

1. Engine Electrical

A: SPECIFICATIONS

1. 2200 cc MODEL

Item		Designation		
Starter	Type	Reduction type		
	Model	MT TN128000-8311	AT TN128000-8321	
	Manufacturer	NIPPONDENSO TENNESSEE		
	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	2,900 rpm or more
	Load characteristics	Voltage	8 V	
		Current	280 A or less	370 A or less
		Torque	9.8 N·m (1.0 kg·m, 7.2 ft·lb)	13.7 N·m (1.4 kg·m, 10.1 ft·lb)
		Rotating speed	900 rpm or more	880 rpm or more
	Lock characteristics	Voltage	5 V	
		Current	800 A or less	1,050 A or less
Torque		27.5 N·m (2.8 kg·m, 20.3 ft·lb) or more		
Generator	Type	Rotating-field three-phase type, Voltage regulator built-in type		
	Model	LR185-701H		
	Manufacturer	HITACHI AUTOMOTIVE PRODUCTS		
	Voltage and output	12 V — 85 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 — 35 A or more		
		2,500 rpm — 62 A or more		
5,000 rpm — 82 A or more				
Regulated voltage	14.5 ^{+0.3} / _{-0.4} V [20°C (68°F)]			
Ignition coil and ignitor assembly	Model	FH0137-01R		
	Manufacturer	DEMCO		
	Primary coil resistance	0.73 Ω±10%		
	Secondary coil resistance	12.8 kΩ±15%		
	Insulation resistance between primary terminal and case	More than 10 MΩ		
Spark plug	Type and manufacturer	RC10YC4 CHAMPION		
		Alternate	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)	

SPECIFICATIONS AND SERVICE DATA

[S1A2] **6-1**
1. Engine Electrical

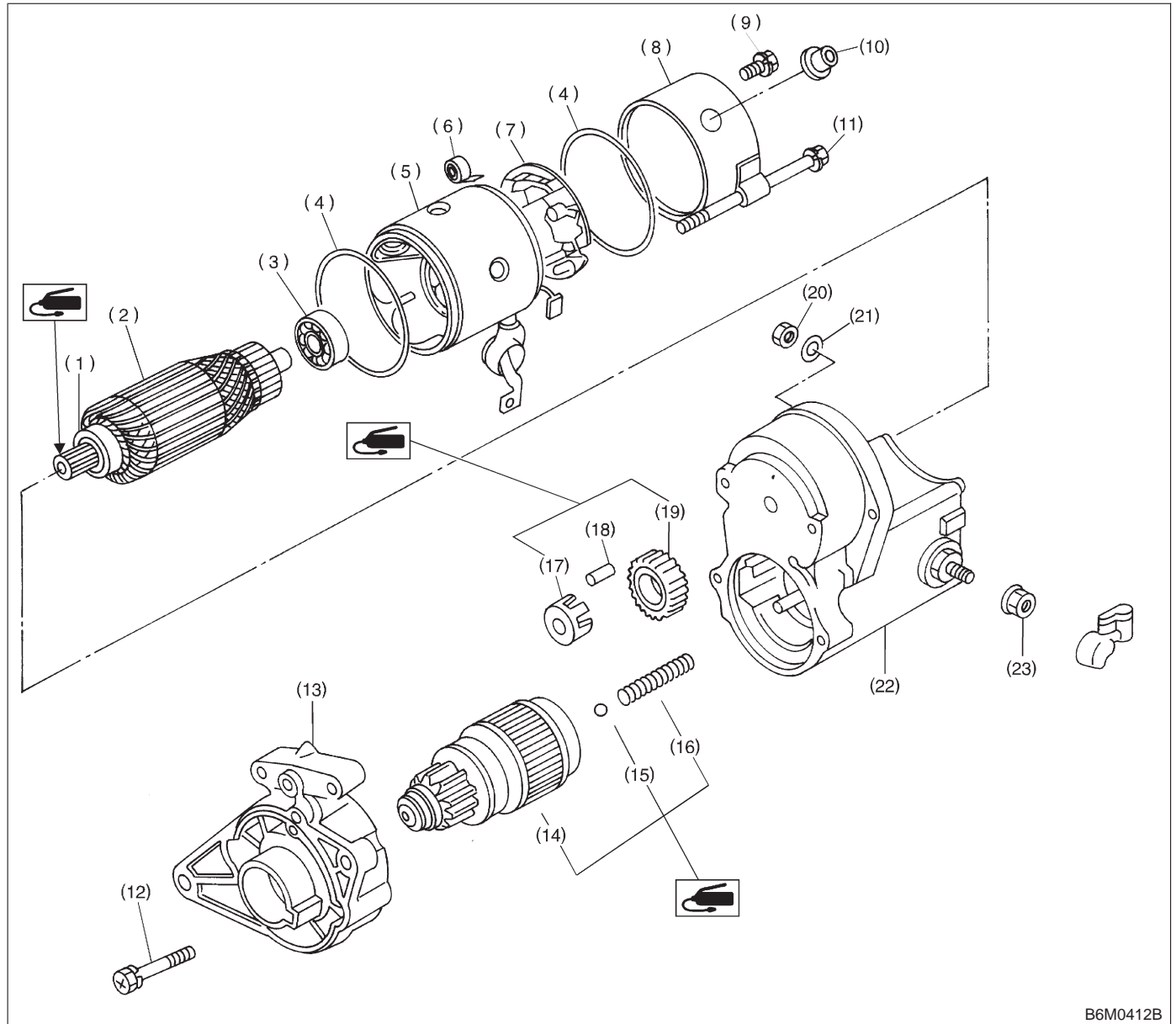
2. 2500 cc MODEL

Item		Designation		
Starter	Type	Reduction type		
	Model	MT TN128000-8311	AT TN128000-8321	
	Manufacturer	NIPPONDENSO TENNESSEE		
	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	2,900 rpm or more
	Load characteristics	Voltage	8 V	
		Current	280 A or less	370 A or less
		Torque	9.8 N·m (1.0 kg-m, 7.2 ft-lb)	13.7 N·m (1.4 kg-m, 10.1 ft-lb)
		Rotating speed	900 rpm or more	880 rpm or more
	Lock characteristics	Voltage	5 V	
		Current	800 A or less	1,050 A or less
Torque		27.5 N·m (2.8 kg-m, 20.3 ft-lb) or more		
Generator	Type	Rotating-field three-phase type, Voltage regulator built-in type		
	Model	LR185-701H		
	Manufacturer	HITACHI AUTOMOTIVE PRODUCTS		
	Voltage and output	12 V — 85 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 — 35 A or more 2,500 rpm — 62 A or more 5,000 rpm — 82 A or more		
	Regulated voltage	14.5 ^{+0.3} / _{-0.4} V [20°C (68°F)]		
	Ignition coil	Model	FH0047-01R	
Manufacturer		DEMCO		
Primary coil resistance		0.73 Ω±10%		
Secondary coil resistance		12.8 kΩ±15%		
Insulation resistance between primary terminal and case		More than 10 MΩ		
Spark plug	Type and manufacturer	PFR5B-11 NGK		
	Thread size	mm	14, P = 1.25	
	Spark gap	mm (in)	1.0 — 1.1 (0.039 — 0.043)	

1. Starter

A: MT VEHICLES

1. MODEL: TN128000-8311



B6M0412B

- (1) Front ball bearing
- (2) Armature
- (3) Rear ball bearing
- (4) O-ring
- (5) Yoke
- (6) Brush spring
- (7) Brush holder
- (8) End frame

- (9) Screw & washer
- (10) Cover
- (11) Through bolt
- (12) Screw & washer
- (13) Starter housing
- (14) Overrunning clutch
- (15) Steel ball
- (16) Spring

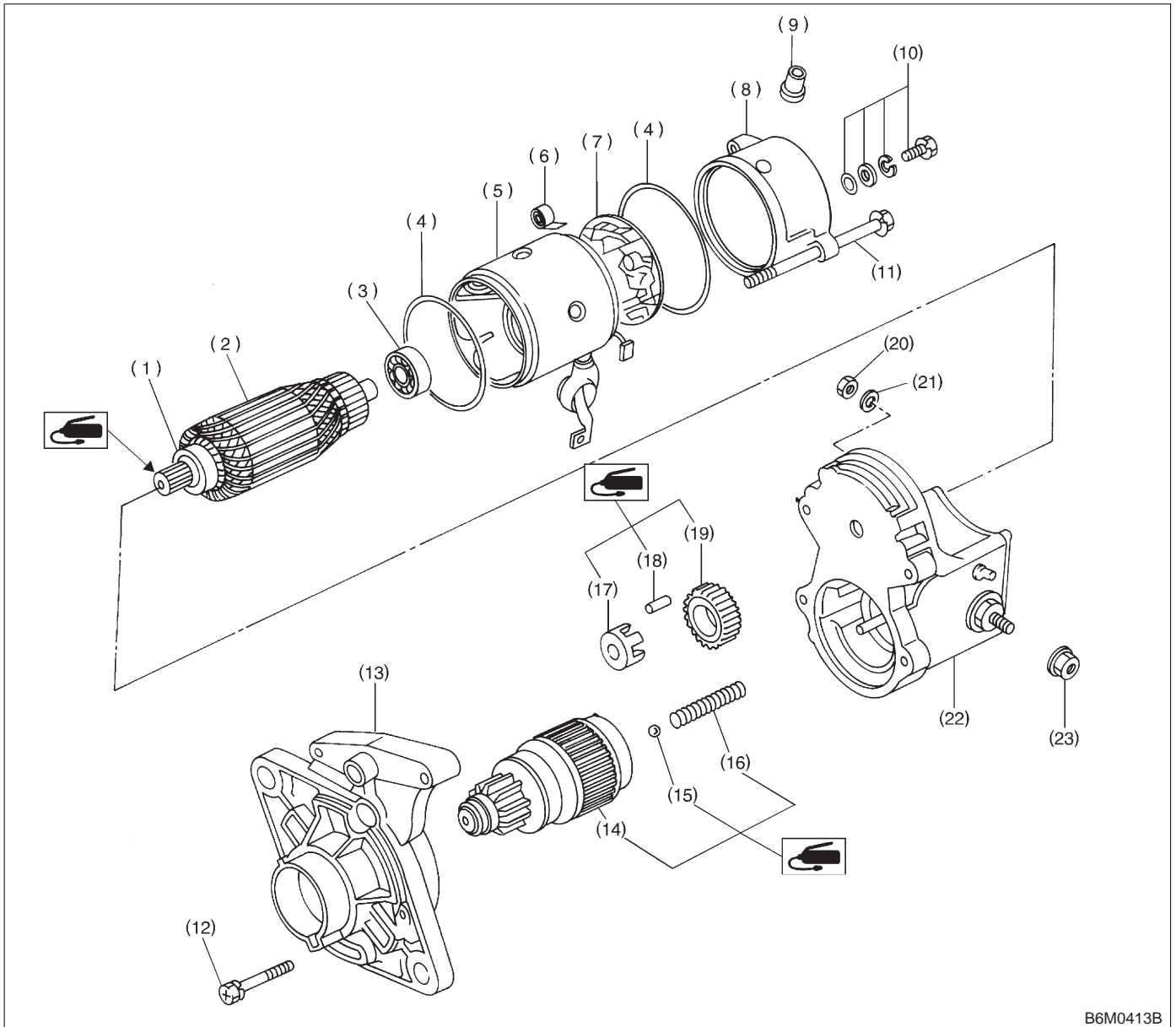
- (17) Retainer
- (18) Roller
- (19) Idle gear
- (20) Nut
- (21) Spring washer
- (22) Magnet switch
- (23) Nut

COMPONENT PARTS

[C1B1] 6-1
1. Starter

B: AT VEHICLES

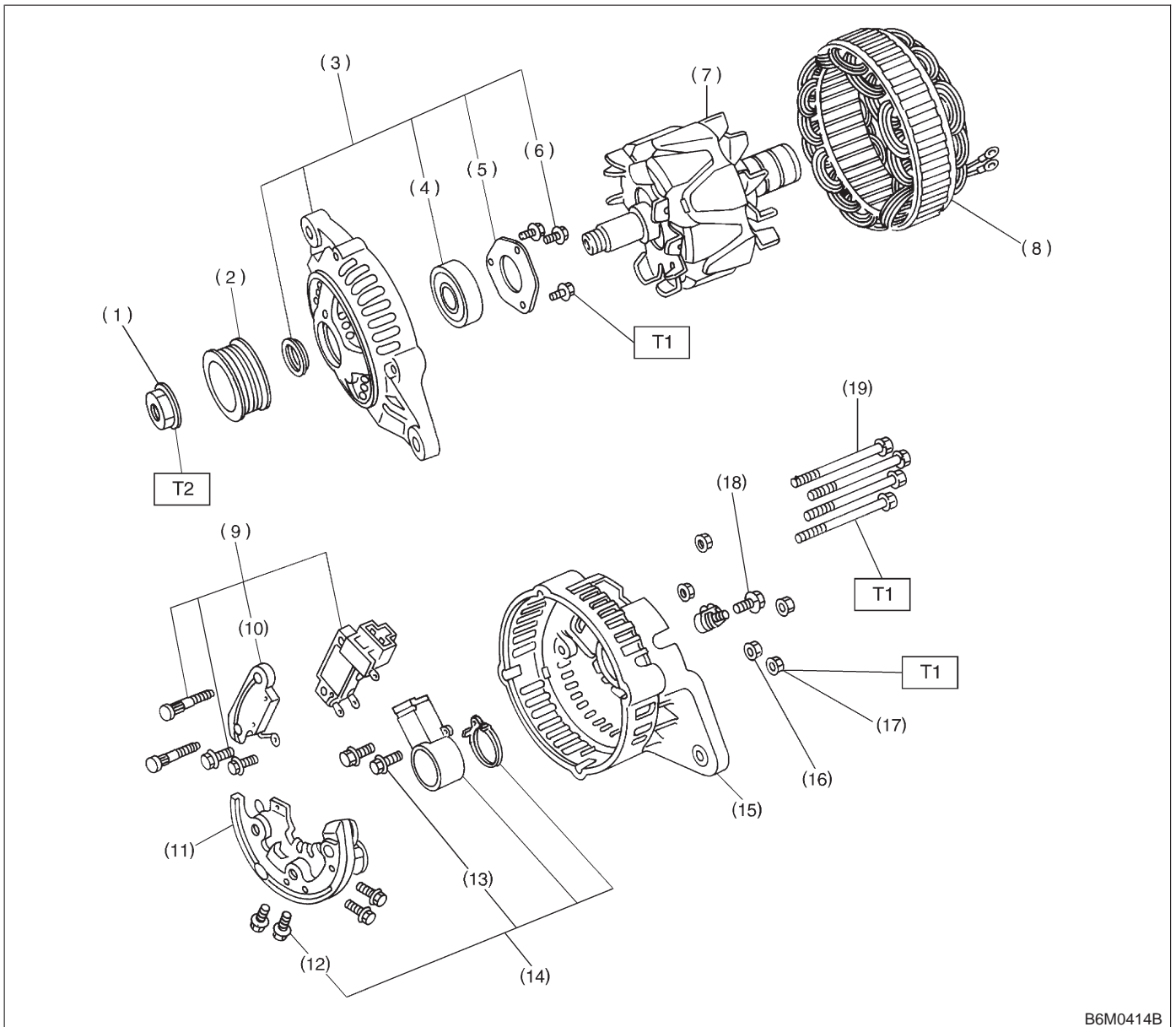
1. MODEL: TN128000-8321



B6M0413B

- | | | |
|------------------------|-------------------------|--------------------|
| (1) Front ball bearing | (9) Cover | (17) Retainer |
| (2) Armature | (10) Screw & washer | (18) Roller |
| (3) Rear ball bearing | (11) Through bolt | (19) Idle gear |
| (4) O-ring | (12) Screw & washer | (20) Nut |
| (5) Yoke | (13) Starter housing | (21) Spring washer |
| (6) Brush spring | (14) Overrunning clutch | (22) Magnet switch |
| (7) Brush holder | (15) Steel ball | (23) Nut |
| (8) End frame | (16) Spring | |

2. Generator



B6M0414B

- | | |
|-----------------------|------------------------|
| (1) Pulley nut | (10) Condenser |
| (2) Pulley | (11) Diode ASSY |
| (3) Front cover ASSY | (12) Bolt |
| (4) Ball bearing | (13) Bolt |
| (5) Bearing retainer | (14) Brush holder ASSY |
| (6) Screw | (15) Rear cover |
| (7) Rotor | (16) BAT. terminal |
| (8) Stator coil | (17) Nut |
| (9) IC regulator ASSY | (18) Bolt |

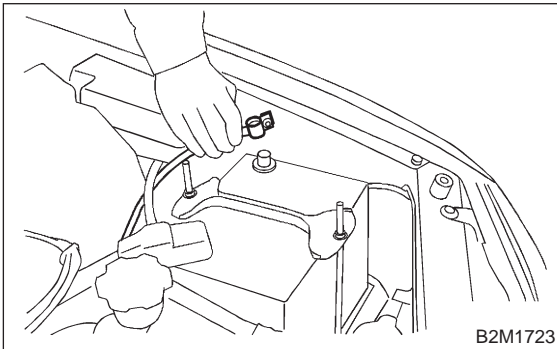
- (19) Through bolt

Tightening torque: N-m (kg-m, ft-lb)
T1: 3.1 — 4.4 (0.32 — 0.45, 2.3 — 3.3)
T2: 63.7 — 83.4 (6.5 — 8.5, 47.0 — 61.5)

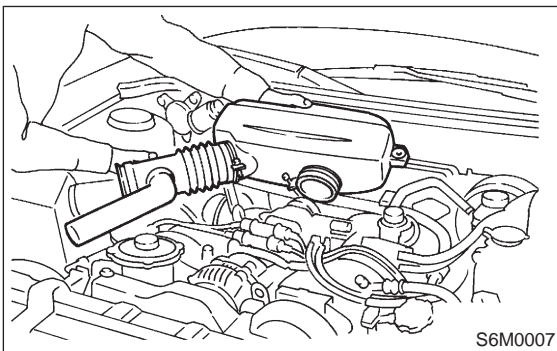
1. Starter

A: REMOVAL AND INSTALLATION

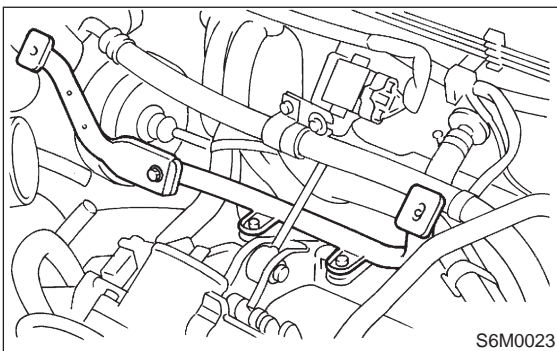
1) Disconnect battery ground cable.



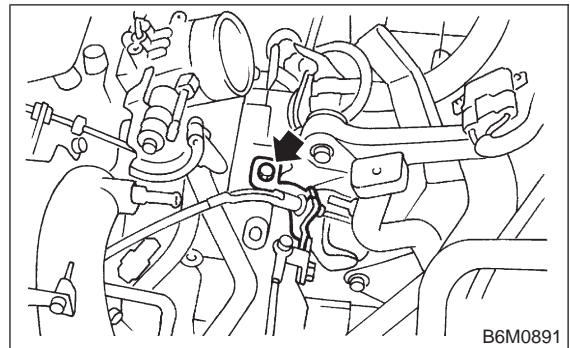
2) Remove air intake chamber. <Ref. to 2-7 [W18A0].>



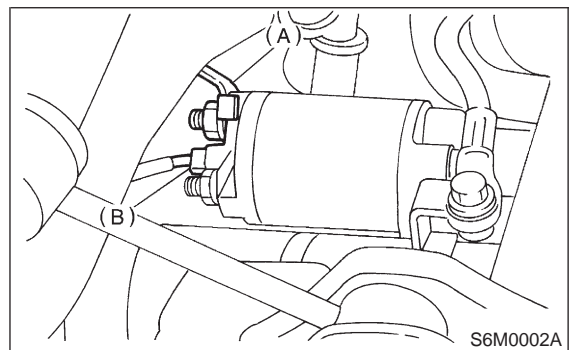
3) Remove air intake chamber stay. (AT vehicles only)



4) Remove bolt which installs hill holder cable bracket. (2200 cc MT model with hill holder)

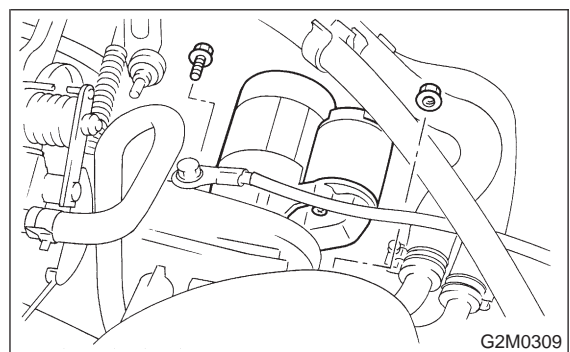


5) Disconnect connector and terminal from starter.



(A) Terminal
(B) Connector

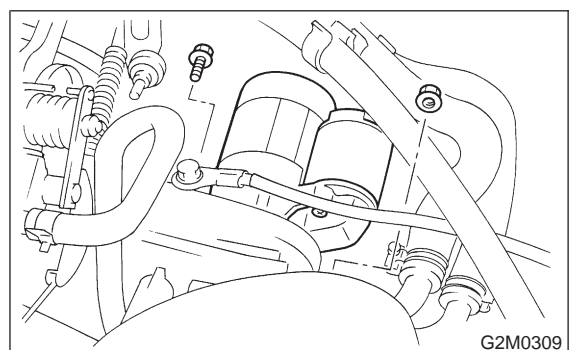
6) Remove starter from transmission.



7) Installation is in the reverse order of removal.

Tightening torque:

50±4 N·m (5.1±0.4 kg·m, 37±2.9 ft·lb)



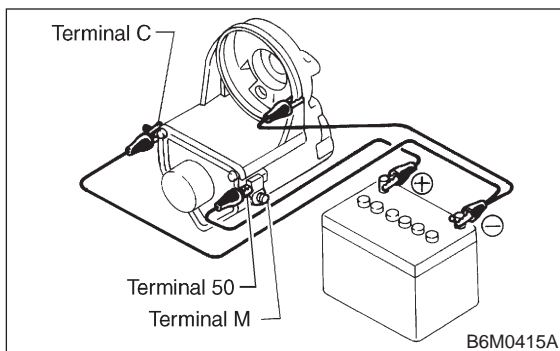
1. Starter

B: TEST**1. MAGNETIC SWITCH****CAUTION:**

- The following magnetic switch tests should be performed with specified voltage applied.
- Each test should be conducted within 3 to 5 seconds. Power to be furnished should be one-half the rated voltage.

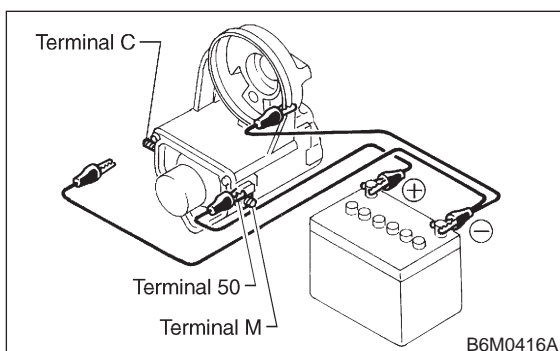
1) Pull-in test

Connect two battery negative leads onto magnetic switch body and terminal C respectively. Then connect battery positive lead onto terminal 50. Pinion should extend when lead connections are made.



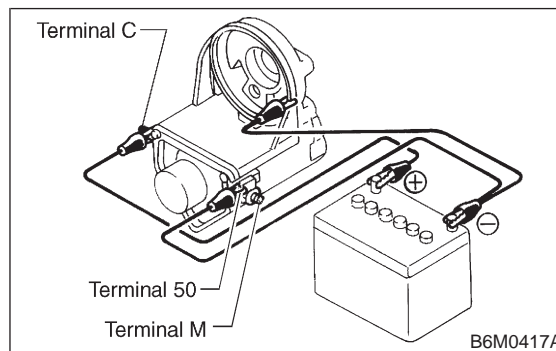
2) Holding-in test

Disconnect lead from terminal C with pinion extended. Pinion should be held in the extended position.



3) Return test

Connect two battery negative leads onto terminal 50 and onto switch body respectively. Then connect battery positive lead onto terminal C. Next, disconnect lead from terminal 50. Pinion should return immediately.

**2. PERFORMANCE TEST**

The starter is required to produce a large torque and high rotating speed, but these starter characteristics vary with the capacity of the battery. It is therefore important to use a battery with the specified capacity whenever testing the starter.

The starter should be checked for the following three items:

● No-load test

Measure the maximum rotating speed and current under a no-load state.

● Load test

Measure the magnitude of current needed to generate the specified torque and rotating speed.

● Stall test

Measure the torque and current when the armature is locked.

1) No-load test

Run single starter under no-load state, and measure its rotating speed, voltage, and current, using the specified battery. Measured values must meet the following standards:

No-load test (Standard):

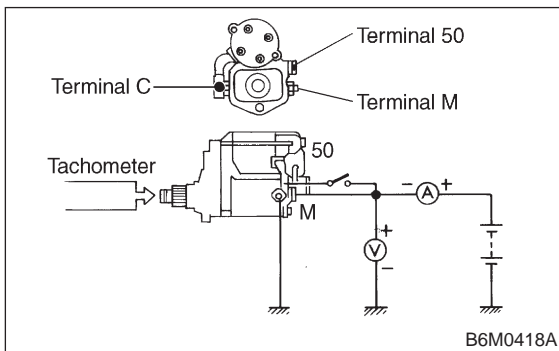
Voltage/Current

11 V/90 A, or more

Rotating speed

TN128000-8311: 3,000 rpm, or more

TN128000-8321: 3,350 rpm, or more



2) Load test (For reference)

Perform this test to check maximum output of starter. Use test bench which is able to apply load (brake) to starter. Measure torque value and rotating speed under the specified voltage and current conditions while controlling braking force applied to starter.

CAUTION:

Change engagement position of overrunning clutch and make sure it is not slipping.

Load test (Standard):

TN128000-8311

Voltage/Load

8 V/9.8 N-m (1.0 kg-m, 7.2 ft-lb)

Current/Speed

280 A max./900 rpm min.

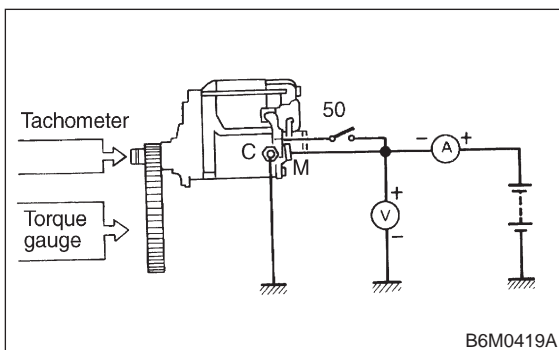
TN128000-8321

Voltage/Load

8 V/13.7 N-m (1.4 kg-m, 10.1 ft-lb)

Current/Speed

370 A, or less/880 rpm, or more



3) Stall test

Using the same test equipment used for load test, apply brake to lock starter armature. Then measure voltage, current, and torque values. Measured values must meet the following standard.

Stall test (Standard):

TN128000-8311

Voltage/Current

5 V/800 A, or less

Torque

27.5 N-m (2.8 kg-m, 20.3 ft-lb) min.

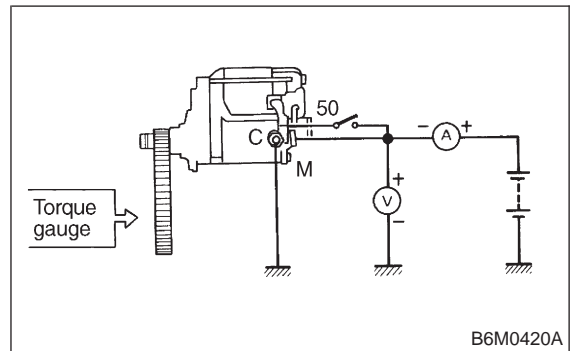
TN128000-8321

Voltage/Current

5 V/1,050 A, or less

Torque

27.5 N-m (2.8 kg-m, 20.3 ft-lb) min.

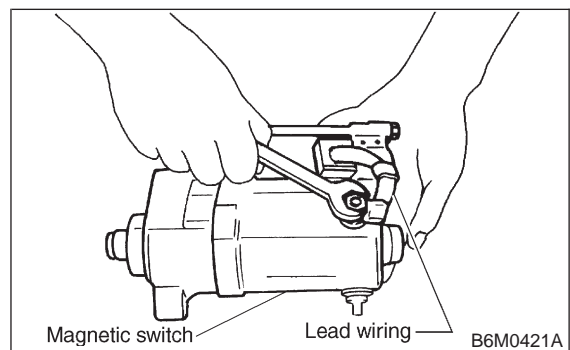


NOTE:

Low rotating speed or excessive current during no-load test may be attributable to high rotating resistance of starter due to improper assembling. Small current and no torque during stall test may be attributable to excessive contact resistance between brush and commutator; whereas, normal current and insufficient torque may be attributable to shorted commutator or poor insulation. Starter can be considered normal if it passes no-load and stall tests; therefore, load test may be omitted.

C: DISASSEMBLY

1) Disconnect lead wire from magnetic switch.

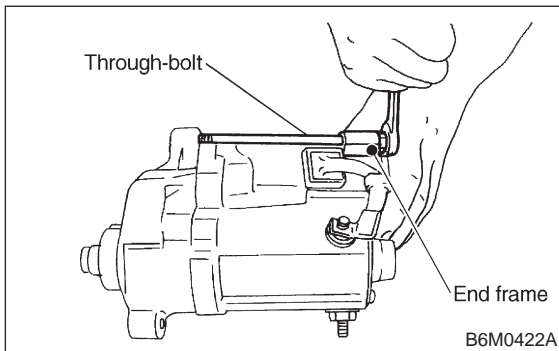


6-1 [W1C0]

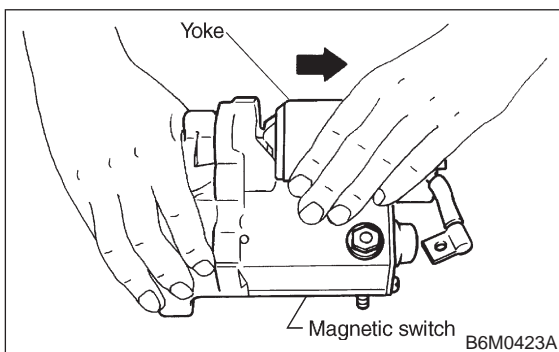
1. Starter

SERVICE PROCEDURE

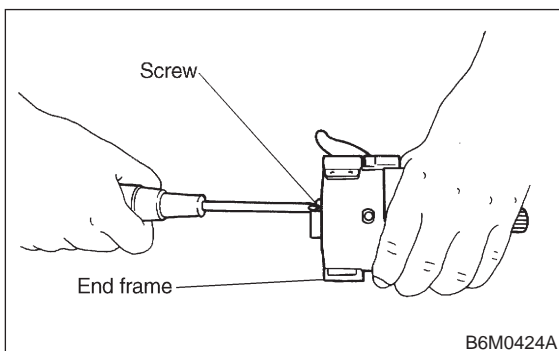
2) Remove through-bolts from end frame.



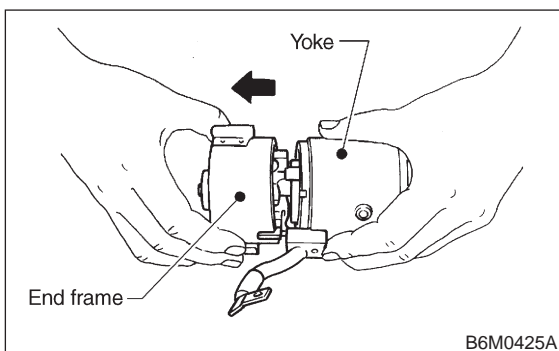
3) Remove yoke from magnetic switch.



4) Remove screws securing end frame to brush holder.

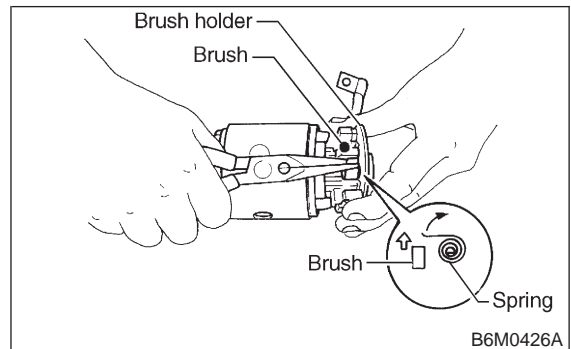


5) Separate yoke from end frame.



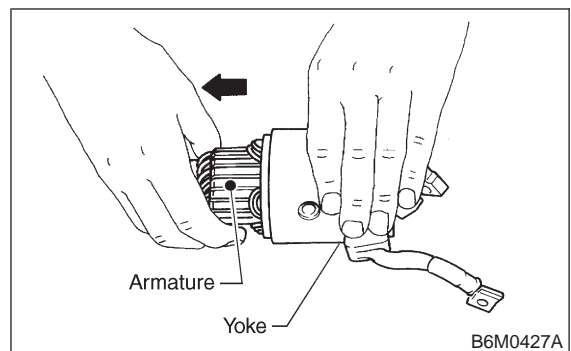
6) Remove brush by lifting up positive (+) side brush spring using long-nose pliers.

CAUTION:
Be careful not to damage brush and commutator.

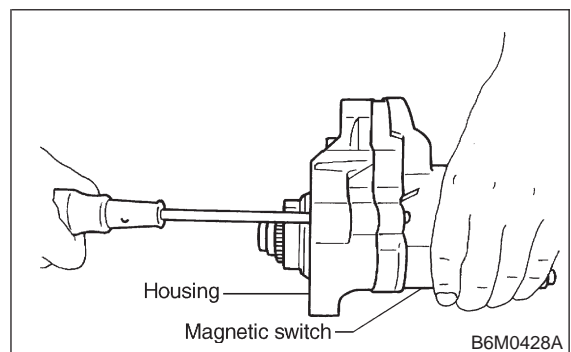


7) Remove armature from yoke.

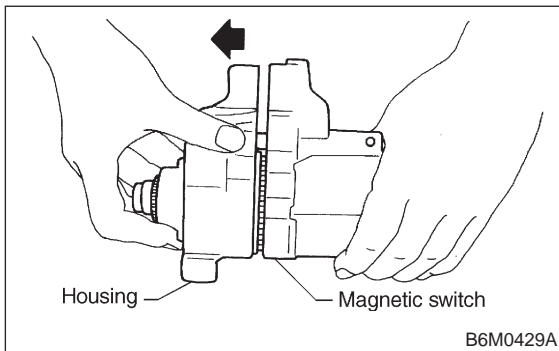
CAUTION:
Be careful not to drop armature.



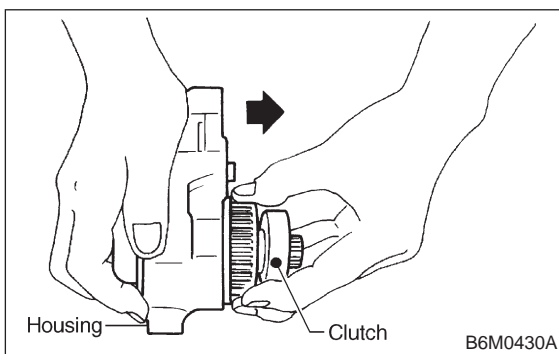
8) Remove screws securing magnetic switch to housing.



9) Remove housing from magnetic switch.

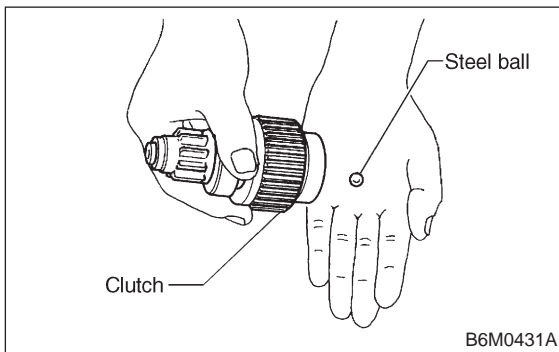


10) Remove clutch from housing.

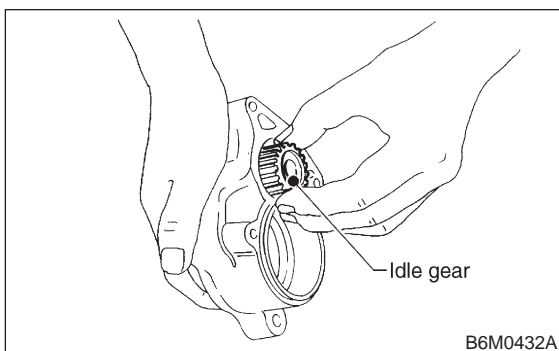


11) Take out steel ball from clutch.

CAUTION:
Be careful not to lose steel ball.

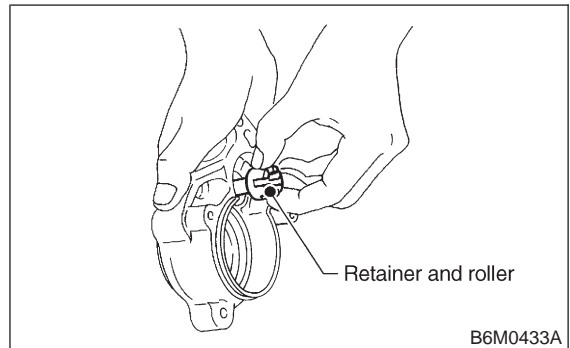


12) Remove idle gear from housing.

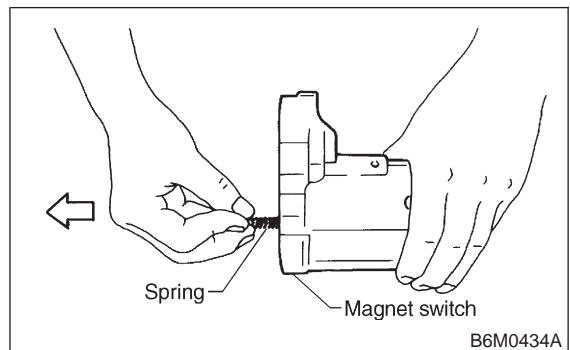


13) Remove retainer and roller from housing.

CAUTION:
Be careful not to drop retainer and roller.



14) Remove coil spring from magnetic switch.



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.

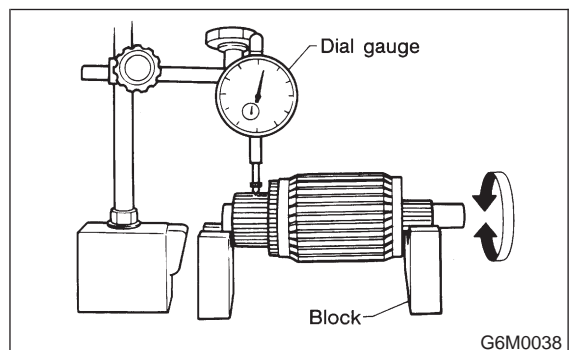
Commutator run-out:

Standard

0.02 mm (0.0008 in), or less

Service limit

Less than 0.05 mm (0.0020 in)



1. Starter

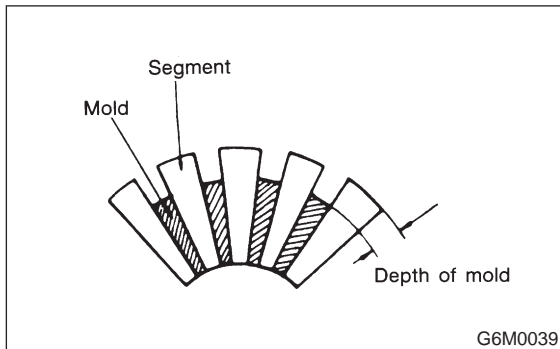
3) Depth of segment mold
Check the depth of segment mold.

Depth of segment mold:

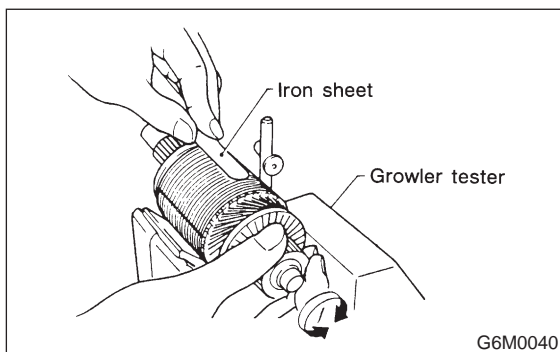
0.6 mm (0.024 in)

Limit

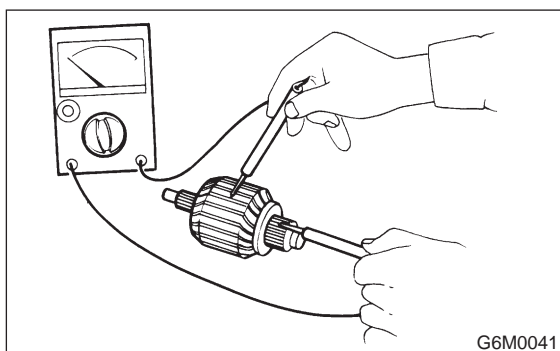
0.2 mm (0.008 in)



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.

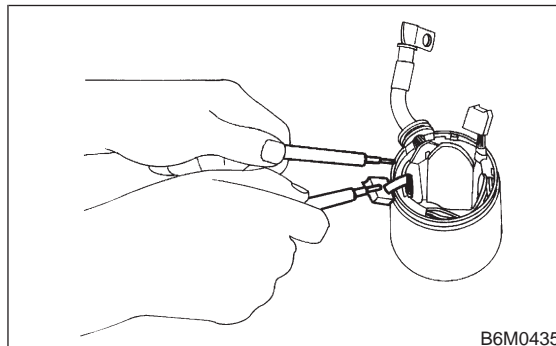


5) Armature ground test
Using circuit tester, touch one probe to the commutator segment and the other to shaft. There should be no continuity. If there is a continuity, armature is grounded.
Replace armature if it is grounded.



2. YOKE

Make sure pole is set in position.

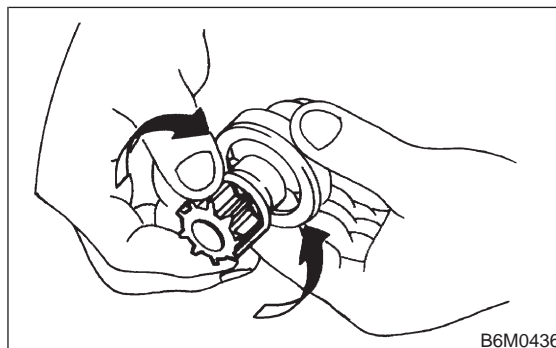


3. OVERRUNNING CLUTCH

Inspect teeth of pinion for wear and damage. Replace if it is 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.

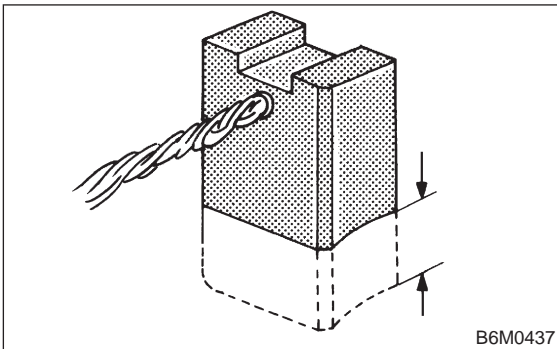
Brush length:

Standard

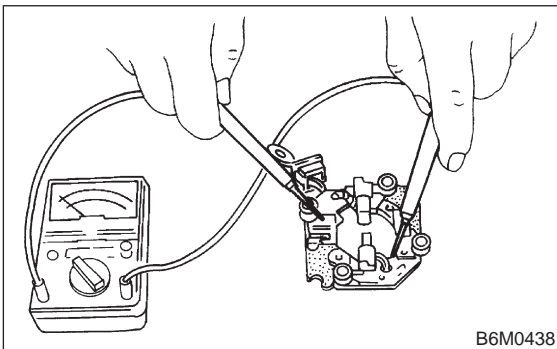
15 mm (0.59 in)

Service limit

10 mm (0.39 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

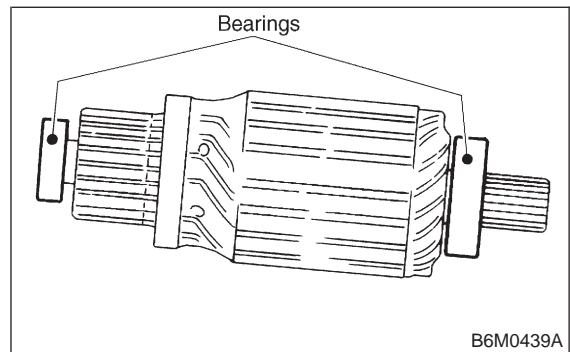
18.6 N (1.9 kg, 4.2 lb) (when new)

Service limit

6.9 N (0.7 kg, 1.5 lb)

5. BEARING

- 1) Rotate bearing by hand; no binding should exist.
- 2) Rotate bearing rapidly; no abnormal noise should be heard.



E: ASSEMBLY

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

- 1) Before assembling, lubricate disassembled parts at the points shown in "COMPONENT PARTS [C1A1] and [C1B2]". <Ref. to 6-1 [C100].>

Grease:

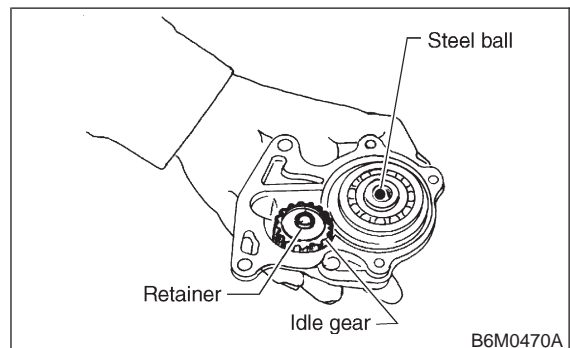
ESSO BEACON 325

SHELL ALVANIA GREASE RA or equivalent

- 2) Assembling magnetic switch, clutch, and housing
To assemble, first install clutch to magnetic switch, then install idle gear, and finally install clutch.

CAUTION:

- Do not forget to install steel ball and coil spring to clutch.
- Attach bearing to idle gear beforehand.

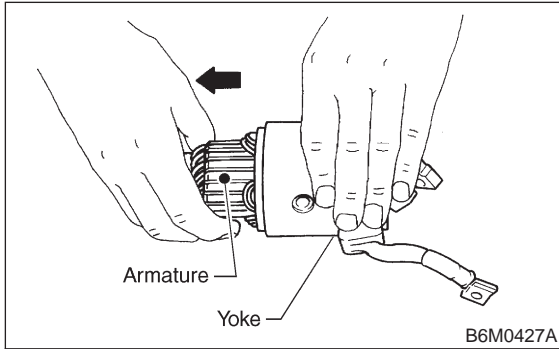


1. Starter

3) Installing armature to yoke

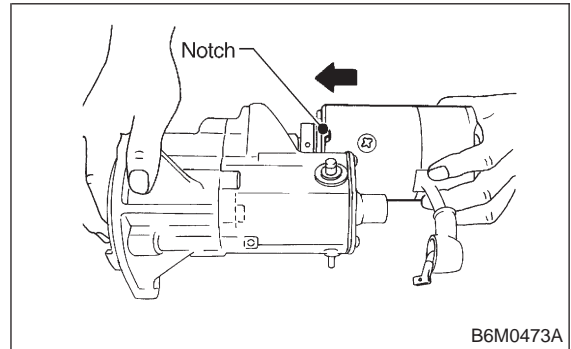
CAUTION:

Do not forget to put felt washer on armature shaft bearing.



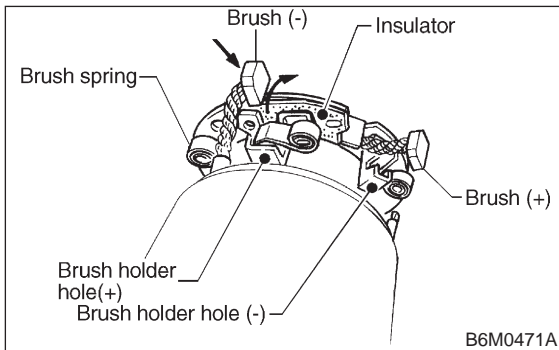
6) Installing yoke

When installing yoke to magnetic switch, align notch of yoke with protrusion of magnetic switch.



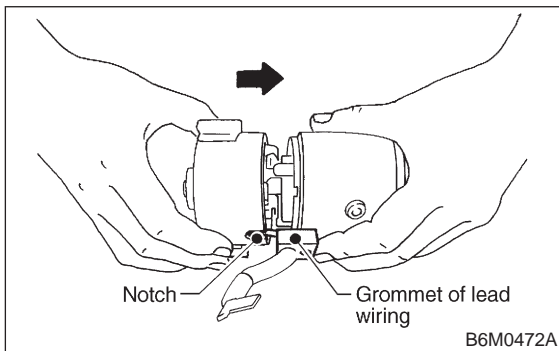
4) Installing brushes

Assemble brush holder to yoke as shown, then assemble two yoke-side brushes to brush holder.



5) Installing end frame

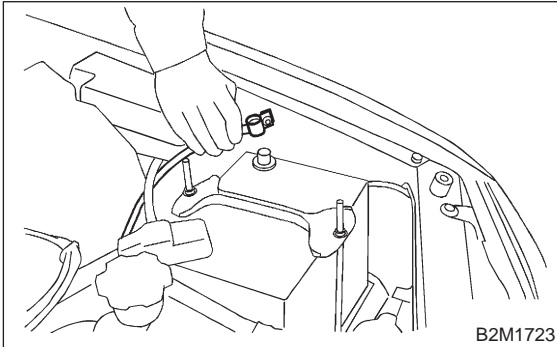
When assembling end frame to yoke, align notched portion of end frame with lead wire grommet.



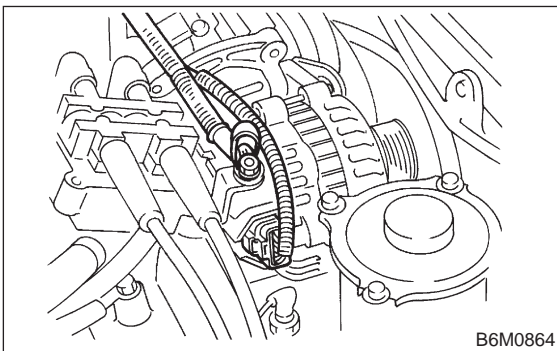
2. Generator

A: REMOVAL AND INSTALLATION

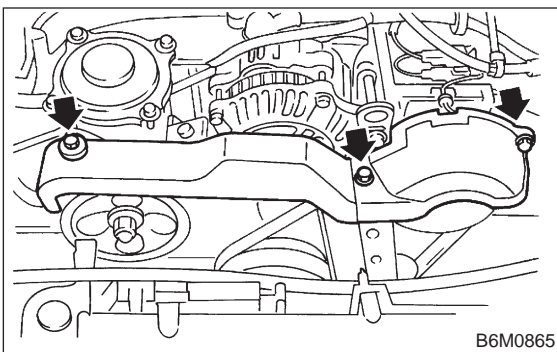
- 1) Disconnect battery ground cable.



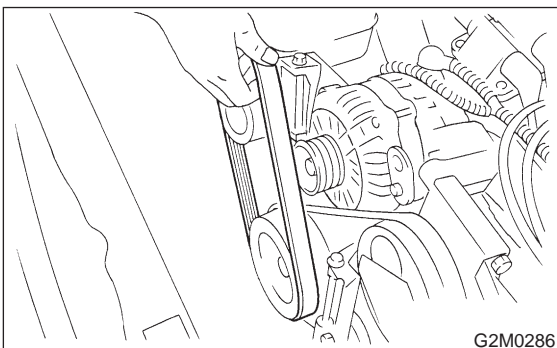
- 2) Disconnect connector and terminal from generator.



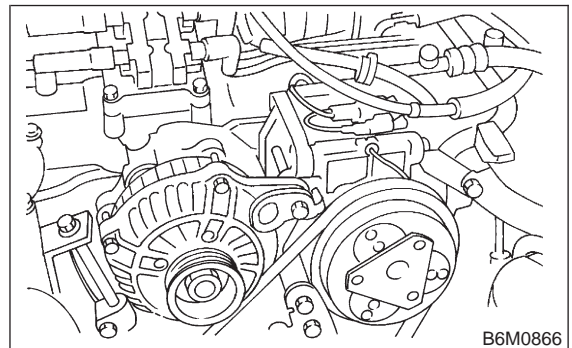
- 3) Remove V-belt covers.



- 4) Remove front side V-belt.

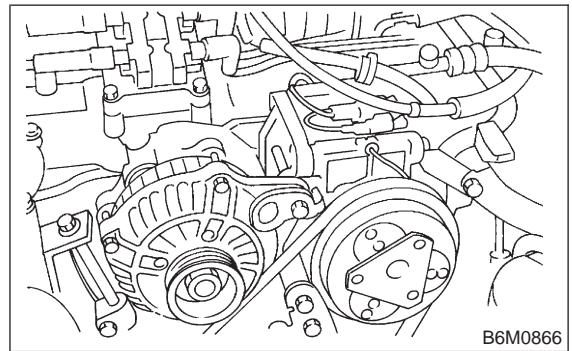


- 5) Remove bolts which install generator onto bracket.



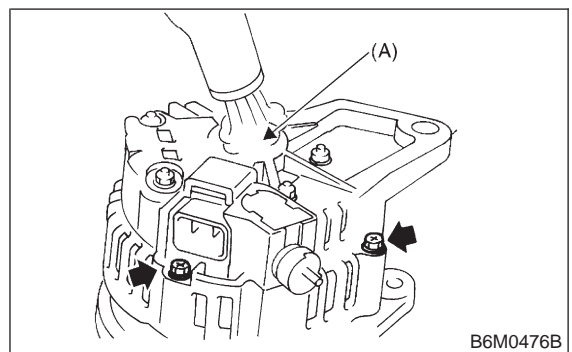
- 6) Installation is in the reverse order of removal.

CAUTION:
Check and adjust V-belt tension. <Ref. to 1-5 [G2A0].>



B: DISASSEMBLY

- 1) Heat the portion (A) of rear cover to 50°C (122°F) with heater drier.

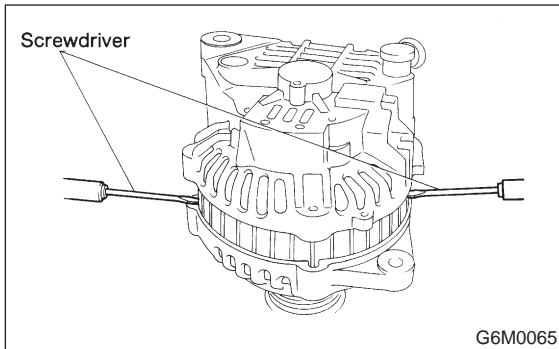


6-1 [W2B0]

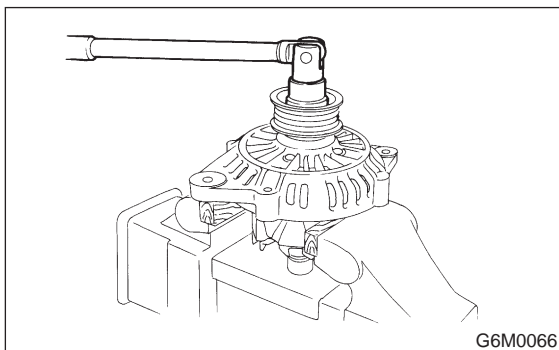
2. Generator

SERVICE PROCEDURE

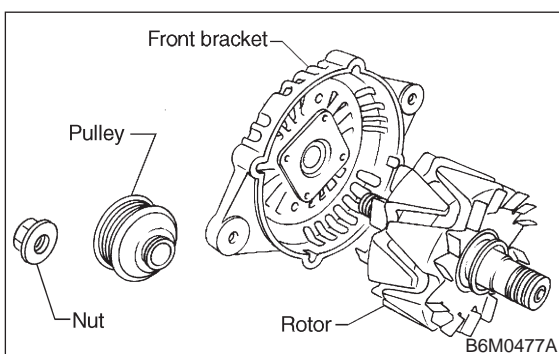
2) Remove the four through bolts. Then insert the tip of a flat-head screwdriver into the gap between the stator core and front bracket. Pry then apart to disassemble.



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

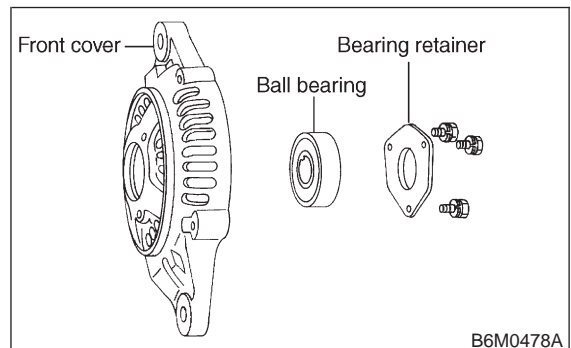


CAUTION:
When holding rotor with vise, insert aluminum plates or wood pieces on the contact surfaces of the vise to prevent rotor from damage.

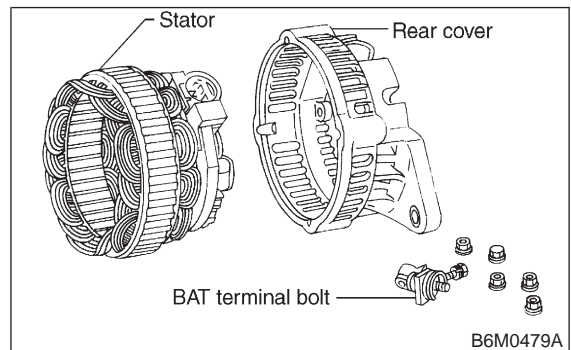


4) Remove rotor from front cover.

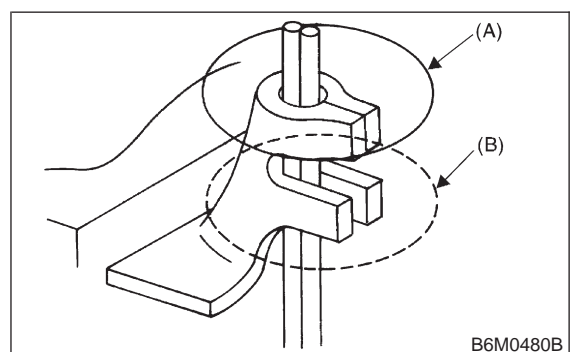
5) Remove three screws from front cover and then bearing retainer and ball bearing.



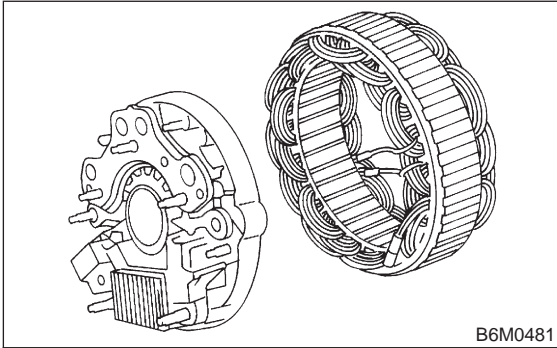
6) Remove bolt which secure battery terminal bolt, and remove rear cover. Remove nuts which secure diode plate, and remove stator and rear cover.



7) Separate diode plate from stator coil.
(1) Cut the connecting position (A) of stator coil to diode.
(2) Unsolder connection (B) and throughout the lead wire of stator coil.



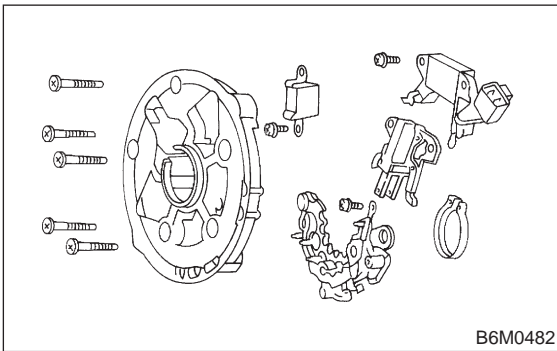
(3) Remove stator coil from diode plate.



B6M0481

8) Remove bolts which secure IC regulator, diode and brush holder.

CAUTION:
Do not apply a shock or load to IC regulator cooling fins.

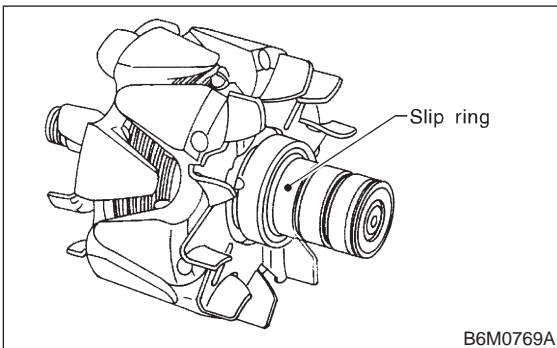


B6M0482

C: INSPECTION

1. ROTOR

1) Slip ring surface
Inspect slip rings for contamination or any roughness of the sliding surface.
Clean or polish with #500 to #600 emery paper if defective.

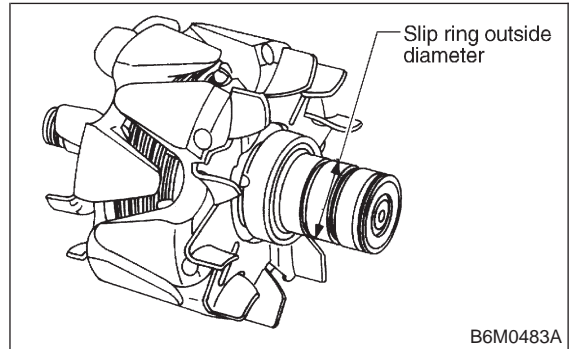


B6M0769A

2) Slip ring outside diameter
Measure slip ring outside diameter. If slip ring is worn, replace rotor.

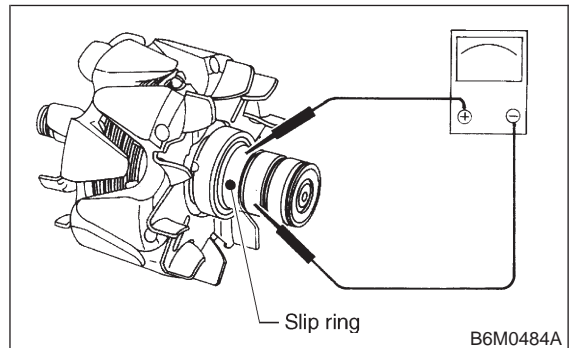
Slip ring outside diameter:

- Standard**
27 mm (1.06 in)
- Limit**
26 mm (1.02 in)



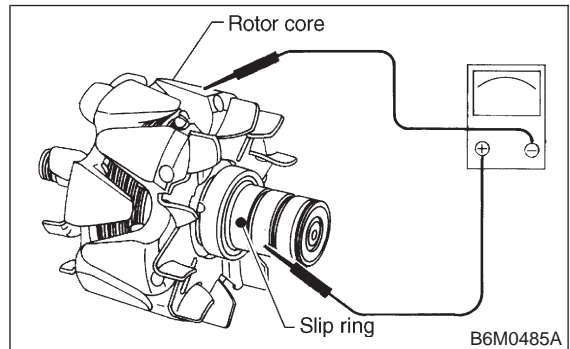
B6M0483A

3) Continuity test
Check continuity between slip rings. If continuity does not exist, replace rotor.



B6M0484A

4) Insulation test
Check continuity between slip ring and rotor core or shaft. If continuity exists, replace rotor.



B6M0485A

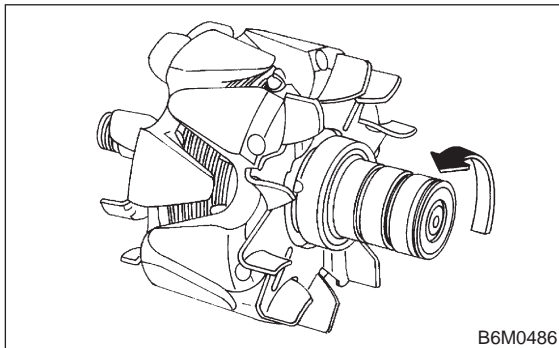
6-1 [W2C2]

2. Generator

SERVICE PROCEDURE

5) Ball bearing

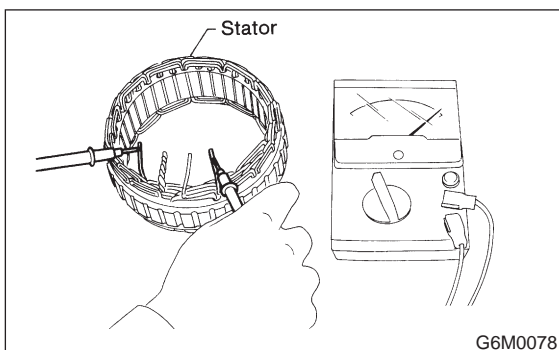
Check rear ball bearing. Replace it if it is noisy or if rotor does not turn smoothly.



2. STATOR

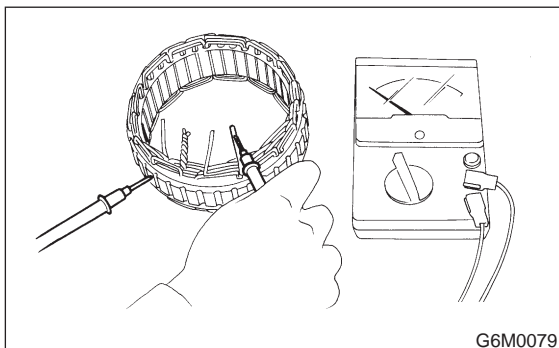
1) Continuity test

Inspect stator coil for continuity between its terminals. When there is no continuity between individual terminals, cable is broken. Replace stator coil.



2) Insulation test

Inspect stator coil for continuity between stator core and each terminal. If there is continuity, replace stator coil.



3. BRUSH

Measure brush length. If brush is worn, replace brush holder assembly.

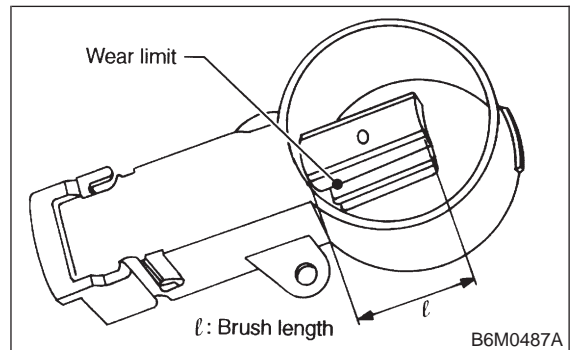
Brush length (ℓ):

Standard

20.5 mm (0.807 in)

Limit

1.5 mm (0.059 in)



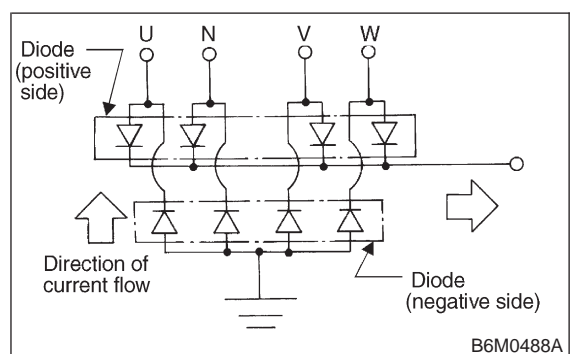
4. DIODE ASSEMBLY

CAUTION:

Never use a high tension insulation tester, such as a megger as it will damage diodes with its high tension.

The diode consists of eight diodes, four each being located on the positive and negative sides. The diode is necessary to restrict current flow to one direction.

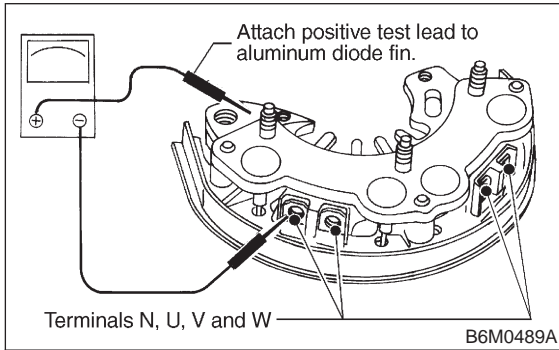
Check all diodes, for continuity. If any diode is faulty, replace diode assembly.



1) Diodes on "+" side

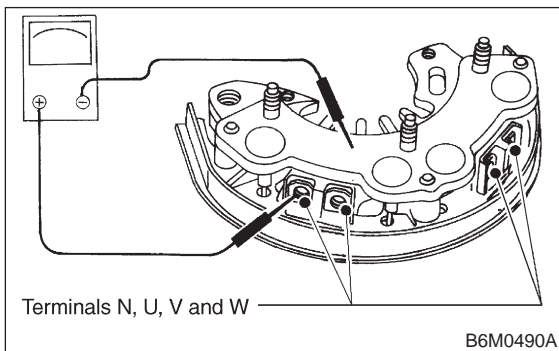
Continuity of proper diodes on "+" side

Terminal N, U, V and W	BAT side	
	(+)	(-)
(+)	—	Continuity must not exist.
(-)	Continuity must exist.	—



2) Diodes on “-” side
Continuity of proper diodes on “-” side

Terminal N, U, V and W	“E” side	
	(+)	(-)
(+)	—	Continuity must exist.
(-)	Continuity must not exist.	—

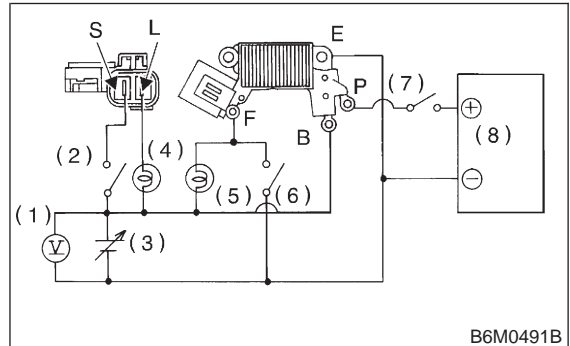


2) Check operation as shown in chart below.

No.	Switch operation			Value of voltage meter	Lamp operation		Remarks
	1	2	3		1	2	
1	ON	OFF	OFF	12 V	DIM	ON	Check initial excitation.
2	ON	ON	OFF	12 V	ON or BLINK	OFF	Check total excitation.
3	ON	ON	OFF	16 V	OFF or DIM-BLINK	OFF	When value of voltage meter is between 12 V and 16 V.
4	OFF	ON	OFF	12 V	ON or BLINK	ON	Check connection for S and B terminals.
5	OFF	ON	ON	18 V	ON	ON	Check for over loading of voltage.

5. IC REGULATOR

1) Compose a circuit diagram as shown in figure.



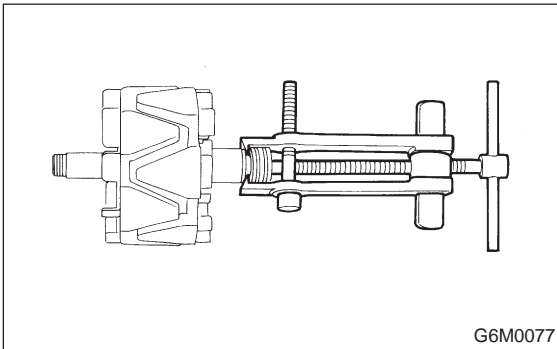
- (1) Voltage meter: 0 to 30 V
- (2) Switch 1
- (3) Variable DC power supply: Variable 0 to 20 V, 1 A or more
- (4) Lamp 2
- (5) Lamp 1
- (6) Switch 3
- (7) Switch 2
- (8) Plus generator: Power supply 5 to 30 V, 1 kHz

D: ASSEMBLY

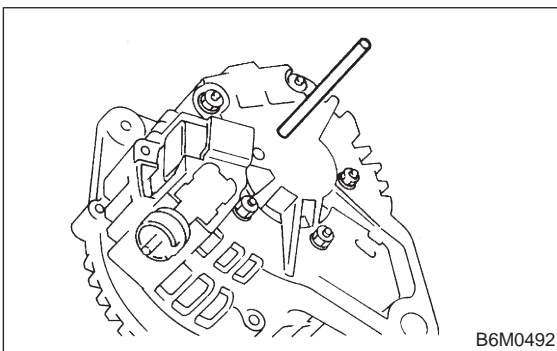
Assembly is in the reverse order of disassembly procedures.

CAUTION:

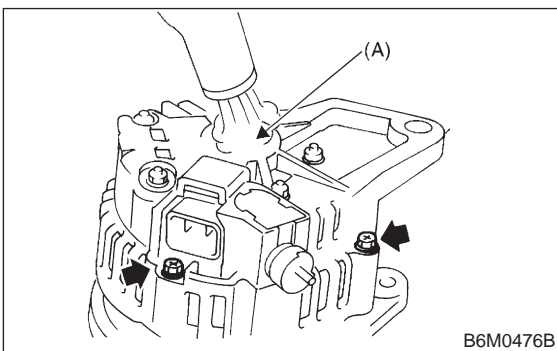
- When disassembling generator, replace rear ball bearing.



- When soldering starter coil to diode, do not touch lead wire with solder for more than 5 seconds.
- Before installing rear cover, insert pin from outside of rear cover so that holds brush. After installing rear cover, remove pin.



- When installing rear cover, heat portion (A) to 50°C (122°F) with heater drier.



3. Spark Plug

A: REMOVAL AND INSTALLATION (2200 cc MODEL)

CAUTION:

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

Spark plug:

CHAMPION: RC10YC4

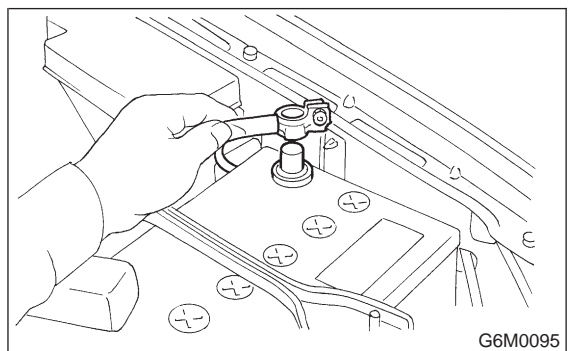
(Alternate)

NGK: BKR6E-11

NIPPONDENSO: K20PR-U11

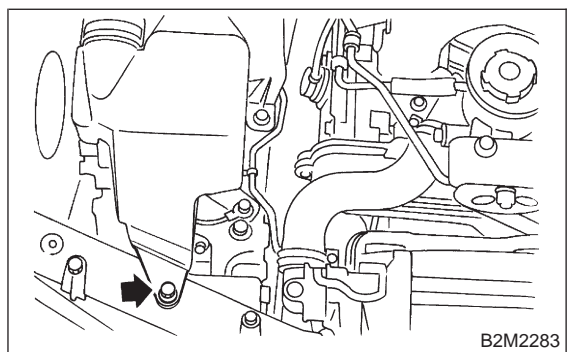
1. #1 SPARK PLUG

- 1) Disconnect battery ground cable.

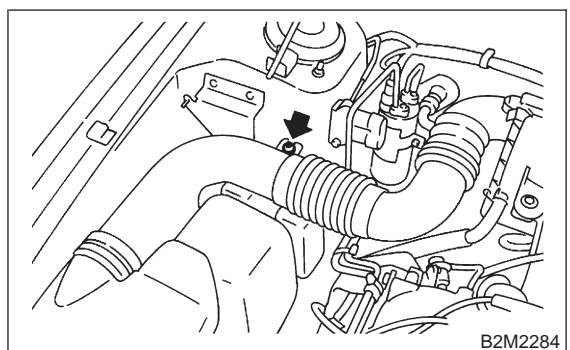


- 2) Remove air intake duct and resonator chamber. (California SPEC. vehicle)

- (1) Remove bolt which installs air intake duct (A) on the front side of body.



- (2) Remove bolt which installs air intake duct (B) on body.

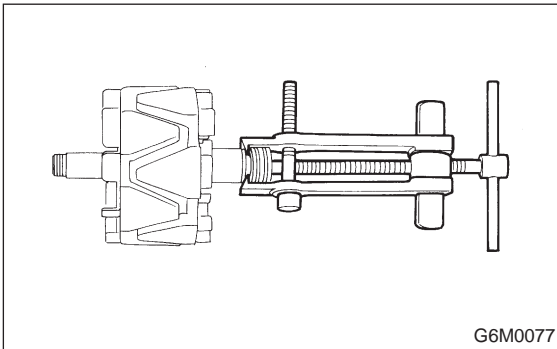


D: ASSEMBLY

Assembly is in the reverse order of disassembly procedures.

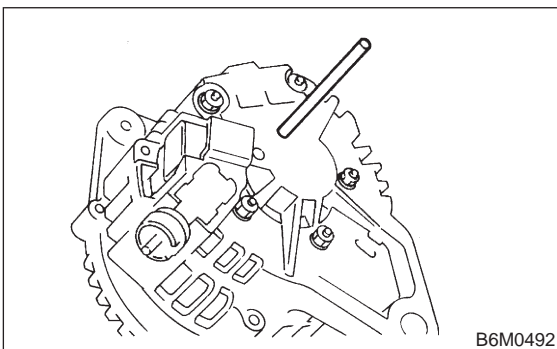
CAUTION:

- When disassembling generator, replace rear ball bearing.

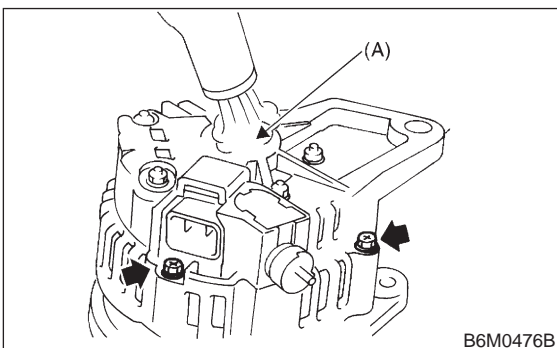


- When soldering starter coil to diode, do not touch lead wire with solder for more than 5 seconds.

- Before installing rear cover, insert pin from outside of rear cover so that holds brush. After installing rear cover, remove pin.



- When installing rear cover, heat portion (A) to 50°C (122°F) with heater drier.



3. Spark Plug

A: REMOVAL AND INSTALLATION (2200 cc MODEL)

CAUTION:

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

Spark plug:

CHAMPION: RC10YC4

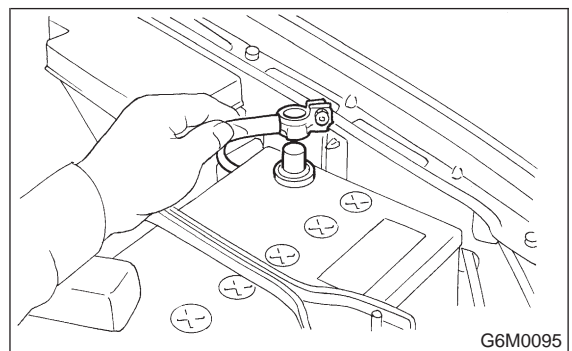
(Alternate)

NGK: BKR6E-11

NIPPONDENSO: K20PR-U11

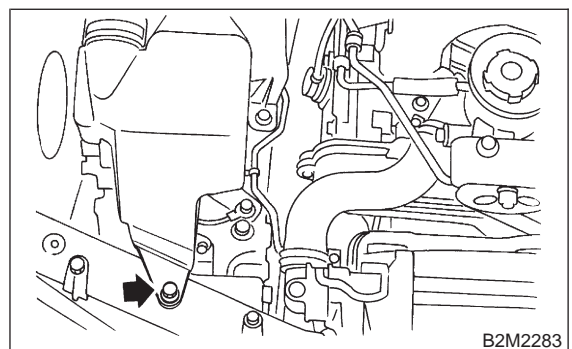
1. #1 SPARK PLUG

- 1) Disconnect battery ground cable.

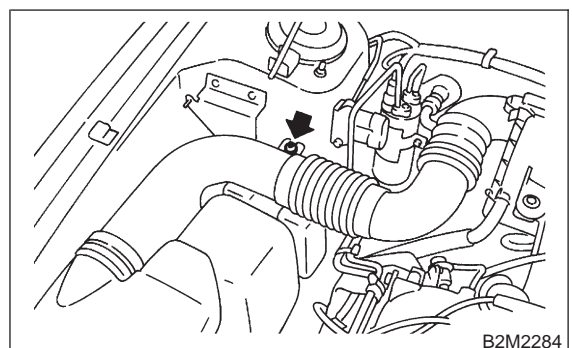


- 2) Remove air intake duct and resonator chamber. (California SPEC. vehicle)

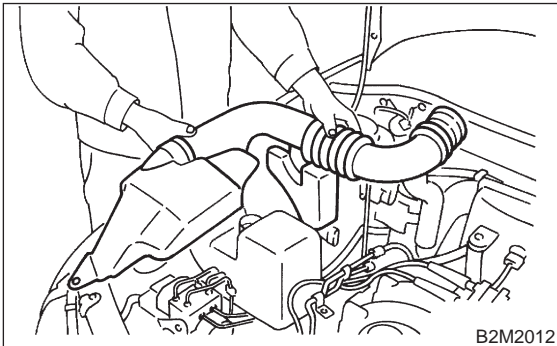
- (1) Remove bolt which installs air intake duct (A) on the front side of body.



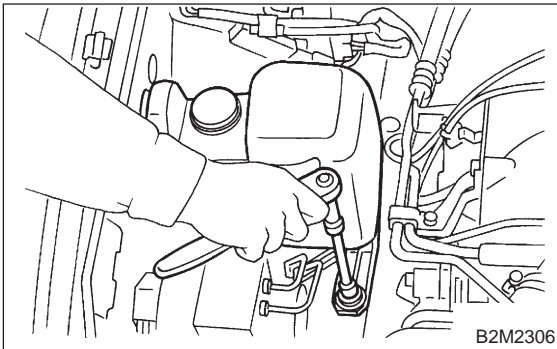
- (2) Remove bolt which installs air intake duct (B) on body.



(3) Remove air intake duct (A) and (B) as a unit.

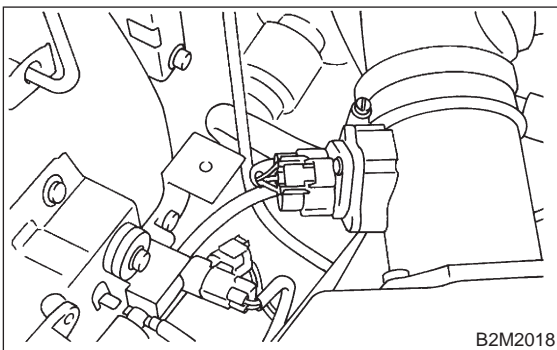


(4) Remove resonator chamber.



3) Remove air cleaner upper case and air cleaner element. (Except California SPEC. vehicle)

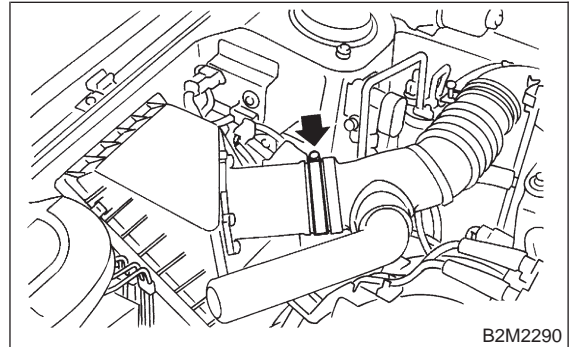
(1) Disconnect mass air flow sensor connector.



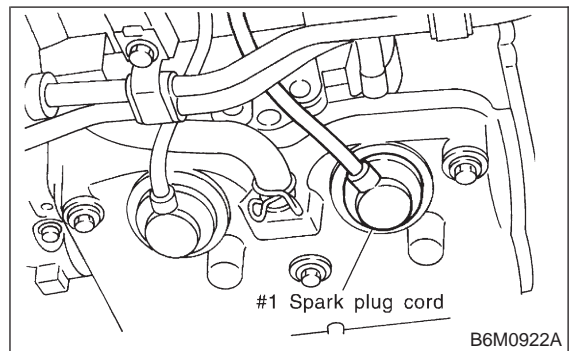
(2) Remove two clips securing air cleaner upper cover.

(3) Loosen the clamp screw and separate air cleaner upper cover from air intake duct.

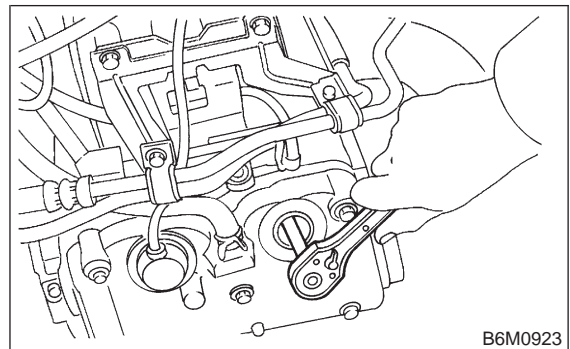
(4) Remove air cleaner element.



4) Remove #1 spark plug cord by pulling boot, not cord itself.



5) Remove spark plug with the spark plug socket.



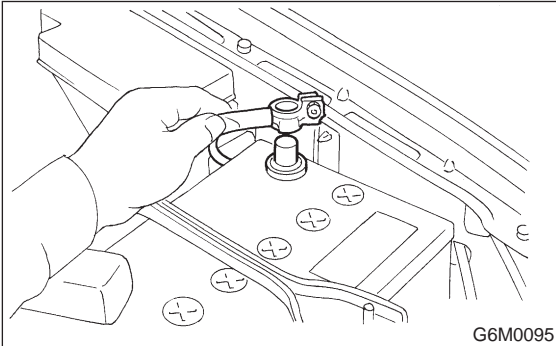
6) Installation is in the reverse order of removal.

Tightening torque (Spark plug):

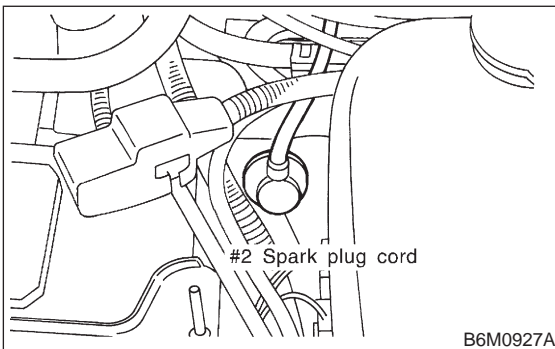
20.6±2.9 N·m (2.10±0.30 kg·m, 15.19±2.14 ft·lb)

2. #2 SPARK PLUG

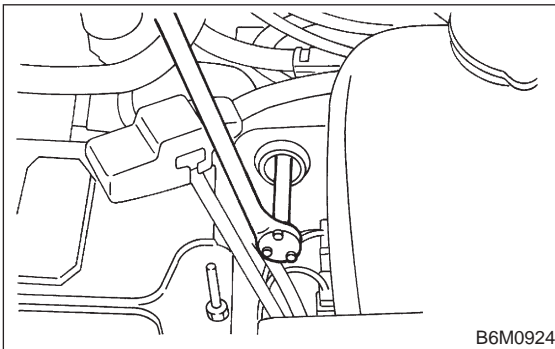
- 1) Disconnect battery ground cable.



- 2) Remove #2 spark plug cord by pulling boot, not cord itself.



- 3) Remove spark plug with the spark plug socket.

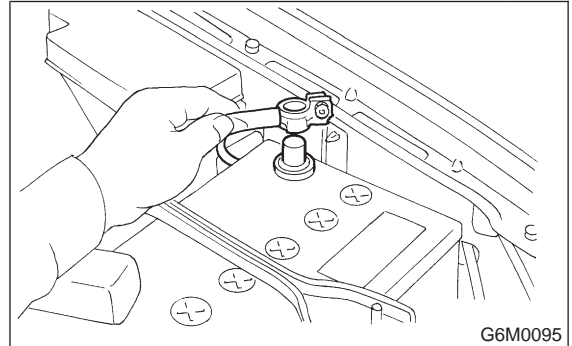


- 4) Installation is in the reverse order of removal.

Tightening torque (Spark plug):
20.6±2.9 N·m (2.10±0.30 kg·m, 15.19±2.14 ft·lb)

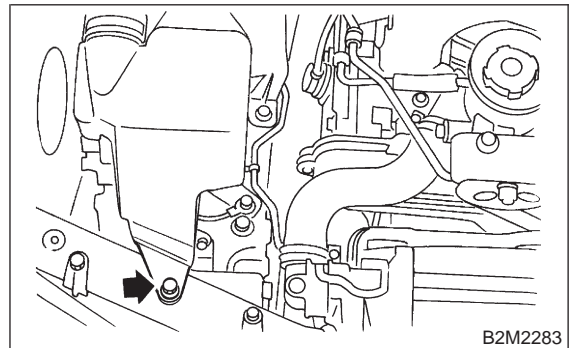
3. #3 SPARK PLUG

- 1) Disconnect battery ground cable.

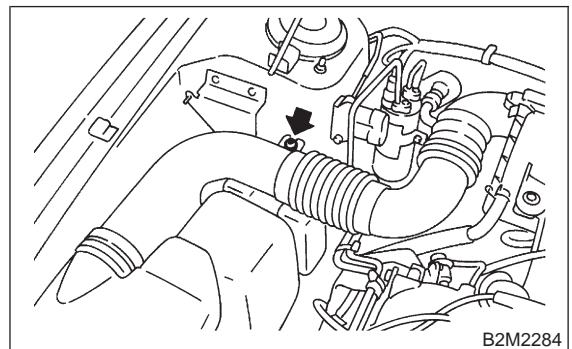


- 2) Remove air intake duct and air chamber. (California SPEC. vehicle)

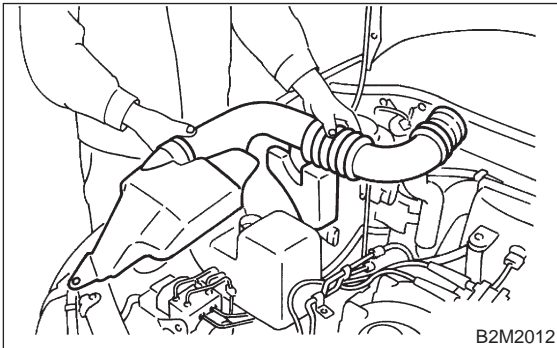
- (1) Remove bolt which installs air intake duct (A) on the front side of body.



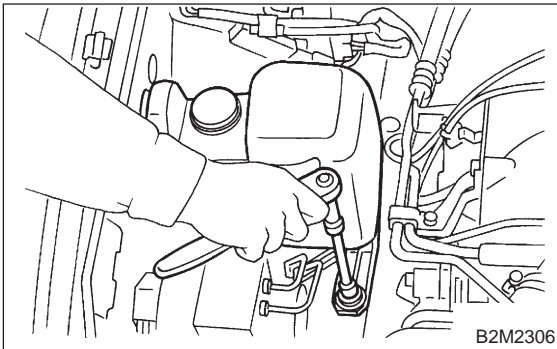
- (2) Remove bolt which installs air intake duct (B) on body.



(3) Remove air intake duct (A) and (B) as a unit.

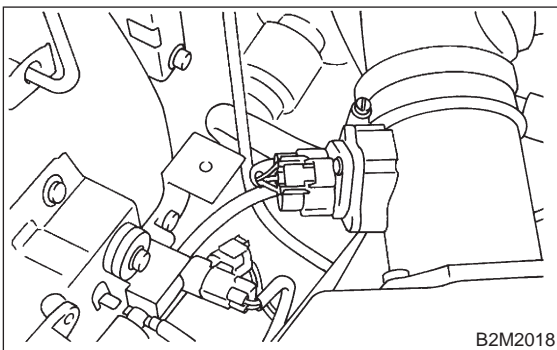


(4) Remove resonator chamber.



3) Remove air cleaner upper case and air cleaner element. (Except California SPEC. vehicle)

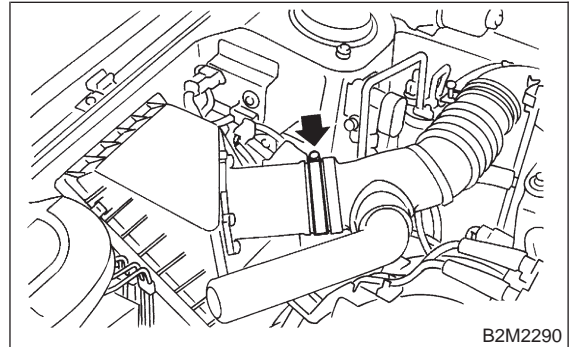
(1) Disconnect mass air flow sensor connector.



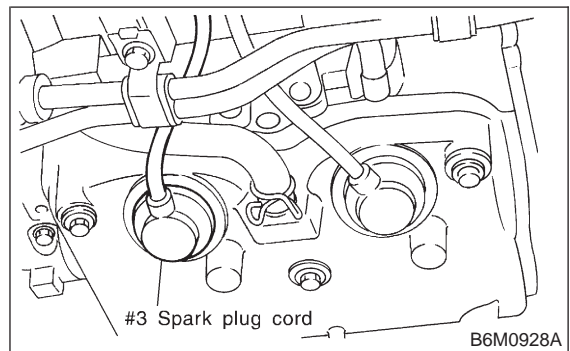
(2) Remove two clips securing air cleaner upper cover.

(3) Loosen the clamp screw and separate air cleaner upper cover from air intake duct.

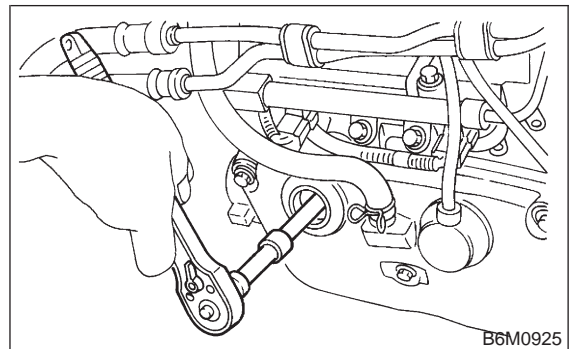
(4) Remove air cleaner element.



4) Remove #3 spark plug cord by pulling boot, not cord itself.



5) Remove spark plug with the spark plug socket.



6) Installation is in the reverse order of removal.

Tightening torque (Spark plug):

20.6±2.9 N·m (2.10±0.30 kg·m, 15.19±2.14 ft·lb)

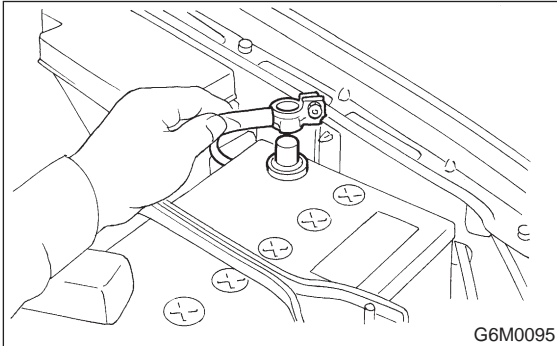
6-1 [W3A4]

3. Spark Plug

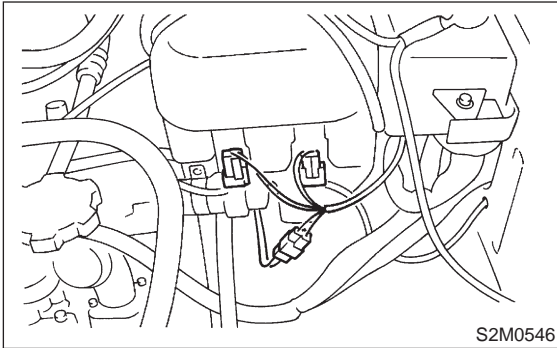
SERVICE PROCEDURE

4. #4 SPARK PLUG

- 1) Disconnect battery ground cable.

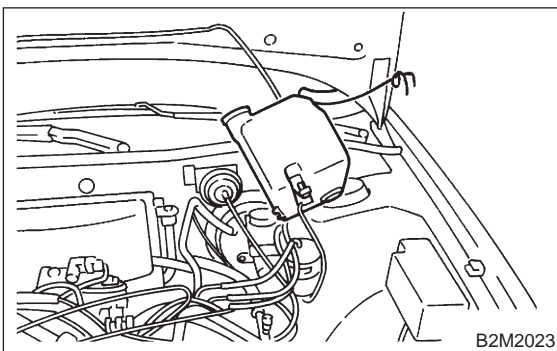


- 2) Disconnect washer motor connector.

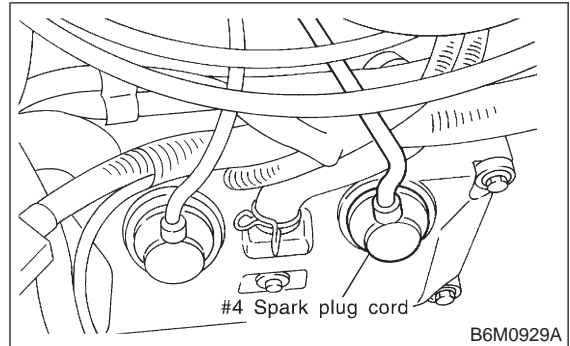


- 3) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.

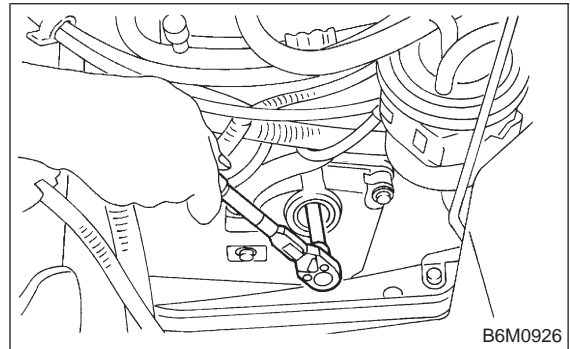
- 4) Remove the two bolts which hold the washer tank, then take the tank away from the working area.



- 5) Remove #4 spark plug cord by pulling boot, not cord itself.



- 6) Remove spark plug with the spark plug socket.



- 7) Installation is in the reverse order of removal.

Tightening torque (Spark plug):

20.6 ± 2.9 N·m (2.10 ± 0.30 kg·m, 15.19 ± 2.14 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 over-stressing.

**B: REMOVAL AND INSTALLATION
(2500 cc EXCEPT OUTBACK
MODEL)**

CAUTION:

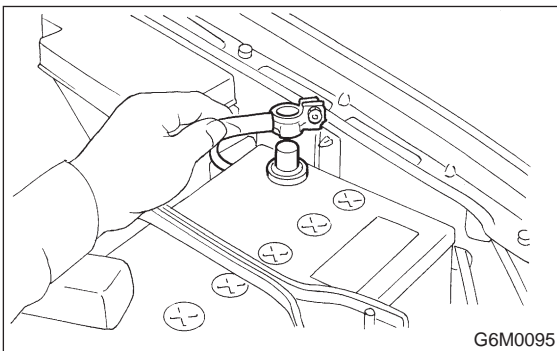
All spark plugs installed on an engine, must be of the same heat range.

Spark plug:

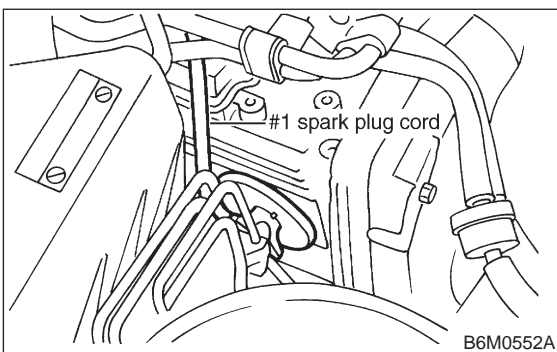
NGK: PFR5B-11

1. #1 SPARK PLUG

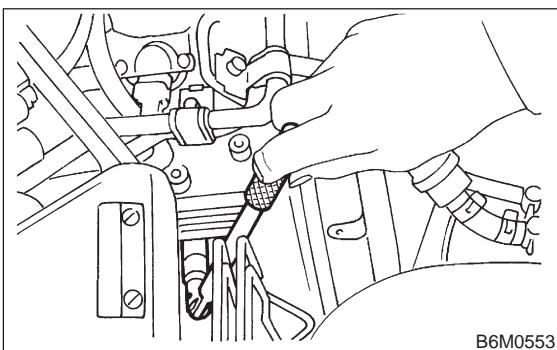
- 1) Disconnect battery ground cable.



- 2) Remove #1 spark plug cord by pulling boot, not cord itself.



- 3) Remove spark plug with the spark plug socket.



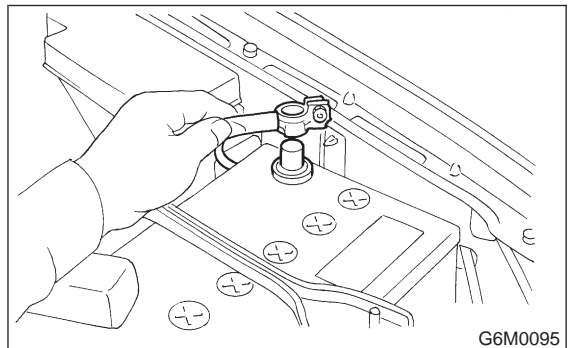
- 4) Installation is in the reverse order of removal.

Tightening torque (Spark plug):

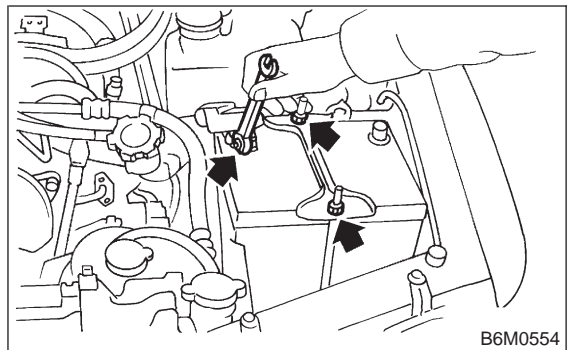
20.6±2.9 N·m (2.10±0.30 kg·m, 15.19±2.14 ft·lb)

2. #2 SPARK PLUG

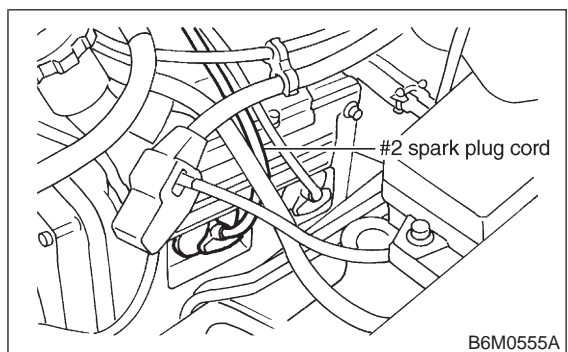
- 1) Disconnect battery ground cable.



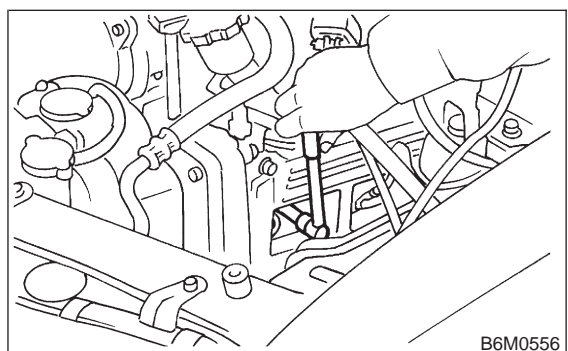
- 2) Remove battery.



- 3) Remove #2 spark plug cord by pulling boot, not cord itself.



- 4) Remove spark plug with the spark plug socket.



- 5) Installation is in the reverse order of removal.

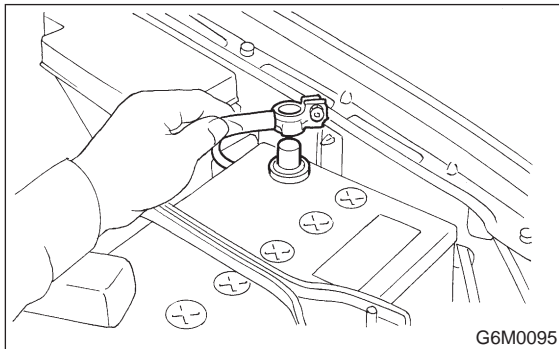
3. Spark Plug

Tightening torque (Spark plug):

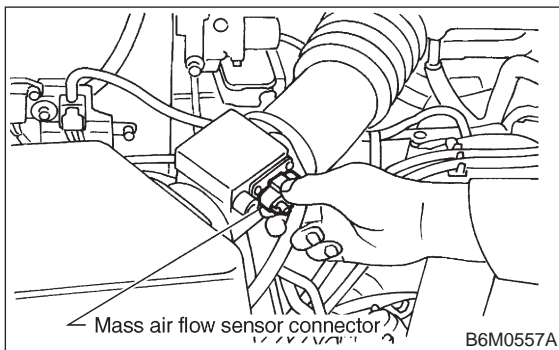
20.6 ± 2.9 N·m (2.10 ± 0.30 kg·m, 15.19 ± 2.14 ft·lb)

3. #3 SPARK PLUG

- 1) Disconnect battery ground cable.

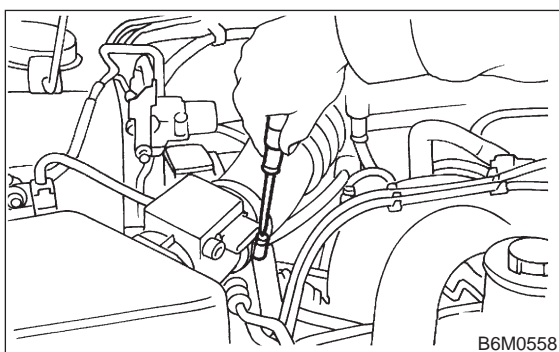


- 2) Disconnect mass air flow sensor connector.



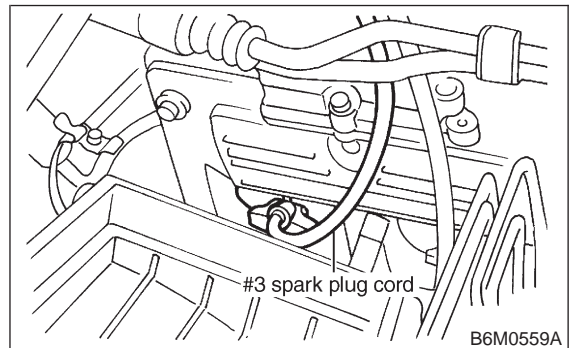
- 3) Remove four clips securing air cleaner upper cover.

- 4) Loosen the clamp screw and separate air cleaner upper cover from air intake duct.

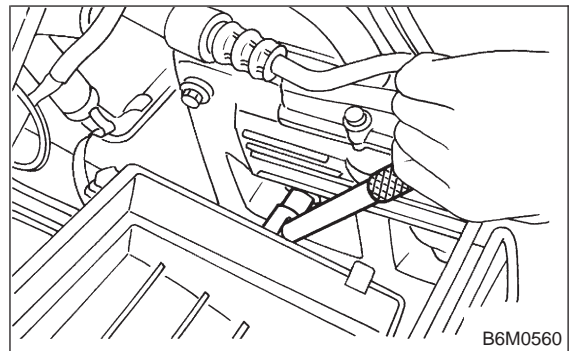


- 5) Remove air cleaner element.

- 6) Remove #3 spark plug cord by pulling boot, not cord itself.



- 7) Remove spark plug with the spark plug socket.



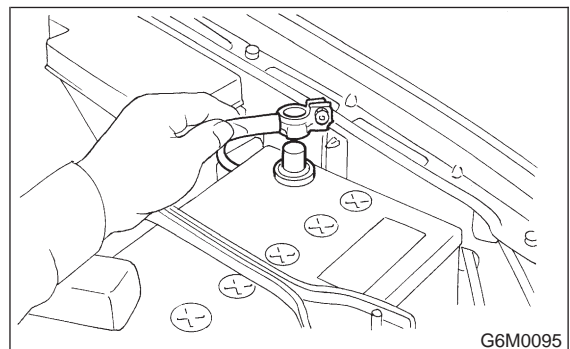
- 8) Installation is in the reverse order of removal.

Tightening torque (Spark plug):

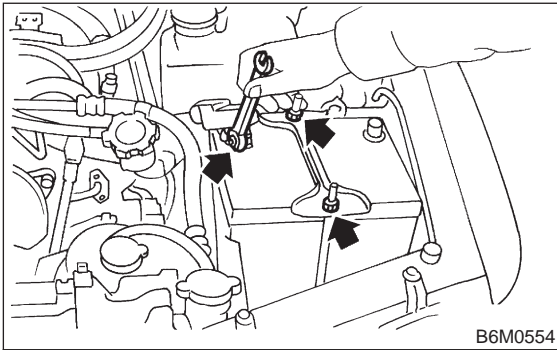
20.6 ± 2.9 N·m (2.10 ± 0.30 kg·m, 15.19 ± 2.14 ft·lb)

4. #4 SPARK PLUG

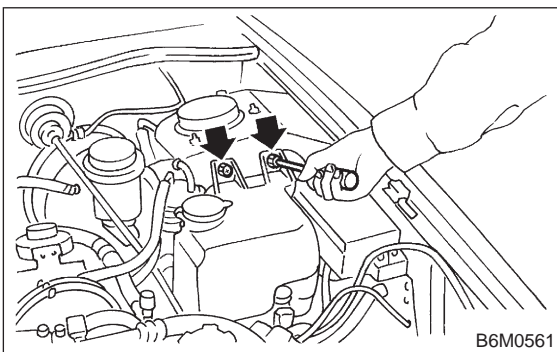
- 1) Disconnect battery ground cable.



2) Remove battery.

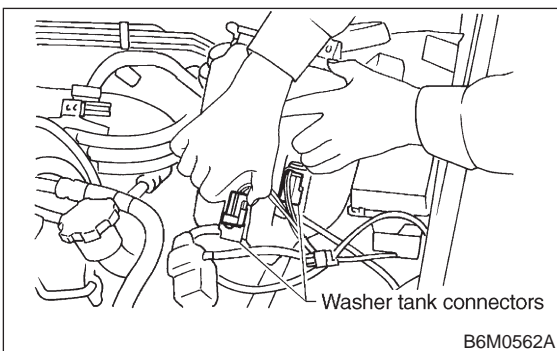


3) Remove washer tank mounting bolts.

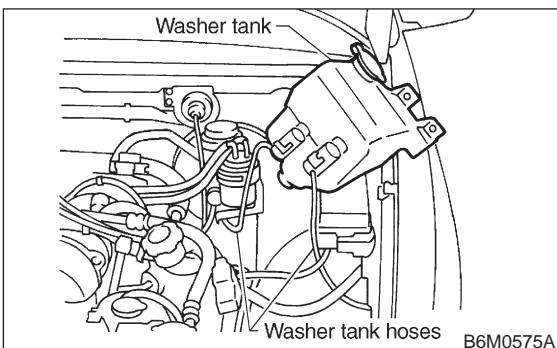


4) Disconnect washer tank connectors.

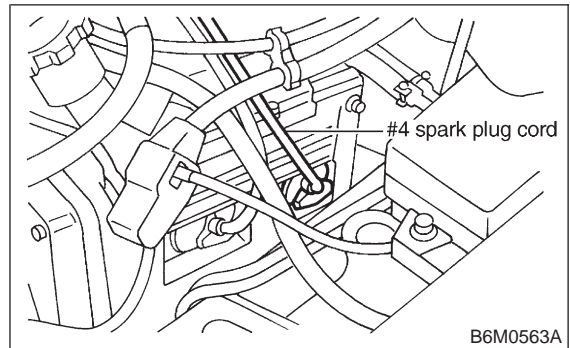
CAUTION:
Do not disconnect washer tank hoses as washer fluid will leak out from washer tank.



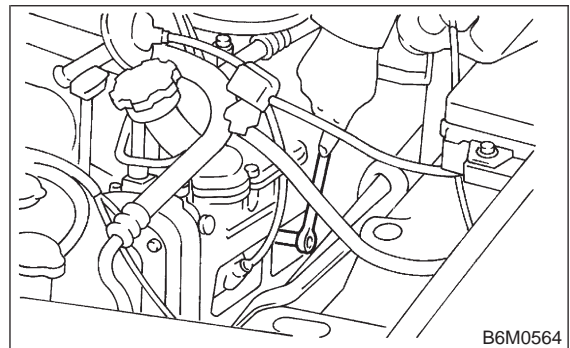
5) Move washer tank upward.



6) Remove #4 spark plug cord by pulling boot, not cord itself.



7) Remove spark plug with the spark plug socket.



8) Installation is in the reverse order of removal.

Tightening torque (Spark plug):
 $20.6 \pm 2.9 \text{ N}\cdot\text{m}$ ($2.10 \pm 0.30 \text{ kg}\cdot\text{m}$, $15.19 \pm 2.14 \text{ ft}\cdot\text{lb}$)

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 over-stressing.

C: REMOVAL (2500 cc OUTBACK MODEL)

CAUTION:

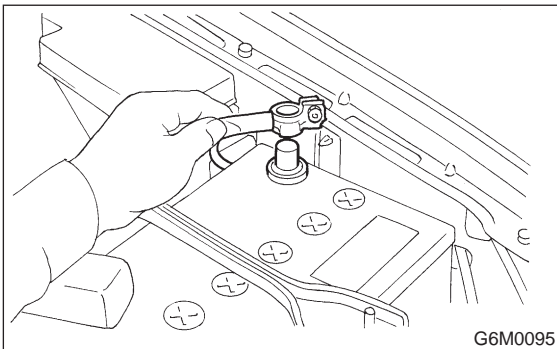
All spark plugs installed on an engine, must be of the same heat range.

Spark plug:

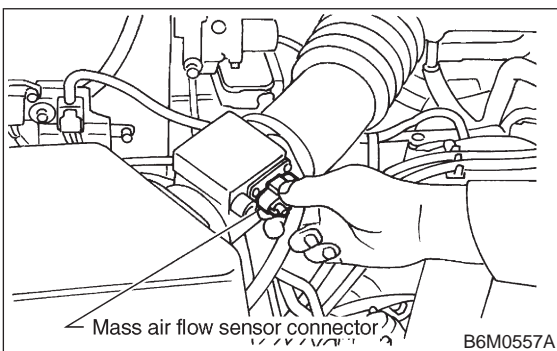
NGK: PFR5B-11

1. #1 SPARK PLUG

- 1) Disconnect battery ground cable.

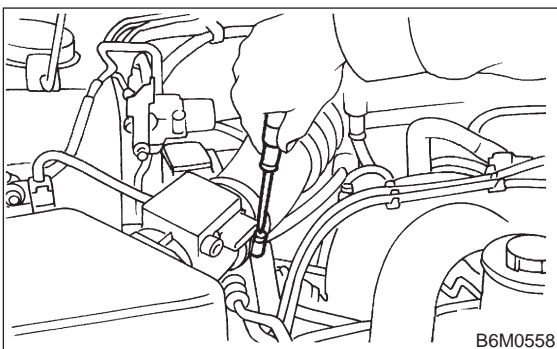


- 2) Disconnect mass air flow sensor connector.

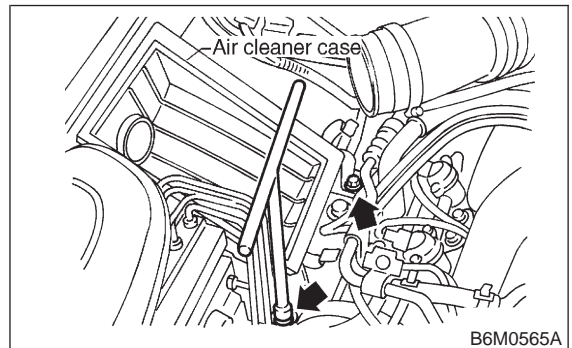


- 3) Remove four clips securing air cleaner upper cover.

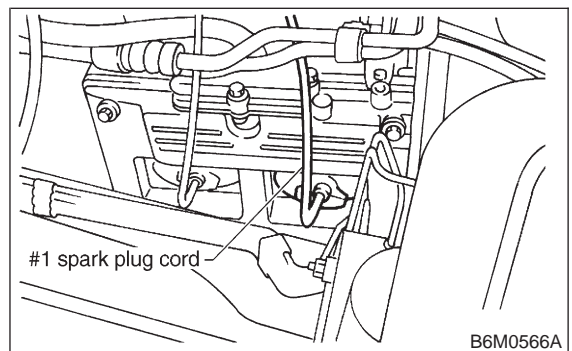
- 4) Loosen the clamp screw and separate air cleaner upper cover from air intake duct.



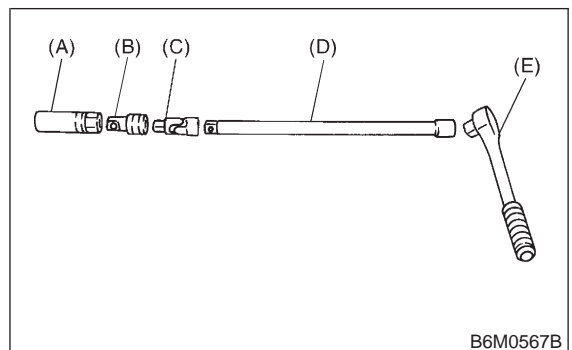
- 5) Remove air cleaner element and air cleaner case.



- 6) Remove #1 spark plug cord by pulling boot, not cord itself.



- 7) After connecting (A) spark plug socket, (B) extension and (C) Universal Joint to each other, securely set them over the spark plug in cylinder head.



- (A) Spark plug socket 16 mm (5/8 in)
(B) Extension
(C) Universal Joint
(D) Extension
(E) Ratchet

- 8) Cover ABS pipes with a rag to prevent damage.

NOTE:

- Length L1 is important in making for easy removal.
- It may be necessary to wrap points (A) and (B) with vinyl tape to prevent them separating while working.

If they do separate, spark plug socket is left on the spark plug and it is very difficult to remove.

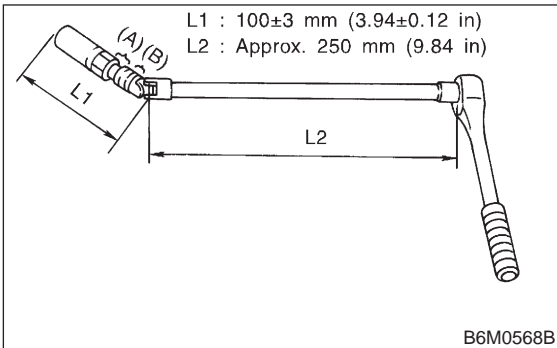
- An approximately 250 mm (9.84 in) long extension is recommended to be connected to ratchet.

- For spark plug socket, extension and Universal Joint, it is recommended to use the following tools.

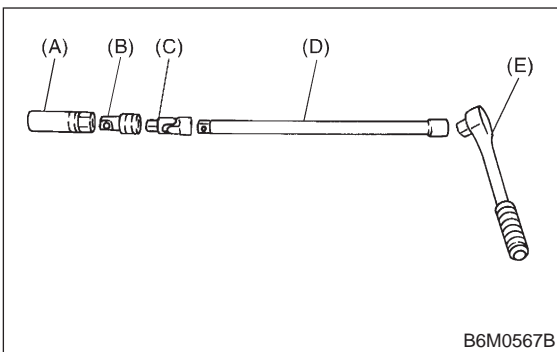
Spark plug socket : PROTO 5020-50

Extension : SNAP-ON FX1

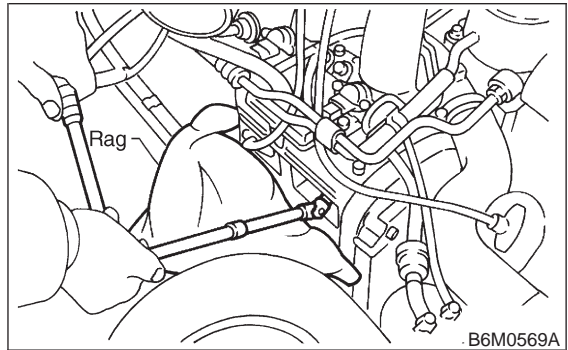
Universal Joint : SNAP-ON FU80B



9) Set (D) extension and (E) ratchet in turn onto the connected tools in plug hole, and remove spark plug using them.

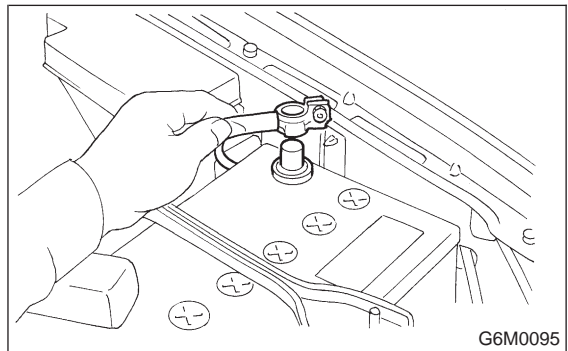


- (A) Spark plug socket 16 mm (5/8 in)
- (B) Extension
- (C) Universal Joint
- (D) Extension
- (E) Ratchet

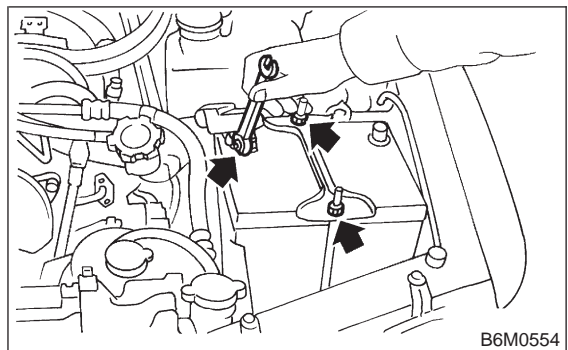


2. #2 SPARK PLUG

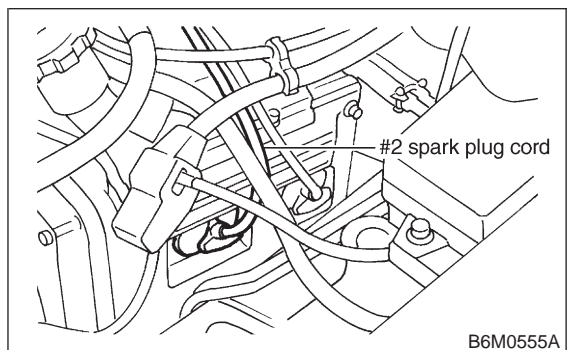
1) Disconnect battery ground cable.



2) Remove battery.



3) Remove #2 spark plug cord by pulling boot, not cord itself.

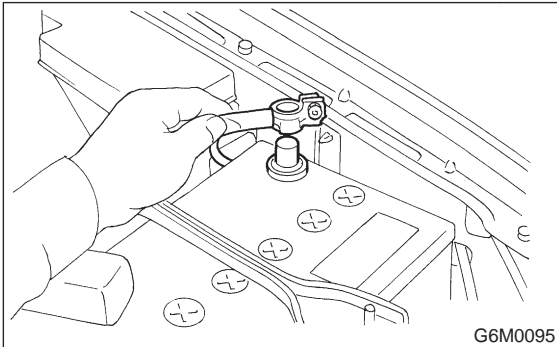


4) For subsequent procedures, refer to the procedure for #1 spark plug. <Ref. to 6-1 [W3C1].>

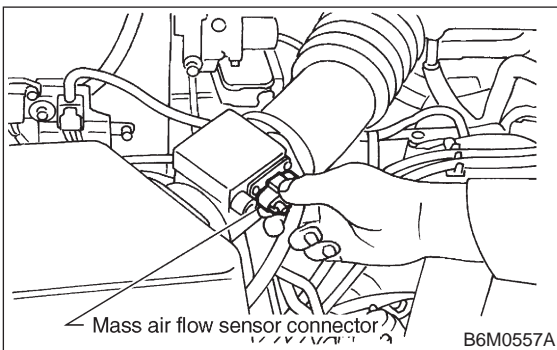
CAUTION:
When removing spark plug, cover the ATF cooling pipes with a rag to prevent damage.

3. #3 SPARK PLUG

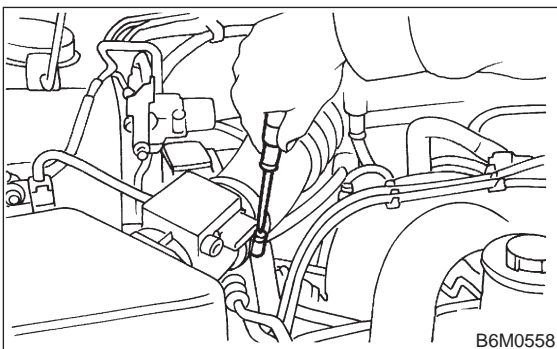
- 1) Disconnect battery ground cable.



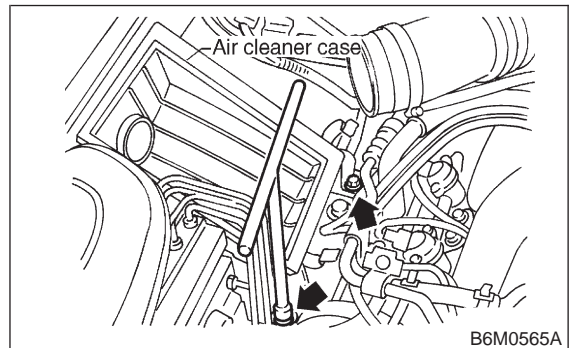
- 2) Disconnect mass air flow sensor connector.



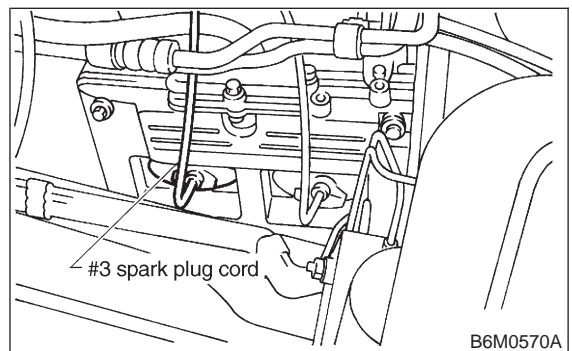
- 3) Remove four clips securing air cleaner upper cover.
4) Loosen the clamp screw and separate air cleaner upper cover from air intake duct.



- 5) Remove air cleaner element and air cleaner case.



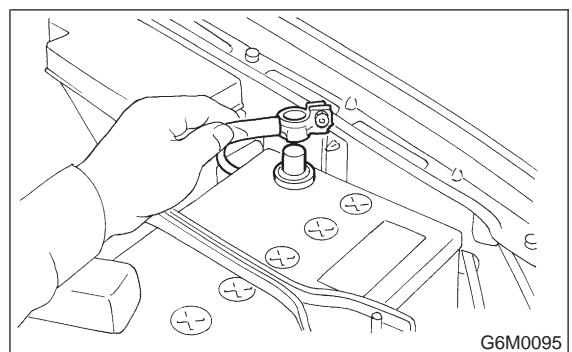
- 6) Remove #3 spark plug cord by pulling boot, not cord itself.



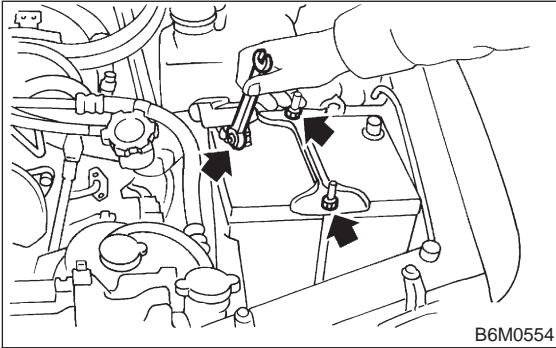
- 7) For subsequent procedures, refer to the procedure for #1 spark plug. <Ref. to 6-1 [W3C1].>

4. #4 SPARK PLUG

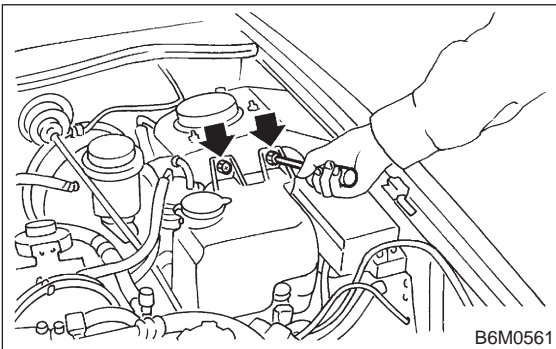
- 1) Disconnect battery ground cable.



2) Remove battery.

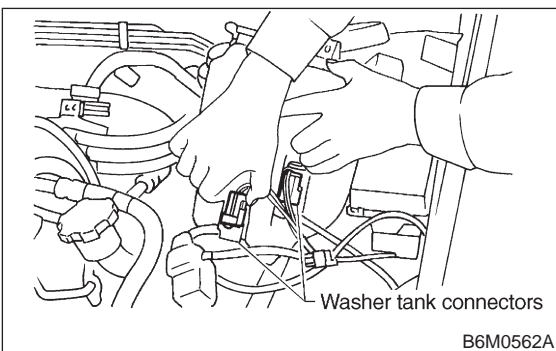


3) Remove washer tank mounting bolts.

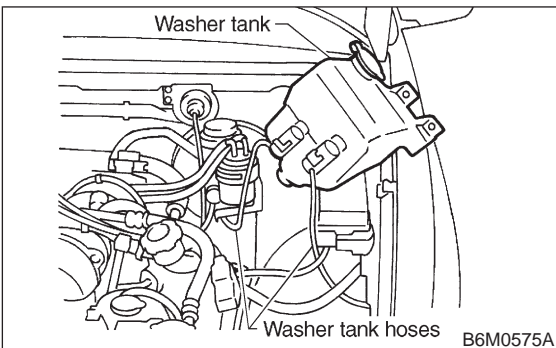


4) Disconnect washer tank connectors.

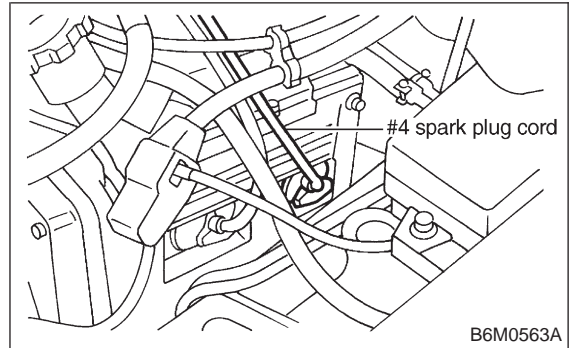
CAUTION:
Do not disconnect washer tank hoses as washer fluid will leak out from washer tank.



5) Move washer tank upward.



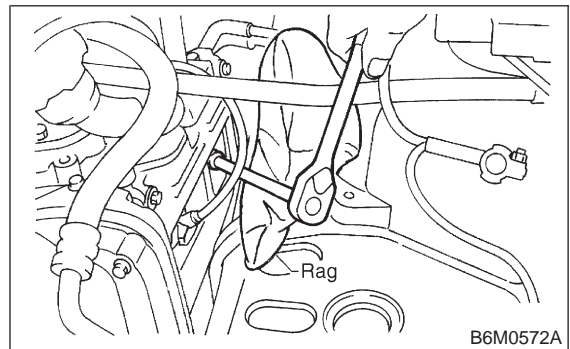
6) Remove #4 spark plug cord by pulling boot, not cord itself.



7) For subsequent procedures, refer to the procedure for #1 spark plug. <Ref. to 6-1 [W3C1].>

CAUTION:
When removing spark plug, cover the ATF cooling pipes with a rag to prevent damage.

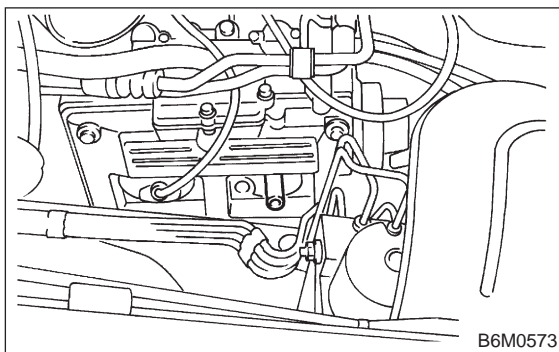
NOTE:
For easier removal of spark plug, diagonally insert the tools from the direction of battery stand into plug hole as shown in figure.



D: INSTALLATION (2500 cc OUTBACK MODEL)

1. #1 SPARK PLUG

- 1) After setting spark plug in spark plug socket, connect the spark plug socket, extension and Universal Joint to each other. <Ref. to 6-1 [W3C1].>
- 2) Screw spark plug into cylinder head using the connected tools above mentioned. At this point, it is necessary to support the rear end of the tools with fingertips.



- 3) When spark plug is screwed in two or three turns, temporarily disconnect the tools connected in the first step.
- 4) Confirm that spark plug is screwed into the cylinder head properly by touching it with finger. If it is difficult to reach it by hand, confirm its condition by using mirror and suchlike.
- 5) Cover ABS pipes with rag to prevent damage.
- 6) Re-insert the tools disconnected in three steps before into plug hole, and set them again over the spark plug.

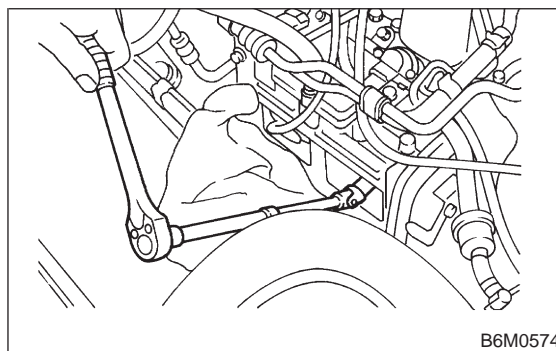
- 7) Set extension and ratchet in turn onto the connected tools in plug hole, and tighten spark plug to the specified torque.

Tightening torque (spark plug):

20.6 ± 2.9 N-m (2.10 ± 0.30 kg-m, 15.19 ± 2.14 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 over-stressing.



- 8) The subsequent procedures are in reverse order of #1 spark plug removal. <Ref. to 6-1 [W3C1].>

2. #2 SPARK PLUG

CAUTION:

When installing spark plug, cover the ATF cooling pipes with a rag to prevent damage.

- 1) Carry out #1 spark plug installation procedure. <Ref. to 6-1 [W3D1].>
- 2) Proceed in reverse order of #2 spark plug removal. <Ref. to 6-1 [W3C2].>

3. #3 SPARK PLUG

- 1) Carry out #1 spark plug installation procedure. <Ref. to 6-1 [W3D1].>
- 2) Proceed in reverse order of #3 spark plug removal. <Ref. to 6-1 [W3C3].>

4. #4 SPARK PLUG

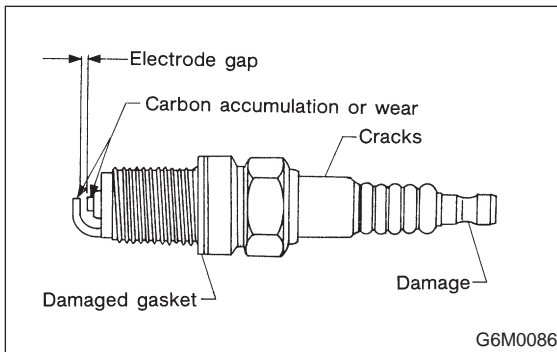
CAUTION:

When installing spark plug, cover the ATF cooling pipes with a rag to prevent damage.

- 1) Carry out #1 spark plug installation procedure. <Ref. to 6-1 [W3D1].>
- 2) Proceed in reverse order of #4 spark plug removal. <Ref. to 6-1 [W3C4].>

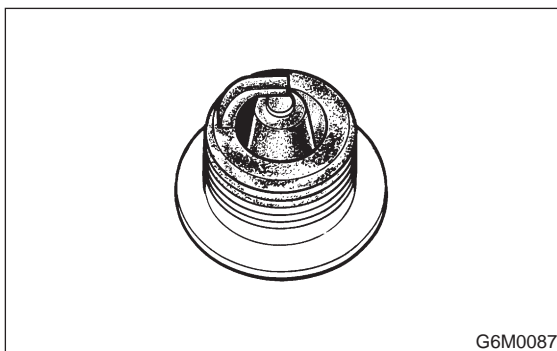
E: INSPECTION

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



1) Normal

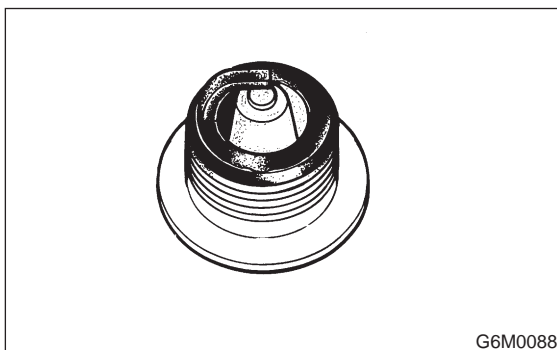
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.



2) Carbon fouled

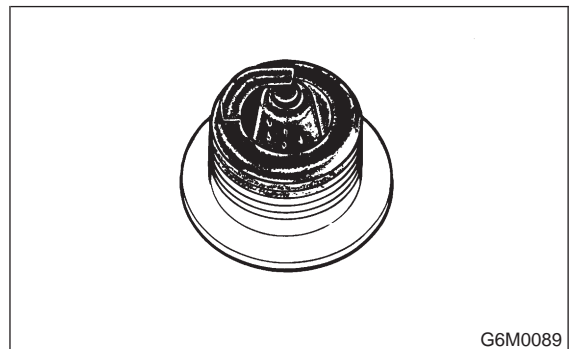
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.

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



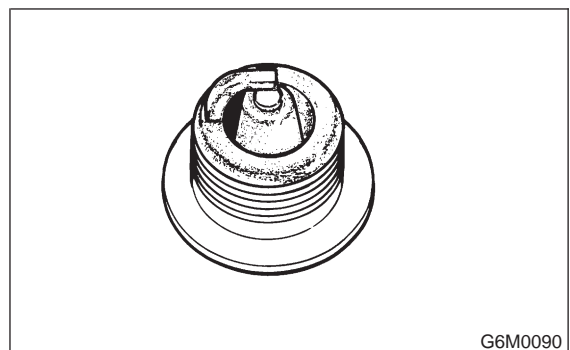
3) Oil fouled

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.



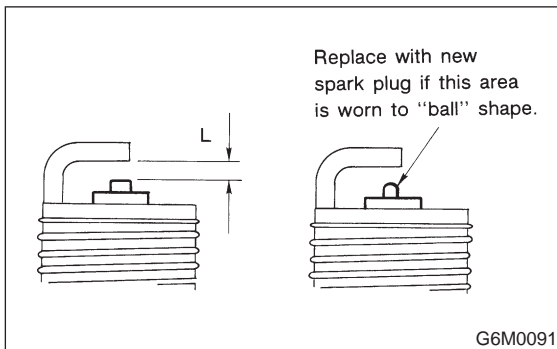
F: CLEANING AND REGAPPING

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.

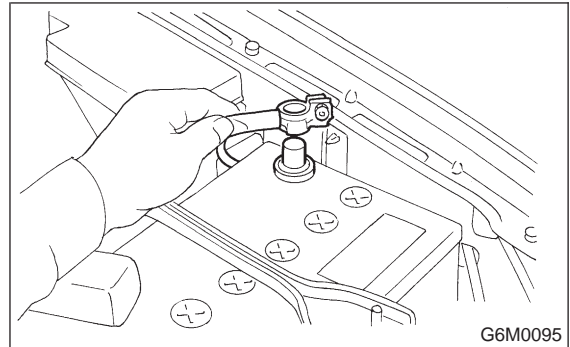
If deposits are too stubborn, discard plugs. After cleaning spark plugs, recondition firing surface of electrodes with file. Then correct the spark plug gap using a gap gauge.

Spark plug gap: L

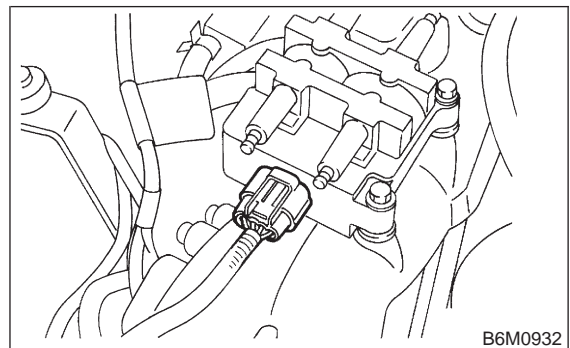
1.0 — 1.1 mm (0.039 — 0.043 in)

**4. Ignition Coil and Ignitor Assembly (2200 cc Model)****A: REMOVAL AND INSTALLATION**

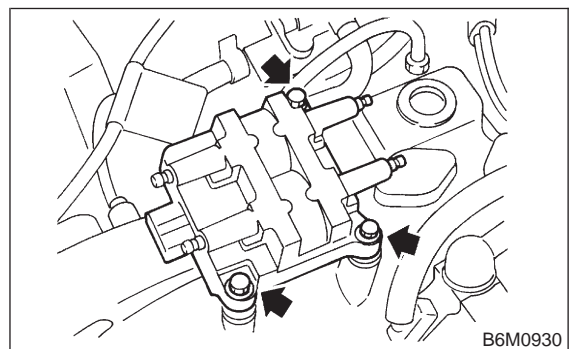
- 1) Disconnect battery ground cable.



- 2) Disconnect spark plug cords from ignition coil and ignitor assembly.
- 3) Disconnect connector from ignition coil and ignitor assembly.



- 4) Remove ignition coil and ignitor assembly.



- 5) 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.

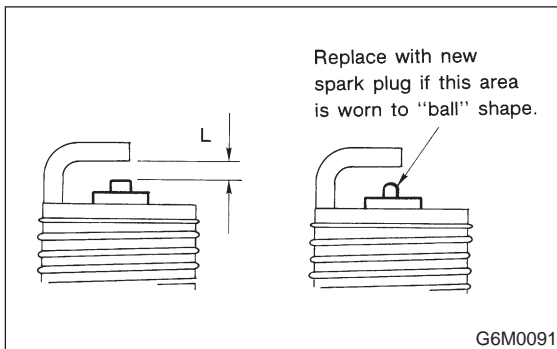
F: CLEANING AND REGAPPING

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.

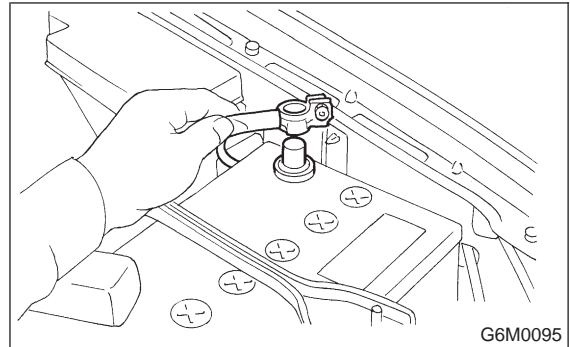
If deposits are too stubborn, discard plugs. After cleaning spark plugs, recondition firing surface of electrodes with file. Then correct the spark plug gap using a gap gauge.

Spark plug gap: L

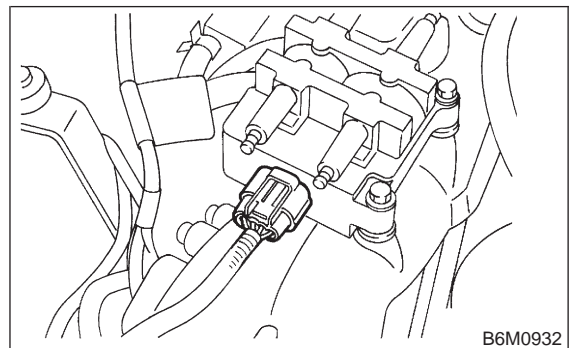
1.0 — 1.1 mm (0.039 — 0.043 in)

**4. Ignition Coil and Ignitor Assembly (2200 cc Model)****A: REMOVAL AND INSTALLATION**

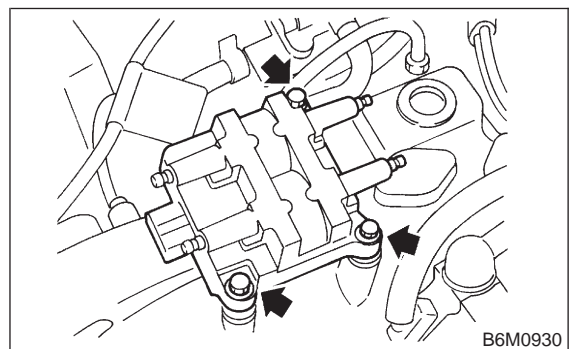
- 1) Disconnect battery ground cable.



- 2) Disconnect spark plug cords from ignition coil and ignitor assembly.
- 3) Disconnect connector from ignition coil and ignitor assembly.



- 4) Remove ignition coil and ignitor assembly.



- 5) 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:

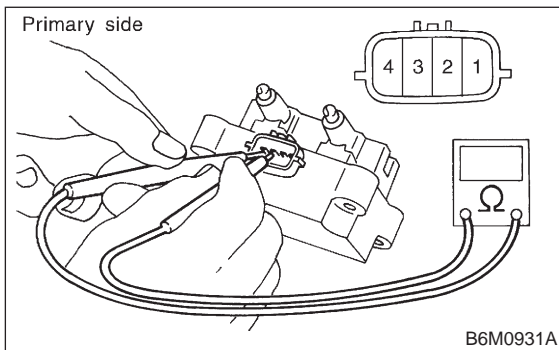
[Primary side]

Between terminal No. 1 and No. 2

$0.73 \Omega \pm 10\%$

Between terminal No. 2 and No. 4

$0.73 \Omega \pm 10\%$



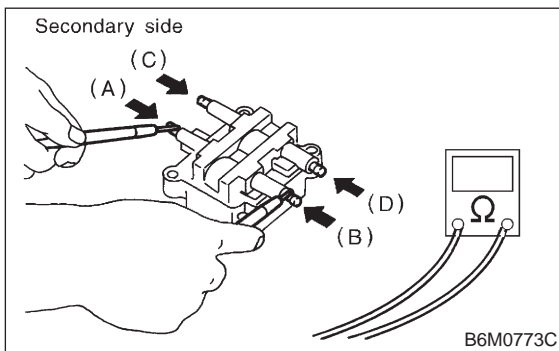
[Secondary side]

Between (A) and (B)

$12.8 k\Omega \pm 15\%$

Between (C) and (D)

$12.8 k\Omega \pm 15\%$

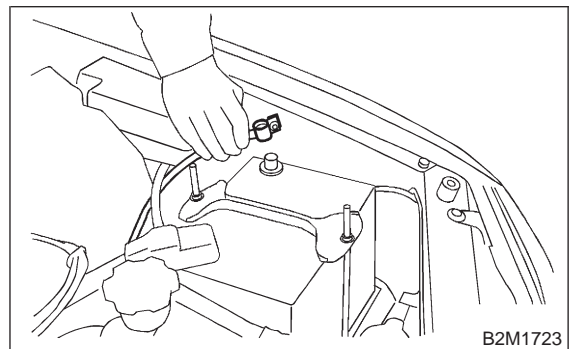


- 3) Insulation between primary terminal and case:
 $10 M\Omega$ or more.

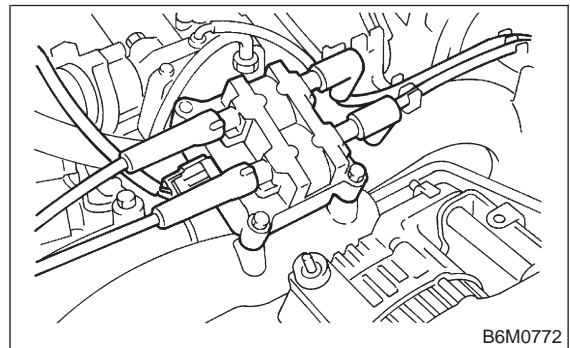
5. Ignition Coil (2500 cc Model)

A: REMOVAL AND INSTALLATION

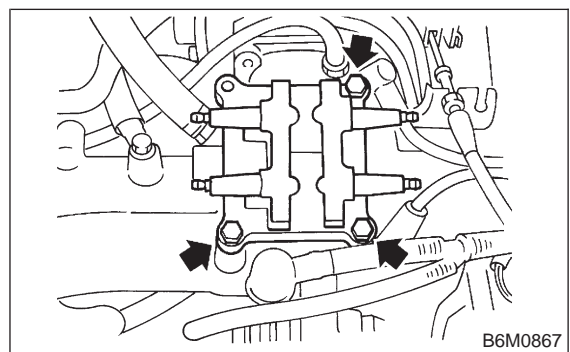
- 1) Disconnect battery ground cable.



- 2) Disconnect spark plug cords from ignition coil.
- 3) Disconnect connector from ignition coil.



- 4) Remove ignition coil.



- 5) 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:

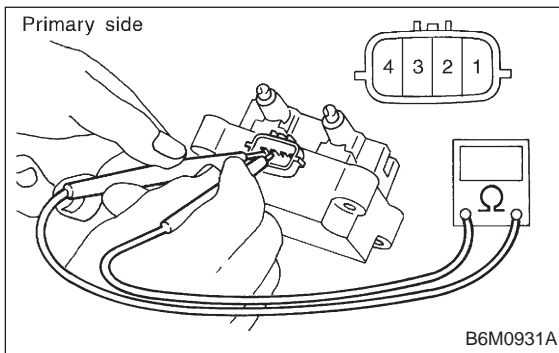
[Primary side]

Between terminal No. 1 and No. 2

0.73 Ω±10%

Between terminal No. 2 and No. 4

0.73 Ω±10%



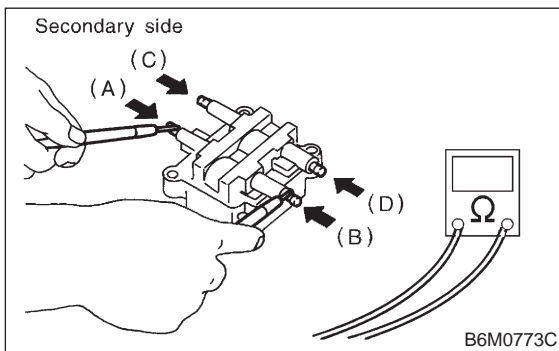
[Secondary side]

Between (A) and (B)

12.8 kΩ±15%

Between (C) and (D)

12.8 kΩ±15%

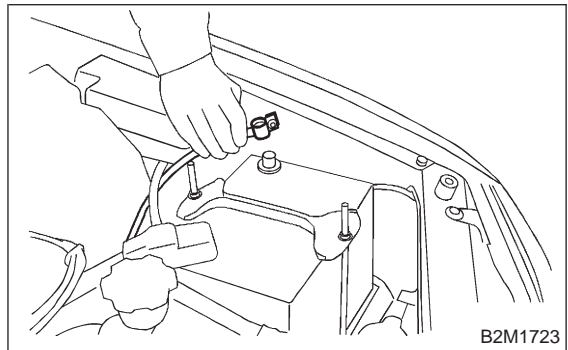


- 3) Insulation between primary terminal and case:
10 MΩ or more.

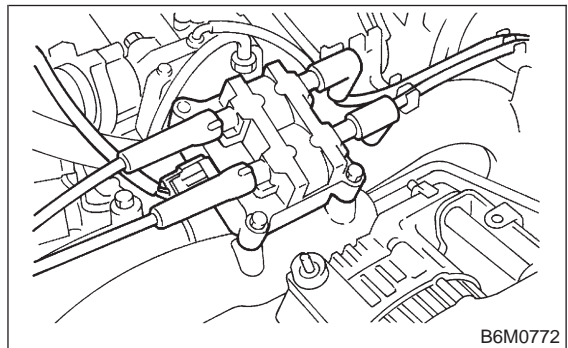
5. Ignition Coil (2500 cc Model)

A: REMOVAL AND INSTALLATION

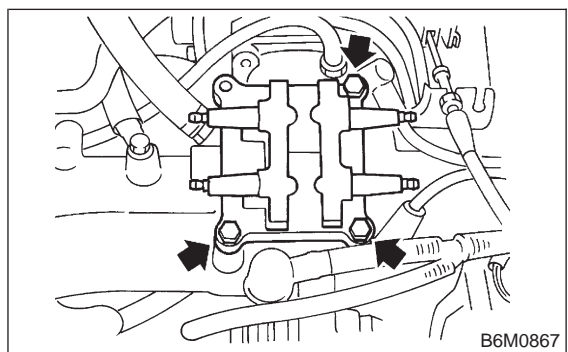
- 1) Disconnect battery ground cable.



- 2) Disconnect spark plug cords from ignition coil.
- 3) Disconnect connector from ignition coil.



- 4) Remove ignition coil.



- 5) 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:

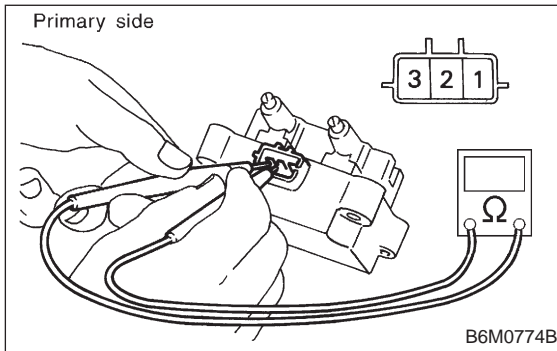
[Primary side]

Between terminal No. 1 and No. 2

0.73 $\Omega \pm 10\%$

Between terminal No. 2 and No. 3

0.73 $\Omega \pm 10\%$



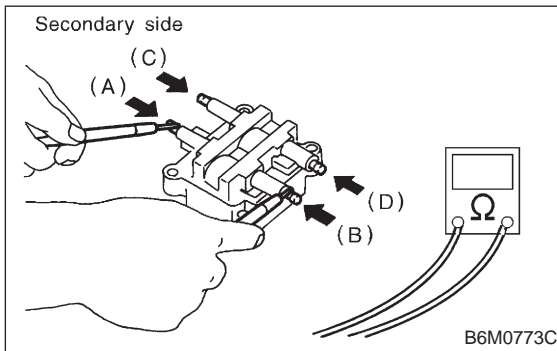
[Secondary side]

Between (A) and (B)

12.8 k $\Omega \pm 15\%$

Between (C) and (D)

12.8 k $\Omega \pm 15\%$

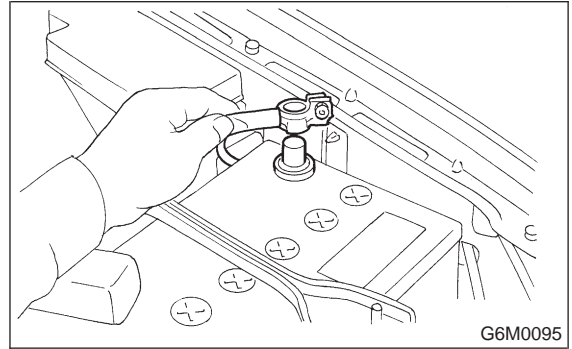


- 3) Insulation between primary terminal and case:
10 M Ω or more.

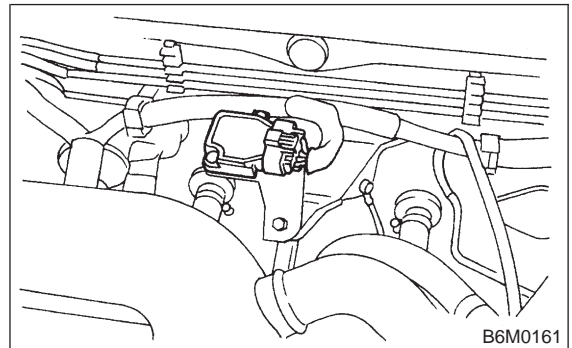
6. Ignitor (2500 cc Model)

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.

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:

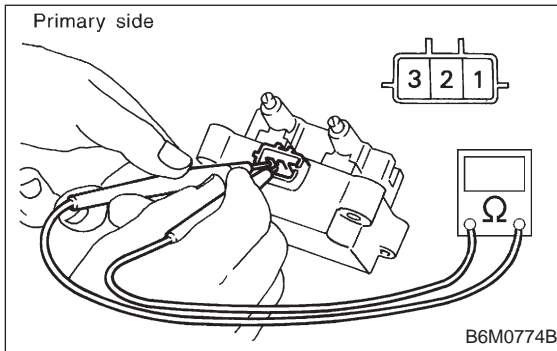
[Primary side]

Between terminal No. 1 and No. 2

$0.73 \Omega \pm 10\%$

Between terminal No. 2 and No. 3

$0.73 \Omega \pm 10\%$



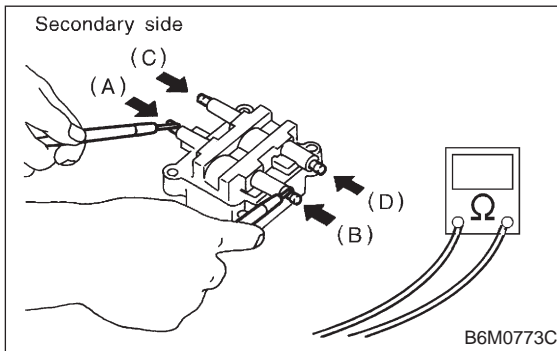
[Secondary side]

Between (A) and (B)

$12.8 k\Omega \pm 15\%$

Between (C) and (D)

$12.8 k\Omega \pm 15\%$

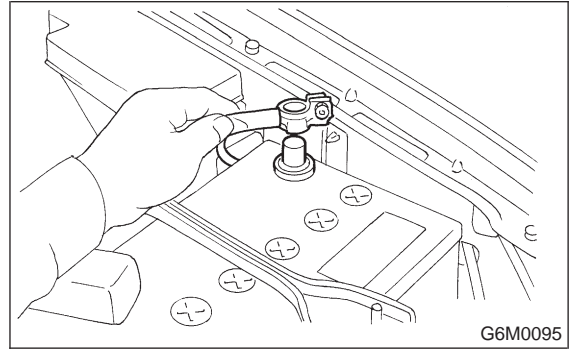


- 3) Insulation between primary terminal and case:
10 M Ω or more.

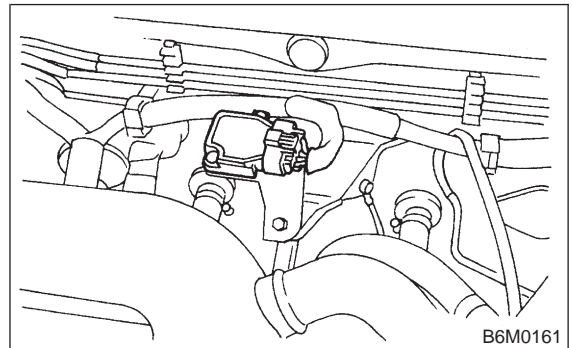
6. Ignitor (2500 cc Model)

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.

7. Spark Plug Cord

A: INSPECTION

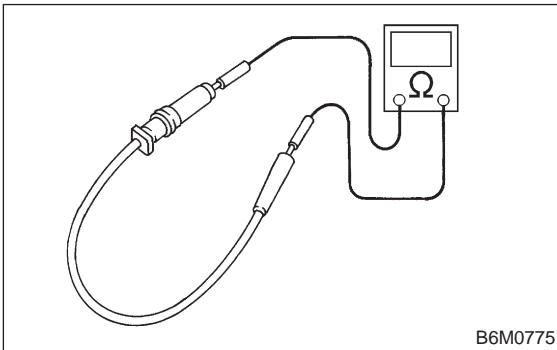
1. 2200 cc MODEL

Check for:

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

Resistance value:

5.12 — 12.34 kΩ



2. 2500 cc MODEL

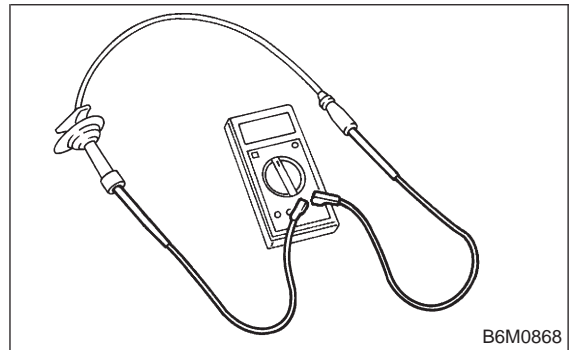
Check for:

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

Resistance value:

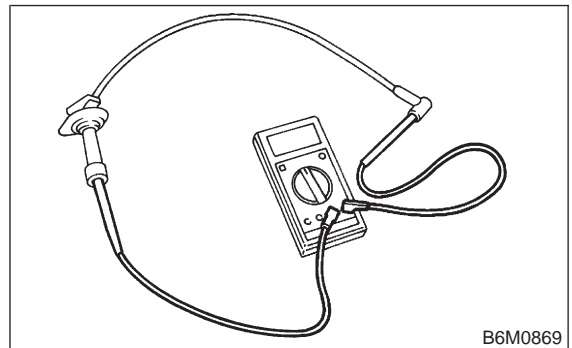
#1 and #3

6.43 — 15.01 kΩ



#2 and #4

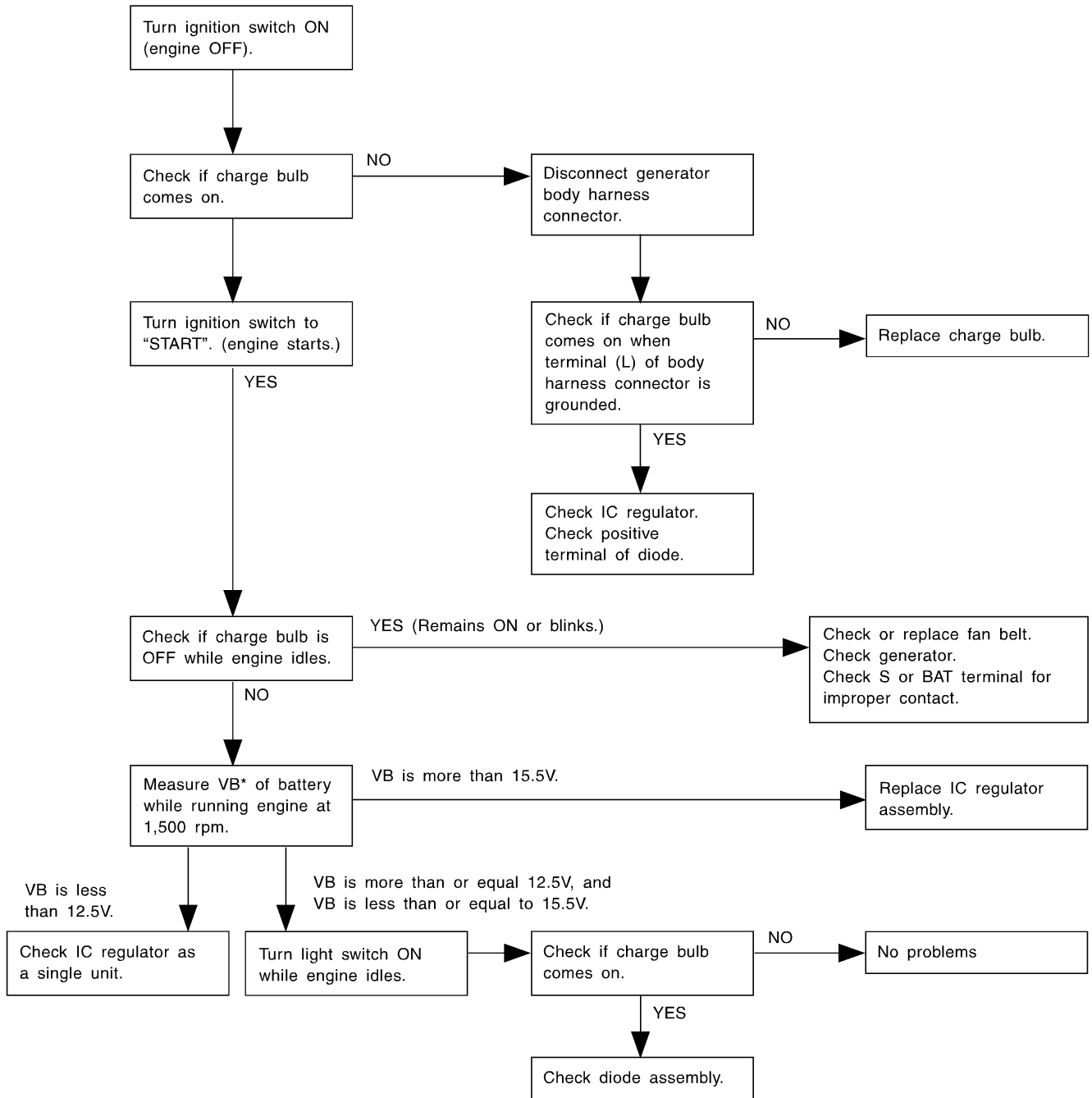
6.67 — 15.57 kΩ



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 Insufficient brush spring pressure
Starter starts but does not crank engine.	Failure of pinion gear to engage ring gear	Worn pinion teeth Improper sliding of overrunning clutch Improper adjustment of stud bolt
	Clutch slippage	Faulty clutch roller spring
Starter starts but engine cranks too slowly.		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 Abnormal brush wear
Starter overruns.		Magnet switch coil is a layer short.

2. Generator



*: Terminal voltage

MEMO:

1. Body Electrical

Battery	Reserve capacity	82 minutes (MT), 100 minutes (AT)
	Cold cranking ampere	430 amperes (MT), 490 amperes (AT)
Fuse		10 A, 15 A, 20 A
Combination meter	Speedometer	Electric pulse type
	Tachometer	Electric impulse type
	Water temperature gauge	Thermistor cross coil type
	Fuel gauge	Resistance cross coil type
	Charge indicator light	12 V — 1.4 W
	Brake fluid level warning/parking brake indicator light	12 V — 1.4 W
	AT oil temperature warning light (AWD only)	12 V — 1.4 W
	ABS warning light	12 V — 1.4 W
	CHECK ENGINE warning light (Malfunction indicator lamp)	12 V — 1.4 W
	Oil pressure warning light	12 V — 1.4 W
	AIRBAG system warning light	12 V — 1.4 W
	Low fuel warning light	12 V — 3 W
	FWD indicator light	12 V — 1.4 W
	Turn signal indicator light	12 V — 1.4 W (2 pieces)
	Seat belt warning light	12 V — 1.4 W
	Door open warning light	12 V — 1.4 W (5 pieces)
Headlight beam indicator light		12 V — 1.4 W
	Meter illumination light	12 V — 3 W (2 pieces) 12 V — 3.4 W (4 pieces)
Headlight		12 V — 60/55 W (Halogen)
Front clearance light		12 V — 5 W
Turn signal light	Front	12 V — 21 W
	Rear	12 V — 21 W
Tail/Stop light		12 V — 5/21 W
Back-up light		12 V — 21 W
High-mount stop light		12 V — 18 W (SEDAN), 12 V — 13 W (WAGON)
License plate light		12 V — 5 W
Room light		12 V — 8 W
Trunk room light (SEDAN)		12 V — 5 W
Luggage room light (WAGON)		12 V — 13 W
Spot light		12 V — 8 W (2 pieces)
Glove box light		12 V — 3.4 W
Selector lever illumination light (AT model)		12 V — 1.7 W
Front wiper motor	Input	12 V — 54 W or less
Rear wiper motor	Input	12 V — 42 W or less
Front washer motor	Pump type	Centrifugal
	Input	12 V — 36 W or less
Rear washer motor	Pump type	Centrifugal
	Input	12 V — 36 W or less
Horn		12 V — 350 Hz
Accessory socket	Input	12 V — 120 W
Rear window defogger	Input	12 V — 160 W
	Indicator light	12 V — 50 mA
Wiper deicer	Input	12 V — 88 W
	Indicator light	12 V — 50 mA

1. Precaution

- Before disassembling or reassembling parts, always disconnect battery ground cable. When repairing radio, control modules, 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:

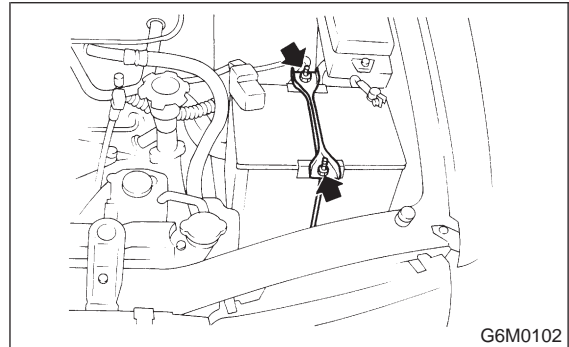
- Airbag system wiring harness is routed near the electrical parts and switch.
- All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuits.
- Be careful not to damage Airbag system wiring harness when servicing the ignition key cylinder.

2. Battery

A: REMOVAL AND INSTALLATION

1. BATTERY

- 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.
- 4) Installation is in the reverse order of removal.

Tightening torque:

$3.4 \pm 1.0 \text{ N}\cdot\text{m}$ ($0.35 \pm 0.1 \text{ kg}\cdot\text{m}$, $2.5 \pm 0.7 \text{ ft}\cdot\text{lb}$)

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.

B: INSPECTION

1. BATTERY

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

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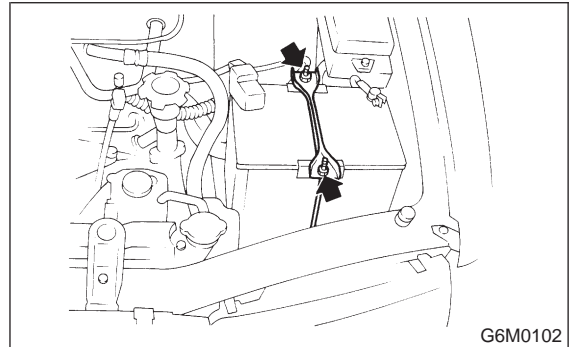
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- Ventilate when charging or using in enclosed space.
- For safety, in case an explosion does occur, wear eye protection or shield your eyes when working near any battery. Never lean over a battery.
- Do not let battery fluid contact eyes, skin, fabrics, 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.

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.

3) Specific gravity of electrolyte:

(1) 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:

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

S₂₀: Specific gravity corrected at electrolyte temperature of 20°C (68°F)

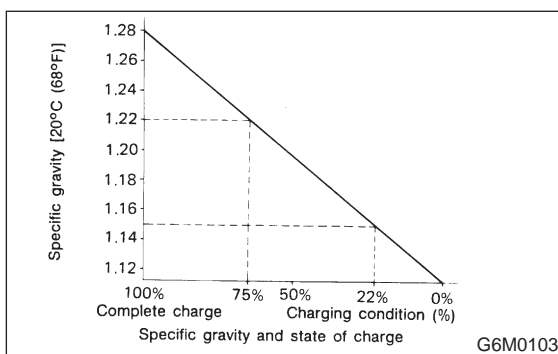
S_t : Measured specific gravity

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)]



(2) 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 generator'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 [W2C1].
- 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)

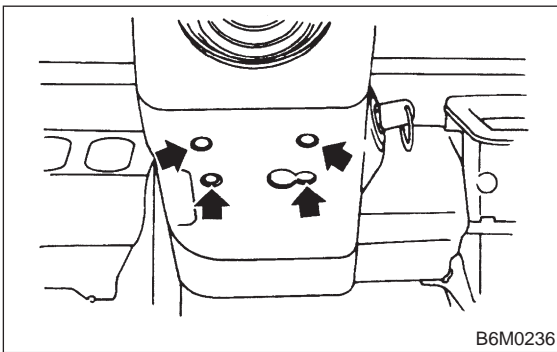
*: Check electrical system before replacement.

3. Ignition Switch

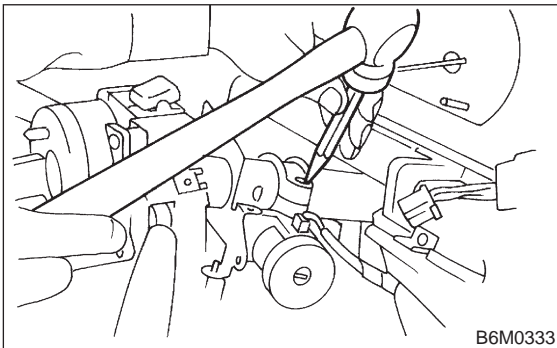
A: REMOVAL AND INSTALLATION

1. IGNITION SWITCH

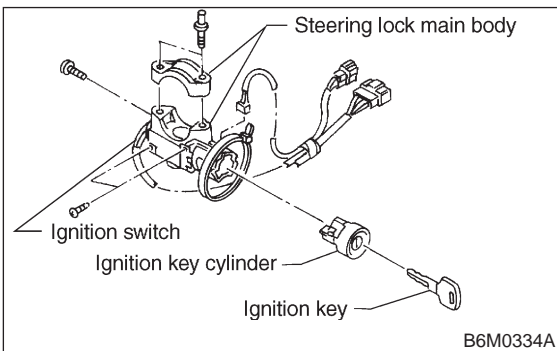
1) Remove screws, separate upper column cover and lower column cover.



- 2) Remove instrument panel lower cover.
- 3) Disconnect ignition switch connector from body harness.
- 4) Using a drift and hammer, hit the torn bolt head to loosen and remove the ignition switch.



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



B: INSPECTION

1. IGNITION SWITCH (ON-CAR)

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

3) Unfasten holddown clip which secures harness, and disconnect connector of ignition switch from body harness.

4) Turn ignition key to each position and check continuity between terminals of ignition switch connector.

Terminal Position	a-1	a-2	a-5	a-4
LOCK				
ACC	○	○		
ON	○	○	○	
START	○		○	○

B6M0830A

4. Headlight

A: ADJUSTMENT

1. HEADLIGHT AIMING

Adjust the headlight aiming by turning the adjusting screws.

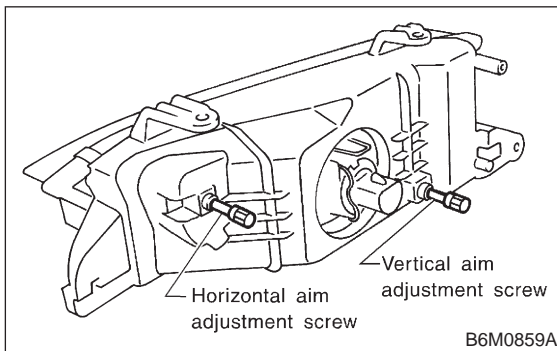
CAUTION:

Before checking the headlight aiming, be sure of the following:

- Turn off the light before adjusting headlight aiming. If the light is necessary to check aiming, do not turn on for more than two minutes.
- The area around the headlight has not sustained any accident, damage or other type of deformation.
- Vehicle is parked on level ground.
- The inflation pressure of tires is correct.
- Vehicle's gas tank is fully charged.
- Bounce the vehicle several times to normalize the suspension.
- Make certain that someone is seated in the driver's seat.

NOTE:

Adjust vertical aim first, then horizontal aim.

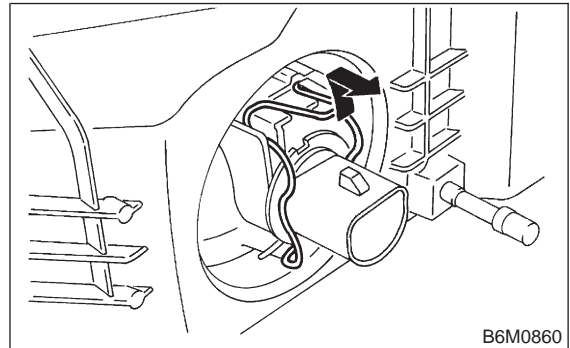


B: REMOVAL AND INSTALLATION

1. HEADLIGHT BULB

- 1) Disconnect the connector from inside of the engine compartment.

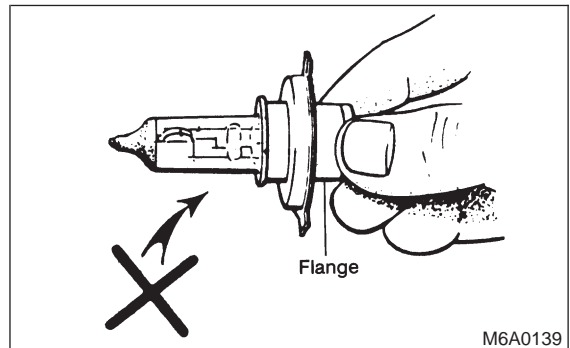
- 2) Remove the light bulb retaining spring and then remove the bulb.



- 3) Replace the bulb with a new one and hook the spring.
- 4) Connect the connector.

CAUTION:

Since the tungsten halogen bulb operates at high temperature, dirt and oil on the bulb surface decreases the bulb's useful life. When replacing the bulb, hold the flange portion and do not touch the glass portion.



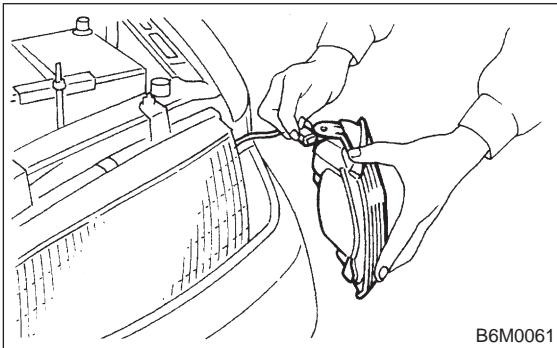
- 5) Installation is in the reverse order of removal.

2. HEADLIGHT

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

NOTE:

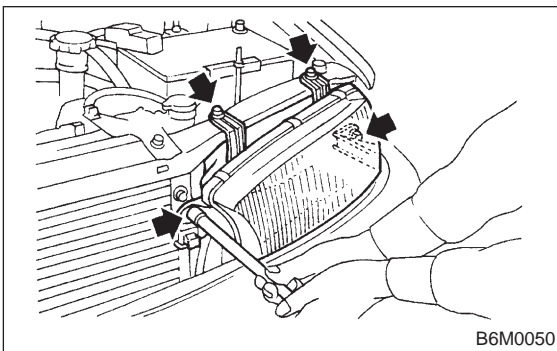
When installing the front turn signal light, securely fit clip into locating.



4) Remove bolts which secure headlight and remove headlight.

Tightening torque:

$6.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.65 \pm 0.05 \text{ kg}\cdot\text{m}$, $4.7 \pm 0.4 \text{ ft}\cdot\text{lb}$)



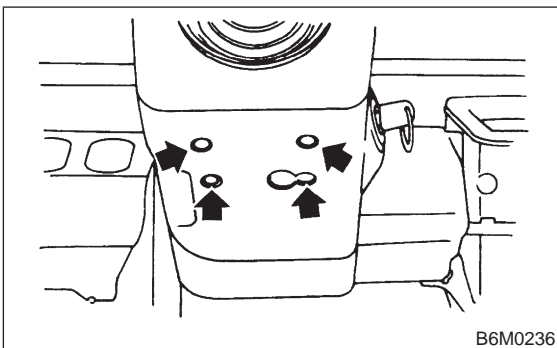
5) Installation is in the reverse order of removal.

3. COMBINATION SWITCH (WITHOUT AIRBAG MODEL)

NOTE:

For the removal procedure of combination switch, refer to procedure for removal of combination switch on airbag equipped model. <Ref. to 5-5 [W600].>

- 1) Remove steering wheel. <Ref. to 4-3 [W2A0].>
- 2) Remove screws which secure upper column cover to lower column cover.



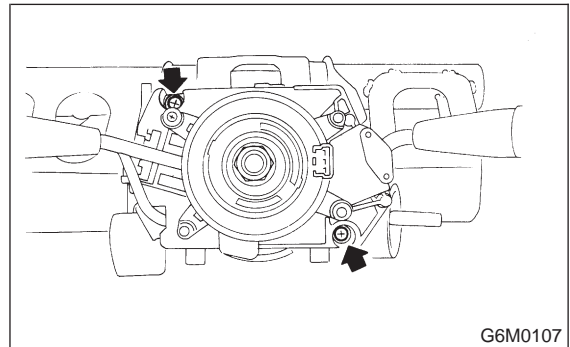
3) Remove screws which secure knee protector and remove knee protector.

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.



6) Installation is in the reverse order of removal.

CAUTION:

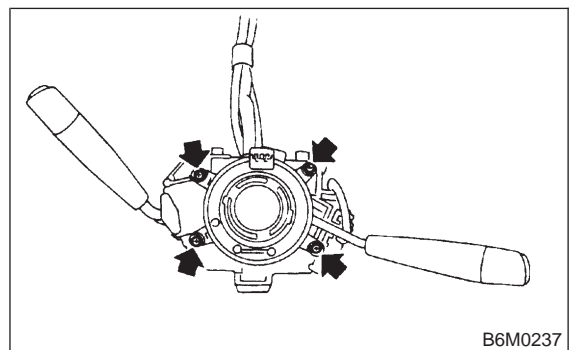
During installation (with key interlock):

- 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

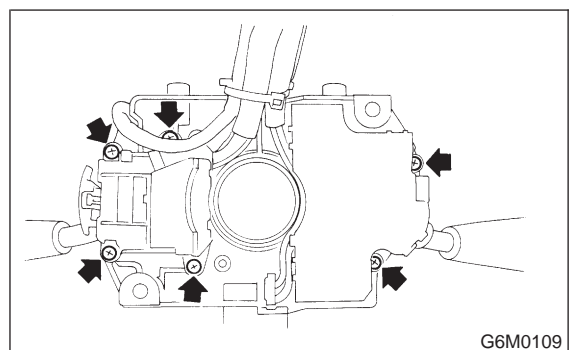
1. COMBINATION SWITCH

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.

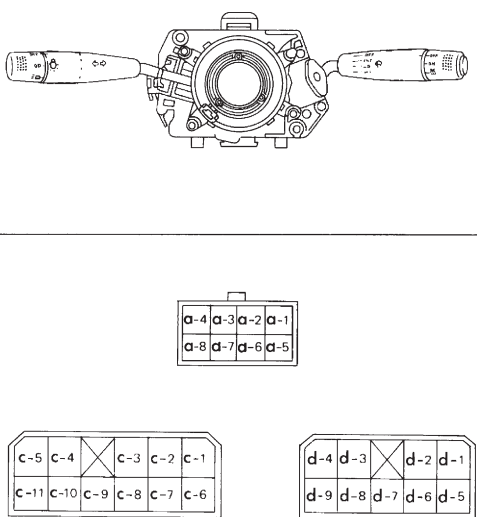
3) Assembly is in the reverse order of disassembly.



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.
- 4) Move combination switch to respective positions and check continuity between terminals.



The diagram shows the combination switch assembly with two indicator lamps. Below it are three connector boxes: a 2x4 terminal block (a-4 to a-1, a-8 to a-5), a 2x6 terminal block (c-5 to c-1, c-11 to c-6), and another 2x6 terminal block (d-4 to d-1, d-9 to d-5).

Lighting switch

Terminal	c-1	c-2	c-3
Switch position			
OFF			
Tail	○	○	
↕	○	○	
Head	○	○	○

Parking switch

Terminal	c-10	c-11	c-9
Switch position			
OFF	○	○	
↕	×	○	×
ON		○	○

Dimmer and passing switch

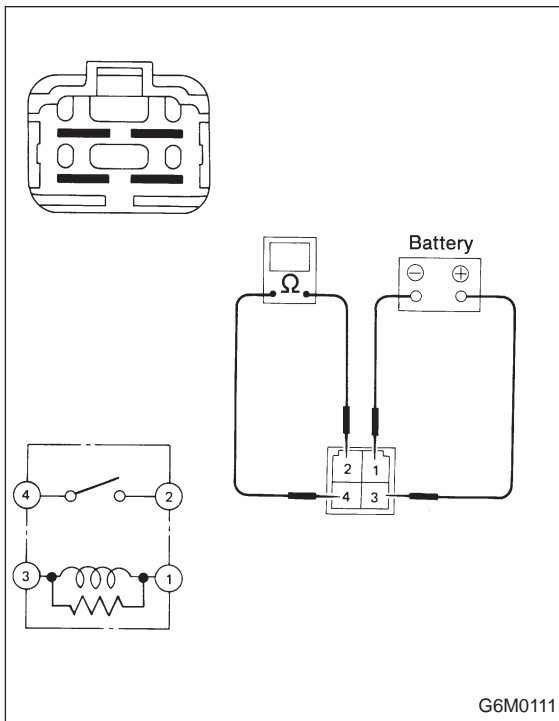
Terminal	a-3	a-2	a-1	a-4
Switch position				
Flash	○		○	○
↕	○	○	○	
Low beam	○	○		
↕	○	○	○	
HI-beam	○		○	

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2. HEADLIGHT RELAY

Check continuity between terminals as indicated in table, when connecting the battery to terminal No. 1 and No. 3.

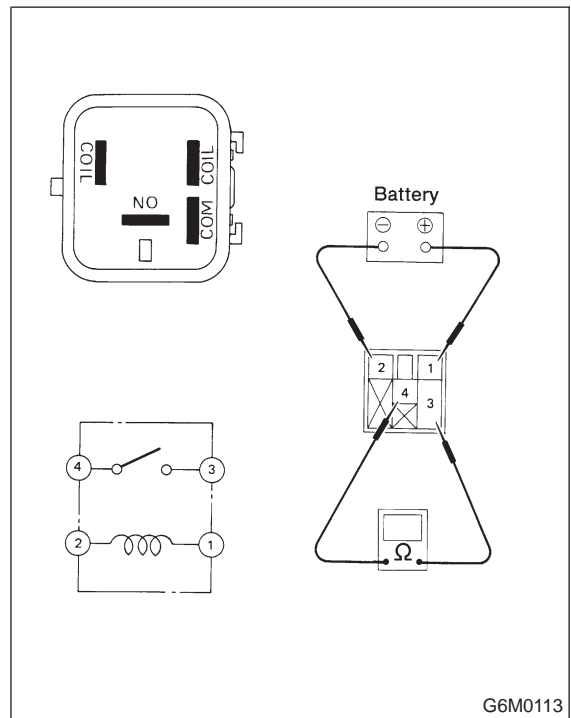
When current flows.	Between terminals No. 2 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 2 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 3	Continuity exists.



3. DAYTIME RUNNING LIGHT RELAY

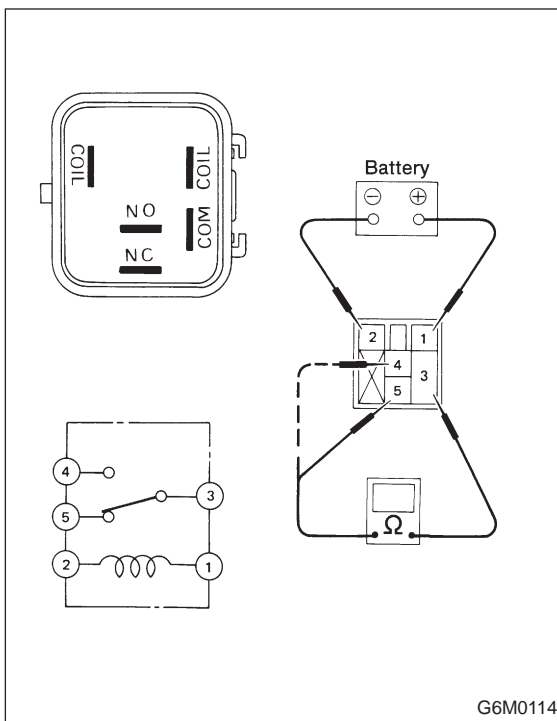
Check continuity between terminals (indicated in table) when terminal No. 1 is connected to battery and terminal No. 2 is grounded.

When current flows.	Between terminals No. 3 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 3 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.



Check continuity between terminals (indicated in table) when terminal No. 1 is connected to battery and terminal No. 2 is grounded.

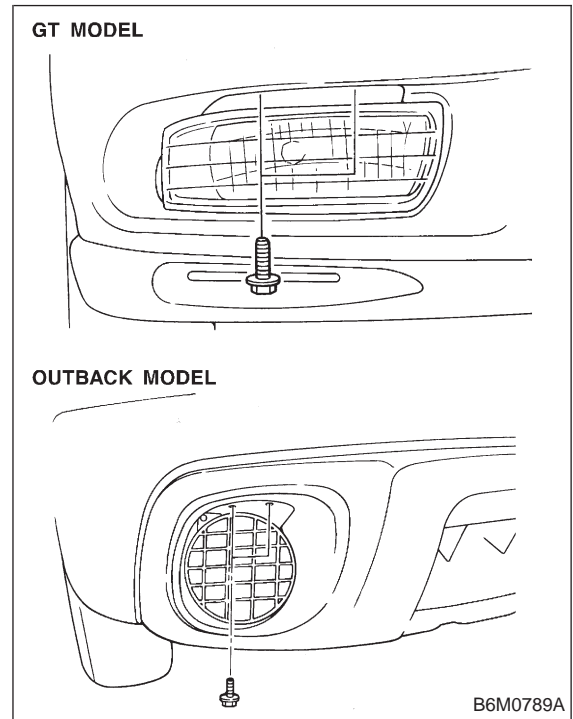
When current flows.	Between terminals No. 3 and No. 5	Continuity does not exist.
	Between terminals No. 3 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 3 and No. 5	Continuity exists.
	Between terminals No. 3 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.



5. Front Fog Light

A: REMOVAL AND INSTALLATION

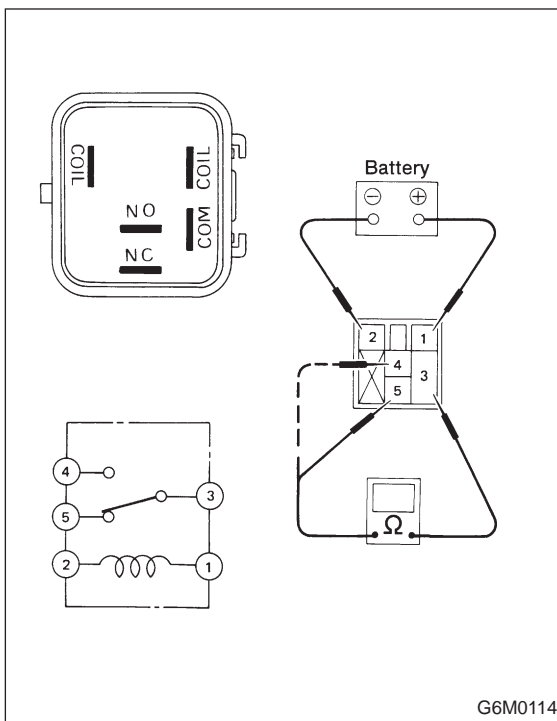
- 1) Disconnect ground cable from battery.
- 2) Remove the two bolts, then draw out the front fog light from front bumper.



- 3) Disconnect the connector.
- 4) Installation is in the reverse order of removal.

Check continuity between terminals (indicated in table) when terminal No. 1 is connected to battery and terminal No. 2 is grounded.

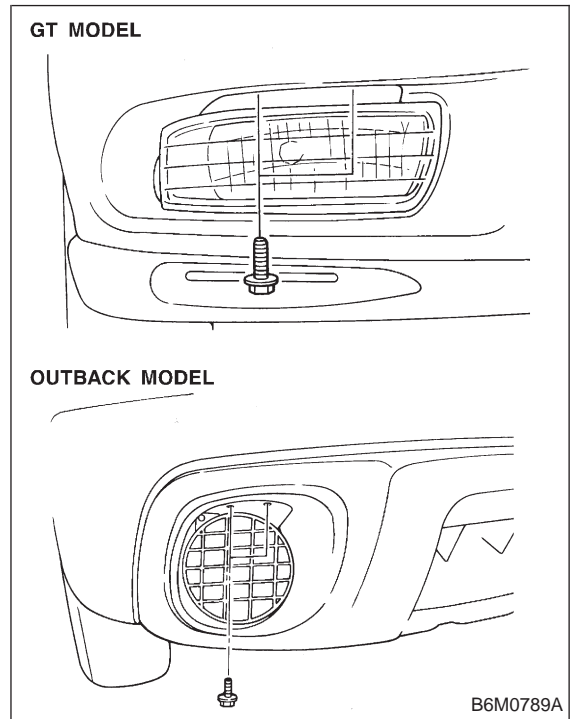
When current flows.	Between terminals No. 3 and No. 5	Continuity does not exist.
	Between terminals No. 3 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 3 and No. 5	Continuity exists.
	Between terminals No. 3 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.



5. Front Fog Light

A: REMOVAL AND INSTALLATION

- 1) Disconnect ground cable from battery.
- 2) Remove the two bolts, then draw out the front fog light from front bumper.



- 3) Disconnect the connector.
- 4) Installation is in the reverse order of removal.

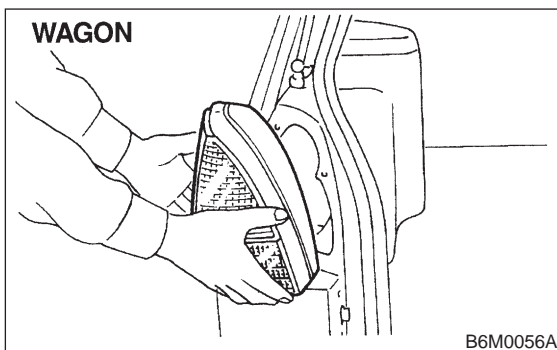
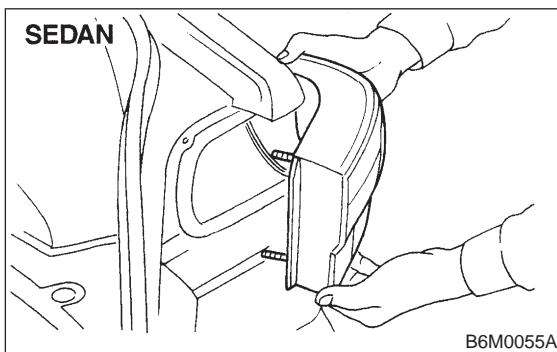
6. Stop and Tail Light

A: REMOVAL AND INSTALLATION

1. REAR COMBINATION LIGHT

- 1) Remove rear trim.
- 2) Disconnect connector from rear combination light.
- 3) Remove nuts which secure rear combination light.

Tightening torque:
 $2.5 \pm 0.5 \text{ N-m}$ ($0.25 \pm 0.05 \text{ kg-m}$, $1.8 \pm 0.4 \text{ ft-lb}$)



- 4) Attach adhesive cloth tape to body area around rear combination light.
- 5) Using a standard screwdriver, carefully pry rear combination light off and away from the vehicle.
- 6) Installation is in the reverse order of removal.

CAUTION:

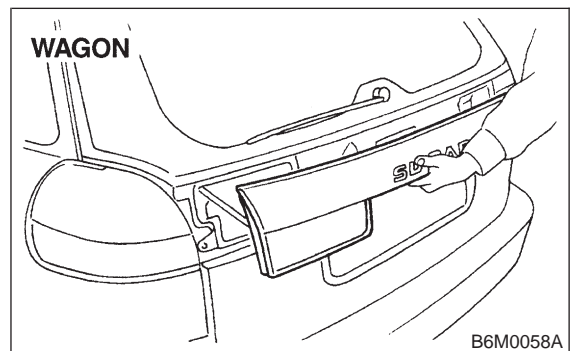
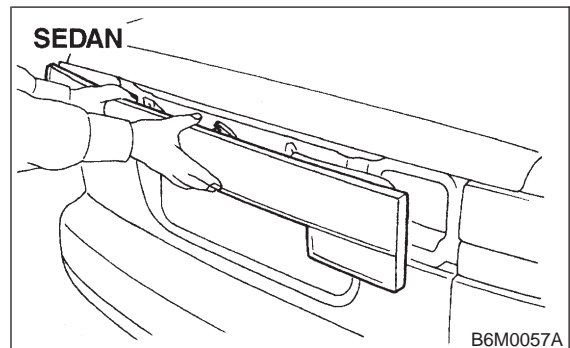
- Do not pry rear combination light forcefully as this may scratch vehicle body.
- Remove all traces of adhesive tape from body before installation.
- Attach butyl rubber tape to back of rear combination light before installing rear combination light on body for sealing purposes.

2. REAR FINISHER

- 1) Remove trunk lid trim (SEDAN) or rear gate trim (WAGON).
- 2) Disconnect connectors from rear finisher.
- 3) Remove rear wiper motor (WAGON).

- 4) Remove nuts which secure rear finisher.

Tightening torque:
 $2.5 \pm 0.5 \text{ N-m}$ ($0.25 \pm 0.05 \text{ kg-m}$, $1.8 \pm 0.4 \text{ ft-lb}$)



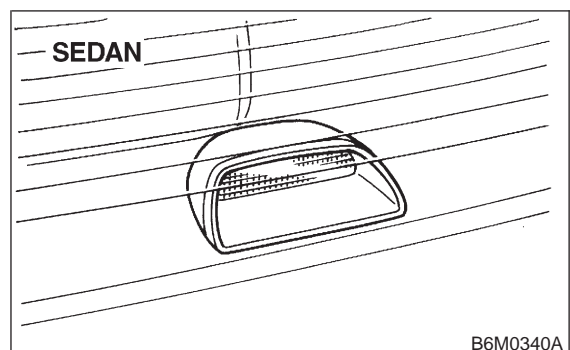
- 5) Attach adhesive cloth tape to body area around rear finisher.
- 6) Using a standard screwdriver, carefully pry rear finisher off and away from the vehicle.
- 7) Installation is in the reverse order of removal.

CAUTION:

Do not pry rear finisher forcefully as this may scratch vehicle body.

3. HIGH-MOUNT STOP LIGHT (SEDAN)

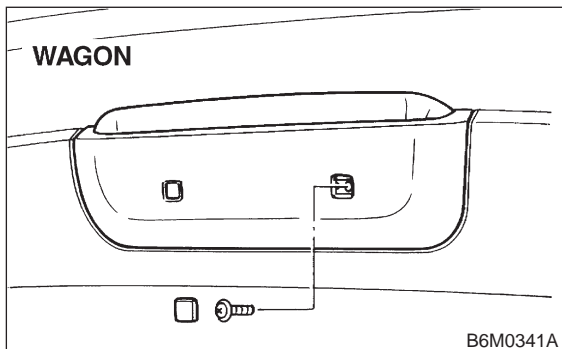
- 1) Disconnect connector of high-mount stop light from body harness.
- 2) Remove screws which secure high-mount stop light to rear shelf panel.
- 3) Remove high-mount stop light.



- 4) Installation is in the reverse order of removal.

4. HIGH-MOUNT STOP LIGHT (WAGON)

- 1) Remove high-mount stop light cover from rear gate trim panel.
- 2) Remove screws which secure high-mount stop light.



- 3) Remove high-mount stop light while disconnecting connector from body harness.
- 4) Installation is in the reverse order of removal.

5. STOP LIGHT SWITCH

Remove and install stop light switch. <Ref. to 4-5 [C1A0].> (MT), <Ref. to 4-5 [C1B0].> (AT)

NOTE:

When installing the stop light switch, adjust the pedal height by adjusting the stop light switch position.

6. COMBINATION SWITCH

Remove and install combination switch. <Ref. to 6-2 [W4B3].>

B: DISASSEMBLY AND ASSEMBLY

1. COMBINATION SWITCH

Disassemble and assemble combination switch. <Ref. to 6-2 [W4C1].>

C: INSPECTION

1. STOP LIGHT SWITCH (ON-CAR)

• Without Cruise Control Model:

- 1) Disconnect connector of stop light switch from body harness.

- 2) Check continuity between terminals when push rod is pushed in 4.0 to 4.5 mm (0.157 to 0.177 in) from end of outer case.

Terminal	1	2
Switch position		
When push rod is pushed in.		
When push rod is released.	○	○

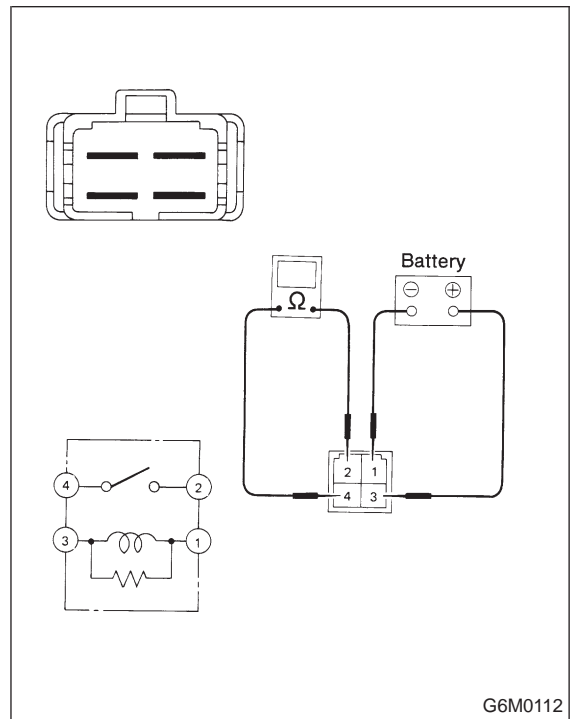
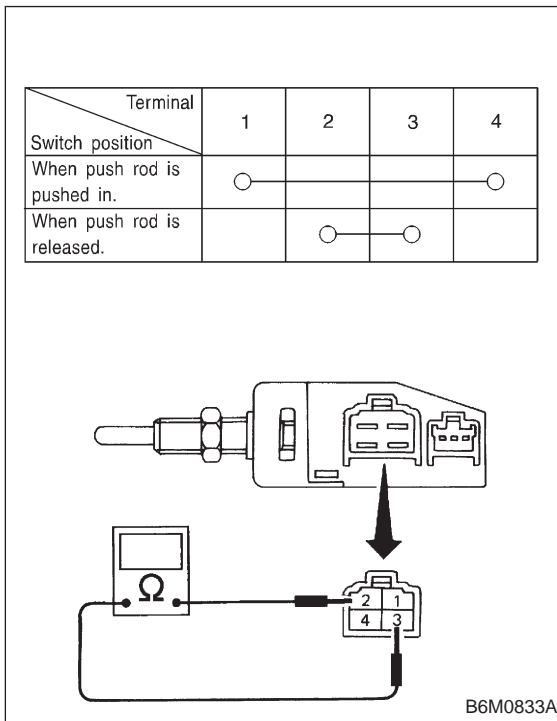
• With Cruise Control Model:

- 1) Disconnect connector of stop light switch from body harness.
- 2) Check continuity between terminals when push rod is pushed in 1.5 to 3.0 mm (0.059 to 0.118 in) from end of outer case.

Terminal	1	2	3	4
Switch position				
When push rod is pushed in.	○			○
When push rod is released.		○	○	

● **With TCS Model:**

- 1) Disconnect connector of stop light switch from body harness.
- 2) Check continuity between terminals when push rod is pushed in 1.2 to 3.2 mm (0.047 to 0.126 in) from end of outer case.



2. COMBINATION SWITCH (ON-CAR)

Inspect combination switch. <Ref. to 6-2 [W4D1].>

3. TAIL AND ILLUMINATION RELAY

Check continuity between terminals as indicated in table when connecting battery to terminal No. 1 and No. 3.

When current flows.	Between terminals No. 2 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 2 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 3	Continuity exists.

7. Turn Signal and Hazard Warning Light

A: REMOVAL AND INSTALLATION

1. FRONT TURN SIGNAL LIGHT

Remove and install front turn signal light. <Ref. to 6-2 [W4B2].>

NOTE:

The front turn signal light is united with headlight assembly.

2. REAR COMBINATION LIGHT

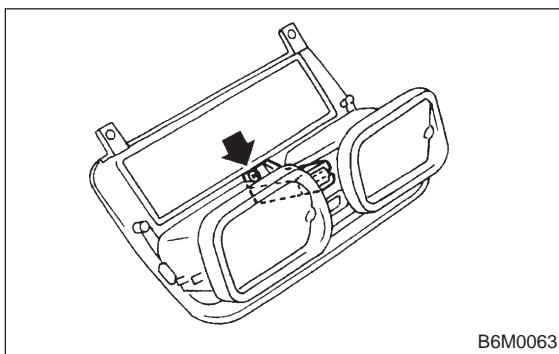
Remove and install rear combination light. <Ref. to 6-2 [W6A1].>

3. COMBINATION SWITCH

Remove and install combination switch. <Ref. to 6-2 [W4B3].>

4. HAZARD SWITCH

- 1) Remove center panel from instrument panel. <Ref. to 5-4 [W1A0].>
- 2) Disconnect connector of hazard switch from body harness.
- 3) Remove hazard switch from center panel.

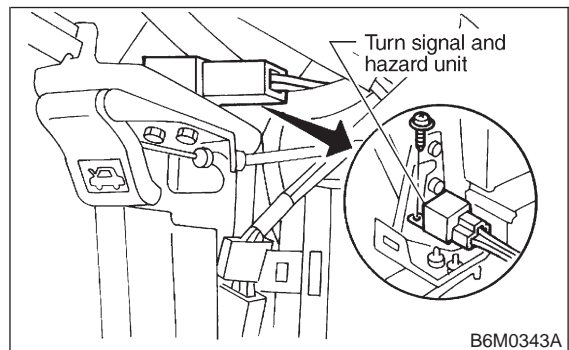


- 4) Installation is in the reverse order of removal.

5. TURN SIGNAL AND HAZARD UNIT

- 1) Remove instrument panel lower cover.
- 2) Remove engine hood opener lever bracket.
- 3) Disconnect connector of turn signal and hazard unit.

- 4) Remove screw, and then remove turn signal and hazard unit from bracket.



- 5) Installation is in the reverse order of removal.

B: DISASSEMBLY AND ASSEMBLY

1. COMBINATION SWITCH

Disassemble and assemble combination switch. <Ref. to 6-2 [W4C1].>

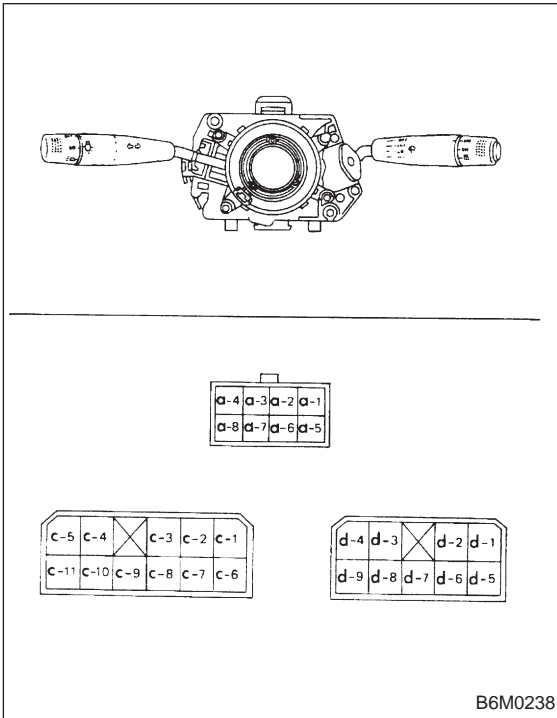
C: INSPECTION

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.
- 4) Move combination switch to respective positions and check continuity between terminals.

Turn signal switch		Terminal		
		a-5	a-7	a-6
Turn	L·L'	○ — ○		
	↕	× — ×		×
	N			
	↕	× — ×		×
	R·R'		○ — ○	

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8. Back-up Light

A: REMOVAL AND INSTALLATION

1. BACK-UP LIGHT

Remove and install rear finisher. <Ref. to 6-2 [W6A2].>

2. BACK-UP LIGHT SWITCH (MT MODEL)

Remove and install back-up light switch. <Ref. to 3-1 [W2B1].> (AWD), <Ref. to 3-1 [W3A0].> (FWD)

3. INHIBITOR SWITCH (AT MODEL)

Remove and install inhibitor switch (R position switch). <Ref. to 3-2 [W3C0].>

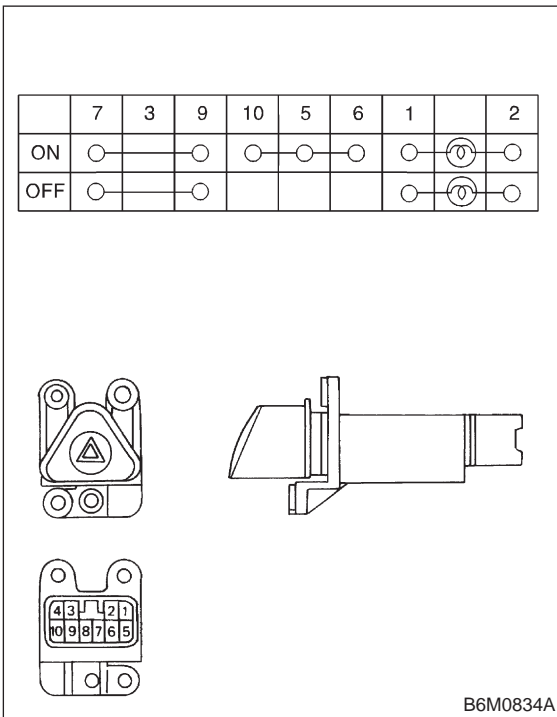
B: INSPECTION

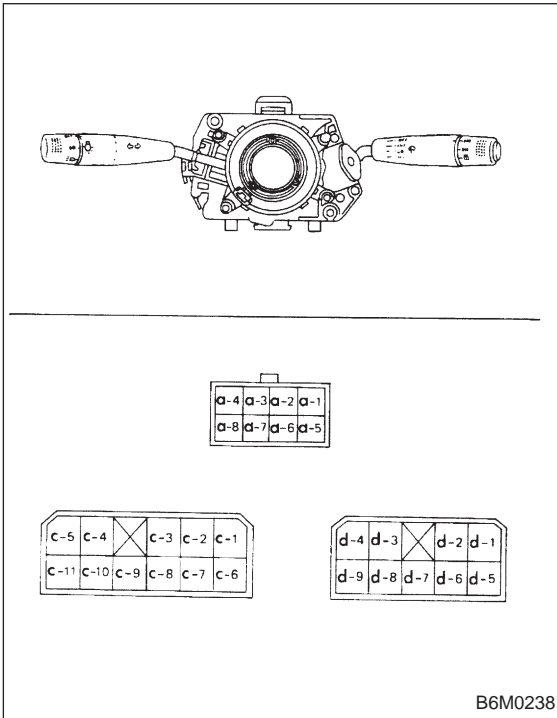
1. INHIBITOR SWITCH (AT MODEL)

Inspect inhibitor switch. <Ref. to 3-2 [W3A0].>

2. HAZARD SWITCH

Move hazard switch to each position and check continuity between terminals.





8. Back-up Light

A: REMOVAL AND INSTALLATION

1. BACK-UP LIGHT

Remove and install rear finisher. <Ref. to 6-2 [W6A2].>

2. BACK-UP LIGHT SWITCH (MT MODEL)

Remove and install back-up light switch. <Ref. to 3-1 [W2B1].> (AWD), <Ref. to 3-1 [W3A0].> (FWD)

3. INHIBITOR SWITCH (AT MODEL)

Remove and install inhibitor switch (R position switch). <Ref. to 3-2 [W3C0].>

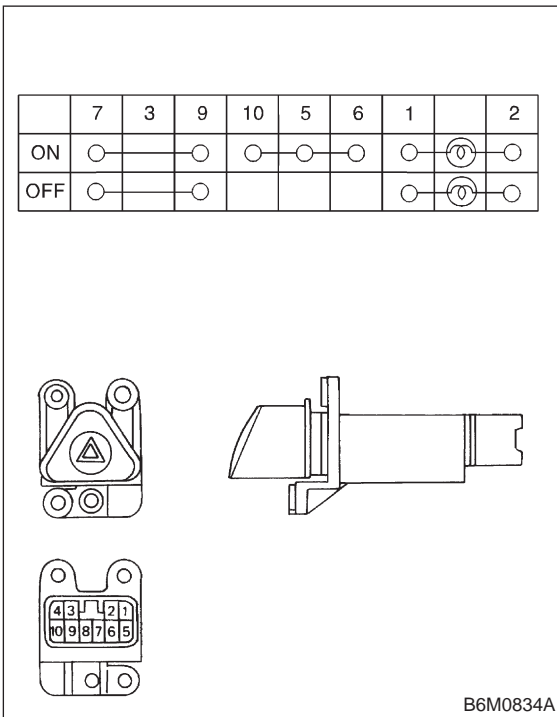
B: INSPECTION

1. INHIBITOR SWITCH (AT MODEL)

Inspect inhibitor switch. <Ref. to 3-2 [W3A0].>

2. HAZARD SWITCH

Move hazard switch to each position and check continuity between terminals.

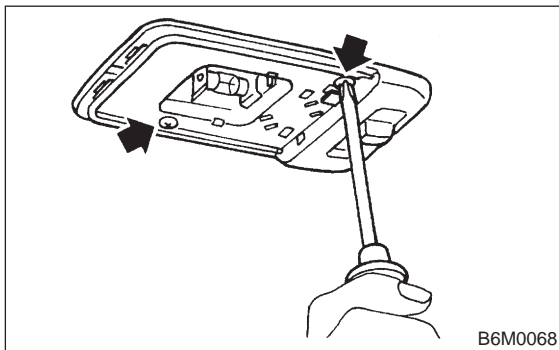


9. Room Light and Door Switch

A: REMOVAL AND INSTALLATION

1. ROOM LIGHT

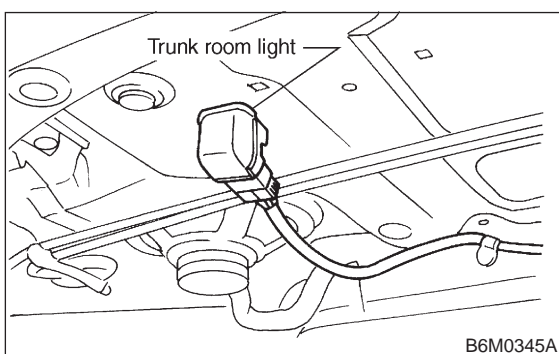
- 1) Pry room light lens off using a screwdriver.
- 2) Remove screws which secure room light body.



- 3) Remove room light body while disconnecting connector.
- 4) Installation is in the reverse order of removal.

2. TRUNK ROOM LIGHT (SEDAN)

- 1) Turn trunk room light body by hand and remove it from rear shelf panel.
- 2) Disconnect connector of trunk room light.

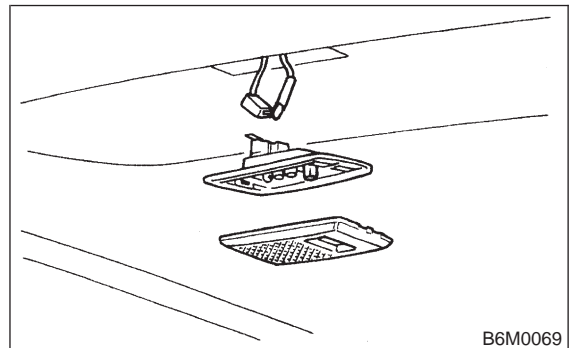


- 3) Installation is in the reverse order of removal.

3. LUGGAGE ROOM LIGHT (WAGON)

- 1) Pry luggage room light lens off using a screwdriver.
- 2) Remove screws which secure luggage room light body.

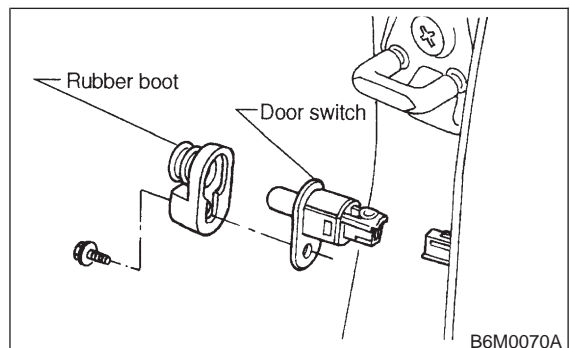
- 3) Remove luggage room light body while disconnecting connector.



- 4) Installation is in the reverse order of removal.

4. DOOR SWITCH

- 1) Remove rubber boot of door switch.
- 2) Remove screw which secures door switch to body.



- 3) Remove door switch while disconnecting connector.
- 4) Installation is in the reverse order of removal.

5. TRUNK ROOM LIGHT SWITCH (SEDAN)

Remove and install trunk room light switch which is installed in trunk lid lock. <Ref. to 5-1 [W2A3].>

6. LUGGAGE ROOM LIGHT SWITCH (WAGON)

Remove and install luggage room light switch which is installed in rear gate lock. <Ref. to 5-2 [W3A2].>

B: INSPECTION

1. DOOR SWITCH

Move switch and check continuity between terminal of door switch and switch body.

Switch position	Terminal	Switch body
Open (ON)		
Push in (OFF)		

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2. TRUNK ROOM LIGHT SWITCH (SEDAN)

Move switch and check continuity between terminals of trunk room light switch.

Terminal	1	2
Switch position		
Open (ON)		
Push in (OFF)		

SEDAN

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3. LUGGAGE ROOM LIGHT SWITCH (WAGON)

Move switch and check continuity between terminals of luggage room light switch.

Terminal	1	2
Switch position		
Open (ON)		
Push in (OFF)		

WAGON

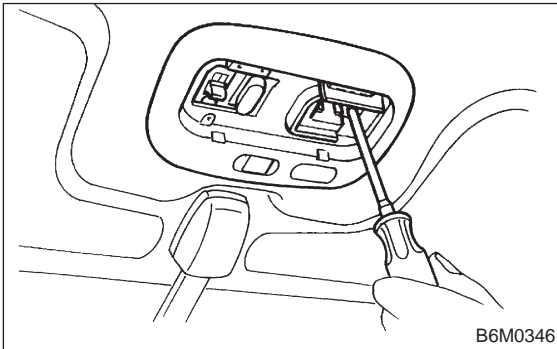
B6M0837A

10. Spot Light

A: REMOVAL AND INSTALLATION

1. SPOT LIGHT AND SWITCH

- 1) Pry spot light lens off using a screwdriver.
- 2) Remove screws which secure spot light body.



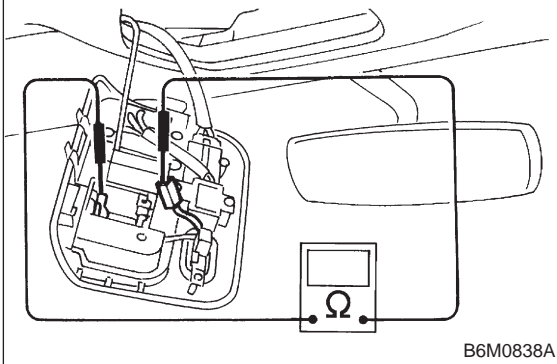
- 3) Remove spot light body while disconnecting connector(s).
- 4) Installation is in the reverse order of removal.

B: INSPECTION

1. SPOT LIGHT SWITCH

Move switch and check continuity between terminal of spot light switch connector and steel plate as shown.

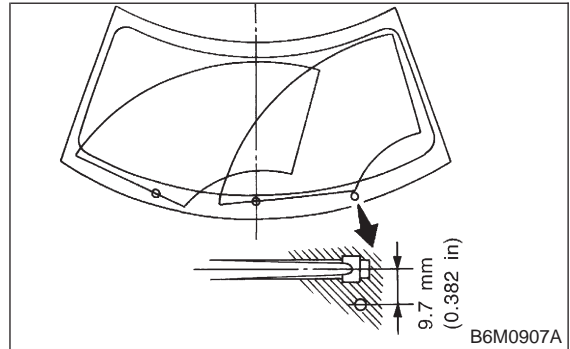
Switch position	Connector terminal	Plate
Open (OFF)		
Push in (ON)	○	○



11. Front Wiper and Washer

A: ADJUSTMENT

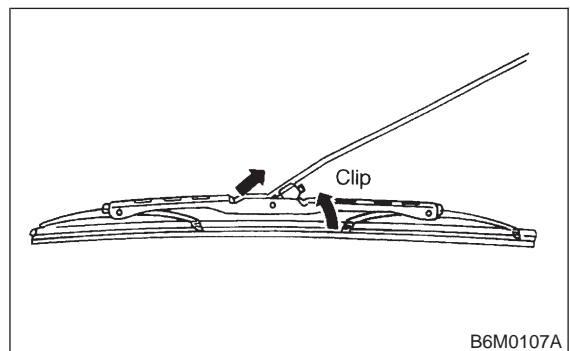
- 1) Turn the wiper switch to OFF position.
- 2) Adjust blades in original position as shown in figure by changing wiper arm installation.



B: REMOVAL AND INSTALLATION

1. BLADE

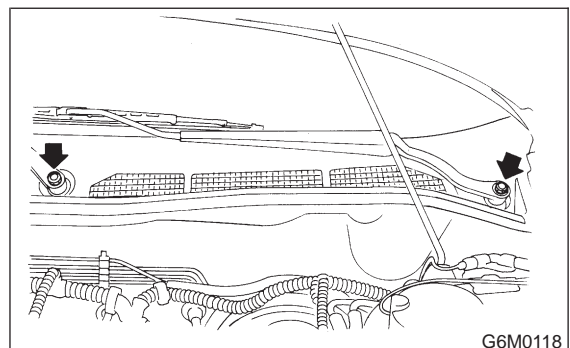
- 1) Pull out blade following the arrow direction from arm while pushing up locking clip.



- 2) Installation is in the reverse order of removal.

2. WIPER ARM

- 1) Open front hood.
- 2) Remove cap of wiper arm installation nut.
- 3) Remove the nut which secures wiper arm.



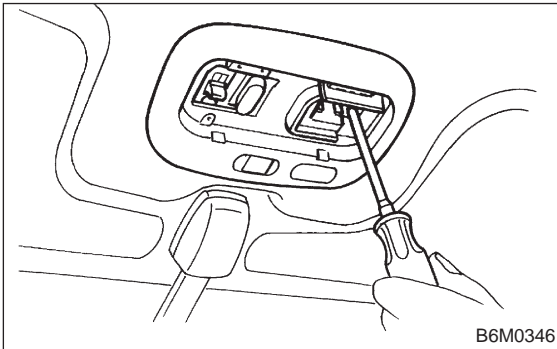
- 4) Remove wiper arm.
- 5) Installation is in the reverse order of removal.

10. Spot Light

A: REMOVAL AND INSTALLATION

1. SPOT LIGHT AND SWITCH

- 1) Pry spot light lens off using a screwdriver.
- 2) Remove screws which secure spot light body.



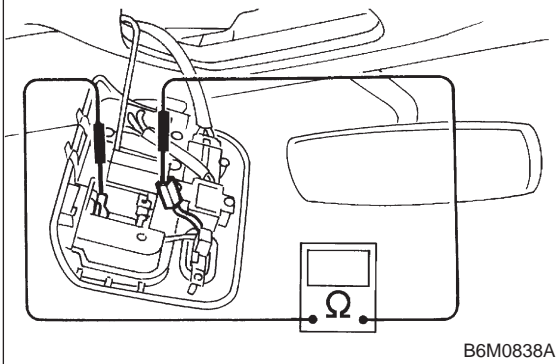
- 3) Remove spot light body while disconnecting connector(s).
- 4) Installation is in the reverse order of removal.

B: INSPECTION

1. SPOT LIGHT SWITCH

Move switch and check continuity between terminal of spot light switch connector and steel plate as shown.

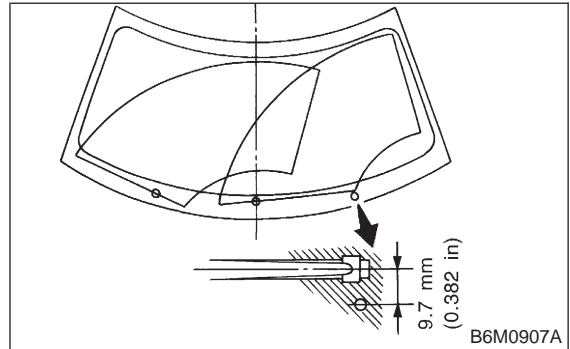
Switch position	Connector terminal	Plate
Open (OFF)		
Push in (ON)	○	○



11. Front Wiper and Washer

A: ADJUSTMENT

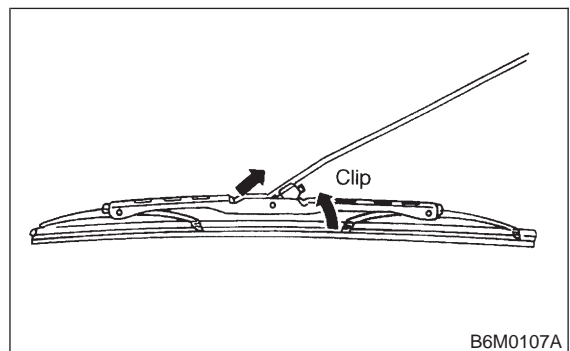
- 1) Turn the wiper switch to OFF position.
- 2) Adjust blades in original position as shown in figure by changing wiper arm installation.



B: REMOVAL AND INSTALLATION

1. BLADE

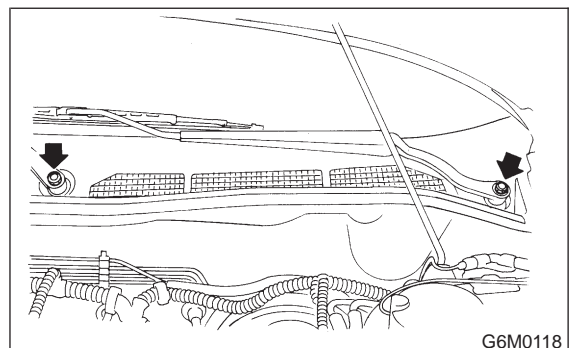
- 1) Pull out blade following the arrow direction from arm while pushing up locking clip.



- 2) Installation is in the reverse order of removal.

2. WIPER ARM

- 1) Open front hood.
- 2) Remove cap of wiper arm installation nut.
- 3) Remove the nut which secures wiper arm.



- 4) Remove wiper arm.
- 5) Installation is in the reverse order of removal.

NOTE:

Remove metal sludge from the wiper arm fixture before installing it.

Tightening torque:

20±3 N·m (2.0±0.3 kg-m, 14.5±2.2 ft-lb)

3. WIPER MOTOR AND LINK

1) Detach weatherstrip and cowl panel. <Ref. to 5-1 [W10A0].>

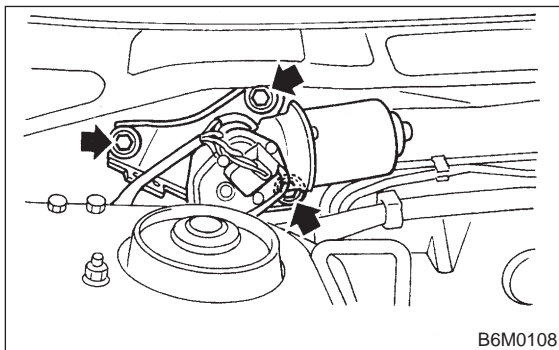
NOTE:

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

- 2) Disconnect connector of wiper motor.
- 3) Remove motor attaching bolts.

Tightening torque:

5.9±1.5 N·m (0.6±0.15 kg-m, 4.3±1.1 ft-lb)



4) Remove wiper link from back side of wiper motor using a screwdriver inserted into service hole in front panel.

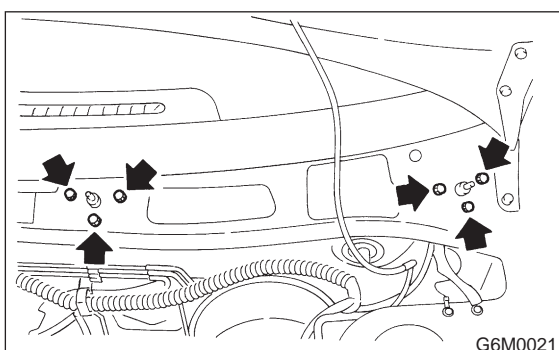
CAUTION:

Do not pry wiper link off forcefully as this may scratch vehicle body.

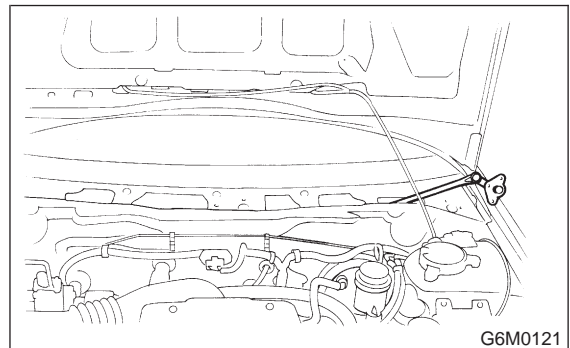
- 5) Remove wiper motor.
- 6) Separate the driver's side wiper link from back side of the passenger's side wiper sleeve unit.
- 7) Remove nuts which secure sleeve unit.

Tightening torque:

5.9±1.5 N·m (0.6±0.15 kg-m, 4.3±1.1 ft-lb)



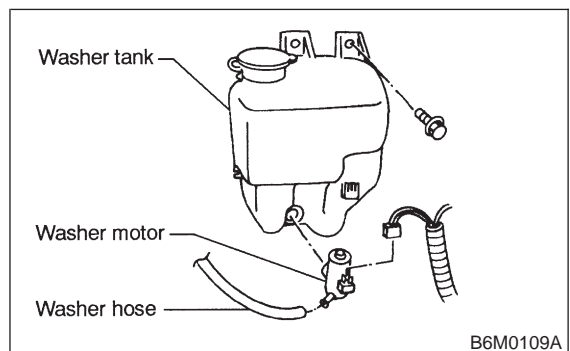
8) Remove wiper link from service hole in front panel.



9) Installation is in the reverse order of removal.

4. WASHER TANK AND WASHER MOTOR

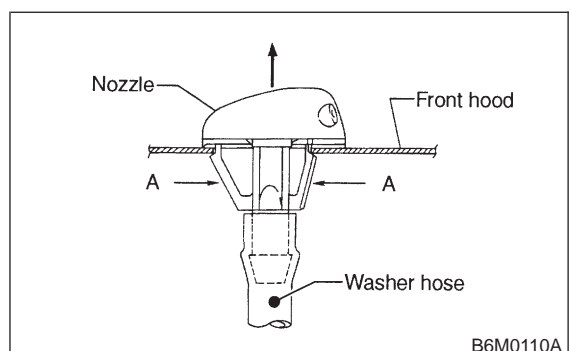
- 1) Remove washer tank attaching bolts.
- 2) Disconnect connectors of washer motors.
- 3) Disconnect washer hoses from each washer motor.
- 4) Remove washer tank and washer motor as an unit.
- 5) Separate washer motor from washer tank.



6) Installation is in the reverse order of removal.

5. NOZZLE

- 1) Disconnect washer hose from nozzle.
- 2) Push nozzle clip in direction A as shown in figure.



3) Remove nozzle from engine hood.

6-2 [W11B6]

11. Front Wiper and Washer

SERVICE PROCEDURE

CAUTION:

Do not pry nozzle off forcefully as this may scratch vehicle body.

4) Installation is in the reverse order of removal.

6. COMBINATION SWITCH

Remove and install combination switch. <Ref. to 6-2 [W4B3].>

C: DISASSEMBLY AND ASSEMBLY

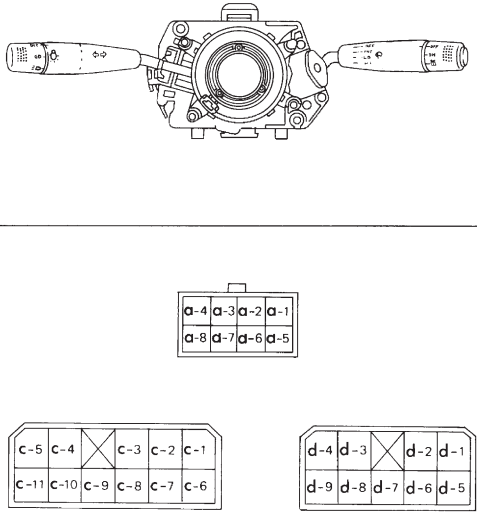
1. COMBINATION SWITCH AND INTERMITTENT UNIT

Disassemble and assemble combination switch. <Ref. to 6-2 [W4C1].>

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.
- 4) Set wiper switch to each position and check continuity between terminals.



Wiper switch

Terminal Switch position		d-9	d-8	d-6	d-7	INT1	INT2
		OFF	○—○	×	×		
OFF	↕	×	×				
	MIST		○—○				
INT	OFF	○—○				○—○	
	↕	×	×				
INT	MIST		○—○			○—○	
	↕	×	×				
LO	OFF		○—○				
	MIST		○—○				
HI	OFF			○—○			
	MIST		○—○	○—○			

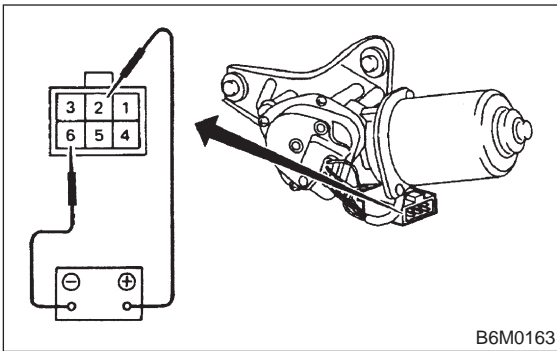
Washer switch

Terminal Switch position		d-5	d-2
		OFF	
ON	○—○	○—○	

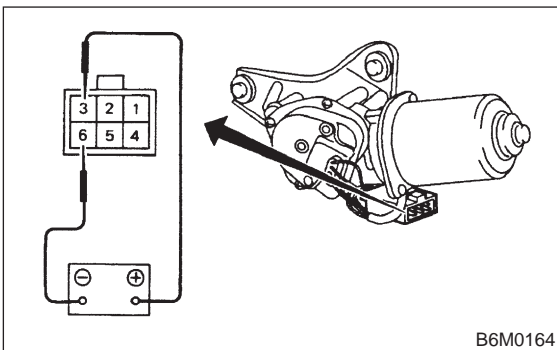
B6M0708

2. WIPER MOTOR

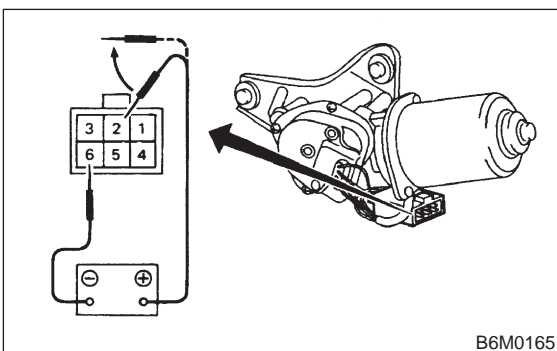
1) Check wiper motor operation at low speed:
Connect battery to wiper motor. Check wiper motor for proper operation at low speed.



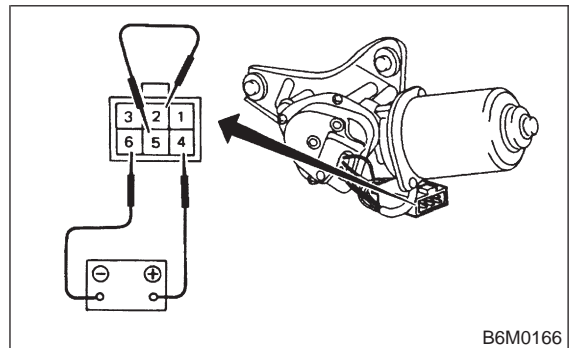
2) Check wiper motor operation at high speed:
Connect battery to wiper motor. Check wiper motor for proper operation at high speed.



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

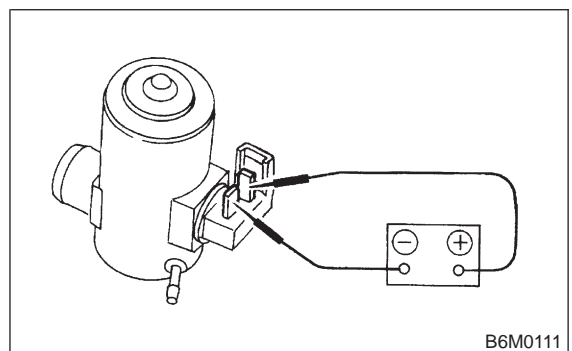


4) Reconnect battery and ensure that wiper motor stops at "AUTO STOP" after operating at low speed.



3. WASHER MOTOR

Apply battery voltage between terminals of washer motor connector and check that washer motor operates.



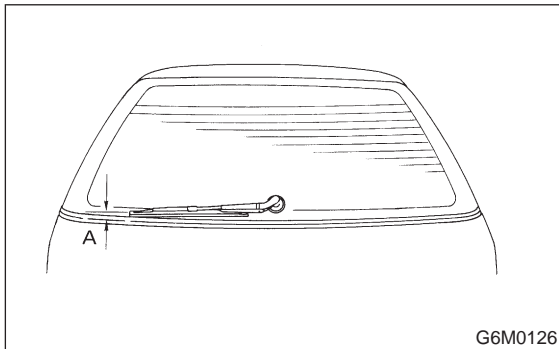
12. Rear Wiper and Washer

A: 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)

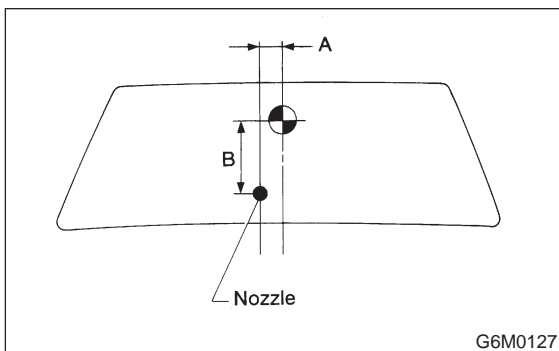


2) Adjust washer ejecting point on rear gate window as shown in figure when the vehicle stops.

Ejecting point:

A: 25 mm (0.98 in)

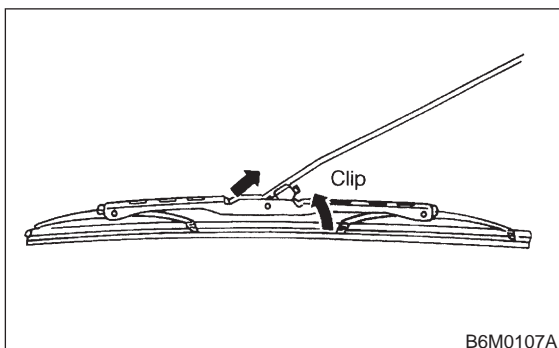
B: 200 — 300 mm (7.87 — 11.81 in)



B: REMOVAL AND INSTALLATION

1. BLADE

1) Pull out blade following the arrow direction, from arm while pushing up locking clip.



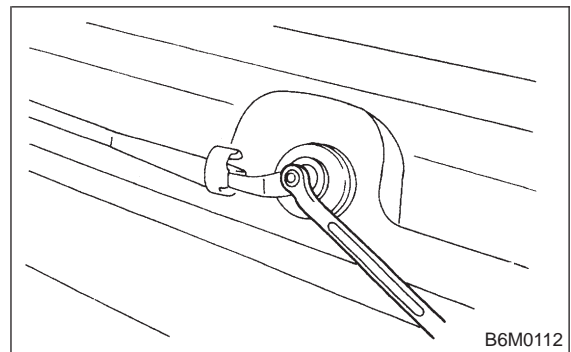
2) Installation is in the reverse order of removal.

2. WIPER ARM

- 1) Remove head cover.
- 2) Remove nut and wiper arm.
- 3) Installation is in the reverse order of removal.

Tightening torque:

$5.9 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.6 \pm 0.15 \text{ kg}\cdot\text{m}$, $4.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



3. WIPER MOTOR

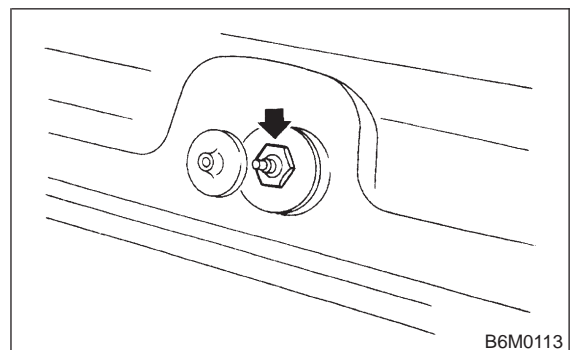
- 1) Remove cap and special nut.

CAUTION:

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

Tightening torque:

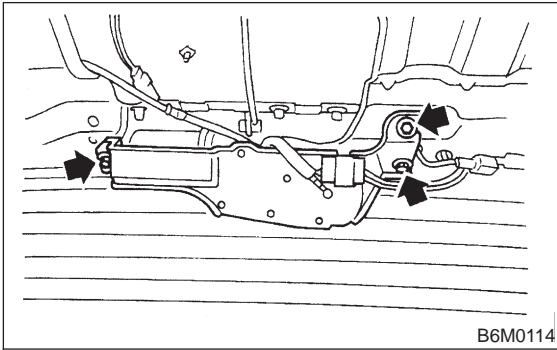
$7.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.15 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.1 \text{ ft}\cdot\text{lb}$)



- 2) Remove rear gate trim. <Ref. to 5-2 [W3A1].>
- 3) Undo clips which secure harness, and disconnect connector of wiper motor.
- 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.



6) Installation is in the reverse order of removal.

Tightening torque:
 $5.9 \pm 1.5 \text{ N-m}$ ($0.6 \pm 0.15 \text{ kg-m}$, $4.3 \pm 1.1 \text{ ft-lb}$)

4. WASHER TANK AND WASHER MOTOR

Remove and install washer tank and washer motor. <Ref. to 6-2 [W11B4].>

5. COMBINATION SWITCH

Remove and install combination switch. <Ref. to 6-2 [W4B3].>

C: DISASSEMBLY AND ASSEMBLY

1. COMBINATION SWITCH

Disassembly and assembly combination switch. <Ref. to 6-2 [W4C1].>

D: INSPECTION

1. COMBINATION SWITCH (ON-CAR)

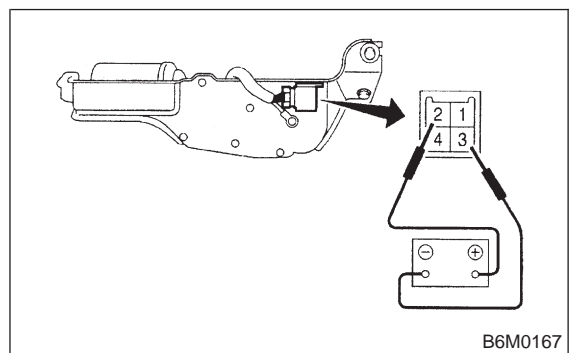
- 1) Remove instrument panel lower cover.
- 2) Remove lower column cover.
- 3) Unfasten holddown clip which secures harness, and disconnect connectors from body harness.

4) Set rear wiper and washer switch to each position and check continuity between terminals.

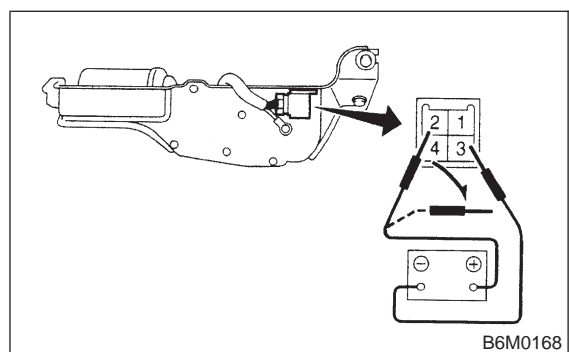
Terminal	d-2	d-1	d-3
Switch position			
WASH	○	○	
OFF			
ON	○		○
WASH	○	○	○

2. WIPER MOTOR

1) Operational check:
Connect battery to wiper motor and check operation of wiper motor.



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

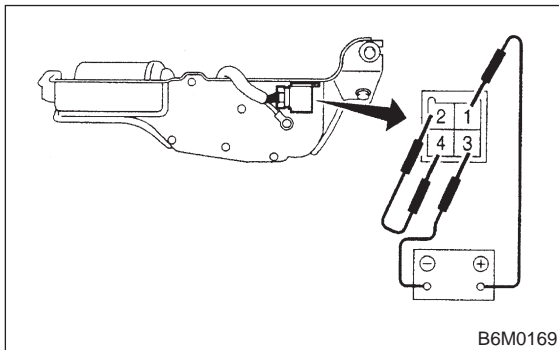


6-2 [W12D3]

12. Rear Wiper and Washer

SERVICE PROCEDURE

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

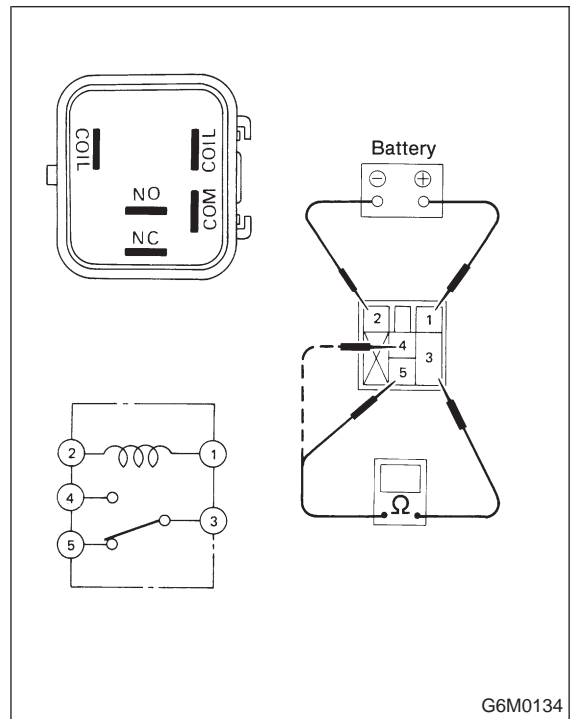


3. REAR WIPER RELAY

1) Connect battery to terminal No. 1 and ground terminal No. 2.

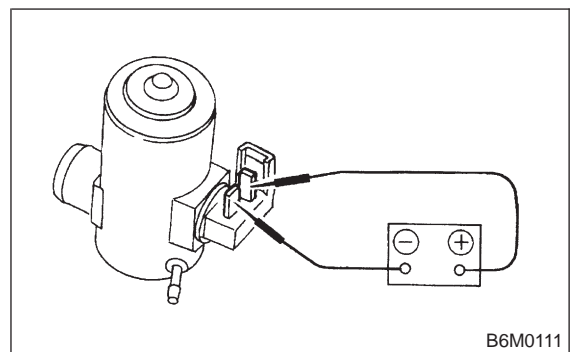
2) Check continuity between terminals.

When current flows.	Between terminals No. 3 and No. 5	Continuity does not exist.
	Between terminals No. 3 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 3 and No. 5	Continuity exists.
	Between terminals No. 3 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.



4. WASHER MOTOR

Apply battery voltage between terminals of washer motor connector and check that washer motor operates.



13. Rear Window Defogger

A: REMOVAL AND INSTALLATION

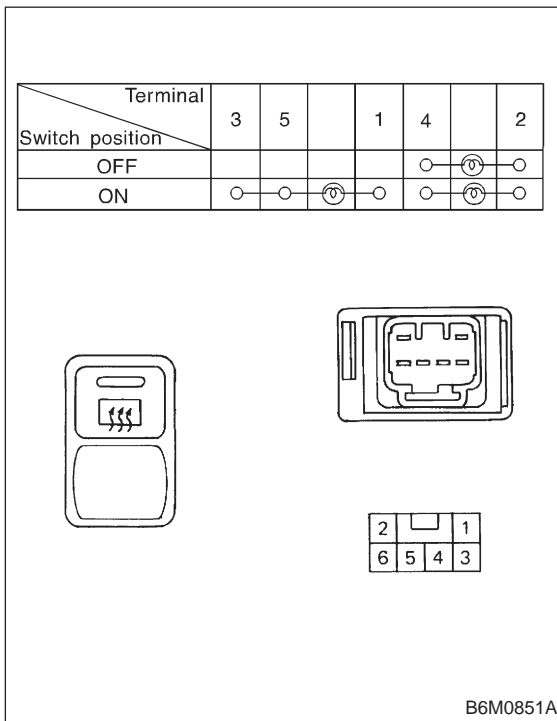
1. DEFOGGER SWITCH

- 1) Remove screws which secure meter visor.
- 2) Remove meter visor from instrument panel while disconnecting connectors.
- 3) Remove rear window defogger switch from meter visor.
- 4) Installation is in the reverse order of removal.

B: INSPECTION

1. DEFOGGER SWITCH

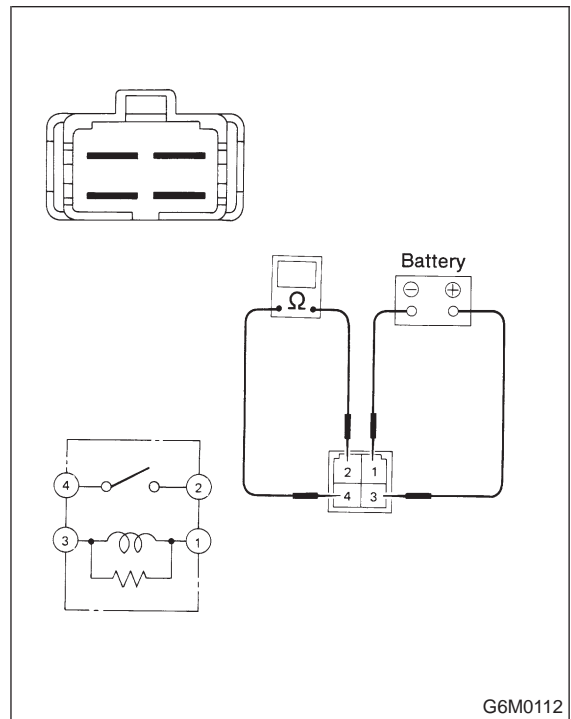
Move rear window defogger switch to each position and check continuity between terminals.



2. DEFOGGER RELAY

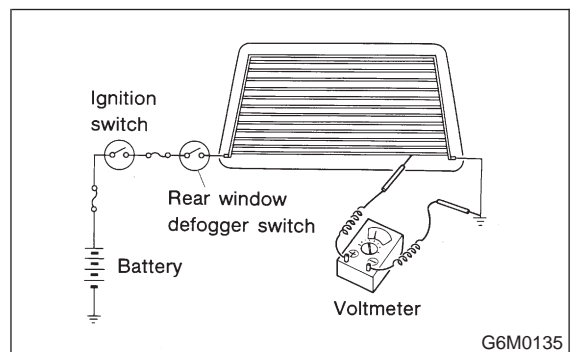
Check continuity between terminals as indicated in table below, when connecting the battery to terminal No. 1 and No. 3.

When current flows.	Between terminals No. 2 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 2 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 3	Continuity exists.



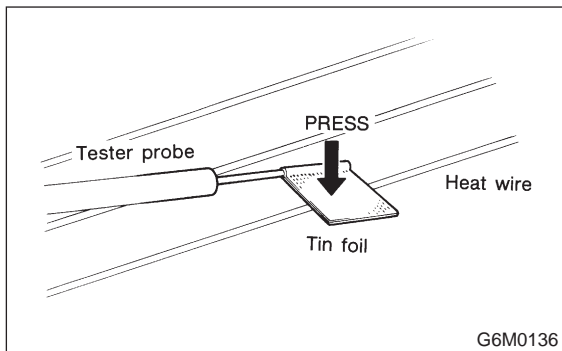
3. HEAT WIRES

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



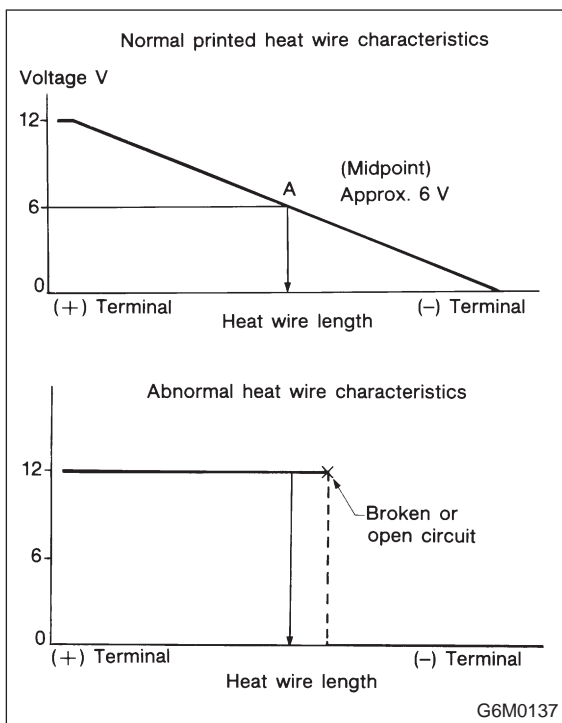
NOTE:

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.



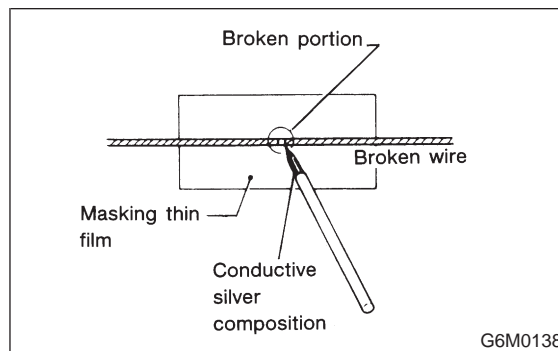
4) When tester indicates 12 volts when its probe reaches point "A", a broken circuit occurs between point "A" and the negative terminal. Slowly move tester probe toward the negative terminal while contacting it on heat wire to locate point where tester indication changes abruptly (0 volts). This is the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



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.

C: REPAIR

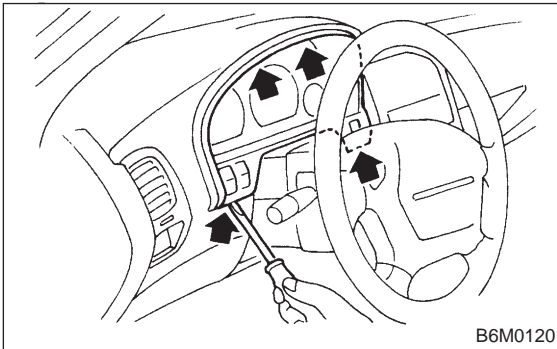
1) Clean broken wire and its surrounding area.

14. Combination Meter

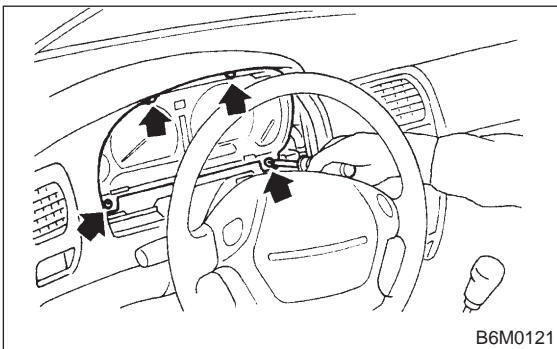
A: REMOVAL AND INSTALLATION

1. COMBINATION METER

- 1) Move steering wheel fully down.
- 2) Remove screws which secure meter visor.



- 3) Remove visor from instrument panel.
- 4) Disconnect connectors from meter visor.
- 5) Remove screws which secure combination meter, and pull combination meter out.

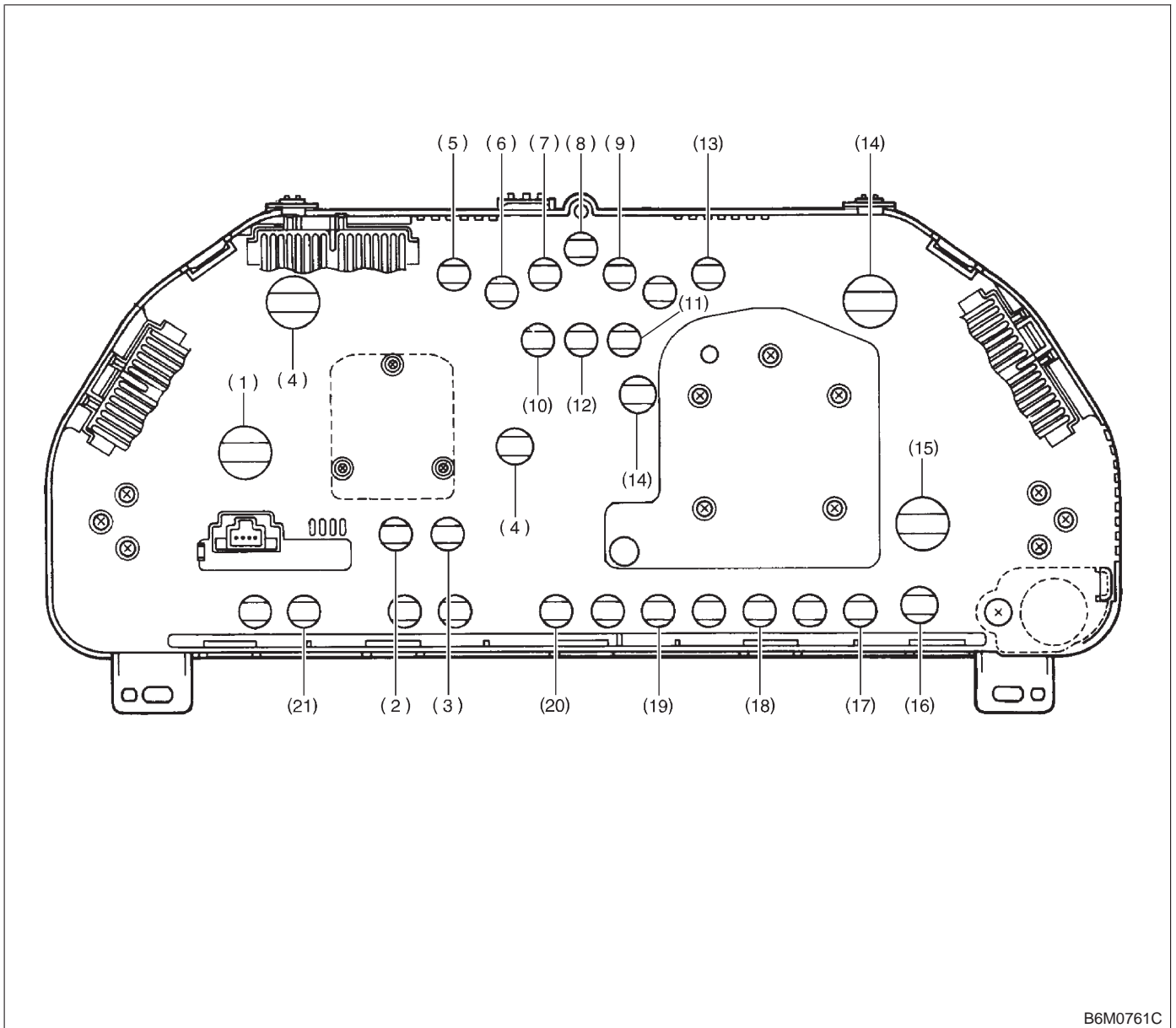


- 6) Disconnect connectors from back of combination meter.
- 7) Installation is in the reverse order of removal.

CAUTION:

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

B: BULB REPLACEMENT



B6M0761C

- | | | |
|---|-------------------------------|--|
| (1) Tachometer and temperature gauge illumination | (7) Door open (Front-Right) | (15) Speedometer and fuel gauge illumination |
| (2) Oil pressure | (8) Seat belt | (16) Low fuel |
| (3) CHECK ENGINE (Malfunction Indicator Light) | (9) Door open (Front-Left) | (17) Charge |
| (4) Tachometer illumination | (10) Door open (Rear-Right) | (18) Brake fluid level/parking brake |
| (5) Turn signal (RH) | (11) Door open (Rear-Left) | (19) FWD |
| (6) Headlight beam | (12) Rear gate open (Wagon) | (20) AT oil temperature |
| | (13) Turn signal (LH) | (21) ABS |
| | (14) Speedometer illumination | |

15. Vehicle Speed Sensor 2

A: GENERAL PRECAUTIONS

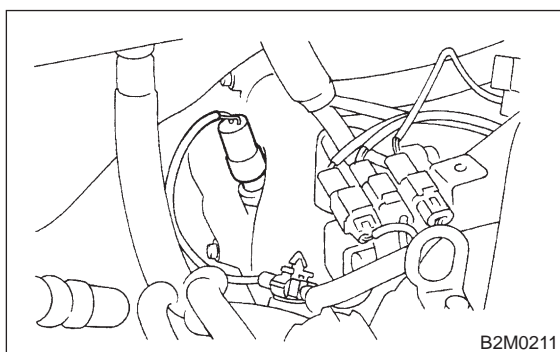
- (1) Be careful not to drop or bump sensor as this may break built-in magnet.
- (2) Drive key is designed to separate from vehicle speed sensor 2. Be careful not to lose it or forget to install.
- (3) Vehicle speed sensor 2 is installed in part (which contains bearings, etc., finished to a high degree of accuracy). Do not allow foreign matter (filings, sand, etc.) to get into it.
- (4) When checking output of vehicle speed sensor 2 as a single unit, ensure test leads are connected to their correct terminals. Failure to do this may damage internal IC.
- (5) Discard vehicle speed sensor 2 after removal; replace with new one.

B: REMOVAL

CAUTION:

- Be careful when removing vehicle speed sensor 2 immediately after driving vehicle for a while, as temperature around it is high.
- Before removing vehicle speed sensor 2, clean dirt, etc. from surrounding areas. Take care not to allow foreign matter to get into mounting hole.

- 1) Remove collector cover.
- 2) Disconnect vehicle speed sensor 2 connector.



- 3) Turn and remove vehicle speed sensor 2.
- 4) Remove key and packing.

C: INSTALLATION

CAUTION:

- Ensure sensor mounting hole is clean and free of foreign matter.
- Apply grease to tip end of key to prevent key from falling off sensor.
- Align tip end of key with key groove on end of speedometer shaft during installation.

- 1) Hand tighten vehicle speed sensor 2, then tighten it using suitable tool.

Tightening torque required for sensor to reach bottom of transmission is as follows:

Tightening torque:

0.39 — 0.88 N·m (4.0 — 9.0 kg·cm, 3.5 — 7.8 in·lb)

CAUTION:

- When torque must be applied that exceeds 0.88 N·m (9.0 kg·cm, 7.8 in·lb), the key and key groove on end of speedometer may not be aligned properly. Remove the key, align it correctly and reassemble.
- Sensor threads are secured by Locktite. The reassembly must be completed within 5 minutes before Locktite dries.

- 2) Tighten vehicle speed sensor 2 further to specified torque.

Tightening torque:

5.9±1.5 N·m (60±15 kg·cm, 52±13 in·lb)

16. Horn and Cigarette Lighter

A: REMOVAL AND INSTALLATION

1. HORN

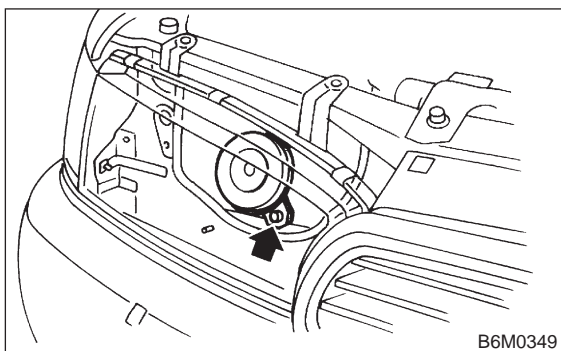
- 1) Open the engine hood.
- 2) Disconnect connector of horn.
- 3) Remove the horn.
- 4) Installation is in the reverse order of removal.

Tightening torque:

$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)

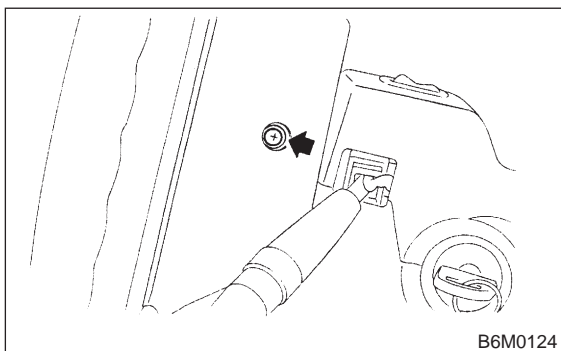
CAUTION:

After installing horn, connect connector, fit firmly wiring harness to prevent from disconnecting due to vibration.



2. HORN SWITCH (HORN PAD)

- 1) Remove screw which secures horn switch (steering pad) to the base of steering wheel.

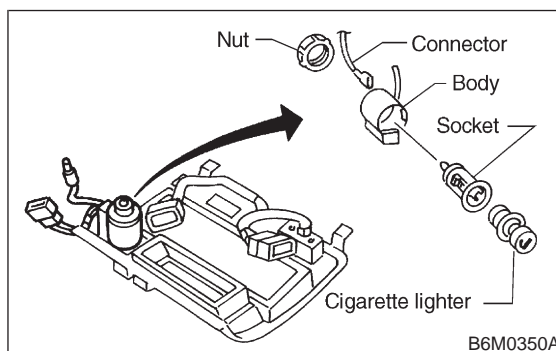


- 2) Remove horn switch (steering pad) from steering wheel while disconnecting connector.
- 3) Installation is in the reverse order of removal.

3. CIGARETTE LIGHTER

- 1) Remove center panel from instrument panel. <Ref. to 5-4 [W1A0].>
- 2) Disconnect connector from cigarette lighter.
- 3) Turn illumination socket 45° counterclockwise and remove it.

- 4) Loosen nut, and then remove cigarette lighter body.



- 5) Installation is in the reverse order of removal.

CAUTION:

- Align socket with cutout portion of instrument panel during installation.
- In case of replacing cigarette lighter, use genuine part only and always replace both plug and socket combination.

B: INSPECTION

1. HORN SWITCH

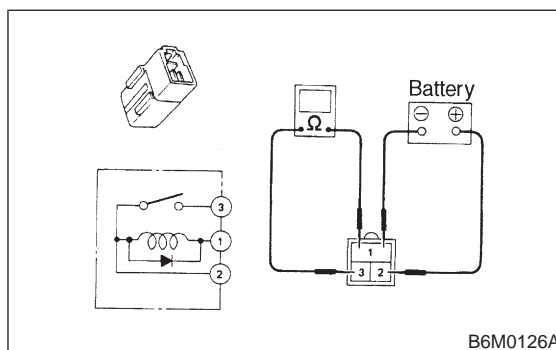
Ensure that horn switch is free from the following defects:

- (1) Burned or shorted contacts
- (2) Broken or weak spring
- (3) Damaged harness
- (4) Worn or corroded mating surface of horn plate

2. HORN RELAY

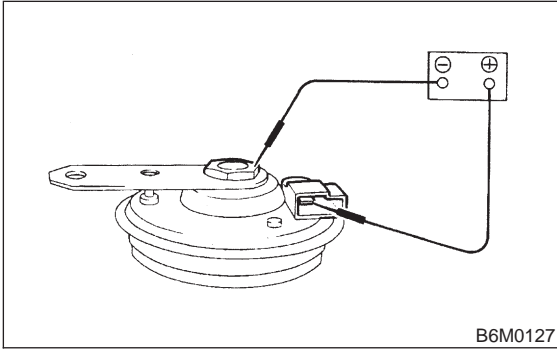
Check continuity between terminals as indicated in table, when connecting the battery to terminals No. 1 and No. 2.

When current flows.	Between terminals No. 2 and No. 3	Continuity exists.
When current does not flow.	Between terminals No. 2 and No. 3	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.



3. HORN

Make sure that horn sounds when battery voltage is applied between connector terminal and horn body.



B6M0127

4. CIGARETTE LIGHTER

- 1) Remove plug. Then, check element's contact for wear, and element for accumulation of ashes, foreign particles, etc.
- 2) Check element for discontinuity.
- 3) Remove socket and clean element. Then, check for wear or foreign particles on element's contact and mating surface.
- 4) Ensure that cigarette lighter returns within 20 seconds after it is turned to ON.

17. Power Window

A: REMOVAL AND INSTALLATION

1. MAIN SWITCH, SUB SWITCH AND POWER WINDOW MOTOR

Remove and install power window main switch, sub switch and motor. <Ref. to 5-2 [W2A2].>

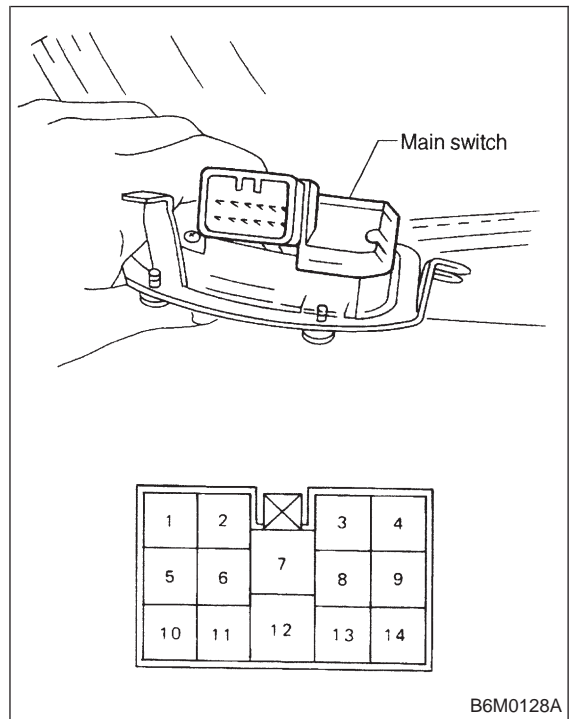
NOTE:

To remove the power window motor, it is necessary to disassemble the door component parts.

B: INSPECTION

1. MAIN SWITCH

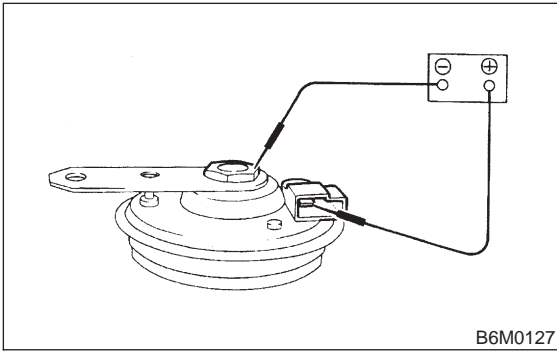
Set power window main switch to each position and check continuity between terminals.



B6M0128A

3. HORN

Make sure that horn sounds when battery voltage is applied between connector terminal and horn body.



B6M0127

4. CIGARETTE LIGHTER

- 1) Remove plug. Then, check element's contact for wear, and element for accumulation of ashes, foreign particles, etc.
- 2) Check element for discontinuity.
- 3) Remove socket and clean element. Then, check for wear or foreign particles on element's contact and mating surface.
- 4) Ensure that cigarette lighter returns within 20 seconds after it is turned to ON.

17. Power Window

A: REMOVAL AND INSTALLATION

1. MAIN SWITCH, SUB SWITCH AND POWER WINDOW MOTOR

Remove and install power window main switch, sub switch and motor. <Ref. to 5-2 [W2A2].>

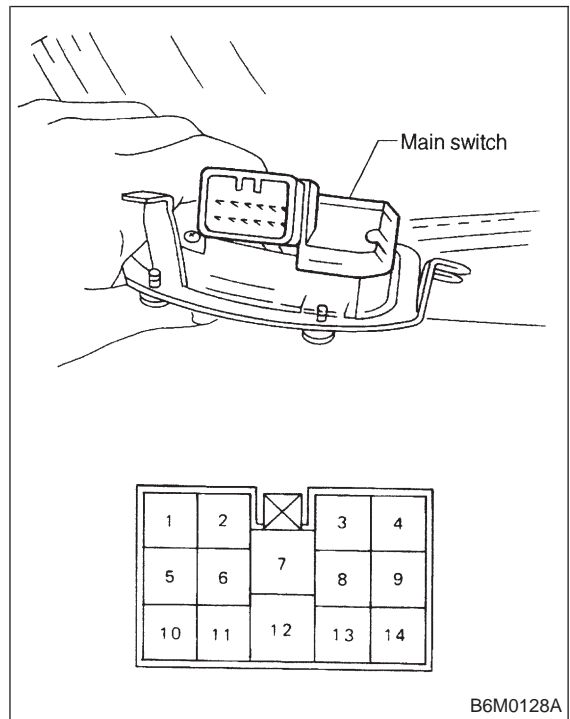
NOTE:

To remove the power window motor, it is necessary to disassemble the door component parts.

B: INSPECTION

1. MAIN SWITCH

Set power window main switch to each position and check continuity between terminals.



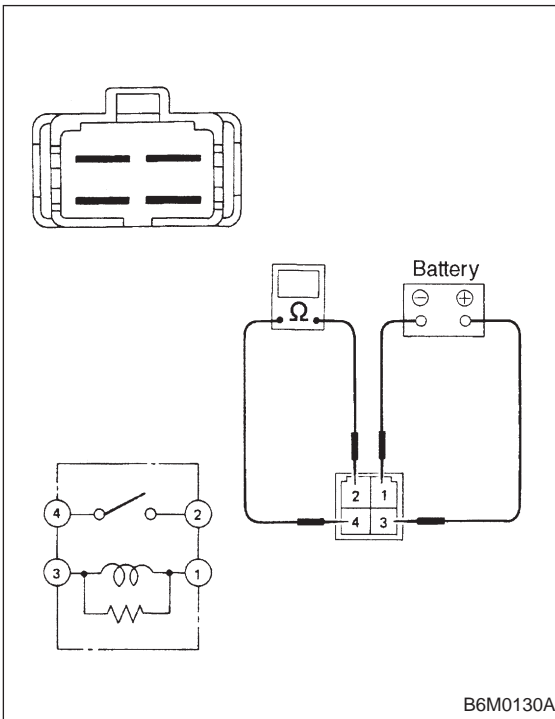
B6M0128A

Window lock switch	Switch Position	Front RH				Front LH				Rear RH				Rear LH			
		7	14	9	12	7	13	8	12	7	6	11	12	7	10	5	12
NORMAL	UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	OFF		○	○	○		○	○	○		○	○	○		○	○	○
	DOWN	○	○	○		○	○	○		○	○	○		○	○	○	
LOCK	UP	○	○			○	○	○	○	○	○			○	○		
	OFF		○	○			○	○	○		○	○			○	○	
	DOWN	○	○			○	○	○		○	○			○	○		

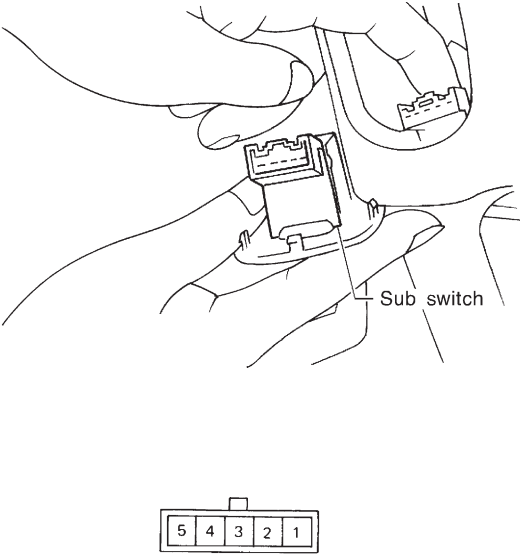
B6M0711

2. SUB SWITCH

Set power window sub switch to each position and check continuity between terminals.



B6M0130A



Terminal Switch position	5	1	3	4	2
UP	○		○	○	○
↕					
OFF		○	○	○	○
↕					
DOWN	○	○		○	○

B6M0712A

3. POWER WINDOW MOTOR

- 1) Make sure that power window motor rotates properly when battery voltage is applied to terminals of motor connector.
- 2) Change polarity of battery connections to terminals to ensure that motor rotates in reverse direction.

4. POWER WINDOW RELAY

Check continuity between terminals as indicated in table, when connecting the battery to terminal No. 1 and No. 3.

When current flows.	Between terminals No. 2 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 2 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 3	Continuity exists.

18. Power Door Lock

A: REMOVAL AND INSTALLATION

1. FRONT AND REAR DOOR, AND REAR GATE LOCK ACTUATOR

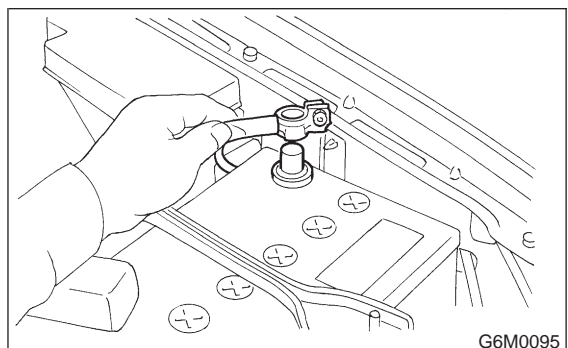
Remove and install front door lock actuator, rear door lock actuators, and rear gate lock actuator. <Ref. to 5-2 [W2A7].>

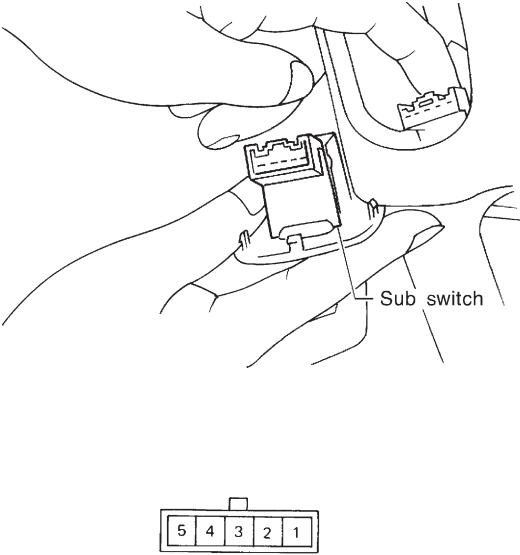
NOTE:

To remove and install the actuators, it is necessary to disassemble the door component parts.

2. DOOR LOCK TIMER

- 1) Disconnect battery ground cable.





Terminal Switch position	5	1	3	4	2
UP	○		○	○	○
↕					
OFF		○	○	○	○
↕					
DOWN	○	○		○	○

B6M0712A

3. POWER WINDOW MOTOR

- 1) Make sure that power window motor rotates properly when battery voltage is applied to terminals of motor connector.
- 2) Change polarity of battery connections to terminals to ensure that motor rotates in reverse direction.

4. POWER WINDOW RELAY

Check continuity between terminals as indicated in table, when connecting the battery to terminal No. 1 and No. 3.

When current flows.	Between terminals No. 2 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 2 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 3	Continuity exists.

18. Power Door Lock

A: REMOVAL AND INSTALLATION

1. FRONT AND REAR DOOR, AND REAR GATE LOCK ACTUATOR

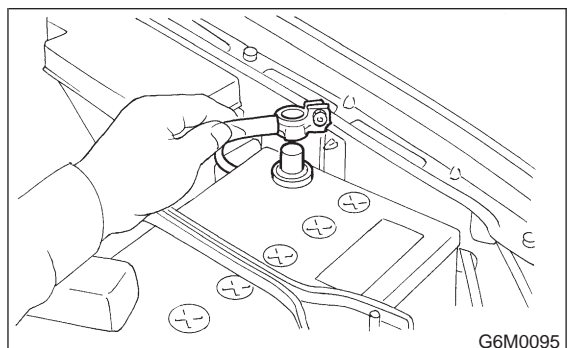
Remove and install front door lock actuator, rear door lock actuators, and rear gate lock actuator. <Ref. to 5-2 [W2A7].>

NOTE:

To remove and install the actuators, it is necessary to disassemble the door component parts.

2. DOOR LOCK TIMER

- 1) Disconnect battery ground cable.

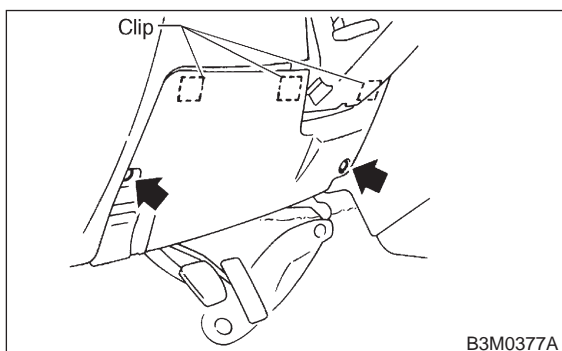


6-2 [W18B1]

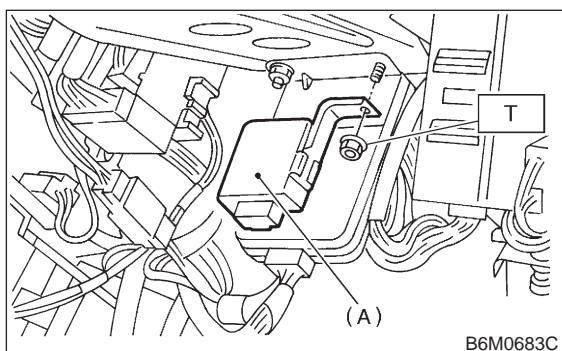
18. Power Door Lock

SERVICE PROCEDURE

2) Remove lower cover and then disconnect connector.



3) Remove door lock timer (A) while disconnecting connector.



4) Installation is in the reverse order of removal.

Tightening torque:

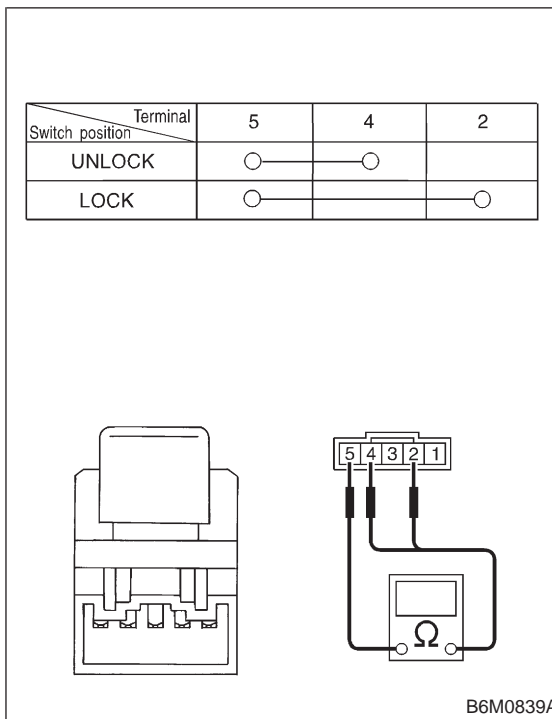
$7.4 \pm 2.5 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.25 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.8 \text{ ft}\cdot\text{lb}$)

B: INSPECTION

1. DOOR LOCK SWITCH (DRIVER'S AND FRONT PASSENGER'S DOOR)

1) Remove door trim panel. <Ref. to 5-2 [W2A2].>

2) Set switch to each position and check continuity between terminals.



2. ACTUATOR

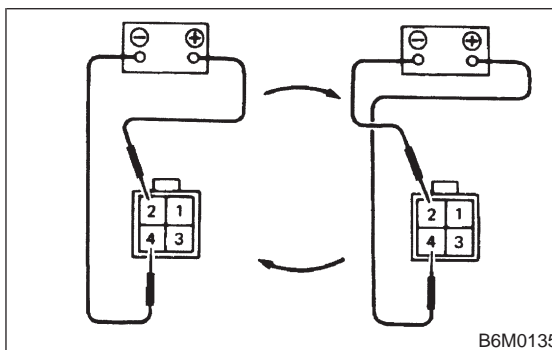
1) Remove door trim panel. <Ref. to 5-2 [W2A2].>

2) Disconnect connector of actuator.

3) Make sure that door link moves to LOCK or UNLOCK position when battery voltage is applied between terminals:

- Connect battery positive (+) terminal to terminal No. 2, and negative (-) terminal to terminal No. 4 at a moment.

- Connect battery positive (+) terminal to terminal No. 4, and negative terminal (-) to terminal No. 2 at a moment.



19. Remote Controlled Rearview Mirror

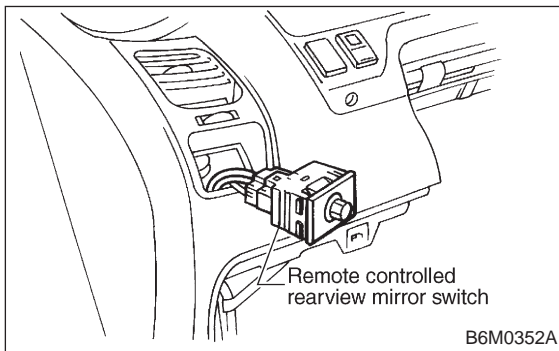
A: REMOVAL AND INSTALLATION

1. REMOTE CONTROLLED REARVIEW MIRROR SWITCH

1) Remove rearview mirror switch from instrument panel by using a small standard screwdriver.

CAUTION:

Do not pry rearview mirror switch forcefully as this may scratch instrument panel.



2) Remove rearview mirror switch while disconnecting connector.

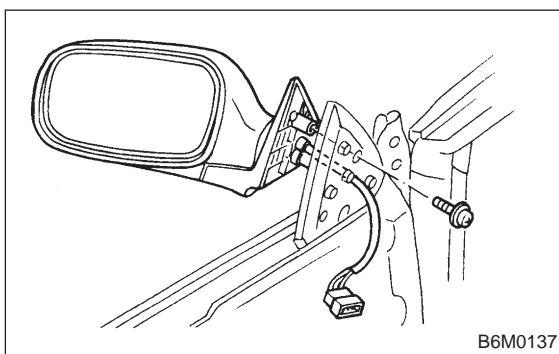
3) Installation is in the reverse order of removal.

2. REARVIEW MIRROR

1) Remove door trim panel. <Ref. to 5-2 [W2A2].>

2) Disconnect connector of rearview mirror.

3) Remove screws which secure rearview mirror, and then remove rearview mirror.



4) Installation is in the reverse order of removal.

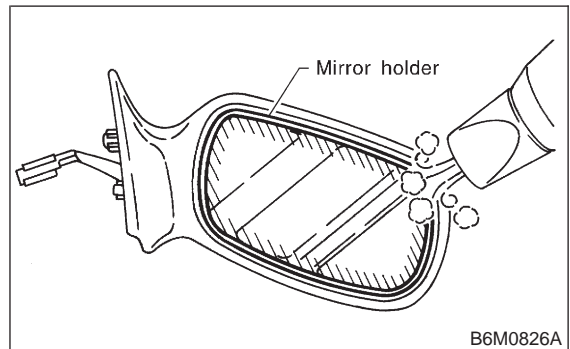
3. MIRROR PLATE

1) Remove rearview mirror. <Ref. to 6-2 [W19A2].>

2) Warm around the mirror holder by hair dryer.

CAUTION:

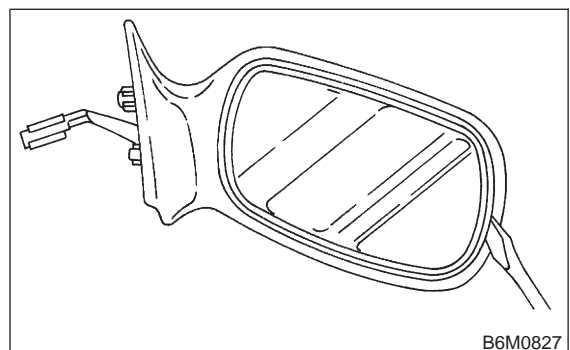
The mirror holder will become extremely hot. Avoid carelessly touching it.



3) Remove mirror plate while lifting the mirror holder using a flat bladed screwdriver.

NOTE:

When removing mirror plate in vehicles with mirror heater, disconnect mirror connector which is on the back side.



4) Installation is in the reverse order of removal.

B: INSPECTION

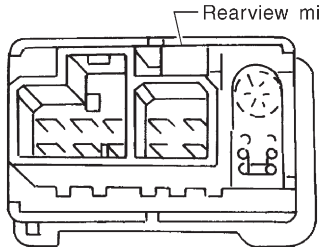

1. REARVIEW MIRROR SWITCH

Move rearview mirror switch to each position and check continuity between terminals.

6-2 [W19B2]

SERVICE PROCEDURE

19. Remote Controlled Rearview Mirror

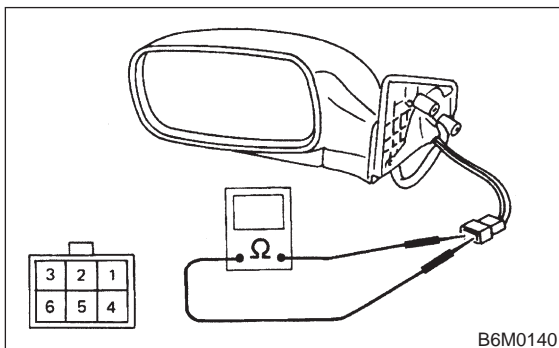
Terminal \ Switch position	Mirror switch					Left/Right changing switch		
	OFF	Right	Left	Up	Down	Left	N	Right
7						○		
9							○	
6								○
8								○
2		○	○	○	○			○
		○	○				○	○
1		○	○	○	○			
				○	○	○		○
4		○	○	○	○			
3								

B6M0714A

2. REARVIEW MIRROR

Check to ensure that rearview mirror moves properly when battery voltage is applied to terminals.

Operation	Terminal connection	
	(+)	(-)
UP	3	1
DOWN	1	3
RIGHT	1	2
LEFT	2	1



20. Sunroof

A: REMOVAL AND INSTALLATION

1. SUNROOF AND SUNROOF MOTOR

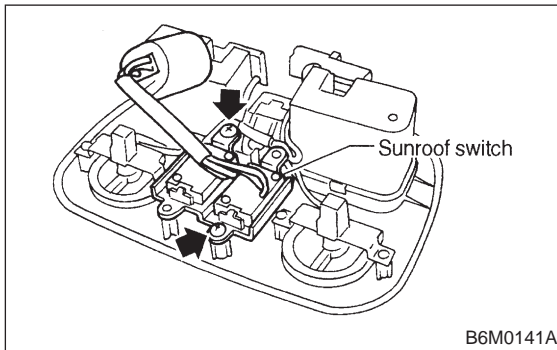
<Ref. to 5-1 [W1600].> as for removal and installation of sunroof system.

2. SUNROOF SWITCH

NOTE:

The sunroof switch is installed in spot light body.

- 1) Pry spot light lens off using a screwdriver.
- 2) Remove screws which secure spot light body.
- 3) Remove spot light body while disconnecting connectors.
- 4) Remove screw which secures sunroof switch, and then remove sunroof switch.

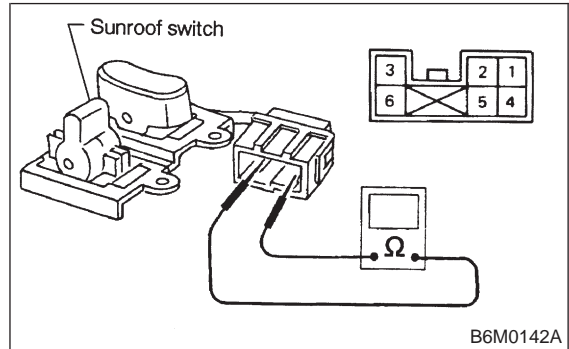


- 5) Installation is in the reverse order of removal.

B: INSPECTION

1. SUNROOF SWITCH

Set sunroof switch to each position and check continuity between terminals as indicated in table below:



Except OUTBACK					
Terminal	4	3	6	5	2
Switch position					
Open	○—○				
Close	○—○	○—○			
Tilt up	○—○			○—○	
Tilt down	○—○				○—○

OUTBACK					
Terminal	4	2	5	6	3
Switch position					
Open (Rear)	○—○				
Close (Rear)	○—○		○—○		
Tilt up (Front)	○—○			○—○	
Tilt down (Front)	○—○				○—○

B6M0861A

2. SUNROOF MOTOR

1) Apply battery voltage between 1-pin connector (Except OUTBACK) or terminal No. 1 (OUTBACK) and body ground wire.

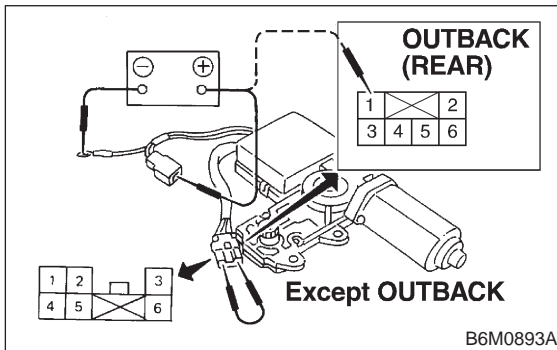
2) Make sure that sunroof motor moves when connecting terminals as described below:

Except OUTBACK

- Connect between terminals No. 3 and 4 (OPEN)
- Connect between terminals No. 6 and 4 (CLOSE)
- Connect between terminals No. 5 and 4 (TILT UP)
- Connect between terminals No. 2 and 4 (TILT DOWN)

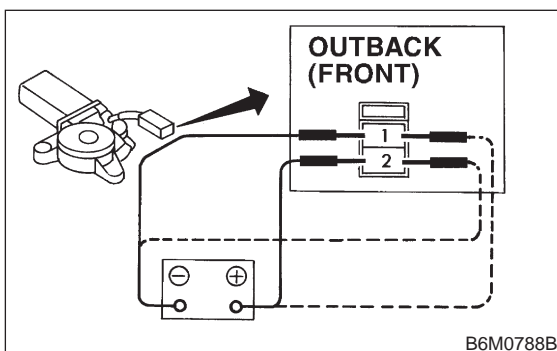
OUTBACK (Rear)

- Connect between terminals No. 2 and 3 (OPEN)
- Connect between terminals No. 6 and 3 (CLOSE)



OUTBACK (Front)

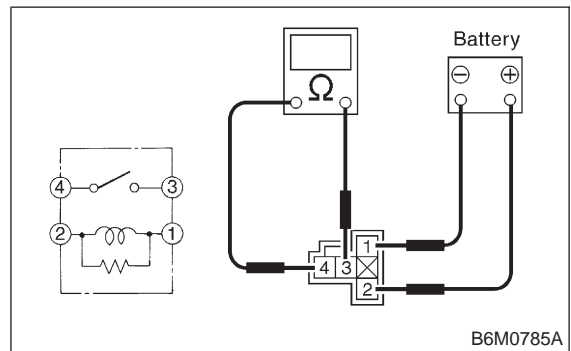
- Connect between terminals No. 1 and 2 (TILT UP)
- Connect between terminals No. 2 and 1 (TILT DOWN)



3. SUNROOF RELAY

Check continuity between terminals as indicated in table below, when battery voltage is applied between terminals No. 1 and No. 2.

When current flows.	Between terminals No. 3 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 3 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.

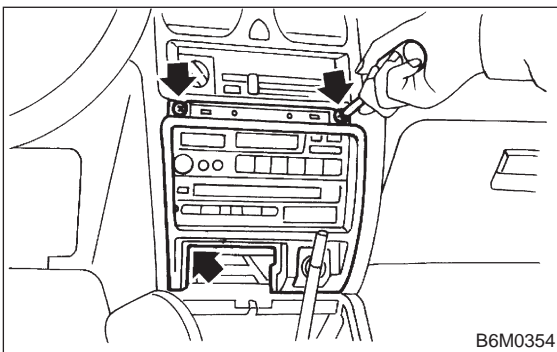


21. Radio, Speaker and Antenna

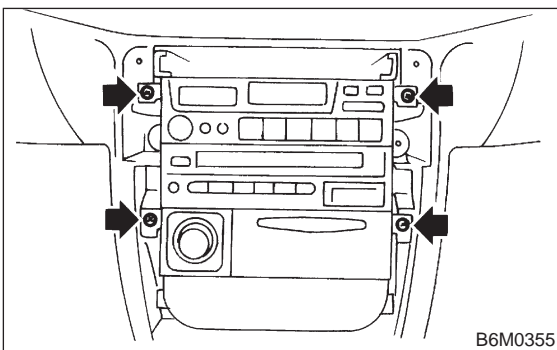
A: REMOVAL AND INSTALLATION

1. RADIO BODY

- 1) Remove hand brake cover.
- 2) Remove console cover.
- 3) Remove screws which secure center panel, and remove center panel.



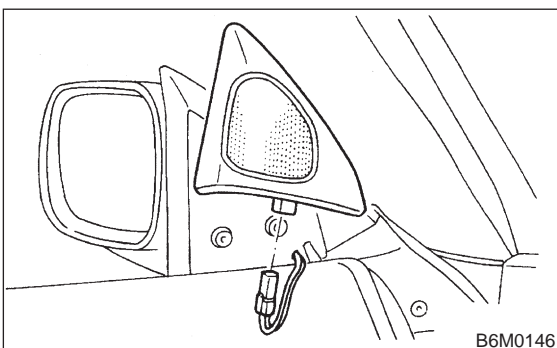
- 4) Remove fitting screws, and slightly pull radio out of instrument panel.



- 5) Disconnect connectors and antenna feeder cord.
- 6) Installation is in the reverse order of removal.

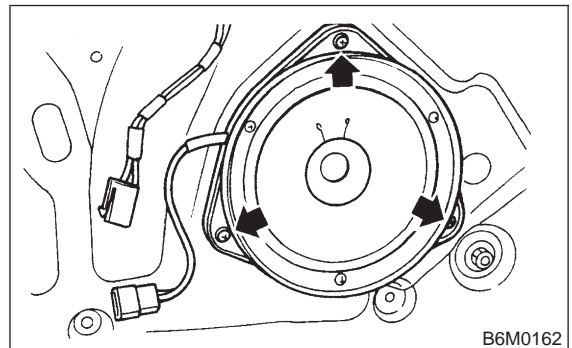
2. FRONT SPEAKER

- 1) Remove gusset speaker from behind the rear-view mirror while disconnecting connector.



- 2) Remove door trim panel. <Ref. to 5-2 [W2A2].>
- 3) Disconnect connector from speaker.

- 4) Remove screws which secure the speaker.
- 5) Remove door mount speaker.



- 6) Installation is in the reverse order of removal.

3. REAR SPEAKER (SEDAN)

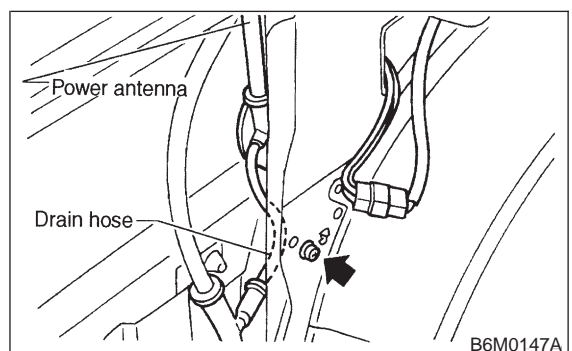
- 1) Remove rear seat cushion and rear backrest.
- 2) Remove left and right rear quarter trim panels.
- 3) Remove rear shelf trim panel.
- 4) Remove screws which secure speaker.
- 5) Remove speaker while disconnecting connector from speaker.
- 6) Installation is in the reverse order of removal.

4. REAR SPEAKER (WAGON)

- 1) Remove door trim panel. <Ref. to 5-2 [W2A2].>
- 2) Disconnect connector from speaker.
- 3) Remove screws which secure the speaker.
- 4) Remove speaker.
- 5) Installation is in the reverse order of removal.

5. POWER ANTENNA

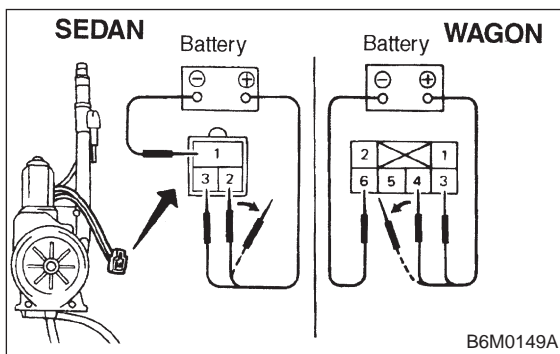
- 1) Remove left side trunk trim (SEDAN), or left side rear lower quarter trim (WAGON).
- 2) Remove special nut (SEDAN).
- 3) Remove bolt which secures power antenna.
- 4) Remove power antenna while disconnecting connector and water drain hose.



- 5) Installation is in the reverse order of removal.

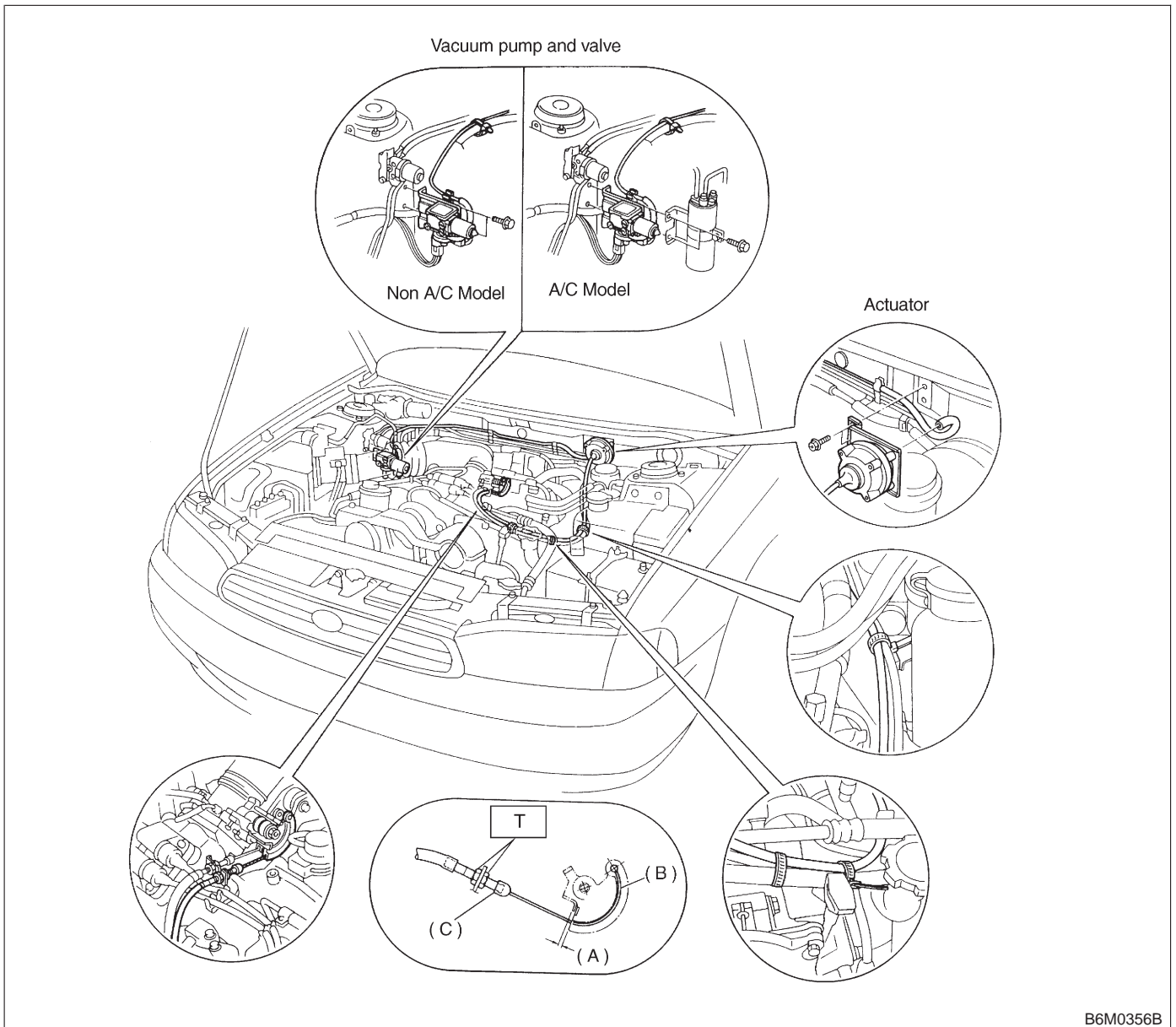
B: INSPECTION**1. POWER ANTENNA**

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



22. Cruise Control

A: ADJUSTMENT



B6M0356B

CAUTION:

(A): Must be adjusted when cable end outer is fixed in place, so that gap between throttle cam and lever is 1^{0}_{-1} mm ($0.04^{0}_{-0.04}$ in).
(Must be attached while throttle cam is being pulled by wire cable.)

(B): Must be coated evenly on cam end inner connection.

(C): Cover must be inserted securely, until tip of cable touches cover stopper.

(T): Tightening torque: N-m (kg-m, ft-lb)

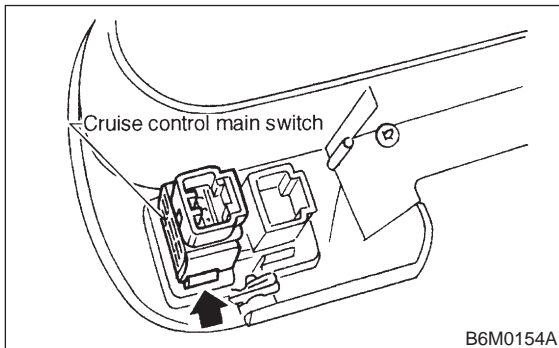
T: 6.4 — 11.3 (0.65 — 1.15, 4.7 — 8.3)

B: REMOVAL AND INSTALLATION

1. CRUISE CONTROL MAIN SWITCH

- 1) Remove screws which secure meter visor.
- 2) Remove meter visor from instrument panel while disconnecting connectors.

- 3) Remove cruise control main switch from meter visor.



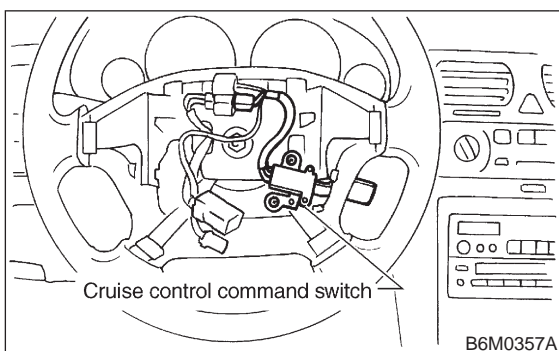
- 4) Installation is in the reverse order of removal.

2. CRUISE CONTROL COMMAND SWITCH

- 1) Remove screw which secures horn pad to the base of steering wheel.
- 2) Remove horn pad from steering wheel while disconnecting connector.
- 3) Disconnect connector of cruise control command switch.
- 4) Remove screws which secure cruise control command switch to steering wheel, and then remove command switch.
- 5) Installation is in the reverse order of removal.

WARNING:

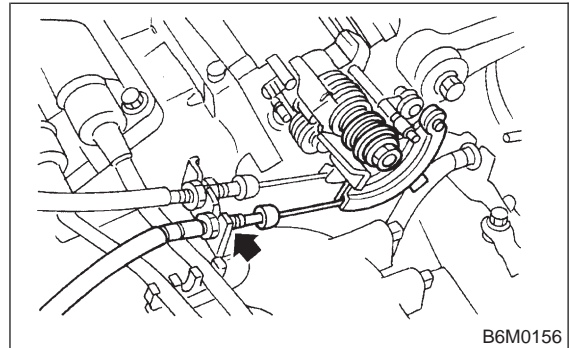
When removing or installing the module from the airbag equipped model, refer to procedure for removal or installation of airbag module. <Ref. to 5-5 [W3A1].>



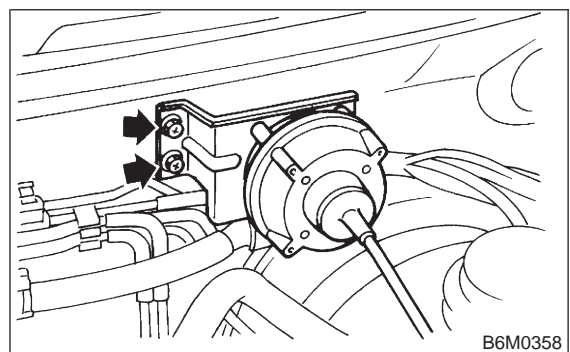
3. ACTUATOR

- 1) Loosen nut which secures cruise control cable end to throttle cam, and then remove cable from engine throttle cam.

- 2) Remove clip bands from cruise control cable.



- 3) Remove nuts which secure actuator.



- 4) Remove actuator while disconnecting vacuum hose.
- 5) Installation is in the reverse order of removal.

Tightening torque:

$7.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.15 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.1 \text{ ft}\cdot\text{lb}$)

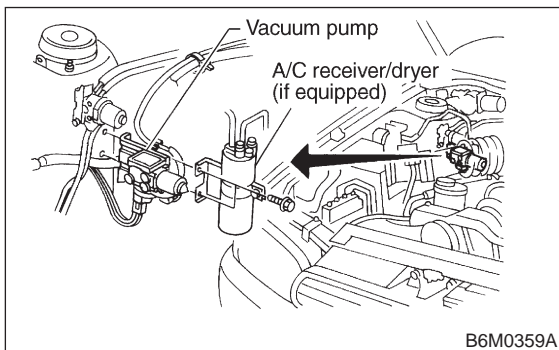
CAUTION:

- 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 mm (3.94 in); 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.

4. VACUUM PUMP AND VALVES

- 1) Disconnect connector from vacuum pump.

- 2) Remove bolts which secure vacuum pump.
- 3) Remove A/C receiver/drier bracket.



- 4) Remove vacuum pump while disconnecting vacuum hose.
- 5) Installation is in the reverse order of removal.

Tightening torque:

$7.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.15 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.1 \text{ ft}\cdot\text{lb}$)

5. STOP AND BRAKE SWITCH

Remove and install stop and brake switch. <Ref. to 4-5 [C1A0].> (MT), <Ref. to 4-5 [C1B0].> (AT)

6. CLUTCH SWITCH (MT)

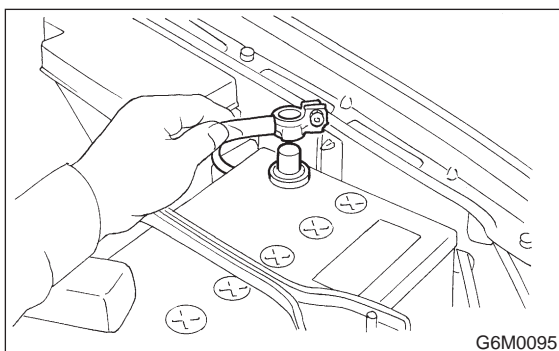
Remove and install clutch switch. <Ref. to 4-5 [C1A0].>

7. INHIBITOR SWITCH (AT)

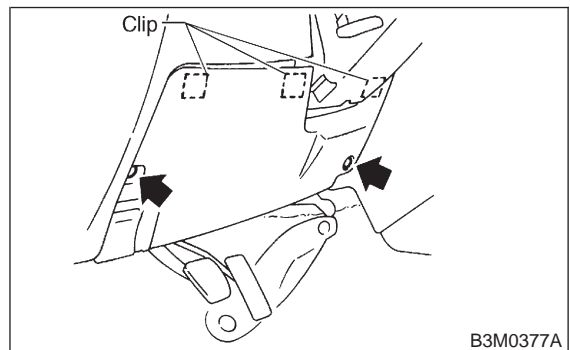
Remove and install inhibitor switch. <Ref. to 3-2 [W200].>

8. CRUISE CONTROL MODULE

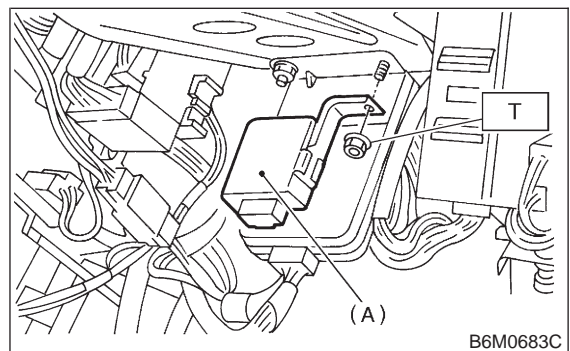
- 1) Disconnect battery ground cable.



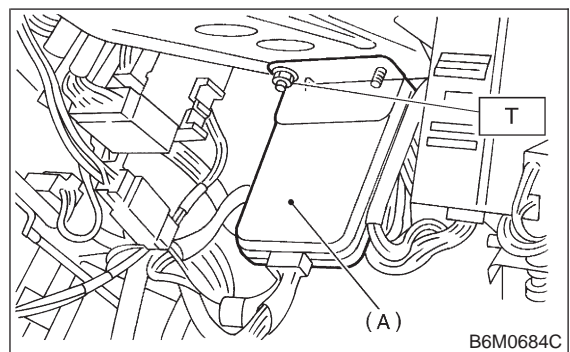
- 2) Remove lower cover and then disconnect connector.



- 3) Remove door lock timer (A) while disconnecting connector.



- 4) Remove cruise control module (A) while disconnecting connector.



- 5) Installation is in the reverse order of removal.

Tightening torque:

$7.4 \pm 2.5 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.25 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.8 \text{ ft}\cdot\text{lb}$)

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.).
- 5) Turn ignition switch ON again to ensure that indicator light remains OFF.

2. COMMAND SWITCH

- 1) Check that command switch is properly set in "SET/COAST", "RESUME/ACCEL" or "CANCEL" mode.
- 2) Also check that command 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 command switch to set in "SET/COAST" mode.
- 4) Ensure that vehicle is maintained at the speed set when command 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 command switch in RESUME/ACCEL mode, and that vehicle maintains that optional speed when command 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 command switch in SET/COAST mode, and that it maintains that optional speed when command switch is released.

NOTE:

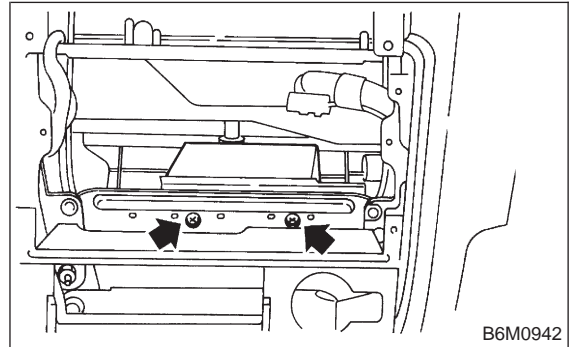
When vehicle speed reaches the lower speed limit of 30 km/h (19 MPH) during deceleration, cruise control will be released.

23. Security System

A: REMOVAL AND INSTALLATION

1. SECURITY CONTROL MODULE

- 1) Disconnect battery ground cable.
- 2) Remove radio. <Ref. to 6-2 [W21A1].>
- 3) Disconnect connector from security control module and then remove security control module.



- 4) Installation is in the reverse order of removal.

NOTE:

- To install the security control module, tighten screws securely so that the screws do not come loose.
- When installing a non-genuine radio, make sure that the radio harness does not touch the security control module.

B: INSPECTION

1. IMPACT SENSOR

Perform impact sensitivity test.
<Ref. to 6-2d [T6A18].>

- 4) Turn ignition switch OFF with main switch ON (which is indicated by illumination.).
- 5) Turn ignition switch ON again to ensure that indicator light remains OFF.

2. COMMAND SWITCH

- 1) Check that command switch is properly set in "SET/COAST", "RESUME/ACCEL" or "CANCEL" mode.
- 2) Also check that command 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 command switch to set in "SET/COAST" mode.
- 4) Ensure that vehicle is maintained at the speed set when command 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 command switch in RESUME/ACCEL mode, and that vehicle maintains that optional speed when command 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 command switch in SET/COAST mode, and that it maintains that optional speed when command switch is released.

NOTE:

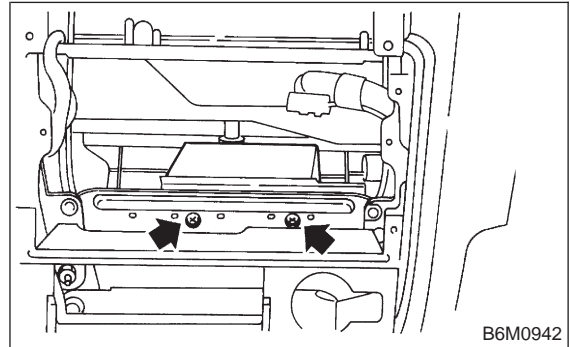
When vehicle speed reaches the lower speed limit of 30 km/h (19 MPH) during deceleration, cruise control will be released.

23. Security System

A: REMOVAL AND INSTALLATION

1. SECURITY CONTROL MODULE

- 1) Disconnect battery ground cable.
- 2) Remove radio. <Ref. to 6-2 [W21A1].>
- 3) Disconnect connector from security control module and then remove security control module.



- 4) Installation is in the reverse order of removal.

NOTE:

- To install the security control module, tighten screws securely so that the screws do not come loose.
- When installing a non-genuine radio, make sure that the radio harness does not touch the security control module.

B: INSPECTION

1. IMPACT SENSOR

Perform impact sensitivity test.
<Ref. to 6-2d [T6A18].>

24. Seat Heater

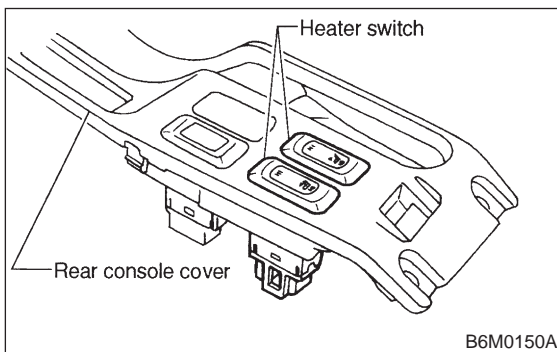
A: REMOVAL AND INSTALLATION

1. SEAT HEATER

Remove and install front seat (including heater system). <Ref. to 5-3 [W1A0].>

2. SEAT HEATER SWITCH

- 1) Remove screws which secure rear console cover, and then remove rear console cover.
- 2) Remove seat heater switch from console cover.



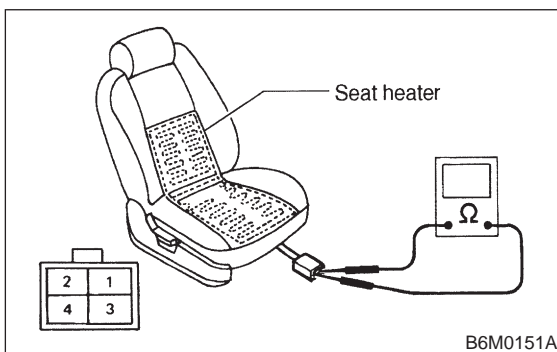
- 3) Installation is in the reverse order of removal.

B: INSPECTION

1. SEAT HEATER

Check continuity between terminals of seat heater connector:

- Between terminals No. 1 and No. 3
- Between terminals No. 1 and No. 4
- Between terminals No. 3 and No. 4



2. SEAT HEATER SWITCH

Set switch to each position and check continuity between terminals.

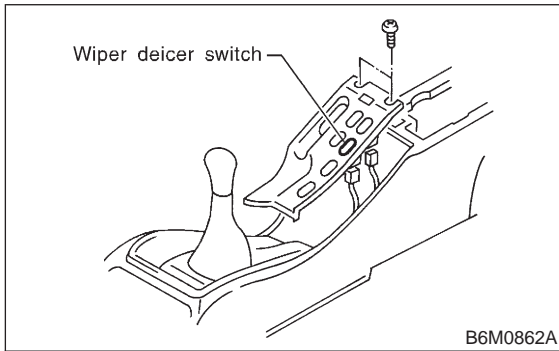
Terminal Switch	5	6	2		3	4	1
OFF				○	⊕	○	⊕
LO	○	○		○	⊕	○	⊕
HI	○		○	○	⊕	○	⊕

25. Wiper Deicer

A: REMOVAL AND INSTALLATION

1. WIPER DEICER SWITCH

- 1) Detach console cover while disconnecting connector.
- 2) Remove wiper deicer switch from console cover.

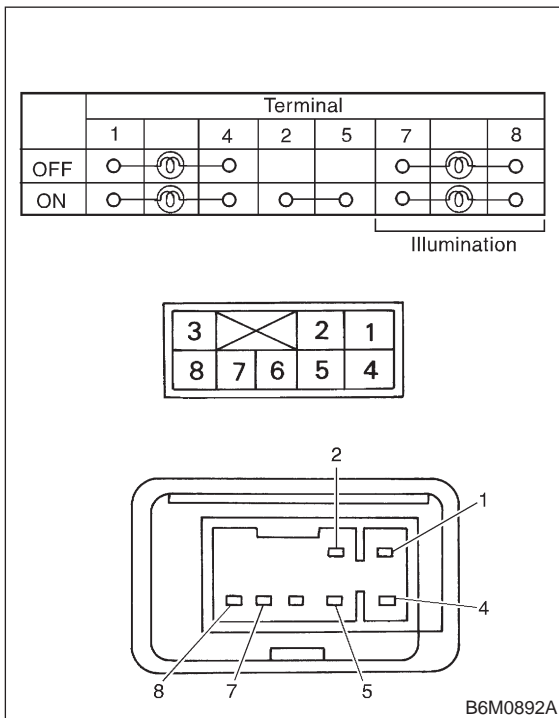


- 3) Installation is in the reverse order of removal.

B: INSPECTION

1. WIPER DEICER SWITCH

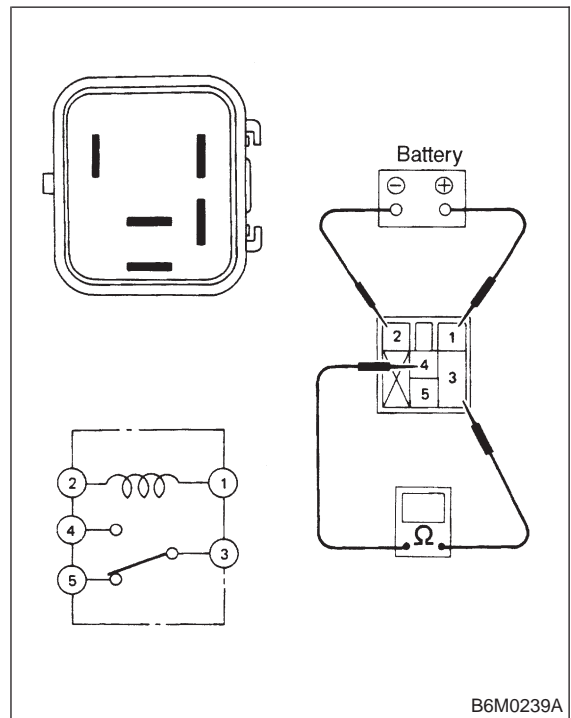
Set switch to each position and check continuity between terminals.



2. WIPER DEICER RELAY

Check continuity between terminals as indicated in table below, when connecting the battery to terminal No. 1 and No. 2.

When current flows.	Between terminals No. 3 and No. 4	Continuity exists.
When current does not flow.	Between terminals No. 3 and No. 4	Continuity does not exist.
	Between terminals No. 1 and No. 2	Continuity exists.

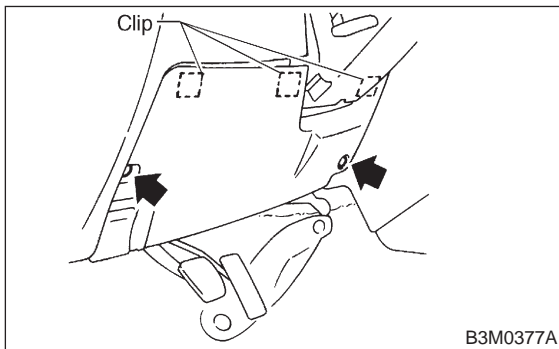


26. Keyless Entry

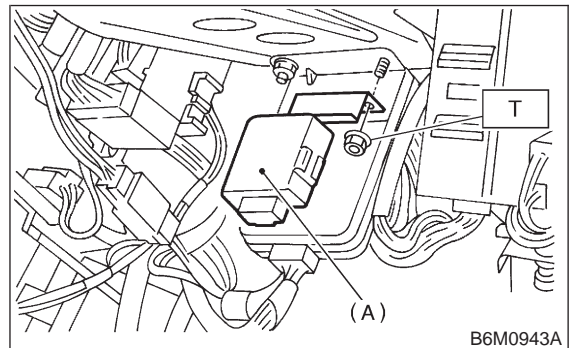
A: REMOVAL AND INSTALLATION

1. KEYLESS ENTRY CONTROL MODULE

- 1) Disconnect battery ground cable.
- 2) Remove lower cover and then disconnect connector.



- 3) Remove keyless entry control module (A) while disconnecting connector.



- 4) Installation is in the reverse order of removal.

Tightening torque:

T: 7.4 ± 2.5 N·m (0.75 ± 0.25 kg·m, 5.4 ± 1.8 ft·lb)

MEMO: