

## 1. Engine Electrical

## A: SPECIFICATIONS

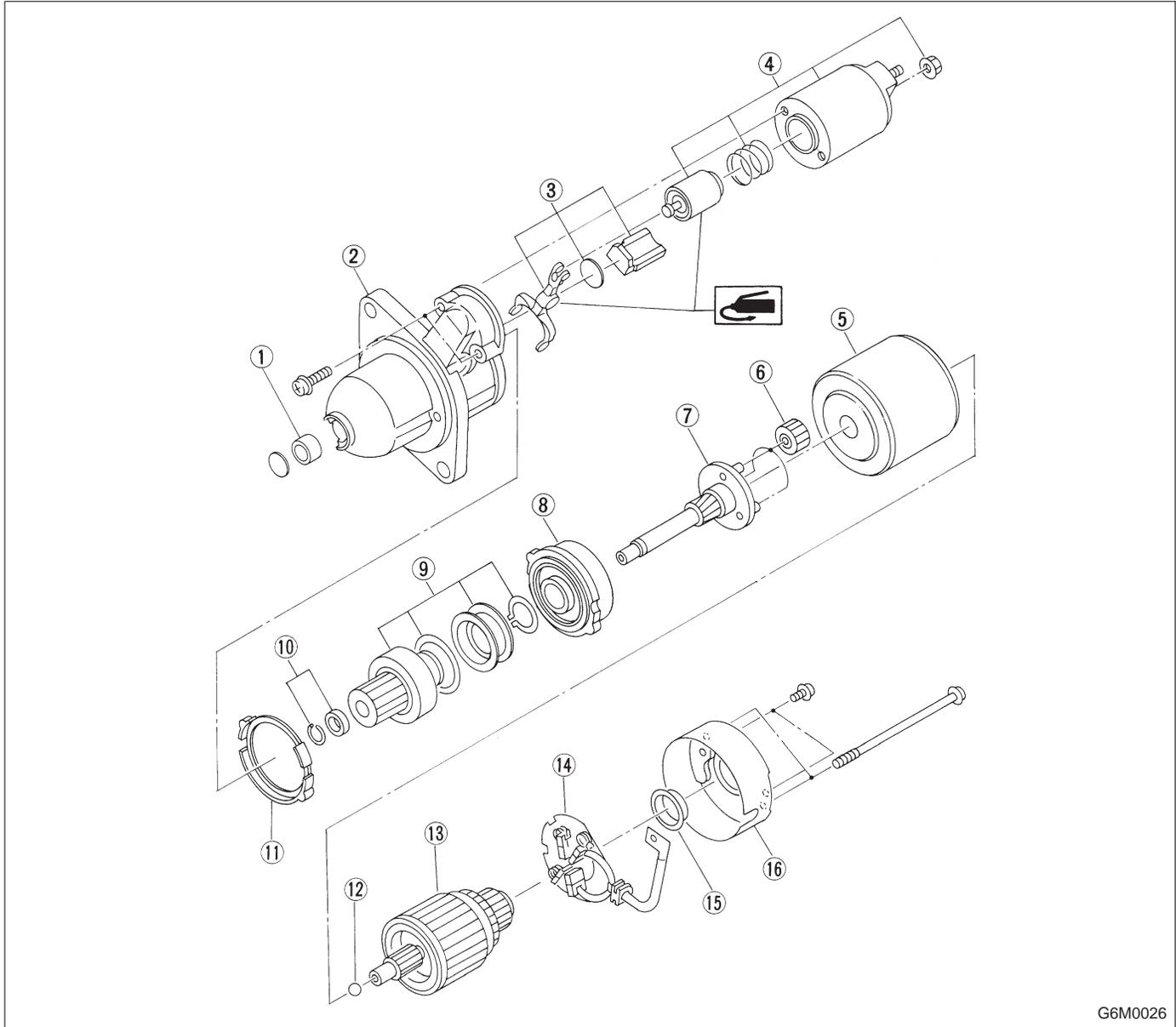
## 1. 1800 cc MODEL

Item		Designation		
Starter	Type	Reduction type		
	Model	MT M001T77181	AT M1T-75681	
	Manufacturer	Mitsubishi Electric		
	Voltage and output	12 V — 1.0 kW	12 V — 1.4 kW	
	Direction of rotation	Counterclockwise (when observed from pinion)		
	Number of pinion teeth	8	9	
	No-load characteristics	Voltage	11 V	
		Current	90 A or less	
		Rotating speed	3,000 rpm or more	
	Load characteristics	Voltage	8 V	7.7 V
		Current	280 A or less	300 A or less
		Torque	8.5 N·m (0.87 kg-m, 6.3 ft-lb)	10 N·m (1.0 kg-m, 7 ft-lb)
		Rotating speed	980 rpm or more	1,000 rpm or more
	Lock characteristics	Voltage	4 V	
		Current	780 A or less	980 A or less
Torque		17.6 N·m (1.80 kg-m, 13.0 ft-lb) or more	23 N·m (2.3 kg-m, 17 ft-lb) or more	
Generator	Type	Rotating-field three-phase type, Voltage regulator built-in type		
	Model	A2T39091		
	Manufacturer	Mitsubishi Electric		
	Voltage and output	12 V — 75 A		
	Polarity on ground side	Negative		
	Rotating direction	Clockwise (when observed from pulley side)		
	Armature connection	3-phase Y-type		
	Output current	1,500 rpm — 30 A or more 2,500 rpm — 64 A or more 5,000 rpm — 76 A or more		
	Regulated voltage	14.1 — 14.8 V [20°C (68°F)]		
Ignition coil	Model	CM12-100		
	Manufacturer	HITACHI		
	Primary coil resistance	0.63 — 0.77 Ω		
	Secondary coil resistance	10.4 — 15.6 kΩ		
	Insulation resistance between primary terminal and case	More than 10 MΩ		
Spark plug	Type and manufacturer	BKR6E-11 ..... NGK		
	Thread size	mm	14, P = 1.25	
	Spark gap	mm (in)	1.0 — 1.1 (0.039 — 0.043)	

**2. 2200 cc MODEL**

Item		Designation	
Starter	Type	Reduction type	
	Model	M001T75681	
	Manufacturer	MITSUBISHI	
	Voltage and output	12 V — 1.4 kW	
	Direction of rotation	Counterclockwise (when observed from pinion)	
	Number of pinion teeth	9	
	No-load characteristics	Voltage	11 V
		Current	90 A or less
		Rotating speed	3,000 rpm, or more
	Load characteristics	Voltage	7.7 V
		Current	300 A
		Torque	9.81 N·m (1.001 kg·m, 7.236 ft·lb)
		Rotating speed	1,000 rpm or more
	Lock characteristics	Voltage	4 V
Current		980 A or less	
Torque		23 N·m (2.35 kg·m, 17.0 ft·lb) or more	
Generator	Type	Rotating-field three-phase type, Voltage regulator built-in type	
	Model	A2T39091	
	Manufacturer	Mitsubishi Electric	
	Voltage and output	12 V — 75 A	
	Polarity on ground side	Negative	
	Rotating direction	Clockwise (when observed from pulley side)	
	Armature connection	3-phase Y-type	
	Output current	1,500 rpm — 30 A or more 2,500 rpm — 64 A or more 5,000 rpm — 76 A or more	
	Regulated voltage	14.5 <sup>+0.3</sup> <sub>-0.4</sub> V [20°C (68°F)]	
	Ignition coil	Model	F-569-01R
Manufacturer		Diamond	
Primary coil resistance		0.69 Ω±10%	
Secondary coil resistance		21.0 kΩ±15%	
Insulation resistance between primary terminal and case		More than 10 MΩ	
Spark plug	Type and manufacturer	Alternate RC10YC4 ..... CHAMPION (BKR6E-11 ..... NGK K20PR-U11 ..... NIPPONDENSO )	
	Thread size	mm 14, P = 1.25	
	Spark gap	mm (in) 1.0 — 1.1 (0.039 — 0.043)	

**1. Starter**



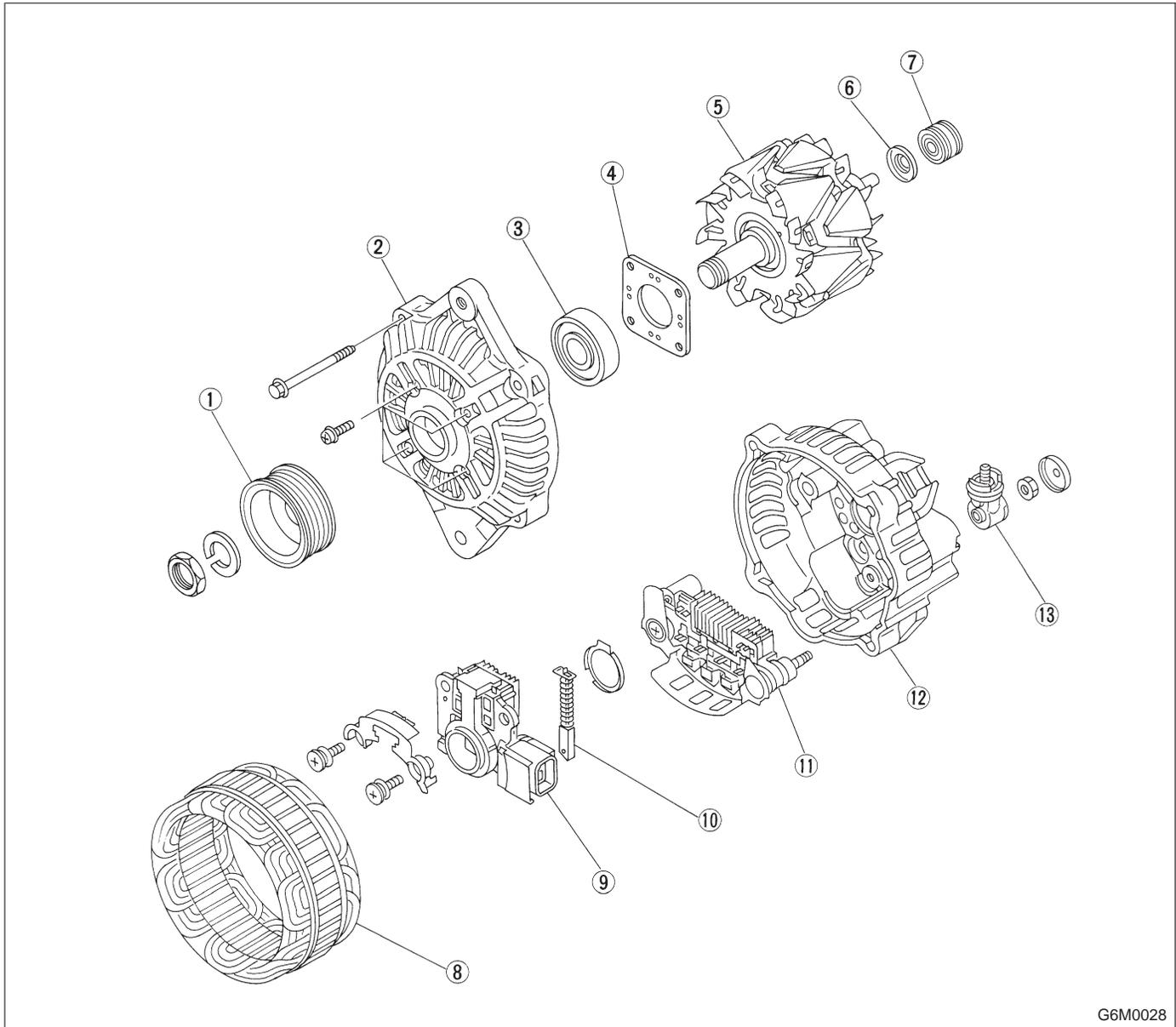
G6M0026

- ① Sleeve bearing
- ② Front bracket
- ③ Lever set
- ④ Magnet switch Assy
- ⑤ Yoke
- ⑥ Gear ASSY

- ⑦ Shaft ASSY
- ⑧ Internal gear ASSY
- ⑨ Over running clutch
- ⑩ Stopper set
- ⑪ Packing

- ⑫ Ball
- ⑬ Armature
- ⑭ Brush holder
- ⑮ Bearing
- ⑯ Rear bracket

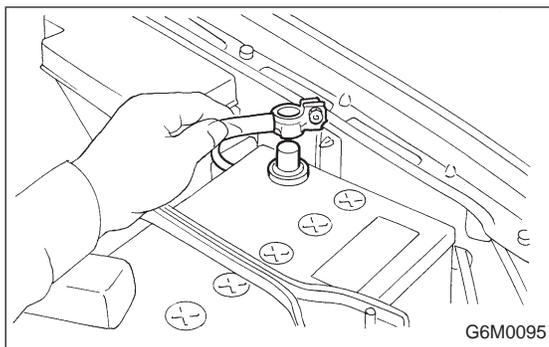
2. Generator



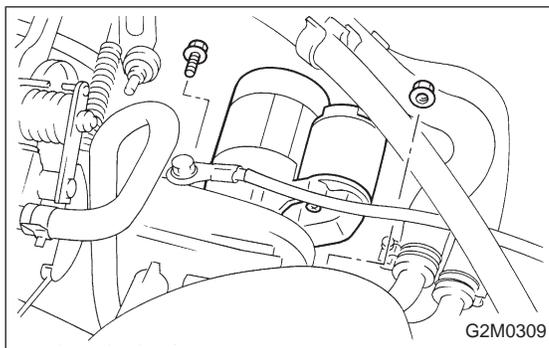
G6M0028

- |                    |                |                |
|--------------------|----------------|----------------|
| ① Pulley           | ⑥ Holder       | ⑩ Brush        |
| ② Front cover      | ⑦ Bearing      | ⑪ IC regulator |
| ③ Ball bearing     | ⑧ Stator coil  | ⑫ Rear cover   |
| ④ Bearing retainer | ⑨ Brush holder | ⑬ Terminal     |
| ⑤ Rotor            |                |                |

## 1. Starter



G6M0095



G2M0309

## 1. Starter

## A: REMOVAL AND INSTALLATION

- 1) Disconnect battery ground cable.
- 2) Disconnect connector and terminal from starter.
- 3) Remove starter from transmission.
- 4) Installation is in the reverse order of removal.

**Tightening torque:**

**46 — 54 N·m (4.7 — 5.5 kg·m, 34 — 40 ft-lb)**

## B: TEST

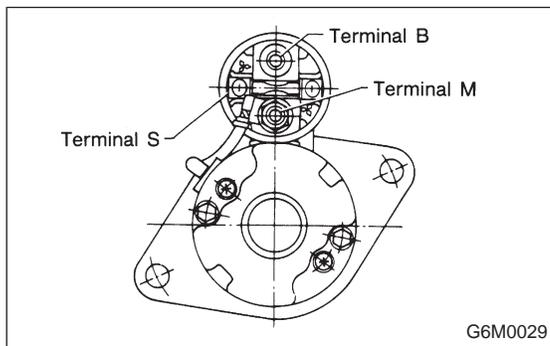
## 1. SWITCH ASSEMBLY OPERATION

- 1) Connect terminal S of switch assembly to positive terminal of battery with a lead wire, and starter body to ground terminal of battery. Pinion should be forced endwise on shaft.

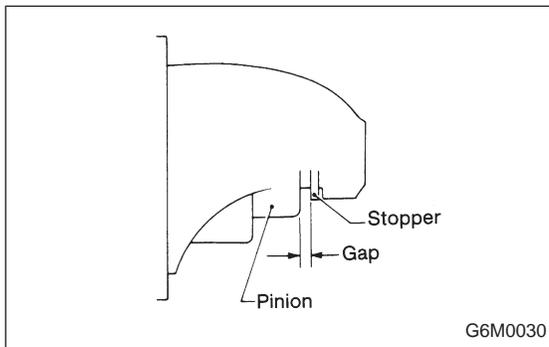
**CAUTION:**

**With pinion forced endwise on shaft, starter motor can sometimes rotate because current flows, through pull-in coil, to motor. This is not a problem.**

- 2) Disconnect connector from terminal M, and connect positive terminal of battery and terminal M using a lead wire and ground terminal to starter body. In this test set up, pinion should return to its original position even when it is pulled out with a screwdriver.



G6M0029



G6M0030

## 2. PINION GAP

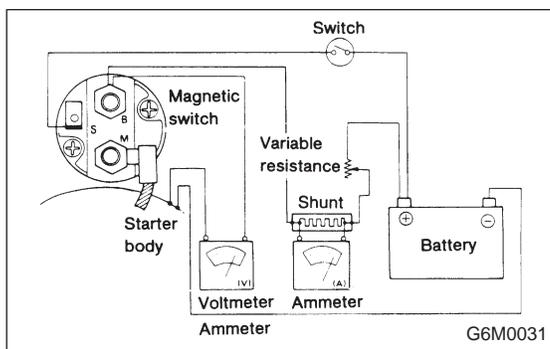
- 1) With pinion forced endwise on shaft, as outlined in step 1) above, measure pinion gap.

**Pinion gap:**

**0.5 — 2.0 mm (0.020 — 0.079 in)**

If motor is running with the pinion forced endwise on the shaft, disconnect connector from terminal M of switch assembly and connect terminal M to ground terminal (-) of battery with a lead wire. Next, gently push pinion back with your fingertips and measure pinion gap.

2) If pinion gap is outside specified range, remove or add number of adjustment washers used on the mounting surface of switch assembly until correct pinion gap is obtained.



### 3. PERFORMANCE TEST

The starter should be submitted to performance tests whenever it has been overhauled, to assure its satisfactory performance when installed on the engine.

Three performance tests, no-load test, load test, and lock test, are presented here; however, if the load test and lock test cannot be performed, carry out at least the no-load test.

For these performance tests, use the circuit shown in figure.

#### 1) No-load test

With switch on, adjust the variable resistance to obtain 11 V, take the ammeter reading and measure the starter speed. Compare these values with the specifications.

#### **No-load test (Standard):**

**Voltage / Current**

**11 V / 90 A max.**

**Rotating speed**

**3,000 rpm / min.**

#### 2) Load test

Apply the specified braking torque to starter. The condition is satisfactory if the current draw and starter speed are within specifications.

#### **Load test (Standard):**

**Voltage / Load**

**7.7 V / 10 N·m (1.0 kg-m, 7 ft-lb)**

**Current / Speed**

**300 A max. / 1,000 rpm / min.**

## 3) Lock test

With starter stalled, or not rotating, measure the torque developed and current draw when the voltage is adjusted to the specified voltage.

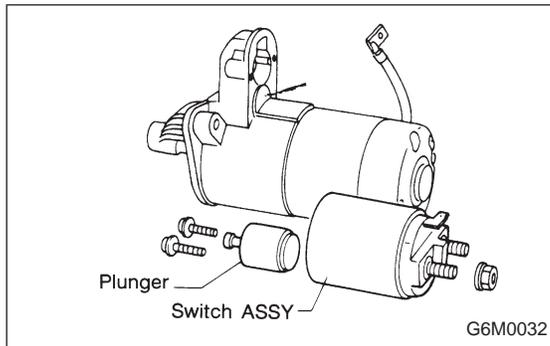
**Lock test (Standard):**

**Voltage / Current**

**4 V / 980 A max.**

**Torque**

**23 N·m (2.3 kg-m, 17 ft-lb) min.**

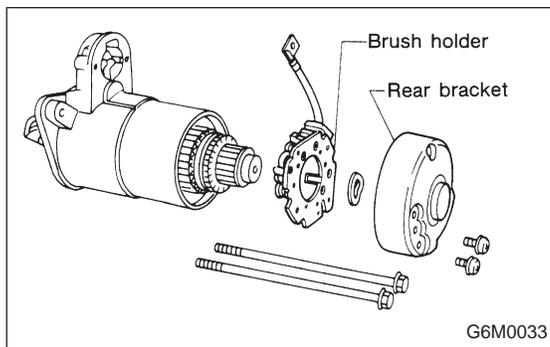
**C: DISASSEMBLY**

1) Loosen nut which holds terminal M of switch assembly, and disconnect connector.

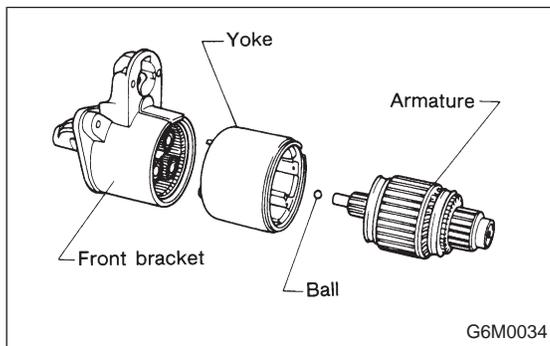
2) Remove bolts which hold switch assembly, and remove switch assembly, plunger and plunger spring from starter as a unit.

**CAUTION:**

**Be careful because pinion gap adjustment washer may sometimes be used on the mounting surface of switch assembly.**



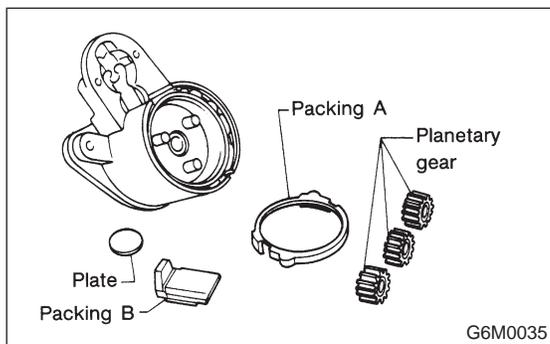
3) Remove both through-bolts and brush holder screws, and detach rear bracket and brush holder.



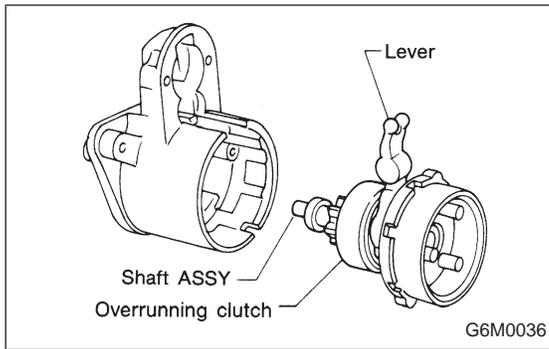
4) Remove armature and yoke. Ball used as a bearing will then be removed from the end of armature.

**CAUTION:**

**Be sure to mark an alignment mark on yoke and front bracket before removing yoke.**



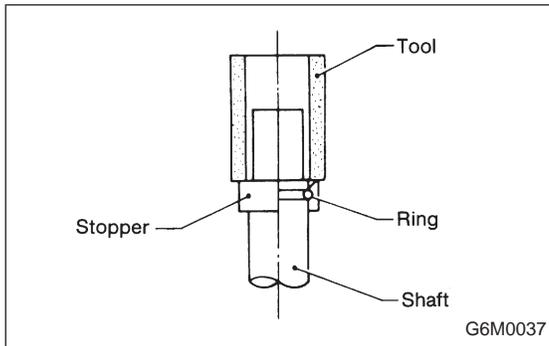
5) Remove packing A, three planetary gears, packing B and plate.



6) Remove shaft assembly and overrunning clutch as a unit.

**CAUTION:**

**Record the direction of lever before removing.**



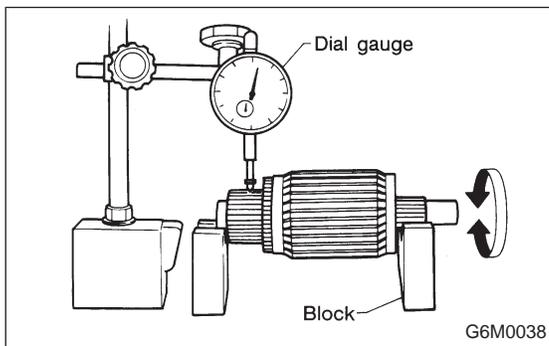
7) Remove overrunning clutch from shaft assembly as follows:

- (1) Remove stopper from ring by lightly tapping a fit tool placed on stopper.
- (2) Remove ring, stopper and clutch from shaft.

## D: INSPECTION

### 1. ARMATURE

1) Check commutator for any sign of burns or rough surfaces or stepped wear. If wear is of a minor nature, correct it by using sand paper.



2) Run-out test

Check the commutator run-out and replace if it exceeds the limit.

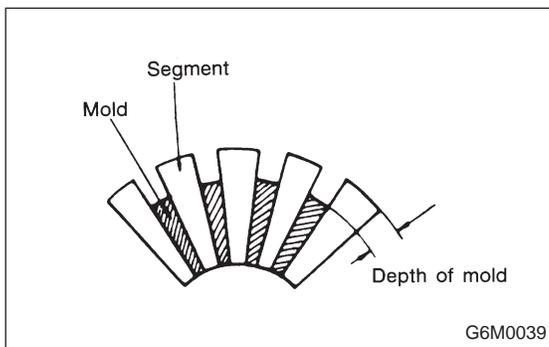
**Commutator run-out:**

**Standard**

**0.05 mm (0.0020 in)**

**Service limit**

**Less than 0.10 mm (0.0039 in)**

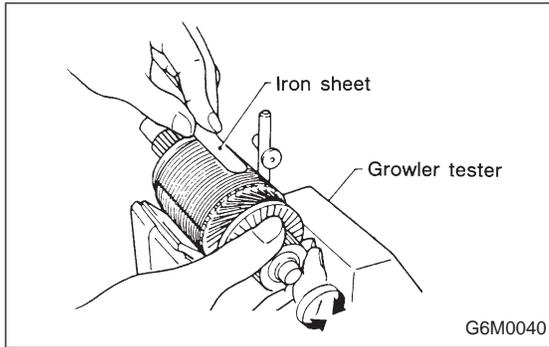


3) Depth of segment mold

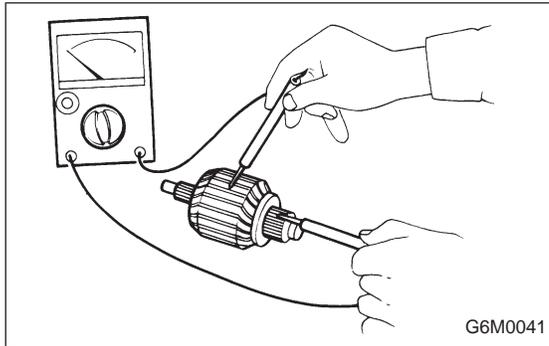
Check the depth of segment mold.

**Depth of segment mold:**

**0.5 — 0.8 mm (0.020 — 0.031 in)**

**4) Armature short-circuit test**

Check armature for short-circuit by placing it on growler tester. Hold a hacksaw blade against armature core while slowly rotating armature. A short-circuited armature will cause the blade to vibrate and to be attracted to core. If the hacksaw blade is attracted or vibrates, the armature, which is short-circuited, must be replaced or repaired.

**5) Armature ground test**

Using circuit tester, touch one probe to the commutator segment and the other to shaft. There should be no continuity. If there is a continuity, armature is grounded. Replace armature if it is grounded.

**2. YOKE**

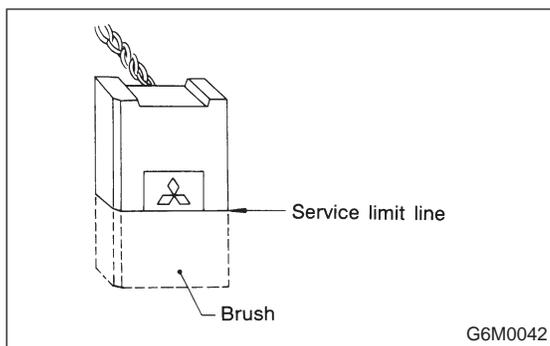
Make sure pole is set in position.

**3. OVERRUNNING CLUTCH**

Inspect teeth of pinion for wear and damage. Replace if it damaged. Rotate pinion in direction of rotation (clockwise). It should rotate smoothly. But in opposite direction, it should be locked.

**CAUTION:**

**Do not clean overrunning clutch with oil to prevent grease from flowing out.**



#### 4. BRUSH AND BRUSH HOLDER

##### 1) Brush length

Measure the brush length and replace if it exceeds the service limit.

Replace if abnormal wear or cracks are noticed.

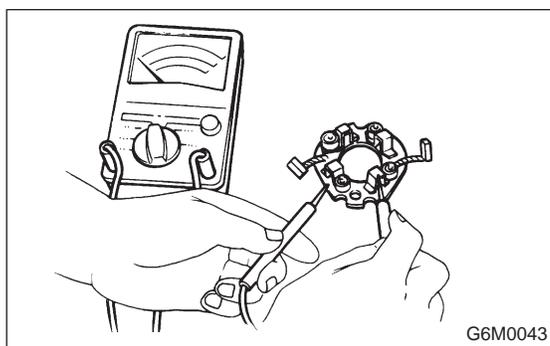
##### **Brush length:**

**Standard**                    **17.0 mm (0.669 in)**

**Service limit**                **11.5 mm (0.453 in)**

##### 2) Brush movement

Be sure brush moves smoothly inside brush holder.



##### 3) Insulation resistance of brush holder

Be sure there is no continuity between brush holder and its plate.

##### 4) Brush spring force

Measure brush spring force with a spring scale. If it is less than the service limit, replace brush spring.

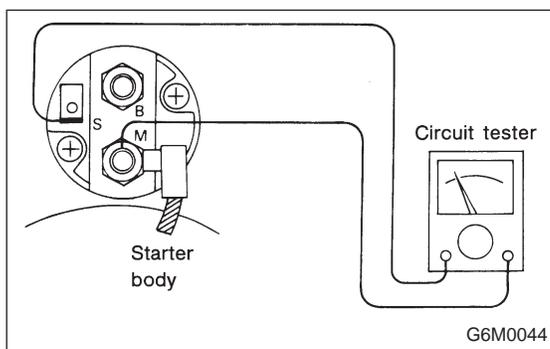
##### **Brush spring force:**

**Standard**

**18.6 N (1.9 kg, 4.2 lb) (when new)**

**Service limit**

**6.9 N (0.7 kg, 1.5 lb)**



#### 5. SWITCH ASSEMBLY

Be sure there is continuity between terminals S and M, and between terminal S and ground. Use a circuit tester (set in "ohm").

Also check to be sure there is no continuity between terminal M and B.

##### **Terminal / Specified resistance:**

**S — M / 10 Ω, max.**

**S — Ground / 10 Ω, max.**

**M — B / 1 MΩ, min.**

**E: ASSEMBLY**

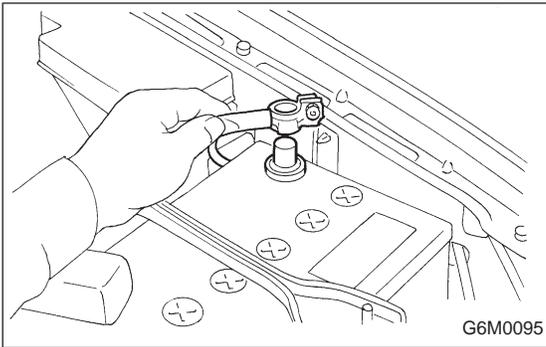
Assembly is in the reverse order of disassembly procedures. Observe the following:

1) Carefully assemble all parts in the order of assembly and occasionally inspect nothing has been overlooked.

2) Apply grease to the following parts during assembly.

- Front bracket sleeve bearing
- Armature shaft gear
- Outer periphery of plunger
- Mating surface of plunger and lever
- Gear shaft splines
- Mating surface of lever and clutch
- Ball at the armature shaft end
- Internal and planetary gears

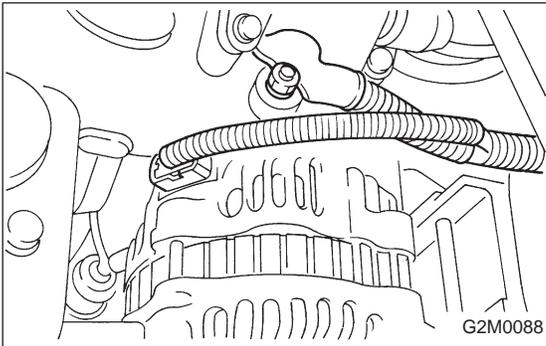
3) After assembling parts correctly, check to be sure starter operates properly.



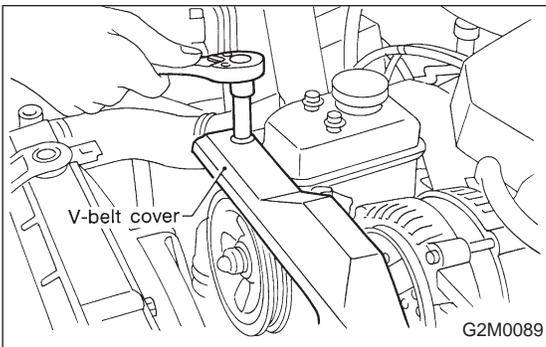
## 2. Generator

### A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.

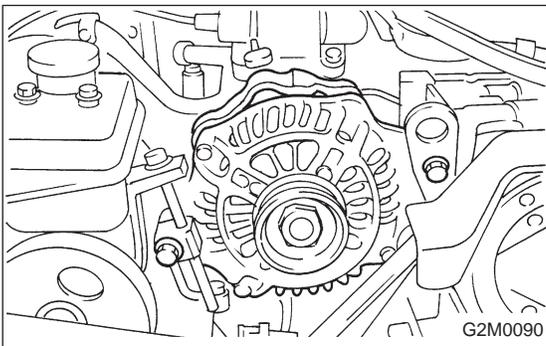


2) Disconnect connector and terminal from generator.

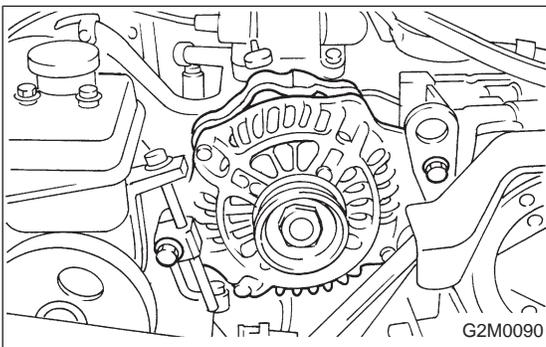


3) Remove V-belt cover.

4) Remove front side V-belt.



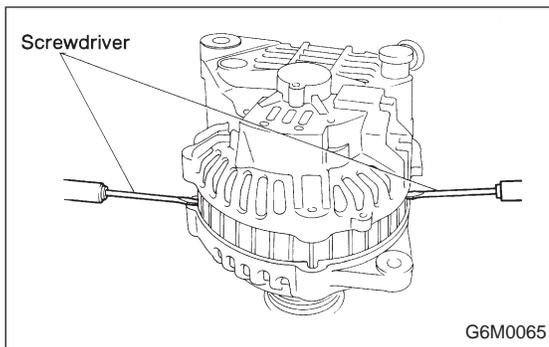
5) Remove bolts which install generator onto bracket.



6) Installation is in the reverse order of removal.

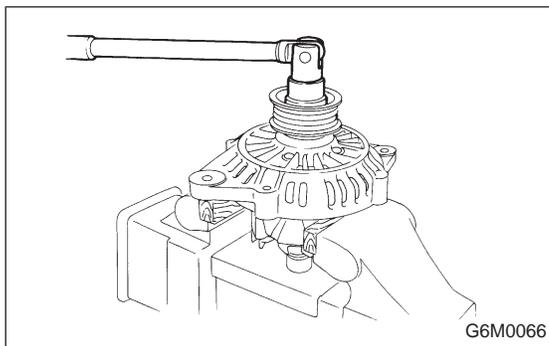
**CAUTION:**

**Check and adjust V-belt tension. <Ref. to 1-5 [W1A0].>**

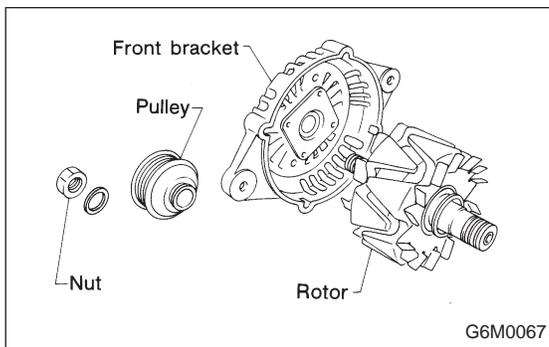


**B: DISASSEMBLY**

1) Remove the four through-bolts. Then insert the tip of a flat-head screwdriver into the gap between the stator core and front bracket. Pry them apart to disassemble.

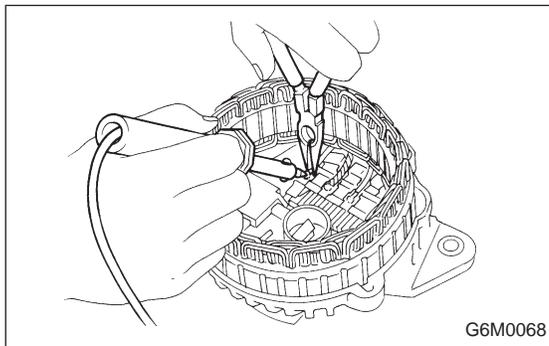


2) Hold rotor with a vise and remove pulley nut.



**CAUTION:**

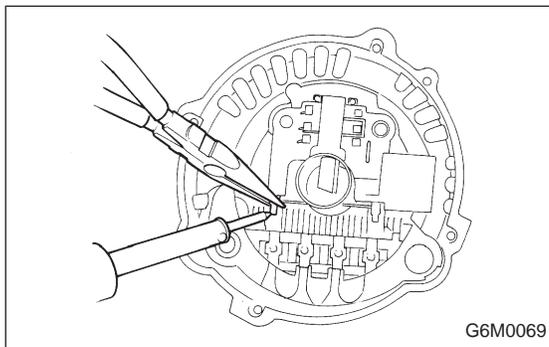
When holding rotor with vise, insert aluminum plates or wood pieces on the contact surfaces of the vise to prevent rotor from damage.



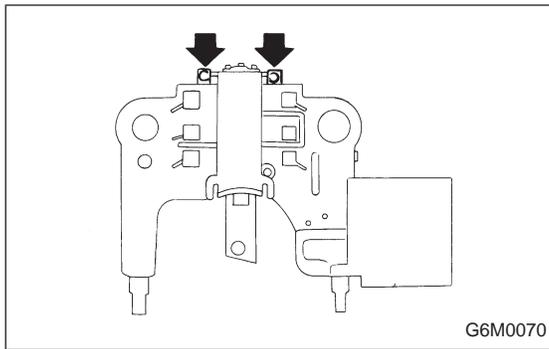
3) Unsolder connection between rectifier and stator coil to remove stator coil.

**CAUTION:**

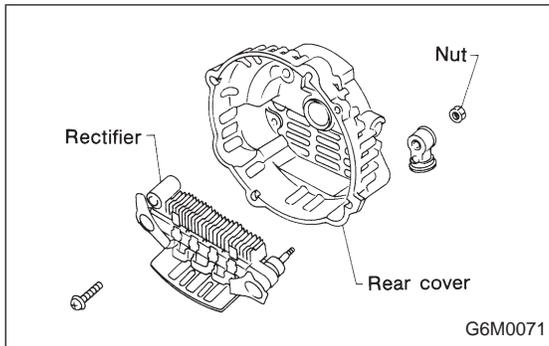
Finish the work rapidly (less than three seconds) because the rectifier cannot withstand heat very well.



4) Remove screws which secure IC regulator to rear cover, and unsolder connection between IC regulator and rectifier to remove IC regulator.



5) Remove the brushes by unsoldering at the pigtails.



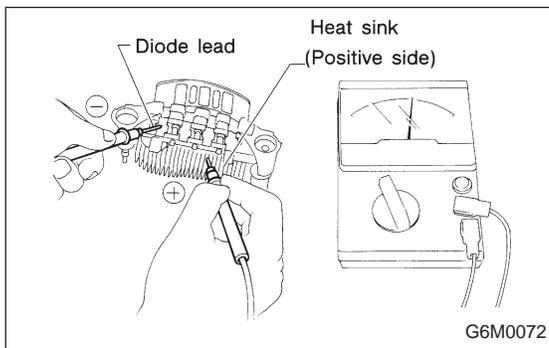
6) Remove the nut and insulating bushing at terminal B. Remove rectifier.

## C: INSPECTION AND REPAIR

### 1. DIODE

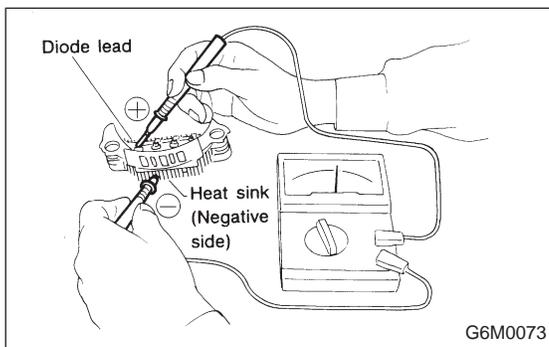
#### CAUTION:

Never use a megger tester (measuring use for high voltage) or any other similar measure for this test; otherwise, the diodes may be damaged.



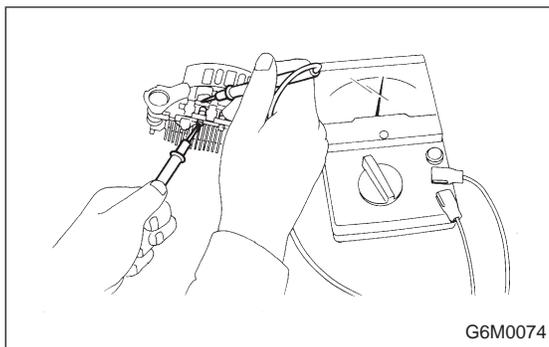
#### 1) Checking positive diode

Check for continuity between the diode lead and the positive side heat sink. The positive diode is in good condition if continuity exists only in the direction from the diode lead to the heat sink.



#### 2) Checking negative diode

Check for continuity between the negative side heat sink and diode lead. The negative diode is in good condition if continuity exists only in the direction from the heat sink to the diode lead.



3) Checking trio diode  
Check the trio diode using a circuit tester. It is in good condition if continuity exists only in one direction.

## 2. ROTOR

1) Slip ring surface  
Inspect slip rings for contamination or any roughness of the sliding surface. Repair slip ring surface using a lathe or sand paper.

2) Slip ring outer diameter  
Measure slip ring outer diameter. If slip ring is worn replace rotor assembly.

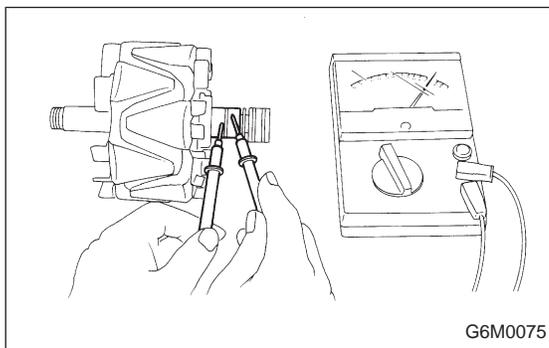
### **Slip ring outer diameter:**

#### **Standard**

**22.7 mm (0.894 in)**

#### **Limit**

**22.1 mm (0.870 in)**

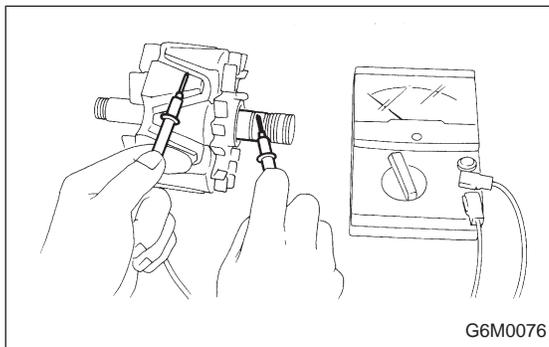


3) Continuity test  
Check resistance between slip rings using circuit tester. If the resistance is not within specification, replace rotor assembly.

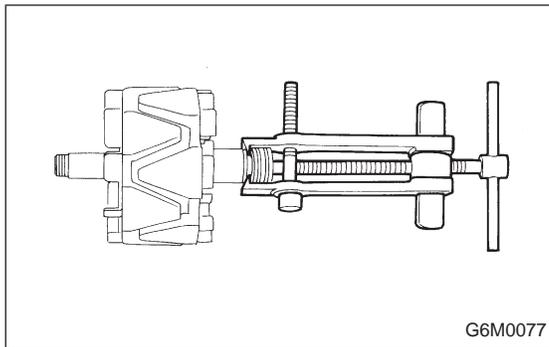
### **Specified resistance:**

**Approx. 3  $\Omega$  (A2T39091)**

**Approx. 2 — 6  $\Omega$  (A2T37291)**

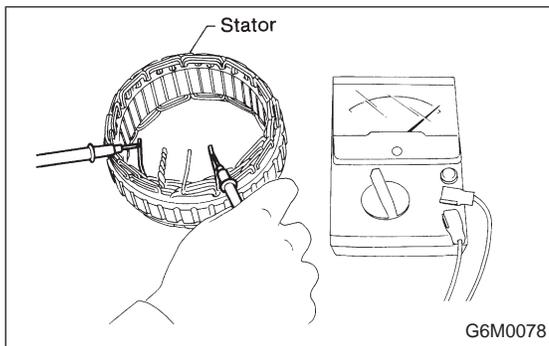


4) Insulation test  
Check continuity between slip ring and rotor core or shaft. If continuity exists, the rotor coil is short-circuited, and so replace rotor assembly.



### 5) Ball bearing (rear side)

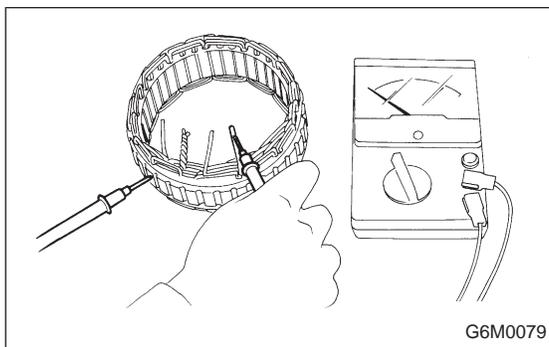
- (1) Check rear ball bearing. Replace if it is noisy or if rotor does not turn smoothly.
- (2) The rear bearing can be removed by using common bearing puller.



### 3. STATOR

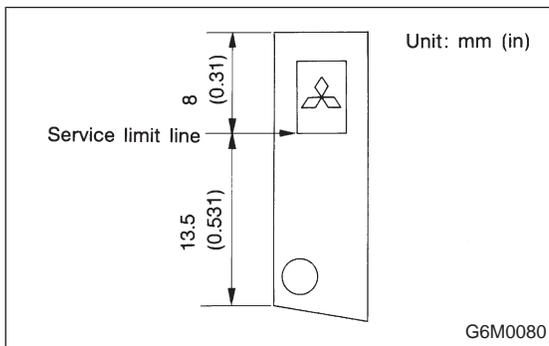
#### 1) Continuity test

Inspect stator coil for continuity between each end of the lead wires. If there is no continuity between individual lead wires, the lead wire is broken, and so replace stator assembly.



#### 2) Insulation test

Inspect stator coil for continuity between stator core and each end of the lead wire. If there is continuity, the stator coil is short-circuited, and so replace stator assembly.



### 4. BRUSH

1) Measure the length of each brush. If wear exceeds the service limit, replace the brush. Each brush has the service limit mark on it.

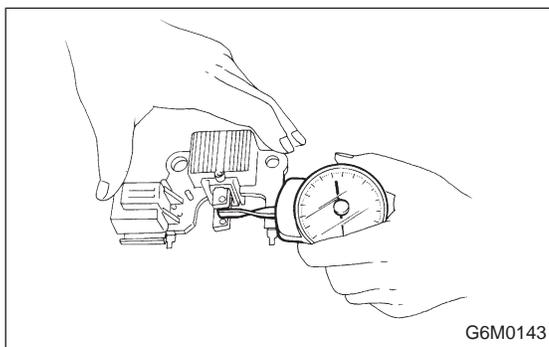
#### Brush length:

##### Standard

**21.5 mm (0.846 in)**

##### Service limit

**8.0 mm (0.315 in)**

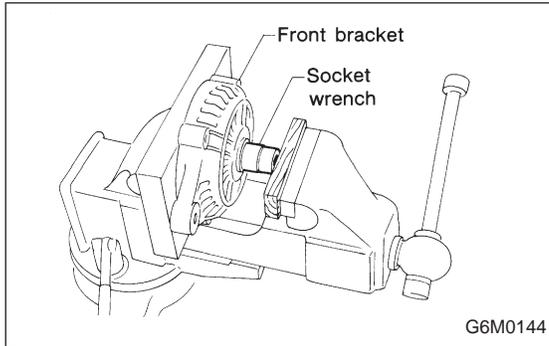


#### 2) Checking brush spring for proper pressure

Using a spring pressure indicator, push the brush into the brush holder until its tip protrudes 2 mm (0.08 in). Then measure the pressure of the brush spring. If the pressure is less than 3.236 N (330 g, 11.64 oz), replace the brush spring with a new one. The new spring must have a pressure of 5.786 to 6.963 N (590 to 710 g, 20.81 to 25.04 oz).

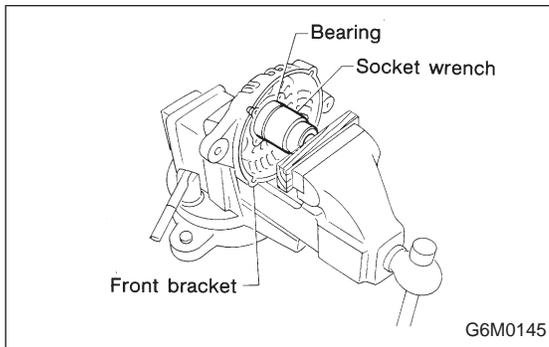
### 5. BEARING (FRONT SIDE)

1) Check front ball bearing. If resistance is felt while rotating, or if abnormal noise is heard, replace the ball bearing.



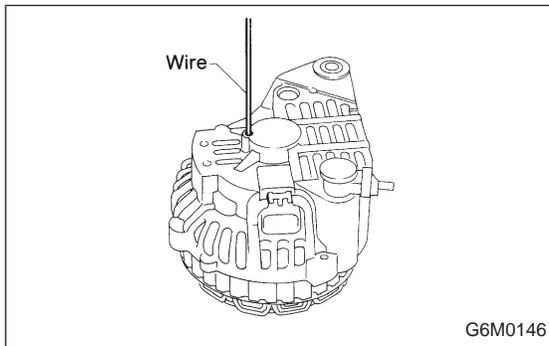
2) Replacing front bearing

- (1) Remove front bearing retainer.
- (2) Closely install a fit tool on the bearing inner race. Press the bearing down out of front bracket with a hand press or vise. A socket wrench can serve as the tool.



(3) Set a new bearing and closely install a fit tool on the bearing outer race. Press the bearing down into place with a hand press or vise. A socket wrench can serve as the tool.

(4) Install front bearing retainer.



### D: ASSEMBLY

To assemble, reverse order of disassembly.

1) Pulling up brush

Before assembling, press the brush down into the brush holder with your finger and secure in that position by passing a [2 mm (0.08 in) dia. length 4 to 5 cm (1.6 to 2.0 in)] wire through the hole shown in the figure.

#### CAUTION:

**Be sure to remove the wire after reassembly.**

2) Heat the rear bracket [50 to 60°C (122 to 140°F)] and press the rear bearing into the rear bracket. Then lubricate the rear bracket.

3) After reassembly, turn the pulley by hand to check that the rotor turns smoothly.

### 3. Spark Plug

#### A: REMOVAL AND INSTALLATION

##### CAUTION:

All spark plugs installed on an engine, must be of the same heat range.

##### Spark plug:

- 1800 cc model

NGK: BKR6E-11

CHAMPION: RC8YC4

- 2200 cc model

CHAMPION: R10YC4

(Alternate)

NGK: BKR6E-11

NIPPONDENSO: K20PR-U11

- 1) Remove spark plug cords by pulling boot, not cord itself.
- 2) Remove spark plugs.
- 3) When installing spark plugs on cylinder head, use spark plug wrench.

##### Tightening torque (Spark plug):

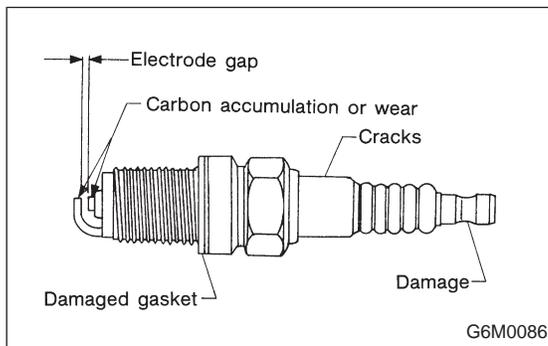
$21 \pm 3$  N·m ( $2.1 \pm 0.3$  kg·m,  $15.2 \pm 2.2$  ft·lb)

##### CAUTION:

The above torque should be only applied to new spark plugs without oil on their threads.

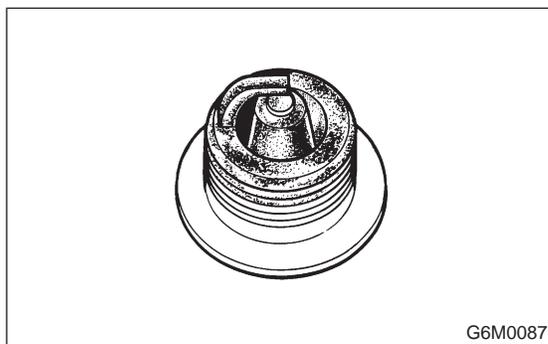
In case their threads are lubricated, the torque should be reduced by approximately 1/3 of the specified torque in order to avoid their over-stressing.

- 4) Connect spark plug cords.



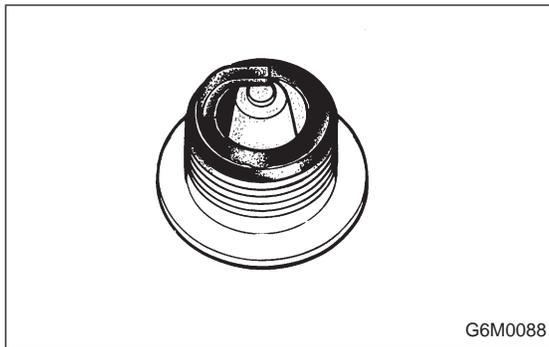
#### B: INSPECTION

Check electrodes and inner and outer porcelain of plugs, noting the type of deposits and the degree of electrode erosion.



- 1) Normal

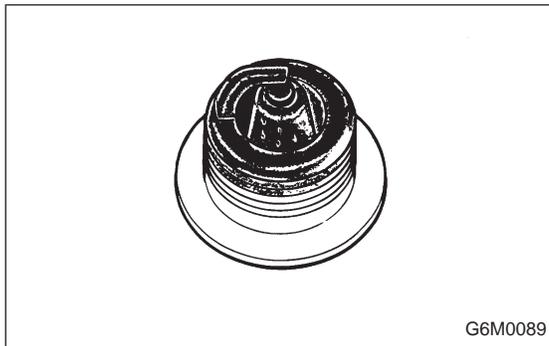
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.



## 2) Carbon fouled

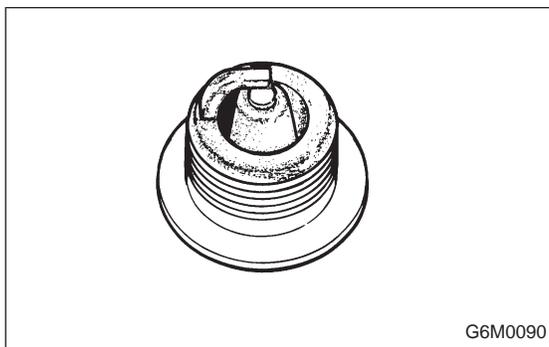
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.

It is advisable to replace with plugs having hotter heat range.



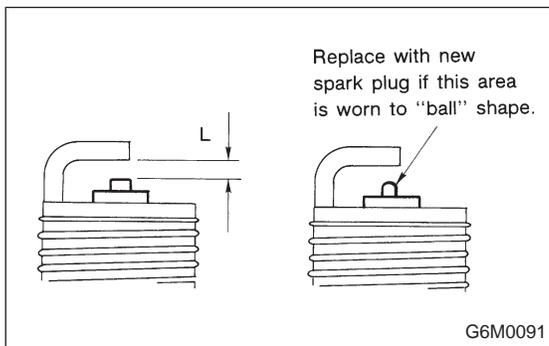
## 3) Oil fouled

Wet black deposits show excessive oil entrance into combustion chamber through worn rings and pistons or excessive clearance between valve guides and stems. If same condition remains after repair, use a hotter plug.



## 4) Overheating

White or light gray insulator with black or gray brown spots and bluish burnt electrodes indicate engine overheating. Moreover, the appearance results from incorrect ignition timing, loose spark plugs, wrong selection of fuel, hotter range plug, etc. It is advisable to replace with plugs having colder heat range.

**C: CLEANING AND REGAPPING**

Clean spark plugs in a sand blast type cleaner.

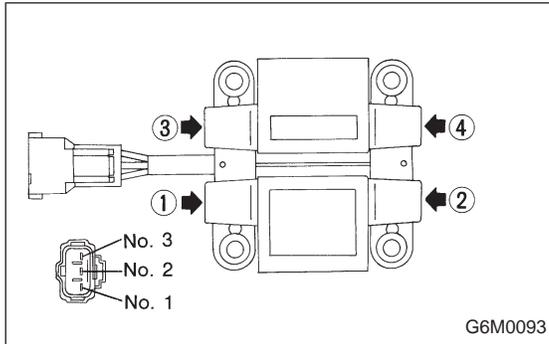
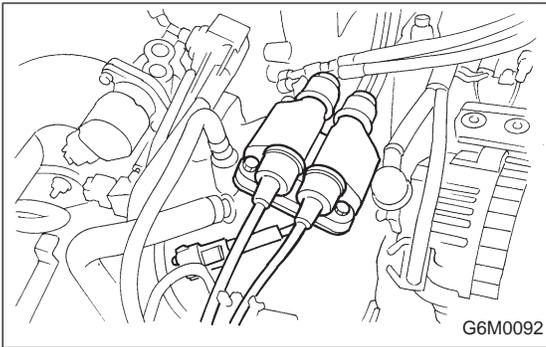
Avoid excessive blasting. Clean and remove carbon or oxide deposits, but do not wear away porcelain.

If deposits are too stubborn, discard plugs.

After cleaning spark plugs, recondition firing surface of electrodes with file. Then correct the spark plug gap using a gap gauge.

**Spark plug gap: L**

**1.0 — 1.1 mm (0.039 — 0.043 in)**



## 4. Ignition Coil

### A: REMOVAL AND INSTALLATION

- 1) Disconnect battery ground cable.
- 2) Disconnect connector from ignition coil.
- 3) Remove ignition coil.
- 4) Installation is in the reverse order of removal.

#### CAUTION:

Be sure to connect wires to their proper positions. Failure to do so will damage unit.

### B: INSPECTION

Using accurate tester, inspect the following items, and replace if defective.

- 1) Primary resistance
- 2) Secondary coil resistance

#### CAUTION:

If the resistance is extremely low, this indicates the presence of a short-circuit.

#### Specified resistance:

##### ● 1800 cc model

###### [Primary side]

Between ① and ②

Between ③ and ④

MT model 0.62 — 0.76 Ω

AT model 0.63 — 0.77 Ω

###### [Secondary side]

Between terminal No. 1 and No. 2

Between terminal No. 2 and No. 3

MT model 17.9 — 24.5 kΩ

AT model 10.4 — 15.6 kΩ

##### ● 2200 cc model

###### [Primary side]

Between ① and ②

Between ③ and ④

0.69 Ω±10%

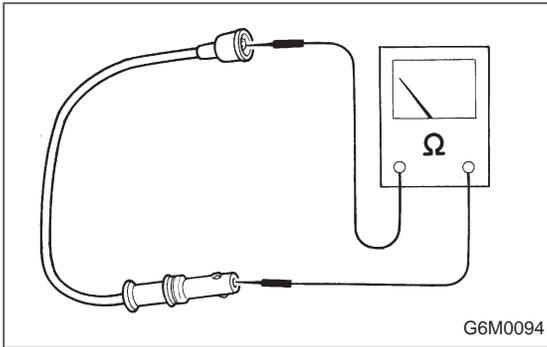
###### [Secondary side]

Between terminal No. 1 and No. 2

Between terminal No. 2 and No. 3

21.0 kΩ±15%

- 3) Insulation between primary terminal and case: 10 MΩ or more.



## 5. Spark Plug Cord

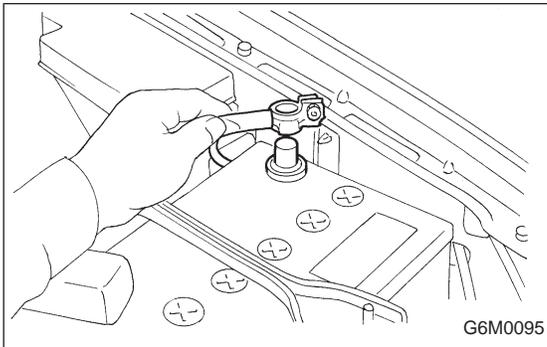
### A: INSPECTION

Check for:

- 1) Damage to cords, deformation, burning or rust formation of terminals.
- 2) Resistance values of cords.

#### **Resistance value:**

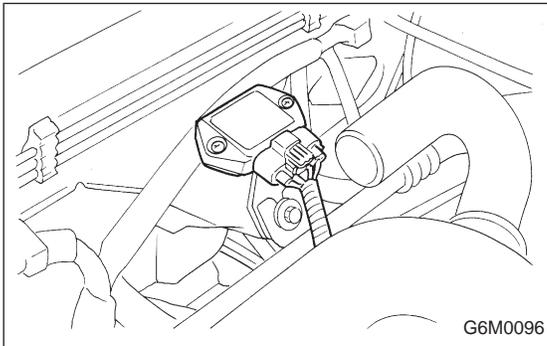
- **1800 cc model**
  - #1 and #3 cords 4.95 — 11.56 kΩ
  - #2 cord 4.86 — 11.33 kΩ
  - #4 cord 5.24 — 12.23 kΩ
- **2200 cc model**
  - 5.12 — 12.34 kΩ

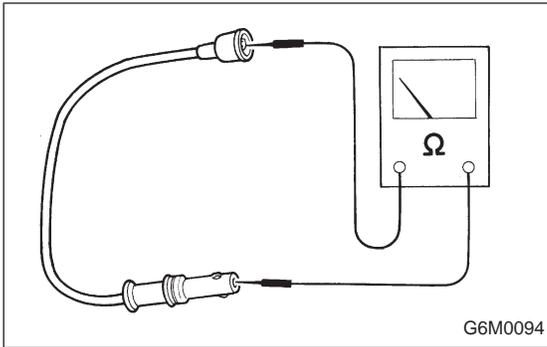


## 6. Ignitor

### A: REMOVAL AND INSTALLATION

- 1) Disconnect battery ground cable.
- 2) Disconnect connector from ignitor.
- 3) Remove screws which hold ignitor onto body.
- 4) Installation is in the reverse order of removal.





## 5. Spark Plug Cord

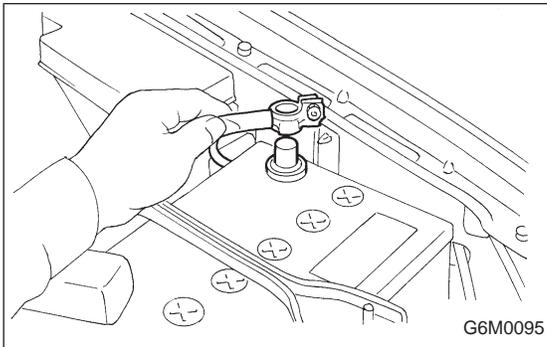
### A: INSPECTION

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- 1) Damage to cords, deformation, burning or rust formation of terminals.
- 2) Resistance values of cords.

**Resistance value:**

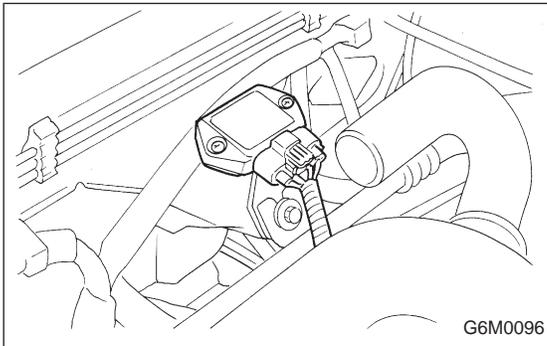
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## 6. Ignitor

### A: REMOVAL AND INSTALLATION

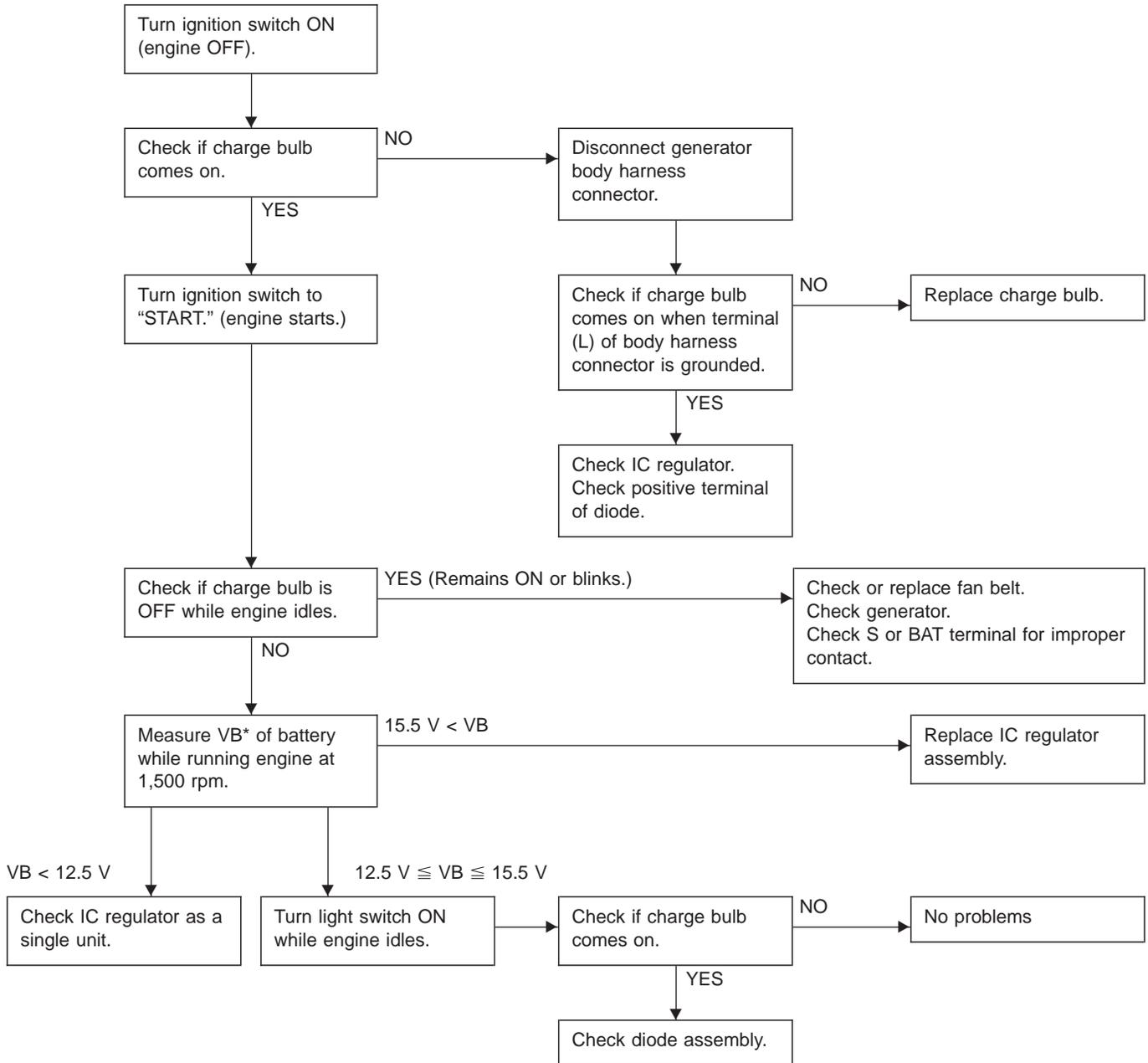
- 1) Disconnect battery ground cable.
- 2) Disconnect connector from ignitor.
- 3) Remove screws which hold ignitor onto body.
- 4) Installation is in the reverse order of removal.



1. Starter

Trouble		Probable cause
Starter does not start.	Magnet switch does not operate. (no clicks are heard.)	Magnet switch poor contact or discontinuity of pull-in coil circuit
		Improper sliding of magnet switch plunger
	Magnet switch operates. (clicks are issued.)	Poor contact of magnet switch's main contact point
		Layer short of armature
		Contaminants on armature commutator
		High armature mica
		Improper grounding of yoke field coil
		Insufficient carbon brush length
Starter starts but does not crank engine.	Failure of pinion gear to engage ring gear	Insufficient brush spring pressure
		Worn pinion teeth
		Improper sliding of overrunning clutch
	Clutch slippage	Improper adjustment of stud bolt
Starter starts but engine cranks too slowly.		Faulty clutch roller spring
		Poor contact of magnet switch's main contact point
		Layer short of armature
		Discontinuity, burning or wear of armature commutator
		Poor grounding of yoke field coil
		Insufficient brush length
		Insufficient brush spring pressure
Starter overruns.		Abnormal brush wear
		Magnet switch coil is a layer short.

2. Generator



\*: Terminal voltage

## 1. Body Electrical

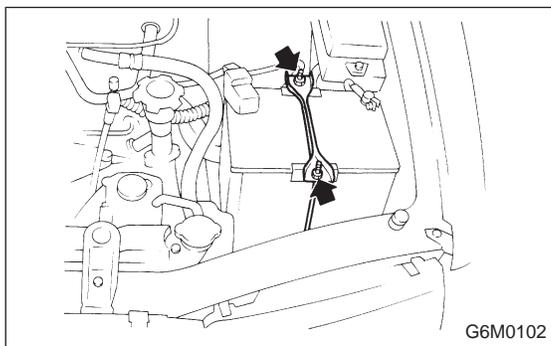
Battery	Type		MT model: 55D23L (MF)    AT model: 75D23L (MF)
	Capacity	Reverse capacity	MT model: 100 minutes    AT model: 120 minutes
		Cold cranking ampere	MT model: 430 amperes    AT model: 520 amperes
Combination meter	Speedometer		Eddy current type
	Temperature gauge		Thermistor cross coil type
	Fuel gauge		Resistance cross coil type
	Tachometer		Electric impulse type
	Turn signal indicator light		12 V — 1.4 W
	Charge indicator light		12 V — 1.4 W
	Oil pressure indicator light		12 V — 1.4 W
	A.B.S. warning light		12 V — 1.4 W
	CHECK ENGINE warning light		12 V — 1.4 W
	HI-beam indicator light		12 V — 3.4 W
	Door open warning light		12 V — 1.4 W
	Seat belt warning light		12 V — 1.4 W
	Brake fluid and parking brake warning light		12 V — 3.4 W
	FWD warning light		12 V — 1.4 W
	AIRBAG warning light		12 V — 1.4 W
	Meter illumination light		12 V — 3.4 W
AT OIL TEMP. warning light		12 V — 1.4 W	
Headlight			12 V — 60/55 W (Halogen)
Front turn signal light			12 V — 27 W
Side turn light			12 V — 3.8 W
Side marker/Parking light			12 V — 3.8 W
Rear combination light	Tail/Stop light		12 V — 8/27 W
	Turn signal light		12 V — 27 W
	Back-up light		12 V — 27 W
License plate light			12 V — 3.8 W
High-mount stop light			Sedan: 12 V — 18 W    Wagon: 12 V — 13 W
Room light			12 V — 8 W
Spot light			12 V — 8 W
Trunk room light			12 V — 5 W
Luggage room light			12 V — 5 W
Selector lever illumination light			12 V — 1.7 W

## 1. Precaution

- Before disassembling or reassembling parts, always disconnect battery ground cable. When repairing radio, control units, etc. which are provided with memory functions, record memory contents before disconnecting battery ground cable. Otherwise, these contents are cancelled upon disconnection.
- Reassemble parts in reverse order of disassembly procedure unless otherwise indicated.
- Adjust parts to specifications contained in this manual if so designated.
- Connect connectors and hoses securely during reassembly.
- After reassembly, ensure functional parts operate smoothly.

### CAUTION:

- Airbag system wiring harness is routed near the electrical parts and switch.
- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
- Be careful not to damage Airbag system wiring harness when servicing the ignition key cylinder.



## 2. Battery

### A: REMOVAL AND INSTALLATION

- 1) Disconnect the positive (+) terminal after disconnecting the negative (-) terminal of battery.
- 2) Remove flange nuts from battery rods and take off battery holder.
- 3) Remove battery.

#### **Tightening torque:**

**2.5 — 4.4 N·m (25 — 45 kg-cm, 22 — 39 in-lb)**

#### NOTE:

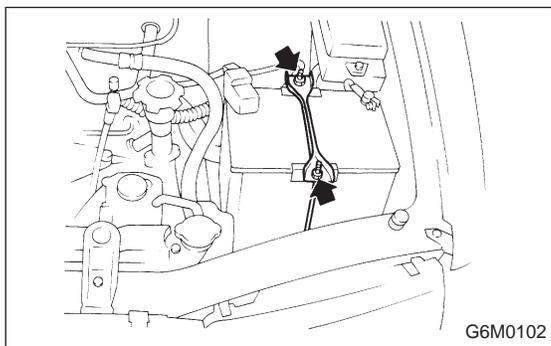
- Clean battery cable terminals and apply grease to retard the formation of corrosion.
- Connect the positive (+) terminal of battery and then the negative (-) terminal of the battery.

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- Connect the positive (+) terminal of battery and then the negative (-) terminal of the battery.

## **B: INSPECTION**

### **1. BATTERY**

#### 1) External parts

Check for the existence of dirt or cracks on the battery case, top cover, vent plugs, and terminal posts. If necessary, clean with water and wipe with a dry cloth.

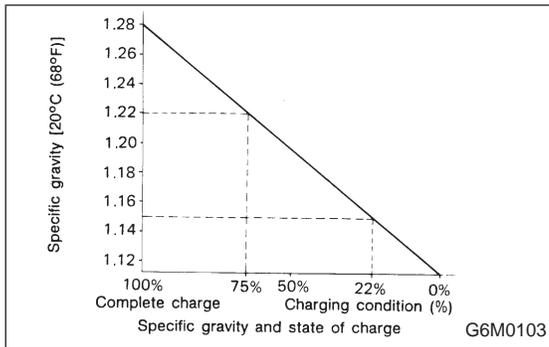
Apply a thin coat of grease on the terminal posts to prevent corrosion.

#### 2) Electrolyte level

Check the electrolyte level in each cell. If the level is below MIN LEVEL, bring the level to MAX LEVEL by pouring distilled water into the battery cell. Do not fill beyond MAX LEVEL.

### **WARNING:**

- **Electrolyte has toxicity; be careful handling the fluid.**
- **Avoid contact with skin, eyes or clothing. Especially at contact with eyes, flush with water for 15 minutes and get prompt medical attention.**
- **Batteries produce explosive gasses. Keep sparks, flame, cigarettes away.**
- **Ventilate when charging or using in enclosed space.**
- **For safety, in case an explosion does occur, wear eye protection or shield your eyes when working near any battery. Never lean over a battery.**
- **Do not let battery fluid contact eyes, skin, fabrics, or paint-work because battery fluid is corrosive acid.**
- **To lessen the risk of sparks, remove rings, metal watch-bands, and other metal jewelry. Never allow metal tools to contact the positive battery terminal and anything connected to it WHILE you are at the same time in contact with any other metallic portion of the vehicle because a short circuit will be caused.**



### 3) Specific gravity of electrolyte

Measure specific gravity of electrolyte using a hydrometer and a thermometer.

Specific gravity varies with temperature of electrolyte so that it must be corrected at 20°C (68°F) using the following Equation:

$$S_{20} = S_t + 0.0007 \times (t - 20)$$

$S_{20}$ : Specific gravity corrected at electrolyte temperature of 20°C

$S_t$ : Measured specific gravity

$t$ : Measured temperature (°C)

Determine whether or not battery must be charged, according to corrected specific gravity.

Standard specific gravity: 1.220 — 1.290 [at 20°C (68°F)]

Measuring the specific gravity of the electrolyte in the battery will disclose the state of charge of the battery. The relation between the specific gravity and the state of charge is as shown in figure.

## C: CHARGING

### WARNING:

- Do not bring an open flame close to the battery at this time.

### CAUTION:

- Prior to charging, corroded terminals should be cleaned with a brush and common baking soda solution.
- Be careful since battery electrolyte overflows while charging the battery.
- Observe instructions when handling battery charger.
- Before charging the battery on vehicle, disconnect battery ground terminal. Failure to follow this rule may damage alternator's diodes or other electrical units.

## 1. NORMAL CHARGING

Charge the battery at current value specified by manufacturer or at approximately 1/10 of battery's ampere-hour rating.

**2. QUICK CHARGING**

Quick charging is a method in which the battery is charged in a short period of time with a relatively large current by using a quick charger.

Since a large current flow raises electrolyte temperature, the battery is subject to damage if the large current is used for prolonged time. For this reason, the quick charging must be carried out within a current range that will not increase the electrolyte temperature above 40°C (104°F). It should be also remembered that the quick charging is a temporary means to bring battery voltage up to a fair value and, as a rule, a battery should be charged slowly with a low current.

**CAUTION:**

- **Observe the items in 1. NORMAL CHARGING.**
- **Never use more than 10 amperes when charging the battery because that will shorten battery life.**

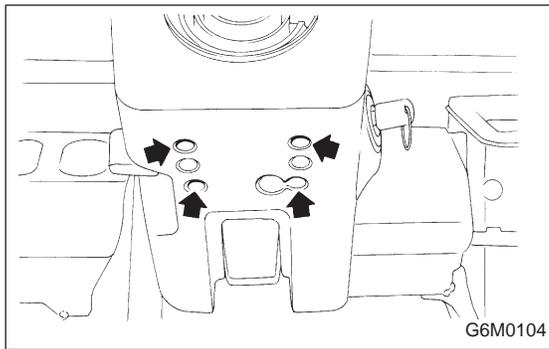
**3. JUDGMENT OF BATTERY IN CHARGED CONDITION**

- 1) Specific gravity of electrolyte is held at a specific value in a range from 1.250 to 1.290 for more than one hour.
- 2) Voltage per battery cell is held at a specific value in a range from 2.5 to 2.8 volts for more than one hour.

**4. CHECK HYDROMETER FOR STATE OF CHARGE**

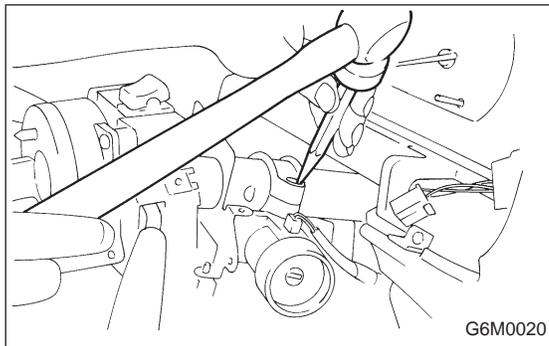
Hydrometer indicator	State of charge	Required action
Green dot	Above 65%	Load test
Dark dot	Below 65%	Charge battery
Clear dot	Low electrolyte	Replace battery* (If cranking complaint)

\*: Check electrical system before replacement.

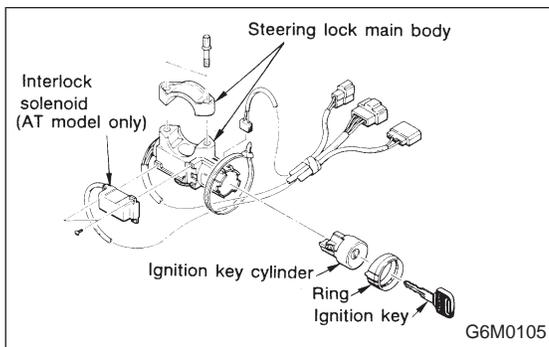


### 3. Ignition Key Switch

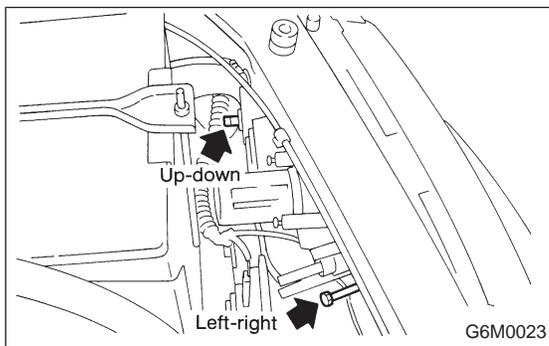
- 1) Remove screws, separate upper column cover and lower column cover.
- 2) Remove knee protector.
- 3) Remove meter visor.



- 4) Disconnect ignition switch connector from body harness.
- 5) Using a drift and hammer, hit the torn bolt head to loosen and remove the ignition switch.



- 6) When installing, tighten the connecting bolt until its head twists off.



### 4. Lighting

#### A: ADJUSTMENT

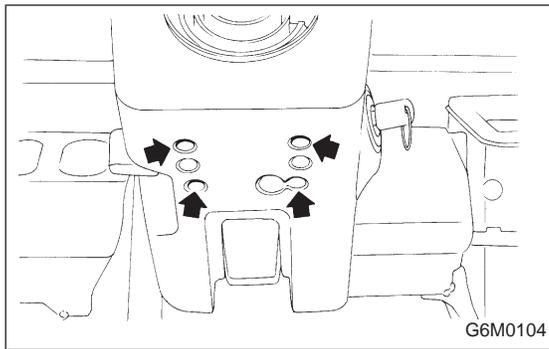
##### 1. HEADLIGHT AIMING

Before checking the headlight aiming:

- Be sure that the area around the headlights has not sustained any accident damage or other type of deformation.
- Park the vehicle on level ground.
- Check the tires for correct inflation pressure.
- Make certain that the vehicle's gas tank is full and that someone is seated in the driver's seat.
- Bounce the vehicle several times to normalize the suspension.

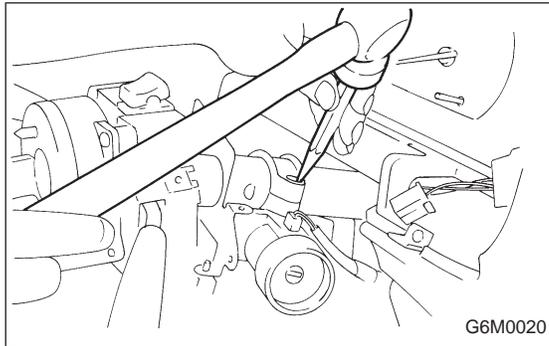
NOTE:

- Adjust vertical aim first, then horizontal aim.
- If headlight location is slightly shifted due to body deformity, etc., repair surface to be mated with headlight. <Ref. to 5-1 [S400].>

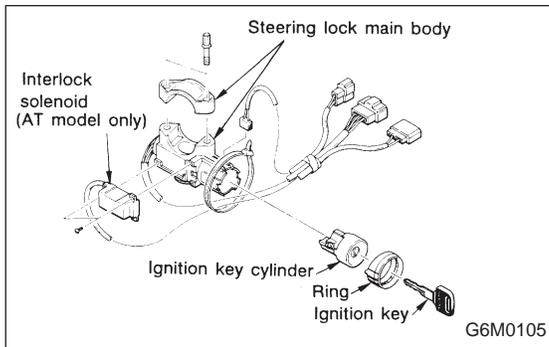


### 3. Ignition Key Switch

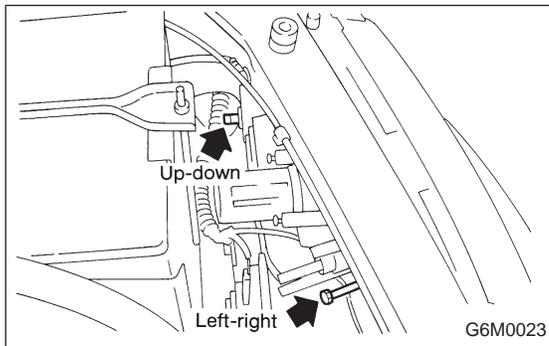
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### 4. Lighting

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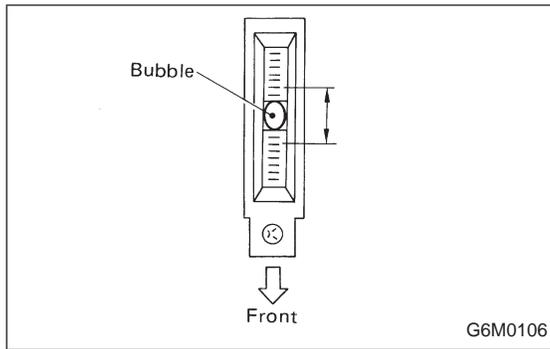
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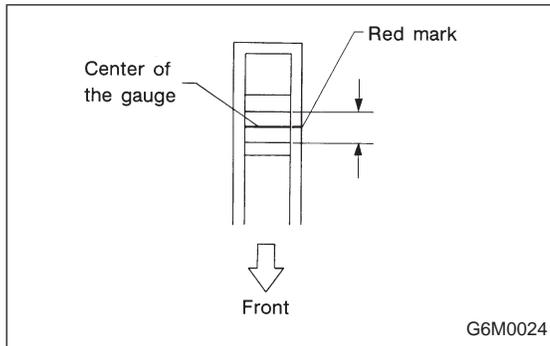
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- Bounce the vehicle several times to normalize the suspension.

NOTE:

- Adjust vertical aim first, then horizontal aim.
- If headlight location is slightly shifted due to body deformity, etc., repair surface to be mated with headlight. <Ref. to 5-1 [S400].>



1) Look at the beam angle gauge (vertical movement). The bubble on the gauge should not deviate from the center of the gauge.



2) Look at the beam angle gauge (horizontal movement). The center mark (the red line on the inner scale) should not deviate from the red line on the outer case.

## B: REMOVAL AND INSTALLATION

### 1. HEADLIGHT AND FRONT TURN SIGNAL LIGHT

- 1) Remove front grille and disconnect connector from headlight.
- 2) Remove screws which secure front turn signal light.
- 3) Remove front turn signal light while disconnecting connector.

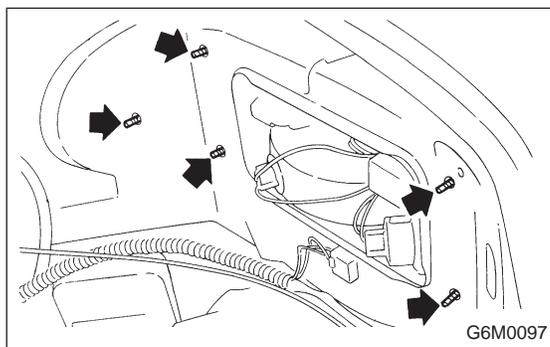
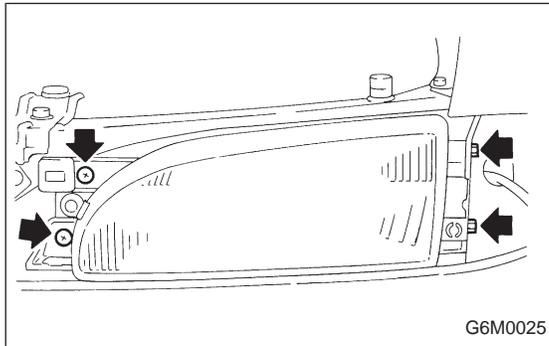
#### NOTE:

When installing, securely fit clip (on fender side) into locating (on front turn signal light side).

- 4) Remove screws and bolts which secure headlight and remove headlight.

#### **Tightening torque:**

**6 — 7 N·m (0.6 — 0.7 kg·m, 4.3 — 5.1 ft-lb)**



### 2. REAR COMBINATION LIGHT

- 1) Remove rear trim.
- 2) Remove nuts and disconnect connector.

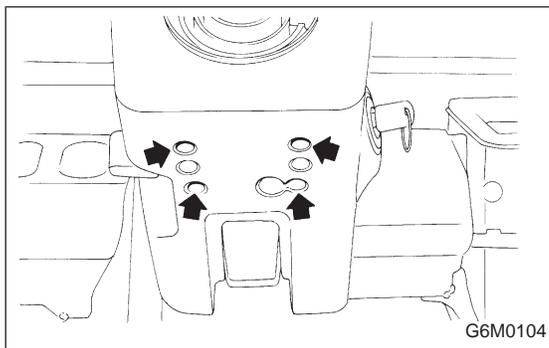
#### **Tightening torque:**

**6 — 7 N·m (0.6 — 0.7 kg·m, 4.3 — 5.1 ft-lb)**

- 3) Attach adhesive cloth tape to body area around rear combination light.
- 4) Using a standard screwdriver, carefully pry rear combination light off and away from the front of vehicle.

**CAUTION:**

- Do not pry rear combination light forcefully as this may scratch vehicle body.
- Remove all traces of adhesive tape from body before installation.
- Attach butyl rubber tape to back of rear combination light before installing rear combination light on body for sealing purposes.



**3. COMBINATION SWITCH (WITHOUT AIRBAG MODEL)**

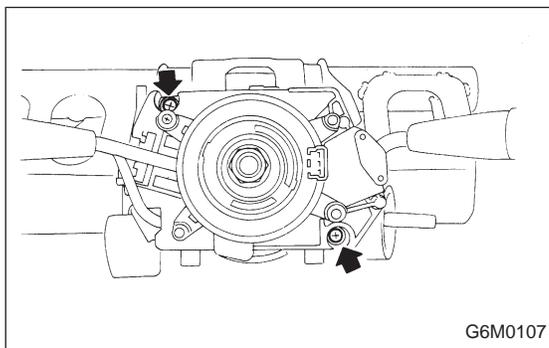
Refer to 5-5 [W5A0] as for removal of combination switch on airbag equipped model.

- 1) Remove steering wheel.
- 2) Remove screws which secure upper column cover to lower column cover.
- 3) Remove screws which secure knee protector and remove knee protector.

**CAUTION:**

When installing knee protector, ensure that harness is not caught by adjacent parts.

- 4) Disconnect connector from body harness and undo holddown band.

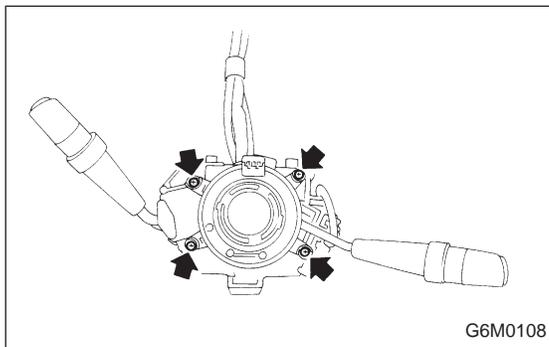


- 5) Remove screws which secure switch and remove switch.

**CAUTION:**

During installation (with key interlock)

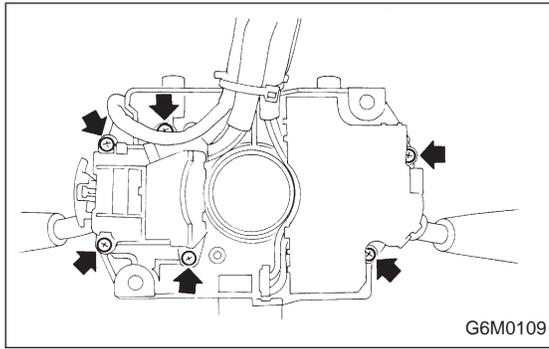
- When routing combination switch harness around steering system, do not place it over key interlock release knob.
- After installing lower column cover, ensure that key interlock release knob is accessible.



**C: DISASSEMBLY AND ASSEMBLY**

**1. COMBINATION SWITCH**

- 1) Remove screws which secure slip ring to combination switch, and remove slip ring.

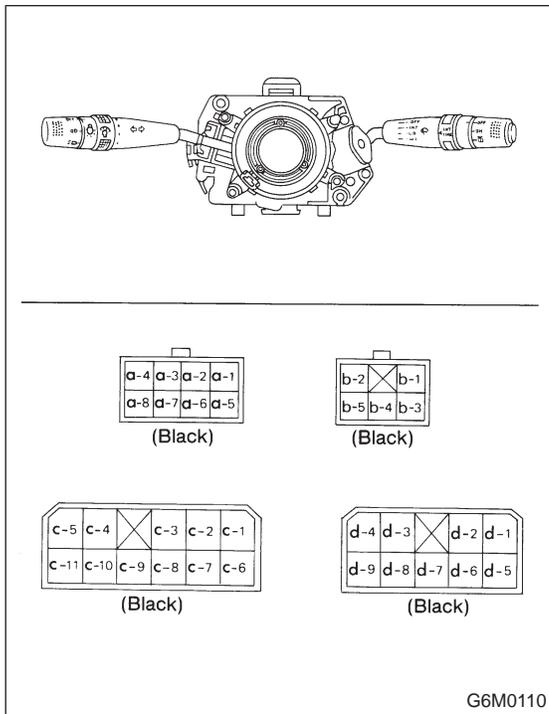


2) Remove screws which secure lighting switch, wiper and washer switch. Remove both switches.  
 Assembly is in the reverse order of disassembly.

**D: INSPECTION**

**1. COMBINATION SWITCH (ON-CAR)**

- 1) Remove instrument panel lower cover.
- 2) Remove lower column cover.



3) Unfasten holddown clip which secures harness, and disconnect connectors from body harness.

Move combination switch to respective positions and check continuity between terminals as indicated in the following tables.

**LIGHTING SWITCH**

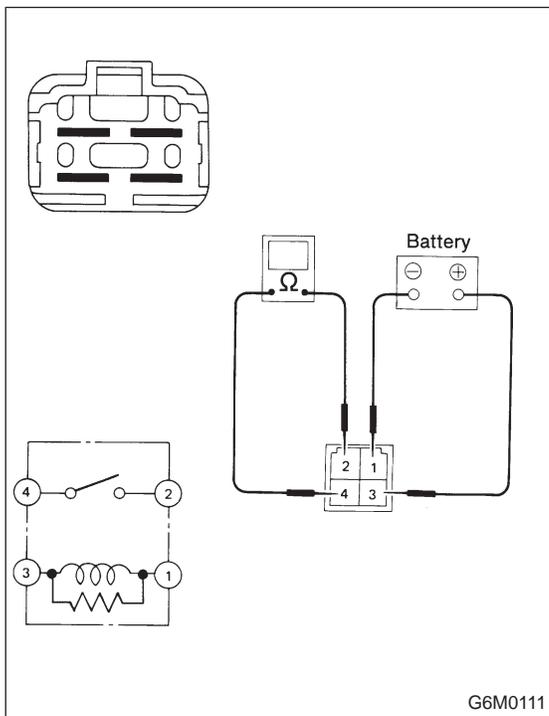
Terminal (Wire color)	c-1 (W)	c-2 (W)	c-3 (R)
Switch position			
OFF			
Tail	○	○	
Head	○	○	○

**PARKING SWITCH**

Terminal (Wire color)	c-10 (R)	c-11 (RG)	c-9 (RW)
Switch position			
OFF	○	○	
ON		○	○

**DIMMER AND PASSING SWITCH**

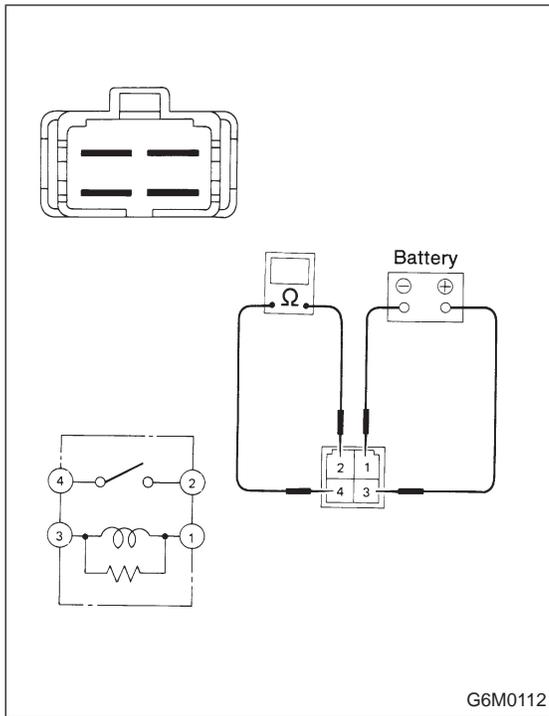
Terminal (Wire color)	a-3 (B)	a-2 (RB)	a-1 (RY)	a-4 (YR)
Switch position				
Flash	○		○	○
Low beam	○	○		
HI-beam	○		○	



**2. HEADLIGHT RELAY**

Check continuity between terminals (indicated in table below) when terminal (3) is connected to battery and terminal (1) is grounded.

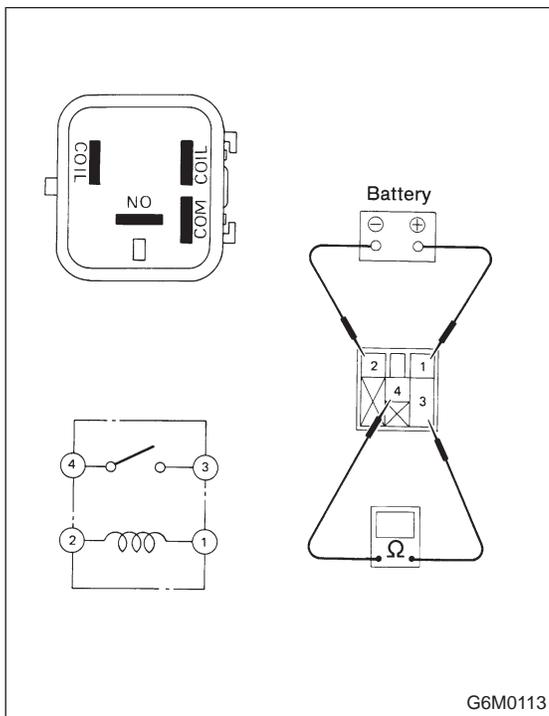
When current flows.	Between terminals (2) and (4)	Continuity exists.
When current does not flow.	Between terminals (2) and (4)	Continuity does not exist.
	Between terminals (1) and (3)	Continuity exists.



**3. TAIL AND ILLUMINATION RELAY**

Check continuity between terminals (indicated in table below) when terminal (3) is connected to battery and terminal (1) is grounded.

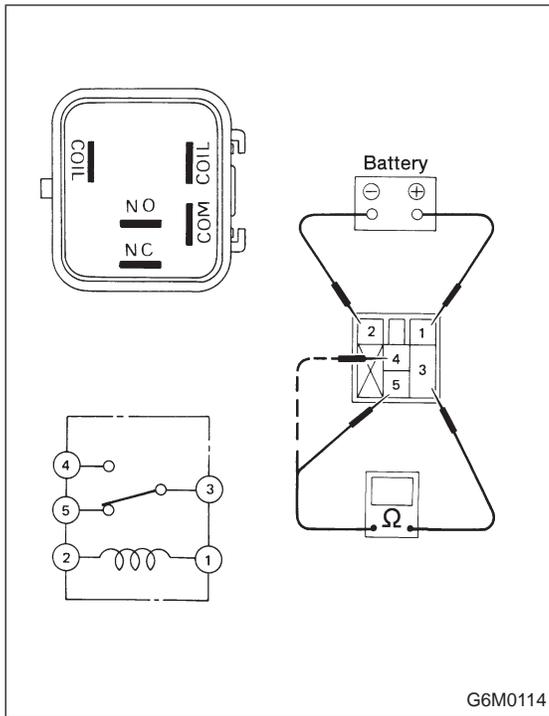
When current flows.	Between terminals (2) and (4)	Continuity exists.
When current does not flow.	Between terminals (2) and (4)	Continuity does not exist.
	Between terminals (1) and (3)	Continuity exists.



**4. DAYTIME RUNNING LIGHT RELAY**

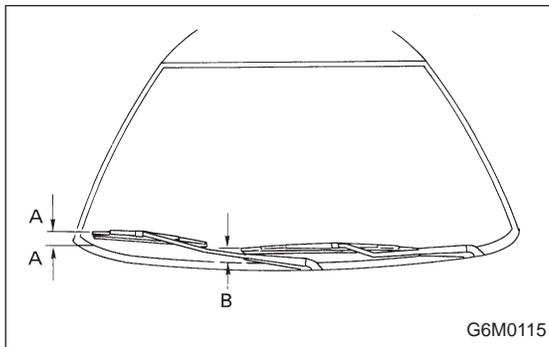
Check continuity between terminals (indicated in table below) when terminal (1) is connected to battery and terminal (2) is grounded.

When current flows.	Between terminals (3) and (4)	Continuity exists.
When current does not flow.	Between terminals (3) and (4)	Continuity does not exist.
	Between terminals (1) and (2)	Continuity exists.



Check continuity between terminals (indicated in table below) when terminal (1) is connected to battery and terminal (2) is grounded.

When current flows.	Between terminals (3) and (5)	Continuity does not exist.
	Between terminals (3) and (4)	Continuity exists.
When current does not flow.	Between terminals (3) and (5)	Continuity exists.
	Between terminals (1) and (2)	Continuity exists.



## 5. Front Wiper and Washer

### A: ON-CAR SERVICES

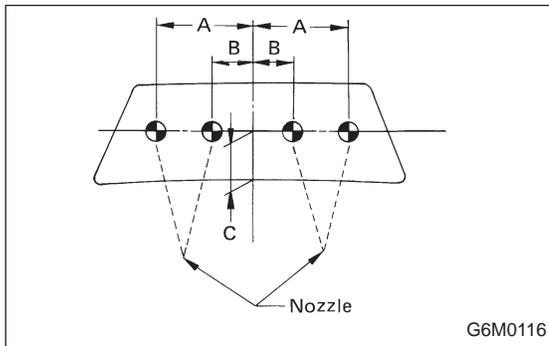
#### 1. ADJUSTMENT

1) When wiper switch is in "OFF" position, adjust blades in original position as shown in figure by changing wiper arm installation.

**Original position:**

**A: 15 — 30 mm (0.59 — 1.18 in)**

**B: 25 — 40 mm (0.98 — 1.57 in)**



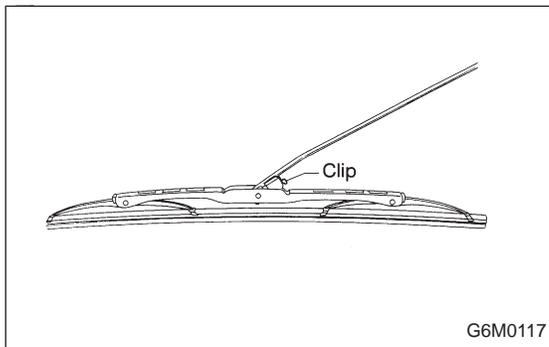
2) Adjust washer ejecting point on windshield glass as shown in figure when car stops.

**Ejecting point:**

**A: 375 mm (14.76 in)**

**B: 150 mm (5.91 in)**

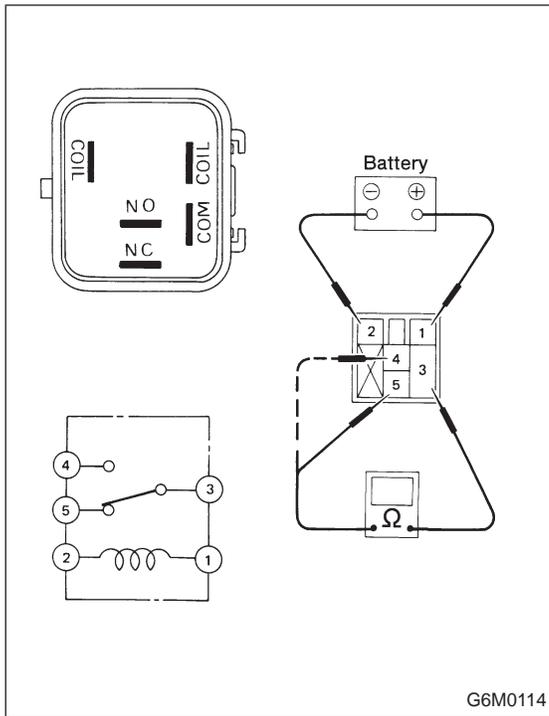
**C: 350 mm (13.78 in)**



### B: REMOVAL AND INSTALLATION

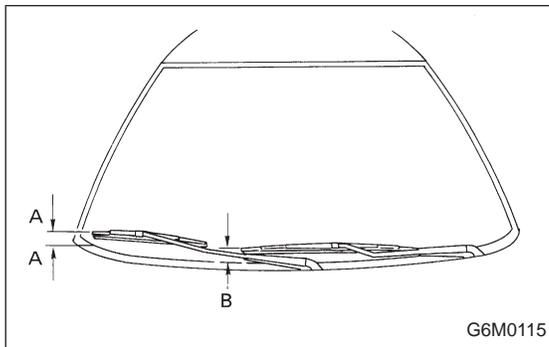
#### 1. BLADE

Pull out blade from arm while pushing up clip.



Check continuity between terminals (indicated in table below) when terminal (1) is connected to battery and terminal (2) is grounded.

When current flows.	Between terminals (3) and (5)	Continuity does not exist.
	Between terminals (3) and (4)	Continuity exists.
When current does not flow.	Between terminals (3) and (5)	Continuity exists.
	Between terminals (1) and (2)	Continuity exists.



## 5. Front Wiper and Washer

### A: ON-CAR SERVICES

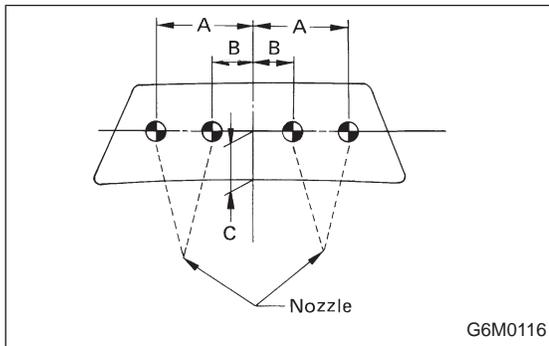
#### 1. ADJUSTMENT

1) When wiper switch is in "OFF" position, adjust blades in original position as shown in figure by changing wiper arm installation.

**Original position:**

**A: 15 — 30 mm (0.59 — 1.18 in)**

**B: 25 — 40 mm (0.98 — 1.57 in)**



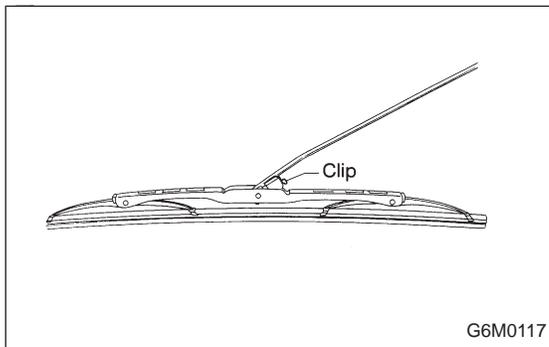
2) Adjust washer ejecting point on windshield glass as shown in figure when car stops.

**Ejecting point:**

**A: 375 mm (14.76 in)**

**B: 150 mm (5.91 in)**

**C: 350 mm (13.78 in)**

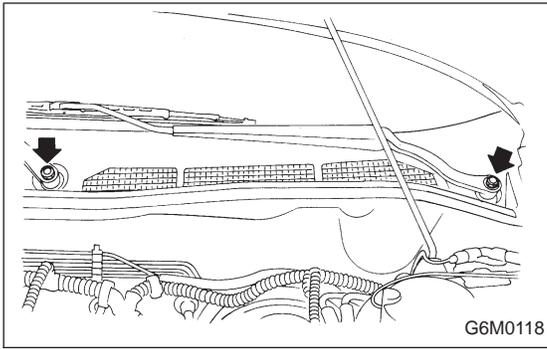


### B: REMOVAL AND INSTALLATION

#### 1. BLADE

Pull out blade from arm while pushing up clip.

## 5. Front Wiper and Washer

**2. WIPER ARM**

- 1) Open front hood.
- 2) Remove cap. Remove the nut which secure wiper arm, and remove wiper arm.

**Tightening torque:**

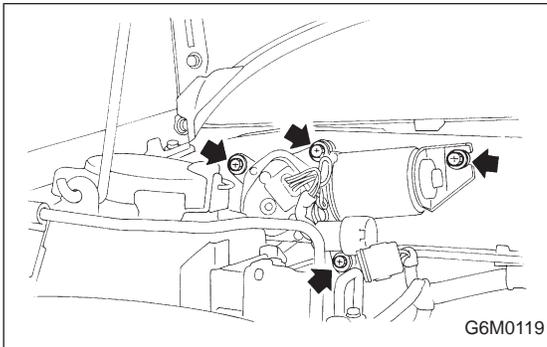
**10 — 18 N·m (1.0 — 1.8 kg-m, 7 — 13 ft-lb)**

**3. WIPER MOTOR AND LINK**

- 1) Detach weatherstrip and cowl net. <Ref. to 5-1.>

**NOTE:**

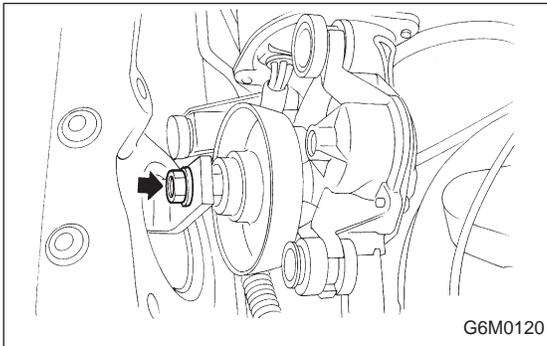
Apply silicone oil or soap water to both sides of cowl net to facilitate removal.



- 2) Disconnect electric connector, and remove motor attaching bolts.

**Tightening torque:**

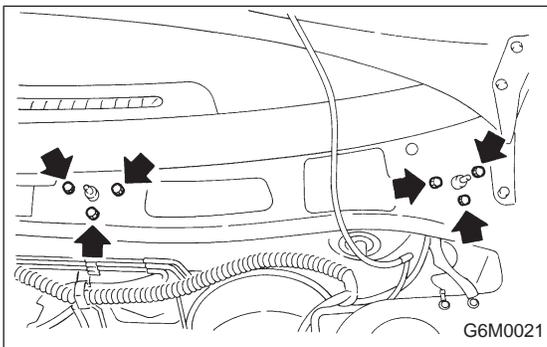
**4.4 — 7.4 N·m (0.45 — 0.75 kg-m, 3.3 — 5.4 ft-lb)**



- 3) Remove nut securing motor link on the back side of motor.

**Tightening torque:**

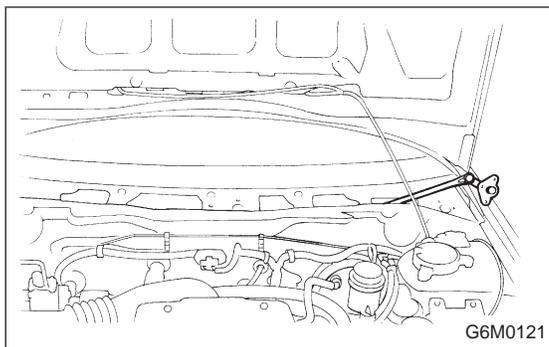
**12 — 18 N·m (1.2 — 1.8 kg-m, 9 — 13 ft-lb)**



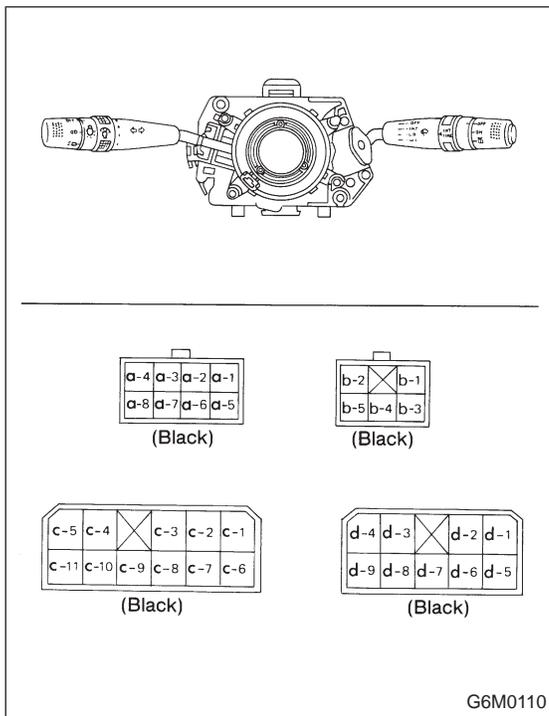
- 4) Remove nuts which secure sleeve unit.

**Tightening torque:**

**4.4 — 7.4 N·m (0.45 — 0.75 kg-m, 3.3 — 5.4 ft-lb)**



5) Remove wiper link from service hole in front panel.



**C: INSPECTION**

**1. FRONT WIPER AND WASHER SWITCH**

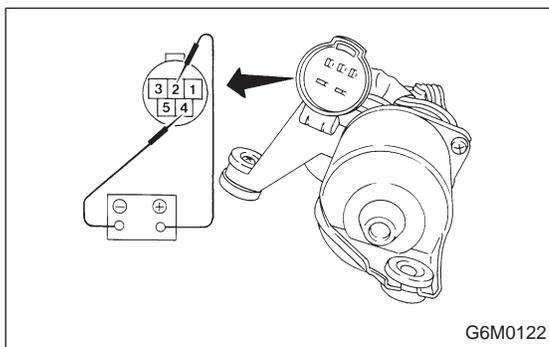
Set wiper switch to each position and check continuity between terminals (indicated in table below).

**Wiper switch**

Terminal (Wire color)		d-9 (Y)	d-8 (L)	d-6 (LY)	d-7 (LW)	INT1	INT2
Switch position	OFF	○—○					
	MIST	x—	○—○	x—			
INT	OFF	○—○				○—○	
	MIST	x—	○—○	x—		○—○	
LO	OFF		○—○				
	MIST		○—○				
HI	OFF			○—○			
	MIST		○—○	○—○			

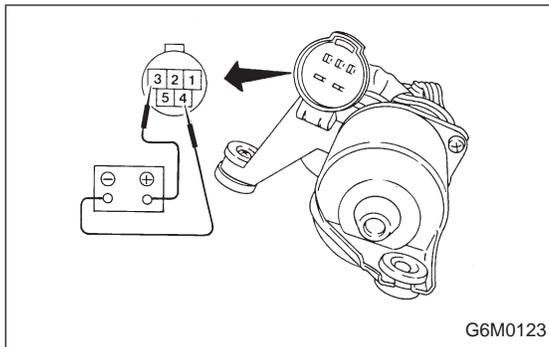
**Washer switch**

Terminal (Wire color)	d-5 (B)	d-2 (W)
Switch position		
OFF		
ON	○—	○—



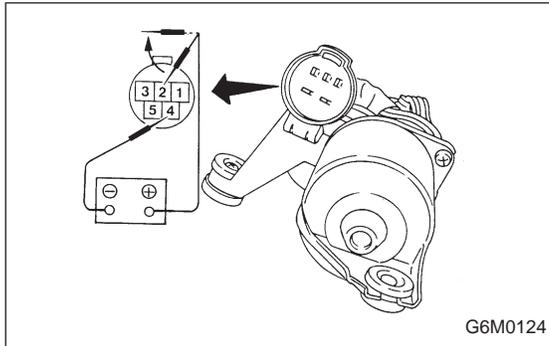
**2. WIPER MOTOR**

1) Check wiper motor operation at low speed.  
Connect battery to wiper motor. Check wiper motor for proper operation at low speed.



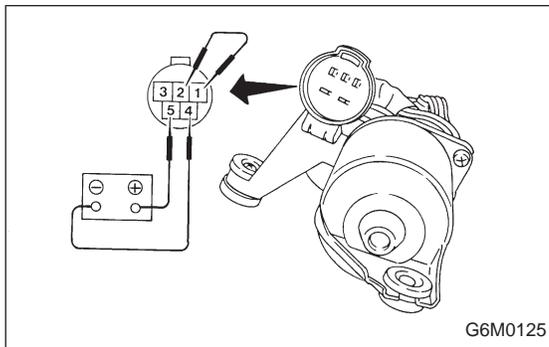
G6M0123

2) Check wiper motor operation at high speed.  
Connect battery wiper motor. Check wiper motor for proper operation at high speed.



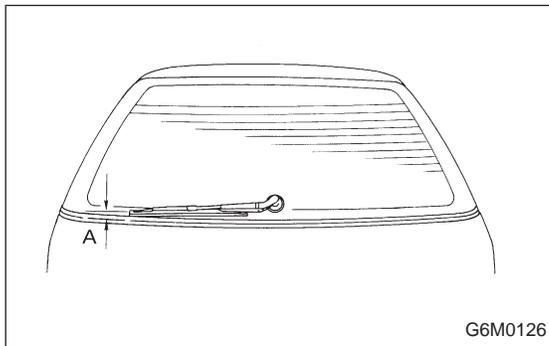
G6M0124

3) Check wiper motor for proper stoppage.  
Connect battery to wiper motor. After operating wiper motor at low speed, disconnect battery to stop it.



G6M0125

Reconnect battery and ensure that wiper motor stops at "AUTO STOP" after operating at low speed.



G6M0126

## 6. Rear Wiper and Washer

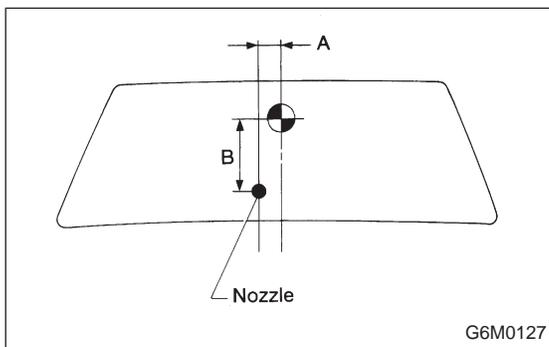
### A: ON-CAR SERVICES

#### 1. ADJUSTMENT

1) Adjust wiper blade in original position as shown in figure by changing wiper arm installation.

**Original position:**

**A: 25 — 35 mm (0.98 — 1.38 in)**



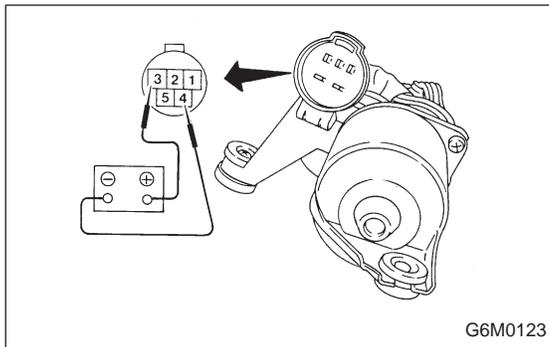
G6M0127

2) Adjust washer ejecting point on rear gate window as shown in figure when the car stops.

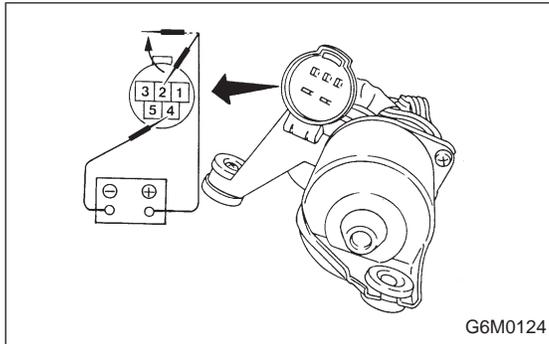
**Ejecting point:**

**A: 25 mm (0.98 in)**

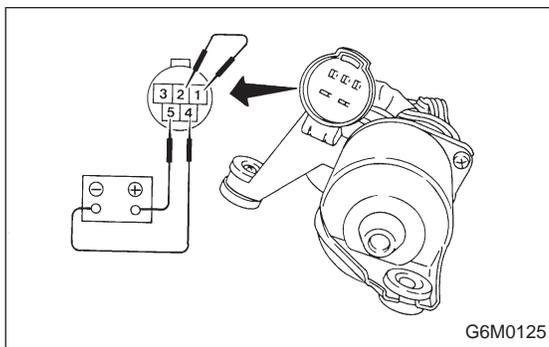
**B: 200 — 300 mm (7.87 — 11.81 in)**



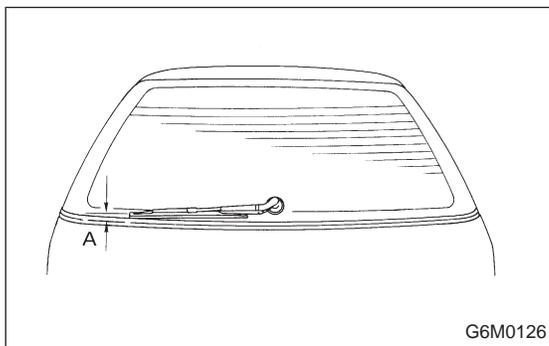
2) Check wiper motor operation at high speed.  
Connect battery wiper motor. Check wiper motor for proper operation at high speed.



3) Check wiper motor for proper stoppage.  
Connect battery to wiper motor. After operating wiper motor at low speed, disconnect battery to stop it.



Reconnect battery and ensure that wiper motor stops at "AUTO STOP" after operating at low speed.



## 6. Rear Wiper and Washer

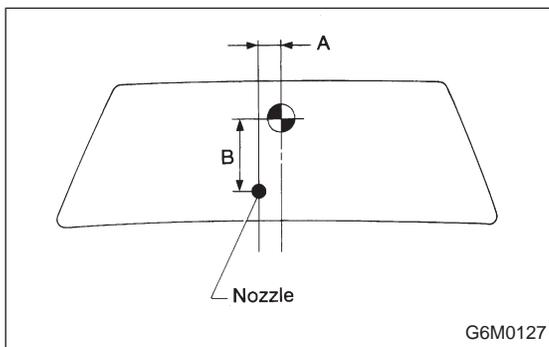
### A: ON-CAR SERVICES

#### 1. ADJUSTMENT

1) Adjust wiper blade in original position as shown in figure by changing wiper arm installation.

**Original position:**

**A: 25 — 35 mm (0.98 — 1.38 in)**

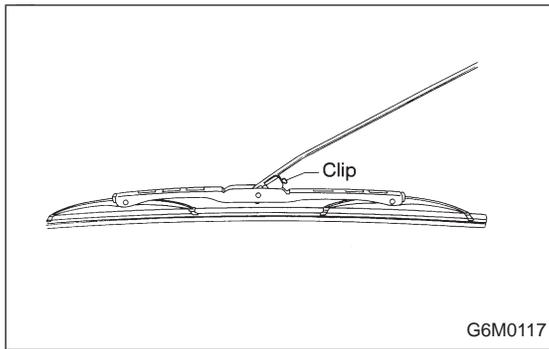


2) Adjust washer ejecting point on rear gate window as shown in figure when the car stops.

**Ejecting point:**

**A: 25 mm (0.98 in)**

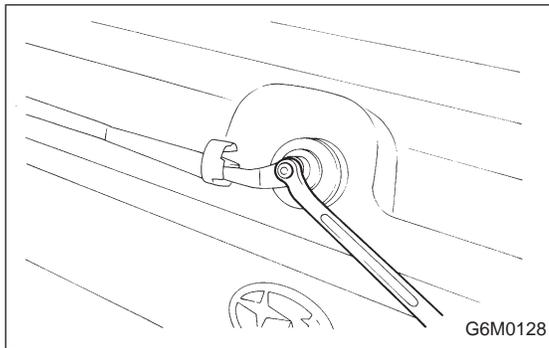
**B: 200 — 300 mm (7.87 — 11.81 in)**



**B: REMOVAL AND INSTALLATION**

**1. BLADE**

Pull out blade from arm while pushing up clip.

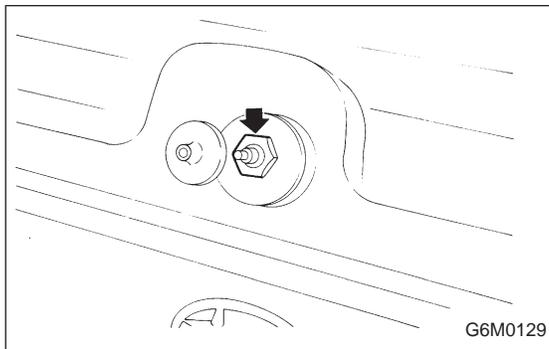


**2. WIPER ARM**

- 1) Remove head cover.
- 2) Remove nut and wiper arm.

**Tightening torque:**

**4.4 — 7.4 N·m (0.45 — 0.75 kg-m, 3.3 — 5.4 ft-lb)**



**3. WIPER MOTOR**

- 1) Remove cap and special nut.

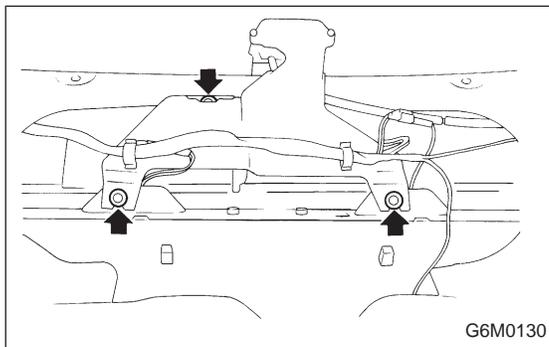
**CAUTION:**

**Be careful not to strike service tool against nozzle during removal.**

**Tightening torque:**

**6 — 9 N·m (0.6 — 0.9 kg-m, 4.3 — 6.5 ft-lb)**

- 2) Remove rear gate trim. <Ref. to 5-2.>
- 3) Undo clips which secure harness, and disconnect connector.



- 4) Separate washer hoses at joint.
- 5) Remove attaching screws and take out wiper motor assembly.

**CAUTION:**

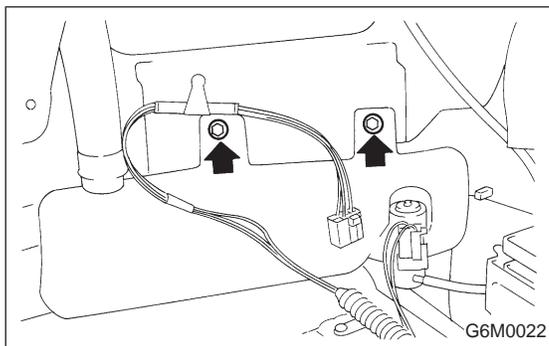
**Be careful not to damage O-ring when removing wiper motor assembly.**

**Tightening torque:**

**4.4 — 7.4 N·m (0.45 — 0.75 kg-m, 3.3 — 5.4 ft-lb)**

**4. WASHER TANK**

1) Remove rear quarter trim. <Ref. to 5-2.>



2) Disconnect washer hose and connector.  
3) Remove attaching bolts.

**Tightening torque:**

**4.4 — 7.4 N·m (0.45 — 0.75 kg·m, 3.3 — 5.4 ft·lb)**

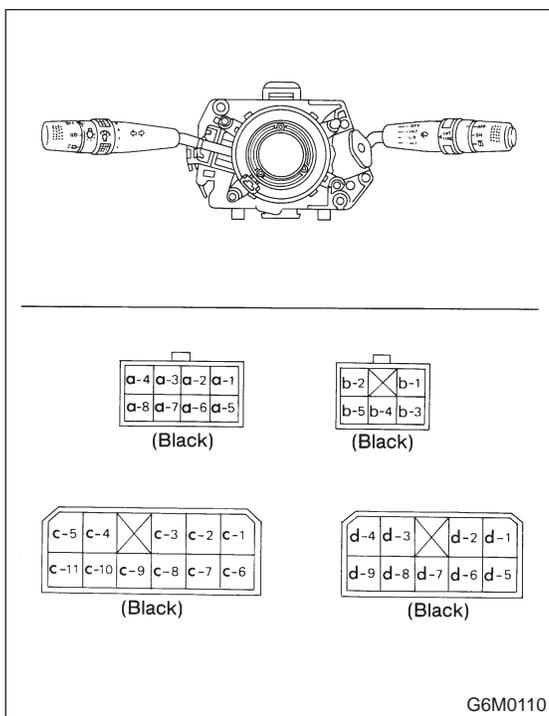
**C: INSPECTION**

**1. REAR WIPER AND WASHER SWITCH**

Set rear wiper and washer switch to each position and check continuity between terminals (indicated in table below).

**WITHOUT INTERMITTENT REAR WIPER**

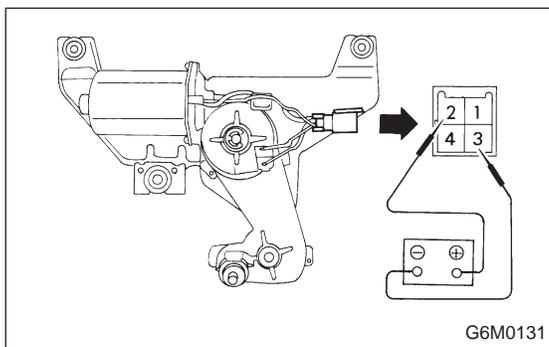
Terminal	d-2	d-1		d-3
Switch position				
WASH	○	○		○
OFF				
ON	○			○
WASH	○	○		○

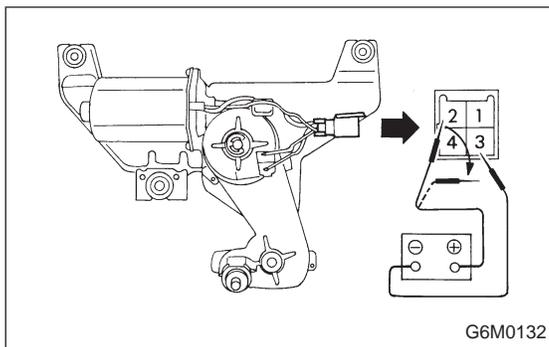


**2. WIPER MOTOR**

1) Operational check

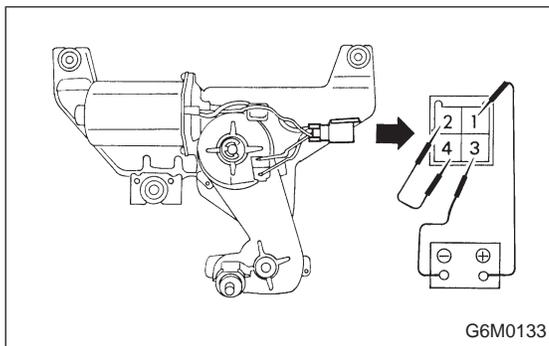
Connect battery to wiper motor and check operation of wiper motor.





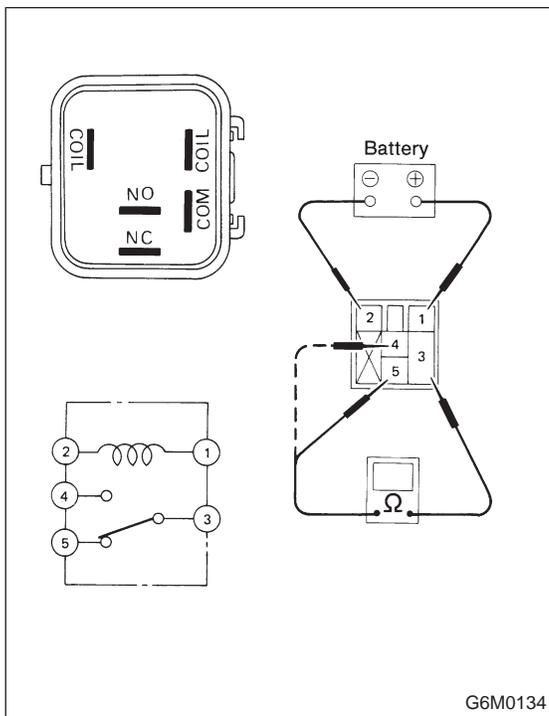
G6M0132

2) Check wiper motor for proper stoppage.  
After operating wiper motor, disconnect battery from wiper motor.



G6M0133

3) Reconnect battery and ensure that wiper motor stops at "AUTO STOP" after it has been operated.



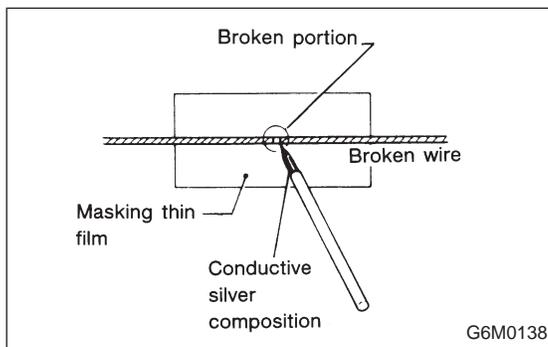
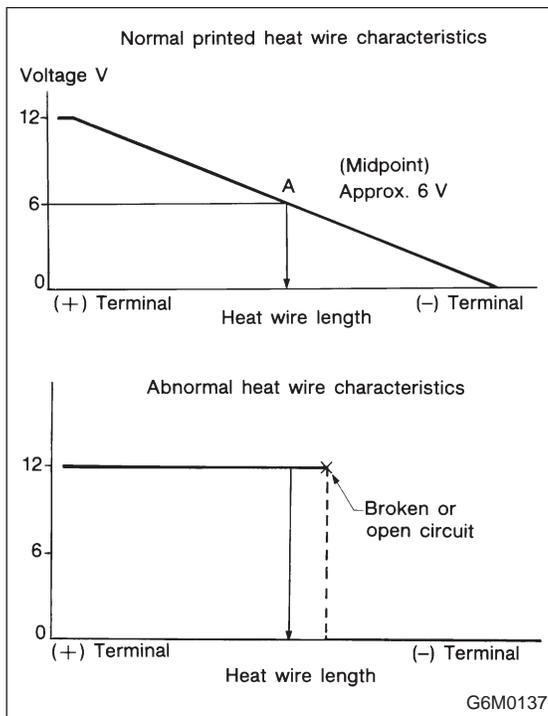
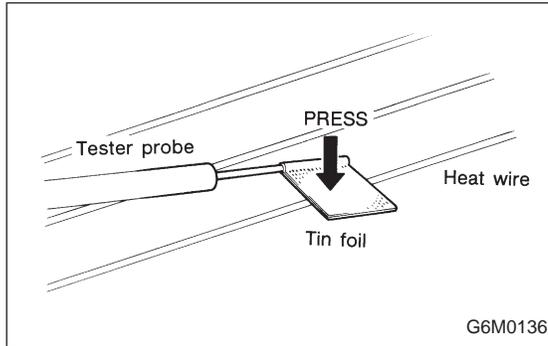
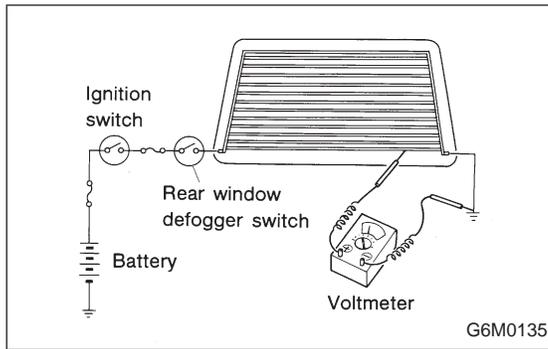
G6M0134

**3. REAR WIPER RELAY**

Connect battery to terminal (1) and ground terminal (2). Check continuity between terminals (indicated in table below).

When current flows.	Between terminals (3) and (5)	Continuity does not exist.
	Between terminals (3) and (4)	Continuity exists.
When current does not flow.	Between terminals (3) and (5)	Continuity exists.
	Between terminals (3) and (4)	Continuity does not exist.
	Between terminals (1) and (2)	Continuity exists.

## 7. Rear Window Defogger



## 7. Rear Window Defogger

## A: INSPECTION

## 1. HEAT WIRES

- 1) Start the engine so that battery is being charged.
- 2) Turn defogger switch ON.
- 3) Check each heat wire at its center position for discontinuity by setting direct current voltmeter. Normal indication is about 6 volts.

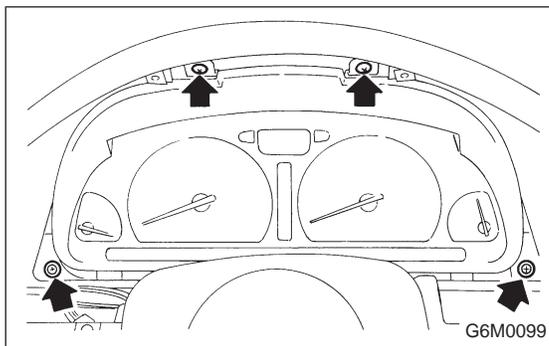
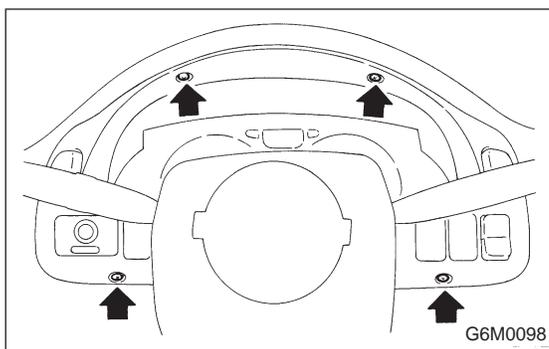
## NOTE:

When measuring voltage, wind a piece of tin foil around the tip of the tester probe and press the foil against the wire with your finger.

- 4) When tester indicates 12 volts when its probe reaches point "A", a broken circuit occurs between point "A" and the negative terminal. Slowly move tester probe toward the negative terminal while contacting it on heat wire to locate point where tester indication changes abruptly (0 volts). This is the point where a broken circuit occurs. When tester indicates 0 volts when its probe reaches point "A", a broken circuit occurs between point "A" and the positive terminal. Locate a point where tester indication changes abruptly (12 volts) while slowly moving tester probe toward the positive terminal.

## B: REPAIR

- 1) Clean broken wire and its surrounding area.
- 2) Cut off slit on (used) thin film by 0.5 mm (0.020 in) width and 10 mm (0.39 in) length.
- 3) Place the slit on glass along the broken wire, and deposit conductive silver composition (DUPONT No. 4817) on the broken portion.
- 4) Dry out the deposited portion.
- 5) Inspect the repaired wire for continuity.



## 8. Combination Meter

### A: REMOVAL AND INSTALLATION

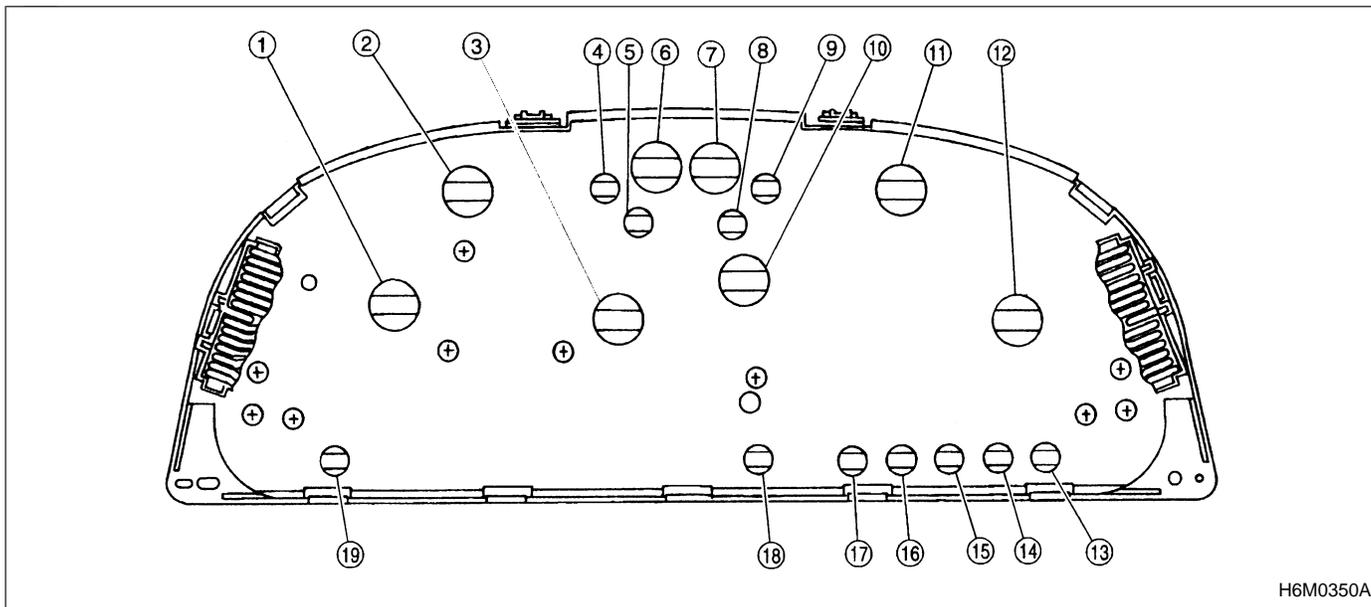
- 1) Move steering wheel down.
- 2) Remove screws which secure visor and remove visor.
- 3) Disconnect switch connectors.

- 4) Remove screws which secure combination meter, and pull combination meter out.
- 5) Disconnect connector and speedometer cable from back of combination meter.

**CAUTION:**

When installing combination meter, be sure to connect speedometer cable and connectors to backside of combination meter.

### B: BULB REPLACEMENT



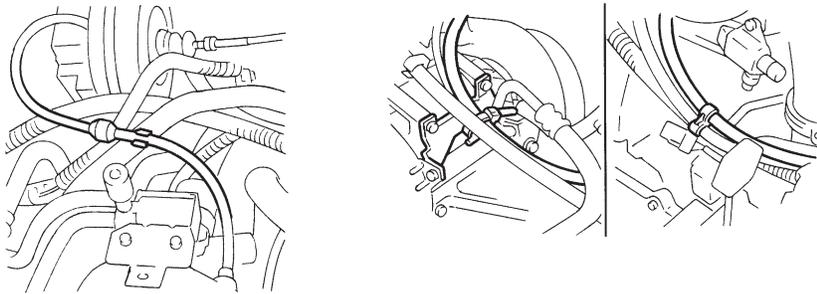
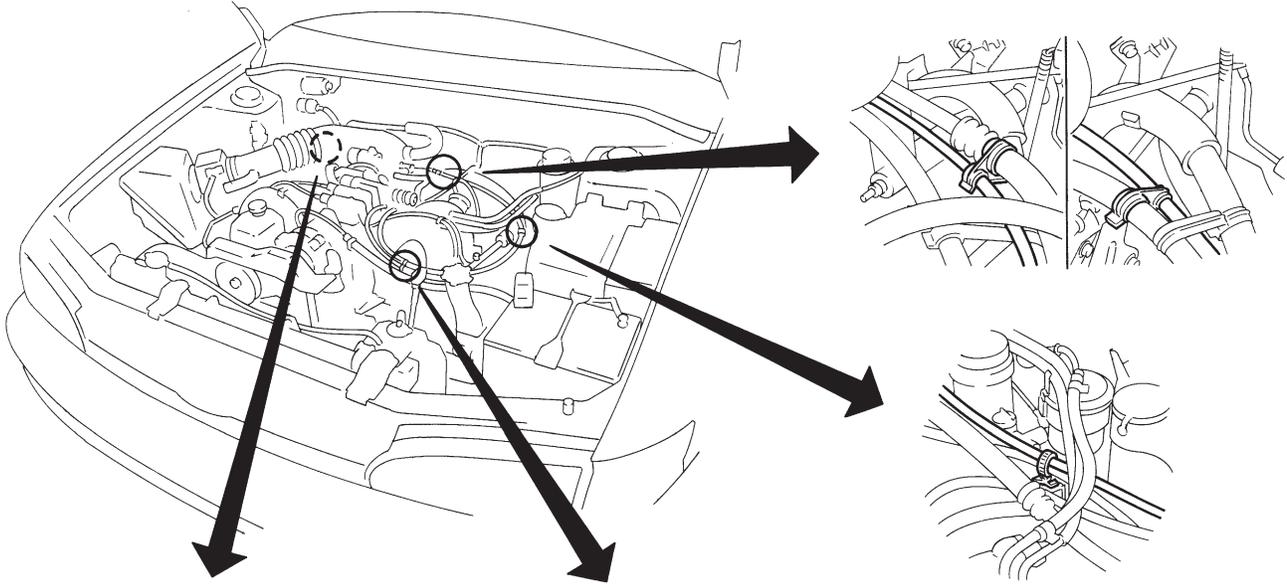
- ① Speedometer and fuel gauge
- ② Speedometer
- ③ Speedometer and AT indicator
- ④ Turn RH
- ⑤ Door open
- ⑥ Hi-beam
- ⑦ Brake

- ⑧ Seat belt
- ⑨ Turn LH
- ⑩ Tachometer and AT indicator
- ⑪ Tachometer
- ⑫ Tachometer and temperature gauge
- ⑬ Check engine

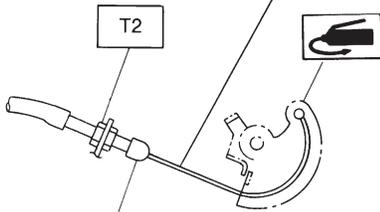
- ⑭ Charge
- ⑮ Oil pressure
- ⑯ AT oil temp.
- ⑰ A.B.S.
- ⑱ Rear defogger
- ⑲ FWD

9. Cruise Control **AIRBAG**

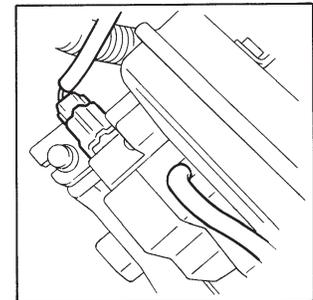
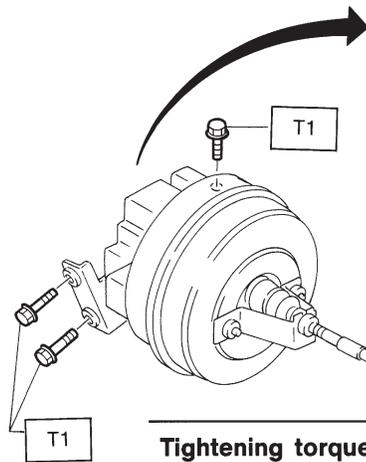
A: ADJUSTMENT



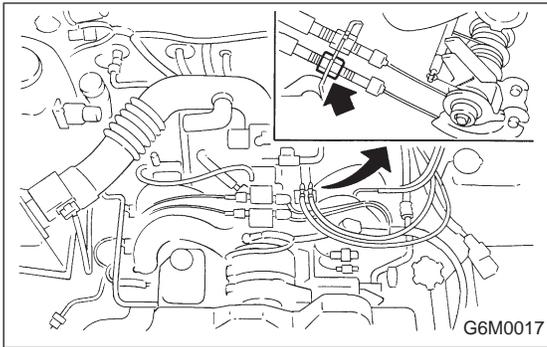
Adjust so that cable deflects  
1 — 8 mm (0.04 — 0.31 in)  
within the specified throttle link  
free play range, and adjust the  
outer end.



Cover must be inserted securely,  
until top of cable touches cover  
stopper.

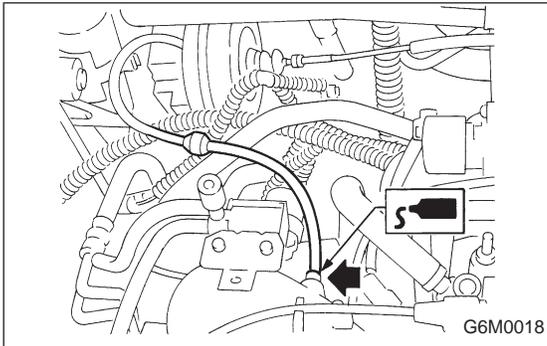


**Tightening torque: N·m (kg-m, ft-lb)**  
**T1: 5.4 — 9.3 (0.55 — 0.95, 4.0 — 6.9)**  
**T2: 10 — 18 (1.0 — 1.8, 7 — 13)**

**B: REMOVAL AND INSTALLATION****1. ACTUATOR**

1) Remove air intake duct. Remove the nut which secures control cable end to throttle cam, and remove control cable end.

2) Remove clip bands from control cable.



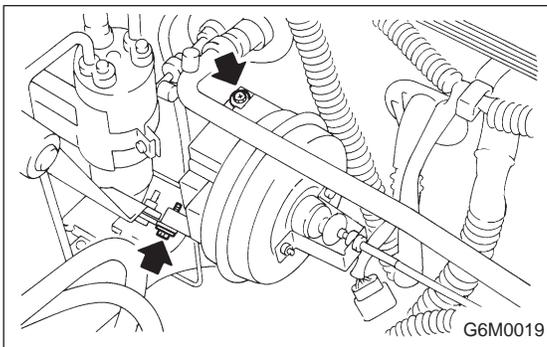
3) Disconnect cruise control hose from intake manifold.

**CAUTION:**

**When inserting hose into intake manifold, apply sealant to hose.**

**Fluid packing:**

**THREE BOND 1105 or equivalent**



4) Disconnect actuator connector.

5) Remove attaching bolts and actuator.

**Tightening torque:**

**5.4 — 9.3 N·m (0.55 — 0.95 kg-m, 4.0 — 6.9 ft-lb)**

**CAUTION:**

- Be careful not to apply excessive load to the wire cable when adjusting and/or installing; otherwise, the actuator may be deformed or damaged.

- Do not bend cable sharply with a radius less than 100; otherwise, cable may bend permanently, resulting in poor performance.

- When installing cable, be careful not to sharply bend or pinch the inner cable; otherwise, the cable may break.

**2. STOP AND BRAKE SWITCH**

<Ref. to 4-5.>

**3. CLUTCH SWITCH**

<Ref. to 4-5.>

**4. CRUISE CONTROL MAIN SWITCH**

1) Remove meter visor, and then remove cruise control main switch by pushing it outward.

2) Disconnect connector.

**5. CRUISE CONTROL SUB SWITCH**

1) Remove horn pad.

2) Disconnect horn switch connector and remove attaching screws.

**WARNING:**

**Refer to 5-5 when removing or installing the module from the airbag equipped model.**

## C: DRIVING TESTS

Conduct road tests by selecting a smooth, flat road or use free rollers as road test simulation.

### 1. MAIN SWITCH

- 1) Turn ignition switch ON.
- 2) Check that indicator light comes on when main switch is pressed (ON).
- 3) Check that indicator light goes out when main switch is pressed again (OFF).
- 4) Turn ignition switch OFF with main switch ON (which is indicated by illumination). Turn ignition switch ON again to ensure that indicator light remains OFF.

### 2. SUB SWITCH

- 1) Check that sub switch is properly set in "SET/ COAST", "RESUME/ACCEL" or "CANCEL" mode.
- 2) Also check that sub switch returns to the original position when released.

### 3. CONSTANT SPEED TEST

- 1) Turn main switch ON.
- 2) Drive vehicle at speed greater than 40 km/h (25 MPH).
- 3) Press sub switch to set in "SET/COAST" mode.
- 4) Ensure that vehicle is maintained at the speed set when sub switch was pressed.

### 4. ACCELERATION TEST

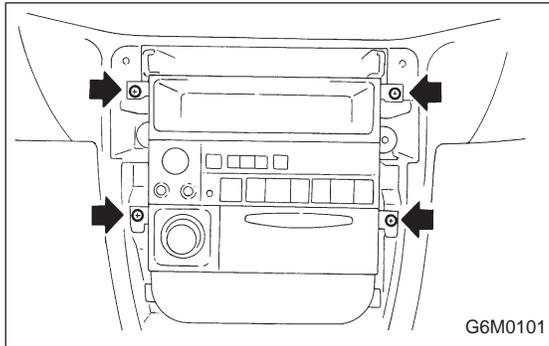
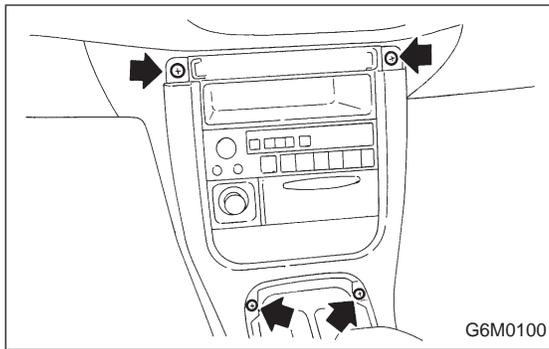
- 1) Set vehicle speed at speed greater than 40 km/h (25 MPH).
- 2) Ensure that vehicle continues to accelerate while holding sub switch in RESUME/ACCEL mode, and that vehicle maintains that optional speed when sub switch is released.

### 5. DECELERATION TEST

- 1) Set vehicle speed at optional speed greater than 40 km/h (25 MPH).
- 2) Ensure that vehicle continues to decelerate while holding sub switch in SET/COAST mode, and that it maintains that optional speed when sub switch is released.

#### NOTE:

When vehicle speed reaches the lower speed limit of 30 km/h (19 MPH) during deceleration, cruise control will be released.



## 10. Radio, Speaker and Antenna

### A: REMOVAL AND INSTALLATION

#### 1. RADIO BODY

- 1) Remove cup holder.
- 2) Remove AT cover (AT model).
- 3) Remove screws which secure center panel. Remove center panel.
- 4) Remove fitting screws, and slightly pull radio out of instrument panel.
- 5) Disconnect electric connectors and antenna feeder cord.

#### 2. FRONT SPEAKER

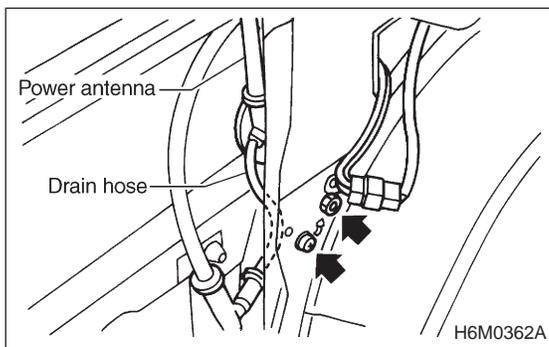
- 1) Remove door trim and disconnect connector. <Ref. to 5-2.>
- 2) Remove screws which secure front speaker. Remove speaker.

#### 3. REAR SPEAKER (WAGON)

- 1) Remove rear quarter trim. <Ref. to 5-3.>
- 2) Remove nuts which secure speaker bracket.
- 3) Remove speaker and disconnect connector.

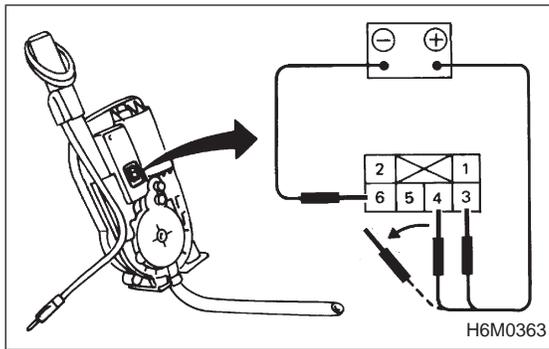
#### 4. REAR SPEAKER (SEDAN)

- 1) Remove rear shelf trim panels. <Ref. to 5-3.>
- 2) Remove screws which secure rear speakers.
- 3) Disconnect connector and remove speakers.



#### 5. POWER ANTENNA

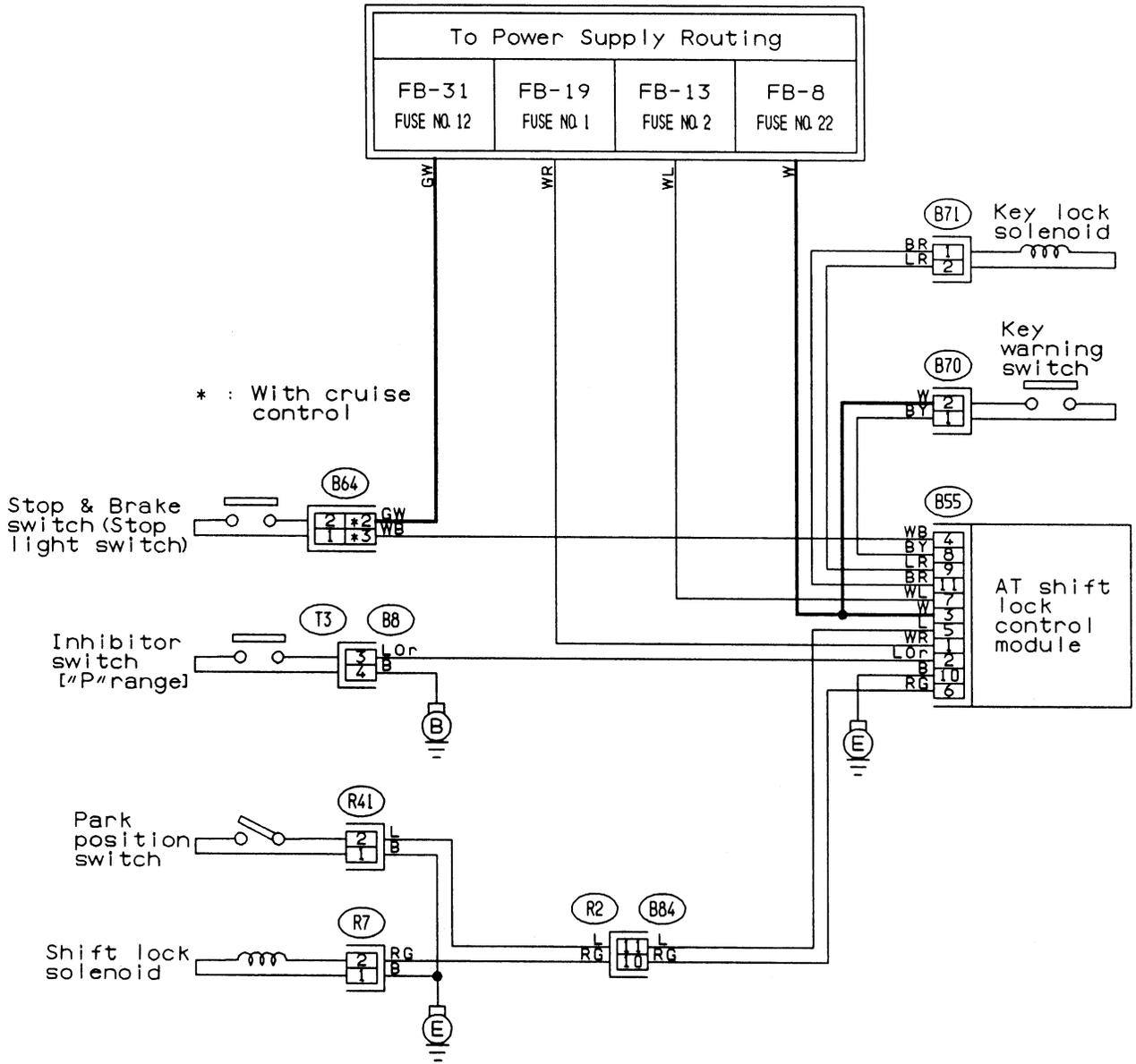
- 1) Remove left side trunk trim (SEDAN), or left side rear lower quarter trim (WAGON).
- 2) Remove nuts which secure power antenna.
- 3) Remove power antenna while disconnecting connector and water drain hose.

**B: INSPECTION****1. POWER ANTENNA**

- 1) Connect battery positive (+) terminal to terminal No. 3 and connect terminal No. 6 to ground. Ensure that antenna rod extends properly when battery positive (+) terminal is connected to terminal No. 4.
- 2) Ensure that antenna rod retracts properly when battery positive (+) terminal is disconnected from terminal No. 4.

# 1. AT Shift Lock System

## A: WIRING DIAGRAM

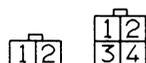


- (B70) (Black)


- (R41) (R7) (Black)


- (B71) (Black)

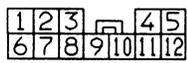

- (B64) (Black)



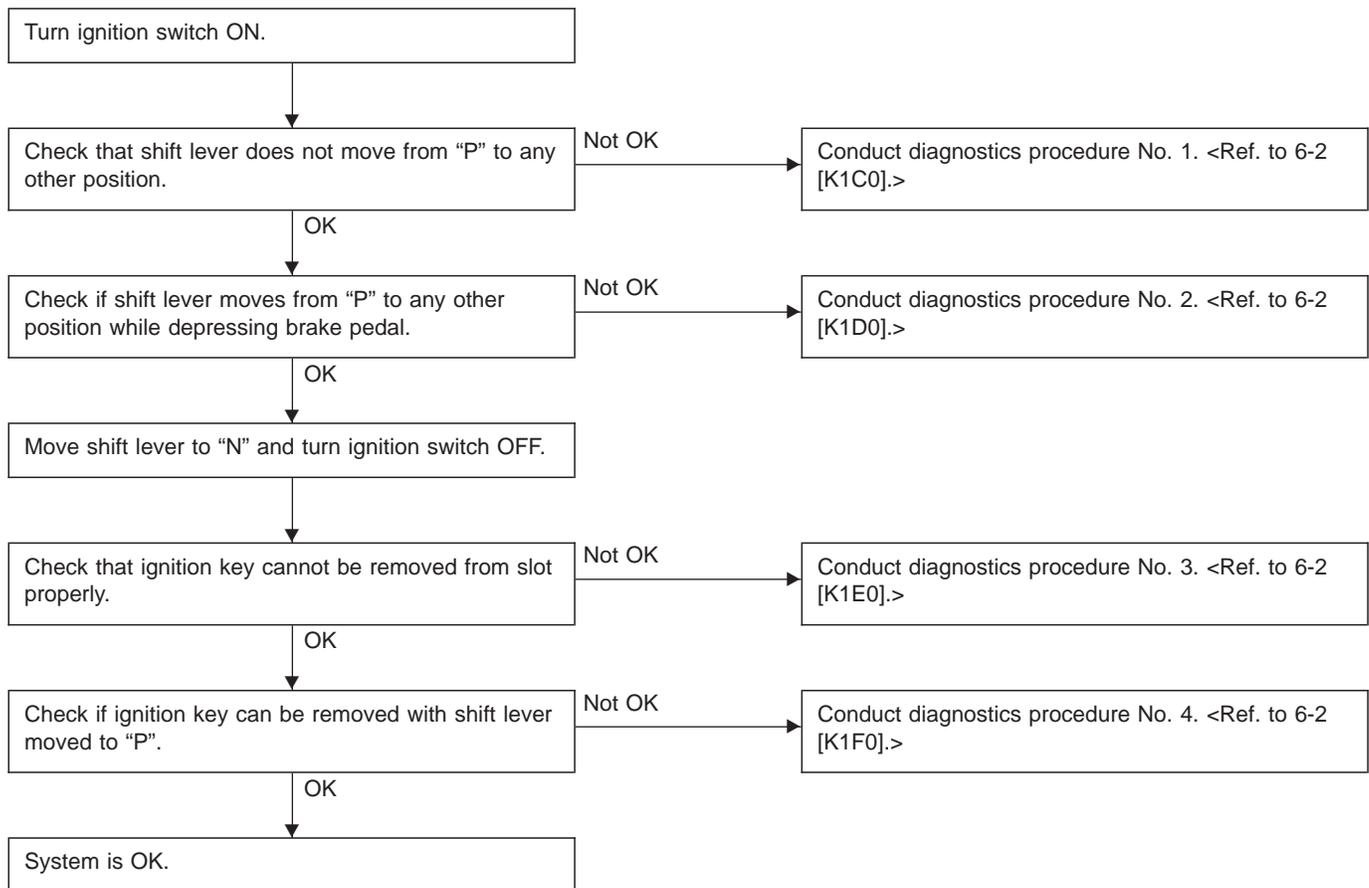
(\*)
- (B55) (Black)


- (B8) (Gray)

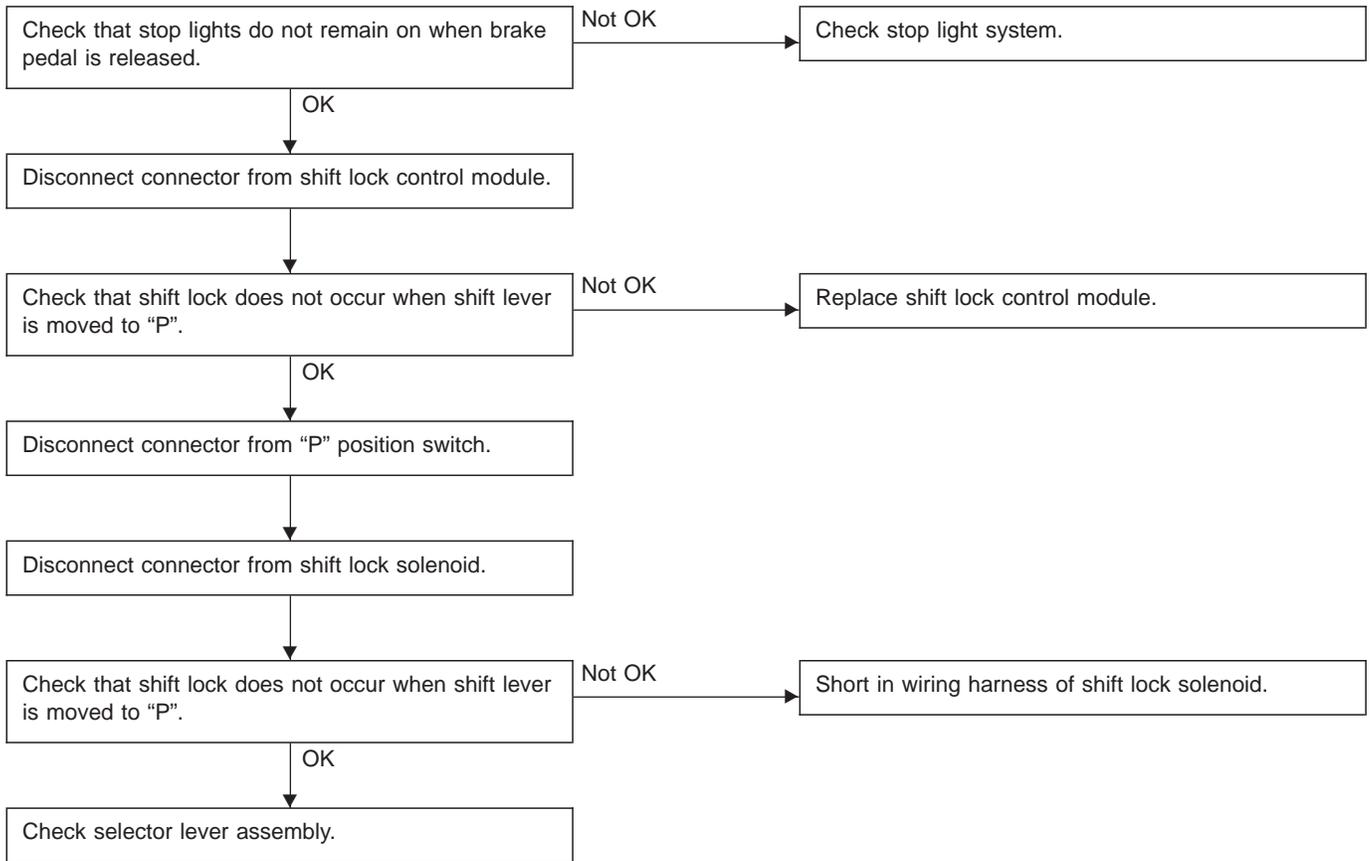

- (B84) (Black)



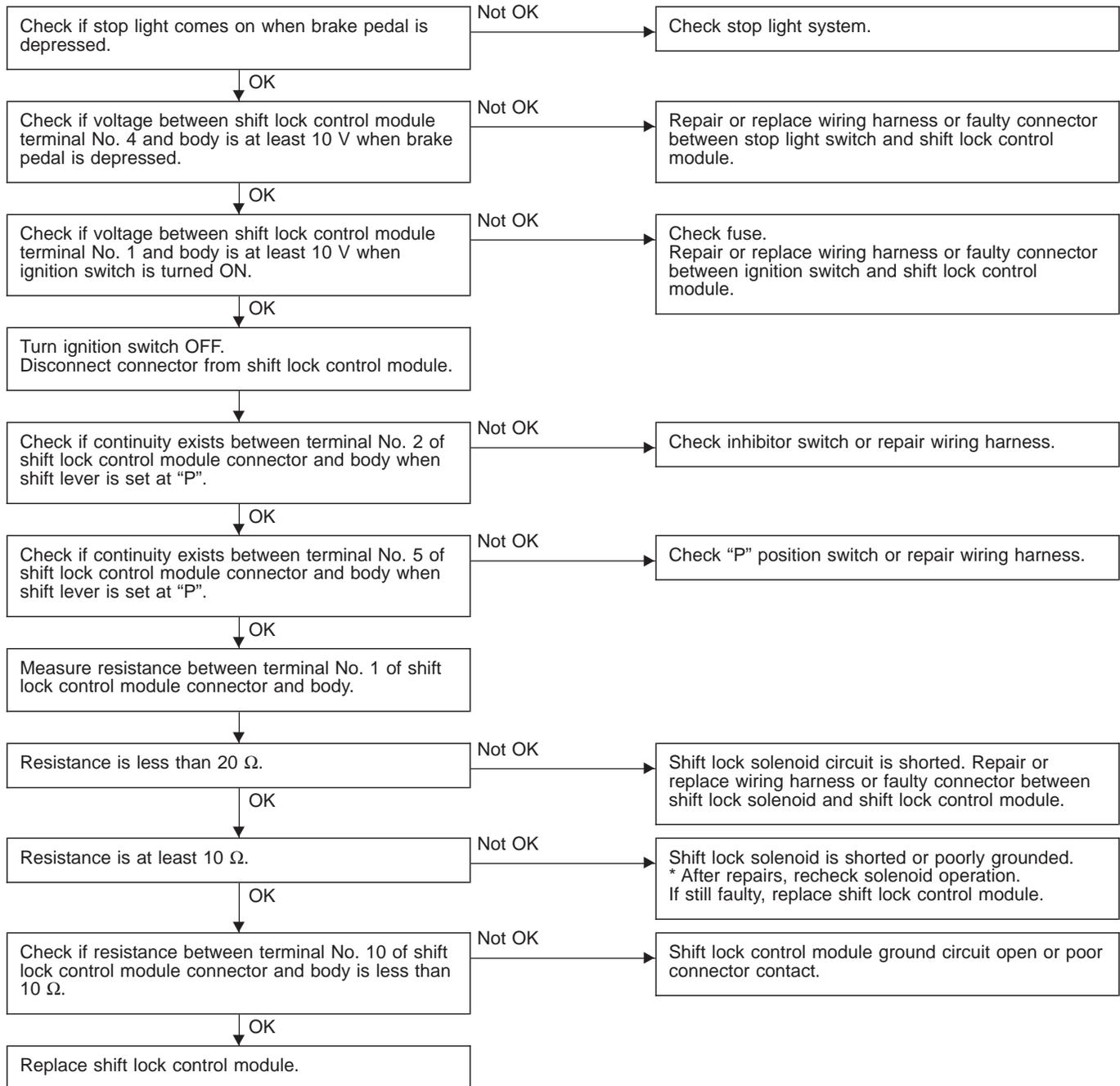
## B: BASIC DIAGNOSTICS CHART



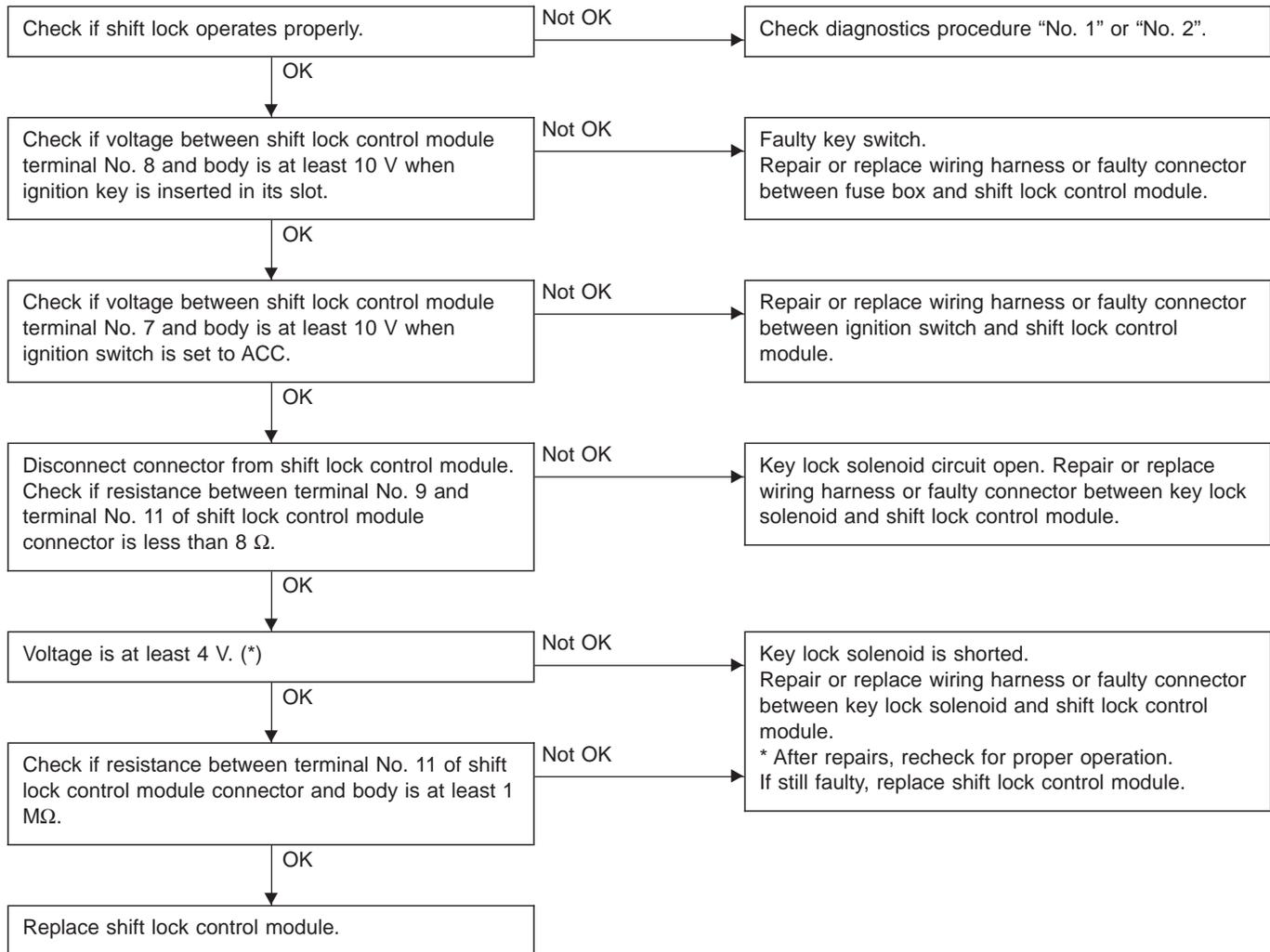
**C: DIAGNOSTICS PROCEDURE No. 1**



## D: DIAGNOSTICS PROCEDURE No. 2 (SHIFT LOCK DOES NOT RELEASE.)

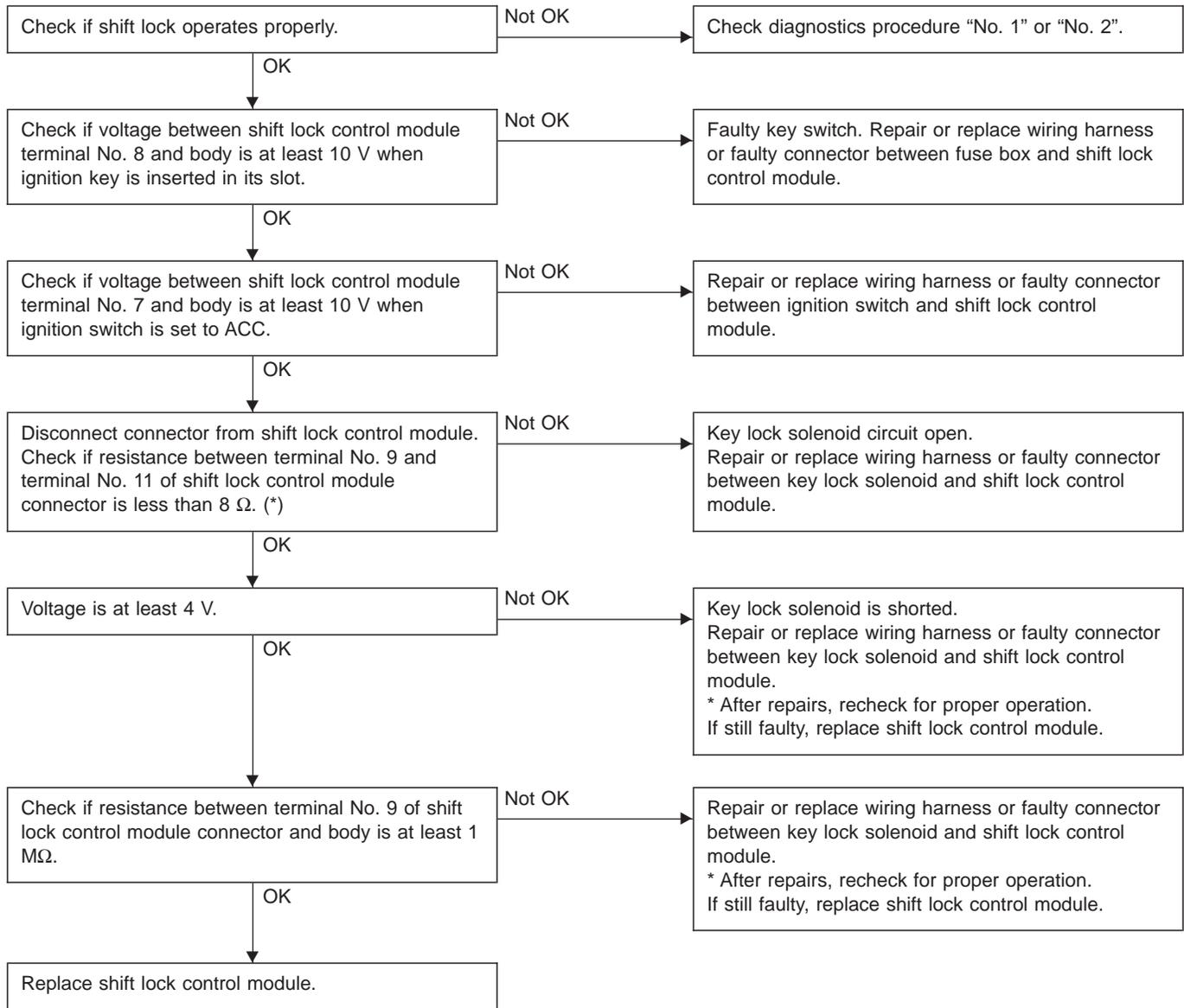


**E: DIAGNOSTICS PROCEDURE No. 3 (KEY INTERLOCK DOES NOT OPERATE.)**



**\*: When conducting operational checks of the key lock solenoid, do not apply 12 V to solenoid for more than one second, since this may break solenoid circuit.**

## F: DIAGNOSTICS PROCEDURE No. 4 (KEY INTERLOCK DOES NOT RELEASE.)



\*: When conducting operational checks of the key lock solenoid, do not apply 12 V to solenoid for more than one second, since this may break solenoid circuit.

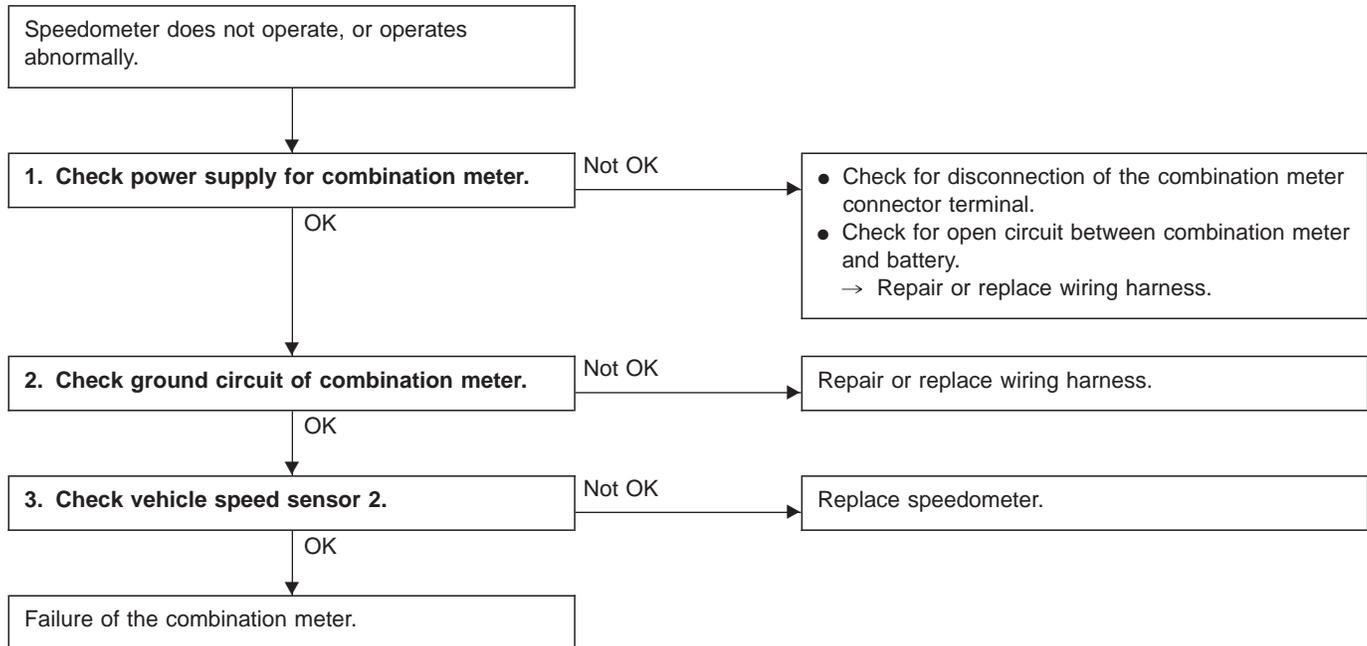
## 2. Combination Meter

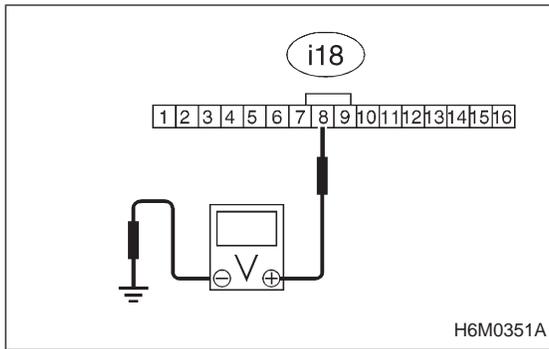
### A: DIAGNOSTICS PROCEDURE

If speedometer does not operate, or operates abnormally, check combination meter circuit (shown in flow chart as described below).

#### CAUTION:

**Make sure that trouble code of vehicle speed sensor 2 system appears in electrical system on-board diagnosis.**



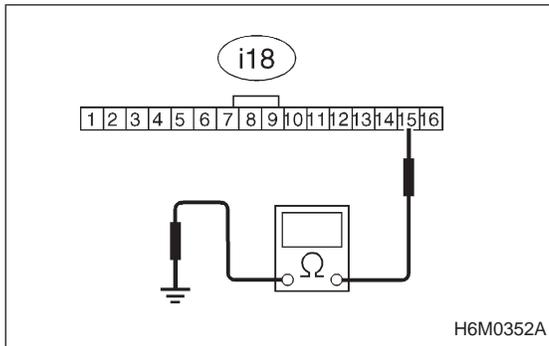


### 1. CHECK POWER SUPPLY FOR COMBINATION METER.

- 1) Remove combination meter.
- 2) Turn ignition switch to ON.
- 3) Measure voltage at combination meter connector terminal.

**Connector & terminal / Specified voltage:**

**(i18) No. 8 — Body / 10 V, or more**



### 2. CHECK GROUND CIRCUIT OF COMBINATION METER.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness connector between combination meter and body.

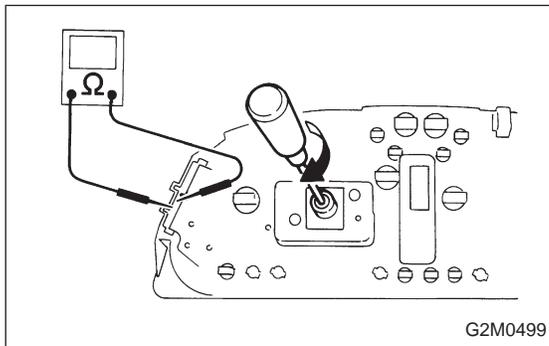
**Connector & terminal / Specified resistance:**

**(i18) No. 15 — Body / 10  $\Omega$ , max.**

### 3. CHECK VEHICLE SPEED SENSOR 2.

NOTE:

- If resistance between terminals of vehicle speed sensor 2 is out of specification, the sensor may have a failure.
- If resistance is OK, mechanical trouble may be present in combination meter, speedometer cable and speedometer drive/driven gears in transmission.



- 1) Remove combination meter.
- 2) Measure resistance between terminals of combination meter by rotating rotor of speedometer cable hole with screwdriver.

**Terminals / Specified resistance:**

**No. 8 — No. 15 / 10  $\Omega$ , max.  $\leftrightarrow$  1 M $\Omega$ , min.  
(Four times per rotation)**