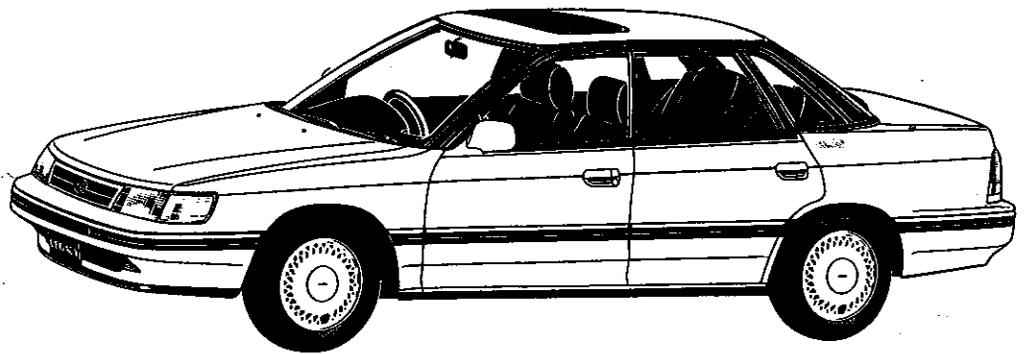




**SUBARU®**

**LIBERTY**

**1992  
SERVICE  
MANUAL**  
SECTION 6



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SUBA  
V.6

 **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 he 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 six 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.

- Each chapter in the manual is basically made of the following five types of areas.

M : Mechanism and function  
 S : Specifications and service data  
 C : Component parts  
 W : Service procedure  
 (X : Service procedure)  
 (Y : Service procedure)  
 T : Troubleshooting

- 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.

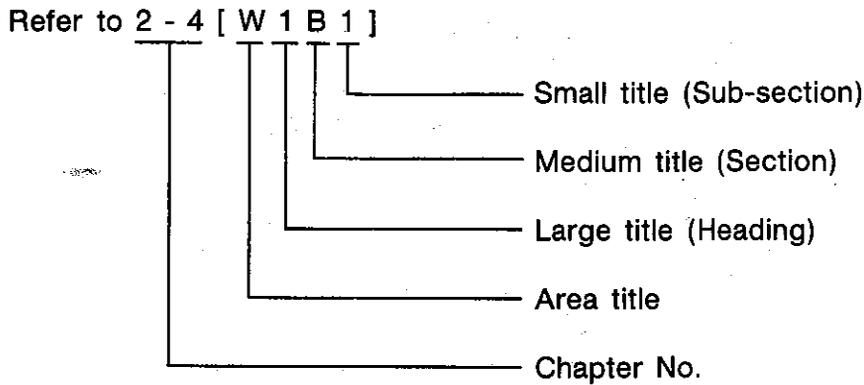
[Example of each title]

- Area title: W. Service procedure (one of the five types of areas)
- Large title (Heading): 1. Oil Pump (to denote the main item of explanation)
- Medium title (Section): A. REMOVAL (to denote the type of work in principle)
- Small title (Sub-section): 1. INNER ROTATOR (to denote a derivative item of explanation)

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 SUBARU HEAVY INDUSTRIES LTD.  
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- 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)



Example of title placement

The diagram shows the title placement for a clutch service procedure:

- 2-10 [W 1 A 0]**: Index number
- CLUTCH**: Chapter title
- W SERVICE PROCEDURE**: Area title
- 1.General**: Large title
- A: PRECAUTION**: Medium title
- 2.RELEASE LEVER**: Small title
- 2.Release Bearing and Lever**: Section title
- A: REMOVAL**: Section title
- 2) Seal**: Small title for a sub-section

When servicing clutch system, pay attention to the following items.

- 1) Check the routing of clutch cable for smoothness.
- 2) Excessive tightness or looseness of clutch cable have a bad influence upon the cable durability.
- 3) Apply grease sufficiently to the connecting portion of clutch pedal.
- 4) Apply grease sufficiently to the release lever portion.
- 5) Position clutch cable through the center of toeboard hole. Adjustment is done by

- In this manual, the following symbols are used.



: Should be lubricated with oil.



: Should be lubricated with grease.



: Sealing point



: Tightening torque

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**SUBARU®**

**1992**

**SERVICE  
MANUAL**

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# M MECHANISM AND FUNCTION

## 1. Ignition Coil (Turbo model)

One ignition coil is installed for each cylinder (or spark plug).

The secondary terminal of the ignition coil is in contact with the spark plug terminal nut.

Since spark plug cable is not used, secondary voltage drop, leaks, etc. do not occur. The result is high performance reliability.

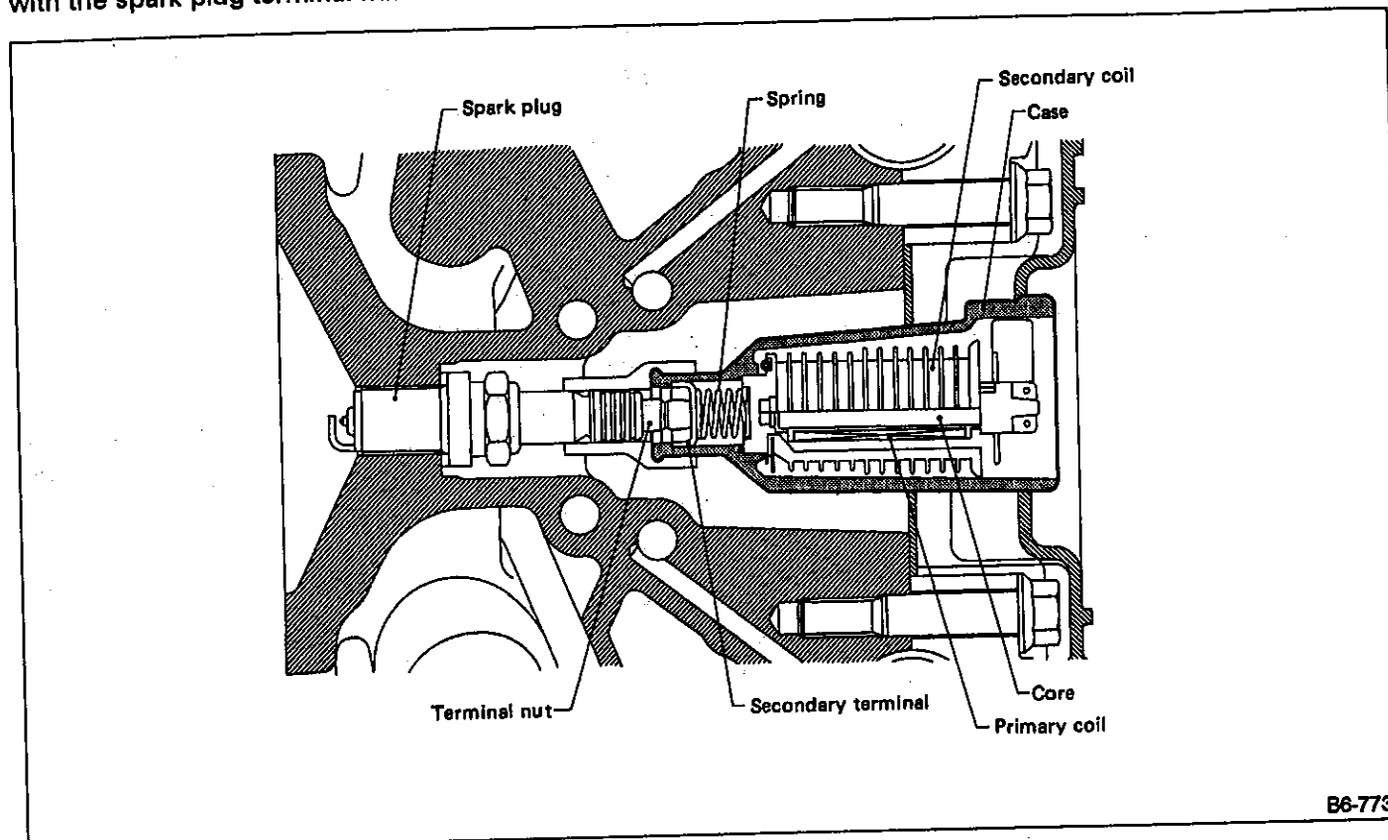


Fig. 1

## 2. Spark Plug (Turbo model)

The spark plug has a platinum tipped type center electrode, with 14 mm (0.55 in) threads and 0.8 mm (0.031 in) gap.

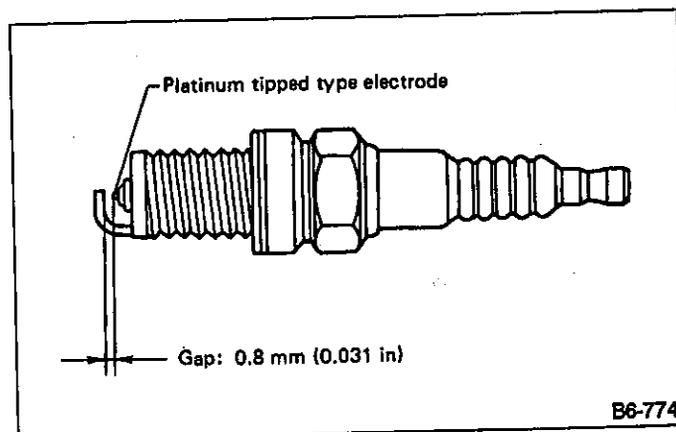


Fig. 2

# S SPECIFICATIONS AND SERVICE DATA

## A: SPECIFICATIONS

### 1. STARTER

	*1 MT	*2 AT	*3 AT	*4 AT	*5 MT	
Model	128000-8311	128000-8321	MIT70381A	MIT75681	MIT77181	
Type	Reduction type					
Manufacture	NIPPONDENSO		MITSUBISHI			
Voltage and output V — kW	12 — 1.0	12 — 1.4	12 — 1.0	12 — 1.4	12 — 1.0	
Direction of rotation	Counterclockwise (when observed from pinion.)					
Number of pinion teeth	9		8	9	8	
No-load characteristics	Voltage	11 V				
	Current	90 A or less				
	Rotating speed rpm	3,000 or more	2,900 or more	3,000 or more		
Load characteristics	Voltage V	8		7.7	8	
	Current A	280 or less	370 or less	280 or less	300 or less	280 or less
	Torque N·m (kg-m, ft-lb)	10 (1.0, 7)	14 (1.4, 10)	8.5 (0.87, 6.3)	10 (1.0, 7)	8.5 (0.87, 6.3)
	Rotating speed rpm	900 or more	880 or more	980 or more	1,000 or more	980 or more
Lock characteristics	Voltage V	5		4		
	Current A	800 or less	1,050 or less	780 or less	980 or less	780 or less
	Torque N·m (kg-m, ft-lb)	27 (2.8, 20) or more		18 (1.8, 13) or more	27 (2.8, 20) or more	18 (1.8, 13) or more

\*1: MT models (except 2000cc Non-Turbo model)

\*2: All 4WD models and Europe FWD (except 2000cc Non-Turbo model)

\*3: FWD models (except Europe and 2000cc Non-Turbo model)

\*4: 2000cc Non-Turbo model

\*5: 2000cc Non-Turbo model

### 2. ALTERNATOR

	2200cc, 2000cc Turbo	1600cc, 1800cc, 2000cc Non-Turbo
Model	LR170-732C	A2T09591
Type	Rotating-field three-phase type, voltage regulator built-in type	
Manufacture	HITACHI	MITSUBISHI
Voltage and output	12 V — 70 A	
Polarity on ground side	Negative	
Rotating direction	Clockwise (when observed from pulley side.)	
Armature connection	3-phase Y-type	
Rectifying system	Full wave rectification by eight self-contained silicone diodes	
Revolution speed at 13.5 V 20°C (68°F)	1,000 rpm or less	700 rpm or less
Output current	1,500 rpm — 33 A or more 3,000 rpm — 66 A or more 6,000 rpm — 80 A or more	1,500 rpm — 35 A or more 2,500 rpm — 60 A or more 5,000 rpm — 77 A or more
Regulated voltage at 20°C (68°F)	14.1 — 14.8 V	14.2 — 14.8 V

## 3. DISTRIBUTOR

		Carburetor (1800cc MT, 3AT)	Carburetor (1800cc 4AT)	Carburetor (1600cc)
Model		T2T82371A	T2T82372A	T2T82373A
Type		Breaker less type with control unit, centrifugal governor and vacuum diaphragm		
Manufacture		MITSUBISHI		
Firing order		1-3-2-4		
Rotating direction		Counterclockwise		
Air gap mm (in)		0.25 (0.0098)		
Cap insulation resistance		More than 50 MΩ		
Rotor head insulation resistance		More than 50 MΩ		
Advancing characteristic	Centrifugal advancer Advance angle (deg.)/ Distributor speed (rpm)	0°/450 10°/1,400 12.5°/3,000	0°/600 10°/1,800 12.5°/3,200	0°/600 13°/1,600 19°/3,000
	Vacuum advancer Advance angle (deg.)/ Vacuum [— kPa (— mmHg, — inHg)]	Chamber A: 0°/16.7 (125, 4.92) 12°/46.7 (350, 13.78) Chamber B: 0°/37.3 (280, 11.02) 8°/53.3 (400, 15.75)	Chamber A: 0°/16.7 (125, 4.92) 11°/46.7 (350, 13.78) Chamber B: 0°/33.3 (250, 9.84) 6°/53.3 (400, 15.75)	Chamber A: 0°/16.7 (125, 4.92) 8°/46.7 (350, 13.78) Chamber B: 0°/33.3 (250, 9.84) 6°/53.3 (400, 15.75)

## 4. IGNITION COIL

	MPFI (Non-TURBO)	MPFI-TURBO	SPFI	Carburetor
Model	CM12-100	F523	CM1T-214	E-083
Manufacturer	HITACHI	DIAMOND	HITACHI	DIAMOND
Primary coil resistance	0.63 — 0.77 Ω	0.68 — 0.83 Ω	0.81 — 0.99 Ω	1.4 — 1.7 Ω
Secondary coil resistance	10.4 — 15.6 kΩ	—	8 — 12 Ω	12.8 — 17.3 Ω
Insulation resistance between primary terminal and case	More than 10 MΩ	More than 10 MΩ	More than 10 MΩ	More than 10 MΩ

## 5. SPARK PLUG

	MPFI-TURBO	MPFI with O <sub>2</sub> sensor, SPFI	MPFI without O <sub>2</sub> sensor, Carburetor
Type and Manufacturer	BKR6EVX (or BKR7EVX, PFR6G, PFR7G) ... NGK	BKR6E-11 (or BKR5E-11, BKR7E-11) ... NGK K20PR-U11 (or K16PR-U11, K22PR-U11) ... NIPPON DENSO	BKR6E (or BKR5E, BKR7E) ... NGK K20PR-U (or K16PR-U, K22PR-U) ... NIPPON DENSO
Thread size mm	14, P = 1.25		
Spark gap mm (in)	0.8 (0.031)	1.1 (0.043)	0.8 (0.031)

# C COMPONENT PARTS

## 1. Starter (NIPPONDENSO)

1. 128000-8311

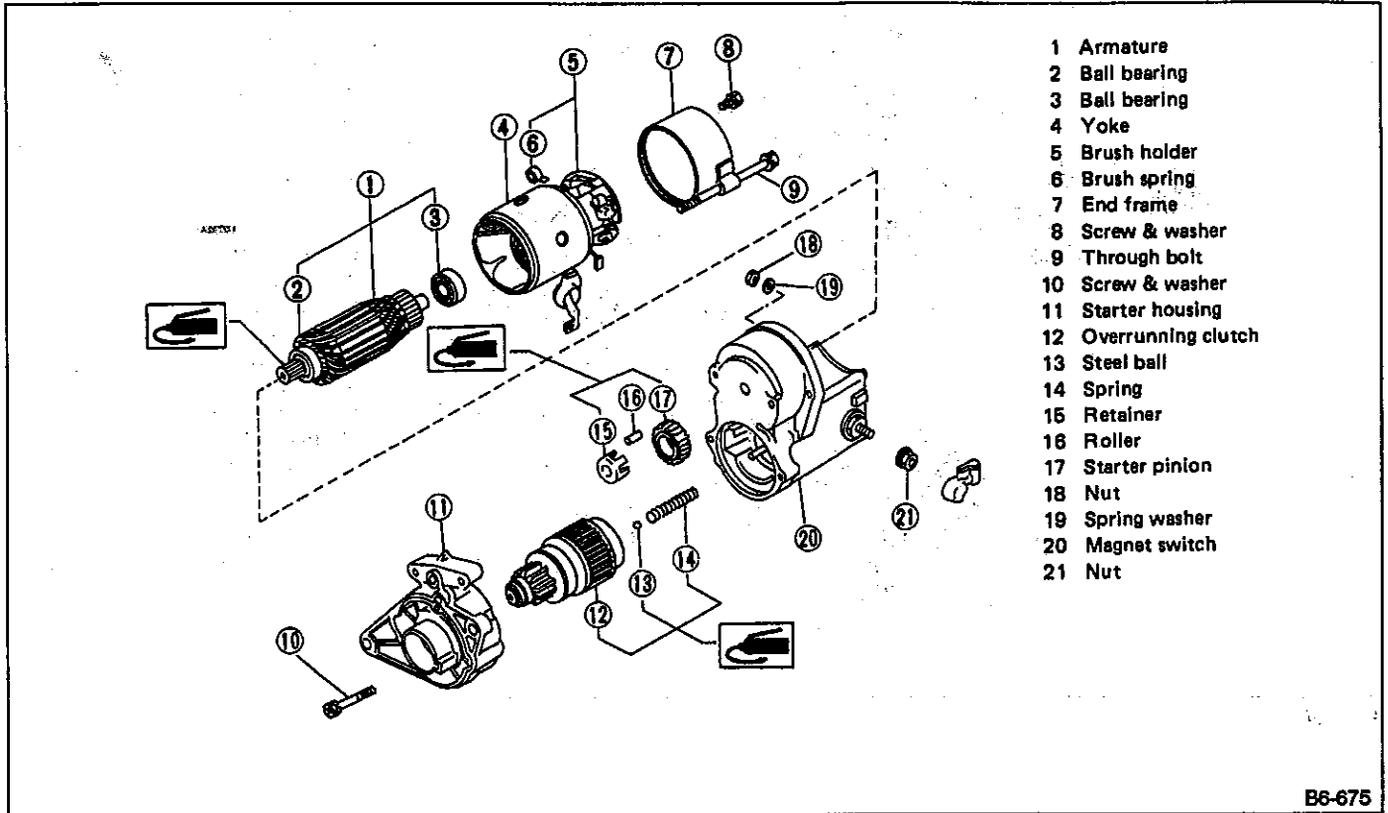


Fig. 3

B6-675

## 2. 128000-8321

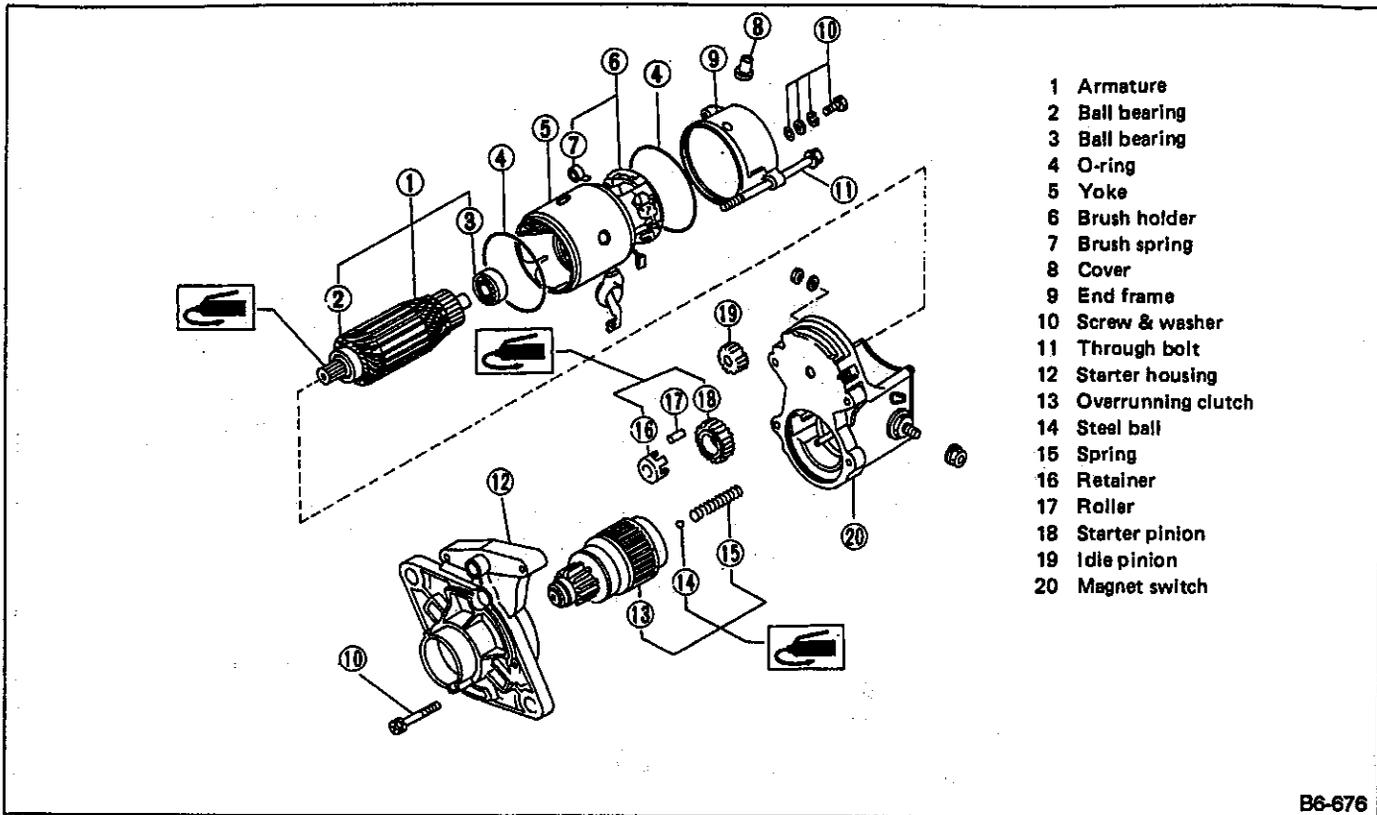
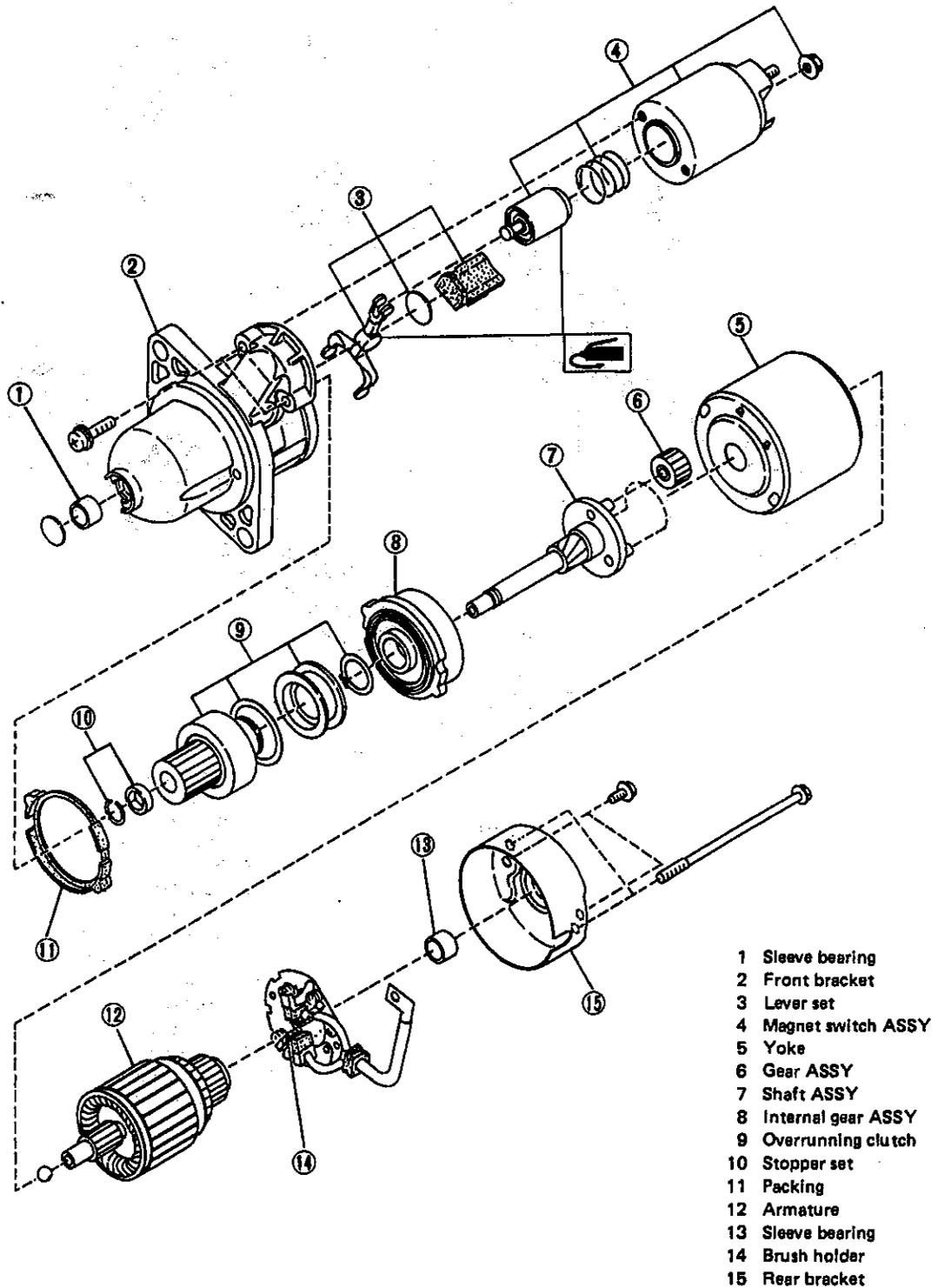


Fig. 4

B6-676

2. Starter (MITSUBISHI)

1. MIT70381A, MIT75681



- 1 Sleeve bearing
- 2 Front bracket
- 3 Lever set
- 4 Magnet switch ASSY
- 5 Yoke
- 6 Gear ASSY
- 7 Shaft ASSY
- 8 Internal gear ASSY
- 9 Overrunning clutch
- 10 Stopper set
- 11 Packing
- 12 Armature
- 13 Sleeve bearing
- 14 Brush holder
- 15 Rear bracket

Fig. 5

## 2. MIT77181

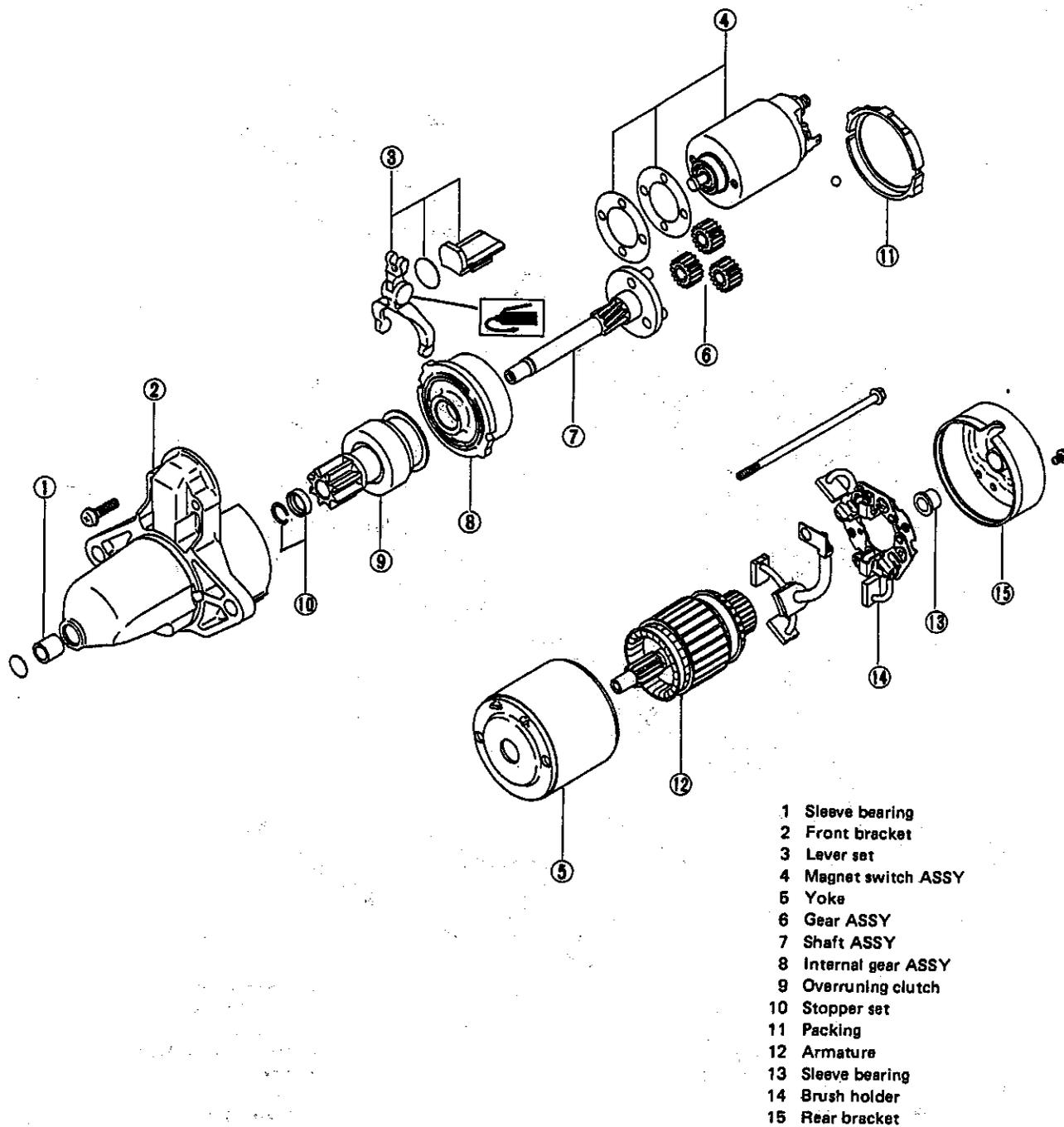
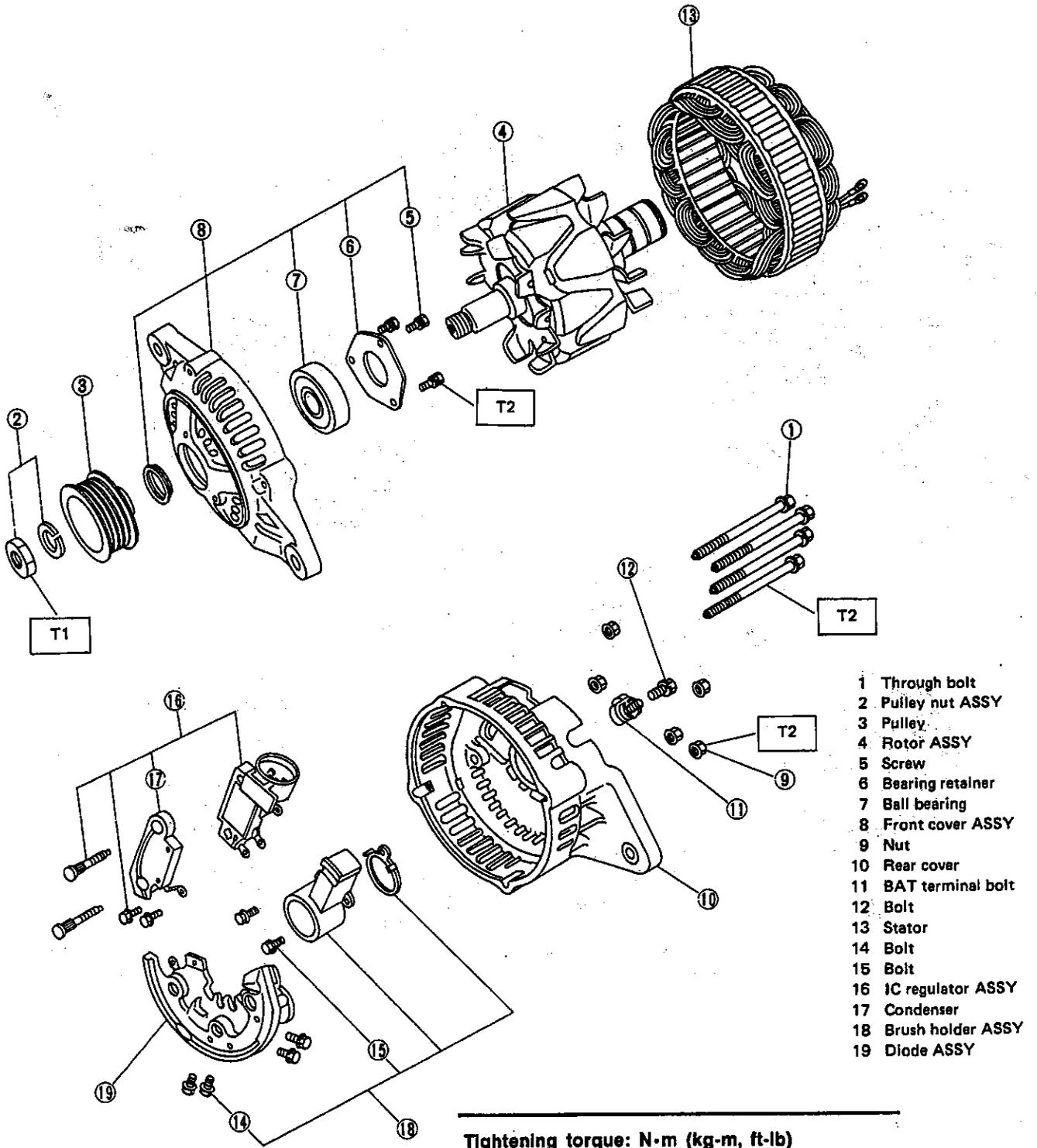


Fig. 6

### 3. Alternator (HITACHI)

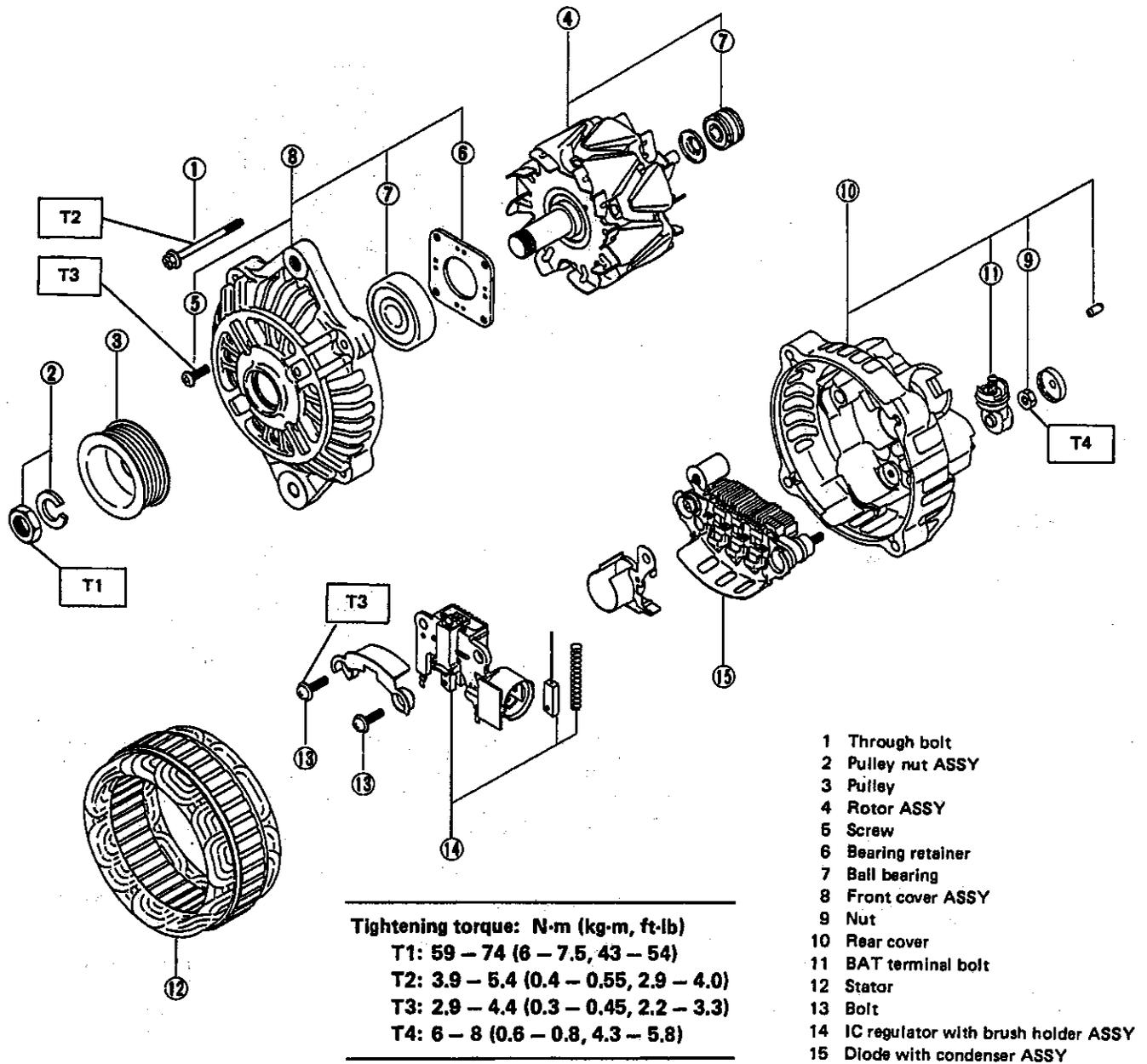


- 1 Through bolt
- 2 Pulley nut ASSY
- 3 Pulley
- 4 Rotor ASSY
- 5 Screw
- 6 Bearing retainer
- 7 Ball bearing
- 8 Front cover ASSY
- 9 Nut
- 10 Rear cover
- 11 BAT terminal bolt
- 12 Bolt
- 13 Stator
- 14 Bolt
- 15 Bolt
- 16 IC regulator ASSY
- 17 Condenser
- 18 Brush holder ASSY
- 19 Diode ASSY

**Tightening torque: N·m (kg·m, ft·lb)**  
**T1: 49.0 — 63.7 (5.00 — 6.50, 36.2 — 47.0)**  
**T2: 3.1 — 3.9 (0.32 — 0.40, 2.3 — 2.9)**

Fig. 7

## 4. Alternator (MITSUBISHI)



- 1 Through bolt
- 2 Pulley nut ASSY
- 3 Pulley
- 4 Rotor ASSY
- 5 Screw
- 6 Bearing retainer
- 7 Ball bearing
- 8 Front cover ASSY
- 9 Nut
- 10 Rear cover
- 11 BAT terminal bolt
- 12 Stator
- 13 Bolt
- 14 IC regulator with brush holder ASSY
- 15 Diode with condenser ASSY

Fig. 8

B6-763

5. Distributor

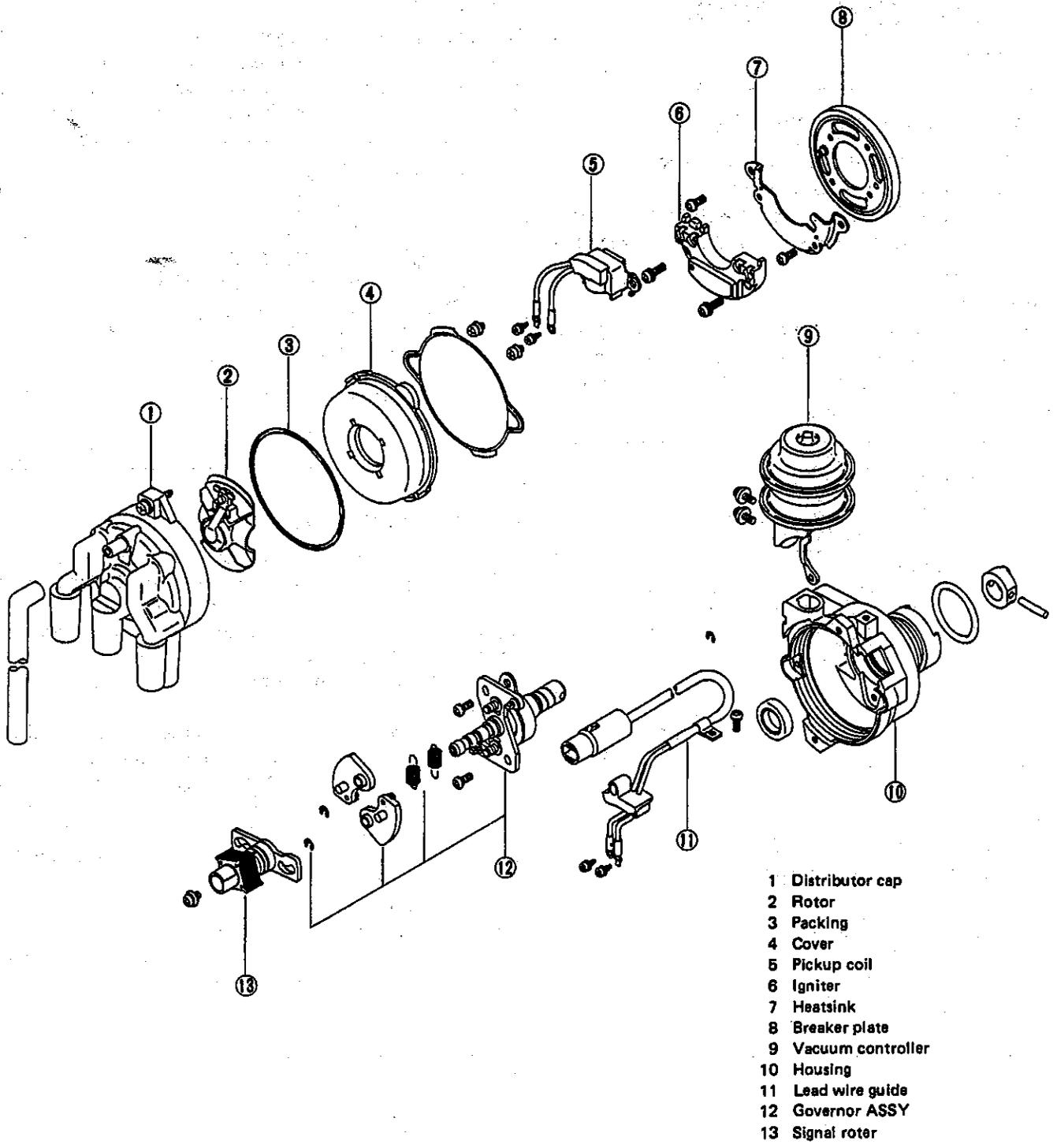


Fig. 9

# W SERVICE PROCEDURE

## 1. Starter (NIPPONDENSO)

### A: TEST

#### 1. MAGNETIC SWITCH OPERATION

- a. The following magnetic switch tests should be performed with specified voltage applied.
- b. 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.

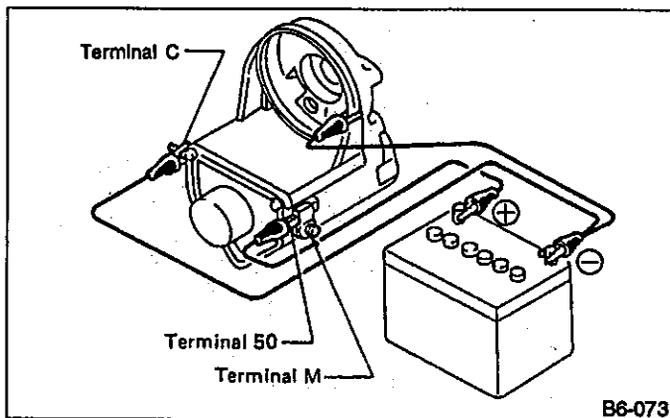


Fig. 10

##### 2) Holding-in test

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

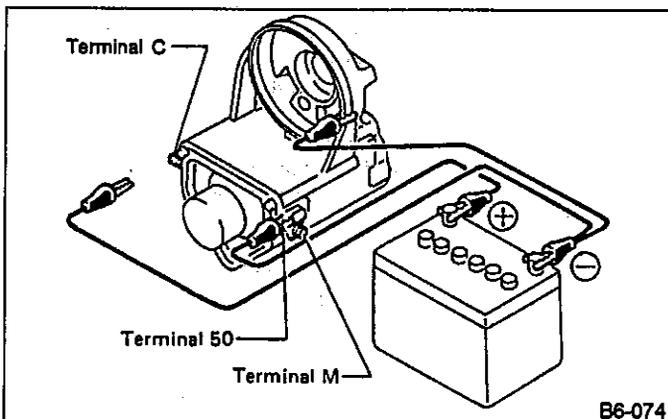


Fig. 11

##### 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.

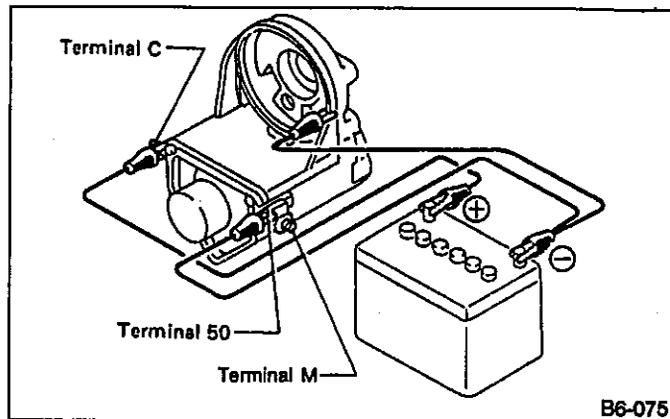


Fig. 12

#### 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.

1. No-load test: Measure the maximum rotating speed and current under a no-load state.
2. Load test: Measure the magnitude of current needed to generate the specified torque and rotating speed.
3. 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 max.

Rotating speed  
128000-8311: 3,000 rpm/min.  
128000-8321: 2,900 rpm/min.

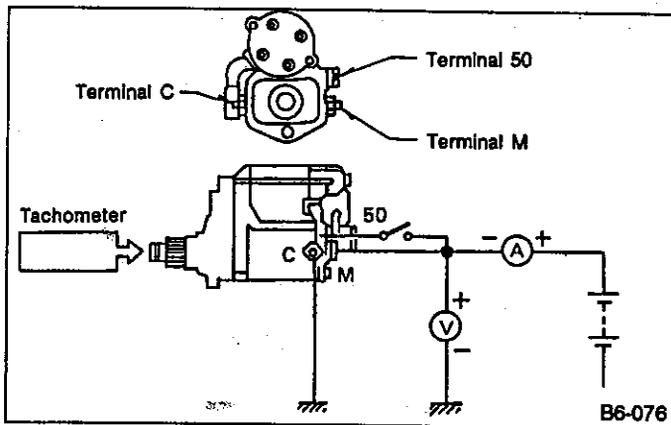


Fig. 13

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.

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

Load test (Standard):

128000-8311

Voltage/Load

8 V/10 N·m (1.0 kg-m, 7 ft-lb)

Current/Speed

280 A max./900 rpm min.

128000-8321

Voltage/Load

8 V/14 N·m (1.4 kg-m, 10 ft-lb)

Current/Speed

370 A max./880 rpm min.

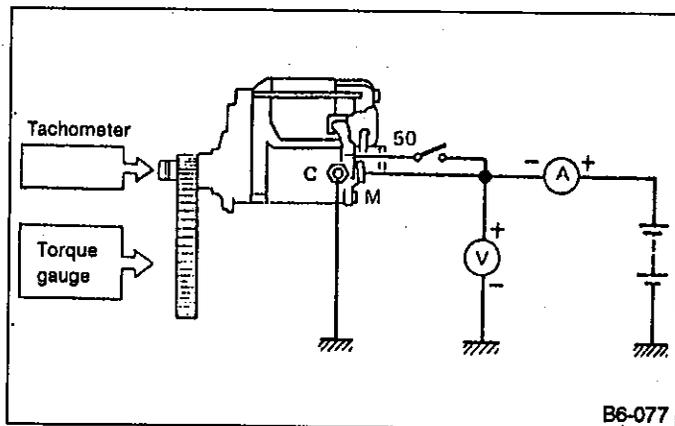


Fig. 14

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):

128000-8311

Voltage/Current

5 V/800A max.

Torque

27 N·m (2.8 kg-m, 20 ft-lb) min.

128000-8321

Voltage/Current

5 V/1,050 A max.

Torque

27 N·m (2.8 kg-m, 20 ft-lb) min.

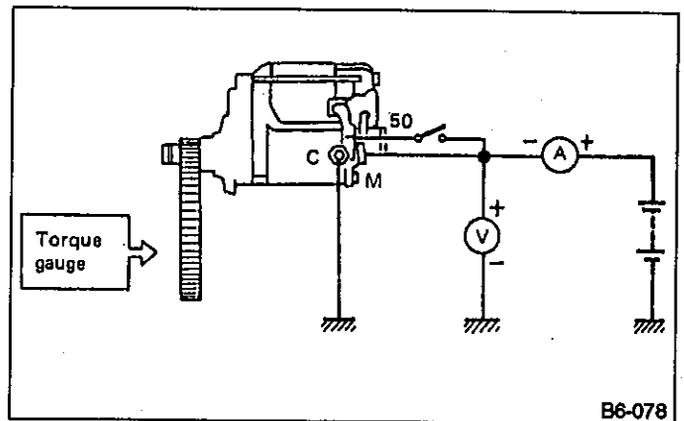


Fig. 15

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.

**B: DISASSEMBLY**

1) Disconnect lead wire from magnetic switch.

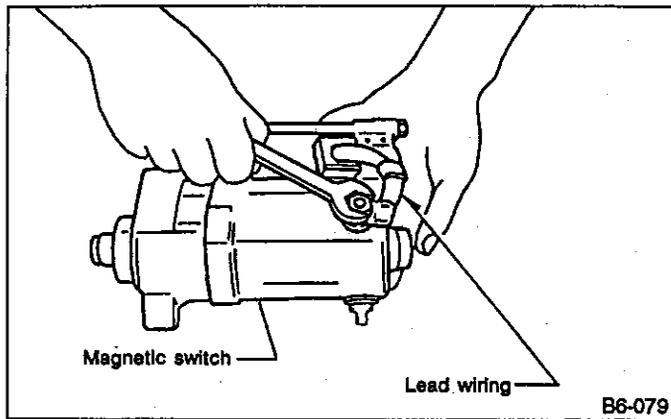


Fig. 16

2) Remove through-bolts from end frame.

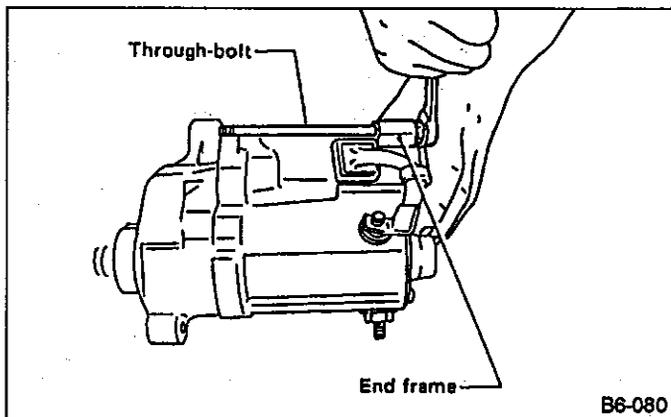


Fig. 17

3) Remove yoke from magnetic switch.

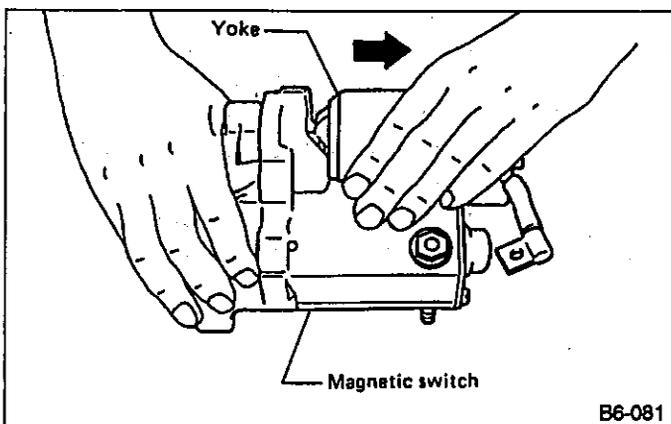


Fig. 18

4) Remove screws securing end frame to brush holder.

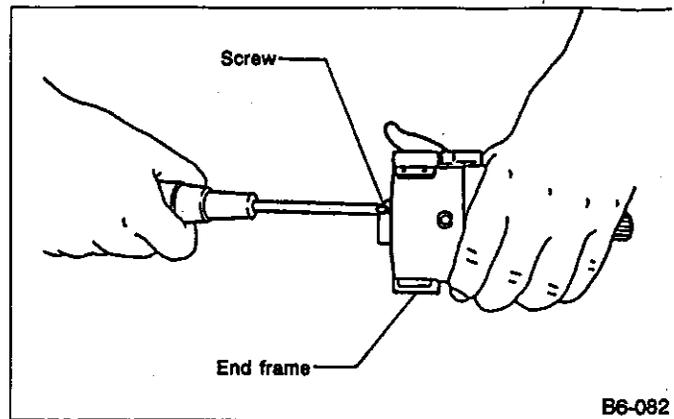


Fig. 19

5) Separate yoke from end frame.

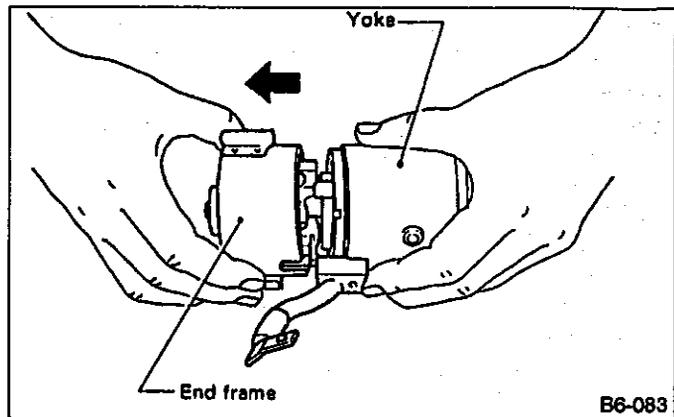


Fig. 20

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

**Be careful not to damage brush and commutator.**

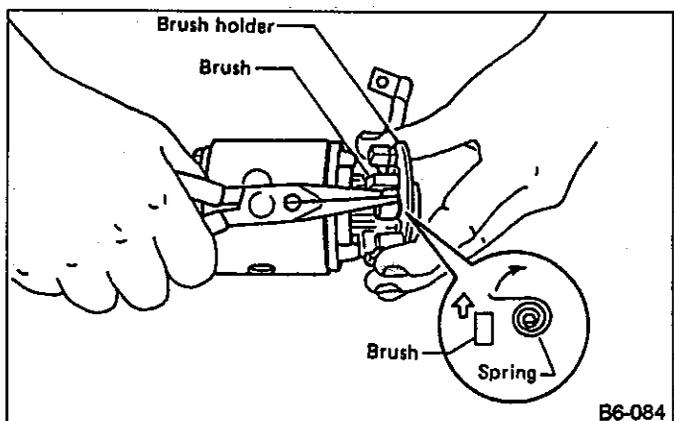


Fig. 21

7) Remove armature from yoke.

Be careful not to drop armature.

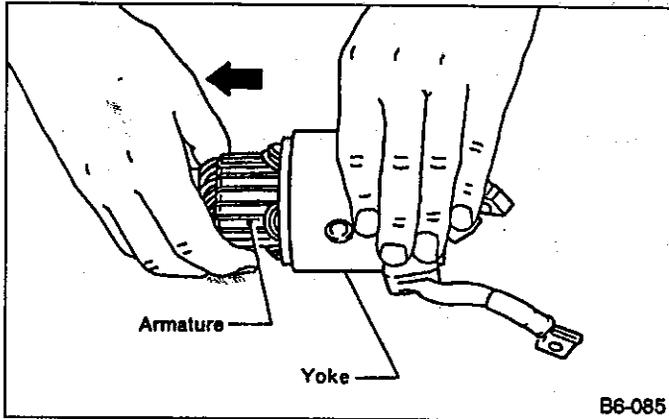


Fig. 22

8) Remove screws securing magnetic switch to housing.

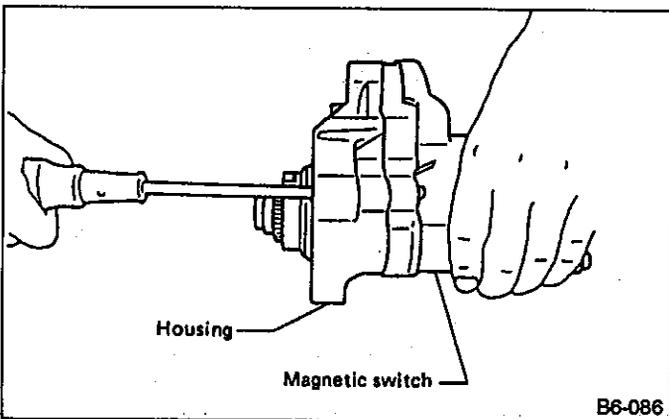


Fig. 23

Remove housing from magnetic switch.

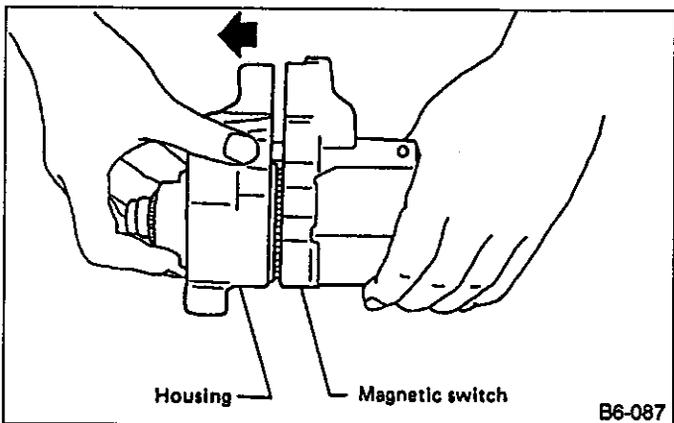


Fig. 24

9) Remove clutch from housing.

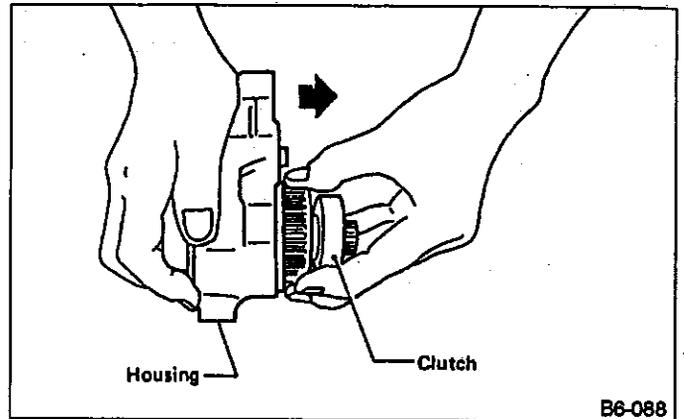


Fig. 25

10) Take out steel ball from clutch.

Be careful not to lose steel ball.

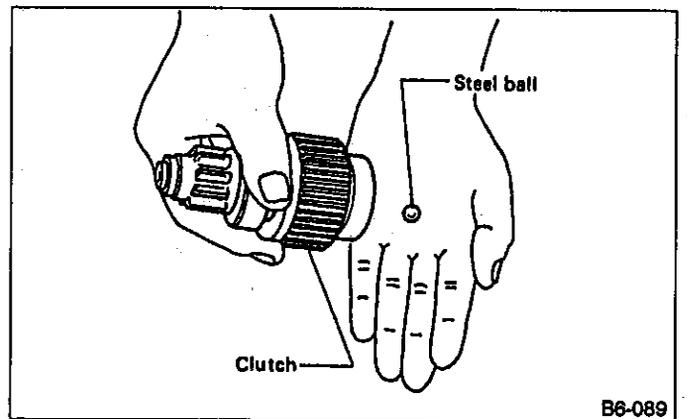


Fig. 26

11) Remove idle gear from housing.

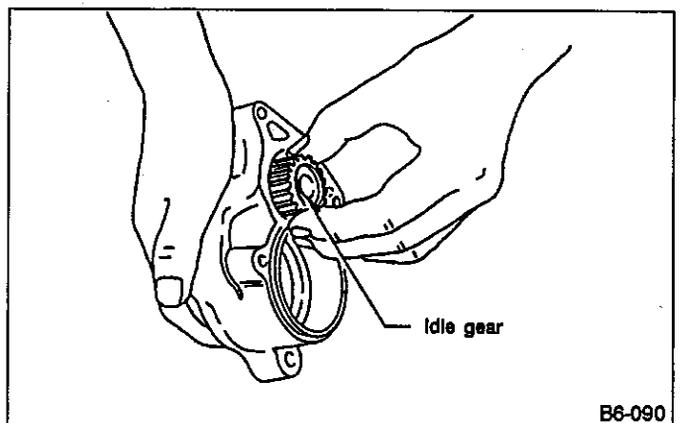


Fig. 27

- 12) Remove retainer and roller from housing.  
Be careful not to drop retainer and roller.

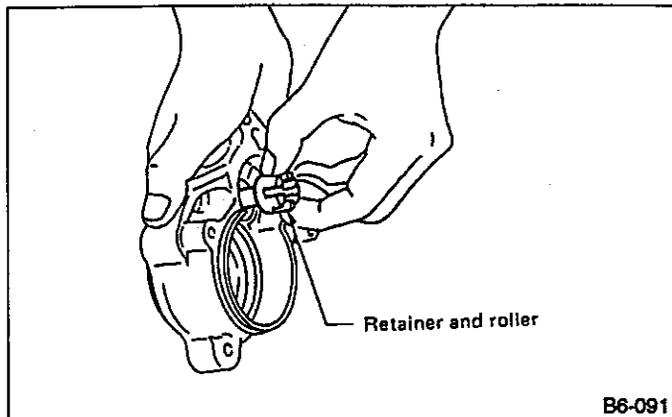


Fig. 28

- 13) Remove coil spring from magnetic switch.

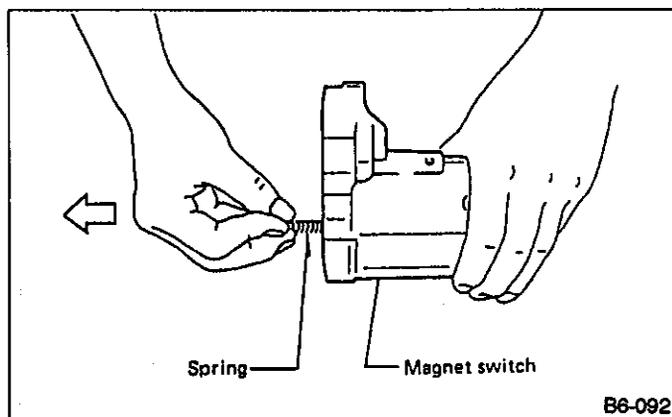


Fig. 29

## C: INSPECTION AND REPAIR

### 1. ARMATURE

#### 1) Layer test

Check armature coil for short-circuit between layers by using growler tester.

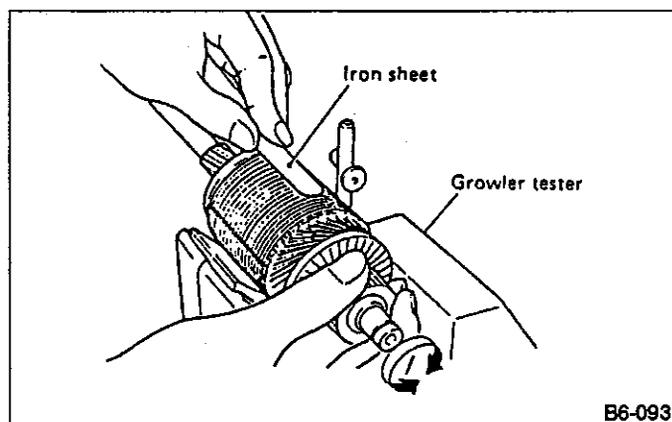


Fig. 30

If any short-circuit exists in armature coil, circulating current is generated by alternating flux of growler tester, and the affected portion of the armature core magnetized.

If an iron piece is brought close to that portion, it will vibrate, locating the short-circuit.

Before performing the test, thoroughly remove carbon powder, etc. from around the commutator.

#### 2) Insulation test

Check insulation between commutator and armature core using 500 V megger.

Insulation resistance should be 10 MΩ or larger.

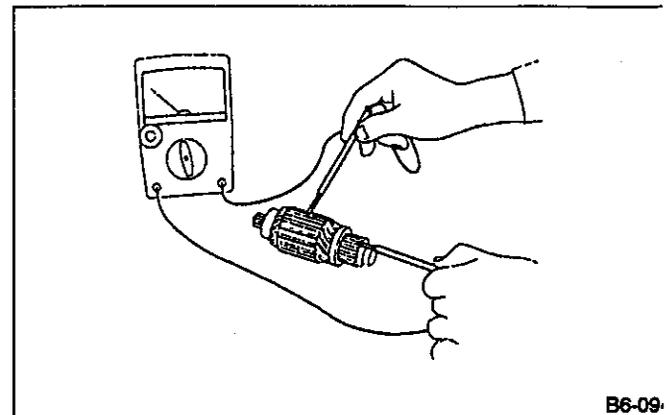


Fig. 31

#### 3) Check commutator for out of roundness.

Use dial gauge to check that commutator is round. Repair commutator using lathe if uneven wear is found.

Out of roundness:

Standard

0.02 mm (0.0008 in) or less

Limit

0.05 mm (0.0020 in)

Be sure to perform this check after checking armature shaft for bend.

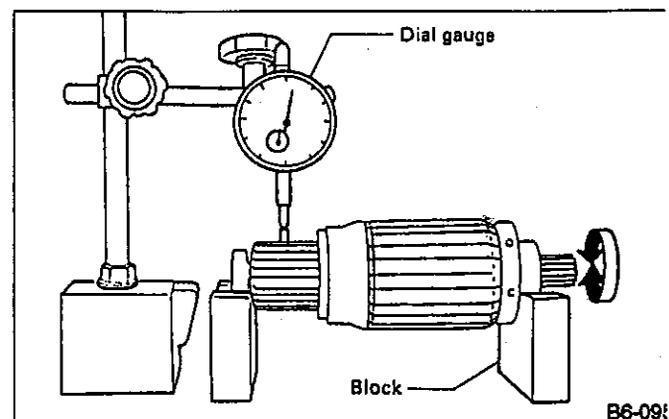


Fig. 32

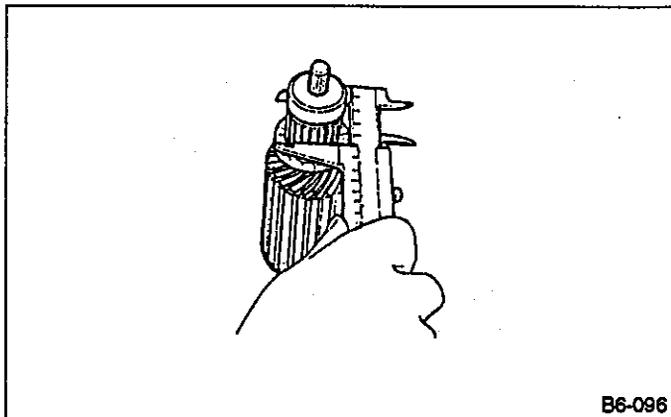
If commutator surface is rough, polish with fine grain sand paper (#300); if burnt excessively, correct by cutting with a lathe.

In repairing commutator with lathe, do not reduce commutator O.D. by more than 1 mm (0.04 in) from its original (standard) value. Excessive cutting will hamper commutator durability.

After repairing, polish finished surface with sand paper.

**Commutator O.D.:**

- Standard**  
30 mm (1.18 in)
- Limit**  
29 mm (1.14 in)



B6-096

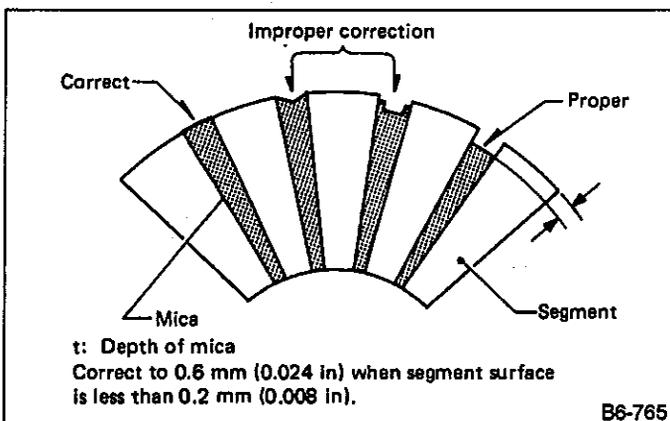
Fig. 33

**4) Under-cutting of commutator**

If commutator segments wear and mica insulation between segments stand higher than segment face, proper rectification is hampered.

**Depth of mica:**

- Standard**  
0.6 mm (0.024 in)
- Limit**  
0.2 mm (0.008 in)



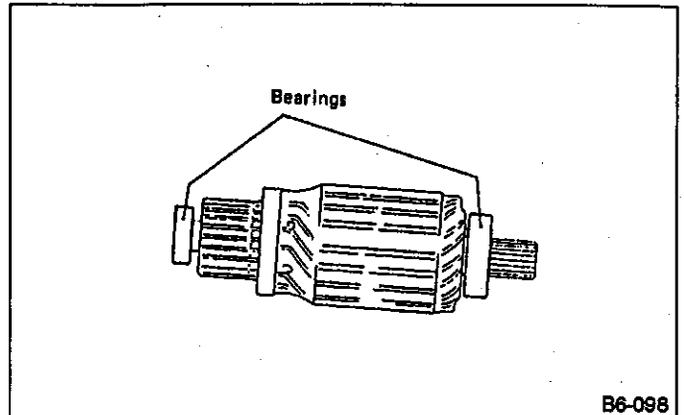
B6-765

Fig. 34

**2. BEARING**

**1) Inspection**

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

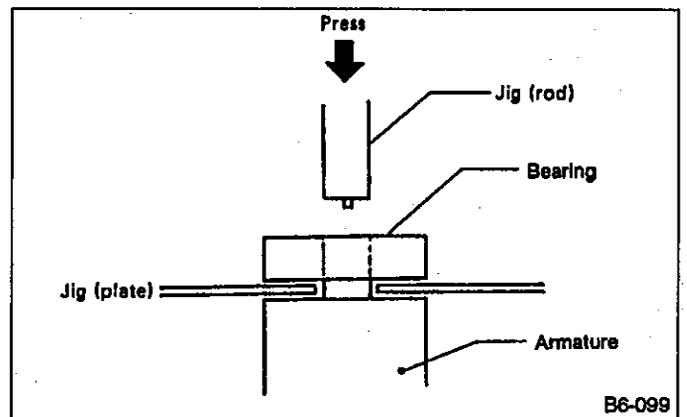


B6-098

Fig. 35

**2) Replacement**

Pull out bearing using a jig as shown in Figure.



B6-099

Fig. 36

**3. YOKE**

**1) Testing field coil for open circuit**

Check field coil for continuity using circuit tester. Continuity should exist.

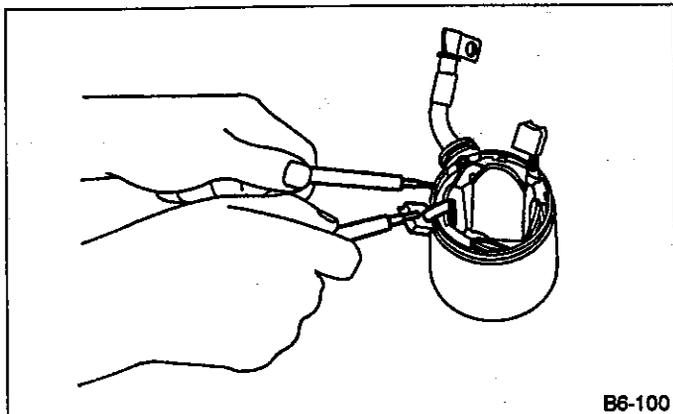


Fig. 37

#### 2) Checking carbon brush

If carbon brush length has been reduced by more than 1/3 the original length, or if brush contact area has been reduced largely due to brush breakage, replace carbon brush.

#### Brush length:

**Standard**  
15 mm (0.59 in)

**Limit**  
10 mm (0.39 in)

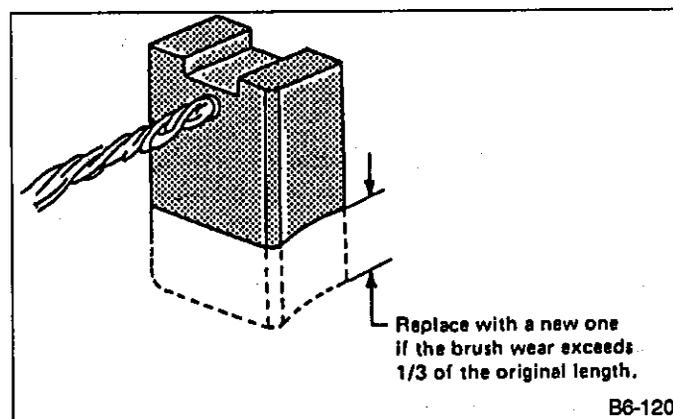


Fig. 38

#### 4. BRUSH HOLDER

Measure insulation resistance of brush holder using Megger.

**Insulation resistance:**  
10 MΩ or over

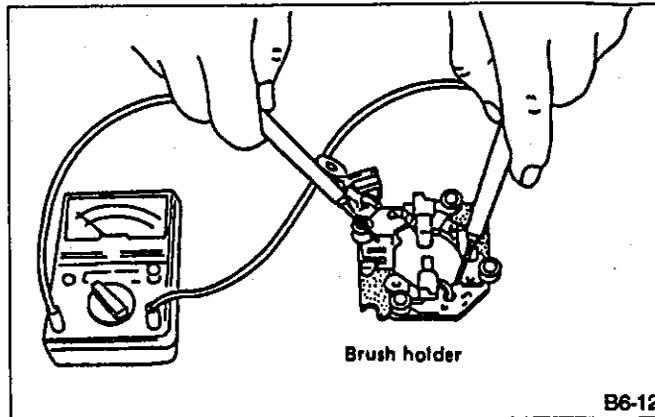


Fig. 39

#### 5. CLUTCH

Check that pinion can be rotated in normal direction only.

Check pinion gear for wear, damage, rusting, or binding during rotation.

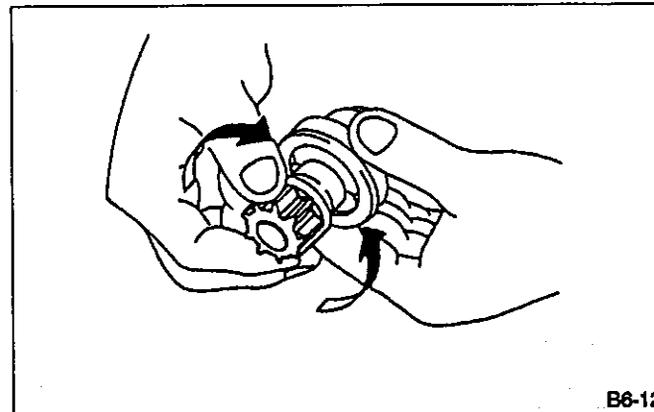


Fig. 40

#### D: ASSEMBLY

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

1) Before assembling, lubricate disassembled parts the points shown in Fig. 1 and Fig. 2.

#### 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.

a. Do not forget to install steel ball and coil spring to clutch.

b. Attach bearing to idle gear beforehand.

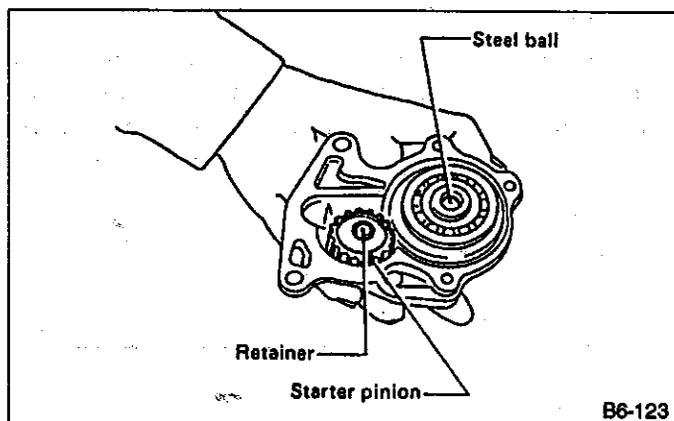


Fig. 41

3) Installing armature to yoke

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

4) Installing brushes

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

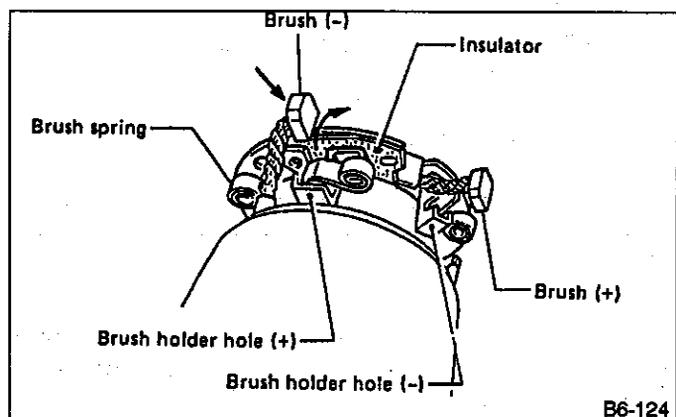


Fig. 42

5) Installing end frame

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

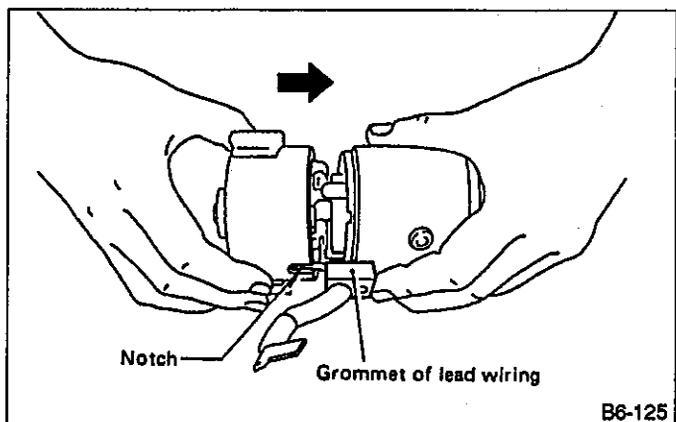


Fig. 43

6) Installing yoke

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

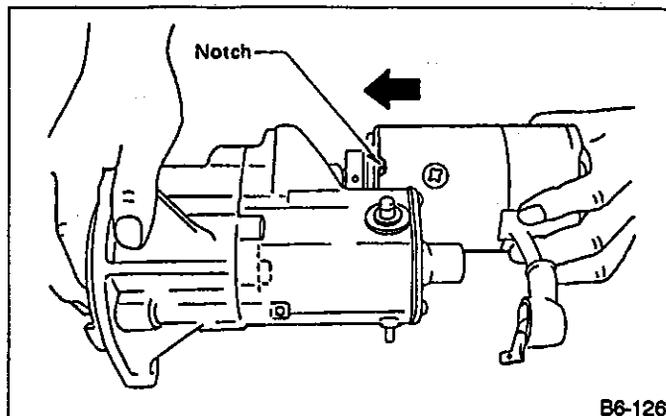


Fig. 44

## 2. Starter (MITSUBISHI)

### A: TEST

#### 1. SWITCH ASSEMBLY OPERATION

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

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

2) Disconnect connector from terminal M, and connect positive terminal of battery to terminal M using a lead wire and ground terminal to starter body.

In this test setup, pinion should return to its original position even when it is pulled out with a screwdriver.

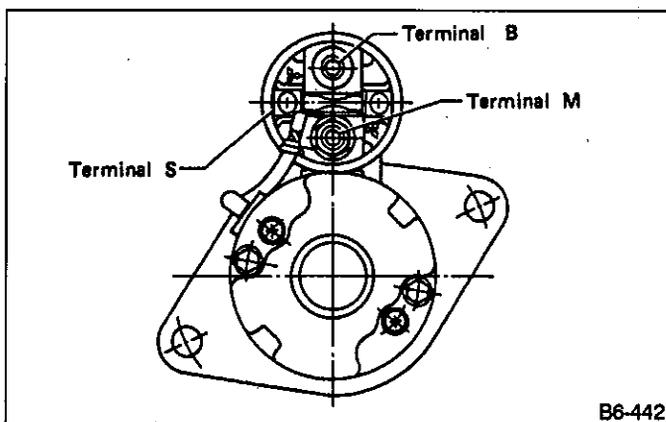


Fig. 45

## 2. PINION GAP

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

**Pinion gap:**

0.5 — 2.0 mm (0.020 — 0.079 in)

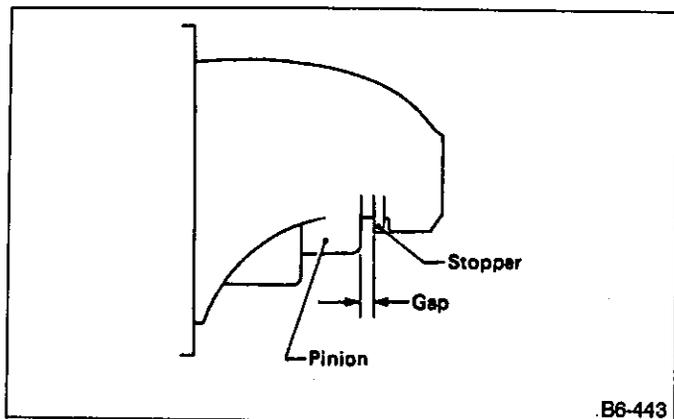


Fig. 46

If motor is running with the pinion forced endwise on the shaft, disconnect connector from terminal M of switch ASSY to stop pinion turning. Next, gently push pinion back with your fingertips and measure pinion gap.

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

## 3. PERFORMANCE TEST

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

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

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

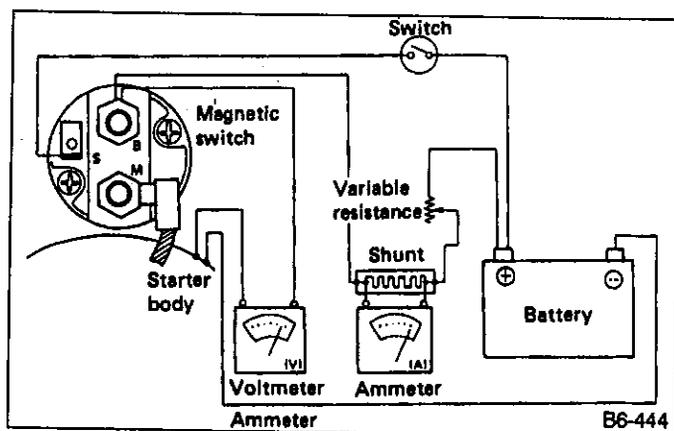


Fig. 47

### 1) No-load test

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

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

**Voltage/Current**

11 V/90 A max.

**Rotating speed**

3,000 rpm/min.

### 2) Load test

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

**Load test (Standard):**

**Voltage/Load**

MIT70381A, MIT77181

8 V/8.5 N·m (0.87 kg-m, 6.3 ft-lb)

MIT75681

7.7 V/10 N·m (1.0 kg-m, 7 ft-lb)

**Current/Speed**

MIT70381A, MIT77181

280 A max./980 rpm/min.

MIT75681

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

### 3) Lock test

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

**Lock test (Standard):**

**Voltage/Current**

MIT70381A, MIT77181

4 V/780 A max.

MIT75681

4 V/980 A max.

**Torque**

MIT70381A, MIT77181

18 N·m (1.8 kg-m, 13 ft-lb) min.

MIT75681

27 N·m (2.8 kg-m, 20 ft-lb) min.

**B: DISASSEMBLY**

- 1) Loosen nut which holds terminal M of switch ASSY, and disconnect connector.
- 2) Remove bolts which hold switch ASSY, and remove switch ASSY, plunger and plunger spring from starter as a unit.

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

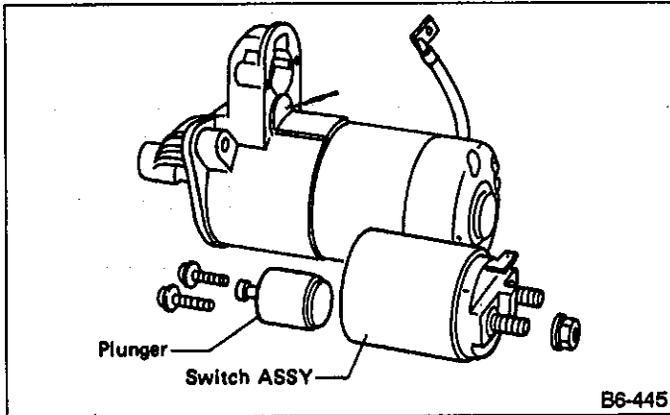


Fig. 48

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

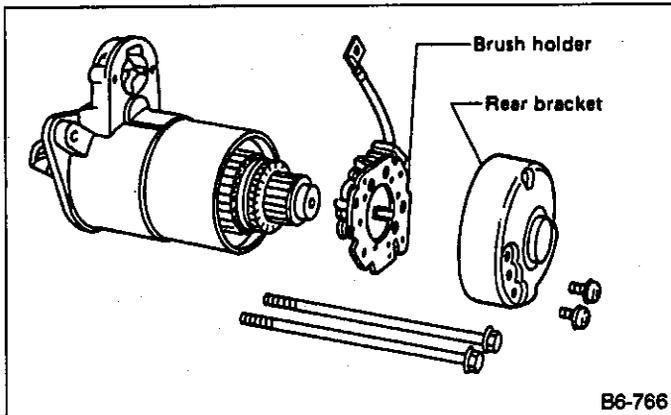


Fig. 49

- 4) Remove armature and yoke. Ball used as a bearing will then be removed from the end of armature.
- Be sure to mark an alignment mark on yoke and front bracket before removing yoke.**

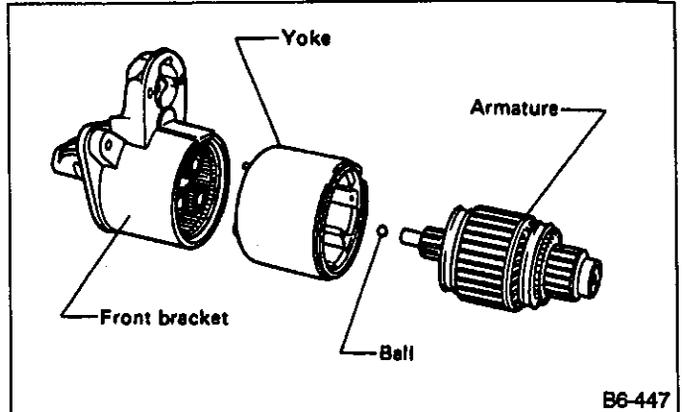


Fig. 50

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

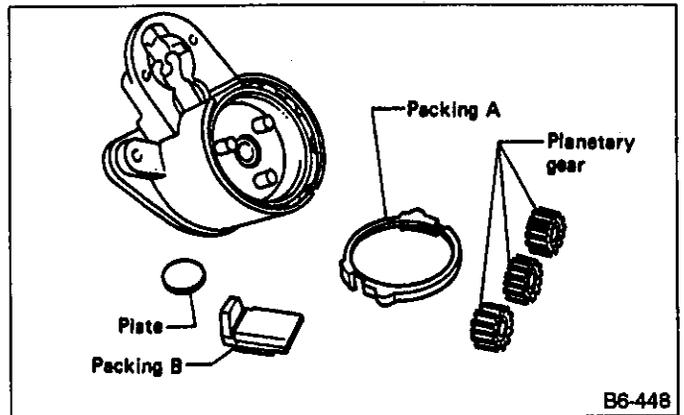


Fig. 51

- 6) Remove shaft ASSY and overrunning clutch as a unit.

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

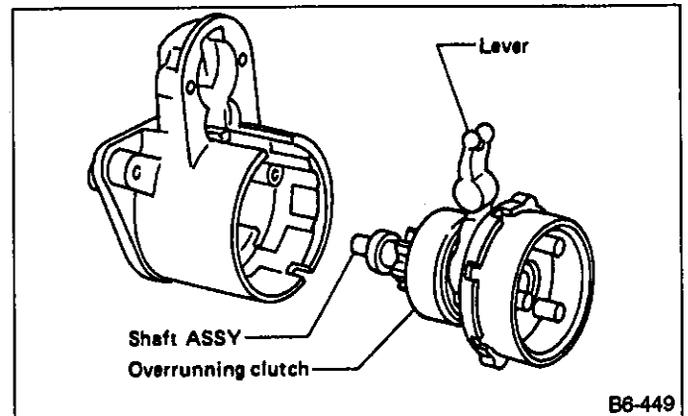


Fig. 52

- 7) Remove overrunning clutch from shaft ASSY as follows:
  - (1) Remove stopper from ring by lightly tapping a jig placed on stopper.
  - (2) Remove ring, stopper and clutch from shaft.

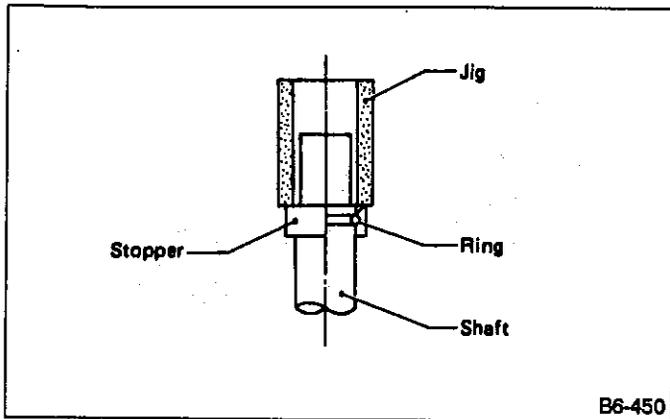


Fig. 53

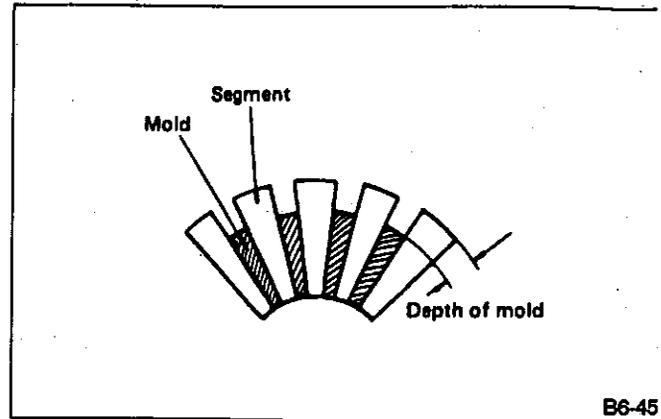


Fig. 55

## C: 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 sandpaper.

2) Run-out test

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

#### Commutator run-out:

Standard

0.05 mm (0.0020 in)

Service limit

Less than 0.10 mm (0.0039 in)

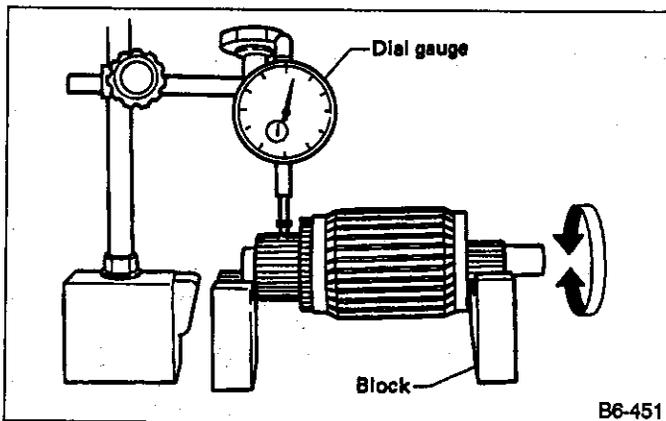


Fig. 54

3) Depth of segment mold

Check the depth of segment mold.

#### Depth of segment mold:

0.5 — 0.8 mm (0.020 — 0.031 in)

### 4) Armature short-circuit test

Check armature for short-circuit by placing it on growler tester. Hold a hacksaw blade against armature coil 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.

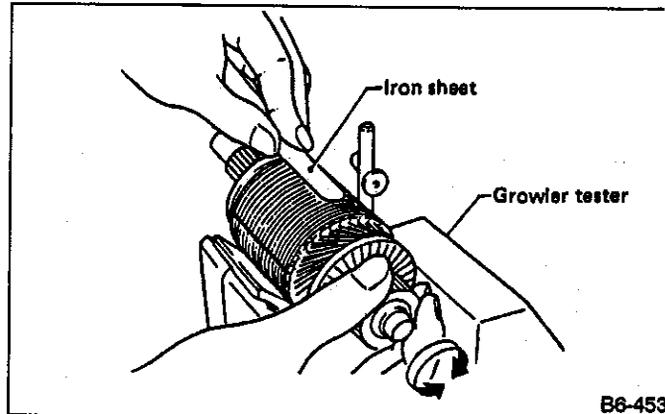


Fig. 56

### 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.

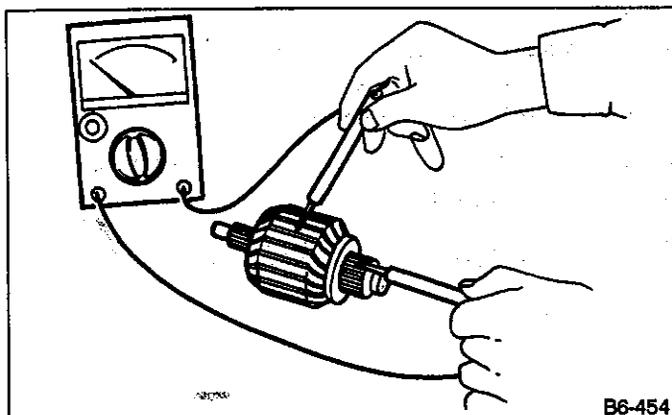


Fig. 57

**2. YOKE**

Make sure pole is set in position.

**3. OVERRUNNING CLUTCH**

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

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

**4. BRUSH AND BRUSH HOLDER**

1) Brush length

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

Replace if abnormal wear or cracks are noticed.

**Brush length:**

Standard	17.5 mm (0.689 in)
Service limit	12.0 mm (0.472 in)

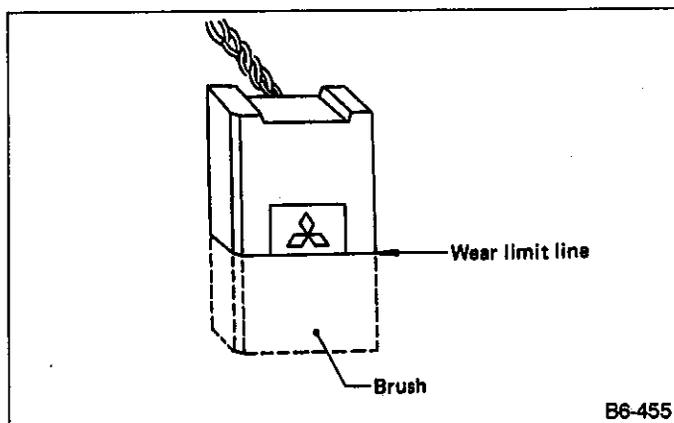


Fig. 58

2) Brush movement

Be sure brush moves smoothly inside brush holder.

3) Insulation of brush holder

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

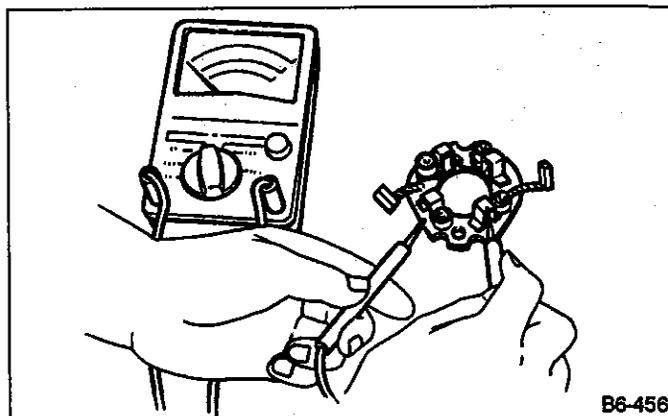


Fig. 59

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**

MIT70381A, MIT77181  
20.6 N (2.1 kg, 4.6 lb) (when new)

MIT75681  
24.5 N (2.5 kg, 5.5 lb) (when new)

**Service limit**

MIT70381, MIT77181  
6.9 N (0.7 kg, 1.5 lb)

MIT75681  
9.32 N (0.95 kg, 2.09 lb)

**5. SWITCH ASSEMBLY**

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

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

Terminal	
S — M	Continuity
S — Body ground	Continuity
M — B	No continuity

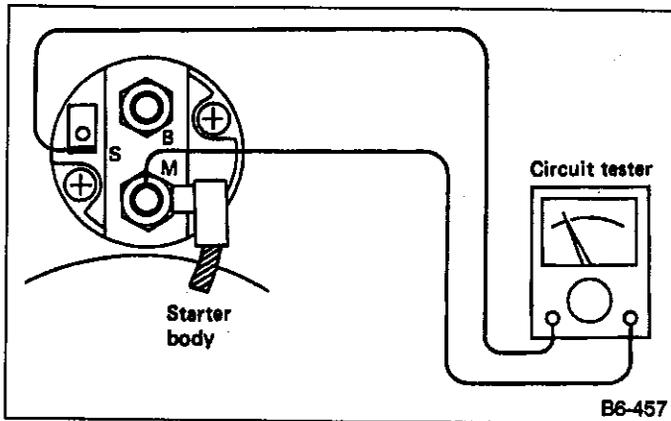


Fig. 60

**D: ASSEMBLY**

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

- 1) Carefully assemble all parts in the order of assembly and occasionally inspect nothing has been overlooked.
- 2) Apply grease to the following parts during assembly.
  - Front and rear bracket sleeve bearings
  - Armature shaft gear
  - Outer periphery of plunger
  - Mating surface of plunger and lever

- Gear shaft splines
- Mating surface of lever and clutch
- Ball at the armature shaft end
- Internal and planetary gears

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

**3. Alternator (HITACHI)****A: TEST****1. PRECAUTION**

Prepare the following measuring equipment:

- (1) DC voltmeter (V): 0 — 30 V
- (2) DC ammeter (A): 0 — 100 A
- (3) Variable resistor: 0.15 — 0.45  $\Omega$ , 1 kW
- (4) Switch (SW1 and SW2): 12 V
- (5) Test lamp: 12 V, 1.4 W

- Connect test leads [of at least 8 mm<sup>2</sup> (0.012 sq in) cross-sectional area and shorter than 2.5 m (8.2 ft)] in line "Y" (between alternator B terminal and battery positive terminal), and in line "Z" (between battery negative terminal and terminal E).
- Use switches SW1 and SW2 having as low a resistance as possible.

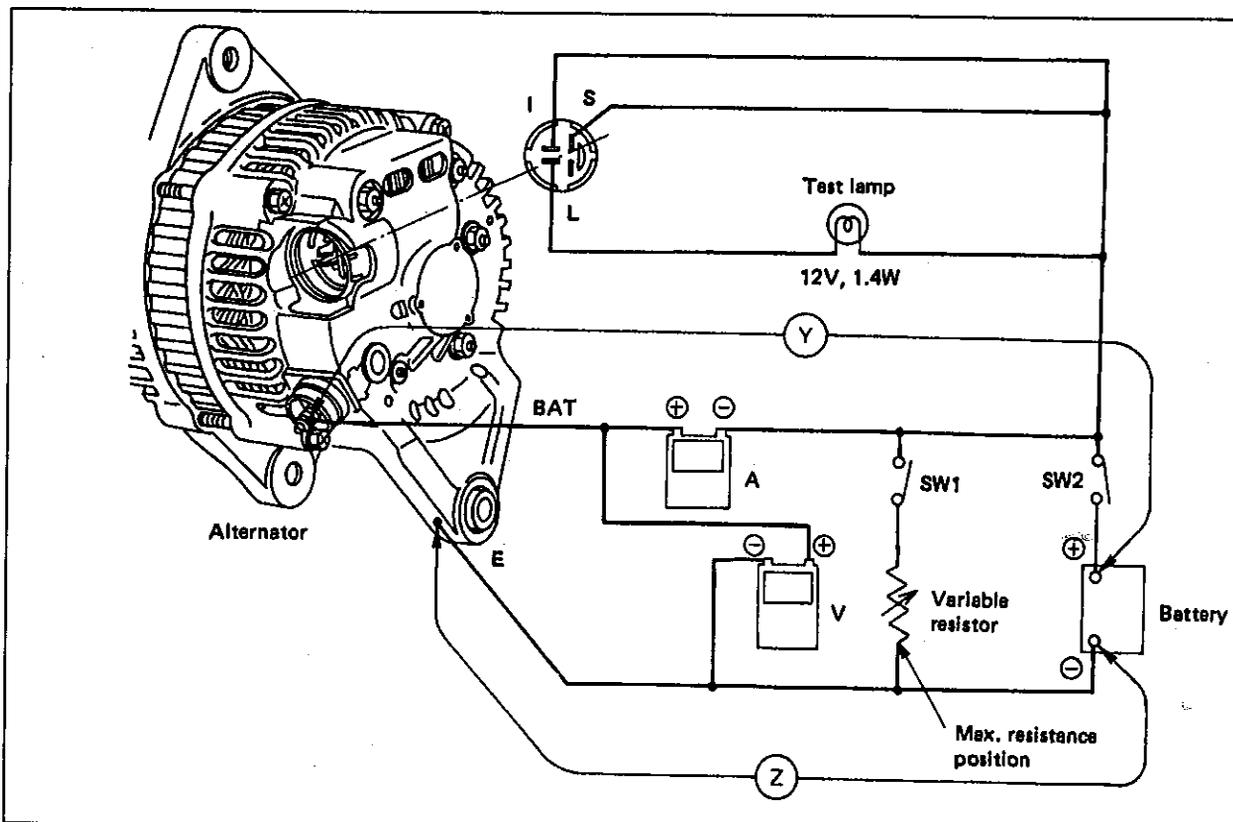


Fig. 61

**2. REGULATING VOLTAGE MEASUREMENT**

- 1) Open switch SW1 and close switch SW2.
- 2) Operate alternator at a rated speed of 6,000 rpm.
- 3) Measure regulating voltage (while operating at 6,000 rpm). If it is in the 14.1 to 14.8 V range, alternator is functioning properly.

**3. OUTPUT CURRENT MEASUREMENT**

- 1) Set variable resistor at maximum resistance position. Close both SW1 and SW2.
- 2) While adjusting variable resistor, increase alternator speed so that voltmeter registers 13.5 volts.
- 3) Measure output current values when alternator speeds reach 1,500, 3,000 and 6,000 rpm, respectively.

1,500 rpm	Greater than 33 A
3,000 rpm	Greater than 66 A
6,000 rpm	Greater than 80 A

**4. ALTERNATOR SPEED AT 13.5 V**

- 1) Open switch SW1, and close switch SW2. Gradually raise alternator speed, and read the speed when the voltage is 13.5 V.
- 2) The alternator is normal if it is turning at less than 1,000 rpm when the voltage is 13.5 V.

**B: DISASSEMBLY**

- 1) Remove through bolts from alternator. Detach front cover with rotor from rear cover with stator by lightly tapping on front cover with a plastic hammer.

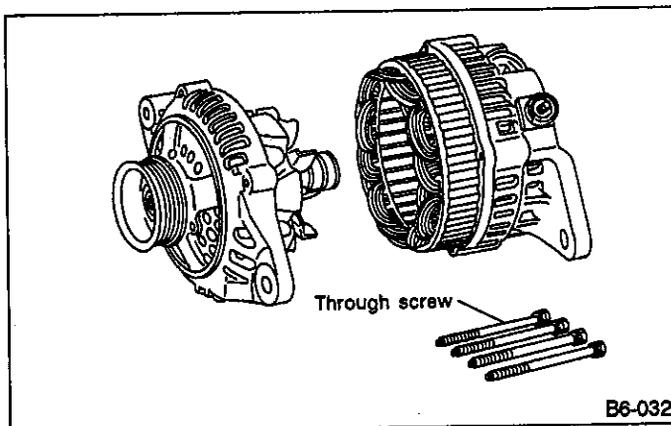


Fig. 62

- 2) Hold rotor with a vise and remove pulley nut. When holding rotor with vise, insert aluminum plates on the contact surfaces of the vise to prevent rotor from damage.

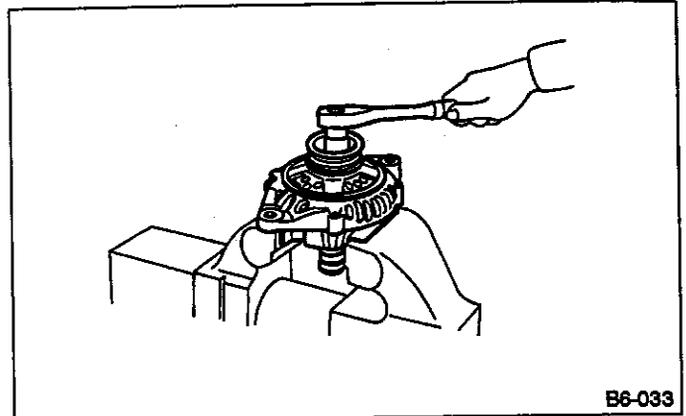


Fig. 63

- 3) Remove rotor from front cover.
- 4) Remove three screws from front cover and then bearing retainer and ball bearing.

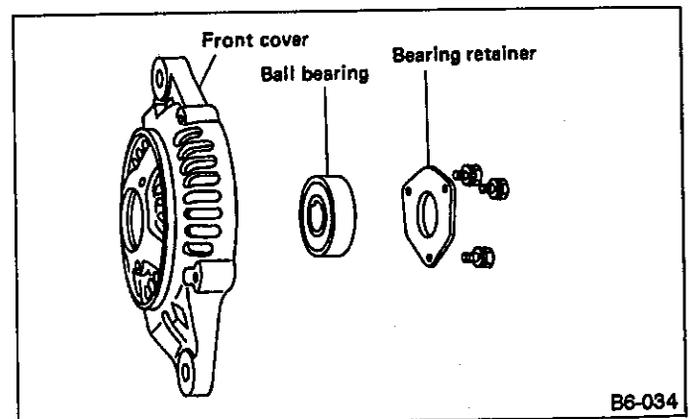


Fig. 64

- 5) Remove bolt which secure battery terminal bolt, and remove rear cover. Remove nuts which secure diode and IC regulator, and remove stator and rear cover.

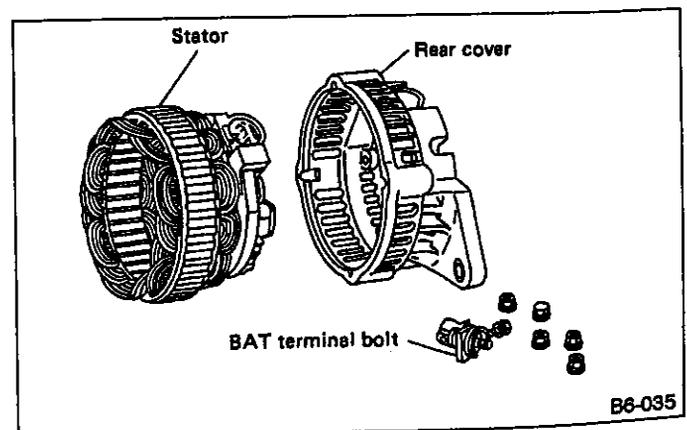


Fig. 65

6) Remove bolts which secure stator terminal to diode terminal, and remove stator.

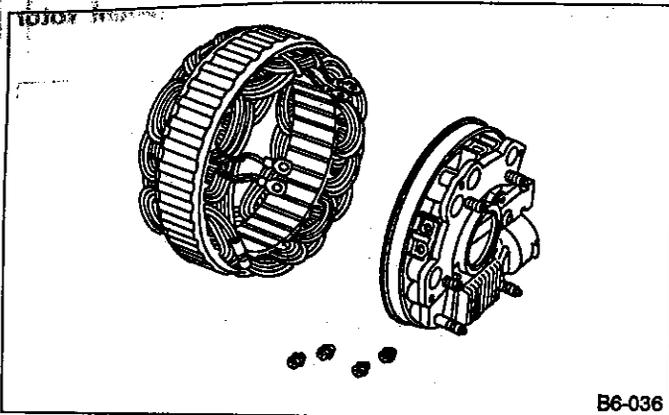


Fig. 66

7) Remove bolts which secure IC regulator ASSY, diode ASSY and brush holder, and separate these ASSY's.

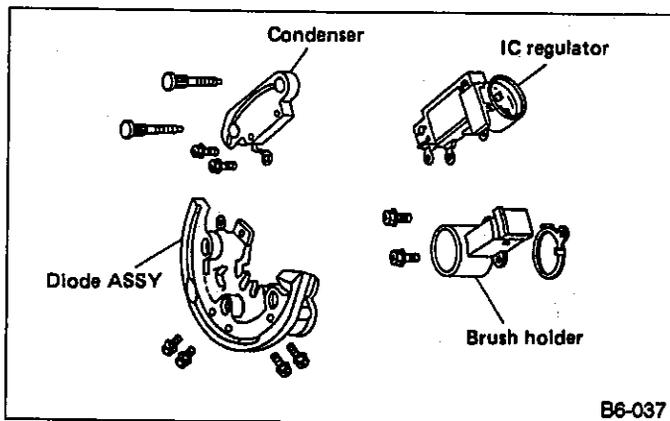


Fig. 67

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

## C: INSPECTION AND REPAIR

### 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.

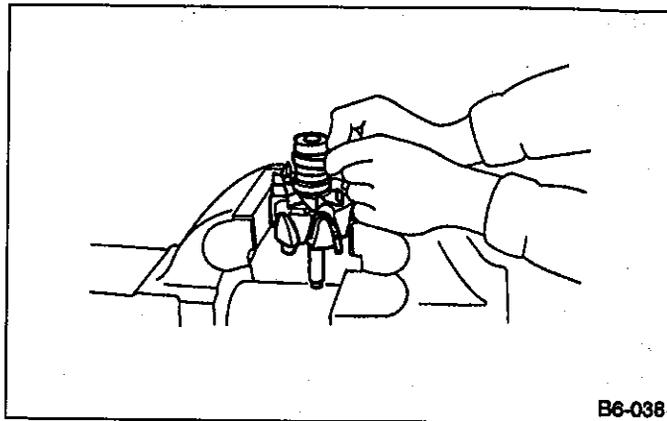


Fig. 68

#### 2) Slip ring outside diameter

Measure slip ring outside diameter. If slip ring is worn, replace rotor ASSY.

#### Slip ring outside diameter:

##### Standard

27 mm (1.06 in)

##### Limit

26 mm (1.02 in)

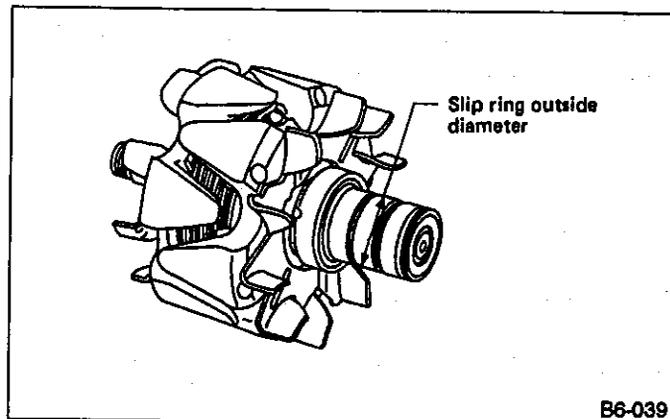


Fig. 69

#### 3) Continuity test

Check continuity between slip rings. If continuity does not exist, replace rotor ASSY.

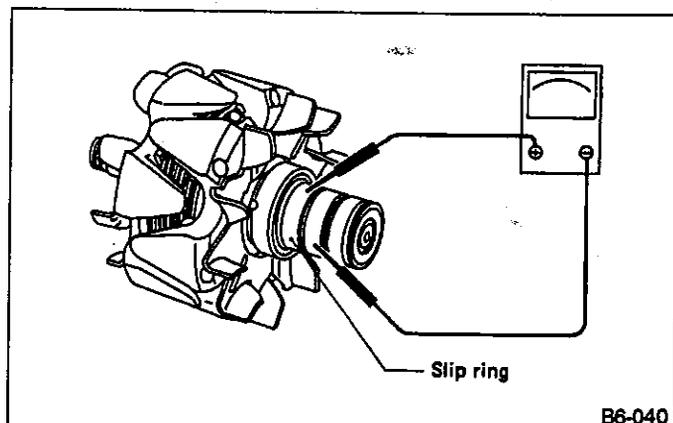


Fig. 70

4) Insulation test

Check continuity between slip ring and rotor core or shaft. If continuity exists, replace rotor ASSY.

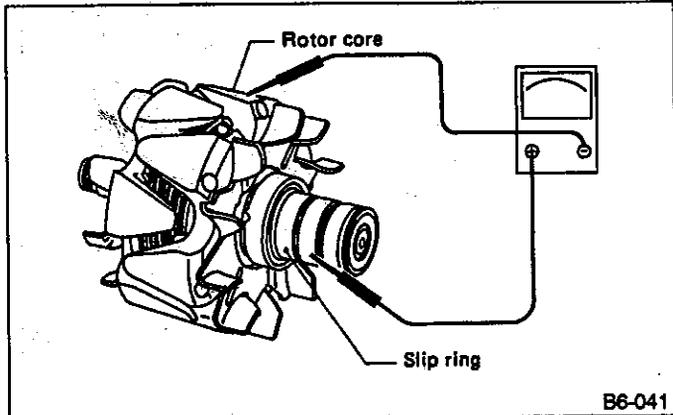


Fig. 71

5) Ball bearing

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

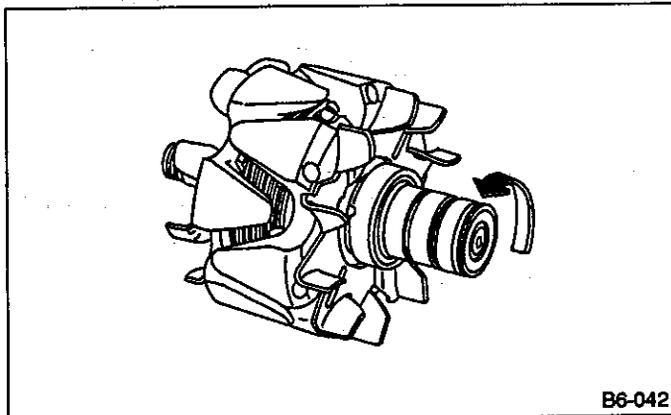


Fig. 72

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 ASSY.

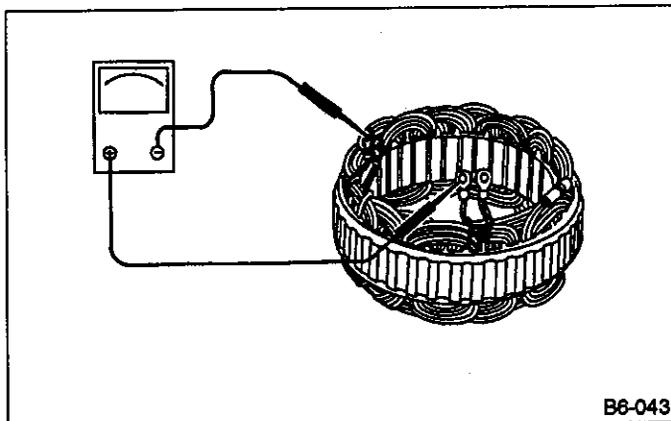


Fig. 73

2) Insulation test

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

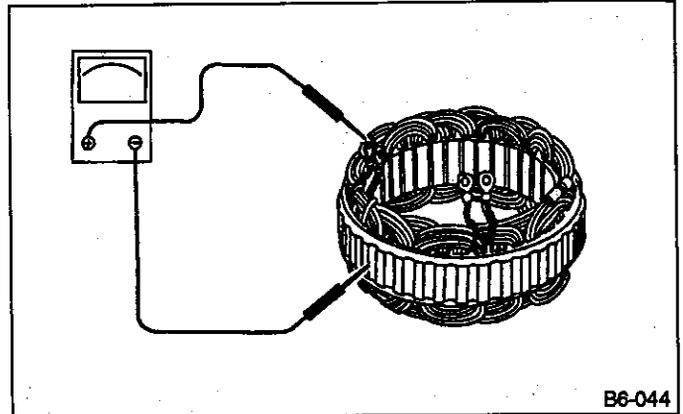


Fig. 74

3. BRUSH

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

Brush length (ℓ):

Standard

25 mm (0.98 in)

Limit

6 mm (0.24 in)

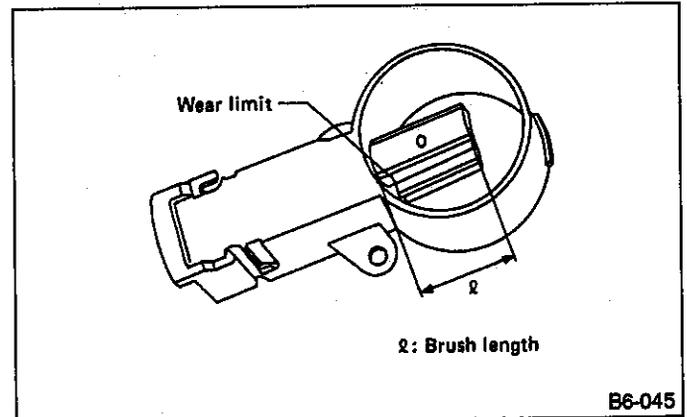


Fig. 75

4. DIODE ASSEMBLY

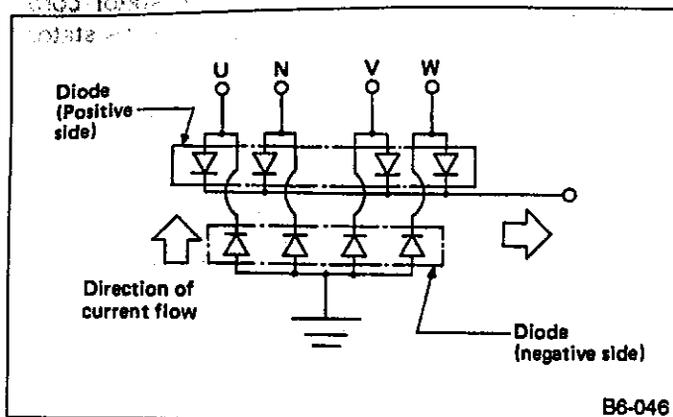


Fig. 76

The diode ASSY 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 ASSY.

1) Diodes on "+ " side

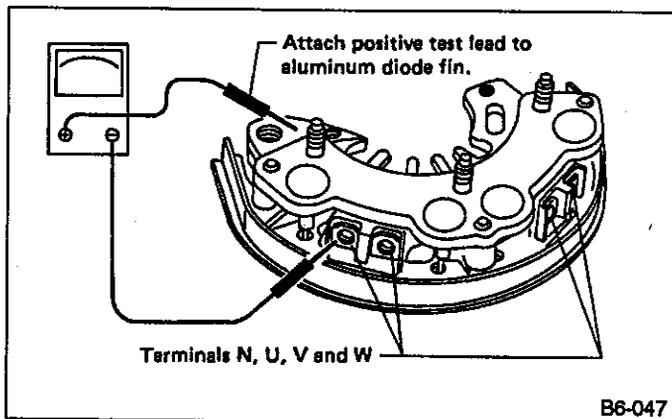


Fig. 77

Continuity of proper diodes on "+ " side

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

2) Diodes on "- " side

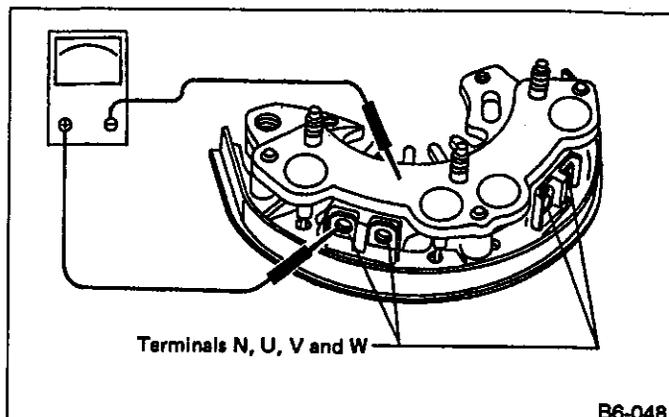


Fig. 78

Continuity of proper diodes on "- " side

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

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

5. IC REGULATOR

1) Prepare the following equipment:

- (1) Power supply: Variable 12 V DC
- (2) Lamp: L1 and L2, 12 V, 1.4 W, 2 each
- (3) Switch: SW1 and SW2, 12 V, 2 each
- (4) DC voltmeter (V): 0 — 50 V

2) Test procedure

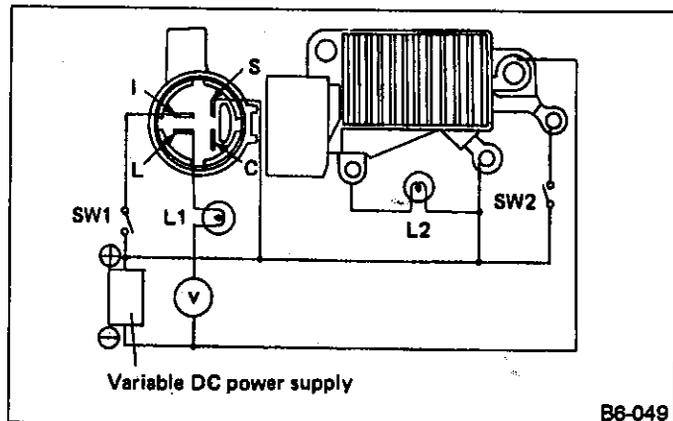


Fig. 79

- (1) Open switches SW1 and SW2.
- (2) Set variable DC power supply to 12 V.
- (3) Close switch SW1 to check L1 and L2 lamp conditions.

- (4) With switch SW1 closed, close switch SW2 to check L1 and L2.
- (5) With both switches closed, gradually increase variable DC power supply. Check L1 and L2 lamp conditions when power supply reaches the specified voltage range.

**Specified voltage range [at 20°C (68°F)]:**  
**14.1 — 14.8 V**

Step No.	Lamp L1	Lamp L2
(3)	ON (bright)	On (dark)
(4)	OFF	ON (bright)
(5)	OFF	OFF

If any of the test results are not as indicated in the above table, replace IC regulator.

**D: ASSEMBLY**

To assemble, reverse order of disassembly procedures

- a. Install a new ball bearing on rear of alternator.
- b. Rear ball bearing has a ring placed in eccentric groove of the outer race. Part of this ring protrudes beyond the outer race. Before assembling the ring, rotate it so that the protrusion is reduced to a minimum. Replace rear cover if it is worn or damaged at bearing location.

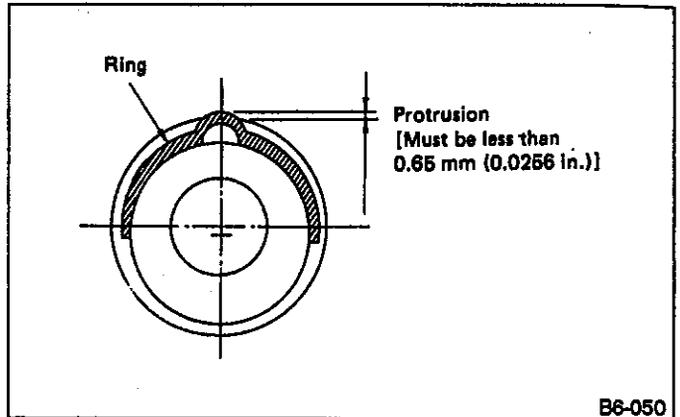


Fig. 80

- c. When installing front and rear covers, insert pin from outside of rear cover. Insert brush into brush holder. After cover installation, remove the pin.

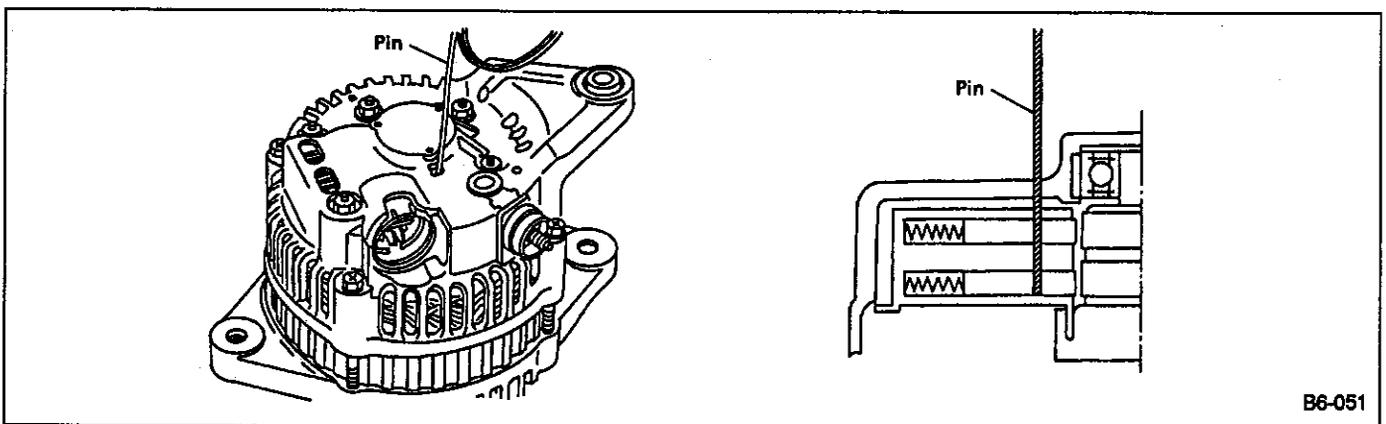


Fig. 81

**E: INSTALLATION**

- 1) Install alternator to bracket on engine with bolts and tighten bolts lightly.
- 2) After installing drive belt, pull belt by moving alternator with adjusting bolt and tighten installing bolts.
- 3) Check belt tension.
- 4) Connect lead wires to alternator.

- a. Be careful not to connect individual terminals erroneously.
- b. Pay careful attention to battery polarity so that it may not be reversed by wrong connection. If polarities are reversed, battery will be shorted by diode, excessive current will flow, and diodes or wire harness may be damaged.

## 4. Alternator (MITSUBISHI)

### A: DISASSEMBLY

1) Heat the bearing box to 50 to 60°C (122 to 140°F) with a 100 W-soldering iron and 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.

Be careful not to lose the spring fitted in the periphery of the rear bearing.

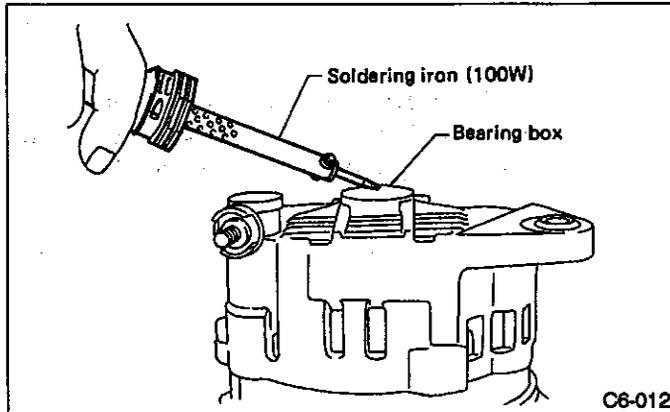


Fig. 82

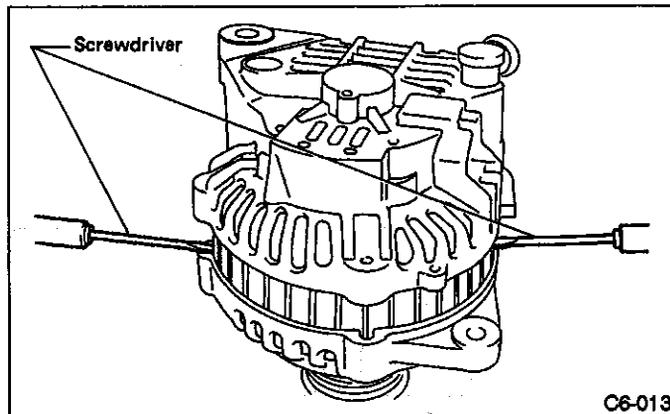


Fig. 83

2) Hold rotor with a vise and remove pulley nut. When holding rotor with vise, insert aluminum plate or wood pieces on the contact surfaces of the vise to prevent rotor from damage.

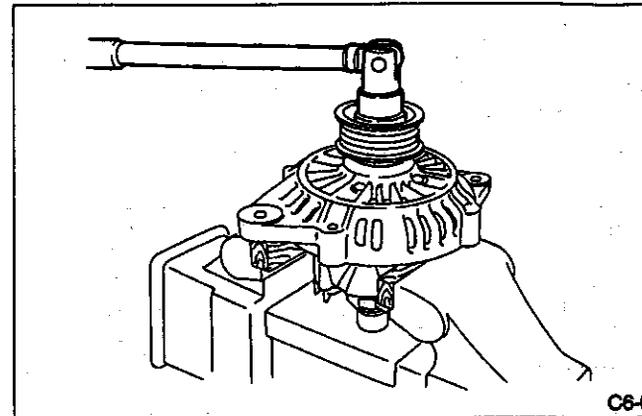


Fig. 84

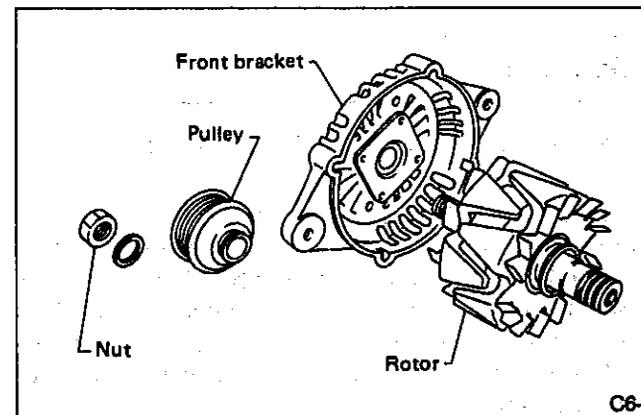


Fig. 85

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

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

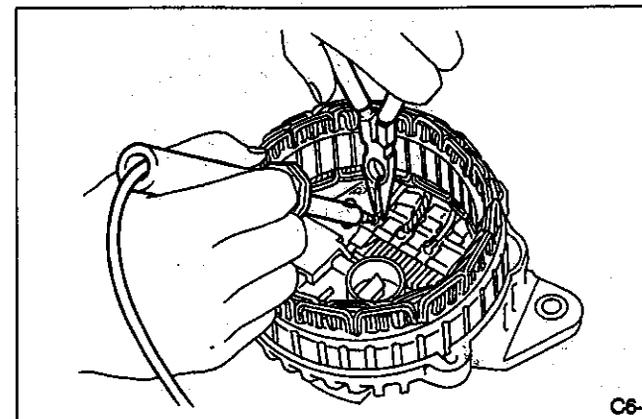
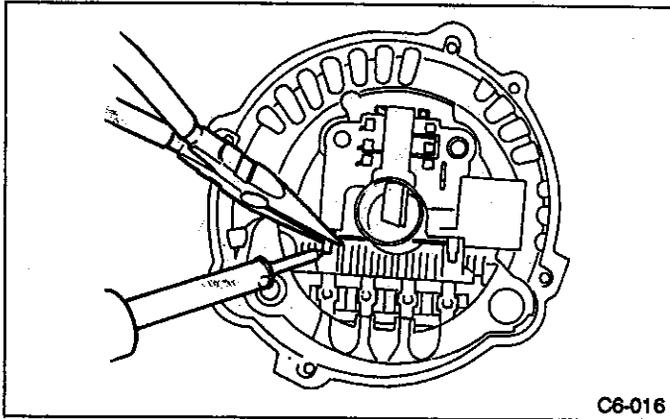


Fig. 86

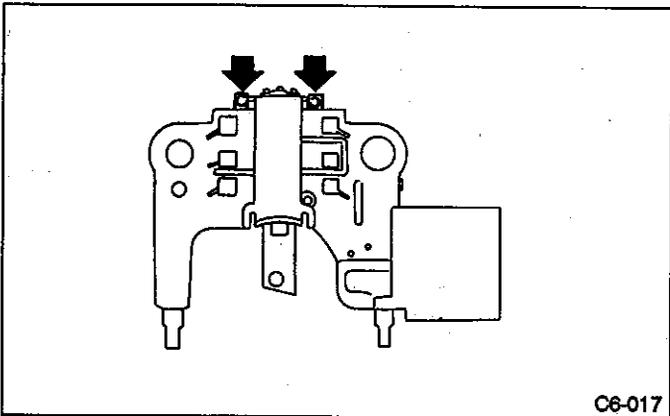
4) Remove screws which secure IC regulator to rear cover, and unsolder connection between IC regulator and rectifier to remove IC regulator.



C6-016

Fig. 87

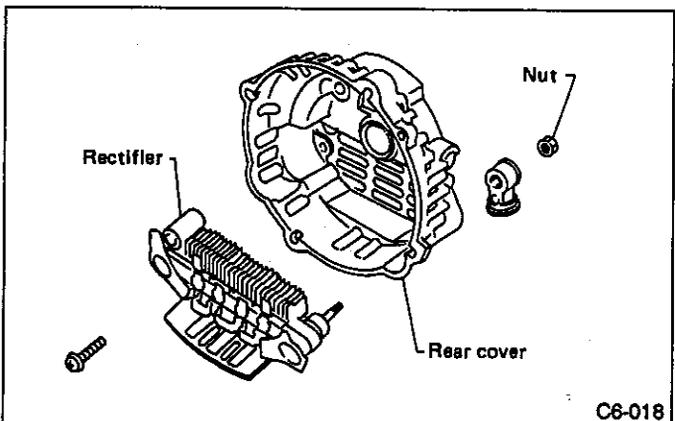
5) Remove the brushes by unsoldering at the pigtails.



C6-017

Fig. 88

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



C6-018

Fig. 89

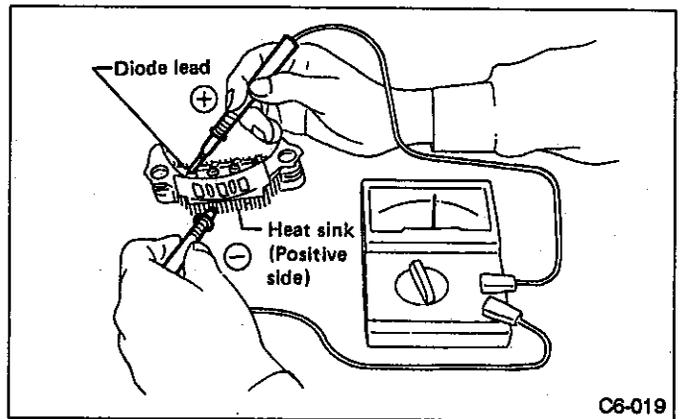
**B: INSPECTION AND REPAIR**

**1. DIODE**

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

1) Checking positive diode

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

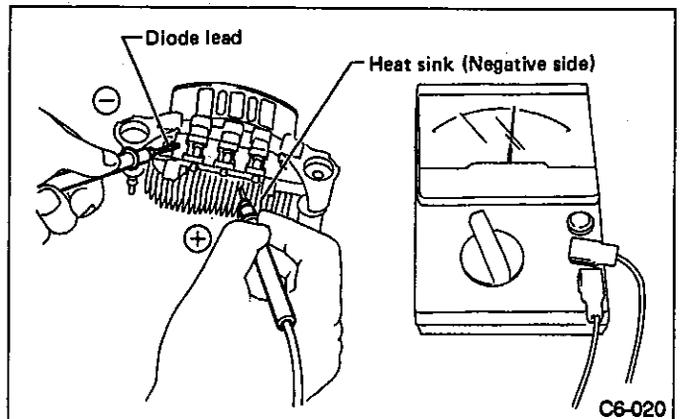


C6-019

Fig. 90

2) Checking negative diode

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



C6-020

Fig. 91

3) Checking trio diode

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

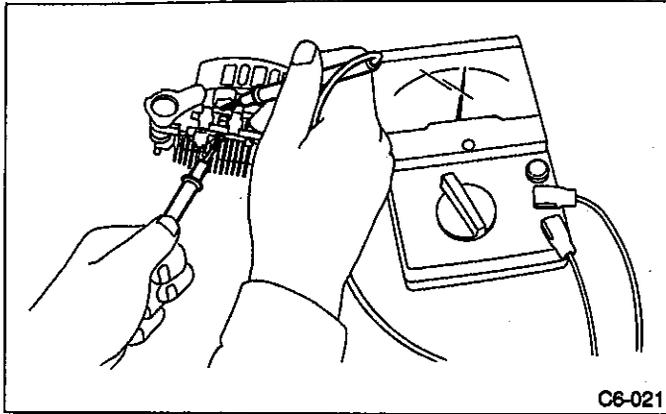


Fig. 92

## 2. ROTOR

### 1) Slip ring surface

Inspect slip rings for contamination or any roughness of the sliding surface. Repair slip ring surface using a lathe or sandpaper.

### 2) Slip ring outer diameter

Measure slip ring outer diameter. If slip ring is worn replace rotor ASSY.

#### Slip ring outer diameter:

##### Standard

22.7 mm (0.894 in)

##### Limit

22.1 mm (0.870 in)

### 3) Continuity test

Check resistance between slip rings using circuit tester. If the resistance is not within specification, replace rotor ASSY.

#### Specified resistance:

Approx. 3  $\Omega$

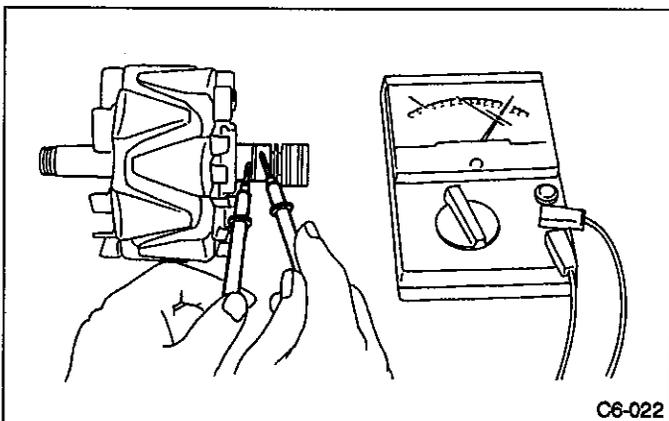


Fig. 93

### 4) Insulation test

Check continuity between slip ring and rotor core shaft. If continuity exists, the rotor coil is short-circuited and so replace rotor ASSY.

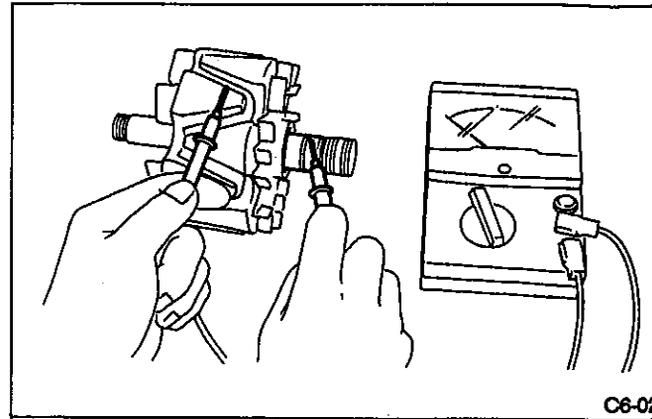


Fig. 94

### 5) Ball bearing (rear side)

(1) Check rear ball bearing. Replace it if it is noisy if rotor does not turn smoothly.

(2) The rear bearing can be removed by using coil bearing puller.

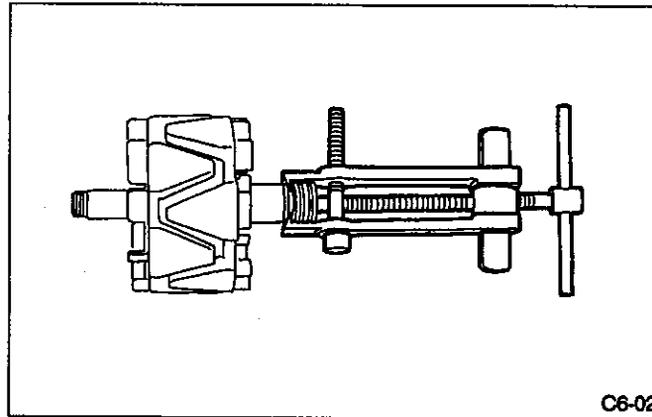


Fig. 95

## 3. STATOR

### 1) Continuity test

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

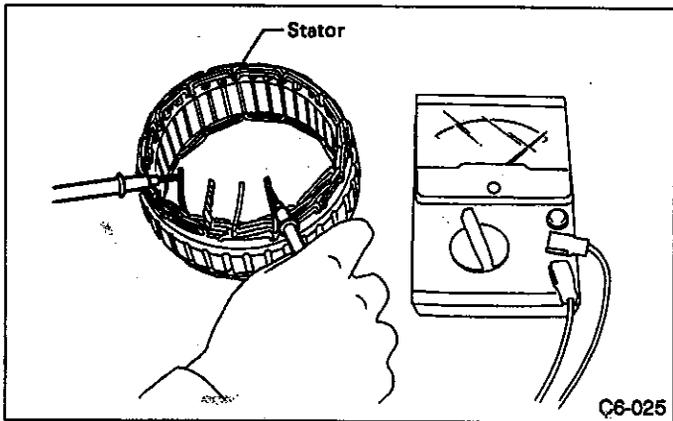


Fig. 96

2) Insulation test

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

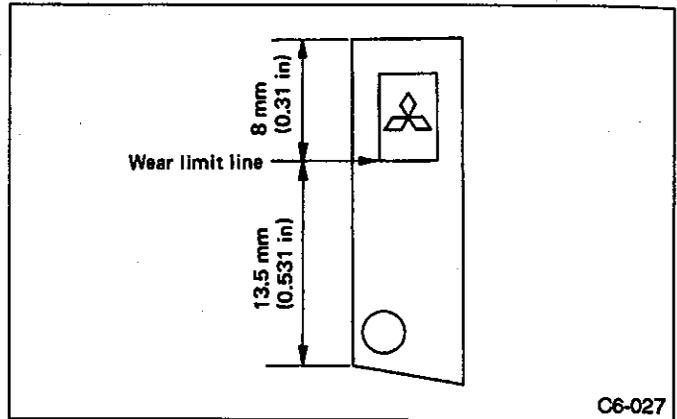


Fig. 98

2) Checking brush spring for proper pressure

Using a spring pressure indicator, push the brush into the brush holder until its tip protrudes 2 mm (0.08 in). Then measure the pressure of the brush spring. If the pressure is less than 1.765 N (180 g, 6.35 oz), replace the brush spring with a new one. The new spring must have a pressure of 3.334 to 4.119 N (340 to 420 g, 11.99 to 14.81 oz).

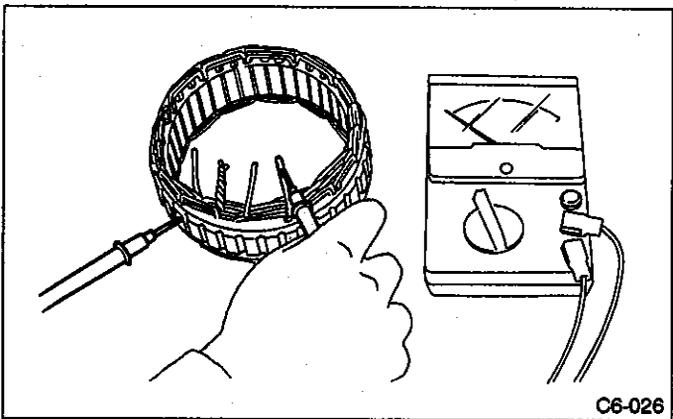


Fig. 97

4. BRUSH

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

Brush length:

Standard

21.5 mm (0.846 in)

Wear limit

8.0 mm (0.315 in)

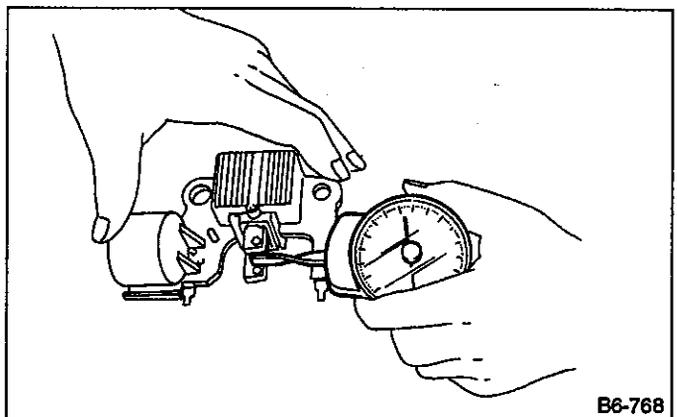


Fig. 99

5. BEARING (front side)

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

2) Replacing front bearing

(1) Remove front bearing retainer.

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

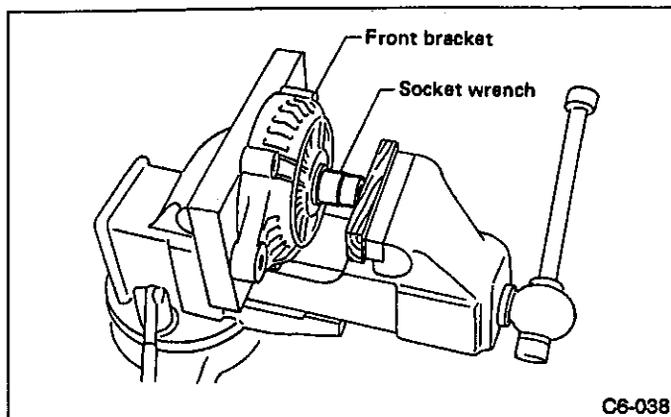


Fig. 100

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

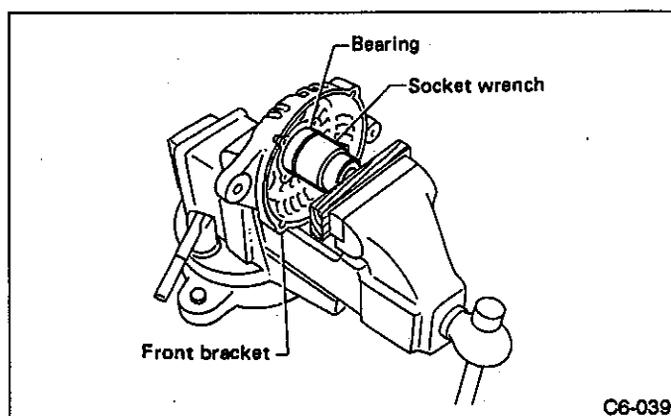


Fig. 101

(4) Install front bearing retainer.

### C: ASSEMBLY

To assemble, reverse order of disassembly.

1) The rear bearing has an eccentric groove on its periphery. Fit the lock spring into this groove so that the projecting part is in the deepest portion of the groove. This will reduce spring projection, making reassembly easy. Also, it assures greater locking effect, since the spring will be free from undue force during reassembly. The deepest portion of the groove has chamfered edges for easy identification.

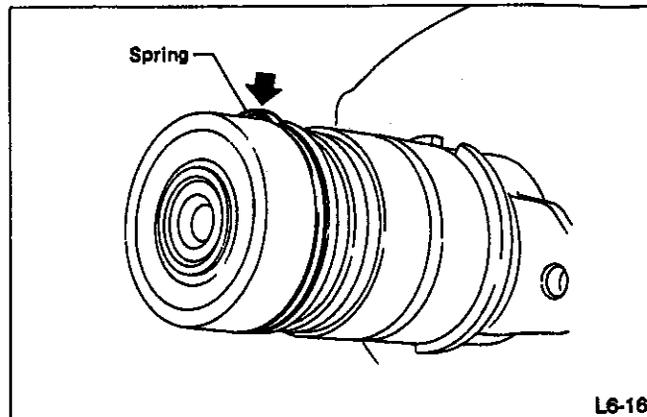


Fig. 102

2) Pulling up brush

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

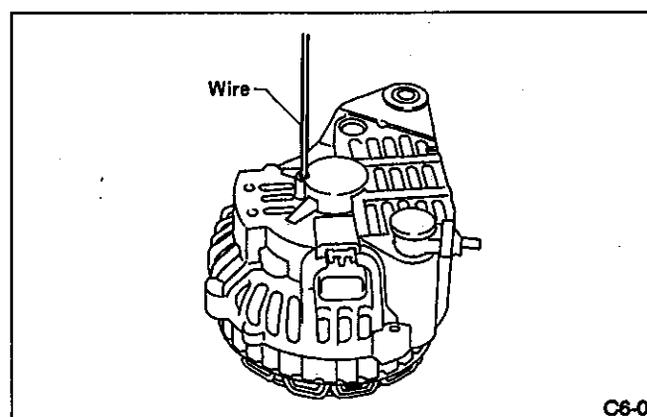


Fig. 103

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

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

## 5. Distributor

### A: DISASSEMBLY

1) Remove bolts, then remove distributor cap.

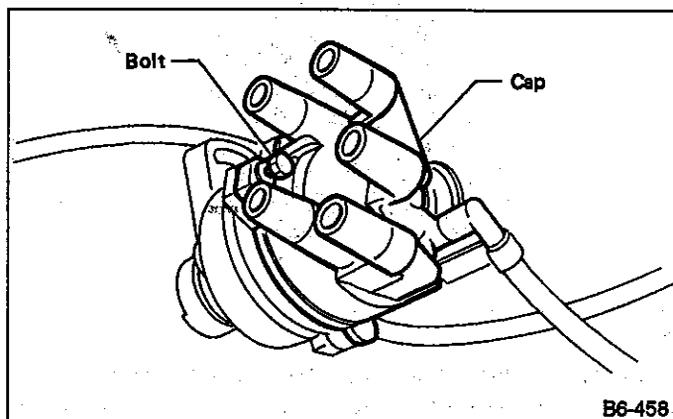


Fig. 104

2) Remove the rotor.

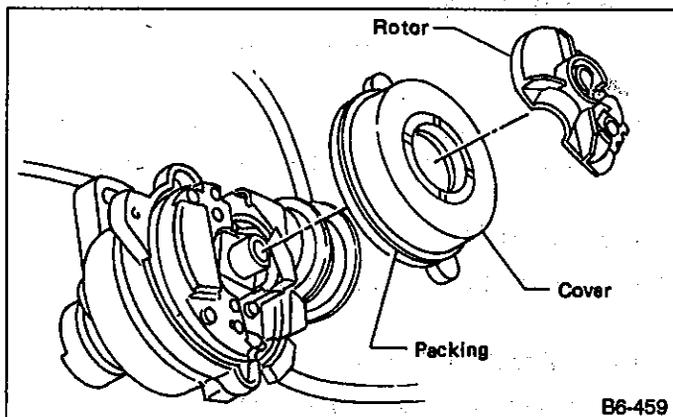


Fig. 105

3) Remove the cover with packing.

4) Disconnect leads from igniter.

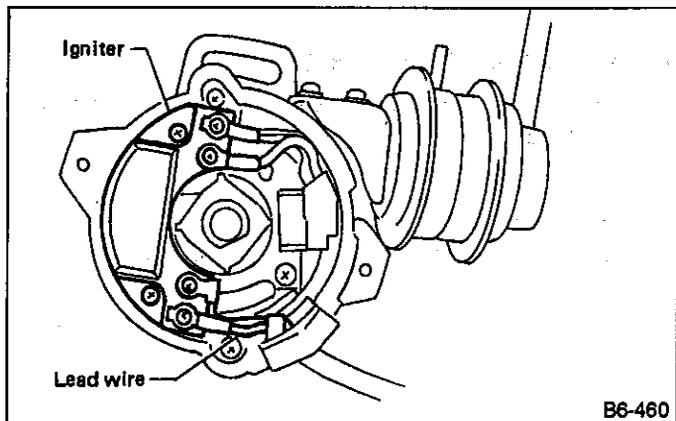


Fig. 106

5) Remove pickup coil and leads as a unit.

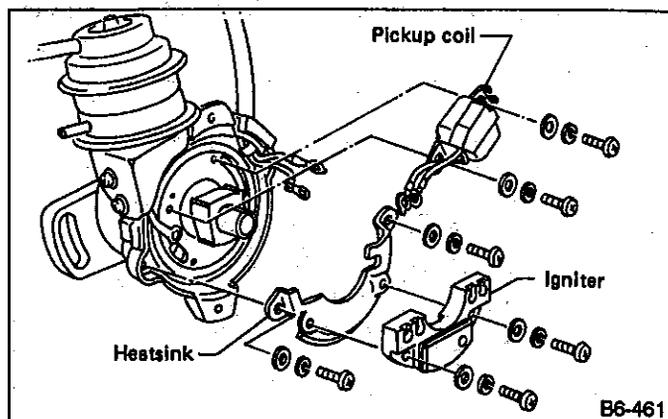


Fig. 107

6) Remove igniter.

7) Remove heatsink.

8) Loosen screw securing electric wiring, and remove lead wire guide and clamp.

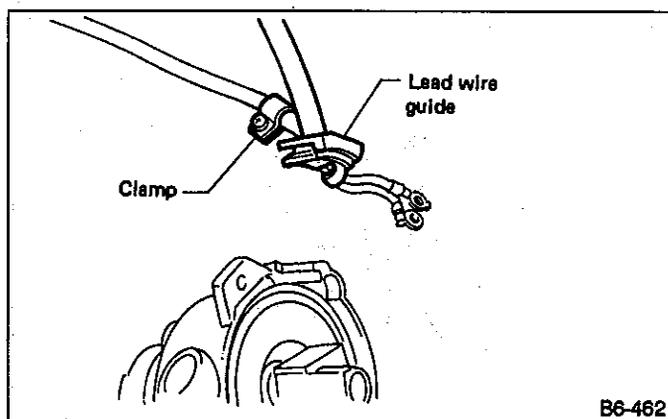


Fig. 108

9) Remove the snap ring and screw, and extract vacuum controller.

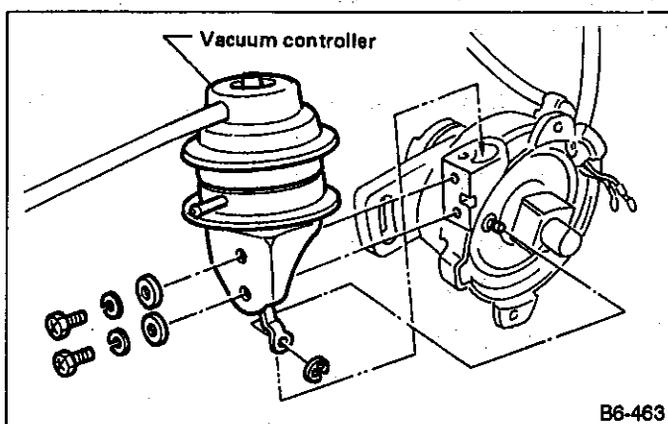


Fig. 109

10) Remove signal rotor and breaker plate.

- (1) Align groove (on engine side) with alignment mark.

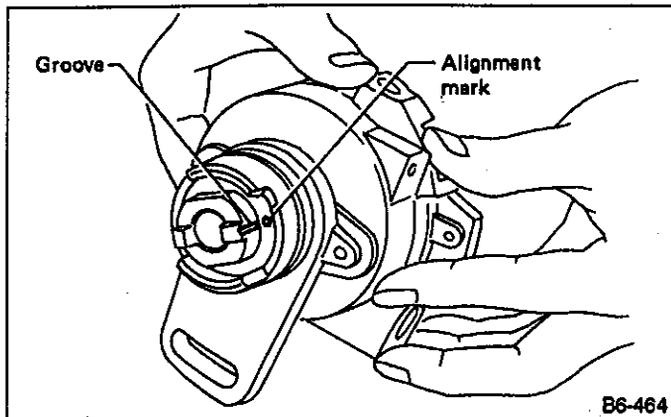


Fig. 110

- (2) Record location of cutout portion at the end of signal rotor before removing signal rotor.

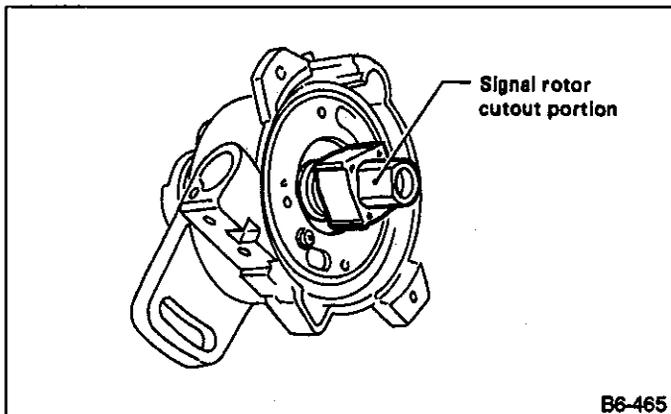


Fig. 111

Incorrect ignition timing will be set if governor shaft and signal rotor are not placed in the specified position during reassembly.

- (3) Loosen bolt, and remove signal rotor and breaker plate.

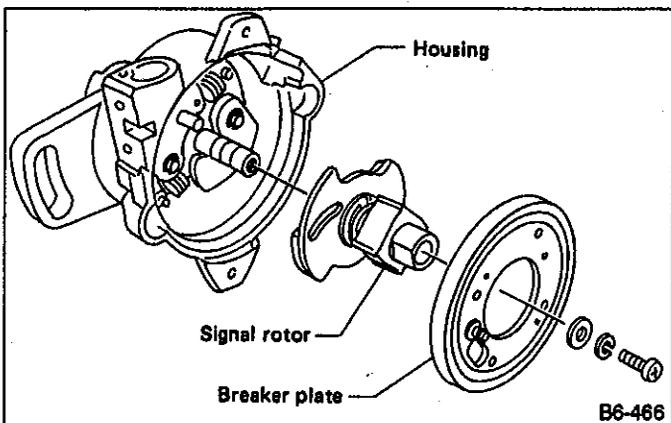


Fig. 112

11) Unhook governor springs with long-nosed pliers and remove snap rings.

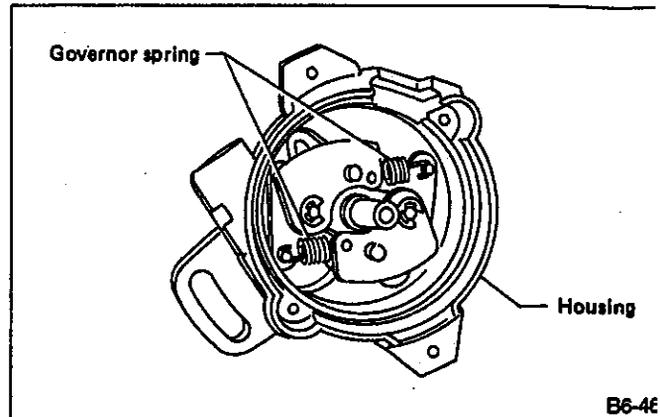


Fig. 113

- a. Be careful not to damage springs and hooks.  
b. Do not disassemble governor ASSY unless necessary.

## B: INSPECTION

### 1. CAP

- 1) Carbon point for wear and operation
- 2) Terminals for wear and evidence of corrosion

### 2. ROTOR HEAD

- 1) For deformation and corrosion

### 3. GOVERNOR SPRING

- 1) For damage, rust, permanent set

### 4. GOVERNOR WEIGHT

- 1) For damage, deformation, and rust

### 5. VACUUM CONTROLLER

- 1) Apply vacuum pressure using a vacuum pump and check for leakage.

### 6. LEAD WIRE

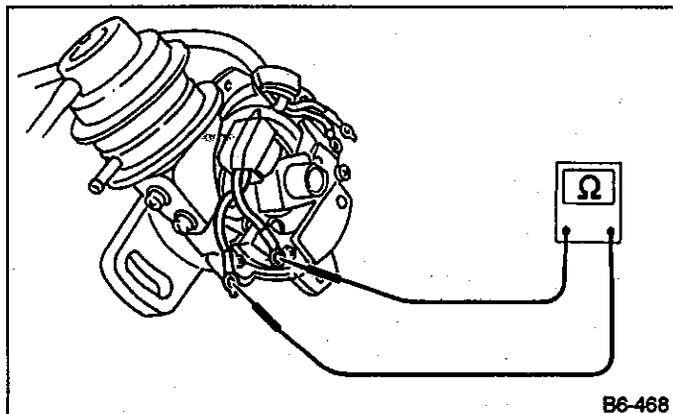
- 1) Lead wire sheathing for cracks, and terminals for corrosion

## 7. INSPECTION OF PICKUP COIL

Disconnect G and R leads from igniter, and measure resistance between the two leads.

**Specified resistance:**

**420 — 540  $\Omega$**

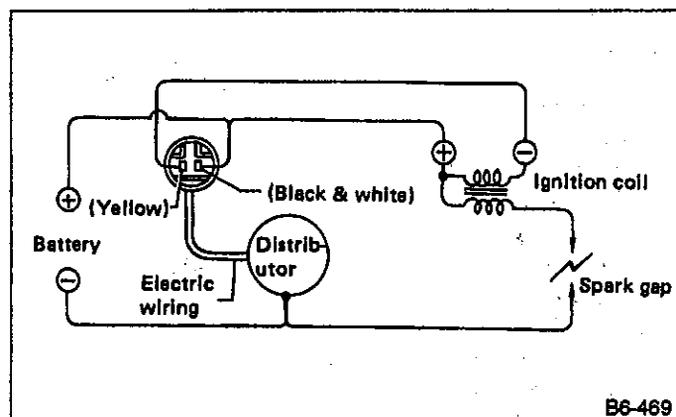


B6-468

Fig. 114

## 8. INSPECTION OF IGNITER

Set up igniter as shown in Figure 115. Hand-rotate distributor shaft with your hand to check that sparks occur. If no sparks occur, replace igniter.



B6-469

Fig. 115

This check should be conducted after pickup coil and air gap have been checked. (Refer to "Assembly".)

## C: ASSEMBLY

Assembly is in the reverse order of disassembly.

Observe the following:

1) Apply a coat of grease to:

- (1) Signal rotor head (at bolt location)
- (2) Sliding surface of breaker plate

2) Governor spring

Governor spring can be attached to either hook pin.

3) Install signal rotor while aligning its cutout portion with the original point before alignment is made.

4) After installing vacuum controller, install igniter and pickup coil.

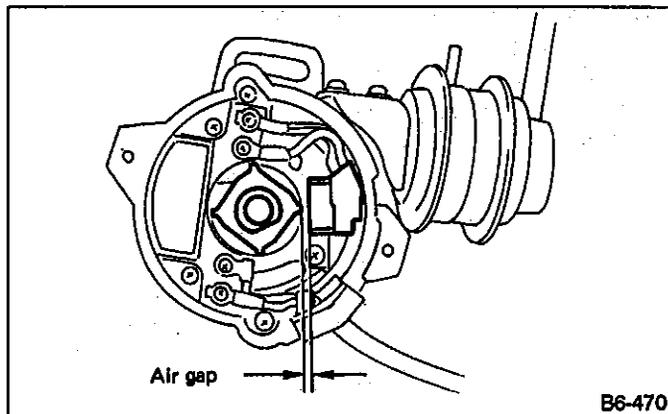
5) Connect lead wires to their proper positions.

6) Air gap

After properly assembling parts, measure air gap between signal rotor and pickup coil with a thickness gauge.

**Specified air gap:**

**More than 0.25 mm (0.0098 in)**



B6-470

Fig. 116

If necessary, adjust the air gap.

## 6. Ignition Coil

### A: REMOVAL AND INSPECTION

#### 1. EXCEPT TURBO MODEL

1) Remove spark plug cord, distributor cord and connector from ignition coil.

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

- (1) Primary resistance
- (2) Secondary coil resistance

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

#### [MPFI]

Specified resistance:

[Primary side]

Between ① and ②

Between ③ and ④

0.63 — 0.77  $\Omega$

[Secondary side]

Between terminal No. 1 and No. 2

Between terminal No. 3 and No. 2

10.4 — 15.6 k $\Omega$

[Insulation resistance]

Between primary terminal and case

More than 10 M $\Omega$

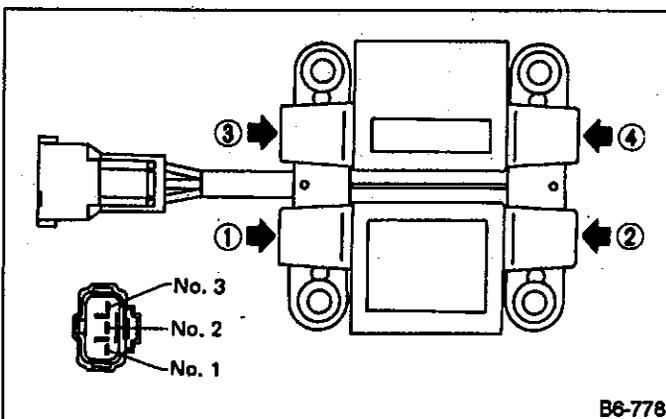


Fig. 117

#### [SPFI]

Specified resistance:

[Primary side]

Between terminal No. 2 and No. 3

0.81 — 0.99  $\Omega$

[Secondary side]

Between terminal No. 2 and secondary terminal

8 — 12 k $\Omega$

[Insulation resistance]

Between primary terminal and case

More than 10 M $\Omega$

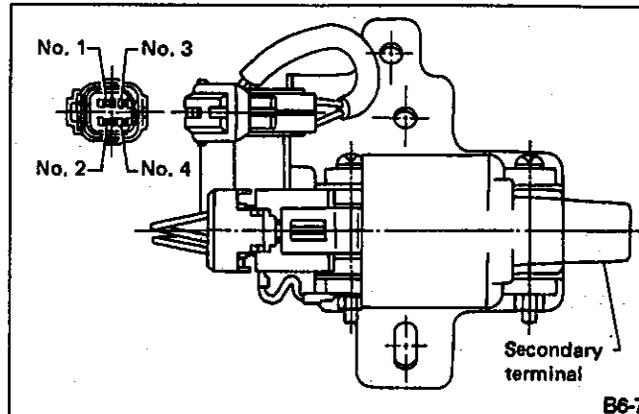


Fig. 118

#### [Carburetor]

Specified resistance:

[Primary side]

Between terminal No. 1 and No. 2

1.4 — 1.7  $\Omega$

[Secondary side]

Between terminal No. 1 and secondary terminal

12.8 — 17.3  $\Omega$

[Insulation resistance]

Between primary terminal and case

More than 10 M $\Omega$

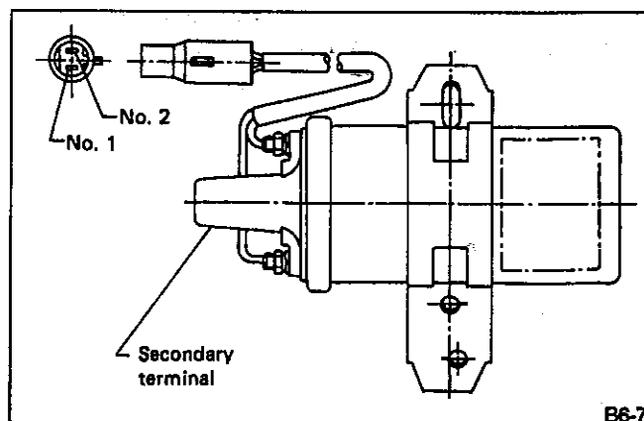


Fig. 119

**2. TURBO MODEL**

- 1) Removal of ignition coil (RH).
  - (1) Dismount accelerator cable from clamps.
  - (2) Remove air intake boot and air cleaner case.
  - (3) Disconnect ignition coil harness connector.
  - (4) Remove ignition coil.
- 2) Removal of ignition coil (LH).
  - (1) Remove battery and window washer tank.
  - (2) Disconnect ignition coil harness connector.
  - (3) Remove ignition coil.

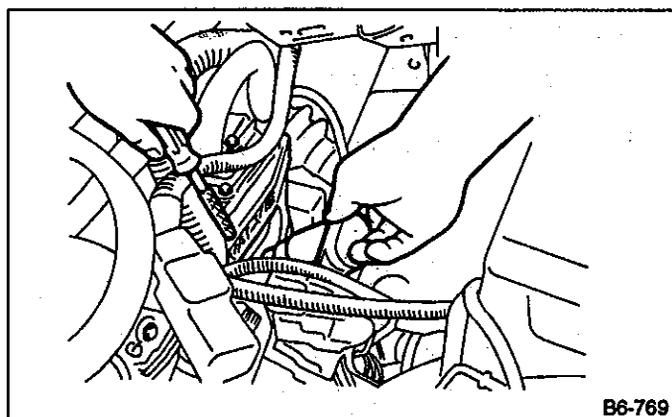


Fig. 120

3) Using accurate tester, measure the primary coil resistance.

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
- 0.68 — 0.83 Ω
- [Insulation resistance]
- Between primary terminal and case
- More than 10 MΩ

4) Using digital ammeter, check the secondary coil.

**Specified current value:**

- [Secondary side]
- Approximately 0.32 mA

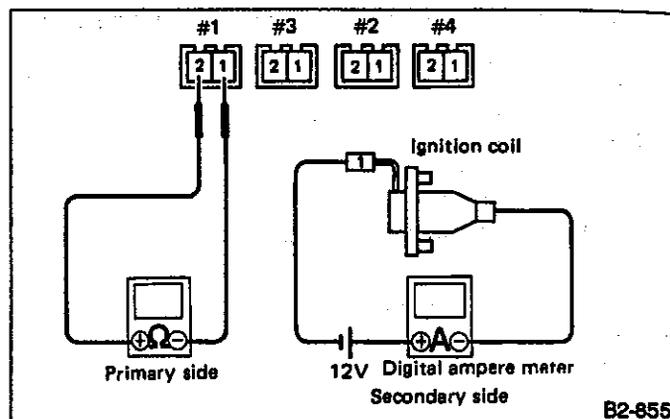


Fig. 121

5) If a digital ammeter is not available, use method described below.

- (1) Disconnect all fuel injector connectors.
- (2) Remove ignition coil to be checked from cylinder head.
- (3) Install good spark plug to ignition coil.
- (4) Make sure all ignition coil connectors except the one to be checked are disconnected.
- (5) Contact metal section of spark plug to cylinder head. Turn ignition switch to "START" to make sure spark occurs between spark plug electrodes.
- (6) If spark does not occur, check primary coil condition. If primary coil is satisfactory, secondary coil is faulty.

Before checking secondary coil using "spark" method described above, make sure the other ignition systems are in good condition. (Ref. to 2-7c [T6C0].)

6) Installation is in the reverse order of removal.

**Tightening torque (Ignition coil):**

- 4.4 — 5.4 N·m (0.45 — 0.55 kg-m, 3.3 — 4.0 ft-lb)

**7. Spark Plug**

**A: DESCRIPTION**

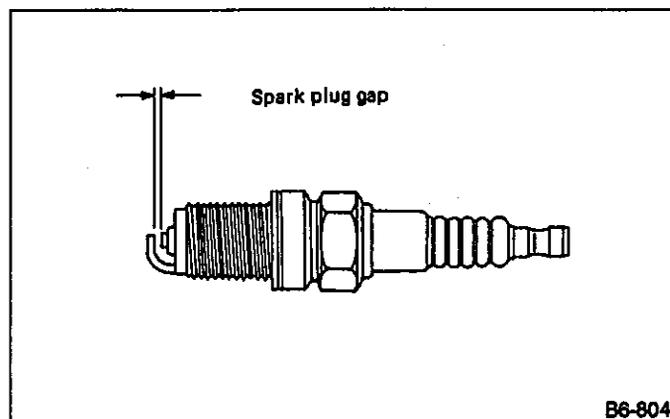


Fig. 122

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

1600cc, 1800cc:

[Carburetor]

Recommended spark plug

NGK BKR6E

NIPPONDENSO K20PR-U

Spark plug gap

0.8 mm (0.031 in)

1800cc:

[SPFI]

Recommended spark plug

NGK BKR6E-11

NIPPONDENSO K20PR-U11

Spark plug gap

1.1 mm (0.043 in)

2000cc:

[NON-TURBO]

Recommended spark plug

NGK BKR6E-11

NIPPONDENSO K20PR-U11

Spark plug gap

1.1 mm (0.043 in)

[TURBO]

Recommended spark plug

NGK BKR6EVX

Spark plug gap

0.8 mm (0.031 in)

2200cc:

[without O<sub>2</sub> sensor]

Recommended spark plug

NGK BKR6E

NIPPONDENSO K20PR-U

Spark plug gap

0.8 mm (0.031 in)

[with O<sub>2</sub> sensor]

Recommended spark plug

NGK BKR6E-11

NIPPONDENSO K20PR-U11

Spark plug gap

1.1 mm (0.043 in)

## B: REMOVAL AND INSTALLATION

### 1. EXCEPT TURBO MODEL

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

Tightening torque (Spark plug):

18 — 24 N•m (1.8 — 2.4 kg-m, 13 — 17 ft-lb)

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

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

- 4) Connect spark plug cords.

### 2. TURBO MODEL

- 1) Remove ignition coil from cylinder head.

(Ref. to "5 Ignition Coil" [W5A2].)

- 2) Remove spark plug using spark plug wrench.

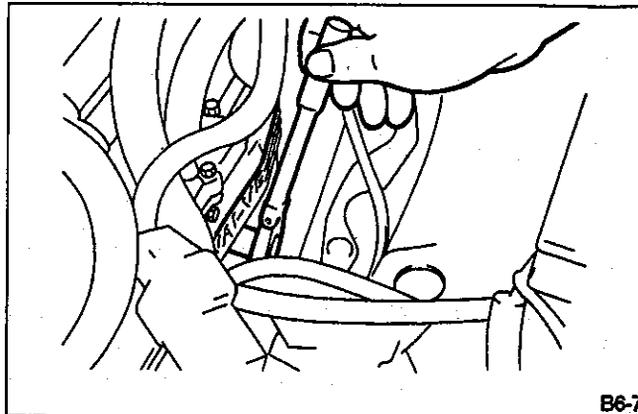


Fig. 123

- 3) When installing spark plug on cylinder head, use spark plug wrench.

Tightening torque (Spark plug):

20 — 29 N•m (2 — 3 kg-m, 14 — 22 ft-lb)

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

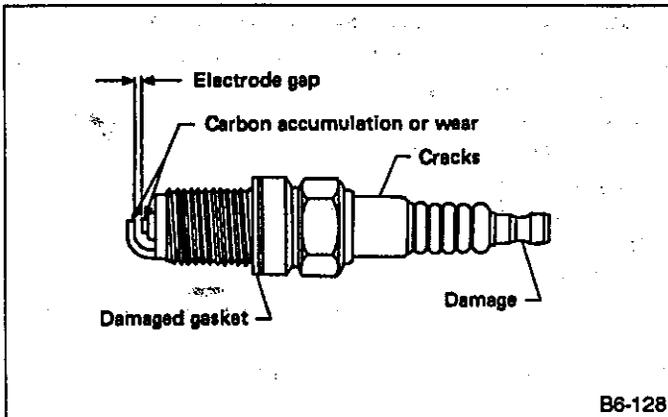
If their threads are lubricated, the torque should be reduced by approximately 1/3 of the specified torque in order to avoid over-stressing.

- 4) Install ignition coil.

Tightening torque (Ignition plug):

4.4 — 5.4 N•m (0.45 — 0.55 kg-m, 3.3 — 4.0 ft-lb)

**C: INSPECTION**



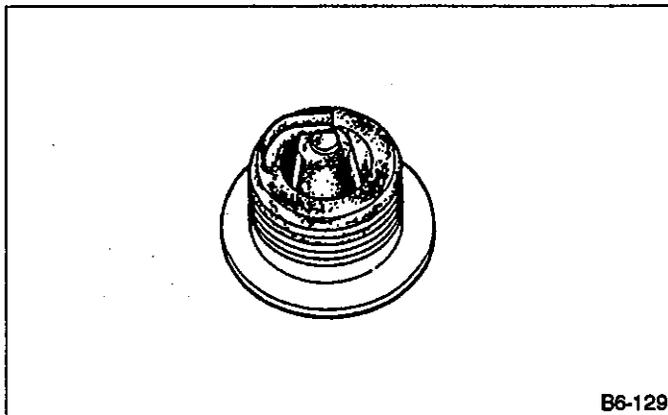
B6-128

*Fig. 124*

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.

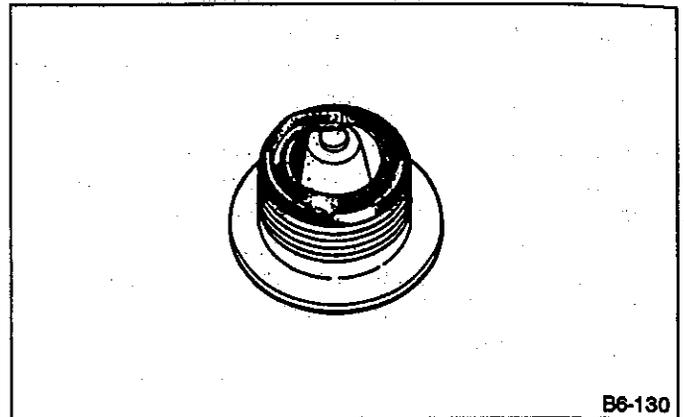


B6-129

*Fig. 125*

**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.

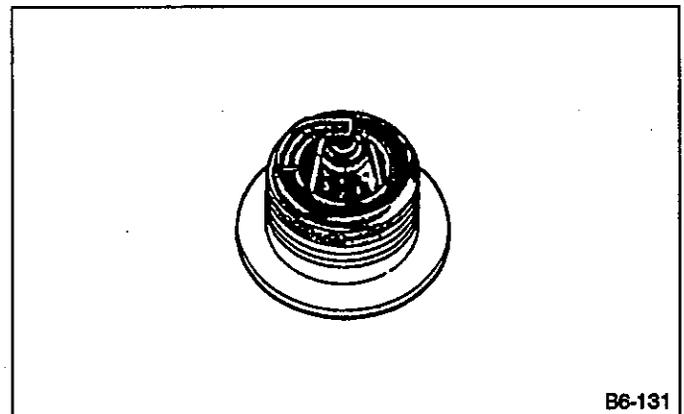


B6-130

*Fig. 126*

**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.

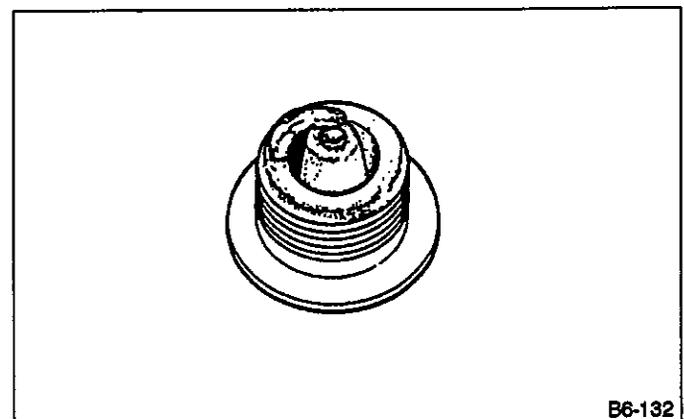


B6-131

*Fig. 127*

**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.



B6-132

*Fig. 128*

**D: CLEANING AND REGAPPING****1. EXCEPT TURBO MODEL**

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.

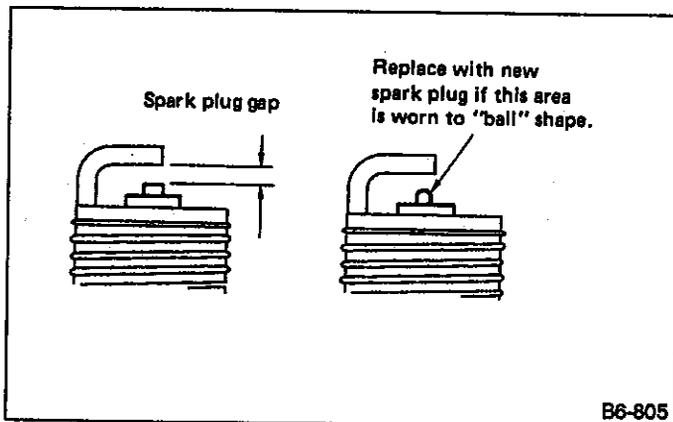


Fig. 129

B6-805

**2. TURBO MODEL**

Do not clean spark plug or adjust plug gap as this will damage platinum tip of electrode. However, if carbon accumulates excessively on electrodes due to "poor" sparks, use a sand blast type plug cleaner under following conditions:

Plug cleaner usage condition:

Air pressure

588 kPa (6.0 kg/cm<sup>2</sup>, 85 psi) or less

Time required

20 sec. or less

Never use wire brush when cleaning.

## 8. Spark Plug Cord

### A: INSPECTION

Check for:

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

[MPFI]

	Resistance value (kΩ)	Length mm (in)
#1 cord	5.29 — 12.34	575 (22.64)
#2 cord	5.24 — 12.23	570 (22.44)
#3 cord	5.29 — 12.34	575 (22.64)
#4 cord	5.96 — 13.91	645 (25.39)

[SPFI and Carburetor]

	Resistance value (kΩ)	Length mm (in)
Distributor cord	6.1 — 11.4	550 (21.65)
#1 cord	6.5 — 12.0	640 (25.20)
#2 cord	11.5 — 21.4	1,090 (42.91)
#3 cord	5.7 — 10.6	570 (22.44)
#4 cord	11.6 — 21.6	1,100 (43.31)

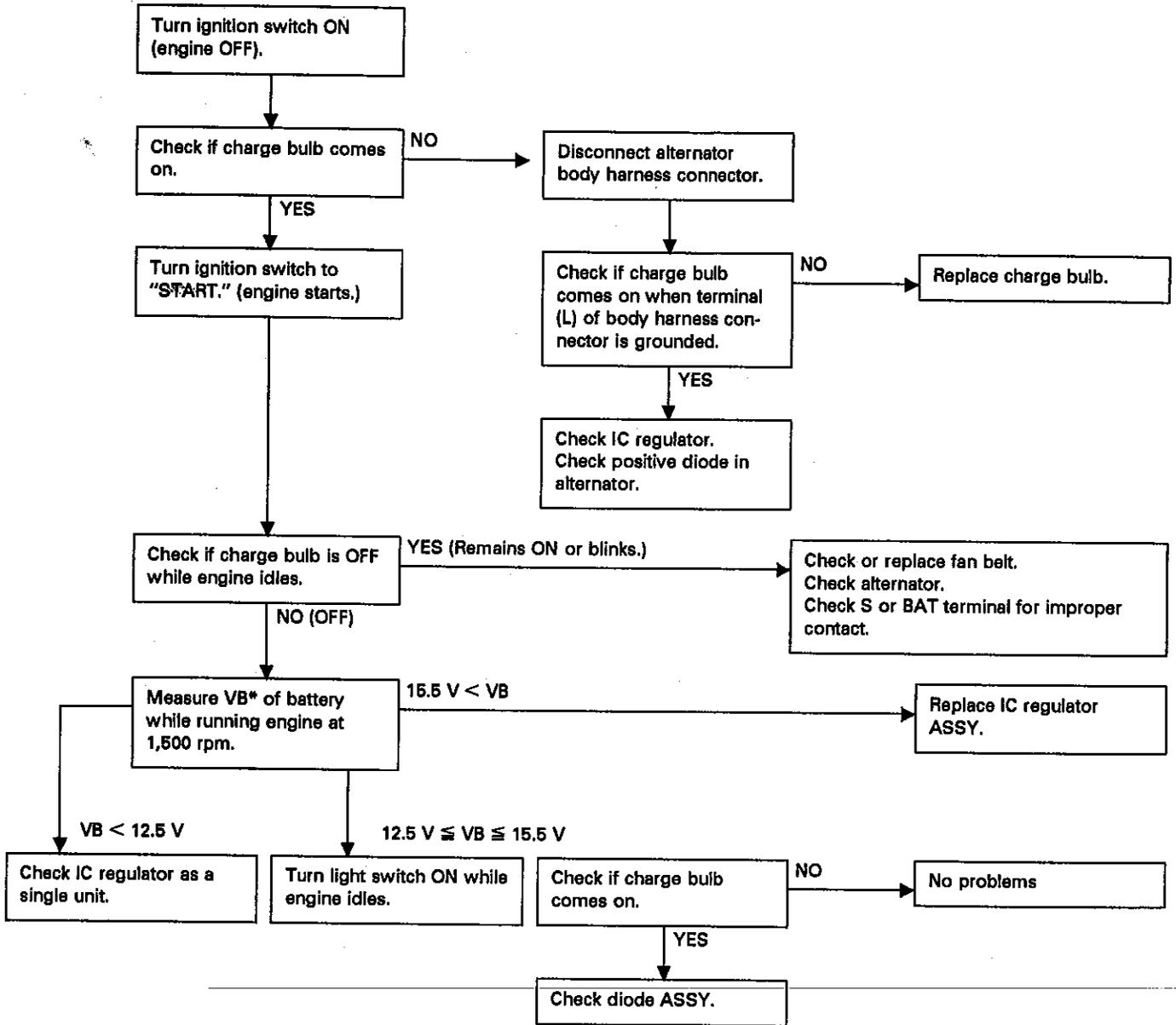
# T TROUBLESHOOTING

## 1. Starter

If battery and wiring harness are satisfactory, inspect starter with the following table.

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
		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
	Clutch slippage	Improper adjustment of stud bolt (manufactured by NIPPONDENSO.) Faulty clutch
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
		Insufficient brush length
		Insufficient brush spring pressure
Starter overruns.		Abnormal brush wear
		Magnet switch coil is a layer short.

2. Alternator



\*: Terminal voltage

**SUBARU®**

**1992**

**SERVICE  
MANUAL**



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## M MECHANISM AND FUNCTION

### 1. Low Fuel Warning Light Delay Amplifier

To prevent temporary illumination of the low fuel warning light when the vehicle is making a right turn or when starting off, a delay amplifier is installed inside the combination meter of 4WD models.

#### 1. OPERATION

1) When the vehicle makes a right turn, fuel moves into the left-chamber of the fuel tank.

2) After completing the right turn, fuel is moved back to the fuel tank right-chamber by a jet pump.

3) The pumping capacity of the jet pump is approximately 1 ℓ (1.1 US qt, 0.9 Imp qt) per minute.

4) The delay amplifier delay time is set to approximately 3 minutes.

5) During this 3-minute period, approximately 3 ℓ (3.2 US qt, 2.6 Imp qt) of fuel is pumped back from the left-chamber to the right-chamber. If approximately 6 ℓ (6.3 US qt, 5.3 Imp qt) of fuel is left in the right-chamber, temporary illumination of the low fuel warning light can be prevented.

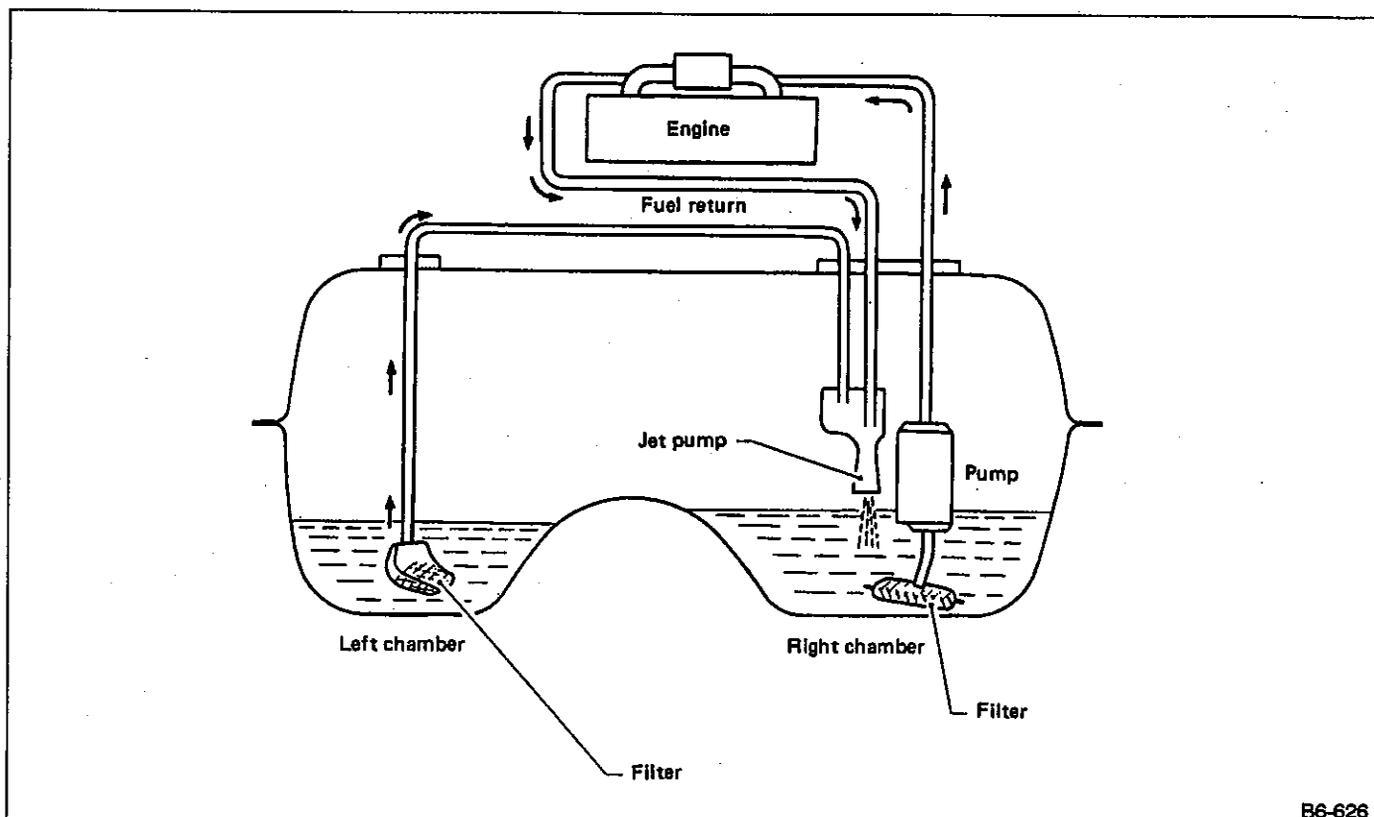


Fig. 1

B6-626

# S SPECIFICATIONS AND SERVICE DATA

Battery	Type		EUROPE	OTHERS	
			MT: 55D23L (MF) AT: 75D23L (MF)	MT: 34B19L (MF) AT: 46B24L (MF)	
Capacity	Reverse capacity		MT: 99 minutes AT: 111 minutes	MT: 49 minutes AT: 71 minutes	
	Cold cranking ampere		MT: 356 amperes AT: 490 amperes	MT: 272 amperes AT: 325 amperes	
Fuses			10 A: 7	15 A: 11    20 A: 7	
Combi- nation meter	Speedometer		Eddy current type, Electric impulse 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 (× 2)		
	Low fuel indicator light		12 V — 3 W		
	Charge indicator light		12 V — 1.4 W		
	Oil pressure indicator light		12 V — 1.4 W		
	ANTILOCK BRAKE warning light		12 V — 1.4 W		
	AT oil temp. warning light		12 V — 1.4 W		
	CHECK ENGINE warning light		12 V — 1.4 W		
	High beam indicator light		12 V — 1.12 W		
	Door open warning light		12 V — 1.12 W (× 4)		
	Rear gate open warning light		12 V — 1.12 W		
	Seat belt warning light		12 V — 1.12 W		
	Brake fluid, parking brake warning light		12 V — 1.4 W		
	FWD warning light		12 V — 1.12 W		
	4WD indicator light		12 V — 1.12 W		
	4WD Lo Indicator light		12 V — 1.12 W		
	Meter illumination light		12 V — 3W (× 4) 12 V — 3.4 W (× 2)		
	AT indi- cator	Power indicator light		12 V — 1.12 W	
		Manual indicator light		12 V — 1.12 W	
		P•R•N•D•3•2•1 (4AT) P•R•N•D•2•1 (3AT)		12 V — 1.12 W	

Headlight		12 V — 60/55 W (Halogen)
Front turn signal light		12 V — 21 W
Rear combination light	Tail/Stop light	12 V — 5/21 W
	Turn signal light	12 V — 21 W
	Back-up light	12 V — 21 W
	Rear fog light	12 V — 21 W
Side turn signal light		12 V — 5 W
Room light		12 V — 8 W
Spot light		12 V — 8 W (× 2)
License plate light		12 V — 10 W (Sedan) 12 V — 5 W (Wagon)
Luggage room light		12 V — 5 W
Glove box light		12 V — 3.4 W
Ash tray illumination light		12 V — 1.4 W
Selector lever illumination light		12 V — 1.7 W
Clearance light		12 V — 10 W
Front wiper	Input	12 V — 54 W or less
Front washer	Pump type	Centrifugal
	Input	12 V — 36 W or less
Rear window wiper	Input	12 V — 42 W or less
Rear window washer	Pump type	Centrifugal
	Input	12 V — 36 W or less
Radio	Type	AM, AM/FM stereo, AM/FM stereo (ETR), AM/FM/LW stereo
	Speaker position	Upper panel of instrument panel (× 1) for AM Front (× 2) Rear (× 2)
Horn		12 V — 420 ± 20 Hz 12 V — 350 ± 20 Hz
Cigarette lighter	Input	12 V — 120 W
	Illumination light	12 V — 1.4 W
Rear window defogger	Input	12 V — 160 ± 16 W
	Indicator light	12 V — 50 mA
Headlight washer	Pump type	Centrifugal
	Input	12 V — 240 W or less

# W SERVICE PROCEDURE

- a. 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 canceled upon disconnection.
- b. Reassemble parts in reverse order of disassembly procedure unless otherwise indicated.
- c. Adjust parts to specifications contained in this manual if so designated.
- d. Connect connectors and hoses securely during reassembly.
- e. After reassembly, ensure functional parts operate smoothly.

## 1. Power Supply Routing

### A: DESCRIPTION

#### 1. IGNITION SWITCH

Ignition switch is installed on steering column and steering lock mechanism is provided. Key plate can be pulled out of ignition switch only in "LOCK" position. On AT models equipped with key interlock, ignition switch can be turned from ACC to LOCK and key plate can be removed from ignition switch only when selector lever is in "P".

#### 2. MAIN FUSE BOX (M/B)

Main fuse box (M/B), which consists of relays, fuses and fusible links, is located at rear of battery. It is connected to battery positive terminal. It has a connection which is connected to front wiring harness.

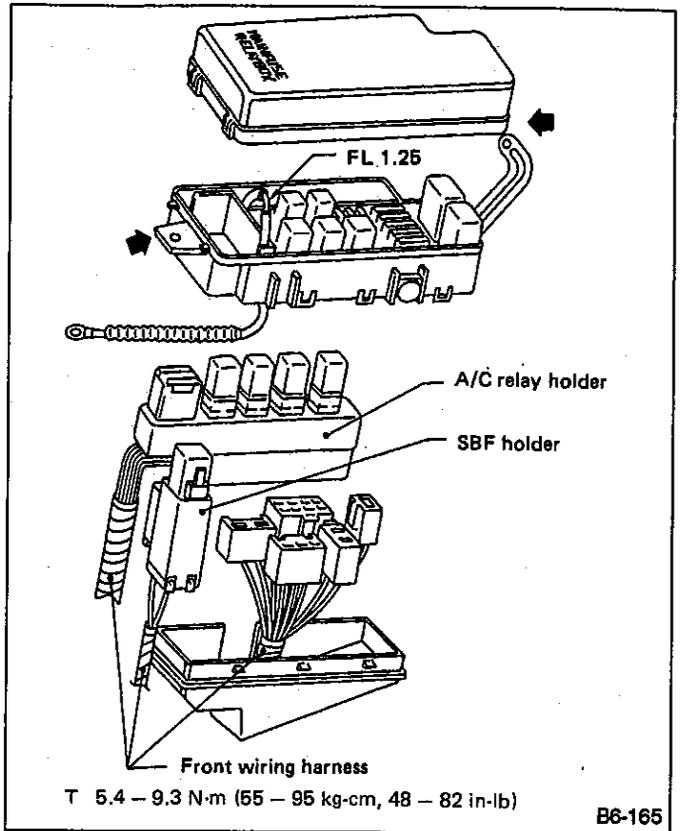


Fig. 2

#### 1) FUSIBLE LINK (FL 1.25)

If current increases beyond specified amperage, fusible metal melts and the circuit is broken, thus protecting cable and electrical equipment from burning.

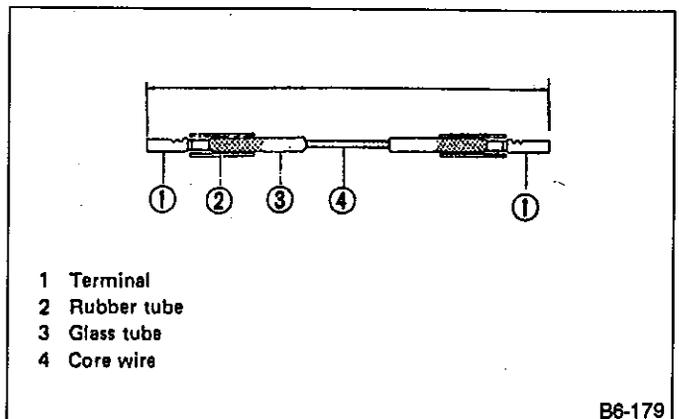


Fig. 3

- a. When replacing fusible link, be sure to use one with the specified rating.
- b. Blown fusible link is caused by short circuit in the source of electricity circuit or large amperage circuit, so careful check of cause and/or repair is necessary.

No.	Item	Nominal gauge size of conductor
		1.25 mm <sup>2</sup> (0.00194 sq in)
1	Voltage drop	50 mV
		Voltage drop across lug terminals should be less than the above value when a 10-ampere current flows through fusible link at room temperature.
2	Melting characteristics	Fusible link should melt within 15 seconds at a current flow of 190 amperes.

## 2) FUSE

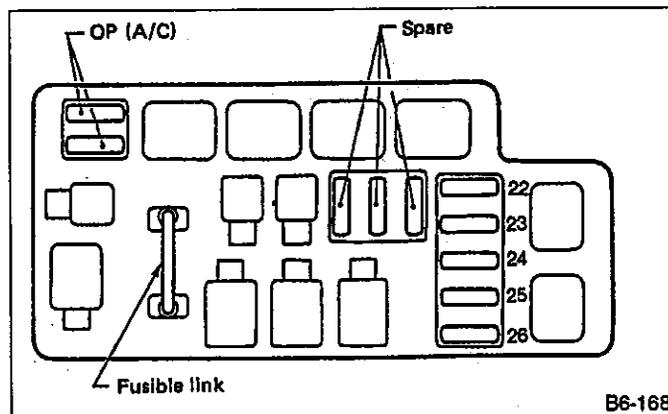


Fig. 4

No. 22	15A	Hazard warning light
No. 23	20A	Lighting switch
No. 24	15A	Headlight (LH)
No. 25	10A	Clock, Room light
No. 26	15A	Headlight (RH)
(O P)	20A	A/C (Sub fan)
(O P)	10A	A/C
SPARE	20A	—
SPARE	15A	—
SPARE	10A	—

## 3. FUSE AND JOINT BOX (F/B)

Fuse and joint box (F/B) is located under instrument panel on driver's side. It consists of small-capacity relays, fuses (including spare fuses) and F/B light (which turns ON or OFF when door is opened or closed). It also has three connections which are connected to front wiring harness, bulkhead wiring harness and instrument wiring harness.

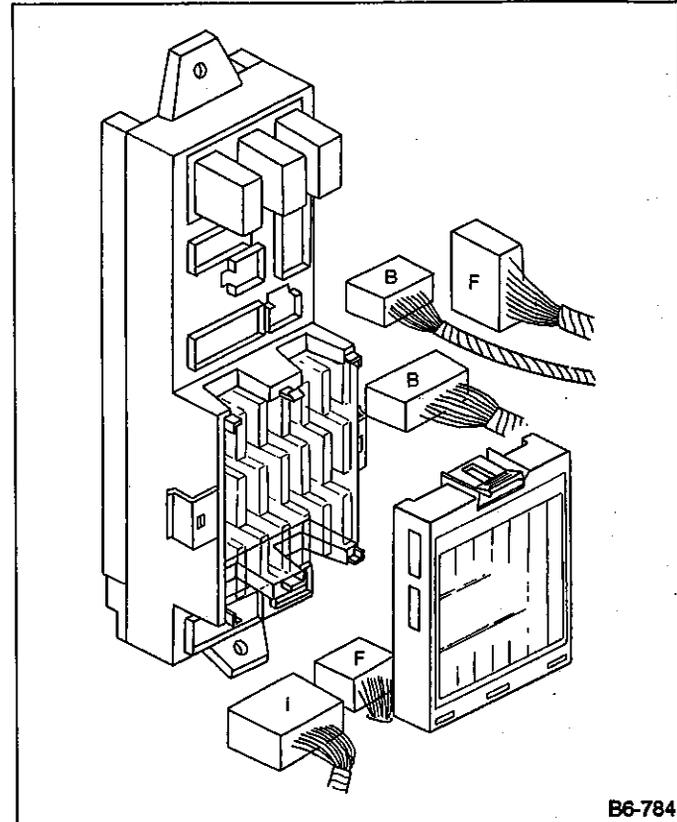


Fig. 5

- F:** Front wiring harness  
**B:** Bulkhead wiring harness  
**I:** Instrument panel wiring harness

### Tightening torque:

5.4 — 9.3 N·m  
 (55 — 95 kg-cm, 48 — 82 in-lb)

1) FUSE

The connection between each fuse and main electrical units/devices is as shown in the following illustration. (Also refer to the wiring diagram.)

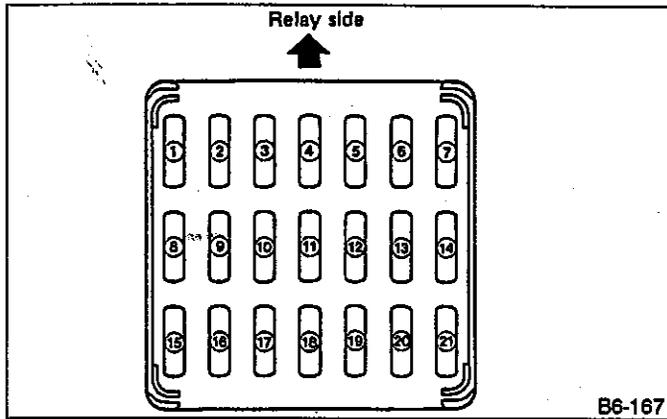


Fig. 6

No. 1	15 A	Back-up light, Turn signal light
No. 2	20 A	Windshield wiper and washer
No. 3	15 A	Cigarette lighter, Remote control rearview mirrors
No. 4	10 A	Tail light LH
No. 5	10 A	Tail light RH
No. 6	Empty	
No. 7	20 A	Rear window defogger
No. 8	10 A	Cruise control, ABS system
No. 9	10 A	Illumination
No. 10	10 A	Height control
No. 11	20 A	Power door lock
No. 12	20 A	Stop light, Horn
No. 13	20 A	Main fan
No. 14	10 A	MPFI, AT unit
No. 15	10 A	Meter
No. 16	15 A	Ignition system
No. 17	15 A	Radio
No. 18	15 A	
No. 19	20 A	ABS solenoid
No. 20	15 A	Heater fan
No. 21	15 A	Heater fan

- a. When replacing fuse, be sure to use fuse of specified rating.
- b. If fuse is blown, be sure to eliminate cause before installing new fuse in position.
- c. Poor contact of any fuse holder will often lead to voltage drop or heating in the circuit or fuse holder and could result in blown fuse, so be careful with holder contacting and clean metal parts if necessary.

4. TOWING POWER CONNECTOR

When additional power is required to activate trailer's lights (for camping cars, etc.), do not exceed rated power capacity indicated in table below.

Terminal No. (R67)	Additional circuit	Additional capacity available
(1)	Tail light LH	10 (W)
(2)	Tail light RH	10 (W)
(3)	Stop light LH/RH	42 (W)
(4)	Turn signal light LH	21 (W)
(5)	Turn signal light RH	21 (W)
(6)	Rear fog light (+)	21 (W)
(7)	Rear fog light (-)	
(8)	Ground	146 (W)
(10)	Battery + B	21 (W)

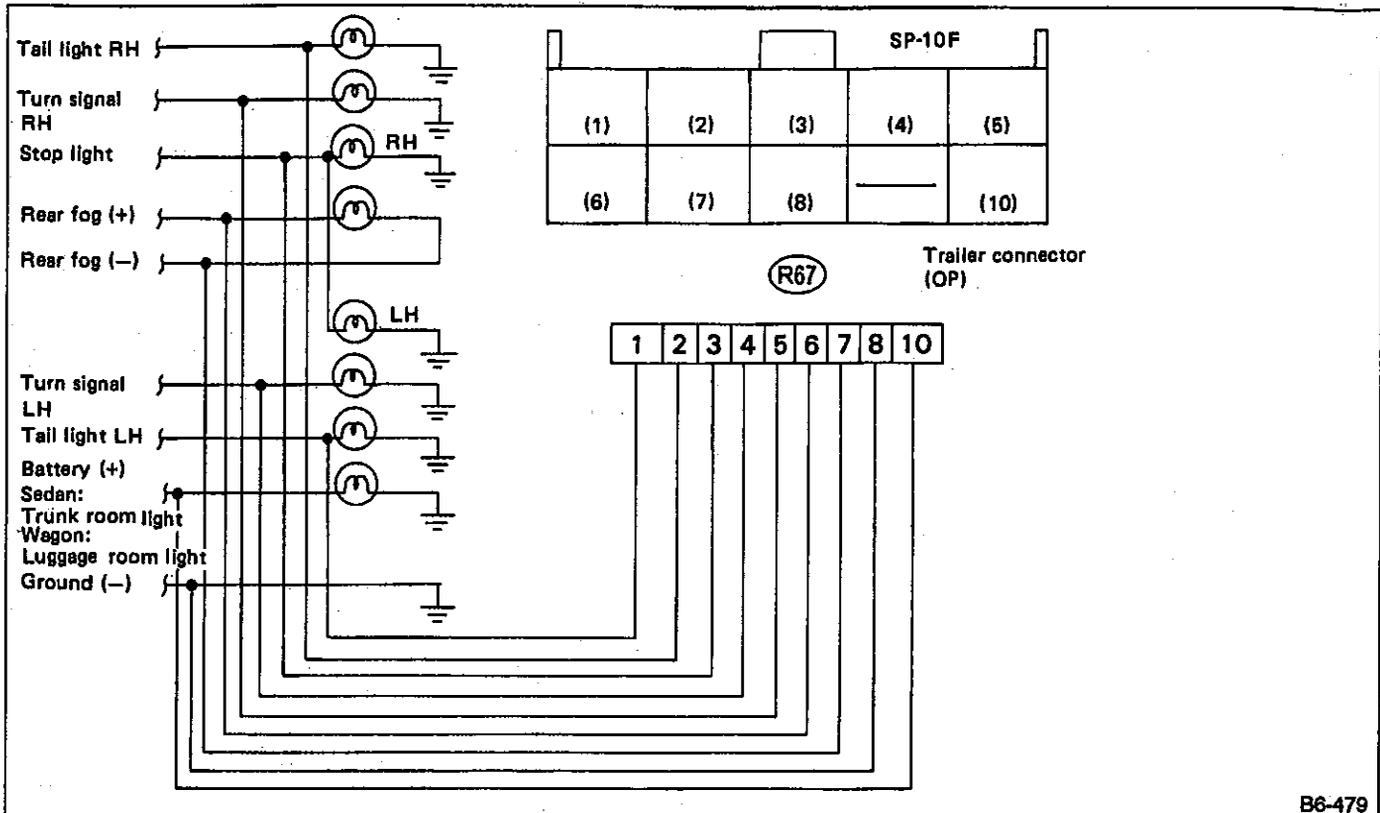


Fig. 7

For details, refer to applicable wiring diagrams.

**B: 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 should follow the removal procedure in the reverse order.

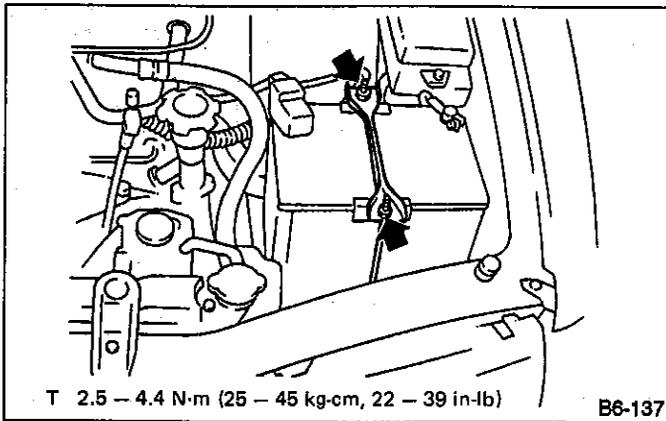


Fig. 8

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

**2. IGNITION KEY CYLINDER**

- 1) Remove lower column cover.

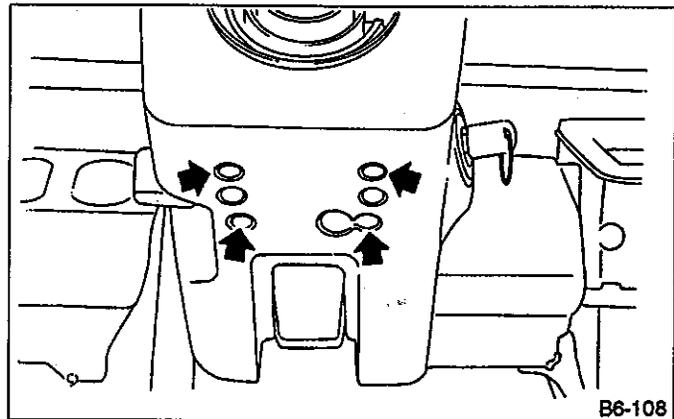


Fig. 9

- 2) Turn ignition switch to ACC, and press dowel in dowel pin hole using a 2 mm (0.08 in) dia. rod to remove key cylinder.

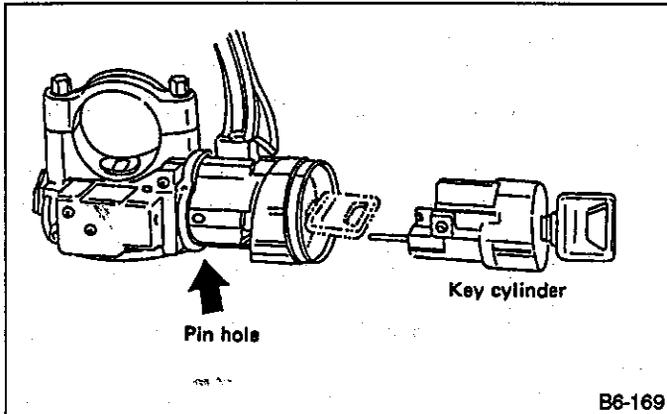


Fig. 10

**3. IGNITION KEY SWITCH**

- 1) Remove instrument panel lower cover.
- 2) Remove screws, and separate upper column cover and lower column cover.
- 3) Disconnect connector from body harness.
- 4) Cut off the bolt which connects upper and lower portions of ignition key switch, and remove the switch.

Remove steering column before cutting off the bolt. The upper and lower portions of ignition key switch can be loosened by tapping the cut-off surface of the bolt using a punch and hammer.

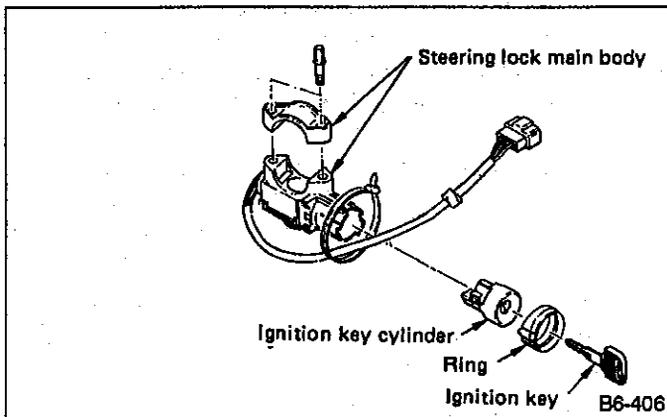


Fig. 11

Tighten the connecting bolt until its head twists off.

**C: 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.

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

**3) Specific gravity of electrolyte**

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

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

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

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

$S_t$ : Measured specific gravity

$t$ : Measured temperature (°C)

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

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

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

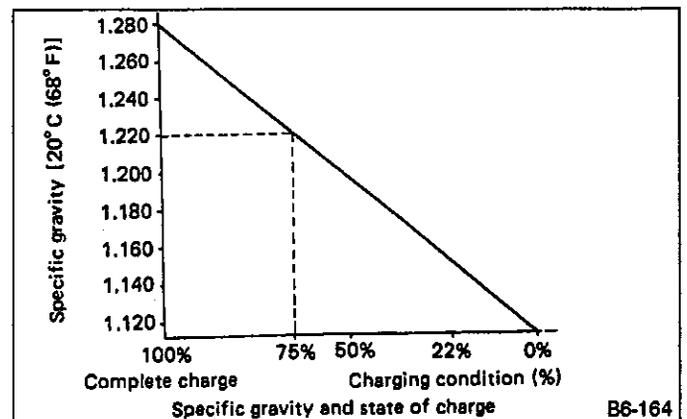


Fig. 12

**2. IGNITION SWITCH**

- 1) Remove instrument panel lower cover.
- 2) Remove lower column cover.
- 3) Disconnect connector from body harness.

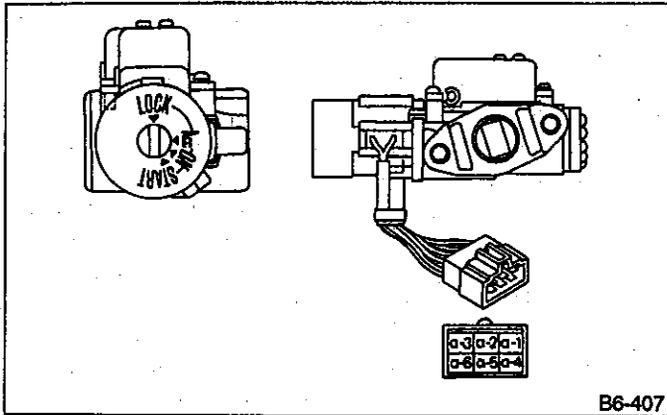


Fig. 13

Turn ignition switch to each position and check continuity between terminals, as indicated in the following table.

**IGNITION**

Terminal (Wire color)	a-1 (BW)	a-2 (BL)	a-5 (B)	a-4 (BY)
LOCK				
ACC	○	○		
ON	○	○	○	
START	○		○	○

**D: CHARGING**

- a. Do not bring an open flame close to the battery at this time.
- b. Prior to charging, corroded terminals should be cleaned with a brush and common baking soda solution.
- c. Be careful since battery electrolyte overflows while charging the battery.
- d. Observe instructions when handling battery charger.
- e. 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.

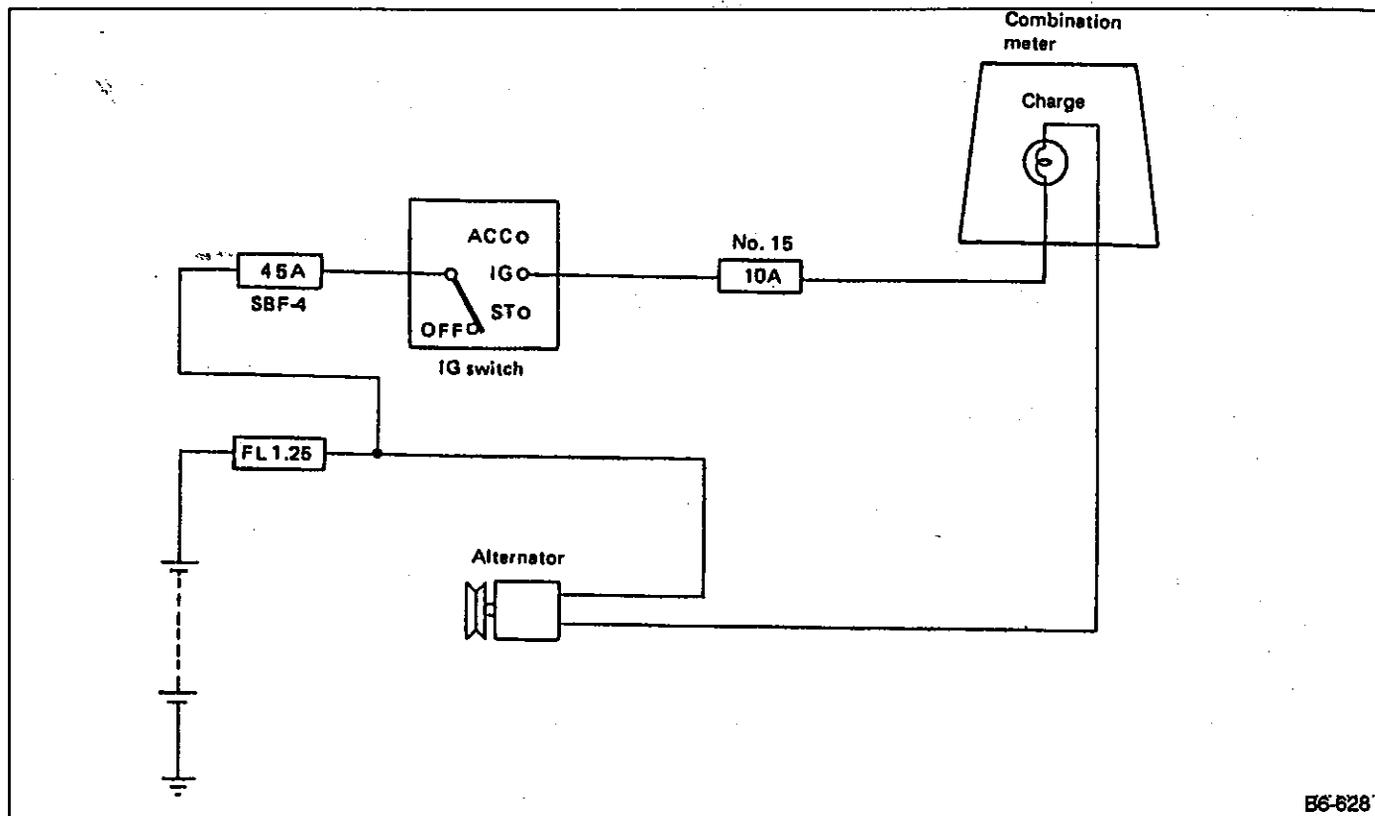
- a. Observe the items in NOTE in 1) Normal charging.
- b. Never use more than 10 amperes when charging the battery because that will shorten battery life.

**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.

## 2. Charging

### A: SCHEMATIC

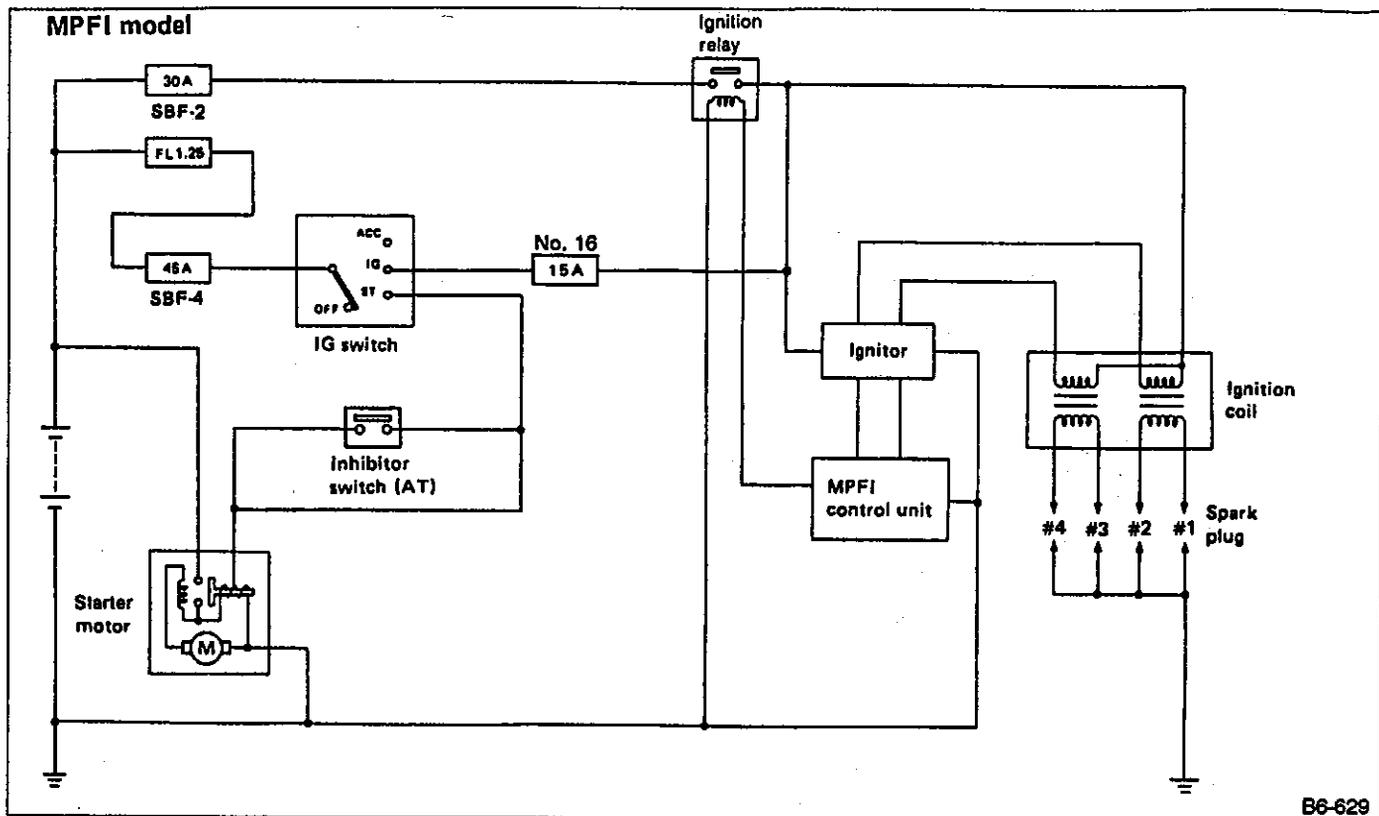


EG-628

Fig. 14

### 3. Starting

#### A: SCHEMATIC



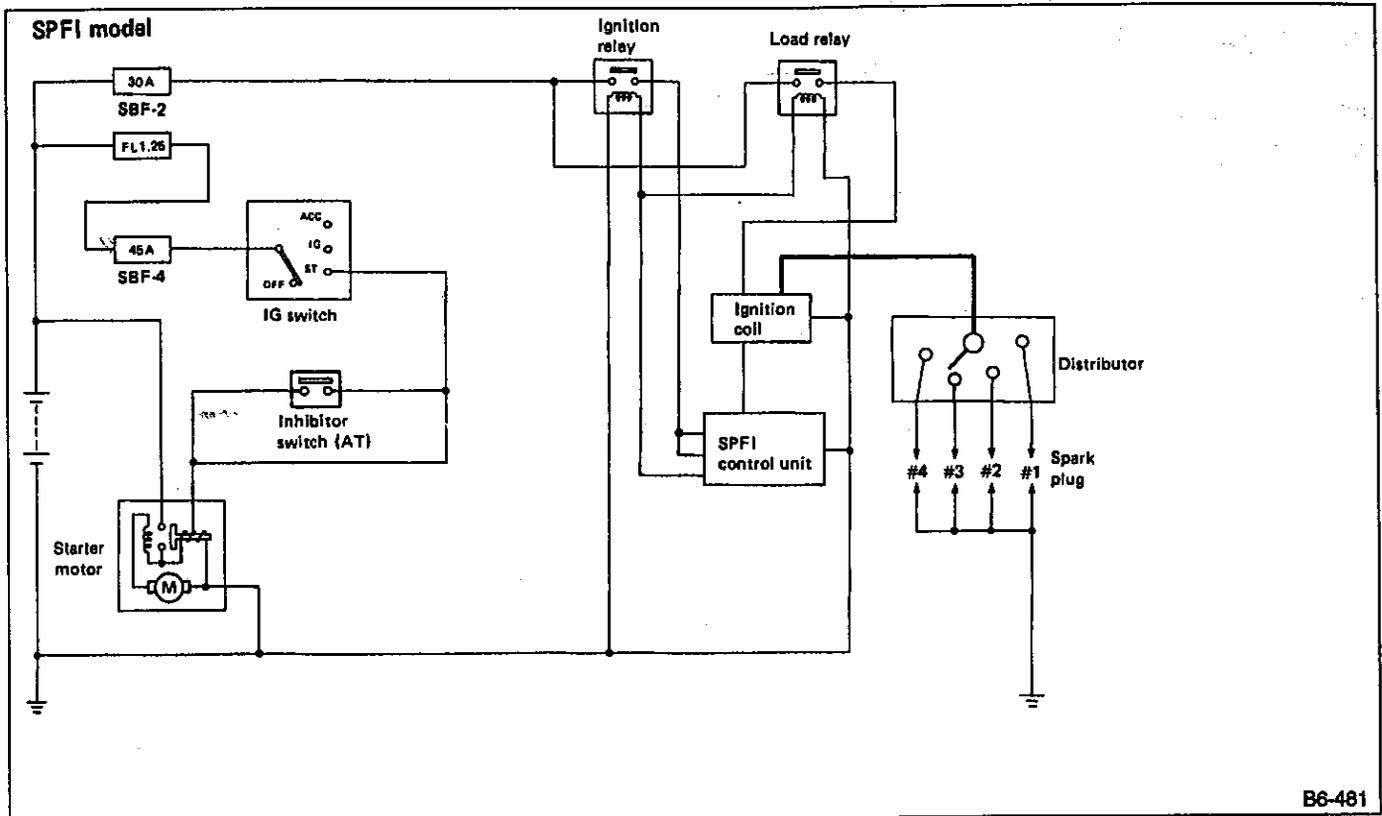


Fig. 16

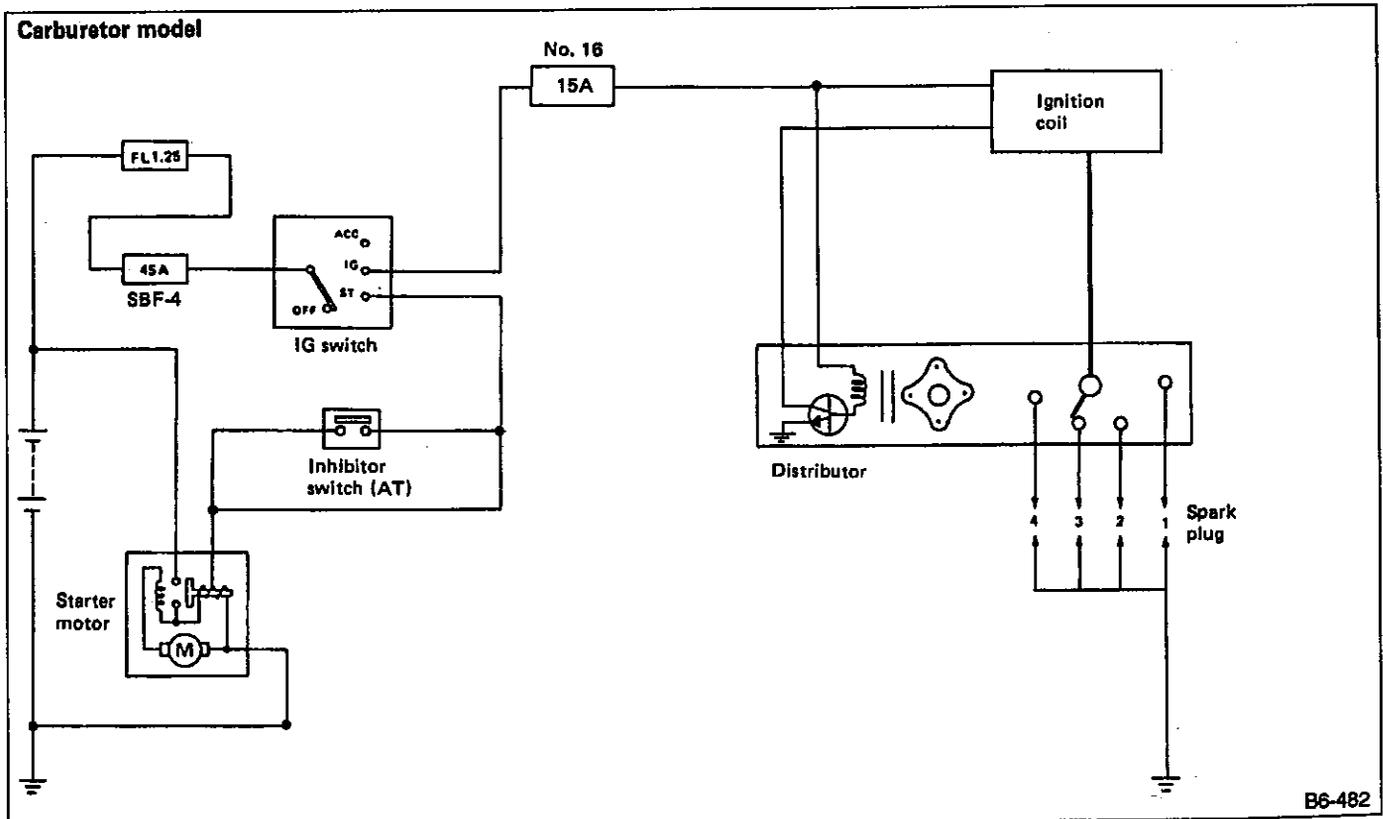


Fig. 17

**B: INSPECTION**

**INHIBITOR SWITCH**

(Ref. to [3-2]).

# 4. Engine Electrical

## A: SCHEMATIC

### 1. MPFI model (NA)

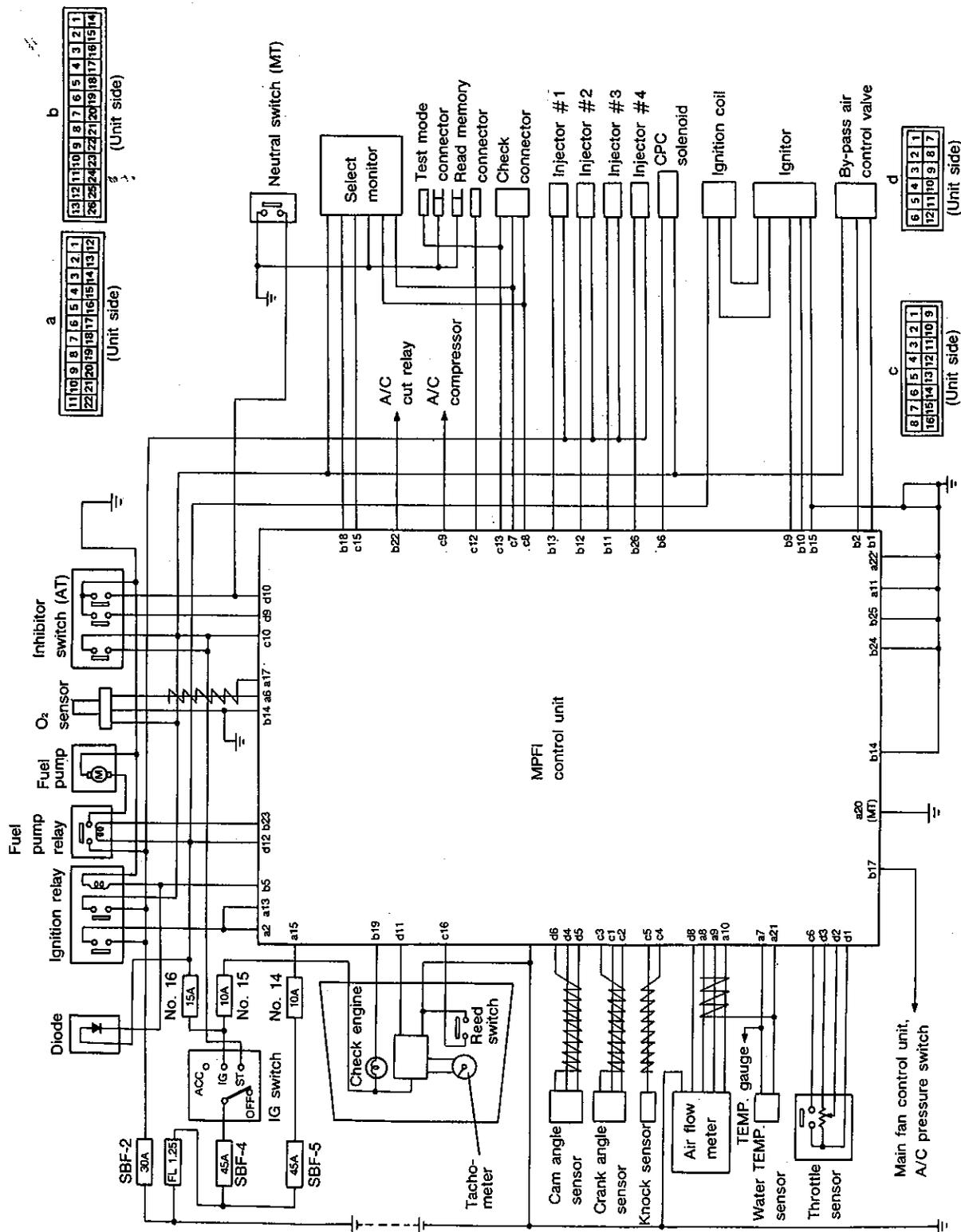


Fig. 18

2. SPFI model

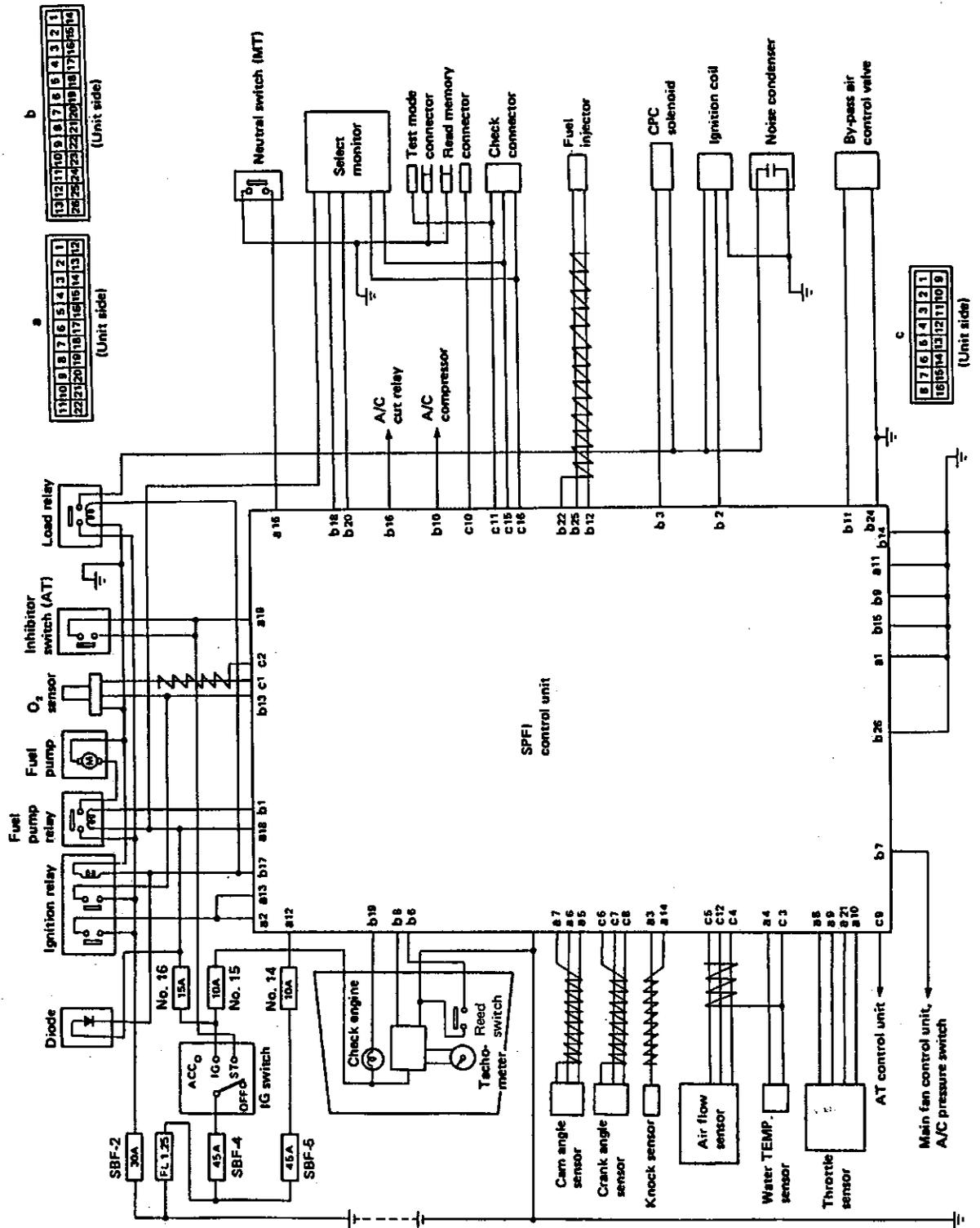


Fig. 19

3. CARBURETOR model

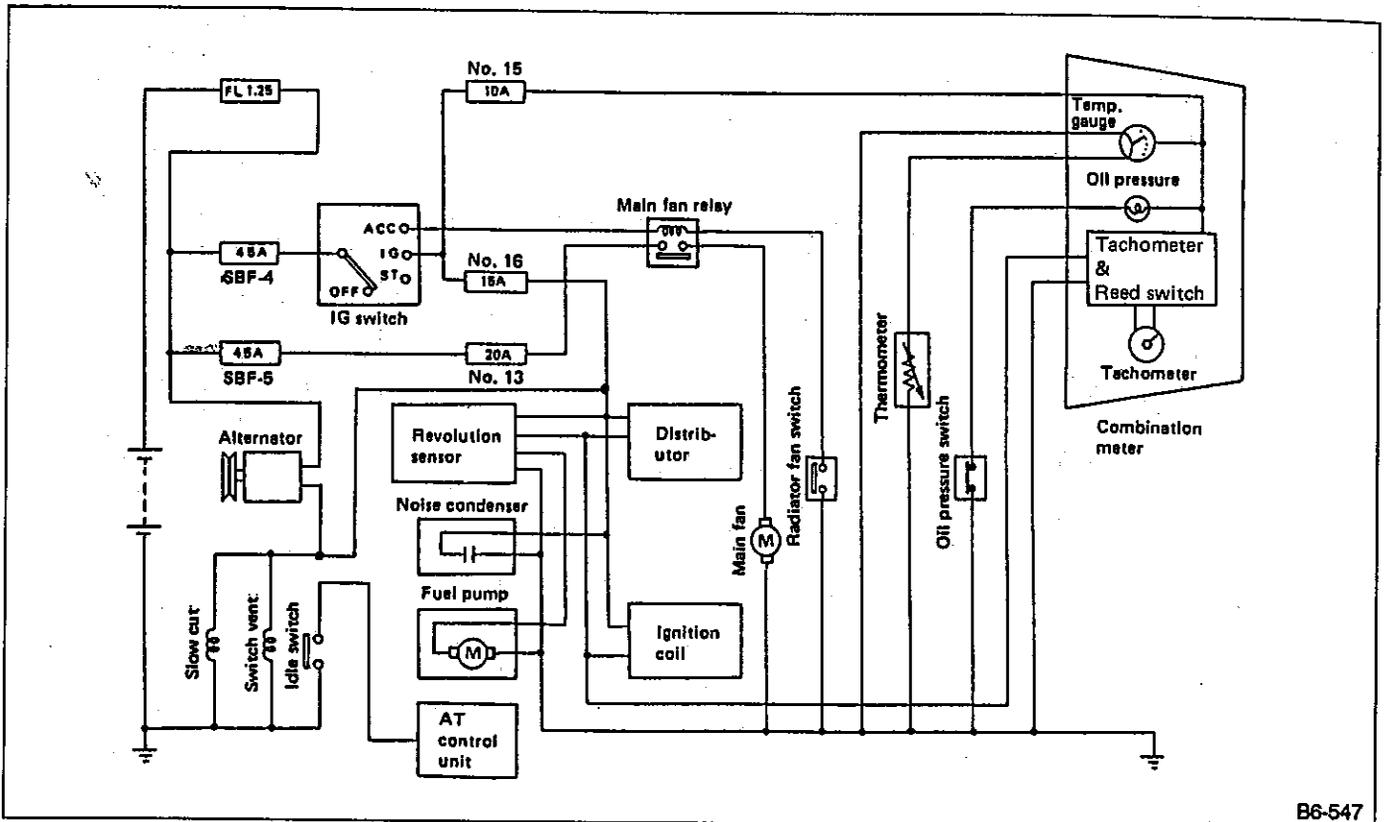


Fig. 20

B6-547

4. MPFI model (TURBO)

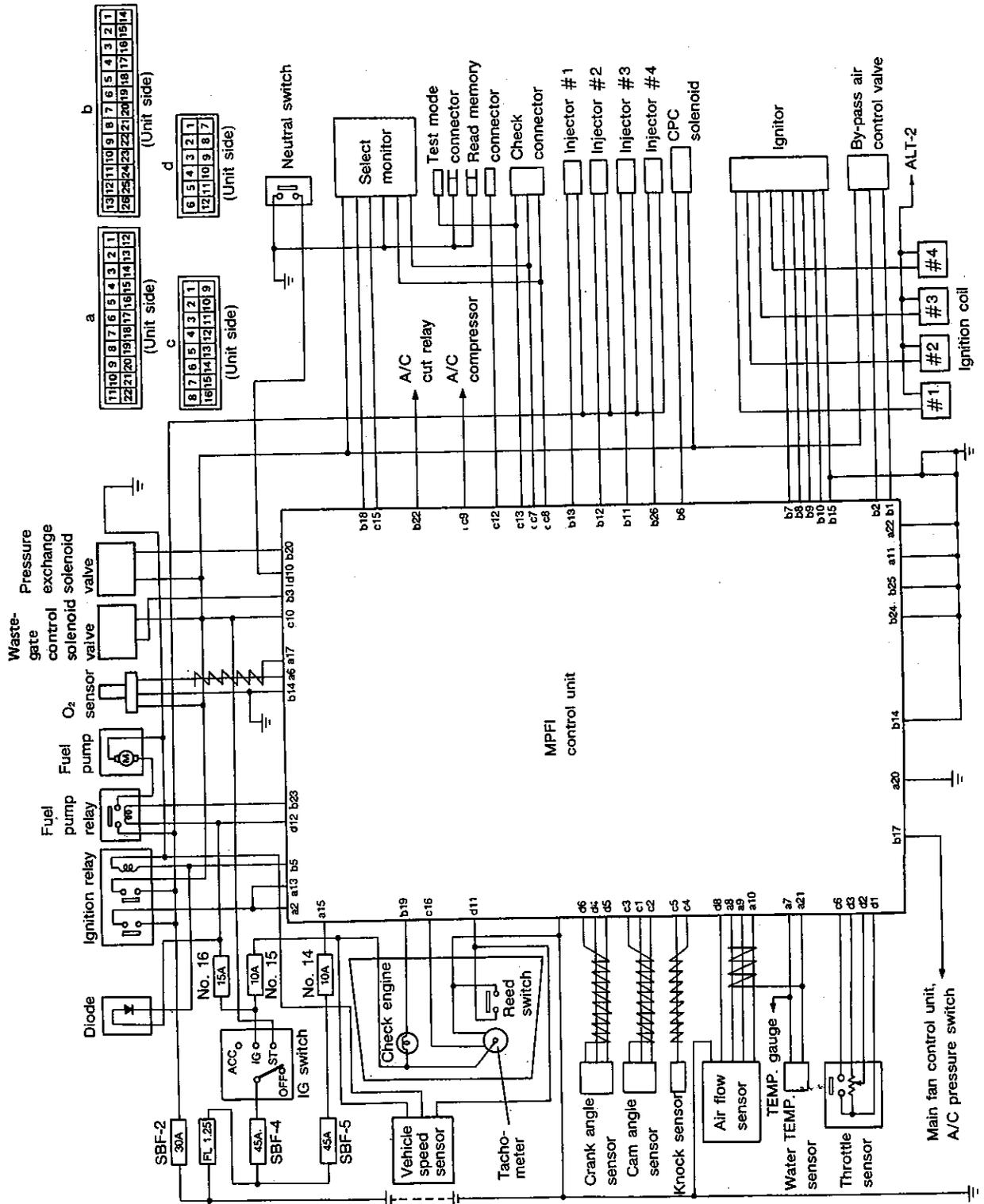
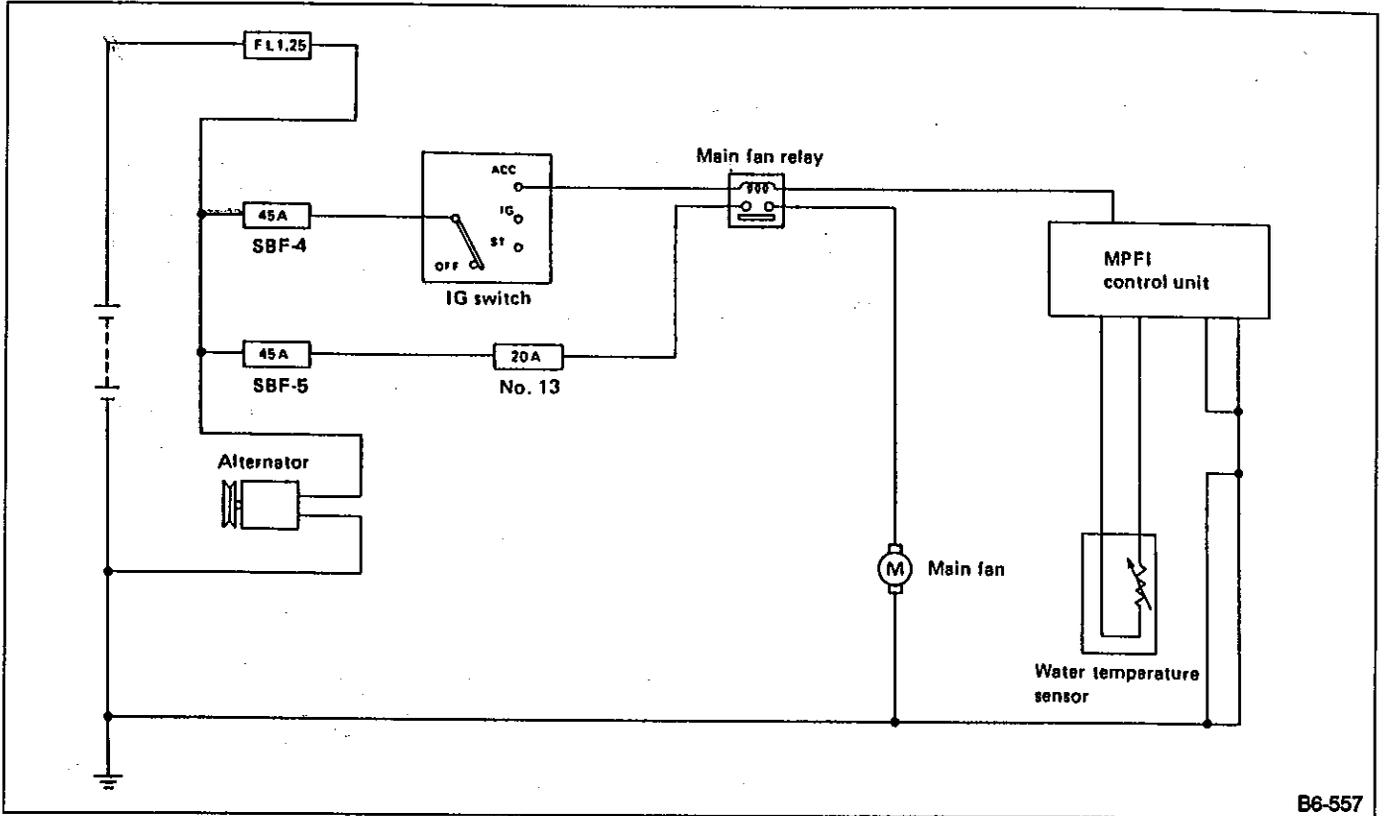


Fig. 21

## 5. Cooling Fan

### A: SCHEMATIC

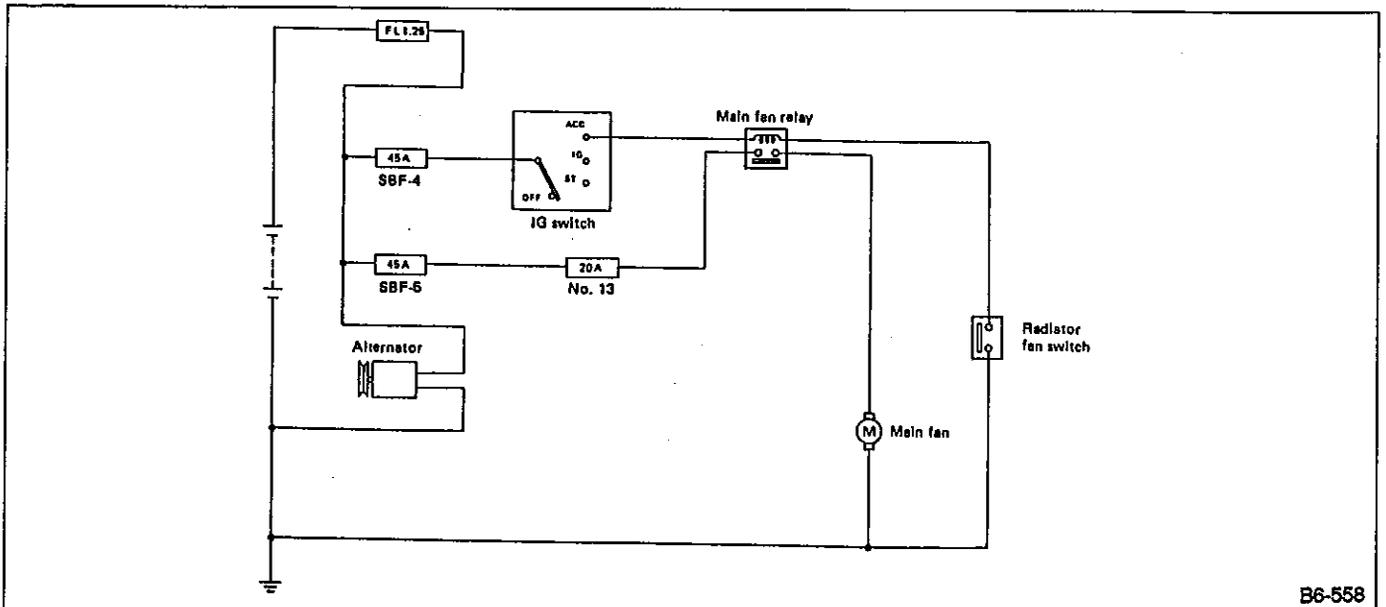
#### 1. MPFI/SPFI model



B6-557

Fig. 22

#### 2. CARBURETOR model



B6-558

Fig. 23

# 6. Lighting

## A: SCHEMATIC

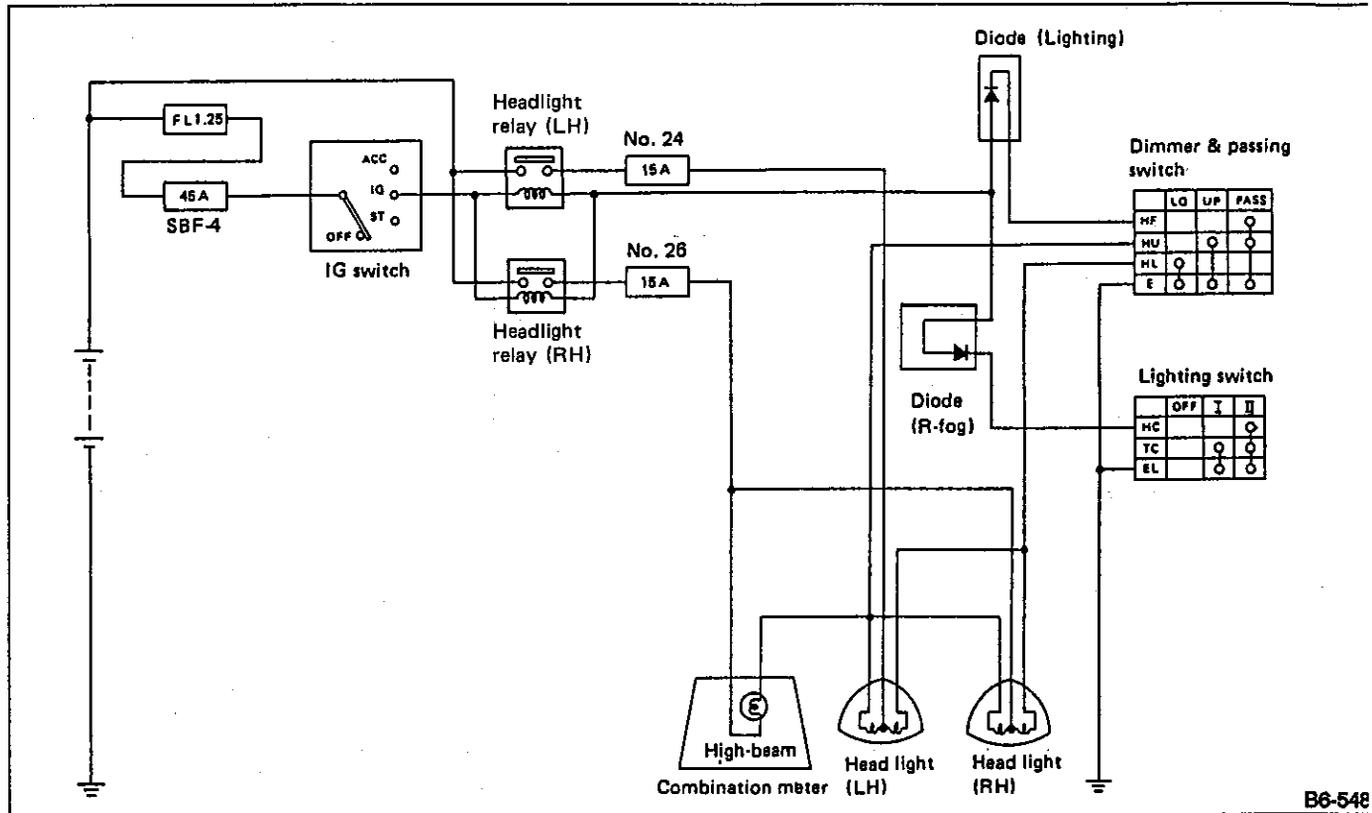
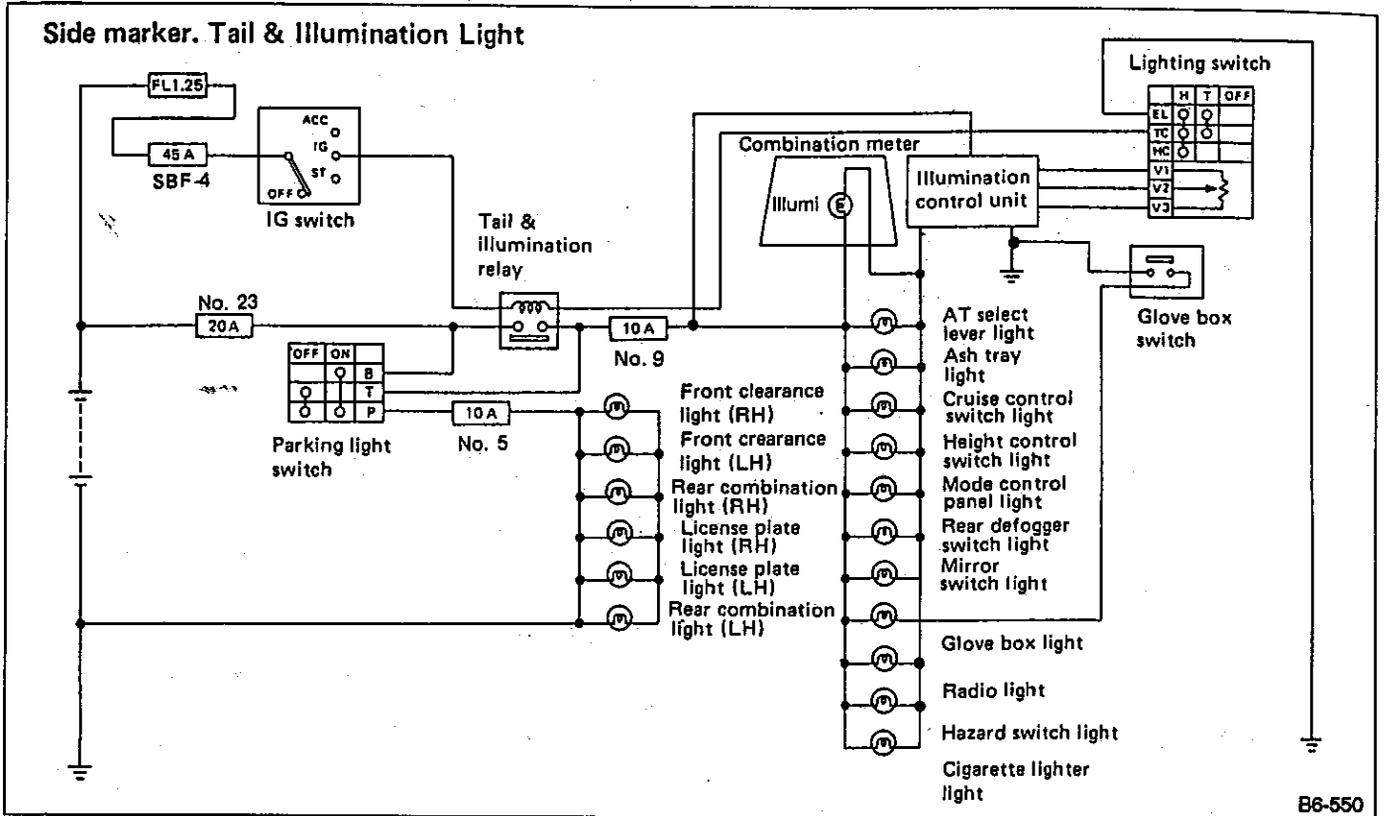


Fig. 24

B6-548



B6-550

Fig. 25

**B: ADJUSTMENT****1. HEADLIGHT AIMING**

Open front hood and turn two bolts used for headlight aiming adjustment.

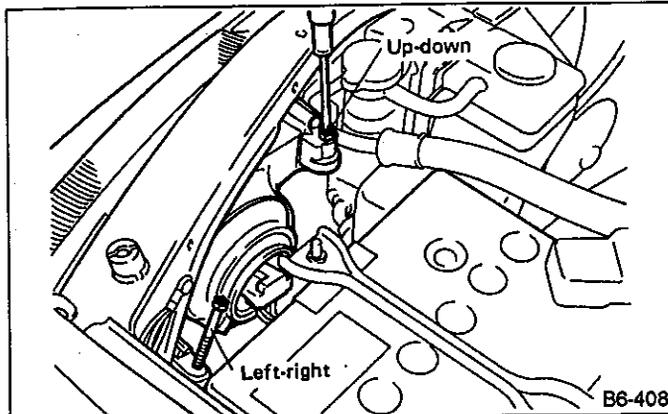


Fig. 26

**C: REMOVAL AND INSTALLATION****1. HEADLIGHT AND FRONT COMBINATION 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.

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

- 4) Remove screws and nuts which secure headlight, and remove headlight.

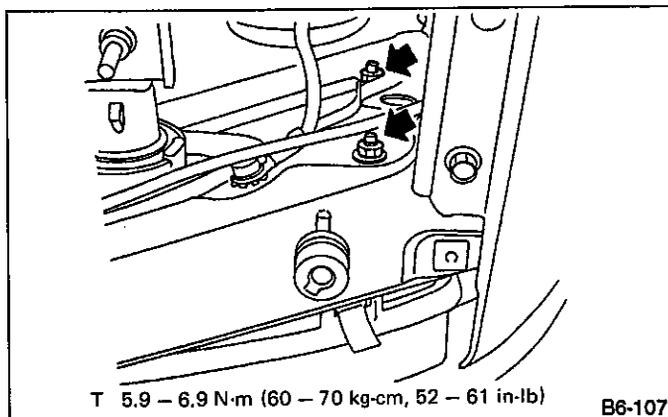
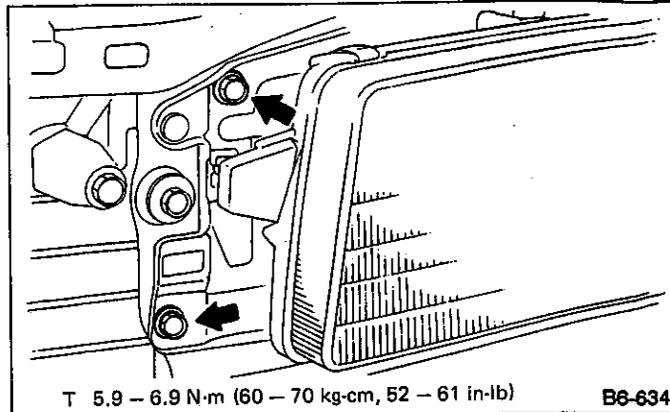


Fig. 27

T 5.9 – 6.9 N·m (60 – 70 kg·cm, 52 – 61 in·lb)



T 5.9 – 6.9 N·m (60 – 70 kg·cm, 52 – 61 in·lb)

Fig. 28

**2. FRONT TURN SIGNAL LIGHT**

- 1) Remove lens and screws.
- 2) While removing turn signal light, disconnect connector.

**3. REAR COMBINATION LIGHT**

- 1) Remove light cover (Wagon). Remove trunk's rear trim (Sedan).
- 2) Remove nuts and disconnect connector.

**Tightening torque:**

5.9 – 6.9 N·m

(60 – 70 kg·cm, 52 – 61 in·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.

a. Do not pry rear combination light forcefully as this may scratch vehicle body.

b. Remove all traces of adhesive tape from body before installation.

c. Attach butyl rubber tape to back of rear combination light before installing rear combination light on body for sealing purposes.

**4. LICENSE PLATE LIGHT**

- 1) Remove screws which secure license plate light.
- 2) While removing license plate light, disconnect connector.

**5. GLOVE BOX LIGHT AND SWITCH**

- 1) Remove glove box.
- 2) Remove screws which secure striker ASSY, and remove striker ASSY.
- 3) Disconnect light ASSY connector. Remove screw and light ASSY.
- 4) Disconnect connector from switch. While pushing pawl on switch forward of switch, remove switch off.

**6. ASH TRAY ILLUMINATION LIGHT**

- 1) Remove ash tray.
- 2) Remove screws which secure ash tray holder, and remove ash tray holder.

Three screws are used. The screw located far back in the ash tray holder need only be loosened.

- 3) While removing ash tray holder, disconnect connector.

**7. SELECTOR LEVER ILLUMINATION LIGHT**

- 1) Remove indicator ASSY. (Ref. to [3-3].)
- 2) Remove screws from back of illumination light, and remove illumination light.

**8. ILLUMINATION CONTROL UNIT**

(Ref. to [6-2] No. W9B3.)

**9. COMBINATION SWITCH**

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

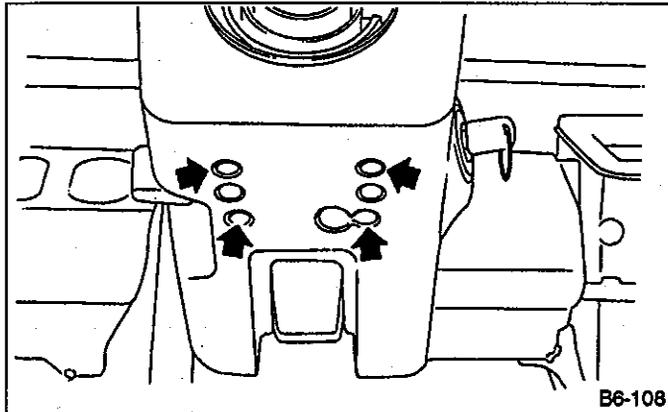


Fig. 29

- 3) Remove screws which secure bracket cover, and remove bracket cover.

When installing bracket cover, ensure that harness is not caught by adjacent parts.

- 4) Disconnect connector from body harness, and undo hold down band.
- 5) Remove screws which secure switch, and remove switch.

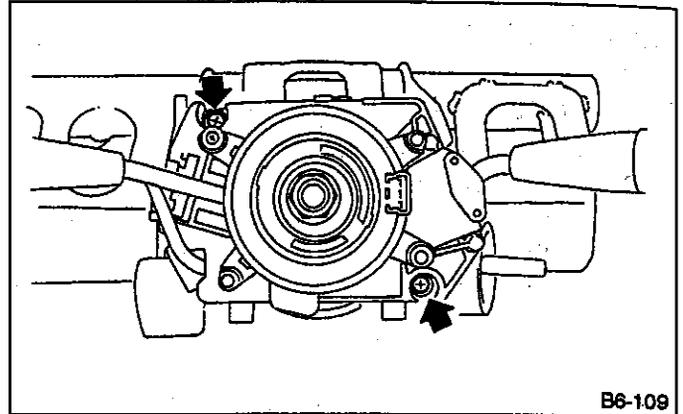


Fig. 30

**D: DISASSEMBLY AND ASSEMBLY**

**1. COMBINATION SWITCH**

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

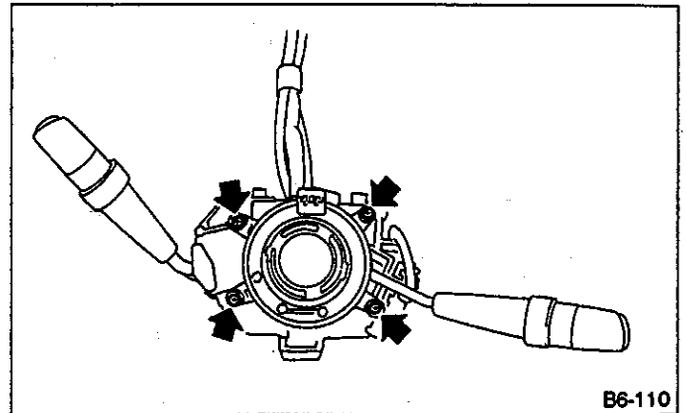


Fig. 31

- 2) Remove screws which secure lighting switch ASSY and wiper and washer switch ASSY. Remove both switch ASSY's.

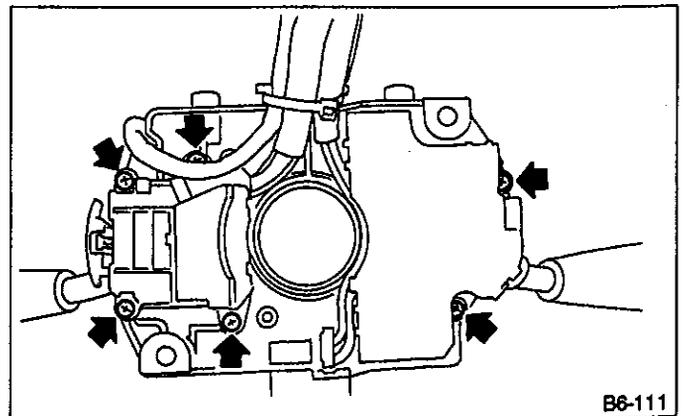


Fig. 32

ASSEMBLY is in the reverse order of disassembly.

**E: INSPECTION**

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

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

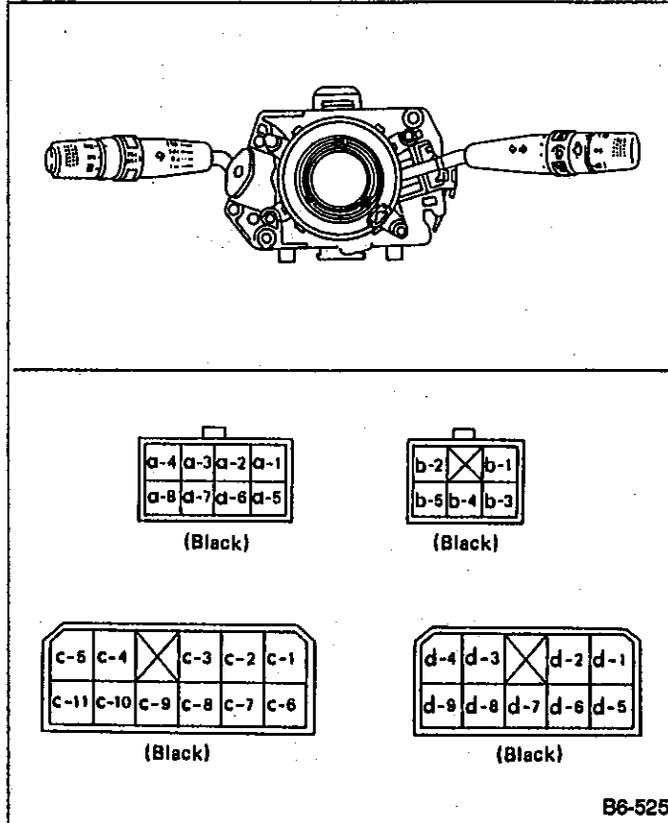


Fig. 33

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

**LIGHTING SWITCH**

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

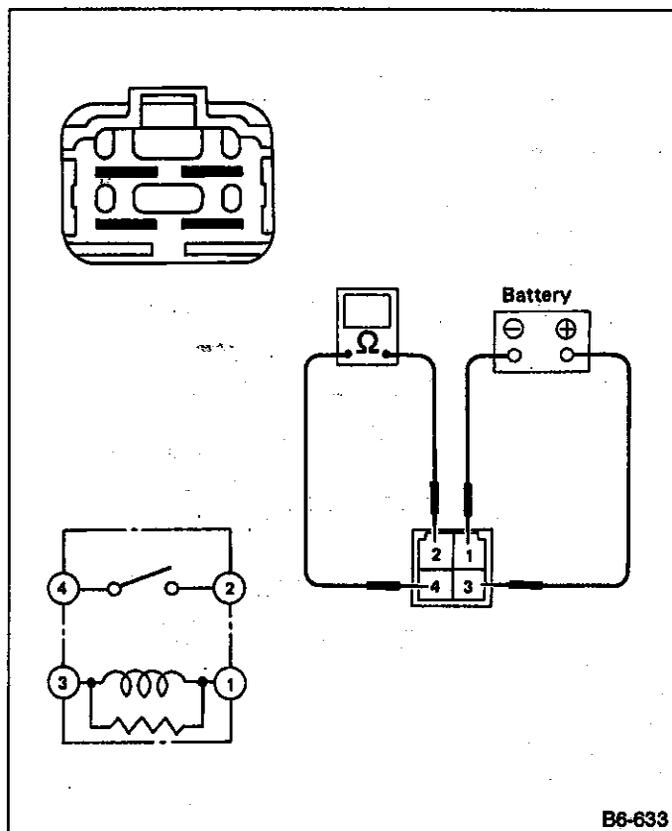
**PARKING LIGHT SWITCH**

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

**DIMMER AND PASSING SWITCH**

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

2. HEADLIGHT RELAY



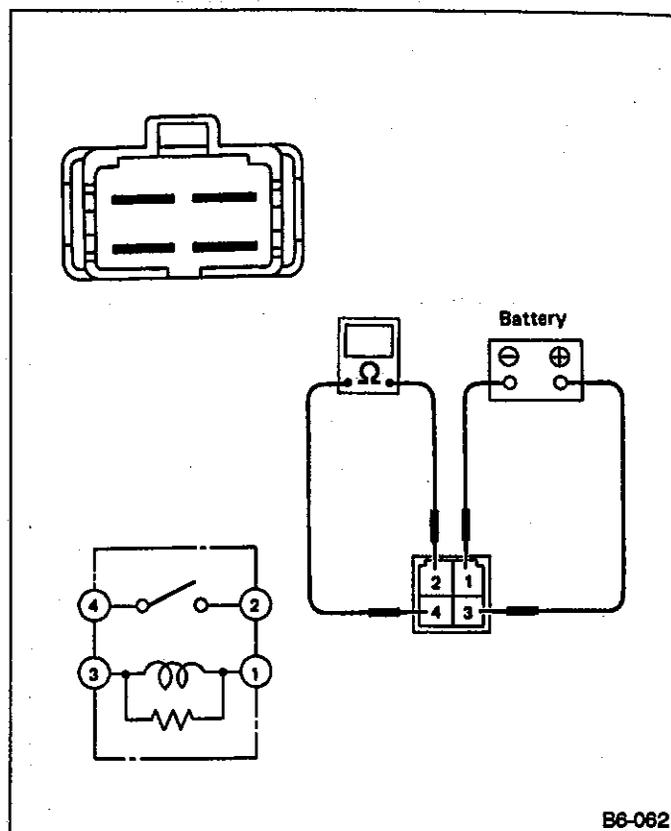
B6-633

Fig. 34

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

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

3. TAIL AND ILLUMINATION RELAY



B6-062

Fig. 35

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.

# 7. Room Light and Door Switch

## A: SCHEMATIC

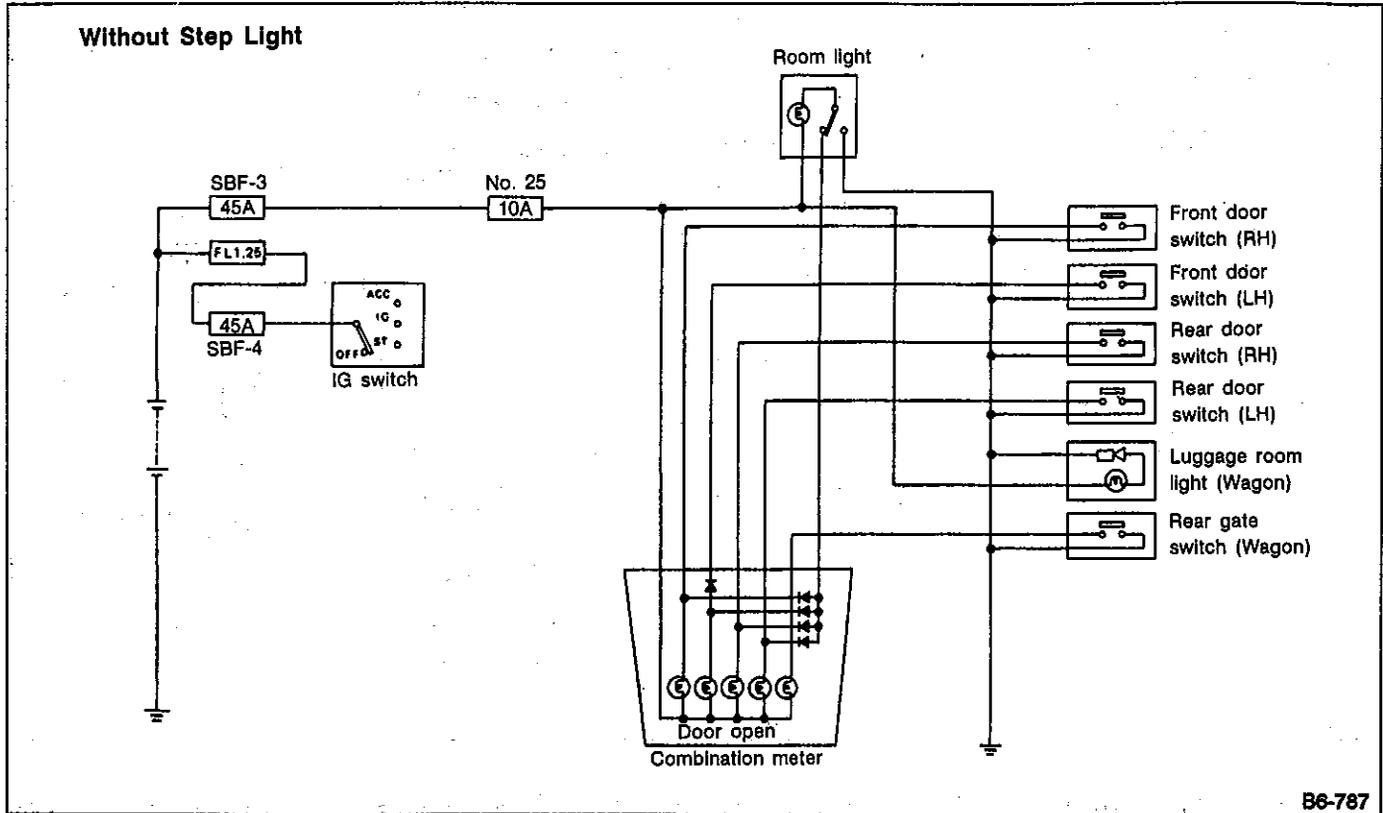


Fig. 36

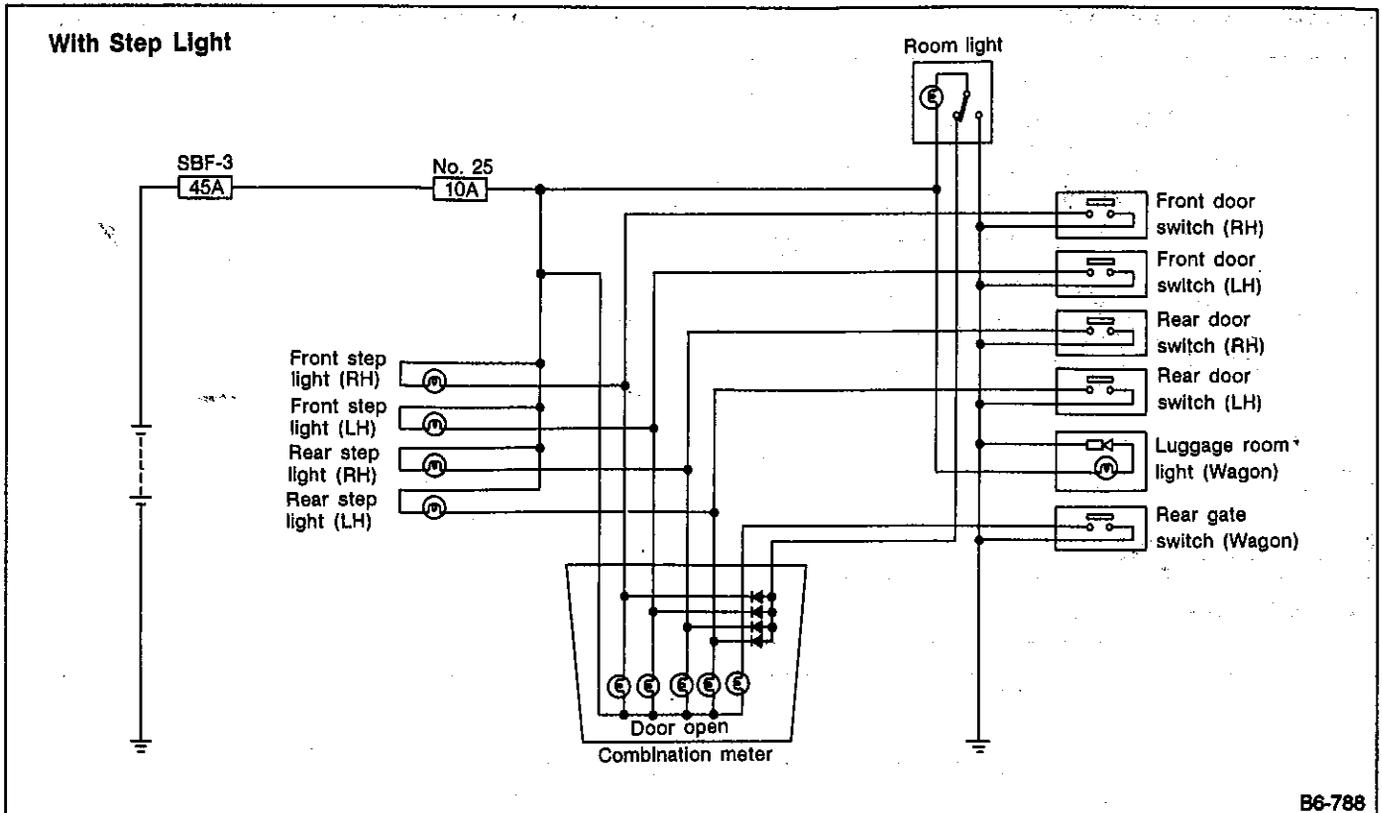


Fig. 37

**B: REMOVAL AND INSTALLATION**

**1. DOOR SWITCH**

- 1) Remove trim panel.
- 2) Disconnect connector.
- 3) While pushing door switch pawl using a standard screwdriver from the compartment side, push door switch out.
- 4) Remove cover.

**2. REAR GATE SWITCH**

(Ref. to [5-2].)

**3. ROOM LIGHT**

- 1) Remove lens and screws.
- 2) While removing room light, disconnect connector.

**4. LUGGAGE ROOM LIGHT**

- 1) Remove lens and screws.
- 2) While removing luggage room light, disconnect connector.

**C: INSPECTION**

**1. DOOR SWITCH**

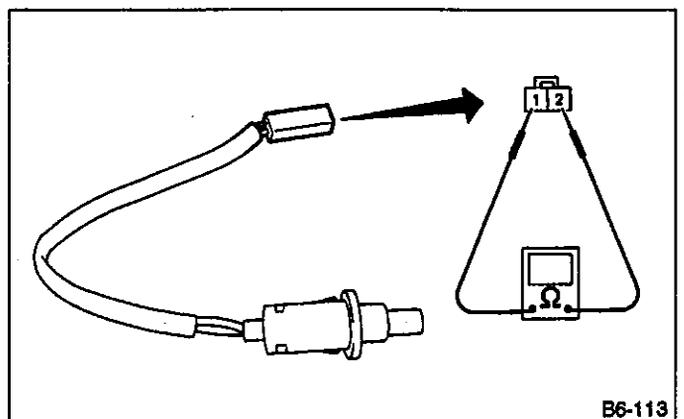


Fig. 38

Check continuity between terminals.

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

**2. REAR GATE SWITCH**

Move latch and check continuity between terminals.

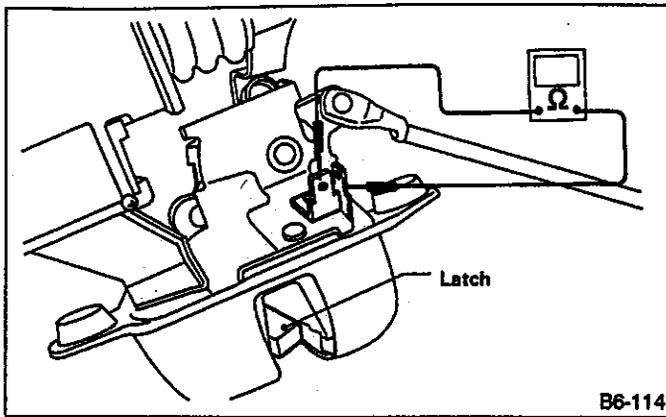


Fig. 39

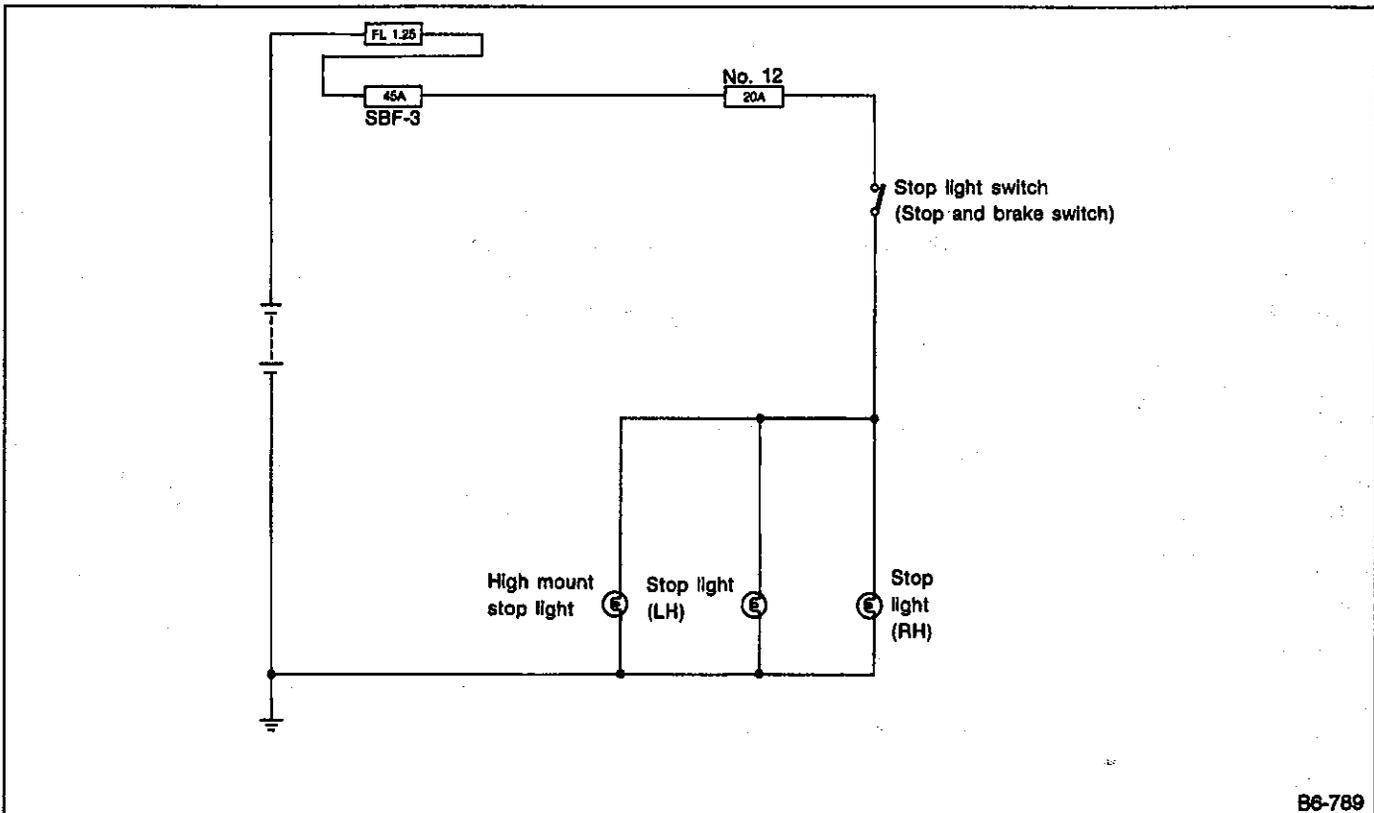
**8. Stop Light****A: SCHEMATIC**

Fig. 40

**B: REMOVAL AND INSTALLATION****1. STOP LIGHT SWITCH**

⟨Ref. to [4-5].⟩

**2. STOP AND BRAKE SWITCH**

⟨Ref. to [4-5].⟩

**3. HIGH MOUNT STOP LIGHT (WAGON)**

- 1) Remove cap.
- 2) Remove screws and cover.
- 3) Remove screws which secure stop light. While disconnecting connector, remove stop light.

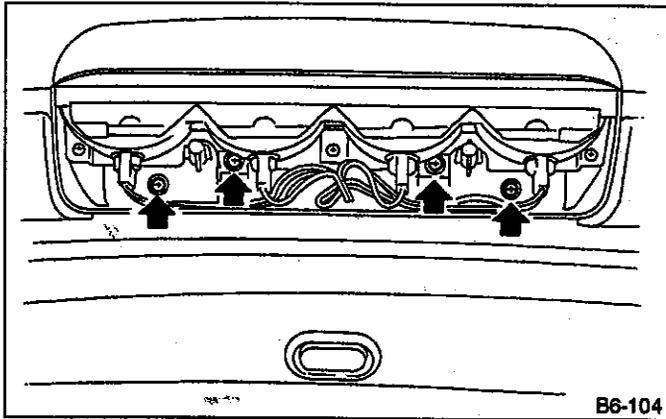


Fig. 41

**4. HIGH MOUNT STOP LIGHT (SEDAN)**

- 1) Disconnect connector.
- 2) Remove screws which secure stop light to rear shelf trim panel, and remove stop light.

**C: INSPECTION**

**1. STOP AND BRAKE SWITCH  
(With cruise control)**

- 1) Check continuity between terminals when push rod is pushed in 1.5 to 3 mm (0.059 to 0.118 in) from end of outer case.

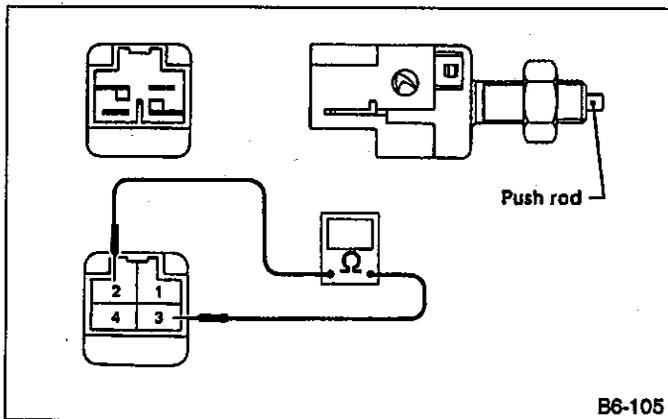


Fig. 42

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

**2. STOP LIGHT SWITCH**

- 1) Check continuity between terminals when push rod is pushed in 4 to 4.5 mm (0.157 to 0.177 in) from end of outer case.

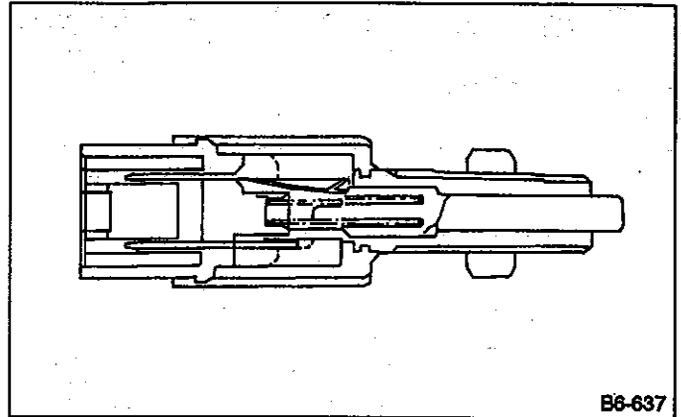


Fig. 43

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

## 9. Turn Signal and Hazard Warning Light

### A: SCHEMATIC

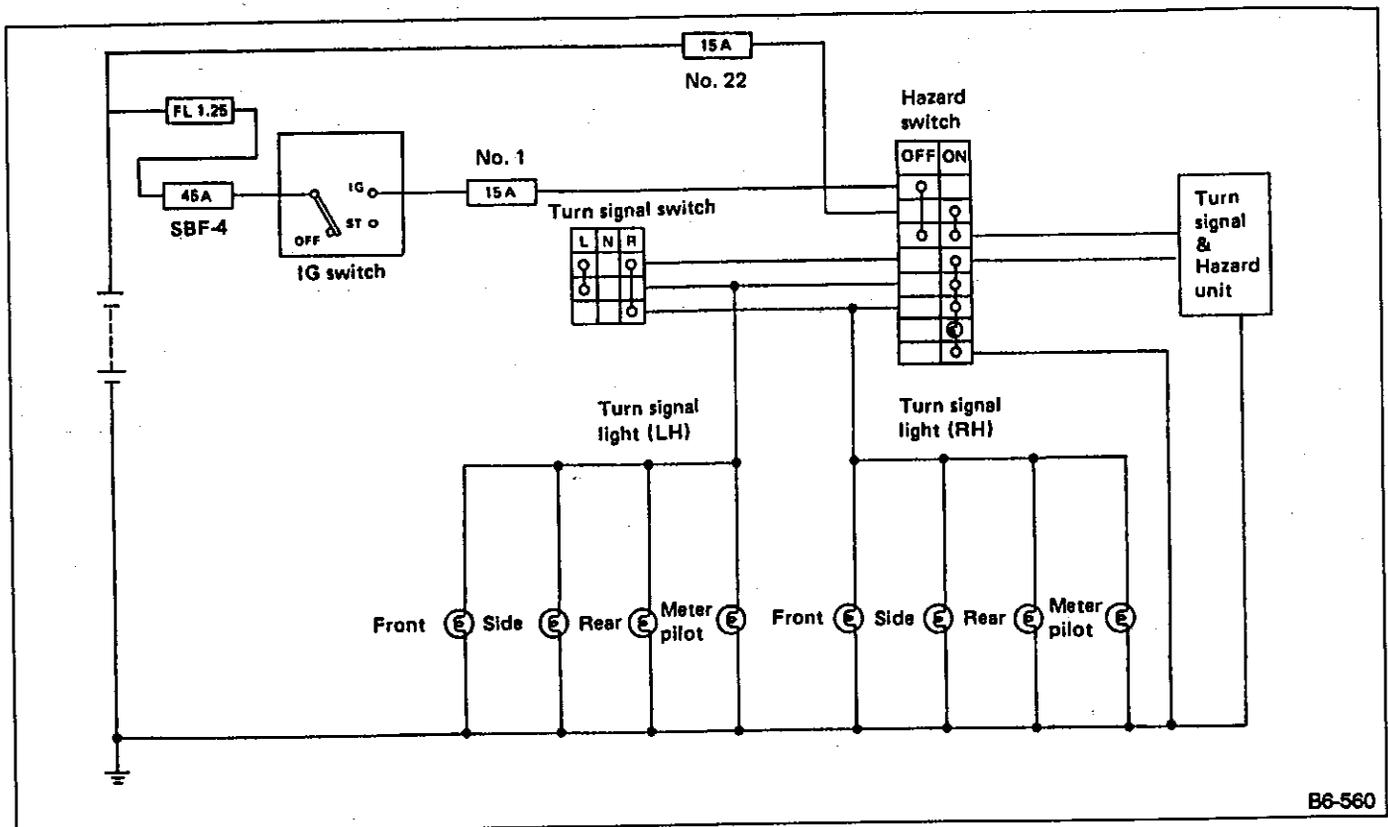


Fig. 44

### B: REMOVAL AND INSTALLATION

#### 1. COMBINATION SWITCH

(Ref. to [6-2].)

#### 2. HAZARD SWITCH

- 1) Remove visor. (Ref. to [6-2].)
- 2) Remove screws which secure hazard switch. Remove hazard switch.

#### 3. TURN SIGNAL AND HAZARD UNIT

- 1) Remove glove box.
- 2) Remove screws which secure frame. Remove frame.

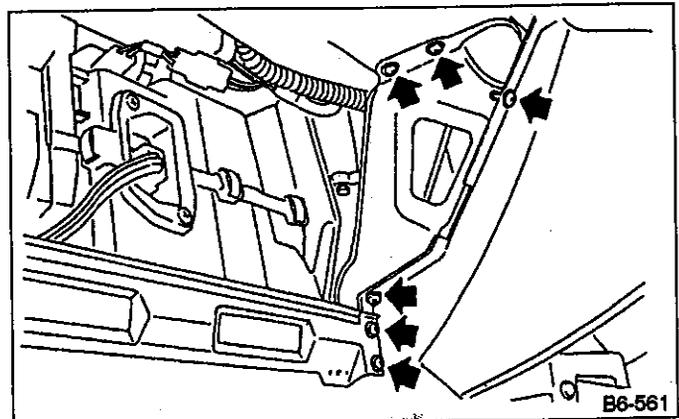
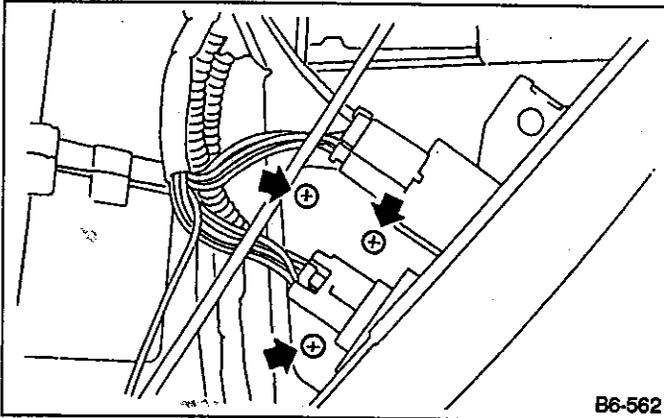


Fig. 45

- 3) Disconnect unit connector, remove screws, and remove unit and bracket as a unit.

Turn signal and hazard unit is secured to bracket together with illumination control unit.

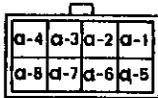
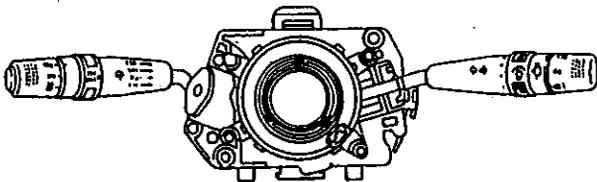


B6-562

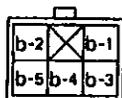
Fig. 46

**C: INSPECTION**

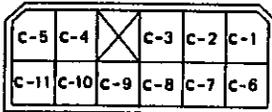
**1. COMBINATION SWITCH**



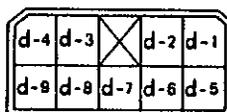
(Black)



(Black)



(Black)



(Black)

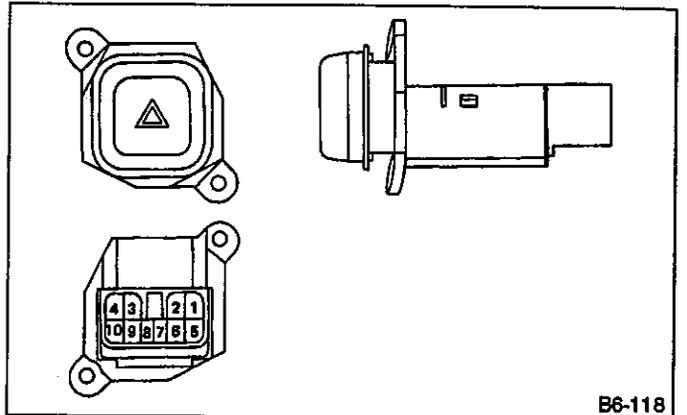
B6-525

Fig. 47

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

Terminal (Wire color)		a-5 (GY)	a-7 (G)	a-6 (GR)
Switch position	L·L'	○	○	
	↓	x		x
	N			
	↑	x		x
	R·R'		○	○

**2. HAZARD SWITCH**



B6-118

Fig. 48

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

Australia

Terminal	7	3	9	10	5	6	1	2
ON	○	○	○	○	○	○	○	○
OFF	○	○					○	○

Others

Terminal	7	3	9	10	5	6	4	1	2
ON	○	○	○	○	○	○	○	○	○
OFF	○	○						○	○

# 10. Trunk Room Light

## A: SCHEMATIC

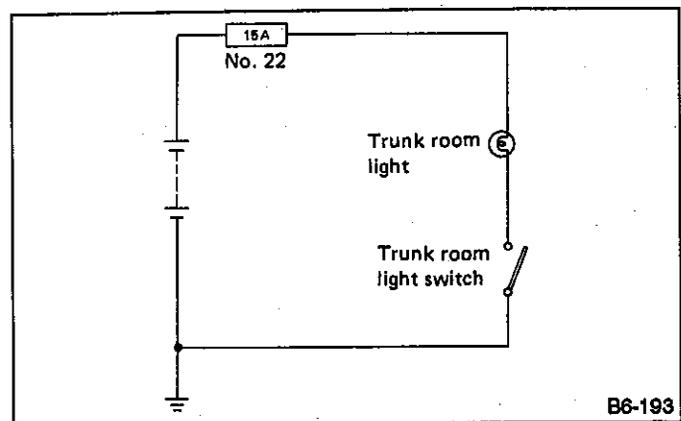
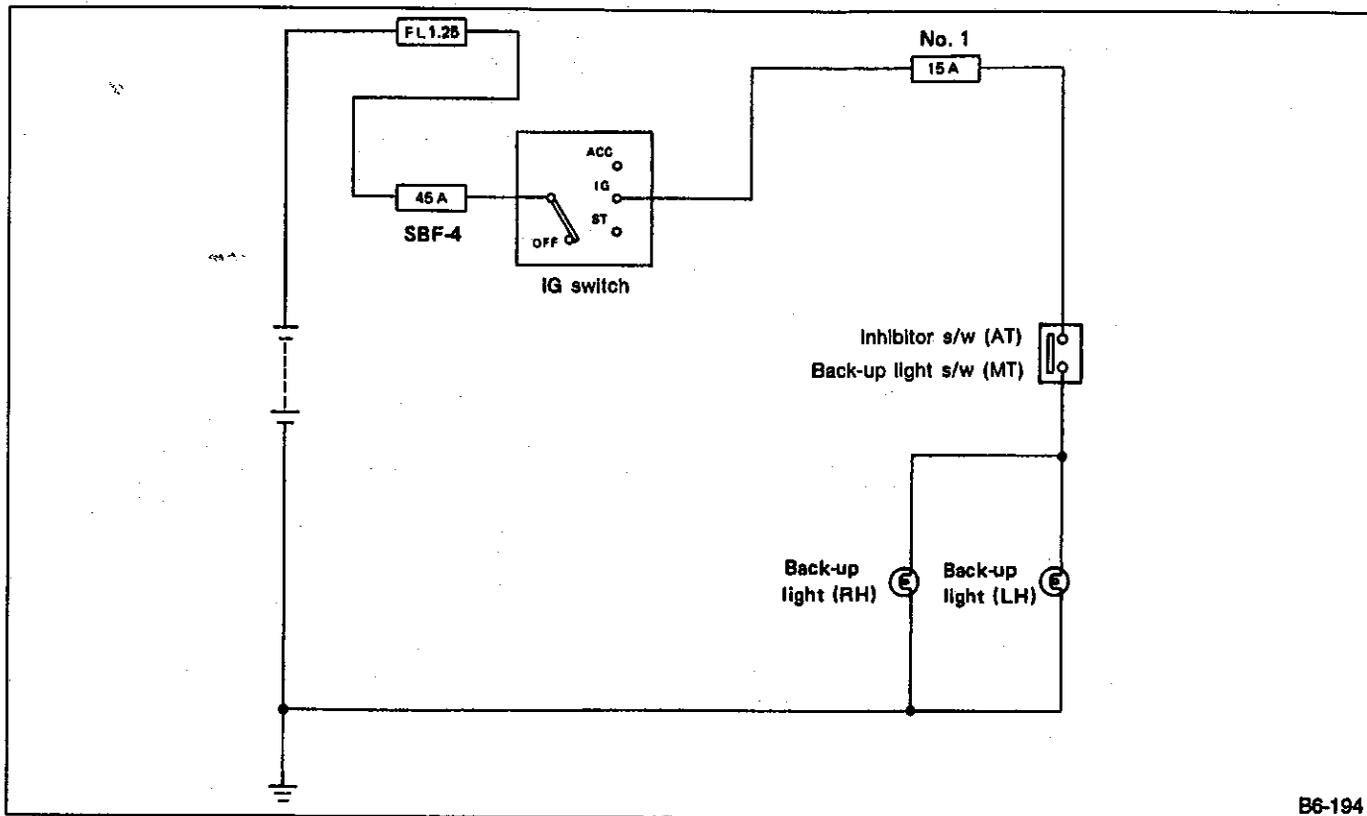


Fig. 49

# 11. Back-Up Light

## A: SCHEMATIC



B6-194

Fig. 50

## B: REMOVAL AND INSTALLATION

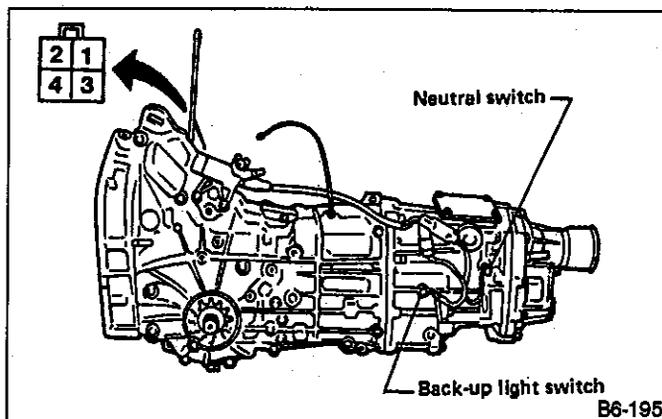
### 1. BACK-UP LIGHT SWITCH (MT)

<Ref. to [3-1].>

## C: INSPECTION

### 1. BACK-UP LIGHT SWITCH (MT)

- 1) Separate transmission cord and bulkhead wiring harness.
- 2) Check for continuity between terminals (2) and (4) when shift lever is set to Reverse.



B6-195

Fig. 51

### 2. INHIBITOR SWITCH

<Ref. to [3-2].>

## 12. Rear Fog Light

### A: SCHEMATIC

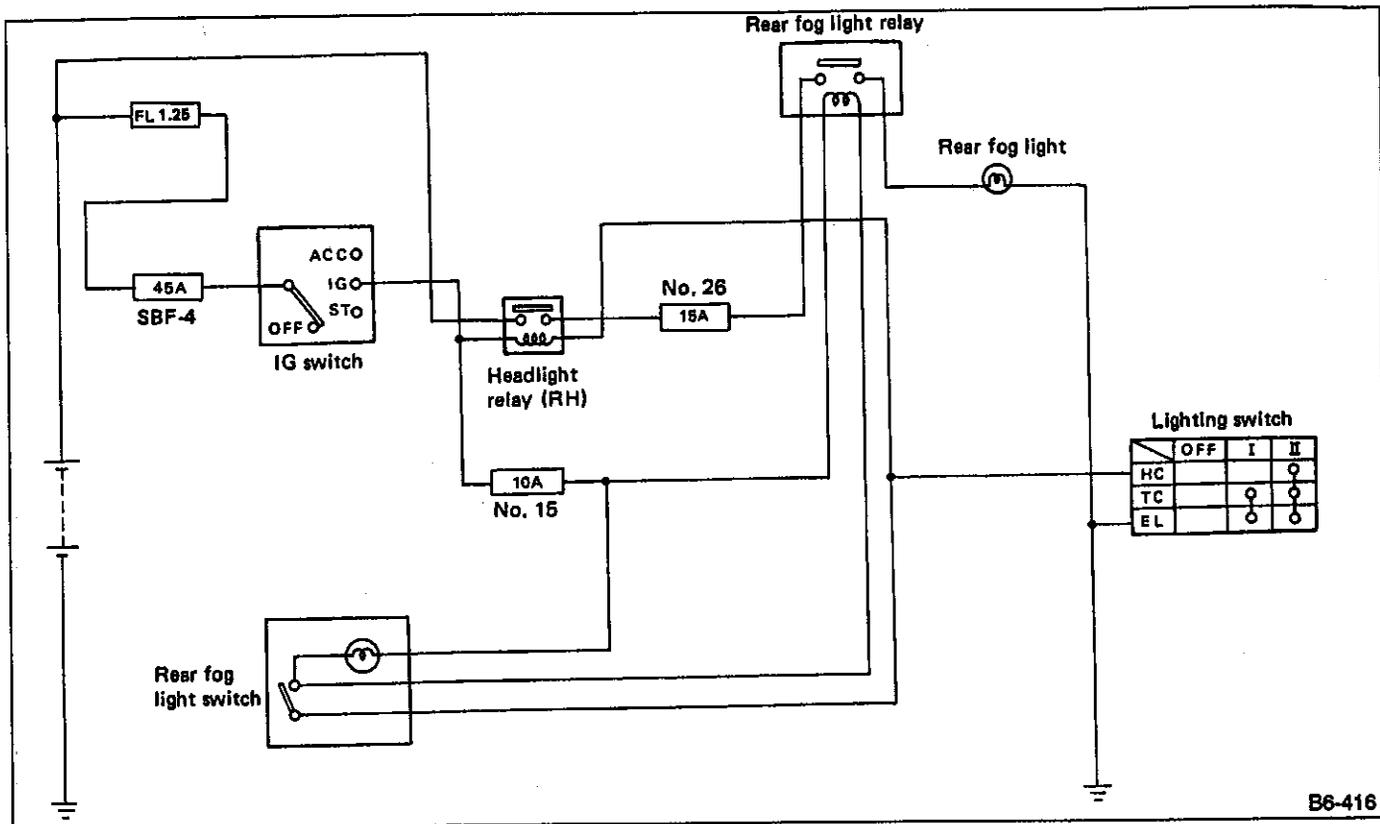


Fig. 52

### B: INSPECTION

#### 1. REAR FOG LIGHT SWITCH

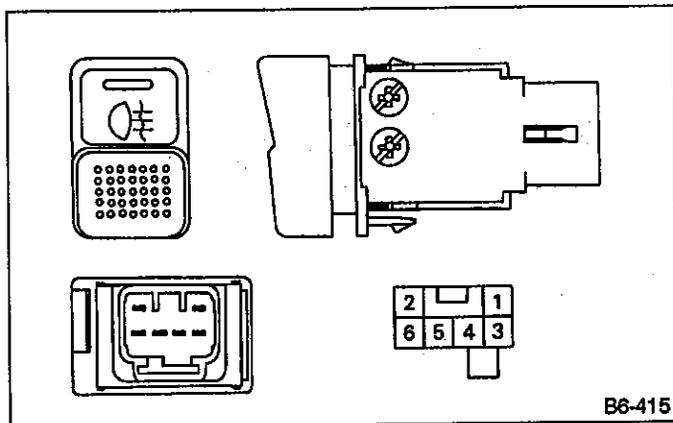


Fig. 53

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

	3	5	1	4	2
ON	○	○	⊙	○	○
OFF				○	⊙

### C: REMOVAL AND INSTALLATION

#### 1. BACK-UP LIGHT SWITCH (MT)

(Ref. to [3-1].)

### D: INSPECTION

#### 1. BACK-UP LIGHT SWITCH (MT)

- 1) Separate transmission cord and bulkhead wiring harness.
- 2) Check for continuity between terminals (2) and (4) when shift lever is set to Reverse.

# 13. Automatic Transmission Control (4AT)

## A: SCHEMATIC

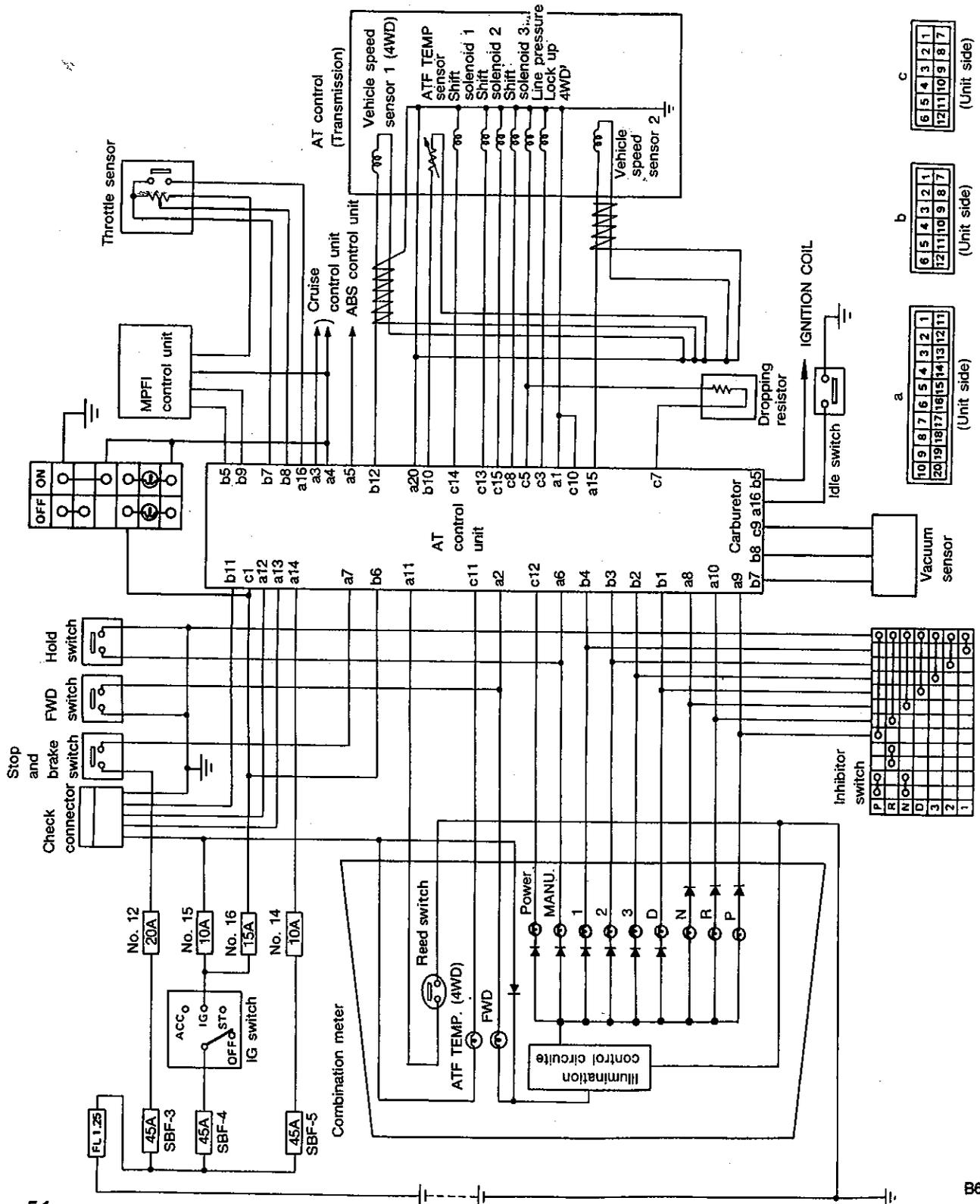
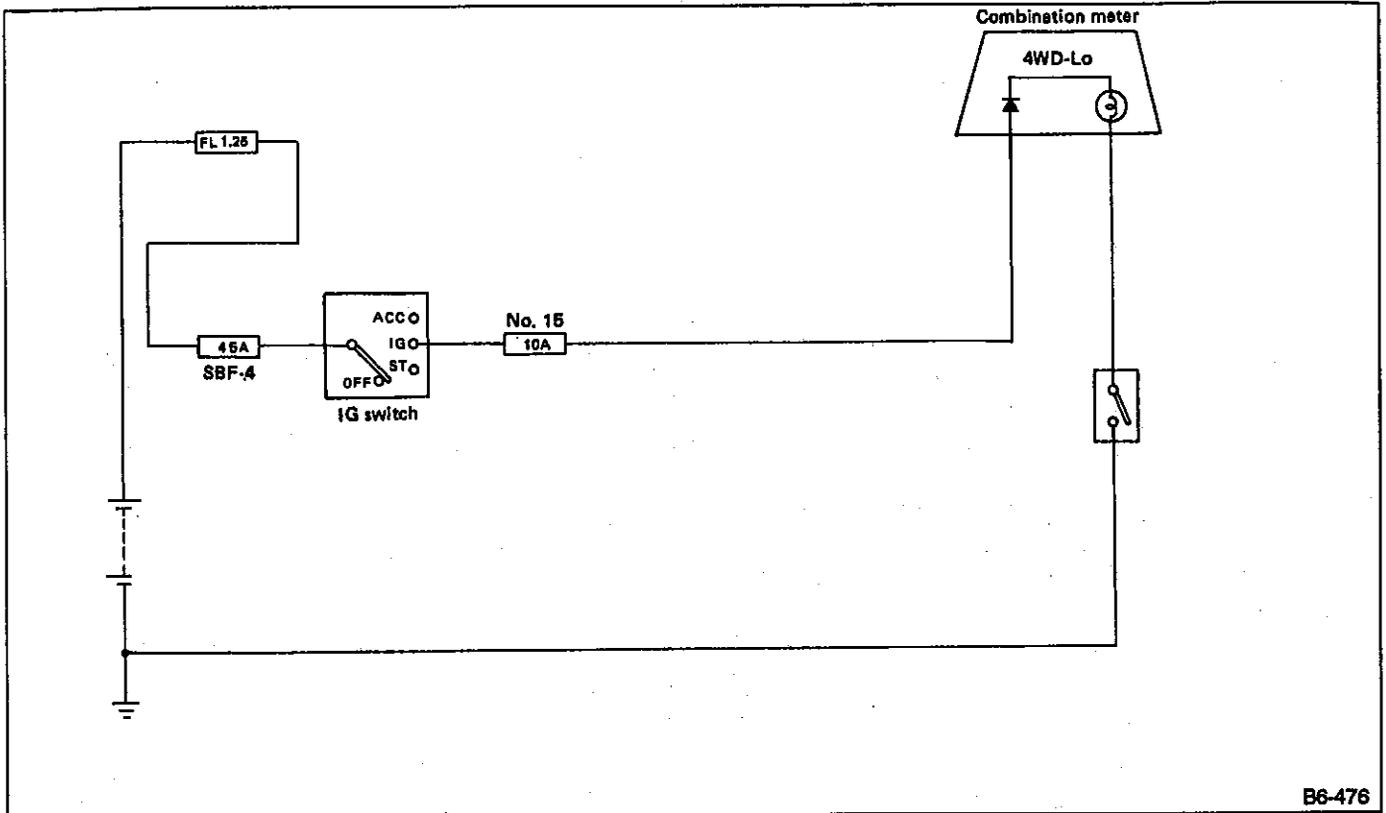


Fig. 54

# 14. 4WD-MT

## A: SCHEMATIC

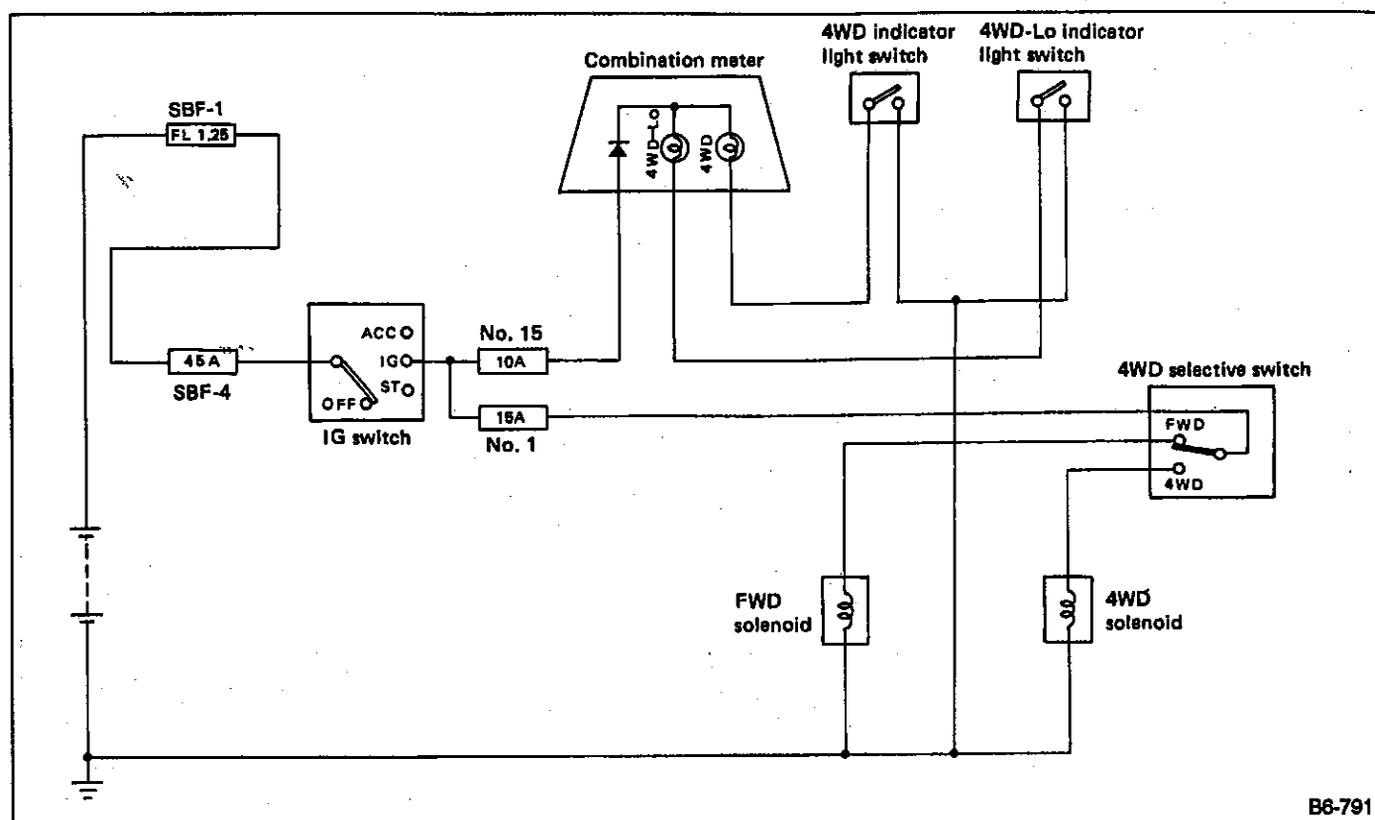
### 1. Full-Time Dual range



B6-476

Fig. 55

2. Part-Time Dual range

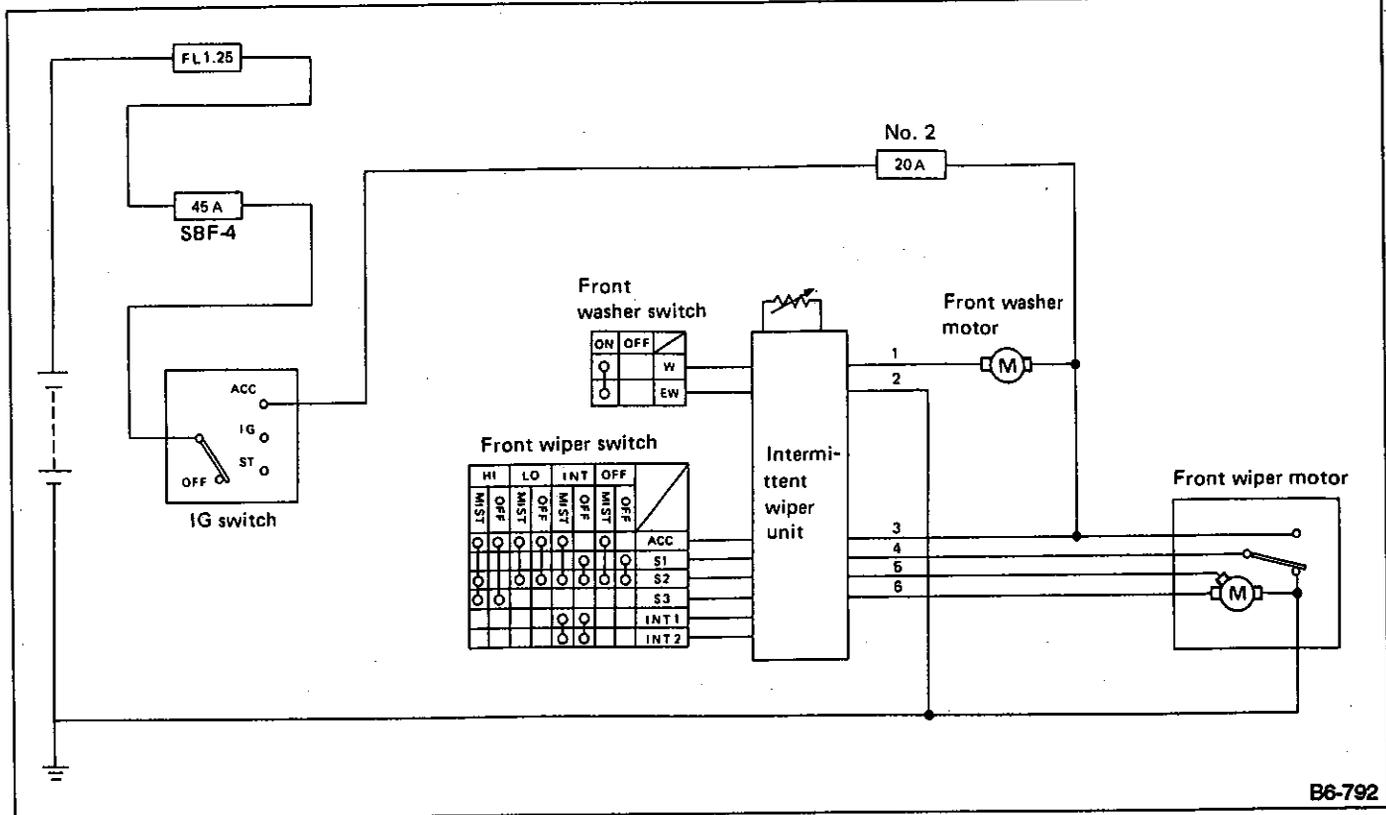


B6-791

Fig. 56

# 15. Front Wiper and Washer

## A: SCHEMATIC



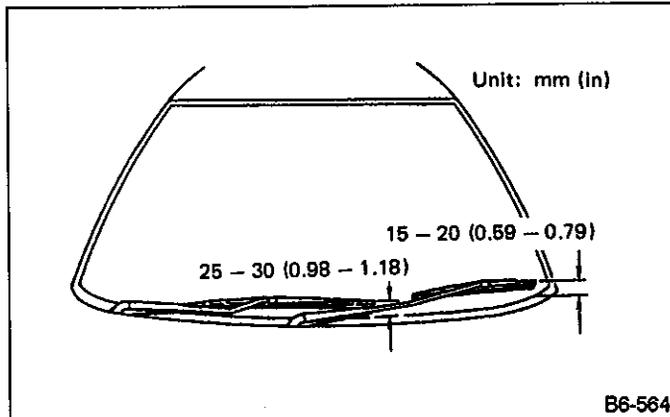
B6-792

Fig. 57

## B: ON-CAR SERVICES

### 1. ADJUSTMENT

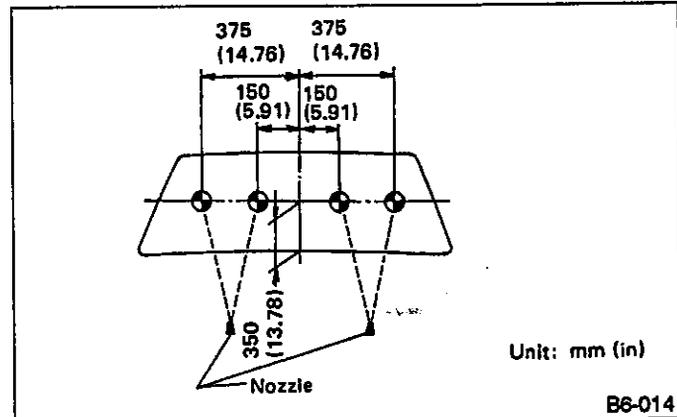
1) When wiper switch is in "OFF" position, adjust blades in original position as shown in illustration by changing wiper arm installation.



B6-564

Fig. 58

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



B6-014

Fig. 59

## C: REMOVAL AND INSTALLATION

### 1. BLADE

Pull out blade from arm while pushing up clip.

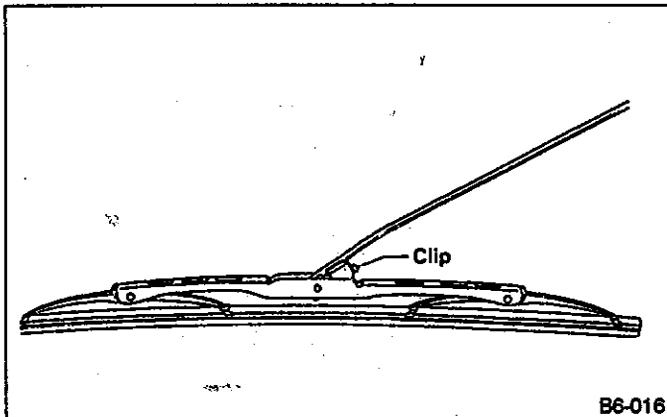


Fig. 60

**2. WIPER ARM**

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

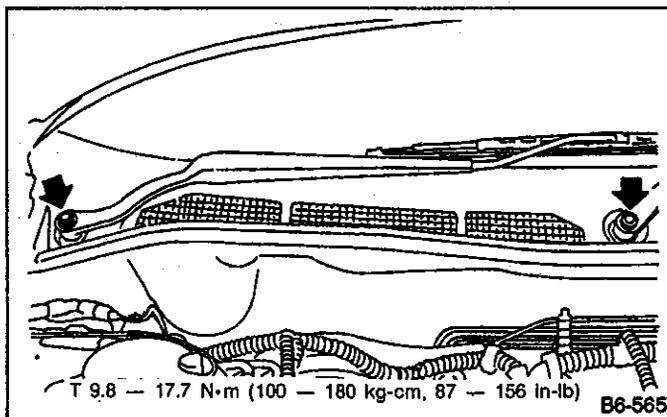


Fig. 61

**3. WIPER MOTOR AND LINK**

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

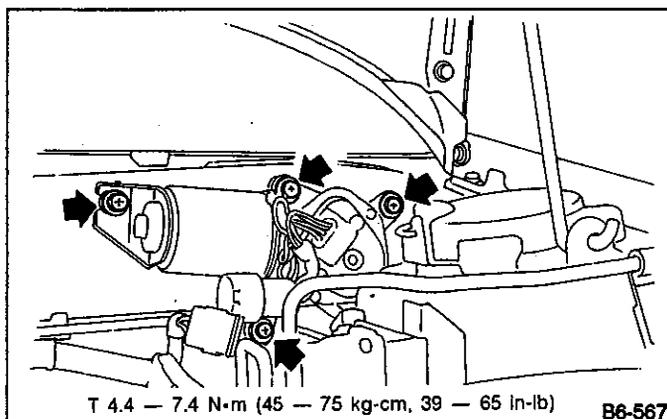


Fig. 62

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

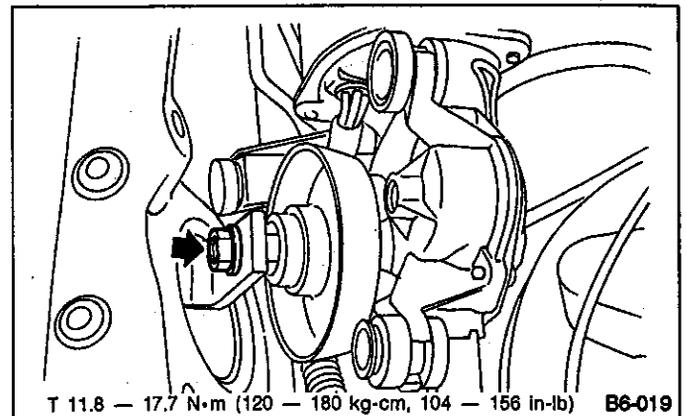


Fig. 63

- 4) Remove nuts which secure left sleeve unit (as viewed from rear of vehicle).

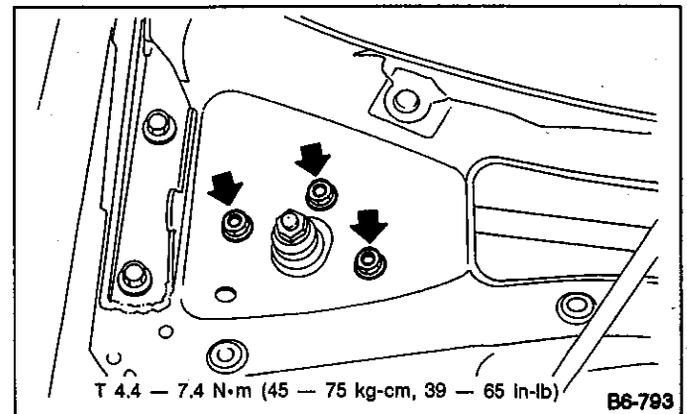


Fig. 64

- 5) Separate left and right wiper links at center joint. Remove nuts which secure right sleeve unit.
  - a. To facilitate removal of wiper link, pry with a standard screwdriver inserted into service hole in front panel.
  - b. To assemble wiper links, push using grip of screwdriver.

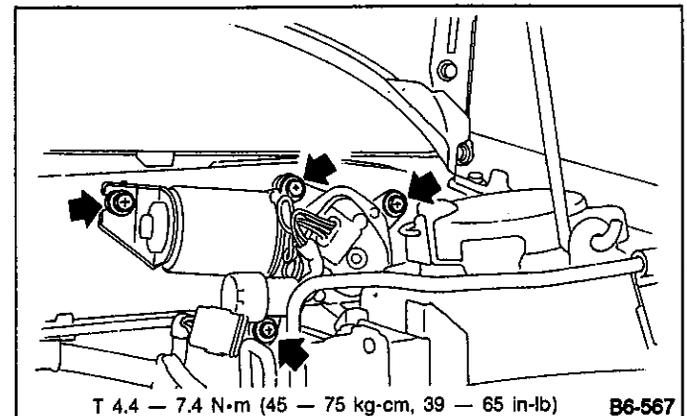


Fig. 65

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

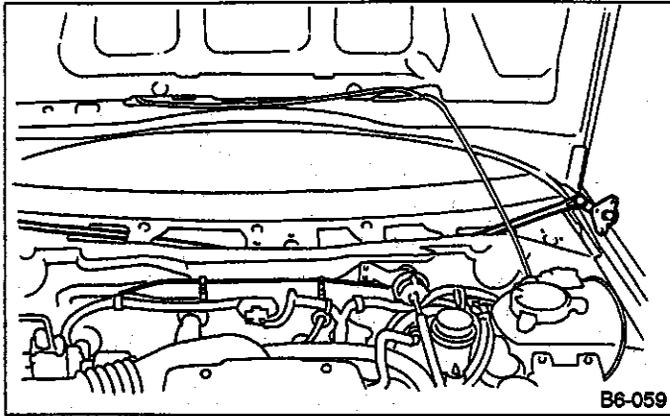


Fig. 66

**4. WASHER TANK**

- 1) Remove washer tank attaching bolts.
- 2) While removing washer tank, disconnect connector and washer hose.

Before installing washer tank, position locating boss (on lower side of washer tank) in hole on body.

Tightening torque:

4.4 — 7.4 N•m  
(45 — 75 kg-cm, 39 — 65 in-lb)

**5. NOZZLE**

- 1) Disconnect washer hose from nozzle.
- 2) Push nozzle clip in direction A. (See Figure below.)
- 3) Remove nozzle from hood.

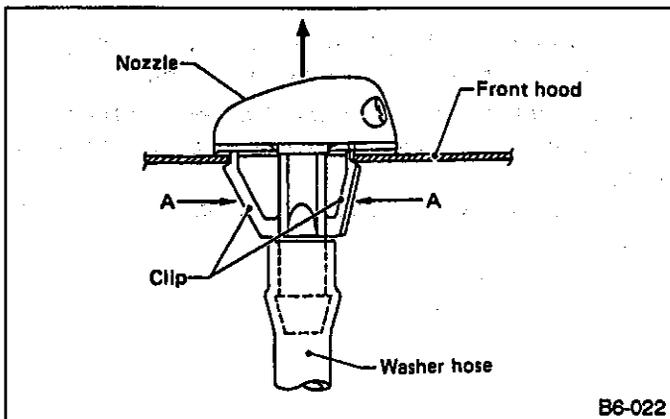


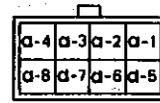
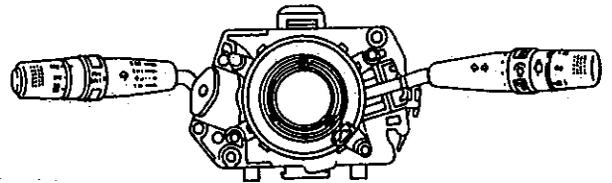
Fig. 67

**6. COMBINATION SWITCH**

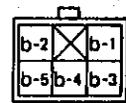
(Ref. to [6-2]).

**D: INSPECTION**

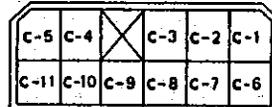
**1. FRONT WIPER AND WASHER SWITCH**



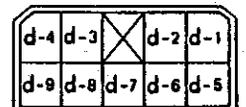
(Black)



(Black)



(Black)



(Black)

B6-525

Fig. 68

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

Wiper switch

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

Washer switch

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

For on-car check procedures, (Ref. to [6-2] No. W6E1)

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.

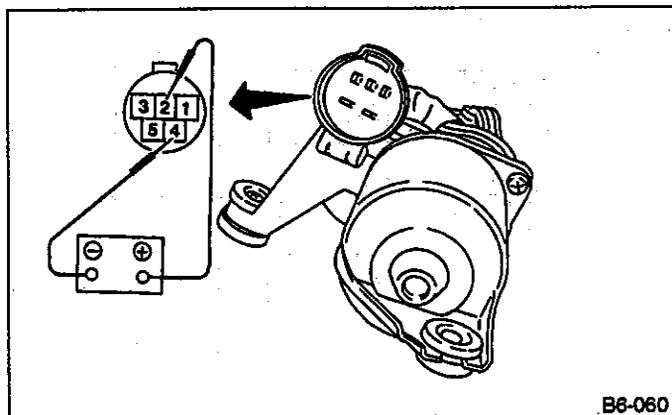


Fig. 69

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

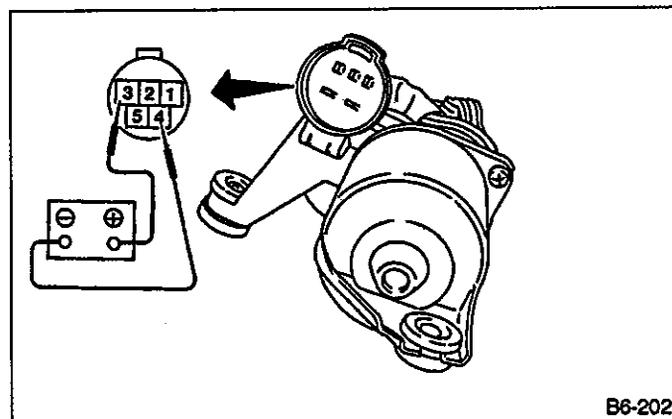


Fig. 70

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

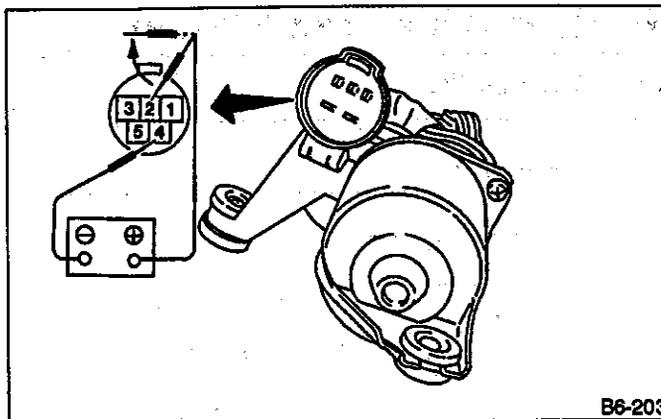


Fig. 71

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

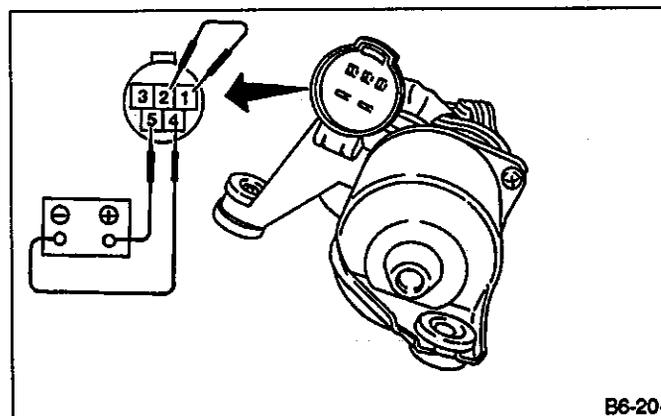


Fig. 72

3. WASHER MOTOR

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

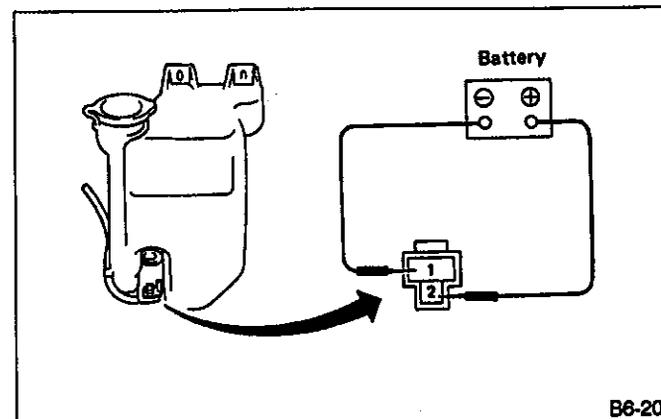
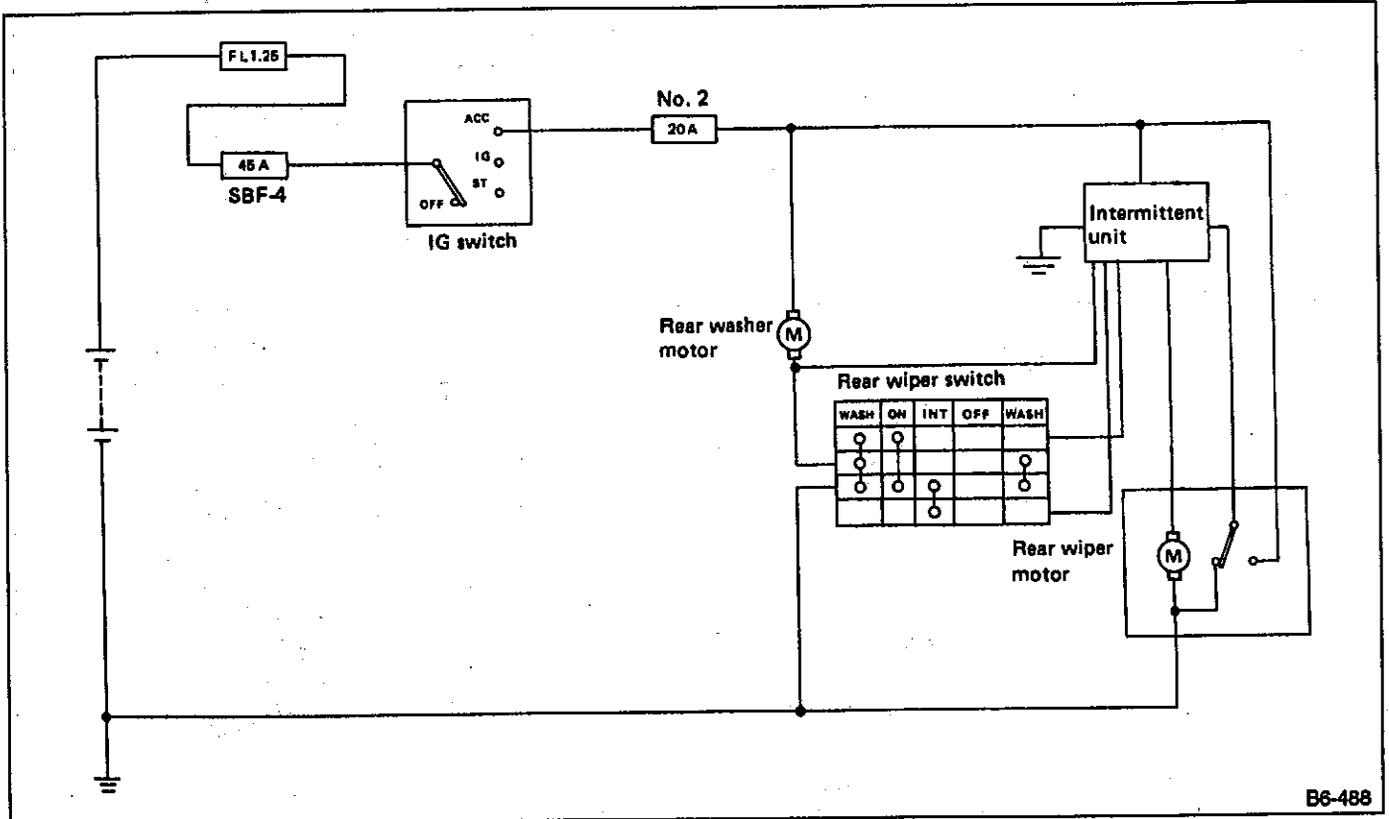


Fig. 73

# 16. Rear Wiper and Washer

## A: SCHEMATIC

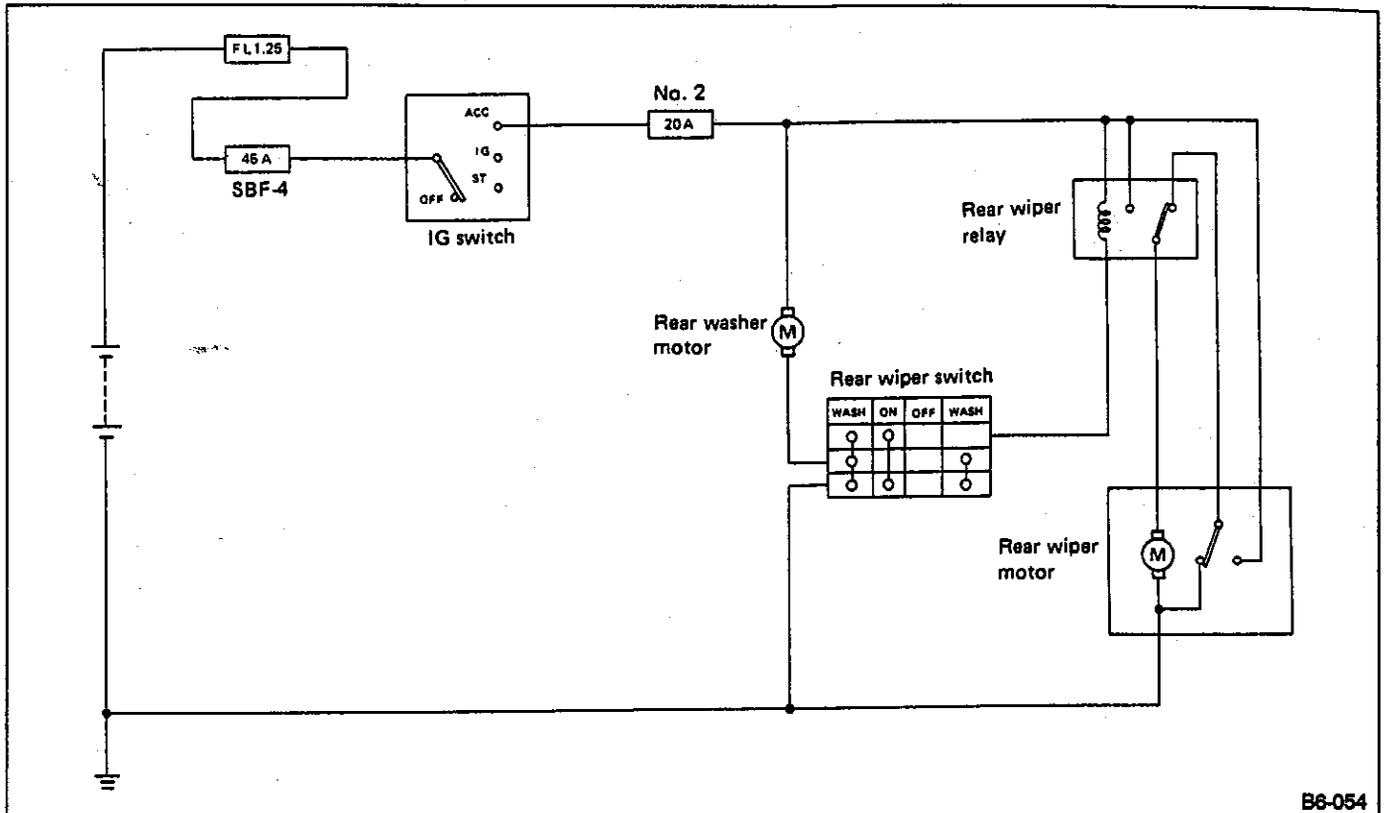
Intermittent type



B6-488

Fig. 74

Others



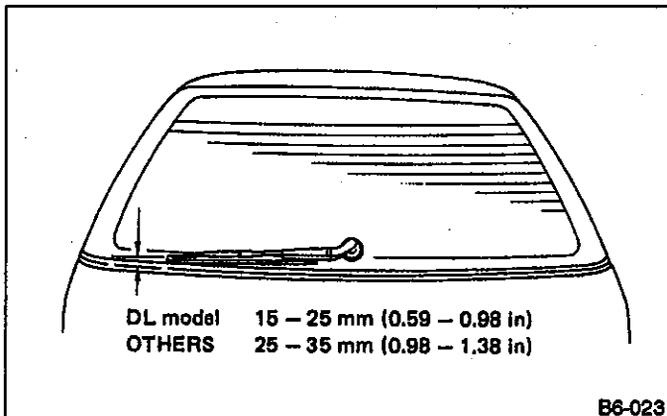
B6-054

Fig. 75

**B: ON-CAR SERVICE**

**1. ADJUSTMENT**

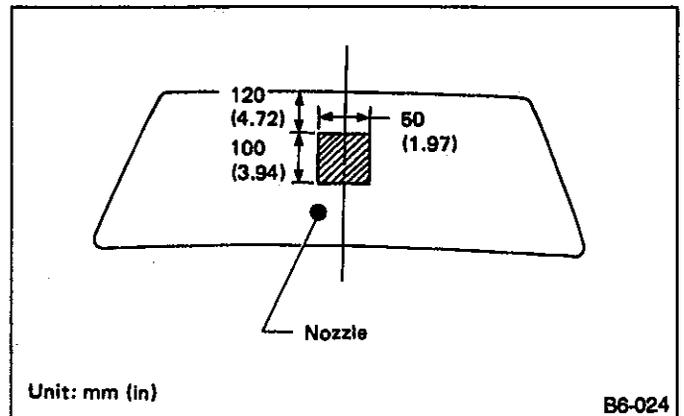
1) Adjust wiper blade in original position as shown in the illustration by changing wiper arm installation.



B6-023

Fig. 76

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



B6-024

Fig. 77

**C: REMOVAL AND INSTALLATION**

**1. BLADE**

Pull out blade from arm while pushing up clip.

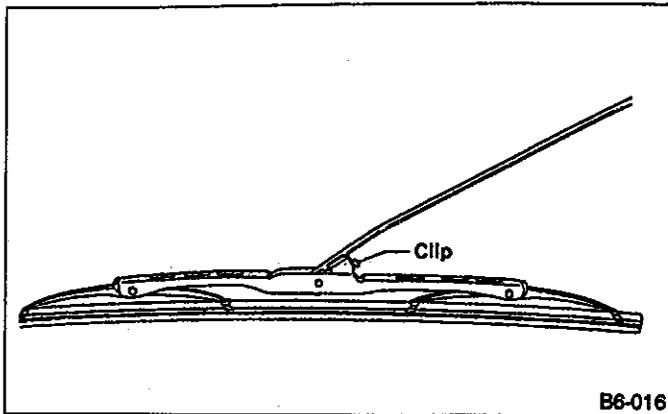


Fig. 78

## 2. WIPER ARM

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

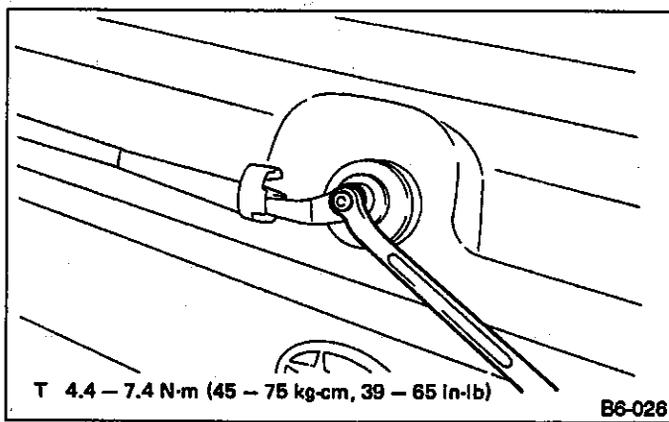


Fig. 79

## 3. WIPER MOTOR

- 1) Remove cap and special nut.

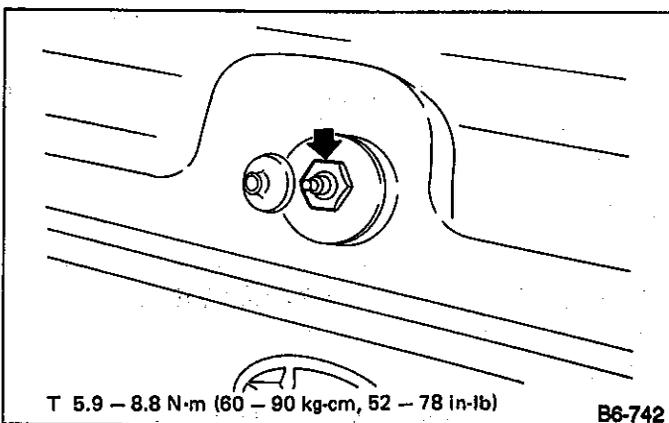


Fig. 80

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

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

Two types of clips are used. Do not confuse one type with the other during installation.

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

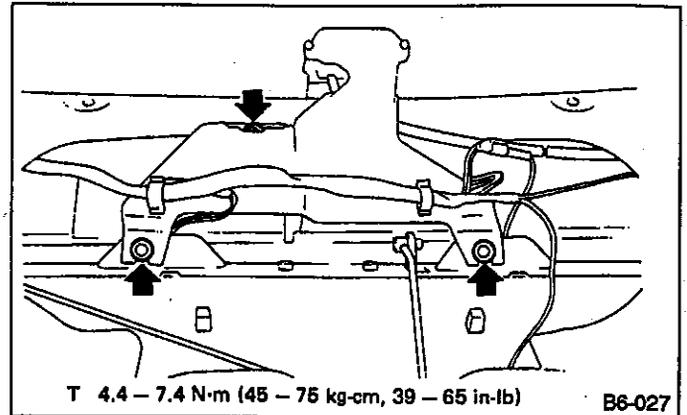


Fig. 81

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

## 4. WASHER TANK

- 1) Open cover. Remove screws, clips and retainers from rear quarter trim panel. Also remove screws and clips from left of rear edge.

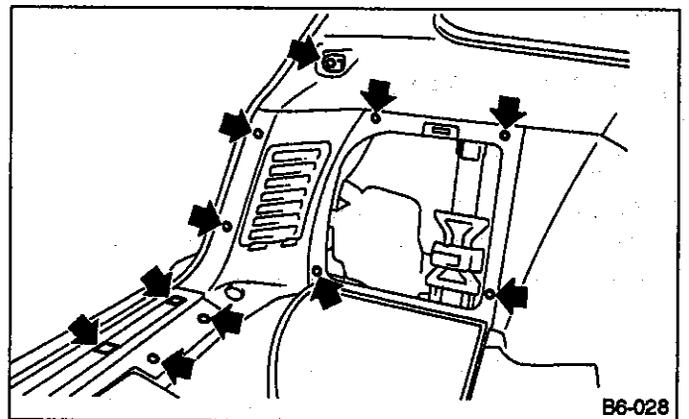


Fig. 82

- 2) Disconnect washer hose.
- 3) While pulling rear quarter trim panel, remove attaching bolts.

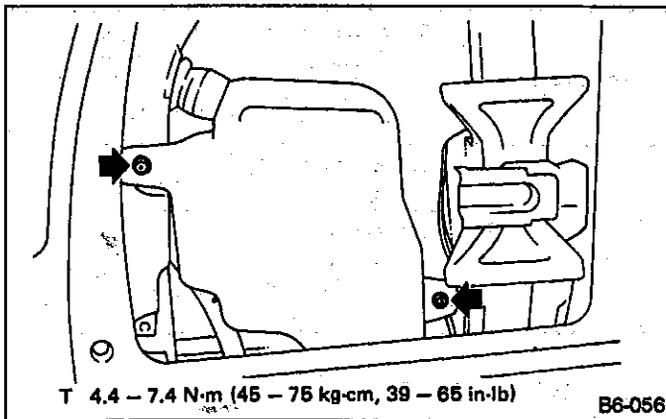


Fig. 83

4) While removing washer tank, disconnect connector and hose (from joint).

Terminal	d-2	d-1	d-4	d-3
Switch position				
WASH	○	○		
OFF				
INT	○	○	○	
ON	○			○
WASH	○	○		○

For "on-car" inspection procedures; (Ref. to [6-2] No. W6E1.)

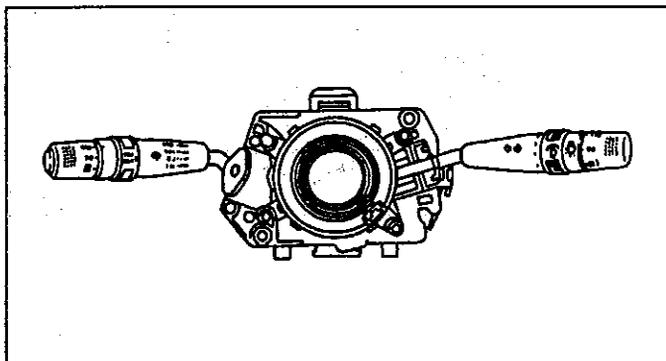
2. WIPER MOTOR

1) Operational check

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

D: INSPECTION

1. REAR WIPER AND WASHER SWITCH



<table border="1"> <tr><td>a-4</td><td>a-3</td><td>a-2</td><td>a-1</td></tr> <tr><td>a-8</td><td>a-7</td><td>a-6</td><td>a-5</td></tr> </table> <p>(Black)</p>	a-4	a-3	a-2	a-1	a-8	a-7	a-6	a-5	<table border="1"> <tr><td>b-2</td><td>b-1</td></tr> <tr><td>b-5</td><td>b-3</td></tr> </table> <p>(Black)</p>	b-2	b-1	b-5	b-3								
a-4	a-3	a-2	a-1																		
a-8	a-7	a-6	a-5																		
b-2	b-1																				
b-5	b-3																				
<table border="1"> <tr><td>c-5</td><td>c-4</td><td>c-3</td><td>c-2</td><td>c-1</td></tr> <tr><td>c-11</td><td>c-10</td><td>c-9</td><td>c-8</td><td>c-7</td><td>c-6</td></tr> </table> <p>(Black)</p>	c-5	c-4	c-3	c-2	c-1	c-11	c-10	c-9	c-8	c-7	c-6	<table border="1"> <tr><td>d-4</td><td>d-3</td><td>d-2</td><td>d-1</td></tr> <tr><td>d-9</td><td>d-8</td><td>d-7</td><td>d-6</td><td>d-5</td></tr> </table> <p>(Black)</p>	d-4	d-3	d-2	d-1	d-9	d-8	d-7	d-6	d-5
c-5	c-4	c-3	c-2	c-1																	
c-11	c-10	c-9	c-8	c-7	c-6																
d-4	d-3	d-2	d-1																		
d-9	d-8	d-7	d-6	d-5																	

Fig. 84

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

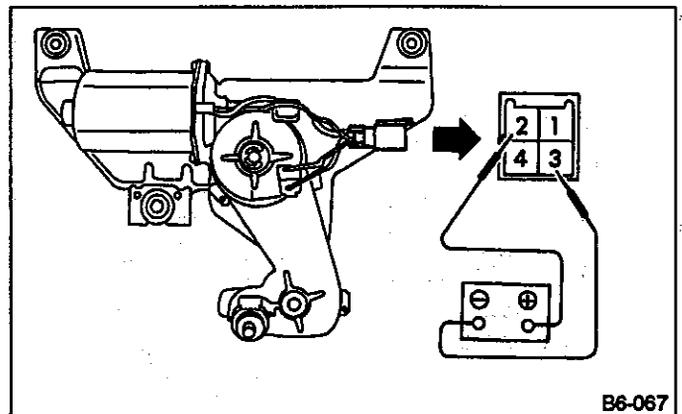


Fig. 85

2) Check wiper motor for proper stoppage.

After operating wiper motor, disconnect battery from wiper motor.

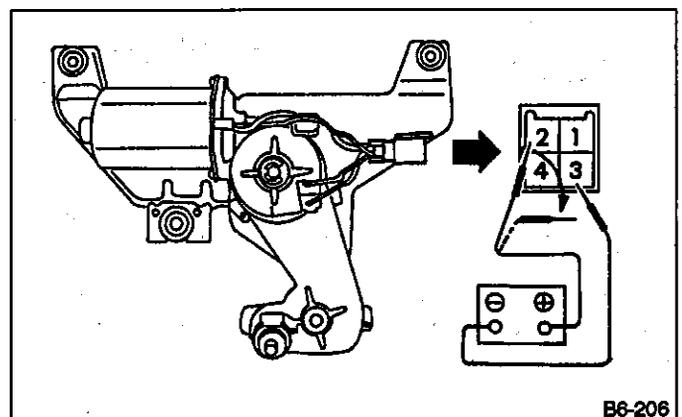
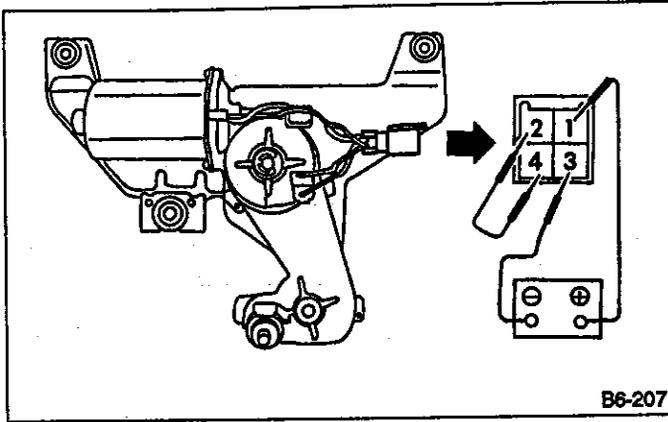


Fig. 86

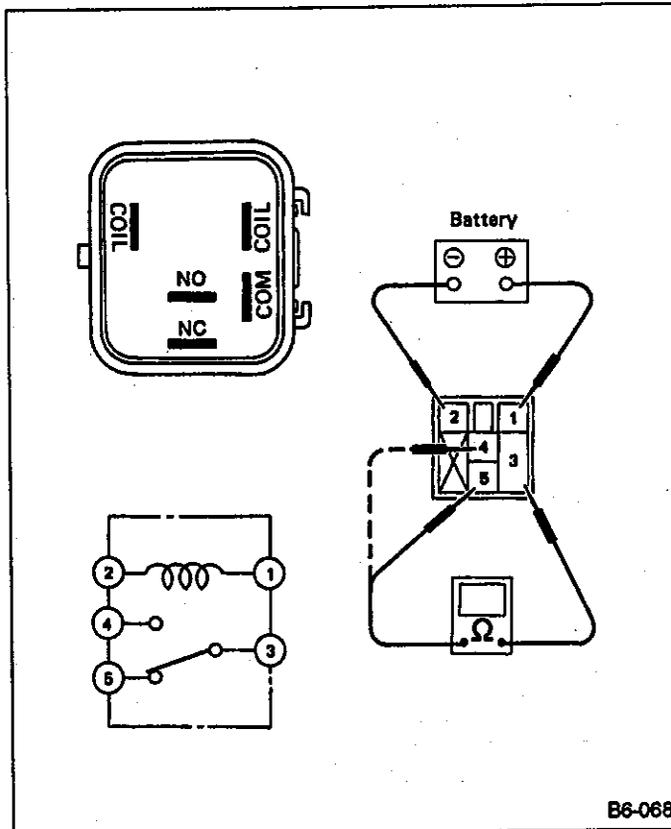
Reconnect battery and ensure that wiper motor stops at "AUTO STOP" after it has been operated.



B6-207

Fig. 87

**3. REAR WIPER RELAY**



B6-068

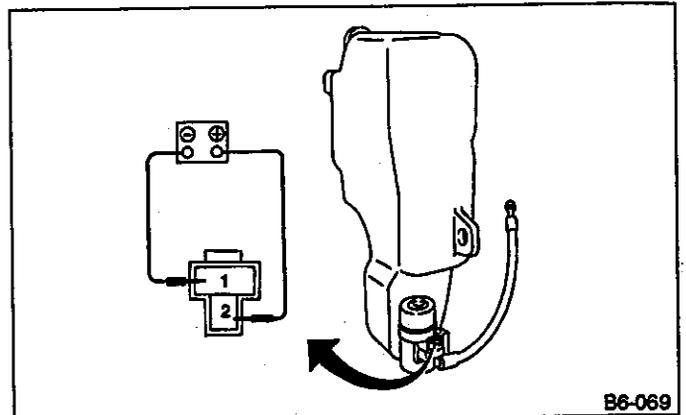
Fig. 88

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.

**4. WASHER MOTOR**

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

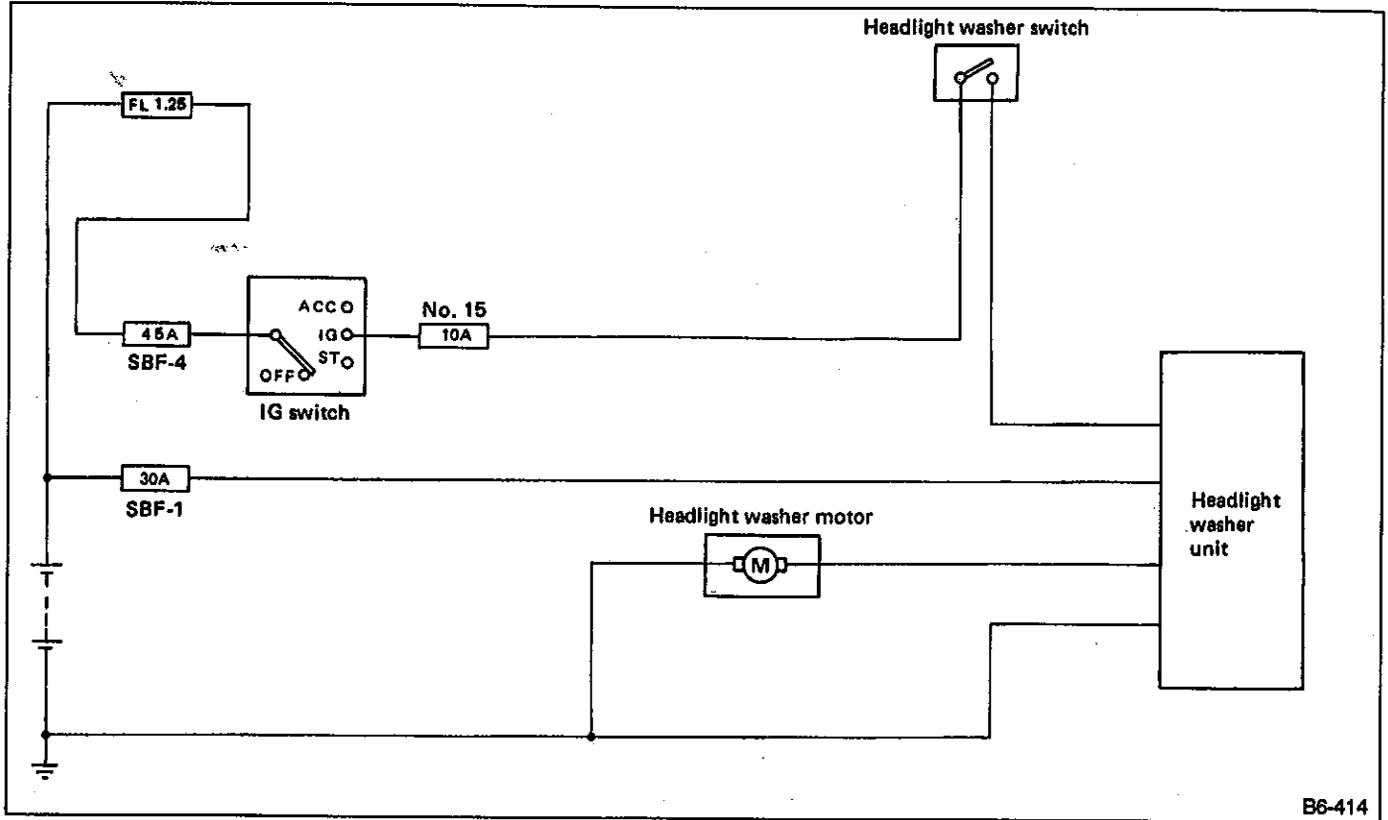


B6-069

Fig. 89

# 17. Headlight Washer

## A: SCHEMATIC



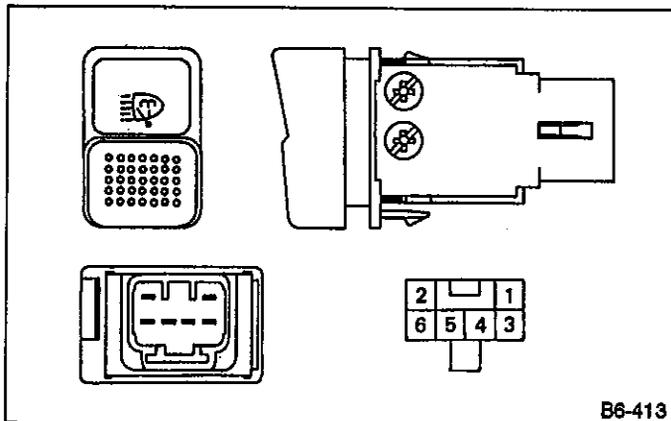
B6-414

Fig. 90

## B: INSPECTION

### 1. HEADLIGHT WASHER SWITCH

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



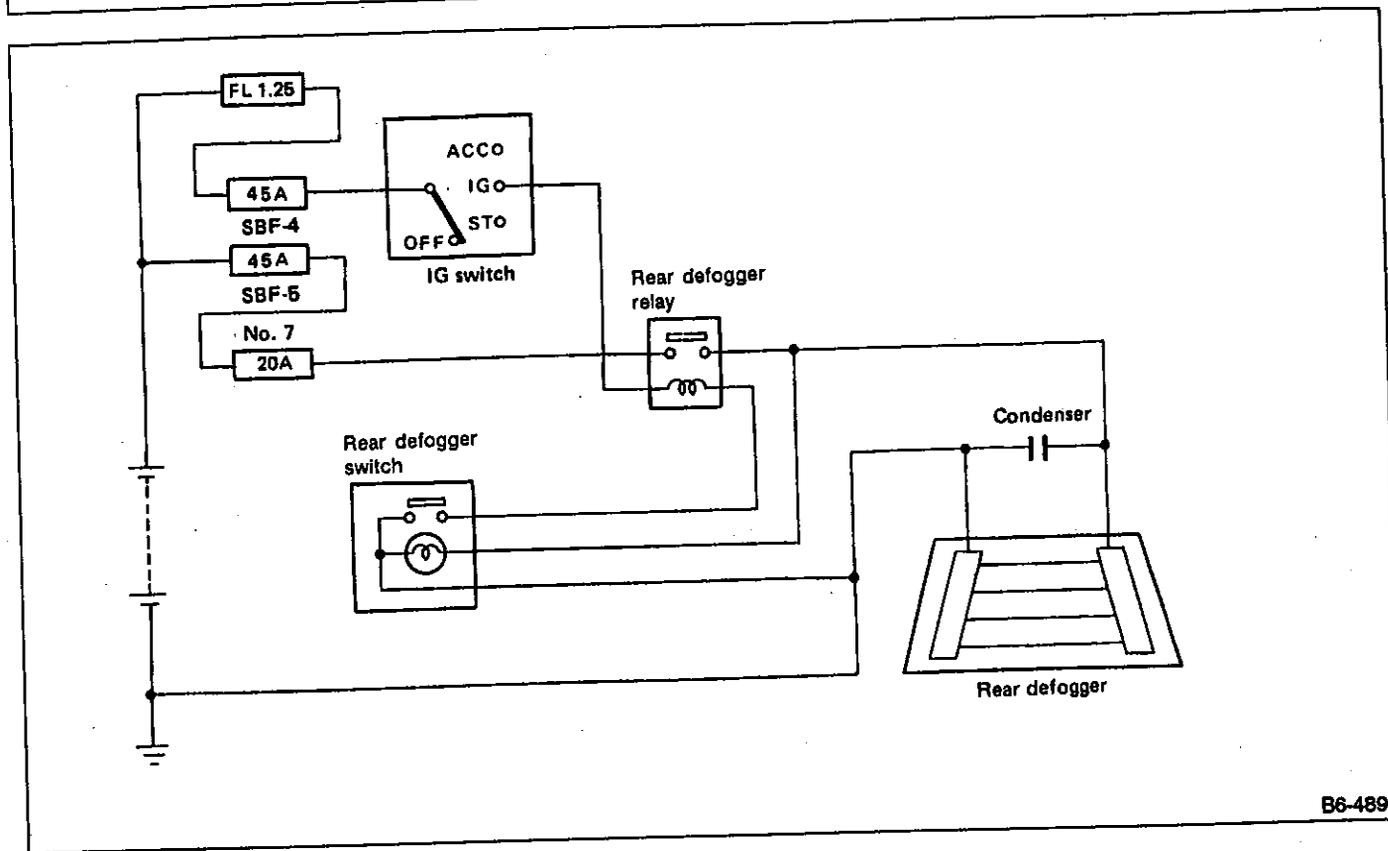
B6-413

	3	5			4		2
ON	○—○				○—○	○—○	
OFF					○—○	○—○	

Fig. 91

# 18. Rear Window Defogger

## A: SCHEMATIC



B6-489

Fig. 92

## B: REMOVAL AND INSTALLATION

### 1. DEFOGGER SWITCH

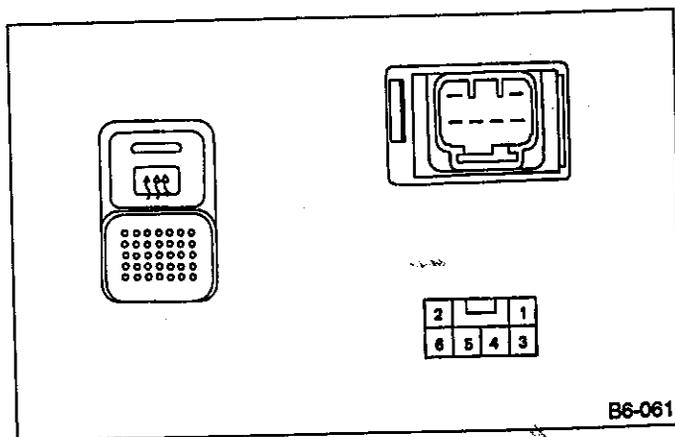
1) Using a small standard screwdriver, remove defogger switch from instrument panel.

**Be careful not to damage switch during removal.**

2) Disconnect connector.

## C: INSPECTION

### 1. DEFOGGER SWITCH



B6-061

Fig. 93

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

Terminal	3	5		1	4		2
Switch position							
OFF					○	○	○
ON	○	○	○	○	○	○	○

**2. DEFOGGER RELAY**

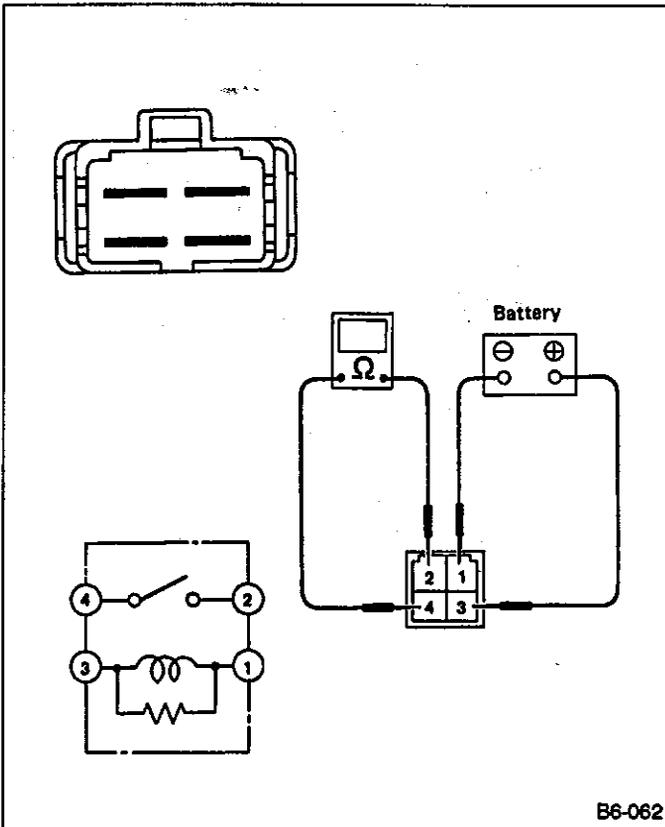


Fig. 94

Connect battery to terminal (3) and ground terminal (1). Check continuity between terminals (indicated in table below).

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

**3. 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.

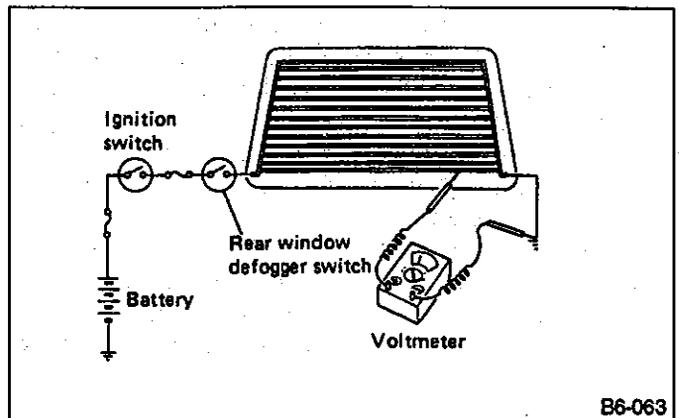


Fig. 95

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

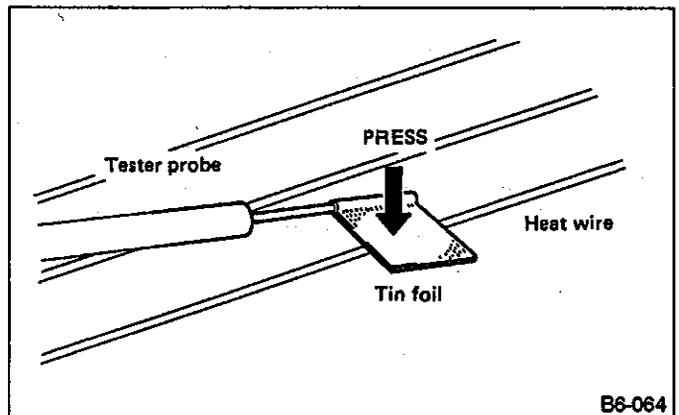


Fig. 96

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.

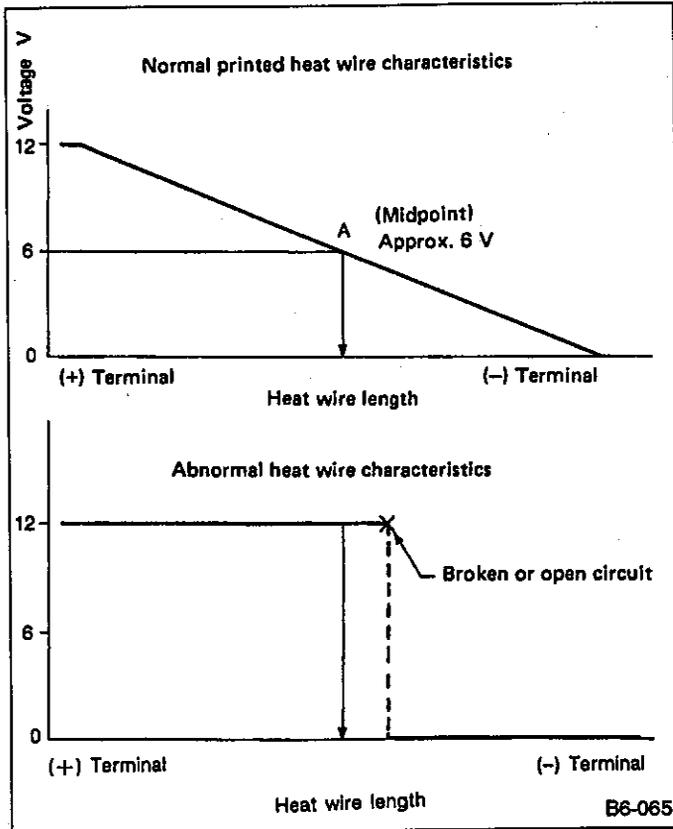


Fig. 97

**D: 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.

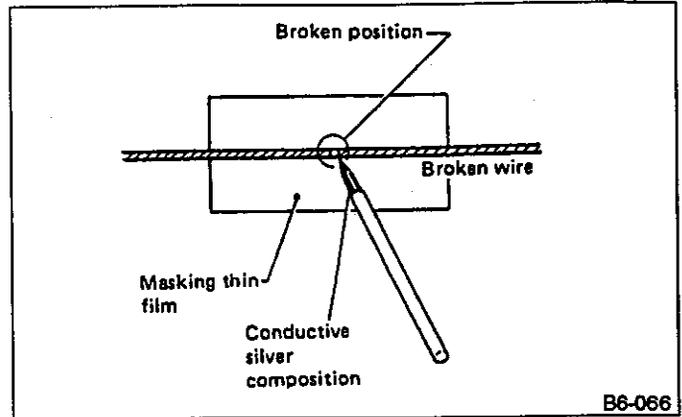


Fig. 98

- 4) Dry out the deposited portion.
- 5) Inspect the repaired wire for continuity.

# 19. Parking Brake Switch and Brake Fluid Level Warning

## A: SCHEMATIC

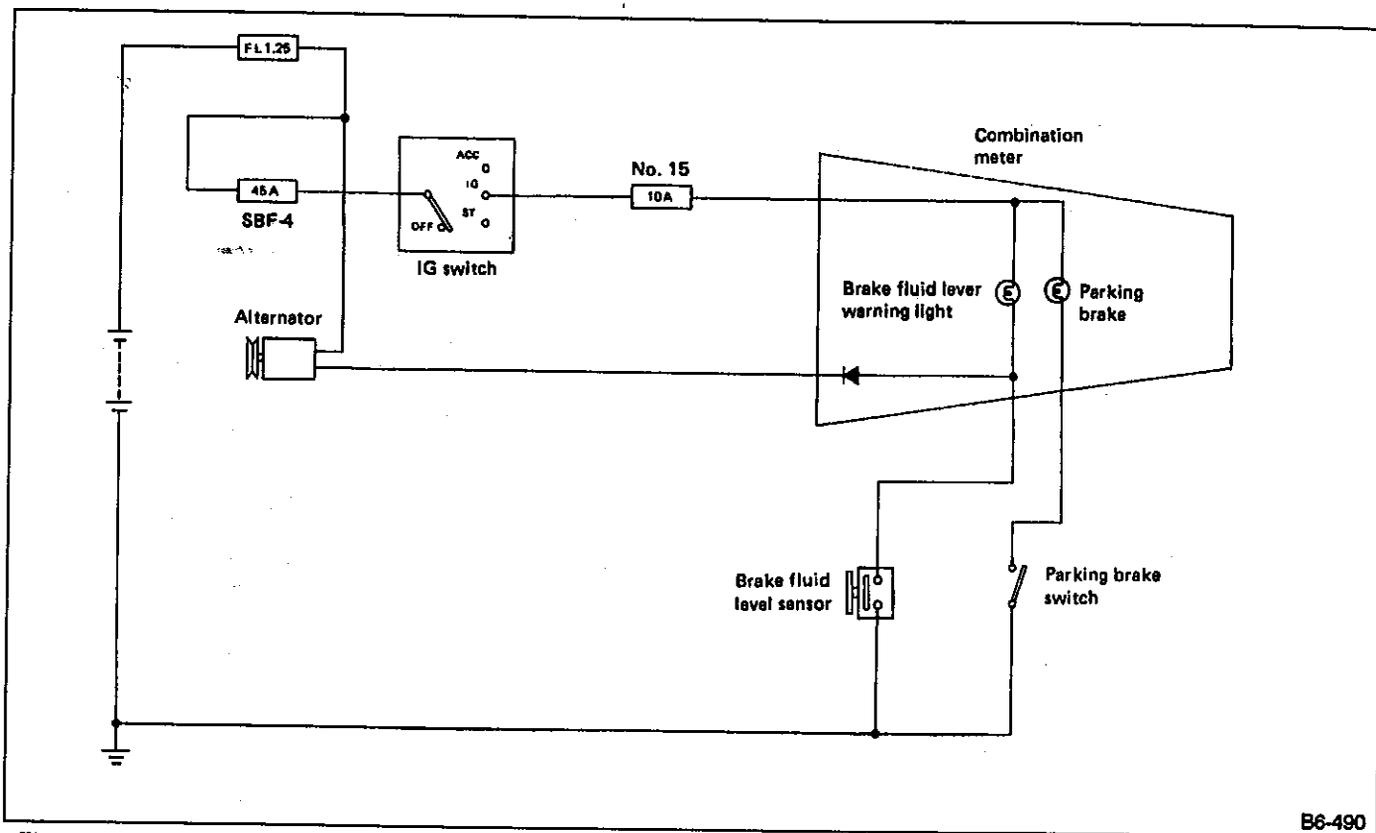


Fig. 99

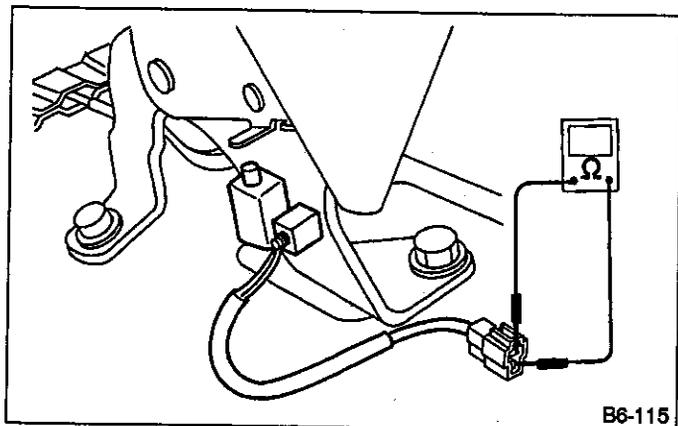
B6-490

## B: INSPECTION

### 1. PARKING BRAKE SWITCH

- 1) Remove right-hand front seat.
- 2) Remove console box and parking brake cover. (Ref. to [5-3].)
- 3) Roll up floor mat and disconnect switch connector.

Ensure that parking brake switch activates at one notch stroke intervals of lever engagement.



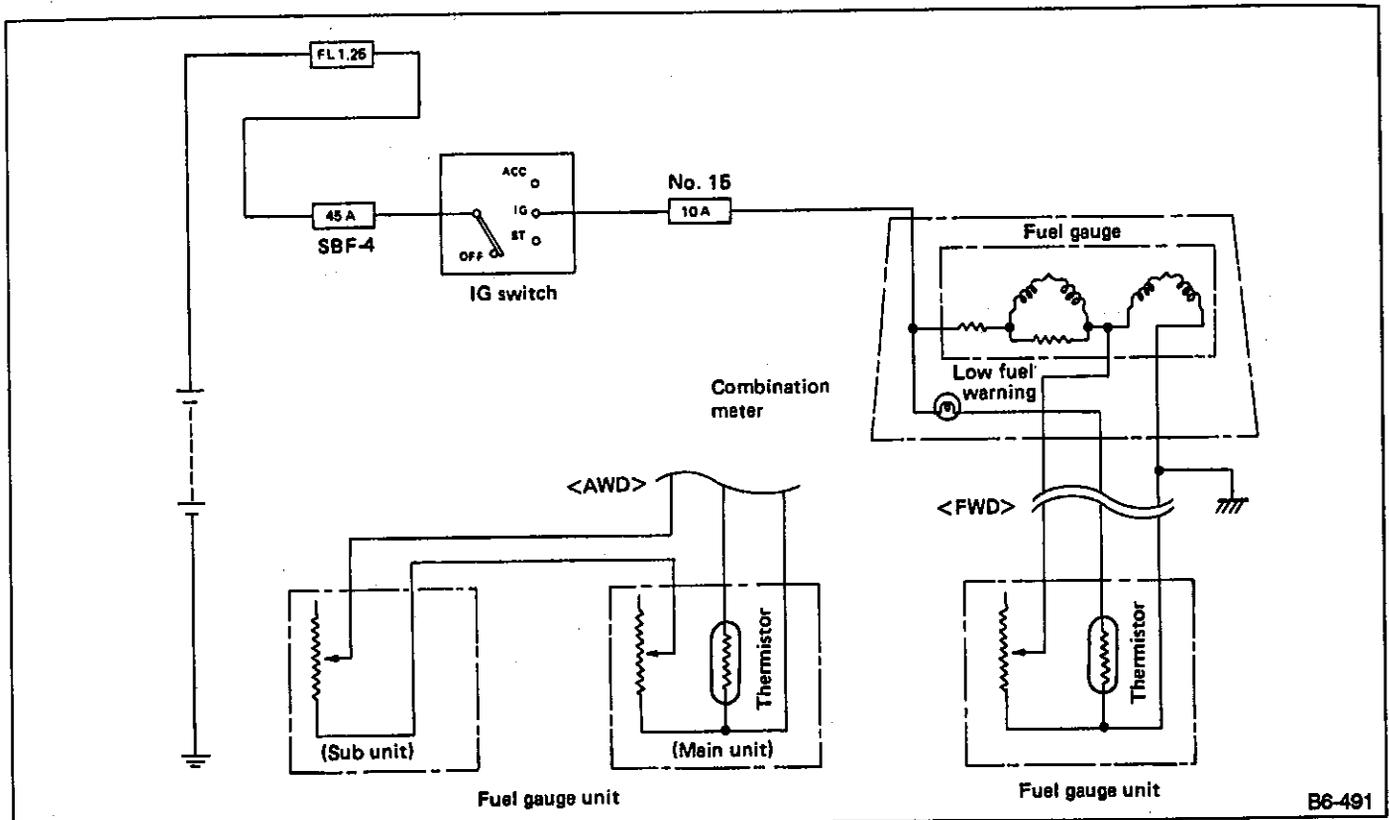
B6-115

Terminal	1	2
Switch position		
Lever pulled	○	○
Lever returned		

Fig. 100

## 20. Fuel Gauge

### A: SCHEMATIC



B6-491

Fig. 101

### B: REMOVAL AND INSTALLATION

#### 1. FUEL GAUGE UNIT

(Ref. to [2-8].)

#### 1) Float position

While moving float, determine point F (upper limit position) where float arm contacts stopper and point E (lower limit position).

#### 2) Standard resistance of fuel gauge unit

When float is at point F (upper limit position) and point E (lower limit position), measure resistance between terminals (1) and (2) (4WD-sub unit) [or between terminals (3) and (5) (4WD model), terminals (5) and (6) (FWD model)].

### C: INSPECTION

#### 1. FUEL GAUGE UNIT

Float position and resistance		Vehicle type	FWD	4WD	
				MAIN UNIT	SUB UNIT
Float position	mm (in)	F	94 ± 3 (3.70 ± 0.12)	80.9 ± 3 (3.185 ± 0.118)	72.9 ± 3 (2.870 ± 0.118)
		E	230.4 ± 3 (9.07 ± 0.12)	252.0 ± 3 (9.92 ± 0.12)	249.0 ± 3 (9.80 ± 0.12)
Normal resistance	(Ω)	F	2.0 — 5.0	0.5 — 2.5	0.5 — 2.5
		E	92.0 — 95.0	50.0 — 52.0	42.0 — 44.0

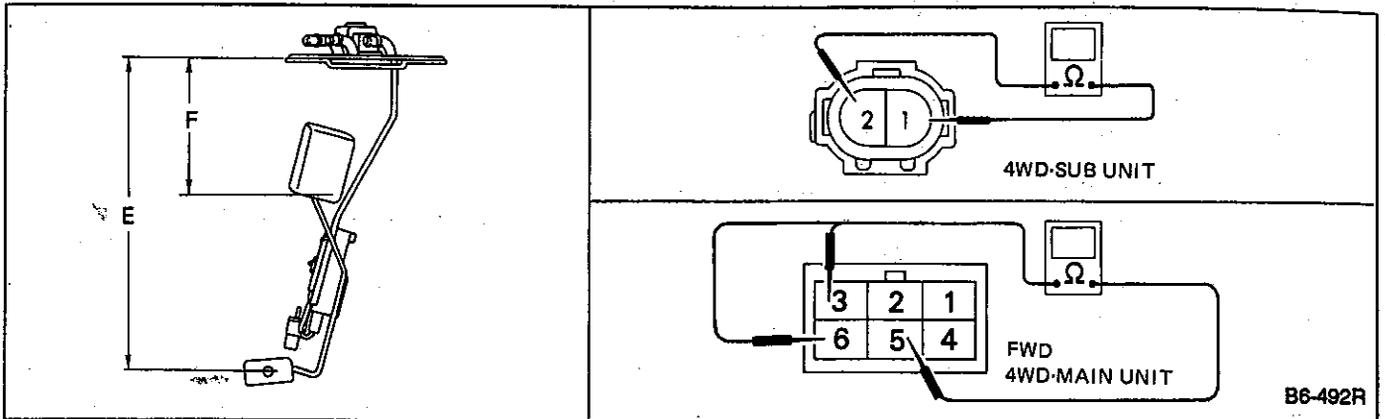


Fig. 102

3) Ensure that resistance gradually changes when float is slowly moved from point F to point E, and vice versa.

4) Low fuel warning sensor (thermistor)  
 Connect fuel gauge unit and test lamp (12V-3.0W) to battery, and connect terminal (5) to fuel gauge unit and terminal (2) to test lamp, respectively.  
 Ensure that test lamp remains off when fuel gauge unit is dipped in fuel and comes on when removed from fuel.

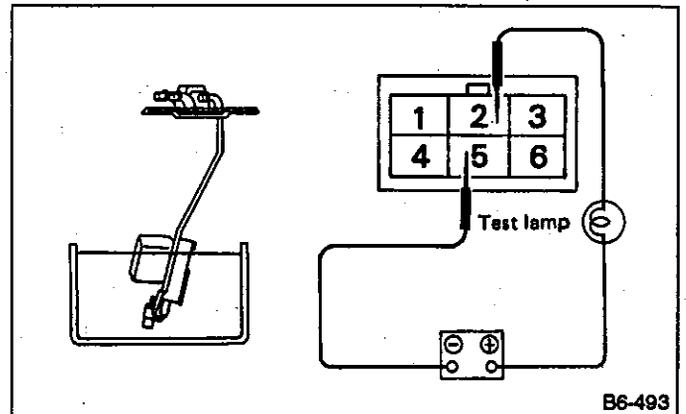


Fig. 103

## 21. Combination Meter

### A: DESCRIPTION

#### 1. WARNING AND INDICATOR LIGHT

According to ignition switch position, each light will come on and/or go off under normal conditions as follows:

Ignition switch position	OFF	ACC	ON	ST	While engine is running
AT oil temperature warning light	OFF	OFF	ON	ON	OFF
Charge indicator light	OFF	OFF	ON	ON	OFF
Oil pressure indicator light	OFF	OFF	ON	ON	OFF
Brake fluid level warning light	OFF	OFF	ON	ON	OFF
Parking brake warning light	OFF	OFF	○	○	○
CHECK ENGINE warning light	OFF	OFF	●	●	OFF
ANTILOCK BRAKE warning light	OFF	OFF	ON	ON	OFF

Symbols used: ○ : Light comes on when parking brake is set.  
● : Light comes on before engine starts, and stays off after engine stops.

##### 1) AT oil temperature warning light

This light comes on when ATF reaches at least 150°C (302°F).

##### 2) Charge indicator light

This light comes on when problem occurs in charging system during operation.

##### 3) Oil pressure indicator light

This light comes on when oil pressure drops below 14.7 kPa (0.15 kg/cm<sup>2</sup>, 2.1 psi).

##### 4) Brake fluid level warning light

This light comes on when brake fluid drops below specified level.

##### 5) CHECK ENGINE warning light

This light comes on when problem occurs in MPFI system.

##### 6) ANTILOCK BRAKE warning light

This light comes on when problem occurs in ABS system.

**2. TELLTALE (GRAPHIC MONITOR)**

According to ignition switch position, each light will come on and/or go off under normal conditions as follows:

Ignition switch position		OFF	ACC	ON	ST	While engine is running
Headlight beam indicator light	High-beam	OFF	OFF	ON	ON	ON
	Low-beam	OFF	OFF	OFF	OFF	OFF
Low fuel warning light		OFF	OFF	●	●	●
Door open warning light	Open	ON	ON	ON	ON	ON
	Shut	OFF	OFF	OFF	OFF	OFF
Rear gate open warning light	Open	ON	ON	ON	ON	ON
	Shut	OFF	OFF	OFF	OFF	OFF
Four wheel drive indicator light (4WD and LO)	Engaged	OFF	OFF	ON	ON	ON
	Disengaged	OFF	OFF	OFF	OFF	OFF
AT selector position indicator light		OFF	OFF	ON	ON	ON
Power indicator light		OFF	OFF	OFF	OFF	△
Manual indicator light		OFF	OFF	□	□	□
Front wheel drive indicator light	FWD	OFF	OFF	ON	ON	ON
	4WD	OFF	OFF	OFF	OFF	OFF

Symbols used: □: Light comes on when manual switch is pressed.  
 ●: Light comes on when fuel in fuel tank drops below specified level (close to "empty").

- 1) Headlight beam indicator light  
This light comes on when headlights are set to "high" beam.
- 2) Low fuel warning light  
This light comes on when fuel in fuel tank is less than 9 liters (9.5 US qt, 7.9 Imp qt).
- 3) Door/rear gate open warning light

- This light comes on when door or rear gate is not completely closed.
- 4) Front wheel drive indicator light  
This light comes on when "full-time" 4WD mode is arbitrarily set to FWD mode (that is, a fuse is inserted into FWD switch).

**B: REMOVAL AND INSTALLATION****1. COMBINATION METER**

- 1) Loosen bolts which secure steering column and suspend steering column. (Ref. to [4-3].)
- 2) Remove ventilation grille from visor. Remove vari-ous switches using a small standard screwdriver. Also disconnect switch connectors.

**Be careful not to damage visor and switches during removal.**

- 3) Remove cup holder.
- 4) Remove screws which secure visor, and remove visor.

**Also disconnect hazard switch connector.**

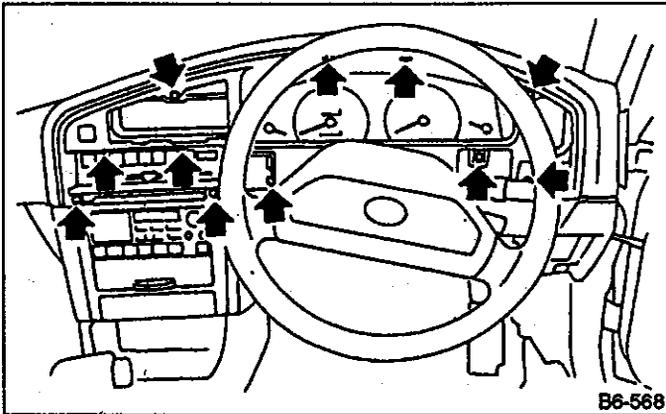


Fig. 104

- 5) Remove screws which secure combination meter, and pull combination meter out.

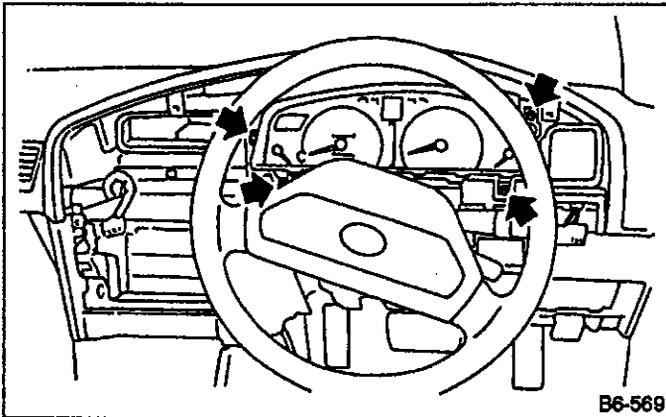


Fig. 105

- 6) Disconnect connector and speedometer cable from back of combination meter.

**Connect connector and speedometer cable in that order during installation.**

- 7) While tilting combination meter to the side, remove it from instrument panel.

**Be sure to connect speedometer cable and connectors to backside of combination meter.**

**C: DISASSEMBLY AND ASSEMBLY****1. METER ASSY**

- 1) Remove following parts from combination meter:
  - Trip meter reset knob
  - Meter glass
  - Window plate

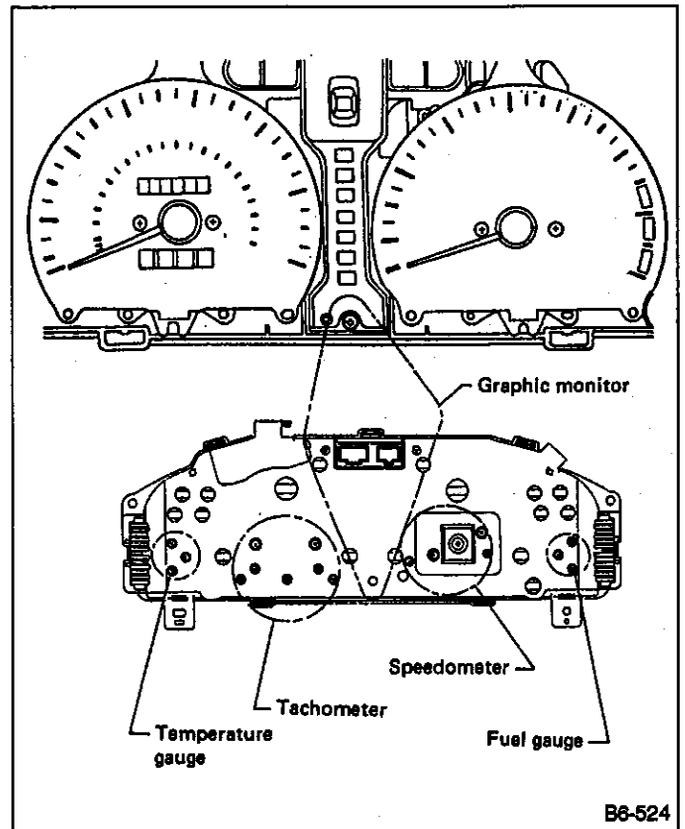


Fig. 106

- 2) Remove screws, and take out meter, gauge, etc.
  - a. Take care not to damage removed speedometer, tachometer etc.
  - b. Remove temperature gauge, fuel gauge and plate as a unit.
- 3) Take out printed circuit board.
- 4) Assembly is in the reverse order of disassembly.

2. BULB REPLACEMENT

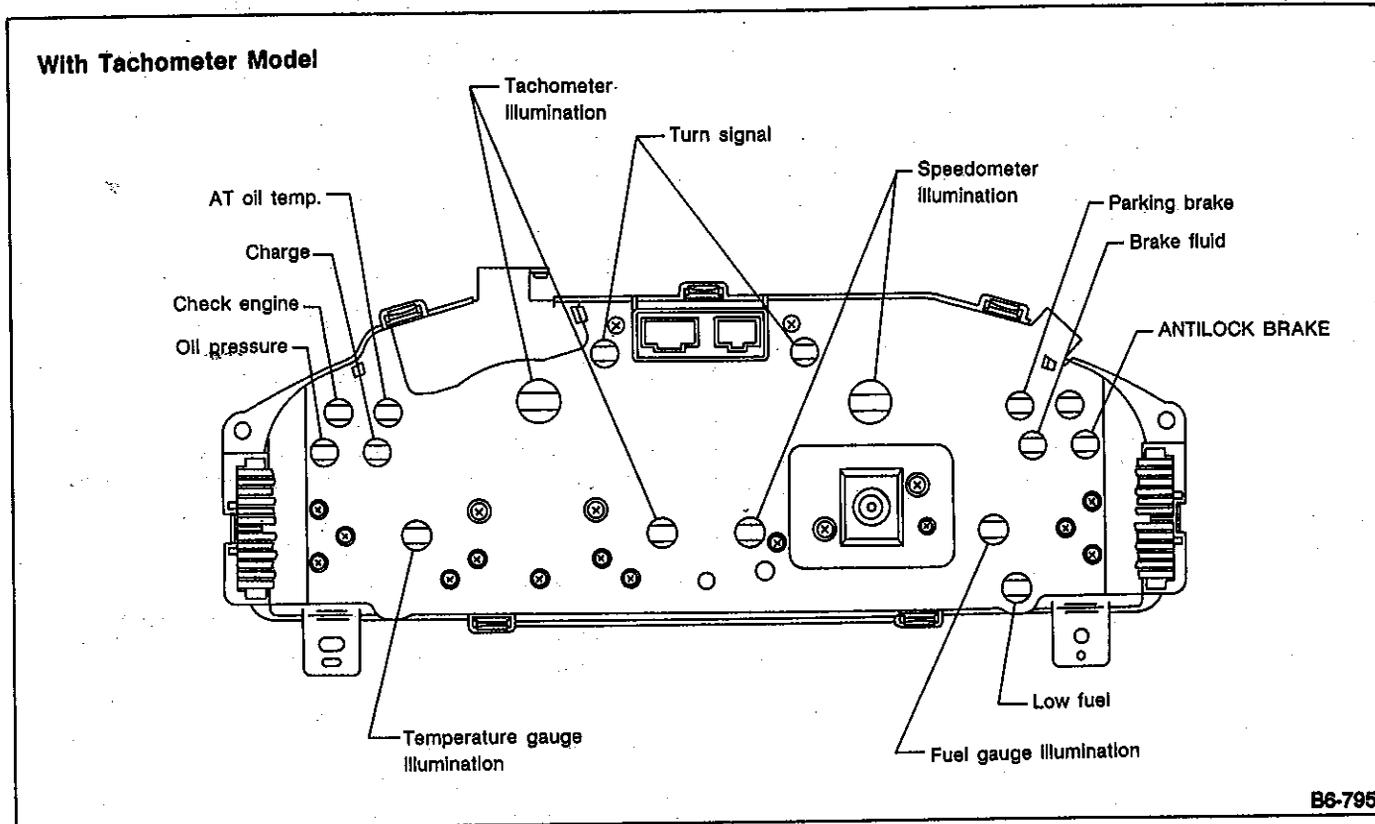


Fig. 107

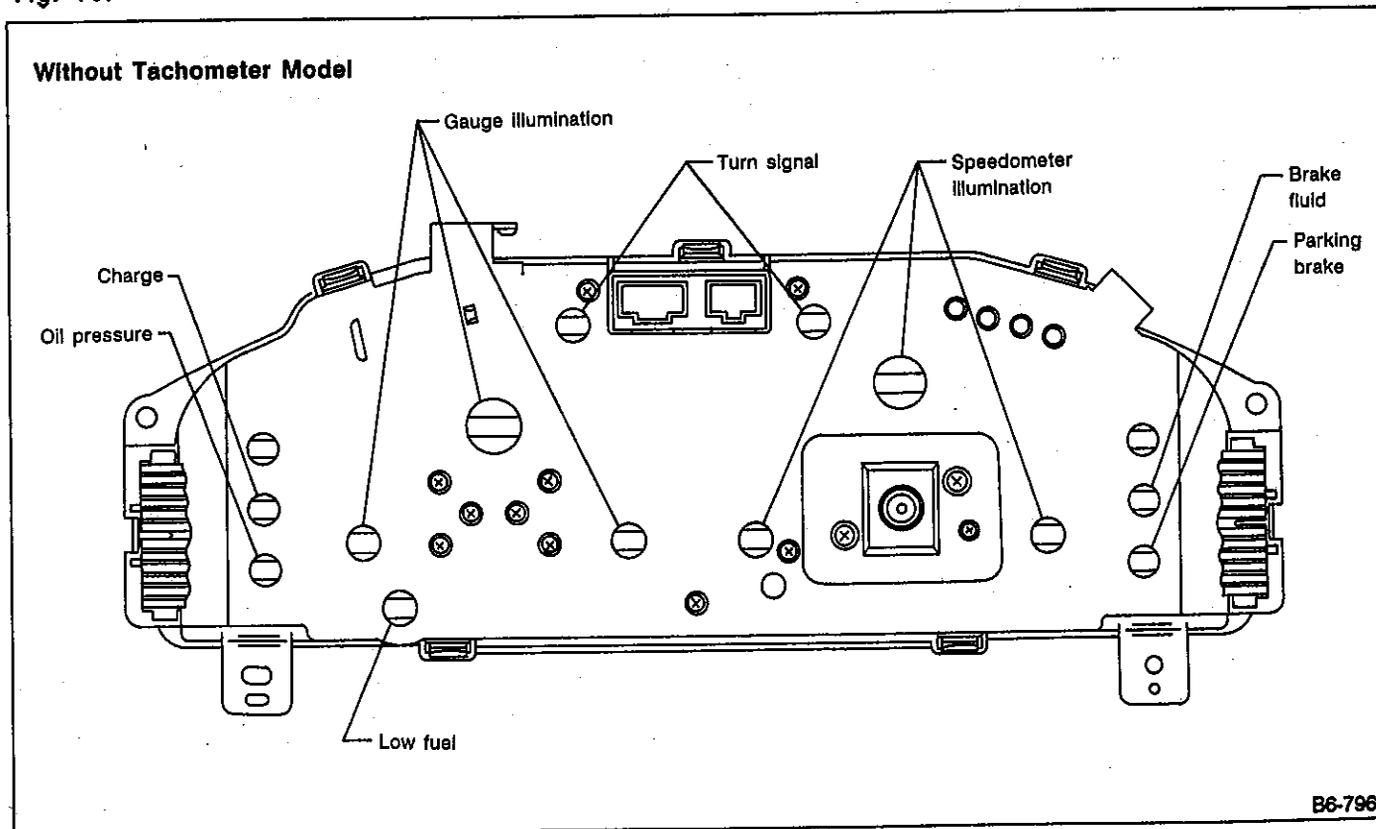


Fig. 108

**D: INSPECTION**

**1. SPEEDOMETER**

It is normal if the readings of speedometer are within the tolerances shown in the table 1, against the standard indicated speeds on the speedometer tester. Besides, speedometer should point as shown in the table 2.

Table 1

1) Without tachometer model

Standard indicated speed (km/h or MPH)		20	40	60	80	100
Readings of speedometer	(km/h)	+ 4.7 + 1.0	+ 4.5 + 1.5	+ 5.2 + 1.5	+ 6.1 + 1.5	+ 6.9 + 1.5
	(MPH)	+ 2.9 + 0.6	+ 2.8 + 0.9	+ 3.2 + 0.9	+ 3.8 + 0.9	+ 4.3 + 0.9

2) With tachometer model

Standard indicated speed (km/h or MPH)		20	40	60	80	100
Readings of speedometer	Australia (km/h)	+ 2.0 - 3.1	+ 1.5 - 2.0	+ 3.0 - 1.5	+ 4.0 - 1.0	+ 5.5 - 0.5
	TURBO (km/h)	+ 5.6 + 0.9	+ 5.5 + 1.4	+ 6.1 + 1.4	+ 6.7 + 1.4	+ 7.2 + 1.4
	TURBO (MPH)	+ 3.5 + 0.8	+ 3.9 + 0.9	+ 4.5 + 0.9	+ 5.0 + 0.9	+ 5.6 + 0.9
	Others (km/h)	+ 4.0 0	+ 4.5 + 0.5	+ 5.5 + 1.0	+ 6.0 + 1.0	+ 6.5 + 1.5

Table 2

Speedometer should point	Meter drive shaft speed
60 km/h	637 rpm
60 MPH	1,020 rpm

**2. TEMPERATURE GAUGE**

Temperature gauge (middle-stable bobbin type) is operated by thermistor incorporated in temperature sending unit installed in water pipe.

Since thermistor resistance changes with voltage, voltage regulator is provided to prevent error in gauge indication due to voltage fluctuation.

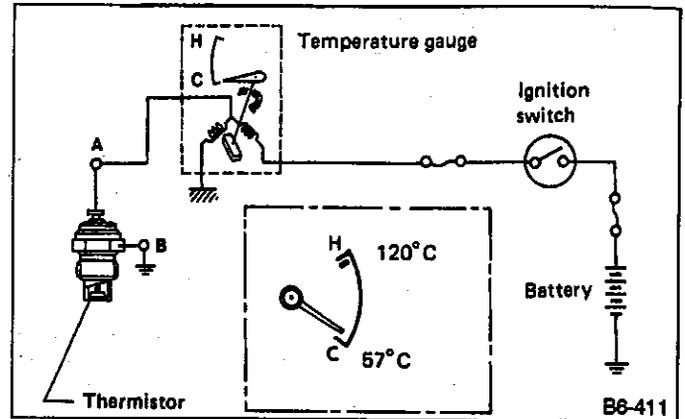


Fig. 109

It is normal if the readings of temperature gauge are within the tolerances of engine coolant temperature as shown in the following table against the standard resistance between point A and B indicated in the wiring diagram when ignition switch is "ON".

Readings of temperature gauge	Standard resistance	Temperature of engine coolant
50°C (122°F)	197.8 Ω	46 — 54°C (115 — 129°F)
120°C (248°F)	19 Ω	116 — 124°C (241 — 255°F)

**3. FUEL GAUGE**

Needle of fuel gauge remains indicating the amount of fuel in fuel tank after turning ignition switch to OFF position.

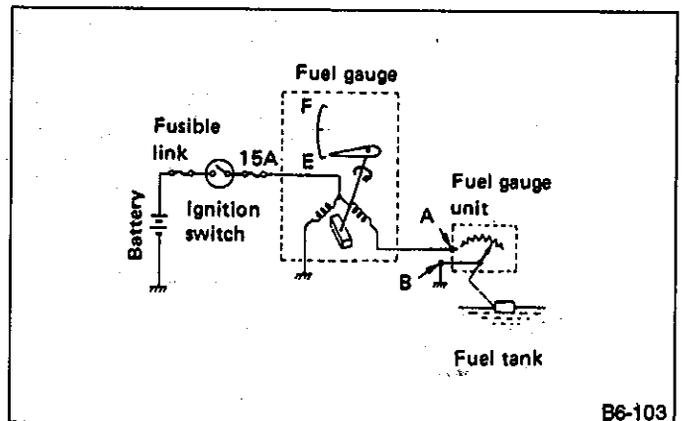


Fig. 110

It is normal if the readings of fuel gauge are within the tolerances of all length between "E" and "F" as shown in the following table, against the standard resistance between point A and B indicated in the wiring diagram when ignition switch "ON".

Readings of fuel gauge	Standard resistance	Tolerance of fuel gauge
E	92 Ω	+ 1/12 to - 1/24 of all length between "E" and "F"
1/2	(48.5 Ω)	—
F	5 Ω	+ 1/24 to - 1/12 of all length between "E" and "F"

**4. TACHOMETER**

It is normal if readings of tachometer are within the tolerances as shown in the following table, against the standard indicated speeds on tachometer tester.

Standard indicated speed (rpm)	1,000	2,000	3,000	4,000	5,000	6,000
Tolerance (rpm)						
- 30 to 60°C	+ 75	+ 145	+ 180	+ 220	+ 255	+ 290
(- 22 to 140°F)	- 75	- 110	- 110	- 110	- 100	- 95

**5. SPEED SENSOR**

Measure resistance between both terminals of combination meter and speed sensor, and ensure that resistance value varies.

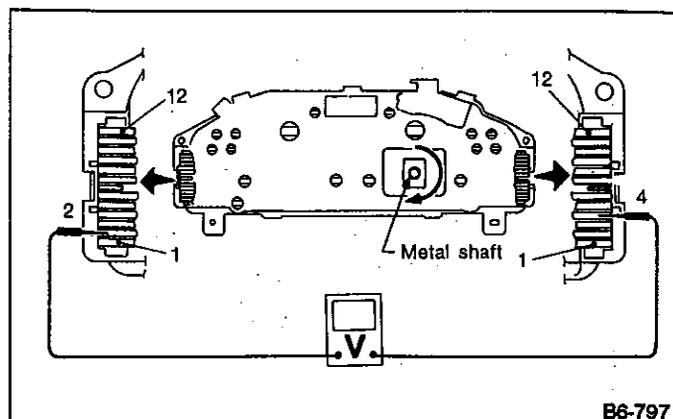


Fig. 111

B6-797

## 22. Oil Pressure Indicator Light and Temperature Gauge

### A: SCHEMATIC

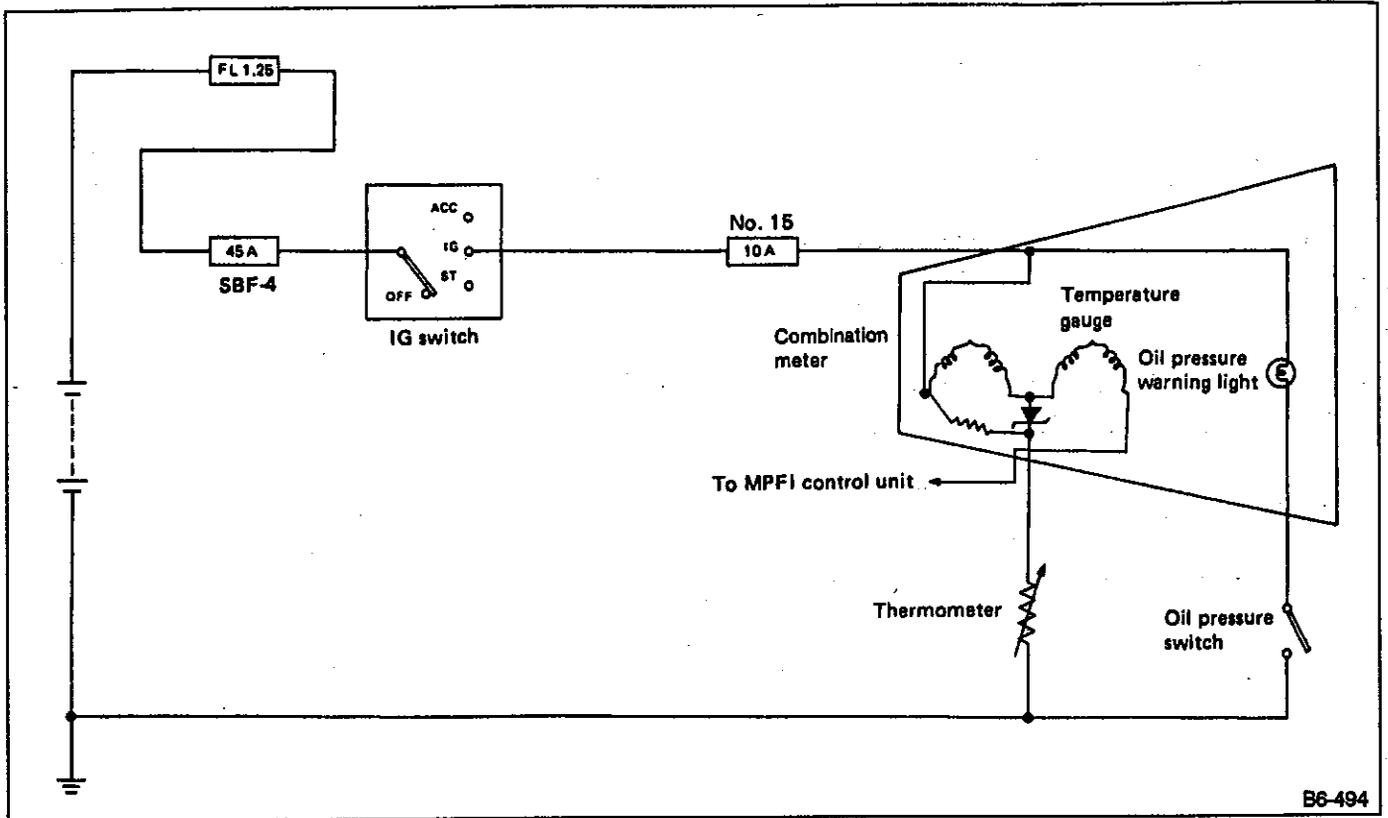


Fig. 112

B6-494

## 23. Power Window

### A: SCHEMATIC

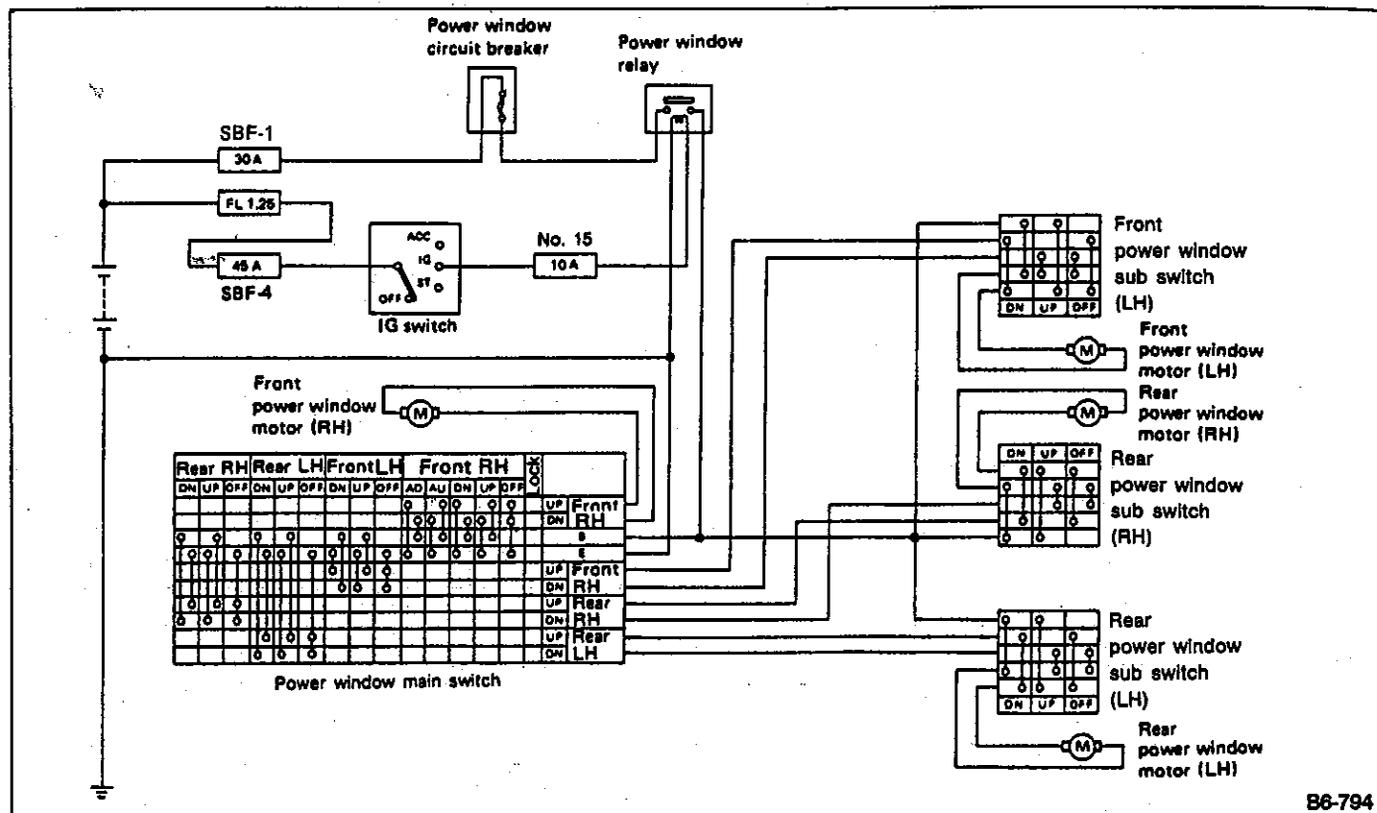


Fig. 113

### B: REMOVAL AND INSTALLATION

#### 1. MAIN SWITCH AND SUB SWITCH

- 1) Remove door trim. (Ref. to [5-2].)
- 2) Main switch
  - (1) Remove pull handle
  - (2) Remove screws which secure switch, and remove switch.
- Sub switch  
Remove main and sub switches using a small standard screwdriver.

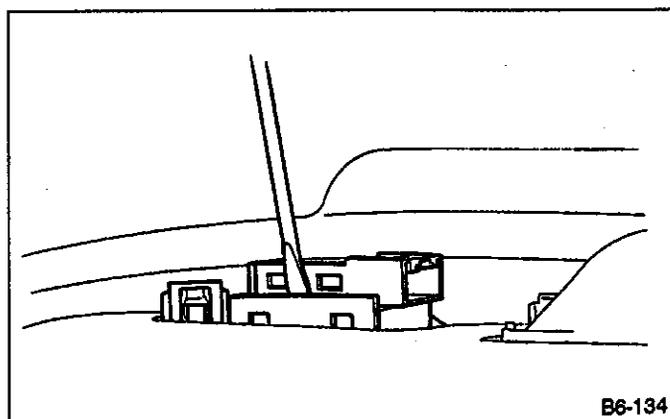


Fig. 114

#### 2. POWER WINDOW MOTOR

(Ref. to [5-2].)

#### 3. POWER WINDOW RELAY AND BREAKER

- 1) Remove front seat LH.
- 2) Remove cover side plate and roll up floor mat.
- 3) Remove attaching screws and remove switches and bracket as a unit.
- 4) Disconnect connector.

**C: INSPECTION**

**1. MAIN SWITCH**

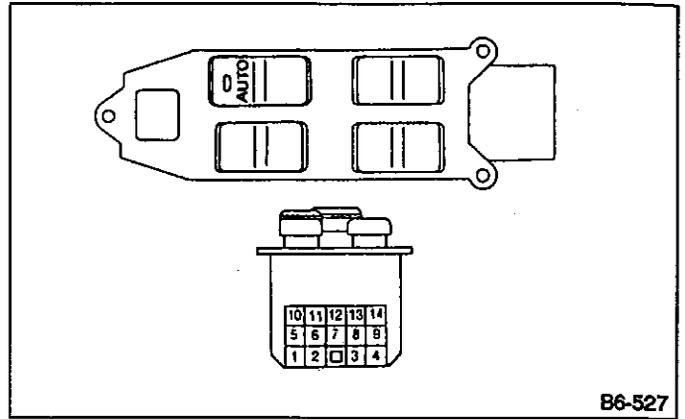


Fig. 115

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

Lock switch	Switch Position	Front RH				Front LH				Rear RH				Rear LH			
		12	6	5	7	12	9	8	7	12	13	14	7	12	11	10	7
NOR-MAL	UP	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	OFF		○	○	○		○	○	○		○	○	○		○	○	○
	DOWN	○		○		○		○		○		○		○		○	
LOCK	UP	○	○	○	○	○	○			○	○			○	○		
	OFF		○	○	○		○	○			○	○			○	○	
	DOWN	○		○		○		○		○		○		○		○	

**2. SUB SWITCH**

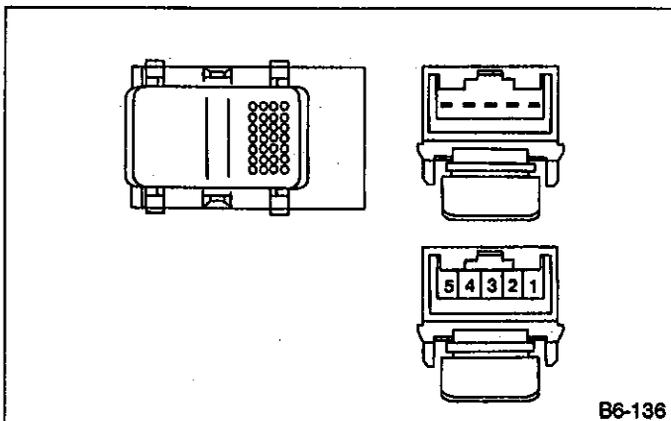


Fig. 116

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

Terminal	3	4	2	5	1
Switch position					
UP	○		○	○	○
↓	×	×			
OFF		○	○	○	○
↑	×		×		
DOWN	○	○	○	○	○

**3. POWER WINDOW MOTOR**

- 1) Connect battery to power window motor terminals to ensure that motor rotates properly.
- 2) Change polarity of battery connections to terminals to ensure that motor rotates in reverse direction.

4. POWER WINDOW RELAY

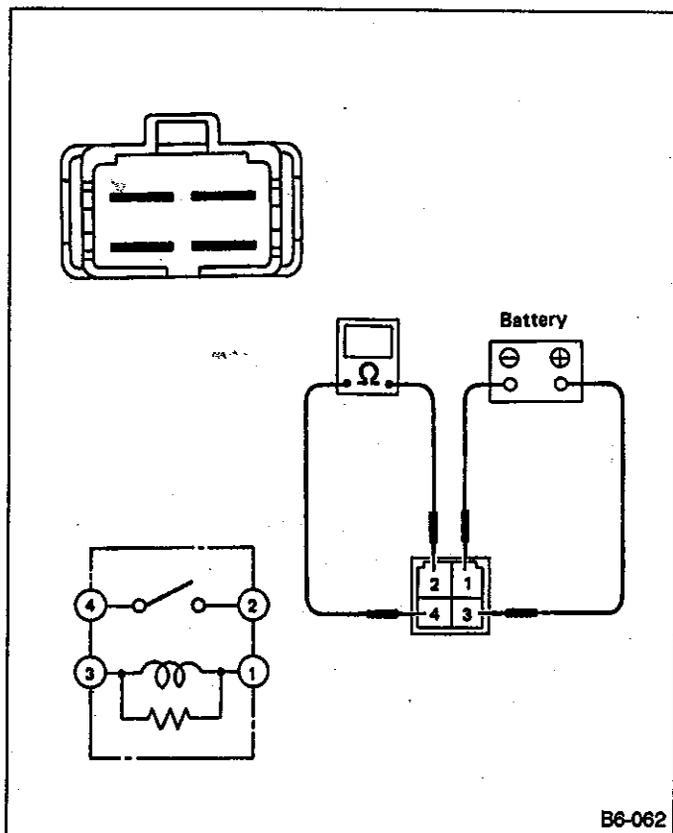


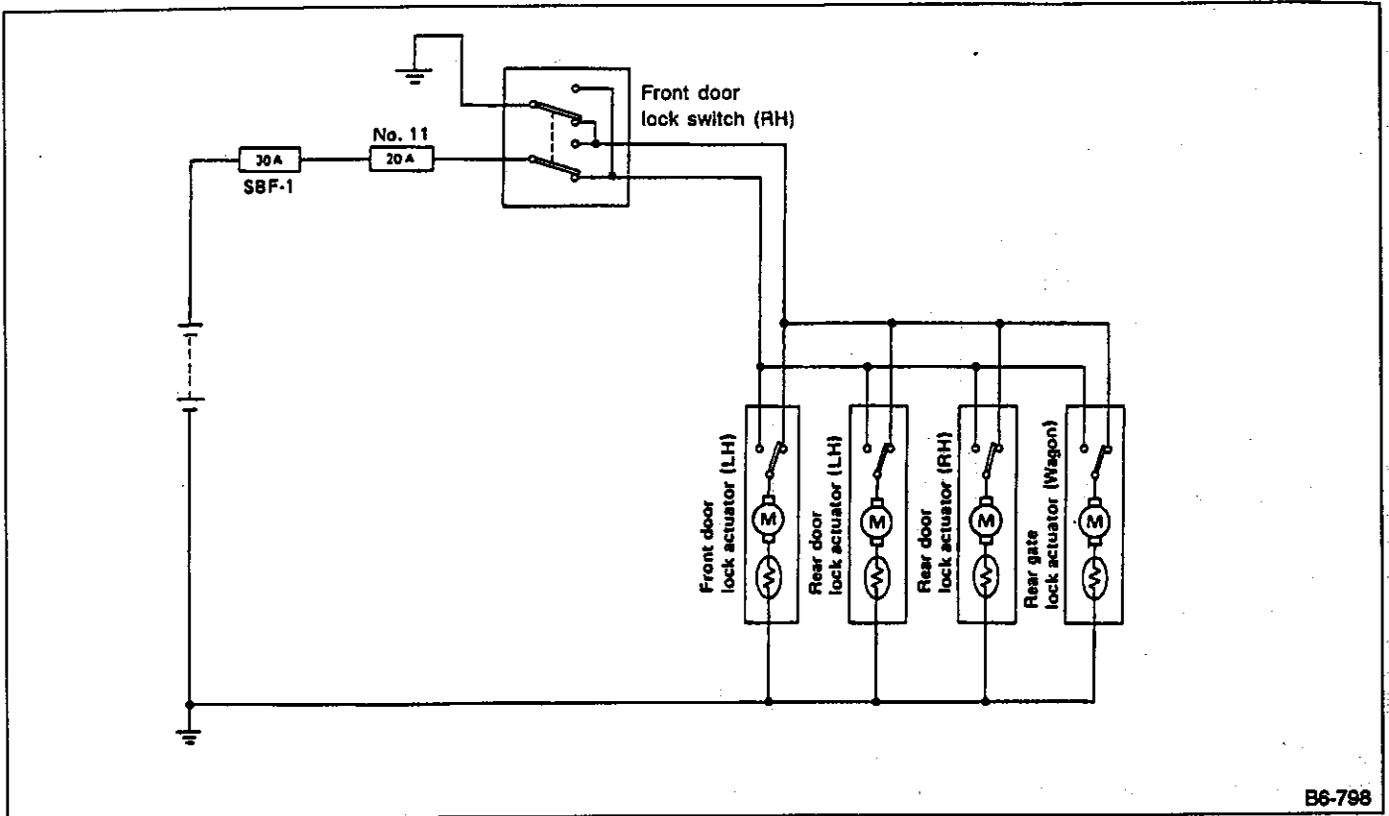
Fig. 117

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

## 24. Door Lock

### A: SCHEMATIC



B6-798

Fig. 118

### B: REMOVAL AND INSTALLATION

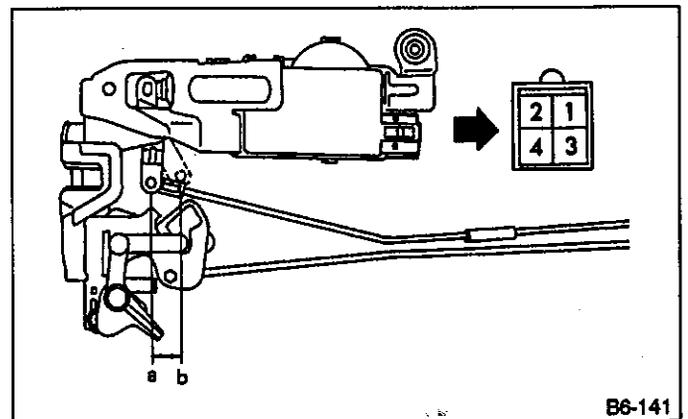
1. FRONT DOOR LOCK ACTUATOR
2. REAR DOOR LOCK ACTUATOR
3. REAR GATE LOCK ACTUATOR

(Ref. to [5-2].)

### C: INSPECTION

#### 1. DOOR LOCK ACTUATOR (except for driver's side)

- 1) Move rod to position (a). Ensure that rod moves to position (b) when terminal (4) is connected to battery and terminal (2) is grounded.
- 2) Move rod to position (b). Ensure that rod moves to position (a) when terminal (3) is connected to battery and terminal (2) is grounded.



B6-141

Fig. 119

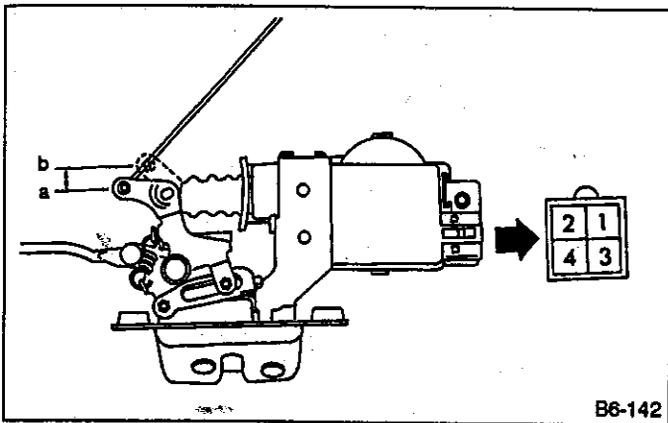


Fig. 120

**2. REAR GATE LOCK ACTUATOR**

- 1) Move rod to position (a). Ensure that rod moves to position (b) when terminal (4) is connected to battery and terminal (2) is grounded.
- 2) Move rod to position (b). Ensure that rod moves to position (a) when terminal (3) is connected to battery and terminal (2) is grounded.

**25. Horn and Cigarette Lighter**

**A: SCHEMATIC**

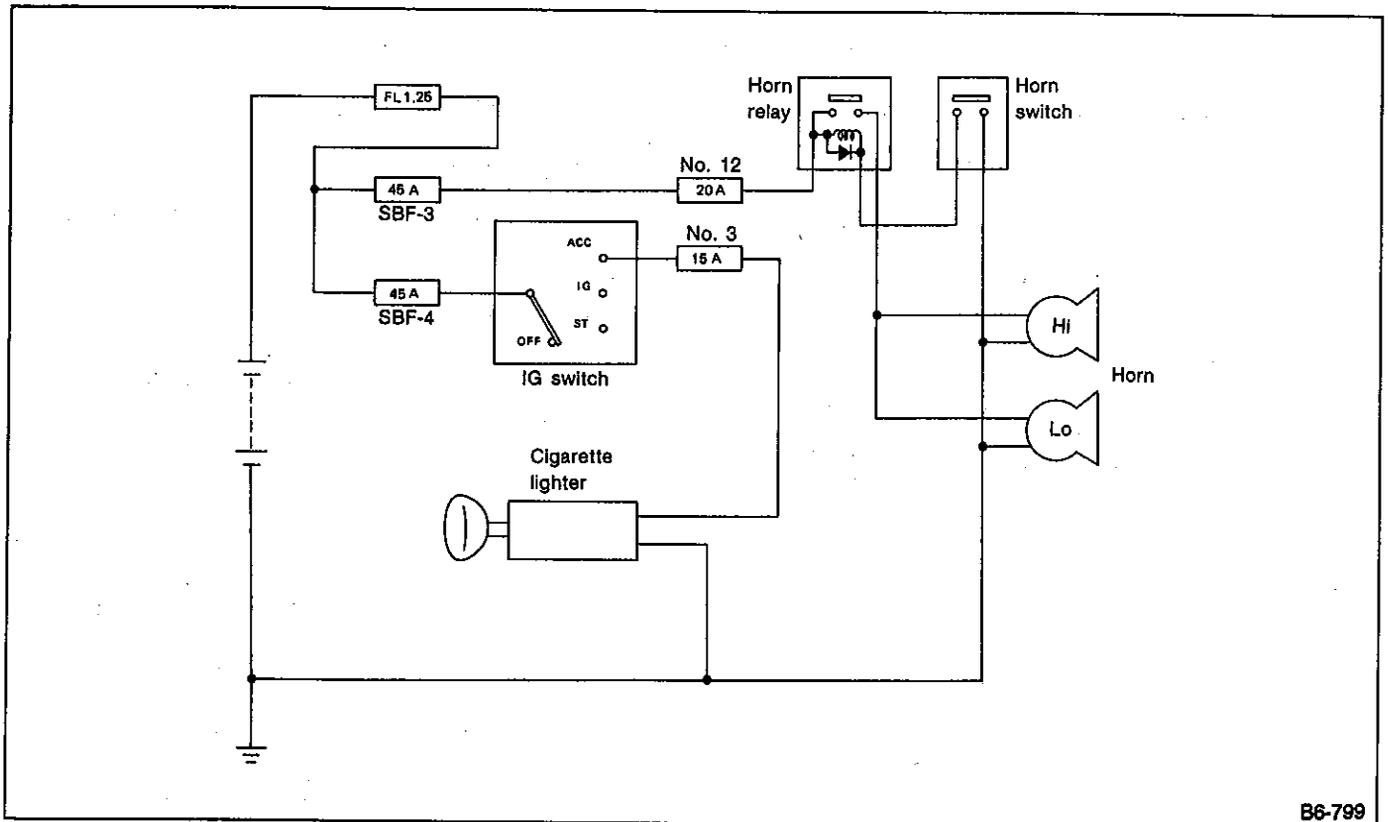


Fig. 121

B6-799

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

- 1) Disconnect left-hand headlight connector.
- 2) Remove attaching bolts.

**Tightening torque:**

13 — 23 N·m

(1.3 — 2.3 kg-m, 9 — 17 ft-lb)

- 3) While removing horn, disconnect connector.
  - a. Install "Lo" horn on the left, and "Hi" horn on the right, as viewed from front of vehicle.
  - b. After installing horn, connect electrical wire with it by keeping some slack to prevent wire from disconnecting by its vibration.

**2. HORN SWITCH**

- 1) Remove screws which secure horn switch to the base of steering wheel.

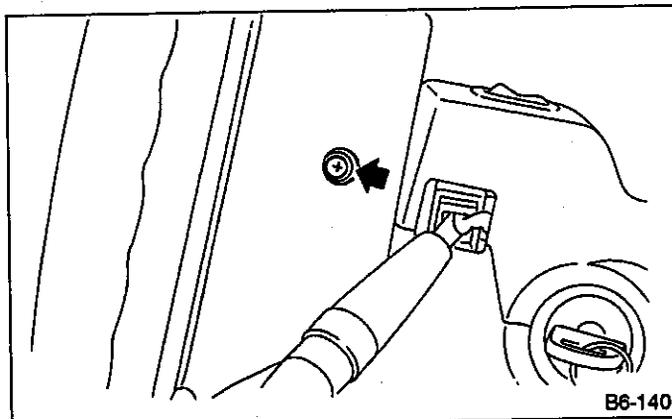
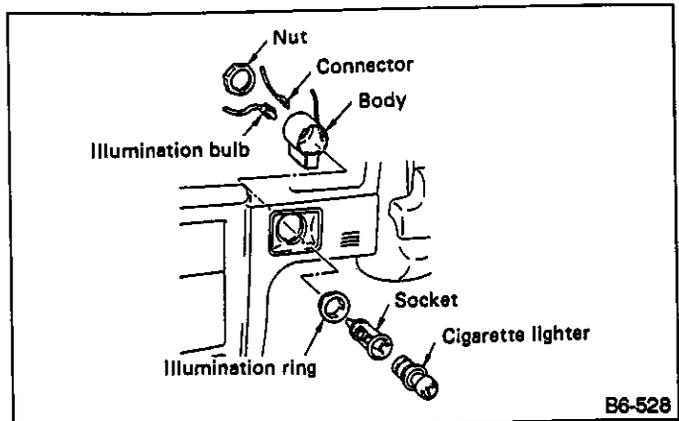


Fig. 122

- 2) Remove horn pad and disconnect connector.

**3. CIGARETTE LIGHTER**

- 1) Remove instrument panel lower cover.
- 2) Disconnect connectors from cigarette lighter.
- 3) Turn illumination & socket 45° counterclockwise and remove.
- 4) Loosen nut. Remove body.



B6-528

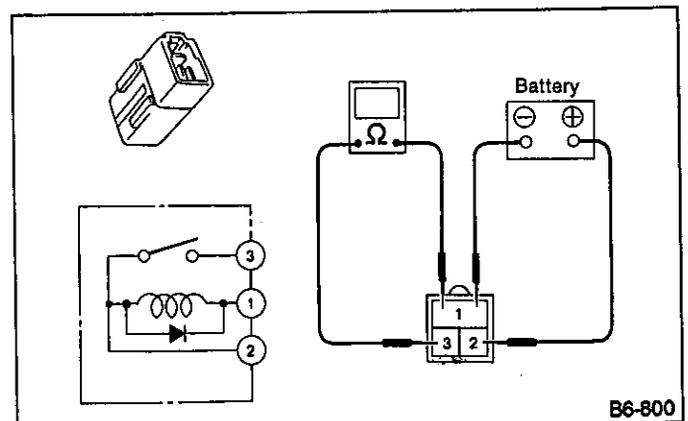
Fig. 123

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

**C: 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**

B6-800

Fig. 124

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

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

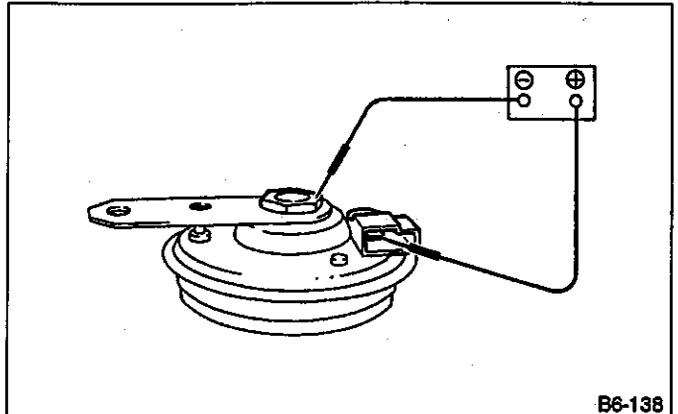


Fig. 125

**3. HORN**

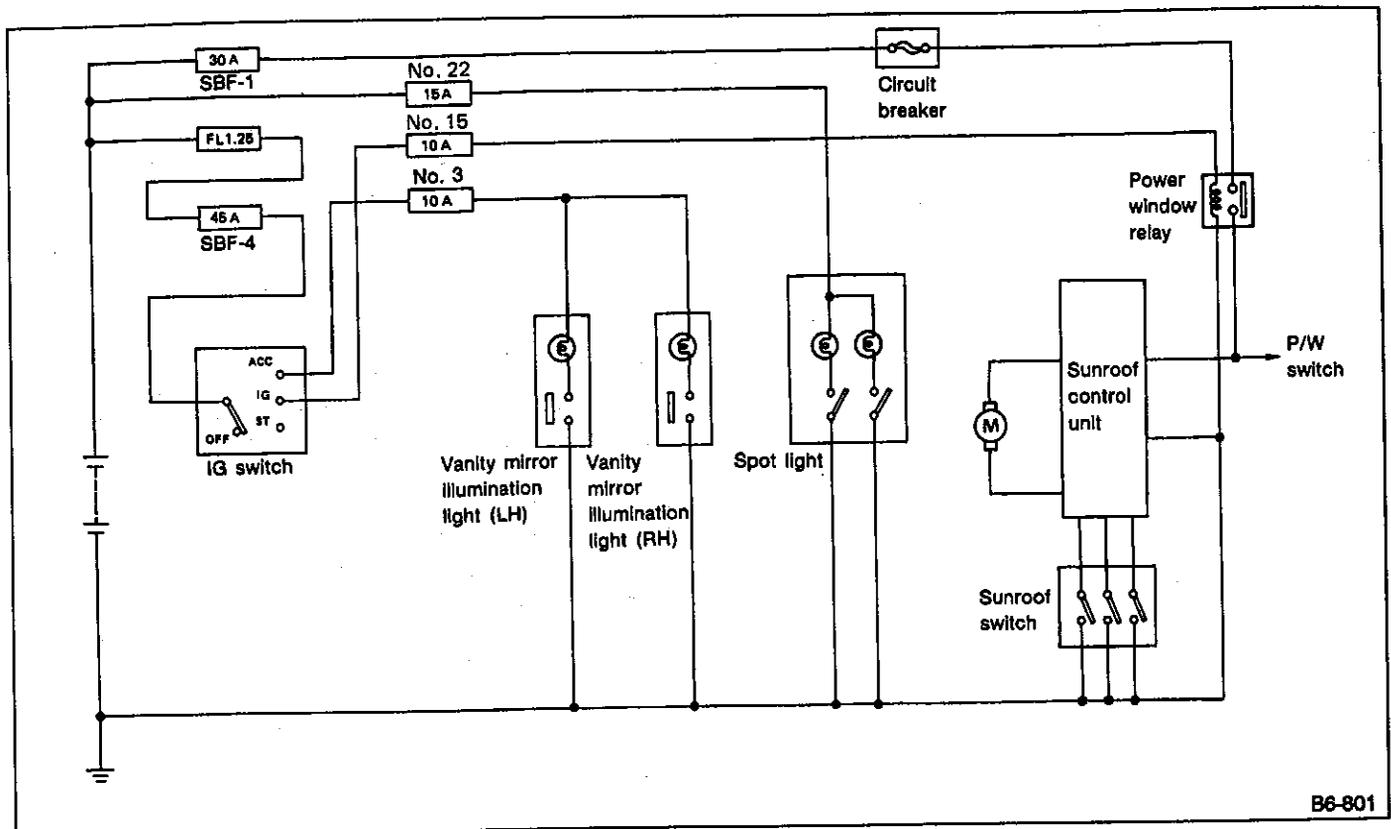
- 1) Check the adjusting screw for looseness.
- 2) Connect battery to horn to ensure that it sounds.

**4. CIGARETTE LIGHTER**

- 1) Remove plug. 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. 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 ON.

## 26. Sunroof, Spot Light and Vanity Mirror

### A: SCHEMATIC



B6-801

Fig. 126

### B: REMOVAL AND INSTALLATION

#### 1. SUNROOF

(Ref. to [5-1].)

#### 2. SUNROOF SWITCH AND SPOT LIGHT

- 1) Remove lens and attaching screws.
- 2) Remove sunroof switch and connector.

#### 3. VANITY MIRROR ILLUMINATION LIGHT

- 1) Remove screws which secure sun visor.
- 2) Remove sun visor and connector.

**C: INSPECTION**

**1. SUNROOF RELAY**

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

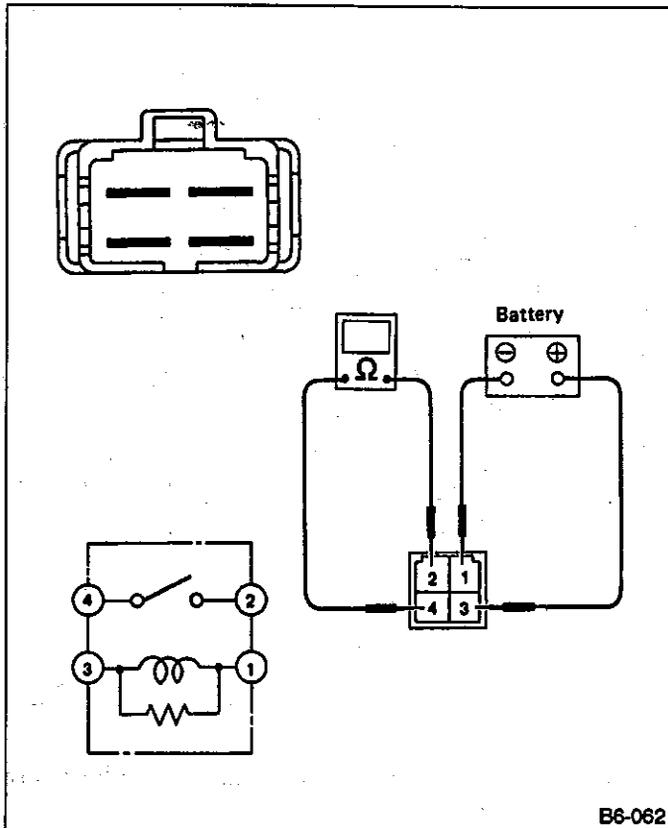


Fig. 127

B6-062

**2. SUNROOF SWITCH**

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

Terminal Switch position	1	2	3	4	5
OPEN	○	○	○		
CLOSE/DOWN			○	○	○
UP			○	○	

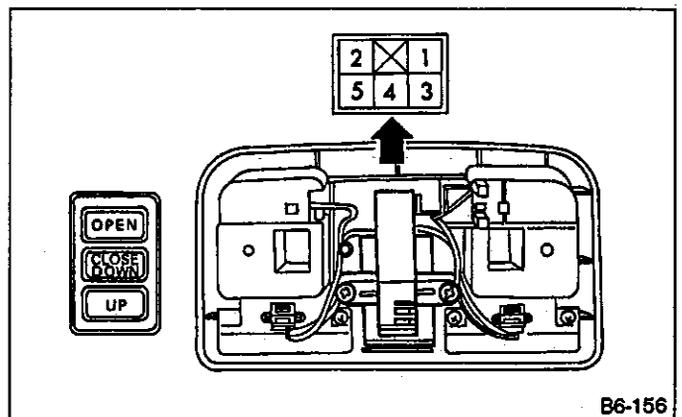


Fig. 128

B6-156

## 27. Radio and Antenna

### A: SCHEMATIC

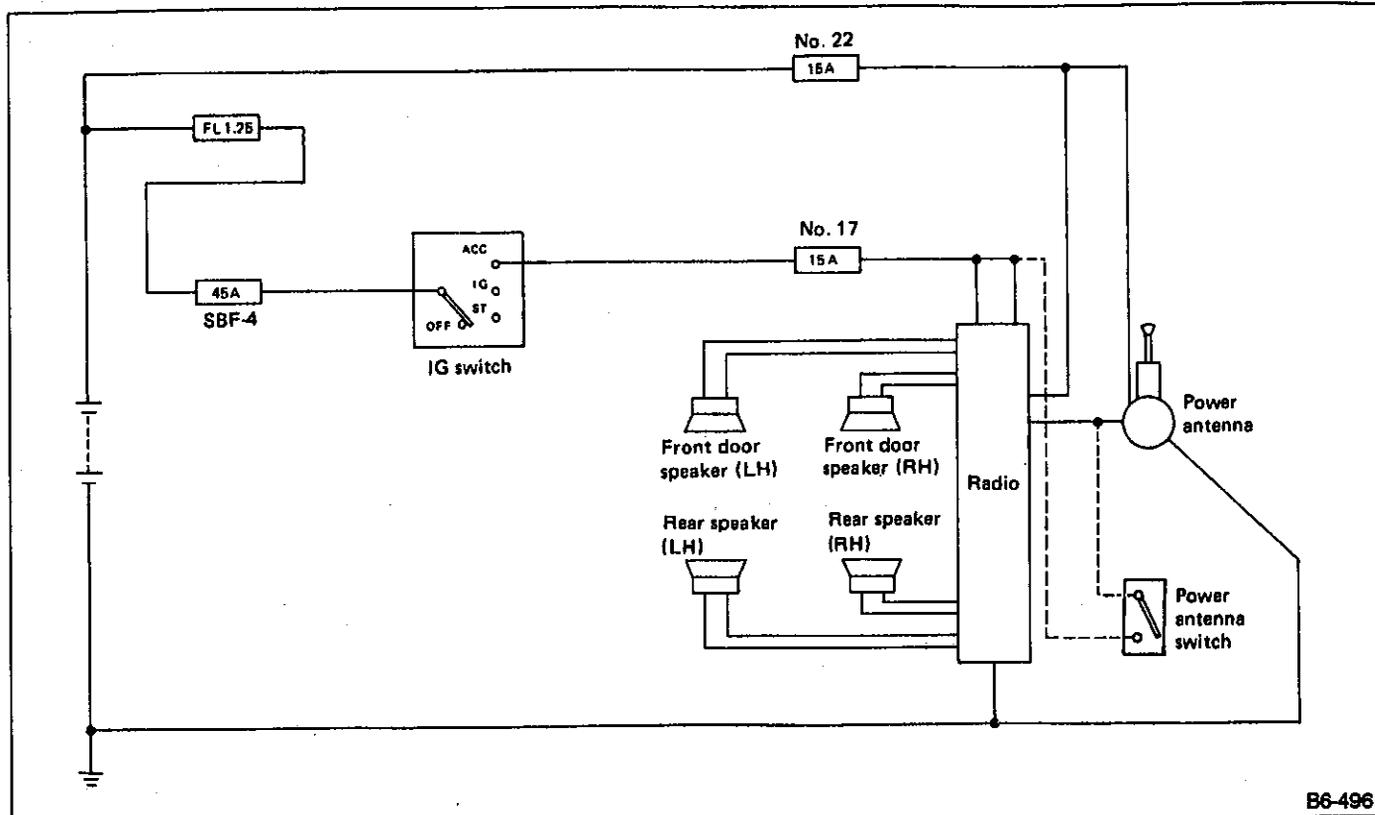


Fig. 129

B6-496

### B: REMOVAL AND INSTALLATION

#### 1. RADIO BODY

- 1) Remove cup holder and ash tray.
- 2) Remove screws which secure center panel. Remove center panel.

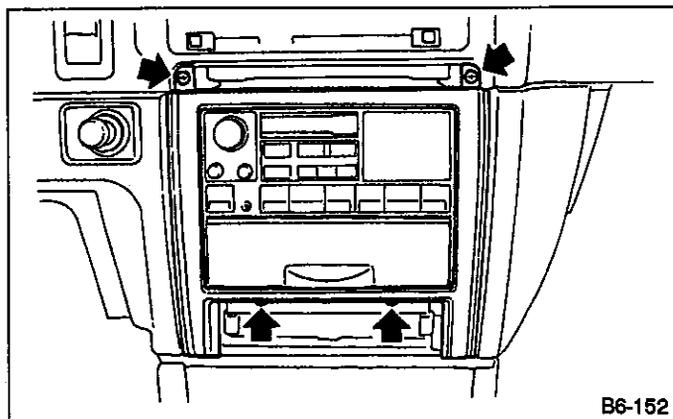


Fig. 130

B6-152

- 3) Remove antenna plug from left side of console box.

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

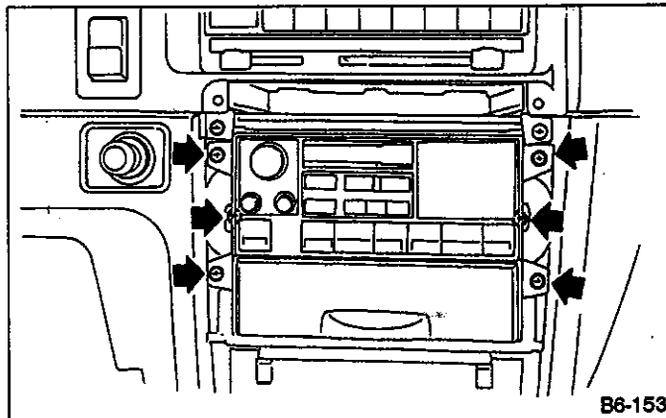


Fig. 131

B6-153

- 5) Disconnect electric connectors and antenna feeder cord and take out radio.

#### 2. POWER ANTENNA

- 1) Remove trim panel.
- 2) Unroll antenna insulator (WAGON) and disconnect connector and antenna feeder.

3) Remove bolts.

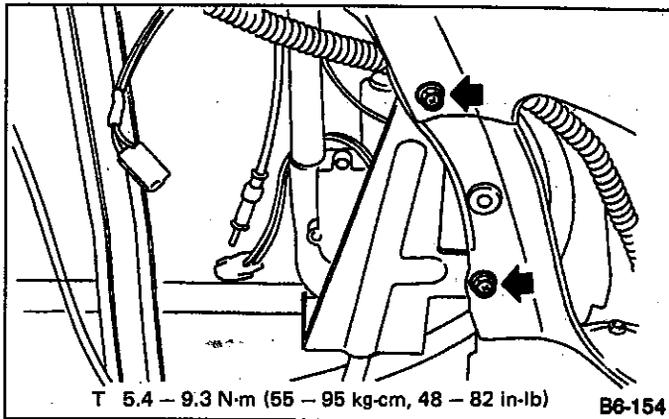


Fig. 132

4) Pull antenna rod out from lower side.

Insert drain tube into its original position during installation.

**3. FRONT SPEAKER**

- 1) Remove door trim and disconnect connector. (Ref. to [5-2].)
- 2) Remove screws which secure front speaker. Remove speaker.

**4. REAR SPEAKER (WAGON)**

- 1) Remove luggage area cover and holder.
- 2) Fold rear backrest forward.
- 3) Remove cover and nuts which secure speaker bracket.
- 4) Remove speaker and disconnect connector.

**5. REAR SPEAKERS (SEDAN)**

- 1) Remove rear cushion and rear backrest.
- 2) Remove left and right rear quarter trim panels.
- 3) Remove rear shelf trim panels.
- 4) Remove screws which secure rear speakers.
- 5) Disconnect connector and remove speakers.

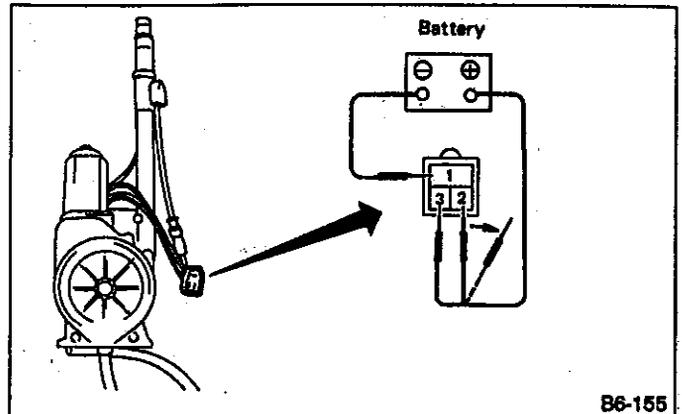


Fig. 133

**C: INSPECTION**

**1. POWER ANTENNA**

- 1) Connect battery positive terminal to terminal (3) and connect terminal (1) to ground. Ensure that antenna rod extends properly when battery positive terminal is connected to terminal (2).
- 2) Ensure that antenna rod retracts properly when battery positive terminal is disconnected from terminal (2).

## 28. Mode Selector and Blower Motor

### A: SCHEMATIC

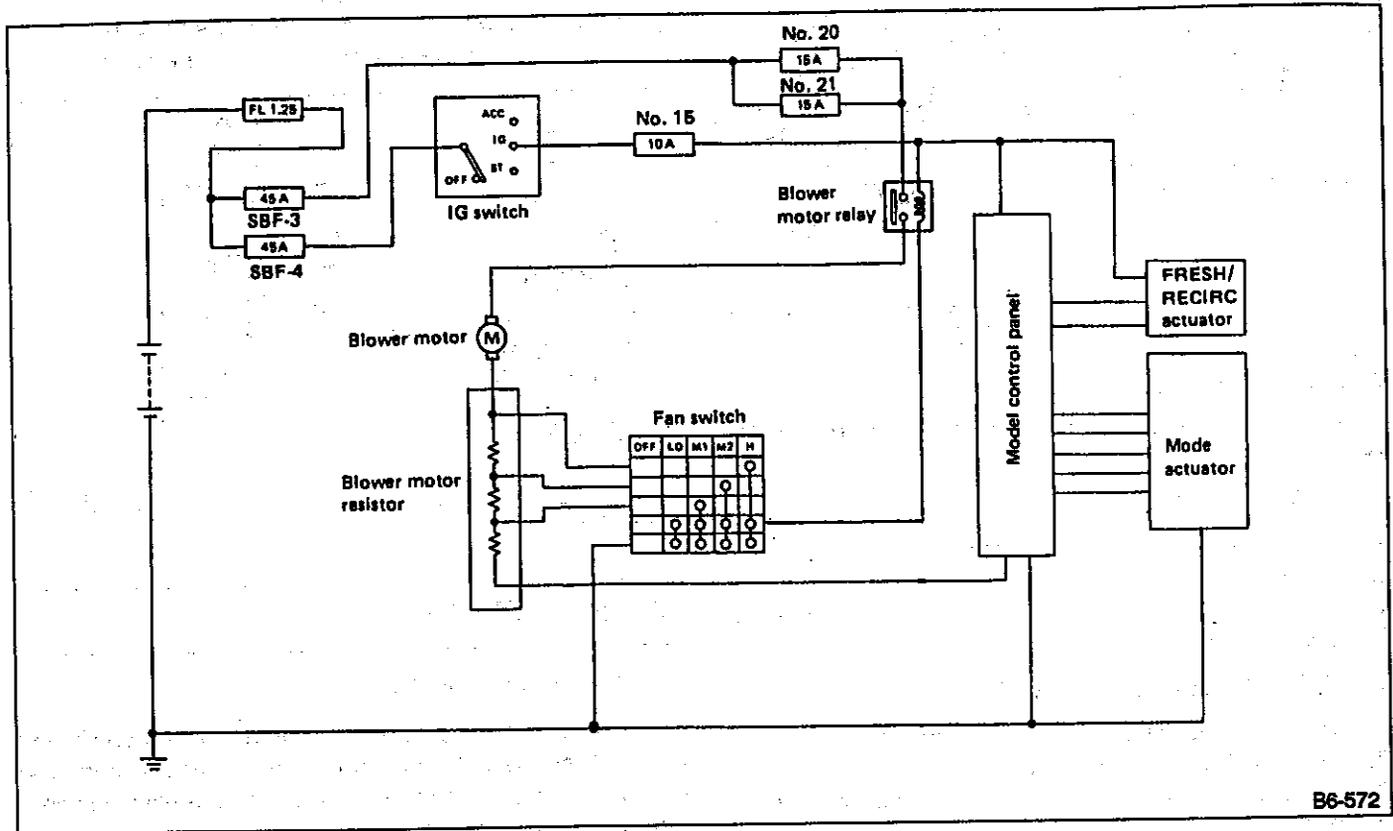


Fig. 134

### B: REMOVAL AND INSTALLATION

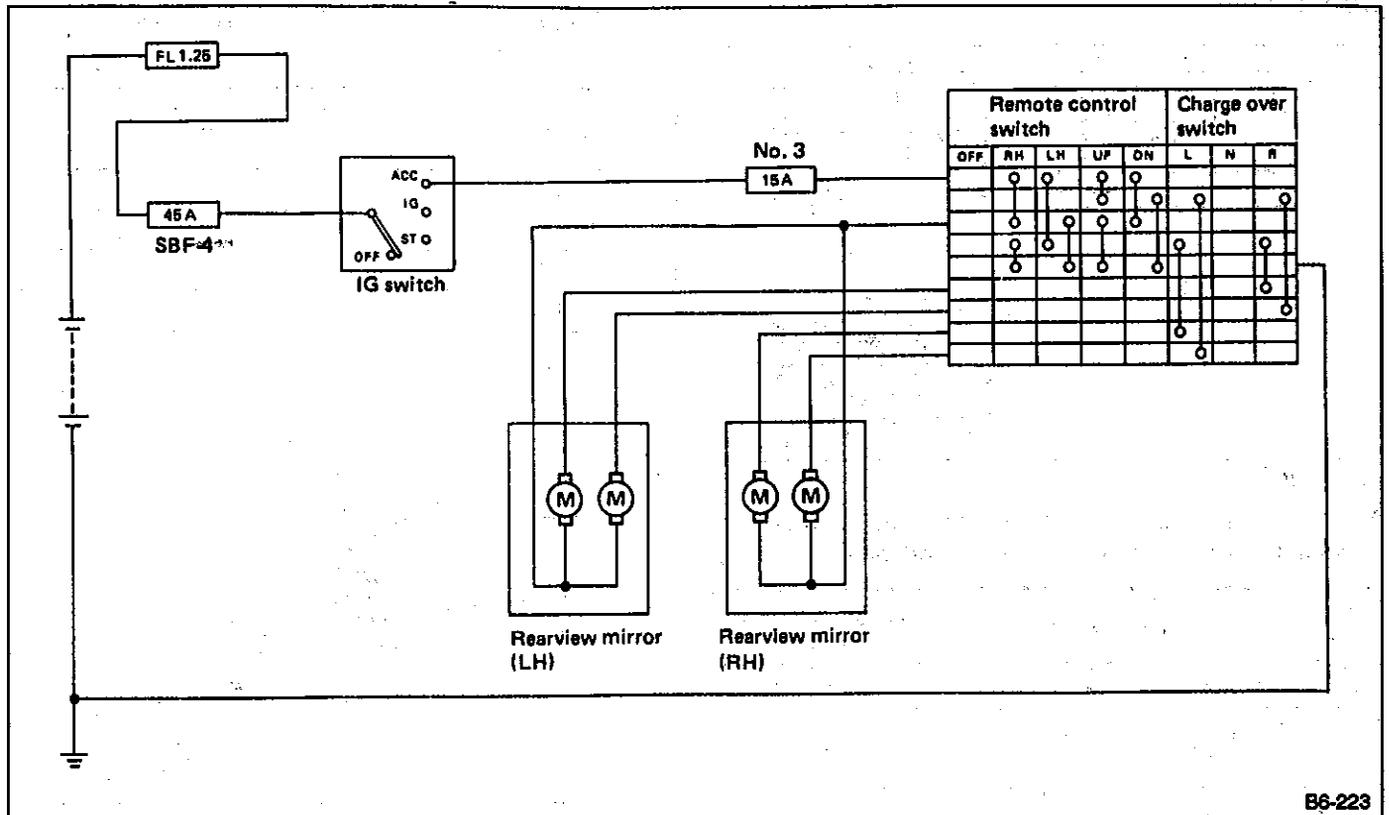
<Ref. to [4-6].>

### C: INSPECTION

<Ref. to [4-6].>

## 29. Remote Control Rearview Mirror

### A: SCHEMATIC



B6-223

Fig. 135

### B: REMOVAL AND INSTALLATION

#### 1. REMOTE CONTROL REARVIEW MIRROR SWITCH

1) Using a small standard screwdriver, remove remote control rearview mirror switch from instrument panel.

Be careful not to scratch instrument panel during removal.

2) Remove rearview mirror switch and disconnect connector.

**C: INSPECTION**

**1. REMOTE CONTROL REARVIEW MIRROR SWITCH**

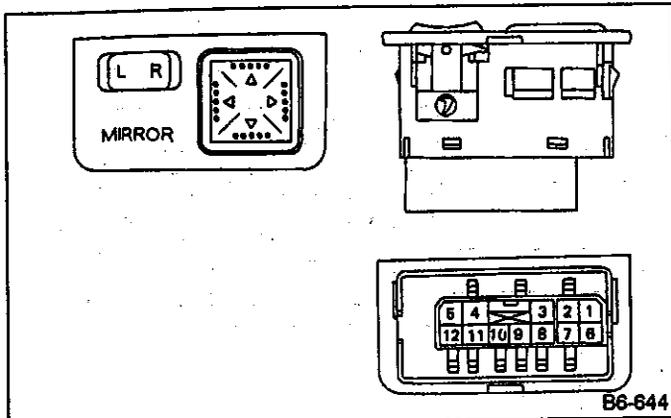


Fig. 136

Move rearview mirror switch to each position and check continuity between terminals (indicated in table below).

Position Terminal	Mirror switch					Left/Right changing switch		
	OFF	Right	Left	Upper	Down	Left	N	Right
4		○	○	○	○			
10		○	○	○	○			
11		○	○	○	○			
1								○
6								○
2						○		
7						○		
8								
9								
5					○			
					○			
12					○			

**2. REARVIEW MIRROR**

- 1) Remove door trim. (Ref. to [5-2].)
- 2) Disconnect 6-pin connector.

Check to ensure that rearview mirror moves properly when battery voltage is applied to terminals (indicated in table below).

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

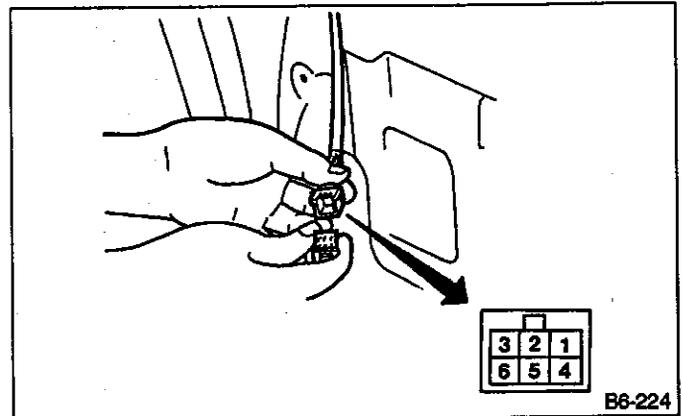


Fig. 137

30. Pneumatic Suspension (Air Suspension)

A: SCHEMATIC

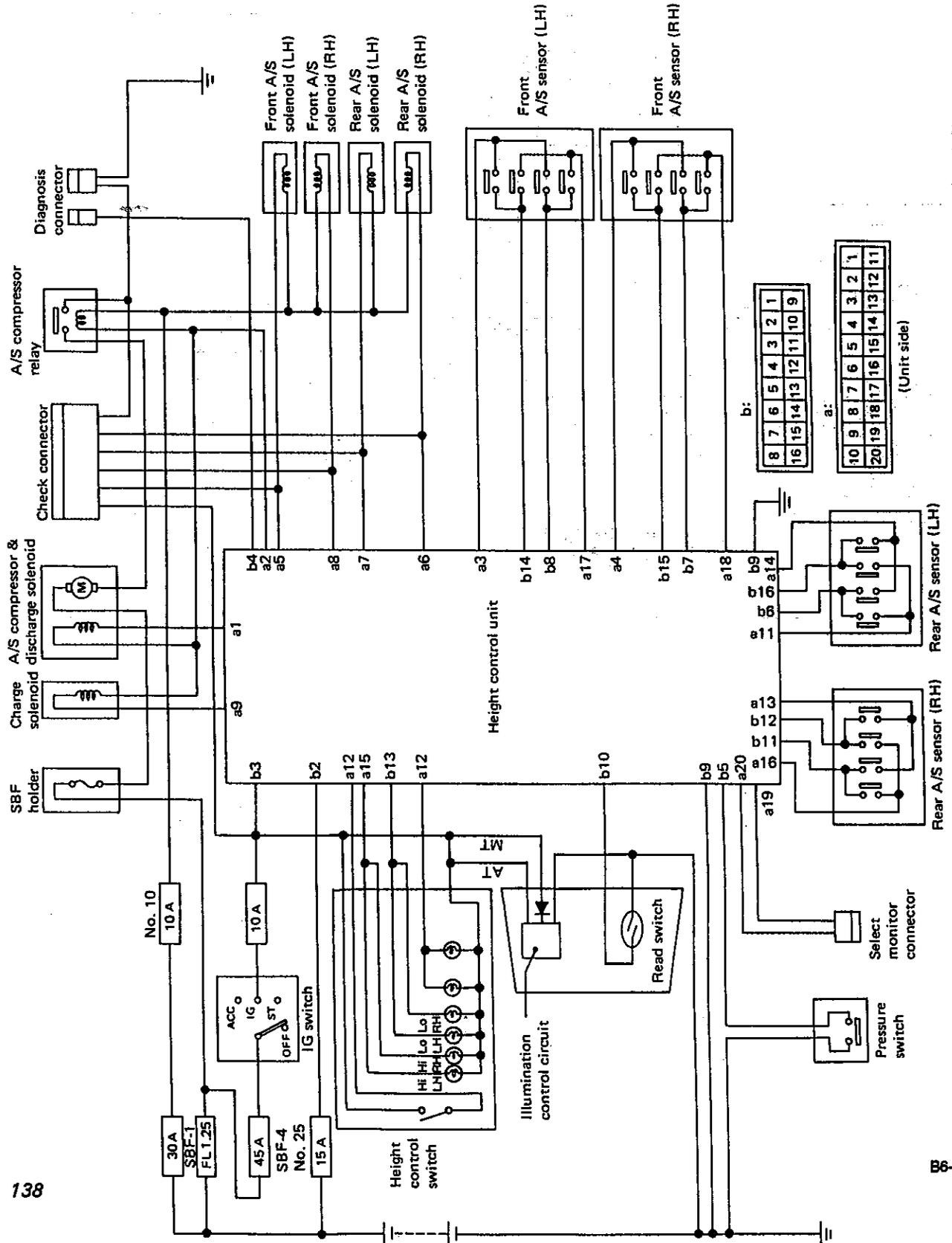


Fig. 138

B6-648

# 31. Antilock Brake System

## A: SCHEMATIC

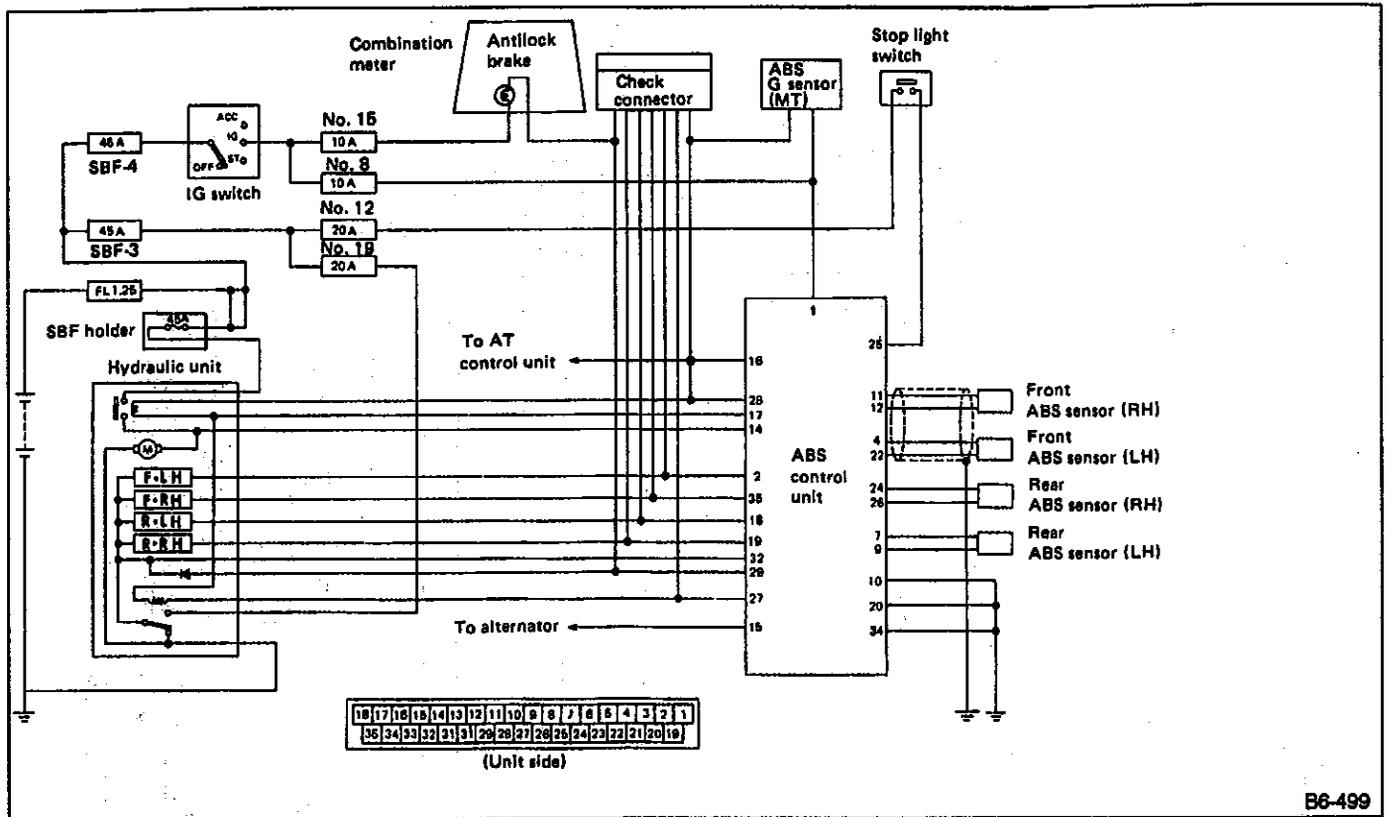
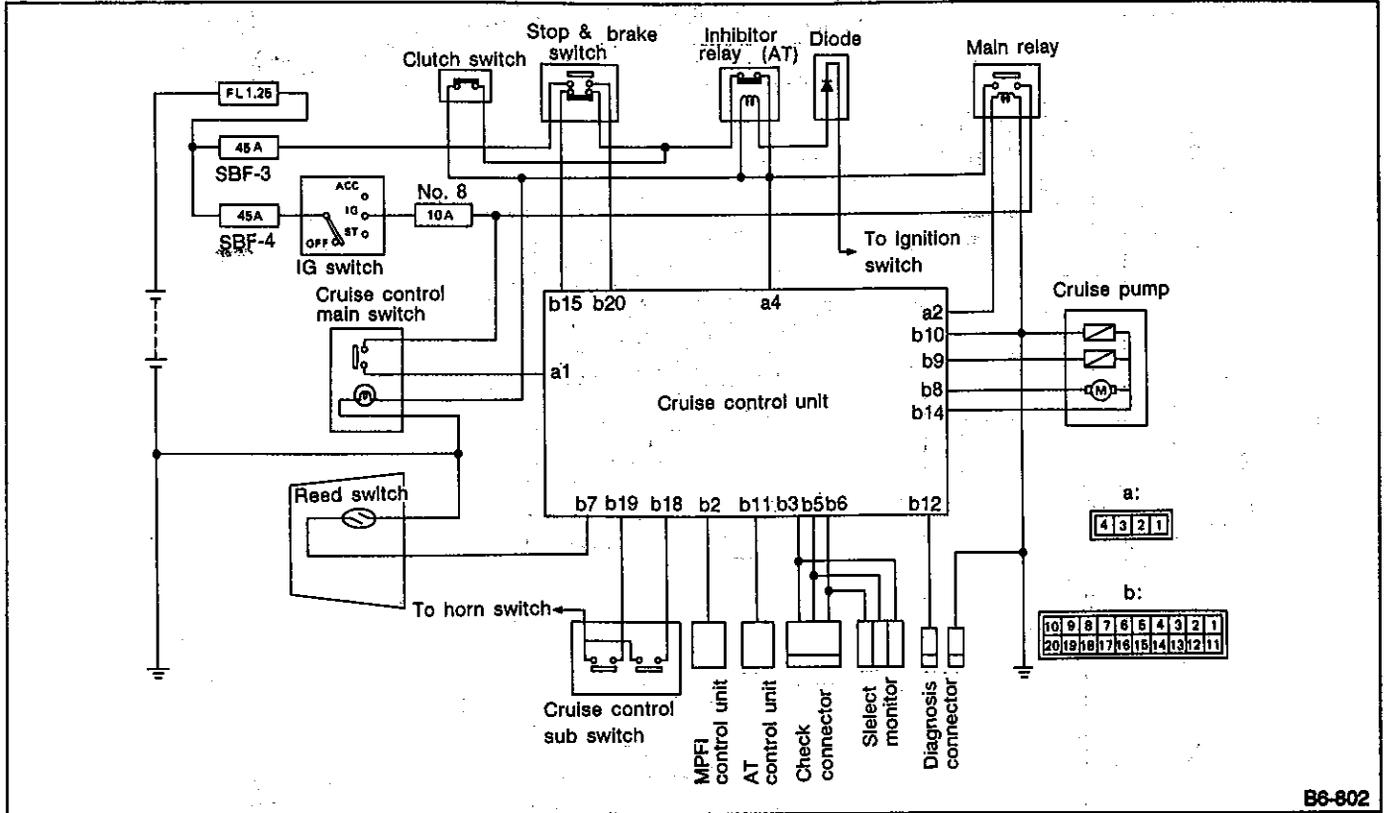


Fig. 139

B6-499

32. Cruise Control

A: SCHEMATIC



B6-802

Fig. 140

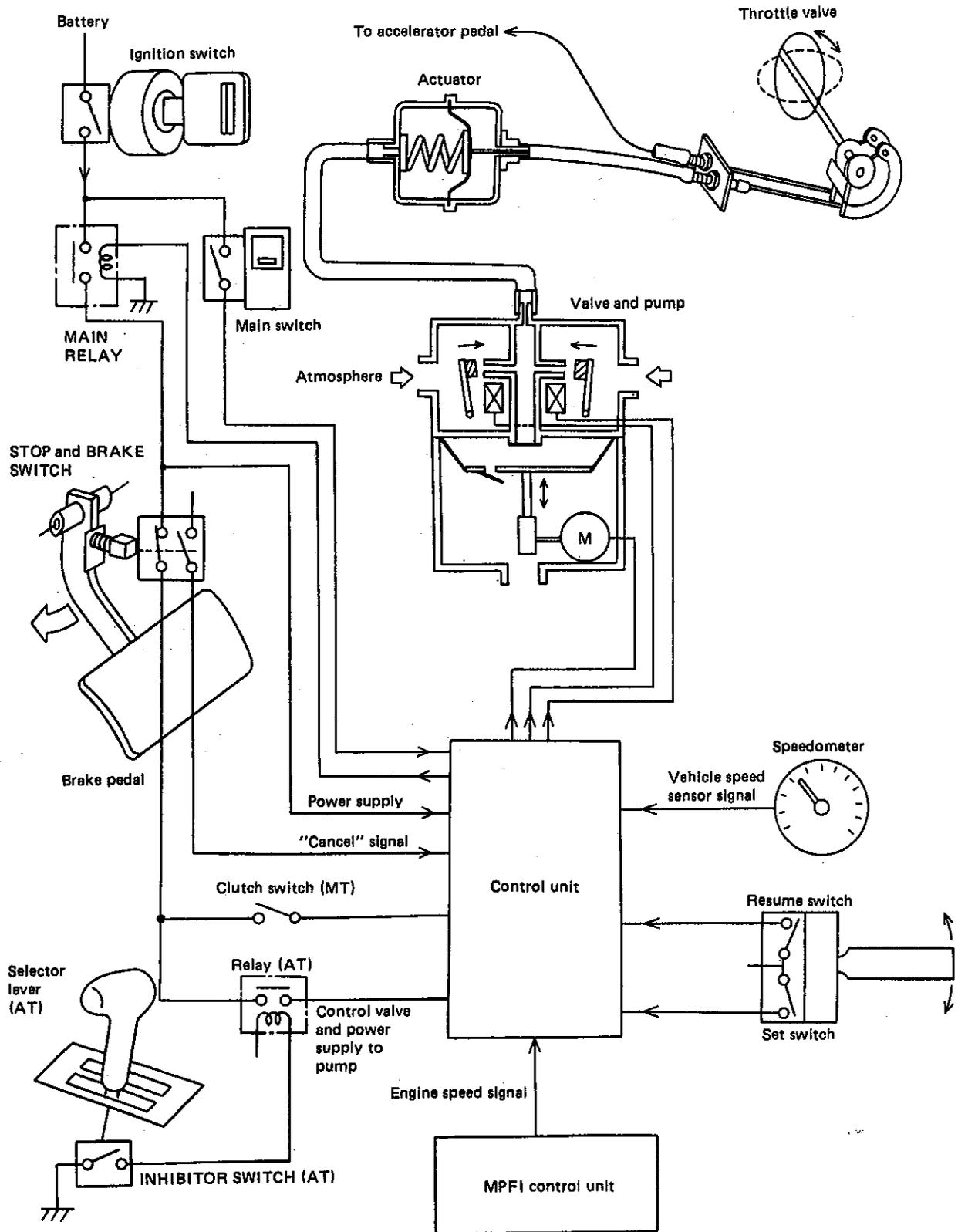


Fig. 141

B6-664

**B: DESCRIPTION**

**1. CONTROL AND OPERATION**

Constant speed control	When actual driving speed is higher than "set" speed, cruise control system intermittently opens vent valve and moves throttle valve toward the close position. This occurs while comparing actual driving speed with "set" speed. When actual driving speed is lower than "set" speed, the system intermittently activates vacuum pump to move throttle valve toward the "open" direction.
"Set" control	When SET/COAST switch is pressed with main switch ON while is being driven a specified greater than 40 km/h (25 MPH), current flows so that vent and safety valves close. This then causes vacuum pump to intermittently activate to set throttle valve at position corresponding with accelerator pedal depression. Thus, vehicle is being driven at constant speed.
Deceleration control	When SET/COASTS switch is turned ON while vehicle is cruising, vent valve intermittently opens, partially closing throttle valve. This causes the vehicle to decelerate. When the switch is turned OFF, vehicle speed is stored in memory and vehicle is constantly driven at that speed.
Acceleration control	When RESUME/ACCEL switch is turned ON while vehicle is cruising, vacuum pump intermittently activates to partially open throttle valve. This causes vehicle to accelerate. When the switch is turned OFF, vehicle speed is stored in memory and vehicle is constantly driven at that speed.
Resume control	When RESUME ACCEL switch is turned ON after cruise control is released, vehicle speed returns to that speed which was stored in memory just before cruise control was released. However, this occurs only when vehicle is being driven at a speed greater than 30 km/h (19 MPH).
Manual cancel control	When any of the following signals are entered, vent valve and safety valve open to release cruising speed. (1) Stop light switch ON signal (Brake pedal depressed) (2) Brake switch OFF signal (Brake pedal depressed) (3) Clutch switch OFF signal (Clutch pedal depressed — MT) (4) Inhibitor switch ON signal (Selector lever set to "N" — AT)
Low speed limit control	When vehicle speed drops below 30 km/h (19 MPH), cruise control is automatically canceled. The memorized speed will also be cleared. Cruise control at speed lower than 40 km/h (25 MPH) cannot be effected.
Release valve control	When vehicle speed increases 10 km/h (6 MPH) greater than memorized speed while vehicle is cruising (downgrade, etc.), actuator's vent valve as well as safety valve are turned OFF (to open to atmospheric pressure) so that vehicle decelerates. When vehicle decelerates within 8 km/h (5 MPH) greater than the memorized speed, vent and safety valve are turned ON (to shut out atmospheric pressure) so that cruise control resumes.
Auto. cancel control	When any of the following signals are entered while vehicle is cruising, actuator's vent valve as well as safety valve are turned OFF (to shut out atmospheric pressure). This cancels cruise control. (a) When vehicle speed drops below low speed limit 30 km/h (19 MPH), (b) When actuator's vent valve, safety valve, vacuum pump motor or harness circuit is shorted, (c) When actuator's vent valve, safety valve, vacuum pump or harness circuit are discontinued, (d) When ON signals are simultaneously emitted from SET/COAST and RESUME/ACCEL switches, or (e) When a vehicle speed signal that implies speed variation of greater than $\pm 25$ km/h ( $\pm 16$ MPH) per second is entered.

Cruise control unit compares the actual car speed detected by feedback signals from speed sensor incorporated in speedometer with the speed set in the memory memorized when set switch was turned on. A signal is then transmitted according to the difference between the two speeds.

This signal is transmitted to solenoid valves of valve ASSY located in engine compartment. The movement of actuator operates throttle valve through accelerator pedal and cable, thereby keeping the car speed constant.

## 2. SYSTEM CONSTRUCTION

Unit	Name	Function	Set	Cancel	Resume	Coast	Vehicle speed
Output signal (sensors)	Main switch	Supplies battery voltage to control unit after main switch is turned ON (with ignition switch ON).	○	○	○	○	○
	SET/COAST switch	Sends a SET/COAST signal to control unit.	○			○	
	RESUME/ACCEL switch	Sends a RESUME/ACCEL signal to control unit.			○		
	Brake switch (NC)	Disconnects power supply to control valve and vacuum pump.	○	○			
	Stop light switch (NO)	Stops control unit's function and disconnects power supply to control valve and vacuum pump.	○	○			
	Clutch switch (NC) or inhibitor switch (NO)	Disconnects power supply to control valve and vacuum pump.	○	○			
	Set signal						○
	Vehicle speed sensor (in combination meter)	Controls vehicle speed.	○	○	○	○	○
Control section	Built-in relay	A safety device to protect system from damage.	○	○	○	○	○
Output signal (actuators)	Vacuum pump motor	Produces vacuum pressure to activate vacuum diaphragm.	○	○	○		○
	Vent valve	Activates when controlling vehicle speed. (Vacuum pressure → Atmospheric pressure)	○	○	○	○	○
	Safety valve	Opens to introduce atmospheric pressure into system if vent valve malfunctions.	○	○	○	○	○

3. FAIL-SAFE FUNCTION

Fail-safe item	Cancel conditions	Operation
Cancels erroneous switch operation	A: <ul style="list-style-type: none"> <li>• SET/COAST switch ON</li> <li>• RESUME/ACCEL switch ON</li> </ul> B: <ul style="list-style-type: none"> <li>• Brake switch OFF</li> <li>• Stop light switch ON (Brake pedal depressed)</li> <li>• Clutch switch OFF (Clutch pedal depressed)</li> <li>• Inhibitor switch ON (Shift lever set to "N")</li> </ul>	When signals emitted from A and B groups are simultaneously entered, cruise control and memory speed will be or are canceled. System resumes after SET/COAST switch is turned ON again.
Cancels erroneous circuit operation	<ul style="list-style-type: none"> <li>• When control unit stops or erroneously operates.</li> <li>• When variations in vehicle speed signal is greater than 25 km/h/sec (16 MPH/sec).</li> <li>• When relay built into control unit remains ON.</li> <li>• When vacuum motor terminal or vent valve when motor drive circuit or vacuum motor circuit in control unit is shorted.</li> </ul>	Cruise control and memory vehicle speed will be or are canceled. Cruise control resumes after power supply is turned ON using ignition or main switch.
Cancels erroneous vehicle speed	When vehicle speed is at least 10 km/h (6 MPH) greater than memory speed.	Cruise control is interrupted (built-in relay OFF.) It resumes (built-in relay ON) when vehicle speed is 8 km/h (5 MPH) less than memory speed.
Cancels abnormal output	When vacuum motor's output remains ON for at least 1 second, due to erroneous operation of control unit.	Cruise control is interrupted (built-in relay OFF). It resumes after ignition switch or main switch is turned OFF and then ON.
Cancels erroneous SET/COAST switch or RESUME/ACCEL switch operation	When SET/COAST switch or RESUME/ACCEL switch is ON before main switch is turned ON.	Cruise control activates after two switches are turned OFF.

**4. PUMP AND VALVE**

Pump activated by a signal emitted from control unit produces vacuum pressure to operate actuator.

**1) During acceleration**

A signal emitted from control unit energizes solenoid to close valve A. This causes motor to move diaphragm in direction F so that valve C closes while valve D opens. As a result, Vacuum pressure applied to section E increases. With this increase in vacuum pressure, actuator moves control cable so that throttle valve opens.

**2) During deceleration**

A signal emitted from control unit energizes solenoid to open valve A. This causes section E to open to the atmosphere so that actuator moves control cable so that throttle valve closes. The above operation of throttle valve is repeated during acceleration and deceleration so that vacuum produced at section E is controlled to meet vehicle speed.

Signal from control unit and valve operation.

		Safety valve	Vacuum motor	Vent valve
System OFF		Open	Stop	Open
System ON	Memory < actual car speed	Close	Stop	Open
	Memory = actual car speed	Close	Stop	Close
	Memory > actual car speed	Close	Rotate	Close

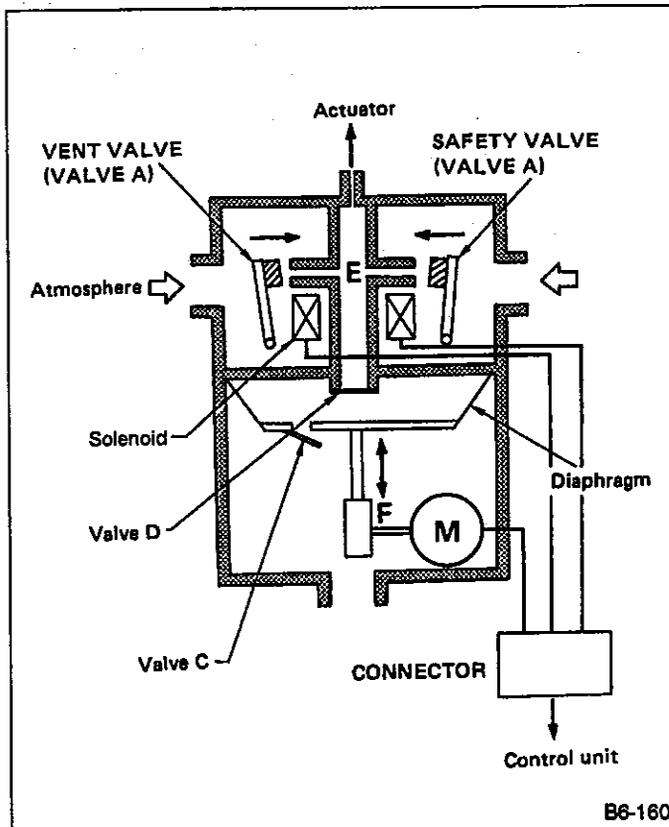


Fig. 142

## 5. ACTUATOR

The diaphragm is operated by vacuum or atmospheric pressure led by each valve, and this diaphragm movement actuates the wire cable via link ASSY to open or close the throttle valve. With the cruise control set to OFF (system OFF state), no diaphragm operation occurs as the atmospheric pressure is kept inside the actuator.

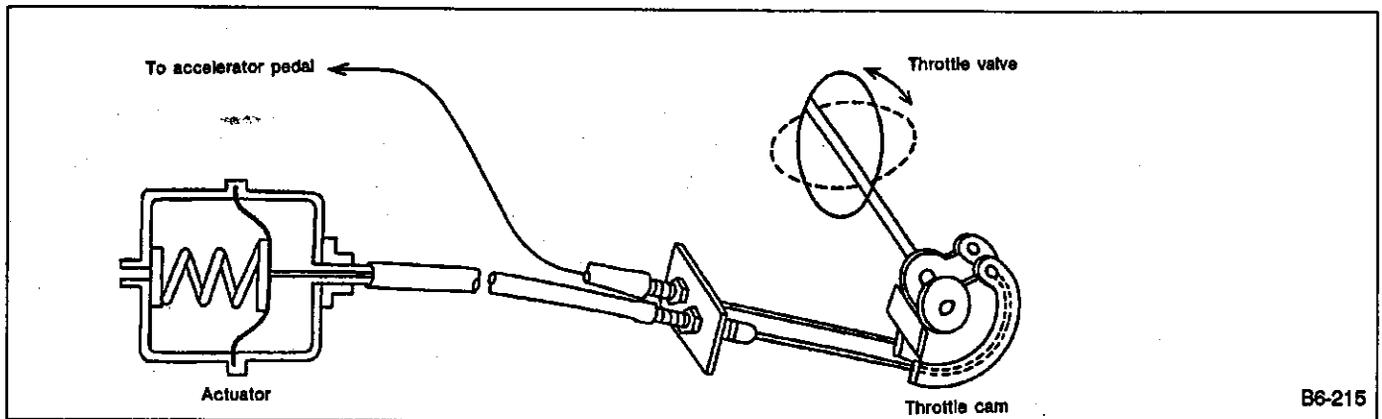


Fig. 143

## 6. ENGINE THROTTLE

The throttle body is equipped with two throttle cams. One cam is used during acceleration and the other during cruising, in order to open or close the throttle valve. These cams operate independently of each other. In other words, while one cam is operating, the other does not.

**C: ADJUSTMENT**

- a. Adjust accelerator pedal when the pedal is held in the fully returned position.
- b. Be careful not to apply excessive load to the wire cable when adjusting and/or installing; otherwise, the actuator may be deformed or damaged.

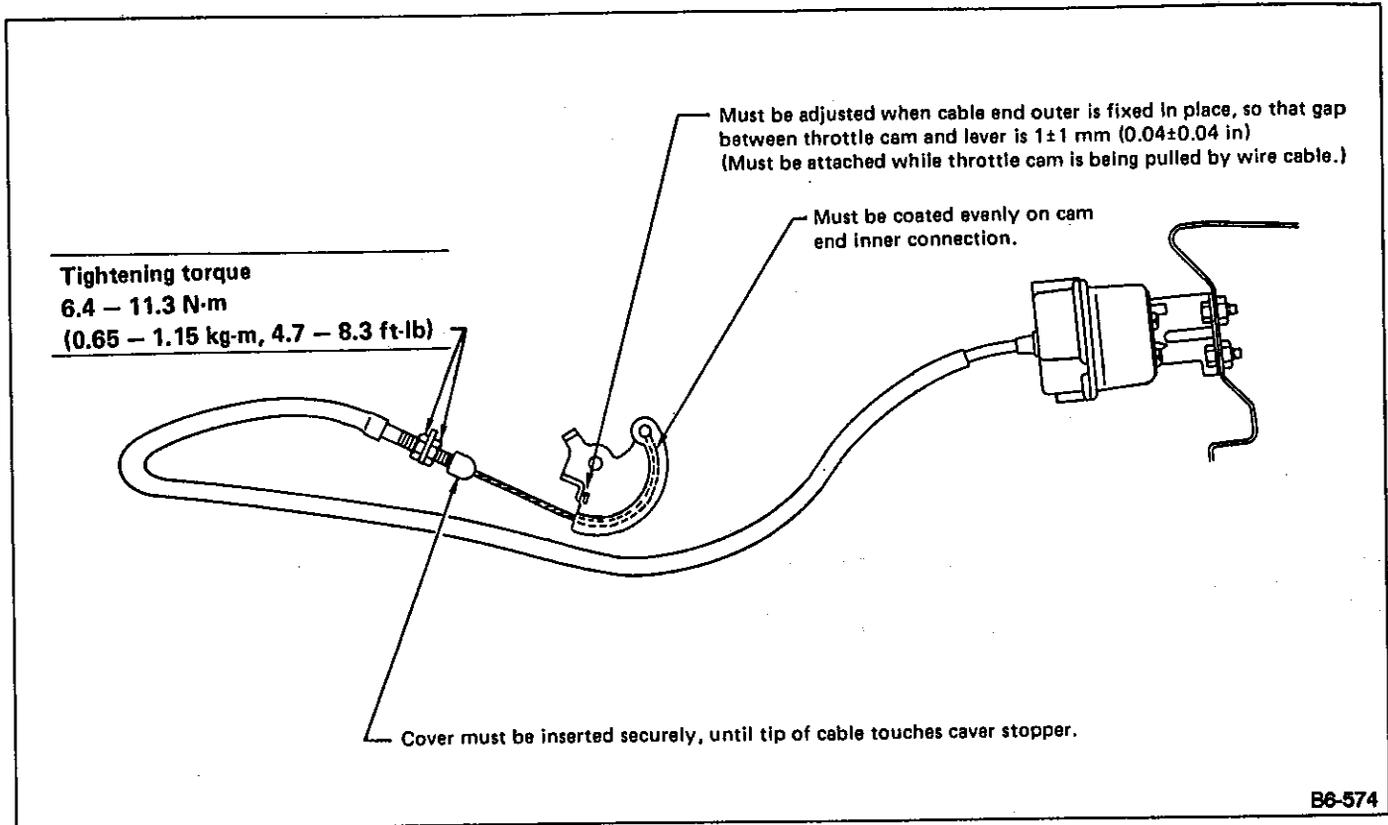


Fig. 144

**D: REMOVAL AND INSTALLATION****1. VACUUM PUMP**

- 1) Disconnect wiring harness connector and hose.  
**Always disconnect hose at body pipe side.**
  - 2) Remove attaching nuts and remove vacuum pump ASSY.
- Be sure to connect hose and wiring harness connector during installation.**

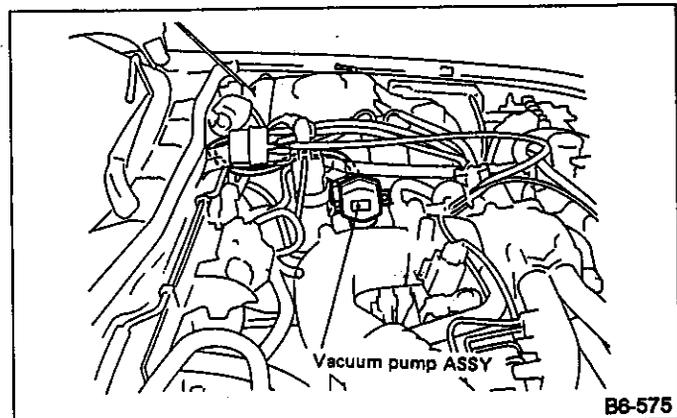


Fig. 145

**Tightening torque:**

5.4 — 9.3 N·m

(55 — 95 kg-cm, 48 — 82 in-lb)

**2. ACTUATOR**

- 1) Remove intake manifold cover. Remove the nut which secures control cable end to throttle cam, and remove throttle cam.
- 2) Remove attaching bolts and actuator ASSY.
- 3) Remove clip bands from control cable. Disconnect vacuum pipe and vacuum hose.

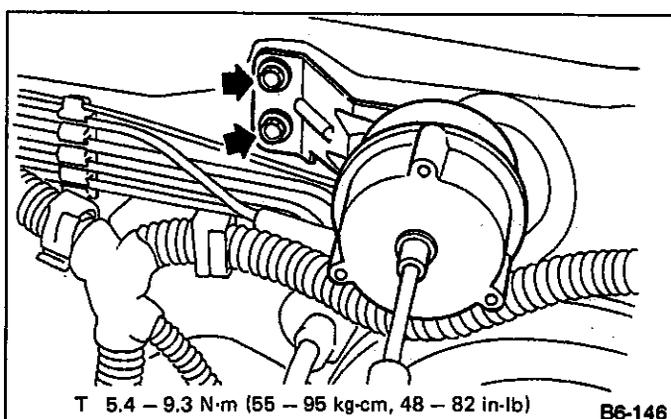


Fig. 146

- a. Install cable with clip opening in correct direction. (Reversed installation disables disassembly.)
- b. Apply grease to inner cable end.

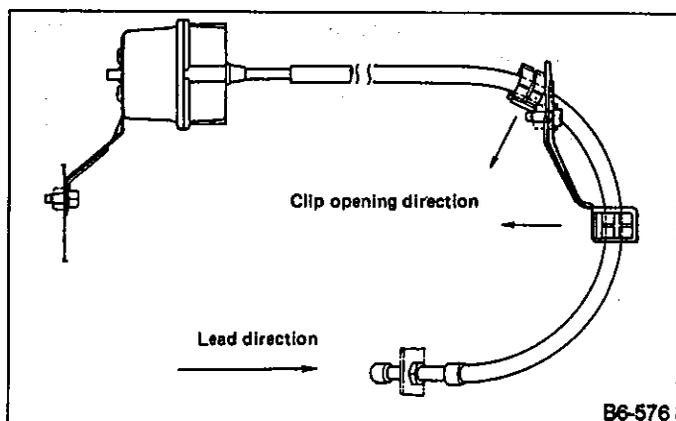


Fig. 147

**3. STOP AND BRAKE SWITCH**

<Ref. to [4-5].>

**4. CLUTCH SWITCH**

<Ref. to [4-5].>

**5. CRUISE CONTROL MAIN SWITCH**

- 1) Using a small screwdriver, remove cruise control main switch from instrument panel.

Be careful not to scratch instrument panel during removal.

- 2) Disconnect connector.

**6. CRUISE CONTROL SUB SWITCH**

- 1) Remove horn pad. <Ref. to [6-2]>
- 2) Disconnect horn switch connector and remove attaching screws.

**E: 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" or "RESUME/ACCEL" 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 subswitch 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 subswitch is released.

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

### 33. Headlight Beam Leveler

#### A: SCHEMATIC

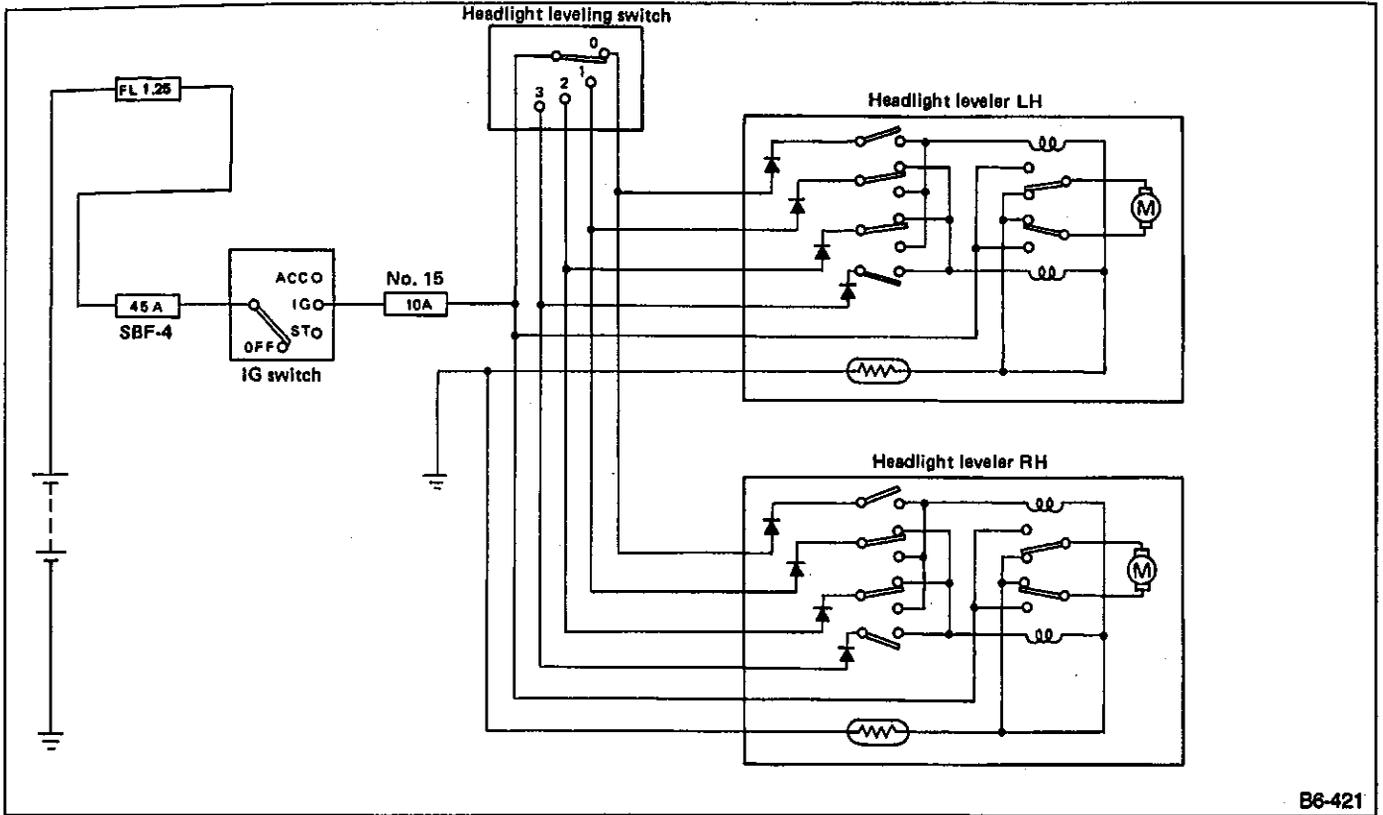


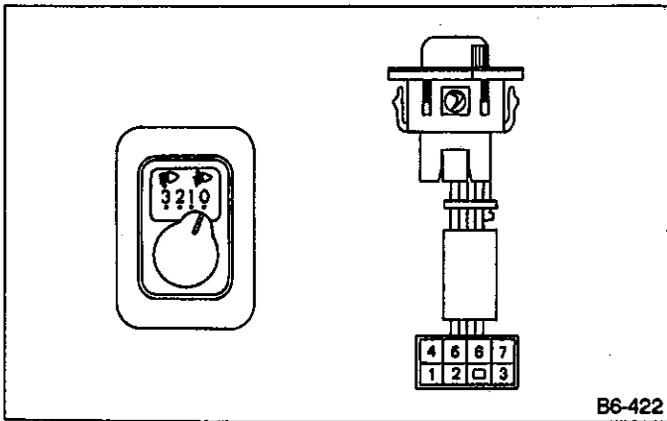
Fig. 148

B6-421

#### B: INSPECTION

##### 1. HEADLIGHT BEAM LEVELER

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



B6-422

Fig. 149

	1	2	3	4	7	5	6
0			○—○				
1		○—○					
2	○—○					○—○	
3				○—○			

# T TROUBLESHOOTING (For Cruise Control)

## 1. Self Diagnosis

### 1. GENERAL

The self-diagnosis function of the cruise control system uses an external select monitor. The self-diagnosis function operates in two categories — the cruise cancel conditions diagnosis and real-time diagnosis, which are used depending on the type of problems.

Applicable cartridge No.: 498347600

● Cruise cancel-conditions diagnosis

This category of diagnosis requires actual vehicle driving in order to determine the cause, (as when cruise speed is canceled during driving although no cruise cancel condition is not entered).



Cruise control unit memory stores the last "cancel" condition which occurred during driving. The code number corresponding with the last cruise "cancel" may be shown on the select monitor display.

a. The cruise control memory stores not only the last cruise "cancel" which occurred (although "cancel" operation is not entered by the driver), but also the "cancel" condition input by the driver.

b. The last cruise "cancel" only is stored in the select monitor memory.

c. The content of memory is cleared when ignition switch or cruise main switch is turned OFF.

● Real-time diagnosis

The real-time diagnosis function is used to determine whether or not the input of output signal system is in good order, according to signal emitted from switches, sensors, etc.

Vehicle cannot be driven at cruise speed because problems occurs in the cruise control system or its associated circuits.



Dummy signals are manually entered from select monitor's keyboard, etc., to determine whether or not the vacuum pump motor circuit, etc. are in good order.

### 2. SELF-DIAGNOSIS PROCEDURES USING SELECT MONITOR

- 1) Connect select monitor to connector (B51) located behind lower instrument cover on driver's side.
- 2) Turn ignition switch ON, then turn cruise main switch ON.
- 3) Turn select monitor's power ON. All LED's will come on. Select monitor display will read, as shown below, after several seconds.

CRUISE (/)  
YES:0, OTHERS:/

- 4) Pressing "0" will convert display to read:

CRUISE  
RUN



CRUISE (F00)  
CONTROL

If cruise main switch is OFF, error 2 will appear. Turn cruise main switch ON and repeat steps 2.

- 5) Press "F", "B", "0", and "ENT" in that order, and enter the desired designated code ("FB0", for example), or press scroll key to select the code.

### 3. DIAGNOSIS OF CRUISE CANCEL CONDITIONS

- 1) Connect select monitor.
- 2) Turn ignition and cruise main switch ON, and set select monitor in "FB0" mode.
- 3) Start engine and drive vehicle in 40 — 100 km/h speed range with cruise speed set.
- 4) If cruise speed is canceled itself (without doing any cancel operations), a trouble code will appear on select monitor display.

a. A trouble code will also appear when cruise cancel is effected by driver. Do not confuse.

b. Have a co-worker ride in vehicle to assist in diagnosis during driving.

- 5) Trouble code will be cleared by turning ignition or cruise main switch OFF.

Function code indication		Item to measure		Contents of diagnosis
Code No.	Abbreviation	Trouble code	Abbreviation	
FB0	CANCEL	10	OK	Normal
		11	BR/ST/CLorN	Input signals from brake switch, stop lamp switch, etc.
		12	E/G REV	Engine speed (rpm) limiter
		13	SPEED LIM	Low-speed control limiter
		14	SET+ RESUME	Simultaneous entry of two signals (Shorted circuit)
		21	MOTOR	Faulty motor or motor drive system
		22	VENT VALVE	Faulty vent valve and valve drive system
		23	C/U RELAY	Faulty relay built into cruise control unit
		24	SP SENSOR	Faulty vehicle speed sensor
		25	RESUME SW	Faulty resume switch

#### 4. REAL-TIME DIAGNOSIS

##### 1) Switch system diagnosis

- (1) Connect select monitor.
- (2) Turn ignition switch and cruise main switch ON.
- (3) Set select monitor in FA0 mode.
- (4) Ensure that normal indication is displayed when controls are operated as indicated below:

- When SET/COAST switch is pressed.
- WHEN RESUME/ACCEL switch is pressed.
- When brake pedal is depressed. (Brake switch & stop lamp switch turns ON.)
- When clutch pedal is depressed (MT model)
- When select lever is set to "N" (AT model).

**LED's come on shortly after switches are pressed.**

Function code indication		Item to measure	Contents of items to be monitored
Code No.	Abbreviation		
FA0	1. SE	SET/COAST switch	LED 1 comes on when switch is turned ON.
	2. RE	RESUME/ACCEL switch	LED 2 comes on when switch is turned ON.
	4. ST	Stop-light switch	LED 3 comes on when switch is turned ON (brake pedal is depressed).
	5. BR	Brake switch and clutch switch/inhibitor switch	<ul style="list-style-type: none"> <li>● Brake switch [Set select lever (AT model) to any position other than "P" or "N"/depress clutch pedal (MT model)]. LED 4 comes on when brake pedal is depressed.</li> <li>● LED 4 comes on when clutch pedal is depressed (MT model).</li> <li>● LED 4 comes on when select lever is set to "P" or "N" (AT model).</li> </ul>

2) Output system diagnosis

- (1) Connect select monitor.
- (2) Turn ignition switch and cruise main switch ON (with engine OFF).
- (3) Set select lever in "D" range (AT model). Do not depress clutch pedal (MT model).
- (4) Set select monitor in FB1 mode. The display will read as shown below, until input OK (which indicates no problems) is present. However, you can change this display to another mode as desired.

OUT PUT ready? (FB1) Yes:0

(5) After ensuring that select lever is set to "P" or "N" range (AT model) or clutch pedal is released (MT model), press "0".

For example, pressing "0" in "N" range shows "31 MOTOR" (which indicates a faulty motor) on display because power supply to vacuum pump motor is disconnected. When this is shown, set select lever to "D" range (AT model) and turn cruise main switch OFF. Then start all over again after main switch is turned ON again.

Function code indication		Item to measure		Contents of diagnosis
Code No.	Abbreviation	Trouble code	Abbreviation	
FB1	OUTPUT	10	OK	Normal
		31	MOTOR	Open or shorted vacuum pump motor circuit/harness
		32	VENT VALVE	Open or shorted vent valve circuit/harness
		33	C/U RELAY	Deposited safety relay built into cruise control unit
		34	C/U VENT V	Faulty vent valve drive circuit of cruise control unit
		35	C/U MOTOR	Faulty vacuum pump motor drive circuit

5. DATA SHOWN ON SELECT MONITOR DISPLAY

Indication of function code		Item to measure	Contents of items to be monitored
Code No.	Abbreviation		
F 00	CRUISE CONTROL	Cruise control unit identification	Reads ROM ID number of cruise control unit to display a possible communication state.
F 01	VSP (MPH)	Vehicle speed (MPH)	Displays vehicle speed data (in miles/h) determined by cruise control unit in relation to signal emitted from vehicle speed sensor in combination meter.
F 02	VSP (km/h)	Vehicle speed (km/h)	Displays vehicle speed in km/h.
F 03	EREV (rpm)	Engine speed	Displays engine rpm determined by cruise speed control unit in relation to reference signal emitted from crank angle sensor.

## 2. I/O Signal of Cruise Control Unit

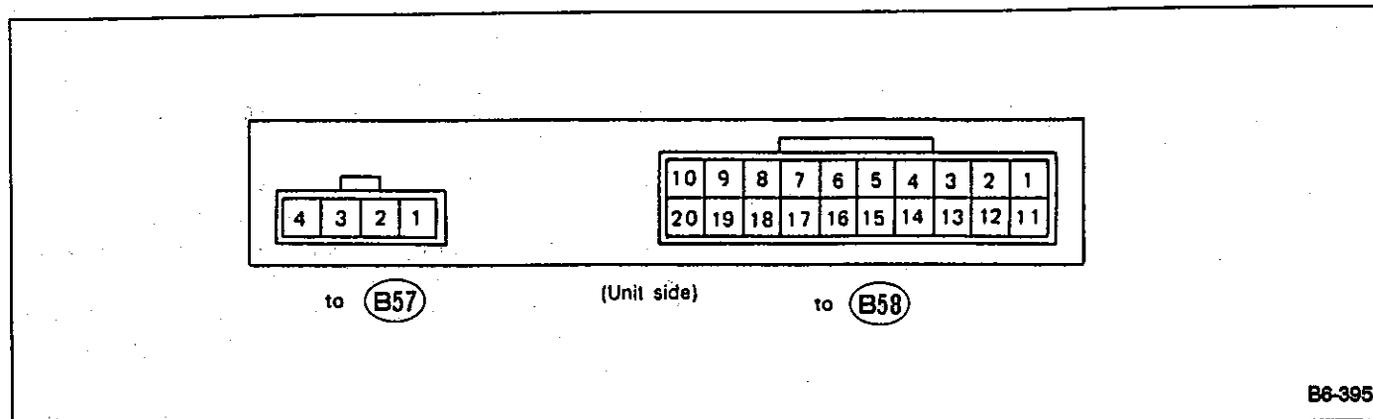


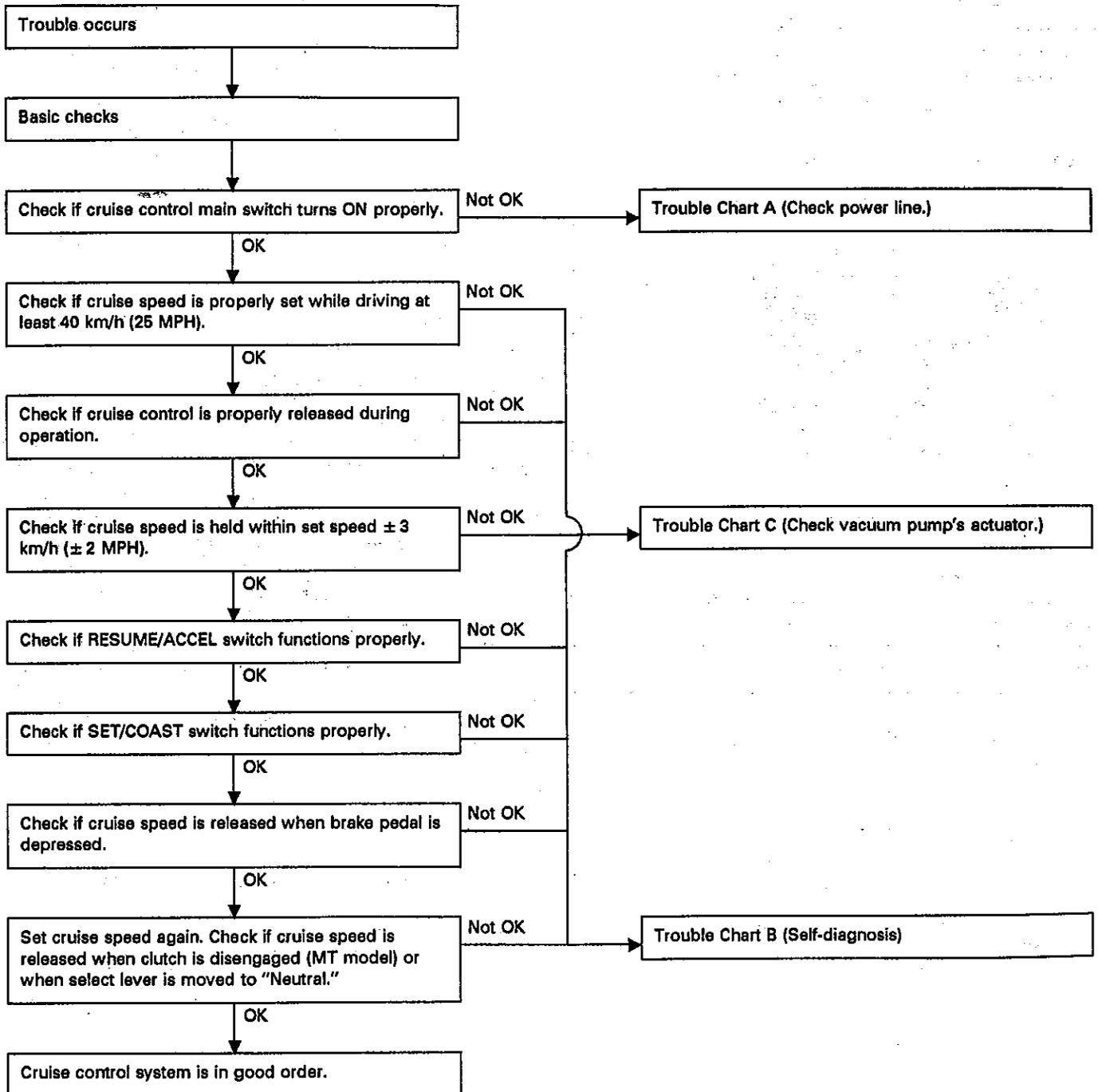
Fig. 150

Content	Connector No.	Terminal No.	Measuring conditions and I/O signals (ignition switch ON and engine idling)
Main switch	<b>(B57)</b>	1	<ul style="list-style-type: none"> <li>When main switch is pressed, battery voltage is present; when it is released, approximately 6.5 volts are present.</li> <li>When main switch is OFF, "0" volts are present.</li> </ul>
Main relay (solenoid)		2	<ul style="list-style-type: none"> <li>When main switch is turned ON, indicator comes on and battery voltage is present.</li> <li>When main switch is turned OFF, "0" volts are present.</li> </ul>
Main relay (contacts)		4	↑
Engine speed (rpm) signal	<b>(B58)</b>	2	When engine starts, a pulse signal is entered (Observe using an oscilloscope.)
Vehicle speed sensor		7	When all four wheels are raised off ground and any wheel is rotated manually, approximately 5 and 0 volt pulse signals are alternately sent to cruise control unit.
Brake switch		15	Set select lever to any position other than "P" or "N" (AT model)/leave clutch released (MT model), with main switch ON. Then check that: <ul style="list-style-type: none"> <li>0 volts are present when brake pedal is depressed.</li> <li>Battery voltage is present when brake pedal is released, or</li> <li>0 volts are present when clutch pedal is depressed (MT model).</li> <li>Battery voltage is present when clutch pedal is released (MT model).</li> <li>0 volts are present when select lever is set to "P" or "N" (AT model).</li> <li>Battery voltage is present when select lever is in any position other than "P" or "N" (AT model).</li> </ul>
Stop light switch		20	With ignition switch ON or OFF: <ul style="list-style-type: none"> <li>Depress brake pedal to check that battery voltage is present.</li> <li>"0" volts are present with brake pedal released.</li> </ul>
SET/COAST switch		18	<ul style="list-style-type: none"> <li>When switch is turned ON, battery voltage is present.</li> <li>When switch is turned OFF, "0" volts are present.</li> </ul>
RESUME/ACCEL switch		19	↑
Set signal		11	<ul style="list-style-type: none"> <li>ECU emits a ground-level signal while driving vehicle at least 40 km/h (25 MPH) with SET switch ON.</li> </ul>
Power supply to vacuum motor, vent valve and safety valve		14	<ul style="list-style-type: none"> <li>"0" volts are present when vehicle is stopped.</li> <li>Battery voltage is present while cruise control system is operating.</li> </ul>
Vacuum motor output		8	<ul style="list-style-type: none"> <li>Power supply is ON when vehicle is stopped.</li> <li>ON-and-OFF (0 and 12 volts) operation is alternately repeated while cruise control is operating.</li> </ul>
Vent valve output		9	↑

Voltage at terminals (11, 14, 8 and 9) cannot be checked unless vehicle is driving at cruising speed.

### 3. Basic Troubleshooting Procedure

#### A: BASIC TROUBLESHOOTING CHART



**B: BASIC CHECKS**

**1. CHECK CABLE AND VACUUM HOSE**

1) Cable installation

- Ensure that cruise control cable is attached to the left of accelerator cable (on accelerator pedal side).
- Ensure that accelerator cable throttle cam does not move when cruise control throttle cam is moved by hand.
- Ensure that throttle cam moves smoothly.

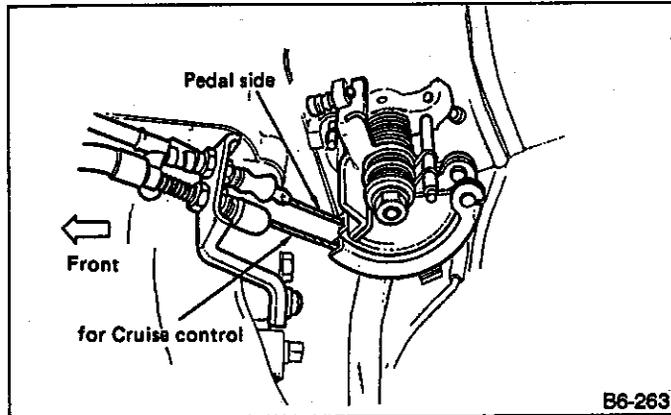


Fig. 151

2) Cable free play

- Ensure that throttle cam-to-lever clearance is within specifications.

**Standard value: 1 mm (0.04 in)**

**If clearance is not within specifications, adjust cable at its outer end.**

- Ensure that cap is positioned in groove.

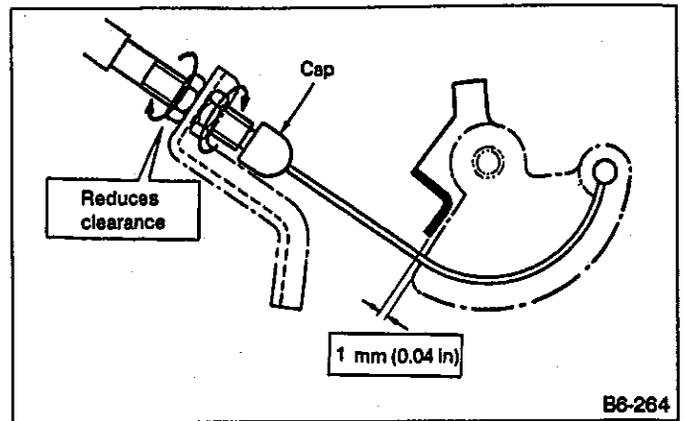


Fig. 152

3) Vacuum hose

Check vacuum hose (which connects vacuum pump and diaphragm) for disconnection or cracks.

**2. CRUISE CONTROL UNIT CHECK**

When a problem occurs in cruise control unit or its associated circuits, basic checks must first be conducted at the power supply, ground circuit, various terminal voltages, etc. Cruise control unit is not easily accessible for removal. In addition, a self-diagnosis function or a select monitor can be utilized, as required, to conduct "real-time" diagnosis or easily determine whether or not the cruise control unit is malfunctioning.

1) Cruise control unit removal

Cruise control unit can be extracted after glove box and right and lower sheet-metal frames of instrument panel are removed.

2) Disconnect cruise control unit connector. Use harness on body side to check cruise control unit condition.

3) Power supply check (ignition switch ON)

	Connector & terminal No.		Ignition switch ON
Main switch	(B57)	No. 1	Battery voltage is present when main switch is continuously pressed; 0 volts are present when main switch is released.
Main relay (solenoid)		No. 2	Battery voltage is present when main switch is continuously pressed; 0 volts are present when main switch is released.
Main relay (contacts)		No. 4	†

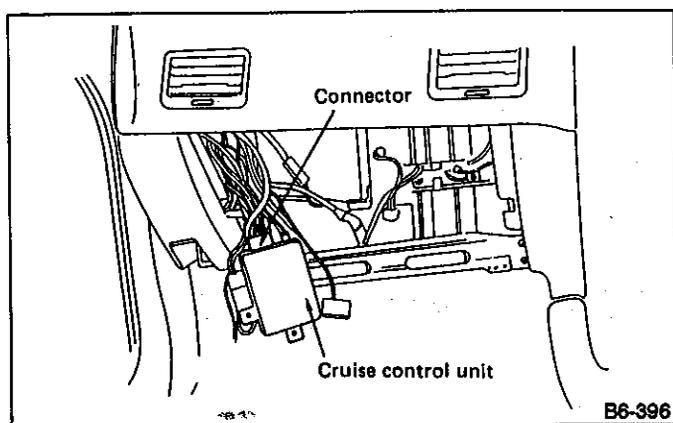


Fig. 153

4) Continuity check  
Check continuity between terminals (indicated in table below).

**Connector & Terminal / Specified resistance :**  
**(B58) No. 10 — Body / 1 Ω max.**

5) "Real-time" diagnosis  
 ● When a problem is displayed as a result of "real-time" diagnosis, check its corresponding system or line. If no problems are displayed, the cruise control unit may be inoperative.  
 ● "Real-time" diagnosis function is also used to directly locate malfunctioning relays built into cruise control unit.

(For reference)

Engine speed signal	(B58)	No. 2	A pulse signal is present when engine starts.
Vehicle speed sensor		No. 7	A pulse signal (approx. 0 — 5 volts) is present when all four wheels are raised off ground and one of them is rotated.
Brake switch		No. 15	Turn main switch ON. Move select lever to any position other than "P" or "N" (AT model) or release clutch pedal (MT model). Under this condition, 0 volts are present when brake pedal is depressed and battery voltage is present when brake pedal is released.
Stop light switch		No. 20	Battery voltage (Brake pedal depressed) 0 V (Brake pedal released)
SET/COAST switch		No. 18	Battery voltage (switch ON) 0 V (switch OFF)
RESUME/ACCEL switch		No. 19	Same as above

### 4. Trouble Chart A

Cruise control main switch fails to turn ON.

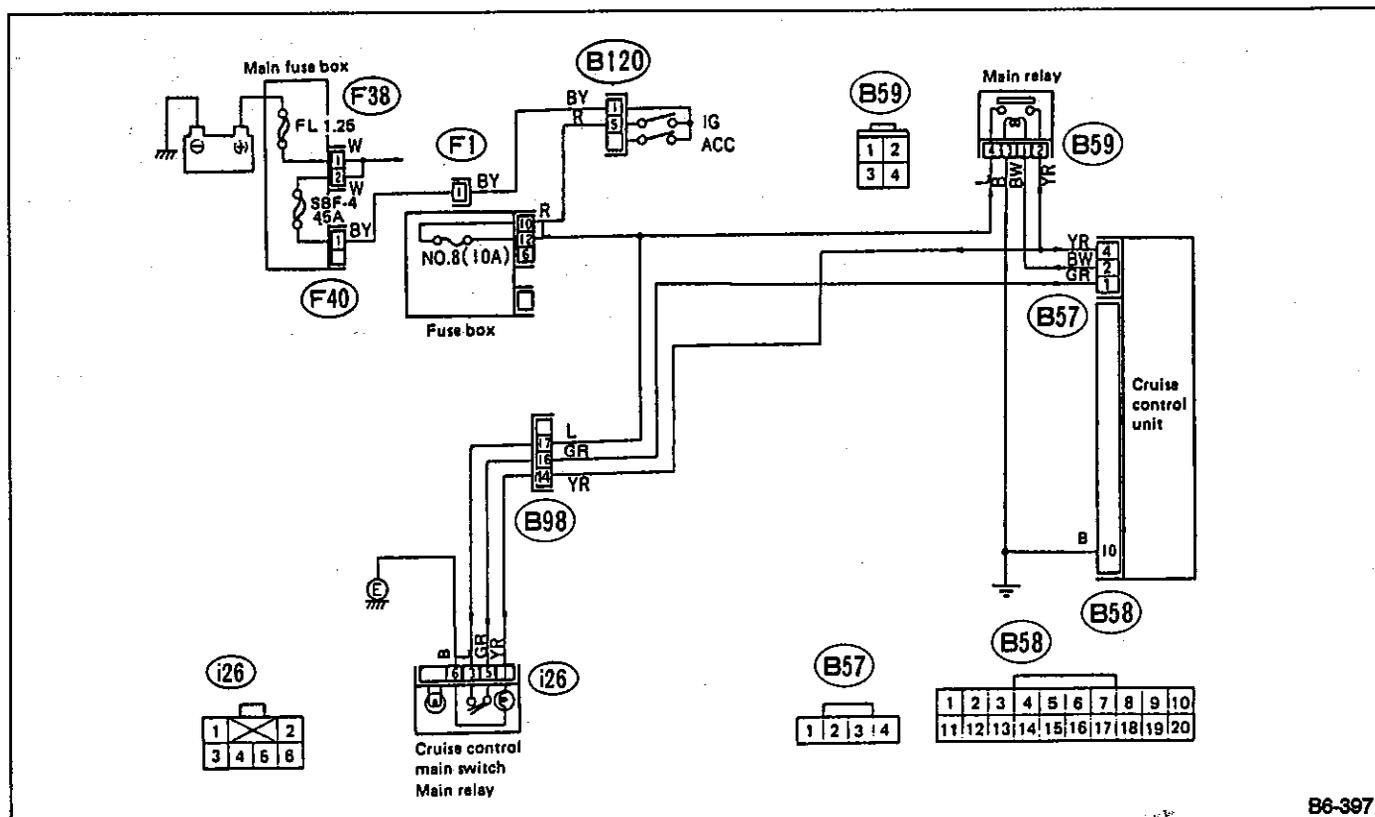
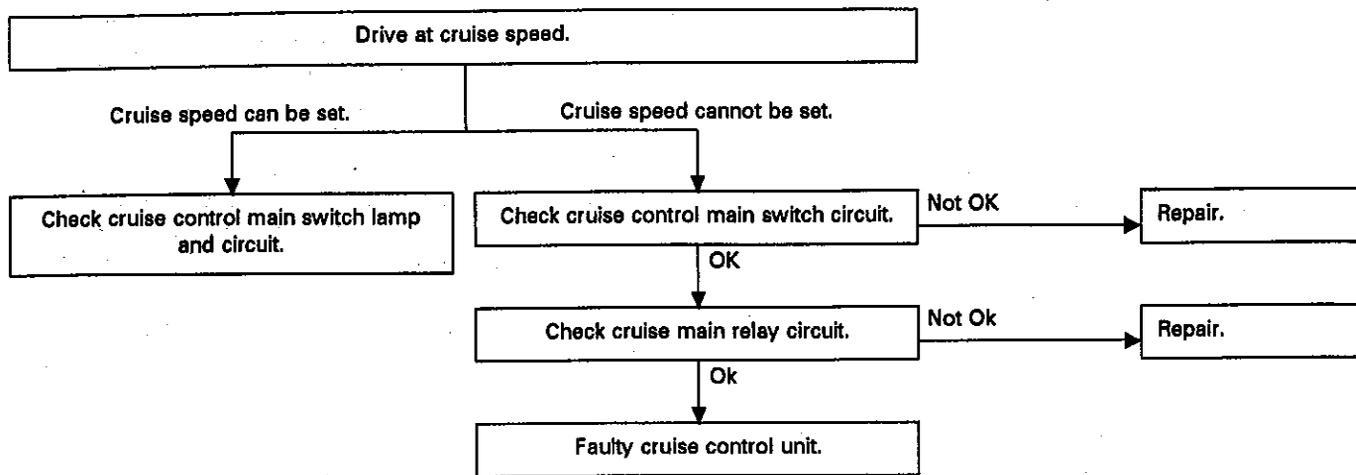


Fig. 154

B6-397

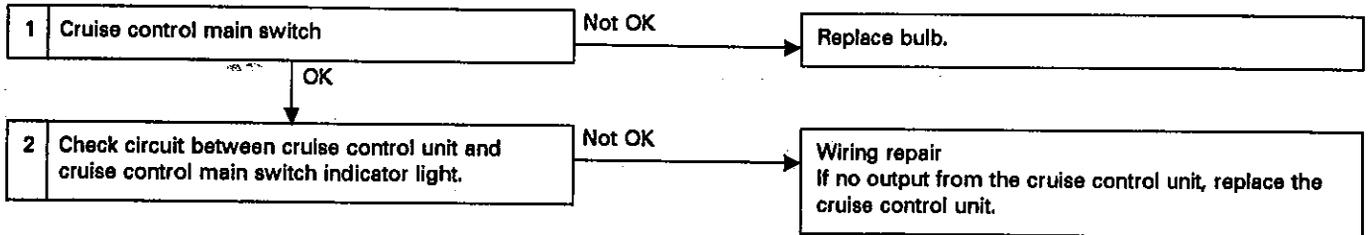
**A: CHECK INDICATOR AND CIRCUIT IN CRUISE CONTROL MAIN SWITCH**

**CONTENT OF DIAGNOSIS:**

Bulb failure or open harness of the indicator circuit in the cruise control main switch.

**TROUBLE SYMPTOM:**

Cruise control can be set normally indicator does not come on (when main switch is pressed).



**1. CHECKING THE INDICATOR LAMP IN THE CRUISE CONTROL MAIN UNIT**

- 1) Remove cruise main switch.  
Turn lower part of the housing upward to remove. If this cannot be done, insert a small screwdriver on the right hand side of the housing to remove the lock.
- 2) Measure resistance value between cruise control main switch terminals.

**Terminal/Specified resistance:**  
No. 1 — No. 6/Approx. 120 Ω

**2. CHECK CIRCUIT BETWEEN CRUISE CONTROL UNIT AND CRUISE CONTROL MAIN SWITCH INDICATOR LAMP**

- 1) Cruise control unit and body  
Measure voltage between cruise control main switch and body. (Perform this measurement by turning ON the ignition switch and the cruise control main switch.)

**Connector & Terminal/Specified voltage:**  
(B57) No. 4 — Body/10 — 13 V  
(i26) No. 1 — Body/10 — 13 V

- 2) Remove the connector from the cruise control main switch.
- 3) Measure the resistance value between the cruise control main switch and the body.

**Connector & Terminal/Specified resistance:**  
(i26) No. 6 — Body/1 Ω max.

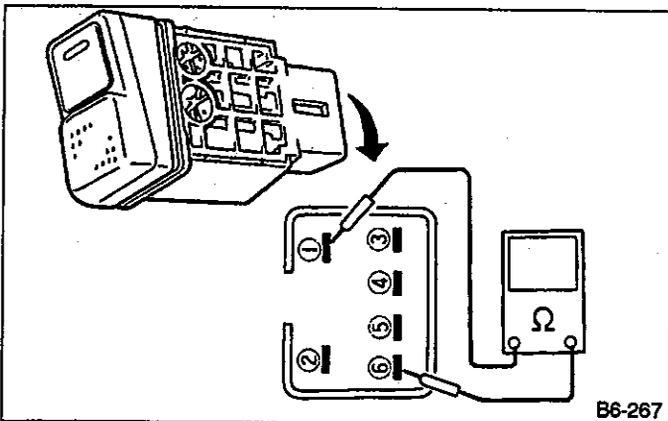


Fig. 155

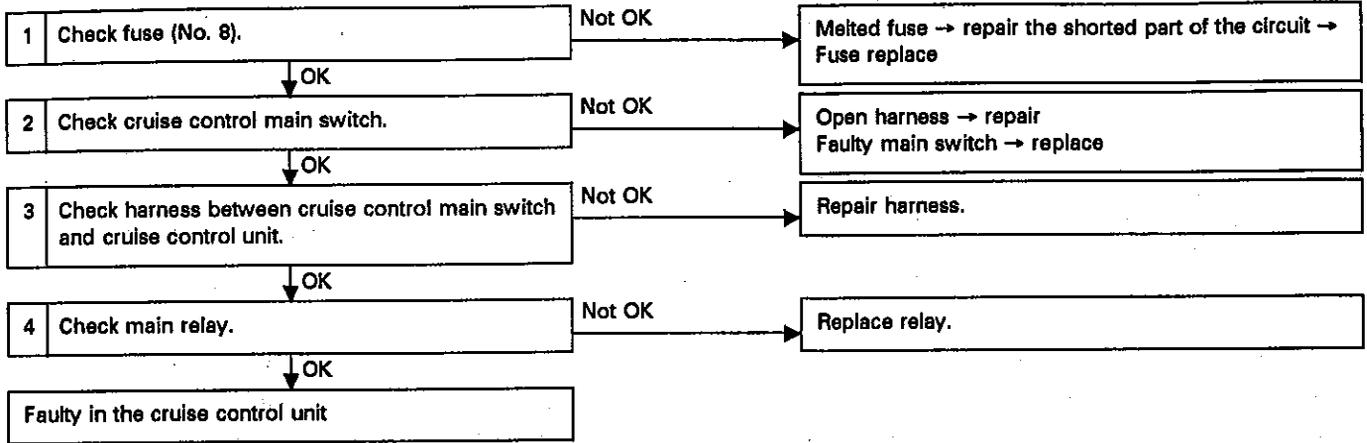
**B: CHECK CRUISE CONTROL MAIN SWITCH AND MAIN RELAY**

**CONTENT OF DIAGNOSIS:**

Faulty cruise control main switch or relay, or open harness.

**TROUBLE SYMPTOM:**

Cruise control main switch is not turned ON and cruise control cannot be set.



- If main relay operates, this circuit operates normally. Whether main relay is normal or not can be checked by operating sound. (When turning ON ignition switch and main switch, a click sound heard from glove box side is normal.)

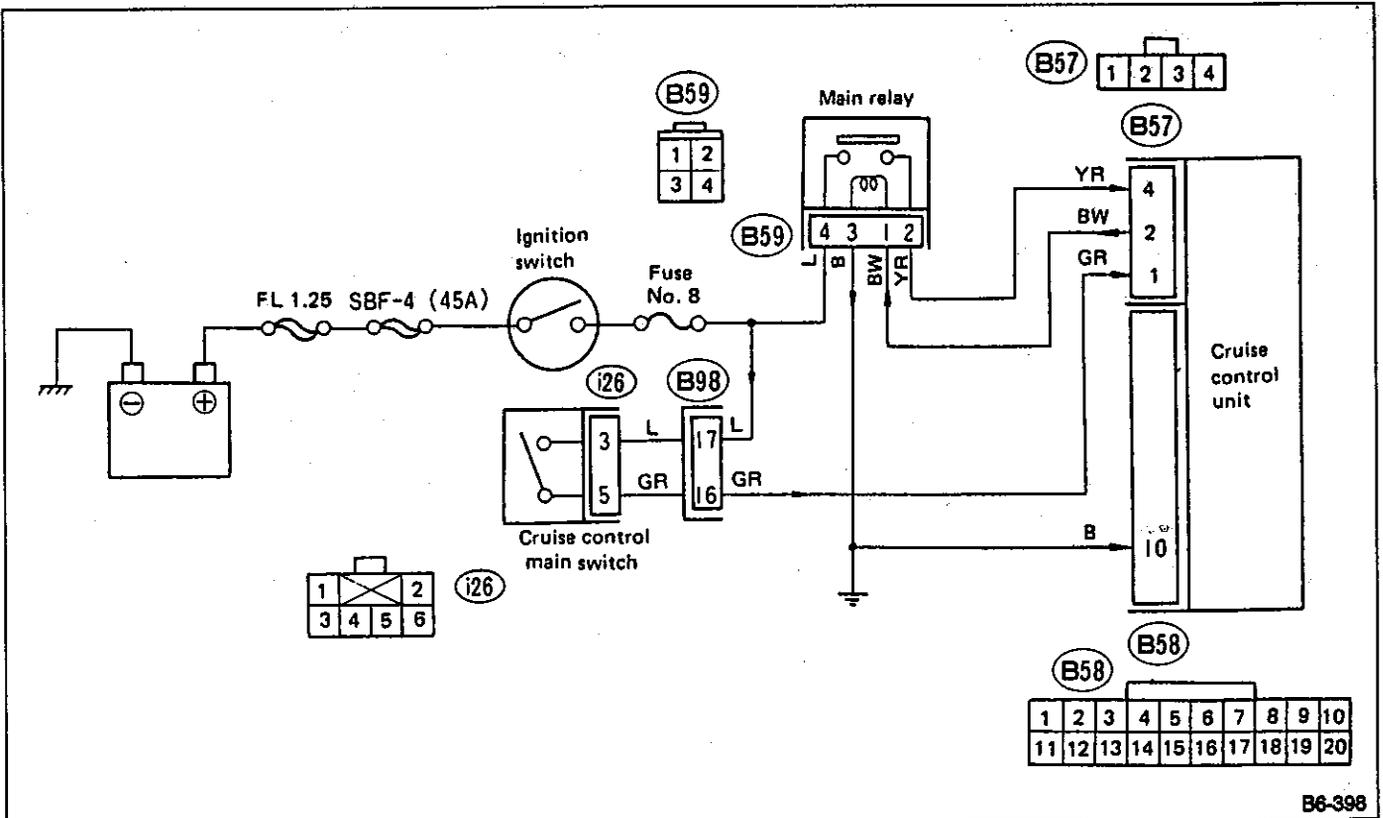


Fig. 156

B6-398

**1. CHECK FUSE (No. 8).**

- 1) Check fuse (No. 8).  
Test circuit with a tester.
- 2) Check voltage of the ignition power source.  
Turn ignition switch ON and measure the voltage between the fuse box connector and the body.

**Connector & Terminal/Specified voltage:**  
(B104) No. 12 — Body/10 — 13 V

**2. CHECK CRUISE CONTROL MAIN SWITCH.**

- 1) Cruise control main switch
  - (1) Insert a small screwdriver into lower cut part of panel to remove. If removal cannot be done, insert a screwdriver into the center part on right hand side of panel to remove the lock.
  - (2) Turn ignition switch ON and measure the voltage between cruise control main switch connector and body.

**Connector & Terminal/Specified voltage:**  
(i26) No. 3 — Body/10 — 13 V

- 2) Check ON/OFF function of main switch.  
Measure resistance between main switch and terminal.

**Terminal/Specified resistance:**  
No. 3 — No. 5/0 Ω (Switch ON)  
1 MΩ min. (Switch OFF)

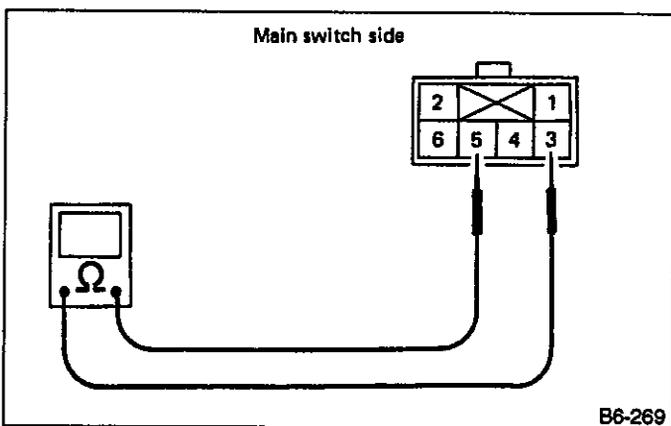


Fig. 157

**3. CHECK HARNESS BETWEEN CRUISE CONTROL MAIN SWITCH AND THE CRUISE CONTROL UNIT.**

To check whether harnesses are normal or not, measure voltage at each of the terminals as the distance between connectors is long.

- 1) Turn ignition switch ON.
- 2) Turn cruise main switch ON.
- 3) Measure voltage between each of terminals and body.

**Connector & Terminal/Specified voltage:**  
(i26) No. 3 — Body/10 — 13 V  
(i26) No. 5 — Body/10 — 13 V  
(B57) No. 1 — Body/10 — 13 V

**4. CHECK MAIN RELAY.**

- 1) Turn ignition switch ON.
- 2) Check voltage at main relay power source. (Tighten main relay together the cruise control unit. Black connector)  
Measure the voltage between the main relay and the body.

**Connector & Terminal/Specified voltage:**  
(B59) No. 4 — Body/10 — 13 V

- 3) Check main relay operation.  
Measure resistance between contact point side terminals when applying battery power to exciting coil side (No. 1-3).

• Whether relay is normal or not can be easily checked by relay operation sound. (When turning ignition switch and cruise control main switch ON, a click sound heard from left side of glove box is normal.)

**Terminal/Specified resistance:**  
No. 2 — No. 4/0 Ω (with 12 V connection)  
1 MΩ min. (without 12 V connection)

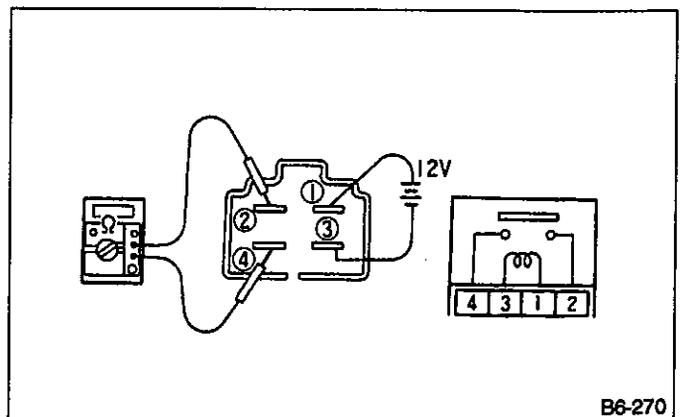
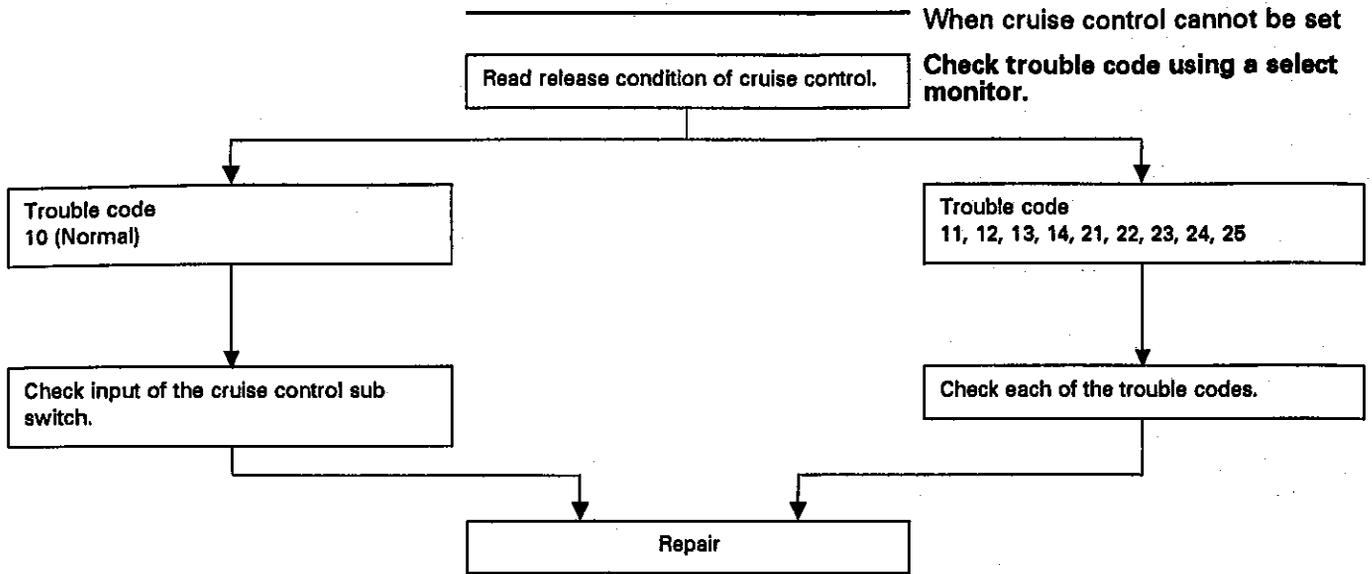


Fig. 158

### 5. Trouble Chart B

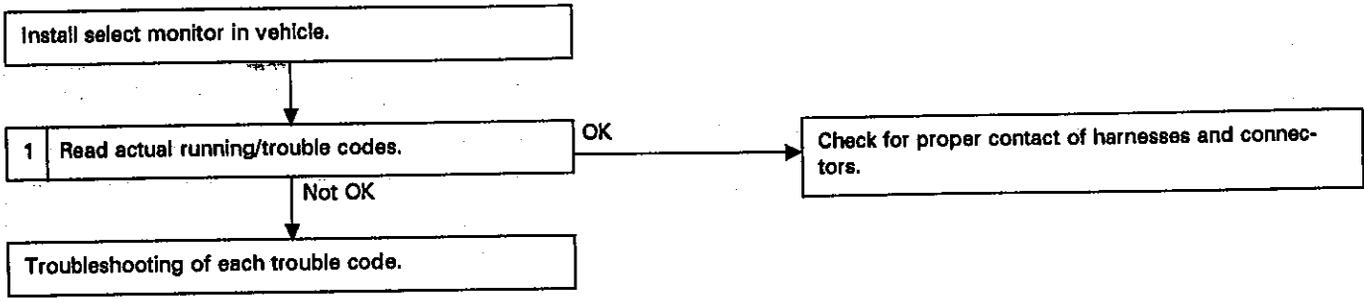


	Page
Check trouble code with a select monitor. ....	99
Checking input of cruise control sub switch. (SET/COAST SW, RESUME/ACCEL SW) .....	100
Trouble code 11. (Stop light switch, brake switch, inhibitor switch and clutch switch) .....	102
Trouble code 12. (Failure of engine revolution input signal) .....	104
Trouble code 13. and 24. Malfunction in the speed sensor system .....	106
Trouble code 14. (Simultaneously input signals of SET/COAST and RESUME/ACCEL SW) .....	108
Trouble code 21. and 22. (Malfunction in cruise vacuum pump and vent valve) .....	110
Trouble code 23. Malfunction in built-in relay of cruise control unit .....	112

**A: CHECK TROUBLE CODE WITH A SELECT MONITOR.**

**CONTENT OF DIAGNOSIS:**  
Read trouble code.

**TROUBLE SYMPTOM:**  
 ● Cruise control cannot be set.  
 ● Cruise control is occasionally released.



● By checking the trouble codes, it can be read through a self diagnosis, but it is effective to use a select monitor.

**CANCEL (FB0)**  
11 BR/ST/CL or N

**1. READ THE TROUBLE CODE.**

● Measuring condition: continuous running until cruise control is released.

● Operation of the function keys: F B O ENT  
 ● Indication: Always perform diagnosis while vehicle is running, and immediately indicate trouble code number when release condition occurs.

**B: CHECKING INPUT OF CRUISE CONTROL SUB SWITCH**

**CONTENT OF DIAGNOSIS:**

- SET/COAST SW or disconnection of the wiring or short circuit
- RESUME/ACCEL SW or disconnection of the wiring or short circuit

**TROUBLE SYMPTOM:**

- The cruise control cannot be set, or it is canceled immediately.
- RESUME/ACCEL cannot be operated.

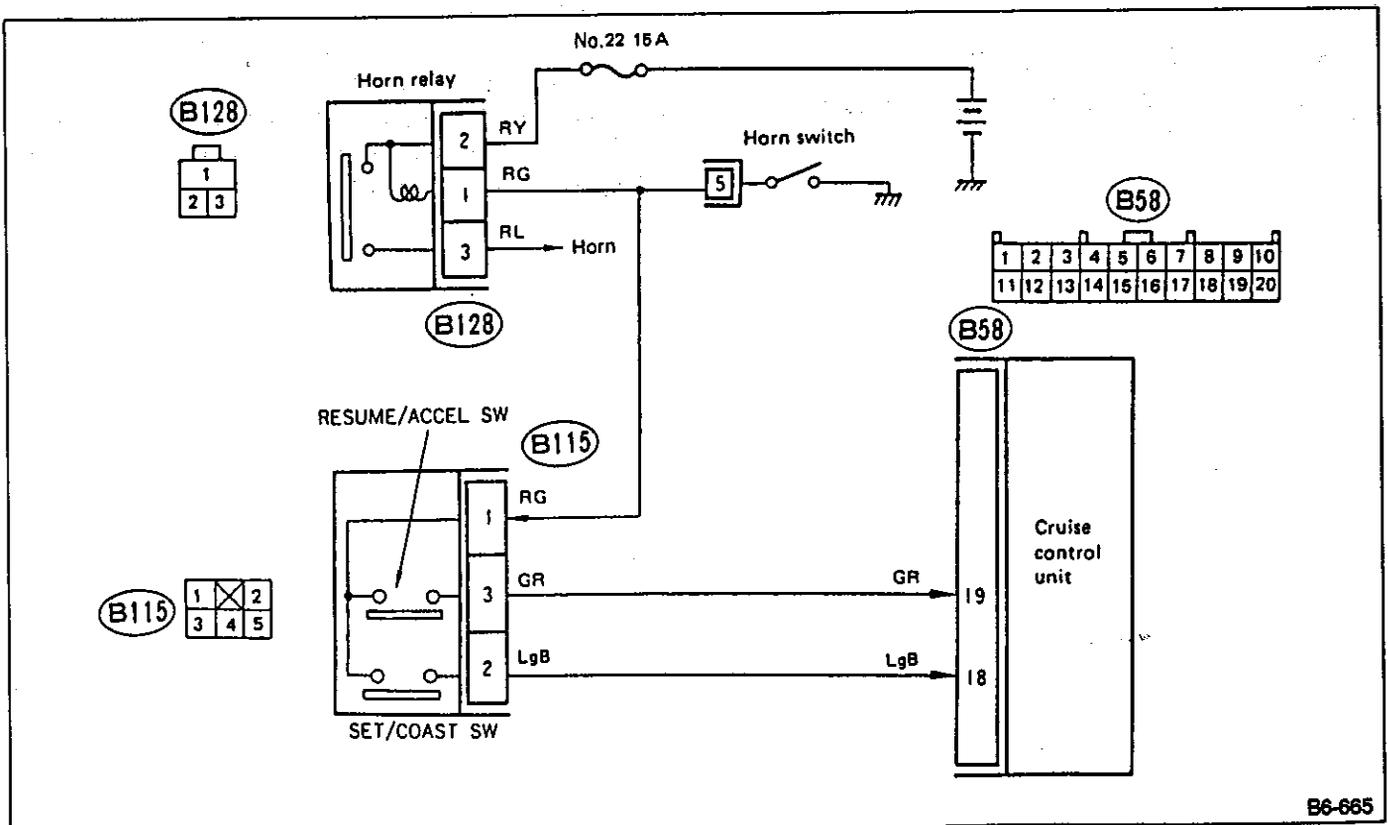
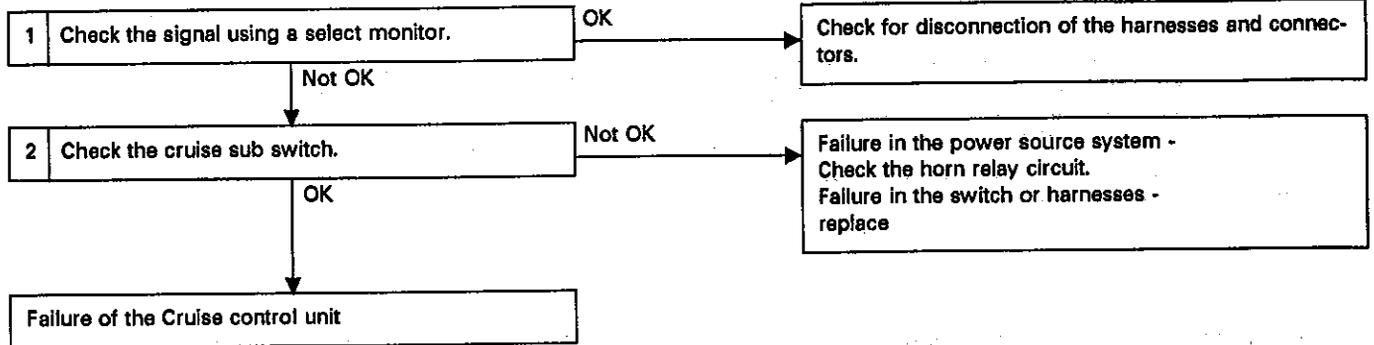


Fig. 159

**1. CHECK WITH SELECT MONITOR.**

● Measuring condition: Turn ON the ignition switch and cruise main switch.

Operation of the function keys: **F** **A** **O** **ENT**

When pushing the SET SW:

**1** The LED goes out - lights

When pushing the RES SW:

**2** The LED goes out - lights

**2. CHECK CRUISE CONTROL SUB SWITCH**

1) Remove horn cover. (Put your finger into slit of cover and pull up.)

2) Separate connector from sub switch. (Use together with horn power supply.)

3) Check voltage between sub switch connector and body.

---

**Connector & Terminal/Specified voltage:**

(B115) No. 1 — Body/10 — 13 V

---

4) Check for harness short circuit between SET/COAST SW, RESUME ACCEL/SW and cruise control unit.

---

**Connector & Terminal/Specified resistance:**

(B115) No. 2 — Body/1 M $\Omega$  min.

(B115) No. 3 — Body/1 M $\Omega$  min.

---

5) Check inner switch of the cruise control sub- switch. Check continuity at switch side connector.

---

**Connector & Terminal:**

(B115) No. 1 — 2 [SET/COAST SWITCH]

(B115) No. 1 — 3 [RESUME/ACCEL SWITCH]

**Specified resistance:**

0  $\Omega$  (Switch ON)

1 M $\Omega$  min. (Switch OFF)

---

**C: TROUBLE CODE 11 — (STOP LIGHT SW, BRAKE SW, INHIBITOR SW AND CLUTCH SW)**

**CONTENT OF DIAGNOSIS:**

- Failure or disconnection of the stop light switch and brake switch.
- Failure or disconnection (AT) of the inhibitor relay and inhibitor switch.
- Failure or disconnection of the clutch relay and clutch switch.

**TROUBLE SYMPTOM:**

The cruise control cannot be set.

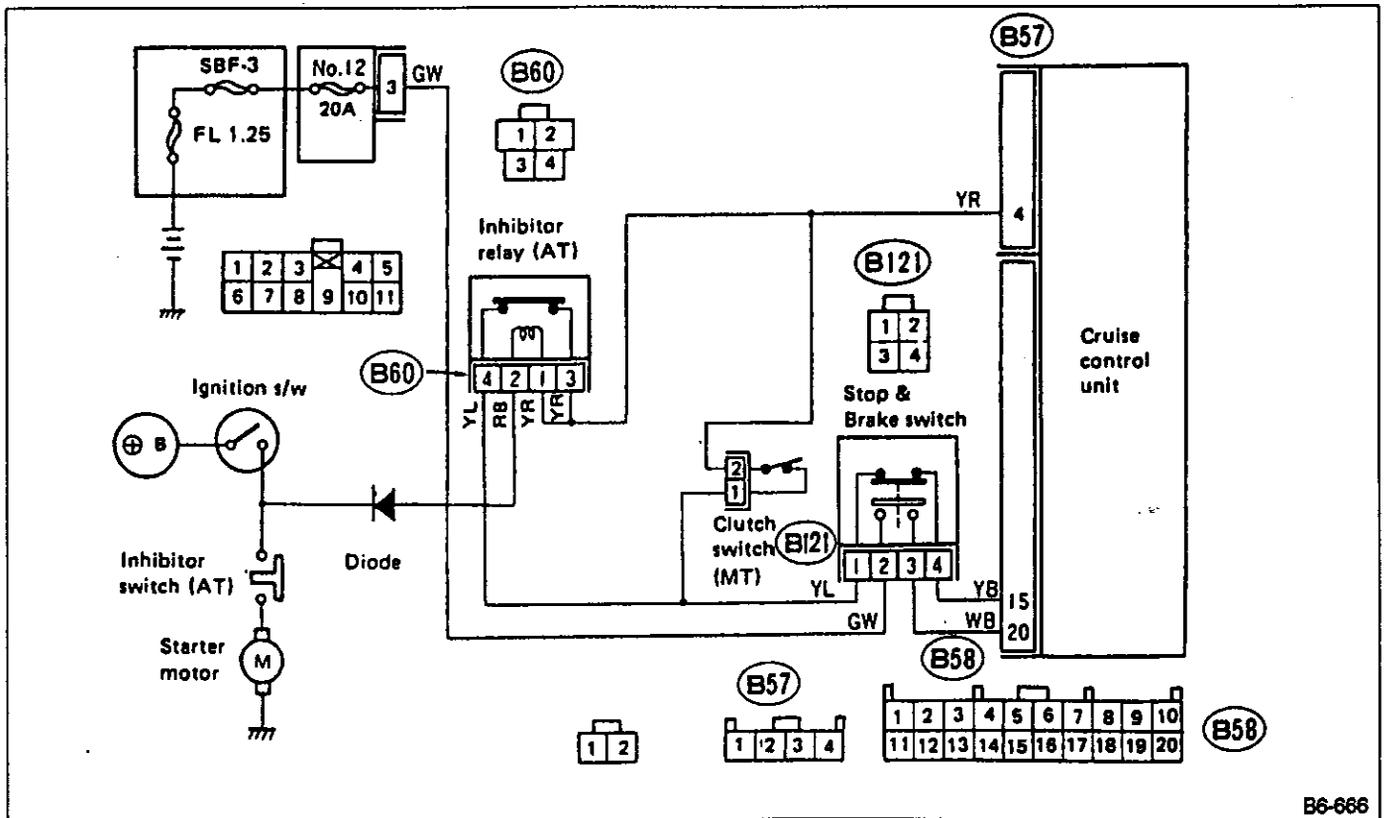
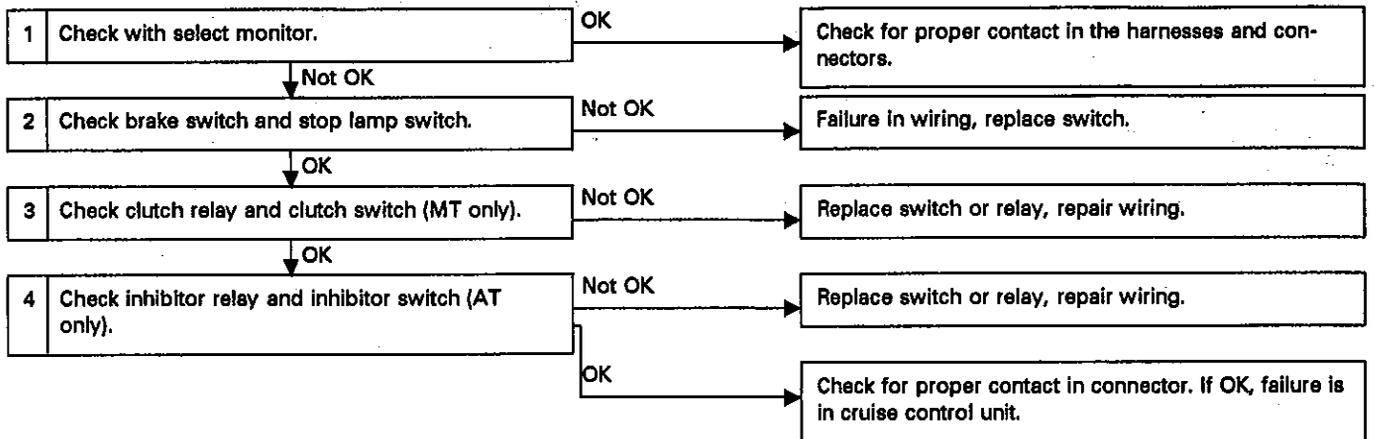


Fig. 160

B6-666

**1. CHECK WITH SELECT MONITOR.**

- Measurement condition: Turn ignition switch ON. Turn cruise main switch ON.
- Operation of the function keys: **F** **A** **O** **ENT**
- 1) When depressing brake pedal (Set in the D range for AT, without depressing clutch pedal for MT)  
Stop light switch:

**4** LED goes out - lights.

Brake switch:

**5** LED goes out - lights.

- 2) When depressing clutch pedal (Clutch relay signal)

**5** LED goes out - lights.

- 3) When setting shift lever in N position (Inhibitor relay signal)

**5** LED goes out - lights.

**2. CHECK BRAKE SWITCH AND STOP LIGHT SWITCH.**

- 1) Remove connector of stop light switch.
- 2) Check circuit between each terminal while depressing brake pedal.

Pedal operation	Brake switch between No. 1-4	Stop light switch between No. 2-3
Depressing the brake pedal	Circuit failure	Circuit normal
Without depressing the brake pedal	Circuit normal	Circuit failure

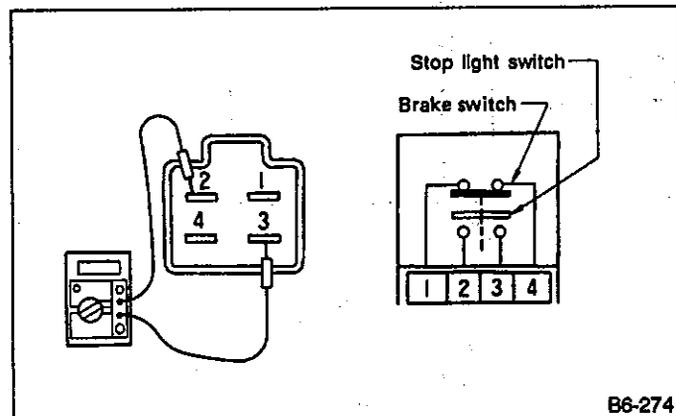


Fig. 161

B6-274

**3. CHECK CLUTCH SWITCH (MT ONLY).**

Check items for the clutch switch (Circuit test between terminals).

**Specified resistance:**

**0 Ω (Switch ON)**

**1 MΩ min. (Switch OFF)**

**4. CHECK INHIBITOR RELAY AND INHIBITOR SWITCH (N RANGE) (AT ONLY).**

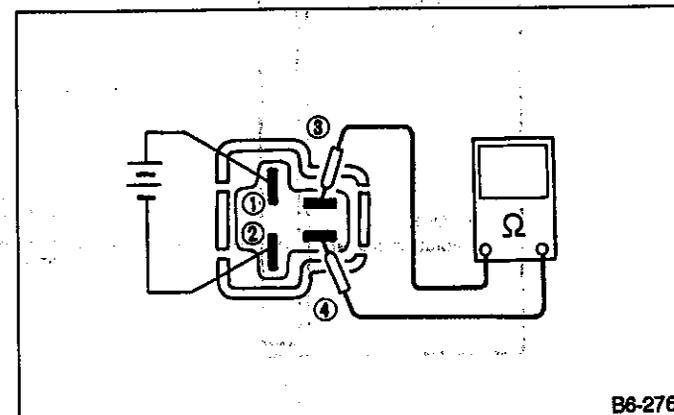
- 1) Check inhibitor relay and inhibitor switch. Turn ignition switch and cruise main switch ON when setting the shift lever to the N position. Operation sounds will be heard when relay contact points are separated.

- 2) Check inhibitor relay.

When applying 12 V power to terminals No. 1 to 2 of inhibitor relay.

**Terminal/Specified resistance:**

**No. 3 — No. 4/1 MΩ min.**



B6-276

Fig. 162

- 3) Item check for inhibitor switch. When engine starts in the N range (the starter rotates), N range contact point of the inhibitor is normal.
- 4) Check the wiring harnesses.

**D: TROUBLE CODE 12 — (FAILURE OF ENGINE REVOLUTION INPUT SIGNAL)**

**CONTENT OF DIAGNOSIS:**  
Short circuit of engine revolution input signal from MPFI control unit

**TROUBLE SYMPTOM:**  
Cruise control cannot be set. (Canceled immediately)

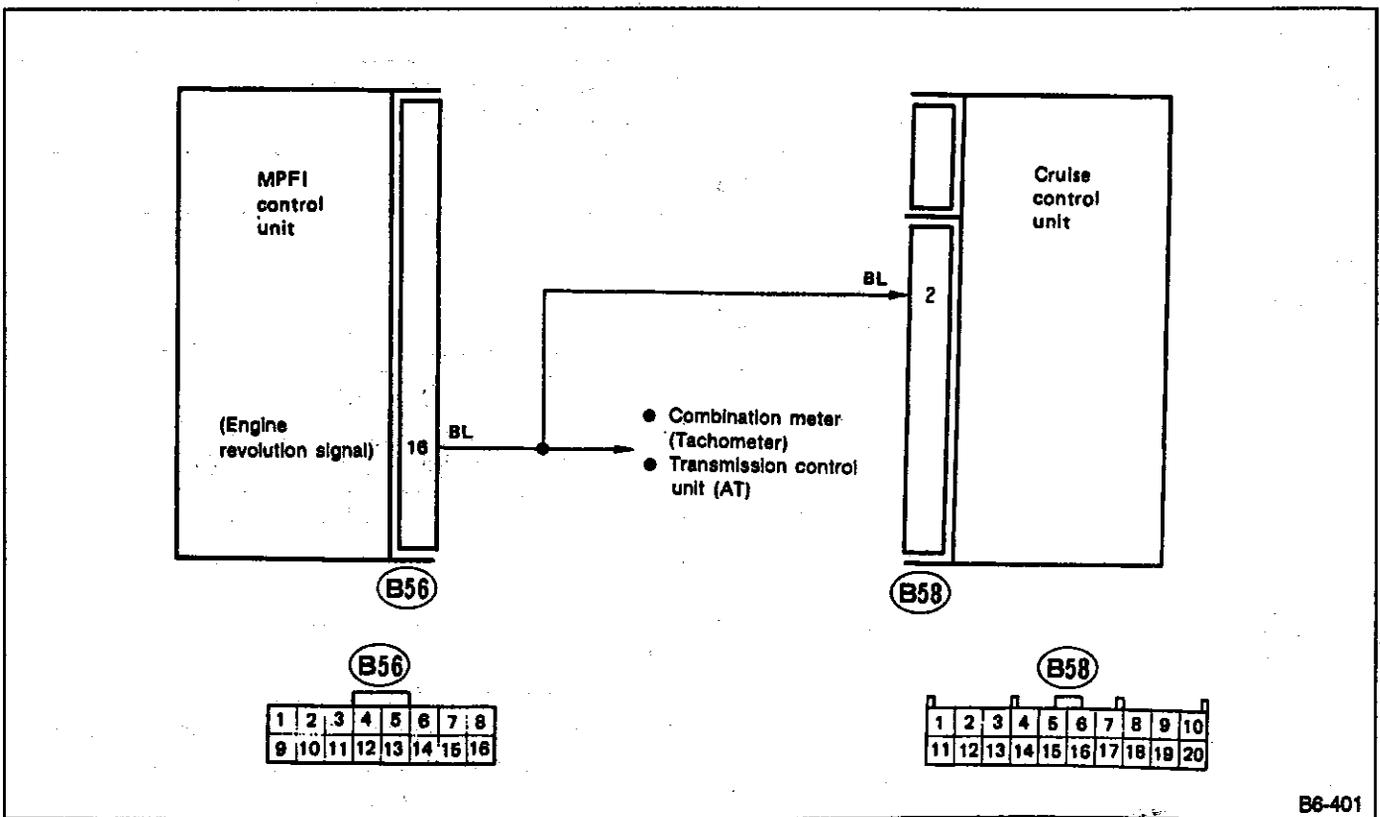
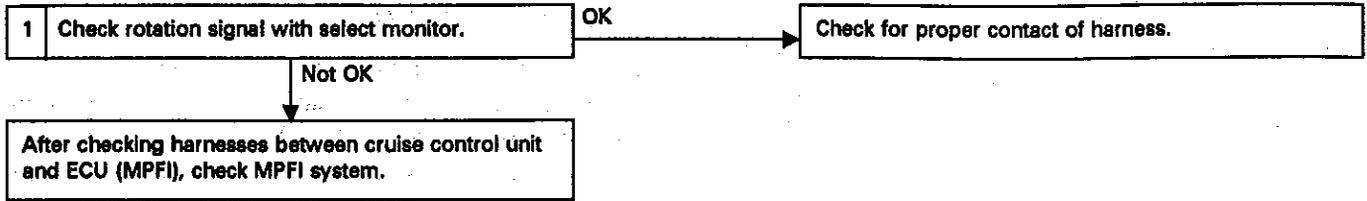


Fig. 163

B6-401

**1. CHECK WITH SELECT MONITOR.**

- Measurement condition: idling or 2000 rpm

EREV F03  
2000 rpm

- Operation of function keys : **F** **0** **3** **ENT**

---

**Standard value:  $\pm 100$  rpm**

---

**Reference: Indicated value for disconnection or short circuit: 0 — 1 km/h**

**E: TROUBLE CODE 13 AND 24 — MALFUNCTION IN SPEED SENSOR SYSTEM**

**CONTENT OF DIAGNOSIS:**  
 Disconnection or short circuit of speed sensor

**TROUBLE SYMPTOM:**  
 Cruise control cannot be set. (Canceled immediately)

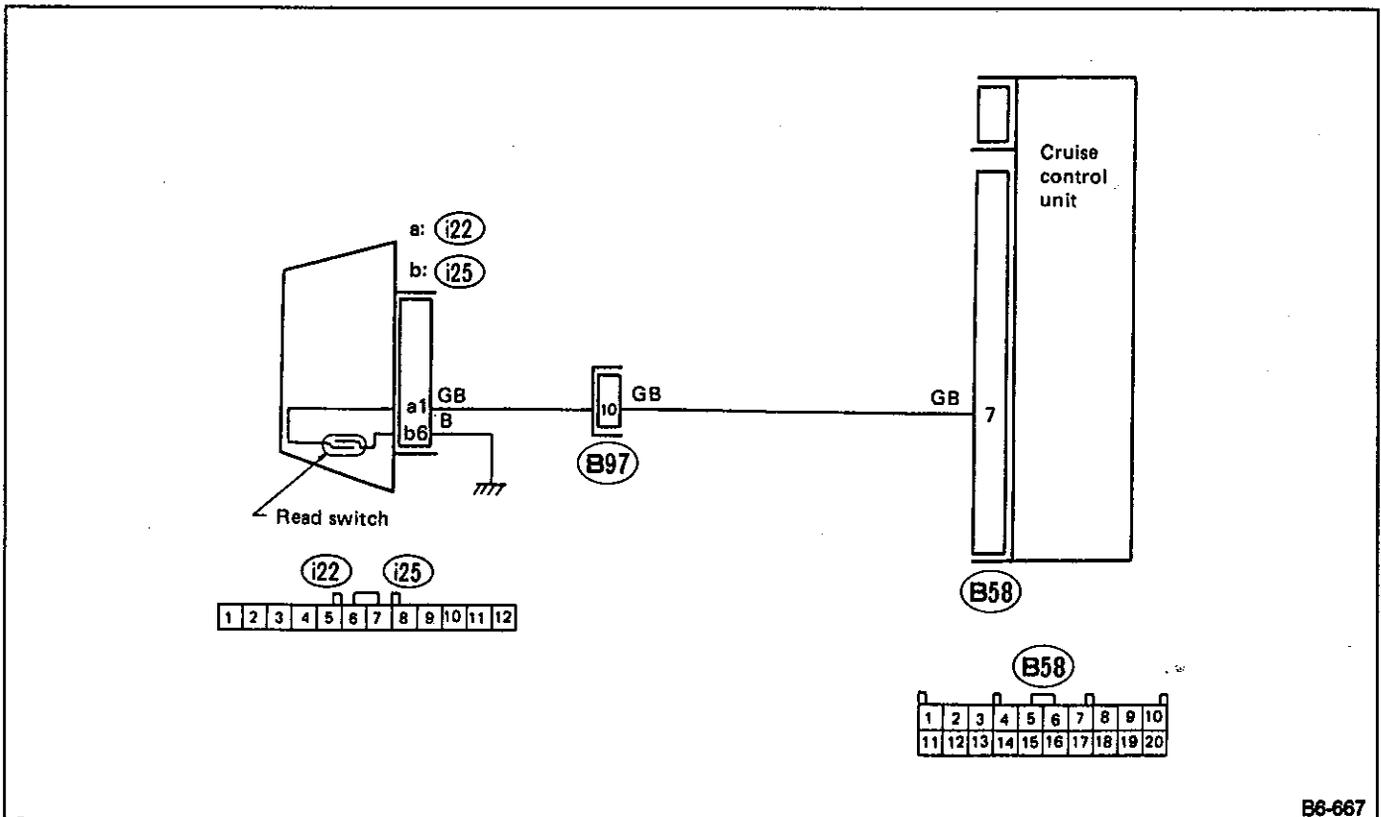
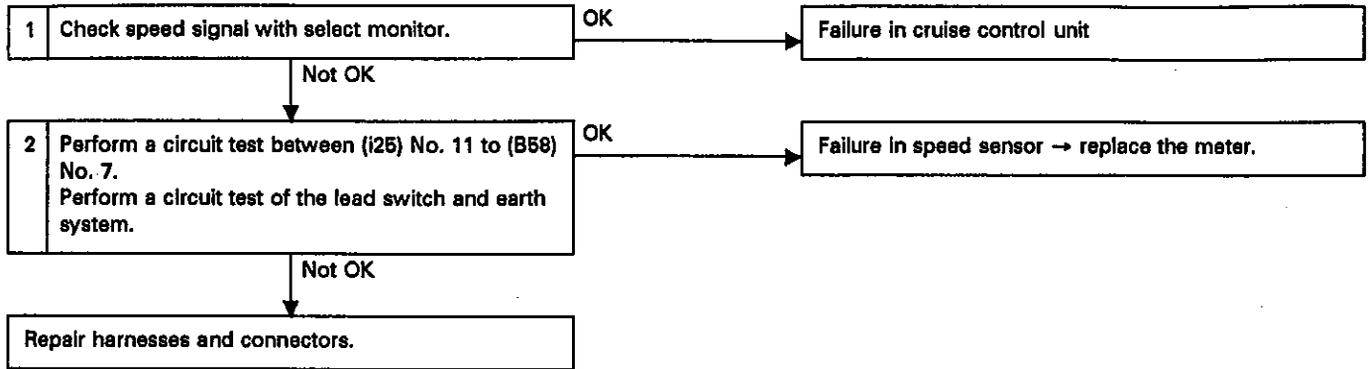


Fig. 164

B6-667

**1. CHECK VEHICLE SPEED SIGNAL WITH SELECT MONITOR.**

- Driving condition: Running at speed greater than 40 km/h (25 MPH)

VSP (F02) 90 km/h
----------------------

- Operation of the function keys: **F** **0** **2** **ENT**

Standard value:  $\pm 16$  km/h ( $\pm 10$  MPH)

**Reference:**

- When there is a failure in the meter cable or the speed sensor, the indicated value of the meter will be incorrect.
- When there is a disconnection or short circuit in the harness between the meter and the cruise control unit, the indicated value will be 0 — 1 km/h.

**2. CIRCUIT TEST FOR EACH HARNESSSES**

- 1) Separate connectors from combination meter and cruise control unit.
- 2) Perform a circuit test in the harnesses.

**Connector & Terminal/Specified resistance:**  
(i25) No. 11 — (B58) No. 7/1  $\Omega$  max.

**F: TROUBLE CODE 14 — (SIMULTANEOUSLY INPUT SIGNALS OF SET/COAST AND RESUME/ACCEL SW)**

**CONTENT OF DIAGNOSIS:**  
Short circuit inside the SET/SW and RESUME SW

**TRouble SYMPTOM:**  
● Cruise control cannot be set.  
● Canceled immediately.

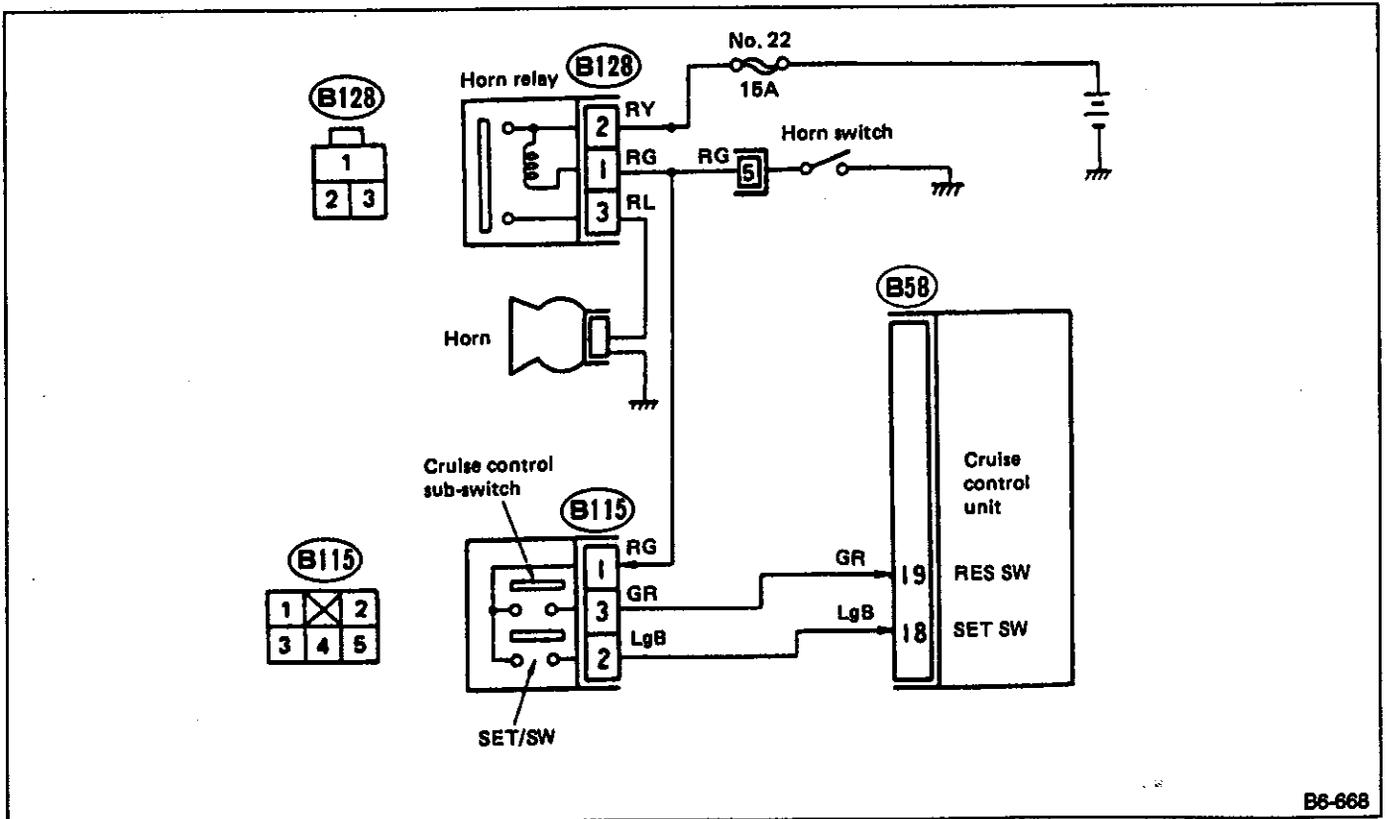
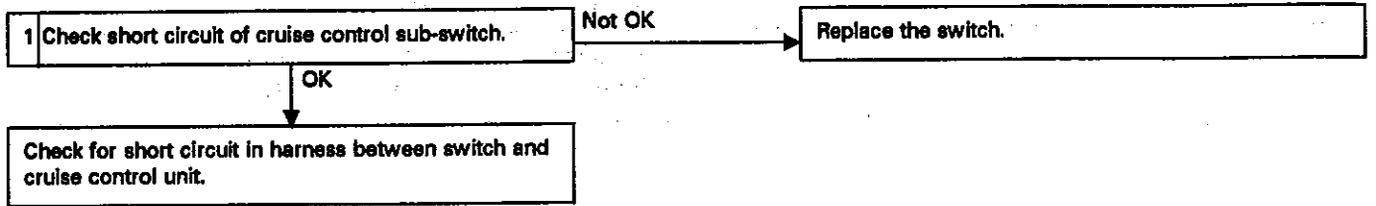


Fig. 165

B6-668

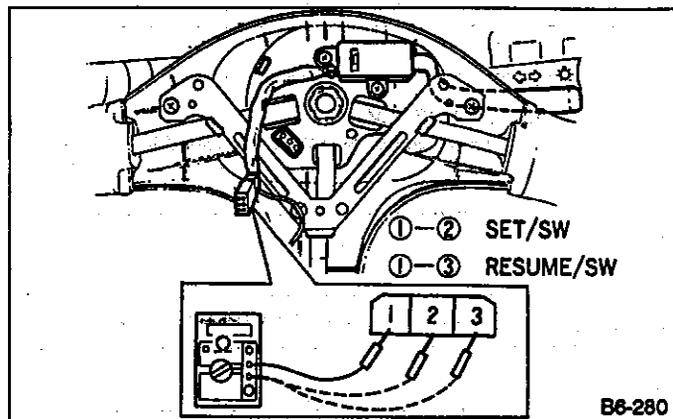
**1. CHECK FOR SHORT CIRCUIT OF CRUISE CONTROL SUB SWITCH.**

Fig. 166

- 1) Separate connector of cruise control sub switch.
- 2) Perform a circuit test between each of terminals while pushing the SET/SW.

Measure resistance between each terminal of cruise control sub switch.

**Terminal/Specified resistance:**

No. 1 — No. 2/0 Ω (SET switch ON)

No. 1 — No. 3/0 Ω (RESUME switch ON)

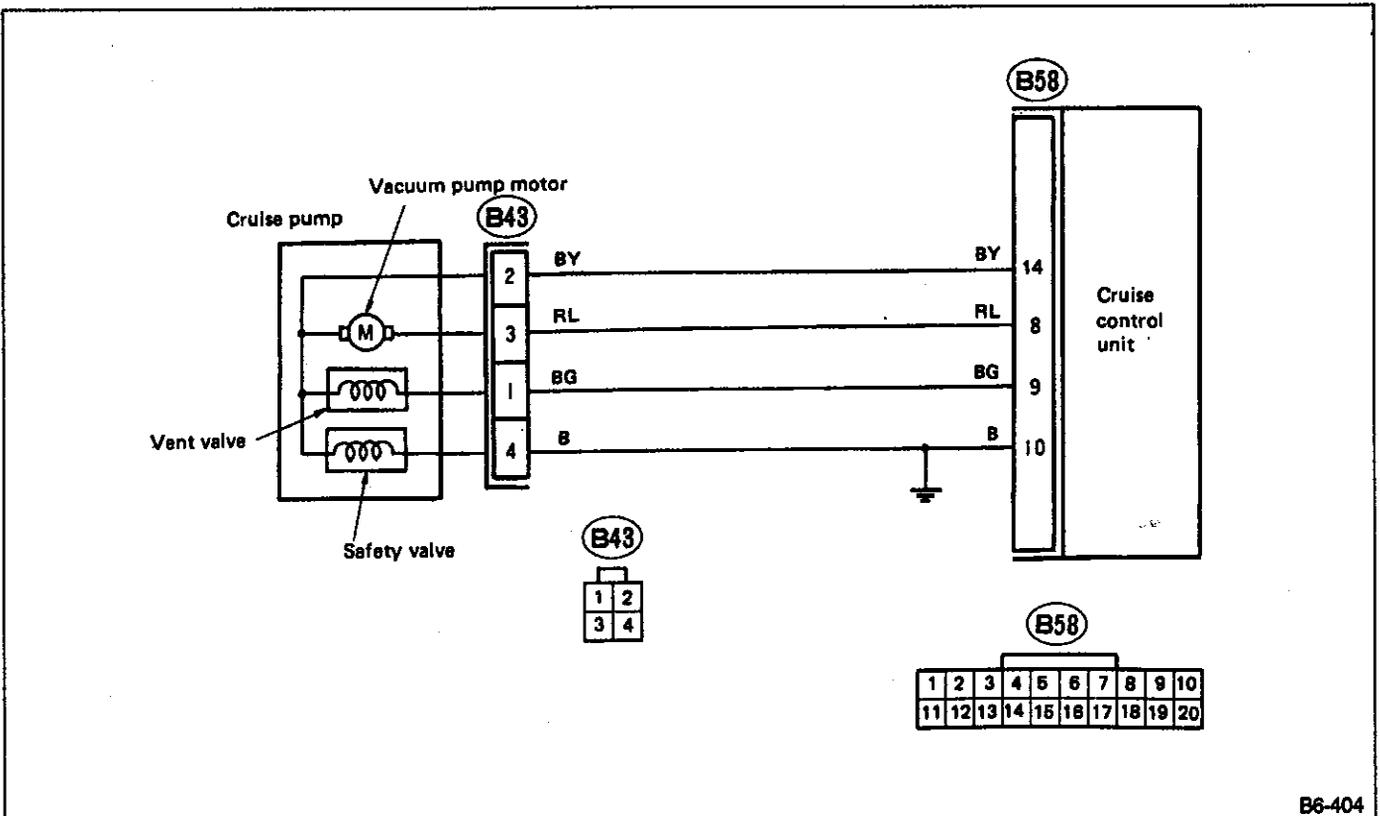
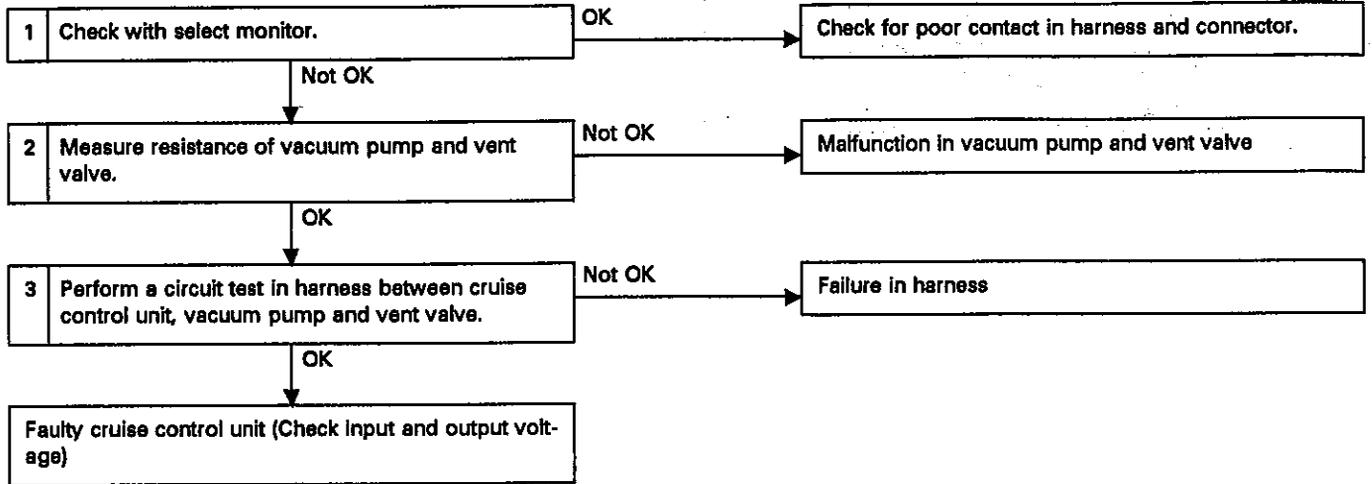
**G: TROUBLE CODE 21 AND 22 — (MALFUNCTION IN CRUISE VACUUM PUMP AND VENT VALVE)**

**CONTENT OF DIAGNOSIS:**

Open or poor contact of the vacuum pump motor and vent valve

**TROUBLE SYMPTOM:**

Cruise control cannot be set. (Or canceled immediately)



B6-404

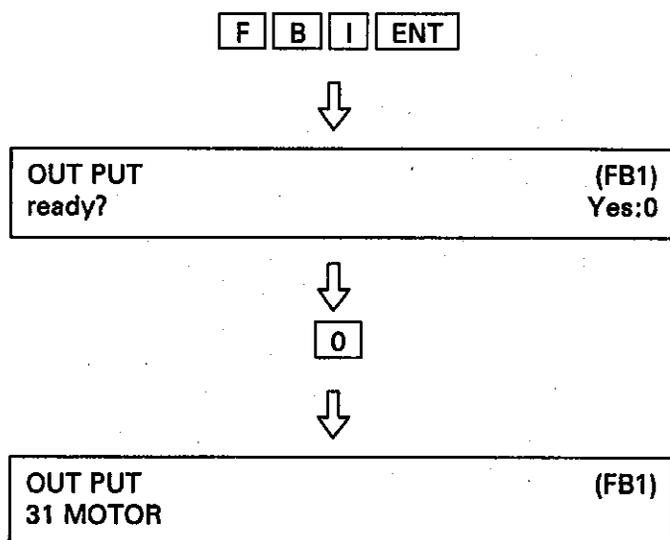
Fig. 167

**1. CHECK WITH SELECT MONITOR.**

- 1) Turn engine OFF.
- 2) Connect select monitor.
- 3) Turn ignition switch ON (the engine is OFF) and turn cruise control main switch ON.
- 4) Operation of function keys: **F B 1 ENT**
- 5) Confirm that the select lever is set in any other than the P, N range for the AT, and without depressing the clutch for the MT, then depress the 0 key.

The code number of the failing parts will be indicated.

"Failure of the 31 MOTOR" will be indicated when setting in the P, N range (when depressing the clutch for MT). In this case, turn OFF the cruise main switch once, then turn it ON again and perform the same procedure.



Normal: Code (10)

Reference Code No. of malfunction

- Open or short circuit in vacuum motor and harness ..... 31
- Open or short circuit in valve and harness ..... 32
- Faulty valve drive circuit in cruise control unit . 34
- Faulty motor drive circuit in cruise control unit . 35
- Built-in relay of cruise control unit is stuck ..... 33

**2. MEASUREMENT OF COIL RESISTANCE IN VACUUM PUMP AND VENT VALVE**

- 1) Separate the connector.
- 2) Measure the resistance value of the vacuum pump and vent valve. (Range  $\Omega \times 1$ )

**Terminal/Specified resistance:**  
 No. 2 — No. 3/100 — 110  $\Omega$   
 No. 2 — No. 1/Approx. 53  $\Omega$   
 No. 2 — No. 4/Approx. 53  $\Omega$

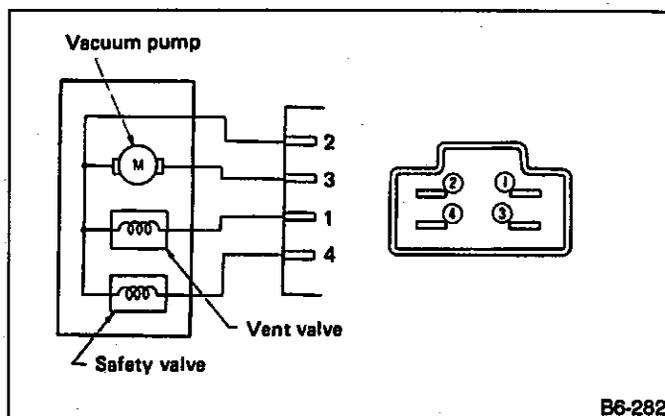


Fig. 168

**3. CIRCUIT TEST IN HARNESS BETWEEN CRUISE CONTROL UNIT AND VACUUM MOTOR**

- 1) Separate both sides of connectors.
- 2) Perform a circuit test between each of the harnesses.

**Connector & Terminal/Specified resistance:**  
 (B58) No. 14 — (B43) No. 2/1  $\Omega$  max.  
 (B58) No. 8 — (B43) No. 3/1  $\Omega$  max.

**H: TROUBLE CODE 23 — MALFUNCTION IN BUILT-IN RELAY OF CRUISE CONTROL UNIT**

**CONTENT OF DIAGNOSIS:**  
Welding of built-in relay of cruise control unit

**TROUBLE SYMPTOM:**  
Cruise canceling function does not operate, but fuel- safe function operates.

Perform real time diagnosis (FB1 mode) with select monitor, and replace cruise control unit when TROUBLE CODE 33 is indicated.

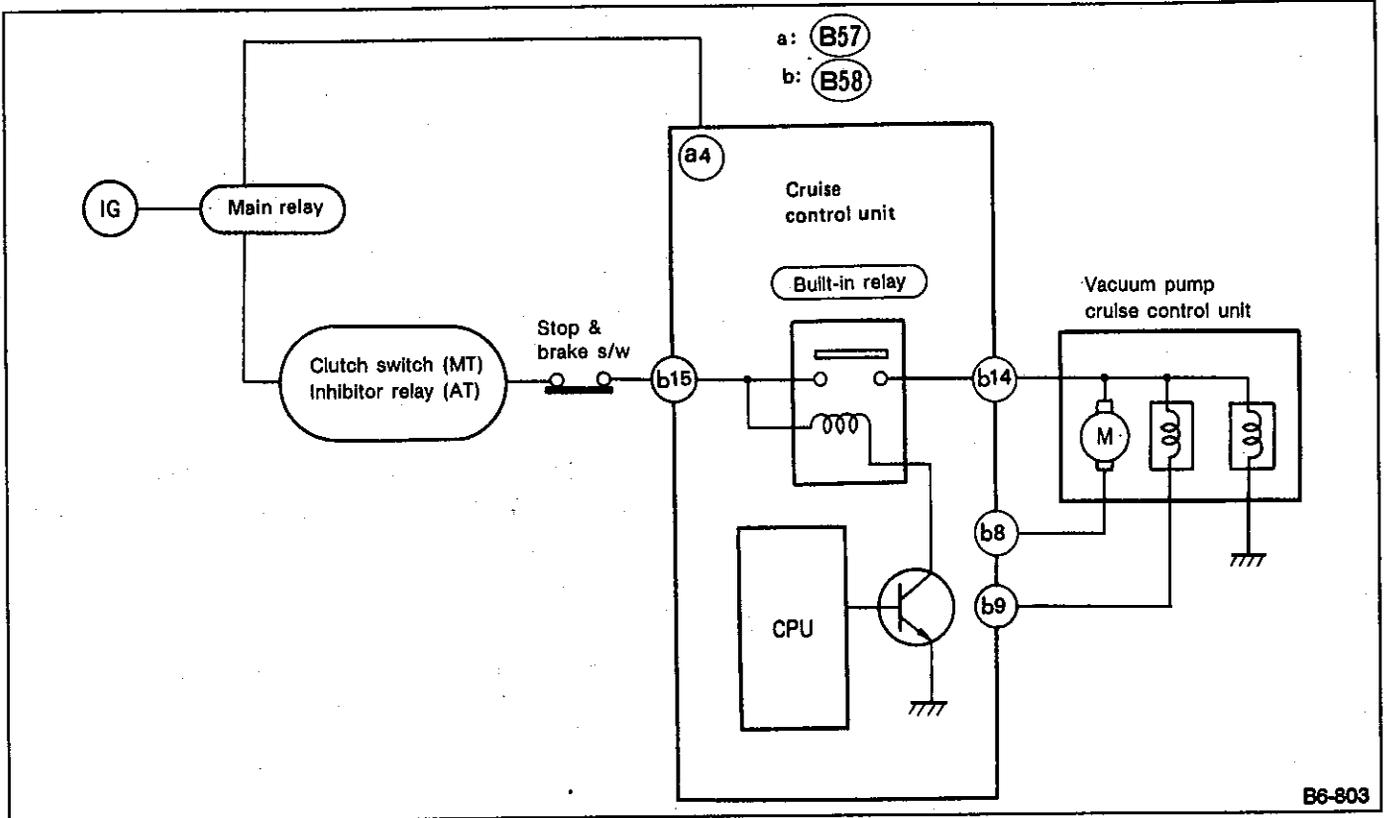
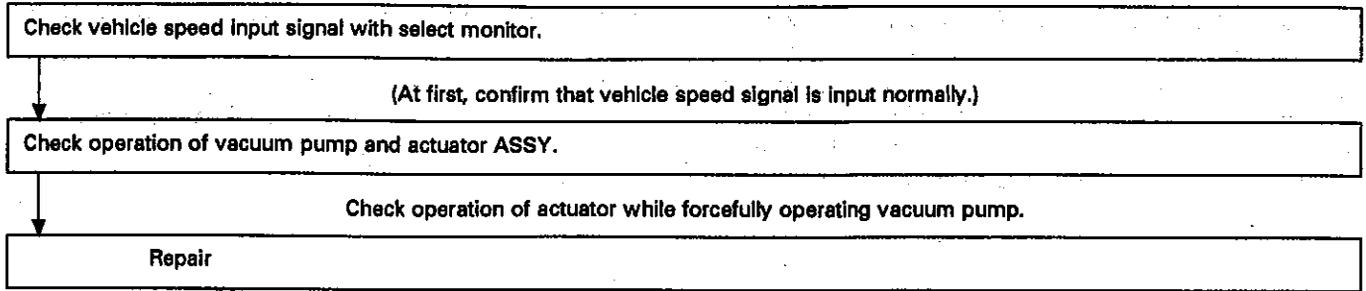


Fig. 169

## 6. Trouble Chart C

When not running at a fixed speed.



### A: CHECK OPERATION OF VACUUM PUMP AND ACTUATOR ASSY

**CONTENT OF DIAGNOSIS:**  
Sticking of air leaves of vacuum pump and actuator, or sticking of valve and actuator diaphragm

**TROUBLE SYMPTOM:**  
Cannot run at set speed  $\pm 3$  km/h ( $\pm 2$  MPH).

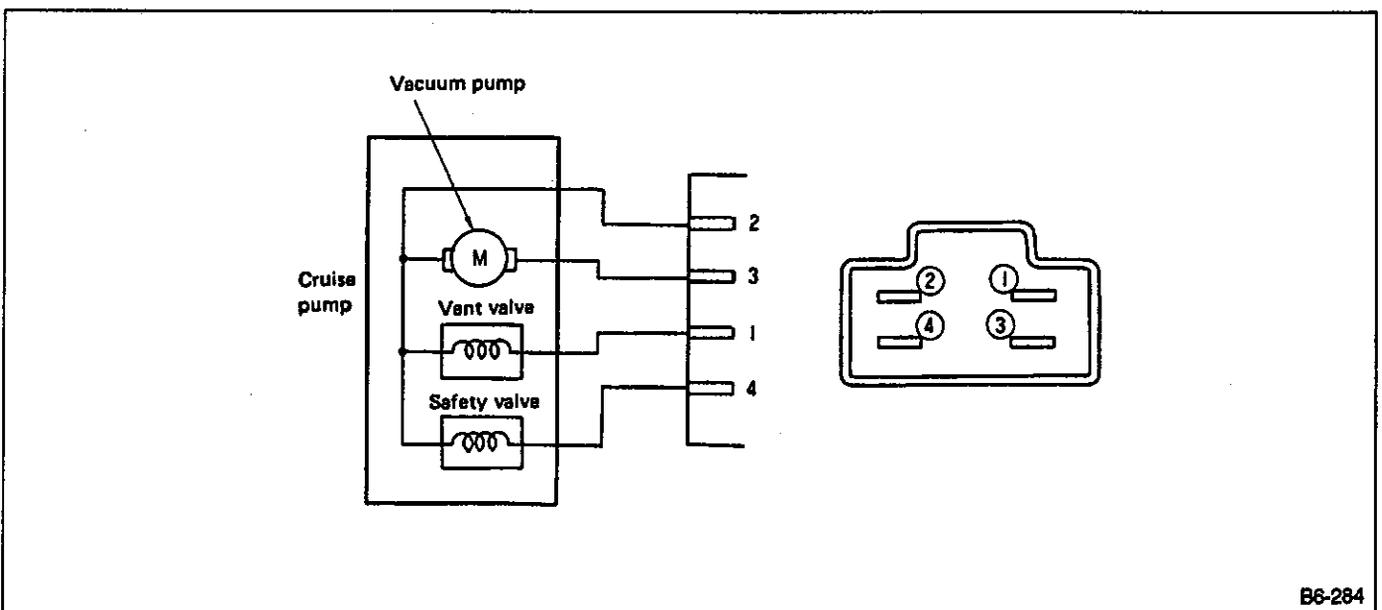
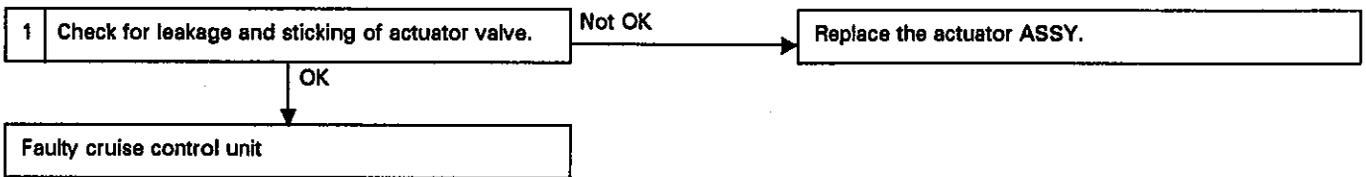


Fig. 170

B6-284

**1. CHECK FOR LEAKAGE AND STICKING OF ACTUATOR VALVE.**

- 1) Separate connector from vacuum pump.
  - 2) Check for leakage of valve. (Perform this check when engine is OFF.)
- Apply battery voltage (+) to cruise vacuum pump connector No. 2, and connect No. 1 and No. 4 to ground. After connecting No. 3 to ground, throttle vehicle should be fully opened within 3 seconds.

In case it closes too late: valve leakage

3) Check for sticking of valve.

Remove battery power source from No. 2.

After removing, throttle valve should be fully closed within 3 seconds.

In case it closes too late: valve sticking

: sticking of the actuator diaphragm

**SUBARU®**

**1992**

**SERVICE  
MANUAL**



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# 1. General Description

## 1. HOW TO USE THIS MANUAL

The description of the electrical system is divided into the charging system, starting system, etc.

1. First, open to the necessary electrical system section and wiring diagram.

2. Next, open the foldout page of the S.M.J. (super Multiple Junction) and that of the electrical wiring diagram. The S.M.J.'s terminal position is given, and by observing the electrical wiring harness' illustrations (front, instrument panel, etc.), the wiring diagram connector can be located.

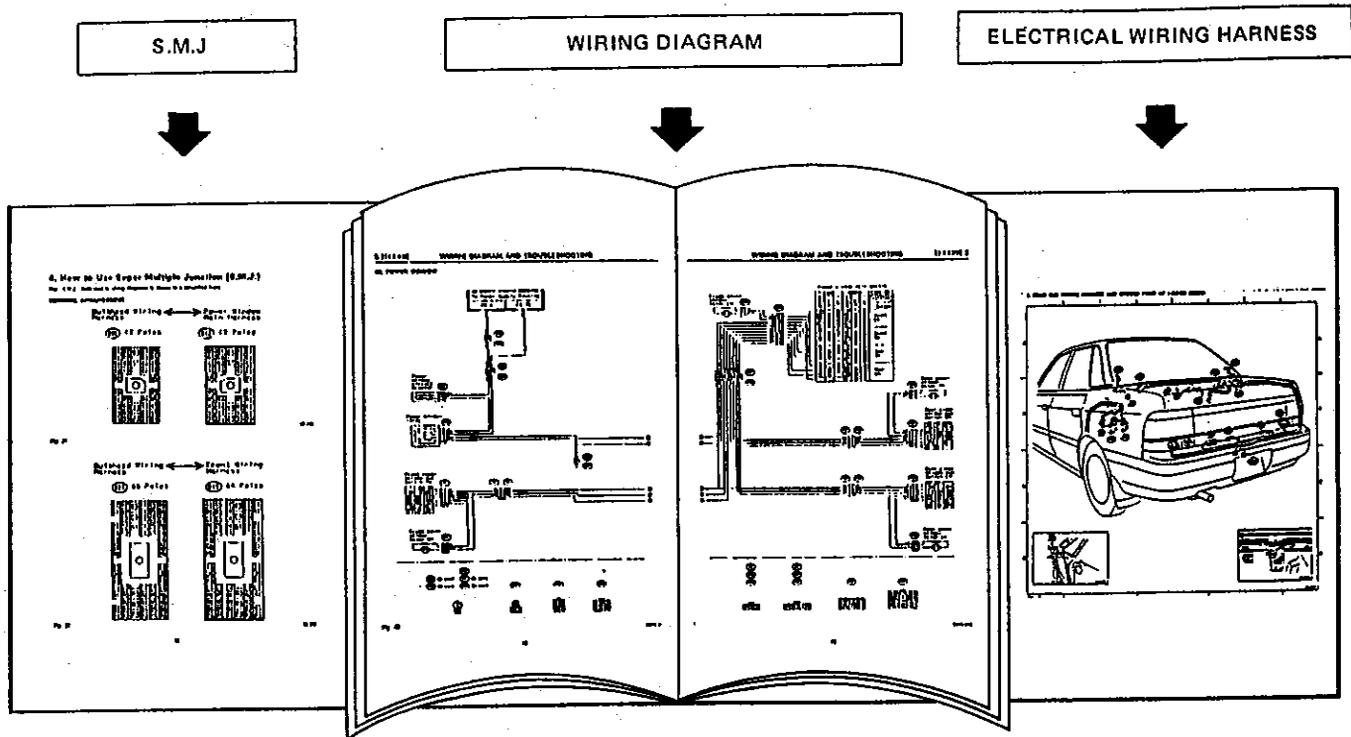


Fig. 1

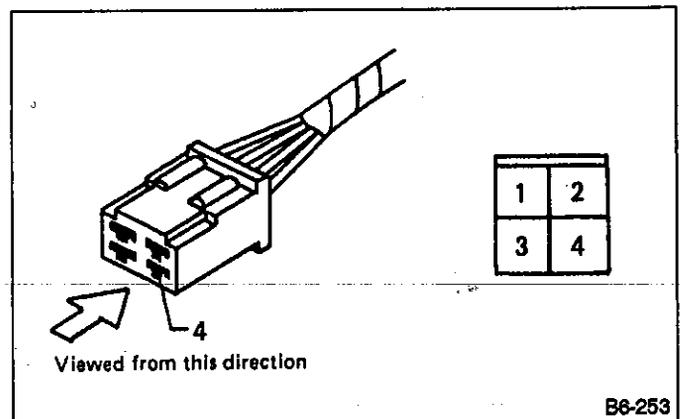
B6-240

## 2. WIRING DIAGRAM

The wiring diagram of each system is illustrated so that you can understand the path through which the electric current flows from the battery.

Sketches and codes are used in the diagrams. They should read as follows:

1) Each connector and its terminal position are indicated by a sketch of the connector in a disconnected state which is viewed from the front, as shown in figure.



B6-253

Fig. 2

2) The number of poles or pins, presence of a lock, and pin number of each terminal are indicated in the sketch of each connector.

In the sketch, the highest pole number refers to the number of poles which the connector has. For example, the sketch of the connector shown in Figure 3 indicates the connector has 9 poles.

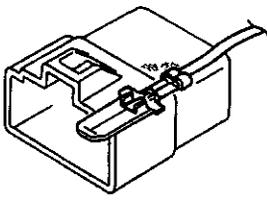
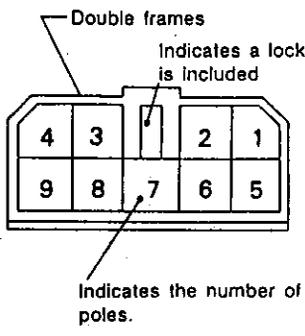
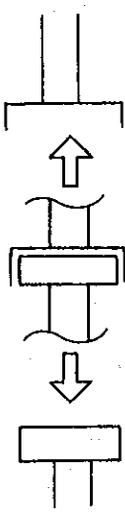
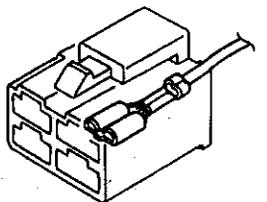
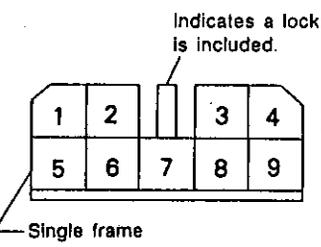
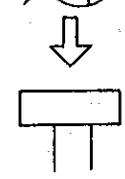
Connector used in vehicle	Connector shown in wiring diagram		
	Sketch	Symbol	Number of poles
			Numbered in order from upper right to lower left.
			Numbered in order from upper left to lower right.

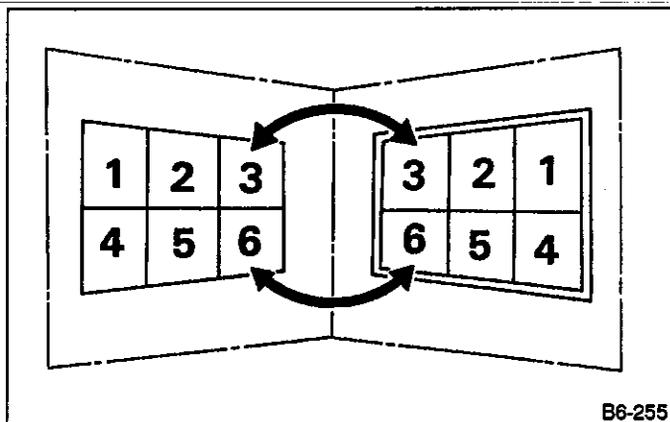
Fig. 3

B6-254

When one set of connectors is viewed from the front side, the pole numbers of one connector are symmetrical to those of the other. When these two connectors are connected as a unit, the poles which have the same number are joined.

3) Electrical wiring harness

The connectors are numbered along with the number of poles, external colors, and mating connections in the accompanying list.



B6-255

Fig. 4

4) The sketch of each connector in the wiring diagram usually shows the "A" side of the connector. The relationship between the wire color, terminal number and connector is described below.

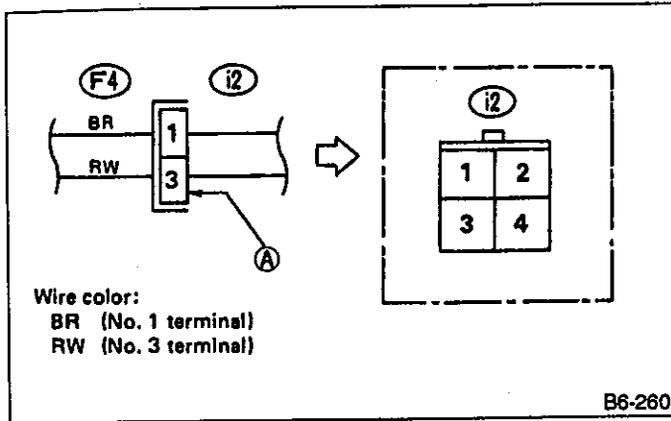


Fig. 5

A wire which runs in one direction from a connector terminal sometimes may have a different color from that which runs in the other direction from that terminal.

5) In wiring diagram, connectors which have no terminal number refer to one-pole types. Sketches of these connectors are omitted intentionally.

6) The following color codes are used to indicate the colors of the wires used.

Color code	Color
L	Blue
B	Black
Y	Yellow
G	Green
R	Red
W	White
Br	Brown
Lg	Light green
Gr	Gray
P	Pink
Or	Orange
Lb	Light Blue
SA	Sealed (Inner)
SB	Sealed (Outer)

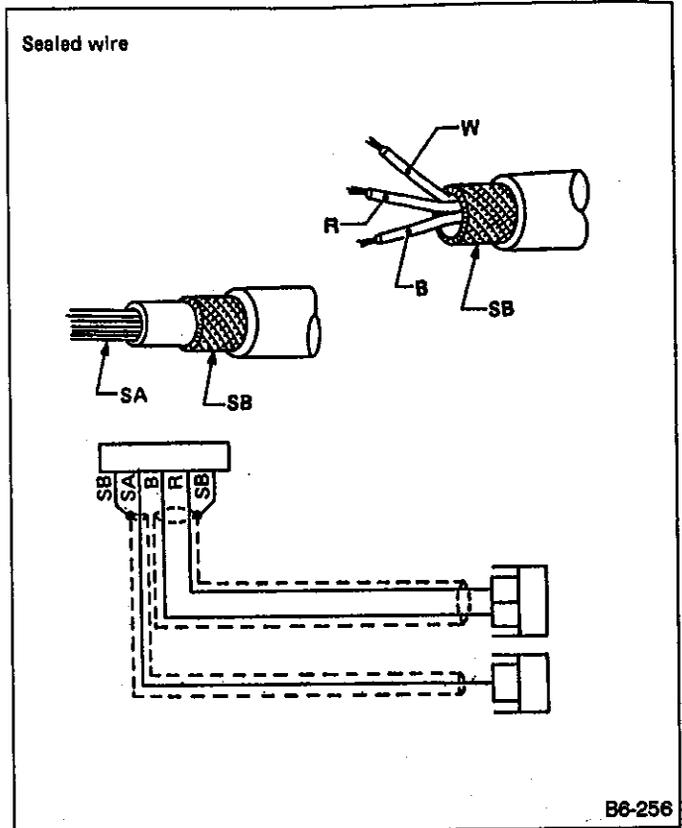


Fig. 6

7) The wire color code, which consists of two letters (or three letters including Br or Lg), indicates the standard color (base color of the wire covering) by its first letter and the stripe marking by its second letter.

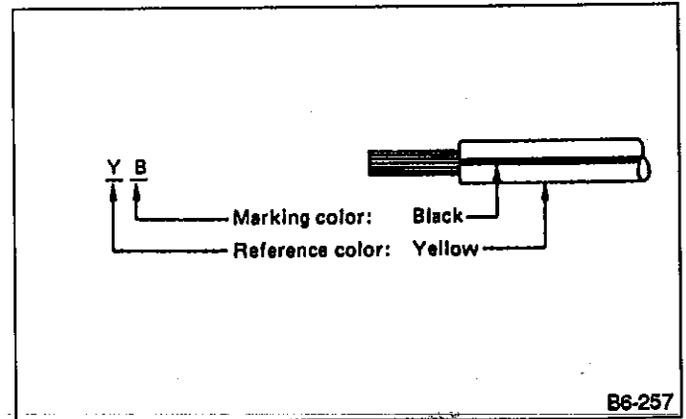


Fig. 7

8) The table below lists the nominal sectional areas and allowable currents of the wires.

The ground points shown in the wiring diagram refer to the following:

- (GB) Body ground
- (GE) Engine ground
- (GR) Radio ground
- (GD) Rear defogger ground

All wiring harnesses are provided with a ground point which should be securely connected.

Nominal sectional area mm <sup>2</sup>	No. of strands/strand diameter	Outside diameter of finished wiring mm	Allowable current Amps/40°C
0.3	7/0.28	1.8	7
0.5	7/0.32	2.2 (or 2.0)	12
0.75	30/0.18	2.6 (or 2.4)	16
0.85	11/0.32	2.4 (or 2.2)	16
1.25	16/0.32	2.7 (or 2.5)	21
2	26/0.32	3.1 (or 2.9)	28
3	41/0.32	3.8 (or 3.6)	38
5	65/0.32	4.6 (or 4.4)	51
8	50/0.45	5.5	67

a. The allowable current in the above table indicates the tolerable amperage of each wire at an ambient temperature of 40°C (104°F).

b. The allowable current changes with ambient temperature. Also, it changes if a bundle of more than two wires is used.

c. When replacing or repairing a wire, be sure to use the same size and type of the wire which was originally used.

9) Each unit is directly grounded to the body or indirectly grounds through a harness ground terminal. Different symbols are used in the wiring diagram to identify the two grounding systems.

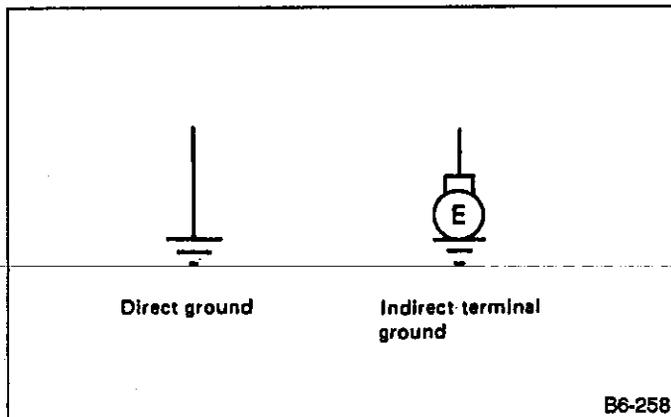


Fig. 8

10) Relays are classified as normally-open or normally-closed.  
 The normally-closed relay has one or more contacts.  
 The wiring diagram shows the relay mode when the energizing circuit is OFF.

Relay type		Energizing circuit OFF	Energizing circuit ON
Normally-open type	4-pole		
	6-pole		
Normally-closed type	4-pole		
Mixed type	5-pole		

B6-243

Fig. 9

Key to symbols:  
 ○ → : Current flows.  
 X → : Current does not flow.

11) Each connector number shown in the wiring diagram corresponds to that in the wiring harness. The location of each connector in the actual vehicle is determined by reading the first character of the connector (for example, a "F" for F8, "i" for i16, etc.) and the type of wiring harness.

The first character of each connector number refers to the area or system of the vehicle, as indicated in table below.

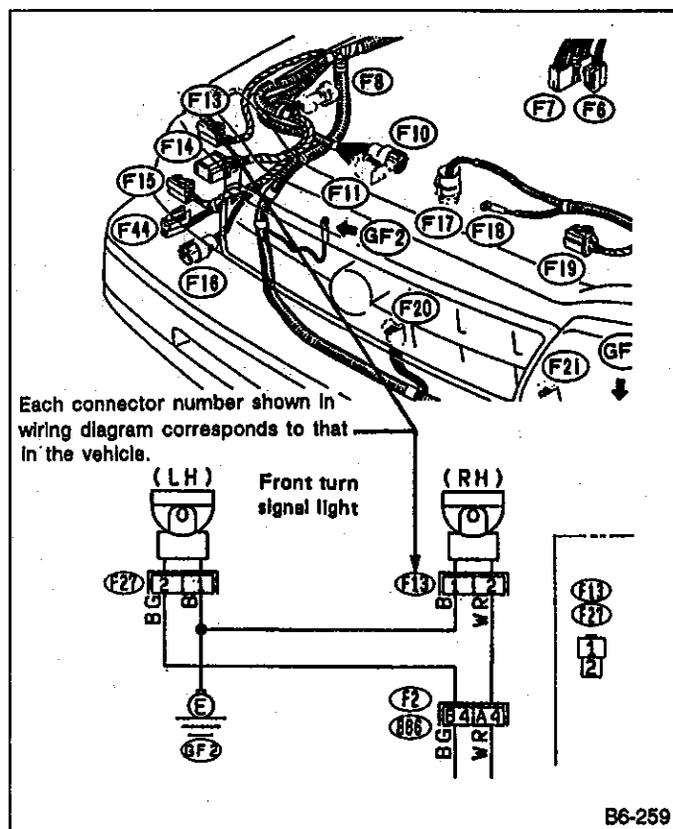


Fig. 10

Symbol	Wiring harness & Cord
F	Front
E	Engine, transmission, etc.
B	Bulkhead
i	Instrument panel
R	Rear & Rear gate
P	Power window & door

**3. TROUBLESHOOTING PROCEDURES**

The most important purpose of troubleshooting is to determine which part is malfunctioning quickly, to save time and labor.

**1. Identification of trouble symptom**

Determine what the problem is based on the symptom.

**2. Probable cause of trouble**

Look at the wiring diagram and check the system's circuit. Then check the switch, relay, fuse, ground, etc.

**3. Location and repair of trouble**

- 1) Using the troubleshooting narrow down the causes.
- 2) If necessary, use a voltmeter, ohmmeter, etc.
- 3) Before replacing certain component parts (switch, relay, etc.), check the power supply, ground, for open wiring harness, poor connectors, etc. If no problems are encountered, check the component parts.

**4. Confirmation of system operation**

After repairing, ensure that the system operates properly.

**4. VOLTAGE MEASUREMENT**

- 1) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal and the positive lead to the connector or component terminal.
- 2) Contact the positive probe of the voltmeter on connector (A). The voltmeter will indicate a voltage.
- 3) Shift the positive probe to connector (B). The voltmeter will indicate no voltage. With test setup held as it is, turn switch ON. The voltmeter will indicate a voltage and, at the same time, the light will come on.
- 4) The circuit is in good order. If a problem such as a lamp failing to light occurs, use the procedures outlined above to track down the malfunction.

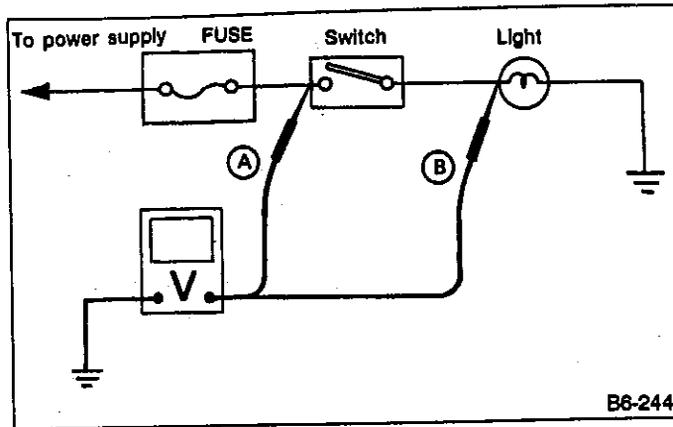


Fig. 11

**5. CIRCUIT CONTINUITY CHECKS**

- 1) Disconnect the battery terminal or connector so there is no voltage between the check points. Contact the two leads of an ohmmeter to each of the check points. If the circuit has diodes, reverse the two leads and check again.
- 2) Use an ohmmeter to check for diode continuity. When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity. When contacting the two leads in reverse, there should be no continuity.

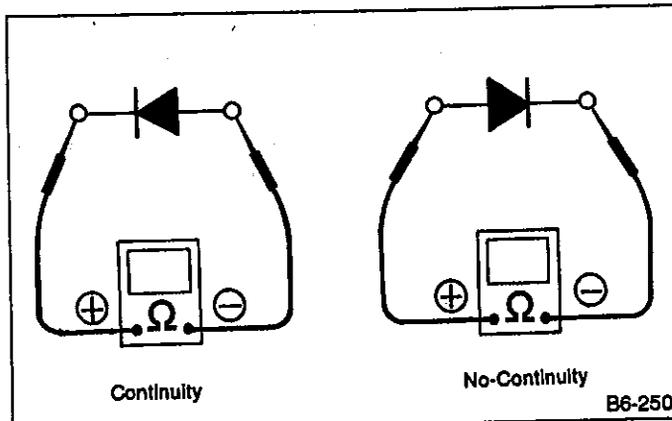


Fig. 12

3) Symbol "o—o" indicates that continuity exists between two points or terminals. For example, when a switch position is "3", continuity exists among terminals 1, 3 and 6, as shown in table below:

Terminal	1	2	3	4	5	6
Switch Position						
OFF						
1	o—o				o—o	o—o
2	o—o			o—o		o—o
3	o—o		o—o			o—o
4	o—o	o—o				o—o

**6. HOW TO DETERMINE AN OPEN CIRCUIT**

1) Voltmeter Method  
 An open circuit is determined by measuring the voltage between respective connectors and ground using a voltmeter, starting with the connector closest to the power supply. The power supply must be turned ON so that current flows in the circuit. If voltage is not present between a particular connector and ground, the circuit between that connector and the previous connector is open.

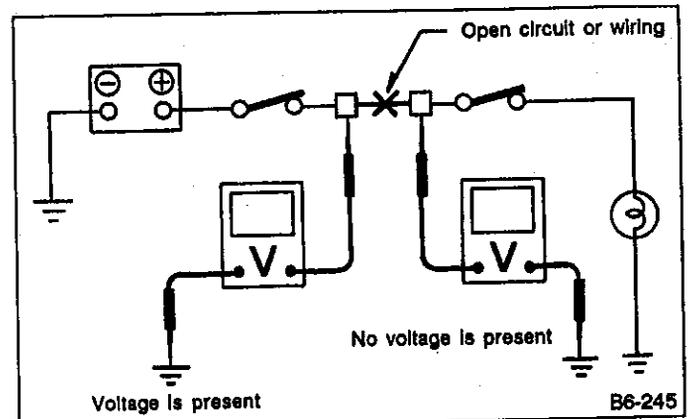


Fig. 13

2) Ohmmeter method

Disconnect all connectors affected, and check continuity in the wiring between adjacent connectors. When the ohmmeter indicates "infinite", the wiring is open.

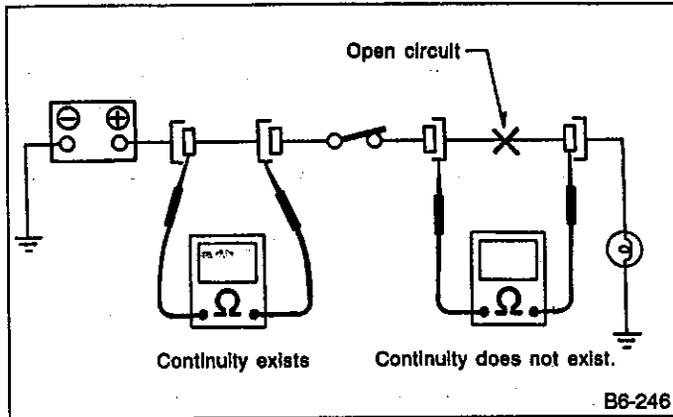


Fig. 14

7. HOW TO DETERMINE A SHORT-CIRCUIT

1) Test lamp method

Connect a test lamp (rated at approximately 3 watts) in place of the blown fuse and allow current to flow through the circuit. Disconnect one connector at a time from the circuit, starting with the one located farthest from the power supply. If the test lamp goes out when a connector is disconnected, the wiring between that connection and the next connector (farther from the power supply) is shorted.

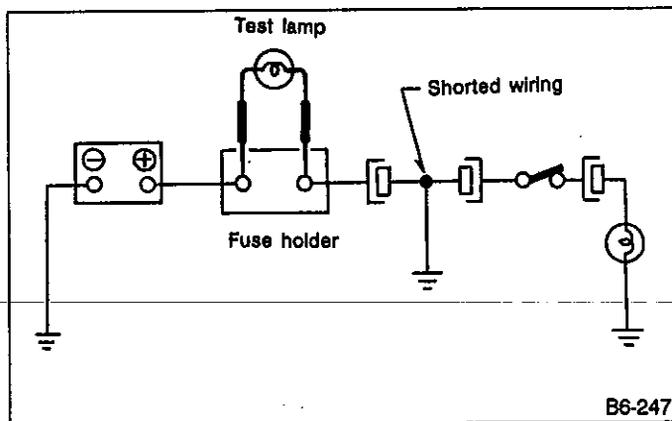


Fig. 15

2) Ohmmeter method

Disconnect all affected connectors, and check continuity between each connector and ground. When ohmmeter indicates continuity between a particular connector and ground, that connector is shorted.

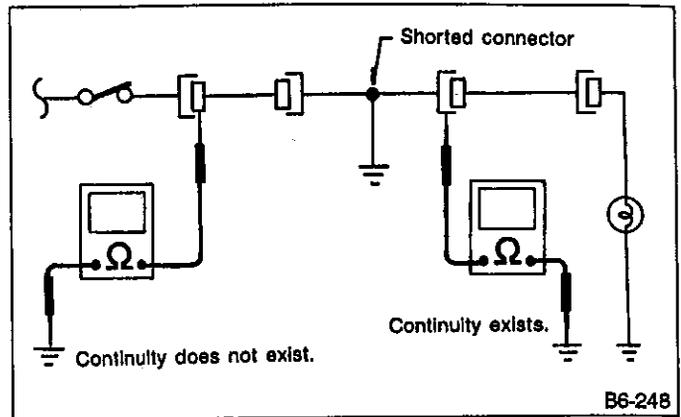


Fig. 16

2. Working Precautions

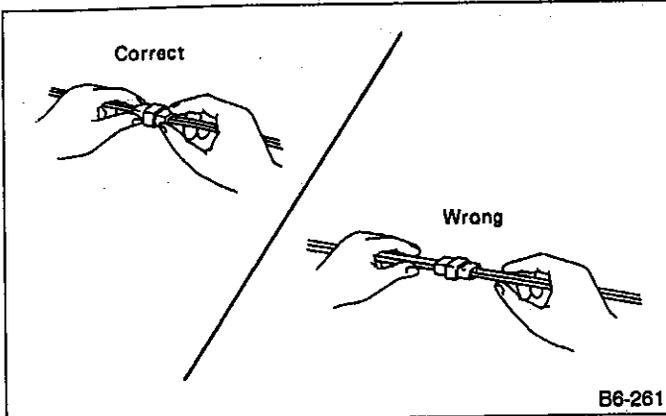
1. PRECAUTIONS WHEN WORKING WITH THE PARTS MOUNTED ON THE VEHICLE

- 1) When working under a vehicle which is jacked up, always be sure to use safety stands.
- 2) The parking brake must always be applied during working. Also, in automatic transmission vehicles, keep the select lever set to the P (Parking) range.
- 3) Be sure the workshop is properly ventilated when running the engine. Further, be careful not to touch the belt or fan while the engine is operating.
- 4) Be careful not to touch hot metal parts, especially the radiator and exhaust system immediately after the engine has been shut off.

2. PRECAUTIONS IN TROUBLE DIAGNOSIS AND REPAIR OF ELECTRIC PARTS

- 1) The battery cable must be disconnected from the battery's (-) terminal, and the ignition switch must be set to the OFF position, unless otherwise required by the troubleshooting.
- 2) Securely fasten the wiring harness with clamps and slips so that the harness does not interfere with the body end parts or edges and bolts or screws.
- 3) When installing parts, be careful not to catch them on the wiring harness.

4) When disconnecting a connector, do not pull the wires, but pull while holding the connector body.

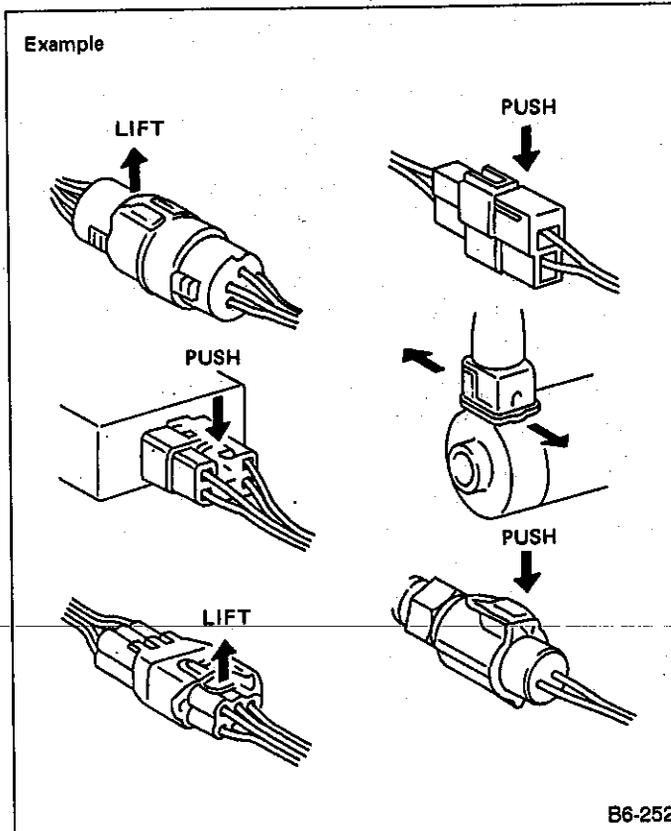


B6-261

Fig. 17

5) Some connectors are provided with a lock. One type of such a connector is disconnected by pushing the lock, and the other, by moving the lock up. In either type the lock shape must be identified before attempting to disconnect the connector.

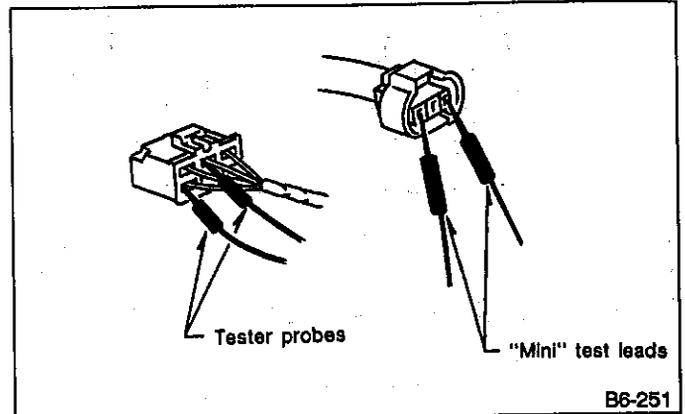
To connect, insert the connector until it snaps and confirm that it is tightly connected.



B6-252

Fig. 18

6) When checking continuity between connector terminals, or measuring voltage across the terminal and ground, always contact tester probe(s) on terminals from the wiring connection side. If the probe is too thick to gain access to the terminal, use "mini" test leads. To check water-proof connectors (which are not accessible from the wiring side), contact test probes on the terminal side being careful not to bend or damage the terminals.



B6-251

Fig. 19

7) Sensors, relays, electrical unit, etc., are sensitive to strong impacts. Handle them with care so that they are not dropped or mishandled.

### 3. How to Use Wiring Diagram

[0300]

**RELAY**  
A symbol used to indicate a relay.

**WIRING CONNECTION**  
Some wiring diagrams are indicated in foldouts for convenience. Wiring destinations are indicated where necessary by corresponding symbols (as when two pages are needed for clear indication), as shown below.

**POWER SUPPLY ROUTING**  
A symbol is used to indicate the power supply in each wiring diagram. "MB-5", "MB-6," etc., which are used as power-supply symbols throughout the text, correspond with those shown in the POWER SUPPLY ROUTING in the wiring diagram. Accordingly, using the POWER SUPPLY ROUTING and wiring diagrams permits service personnel to understand the entire electrical arrangement of a system.

**FUSE NO. & RATING**  
The "FUSE NO. & RATING" corresponds with that used in the fuse box (main fuse box, fuse and joint box).

**SYMBOLS OF WIRE CONNECTION AND CROSSING**

Symbol  Refers to wires which are connected and branched at the "dot" point.

Symbol  Refers to wires which are crossed but not connected.

**CONNECTOR**

1. Each connector is indicated by a symbol.
2. Each terminal number is indicated in the corresponding wiring diagram in an abbreviated form.
3. For example, terminal number "C2" refers to No. 2 terminal of connector (C:F41) shown in the connector sketch.

**SYMBOLS AND ABBREVIATIONS**  
A number of symbols and abbreviations are used in each wiring diagram to easily identify parts or circuits. < Refer to Abbreviation List >

**CONNECTOR SKETCH**

1. Each connector sketch clearly identifies the shape and color of a connector as well as terminal locations. Non-colored connectors are indicated in natural color.
2. When more than two types of connector number are indicated in a connector sketch, it means that the same type connectors are used.

**S.M.J.**  
A symbol is used to indicate the terminal arrangement of the super multiple junction. The S.M.J. is not shown in respective wiring diagrams but is indicated on the next page.

**DIODE**  
A symbol is used to indicate a diode.

**GROUND**  
Each grounding point can be located easily by referring to the corresponding wiring harness.

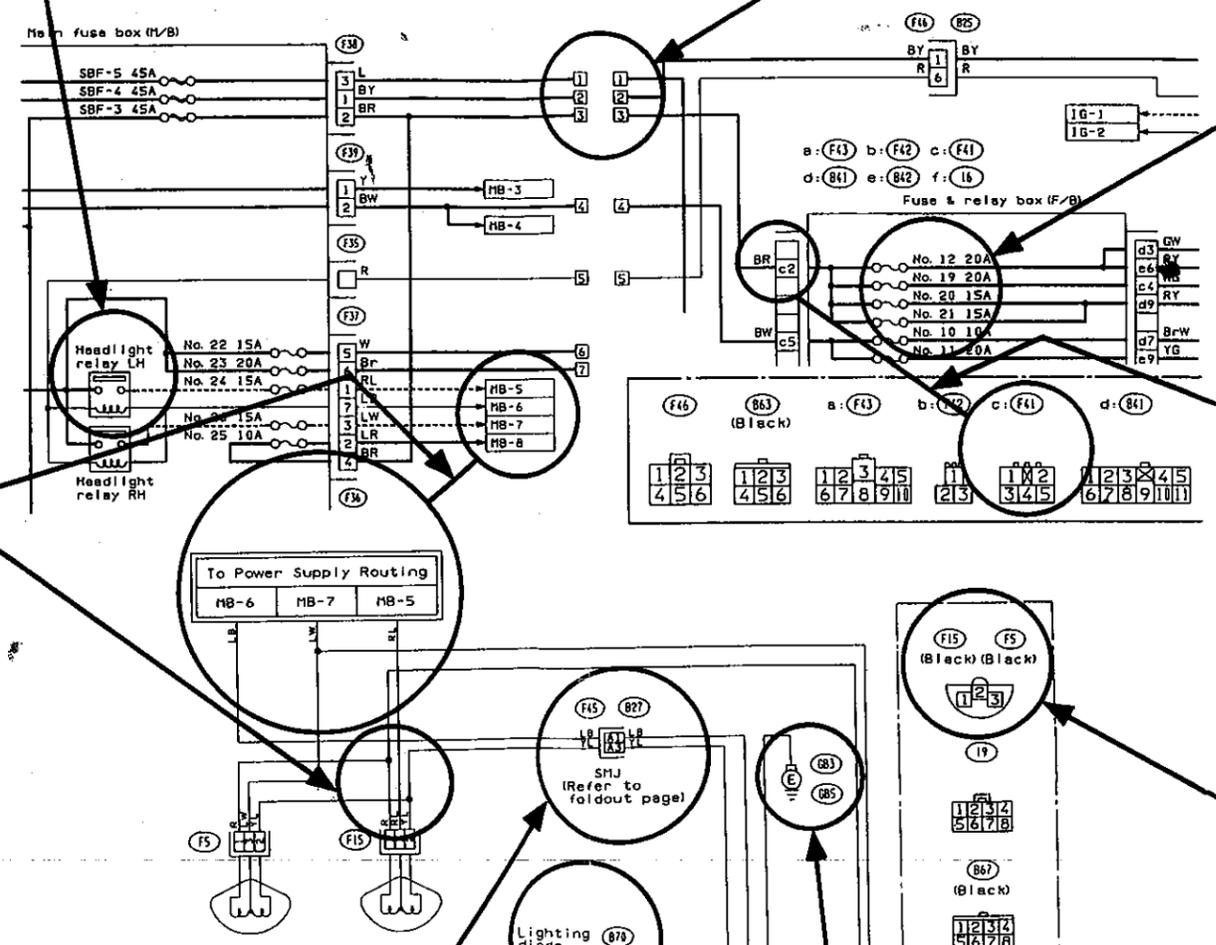


Fig. 20

86-249

# 4. How to Use Super Multiple Junction (S.M.J.)

The "S.M.J." indicated in wiring diagrams is shown in a simplified form.

## TERMINAL ARRANGEMENT

Bulkhead Wiring Harness ↔ Front Wiring Harness

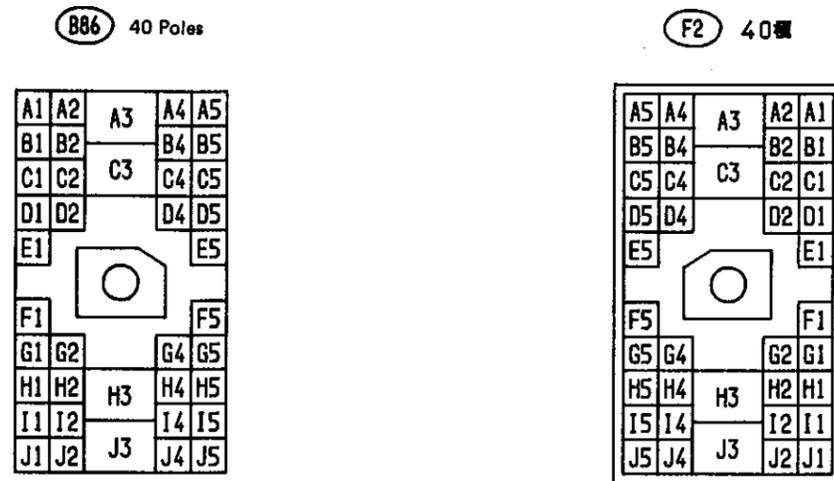


Fig. 21

Bulkhead Wiring Harness ↔ Rear Wiring Harness

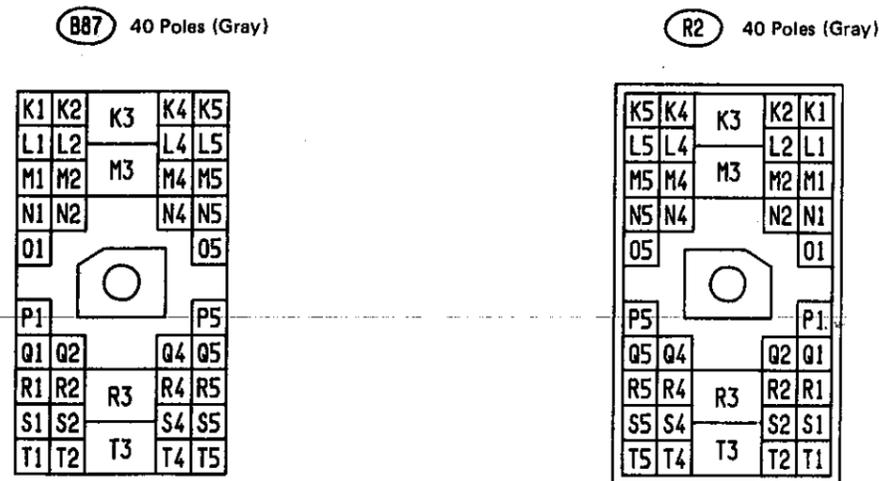
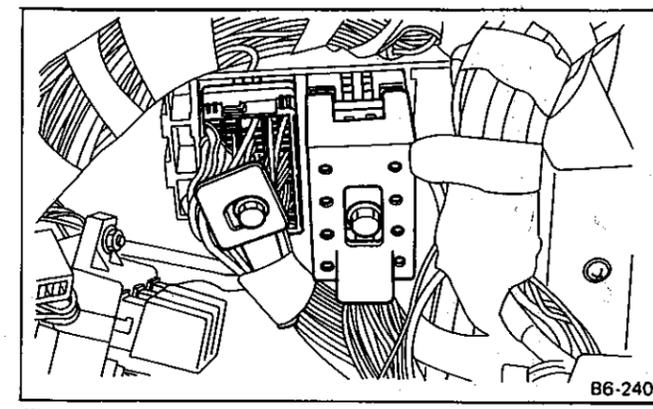


Fig. 22

## INSTALLATION



Tightening torque  
4.4 – 7.4 N·m

Fig. 23

- Align the cutout portion of one connector with that of other before tightening.
- Do not tighten the bolt excessively since this may deform the connector.

B6-578

## EXPLANATION OF S.M.J. SHOWN IN THE WIRING DIAGRAM

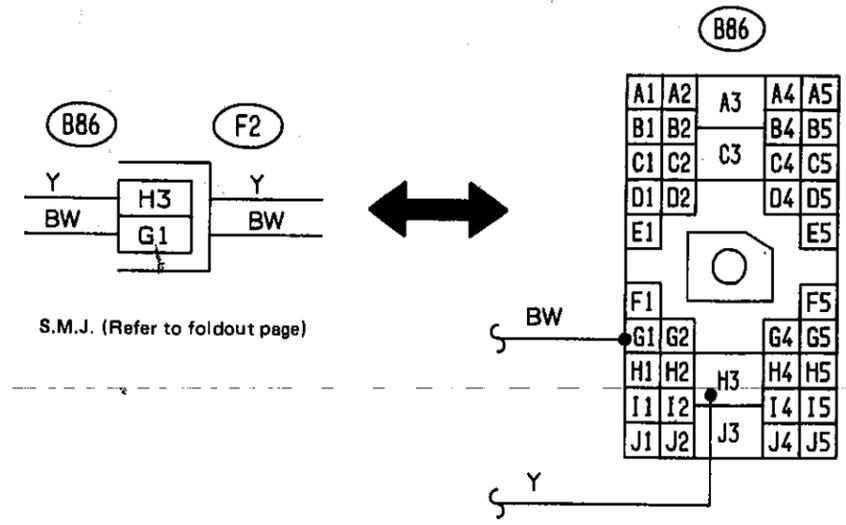


Fig. 24

B6-579

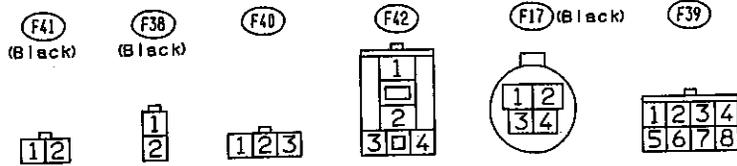
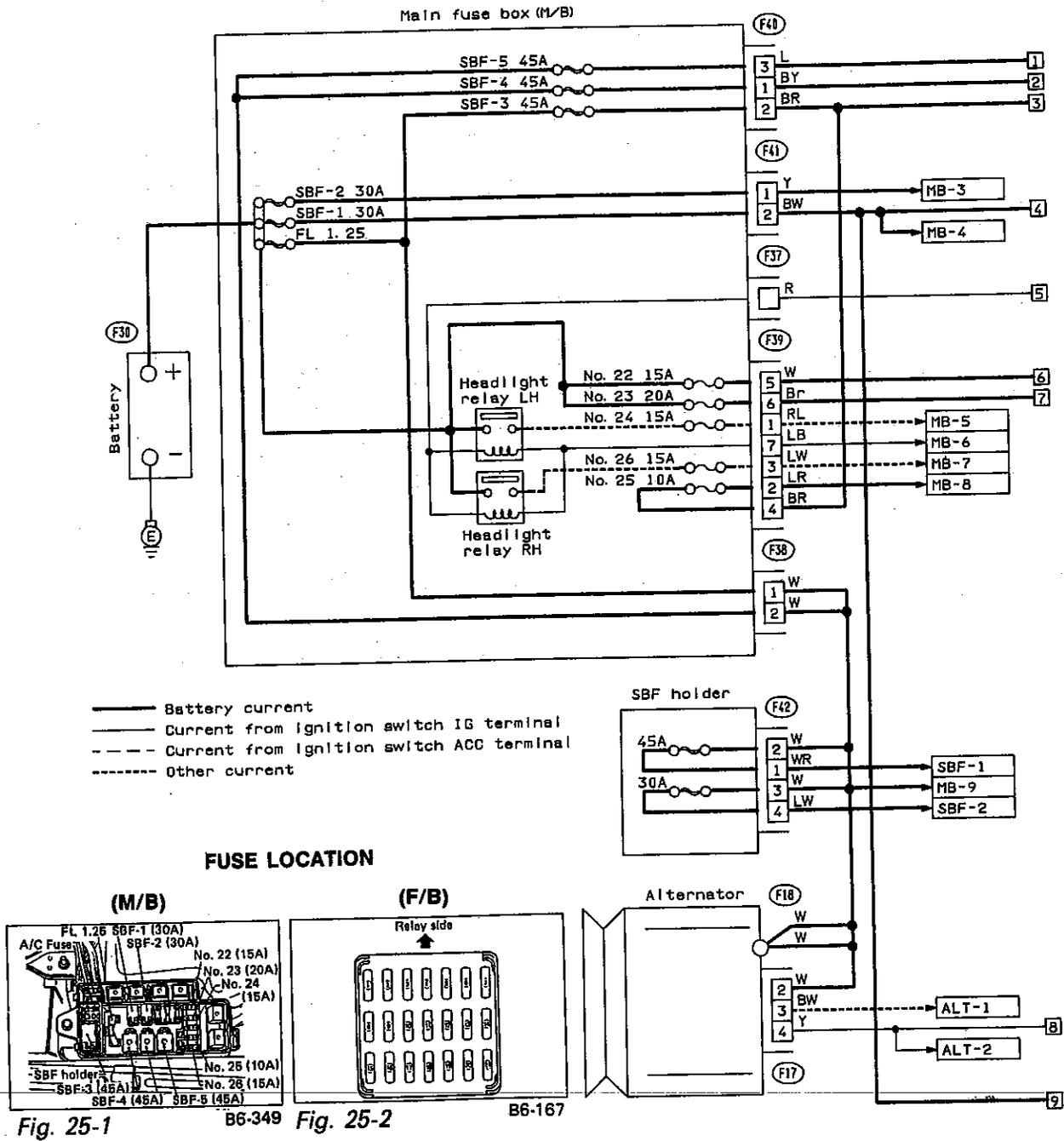
## ABBREVIATION LIST

Abbr.	Full name
ABS	Antilock Brake System
ACC	Accessory
A/C	Air Conditioner
AD	Auto Down
A/S	Air Suspension
AT	Automatic Transmission
AU	Auto Up
+ B	Battery
CARB.	Carburetor model
DN	Down
Dr	Dual Range
DRL	Daytime Running Light
E	Ground
F/B	Fuse & Joint Box
FL1.25	Fusible link 1.25 mm <sup>2</sup>
F/REC	FRESH/RECIRC
F/T	Full Time
IG	Ignition
Illumi.	Illumination
INT	Intermittent

Abbr.	Full name
ISC	Idle Speed Control
LH	Left Hand
Lo	Low
M	Motor
M/B	Main Fuse Box
MG	Magnet
Mi	Middle
MPFI	Multi Point Fuel Injection Model
MT	Manual Transmission
OP	Optional Parts
PASS	Passing
P/T	Part Time
RH	Right Hand
SBF	Slow Blow Fuse
S.M.J.	Super Multiple Junction
Sr	Single Range
ST	Starter
SW	Switch
UP	Up
WASH	Washer

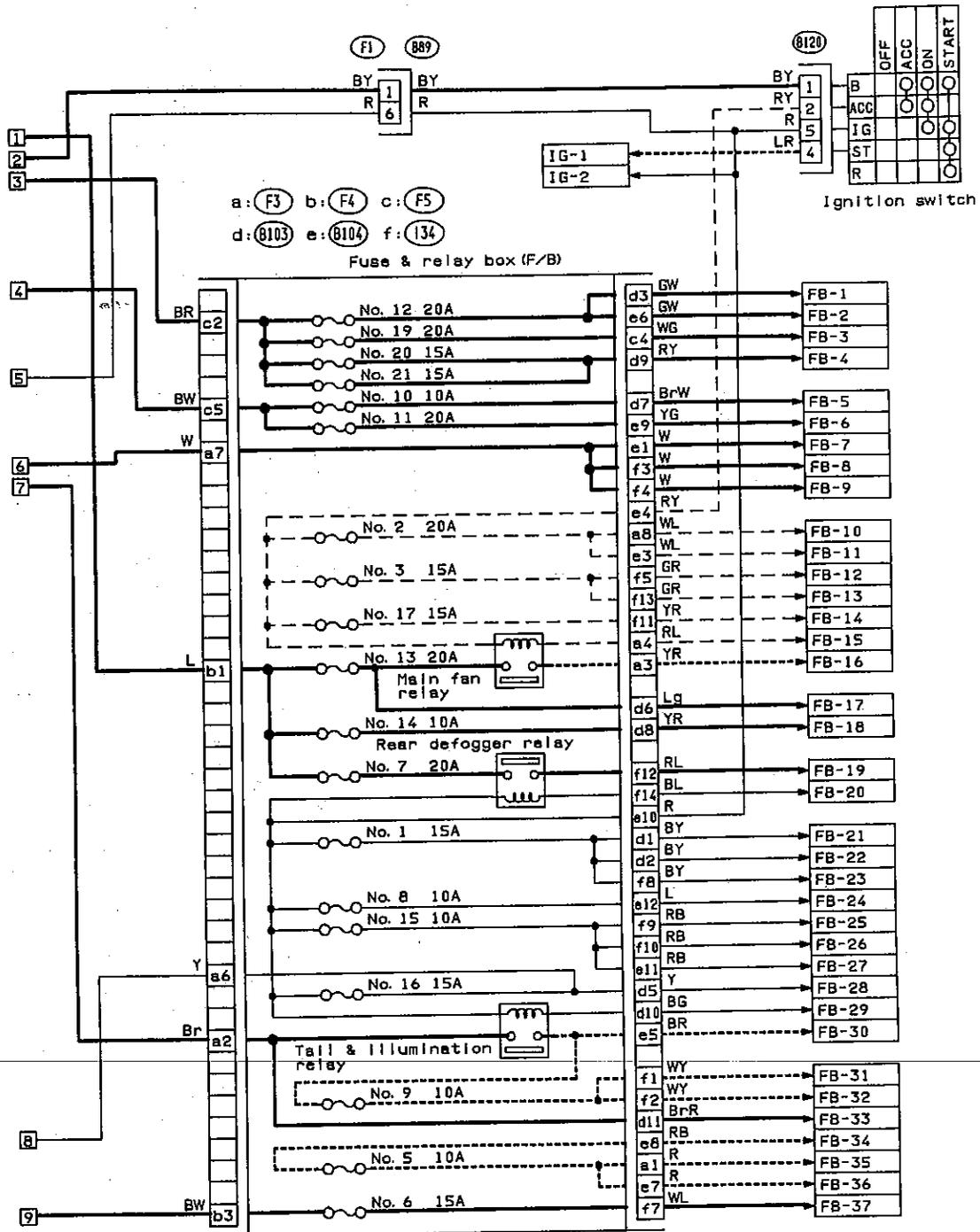
# 5. Wiring Diagram and Troubleshooting

## 1. POWER SUPPLY ROUTING

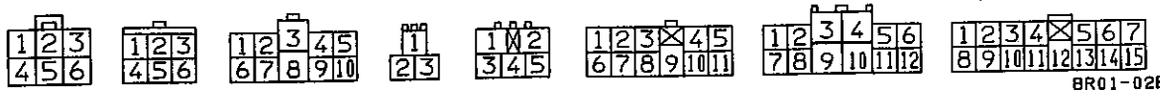


BR01-02A

Fig. 25



F1   
 B120 (Black)   
 a: F3 (Gray)   
 b: F4 (Gray)   
 c: F5 (Gray)   
 d: B103 (Gray)   
 e: B104 (Gray)   
 f: I34 (Gray)



No.	Load
MB-3	Ignition relay: Fig. 29-1, 30-1 Fuel pump relay: Fig. 29-1, 30-1 Injector: Fig. 29-2, 30-2
MB-4	Headlight washer unit: Fig. 47 P/W circuit breaker: Fig. 58-1 Power window relay: Fig. 58-1, 55
MB-5	Headlight LH: Fig. 34, 35
MB-6	Lighting diode: Fig. 34, 35 Rear fog diode: Fig. 42 Diode (Lighting relay): Fig. 34, 35
MB-7	Headlight RH: Fig. 34, 35 Combination meter: Fig. 34, 35 Rear fog light relay: Fig. 42
MB-8	Room light: Fig. 37-1, 37-2 Step light: Fig. 37-1 Height control unit: Fig. 62 Luggage room light: Fig. 37-1, 37-2 Trailer connector: Fig. 37-1, 37-2, 40 Trunk room light: Fig. 40 Spot light: Fig. 58-1 Radio: Fig. 59 Clock: Fig. 59
MB-9	A/C (op)
SBF-1	Hydraulic unit: Fig. 63
SBF-2	A/S compressor: Fig. 62
ALT-1	Combination meter: Fig. 26, 38, 49
ALT-2	
IG-1	Inhibitor SW: Fig. 27, 28, 29-1 Starter motor: Fig. 2 MPFI unit: Fig. 29-1, 30-1
IG-2	A/C (OP)
FB-1	Stop light SW: Fig. 38, 43-1, 43-2, 63 Stop & Brake SW: Fig. 64
FB-2	Stop light SW: Fig. 38 Horn relay: Fig. 57 Horn condenser: Fig. 57
FB-3	Hydraulic unit: Fig. 63
FB-4	Blower motor relay: Fig. 60
FB-5	Charge solenoid: Fig. 62 A/S compressor relay: Fig. 62 Discharge solenoid: Fig. 62 A/S solenoid: Fig. 62
FB-6	Door lock SW: Fig. 56
FB-7	Power antenna: Fig. 59
FB-8	Hazard SW: Fig. 39
FB-9	Hazard SW: Fig. 39
FB-10	Front washer motor: Fig. 45
FB-11	Front wiper motor: Fig. 45 Front wiper SW: Fig. 45 Rear washer motor: Fig. 46 Rear wiper relay: Fig. 46 Rear wiper intermittent unit: Fig. 46 Rear wiper motor: Fig. 46
FB-12	Cigarette lighter: Fig. 57

No.	Load
FB-13	Remote control rearview mirror SW: Fig. 61
FB-14	Radio: Fig. 59 Power antenna SW: Fig. 59
FB-15	Radiator fan SW: Fig. 32 MPFI unit: Fig. 33
FB-16	Main fan motor: Fig. 32, 33
FB-17	A/C (OP)
FB-18	MPFI unit: Fig. 29-1, 30-1 AT unit: Fig. 43-1, 43-2
FB-19	Rear defogger SW: Fig. 48 Condenser: Fig. 48 Rear defogger (Heat wire): Fig. 48
FB-20	Rear defogger SW: Fig. 48
FB-21	Back-up light SW: Fig. 41 Inhibitor switch: Fig. 41 4WD selector SW: Fig. 44-2
FB-22	4WD selector SW: Fig. 44-2
FB-23	Hazard SW: Fig. 39
FB-24	ABS G sensor: Fig. 63 ABS control unit: Fig. 63 Cruise control main SW: Fig. 64 Main relay: Fig. 64
FB-25	Combination meter: Fig. 26, 29-1, 30-1, 31-1, 37-1, 37-2, 43-1, 43-2, 44-1, 44-2, 49, 50, 54, 62, 63 Rear fog light SW: Fig. 42 Rear fog light relay: Fig. 42 Headlight washer SW: Fig. 47 Mode control panel: Fig. 60 Height control SW: Fig. 62
FB-26	Combination meter: Fig. 26, 29-1, 30-1, 31-1, 37-1, 37-2, 43-1, 43-2, 44-1, 44-2, 49, 50, 54, 58-1, 62, 63 Rear fog light SW: Fig. 42 Rear fog light relay: Fig. 42 Headlight washer SW: Fig. 47 Mode control panel: Fig. 60 Height control SW: Fig. 62
FB-27	Dim-dip cancel relay: Fig. 35 Main beam cancel relay: Fig. 35 Dim-dip relay: Fig. 35 Check connector: Fig. 43-1, 43-2, 62 P/W relay: Fig. 55, 58-1 Vanity mirror illumi.: Fig. 58-1 Blower motor relay: Fig. 60 F/C actuator: Fig. 60 Mode actuator: Fig. 60
FB-28	Igniter: Fig. 27, 29-2, 30-2 Ignition coil: Fig. 27, 28, 29-2, 30-2, 31-2, 32 Distributor: Fig. 28, 32 Fuel pump relay: Fig. 29-1, 30-1 Diode (MPFI): Fig. 29-1, 30-1 MPFI unit: Fig. 29-1, 30-1 Noise condenser: Fig. 32 Revolution sensor: Fig. 32 Carburetor solenoid: Fig. 32 AT unit: Fig. 43-1, 43-2 AT economy SW: Fig. 43-1, 43-2

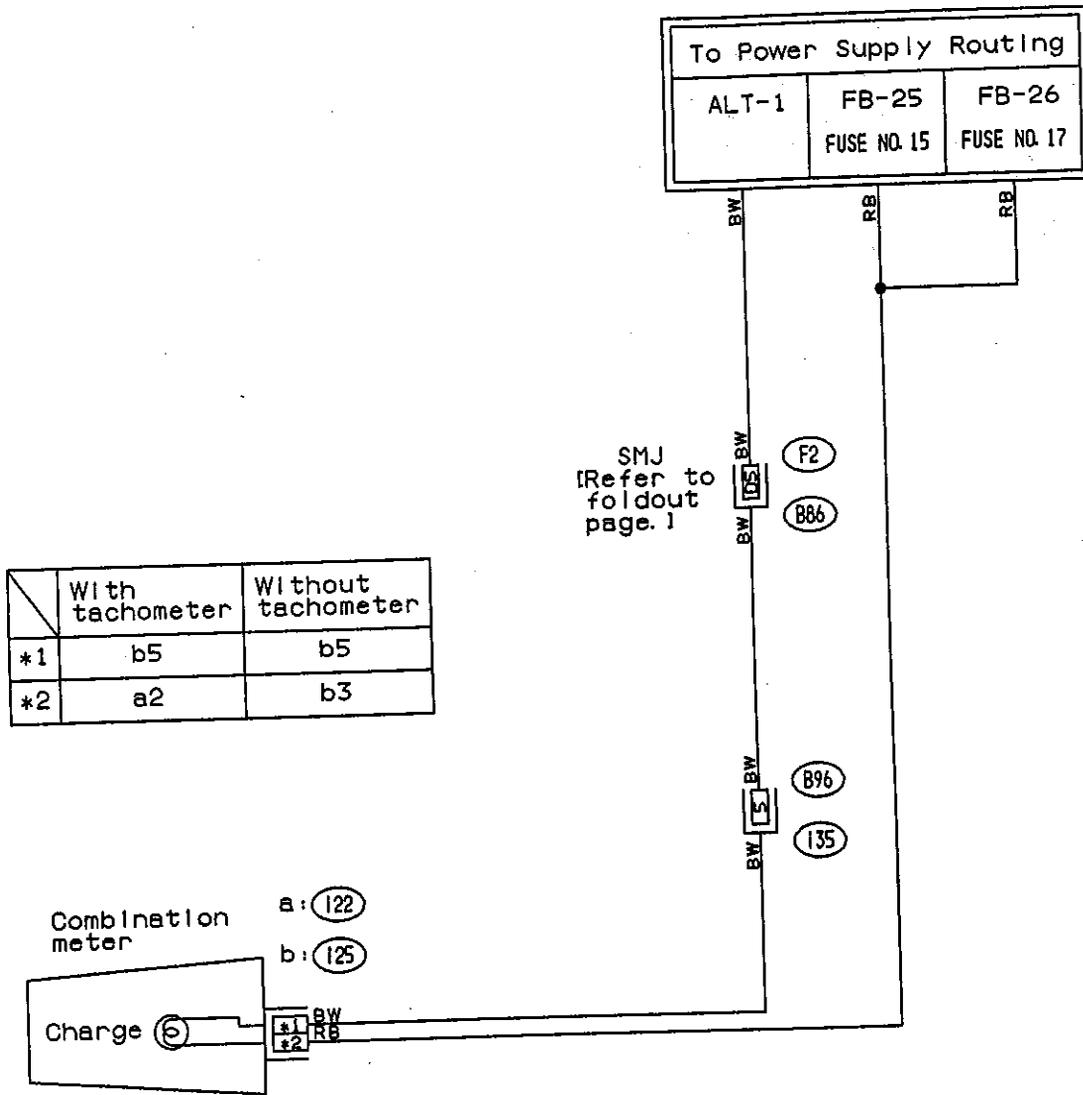
## WIRING DIAGRAM AND TROUBLESHOOTING

[0501] 6-3

No.	Load
FB-29	Lighting SW: Fig. 35
FB-30	Dim-dip control relay: Fig. 35 Parking light SW: Fig. 36
FB-31	Illumination cancel SW: Fig. 36 Illumination light: Fig. 36
FB-32	Illumination control unit: Fig. 36 Illumination light: Fig. 36
FB-33	Parking light SW: Fig. 36

No.	Load
FB-34	Parking light SW: Fig. 36
FB-35	Front clearance light: Fig. 36
FB-36	Trailer connector: Fig. 36 Rear combination light: Fig. 36 Licence plate light: Fig. 36

2. CHARGING



	With tachometer	Without tachometer
*1	b5	b5
*2	a2	b3

a: (122)

b: (125)

(B96) (Black)

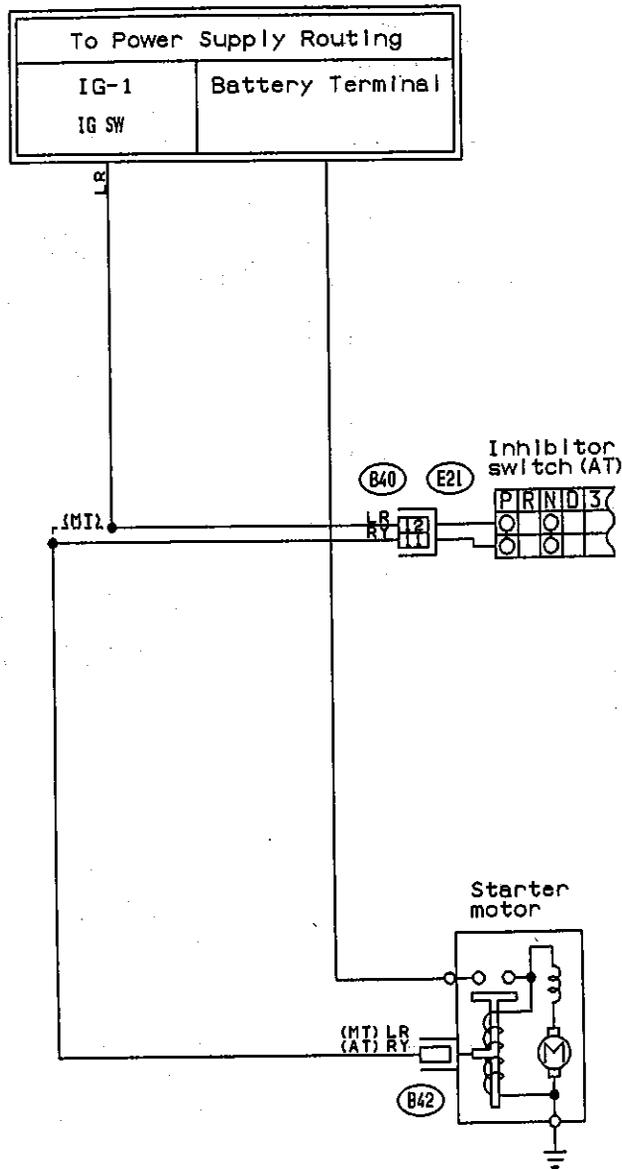
1 2 3 4 5 6 7 8 9 10 11 12

1 2 3 4 5 6 7 8 9 10  
11 12 13 14 15 16 17 18 19 20 21 22

BR02-02

Fig. 26

3. STARTING  
MPFI MODEL



(B40) (Gray)

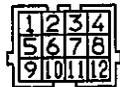
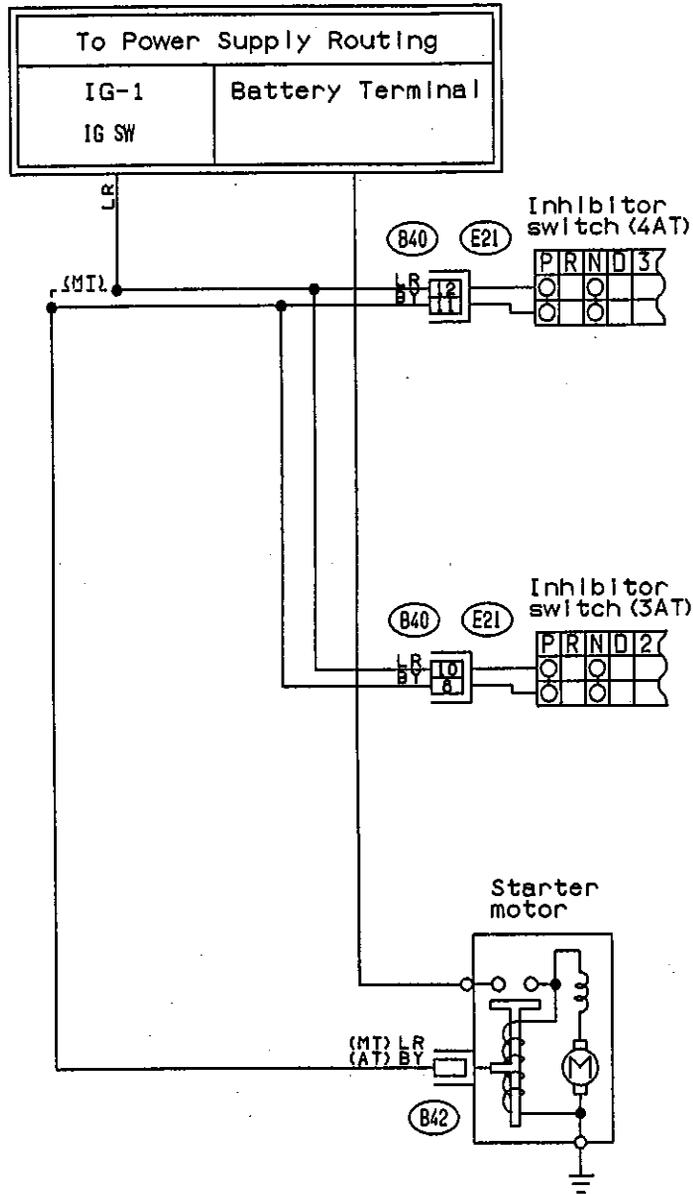
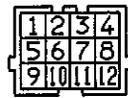


Fig. 27

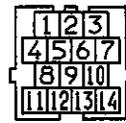
SPFI/CARBURETOR MODEL



(B40) (Gray)



(4AT)



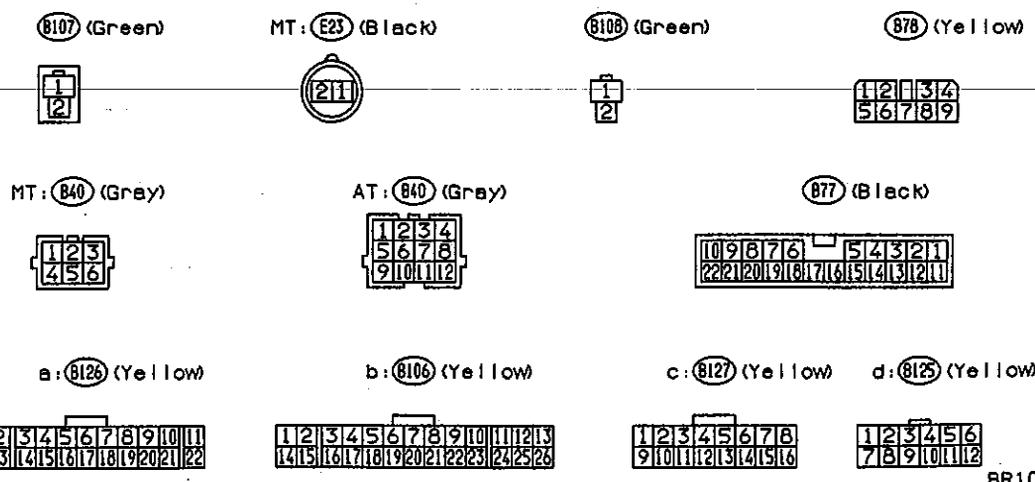
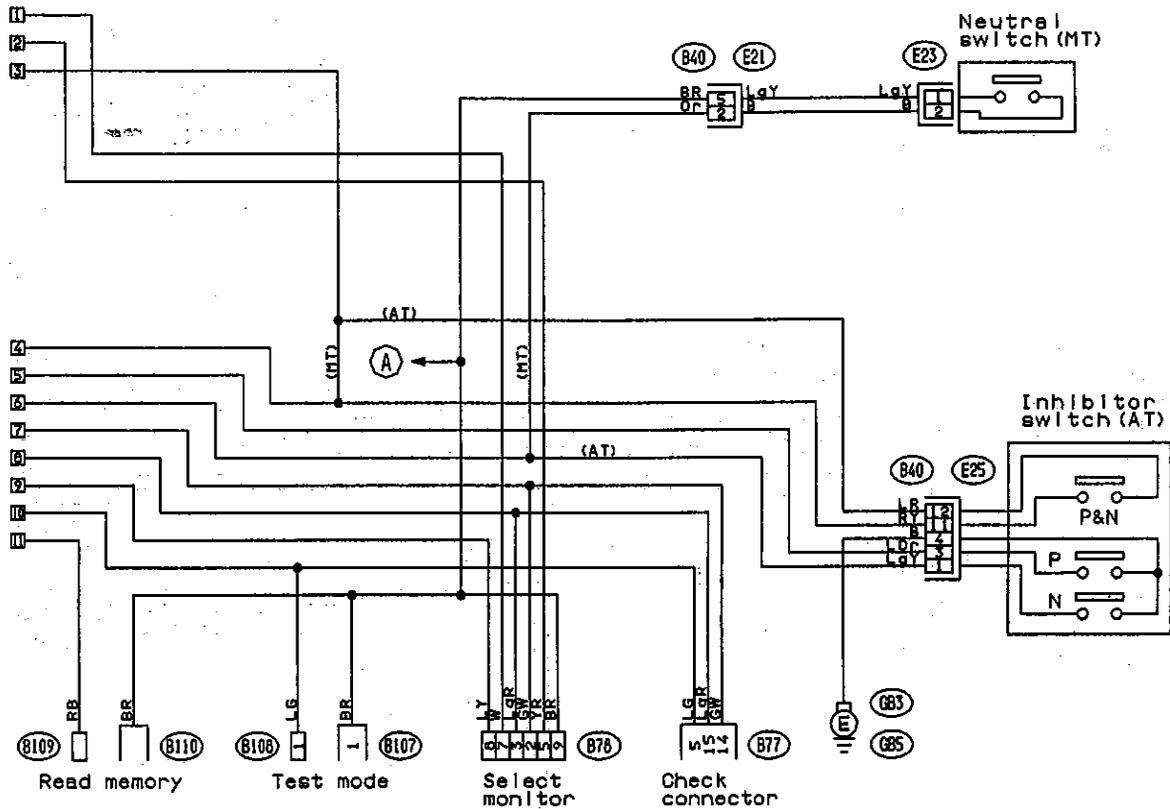
(3AT)

BR03-05

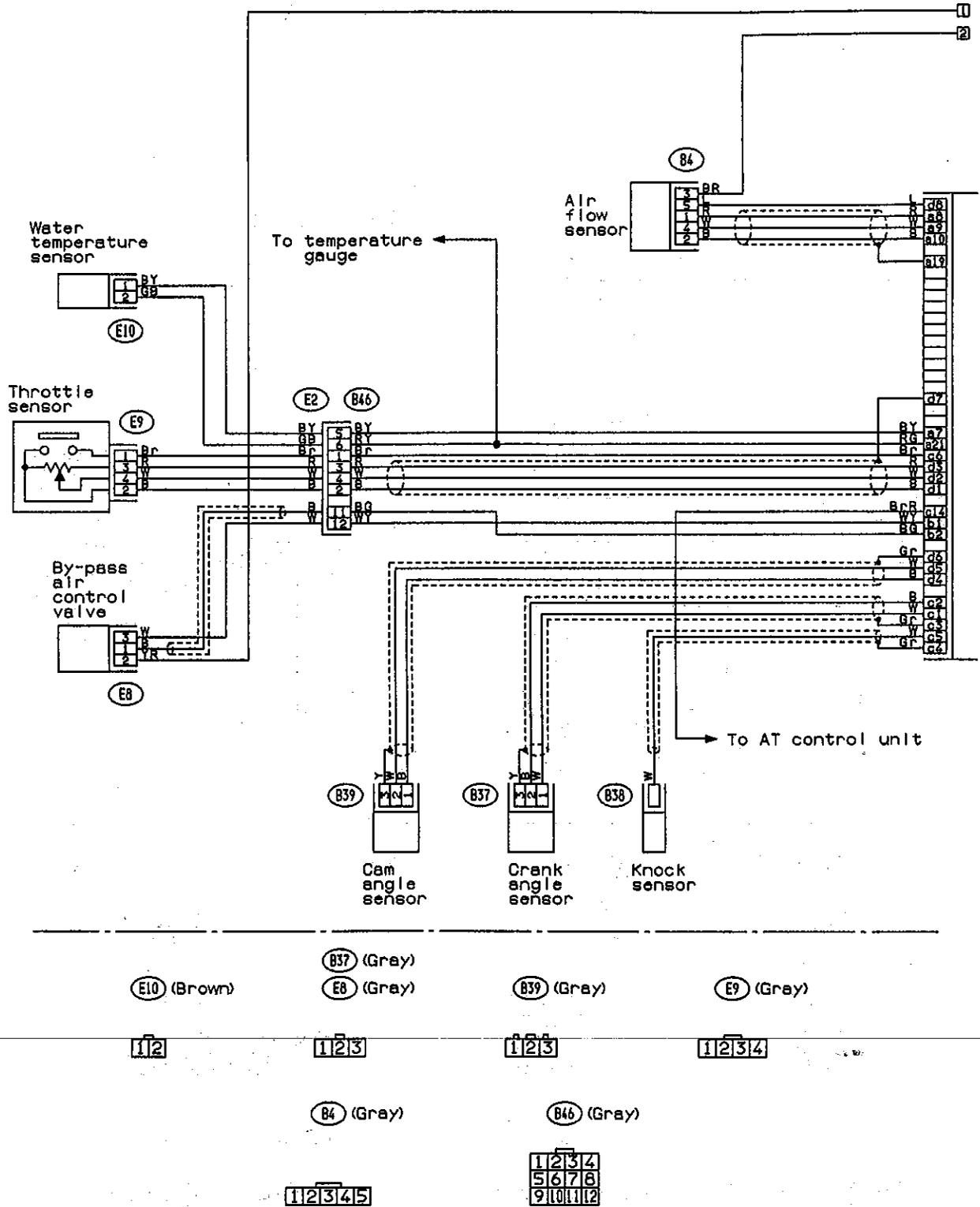
Fig. 28

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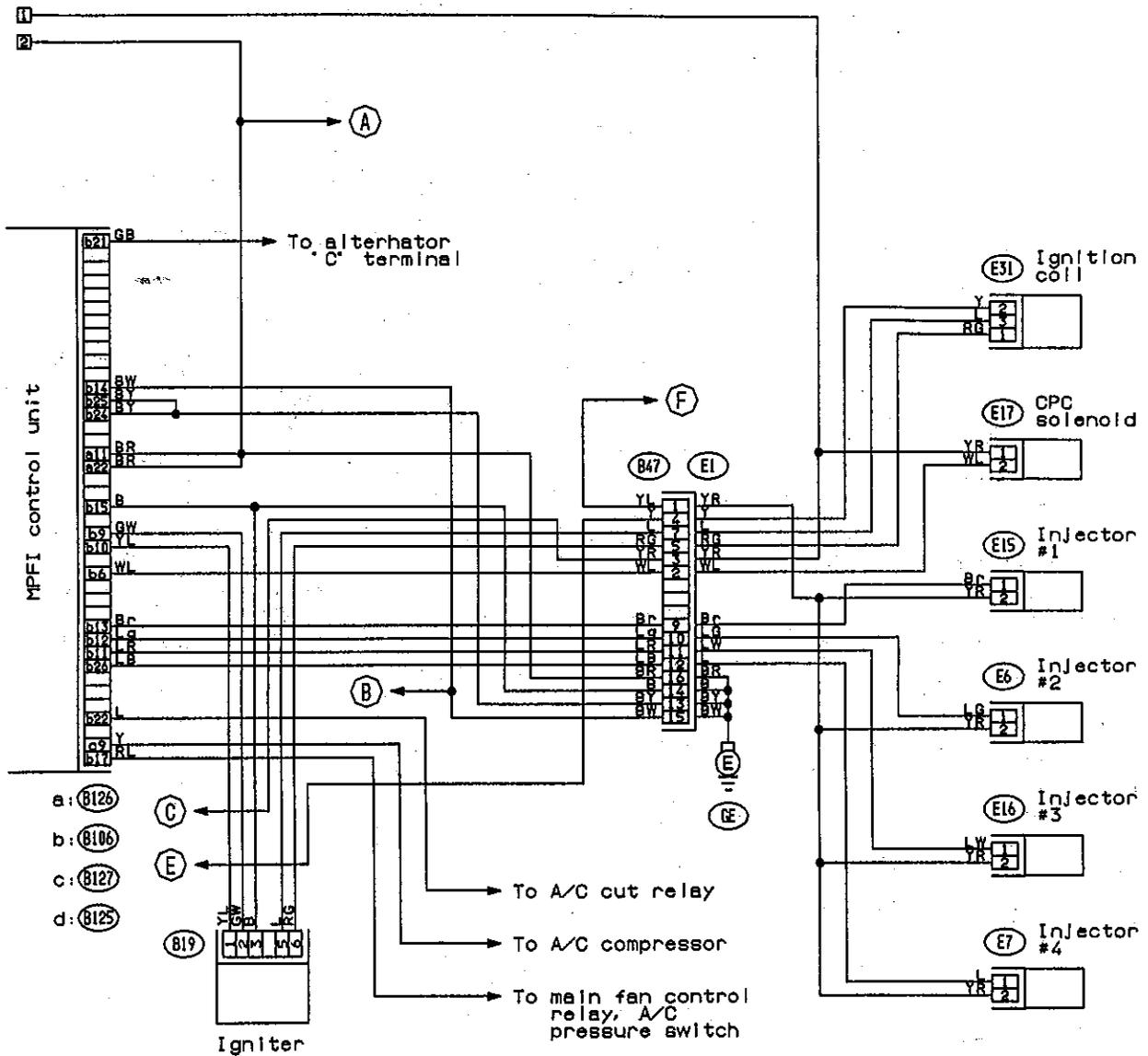


BR10-03B



BR10-03C

Fig. 29-2



- (E6) (Gray)
- (E17) (Blue)
- (E7) (Gray)
- (E6) (Gray)
- (E15) (Gray)
- (E31) (Gray)
- (B19) (Gray)

1 2

1 2 3

1 2 3 4 5 6

a: (B126) (Yellow)

b: (B106) (Yellow)

c: (B127) (Yellow)

d: (B125) (Yellow)

(Gray)  
(B47)

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26

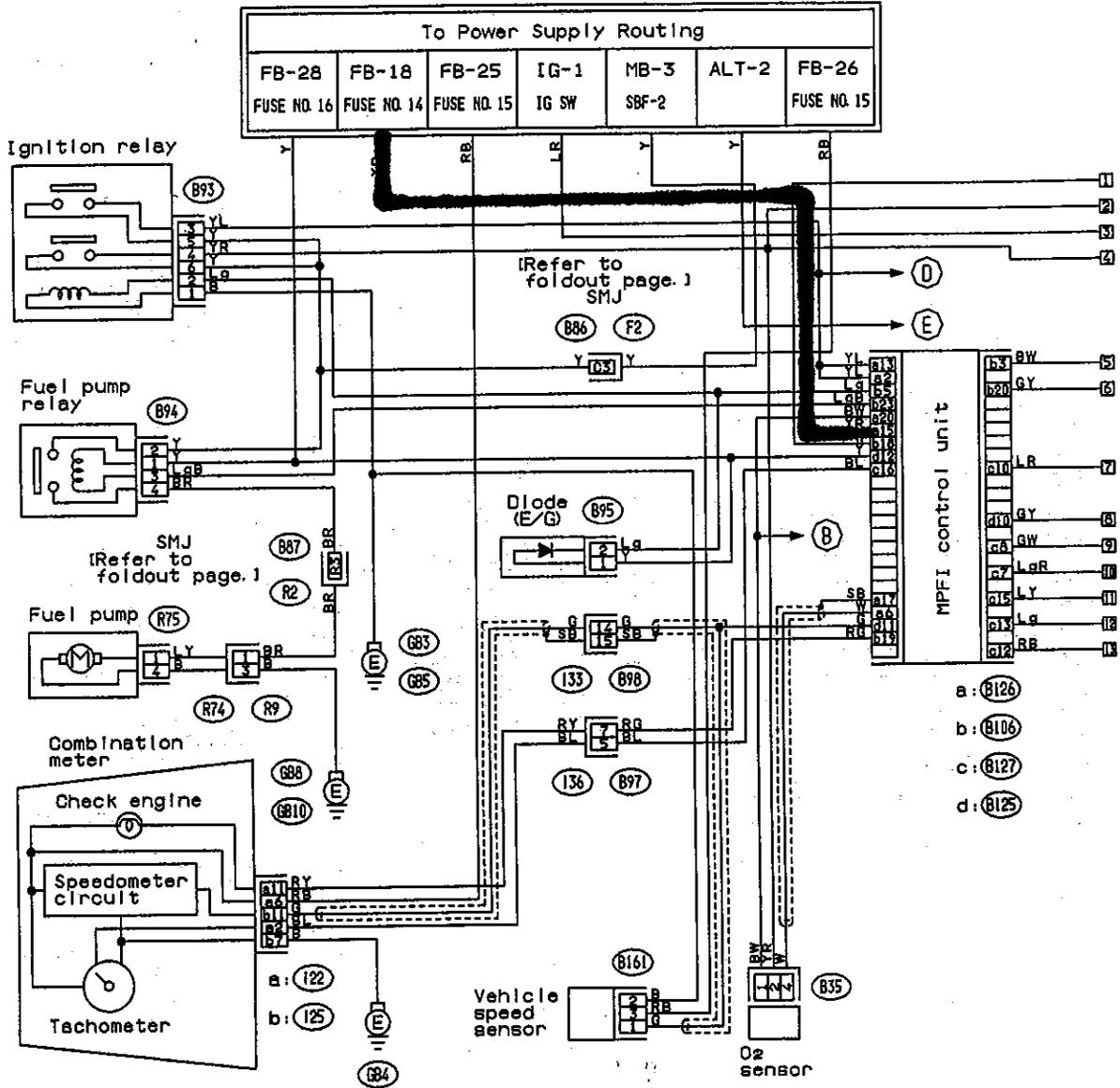
1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16

1	2	3	4	5	6
7	8	9	10	11	12

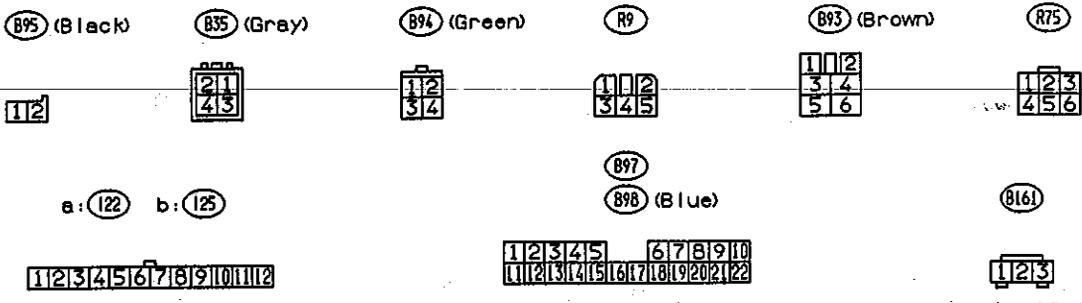
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

BR10-03D

MPFI MODEL (TURBO)

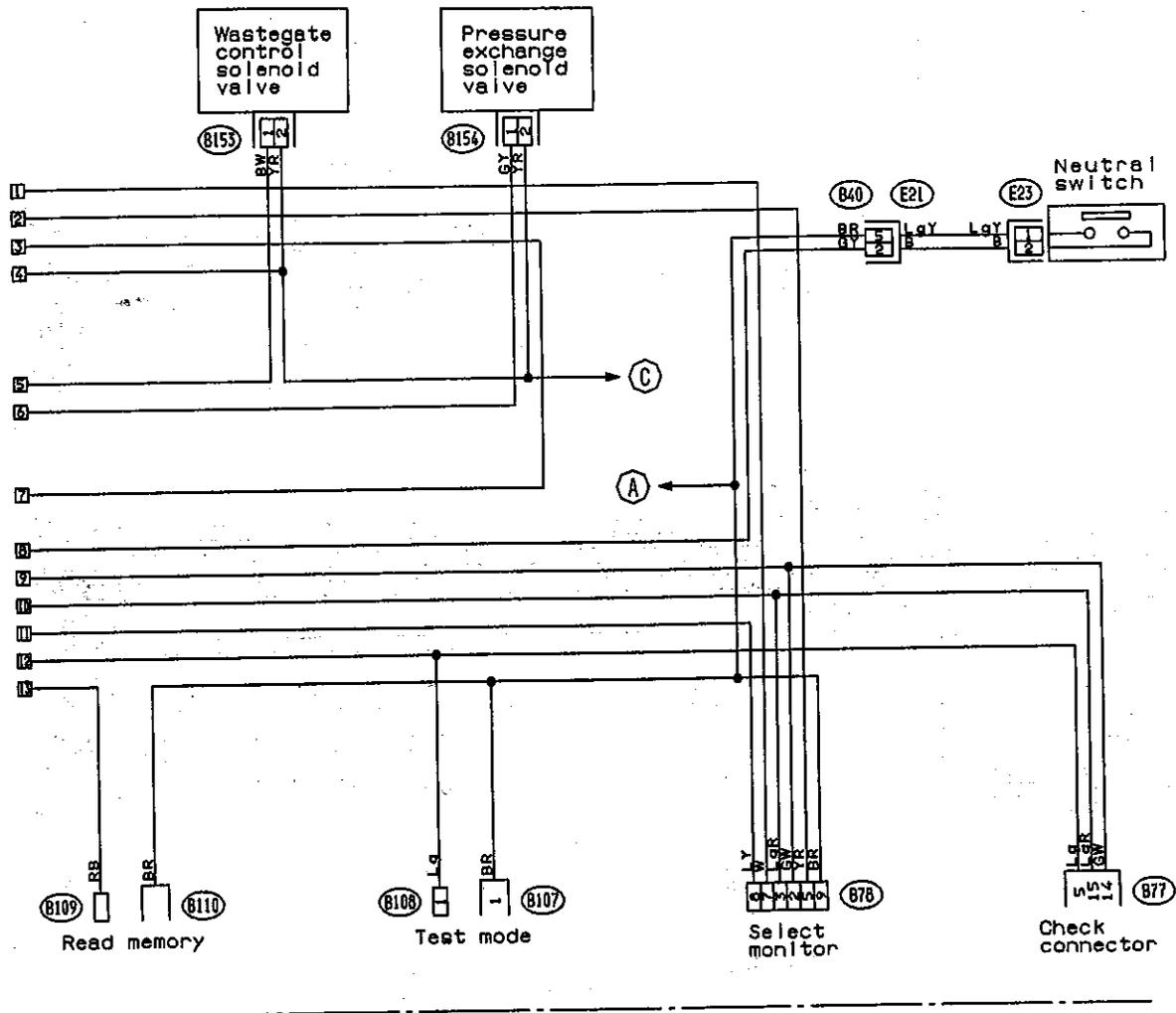


- a: (B126)
- b: (B106)
- c: (B127)
- d: (B125)

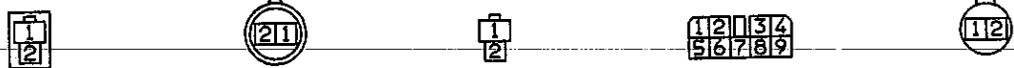


BR10-04A

Fig. 30-1



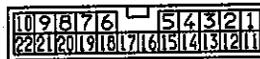
(8107) (Green)      (E23) (Black)      (8108) (Green)      (878) (Yellow)      (8153) (Black)



(840) (Gray)

(877) (Black)

(8156) (Brown)



a: (8126) (Yellow)

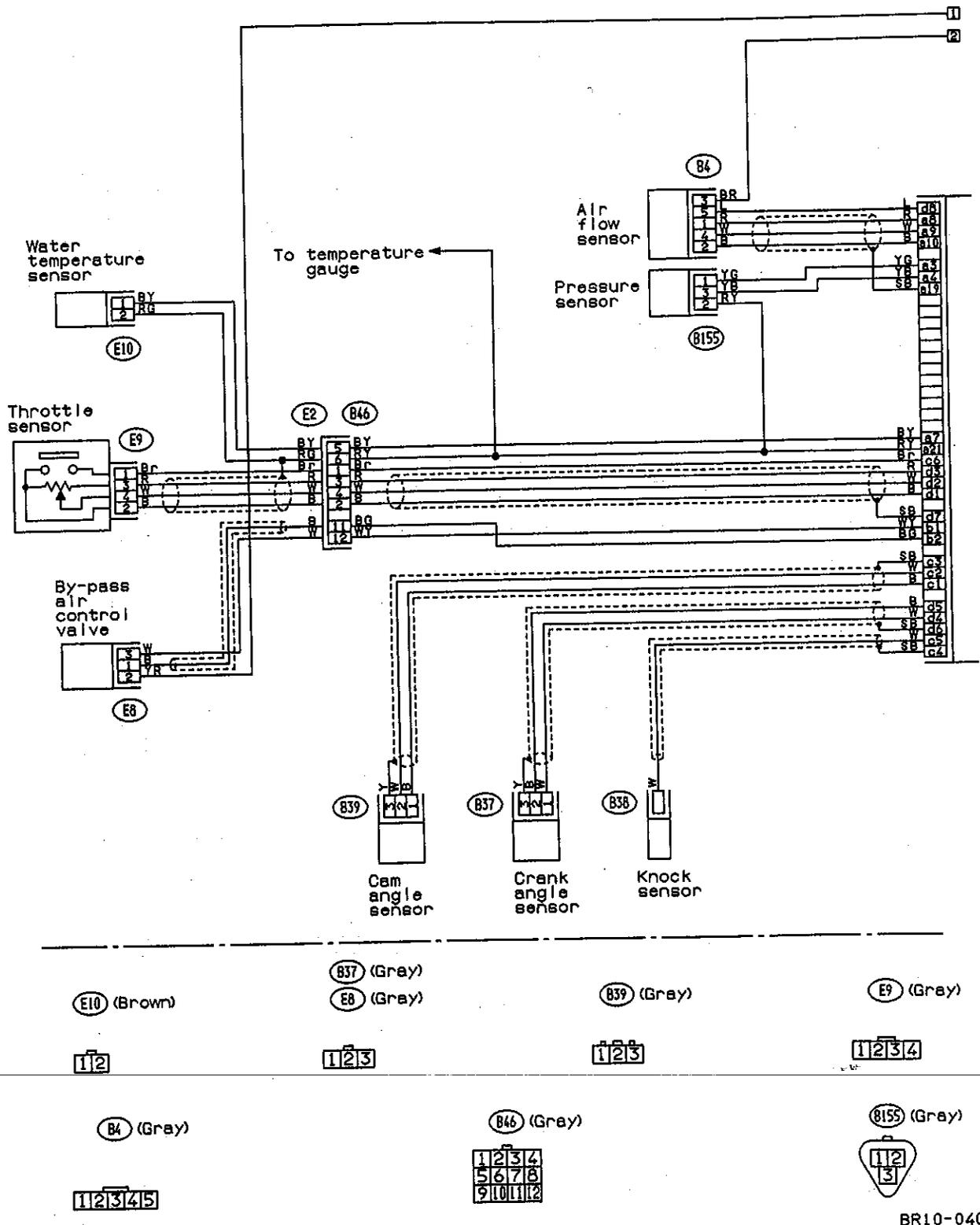
b: (8106) (Yellow)

c: (8127) (Yellow)

d: (8125) (Yellow)



BR10-04B

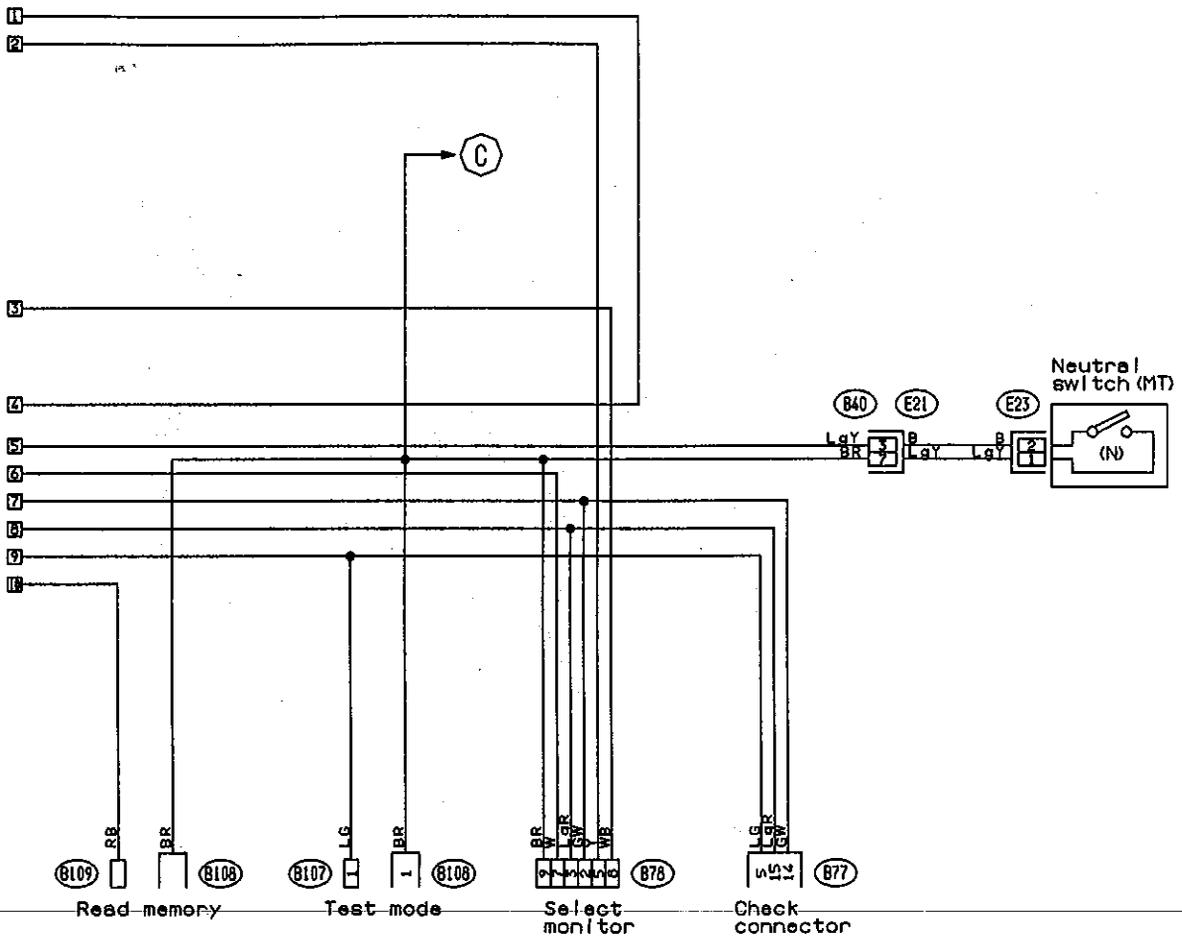


BR10-04C

Fig. 30-2







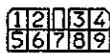
ⓑ107 (Green)



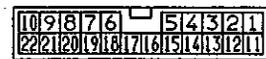
ⓑ108 (Green)



ⓑ78 (Yellow)



ⓑ77 (Black)



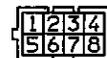
MT: ⓑ23  
(Black)



ⓑ95



ⓑ40  
(Gray)



BR11-02B

# WIRING DIAGRAM AND TROUBLESHOOTING

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SPFI W

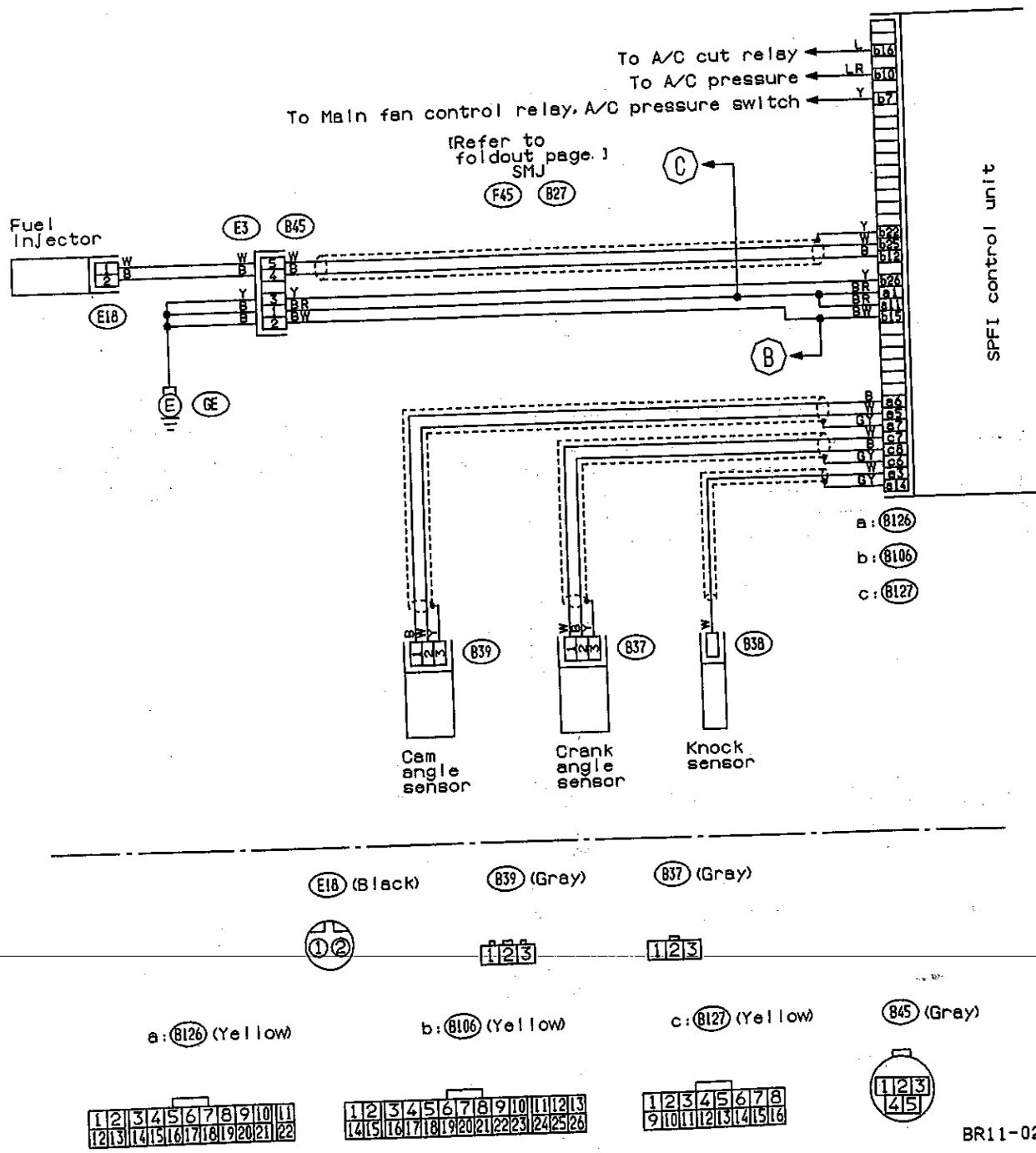
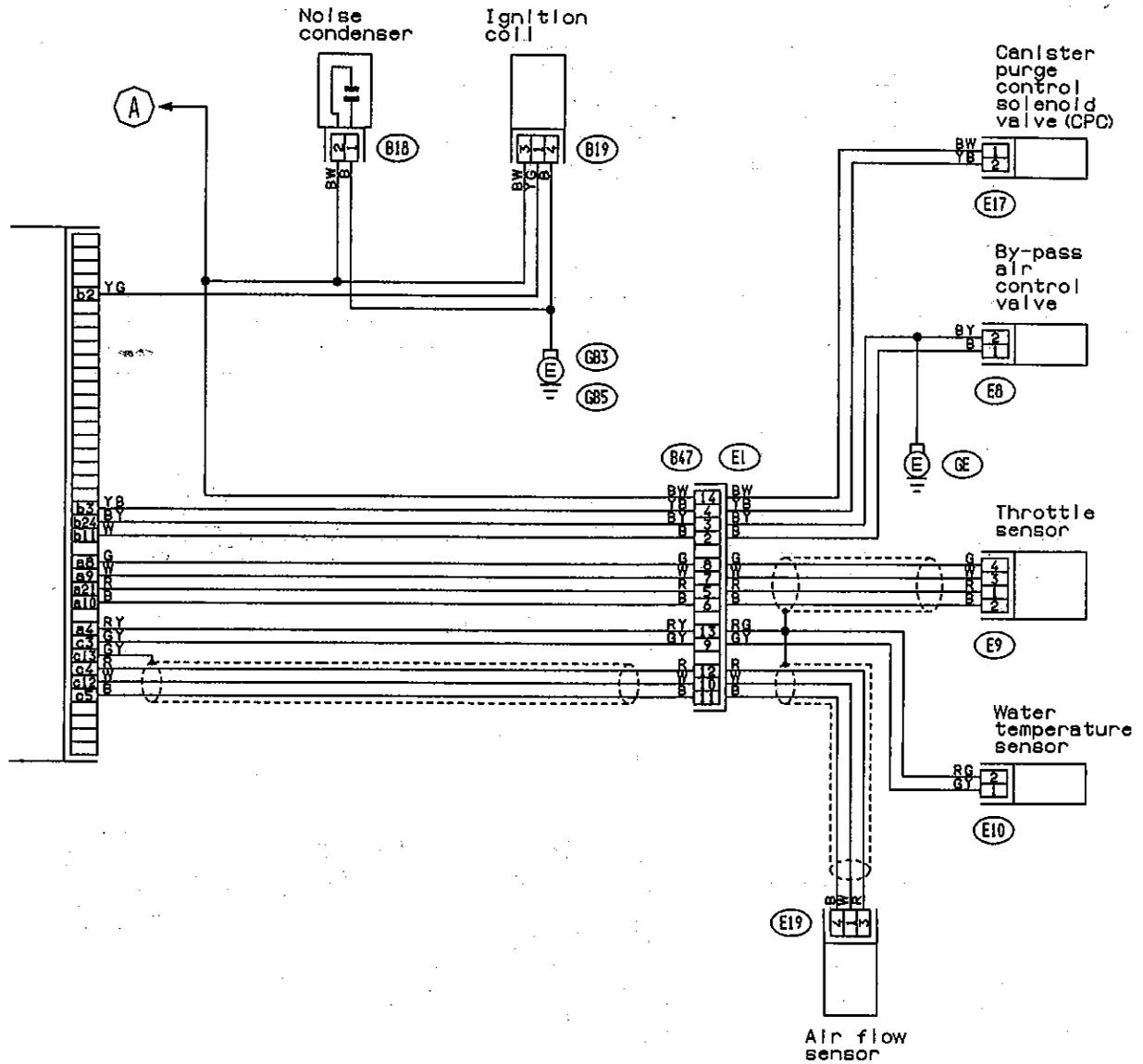


Fig. 31-2

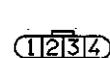
BR11-02C

# WIRING DIAGRAM AND TROUBLESHOOTING

[0504] 6-3



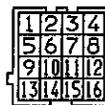
(B18) (Black)    (E10) (Brown)    (E17) (Blue)    (E8) (Gray)    (E9) (Gray)



(B19) (Gray)

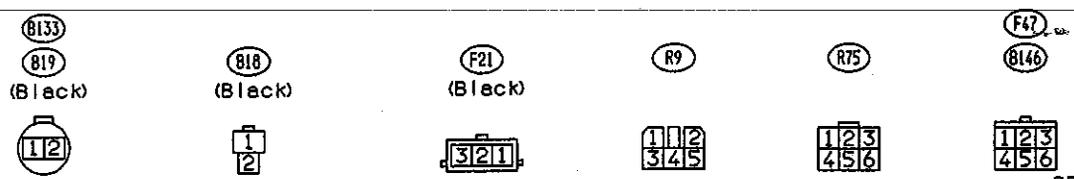
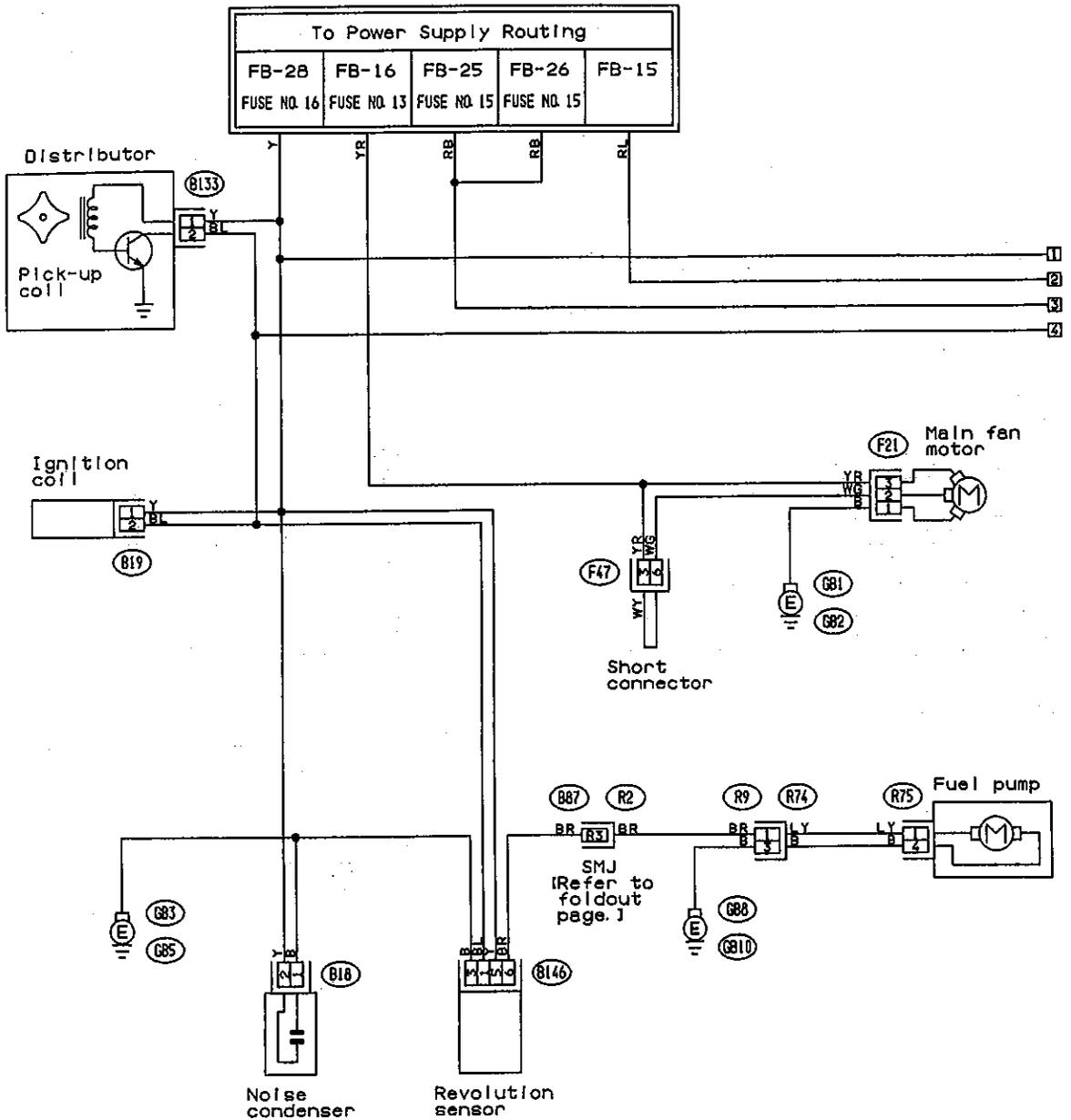
(E19) (Gray)

(B47) (Gray)



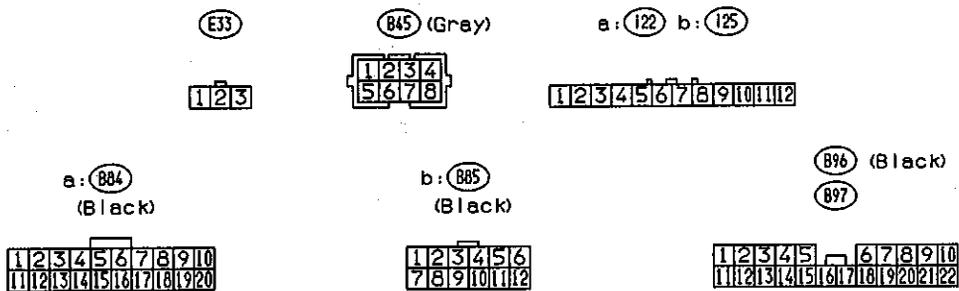
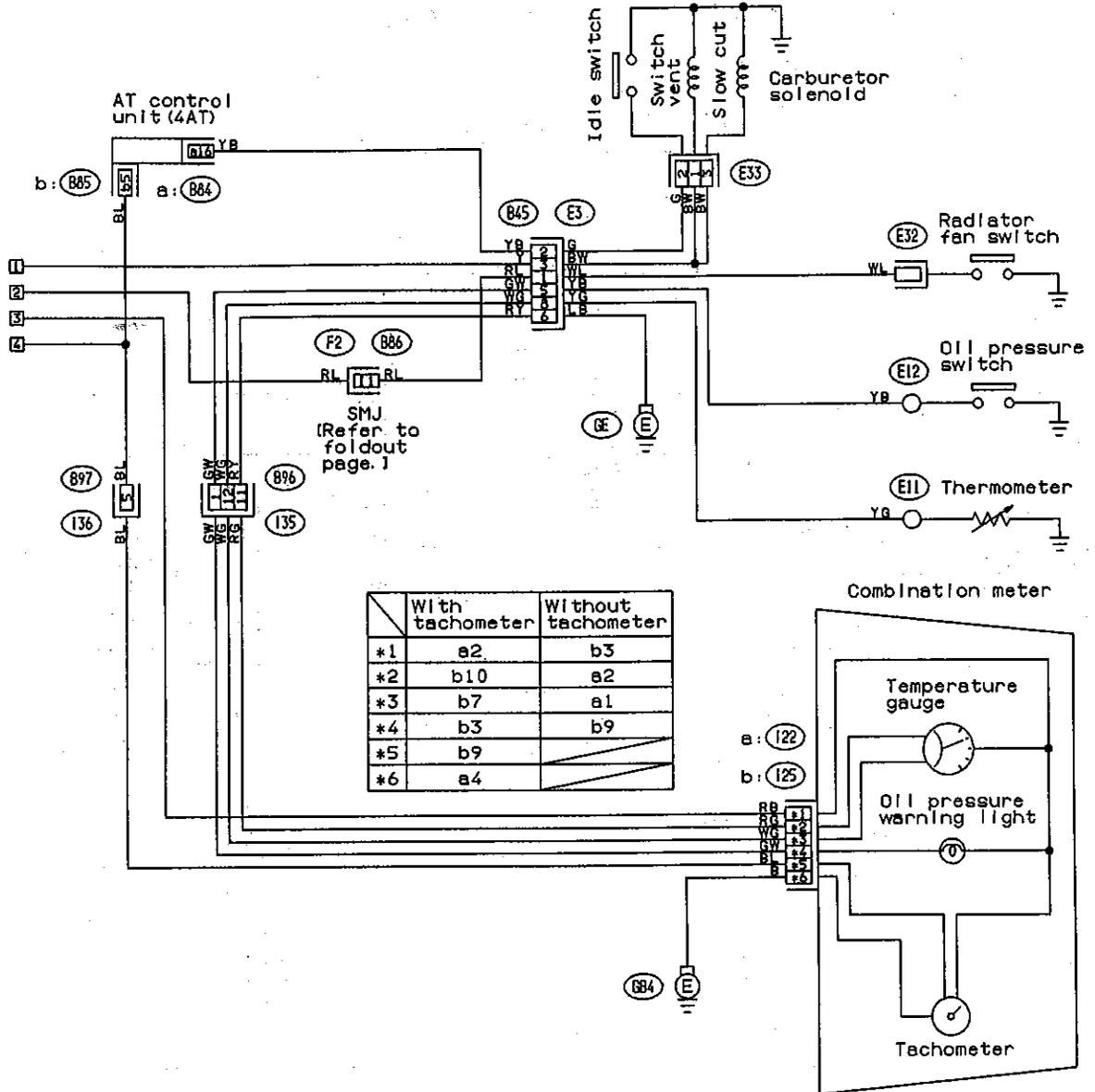
BR11-02D

CARBURETOR MODEL



BR09-03A

Fig. 32



BR09-03B





OTHER MODELS

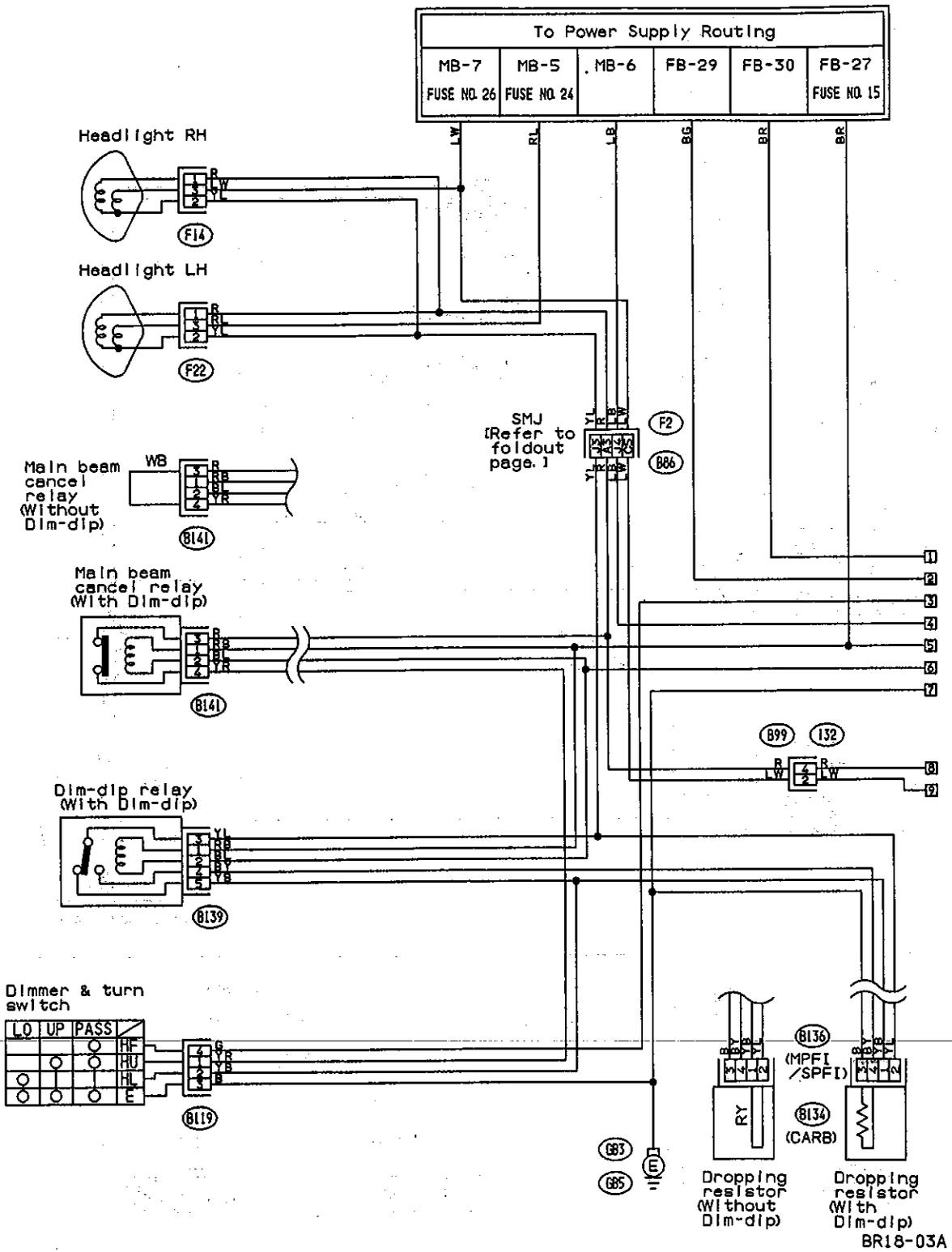
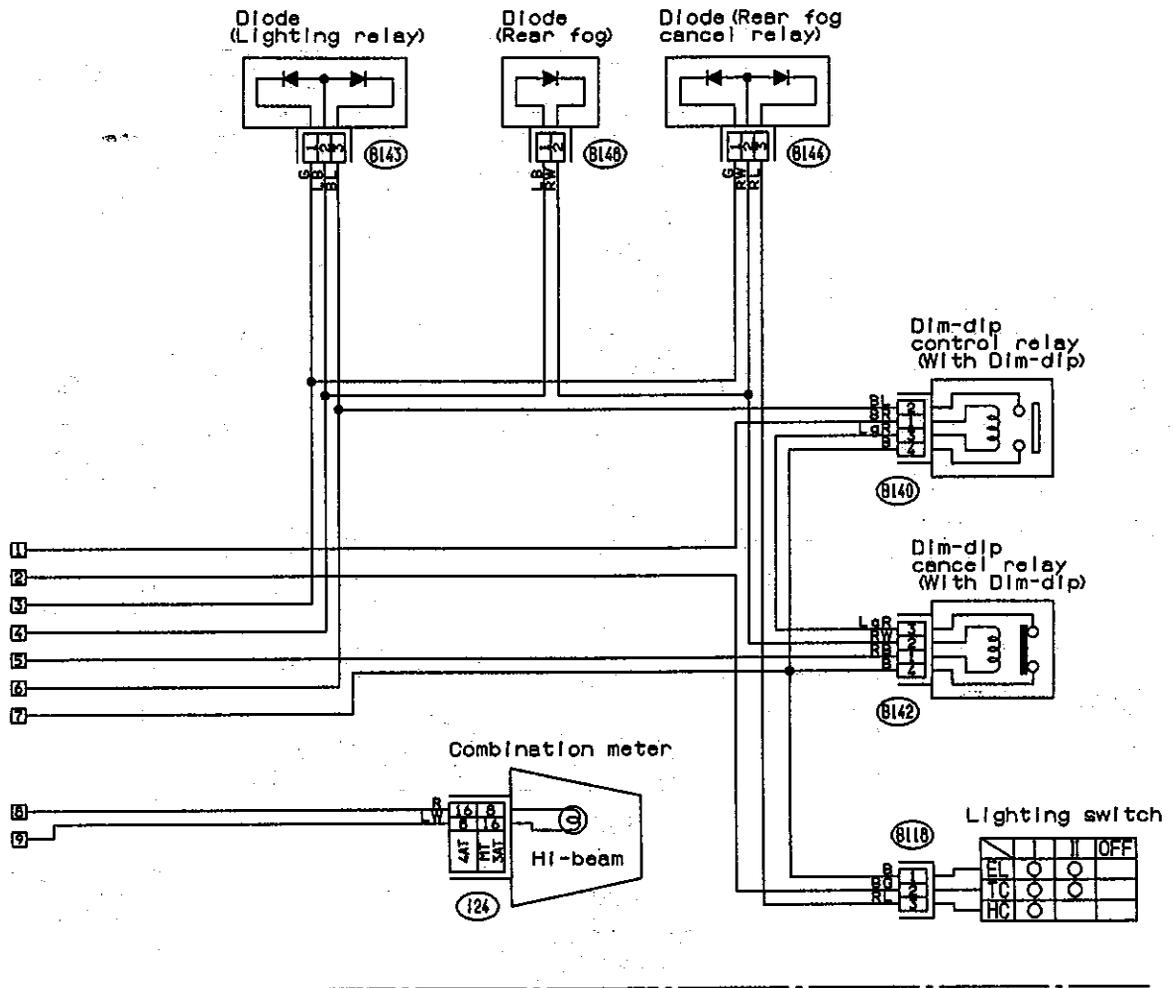


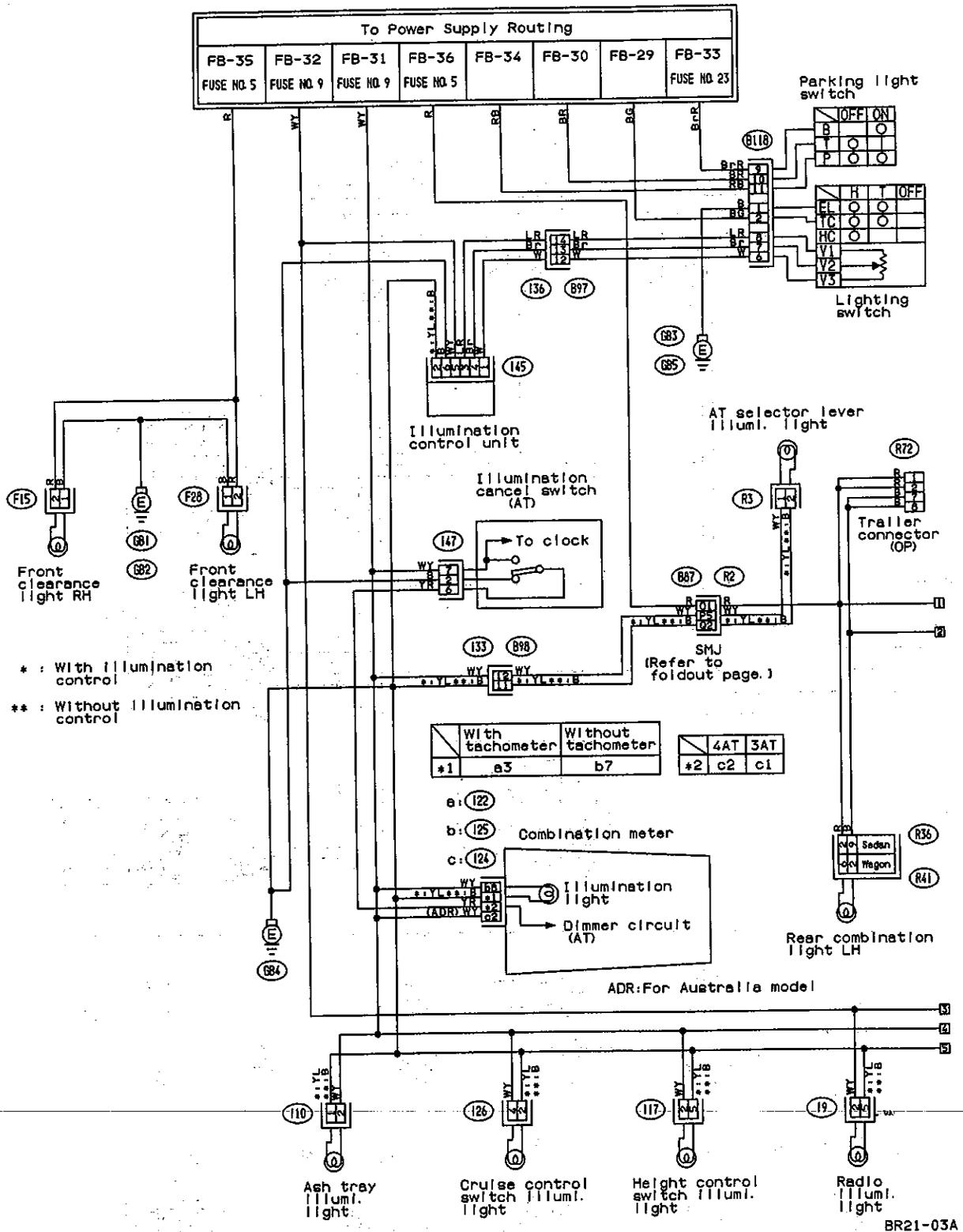
Fig. 35



(B140) (Black)	(B143) (B146)	(F14) (Black) (F22) (Black)	(B141) (B142) (Green)	(B140)	(B134) (B136) (Gray)
1 2	1 2 3	1 2 3	1 2 3 4	1 2 3 4	1 2 3 4
(B139) (Black)	(B119)	(132)	(B118) (Black)	(124)	
1 1 2 3 4 X 5	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8 9 10 11	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	

BR18-03B

6-2 LIGHTING (TAIL ILLUMINATION etc.)

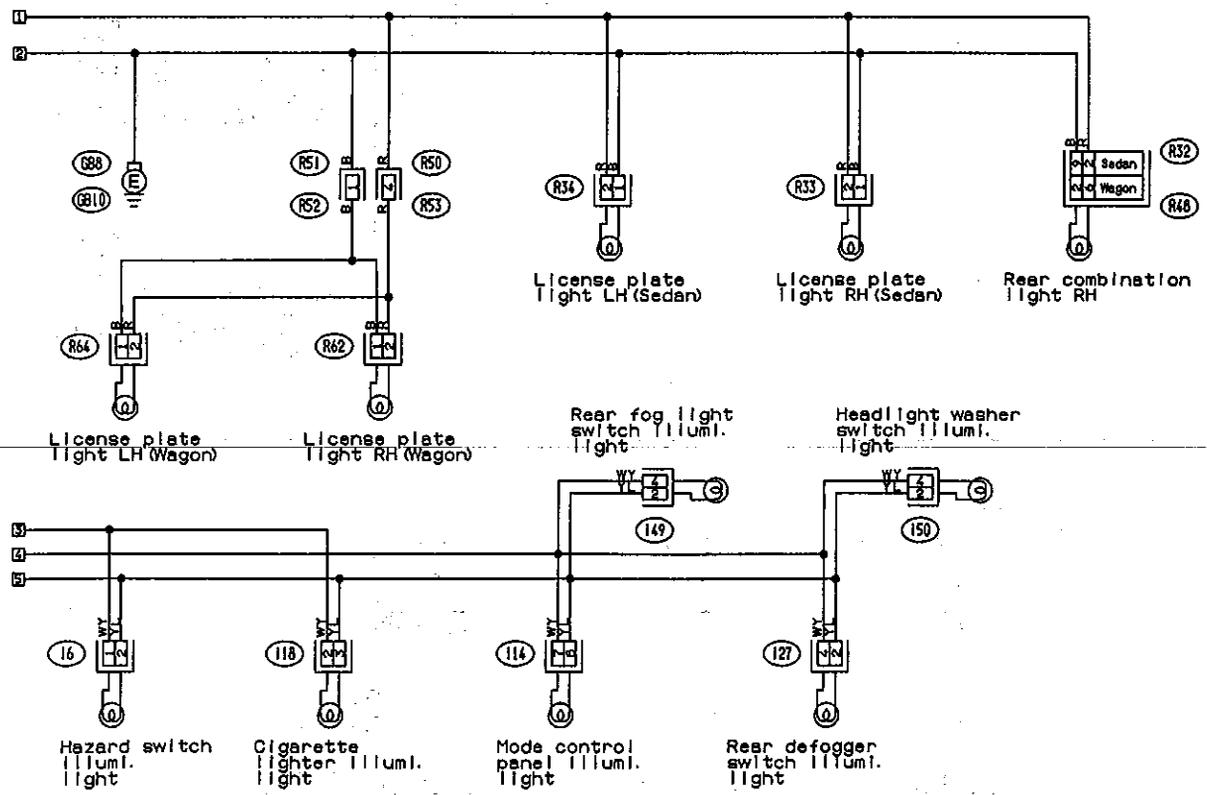
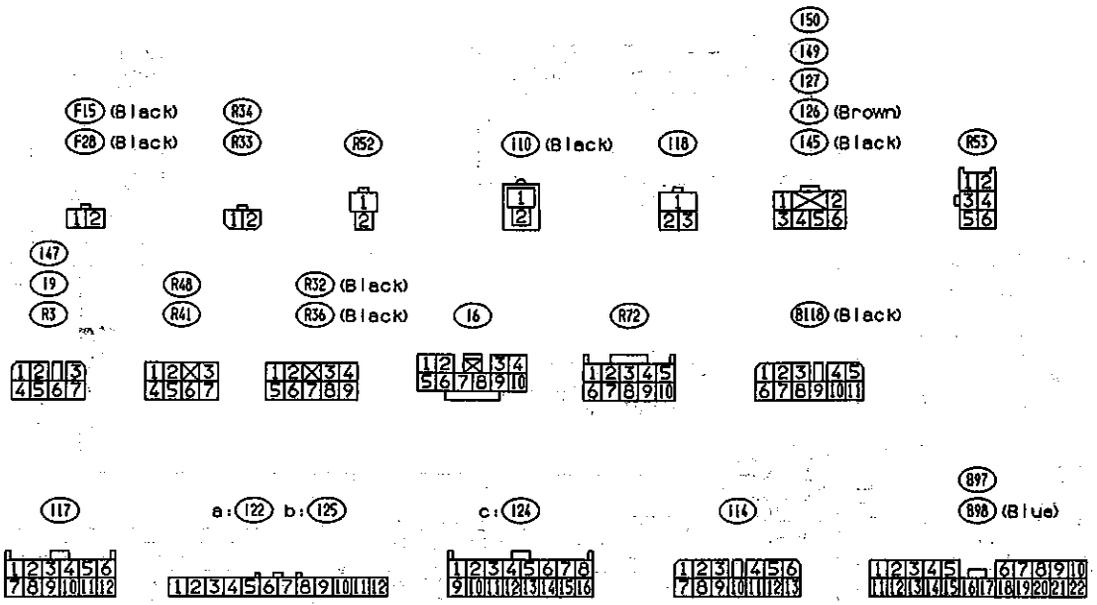


BR21-03A

Fig. 36

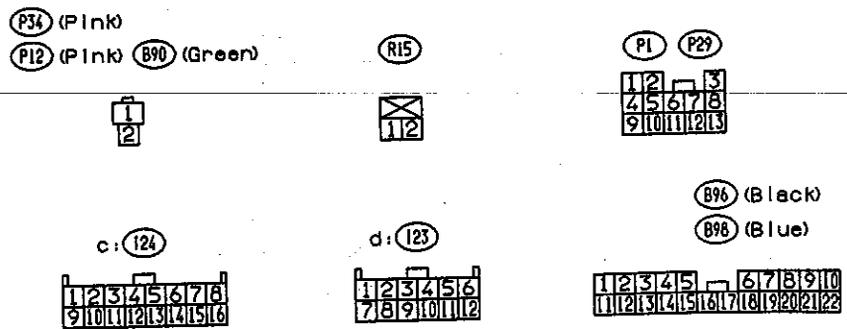
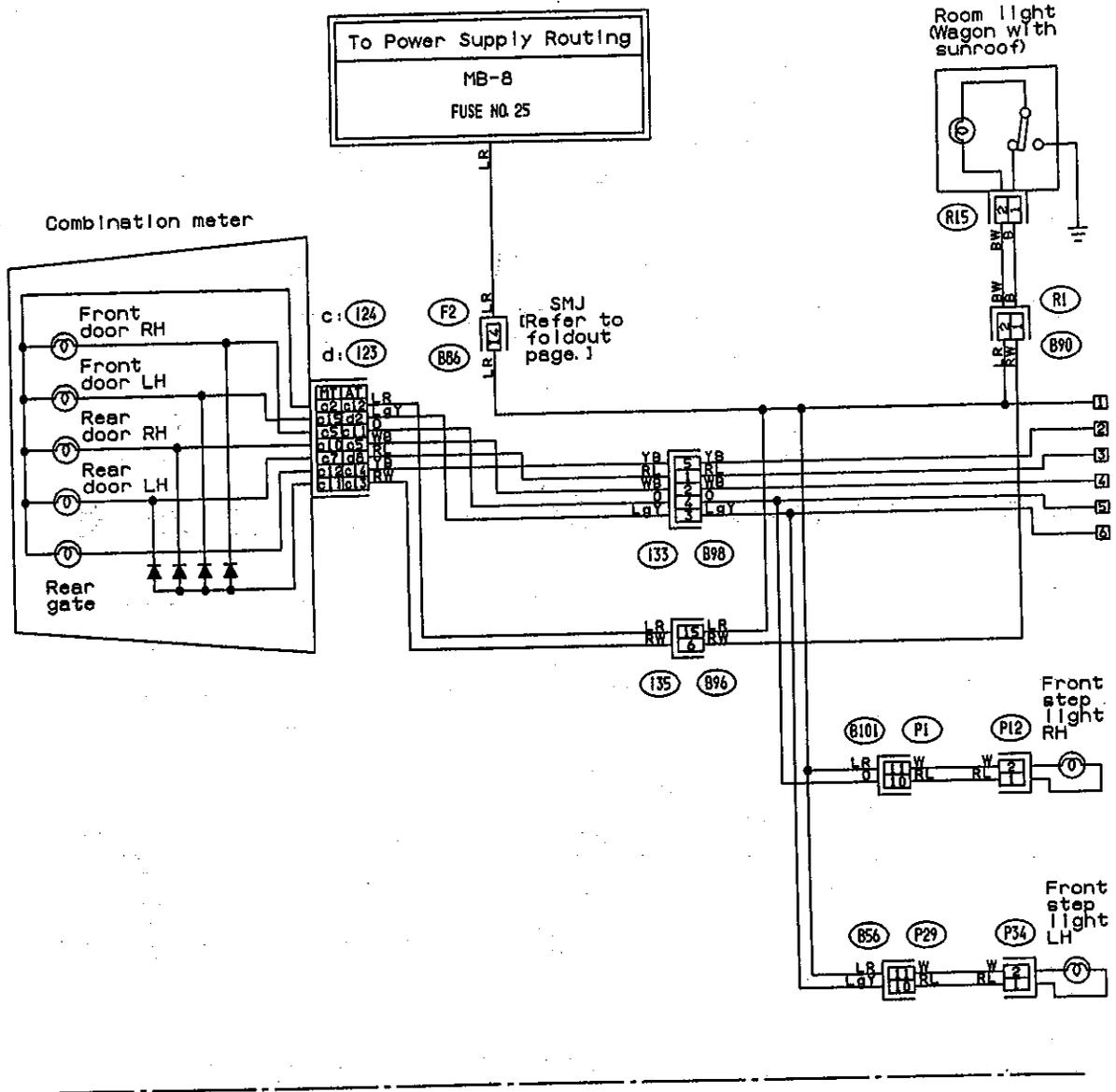
# WIRING DIAGRAM AND TROUBLESHOOTING

[0506] 6-3



8R21-03B

7. ROOM LIGHT AND DOOR SWITCH  
With Step Light

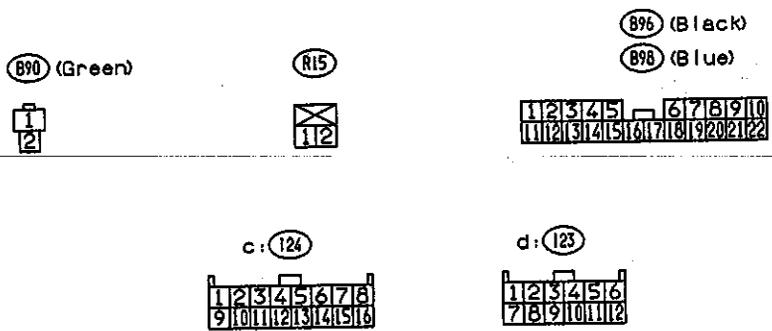
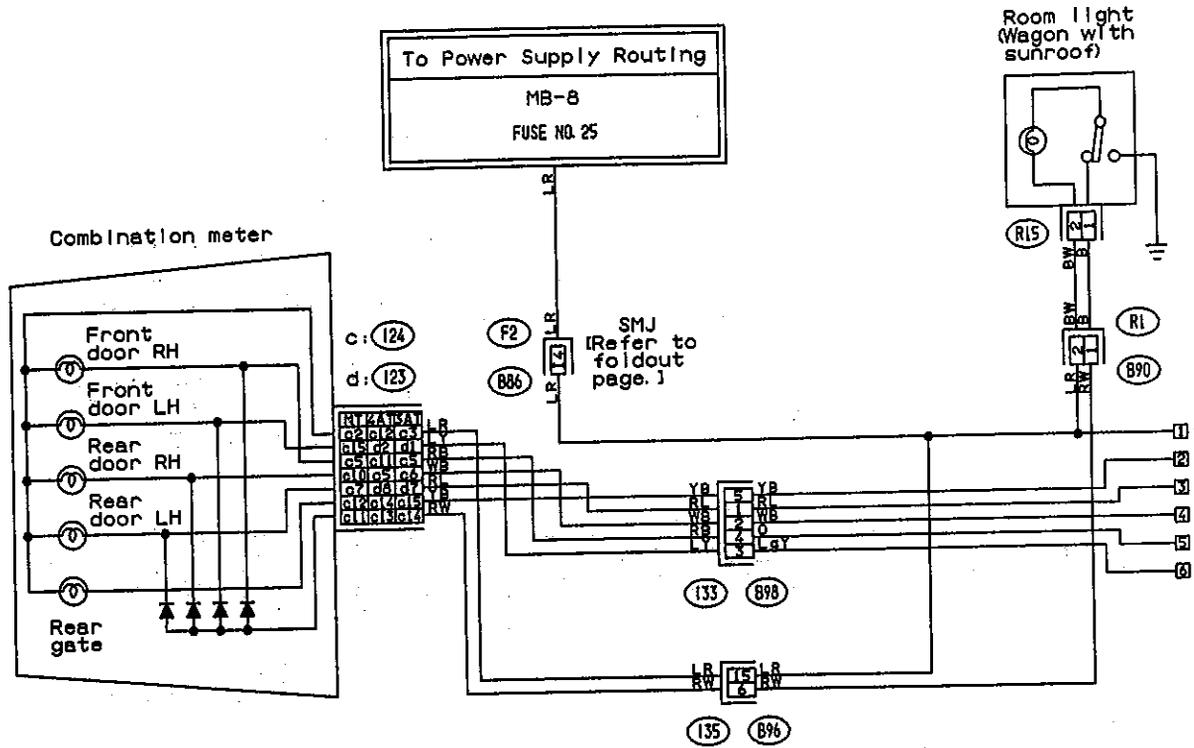


BR23-03A

Fig. 37-1

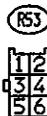
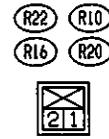
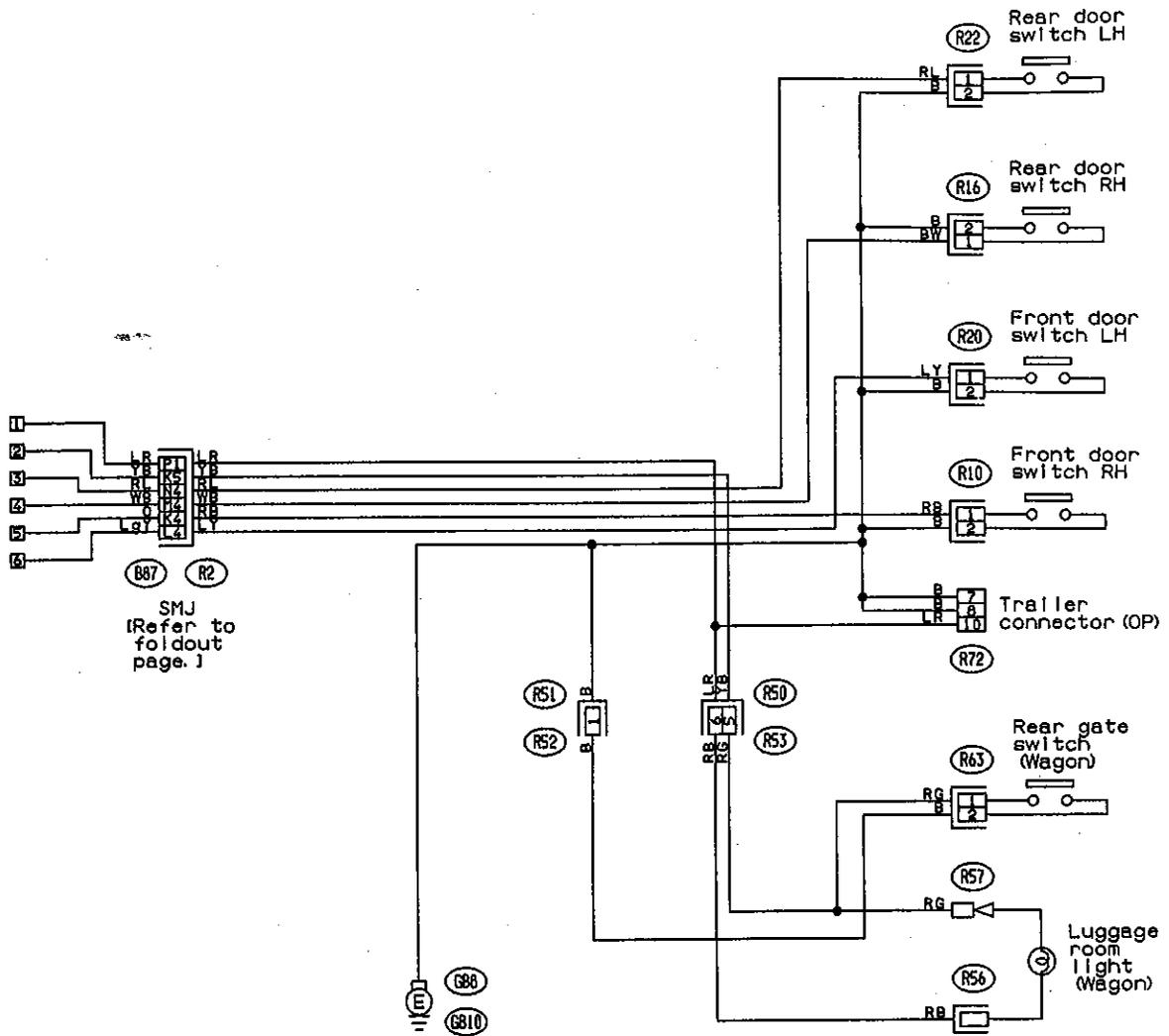


Without Step Light



BR24-03A

Fig. 37-2



BR24-03B

8. STOP LIGHT

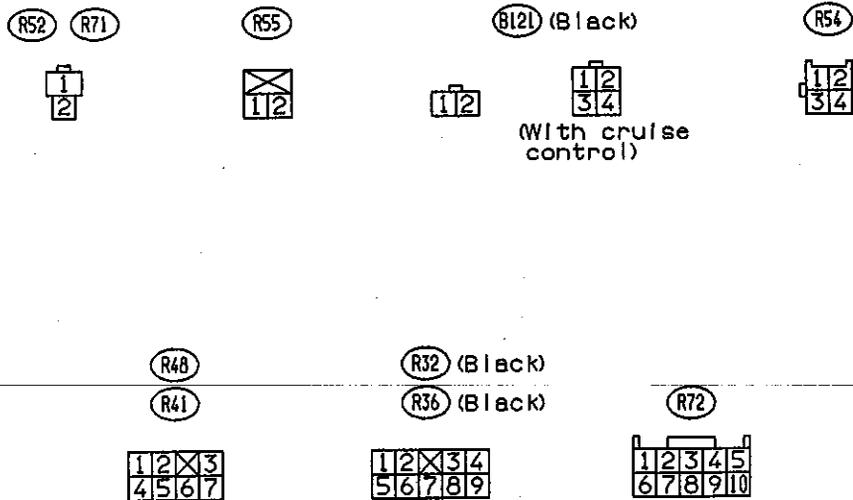
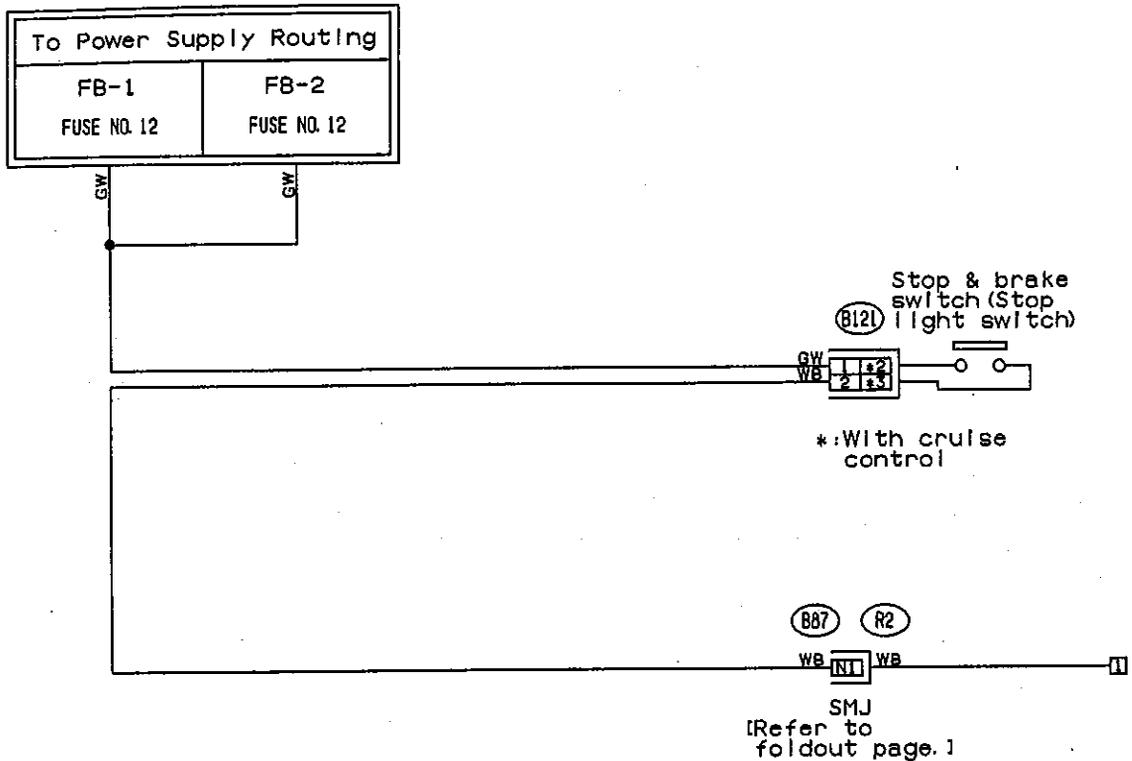
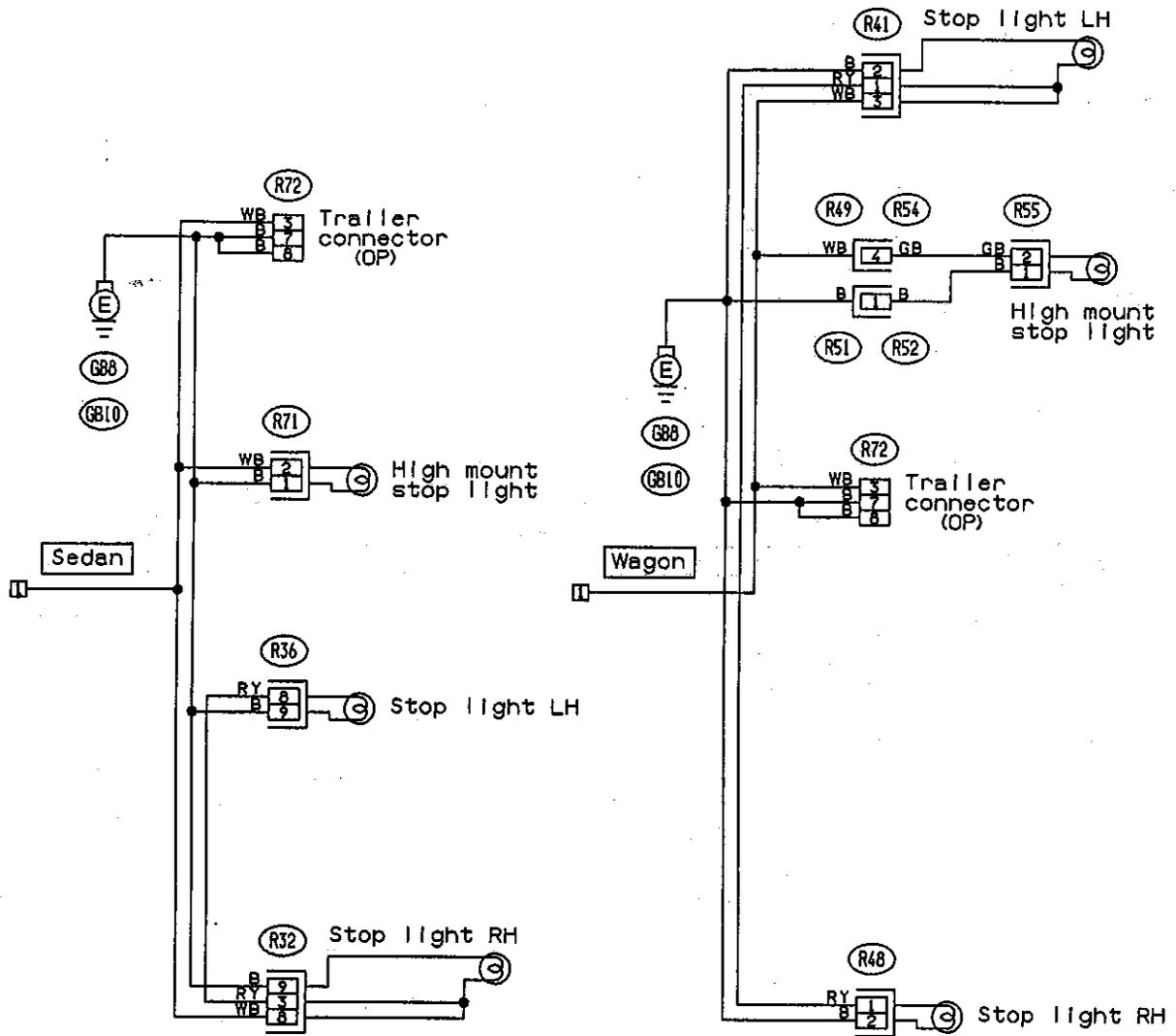


Fig. 38

BR25-02A



BR25-02B

9. TURN SIGNAL AND HAZARD

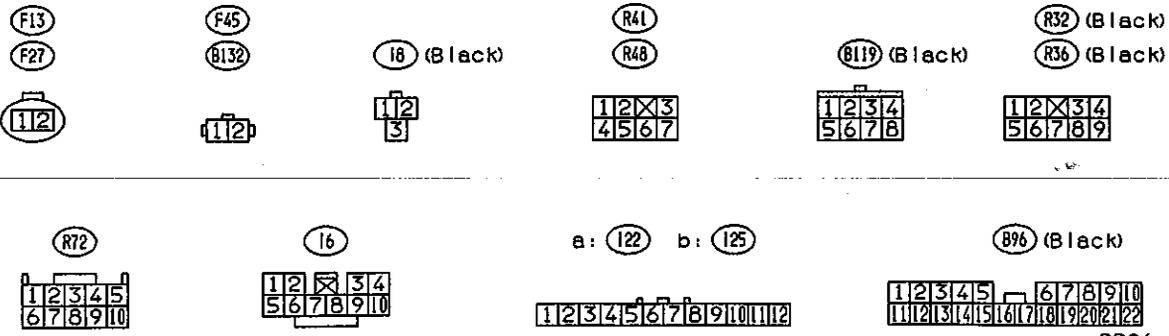
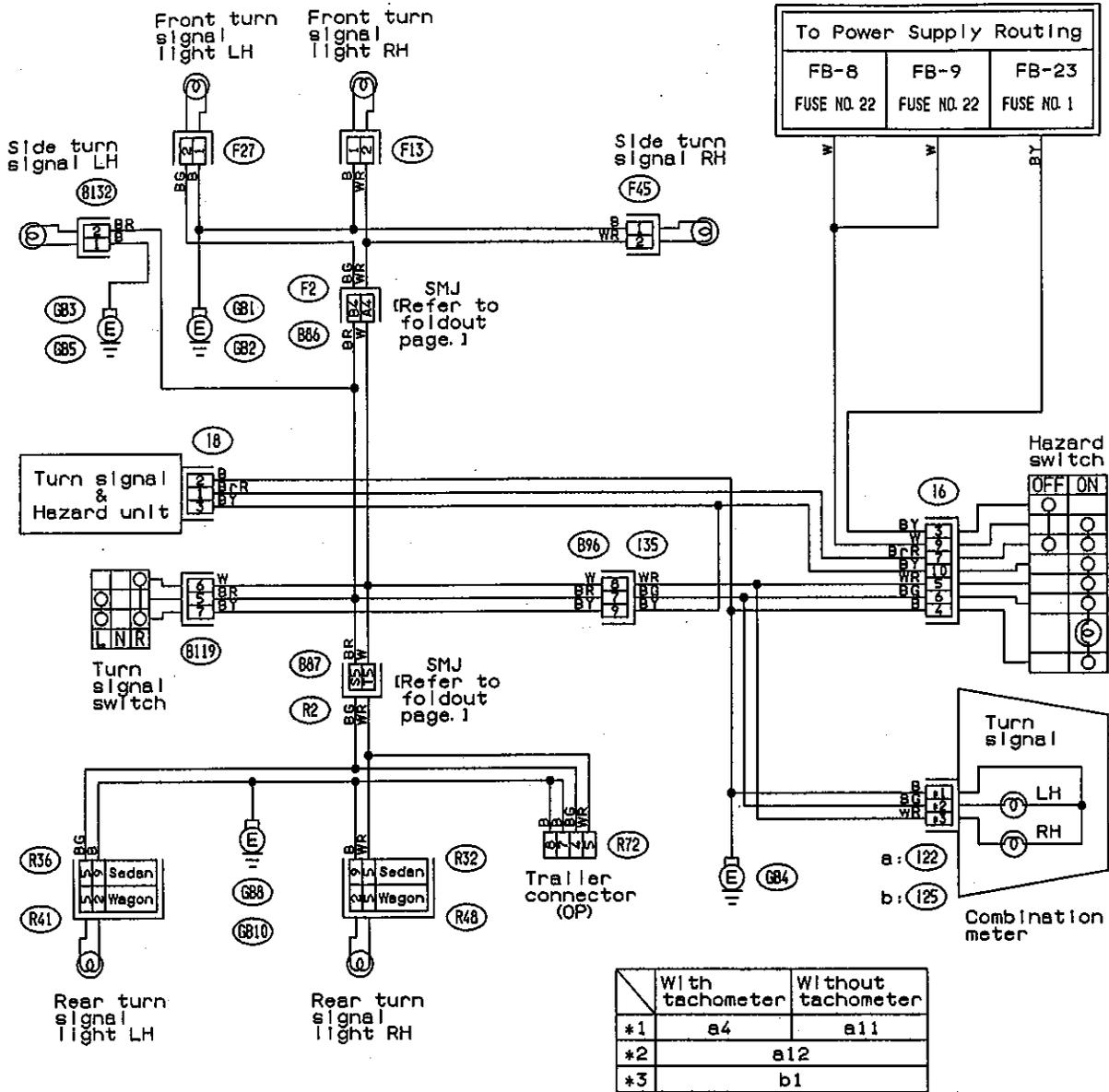


Fig. 39

BR26-02

10. TRUNK ROOM LIGHT

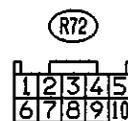
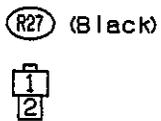
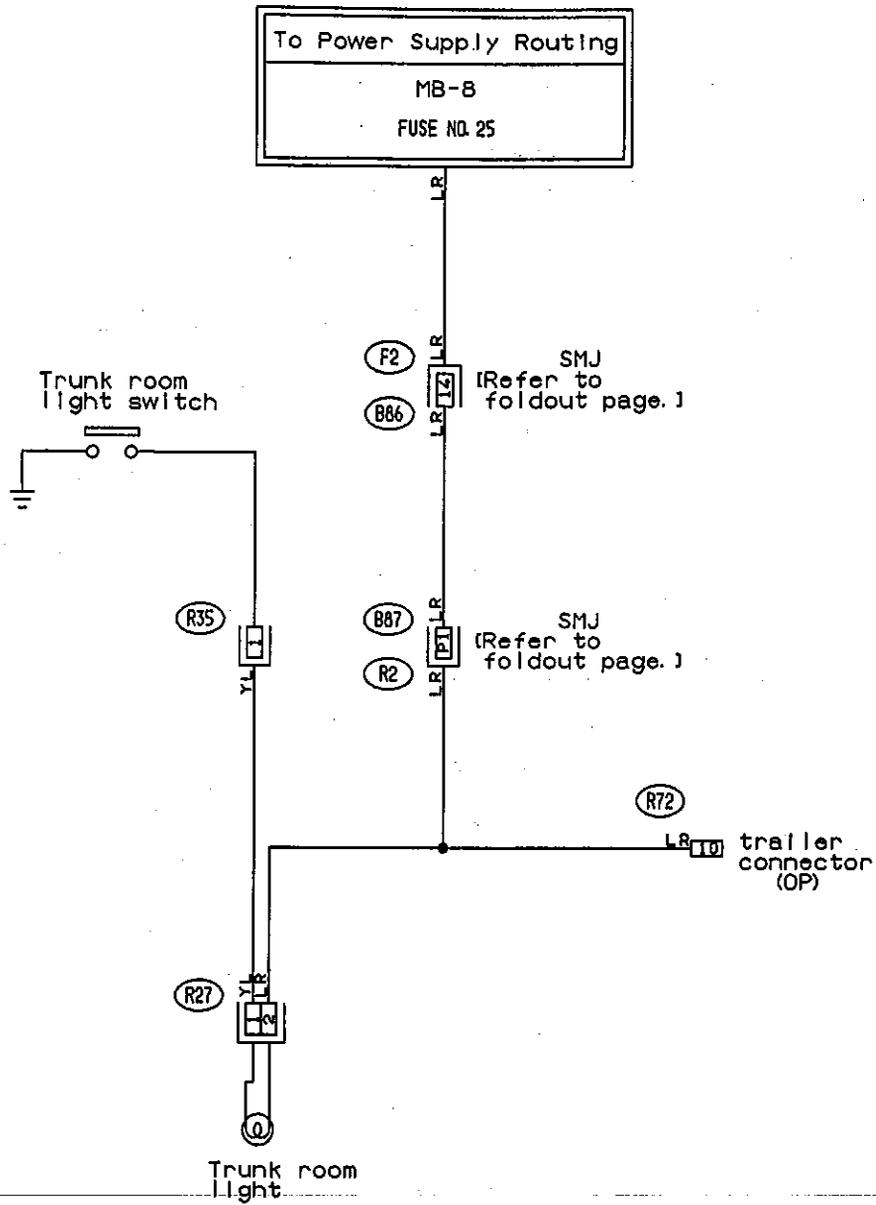
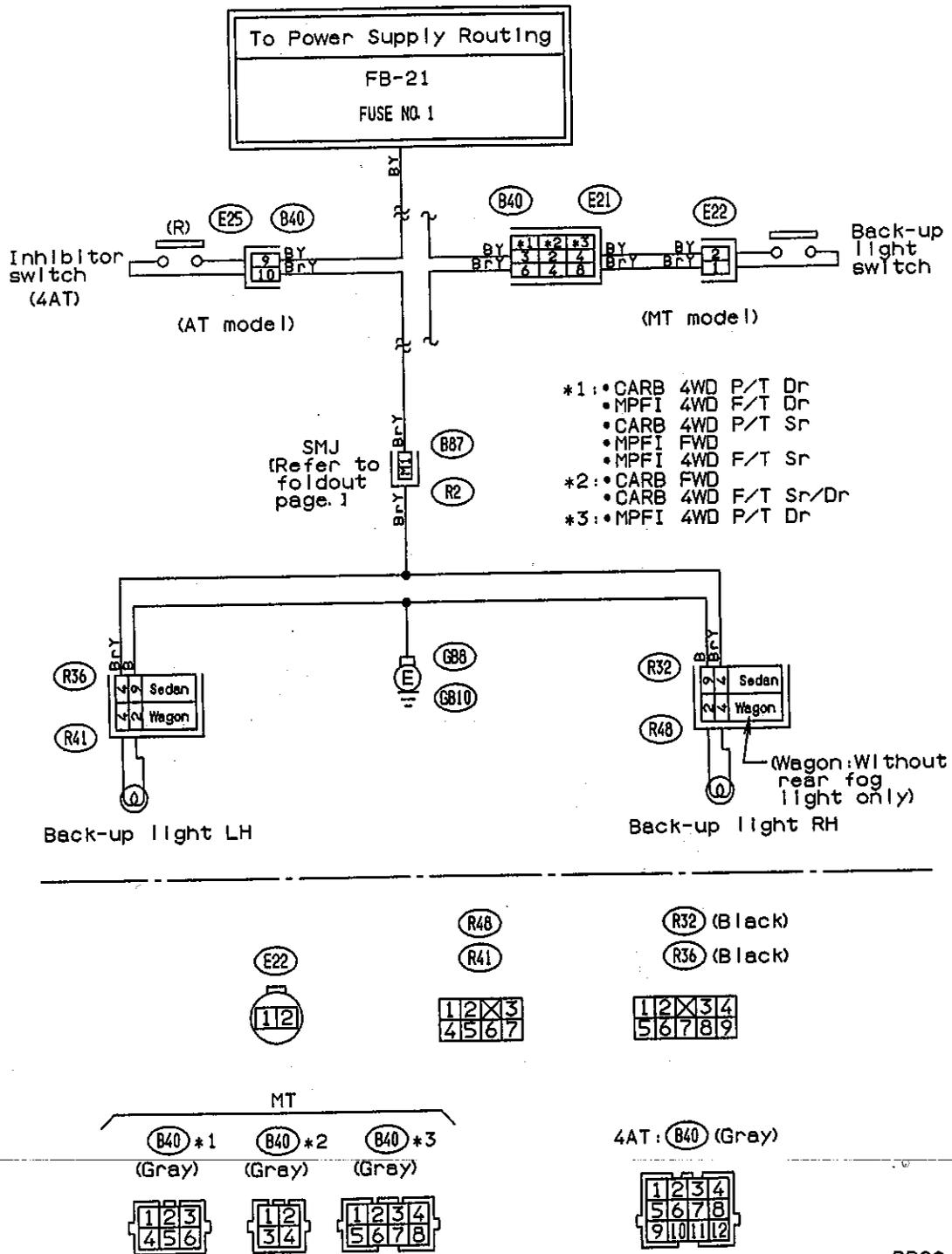


Fig. 40

BR28-02

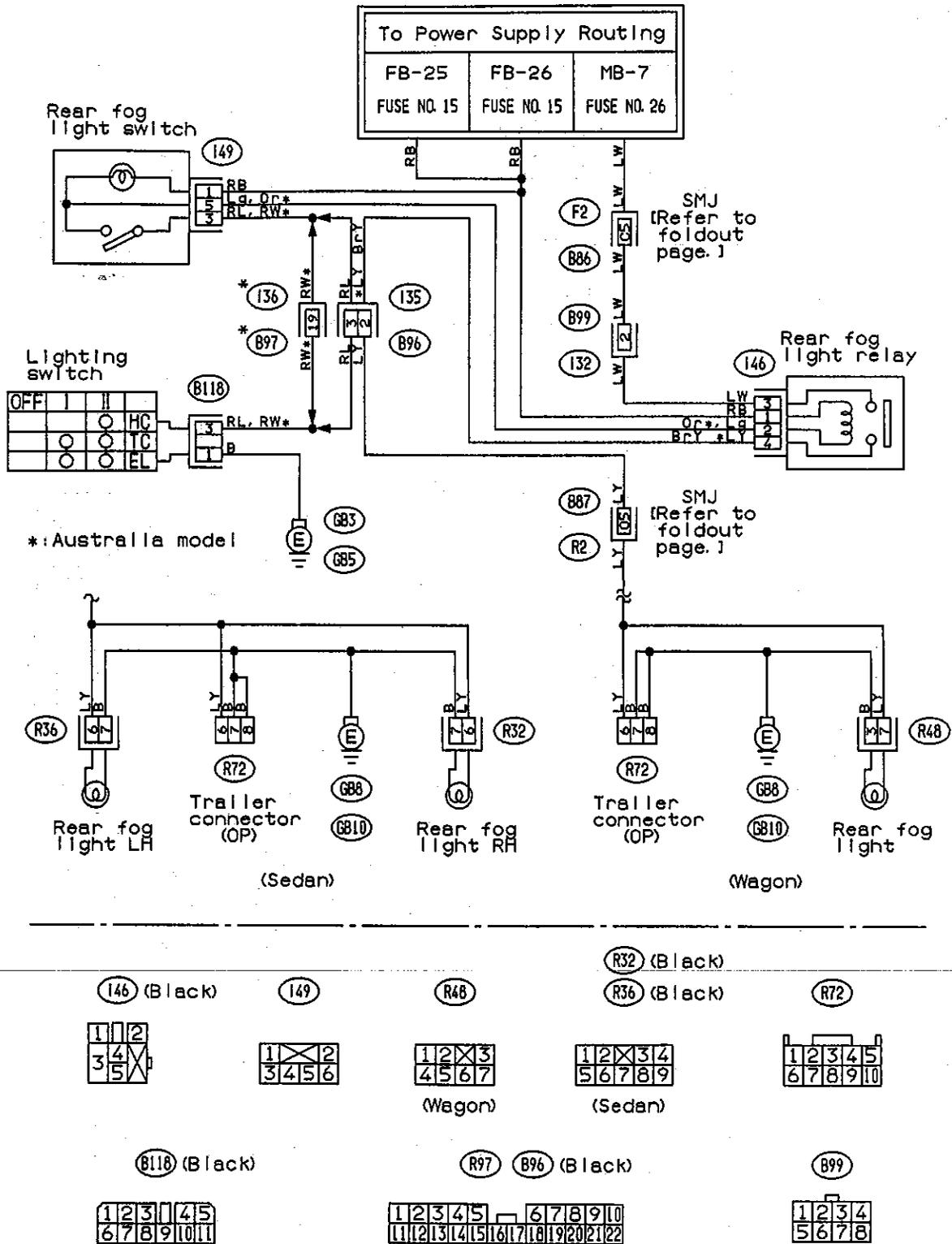
11. BACK-UP LIGHT



BR29-02

Fig. 41

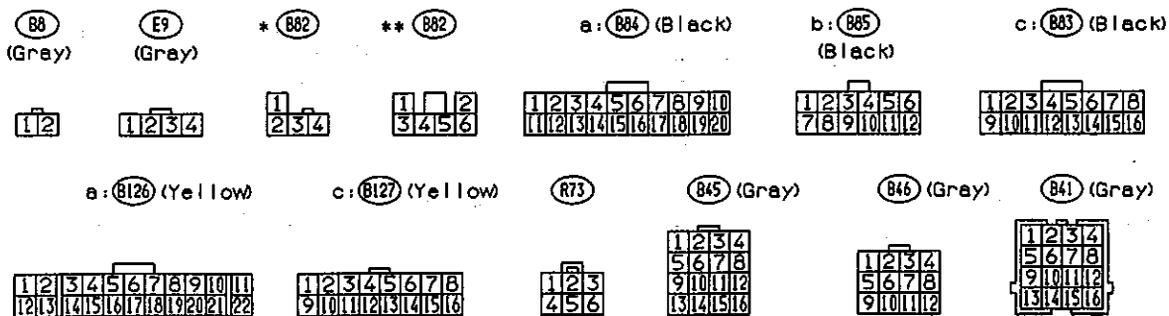
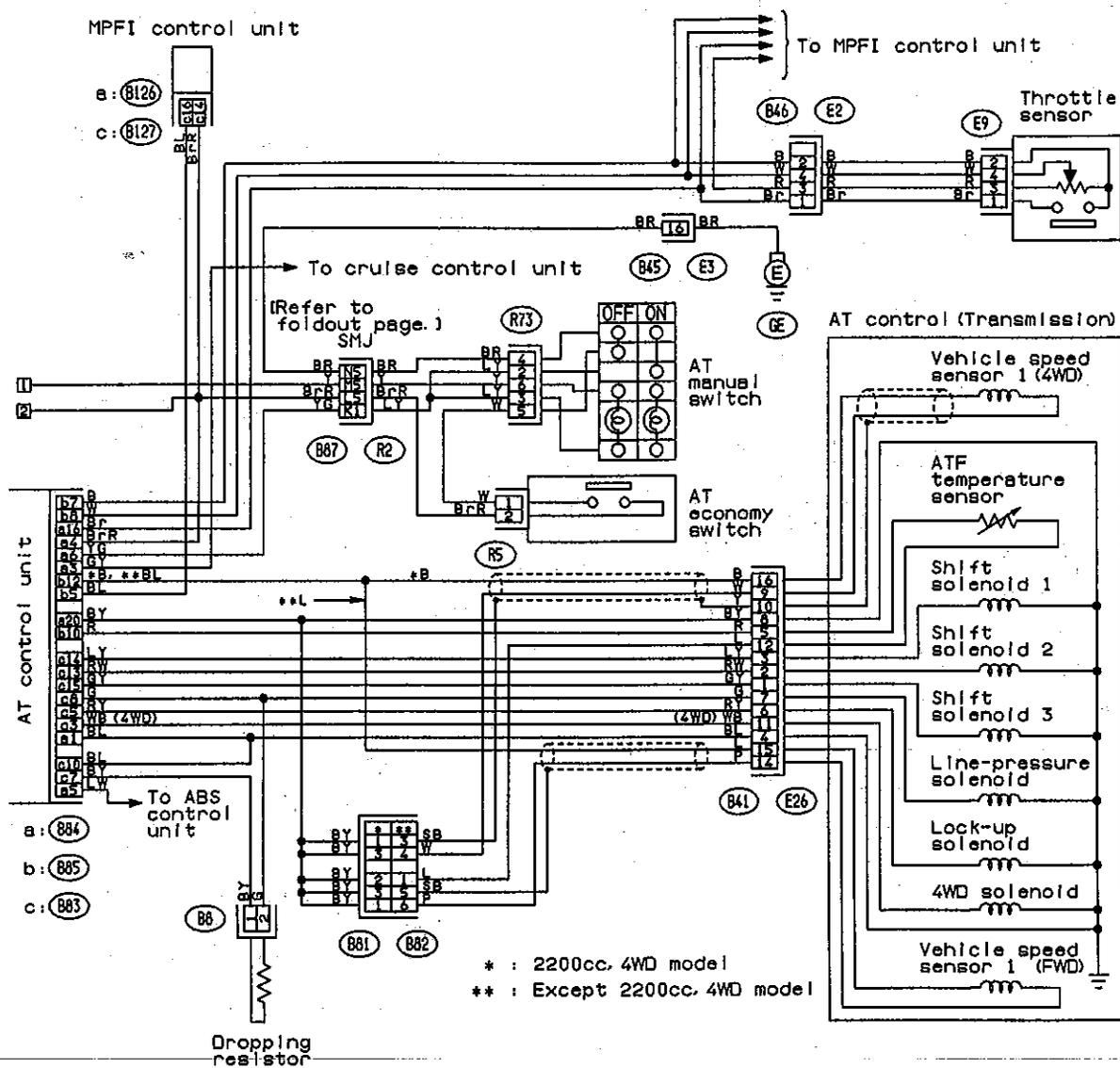
12. REAR FOG LIGHT



BR30-02

Fig. 42





BR41-06B

CARBURETOR MODEL

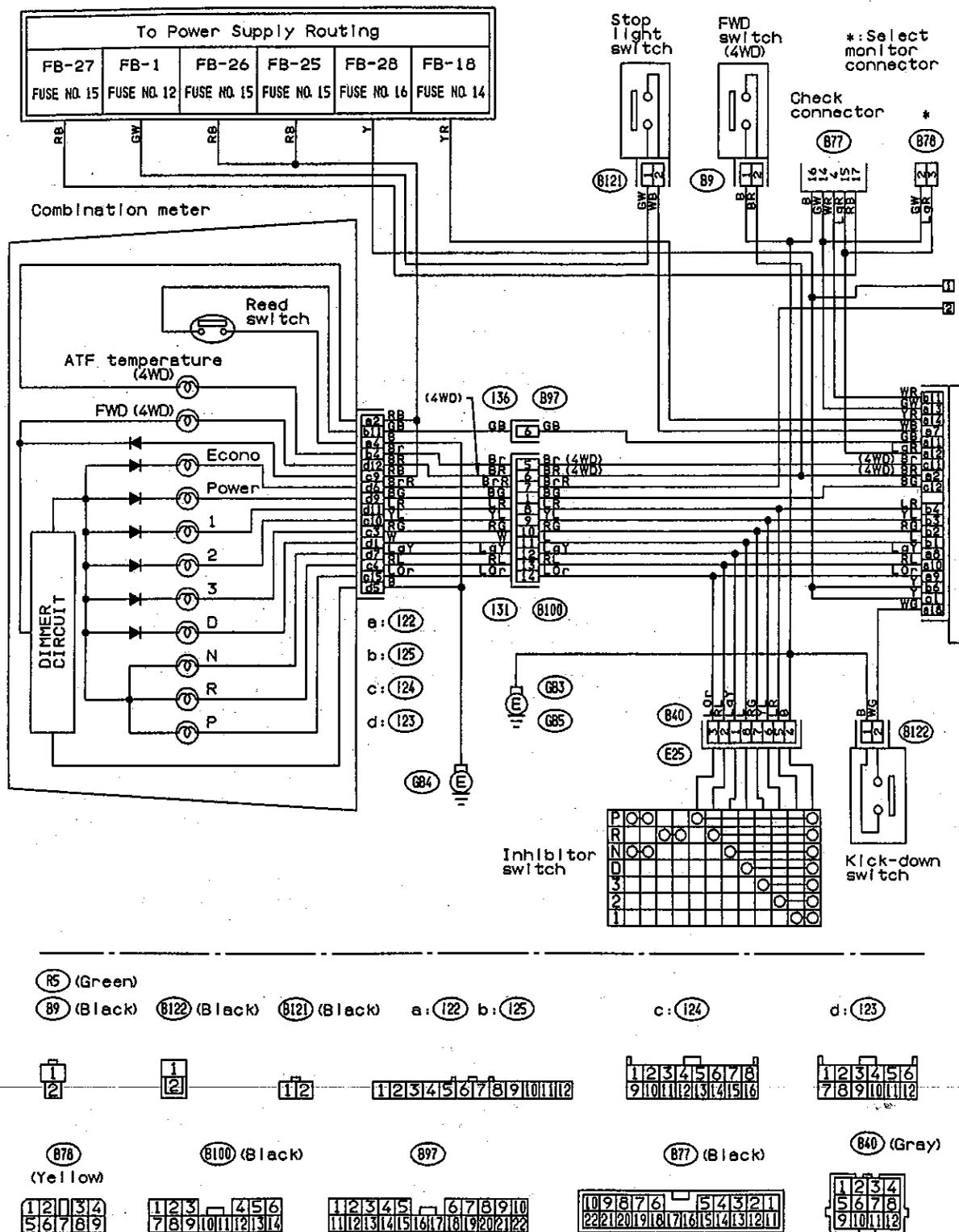
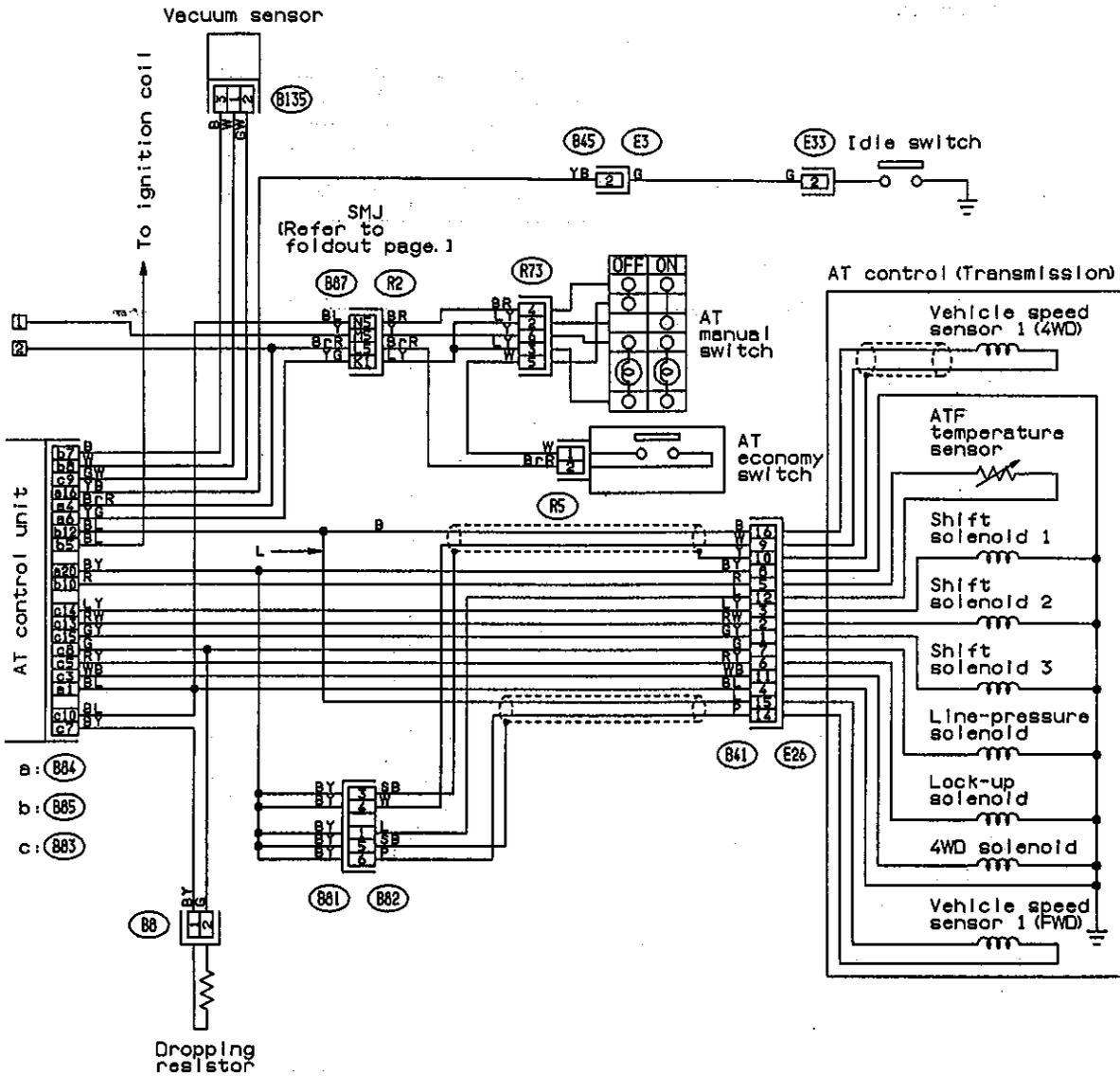
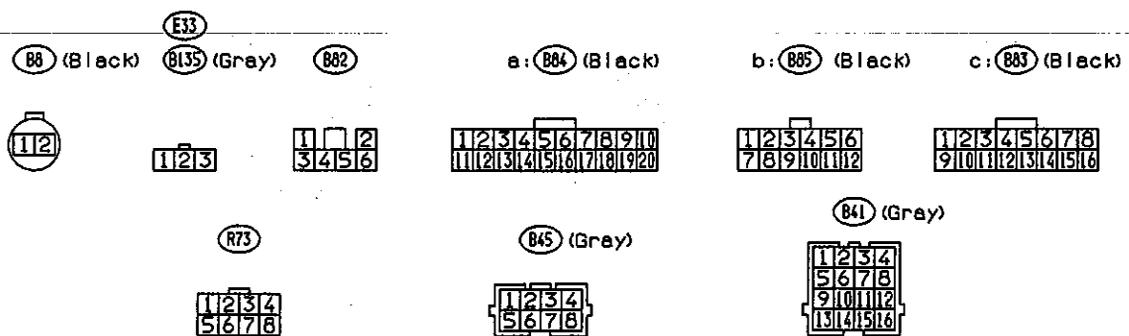


Fig. 43-2



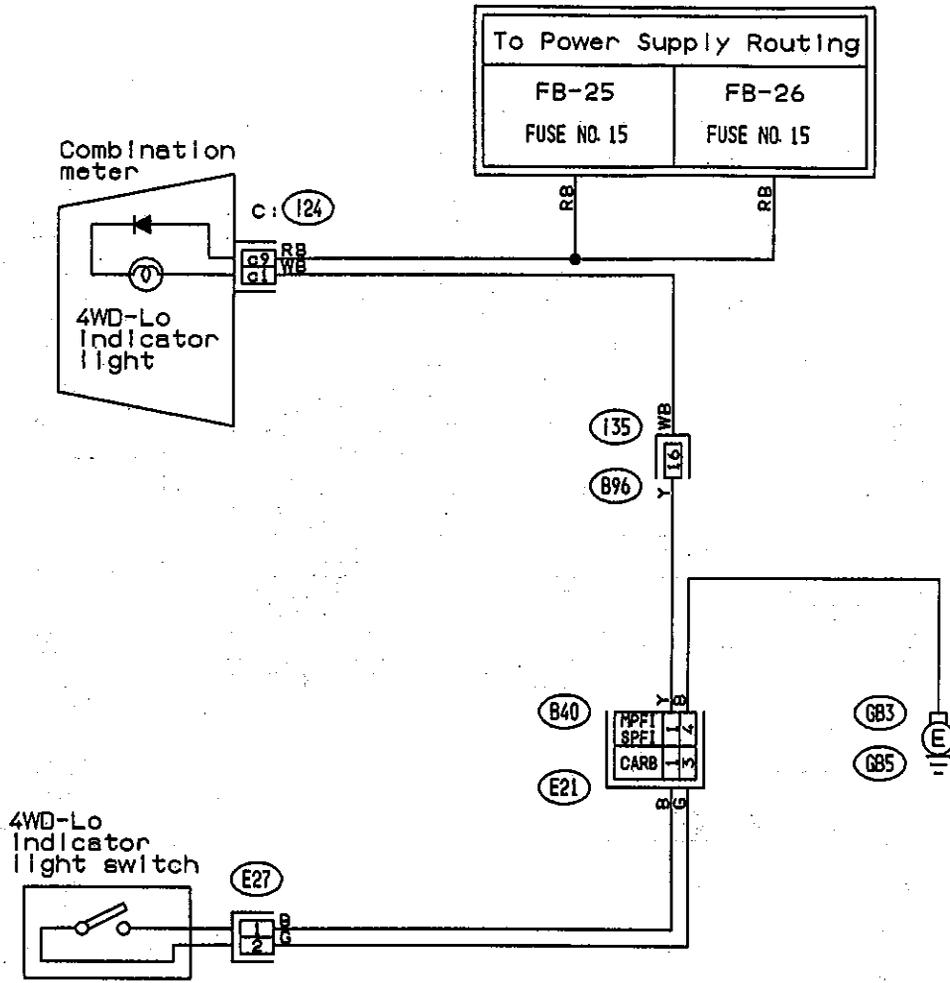
- a: 884
- b: 885
- c: 883



BR41-07B

14. 4WD—MT

FULL-TIME DUAL RANGE



(E27)

(B40) (Gray)

(B40) (Gray)



(Carburetor engine model)

(MPFI/SPFI engine model)

c: (124)

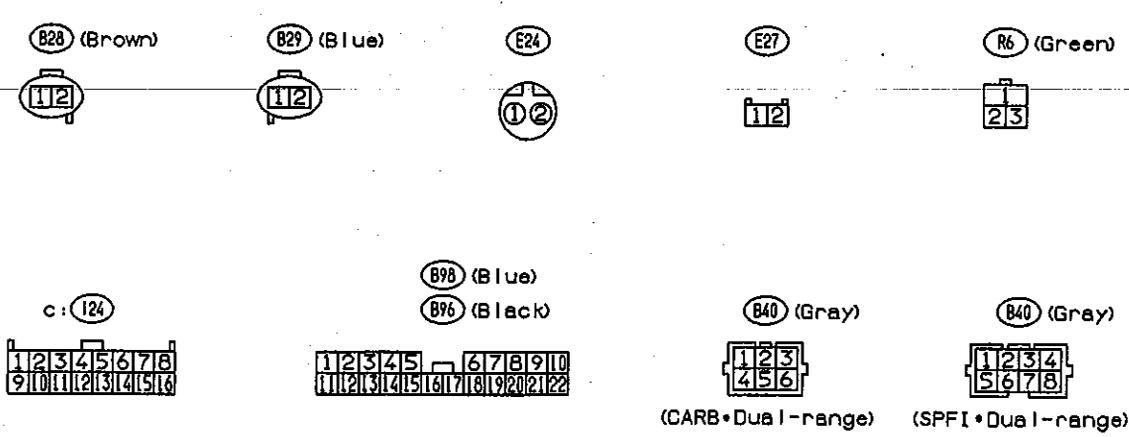
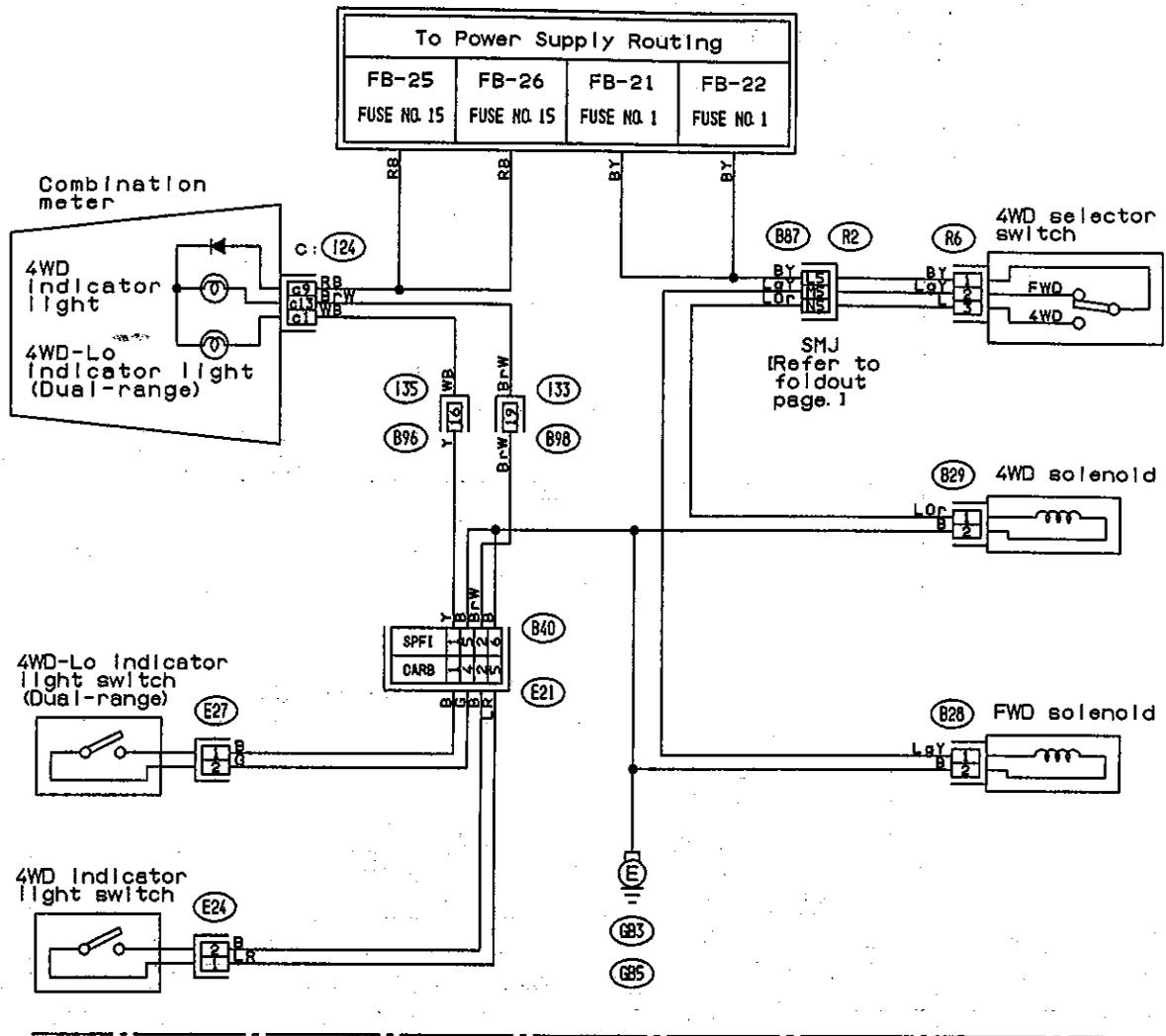
(B96) (Black)



BR40-05

Fig. 44-1

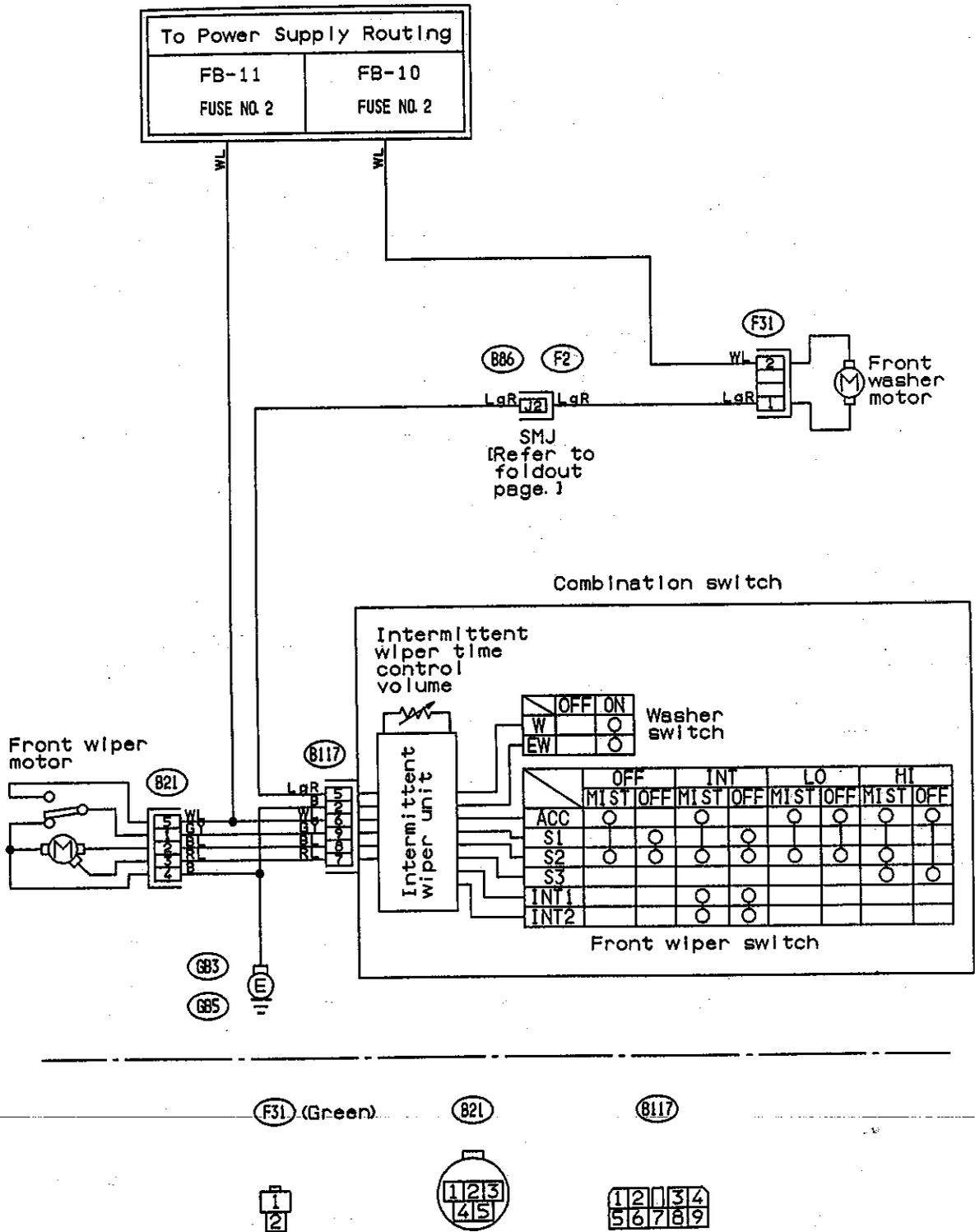
PART-TIME DUAL RANGE



BR40-06

Fig. 44-2

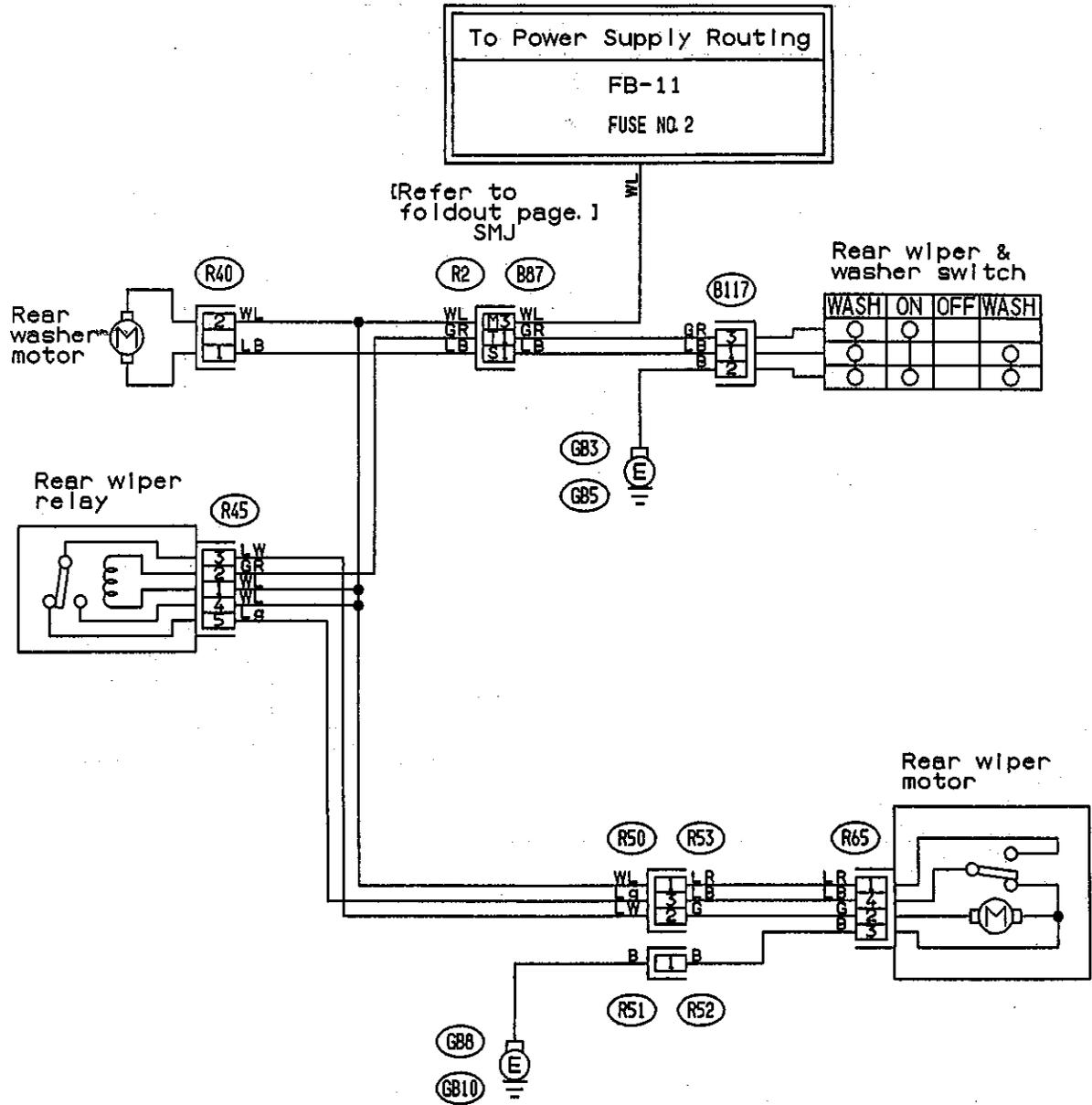
15. FRONT WIPER AND WASHER



BR50-02

Fig. 45

16. REAR WIPER AND WASHER



(R40) (Green)

(R52)

(R65)

(R45)

(R53)

(B117)  
(Black)

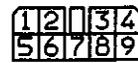


Fig. 46

BR51-02

17 HEADLIGHT WASHER

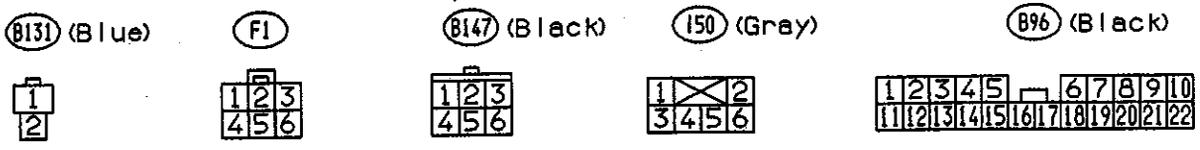
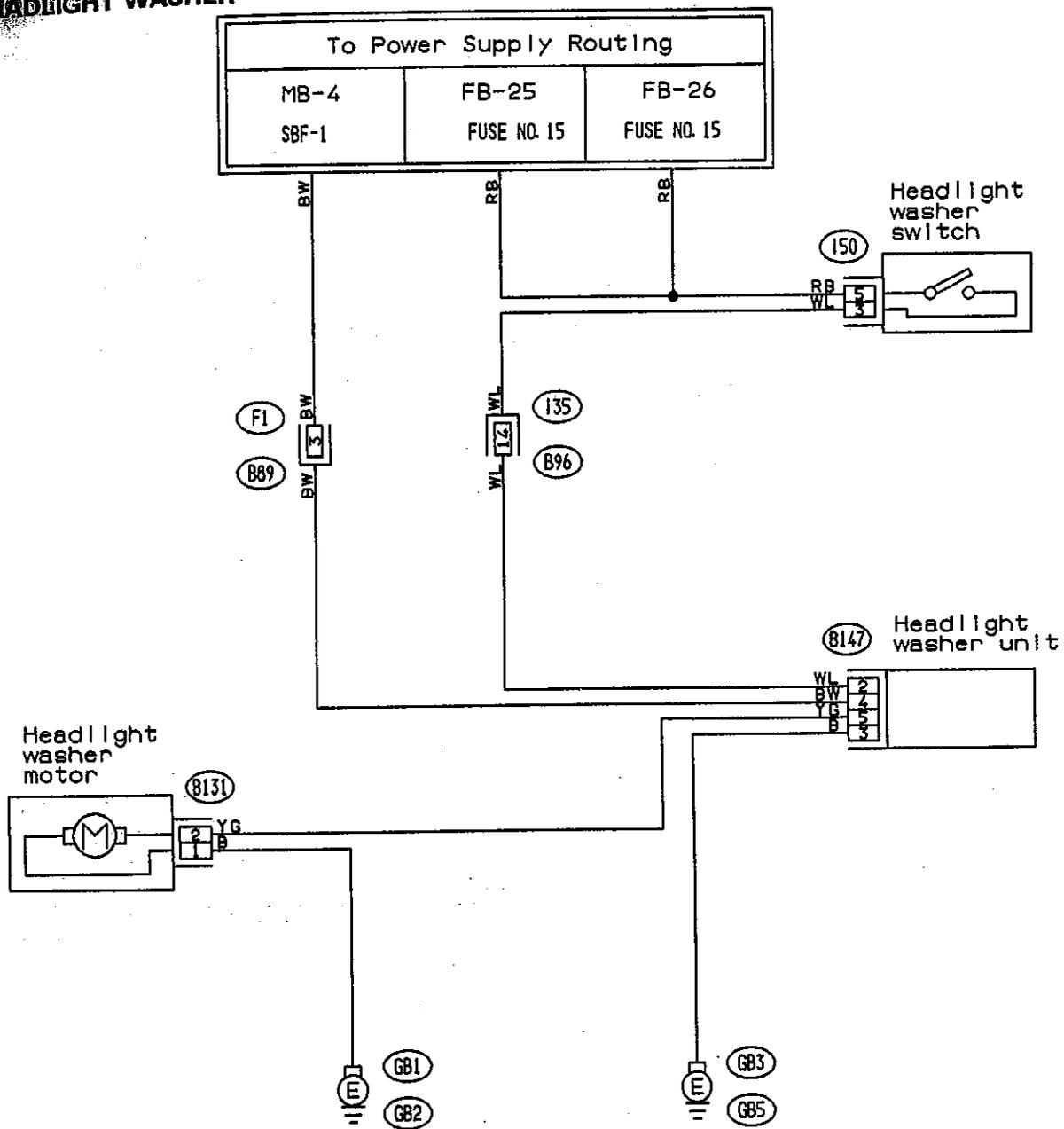
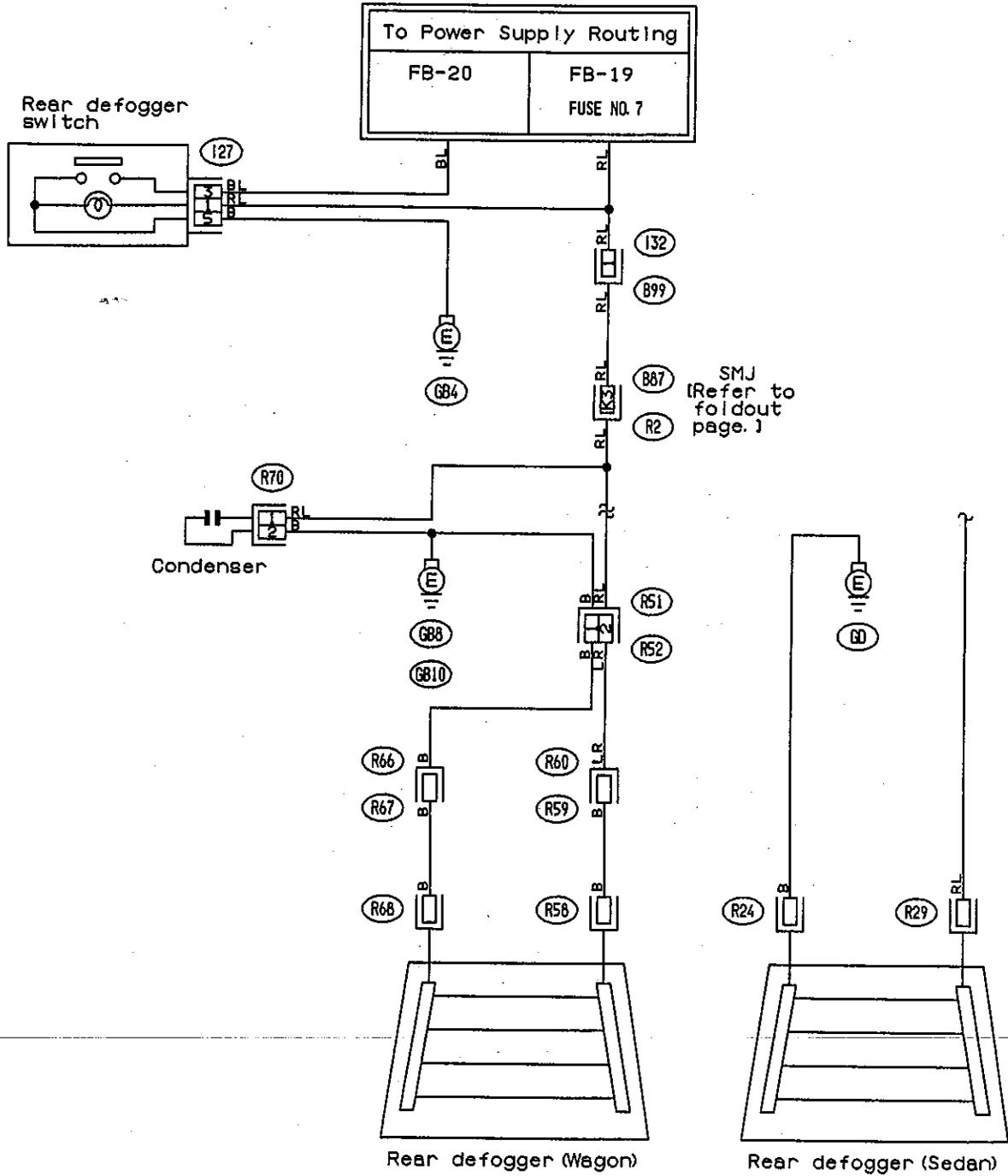


Fig. 47

BR53-02

18. REAR WINDOW DEFOGGER



SMJ  
[Refer to  
foldout  
page.]

- (R52) (Black)
- (R70) (Black)

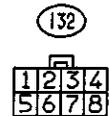
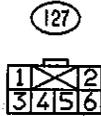
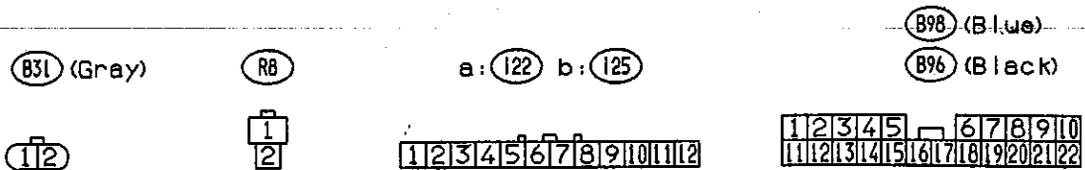
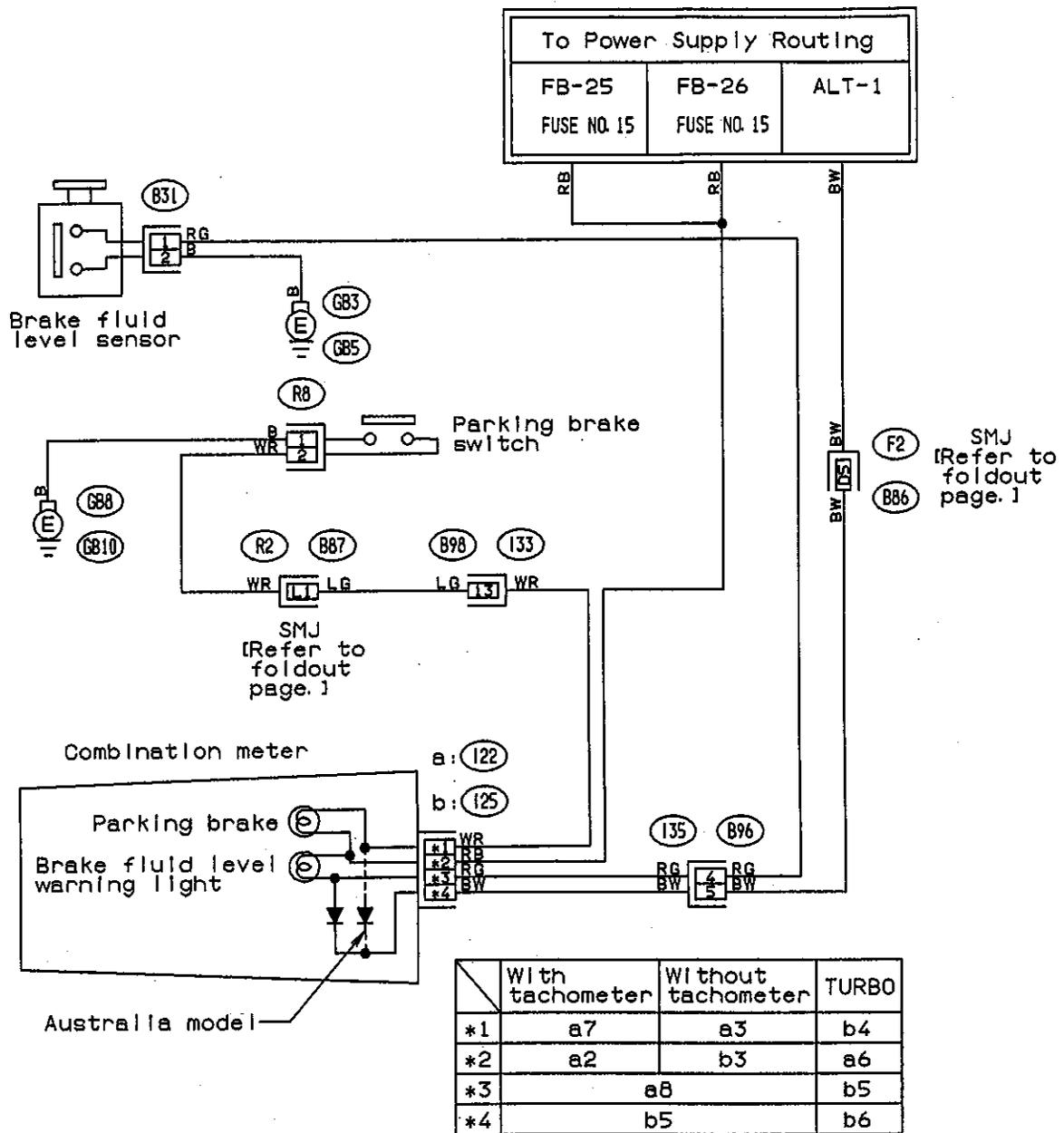


Fig. 48

BR52-03

19. PARKING BRAKE AND BRAKE FLUID LEVEL WARNING



BR60-02

Fig. 49



## 21. COMBINATION METER

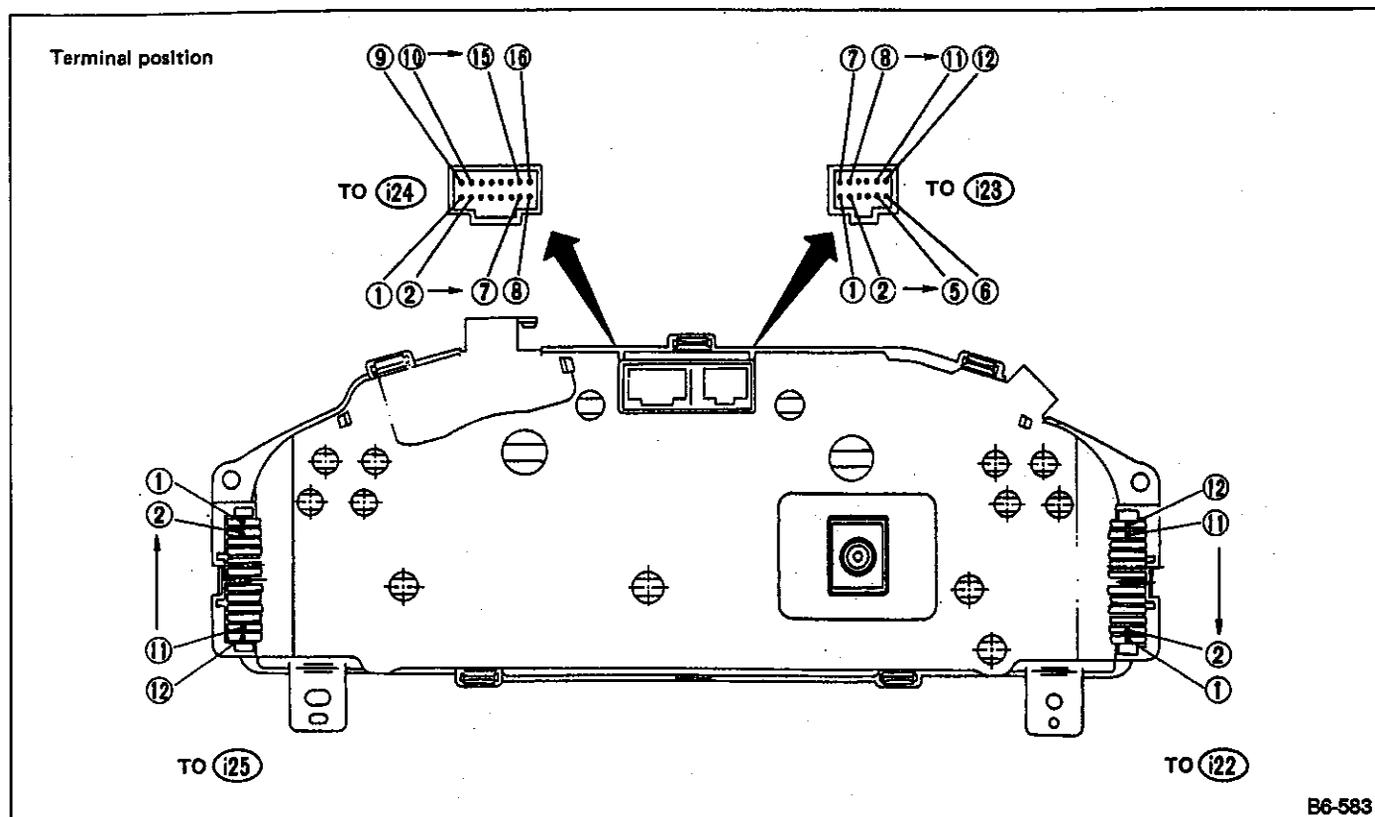


Fig. 51

GRAPHIC MONITOR

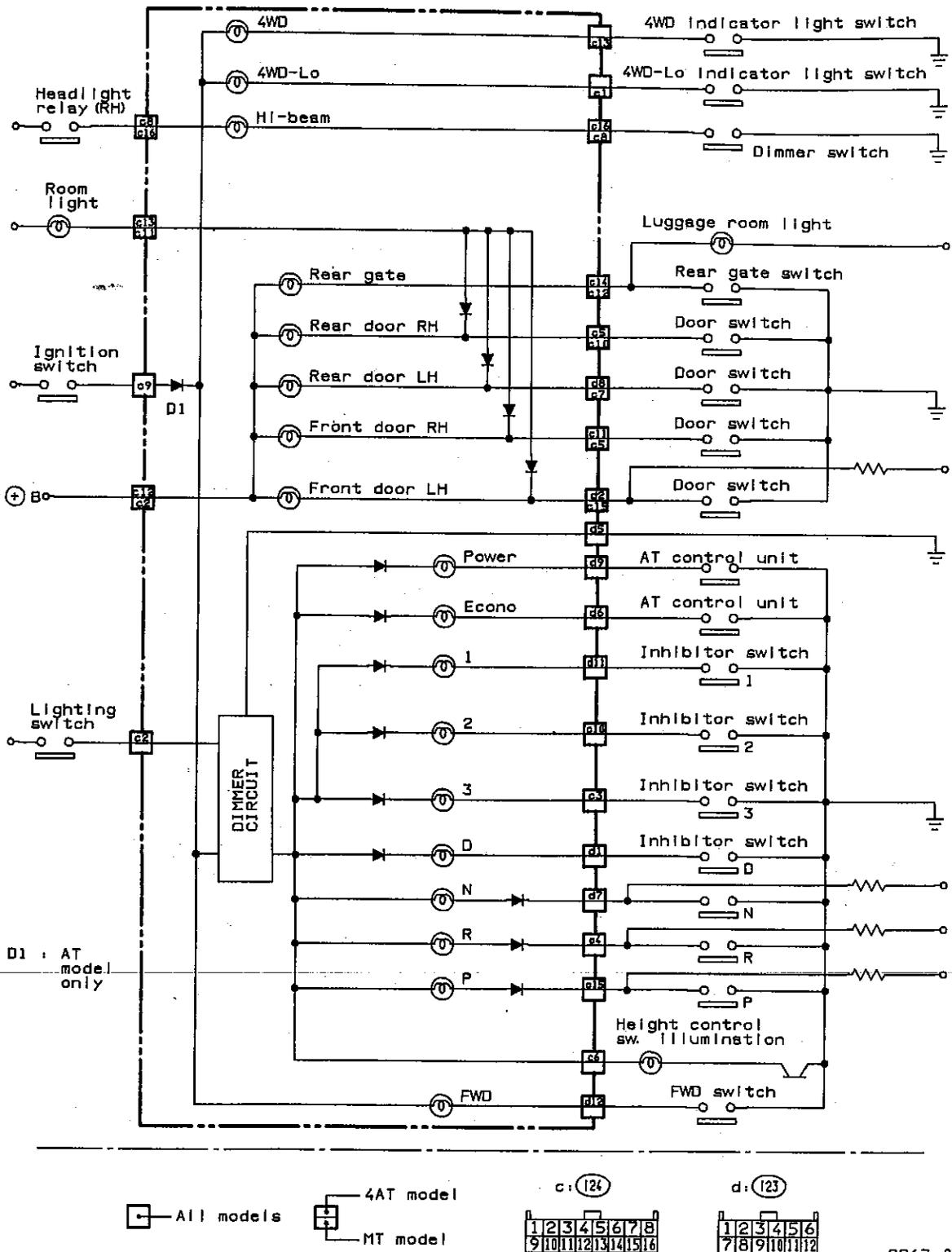
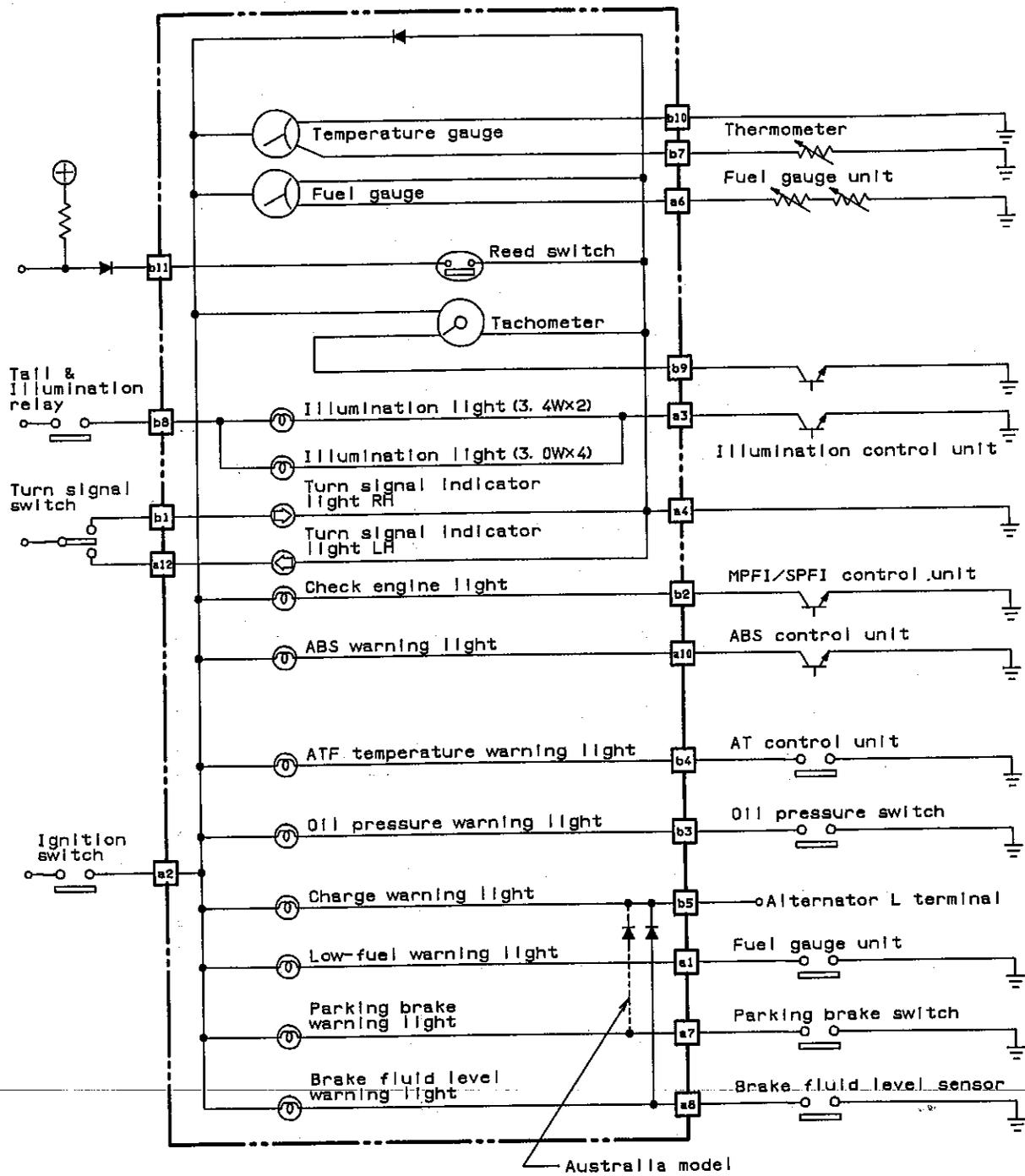


Fig. 52

BR67-03

WARNING AND ILLUMINATION

1. With tachometer (NA) model



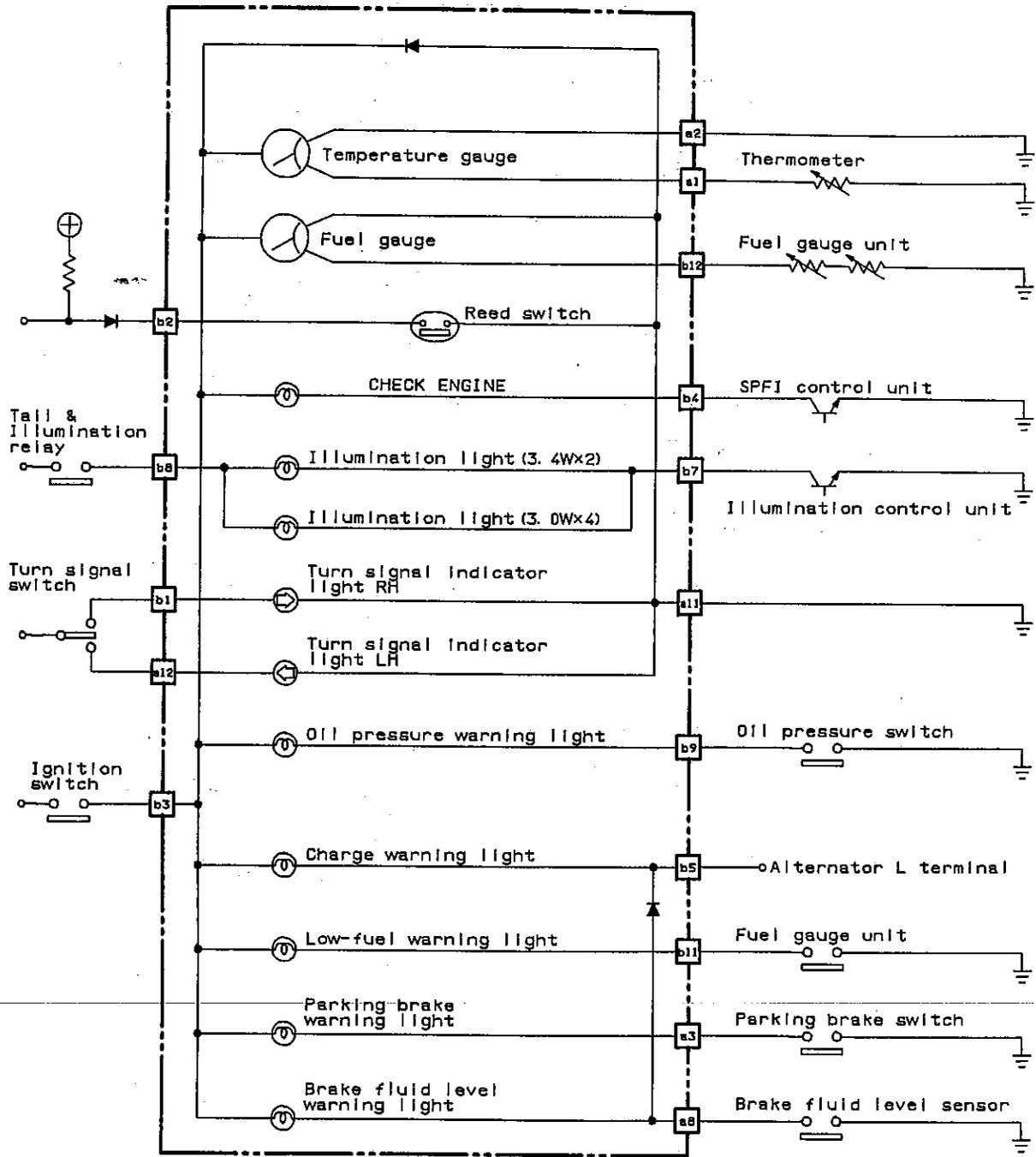
a: 122 b: 125

1 2 3 4 5 6 7 8 9 10 11 12

BR65-03

Fig. 53-1

2. Without tachometer model



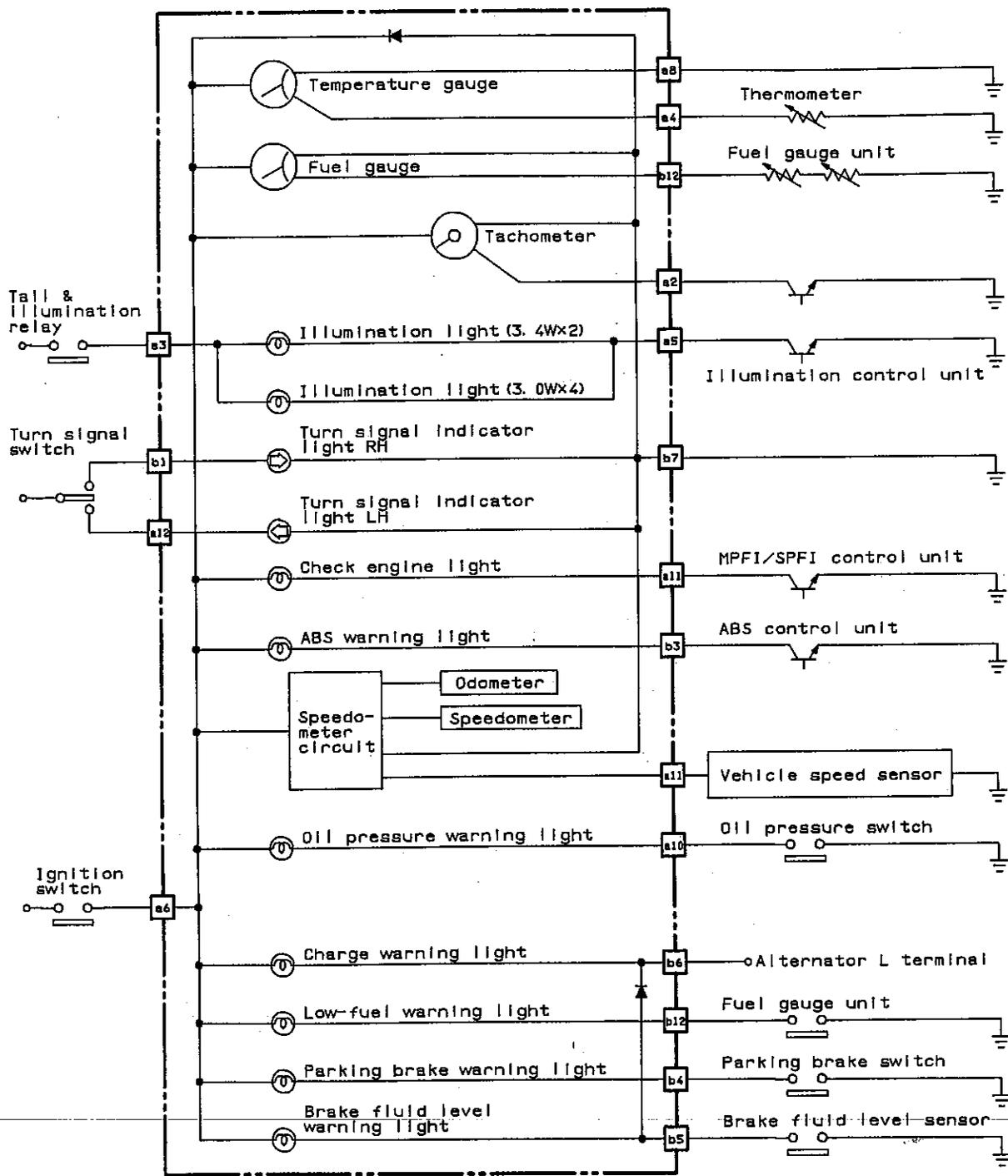
a: (122) b: (125)

1 2 3 4 5 6 7 8 9 10 11 12

BR64-03

Fig. 53-2

3. With tachometer (TURBO) model



a: 122 b: 125

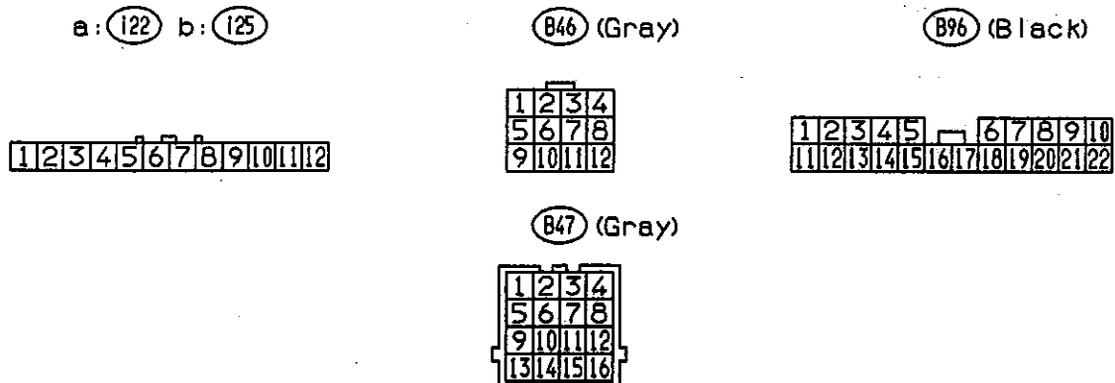
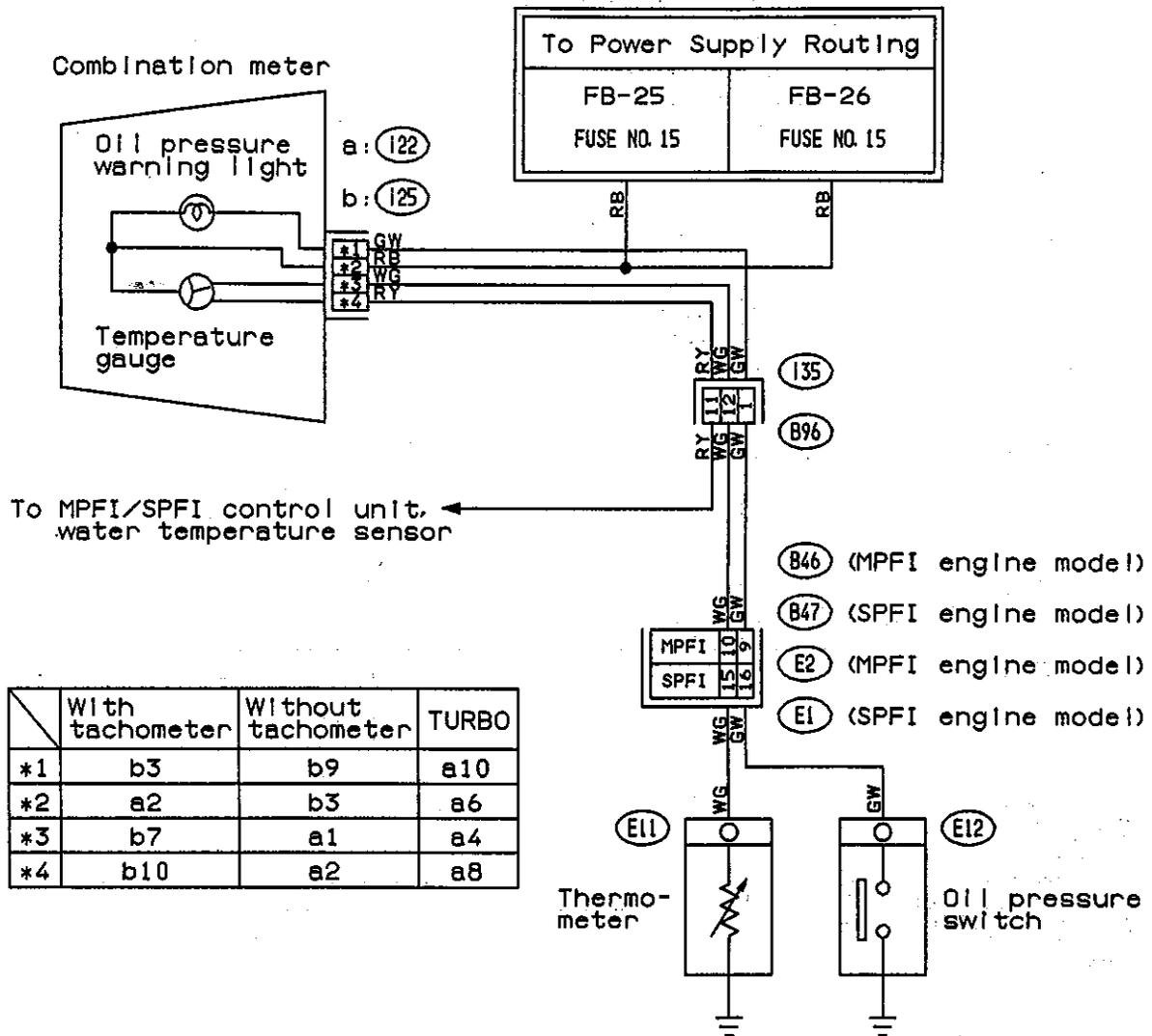
1 2 3 4 5 6 7 8 9 10 11 12

BR65-04

Fig. 53-3

22. OIL PRESSURE AND TEMPERATURE GAUGE

MPFI/SPFI MODEL (Refer to "Engine Electrical" for carburetor models.)



BR66-03

Fig. 54

23. POWER WINDOW

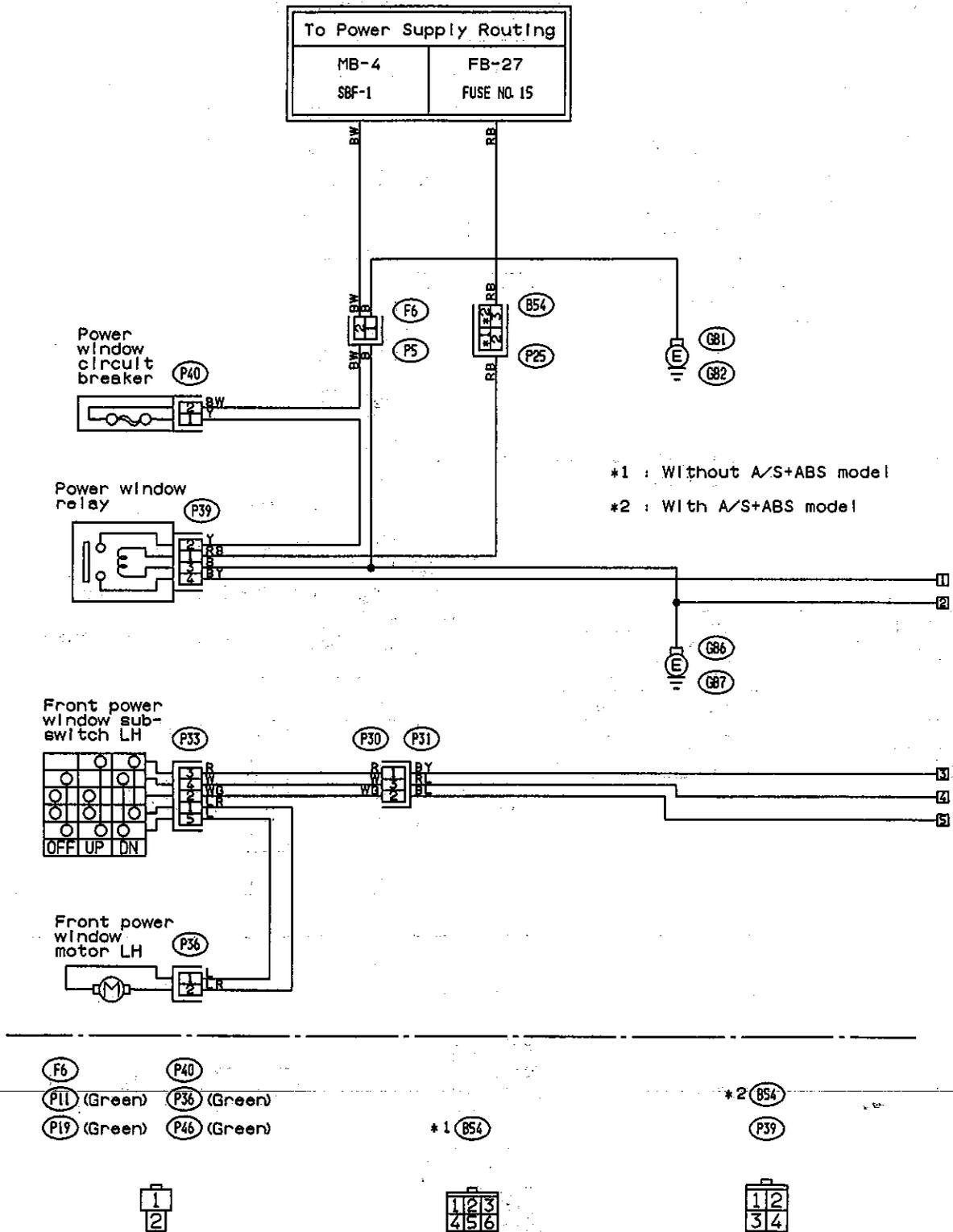
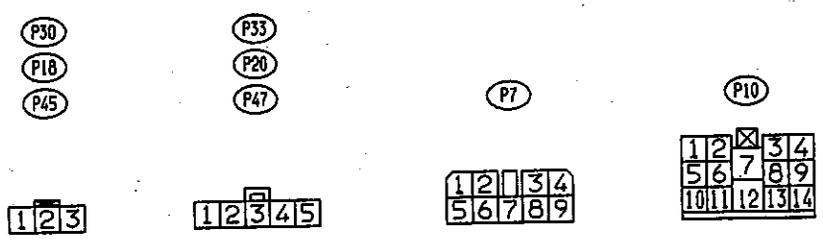
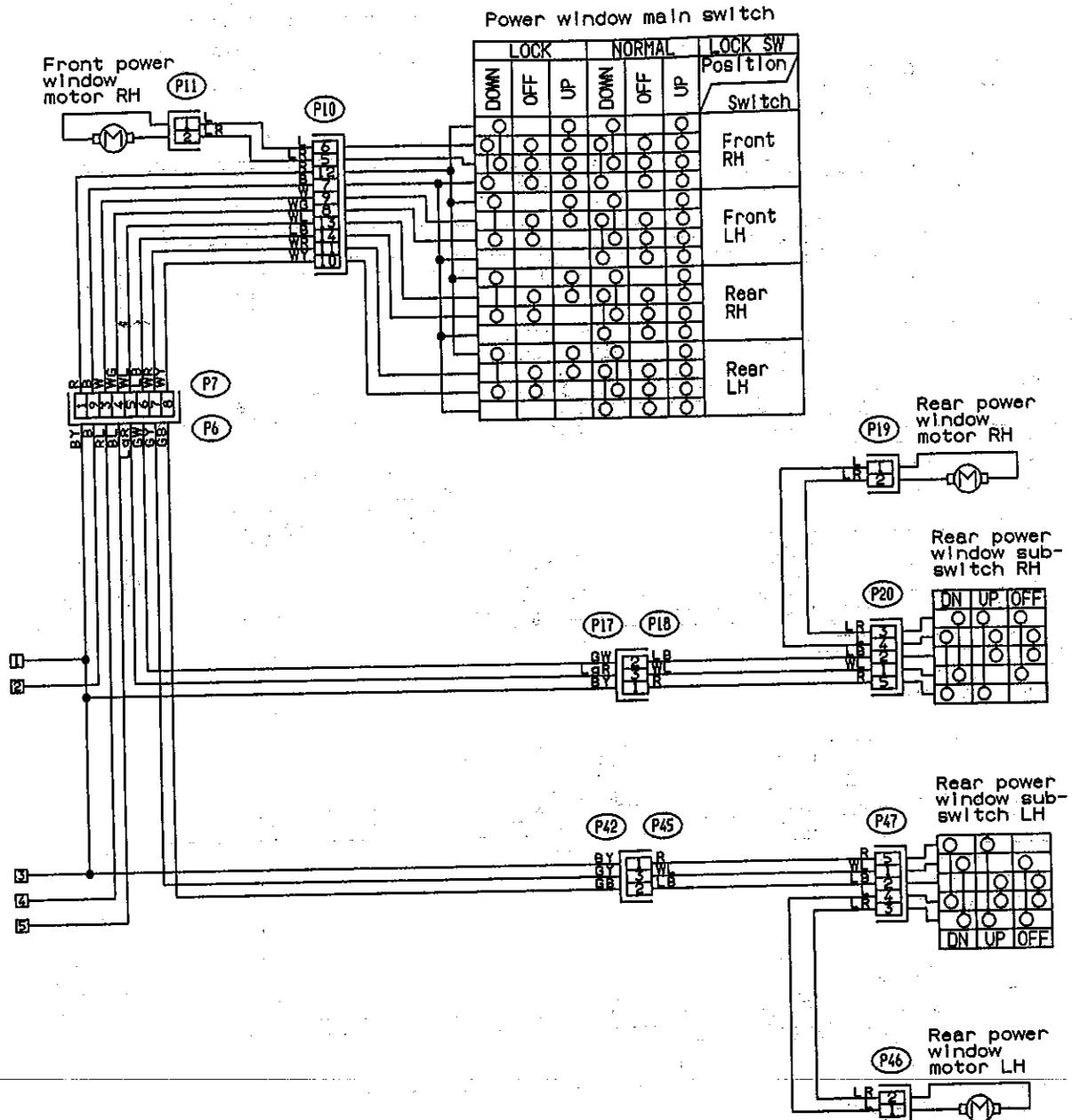


Fig. 55

BR70-02A

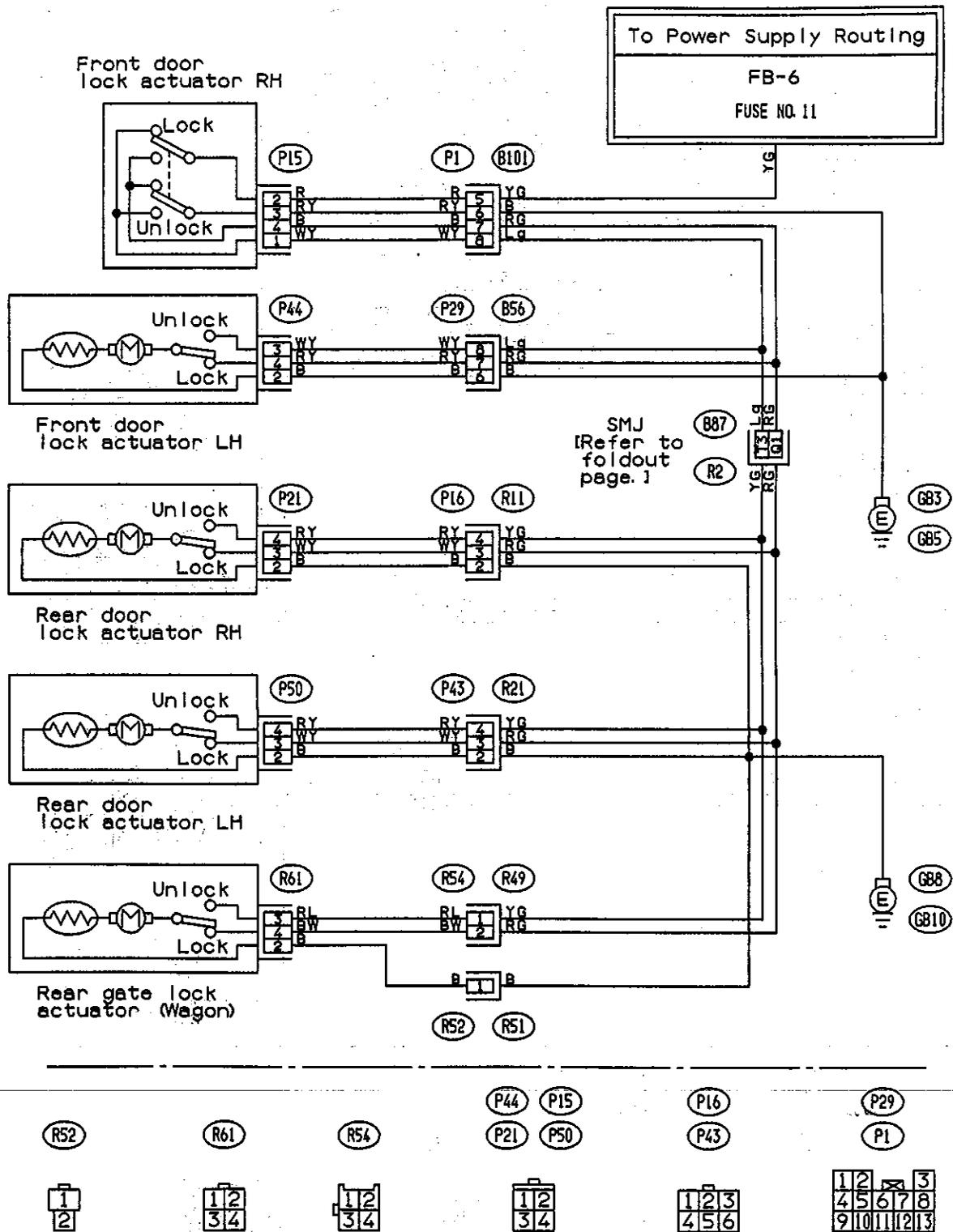
# WIRING DIAGRAM AND TROUBLESHOOTING

[05023] 6-3



BR70-02B

24. DOOR LOCK



BR73-02

Fig. 56



26. SUNROOF • SPOT LIGHT AND VANITY MIRROR

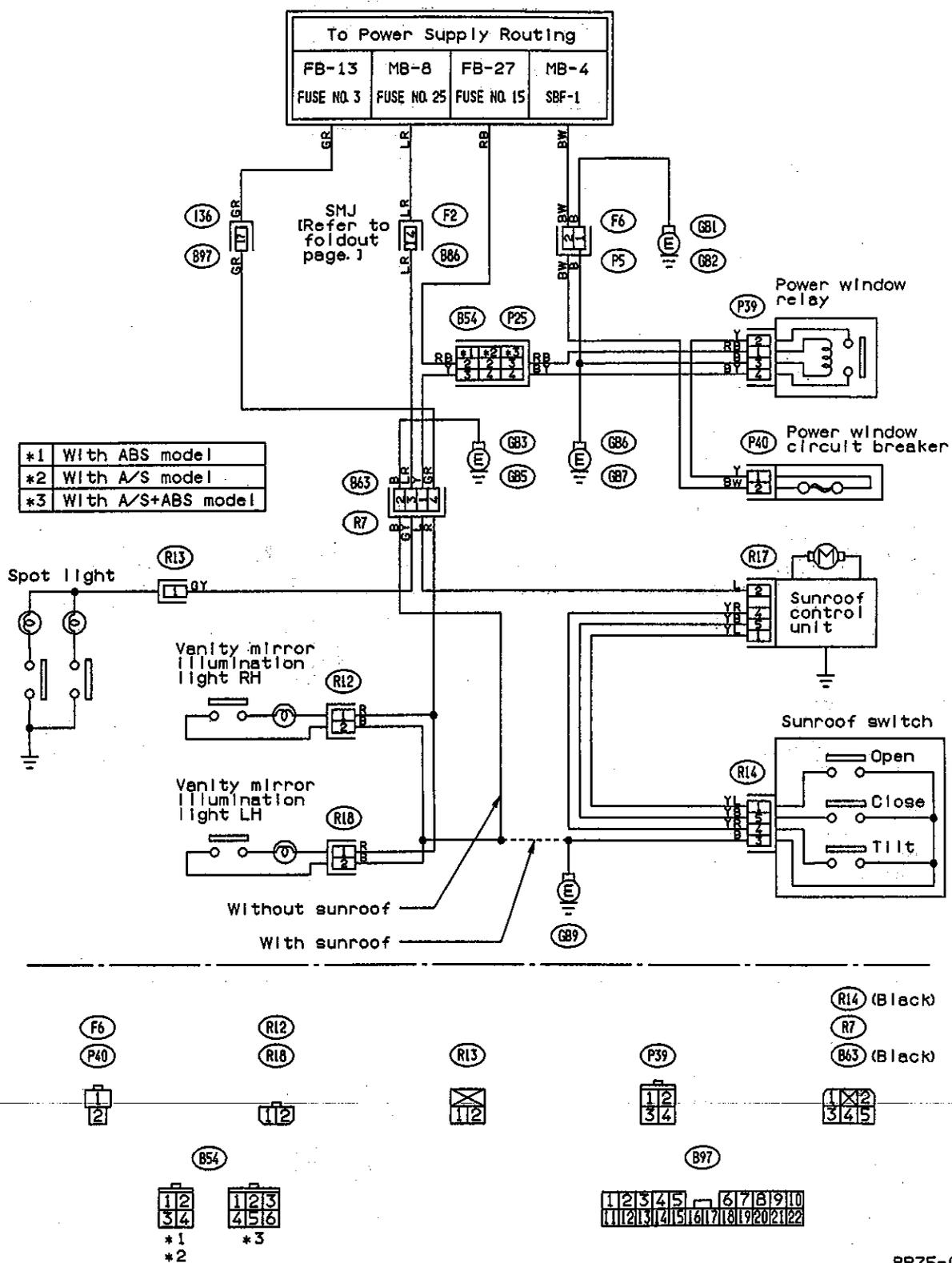
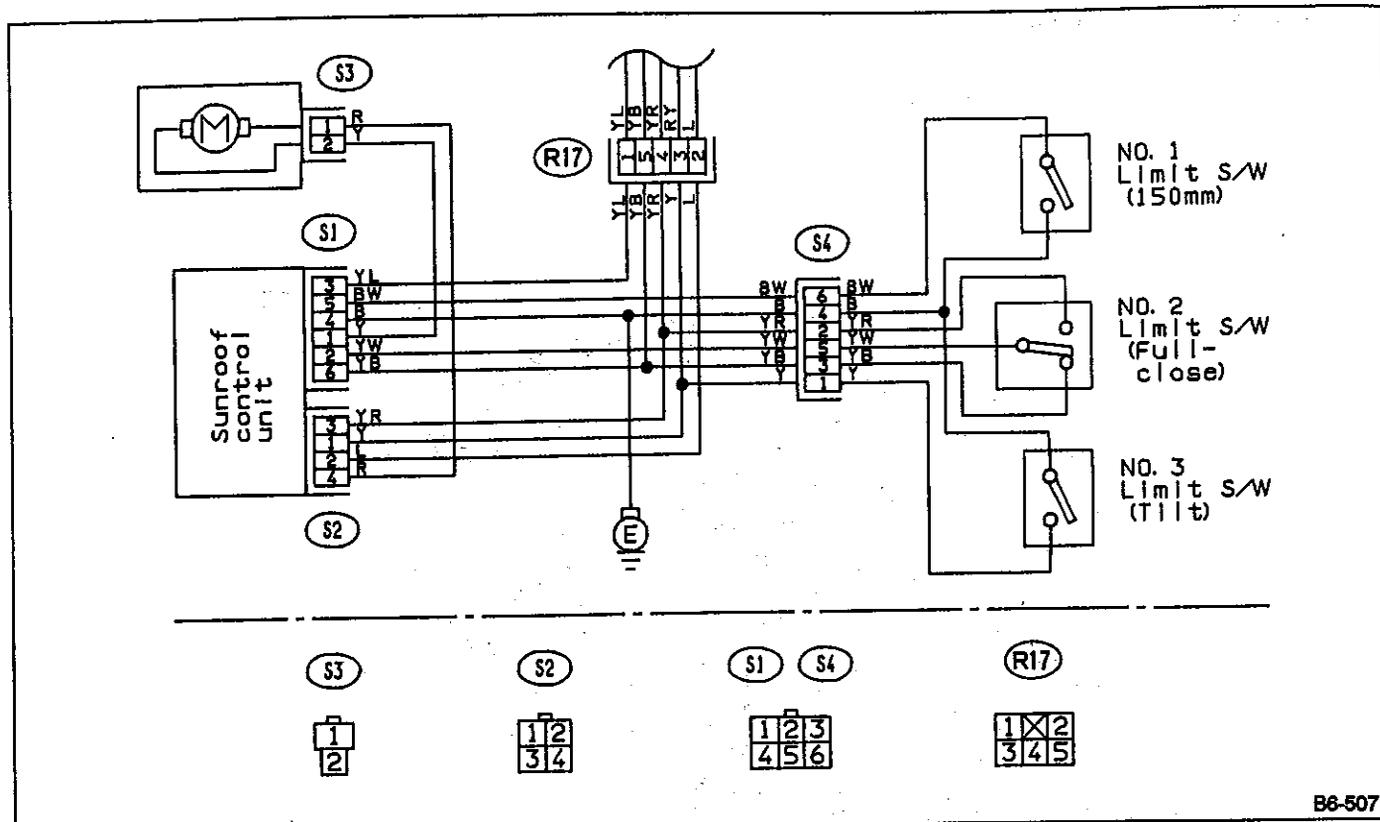


Fig. 58-1





B6-507

Fig. 58

27. RADIO AND POWER ANTENNA

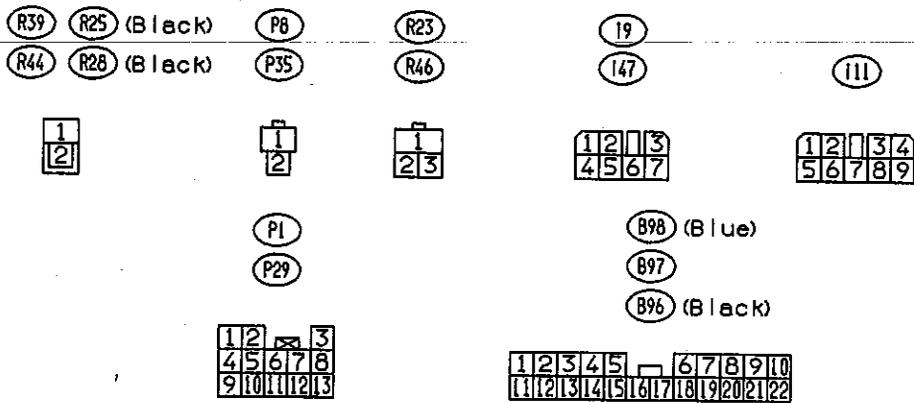
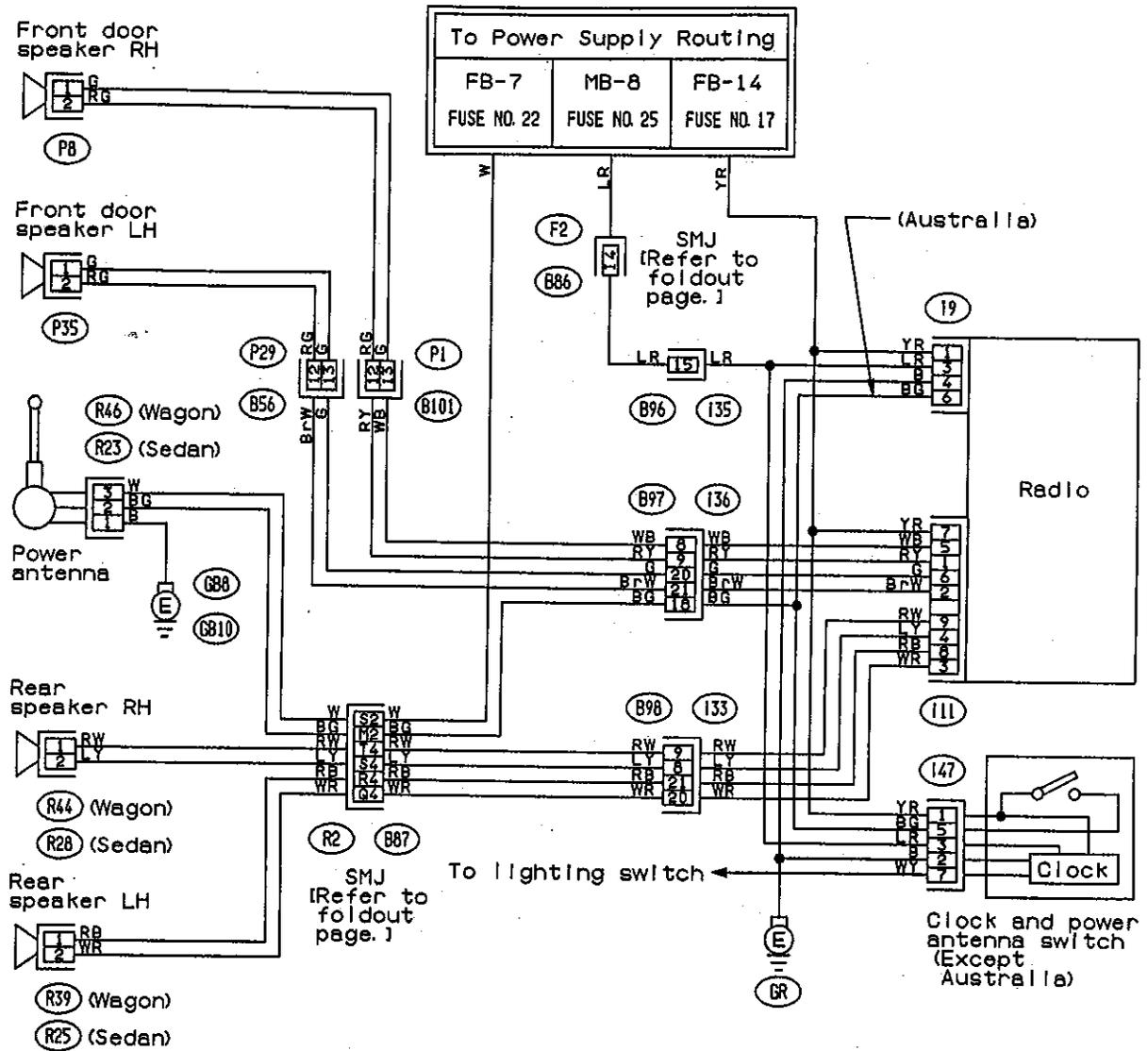


Fig. 59

BR76-02

28. MODE SELECTOR AND BLOWER MOTOR

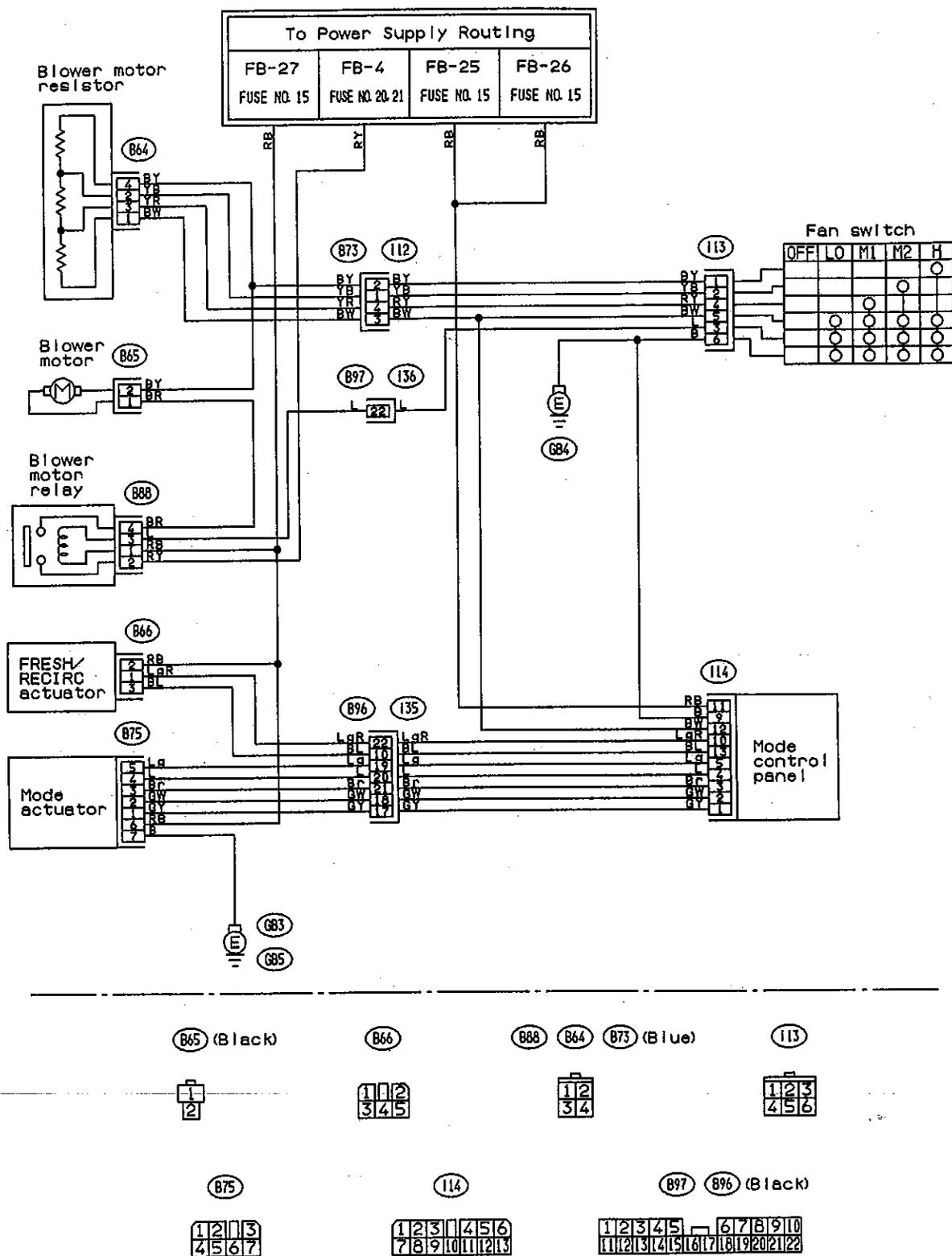


Fig. 60

BR78-02

29. REMOTE CONTROL REARVIEW MIRROR

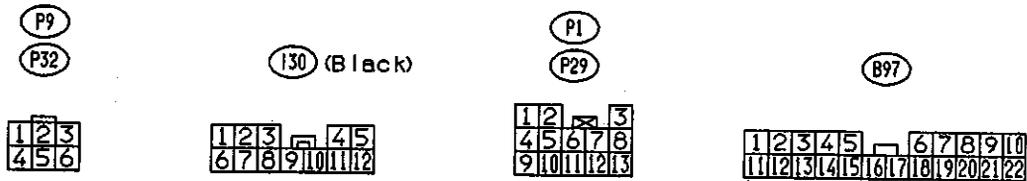
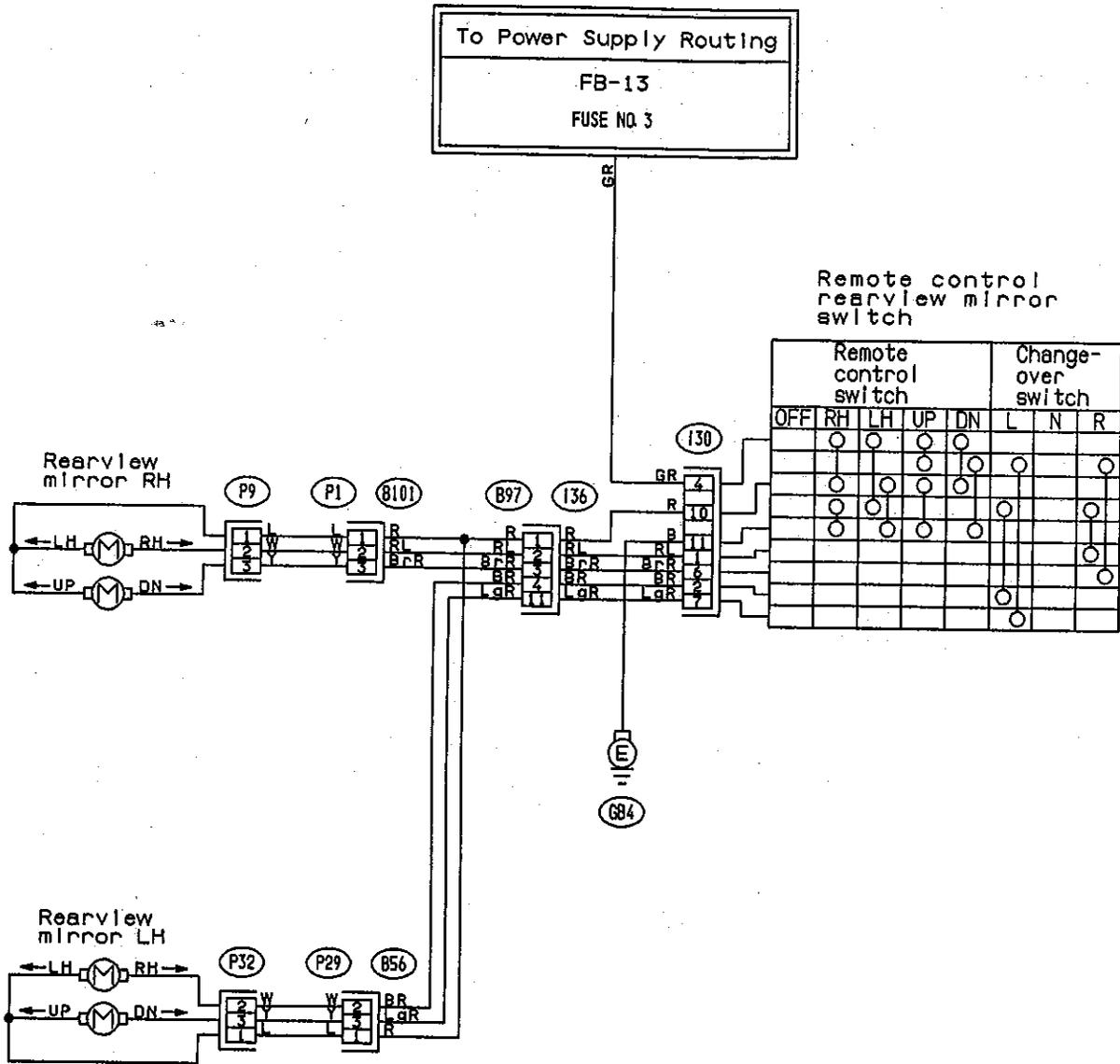
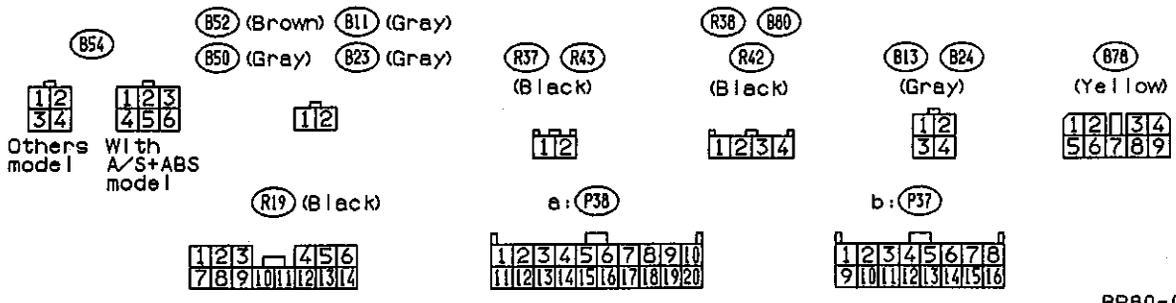
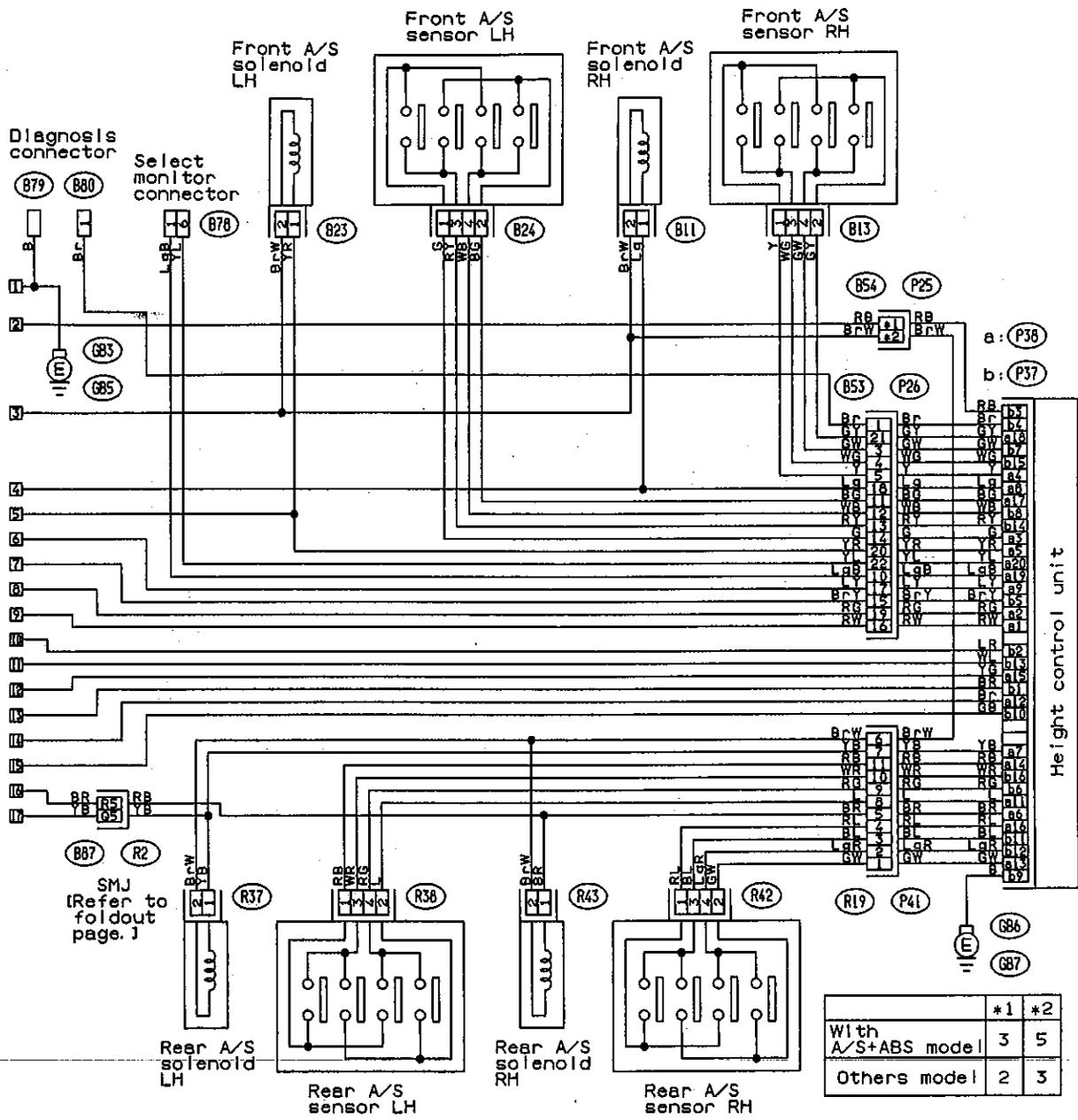


Fig. 61

BR79-02





BR80-03B





32. CRUISE CONTROL

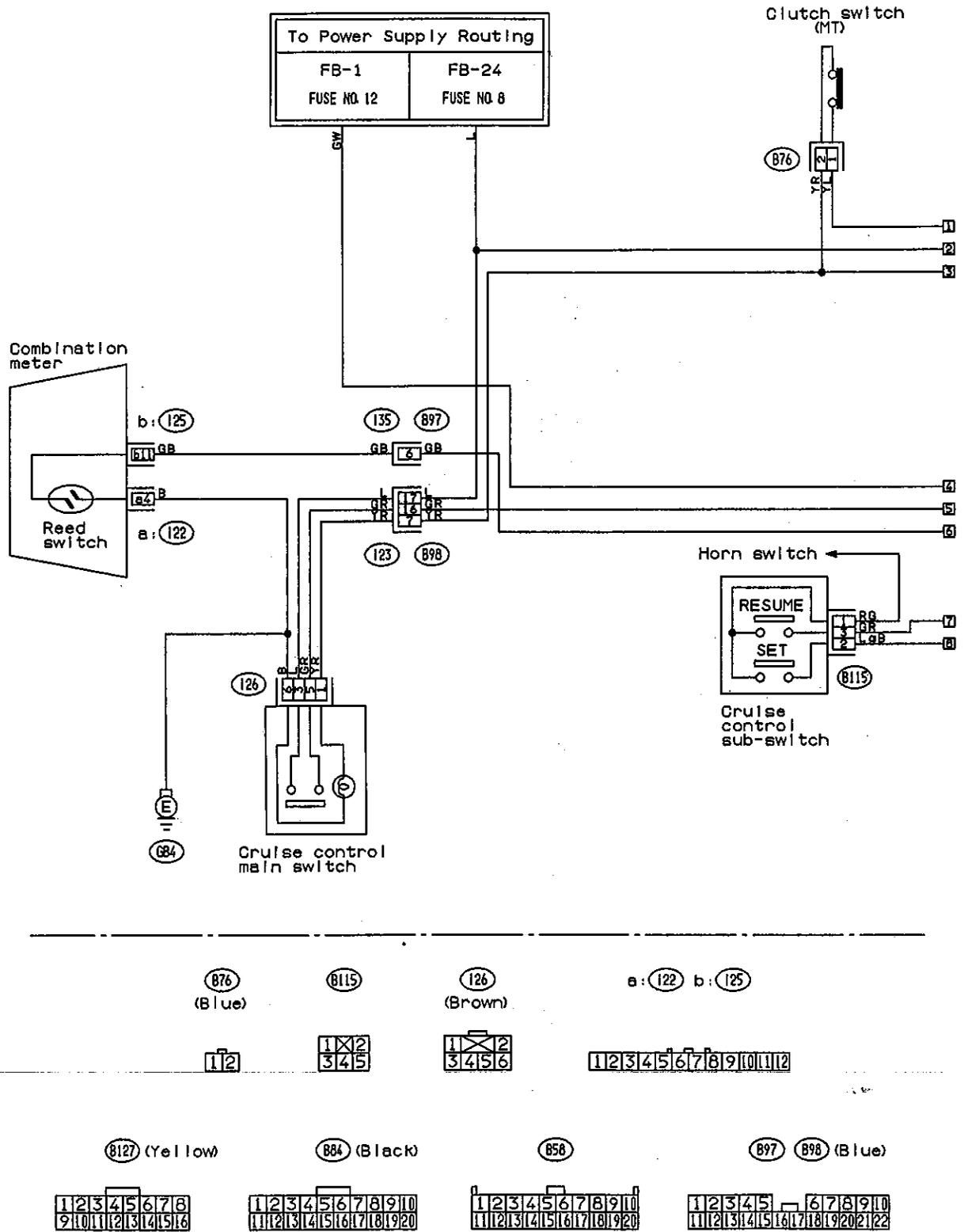
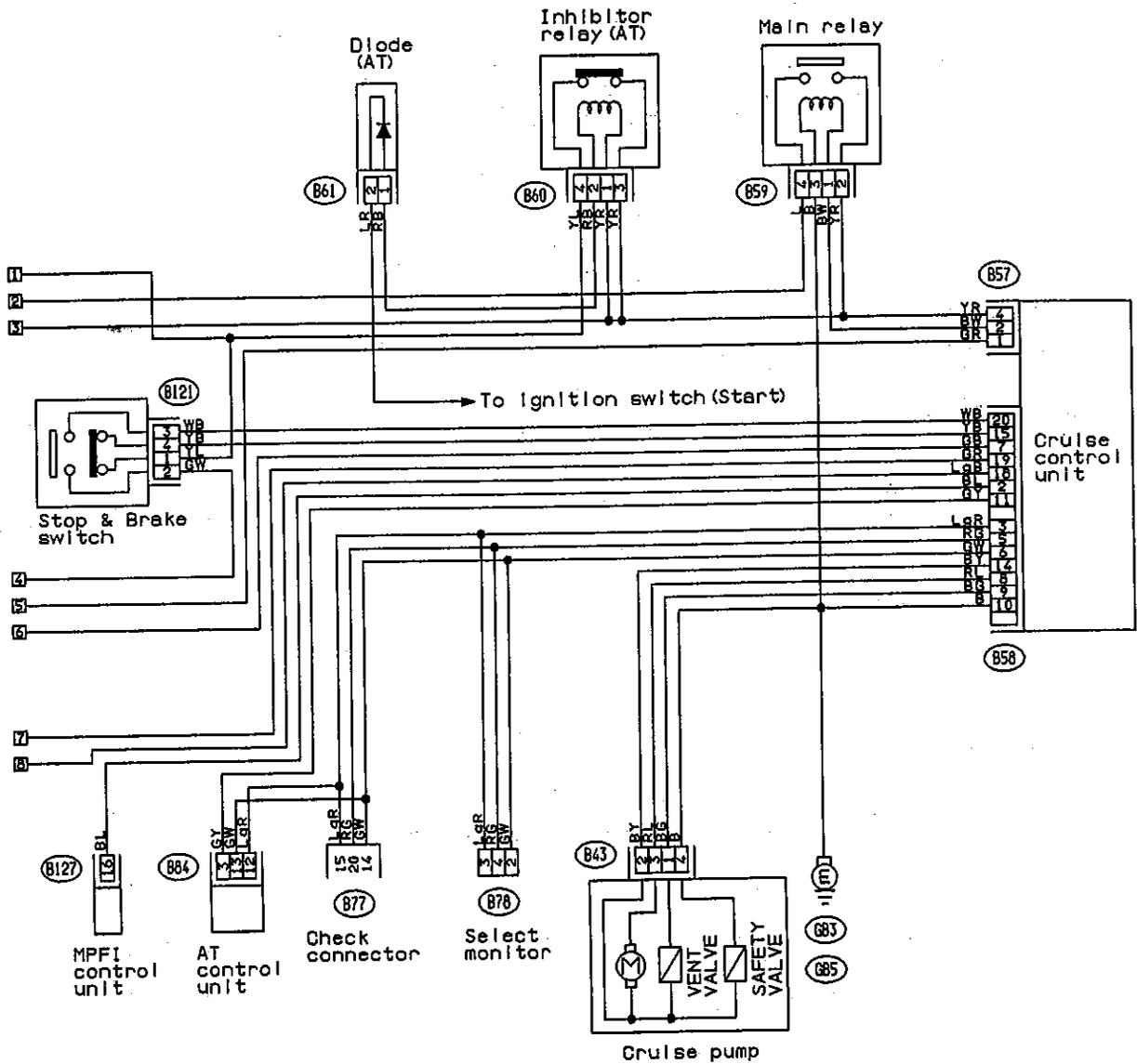


Fig. 64

BR71-03A



(B61) (Black)

(B57)

(B43) (B121)  
(Gray) (Black)

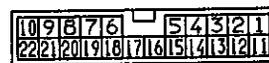
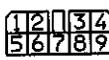


(B59) (Black)

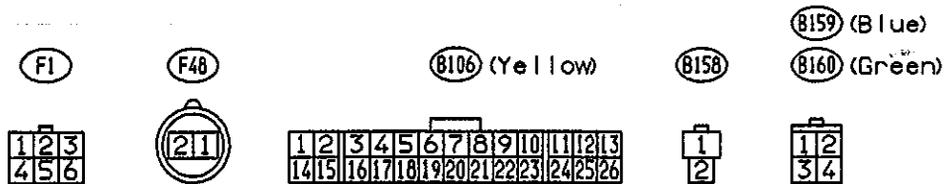
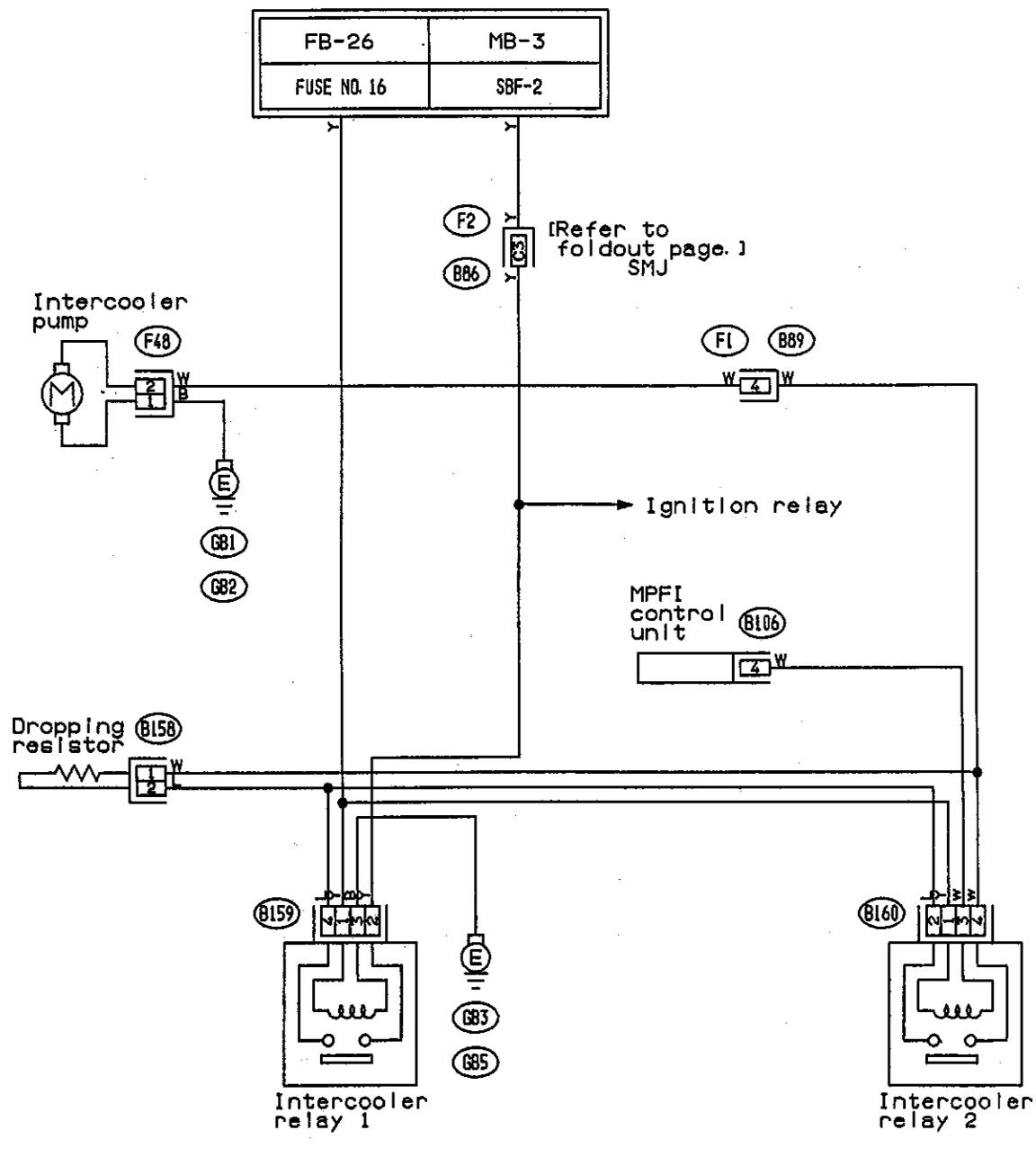
AT: (B60)

(B78) (Yellow)

(B77) (Black)



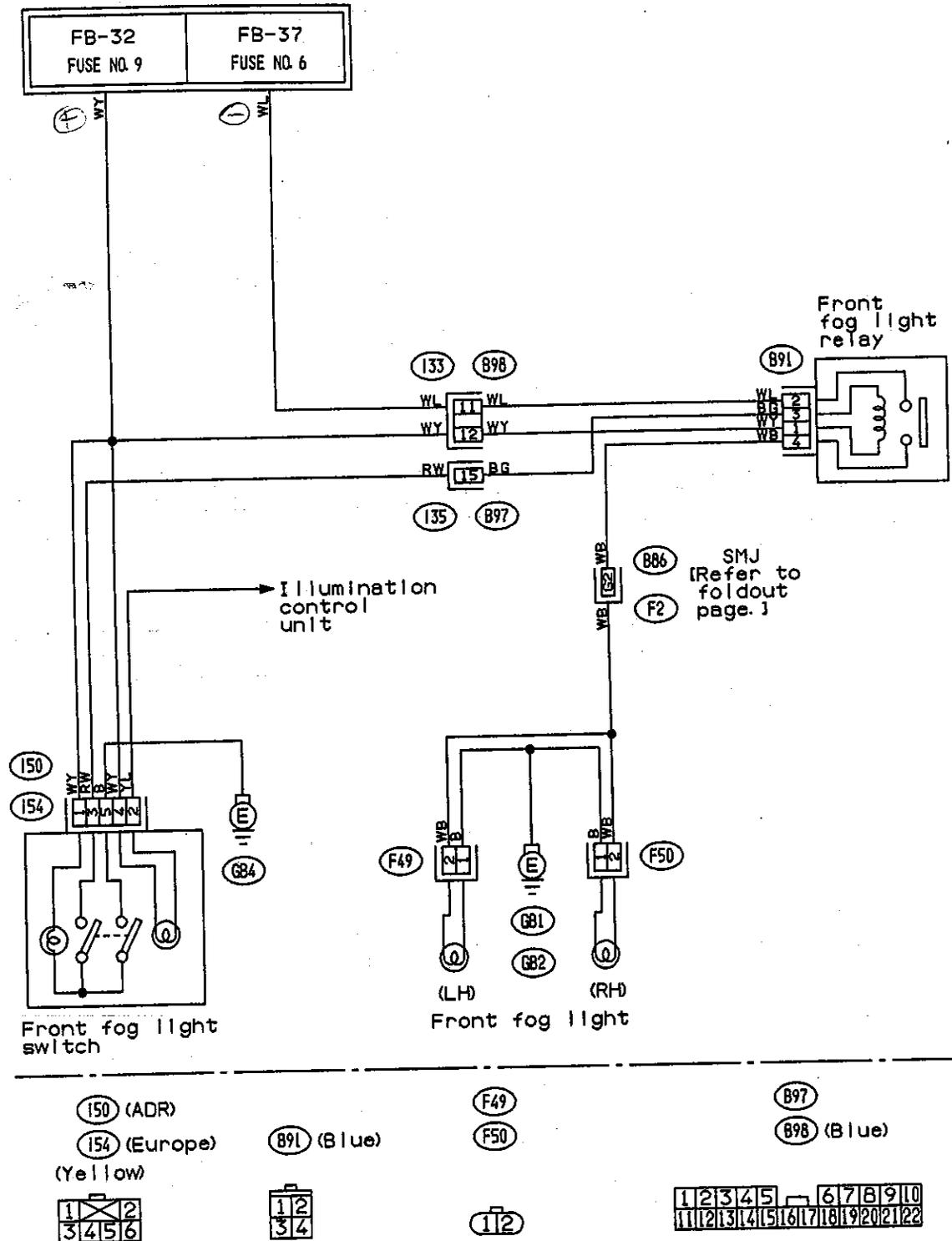
33. INTERCOOLER PUMP



BR12-01

Fig. 65

34. FRONT FOG LIGHT



BR22-01

Fig. 66

35. KEYLESS ENTRY

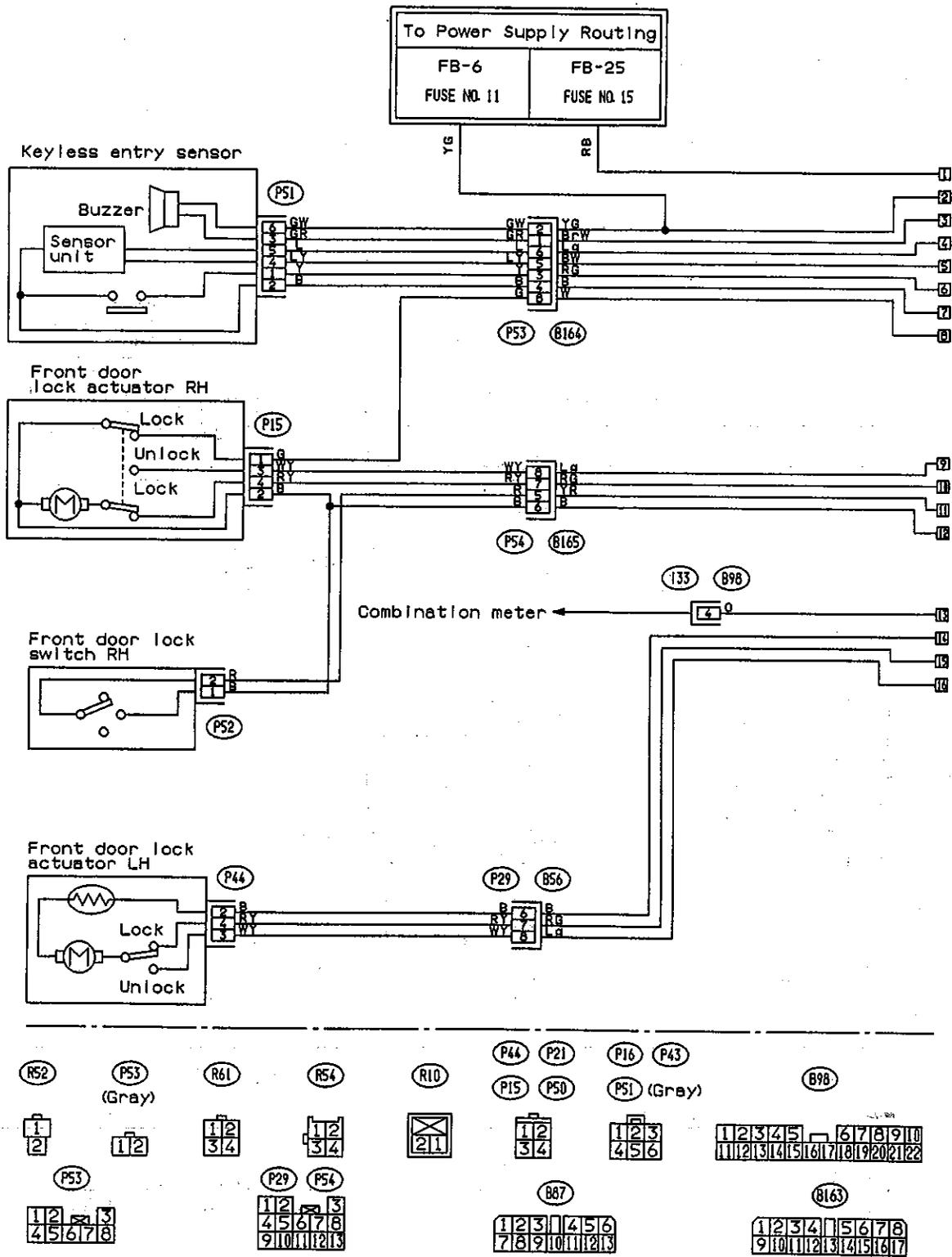


Fig. 67

BR77-01A



36. HEADLIGHT BEAM LEVELER

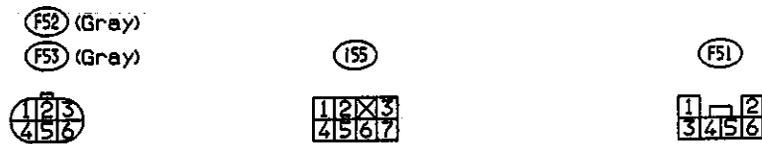
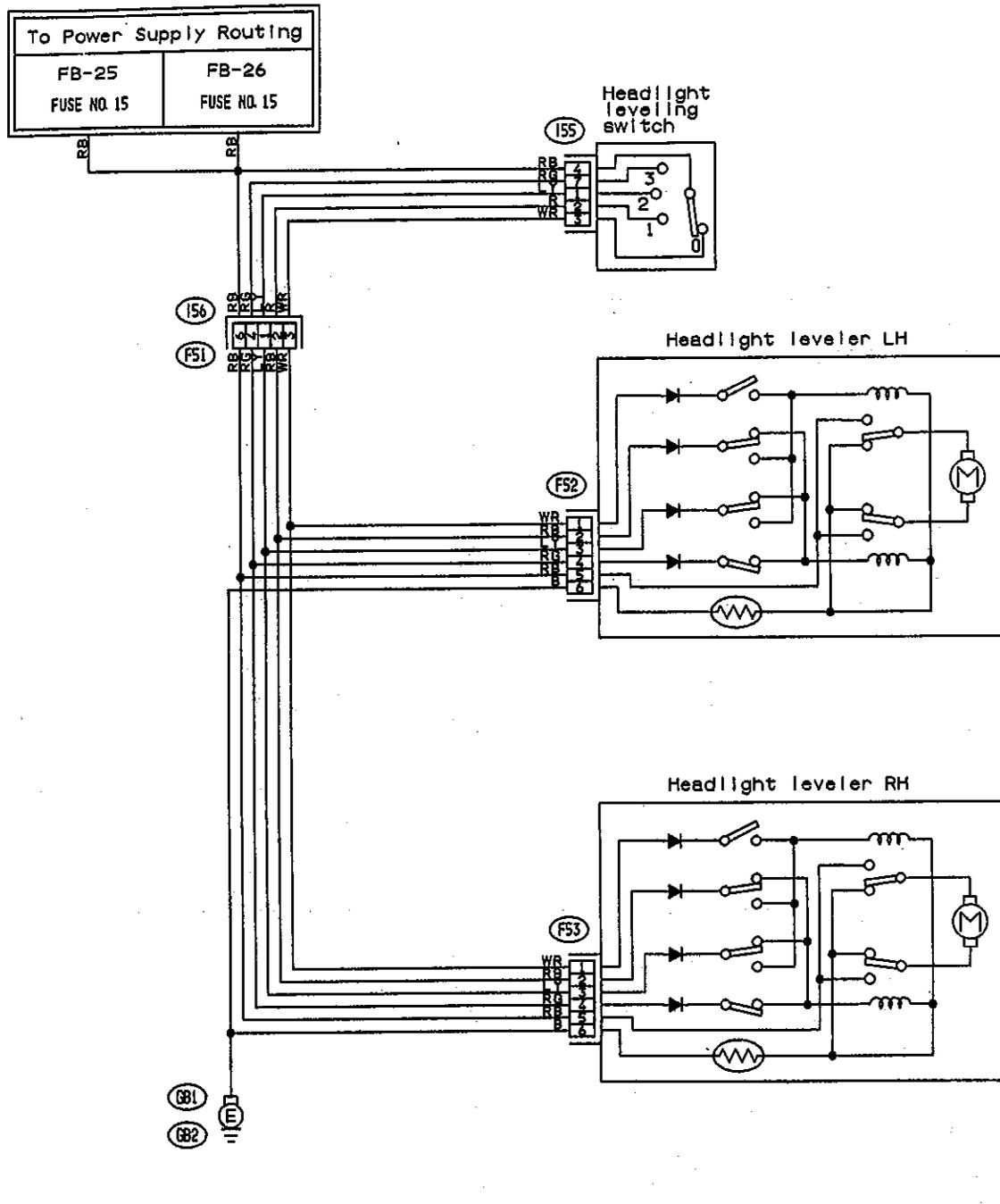


Fig. 68

BR83-01

## 6. Electrical Unit Location

	Page		Page
Sec. 1 RELAY .....	92	Sec. 5 DIODE•CONDENSER .....	104
Sec. 2 CONTROL UNIT .....	95	Sec. 6 FUSE AND FUSIBLE LINK .....	106
Sec. 3 SWITCH .....	97	Sec. 7 SELECT MONITOR CONNECTOR AND CHECK CONNECTOR .....	107
Sec. 4 SENSOR•VALVE•SOLENOID•ETC. ....	99		

Electrical Unit	Refer to
	Sec.
ABS control unit	2
ABS G-sensor	4
A/S compressor relay	1
A/C cut relay	1
A/C main fan relay	1
A/C pressure switch	3
A/C relay	1
A/C sub fan relay	1
A/C sub fan water temperature relay	1
A/S charge solenoid	4
A/S compressor	4
A/S control unit	2
A/S pressure switch	3
AT control unit (4AT)	2
Back-up light switch	3
Blower motor resistor	4
Blower relay	1
By-pass air control valve	4
Cam angle sensor	4
Check connector	7
Condenser (Horn)	5
Condenser (Rear defogger)	5
CPC solenoid	4
Crank angle sensor	4
Cruise control	2
Diagnosis connector	7
Diagnosis connector (Ground)	7
Diode (For Door warning)	5
Diode (For Lighting)	5
Dropping resistor	4
Evaporator thermostwitch	3
Fuel gauge unit	4
Fuel pump relay	1
Fuse and fusible link	6
FWD switch	3

Electrical Unit	Refer to
	Sec.
Headlight relay LH	1
Headlight relay RH	1
Horn relay	1
Igniter	4
Ignition relay	1
Illumination control unit	2
Intercooler relay	1
Knock sensor	4
Main fan relay	1
MPFI control unit	2
Mode actuator	4
Neutral switch	3
Oil pressure switch	3
O <sub>2</sub> sensor	4
Pressure exchange solenoid valve	4
Pressure sensor	4
P/W relay	1
P/W circuit breaker	4
Read memory connector	7
Rear defogger relay	1
Rear wiper intermittent unit	2
Select monitor connector	7
Stop light switch	3
Sunroof control unit	2
Front fog light relay	1
Tail and illumination relay	1
Test mode connector	7
Thermometer	4
Throttle sensor	4
Turn signal and Hazard unit	2
Vehicle speed sensor	4
Wastegate control solenoid valve	4
Water temperature sensor	4

**Sec. 1 RELAY**

A/C cut relay	Fig. 69-1
A/C main fan relay	Fig. 68-2
A/C relay	Fig. 68-2
A/C sub fan relay	Fig. 68-2
A/C sub fan water temperature relay	Fig. 68-2
A/S compressor relay	Fig. 68-1
Blower relay	Fig. 69-2
Fuel pump relay	Fig. 69-2
Headlight relay LH	Fig. 68-2

Headlight relay RH	Fig. 68-2
Horn relay	Fig. 69-3
Ignition relay	Fig. 69-2
Main fan relay	Fig. 69-4
P/W relay	Fig. 70-1
Rear defogger relay	Fig. 69-4
Front fog light relay	Fig. 69-2
Tail and illumination relay	Fig. 69-4
Intercooler relay	Fig. 68-3

**(1) Engine Room**

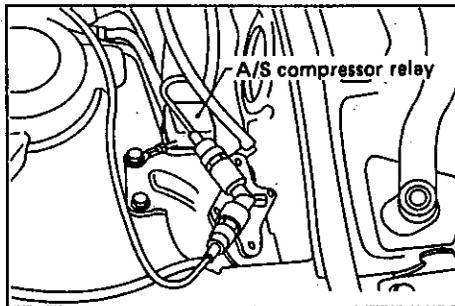


Fig. 69-1

B6-304

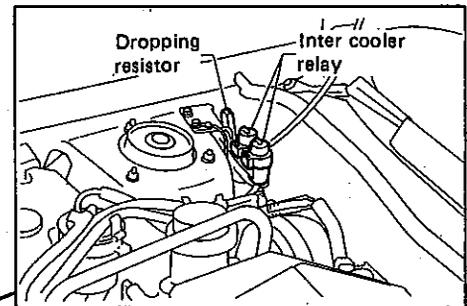


Fig. 69-3

B6-765

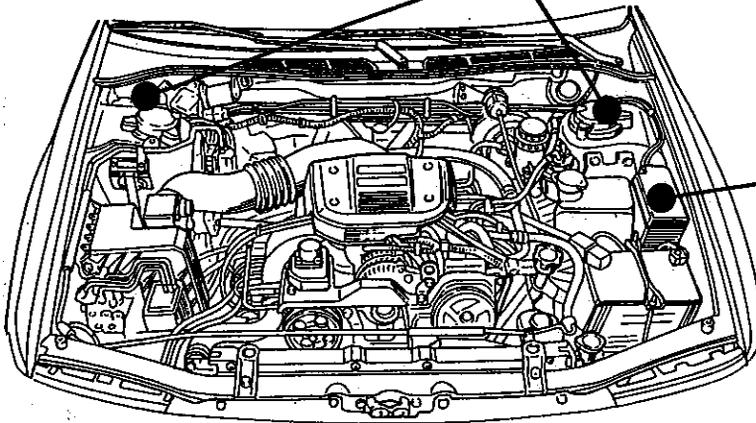


Fig. 69

B6-718

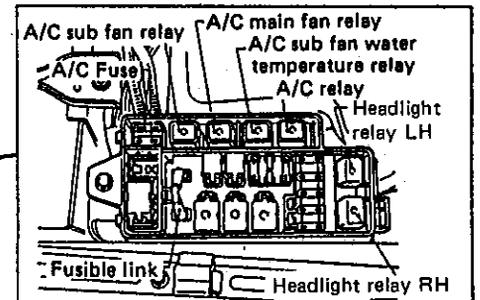
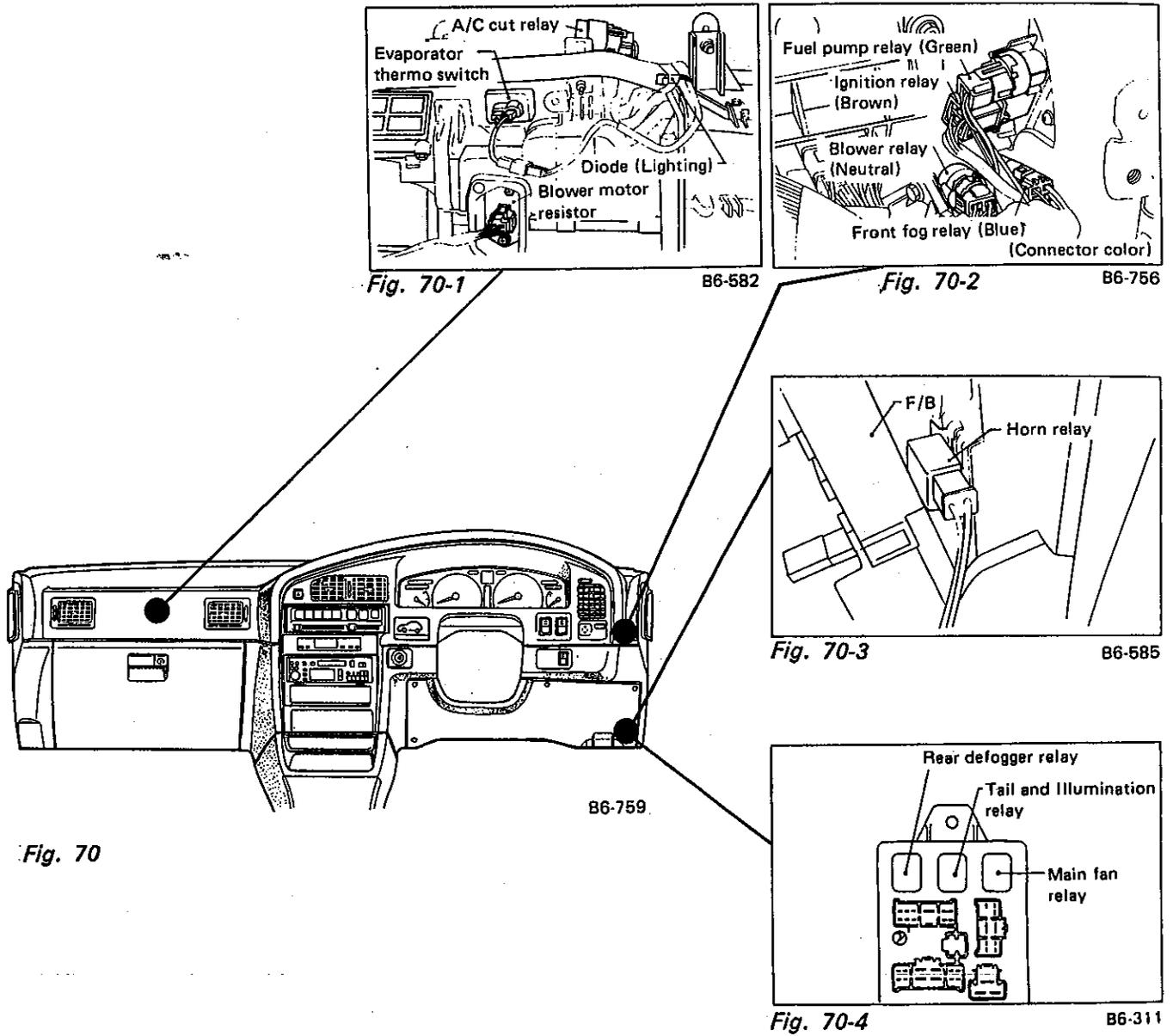


Fig. 69-2

B6-339

(2) Instrument Panel



(3) Compartment

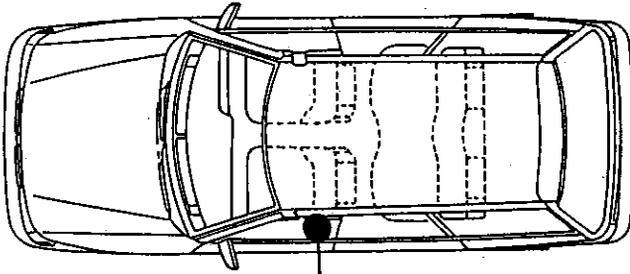


Fig. 71

B6-331

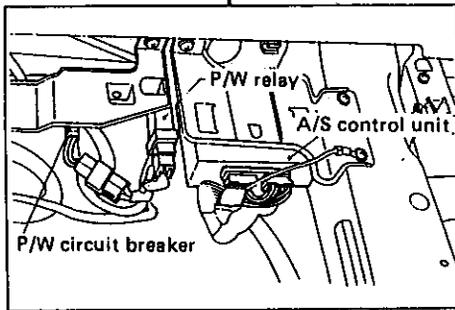


Fig. 71-1

B6-295

Sec. 2 CONTROL UNIT

ABS control unit	Fig. 72-1	Illumination control unit	Fig. 71-4
A/S control unit	Fig. 72-3	MPFI control unit	Fig. 71-3
AT control unit (4AT)	Fig. 71-2	Sunroof control unit	Fig. 72-2
Cruise control unit	Fig. 71-1	Turn signal and Hazard unit	Fig. 71-4

(1) Instrument Panel

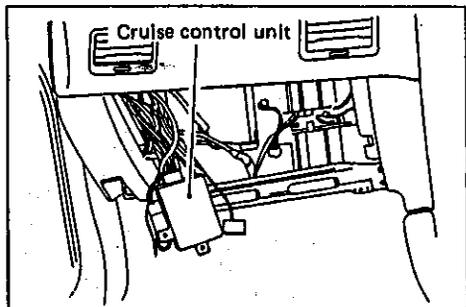


Fig. 72-1

B6-587

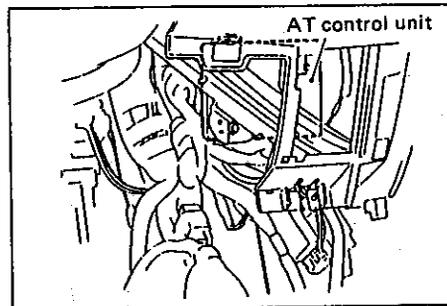


Fig. 72-2

B6-586

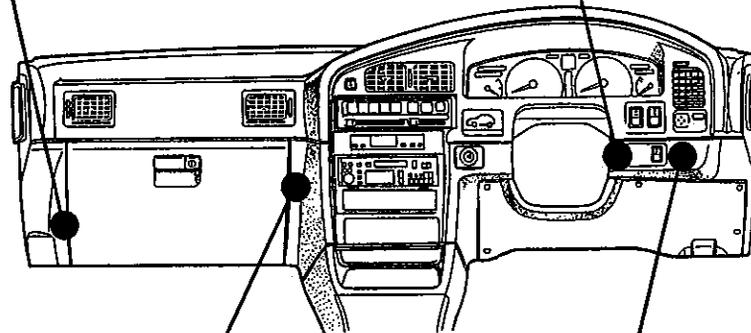


Fig. 72

B6-759

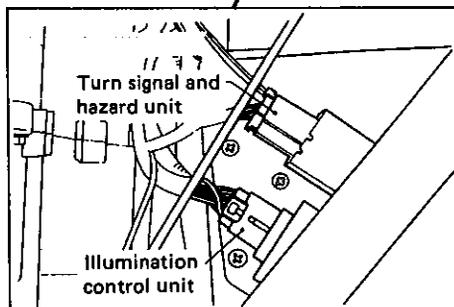


Fig. 72-4

B6-588

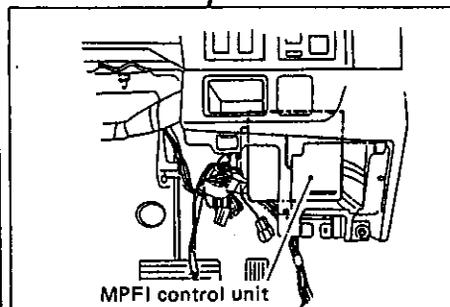


Fig. 72-3

B6-589

(2) Compartment

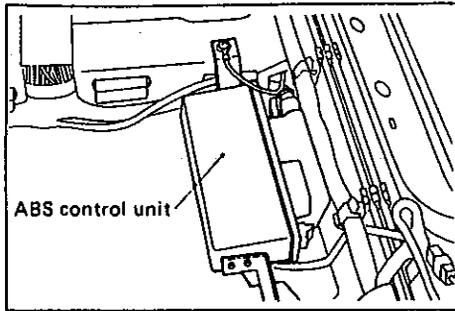


Fig. 73-1

B6-293

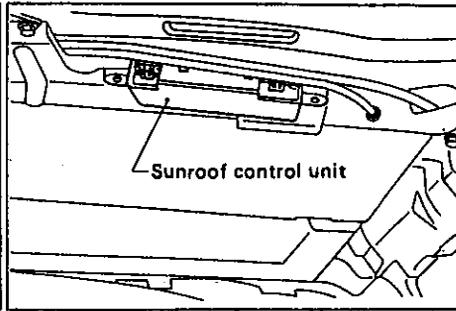


Fig. 73-2

B6-313

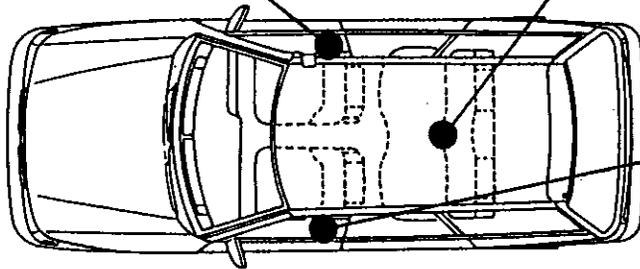


Fig. 73

B6-331A

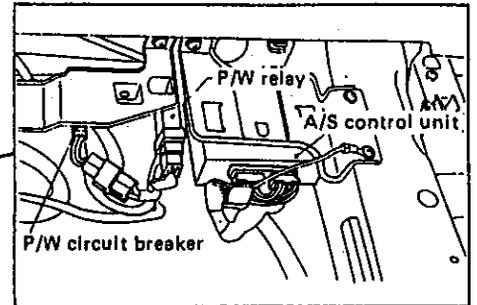


Fig. 73-3

B6-295

(3) Luggage Room

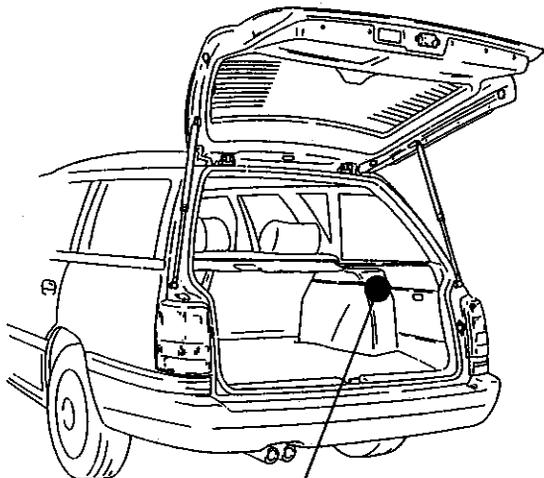


Fig. 74

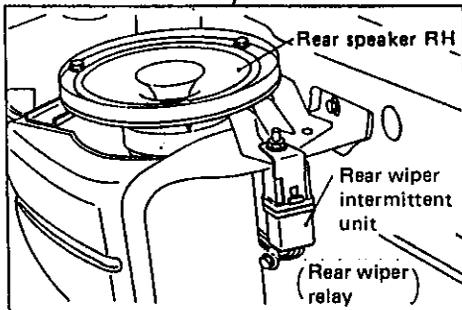


Fig. 74-1

B6-757

Sec. 3 SWITCH

A/C pressure switch	Fig. 74-1	FWD switch	Fig. 74-2
A/S pressure switch	Fig. 74-4	Neutral switch	Fig. 74-3
Back-up light switch	Fig. 74-3	Oil pressure switch	Fig. 74-5
Evaporator thermoswitch	Fig. 75-2	Stop light switch	Fig. 75-1

(1) Engine Room

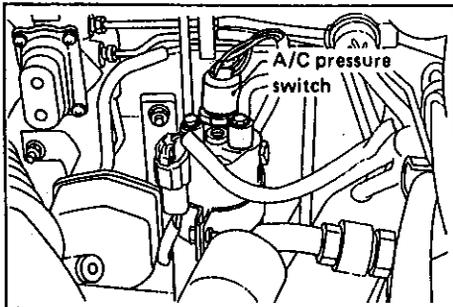


Fig. 75-1

B6-297

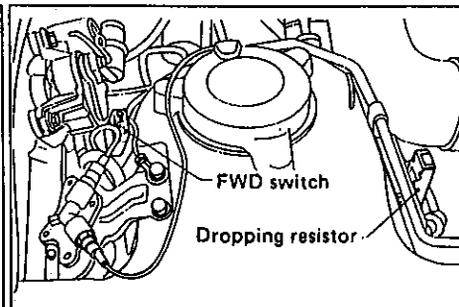


Fig. 75-2

B6-305

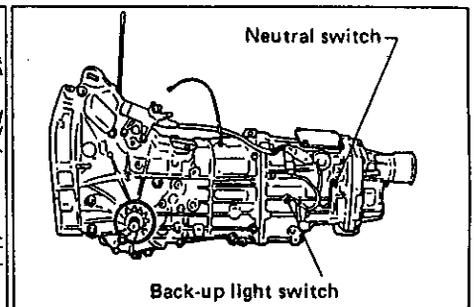


Fig. 75-3

B6-343

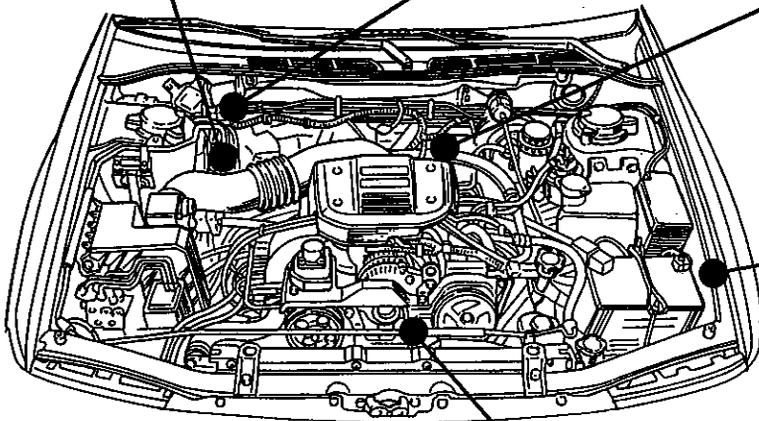


Fig. 75

B6-718A

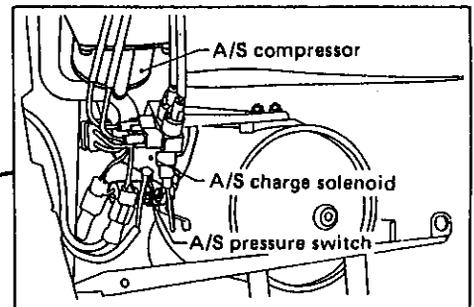


Fig. 75-4

B6-315

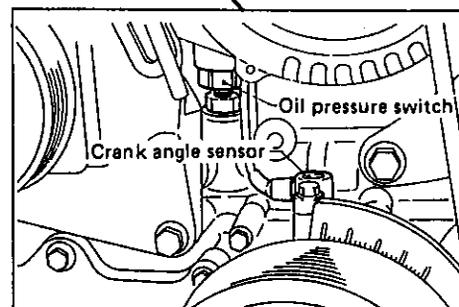


Fig. 75-5

B6-334

(2) Instrument Panel

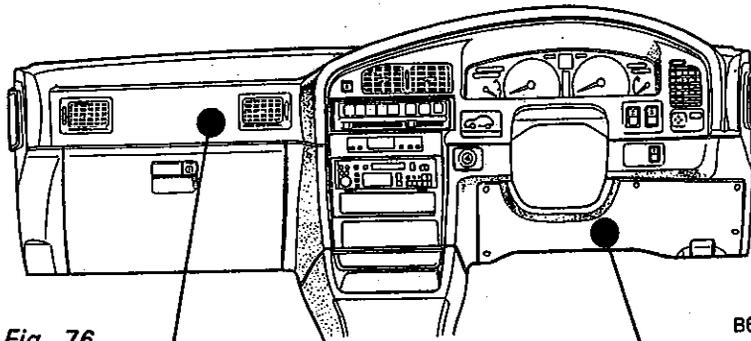


Fig. 76

B6-759

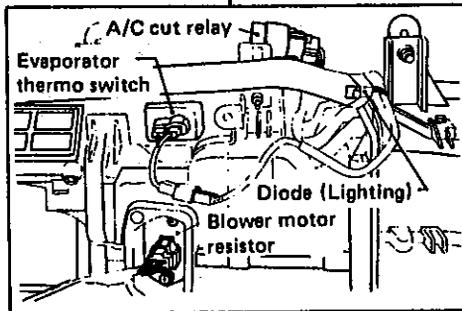


Fig. 76-2

B6-582

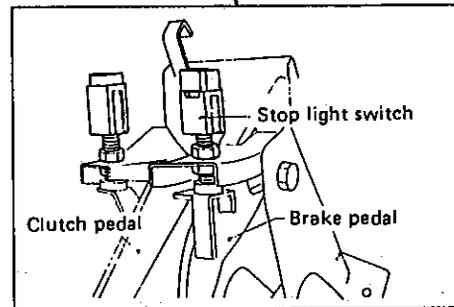


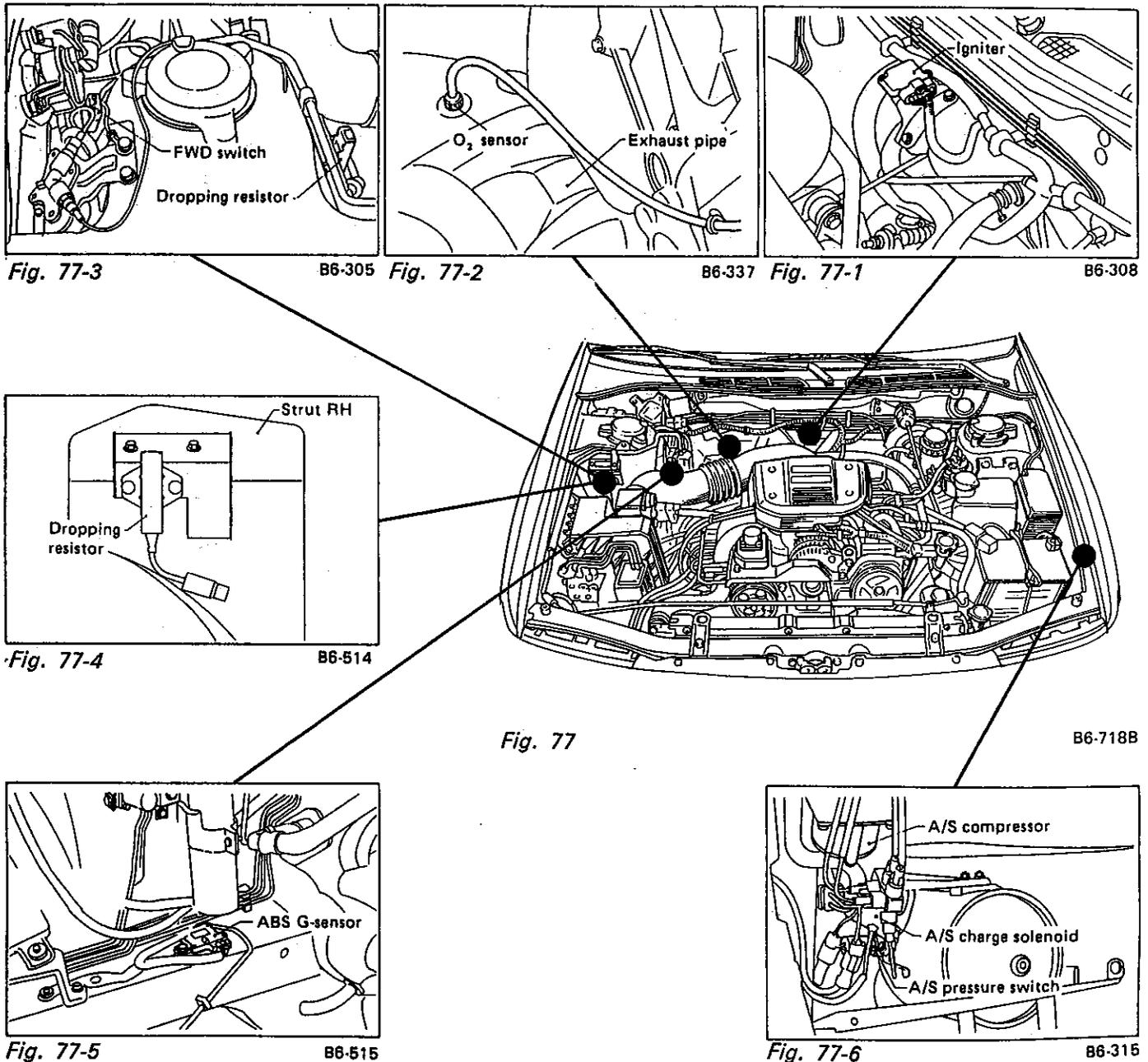
Fig. 76-1

B6-290

Sec. 4 SENSOR·VALVE·SOLENOID·ETC.

ABS G-sensor	Fig. 76-5	Fuel gauge unit	Fig. 80-1
A/S charge solenoid	Fig. 76-6	Igniter	Fig. 76-1
A/S compressor	Fig. 76-6	Knock sensor	Fig. 77-4
Blower motor resistor	Fig. 80-2	Mode actuator	Fig. 80-3
By-pass air control valve	Fig. 77-2	P/W circuit breaker	Fig. 80-4
Cam angle sensor	Fig. 77-5	O <sub>2</sub> sensor	Fig. 76-2
CPC solenoid	Fig. 77-1	Thermometer	Fig. 77-2
Crank angle sensor	Fig. 77-6	Throttle sensor	Fig. 77-3
Dropping resistor	Fig. 76-4	Water temperature sensor	Fig. 77-2

(1) Engine Room (NA model)



(2) Engine (NA model)

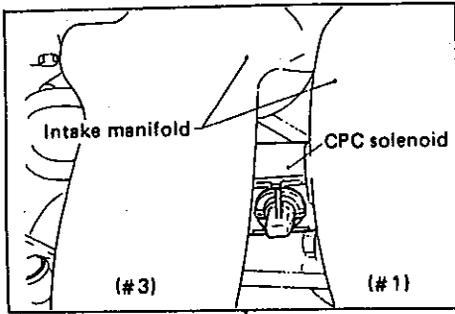
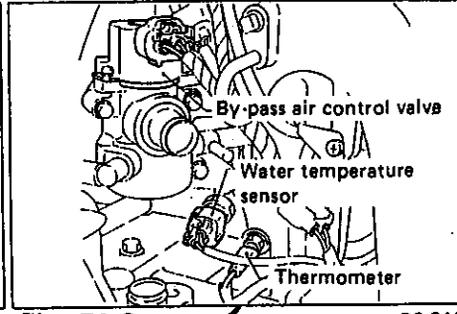


Fig. 78-1



86-338 Fig. 78-2

B6-310

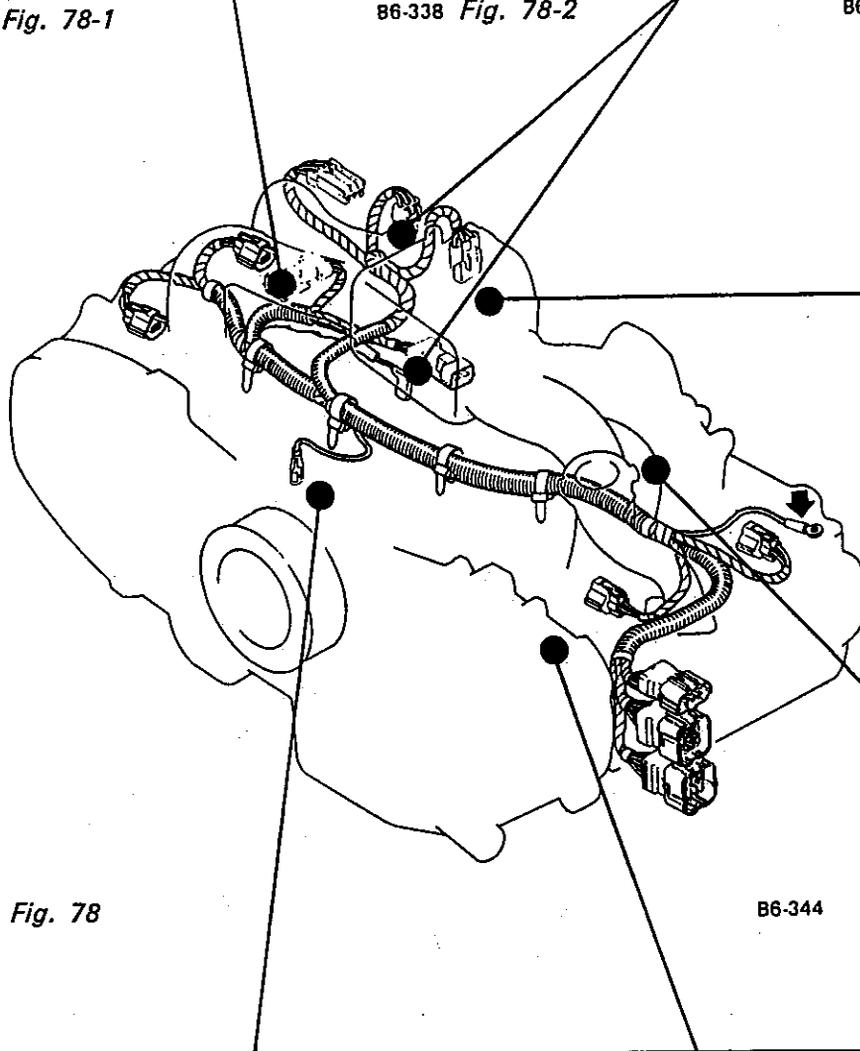


Fig. 78

B6-344

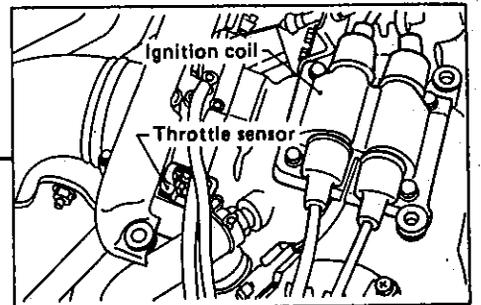


Fig. 78-3

B6-309

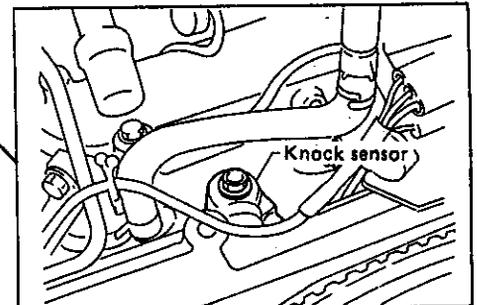


Fig. 78-4

B6-336

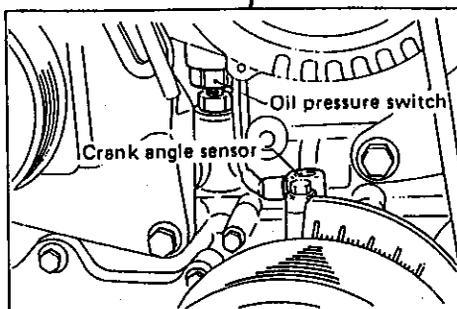


Fig. 78-6

B6-334

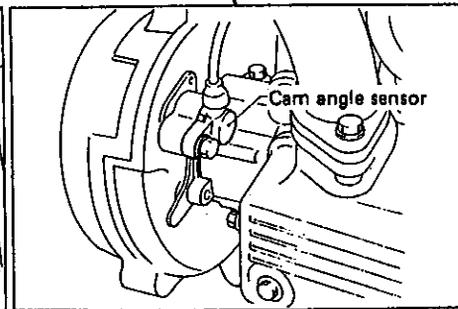


Fig. 78-5

B6-335

ABS G-sensor	Fig. 78-5	Igniter 1 & 2	Fig. 78-4
Vehicle speed sensor	Fig. 78-1	Knock sensor	Fig. 79-4
Pressure sensor	Fig. 78-3	Mode actuator	Fig. 80-3
Blower motor resistor	Fig. 80-2	P/W circuit breaker	Fig. 80-4
By-pass air control valve	Fig. 79-3	O <sub>2</sub> sensor	Fig. 78-2
Cam angle sensor	Fig. 79-5	Thermometer	Fig. 79-2
CPC solenoid	Fig. 79-1	Throttle sensor	Fig. 79-3
Crank angle sensor	Fig. 79-6	Water temperature sensor	Fig. 79-2
Dropping resistor	Fig. 78-6	Pressure exchange solenoid valve	Fig. 78-3
Fuel gauge unit	Fig. 80-1	Wastegate control solenoid valve	Fig. 78-3

(3) Engine Room (TURBO model)

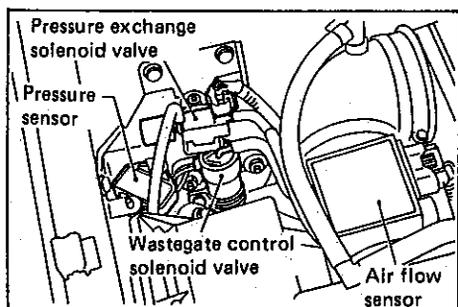


Fig. 79-3

B6-722

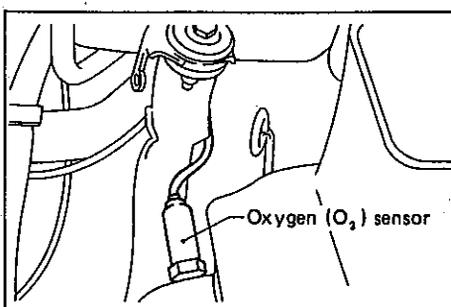
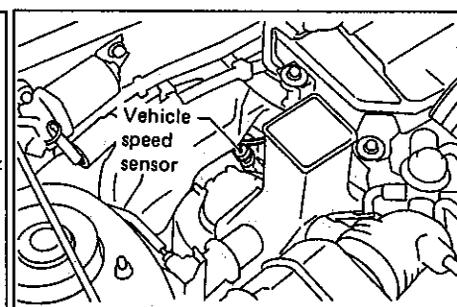


Fig. 79-2



B2-812 Fig. 79-1

B6-723

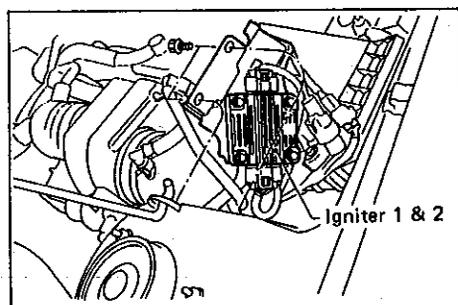


Fig. 79-4

B6-721

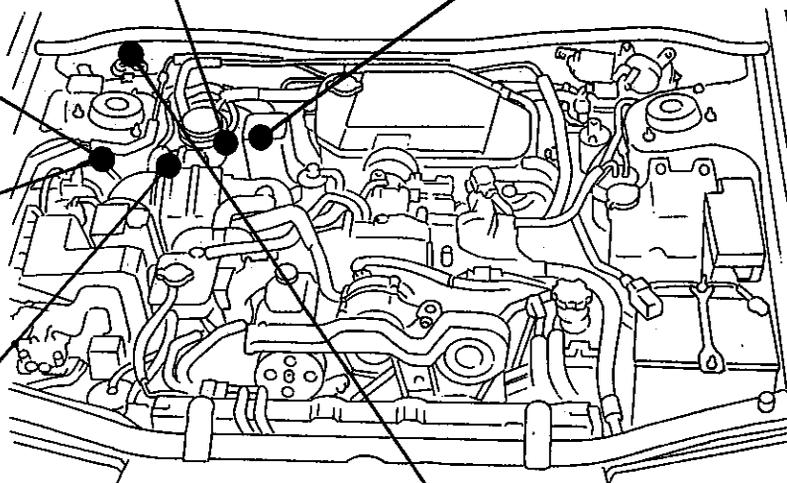


Fig. 79

B6-758

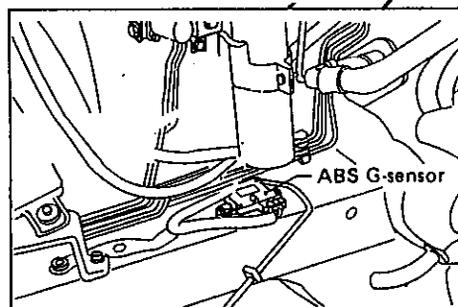


Fig. 79-5

B6-515

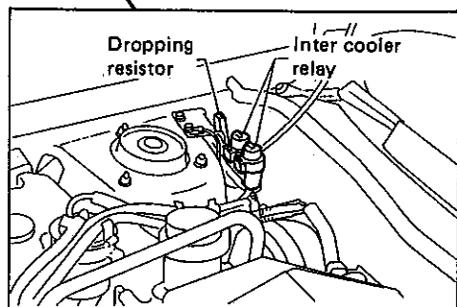


Fig. 79-6

B6-755

(4) Engine (TURBO model)

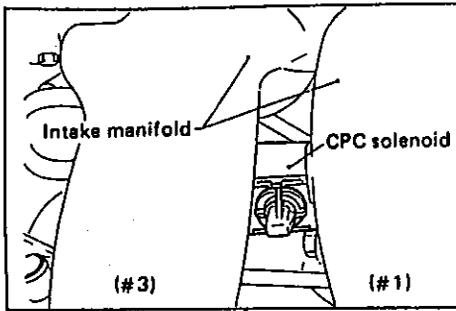


Fig. 80-1

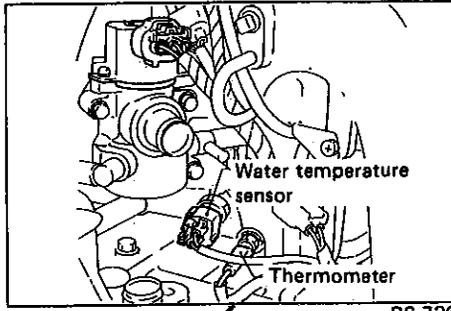


Fig. 80-2

B6-338 B6-726

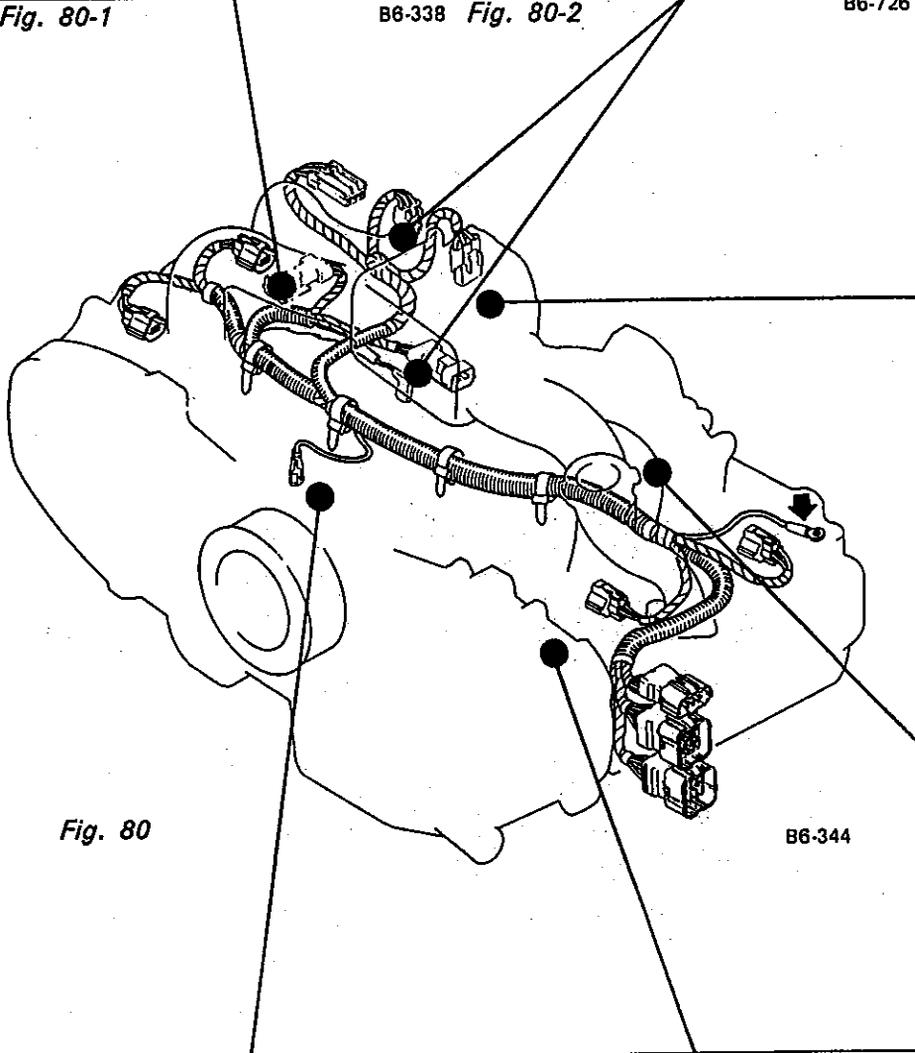


Fig. 80

B6-344

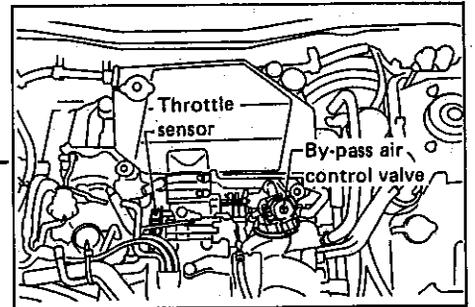


Fig. 80-3

B6-720

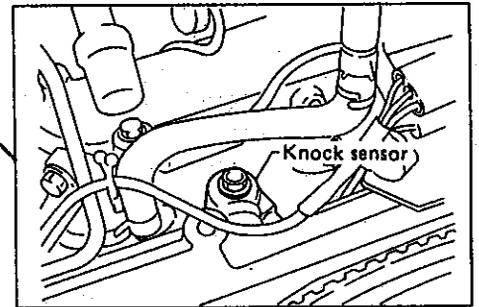


Fig. 80-4

B6-336

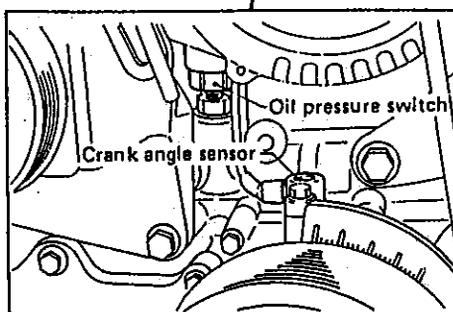


Fig. 80-6

B6-334

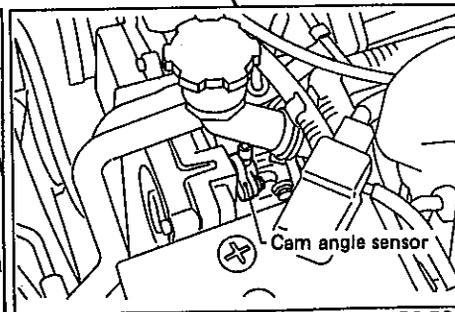


Fig. 80-5

B6-732

(5) Compartment

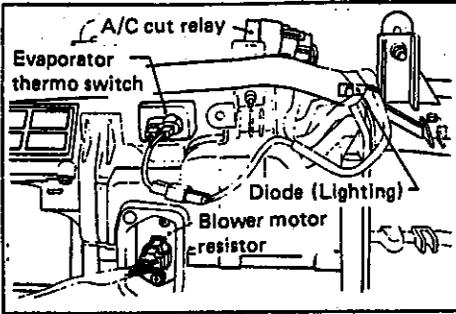


Fig. 81-2

B6-582

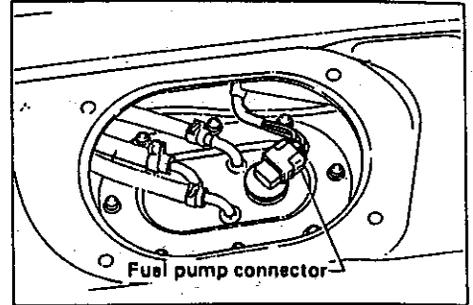


Fig. 81-1

B2-160

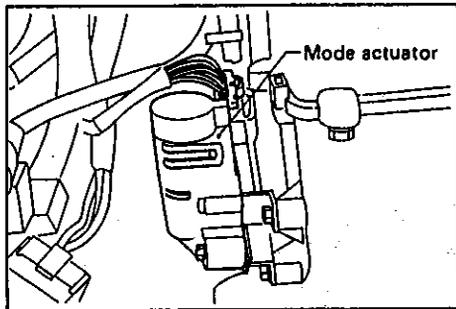


Fig. 81-3

B6-300

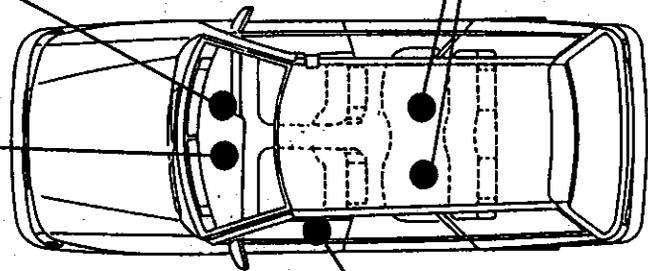


Fig. 81

B6-331B

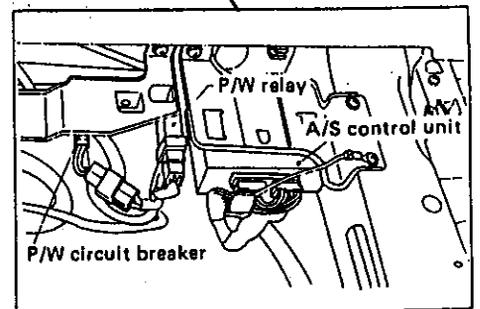


Fig. 81-4

B6-295

**Sec. 5 DIODE-CONDENSER**

Diode (Door warning)	Fig. 81-2
Diode (Lighting)	Fig. 81-1
Condenser (Horn)	Fig. 81-3

Condenser (Rear defogger)	Fig. 82-1 Fig. 83-1
---------------------------	------------------------

**(1) Instrument Panel**

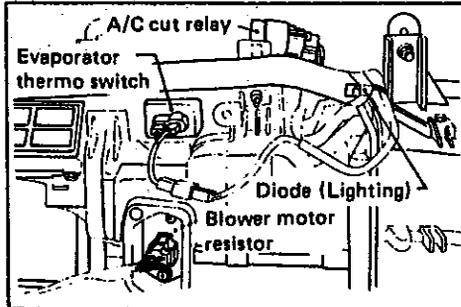


Fig. 82-1

B6-582

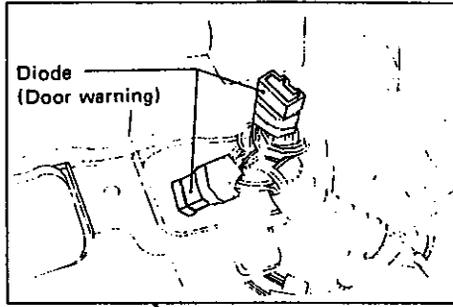
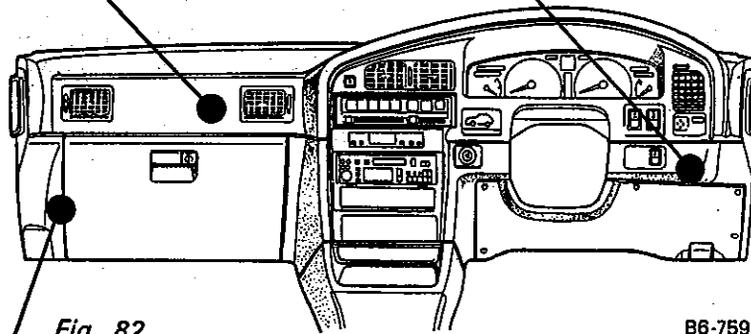


Fig. 82-2

B6-294



B6-759

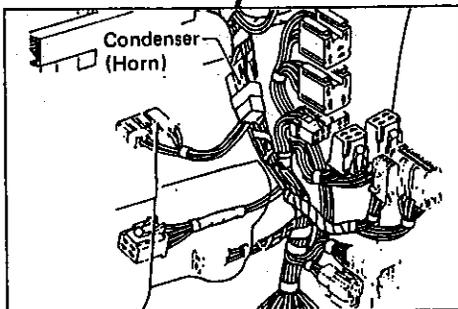


Fig. 82-3

B6-516

(2) Trunk Room

(3) Luggage Room

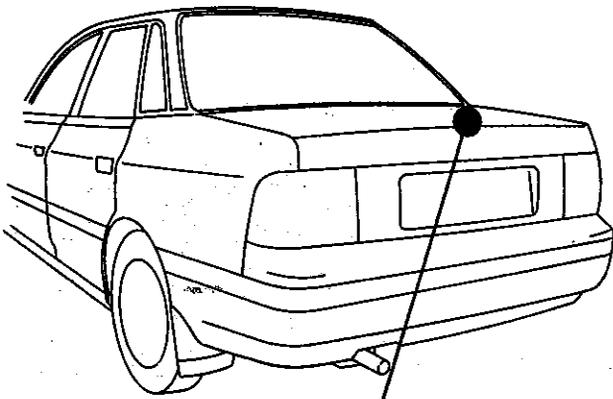


Fig. 83

B6-719

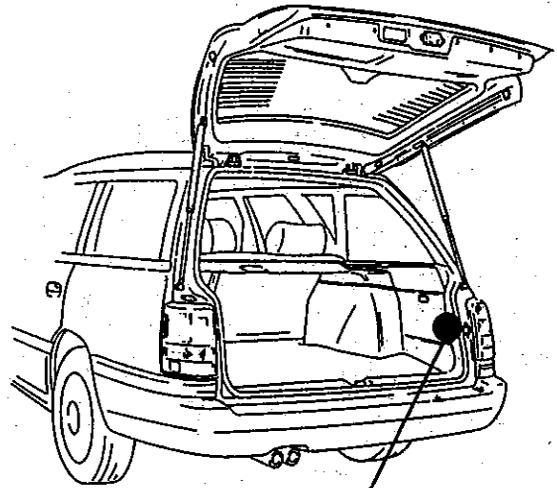


Fig. 84

B6-332

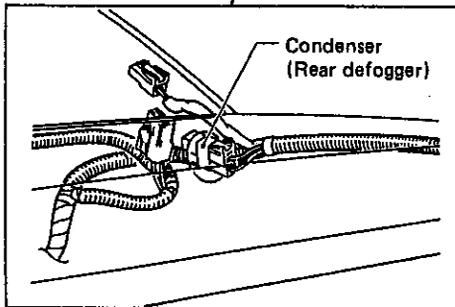


Fig. 83-1

B6-347

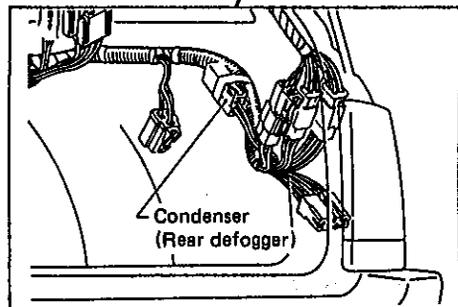


Fig. 84-1

B6-348

Sec. 6 FUSE AND FUSIBLE LINK

(1) Engine Room

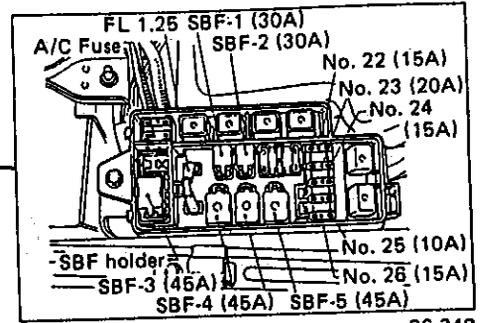
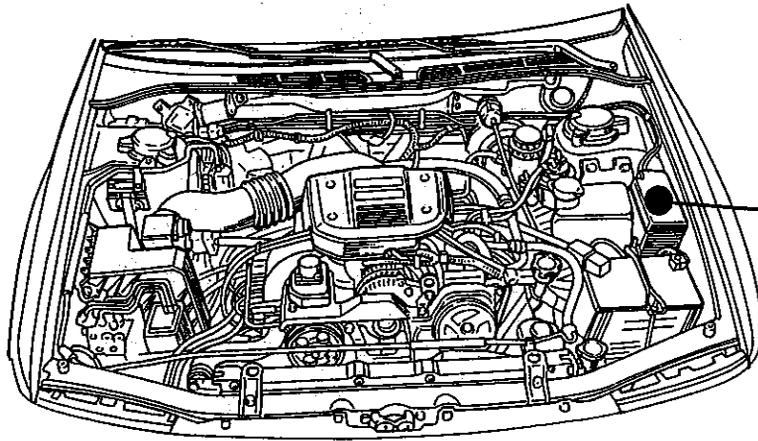


Fig. 85-1

B6-349

Fig. 85

B6-718C

(2) Instrument Panel

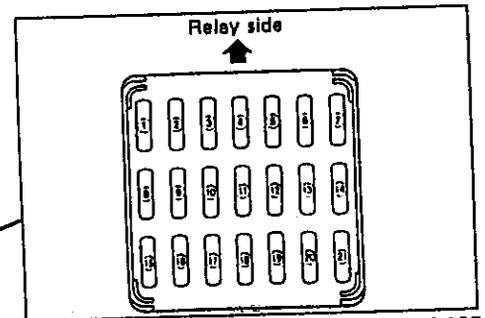
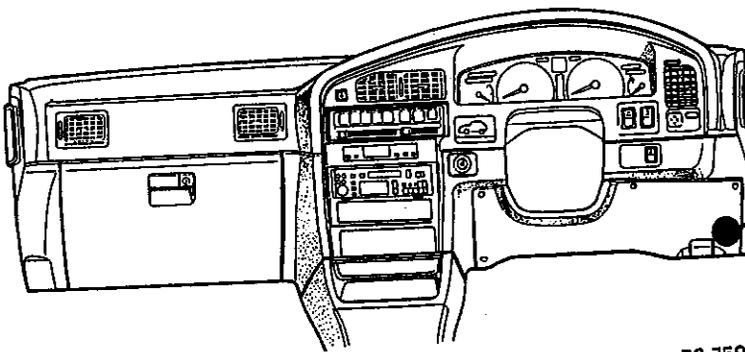


Fig. 86-1

B6-167

Fig. 86

B6-759

**Sec. 7 SELECT MONITOR CONNECTOR AND CHECK CONNECTOR**

Check connector	Fig. 86-2	Read memory connector	Fig. 86-1
Diagnosis connector	Fig. 86-3	Select monitor connector	Fig. 86-2
Diagnosis connector (Ground)	Fig. 86-3	Test mode connector	Fig. 86-1

**Instrument Panel**

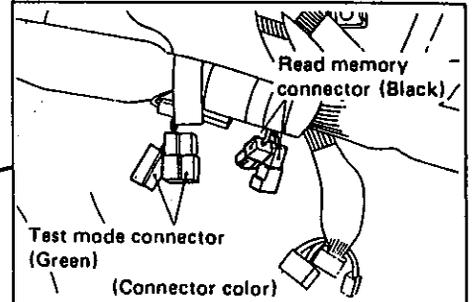
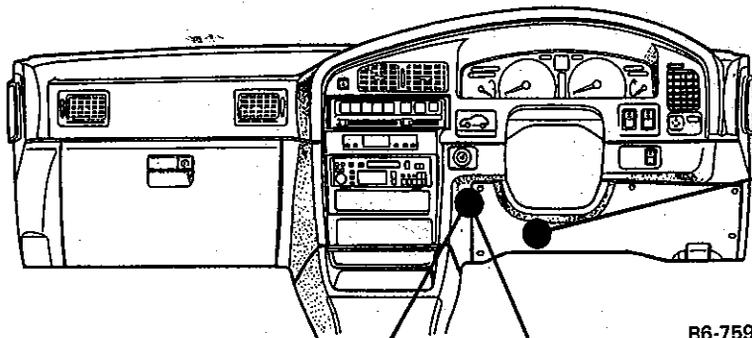


Fig. 87-1

B6-301

B6-759

Fig. 87

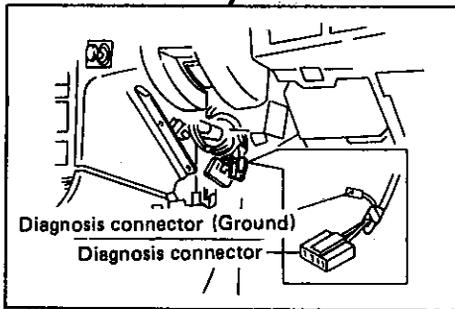


Fig. 87-3

B6-590

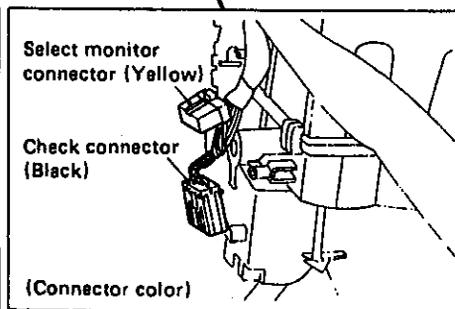
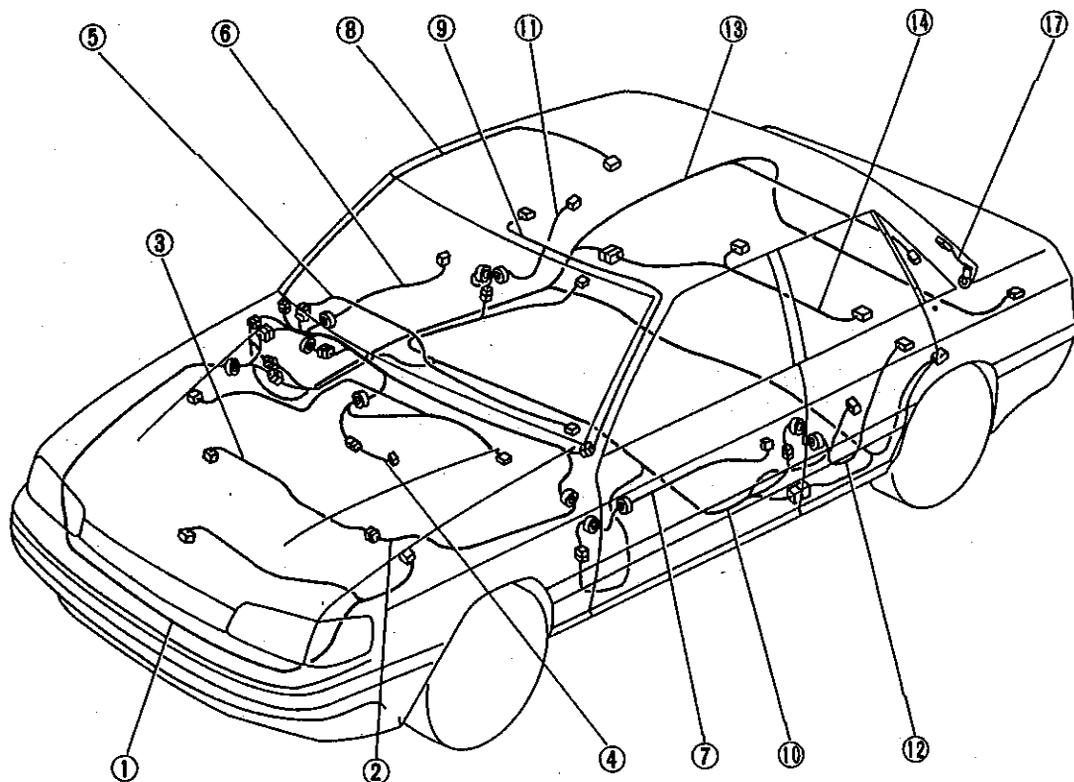


Fig. 87-2

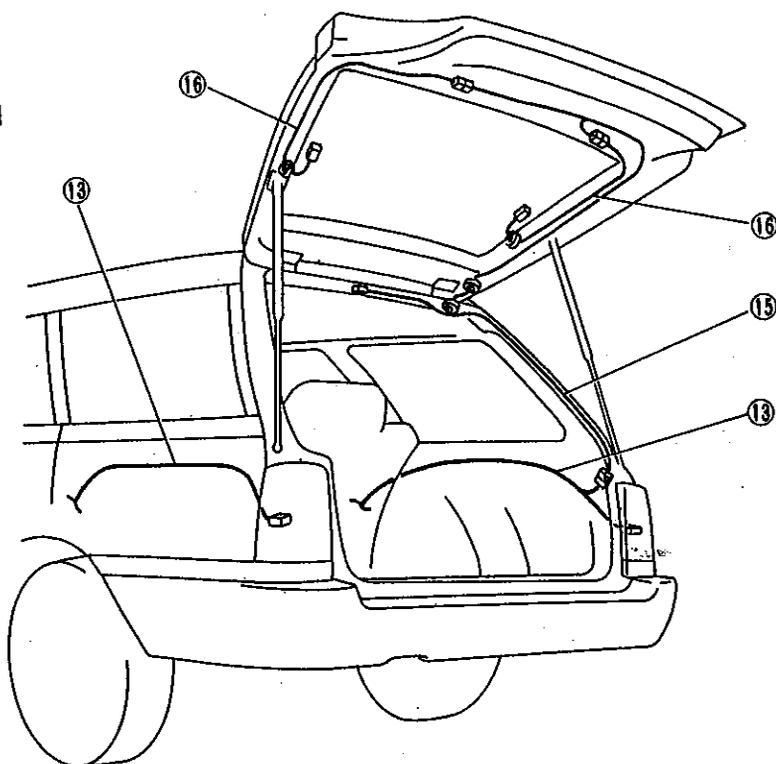
B6-326

## 7. Electrical Wiring Harness and Ground Point

SEDAN



WAGON



- 1 Front wiring harness
- 2 Bulkhead wiring harness
- 3 Engine wiring harness
- 4 Transmission cord
- 5 Instrument panel wiring harness
- 6 Front door cord RH
- 7 Front door cord LH
- 8 Room light cord
- 9 Sunroof cord or spot light cord
- 10 Power window main harness
- 11 Rear door cord RH
- 12 Rear door cord LH
- 13 Rear wiring harness
- 14 Fuel cord
- 15 Rear gate cord
- 16 Rear defogger cord
- 17 Rear defogger cord (Ground)

B6-533

Fig. 88

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
F1	6		A-2	B89	Bulkhead wiring harness
F2	40	White	A-2	B86	Bulkhead wiring harness (SMJ)
F3	10	Gray	A-2		
F4	3	Gray	B-2		F/B
F5	5	Gray	B-2		
F6	2		B-2	P5	
F7	13		B-2	P4	Power window main harness
F10	12	Black	B-1		
F11	2	Gray	B-1		Hydraulic unit (ABS)
F13	2		B-1		Front turn signal light RH
F14	3	Black	B-1		Headlight RH
F15	2	Black	B-1		Front clearance light RH
F17	4	Black	B-2		
F18	1 x 2		B-2		Alternator
F21	3	Black	B-2		Fan motor (Cooling fan)
F22	3	Black	C-2		Headlight LH
F23	1	Black	C-2		
F24	1	Black	C-2		Horn
F27	2		B-3		Front turn signal light LH
F28	2	Black	B-2		Front clearance light LH
F29	1	Brown	B-3	B44	Bulkhead wiring harness
F31	2	Green	B-3		Front washer motor
F37	1		B-3		
F38	2	Black	B-3		
F39	8		B-3		M/B
F40	3		B-3		
F41	2	Black	B-3		
F42	4		B-3		SBF holder
F45	2		A-2		Side turn signal RH
F46	5	Black	B-3		A/C cord (MPFI/SPFI)
	2	Black	B-3		A/C cord (CARB)
F47	6	Black	B-3		A/C adapter
F48	2		C-3		Intercooler pump (TURBO model)
F49	2		C-2		Front fog light (LH)
F50	2		B-1		Front fog light (RH)
F51	6		A-2	I56	Instrument panel wiring harness
F52	6	Gray	B-2		Headlight leveler (LH)
F53	6	Gray	B-1		Headlight leveler (RH)

1. FRONT WIRING HARNESS AND GROUND POINT

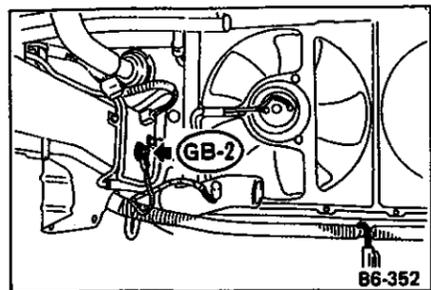
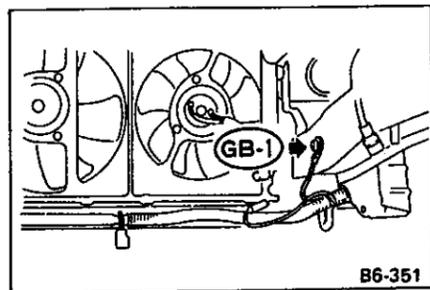
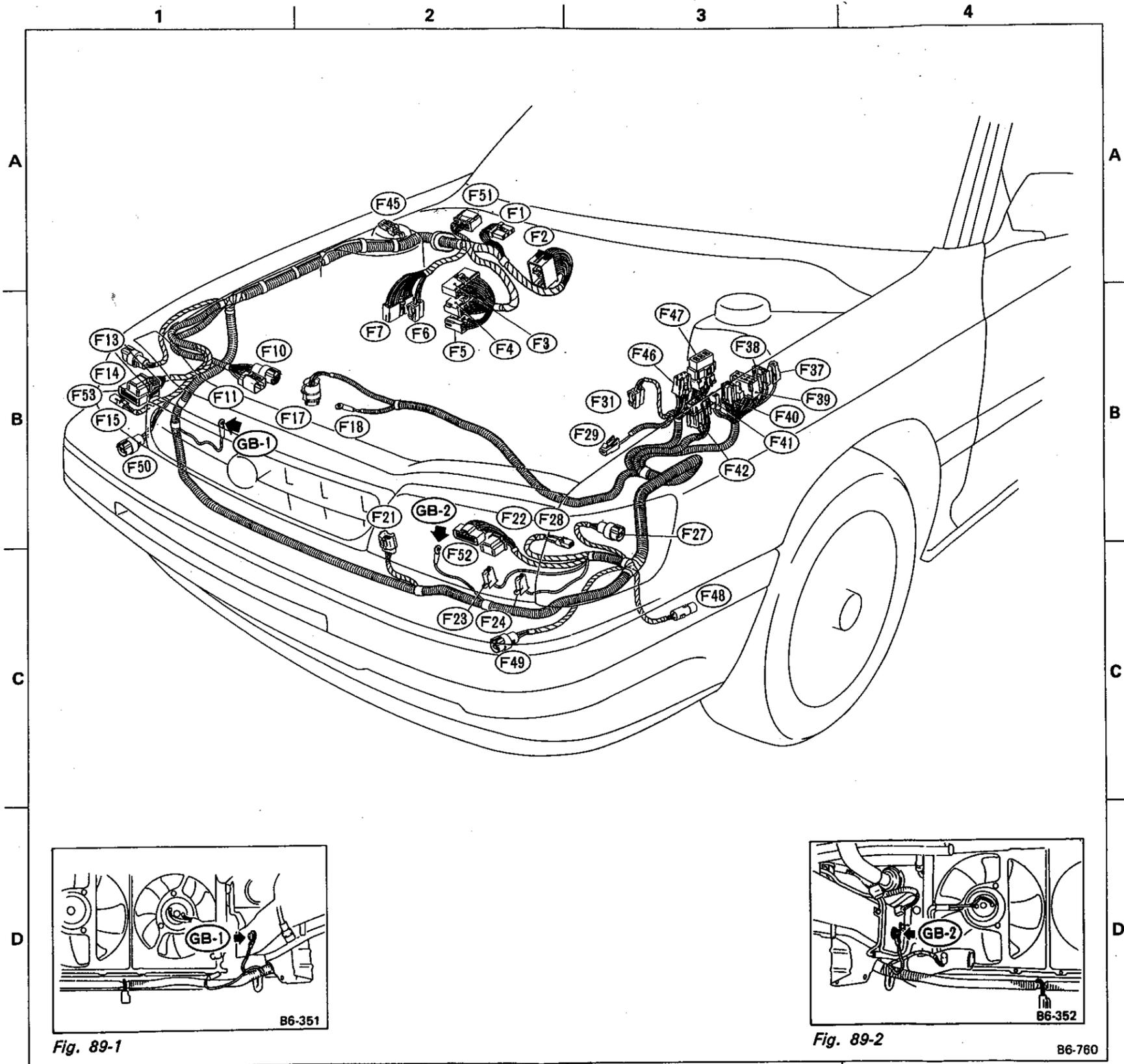


Fig. 89-1

Fig. 89-2

B6-760

Connector				Connecting to		
No.	Pole	Color	Area	No.	Name	
B4	6		B-1		Air flow meter	
B8	2	Black	B-2		Dropping resistor (4AT)	
B9	2	Black	A-2		FWD switch (4AT)	
B11	2	Black	A-2		A/S front solenoid	
B13	4	Black	A-2		A/S front sensor	
B18	2	Black	A-1		Noise condenser (CARB & SPFI)	
B19	6		A-3	}	Igniter (MPFI)	
	4	Gray	A-3		Ignition coil (SPFI)	
	2	Black	A-3		Ignition coil (CARB)	
B21	5		A-3		Wiper motor	
B22	5	Black	A-3		A/S compressor relay	
B23	2	Gray	B-4		A/S front solenoid	
B24	4	Gray	B-4		A/S front sensor	
B25	2	Gray	B-3		ABS front sensor LH	
B28	2	Brown	B-3		4WD solenoid (Part time 4WD)	
B29	2	Blue	B-3		FWD solenoid (Part time 4WD)	
B31	2	Gray	A-2		Brake fluid level sensor	
B33	2	Gray	B-2		ABS front sensor RH	
B34	2	Black	B-2		ABS G-sensor (MT)	
B35	4	Gray	B-2		O <sub>2</sub> sensor (ADR)	
B37	3	Gray	B-2		Crank angle sensor	
B38	1	Gray	B-2		Knock sensor	
B39	3	Gray	B-2		Cam angle sensor	
B40	14	Gray	B-3	E28	Transmission (3AT)	
	12	Gray	B-3	E25	Transmission (4AT)	
	8	Gray	B-3	E21	}	Transmission (MT)
	6	Gray	B-3	E21		
	4	Gray	B-3	E21		
	2	Gray	B-3	E21		
B41	16	Gray	B-3	E26	Transmission (4AT)	
B42	1		B-3		Starter (Magnet)	
B43	4		B-3		Cruise control pump	
B44	1		B-3	F29	Front wiring harness	
B45	8		B-2	E3	}	Engine wiring harness
	5	Gray	B-2			
B46	14	Gray	B-2	E2	}	Engine wiring harness
B47	16	Gray	B-2			
B50	2	Gray	B-3		A/S charge solenoid	
B51	4	Gray	B-3		A/S compressor	
B52	2	Brown	B-2		A/S pressure switch	
B131	2	Blue	B-2		Headlight washer motor (Europe)	
B132	2		B-3		Side turn signal LH	
B133	2		A-1		Distributor (CARB)	
B134	2		A-1		Dropping resistor (CARB)	
B135	3	Gray	A-1		Vacuum sensor (CARB)	
B136	4		B-2		Dropping resistor (MPFI)	
B153	2	Black	B-2		Wastegate control solenoid valve	
B154	2	Brown	B-1		Pressure exchange solenoid valve	
B155	3	Gray	B-2		Pressure sensor	
B156	5	Gray	B-1		Ignitor 1	
B157	4	Gray	B-2		Ignitor 2	
B158	2		A-2		Dropping resistor	
B159	4	Blue	A-2		Intercooler relay 1	
B160	4	Green	A-2		Intercooler relay 2	
B161	3		B-2		Vehicle speed sensor	
B162	4		B-4		Dim dip resistor	

### 2. BULKHEAD WIRING HARNESS (Engine side)

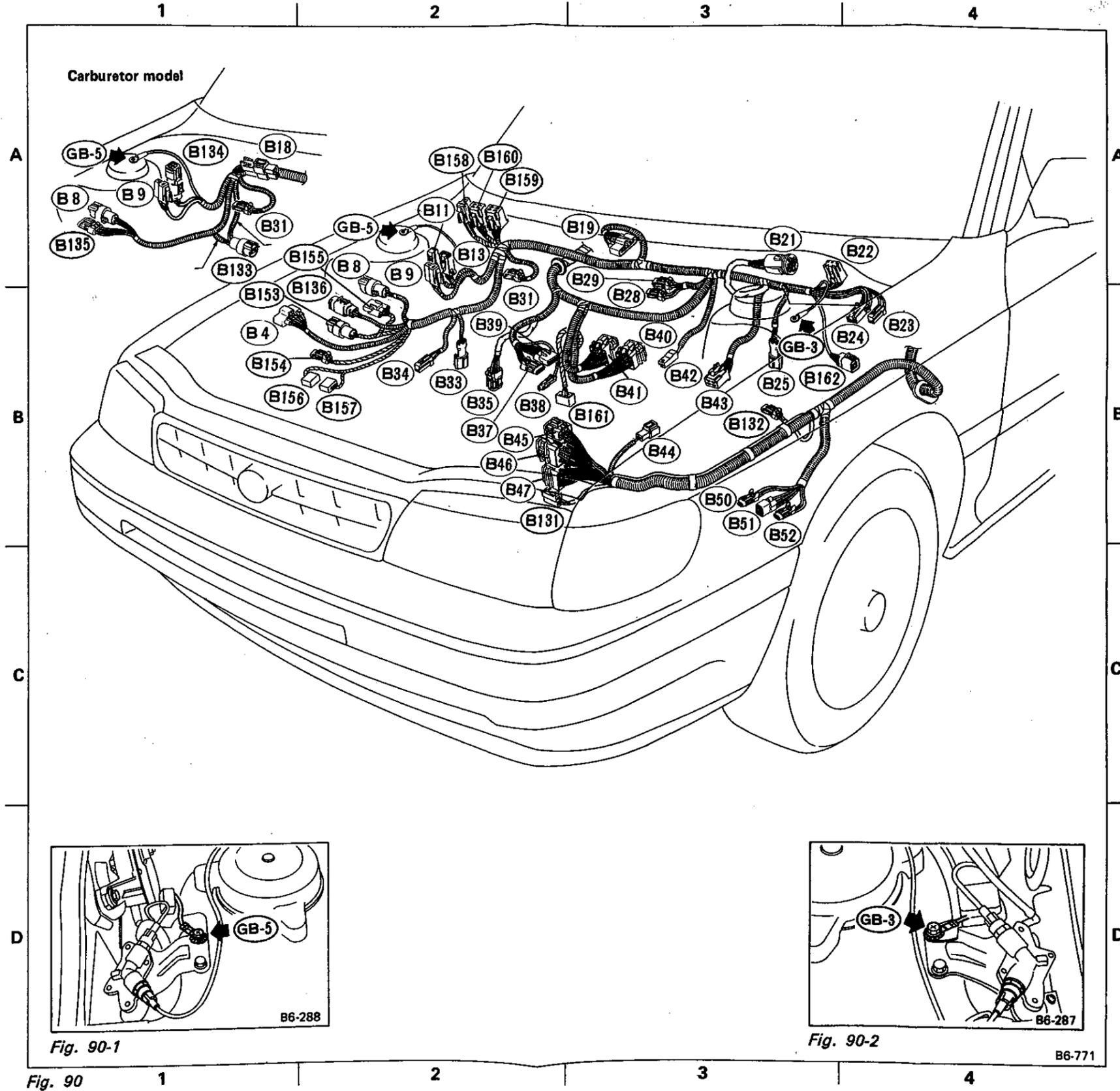


Fig. 90-1

Fig. 90-2

Fig. 90

1

2

3

4

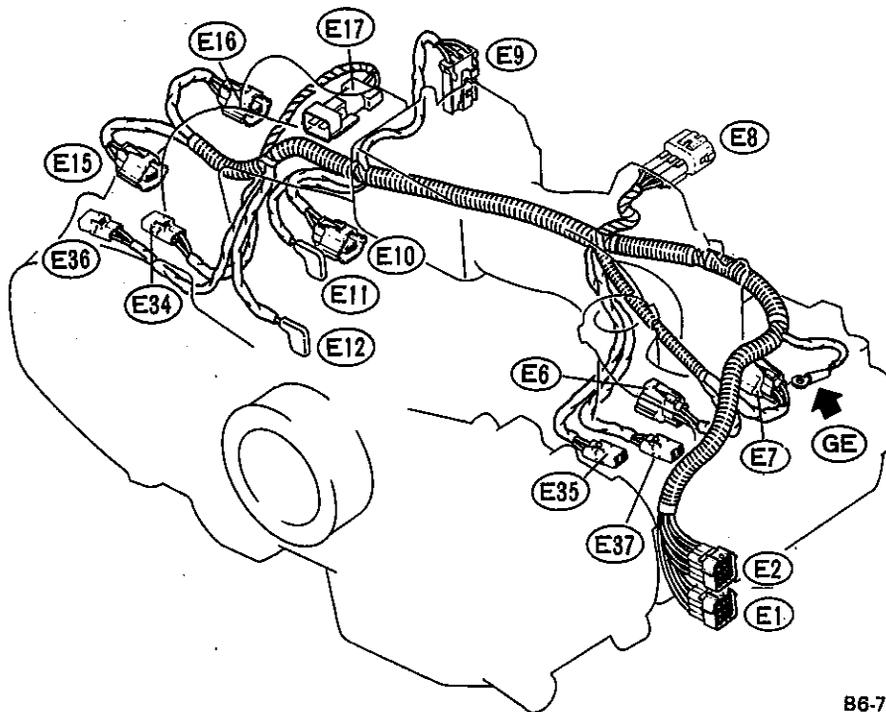
B6-288

B6-287

B6-771

**MPFI TURBO engine model**

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E1	16	Gray		B47	Bulkhead wiring harness
E2	12	Gray		B46	
E6	2	Gray			Injector #2
E7	2	Gray			Injector #4
E8	3	Gray			By-pass air control valve
E9	4	Gray			Throttle sensor
E10	2	Brown			Water temperature sensor
E11	1				Thermometer
E12	1	Black			Oil pressure switch
E15	2	Gray			Injector #1
E16	2	Gray			Injector #3
E17	2	Blue			CPC solenoid
E34	2	Gray			Ignition coil #1
E35	2	Gray			Ignition coil #2
E36	2	Gray			Ignition coil #3
E37	2	Gray			Ignition coil #4



B6-782

Fig. 91

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**(MPFI NA MODEL)**

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E1	16	Gray	B-3	B47	Bulkhead wiring harness
E2	12	Gray	B-3	B46	
E6	2	Gray	B-3		Injector #2
E7	2	Gray	B-3		Injector #4
E8	3	Gray	A-2		By-pass air control valve
E9	4	Gray	A-3		Throttle sensor
E10	2	Brown	A-2		Water temperature sensor
E11	1	Black	A-2		Thermometer
E12	1	Black	A-2		Oil pressure switch
E15	2	Gray	A-2		Injector #1
E16	2	Gray	A-2		Injector #3
E17	2	Blue	A-2		CPC solenoid
E31	2	Gray	A-2		Ignition coil

**(SPFI MODEL)**

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E1	16	Gray	D-2	B47	Bulkhead wiring harness
E3	5	Gray	D-2	B45	
E8	2	Gray	D-2		By-pass air control valve
E9	4	Gray	C-1		Throttle sensor
E10	2	Brown	C-1		Water temperature sensor
E11	1	Black	C-1		Thermometer
E12	1	Black	D-1		Oil pressure switch
E17	2	Blue	C-1		CPC solenoid valve
E18	2	Black	C-1		Fuel injector
E19	5	Gray	C-1		Air flow sensor

**(CARBURETOR MODEL)**

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E3	8	Gray	D-3	B45	Bulkhead wiring harness
E11	1	Black	C-2		Thermometer
E12	1	Black	C-2		Oil pressure switch
E32	1	Gray	C-2		Fan switch
E33	3		C-2		Idle switch

### 3. ENGINE WIRING HARNESS AND GROUND POINT

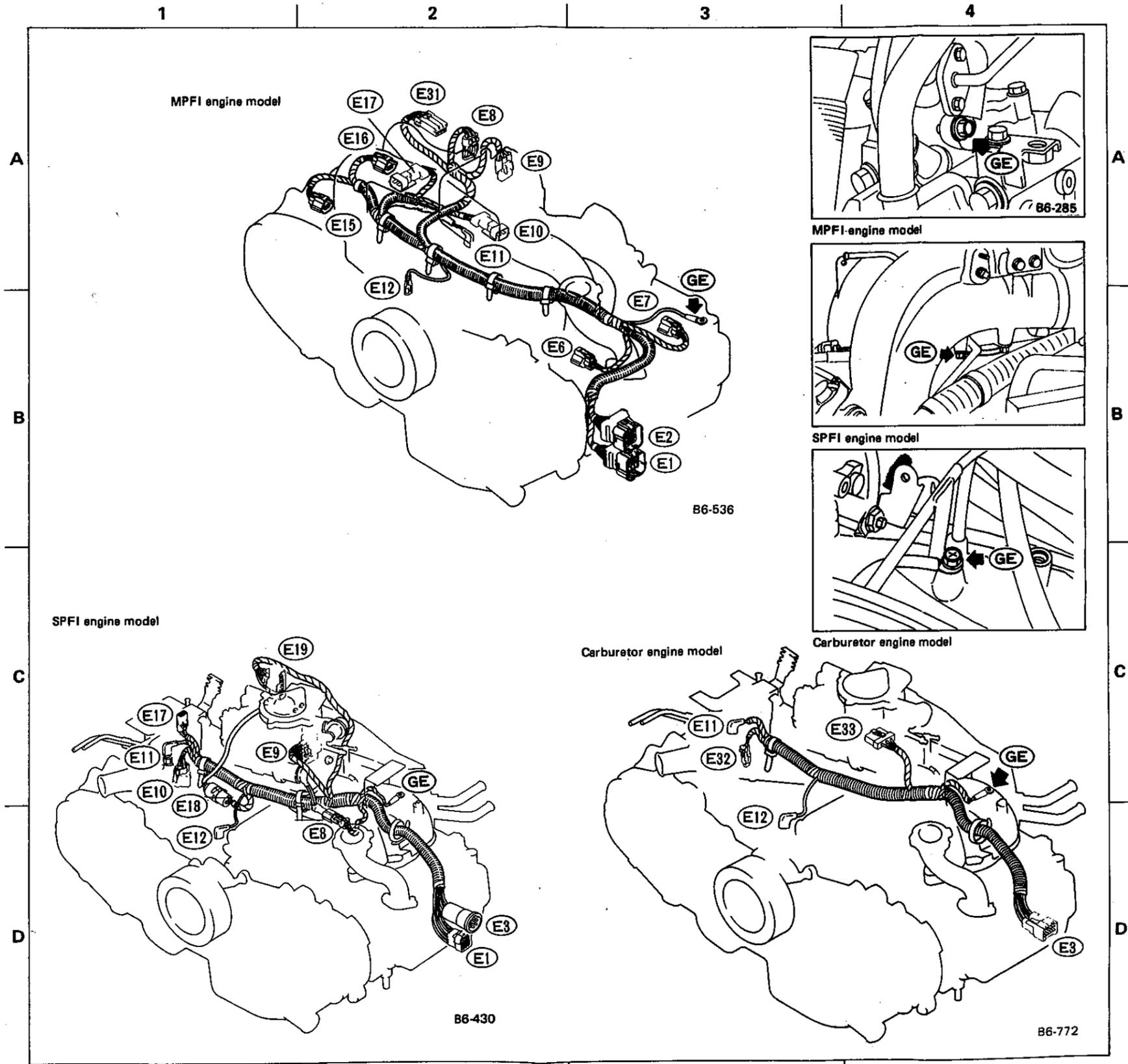


Fig. 92

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
E21	8	Gray	C-1	B40	Bulkhead wiring harness (MT)
	6	Gray	C-1	B40	
	4	Gray	C-1	B40	
	2	Gray	C-1	B40	
E22	2		D-2		Back-up light switch (MT)
E23	2	Black	D-2		Neutral switch (MT)
E24	2		D-2		4WD indicator light switch (Selective 4WD)
E25	12	Gray	A-1	B40	Bulkhead wiring harness (AT)
E26	16	Gray	A-2	B41	
E27	2	Black	D-2		4WD-Lo indicator light switch (Dual-range)
E28	14	Gray	B-3	B40	Bulkhead wiring harness (3AT)
E29	2		B-3		Kick-down solenoid (3AT)

4. TRANSMISSION CORD

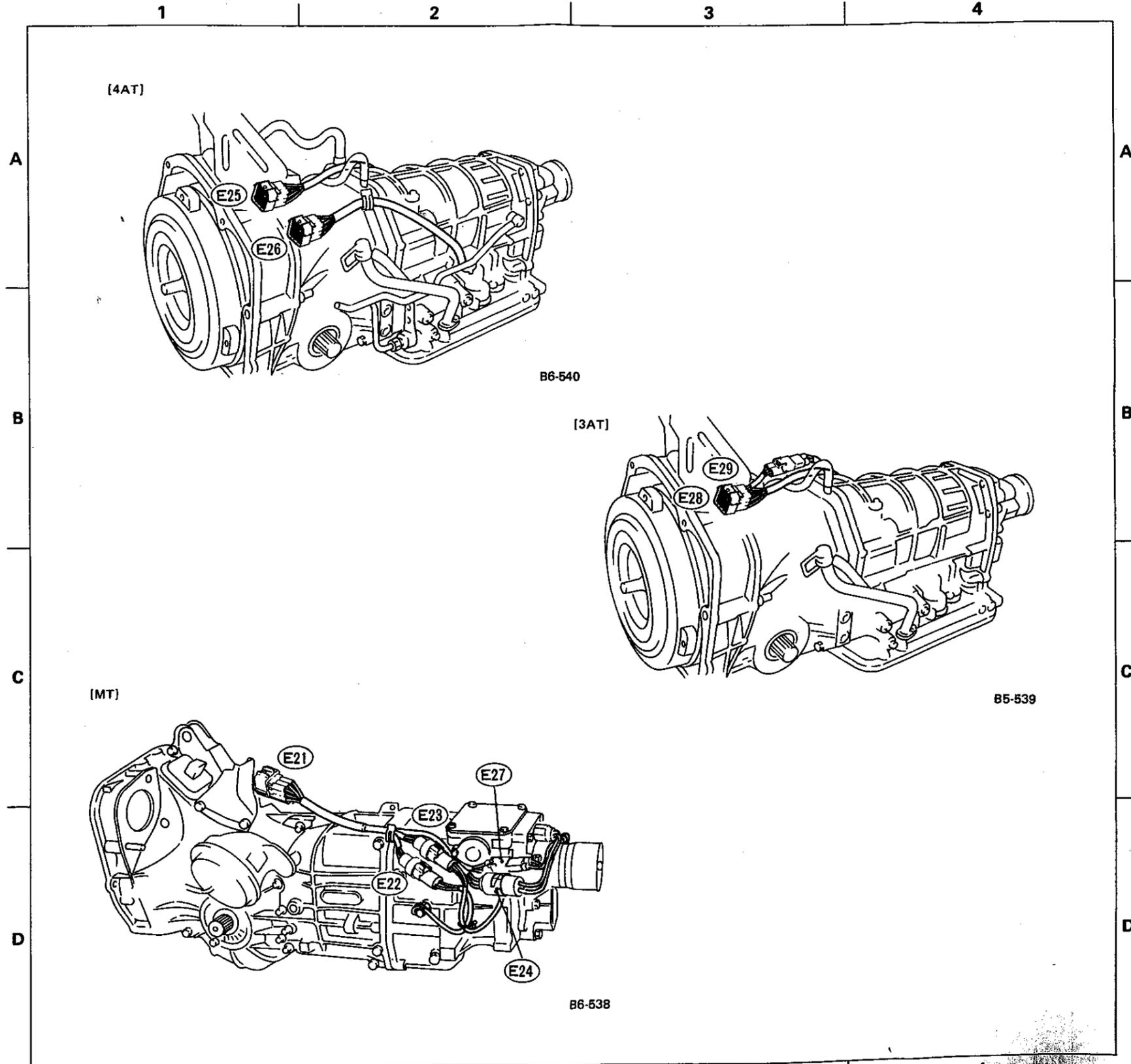


Fig. 93

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B53	22	Black	B-1	P26	Power window main harness
	8	Black	B-1		
B54	4		C-1	P25	Power window main harness
B56	13		B-1	P29	Front door cord LH
B57	4		B-1		Cruise control unit
B58	20		B-1		
B59	4	Black	B-1		Main relay (Cruise control)
B60	4	White	B-1		Inhibitor relay (AT-cruise control)
B61	2	Black	B-1		Diode (AT-cruise control)
B63	5	Black	B-1	R7	Sunroof cord
B64	4	Black	B-1		Blower motor resistor
B65	2	Black	B-1		Blower motor
B66	5		B-1		FRESH/RECIRC actuator
B68	2	Black	B-2		Evaporator thermostwitch
B69	2	Black	B-1		Diode (Lighting)
B71	4	Blue	B-2		A/C cut relay
B73	4	Blue	B-2	I12	Instrument panel wiring harness
B75	7		B-2		Mode actuator
B76	2	Blue	B-3		Clutch switch (MT-cruise control)
B77	22	Black	B-3		Check connector
B78	9	Yellow	B-3		Select monitor connector
B79	1		B-3		Diagnosis terminal (Ground)
B80	4	Black	B-3		Diagnosis connector
B81	4	Black	B-3	B82	Shield joint connector (4AT)
B82	4	Black	B-3	B81	
B83	16	Black	B-3		AT control unit
B84	20	Black	B-3		
B85	12	Black	B-3		
B86	40	White	B-3	F2	Front wiring harness (SMJ)
B87	40	Gray	B-3	R2	Rear wiring harness (SMJ)
B88	4		B-4		Blower relay
B89	6		B-4	F1	Front wiring harness
B90	2	Green	B-4	R1	Room light cord
B91	4	Blue	B-4		Front fog light relay
B93	6	Brown	B-4		Ignition relay
B94	4	Green	B-4		Fuel pump relay
B95	2	Black	B-4		Diode (Engine)
B96	22	Black	C-3	I35	Instrument panel wiring harness
B97	22		C-3	I36	
B98	22	Blue	C-3	I33	
B99	8		C-3	I32	
B100	14	Black	C-3	I31	
B101	13		C-4	P1	Front door cord RH
B103	11	Gray	C-4		F/B
B104	12	Gray	C-4		
B105	2	Brown	C-4		MPFI/SPFI control unit
B106	26	Yellow	C-4		
B107	2	Green	C-4	B108	Test mode connector
B108	2	Green	C-4	B107	
B109	1	Black	C-4	B110	Read memory connector
B110	1	Black	C-4	B109	
B115	5	Black	C-3		Cruise control sub-switch

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
B117	9	Black	C-3		Combination switch (Turn signal)
B118	11	Black	C-3		Combination switch (Wiper)
B119	8	Black	C-3		Combination switch (Lighting)
B120	6	Black	C-3		Ignition switch
	4	Black	B-3		Stop and Brake switch (with cruise control)
B121	2	Black	B-3		
	2	Black	B-3		Stop light switch (without cruise control)
B122	2	Black	B-3		Kick-down switch (AT)
B123	2	Black	C-3	B124	
B124	2	Black	C-3	B123	Shield joint connector
B125	12	Yellow	C-4		MPFI control unit
B126	22	Yellow	C-4		
B127	16	Yellow	C-4		MPFI/SPFI control unit
B128	3	Black	C-4		MPFI/SPFI control unit
B137	2	Black	B-1	B138	Shield joint connector (ABS)
B138	2	Black	B-1	B137	
B139	5	Black	B-2		Horn relay
	4		B-2		
B140	4		B-2		Dim-dip relay
	4		B-2		
B141	4		B-2		Dim-dip control relay
B142	4		B-2		Dim-dip main beam cancel relay
B143	3		B-2		Dim-dip cancel relay
B144	3		B-2		Diode (Dim-dip)
B146	6		C-4		Diode (Dim-dip)
B147	6	Black	C-4		Revolution sensor (CARB)
B148	2	Black	C-3		Headlight washer unit (Europe)
B149	3	Black	B-2		Diode (Rear fog lamp)
B152	4		B-4		Diode (4WD-solenoid)
B163	17		B-2		Load relay (SPFI)
B164	8		B-4	P54	Keyless entry unit
B165	13		B-4	P55	Front door cord RH (with keyless entry)
					Front door cord RH

5. BULKHEAD WIRING HARNESS (Interior side)

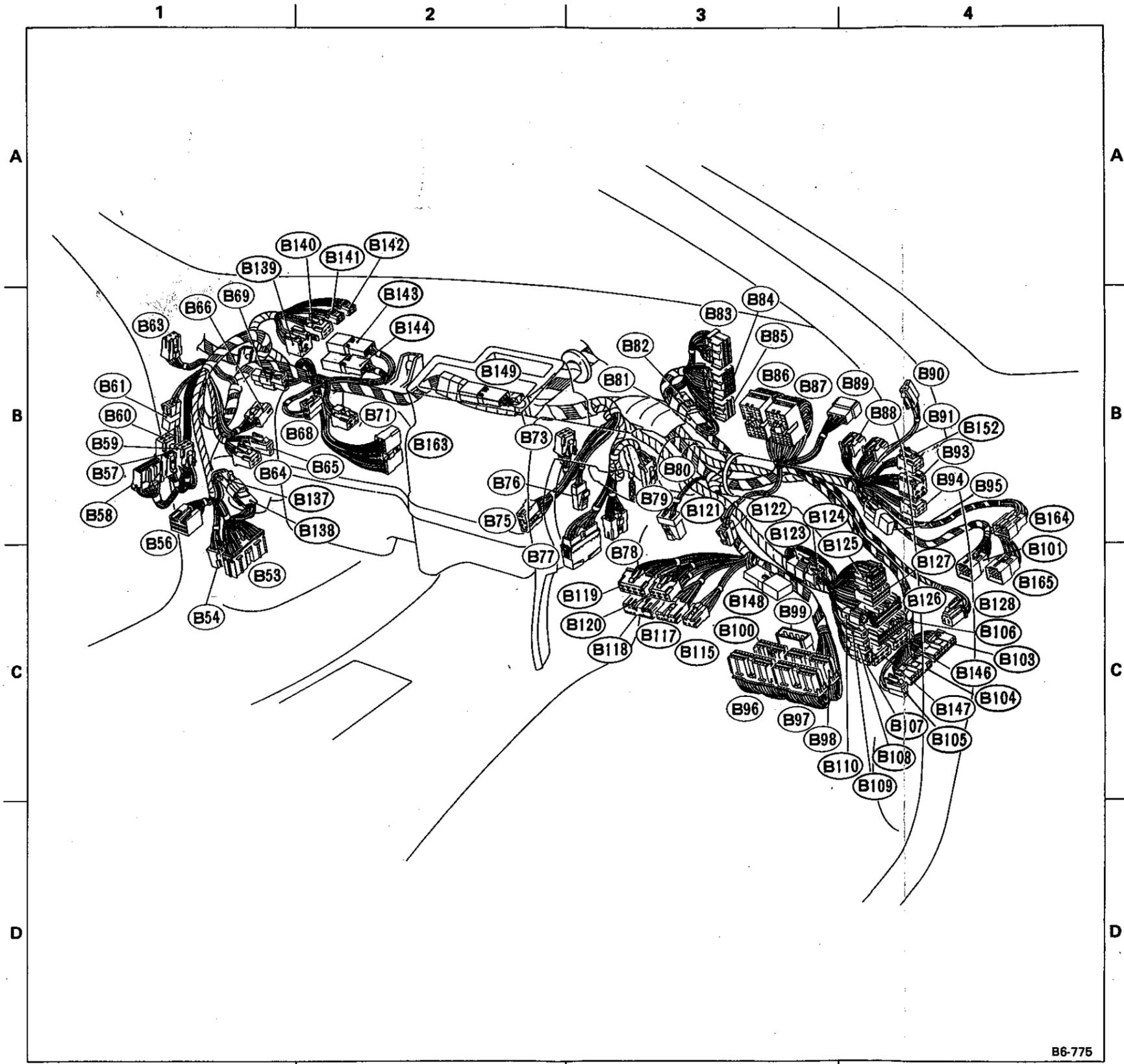


Fig. 94

B6-775

Connector				Connecting to		
No.	Pole	Color	Area	No.	Name	
i2	7		B-1	P27	Power window main harness	
i3	2		B-1		Glove box light switch	
i4	2	Black	A-1		Diode (A/C) (GX • LX • GL)	
i5	2	Brown	B-1		Glove box light	
i6	10		B-2		Hazard switch	
i8	3	Black	B-2		Turn signal & Hazard unit	
i9	7		B-2		Radio	
i10	2	Black	B-2		Ash tray illumination light	
i11	9		B-2		Radio	
i12	4	Blue	B-2		B73	Bulkhead wiring harness (A/C)
i13	6	Black	B-2	Fan switch		
i14	13	Black	B-2	Mode control panel		
i17	12		B-3	Height control switch		
i18	3		B-2	Cigarette lighter illumination light		
i19	1		B-2	Cigarette lighter		
i22	12		B-3	} Combination meter		
i23	12		B-3			
i24	16		B-3			
i25	12		B-3			
i26	6	Brown	B-3	Cruise control main switch		
i27	6		B-3	Rear defogger switch		
i30	12	Black	B-4	Remote control rearview mirror switch		
i31	14	Black	C-3	B100		Bulkhead wiring harness (AT)
i32	8		C-3			} Bulkhead wiring harness
i33	22	Blue	C-3	B99		
i34	15	Gray	C-4	B98	F/B	
i35	22	Black	C-3	B96	} Bulkhead wiring harness	
i36	22		C-3			B97
i37	1		B-4	i38	Illumination control short connector (without illumination control)	
i38	1		B-4	i37		
i42	2		B-2	Diode (A/C) (DL)		
i45	6	Black	B-2	Illumination control unit		
i46	5	Black	B-2	Rear fog light relay		
i47	7		B-2	Clock & Auto antenna switch		
i49	6	Black	B-3	Rear fog light switch		
i50	6	Black/Yellow	B-3	Headlight washer switch (Europe)/Front fog light switch (ADR)		
i52	8	Black		Delay amp. (Fuel gauge)		
i53	1 × 2			Delay amp. cut connector		
i54	6	Yellow	C-4	Front fog light switch (Europe)		
i55	7		B-3	Headlight leveling switch		
i56	6		B-4	F51	Front wiring harness	

### 6. INSTRUMENT PANEL WIRING HARNESS

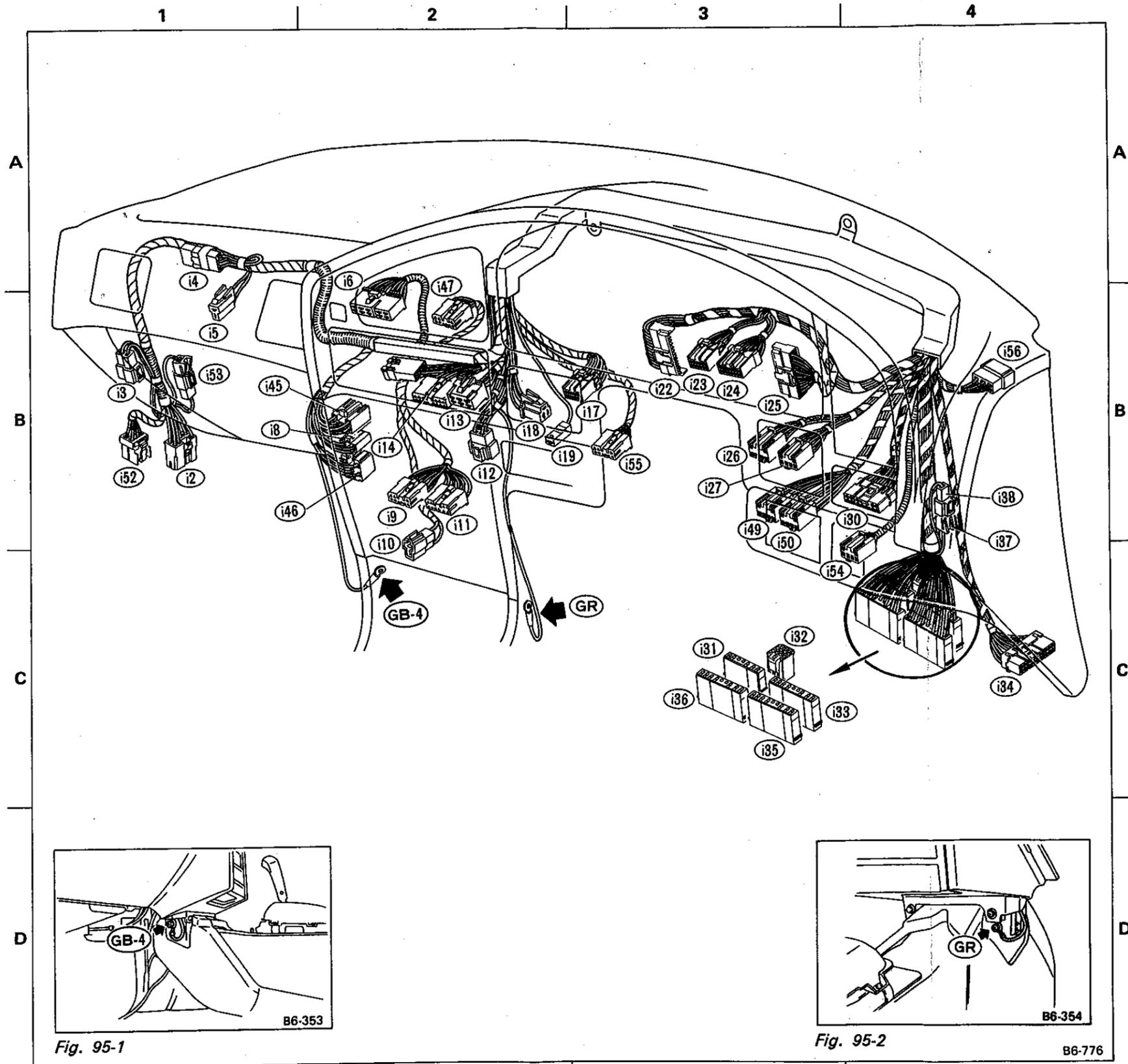
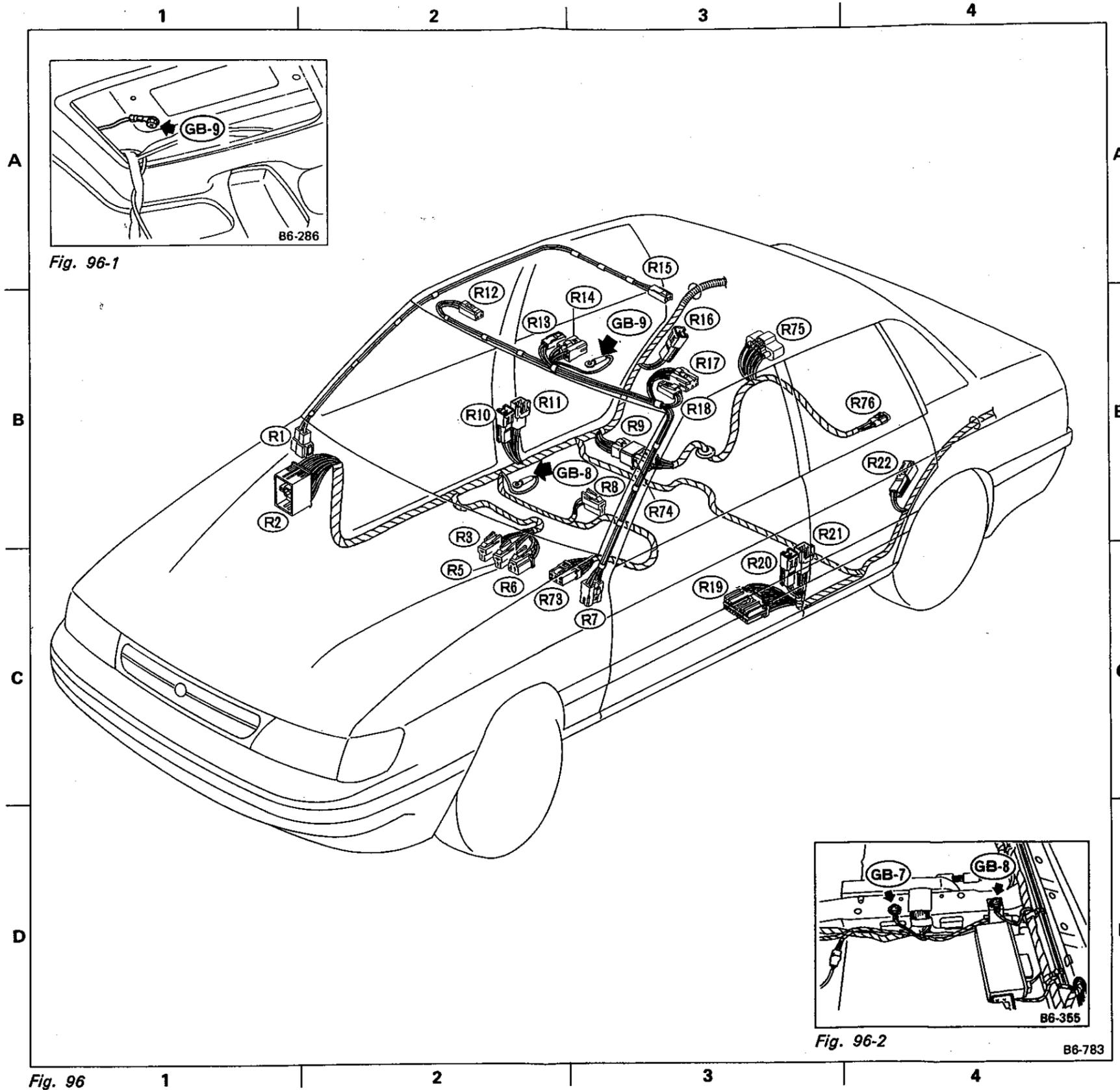


Fig. 95-1

Fig. 95-2

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
R1	2	Green	B-2	B90	Bulkhead wiring harness
R2	40	Gray	B-2	B87	Bulkhead wiring harness (SMJ)
R3	2	Blue	B-2		Select lever illumination light (AT)
R5	2	Green	C-2		AT manual switch (4AT)
R6	3	Green	C-2		4WD select switch (MT)
R7	5	Black	C-3	B63	Bulkhead wiring harness
R8	2		B-3		Parking brake switch
R9	5		B-3	R74	Fuel cord ↔ Rear wiring harness
R10	2		B-2		Front door switch RH
R11	6		B-2	P16	Rear door cord RH
R12	2		B-2		Vanity mirror illumination light RH (ADR. GX)
R13	2		B-2		Spot light
R14	5	Black	B-3		Sunroof switch
R15	2		A-3		Room light
R16	2		B-3		Rear door switch RH
R17	5		B-3		Sunroof control unit
R18	2		B-3		Vanity mirror illumination light LH (ADR. GX)
R19	14	Black	C-3	P41	Power window main harness
R20	2		C-3		Front door switch LH
R21	6		C-3	P43	Rear door cord LH
R22	2		B-4		Rear door switch LH
R73	6		C-3		AT economy switch (4AT)
R74	5		B-3	R9	Rear wiring harness
R75	6		B-3		Fuel gauge unit and Fuel pump
R76	2		B-4		Fuel gauge sub unit (4WD)

### 7. REAR WIRING HARNESS



Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
P1	13		B-1	B101	Bulkhead wiring harness
P4	13		C-1	F7	} Front wiring harness
P5	2		C-2	F6	
P6	9		C-2	P7	Front door cord RH
P7	9		C-2	P6	Power window main harness
P8	2		B-2		Front speaker RH
P9	6		B-2		Remote control rearview mirror RH
P10	10		B-2		Power window main switch
P11	2	Green	B-2		Front power window motor RH
P12	2	Pink	B-2		Front step light RH (ADR)
P15	4		B-2		Front door lock actuator RH
P16	6		B-2	R11	Rear wiring harness
P17	3		B-2	P18	Rear door cord RH
P18	3		B-2	P17	Power window main harness
P19	2	Green	B-2		Rear power window motor RH
P20	5		B-3		Rear power window sub-switch RH
P21	4		B-3		Rear door lock actuator RH
P22	2	Pink	B-3		Rear step light RH (ADR)
P23	2	Gray	B-3		Rear ABS sensor RH
P24	35	Blue	B-2		ABS control unit
P25	4		C-2	B54	} Bulkhead wiring harness
P26	22	Black	C-2	B53	
	8	Black	C-2		
P27	7		C-2	i2	Instrument wiring harness
P29	13		C-2	B56	Bulkhead wiring harness
P30	3		C-3	P31	Power window main harness
P31	3		C-3	P30	Front door cord LH
P32	6		C-3		Remote control rearview mirror LH
P33	5		C-3		Front power window sub-switch LH
P34	2	Pink	C-3		Front step light LH (ADR)
P35	2		C-3		Front speaker LH
P36	2	Green	C-3		Front power window motor LH
P37	16		C-3		} A/S control unit
P38	20		C-3		
P39	4		C-3		Power window relay
P40	2		C-3		Power window circuit breaker
P41	20	Black	C-3	R19	Rear wiring harness
P42	3		C-3	P45	Rear door cord LH
P43	6		C-3	R21	Rear wiring harness
P44	4		C-3		Front door lock actuator LH
P45	3		C-3	P42	Power window main harness
P46	2	Green	B-4		Rear power window motor LH
P47	5		B-4		Rear power window sub-switch LH
P48	2	Pink	B-4		Rear step light LH (ADR)
P49	2	Gray	B-4		Rear ABS sensor LH
P50	4		B-4		Rear door lock actuator LH
P51	6	Gray	B-2		Keyless entry sensor
P52	2	Gray	B-2		Front door lock switch RH
P53	8		C-1	B164	} Bulkhead wiring harness
P54	13		C-1	B165	

### 8. POWER WINDOW MAIN HARNESS

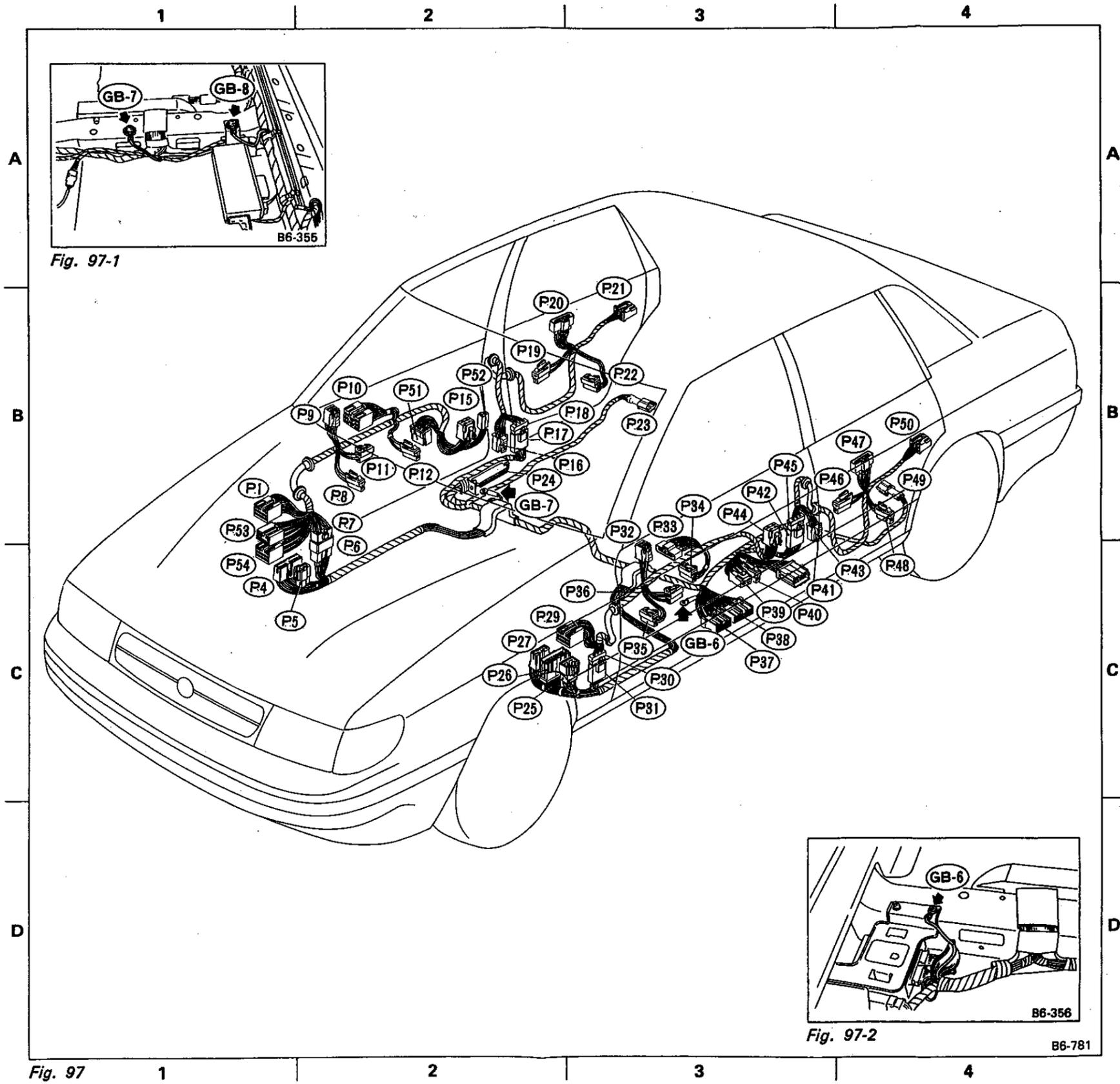


Fig. 97-1

Fig. 97-2

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
R23	3		B—2		Power-antenna
R24	1		A—2		Rear defogger (Ground)
R25	2	Black	B—2		Rear speaker LH
R27	2	Black	B—3		Trunk room light
R28	2	Black	B—3		Rear speaker RH
R29	1		A—3		Rear defogger (Power)
R32	9	Black	B—4		Rear combination light RH (with rear fog light)
	7		B—4		Rear combination light RH (without rear fog light)
R33	2		B—4		License plate light RH
R34	2		B—3		License plate light LH
R35	2		B—3		Trunk room light switch
R36	9	Black	B—2		Rear combination light LH (with rear fog light)
	7		B—3		Rear combination light LH (without rear fog light)
R69	2	Black	B—3		Condenser (Rear defogger)
R71	2		B—3		High-mount stop light
R72	10		C—4		Trailer connector (OP)

9. REAR END WIRING HARNESS AND GROUND POINT OF 4-DOOR SEDAN

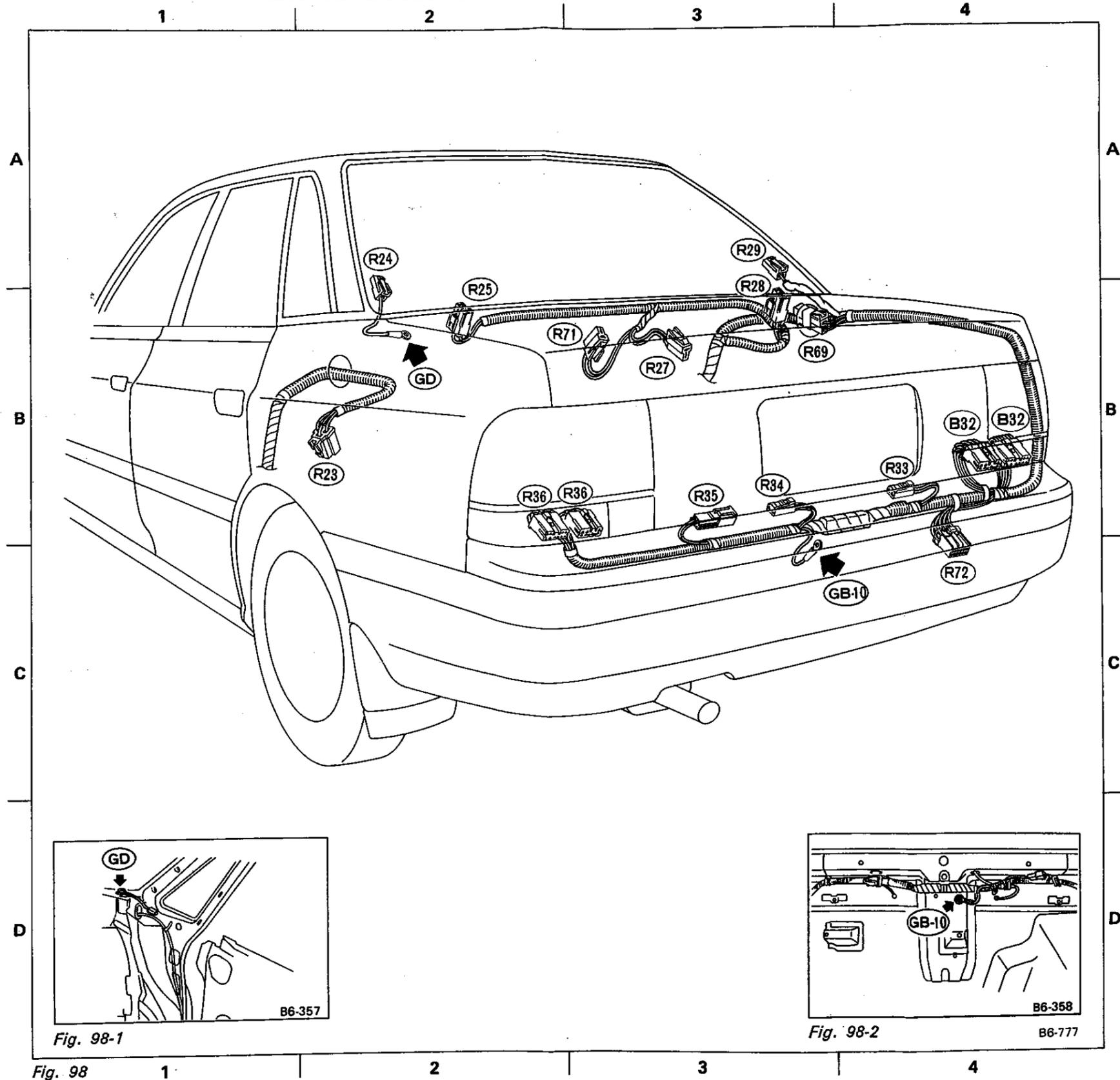


Fig. 98-1

Fig. 98-2

Connector				Connecting to	
No.	Pole	Color	Area	No.	Name
R37	2	Black	C-1		A/S rear solenoid LH
R38	4	Black	C-1		A/S rear sensor LH
R39	2	Black	C-1		Rear speaker LH
R40	2	Green	C-2		Rear washer motor
R41	7		C-2		Rear combination light LH
R42	4	Black	C-3		A/S rear sensor RH
R43	2	Black	C-3		A/S rear solenoid RH
R44	2	Black	C-3		Rear speaker RH
R45	8	Black	C-3		Rear wiper relay (with INT.)
	5		C-3		Rear wiper relay (without INT.)
R46	3		C-3		Power-antenna
R48	7	Black	C-4		Rear combination light RH (with rear fog light)
	7		C-4		Rear combination light RH (without rear fog light)
R49	4		C-4	R54	Rear gate cord
R50	6		C-4	R53	
R51	2		C-3	R52	
R52	2		C-4	R51	
R53	6		C-4	R60	Rear wiring harness
R54	4		C-4	R49	
R55	2		B-3		High-mount stop light
R56	1	Black	B-3		Luggage room light
R57	1		B-3		
R58	1	Black	B-3		Rear defogger (Power)
R59	1		A-4	R60	Rear defogger cord
R60	1		A-4	R59	Rear gate cord
R61	4		A-4		Rear gate lock actuator
R62	2		A-4		License plate light RH
R63	2		A-3		Rear gate latch switch
R64	2		A-3		License plate light LH
R65	4		A-3		Rear wiper motor
R66	1		A-3	R67	Rear defogger cord
R67	1		A-3	R66	Rear gate cord
R68	1	Black	A-2		Rear defogger (Ground)
R70	2	Black	C-3		Condenser (Rear defogger)
R72	10		C-2		Trailer connector (OP)

10. REAR END WIRING HARNESS AND GROUND POINT OF WAGON

