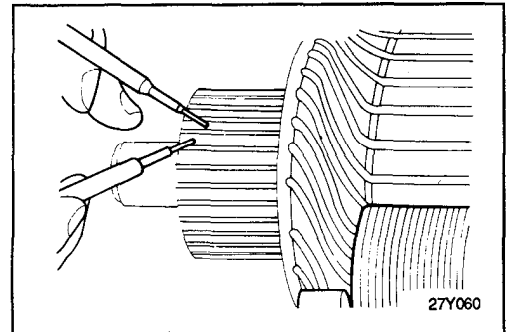
### TESTING ARMATURE FOR GROUNDING

Check the insulation between the armature coil cores and the commutator segments. They are normal if there is no continuity.



### CHECKING FOR ARMATURE COIL WIRING DAMAGE/DISCONNECTION

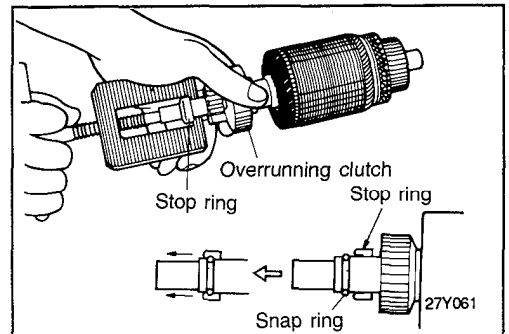
Check for continuity between segments. The condition is normal if there is continuity.



## SERVICE POINTS OF ASSEMBLY

### INSTALLATION OF THE STOP RING AND SNAP RING

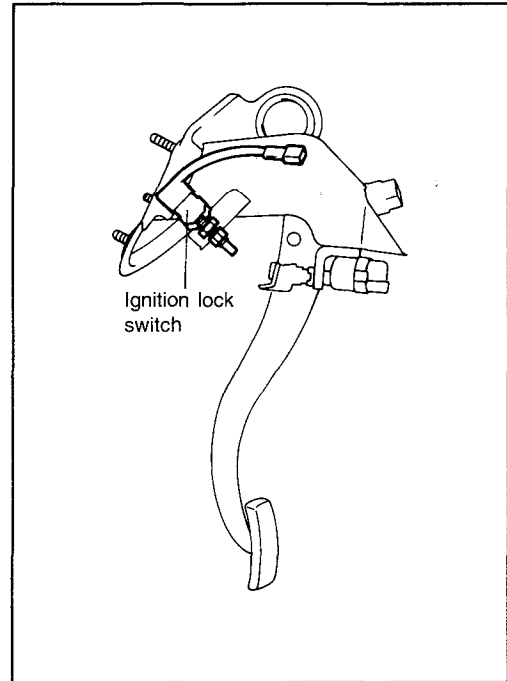
Using a suitable pulling tool, pull overrunning clutch stop ring over snap ring.



## INSPECTION OF CLUTCH START SYSTEM (IGNITION LOCK SYSTEM)

### Check clutch pedal

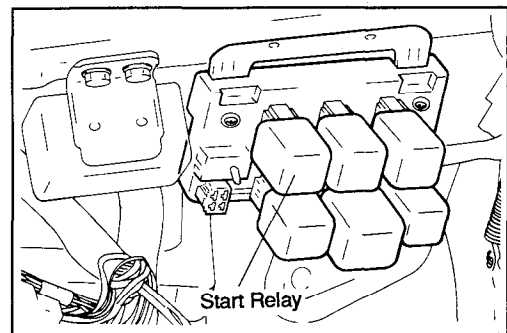
Check that pedal height, pedal freeplay and clutch pedal clevis pin play are correct. (Refer to clutch group)



### Check starter relay

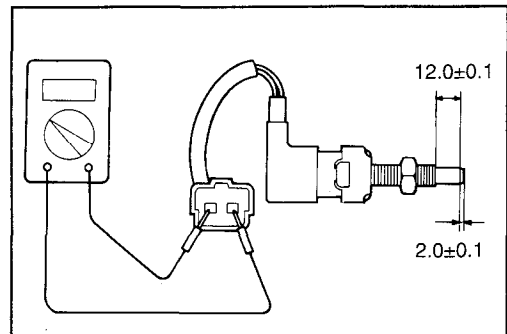
Remove the starter relay and check continuity between the terminals. If the continuity is not as specified, replace the relay.

Terminal	S <sub>1</sub> <sup>(1)</sup>	S <sub>2</sub> <sup>(3)</sup>	L <sup>(2)</sup>	B <sup>(4)</sup>
When de-energized	○ — ○			
When energized	○ — ○		○ — ○	



### Check ignition lock switch

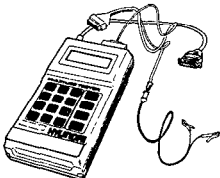
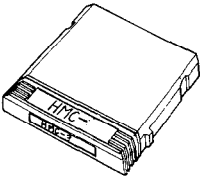
1. Check for continuity between terminals when the switch is ON (pushed).
2. Check for no continuity between terminals when the switch is OFF (free).

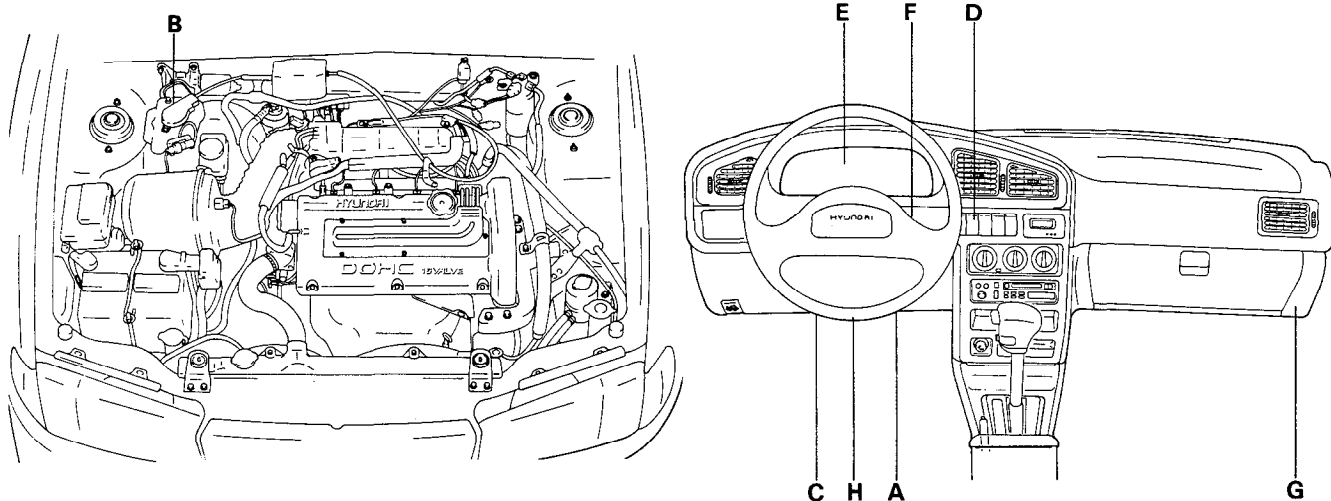


## AUTOMATIC SPEED CONTROL (CRUISE) SPECIFICATIONS

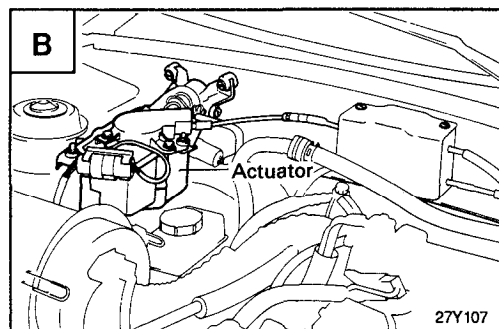
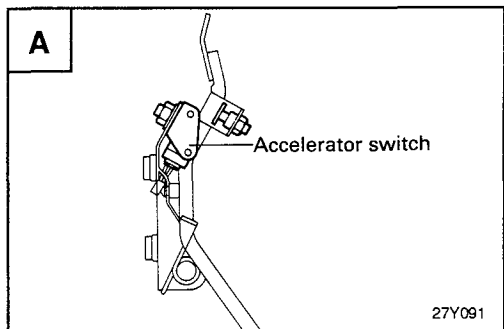
Items	Specifications
Speed control unit Operating voltage range Operating temperature Voltage drop between unit and actuator Operating speed range	DC 10 ~ 16V -30 ~ +75°C (-22 ~ +167°F) 0.4 V Low speed limit : 40 ± 3 km/h (25 ± 2 mph) High speed limit : 145 ± 5 km/h (90 ± 3 mph)
Actuator Rated voltage Operating temperature Operating consumption	DC 12V -30 ~ +90°C (-22 ~ +194°F) 3A or less (at 12V 20°C)
Cruise main switch Rated voltage Operating force Voltage drop	DC 12V 0.3 ~ 1.0 kg 0.15 V or less
Stop lamp switch Rated voltage Rated load Stop lamp Cruise control	DC 12V  27 x 5 W (lamp load) 0.1 ~ 0.5 A (relay load)

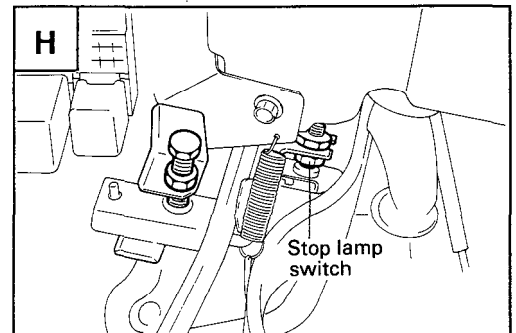
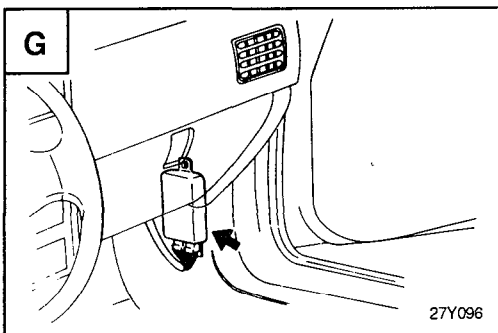
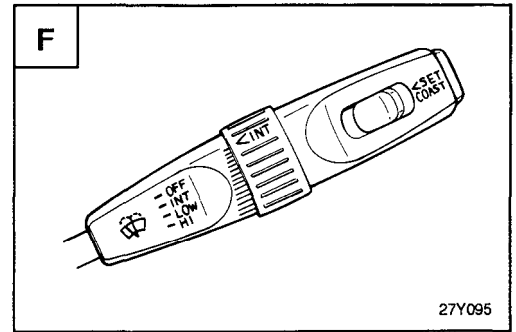
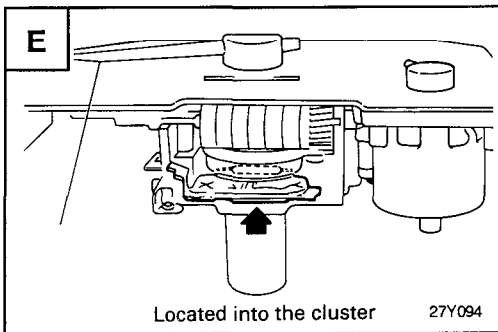
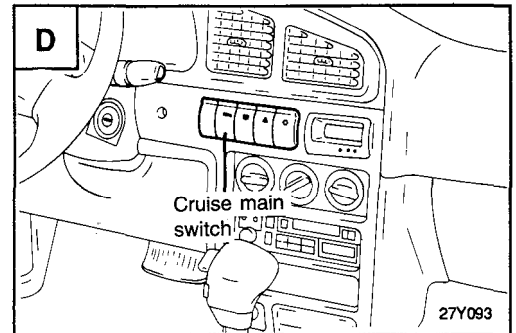
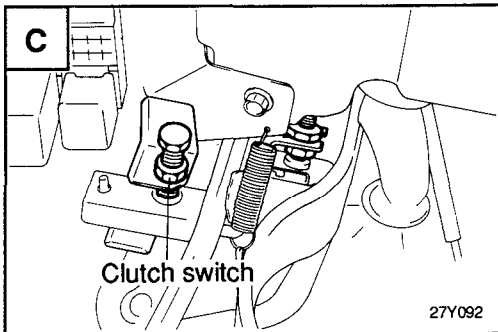
## SPECIAL SERVICE TOOL

Tool (Number and name)	Illustration	Use
09391-33100 Multi-use tester		Reading diagnosis code
09391-33402 Rom pack HMC-3		Reading diagnosis code with MUT

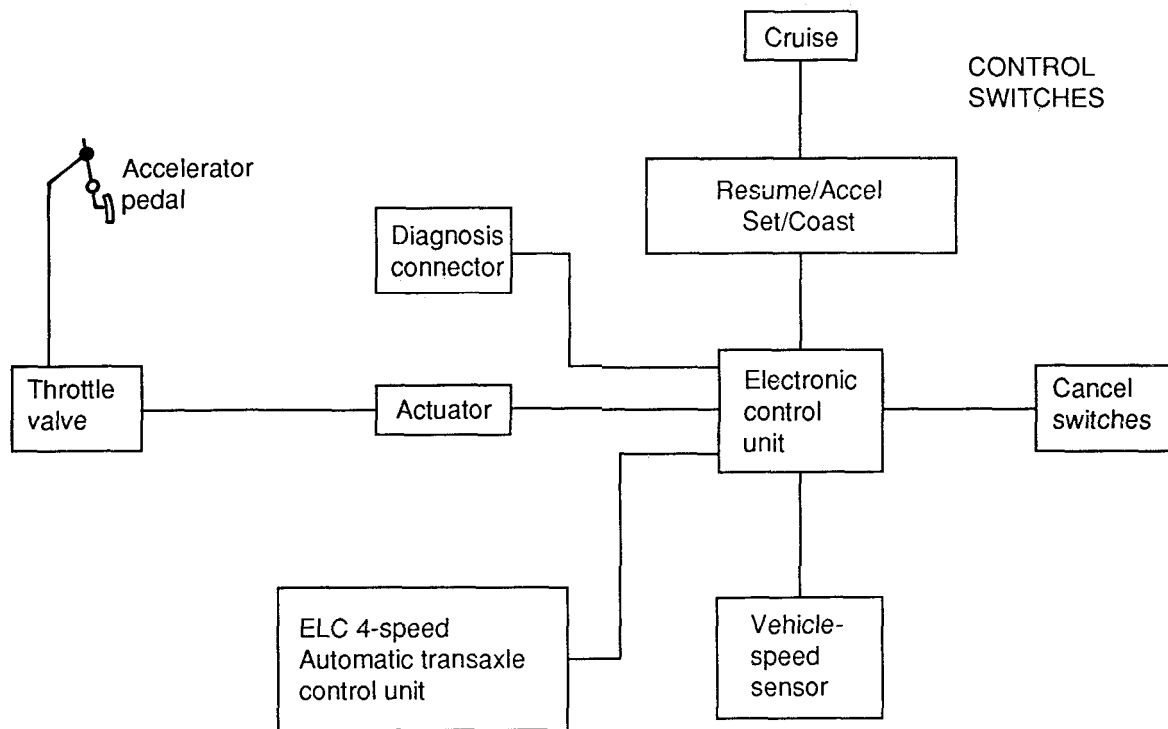


Name	Symbol	Name	Symbol
Accelerator switch	A	Reed switch (Vehicle speed sensor)	E
Actuator	B	Speed-control switch	F
Cruise switch	C	Speed-control unit (cruise control unit)	G
Cruise main switch	D	Stop lamp switch	H





## System Block Diagram

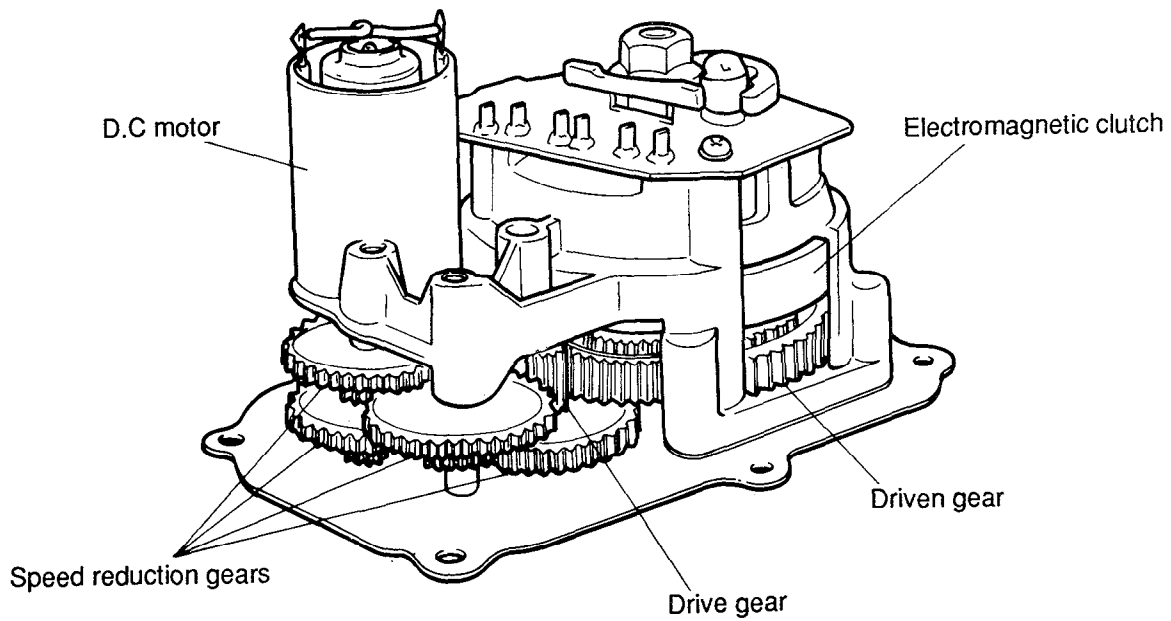


## Component parts and function outline

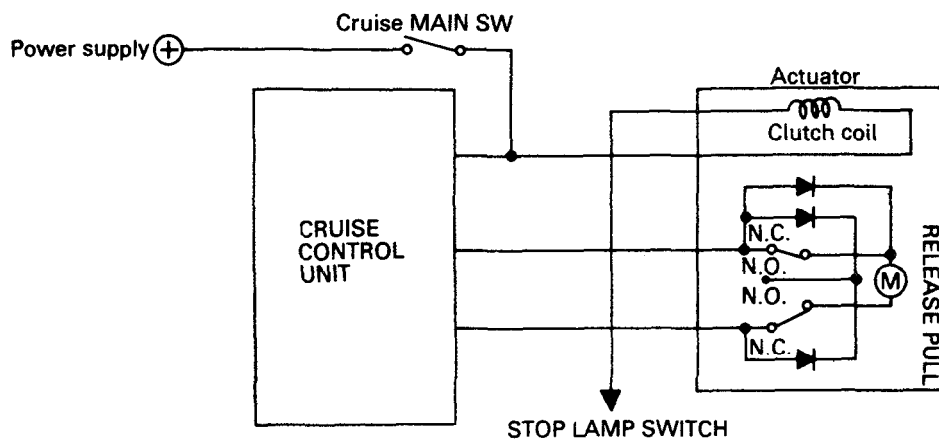
COMPONENT PART		FUNCTION
Vehicle-speed sensor		Converts vehicle speed to pulse.
Electronic control unit (ECU)		Receives signals from sensor and control switches; ECU controls all automatic speed control functions.
Actuator		Regulates the throttle valve to the set opening by signals from the ECU.
Control switch	CRUISE main switch	Switch for automatic speed control power supply.
	SET switch RESUME switch	Controls automatic speed control functions by SET (COAST) and RESUME (ACCEL).
	CRUISE main switch indicator	Illuminates when CRUISE main switch is ON (Built into CRUISE switch).
Piezo alarm		When the SET or RESUME switch is switched ON, the alarm sounds to notify the driver that the control unit has recieved the ON signal.

COMPONENT PART		FUNCTION
Cancel switch	Stop lamp switch/Clutch switch (A/T) Brake switch	Sends cancel signals to the ECU.
	Inhibitor switch	
ELC 4-speed automatic transaxle control unit		Controls the overdrive ON and OFF, based on signals from the ECU for the ASC.
Diagnostic connector		By connecting the voltmeter or multi-use tester, control unit diagnostic codes can be read.

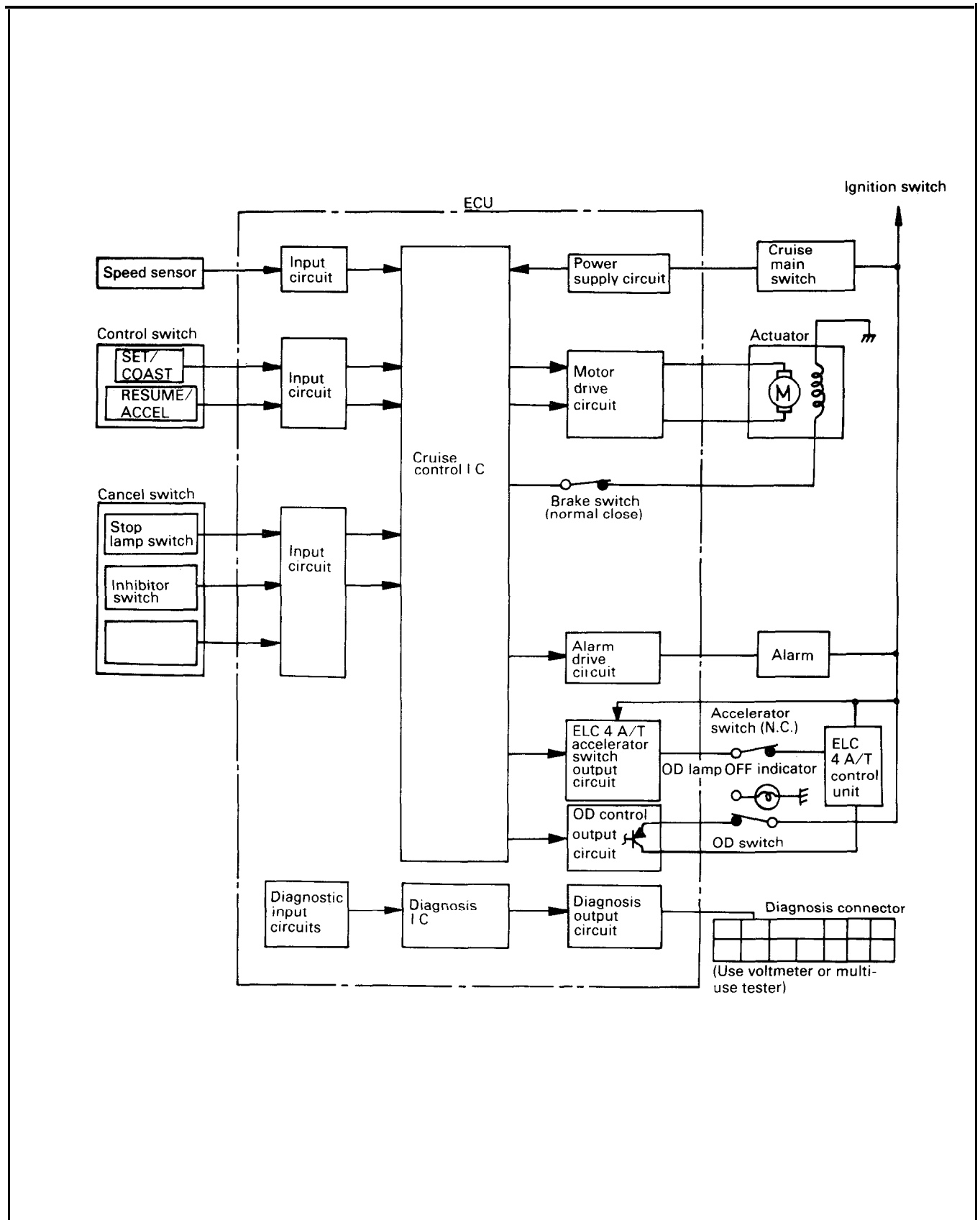
### CONSTRUCTION OF ACTUATOR INTERNAL CONSTRUCTION



### CIRCUIT DIAGRAM



## CONTROL LOGIC BLOCK DIAGRAM



## TROUBLESHOOTING BEFORE TROUBLESHOOTING

The ASC (Automatic speed-control) system performs control functions for the setting or cancellation of the fixed-speed driving speed based upon the data provided by input signals. As a result, when the ASC system is canceled, the cause of the cancellation is memorized in a separate circuit by the ECU, regardless of whether or not the ASC system condition is normal or abnormal, thus providing the ECU with the self-diagnosis function by certain fixed patterns, as well as the function of being able to check whether or not the ECU's input switches or sensor are normal. Thus, by effectively using these function, the time required checking and repair can be shortened.

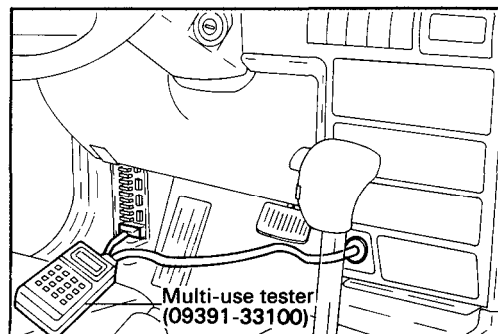
### NOTE

When the computer (ECU) power supply (ignition switch and main switch) is switched OFF, the memorized trouble codes are erased, and so for this reason the power supply must be left ON until the checking is completed.

## SELF-DIAGNOSIS CHECKING

Self-diagnosis checking is performed when there has been an automatic cancellation, without cancel switch operation.

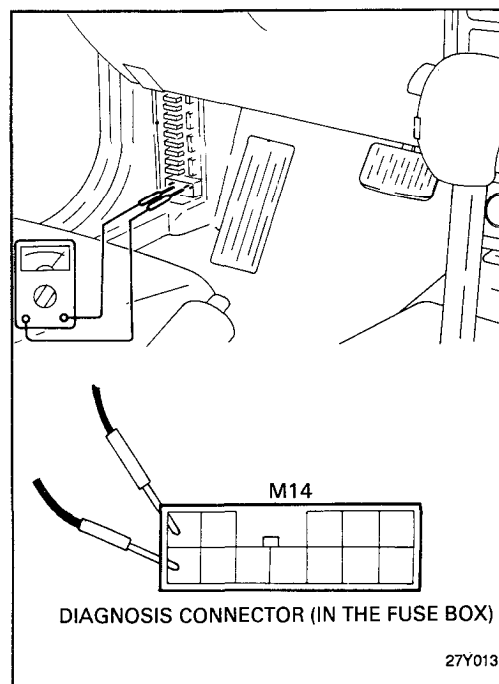
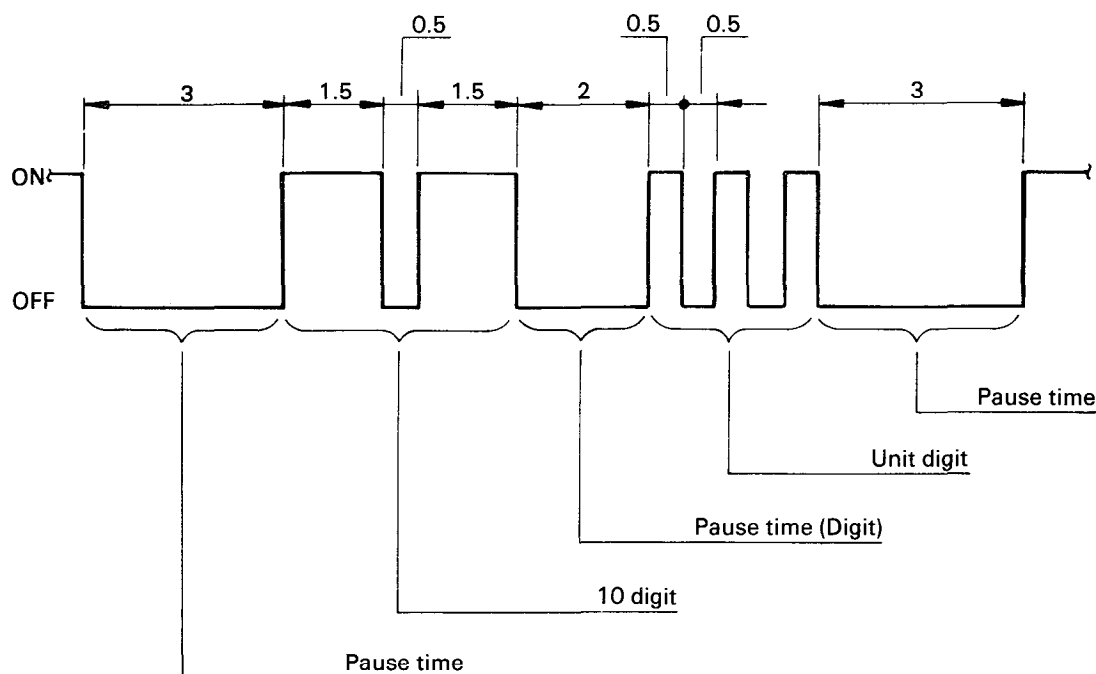
1. The following two methods can be used for checking the diagnosis. Note that the diagnosis check connector is located in the fuse box.
  - 1) If a multi-use tester is used  
Connect the multi-use tester's socket and connector to the cigarette lighter socket and the self-diagnosis check connector, and set the tester.  
Use the tester according to its operation instructions; display the diagnosis code number and then check.



- 2) If a voltmeter is used  
Connect a voltmeter between the ground terminal and the terminal for ASC of the diagnosis check connector.  
It is possible to discover which circuit is the cause of the cancellation by verifying the indication shown by the volt meter with the display patterns shown on the next page.
2. When trouble codes No. 11, 12, 15 or 16 are displayed, check the troubleshooting symptom applicable to that number.

**NOTE**

Code No. 16 is entered in the memory as cancel switch ON signal input if the system is canceled by depressing the brake pedal, and code No.13 or No.14 is entered when there is an automatic cancellation because the vehicle speed drops when the vehicle is driven up a steep slope with the preset speed setting left set, etc., when however, there is a cancellation not intentionally made by the driver, the cause might be damaged or disconnected stop lamp switch input wiring, a malfunction of the stop lamp switch ON, etc., even though the same code No.16 is displayed.

**DISPLAY SIGNAL PATTERN (FOR EXAMPLE CODE 23)**

## TROUBLESHOOTING PROCEDURES

First, select the applicable malfunction symptom from the Trouble Symptom Charts.

Conduct the self-diagnostic test following the directions on the charts.

Determine the condition of all function circuits.

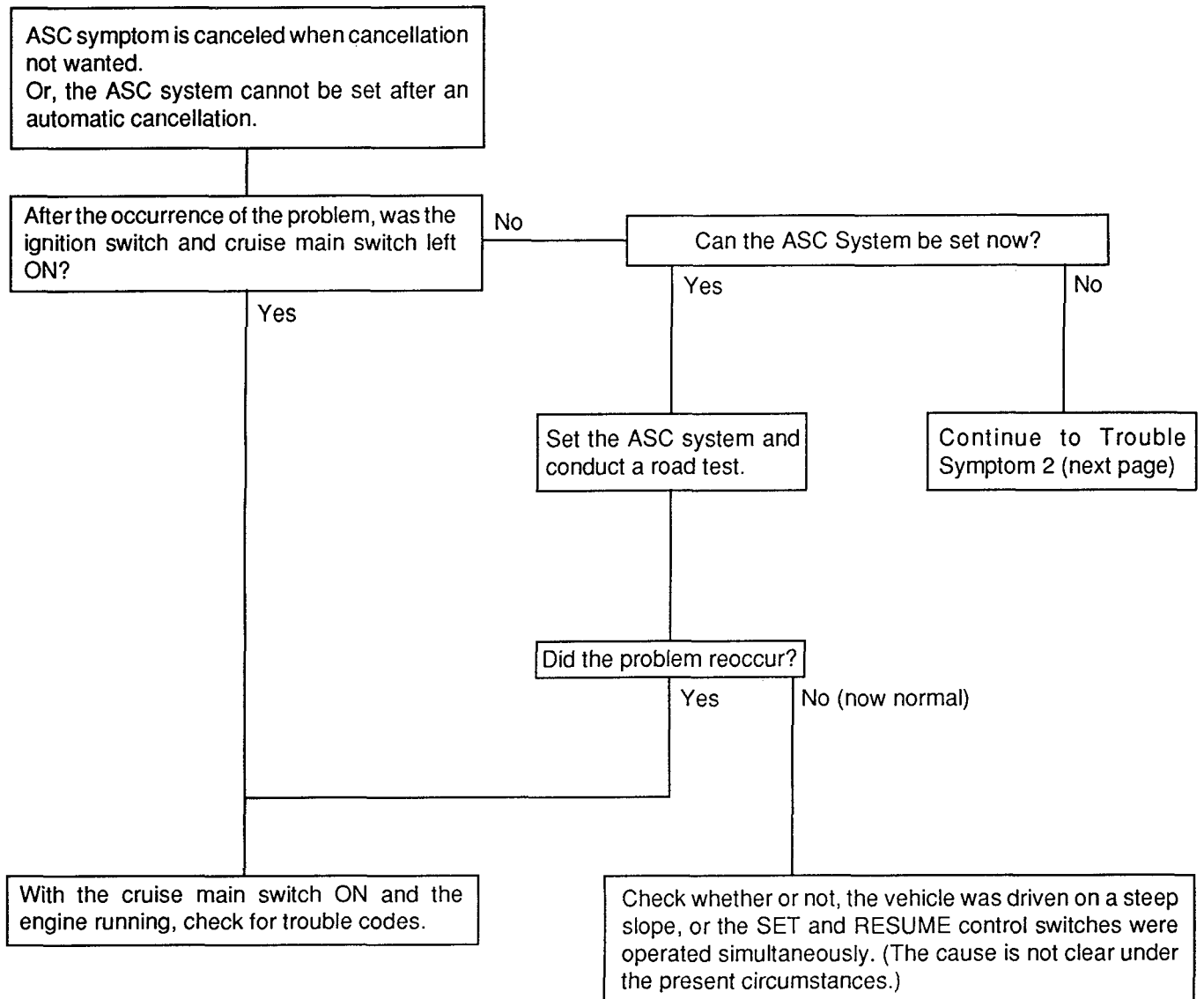
### CAUTION

**Because the computer (self-diagnosis) memory data will be erased, when the system is unintentionally canceled during fixed-speed driving, the ignition switch and/or the cruise main switch of the ASC system should not be switched OFF, and the battery should not be disconnected.**

1. Make the following preliminary inspections.
  - 1) Check that the installation of the actuator, accelerator cables are correct, and that the cables and links are securely connected.
  - 2) Check that the accelerator pedal moves smoothly.
  - 3) Adjust the cable so there is no excessive tension or excessive play on the accelerator cable.
  - 4) Check that the ECU, actuator, cruise main and control switch and the connector of each cancel switch are connected securely.
2. Check in the sequence indicated in the Trouble Symptom Chart.
3. If these checks indicate a normal condition, replace the cruise control unit.

## TROUBLE SYMPTOM CHARTS

## Trouble Symptom 1



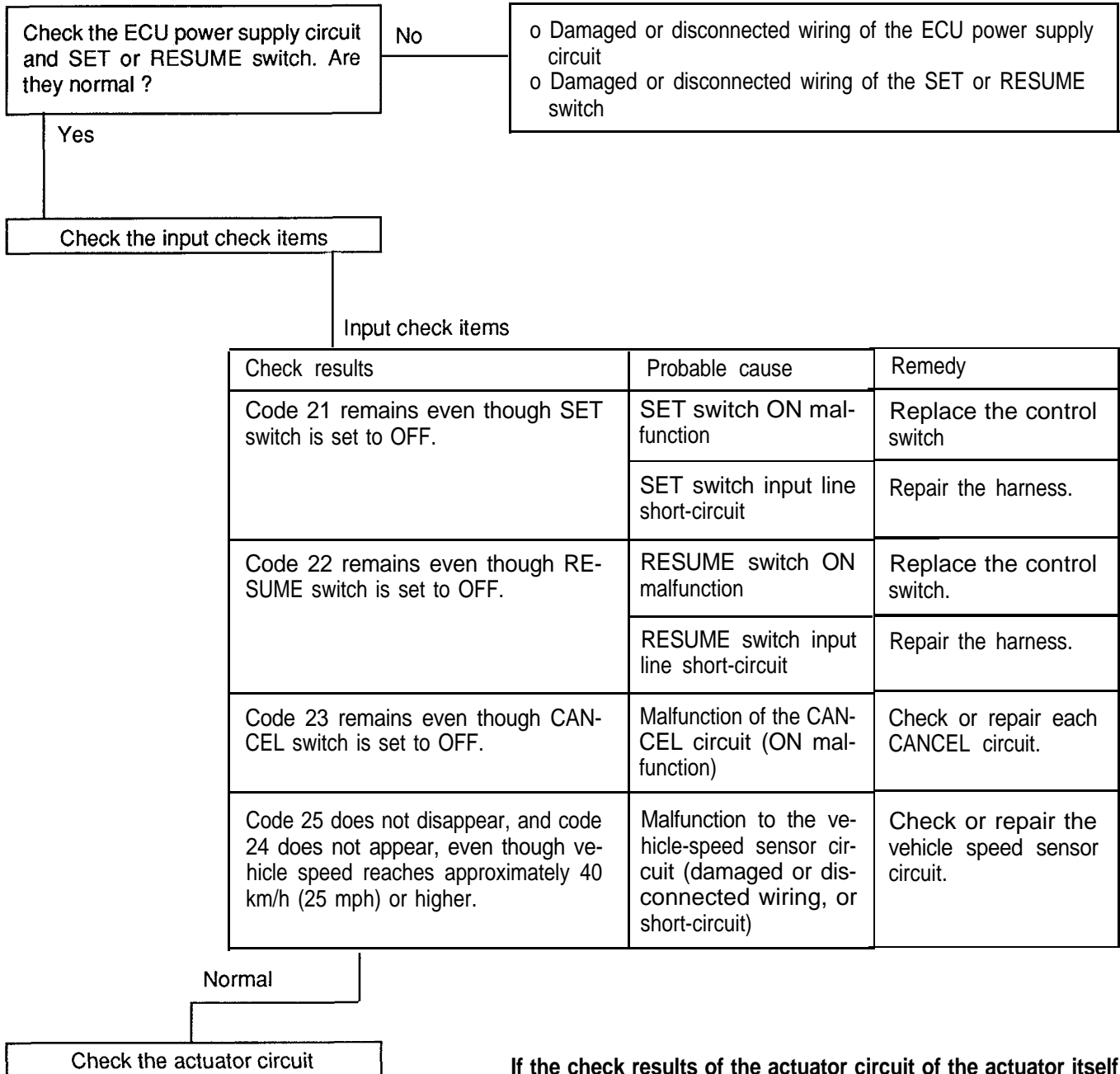
## Trouble Symptom 2

ASC system cannot be set

## NOTE

If, after the occurrence of the problem, the ignition switch and the cruise main switch have not been switched OFF, it is possible to determine (by checking the diagnosis output code) which circuit canceled the system's operation.

This chart is to be used, for troubleshooting if it is not possible to use the self-diagnosis for checking.



If the check results of the actuator circuit of the actuator itself reveal a normal condition, replace the electronic control unit (ECU)

**Trouble Symptom 3**

Trouble symptom	Probable cause	Remedy
<ul style="list-style-type: none"> <li>o The set vehicle speed varies greatly upward or downward</li> <li>o "Surging" (repeated alternating acceleration and deceleration) occurs after setting</li> </ul>	Malfunction of the vehicle speed sensor circuit	Repair the vehicle speed sensor system, or replace the part
	Malfunction of the speedometer cable or speedometer drive gear	
	Actuator circuit poor contact	Repair the actuator system, or replace the part
	Malfunction of the actuator	
	Malfunction of the ECU	Replace the ECU

**Trouble Symptom 4**

Trouble symptom	Probable cause	Remedy
The ASC system is not canceled when the brake pedal is depressed	Damaged or disconnected wiring of the stop lamp switch	Repair the harness or replace the stop lamp switch
	Actuator drive circuit short	Repair the harness or replace the actuator
	Malfunction of the ECU	Replace the ECU

**Trouble Symptom 5**

Trouble symptom	Probable cause	Remedy
The ASC system is not canceled when the shift lever is moved to the "N" position (It is canceled, however, when the brake pedal is depressed)	Damaged or disconnected wiring of inhibitor switch input circuit	Repair the harness or repair or replace the inhibitor switch
	Improper adjustment of inhibitor switch	
	Malfunction of the ECU	Replace the ECU

**Trouble Symptom 6**

Trouble symptom	Probable cause	Remedy
Cannot decelerate (coast) by using the SET switch	Temporary damaged or disconnected wiring of SET switch input circuit	Repair the harness or replace the SET switch
	Actuator circuit poor contact	Repair the harness or replace the actuator
	Malfunction of the actuator	
	Malfunction of the ECU	Replace the ECU

**Trouble Symptom 7**

Trouble symptom	Probable cause	Remedy
Cannot accelerate or resume speed by using the RESUME switch	Damaged or disconnected wiring, or short circuit, or RESUME switch input circuit	Repair the harness or replace the RESUME switch
	Actuator circuit poor contact	Repair the harness or replace the actuator
	Malfunction of the actuator	
	Malfunction of the ECU	Replace the ECU

**Trouble Symptom 8**

Trouble symptom	Probable cause	Remedy
ASC system can be set while driving at a vehicle speed of less than 40 km/h (25 mph), or there is no automatic cancellation at that speed	Malfunction of the vehicle-speed sensor circuit	Repair the vehicle speed sensor system, or replace the part
	Malfunction of the speedometer cable or the speedometer drive gear	
	Malfunction of the ECU	Replace the ECU.

**Trouble Symptom 9**

Trouble symptom	Probable cause	Remedy
The cruise main switch indicator lamp does not illuminate (But ASC system is normal.)	Damaged or disconnected bulb of cruise main switch indicator lamp	Repair the harness or replace the part.
	Harness damaged or disconnected	

**Trouble Symptom 10**

Trouble symptom	Probable cause	Remedy
No alarm sound when SET switch or RESUME switch is used. (But ASC system is normal.)	Malfunction of the alarm circuit	Repair the harness or replace the part
	Malfunction of the ECU	

**Trouble Symptom 11**

Trouble symptom	Probable cause	Remedy
Malfunction of control function by ON/OFF switching of ELC 4 A/T accelerator switch	Malfunction of circuit related to accelerator switch OFF function	Repair the harness or replace the part
	Malfunction of the ECU	

**Trouble Symptom 12**

Trouble symptom	Probable cause	Remedy
Overdrive is not canceled during fixed speed driving.	Malfunction of circuit related to overdrive cancelation, or malfunction of ECU	Repair the harness or replace the part
No shift to overdrive during manual driving.		

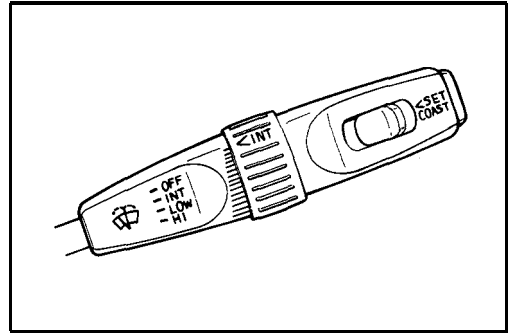
## CHECKING AUTOMATIC SPEED CONTROL SETTING

### CHECKING AUTOMATIC SPEED CONTROL MAIN SWITCH

1. Switch ON the MAIN switch.
2. Drive at the desired speed within the range of approximately 40-145 km/h (25-90 mph).
3. Press the SET button (of the control switch).
4. Check that the alarm sounds when the switch is pressed, and that when it is released the speed is the desired speed.

#### NOTE

If the vehicle speed decreases to approximately 20 km/h (12 mph) below the set speed, because of climbing a hill for example, the automatic speed control will be cancelled.

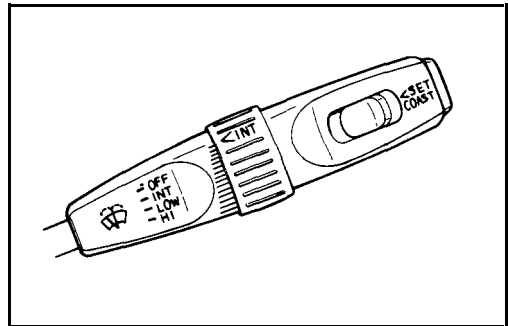


### CHECKING SPEED INCREASE SETTING

1. Set to the desired speed.
2. Press the RESUME button (of the control switch).
3. Check that the alarm sounds when the switch is pressed, that acceleration continues while the switch is pressed, and that the speed at the time that the switch is released, becomes the driving speed.

#### NOTE

Even if, during acceleration, the vehicle speed reaches or exceeds the high speed limit [approximately 145 km/h] acceleration will continue and when the button is released, the speed at that time ("memorized speed") will become the high limit of the vehicle speed.

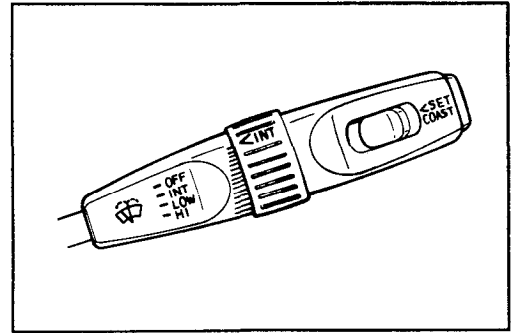


**CHECKING SPEED REDUCTION SETTING**

1. Set to the desired speed.
2. Press the COAST button (of the control switch).
3. Check that the alarm sounds when the switch is pressed, that deceleration continues while the switch is pressed, and that the speed at the time that the switch is released becomes the driving speed.

**NOTE**

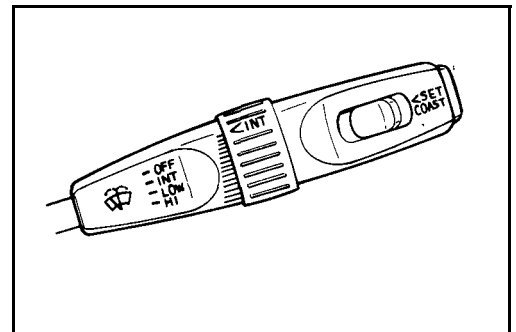
When the vehicle speed reaches the low limit [approximately 40 km/h (25 mph)] during deceleration, the automatic speed control will be cancelled.

**CHECKING AUTOMATIC SPEED CONTROL CANCELLATION**

1. Set the automatic speed control.
2. Check that the ASC is cancelled when either of the operations below is performed.
  - 1) The brake pedal is depressed.
  - 2) The shift lever is moved to the "N" range.
  - 3) The automatic speed control MAIN switch is switched OFF.

**CHECKING RETURN TO THE SET SPEED BEFORE CANCELLATION**

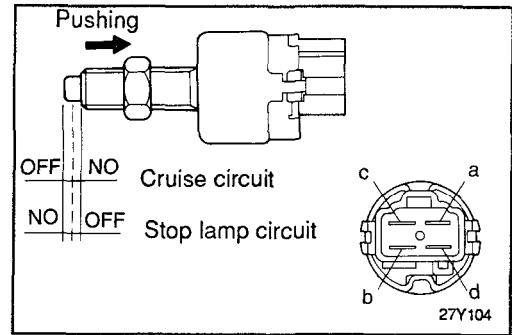
1. Set the automatic speed control.
2. Check that the automatic speed control is cancelled when either of the operations below is performed.
  - 1) The brake pedal is depressed.
  - 2) The shift lever is moved to the "N" range.
3. Press the RESUME button (of the control switch) while driving at a vehicle speed of approximately 40 km/h (25 mph) or higher.
4. The alarm will sound when the switch is pressed. The ASC will return to the previously set speed before the automatic speed control was cancelled.



# INDIVIDUAL PARTS INSPECTION STOP LAMP SWITCH INSPECTION

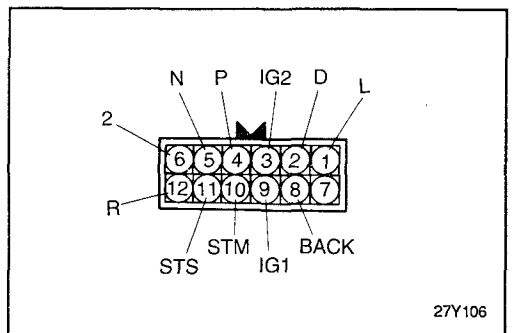
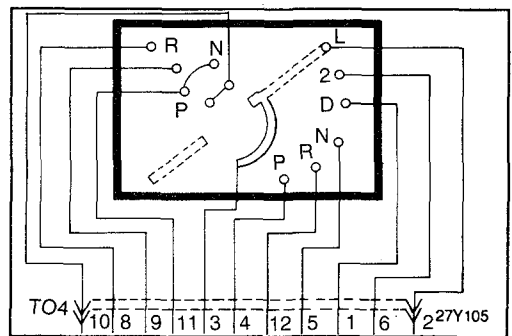
After operating the stop lamp switch, check for continuity between the terminals.

Terminal Position	a	b	c	d
Pushing			○ — ○	
Not pushing	○ — ○			



## CHECKING INHIBITOR SWITCH ("N" AND "P" POSITIONS)

1. Disconnect the connector.
2. Check that there is continuity between connector (EI 2) terminals 3 and 5, 3 and 4 when the shift lever is moved to the "N" range and the "P" range.



## CHECKING ACTUATOR

1. Disconnect the connector.
2. Measure the resistance value of the clutch coil.  
**Resistance of clutch coil between connector terminals (3) and (4)**  
**Standard value : Approx. 55**

