Service Manual

CONQUEST

1988

Volume-2
Electrical

FOREWORD

This Service Manual has been prepared with the latest service information available at the time of publication. It is subdivided into various group categories and each section contains diagnosis, disassembly, repair, and installation procedures along with complete specifications and tightening references. Use of this manual will aid in properly performing any servicing necessary to maintain or restore the high levels of performance and reliability designed into these outstanding vehicles.

CHRYSLER MOTORS

Printed in Japan

GROUP / SECTION INDEX

NOTE:
For Engine, Chassis & Body, refer to ...
Volume-1
"Engine, Chassis & Body".

HOW TO USE THIS MANUAL

N00BAAF

CONTENTS

The preceding page contains GROUP INDEX which lists the group title and group number.

PAGE NUMBERS

All page numbers consist of two sets of digits separated by a dash. The digits preceding the dash identify the number of the group. The digits following the dash represent the consecutive page number within the group. The page numbers can be found on the top left or right of each page.

TEXT

Unless otherwise specified, each service procedure covers all models. Procedures covering specific models are identified by the model codes or similar designation (engine type, transmission type, etc.). A description of these designations is covered in this unit under "VEHICLE IDENTIFICATION".

SERVICE PROCEDURES

The service steps are arranged in numerical order and attentions to be paid in performing vehicle service are described in detail in SERVICE POINTS.

DEFINITION OF TERMS

STANDARD VALUE

Indicates the value used as the standard for judging the quality of a part or assembly on inspection or the value to which the part or assembly is corrected and adjusted. It is given by tolerance.

LIMIT

Shows the standard for judging the quality of a part or assembly on inspection and means the maximum or minimum value within which the part or assembly must be kept functionally or in strength. It is a value established outside the range of standard value.

Indicates tightening torque.

Repair kit or set parts are shown. (Only very frequently used parts are shown.)

Removal steps:
The numbers before part names correspond to numbers in the illustration, and indicate the order of removal.
Disassembly steps:
The numbers before part names correspond to numbers in the illustration, and indicate the order of disassembly.
Installation steps:
This is provided if installation cannot be made in the reverse order of "Removal steps"; omitted if installation in the reverse order of "Removal steps" is possible.
Reassembly steps:
This is provided if reassembly cannot be made in the reverse order of "Disassembly steps"; omitted if reassembly in the reverse order of "Disassembly steps" is possible.

Classification of SERVICE POINTS
•• Removal
•• Installation
•• Disassembly
•• Reassembly

Page number

Group title

Section title

Indicates the incidental operation to be performed before removal or after installation.

5-44 BRAKES – Rear Brake Wheel Cylinder

REAR BRAKE WHEEL CYLINDER

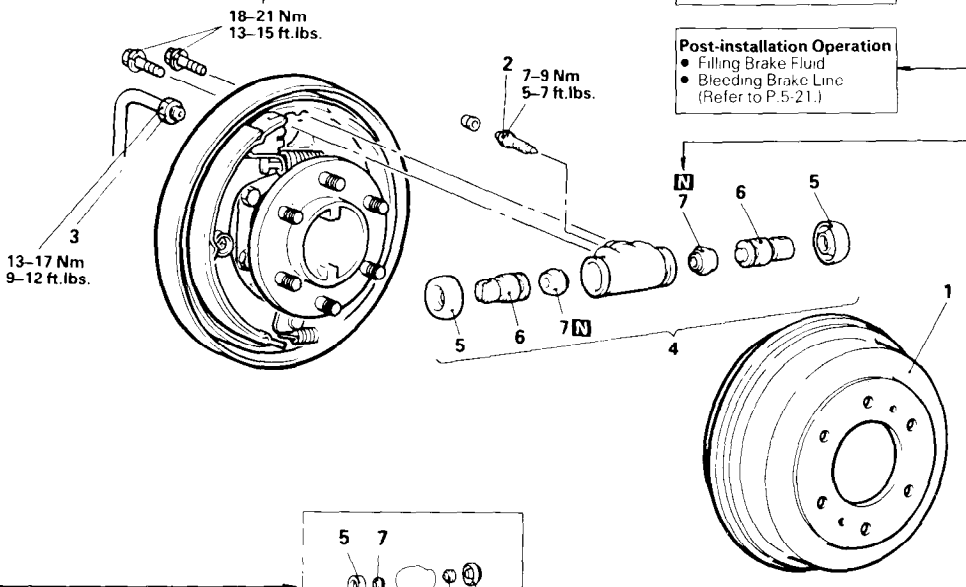
N05VA

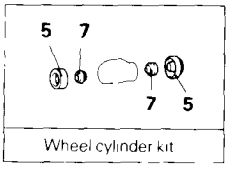
REMOVAL AND INSTALLATION

Pre-removal Operation
- Draining Brake Fluid

Post-installation Operation
- Filling Brake Fluid
- Bleeding Brake Line (Refer to P.5-21.)

Indicates non-reusable part.





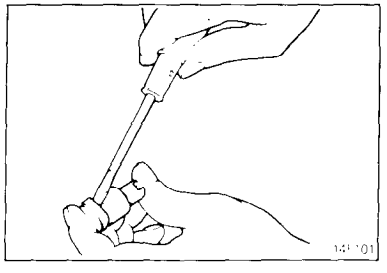
Wheel cylinder kit

Removal steps

1. Brake drum
2. Bleeder screw
3. Brake tube
- ◆◆ 4. Wheel cylinder assembly
- ◆◆ 5. Wheel cylinder boot
- ◆◆ 6. Piston assembly
- ◆◆ ◆◆ 7. Piston cup

NOTE
(1) Reverse the removal procedures to reinstall
(2) ◆◆ Refer to "Service Points of Removal"
(3) ◆◆ Refer to "Service Points of Installation"
(4) N Non reusable parts

14W600



SERVICE POINTS OF REMOVAL

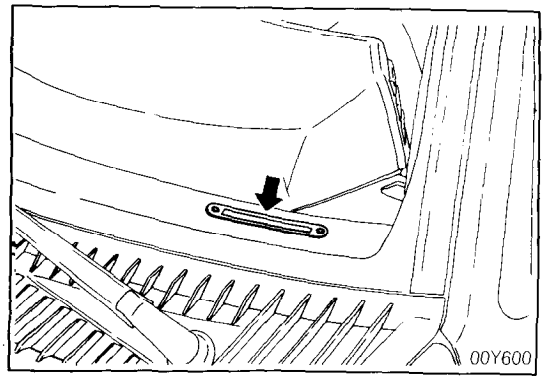
N05VBAA

7. REMOVAL OF PISTON CUP

Using a screwdriver, remove the piston cup from the piston.

This number corresponds to the number in "Removal steps", "Disassembly steps", "Installation steps" or "Reassembly steps".

An explanation of procedures, notes, etc. regarding removal, installation, disassembly and reassembly.



VEHICLE IDENTIFICATION

N00CA-

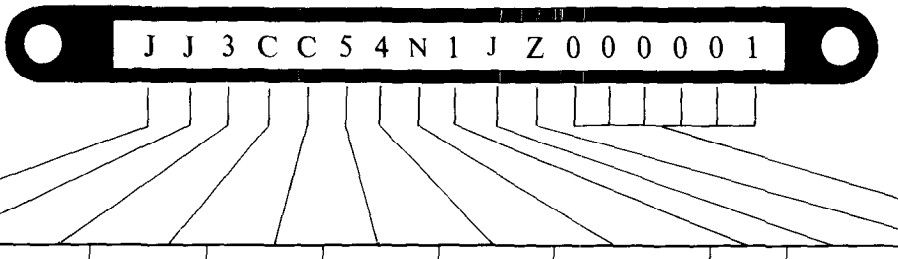
VEHICLE IDENTIFICATION NUMBER LOCATION

The vehicle identification number (V.I.N.) is located on a plate attached to the left top side of the instrument panel and visible through the windshield.

VEHICLE IDENTIFICATION CODE CHART PLATE

N00CB-

All vehicle identification numbers contain 17 digits. The vehicle number is a code which tells country, make, vehicle type, etc.



1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th Digit	9th Digit	10th Digit	11th Digit	12th to 17th Digits
Country	Make	Vehicle type	Others	Line	Series	Body	Engine	*Check digits	Model year	Plant	Serial number
J Japan	J– Chrysler	3 Passenger car	C– Passive belt	C– CONQUEST	5– Premium	4– 3-door hatchback	N– 2.6 liters (155.9 C.I.D.) turbocharged engine with intercooler	0 1 2 3 . . . 9 X	J– 1988	Z– Okazaki plant	000001 to 999999

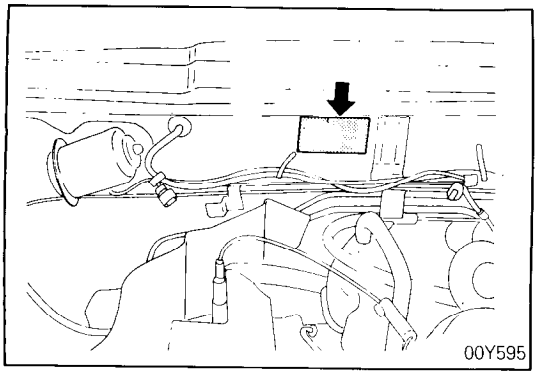
NOTE
* "Check digit" means a single number or letter X used to verify the accuracy of transcription of vehicle identification number.

VEHICLE IDENTIFICATION NUMBER LIST

N00CC-

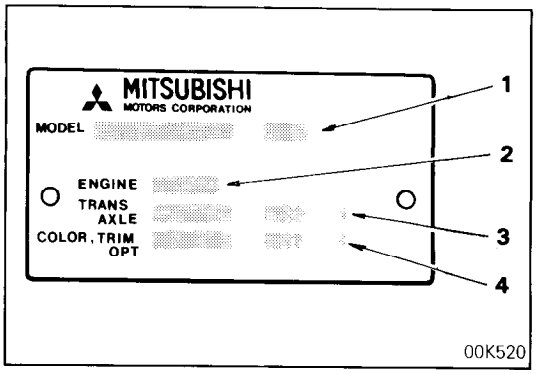
V.I.N. (except sequence number)	Brand (Package)	Destination	Engine displacement	Models code
JJ3CC54H□HZ	Chrysler	Federal	2.555 liters (155.9 C.I.D.)	A187AMRFGL4
JJ3CC54H□HZ		California*		A187AMRFGL9
JJ3CC54N□HZ		Federal		A187AMNFGL4
JJ3CC54N□HZ		California*		A187AMNFGL9

* Can also be sold in Federal states.

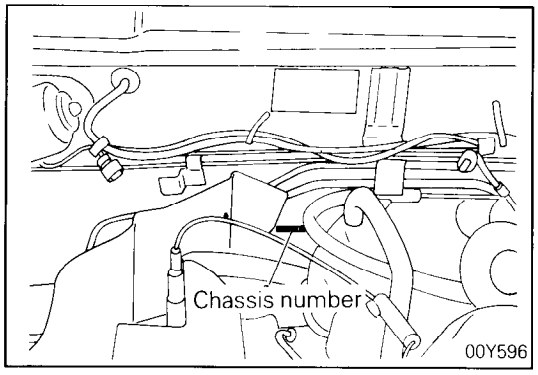


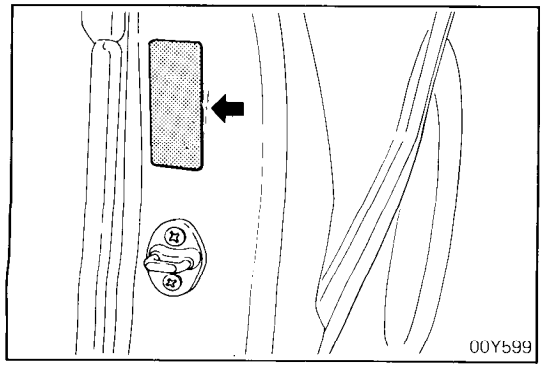
VEHICLE INFORMATION CODE PLATE N00CD--

Vehicle information code plate is riveted onto the firewall in the engine compartment.
The plate shows model code, engine model, transmission model, final gear ratio, and body color code.



1. MODEL — A187AMNFGL4
   - A187AMNF: Vehicle model
   - GL4: Model series
2. ENGINE — G54B
   - G54B: Engine model
3. TRANS-AXLE — KM132□3545
   - KM132: Transmission model
   - □: Blank
   - 3545: Final gear ratio
4. COLOR, TRIM OPT — H84
   - H84: Monotone exterior color code





CHASSIS NUMBER N00CE--

STAMPING LOCATION

The chassis number is stamped on the top center of the firewall located in the engine compartment.

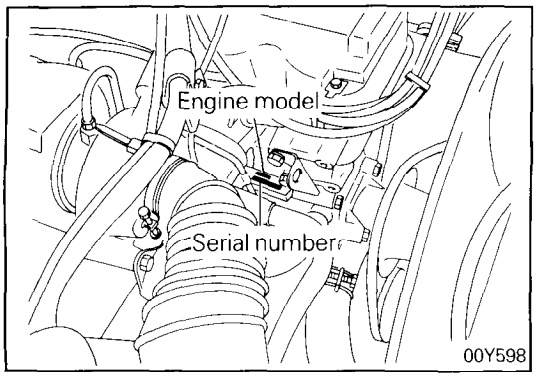
CHASSIS NUMBER CODE CHART

A 1 8 7 M J Z 0 0 0 0 0 1

Vehicle line	Engine displacement	Body type	Refer to 10th thru 17th digits of V.I.N. plate
A18– CONQUEST	7– 2.555 liters (155.9 C.I.D.)	M– 2-door Hatchback	

VEHICLE SAFETY CERTIFICATION LABEL N00CF--

The vehicle safety certification label is attached to face of left door pillar.
This label indicates the month and year of manufacture, Gross Vehicle Weight Rating (G.V.W.R.), Gross Axle Weight Rating (G.A.W.R.) front and rear, and Vehicle Identification Number (V.I.N.).



ENGINE MODEL STAMPING N00CG--

The engine model number is stamped at the right front side on the top edge of the cylinder block as shown in the following:

Engine model	Engine displacement
G54B	2.555 liters (155.9 C.I.D.)

The engine serial number is stamped near the engine model number, and the serial number cycles, as shown below.

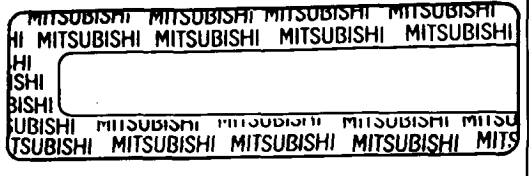
Engine serial number	Number cycling
AA0201 to YY9999	AA0201 – – – – → AA9999 AB0001 – – – – → AY9999 BA0001 – – – – → YY9999

BODY COLOR CODE N00CH--

Exterior code	Body color
H84	Silver (Metallic)
R04	Red
R88	Maroon (Metallic)
T87	Blue (Metallic)
W09	White
X15	Black
Y59	Yellow

Theft protection label

For original parts



00K619

For replacement parts

00K621

THEFT PROTECTION N00CIAA

To provide protection against theft, the vehicle identification number (V.I.N.) is stamped on or its label is affixed to the following major engine, transmission parts and body outer panels.

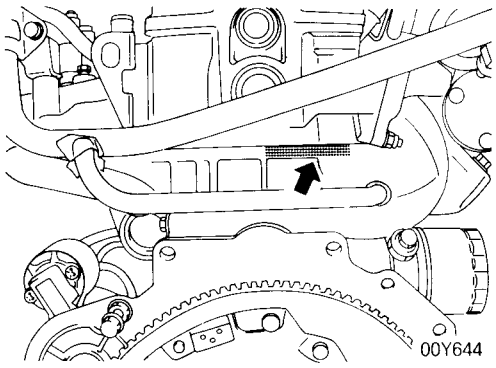
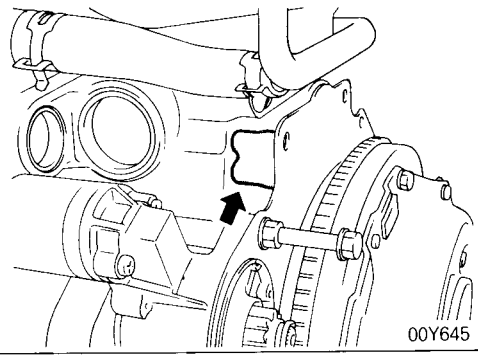
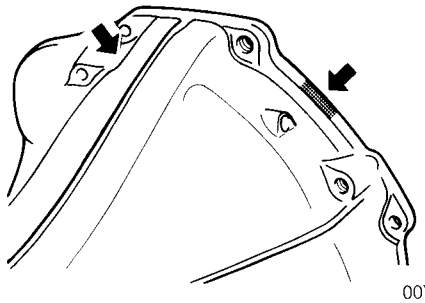
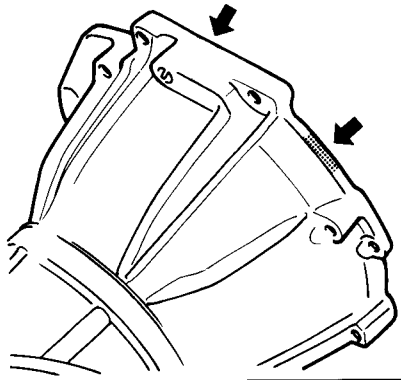
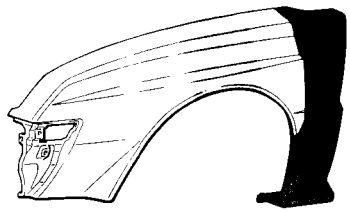
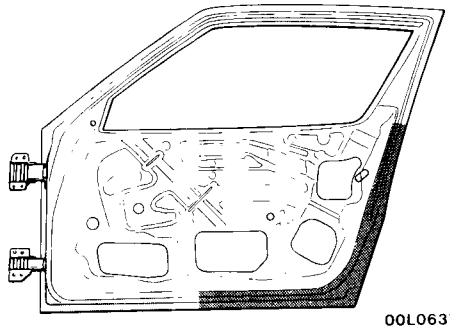
Engine cylinder block, transmission housing, fender, quarter panel, hood, rear hatch and bumpers.

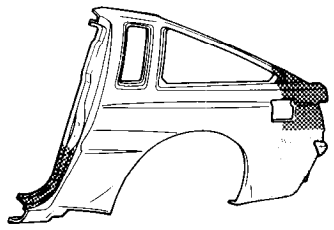
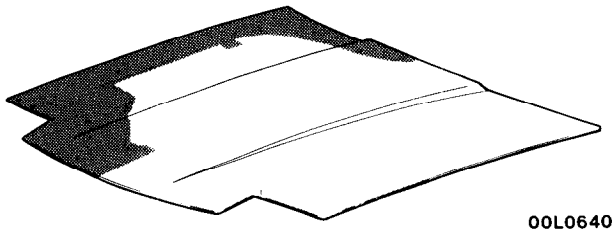
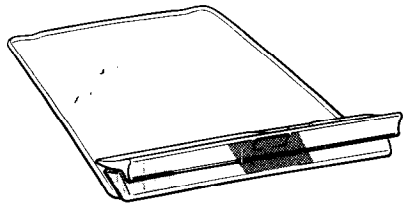
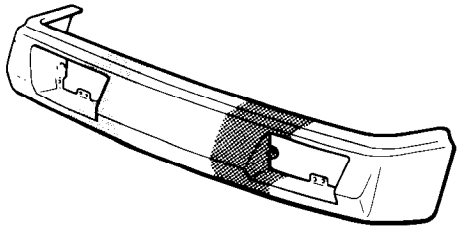
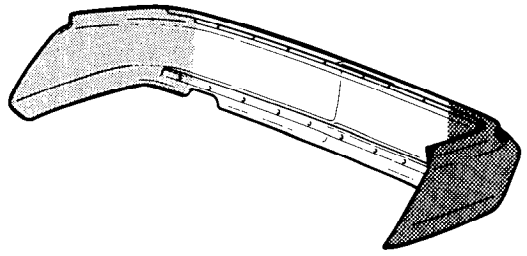
The theft protection label is also affixed to each of major body outer panels for servicing, while the same information as the theft protection label is stamped on the engine and transmission for servicing.

Caution

1. **Affix masking tape to the theft protection label before repainting the original part. After painting, be sure to remove the masking tape.**
2. **The theft protection label on the service part has masking tape affixed to it. Therefore, paint the part as is and remove the masking tape after painting.**
3. **Do not remove the theft protection label from the original or service part.**

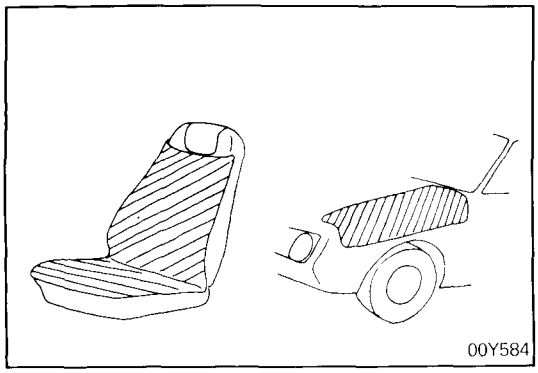
LOCATIONS

Part name	Target area	■: for original equipment parts ▨: for replacement parts
Engine	 00Y644  00Y645	
Transmission	Manual transmission  00Y643	Automatic transmission  00Y647
Fender	 00L0634 • The theft protection label is affixed to the inside surface. • The illustration indicates left hand side, outer. Right hand side is symmetrical.	
Door	 00L0637 • The illustration indicates left hand side, outer. Right hand side is symmetrical.	

Part name	Target area ■: for original equipement parts ▒: for replacement parts
Quarter panel	 00L0638 • The theft protection label is affixed to the inside surface. • The illustration indicates left hand side, outer. Right hand side is symmetrical.
Hood	 00L0640 • The theft protection label is affixed to the inside surface.
Rear hatch	 00L0639 • The theft protection label is affixed to the inside surface.
Bumpers	Front bumper  00L0635 Rear bumper  00L0636 • The theft protection label is affixed to the inside surface.

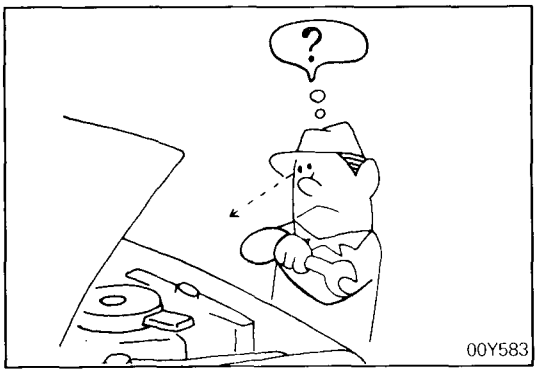
PRECAUTIONS BEFORE SERVICE N00DAAD

PROTECTING VEHICLE


00Y584

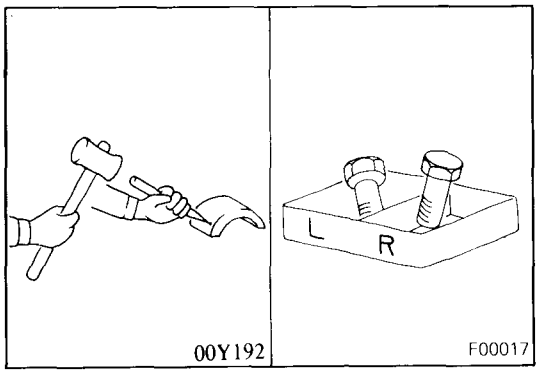
If there is a likelihood of damaging painted or interior parts during service operations, protect them with suitable covers (such as seat covers, fender covers, etc.).

REMOVAL AND DISASSEMBLY



00Y583

When checking a malfunction, find the cause of the problem. If it is determined that removal and/or disassembly is necessary, perform the work by following the procedures contained in this Service Manual.

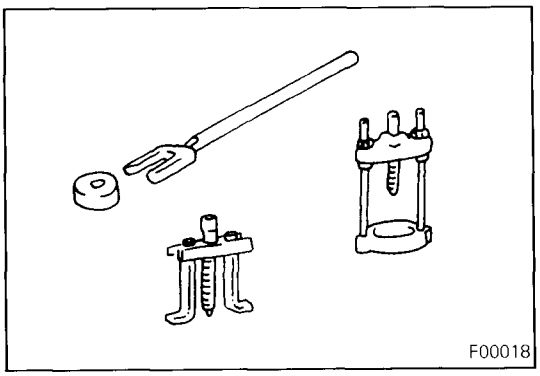


00Y192 F00017

If punch marks or mating marks are made to avoid error in assembly and to facilitate the assembly work, be sure to make them in locations which will have no detrimental effect on performance and/or appearances.
If an area having many parts, similar parts, and/or parts which are symmetrical right and left is disassembled, be sure to arrange the parts so that they do not become mixed during the assembly process.

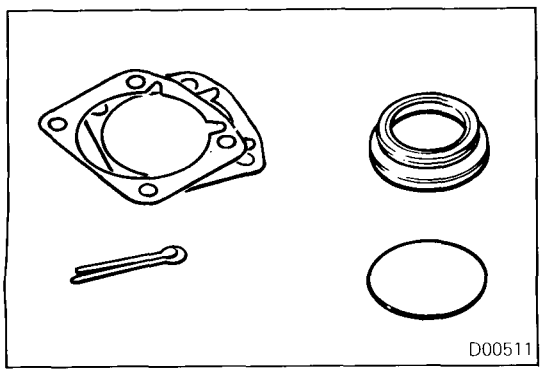
1. Arrange the parts removed in the proper order.
2. Determine which parts are to be reused and which are to be replaced.
3. If bolts, nuts, etc., are to be replaced, be sure to use only the exact size specified.

SPECIAL TOOLS


F00018

If other tools are substituted for the special tools to do service or repair work, there is the danger that vehicle parts might be damaged, or the technician might be injured; therefore, be sure to use the special tool whenever doing any work for which the use of one is specified.

PARTS TO BE REPLACED

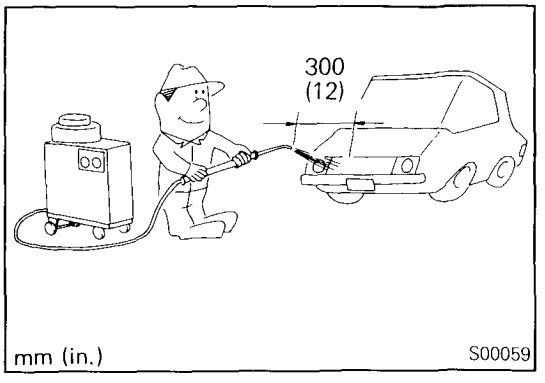

D00511

If any of the following parts are removed, they must be replaced with new parts.

1. Oil seals
2. Gaskets (except rocker cover gasket)
3. Packings
4. O-rings
5. Lock washers
6. Cotter pins
7. Self-locking nuts

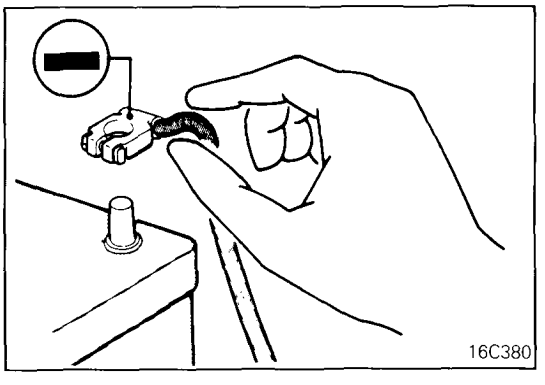
PARTS

When replacing parts, use MOPAR genuine parts.



VEHICLE WASHING

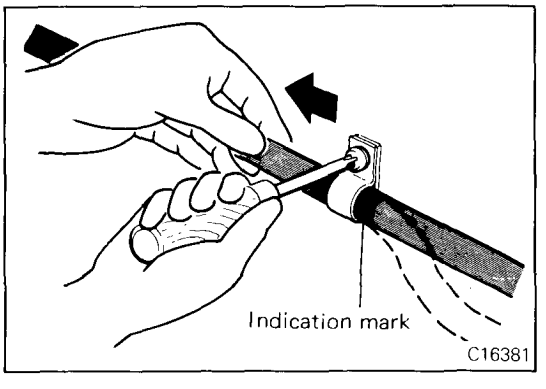
If high-pressure car-washing equipment or steam car-washing equipment is used to wash the vehicle, be sure to maintain the spray nozzle at a distance of at least 300 mm (12 in.) from any plastic parts and all opening parts (doors, luggage compartment, sunroof, etc.).



SERVICING ELECTRICAL SYSTEM

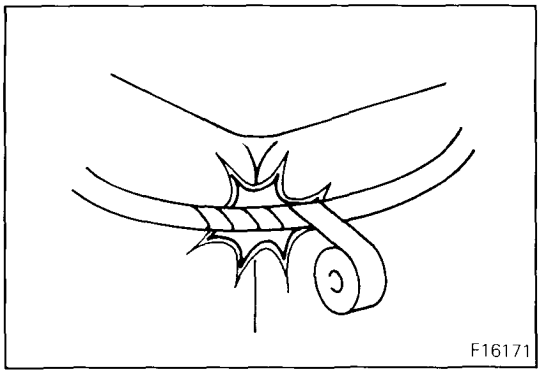
1. When servicing the electrical system, pay attention to the following.
   Never attempt to modify an electrical unit or to change wirings, which may otherwise cause not only a vehicle failure but a vehicle fire due to over-capacity load or short-circuit.
2. Before servicing the electrical system, disconnect the negative cable terminal from the battery.

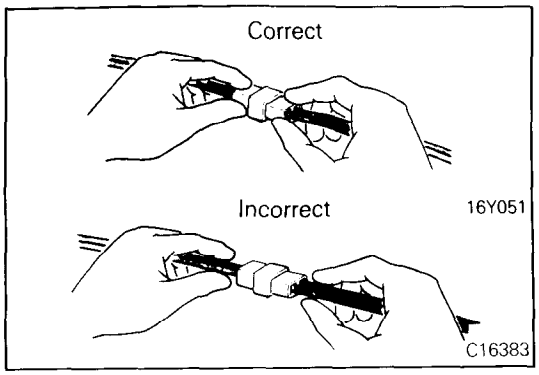
   Caution
   Before connecting or disconnecting the negative cable, be sure to turn off the ignition switch and the lighting switch.
   (If this is not done, there is the possibility of semiconductor parts being damaged.)



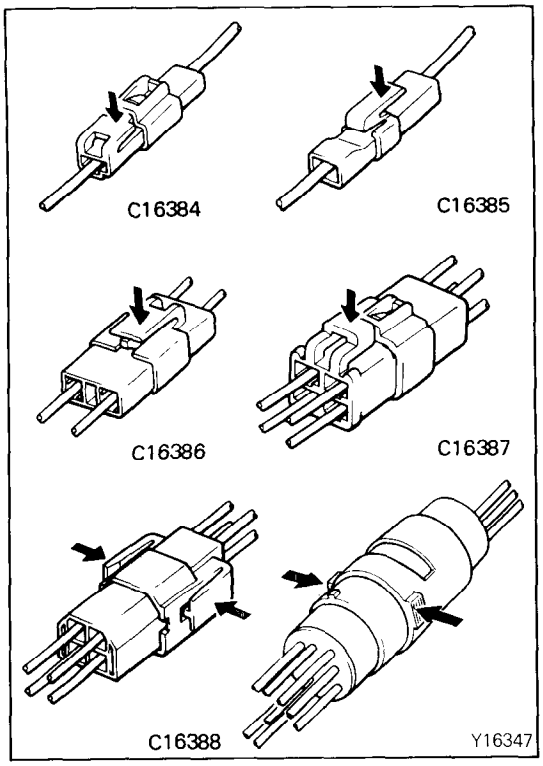
WIRING HARNESSES

1. Secure the wiring harnesses by using clamps. However, for any harness which passes to the engine or other vibrating parts of the vehicle, allow some slack within a range that does not allow the engine vibrations to cause the harness to come into contact with any of the surrounding parts. Then secure the harness by using a clamp.
   In addition, if a mounting indication mark (yellow tape) is on a harness, secure the indication mark in the specified location.
2. If any section of a wiring harness contacts the edge of a part, or a corner, wrap the section of the harness with tape or something similar in order to protect it from damage.

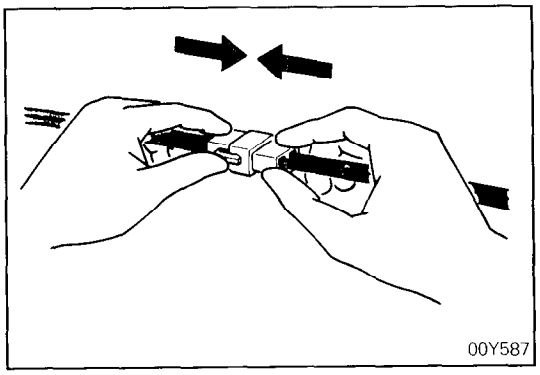




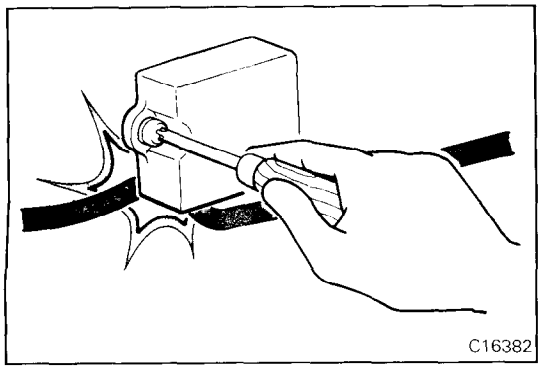
3. When disconnecting a connector, be sure to pull only the connector, not the harness.



4. Disconnect connectors which have catches by pressing in the direction indicated by the arrows in the illustration.

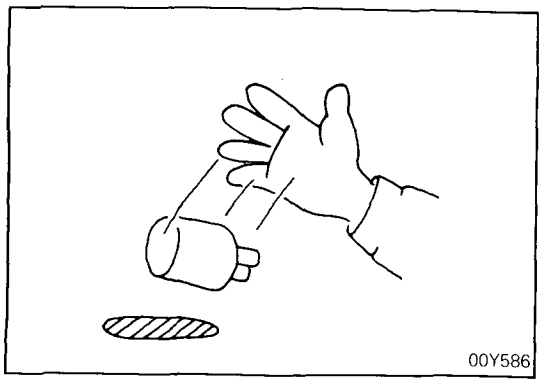


5. Connect connectors which have catches by inserting the connectors until they snap.

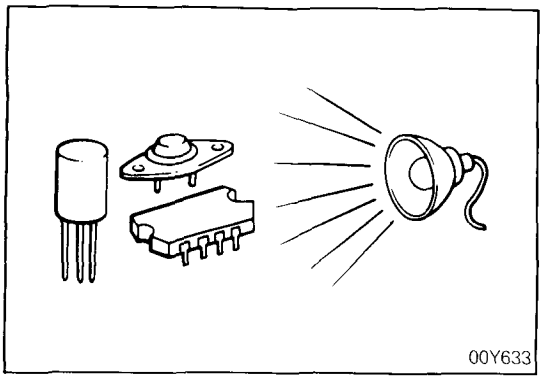


ELECTRICAL COMPONENTS

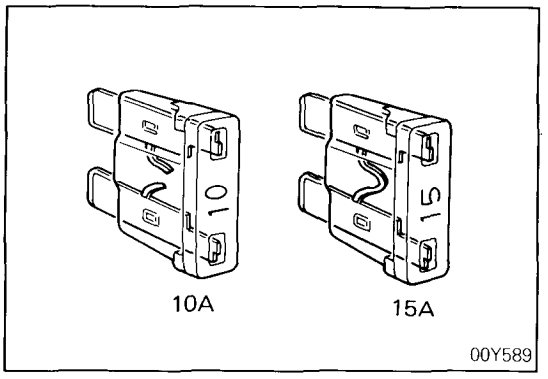
1. When installing any of the vehicle parts, be careful not to pinch or damage any of the wiring harnesses.



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



3. The electronic parts used for relays, etc., are sensitive to heat. If any service which causes a temperature of 80°C (176°F) or more is performed, remove the part or parts in question before carrying out the service.



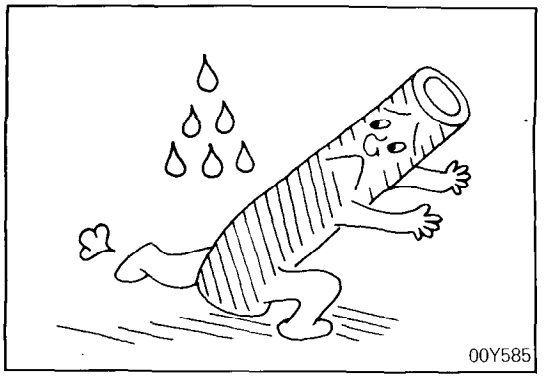
FUSES AND FUSIBLE LINKS

1. If a blown-out fuse is to be replaced, be sure to use only a fuse of the specified capacity. If a fuse of a capacity larger than that specified is used, parts may be damaged and the circuit may not be protected adequately.

   Caution
   1. **If a fuse is blown-out, be sure to eliminate the cause of the problem before installing a new fuse.**
   2. **Check the condition of fuse holders. If rust or dirt is found, clean metal parts with a fine-grained sand-paper until proper metal-to-metal contact is made. Poor contact of any fuse holder will often lead to voltage drop or heating in the circuit and could result in improper circuit operation.**

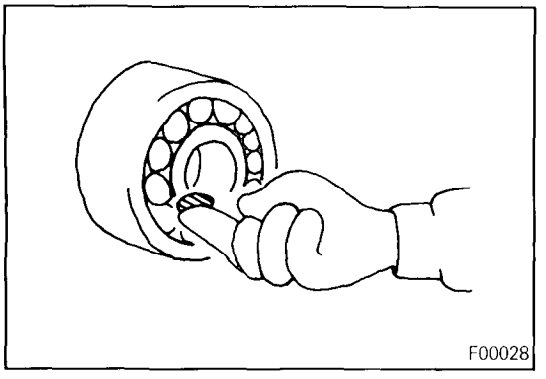
2. If additional optional equipment is to be installed in the vehicle, follow the procedure listed in the appropriate instruction manual; however, be sure to pay careful attention to the following points:
   (1) In order to avoid overloading the wiring, take the electrical current load of the optional equipment into consideration, and determine the appropriate wire size.
   (2) Where possible, route the wiring through the existing harnesses.
   (3) If an ammeter or similar instrument is to be connected to a live-wire circuit, use tape to protect the wire, use a clamp to secure the wire, and make sure that there is no contact with any other parts.
   (4) Be sure to provide a fuse for the load circuit of the optional equipment.

Nominal size	SAE gauge No.	Permissible current	
		In engine compartment	Other areas
0.3 mm²	AWG 22	–	5A
0.5 mm²	AWG 20	7A	13A
0.85 mm²	AWG 18	9A	17A
1.25 mm²	AWG 16	12A	22A
2.0 mm²	AWG 14	16A	30A
3.0 mm²	AWG 12	21A	40A
5.0 mm²	AWG 10	31A	54A



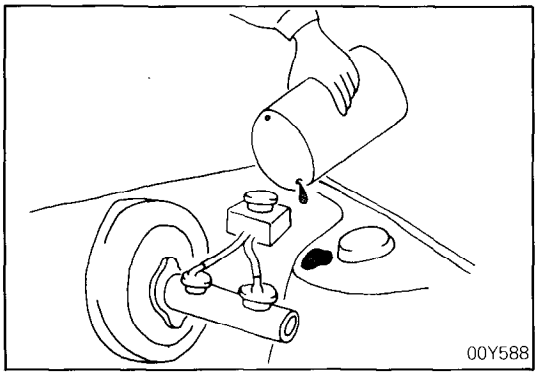
TUBES AND OTHER RUBBER PARTS

Be careful to avoid spilling any gasoline, oil, etc., because if it adheres to any tubes or other rubber parts, they might be adversely affected.



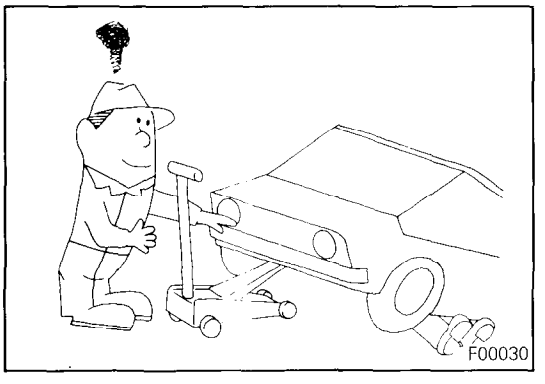
LUBRICANTS

In accordance with the instructions in this Service Manual, apply the specified lubricants in the specified locations during assembly and installation.



BRAKE FLUID

Be careful to avoid spilling any brake fluid on painted surfaces, because the paint coat might be discolored or damaged.



DOING SERVICE WORK IN GROUPS OF TWO OR MORE TECHNICIANS

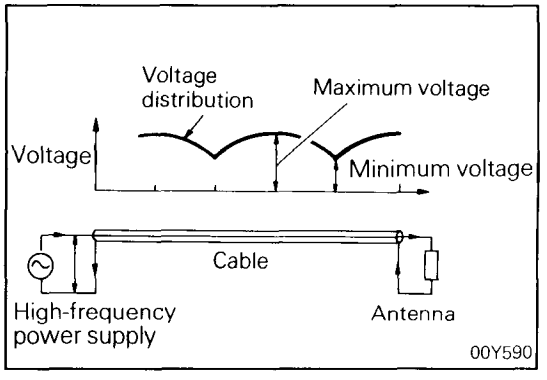
If the service work is to be done by two or more technicians working together, extra caution must be taken.

NOTE ON INSTALLATION OF RADIO EQUIPMENT

N00EA--

The computers of the electronic control system has been designed so that external radio waves will not interfere with their operation.
However, if antenna or cable of amateur transceiver etc. is routed near the computers, it may affect the operation of the computers, even if the output of the transceiver is no more than 25W.
To protect each of the computers from interference by transmitter (hum, transceiver, etc.), the following should be observed.

1. Install the antenna on the roof or rear bumper.
2. Because radio waves are emitted from the coaxial cable of the antenna, keep it 200 mm (8 in.) away from the computers and the wiring harness. If the cable must cross the wiring harness, route it so that it runs at right angles to the wiring harness.
3. The antenna and the cable should be well matched, and the standing-wave ratio* should be kept low.
4. A transmitter having a large output should not be installed in the vehicle.
5. After installation of transmitter, run the engine at idle, emit radio waves from the transmitter and make sure that the engine is not affected.



*STANDING-WAVE RATIO

If an antenna and a cable having different impedances are connected, the input impedance Zi will vary in accordance with the length of the cable and the frequency of the transmitter, and the voltage distribution will also vary in accordance with the location.
The ratio between this maximum voltage and minimum voltage is called the standing-wave ratio. It can also be represented by the ratio between the impedances of the antenna and the cable.
The amount of radio waves emitted from the cable increases as the standing-wave ratio increases, and this increases the possibility of the electronic components being adversely affected.

TOWING AND HOISTING

N00GA--

WRECKER TOWING

1. This vehicle cannot be towed with sling-type equipment.
2. If a vehicle is towed from the front, use wheel lift or flat bed equipment.
3. If a vehicle is towed from the rear, use flat bed equipment.

SAFETY PRECAUTIONS

1. Any loose or protruding parts of damaged vehicle such as hoods, doors, fenders, trim, etc., should be secured prior to moving the vehicle.
2. Operator should refrain from going under a vehicle such as hood, doors, fenders, trim, etc., unless the vehicle is adequately supported by safety stands.
3. Never allow passengers to ride in a towed vehicle.
4. State and local rules and regulations must be followed when towing a vehicle.

HOISTING

POST TYPE

Special care should be taken when raising the vehicle on a frame contact type hoist. The hoist must be equipped with the proper adapters in order to support the vehicle at the proper locations. (Next page)
Conventional hydraulic hoists may be used after determining that the adapter plates will make firm contact with the front/rear crossmembers.

FLOOR JACK

A regular floor jack may be used under the front/rear crossmembers.

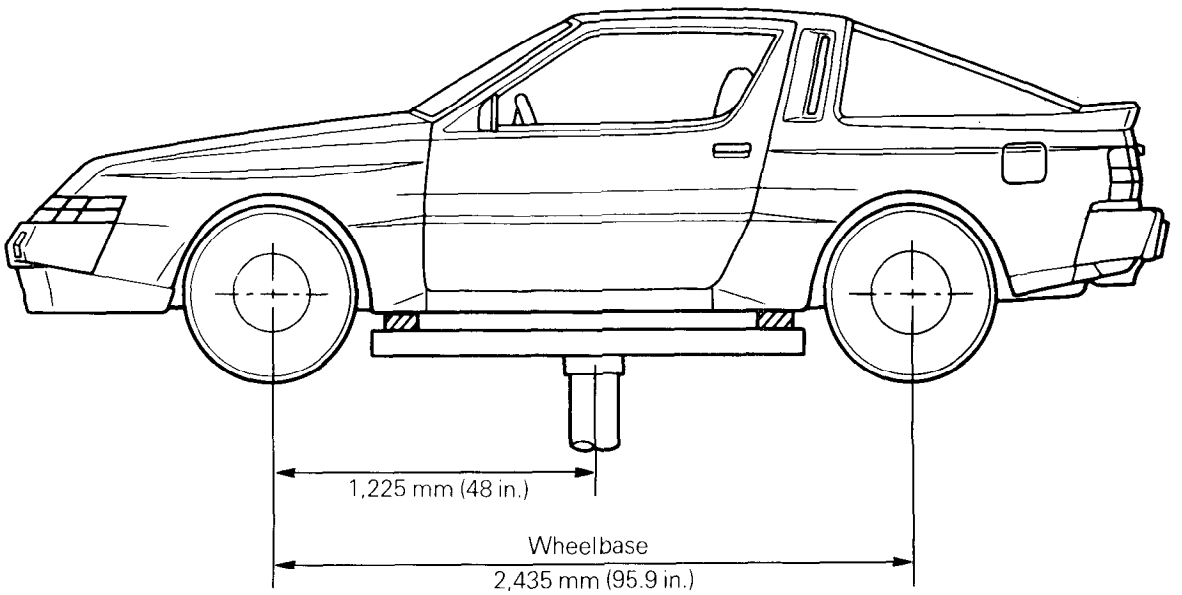
Caution

1. **A floor jack must never be used on any part of the underbody.**
2. **Do not attempt to raise one entire side of the vehicle by placing a jack midway between front and rear wheels. This practice may result in permanent damage to the body.**

EMERGENCY JACKING

Jack receptacles are located at the body sills to accept the scissors jack supplied with the vehicle for emergency road service. Always block opposite wheels and jack on level surface.

FRAME CONTACT SUPPORT LOCATION



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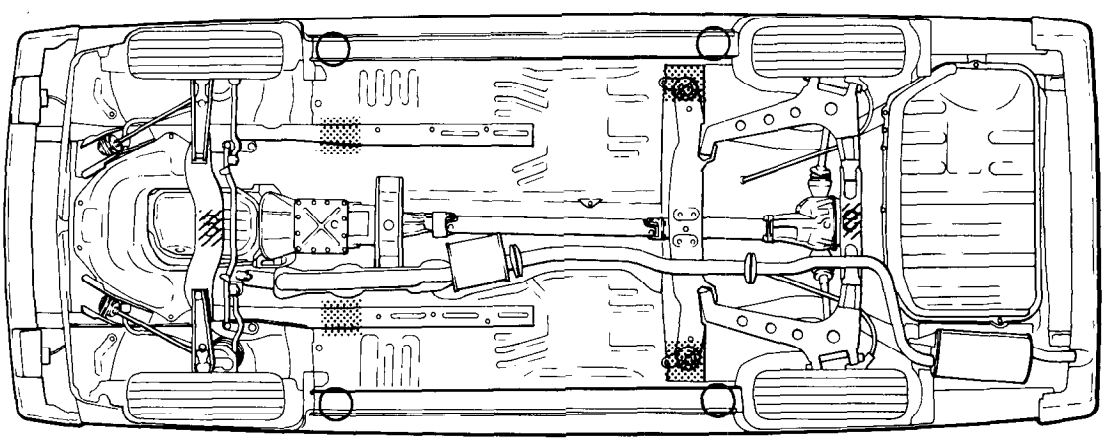
LIFTING, JACKING SUPPORT LOCATION



Frame contact hoist

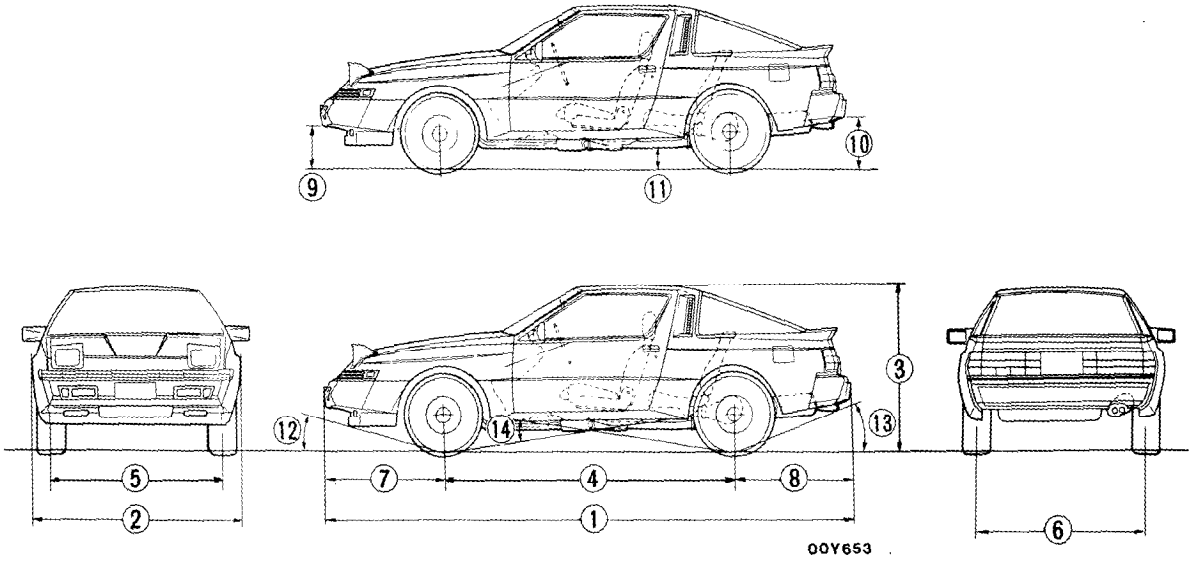
Floor jack

Twin post hoist or scissors jack (emergency) locations

00Y196

GENERAL DATA AND SPECIFICATIONS

N00HA- -



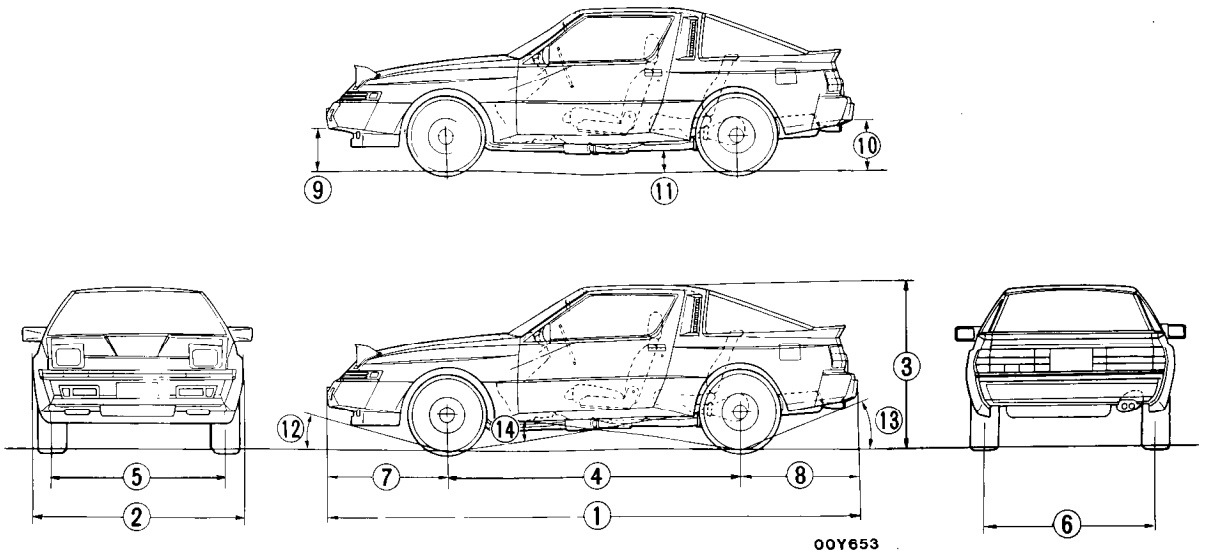
00Y653

Items			A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Vehicle dimensions mm (in.)				
Overall length		①	4,400 (173.2)	4,400 (173.2)
Overall width		②	1,735 (68.3)	1,735 (68.3)
Overall height		③	1,275 (50.2)	1,275 (50.2)
Wheel base		④	2,435 (95.9)	2,435 (95.9)
Tread	Front	⑤	1,465 (57.7)	1,465 (57.7)
	Rear	⑥	1,455 (57.3)	1,455 (57.3)
Overhang	Front	⑦	970 (38.2)	970 (38.2)
	Rear	⑧	995 (39.2)	995 (39.2)
Height at curb mass (wt.)				
Front bumper to ground		⑨	355 (14.0)	355 (14.0)
Rear bumper to ground		⑩	370 (14.6)	370 (14.6)
Minimum running ground clearance		⑪	115 (4.5)	115 (4.5)
ngle of approach		⑫	16°	16°
igle of departure		⑬	19°	19°
mp breakover angle		⑭	12°	12°
e weights kg (lbs.)				
b weight			1,405 (3,097)	1,375 (3,031)
ss vehicle weight rating			1,840 (4,056)	1,840 (4,056)
s axle weight rating	Front		885 (1,951)	885 (1,951)
	Rear		955 (2,105)	955 (2,105)
ng capacity			5	5

Items		A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Engine			
Model No.		G54B with turbo	G54B with turbo
Type		In line OHC	In line OHC
Number of cylinders		4	4
Bore mm (in.)		91.1 (3.59)	91.1 (3.59)
Stroke mm (in.)		98.0 (3.86)	98.0 (3.86)
Piston displacement	cm^3 (CID)	2,555 (155.9)	2,555 (155.9)
Compression ratio		7.0	7.0
Firing order		1–3–4–2	1–3–4–2
Basic ignition timing		10° BTDC	10° BTDC
Manual transmission			
Model No.		–	KM132
Type		–	5-speed manual
Gear ratio	1st	–	3.369
	2nd	–	2.035
	3rd	–	1.360
	4th	–	1.000
	5th	–	0.856
	Reverse	–	3.578
Automatic transmission			
Model No.		JM600	–
Type		4-speed automatic	–
Gear ratio	1st	2.458	–
	2nd	1.458	–
	3rd	1.000	–
	4th	0.686	–
	Reverse	2.182	–
Final drive gear ratio		3.545	3.545
Clutch			
Type		Dry-single disc & diaphragm spring	Dry-single disc & diaphragm spring

GENERAL DATA AND SPECIFICATIONS

N00HA- -



00Y653

Items			A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Vehicle dimensions mm (in.)				
Overall length		①	4,400 (173.2)	4,400 (173.2)
Overall width		②	1,735 (68.3)	1,735 (68.3)
Overall height		③	1,275 (50.2)	1,275 (50.2)
Wheel base		④	2,435 (95.9)	2,435 (95.9)
Tread	Front	⑤	1,465 (57.7)	1,465 (57.7)
	Rear	⑥	1,455 (57.3)	1,455 (57.3)
Overhang	Front	⑦	970 (38.2)	970 (38.2)
	Rear	⑧	995 (39.2)	995 (39.2)
Height at curb mass (wt.)				
Front bumper to ground		⑨	355 (14.0)	355 (14.0)
Rear bumper to ground		⑩	370 (14.6)	370 (14.6)
Minimum running ground clearance		⑪	115 (4.5)	115 (4.5)
Angle of approach		⑫	16°	16°
Angle of departure		⑬	19°	19°
Ramp breakover angle		⑭	12°	12°
Vehicle weights kg (lbs.)				
Curb weight			1,405 (3,097)	1,375 (3,031)
Gross vehicle weight rating			1,840 (4,056)	1,840 (4,056)
Gross axle weight rating	Front		885 (1,951)	885 (1,951)
	Rear		955 (2,105)	955 (2,105)
Seating capacity			5	5

Items		A187AMRFGL4 A187AMRFGL9	A187AMNFGL4 A187AMNFGL9
Engine			
Model No.		G54B with turbo	G54B with turbo
Type		In line OHC	In line OHC
Number of cylinders		4	4
Bore mm (in.)		91.1 (3.59)	91.1 (3.59)
Stroke mm (in.)		98.0 (3.86)	98.0 (3.86)
Piston displacement	cm^3 (CID)	2,555 (155.9)	2,555 (155.9)
Compression ratio		7.0	7.0
Firing order		1–3–4–2	1–3–4–2
Basic ignition timing		10° BTDC	10° BTDC
Manual transmission			
Model No.		–	KM132
Type		–	5-speed manual
Gear ratio	1st	–	3.369
	2nd	–	2.035
	3rd	–	1.360
	4th	–	1.000
	5th	–	0.856
	Reverse	–	3.578
Automatic transmission			
Model No.		JM600	–
Type		4-speed automatic	–
Gear ratio	1st	2.458	–
	2nd	1.458	–
	3rd	1.000	–
	4th	0.686	–
	Reverse	2.182	–
Final drive gear ratio		3.545	3.545
Clutch			
Type		Dry-single disc & diaphragm spring	Dry-single disc & diaphragm spring

Items		A187AMRFGL4 A187AMRFGL9		A187AMNFGL4 A187AMNFGL9	
Chassis					
Tire		Front 205/55VR16 or 225/50VR16 Radial	Rear 225/50VR16 or 245/45VR16 Radial	Front 205/55VR16 or 225/50VR16 Radial	Rear 225/50VR16 or 245/45VR16 Radial
Front suspension					
Type		Independent strut		Independent strut	
Rear suspension					
Type		Independent strut		Independent strut	
Brakes					
Type	Front	Disc		Disc	
	Rear	Disc		Disc	
Power steering					
Gear type		Integral type (Recirculating ball nut)		Integral type (Recirculating ball nut)	
Gear ratio		14.3 (Constant ratio gear)		14.3 (Constant ratio gear)	
Fuel tank capacity		75 liters (19.8 gals.)		75 liters (19.8 gals.)	

TIGHTENING TORQUE

N00JA--

Description	Head mark ④		Head mark ⑦	
	Nm	ft.lbs.	Nm	ft.lbs.
Thread for general purposes (size x pitch) mm				
6 x 1.0	3.0 – 3.9	2.2 – 2.9	4.9 – 7.8	3.6 – 5.8
8 x 1.25	7.9 – 12	5.8 – 8.7	13 – 19	9.4 – 14
10 x 1.25	16 – 23	12 – 17	27 – 39	20 – 29
12 x 1.25	29 – 43	21 – 32	47 – 72	35 – 53
14 x 1.5	48 – 70	35 – 52	77 – 110	57 – 85
16 x 1.5	67 – 100	51 – 77	130 – 160	90 – 120
18 x 1.5	100 – 150	74 – 110	180 – 230	130 – 170
20 x 1.5	150 – 190	110 – 140	260 – 320	190 – 240
22 x 1.5	200 – 260	150 – 190	340 – 430	250 – 320
24 x 1.5	260 – 320	190 – 240	420 – 550	310 – 410

Items	Nm	ft.lbs.	Remarks
Taper thread for pipes (size)			
PT 1/8	7.9 – 12	5.8 – 8.7	Internal thread: Aluminum
	16 – 19	12 – 14	Internal thread: Cast iron
PT 1/4	19 – 30	14 – 22	Internal thread: Aluminum
	34 – 45	25 – 33	Internal thread: Cast iron
PT 3/8	39 – 54	29 – 40	Internal thread: Aluminum
	58 – 73	43 – 54	Internal thread: Cast iron
Taper thread for dry sealed pipes (size)			
NPTF 1/16	4.9 – 7.8	3.6 – 5.8	Internal thread: Aluminum
	7.9 – 12	5.8 – 8.7	Internal thread: Cast iron
NPTF 1/8	7.9 – 12	5.8 – 8.7	Internal thread: Aluminum
	16 – 19	12 – 14	Internal thread: Cast iron
NPTF 1/4	19 – 30	14 – 22	Internal thread: Aluminum
	34 – 45	25 – 33	Internal thread: Cast iron

ELECTRICAL

CONTENTS

ELECTRICAL SYSTEM PARTS LOCATION

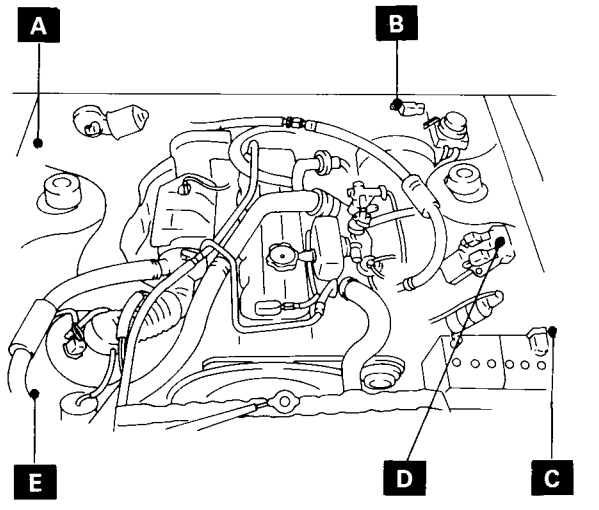
N08BA--

RELAY · CONTROL UNIT

Name	Symbol
Automatic air conditioner control unit	H
Automatic seat belt control unit	L
Blower motor high speed relay	I
Blower motor starter cutout relay	I
Blower relay	G
Condenser fan motor relay	D
Defogger relay	C
Door lock relay	F
Door unlock relay	F
ECI control relay	J
ECI control unit	J
Fog light relay	E
Hazard flasher unit	F
Lighting relay	C
Magnet clutch relay	D
Motor antenna relay	N
Overdrive relay	F

Name	Symbol
Passing control relay	K
Passing relay (for theft-alarm system)	B
Pop-up relay	C
Power window relay	C
Radiator fan air conditioner relay	D
Radiator fan motor relay	E
Rear brake lock-up control relay	F
Rear brake lock-up control unit	O
Rear intermittent wiper relay	P
Speed control unit	N
Starter inhibitor relay	C
TAC unit	M
Theft-alarm horn relay	D
Turn signal flasher unit	F
Vacuum pump relay	A
Wiper relay	C

ENGINE COMPARTMENT



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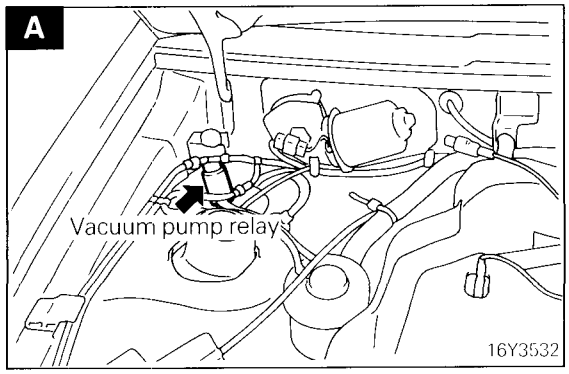

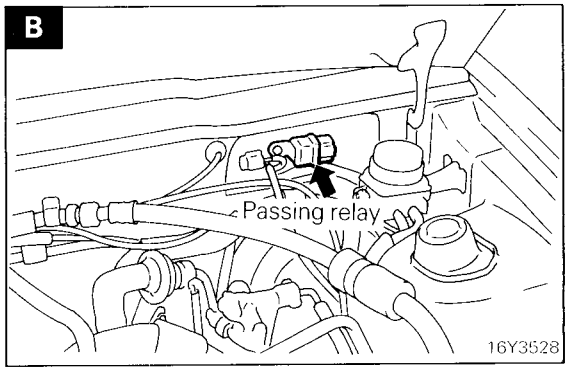

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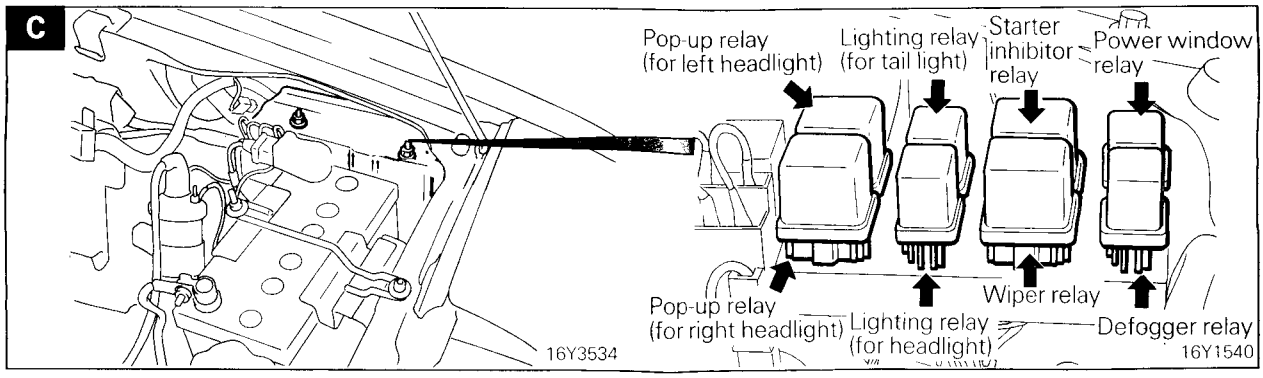

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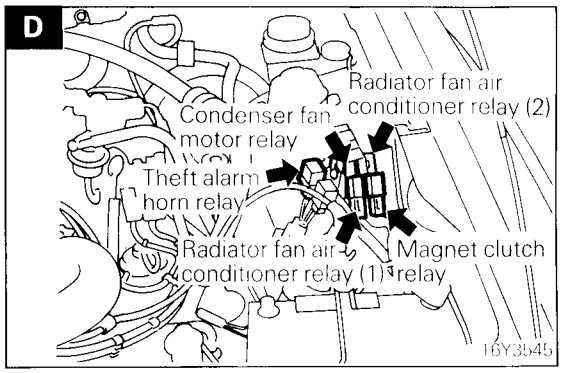

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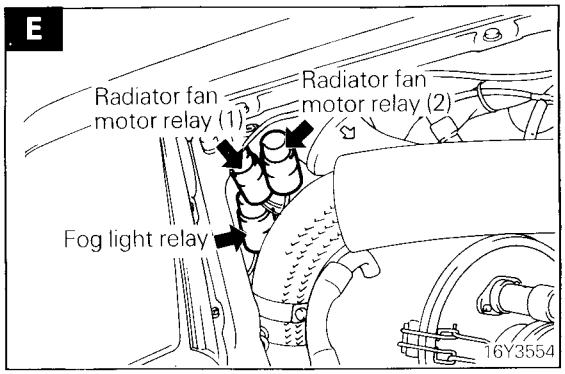
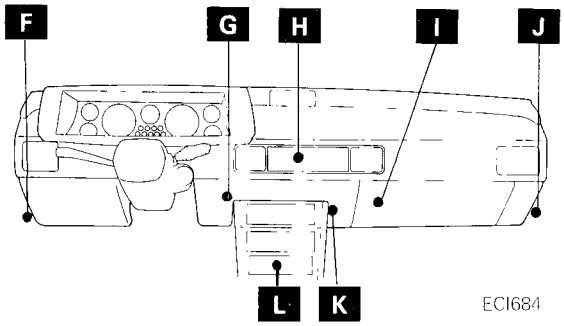


INSTRUMENT PANEL



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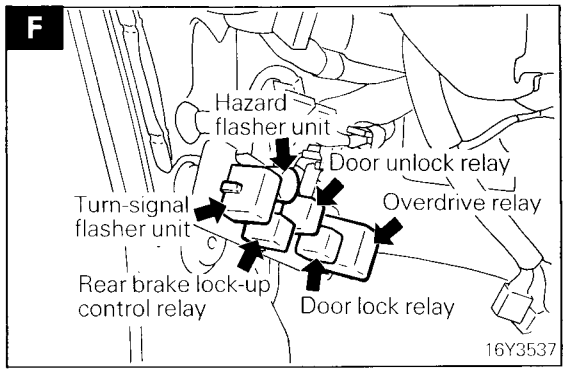

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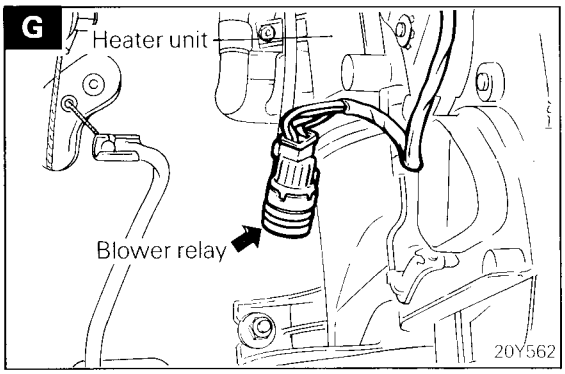

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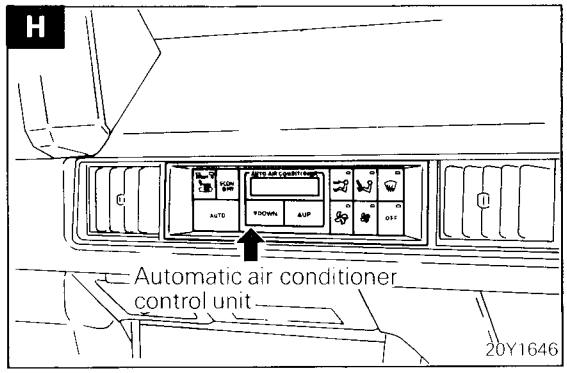

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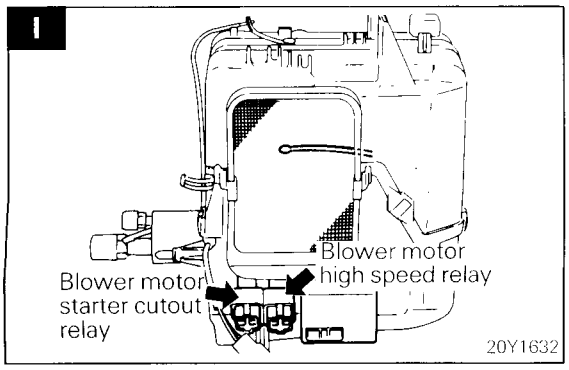

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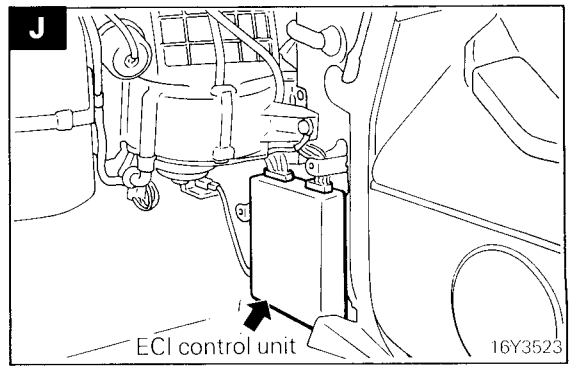

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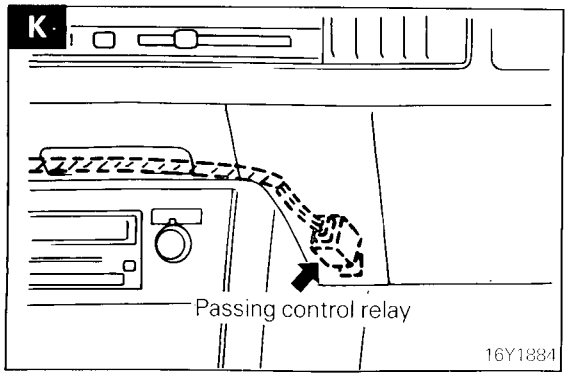
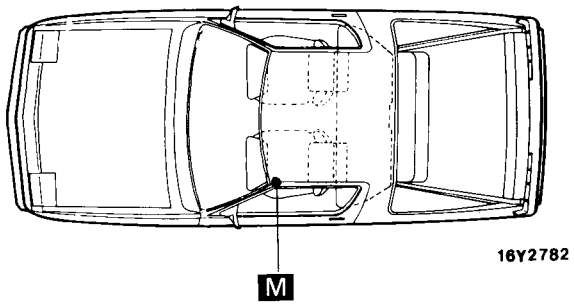
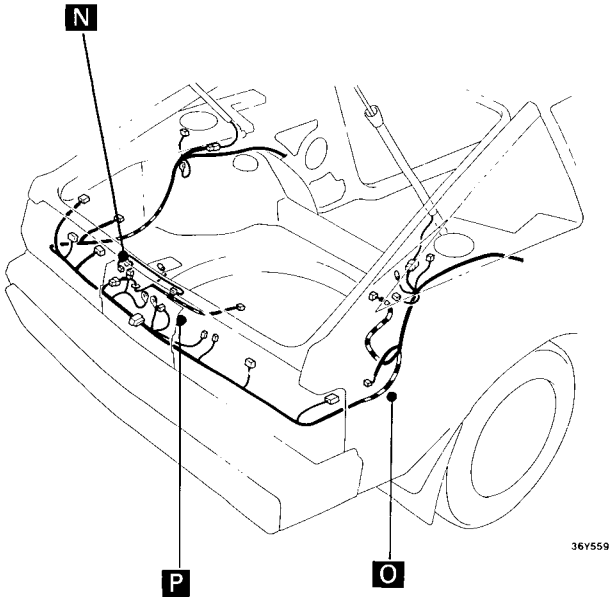


FLOOR



LUGGAGE COMPARTMENT



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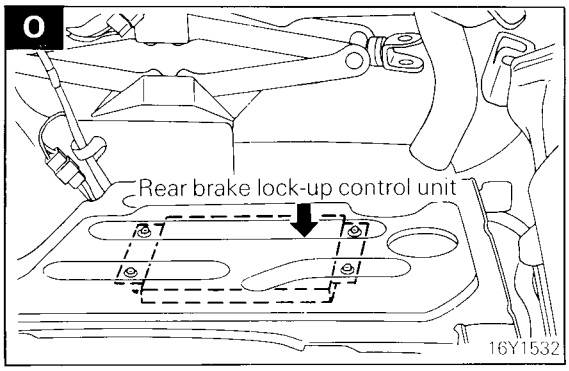

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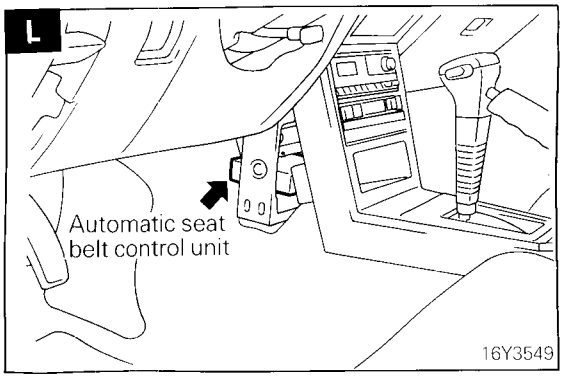

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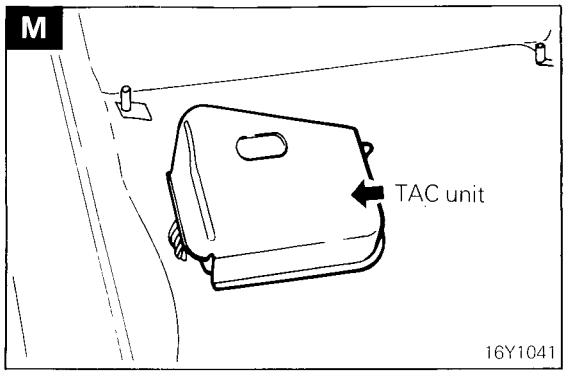

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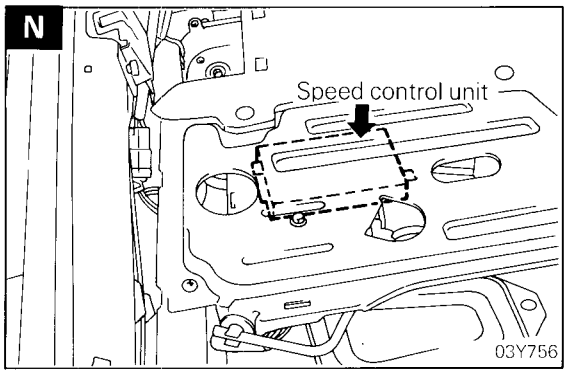

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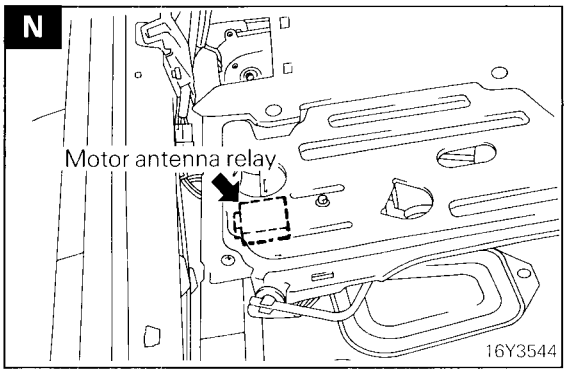

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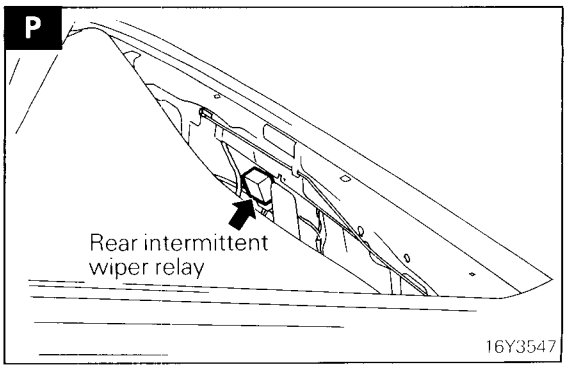
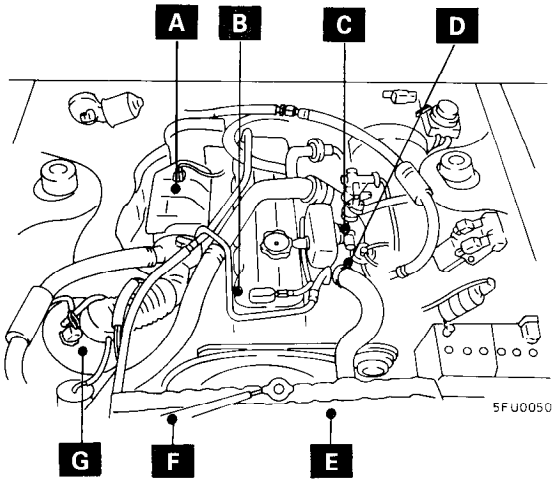


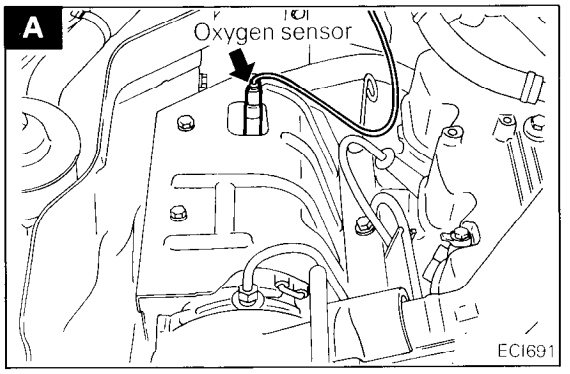
SENSOR

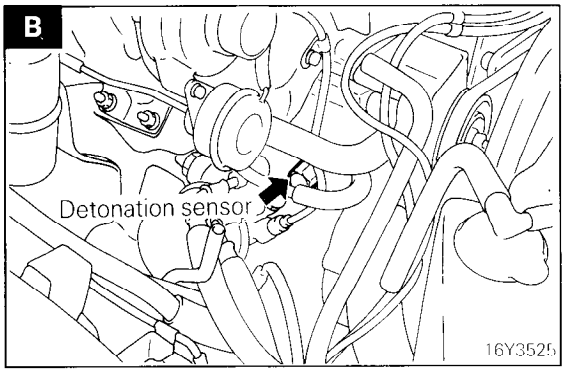
Name	Symbol
Air flow sensor	G
Detonation sensor	B
Engine coolant temperature sensor	D
Foot area temperature sensor	J
G-sensor	L

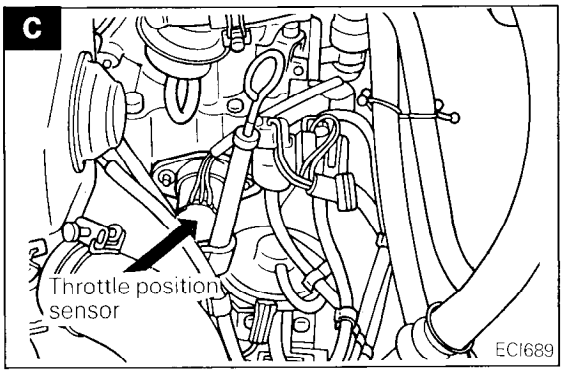
Name	Symbol
Interior temperature sensor	K
Oxygen sensor	A
Photo sensor	H
Thermistor	I
Thermosensor No. 1	F
Thermosensor No. 2	E
Throttle position sensor	C

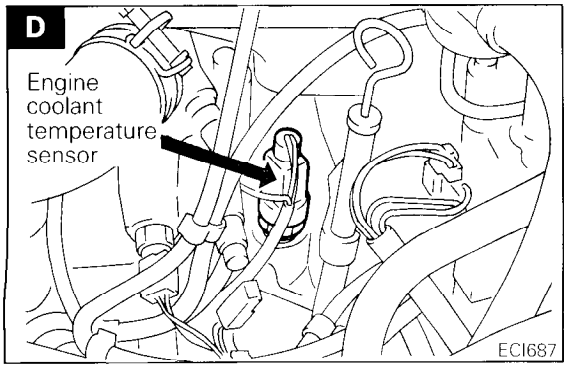
ENGINE COMPARTMENT

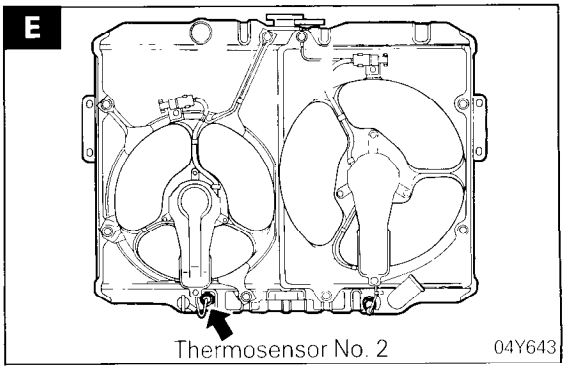












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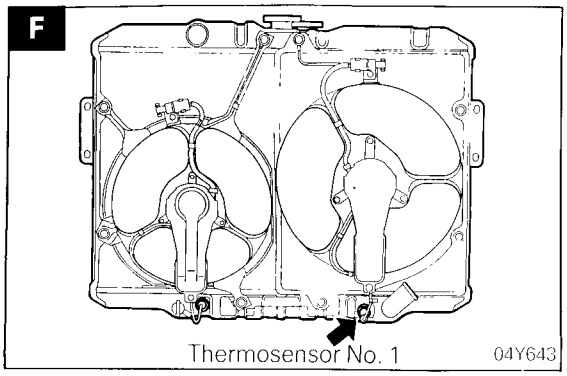

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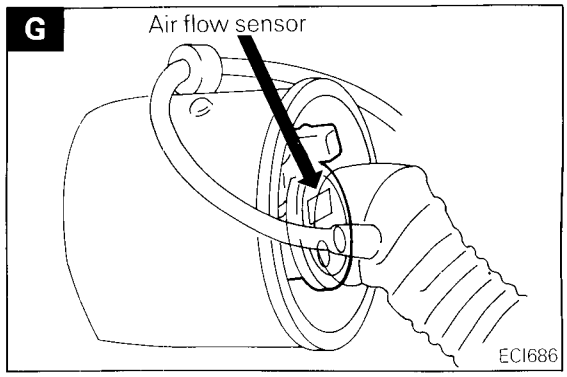
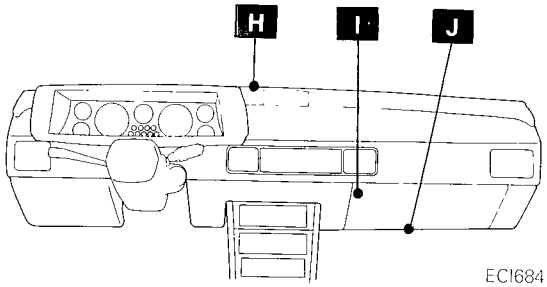


INSTRUMENT PANEL



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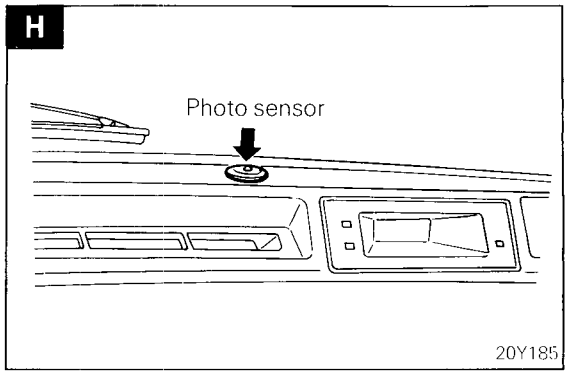

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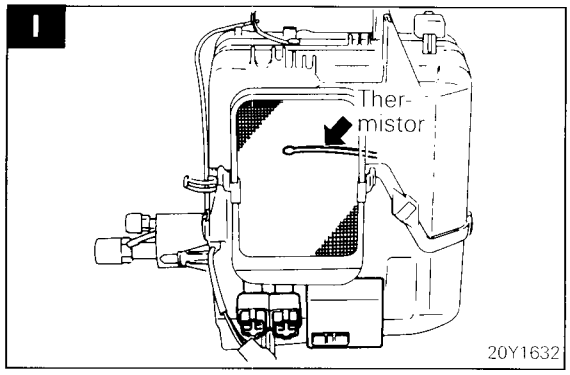

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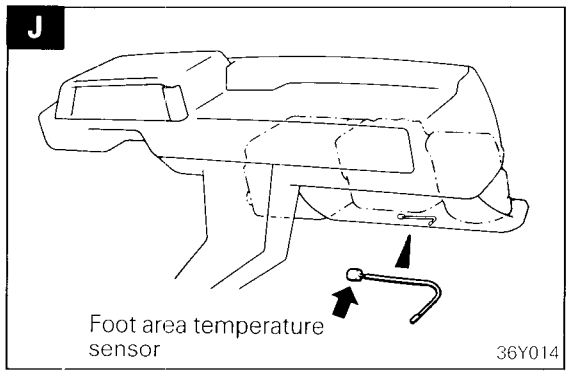
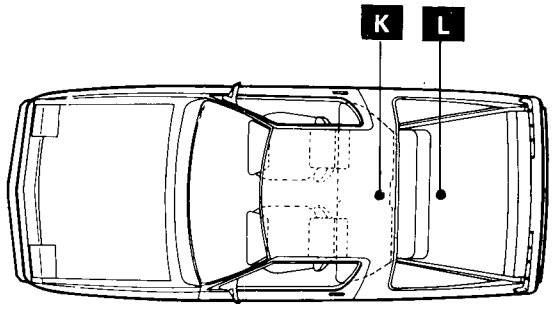


ROOF, LUGGAGE COMPARTMENT



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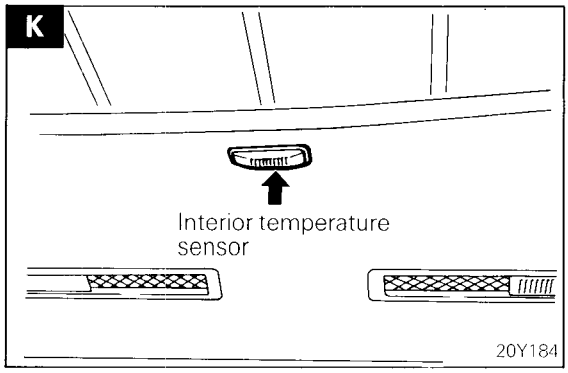

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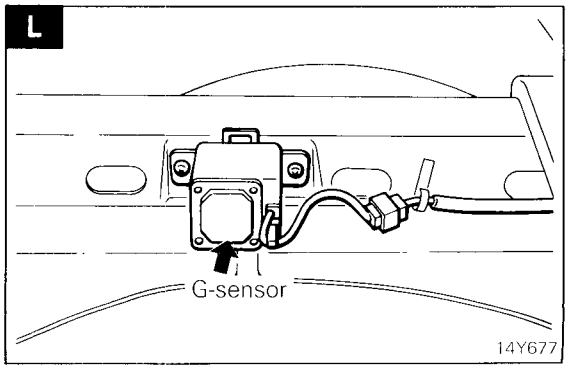
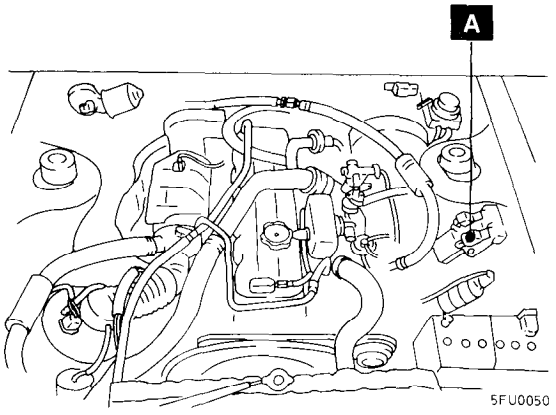


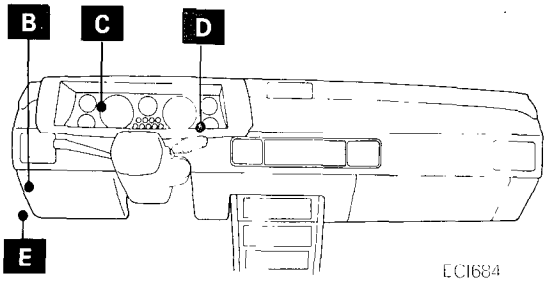
DIODE

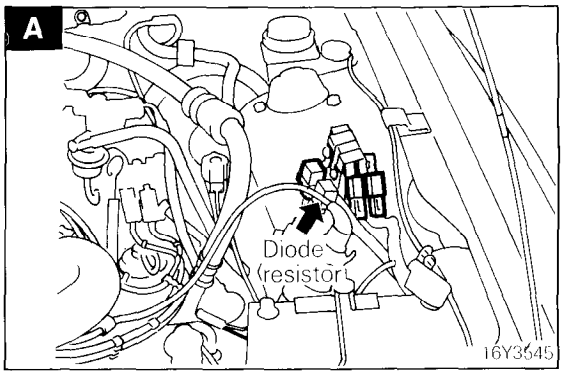
ENGINE COMPARTMENT

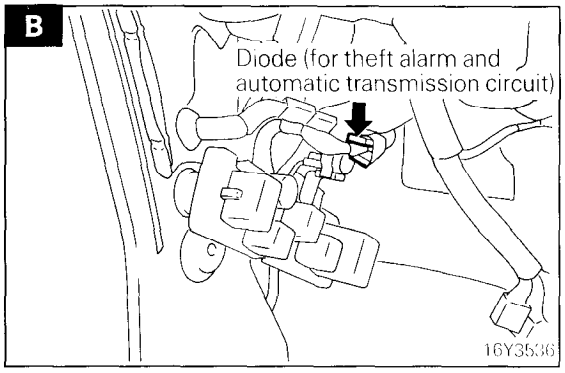


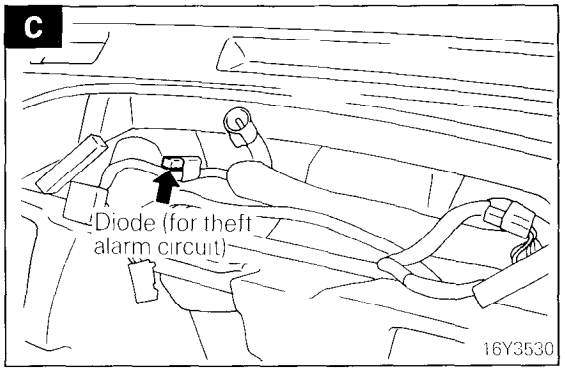
Name	Symbol
Diode (for fog light circuit)	D
Diode (for rear brake lock-up control circuit)	E
Diode (for theft-alarm and automatic transmission circuit)	B
Diode (for theft-alarm system circuit)	C
Diode resistor	A

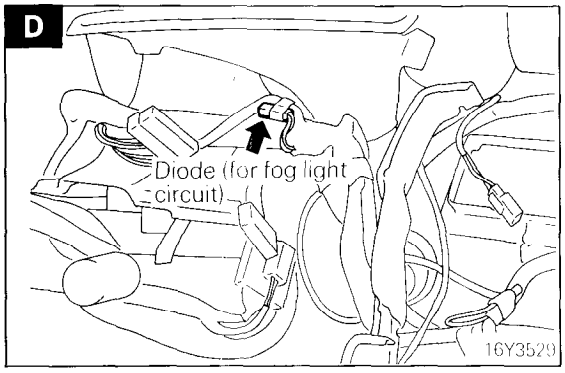
INSTRUMENT PANEL

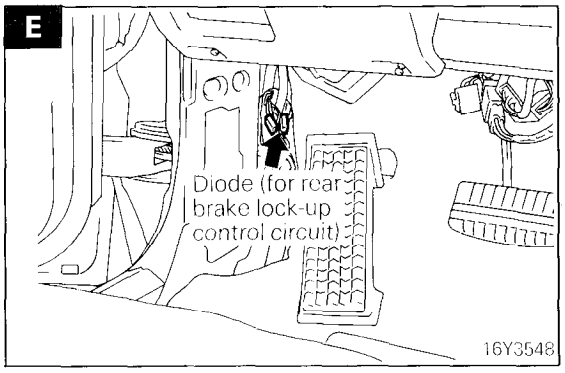






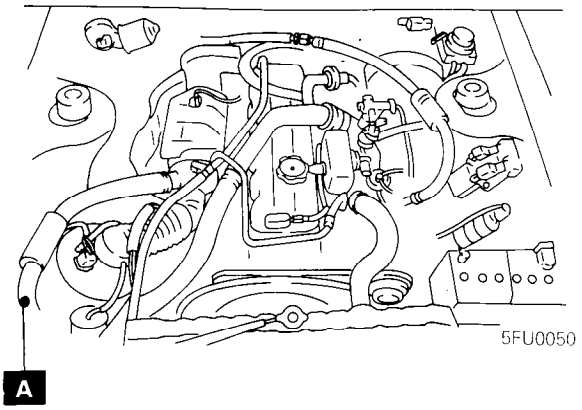






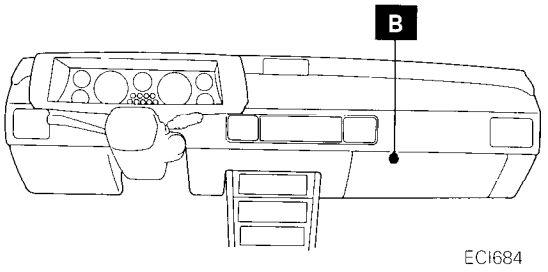
INSPECTION TERMINAL

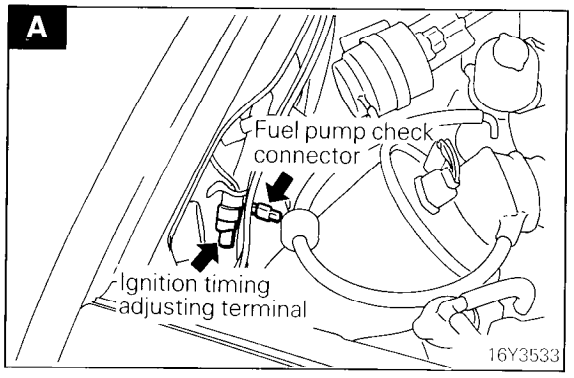
ENGINE COMPARTMENT

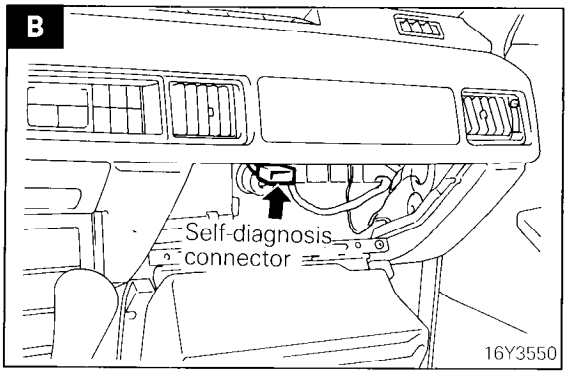


Name	Symbol
Fuel pump check connector	A
Ignition timing adjusting terminal	A
Self-diagnosis connector (for ECI system, automatic speed control system automatic air conditioning and ETACS)	B

INSTRUMENT PANEL

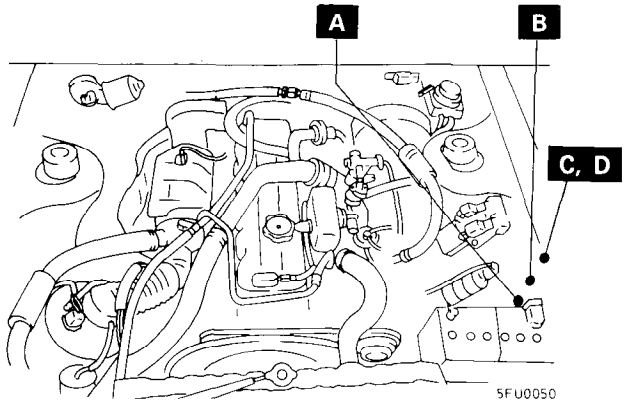




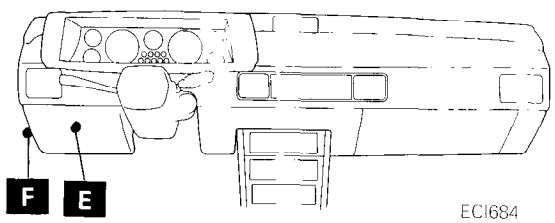


FUSIBLE LINK, FUSE

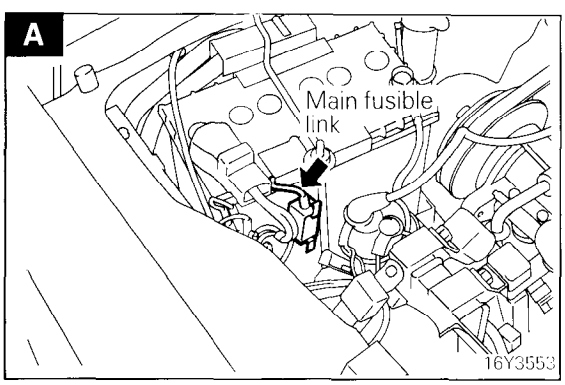
ENGINE COMPARTMENT

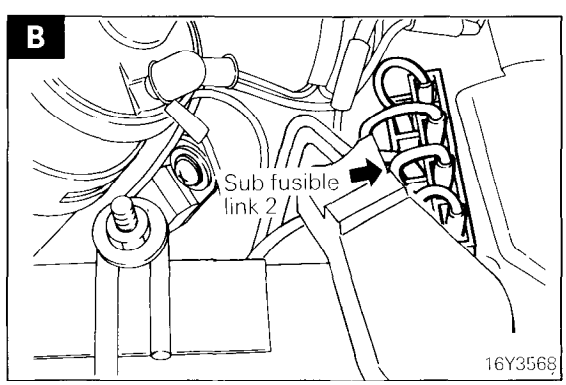


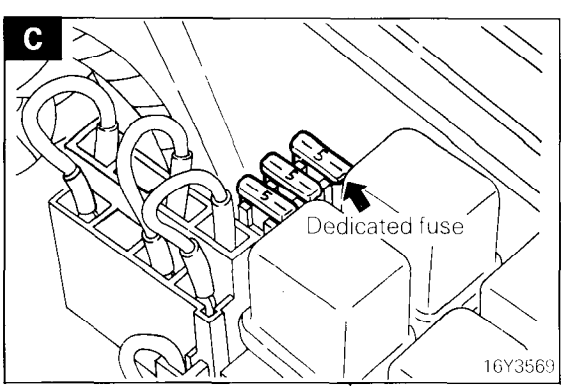
INSTRUMENT PANEL

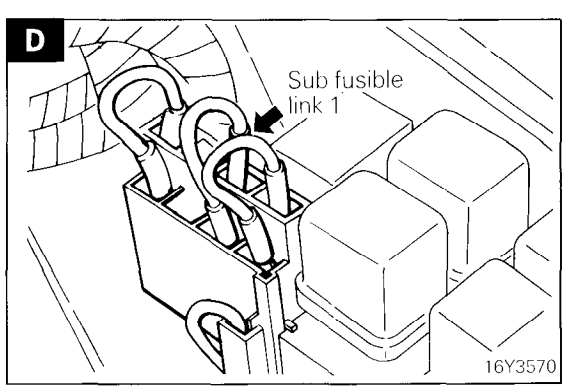


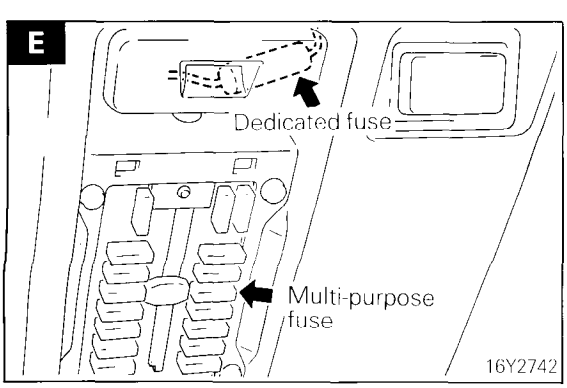
Name	Symbol
Circuit breaker (for automatic seat belt)	F
Dedicated fuse	C
Dedicated fuse (for heated remote controlled mirror)	E
Main fusible link	A
Multi-purpose fuse	E
Sub fusible link 1	D
Sub fusible link 2	B

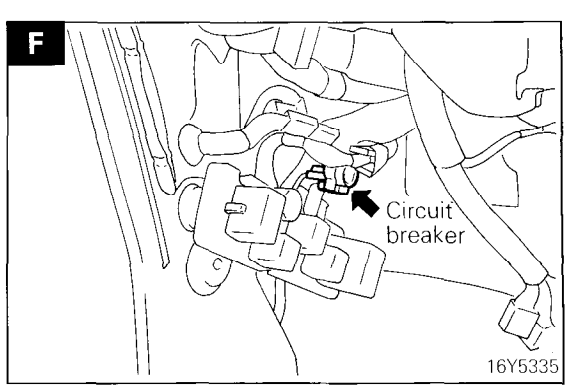






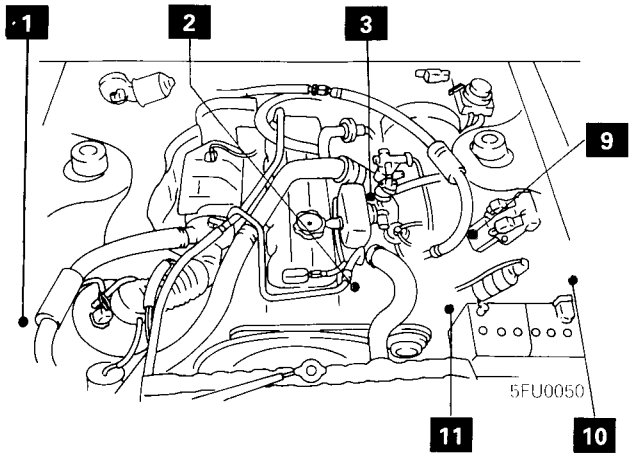




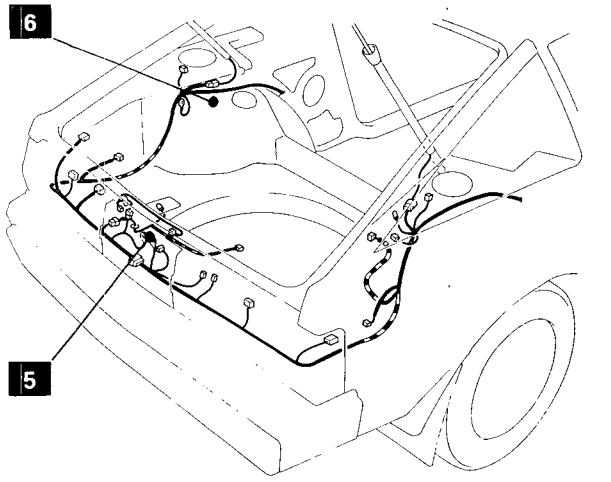


GROUNDING

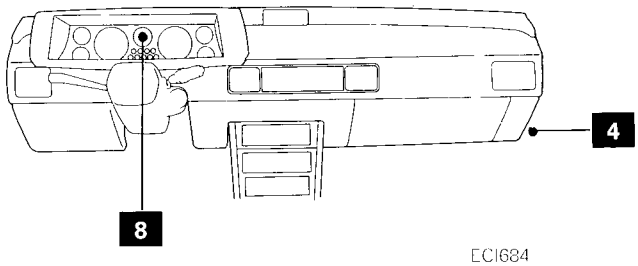
ENGINE COMPARTMENT



LUGGAGE COMPARTMENT



INSTRUMENT PANEL



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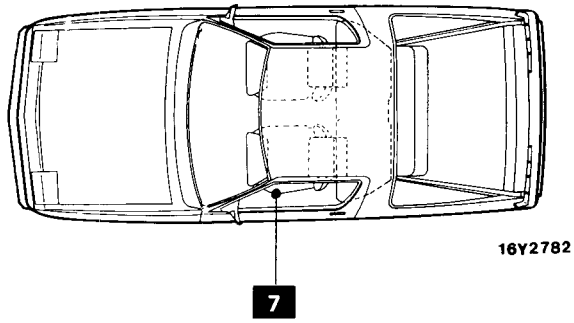

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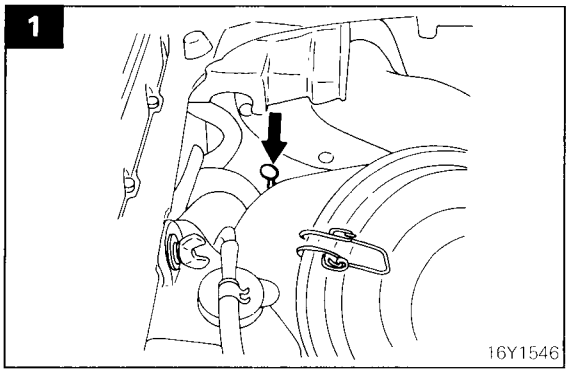

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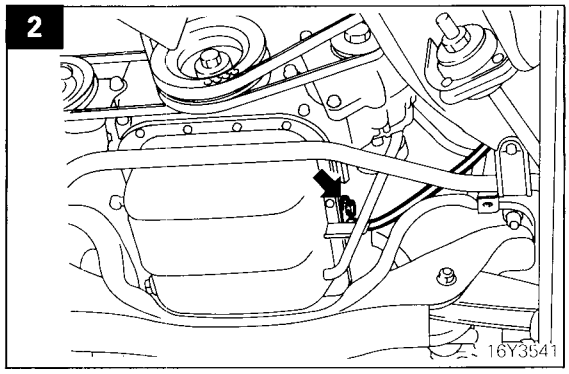

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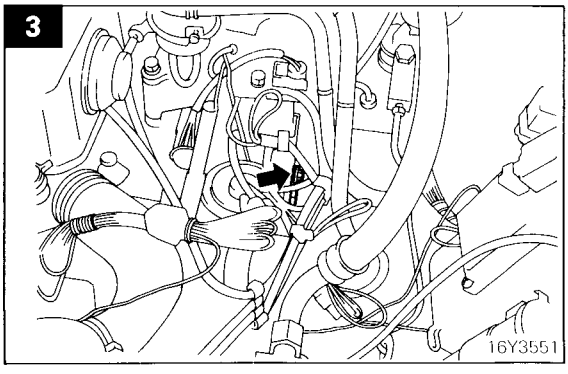

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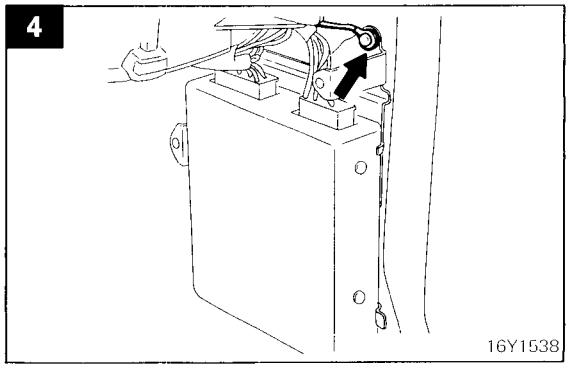

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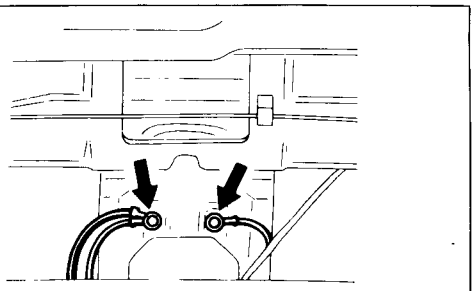

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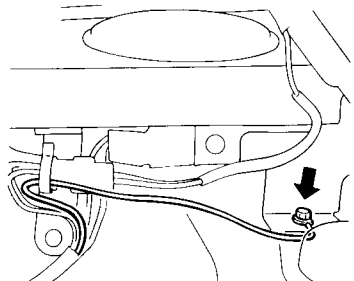

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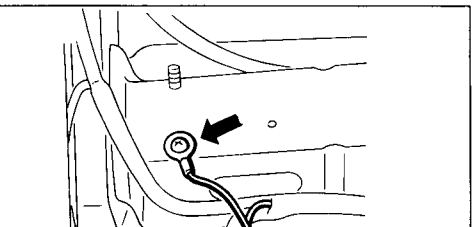

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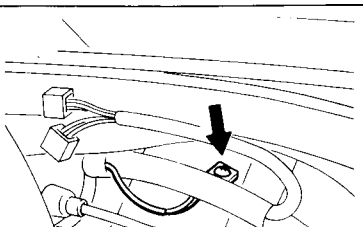

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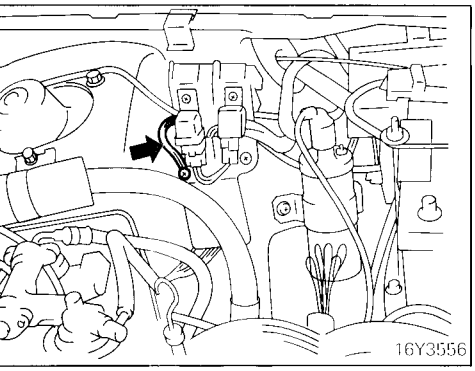

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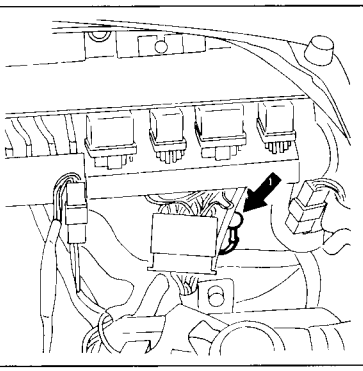
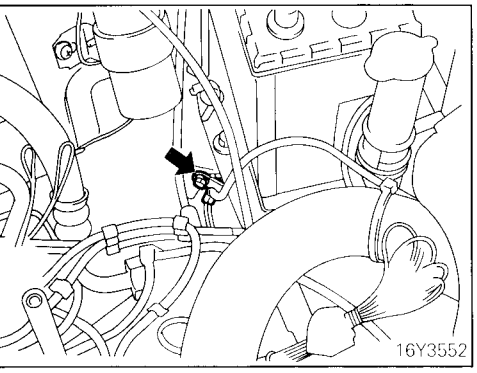


16Y1545

11



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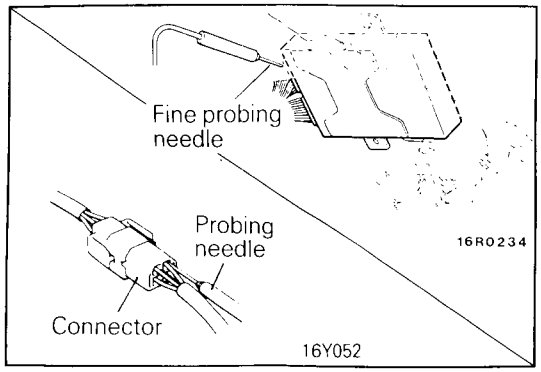
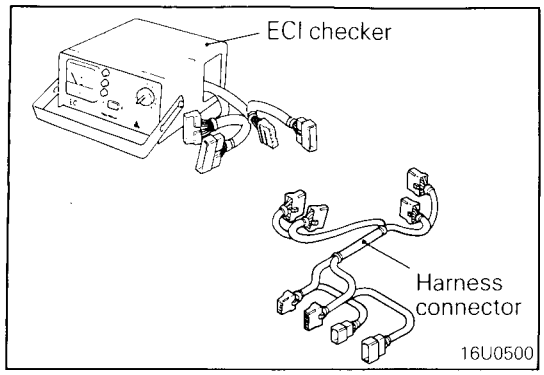
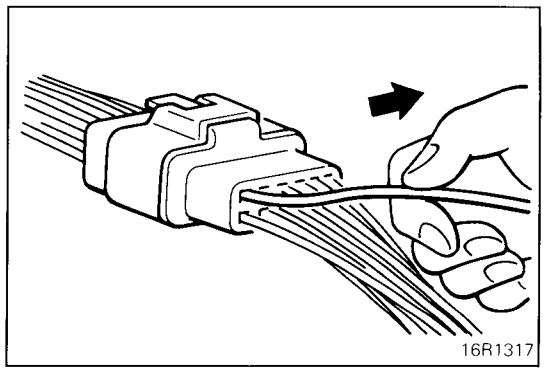
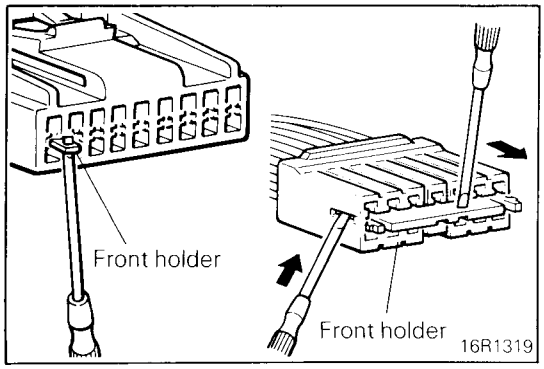








INSPECTION OF HARNESS CONNECTOR

N08CAAA

CONTINUITY AND VOLTAGE TEST FOR CONNECTOR

Following procedures shall be followed for testing continuity and voltage at connector in order to prevent improper contact and deterioration of waterproof in connector.

CONVENTIONAL (NON-WATERPROOF) CONNECTOR

Check shall be done by inserting a probing needle from harness side.

WATERPROOF CONNECTOR

Caution
Do not insert probing needle from harness side as it will deteriorate waterproof and cause for rusting.

To inspect the energized circuit, use the ECI checker.

CHECK FOR IMPROPER ENGAGEMENT OF TERMINAL

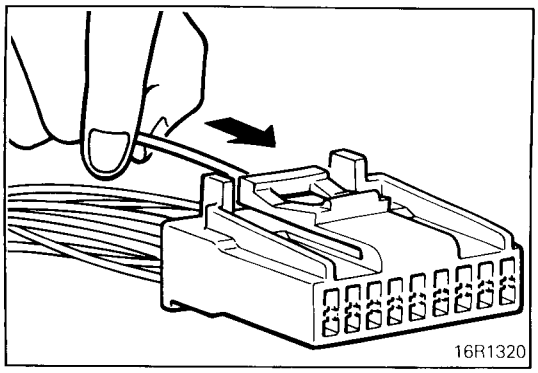
When terminal stopper of connector is out of order, engagement of male and female terminals becomes improper even when connector itself is engaged perfectly and terminal sometimes slips out to rear side of connector. Ascertain, therefore, that each terminal does not come off connector by pulling each harness wire.

ENGAGING AND DISENGAGING OF CONNECTOR TERMINAL

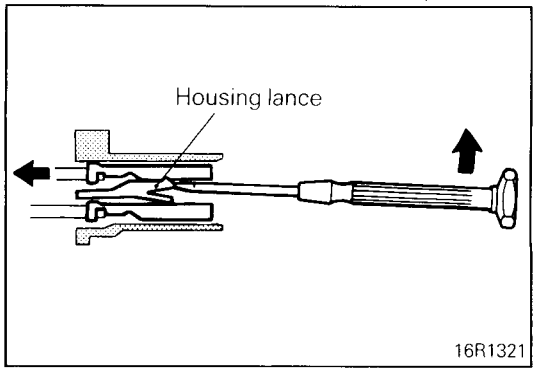
Connector which gives loose engagement shall be rectified by removing female terminal from connector housing and raise its lance to establish securer engagement. Removal of connector housing and raise its lance to establish securer engagement. Removal of connector terminal used for ECI and ELC 4 A/T control circuit shall be done in the following manner.

COMPUTER CONNECTOR

(1) Insert screwdriver [1.4 mm (.06 in.) width] as shown in the figure, disengage front holder and remove it.

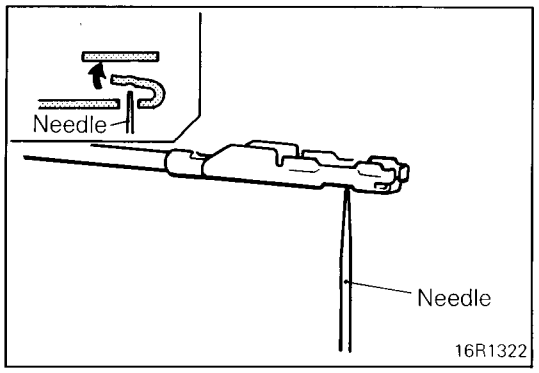


(2) Insert harness of terminal to be rectified deep into connector from harness side and hold it there.



(3) Insert tip of screwdriver [1.4 mm (.06 in.) width] into connector in a manner as shown in the figure, raise housing lance slightly with it and pull out harness.

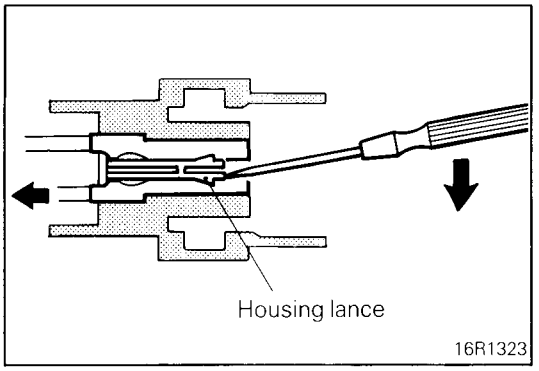
NOTE
Tool No. 753787-1 supplied by AMP can be used instead of screwdriver.

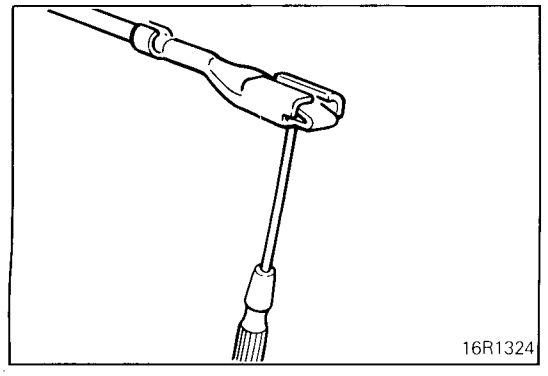


(4) Insert needle through a hole provided on terminal and raise contact point of male terminal.

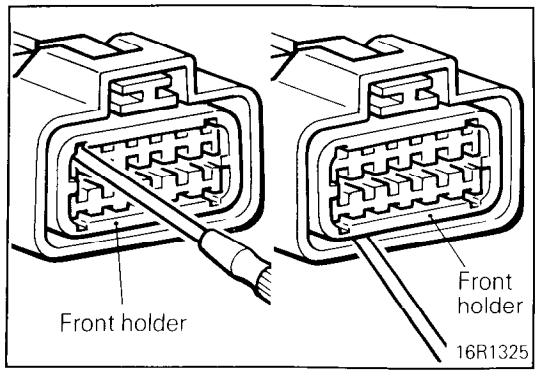
ROUND WATERPROOF CONNECTOR

(1) Remove waterproof cap by using a screwdriver.
(2) Insert tip of screwdriver [14 mm (.06 in.) or 20 mm (.08 in.) width] as shown in the figure, raise housing lance slightly with it and pull out harness.



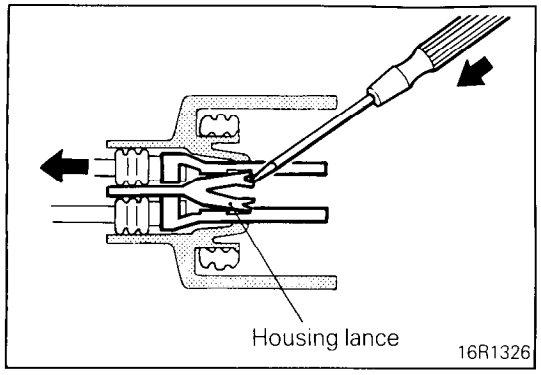


(3) Insert screwdriver through a hole provided on terminal and raise contact point of male terminal.



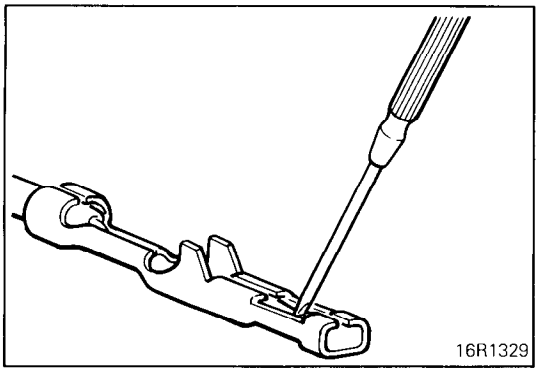
RECTANGULAR WATERPROOF CONNECTOR

(1) Disengage front holder by using a screwdriver and remove it.

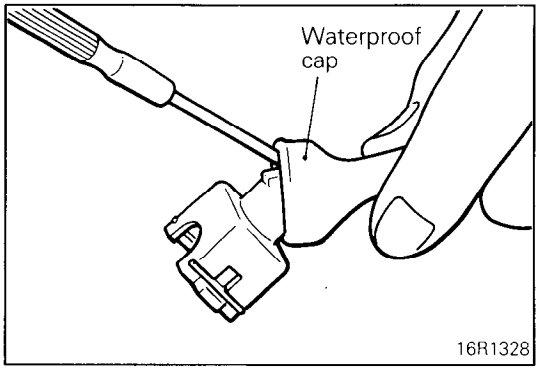


(2) Insert tip of screwdriver [*0.8 mm (.03 in.) width] into connector in a manner as shown in the figure, push it lightly to raise housing lancer and pull out harness.

* If right size screwdriver is not available, convert a conventional driver to suit the size.

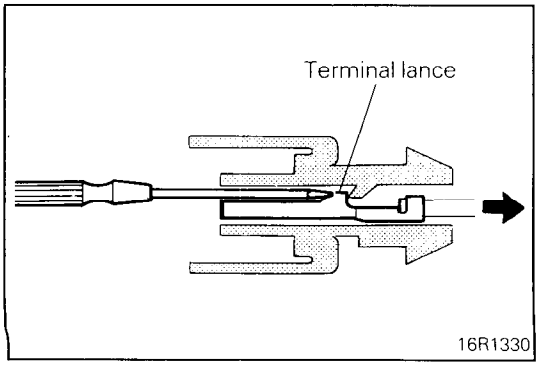


(3) Press contact point of male terminal down by holding a screwdriver [1.4 mm (.06 in.) width] in a manner as shown in the figure.

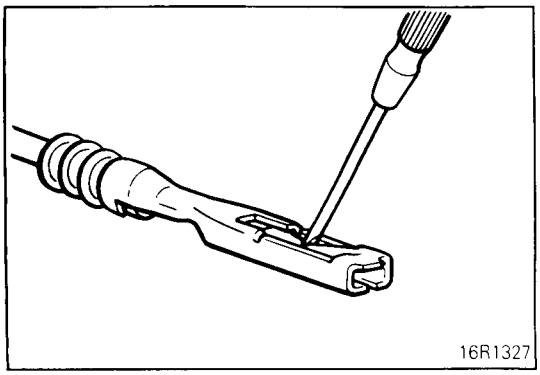


INJECTOR CONNECTOR

(1) Remove waterproof cap.



(2) Insert tip of screwdriver [1.4 mm (.06 in.) width] into connector in a manner as shown in the figure, press in terminal lance and pull out harness.



(3) Press contact point of male terminal down by holding a screwdriver [1.4 mm (.06 in.) width] in a manner as shown in the figure.

Caution
Correct lancer to be in proper condition before terminal is inserted into connector.

WIRING HARNESS

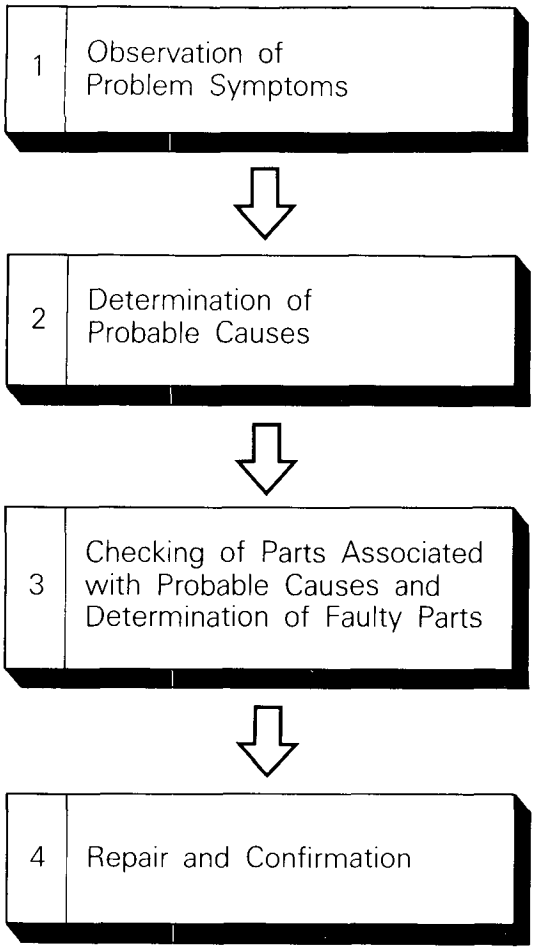
N08DAAA

TROUBLESHOOTING

The most important point in troubleshooting is to determine "Probable Causes". Once the probable causes are determined, parts to be checked can be limited to those associated with such probable causes. Therefore, unnecessary checks can be eliminated. The determination of the probable causes must be based on a theory and be supported by facts, and must not be based on intuition only.

TROUBLESHOOTING STEPS

If an attempt is made to solve a problem without going through correct steps for troubleshooting, the problem symptoms could become more complicated, resulting in failure to determine the causes correctly and making incorrect repairs. The four steps below should be followed in troubleshooting.



Observe the symptom carefully.
Check if there are also other problems.

In determining the probable causes, it is necessary to check the wiring diagram to understand the circuit as a system. Knowledge of switches, relays and other parts is necessary for accurate determination. The causes of similar problems in the past must be taken into account.

Troubleshooting is carried out by making step-by-step checks until the true cause is found. Always go through the procedures considering what check is to be made where for the best results.

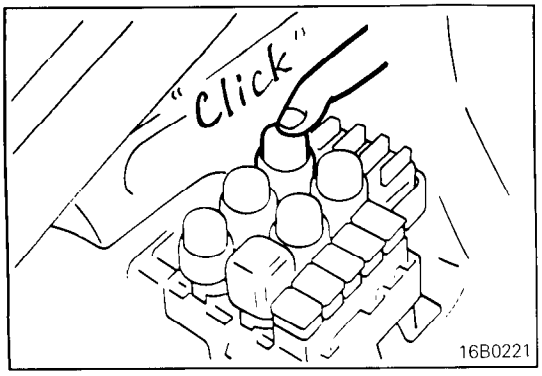
After the problems are corrected, be sure to check that the system operates correctly. Also, check that new problems have not been caused by the repair.

Information for diagnosis

This manual contains the cable diagrams as well as the individual circuit drawings, operational explanations, and troubleshooting hints for each component required to facilitate the task of troubleshooting. The information is compiled in the following manner:

(1) Cable diagrams show the connector positions, etc., on the actual vehicle as well as the harness path.
(2) Circuit drawings show the configuration of the circuit with all switches in their normal positions.
(3) Operational explanations include circuit drawings of voltage flow when the switch is operated and how the component operates in reaction.
(4) Troubleshooting hints include numerous examples of problems which might occur, traced backward in a common-sense manner to the origin of the trouble.
Problems whose origins may not be found in this manner are pursued through the various system circuits.

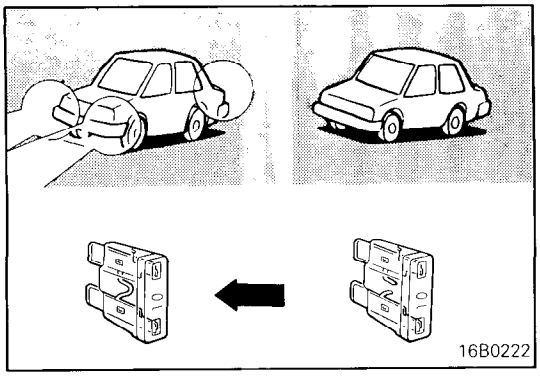
REMARKS
Components of ECI, ETACS, ECS, etc. with ECU do not include 3 and 4 above. For this information, refer to a manual which includes details of these components.



INSPECTION

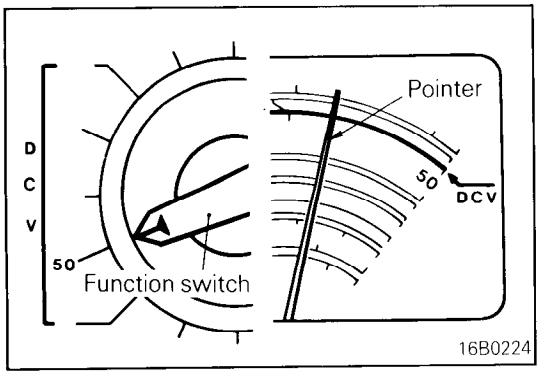
1. VISUAL AND AURAL CHECKS

Check relay operation, blower motor rotation, light illumination, etc. visually or aurally. The flow of current is invisible but can be checked by the operation of the parts.



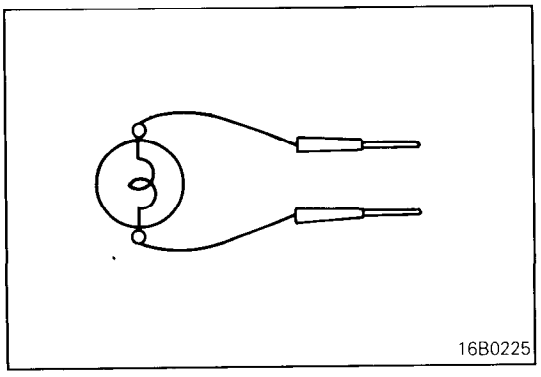
2. SIMPLE CHECKS

For example, if a headlight does not come on and a faulty fuse or poor grounding is suspected, replace the fuse with a new one or ground the light to the body by a jumper wire to determine which part is responsible for the problem.



3. CHECKING WITH INSTRUMENTS

Use an appropriate instrument in an adequate range and read the indication correctly. You must have sufficient knowledge and experience to handle instruments correctly.

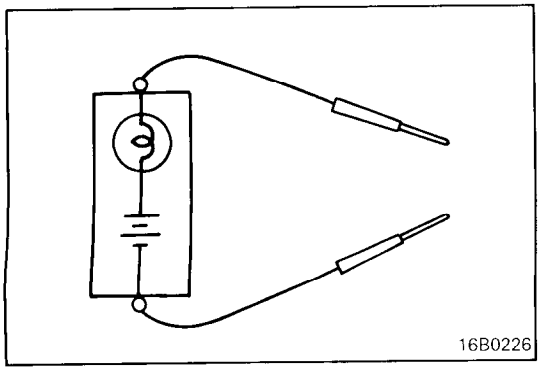


INSPECTION INSTRUMENTS

In inspection, make use of the following instruments.

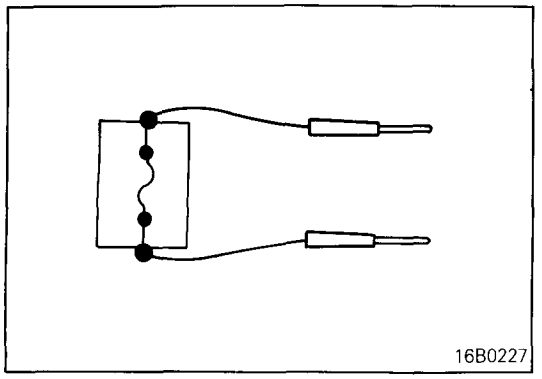
1. TEST LAMPS

A test lamp consists of a 12 V bulb and lead wires. It is used to check voltages or shortcircuits.



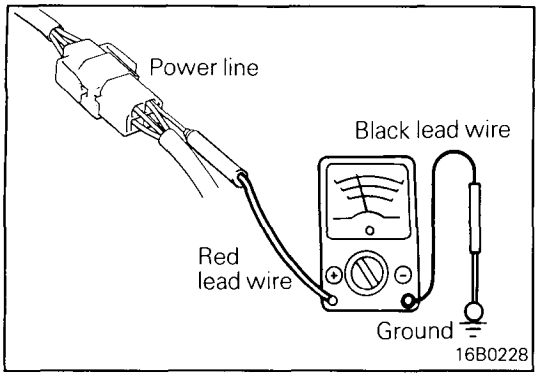
2. SELF-POWER TEST LAMP

A self-power test lamp consists of a bulb, battery and lead wires connected in series. It is used to check continuity or grounding.



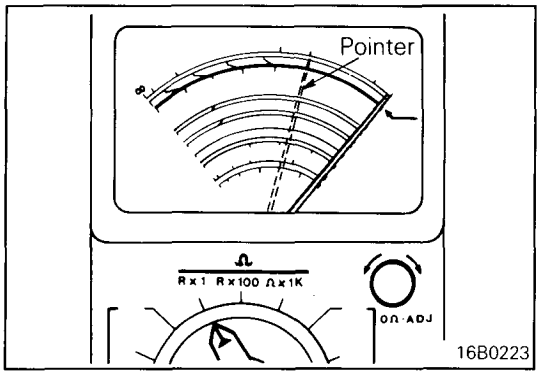
3. JUMPER WIRE

A jumper wire is used to close an open circuit. Never use one to connect a power supply directly to a load.



4. VOLTMETER

A voltmeter is used to measure the circuit voltage. Normally, the positive (red lead) probe is applied to the point of voltage measurement and the negative (black lead) probe to the body ground.



5. OHMMETER

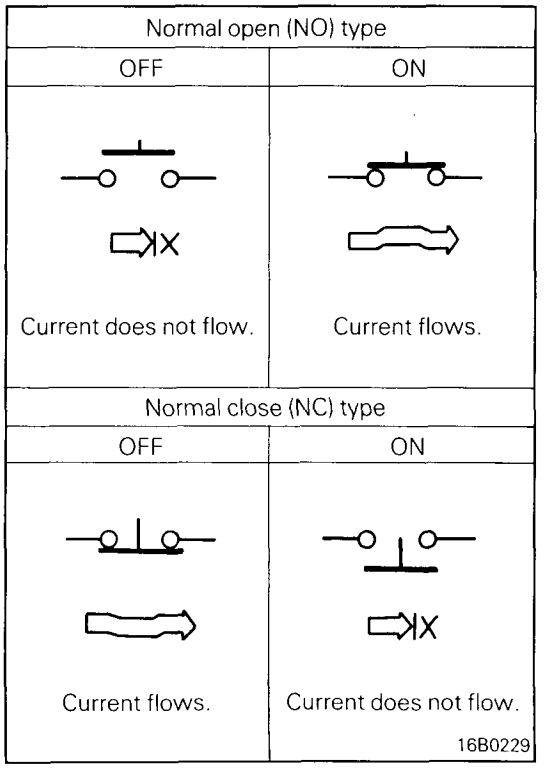
An ohmmeter is used to check continuity or measure resistance of a switch or coil. If the measuring range has been changed, the zero point must be adjusted before measurement.

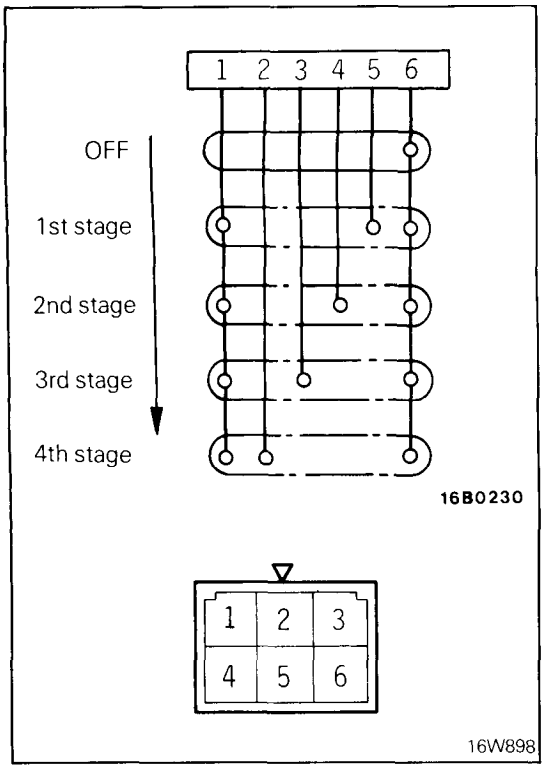
CHECKING SWITCHES

In a circuit diagram, a switch is represented by a symbol and in the idle state.

1. NORMAL OPEN OR NORMAL CLOSE SWITCH

Switches are classified into those which make the circuit open and those which make the circuit closed when off.



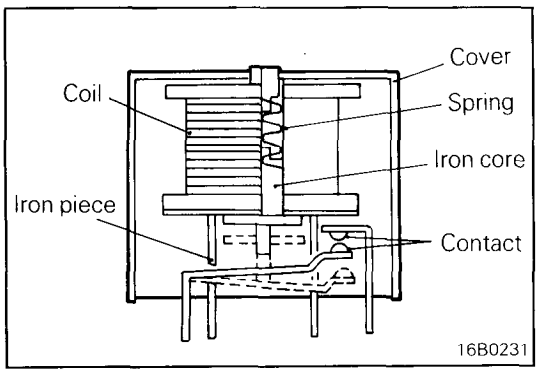


2. SWITCH CONNECTION

This figure illustrates a complex switch. The switch plates indicated by solid lines move in the direction of the arrow when operated. The continuity between terminals at each position is as indicated in the table below.

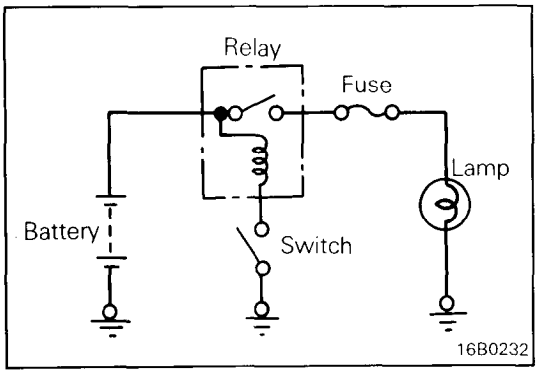
Position \ Terminal No.	1	2	3	4	5	6
OFF						
1st stage	○				○	○
2nd stage	○			○		○
3rd stage	○		○			○
4th stage	○	○				○

NOTE: ○–○ denotes continuity between terminals.

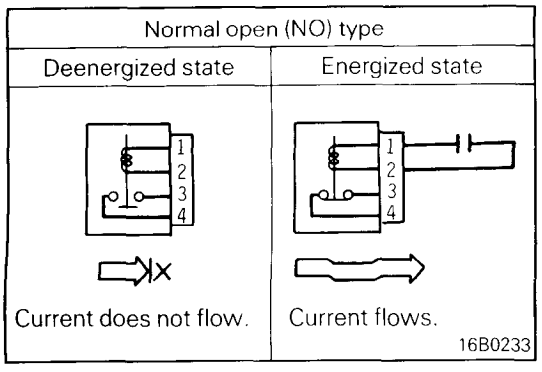


CHECKING RELAYS

1. When current flows through the coil of a relay, its core is magnetized to attract the iron piece, closing (ON) the contact at the tip of the iron piece. When the coil current is turned off, the iron piece is made to return to its original position by a spring, opening the contact (OFF).

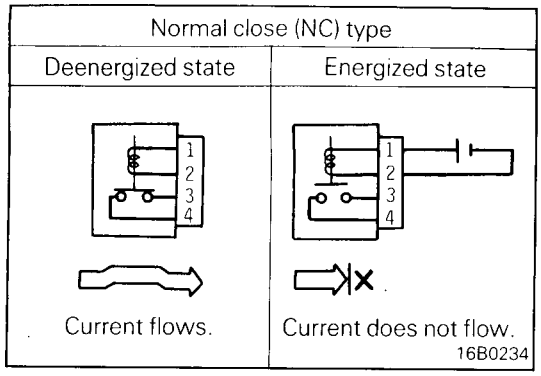


2. By using a relay, a heavy current can be turned on and off by a switch of small capacity. For example, in the circuit shown here, when the switch is turned on (closed), current flows to the coil of the relay.
Then, its contact is turned on (closed) and the lamp comes on. The current flowing at this time to the switch is the relay coil current only and is very small.

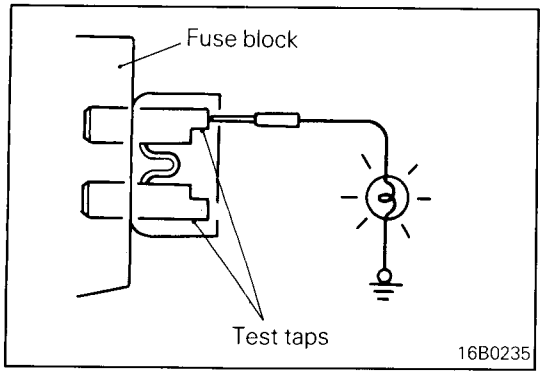


3. The relays may be classified into the normal open type and the normal close type by their contact construction.

NOTE
The deenergized state means that no current is flowing through the coil and the energized state means that current is flowing through the coil.



When a normal close type relay as illustrated here, is checked, there should be continuity between terminals ① and ② and between terminals ③ and ④ when the relay is deenergized, and the continuity should be lost between terminals ③ and ④ when the battery voltage is applied to the terminals ① and ②. A relay can be checked this manner and it cannot be determined if a relay is okay or faulty by checking its state only when it is deenergized (or energized).

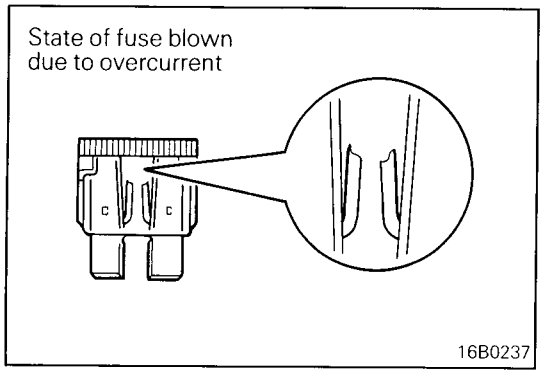


CHECKING FUSES

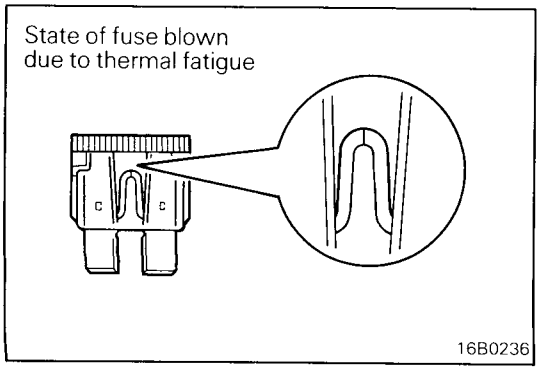
A blade type fuse has test taps provided to allow checking of the fuse itself without removing it from the fuse block. The fuse is okay if the test lamp comes on when its one lead is connected to the test taps (one at a time) and the other lead is grounded. (Change the ignition switch position adequately so that the fuse circuit becomes live.)

CAUTIONS IN EVENT OF BLOWN FUSE

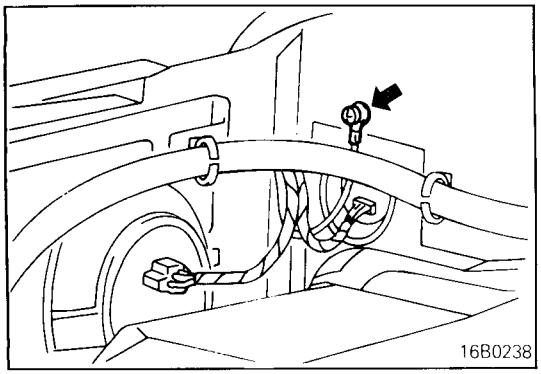
When a fuse is blown, there are two probable causes as follows: One is that it is blown due to flow of current exceeding its rating. The other is that it is blown due to repeated on/off current flowing through it. Which of the two causes is responsible can be easily determined by visual check as described below.

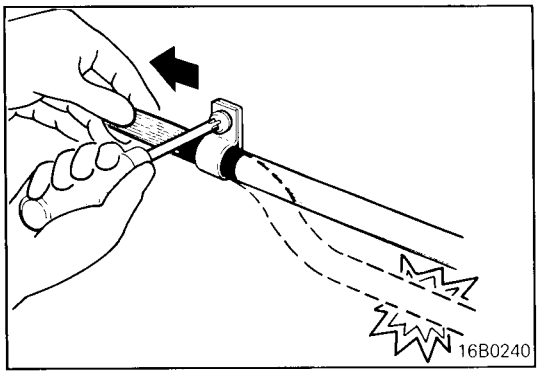


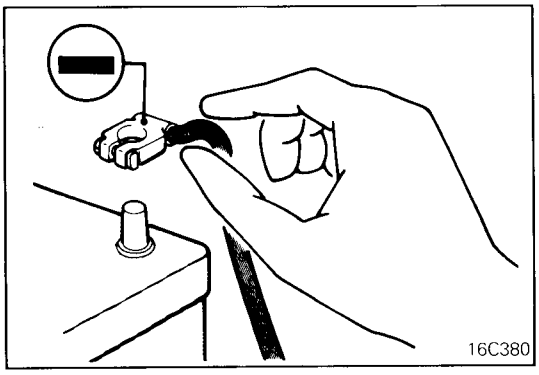
(1) Fuse blown due to current exceeding rating
The illustration shows the state of a fuse blown due to this cause. In this case, do not replace the fuse with a new one hastily since a current heavy enough to blow the fuse has flowed through it. First, check the circuit for shorting and check for abnormal electric parts. Only after the correction of such shorting or parts, should fuse of the same capacity be used as a replacement. Never use a fuse of larger capacity than the one that has blown. If such a fuse is used, electric parts or wirings could be damaged before the fuse blows in the event an overcurrent occurs again.

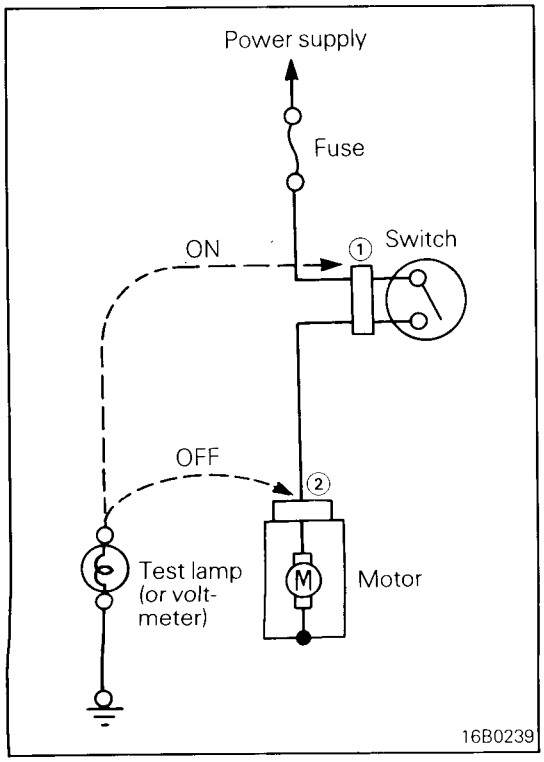


(2) Fuse blown due to repeated current on/off
The illustration shows the state of a fuse blown due to repeated current on/off. Normally, this type of problem occurs after fairly long period of use and hence is less frequent than the above type. In this case, you may simply replace with a new fuse of the same capacity.









CHECKING CABLES AND WIRES

1. Check connections for looseness, rust and stains.
2. Check terminals and wires for corrosion by battery electrolyte, etc.
3. Check terminals and wires for open circuit or impending open circuit.
4. Check wire insulation and coating for damage, cracks and degrading.
5. Check conductive parts of terminals for contact with other metallic parts (vehicle body and other parts).
6. Check grounding parts to verify that there is complete continuity between attaching bolt(s) and vehicle body.
7. Check for incorrect wiring.
8. Check that wirings are so clamped as to prevent contact with sharp corners of the vehicle body, etc. or hot parts (exhaust manifold, pipe, etc.).
9. Check that wirings are clamped firmly to secure enough clearance from the fan pulley, fan belt and other rotating or moving parts.
10. Check that the wirings between the fixed parts such as the vehicle body and the vibrating parts such as the engine are made with adequate allowance for vibrations.

HANDLING ON-VEHICLE BATTERY

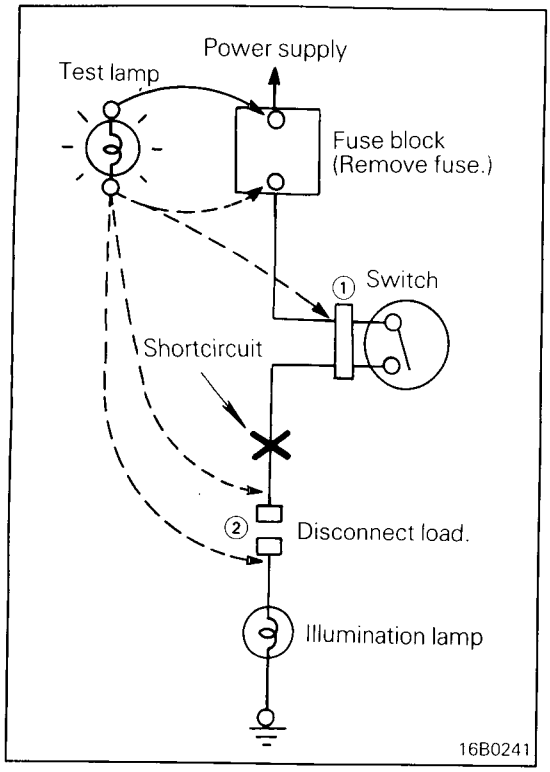
When checking or servicing does not require power from the on-vehicle battery, be sure to disconnect the cable from the battery ⊖ terminal. This is to prevent problems that could be caused by shorting of the circuit.
Disconnect the ⊖ terminal first and reconnect it last.

TROUBLESHOOTING

A circuit consists of the power supply, switch, relay, load, ground, etc. There are various methods to check a circuit including an overall check, voltage check, shortcircuit check and continuity check. Each of these methods is briefly described in the following.

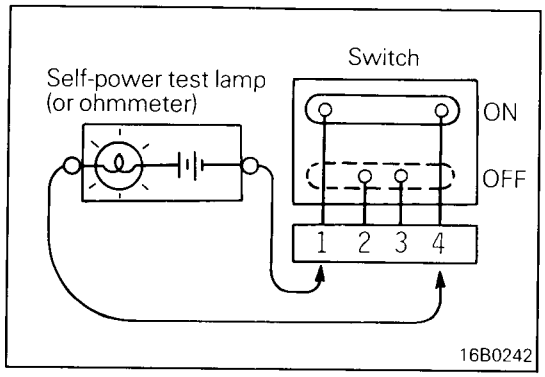
1. VOLTAGE CHECK

(1) Ground one lead wire of the test lamp. If a voltmeter is used instead of the test lamp, ground the grounding side lead wire.
(2) Connect the other lead wire of the test lamp to the power side terminal of the connector ①. The test lamp should come on, or the voltmeter should indicate a voltage.
(3) Then, connect the test lamp or voltmeter to the connector ②. The test lamp should not come on, or the voltmeter should indicate no voltage. When the switch is turned on in this state, the test lamp should come on, or the voltmeter should indicate a voltage, with the motor starting to run.
(4) The circuit illustrated here is normal but if there is any trouble such as the motor failing to run, check voltages beginning at the connector nearest to the motor until the faulty part is identified.



2. CHECKING SHORTCIRCUITS

(1) Remove the blown fuse and connect the test lamp to the disconnected terminal. The test lamp should not come on.
(2) Connect a lead wire of the test lamp to the power side of the connector ①. The test lamp should not come on.
(3) Connect a lead wire of the test lamp to the load side of the connector ①. The test lamp should come on and the load lamp should also come on.
(4) Disconnect the load at the connector ② and connect the test lamp lead wire to the load side of the connector ②. The test lamp should come on and the load lamp should also come on.
(5) Connect the test lamp lead wire to the switch side of the connector ②. The test lamp should come on.
(6) If the test conforms to any of the above conditions, there is a shortcircuit in the wiring between the connector ① and the connector ②.



3. CHECKING CONTINUITY

(1) When the switch is in the OFF position, the self-power test lamp should come on or the ohmmeter should read 0 ohm only when the terminals ② and ③ are interconnected.
(2) When the switch is in the ON position, the self-power test lamp should come on or the ohmmeter should read 0 ohm only when the terminals ① and ④ are interconnected.

HOW TO READ WIRING DIAGRAMS

N08DBAG

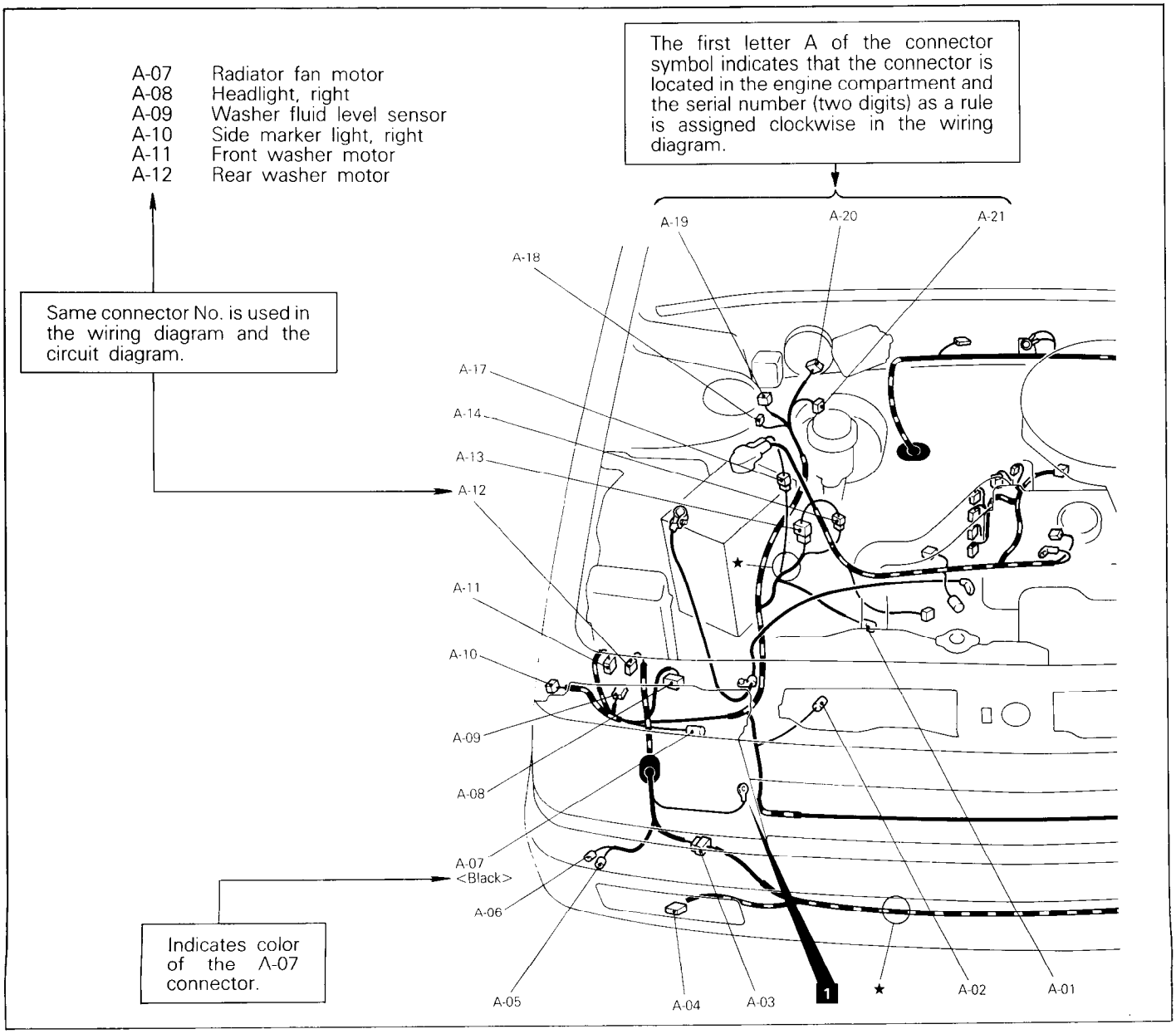
HOW TO READ CONFIGURATION DIAGRAMS

(1) Connector symbols

A wiring diagram shows the installed condition of each connector in a schematic style. The connectors are shown and classified as follows, depending on their locations and are marked by connector symbols. In case connectors of the same shape (same number of wires) are centralized, their colors are indicated for identification.

Example: A – 12 (black)

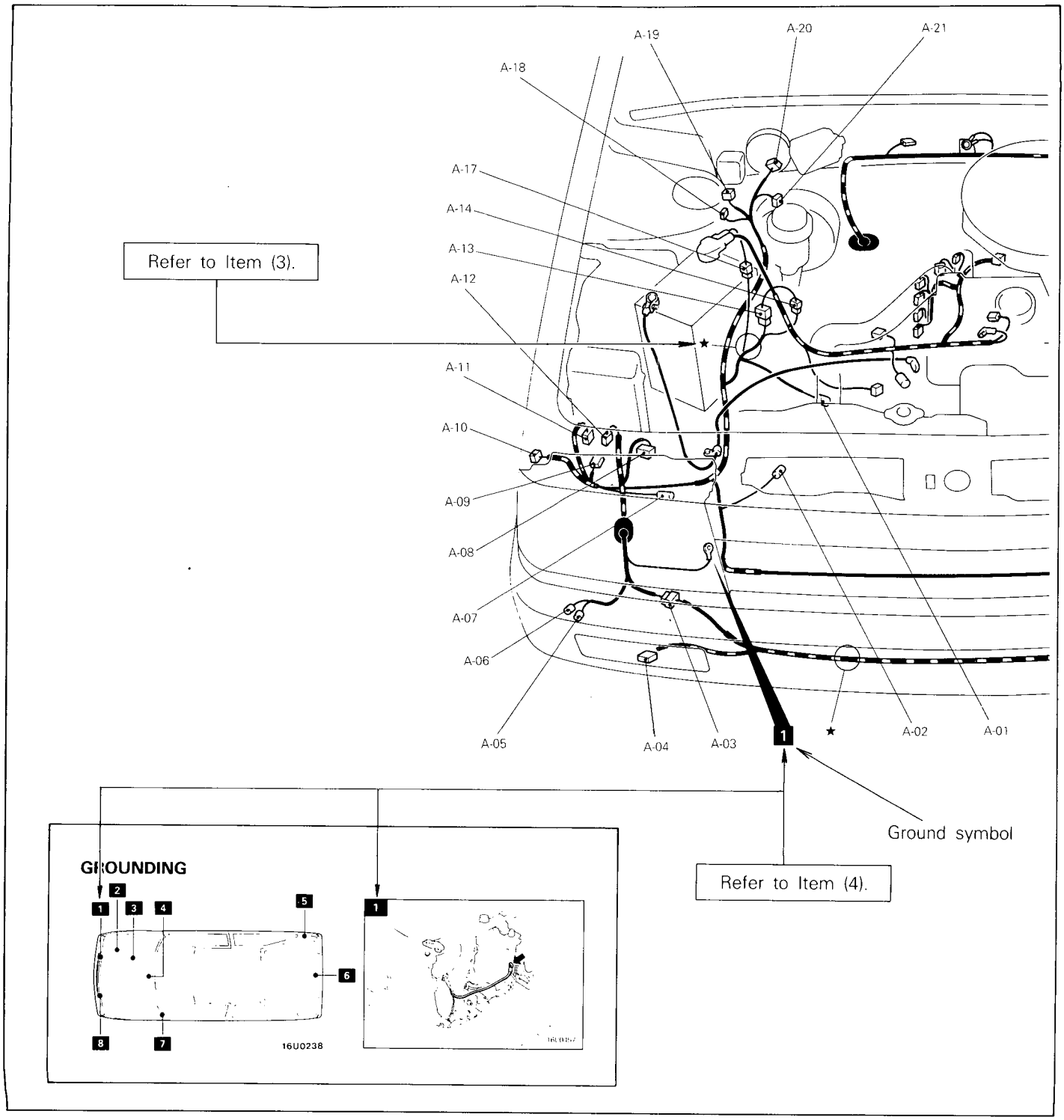
- A – Connector symbol
  - A: Engine compartment
  - B: Dash panel
  - C: Interior
  - D: Instrument panel
  - E: Luggage compartment
  - F: Rear hatch
- 12 – Connector's unique number (serial number)
- (black) – Connector color



(2) Identification of connectors differing according to different vehicle specifications
With regard to wiring harness connectors, the inter-device or -wiring harness connectors which vary in shape or position on different vehicle specifications are given the specification-dependent connector identification symbol (lower case alphabet) after a serial number.
For detailed information on this specification-dependent symbol, refer to Item (8) under "HOW TO READ CIRCUIT DIAGRAMS"

(3) Indication of standard mounting positions of harnesses
The standard mounting positions of harnesses are shown with the mark ★ in wiring harness configuration diagrams.

(4) Indication of ground point
The position of ground points are shown in wiring harness configuration diagrams. For detailed information on the ground portion, refer to ELECTRICAL SYSTEM PARTS LOCATION (Grounding).



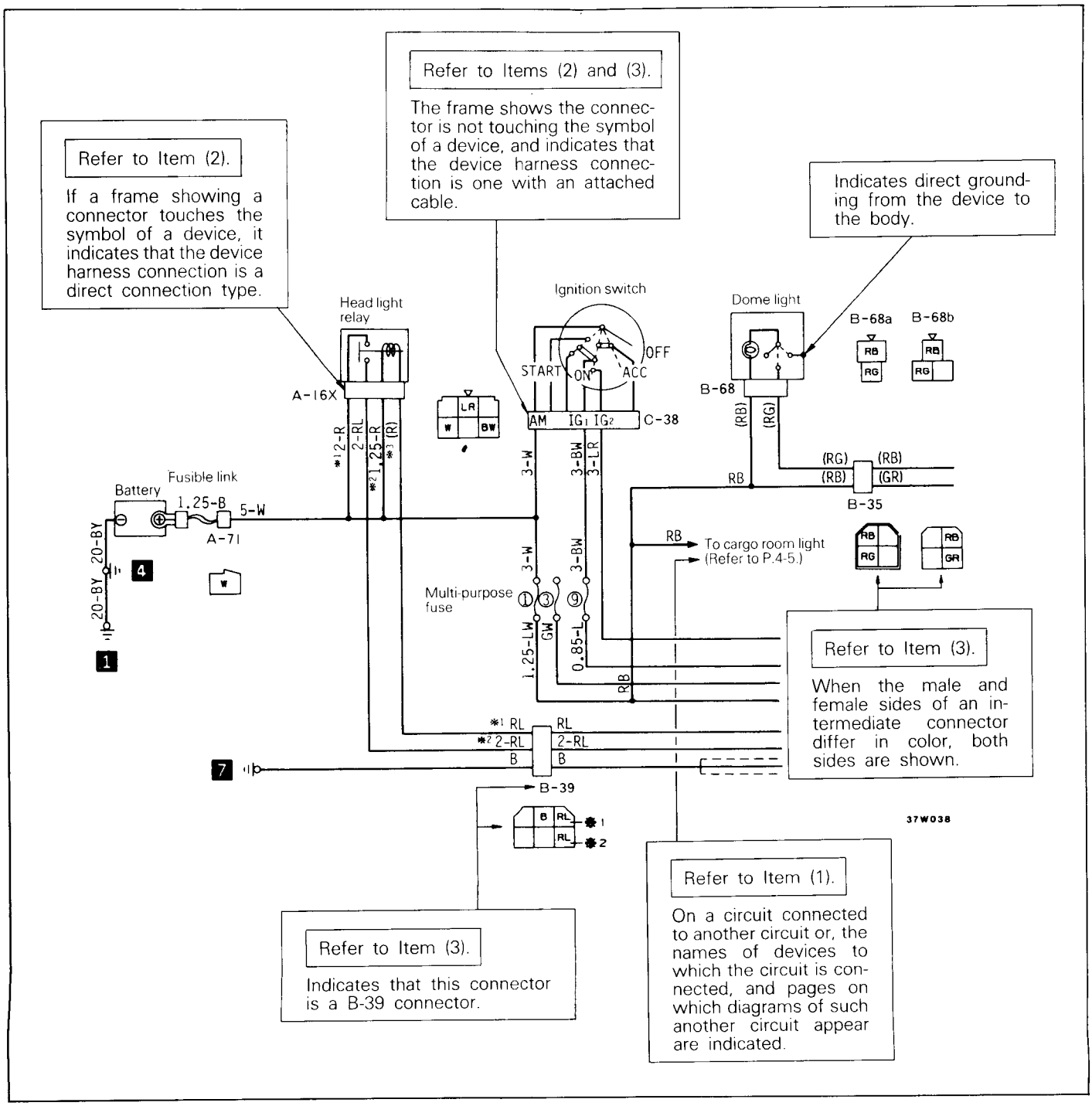
HOW TO READ CIRCUIT DIAGRAMS

The circuit diagrams are functionally separated.

(1) Indication of circuit connected to another circuit.
When the circuit in a circuit diagram is connected to another circuit in a different diagram, the page number of that different diagram is indicated so that it can be referred to.

(2) Indication of device connections
The circuit diagram shows whether a device harness connection is one with an attached cable or is a direct connection type.

(3) Indication of connectors in circuit diagrams
A connector in a circuit diagram is shown in a frame and is assigned a connector symbol. This symbol corresponds to the symbol in a wiring harness configuration diagram so that the connector location can be known easily. An intermediate connector has its female side only shown as a rule. However, both of the male and female sides are shown when they differ in wiring color.

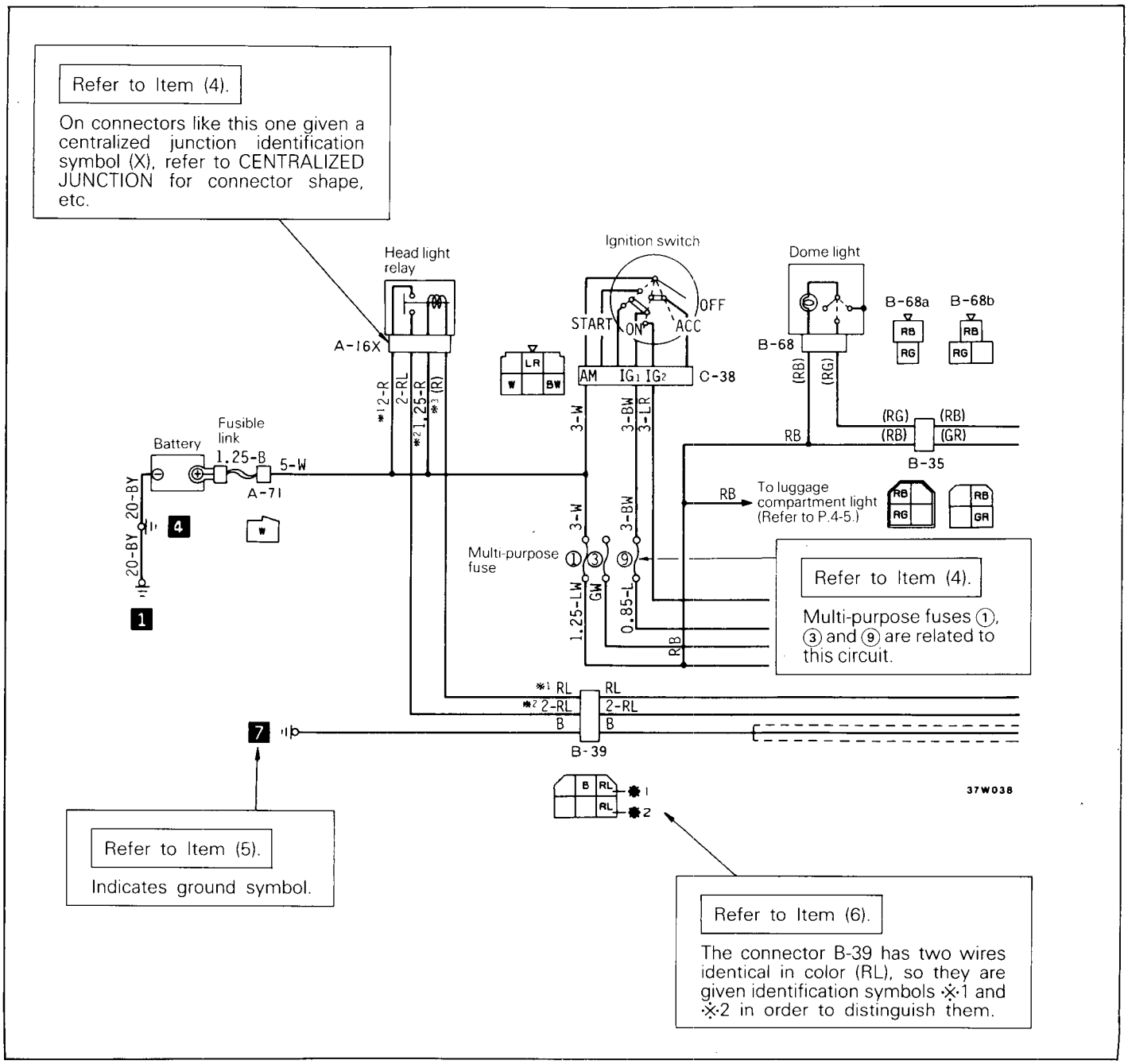


(4) Indication of fuses, fusible links and centralized relays
The fuses and fusible links in a circuit diagram are indicated by a wave symbol and a double wave symbol, respectively. At a centralized junction, the fuses are given fuse numbers and centralized relays are given connector symbols.

Example of centralized junction symbol: A – 01 X
- X: Centralized junction indication symbol
- 01: Connector's unique number (serial number)
- A: Connector symbol

(5) Indication of ground point
The ground point in a circuit diagram is marked by a GND symbol, making it possible for you to refer to a wiring harness configuration diagram and to ELECTRICAL SYSTEM PARTS LOCATION (Grounding).

(6) Indication of wires
In a circuit diagram, the wire diameter and wire color are shown for each wire. If there are several wires of the same color in a connector, their wire color indication symbols should be such symbols as ※1 and ※2 for identification.

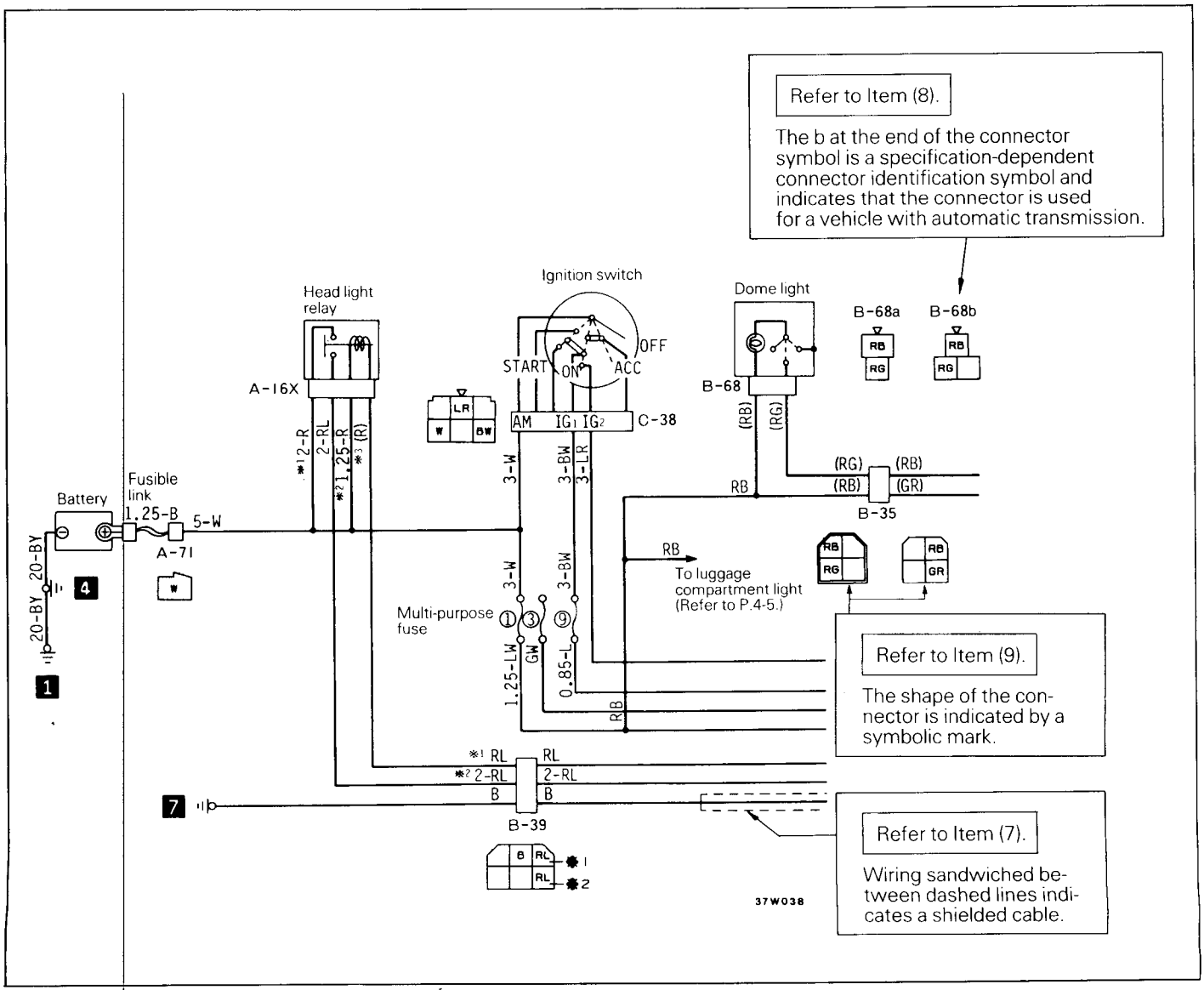


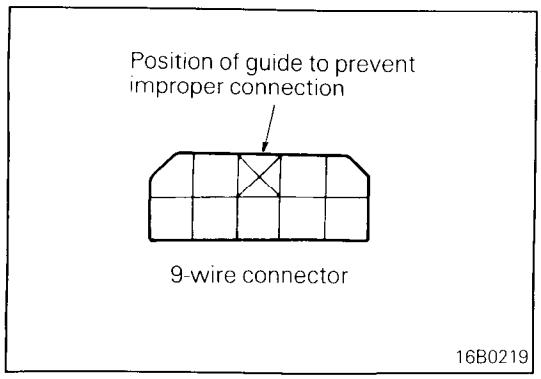
(7) Indication of shielded cables
A shielded cable used, for example, in an electronic control circuit for prevention of malfunctions that may otherwise be caused by radio interference is indicated by a solid line sandwiched between dashed lines (═══).

(8) Indication of specification-dependent connectors
With regard to harness connectors, the inter-device and -harness connectors which vary in shape or position on different vehicle specifications, such as those with rear wipers and turbocharger and those without turbocharger, are given a specification-dependent connector identification symbols (lower case alphabet) following the connector symbol.

Example: A-01a
└── Specification-dependent connector identification symbol
a. Vehicle with manual transmission
b. Vehicle with automatic transmission

(9) Shapes of connectors
The connector shapes are indicated by simplified symbolic marks. For distinction between male and female connectors, refer to IDENTIFYING CONNECTORS.

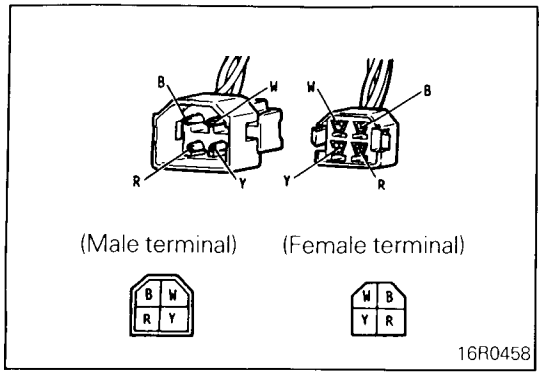




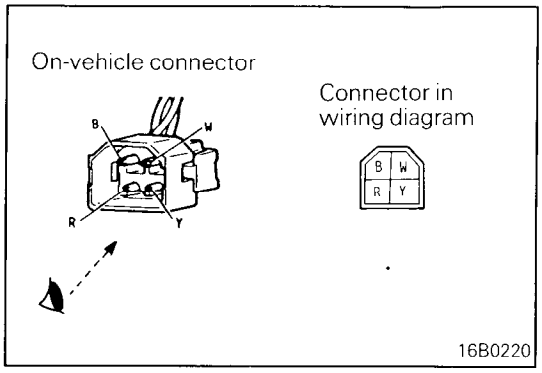
IDENTIFYING CONNECTORS

In circuit diagrams, the connectors are indicated by symbolic marks which show the number of their wires and whether they are male or female connectors.

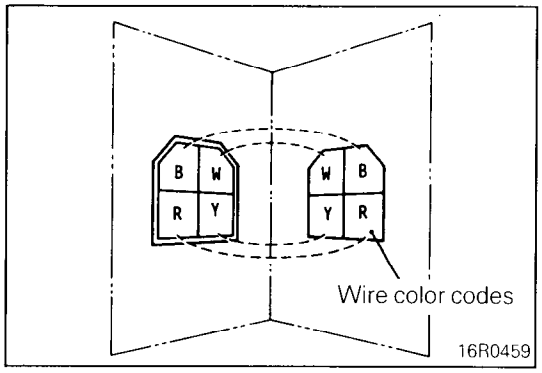
(1) Number of connector wires
The number of divisions in the connector diagram indicates the number of wires. A cross in a division, however, indicates the position of a guide to prevent improper connection. The connector shown here, therefore, is a 9-wire connector.



(2) Identification of male and female connectors
Connectors drawn with double outer lines are male, and those with single outer lines are female.

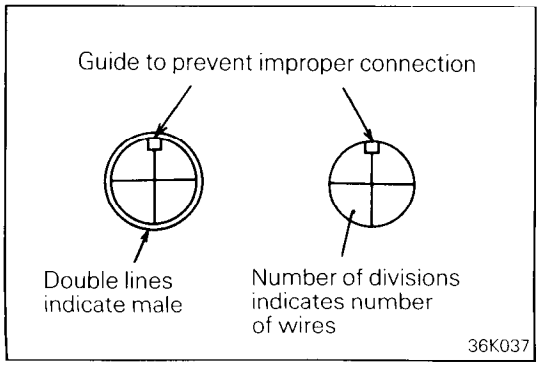


(3) Connector direction
The connector marks show on-vehicle connectors as viewed from the direction shown here.



(4) Identification of connector terminals
The color codes of a pair of connectors (male and female), if viewed at their joining surfaces, will appear symmetrical as illustrated here. When the connectors are connected, their joining surfaces are put together in the way a book is closed, so the terminals of identical codes are connected together.

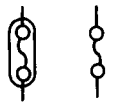
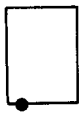
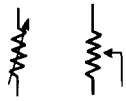
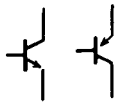
NOTE
The color codes of male and female connectors are not always identical.



(5) Identification of sealed connectors
Identification of round, sealed connectors (water-proof pin terminal connectors) used in radiator fan motor circuits turbo circuits, etc. is accomplished by the same method as described above.

SYMBOLIC MARKS

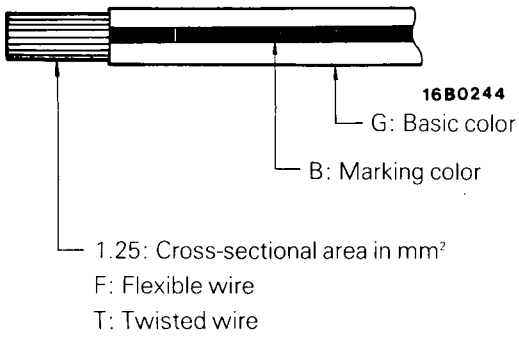
Various equipment is indicated symbolically in circuit diagrams as shown below.

Battery 	Body ground 	Single bulb 	Resistor 	Diode 	Capacitor 
Fuse 	Equipment ground 	Dual bulb 	Variable resistor 	Zener diode 	Crossing of wires without connection 
Fusible link	Motor 	Speaker 	Coil 	Transistor 	Crossing of lines with connection 

WIRE COLOR CODES

Wire colors are identified by the following color codes.

Example: 1.25F-GB



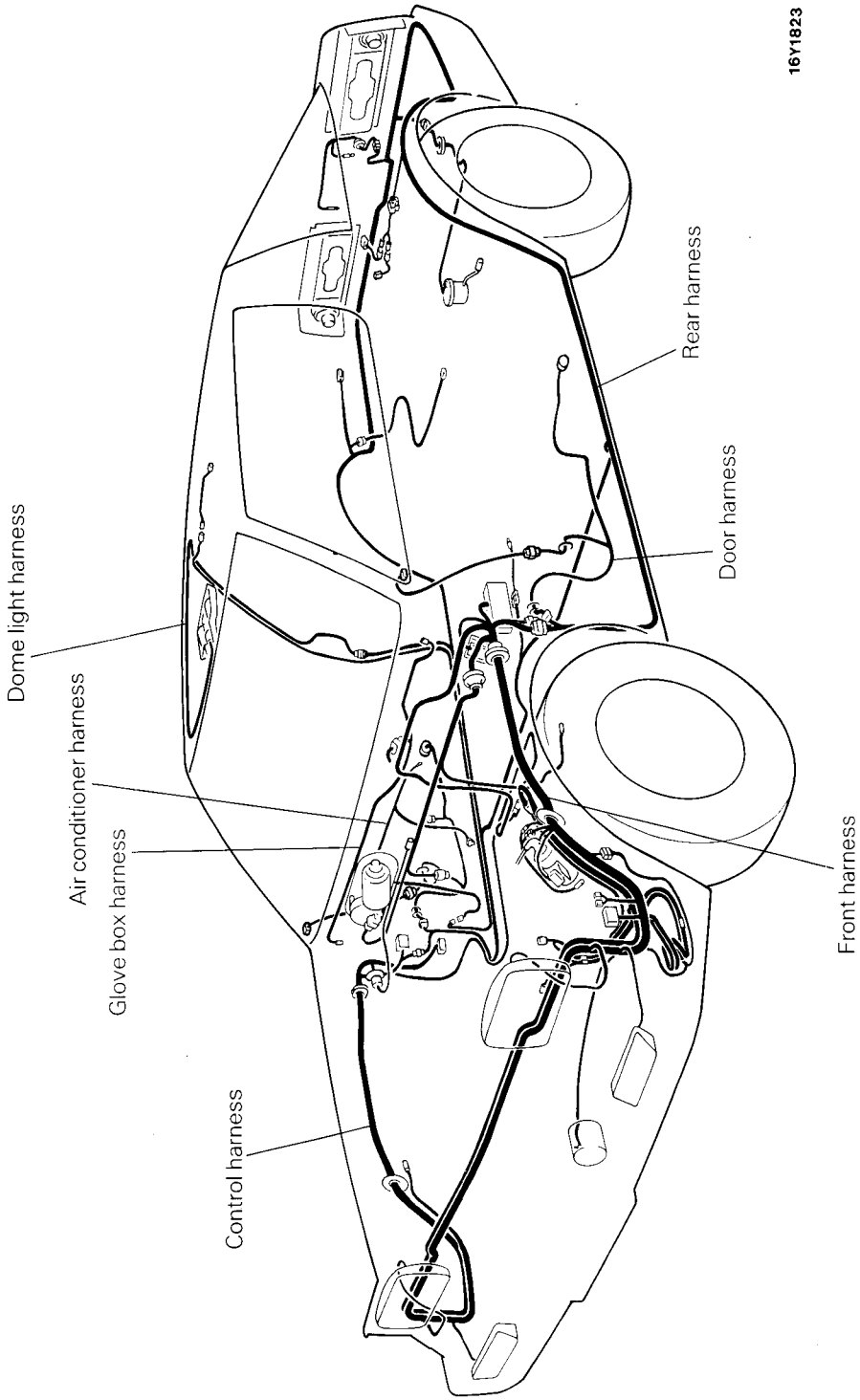
(1) When cross-sectional area is not indicated, the area is 0.5 mm².
(2) Cross-sectional area, indicated by ( ) in cable color, is 0.3 mm².

Code	Wire color	Code	Wire color
B	Black	Ll	Light blue
Br	Brown	O	Orange
G	Green	P	Pink
Gr	Gray	R	Red
L	Blue	Y	Yellow
Lg	Light green	W	White

NOTE
If a cable has two colors, the first of the two color code characters indicates the basic color (color of the cable coating) and the second indicates the marking color.

Wiring Harness Overview

N08DC--

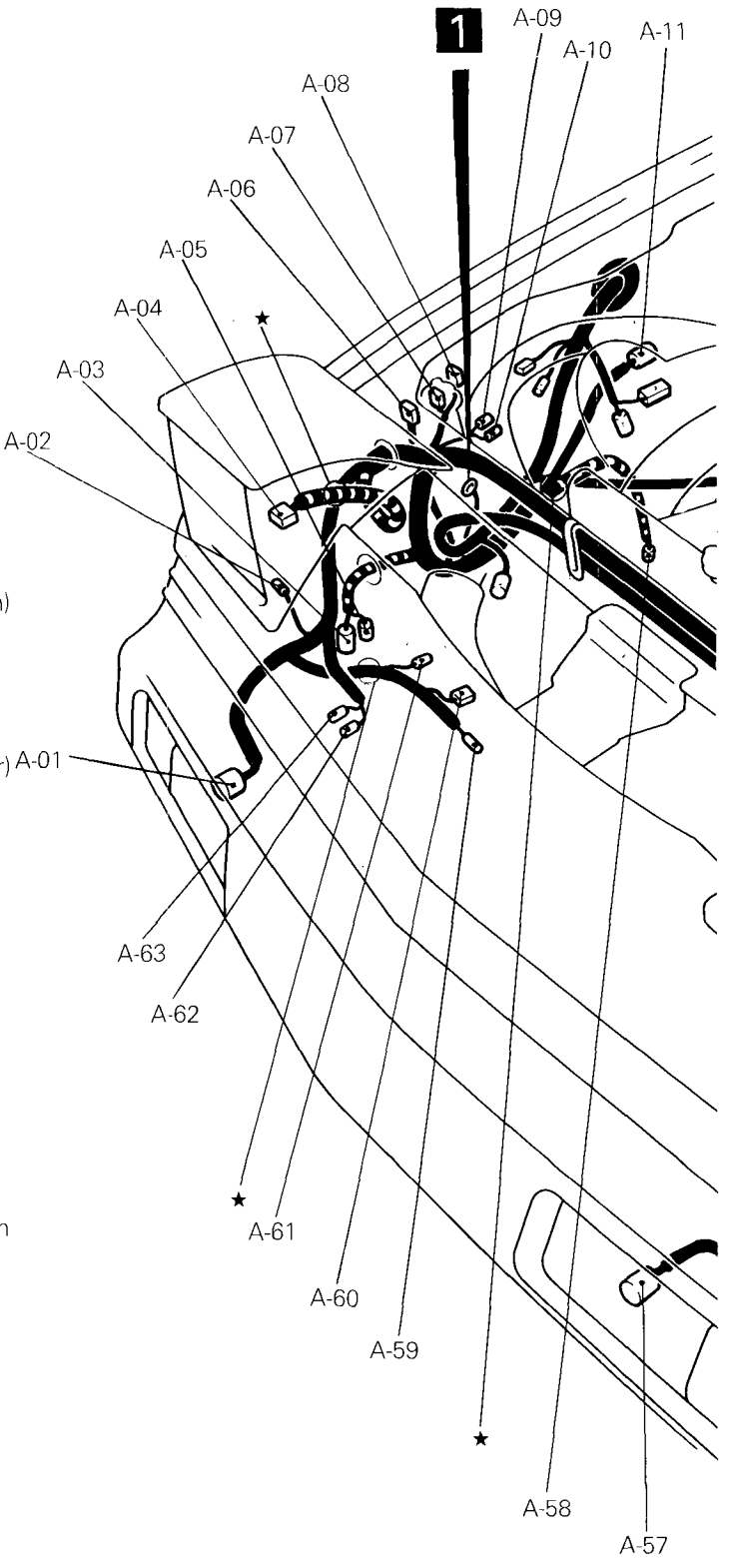


1-1 ENGINE COMPARTMENT

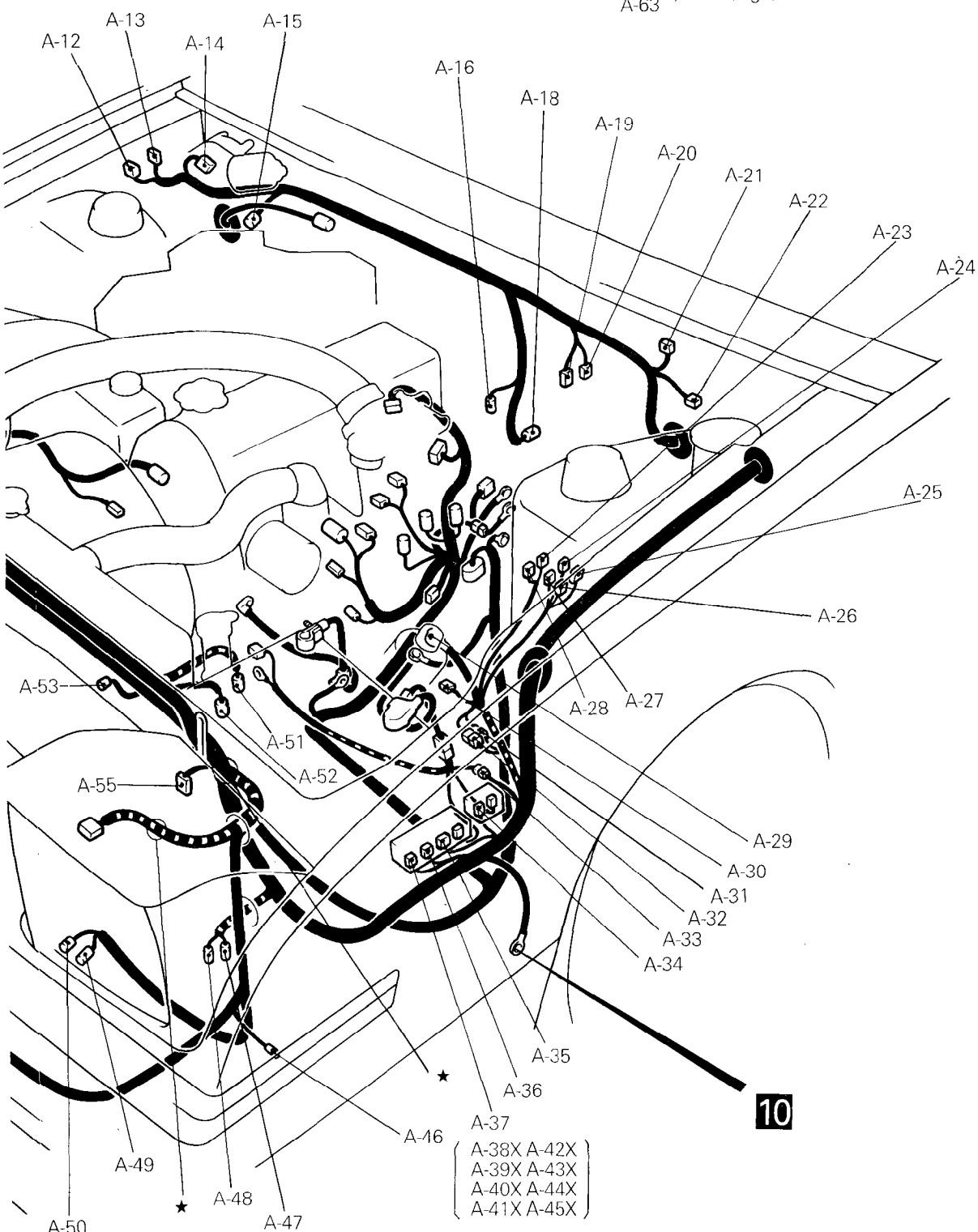
Connector symbol

A -01 ~ -63

A-01 Front combination light (R.H.)
A-02 Side marker light (R.H.)
A-03 Pop-up motor (R.H.)
A-04 Headlight (R.H.)
A-05 Pop-up motor (R.H.)
A-06 Fog light relay
A-07 Radiator fan motor relay No. 1
A-08 Radiator fan motor relay No. 2
A-09, A-10 } Theft alarm horn
A-11 Actuator
A-12 Vacuum pump relay
A-13 Vacuum switch
A-14 Front wiper motor
A-15 Modulator
A-16 Pulse generator (for rear brake lock-up control)
A-17 –
A-18 Back up light switch (vehicles with manual transmission)
A-19, A-20 } Automatic transmission
A-21 Passing relay
A-22 Brake fluid level sensor
A-23 Theft alarm horn relay
A-24 Condenser fan motor relay (vehicles with air conditioner)
A-25 Radiator fan A/C relay [2] (vehicles with air conditioner)
A-26 Magnet clutch relay (vehicles with air conditioner)
A-27 Radiator fan A/C relay [1] (vehicles with air conditioner)
A-28 Resistor
A-29, A-30 } Ignition coil
A-31, A-32 } Front harness and control harness combination
A-33 Front harness and alternator harness combination
A-34 Fusible link box
A-35, A-36, A-37 } Relay box
A-38X Pop-up motor relay (L.H.)
A-39X Tail light relay
A-40X Starter inhibitor relay
A-41X Power window relay
A-42X Defogger relay
A-43X Wiper relay
A-44X Headlight relay
A-45X Pop-up motor relay (R.H.)
A-46X Side marker light (L.H.)
} Refer to centralized junction
A-47, A-48 } Pop-up motor (L.H.)
A-49, A-50 } Horn (low)
A-51 Radiator fan motor No. 2
A-52 Vacuum pump
A-53 Hood switch
A-54 –
A-55 Front washer motor



A-56 Headlight (L.H.)
A-57 Front combination light (L.H.)
A-58 Radiator fan motor No. 1
A-59 Condenser fan motor (vehicles with air conditioner)
A-60 Dual pressure switch
A-61 Pressure switch (vehicles with air conditioner)
A-62, A-63 } Horn (high)



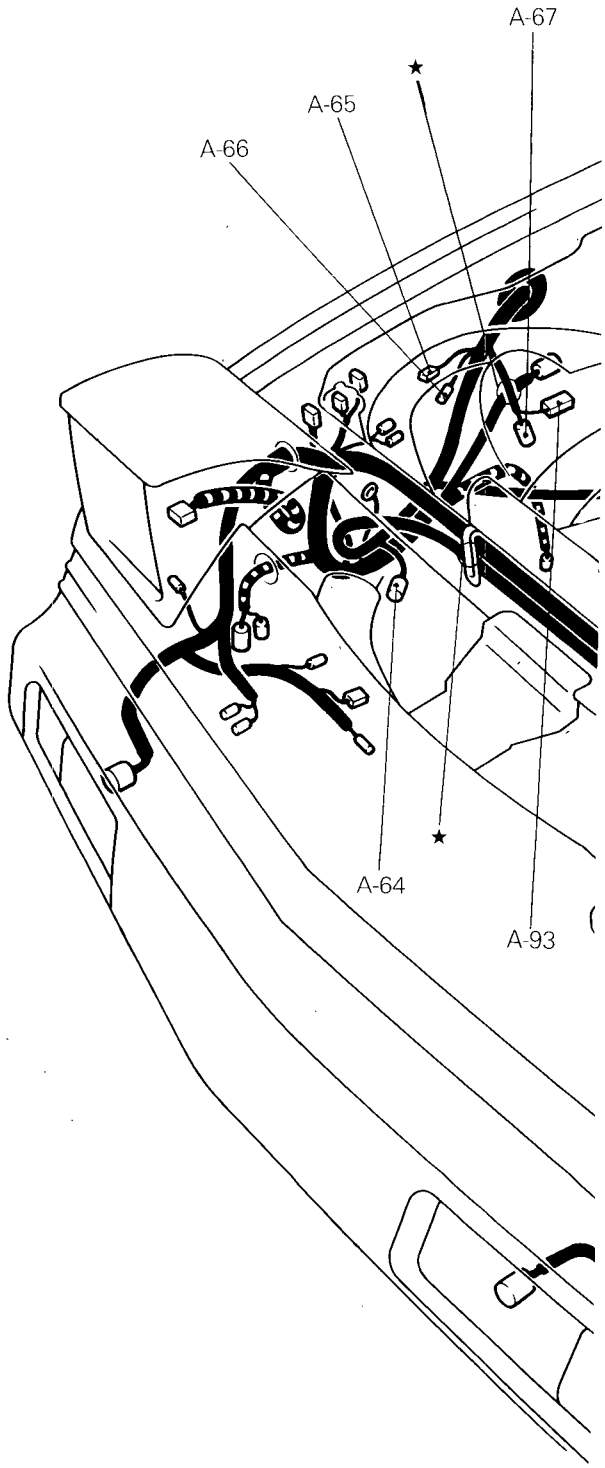
Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details of grounding points (ex.: 1), refer to page 8-10.
(3) "–" means that the connector with corresponding code-number is not used.

1-2 ENGINE COMPARTMENT

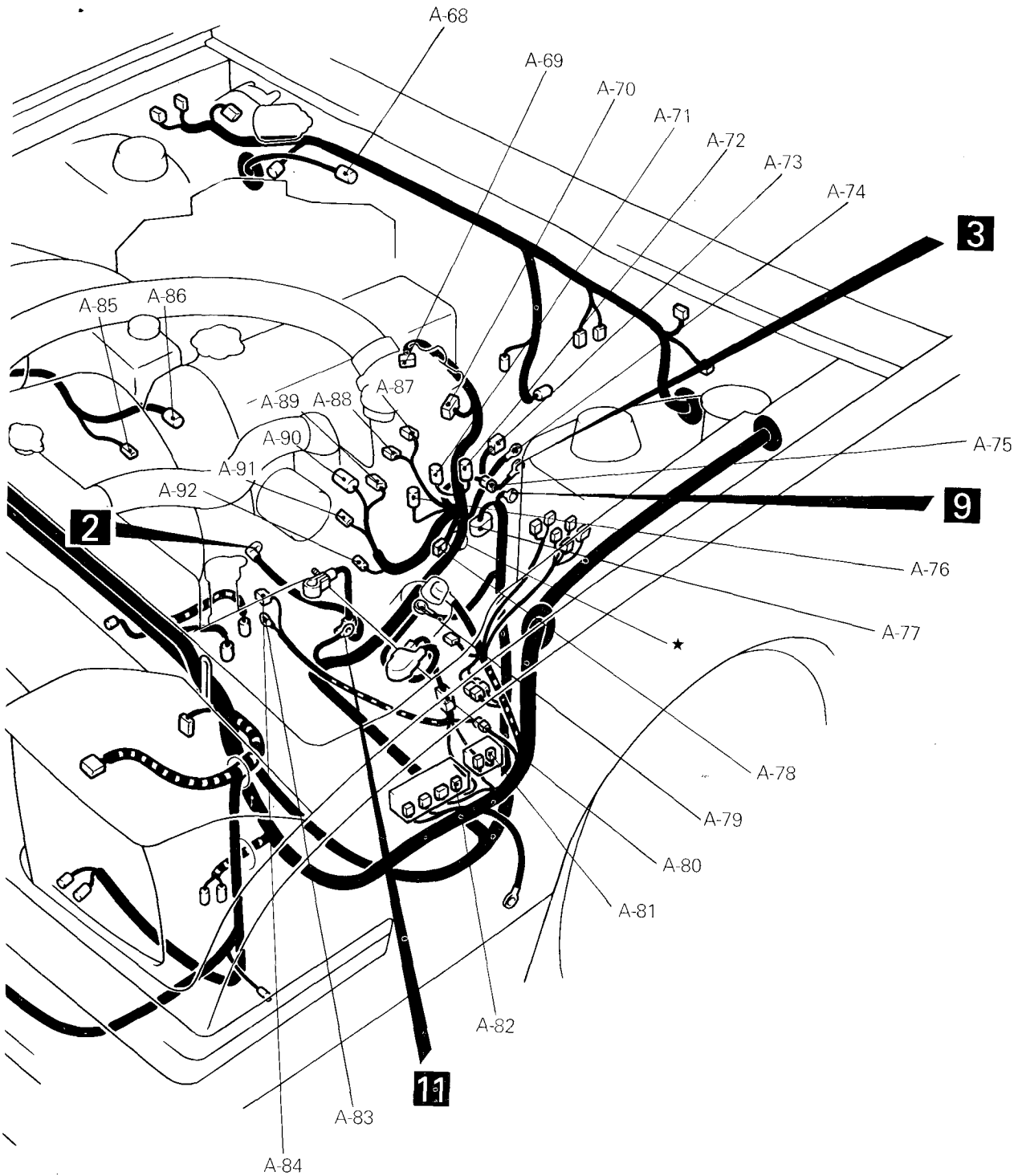
Connector symbol

A -64 ~ -93

A-64 Resistor
A-65 Fuel pump check connector
A-66 Ignition timing adjusting terminal
A-67 Air-flow sensor
A-68 Oxygen sensor
A-69 Injector (large)
A-70 Injector (small)
A-71 Motor position sensor
A-72 Idle speed control servo
A-73, A-74 } Starter motor
A-75 Ground
A-76 Throttle position sensor
A-77 Electronic spark control igniter
A-78 Magnet clutch
A-79 Ignition coil
A-80 Main fusible link
A-81 Fusible link box
A-82 Relay box
A-83, A-84 } Alternator
A-85 Oil pressure gauge unit
A-86 Detonation sensor
A-87 Secondary air control solenoid valve
A-88 EGR control solenoid valve
A-89 Engine coolant temperature switch
A-90 Engine coolant temperature sensor
A-91 Engine coolant temperature gauge unit
A-92 Distributor signal generator
A-93 Waste gate solenoid valve



Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details of grounding points (ex.: 2), refer to page 8-10.

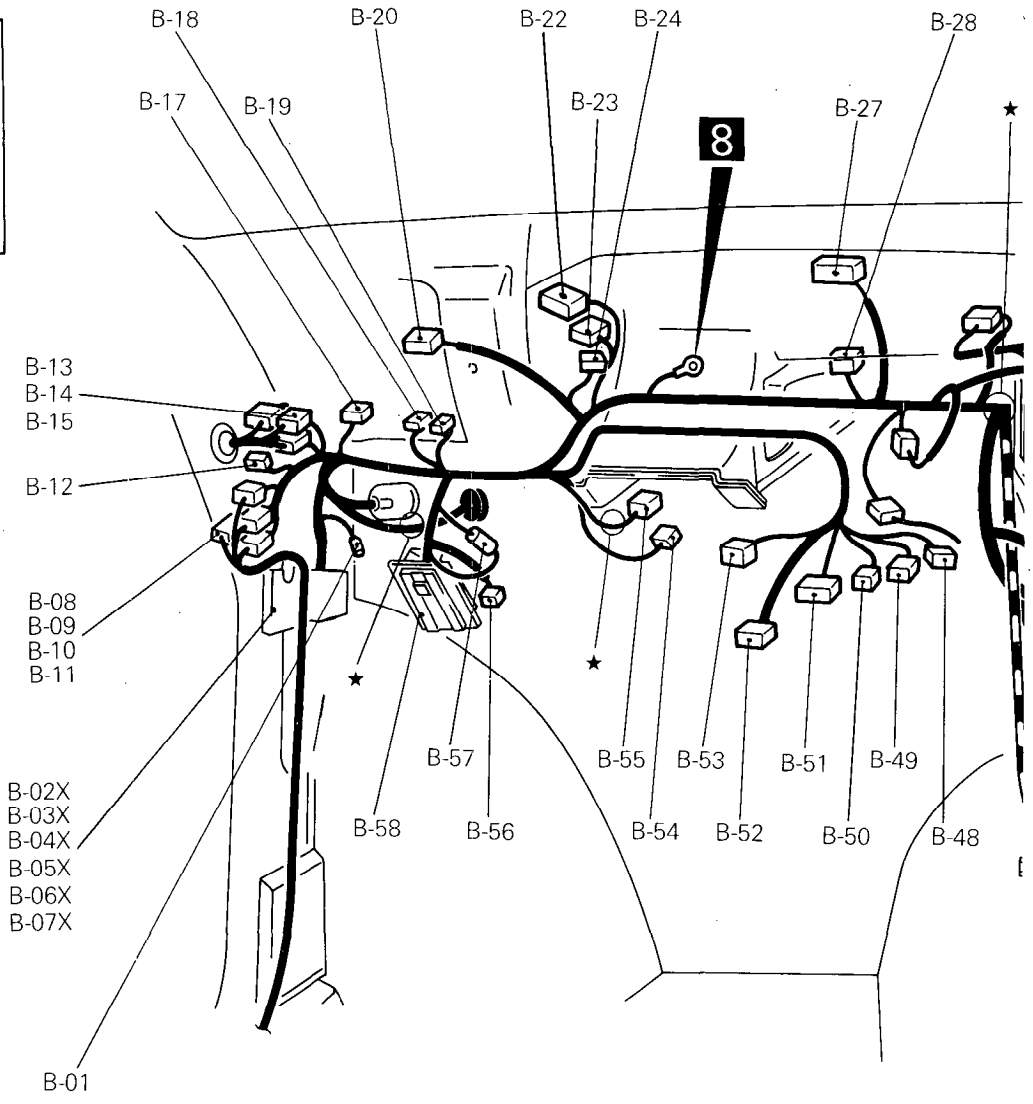

A-68
A-69
A-70
A-71
A-72
A-73
A-74
3
A-85
A-86
A-89
A-88
A-87
A-90
A-91
A-92
A-75
9
2
A-76
A-77
A-78
A-79
A-80
A-81
A-82
11
A-83
A-84

36Y565

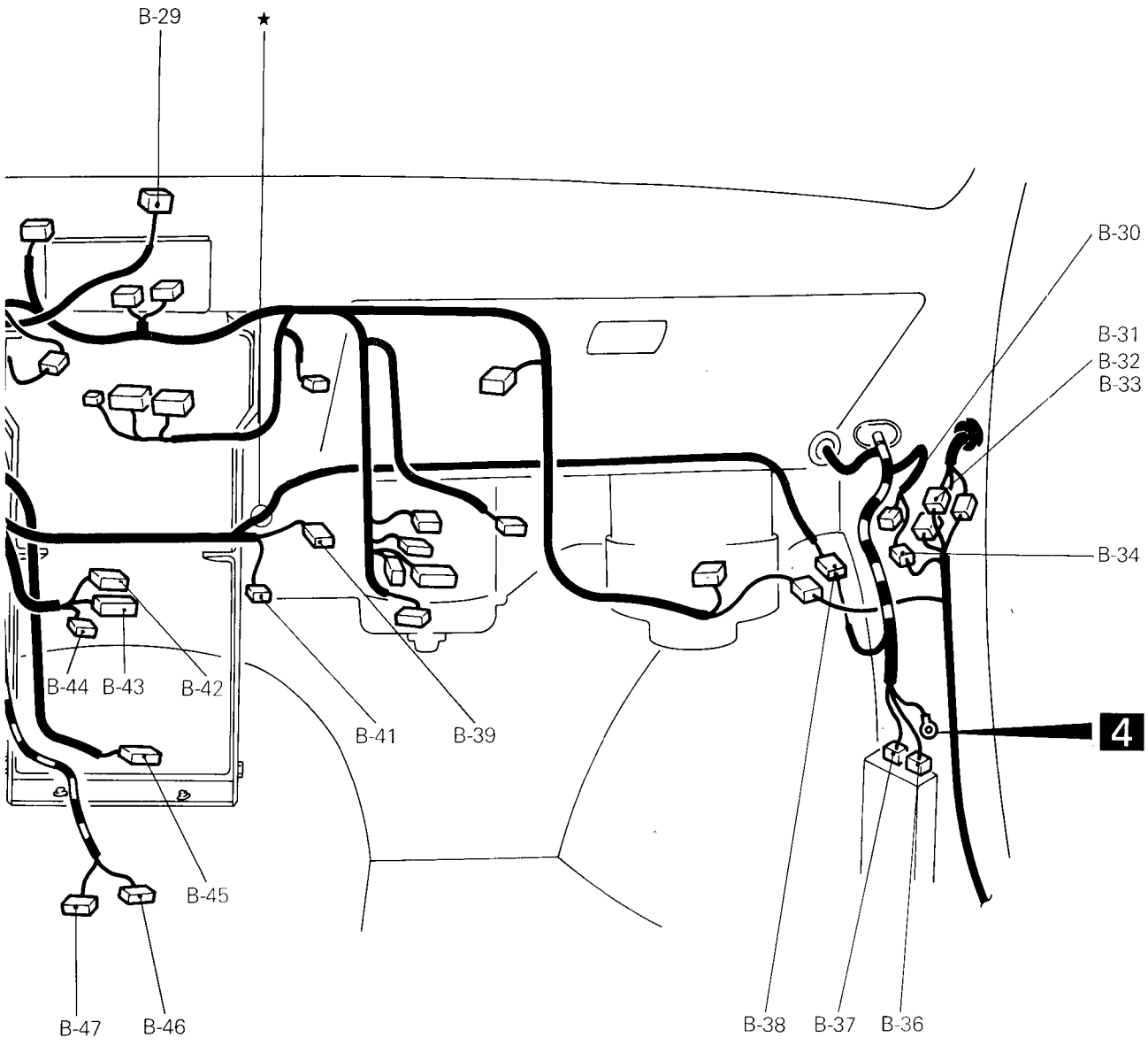
2-1 DASH PANEL

Connector symbol

B -01 ~ -58



B-01 Circuit breaker (for automatic seat belt)
B-02X Turn signal flasher unit
B-03X Hazard flasher unit
B-04X Rear brake lock-up control relay
B-05X Door unlock relay
B-06X Door lock relay
B-07X Overdrive relay
} Refer to centralized junction
B-08
B-09
B-10
B-11
} Front harness and rear harness combination
B-12 Resistor
B-13
B-14
B-15
} Front harness and door harness combination
B-16 –
B-17
B-18
B-19
} Diode
B-20 Cluster switch (L.H.)
B-21 –
B-22
B-23
} Combination meter
B-24 Diode
B-25
B-26
} –
B-27 Cluster switch (R.H.)
B-28 Diode
B-29 Clock
B-30 ECI control relay
B-31
B-32
B-33
} Rear harness and door harness combination
B-34 Rear harness and control harness combination
B-35 –
B-36
B-37
} ECI control unit
B-38 Front harness and control harness combination
B-39 Passing control relay
B-40 –
B-41 Buzzer
B-42
B-43
B-44
} Radio



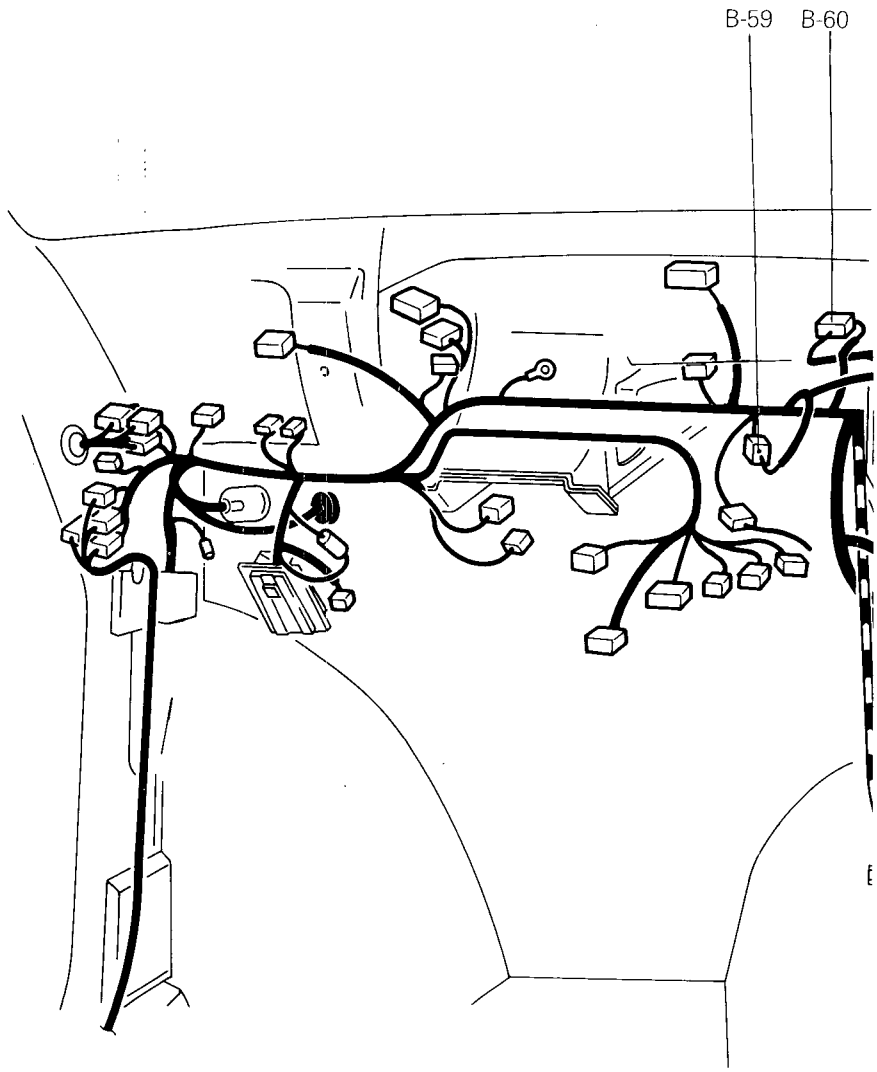
B-45 Automatic seat belt control unit
B-46 Overdrive switch
B-47 Overdrive switch illumination light
B-48 Ignition switch
B-49 Light monitor and key remind switch
B-50 Radio remote control switch
B-51 Column switch
B-52 Kickdown switch (Vehicles with automatic transmission)
B-53 Speed control switch
B-54 Stop light switch
B-55 Clutch switch (Vehicles with manual transmission)
B-56 Cancel switch
B-57 Dedicated fuse (for heated remote controlled mirror)
B-58 Fuse box

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details of grounding points (ex.: 8), refer to page 8-10.
(3) "–" means that the connector with corresponding code-number is not used.

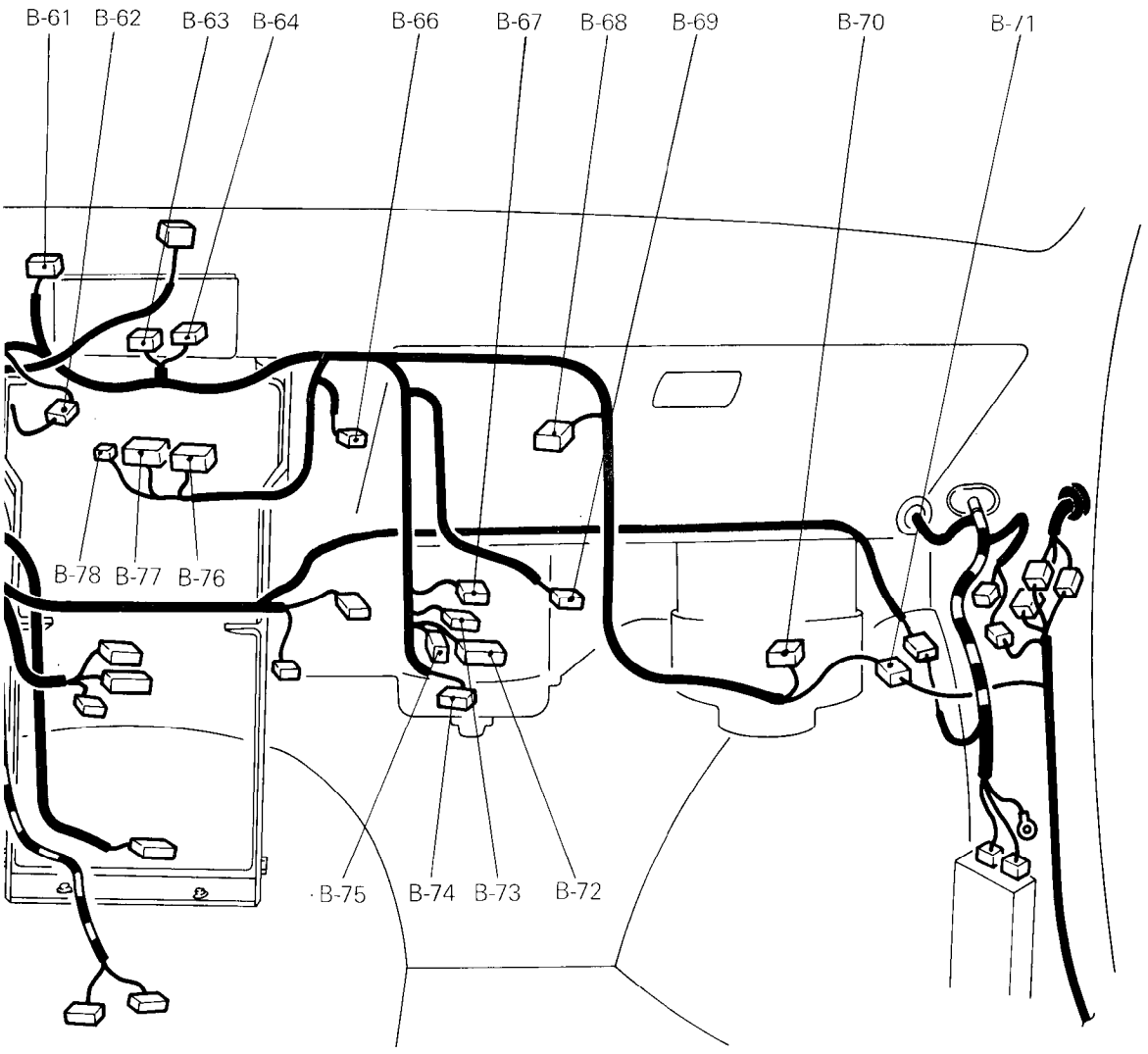
2-2 DASH PANEL

Connector symbol

B -59 ~ -78

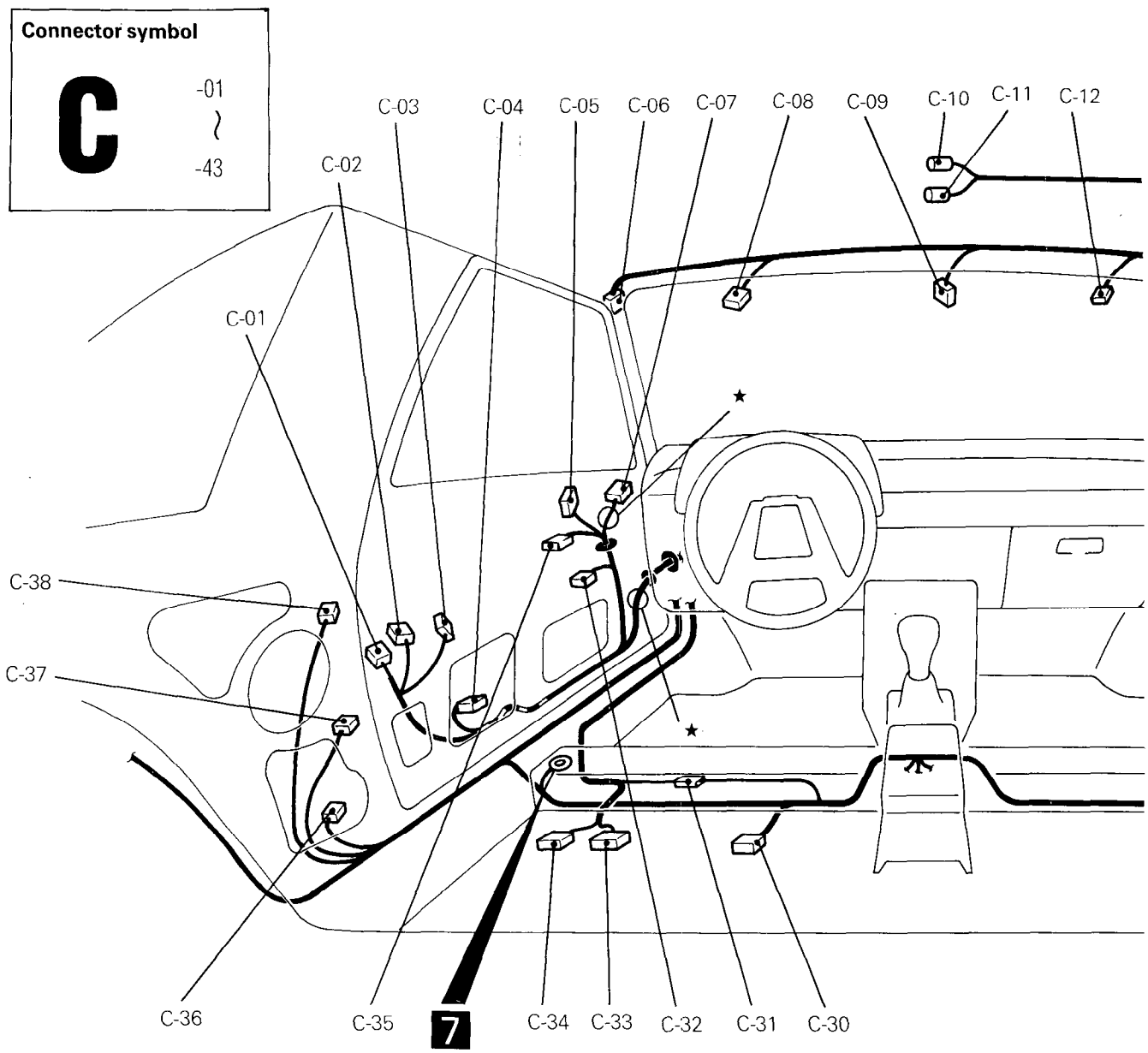


B-59 Blower relay of front harness and air conditioner harness combination
B-60 Heater switch or front harness and air conditioner harness combination
B-61 Photo sensor
B-62 Heater control panel illumination light or front harness and air conditioner harness combination
B-63, B-64 } Servo motor
B-65 –
B-66 Vacuum solenoid valve
B-67 Blower motor starter cutout relay
B-68 Vacuum solenoid valve
B-69 Foot area temperature sensor
B-70 Power transistor
B-71 No connection or air conditioner harness and rear harness combination
B-72 Light controller
B-73 Blower motor high speed relay
B-74 Air-flow sensor
B-75 Automatic air conditioner self-diagnosis connector
B-76, B-77, B-78 } Automatic air conditioner control unit

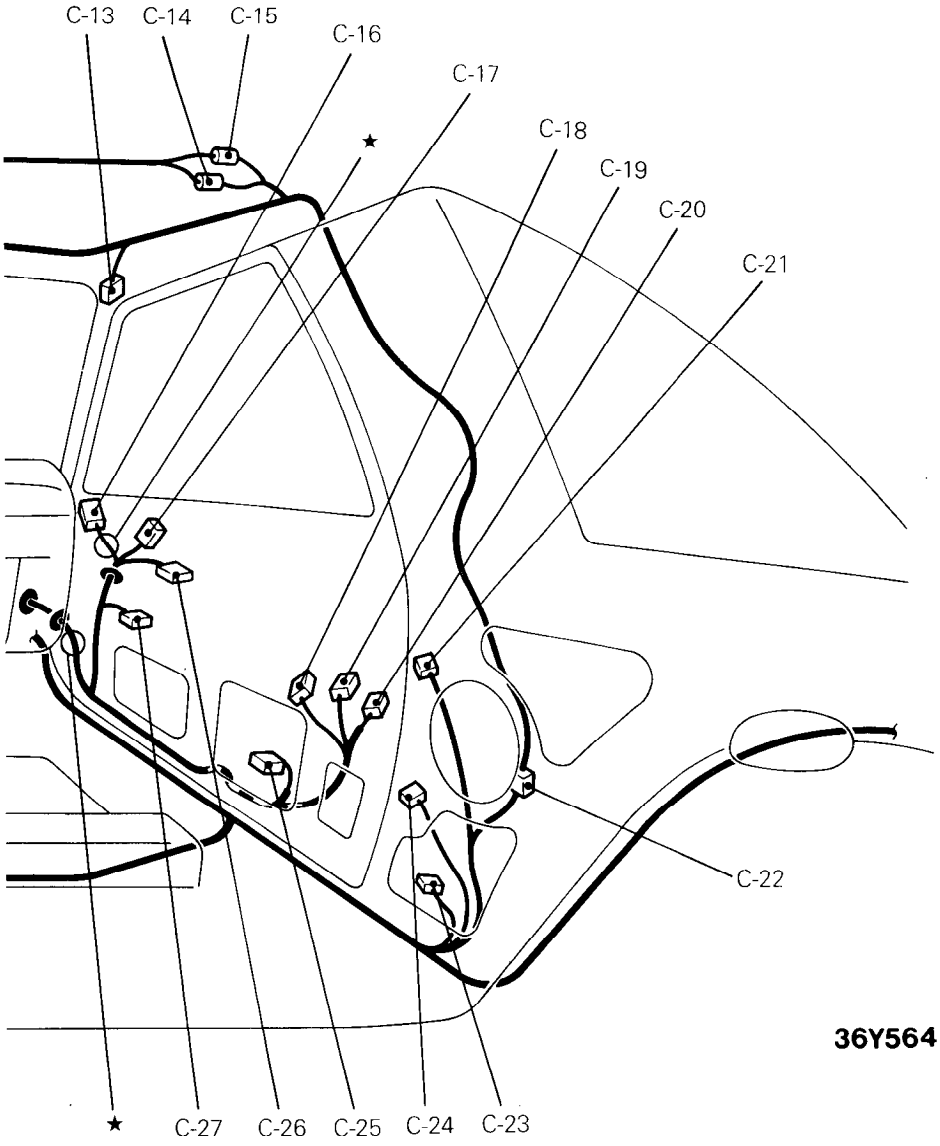


Remark
"–" means that the connector with corresponding code-number is not used.

3 INTERIOR

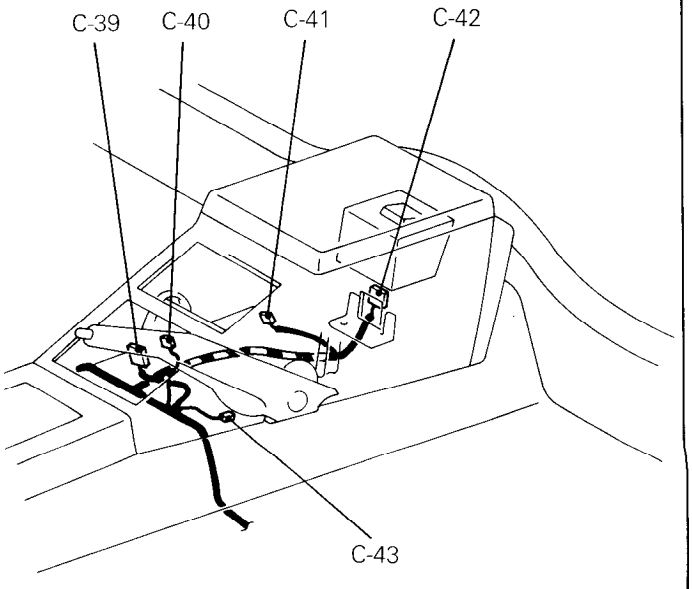


C-01 Door lock actuator (L.H.)
C-02 Door lock switch (L.H.)
C-03 Door key cylinder unlock switch (L.H.)
C-04 Door light (L.H.)
C-05 Power window switch (L.H.)
C-06 Release switch (L.H.)
C-07 Remote-controlled mirror (L.H.)
C-08 Vanity mirror light (L.H.)
C-09 Dome light
C-10, C-11 } Interior temperature sensor
C-12 Vanity mirror light (R.H.)
C-13 Release switch (R.H.)
C-14, C-15 } Joint harness and roof harness combination
C-16 Remote-controlled mirror (R.H.)
C-17 Power window switch (R.H.)
C-18 Door key cylinder unlock switch (R.H.)
C-19 Door lock switch (R.H.)
C-20 Door lock actuator (R.H.)
C-21 Fasten switch (R.H.)
C-22 Roof harness and rear harness combination
C-23 Door switch (R.H.)
C-24 Motor (R.H.)
C-25 Door light (R.H.)
C-26 Door speaker (R.H.)
C-27 Power window motor (R.H.)
C-28, C-29 } –
C-30 Buckle switch
C-31 Front harness and rear harness combination
C-32 Power window motor (L.H.)
C-33, C-34 } TAC unit
C-35 Door speaker (L.H.)
C-36 Door switch (L.H.)
C-37 Motor (L.H.)
C-38 Fasten switch (L.H.)
C-39 Remote-controlled mirror switch
C-40 Spool release indicator light



36Y564

C-41 Spool release lever switch
C-42 Ashtray illumination light
C-43 Parking brake switch



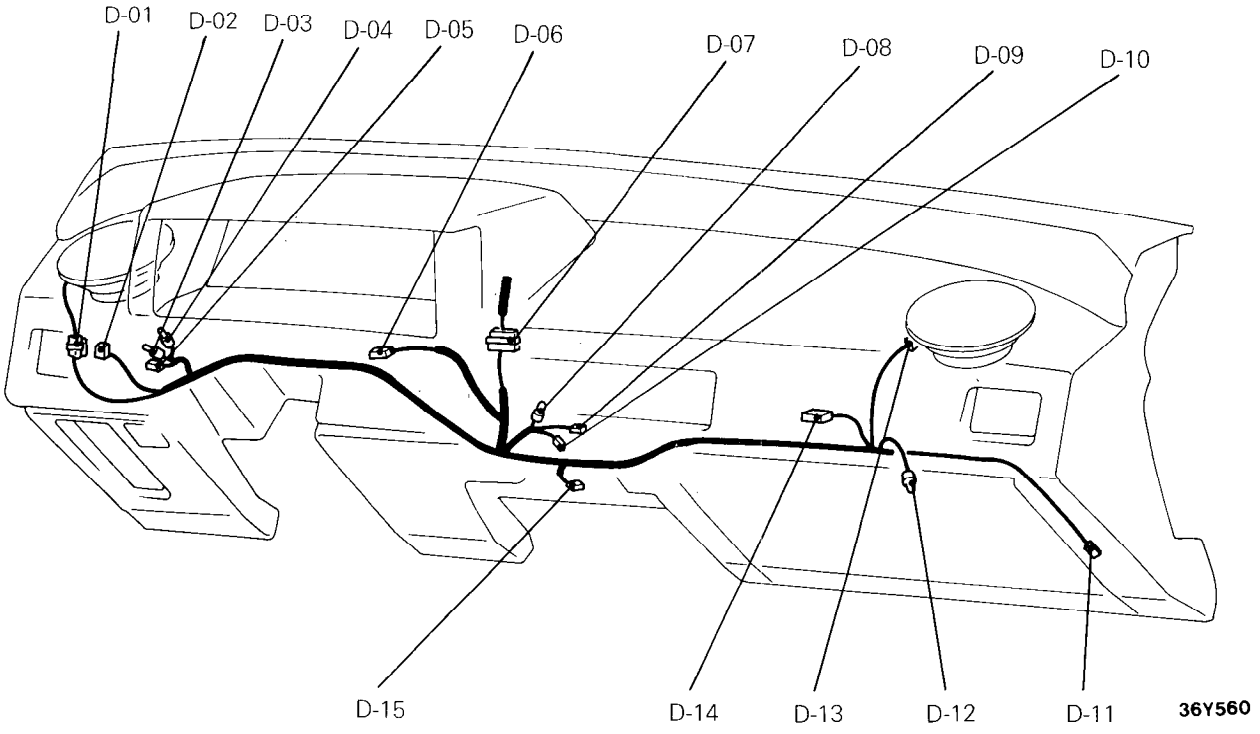
Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details of grounding points (ex.: 7), refer to page 8-10.

36Y562

4 INSTRUMENT PANEL

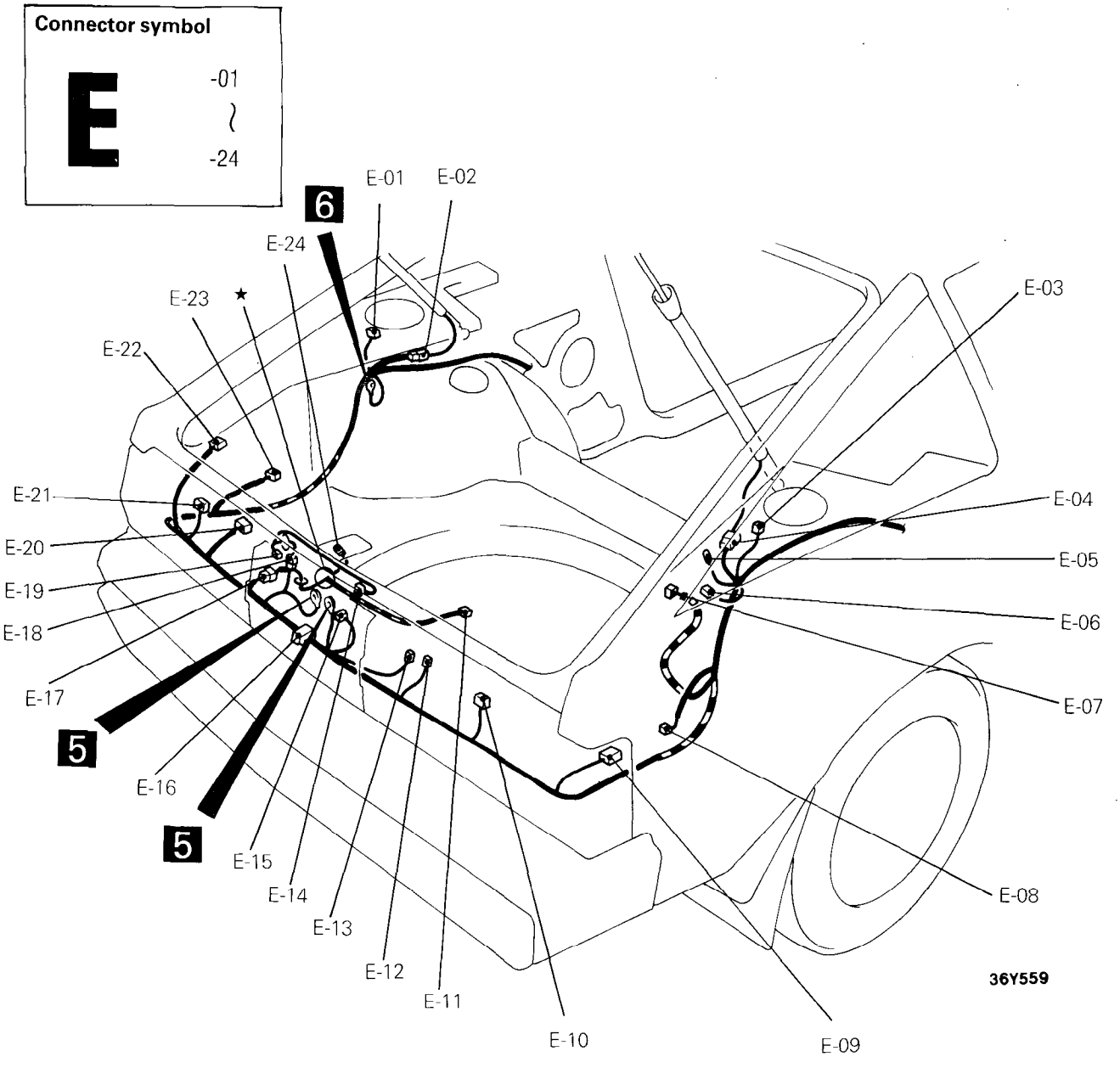
Connector symbol

D -01 ~ -15



D-01 Front speaker (L.H.)
D-02 Dimmer control switch
D-03, D-04, D-05 } Defogger switch
D-06 Rear wiper and washer switch
D-07 Front harness and glove box harness combination
D-08, D-09, D-10 } Cigarette lighter
D-11 Glove box switch
D-12 Glove box illumination light
D-13 Front speaker (R.H.)
D-14 Self-diagnosis connector
D-15 Ashtray illumination light

5 LUGGAGE COMPARTMENT



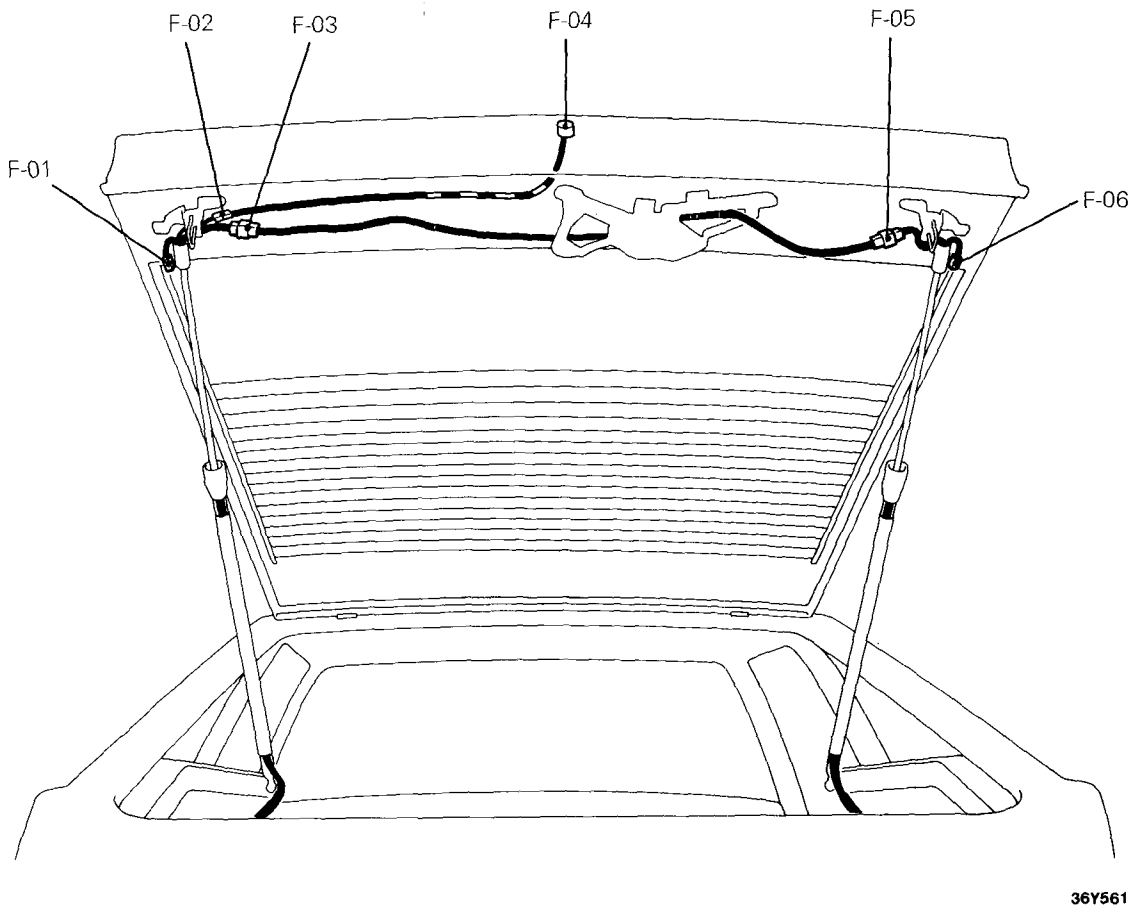
E-01 Rear speaker (L.H.)
E-02 Rear harness and stay switch (L.H.) combination
E-03 Rear speaker (R.H.)
E-04 Rear harness and stay switch (R.H.) combination
E-05 Condenser
E-06 Luggage compartment light
E-07 G sensor
E-08 Rear washer motor
E-09 Rear brake lock-up control unit
E-10 Rear combination light (R.H.)
E-11 Fuel gauge unit
E-12 Rear hatch switch
E-13 Rear hatch key cylinder unlock switch
E-14 License plate light (R.H.)
E-15 Rear intermittent wiper relay
E-16 Joint connector
E-17 Rear harness and fuel gauge unit harness combination
E-18 Rear harness and license plate light harness combination
E-19 License plate light (L.H.)
E-20 Motor antenna relay
E-21 Rear combination light (L.H.)
E-22 Motor antenna
E-23 Speed control unit
E-24 Fuel pump

Remarks
(1) The mark ★ shows the standard mounting position of wiring harness.
(2) For details of grounding points (ex.: 6), refer to page 8-10.

6 REAR HATCH

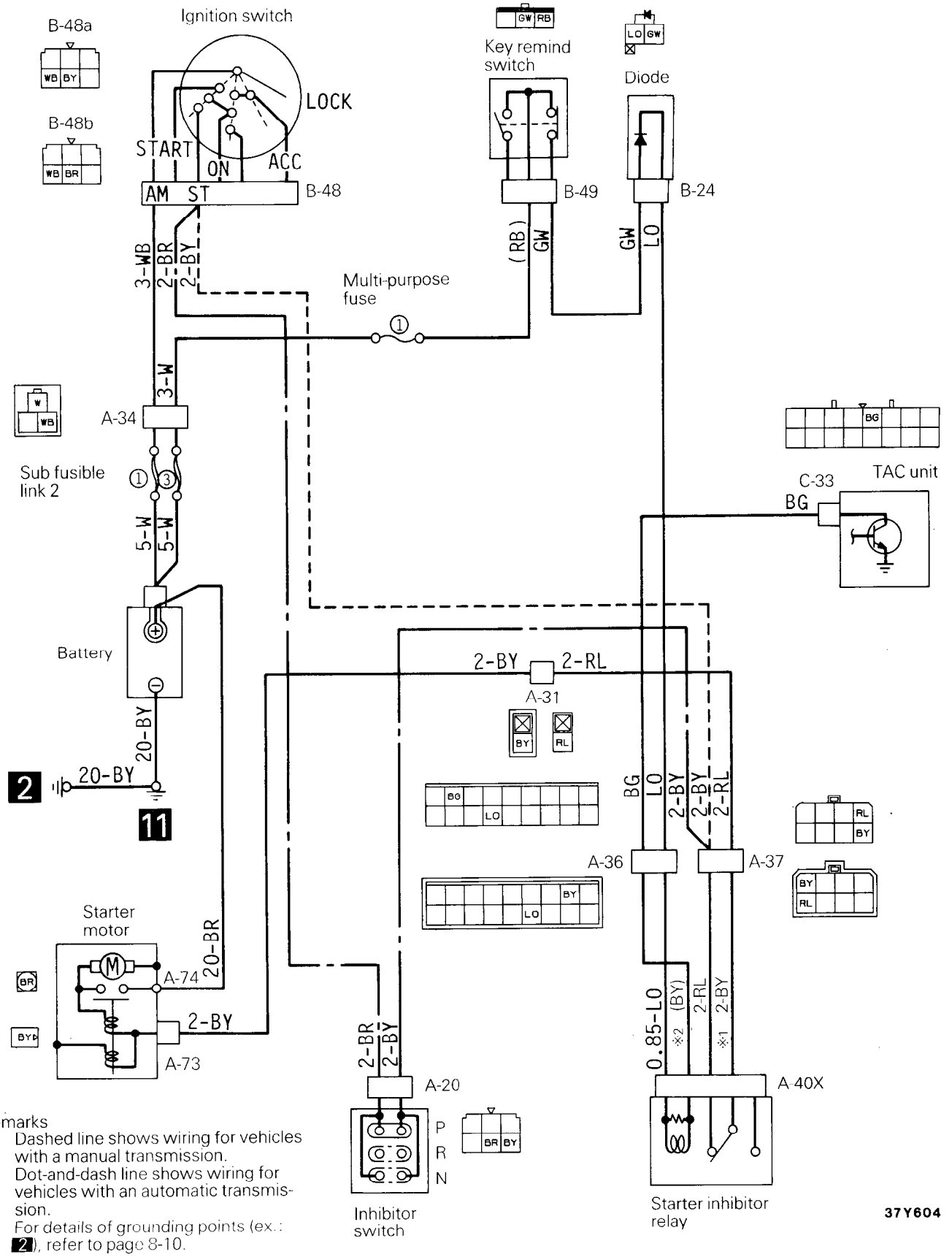
Connector symbol

F -01 ~ -06



F-01 Stay switch (L.H.) and rear window defogger combination
F-02 Stay switch (L.H.) and high mounted stop light harness combination
F-03 Stay switch (L.H.) and rear wiper motor combination
F-04 High mounted stop light
F-05 Stay switch (R.H.) and rear wiper motor combination
F-06 Stay switch (R.H.) and rear window defogger combination

1 STARTING CIRCUIT

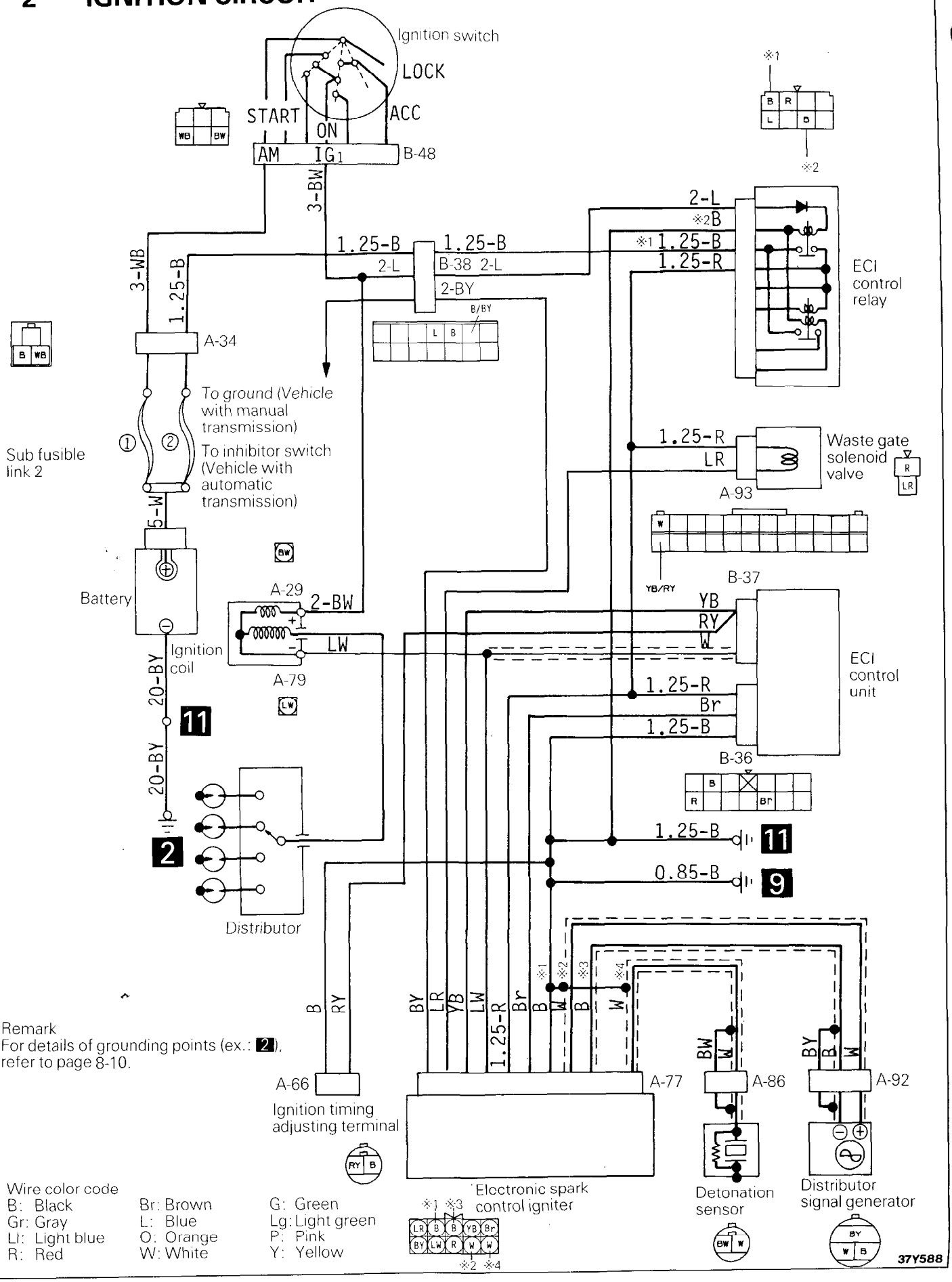


Remarks
(1) Dashed line shows wiring for vehicles with a manual transmission.
(2) Dot-and-dash line shows wiring for vehicles with an automatic transmission.
(3) For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

2 IGNITION CIRCUIT

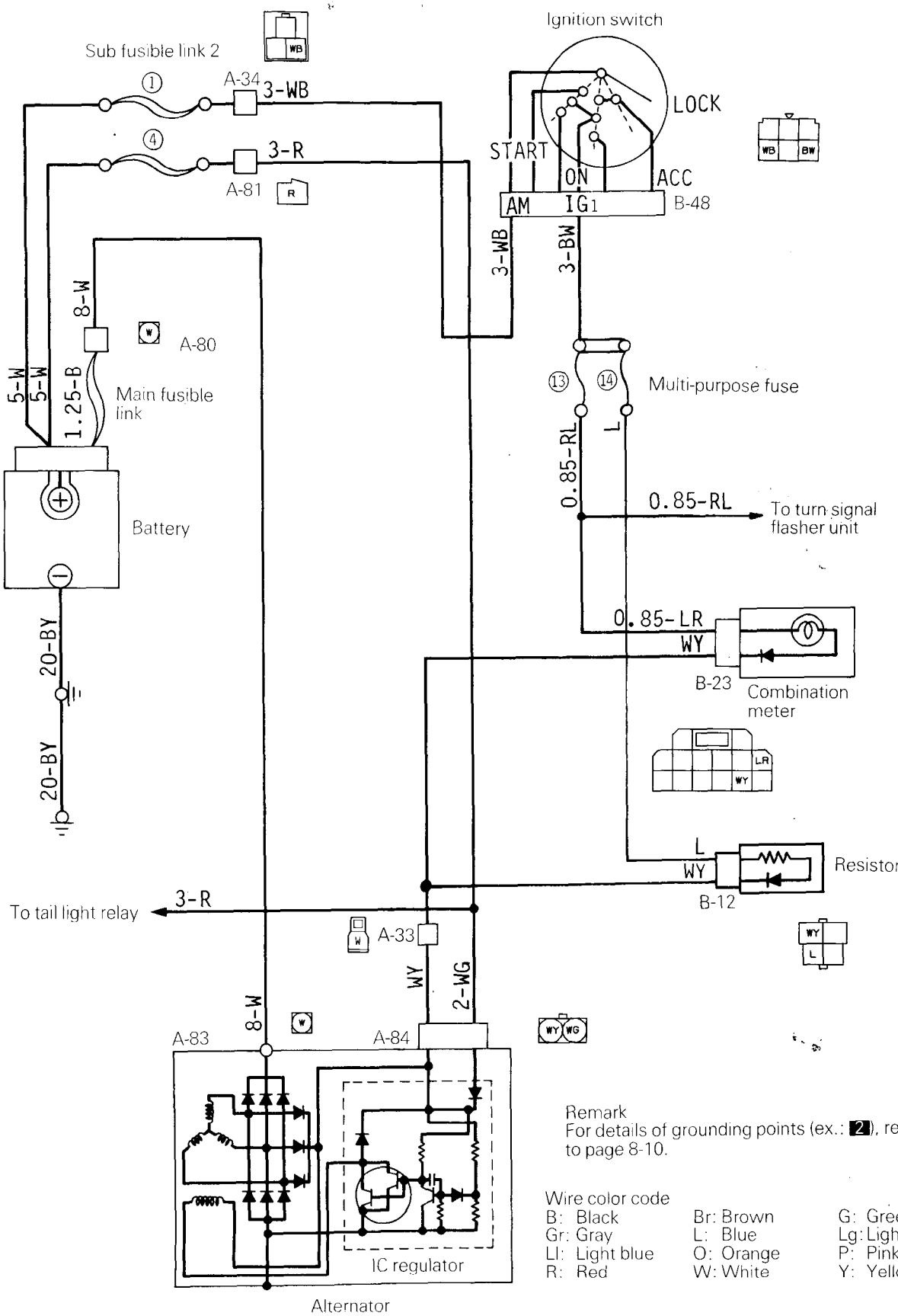


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

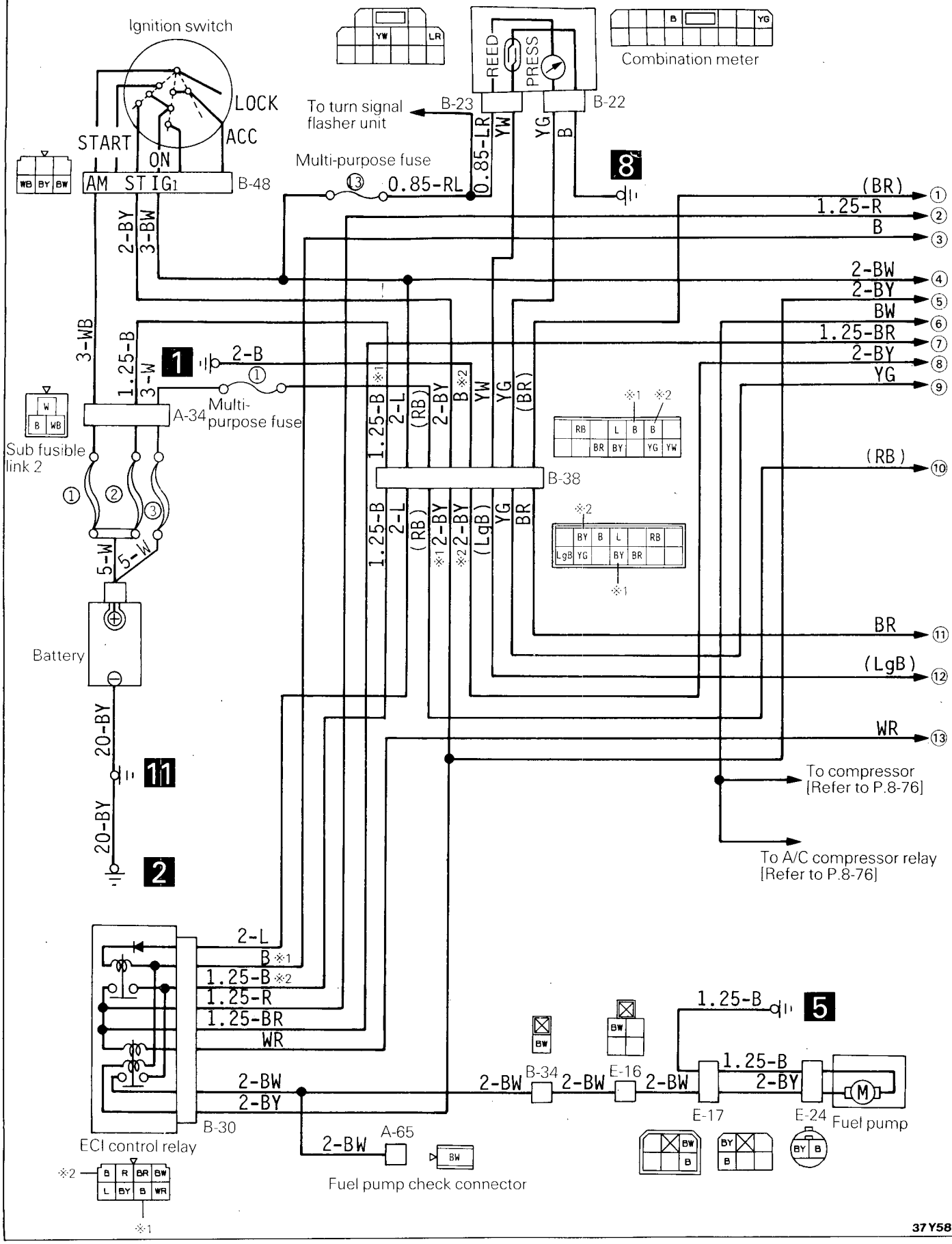
B: Black	Br: Brown	G: Green
Gr: Gray	L: Blue	Lg: Light green
Lt: Light blue	O: Orange	P: Pink
R: Red	W: White	Y: Yellow

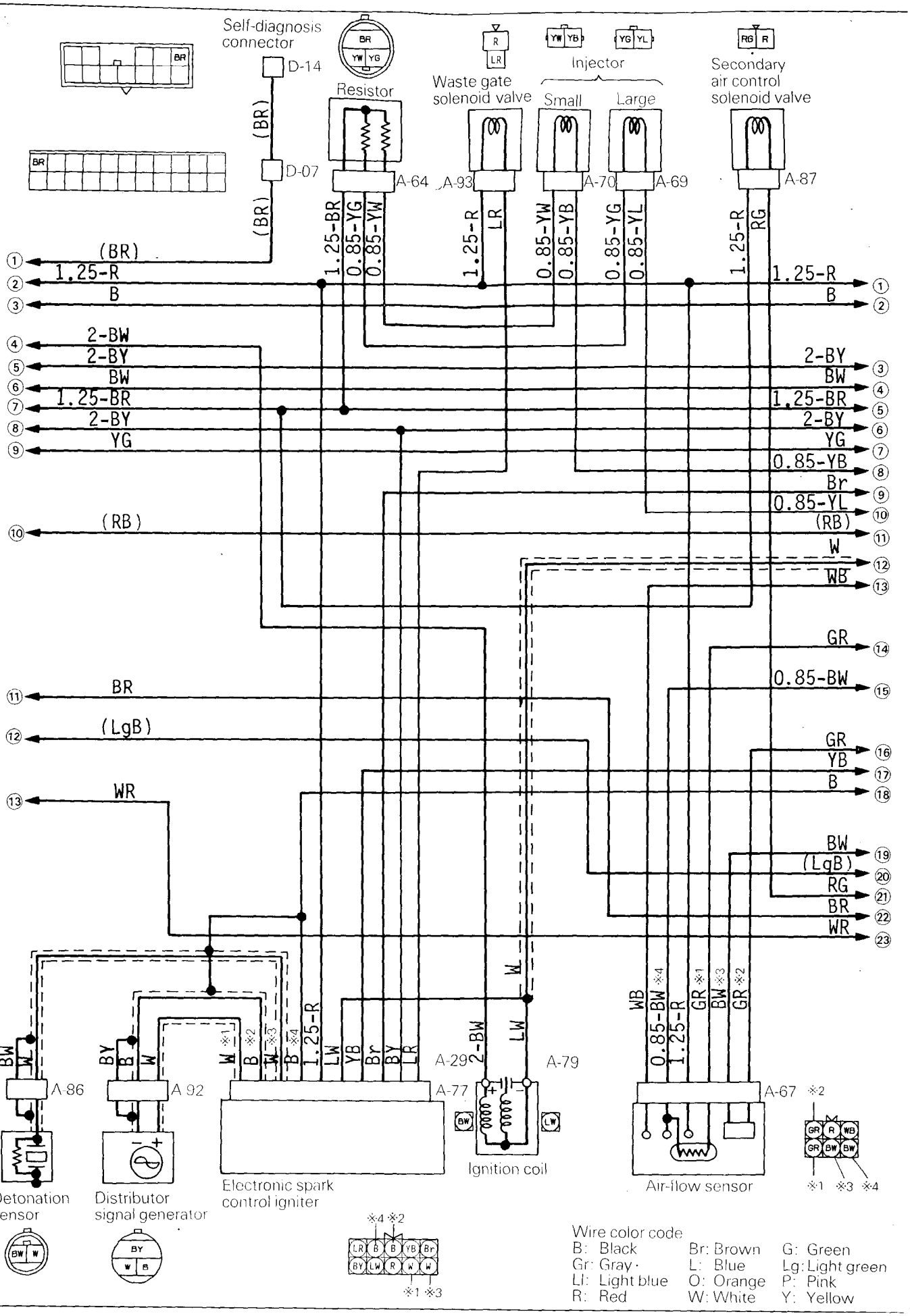
3 CHARGING CIRCUIT



37Y602

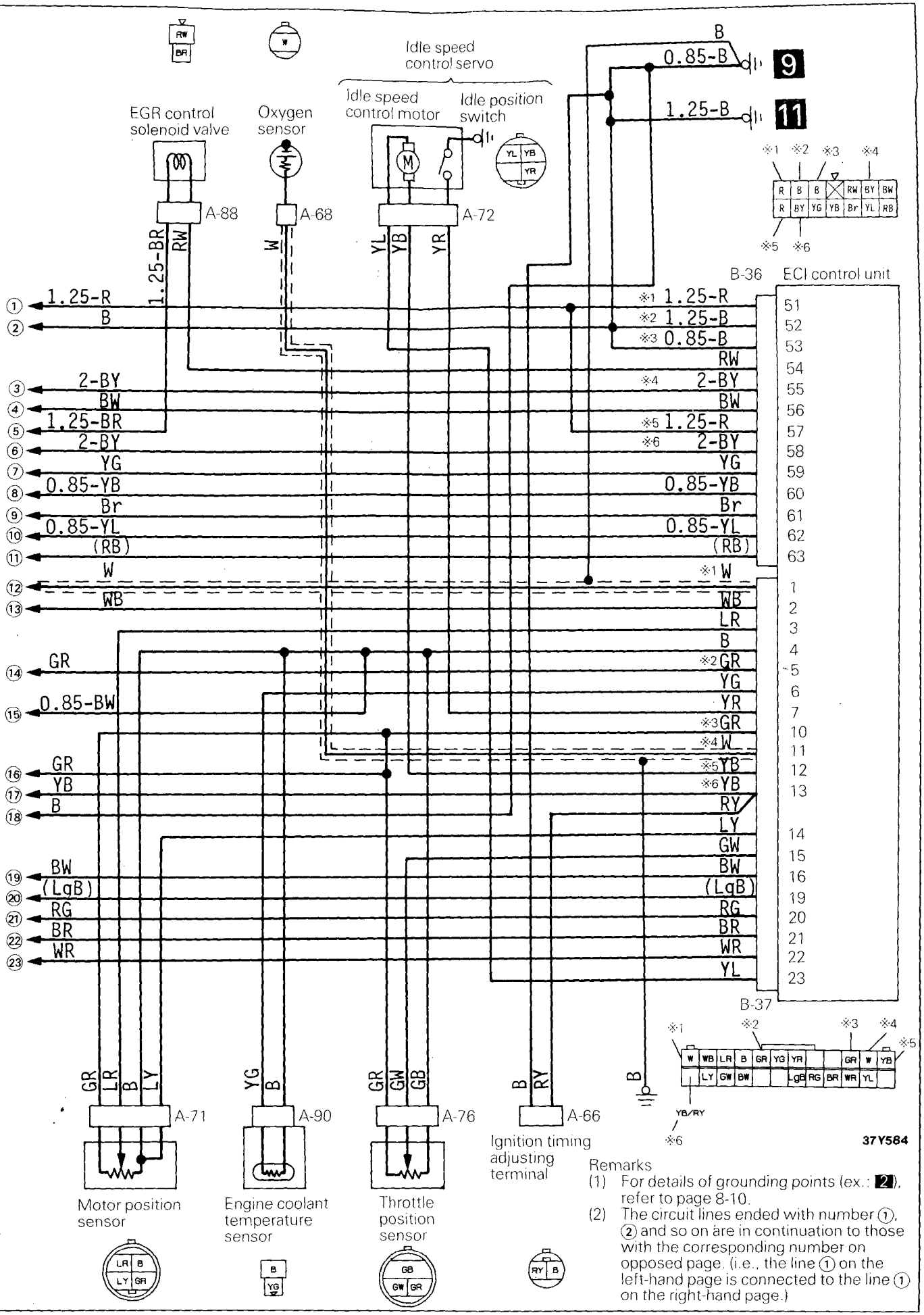
4-1 ECI SYSTEM CIRCUIT (Vehicles with Manual Transmission)





Wire color code

B: Black	Br: Brown	G: Green	
Gr: Gray	L: Blue	Lg: Light green	
Ll: Light blue	O: Orange	P: Pink	
R: Red	W: White	Y: Yellow	

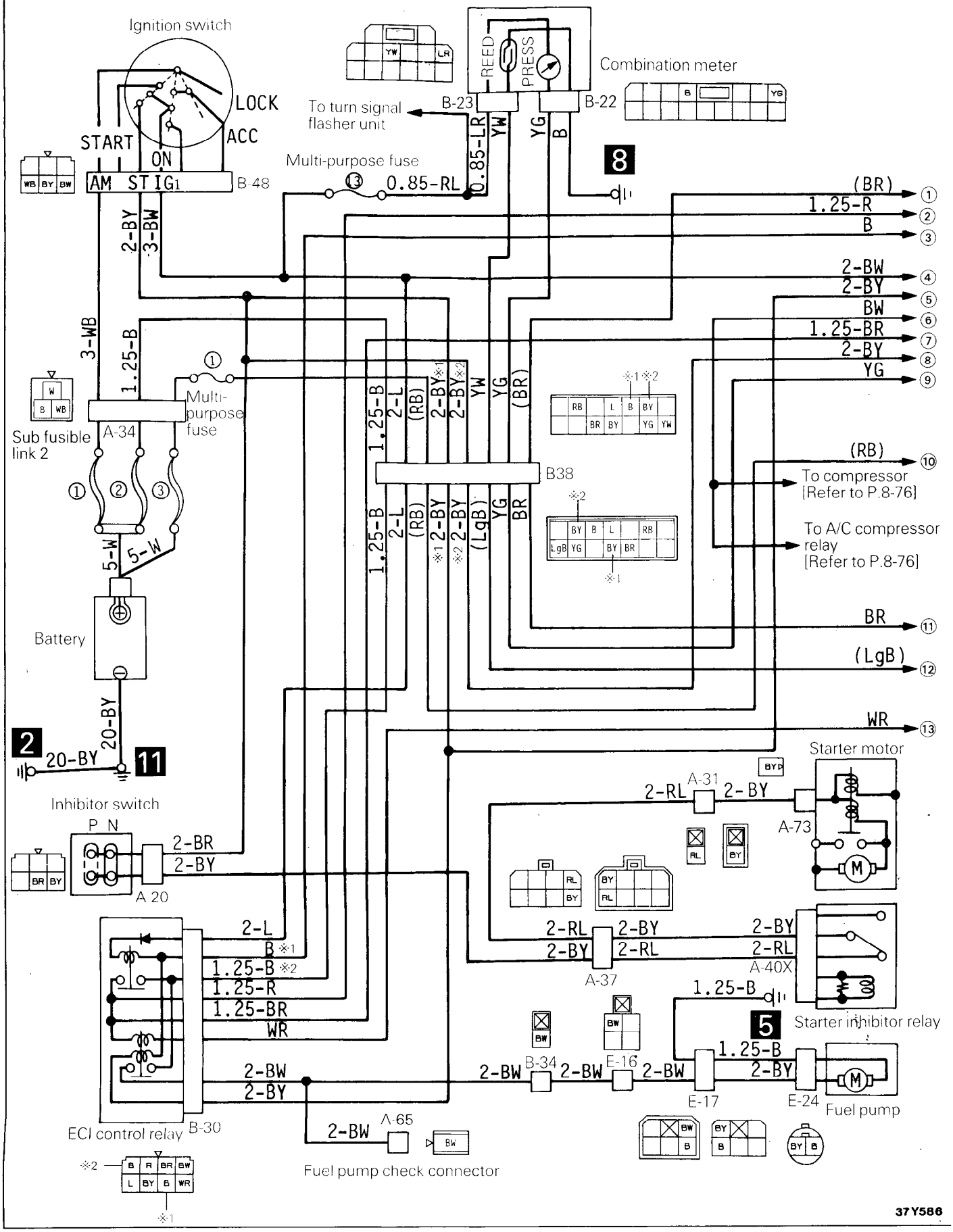


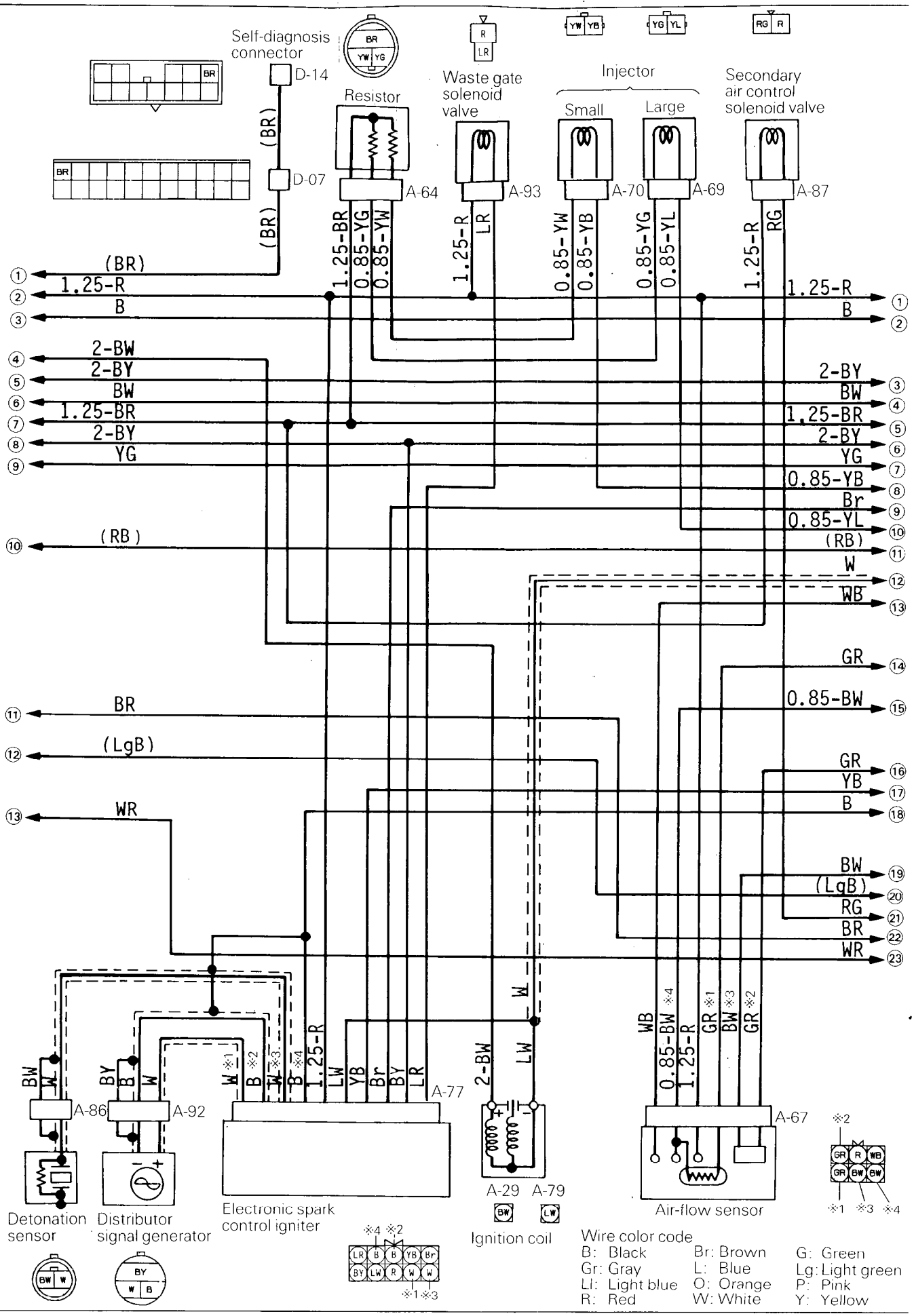
Remarks

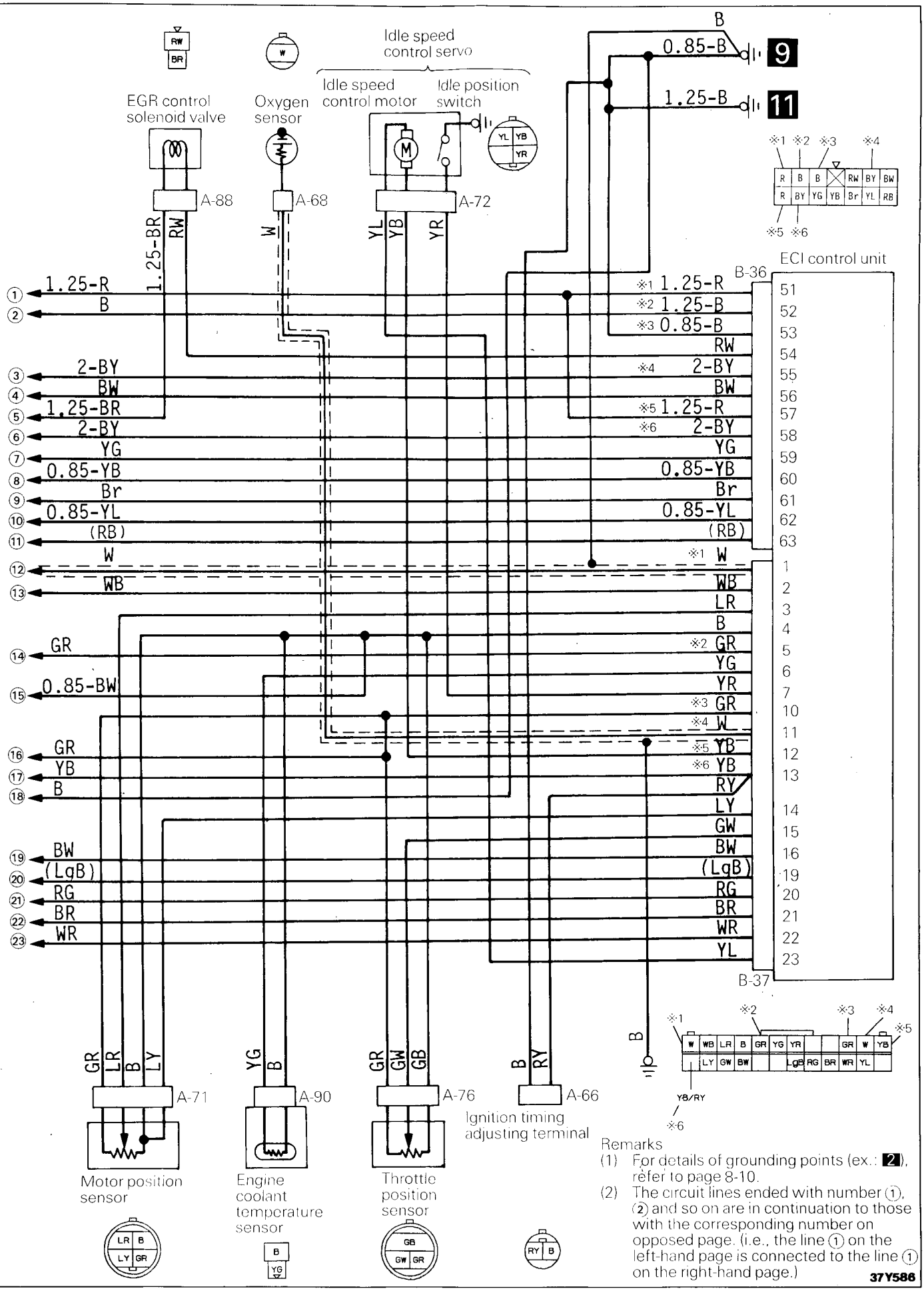
(1) For details of grounding points (ex.: 2), refer to page 8-10.

(2) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

4-2 ECI SYSTEM CIRCUIT (Vehicles with Automatic Transmission)




Self-diagnosis connector
D-14
D-07
Resistor
Waste gate solenoid valve
Injector
Small
Large
Secondary air control solenoid valve
A-64
A-93
A-70
A-69
A-87
A-86
A-92
A-77
A-67
A-29
A-79
Detonation sensor
Distributor signal generator
Electronic spark control igniter
Ignition coil
Air-flow sensor
(BR)
1.25-R
B
2-BW
2-BY
BW
1.25-BR
YG
(RB)
BR
(LgB)
WR
0.85-YB
Br
0.85-YL
W
WB
GR
0.85-BW
YB
BW
RG
Wire color code
B: Black
Br: Brown
G: Green
Gr: Gray
L: Blue
Lg: Light green
Li: Light blue
O: Orange
P: Pink
R: Red
W: White
Y: Yellow



Remarks

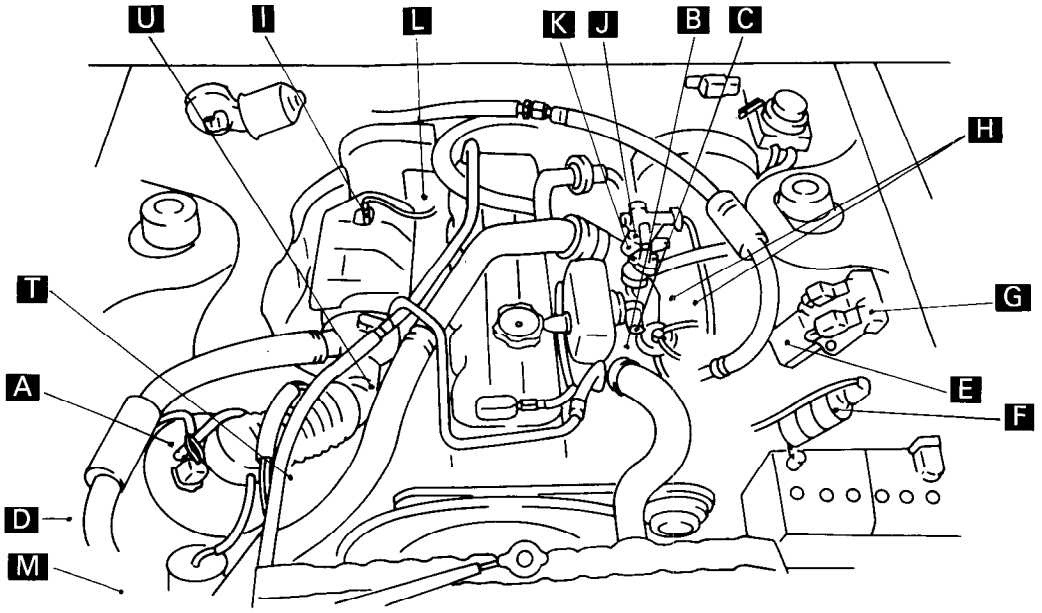
(1) For details of grounding points (ex.: 2), refer to page 8-10.

(2) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

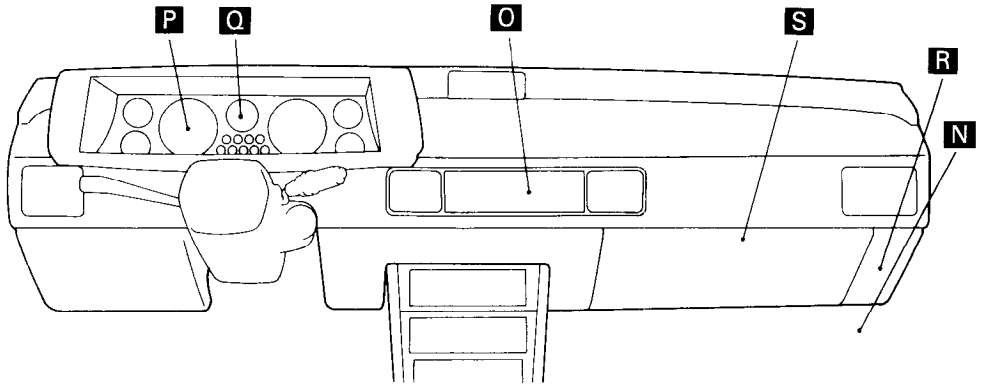
37Y586

ECI SYSTEM CIRCUIT CONTROL PARTS LAYOUT

N14ED-B



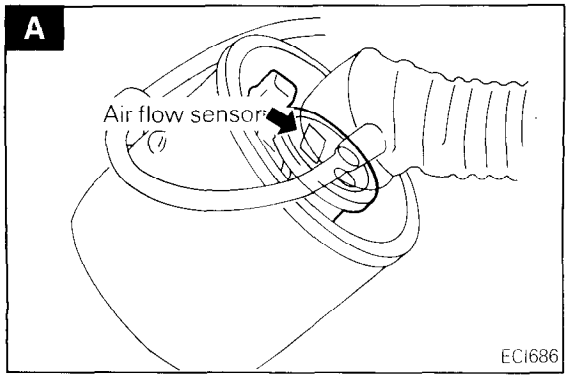
5FU0050



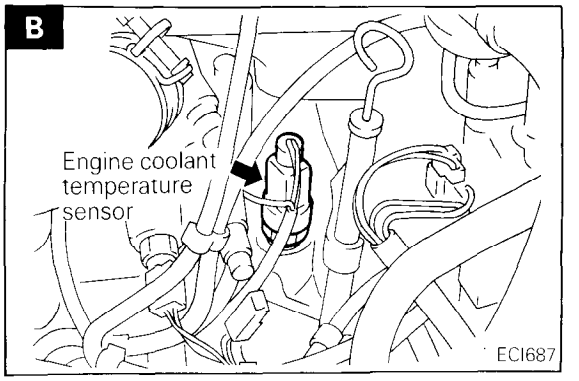
ECI684

Name	Symbol	Name	Symbol
Air conditioner relay	G	Fuel pump check terminal, ignition timing adjusting terminal	D
Air conditioner switch	O	Igniter	E
Air flow sensor (with built-in atmospheric pressure sensor and intake air temperature sensor)	A	Inhibitor switch (vehicles with an automatic transmission)	L
Boost meter	Q	Injector	J
Control relay	R	ISC motor (idle switch, motor position sensor)	K
Detonation sensor	U	Oxygen sensor	I
Diagnosis terminal	S	Resister	M
ECU	N	Throttle position sensor (TPS)	C
EGR control solenoid valve, secondary air control solenoid valve	H	Vehicle speed sensor (reed switch)	P
Engine coolant temperature sensor	B	Waste gate solenoid valve	T
Engine speed sensor (ignition coil ⊖)	F		

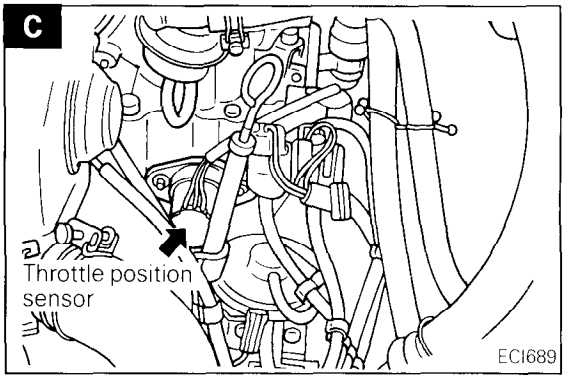
A


Air flow sensor
ECI686

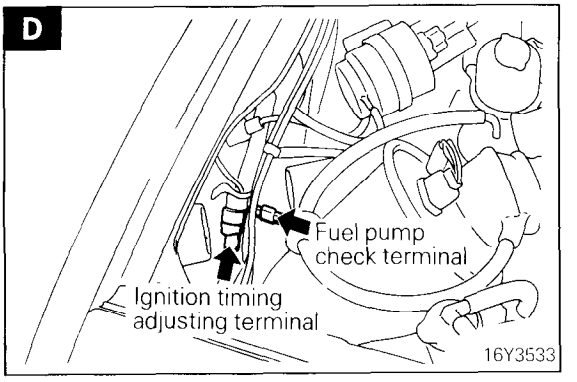
B


Engine coolant temperature sensor
ECI687

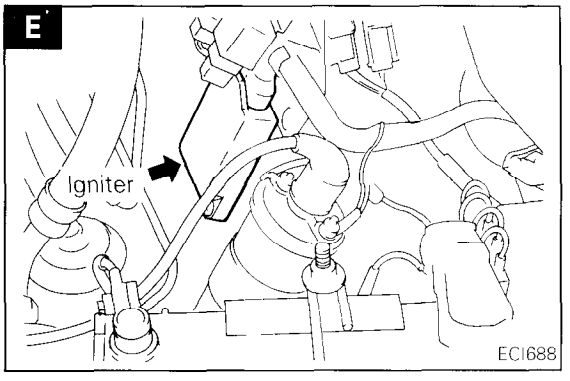
C


Throttle position sensor
ECI689

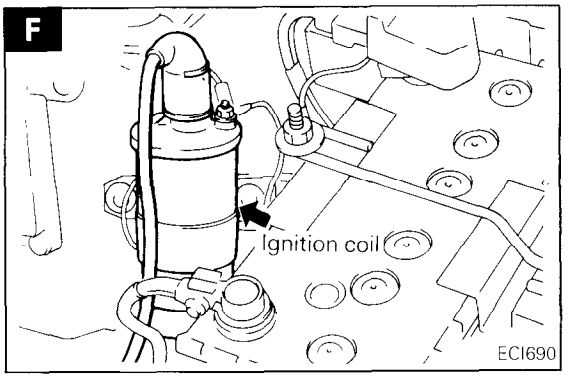
D


Fuel pump check terminal
Ignition timing adjusting terminal
16Y3533

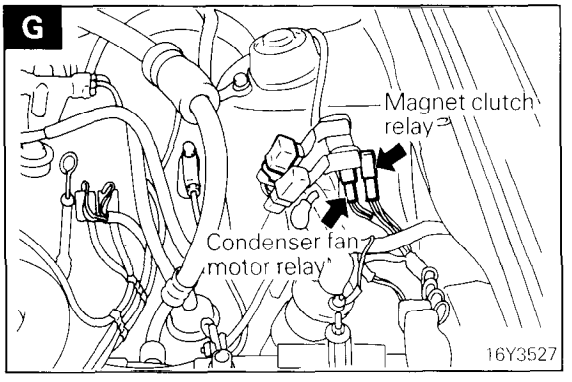
E


Igniter
ECI688

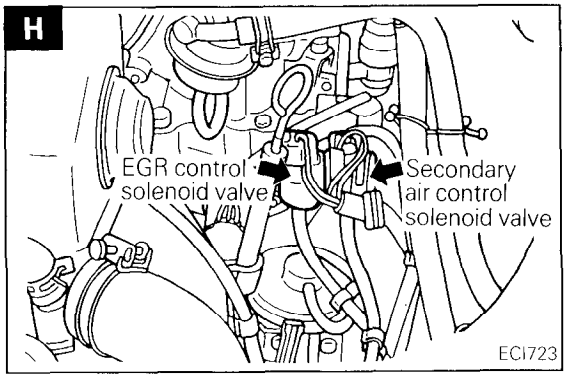
F


Ignition coil
ECI690

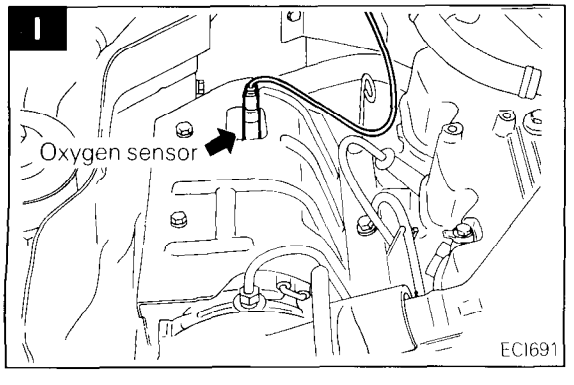
G


Magnet clutch relay
Condenser fan motor relay
16Y3527

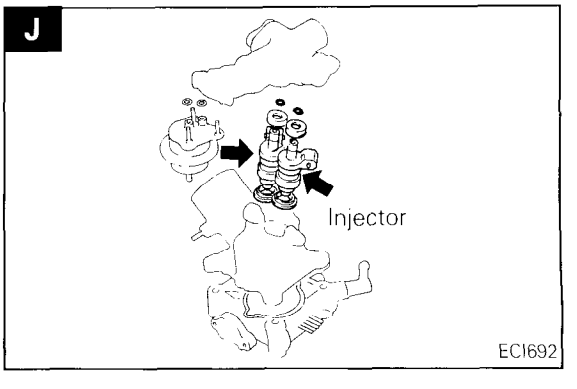
H


EGR control solenoid valve
Secondary air control solenoid valve
ECI723

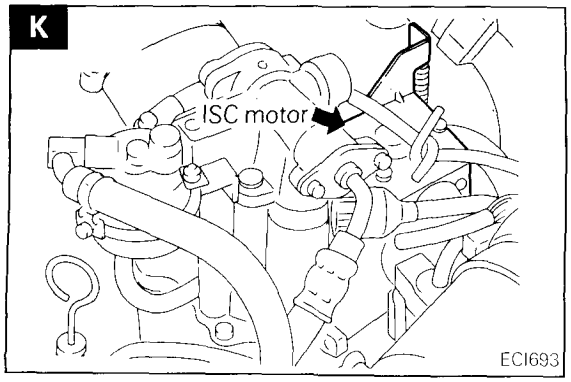
I


Oxygen sensor
ECI691

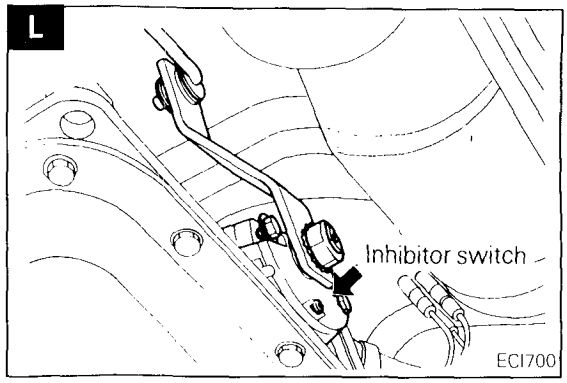
J


Injector
ECI692

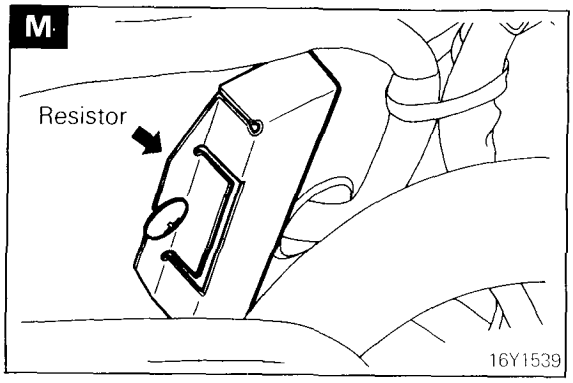
K


ISC motor
ECI693

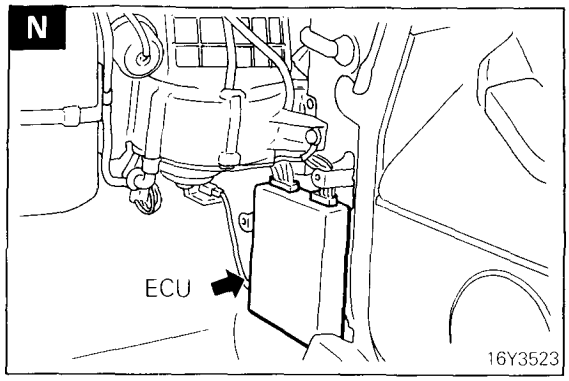
L


Inhibitor switch
ECI700

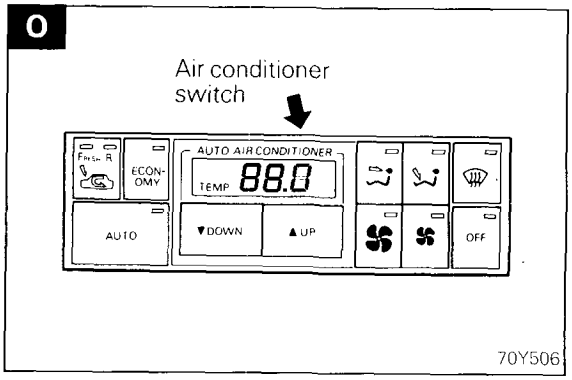
M


Resistor
16Y1539

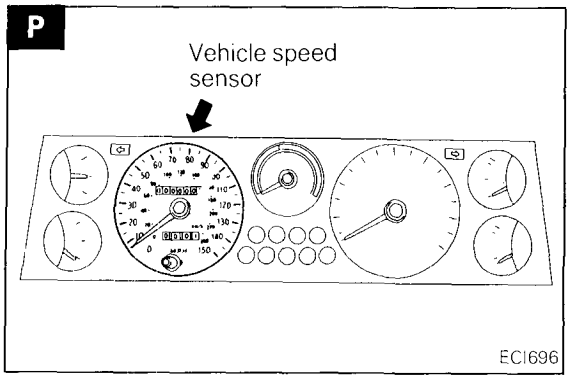
N


ECU
16Y3523

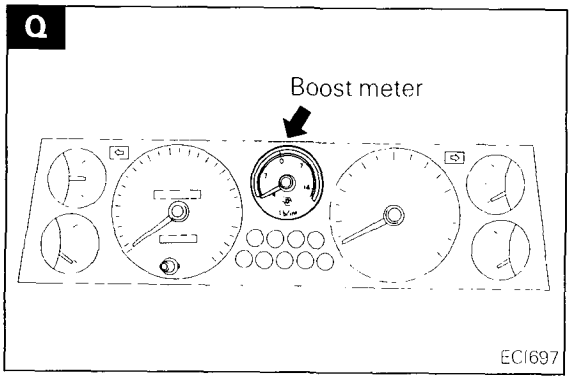
O


Air conditioner switch
AUTO AIR CONDITIONER
TEMP 88.0
ECON-OMY
AUTO
DOWN
UP
OFF
70Y506

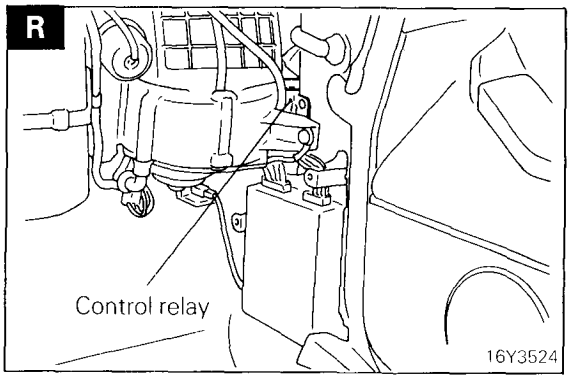
P


Vehicle speed sensor
ECI696

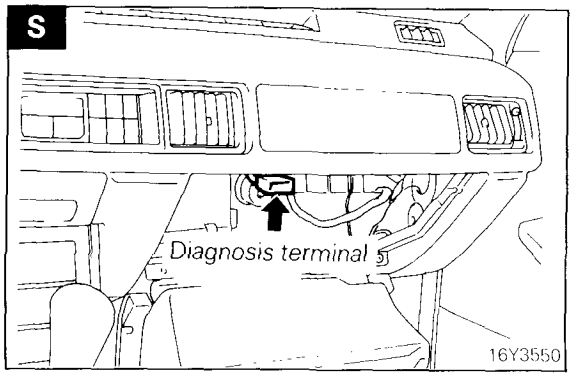
Q


Boost meter
ECI697

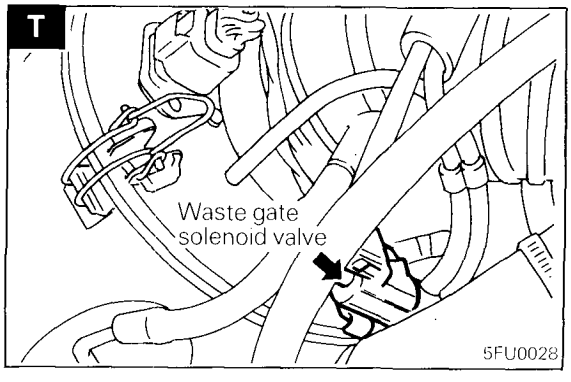
R


Control relay
16Y3524

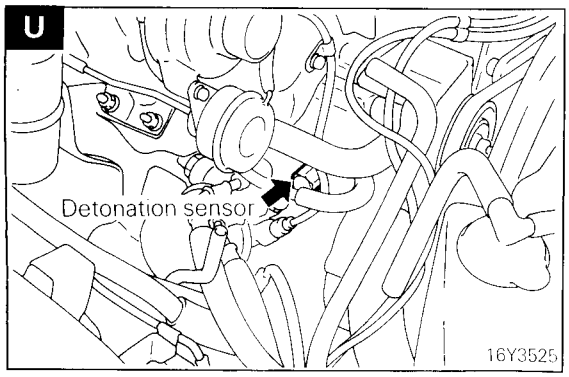
S


Diagnosis terminal
16Y3550

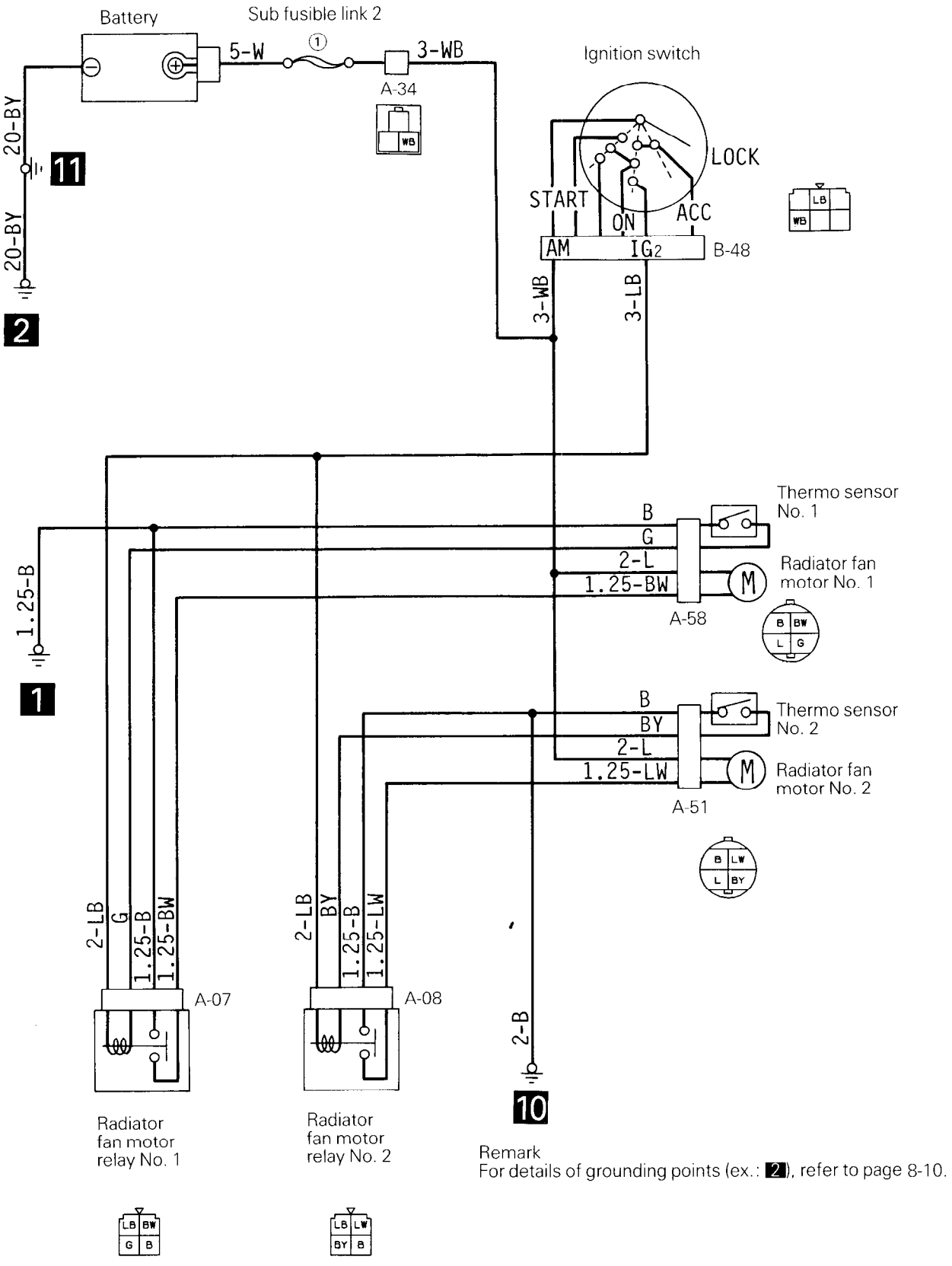
T


Waste gate solenoid valve
5FU0028

U



5 COOLING CIRCUIT



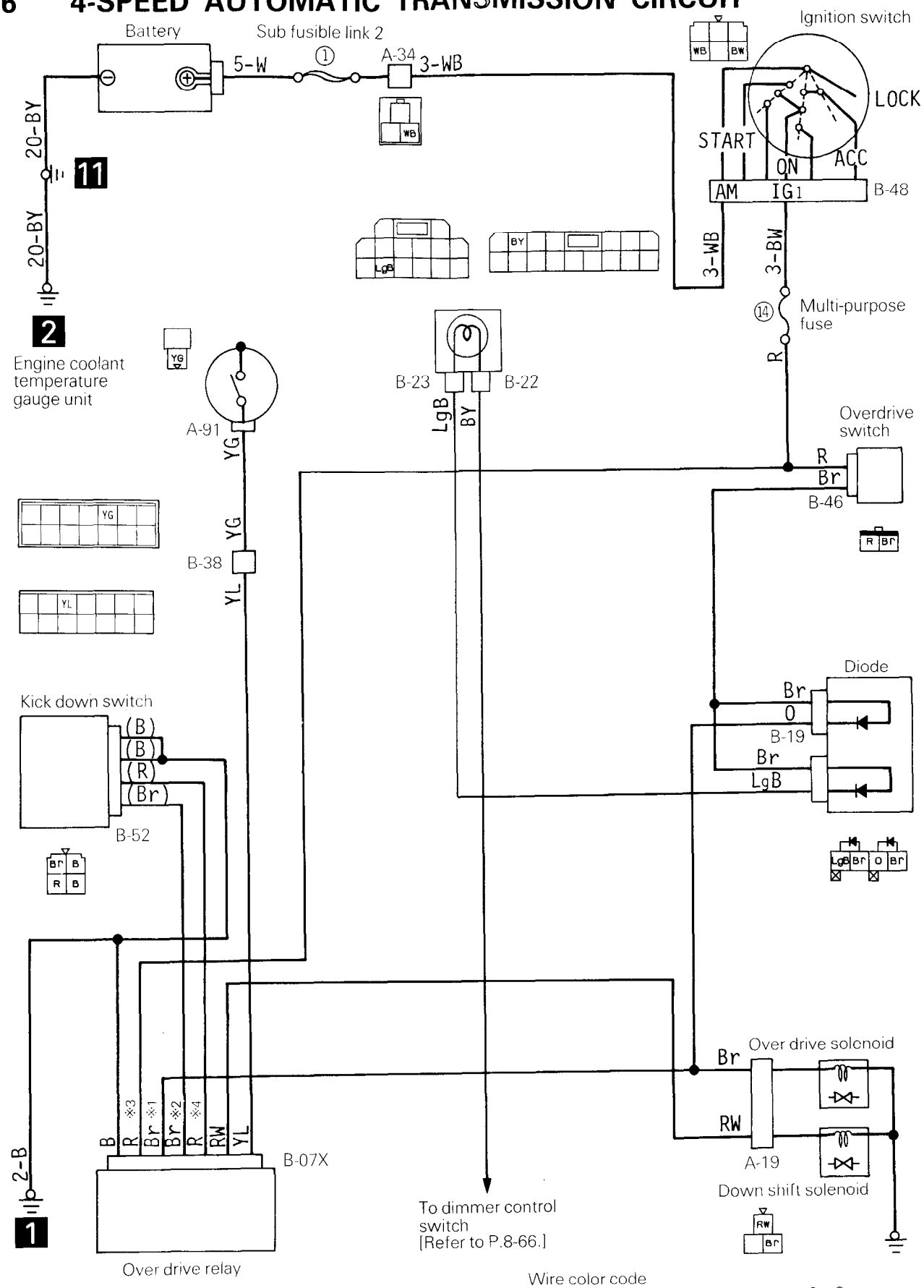
Remark
For details of grounding points (ex.: 2), refer to page 8-10.

37Y603

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
LI: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

6 4-SPEED AUTOMATIC TRANSMISSION CIRCUIT



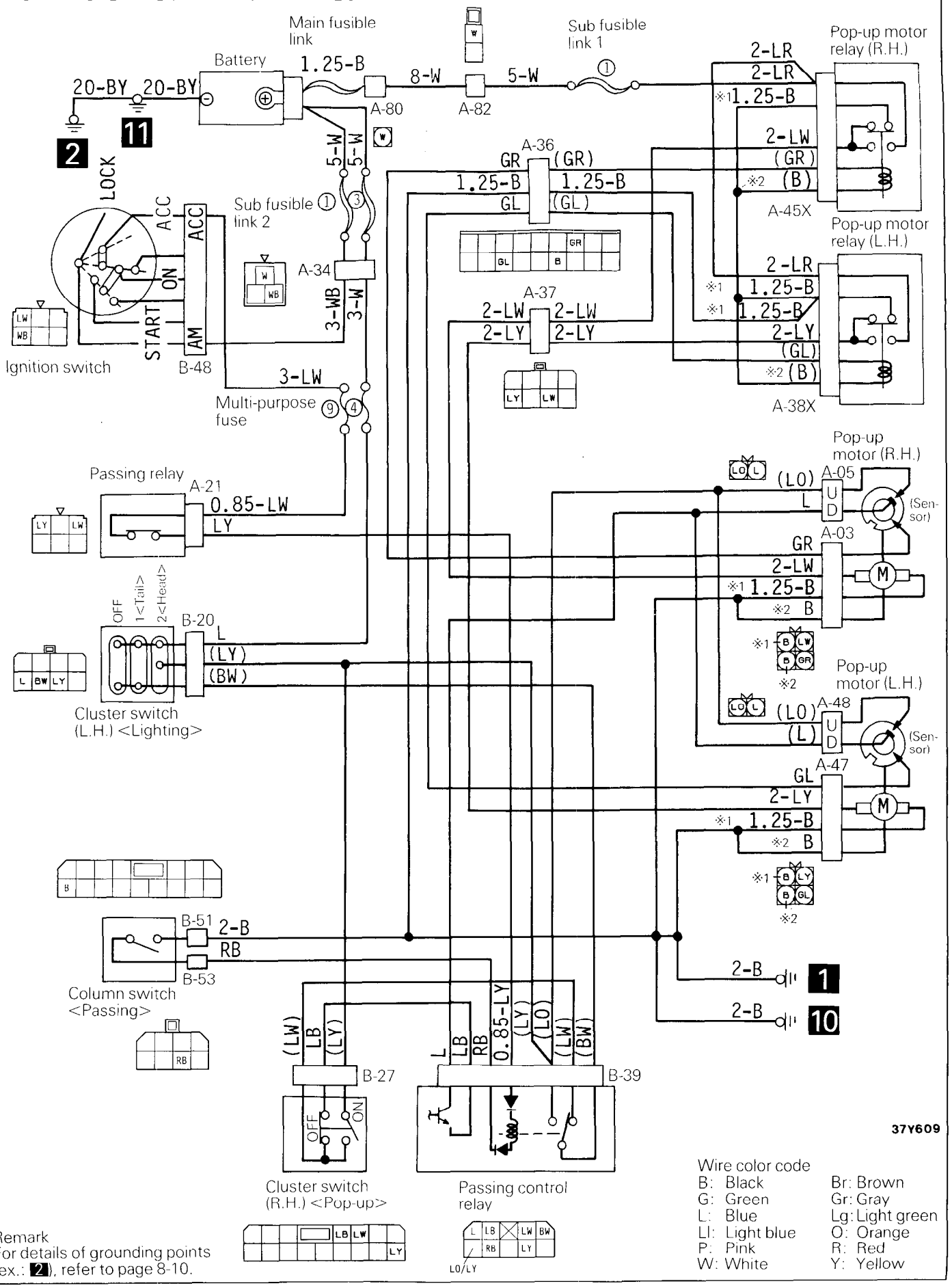
Wire color code

B: Black	Br: Brown	G: Green	
Gr: Gray	L: Blue	Lg: Light green	
Ll: Light blue	O: Orange	P: Pink	
R: Red	W: White	Y: Yellow	

Remark
For details of grounding points (ex.: 2), refer to page 8-10.

37Y597

7 POP-UP MECHANISM CIRCUIT

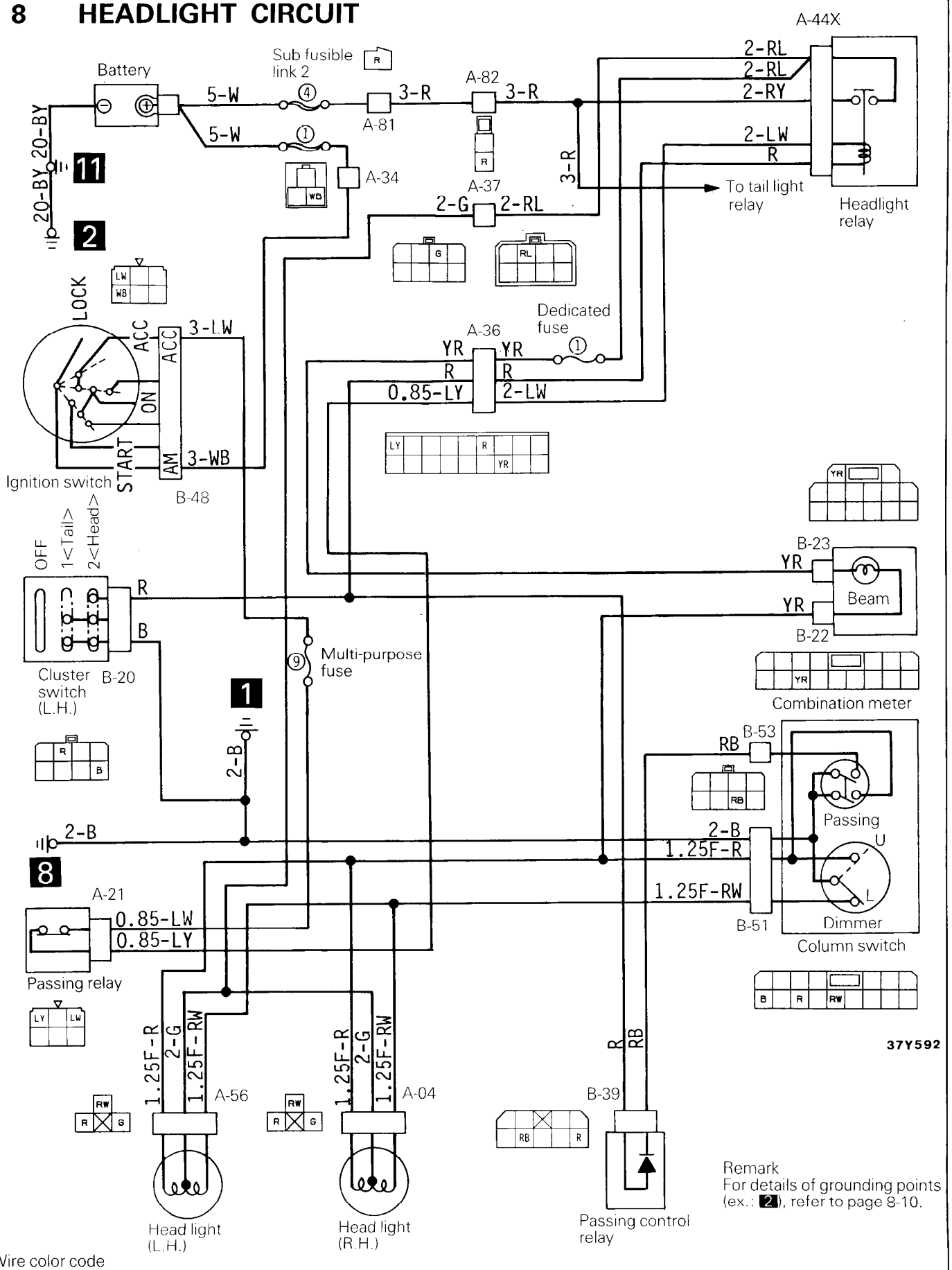


Wire color code

B: Black	Br: Brown
G: Green	Gr: Gray
L: Blue	Lg: Light green
Ll: Light blue	O: Orange
P: Pink	R: Red
W: White	Y: Yellow

Remark
For details of grounding points (ex.: 2), refer to page 8-10.

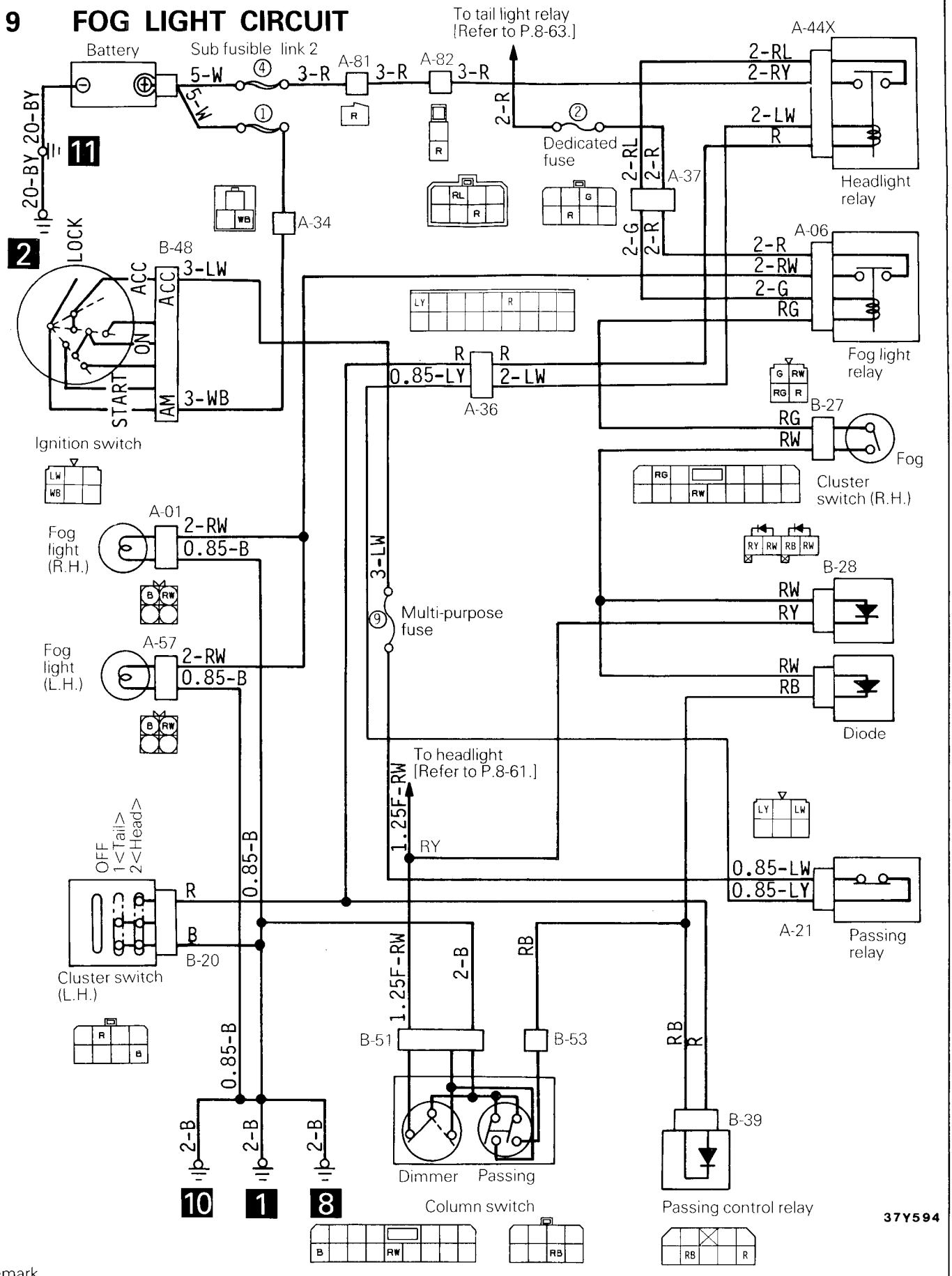
8 HEADLIGHT CIRCUIT



Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

9 FOG LIGHT CIRCUIT

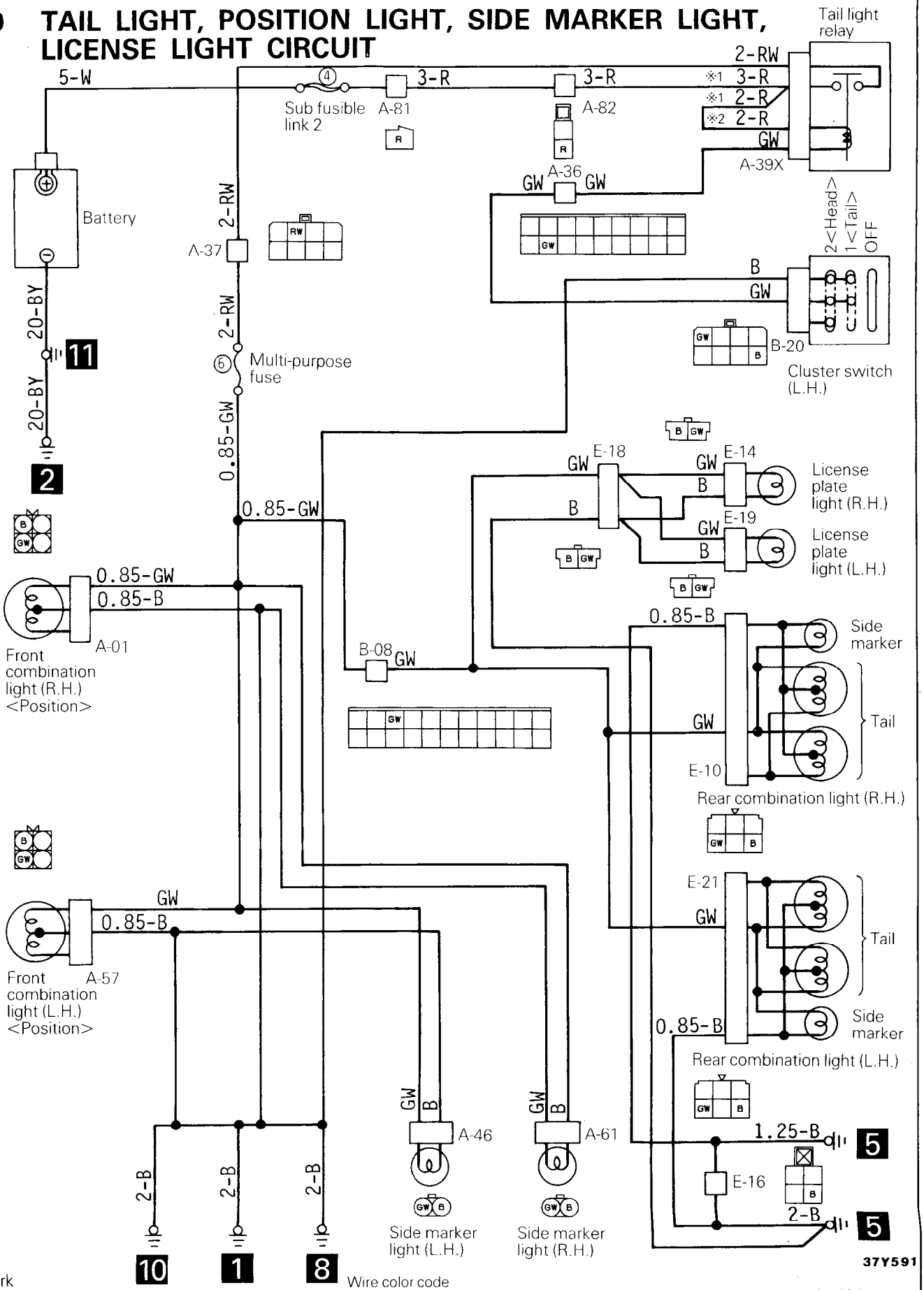


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

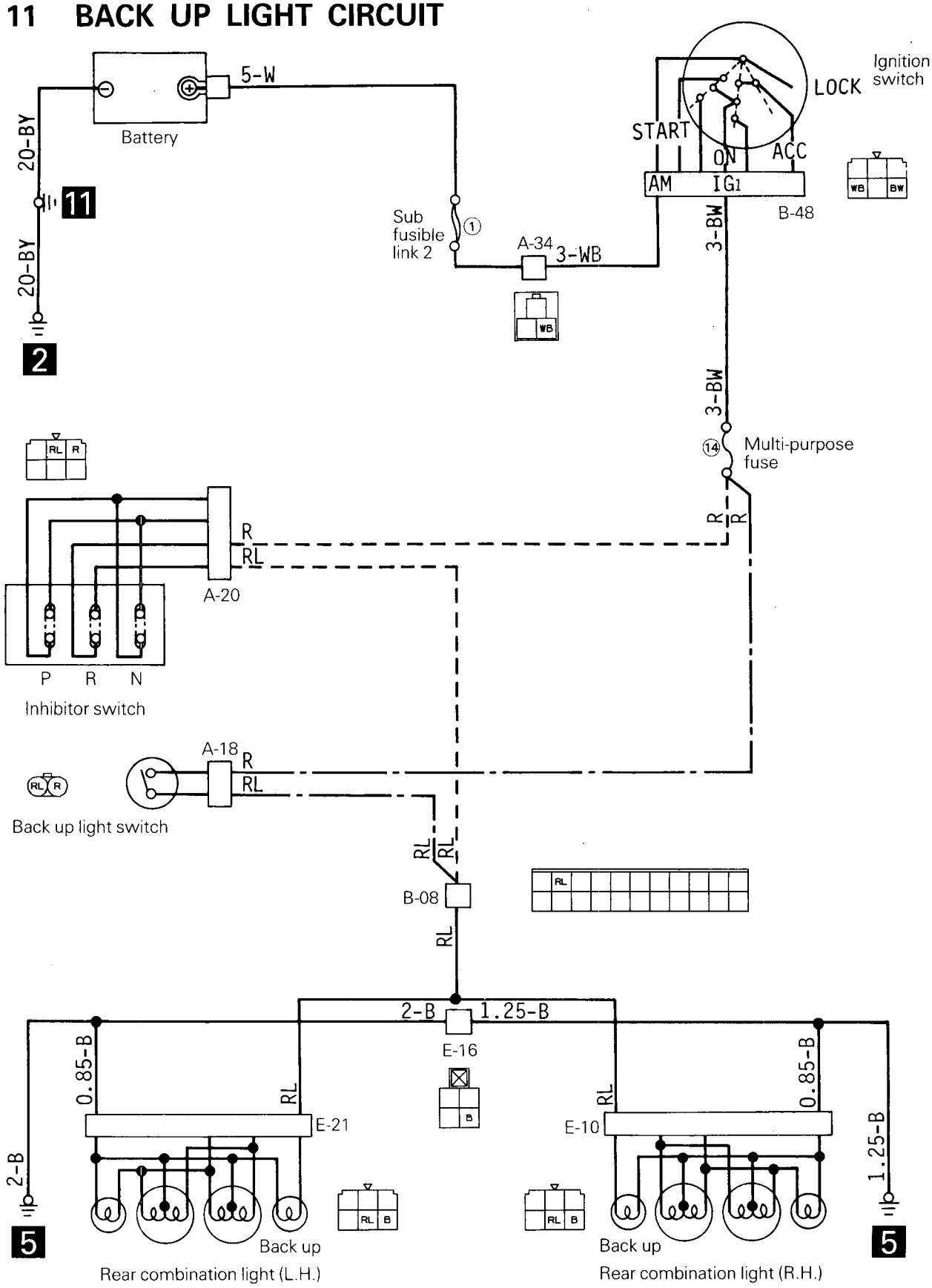
10 TAIL LIGHT, POSITION LIGHT, SIDE MARKER LIGHT, LICENSE LIGHT CIRCUIT



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code
B: Black Br: Brown G: Green Gr: Gray L: Blue Lg: Light green
Ll: Light blue O: Orange P: Pink R: Red W: White Y: Yellow

11 BACK UP LIGHT CIRCUIT



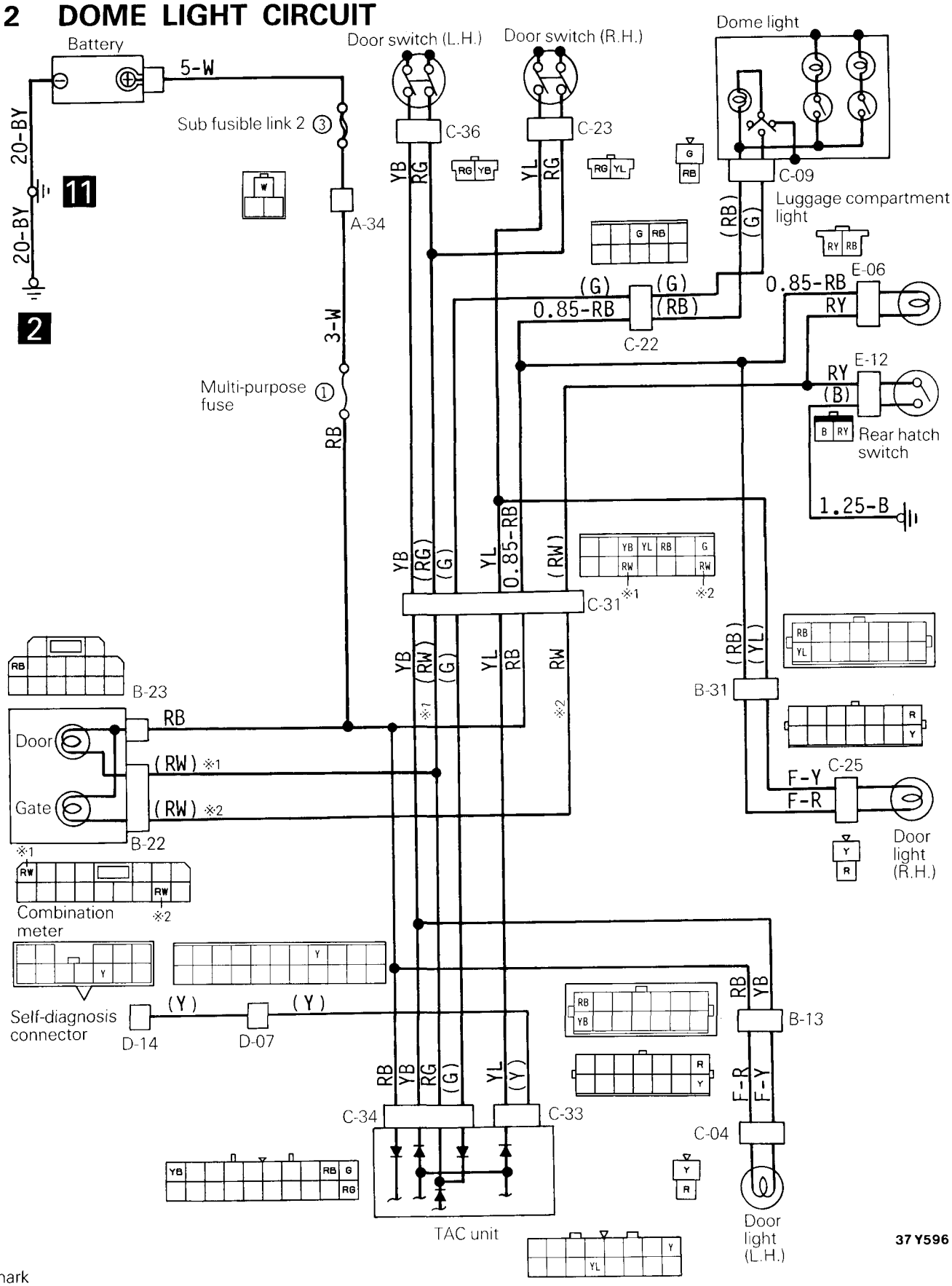
37Y590

Remarks
(1) Dot-and-dash line shows wiring for vehicles with a manual transmission.
(2) Dashed line shows wiring for vehicles with an automatic transmission.
(3) For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green
Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink
R: Red	Y: Yellow	W: White

12 DOME LIGHT CIRCUIT

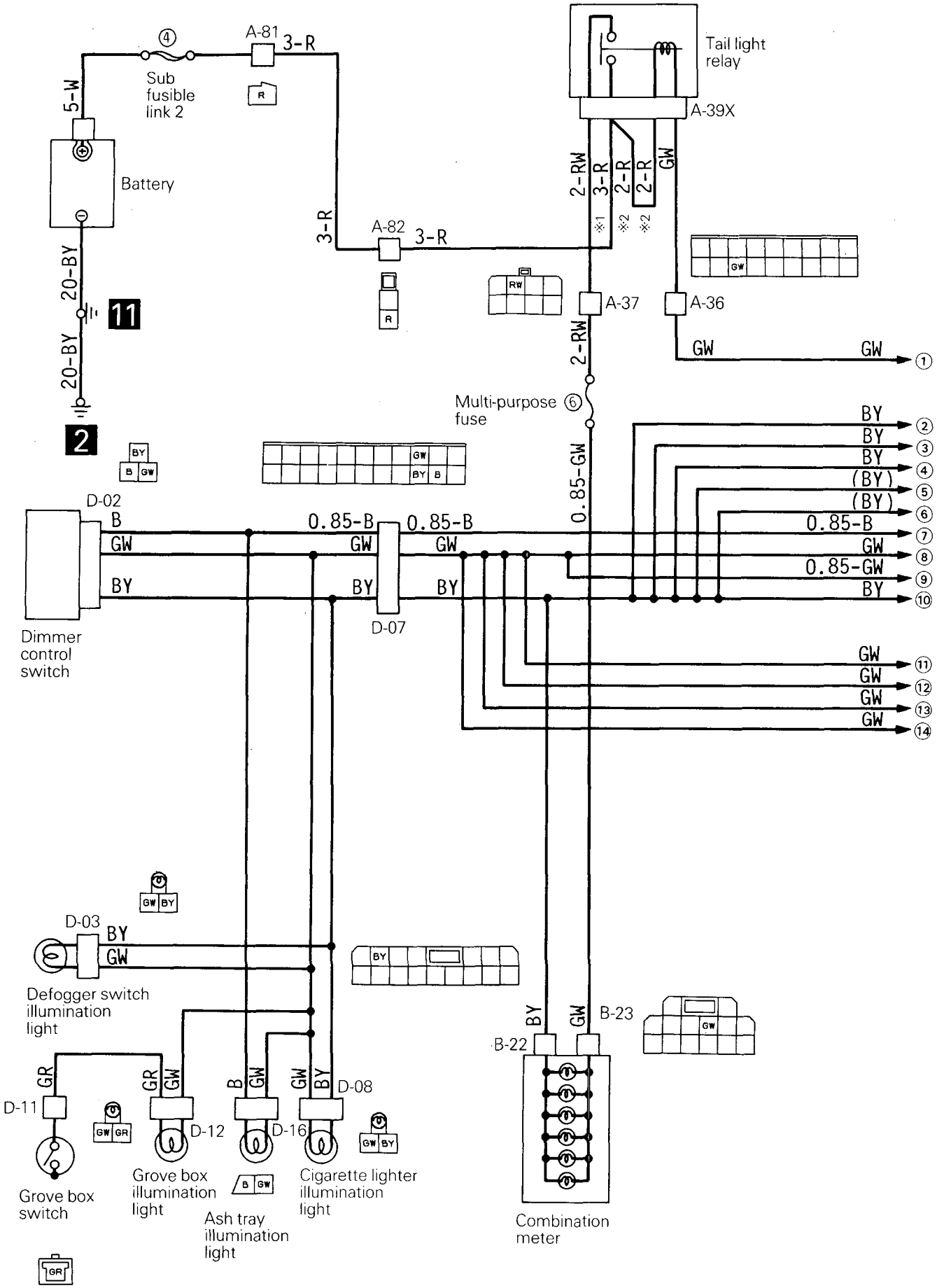


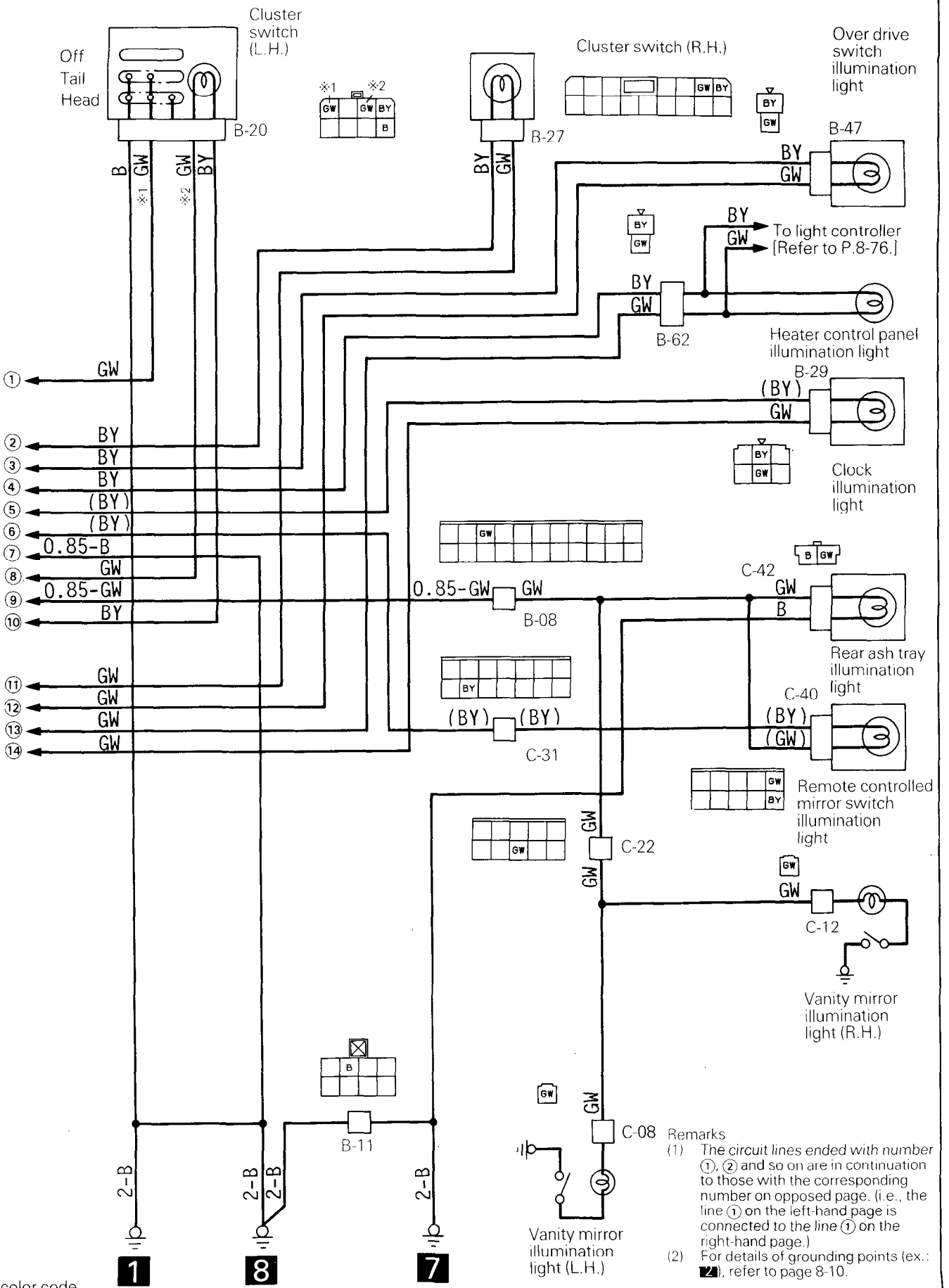
Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

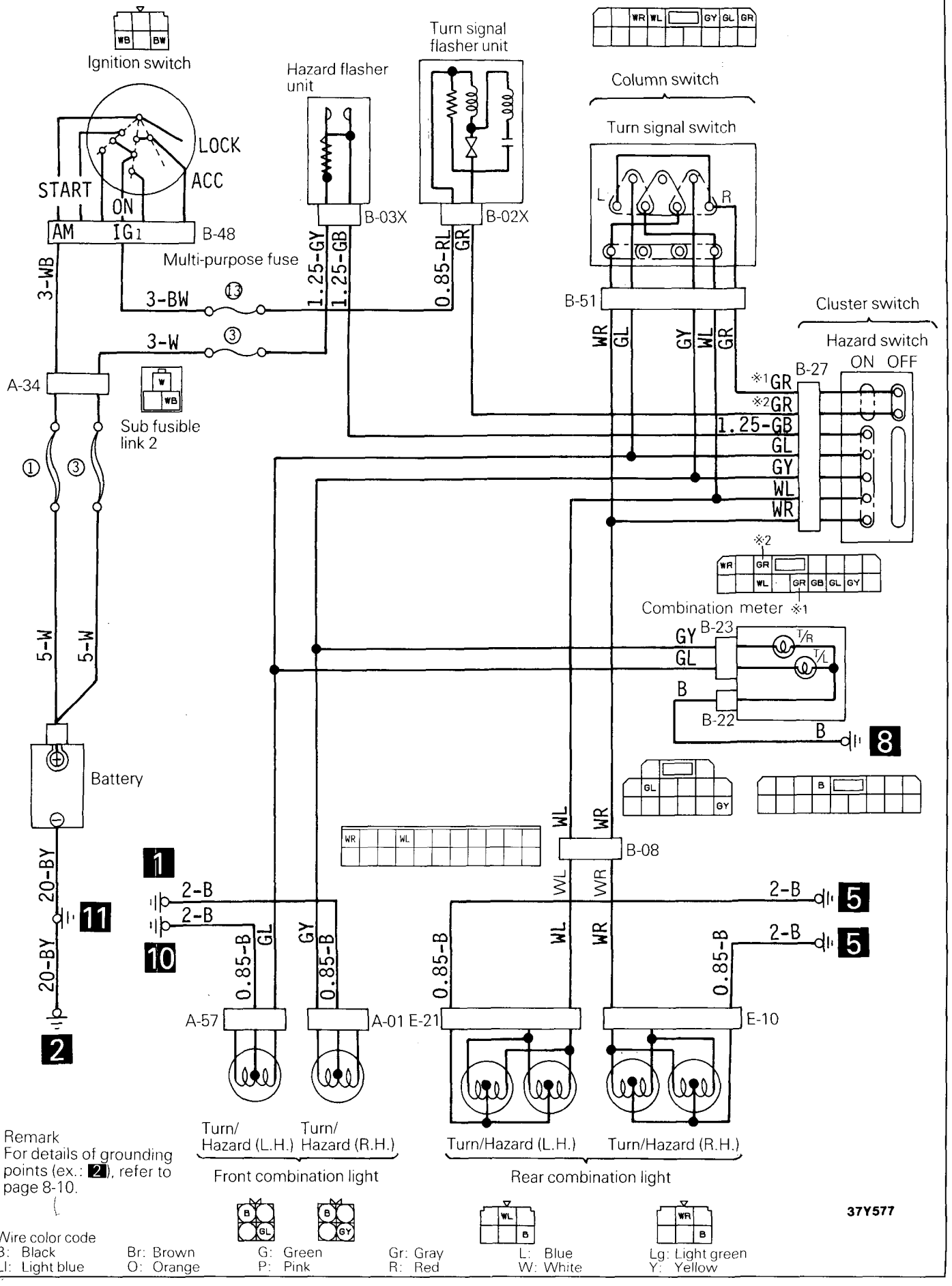
B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

13 INSTRUMENT PANEL ILLUMINATION CIRCUIT




Cluster switch (L.H.)
Off
Tail
Head
B-20
※1
※2
Cluster switch (R.H.)
B-27
Over drive switch illumination light
B-47
To light controller [Refer to P.8-76.]
B-62
Heater control panel illumination light
B-29
Clock illumination light
C-42
Rear ash tray illumination light
C-40
B-08
C-31
Remote controlled mirror switch illumination light
C-22
C-12
Vanity mirror illumination light (R.H.)
B-11
C-08
Vanity mirror illumination light (L.H.)
2-B
1
8
7
Remarks
(1) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)
(2) For details of grounding points (ex.: ■), refer to page 8-10.
Wire color code
B: Black
Br: Brown
G: Green
Gr: Gray
L: Blue
Lg: Light green
LI: Light blue
O: Orange
P: Pink
R: Red
W: White
Y: Yellow
37Y606

14 TURN SIGNAL CIRCUIT

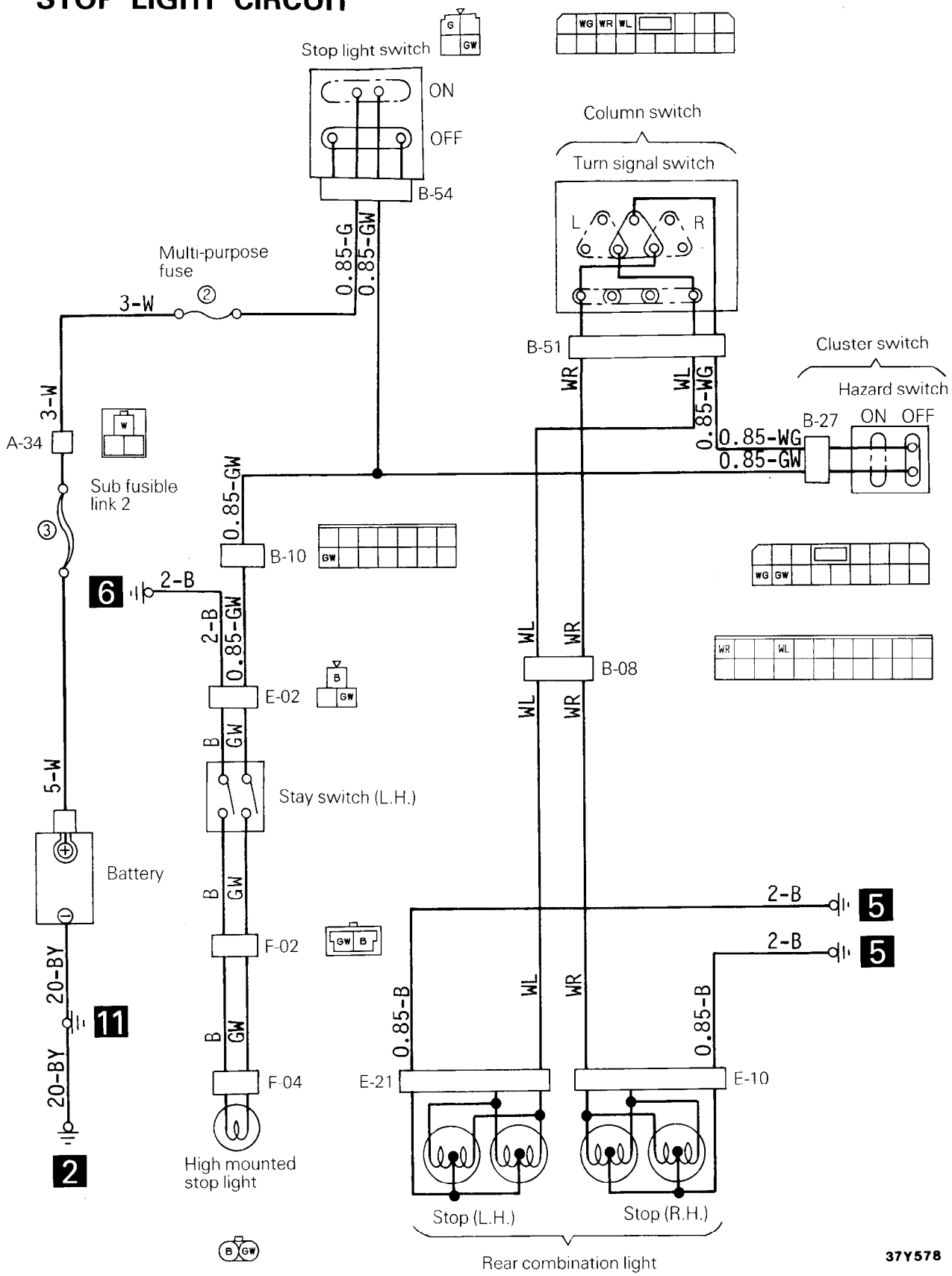


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

15 STOP LIGHT CIRCUIT

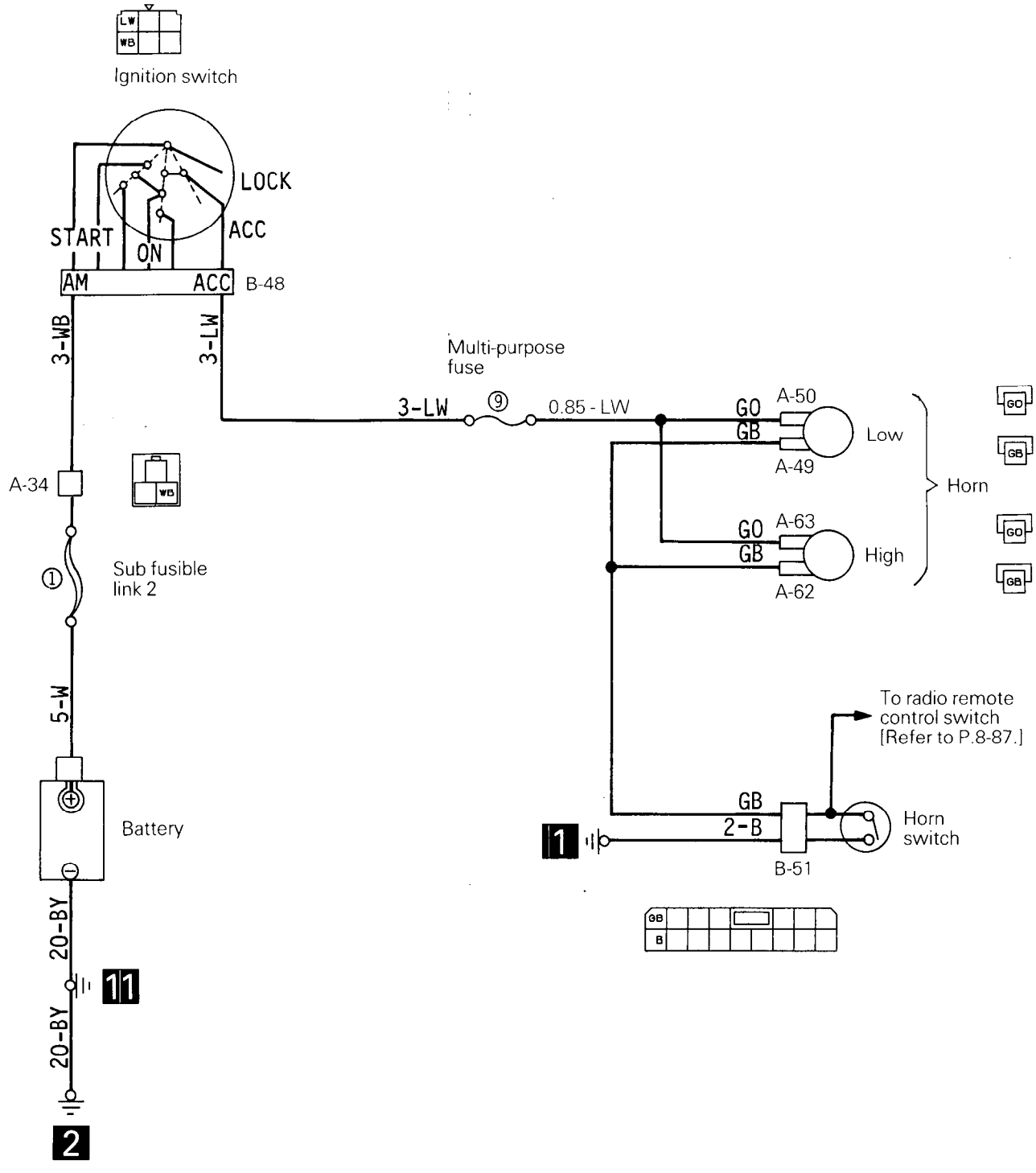


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

16 HORN CIRCUIT

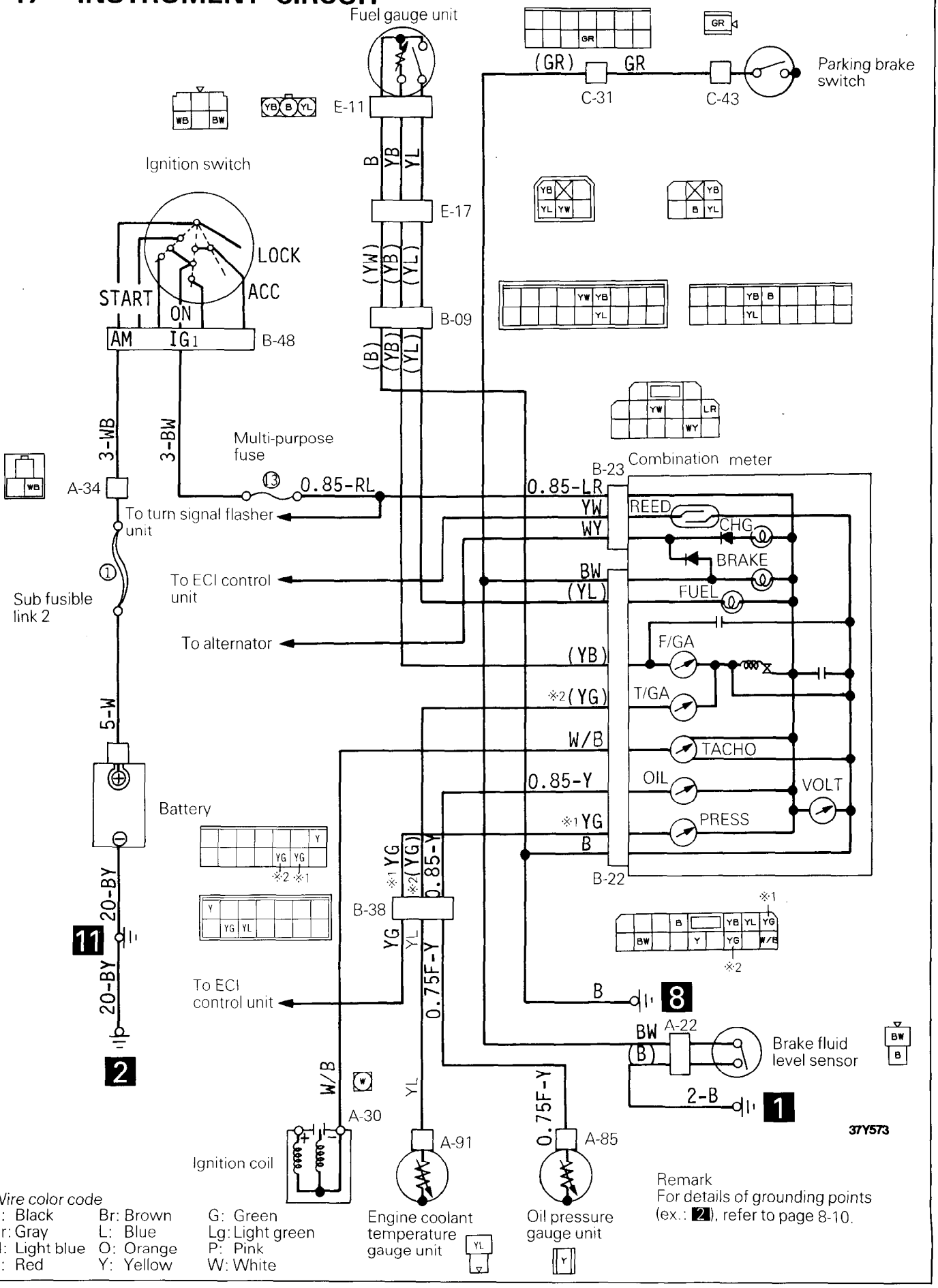


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

17 INSTRUMENT CIRCUIT

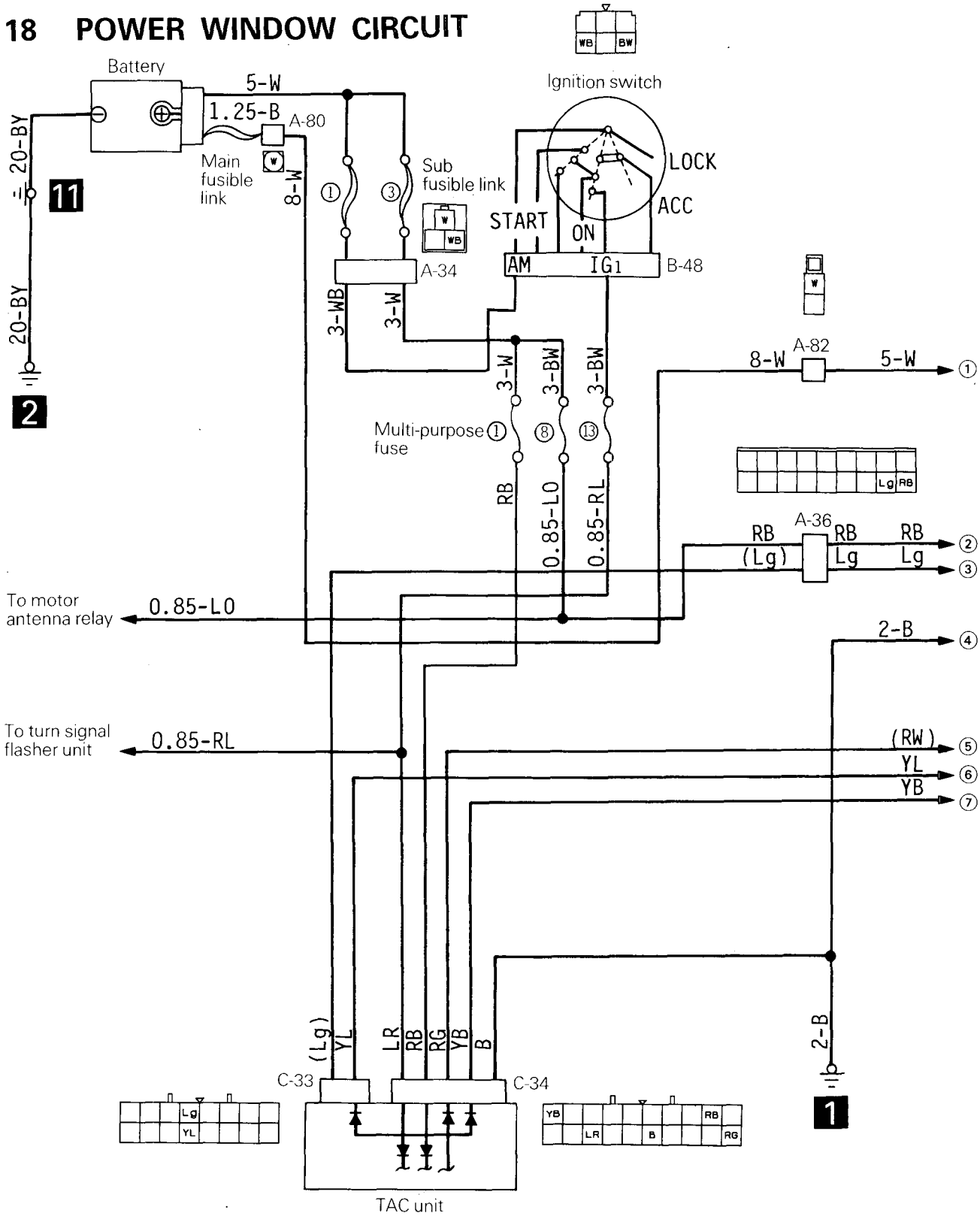


Wire color code

B: Black	Br: Brown	G: Green	
Gr: Gray	L: Blue	Lg: Light green	
Ll: Light blue	O: Orange	P: Pink	
R: Red	Y: Yellow	W: White	

Remark
For details of grounding points (ex.: 2), refer to page 8-10.

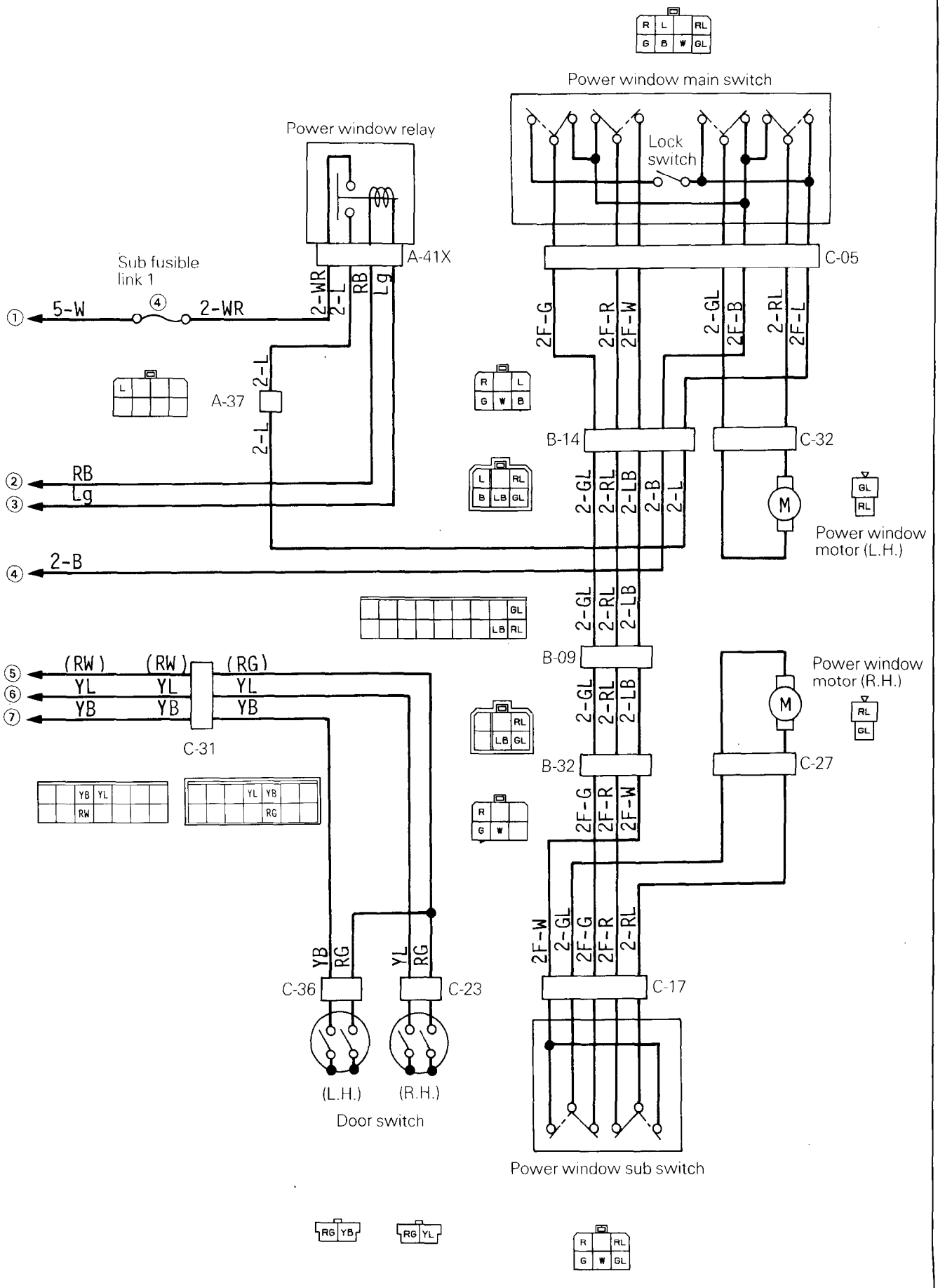
18 POWER WINDOW CIRCUIT



Remarks
(1) For details of grounding points (ex.: 2), refer to page 8-10.
(2) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

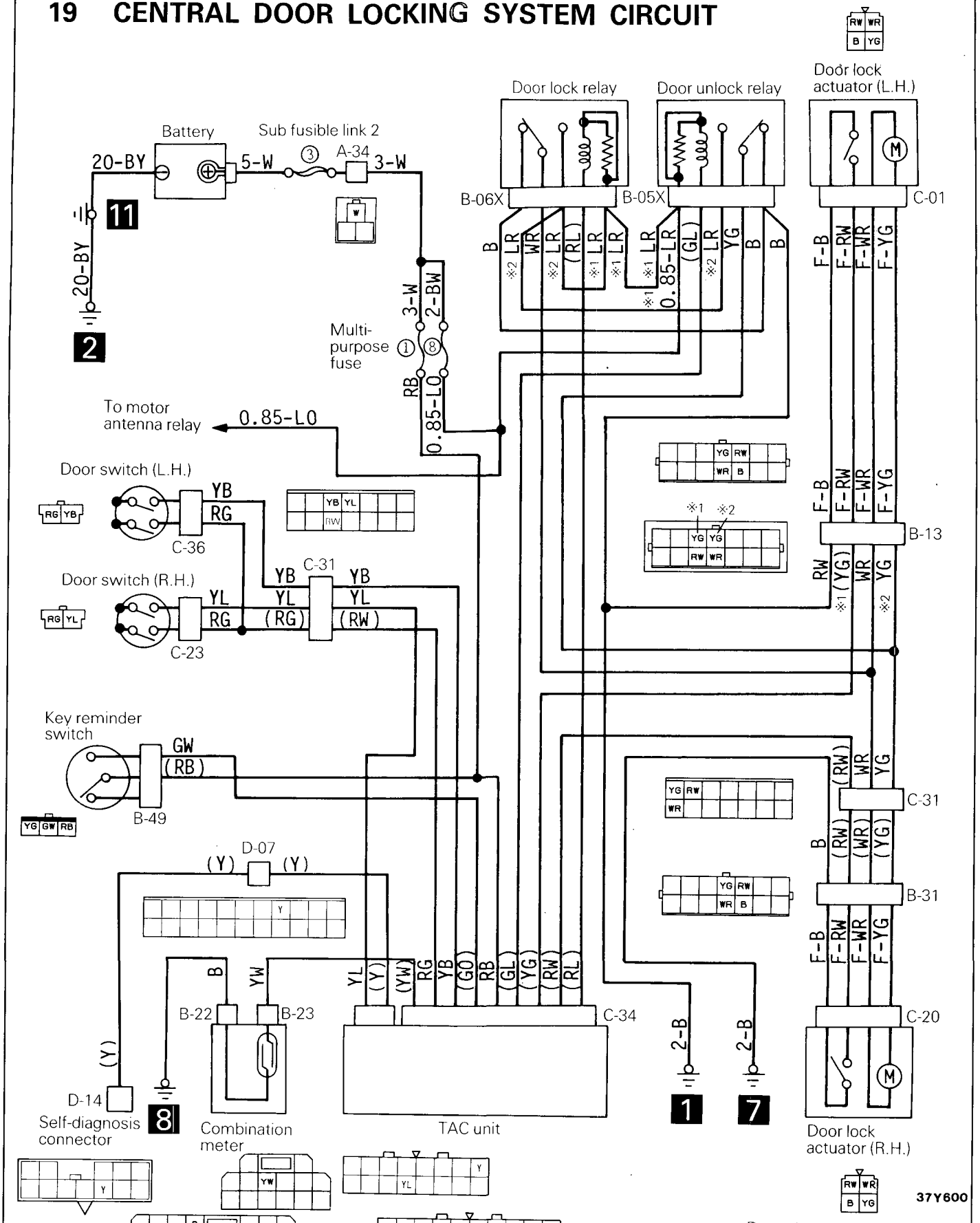
Wire color code

B: Black	Br: Brown	G: Green
Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink
R: Red	W: White	Y: Yellow


Power window main switch
Lock switch
Power window relay
Sub fusible link 1
A-41X
C-05
5-W
2-WR
2-WR
2-L
RB
Lg
A-37
2-L
2-L
RB
Lg
2-B
2F-G
2F-R
2F-W
2-GL
2F-B
2-RL
2F-L
B-14
C-32
2-GL
2-RL
2-LB
2-B
2-L
Power window motor (L.H.)
B-09
Power window motor (R.H.)
B-32
C-27
(RW)
(RW)
(RG)
YL
YL
YL
YB
YB
YB
C-31
2F-W
2-GL
2F-G
2F-R
2-RL
YB
RG
YL
RG
C-36
C-23
C-17
(L.H.)
(R.H.)
Door switch
Power window sub switch

37Y598

19 CENTRAL DOOR LOCKING SYSTEM CIRCUIT

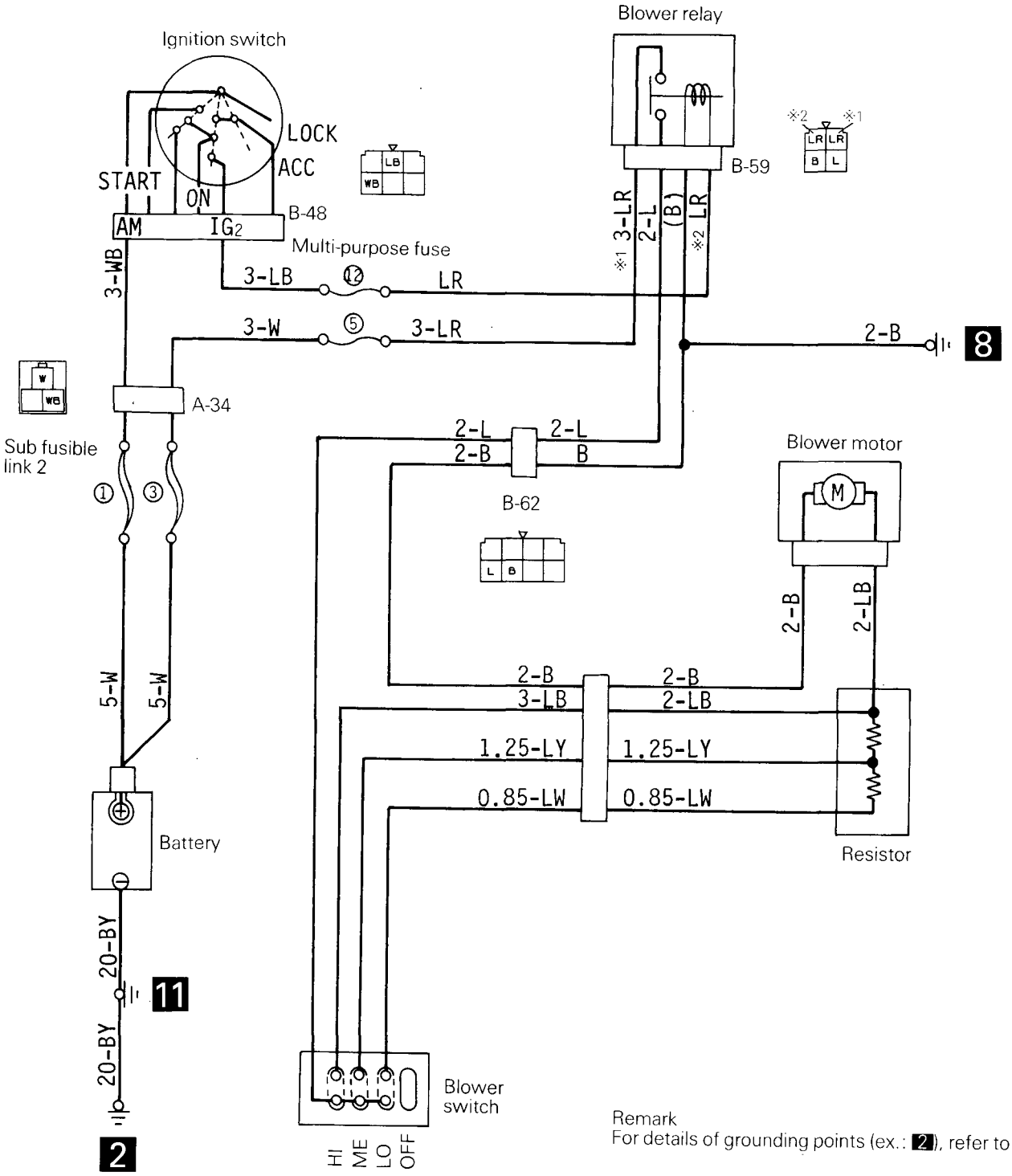


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

20 HEATER CIRCUIT



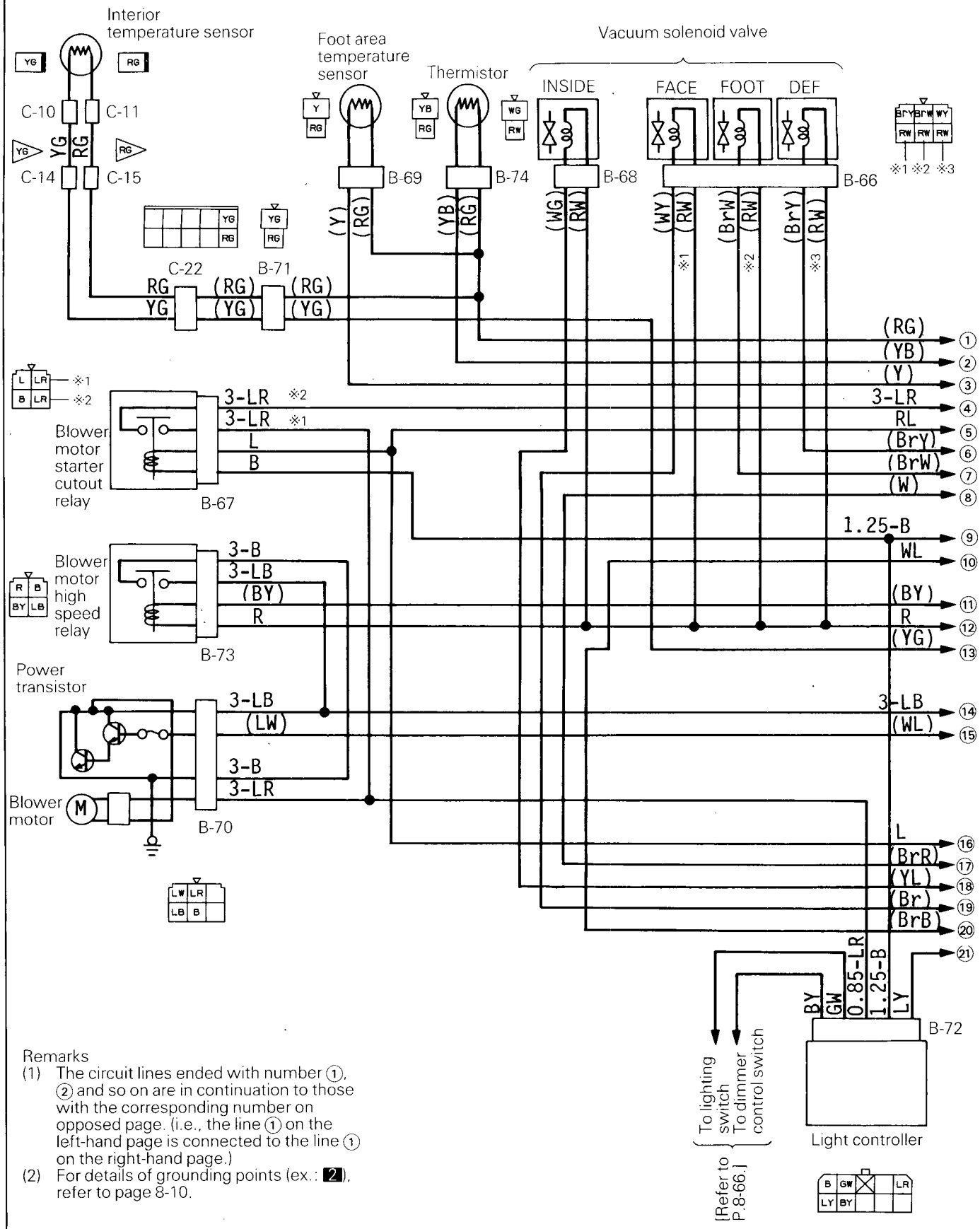
Remark
For details of grounding points (ex.: 2), refer to page 8-10.

37Y589

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

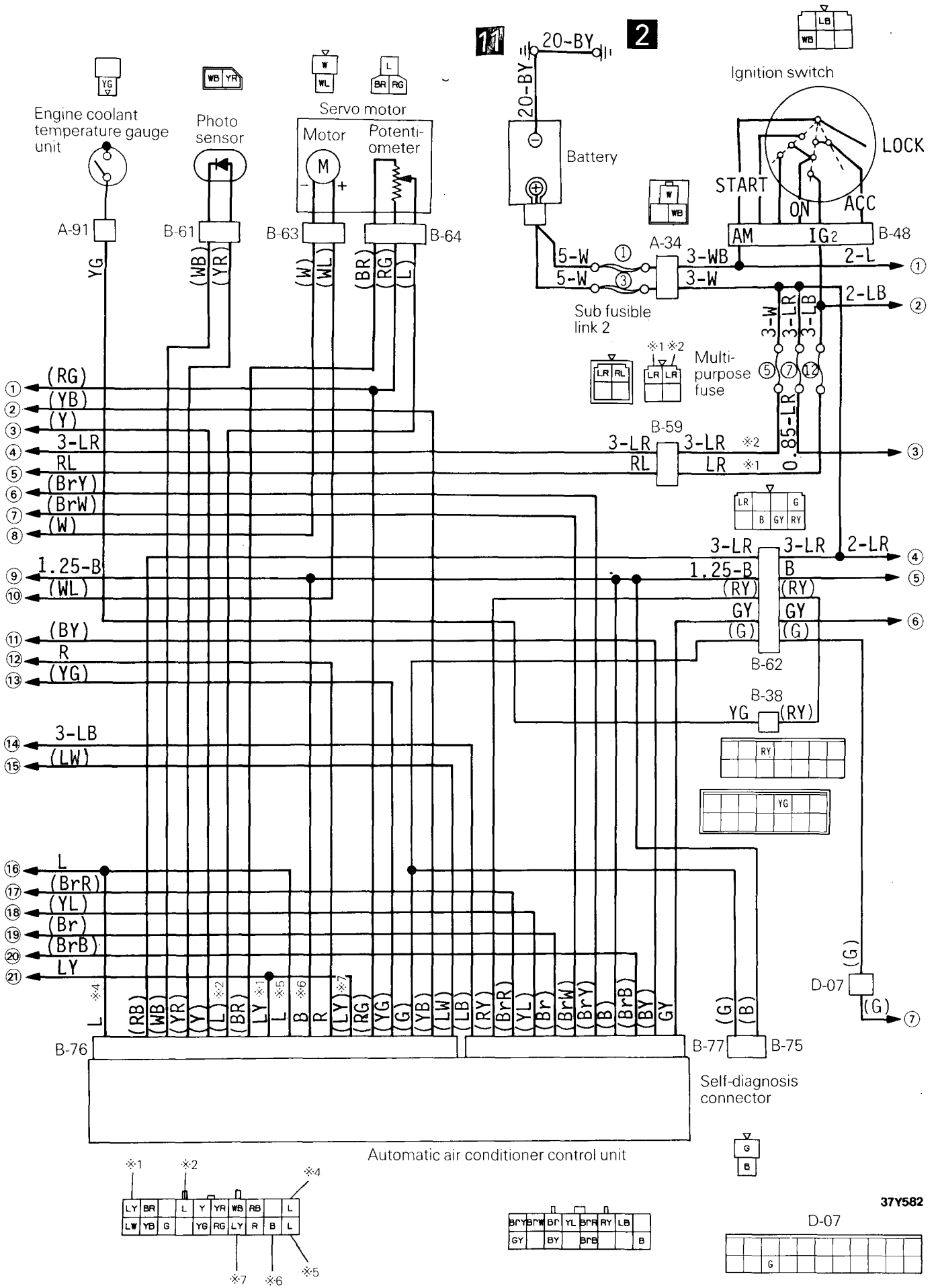
21 AIR CONDITIONER CIRCUIT

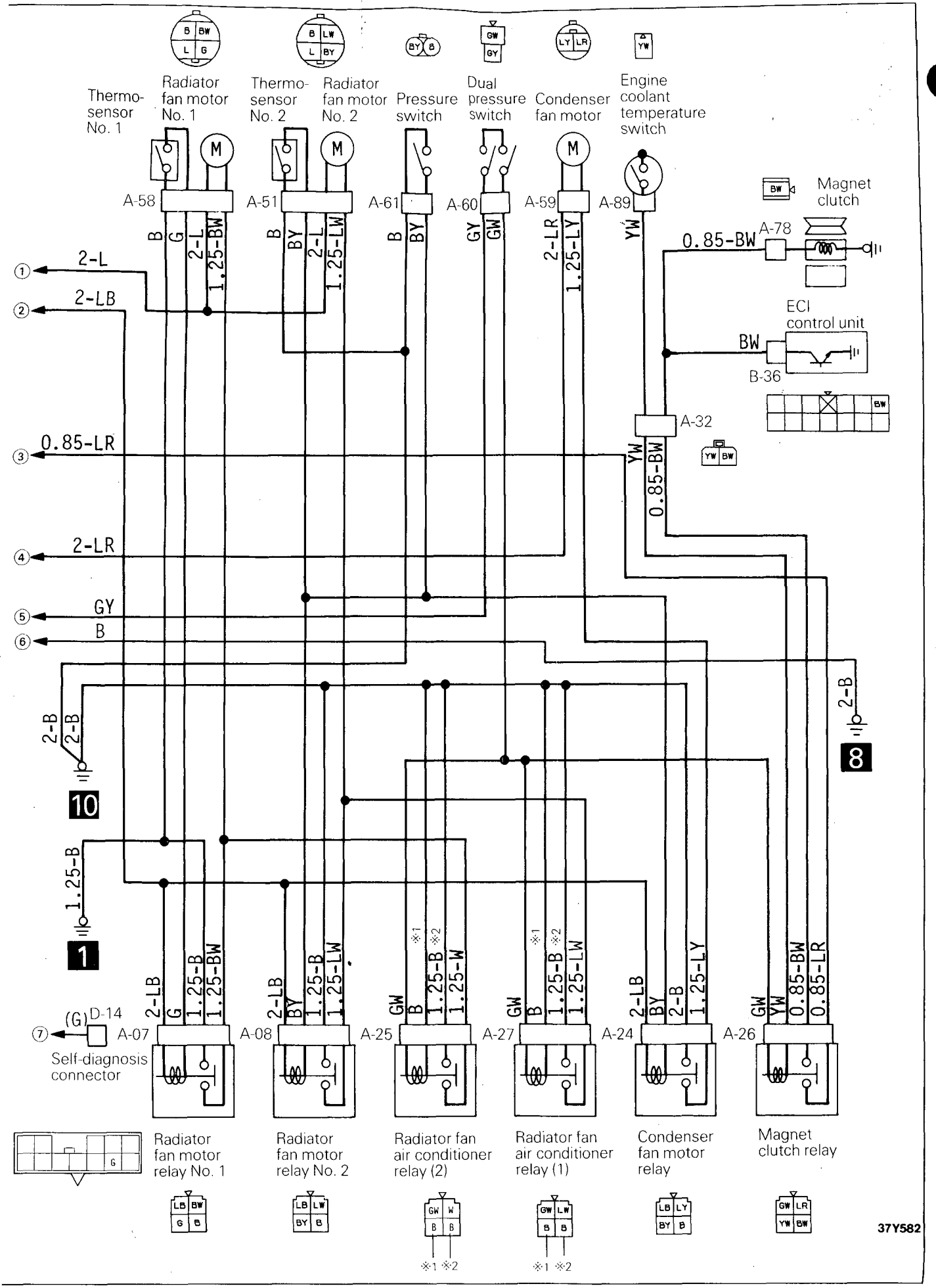


Remarks
(1) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)
(2) For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

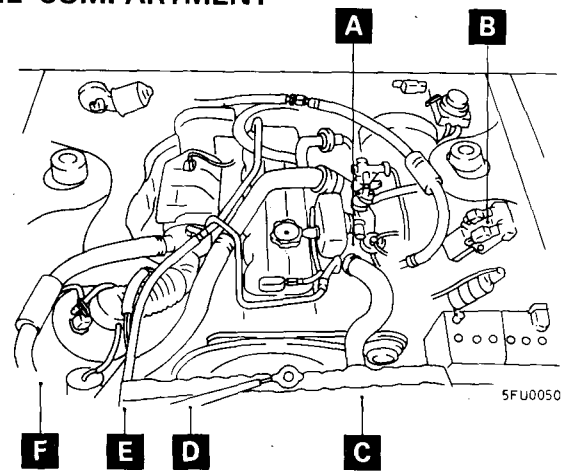

Engine coolant temperature gauge unit
Photo sensor
Servo motor
Motor
Potentiometer
Ignition switch
Battery
LOCK
START
ON
ACC
AM
IG2
A-91
B-61
B-63
B-64
B-48
A-34
Sub fusible link 2
Multi-purpose fuse
B-59
B-62
B-38
B-76
B-77
B-75
Self-diagnosis connector
Automatic air conditioner control unit
D-07
37Y582

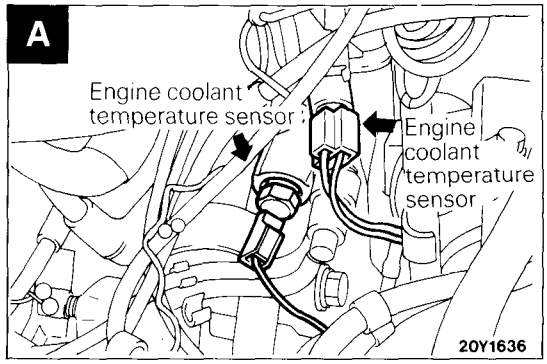

Thermo-sensor No. 1
Radiator fan motor No. 1
Thermo-sensor No. 2
Radiator fan motor No. 2
Pressure switch
Dual pressure switch
Condenser fan motor
Engine coolant temperature switch
A-58
A-51
A-61
A-60
A-59
A-89
Magnet clutch
A-78
0.85-BW
ECI control unit
BW
B-36
A-32
YW BW
2-L
2-LB
0.85-LR
2-LR
GY
B
2-B
10
8
1.25-B
1
(G) D-14
A-07
Self-diagnosis connector
2-LB
1.25-B
1.25-BW
1.25-LW
1.25-W
1.25-LY
0.85-BW
0.85-LR
※1
※2
A-08
A-25
A-27
A-24
A-26
Radiator fan motor relay No. 1
Radiator fan motor relay No. 2
Radiator fan air conditioner relay (2)
Radiator fan air conditioner relay (1)
Condenser fan motor relay
Magnet clutch relay
37Y582

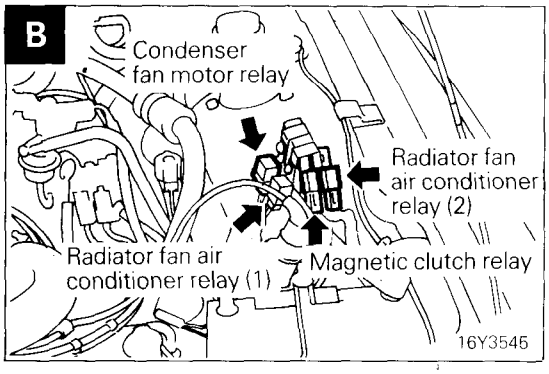
AUTOMATIC AIR CONDITIONING SYSTEM CONTROL PARTS LAYOUT

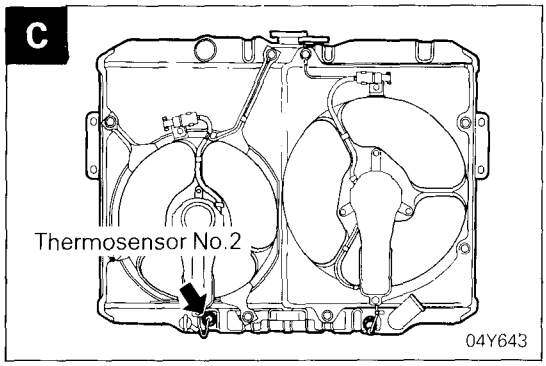
Name	Symbol	Name	Symbol
Automatic air conditioner control unit	H	Magnetic clutch relay	B
Automatic air conditioner self-diagnosis connector	J	Photo-sensor	G
Blower motor high speed relay	M	Power transistor	K
Blower motor starter cutout relay	M	Pressure switch	E
Condenser fan motor relay	B	Radiator fan, air conditioner relay (1), (2)	B
Dual pressure switch	E	Radiator fan motor relay 1, 2	F
Engine coolant temperature sensor	A	Solenoid valve No. 1	K
Engine coolant temperature switch	A	Solenoid valve No. 2, No. 3, No. 4	I
Foot area temperature sensor	L	Thermistor	M
Interior temperature sensor	N	Thermosensor No. 1	D
Light controller	M	Thermosensor No. 2	C

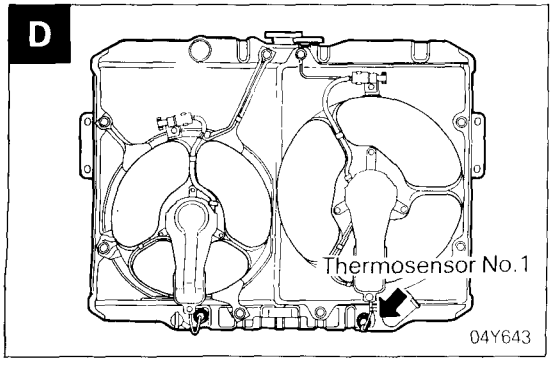
ENGINE COMPARTMENT

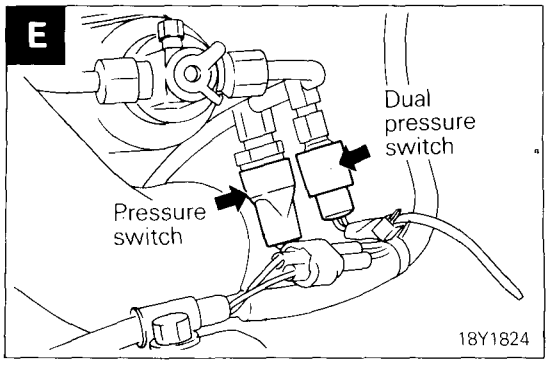




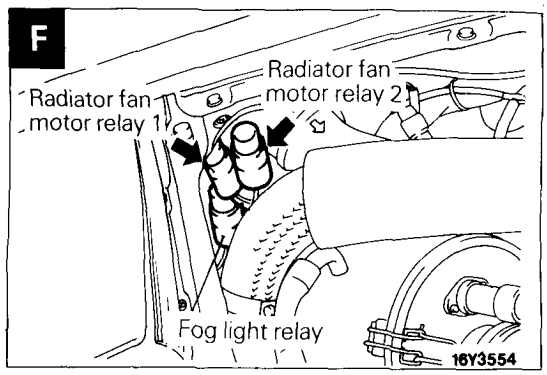




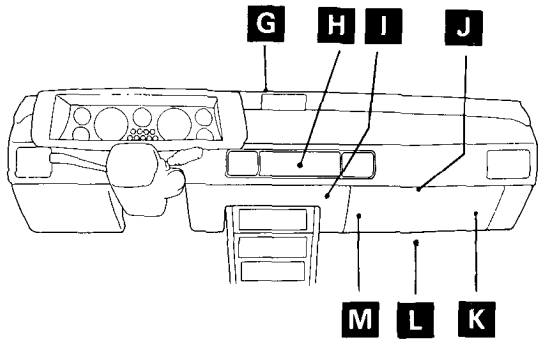




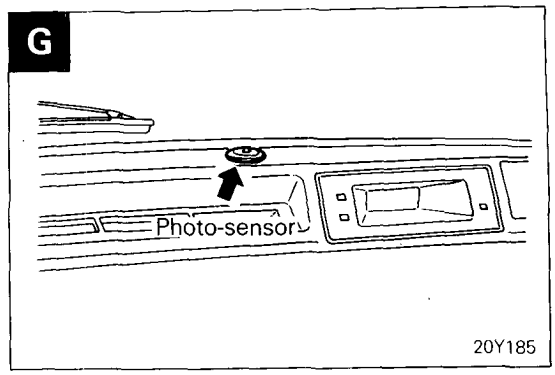
F



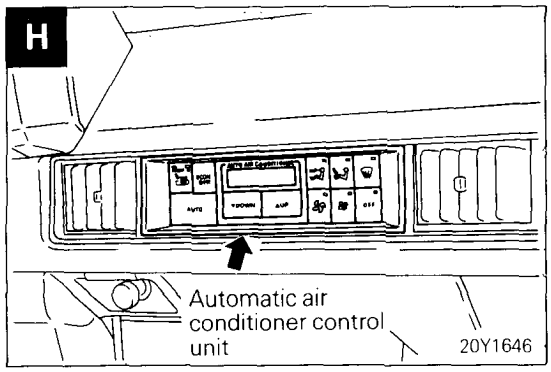
INSTRUMENT PANEL



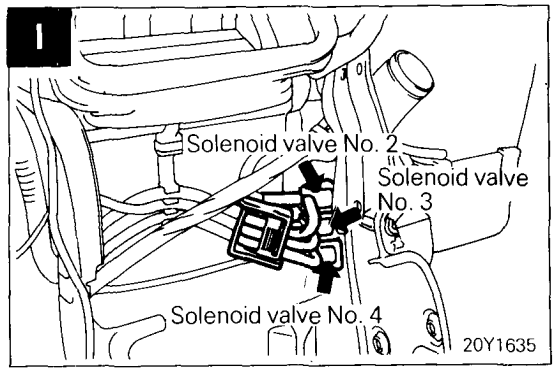
G



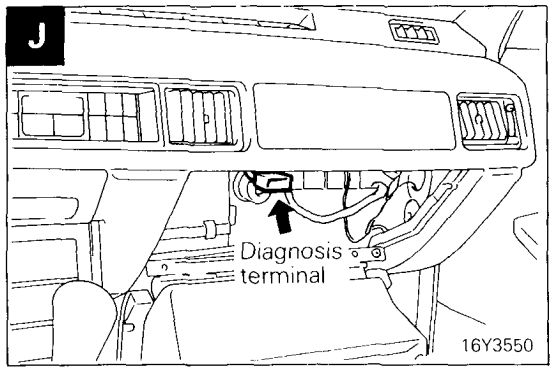
H



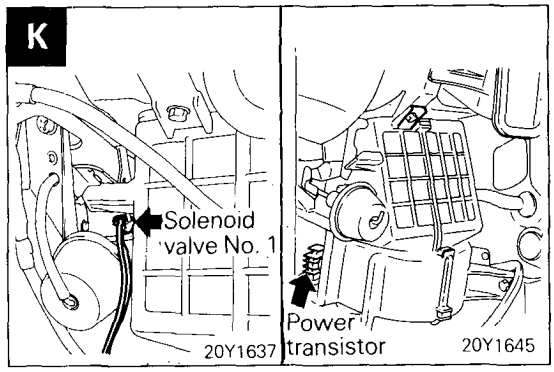
I



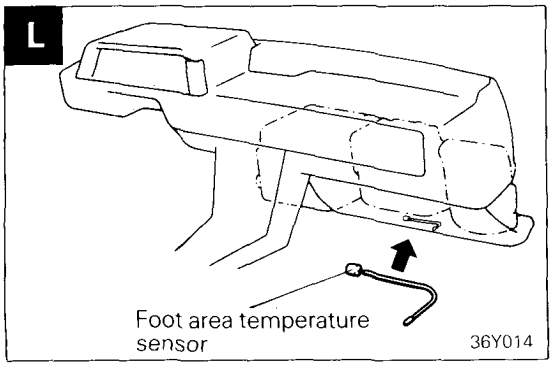
J



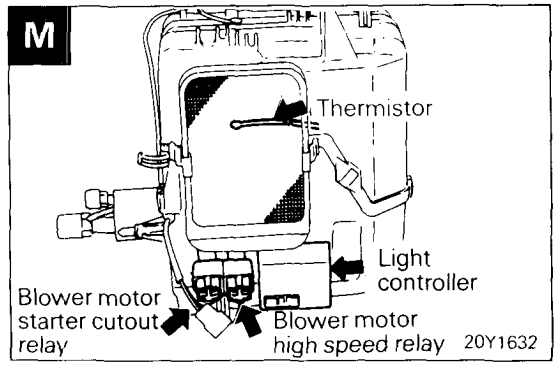
K



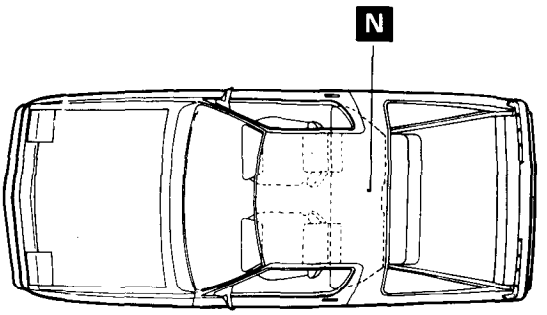
L



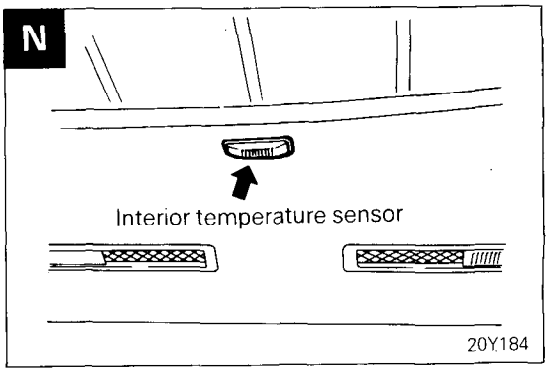
M



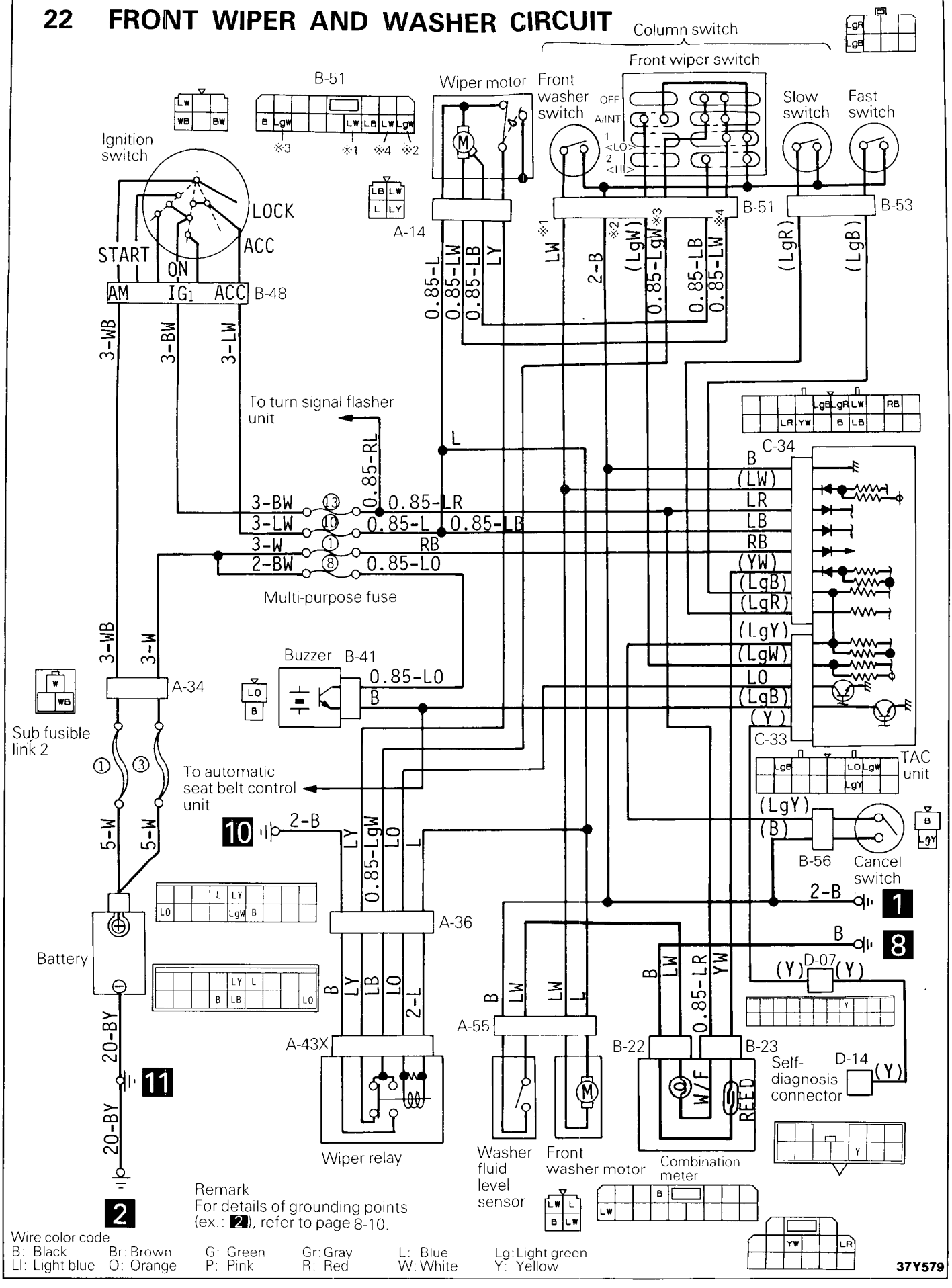
ROOF



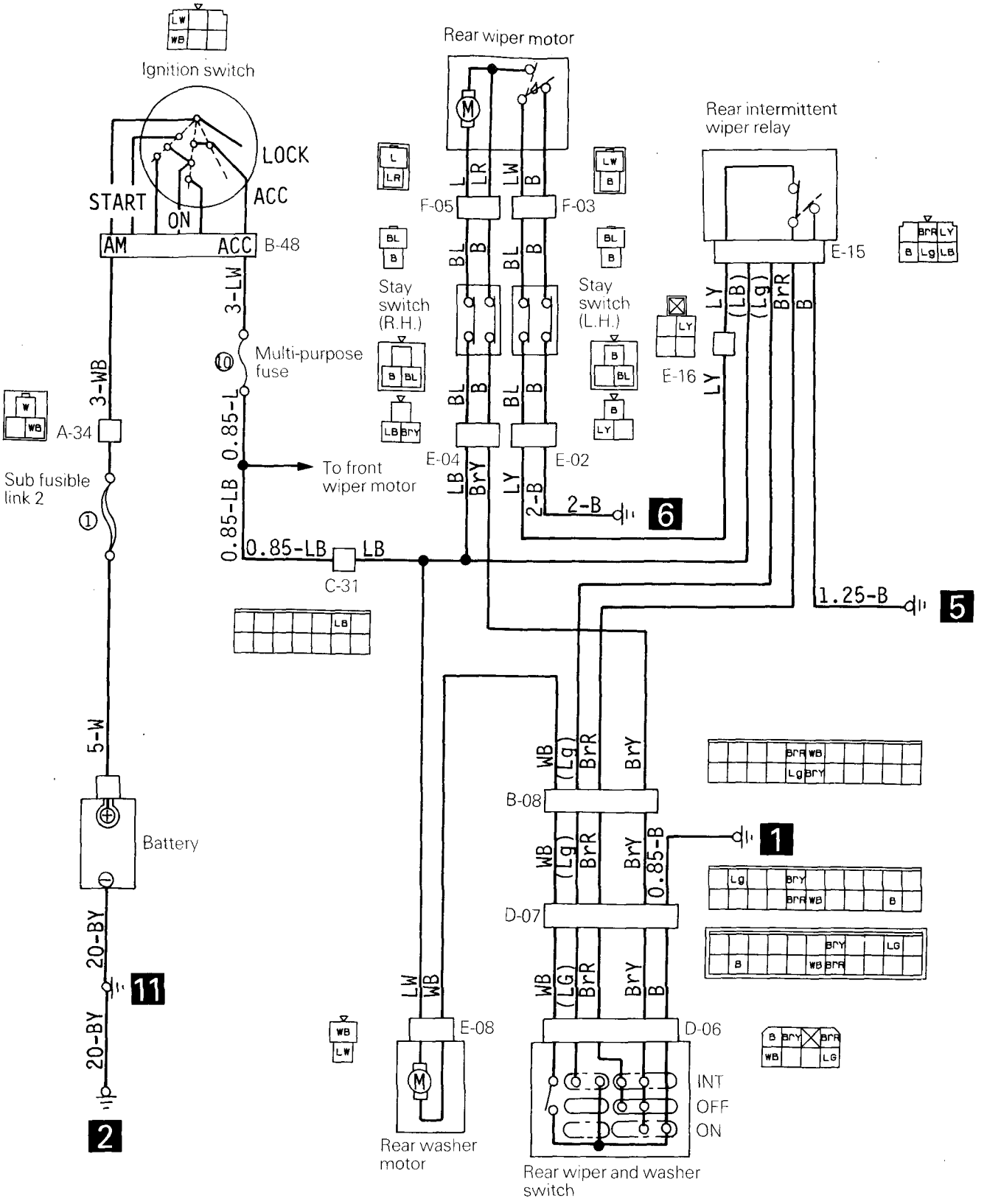
16Y2782



22 FRONT WIPER AND WASHER CIRCUIT



23 REAR WIPER AND WASHER CIRCUIT

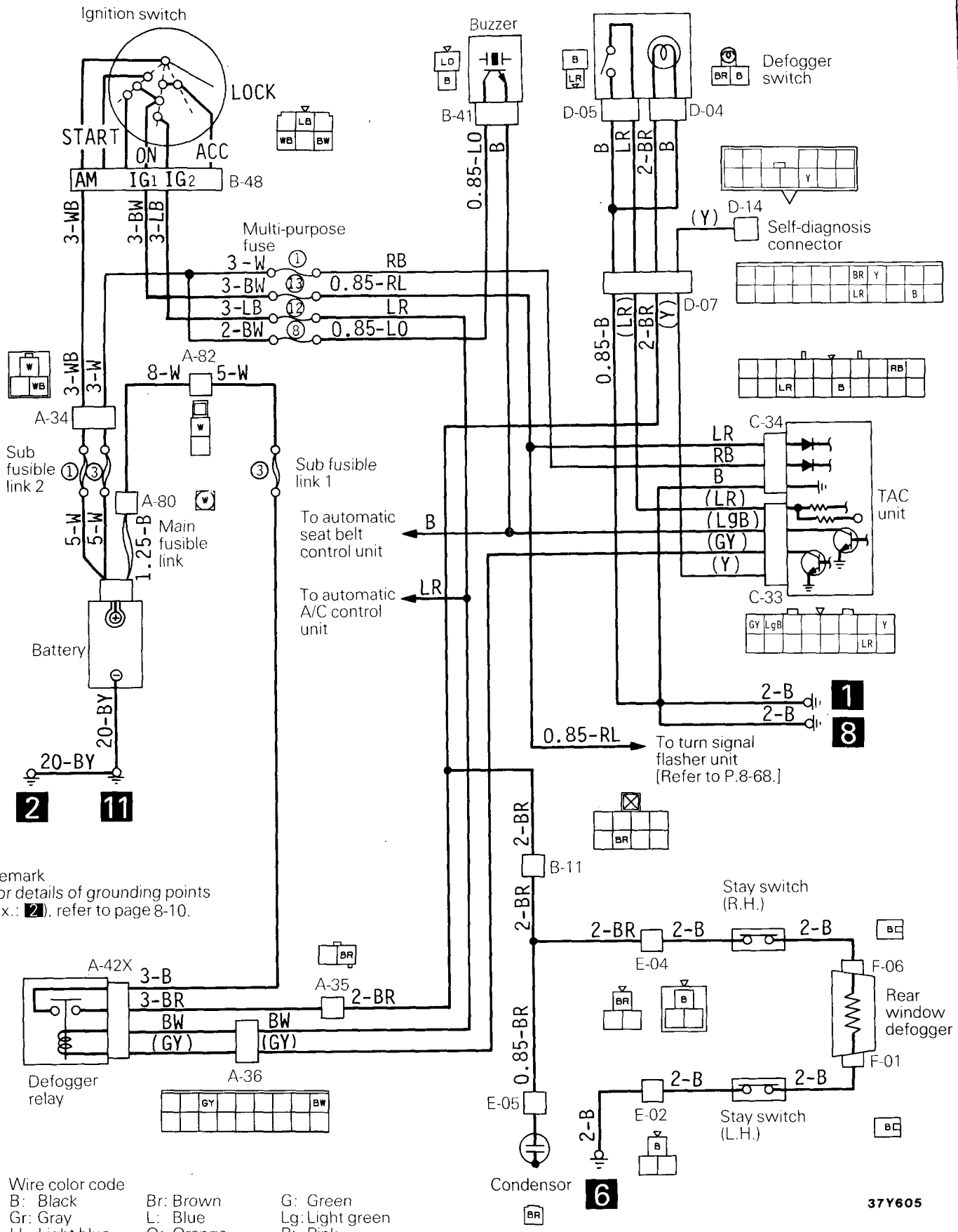


Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

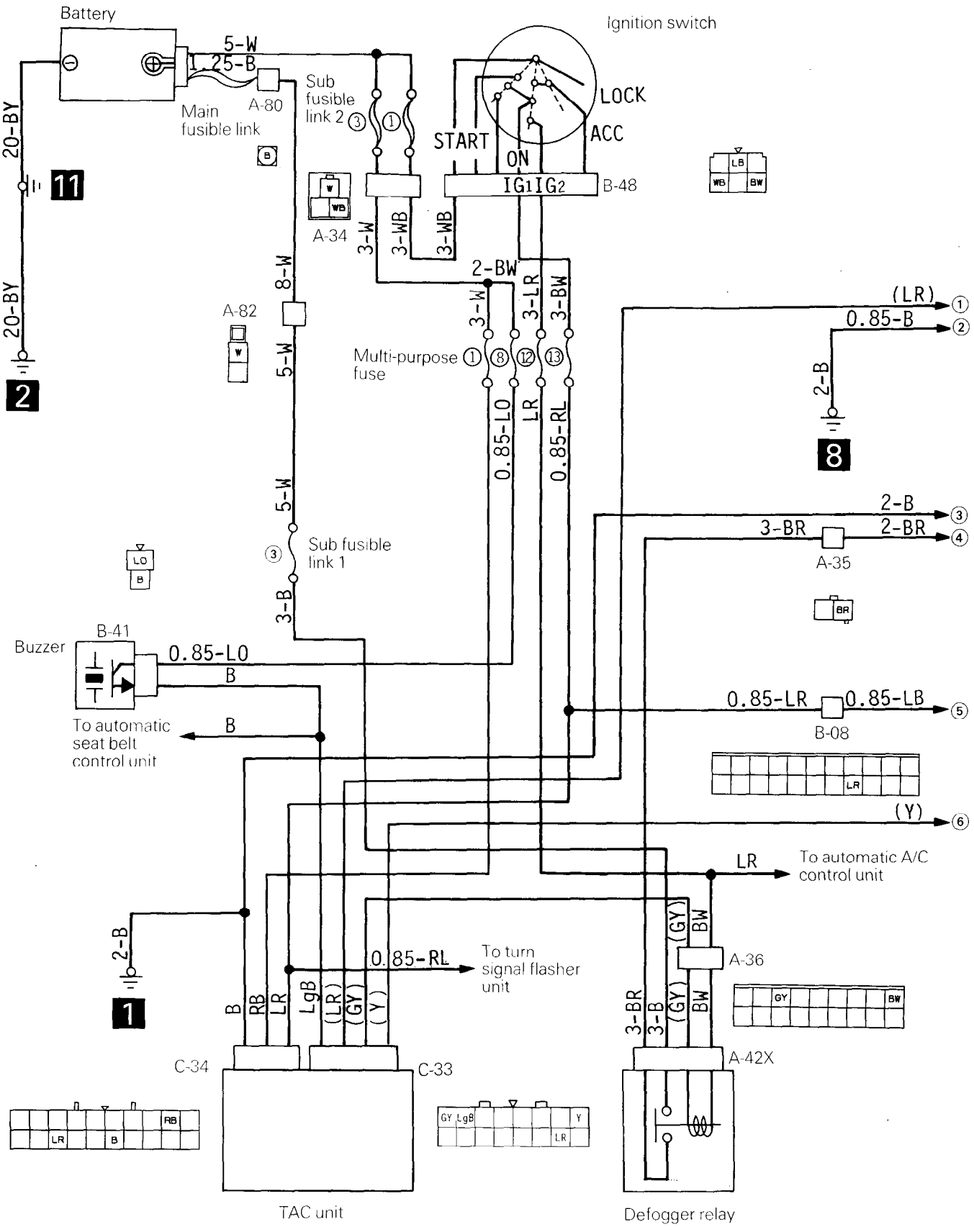
24 REAR WINDOW DEFOGGER CIRCUIT



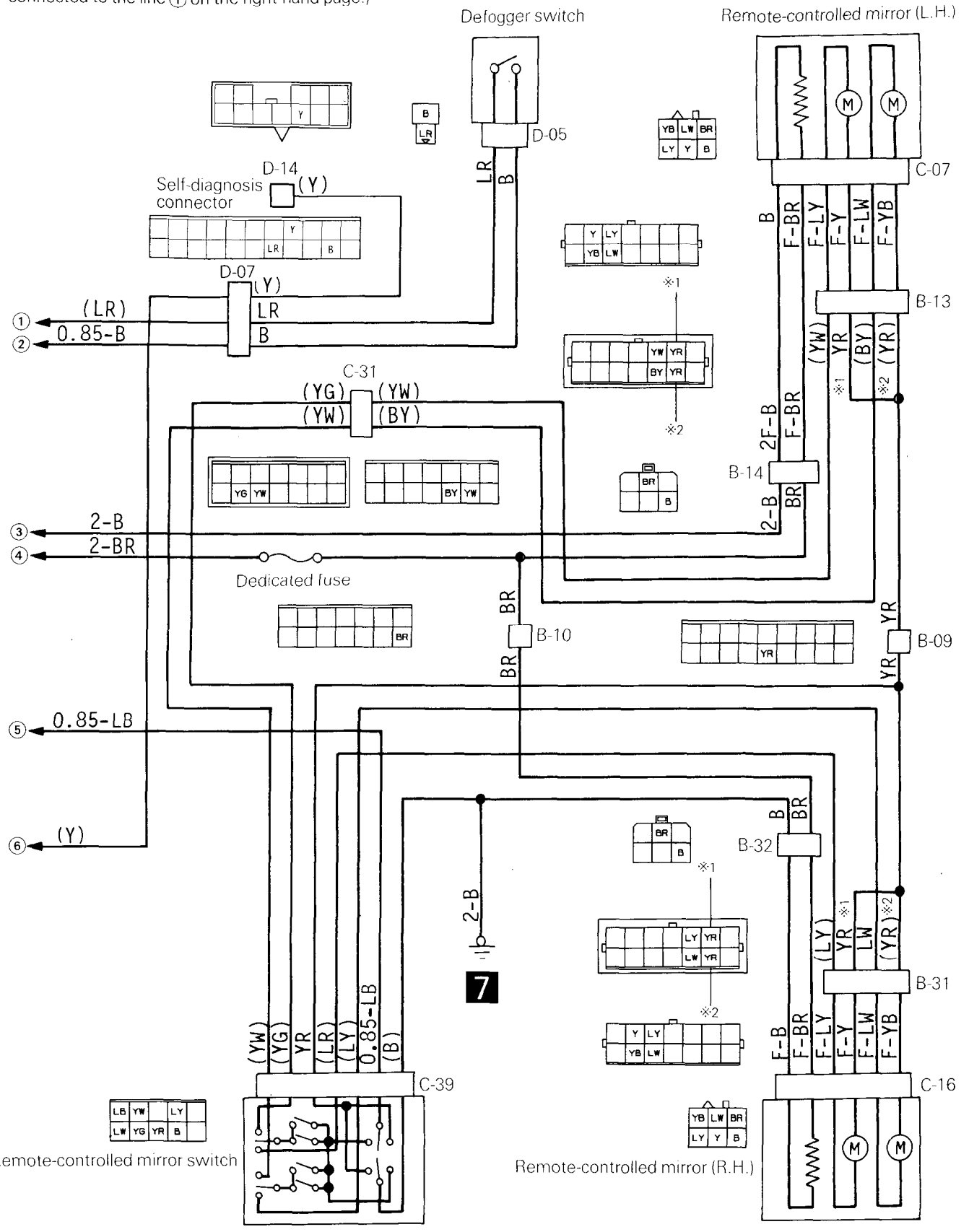
Wire color code

B: Black	Br: Brown	G: Green
Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink
R: Red	W: White	Y: Yellow

25 REMOTE CONTROLLED MIRROR CIRCUIT



Remarks
(1) For details of grounding points (ex.: 2), refer to page 8-10.
(2) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

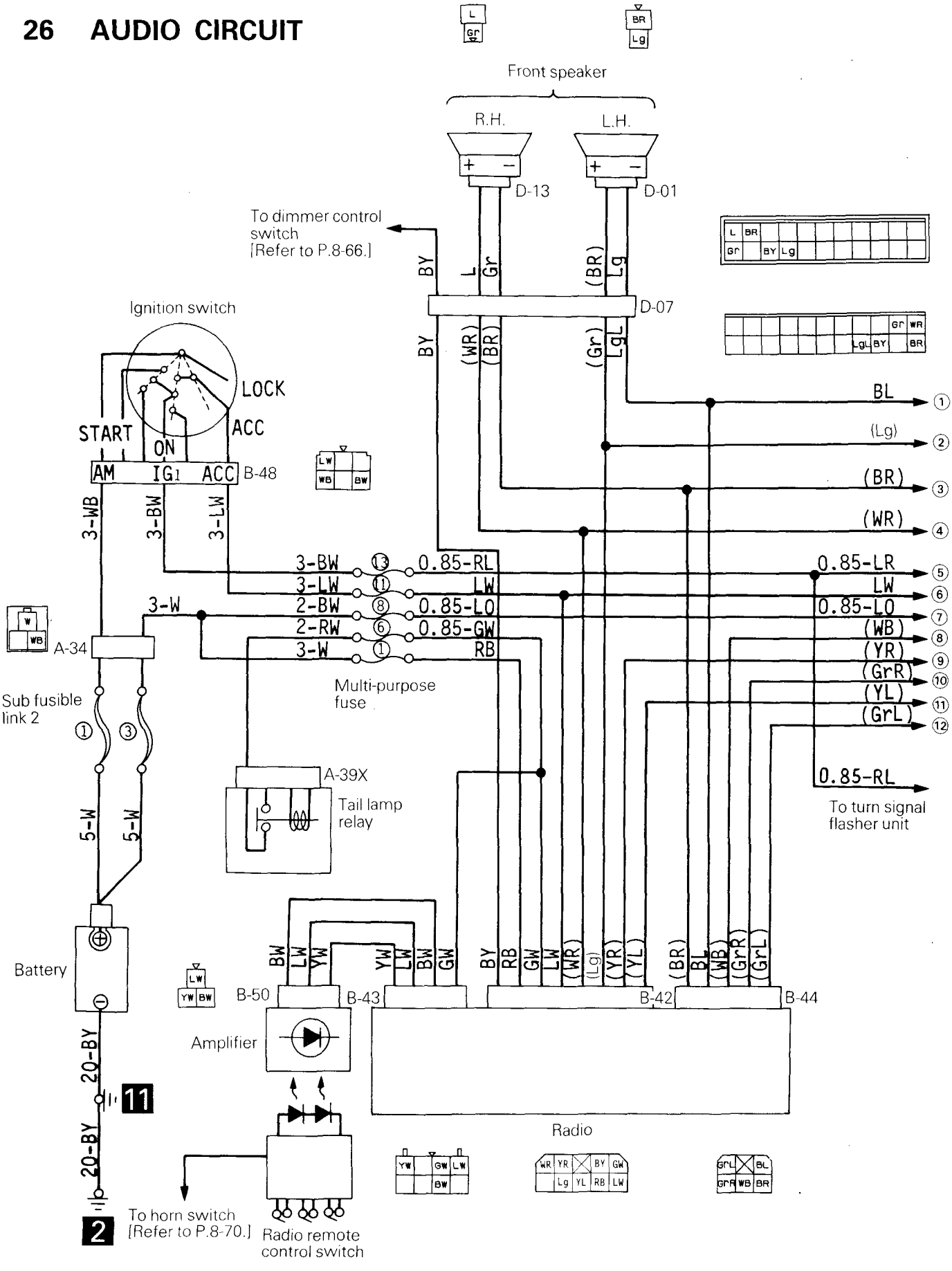


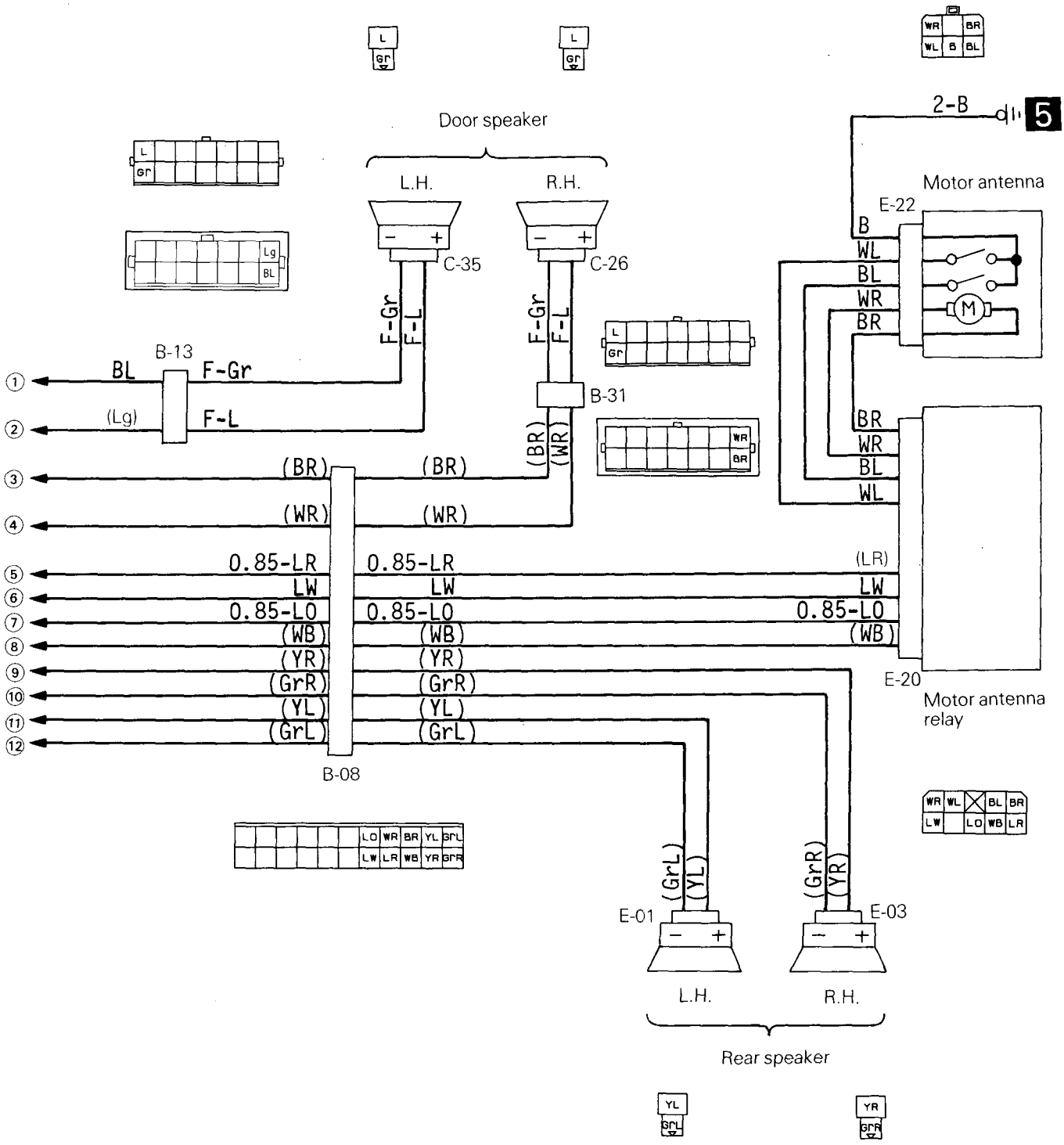
Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

37Y601

26 AUDIO CIRCUIT





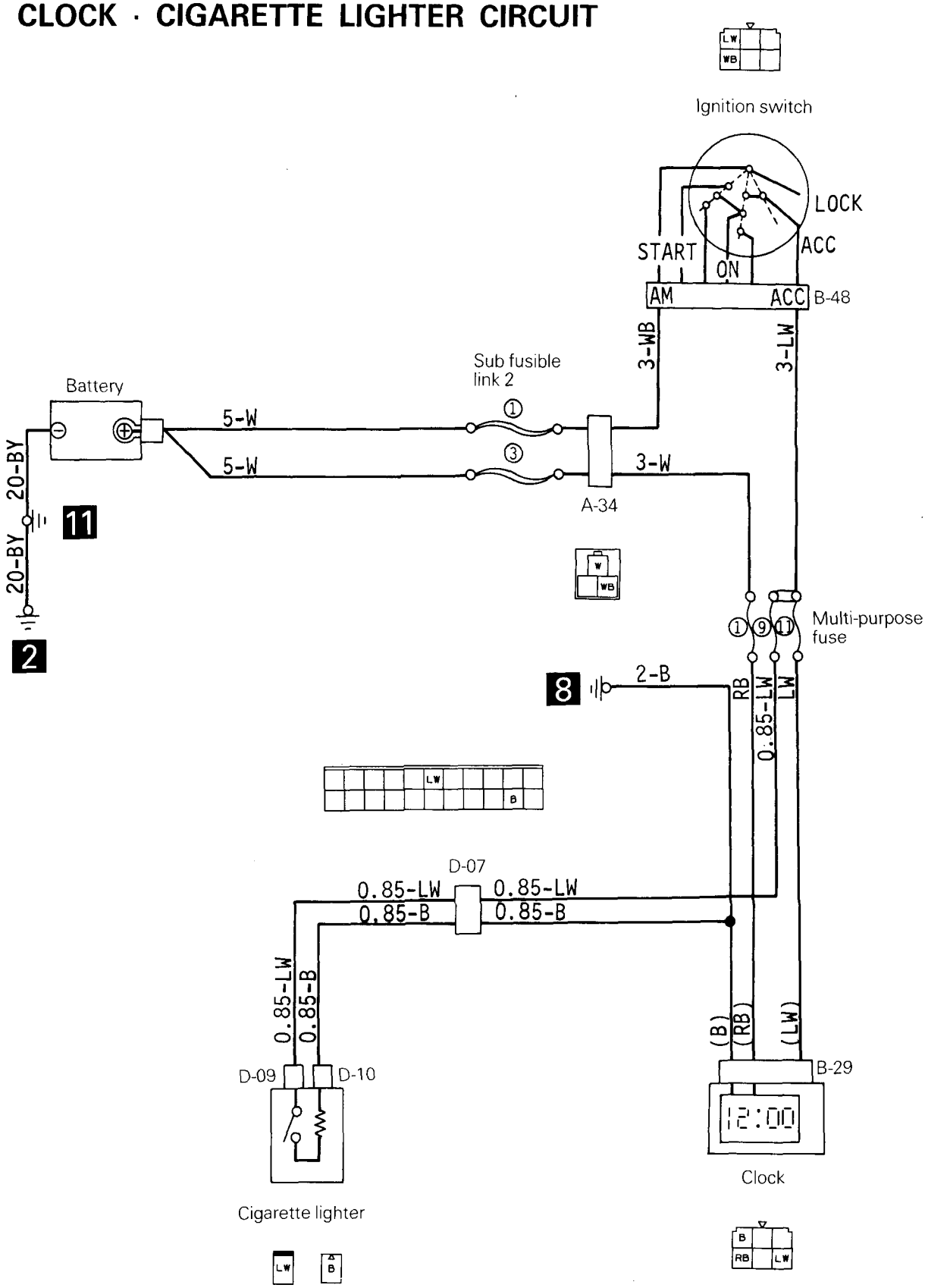
Remarks
(1) For details of grounding points (ex.: 2), *refer to page 8-10.*
(2) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

37Y572

27 CLOCK · CIGARETTE LIGHTER CIRCUIT



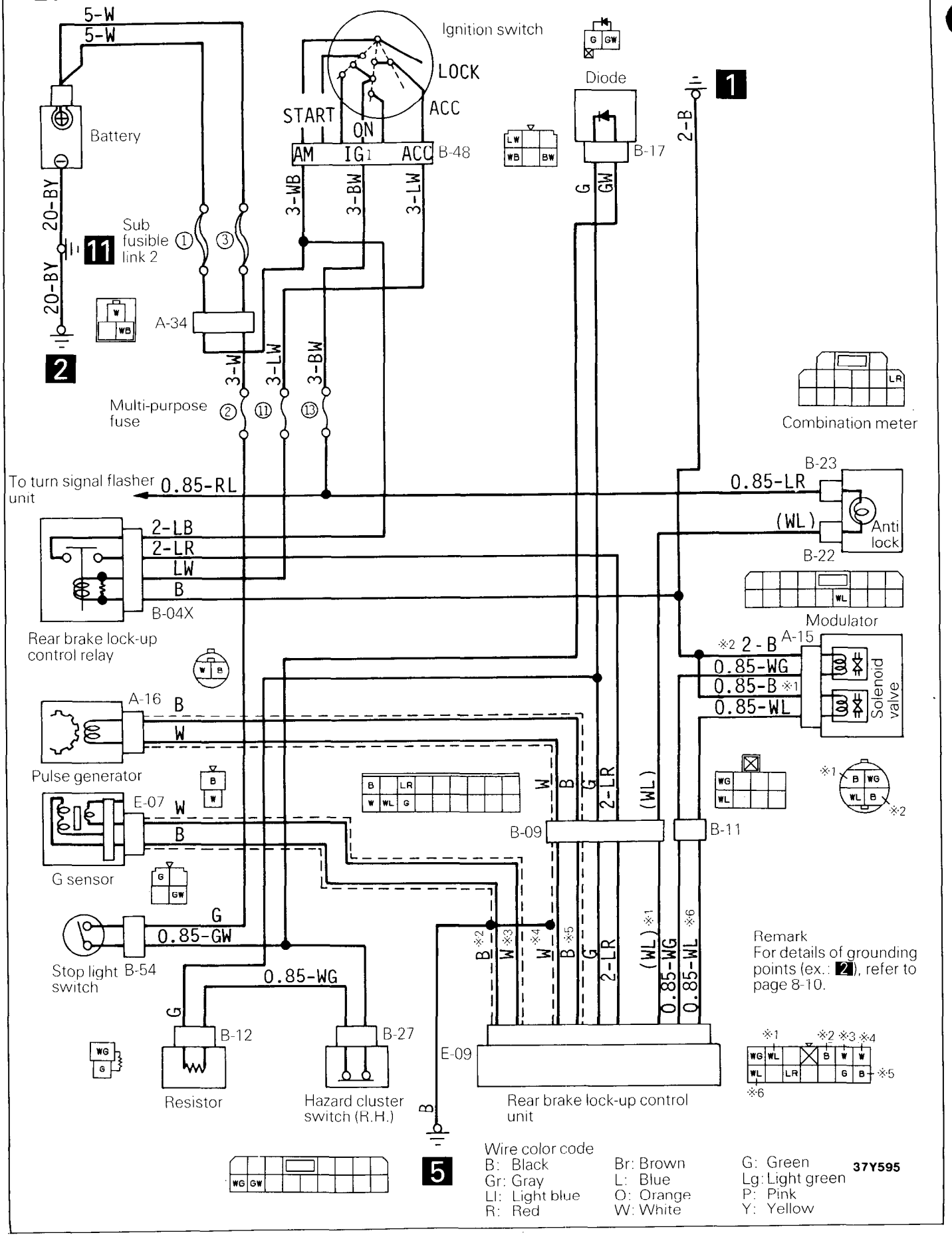
Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
LI: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

37Y570

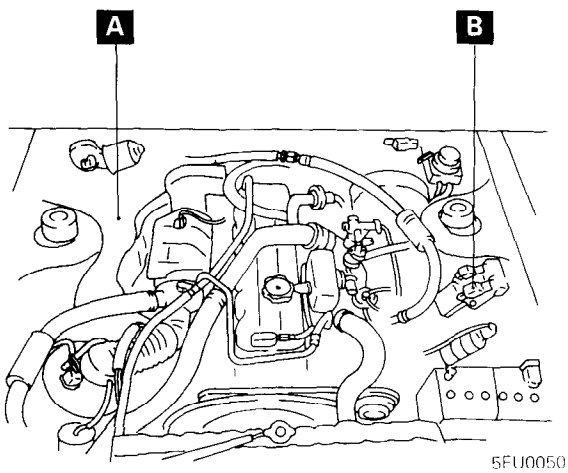
28 REAR BRAKE LOCK-UP CONTROL CIRCUIT

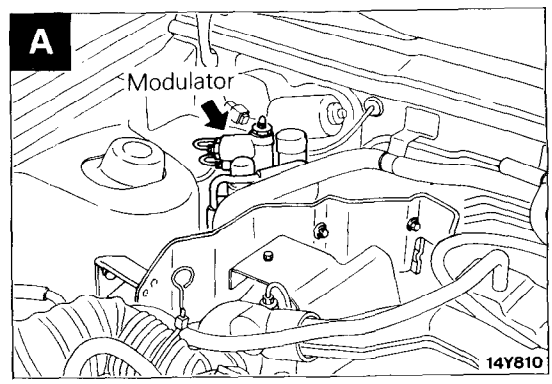


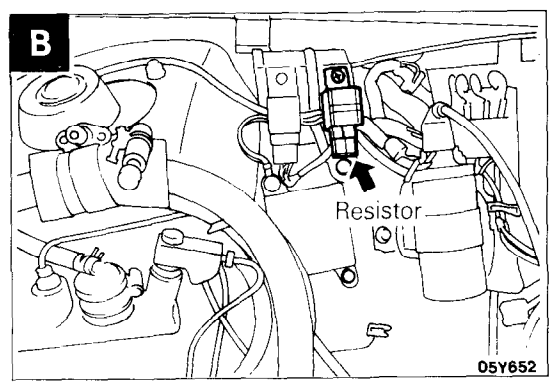
REAR BRAKE LOCK-UP CONTROL SYSTEM – CONTROL PARTS LAYOUT

Name	Symbol	Name	Symbol
G-sensor	F	Rear brake lock-up control relay	C
Modulator	A	Rear brake lock-up control unit	E
Pulse generator	D	Resistor	B

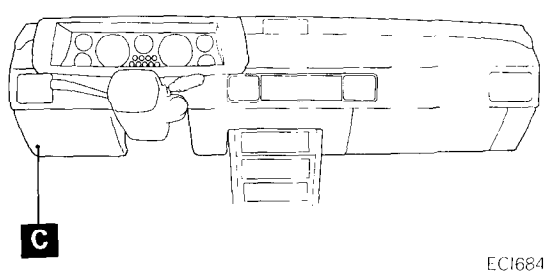
ENGINE COMPARTMENT

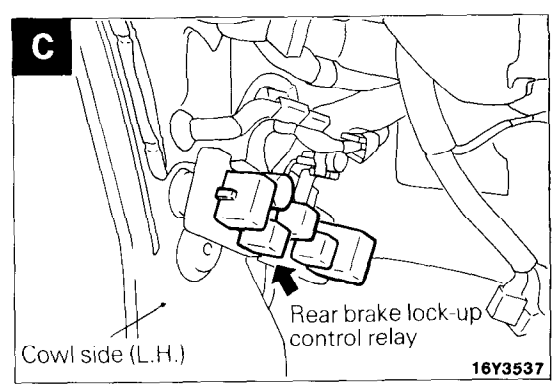




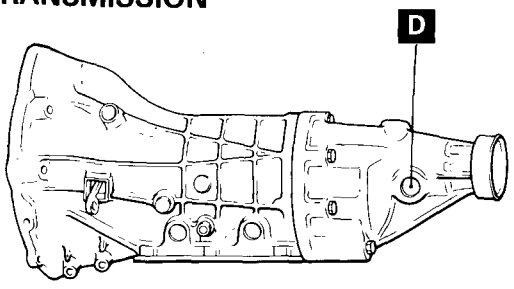


INSTRUMENT PANEL

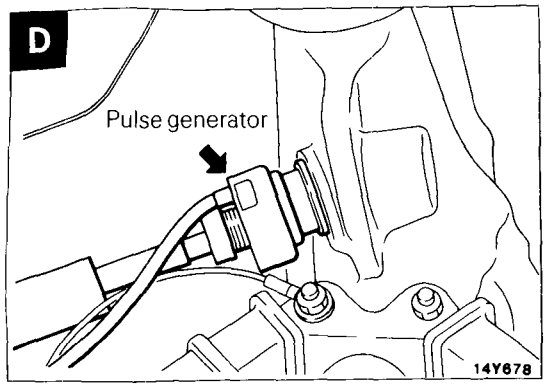




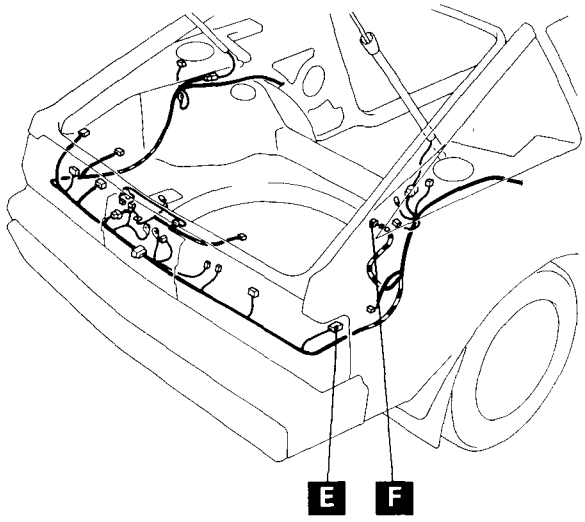
TRANSMISSION



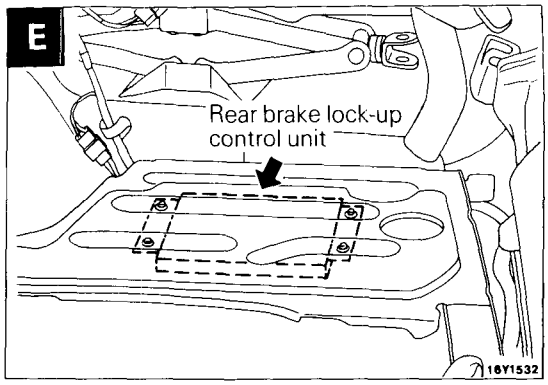
09Y665

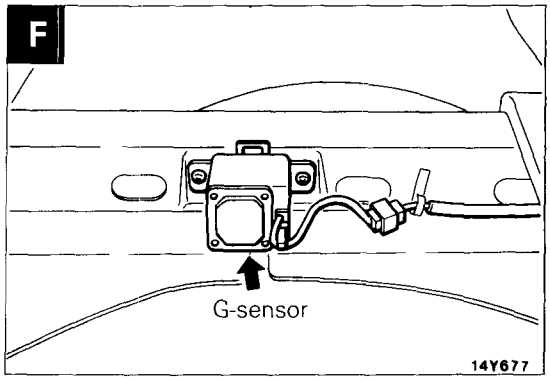


LUGGAGE COMPARTMENT

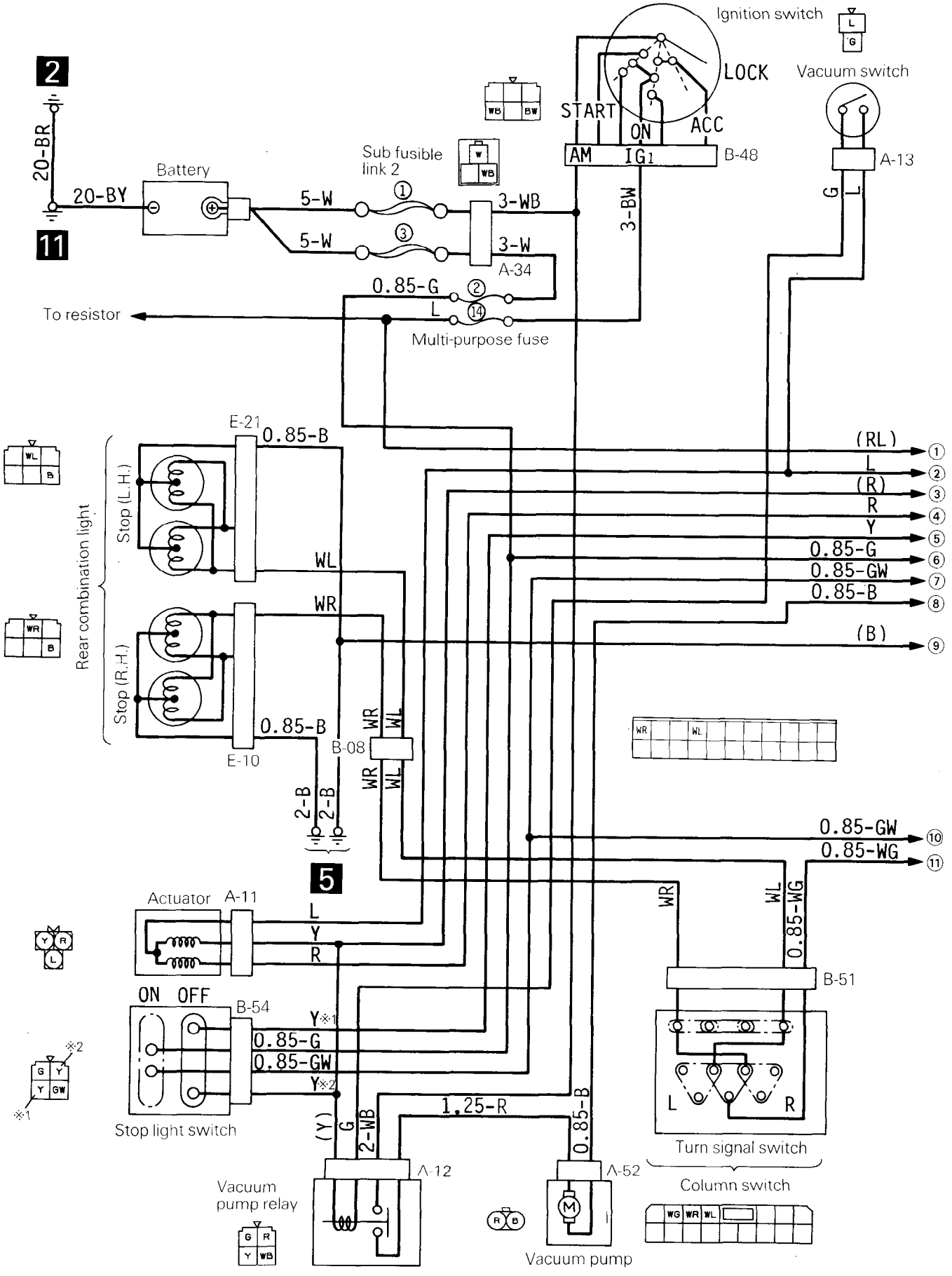


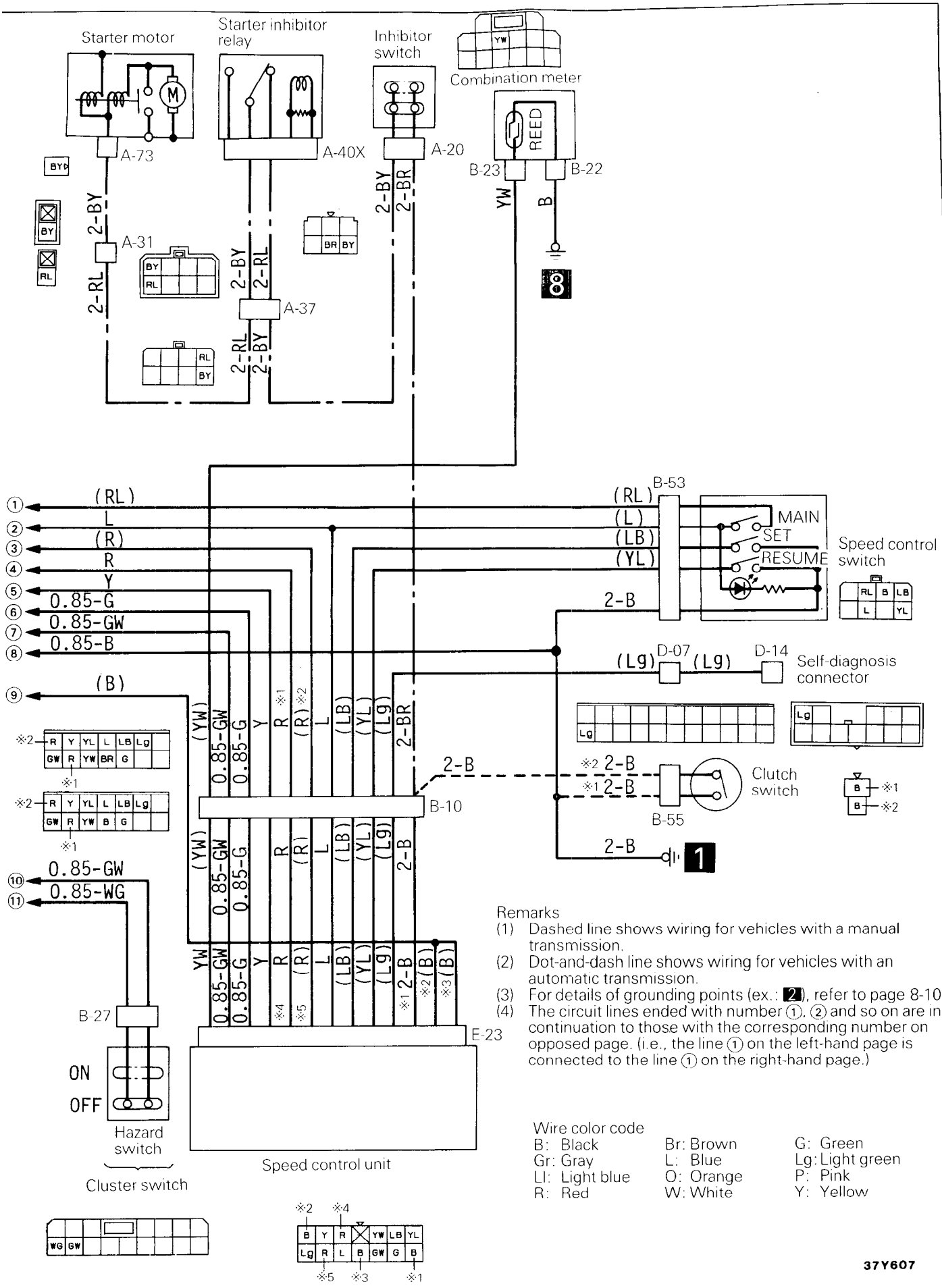
36Y559





29 SPEED CONTROL SYSTEM CIRCUIT





Remarks
(1) Dashed line shows wiring for vehicles with a manual transmission.
(2) Dot-and-dash line shows wiring for vehicles with an automatic transmission.
(3) For details of grounding points (ex.: 2), refer to page 8-10.
(4) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

Wire color code

B: Black	Br: Brown	G: Green
Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink
R: Red	W: White	Y: Yellow

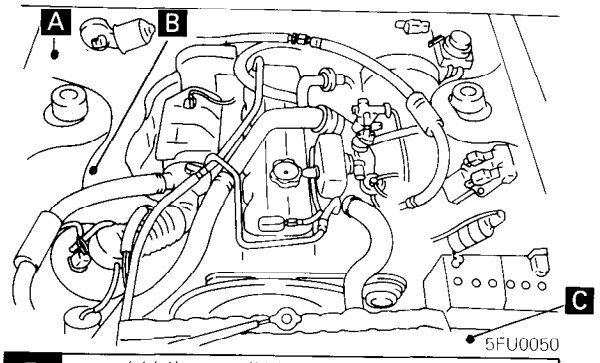
37Y607

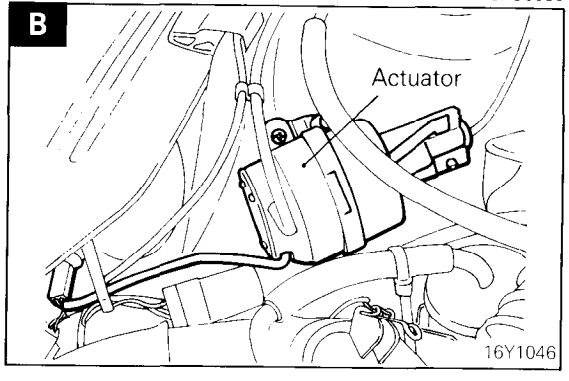
AUTOMATIC SPEED CONTROL SYSTEM CONTROL PARTS LAYOUT

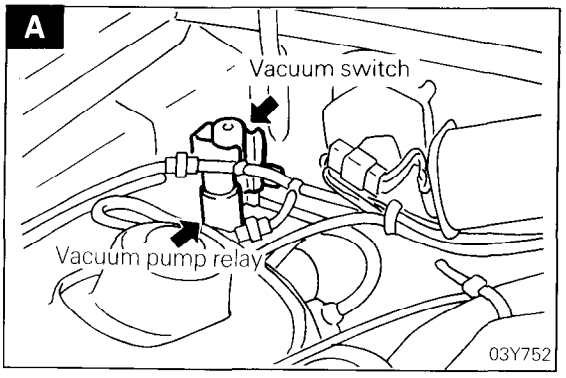
N14ED-A

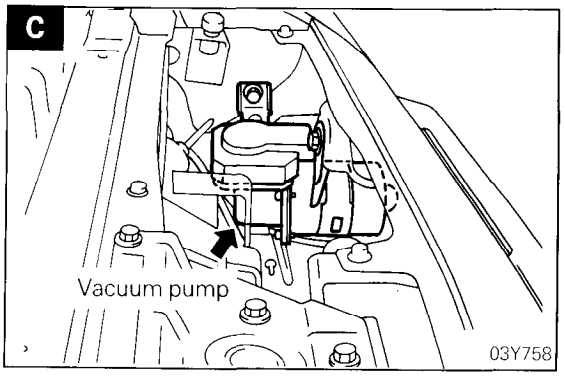
Name	Symbol	Name	Symbol
Actuator	B	Electronic control unit (ECU)	G
Brake switch	E	Vacuum pump	C
Clutch switch (Vehicles with manual transmission)	F	Vacuum pump relay	A
Diagnosis terminal	D	Vacuum switch	A

ENGINE COMPARTMENT

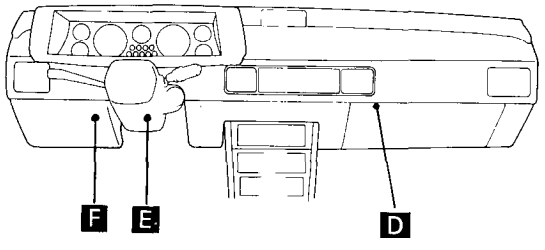


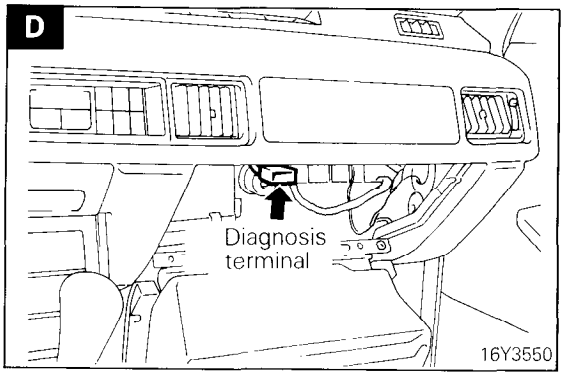


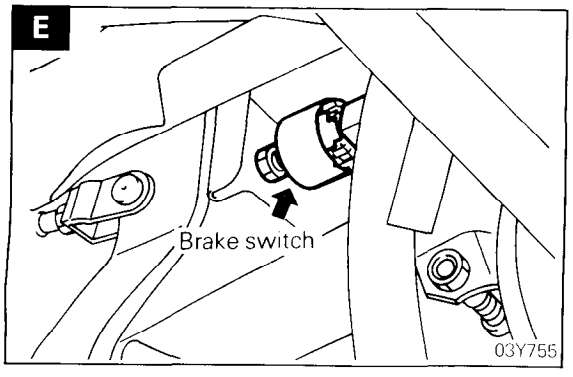


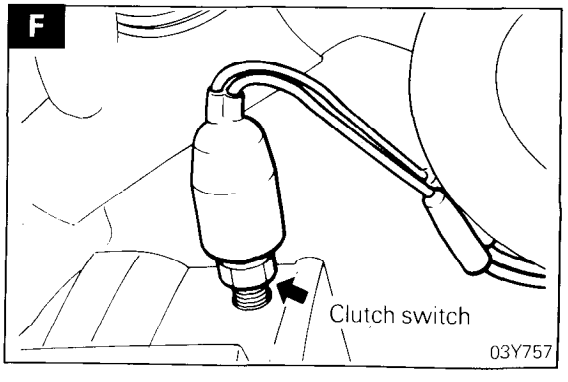


INSTRUMENT PANEL

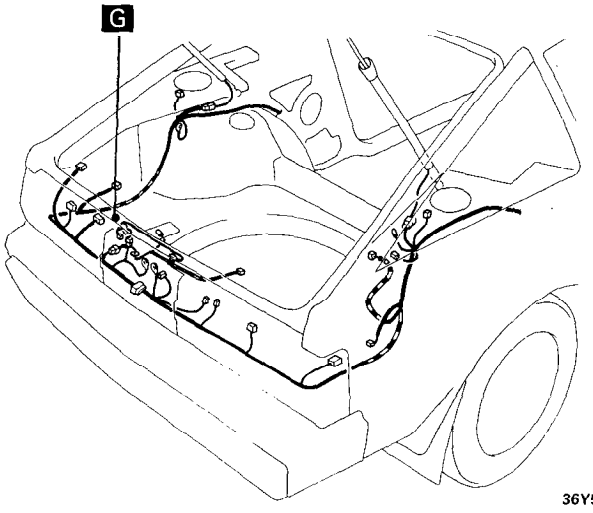




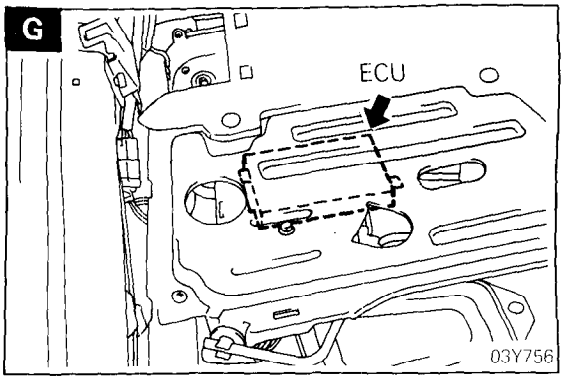




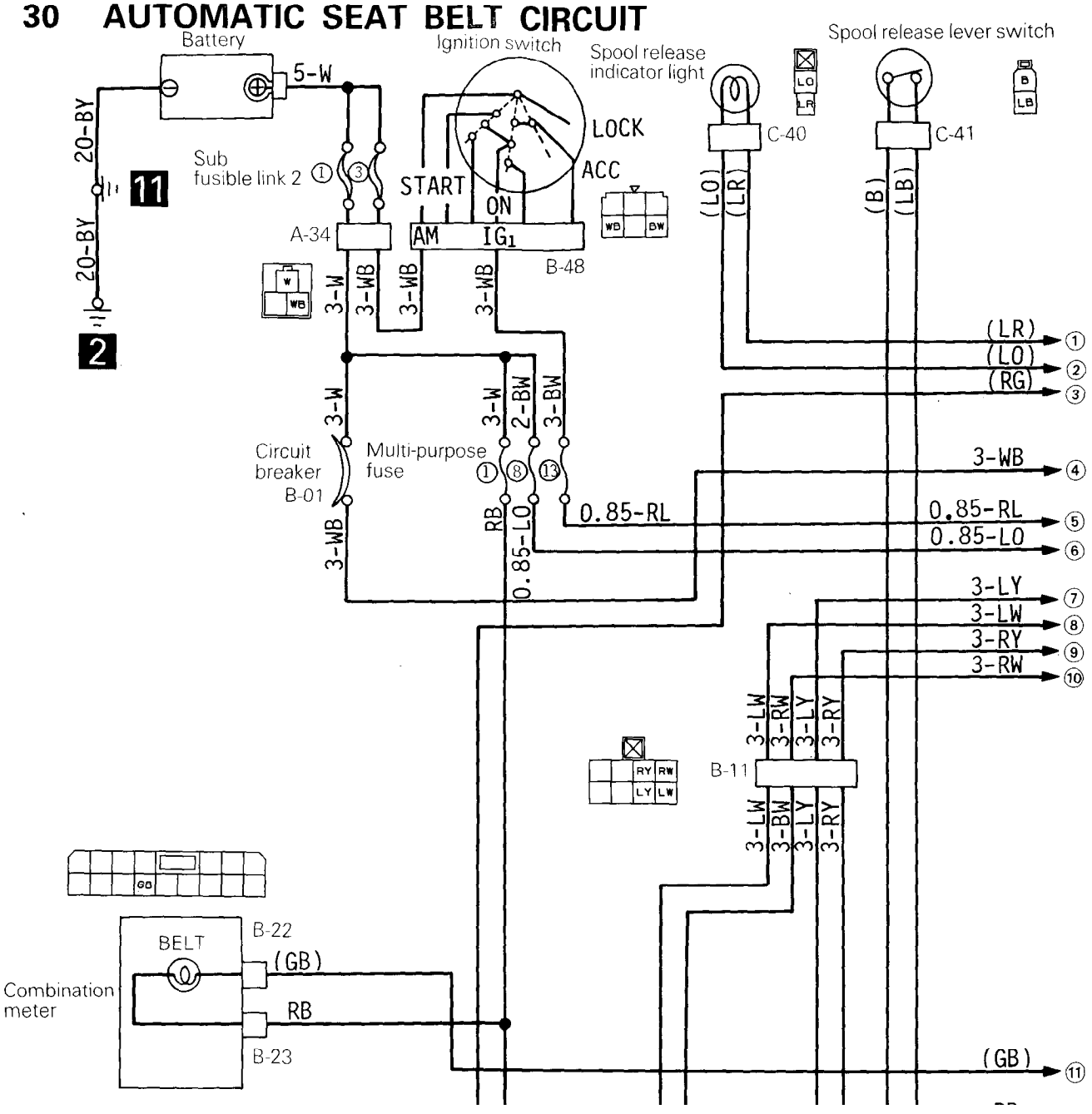
LUGGAGE COMPARTMENT



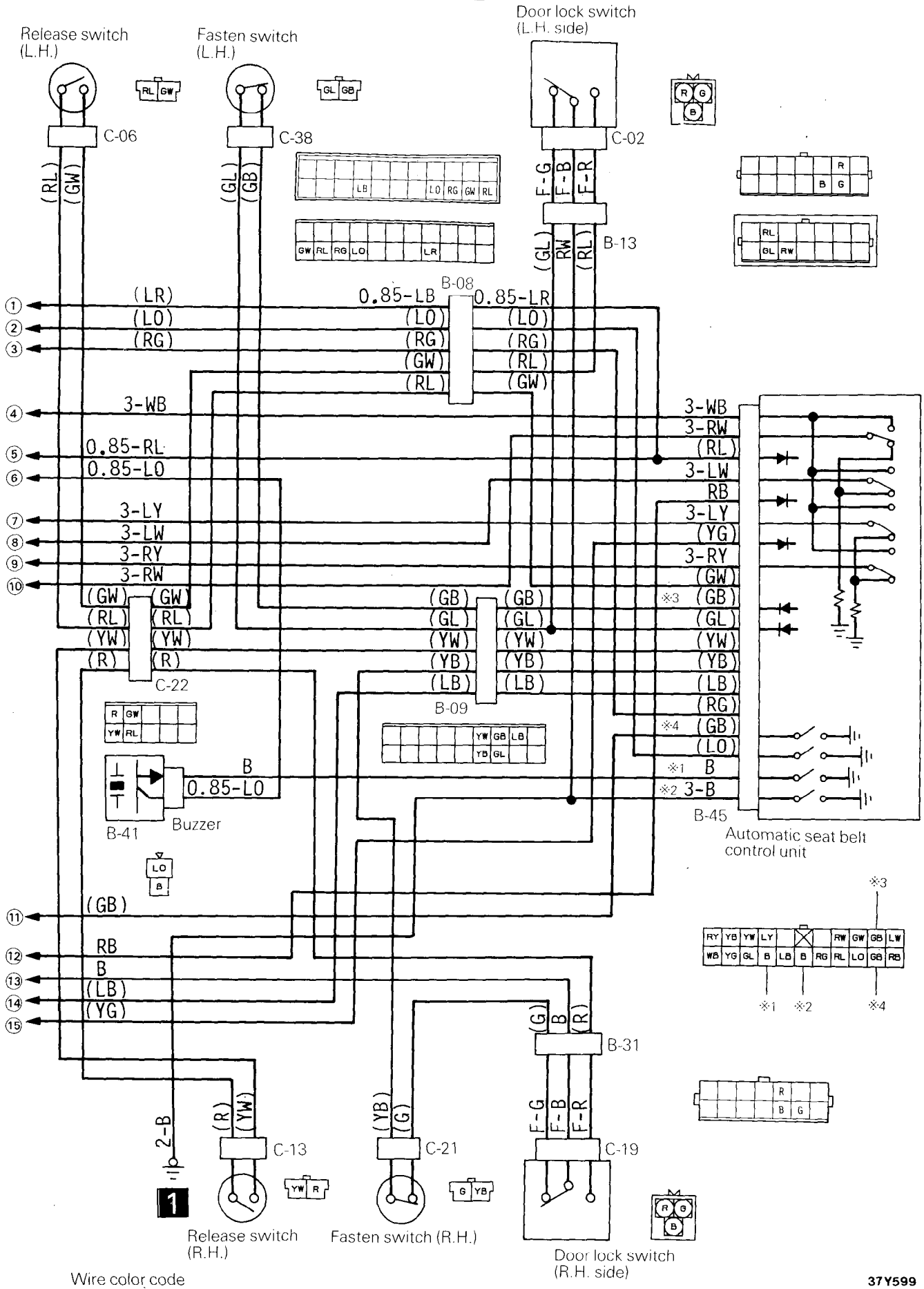
36Y559



30 AUTOMATIC SEAT BELT CIRCUIT



Remarks
(1) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)
(2) For details of grounding points (ex.: 2), refer to page 8-10.

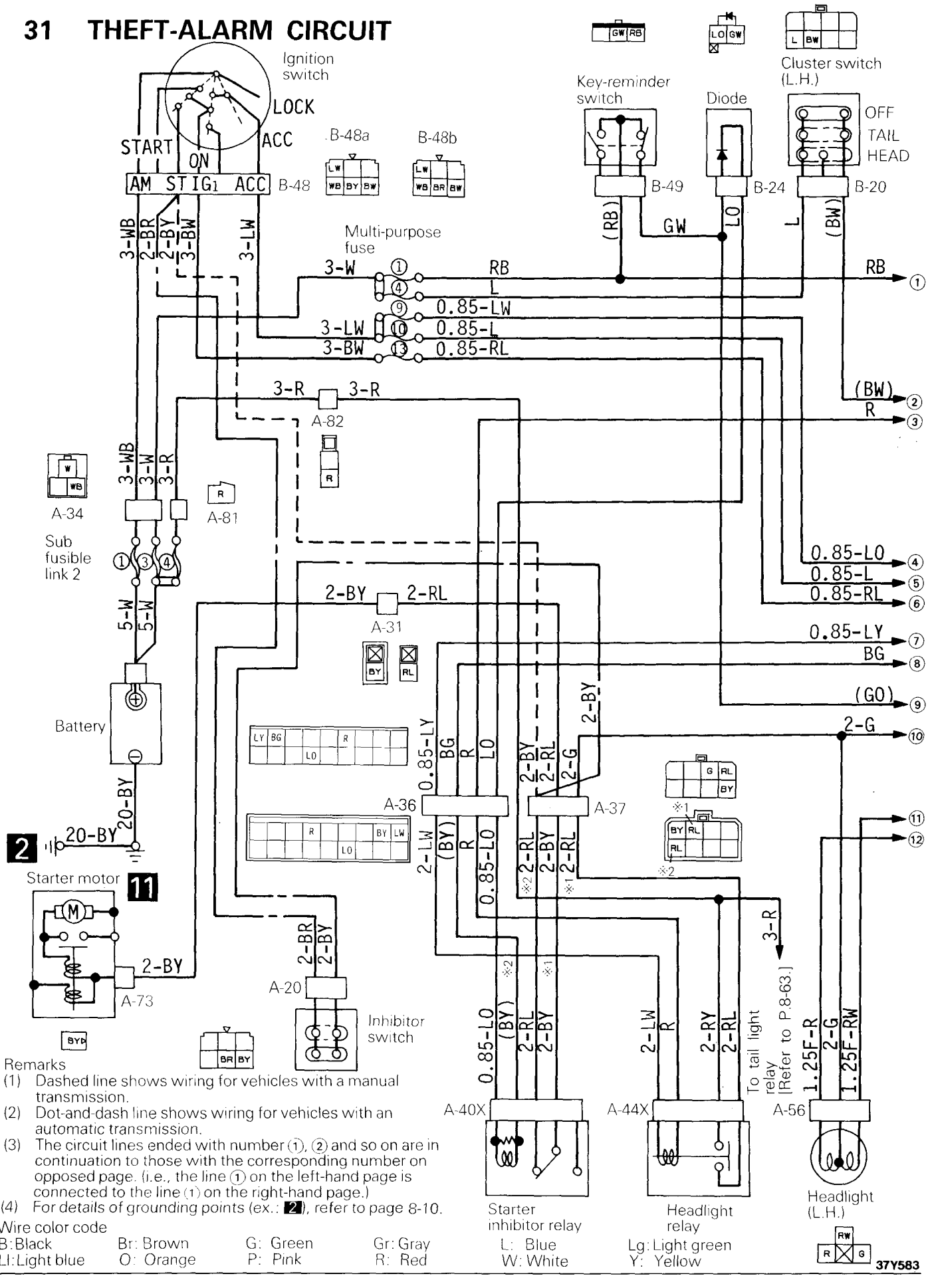


Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

37Y599

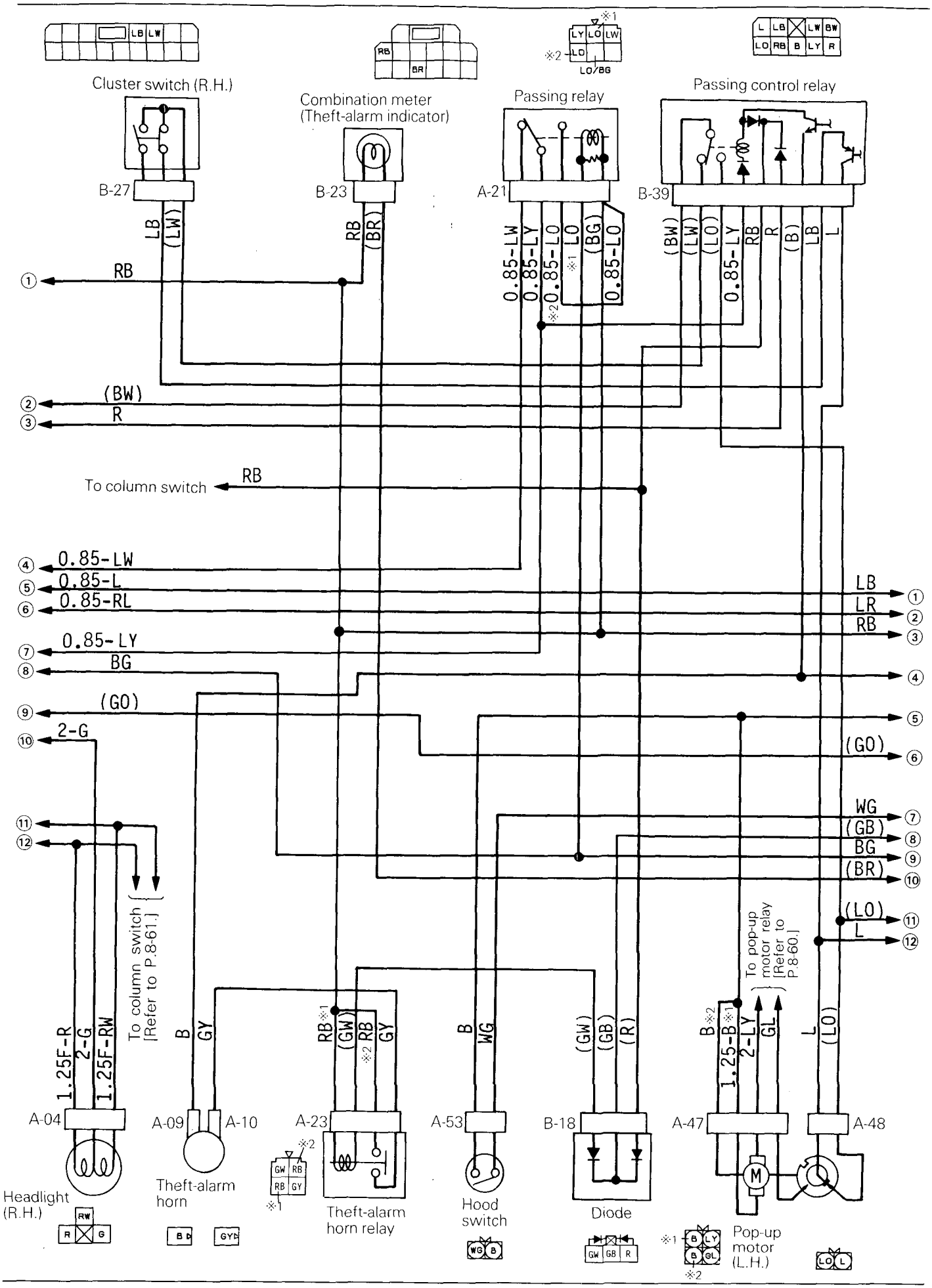
31 THEFT-ALARM CIRCUIT

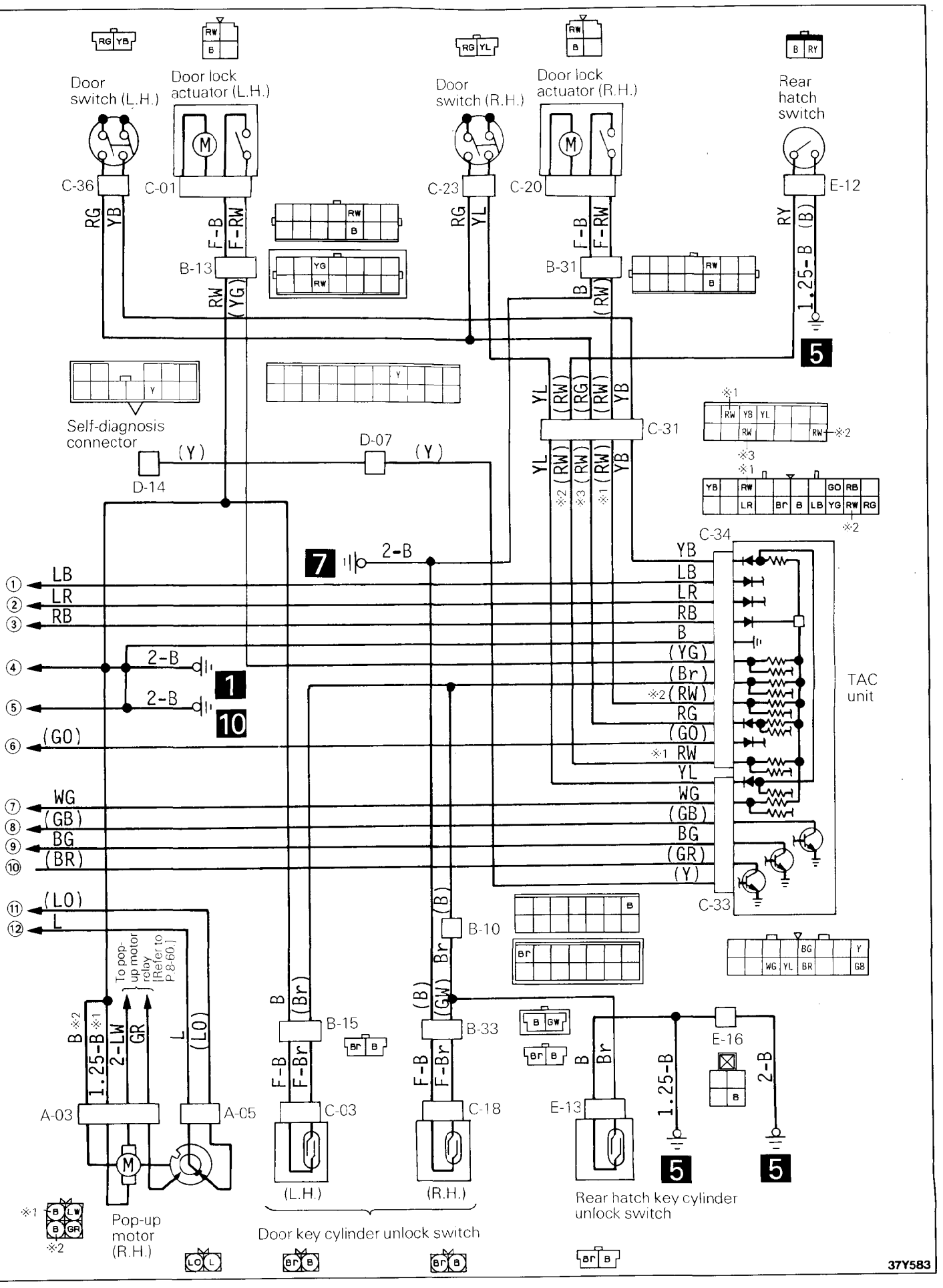


Remarks
(1) Dashed line shows wiring for vehicles with a manual transmission.
(2) Dot-and-dash line shows wiring for vehicles with an automatic transmission.
(3) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)
(4) For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow


Cluster switch (R.H.)
Combination meter (Theft-alarm indicator)
Passing relay
Passing control relay
B-27
B-23
A-21
B-39
LB (LW)
RB (BR)
0.85-LW
0.85-LY
0.85-LO
LO (BG)
(BW)
(LW)
(LO)
RB
R
(B)
LB
L
RB
(BW)
R
To column switch
RB
0.85-LW
0.85-L
0.85-RL
0.85-LY
BG
(GO)
2-G
LB
LR
RB
(GO)
WG
(GB)
BG
(BR)
(LO)
L
To column switch [Refer to P.8-61.]
To pop-up motor relay [Refer to P.8-60.]
1.25F-R
2-G
1.25F-RW
B
GY
RB (GW)
RB
GY
B
WG
(GW)
(GB)
(R)
B
1.25-B
2-LY
GL
L
(LO)
A-04
A-09
A-10
A-23
A-53
B-18
A-47
A-48
Headlight (R.H.)
Theft-alarm horn
Theft-alarm horn relay
Hood switch
Diode
Pop-up motor (L.H.)


Door switch (L.H.)
Door lock actuator (L.H.)
Door switch (R.H.)
Door lock actuator (R.H.)
Rear hatch switch
C-36
C-01
C-23
C-20
E-12
B-13
B-31
Self-diagnosis connector
D-14
D-07
C-31
C-34
TAC unit
C-33
B-10
B-15
B-33
C-03
C-18
E-13
E-16
A-03
A-05
Pop-up motor (R.H.)
To pop-up motor relay [Refer to P.8-60.]
(L.H.)
(R.H.)
Door key cylinder unlock switch
Rear hatch key cylinder unlock switch
37Y583

32 CENTRALIZED JUNCTION

Main Fusible Link

Item	Wire color	Size	
		mm^2	$in.^2$
Pop-up, Defogger, Power window circuit	Black	1.25	0.0019

Sub Fusible Link 1

Item	No.	Wire color	Size	
			mm^2	$in.^2$
Pop-up circuit	1	Green	0.5	0.0008
Defogger circuit	3	Green	0.5	0.0008
Power window circuit	4	Green	0.5	0.0008

Sub Fusible Link 2

Item	No.	Wire color	Size	
			mm^2	$in.^2$
Ignition circuit	1	Red	0.85	0.0013
ECI system circuit	2	Brown	0.3	0.0005
Battery circuit	3	Red	0.85	0.0013
Headlight circuit	4	Green	0.5	0.0008

Dedicated Fuse

Item	No.	Rated capacity A
High beam circuit	1	5
Fog light circuit	2	15
Heated remote controlled mirror circuit	–	5

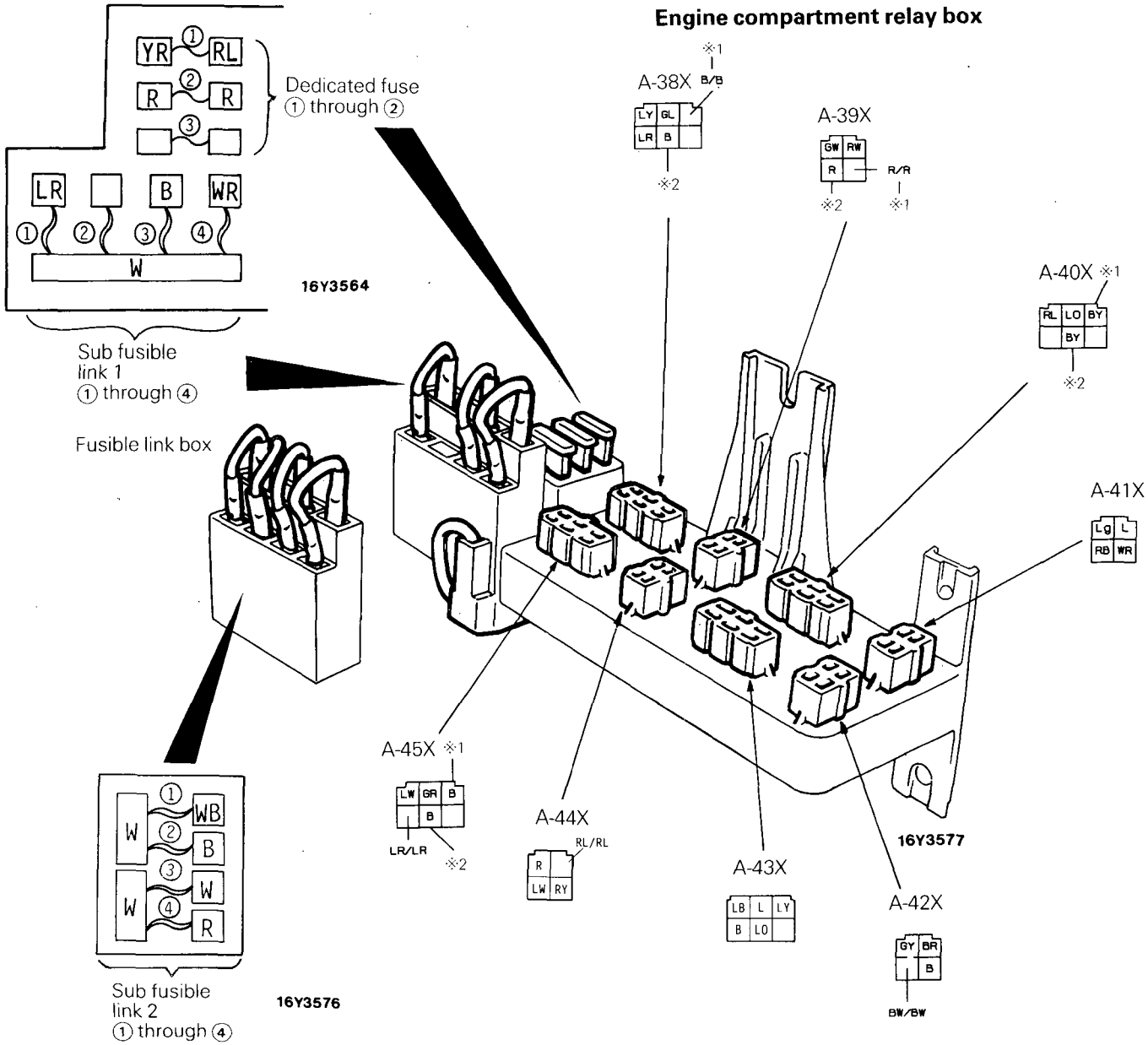
Circuit Breaker

Item	Rated capacity A
Automatic seat belt circuit	20

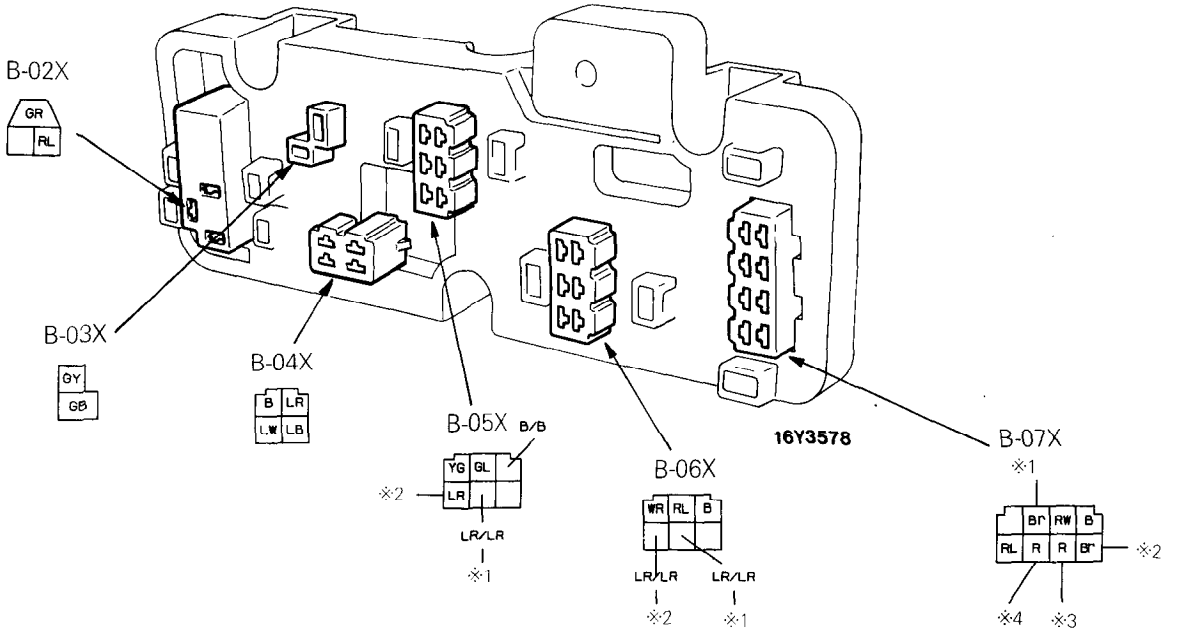
Power supply circuit	Fuse No.	Rated capacity A	Load circuit
Battery	1	10	Dome light, Luggage compartment light, Automatic seat belt, Clock, Radio, Door light, ETACS, Theft alarm
	2	15	Stop light, Speed control unit
	3	15	Hazard
	4	10	Pop-up motor
	5	20	Blower motor
Tail light	6	15	Position light, Illumination light, Tail light, License plate light
Battery	7	10	Magnet clutch
	8	15	Power antenna, Central door lock, Power window relay, Alarm buzzer
Ignition switch (ACC)	9	15	Horn, Cigarette lighter, Headlight relay
	10	15	Wiper motor, Washer motor, ETACS, Rear intermittent wiper relay
	11	10	Radio, Clock, Power antenna, Rear brake lock-up control relay
Ignition switch (IG_2)	12	10	Blower relay, Defogger relay, Air conditioner
Ignition switch (IG_1)	13	10	Turn-signal light, Meter and gauge, Remote controlled mirror, Power antenna, ETACS, Automatic seat belt
	14	10	Alternator, Back-up light, Overdrive relay, Speed control switch

Centralized Relay, etc.

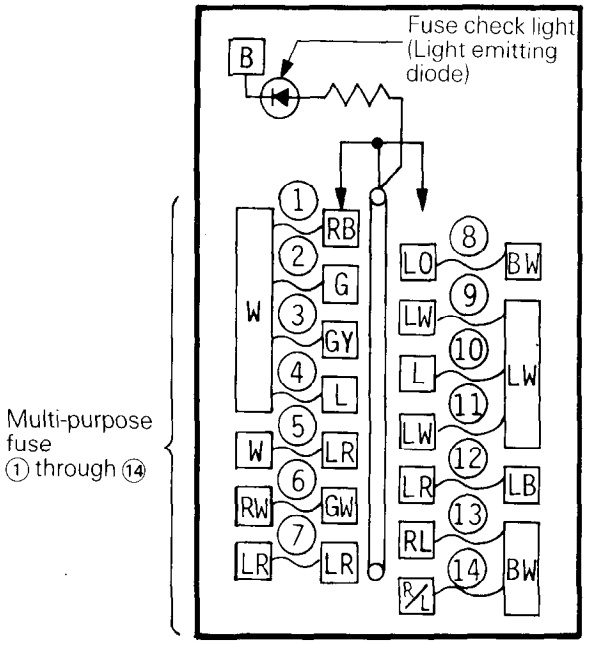
Identification symbol		Part name	Identification symbol		Part name
Relay box in engine compartment	A-38X	Pop-up motor relay (L.H.)	Relay box in interior	B-02X	Turn-signal flasher unit
	A-39X	Tail light relay		B-03X	Hazard flasher unit
	A-40X	Starter inhibitor relay		B-04X	Rear brake lock-up control relay
	A-41X	Power window relay			
	A-42X	Defogger relay		B-05X	Door unlock relay
	A-43X	Wiper relay		B-06X	Door lock relay
	A-44X	Headlight relay		B-07X	Overdrive relay
	A-45X	Pop-up motor relay (R.H.)		–	–



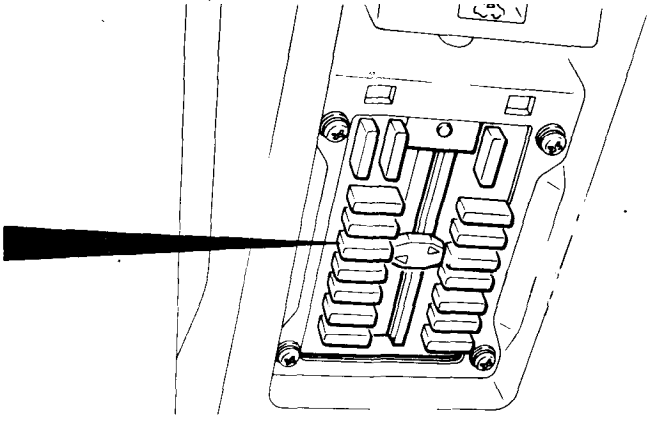
Interior relay box



Interior fuse box



16Y3563



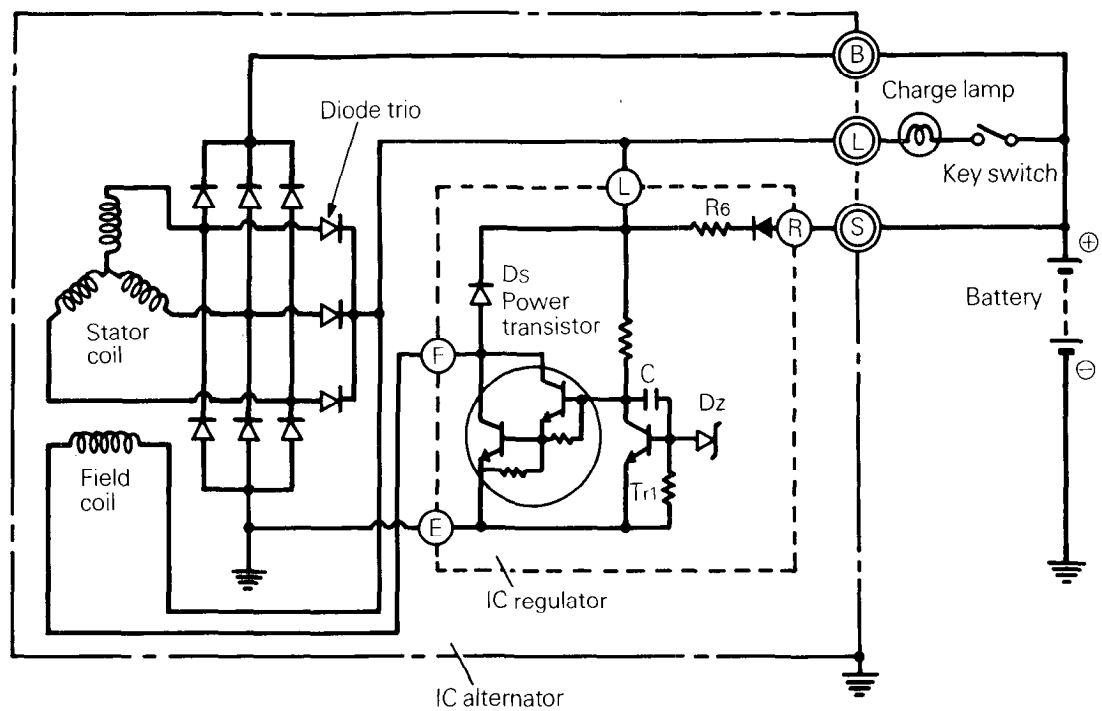
20Y809

CHARGING SYSTEM

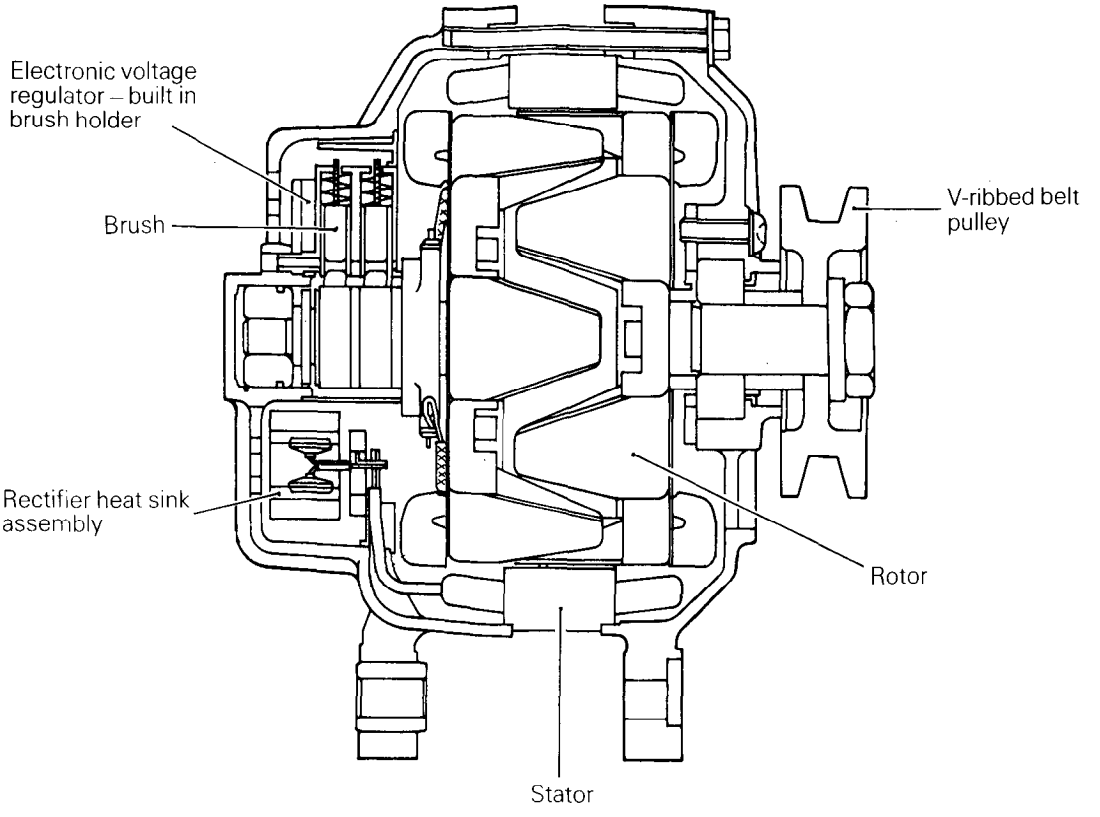
GENERAL INFORMATION

N08EAAC

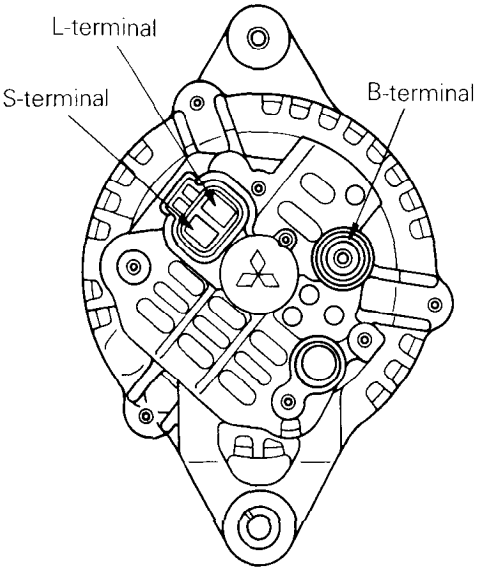
The charging system includes a battery, alternator with regulator, charging indicator lamp and wires.
The alternator has six built-in rectifiers (three positive and three negative), each rectifying AC current to DC current. Therefore, DC current appears at the alternator "B" terminal.
This alternator regulates charging voltage by detecting battery voltage.
The main components of the alternator are rotor, stator, rectifiers, capacitors, brushes, bearings and V-ribbed belt pulley. The brush holder has a built-in electronic voltage regulator.



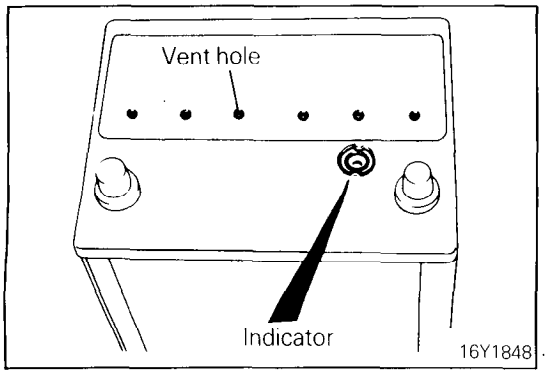
6EL239



6EL240



6EL211



MAINTENANCE-FREE TYPE BATTERY

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

SPECIFICATIONS

N08EB- -

GENERAL SPECIFICATIONS

ALTERNATOR

Items	Specifications
Type	Battery voltage sensing
Identification No.	A2T49977
Part No.	MD125569
Rated output	12 V – 75 A
Voltage regulator	Electronic built-in type

BATTERY

Items	Specifications
Type	55B24R-MF
Ampere hours (5HR) Ah	36
Cranking rating [at –17.8°C (0°F)] A	420
Reserve capacity min.	75

NOTE
1. CRANKING RATING is the current a battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 or greater at a specified temperature.
2. RESERVE CAPACITY RATING is the amount of time a battery can deliver 25A and maintain a minimum terminal voltage of 10.5 at 26.7°C (80°F).

SERVICE SPECIFICATIONS

N08EC- -

Items		Specifications
Standard value		
Regulated voltage V		
Ambient temp. at voltage regulator	–20°C (–4°F)	14.2 – 15.4
	20°C (68°F)	13.9 – 14.9
	60°C (140°F)	13.4 – 14.6
	80°C (176°F)	13.1 – 14.5
Slip ring O.D. mm (in.)		23 (.906)
Field coil resistance Ω		3.1
Limit		
Output current A		Min. 52
Slip ring O.D. mm (in.)		22.2 (.874)

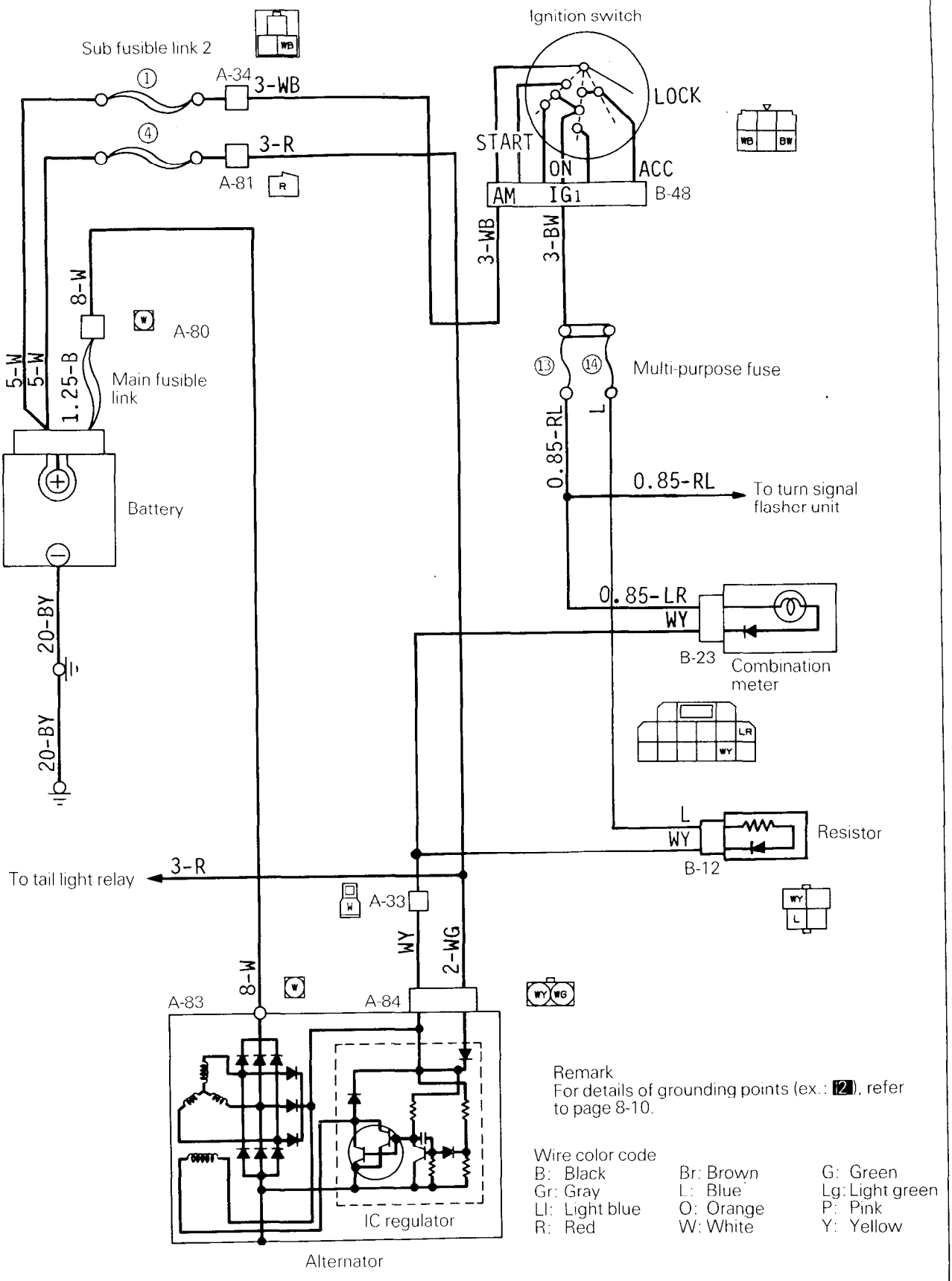
TORQUE SPECIFICATIONS

N08ED- -

Items	Nm	ft.lbs.
Alternator support bolt and nut	20 – 25	14 – 18
Alternator brace bolt	12 – 15	9 – 10
Discharge hose	20 – 25	14 – 18
Suction hose	30 – 34	22 – 26

TROUBLESHOOTING

CIRCUIT DIAGRAM



OPERATION

N08EHAC

Before Engine Starts

- First, when the ignition switch is turned to "ON", and before the engine starts, current flows through fuse No. 7, charging indicator light, then to alternator, and ground, causing the charging indicator light to go on.

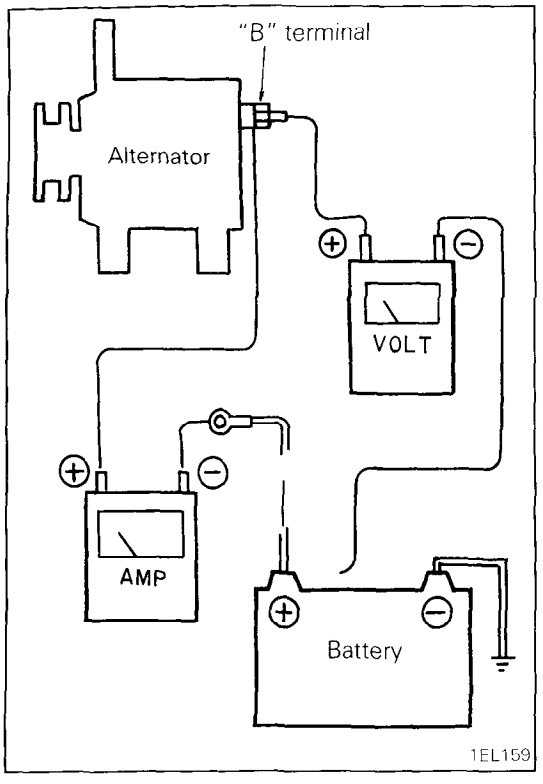
When Alternator is Generating Current

- Once the engine starts, battery voltage is applied to alternator S terminal. The battery voltage imposed on this terminal is monitored by the IC voltage regulator, and according to the voltage detected, the IC voltage regulator regulates the alternator field coil current, thus controlling the current the alternator generates.
- Once the alternator starts generating current, a voltage, slightly higher than battery voltage is applied to L terminal. This prevents current from flowing to the charging indicator light and the light goes off.
- At alternator B terminal, a load current proportional to the battery voltage is produced and is sent to any load.

Remarks
The alternator relay is to ensure charging the battery even when the charging indicator light bulb is burnt out.

TROUBLESHOOTING HINTS

1. Charging indicator light does not go on when the ignition switch is turned to "ON", before the engine starts
   - Check the bulb.
2. Charging indicator light fails to go off once the engine starts
   - Check drive belt tension.
   - Check the IC voltage regulator.
3. Discharged or overcharged battery
   - Check the IC voltage regulator.



SERVICE ADJUSTMENT PROCEDURES

CHARGING SYSTEM INSPECTION N08EIAD

VOLTAGE DROP TEST OF ALTERNATOR OUTPUT WIRE

This test judges whether or not the wiring between the alternator B terminal and the battery (+) terminal (including fusible link) is sound by the voltage drop method.

Preparation

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

NOTE:
Use of a clamp type ammeter that can measure current without disconneting the harness is preferred. The reason is that when checking a vehicle that has a low output current due to poor connection of the alternator "B" terminal, such poor connection is corrected as the "B" terminal is loosened and a test ammeter is connected in its place and as a result, causes for the trouble may not be determined.

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

Test

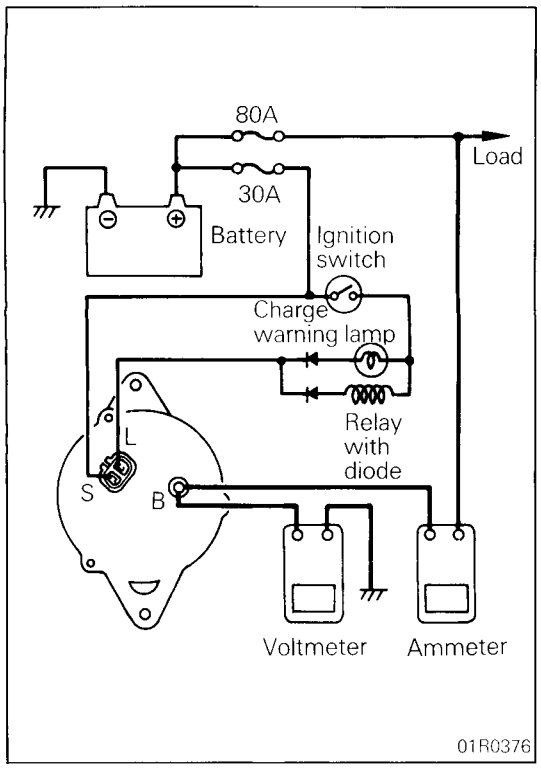
(1) Start the engine.
(2) Turn on or off the headlights and clearance lights and adjust the engine speed so that the ammeter reads 20A and read off the voltmeter indication under this condition.

Result

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

Standard value: 0.2V max.

(2) If the voltmeter indicates a value that is larger than the standard value, poor wiring is suspected, in which case check the wiring from the alternator "B" terminal to fusible link to battery (+) terminal. Check for loose connection, color change due to overheated harness, etc. and correct them before testing again.
(3) Upon completion of the test, set the engine speed at idle. Turn off the lights and turn off the ignition switch.
(4) Disconnect the battery ground cable.
(5) Disconnect the ammeter and voltmeter that have been connected for the test purpose.
(6) Connect the alternator output wire to the alternator "B" terminal.
(7) Connect the battery ground cable.



OUTPUT CURRENT TEST

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

Preparation

(1) Prior to the test, check the following items and correct as necessary.
   (a) Check the battery installed in the vehicle to ensure that it is in sound state*. The battery checking method is described in "BATTERY".

   NOTE:
   *The battery that is used to test the output current should be one that has been rather discharged. With a fully charged battery, the test may not be conducted correctly due to an insufficient load.

   (b) Check tension of the alternator drive belt. The belt tension check method is described in "GROUP 7 COOLING".

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

   NOTE:
   Tighten each connection by bolt and nut securely as a heavy current will flow. Do not rely on clips.

(6) Connect a voltmeter (0 to 20V) between the "B" terminal and ground. Connect the (+) lead wire of the voltmeter to the alternator "B" terminal and (–) lead wire to a sound ground.
(7) Set the engine tachometer and connect the battery ground cable.
(8) Leave the engine hood open.

Test

(1) Check to see that the voltmeter reads the same value as the battery voltage.
   If the voltmeter reads 0V, an open circuit in the wire between the alternator "B" terminal and battery (+) terminal, a blown fusible link or poor grounding is suspected.
(2) Turn on the headlight switch and start the engine.
(3) Set the headlight at high beam and the heater blower switch at HIGH, quickly increase the engine speed to 2,500 rpm and read the maximum output current value indicated by the ammeter.

   NOTE:
   After the engine startup, the charging current quickly drops. Therefore, above operation must be done quickly to read maximum current value correctly.

Result

(1) The ammeter reading must be higher than the limit value. If it is lower but the alternator output wire is normal, remove the alternator from the vehicle and check it.

Limit value: 52 A min.

NOTE:
(1) The nominal output current value is shown on the nameplate affixed to the alternator body.
(2) The output current value changes with the electrical load and the temperature of the alternator itself. Therefore, the nominal output current may not be obtained if the vehicle electrical load at the time of test is small. In such a case, keep the headlights on to cause discharge of the battery or use lights of another vehicle as a load to increase the electrical load.
The nominal output current may not be obtained if the temperature of the alternator itself or ambient temperature is too high.
In such a case, reduce the temperature before testing again.

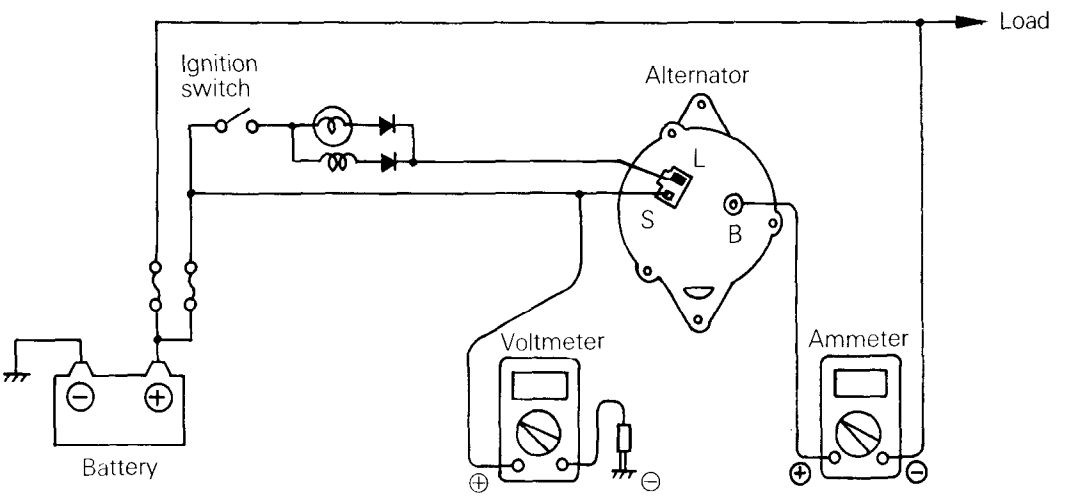
(2) Upon completion of the output current test, lower the engine speed to the idle speed and turn off the ignition switch.
(3) Disconnect the battery ground cable.
(4) Remove the test ammeter and voltmeter and the engine tachometer.
(5) Connect the alternator output wire to the alternator "B" terminal.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

REGULATED VOLTAGE TEST

The purpose of this test is to check that the electronic voltage regulator controls the voltage correctly.

Preparation

(1) Prior to the test, check the following items and correct if necessary.
  (a) Check the battery installed on the vehicle to see that it is fully charged. For battery checking method, see "BATTERY".
  (b) Check the alternator drive belt tension. For belt tension check, see "GROUP 7 COOLING".
(2) Turn the ignition switch to "OFF".
(3) Disconnect the battery ground cable.
(4) Connect a digital voltmeter between the "S" terminal of the alternator and ground. Connect the (+) lead of the voltmeter to the "S" terminal of the alternator, inserting from the wire side of the 2-way connector and connect the (–) lead to sound ground or battery (–) terminal.



6EL252

(5) Disconnect the alternator output wire from the alternator "B" terminal.
(6) Connect a DC ammeter (0 to 100A) in series between the "B" terminal and the disconnected output wire. Connect the (+) lead wire of the ammeter to the alternator "B" terminal and the (–) lead wire to the disconnected output wire.
(7) Set the engine tachometer and connect the battery ground cable.

Test

(1) Turn on the ignition switch and check that the voltmeter indicates the following value.

Voltage: Battery voltage

If it reads 0V, there is an open circuit in the wire between the alternator "S" terminal and the battery (+) or the fusible link is blown.
(2) Start the engine. Keep all lights and accessories off.
(3) Run the engine at a speed of about 2,500 rpm and read the voltmeter when the alternator output current drops to 10A or less.

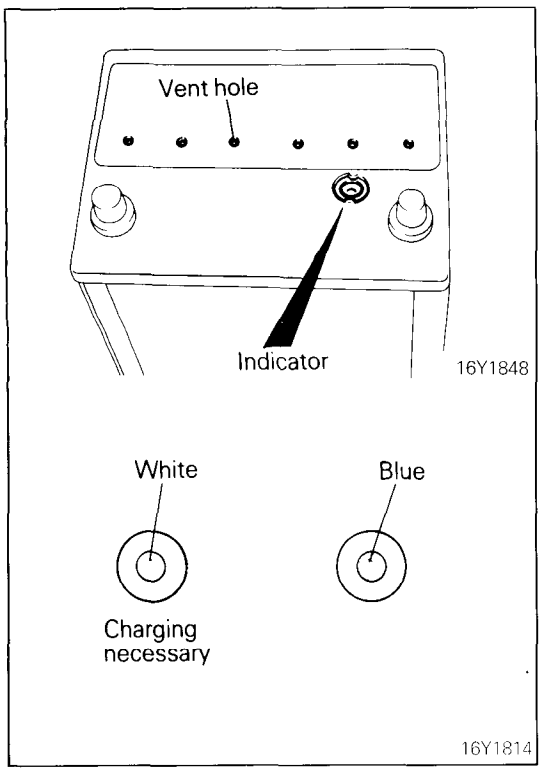
Result

(1) If the voltmeter reading agrees with the value listed in the following regulating voltage table, the voltage regulator is functioning correctly. If the reading is other than the standard value, the voltage regulator or the alternator is faulty.

Regulating Voltage Table

Voltage regulator ambient temperature °C (°F)	Regulated voltage [Standard value]
–20 (–4)	14.2 – 15.4
20 (68)	13.9 – 14.9
60 (140)	13.4 – 14.6
80 (176)	13.1 – 14.5

(2) After the test, lower the engine speed to idle speed and turn the ignition switch to "OFF"
(3) Disconnect the battery ground cable.
(4) Remove the test voltmeter, ammeter and engine tachometer.
(5) Connect the alternator output lead to alternator "B" terminal.
(6) Connect the battery ground cable.



BATTERY INSPECTION

N08EIBA

BATTERY VISUAL INSPECTION (1)

The battery contains a visual test indicator which gives blue signal when an adequate charge level exists, and white signal when charging is required.

BATTERY VISUAL INSPECTION (2)

Make sure ignition switch is in Off position and all battery feed accessories are Off.

1. Disconnect ground cable from battery before disconnecting (+) cable.
2. Remove battery from vehicle.

   Caution
   Care should be taken in the event battery case is cracked or leaking to protect hands from the electrolyte. A suitable pair of rubber gloves (not the household type) should be worn when removing battery by hand.
3. Inspect battery carrier for damage caused by loss of acid from battery. If acid damage is present, it will be necessary to clean area with a solution of clean warm water and baking soda. Scrub area with a stiff bristle brush and wipe off with a cloth moistened with ammonia or baking soda in water.
4. Clean top of battery with same solutions as described in Step (3).
5. Inspect battery case and cover for cracks. If cracks are present, battery must be replaced.
6. Clean the battery post with a suitable battery post cleaning tool.
7. Clean the inside surfaces of the terminal clamps with a suitable battery terminal cleaning tool. Replace damaged or frayed cables and broken terminals clamps.
8. Install the battery in vehicle.
9. Connect (+) and (–) cables to battery in the order of mention.
10. Tighten the clamp nut securely.

BATTERY CHARGING

N08EICA

Caution

When batteries are being charged, an *explosive gas forms* beneath the cover of each cell. Do not smoke near batteries on charge or which have recently been charged. Do not break live circuits at the terminals of the batteries on charge. A spark will occur where the live circuit is broken. Keep all open flames away from the battery.

Battery electrolyte temperature may temporarily be allowed to rise to 55°C (131°F). Increase of electrolyte temperature above 55°C (131°F) is harmful to the battery, causing deformation of battery cell, decrease in life of battery, etc.

CHARGE RATE

If the test indicator is white, the battery should be charged as outlined below.
When the dot appears or when maximum charge shown below is reached, charging should be stopped.

NOTE
If the indicator does not turn to blue even after the battery is charged, the battery should be replaced; do not overcharge.

Charge Rate Chart

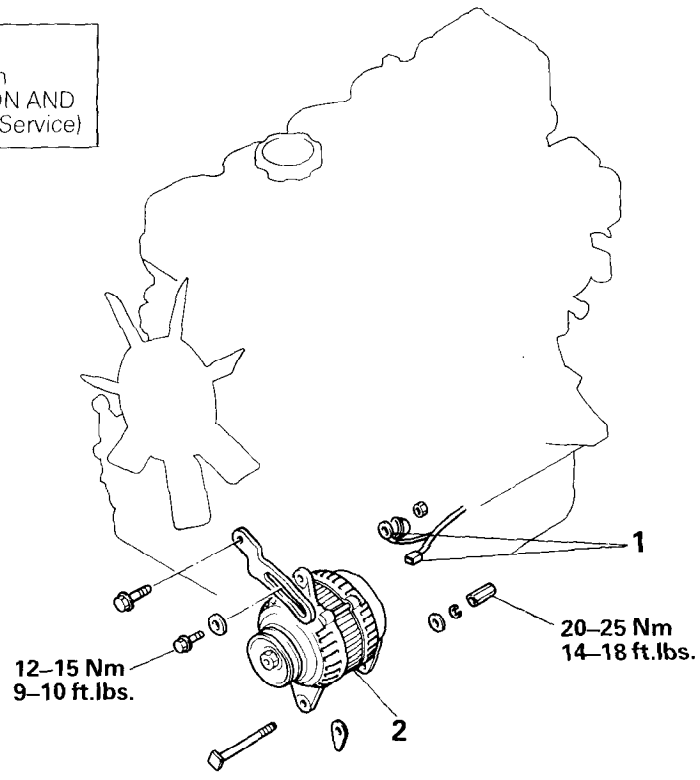
Battery	55B24R MF (420 amps)
Slow Charging	5 amps 10 hrs.
	10 amps 5 hrs.
Fast Charging	20 amps 2.5 hrs.
	30 amps 1.5 hrs.

ALTERNATOR

N08EJAD

REMOVAL AND INSTALLATION (Vehicles without Air Conditioner)

Post-installation Operation
- Adjustment of Drive Belt Tension (Refer to GROUP 0 LUBRICATION AND MAINTENANCE - Maintenance Service)



Removal steps

1. Connector connection
2. Alternator

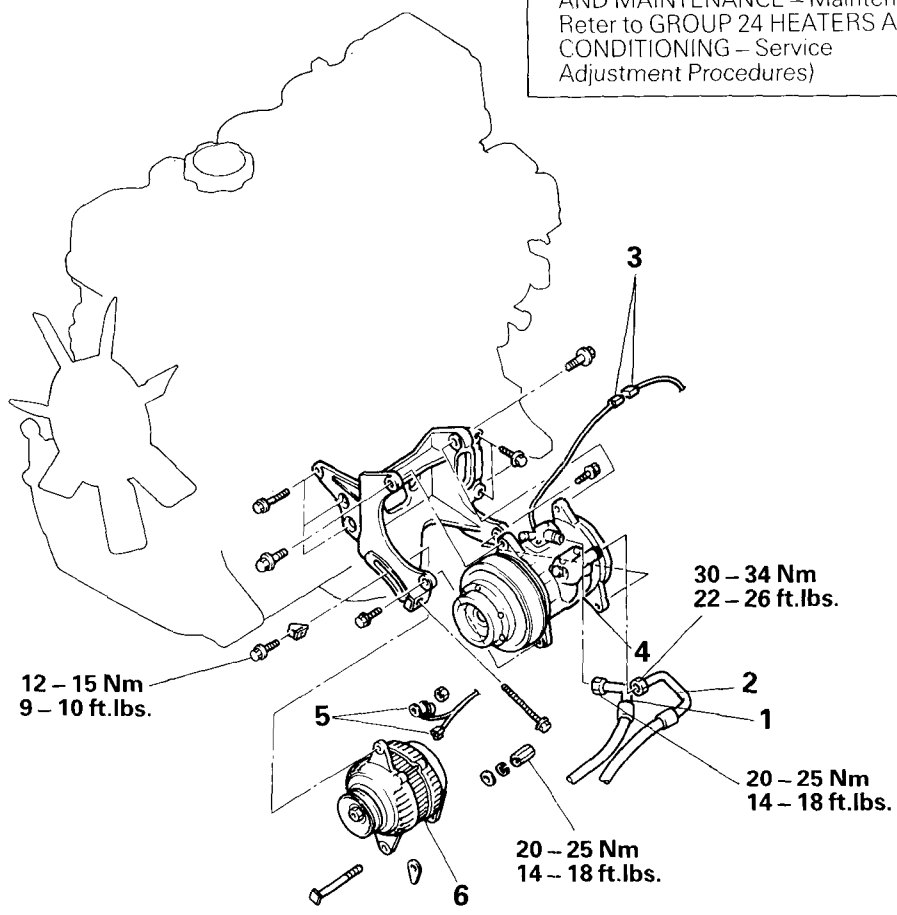
NOTE
Reverse the removal procedures to reinstall.

16W1565

REMOVAL AND INSTALLATION (Vehicles with Air Conditioner)

Pre-removal Operation
- Discharging Refrigerant
  (Refer to GROUP 24 HEATERS AND AIR CONDITIONING – Service Adjustment Procedures)

Post-instllation Operation
- Charging Refrigerant
  (Refer to GROUP 24 HEATERS AND AIR CONDITIONING – Service Adjustment Procedures)
- Adjustment of Drive Belt and Compressor Belt Tension
  (Refer to GROUP 0 LUBRICATION AND MAINTENANCE – Maintenance Service, Reter to GROUP 24 HEATERS AND AIR CONDITIONING – Service Adjustment Procedures)



Removal steps

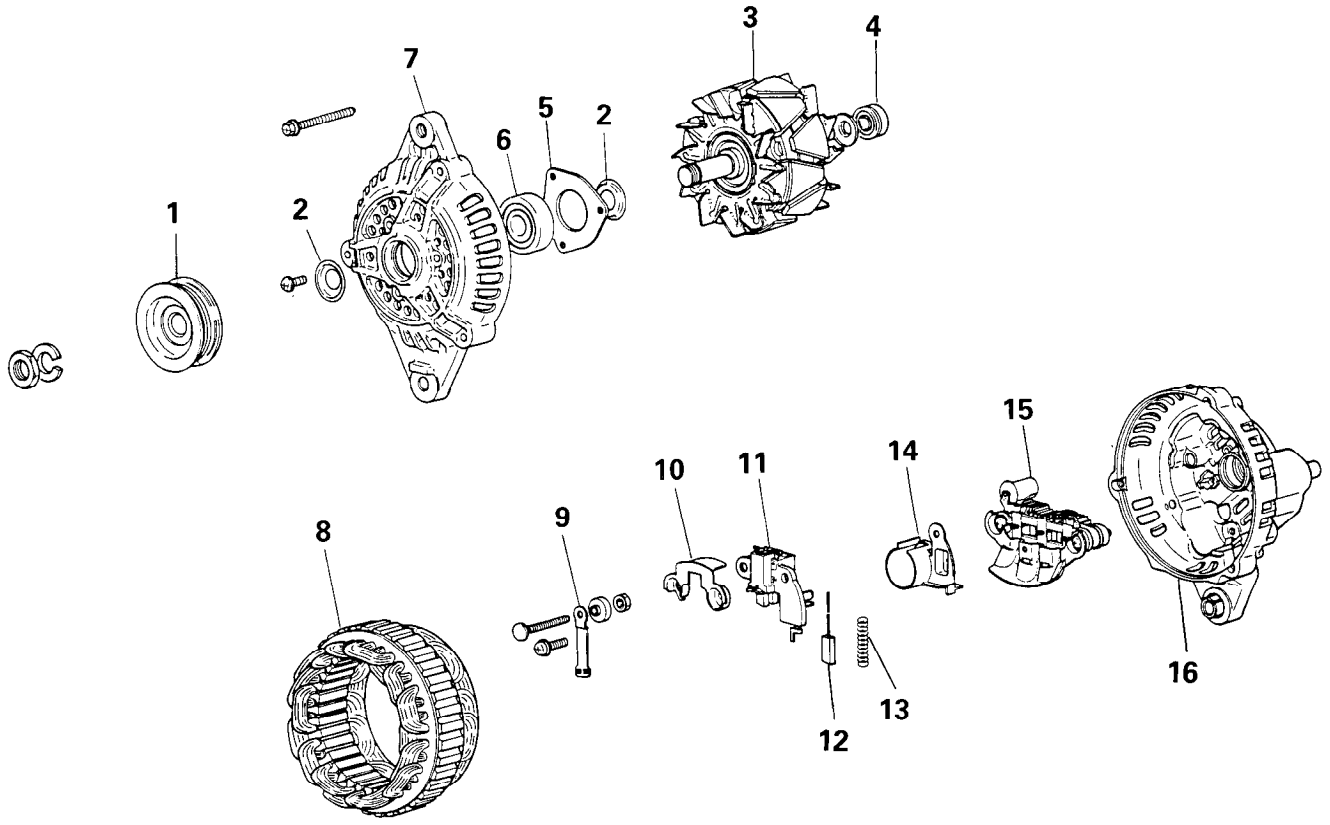
1. Discharge hose connection
2. Suction hose connection
3. Connector connection
4. Compressor
5. Connector connection
6. Alternator

NOTE
Reverse the removal procedures to reinstall.

16W1566

ALTERNATOR

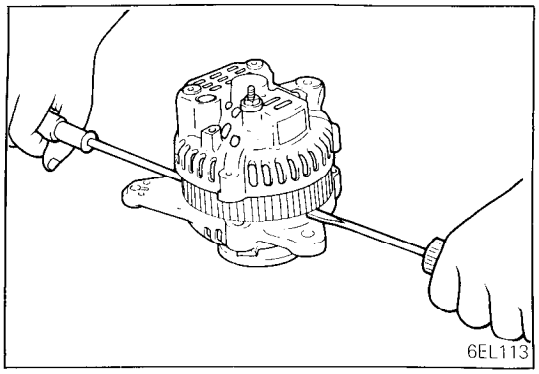
DISASSEMBLY AND REASSEMBLY



Disassembly steps

◆◆ 1. Pulley
2. Seal
◆◆ 3. Rotor assembly
4. Rear bearing
5. Bearing retainer
6. Front bearing
7. Front bracket
8. Stator
9. Terminal
10. Plate
◆◆ 11. Regulator and brush holder
12. Brush
13. Brush spring
14. Slinger
15. Rectifier assembly
16. Rear bracket

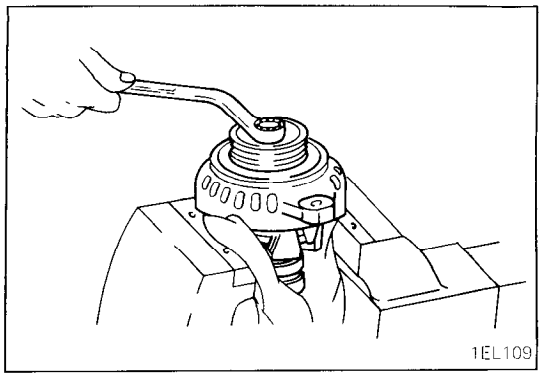
NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ◆◆: Refer to "Service Points of Reassembly".



SERVICE POINTS OF DISASSEMBLY

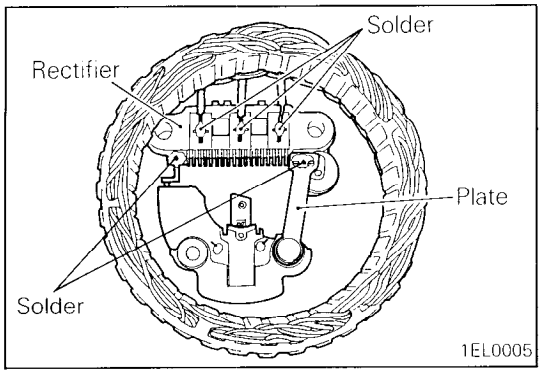
NOTE
Insert plain screwdriver between front bracket and stator core and pry downward.

Caution
Do not insert screwdriver too deep, as there is danger of damage to stator coil.



1. REMOVAL OF PULLEY

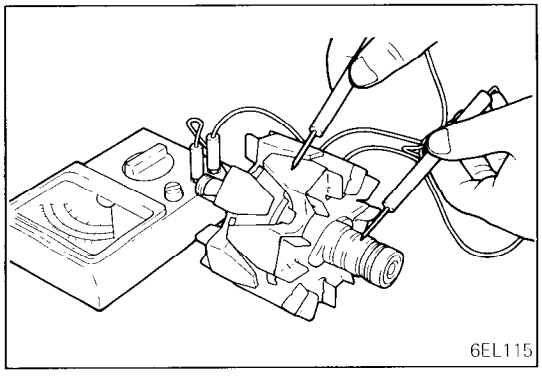
Clamp the rotor in a vise with soft jaws.



11. REMOVAL OF REGULATOR AND BRUSH HOLDER

(1) Unsolder three stator leads soldered to main diodes on rectifier.
(2) Unsolder two soldered points to rectifier.

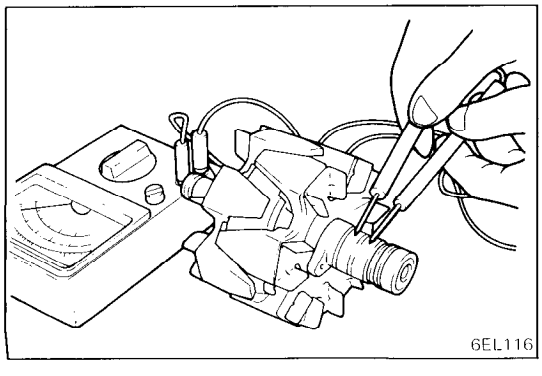
Caution
1. **When soldering or unsoldering, use care to make sure that heat of soldering iron is not transmitted to diodes for a long period. Finish soldering or unsoldering in as short a time as possible.**
2. **Use care that no undue force is exerted to leads of diodes.**



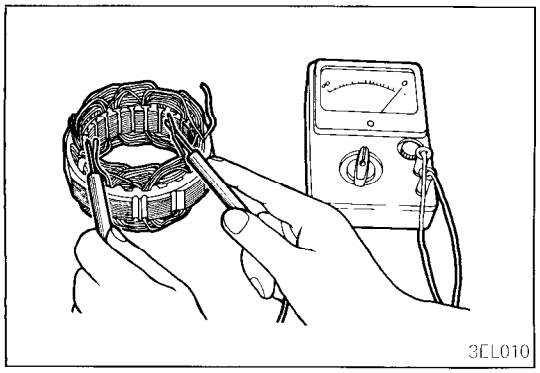
INSPECTION

ROTOR

- Check rotor coil for continuity. Check to ensure that there is continuity between slip rings.
  If resistance is extremely small, it means that there is a short. If there is no continuity or if there is short circuit, replace rotor assembly.
  Standard value: 3.1 Ω

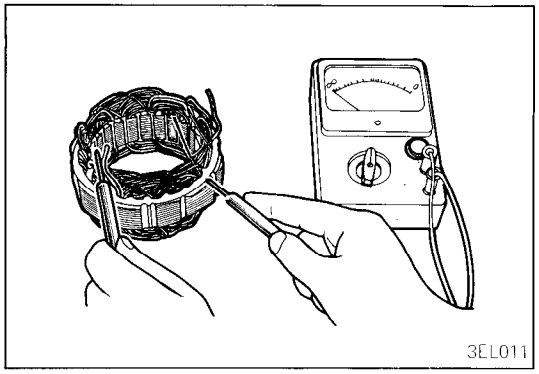


- Check rotor coil for grounding. Check to ensure that there is no continuity between slip ring and core. If there is continuity, replace rotor assembly.

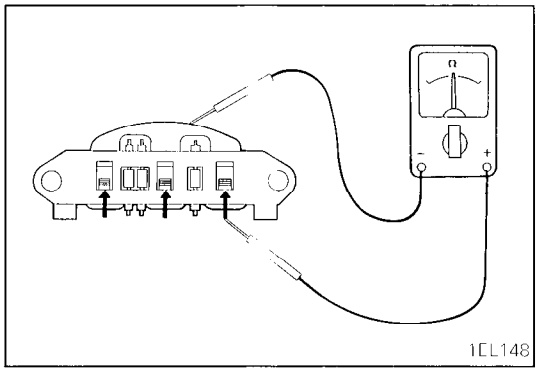


STATOR

- Make continuity test on stator coil. Check to ensure that there is continuity between coil leads.
  If there is no continuity, replace stator assembly.



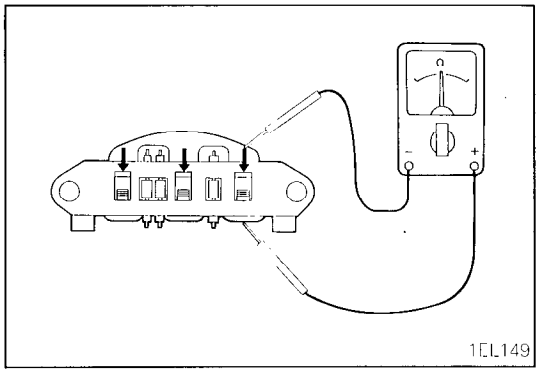
- Check coil for grounding. Check to ensure that there is no continuity between coil and core. If there is continuity, replace stator assembly.



RECTIFIERS

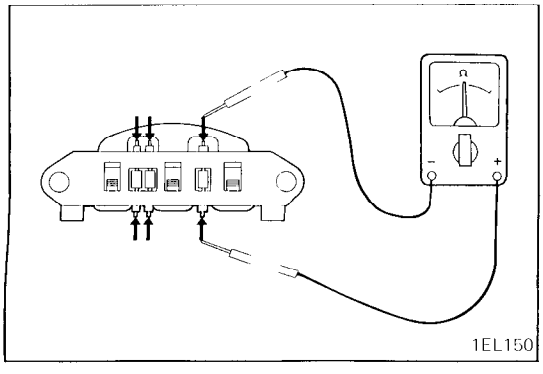
Positive Rectifier Test

Check for continuity between positive rectifier and stator coil lead connection terminal with a circuit tester. If there is continuity in both directions, diode is shorted.
Replace rectifier assembly.



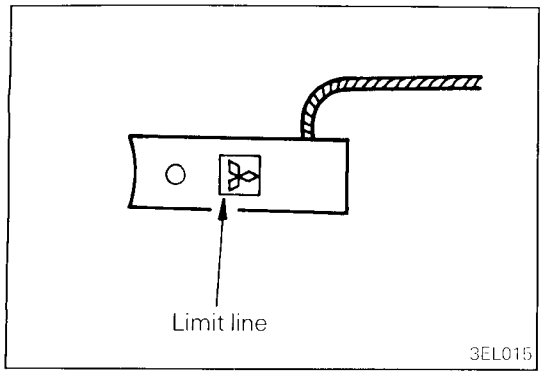
Negative Rectifier Test

Check for continuity between negative rectifier and stator coil lead connection terminal. If there is continuity in both direction, diode is shorted, and rectifier assembly must be replaced.



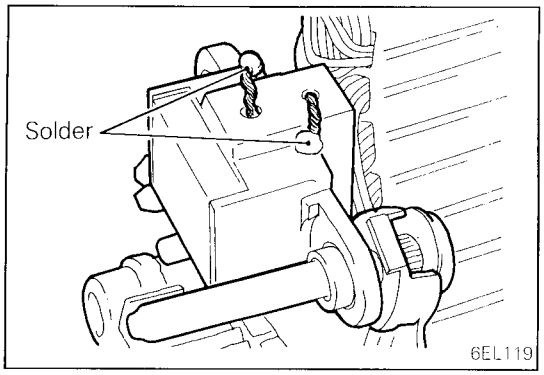
DIODE TRIO TEST

Check three diodes for continuity by connecting a circuit tester to both ends of each diode. If there is continuity or no continuity in both directions, diode is defective and heatsink assembly must be replaced.

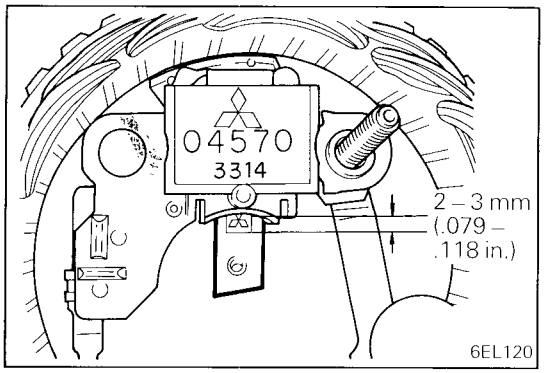


BRUSH REPLACEMENT

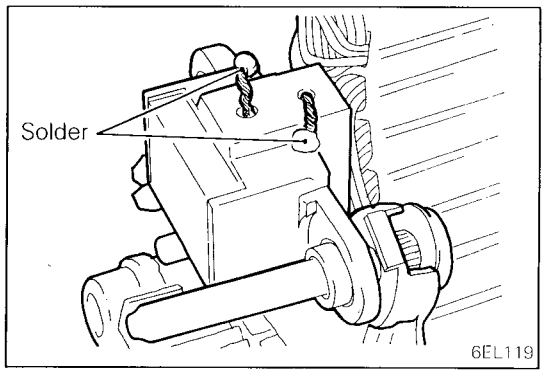
(1) Replace the brush by the following procedures if it has been worn to the limit line.



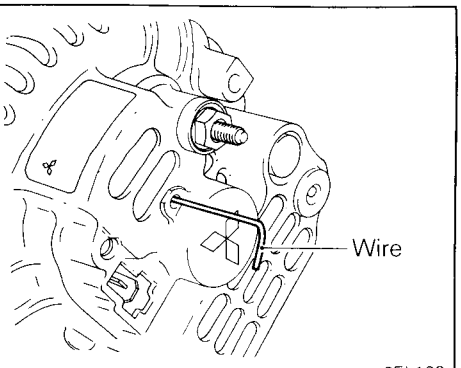
(2) Unsolder the pigtail and remove old brush and spring.



(3) Install the brush spring and new brush in the brush holder.
(4) Push in the brush for a brush limit line to brush holder end distance of 2 to 3 mm (.079 to .118 in.).



(5) While holding the position of step (4), solder the pigtail to the brush holder terminal.



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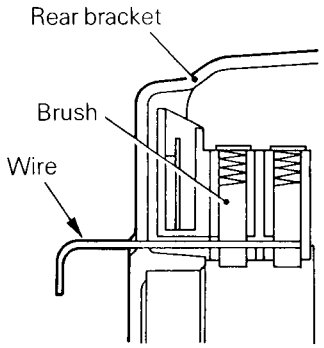

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SERVICE POINT OF REASSEMBLY

3. INSTALLATION OF ROTOR ASSEMBLY

Before rotor is attached to rear bracket, insert wire through small hole made in rear bracket to lift brush. After rotor has been installed, remove the wire.

STARTING SYSTEM

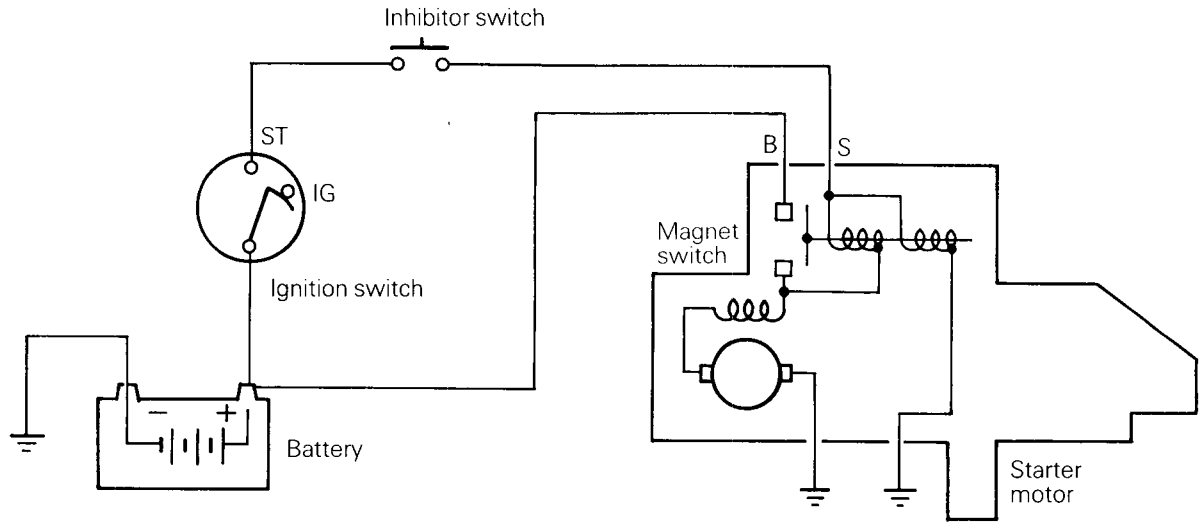
N08FAAF

GENERAL INFORMATION

Starting system circuit includes a battery, starter motor, magnet switch, ignition switch, inhibitor switch (vehicle with automatic transaxle only), connection wires and battery cable.

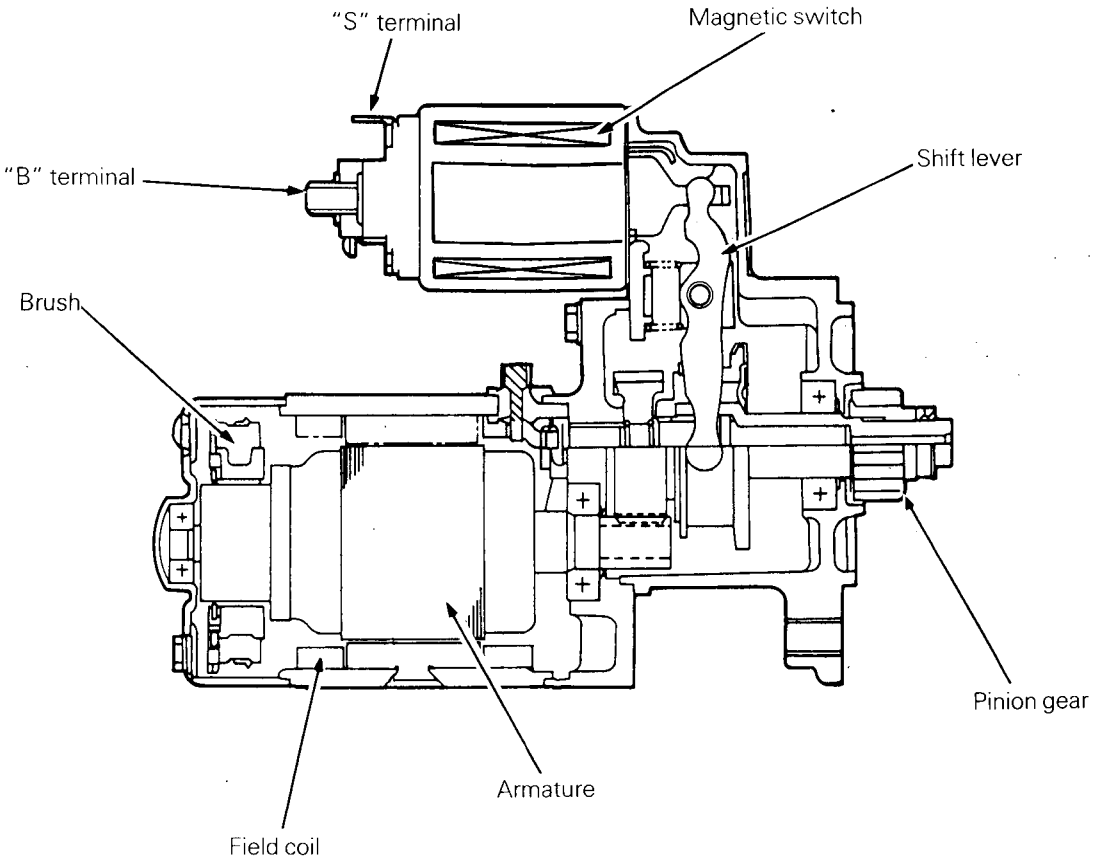
When ignition switch is turned to "START" position, current flows to energize solenoid windings of starter motor. As a result, solenoid plunger and clutch shift lever operate to cause clutch pinion to engage with ring gear. At the same time, magnet switch contacts close to crank starter motor.

Running clutch pinion gear overruns to prevent damage that could be caused by overrunning of starter armature when engine is started immediately. When engine is started, ignition switch must be turned back to "ON" position to prevent damage to starter motor.



1EL151

STARTER MOTOR



5EL035

SPECIFICATIONS

GENERAL SPECIFICATIONS

N08FB--

Items	Specifications
Starter motor	
Type	Reduction type
Identification No.	M2T53085
Part No.	MD072585
Rated output kw/V	1.2/12
No. of pinion teeth	9

SERVICE SPECIFICATIONS

N08FC--

Items	Specifications
Standard value	
Free running characteristics	
Terminal voltage V	11.5
Current A	Max. 100
Speed rpm	Min. 3,000
Under-cut depth mm (in.)	0.5 (.020)
Commutator diameter mm (in.)	32 (1.26)
Commutator runout mm (in.)	0.05 (.0020)
Pinion gap mm (in.)	0.5 – 2.0 (.020 – .079)
Limit	
Commutator diameter mm (in.)	31.4 (1.236)
Commutator runout mm (in.)	0.1 (.004)

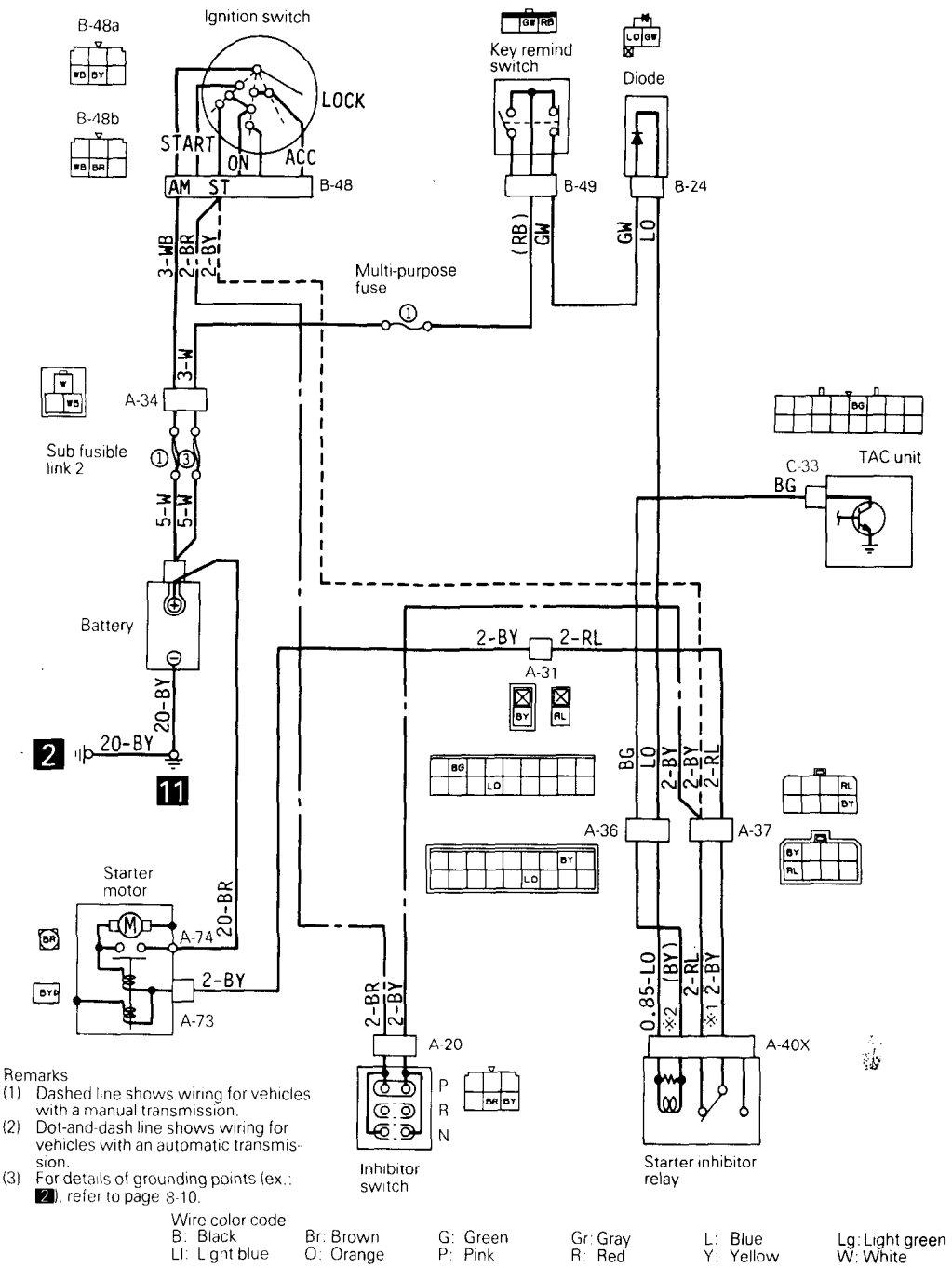
TORQUE SPECIFICATIONS

N08FD--

Items	Nm	ft.lbs.
Starter motor mounting bolts	27 – 34	20 – 25

TROUBLESHOOTING

CIRCUIT DIAGRAM



Remarks
(1) Dashed line shows wiring for vehicles with a manual transmission.
(2) Dot-and-dash line shows wiring for vehicles with an automatic transmission.
(3) For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code
B: Black Br: Brown G: Green Gr: Gray L: Blue Lg: Light green
Ll: Light blue O: Orange P: Pink R: Red Y: Yellow W: White

37Y604

OPERATION N08FHAB

- When the ignition switch is turned to "START" with the inhibitor switch in "P" or "N" position (automatic transmission vehicles), current flows through the inhibitor switch, starter inhibitor relay (contacts) and starter coil to ground. This closes the contacts of the starter switch (magnetic switch).
- Closing the magnetic switch contacts completes the circuit from the battery to magnetic switch to starter motor and ground, so that the starter motor starts rotating.

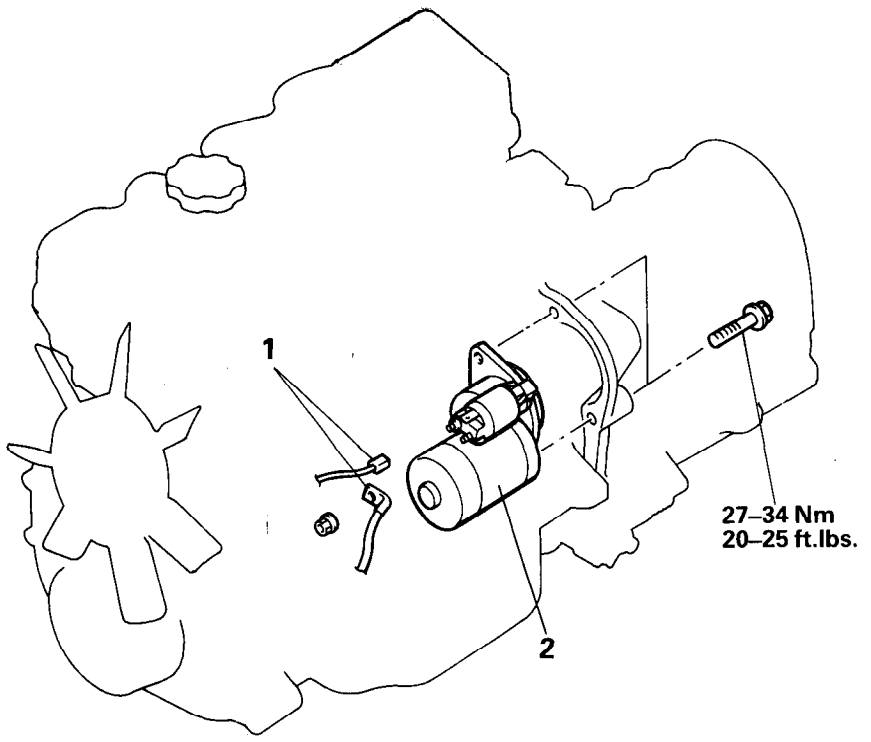
TROUBLESHOOTING HINTS

1. Starter motor does not turn over
   1) Starter motor operating sound is heard for an instant
      - Check starter motor for condition of its magnetic switch.
   2) Starter motor does not operate at all
      - Check starter motor coils.
2. Starter motor does not stop
   - Check starter motor for condition of its magnetic switch.

STARTER MOTOR

N08FJAD

REMOVAL AND INSTALLATION

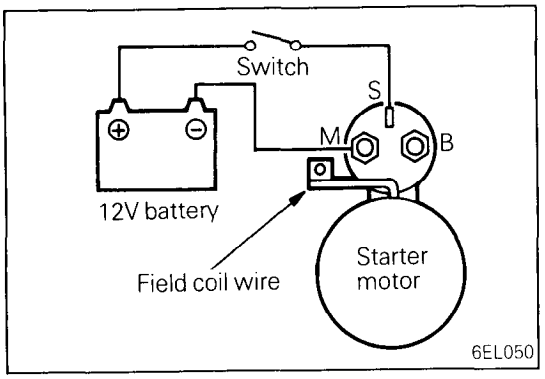


Removal steps

1. Connector connection
◆◆ 2. Starter motor

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".

16W1564

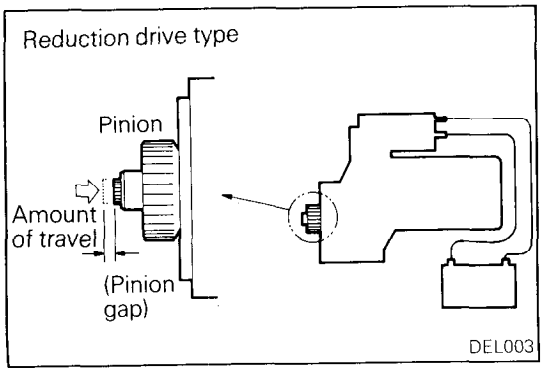


INSPECTION

PINION GAP ADJUSTMENT

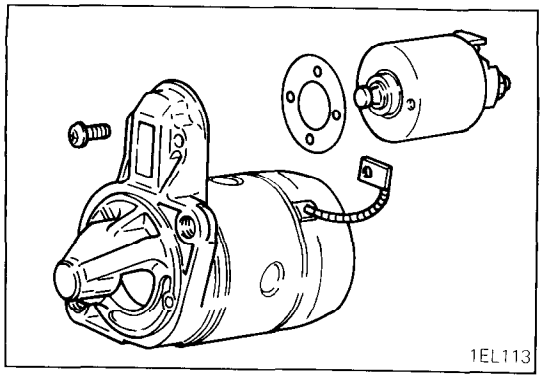
(1) Disconnect field coil wire from M-terminal of magnetic switch.
(2) Connect a 12V battery between S-terminal and M-terminal.
(3) Set switch to "ON", and pinion will move out.

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

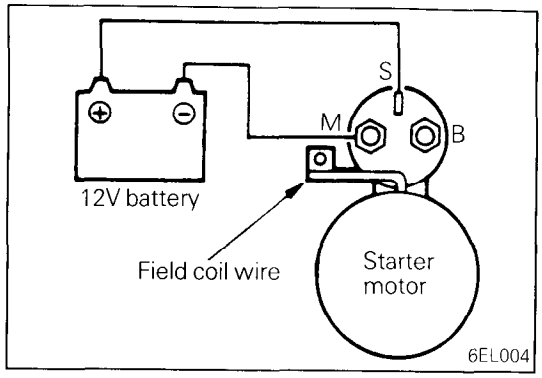


(4) Lightly push back the pinion, and measure the amount of travel, which represents the pinion gap. Adjust the thickness (number) of washers at switch area so that the gap becomes standard value.

Standard value: 0.5 – 2.0 mm (.020 – .079 in.)



(5) If pinion gap is out of specification, adjust by adding or removing gaskets between magnetic switch and front bracket.

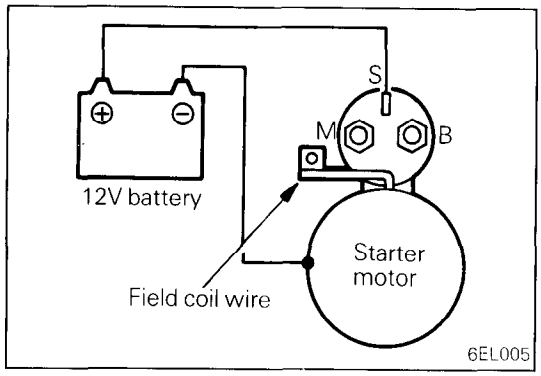


PULL-IN TEST OF MAGNETIC SWITCH

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

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

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

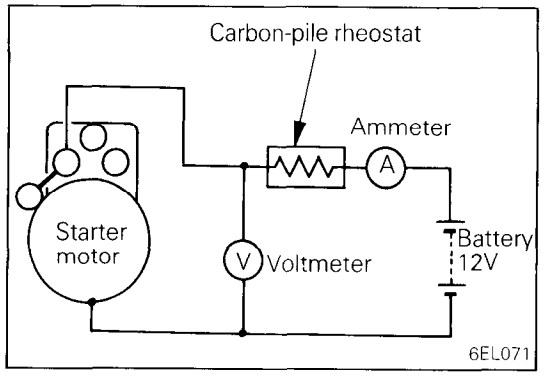


HOLD-IN TEST OF MAGNETIC SWITCH

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

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

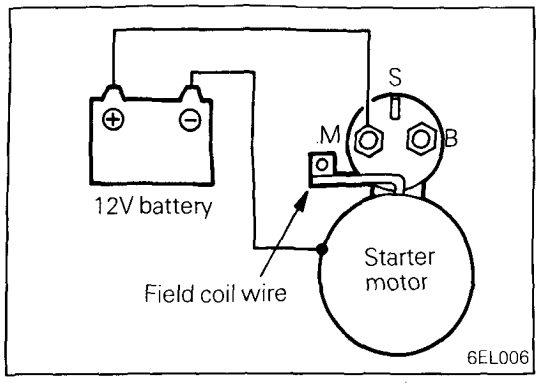
(3) If pinion remains out, everything is in order. If pinion moves in, hold-in circuit is open. Replace magnetic switch.



FREE RUNNING TEST

(1) Place starter motor in a vise equipped with soft jaws and connect a fully-charged 12-volt battery to starter motor as follows:
(2) Connect a test ammeter (100-ampere scale) and carbon pile rheostat in series with battery positive post and starter motor terminal.
(3) Connect a voltmeter (15-volt scale) across starter motor.
(4) Rotate carbon pile to full-resistance position.
(5) Connect battery cable from battery negative post to starter motor body.
(6) Adjust rheostat until battery voltage shown on the voltmeter reads 11.5 volts.
(7) Confirm that the maximum amperage draw is within the specifications and that the starter motor turns smoothly and freely.

Standard value:
Terminal voltage 11.5V
Current Max. 100A
Speed Min. 3,000 rpm

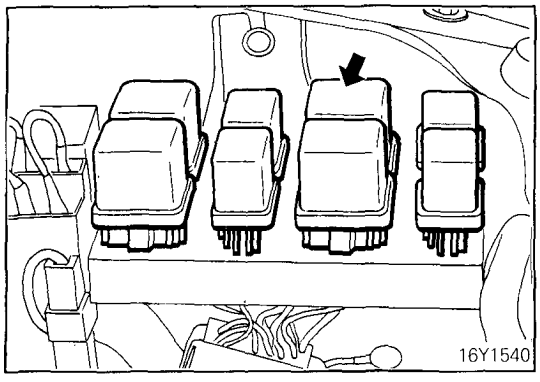


RETURN TEST OF MAGNETIC SWITCH

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

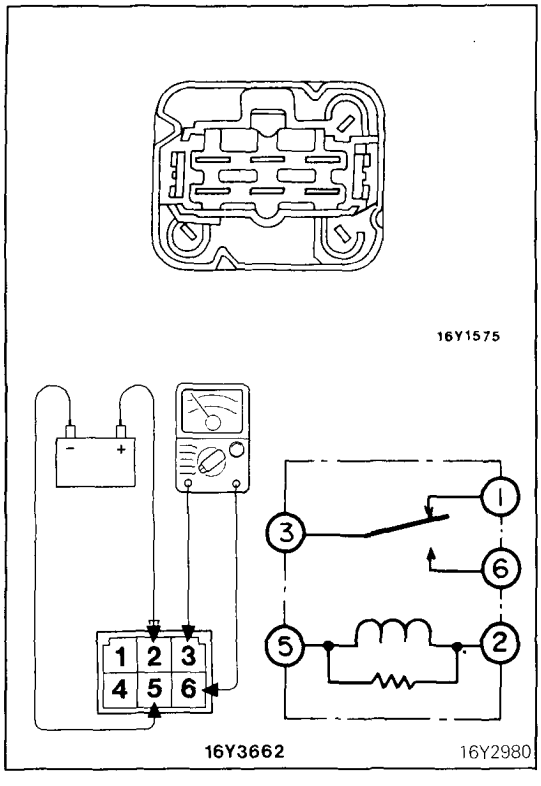
Caution
This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

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



STARTER INHIBITOR RELAY

(1) Remove the starter inhibitor relay from the relay box in the engine compartment.



(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 5 is earthed.

Voltage applied	Terminals 3 – 6	Conductive
Voltage not applied	Terminals 3 – 6	Non-conductive
	Terminals 1 – 3	Conductive
	Terminals 2 – 5	

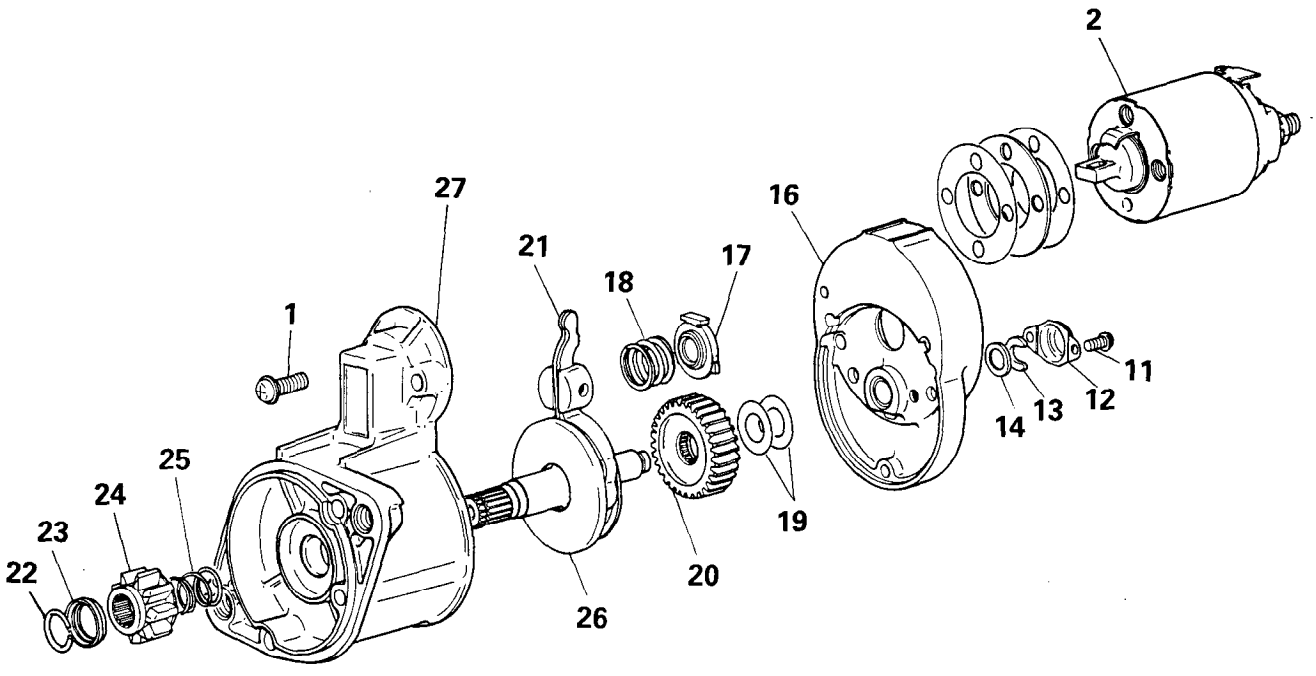
SERVICE POINT OF INSTALLATION

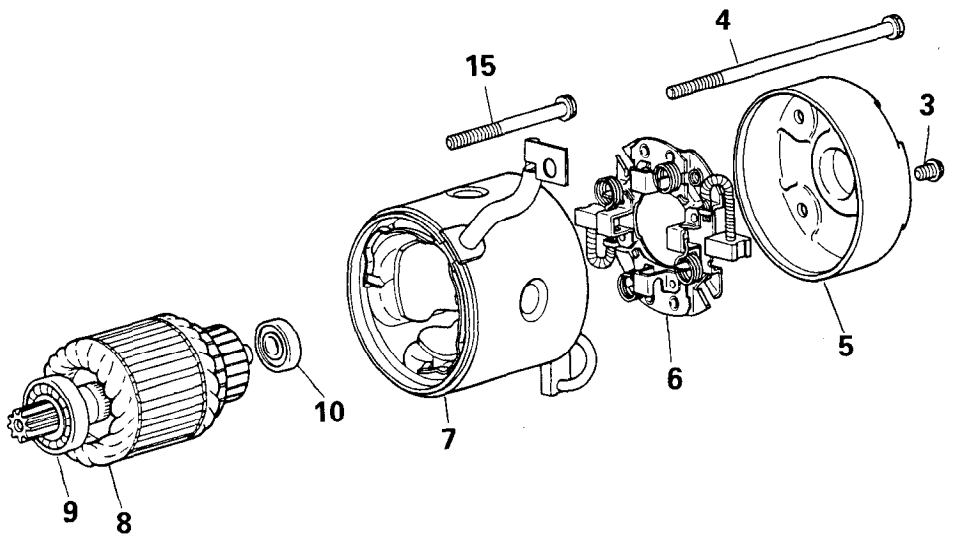
2. INSTALLATION OF STARTER MOTOR

Clean both surfaces of starter motor flange and rear plate.

STARTER MOTOR

DISASSEMBLY AND REASSEMBLY

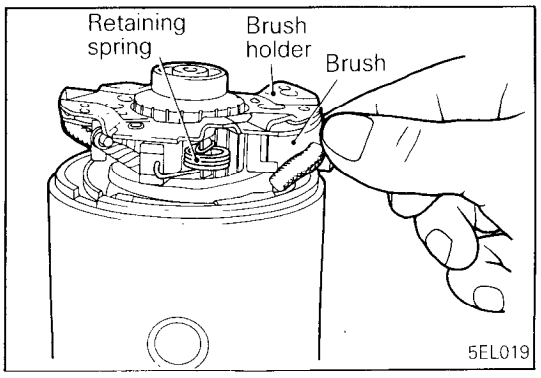




Disassembly steps

1. Screw
2. Magnetic switch
3. Screw
4. Screw
5. Rear bracket
6. ◆◆ Brush holder
7. Yoke assembly
8. Armature
9. Front bearing
10. Rear bearing
11. Screw
12. Cover
13. ◆◆ Retaining ring
14. Washer
15. Screw
16. Center bracket
17. Spring seat
18. Lever spring
19. Adjusting washer
20. Gear
21. Lever
22. ◆◆ Snap ring
23. ◆◆ Stop ring
24. Pinion gear
25. Spring
26. Pinion shaft assembly
27. Front bracket

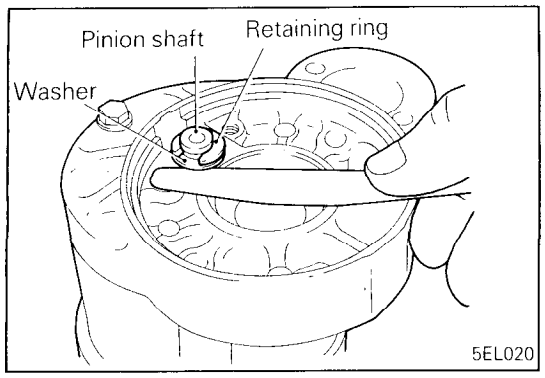
NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ◆◆: Refer to "Service Points of Reassembly".



SERVICE POINTS OF DISASSEMBLY

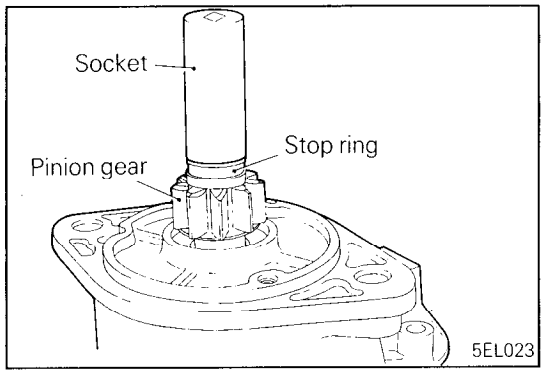
6. REMOVAL OF BRUSH HOLDER

Slide the two brushes from brush holder by prying retaining springs back.



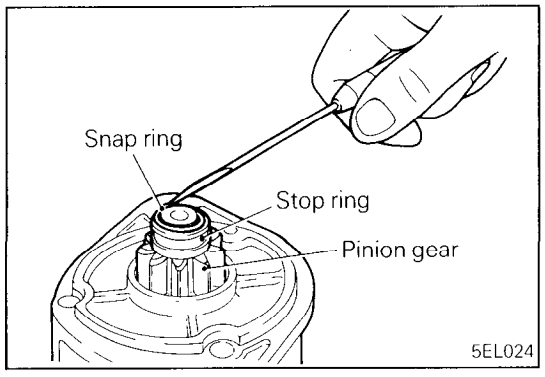
13. REMOVAL OF RETAINING RING

Measure the pinion shaft end play using feeler gauge for reassembly.



22. REMOVAL OF SNAP RING

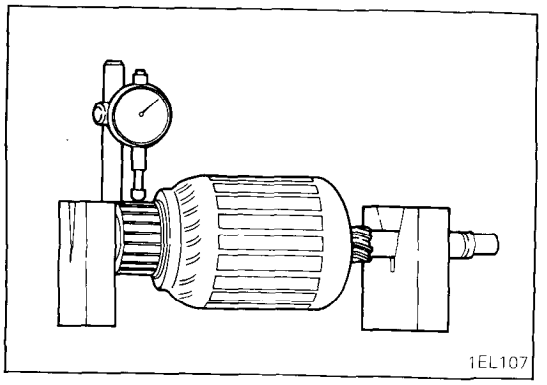
(1) Press the stop ring off the snap ring with suitable socket.



(2) Remove the snap ring with screwdriver.

CLEANING STARTER MOTOR PARTS

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

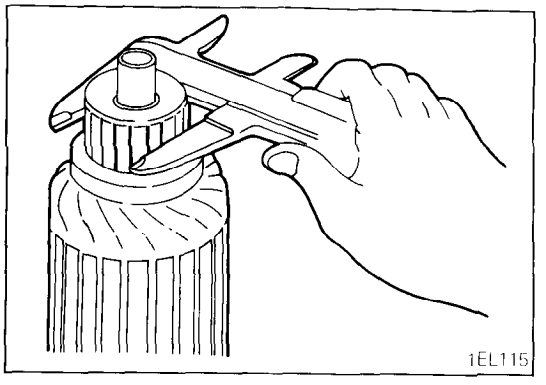


INSPECTION

INSPECTION OF COMMUTATOR

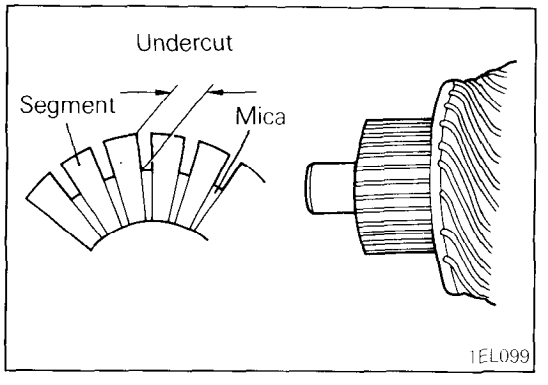
(1) Place the armature in a pair of "V" blocks and check the runout with a dial indicator.

Standard value: 0.05 mm (.0020 in.)
Limit: 0.1 mm (.004 in.)



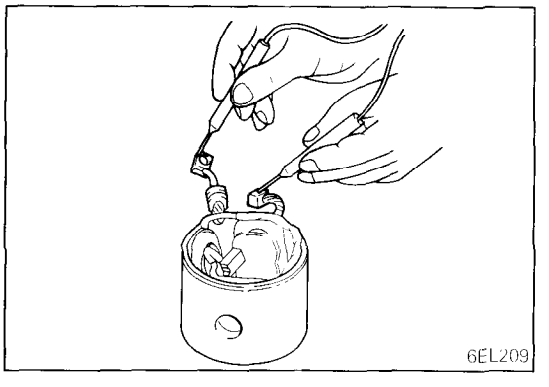
(2) Measure the commutator outer diameter.

Standard value: 32 mm (1.26 in.)
Limit: 31.4 mm (1.236 in.)



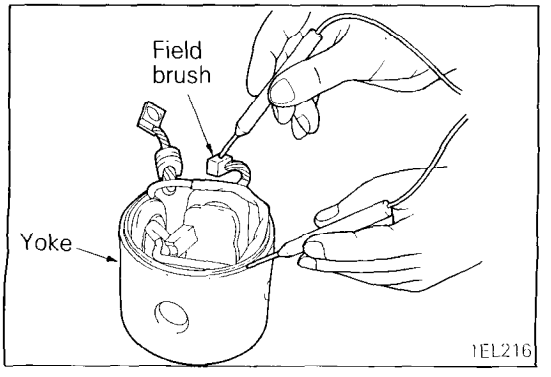
(3) Check the undercut depth between segments.

Standard value: 0.5 mm (.020 in.)



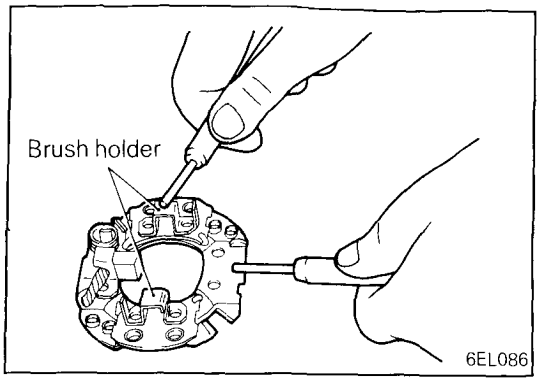
TESTING FIELD COIL FOR GROUNDING

Check the continuity between field brushes. If there is continuity, the field coil is in order.



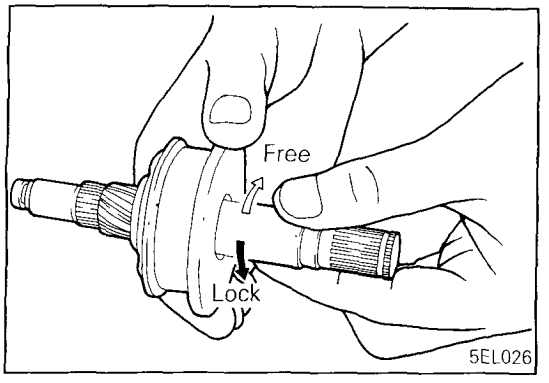
TESTING FIELD COIL FOR GROUNDING

Check the continuity between field coil brush and yoke. If there is no continuity, the field coil is in order.



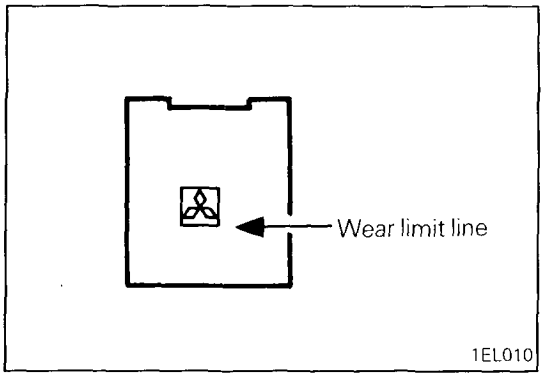
BRUSH HOLDER

Check the continuity between brush holder plate and brush holder.
If there is no continuity, the brush holder is in order.



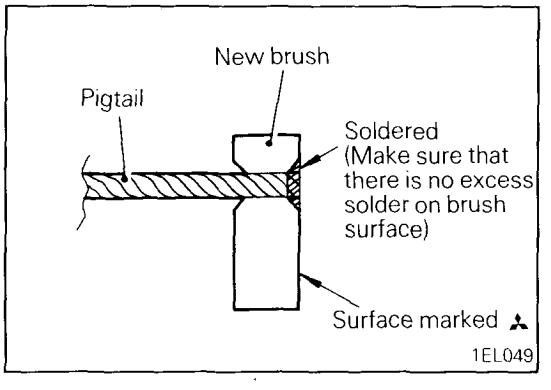
OVERRUNNING CLUTCH

(1) While holding clutch housing, rotate the pinion.
Drive pinion should rotate smoothly in one direction, but should not rotate in opposite direction.
(2) Check the pinion for wear and damage.

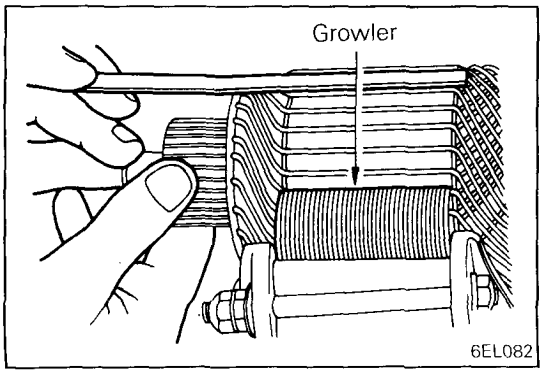


BRUSHES AND SPRINGS – REPLACEMENT

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



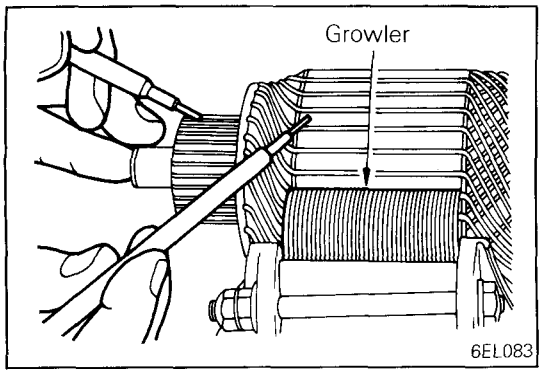
3. Sand pigtail end with sandpaper to ensure good soldering.
4. Insert pigtail into hole provided in new brush and solder it. Make sure that pigtail and excess solder do not come out onto brush surface.
5. When replacing ground brush, slide the brush from brush holder by prying retaining spring back.



TESTING ARMATURE

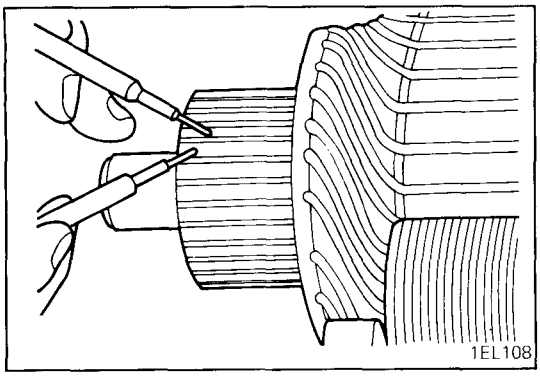
TESTING ARMATURE FOR SHORT-CIRCUIT

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



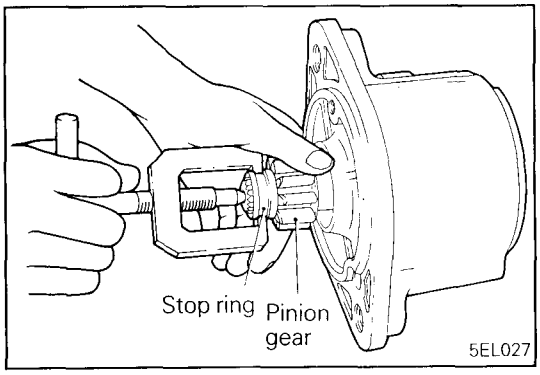
TESTING ARMATURE FOR GROUNDING

Check the insulation between each commutator segment and armature coil core.
If there is no continuity, the insulation is in order.



TESTING ARMATURE COIL FOR CONTINUITY

Check the continuity between segments.
If there is continuity, the coil is in order.



SERVICE POINT OF REASSEMBLY

23. REASSEMBLY OF STOP RING

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

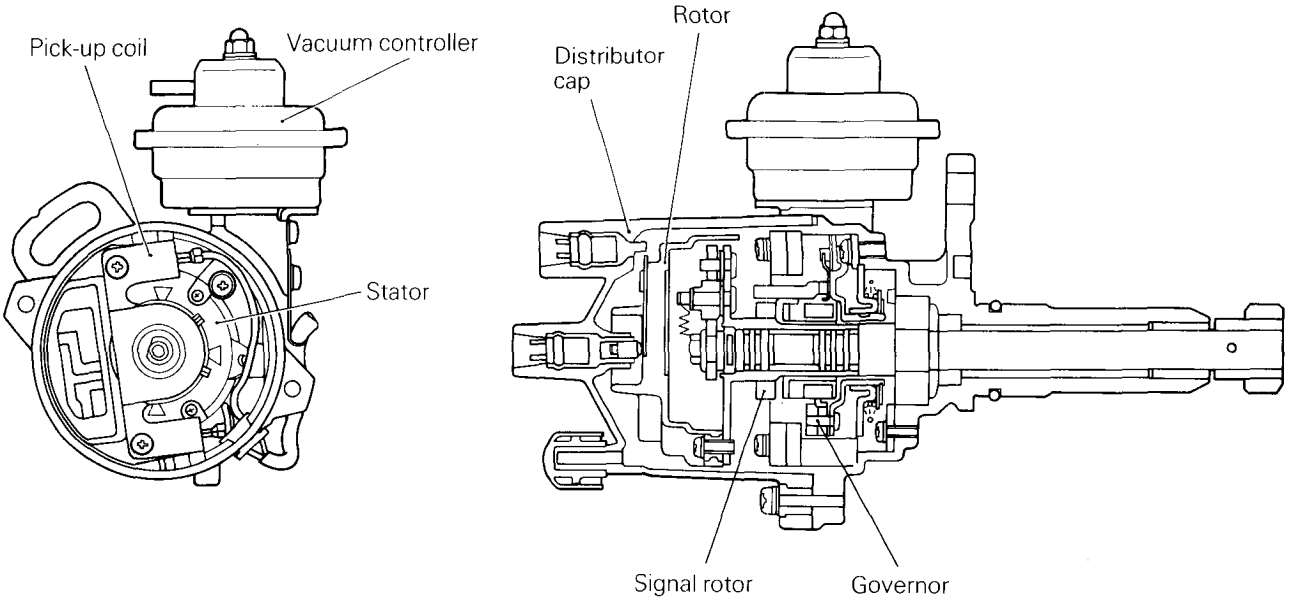
IGNITION SYSTEM

N08GABB

GENERAL INFORMATION

The ignition system consists of a battery, distributor (with built-in signal generator), electronic spark control (ESC) ignitor, electronic control unit, ignition coil, spark plug cables, high tension cable, ignition switch and connection wires.

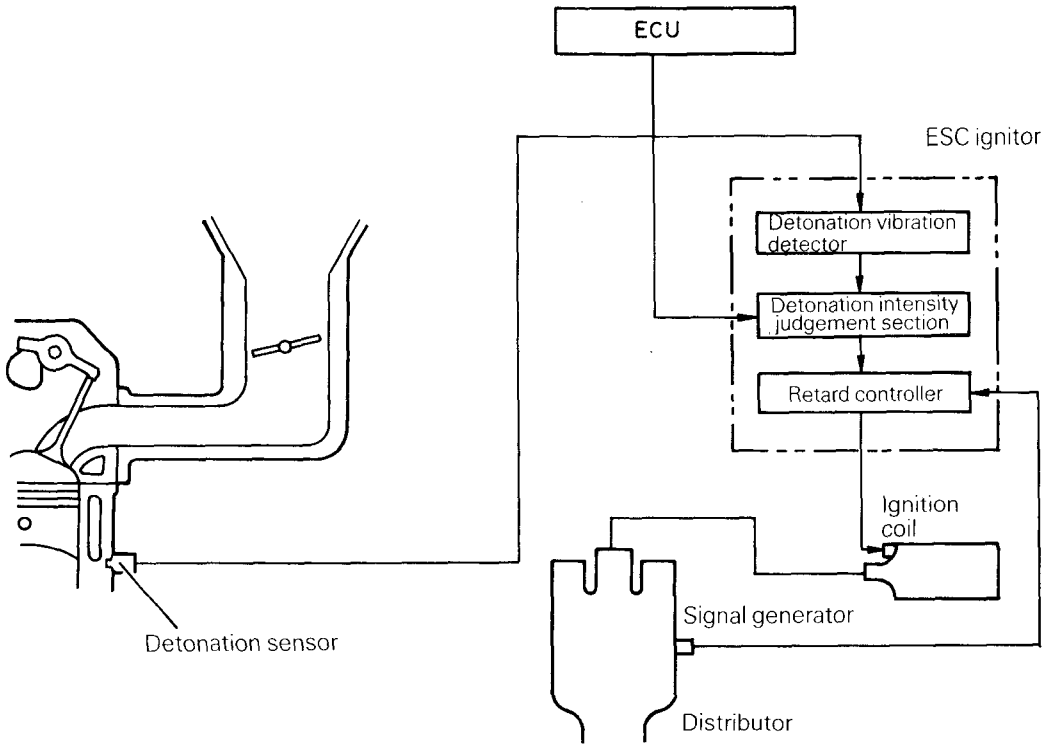
The distributor consists of the signal generator (signal rotor and pick up coil), timing advance controller (governor and vacuum controller) and distributor (rotor and distributor cap).



5EL036

The ignition timing control device has an ordinary governor and a vacuum timing control unit with timing retard feature in the distributor to prevent detonation during engine turbocharging. This timing device causes the timing to be retarded when a positive pressure acts on the diaphragm of the ordinary vacuum advance unit due to turbocharging.

In order to prevent detonation in high load region for engine protection, a detonation prevention device is also used. Namely, a detonation sensor detects vibration of the mount, and the control circuit in the ignitor detects detonation and judges its intensity, according to which the curcuit retards the ignition timing to prevent detonation.



1EL156

SPECIFICATIONS

N08GB--

GENERAL SPECIFICATIONS

DISTRIBUTOR

Items	Specifications
Type	Contact point less type
Identification No.	T4T63373G
Part No.	MD119754
Firing order	1 - 3 - 4 - 2

IGNITION COIL

Items	Specifications
Type	Oil filled
Identification No./Part No.	LB – 119/MD025703

DETONATION SENSOR

Items	Specifications
Identification No./Part No.	E1T15071/MD063724
Type	Piezo-electric element

ESC IGNITER

Items	Specifications
Identification No./Part No.	E2T16771/MD125748

SPARK PLUG

Items	Identification No.	Manufacturer
Factory installed plug	BUR7EA-11 W22EPR-S11	NGK NIPPON DENSO
Alternate plug	BPR7ES-11 BP7ES-11 W22EP-U10 W22EPR-U10 RN7YC4 N7YC4	NGK NGK NIPPON DENSO NIPPON DENSO CHAMPION CHAMPION

IGNITION SWITCH

Items	Specifications
Ignition switch	
Load capacity A	
AM-ACC	15
AM-IG1	12
AM-IG2	20
AM-ST	15
AM-R	15
Voltage drop (under actual load) V	0.1 or less
Key reminder switch	
Load capacity W	1
Voltage drop V	0.2 or less
Light monitor switch	
Load capacity W	1
Voltage drop V	0.2 or less

SERVICE SPECIFICATIONS

N08GC- -

Items	Specifications
Standard value	
Basic ignition timing at curb idle speed	10° ± 2°BTDC
Actual ignition timing at curb idle speed for high-altitude only	15° BTDC
Distributor	
Governor crank deg/rpm	
Initial	0/1,200
Middle	10/2,000
Final	33/6,000
Vacuum crank deg/mmHg	
Initial	0/80
Middle	12/150
Final	23/280
Ignition coil	
Primary resistance Ω	1.12 – 1.38
Secondary resistance kΩ	9.4 – 12.7
Spark plug gap mm (in.)	
NGK, CHAMPION	1.0 – 1.1 (.039 – .043)
NIPPON DENSO	
W22EP-U10, W22EPR-U10	0.9 – 1.0 (.035 – .039)
Other type	1.0 – 1.1 (.039 – .043)

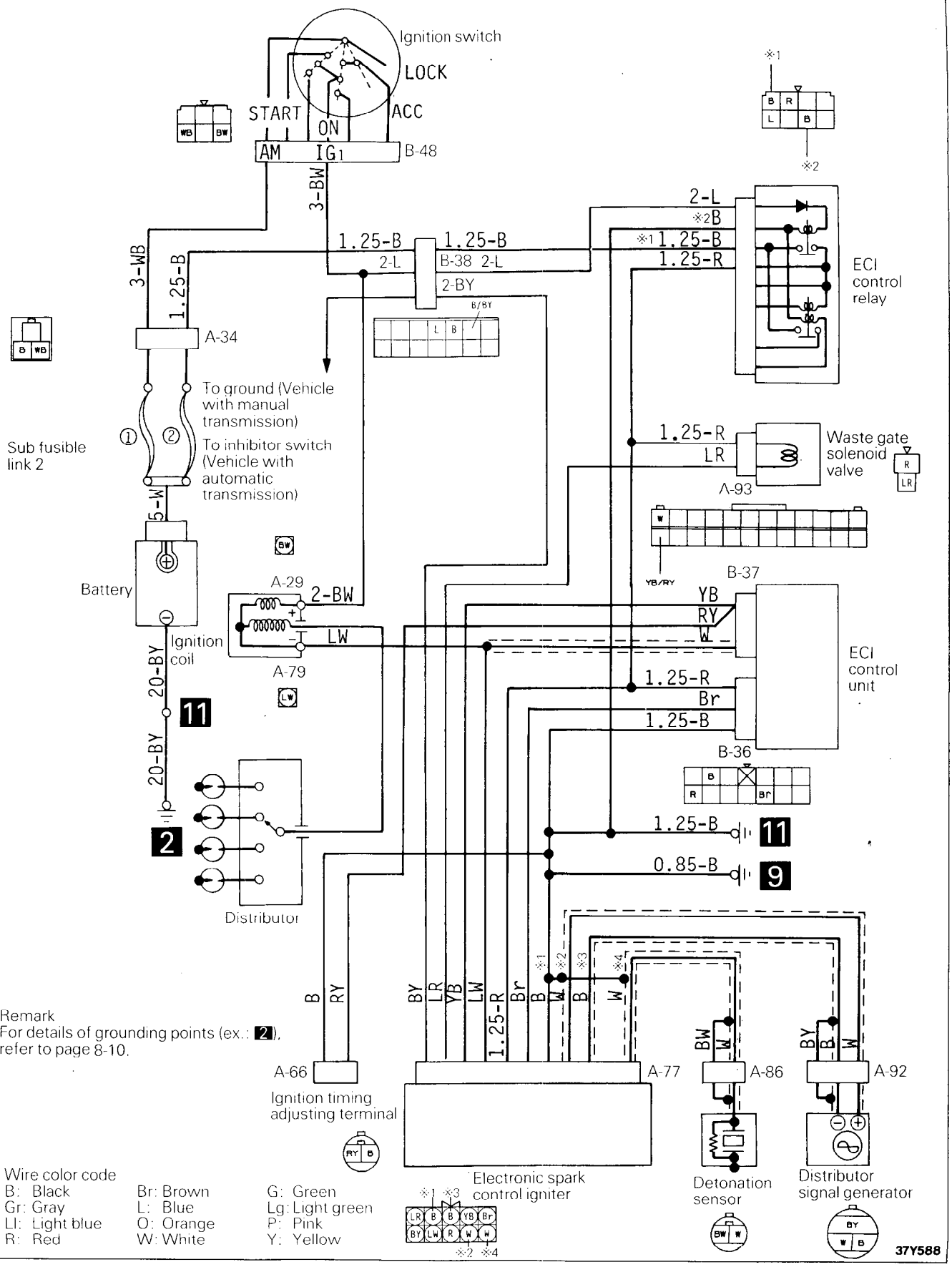
TORQUE SPECIFICATIONS

N08GD- -

Items	Nm	ft.lbs.
Spark plug	20 – 30	15 – 21
Distributor mounting nut	10 – 12	7 – 9

TROUBLESHOOTING

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	
Gr: Gray	L: Blue	Lg: Light green	
LI: Light blue	O: Orange	P: Pink	
R: Red	W: White	Y: Yellow	

OPERATION N08GHAB

- When the ignition switch is turned to "ON", battery voltage is applied to the ignition coil primary winding.
- As the distributor shaft rotates, the igniter opens and closes the circuit repeatedly causing ignition coil primary winding current to flow through the ignition coil negative terminal and igniter to ground, or be interrupted.
- This action induces high voltage in the ignition coil secondary winding. From the ignition coil, the secondary winding current produced flows through the distributor and spark plug to ground, thus causing ignition in each cylinder.

Remarks
For discussion regarding the ignition timing control, refer to GROUP 14, FUEL SYSTEM in Technical Description.

TROUBLESHOOTING HINTS

1. Engine cranks, but does not start
   1) Spark is insufficient or no spark occurs at all (on spark plug)
      - Check ignition coil.
      - Check distributor.
      - Check power transistor.
      - Check spark plugs.
   2) Spark is good
      - Check the ignition timing.
2. Engine idles roughly or stalls
   - Check spark plugs.
   - Check ignition timing.
   - Check ignition coil.
3. Poor acceleration
   - Check ignition timing.
4. Engine overheats or consumes excessive fuel
   - Check ignition timing.

SERVICE ADJUSTMENT PROCEDURES

N08GIAC

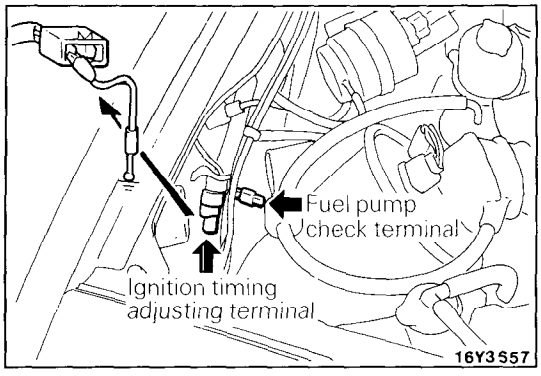
IGNITION TIMING

IGNITION TIMING ADJUSTMENT

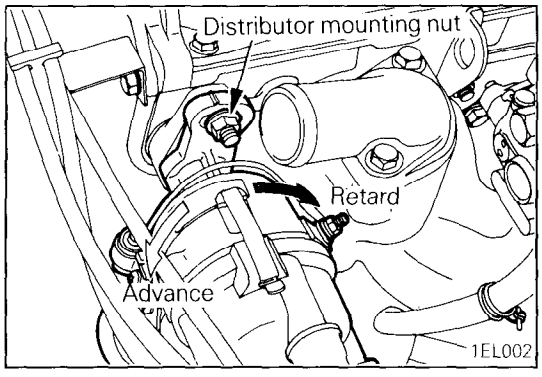
Adjustment conditions:
- Coolant temperature: 85 – 95°C (185 – 205°F)
- Lamps and all accessories: Off
- Transmission: N (Neutral)
- Set Parking Brake

1. Connect tachometer and timing light.
2. Start engine and run at curb idle speed.

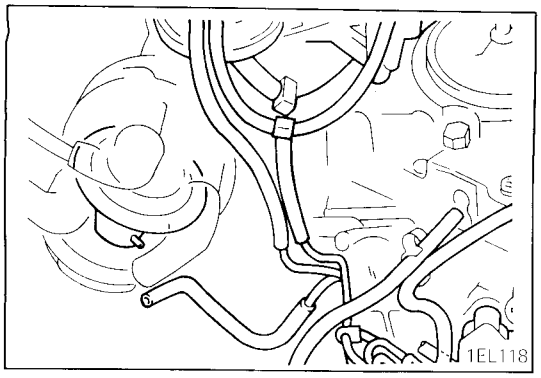
Curb idle speed rpm
850 ± 100



3. When checking the basic ignition timing at high altitude [higher than 1,200 m (3,900 ft.)], stop the engine and disconnect the water-proof female connector from the ignition timing connector. Connect a lead wire with an alligator clip to the ignition timing adjusting terminal to ground it.



4. Check basic ignition timing and adjust if necessary.
   Basic ignition timing: 10° ± 2°BTDC
5. To adjust ignition timing, loosen distributor mounting nut and turn distributor housing.
6. After adjustment, securely tighten mounting nut.
7. In case of checking at high altitude, stop the engine and disconnect the grounding wire connected in Step 3 to restore the original condition of the ignition timing adjusting terminal. Then, restart the engine and check to see that the ignition timing has been advanced from the basic to actual one.
   Actual ignition timing: 15°BTDC



IGNITION SYSTEM INSPECTION

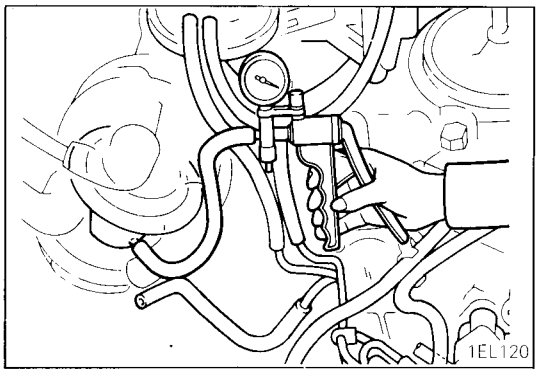
N08GIDA

1. Inspection of Centrifugal Timing Device

(1) Set tachometer and timing light.
(2) Set parking brake, start engine and run idle.
(3) Disconnect vacuum hose from vacuum controller.
(4) While slowly increasing engine speed, check timing advance.
It is okay if timing advances smoothly as engine speed increases.

Symptom	Probable cause
Timing advance too large	Deteriorated governor spring
Timing advance too sharp	Broken spring
Timing advance too small or hysteresis too large	Governor weight or cam not operating correctly

(5) If any of the above symptoms is observed, disassemble and check distributor.
(6) After the check, turn ignition switch to "OFF".
(7) Remove tachometer and timing light.

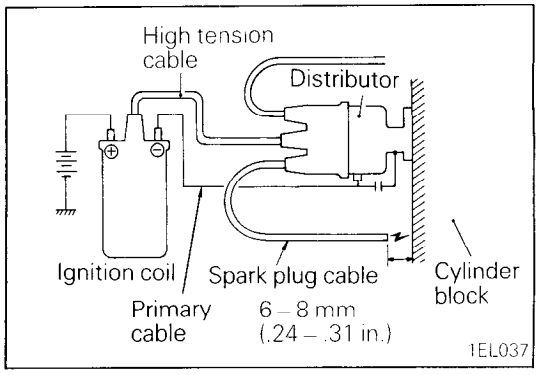


2. Inspection of Vacuum Timing Device

(1) Set timing light.
(2) Set parking brake, start engine and run idle.
(3) Disconnect vacuum hose from vacuum controller and connect a vacuum pump to its nipple.
(4) Apply a vacuum to the vacuum controller gradually and check timing advance.
It is okay if timing advances smoothly as negative pressure increases.

Symptom	Probable cause
Timing advance too large	Weakened vacuum controller spring
Timing advance too sharp	Broken spring
Timing advance too small or hysteresis too large	Breaker base not operating correctly
No timing advance at all	Broken diaphragm

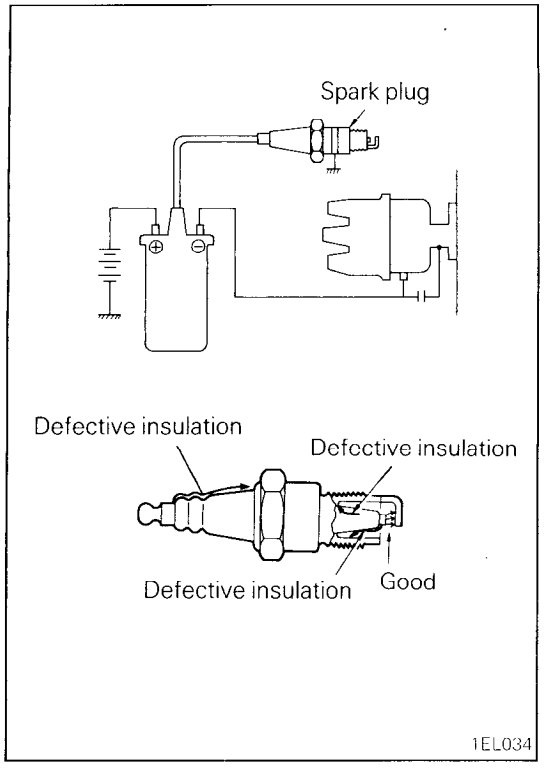
(5) If any of the above symptoms is observed, disassemble and check distributor.
(6) Turn ignition switch to "OFF".
(7) Disconnect vacuum pump and connect vacuum hose to the nipple of vacuum controller.
(8) Remove timing light.



SPARK PLUG CABLE TEST

N08GIGA

Hold the spark plug cable about 6 – 8 mm (.24 – .31 in.) away from engine proper (grounding portion such as cylinder block) and crank engine to verify that sparks are produced.



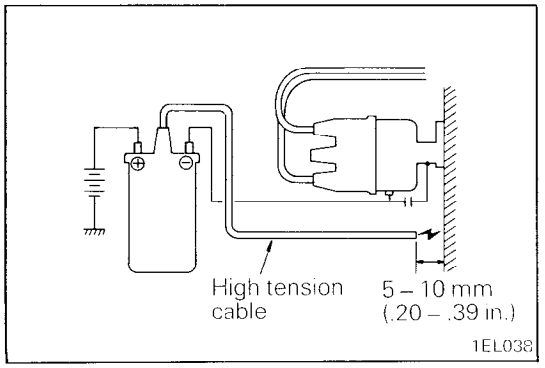
SPARK PLUG TEST

N08GIHA

Connect the spark plug to the high tension cable, ground outer electrode (main body), and crank engine. In the atmosphere, only short sparks are produced because of small discharge gap. If the spark plug is good, however, sparks will occur in discharge gap (between electrodes). In a defective spark plug, no sparks will occur because of leak of insulation puncture.

SPARK TEST – ENGINE CANNOT BE CRANKED

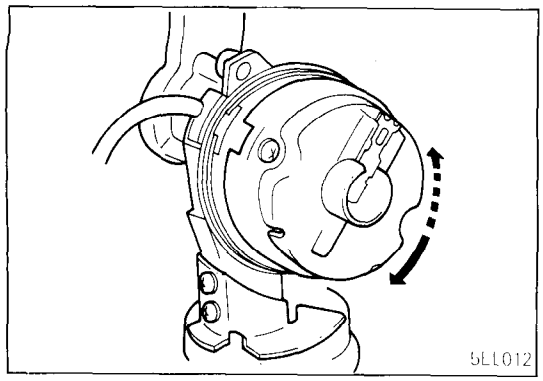
If spark test is performed by cranking while the catalyst is hot, unburned gas will be supplied to the catalyst, and this is not desirable to the catalyst.
For this reason, use the following methods which allow spark test to be performed without cranking.



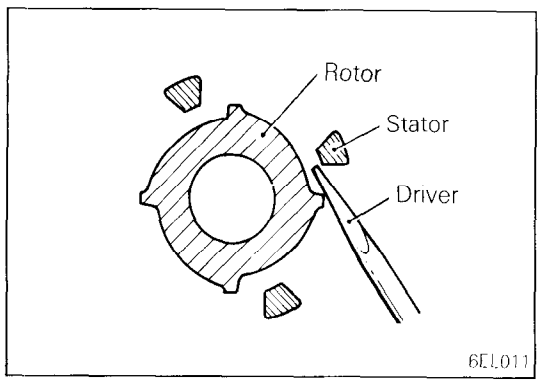
HEI TYPE DISTRIBUTOR

Method 1

Hold the high tension cable as shown.



Then remove the distributor cap, turn the rotor in the normal direction (clockwise) by hand until it is blocked, and then return it to its original position. Spark can be produced by moving the projection of the signal rotor close to the stator in this manner.



Method 2

Remove the cap and rotor. Quickly move a screwdriver in and out through the gap between the governor base and housing, and spark can be produced as in Method 1.

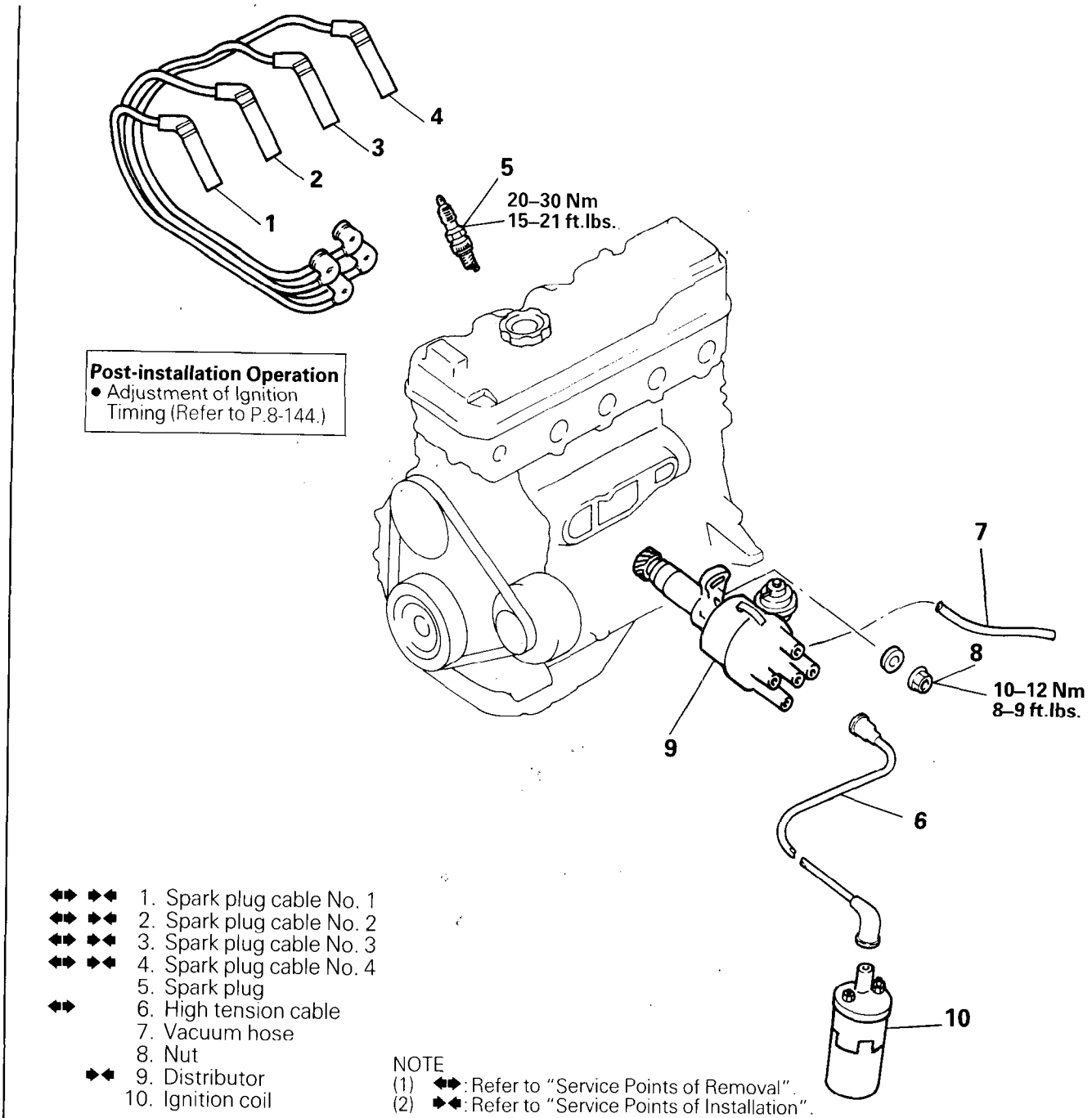
Method 3

Remove the distributor from the engine (do not disconnect the primary cable). While holding the distributor housing in contact with the engine (to complete the ground circuit), turn the distributor shaft, and spark can be produced as when the engine is cranked.

IGNITION SYSTEM

N08GJAD

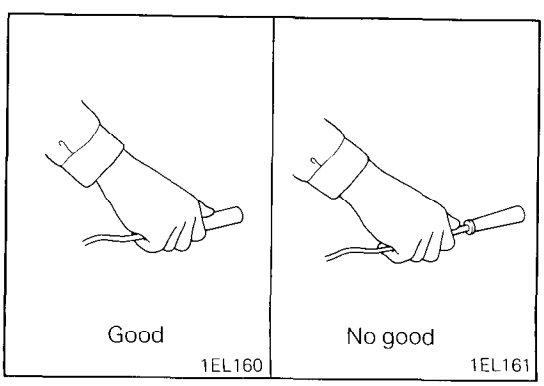
REMOVAL AND INSTALLATION



◆▶ ▶◀ 1. Spark plug cable No. 1
◆▶ ▶◀ 2. Spark plug cable No. 2
◆▶ ▶◀ 3. Spark plug cable No. 3
◆▶ ▶◀ 4. Spark plug cable No. 4
5. Spark plug
◆▶ 6. High tension cable
7. Vacuum hose
8. Nut
▶◀ 9. Distributor
10. Ignition coil

NOTE
(1) ◆▶: Refer to "Service Points of Removal".
(2) ▶◀: Refer to "Service Points of Installation".

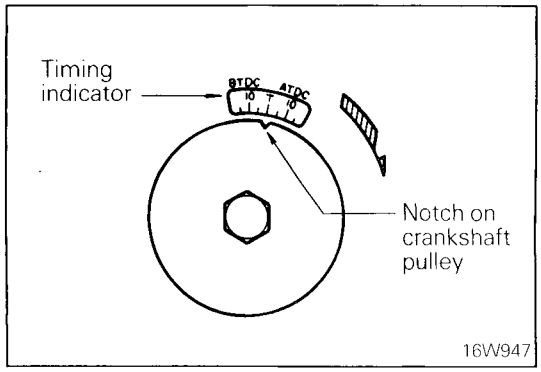
5EL038



SERVICE POINTS OF REMOVAL

1. 2. 3. 4. REMOVAL OF SPARK PLUG CABLE / 6. HIGH TENSION CABLE

Be sure to pull by the cable cap, not by the cable.



9. REMOVAL OF DISTRIBUTOR

Before removing the distributor, position the piston in No. 1 cylinder at the top dead center on compression stroke by the following procedure.

(1) Remove the cap from the distributor.
(2) Turn the crankshaft until the distributor rotor lines up with the No. 1 spark plug cable electrode on the distributor cap.
(3) Align the notch on the crank shaft pulley with the timing mark "T" on the timing indicator to set the engine so that the piston in No. 1 cylinder is at the compression top dead center.

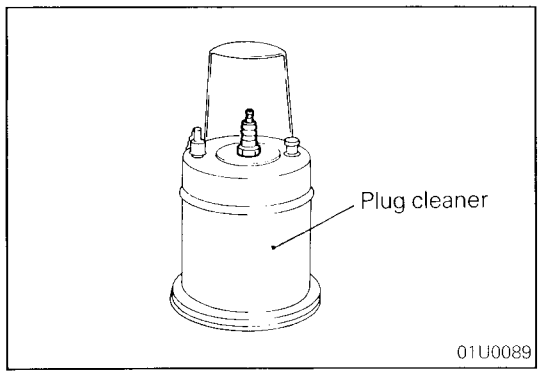
INSPECTION AND CLEANING OF SPARK PLUGS

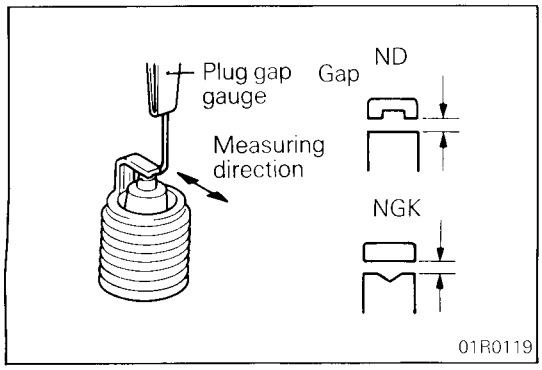
(1) Disconnect spark plug cable from plug.
(2) Using a plug wrench, remove all plugs from cylinder head.

Caution
Use care not to allow foreign matter to enter through plug holes.

(3) Check the following items to see that the electrodes are not damaged and are in soundly burnt state and insulators are not damaged.
- Damage of insulators
- Wearing of electrodes
- Carbon deposit
  For cleaning, use a plug cleaner or wire brush. Also clean cord-side insulator.
- Damage of gasket
- Burnt condition of insulator.
  Dark deposit of carbon indicates too thick mixture or insufficient intake air. Also, misfiring due to too large plug gap is suspected.
  White burn indicates too lean mixture or too fast ignition timing. Also insufficient plug tightening is suspected.

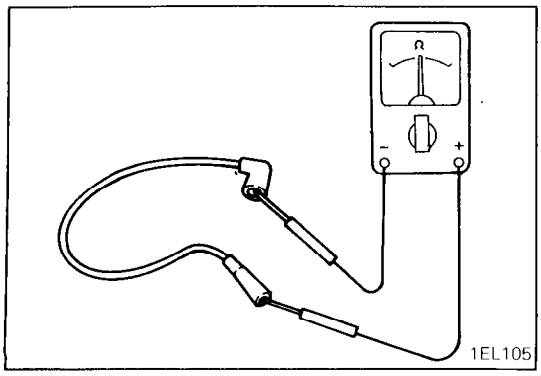
(4) Clean with a plug cleaner.
Use an air gun to remove dust deposited on plug threads.





(5) Check plug gap using a plug gap gauge and adjust if it is not as specified.

Standard value:
NGK, CHAMPION
1.0 – 1.1 mm (.039 – .043 in.)
NIPPON DENSO
W22EP-U10, W22EPR-U10
0.9 – 1.0 mm (.035 – .039 in.)
Other type
1.0 – 1.1 mm (.039 – .043 in.)

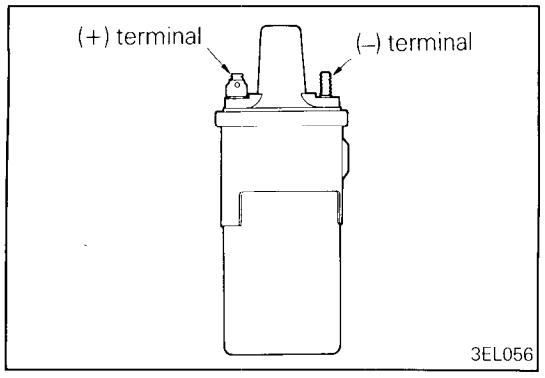


INSPECTION OF SPARK PLUG CABLES

(1) Check the caps and coatings for cracks.
(2) Measure resistance.

Unit: kΩ

High tension cable	Spark plug cable			
	No. 1	No. 2	No. 3	No. 4
Approx. 10	Approx. 10	Approx. 12	Approx. 13	Approx. 15



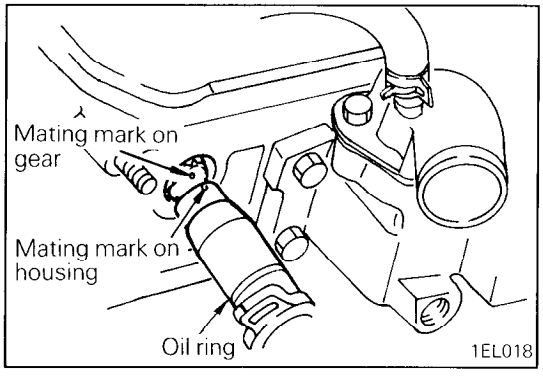
INSPECTION OF IGNITION COIL

1. Measurement of resistance of primary coil
   Measure resistance between terminals (+) and (–) of ignition coil.

   Standard value: 1.12 – 1.38 Ω

2. Measurement of resistance of secondary coil
   Measure resistance between terminal (+) of ignition coil and high tension terminal.

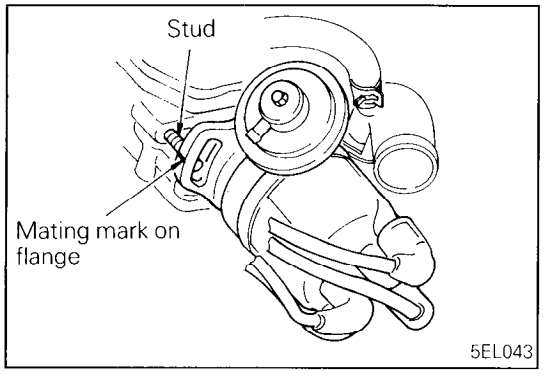
   Standard value: 9.4 – 12.7 kΩ



SERVICE POINTS OF INSTALLATION

9. INSTALLATION OF DISTRIBUTOR

(1) Check the distributor oil ring for damage and seat it securely in the distributor housing groove.
(2) Align mating mark on distributor housing with mating mark on distributor driven gear.



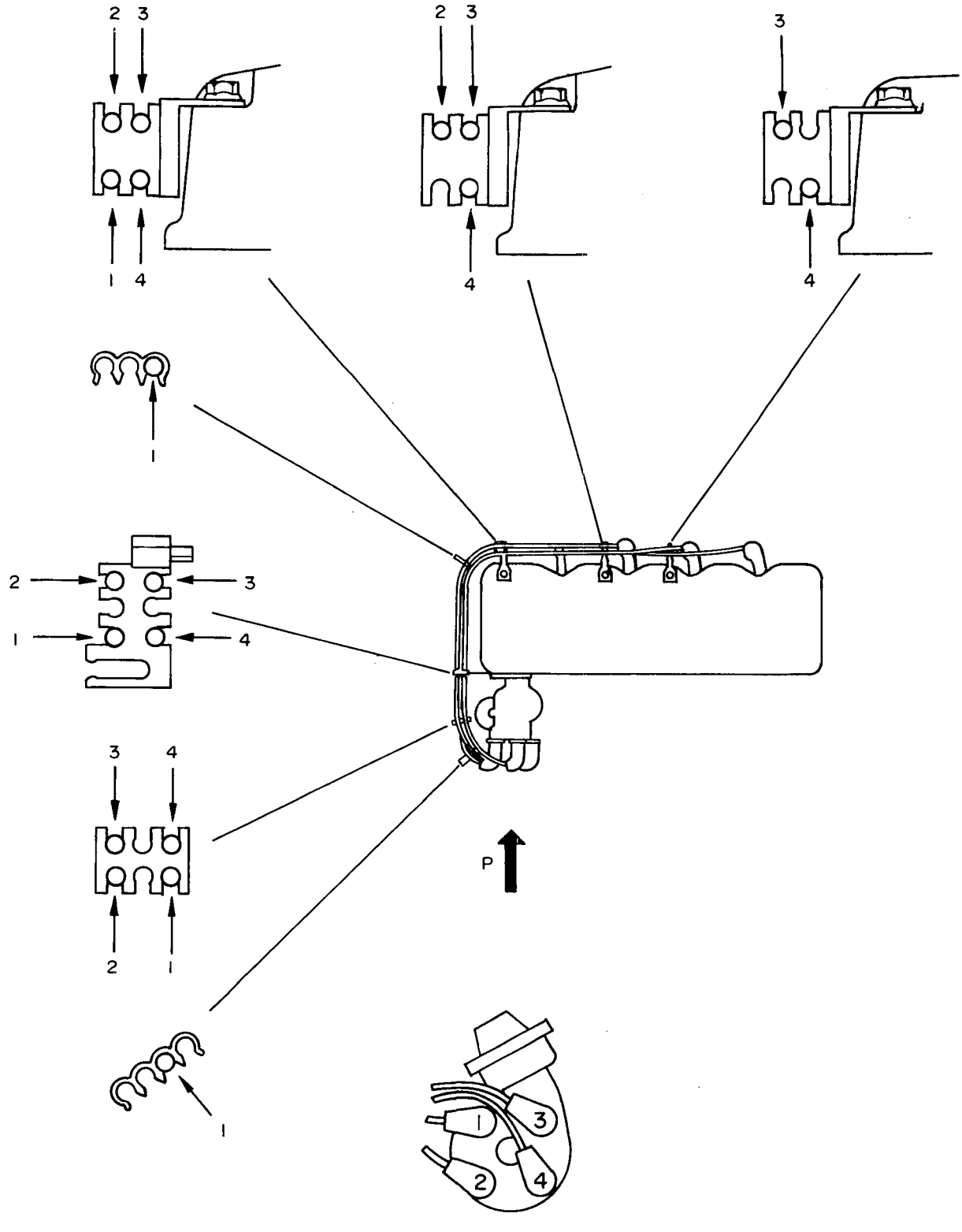
(3) Install distributor to cylinder head while aligning mating mark on distributor attaching flange with center of distributor installing stud and tighten nut.

1. 2. 3. 4. INSTALLATION OF SPARK PLUG CABLE

Improper arrangement of spark plug cables will induce voltage between the cables, causing miss firing and developing a surge at acceleration in high-speed operation. Therefore, be careful to arrange the spark plug cables properly by the following procedure.

1. Install the spark plug cable clamps as shown in the illustration.
2. The numerals on the support and clamp indicate the spark plug cable No.
3. Pay attention to the following items when the spark plug cables are installed.
   (1) Install the cables securely to avoid possible contact with metal parts.
   (2) Install the cables neatly, ensuring they are not too tight, loose, twisted or kinked.

SPARK PLUG CABLE INSTALLATION



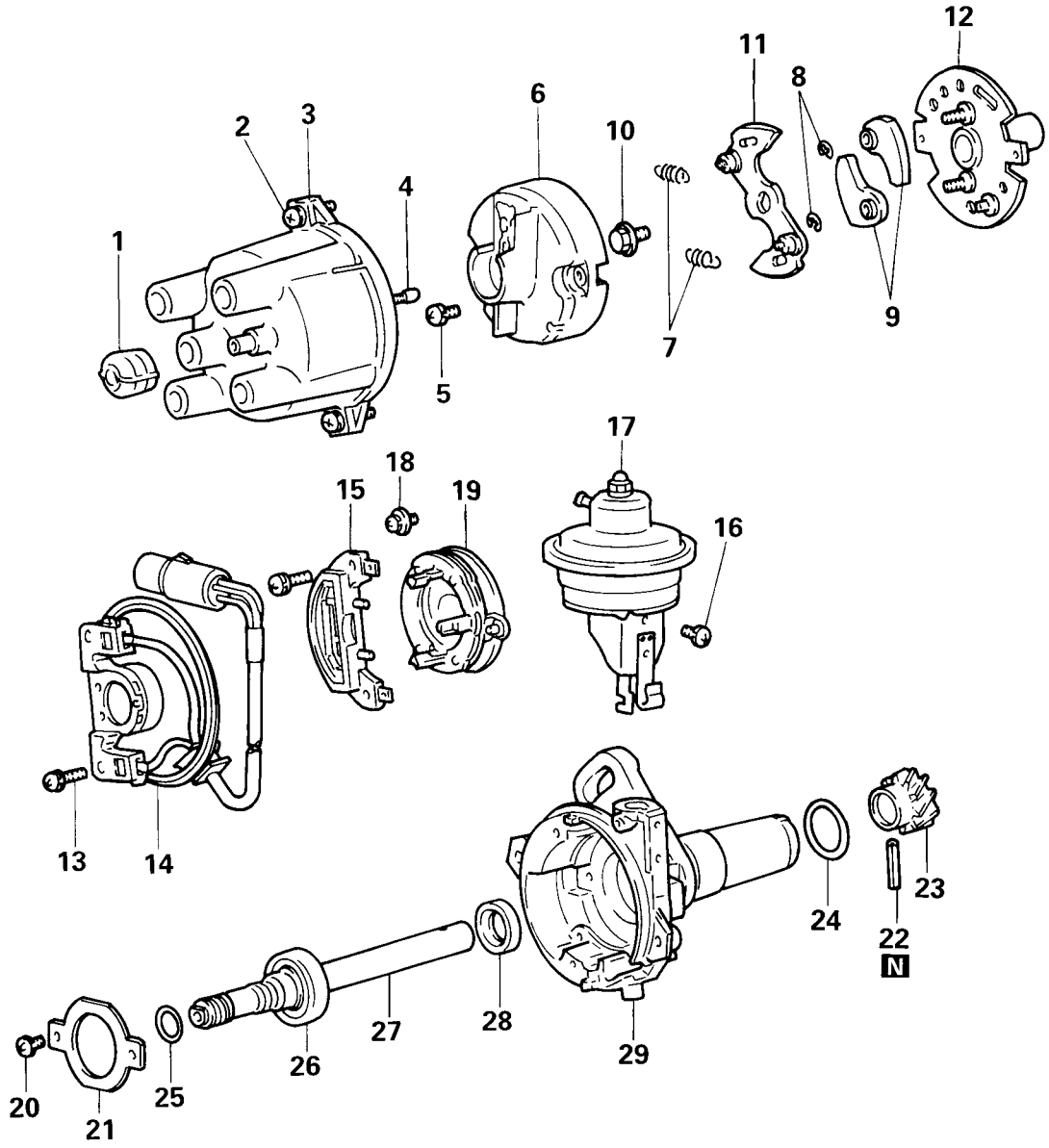
View P

5EL041

DISTRIBUTOR

N08GKFA

DISASSEMBLY AND REASSEMBLY



Disassembly steps

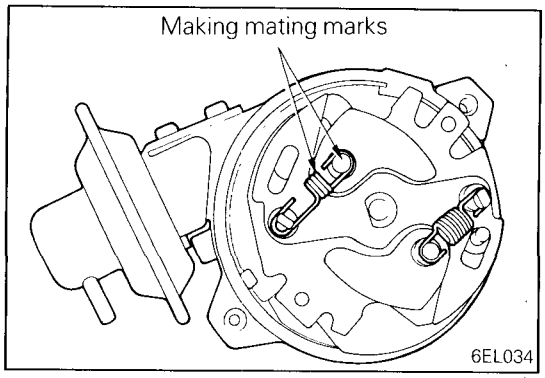
1. Breather
2. Screw
3. Cap
4. Contact carbon
5. Screw
6. Rotor
◆◆ 7. Governor spring
8. Snap ring
9. Governor weight
◆◆ 10. Retaining bolt
11. Governor plate
◆◆ 12. Governor base and signal rotor assembly
13. Screw
14. Pick-up coil
15. Frame or ignitor
16. Screw
17. Vacuum controller
18. Screw
◆◆ ◆◆ 19. Stator
20. Screw
21. Plate
◆◆ ◆◆ 22. Spring pin
◆◆ 23. Driven gear
24. O-ring
25. Washer
26. Bearing
27. Shaft
28. Oil seal
29. Housing

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ◆◆: Refer to "Service Points of Reassembly".
(4) N : Non-reusable parts

6EL0020

SERVICE POINTS OF DISASSEMBLY

Before servicing be sure to lightly clamp distributor in a vice equipped with soft jaws.

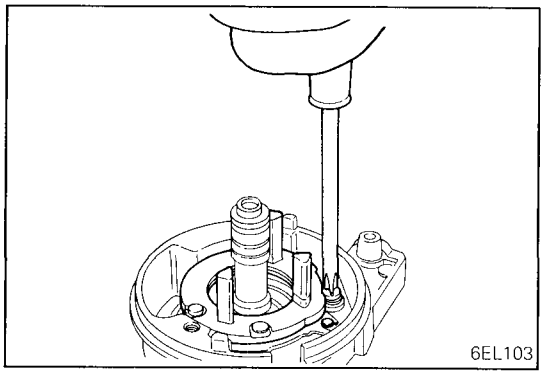


7. REMOVAL OF GOVERNOR SPRING

Make marks on either pair of governor pin and spring for reference at reassembly.

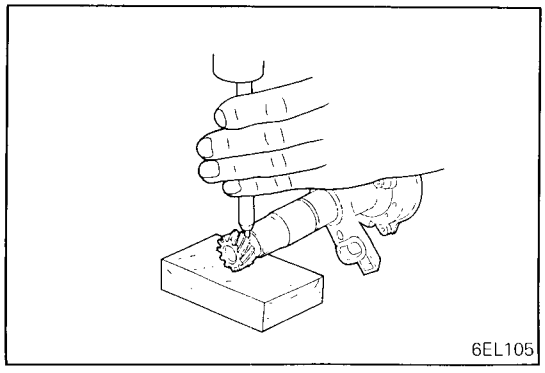
10. REMOVAL OF RETAINING BOLT

Be very careful when loosening the retaining bolt, because it is coated with screw-lock cement.



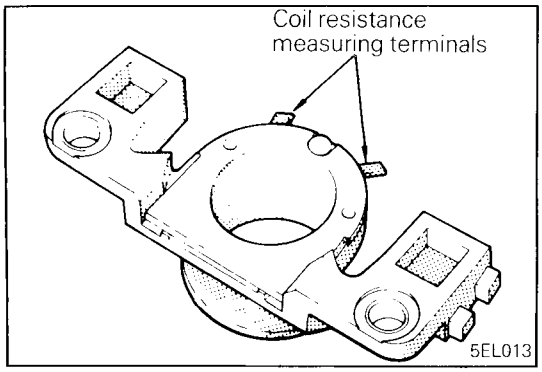
19. REMOVAL OF STATOR

Do not place the removed stator in an area where it might attract iron filings or pieces.



22. REMOVAL OF SPRING PIN

(1) Mark location of driven gear on distributor shaft.
(2) Place driven gear on soft vise (wood block) so that spring pin can be removed.
(3) Using a pin punch, remove spring pin.



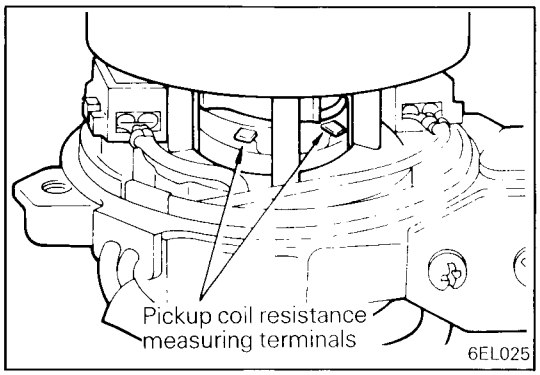
INSPECTION

PICK-UP COIL

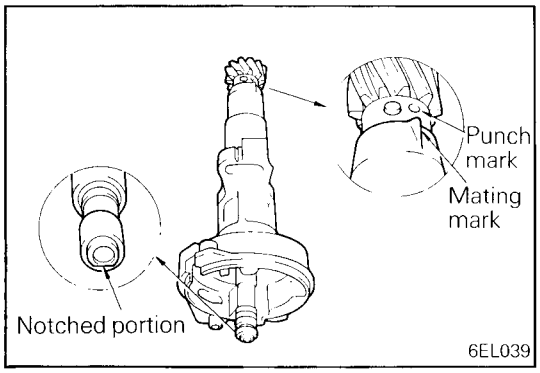
(1) Using an ohmmeter, measure resistance of pickup coil.

Resistance value: 920 – 1,120 Ω

Caution
Do not insert tester probe into igniter connecting terminals, as damage to terminals could result.



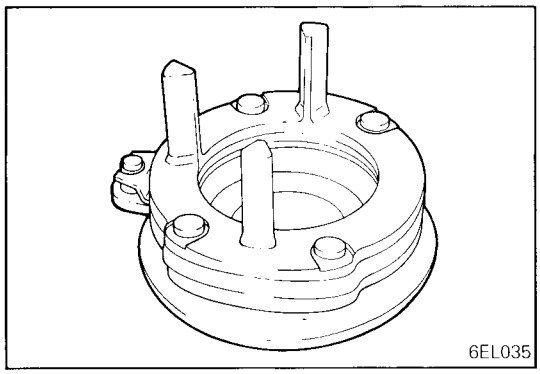
(2) When coil resistance is to be measured without disassembling distributor assembly, insert tester probes through portions shown in illustration.



SERVICE POINTS OF REASSEMBLY

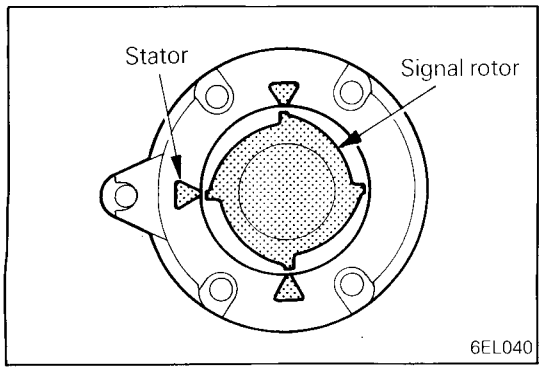
23. INSTALLATION OF DRIVEN GEAR / 22. SPRING PIN

(1) Install driven gear into distributor shaft at previously marked location. Then install new roll pin.
(2) Align punch mark on gear with mating mark on housing, check to ensure that notched portion of shaft end is positioned as shown, and then install a pin to secure the gear to the shaft.



19. INSTALLATION OF STATOR

Before the stator is installed, check to ensure that there are no iron filings or iron pieces on the stator.



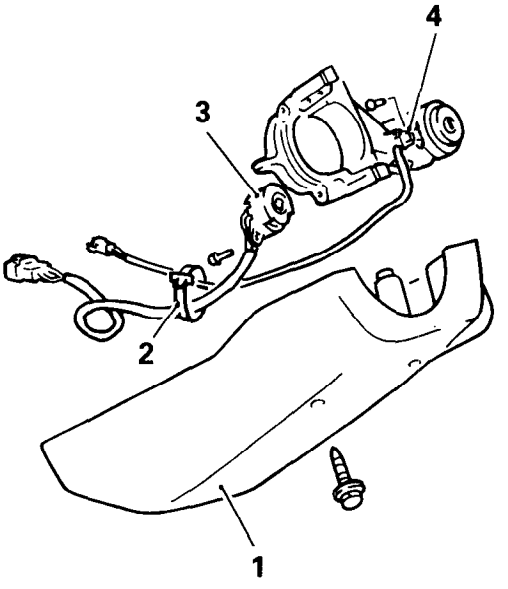
12. INSTALLATION OF GOVERNOR BASE AND SIGNAL ROTOR ASSEMBLY

After the governor assembly has been installed, turn the shaft to confirm that the projection of the signal rotor does not touch the stator.

IGNITION SWITCH

N08GLAD

REMOVAL AND INSTALLATION

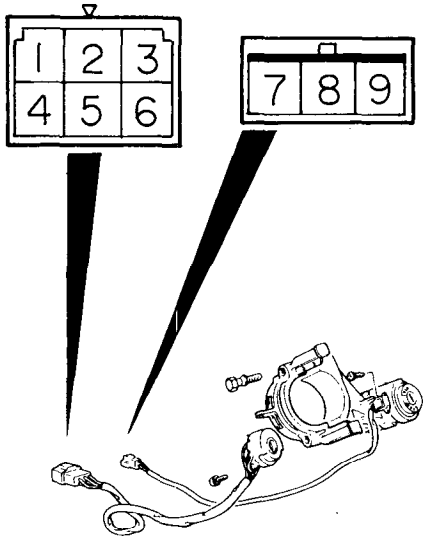


Removal steps

1. Lower column cover
2. Cable bands
3. Ignition switch
4. Key remind switch

NOTE
Installation procedure is a reversal of removal procedure.

16Y2988



16Y2957
16Y510

INSPECTION

(1) Remove the knee protector.
(2) Disconnect the ignition switch connector.
(3) Operate the switch, and check the continuity between the terminals.

Position \ Terminal / Key		Ignition switch						Key remind switch		
		6	3	4	2	5	1	7	8	9
LOCK	Removed							○—○		
ACC	Inserted	○—○						○		○
ON		○—○		○—○						
START		○		○		○—○				

NOTE
○—○ indicates that there is continuity between the terminals.

METERS AND GAUGES

N08HB- -

SPECIFICATIONS

GENERAL SPECIFICATIONS

METERS AND GAUGES

Items	Specifications
Speedometer	
Type	Rotary magnet type
Tachometer	
Type	Pulse type
Fuel gauge	
Type	Bi-metal type (for 7V built-in constant voltage relay)
Fuel gauge unit	
Type	Variable resistance type
Engine coolant temperature gauge	
Type	Bi-metal type (7V operation)
Engine coolant temperature gauge unit	
Type	Thermistor type
Oil pressure gauge	
Type	Bi-metal type
Oil pressure gauge unit	
Type	Bi-metal type
Voltmeter	
Type	Moving iron type
Pressure meter	
Type	Moving coil type

INDICATORS

Items	Specifications
Turn signal indicator W	3.4 [158]
Rear hatch-ajar warning indicator W	1.4 [74]
Rear brake lock-up control system failure indicator W	1.4 [74]
Washer fluid level warning indicator W	1.4 [74]
Low-fuel warning indicator W	3.4 [158]
Fasten seat belt warning indicator W	1.4 [74]
Door-ajar warning indicator W	1.4 [74]
High beam indicator W	1.4 [74]
Brake warning indicator W	1.4 [74]
Overdrive indicator W	1.4 [74]
Charge warning indicator W	1.4 [74]
Theft-alarm indicator W	1.4 [74]

NOTE
The values in parenthesis denote SAE grade numbers.

SERVICE SPECIFICATIONS

N08HC- -

Items	Specifications
Standard value	
Tachometer indication error rpm	
1,000 rpm	±100
3,000 rpm	±150
5,000 rpm	±250
Fuel gauge resistance value Ω	
Between power source terminal (1) and ground terminal (2)	62 – 78
Between /V terminal (3) and fuel gauge unit terminal (4)	49 – 61
Fuel gauge unit resistance value Ω	
Float point "F"	1 – 5
Float point "E"	103 – 117
Fuel gauge unit float position mm (in.)	
Float point "F"	34.4 – 38.2 (1.35 – 1.50)
Float point "E"	234 – 238 (9.21 – 9.37)
Engine coolant temperature gauge resistance value Ω	49 – 61
Engine coolant temperature gauge unit resistance value	
When engine coolant temperature is 70°C (158°F) Ω	90.5 – 117.5
Oil pressure gauge resistance value Ω	37 – 47
Voltmeter indication error at 12.5 V V	±1
Pressure meter resistance value Ω	30 – 56

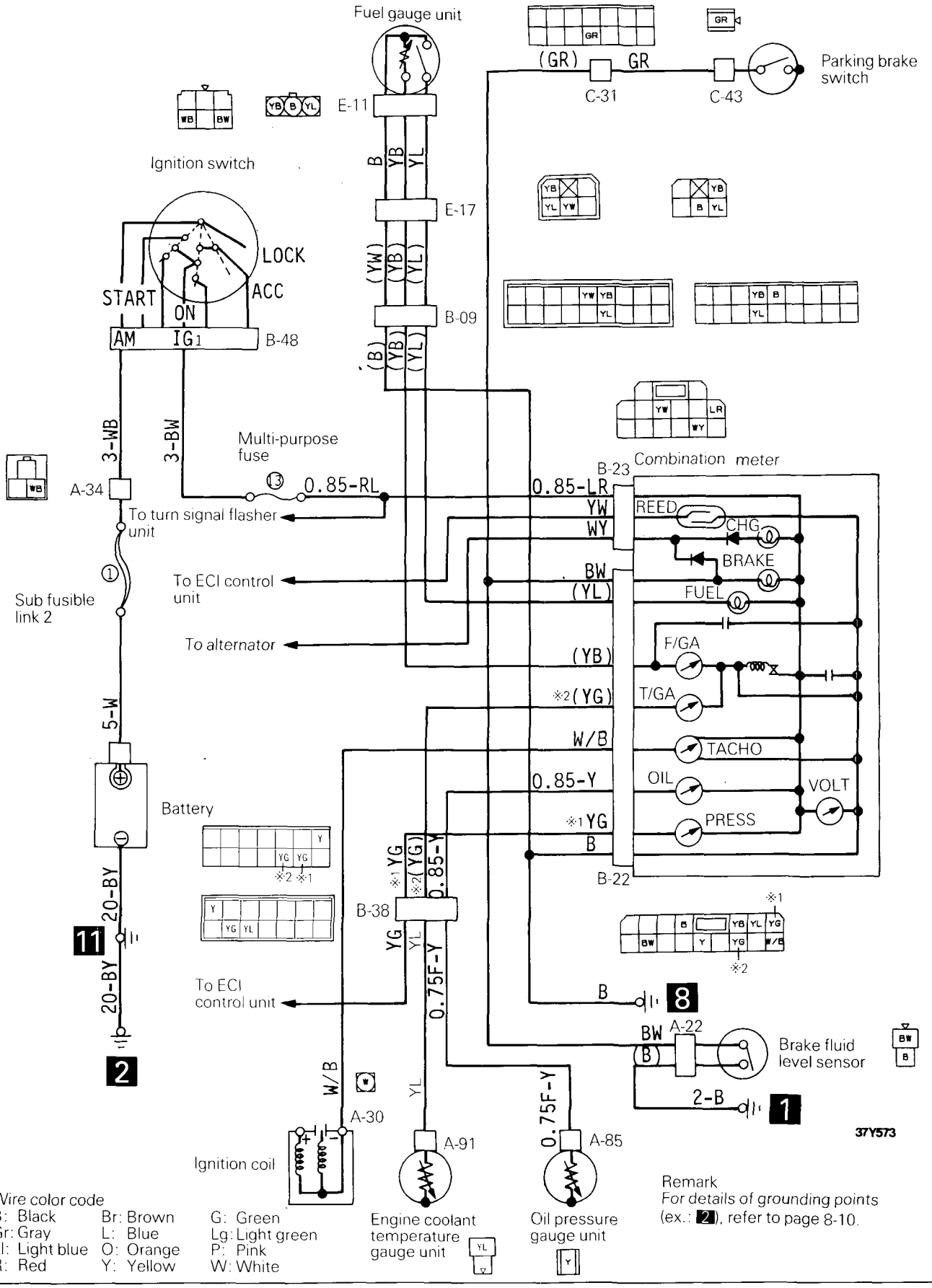
TORQUE SPECIFICATIONS

N08HD- -

Item	Nm	ft.lbs.
Engine coolant temperature gauge unit	30 – 39	22 – 28

TROUBLESHOOTING

CIRCUIT DIAGRAM



Wire color code

B: Black	Br: Brown	G: Green	
Gr: Gray	L: Blue	Lg: Light green	
Ll: Light blue	O: Orange	P: Pink	
R: Red	Y: Yellow	W: White	

Remark
For details of grounding points (ex.: 2), refer to page 8-10.

OPERATION N08HHAC

Fuel Gauge

- When the ignition switch is turned to "ON", current flows through fuse No. 13, fuel gauge, fuel gauge unit and ground, operating the fuel gauge.
- When fuel level is high, the fuel gauge unit internal resistance is small so that the current passing through the circuit is relatively large. This causes the gauge pointer to swing towards "F".
- When fuel level becomes low, the unit internal resistance is increased, so only a small current flows in the circuit and the gauge pointer swings towards "E".
- Inside the fuel gauge, there is a voltage limiter which functions to maintain a constant output voltage (at 7 V) to the gauge units (fuel gauge unit and engine coolant temperature gauge unit.)

Engine Coolant Temperature Gauge

- When the ignition switch is turned to "ON", current flows through fuse No. 13, engine coolant temperature gauge, engine coolant temperature gauge unit, and ground, operating the engine coolant temperature gauge.
- When coolant temperature is high, the gauge unit internal resistance is small so that the current passing through the circuit is relatively large. This causes the gauge pointer to swing towards "H".
- When coolant temperature is low, the unit internal resistance is increased so a small current flows in the circuit, and the gauge pointer swings towards "C".

Oil Pressure Gauge

- When the ignition switch is in the "ON" position, current flows through fuse No. 13, oil pressure gauge, oil pressure gauge unit, and ground, causing the oil pressure gauge to operate.
- When oil pressure is high, the internal contacts of the gauge unit are kept closed for a longer period of time. This causes more current to flow in the circuit, and the gauge pointer swings to the high pressure side.
- When oil pressure is low, the internal contacts of the gauge unit open in a shorter period of time. Therefore, there is less current flowing in the circuit and the gauge pointer swings to the low pressure side.

Low-Fuel Warning Light

- When the ignition switch is turned to "ON", current flows through fuse No. 13, low-fuel warning light, fuel level sensor, and ground.
- If the fuel level falls below the preset level, the fuel level sensor, which normally is submerged in fuel, is exposed to air, and its resistance becomes small, in turn causing the warning light to go on.

Brake Warning Light

- When the ignition switch is turned to "ON" and before the engine starts, current flows through fuse No. 13, brake warning light, alternator, and ground. The brake warning light goes on and stays on until the engine starts. The light goes off once the engine starts. – Burnt-out bulb check.
- If the brake fluid level falls below the preset level or the parking brake is applied, the brake fluid level sensor switch or the parking brake switch contacts close. This causes current to flow through the brake warning light and brake fluid level sensor or parking brake switch to ground, causing the warning light to go on.

SERVICE ADJUSTMENT PROCEDURES

N08HIAA

SPEEDOMETER INSPECTION

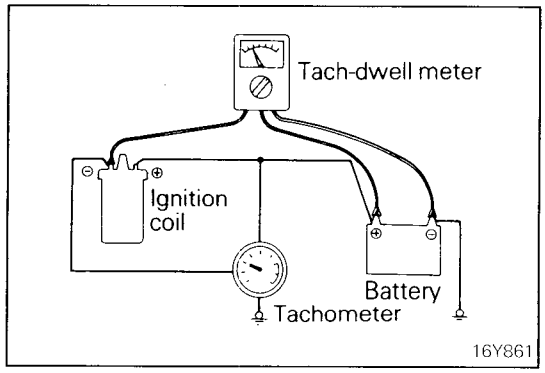
NOTE
If there is a special regulation for speedometer indicator difference in the area where the car is operated, be sure to meet the requirement of the regulation.

1. Adjust tire inflation pressure to the standard value. (Refer to GROUP 22 WHEELS AND TIRES – General Specifications.)
2. Use speedometer tester to make sure that the speedometer indicator difference.

Caution
When speedometer indication error is checked with a speedometer tester, apply chocks to the driven wheels to prevent the car from running away.

TACHOMETER INSPECTION

N08HIBE



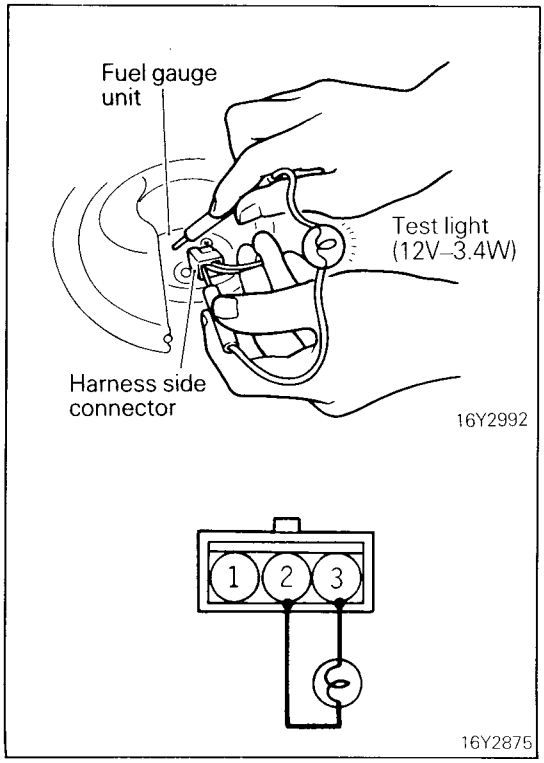
Connect a tacho-dwell meter. Compare the tacho-dwell meter reading with the tachometer reading at each engine speed and check that the error is within the standard value.

Standard value:	**1,000 rpm**	**±100 rpm**
	3,000 rpm	**±150 rpm**
	5,000 rpm	**±250 rpm**

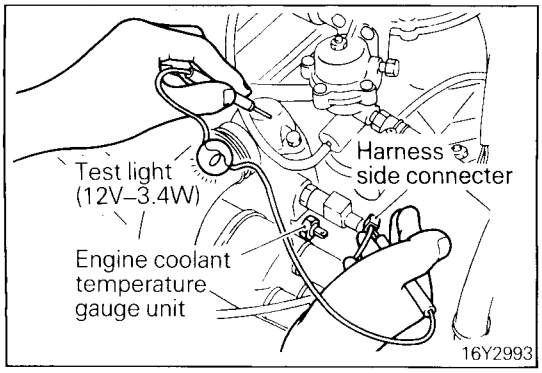
Caution
The tachometer is the negative ground type, and therefore should not be connected in reverse to the battery. If the tachometer is connected in reverse, transistors and diodes will be damaged.

FUEL GAUGE SIMPLE TEST

N08HICA



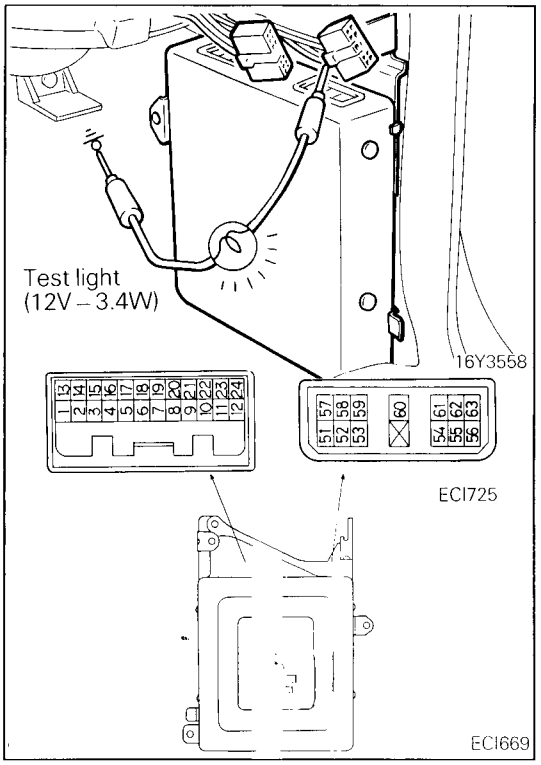
1. Disconnect the wiring connector from the fuel gauge unit inside the luggage compartment.
2. Ground the connector at the harness through a test light.
3. Turn the ignition key to the ON position.
4. Check to be sure that the test light flashes or lights steadily and the fuel gauge operates.
5. If both the test light and gauge operate, the circuit to the gauge unit is normal and the gauge unit itself is faulty.
   If the test light flashes or lights steadily but the gauge does not operate, the gauge is faulty.
   If neither the test light nor the gauge operates, the fuel gauge circuit is faulty.



ENGINE COOLANT TEMPERATURE GAUGE SIMPLE TEST

N08HIDA

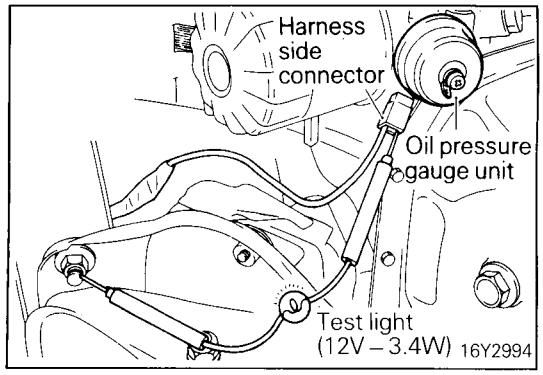
1. Disconnect the wiring connector from the engine coolant temperature gauge unit inside the engine compartment.
2. Ground the connector at the harness through a test light.
3. Turn the ignition key to the ON position.
4. Check to be sure that the test light flashes or lights steadily and the engine coolant temperature gauge operates.
5. If both the test light and gauge operate, the circuit to the gauge unit is normal and the gauge unit itself is faulty.
   If the test light flashes or lights steadily but the gauge does not operate, the gauge is faulty.
   If neither the test light nor the gauge operates, the engine coolant temperature gauge circuit is faulty.



PRESSURE METER SIMPLE TEST

N08HIEB

1. Disconnect connectors from ECI control unit located on the R.H. cowl side.
2. Ground the terminal number 59 of the ECI control unit through the test light.
3. Turn the ignition key to the ON position.
4. Check to be sure that the test light flashes or lights steadily and the pressure meter operates.
5. If both the test light and meter operate, the circuit to the control unit is normal and the control unit itself is faulty.
   If the test light flashes or lights steadily but the meter does not operate, the meter is faulty.
   If neither the test light nor the meter operates, the pressure meter circuit is faulty.



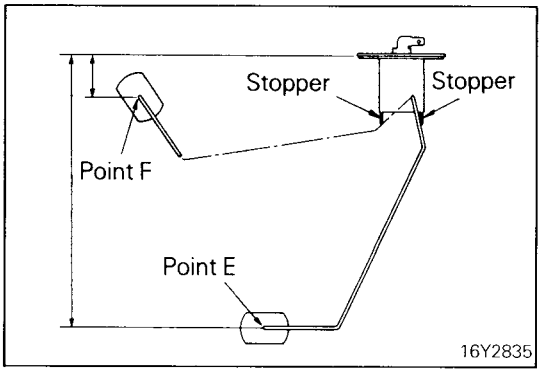
OIL PRESSURE GAUGE SIMPLE TEST N08HIFB

1. Disconnect the wiring connector from the oil pressure gauge unit inside the engine compartment.
2. Ground the connector at the harness through a test light.
3. Turn the ignition key to the ON position.
4. Check to be sure that the test light flashes or lights steadily and the oil pressure gauge operates.
5. If both the test light and gauge operate, the circuit to the gauge unit is normal and the gauge unit itself is faulty.
   If the test light flashes or lights steadily but the gauge does not operate, the gauge is faulty.
   If neither the test light nor the gauge operates, the oil pressure gauge circuit is faulty.

VOLTMETER INSPECTION N08HIGB

1. Connect the (+) terminal of the checking voltmeter to the S terminal of the alternator and ground the (–) terminal.
2. Crank the engine and compare indications to check that the error is within the standard value.

   Standard value: at 12.5 V ±1V



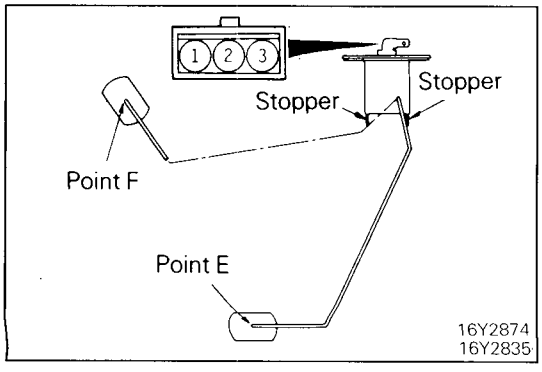
FUEL GAUGE UNIT INSPECTION N08HIIE

To inspect the fuel gauge unit, replace the unit from fuel tank.

FUEL GAUGE UNIT FLOAT POSITION CHECK

Move the float and measure the float position at points "F" and "E" when the float arm contacts the stopper.

Standard value:
POINT F: 34.4 – 38.2 mm (1.35 – 1.50 in.)
POINT E: 234 – 238 mm (9.21 – 9.37 in.)

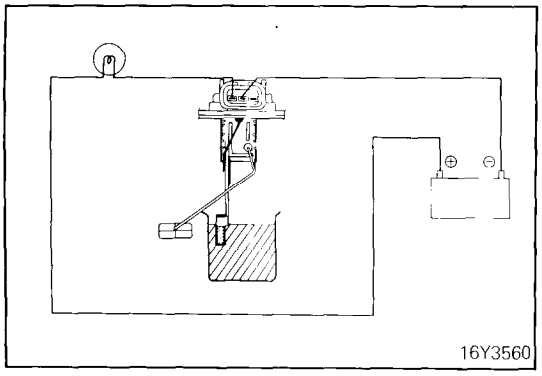


FUEL GAUGE UNIT RESISTANCE CHECK

1. Check that the resistance between terminals 2 and 3 is within the standard value when the fuel gauge unit float is between positions "F" and "E".

   Standard value:
   Point "F": 1 – 5 Ω
   Point "E": 103 – 117 Ω

2. Also check that the resistance changes smoothly when the float is moved to "F" and "E".



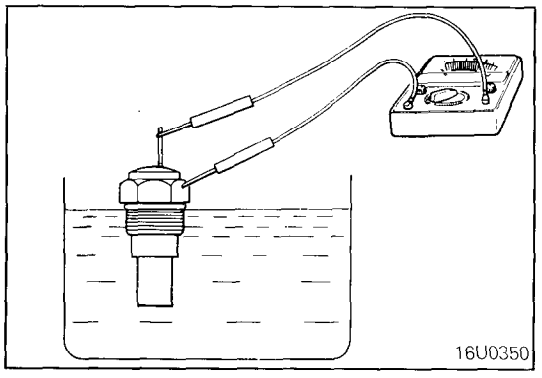
FUEL LEVEL SENSOR CHECK

1. Connect the gauge unit with a test light to the battery, and immerse it in the water.
2. The lamp should be off while thermistor of the gauge unit is beneath the water, and should illuminate when the unit is taken out of the water.

NOTE
If there is a malfunction, replace the fuel gauge as an assembly.

Caution
After completing this test, wipe the unit dry and install it in the fuel tank.

After the check, install the fuel gauge unit on the fuel tank and apply sealant to the portion where the floor plug is to be installed and then install the plug.



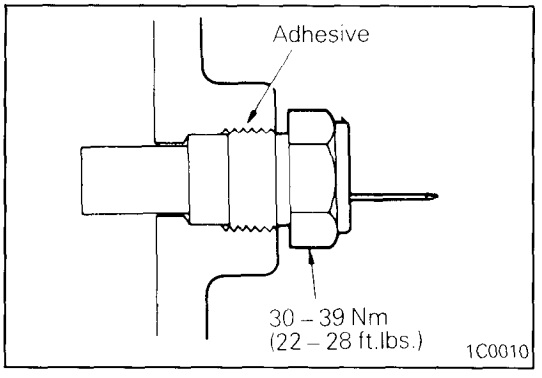
ENGINE COOLANT TEMPERATURE GAUGE UNIT INSPECTION N08HIKB

To inspect the engine coolant temperature gauge unit, remove the unit from the manifold.

ENGINE COOLANT TEMPERATURE GAUGE UNIT RESISTANCE CHECK

Immerse the gauge unit in hot water at 70°C (158°F) and measure the resistance value with an ohmmeter.

Standard value: 90.5 – 117.5 Ω

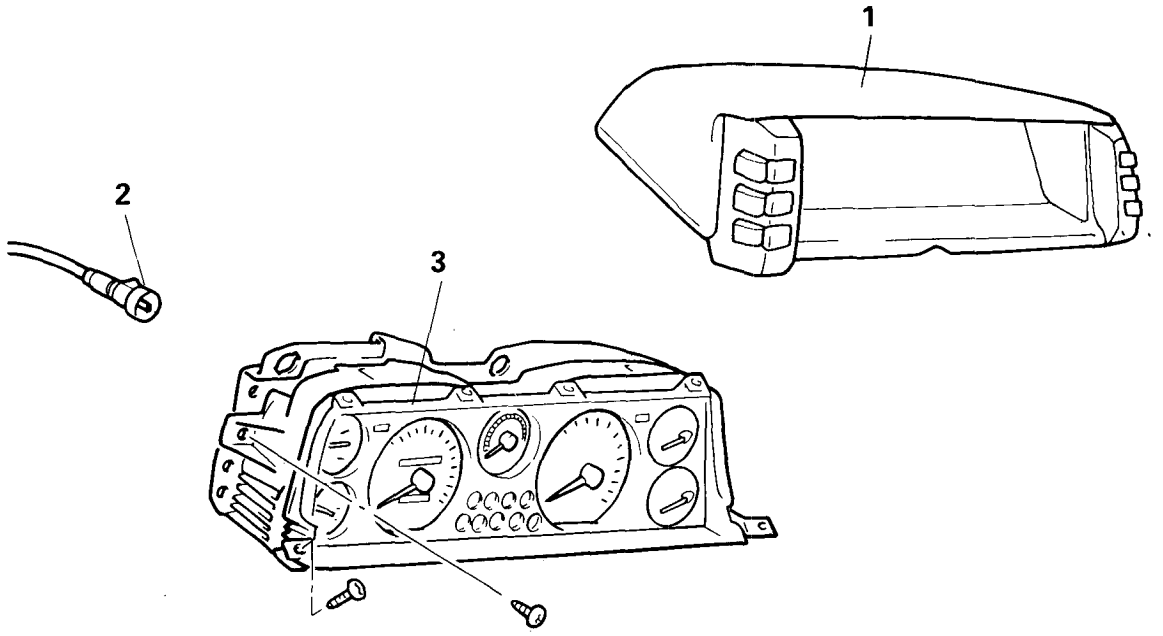


After inspection, apply adhesive to the threaded portion of the engine coolant temperature gauge unit and then install the unit on the manifold.

METERS AND GAUGES

N08HJAE

REMOVAL AND INSTALLATION

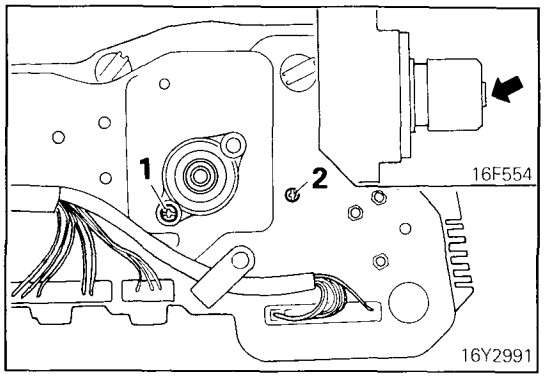


Removal steps

1. Meter hood
2. Speedometer cable connection
3. Meter assembly

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".

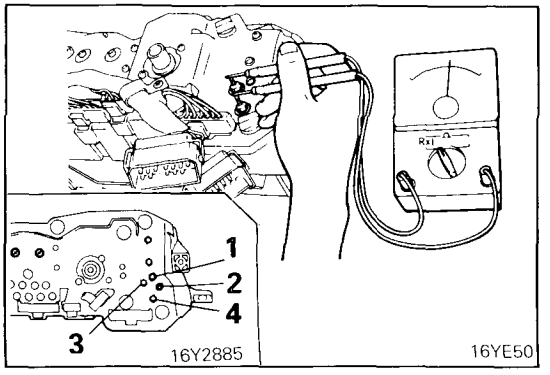
16Y3562



INSPECTION

REED SWITCH

Using an ohmmeter, check that continuity and discontinuity alternate between terminals 1 and 2 four times at every rotation of the shaft of the speedometer cable connection.

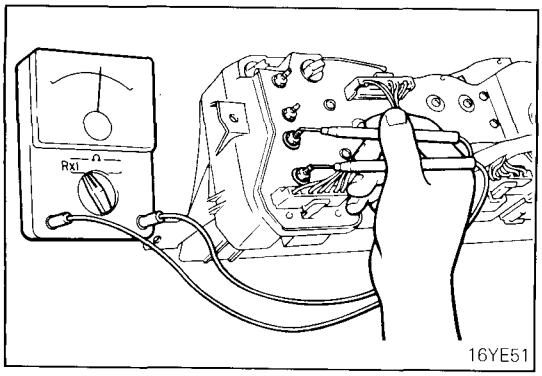


FUEL GAUGE

Measure the resistance value between the terminals by using an ohmmeter.

Standard value:

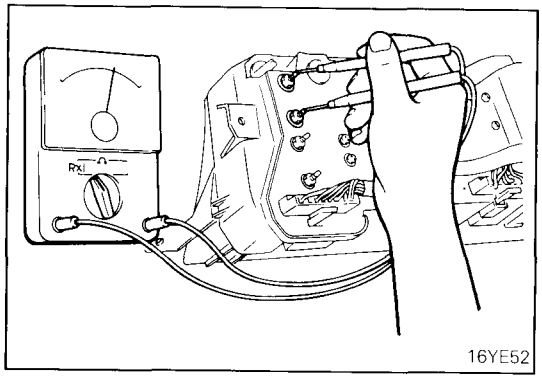
Between terminals No. 1 and No. 2: 62 – 78 Ω
Between terminals No. 3 and No. 4: 49 – 61 Ω



ENGINE COOLANT TEMPERATURE GAUGE

Measure the resistance value between the terminals with an ohmmeter.

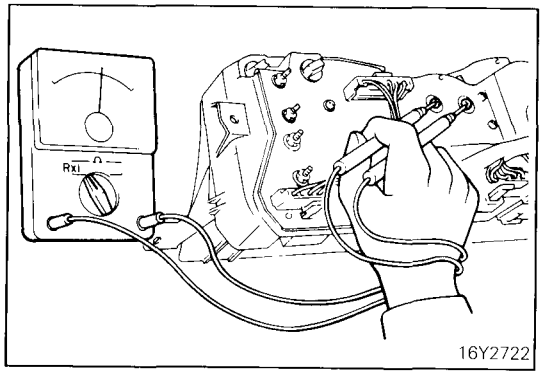
Standard value: 49 – 61 Ω



OIL PRESSURE GAUGE

Measure the resistance value between the terminals with an ohmmeter.

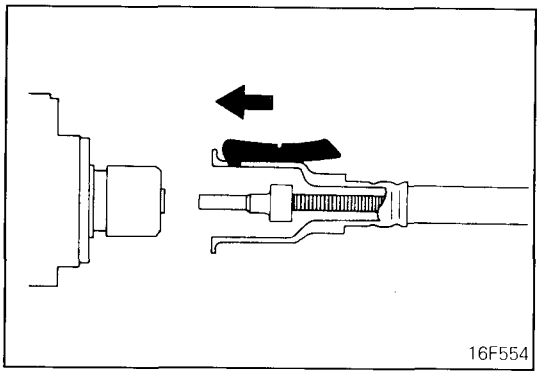
Standard value: 37 – 47 Ω



PRESSURE METER

Measure the resistance value between the terminals with an ohmmeter.

Standard value: 30 – 56 Ω



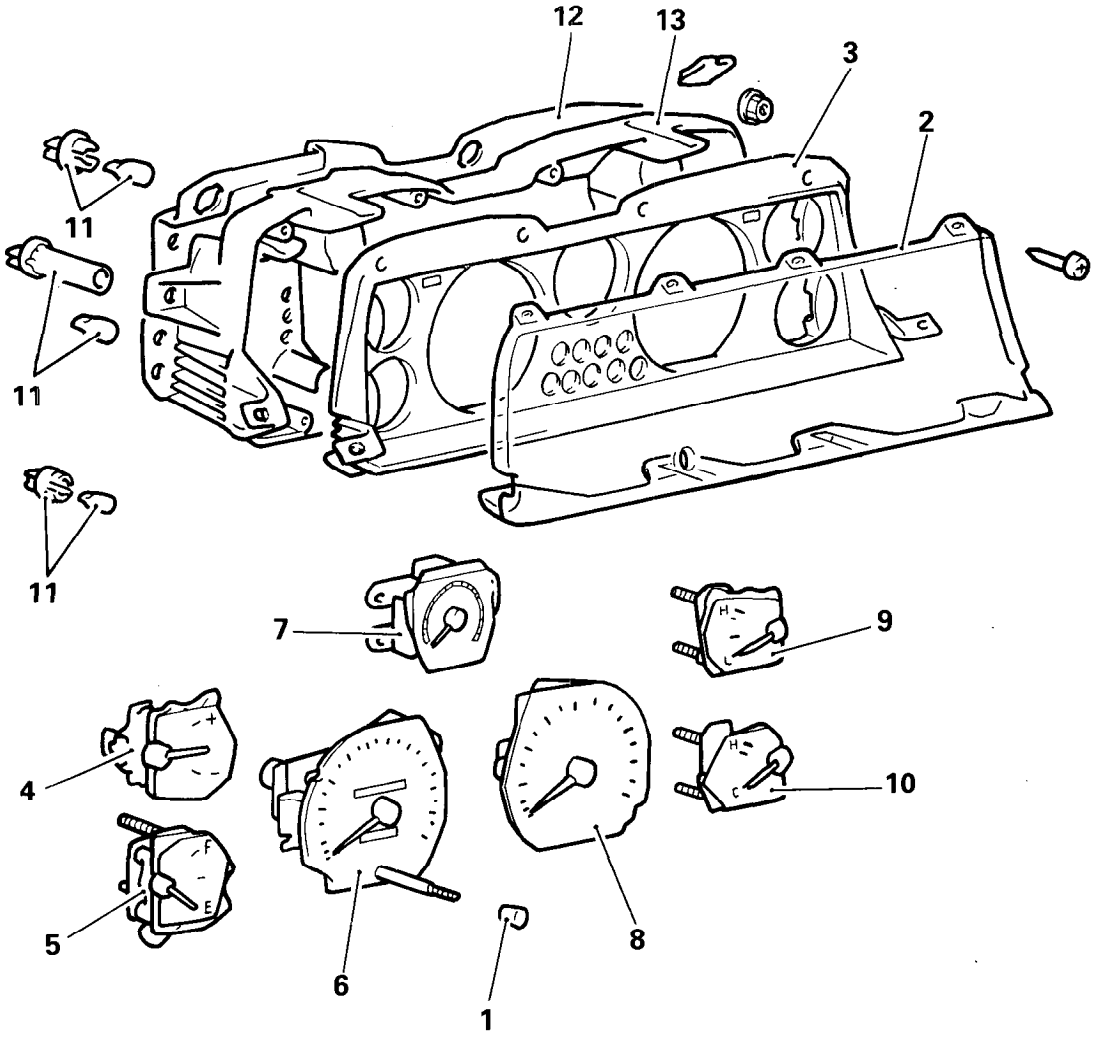
SERVICE POINT OF INSTALLATION

2. INSTALLATION OF SPEEDOMETER CABLE

Insert the cable until its stopper properly fits to the meter side groove.

Caution
Poor installation of the cable may cause a fluctuating meter pointer, or noise and a damaged harness inside the instrument panel.

DISASSEMBLY AND REASSEMBLY

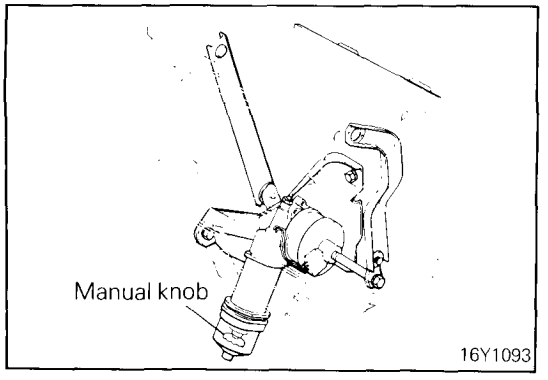


Disassembly steps

1. Trip counter knob
2. Meter glass
3. Window plate
4. Voltmeter
5. Fuel gauge
6. Speedometer
7. Pressure meter
8. Tachometer
9. Oil pressure gauge
10. Engine coolant temperature gauge
11. Lamp bulb and socket
12. Printed board
13. Meter case

NOTE
Reverse the disassembly procedures to reassemble.

16Y2989



LIGHTING SYSTEM

GENERAL INFORMATION

N08IAAA

The right and left headlights are driven up and down by independent motors and linkages. Manual knobs are also provided which, in the event of electric trouble, allow the headlights to be manually raised or lowered.

SPECIFICATIONS

GENERAL SPECIFICATIONS

N08IB- -

Items	Specifications
Exterior light	
Headlight W	65/55 [6052]
Front combination light W	
Turn-signal	27 [1156]
Position light	5 [168]
Fog light	35
Front side marker light W	3.8 [194]
Rear combination light W	
Turn-signal, stop and tail light	27/8 [1157]
Rear side marker light	8 [67]
Back-up light	27 [1156]
License plate light W	8 [67]
High mounted stop light W	18
Interior light	
Dome light W	10
Spot light W	6
Door light W	5
Luggage compartment light W	5
Combination meter illumination light W	3.4 [158]
Glove box illumination light W	3.4 [158]
Accessory box illumination light W	1.4 [74]
Cigarette lighter illumination light W	3
Heater knob illumination light W	3.8 [194]
Heater panel illumination light W	1.4 [74]
Rear defogger switch illumination light W	1.4 [74]
Cluster switch illumination light W	1.4 [74]
Ashtray illumination light W	1.4 [74]
Vanity mirror light W	1.5

NOTE
The values in parentheses denote SAE grade numbers.

Items	Specifications
Cluster switch	
Lighting switch	
Rated load A	0.3
Voltage drop (at 12.8V and the rated load) V	0.1 or less
Pop-up switch	
Rated load A	0.6
Voltage drop (at 12V and the rated load) V	0.1 or less
Hazard switch	
Rated load A	
FR-HZ, FL-HZ, RR-HZ, RL-HZ	4.2 – 4.8
SS-ST	8.6 – 9.4
TB-TS	6.7 – 7.3
Voltage drop (at 12V and the rated load) V	0.1 or less
Fog light switch	
Rated load A	0.3
Voltage drop (at 12V and the rated load) V	0.1 or less
Column switch	
Turn-signal switch	
Rated load A	4.2 – 4.8
TB-FL, TB-FR	2.2 – 2.8
TB-RL, TB-RR	4.2 – 4.8
ST-RL, ST-RR	4.2 – 4.8
Voltage drop (at 12V and the rated load) V	0.2 or less
Dimmer switch	
Rated load A	
Upper beam	14.9 – 15.7
Lower beam	7.4 – 10.2
Voltage drop (at 12V and the rated load) V	0.2 or less
Passing switch	
Rated load A	
Upper beam	14.9 – 15.7
Lower beam	0.17 – 0.27
Voltage drop (at 12V and the rated load) V	0.2 or less
Windshield wiper switch	
Rated load A	0.5
Voltage drop (at 12V and the rated load) V	0.2 or less
Windshield washer switch	
Rated load A	3
Voltage drop (at 12V and the rated load) V	0.5 or less
Dimmer control switch	
Type	Electronic type
Rated load W	40

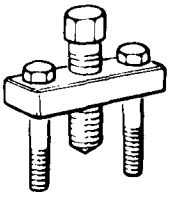
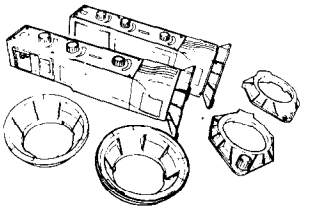
SERVICE SPECIFICATIONS

N08IC--

Items	Specifications
Limit Headlight intensity cd	20,000 or more

SPECIAL TOOLS

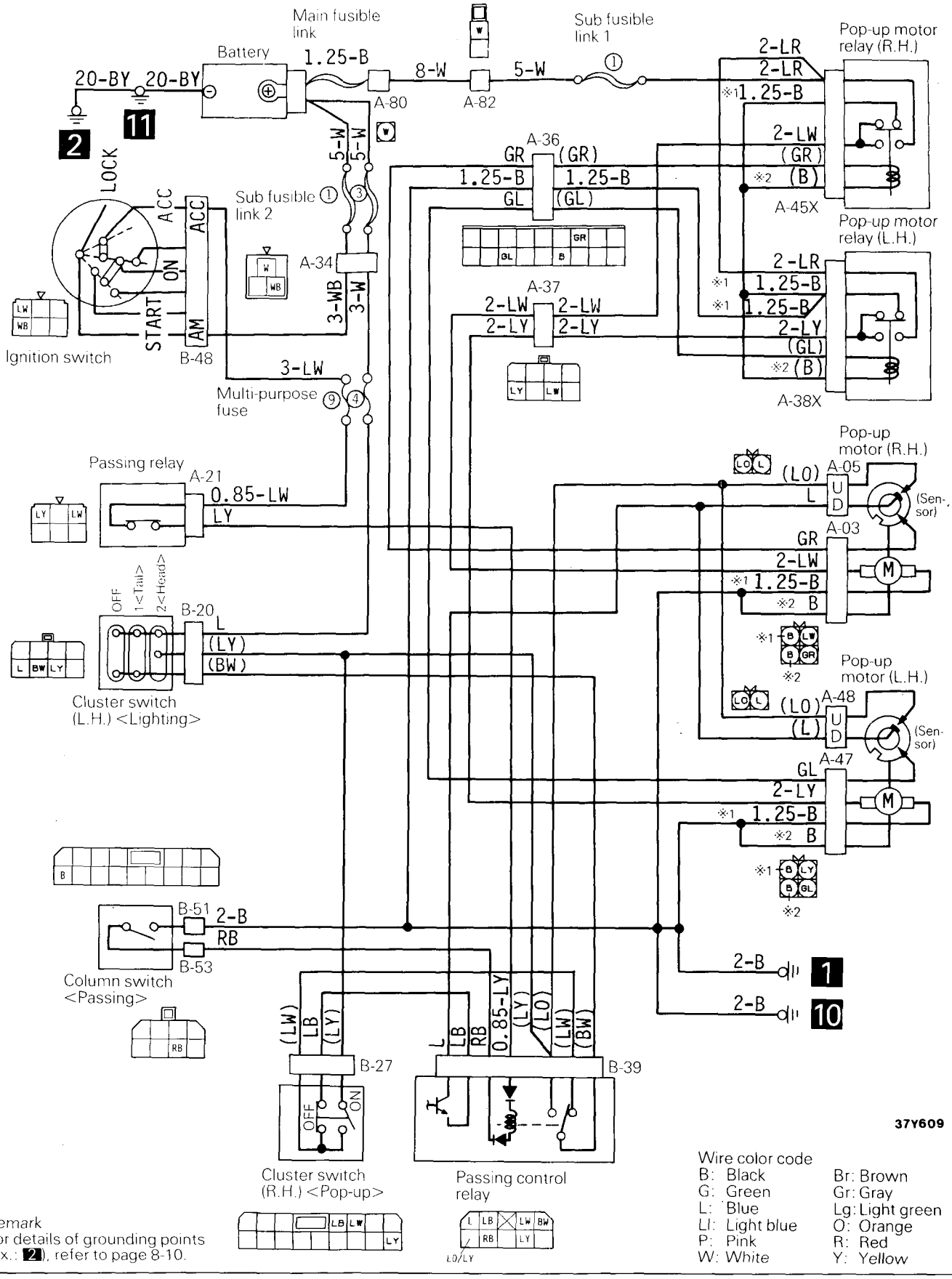
N08IG--

Tool (Number and name)	Use	Tool (Number and name)	Use
DT-1001-A Steering wheel puller 	Removal of steering wheel	C-4466 Headlight aimer 	Aiming of headlight

TROUBLESHOOTING

POP-UP MECHANISM

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

OPERATION

N08IHAA

Functions of the Lighting Switch

- Battery voltage is always applied to the lighting switch through fuse No. 4.
- When the lighting switch is set at the "2" position, current flows through the pop-up motor (sensor), pop-up motor relay (coil), and ground, closing the pop-up motor relay contacts.
- After flowing through the closed pop-up motor relay contacts, current flows through the pop-up motor to ground.
  The pop-up motor starts operating to raise the retractable headlight.
- Once the pop-up motor has revolved up to its UP limit, the sensor inside the motor switches its contact from the UP side to the DOWN side.
- This operation of the sensor causes the circuit leading to the pop-up motor relay (coil) to open and the pop-up motor stops, maintaining the retractable headlight in its raised position.
- When the lighting switch is set at the "OFF" or "1" position, current flows through the lighting switch, passing control relay, pop-up switch, passing control relay, pop-up motor (sensor), pop-up motor relay (coil), and ground, closing the pop-up motor relay contacts.
- After flowing through the closed pop-up motor relay contacts, current flows through the pop-up motor to ground. The pop-up motor begins operating to retract the headlight.
- Once the pop-up motor has revolved up to its DOWN limit, the sensor inside the motor switches its contact from the DOWN side to the UP side, and the motor stops, maintaining the headlight in its retracted position.

Functions of the Pop-up Switch

- When the pop-up switch is set at "ON", current flows through fuse No. 4, lighting switch, passing control relay, pop-up switch, pop-up motor (sensor), pop-up motor relay (coil), and ground. The retractable headlights rises just as it does when the lighting switch is set at the "2" position.
- When the pop-up switch is set at "OFF", current flows through the pop-up switch, the passing control relay, the pop-up motor (sensor), the pop-up motor relay (coil), and ground. The headlight retracts just as it does when the lighting switch is set at the "OFF" or "1" position.

Functions of the Passing Switch

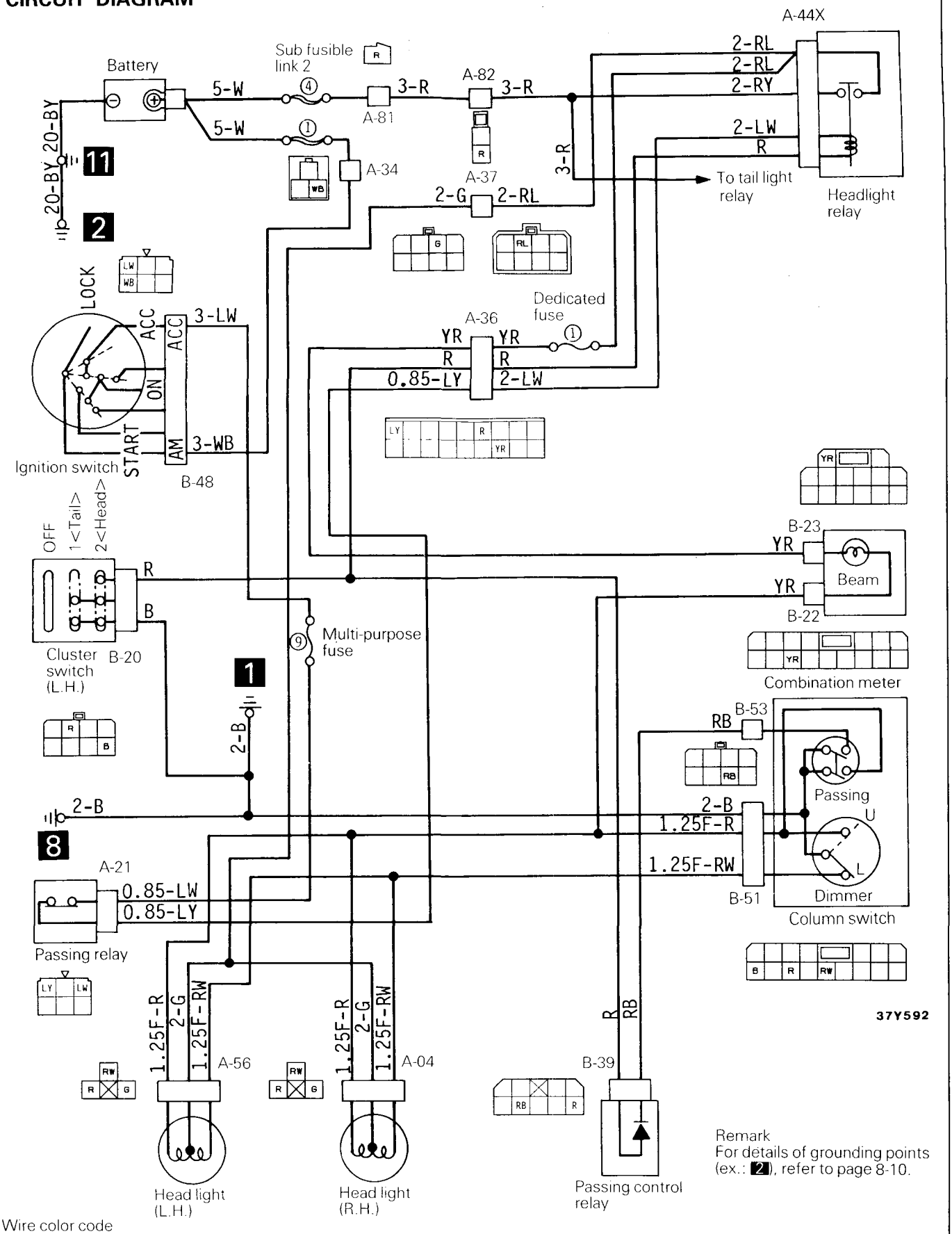
- By setting the passing switch at the "ON" position while the ignition switch is turned to "ACC" or "ON", current flows through fuse No. 9, passing relay, passing control relay, passing switch, and ground, closing the passing control relay contacts.
- Once the passing control relay contacts have closed, current flows through fuse No. 4, lighting switch, passing control relay, pop-up motor (sensor), pop-up motor relay (coil), and ground, and the retractable headlight rises just as it does when the lighting switch is set at "2".

TROUBLESHOOTING HINTS

1. Headlights do not rise
   1) They rise only when the lighting switch is operated.
      - Check the pop-up switch.
      - Check the passing control relay.
   2) They rise only when the pop-up switch is operated
      - Check the lighting switch.
2. Headlights do not retract
   - Check the pop-up switch.
   - Check the passing control relay.
3. One headlight does not move
   - Check the pop-up motor relay.
   - Check the pop-up motor.

HEADLIGHT

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

OPERATION

N08IHBC

Switching Between Low Beam and High Beam

- When the lighting switch is set at the "2" position while the ignition switch is at the "ACC" position, current flows through fuse No. 9, passing relay, headlight relay (coil), lighting switch, and ground, closing the headlight relay contacts.
- If the dimmer switch is set at the "low" (or "high") position while the above-mentioned condition is obtained, current flows through the headlight relay (contacts), headlight, dimmer switch, and ground, causing the headlight low beam filament (or high beam filament) to go on.
- When current is flowing to the high beam filament of the headlight, current is also flowing to the high beam indicator through a dedicated fuse, causing the indicator to light.

Signaling Passing

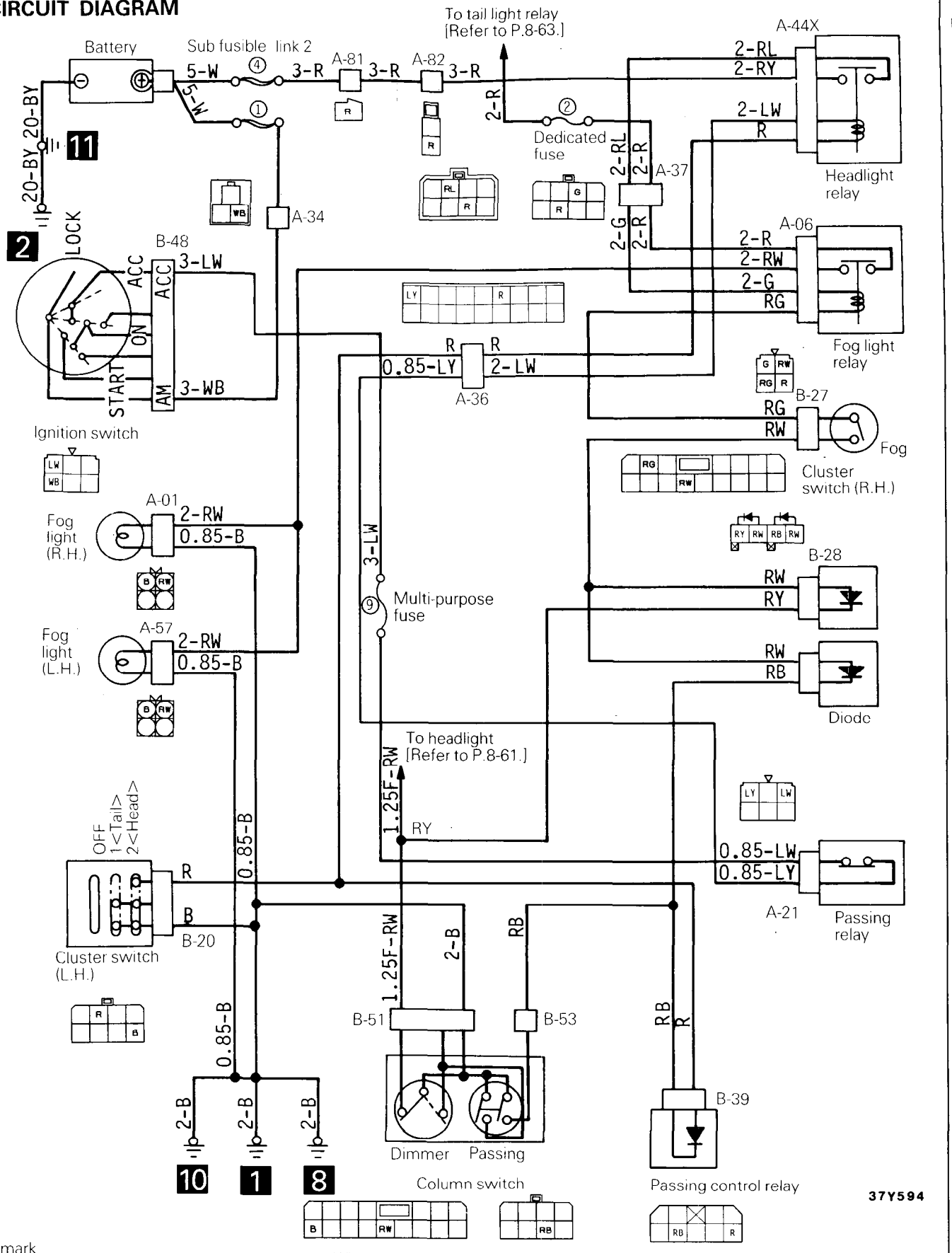
- When the passing switch is set at the "ON" position current flows through the headlight relay (coil), passing control relay, passing switch, and ground, causing the headlight relay contacts to close.
- After flowing through the closed contacts of the headlight relay, current flows through the headlight (high beam filament), passing switch, and ground, and the headlight high beam filaments go on.

TROUBLESHOOTING HINTS

1. Low beam filaments (or high beam filaments) do not go on for both headlights
   - Check the dimmer switch.
2. Only one headlight goes on
   - Check the bulb.
3. Headlights do not switch between low beam and high beam
   - Check the dimmer switch.

FOG LIGHT

CIRCUIT DIAGRAM



OPERATION

N08IHIA

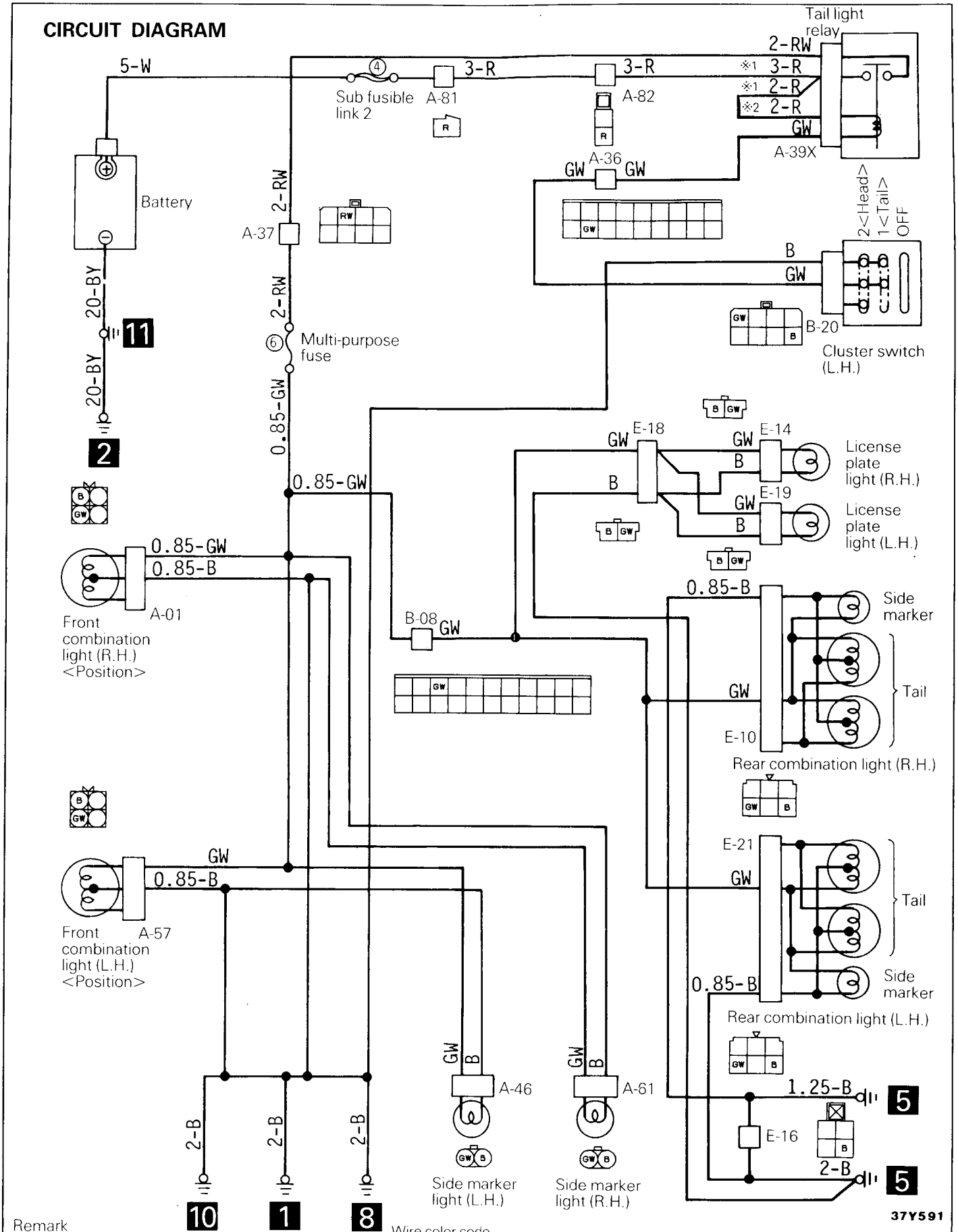
- By setting the lighting switch at the "2" position when the ignition switch is at the "ACC" or "ON" position, the headlight relay contacts close. Refer to OPERATION for the headlights.
- If the fog light switch is set at the "ON" position when the dimmer switch is at the "low" position, current flows through the headlight relay (contacts), fog light relay (coil), fog light switch, diode, dimmer switch, and ground, causing the fog light relay contacts to close.
- Once the fog light relay contacts have closed, current flows through the dedicated fuse, fog light relay (contacts), fog lights, and ground, causing the fog lights to go on.
- If the passing switch is set at the "ON" position while the fog lights are illuminated, the headlight relay contacts close. Refer to OPERATION of the headlights.
- After flowing through the closed contacts of the headlight relay, current flows through the fog light relay (coil), fog light switch, diode, passing switch, and ground, causing the fog light relay contacts to close, which turns on the fog lights.

TROUBLESHOOTING HINTS

1. Only the right or left fog lights go on
   - Check the bulb.
2. Fog lights do not go on when the passing switch is set at "ON".
   - Check the diode.

TAIL LIGHT, POSITION LIGHT, SIDE MARKER LIGHT AND LICENSE PLATE LIGHT

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code
B: Black Br: Brown G: Green Gr: Gray L: Blue Lg: Light green
Ll: Light blue O: Orange P: Pink R: Red W: White Y: Yellow

OPERATION N08IHCC

- Battery voltage is always applied to the lighting switch through sub fusible link.
- When the lighting switch is at the "1" or "2" position, current flows through the tail light relay (coil), lighting switch and ground, causing the tail light relay contacts to close.
- When the tail light relay contacts close, current flows through tail light relay (contacts), fuse No. 6, each light, and ground, causing each light go on.

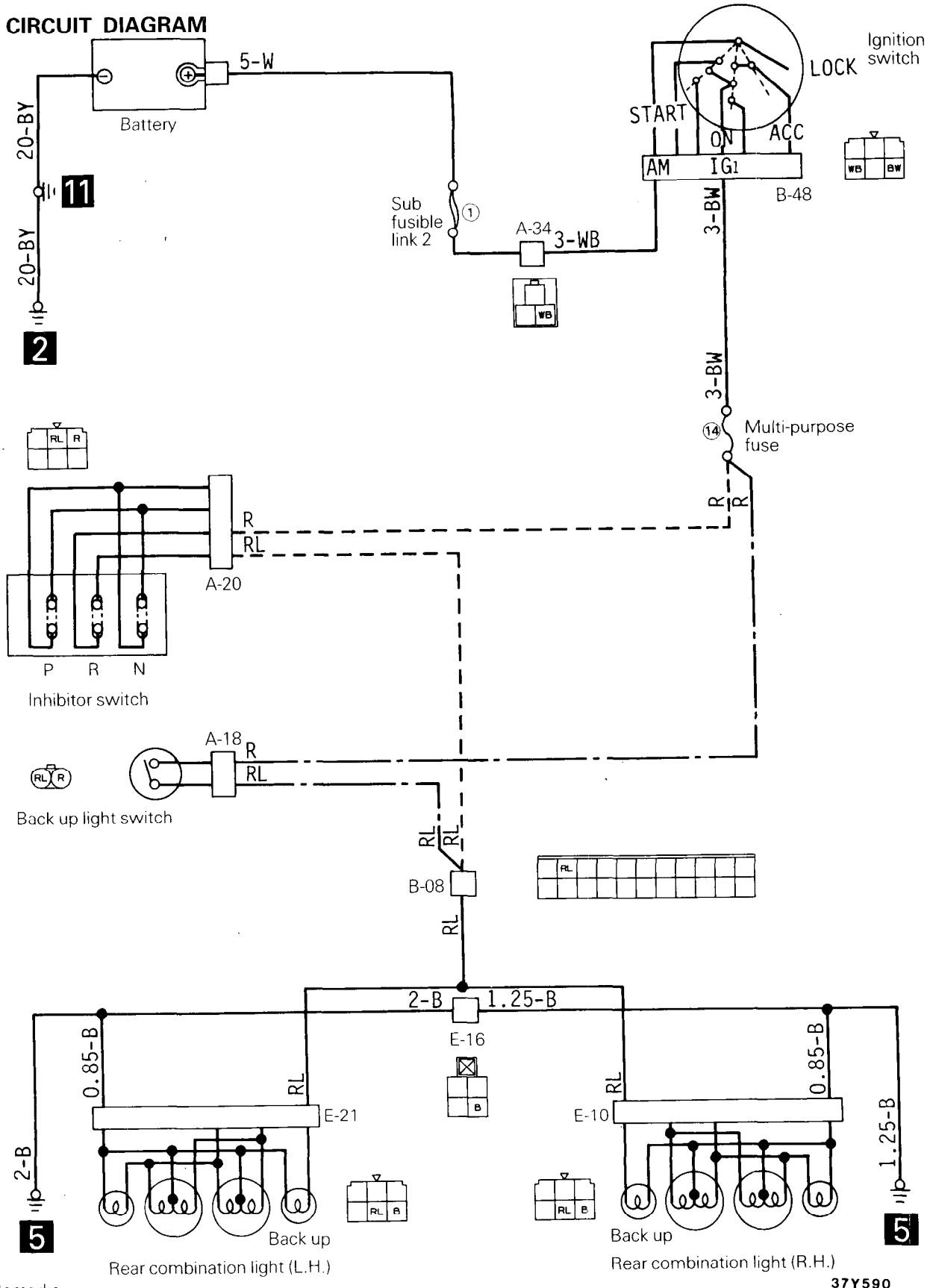
TROUBLESHOOTING HINTS

Only one light does not go on

- Check bulb.

BACK UP LIGHT

CIRCUIT DIAGRAM



37Y590

Remarks
(1) Dot-and-dash line shows wiring for vehicles with a manual transmission.
(2) Dashed line shows wiring for vehicles with an automatic transmission.
(3) For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green
Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink
R: Red	Y: Yellow	W: White

OPERATION N08IHDA

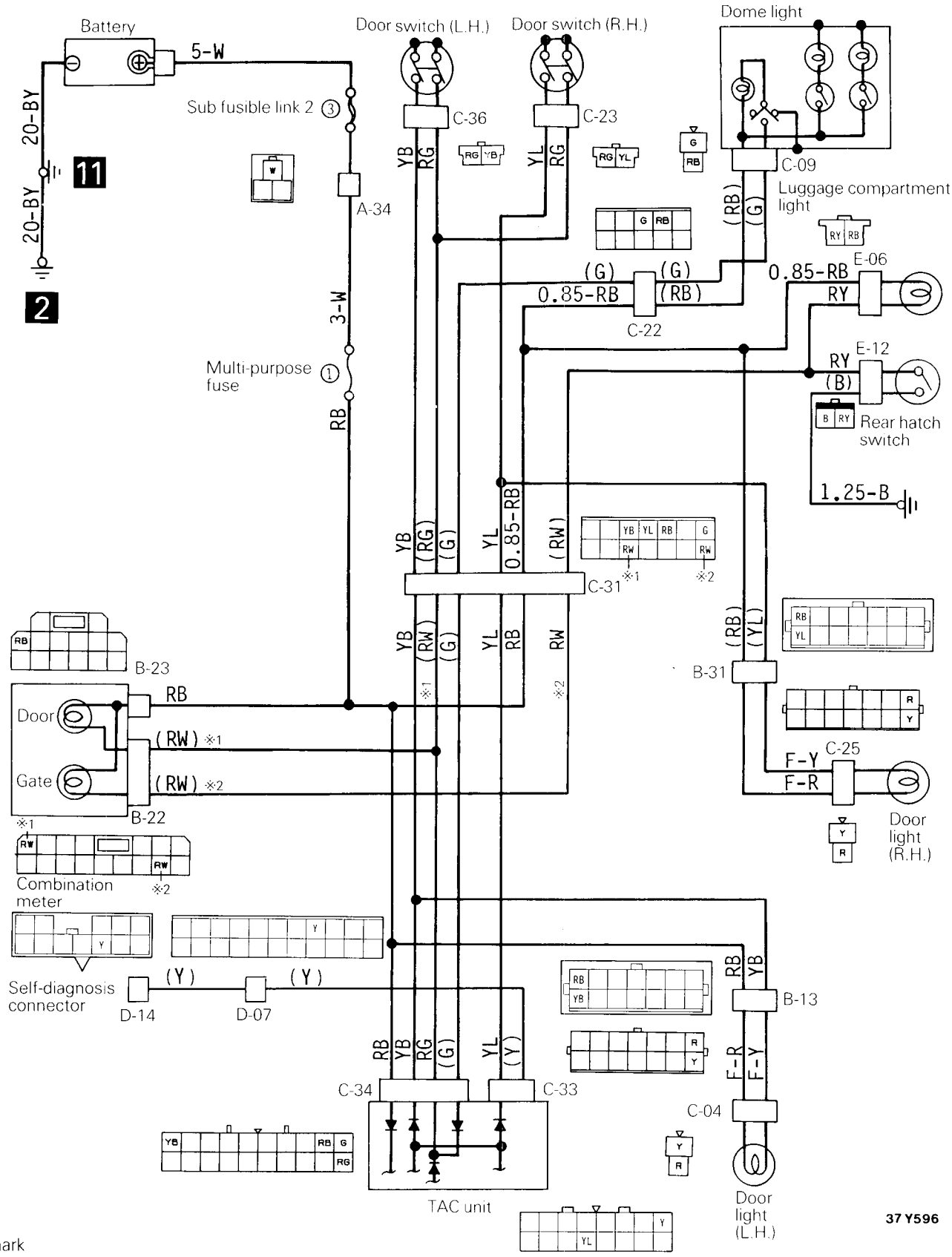
- When the gearshift lever is moved to the "R" position, with the ignition switch turned to "ON", the backup light switch (manual transmission vehicles) or inhibitor switch (automatic transmission vehicles) is closed, allowing current to flow through fuse No. 14, backup light switch or inhibitor switch, backup lights, and ground. This causes the backup lights to go on.

TROUBLESHOOTING HINTS

1. Only one backup light does not go on
   - Check bulb.
2. Backup lights fail to go off
   - Check backup light switch. – Manual transmission vehicles
   - Check inhibitor switch. – Automatic transmission vehicles

DOME LIGHT

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

OPERATION

N08IHEC

Dome Light

- Battery voltage is always applied to the dome light through fuse No. 1.
- When the dome light switch is set at "ON", current flows through fuse No. 1, dome light, and ground, causing the dome light to go on.

For the operation of the delayed switch-off dome light, refer to the "ETACS" section.

Door-Ajar Warning Light

- Battery voltage is always applied to the door-ajar warning light through fuse No. 1.
- Once any door is opened or remains ajar, the door switch contacts close causing current to flow through fuse No. 1, door-ajar warning light, door switch, and ground so the door-ajar warning light goes on.

TROUBLESHOOTING HINTS

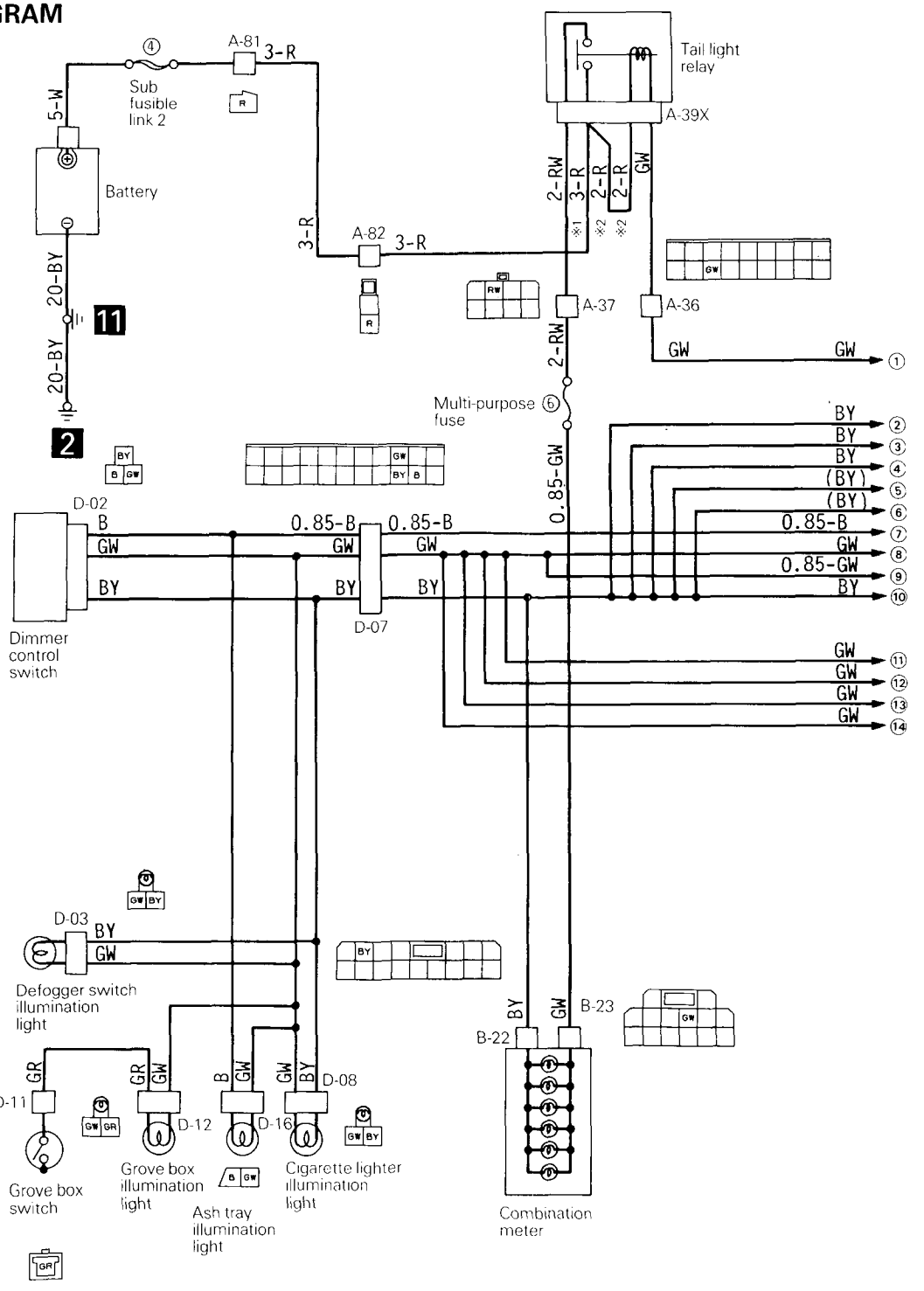
Dome light does not come on

1) Clock also does not operate
   - Check fuse.
2) Dome light does not come on even when door is opened with dome light switch at "DOOR" position
   - Check bulb.

For the operation of the delayed switch-off dome light, refer to the "ETACS" section.

INSTRUMENT PANEL ILLUMINATION

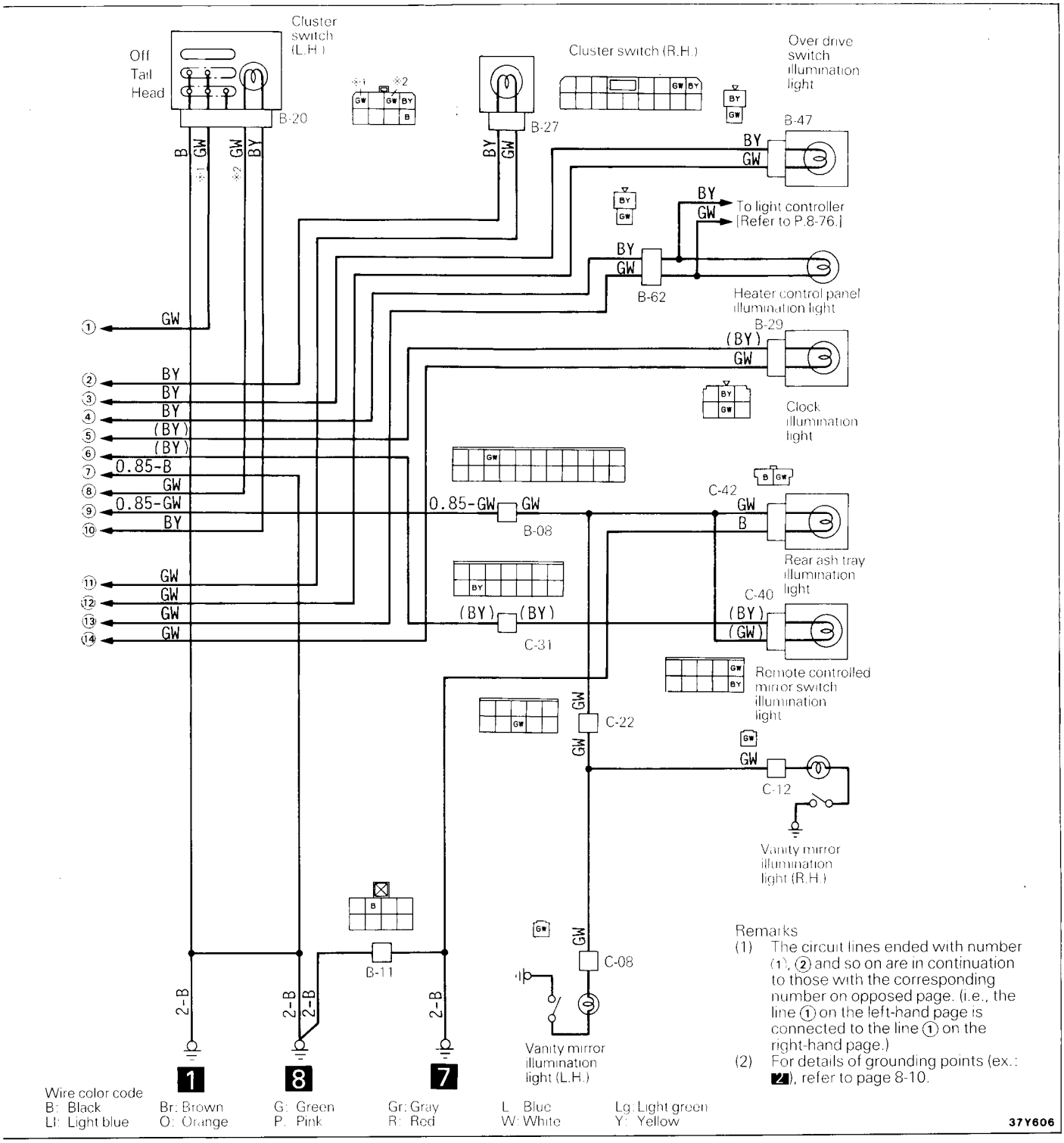
CIRCUIT DIAGRAM



OPERATION

N08IHEC

- Battery voltage is always applied to the lighting switch through the fusible link.
- When the lighting switch is at the "1" or "2" position, current flows through the tail light relay (coil), lighting switch, and ground, causing the tail light relay contacts to close.
- When the tail light relay contacts close, current flows through the tail light relay (contacts), fuse No. 12, lighting switch, each illumination light, dimmer control switch (partial circuit), and ground, causing the illumination lights to go on.

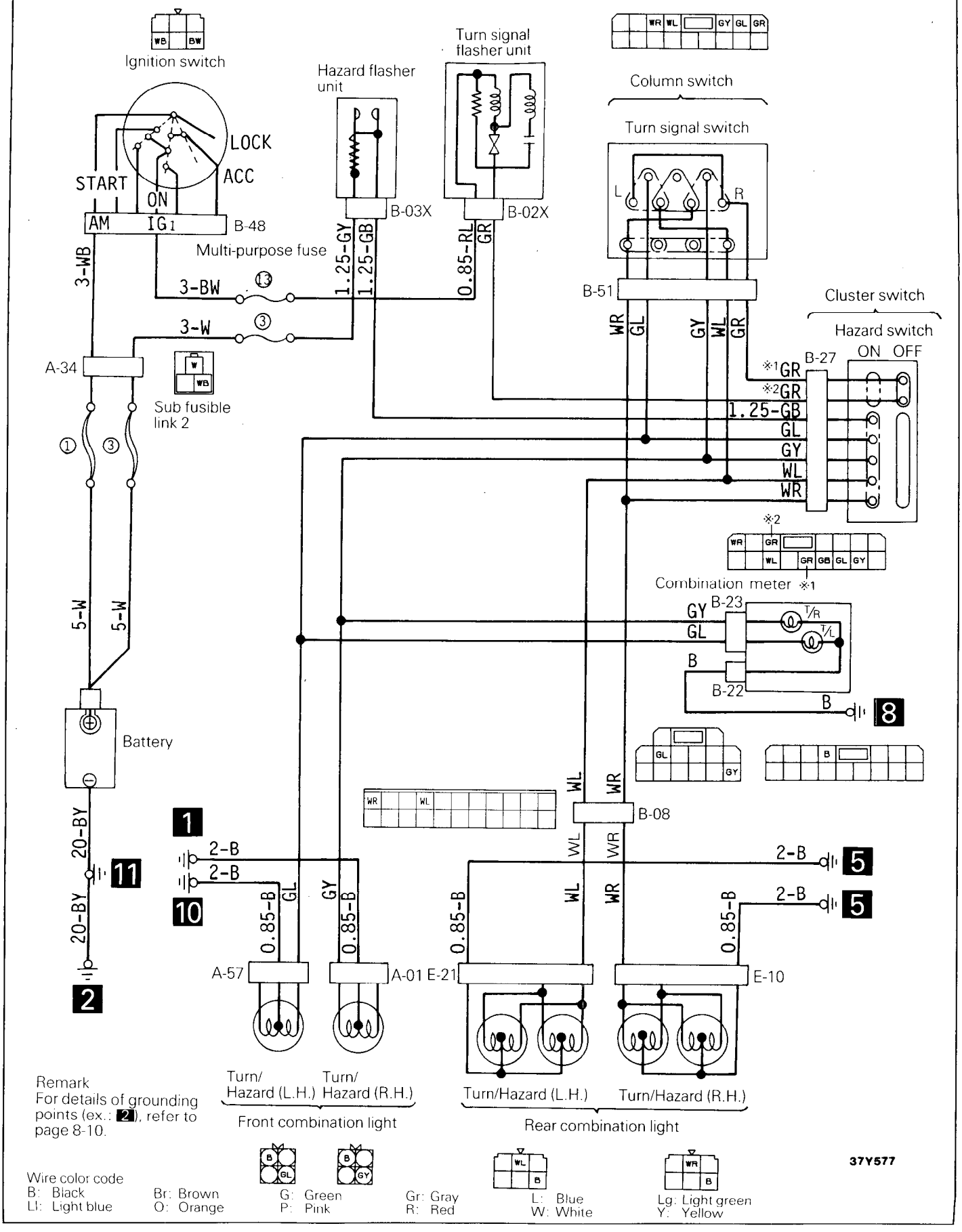


TROUBLESHOOTING HINTS

1. Only one light does not come on
   - Check bulb.
2. Lights cannot be dimmed
   - Check dimmer control switch.

TURN SIGNAL

CIRCUIT DIAGRAM



OPERATION N08IHGC

Turn Signal Lights

- When the turn signal light switch is at "L.H.", with the ignition switch turned to "ON", current flows through fuse No. 13, flasher unit, hazard warning light switch, turn signal light switch, turn signal lights (L.H.), and ground, causing the flasher unit to alternately close and open its contacts.
- As the contacts repeatedly open and close, the turn signal lights (L.H.) flash.
- The turn signal indicator light (L.H.) flashes at the same time as do the turn signal lights.
- When the turn signal light switch is at "R.H.", the turn signal lights (R.H.) and turn signal indicator light flash in the same way as when the switch is at "L.H.".

Remarks
If one or more turn signal light bulbs are burnt out, the flasher unit keeps the indicators illuminated, to warn the driver that bulb replacement is required.

Hazard Warning Lights

Battery voltage is always applied to the hazard warning light switch through fuse No. 3.

When the hazard warning light switch is turned "ON", current flows through fuse No. 3, flasher unit, hazard warning light switch, right and left turn signal lights, and ground, causing the flasher unit contacts to close and open repeatedly.

As the contacts repeatedly open and close, all of the turn signal lights flash.

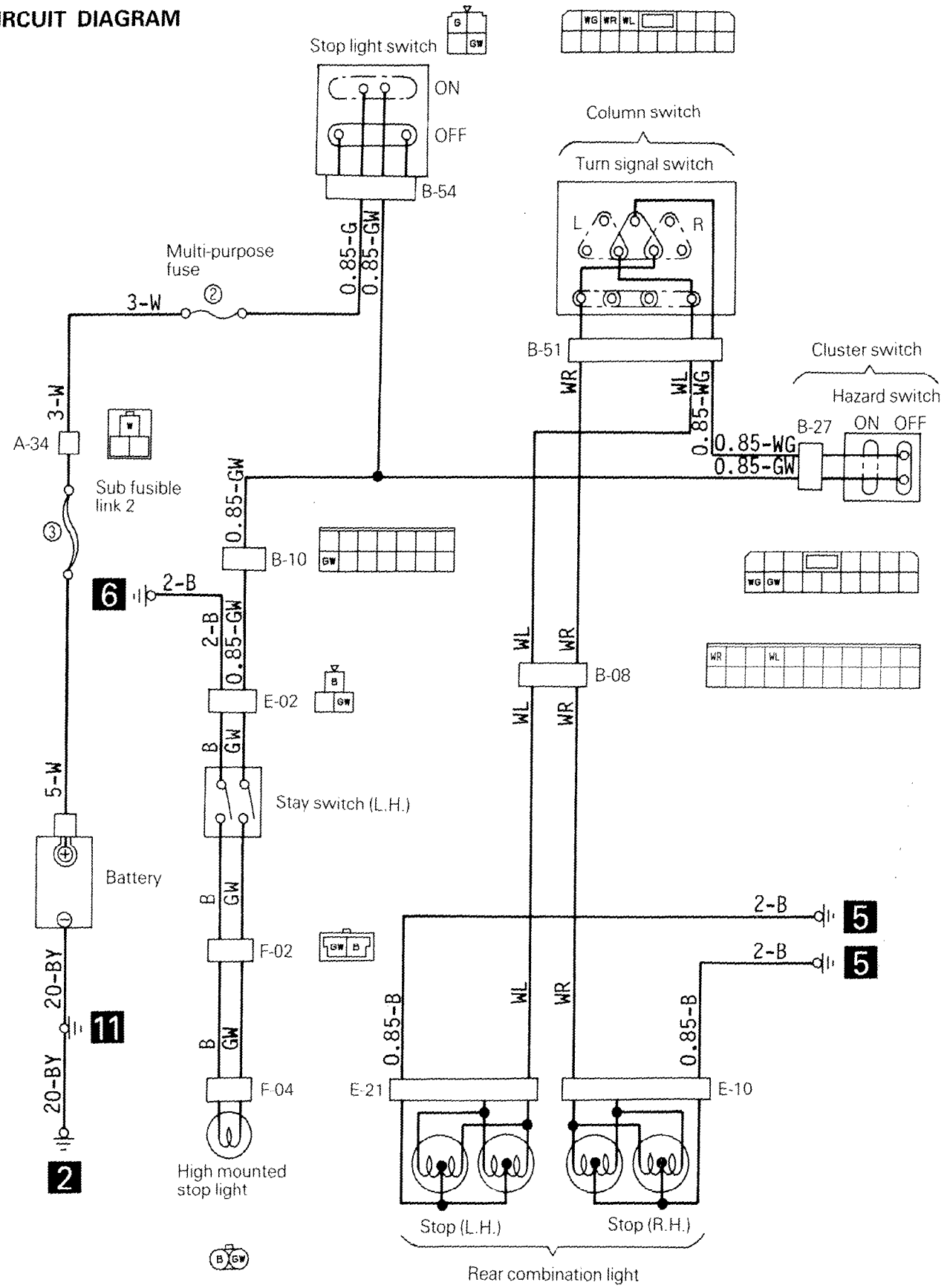
Both turn signal indicator lights flash at the same time as do the turn signal lights.

TROUBLESHOOTING HINTS

1. Turn signal lights do not work neither when turn signal switch nor hazard warning light switch is operated
   - Check hazard warning light switch.
2. Turn signal lights do not flash
   1) Stop lights go on
      - Check the turn signal light switch.
   2) Neither the turn signal lights nor the stop lights operate
      - Check the hazard warning light switch.

STOP LIGHT

CIRCUIT DIAGRAM



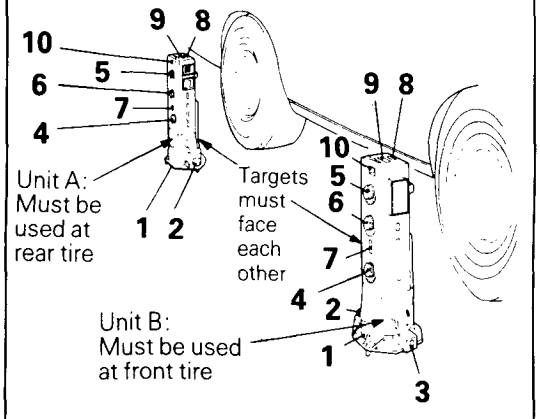
... ex : 2), refer to page 8-10.

OPERATION N08IHHA

- Battery voltage is always applied to the stop light switch through fuse No. 2.
- When the brake pedal is depressed for braking, the stop light switch contacts are closed so that current flows through fuse No. 2, stop light switch, hazard warning light switch, turn signal light switch, stop lights, and ground, causing the stop lights to go on.

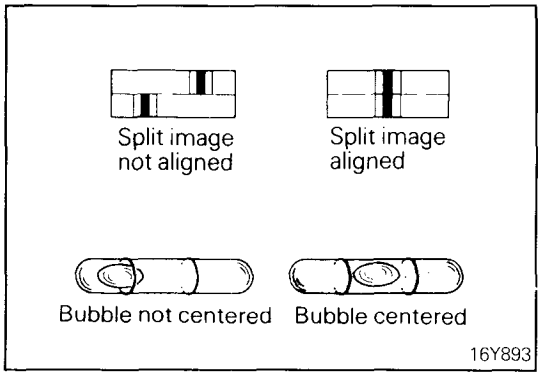
TROUBLESHOOTING HINTS

1. One stop light does not light
   - Check bulb.
2. Stop lights fail to go off
   - Check stop light switch.



1. Calibration fixture
2. Thumb adjusting screws
3. Level vial
4. Floor level offset dial
5. Horizontal dial knob
6. Vertical dial knob
7. Aimer level vial
8. Level vial bubble
9. Top port hole
10. Viewing port

16C789



16Y893

SERVICE ADJUSTMENT PROCEDURES

N08IIAA

HEADLIGHT AIMING

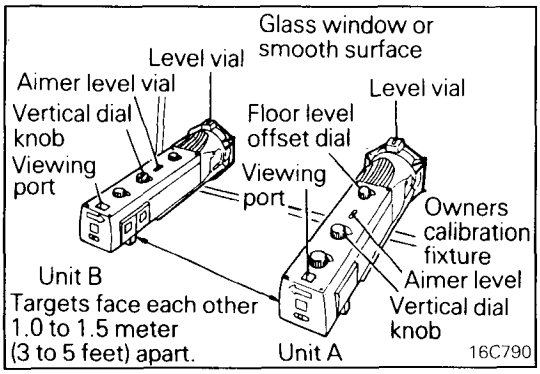
PRE-AIMING INSTRUCTIONS

1. Test dimmer switch operation.
2. Observe operation of high beam light mounted in instrument cluster.
3. Inspect for badly rusted or faulty headlight assemblies. These conditions must be corrected before a satisfactory adjustment can be made.
4. Place vehicle on a level floor.
5. Bounce front suspension through three (3) oscillations by applying body weight to hood or bumper.
6. Inspect tire inflation.
7. Rock vehicle sideways to allow vehicle to assume its normal position.
8. If fuel tank is not full, place a weight in trunk of vehicle to simulate weight of a full tank [3 kg (6.5 lbs.) per gallon].
9. There should be no other load in the vehicle other than driver or substituted weight of approximately 70 kg (150 lbs.) placed in driver's position.
10. Thoroughly clean headlight lenses.

COMPENSATING THE AIMERS (C-4466) FOR FLOOR SLOPE

The floor level offset dial must coincide with the floor slope for accurate aiming. Calibration fixtures are included with the aimers.

1. Attach one calibration fixture to each aimer. Fixtures will easily snap into position on aimer when properly positioned.
2. Place aimers at center line of each wheel on one side of vehicle. Unit A must be placed at rear wheel with target facing forward. Unit B must be placed at front wheel with target facing rearward.
3. Adjust thumb adjusting screw on each calibration fixture by turning either clockwise or counterclockwise until level vial bubble registers in a centered, level position.
4. Look into top port hole of Unit A. Turn horizontal knob until split image is aligned.
5. Transfer plus or minus reading indicated on horizontal dial to floor level offset dial on each aimer. Press floor level dial inward to set reading.
6. Remove calibration fixtures from both units.



16C790

TESTING AIMER CALIBRATION

The aimer calibration may be off due to extended use. Calibration fixtures used in conjunction with aimers can be used to check and adjust aimers.

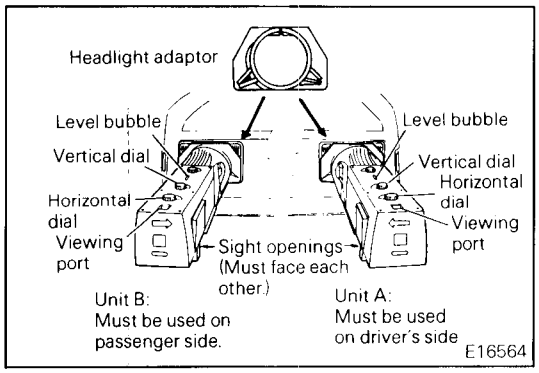
1. Turn thumb adjusting screw on each calibration fixture until it is approximately the same distance as the supporting posts.
2. Attach calibration fixtures to each unit with level vials on top.

3. Locate a true vertical plate glass window or smooth surface and secure aimers three to five feet apart so split image targets can be located in viewing ports.
4. Set floor level dial at zero.
5. Rotate thumb adjusting screws on each calibration fixture until level vials on fixtures are centered.
6. With both calibration level vials centered turn vertical dial knobs on each aimer until aimer level vials are centered. If aimer vertical dial pointers read between 1/2 up and 1/2 down, aimers are within allowable vertical tolerance. Recalibrate units if beyond these limits.

   Vertical dial pointer reading (on each aimer): 1/2 up to 1/2 down

7. Adjust horizontal dial knob on each aimer until split image targets align. If aimer horizontal dial pointers read between 1 left and 1 right, the aimers are within allowable tolerance limits. Recalibrate units if beyond these limits.

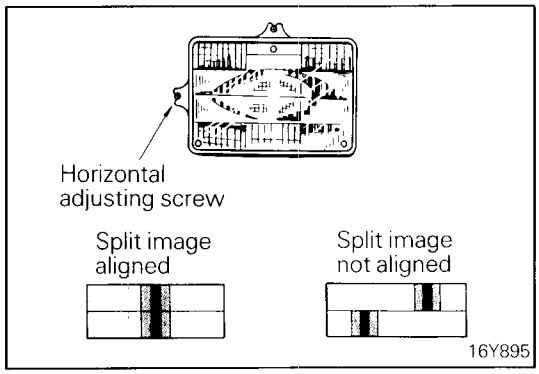
   Horizontal dial pointer reading (on each aimer): 1 left to 1 right



MOUNTING AIMERS

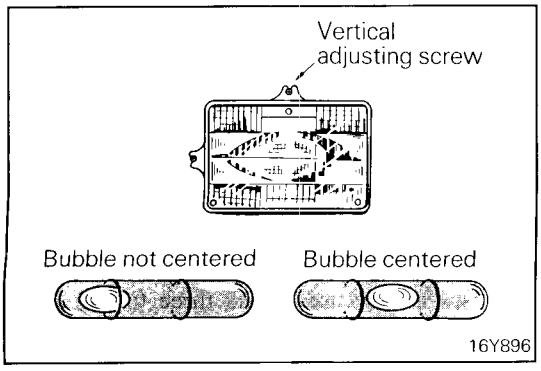
1. If necessary to expose adjusting screws, remove headlight trim rings.
2. Snap proper adaptor into position on each aimer making full contact with aimer mounting flange.
3. Position aimers on headlights by pushing piston handle forward, engaging rubber suction cup. Immediately pull back piston handle until it locks in place.

NOTE
Steel inserts are molded into position on the adaptor to insure accuracy. These inserts must be in contact with the three guide points on the lights when the aimers are properly positioned.



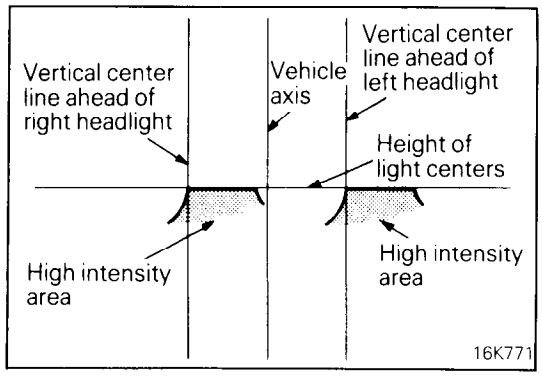
HORIZONTAL ADJUSTMENT

1. Set horizontal dial to zero.
2. Check to see that the split image target lines are visible in the viewing port. If necessary, rotate each aimer slightly to locate the target.
3. Turn horizontal screw on side of headlight until split image of target line appears in mirrors as one solid line. To remove "backlash", make final adjustment by turning adjusting screw in a clockwise direction.
4. Repeat the last three steps on opposite headlight.



VERTICAL ADJUSTMENT

1. The vertical dial should be set at zero. (For passenger vehicles an "O" setting is generally required. For special settings, consult local state laws.)
2. Turn vertical adjusting screw until the level bubble is centered between the lines.
3. Repeat the last two steps on the opposite headlight.
4. Re-check target alignment on both aimers and readjust horizontal aim if necessary.
5. Remove aimers by pressing "vacuum release" button located on piston handle.



AIMING WITH SCREEN

HEADLIGHT AIM PREPARATION

Place vehicle on a known level floor 7.6 m (25 feet) from aiming screen or light colored wall. Four lines of adhesive tape or like are required on screen or wall:

1. Position a vertical tape so that it is aligned with the vehicle center line.
2. Position a horizontal tape with reference to center line of headlight.
3. Position a vertical tape on the screen with reference to the center line of each of headlights.

VISUAL HEADLIGHT ADJUSTMENT

1. A properly aimed lower beam will appear on the aiming screen 7.6 m (25 feet) in front of the vehicle. The shaded area as shown in the illustration indicates high intensity zone.
2. Adjust low beam of headlights to match the low beam pattern of the right and left headlights.

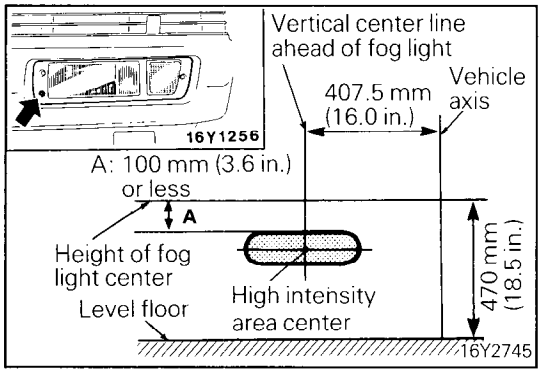
LUMINOUS INTENSITY MEASUREMENT

Measure the luminous intensity of headlights with a photometer in accordance with the instruction manual prepared by the manufacturer of the photometer and make sure that the luminous intensity is within the following limit.

Limit: 20,000 cd or more

NOTE

(1) When measuring the luminous intensity of headlight, keep the engine at 2,000 rpm and have the battery charged.
(2) If there are specific regulations for luminous intensity of headlights in the region where the vehicle is operated, make sure that the intensity conforms to the requirements of such regulations.



FOG LIGHT AIMING N08IIEA

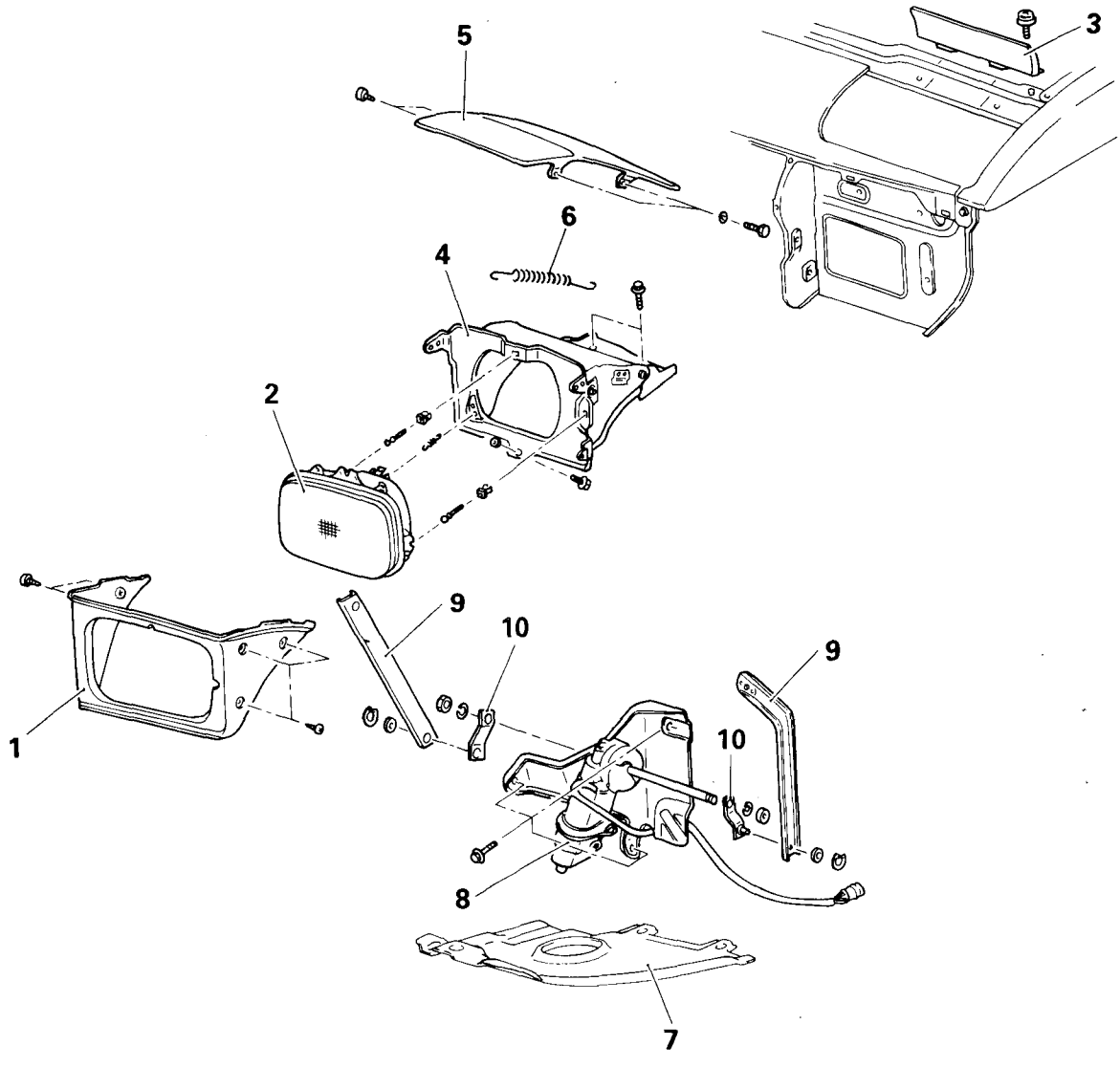
1. Place vehicle on a known level floor 7.6 m (25 feet) from aiming screen or light colored wall.
2. Use adjusting screw to adjust the top end of high intensity zone to dimension A.

HEADLIGHT

N08IJAD

REMOVAL AND INSTALLATION

Post-installation Operation
- Aiming Headlights
  (Refer to P.8-190.)

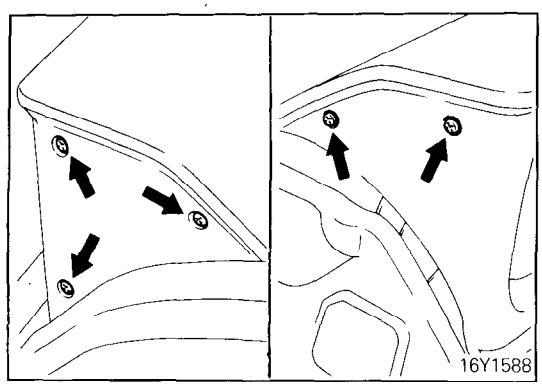


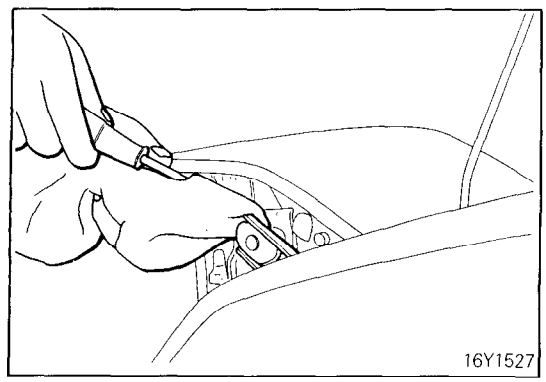
Removal steps

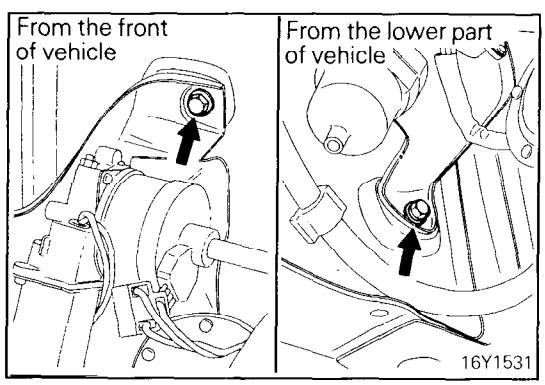
◆◆ 1. Headlight bezel
2. Headlight assembly
3. Headlight hood protector
◆◆ ◆◆ 4. Headlight housing assembly
5. Headlight hood
6. Spring
◆◆ 7. Air guide panel
◆◆ 8. Pop-up motor assembly
9. Link
◆◆ 10. Arm

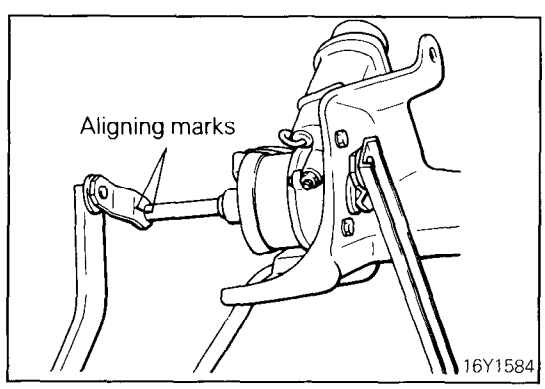
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".

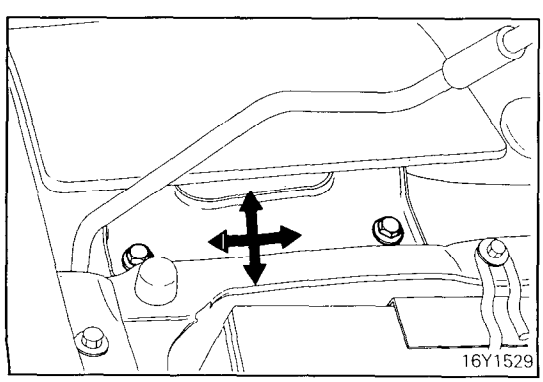
16Y2996











SERVICE POINTS OF REMOVAL

1. REMOVAL OF HEADLIGHT BEZEL

(1) Raise the headlights by using the pop-up switch. Disconnect the negative (–) battery terminal.

Caution
Because there is the danger of burning the coil of the headlight relay by a reverse flow of power if the headlight switch is used to raise the headlights and the negative terminal of the battery is disconnected, be sure to always raise the headlights, in this condition, by using the pop-up switch.

(2) Remove the headlight bezel.

4. REMOVAL OF HEADLIGHT HOUSING ASSEMBLY

Remove the headlight housing assembly and the linkage coupling part.

NOTE
Remove the linkage coupling part while holding the headlight hood by hand.

7. REMOVAL OF AIR GUIDE PANEL

Refer to GROUP 23 BODY – Air Parts.

8. REMOVAL OF POP-UP MOTOR

Remove the pop-up motor together with the horn.

10. REMOVAL OF ARM

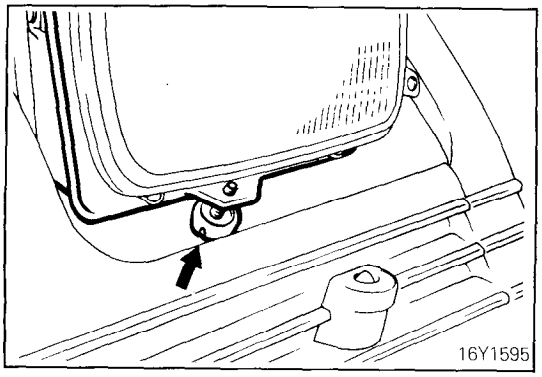
Put aligning marks on the arm and motor shaft before the arm is removed.

NOTE
When replacing the arm, put an alignment mark to a new arm in the same location as made in the old arm.

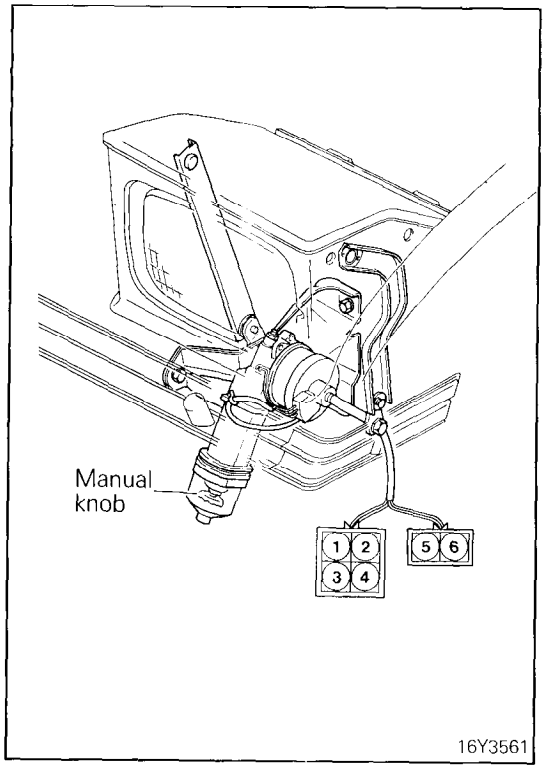
SERVICE POINT OF INSTALLATION

4. INSTALLATION OF HEADLIGHT HOUSING ASSEMBLY

(1) Use the elliptical hole in the headlight hood to adjust the clearance between the headlight hood and the fender, and between the headlight hood and the header panel, so that they are equal.



(2) Irregularity between the headlight housing assembly and the fender, and between the assembly and the header panel, can be eliminated by using the stopper bolt in the headlight housing assembly to make the necessary adjustment.
(3) Couple the linkage.



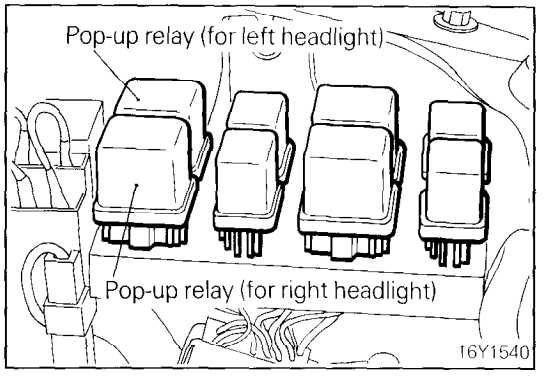
INSPECTION

POP-UP MOTOR

(1) Disconnect the wiring connector from the pop-up motor, and connect an ohmmeter to the motor side connector.
(2) Run the motor by the manual knob and check the continuity between the terminals.

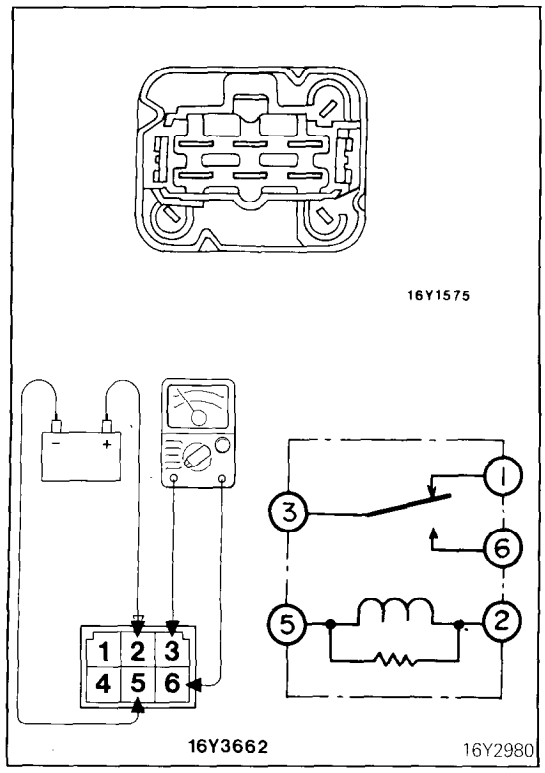
Terminal / Headlight	6	5	3	1	2	4
UP	⊕		⊖	○	○	
			⊖			⊕
Down		⊕	⊖	○	○	
			⊖			⊕

NOTE
(1) ○–○ indicates that there is continuity between the terminals.
(2) ⊕ (plus), and ⊖ (minus) indicate ohmmeter test bar connection.



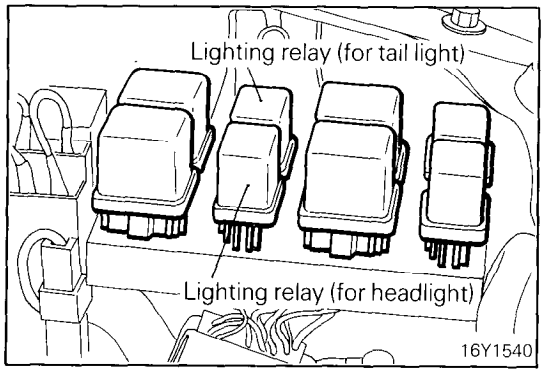
POP-UP RELAY

(1) Remove the pop-up relay from the relay box in the engine compartment.



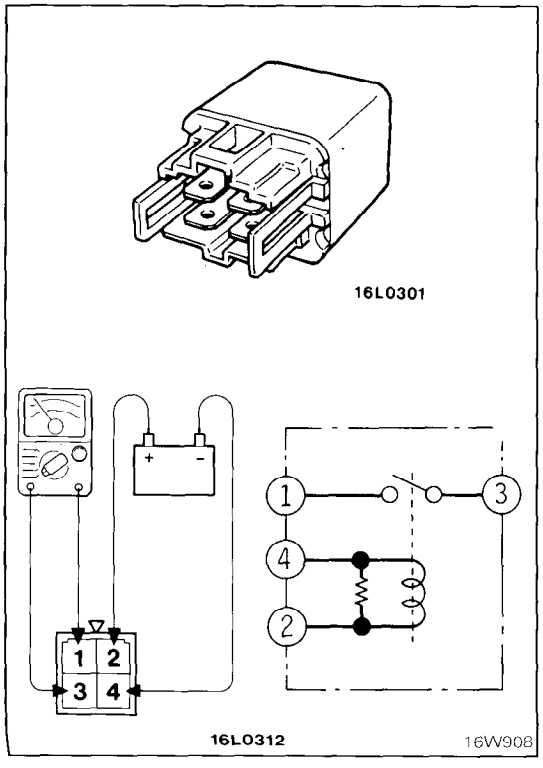
(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 5 is earthed.

Voltage applied	Terminals 3 – 6	Conductive
Voltage not applied	Terminals 3 – 6	Non-conductive
	Terminals 1 – 3	Conductive
	Terminals 2 – 5	



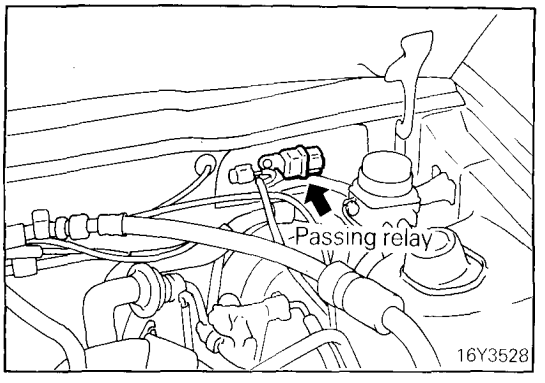
LIGHTING RELAY

(1) Remove the lighting relay from the relay box in the engine compartment.



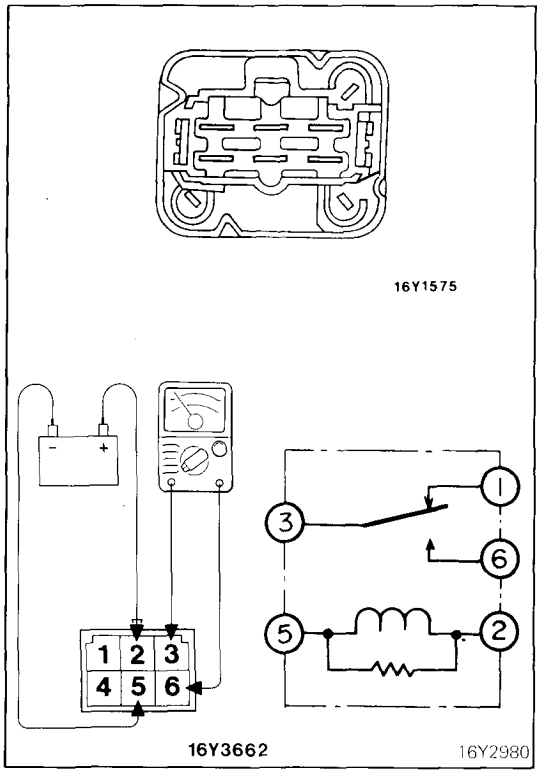
(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 4 is earthed.

Voltage applied	Terminals 1 – 3	Conductive
Voltage not applied	Terminals 1 – 3	Non-conductive
	Terminals 2 – 4	Conductive



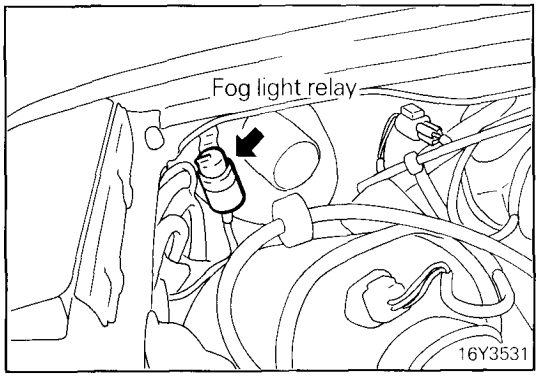
PASSING RELAY

(1) Remove the passing relay.



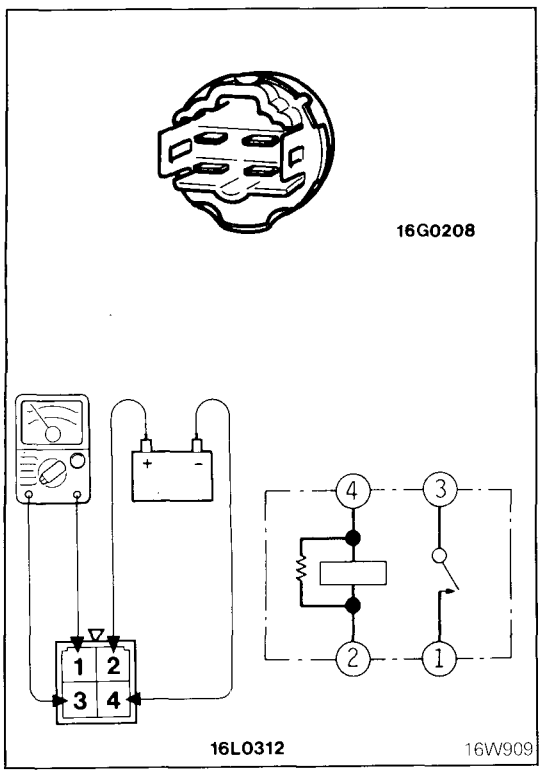
(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 5 is earthed.

Voltage applied	Terminals 3 – 6	Conductive
Voltage not applied	Terminals 3 – 6	Non-conductive
	Terminals 1 – 3	Conductive
	Terminals 2 – 5	



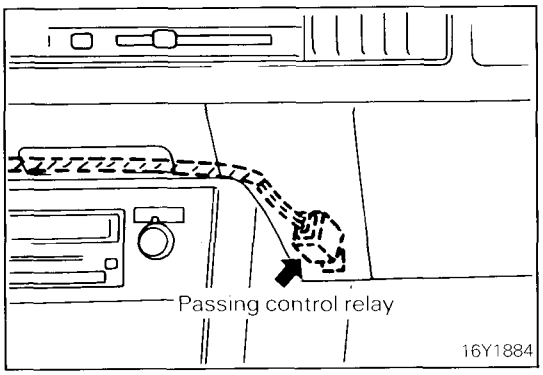
FOG LIGHT RELAY

(1) Remove the fog light relay.



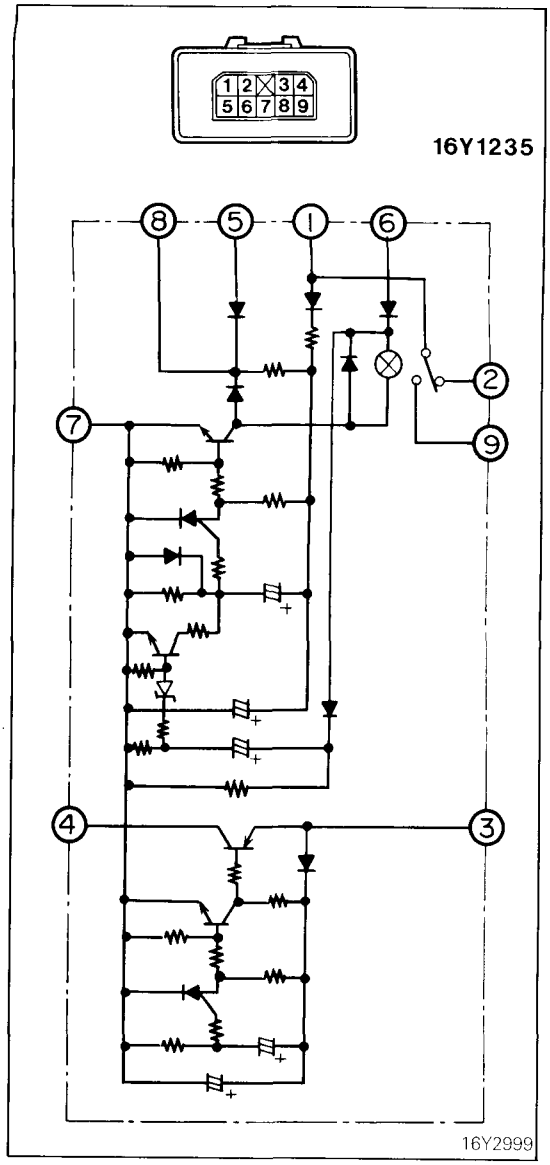
(2) Check continuity between terminals when the battery voltage is applied to terminal 2, and terminal 4 is grounded.

Voltage applied	Terminals 1 – 3	Conductive
Voltage not applied	Terminals 1 – 3	Non-conductive
	Terminals 2 – 4	Conductive



PASSING CONTROL RELAY

(1) Remove the passing control relay.



(2) Check continuity between terminals when the battery voltage is applied to terminal 6, and terminal 8 is grounded.

Voltage applied	Terminals 1 – 9	Conductive
Voltage not applied	Terminals 1 – 9	Non-conductive
	Terminals 1 – 2	Conductive
	Terminals 5 – 8	

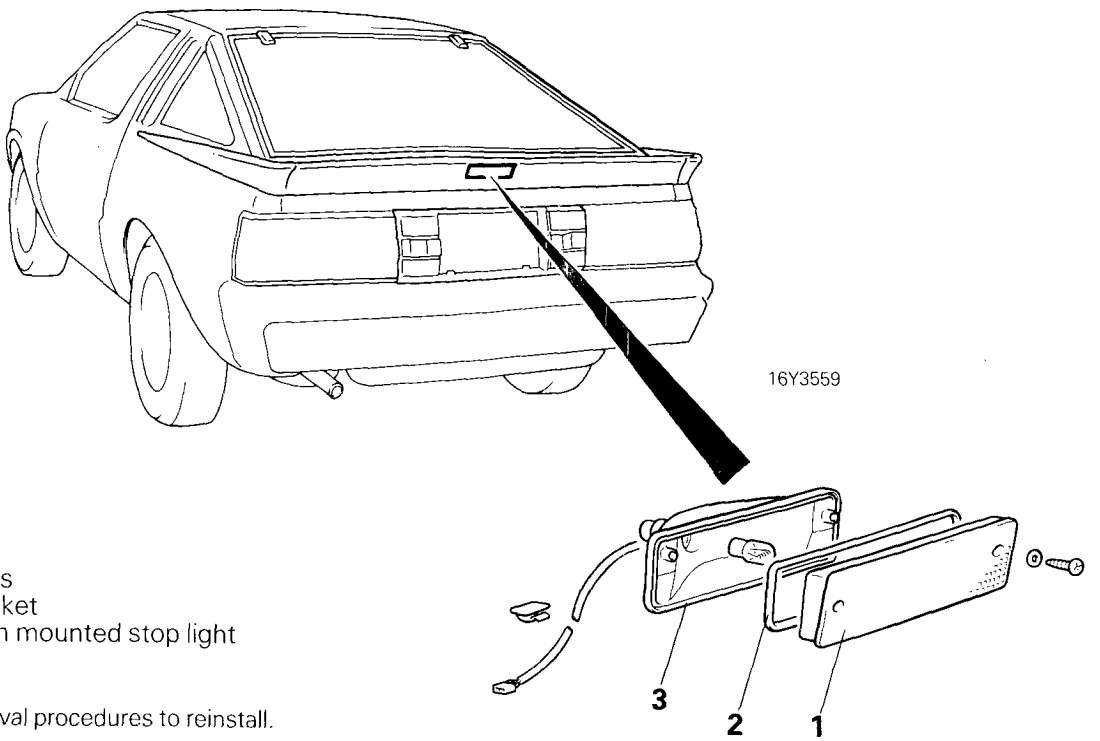
(3) Check continuity between terminals 3 and 4 when the battery voltage is applied to terminal 3, and terminal 7 is grounded.

Voltage applied	Terminals 3 – 4	Conductive for approx. 4 seconds and non-conductive afterwards.
Voltage not applied	Terminals 3 – 4	Non-conductive

HIGH MOUNTED STOP LIGHT

N08IKAC

REMOVAL AND INSTALLATION



Removal steps

1. Lens
2. Gasket
3. High mounted stop light

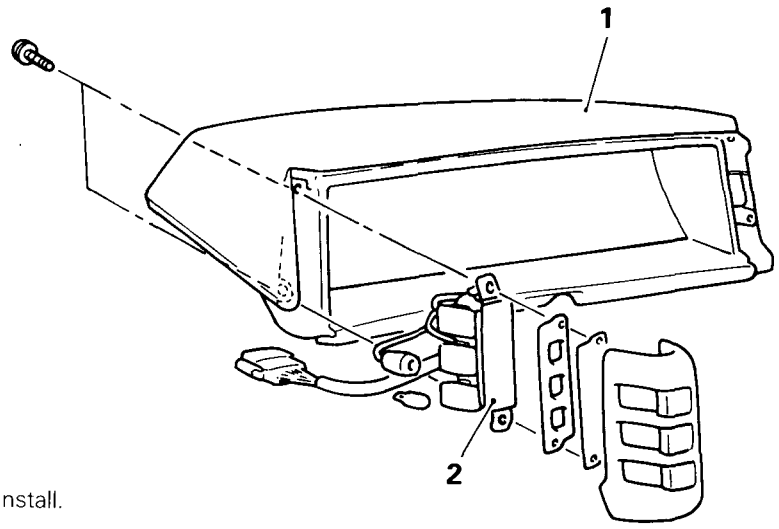
NOTE
Reverse the removal procedures to reinstall.

16Y2890

CLUSTER SWITCH

N08INAA

REMOVAL AND INSTALLATION



Removal steps

1. Meter hood
2. Cluster switch

NOTE
Reverse the removal procedures to reinstall.

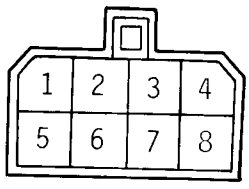
16Y3501

INSPECTION

(1) Remove the meter hood.
(2) Disconnect the cluster switch connector.
(3) Operate the switch and check the continuity between the terminals.

NOTE
○–○ indicates that there is continuity between the terminals.

Cluster switch (L.H.) connector

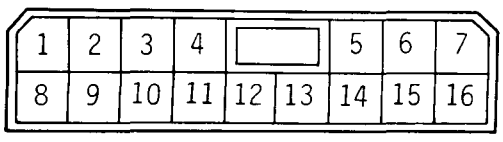


16Y2878

LIGHTING SWITCH

Switch position \ Terminal	1	2	3	4	5	6	7	8
OFF							○—○	
TAIL	○—○			○—○			○—○	
HEAD			○—○		○—○	○—○		○—○

Cluster switch (R.H.) connector



16Y2877

HAZARD SWITCH

Switch position \ Terminal	9	10	11	12	5	7	14	15	16
OFF				○—○				○—○	
ON	○—○—○					○—○			

FOG LIGHT SWITCH

Switch position \ Terminal	6	13
OFF		
ON	○	○

POP-UP SWITCH

Switch position \ Terminal	3	4	8
OFF	○	○	
ON	○		○

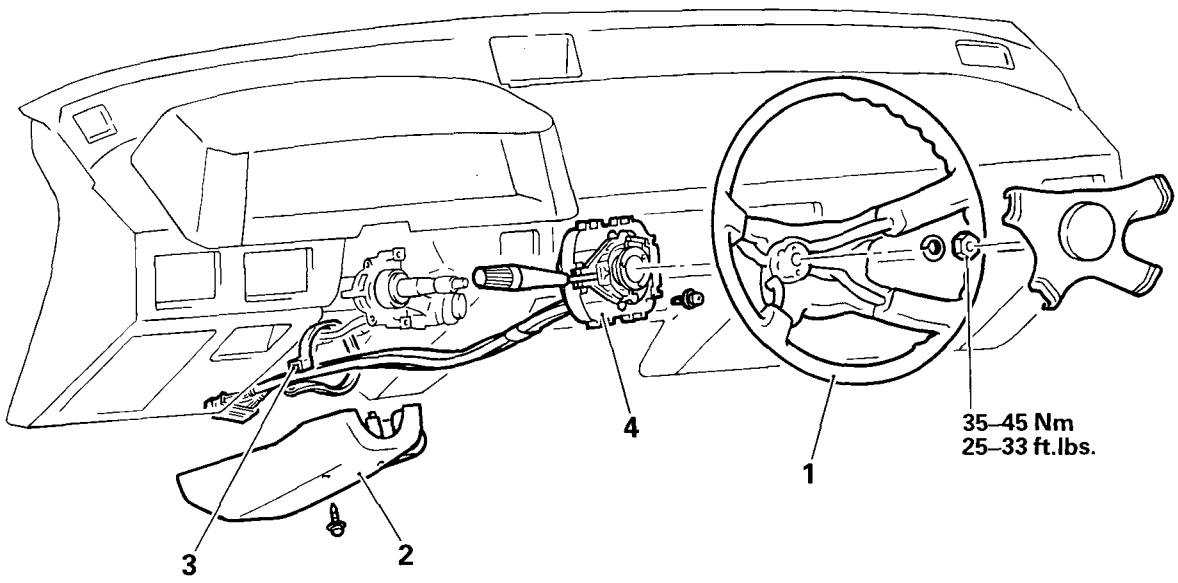
ILLUMINATION

Terminal	1	2
	○ (l) ○	

COLUMN SWITCH

N08IPAE

REMOVAL AND INSTALLATION

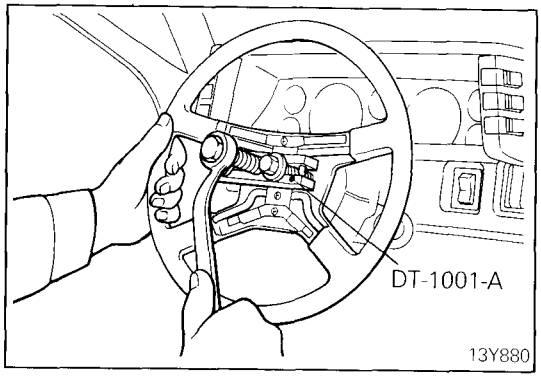


Removal steps

◆◆ 1. Steering wheel
2. Lower column cover
3. Cable bands
4. Column switch

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

13Y3500



SERVICE POINT OF REMOVAL

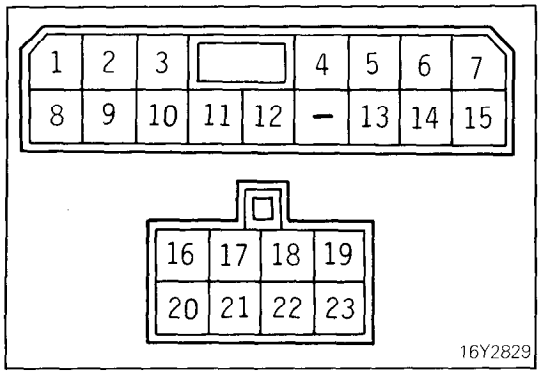
1. REMOVAL OF STEERING WHEEL

Remove the steering wheel by using the special tool.

INSPECTION

(1) Remove the knee protector.
(2) Disconnect the column switch connector.
(3) Operate the switch and check the continuity between the terminals.

NOTE
○–○ indicates that there is continuity between the terminals.



TURN-SIGNAL SWITCH

Switch position \ Terminal	1	2	3	4	5	6
Right side	○		○		○	
				○		○
Neutral				○	○	○
Left side	○	○		○	○	○

DIMMER/PASSING SWITCH

Switch position \ Terminal		12	13	15	21
Dimmer switch	Lower	○		○	
	Upper		○	○	
Passing switch			○	○	○

WINDSHIELD WIPER AND WASHER SWITCH

Switch position \ Terminal		8	17	9	10	14	11	23	19
Wiper switch	OFF			○		○			
	A/INT	○	○	○		○			
	1		○	○					
	2		○		○				
Washer switch	OFF								
	ON		○				○		
FAST	OFF								
	ON		○					○	
SLOW	OFF								
	ON		○						○

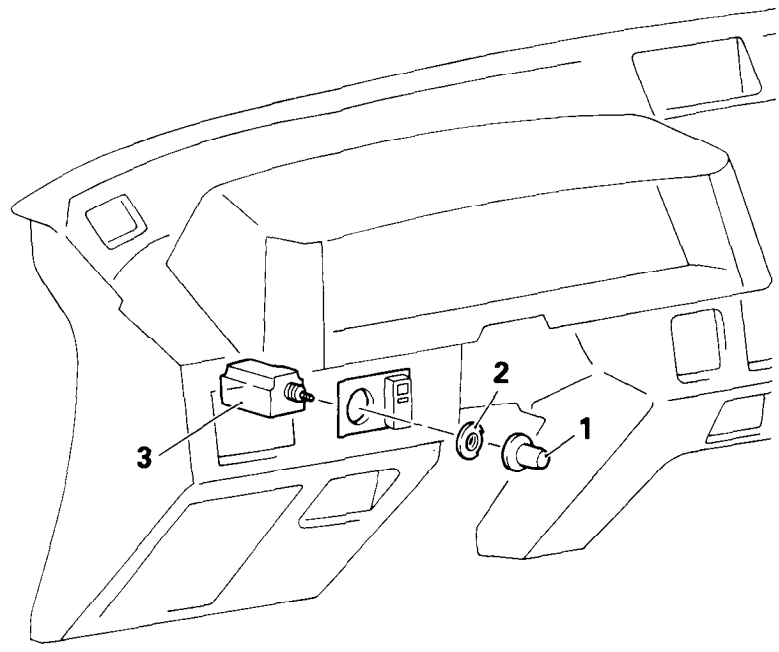
HORN SWITCH

Switch position \ Terminal	7	15
OFF		
ON	○	○

DIMMER CONTROL SWITCH

N08IRAC

REMOVAL AND INSTALLATION

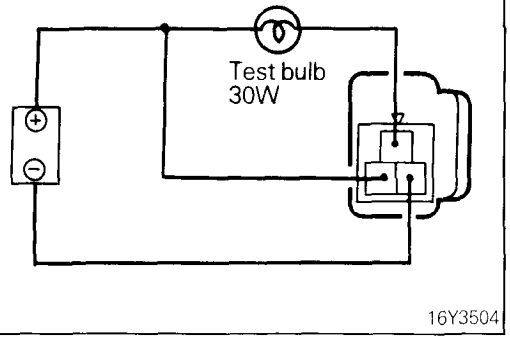


Removal steps

1. Knob
2. Ring nut
3. Dimmer control switch

NOTE
Reverse the removal procedures to install

16Y3503



16Y3504

INSPECTION

CONTINUITY TEST

(1) Remove the dimmer control switch from the instrument panel, and then connect the battery and the test bulb as shown in the illustration.
(2) If the light intensity of the test bulb changes smoothly, without any flickering, when the dimmer control switch knob is turned, then it can be assumed that the dimmer control switch is functioning properly.

WIPER AND WASHER SYSTEM

SPECIFICATIONS

GENERAL SPECIFICATIONS

N08KB--

Items	Specifications
Windshield wiper motor	
Type	Permanent-magnet type
Speed control system	Third brush system
Braking system	Dynamic brake system
Rpm at load of 1 Nm (0.72 ft.lbs.) rpm	
Low speed	47 ± 5
High speed	69 ± 7
Limited torque Nm (ft.lbs.)	
Low speed	18 (13)
High speed	16 (12)
Rear wiper motor	
Motor type	Ferrite magnet type
Braking system	Dynamic braking system
Rpm under load [at 0.6 Nm (0.4 ft.lbs.)] rpm	45 – 53
Nominal torque Nm (ft.lbs.)	12 (9)
No-load current A	2 or less
Windshield wiper blade	
Wiping angle	
Driver's side	79° ± 1.5°
Passenger's side	107° ± 1.5°
Wiper blade length mm (in.)	484 (19)
Rear wiper blade	
Wiping angle	107°
Length of wiper blade mm (in.)	459 (18.0)
Windshield washer motor and pump	
Motor type	Direct current ferrite magnet type
Pump type	Centrifugal type
Power consumption A	3.5 or less
Time of continuous use sec.	
With washer fluid	Max. 60
Empty operation	Max. 20
Nozzle jet pressure kPa (psi)	78 (11.3)
Tank capacity lit. (qts.)	2.5 (2.6)
Rear washer motor and pump	
Motor type	Direct current ferrite magnet type
Pump type	Centrifugal type
Power consumption A	3.5 or less
Allowable period of continuous use sec.	
With washer fluid	60
Empty operation	30
Nozzle jet-spray pressure kPa (psi)	78 (11.3)
Tank capacity lit. (qts.)	1.1 (1.1) or more

Items	Specifications
Rear wiper and rear washer switch	
Rated load A	3
Rear wiper switch	5
Rear washer switch	0.2 or less
Voltage drop (at 12V and the rated load) V	
Rear intermittent wiper relay	
Intermittent time sec.	6 – 10

SERVICE SPECIFICATIONS

Items	Specifications
Windshield wiper blade stopping position (distance between blade tip and front deck garnish) mm (in.)	13 (.5)
Rear wiper blade stopping position (distance between blade tip and hatch garnish) mm (in.)	45 – 55 (1.8 – 2.2)

N08KC- -

RQUE SPECIFICATIONS

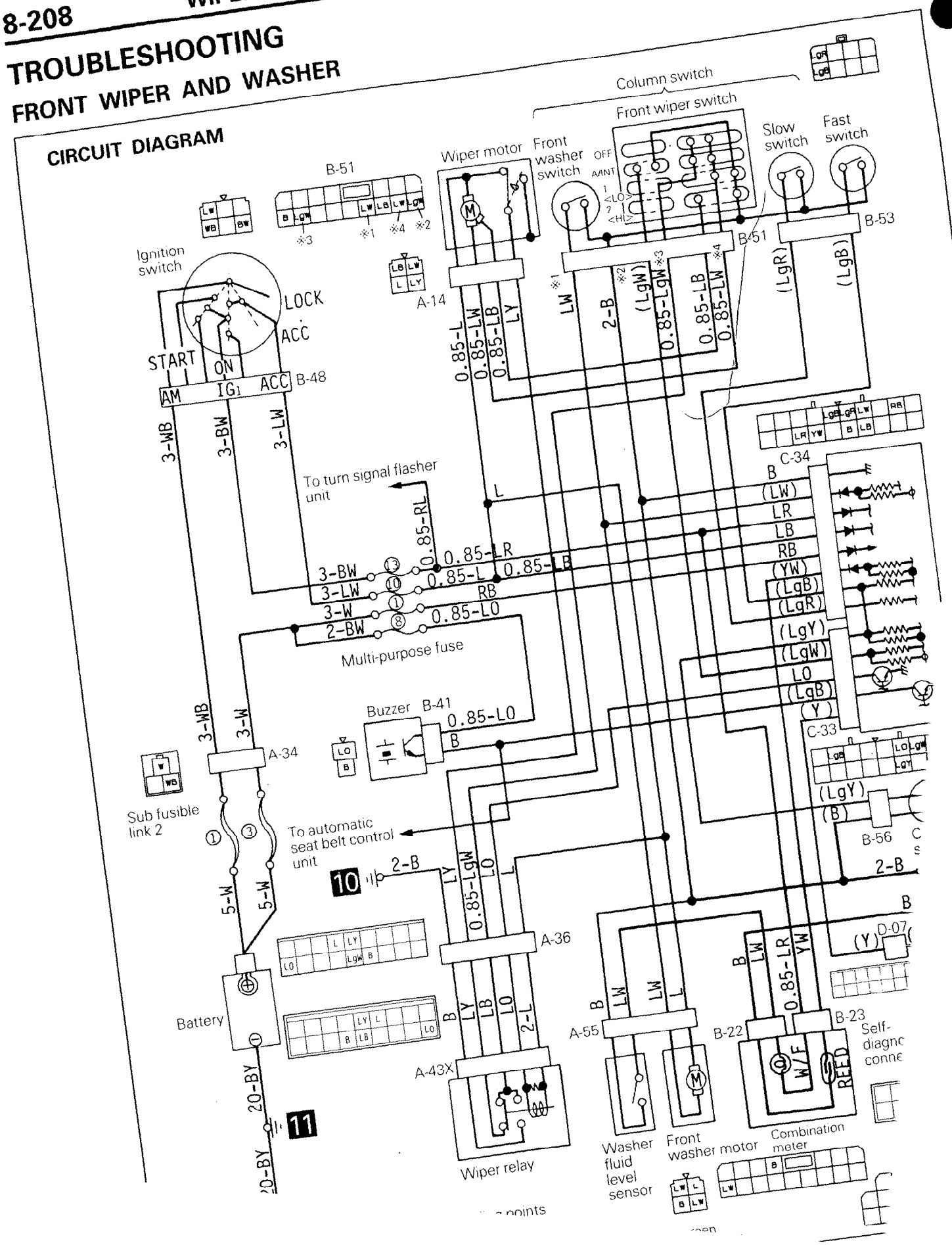
's	Nm	ft.lbs.
shield wiper arm locking nut	10 – 16	7.2 – 11.6
shield wiper pivot shaft installing nut	10 – 16	7.2 – 11.6
iper arm locking nut	6 – 9	4.3 – 6.5
per pivot shaft installing nut	10 – 16	7.2 – 11.6
er motor mounting nut	6 – 9	4.3 – 6.5

N08KD- -

TROUBLESHOOTING

FRONT WIPER AND WASHER

CIRCUIT DIAGRAM



Items	Specifications
Rear wiper and rear washer switch	
Rated load A	
Rear wiper switch	3
Rear washer switch	5
Voltage drop (at 12V and the rated load) V	0.2 or less
Rear intermittent wiper relay	
Intermittent time sec.	6 – 10

SERVICE SPECIFICATIONS

N08KC- -

Items	Specifications
Windshield wiper blade stopping position (distance between blade tip and front deck garnish) mm (in.)	13 (.5)
Rear wiper blade stopping position (distance between blade tip and hatch garnish) mm (in.)	45 – 55 (1.8 – 2.2)

TORQUE SPECIFICATIONS

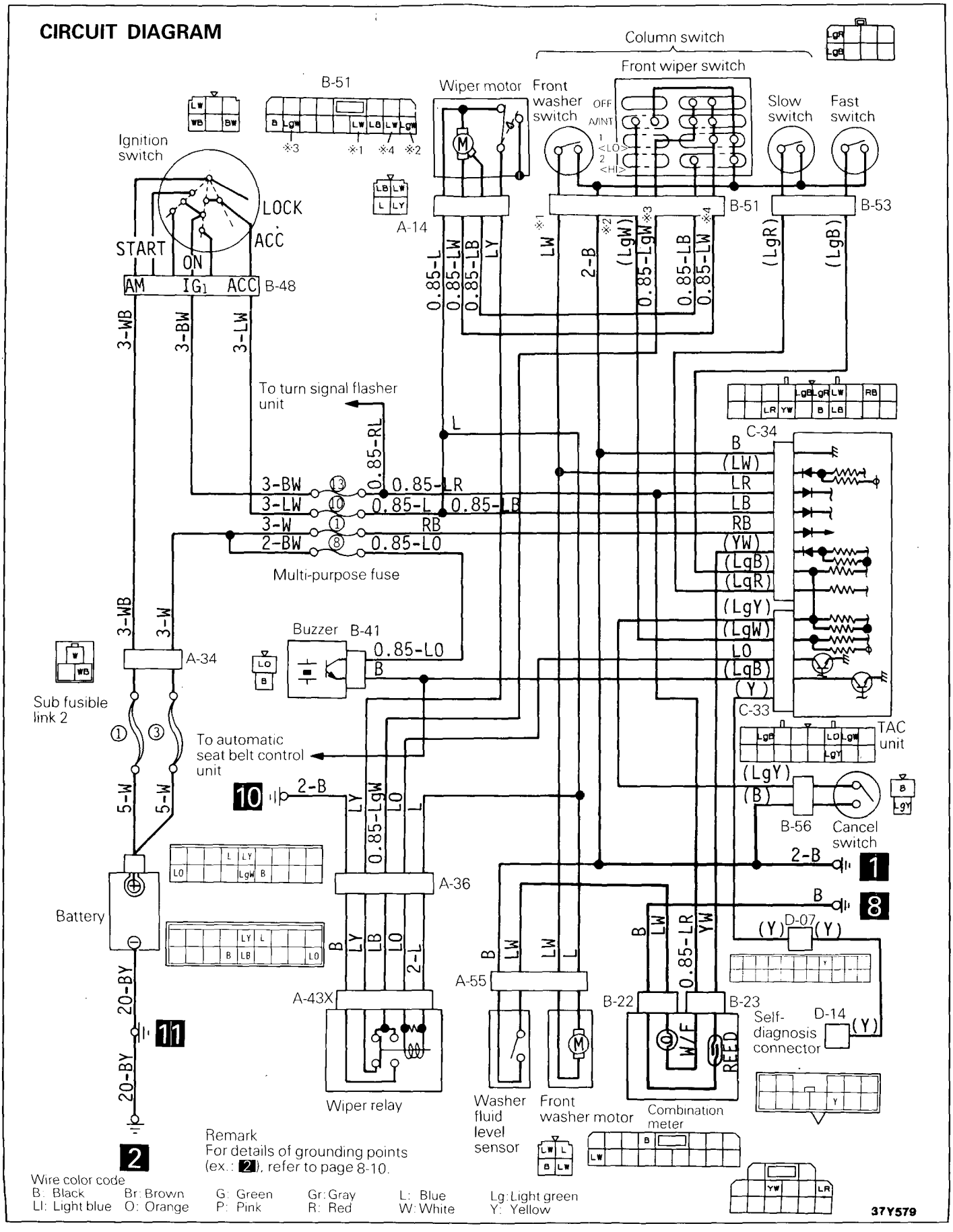
N08KD- -

Items	Nm	ft.lbs.
Windshield wiper arm locking nut	10 – 16	7.2 – 11.6
Windshield wiper pivot shaft installing nut	10 – 16	7.2 – 11.6
Rear wiper arm locking nut	6 – 9	4.3 – 6.5
Rear wiper pivot shaft installing nut	10 – 16	7.2 – 11.6
Rear wiper motor mounting nut	6 – 9	4.3 – 6.5

TROUBLESHOOTING

FRONT WIPER AND WASHER

CIRCUIT DIAGRAM



OPERATION N08KHAC

Wiper Low-speed and High-speed Operation

- When the wiper switch is at "1" with the ignition switch at either "ACC" or "ON", current flows through fuse No. 10, wiper motor (low-speed brush), wiper switch and ground; the wipers operate at low speed.
- When the wiper switch is at "2", current flows through fuse No. 10, wiper motor (high-speed brush), wiper switch, and ground; the wipers operate at high speed.

Wiper Automatic Stopping Operation

- When the wiper switch is set at "OFF" position to stop the wipers, current flows through the wiper motor (low-speed brush), wiper switch, wiper relay (contacts) wiper motor (cam contacts), and ground, causing the wiper motor to continue operation until the wiper blades return to their park positions.
- Once the wiper blades have reached park positions, the wiper motor cam moves to open its contacts. This interrupts flow of current to ground, and the wiper motor stops.

Washer Operation

When the washer switch is "ON", with the ignition switch in either "ACC" or "ON", current flows through fuse No. 10, washer motor, washer switch, and ground; the washer motor operates.

Washer Fluid Level Indicator Light

When the washer fluid level drops below the preset level while the ignition switch at "ON", the washer fluid level sensor closes its contacts, causing current to flow through fuse No. 13, washer fluid level sensor, and ground, and in turn, the washer fluid level indicator light goes on.

For the operation of the intermittent wipers and washer-interlocked wipers, refer to the "ETACS" section.

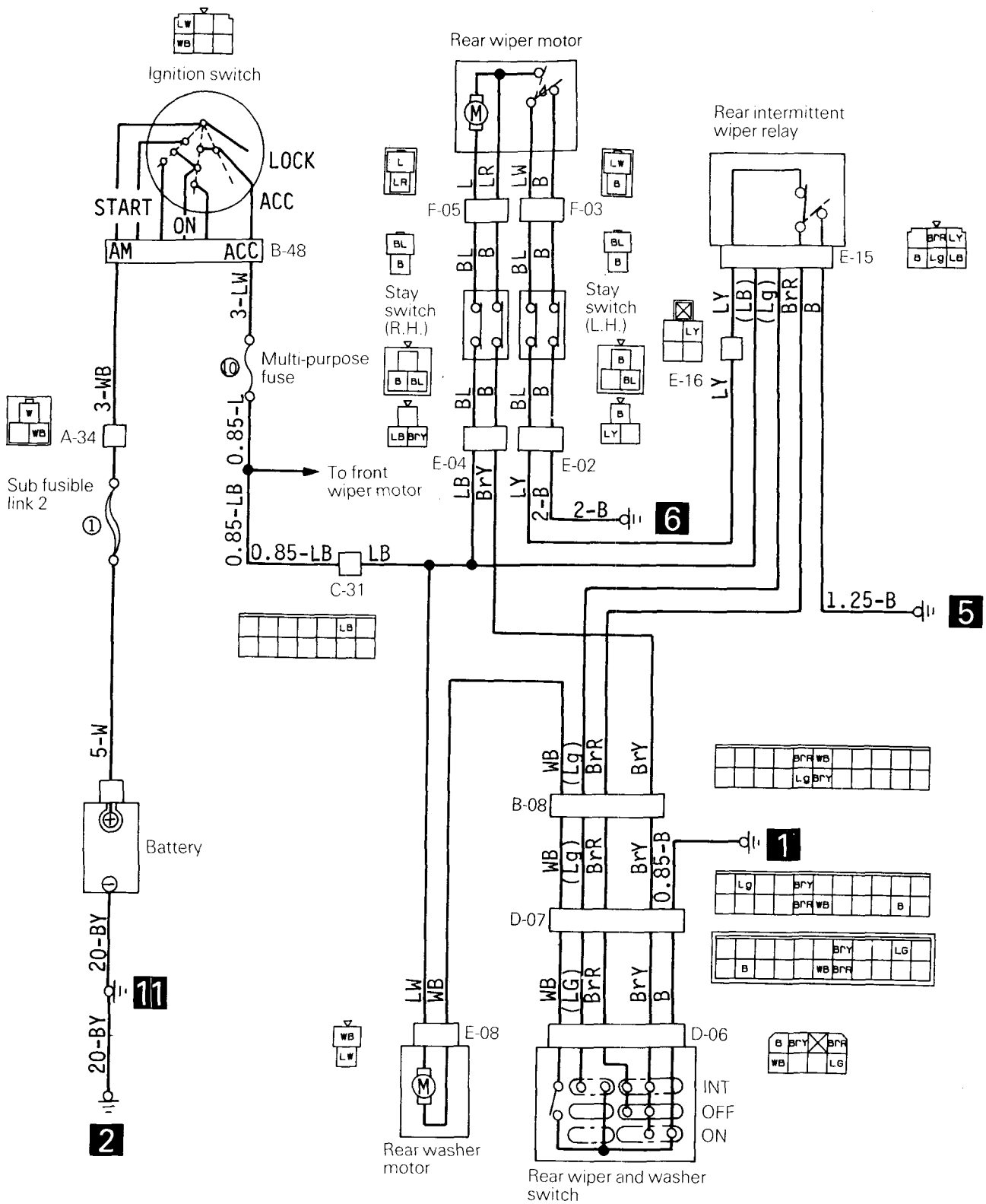
TROUBLESHOOTING HINTS

1. Wipers do not operate
   1) Washer also does not operate
      - Check fuse.
      - Check connection to ground.
2. Wipers do not work in either low-speed or high-speed mode
   - Check wiper switch.
3. Wipers fail to stop
   - Check wiper motor.

For troubleshooting hints for the intermittent wipers and washer-interlocked wipers, refer to the "ETACS" section.

REAR WIPER AND WASHER

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	W: White	Y: Yellow

OPERATION N08KHBB

Wiper Operation

- When the wiper switch is at "ON" with the ignition switch at either "ACC" or "ON", current flows through fuse No. 10, stay switch, wiper motor, wiper switch and ground, the wiper operate.

Wiper Automatic Stopping Operation

- When the wiper switch is set at "OFF" to stop the wipers, current flows through the wiper motor, wiper switch, intermittent wiper relay (contacts), wiper motor (cam contacts), and ground, causing the wiper motor to continue operation until the wiper blade returns to its park positions.
- Once the wiper blade has reached park position, the wiper motor cam moves to open its contacts. This interrupts flow of current to ground, and the wiper motor stops.

Wiper Intermittent Operation

- With the ignition switch at "ACC" or "ON", battery voltage is applied to the intermittent wiper relay through fuse No. 10.
- When the wiper switch is at "INT", current flows through the intermittent wiper relay, wiper switch, and ground, and the wiper relay internal contacts close and open repeatedly.
- While the contacts are closed, current flows through the stay switch, wiper motor, wiper switch, intermittent wiper relay (contacts), and ground, causing the wiper motor to operate.
- When the wiper motor starts operating, the relay internal contacts open, causing current to flow through the wiper motor (cam contacts), and ground. This keeps the wiper motor operating until the wiper blades return to their park positions.
- Once the wiper blades have reached park positions, the wiper motor cam moves to open its contacts. This interrupts flow of current to ground so the wiper motor stops.

Washer Operation

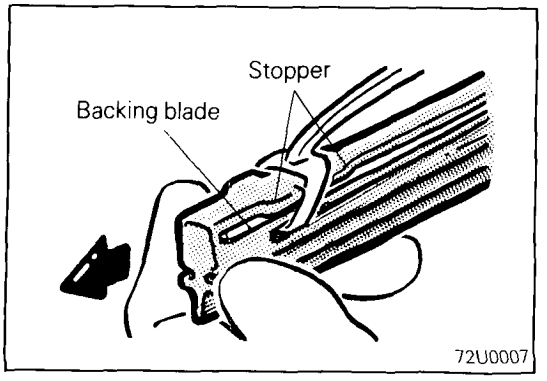
When the washer switch is "ON", with the ignition switch in either "ACC" or "ON", current flows through fuse No. 10, washer motor, washer switch, and ground; the washer motor operates.

TROUBLESHOOTING HINTS

1. Wipers do not operate
   1) Washer also does not operate
      - Check fuse.
      - Check for ground connection.
2. Wipers do not operate in intermittent mode
   - Check intermittent wiper relay terminal voltage with relay energized.

Terminal	Voltage	Check location
2	0V	Wiper switch
	12V	Intermittent wiper relay
	Changes betweeen 0 V and 12 V repeatedly	– (Normal)

3. Wipers fail to stop
   - Check wiper motor.



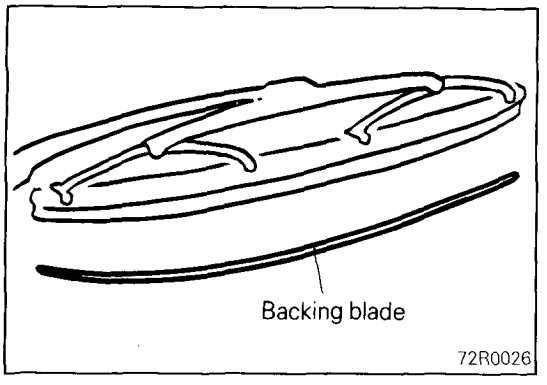
SERVICE ADJUSTMENT PROCEDURES

N08KIAA

REPLACEMENT OF WIPER BLADE RUBBER

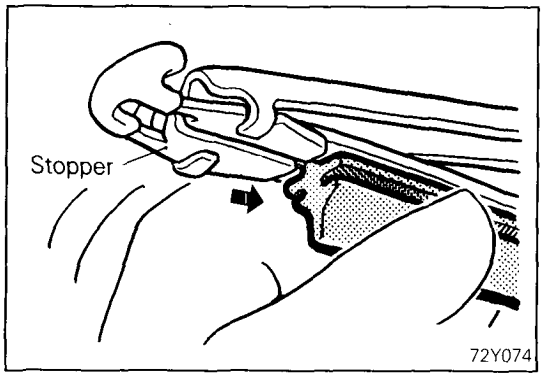
WINDSHIELD WIPER

1. Pull out the rubber and backing blade from the stopper side.

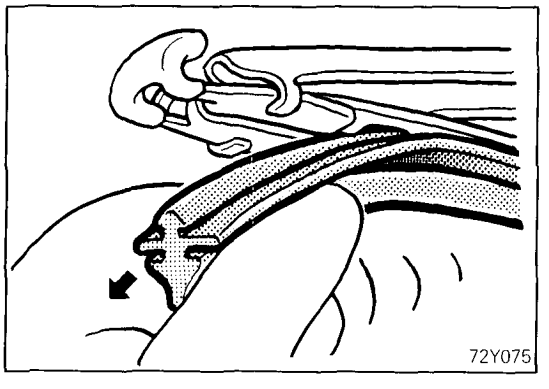


2. Remove the backing blade from the rubber.
3. To attach a new rubber, assemble the rubber and backing blade, insert from the direction opposite the stopper, and secure by the stopper. Note that, because the backing blade is curved, installation should be as shown in the figure.

REAR WIPER



1. Pull out one side of the wiper blade rubber from the stopper.

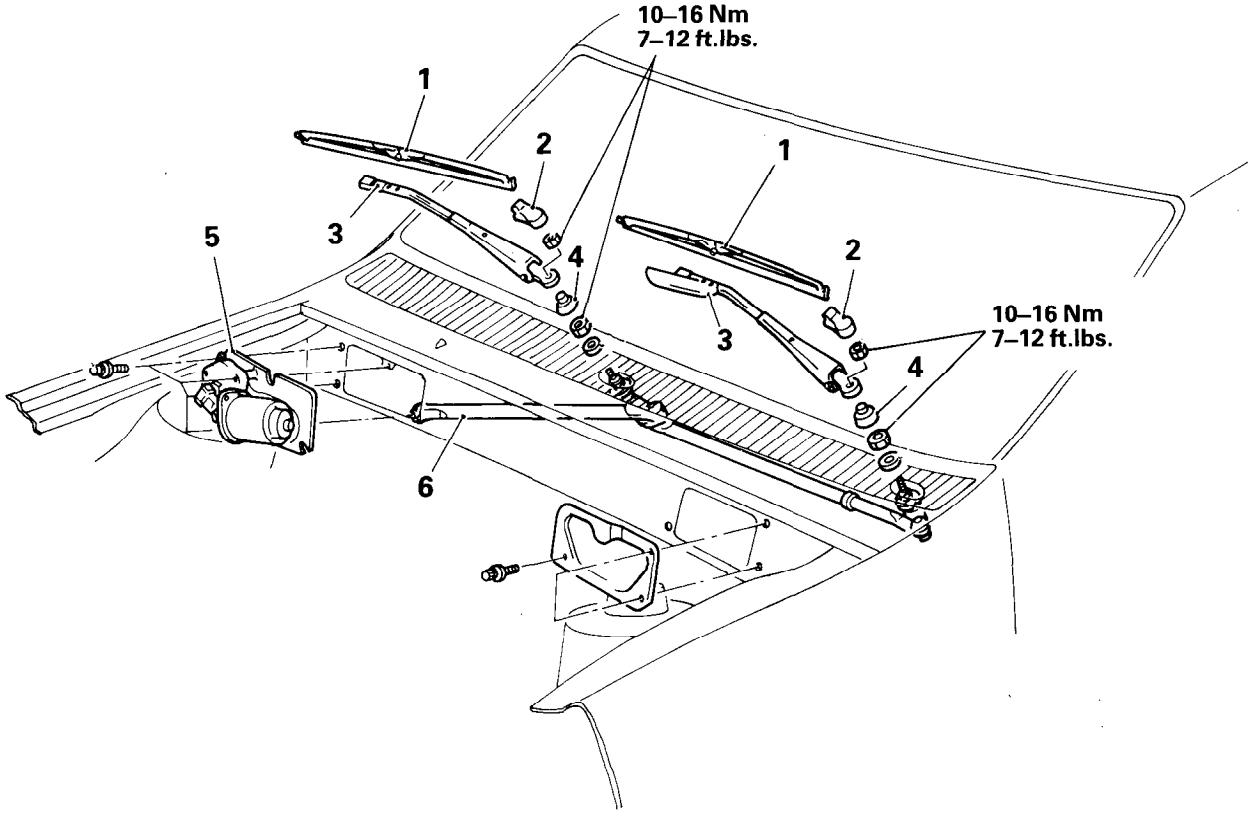


2. Pull out the wiper blade rubber, and then remove the blade rubber.
3. Installation of the new blade rubber is the reverse procedure of removal.

WINDSHIELD WIPERS

N08KJAC

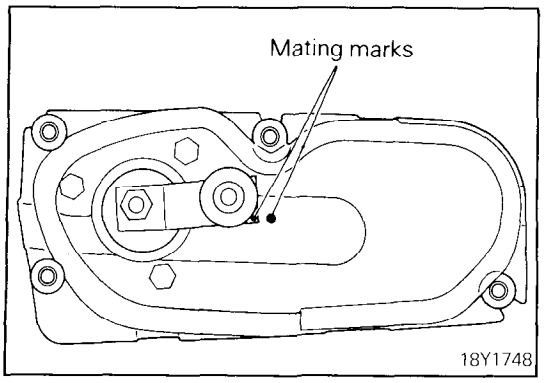
REMOVAL AND INSTALLATION



Removal steps

1. Wiper blade
2. Head cover
3. Wiper arm
4. Shield cap
5. Wiper motor
6. Wiper linkage

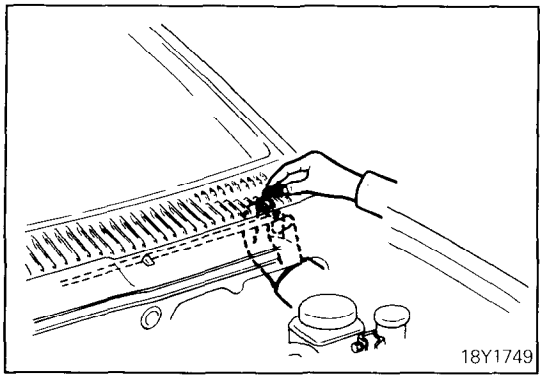
NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".



SERVICE POINT OF REMOVAL

5. CAUTION OF WIPER MOTOR

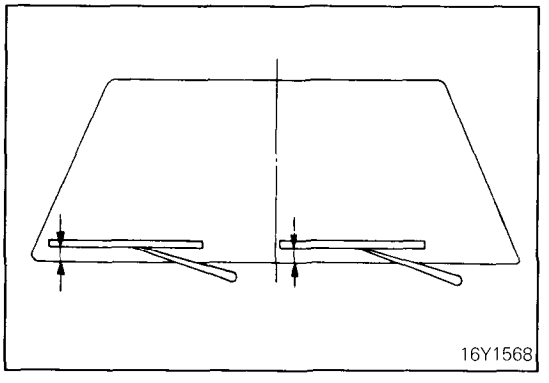
Caution
Because the installation angle of the crank arm and the motor has been set, do not remove them unless it is necessary to do so. If they must be removed, remove them only after marking their mounting positions.



SERVICE POINTS OF INSTALLATION

6. INSTALLATION OF WIPER LINKAGE

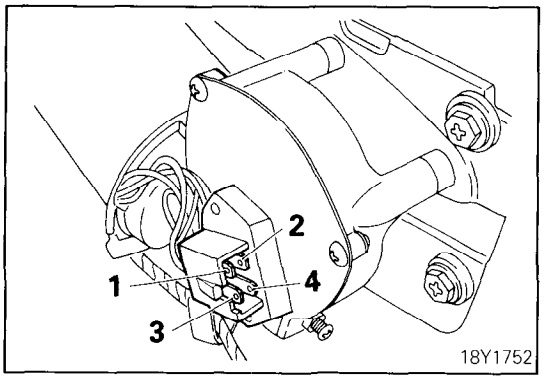
When the passenger side pivot shaft is installed, use the access hole exposed by removal of cowl top outer cover from the front deck.



3. INSTALLATION OF WIPER ARM

Install the wiper arms on the pivot shafts so that the stopping position of the wiper blades is in agreement with the standard value.

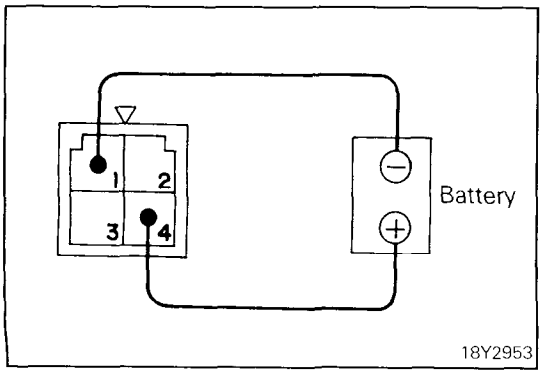
Standard value (distance between blade tip and front deck center garnish): 13 mm (.5 in.)



INSPECTION

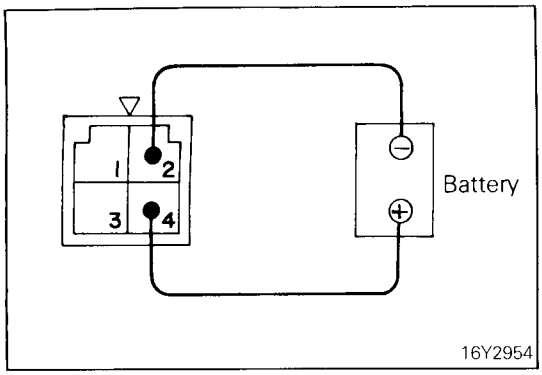
WIPER MOTOR

Disconnect the wiring connector from the wiper motor and connect battery to the wiper motor connector to check that the wiper motor runs.



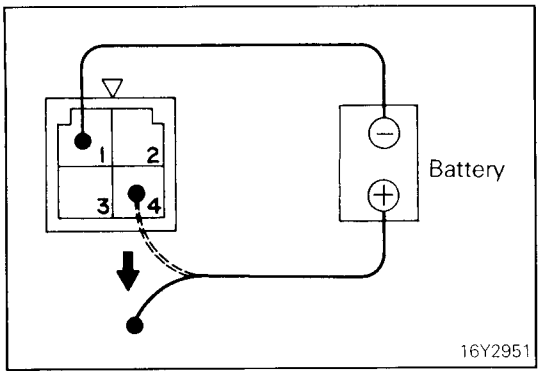
LOW SPEED OPERATION CHECK

Connect battery (+) to terminal 4 and battery (–) to terminal 1 and check that the motor runs at low speed.



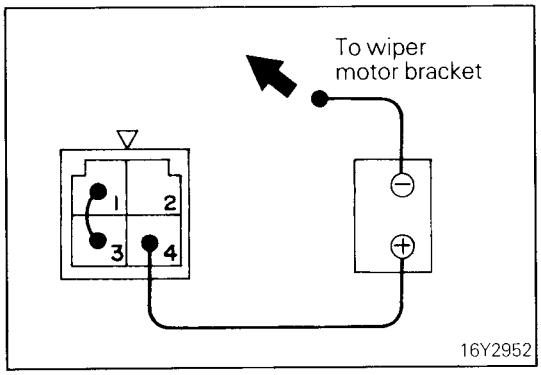
HIGH SPEED OPERATION CHECK

Connect battery (+) to terminal 4 and battery (–) to terminal 2 and check that the motor runs at high speed.

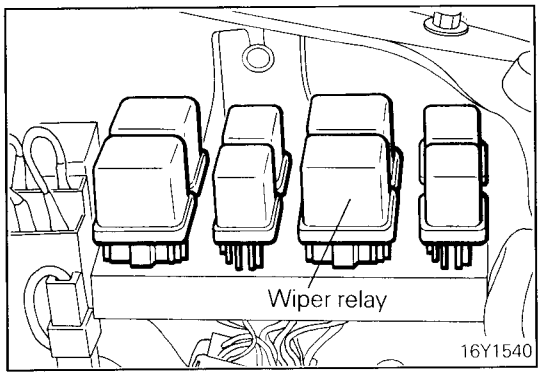


AUTOMATIC STOP OPERATION CHECK

(1) Connect battery (+) to terminal 4 and battery (–) to terminal 1 to run the motor at low speed.
(2) Disconnect terminal 4 during operation to stop the motor.

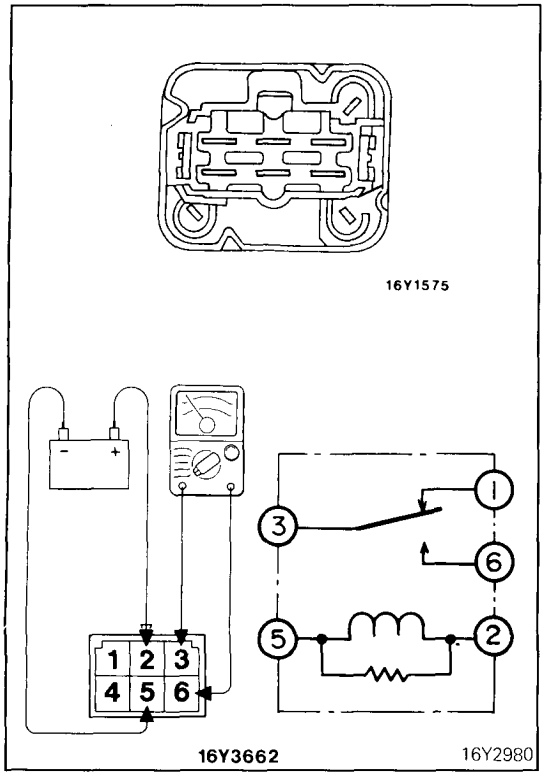


(3) Connect terminal 1 to terminal 3 and connect battery (+) to terminal 4 and battery (–) to the wiper motor bracket to check that the motor starts to run at low speed and then stops.



WIPER RELAY

(1) Remove the wiper relay.



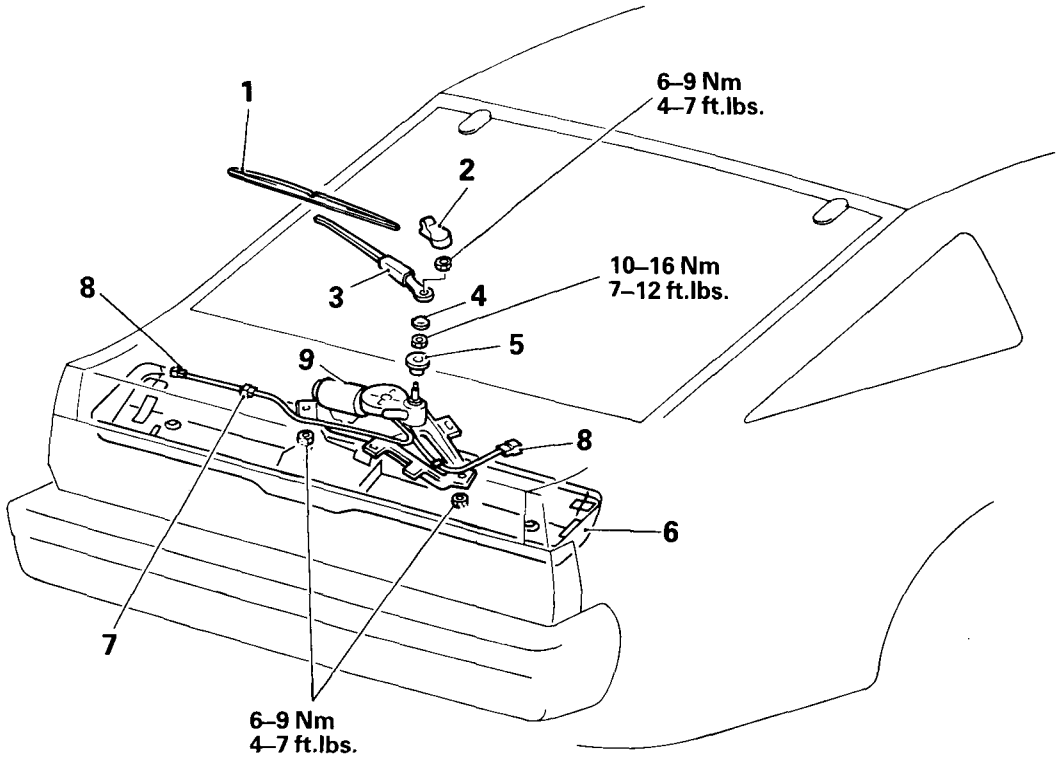
(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 5 is earthed.

Voltage applied	Terminals 3 – 6	Conductive
Voltage not applied	Terminals 3 – 6	Non-conductive
	Terminals 1 – 3	Conductive
	Terminals 2 – 5	

REAR WIPER

N08KKAB

REMOVAL AND INSTALLATION

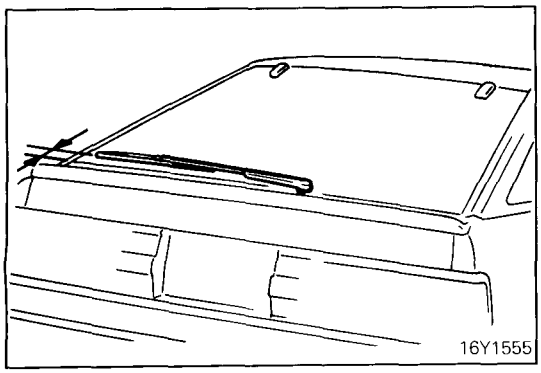


Removal steps

1. Wiperblade
2. Head cover
- ◆◆ 3. Wiper arm
4. Shield cap
5. Collar
6. Tailgate trim
7. Harness clip
8. Wiper motor connector
9. Wiper motor

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".

18Y1750

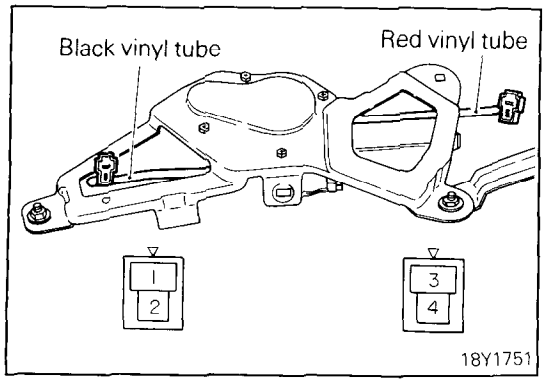


SERVICE POINT OF INSTALLATION

3. INSTALLATION OF WIPER ARM

Mount the wiper arm on the pivot shaft so that the stopping position of the wiper blade is in agreement with the standard value.

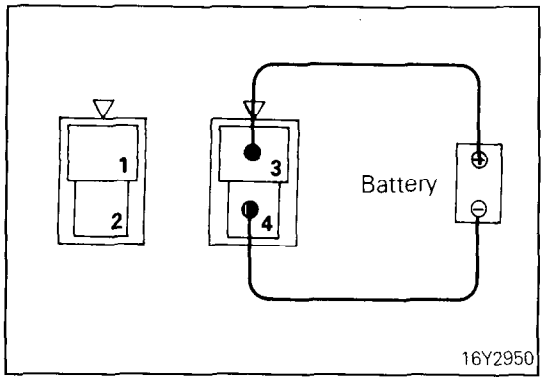
Standard value (distance between blade tip and tailgate garnish): 45 – 55 mm (1.8 – 2.2 in.)



INSPECTION

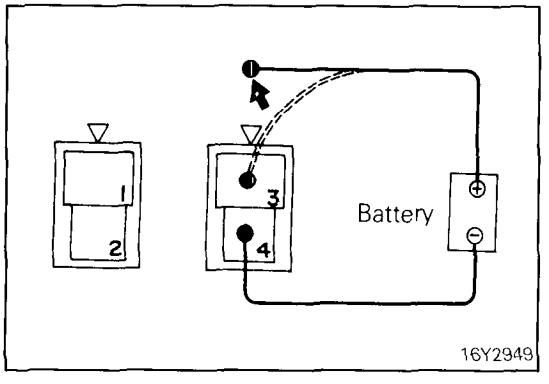
WIPER MOTOR

Disconnect the wiring connector from the wiper motor and connect battery to the wiper motor connector to check that the wiper motor runs.



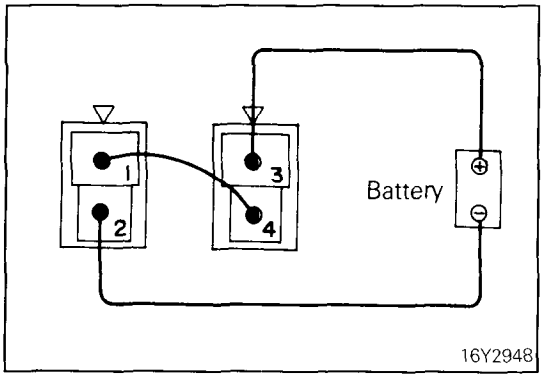
OPERATION CHECK

Connect battery (+) to terminal 3 and battery (–) to terminal 4 to check that the motor runs.

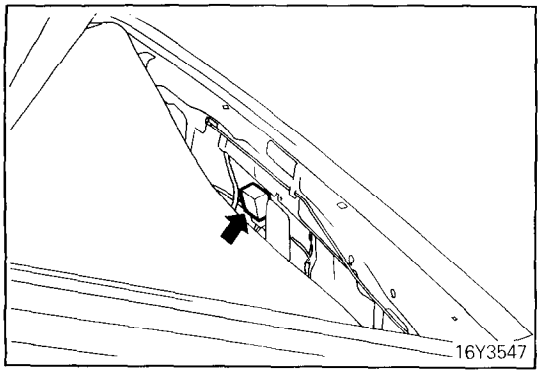


AUTOMATIC OPERATION CHECK

(1) Connect battery (+) and battery (–) to terminal 3 and terminal 4, respectively, to run the motor.
(2) While the motor is running, disconnect terminal 3 to stop the motor.



(3) Connect terminal 1 to terminal 4 and connect battery (+) and battery (–) to terminal 3 and terminal 2, respectively, to check that the motor starts to run again and then stops.

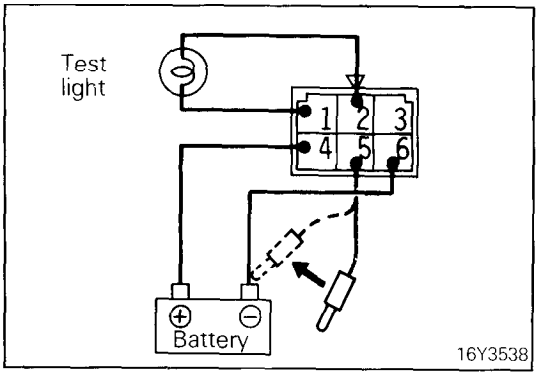


REAR INTERMITTENT WIPER RELAY

Remove the rear intermittent wiper relay from the rear end panel.

CONTINUITY CHECK

Check to see that there is continuity between terminals 1 and 5.



INTERMITTENT OPERATION CHECK

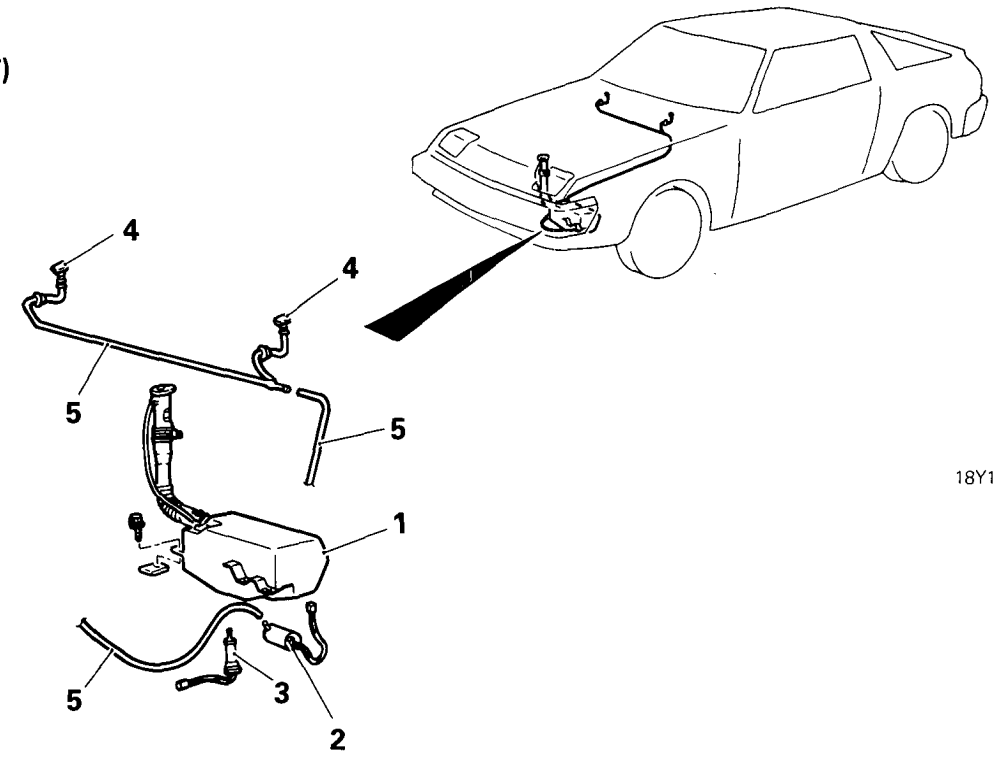
(1) Connect the battery and the test light to the relay, as shown in the figure.
(2) The condition is normal if, when the battery's negative (–) terminal is connected to terminal 5, the test light illuminates at the same time.

WINDOW WASHER

N08KLBA

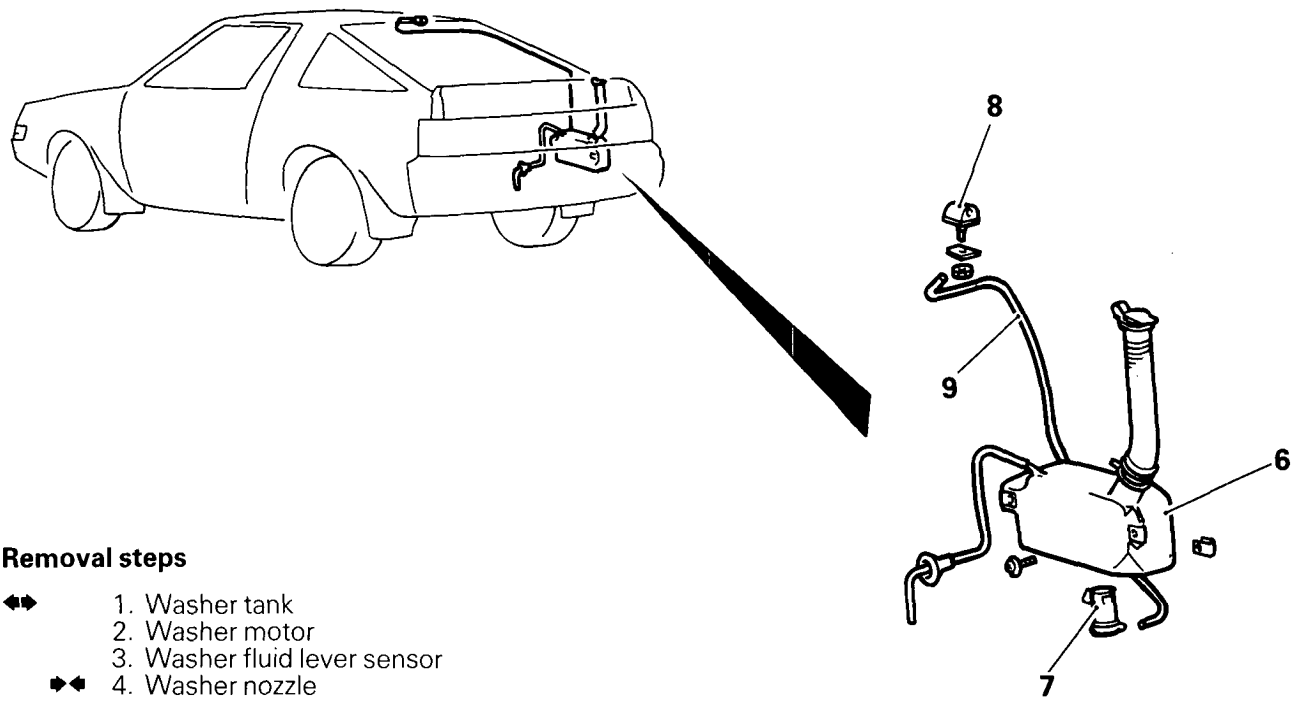
REMOVAL AND INSTALLATION

(FRONT)



18Y1754

(REAR)

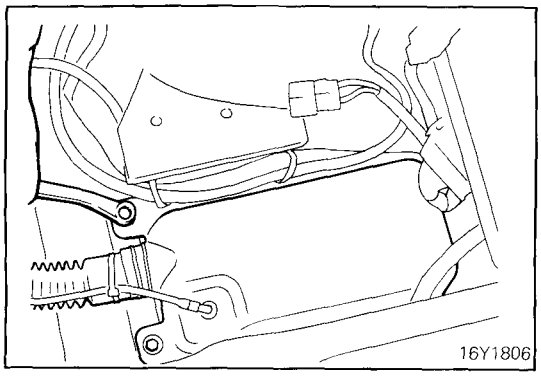


Removal steps

- ◆◆ 1. Washer tank
- 2. Washer motor
- 3. Washer fluid lever sensor
- ◆◆ 4. Washer nozzle
- 5. Washer tube
- ◆◆ 6. Washer tank
- 7. Washer motor
- ◆◆ 8. Nozzle
- 9. Washer tube

NOTE
(1) ◆◆: Refer to "Service Points of Removal".
(2) ◆◆: Refer to "Service Points of Installation".

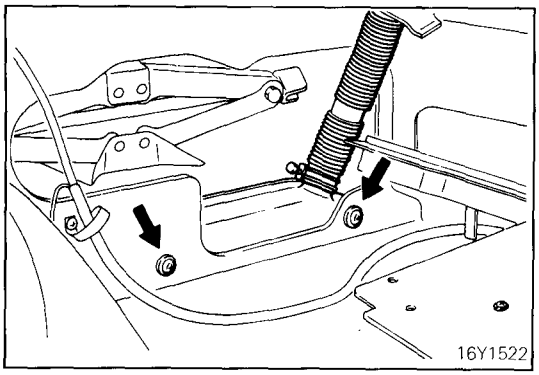
18Y1755



SERVICE POINTS OF REMOVAL

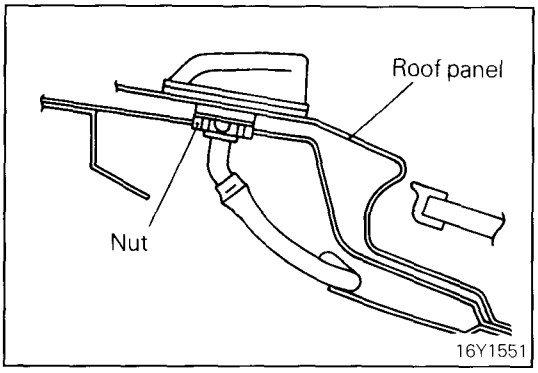
1. REMOVAL OF WASHER TANK

(1) Remove the battery and the battery tray.
(2) Remove the washer tank mounting bolt.
(3) Remove the washer tank.



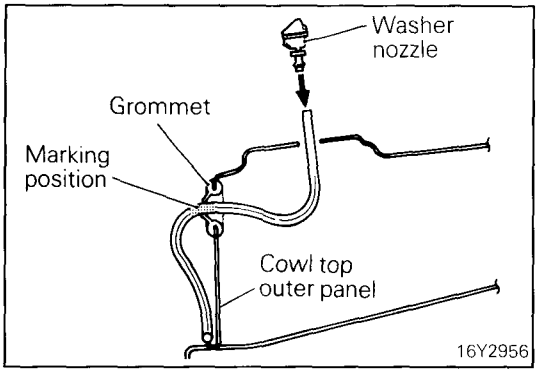
6. REMOVAL OF WASHER TANK

(1) Remove the right rear side trim, the high floor side panel, and the high floor side frame.
(2) Remove the washer tank mounting screws, and then take out the tank.



8. REMOVAL OF WASHER NOZZLE

(1) Remove the roll bar trim.
(2) Remove the nut, and then remove the nozzle.

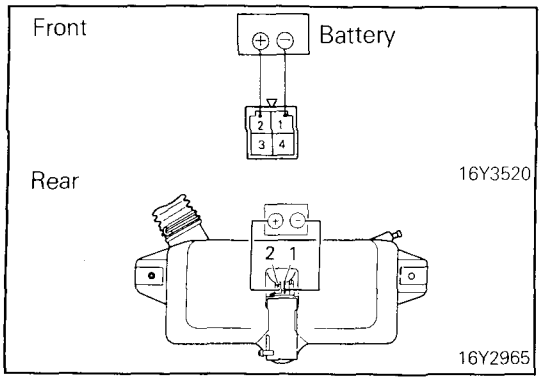


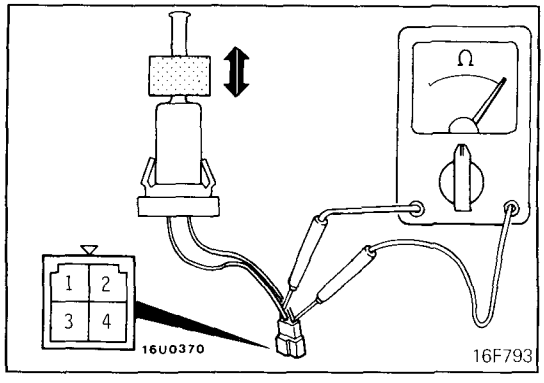
SERVICE POINT OF INSTALLATION

4. INSTALLATION OF WASHER NOZZLE

After the grommet is installed, pull out the washer tube until the marking position is slightly visible.

NOTE
Make sure that the washer tube is routed between the wiper link rod and cowl top outer panel.





INSPECTION

WASHER MOTOR

(1) With the washer motor installed to the washer tank, fill the washer tank with water.
(2) Connect the battery (+) and (–) cables to terminals 2 and 1 respectively to see that the washer motor runs and water is injected.

WASHER FLUID LEVEL SENSOR

(1) Remove the washer fluid level sensor from the washer tank.
(2) Connect ohmmeter to the connector of washer fluid level sensor.
(3) Move the float up and down.
(4) Make sure that when the float is raised, there is no continuity and when it is lowered, there is continuity.

WINDSHIELD WIPER AND WASHER SWITCH

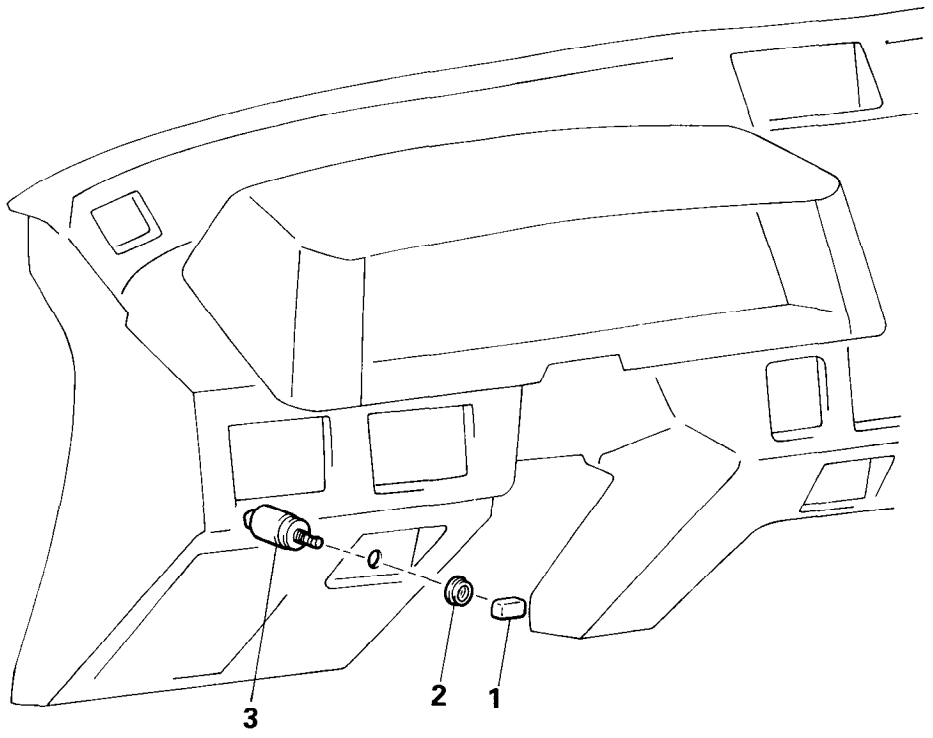
N08KMAC

For removal, inspection and installation, refer to LIGHTING SYSTEM – Column Switch (P.8-203).

CANCEL SWITCH

N08KNAA

REMOVAL AND INSTALLATION

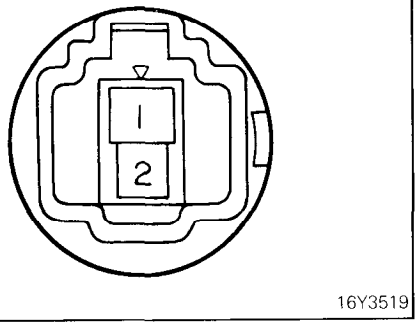


Removal steps

1. Button
2. Ring nut
3. Cancel switch

NOTE
Reverse the removal procedures to reinstall.

16Y3599



16Y3519

INSPECTION

(1) Remove the cancel switch from the instrument panel and connect an ohmmeter to the switch side connector.
(2) Operate the switch and check the continuity between the terminals.

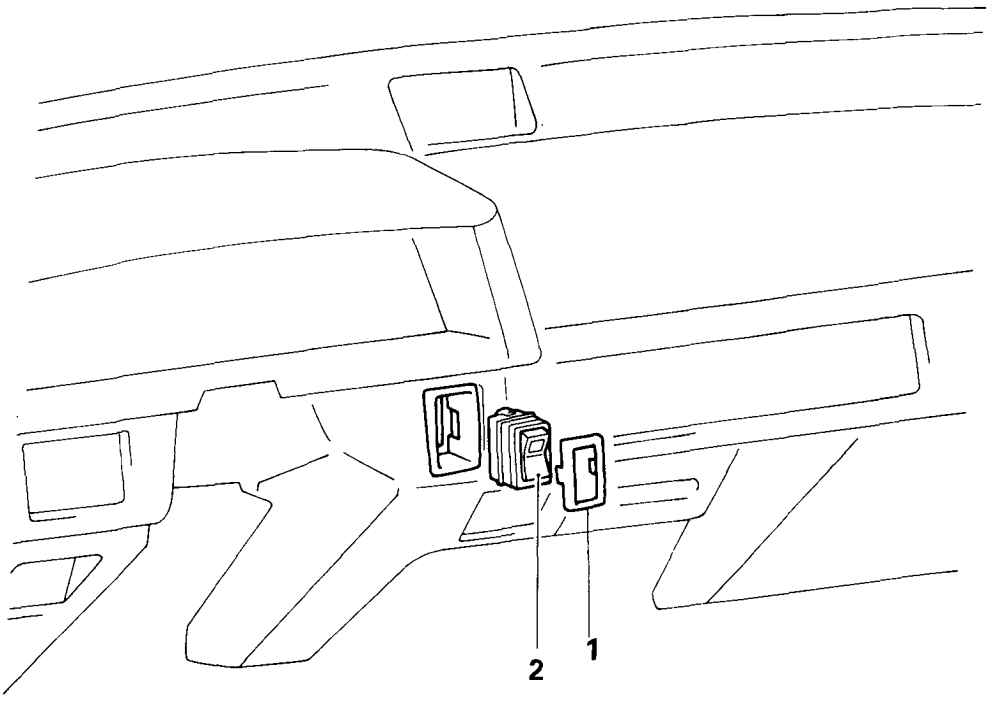
Condition \ Terminal	1	2
When free (OFF)		
When pushed (ON)	○	○

NOTE
○–○ indicates that there is continuity between the terminals.

REAR WIPER AND WASHER SWITCH

N08KOAA

REMOVAL AND INSTALLATION

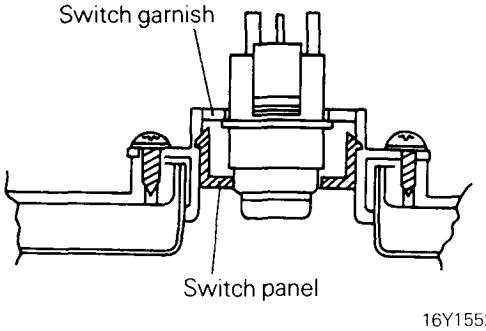


Removal steps

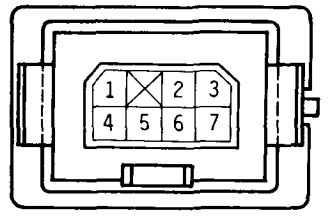
◆◆ 1. Switch panel
2. Rear wiper and washer switch

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

18Y1756



16Y1552



16Y3557

SERVICE POINT OF REMOVAL

1. REMOVAL OF SWITCH PANEL

Remove the switch panel from the instrument panel.

INSPECTION

(1) Remove the rear wiper and washer switch from instrument panel.
(2) Operate the switch, and check the continuity between the terminals.

Switch \ Terminal	2	1	3	4	7	5	6
ON & WASH	○		○		○		
ON	○		○				
OFF	○	○				○	○
INT	○	○	○	○			
INT & WASH	○	○	○	○	○		

HORN

SPECIFICATIONS

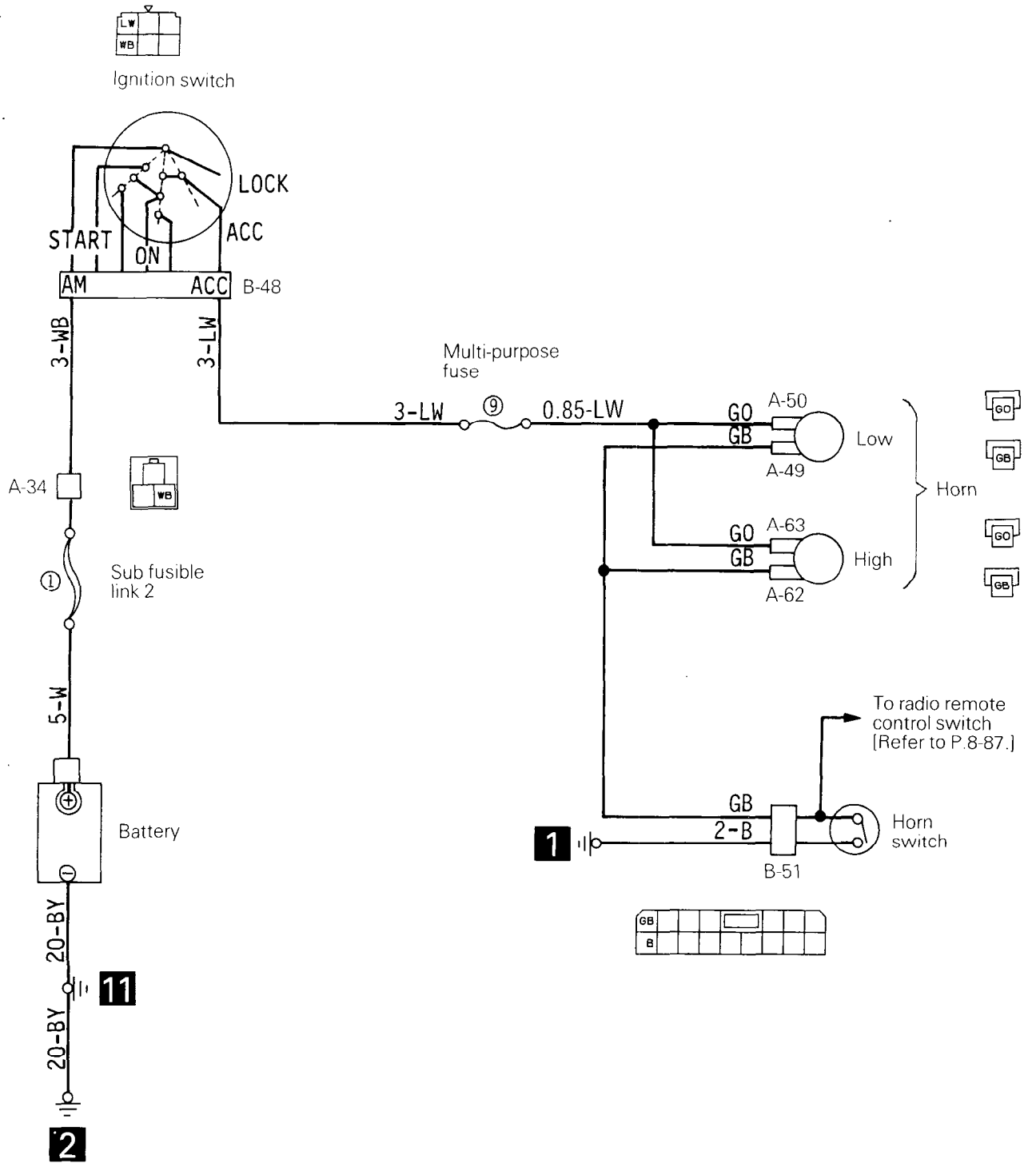
N08LB--

GENERAL SPECIFICATIONS

Items	Horn	Theft-alarm horn
Type	Flat type	Flat type
Effective sounding voltage V	10 – 14.5	11 – 14.5
Power consumption A	1.5 – 3.0	1.5 – 3.0
Sound level dB	100 – 115	100 – 115
Fundamental frequency Hz		
Low sound	335 – 365	350 – 390
High sound	400 – 430	–

TROUBLESHOOTING

CIRCUIT DIAGRAM



Remark
For details of grounding points (ex.: 2), refer to page 8-10.

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
Ll: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

OPERATION N08LHAA

- When the horn switch is turned on, with the ignition switch at "ACC" or "ON", current flows through fuse No. 9, horn switch, and ground, causing the horns to sound.

TROUBLESHOOTING HINTS

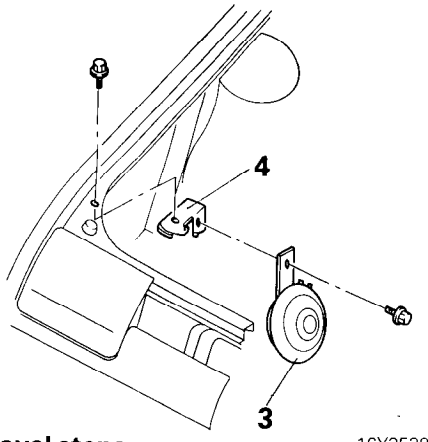
One or other horn does not sound

- Check horn.

HORN

N08LJAD

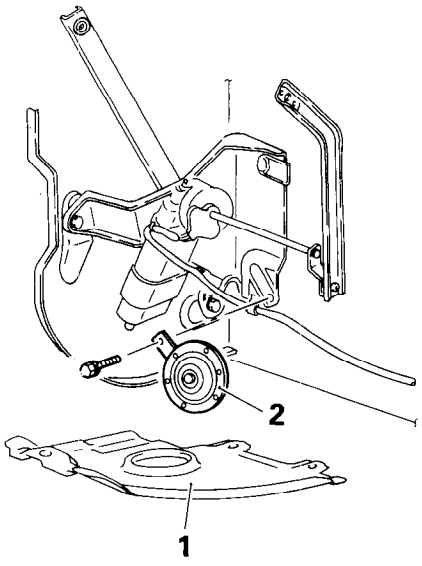
REMOVAL AND INSTALLATION



16Y3539

Removal steps

◆◆ 1. Air guide panel
2. Horn
3. Theft-alarm horn
4. Horn bracket



NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

16Y3506

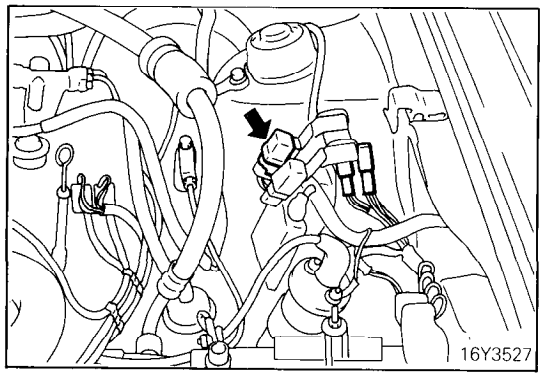
SERVICE POINT OF REMOVAL

1. REMOVAL OF AIR GUIDE PANEL

Refer to GROUP 23 BODY – Air Parts.

INSPECTION

- Check horn adjustment screw for looseness.
- Check the inside of the horn for lodged water, dirt or other foreign matter.

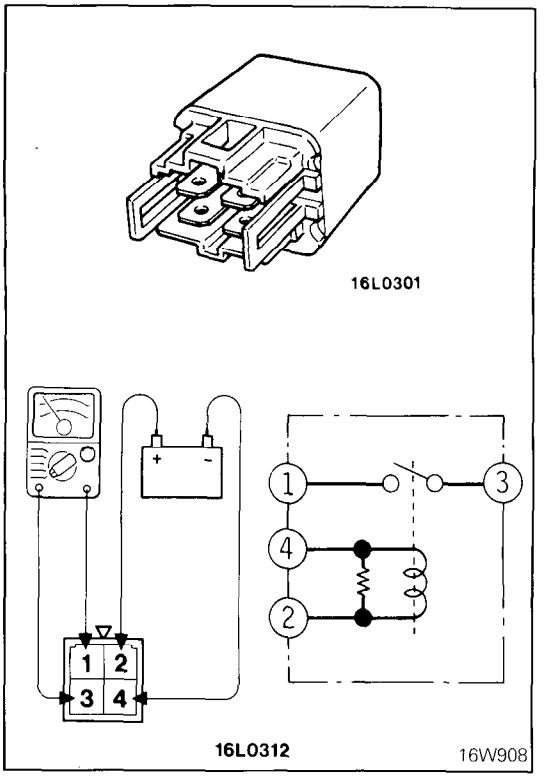


16Y3527

THEFT-ALARM HORN RELAY

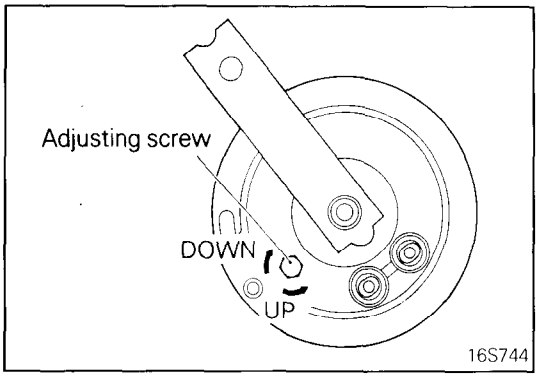
N08LTAD

(1) Remove the theft-alarm horn relay.



(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 4 is earthed.

Voltage applied	Terminals 1 – 3	Conductive
Voltage not applied	Terminals 1 – 3	Non-conductive
	Terminals 2 – 4	Conductive



HORN ADJUSTMENT

1. Secure the horn bracket in a vice, and then connect a 12V battery.
2. Sound the horn, and adjust it by turning the adjusting screw.
   (1) The sound volume is too low:
   Turn the adjusting screw in the "UP" direction within a range of about 180°, and then lock it in position when a satisfactory sound volume has been obtained.
   (2) The sound volume is too loud:
   Turn the adjusting screw 20° to 30° in the "DOWN" direction, and then lock it in position when a satisfactory sound volume has been obtained.
   (3) Horn will not sound:
   Turn the adjusting screw slightly in the "UP" direction until the horn sounds, find a satisfactory sound volume by continuing to turn the screw within a range of 180°, and then lock the screw in place.
   If a satisfactory volume cannot be obtained, replace the horn.

Caution
After the adjustment, apply lacquer to prevent the adjusting screw from becoming loose.

ACCESSORY

SPECIFICATIONS

N08MB- -

GENERAL SPECIFICATIONS

CIGARETTE LIGHTER

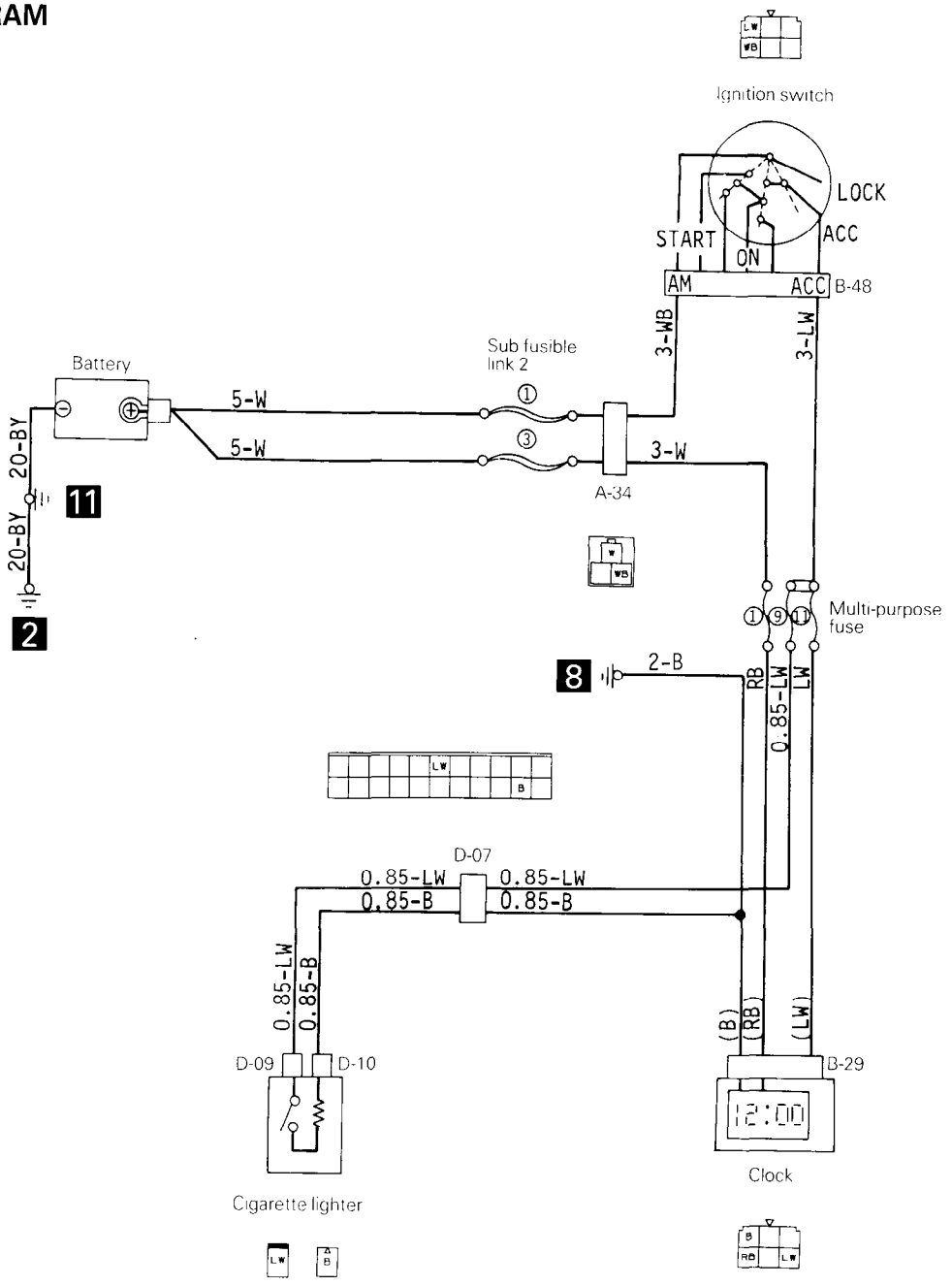
Items	Specifications
Maximum current (at 12V) A Return time second	10 18 or less

CLOCK

Items	Specifications
Type Display method	Crystal oscillating type Liquid crystal digital display

TROUBLESHOOTING

CIRCUIT DIAGRAM



OPERATION N08MHAA

Clock

- Current always flows through the circuit connecting fuse No. 1, clock, and ground, to operate the clock.
- When the ignition switch is at "ACC" or "ON", current flows through fuse No. 11, clock and ground, causing the time to display on the clock.

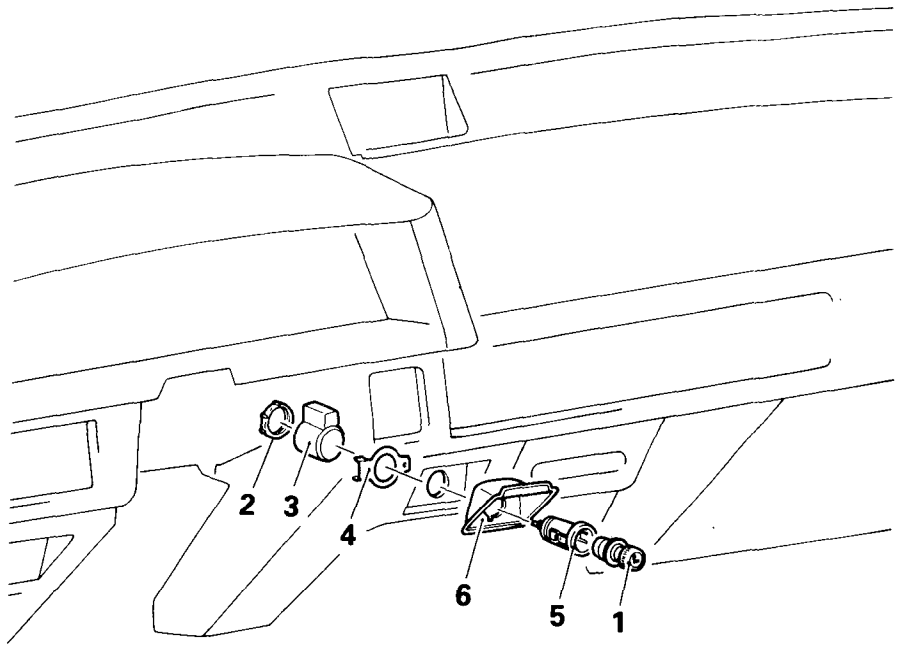
Cigarette Lighter

- When the cigarette lighter is pushed in with the ignition switch at "ACC" or "ON", the lighter contacts close, causing current to flow through fuse No. 9, cigarette lighter, and ground, and the cigarette lighter element glows.

CIGARETTE LIGHTER

N08MJAD

REMOVAL AND INSTALLATION



Removal steps

1. Plug
2. Fixing ring
3. Socket case
4. Plate
5. Socket
6. Protector

NOTE
Reverse the removal procedures to reinstall.

16Y3507

INSPECTION

- Take out the plug, and check for a worn edge on the element spot connection, and for shreds of tobacco or other material on the element.
- Using an ohmmeter, check the element for continuity.
- Check that there is no dirt on the surface of the socket tht contacts the plug.

Cautions for use of the Cigarette Lighter Socket as Auxiliary Power Source

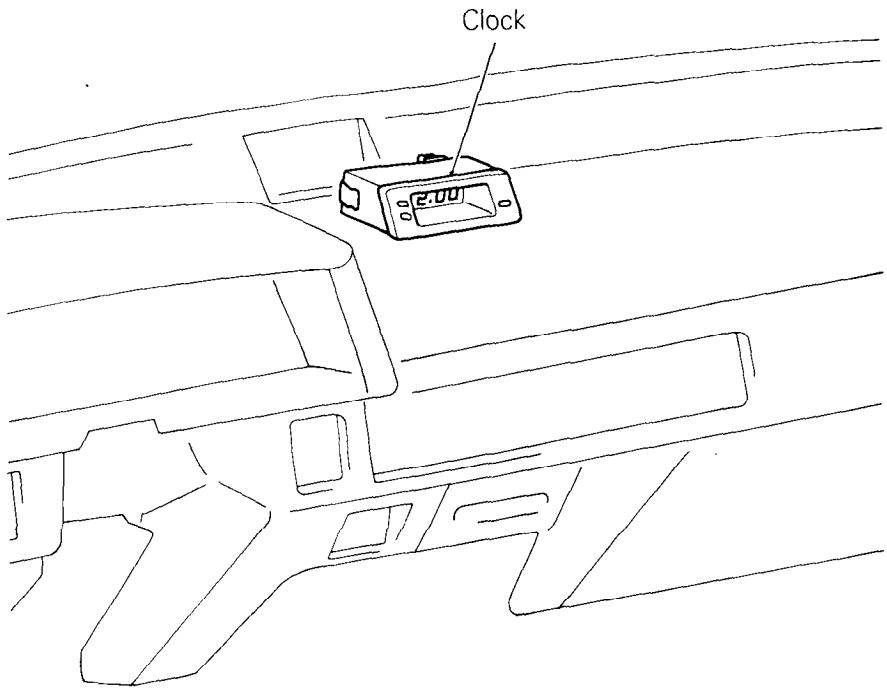
1. When using a "plug-in" type of accessory, do not use anything with a load of more than 120W.
2. It is recommended that only the lighter be inserted in the receptacle. Use of "plug-in" type accessories may damage the receptacle and result in poor retention of the lighter.

   NOTE
   The specified load should be strictly observed, because overload could burn the ignition switch and harness.

CLOCK

N08MKAC

REMOVAL AND INSTALLATION



16Y3508

AUDIO SYSTEM

N08NB- -

SPECIFICATIONS

GENERAL SPECIFICATIONS

Items	Specifications	
Radio		
Model	AR-6377PY	RX-321Y
Receiving band	AM/FM (Automatic station search)	AM/FM (Automatic station search)
Tape player		
Model	CX-25Y	– (integral with radio)
Speaker		
Instrument panel		
Model	SR-10YQ8-UJL	SR-10YQ8-UJL
Rated input power	15W (Max. 20W)	15W (Max. 20W)
Door		
Model	SR-13SA8-UJ	SR-13SA8-UJ
Rated input power	15W (Max. 30W)	15W (Max. 30W)
Rear shelf		
Model	SR-16SA4-UJ	SR-16SA4-UJ
Rated input power	15W (Max. 30W)	15W (Max. 30W)
Antenna		
Type	Telescoping power antenna	Telescoping power antenna

TROUBLESHOOTING

NOISE SOURCES

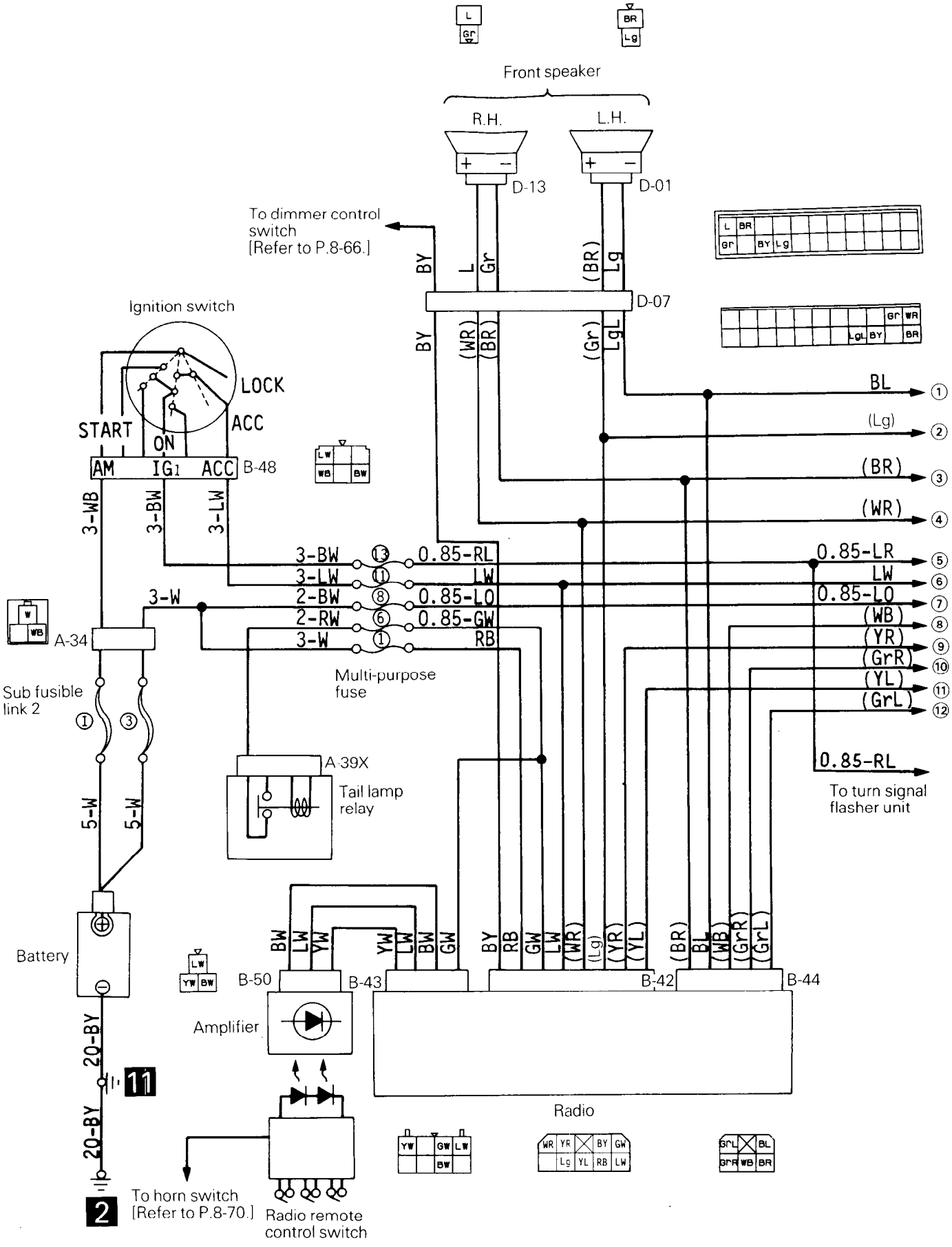
SOURCE OF ELECTRICAL SYSTEM NOISE

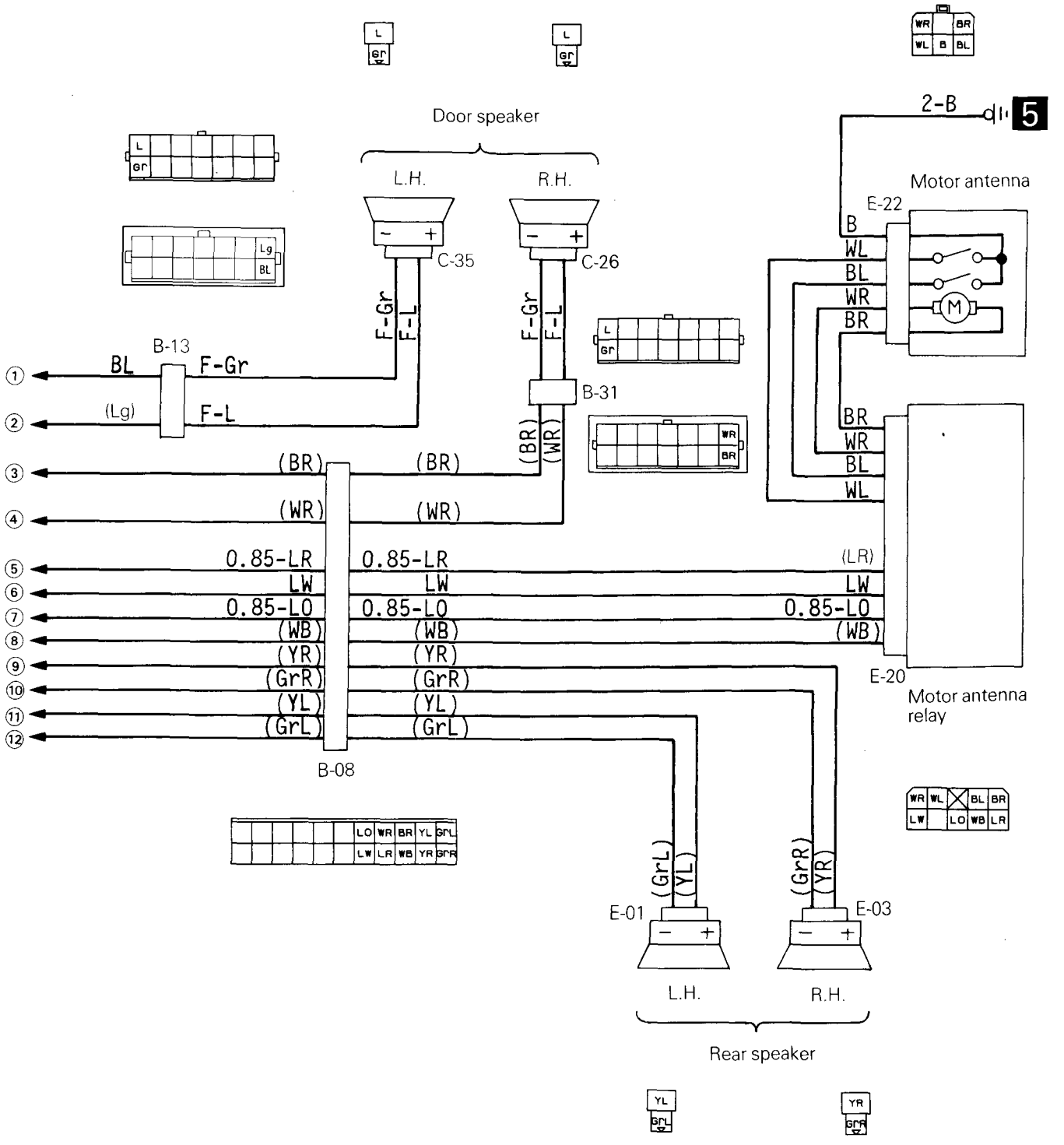
Ignition system	Power generation system	Other electrical device
(1) Spark plug (2) High tension cable (3) Distributor	(1) Ripple at contact between alternator armature and carbon brush (2) Spark from voltage regulator contact	(1) Armature of wiper, blower and other motors (2) Starter and switch when starting engine (3) Contact of fuel pump (4) Spark from changeover switch (5) Horn (6) Contact of turn signal (7) Loose contact of wiring harness (8) Static electricity generated by tire or generator V-belt (9) Electric fuel pump (10) Voltage stability unit for instrument

NOISE SOURCE OF VEHICLE EQUIPMENT

Kind of noise	Equipment	Symptom of noise generation
Whistling sound	Alternator	Noise increases when accelerator pedal is depressed and it subsides soon after engine is stopped.
Scratching sound	Coolant temperature gauge unit	Noise is produced while engine is running and it persists for a while after engine shutdown.
	Fuel gauge unit	Noise is produced at sudden acceleration, driving on rough road or when ignition key is placed to ON.
Jarring	Oil pressure switch	Noise is produced with engine operation and no noise is made when engine is idling.
Wish-wash, wish-wash	Flasher relay	Noise is produced with operation of turn signal light.
Buzz, click	Horn	Noise is made when horn button is pressed or released.
Whinning	Wiper motor	Noise is generated with the wiper speed.
	Washer motor	Noise is made when washer is operated.

CIRCUIT DIAGRAM





Remarks
(1) For details of grounding points (ex.: 2), refer to page 8-10.
(2) The circuit lines ended with number ①, ② and so on are in continuation to those with the corresponding number on opposed page. (i.e., the line ① on the left-hand page is connected to the line ① on the right-hand page.)

Wire color code

B: Black	Br: Brown	G: Green	Gr: Gray	L: Blue	Lg: Light green
LI: Light blue	O: Orange	P: Pink	R: Red	Y: Yellow	W: White

37Y572

OPERATION

N08NHAC

Audio

- When the radio power switch is turned on with the ignition switch at "ACC" or "ON", current flows through fuse No. 5, radio, and ground, causing the radio to operate.
- For an electronically tuned radio, battery voltage is always supplied for use of the memory and other functions in the radio.

Power Antenna

ANTENNA MAST EXTENSION OPERATION

- Battery voltage is always applied to the motor antenna relay through fuse No. 8.
- When the radio power switch is turned on with the ignition switch at "ACC" or "ON", current flows through fuse No. 11, radio, motor antenna relay, limit switch (UP), and ground.
- As a result of the above condition, current flows through fuse No. 8, motor antenna relay, motor, limit switch (UP), and ground, and the antenna mast starts to extend.
- Once the mast is fully extended, the limit switch (UP) contacts open to interrupt the circuit, and the mast stops extending.

ANTENNA MAST RETRACTION OPERATION

- When the radio power switch is turned off, current flows through fuse No. 11, motor antenna relay, limit switch (DOWN), and ground.
- As a result of the above condition, current flows through fuse No. 8, motor antenna relay, motor, limit switch (DOWN), and ground, and the mast begins to retract.
- Once the mast is completely retracted, the limit switch (DOWN) contacts open to interrupt the circuit, stopping the mast from further retraction.

Radio Remote Control

- If any desired radio remote control switch is pressed when the ignition switch is set at the "ACC" or "ON" position, current flows through fuse No. 9, horn, radio remote control switch, and ground.
- The controller generates the electric signals that are specific to the pressed switch, and the LED goes on and off (blinks) accordingly.
- The photo diode located on the steering column receives light emitted from the LED and converts it into electric signals. The signals are amplified by the amplifier and sent to the radio.
- The detector inside the radio decodes the electric signals and causes the radio to operate as commanded by the signals.

TROUBLESHOOTING HINTS

Audio

1. Radio does not operate
   1) Clock also does not operate
      - Check fuse.
   2) Clock is operating
      - Check radio.
2. One speaker produces no sound
   - Check that speaker.

Power Antenna

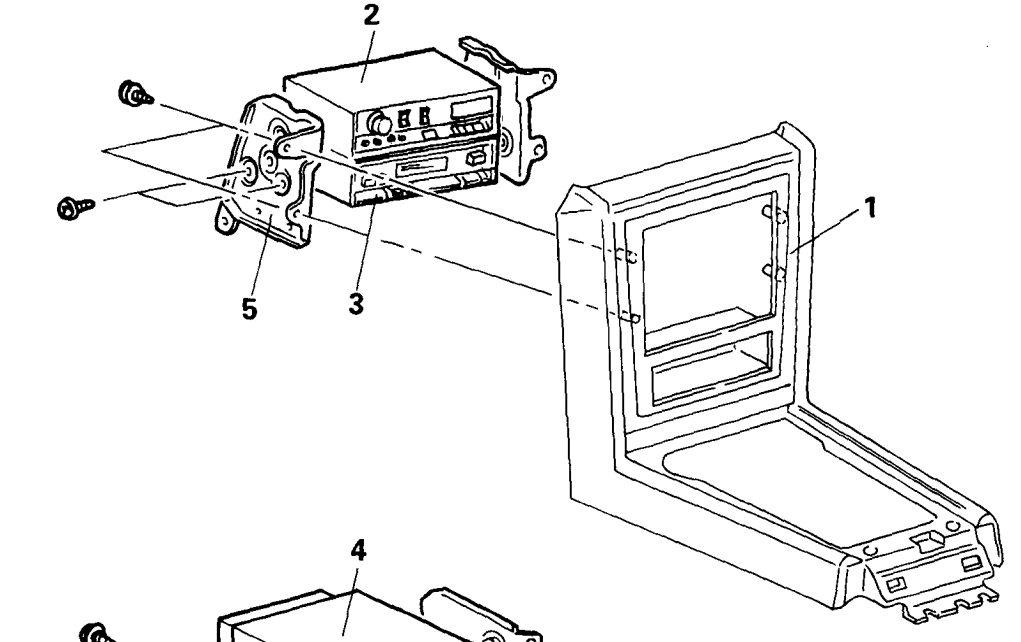
Antenna mast does not extend/retract

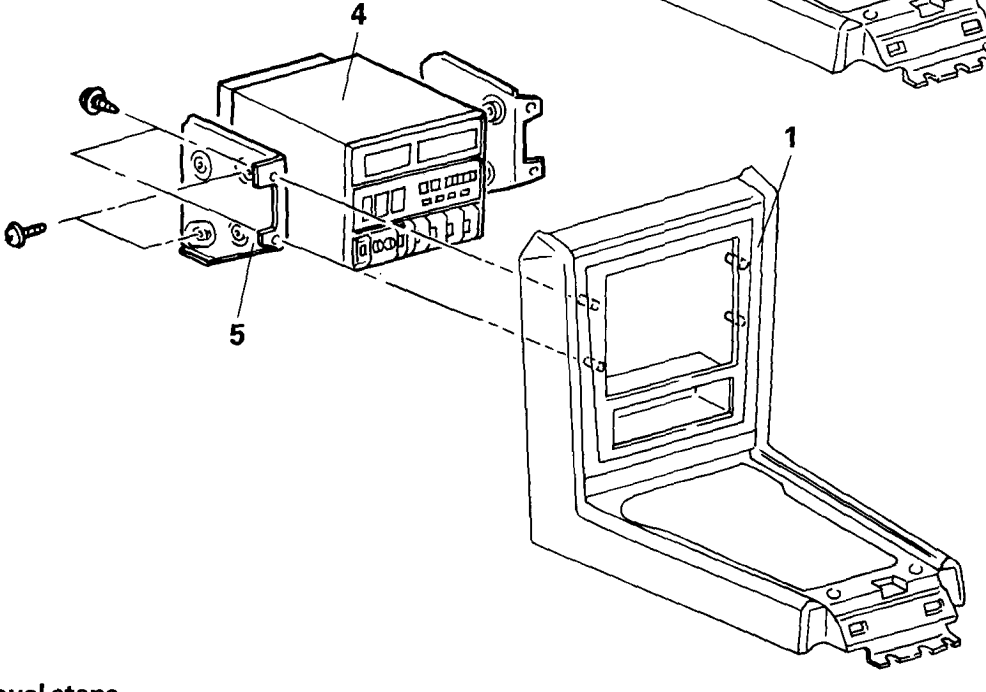
1) Radio also does not operate
   - Check the fuse
2) Radio operates
   - Check the motor antenna relay.
   - Check the motor antenna.

RADIO AND TAPE PLAYER

N08NJAD

REMOVAL AND INSTALLATION





16Y3565

Removal steps

◆◆ 1. Front console box
2. Radio
3. Tape player
4. Radio with tape player
5. Radio bracket

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

16Y3566

SERVICE POINT OF REMOVAL

1. REMOVAL OF FRONT CONSOLE BOX

Refer to GROUP 23 BODY – Floor Console.

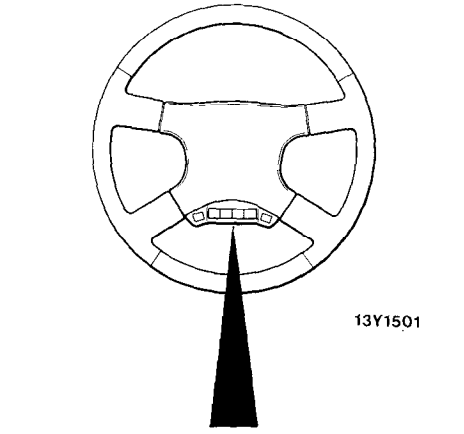
RADIO REMOTE CONTROL

N08NRAA

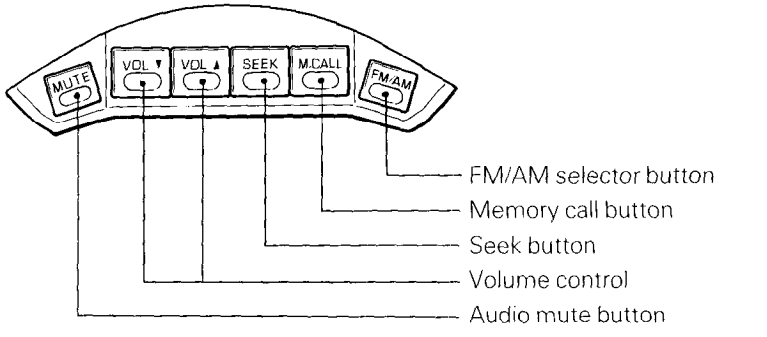
OUTLINE

Radio remote-control is used relatively frequently while driving, the radio switch has been incorporated at the center of the steering wheel for remote control of the radio. In order for the radio switch to be able to rotate as a unit with the steering wheel as it is turned, a system of light transmission which employs infra-red rays is used between the steering wheel and the steering wheel column so that there is no interference with the operation of the steering wheel.

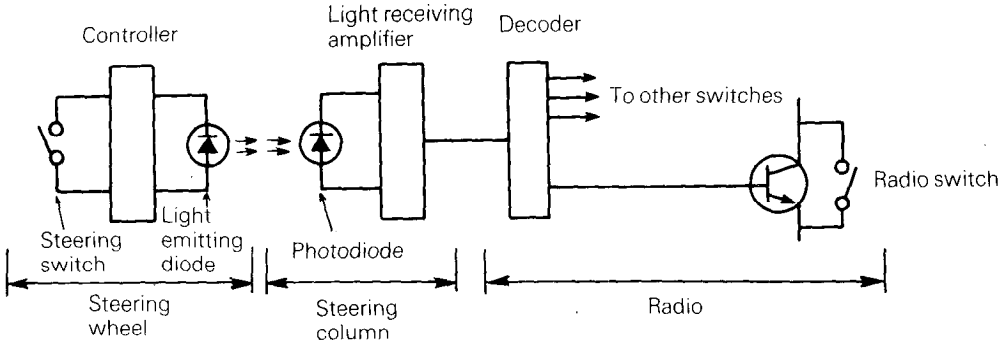
CONSTRUCTION AND OPERATION



13Y1501



70Y528



16Y2547

1. When the radio switch in the steering wheel is pressed, the controller emits a corresponding electrical signal.

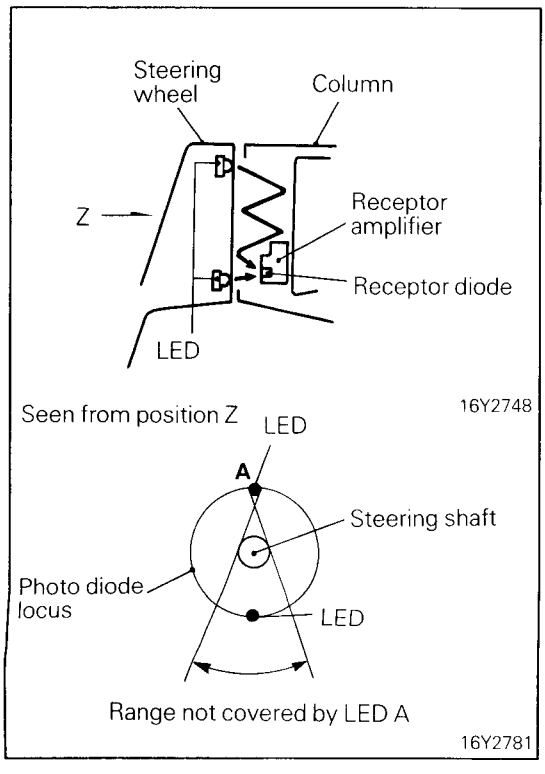
Reference

The electrical signal used in this radio remote-control system is called a Pulse coordinate modulation code. The correspondence with the switch keys is as described below.

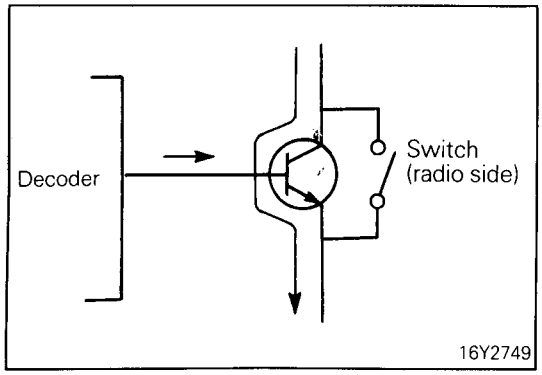
Pulse coordinate modulation

Key input (command)	Pulse coordinate modulation							
	K_0	K_1	K_2	D_0	D_1	D_2	D_3	D_4
MUTE	0	0	0	0	1	1	0	0
VOL –	0	0	0	1	0	0	1	0
VOL +	0	0	0	0	0	0	1	0
SEEK	0	0	0	1	0	0	0	0
M. CALL	0	0	0	1	1	1	0	0
FM/AM	0	0	0	1	1	0	0	0

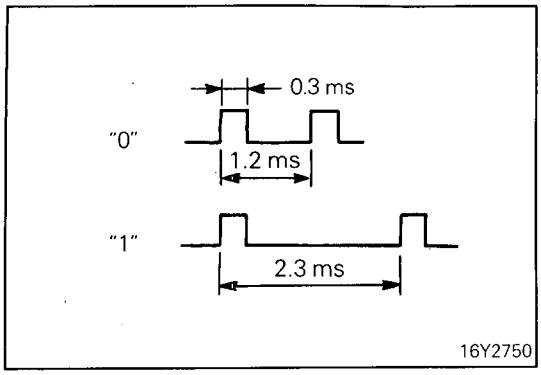
2. The infra-red ray LED flashes according to that signal.



3. The infra-red ray beam reaches the photo-diode in the column either directly or indirectly due to reflection. Note that two LEDs are located 180°C apart to assure that the infrared beams reach all around the column. This is to provide a back up LED if the first one is in the "shadow" of the steering shaft.

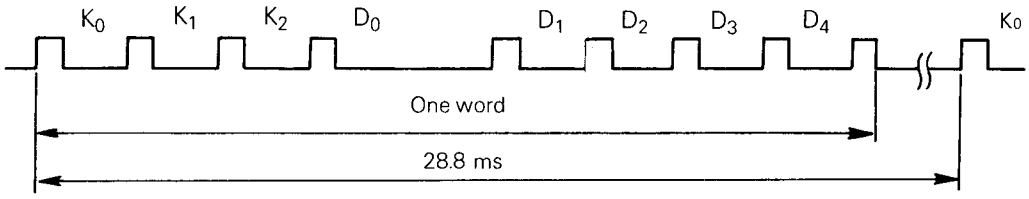


4. The beam signal received is converted back to an electrical signal by the receptor amplifier, and is amplified and demodulated.
5. This amplified and demodulated signal is decoded by the decoder, after which the corresponding electronic switch (transistor) is switched ON.

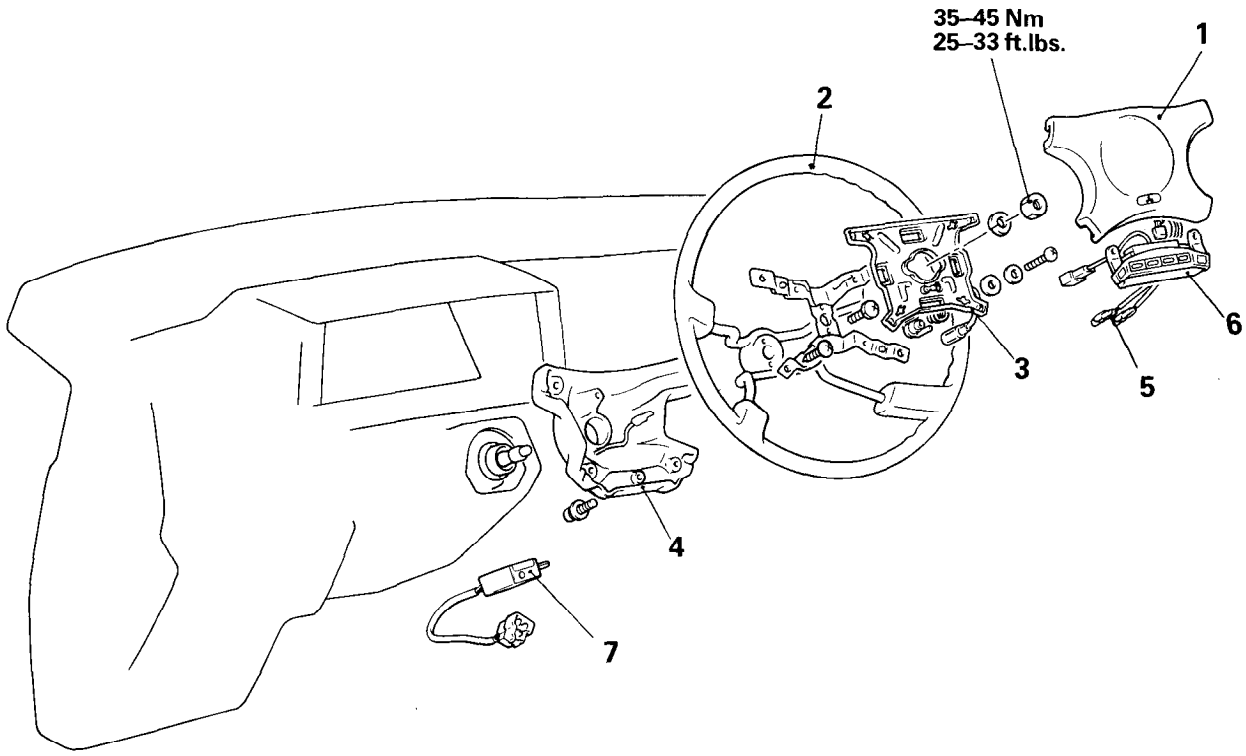


NOTE
(1) Code "0" sets a two-pulse interval to 1.2 msec., and code "1" sets it to 2.3 msec.
(2) One expression of the transmission command is composed of 8 bits, and is transmitted in a cycle of 28.8 msec. while there is key input.
(3) K_0 – K_2 are codes used to distinguish the signals of this system from those used for remote control of VTRs, TVs, air conditioners, video disc players, audio equipment, etc. so that there is no mis-operation.

<Example> SEEK



REMOVAL AND INSTALLATION



Removal steps

1. Steering wheel pad
2. Steering wheel
3. Horn switch
4. Lower cover
◆■ ■◆ 5. L. E. D. assembly
6. Radio remote control assembly
◆■ 7. Amplifier

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆■: Refer to "Service Points of Removal".
(3) ■◆: Refer to "Service Points of Installation".

16Y3664

SERVICE POINTS OF REMOVAL

5. LED ASSEMBLY

Caution
Be careful not to dirty or stain the LED.

7. AMPLIFIER

Caution
Be careful not to dirty or stain the photo-diode.

SERVICE POINT OF INSTALLATION

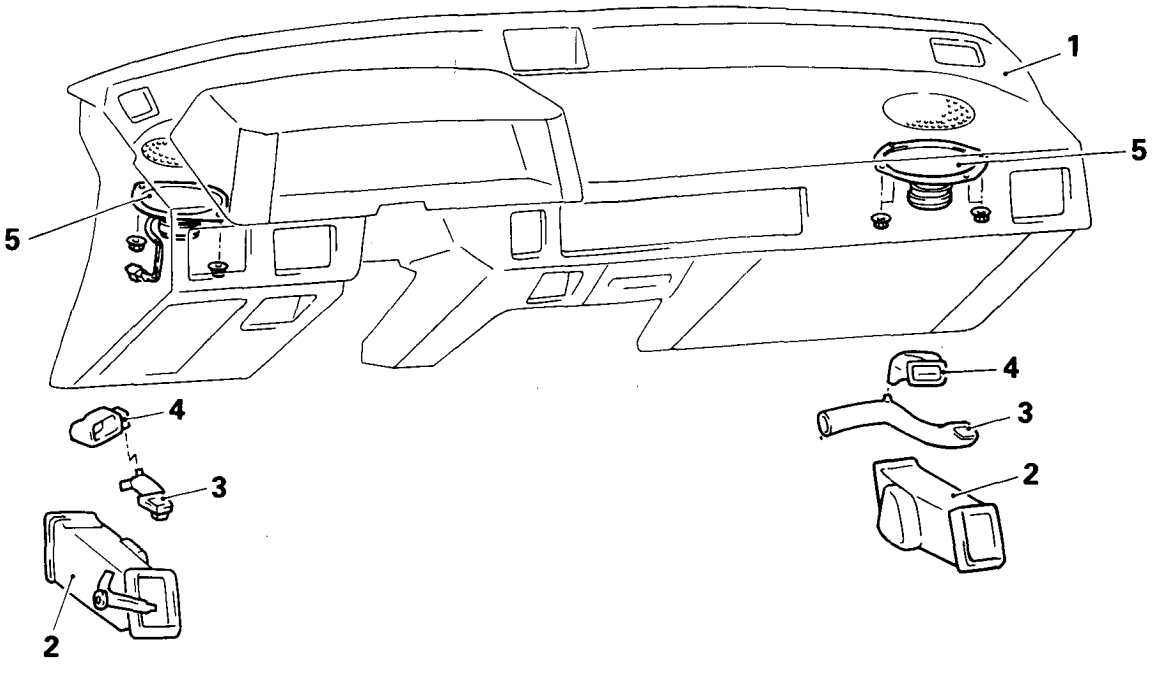
5. LED ASSEMBLY

Caution
Securely install the LED into the lower cover.

FRONT SPEAKER

N08NMAD

REMOVAL AND INSTALLATION



Instrument panel speaker removal steps

◆◆ 1. Instrument panel
2. Defrostor duct
3. Demister duct
4. Demister nozzle
5. Speaker

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

16Y3511

SERVICE POINT OF REMOVAL

1. REMOVAL OF INSTRUMENT PANEL

Refer to GROUP 23 BODY – Instrument Panel.

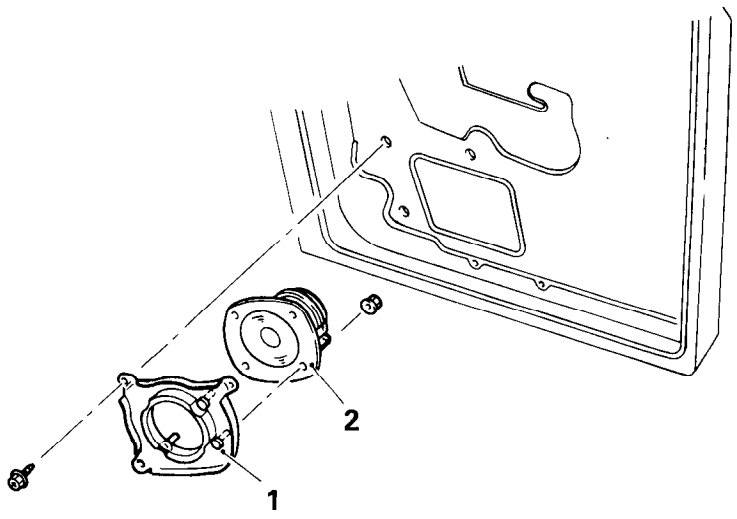
DOOR SPEAKER

N08NNAA

REMOVAL AND INSTALLATION

Pre-removal Operation
- Removal of Door Trim
  (Refer to GROUP 23 BODY – Door Trim)

Post-installation Operation
- Installation of Door Trim
  (Refer to GROUP 23 BODY – Door trim)



Door speaker removal steps

1. Speaker bracket
2. Speaker

NOTE
Reverse the removal procedures to reinstall.

16Y3512

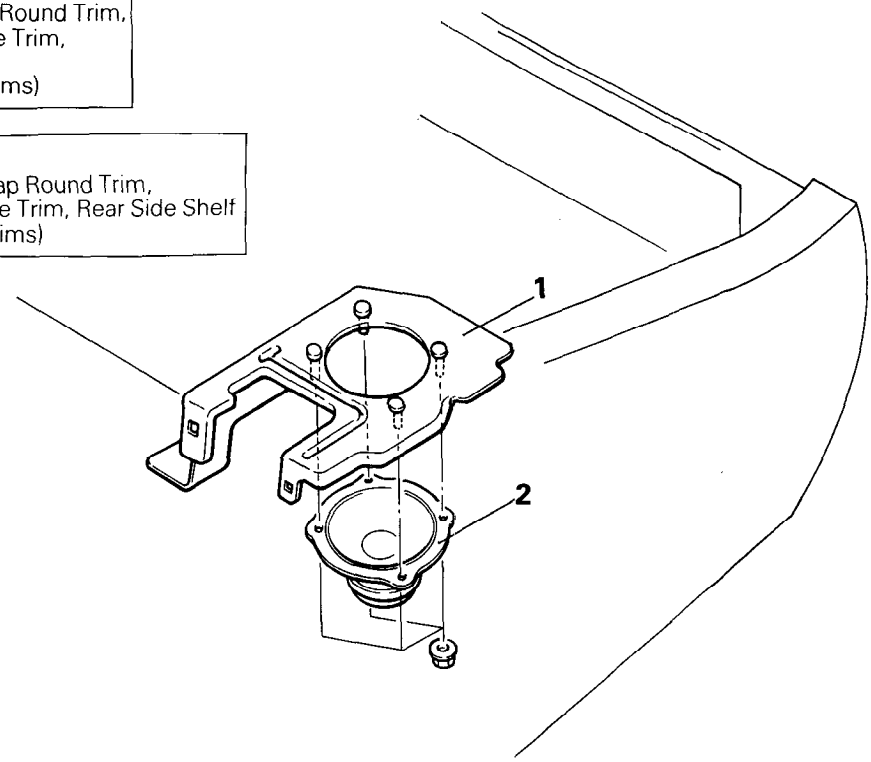
REAR SPEAKER

N08NOAC

REMOVAL AND INSTALLATION

Pre-removal Operation
- Removal of Quarter Trim, Wrap Round Trim, Rear End Trim, Trunk Room Side Trim, Rear Side Shelf (Refer to GROUP 23 BODY – Trims)

Post-installation Operation
- Installation of Quarter Trim, Wrap Round Trim, Rear End Trim, Trunk Room Side Trim, Rear Side Shelf (Refer to GROUP 23 BODY – Trims)



Removal steps

1. Rear shelf bracket
2. Speaker

NOTE
Reverse the removal procedures to reinstall.

16Y2893

POWER ANTENNA

N08NPBB

OPERATION

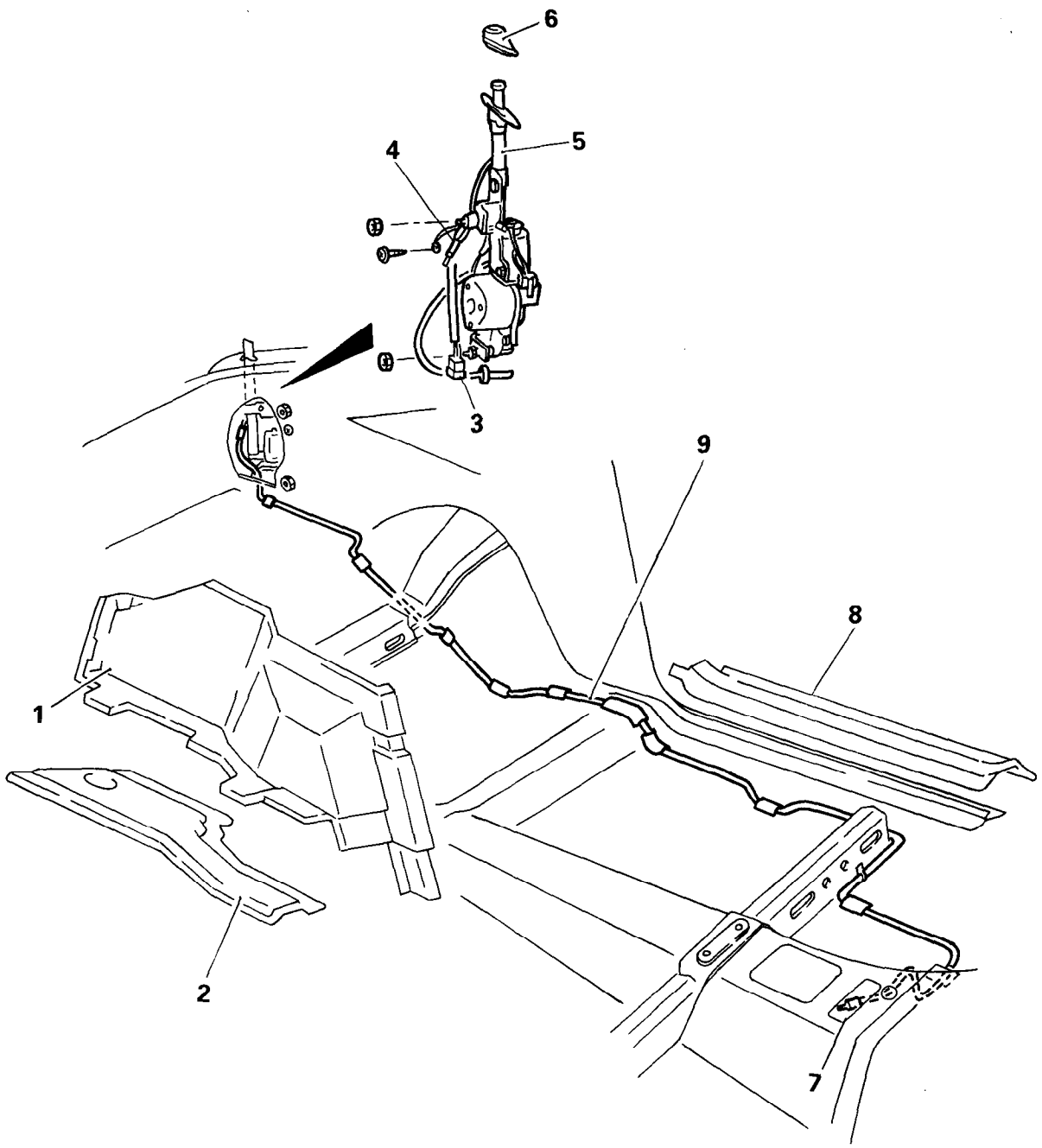
The power antenna extends or retracts the antenna mast as follows:

Ignition key position	Radio switch	Tape player	Antenna mast
ACC or ON	OFF → ON	OFF	Extended
	ON → OFF	OFF	Retracted
	OFF	ON	Remains retracted
LOCK	ON	–	Retracted

–: No operations required

NOTE
Before operating the radio, make sure that there is no person near the antenna.

REMOVAL AND INSTALLATION



Removal steps

1. Trunk room side trim
◆◆ 2. High floor side panel
3. Connector connection
4. Feeder wire connection
5. Motor antenna assembly
6. Grommet

• Front Seat, Rear Seat and Floor Console (Refer to GROUP 23 BODY – Seat and Floor Console)

7. Feeder wire to radio connection
◆◆ 8. Scuff plate
9. Feeder wire

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

16Y3514

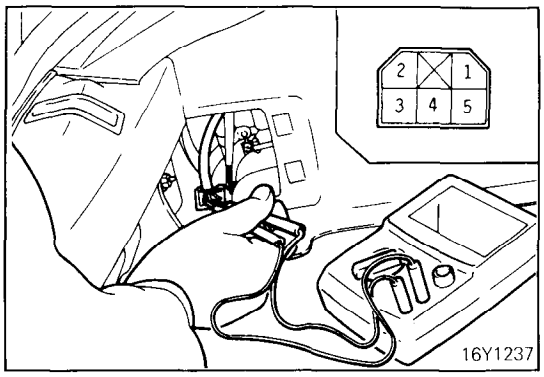
SERVICE POINTS OF REMOVAL

2. REMOVAL OF HIGH FLOOR SIDE PANEL

Make sure that the antenna mast is retracted before this operation. Disconnect the antenna relay before removing the high floor side panel.

8. REMOVAL OF SCUFF PLATE

Refer to GROUP 23 BODY – Trims.



INSPECTION

MOTOR ANTENNA

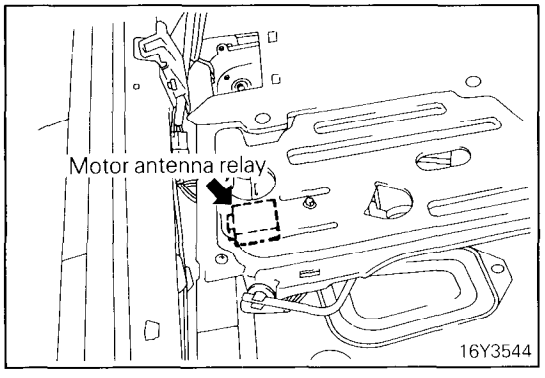
Following inspections should be made with the harness connector connected.

(1) With the (+) power connected to the terminal (1) and the (–) power to the terminal (2), check that the antenna mast extends. With the connection reversed, check that the antenna mast retracts.

(2) Under the following antenna mast conditions, check continuity between terminals.

Antenna mast position \ Terminal	3	4	5
Fully extended		○——	——○
Fully retracted	○——	——○	
During extension/retraction	○——	——○——	——○

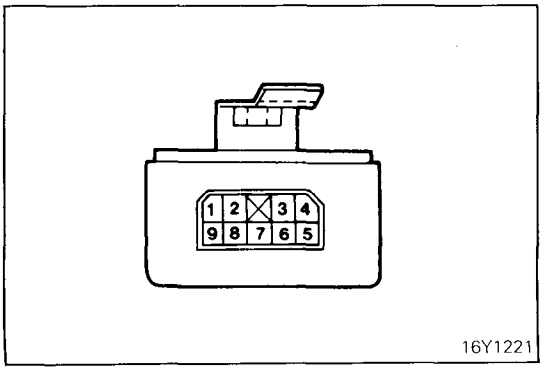
NOTE
○—○ indicates that there is continuity between the terminals.

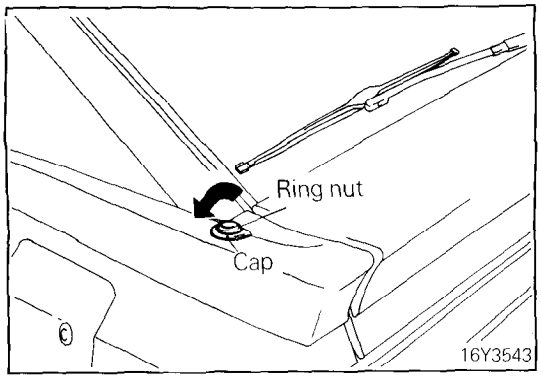


MOTOR ANTENNA RELAY

With the harness connector connected and the antenna mast extending/retracting, check the antenna relay voltage.

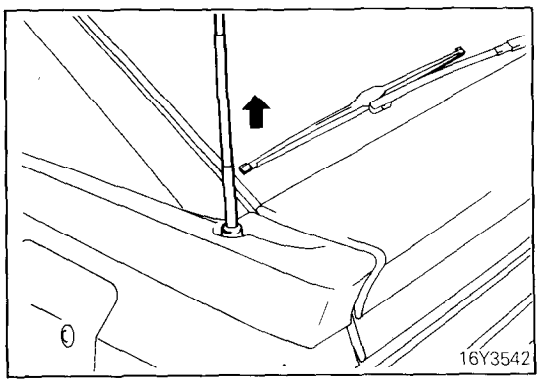
Antenna mast extending	
Terminal (1)	–1 to + 1V
Terminal (4)	10 to 13V
Antenna mast retracting	
Terminal (1)	10 to 13V
Terminal (4)	–1 to + 1V



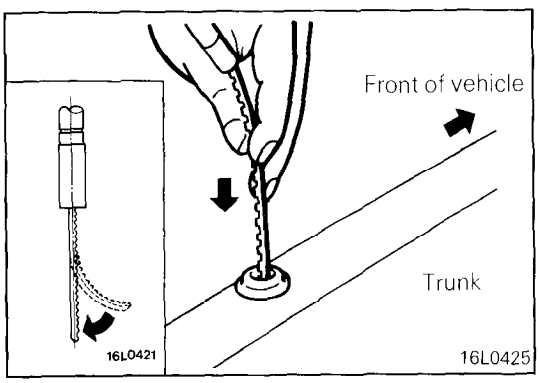


MAST ASSEMBLY WITH CABLE REPLACEMENT

1. Remove the ring nut and cap.

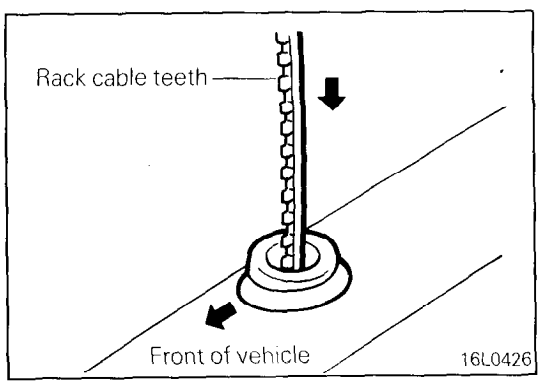


2. Turn on the radio to operate the power antenna.
3. Draw out the antenna mast when the mast assembly is fully extended.



4. Fully extend the antenna mast of a new mast assembly. Insert the rack cable in the motor assembly with the rack teeth towards the outside of the vehicle, as shown.

   NOTE
   Before inserting the rack cable, straighten its end as shown if it is bent.



5. Turn the rack cable through 90° clockwise to face its teeth towards the front of the vehicle so that they will engage with the motor gear.

   NOTE
   If the rack cable comes out without resistance when it is pulled lightly, the rack teeth are not engaged with the motor gear. Repeat Steps 4 and 5 above to reinsert the rack cable after straightening the cable.

6. Hold the antenna mast upright, and turn off the radio to reel up the rack cable.
7. After installing the cap and ring nut, turn the radio on and off to make sure that the antenna mast extends and retracts smoothly.

NOISE SUPPRESSION

N08NQAC

1. Noise interfering with radio reception may be roughly classified as follows:
   (1) Noise produced by the vehicle itself
   Noise from the ignition circuit, alternator circuit, etc.
   (2) Noise generated in the radio itself
   Thermal noise from transistors, IC, resistor, etc.
   (3) Atmospheric noise
   Noise from other cars, neon signs, etc.
2. The radio has devices to suppress noise of the radio itself and atmospheric noise, but it is difficult to eliminate them completely. Noise produced by the vehicle includes whining from the alternator system, and a strong, impulsive, fast popping noise from the ignition system.

PREVENTION OF IGNITION CIRCUIT NOISE

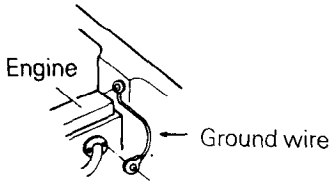
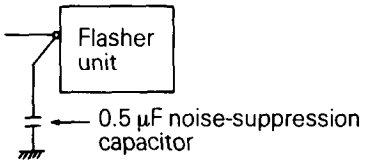
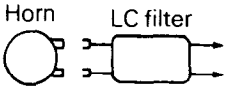
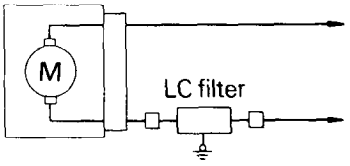
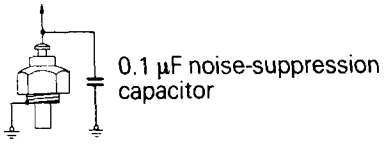
A resistance-equipped cable is used for the high-tension cable in order to prevent noise; however, if any noise from the ignition circuit does occur, check the tightness and ground connection of the terminal of the noise suppression capacitor, and, if necessary, check the noise suppression capacitor.

Caution
Be careful not to connect the noise filter to the high-tension cable; doing so could damage the noise filter.

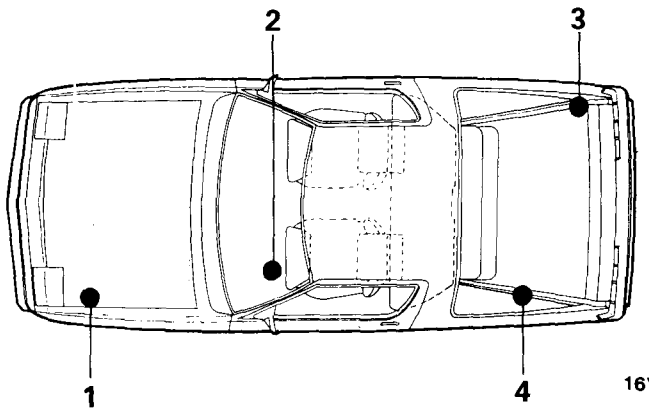
PREVENTION OF OTHER CIRCUIT NOISE

1. For other noises, take necessary corrective actions in accordance with the following items and the NOISE SUPPRESION CHART.
2. Polish the grounding cable terminal, and connect it properly.
3. Polish the power antenna ground terminal, and connect it properly.
4. Ground electric parts completely.
5. Keep the antenna cable and speaker lead wire away from other electric wiring.

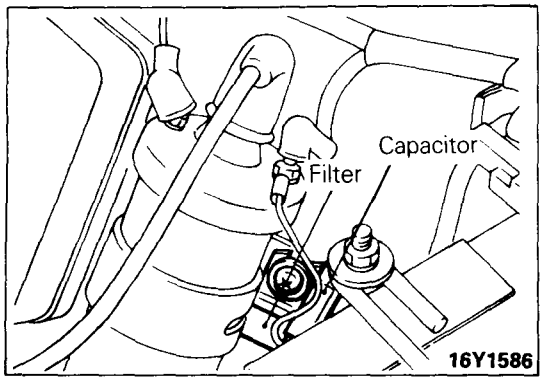
NOISE SUPPRESSION CHART

Symptom	Noise source	Remedy
Unusual noise related to engine speed	Engine	Securely ground the engine, frame and/or body and engine hood.  16E710
"Clatter" noise related to the flashing of turn-signal lights	Turn-signals	Connect a 0.5 μF noise-suppression capacitor to the B terminal of the flasher unit.  16E712
Abnormal noise when the horn is operated	Horn	1. Connect a 0.5 μF noise-suppression capacitor to the + B-terminal of the horn. 2. For an FM radio, connect an LC filter to the horn terminals.  16E713
Noise when the windshield washer operates	Washer motor	1. Connect a 0.5 μF noise-suppression capacitor between the terminal of the washer motor and the power source wire. 2. For an FM radio, connect an LC filter between the terminal of the washer motor and the power source wire.  16F671
Unusual noise when the engine is started	Coolant temperature gauge unit	Connect a 0.1 μF noise-suppression capacitor to the terminal of the coolant temperature gauge unit.  16F672

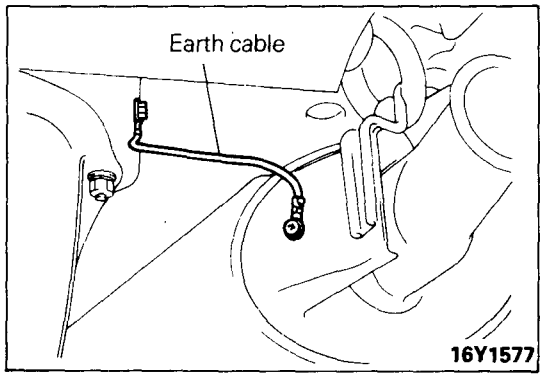
NOISE SUPPRESSOR LOCATION



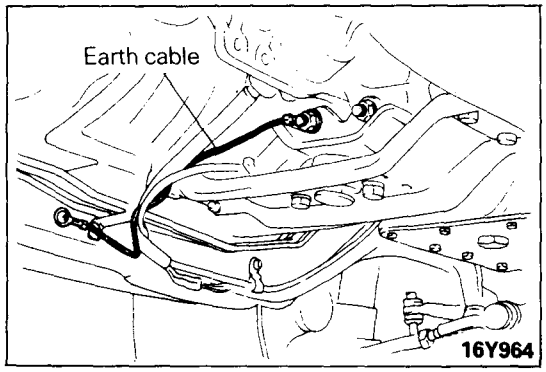
1 **Ignition coil**



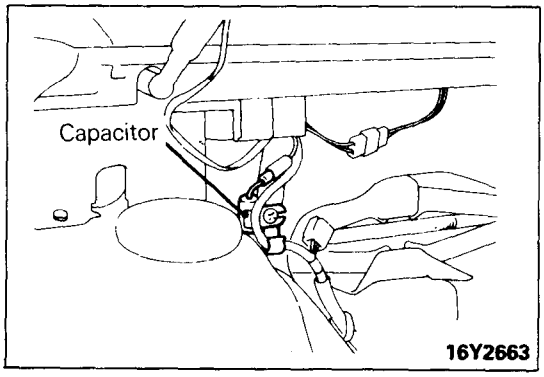
3 **Main muffler**



2 **Transmission**



4 **Rear shelf bracket**



REAR WINDOW DEFOGGER

SPECIFICATIONS

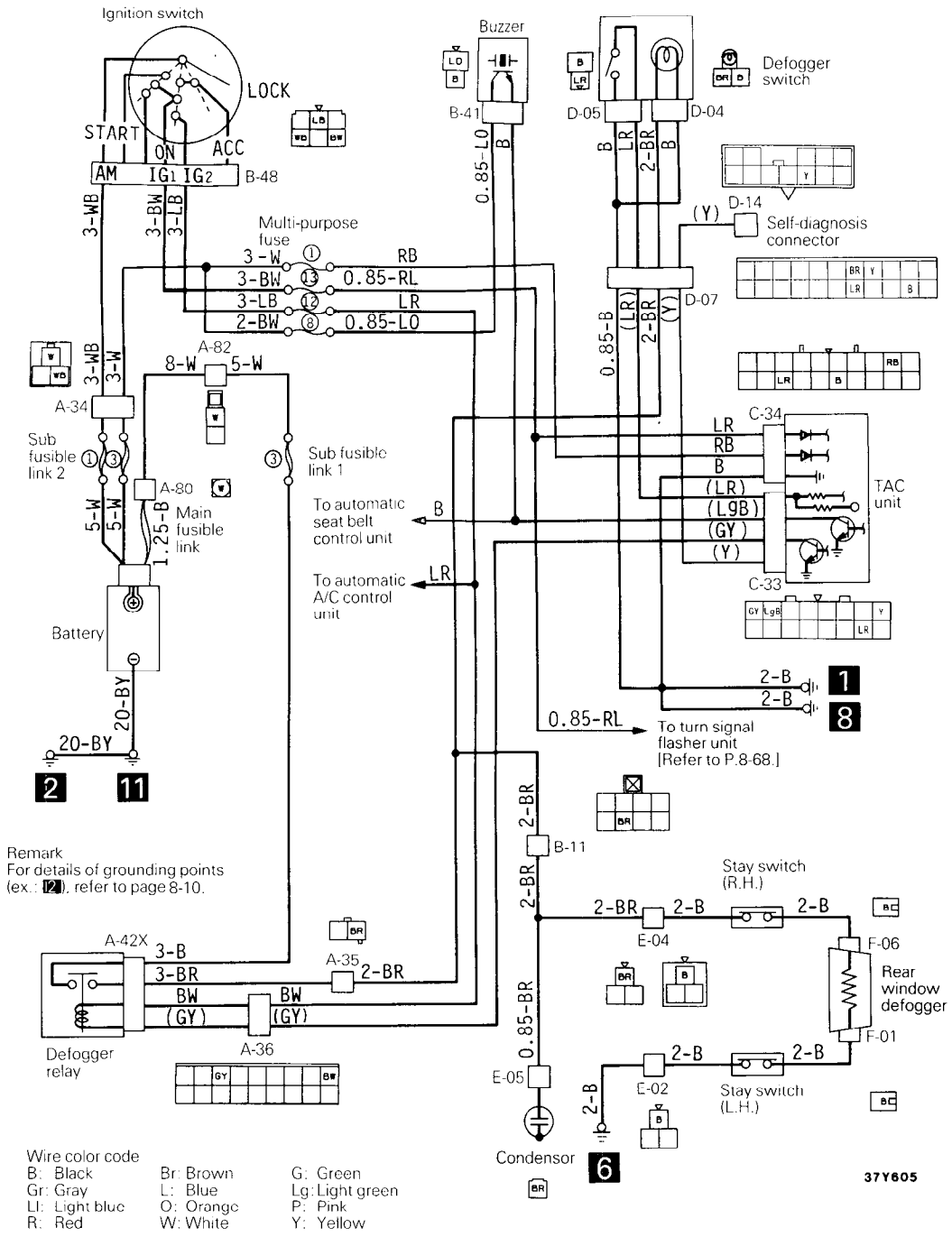
N08PB--

GENERAL SPECIFICATIONS

Items	Specifications
Rear window defogger switch	
Type	Push type (automatic return)
Rated current A	12
Indicator light W	1.4
Rear window glass with defogger	
No. of printed heater lines	16
Power consumption [20°C (68°F)] W	200 – 250

TROUBLESHOOTING

CIRCUIT DIAGRAM



OPERATION

Refer to ETACS.

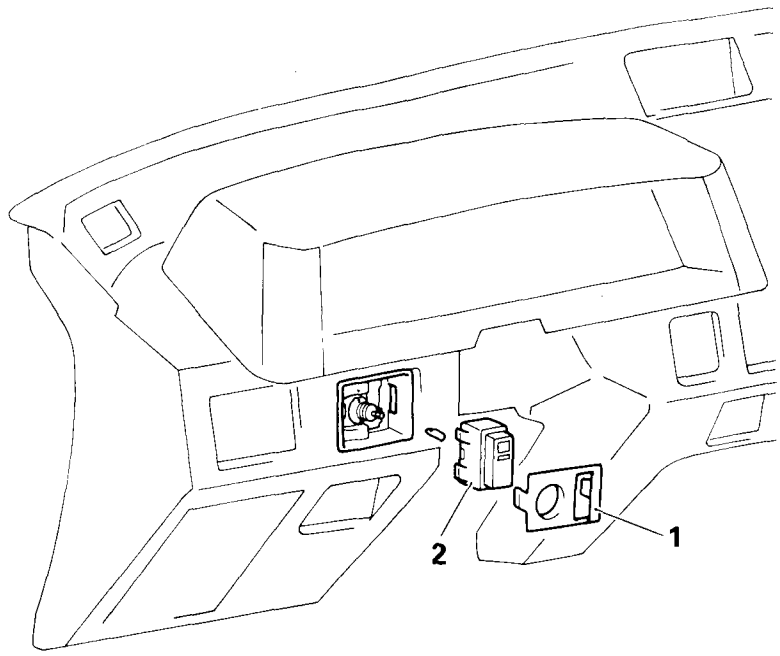
TROUBLESHOOTING HINTS

Refer to ETACS.

DEFOGGER SWITCH

N08PJBC

REMOVAL AND INSTALLATION

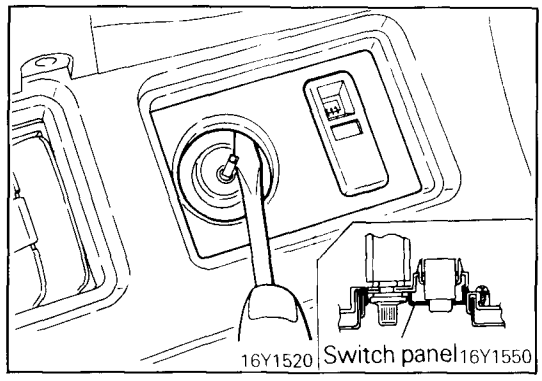


Removal steps

◆◆ 1. Switch panel
◆◆ 2. Rear window defogger switch

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".

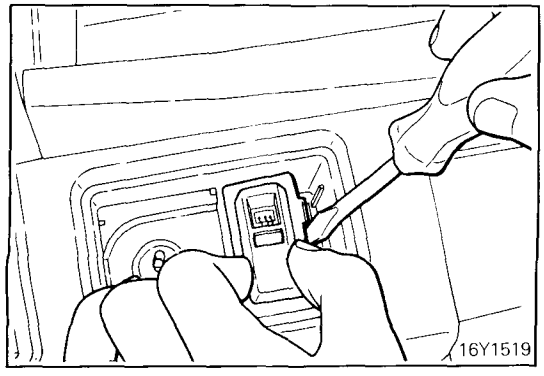
16Y3516



SERVICE POINTS OF REMOVAL

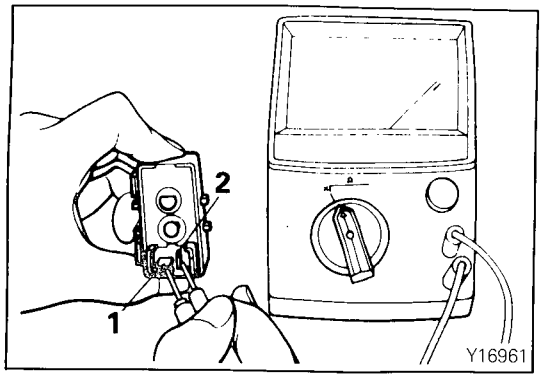
1. REMOVAL OF SWITCH PANEL

(1) Remove the dimmer control switch knob.
(2) Remove the switch panel.



2. REMOVAL OF REAR WINDOW DEFOGGER SWITCH

Remove the rear window defogger switch by pressing the tabs of the switch.



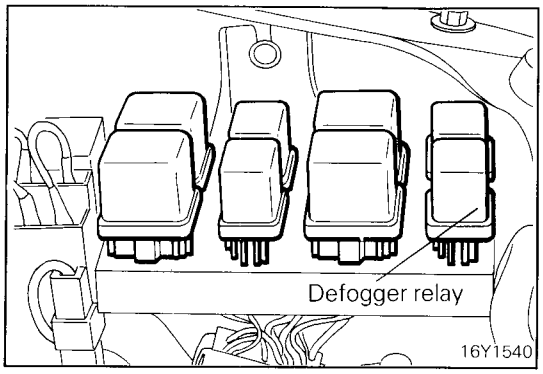
INSPECTION

REAR WINDOW DEFOGGER SWITCH

(1) Remove the rear window defogger switch from the instrument panel and connect an ohmmeter to the switch side connector.
(2) Operate the switch and check the continuity between the terminals.

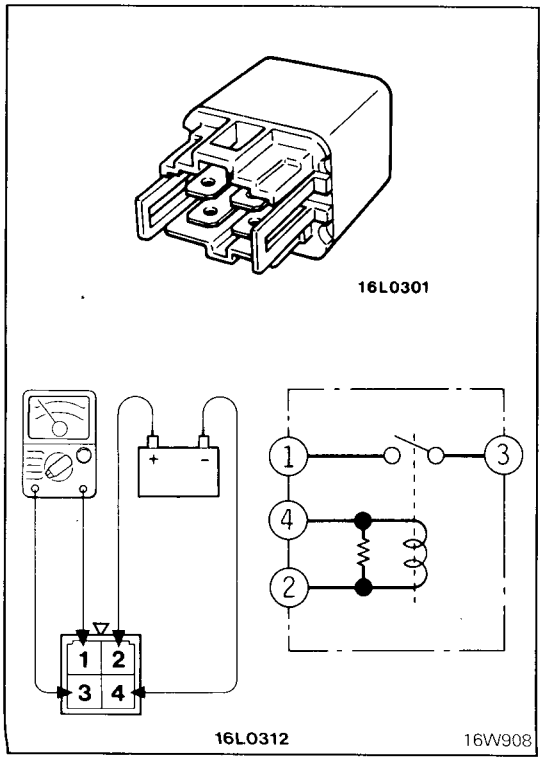
Terminal	1	2
OFF		
ON	○	○

NOTE
○–○ indicates that there is continuity between the terminals.



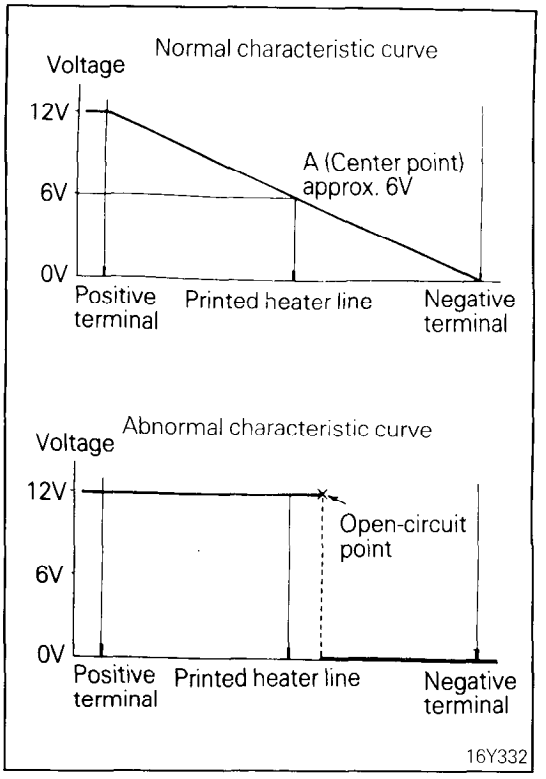
DEFOGGER RELAY

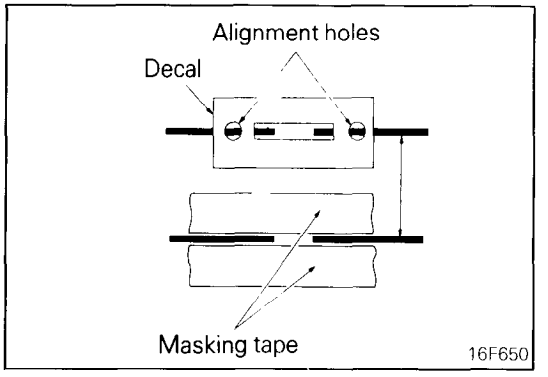
(1) Remove the defogger relay from the relay box in the engine compartment.



(2) Check continuity between terminals when the battery voltage is applied to the terminal 2 and the terminal 4 is earthed.

Voltage applied	Terminals 1 – 3	Conductive
Voltage not applied	Terminals 1 – 3	Non-conductive
	Terminals 2 – 4	Conductive





PRINTED HEATER LINES

N08PKAA

INSPECTION

1. The printed heater lines should be tested while the engine is running at 2,000 rpm and the battery is being charged.
2. Turn the defogger switch to the "ON" position, and use voltmeter to measure the voltage of each printed heater line at the rear window glass center point "A".
3. If all of the heater lines indicate approximately 6V, the rear window printed heater lines are functioning properly.
4. If a voltage of 12V is indicated at point "A", the heater line is broken between point "A" and the negative (–) terminal. Move the test probe gradually toward the negative (–) terminal, and search for the place where there is a sudden change in the voltage (to 0V).
5. This place where the voltage suddenly changes indicates the location of the broken heater line.
6. If 0V is indicated at point "A", the heater line is broken between point "A" and the positive (+) terminal. Find the point where there is a sudden change in the voltage (to 12V), as described in step 4. above.

REPAIR

1. Prepare the following items:
   - Conductive paint
   - Paint thinner
   - Masking tape, decal, etc.
   - Unleaded gasoline
   - Thin brush

   Wipe the glass adjacent to the broken heater line, clean with unleaded gasoline, and bond a decal or masking tape as shown.
2. Shake the electroconductive paint container well, and remove the amount of paint needed. Dilute it with a small quantity of paint thinner, and apply three coats with the brush at intervals of about 15 minutes.
3. Remove the tape or decal and leave the repaired defogger unused for a while before supplying power.
4. For a better finish, scrape away excess deposits with a knife after drying is complete (one day later).

Caution

After repair, clean the glass with a soft dry shop towel or wipe along the printed heater line with a slightly moistened shop towel.

ETACS

INDEX

N08QA--

OUTLINE

N08QBAB

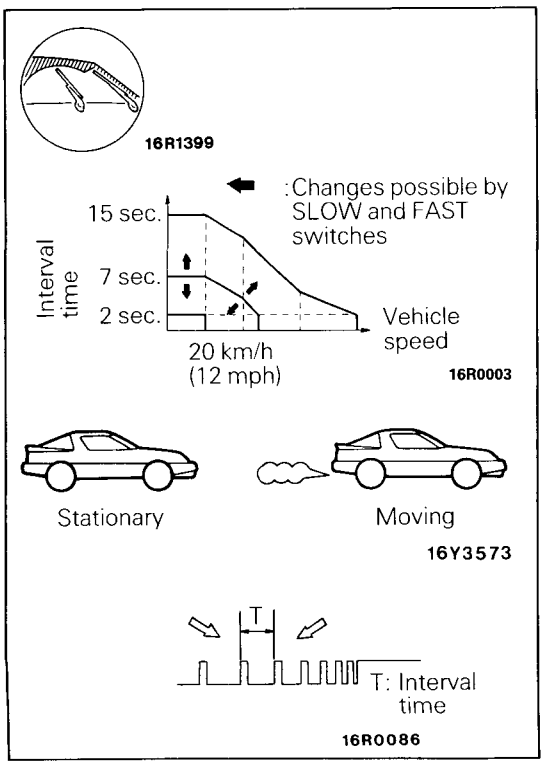
THE ETACS (Electronic Time and Alarm Control System) provides various timer and alarm facilities through centralized control by an electronic control unit (ECU).
The ECU incorporates two microcomputers; one of these is used exclusively for control of the theft-alarm system, and the other is used for control of various other functions.
An outline of the various functions of the ETACS is provided below.

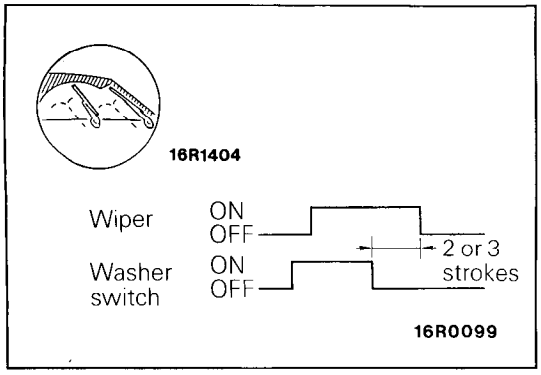
1. INTERMITTENT WIPERS (VEHICLE-SPEED-CORRELATIVE TYPE)

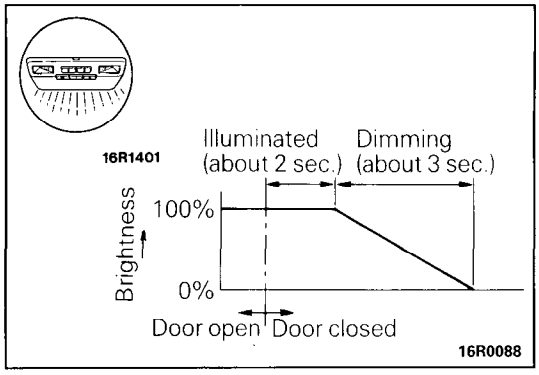
The interval time is automatically changed in accordance with increases or decreases of the vehicle speed.
The continuous response action is canceled when the CANCEL switch is switched ON, and the wipers are then the manual, variable-intermittent type.
The initial interval setting is seven seconds; this can be changed by using the SLOW and FAST switches.

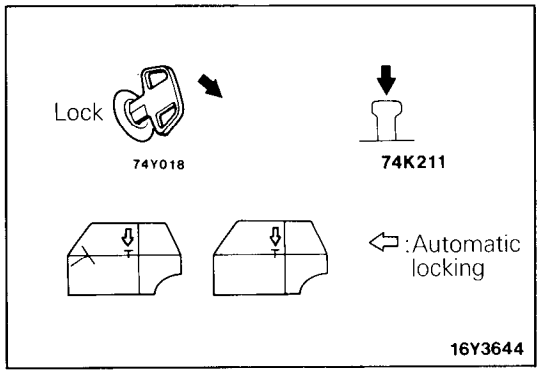
15 seconds	SLOW ←	7 seconds (Standard)	FAST →	Changeable up to wiper's LOW speed

NOTE
(1) The washer-interlocked wiper operation has priority.
(2) When the SLOW, FAST or CANCEL switch is switched ON, the buzzer sounds for about 0.1 second.









2. WASHER-INTERLOCKED WIPERS

When the washer switch is switched ON while the ignition key is at the ON or ACC position, the wipers operate; after the washer switch is switched OFF, the wipers wipe two or three times and then stop.

Input		Output	
Ignition switch (ACC, ON)	Operation conditions	Wiper relay	Wiper motor drive
Washer switch	Operation start		

3. DELAYED SWITCH-OFF DOME LIGHT

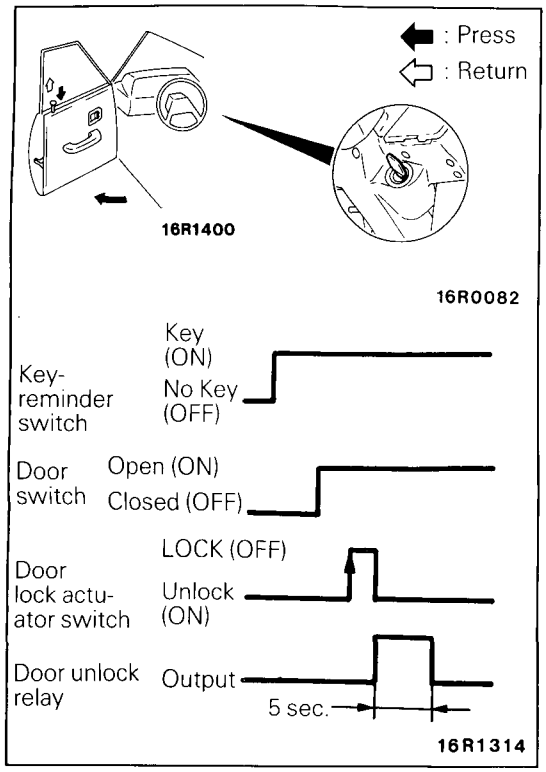
When the dome light switch is at the position linked to the doors, the light will remain illuminated for approximately two seconds after the doors are closed, and will then begin to gradually dim, finally switching OFF completely.

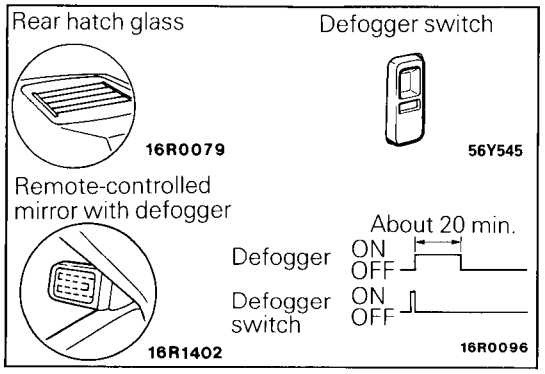
Input		Output
Door switch	Illumination by switch ON Starts dimming by switching ON to OFF	Dome light

4. CENTRAL DOOR LOCKING SYSTEM

Both doors can be locked (or unlocked) by locking (or unlocking) either one door.

Input		Output
Door lock actuator switch	Signal change to LOCK→ UNLOCK or UNLOCK→ LOCK	Door lock relay or door unlock relay (LOCK or UNLOCK activation output)





5. DOOR LOCK PREVENTION WHEN KEY IS NOT REMOVED

If the doors are locked with the ignition key still in the ignition key cylinder, the door locking is canceled in order to prevent the doors from becoming locked when the ignition key has been forgotten in the ignition key hole.
Output is stopped if the key is removed (from the ignition key cylinder) during unlocking or the door is closed. Does not function while vehicle is moving.

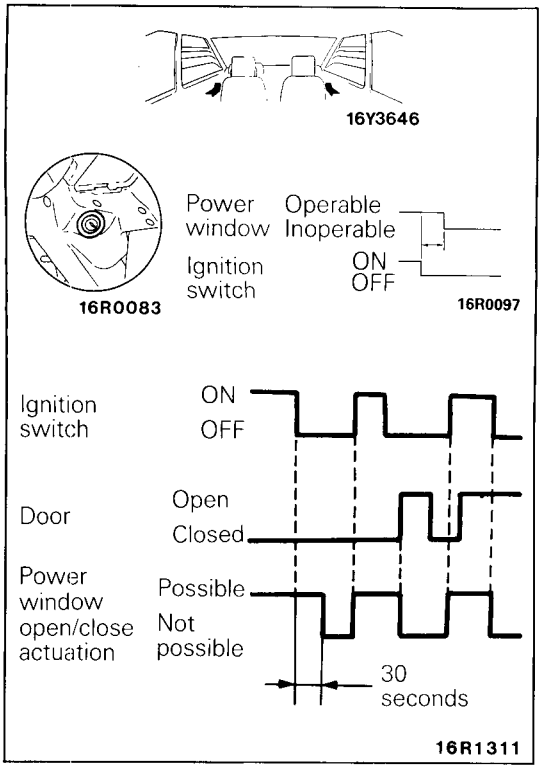
NOTE
This function has priority over the central door locking system.

Input		Output
Vehicle-speed sensor	Vehicle speed sensing	Door unlock relay (UNLOCK activation output)
Key-reminder switch	Presence of key	
Door switch	Door condition	
Front door lock actuator switch	Lock-activation detection	

6. DEFOGGER TIMER

When the defogger switch is switched ON while the ignition key is at ON, the defogger will function for approximately 20 minutes at the rear hatch glass and the remote-controlled mirror with defogger.
Defogging will stop if the switch is pressed again (to OFF) before the 20 minutes have elapsed.

Input		Output
Ignition switch ON	Operation conditions	Defogger output
Defogger switch	Start or reset	Defogger relay (operation output)

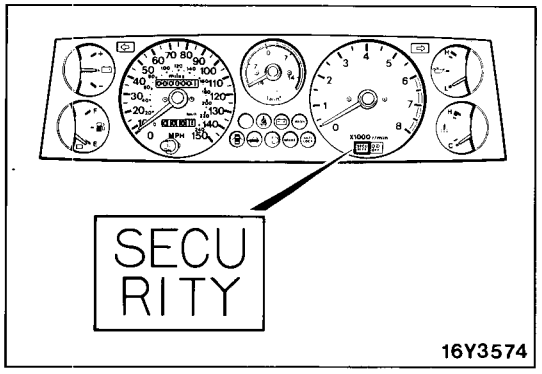


7. POWER WINDOW TIMER

The power windows can be operated for about 30 seconds after the ignition key is turned to OFF.
They stop, however, if a front door is opened.

NOTE
If the ignition key is turned to OFF while either (or both) door is open, the power window delay timer will not function, and the power windows cannot be operated.

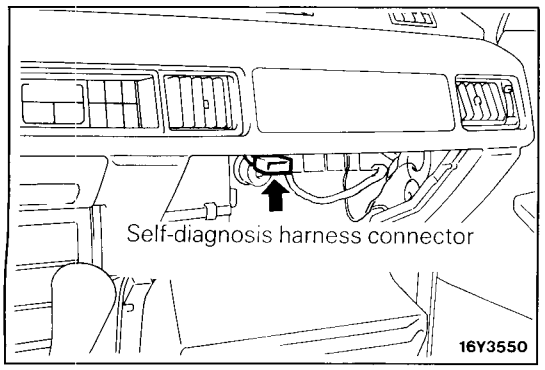
Input		Output	
Ignition switch (ON)	Compulsory actuation input	Power window relay (approx. 30-second output)	Power window motor operation made possible
Door switch	Timer stop condition		



8. THEFT-ALARM SYSTEM

This system is designed to protect the vehicle itself and its contents against unauthorized forced entry after all doors, the rear hatch and the hood have been closed and locked. If an unauthorized forced entry occurs, the starter circuitry will not function, and, moreover, visible and audible alarms will result as the headlights illuminate and the horn sounds. Confirmation of the system's setting is provided by temporal illumination of the security light. (For additional detailed information, refer to the section on P.8-285 concerning the theft-alarm system.)

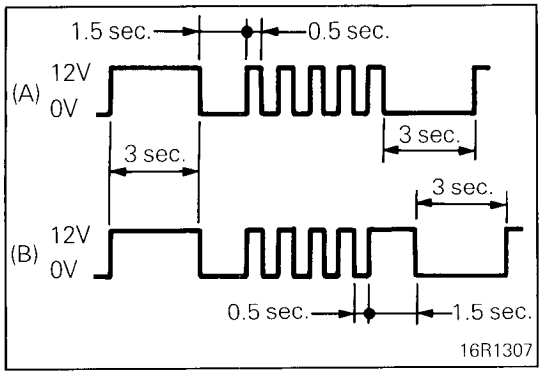
NOTE
The interruption of the starter circuit will be maintained, once the system has been activated, until it is deactivated. If, however, the key is used, starting is possible even if the alarm is not deactivated.



9. INPUT SIGNALS CHECK SYSTEM

The electronic control unit (ECU) of the ETACS provides the input-check function for checking whether or not the signals from the switches and sensors are correctly input to the ECU.
The function checking signal is output as a certain fixed pattern from the exclusive ETACS terminal of the self-diagnosis harness connector located at the upper part of the glove compartment. (For information concerning checking procedures, refer to P.8-296.)

Input		Output
Door switch	All doors	200 – 300 msec.
A/INT switch		60 msec.
CANCEL switch		60 msec.
Defogger switch		60 msec.
Key-reminder switch		200 msec.
Vehicle-speed sensor (reed switch)		Flashing at 60 msec. intervals (For approx. one second)
Door lock actuator switch	Left	200 – 300 msec.
	Right	200 – 300 msec.
Key cylinder unlock switch		60 msec.
Rear hatch switch		200 msec.
Hood switch		200 msec.

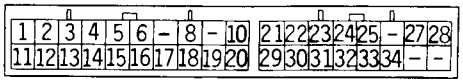


(1) The input-check system can be activated when, with the ignition key at OFF (LOCK condition), one of the doors is open (door switch ON).
(2) When the ECU detects a change from a HIGH signal to a ground signal when a sensor or input switch shown in the table at the left is actuated, a HIGH signal (12V) is output from the self-diagnosis terminal for a period of 60 to 300 msec.
(3) By checking this by the movement of the needle of a voltmeter, it is possible to determine whether or not the input circuit of that sensor or switch is normal.

NOTE
(1) The door switch can be checked when one door is opened while all doors are closed.
Other Switches and sensors can be checked by opening either door and leaving the ECU in the started condition.
(2) The FAST, SLOW, CANCEL and defogger switches can be checked, other than by this check, by checking for the buzzer sound at the time of switch ON.

(4) To check the harness between the ECU and the self-diagnosis harness connector, check to be sure that the voltage of the terminal for the ETACS is output as shown by the (A) or (B) patterns in the figure at the left when the ignition key is switched ON (at the ACC or ON position.)

ECU connector terminals



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ETACS COMPUTER INPUT/OUTPUT SIGNALS

N08QCAB

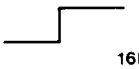
1. POWER SUPPLY AND GROUND CIRCUIT

Name	Terminal No.	Voltage level
Battery (+B)	2	H
GROUND (GND)	15	L

NOTE
H and L in the voltage level column indicate the terminal voltage of each signal.
H: Battery voltage
H': 5 ± 0.7V
L: Ground voltage (0.8V or less)

2. INPUT SIGNALS

Input signals (to the computer) corresponding to the ON/OFF condition of each of the switches and sensors are as shown in the table below.
Note that the checking should be done with a door open or the ignition key at the ON position, otherwise the correct voltage measurement might not be obtained.

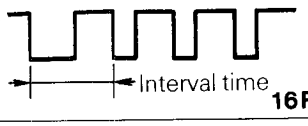
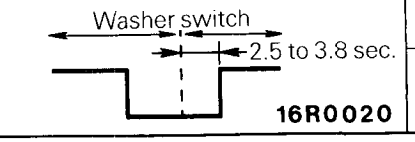
Input name	Terminal No.	Switch operation and condition		Voltage level	Input signal waveform
ACC	14	Ignition switch	ON or ACC	H	ON / OFF  16R0919
			LOCK	L	
IG1	18	Ignition switch	ON	H	↑
			ACC or LOCK	L	
Wiper (A/INT) switch	22	Switch at position other than A/INT	OFF	H'	ON / OFF  16R0016
		Switch at A/INT position	ON	L	
FAST switch	6	–	OFF	H'	↑
		Press the switch	ON	L	
SLOW switch	5	–	OFF	H'	↑
		Press the switch	ON	L	
CANCEL switch	31	ON/OFF alternately each time switch is pressed	OFF	H'	↑
			ON	L	
Reed switch or pulse generator	17	ON/OFF interval time changes corresponding to vehicle speed	OFF	H'	ON / OFF  16R0017
			ON	L	
Washer switch	4	–	OFF	H'	OFF / ON  16R0016
		Press the switch	ON	L	
Door switch (left)	10	Closing of doors	OFF	H'	↑
		Opening of doors	ON	L	
Door switch (right)	33	Closing of door	OFF	H'	↑
		Opening of door	ON	L	
Door switch (all doors)	11	Closing of all doors	OFF	H'	↑
		Opening of either door	ON	L	
Door lock actuator switch (left)	13	Lock	OFF	H'	↑
		Unlock	ON	L	
Door lock actuator switch (right)	12	Lock	OFF	H'	↑
		Unlock	ON	L	

Input name			Terminal No.	Switch operation and condition		Voltage level	Input signal waveform
Key-reminder switch			3	Insertion of ignition key	OFF	H'	OFF / ON  16R0016
				Removal ignition key	ON	L	
Defogger switch			30	ON/OFF alternately each time switch is pressed	OFF	H'	↑
					ON	L	
Rear hatch switch			8	Closing of rear hatch	OFF	H'	↑
				Opening of rear hatch	ON	L	
Hood switch			34	Closing of hood	OFF	H'	↑
				Opening of hood	ON	L	
Key cylinder unlock switches	Door	Left	16	–	OFF	H'	↑
		Right		Turn the key cylinder to the unlocked side	ON	L	
	Rear hatch						

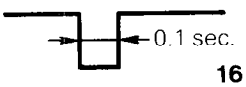
3. OUTPUT SIGNALS

Signals output from the computer in accordance with changes of input signals are as shown in the table below.

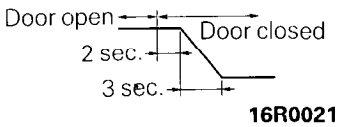
(1) Wiper relay drive (terminal No.23)

Condition at input side			Output signal waveform and its operation	
			Output signal	Wiper relay
Ignition key at ON or ACC	Wiper switch at A/INT			OFF ON
	Washer switch	OFF ON		OFF ON

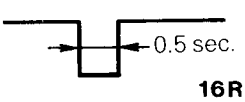
(2) Buzzer drive (terminal No.27)

Condition at input side			Output signal waveform and its operation	
			Output signal	Buzzer
Ignition key at ON or ACC	Defogger, FAST, SLOW, CANCEL switch	OFF ON		OFF ON

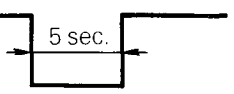
(3) Dome light control (terminal No.1)

Condition at input side			Output signal waveform and its operation	
			Output signal	Dome light
Dome light switch at door position	Door switch	ON ON → OFF		ON Dim → OFF OFF

(4) Door lock relay drive (terminal No.20)

Condition at input side			Output signal waveform and its operation	
			Output signal	Door lock relay
Except when key-reminder switch at OFF, and door switch at ON	Door lock actuator switch (left and right)	ON (unlock) OFF (lock)		OFF ON

(5) Door unlock relay drive (terminal No.19)

Condition at input side			Output signal waveform and its operation	
			Output signal	Door unlock relay
Door switch at ON and key-reminder switch at OFF	Door lock actuator switch (left and right)	ON (unlock)	H	OFF
		OFF (lock)	L  16R0022	ON

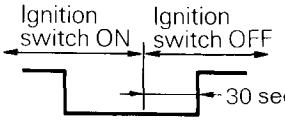
(6) Defogger relay and defogger indicator light drive (terminal No.28)

*I/L: Indicator light

Condition at input side			Output signal waveform and its operation	
			Output signal	Defogger and *I/L
Ignition key at ON	Defogger switch	OFF	H	OFF
		ON	L  16R0026	ON

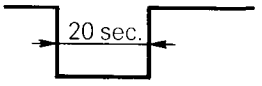
NOTE
Defogger switch will be switched OFF after left ON for 20 minutes.

(7) Power window relay (terminal No.25)

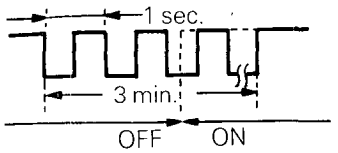
Condition at input side			Output signal waveform and its operation	
			Output signal	Power window relay
30-second period after ignition key turned to ON or OFF	Ignition switch	OFF		OFF
		ON → OFF	H	ON (30-sec.)
		ON	L 16R0025	ON

NOTE
When a door is opened during timer (30-second) operation, timer operation will stop and power windows can't be operated.

(8) Security light control (terminal No.32)

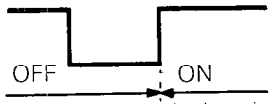
Condition at input side	Output signal waveform and its operation	
	Output signal	Security light
Ignition key removed; all doors keyless-locked	H	Illumination off
		Off after 20 second illumination
	L 16R0022	

(9) Theft alarm horn and headlight drive (terminal No.29)

Condition at input side		Output signal waveform and its operation	
		Output signal	Horn and headlight
After security light illumination OFF, doors and rear hatch can be opened without key, and also hood can be opened	OFF	H L  Key cylinder unlock switch 16R1413	3-minute repeated ON/OFF at 1 Hz 50% duty
	ON		

NOTE
Deactivated by switching ON of key cylinder unlock switch.

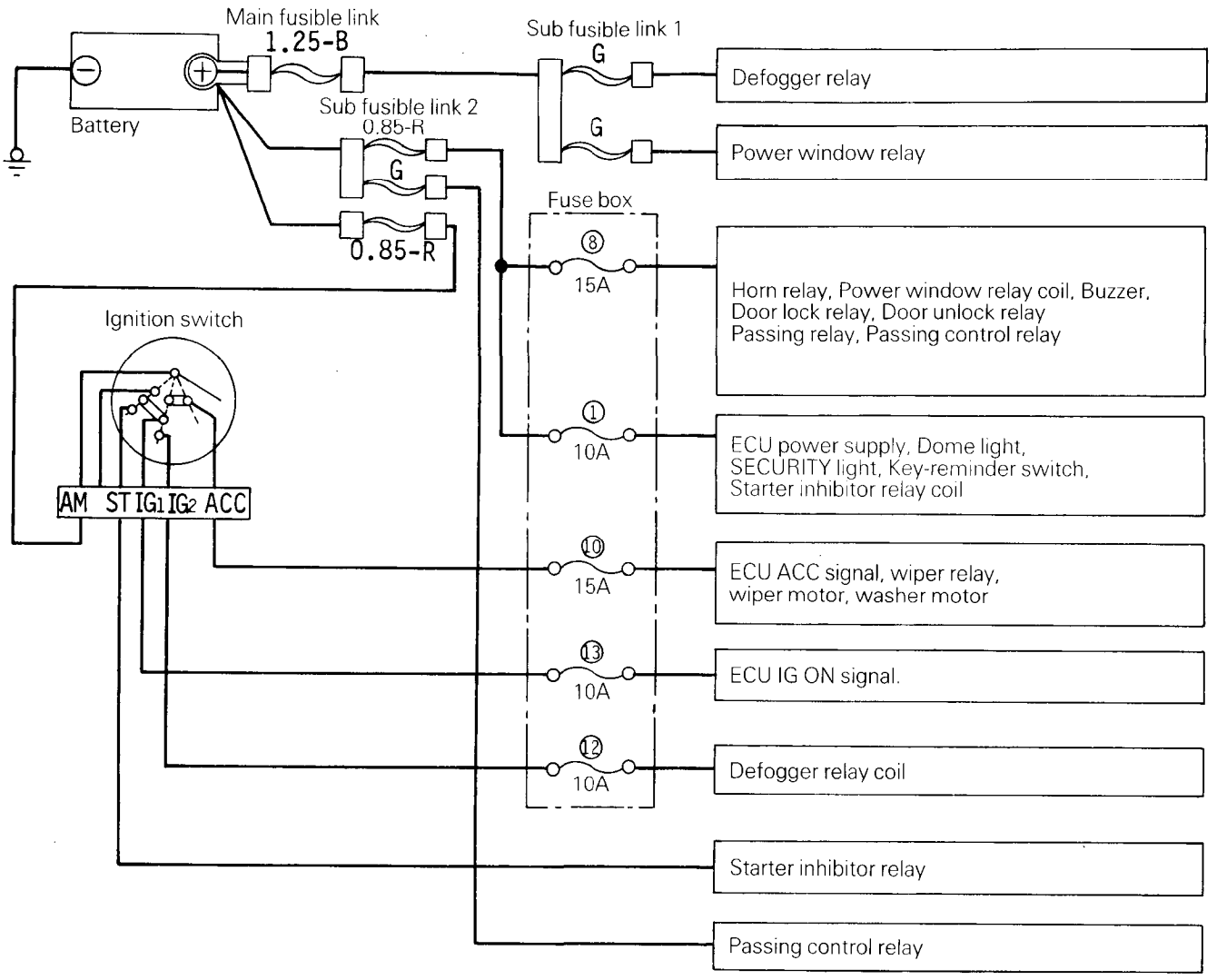
(10)Starter inhibitor relay and passing relay drive (terminal No.24)

Condition at input side	Output signal waveform and its operation	
	Output signal	Starter inhibitor relay and passing relay
After security light illumination OFF, doors and rear hatch can be opened without key, and also hood can be opened	H L  Key cylinder unlock switch 16R0026	OFF
		ON

NOTE
Deactivated by switching ON of key cylinder unlock switch.

ETACS-RELATED FUSES AND CIRCUITRY USED

N08QDAB



16Y3598

FUNCTIONS AND RELATED PARTS OF ETACS

N08QEAA

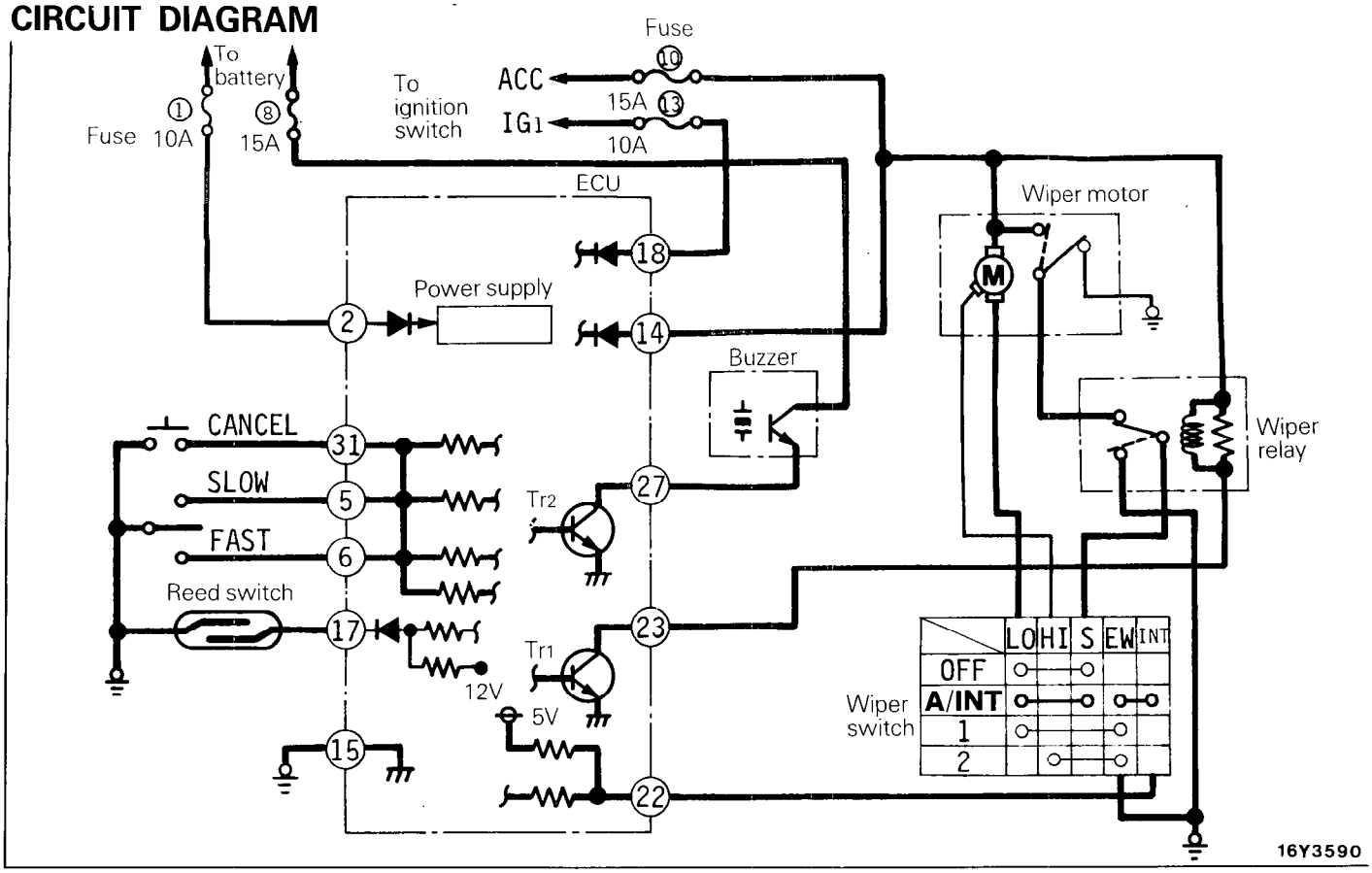
COMPONENT / FUNCTION	Electronic control unit (ECU)		INPUT															
			Ignition switch		Column switch							Door switch				Door lock actuator switch	
	CPU 1	CPU 2	ON position	ACC position	Wiper switch (A/INT)*	SLOW switch*	FAST switch*	Washer switch*	CANCEL switch*	Defogger switch*	Vehicle-speed sensor*	L.H.*	R.H.*	All doors*	Key-reminder switch*	L.H.*	R.H.*
Intermittent wipers (Vehicle-speed-correlative type)	○		○	○	○	○	○		○		○						
Washer-interlocked wipers	○		○	○				○									
Delayed switch-off dome light	○													○			
Central door locking system	○											○	○			○	○
Door lock prevention when key is not removed	○										○	○	○		○	○	○
Defogger timer	○		○							○							
Power window timer	○		○									○	○				
Theft-alarm system		○	○	○								○	○	○		○	○

NOTE
The * symbol indicates an input switch or sensor checkable by input-check function.
For information concerning input-check procedures, refer to P.8-296.

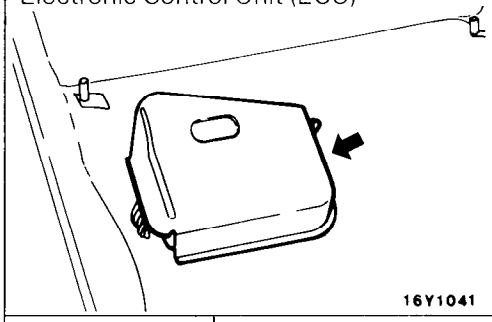
INPUT			OUTPUT												
Key cylinder unlock switch*	Rear hatch switch*	Hood switch*	Wiper relay (Wiper motor)	Operation indication buzzer	Dome light	Door unlock reay (Door lock actuator)	Door lock relay (Door lock actuator)	Defogger relay (Defogger, remote-controlled mirror with defogger)	Power window relay (Power window motor)	Security light (for anti-theft)	Passing control relay (Headlight)	Horn relay (Theft-alarm horn)	Starter inhibitor relay (Starter)	Passing relay (Pop-up motor)	Troubleshooting page No.
			○	○											8-273
			○												8-275
					○										8-276
							○								8-278
						○									8-280
				○				○							8-282
									○						8-284
○	○	○								○	○	○	○	○	8-291

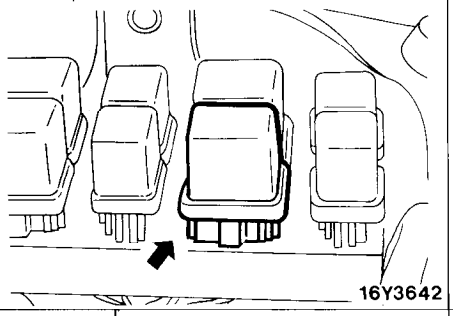
INTERMITTENT WIPERS (VEHICLE-SPEED-CORRELATIVE TYPE) N08QFAB

CIRCUIT DIAGRAM



COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)  16Y1041		Located at the underside of the driver's seat. Based upon input signals from the various switches and sensors, the ECU controls the wiper control and buzzer by switching ON and OFF transistors Tr1 and Tr2. (This unit is also used in common for control of other ETACS functions.)	
Column Switch	Wiper switch (A/INT position)	This switch is used for intermittent activation of the wiper control. When the wiper switch is set to the A/INT position, the ground signal is sent to the ECU.	
	SLOW switch	Lengthens intermittent time.	Automatic-return type switches; ON when turned and OFF when released.
	FAST switch	Shortens intermittent time.	
CANCEL switch		Switches to vehicle-speed-correlative/non-correlative.	Automatic-return type switches; ON when pressed and OFF when released.
Buzzer		Located at the inside, right of the center console. Activated by ECU when SLOW, FAST or CANCEL switch ON (L) signal is input; power is supplied from fuse No. 8.	

Wiper Relay  16Y3642		Located in the relay box at left front part of engine compartment. This relay controls the wiper intermittent drive based upon signals from the wiper switch and ECU.	
Vehicle-speed Sensor	Reed switch type	Located within the speedometer	Sends four pulse signals to the ECU for each revolution of the transaxle output gear (speedometer cable). (This sensor is also used in common for other electronic control systems.)
Ignition Switch	ON position	Sends HIGH signals to ECU (when ignition key is turned to ON or ACC).	
	ACC position		

TROUBLESHOOTING GUIDE

Trouble Symptom	Cause	Check method	Remedy
No wiper operation when wiper switch is set to A/INT position. [Wipers operate, however, when wiper switch is at position 1 (low speed).]	Damaged or disconnected wiring of A/INT switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.3 (P.8-303).	Repair the harness or replace the wiper switch
	Damaged or disconnected wiring of A/INT switch		
	Damaged or disconnected wiring of ignition switch ACC or ON input circuits	Check by using check chart No.2 (P.8-302).	Replace the fuse or repair the harness.
	Damaged or disconnected wiring of wiper relay drive circuit	Check by using check chart No.5 (P.8-305).	Repair the harness or replace the wiper relay.
	Malfunction of the wiper relay		
	Damaged or disconnected wiring of wiper motor low-speed drive circuit	Check by using check chart No.4 (P.8-304).	Repair the harness or replace the wiper switch.
	Malfunction of the ECU	–	Replace the ECU.
Wipers don't stop when wiper switch set to OFF. (When wipers are operating at low speed) NOTE If the wipers continue non-stop operation at high speed, there is a short-circuit at the high speed side of the wiper motor.	Short-circuit of A/INT switch input circuit	After checking A/INT switch input (P.8-297), check by using check chart No.3 (P.8-303).	Repair the harness or replace the wiper switch.
	Short-circuit of A/INT switch		
	Short-circuit of wiper relay drive circuit	Check by using check chart No.5 (P.8-305).	Repair the harness.
	Short-circuit of wiper motor low-speed drive circuit	Check by using check chart No.4 (P.8-304).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.

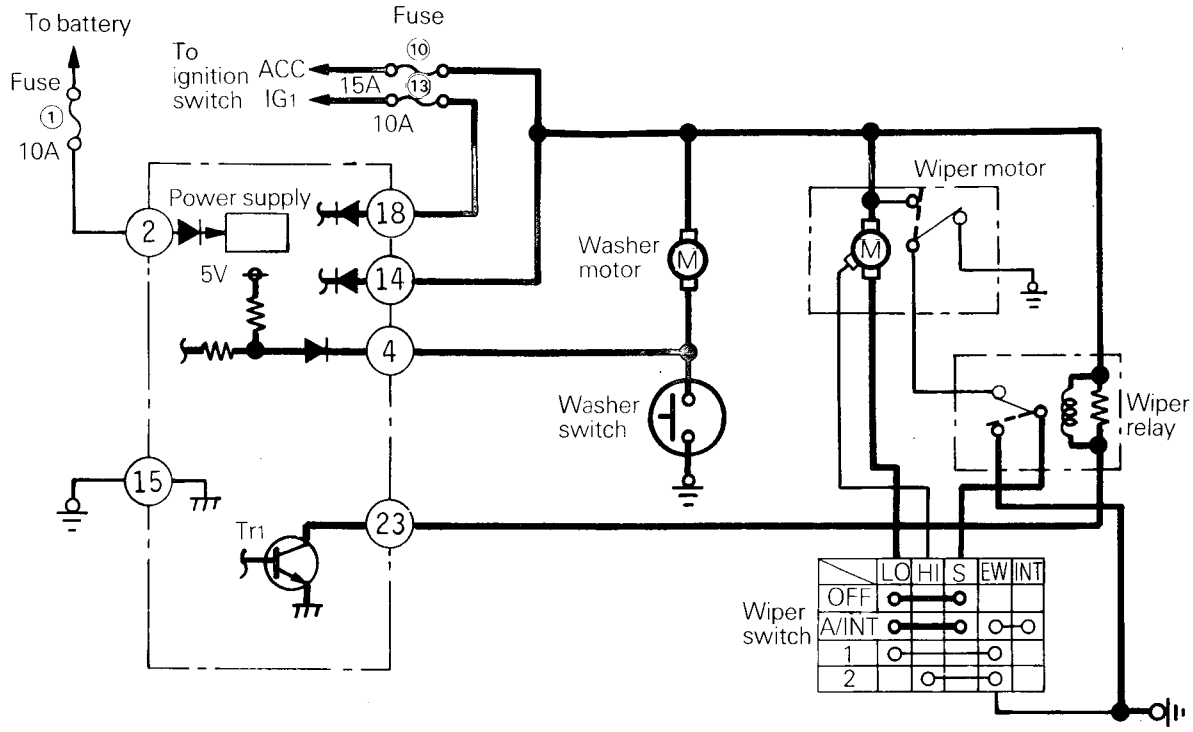
ECU: Electronic Control Unit

Trouble Symptom	Cause	Check method	Remedy
No intermittent operation when wiper switch is set to A/INT wipers operate at low speed) (Wipers stop, however, when wiper switch is set to OFF).	Short-circuit of FAST switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.6 (P.8-306).	Repair the harness or replace the FAST switch.
	Short-circuit of FAST switch		
	Malfunction of the ECU	–	Replace the ECU.
No change of intermittent operation time interval when SLOW or FAST switch is operated (time interval remains at about 7 seconds)	Damaged wiring of FAST and/or SLOW switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.6 (P.8-306).	Repair the harness or replace the FAST and/or SLOW switch.
	Damaged wiring of FAST and/or SLOW switch		
	Malfunction of the ECU	–	Replace the ECU.
Intermittent operation time interval do not correlate with vehicle speed when wiper switch is set to the A/INT position and the CANCEL switch is pressed. (The buzzer does not sound when the CANCEL switch is pressed.)	Damaged or disconnected wiring, or short-circuit, of vehicle-speed sensor input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.7 (P.8-307).	Repair the harness or replace the vehicle speed sensor.
	Malfunction of the vehicle-speed sensor		
	Short-circuit of CANCEL switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.6 (P.8-306).	Repair the harness or replace the CANCEL switch.
	Short-circuit of CANCEL switch		
	Malfunction of the ECU	–	Replace the ECU.
When the CANCEL switch is pressed during intermittent operation of wipers correlated to vehicle speed, correlation continues.	Damaged or disconnected wiring, or short-circuit, of CANCEL switch input circuit	If input checks (P.8-296) indicate a malfunction check by using check chart No.6 (P.8-306).	Repair the harness or replace the CANCEL switch.
	Damaged or disconnected wiring, or short-circuit, of CANCEL switch		
	Malfunction of the ECU	–	Replace the ECU.
No buzzer sound when SLOW, FAST and CANCEL switches are operated.	Malfunction of the SLOW, FAST and/or CANCEL switch	If input checks (P.8-296) indicate a malfunction, check by using check chart No.6 (P.8-306).	Repair the harness or replace the SLOW, FAST and/or CANCEL switch.
	Damaged or disconnected wiring of buzzer drive circuit	Check by using check chart No.8 (P.8-308).	Repair the harness or replace the buzzer.
	Malfunction of the buzzer		
	Malfunction of the ECU	–	Replace the ECU.

ECU: Electronic Control Unit

WASHER-INTERLOCKED WIPERS

CIRCUIT DIAGRAM



COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)		Wiper control relay is controlled based upon wiper switch ON (L) signals. (transistor Tr1)
Washer Switch		This is an automatic-reset type switch. It is ON when pressed, and OFF when released. When switched ON, washer motor is activated and a ground signal is sent to the ECU.
Washer Motor		Washer fluid is sprayed from the washer nozzles when the washer switch is ON, (There is no direct relationship with ETACS control.)
Wiper Relay		Switched ON by signals from the ECU, thus forming the wiper motor's low speed circuit and activating the wipers. (When the wiper switch is at the OFF or A/INT position.)
Ignition Switch	ON position	Sends HIGH signals to the ECU (when ignition key is turned to ON or ACC), to activate the system.
	ACC position	

TROUBLESHOOTING GUIDE

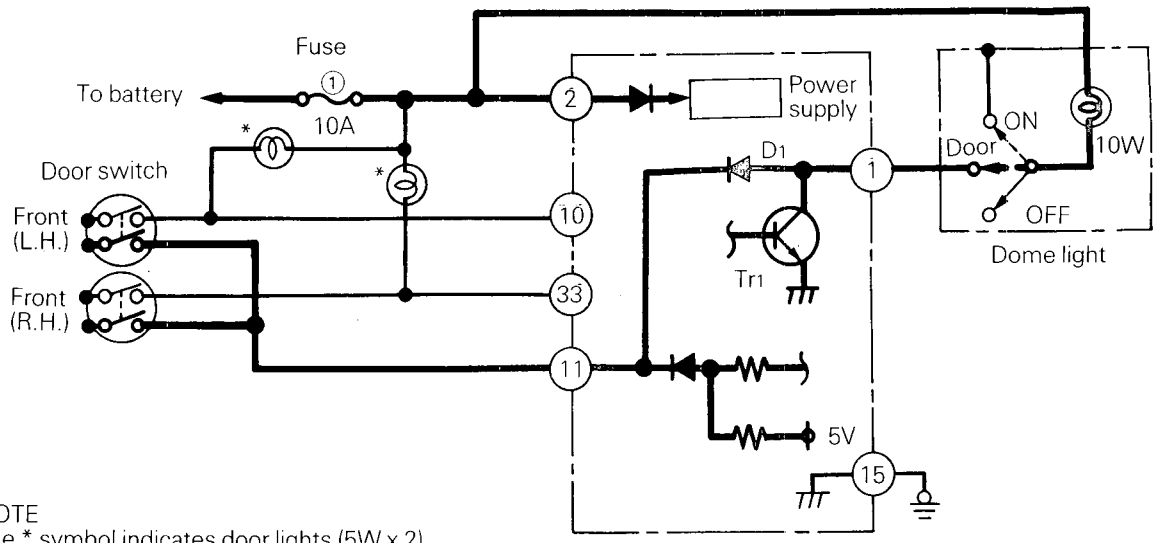
Trouble Symptom	Cause	Check method	Remedy
No wiper operation when washer switch set to ON. (Wiper intermittent operation and washer function is normal, however, at the A/INT position of the wiper switch.)	Damaged or disconnected wiring of washer switch input circuit	Check by using check chart No.9 (P.8-309).	Repair the harness.
	Damaged wiring between LO and S terminals of wiper switch OFF position	Check the wiper switch (P.8-204).	Replace the wiper switch.
	Malfunction of the ECU	–	Replace the ECU.

ECU: Electronic Control Unit

DELAYED SWITCH-OFF DOME LIGHT

N08QGAB

CIRCUIT DIAGRAM



NOTE
The * symbol indicates door lights (5W x 2)

16Y3580

COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)	When the door is open (door switch ON), the ground circuit (diode D1) of the dome light is formed; after the door is closed (door switch OFF), the dome light illumination gradually dims and then disappears. (Transistor Tr1 changes gradually from ON to OFF.)
Door Switch (All doors)	Located at body side at all door openings. Switched ON when door is opened, and switched OFF when door is closed. Because the two door switches are connected in parallel, HIGH signals are sent to the ECU only when all doors are closed (door switches OFF).
Dome Light	Illuminates the vehicle interior. When the dome light switch is at the DOOR position, illumination and non-illumination are controlled by the ECU of the ETACS. Power is supplied, via fuse No.1, directly from the battery.

TROUBLESHOOTING GUIDE

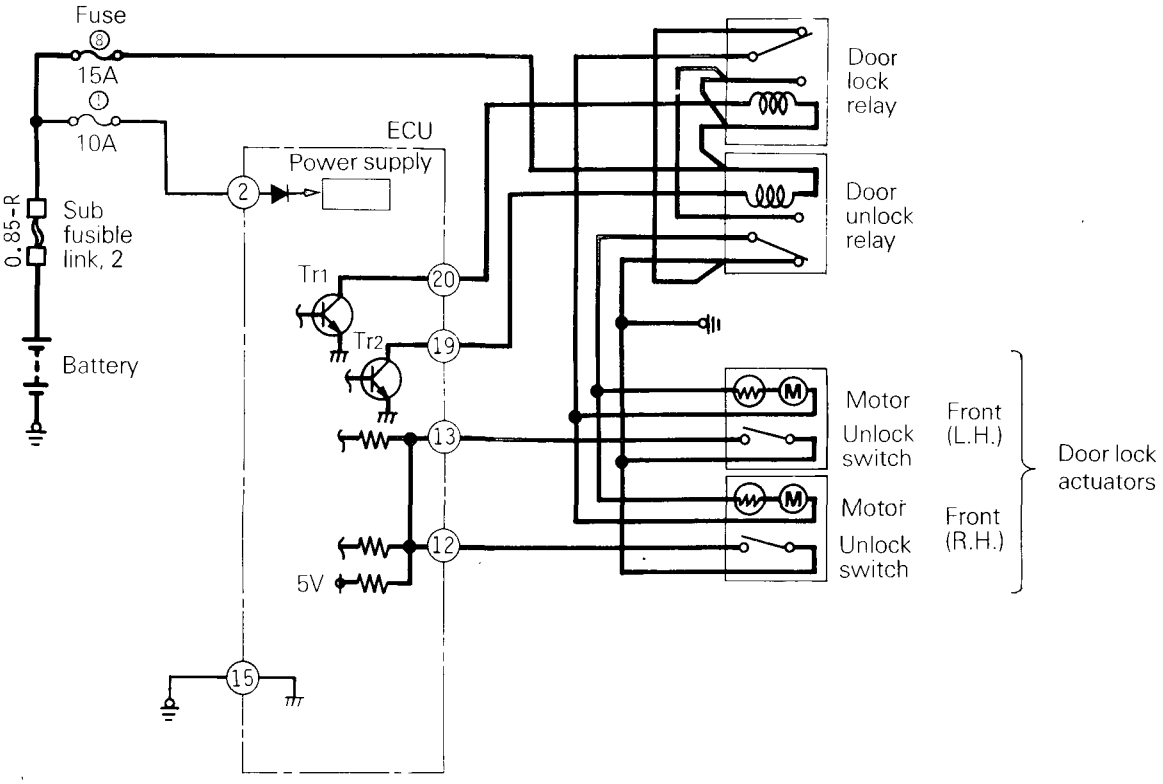
Trouble Symptom	Cause	Check method	Remedy
With the dome light switch set to DOOR position, the light doesn't illuminate when any door is opened (The dome light illuminates, however, when the dome light switch is at the ON position.)	Damaged or disconnected wiring of door switch (all doors) input circuit	Check by using check chart No.10 (P.8-310).	Repair the harness.
	Damaged or disconnected wiring of dome light drive circuit	Check by using check chart No.11 (P.8-311).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.
With the dome light switch set to the DOOR position, the light remains illuminated when all doors are closed. (The dome light illumination is switched OFF, however, when the dome light switch is set to the OFF position.)	Short-circuit of door switch (all doors) input circuit	Check by using check chart No.10 (P.8-310).	Repair the harness or replace the door switch.
	Short-circuit of door switch		
	Short-circuit of dome light drive circuit	Check by using check chart No.11 (P.8-311).	Repair the harness.
	Malfunction of the ECU	–	Replace the ECU.

ECU: Electronic Control Unit

CENTRAL DOOR LOCKING SYSTEM

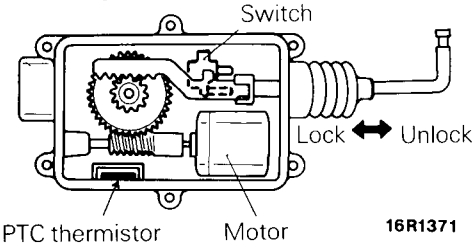
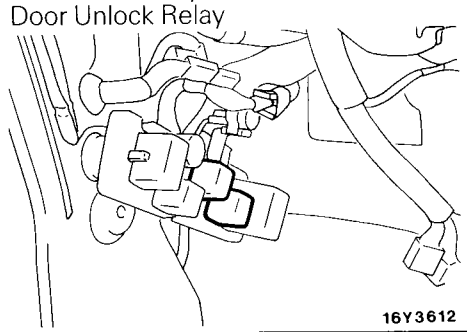
N08QIAA

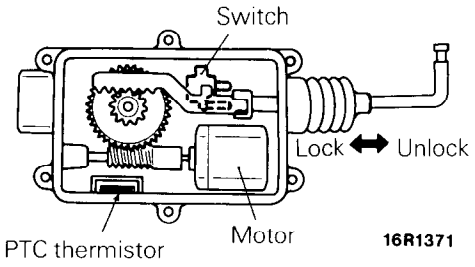
CIRCUIT DIAGRAM



16Y3581

COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)	Based upon signals from the unlock switch of either door, transistor Tr_1 is switched ON (when lock), or transistor Tr_2 is switched ON (when unlock), for 0.5 second, and, by activating the door lock relay or door unlock relay, all door lock actuators are activated to the lock (or unlock) side.
Door Lock Actuator Switch left and right  16R1371	Located in the door lock actuator. This switch is switched ON when the door lock knob is at the unlocked position, and is switched OFF when it is at the locked position. When a door is locked or unlocked, this switch is switched OFF or ON, and the change from ground signal to HIGH signal is sent to the ECU. The ECU detects the locked or unlocked condition based upon this signal change, and the door lock relay or door unlock relay drive timer is caused to start.
Door Lock Relay and Door Unlock Relay  16Y3612	Located in the relay box at the lower left part of the instrument panel. Under the control of ECU, one of these relays is activated and closes lock or unlock circuit of the door lock actuators to supply them with power. The power for activation of the actuator and for the relay's coil is supplied, through fuse No. 8, from the battery.

Door Lock Actuator (All doors)  	Located at the locking mechanism of each door. These are motor-type actuators; according to the door lock or unlock relay opertion, they make door lock or unlock motion. In addition, a PTC thermistor is located in series in the motor circuit; when the motor load is excessive, it functions as a fuse to protect the motor. Note that the PTC thermistor again becomes conductive if there is a decrease to the ordinary temperature. PTC: Positive Temperature Coefficient

TROUBLESHOOTING GUIDE

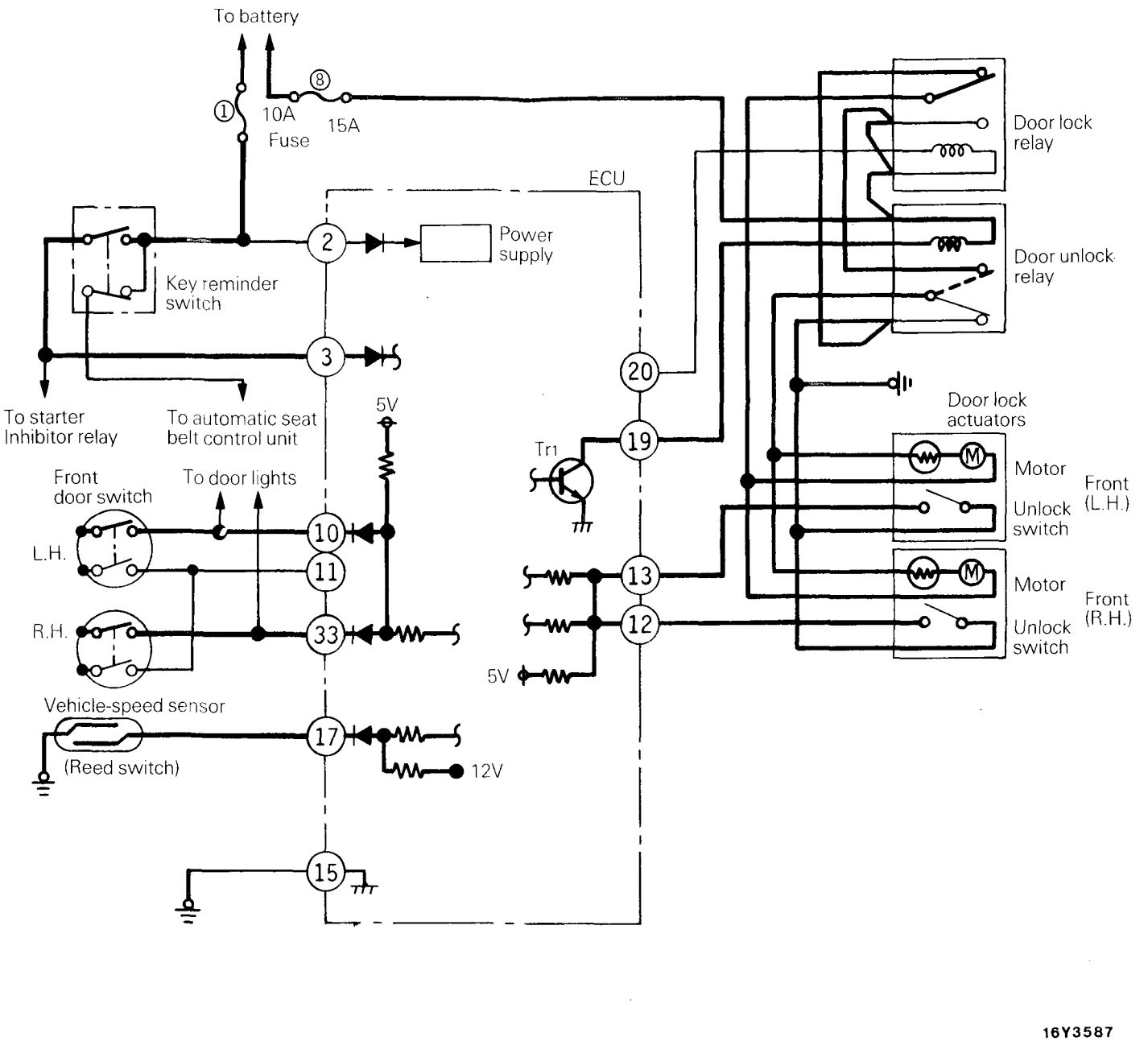
Trouble Symptom	Cause	Check method	Remedy
Central door locking system doesn't function when door lock knob is pressed down or pulled up.	Damaged or disconnected wiring, or short-circuit, of door actuator switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.13 (P.8-313).	Repair the harness or replace the door lock actuator.
	Malfunction of the front door lock actuator switch		
	Damaged or disconnected wiring of the door lock relay or door unlock relay power-supply circuit	Check by using check chart No. 14 (P.8-314).	Repair the harness or replace the fuse.
	Fuse ⑧ is fused.		
	Damaged or disconnected wiring of door lock relay or door unlock relay drive circuit	Check by using check chart No.15 (P.8-315).	Repair the harness or replace the door lock relay or door unlock relay.
	Malfunction of the door lock relay or door unlock relay		
	Damaged or disconnected wiring of door lock actuator drive circuit	Check by using check chart No.16 (P.8-316).	Repair the harness or replace the door lock actuator.
	Malfunction of the door lock actuator		
	Malfunction of the ECU	–	Replace the ECU.

ECU: Electronic Control Unit

DOOR LOCK PREVENTION WHEN KEY IS NOT REMOVED

N08QJAA

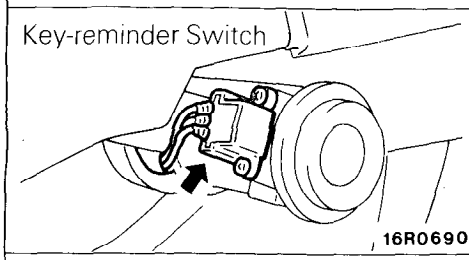
CIRCUIT DIAGRAM



16Y3587

COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)	Based upon input signals from the vehicle-speed sensor, door switches, key-reminder switch and door lock actuator switches, under certain condition, transistor Tr_1 is switched ON for approximately five seconds to activate door unlock relay so door locking with the ignition key left in the ignition switch is prevented. NOTE This function has priority over the central door locking system.

Vehicle-speed Sensor	Sends vehicle-speed signals to the ECU. This function is inhibited when the ECU detects the vehicle speed.
Door switch (left and right)	Detects the open/closed condition of the doors. The left and right door switch input circuit within the ECU is a wired OR circuit; when both (left and right) doors are closed (door switch OFF) HIGH signals are sent to the ECU; if either door is open (door switch ON), ground signals are sent to the ECU.
Key-reminder Switch  16R0690	Located in the ignition key cylinder. A two-way switch is incorporated within the cylinder; a switch that switches ON, and a switch that switches OFF when the ignition key is inserted into the key cylinder. With this system, switch ON occurs when the key is inserted into the key cylinder, and switch OFF occurs when it is taken out from the cylinder. If the key is left in the cylinder, HIGH signals from the battery, via fuse ①, are sent to the ECU. (ECU terminal No. 3)
Door Lock Actuator Switch (left and right)	When an attempt is made to lock a door, the switch changes from ON to OFF, and HIGH signal is sent to the ECU.
Door Unlock Relay	This relay is activated by the ECU; it activates the door lock actuator to the unlock side.
Door Lock Actuator (All doors)	These actuators are activated by the door unlock relay; they function to unlock the doors. NOTE When these actuators are caused to operate many times continuously, the protection circuit whithin the actuators functions, inhibiting operation.

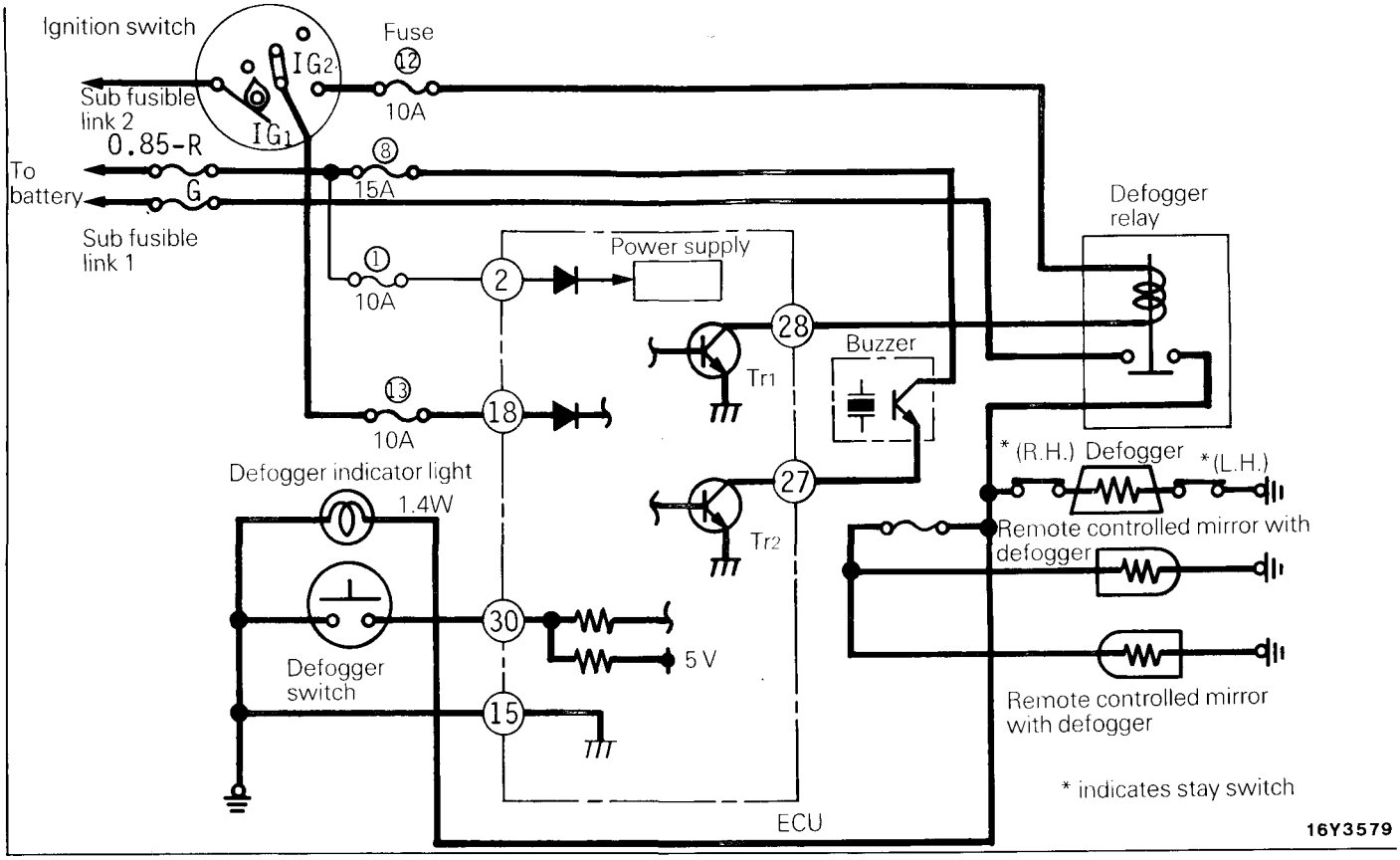
TROUBLESHOOTING GUIDE

Trouble Symptom	Cause	Check method	Remedy
When the following conditions are present, the door lock knob, even if locked, will not function to unlock. • Key inserted. (key-reminder switch OFF) • Door open. (door switch ON) • Vehicle stationary. (No vehicle-speed signal input.) (The central door locking system, however, functions normally.)	Damaged or disconnected wiring of key-reminder switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.17 (P.8-318).	Repair the harness or replace the key-reminder switch.
	Damaged or disconnected wiring of key-reminder switch		
	Damaged or disconnected wiring of door switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.12 (P.8-312).	Repair the harness or replace the front door switch.
	Damaged or disconnected wiring of door switch		
	Malfunction of the ECU	–	Replace the ECU.

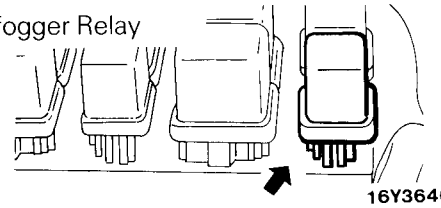
DEFOGGER TIMER

N08QKAB

CIRCUIT DIAGRAM



COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)		The defogger relay is controlled by the switch-on of transistor Tr1, based on input signals of the defogger switch, thus causing the defogger and Remote-controlled mirror with defogger to operate for about 20 minutes. In addition, when there is switch-on input, the buzzer is activated for about 0.1 second by the switch-on of transistor Tr2.
Ignition Switch (ON position)		Sends HIGH signals to ECU (when ignition key is turned to ON).
Column Switch	Defogger switch	Starts or resets the defogger timer. This is an automatic-reset type switch; it is switched ON when pressed, and switched OFF when released.
	Defogger indicator light	Illuminates when the defogger relay is ON, and stops illumination when it is OFF. Power is supplied, via fusible link (sub. 1) and the defogger relay, from the battery.
	Buzzer	Activated by ECU when defogger switch ON (L) signal is input. Power is supplied, when the ignition key is at ACC or ON, from fuse No.8.
Defogger Relay  16Y3640		Located the relay box at the left-front of the engine compartment. Activated by the ECU, the defogger relay conducts current to the heaters of the defogger and the remote-controlled mirror with defogger. The power for the relay coil is supplied, when IG2 is ON, through the sub fusible link 1. The power for activation of the defogger is supplied, via fuse No.12, from the battery.
Defogger		The defogger is conductive when the defogger relay is ON, and functions to defog the rear hatch glass.

Remote-controlled Mirror with Defogger	The defoggers for door mirrors are conductive when the defogger relay is ON, and function to defog the door mirrors.
Stay Switch	The stay switch closes the defogger and rear wiper circuits when the rear hatch is opened.

TROUBLESHOOTING GUIDE

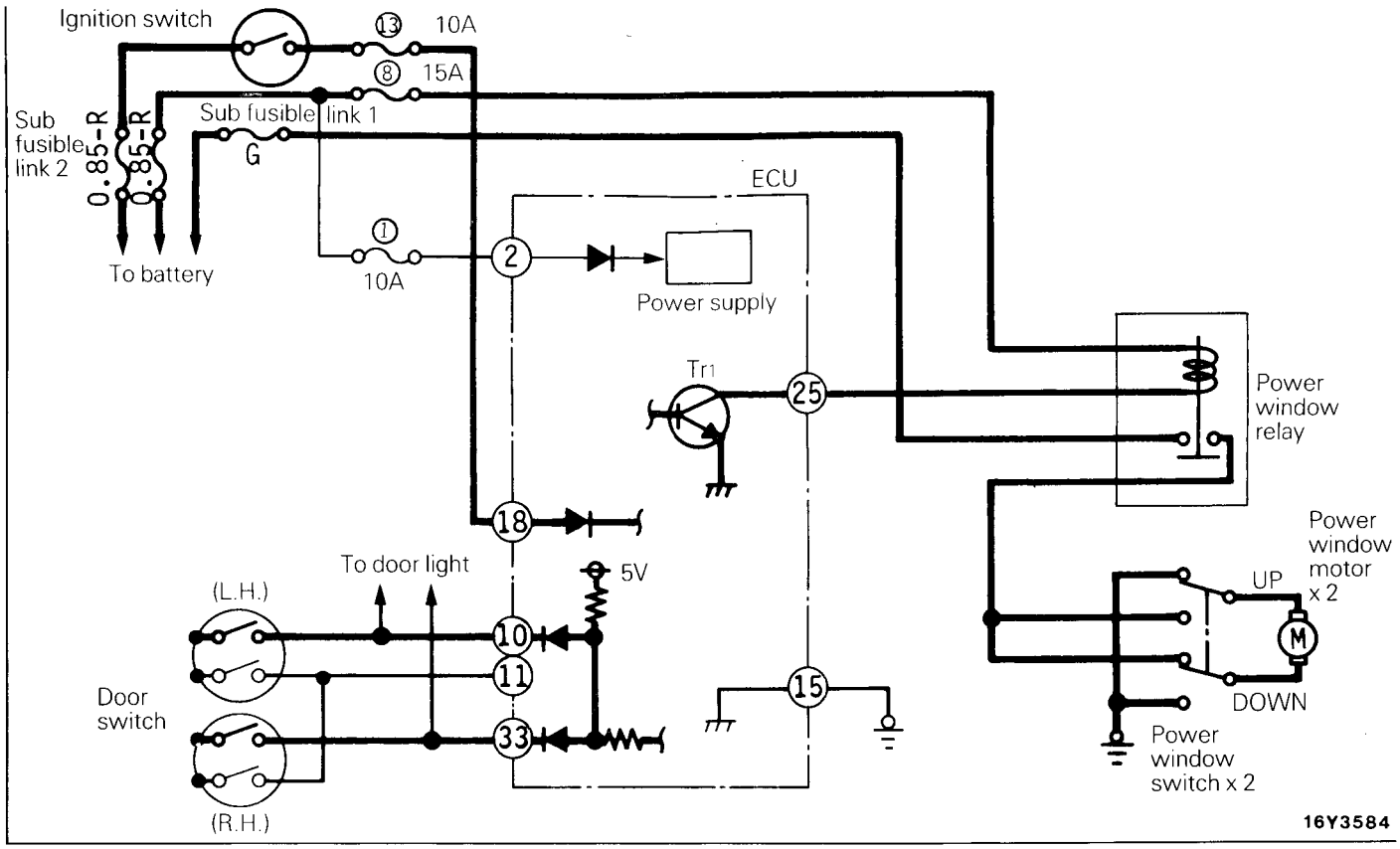
Trouble Symptom	Cause	Check method	Remedy
The defogger (or the defogger for door mirror) does not function when the defogger switch is pressed. (The rear hatch is closed and defogger indicator light illuminates.)	Damaged or disconnected wiring of defogger	Check by using check chart No.18 (P.8-320).	Repair the harness or replace.
	Damaged or disconnected wiring of defogger for door mirror		Repair the harness.
	Malfunction of the defogger or the remote-controlled mirror with defogger	Check the defogger (or the remote-controlled mirror with defogger). (P.8-257, P.23-78)	Replace the defogger or the remote-controlled mirror with defogger or repair the heater line.
The defogger and the defogger for door mirror do not function when the defogger switch is pressed. (The indicator light does not illuminate.)	Damaged or disconnected wiring of ignition switch ON input circuit	Check by using check chart No.2 (P.8-302).	Replace the fuse or repair the harness.
	Damaged or disconnected wiring of defogger switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.19 (P.8-322).	Repair the harness or replace the defogger switch.
	Malfunction of the defog ger switch		
	Damaged or disconnected wiring of defogger relay power supply circuit	Check by using check chart No.20 (P.8-323).	Repair the harness.
	Damaged or disconnected wiring of the defogger relay drive circuit, or a malfunction of the defogger relay	Check by using check chart No.21 (P.8-324).	Repair the harness or replace the defogger relay.
	Malfunction of the ECU	–	Replace the ECU.
Defogger continues to operate while the ignition key is at the ON position. (The indicator light remains illuminated when the defogger switch is pressed.)	Short-circuit of defogger relay drive circuit	Check by using check chart No.21 (P.8-324).	Repair the harness or replace the defogger relay.
	Poor contact of the defogger relay points		
	Malfunction of the ECU	–	Replace the ECU.
Buzzer does not sound when the defogger switch is pressed.	Damaged or disconnected wiring of defogger switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No.19 (P.8-322).	Repair the harness or replace the defogger switch.
	Malfunction of the defogger switch		
	Damaged or disconnected wiring of buzzer drive circuit	Check by using check chart No.8 (P.8-308).	Repair the harness or replace the buzzer.
	Malfunction of the buzzer		
	Malfunction of the ECU	–	Replace the ECU.

ECU: Electronic Control Unit

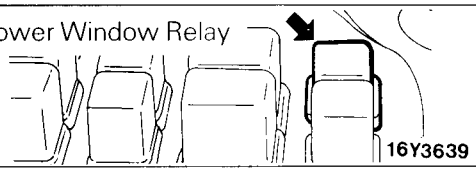
POWER WINDOW TIMER

N08QLAB

CIRCUIT DIAGRAM



COMPONENTS PARTS AND FUNCTION

Electronic Control Unit (ECU)	The ECU switches transistor Tr1 ON when the ignition key is at the ON position, and for about 30 seconds after the ignition key is turned to the OFF position, thus maintaining the power window relay in the ON condition. Note that the timer is stopped if a door is opened during timer operation (about 30 seconds).
Ignition Switch (ON position)	Sends HIGH signals to the ECU (when the ignition key is at ON only), for system compulsory activation input and timer start condition.
Door Switch (left and right)	Detect the open/closed condition of the doors. These switches are switched ON when the doors are opened, and send ground signals to the ECU. When these signals are input during the 30-second operation time of the delay timer, the ECU switches OFF transistor Tr1 thus switching OFF the power window relay.
Power Window Relay  16Y3639	Located in the relay box at the left front part of the engine compartment. This relay is activated by the ECU; power is supplied, via fuse No.8, from the battery. In addition, when this relay is ON, power is supplied to the power window circuit, via the sub fusible link 1 from the battery.
Power Window Switches / Power Window Motors	These switches and motors are activated when the power window relay is switched ON; the direction of conductivity to the motors is switched by the operation of each switch, thus opening and closing the windows.

TROUBLESHOOTING GUIDE

Trouble Symptom	Cause	Check method	Remedy
Power windows do not operate with ignition key at the ON position.	Damaged or disconnected wiring of power window motor drive circuit	Check by using check chart No.22 (P.8-325)	Repair the harness or replace the power window switch and motor.
	Damaged or disconnected wiring of ignition switch ON input circuit	Check by using check chart No.2 (P.8-302).	Replace the fuse or repair the harness.
	Damaged or disconnected wiring of power window relay drive circuit	Check by using check chart No.23 (P.8-326).	Repair the harness or replace the power window relay.
	Malfunction of the ECU	–	Replace the ECU.
Operation of the power window is possible after the ignition key is turned to OFF, but the power window operation does not stop when, within 30 seconds, the door is opened.	Malfunction of a door switch, or damaged or disconnected wiring of the door switch input circuit	Check by using check chart No.12 (P.8-312).	Repair the harness or replace the door switch.
	Malfunction of the ECU	–	Replace the ECU.
The power windows can be operated even though the timer operation time (about 30 seconds) after the ignition key is turned to OFF has passed.	Short-circuit of power window relay drive circuit	Check by using check chart No.23 (P.8-326).	Repair the harness.
	Malfunction of power window relay points	Check the power window relay (P.23-69).	Replace the power window relay.
	Malfunction of the ECU	–	Replace the ECU.

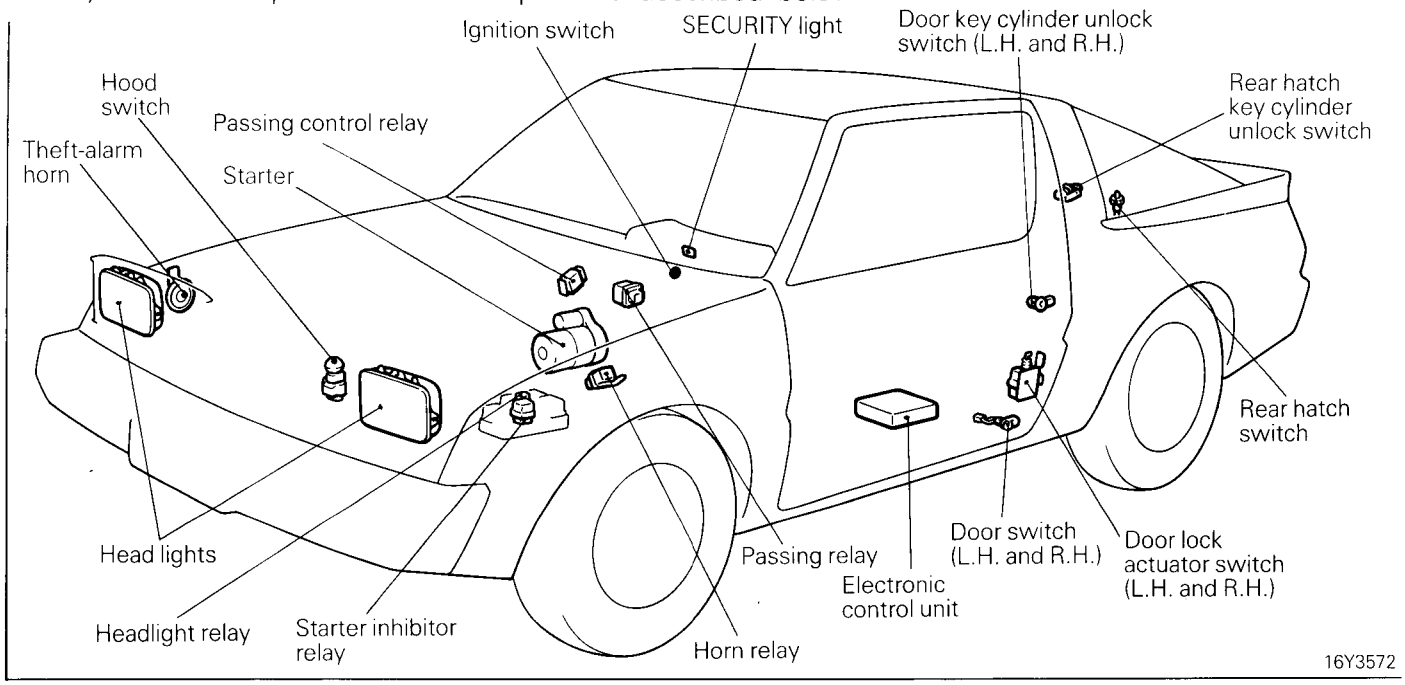
ECU: Electronic Control Unit

THEFT-ALARM SYSTEM

N08QNAB

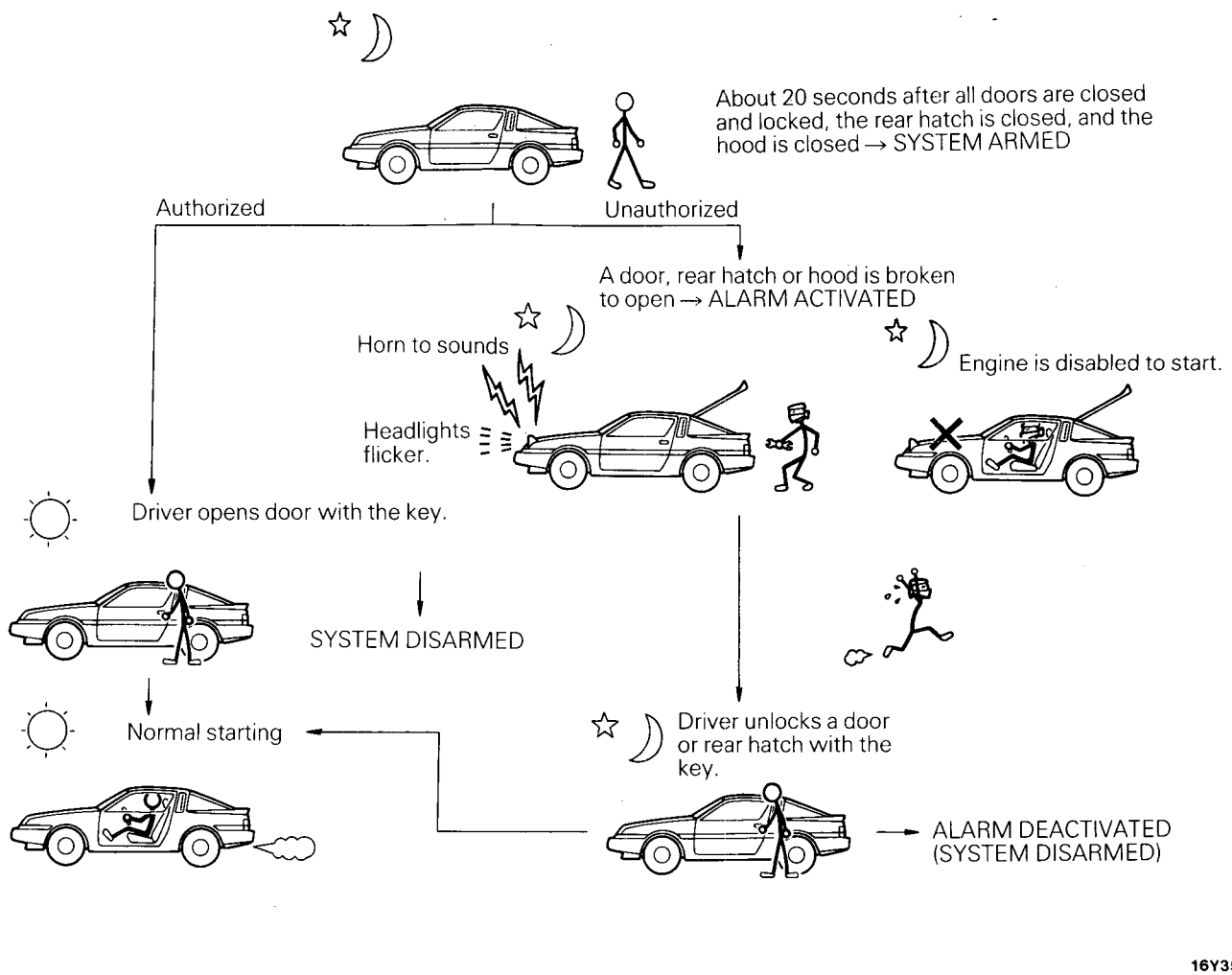
OUTLINE

When the theft-alarm system has been armed by a fixed sequence for locking the doors, if thereafter any door, the rear hatch or the hood is opened in an unauthorized way, the horn will sound intermittently for a period of approximately three minutes, and, at the same time, the headlights will flash on and off, thus providing audible and visual warning signals.
Furthermore, the starter circuit is interrupted in such a way that the engine cannot be started, if the ignition key is not used. Note that this system is controlled by the electronic control unit (ECU) as one function of the ETACS.
This ECU includes an independent (separate from the control of the other ETACS functions) microcomputer for the exclusive use of the theft-alarm system. This microcomputer arms, disarms, activates and deactivates the alarm system.
The system is composed of the components described below.



Input		Output	
Ignition switch (ACC or ON)	Armed or disarmed condition	SECURITY light	Indicates armed condition.
Door switch (left and right)	Armed or activated condition	Horn relay	Activates theft-alarm horn when activated.
Door lock actuator switch (All doors)	Armed or disarmed condition	Passing relay	When activated, this relay activates the passing control relay for raising the headlights, activates the headlight relay, and turns on the headlights.
Door switch (All doors)	Armed or activated condition	Starter inhibitor relay	Opens starter circuit, making starting impossible, when activated.
Hood switch	Activated condition		
Rear hatch switch			
Key cylinder unlock switch – Left and right door	Disarmed or deactivated condition		
Key cylinder unlock switch – Rear hatch	Deactivated condition		

OPERATION



1. ARMING THE SYSTEM

After the following procedures have been completed, the SECURITY light illuminates for about 20 seconds, and when illumination stops, the system is armed.

(1) Pull out the ignition key from the key cylinder.
(2) Open a door. (The other door is closed.)
(3) Use the keyless-locking method to lock the door.
(The central door locking system will then function to lock all doors.)

NOTE

(1) The system is not armed, and therefore does not function, if the key is used to lock the doors.
(2) Even after the system has been armed, if the key is used to open the rear hatch, the system will not be activated; when the rear hatch is then closed, moreover, the system will be armed.
(3) In order to prevent the system's alarm from being accidentally activated by someone remaining in the vehicle, the system is disarmed when, while the SECURITY light is illuminated, a door is unlocked.
(4) If a door is locked by the keyless method but, in error, a door is not completely or securely closed, the system will be disarmed. If this happens, the doors must be locked once again by the keyless method.
(5) If the doors are locked while a door is not closed completely, the SECURITY light will go out after 20 seconds, but the system is not armed. If this happens, the doors must be locked once again by the keyless method.
(6) If a door is unlocked with the key while the SECURITY light is illuminated, the system will not be armed.

2. DISARMING THE SYSTEM

(1) The system will be disarmed if the key is used to unlock a door.
(2) If the system is armed while the driver is still in the vehicle, the system can be disarmed by inserting the ignition key and turning it to the ACC or ON position.

NOTE
Except when the key is used to unlock the rear hatch, once the system has been disarmed, it cannot be re-armed except by following the arming sequence.

3. ACTIVATING THE ALARM

(1) If an attempt is made to open a door, the rear hatch or the hood, without using the key, while the system is armed, the horn will sound intermittently and the headlights will flash on and off for approximately three minutes.
Furthermore, the starter circuit is interrupted at this time also, making starting of the engine impossible.
(2) If a further attempt at forcible entry is made after the first three-minute alarm has finished, the three-minute alarm will be activated again.

NOTE
(1) The interruption of the starter circuit will be maintained, once the system has been activated, until it is deactivated. If, however, the key is used, starting is possible even if the alarm is not deactivated.
(2) An alarm start initiated by an opening of the rear hatch or the hood is limited to when all doors are closed and locked, or the second unauthorized entry after the alarm has occurred one time.

4. DEACTIVATING THE ALARM

The alarm is deactivated and the system is disarmed when a door or rear hatch is unlocked with the key.

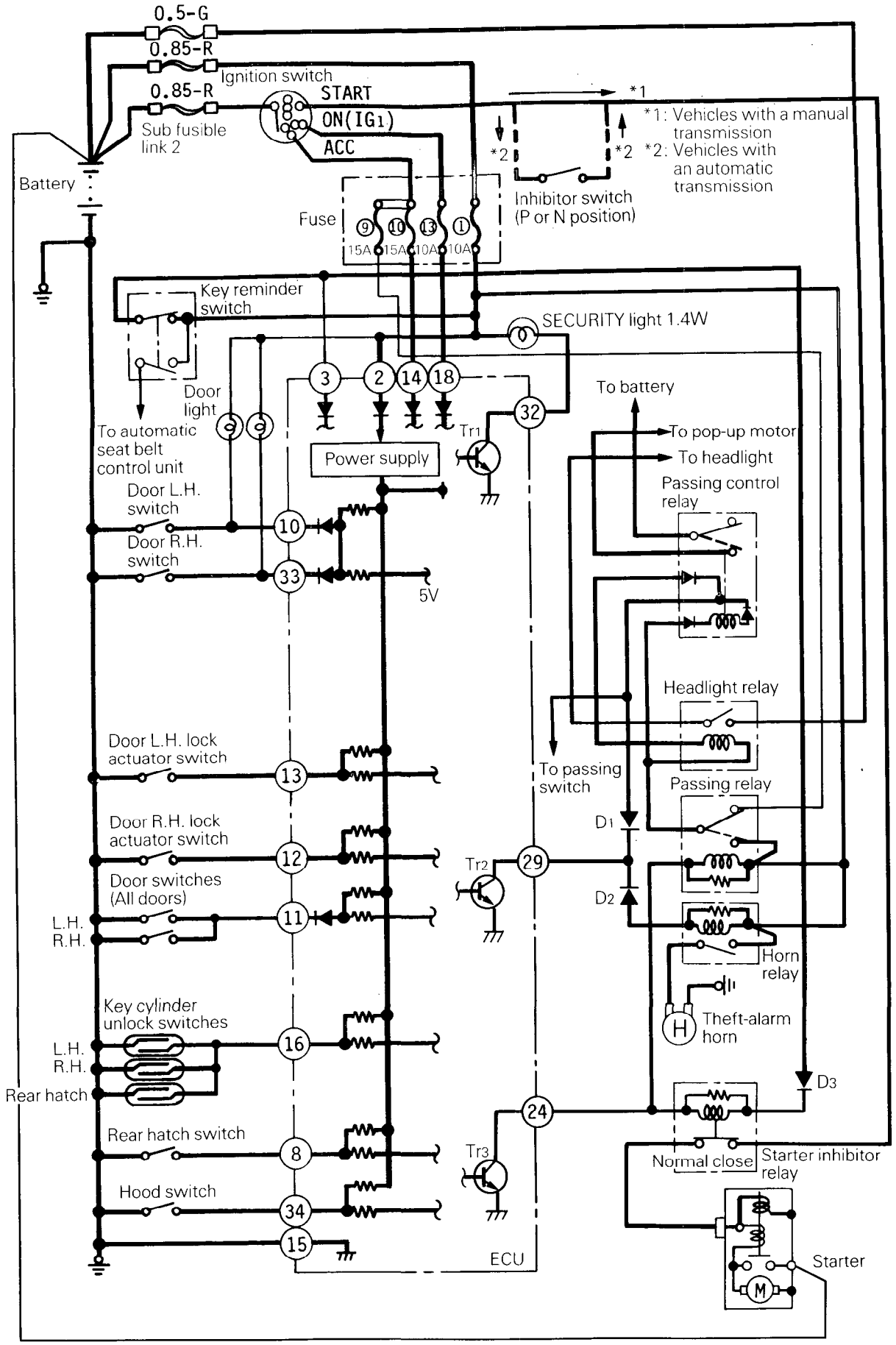
NOTE
Once the alarm has started, the system cannot be deactivated even if the ignition key is turned to the ACC or ON position.

5. CHECKING THE SYSTEM OPERATION

The activation/operation of the system can be checked by following the steps below.
(1) Turn the ignition key to the ON position and then use the power-window switch to fully open the window at the driver's seat side.
(2) Turn the ignition key to the LOCK position and then remove the key from the ignition.
(3) Open only the driver's door, and close all the other doors, as well as the hood and the rear hatch.
(4) Lock the driver's door by the keyless lock method.
(5) All doors will then be locked, and the SECURITY light (within the combination meter) will illuminate; check to be sure that illumination stops in about 20 seconds.
(6) After about two seconds have passed after the SECURITY light illumination stopped, reach through the window of the driver's door, pull up the lock lever to unlock the door, and then open the door.
(7) Check to be sure that, when the door is opened, the horn starts sounding and the headlights flash on and off.
(8) To stop the alarm, insert the key into the door's key cylinder and turn the key to the unlock position.

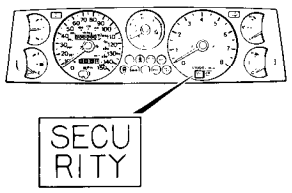
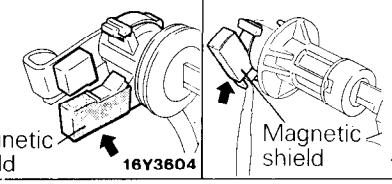
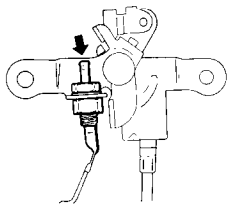
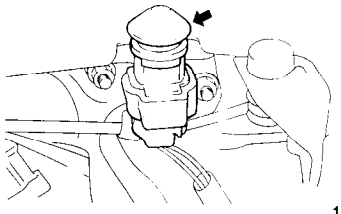
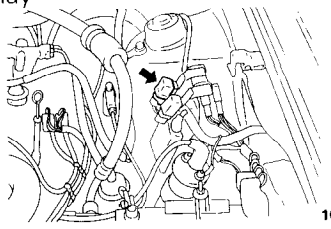
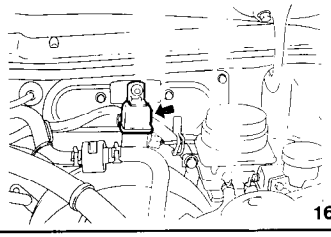
NOTE
To check the alarm for the opening of the rear hatch or hood, open the rear hatch (or the hood) by using the remote rear hatch release lever (or the hood release lever), located at the driver's seat side either before the alarm is activated by the opening of a door, or after the finish of the first three-minute alarm.

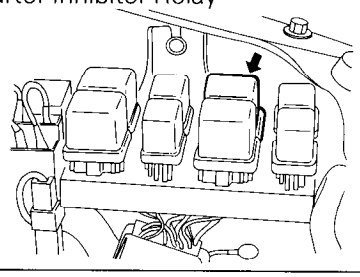
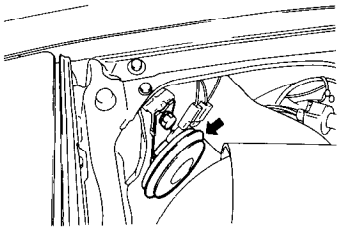
CIRCUIT DIAGRAM



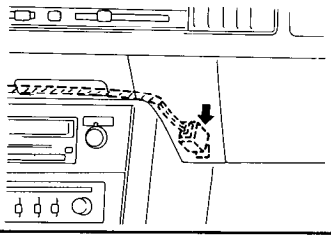
16Y3586

COMPONENT PARTS AND FUNCTION

Electronic Control Unit (ECU)	Controls the system based on the various input signals. Control steps ① Arming the system ② Disarming the system ③ Activating the alarm ④ Deactivating the alarm
SECURITY Light  16Y3574	Located at the combination meter. The SECURITY light illuminates when the alarm system is set to arm; the illumination stops after about 20 seconds, thus informing the driver that the system is now armed. The illumination ON/OFF of this light are controlled by the ECU (transistor Tr_1), and power is supplied, through fuse No.1, from the battery.
Key Cylinder Unlock Switch (Doors) (Rear hatch)  16Y3604 16Y3607	Located at the key cylinders of the doors and the rear hatch. When the key is inserted into the cylinder and turned to a fixed angle or more toward the unlock position, a ground signal is sent to the ECU. The ECU functions to disarm or deactivate the system according to this signal.
Rear Hatch Switch  16Y3602	Located in the lock mechanism for the rear hatch. The switch detects the open/close condition of the rear hatch. When the rear hatch is opened, an ON (ground) signal is sent to the ECU, and, when it is closed, an OFF (HIGH) signal is sent to the ECU, for arming, disarming or activating the system.
Hood Switch  16Y3610	Located at the front left of the hood. It detects the open/close condition of the hood. When the hood is opened, this switch is ON, and a ground signal is sent to the ECU. If the signal is input to the ECU when the system is in the armed condition, the ECU functions to activate the alarm.
Horn Relay  16Y3613	Located at the left part of the engine compartment. The relay is activated by the ECU (transistor Tr_2) when the system is activated to alarm. When this relay is ON, the theft-alarm horn begins to sound. The power for this relay is supplied, through the fuse No.1, from the battery.
Passing Relay  16Y3609	Located at the left front of the dash panel. When the system is in its activated state, this relay is activated on command from the ECU (transistor Tr_3). When this relay is activated, the circuit to the passing control relay and headlight relay is completed. The power for this relay is supplied, through the fuse No.1, from the battery.

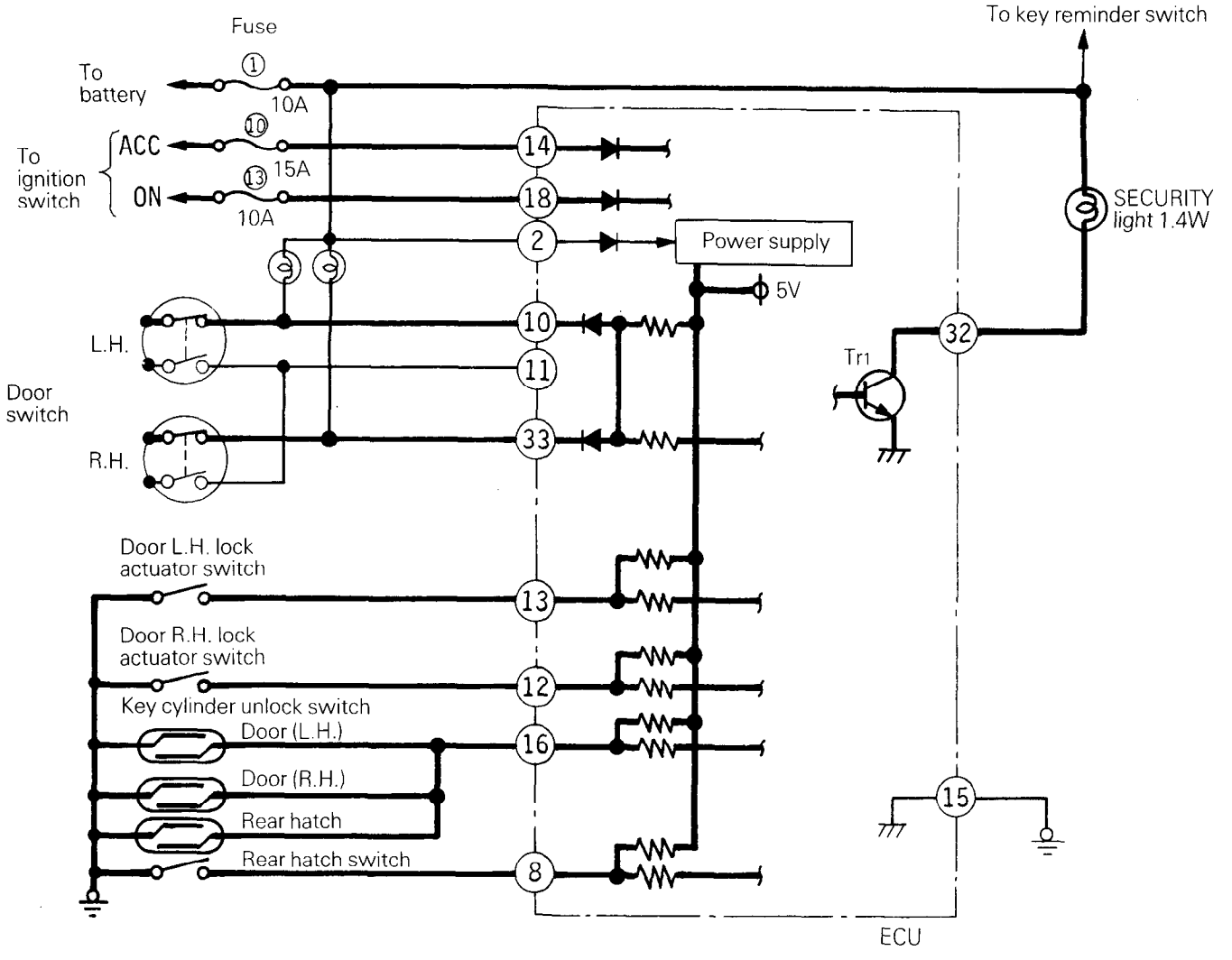
Starter Inhibitor Relay  16Y3641	This relay is located in the relay box at the left front of the engine compartment. When the system is activated, this relay is activated by the ECU (transistor Tr3). This relay is usually closed; when it is switched ON, the circuit conductive to the starter is opened, making starting impossible.
Theft-alarm Horn  16Y3603	This horn is located at the right front of the engine compartment. The horn sounds when the horn relay is switched ON.

The following components also constitute the theft-alarm system.

Door Switch	Left	These switches detect the open/close condition of the doors. (This is a condition for arming the system.)
	Right	
	All doors	One of these switches is located at each door. They detect the open or closed condition of the doors, and when any one of them is opened, a ground signal is sent to the ECU. When this signal is input while the system is armed, the ECU functions to activate the alarm.
Door Lock Actuator Switch (left and right)		These switches detect the locked/unlocked condition of the doors. (This is a condition for arming or disarming the system.)
Ignition Switch	ON position	This switch sends a HIGH signal to the ECU when the ignition key is at the ON or ACC position. (This is a condition when arming or disarming the system.)
	ACC position	
Key-reminder Switch (for lighting monitor)		When the system is activated, the starter circuit is inhibited. By inserting the key in the ignition switch, the power to the starter inhibitor relay is cut, and the engine can be started.
Headlight Relay		This relay, in the same way as the horn relay, is activated by the ECU (transistor Tr2) when the system is activated and the alarm starts. When this relay is switched ON, the headlights (upper or lower) are switched ON. This relay's power is supplied, through the sub-fusible link from the battery.
Passing Control Relay  16Y3601		Located at the center of the instrument panel inside. This relay is activated by the ECU (transistor Tr2) when the system is in its activated state and the passing control relay is closed, thus completing the circuit beginning with fuse No. 1. This causes the headlights to rise and flash.

TROUBLESHOOTING GUIDE

1. ARMING / DISARMING RELATIONSHIP



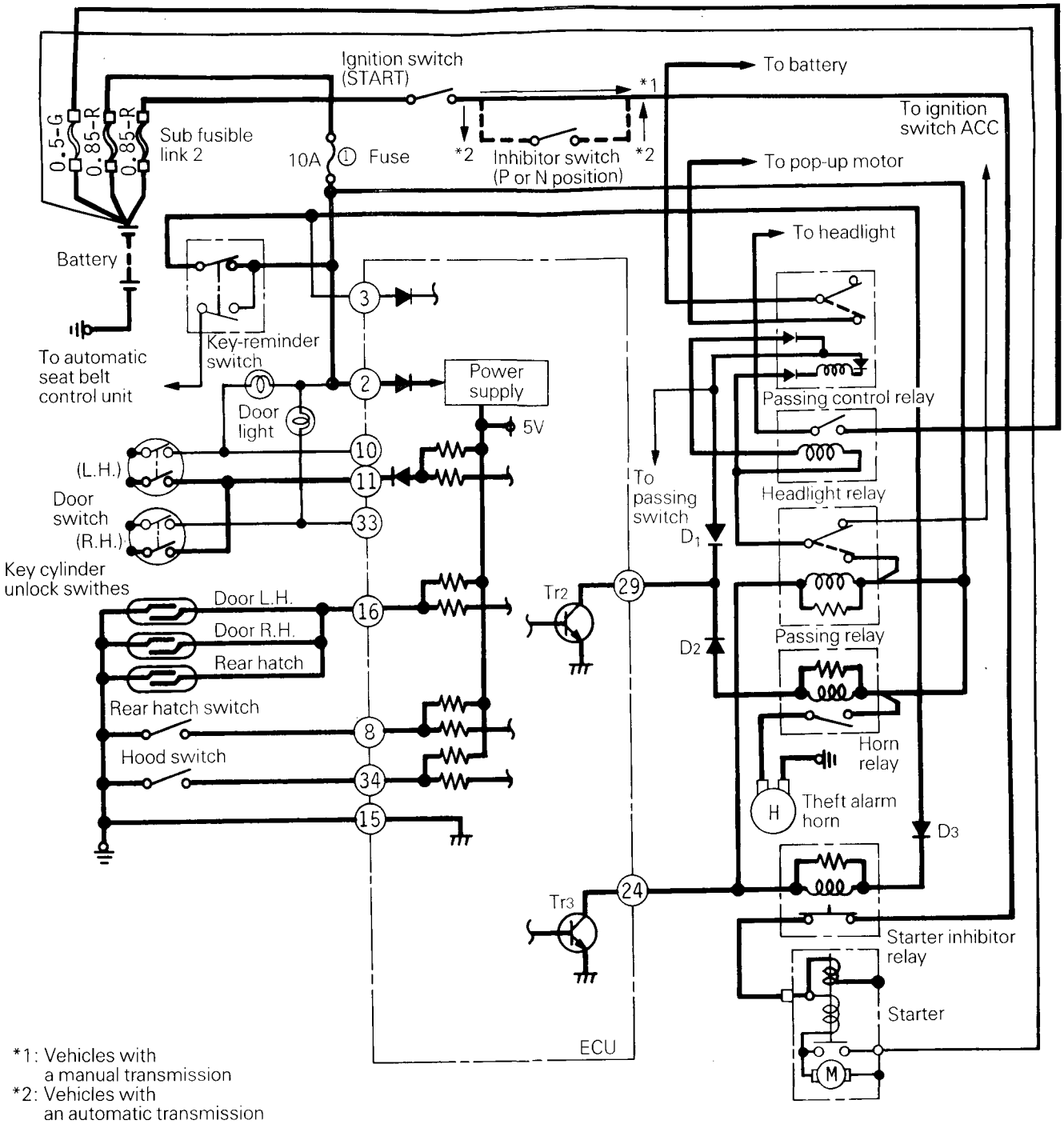
16Y3585

Trouble symptom	Cause	Check method	Remedy
The system is not armed (The SECURITY light doesn't illuminate, and the alarm doesn't function.) (The central door locking system functions normally. If the central locking system does not function normally, refer to P.8-278.)	Damaged or disconnected wiring of ECU power supply circuit	Check by using check chart No.1 (P.8-301).	Replace the fuse No.1 or repair the harness.
	Damaged or disconnected wiring of door switch input circuit	Check by using check chart No. 12 (P.8-312).	Repair the harness or replace the door switch.

Trouble symptom	Cause	Check method	Remedy
The arming procedures are followed, but the SECURITY light does not illuminate. (There is an alarm, however, when an alarm test is conducted after about 20 seconds have passed.)	Damaged or disconnected wiring of SECURITY light power supply or drive circuit	Check by using check chart No. 25 (P.8-328).	Replace the fuse No. 1 or repair the harness.
	Blown SECURITY light bulb		Replace the bulb.
	Malfunction of the ECU	–	Replace the ECU.
The alarm sounds in error when, while the system is armed, the rear hatch lock is unlocked by using the key.	Damaged or disconnected wiring of rear hatch key cylinder unlock switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No. 24 (P.8-327).	Repair the harness or replace the rear hatch key cylinder.
	Malfunction of the rear hatch key cylinder unlock switch		
	Malfunction of the ECU	–	Replace the ECU.
The system is not disarmed when; while armed, a door is opened by using the key. (Alarm sounds in error.)	Damaged or disconnected wiring of door key cylinder unlock switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No. 24 (P.8-327).	Repair the harness or replace the key cylinder.
	Malfunction of the door key cylinder unlock switch		
	Malfunction of the ECU	–	Replace the ECU.

ECU: Electronic Control Unit

2. ACTIVATION / DEACTIVATION RELATIONSHIP



16Y3582

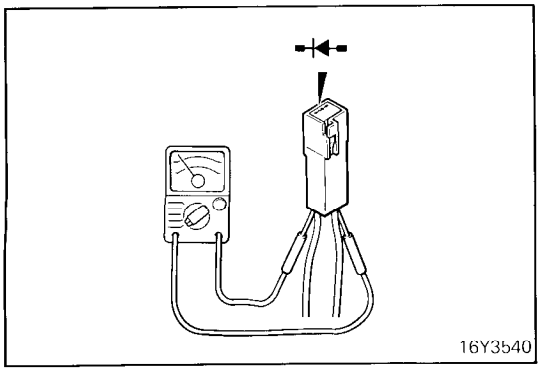
Trouble symptom	Cause	Check method	Remedy
There is no alarm when, as an alarm test, a door is opened without using the key. (The arming and disarming are normal, and the alarm is activated when the rear hatch or hood is opened.)	Damaged or disconnected wiring of door switch (all doors) input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No. 10 (P.8-310).	Repair the harness or replace the door switch.
	Malfunction of the door switch		
	Malfunction of the ECU.	–	Replace the ECU.

Trouble symptom	Cause	Check method	Remedy
There is no alarm when, as an alarm test, the rear hatch is opened without using the key. (The alarm is activated, however, by opening a door.)	Damaged or disconnected wiring of rear hatch switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No. 26 (P.8-329).	Repair the harness or replace the rear hatch switch.
	Malfunction of the rear hatch switch		
	Malfunction of the ECU	–	Replace the ECU.
There is no alarm when, as an alarm test, the hood is opened from within the vehicle. (The alarm is activated, however, by opening a door.)	Damaged or disconnected wiring of hood switch input circuit	If input checks (P.8-296), indicate a malfunction, check by using check chart No. 27 (P.8-330).	Repair the harness or replace the hood switch.
	Malfunction of the hood switch		
	Malfunction of the ECU	–	Replace the ECU.
Engine would not start. [Engine starting is possible when the starter inhibitor relay is in the switched-off (normally closed) condition, with the ECU harness connector disconnected.]	There is a short-circuit of the starter inhibitor relay drive circuit and a short-circuit of the key-reminder switch at the same time.	Check by using check chart No. 28 (P.8-332).	Repair the harness, and replace the key-reminder switch.
The headlights flashes on and off without popping-up when, as an alarm test, a door or the rear hatch is opened without using the key or the hood is opened from within the vehicle. (The headlights can, however, be popped-up and flashed by the passing switch.)	Damaged or disconnected wiring of passing relay power supply circuit	Check by using check chart No.29 (P.8-334).	Repair the harness or replace the passing relay.
When, as a test of the alarm, a door or the rear hatch is opened without using the key, or the hood is opened from within the vehicle, the theft alarm horn sounds but the headlights neither rise nor flash. (The headlights can, however, be switched ON by using the passing switch.)	Damaged or disconnected wiring of passing relay drive circuit	Check by using check chart No. 28 (P.8-332).	Repair the harness or replace the passing relay
	Damaged or disconnected wiring of passing relay power supply circuit	Check by using check chart No. 29 (P.8-334).	
	Damaged or disconnected wiring of diode D_1	Check by using check chart No. 30 (P.8-335).	Repair the harness or replace the diode (D_1)

Trouble Symptom	Cause	Check method	Remedy
The headlights flash during an alarm test, but the theft-alarm horn does not sound.	Damaged or disconnected wiring of horn relay drive circuit	Check by using check chart No. 30 (P.8-335).	Repair the harness or replace the diode D_2 or the horn relay.
	Damaged or disconneted wiring of diode D_2.		
	Malfunction of the horn relay		
	Damaged or disconnected wiring of horn relay power supply circuit	Check by using check chart No. 31 (P.8-336).	Repair the harness.
	Damaged or disconnected wiring of theft-alarm horn drive circuit	Check by using check chart No. 32 (P.8-338).	Repair the harness or replace the theft-alarm horn.
	Malfunction of the theft-alarm horn		
The system is not deactivated when, during an alarm test in which the alarm is intentionally activated, the door or rear hatch is unlocked by using the key. (The system also cannot be disarmed.)	Damaged or disconnected wiring of key cylinder unlock switch input circuit	If input checks (P.8-296) indicate a malfunction, check by using check chart No. 24 (P.8-327).	Repair the harness or replace the key cylinder.
	Malfunction of the key cylinder unlock switch		
	Malfunction of the ECU	–	Replace the ECU.
The theft-alarm horn sounds when the passing switch is operated with the ignition switch at ACC or ON position.	Short-circuit of diode D_1	Check the diode.	Replace the diode D_1.

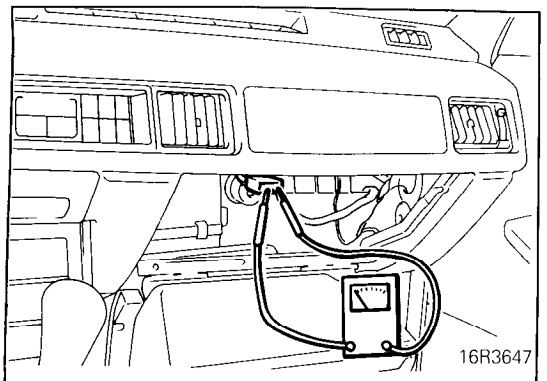
ECU: Electronic Control Unit

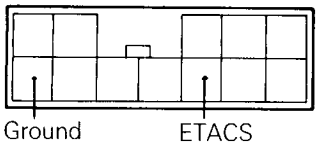
NOTE
(1) If there is abnormally excessive play in the installation of the key cylinder unlock switch of the trunk and for doors, or if there is improper installation, or if there is a malfunction of the switch itself, the signals to disarm the system and to deactivate the alarm won't be sent to the ECU.
In this instance, after the system has been armed the alarm will be activated even if the door is opened by using the key.
(2) If there is a malfunction of the key cylinder unlock switch system (damaged or disconnected wiring, or short-circuit), thus making it necessary to prevent an incorrect (accidental) alarm, the system should not be armed by using the key to lock when all the doors are closed.



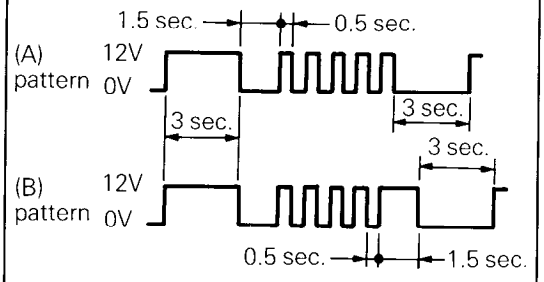
Inspection of Diode

Using the ohmmeter, check the continuity by contacting the probes to the diode connector for two directions.
If the continuity exists only in one direction, the diode is normal.
If the continuity exists in both directions, or there is no continuity, the diode is faulty.


16R3647



16R1338

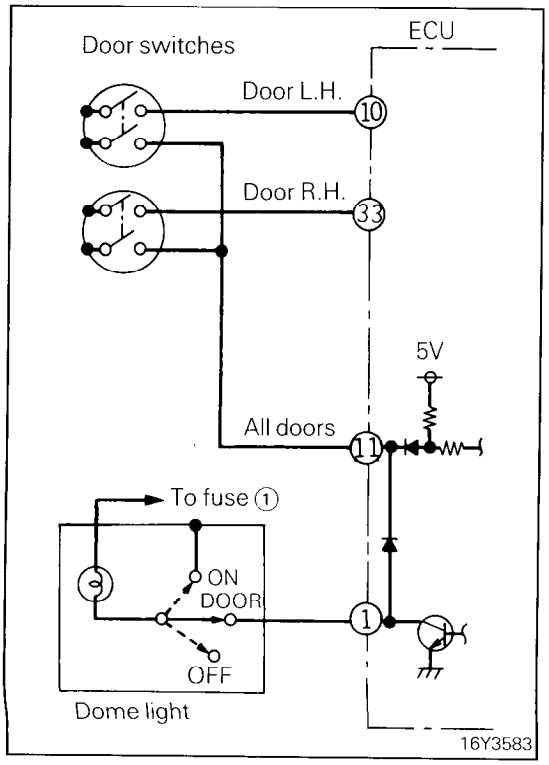


16R1307

INSPECTION PROCEDURE BY INPUT CHECK SYSTEM

1. Open the glove compartment and connect a voltmeter between terminal for "ETACS" and terminal for ground.
2. Check to be sure that voltage should be output repeatedly in the (A) or (B) pattern shown in the figure at the left when the ignition key is turned to the ON or ACC position.

   NOTE
   If there is no output of a voltage pattern at all, check the ECU power-supply and ground circuits as described in check chart No. 1 (Refer to P.8-301).
   If there is still no output of voltage pattern despite the fact that the power-supply circuit is normal, check for a disconnected or damaged harness of the diagnosis output terminal, or a short-circuit.
3. Check each switch or sensor separately, as described below.



16Y3583

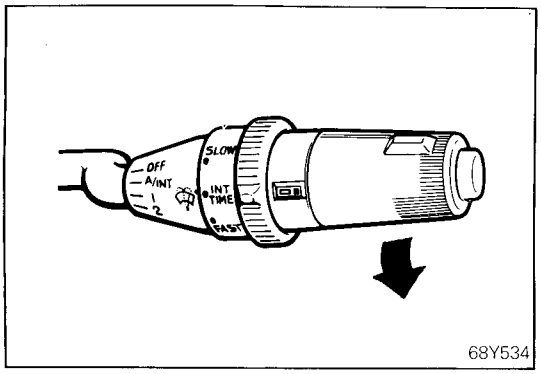
1. DOOR SWITCHES (ALL DOORS)

(1) Turn the ignition key to LOCK.
(2) Set the dome light switch to the DOOR position.
(3) Check to be sure that the dome light is switched OFF when all doors are closed.

NOTE
If the dome light remains illuminated even though all doors are closed, either there is a short-circuit at one of the door switches, or there is a malfunction of the ECU.

(4) With all doors closed, open only the left door.
Check to be sure that, at the moment when the door is opened, the dome light lights and the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more.
If it does not, the problem is damaged or disconnected wiring of the left door's door switch input circuit.
(5) Check the right door in the same way.

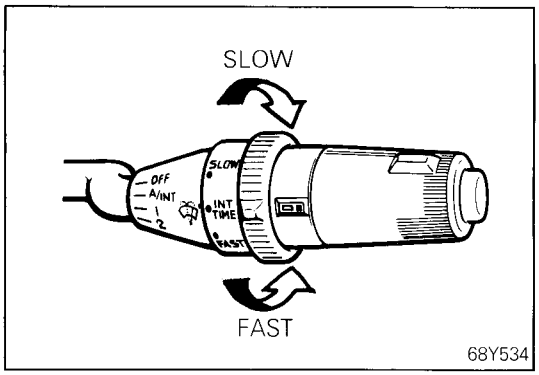
NOTE
If a malfunction is found as a result of the input checking, check according to check chart No. 10 (P.8-310).



68Y534

2. A/INT SWITCH

(1) Turn the ignition key to the LOCK position and open the doors.
(2) Check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more when the wiper switch is set to the A/INT position.
(3) If it does not, check as described in check chart No. 3 (Refer to P.8-303).

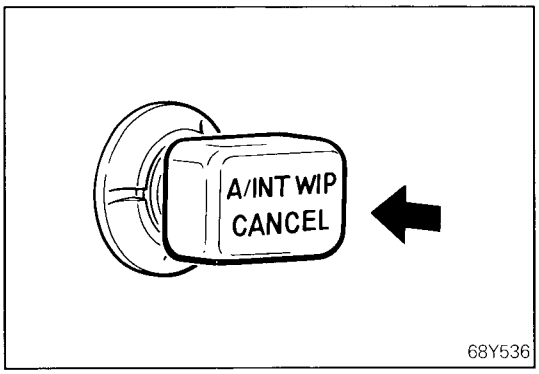


68Y534

3. FAST/SLOW SWITCH

(1) Turn the ignition key to ON.
(2) Check to be sure that the buzzer sounds when the FAST or SLOW switch is switched ON.
If the buzzer does not sound although the buzzer circuit is normal, the problem is damaged or disconnected wiring, or a short-circuit, of the FAST or SLOW switch input circuit.

NOTE
(1) The buzzer circuit can be considered to be normal if the buzzer sounds when another switch (CANCEL or defogger) is used.
(2) If a malfunction is found as a result of the input checking, check according to check chart No. 6 (Refer to P.8-306).

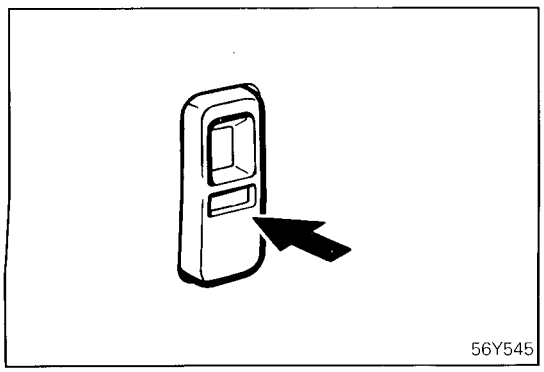


68Y536

4. CANCEL SWITCH

(1) Turn the ignition key to ON.
(2) Check to be sure that the buzzer sounds when the CANCEL switch is pushed.
(3) If there is a malfunction of the buzzer circuit, check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more by pushing the CANCEL switch with the ignition key in LOCK position and a door opened.

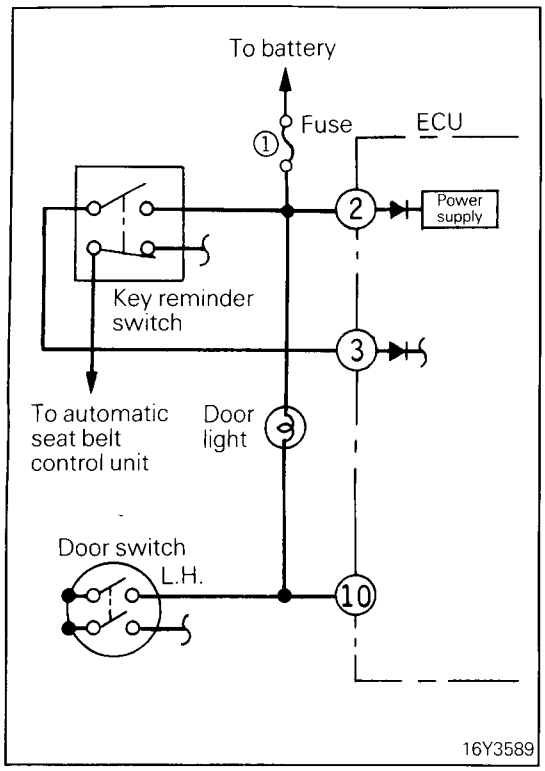
NOTE
If a malfunction is found as a result of the input checking, check according to check chart No. 6 (Refer to P.8-306).


56Y545

5. DEFOGGER SWITCH

Check in the same way as CANCEL switch as shown above.

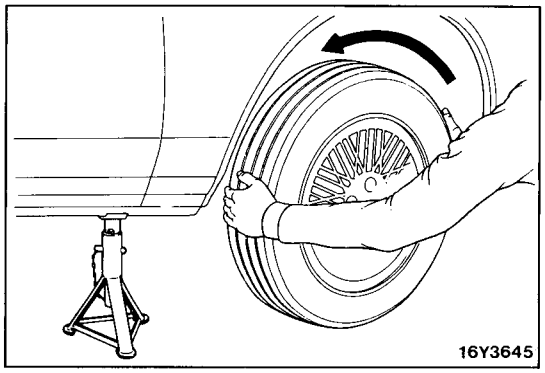
NOTE
If a malfunction is found as a result of the input checking, check according to check chart No. 19 (Refer to P.8-322).



6. KEY-REMINDER SWITCH

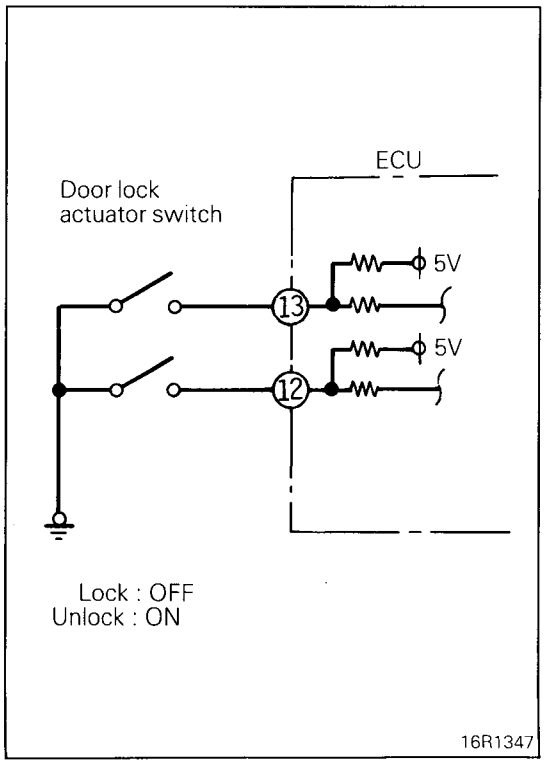
(1) Turn the ignition key to the LOCK position and open one of the doors.
(2) Check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more when the ignition key is taken from the key cylinder.
(3) If it does not, check as described in check chart No. 17 (Refer to P.8-318).

NOTE
Check the key-reminder switch by cheking to be sure that the alarm buzzer sounds when the lighting switch is switched ON while the ignition key is not inserted, or when the left door is opened while the ignition key is inserted; by making these checks, the key-reminder switch itself can be checked.



7. VEHICLE-SPEED SENSOR

(1) Turn the ignition key to the LOCK position and open one of the doors.
(2) Jack up the rear end and check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V for one second or more when a tire is rotated at a speed of one rotation per second.
(3) If it does not, check as described in check chart No. 7 (Refer to P.8-307).



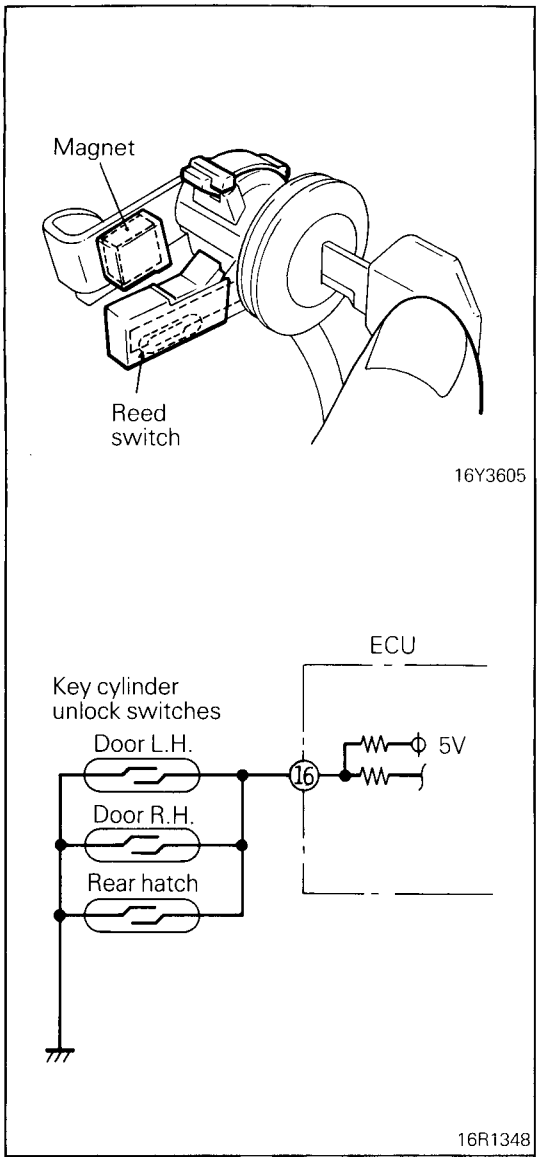
8. DOOR LOCK ACTUATOR SWITCH (LEFT AND RIGHT)

(1) Remove the ignition key and open one of the doors.
(2) Check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more when the door lock lever of the left door is set from the locked condition to the unlocked condition.

NOTE
If the central door locking system functions at this time, the left door actuator switch can be considered to be normal without making an input check.

(3) Check the right door in the same way.

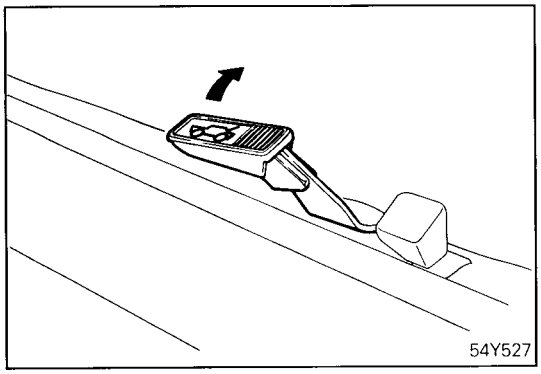
NOTE
If a malfunction is found as a result of the input checking, check according to check chart No. 13 (Refer to P.8-313).



9. KEY CYLINDER UNLOCK SWITCH

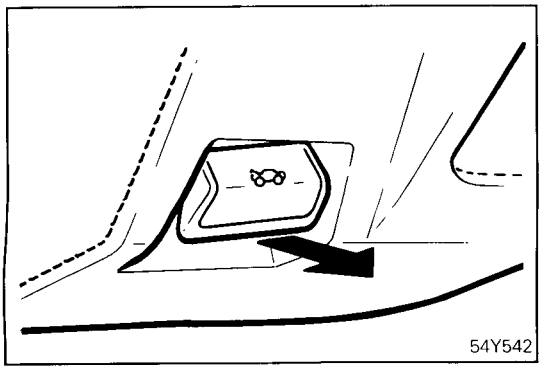
(1) Turn the ignition key to the LOCK position and open one of the doors.
(2) Check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more when the key is inserted into the left door's key cylinder and turned to the unlocked position.
If it does not, the problem is damaged or disconnected wiring, or a short-circuit, of the left door's key cylinder unlock switch input circuit.
(3) Check the right door lock and the rear hatch in the same way.

NOTE
(1) If there is a short-circuit of the key cylinder unlock switch input circuit, all key cylinder input checks will be no good.
(2) If a malfunction is found as a result of the input checking, check according to check chart No. 24 (Refer to P.8-327).



10. REAR HATCH SWITCH

(1) Turn the ignition key to the LOCK position and open one of the doors.
(2) Check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more when the rear hatch is opened by using the remote rear hatch release lever (located at the driver's seat side).
(3) If it does not, check as described in check chart No. 26 (Refer to P.8-329).



11. HOOD SWITCH

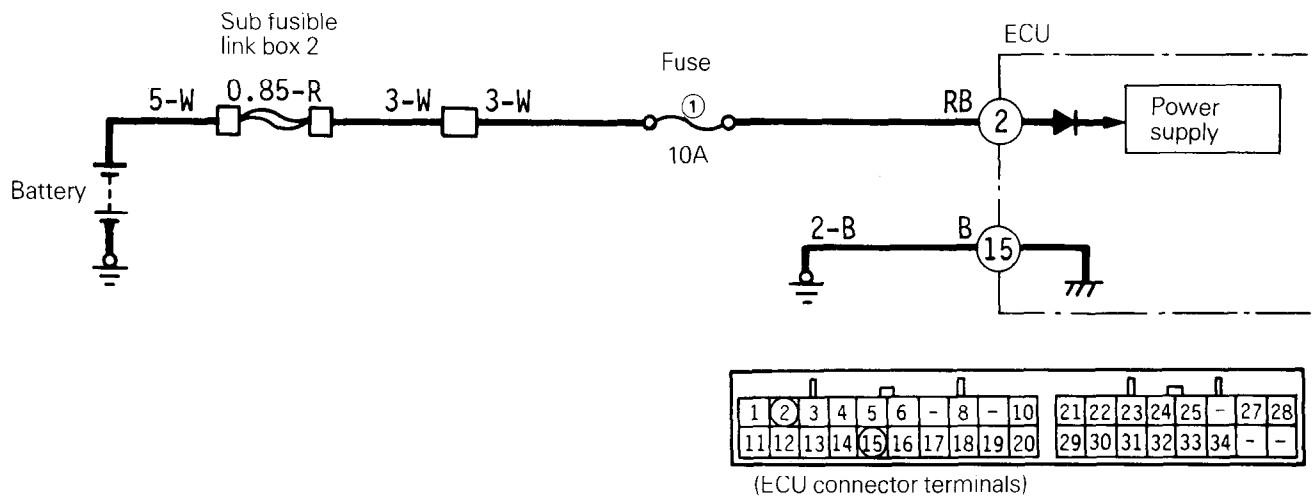
(1) Turn the ignition key to the LOCK position and open one of the doors.
(2) Check to be sure that the indication of the voltmeter connected to the diagnosis terminal moves by about 2V or more when the engine hood is opened by using the hood release lever.
(3) If it does not, check as described in check chart No. 27 (Refer to P.8-330).

CHECKING CIRCUIT

N08QOAB

INDEX OF CHECK CHART

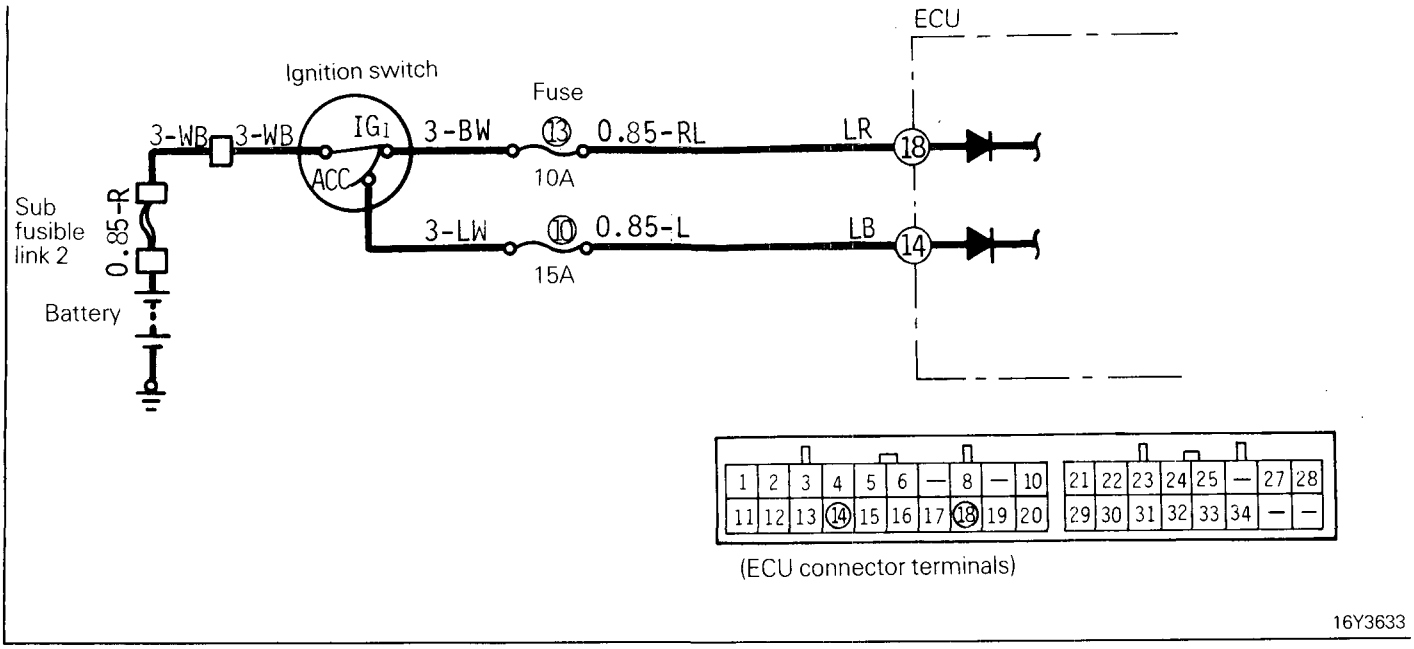
1. ECU Power Supply and Ground Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	—	ECU terminal voltage (2-Ground)	Battery voltage	0V	Fuse ① damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected	Repair the harness.
2	Disconnect ECU's harness connector.	Continuity of ECU ground circuit (15-Ground)	Continuity	∞Ω	Harness damaged or disconnected	Repair the harness.

ECU: Electronic Control Unit

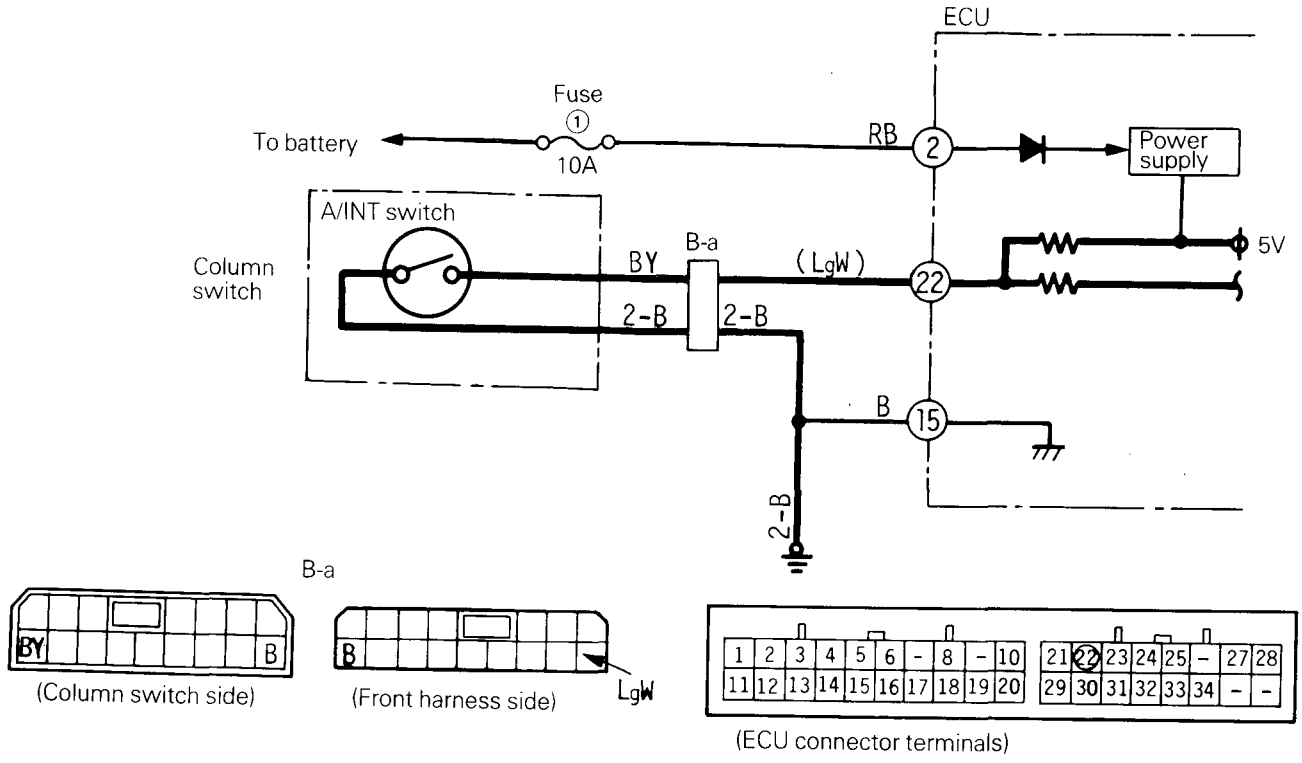
2. Ignition Switch (ON, ACC) Input Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: ACC	ECU terminal voltage (14-Ground)	Battery voltage	0V	Fuse ⑩ damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected	Repair the harness.
2	IG SW: ON	ECU terminal voltage (18-Ground)	Battery voltage	0V	Fuse ⑬ damaged or disconnected	Repair the harness.
					Harness damaged or disnonnected	Repair the harness.

IG SW: Ignition Switch, ECU: Electronic Control Unit

3. A/INT Switch Input Circuit

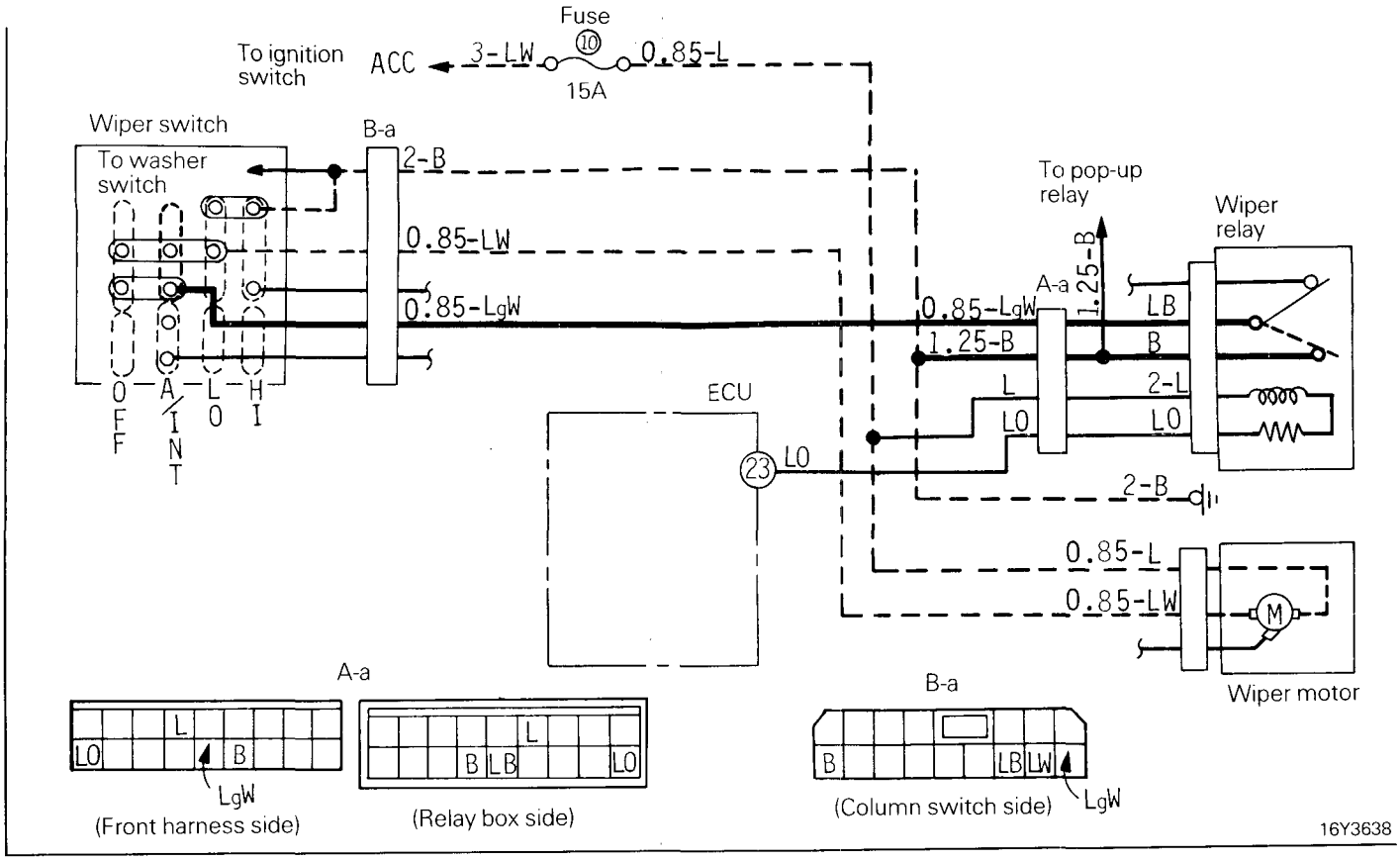


16Y3629

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: OFF B-a connector: separation A/INT switch: ON ↔ OFF	Continuity between B-a connector (column switch side) terminals (BY-B)	0Ω ↔ ∞Ω	Remains ∞Ω.	A/INT switch or harness damaged or disconnected, or short-circuit	Replace the part or repair the harness. (Refer to P.8-203.)
				Remains 0Ω.		
2	IG SW: OFF B-a connector: ECU connector: separation A/INT switch: ON ↔ OFF	Continuity between the ECU terminal and ground (22-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of B-a connector B line, or of LgW line between ECU and B-a	Repair the harness.
				Remains 0Ω.	Short-circuit of LgW line between ECU and A-a	Repair the harness.

IG SW: Ignition Switch, ECU: Electronic Control Unit

4. Wiper Motor Drive Circuit

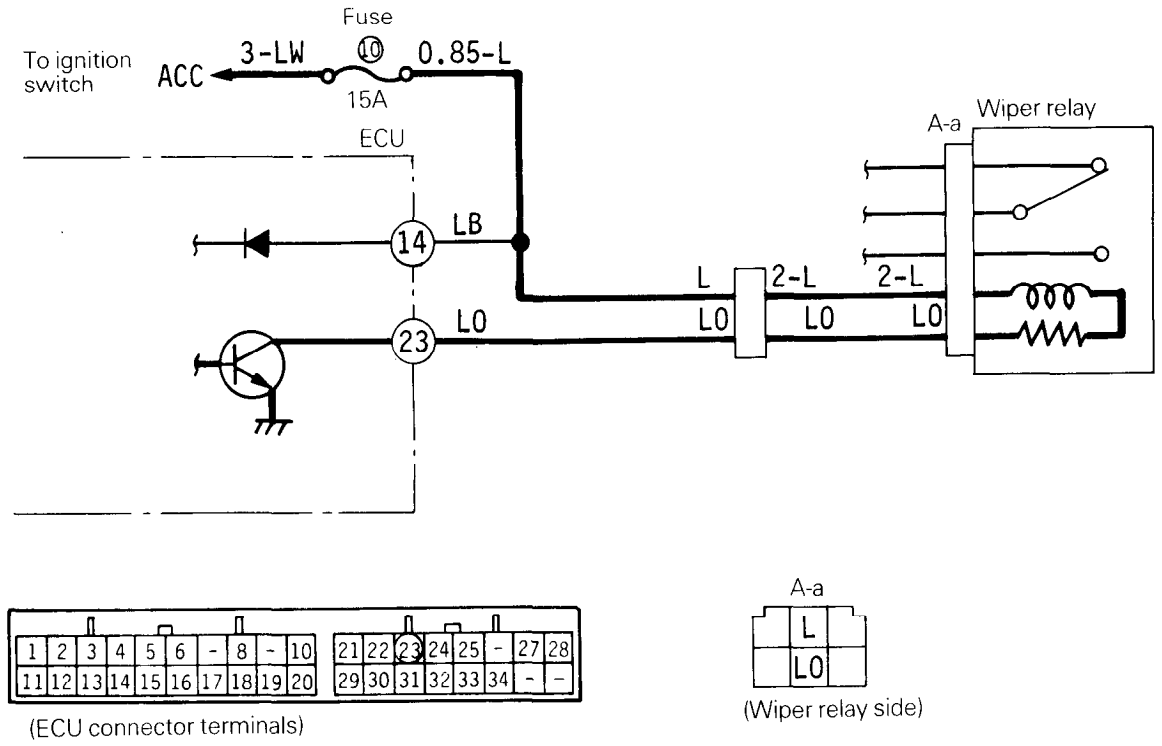


NOTE
The check table shown below is based upon the assumption that the circuit indicated by the broken line (- - - -) in the figure above is normal. [The wipers operate normally when the wiper switch is at the "1" (low speed) position.]

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: OFF Wiper switch: A/INT ↔ OFF	Continuity between A-a connector and B-b connector (LgW-LW)	0Ω ↔ ∞Ω	Remains 0Ω.	Malfunction of the wiper switch	Replace the wiper switch. (Refer to P.8-203.)
				Remains ∞Ω.	Harness damaged or disconnected	Repair the harness.
2	Separate the ECU's harness connector; then short-circuit terminal No. 23 (body harness side LO line) to activate the wiper relay. IG SW: ACC	Continuity between A-a connector and ground (LB-Ground)	0Ω	∞Ω	Malfunction of the wiper relay	Replace the wiper relay.
					Harness damaged or disconnected	Repair the harness.

IG SW: Ignition Switch, ECU: Electronic Control Unit

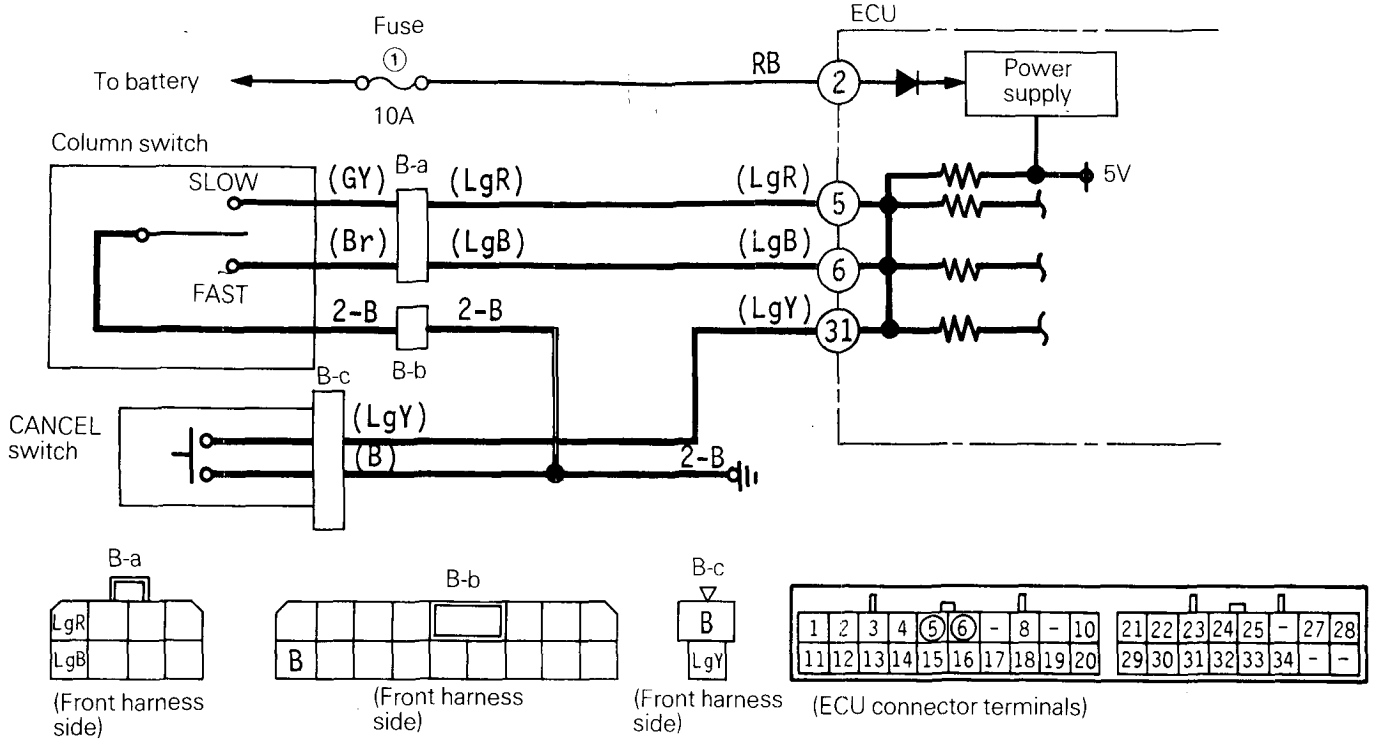
5. Wiper Relay Drive Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: ACC	A-a connector (harness side) terminal voltage (L-Ground)	Battery voltage	0V	Fuse ⑩ damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected, or short-circuit	Repair the harness.
2	Separate the ECU's harness connector. IG SW: ACC	ECU terminal voltage (23-Ground)	Battery voltage	0V	Damaged or disconnected wiring of relay coil	Repair the wiper control relay.
					Harness (LO line) damaged or disconnected, or short-circuit	Repair the harness.

IG SW: Ignition Switch, ECU: Electronic Control Unit

6. SLOW, FAST, CANCEL Switch Input Circuit

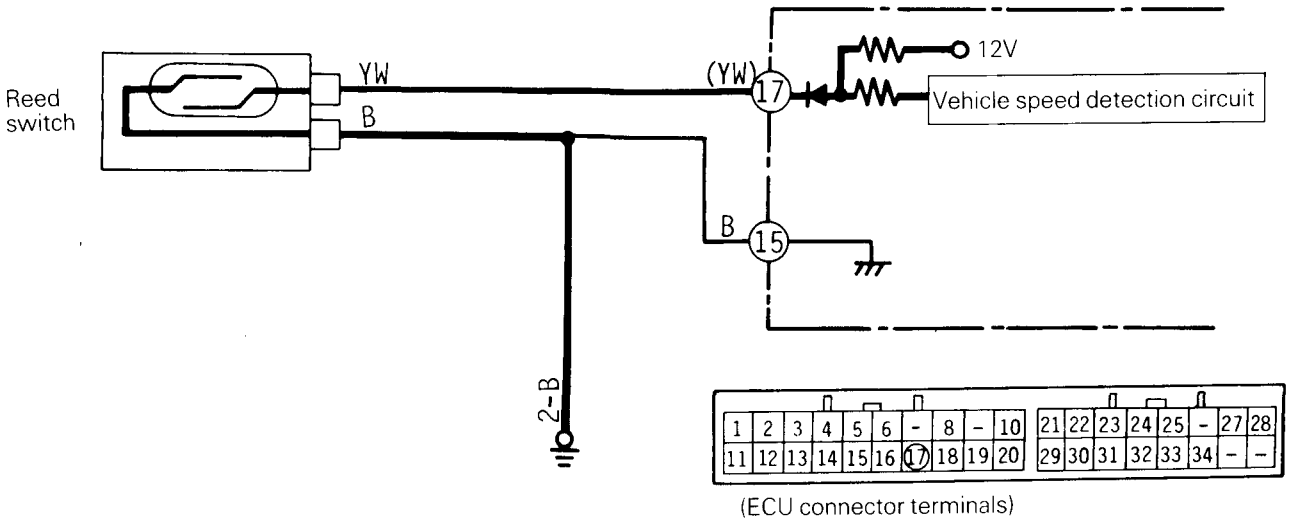


16Y3591

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: OFF B-a, B-b or B-c connector: separation FAST, SLOW or CANCEL SW: ON ↔ OFF	Continuity between B-a, B-b or B-c connector terminals SLOW: GY-Ground FAST: Br-Ground CANCEL: LgY-Ground	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of switch or harness	Replace the column switch or CANCEL switch (refer to P.8-203, 223) or repair the harness.
				Remains 0Ω.	Short-circuit of switch or harness	
2	IG SW: OFF B-a, B-b or B-c connector: connection ECU connector: separation FAST, SLOW or CANCEL SW: ON ↔ OFF	Continuity between the ECU terminal and ground SLOW: 5-Ground FAST: 6-Ground CANCEL: 31-Ground	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring between ECU and B-a (LgR or LgB) or B-c (LgY) connector	Repair the harness.
				Remains ∞Ω.	Damaged or disconnected wiring of B-b (B) or B-c (B) connector	
				Remains 0Ω.	Short-circuit between ECU and B-a or B-c (LgR, LgB or LgY)	

IG SW: Ignition Switch, ECU: Electronic Control Unit

7. Vehicle-speed Sensor Circuit

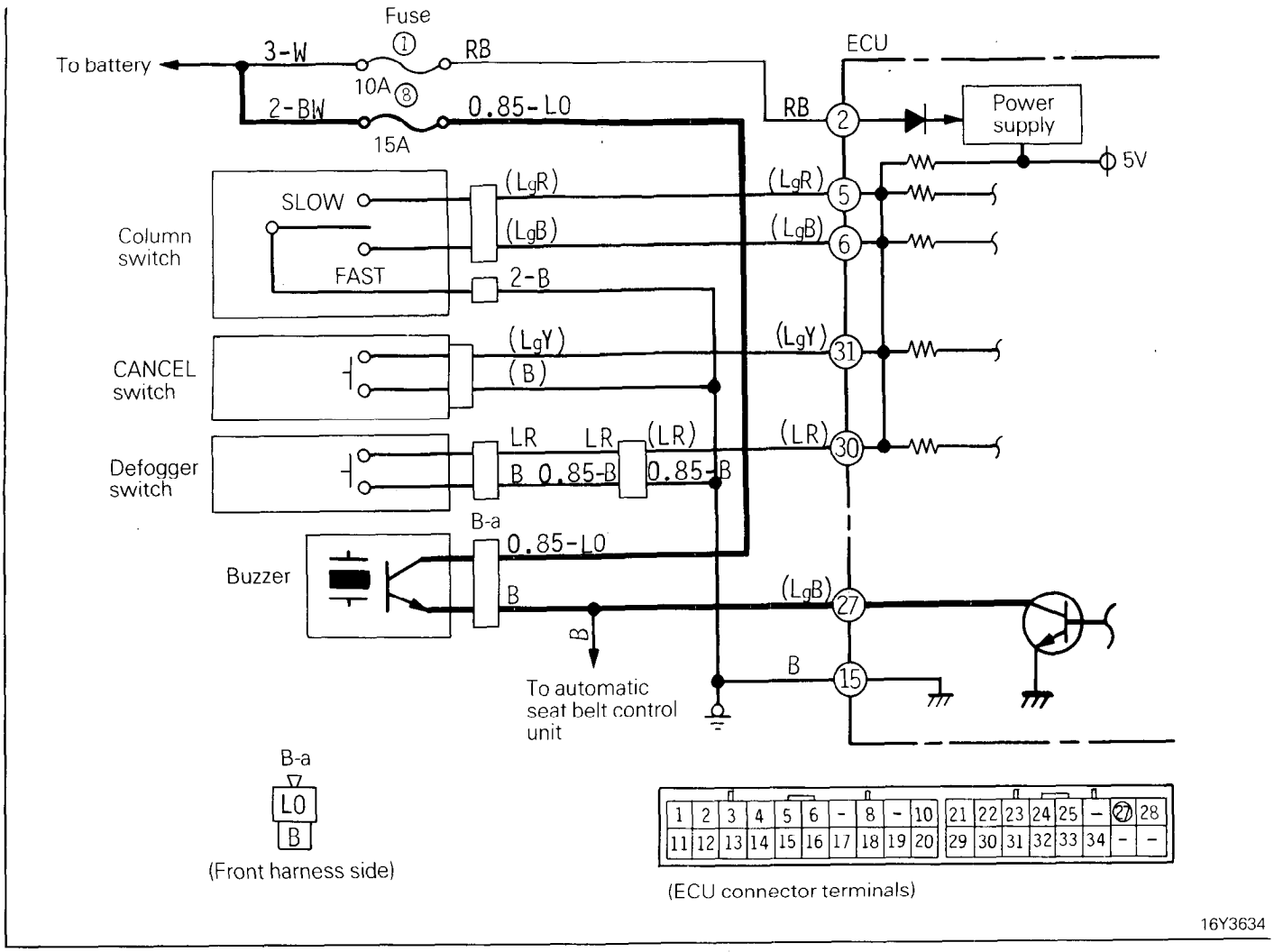


16Y3635

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Disconnect the speedometer cable where connected to the transmission. IG SW: OFF ECU connector: separation	Continuity between ground and ECU terminal when inner cable of speedometer cable is turned slowly (17-Ground)	0Ω ↔ ∞Ω	∞Ω	Reed switch or harness damaged or disconnected	Replace the speedometer (refer to P.8-168) or repair the harness.
				0Ω	Reed switch or harness short-circuit	

IG SW: Ignition Switch, ECU: Electronic Control Unit

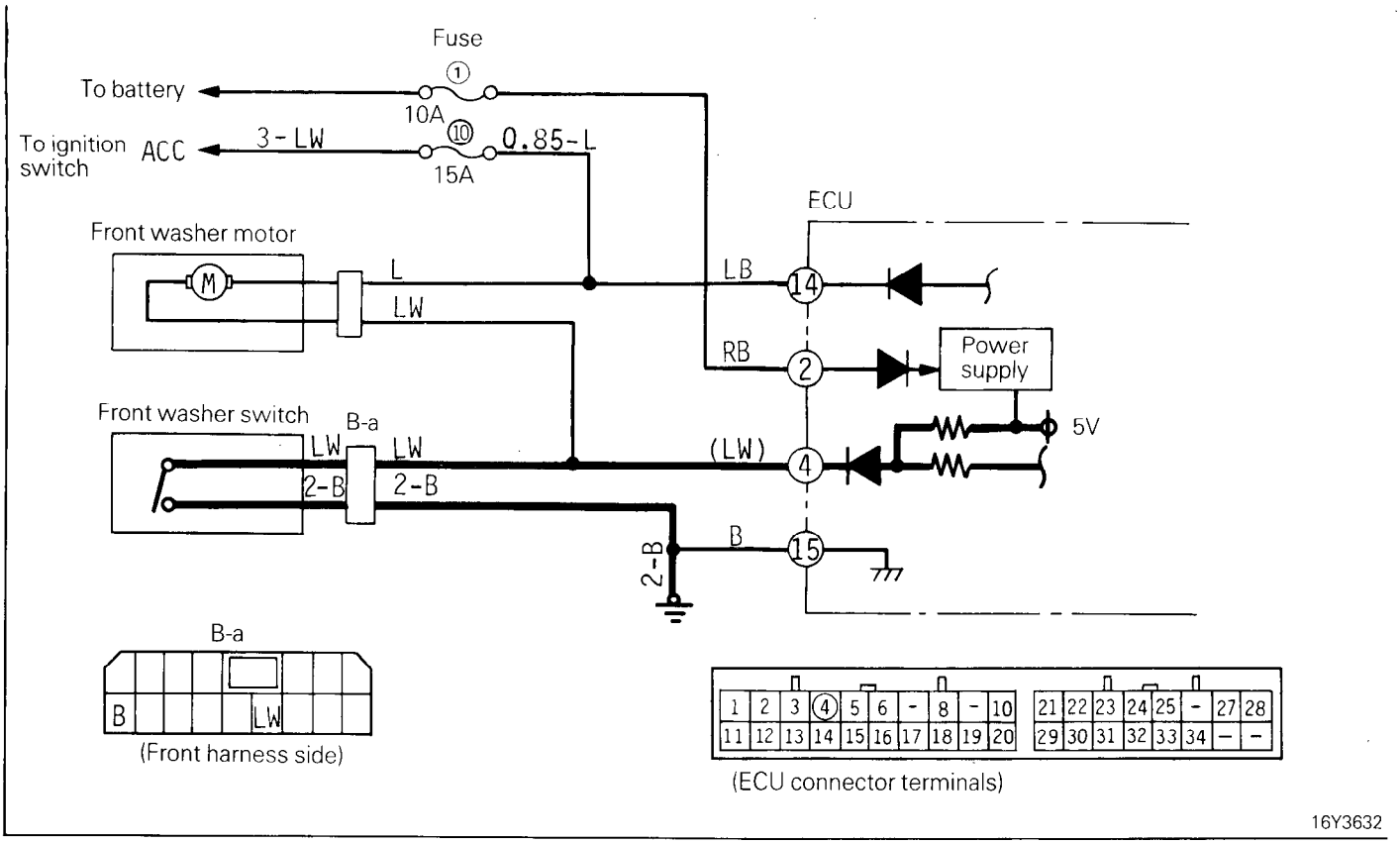
8. Buzzer Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Separate the B-a connector.	B-a connector (front harness side) terminal voltage (LO-Ground)	Battery voltage	0V	Fuse ⑧ damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected	Repair the harness.
2	Connect the B-a connector. Separate the ECU's harness connector.	ECU harness side connector terminal voltage (27-Ground)	Battery voltage	0V	Damaged or disconnected wiring of harness between B-a connector and ECU	Repair the harness.
					Malfunction of the buzzer	Check the buzzer. (Refer to P.23-123.)

ECU: Electronic Control Unit

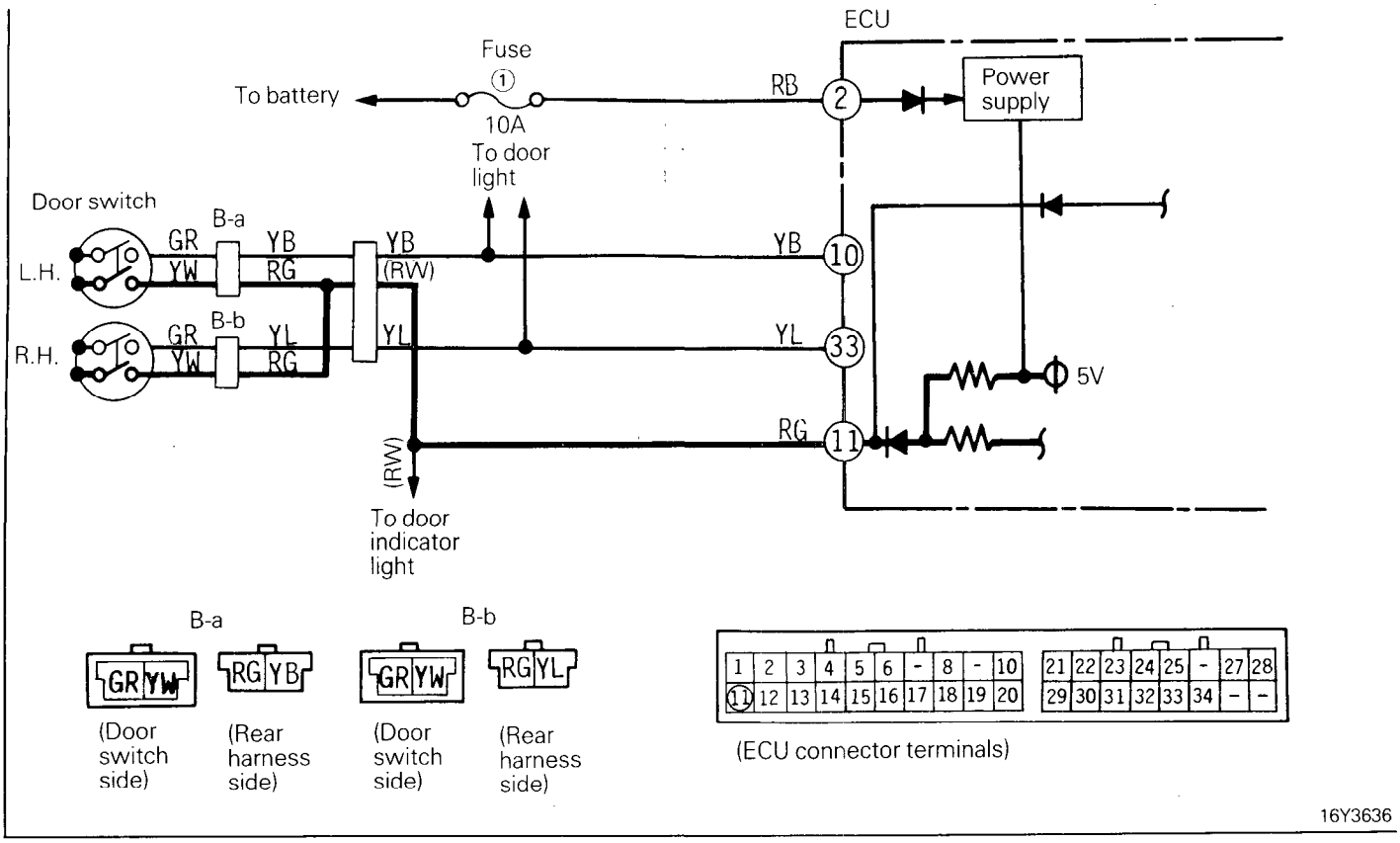
9. Washer Switch Input Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: OFF B-a connector: separation Washer switch: ON ↔ OFF	Continuity between B-a connector terminals (LW-B)	0Ω ↔ ∞Ω	Remains ∞Ω.	Washer switch or harness damaged or disconnected	Replace the washer switch (refer to P.8-203) or repair the harness.
				Remains 0Ω.	Washer switch or harness short-circuit	
2	IG SW: OFF B-a connector: connection ECU connector: separation Washer switch: ON ↔ OFF	Continuity between the ECU terminal and ground (4-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of B-a connector (B line) or between ECU and B-a (LW line)	Repair the harness.
				Remains 0Ω.	Short-circuit between ECU and B-a (LW line)	

IG SW: Ignition Switch, ECU: Electronic Control Unit

10. Door Switch (All Doors) Input Circuit

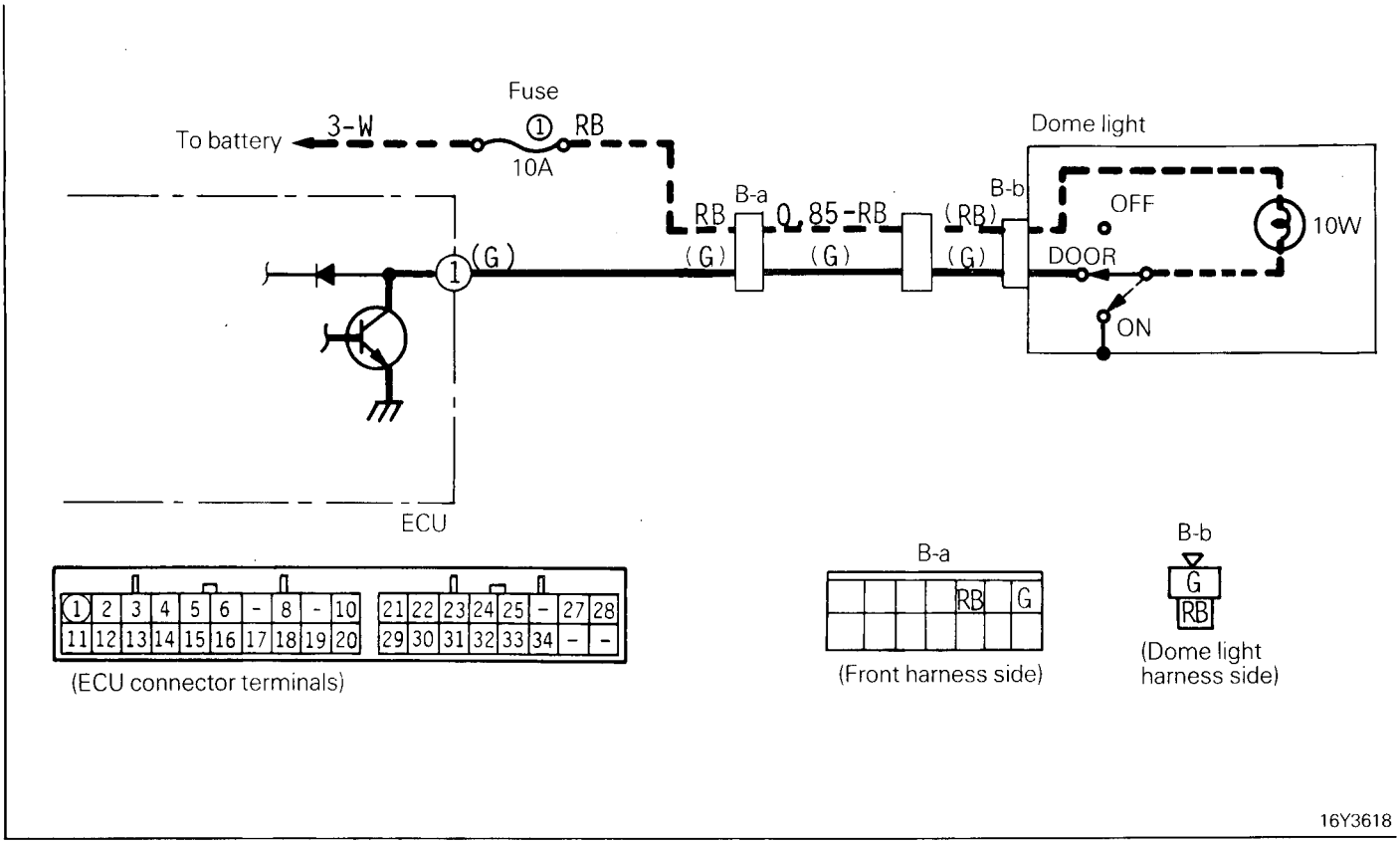


16Y3636

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	B-a and B-b connectors: separation Door switch: ON ↔ OFF	Continuity between B-a and B-b connector terminals (YW-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Door switch or harness damaged or disconnected	Replace the door switch (refer to P.23-62) or repair the harness.
				Remains 0Ω.	Door switch or harness short-circuit	
2	B-a and B-b connectors: connection ECU connector: separation Door switch: ON ↔ OFF	Continuity between the ECU terminal and each door switch's ground (11-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Harness damaged or disconnected	Repair the harness.
				Remains 0Ω.	Harness short-circuit	

ECU: Electronic Control Unit

11. Dome Light Drive Circuit



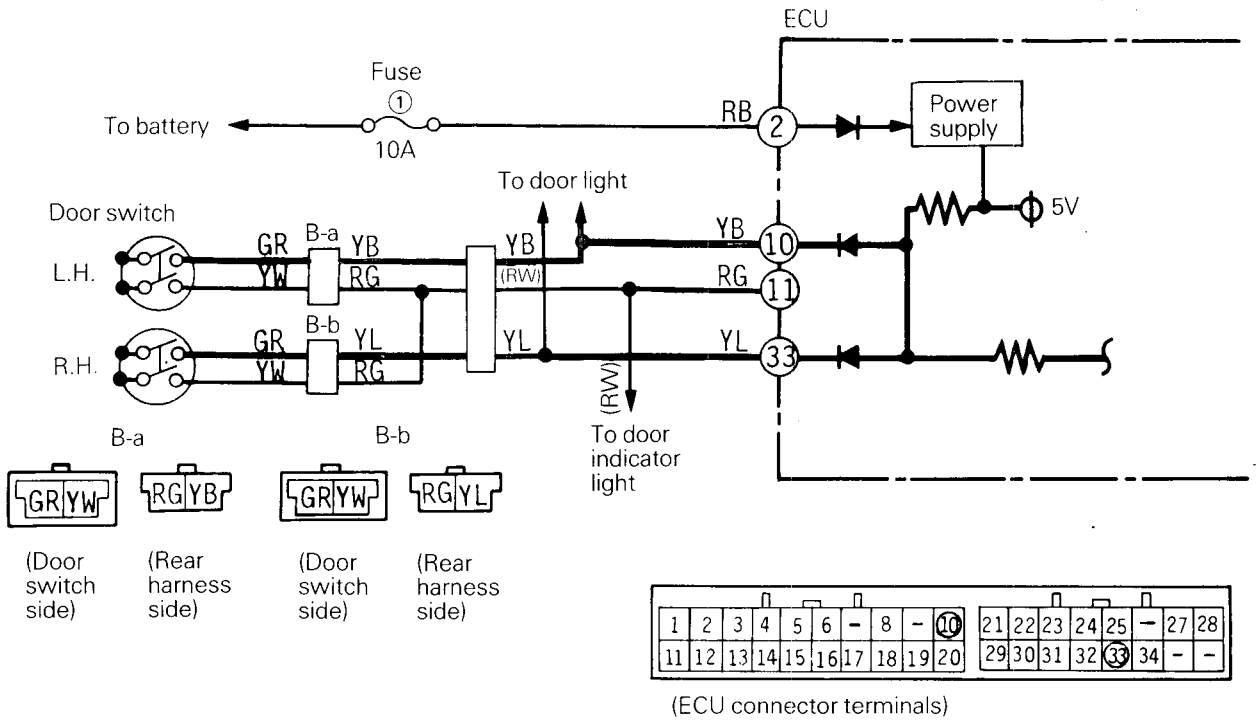
16Y3618

NOTE
The check table shown below is based upon the assumption that the circuit (when dome light switch ON) indicated by the broken line (- - - -) in the figure above is normal.

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation Dome light switch: DOOR ↔ OFF	B-a connector (rear harness side) terminal voltage (G-Ground)	Battery voltage ↔ 0V	Remains 0V.	Malfunction of dome light switch, or damaged or disconnected wiring, short-circuit, or of the harness (G) between B-a and B-b	Replace the dome light or repair the harness.
				Remains battery voltage.	Malfunction of the dome light switch (short-circuit)	Replace the dome light switch.
2	ECU connector: separation Door light switch: Door	ECU terminal voltage (1-Ground)	Battery voltage	0V	Harness damaged or disconnected	Repair the harness.

ECU: Electronic Control Unit

12. Door Switch (L.H. and R.H.) Input Circuit

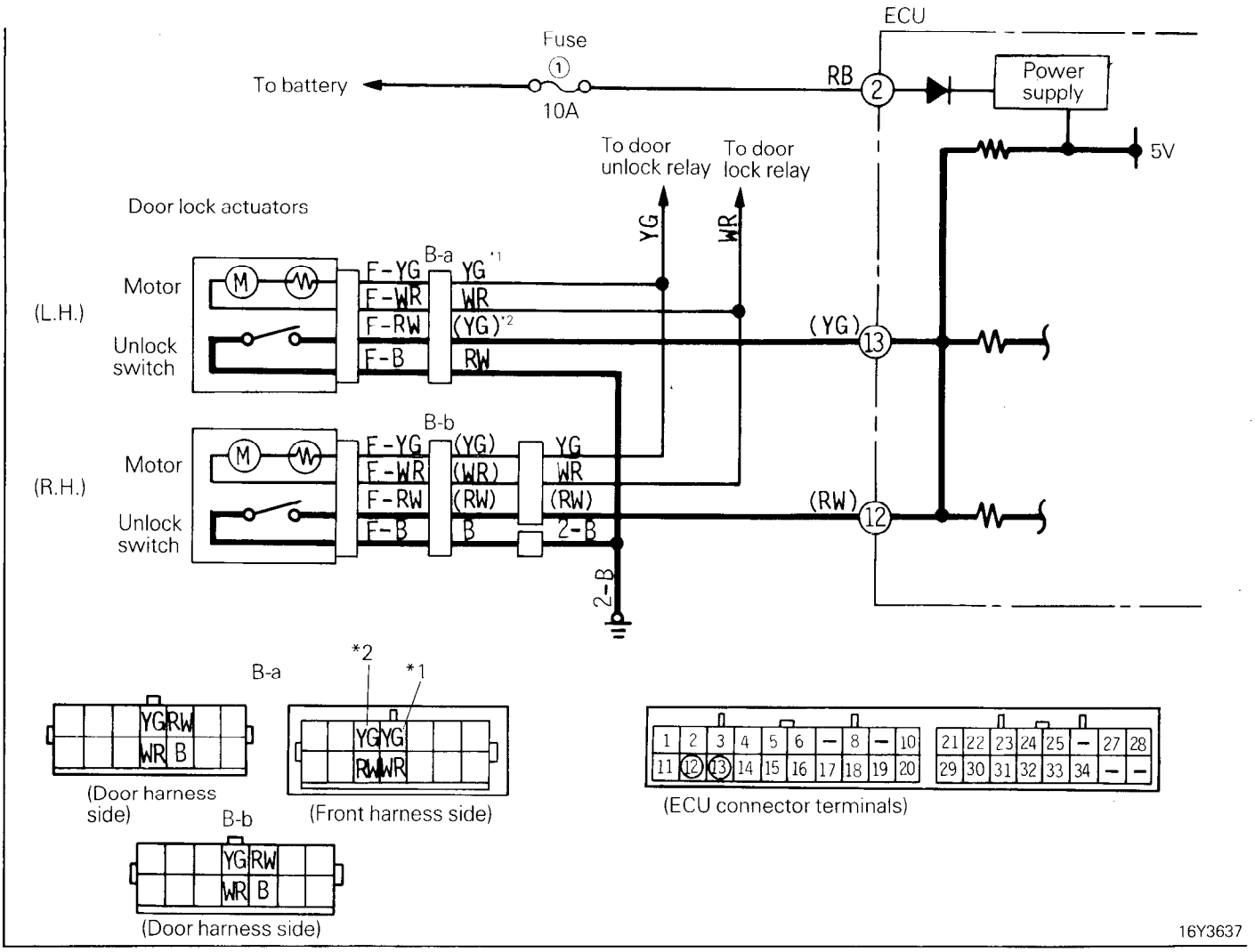


16Y3630

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	B-a and B-b connector: separation Door switch: ON ↔ OFF	Continuity between B-a and B-b connector terminals (GR-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Door switch or harness damaged or disconnected	Replace the door switch (refer to P.23-62) or repair the harness.
				Remains 0Ω.	Door switch or harness short-circuit	
2	B-a and B-b connector: connection ECU connector: separation Door switch: ON ↔ OFF	Continuity between ECU terminal and left and right door switches ground Left door switch: (10-Ground) Right door switch: (33-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Harness damaged or disconnected	Repair the harness.
				Remains 0Ω.	Harness short-circuit	

ECU: Electronic Control Unit

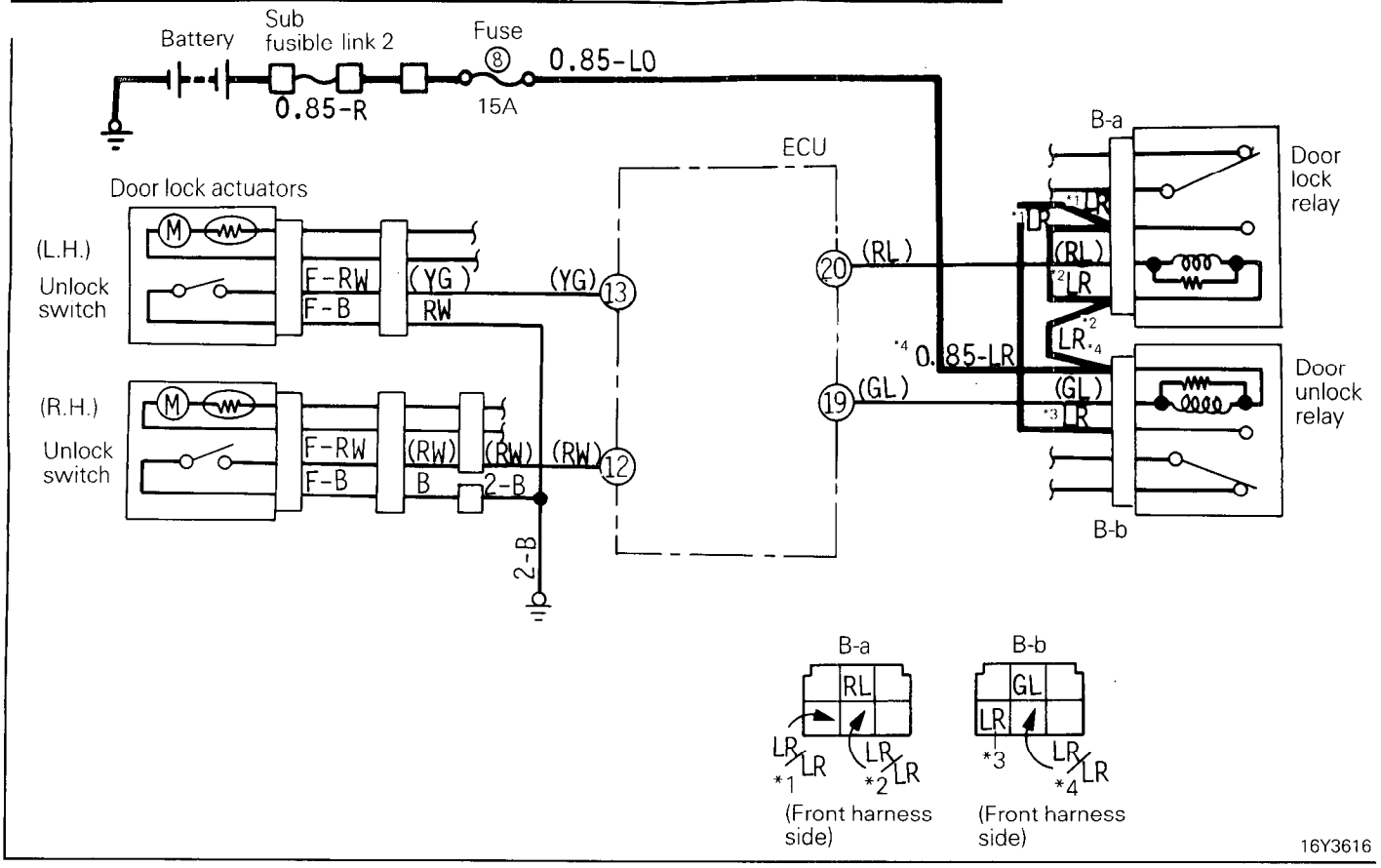
13. Door Lock Actuator Switch Input Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	B-a or B-b connectors: separation Unlock switch: ON ↔ OFF	Continuity between B-a or B-b connector terminals (RW-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Unlock switch or harness damaged or disconnected	Check the unlock switch (refer to P.23-72) or repair the harness.
				Remains 0Ω.	Unlock switch or harness short-circuit	
2	B-a and B-b connectors: connection ECU connector: separation Unlock switch: ON ↔ OFF	Continuity between the ECU terminal and ground Left: (13-Ground) Right: (12-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of B-a and B-b connector (RW or B line) or between ECU and B-a or B-b (YG or RW line)	Repair the harness.

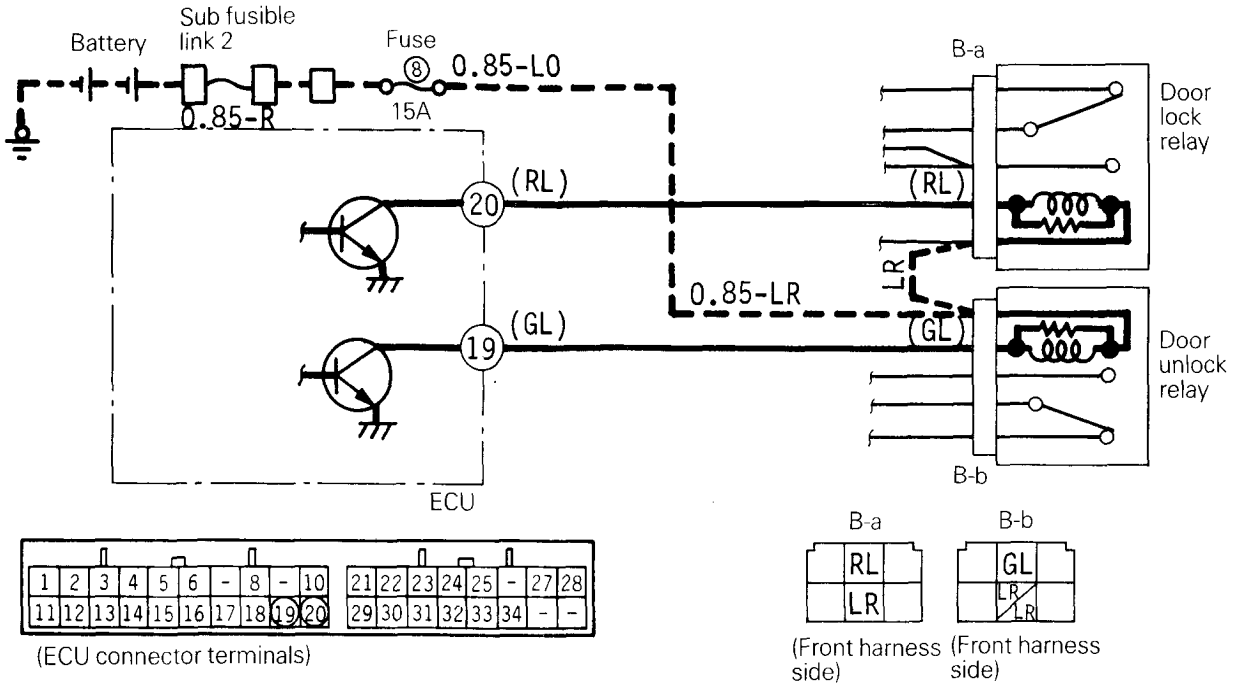
ECU: Electronic Control Unit

14. Door Lock Relay and Door Unlock Relay Power-supply Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	B-a and B-b connectors: separation	B-a and B-b connector (front harness side) terminal voltage *1LR-Ground *2LR-Ground *3LR-Ground *4LR-Ground	Battery voltage	0V	Fuse ⑧ damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected, or short-circuit	Repair the harness.

15. Door Lock Relay and Door Unlock Relay Drive Circuit



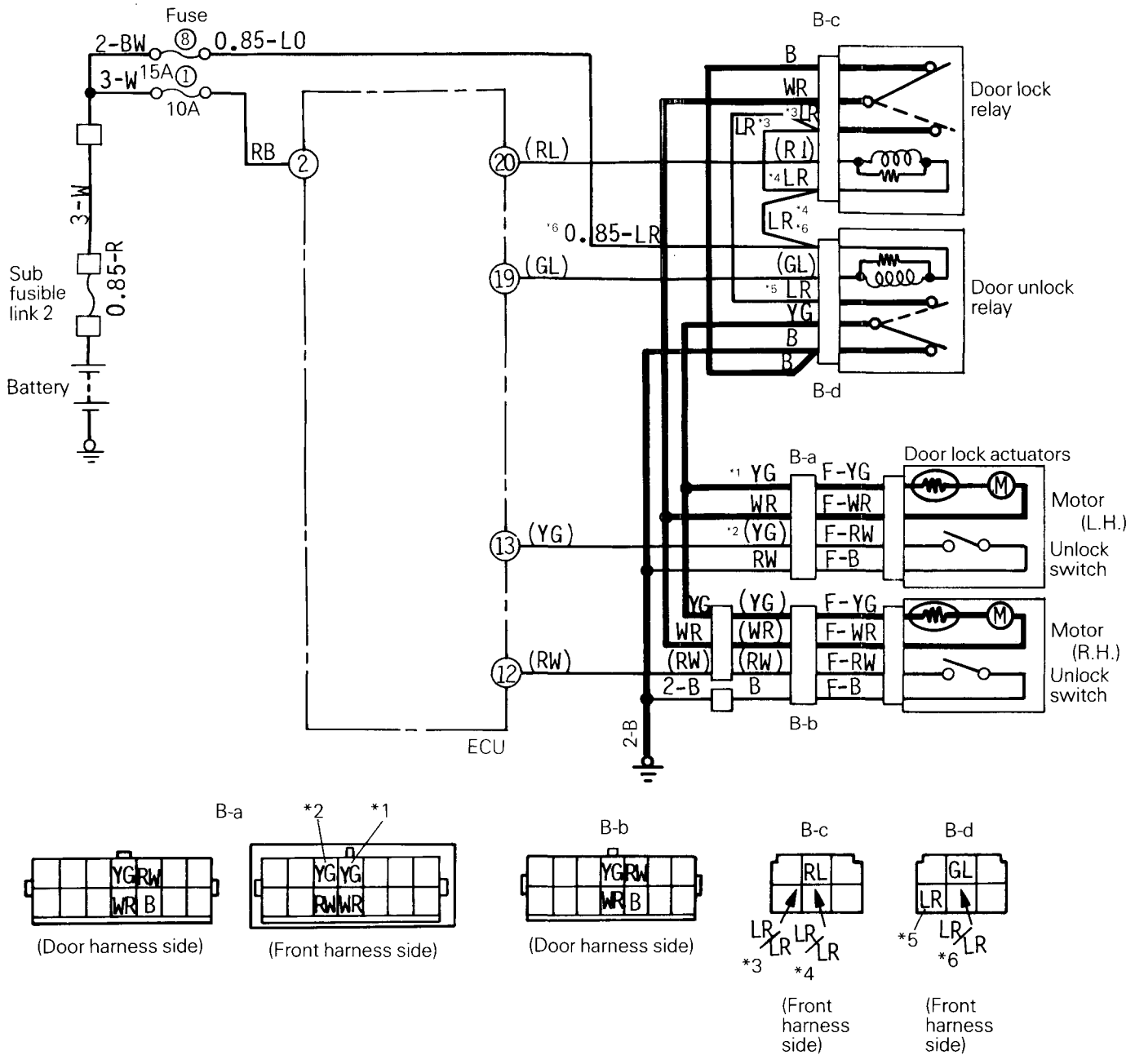
16Y3594

NOTE
The check table shown below is based upon the assumption that the circuit (door lock relay and door unlock relay power-supply circuit) indicated by the broken line (- - - -) in the figure above is normal. (Refer to check chart No. 14.)

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Separate the ECU connector.	ECU terminal voltage Door lock relay: (20-Ground) Door unlock relay: (19-Ground)	Battery voltage	0V	Damaged or disconnected wiring of relay coil	Replace the door lock relay and door unlock relay.
					Harness (RL line or GL line) damaged or disconnected, or short-circuit	Repair the harness.

ECU: Electronic Control Unit

16. Door Lock Actuator Drive Circuit



NOTE

For the check chart shown hereafter, check the circuits described by the heavy lines in the diagram above by forcing the activation of the door lock relay and the door unlock relay.

Measurements of voltage should be made quickly; the time of continuous motor conductivity (relay ON) should not exceed five seconds.

(continued on next page)

(1) LOCK side

(continued from previous page)

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Separate the ECU's harness connector; then short-circuit terminal No. 20 (front harness side RL line), and activate the door lock relay.	B-a, B-b and B-c connector (front harness side) terminal voltage (WR-Ground)	Battery voltage	0V	Malfunction of the door lock relay	Replace the door lock relay.
					Harness damaged or disconnected	Repair the harness.
2	B-a and B-b connectors: separation	Continuity between B-a and B-b connectors (door harness side) terminals (YG-WR)	0Ω	∞Ω	Malfunction of the door lock actuator	Replace the door lock actuator. (Refer to GROUP 23 BODY – Door.)
					Harness damaged or disconnected	Repair the harness.
3	B-a and B-b connectors: separation	Continuity between B-a and B-b connectors (front harness side) and ground (YG-Ground)	0Ω	∞Ω	Malfunction of the door unlock relay	Replace the door unlock relay.
					Harness damaged or disconnected	Repair the harness.

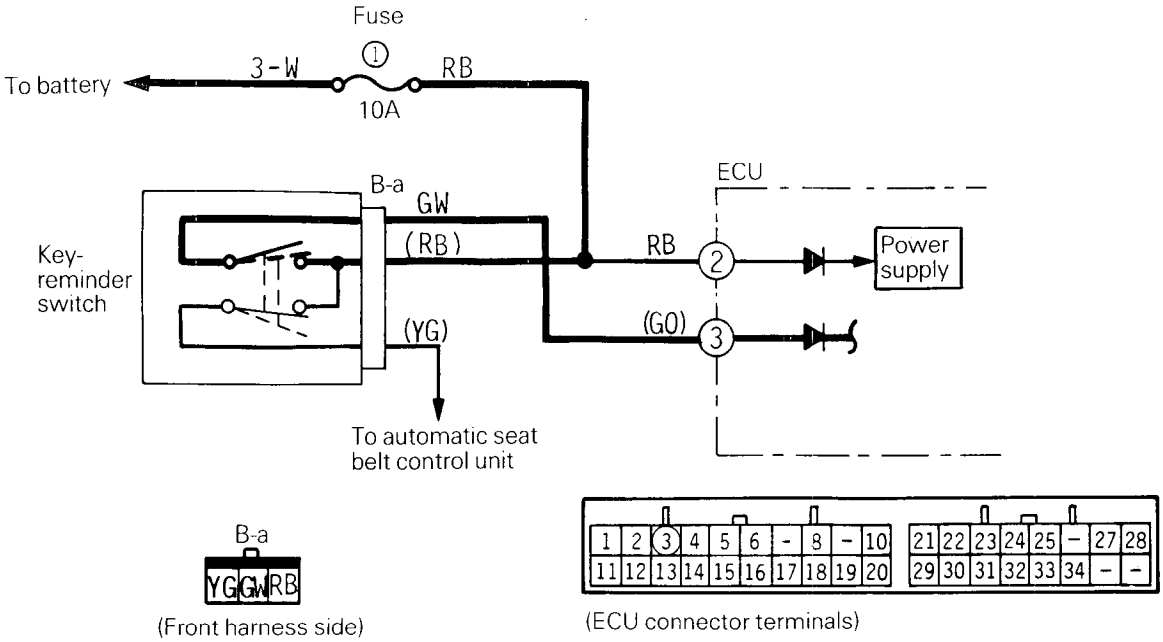
ECU: Electronic Control Unit

(2) UNLOCK side

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Separate the ECU's harness connector; then short-circuit terminal No. 19 (front harness side GL line), and activate the door unlock relay.	B-a, B-b and B-d connector (front harness side) terminal voltage (YG-Ground)	Battery voltage	0V	Malfunction of the door unlock relay	Replace the door unlock relay.
					Harness damaged or disconnected	Repair the harness.
2	B-a and B-b connectors: separation	Continuity between B-a and B-b connectors (door harness side) terminals (YG-WR)	0Ω	∞Ω	Malfunction of the door lock actuator	Replace the door lock actuator. (Refer to GROUP 23 BODY – Door.)
3	B-a and B-b connectors: separation	Continuity between B-a and B-b connectors (front harness side) and ground (WR-Ground)	0Ω	∞Ω	Malfunction of the door lock relay	Replace the door lock relay.
					Harness damaged or disconnected	Repair the harness.

ECU: Electronic Control Unit

17. Key-reminder Switch Input Circuit

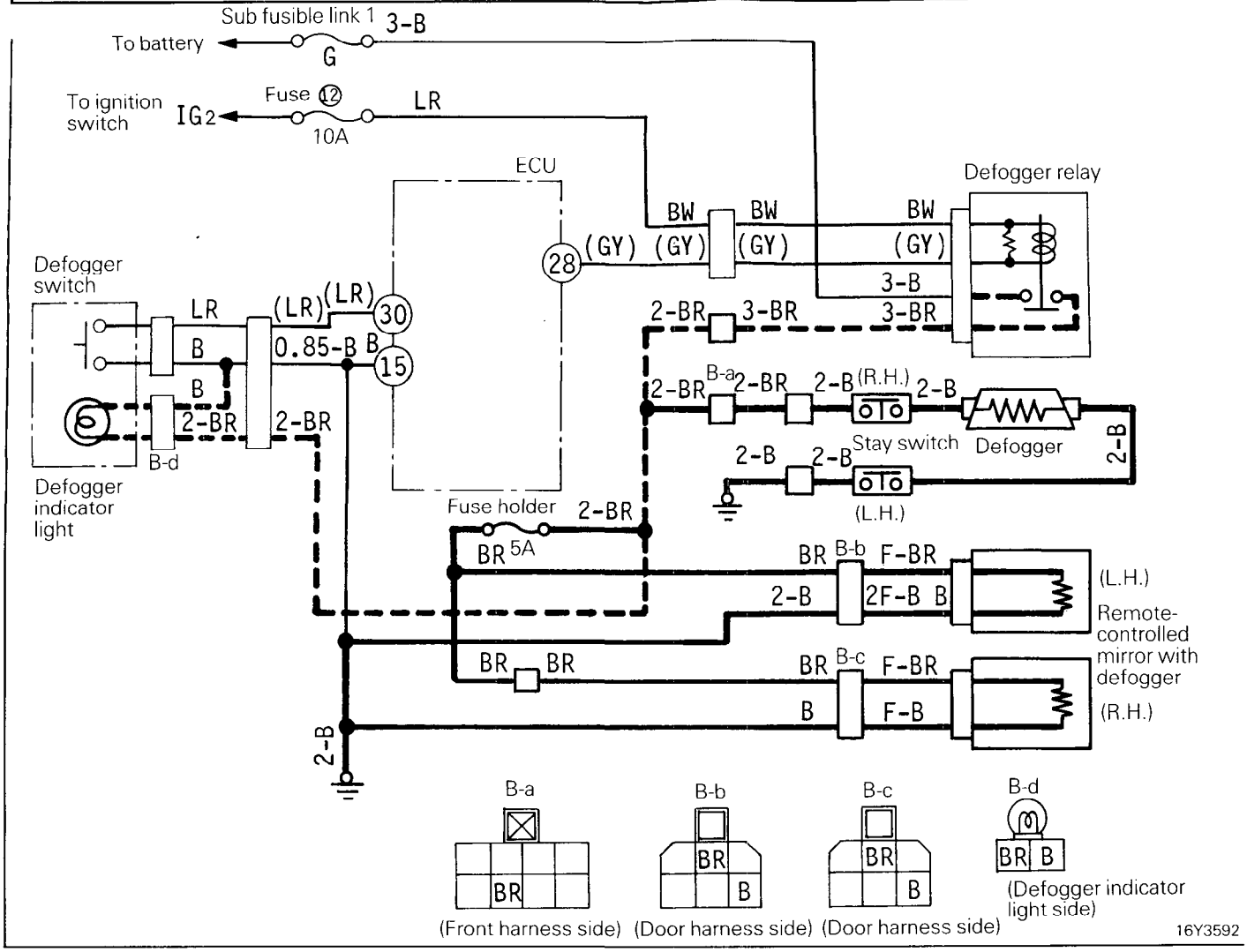


16Y3631

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Separate the B-a connector.	B-a connector (front harness side) terminal voltage (RB-Ground)	Battery voltage	0V	Fuse ① damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected	Repair the harness.
2	B-a connector: connection Key-reminder switch: OFF (key) ↔ ON (No key)	B-a connector (front harness side) terminal voltage (GW-Ground)	0V ↔ Battery voltage	Remains 0V.	Damaged or disconnected wiring of key-reminder switch	Replace the key-reminder switch. (Refer to P.8-156.)
					Harness damaged or disconnected, or short-circuit	Repair the harness.
3	Separate the ECU connector. Key-reminder switch: ON (No key)	ECU connector terminal voltage (3-Ground)	Battery voltage	0V	Harness damaged or disconnected, or short-circuit	Repair the harness.

ECU: Electronic Control Unit

18. Defogger Circuit (Defogger and Remote-controlled Mirror with Defogger)



(1) Defogger indicator light

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: ON Defogger switch: ON	B-d connector terminal voltage (BR-Ground)	Battery voltage	0V	Harness damaged or disconnected, or short-circuit	Repair the harness.
2	IG SW: ON Defogger switch: ON	B-d connector terminal voltage (B-Ground)	Battery voltage	0V	Damaged or disconnected wiring of defogger indicator light	Replace the defogger indicator light bulb.
					Harness damaged or disconnected, or short-circuit	Repair the harness.

IG SW: Ignition Switch

NOTE

This check is based upon the assumption that the defogger function is normal, and that only the indicator light does not illuminate

(continued on next page)

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NOTE
This check table shown below is based upon the assumption that the circuit indicated by the broken line (- - - -) in the figure on the previous page is normal. (The indicator light should illuminate when the defogger switch is pressed.)

(2) Defogger

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: ON Defogger switch :ON	B-a connector terminal voltage (BR-Ground)	Battery voltage	0V	Harness damaged or disconnected	Replace the fuse.
2	IG SW: OFF B-a connector: separation	Continuity between the B-a connector and ground (BR-Ground)	Continuity exists	∞Ω	Damaged or disconnected wiring of defogger	Repair the heated line. (Refer to P.8-257.)
					Harness damaged or disconnected or damaged stay switch	Repair the harness or check the stay switch. Refer to Group 23 BODY – Stay Switch.

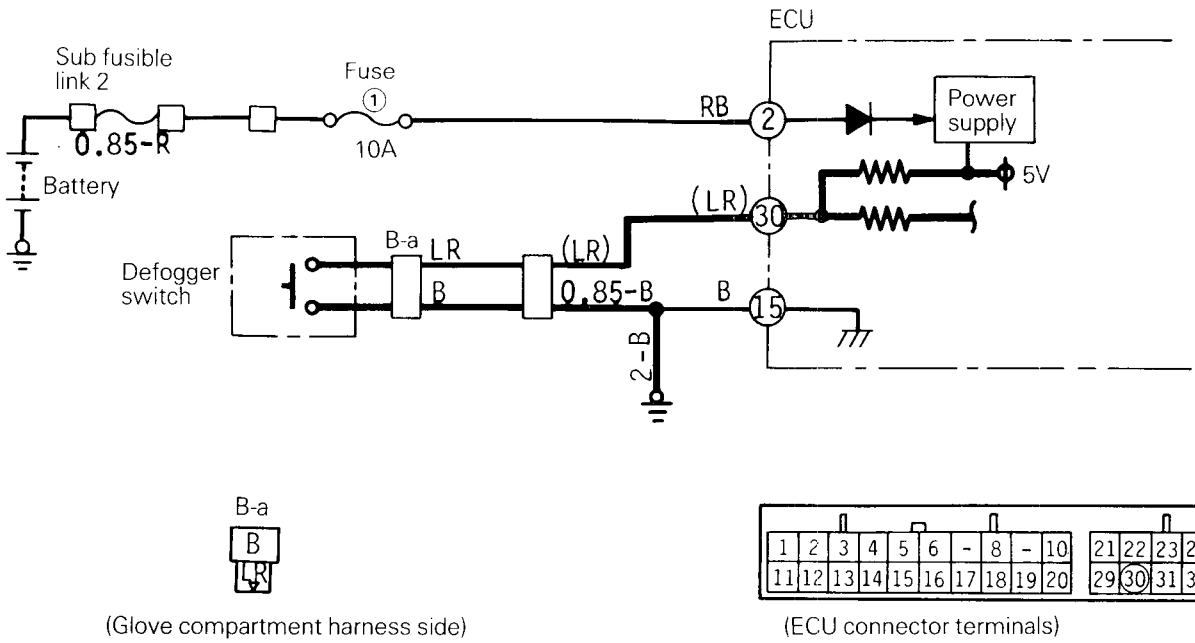
IG SW: Ignition Switch

(3) Remote-controlled mirror with defogger

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: ON Defogger switch: ON	B-b or B-c connector terminal voltage (BR-Ground)	Battery voltage	0V	Damaged fuse holder	Replace the fuse holder.
					Harness damaged or disconnected	Replace the harness.
2	IG SW: OFF B-b or B-c connector: separation	Continuity between the B-b or B-c connector (door harness side) terminals (BR-B)	Continuity exists	∞Ω	Malfunction of the remote-controlled mirror with defogger	Replace the mirror.
					Harness damaged or disconnected	Repair the harness.
3	IG SW: OFF B-b or B-c connector: separation	Continuity between the B-b or B-c connector and ground (B-Ground)	0Ω	∞Ω	Harness damaged or disconnected	Repair the harness.

IG SW: Ignition Switch

19. Defogger Switch Input Circuit

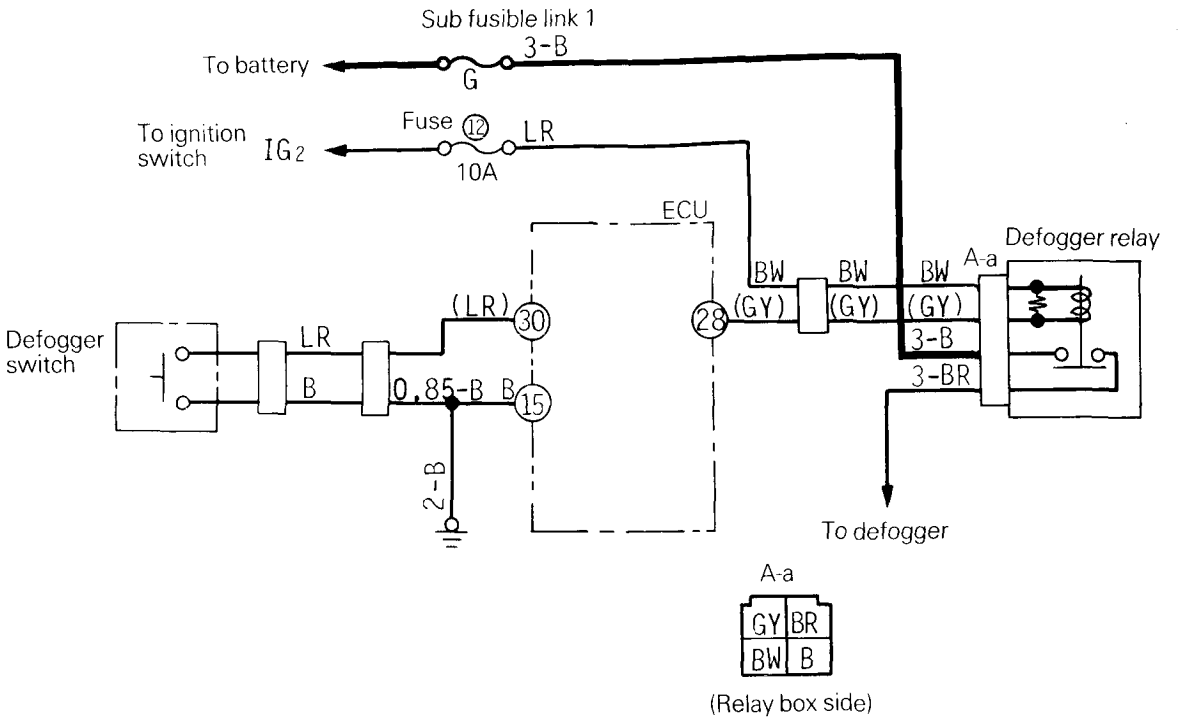


16Y3626

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	B-a connector: separation Defogger switch: ON ↔ OFF	Continuity between B-a connector terminals (LR-B)	0Ω ↔ ∞Ω	Remains ∞Ω.	Defogger switch or harness damaged or disconnected	Replace the defogger switch (refer to P.8-255) or repair the harness.
				Remains 0Ω.	Defogger switch or harness short-circuit	
2	ECU connector: separation Defogger switch: ON ↔ OFF	Continuity between the ECU terminal and ground (30-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of B-a connector B line or LR line between ECU and B-a	Repair the harness.
				Remains 0Ω.	Short-circuit of LR line between ECU and B-a	

ECU: Electronic Control Unit

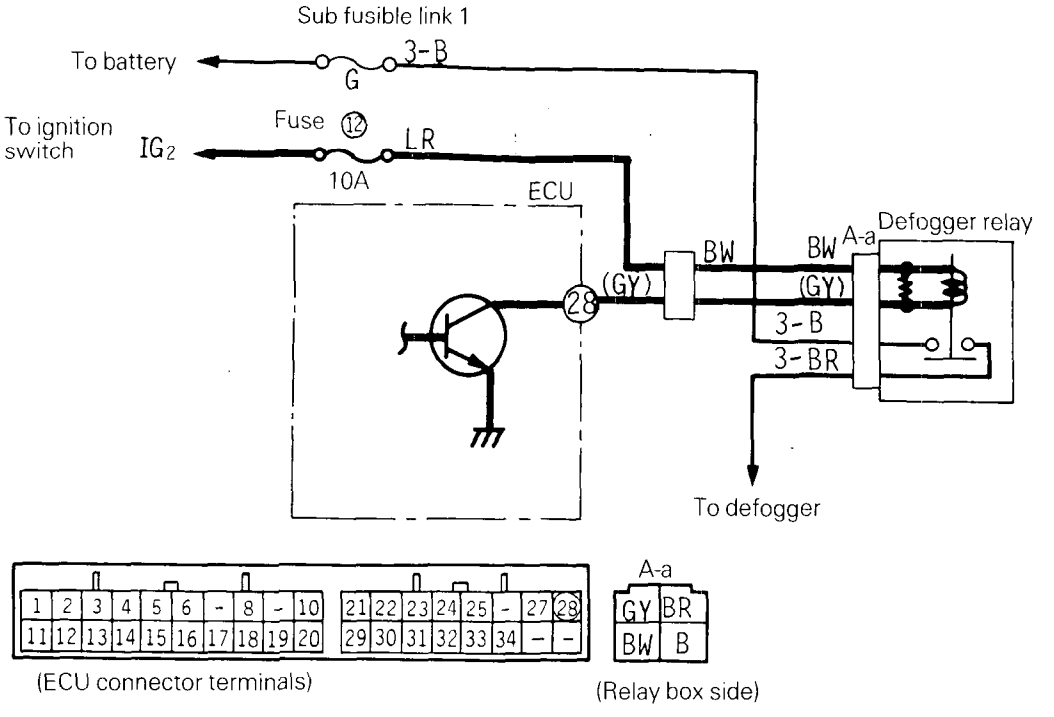
20. Defogger Relay Power-supply Circuit



16Y3625

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	A-a connector: separation	A-a connector (body harness side) terminal voltage (B-Ground)	Battery voltage	0V	Fusible link G-wire blown	Replace the fusible link.
					Harness damaged or disconnected, or short-circuit	Repair the harness.

21. Defogger Relay Drive Circuit

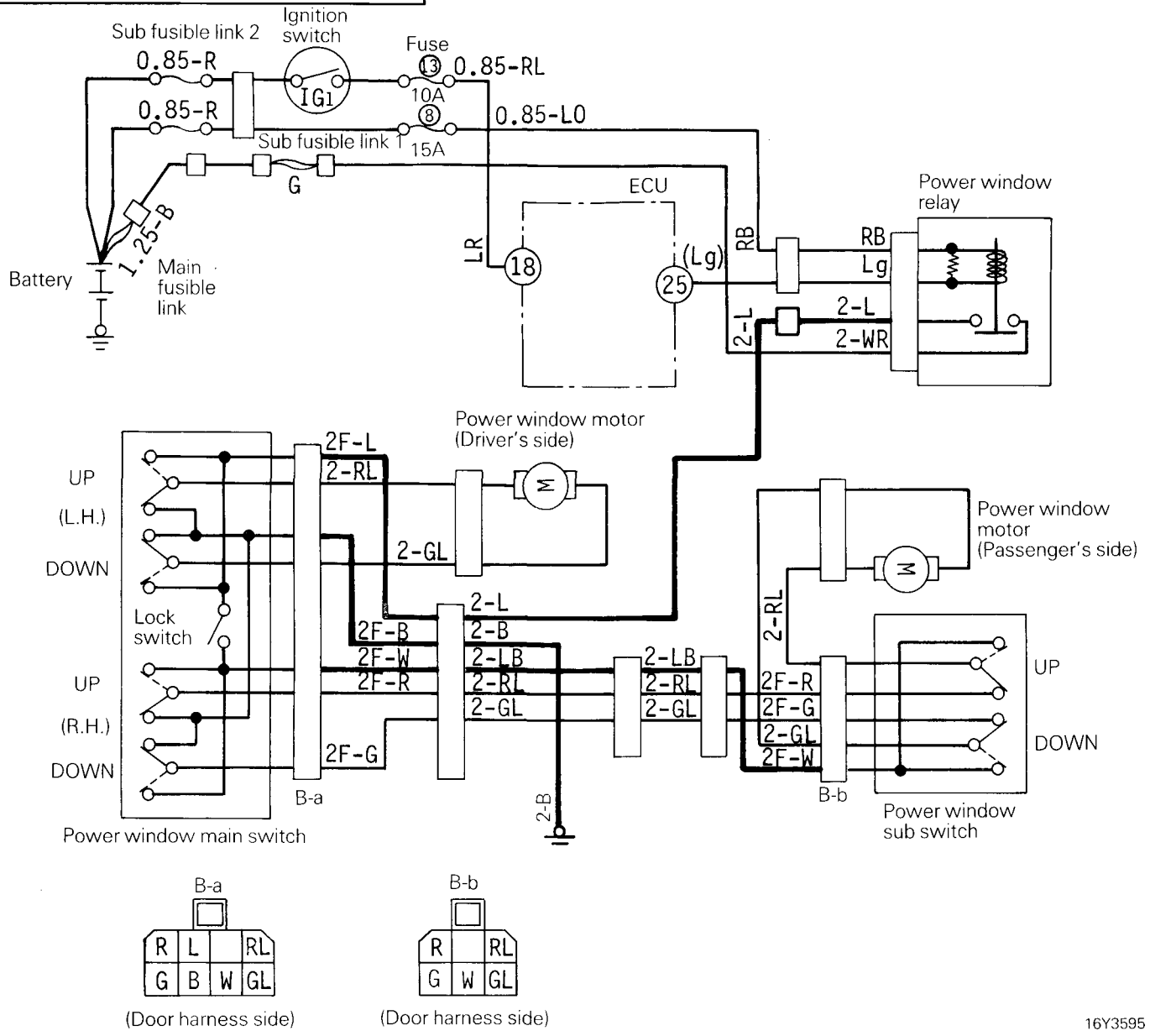


16Y3624

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation IG SW: ON	A-a connector (relay box side) terminal voltage (BW-Ground)	Battery voltage	0V	Fuse ⑫ blown	Replace the fuse.
					Harness damaged or disconnected, or short-circuit	Repair the harness.
2	ECU connector: separation IG SW: ON	ECU terminal voltage (28-Ground)	Battery voltage	0V	Damaged wiring of defogger relay coil	Replace the defogger relay.
					Harness damaged or disconnected, or short-circuit	Repair the harness.

IG SW: Ignition Switch, ECU: Electronic Control Unit

22. Power Window Drive Circuit



16Y3595

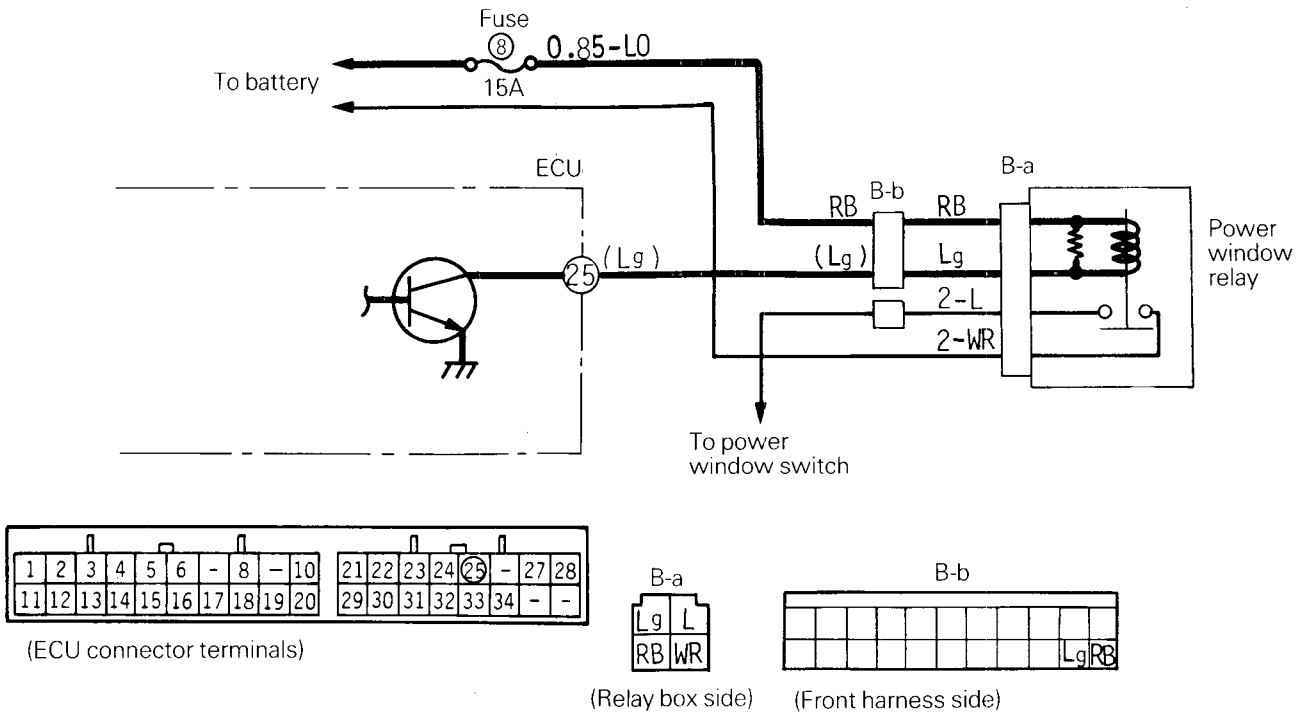
Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	IG SW: ON Lock switch: NORMAL	B-a and B-b connector (door harness side) terminals voltage B-a: (L-Ground) B-b: (W-Ground)	Battery voltage	0V	Harness damaged or disconnected	Repair the harness.
2	B-a connector: separation	Conitnuity between the B-a connector (door harness side) and ground (B-Ground)	0Ω	∞Ω	Harness damaged or disconnected	Repair the harness.

IG SW: Ignition Switch

NOTE

For information concerning the checking of the power window switch itself, refer to the section regarding the doors in GROUP 23 BODY.

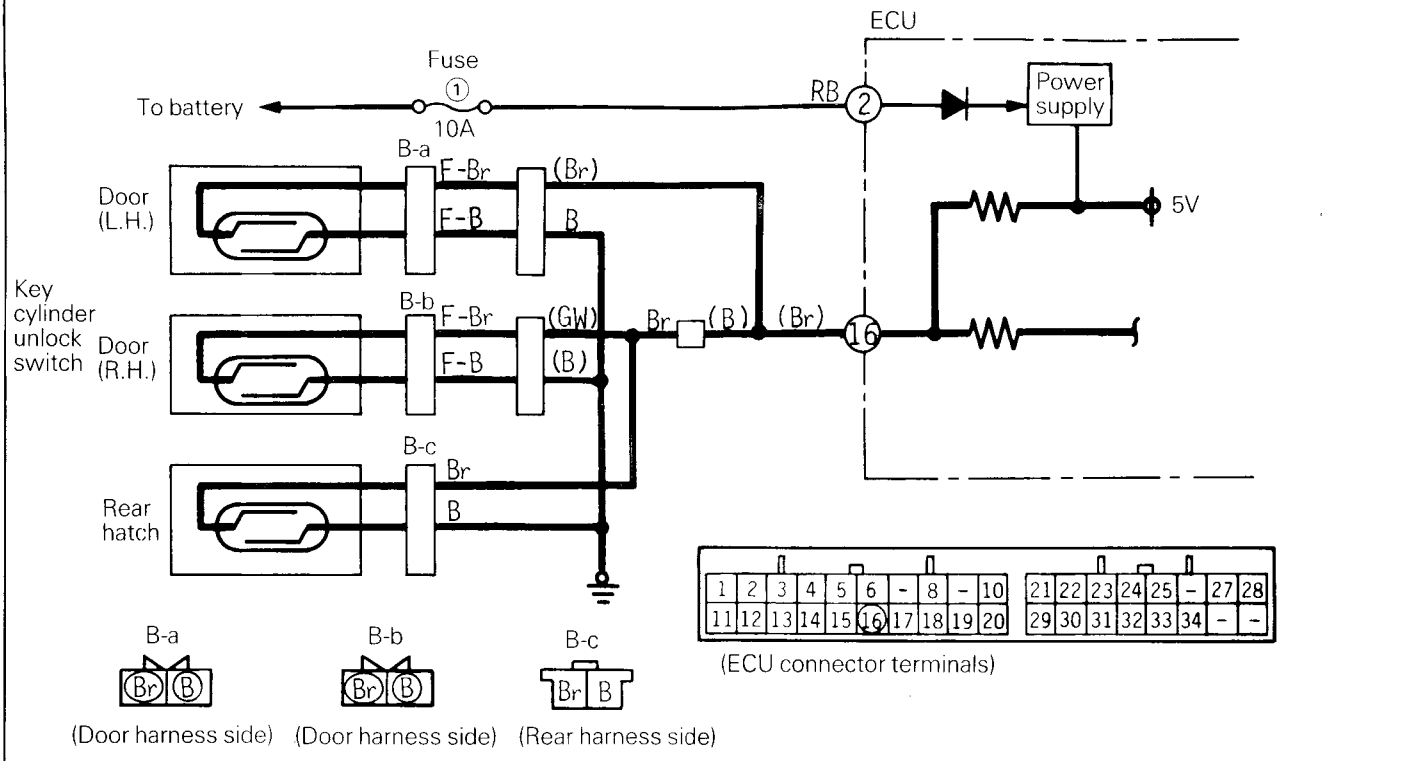
23. Power Window Relay Drive Circuit



Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation	B-b connector (front harness side) terminals voltage (RB-Ground)	Battery voltage	0V	Fuse ⑧ damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected, or short-circuit	Repair the harness.
2	ECU connector: separation	B-a connector (relay box side) terminal voltage (Lg-Ground)	Battery voltage	0V	Damaged or disconnected wiring of coil	Replace the power window relay.
					Harness damaged or disconnected, or short-circuit	Repair the harness.
3	ECU connector: separation	ECU connector terminal voltage (25-Ground)	Battery voltage	0V	Harness damaged or disconnected, or short-circuit	Repair the harness.

ECU: Electronic Control Unit

24. Key Cylinder Unlock Switch Input Circuit

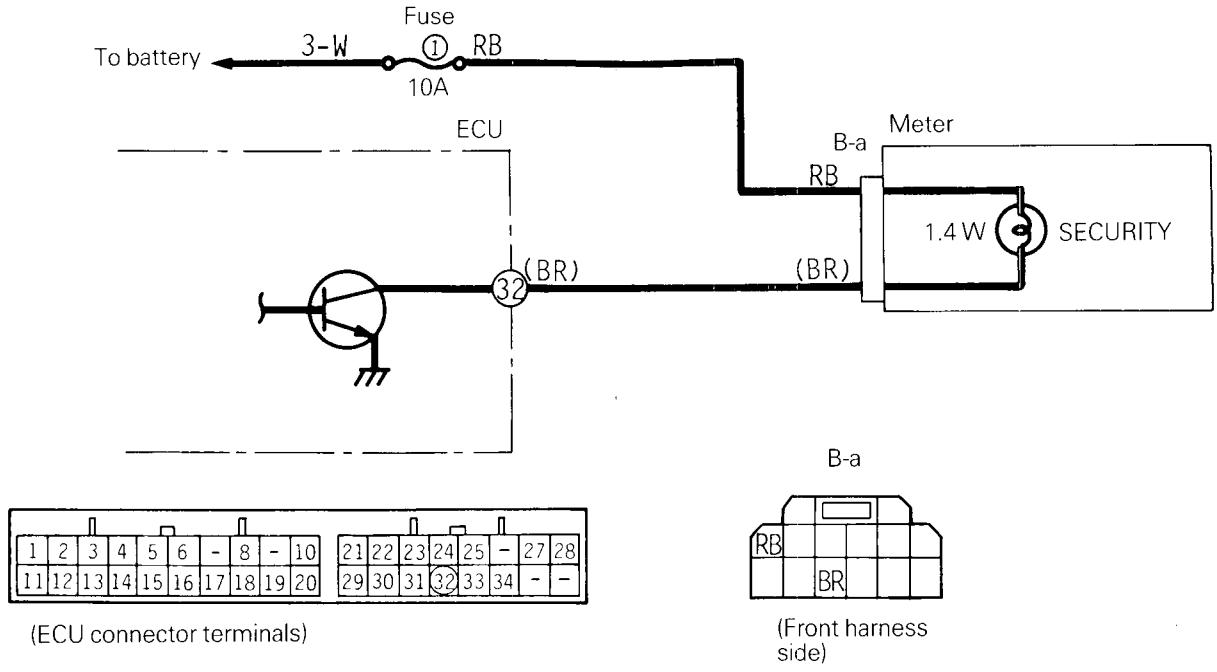


16Y3622

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation	Continuity between the ECU terminal and ground when the key is inserted into the key cylinder and slowly turned to the unlock side (16-Ground)	0Ω ↔ ∞Ω	∞Ω	Key cylinder unlock switch or harness damaged or disconnected	Replace the key cylinder unlock switch (refer to P.23-74) or repair the harness.
				0Ω	Key cylinder unlock switch or harness short-circuit	

ECU: Electronic Control Unit

25. SECURITY Light Drive Circuit

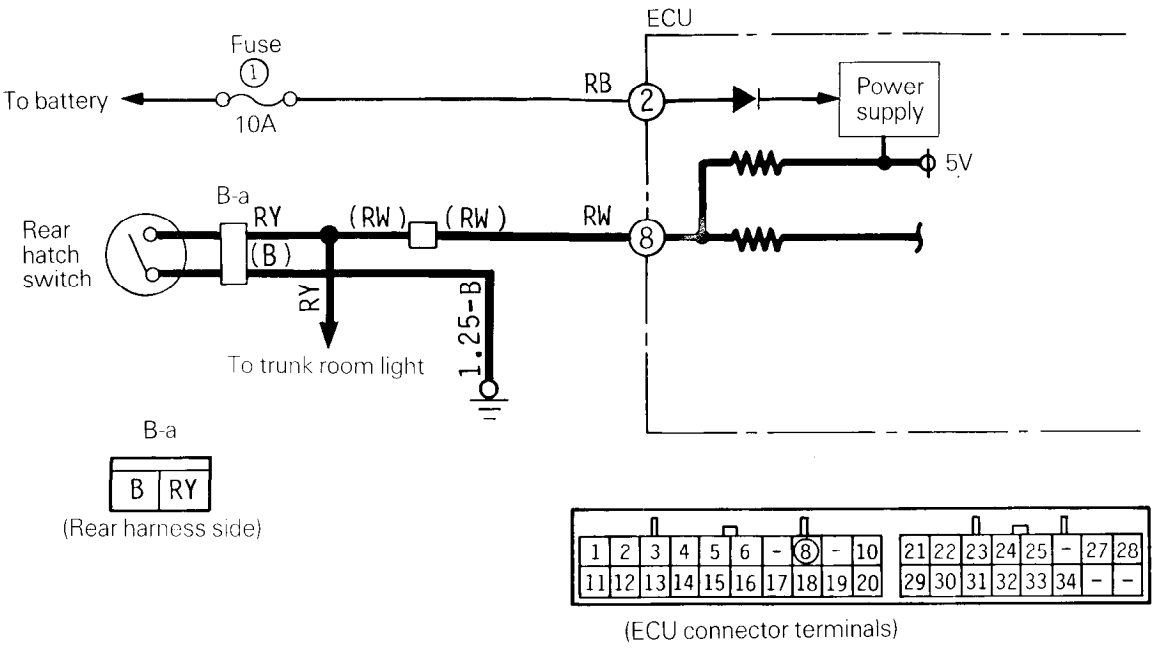


16Y3627

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation	B-a connector (front harness side) terminal voltage (RB-Ground)	Battery voltage	0V	Fuse ① damaged or disconnected	Replace the fuse.
					Harness damaged or disconnected, or short-circuit	Repair the harness.
2	ECU connector: separation	B-a connector (body harness side) terminal voltage (BR-Ground)	Battery voltage	0V	Damaged or disconnected wiring of SECURITY light bulb	Replace the bulb.
					Harness damaged or disconnected	Repair the harness.
3	ECU connector: separation	ECU terminal voltage (32-Ground)	Battery voltage	0V	Harness damaged or disconnected, or short-circuit	Repair the harness.

ECU: Electronic Control Unit

26. Rear Hatch Switch Input Circuit

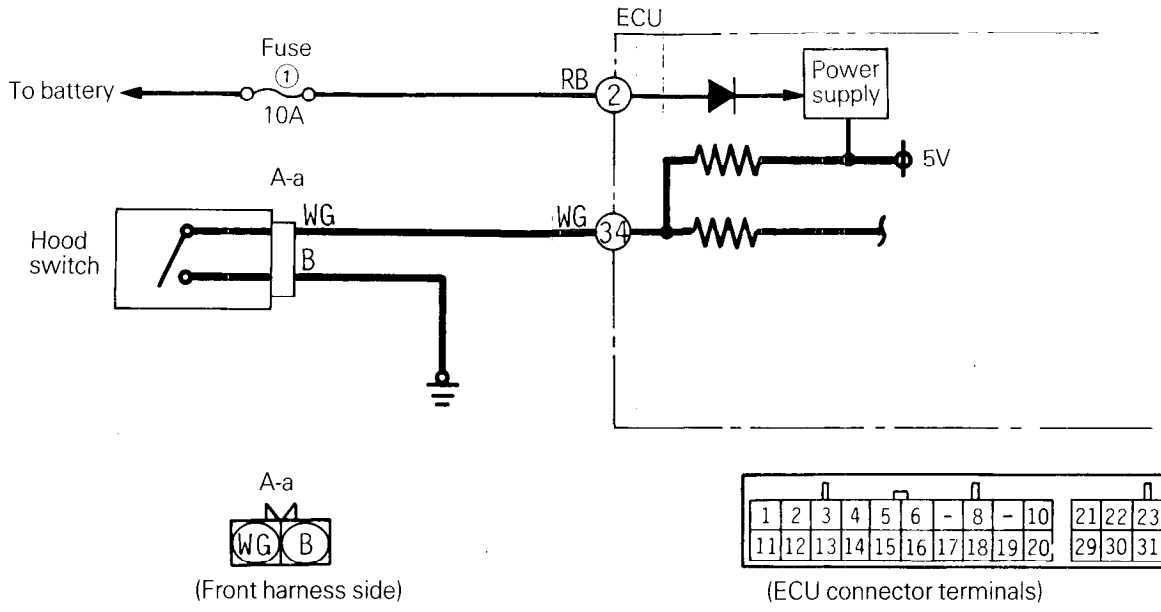


16Y3628

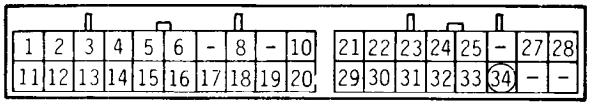
Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	B-a connector: separation Rear hatch switch: ON ↔ OFF	Continuity between B-a connector terminals (RY-B)	0Ω ↔ ∞Ω	Remains ∞Ω.	Rear hatch switch or harness damaged or disconnected	Replace the rear hatch switch (refer to P.23-39) or repair the harness.
				Remains 0Ω.	Rear hatch switch or harness short-circuit	
2	ECU connector: separation B-a connector: connection Rear hatch switch: ON ↔ OFF	Continuity between the ECU terminal and ground (8-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of B-a connector RW line between ECU and B-a	Repair the harness.
				Remains 0Ω.	Short-circuit of RB line between ECU and B-a	

ECU: Electronic Control Unit

27. Hood Switch Input Circuit



(Front harness side)



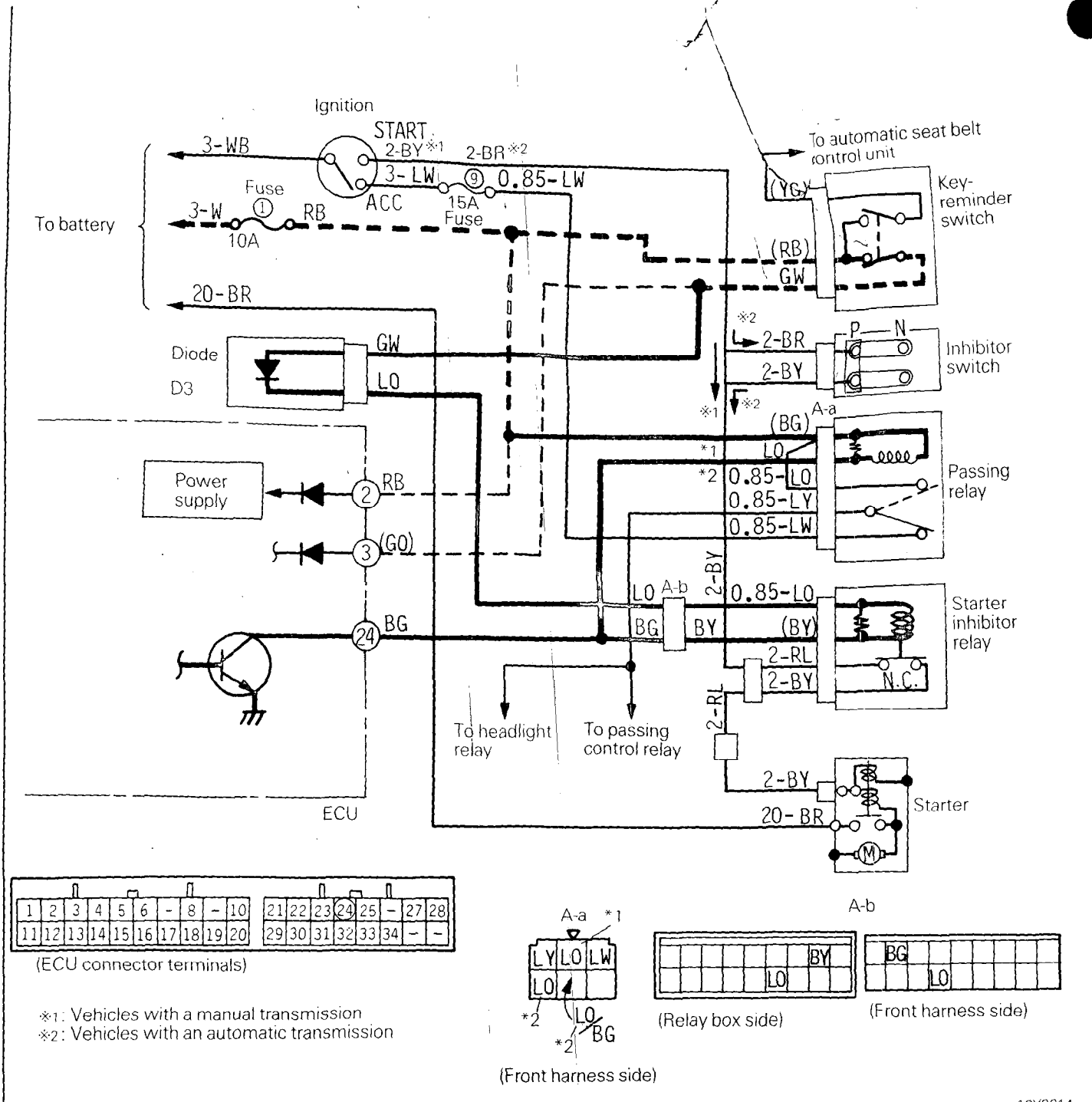
(ECU connector terminals)

16Y3621

Step	Check method		Judgement		Cause	Remedy
	Condition	Check point	Normal	Malfunction		
1	A-a connector: separation Hood switch: ON ↔ OFF	Continuity between the A-a connector (hood switch side) terminal (WG-B)	0Ω ↔ ∞Ω	Remains ∞Ω.	Hood switch damaged or disconnected	Replace the hood switch (refer to P.23-33).
				Remains 0Ω.	Hood switch short-circuit	
2	ECU connector: separation A-a connector: connection Hood switch ON ↔ OFF	Continuity between the ECU terminal and ground (34-Ground)	0Ω ↔ ∞Ω	Remains ∞Ω.	Damaged or disconnected wiring of WG line between ECU and A-a	Repair the harness.
				Remains 0Ω.	Short-circuit of WG line between ECU and A-a	

ECU: Electronic Control Unit

28. Passing Relay and Starter Inhibitor Relay Drive Circuit



NOTE
The check table shown on the next page is based upon the assumption that the circuit (ECU power supply and ground circuit and key-reminder switch input circuit) indicated by the broken line (- - - -) in the figure above is normal. (Refer to check chart No. 1 and 19.)

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(1) Passing relay

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	A-a connector: separation	A-a connector (front harness side) terminal voltage (BG-Ground)	Battery voltage	0V	Damaged or disconnected harness	Repair the harness.
2	ECU connector: separation A-a connector: connection	ECU terminal voltage (24-Ground)	Battery voltage	0V	Damaged or disconnected wiring of relay coil	Check the passing relay. (Refer to P.8-197.)
					Damaged or disconnected harness	Repair the harness.

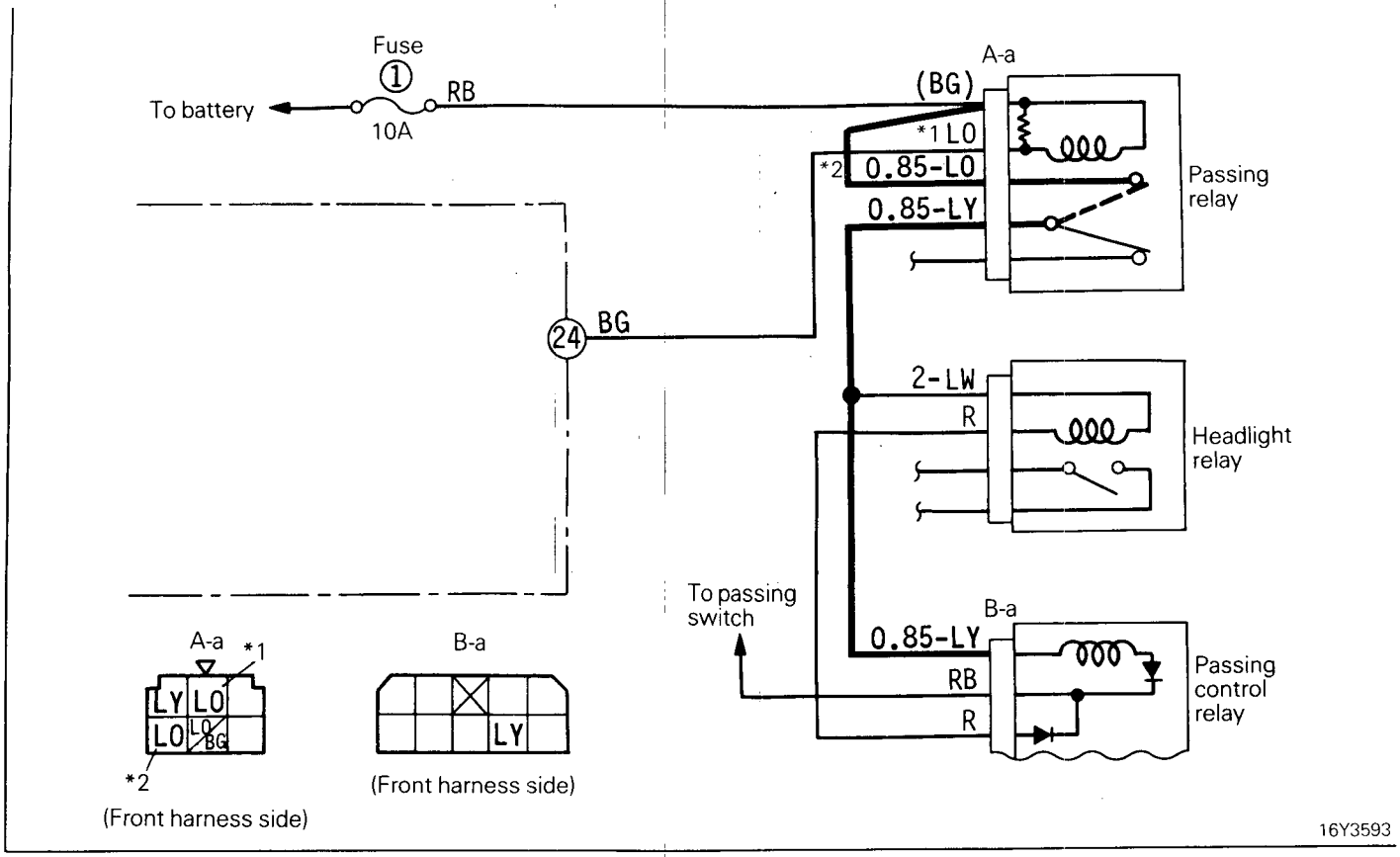
ECU: Electronic Control Unit

(2) Starter inhibitor relay

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation A-b connector: separation	A-b connector (front harness side) terminal voltage (LO-Ground)	Battery voltage	0V	Damaged diode D_3	Replace the diode.
					Damaged or disconnected harness	Repair the harness.
2	A-b connector: separation	Continuity between A-b connector terminals (relay box side) (LO-BY)	0Ω	∞Ω	Damaged relay coil	Check the starter inhibitor relay. (Refer to P.8-132.)
					Damaged or disconnected harness	Repair the harness.
3	ECU connector: separation A-b connector: connection Key-reminder switch: ON (No key)	ECU terminal voltage (24-Ground)	Battery voltage	0V	Damaged or disconnected harness	Repair the harness.

ECU: Electronic Control Unit

29. Passing Relay Power-supply Circuit

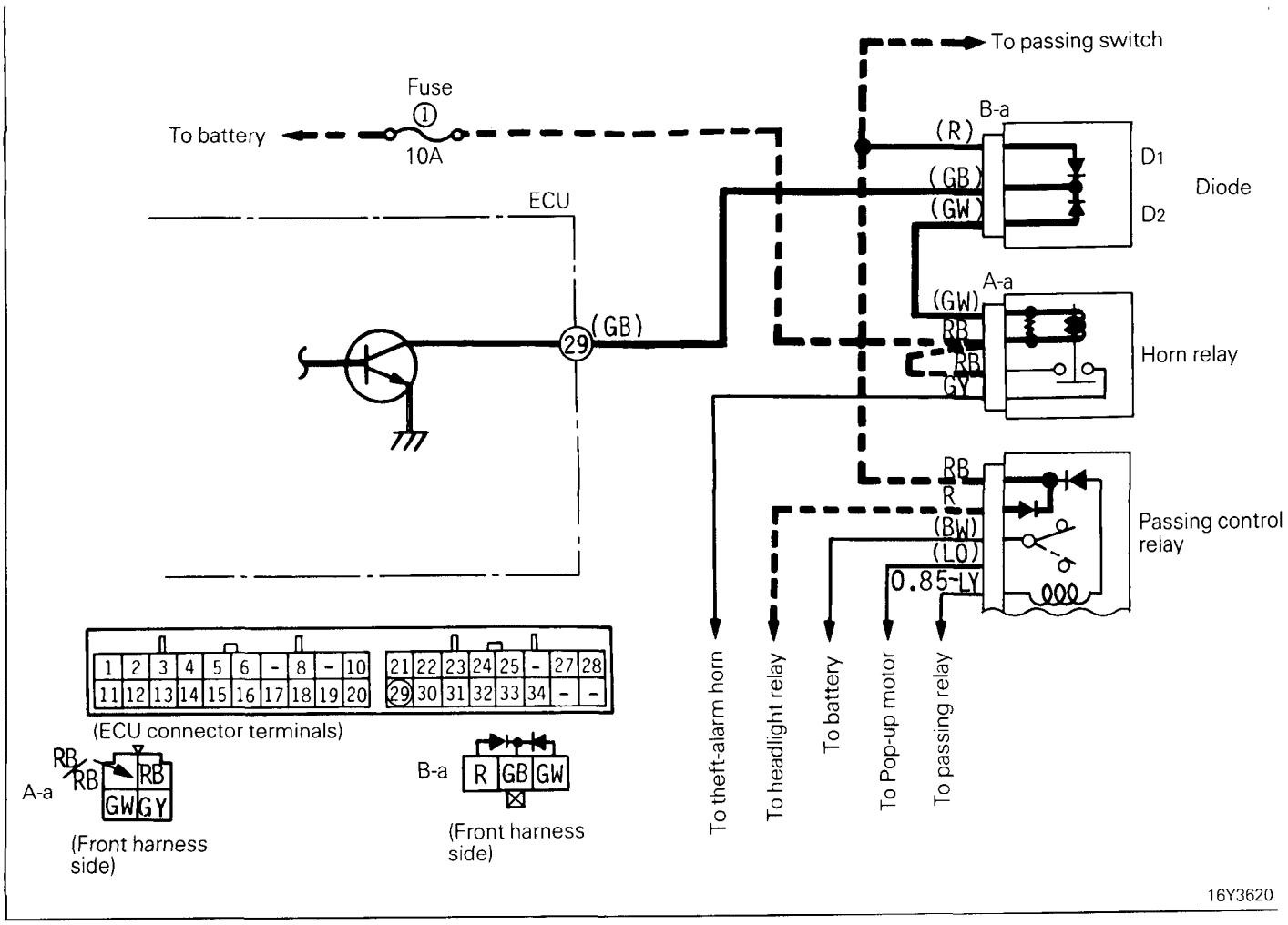


NOTE
The check table shown below is based upon the assumption that the passing relay drive circuit is normal. [Refer to check chart No. 28. In addition, the headlights (high beam) should go on when the passing switch is turned on with ignition switch ACC or ON.]

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation A-a connector: separation	A-a connector (front harness side) terminal voltage (LO-Ground)	Battery voltage	0V	Fuse ① blown	Replace the fuse ①.
					Harness damaged or disconnected	Repair the harness.
2	A-a connector: connection Disconnect the ECU harness connector and short the terminal ㉔ (front harness side, BG line) to drive the passing relay. B-a connector: separation	B-a connector terminal voltage (LY-Ground)	Battery voltage	0V	Passing relay malfunction	Check the passing relay. (Refer to P.8-197.)
					Harness damaged or disconnected	Repair the harness.

ECU: Electronic Control Unit

30. Horn Relay and Passing Control Relay Drive Circuit

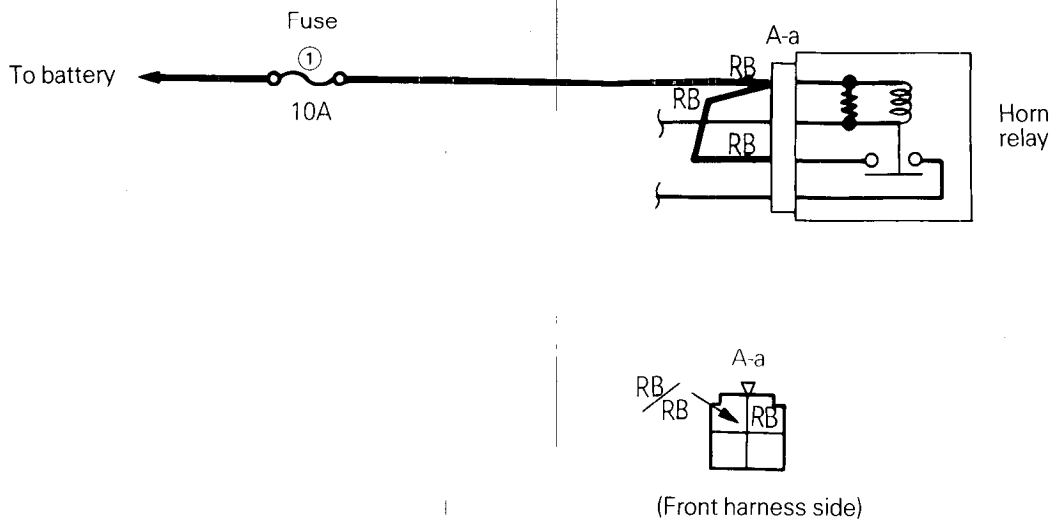


NOTE
The check table shown below is based upon the assumption that the circuit indicated by the broken line (- - - -) in the figure above is normal. [Refer to check chart No. 31. In addition, the headlights (high beam) should go on when the passing switch is turned on with ignition switch ACC or ON.]

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	ECU connector: separation	A-a connector (front harness side) terminal voltage (GW-Ground)	Battery voltage	0V	Damaged relay coil	Check the horn relay. (Refer to P.8-228.)
					Damaged or disconnected harness	Repair the harness.
2	ECU connector: separation	B-a connector (front harness side) terminal voltage (GB-Ground)	Battery voltage	0V	Damaged diode D_1 or D_2	Replace the diode.
					Damaged or disconnected harness	Repair the harness.
3	ECU connector: separation	ECU terminal voltage (29-Ground)	Battery voltage	0V	Damaged or disconnected harness	Repair the harness.

ECU: Electronic Control Unit

31. Horn Relay Power-supply Circuit



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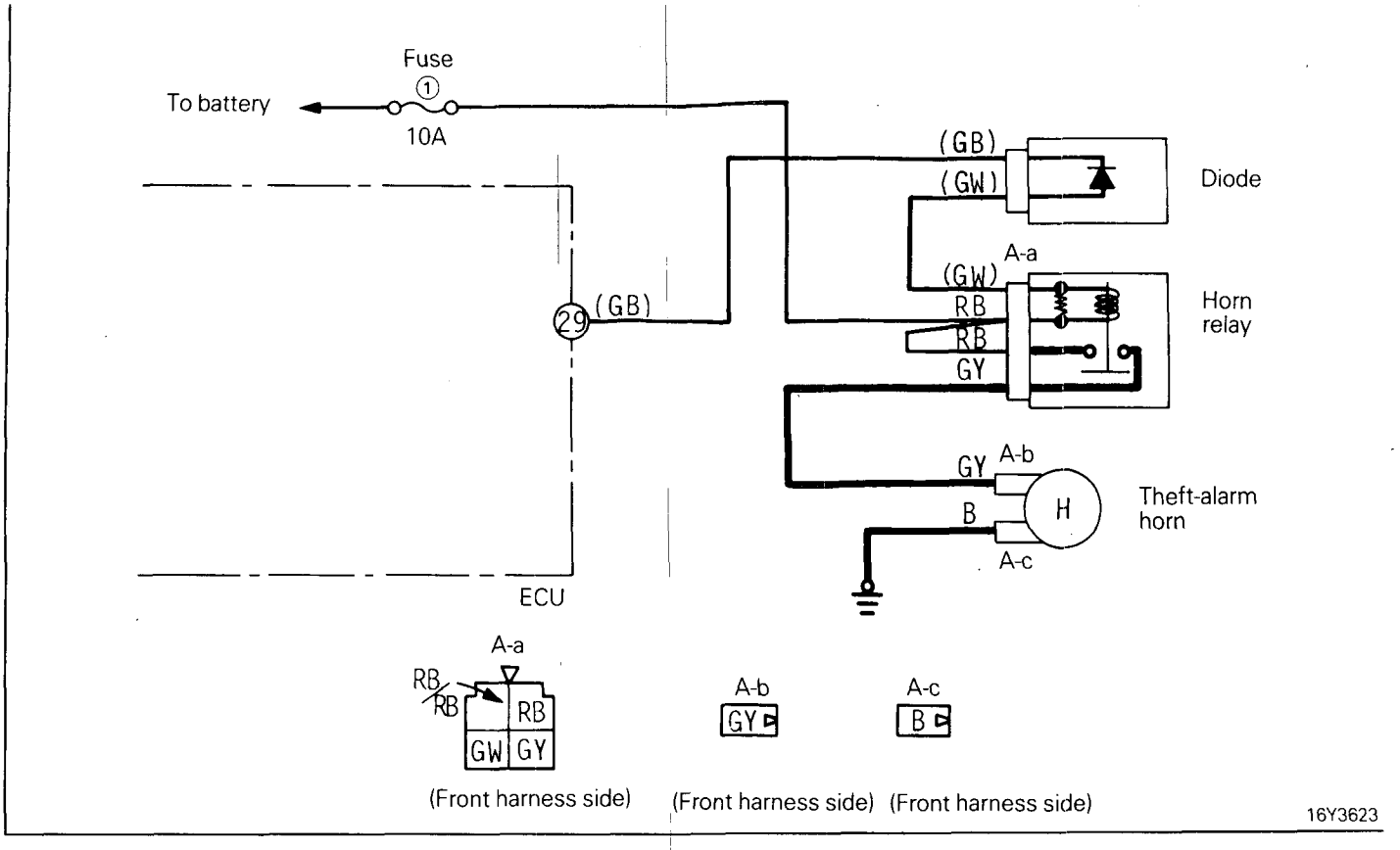
Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	A-a connector: separation	A-a connector (front harness side) terminal voltage (RB-Ground)	Battery voltage	0V	Fuse ① blown	Replace the fuse.
					Damaged or disconnected harness	Repair the harness.

32. Theft-alarm Horn Drive Circuit



NOTE
The checks described below are based upon the assumption that the horn relay circuit is normal. (Refer to check chart No. 30 and No. 31.)

Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
1	Separate the ECU's harness connector; then short-circuit terminal No. 29 (front harness side GB line), and activate the horn relay.	A-a connector terminal voltage (GY-Ground)	Battery voltage	0V	Malfunction of the horn relay	Check the horn relay. (Refer to P.8-228.)
2	Separate the ECU's harness connector; then short-circuit terminal No. 29 (front harness side GB line), and activate the horn relay.	A-b connector terminal voltage (GY-Ground)	Battery voltage	0V	Harness damaged or disconnected	Repair the harness.

ECU: Electronic Control Unit

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Step	Check method		Judgement		Cause	Remedy
	Condition	Check object	Normal	Malfunction		
3	Separate the ECU's harness connector; then short-circuit terminal No. 29 (front harness side GB line), and activate the horn relay.	A-c connector terminal voltage (B-Ground)	Horn sounds. (0V)	Horn doesn't sound. (0V)	Malfunction of the theft-alarm horn	Replace the theft-alarm horn.
				Battery voltage	Damaged or disconnected wiring of ground circuit	Repair the harness.

ECU: Electronic Control Unit