BODY ELECTRICAL SYSTEM 6-2

PRECAUTION FOR SUPPLEMENTAL RESTRAINT SYSTEM "AIRBAG"

The Supplemental Restraint System "Airbag" helps to reduce the risk or severity of injury to the driver in a frontal collision.

The Supplemental Restraint System consists of an airbag module (located in the center of the steering wheel), sensors, a control module, warning light, wiring harness and roll connector.

Information necessary to service the safety is included in the "5-5. SUPPLEMENTAL RESTRAINT SYSTEM" of this Service Manual.

WARNING:

- **To avoid rendering the Airbag system inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized SUBARU dealer.**
- **Improper maintenance, including incorrect removal and installation of the Airbag system, can lead to personal injury caused by unintentional activation of the Airbag system.**
- **All Airbag system electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the Supplemental Restraint System "Airbag".**

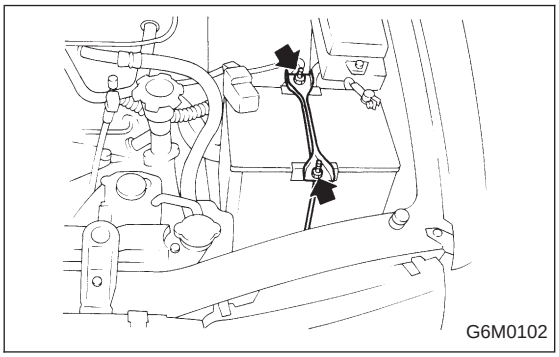
1. Body Electrical

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

1. Precaution

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

CAUTION:
● Airbag system wiring harness is routed near the electrical parts and switch.
● All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
● Be careful not to damage Airbag system wiring harness when servicing the ignition key cylinder.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2. Battery

A: REMOVAL AND INSTALLATION

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

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

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

B: INSPECTION

1. BATTERY

1) External parts

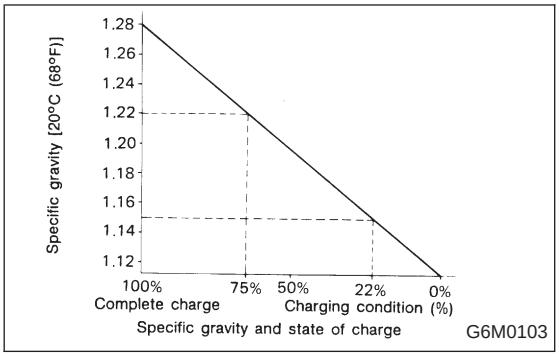
Check for the existence of dirt or cracks on the battery case, top cover, vent plugs, and terminal posts. If necessary, clean with water and wipe with a dry cloth.
Apply a thin coat of grease on the terminal posts to prevent corrosion.

2) Electrolyte level

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

WARNING:

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



3) Specific gravity of electrolyte
Measure specific gravity of electrolyte using a hydrometer and a thermometer.
Specific gravity varies with temperature of electrolyte so that it must be corrected at 20°C (68°F) using the following Equation:

S_{20} = St + 0.0007 x (t − 20)

S_{20}:Specific gravity corrected at electrolyte temperature of 20°C
St :Measured specific gravity
t :Measured temperature (°C)

Determine whether or not battery must be charged, according to corrected specific gravity.
Standard specific gravity: 1.220 — 1.290 [at 20°C (68°F)]

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

C: CHARGING

WARNING:
● Do not bring an open flame close to the battery at this time.

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

1. NORMAL CHARGING

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

2. QUICK CHARGING

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

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

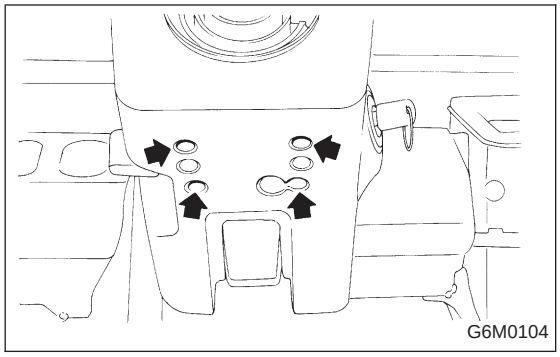
3. JUDGMENT OF BATTERY IN CHARGED CONDITION

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

4. CHECK HYDROMETER FOR STATE OF CHARGE

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

*: Check electrical system before replacement.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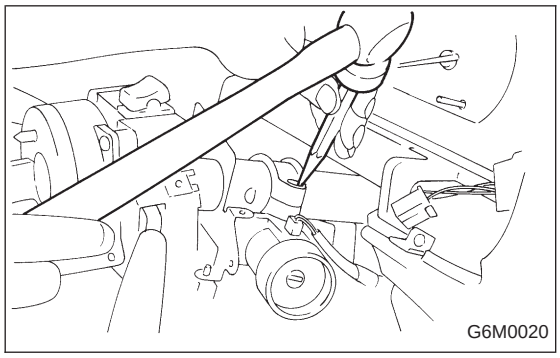
3. Ignition Key Switch

1) Remove screws, separate upper column cover and lower column cover.
2) Remove knee protector.
3) Remove meter visor.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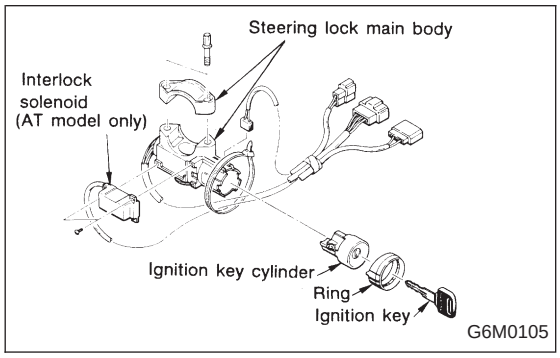
4) Disconnect ignition switch connector from body harness.
5) Using a drift and hammer, hit the torn bolt head to loosen and remove the ignition switch.



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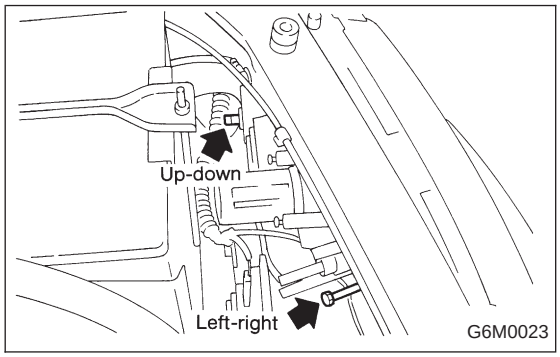
6) When installing, tighten the connecting bolt until its head twists off.



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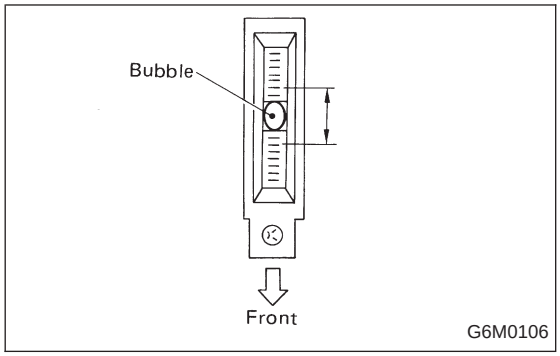
4. Lighting

A: ADJUSTMENT

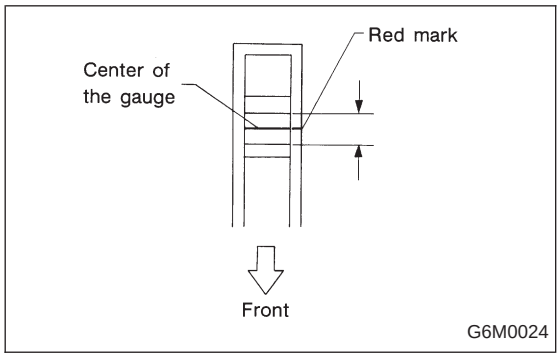
1. HEADLIGHT AIMING

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

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



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



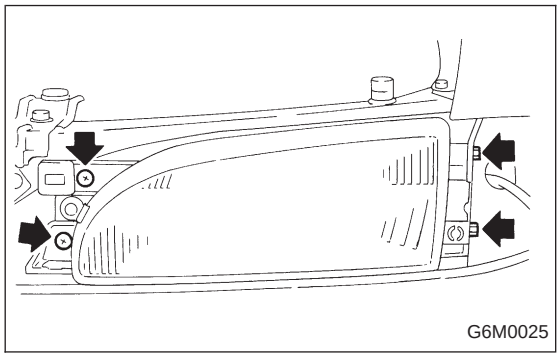
2) Look at the beam angle gauge (horizontal movement). The center mark (the red line on the inner scale) should not deviate from the red line on the outer case.

B: REMOVAL AND INSTALLATION

1. HEADLIGHT AND FRONT TURN SIGNAL LIGHT

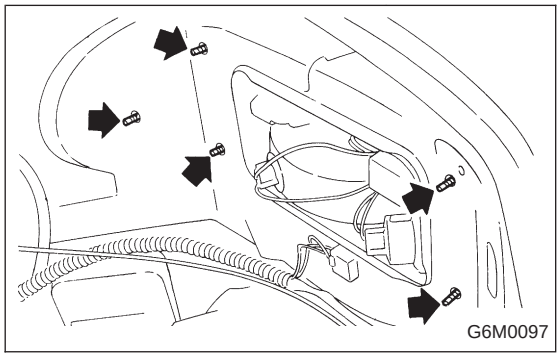
1) Remove front grille and disconnect connector from headlight.
2) Remove screws which secure front turn signal light.
3) Remove front turn signal light while disconnecting connector.

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



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

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



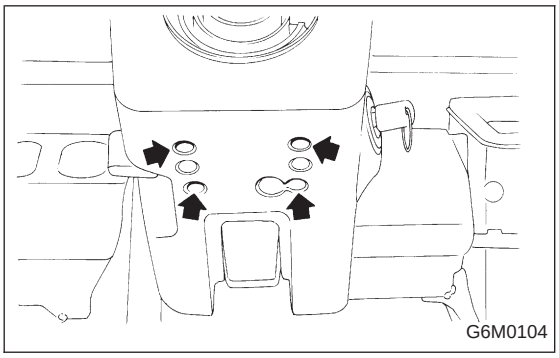
2. REAR COMBINATION LIGHT

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

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

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

CAUTION:
● Do not pry rear combination light forcefully as this may scratch vehicle body.
● Remove all traces of adhesive tape from body before installation.
● Attach butyl rubber tape to back of rear combination light before installing rear combination light on body for sealing purposes.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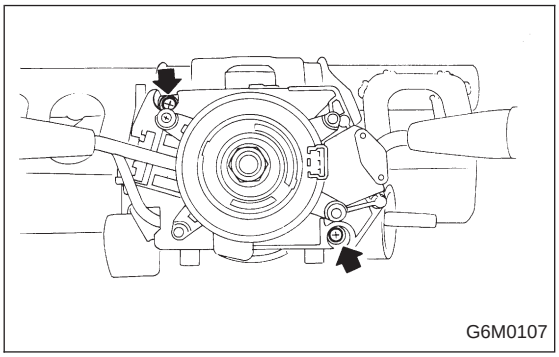
3. COMBINATION SWITCH (WITHOUT AIRBAG MODEL)

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

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

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

4) Disconnect connector from body harness and undo holddown band.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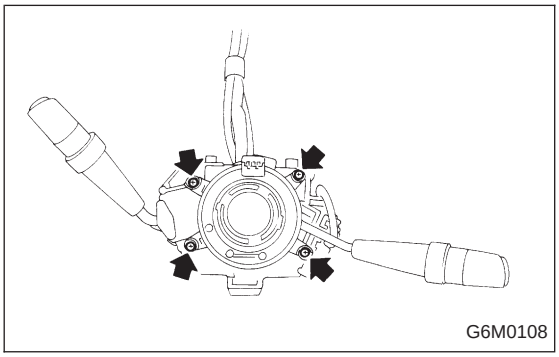
5) Remove screws which secure switch and remove switch.

CAUTION:
During installation (with key interlock)
● When routing combination switch harness around steering system, do not place it over key interlock release knob.
● After installing lower column cover, ensure that key interlock release knob is accessible.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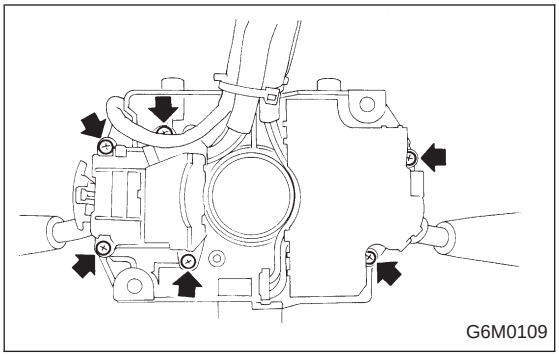
C: DISASSEMBLY AND ASSEMBLY

1. COMBINATION SWITCH

1) Remove screws which secure slip ring to combination switch, and remove slip ring.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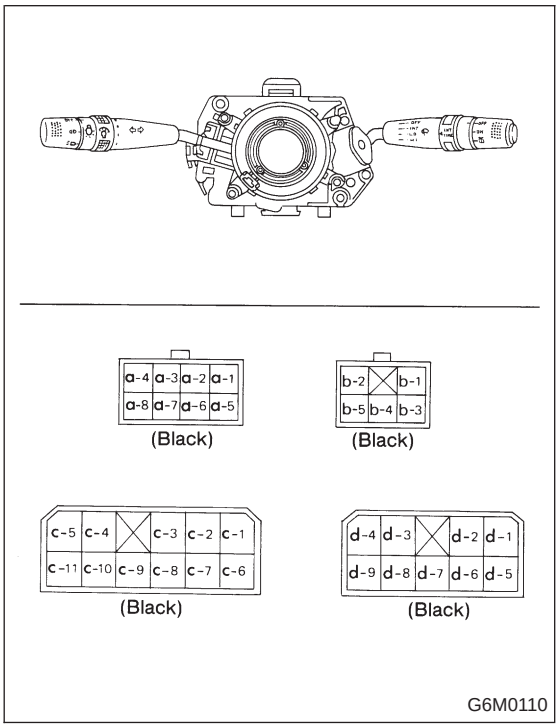
2) Remove screws which secure lighting switch, wiper and washer switch. Remove both switches.

Assembly is in the reverse order of disassembly.

D: INSPECTION

1. COMBINATION SWITCH (ON-CAR)

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



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

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

LIGHTING SWITCH

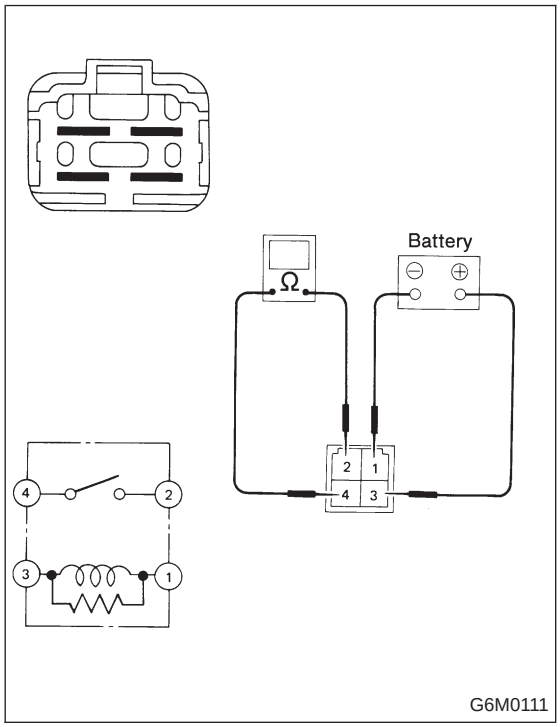
Terminal (Wire color) / Switch position	c-1 (W)	c-2 (W)	c-3 (R)
OFF			
Tail	○	○	
Head	○	○	○

PARKING SWITCH

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

DIMMER AND PASSING SWITCH

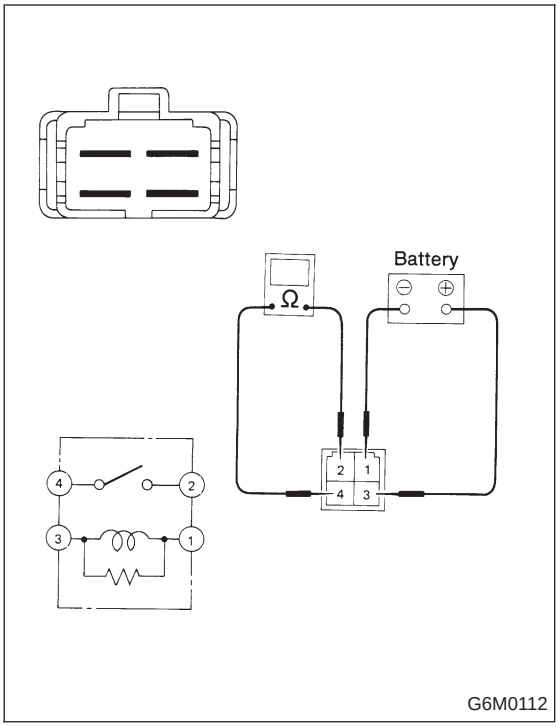
Terminal (Wire color) / Switch position	a-3 (B)	a-2 (RB)	a-1 (RY)	a-4 (YR)
Flash	○		○	○
Low beam	○	○		
HI-beam	○		○	



2. HEADLIGHT RELAY

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

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



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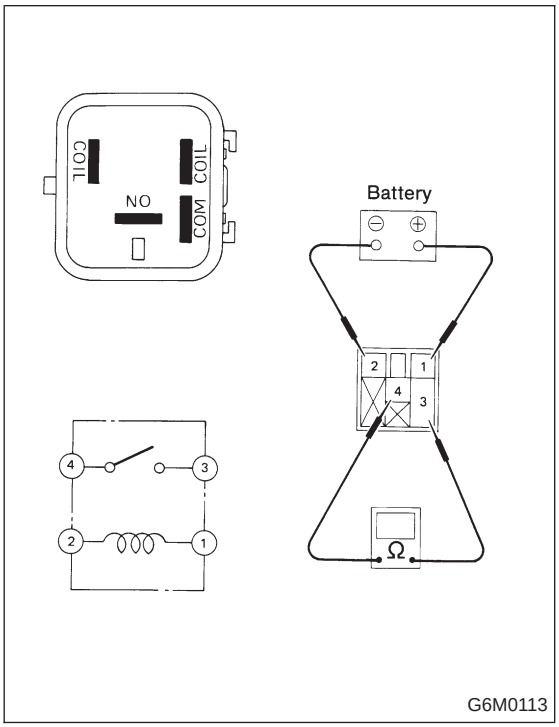
3. TAIL AND ILLUMINATION RELAY

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

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



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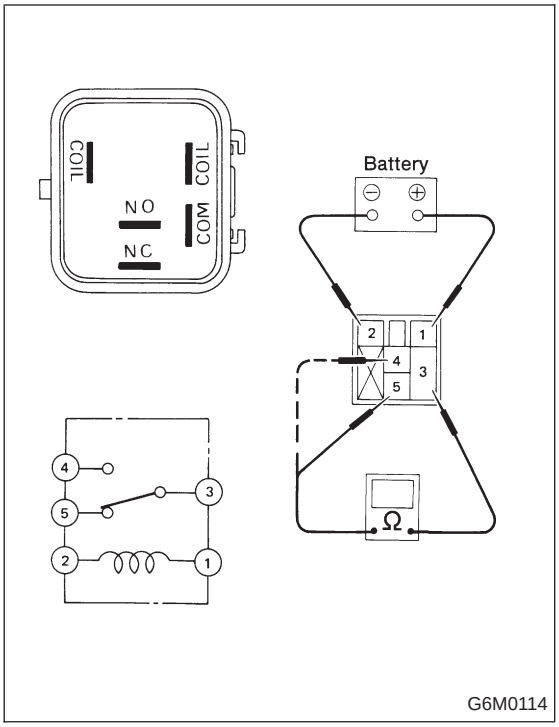
4. DAYTIME RUNNING LIGHT RELAY

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

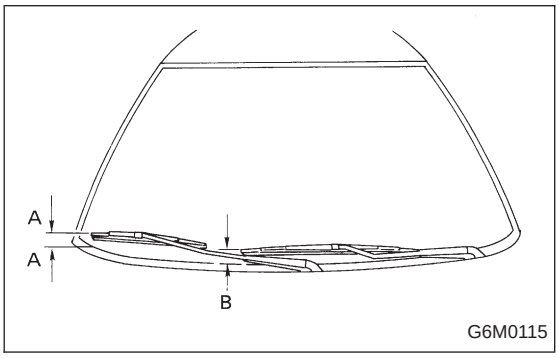
When current flows.	Between terminals (3) and (4)	Continuity exists.
When current does not flow.	Between terminals (3) and (4)	Continuity does not exist.
	Between terminals (1) and (2)	Continuity exists.



G6M0114

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

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



G6M0115

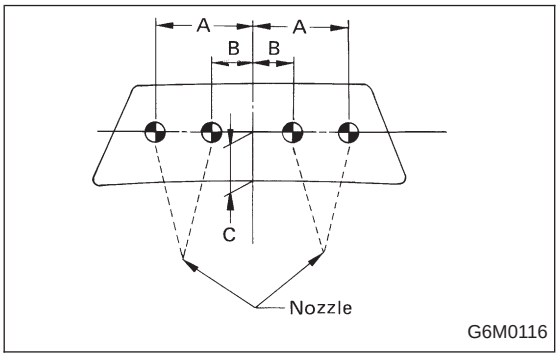
5. Front Wiper and Washer

A: ON-CAR SERVICES

1. ADJUSTMENT

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

Original position:
A: 15 — 30 mm (0.59 — 1.18 in)
B: 25 — 40 mm (0.98 — 1.57 in)



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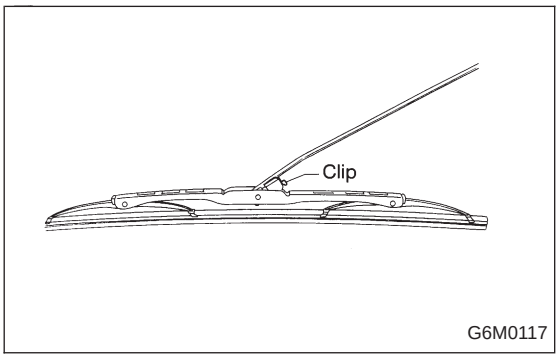
2) Adjust washer ejecting point on windshield glass as shown in figure when car stops.

Ejecting point:
A: 375 mm (14.76 in)
B: 150 mm (5.91 in)
C: 350 mm (13.78 in)

B: REMOVAL AND INSTALLATION

1. BLADE

Pull out blade from arm while pushing up clip.



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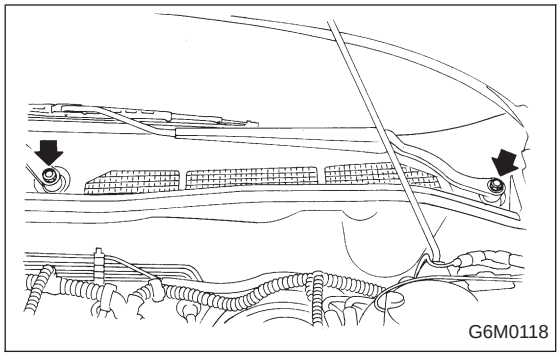

G6M0118

2. WIPER ARM

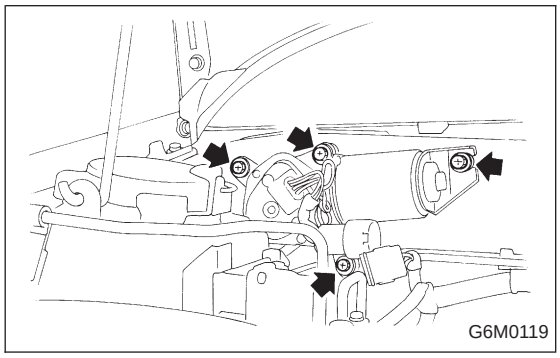
1) Open front hood.
2) Remove cap. Remove the nut which secure wiper arm, and remove wiper arm.

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

3. WIPER MOTOR AND LINK

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

NOTE:
Apply silicone oil or soap water to both sides of cowl net to facilitate removal.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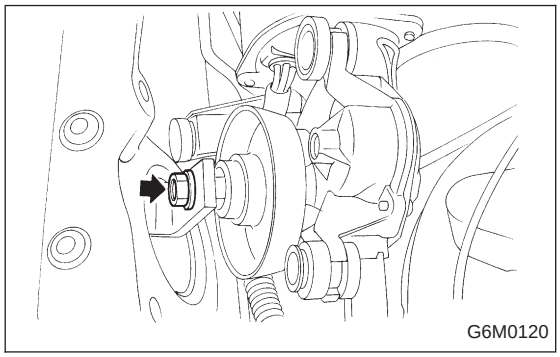
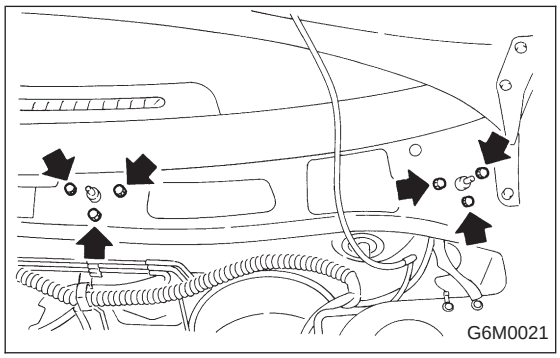
2) Disconnect electric connector, and remove motor attaching bolts.

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


G6M0120

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

Tightening torque:
12 — 18 N·m (1.2 — 1.8 kg-m, 9 — 13 ft-lb)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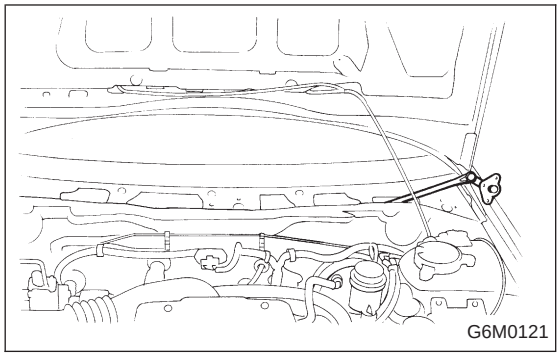
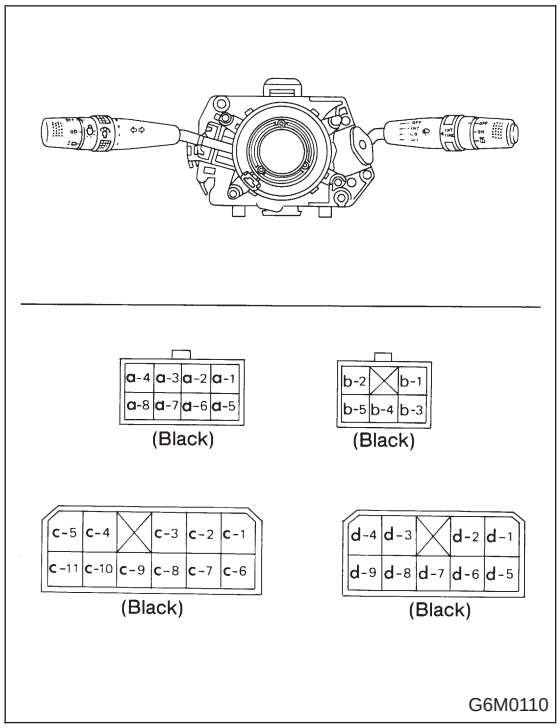
4) Remove nuts which secure sleeve unit.

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



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



C: INSPECTION

1. FRONT WIPER AND WASHER SWITCH

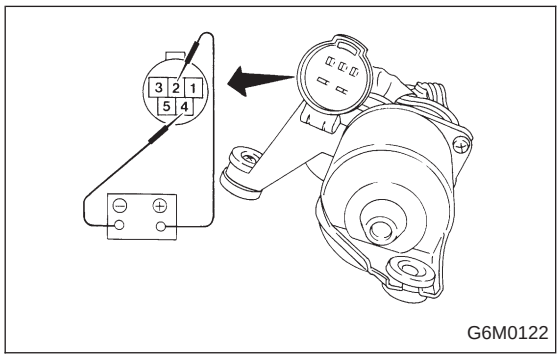
Set wiper switch to each position and check continuity between terminals (indicated in table below).

Wiper switch

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

Washer switch

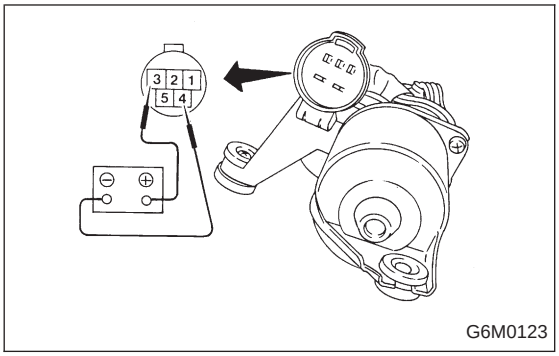
Terminal (Wire color) / Switch position	d-5 (B)	d-2 (W)
OFF		
ON	○	○



2. WIPER MOTOR

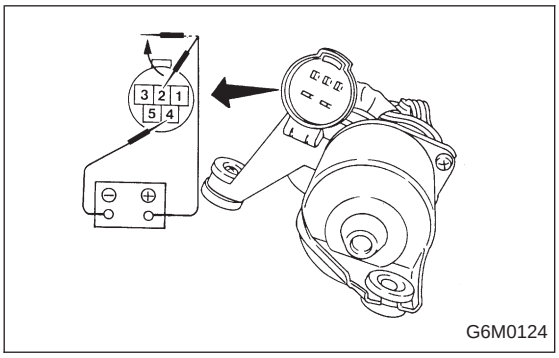
1) Check wiper motor operation at low speed.

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



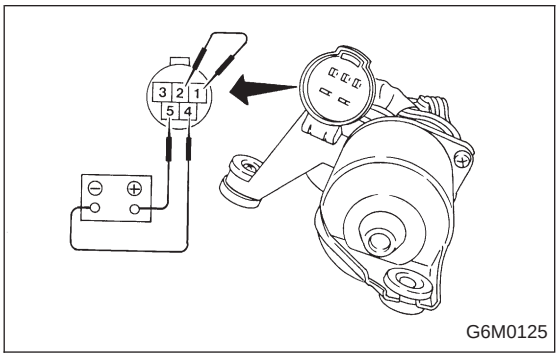
G6M0123

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



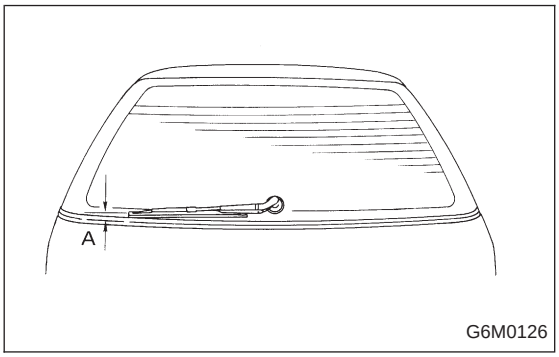
G6M0124

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



G6M0125

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



G6M0126

6. Rear Wiper and Washer

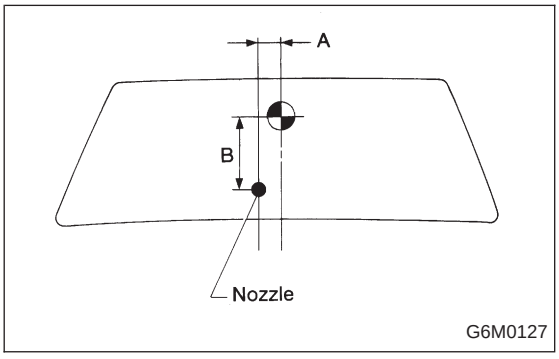
A: ON-CAR SERVICES

1. ADJUSTMENT

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

Original position:

A: 25 — 35 mm (0.98 — 1.38 in)



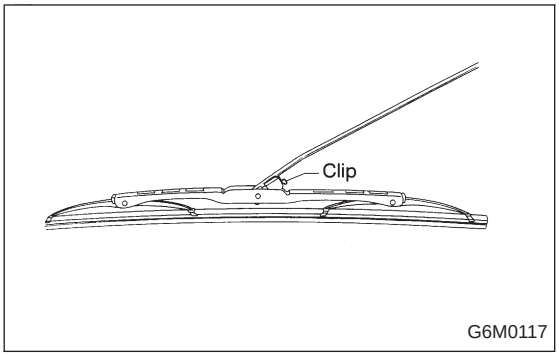
G6M0127

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

Ejecting point:

A: 25 mm (0.98 in)

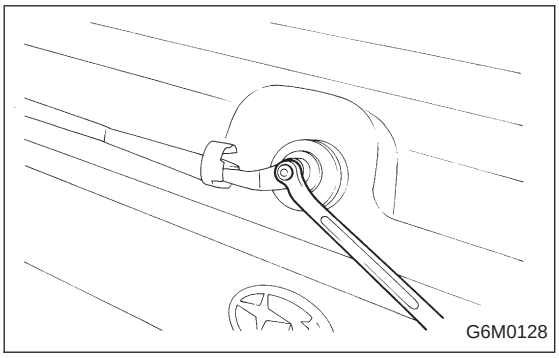
B: 200 — 300 mm (7.87 — 11.81 in)



B: REMOVAL AND INSTALLATION

1. BLADE

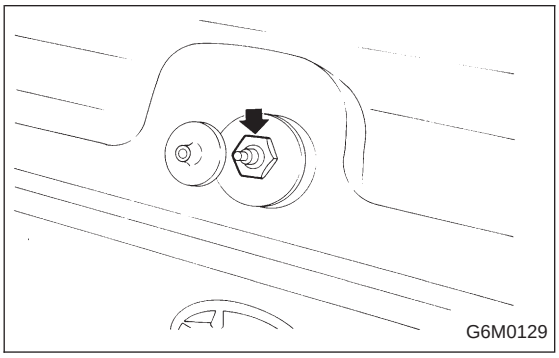
Pull out blade from arm while pushing up clip.



2. WIPER ARM

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

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



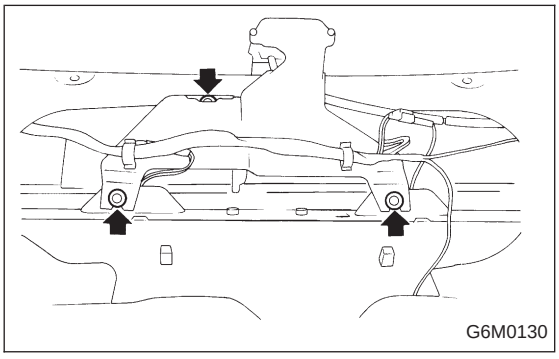
3. WIPER MOTOR

1) Remove cap and special nut.

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

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

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



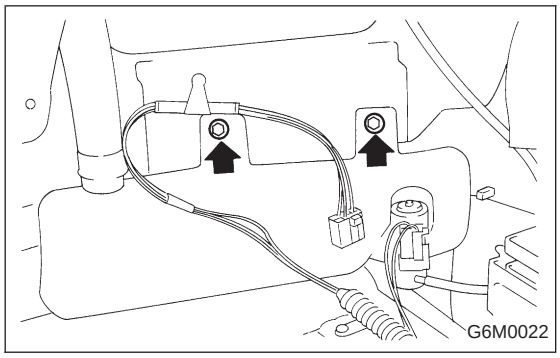
4) Separate washer hoses at joint.
5) Remove attaching screws and take out wiper motor assembly.

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

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

4. WASHER TANK

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



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

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

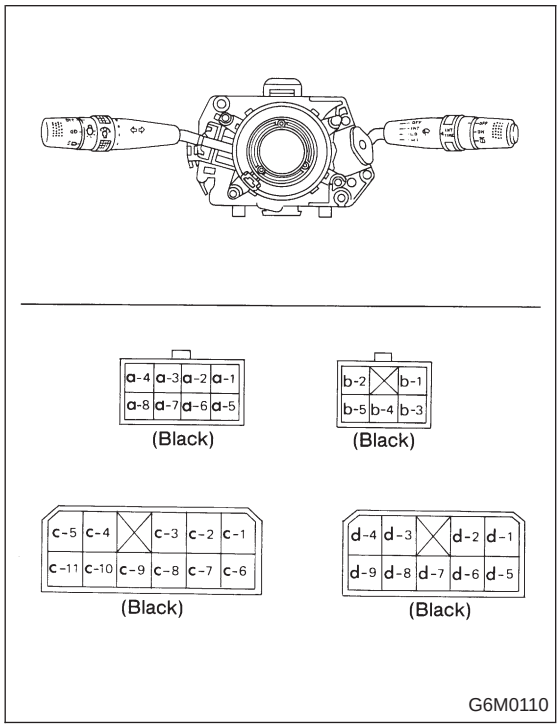
C: INSPECTION

1. REAR WIPER AND WASHER SWITCH

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

WITHOUT INTERMITTENT REAR WIPER

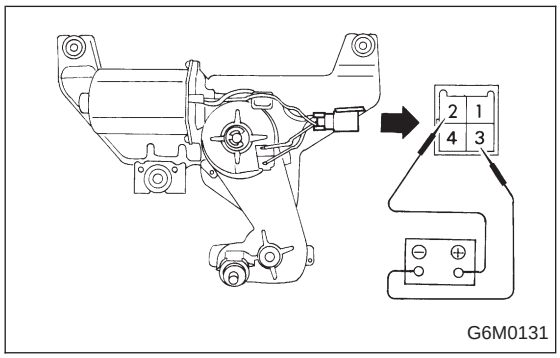
Terminal / Switch position	d-2	d-1		d-3
WASH	○	○		○
OFF				
ON	○			○
WASH	○	○		○

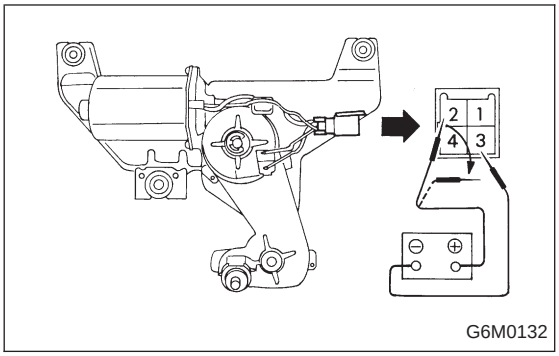


2. WIPER MOTOR

1) Operational check

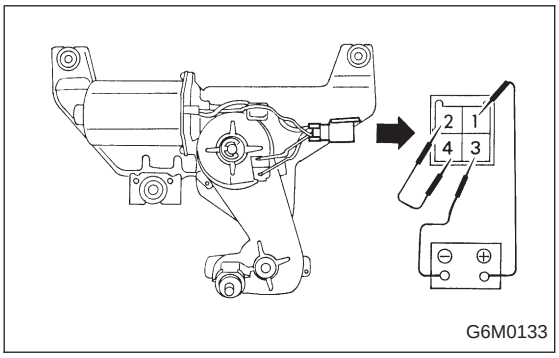
Connect battery to wiper motor and check operation of wiper motor.





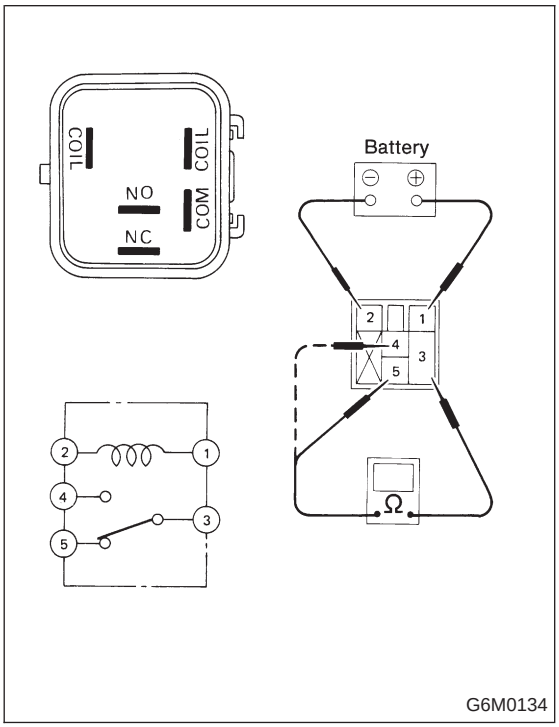
G6M0132

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



G6M0133

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

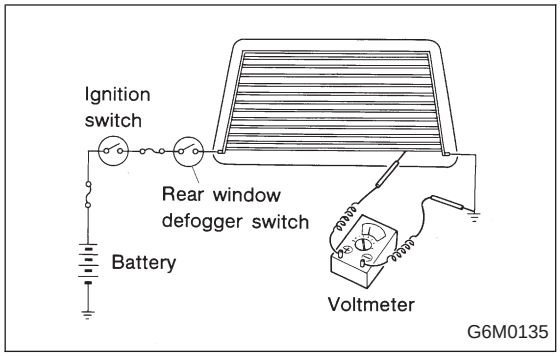


G6M0134

3. REAR WIPER RELAY

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

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

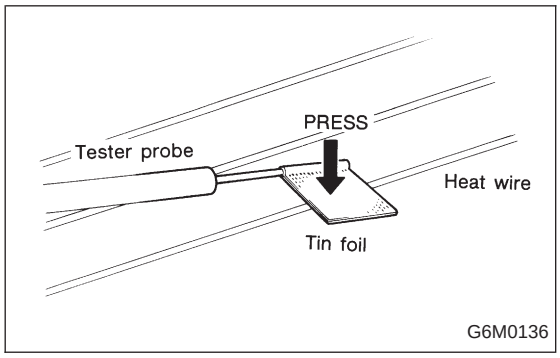


7. Rear Window Defogger

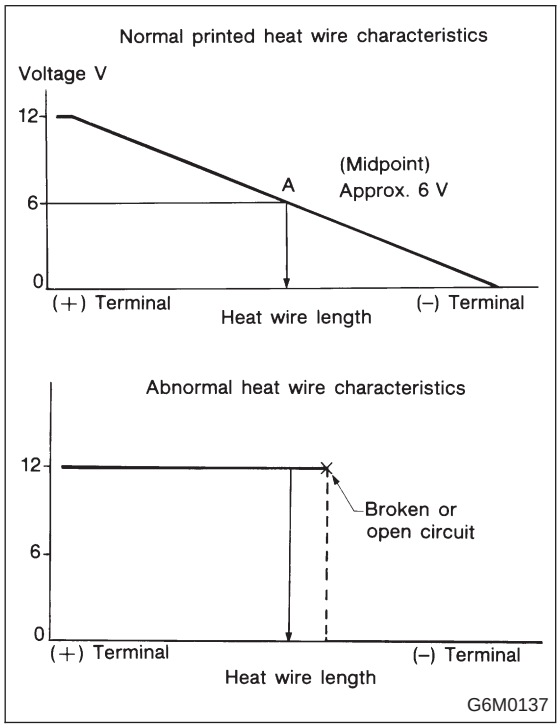
A: INSPECTION

1. HEAT WIRES

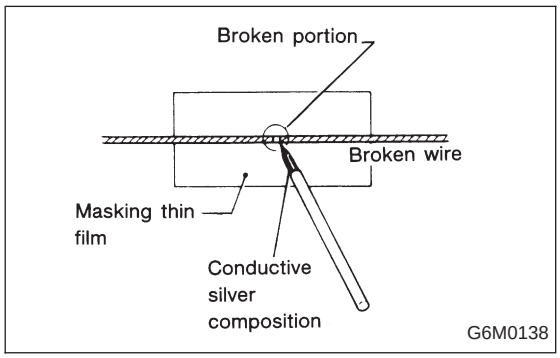
1) Start the engine so that battery is being charged.
2) Turn defogger switch ON.
3) Check each heat wire at its center position for discontinuity by setting direct current voltmeter.
Normal indication is about 6 volts.



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

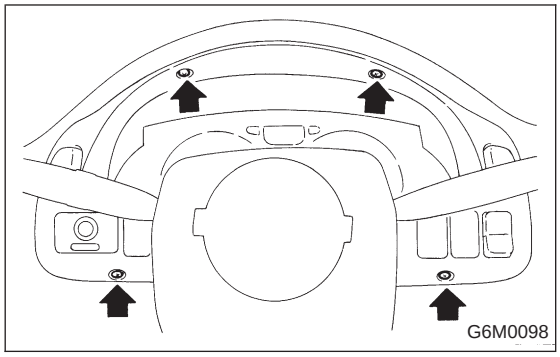


4) When tester indicates 12 volts when its probe reaches point “A”, a broken circuit occurs between point “A” and the negative terminal. Slowly move tester probe toward the negative terminal while contacting it on heat wire to locate point where tester indication changes abruptly (0 volts). This is the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



B: REPAIR

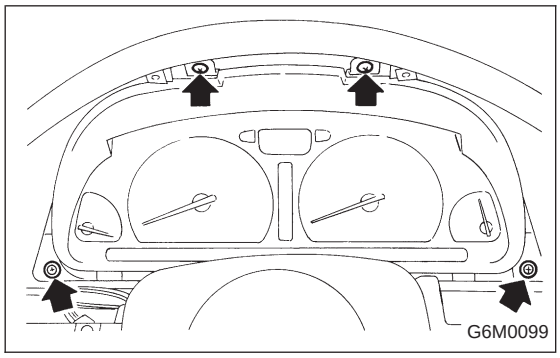
1) Clean broken wire and its surrounding area.
2) Cut off slit on (used) thin film by 0.5 mm (0.020 in) width and 10 mm (0.39 in) length.
3) Place the slit on glass along the broken wire, and deposit conductive silver composition (DUPONT No. 4817) on the broken portion.
4) Dry out the deposited portion.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



8. Combination Meter

A: REMOVAL AND INSTALLATION

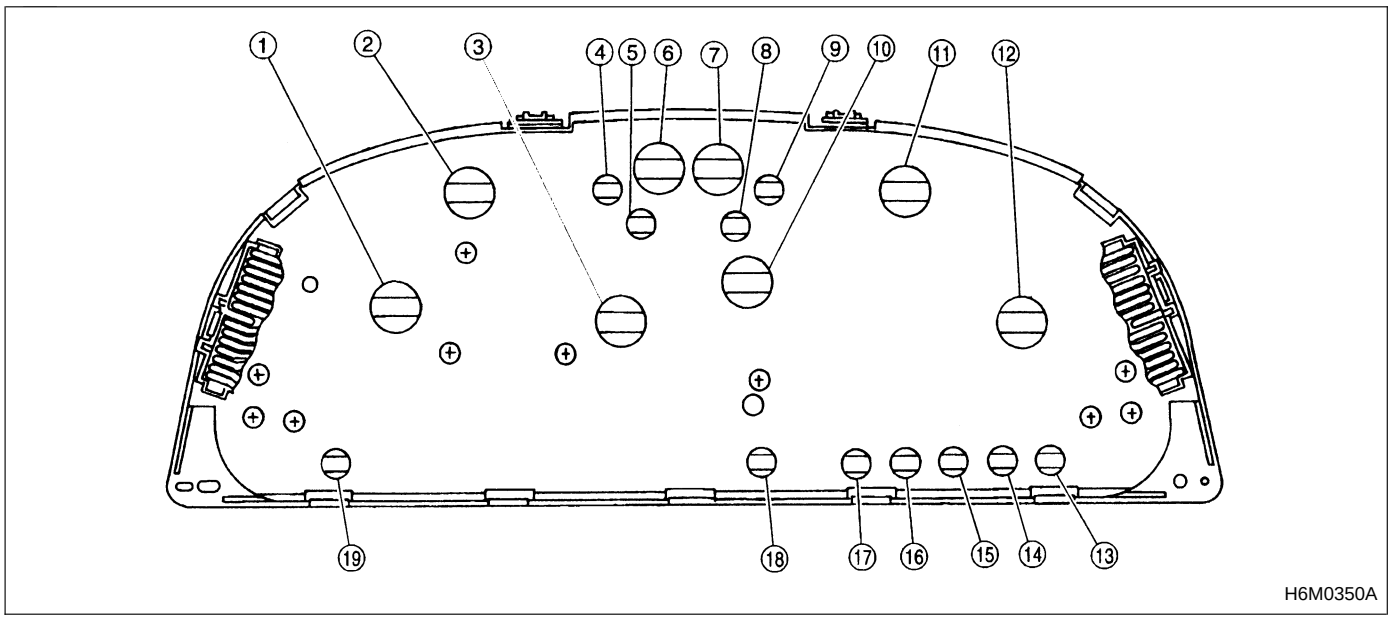
1) Move steering wheel down.
2) Remove screws which secure visor and remove visor.
3) Disconnect switch connectors.



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

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

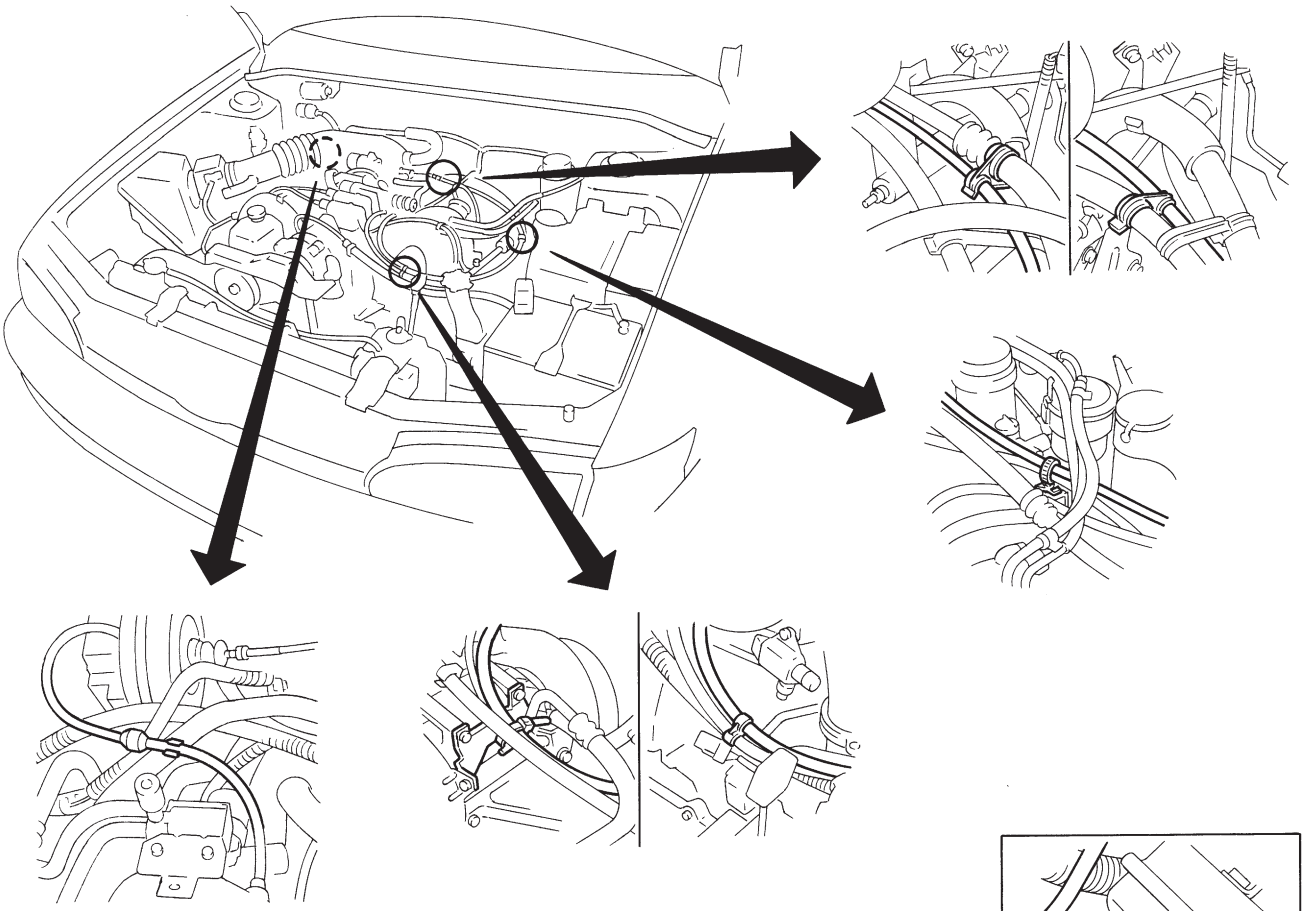
B: BULB REPLACEMENT

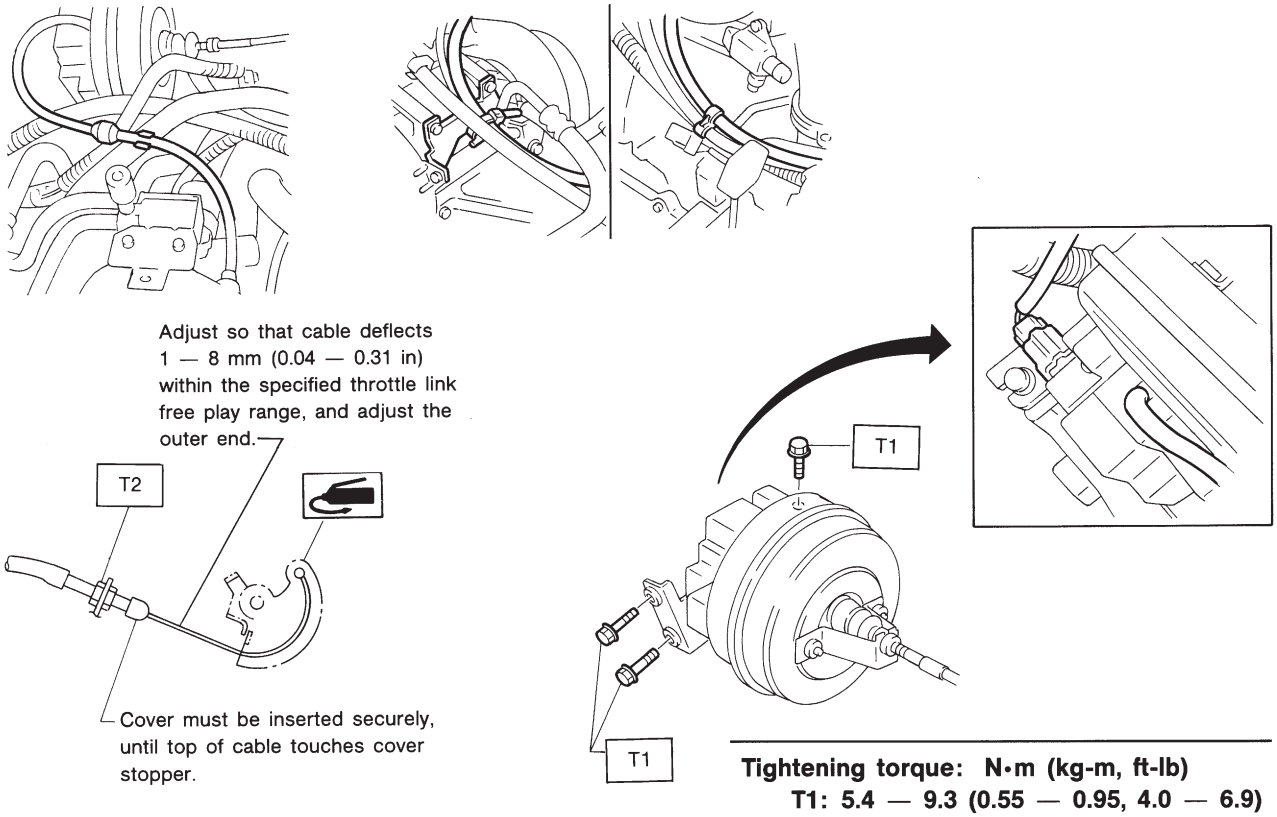


① Speedometer and fuel gauge
② Speedometer
③ Speedometer and AT indicator
④ Turn RH
⑤ Door open
⑥ Hi-beam
⑦ Brake
⑧ Seat belt
⑨ Turn LH
⑩ Tachometer and AT indicator
⑪ Tachometer
⑫ Tachometer and temperature gauge
⑬ Check engine
⑭ Charge
⑮ Oil pressure
⑯ AT oil temp.
⑰ A.B.S.
⑱ Rear defogger
⑲ FWD

9. Cruise Control AIRBAG

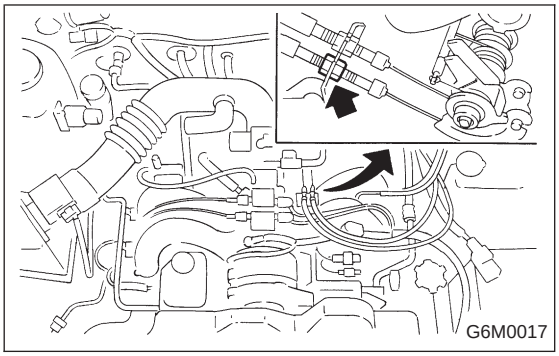
A: ADJUSTMENT





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

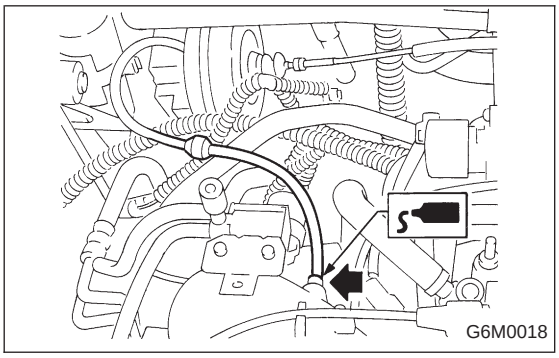
G6M0016


G6M0017

B: REMOVAL AND INSTALLATION

1. ACTUATOR

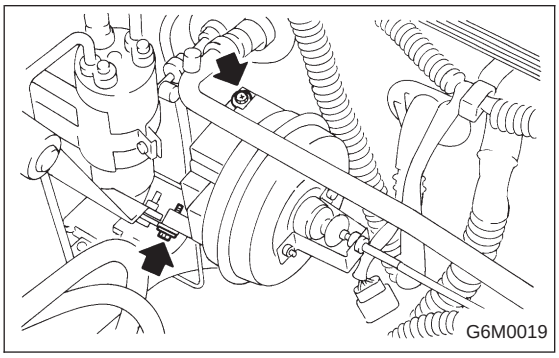
1) Remove air intake duct. Remove the nut which secures control cable end to throttle cam, and remove control cable end.
2) Remove clip bands from control cable.


G6M0018

3) Disconnect cruise control hose from intake manifold.

CAUTION:
When inserting hose into intake manifold, apply sealant to hose.

Fluid packing:
THREE BOND 1105 or equivalent


G6M0019

4) Disconnect actuator connector.
5) Remove attaching bolts and actuator.

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

CAUTION:
● Be careful not to apply excessive load to the wire cable when adjusting and/or installing; otherwise, the actuator may be deformed or damaged.
● Do not bend cable sharply with a radius less than 100; otherwise, cable may bend permanently, resulting in poor performance.
● When installing cable, be careful not to sharply bend or pinch the inner cable; otherwise, the cable may break.

2. STOP AND BRAKE SWITCH

<Ref. to 4-5.>

3. CLUTCH SWITCH

<Ref. to 4-5.>

4. CRUISE CONTROL MAIN SWITCH

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

5. CRUISE CONTROL SUB SWITCH

1) Remove horn pad.
2) Disconnect horn switch connector and remove attaching screws.

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

C: DRIVING TESTS

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

1. MAIN SWITCH

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

2. SUB SWITCH

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

3. CONSTANT SPEED TEST

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

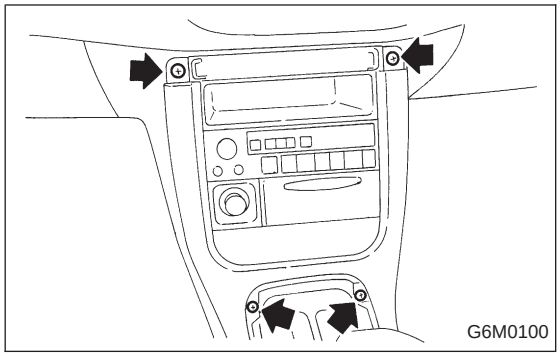
4. ACCELERATION TEST

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

5. DECELERATION TEST

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

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

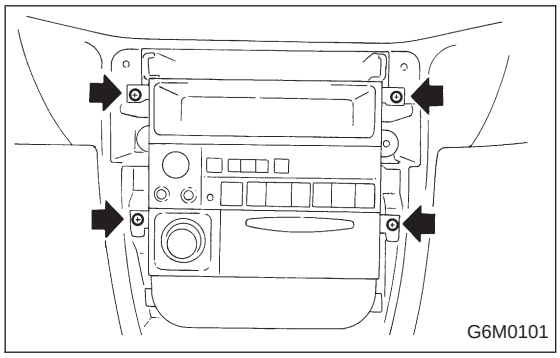


10. Radio, Speaker and Antenna

A: REMOVAL AND INSTALLATION

1. RADIO BODY

1) Remove cup holder.
2) Remove AT cover (AT model).
3) Remove screws which secure center panel. Remove center panel.



4) Remove fitting screws, and slightly pull radio out of instrument panel.
5) Disconnect electric connectors and antenna feeder cord.

2. FRONT SPEAKER

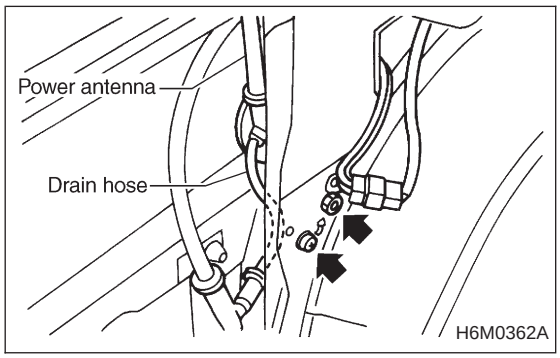
1) Remove door trim and disconnect connector. <Ref. to 5-2.>
2) Remove screws which secure front speaker. Remove speaker.

3. REAR SPEAKER (WAGON)

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

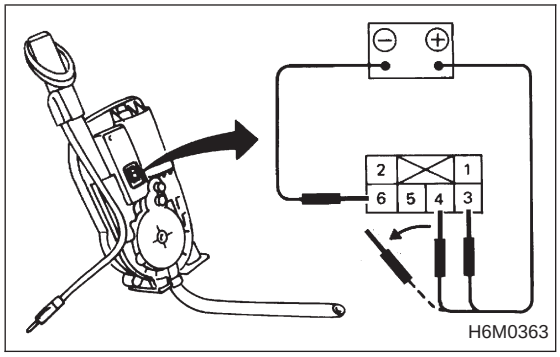
4. REAR SPEAKER (SEDAN)

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



5. POWER ANTENNA

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



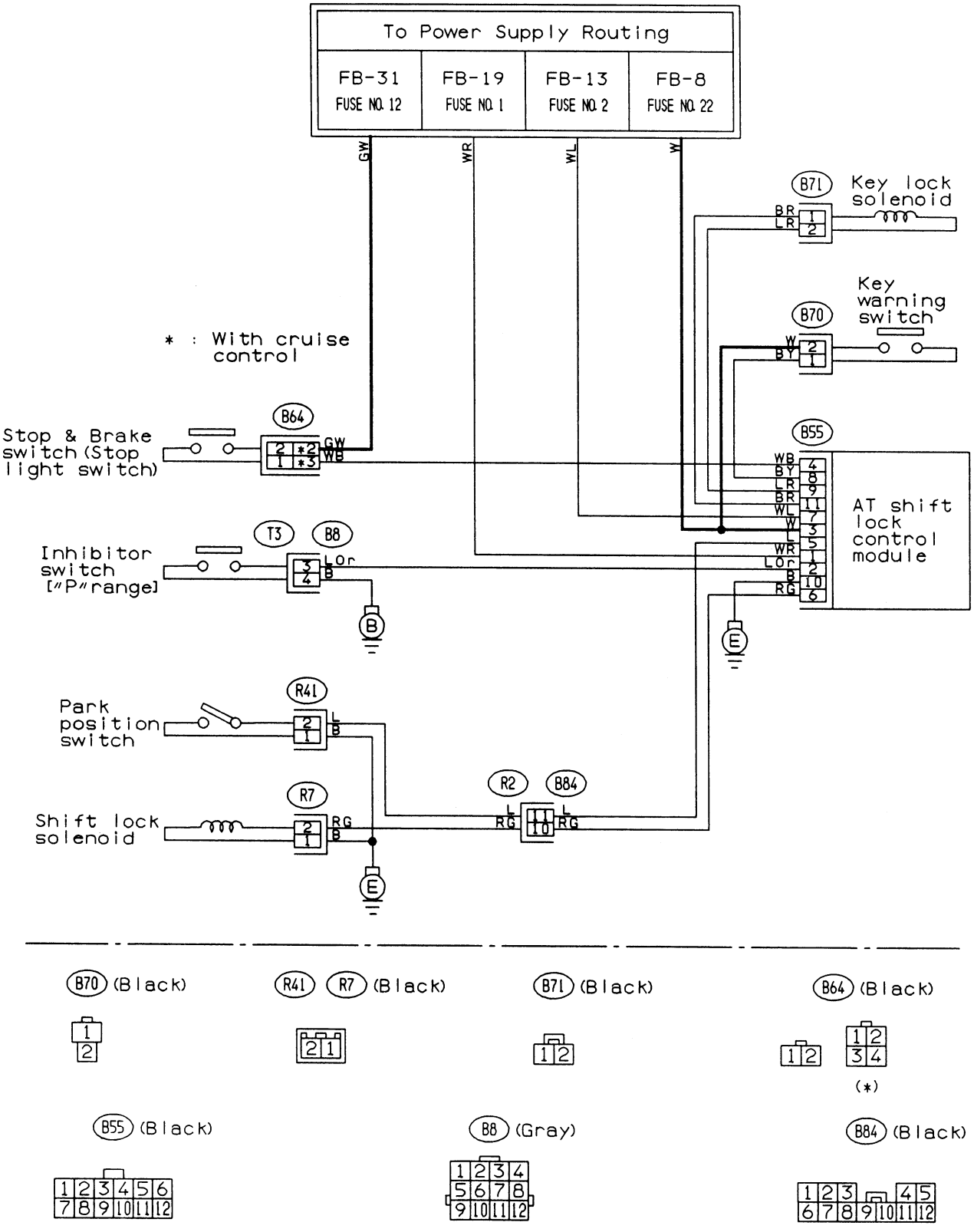
B: INSPECTION

1. POWER ANTENNA

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

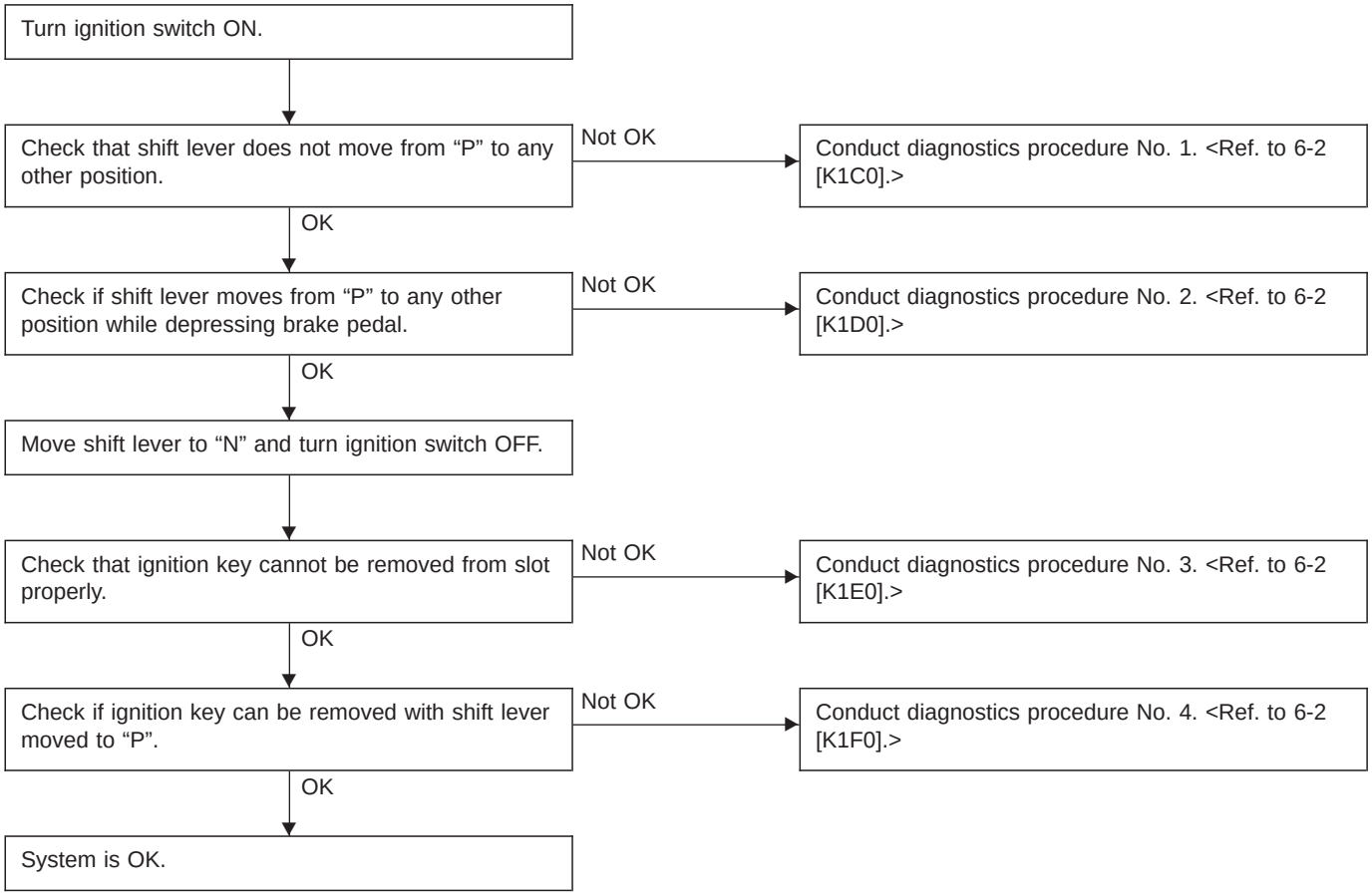
1. AT Shift Lock System

A: WIRING DIAGRAM

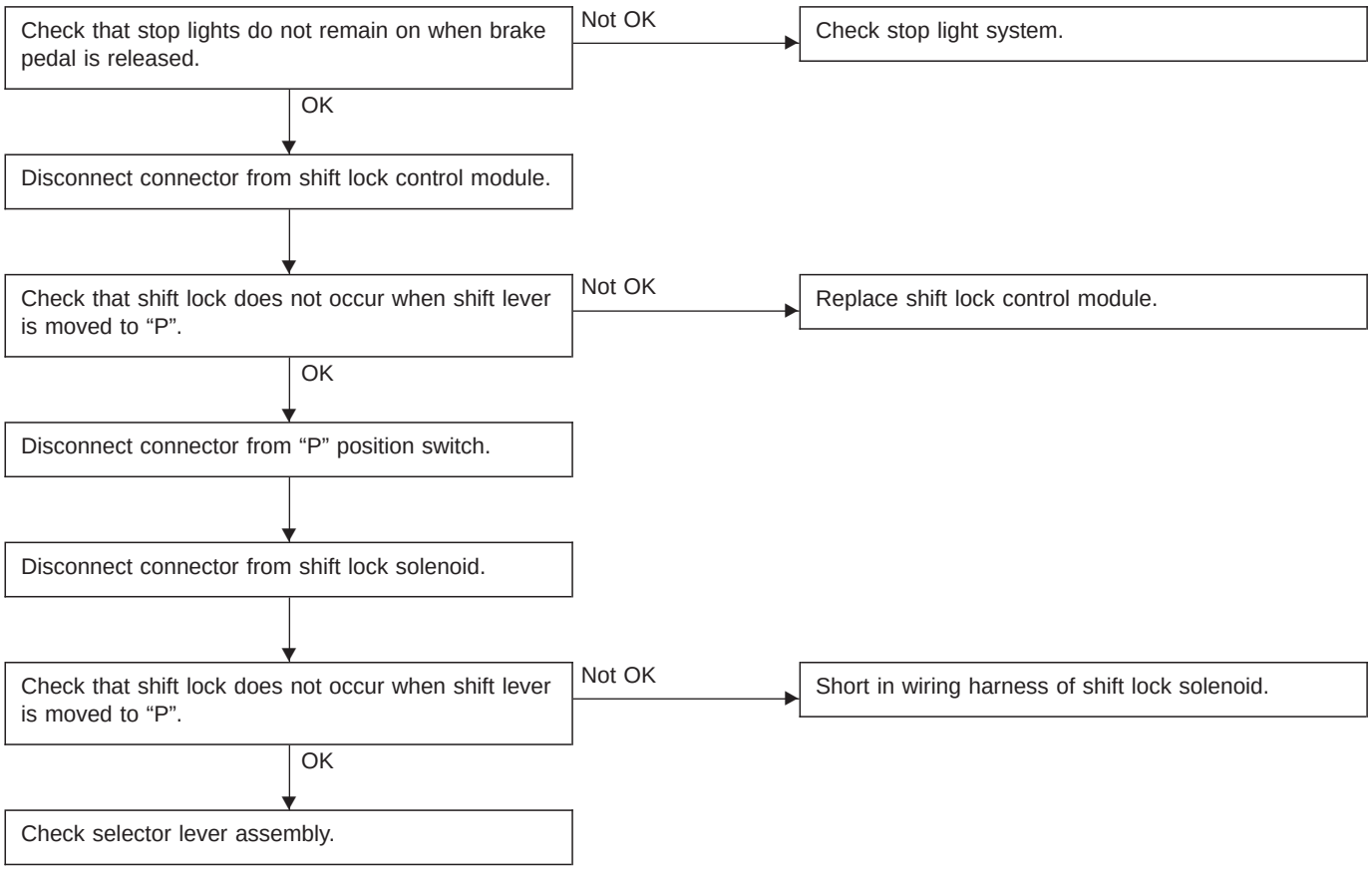


GU42-02

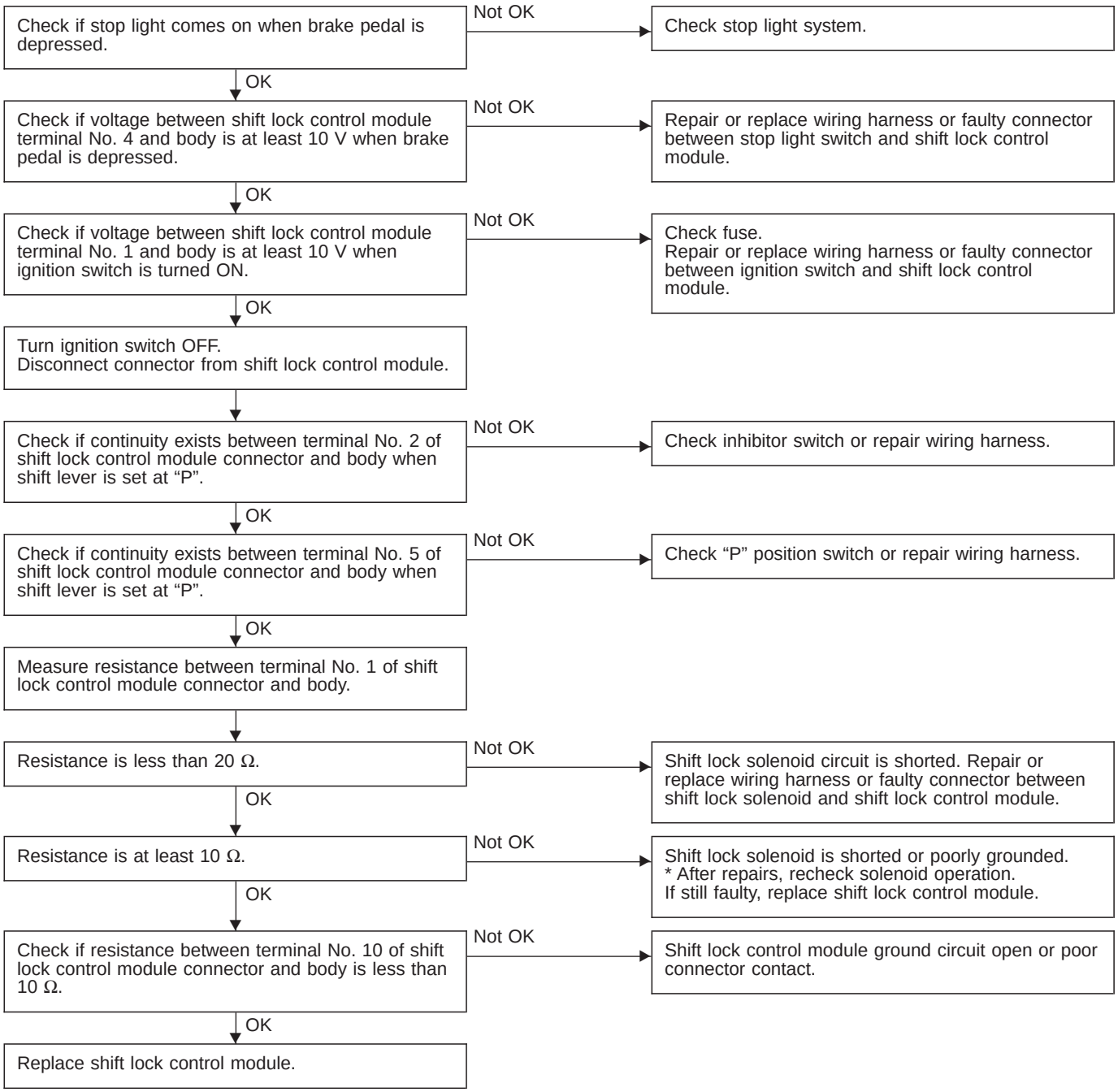
B: BASIC DIAGNOSTICS CHART



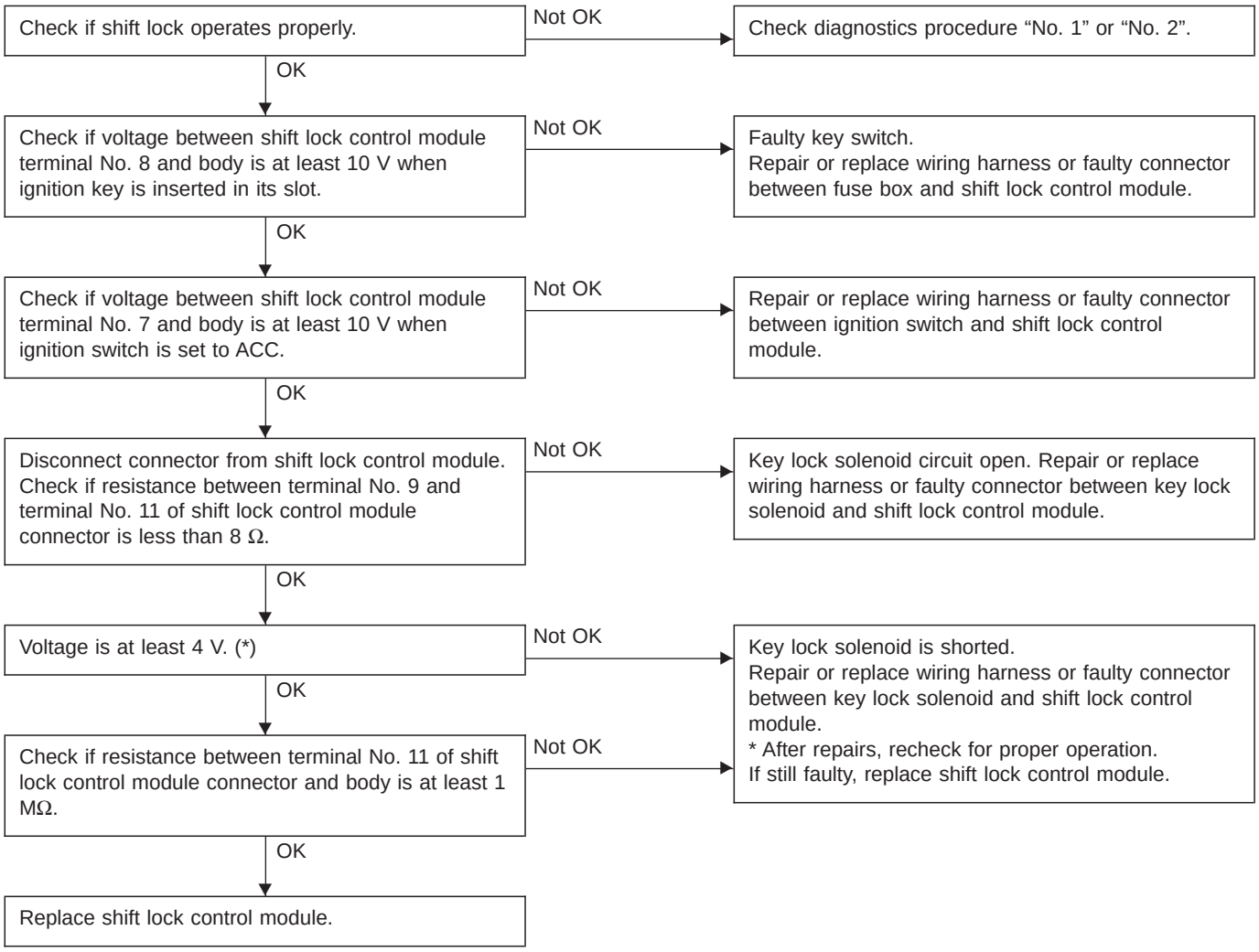
C: DIAGNOSTICS PROCEDURE No. 1



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

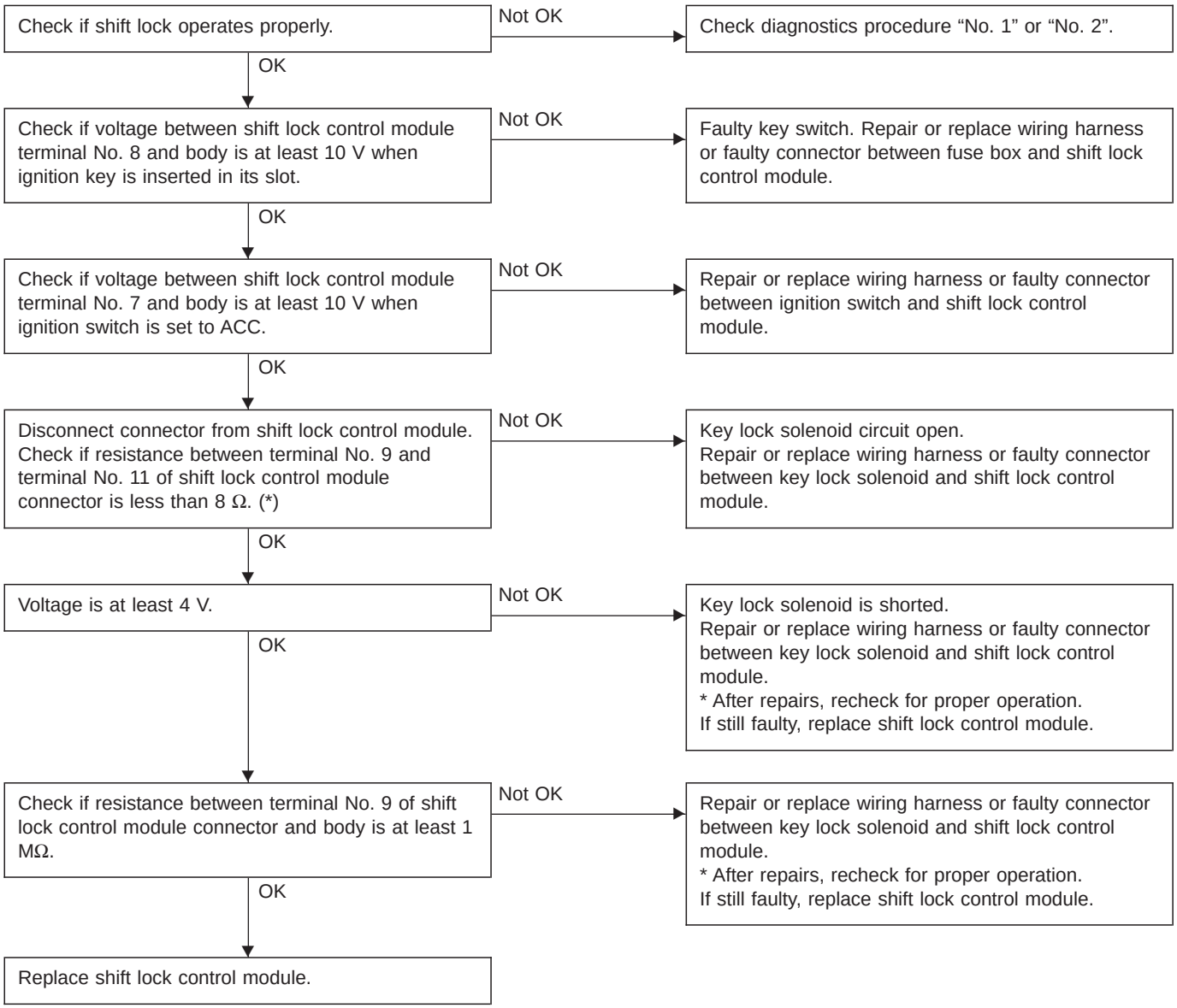


E: DIAGNOSTICS PROCEDURE No. 3 (KEY INTERLOCK DOES NOT OPERATE.)



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

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



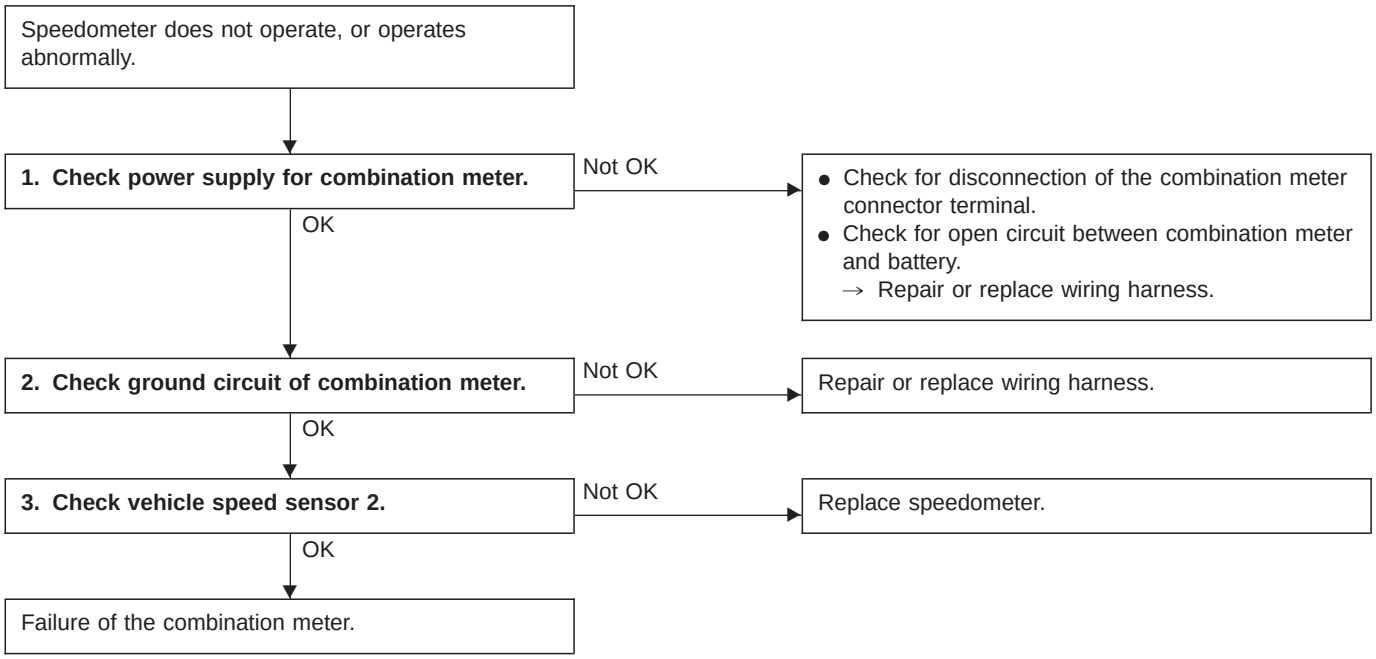
***: When conducting operational checks of the key lock solenoid, do not apply 12 V to solenoid for more than one second, since this may break solenoid circuit.**

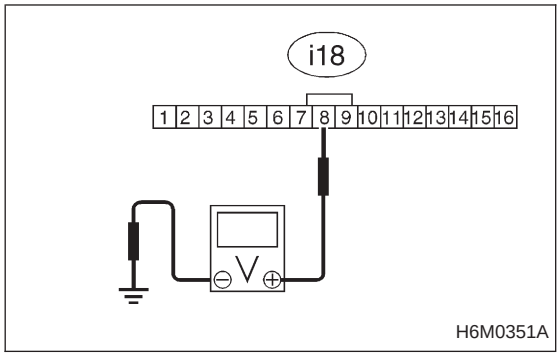
2. Combination Meter

A: DIAGNOSTICS PROCEDURE

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

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

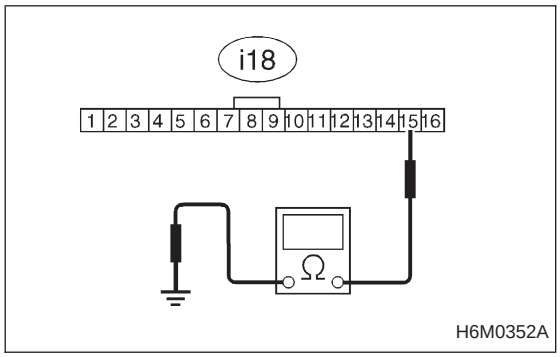




1. CHECK POWER SUPPLY FOR COMBINATION METER.

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

Connector & terminal / Specified voltage:
(i18) No. 8 — Body / 10 V, or more



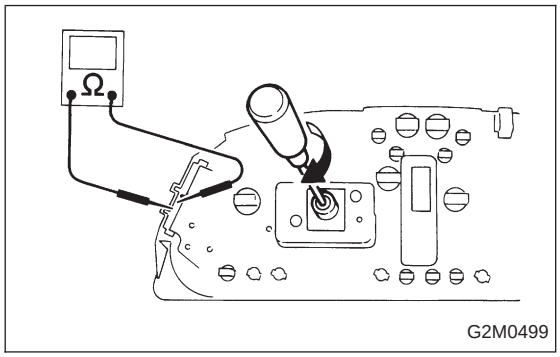
2. CHECK GROUND CIRCUIT OF COMBINATION METER.

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

Connector & terminal / Specified resistance:
(i18) No. 15 — Body / 10 Ω, max.

3. CHECK VEHICLE SPEED SENSOR 2.

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



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

Terminals / Specified resistance:
No. 8 — No. 15 / 10 Ω, max. ↔ 1 MΩ, min.
(Four times per rotation)

DIAGNOSTICS SECTION

FOREWORD

This portion of the service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
The diagnostics relating to the Electronic Control System which is made up of various electronic components (ECM's etc.) are explained in this manual.
For the repair or exchange of defective parts, please refer to the SERVICE MANUAL (Repair Section).
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

Important safety notice

- Providing appropriate service and repair is a matter of great importance in the serviceman's safety maintenance and safe operation, function and performance which the SUBARU vehicle possesses.
- In case the replacement of parts or replenishment of consumables is required, genuine SUBARU parts whose parts numbers are designated or their equivalents must be utilized.
- It must be made well known that the safety of the serviceman and the safe operation of the vehicle would be jeopardized if the used any service parts, consumables, special tools and work procedure manuals which are not approved or designated by SUBARU.

How to use this manual

- This Service Manual is divided into four volumes by section so that it can be used with ease at work. Refer to the Table of Contents, select and use the necessary section.

  - GENERAL INFORMATION SECTION
  - REPAIR SECTION
  - DIAGNOSTICS SECTION
  - WIRING DIAGRAM SECTION

- The description of each area is provided with four types of titles different in size as shown below. The Title No. or Symbol prefixes each title in order that the construction of the article and the flow of explanation can be easily understood.

  [Example of each title]

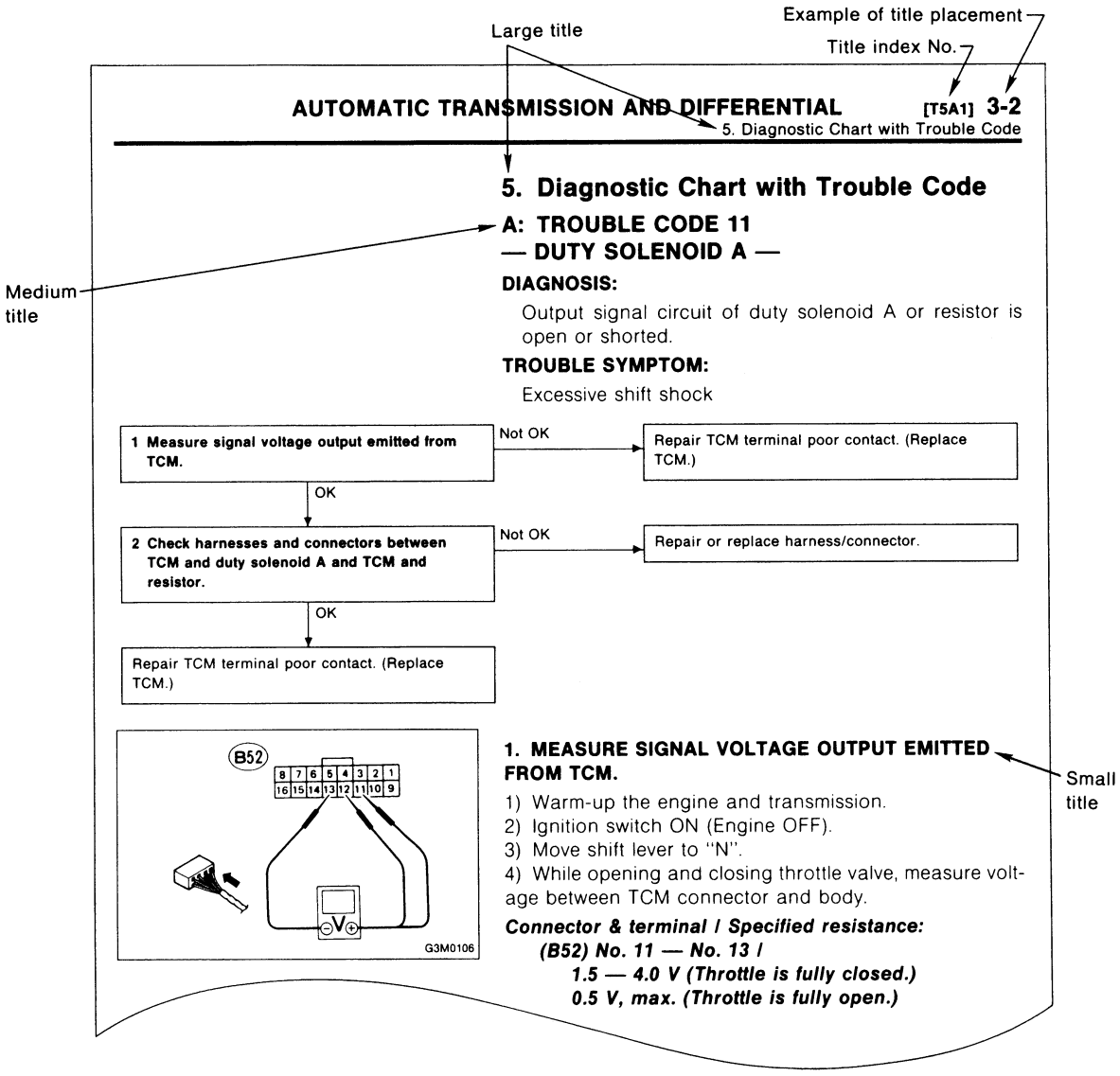
  - Area title: T. DIAGNOSTICS
  - Large title (Heading): 1. Diagnostics Chart with Select Monitor
    (to denote the main item of explanation)
  - Medium title (Section): A: BASIC DIAGNOSTICS CHART
    (to denote the type of work in principle)
  - Small title (Sub-section): 1. CHECK INPUT SIGNAL FOR ECM
    (to denote a derivative item of explanation)

- The Title Index No. is indicated on the top left (or right) side of the page as the book is opened. This is useful for retrieving the necessary portion.

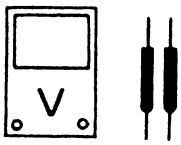
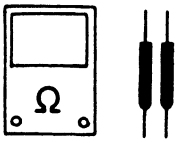
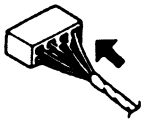
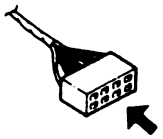
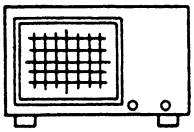
(Example of usage)

Refer to 3 - 2 [T 5 A 0]

- Small title (Sub-section)
- Medium title (Section)
- Large title (Heading)
- DIAGNOSTICS
- Chapter no.



- In this manual, the following symbols are used.

	Circuit tester Voltage measurement
	Circuit tester Resistance measurement
	The arrow indicates that insertion of the probe or numbering of the connector pins is made from the side indicated.
	The arrow indicates that insertion of the probe or numbering of the connector pins is made from the side indicated.
	Oscilloscope
	Oscilloscope probe

- WARNING, CAUTION, NOTE
  - WARNING: Indicates the item which must be observed precisely during performance of maintenance services in order to avoid injury to the mechanics and other persons.
  - CAUTION: Indicates that item which must be followed precisely during performance of maintenance services so as to avoid damage and breakage to the vehicle and its parts and components.
  - NOTE: Indicates the hints, knacks, etc. which make the maintenance job easier.

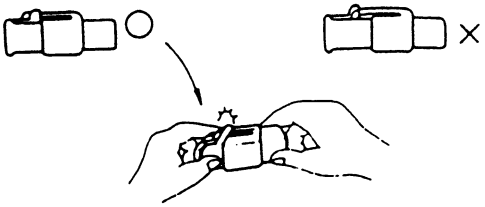
Basic checks

DISCONNECTING CONNECTORS

- Always hold the connector itself.

CAUTION:
Don't pull the harness.

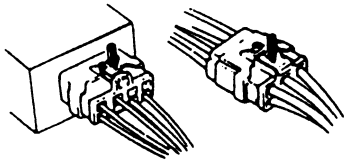
- Insert a connector by pushing it all the way in. If the connector is equipped with a locking device, push it in until a clicking sound is heard.



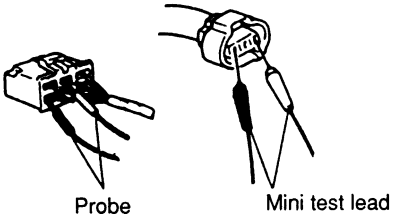
- To disconnect a locking connector, first re-lease the lock, then pull the connector off.

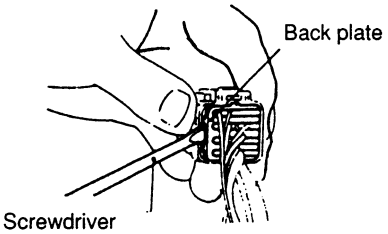
<Unlock by pulling the locking tab>

<Unlock by pushing the locking tab>



INSERTING A PROBE

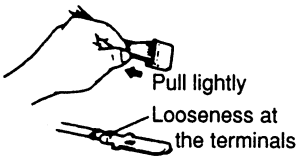


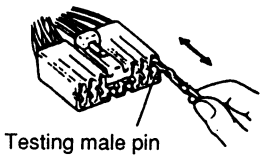


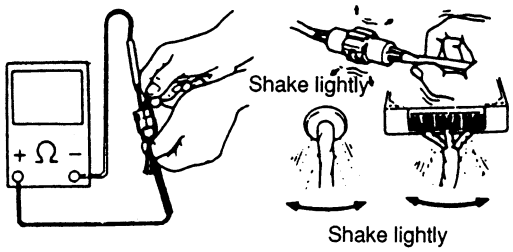
- Generally, probes are inserted into connectors from the rear.
- Connectors equipped with shock protectors must be checked with a mini probe (thin), or it will be necessary to remove the shock protector.
- When removing the shock protector take care not to deform it; this also applies to waterproof connectors, which cannot be tested from the wire side.
- When the connector has a back plate, remove the plate after removing the projection of the plate first. (Be careful not to use excessive force, since the terminals might brake off).

CHECKING FOR POOR CONTACT ON PLUG-IN CONNECTORS

Poor contact Poor contact is frequently caused by corroded terminals, dirt, foreign substances, weak contact points between male and female connectors, etc. Quite often a plug with poor contact will work perfectly again after it has been pulled off and reconnected. If harness and connector checks do not reveal any defect, it can be assumed that an intermittent contact in a connector is the source of trouble.







Visual inspection

- Disconnect the two connector halves.
- Check the connector pins for signs of corrosion or foreign material.
- Check the connector for loose and damaged terminals, and make sure they are set correctly in the connector.

NOTE:
When the harness is pulled lightly, the terminals should not come out.

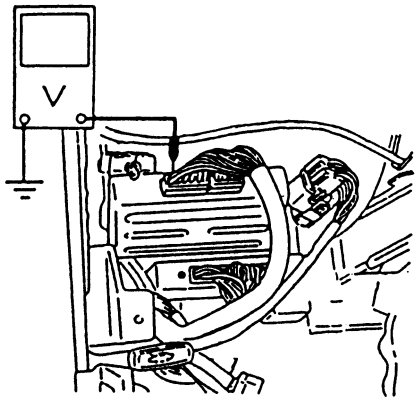
- Insert the male pin of the connector into the female pin, then pull it out.

NOTE:
If one of the pins allows to pull out easily, it is a likely source of a malfunction.

- Shake lightly the connector and the harness, and check for sudden changes in voltage or resistance.

Diagnosis and checking prodecdure using instruments

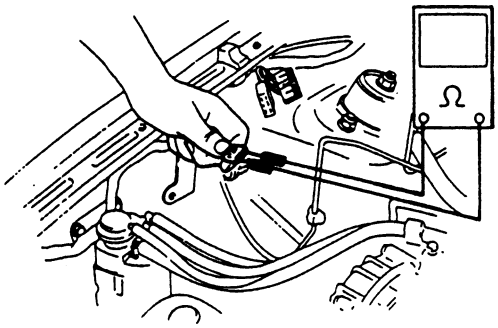
USING A CIRCUIT TESTER



J3-1012

- **Voltage ckeck (range set to DC V)**

Connect the positive probe to the terminal to be tested, and the negative probe to body ground (or the ground terminal of the ECM)



J3-830

- **Checking the connection (range set to Ω)**

Measure the resistance and check for open or shorted wire in the harness or the connector.
NOTE:
This check must be carried out with both connectors disconnected.
(This avoids by-passing the connection through other circuits).
1) Check for open circuit (range: Ω x 1K)
Measure the resistance between the respective pins in both connectors.
Specified resistance:
1 MΩ, min. (No continuity) Open circuit
10 Ω, max. (Continuity) O.K.
2) Check for correct insulation value (range: Ω x 1K)
Measure the resistance between the pins in both connectors, as well as between the suspected pin and the body (body short).
Specified resistance:
1 MΩ, min. (No continuity) O.K.
10 Ω, max. (Continuity) Short circuit

- Resistance measurement (range set to Ω)

Measuring the internal resistance of sensors, solenoid valves etc. to check the operating condition of components.
NOTE:
- Select the appropriate range for measuring the internal resistance, or the measurement will result in an incorrect reading.
- Before changing the measurement range the gauge must be reset to zero.

USING A SUBARU SELECT MONITOR

With this testing procedure the defective component can be determined by directly monitoring input/output signals of the ECM or the trouble codes.

Features

- A variety of data can be checked without movements from the drivers seat, passenger's seat or from outside the vehicle.
- This unit allows the identification of the type of malfunction, for example whether the cause is an open or shorted wire in the input/output signal line, or whether the breakdown of a component is caused by a lack of maintenance.

Diagnosis

- Refer to the reference values for input/output and control data to determine whether the malfunction is caused by a worn out component, an open wire, a short etc.
- Perform the diagnostics procedure as described in chapter "Check based on trouble codes" by monitoring the trouble codes.

NOTE:
It will be easier to determine a malfunction if the vehicle data for normal conditions are available for comparison.

USING AN OSCILLOSCOPE

A malfunction can be determined by displaying the waveforms of input/output signals on the oscilloscope.

Diagnosis

A simple comparison of the waveforms may lead to an incorrect diagnosis. To exactly determine the sources of the malfunction it will be necessary to determine them under consideration about information other than waveforms.

Applying input/output signals

Connect the probe directly with the terminal of the signal.

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