

2010
MARUTI
SUZUKI

GYPSY KING

SUPPLEMENTARY SERVICE MANUAL
MG413W BSIV



Caring for Customers

Part No. 99510M82C20-74E
December, 2010 (ENG)

IMPORTANT

WARNING/CAUTION/NOTE

Please read this manual and follow its instructions carefully. To emphasize special information, the words **WARNING**, **CAUTION** and **NOTE** have special meanings. Pay special attention to the messages highlighted by these signal words.

WARNING:

Indicates a potential hazard that could result in death or injury.

CAUTION:

Indicates a potential hazard that could result in vehicle damage.

NOTE:

Indicates special information to make maintenance easier or instructions clearer.

WARNING :

This service manual is intended for authorized Maruti dealers and qualified service mechanics only. Inexperienced mechanics or mechanics without the proper tools and equipment may not be able to properly perform the services described in this manual. Improper repair may result in injury to the mechanic and may render the vehicle unsafe for the driver and passengers.

Prepared by
MARUTI SUZUKI INDIA LIMITED

Service Division
December, 2010

Part NO. 99510M82C20-74E
Printed in India

FOREWORD

This SUPPLEMENTARY SERVICE MANUAL is a supplement to MG413 BSIV SERVICE MANUAL and has been prepared exclusively for the following model.

Applicable model: MG413W (BS-IV)

Therefore, whenever servicing the above applicable model, consult this supplement first. And for any section, item or description not found in this supplement, refer to the RELATED MANUAL below.

When replacing parts or servicing by disassembling, it is recommended to use MARUTI genuine parts, tools and service materials (lubricants, sealants, etc.) as specified in each description.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. And use as the main subject of description is the vehicle of standard specifications among others. Therefore, note that illustrations may differ from the vehicle being actually serviced. The right is reserved to make changes at any time without notice.

NOTE: For the screen toned sections with asterisk (*) in the table of contents above, refer to the same sections of the service manual mentioned below.

RELATED MANUAL:

99500M 80303-74E	Service Manual
99510M82C00-74E	Supplementary Service Manual
99510M82C01-74E	Supplementary Service Manual
99500M82C51-74E	Supplementary Service Manual
99512M82C00-74E	Wiring Diagram Manual
99512M82C51-74E	

MARUTI SUZUKI INDIA LIMITED
SERVICE DIVISION

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GENERAL INFORMATION

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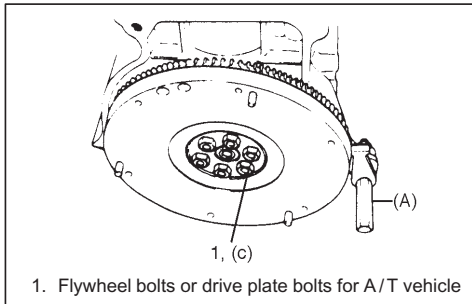
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HOW TO USE THIS MANUAL

- 1) There is a TABLE OF CONTENTS FOR THE WHOLE MANUAL on the third page of this manual, whereby you can easily find the section that offers the information you need. Also, there is a CONTENTS on the first page of EACH SECTION, where the main items in that section are listed.
- 2) Each section of this manual has its own pagination. It is indicated at the top of each page along with the Section name.
- 3) The SPECIAL TOOL usage and TORQUE SPECIFICATION are given as shown in figure below.



- 6) Install oil pump. Refer to OIL PUMP.
- 7) Install flywheel (for M/T vehicle) or drive plate (for A/T vehicle). Using special tool, lock flywheel or drive plate, and tighten flywheel or drive plate bolts to specified torque.

Special Tool**(A): 09924M17810****Tightening Torque****(c): 78 N·m (7.8 kg-m, 56.0 lb-ft)**

- 4) A number of abbreviations are used in the text. For their full explanations, refer to **ABBREVIATIONS MAY BE USED IN THIS MANUAL** of this section.
- 5) The SI, metric and foot-pound systems are used as units in this manual.
- 6) DIAGNOSIS are included in each section as necessary.
- 7) At the end of each section, there are descriptions of SPECIAL TOOLS, REQUIRED SERVICE MATERIALS and TIGHTENING TORQUE SPECIFICATIONS that should be used for the servicing work described in that section.

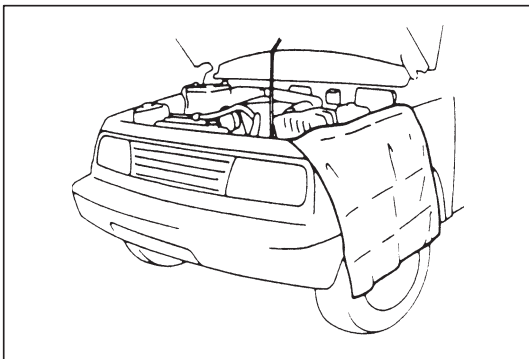
PRECAUTIONS

GENERAL PRECAUTIONS

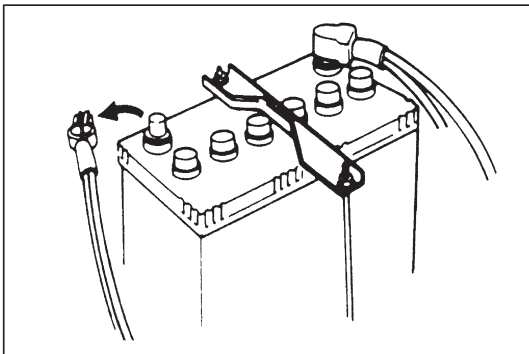
The WARNING and CAUTION below describe some general precautions that you should observe when servicing a vehicle. These general precautions apply to many of the service procedures described in this manual, and they will not necessarily be repeated with each procedure to which they apply.

WARNING:

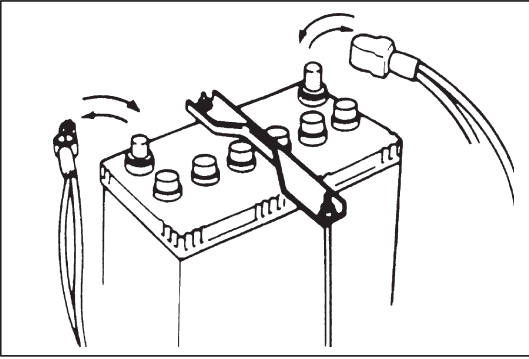
- Whenever raising a vehicle for service, be sure to follow the instructions under **VEHICLE LIFTING POINTS** on **SECTION 0A**.
- When it is necessary to do service work with the engine running, make sure that the parking brake is set fully and the transmission is in Neutral (for manual transmission vehicles) or Park (for automatic transmission vehicles). Keep hands, hair, clothing, tools, etc. away from the fan and belts when the engine is running.
- When it is necessary to run the engine indoors, make sure that the exhaust gas is forced outdoors.
- Do not perform service work in areas where combustible materials can come in contact with a hot exhaust system. When working with toxic or flammable materials (such as gasoline and refrigerant), make sure that the area you work in is well-ventilated.
- To avoid getting burned, keep away from hot metal parts such as the radiator, exhaust manifold, tail-pipe, muffler, etc.
- New and used engine oil can be hazardous. Children and pets may be harmed by swallowing new or used oil. Keep new and used oil and used engine oil filters away from children and pets. Continuous contact with used engine oil has been found to cause [skin] cancer in laboratory animals. Brief contact with used oil may irritate skin. To minimize your exposure to used engine oil, wear a long-sleeve shirt and moisture-proof gloves (such as dish washing gloves) when changing engine oil. If engine oil contacts your skin, wash thoroughly with soap and water. Launder any clothing or rags if wet with oil, recycle or properly dispose of used oil and filters.
- Make sure the bonnet (front hood) is fully closed and latched before driving. If it is not, it can fly up unexpectedly during driving, obstructing your view and resulting in an accident.

**CAUTION:**

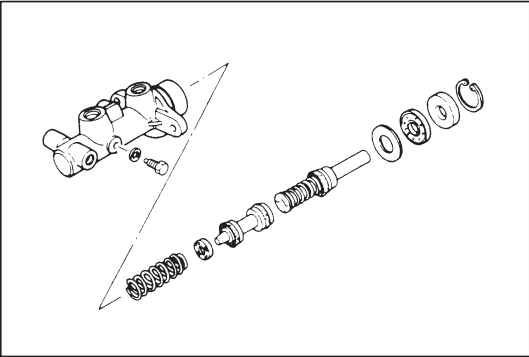
- Before starting any service work, cover fenders, seats and any other parts that are likely to get scratched or stained during servicing. Also, be aware that what you wear (e.g. buttons) may cause damage to the vehicle's finish.



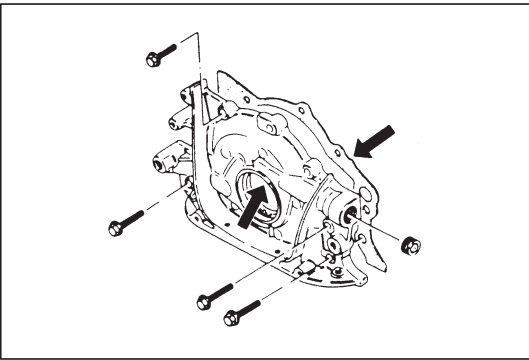
- When performing service to electrical parts that does not require use of battery power, disconnect the negative cable of the battery.



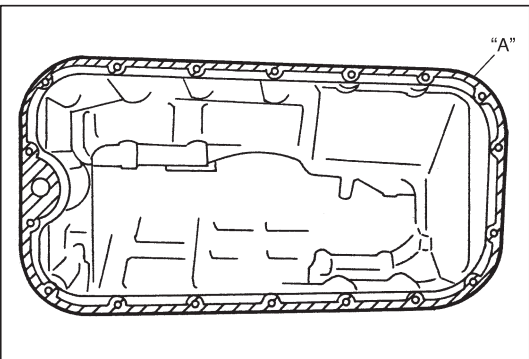
- When removing the battery, be sure to disconnect the negative cable first and then the positive cable. When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal cover.



- When removing parts that are to be reused, be sure to keep them arranged in an orderly manner so that they may be reinstalled in the proper order and position.

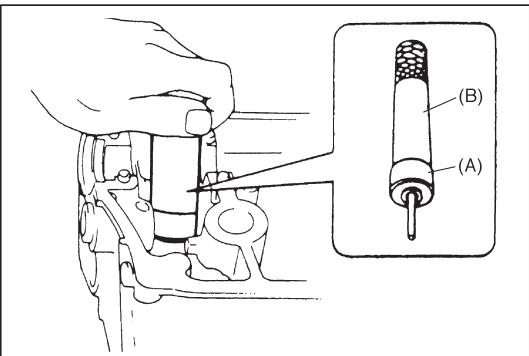


- Whenever you use oil seals, gaskets, packing, O-rings, locking washers, split pins, self-locking nuts, and certain other parts as specified, be sure to use new ones. Also, before installing new gaskets, packing, etc., be sure to remove any residual material from the mating surfaces.



- Make sure that all parts used in reassembly are perfectly clean.
- When use of a certain type of lubricant, bond or sealant is specified, be sure to use the specified type.

“A”: Sealant 99000M31150

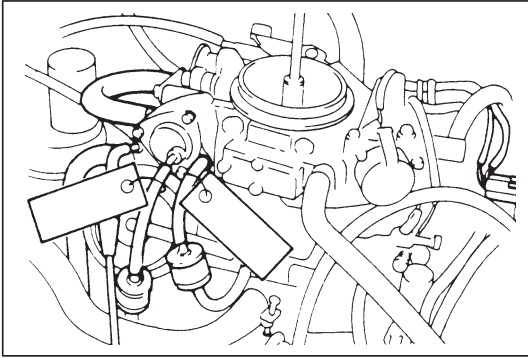


- Be sure to use special tools when instructed.

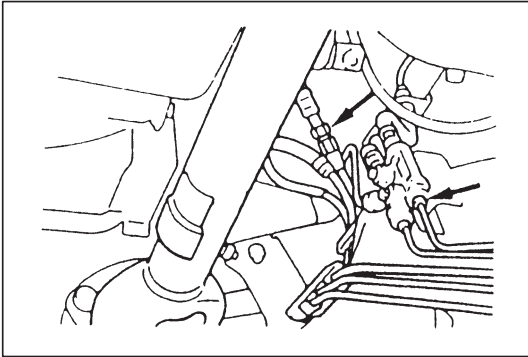
Special Tool

(A): 09917M98221

(B): 09916M58210



- When disconnecting vacuum hoses, attach a tag describing the correct installation positions so that the hoses can be re-installed correctly.



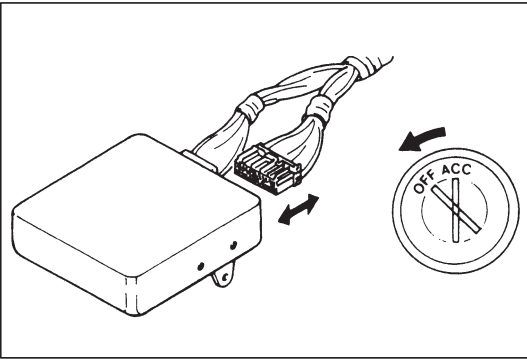
- After servicing fuel, oil, coolant, vacuum, exhaust or brake systems, check all lines related to the system for leaks.

- Never disconnect the fuel line between the fuel pump and injector without first releasing the fuel pressure, or fuel can be sprayed out under pressure.

PRECAUTIONS FOR CATALYTIC CONVERTER

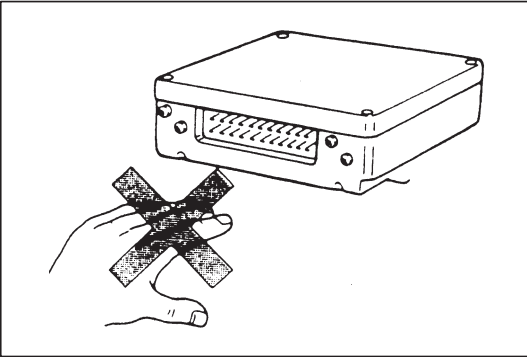
For vehicles equipped with a catalytic converter, use only unleaded gasoline and be careful not to let a large amount of unburned gasoline enter the converter or it can be damaged.

- Conduct a spark test only when necessary, make it as short as possible, and do not open the throttle.
- Conduct engine compression checks within the shortest possible time.
- Avoid situations which can result in engine misfire (e.g. starting the engine when the fuel tank is nearly empty.)



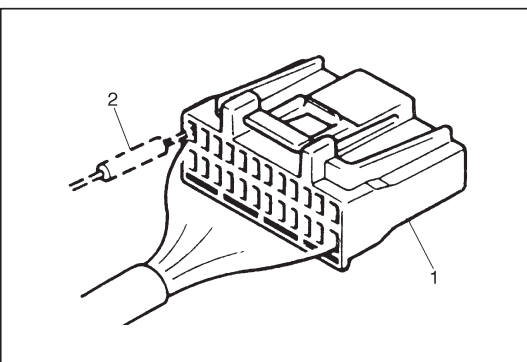
PRECAUTIONS FOR ELECTRICAL CIRCUIT SERVICE

- When disconnecting and connecting coupler, make sure to turn ignition switch to OFF position, or electronic parts may get damaged.

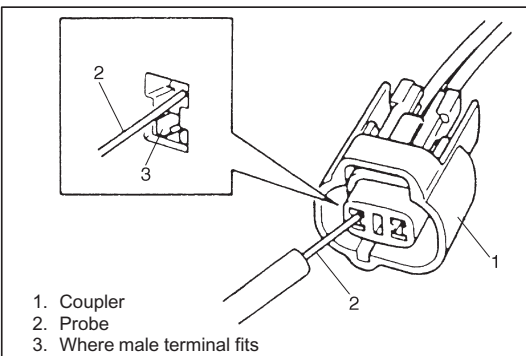


- Be careful not to touch the electrical terminals of parts which use microcomputers (e.g. electronic control unit like as ECM, PCM, P/S controller, etc.). The static electricity from your body can damage these parts.

- Never connect any tester (voltmeter, ohmmeter, or whatever) to electronic control unit when its coupler is disconnected. Attempt to do it may cause damage to it.
- Never connect an ohmmeter to electronic control unit with its coupler connected to it. Attempt to do it may cause damage to electronic control unit and sensors.
- Be sure to use a specified voltmeter/ohmmeter. Otherwise, accurate measurements may not be obtained or personal injury may result. If not specified, use a voltmeter with high-impedance ($M\Omega/V$ minimum) or a digital type voltmeter.



- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe (2) from the wire harness side (backside) of the connector (1).

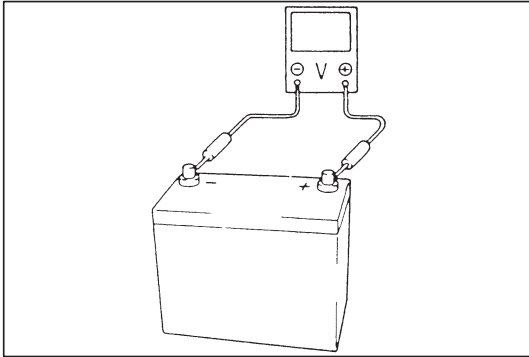


- When connecting meter probe from terminal side of coupler because it can't be connected from harness side, use extra care not to bend male terminal of coupler or force its female terminal open for connection.

In case of such coupler as shown connect probe as shown to avoid opening female terminal.

Never connect probe where male terminal is supposed to fit.

- When checking connection of terminals, check its male half for bend and female half for excessive opening and both for locking (looseness), corrosion, dust, etc.



- Before measuring voltage to check for electrical system, check to make sure that battery voltage is 11V or higher. Such terminal voltage check at low battery voltage will lead to erroneous diagnosis.

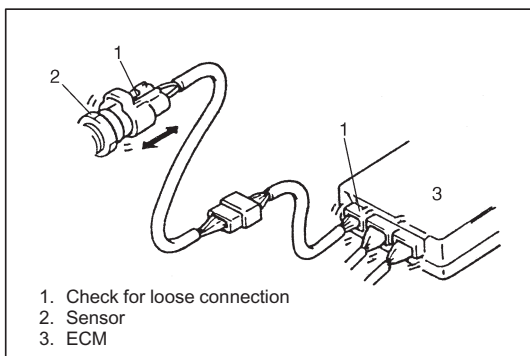
ELECTRICAL CIRCUIT INSPECTION PROCEDURE

While there are various electrical circuit inspection methods, described here is a general method to check its open and short circuit by using an ohmmeter and a voltmeter.

OPEN CIRCUIT CHECK

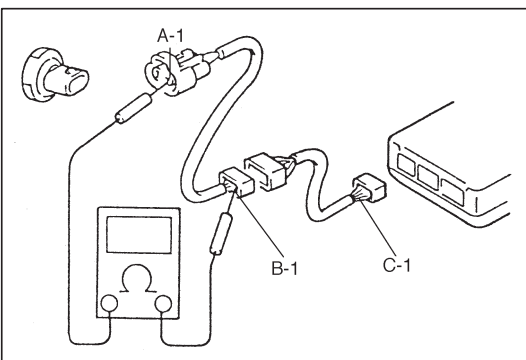
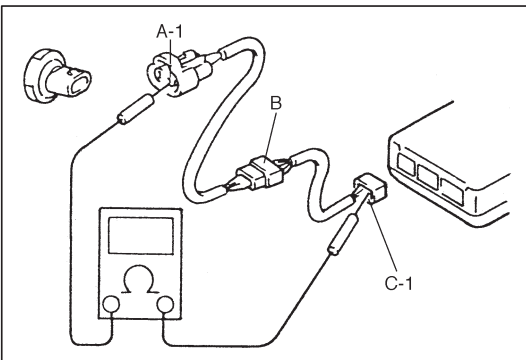
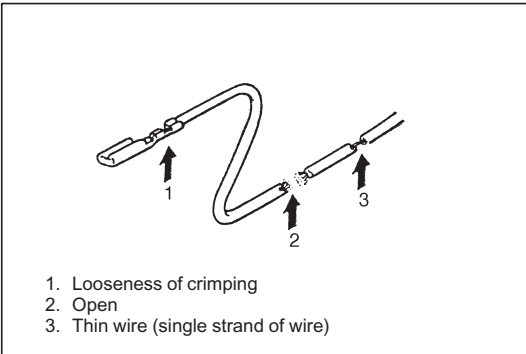
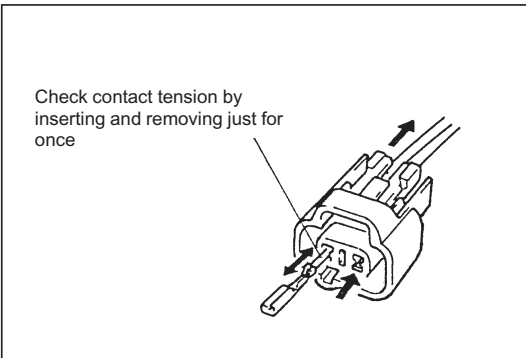
Possible causes for the open circuit are as follows. As the cause is in the connector or terminal in many cases, they need to be checked particularly carefully.

- Loose connection of connector
- Poor contact of terminal (due to dirt, corrosion or rust on it, poor contact tension, entry of foreign object etc.)
- Wire harness being open



When checking system circuits including an electronic control unit such as ECM, ABS control module, etc., it is important to perform careful check, starting with items which are easier to check.

- 1) Disconnect negative cable at battery.
- 2) Check each connector at both ends of the circuit being checked for loose connection. Also check lock condition of connector if equipped with connector lock.



- 3) Using a test male terminal, check both terminals of the circuit being checked for contact tension of its female terminal. Check each terminal visually for poor contact (possibly caused by dirt, corrosion, rust entry of foreign object, etc.). At the same time, check to make sure that each terminal is locked in the connector fully.

- 4) Using continuity check or voltage check procedure described in the following page, check the wire harness for open circuit and poor connection with its terminals. Locate abnormality, if any.

Continuity check

- 1) Measure resistance between connector terminals at both ends of the circuit being checked (between A-1 and C-1 in the figure). If no continuity is indicated (infinity or over limit), that means that the circuit is open between terminals A-1 and C-1.

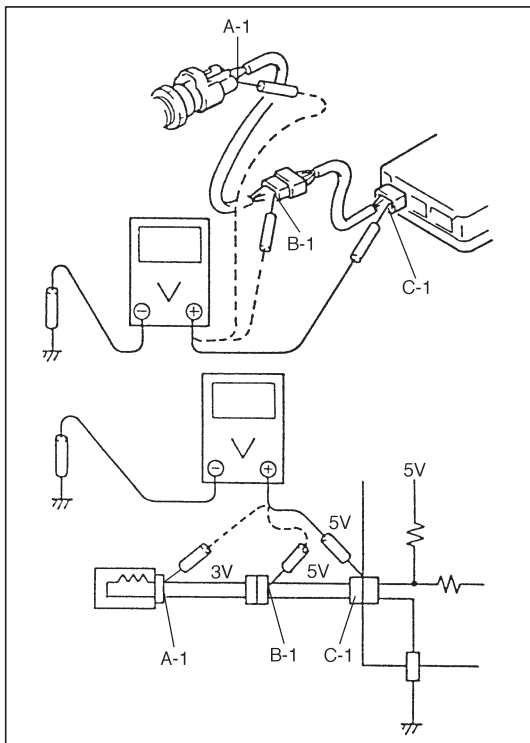
- 2) Disconnect the connector included in the circuit (connector-B in the figure) and measure resistance between terminals A-1 and B-1.

If no continuity is indicated, that means that the circuit is open between terminals A-1 and B-1. If continuity is indicated, there is an open circuit between terminals B-1 and C-1 or an abnormality in connector-B.

Voltage check

If voltage is supplied to the circuit being checked, voltage check can be used as circuit check.

- 1) With all connectors connected and voltage applied to the circuit being checked, measure voltage between each terminal and body ground.



If measurements were taken as shown in the figure and results were as listed below, it means that the circuit is open between terminals B-1 and A-1.

Voltage Between:

C-1 and body ground: Approx. 5V

B-1 and body ground: Approx. 5V

A-1 and body ground: 0V

Also, if measured values were as listed below, it means that there is a resistance (abnormality) of such level that corresponds to the voltage drop in the circuit between terminals A-1 and B-1.

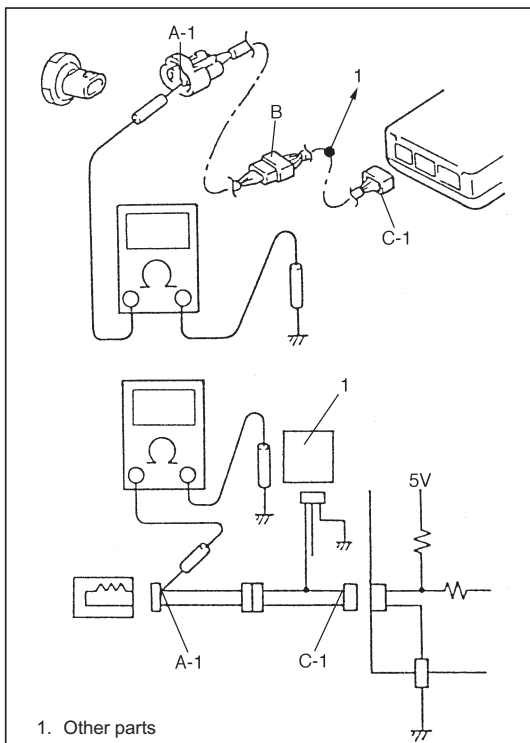
Voltage Between:

C-1 and body ground: Approx. 5V

B-1 and body ground: Approx. 5V

A-1 and body ground: Approx. 3V

2V voltage drop



Short circuit check (wire harness to ground)

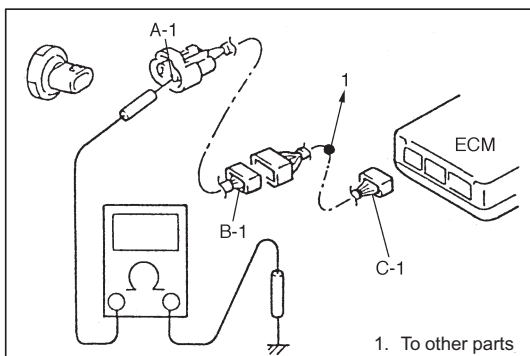
- 1) Disconnect negative cable at battery.
- 2) Disconnect connectors at both ends of the circuit to be checked.

NOTE:

If the circuit to be checked is connected to other parts, disconnect all connectors of those parts.

Otherwise, diagnosis will be misled.

- 3) Measure resistance between terminal at one end of circuit (A-1 terminal in figure) and body ground. If continuity is indicated, it means that there is a short to ground between terminals A-1 and C-1 of the circuit.

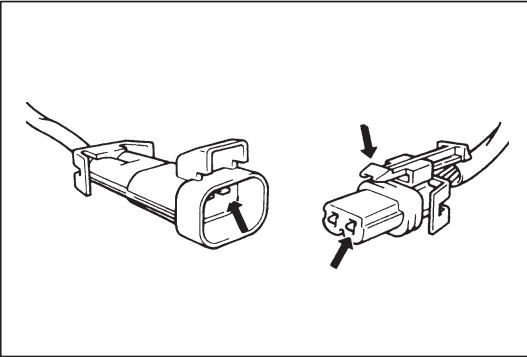


- 4) Disconnect the connector included in circuit (connector B) and measure resistance between A-1 and body ground.

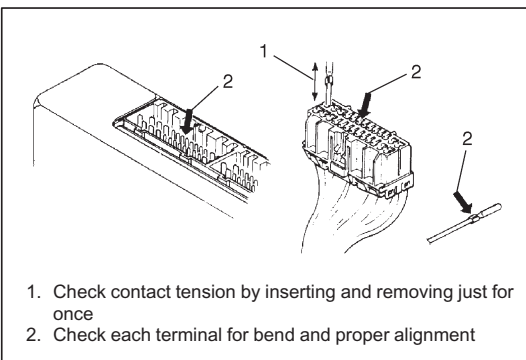
If continuity is indicated, it means that the circuit is shorted to the ground between terminals A-1 and B-1.

INTERMITTENT AND POOR CONNECTION

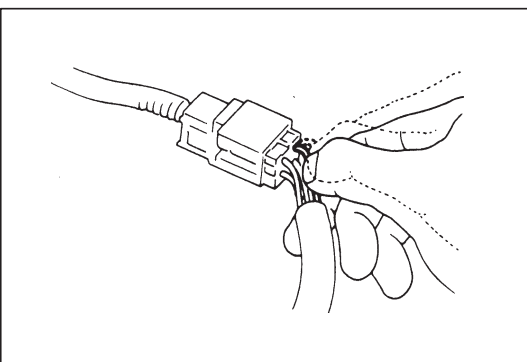
Most intermittent are caused by faulty electrical connections or wiring, although a sticking relay or solenoid can occasionally be at fault. When checking it for proper connection, perform careful check of suspect circuits for:



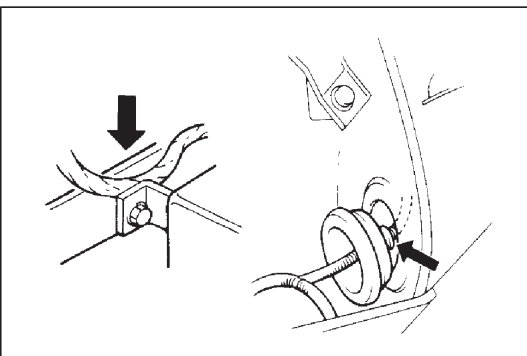
- Poor mating of connector halves, or terminals not fully seated in the connector body (backed out).
- Dirt or corrosion on the terminals. The terminals must be clean and free of any foreign material which could impede proper terminal contact. However, cleaning the terminal with a sand paper or the like is prohibited.
- Damaged connector body, exposing the terminals to moisture and dirt, as well as not maintaining proper terminal orientation with the component or mating connector.



- Improperly formed or damaged terminals.
Check each connector terminal in problem circuits carefully to ensure good contact tension by using the corresponding mating terminal.
If contact tension is not enough, reform it to increase contact tension or replace.



- Poor terminal-to-wire connection.
Check each wire harness in problem circuits for poor connection by shaking it by hand lightly. If any abnormal condition is found, repair or replace.



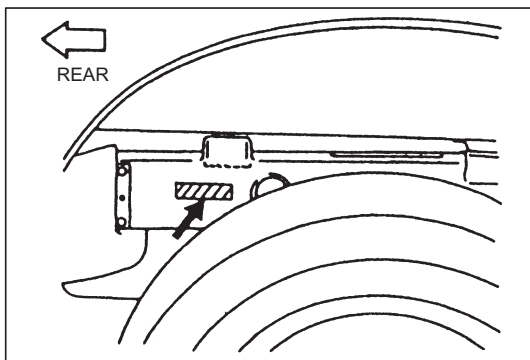
- Wire insulation which is rubbed through, causing an intermittent short as the bare area touches other wiring or parts of the vehicle.
- Wiring broken inside the insulation. This condition could cause continuity check to show a good circuit, but if only 1 or 2 strands of a multi-strand-type wire are intact, resistance could be far too high.
If any abnormality is found, repair or replace.

PRECAUTIONS FOR INSTALLING MOBILE COMMUNICATION EQUIPMENT

When installing mobile communication equipment such as CB (Citizens-Band)-radio or cellular-telephone, be sure to observe the following precautions.

Failure to follow cautions may adversely affect electronic control system.

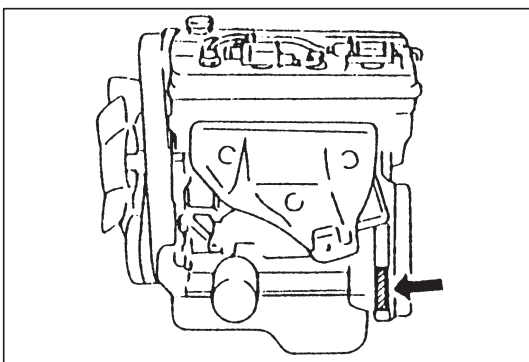
- Keep the antenna as far away as possible from the vehicle's electronic control unit.
- Keep the antenna feeder more than 20 cm (7.9 in) away from electronic control unit and its wire harnesses.
- Do not run the antenna feeder parallel with other wire harnesses.
- Confirm that the antenna and feeder are correctly adjusted.



IDENTIFICATION INFORMATION

BODY NUMBER

The vehicle body number is punched on the chassis inside the tire housing on the right rear side.

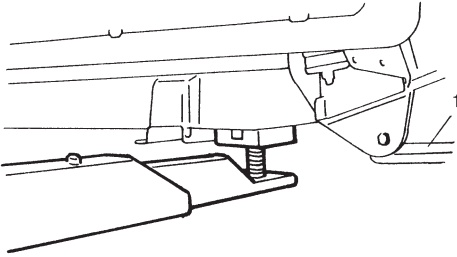


ENGINE IDENTIFICATION NUMBER

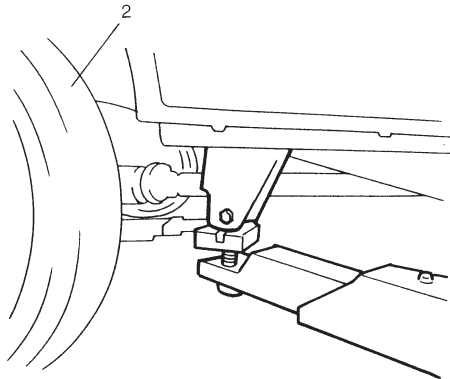
The number is punched on the cylinder block.

When using frame contact hoist:

Front



Rear



1. Front right leaf spring
2. Rear right tire

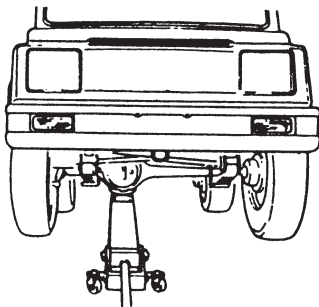
VEHICLE LIFTING POINTS

WARNING:

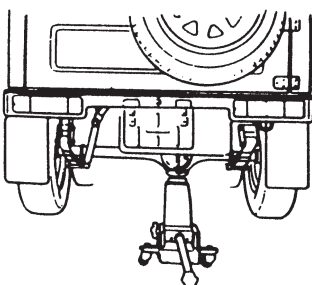
- Before applying hoist to underbody, always take vehicle balance throughout service into consideration. Vehicle balance on hoist may change depending on what part to be removed.
- Before lifting up the vehicle, check to be sure that end of hoist arm is not in contact with brake pipe, fuel pipe, bracket or any other part.
- When using frame contact hoist, apply hoist as shown in figure (right and left at the same position). Lift up the vehicle till 4 tires are a little off the ground and make sure that the vehicle will not fall off by trying to move vehicle body in both ways. Work can be started only after this confirmation.
- Make absolutely sure to lock hoist after vehicle is hoisted up.

When using floor jack:

Front



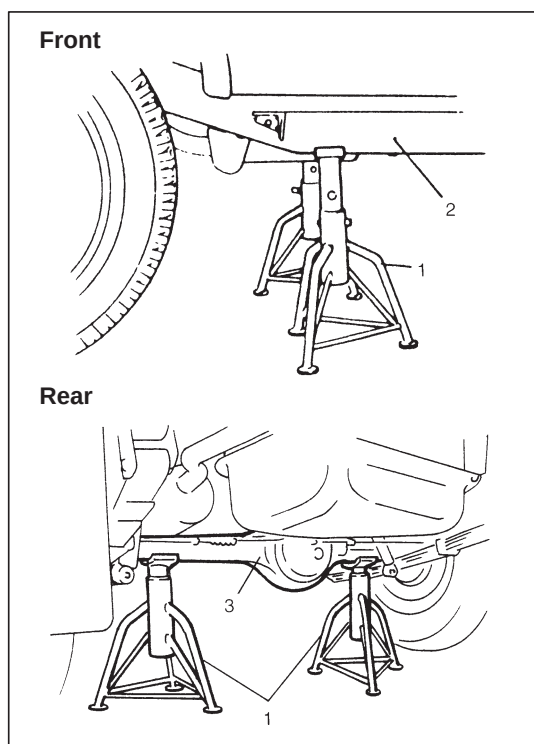
Rear



In raising front or rear vehicle end off the floor by jacking, be sure to put the jack against the differential portion of the front or rear axle housing.

WARNING:

- Never apply jack against suspension parts (i.e., stabilizer, etc.) or vehicle floor, or it may get deformed.
 - If the vehicle to be jacked up only at the front or rear end, be sure to block the wheels on ground in order to ensure safety.
- After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on the vehicle raised on jack alone.

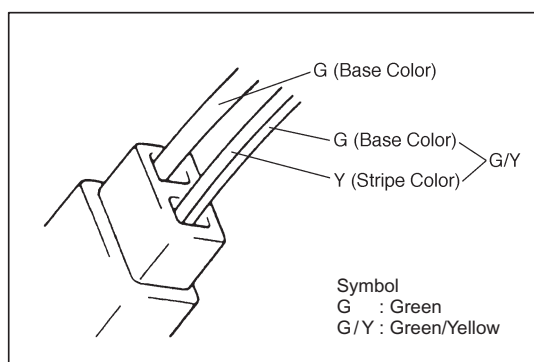


To perform service with either front or rear vehicle end jacked up, be sure to place safety stands (1) under chassis frame (2) (for front side) and rear axle housing (3) (for rear side) so that body is securely supported. And then check to ensure that chassis frame and rear axle housing do not slide on safety stands and the vehicle is held stable for safety's sake.

Symbol	Wire Color	Symbol	Wire Color
BLK	Black	ORN	Orange
BLU	Blue	RED	Red
BRN	Brown	WHT	White
GRN	Green	YEL	Yellow
GRY	Gray	PNK	Pink
LT BLU	Light blue	PPL	Purple
LT GRN	Light green		

WIRE COLOR SYMBOLS IN THIS MANUAL

The wire color is abbreviated to the three alphabet(s) of each color.



There are two kinds of colored wire used in this vehicle. One is single-colored wire and the other is dual-colored (striped) wire. The single-colored wire uses only one color symbol (i.e. "GRN"). The dual-colored wire uses two color symbols (i.e. "GRN/YEL"). The first symbol represents the base color of the wire ("G" in the figure) and the second symbol represents the color of the stripe ("Y" in the figure).

ABBREVIATIONS MAY BE USED IN THIS MANUAL

A

ABS	: Anti-lock Brake System
ATDC	: After Top Dead Center
API	: American Petroleum Institute
ATF	: Automatic Transmission Fluid
ALR	: Automatic Locking Retractor
AC	: Alternating Current
A/T	: Automatic Transmission
A/C	: Air Conditioning
ABDC	: After Bottom Dead Center
A/F	: Air Fuel Mixture Ratio
A-ELR	: Automatic-Emergency Locking Retractor

B

B+	: Battery Positive Voltage
BTDC	: Before Top Dead Center
BBDC	: Before Bottom Dead Center

C

CKT	: Circuit
CMP Sensor	: Camshaft Position Sensor (Crank Angle Sensor, CAS)
CO	: Carbon Monoxide
CPP Switch	: Clutch Pedal Position Switch (Clutch Switch, Clutch Start Switch)
CPU	: Central Processing Unit
CRS	: Child Restraint System

D

DC	: Direct Current
DLC	: Data Link Connector (Assembly Line Diag. Link, ALDL, Serial Data Link, SDL)
DOHC	: Double Over Head Camshaft
DOJ	: Double Offset Joint
DRL	: Daytime Running Light
DTC	: Diagnostic Trouble Code (Diagnostic Code)

E

EBCM	: Electronic Brake Control Module, ABS Control Module
ECM	: Engine Control Module
ECT Sensor	: Engine Coolant Temperature Sensor (Water Temp. Sensor, WTS)
EGR	: Exhaust Gas Recirculation
EGRT Sensor	: EGR Temperature Sensor (Recirculated Exhaust Gas Temp. Sensor, REGTS)
EFE Heater	: Early Fuel Evaporation Heater (Positive Temperature Coefficient, PTC Heater)
ELR	: Emergency Locking Retractor
EPS	: Electrical Power Steering
EVAP	: Evaporative Emission
EVAP Canister	: Evaporative Emission Canister (Charcoal Canister)

F

4WD	: 4 Wheel Drive
-----	-----------------

G

GEN	: Generator
GND	: Ground

H

HC	: Hydrocarbons
HO2S	: Heated Oxygen Sensor

I

IAC Valve	: Idle Air Control Valve (Idle Speed Control Solenoid Valve, ISC Solenoid Valve)
IAT Sensor	: Intake Air Temperature Sensor (Air temperature Sensor, ATS)
ICM	: Immobilizer Control Module
IG	: Ignition
ISC Actuator	: Idle Speed Control Actuator (Motor)

L

LH	: Left Hand
LSPV	: Load Sensing Proportioning Valve

M

MAF Sensor	: Mass Air Flow Sensor (Air Flow Sensor, AFS, Air Flow Meter, AFM)
MAP Sensor	: Manifold Absolute Pressure Sensor (Pressure Sensor, PS)
Max	: Maximum
MFI	: Multiport Fuel Injection (Multipoint Fuel Injection)
Min	: Minimum
MIL	: Malfunction Indicator Lamp ("CHECK ENGINE" Light)
M/T	: Manual Transmission

N

NOx	: Nitrogen Oxides
-----	-------------------

O

OBD	: On-Board Diagnostic System (Self-Diagnosis Function)
O/D	: Overdrive
OHC	: Over Head Camshaft

P

PNP	: Park/Neutral Position
P/S	: Power Steering
PSP Switch	: Power Steering Pressure Switch (P/S Pressure Switch)
PCM	: Powertrain Control Module
PCV	: Positive Crankcase Ventilation

R

RH	: Right Hand
----	--------------

S

SAE	: Society of Automotive Engineers
SDM	: Sensing and Diagnostic Module (Air bag controller, Air bag control module)
SFI	: Sequential Multiport Fuel Injection
SOHC	: Single Over Head Camshaft

T

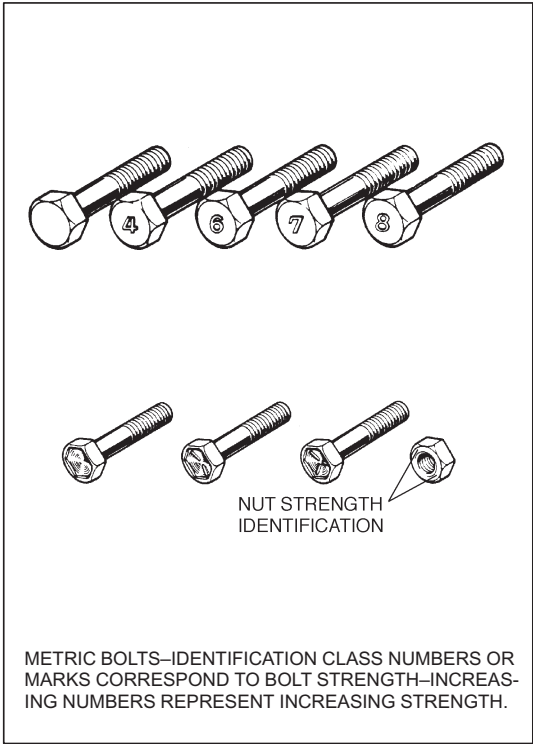
TBI	: Throttle Body Fuel Injection (Single-Point Fuel Injection, SPI)
TCC	: Torque Converter Clutch
TCM	: Transmission Control Module (A/T Controller, A/T Control Module)
TP Sensor	: Throttle Position Sensor
TVV	: Thermal Vacuum Valve (Thermal Vacuum Switching Valve, TVSV, Bimetal Vacuum Switching Valve, BVSV)
TWC	: Three Way Catalytic Converter (Three Way Catalyst)
2WD	: 2 Wheel Drive

V

VIN	: Vehicle Identification Number
VSS	: Vehicle Speed Sensor

W

WU-OC	: Warm Up Oxidation Catalytic Converter
WU-TWC	: Warm Up Three Way Catalytic Converter



METRIC INFORMATION

METRIC FASTENERS

Most of the fasteners used for this vehicle are metric. When replacing any fasteners, it is most important that replacement fasteners be the correct diameter, thread pitch and strength.

FASTENER STRENGTH IDENTIFICATION

Most commonly used metric fastener strength property classes are 4T, 7T and radial line with the class identification embossed on the head of each bolt. Some metric nuts will be marked with punch mark strength identification on the nut face. Figure shows the different strength markings.

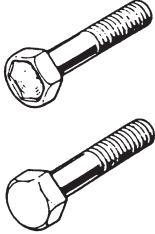
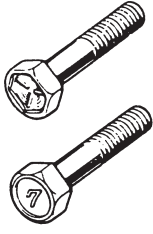
When replacing metric fasteners, be careful to use bolts and nuts of the same strength or greater than the original fasteners (the same number marking or higher). It is likewise important to select replacement fasteners of the correct size. Correct replacement bolts and nuts are available through the parts division.

STANDARD TIGHTENING TORQUE

Each fastener should be tightened to the torque specified in each section of this manual. If no description or specification is provided, refer to the following tightening torque chart for the applicable torque for each fastener. When a fastener of greater strength than the original one is used, however, use the torque specified for the original fastener.

NOTE:

- For the flanged bolt and nut, add 10% to the tightening torque given in the chart below.
- The chart below is applicable only where the fastened parts are made of steel light alloy.

STRENGTH THREAD DIAMETER (mm)	 Conventional bolt			 "4T" bolt			 "7T" bolt		
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1.5	0.15	1.0				2.3	0.23	2.0
5	3.0	0.30	2.5				4.5	0.45	3.5
6	5.5	0.55	4.0				10	1.0	7.5
8	13	1.3	9.5				23	2.3	17.0
10	29	2.9	21.0				50	5.0	36.5
12	45	4.5	32.5				85	8.5	61.5
14	65	6.5	47.0				135	13.5	98.0
16	105	10.5	76.0				210	21	152.0
18	160	16	116.0				240	24	174.0

SECTION 0B

0B

MAINTENANCE AND LUBRICATION

CONTENTS

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PERIODIC MAINTENANCE SCHEDULE

Interval: This interval should be judged by odometer reading or months, which- ever comes first.	This table includes services as scheduled up to 80,000 km mileage. Beyond 80,000 km, carry out the same services at the same intervals respectively.										
	Km (x 1,000)	1	5	10	20	30	40	50	60	70	80
	Months	1	6	12	24	36	48	60	72	84	96
ENGINE											
1. Water pump drive belt (tension, wear)	A	I	I	I	I	I	I	I	R	A	I
2. Engine coolant (level, leakage)	I	I	I	R	I	R	I	R	I	R	
3. Engine oil (API GRADE SF, SG, SH) & Oil filter	R	I	R	R	R	R	R	R	R	R	R
4. Cooling system hoses and connections (leakage, damage)	I	I	I	I	I	I	I	I	I	I	I
5. Engine bolts (All cylinder head and manifold fixings)	—	—	T	—	T	—	T	—	T	—	
6. Engine mounting (loose, damage)	—	—	T	—	T	—	T	—	T	—	
7. Valve clearance	—	A	—	A	—	A	—	A	—	A	
8. Camshaft timing belt (damage, wear)	—	—	—	I	—	I	—	I	—	I	
	Replace every 1,00,000 km										
9. Exhaust system (noise, leakage or otherwise defective)	—	I	—	I	—	I	—	I	—	I	
10. Positive crankcase ventilation System (Hoses, connections and valve)	—	I	—	I	—	I	—	I	—	I	
IGNITION											
1. Ignition wiring, (damage, deterioration)	—	—	—	I	—	I	—	I	—	I	
2. Spark plugs (clean and adjust the gap)	—	—	I	R	I	R	I	R	I	R	
FUEL											
1. Air cleaner	Paved-road	Clean every 5,000 km. Replace every 40,000 km.									
	Dusty condition	Clean every 2,500 km. or as required. Replace every 40,000 km. More frequent replacement if dust condition is severe.									
2. Accelerator cable and Throttle shafts	—	I&L	I&L	I&L	I&L	I&L	I&L	I&L	I&L	I&L	I&L
3. Fuel tank cap, fuel lines & connections (leakage, damage)	—	I	—	—	—	I	—	—	—	I	
4. Fuel filter (leakage)	I	I	I	I	I	R	I	I	I	R	
CLUTCH AND TRANSMISSION											
1. Clutch pedal (play)	I	I	I	I	I	I	I	I	I	I	I
2. Clutch slipping (dragging or excessive damage)	I	I	I	I	I	I	I	I	I	I	I
3. Manual Transmission/Transfer and Differential oil (level, leakage)	I	I	I	R	I	R	I	R	I	R	

Notes:

"A" : Adjust.

"I" : Inspect and correct or replace if necessary

"T" : Tighten to specified torque.

"C" : Clean.

"R" : Replace or change.

"O" : Rotate.

"L" : Lubricate.

Interval: This interval should be judged by odometer reading or months, which- ever comes first.	This table includes services as scheduled up to 80,000 km mileage. Beyond 80,000 km, carry out the same services at the same intervals respectively.										
	Km (x 1,000)	1	5	10	20	30	40	50	60	70	80
	Months	1	6	12	24	36	48	60	72	84	96
PROPELLER SHAFTS											
1. Propeller shafts (play)	—	—	I	I	I	I	I	I	I	I	I
2. Universal joints (slack)	—	—	I	I	I	I	I	I	I	I	I
BRAKE											
1. Brake fluid (level, leakage)	I	I	I	R	I	R	I	R	I	R	R
2. Brake pedal (pedal-to-wall clearance)	I	I	I	I	I	I	I	I	I	I	I
3. Parking brake lever and cable (play, damage)	I	I	I	I	I	I	I	I	I	I	I
4. Brake discs & pads (wear)	—	I	I	I	I	I	I	I	I	I	I
5. Brake drums & shoes	—	—	I	I	I	I	I	I	I	I	I
6. Master cylinder and wheel cylinder (oil leakage, boot kit)	I	I	I	I	I	R	I	I	I	I	R
7. Brake hoses and pipes (leakage, damage)	I	I	I	I	I	I	I	I	I	I	I
WHEEL											
1. Tyres (air pressure, abnormal wear, crack, ROTATION)	I	I&O	I&O	I&O	I&O	I&O	I&O	I&O	I&O	I&O	I&O
2. Wheels (damage)	I	I	I	I	I	I	I	I	I	I	I
3. Front wheel bearings (loose, damage)	—	I	I	I	I	I	I	I	I	I	I
4. Rear wheel bearings (loose, damage)	—	I	I	I	I	I	I	I	I	I	I
FRONT AND REAR SUSPENSION											
1. Knuckle supports and tension rod (loose,damage)	—	I	I	I	I	I	I	I	I	I	I
2. Front and Rear springs (damage)	—	I	I	I	I	I	I	I	I	I	I
3. Shock absorbers (oil leakage, damage)	I	I	I	I	I	I	I	I	I	I	I
4. All bolts and nuts (loose)	—	T	T	T	T	T	T	T	T	T	T

Notes:

"A" : Adjust.

"I" : Inspect and correct or replace if necessary

"T" : Tighten to specified torque.

"C" : Clean.

"R" : Replace or change.

"O" : Rotate.

"L" : Lubricate.

Interval: This interval should be judged by odometer reading or months, which- ever comes first.	This table includes services as scheduled up to 80,000 km mileage. Beyond 80,000 km, carry out the same services at the same intervals respectively.										
	Km (x 1,000)	1	5	10	20	30	40	50	60	70	80
	Months	1	6	12	24	36	48	60	72	84	96
STEERING											
1. Steering wheel (play, loose)	I	I	I	I	I	I	I	I	I	I	I
2. Steering gear box (loose, leakage)	I	I	I	I	I	I	I	I	I	I	I
3. All rods and arms (loose, damage, wear)	I	I	I	I	I	I	I	I	I	I	I
ELECTRICAL											
1. Battery electrolyte (level, leakage)	I	I	I	I	I	I	I	I	I	I	I
2. Wiring harness connection (looseness, damage)	—	I	I	I	I	I	I	I	I	I	I
3. Lighting system (operation, stains, damage)	I	I	I	I	I	I	I	I	I	I	I
4. Horn (operation)	I	I	I	I	I	I	I	I	I	I	I
5. System voltage	—	I	I	I	I	I	I	I	I	I	I
BODY											
1. All chassis bolts and nuts (tighten)	—	I	T	T	T	T	T	T	T	T	T
2. All Latches, Hinges & Locks (function)	I	I&L	I&L	I&L	I&L	I&L	I&L	I&L	I&L	I&L	I&L
ROAD TEST											
1. Operation of Brakes, Gear shifting & speedometer	I	I	I	I	I	I	I	I	I	I	I
2. Body and Chassis noise	I	I	I	I	I	I	I	I	I	I	I

Notes:

"A" : Adjust.

"I" : Inspect and correct or replace if necessary

"T" : Tighten to specified torque.

"C" : Clean.

"R" : Replace or change.

"O" : Rotate.

"L" : Lubricate.

MAINTENANCE SERVICE

ENGINE

Drive Belt Inspection and Replacement

WARNING:

Disconnect negative cable at battery before checking and replacing belt.

Water pump and generator drive belt

Inspection

- 1) Disconnect negative cable at battery.
- 2) Inspect belt for cracks, cuts, deformation, wear and cleanliness.
If any defect exists, replace.
Check belt for tension.

Water pump and generator belt tension

“a”: 6 – 8 mm (0.24 – 0.32 in.) deflection under 100 N
(10 kg, 22 lb) pressure

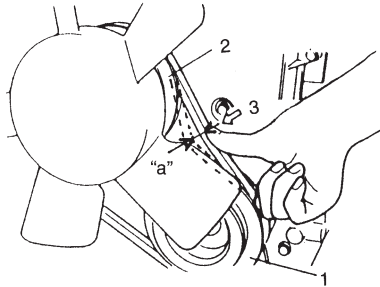
NOTE:

When replacing belt with a new one, adjust belt tension to 5 – 6 mm (0.20 – 0.24 in.).

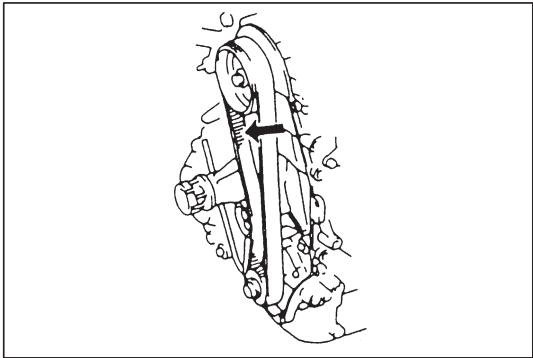
- 3) If belt is too tight or too loose, adjust it to specification by adjusting generator position.
- 4) Tighten generator adjusting bolt and pivot bolts.
- 5) Connect negative cable to battery.

Replacement

Replace belt with new one referring to “Water Pump Belt Removal and Installation” in Section 6B.



1. Crankshaft pulley
2. Water pump pulley
3. 100 N (10 kg, 22 lb)

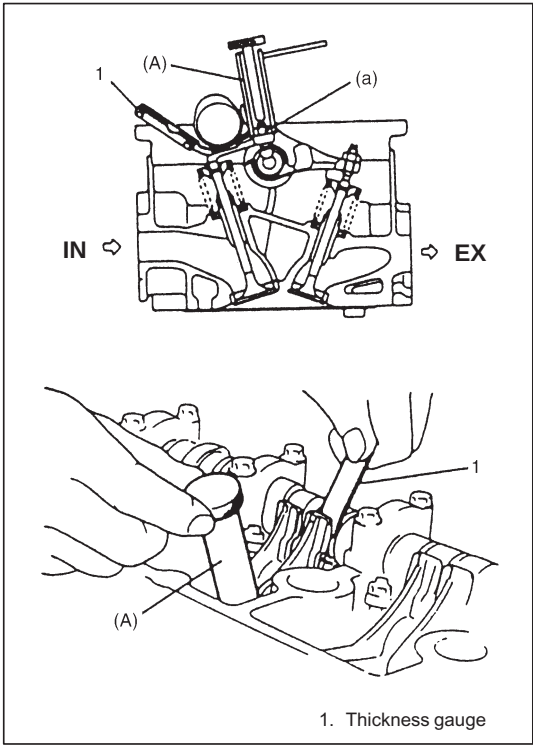


Camshaft Timing Belt Replacement

Replace belt with new one. Refer to Section 6A1 for replacement procedure.

CAUTION:

- Do not bend or twist timing belt.
- Do not allow timing belt to come into contact with oil, water, etc.



Valve Lash Inspection

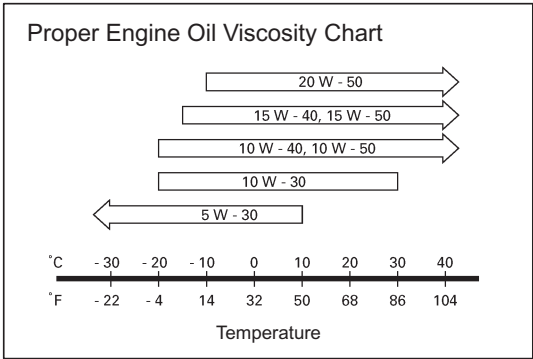
- 1) Remove cylinder head cover.
- 2) Inspect intake and exhaust valve lash and adjust as necessary. Refer to Section 6A1 for valve lash inspection and adjustment procedure.

Valve lash (clearance) specification		When cold (Coolant temperature is 15 – 25°C or 59 – 77°F)	When hot (Coolant temperature is 60 – 68°C or 140 – 154°F)
	Intake	0.13 – 0.17 mm (0.005 – 0.007 in)	0.17 – 0.21 mm (0.007 – 0.008 in)
	Exhaust	0.23 – 0.27 mm (0.009 – 0.011 in)	0.27 – 0.31 mm (0.011 – 0.012 in)

Special Tool
(A): 09917M18210

Tightening Torque
(a): 12 N·m (1.2 kg-m, 8.5 lb-ft)

- 3) Install cylinder head cover and tighten bolts to specification.



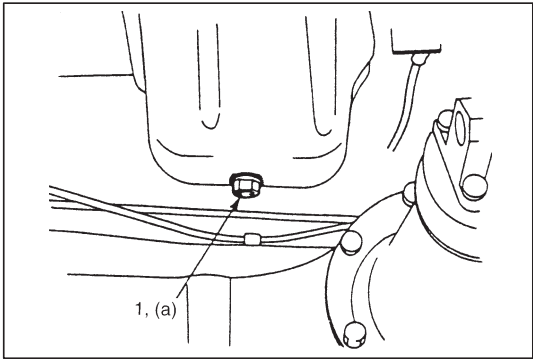
Engine Oil and Filter Change

WARNING:

New and used engine oil can be hazardous.

Be sure to read “WARNING” in General Precaution in Section 0A and observe what is written there.

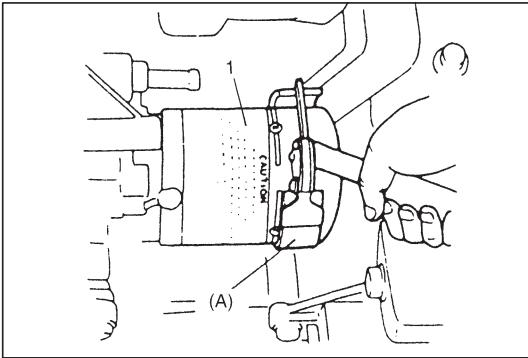
Use engine oil of SE, SF, SG, SH or SJ grade.
Select the appropriate oil viscosity according to the left chart.



Before draining engine oil, check engine for oil leakage. If any evidence of leakage is found, make sure to correct defective part before proceeding to the following work.

- 1) Drain engine oil by removing drain plug (1).
- 2) After draining oil, wipe drain plug clean. Reinstall drain plug, and tighten it securely as specified below.

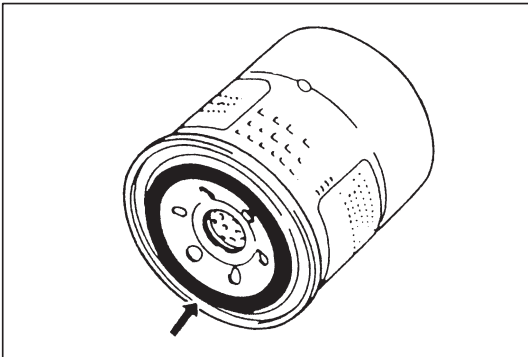
Tightening Torque
(a): 50 N·m (5.0 kg-m, 36.0 lb-ft)



- 3) Loosen oil filter (1) by using oil filter wrench (Special tool).

Special Tool

(A): 09915M47310

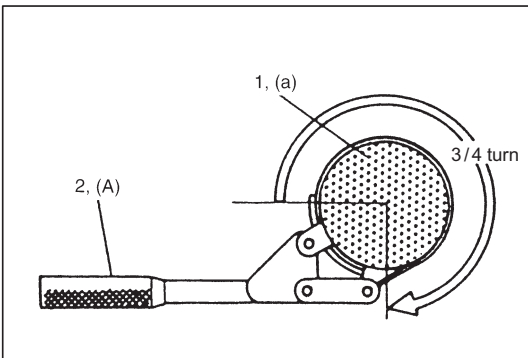


- 4) Apply engine oil to new oil filter "O" ring.

- 5) Screw new filter on oil filter stand by hand until filter "O" ring contacts mounting surface.

CAUTION:

To tighten oil filter properly, it is important to accurately identify the position at which filter "O" ring first contacts mounting surface.



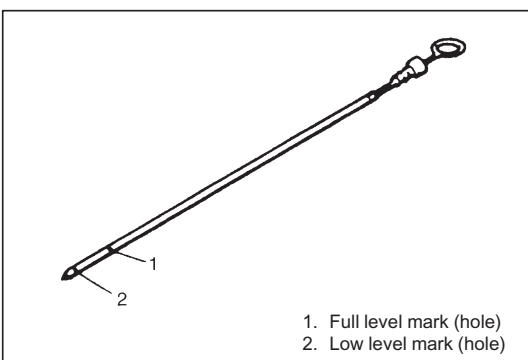
- 6) Tighten filter (1) 3/4 turn from the point of contact with mounting surface using an oil filter wrench (2).

Special Tool

(A): 09915M47310

Tightening Torque (Reference)

(a): 14 N·m (1.4 kg·m, 10.5 lb·ft)



- 7) Replenish oil until oil level is brought to FULL level mark on dipstick (oil pan and oil filter capacity). Filler inlet is at the top of cylinder head cover.

- 8) Start engine and run it for three minutes. Stop it and wait another 5 minutes before checking oil level. Add oil, as necessary, to bring oil level to FULL level mark on dipstick.

Engine oil capacity

Oil pan capacity	about 4.0 liters (10.6/8.8 US/Imp pt.)
Oil filter capacity	about 0.2 liter (0.4/0.3 US/Imp pt.)
Others	about 0.3 liter (0.6/0.5 US/Imp pt.)
Total	about 4.5 liters (9.5/7.9 US/Imp pt.)

NOTE:

Engine oil capacity is specified as left table.

However, note that amount of oil required when actually changing oil may somewhat differ from data in left table depending on various conditions (temperature, viscosity, etc.).

- 9) Check oil filter and drain plug for oil leakage.

Engine Coolant Change

WARNING:

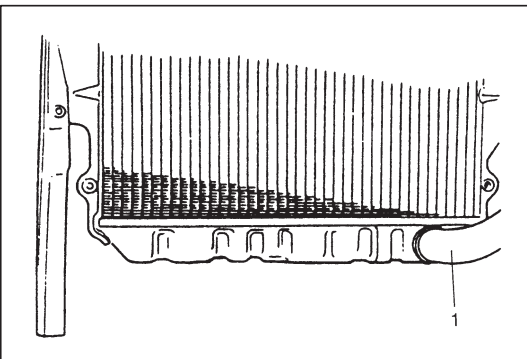
To help avoid danger of being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.

CAUTION:

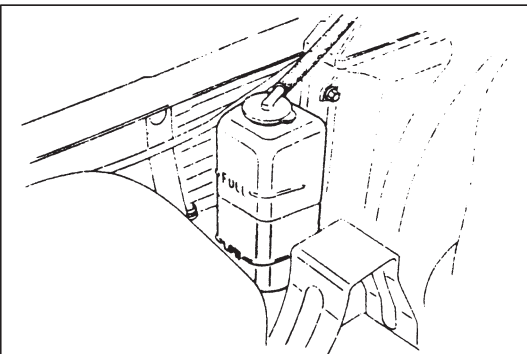
When changing engine coolant, use mixture of 50% water and 50% ethylene-glycol base coolant (Anti-Freeze/Anti-corrosion coolant) for the market where ambient temperature falls lower than -16°C (3°F) in winter and mixture of 70% water and 30% ethylene-glycol base coolant for the market where ambient temperature doesn't fall lower than -16°C (3°F).

Even in a market where no freezing temperature is anticipated, mixture of 70% water and 30% ethylene-glycol base coolant should be used for the purpose of corrosion protection and lubrication.

Refer to Section 6B of this manual for coolant capacity.



- 1) Remove radiator cap when engine is cool.
- 2) Disconnect radiator outlet hose (1) from radiator to drain coolant.
- 3) Remove reservoir and drain.
- 4) Connect outlet hose to radiator securely. Also install reservoir.



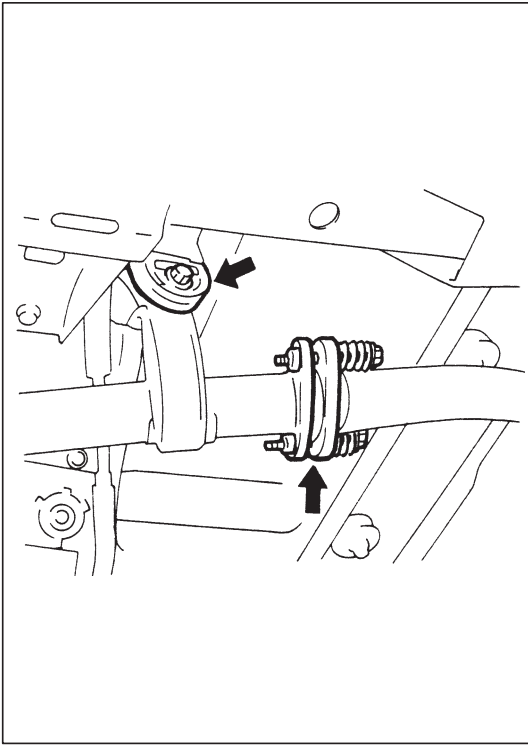
- 5) Slowly pour specified amount of coolant to the base of radiator filler neck, and run engine, with radiator cap removed, until radiator upper hose is hot. This drives out any air which may still be trapped within cooling system. Add coolant as necessary until coolant level reaches filler throat of radiator. Reinstall radiator cap.
- 6) Add coolant to reservoir so that its level aligns with FULL level line. Then, reinstall cap to reservoir.

Exhaust System Inspection

WARNING:

To avoid danger of being burned, do not touch exhaust system when it is still hot.

Any service on exhaust system should be performed when it is cool.



When carrying out periodic maintenance or vehicle is raised for other service, check exhaust system as follows:

- Check rubber mountings for damage and deterioration.
- Check exhaust system for leakage, loose connections, dents and damages.

If bolts or nuts are loose, tighten them to specification.

Refer to Section 6K in related manual as mentioned in FOREWORD of this manual for torque specification of bolts and nuts.

- Check nearby body areas for damaged, missing or mispositioned parts, open seams, holes, loose connections or other defects which could permit exhaust fumes to seep into vehicle.
- Make sure that exhaust system components have enough clearance from underbody to avoid overheating and possible damage to floor carpet.
- Any defects should be fixed at once.

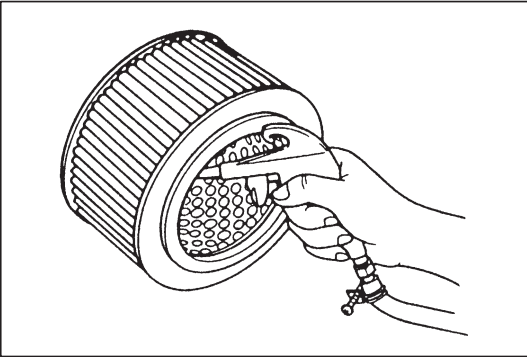
Exhaust Pipe Mountings Inspection

- Check rubber mountings for damage and deterioration. Replace damaged or deteriorated mountings.

IGNITION SYSTEM

Spark Plugs Replacement

Replace spark plugs with new ones referring to Section 6F1 in related manual as mentioned in FOREWORD of this manual.



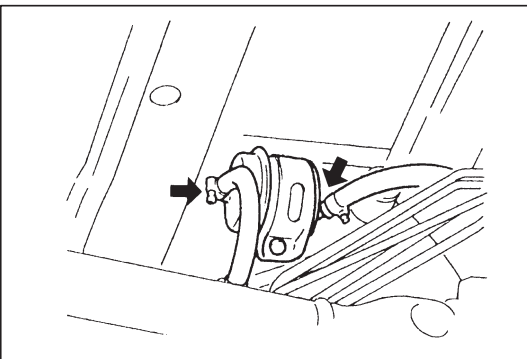
FUEL SYSTEM

Air Cleaner Filter Inspection

- 1) Unclamp air cleaner case clamps.
- 2) Take cleaner filter out of air cleaner case.
- 3) Visually check that air cleaner filter is not excessively dirty, damaged or oily.
- 4) Clean filter with compressed air from inside of filter.
- 5) Install air cleaner filter into case.
- 6) Clamp case securely.

Air Cleaner Filter Replacement

Replace air cleaner filter with new one according to step 1), 2), 5) and 6) of air cleaner filter inspection.

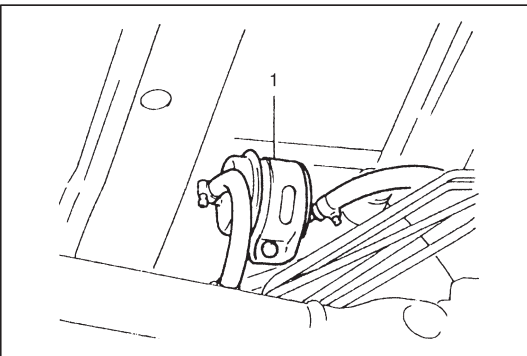


Fuel Lines Inspection

Check fuel lines for loose connection, deterioration or damage which could cause leakage. Make sure all clamps are secure.

Replace any damaged or deteriorated parts.

There should be no sign of fuel leakage or moisture at any fuel connection.



Fuel Filter Replacement

WARNING:

This work must be performed in a well ventilated area and away from any open flames (such as gas hot water heaters).

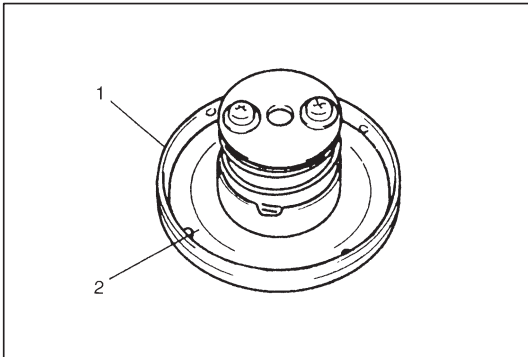
Fuel filter (1) is installed in front of fuel tank, inside the right side chassis.

Replace fuel filter with new one, referring to Section 6C in related manual as mentioned in FOREWORD of this manual for removal and installation.

Fuel Tank Inspection

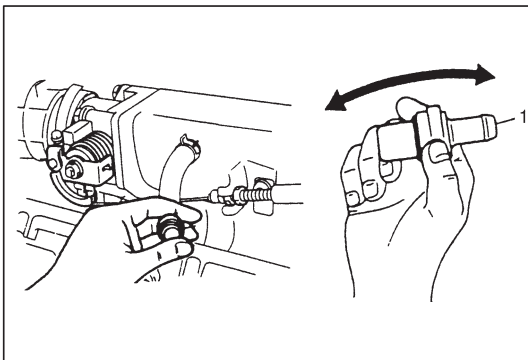
Check fuel tank for damage, cracks, fuel leakage, corrosion and tank bolts looseness.

If a problem is found, repair or replace.



Fuel Tank Cap Inspection

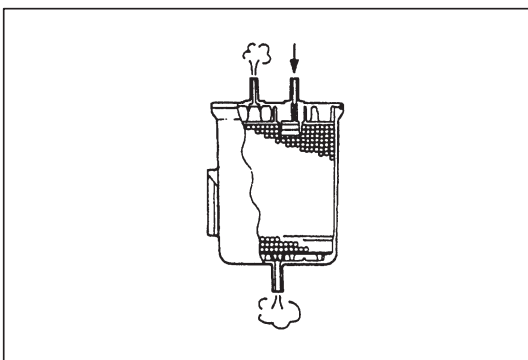
Check fuel filler cap (1) for malfunction and damage, gasket (2) for even filler neck imprint, deterioration and damage. Replace if faulty.



EMISSION CONTROL SYSTEM

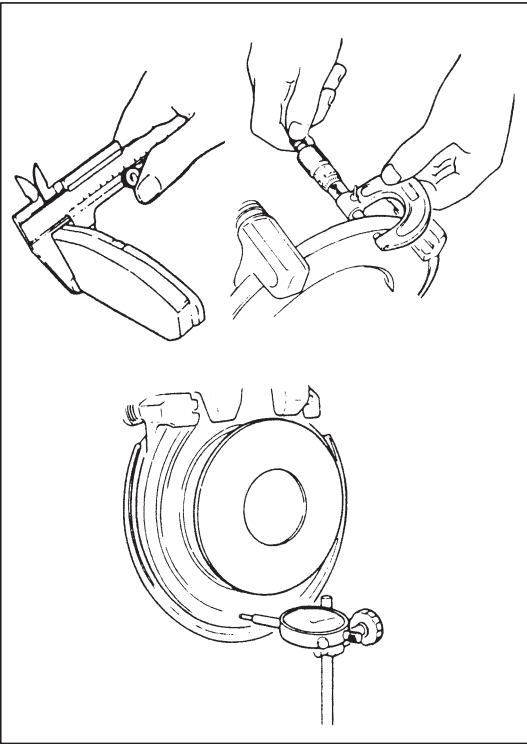
PCV (Positive Crankcase Ventilation) Valve, Crankcase Ventilation Hoses and Connections Inspection

Check crankcase ventilation hoses and PCV hoses for leaks, cracks or clog, and PCV valve (1) for stick or clog. Refer to Section 6E1 in related manuals mentioned in FOREWORD of this manual for PCV valve checking procedure.



Fuel Evaporative Emission Control System (if equipped)

Check EVAP (Evaporative Emission) canister for damage, clog and operation referring to Section 6E3.

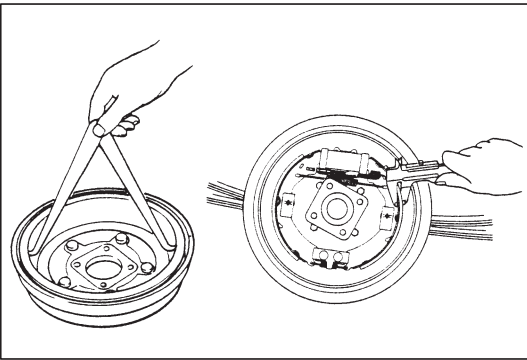


BRAKE

Brake Discs, Pads, Drums and Shoes Inspection

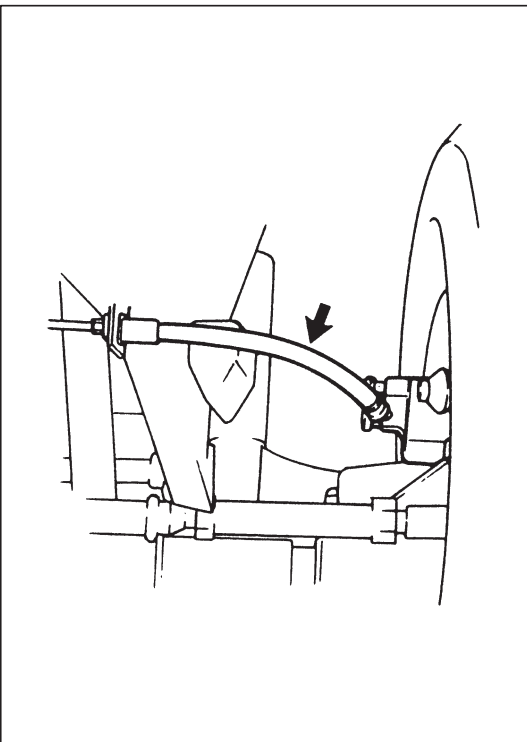
Brake discs and pads

- 1) Remove wheel and caliper but don't disconnect brake hose from caliper.
- 2) Check front disc brake pads and discs for excessive wear, damage and deflection. Replace parts as necessary. For the details, refer to Brake System Section in related manual in FOREWORD.
- 3) Install caliper and wheel.



Brake drums and shoes

- 1) Remove wheel and brake drum.
- 2) Check rear brake drums and brake linings for excessive wear and damage.
At the same time, check wheel cylinders for leakage.
Replace as necessary.
For the details, refer to Brake System Section in related manual.
- 3) Install brake drum and wheel.



Brake Hoses and Pipes Inspection

Perform this inspection where there is enough light and use a mirror as necessary.

- Check brake hoses and pipes for proper hook-up, leaks, cracks, chafing, wear, corrosion, bends, twists and other damage.
Replace any of these parts as necessary.
- Check all clamps for tightness and connections for leakage.
- Check that hoses and pipes are clear of sharp edges, moving parts.

CAUTION:

After replacing any brake pipe or hose, be sure to carry out air purge operation.

Brake Fluid Change

CAUTION:

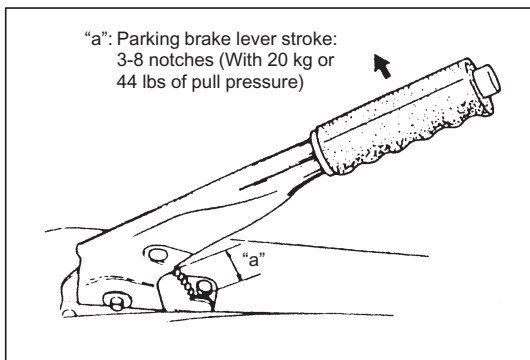
Since brake system of this vehicle is factory-filled with brake fluid indicated on reservoir cap, do not use or mix different type of fluid when refilling; otherwise serious damage will occur.

Do not use old or used brake fluid, or any fluid from a unsealed container.

Change brake fluid as follows.

Drain existing fluid from brake system completely, fill system with specified fluid and carry out air purge operation.

For air purging procedure, refer to Brake System Section.

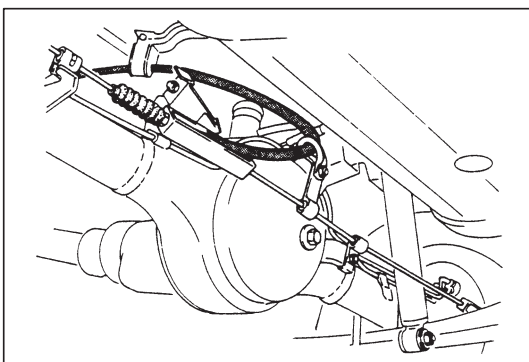


Brake Lever and Cable Inspection

Parking brake lever

- Check tooth tip of each notch for damage or wear. If any damage or wear is found, replace parking lever.
- Check parking brake lever for proper operation and stroke, and adjust it if necessary.

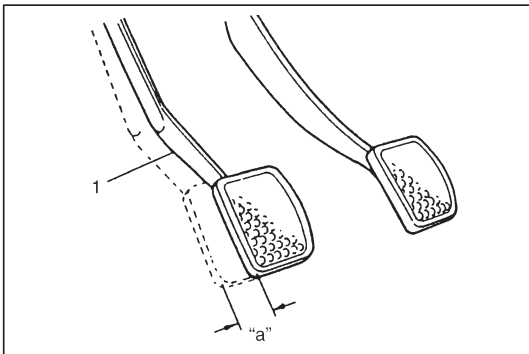
For checking and adjusting procedures, refer to Brake System Section in related manual as mentioned in FOREWORD.



Parking brake cable

Inspect brake cable for damage and smooth movement.

Replace cable if it is in deteriorated condition.

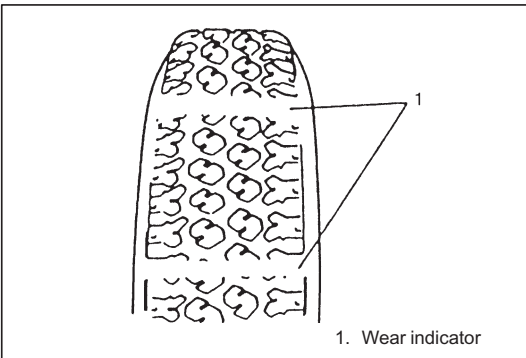


CHASSIS AND BODY

Clutch Pedal Free Travel Inspection

Check clutch pedal (1) for height and free travel "a" referring to Clutch Section in related manual as mentioned in FOREWORD.

Adjust or correct if necessary.



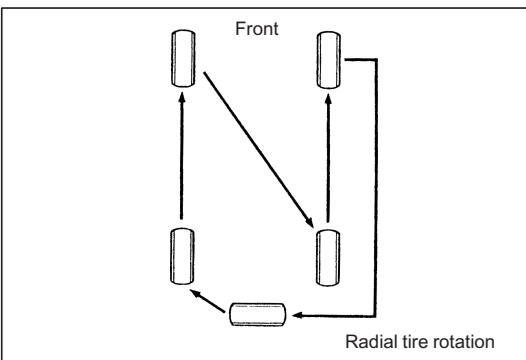
Tire and Wheel Disc Inspection

Tire inspection

- 1) Check tire for uneven or excessive wear, or damage. If defective, replace.
- 2) Check inflating pressure of each tire and adjust pressure to specification as necessary.

NOTE:

- Tire inflation pressure should be checked when tires are cool.
- Specified tire inflation pressure should be found on tire placard or in owner's manual which came with vehicle.

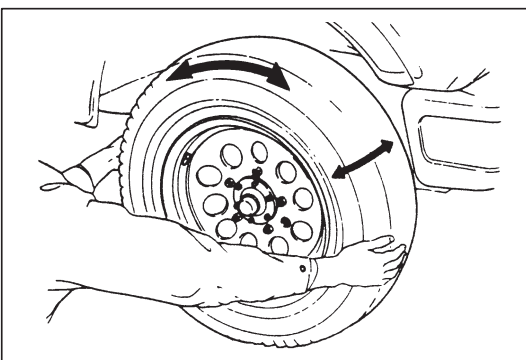


Wheel disc inspection

Inspect each wheel disc for dents, distortion and cracks. A disc in badly damaged condition must be replaced.

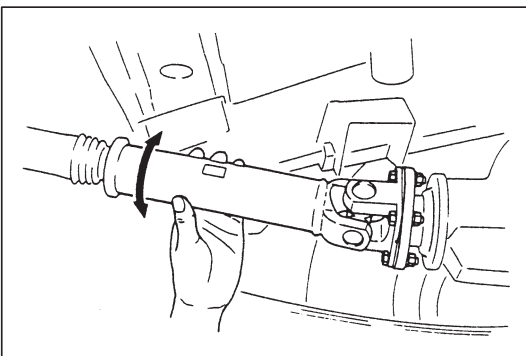
Tire rotation

Rotate tires periodically as shown in figure.



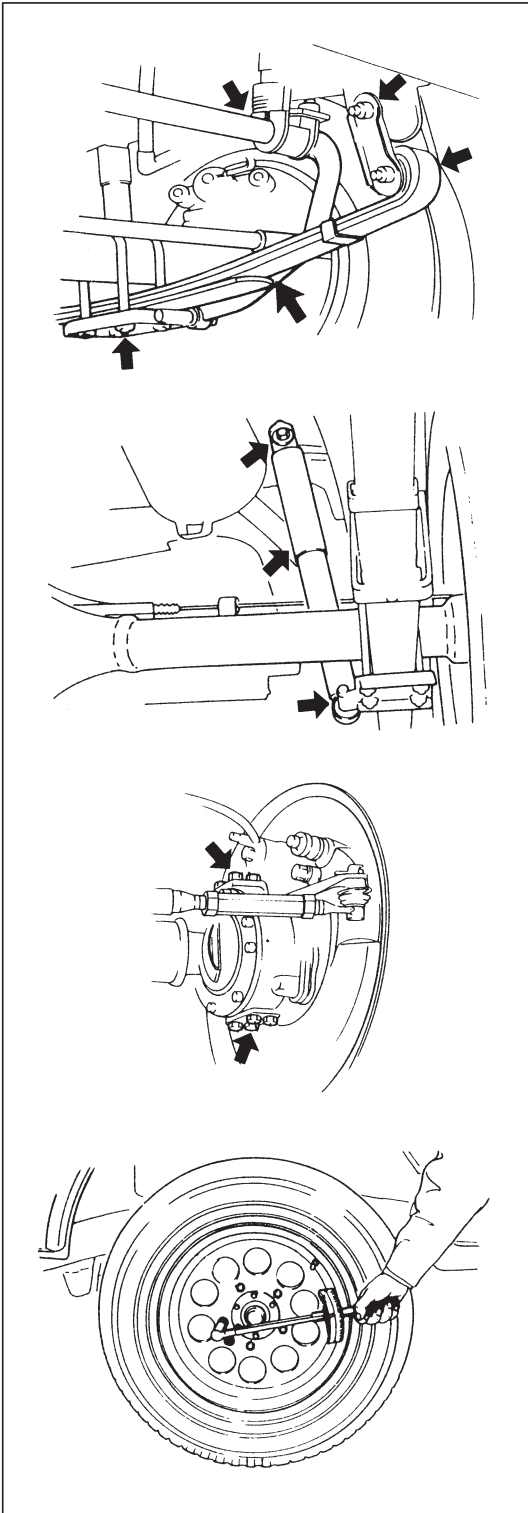
Wheel Bearing Inspection

- 1) Check front wheel bearing for wear, damage, abnormal noise or rattles. For details, refer to Suspension Section in related manual as mentioned in FOREWORD of this manual.
- 2) Check rear wheel bearing for wear, damage abnormal noise or rattle. For details, refer to Suspension Section in related manual as mentioned in FOREWORD of this manual.



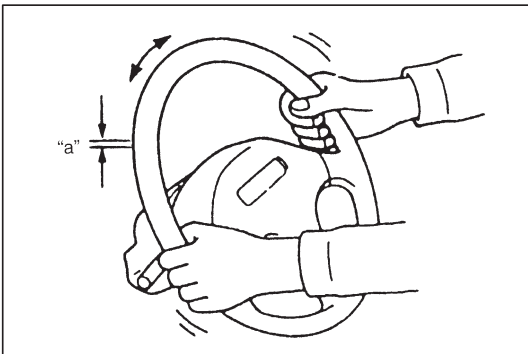
Propeller Shafts Inspection

- 1) Check universal joint and spline of propeller shaft for rattle. If rattle is found, replace defective part with a new one.
 - 2) Check propeller shaft (front & rear) flange yoke bolts for tightness, and retighten them as necessary.
- Refer to Propeller Shafts Section for tightening torque.



Suspension System Inspection

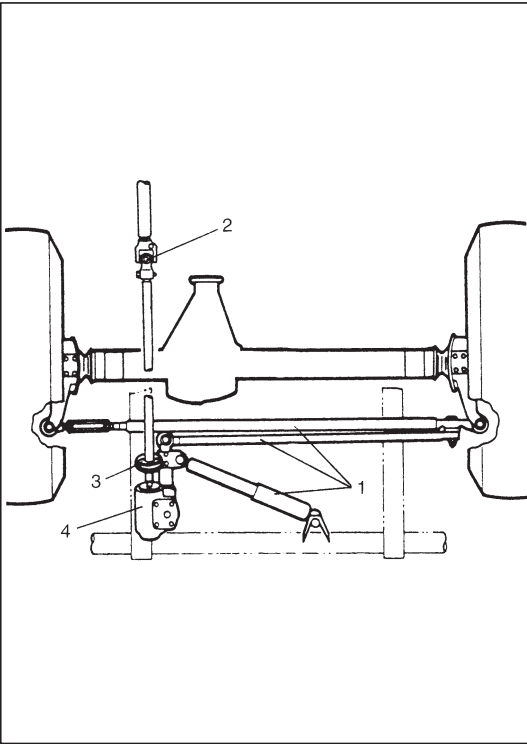
- Check leaf spring (where each end of shorter leaf contacts) for wear, crack and damage.
If excessive wear or cracking is noted, replace.
- Check front and rear shock absorbers for oil leakage, dents or any other damage on sleeves, and anchor ends for deterioration.
Replace defective parts, if any.
- Check front and rear suspension systems for damaged, loose or missing part(s), and also for parts showing signs of wear or deterioration.



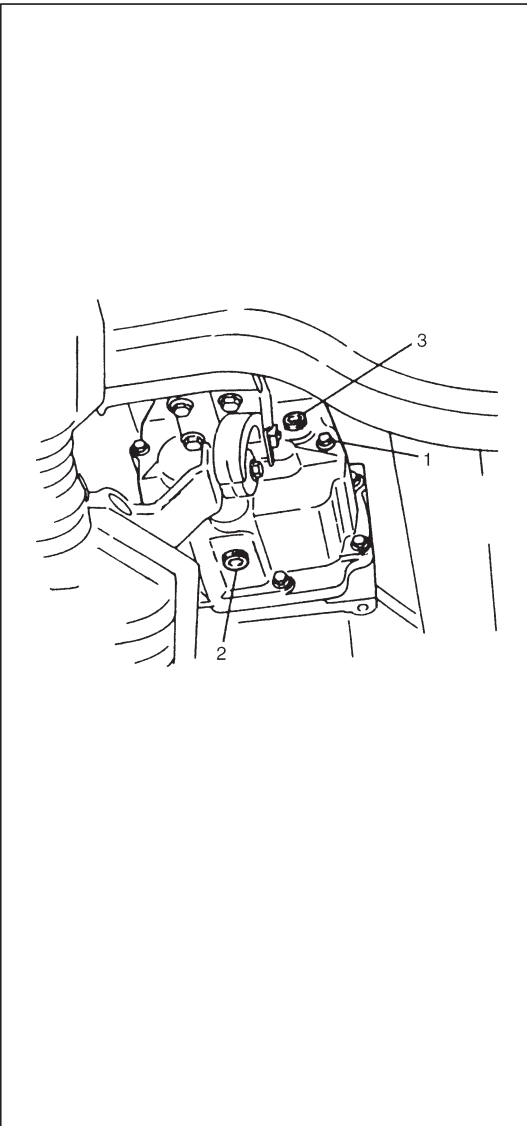
Steering System Inspection

- 1) Check steering wheel for play and rattle, holding vehicle straight on ground.

Steering wheel play "a": 10 – 30 mm (0.4 – 1.1 in.)



- 2) Check bolts and nuts for tightness and retighten them as necessary. Repair or replace defective parts, if any.
- 3) Check steering linkage (1) for looseness and damage. Repair or replace defective parts, if any.
- 4) Check steering gear box (4) for evidence of oil leakage. If leakage is found, check oil level in gear box.
- 5) Check universal joint (2) and rubber joint (3) of steering shaft for rattle and damage. If rattle or damage is found, replace it with a new one.
- 6) Check that steering wheel can be turned fully to the right and left. Repair or replace defective parts, if any.
- 7) Check wheel alignment. For the details of wheel alignment, refer to Steering System Section in related manual in FOREWORD.



Manual Transmission Oil Inspection and Change

Inspection

- 1) Inspect transmission case for evidence of oil leakage.
Repair leaky point if any.
- 2) Make sure that vehicle is placed level for oil level check.
- 3) Remove oil level plug (1) of transmission.
- 4) Check oil level.
Oil level can be checked roughly by means of level plug hole. That is, if oil flows out of level plug hole or if oil level is found up to hole when level plug is removed, oil is properly filled. If oil is found insufficient, pour specified oil up to level hole. For specified oil, refer to description of oil change under On-Vehicle Service in Section 7A in related manual in FOREWORD.
- 5) Tighten level plug to specified torque.

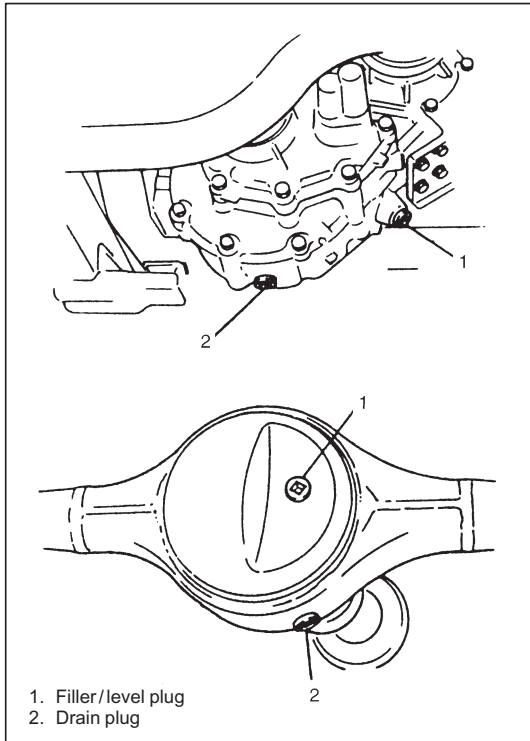
Change

- 1) Place the vehicle level and drain oil by removing drain plug (2).
- 2) Apply sealant to drain plug after cleaning it and tighten drain plug to specified torque.
- 3) Remove filler and level plugs and pour specified oil up to level hole through filler plug (3) hole.
- 4) Tighten filler and level plugs to specified torque.
For recommended oil, its amount and tightening torque data, refer to On-Vehicle Service of Section 7A in related manual in FOREWORD.

Transfer and Differentials (Front and Rear) Oil Inspection and Change

Inspection

- 1) Inspect transfer case and differential housings for evidence of oil leakage. Repair leaky point, if any.
- 2) Make sure that vehicle is placed level for oil level check.



- 3) Remove filler/level plug of transfer or differentials (front and rear) and check for oil level.

If oil flows out of plug hole or if oil level is found up to hole, oil is properly filled.

If oil is found insufficient, pour specified oil up to level hole. For specified oil, refer to Section 7D or 7E in related manual as mentioned in FOREWORD of this manual

- 4) Apply sealant to transfer level plug thread and tighten it or differential level plug to specified torque referring to Section 7D or 7E.

Change

Change transfer oil and differentials oil with new specified oil referring to Section 7D or 7E in related manual in FOREWORD.

All Latches, Hinges and Locks Inspection

Doors

Check that each front door opens and closes smoothly and locks securely when closed.

If any malfunction is found, lubricate hinge and latch or repair door lock system.

Engine hood

Check that secondary latch operates properly (check that secondary latch keeps hood from opening all the way even when pulling hood release handle inside vehicle.) Also check that hood opens and closes smoothly and properly and hood locks securely when closed.

If any malfunction is found, lubricate hinge and latch, or repair hood lock system.

FINAL INSPECTION

WARNING:

When carrying out road tests, select a safe place where no man or no running vehicle is seen so as to prevent any accident.

Seats

Check that seat slides smoothly and locks securely at any position. Also check that reclining mechanism of front seat back allows it to be locked at any angle.

Seat Belt

Inspect belt system including webbing, buckles, latch plates, retractors (if equipped) and anchors for damage or wear.

Check that seat belt is securely locked.

Battery Electrolyte Level Check

Check that the electrolyte level of all battery cells is between the upper (MAX) and lower (MIN) level lines on the case.

If battery is equipped with built-in indicator, check battery condition by the indicator.

Accelerator Pedal Operation

Check that pedal operates smoothly without getting caught or interfered by and other part.

Engine Start

Check engine start for readiness.

WARNING:

Before performing the following check, be sure to have enough room around the vehicle. Then, firmly apply both the parking brake and the regular brakes. Do not use the accelerator pedal. If the engine starts, be ready to turn off the ignition promptly. Take these precautions because the vehicle could move without warning and possibly cause personal injury or property damage.

On manual transmission vehicles, place the shift lever in "Neutral," depress clutch pedal fully and try to start.

Exhaust System Check

Check for leakage, cracks or loose supports.

Clutch (For Manual transmission)

Check for the following.

- Clutch is completely released when depressing clutch pedal.
- No slipping clutch occurs when releasing pedal and accelerating.
- Clutch itself is free from any abnormal condition.

Gearshift or Select Lever (Transmission)

Check gear shift or select lever for smooth shifting to all positions and for good performance of transmission in any position.

With automatic transmission equipped vehicle, also check that shift indicator indicates properly according to which position select lever is shifted to.

Brake

[Foot brake]

Check the following;

- that brake pedal has proper travel,
- that brake works properly,
- that it is free from noise,
- that vehicle does not pull to one side when brake is applied,
- and that brake do not drag.

[Parking brake]

Check that parking brake lever has proper travel.

WARNING:

With vehicle parked on a fairly steep slope, make sure nothing is in the way downhill to avoid any personal injury or property damage. Be prepared to apply regular brake quickly even if vehicle should start to move.

Check to ensure that parking brake is fully effective when the vehicle is stopped on the safe slope and brake lever is pulled all the way.

Steering

- Check to ensure that steering wheel is free from instability, or abnormally heavy feeling.
- Check that the vehicle does not wander or pull to one side.

Engine

- Check that engine responds readily at all speeds.
- Check that engine is free from abnormal noise and abnormal vibration.

Body, Wheels and Power Transmitting System

Check that body, wheels and power transmitting system are free from abnormal noise and abnormal vibration or any other abnormal condition.

Meters and Gauge

Check that speedometer, odometer, fuel meter, temperature gauge, etc. are operating accurately.

Lights

Check that all lights operate properly.

Windshield Defroster

Periodically check that air comes out from defroster outlet when operating heater or air conditioning. Set mode control lever to defroster position and fan switch lever to "HI" position for this check.

RECOMMENDED FLUIDS AND LUBRICANTS

Engine oil	SE, SF, SG, SH or SJ (Refer to engine oil viscosity chart in item 1-4.)
Engine coolant (Ethylene glycol base coolant)	"Antifreeze/Anticorrosion coolant"
Brake fluid	DOT3 or SAE J1703
Manual transmission oil	Refer to Section 7A in related manual in FOREWORD for detail.
Transfer oil	Refer to Section 7D in related manual in FOREWORD for detail.
Differential oil (front and rear)	Refer to Section 7E in related manual in FOREWORDfor detail.
Door hinges	Engine oil or water resistance chassis grease
Hood latch assembly	
Key lock cylinder	Spray lubricant

SECTION 6A

ENGINE MECHANICAL

6A

NOTE : For the descriptions (items) not found in this section of this manual, refer to the same section of Service Manual mentioned in the FOREWORD of this manual.

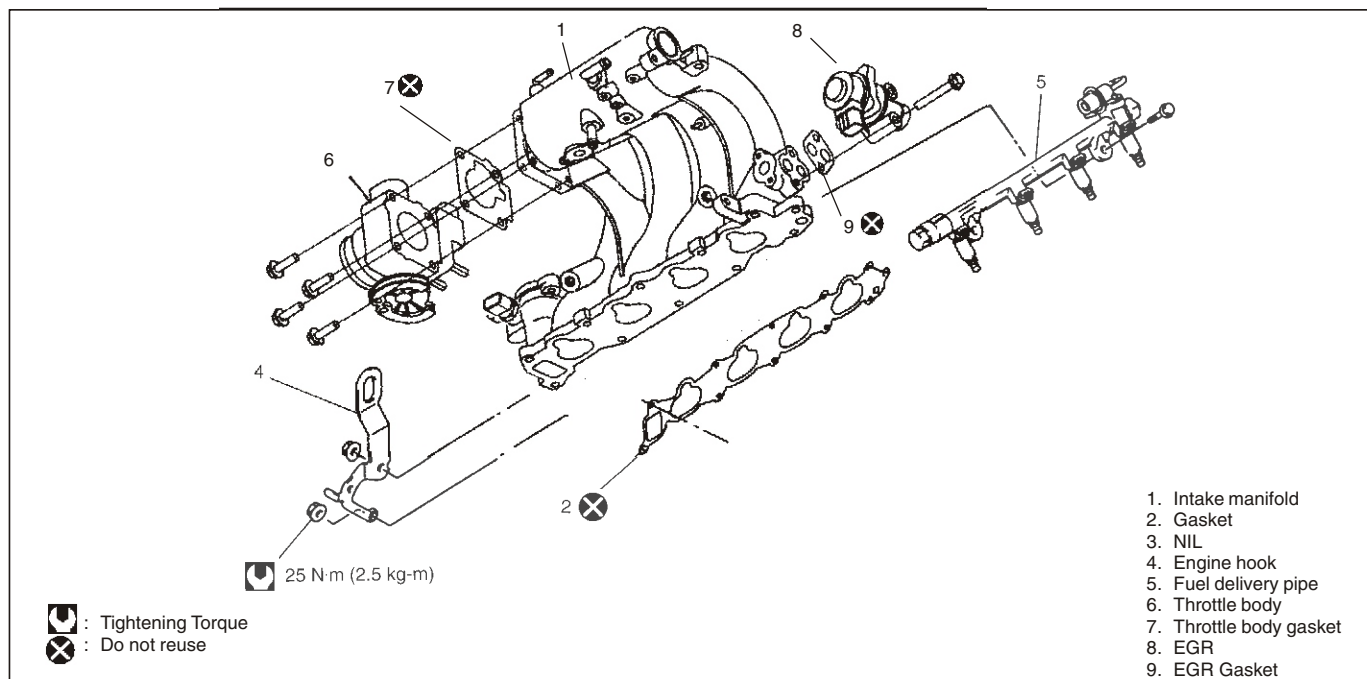
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REQUIRED SERVICE MATERIALS	6A- *

NOTE:

For what each abbreviation stands for (i.e., full term), refer to SECTION 0A.

THROTTLE BODY AND INTAKE MANIFOLD



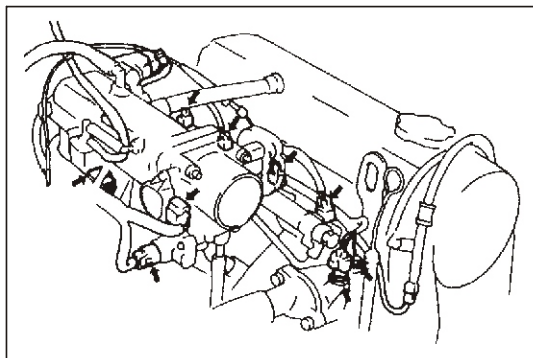
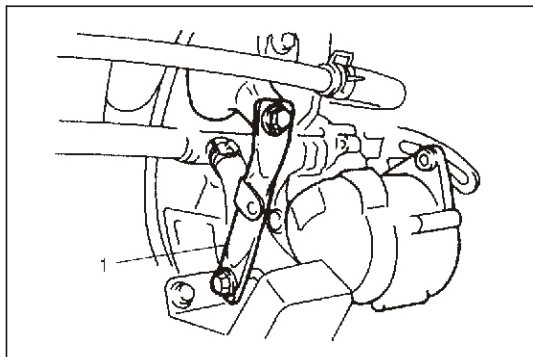
REMOVAL

- 1) Relieve fuel pressure according to fuel pressure relief procedure described in Section 6 in related manual as mentioned in the FOREWORD of this manual.
- 2) Disconnect negative cable at battery.
- 3) Remove engine under cover.
- 4) Drain cooling system.

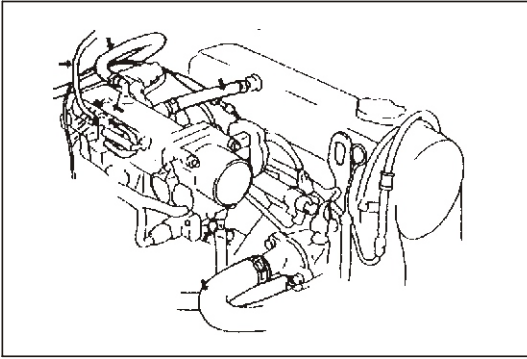
WARNING:

To help avoid danger of being burned, do not remove drain plug and radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if plug and cap are taken off too soon.

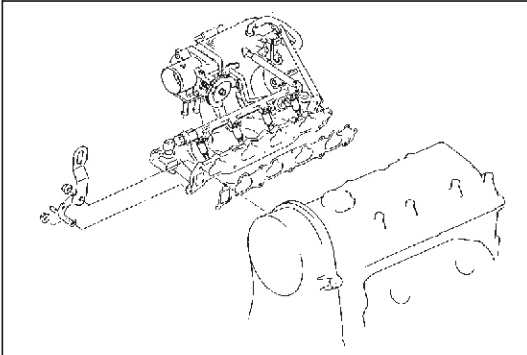
- 5) Remove intake manifold stiffener (1).



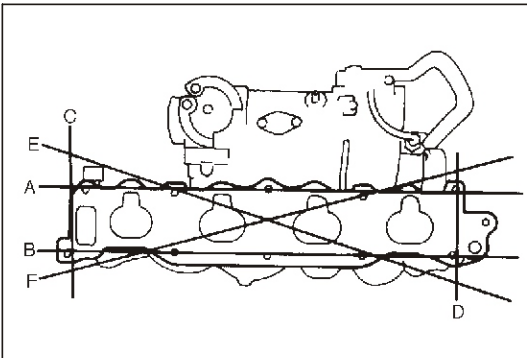
- 6) Disconnect IAT sensor coupler and breather hose and remove air cleaner outlet hose.
- 7) Disconnect following electric lead wires:
 - Ground wires from intake manifold
 - ECT sensor
 - Injectors lead wires at the coupler
 - EVAP canister purge valve
 - TP sensor
 - MAP sensor
 - IAC valve
 - EGR valve
 and then release wire harness from clamps.



- 8) Disconnect accelerator cable from throttle body.
- 9) Disconnect following hoses:
 - Brake booster hose from intake manifold
 - Canister purge hose from EVAP canister purge valve bracket
 - Engine cooling water (coolant) hose (outlet side) from throttle body
 - Radiator inlet hose from thermostat cap
 - PCV hose from intake manifold
 - Fuel feed hose and return hose from each pipe
 - Heater inlet hose from thermostat cap



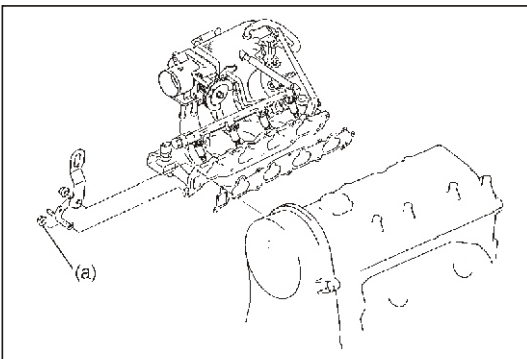
- 10) Remove heater pipe from intake manifold by removing 2 bolts.
- 11) Remove intake manifold with throttle body and thermostat cap from cylinder head, and then its gasket.



INSPECTION

- Using a straight edge and thickness gauge, check surface at a total of 6 locations. If distortion limit, given below, is exceeded, correct gasketed surface or replace intake manifold.

Limit of distortion: 0.07 mm (0.003 in.)



INSTALLATION

Reverse removal procedure for installation noting the followings.

- Use new intake manifold gasket.
- Tighten bolts and nuts to specified torque.

Tightening Torque

(a): 25 N·m (2.5 kg-m, 18.0 lb-ft)

- Adjust accelerator cable play, referring to Section 6E in related manual.
- Check to ensure that all removed parts are back in place. Reinstall any necessary parts which have not been reinstalled.
- Refill cooling system, referring to Section 6B in related manual.
- Upon completion of installation, turn ignition switch ON but engine OFF and check for fuel leakage.
- Finally, start engine and check for engine coolant leakage.

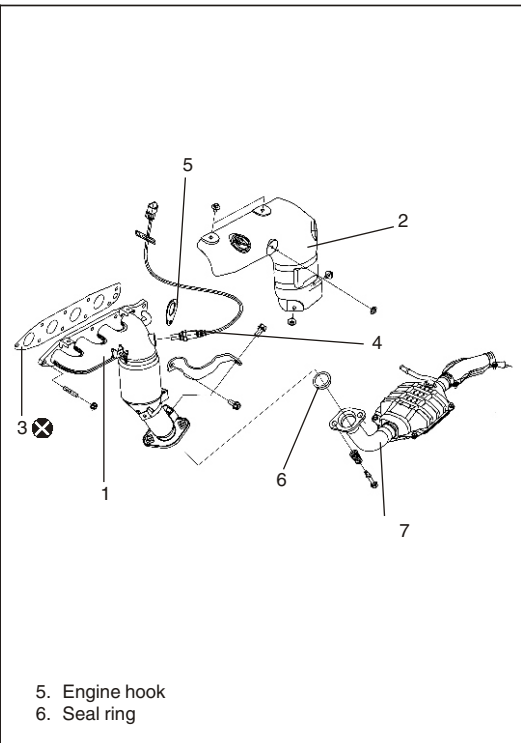
EXHAUST MANIFOLD

WARNING:

To avoid danger of being burned, do not service exhaust system while it is still hot. Service should be performed after system cools down.

REMOVAL

- 1) Disconnect negative cable at battery.
- 2) Disconnect heated oxygen sensor (4) coupler (if equipped).
- 3) Remove exhaust manifold cover (2) of exhaust manifold.
- 4) Disconnect exhaust pipe (7) from exhaust manifold.
- 5) Remove exhaust manifold (1) and its gasket (3) from cylinder head.



INSTALLATION

- 1) Install new gasket (1) to cylinder head.
- 2) Install exhaust manifold.
Tighten nuts to specified torque.

Tightening Torque

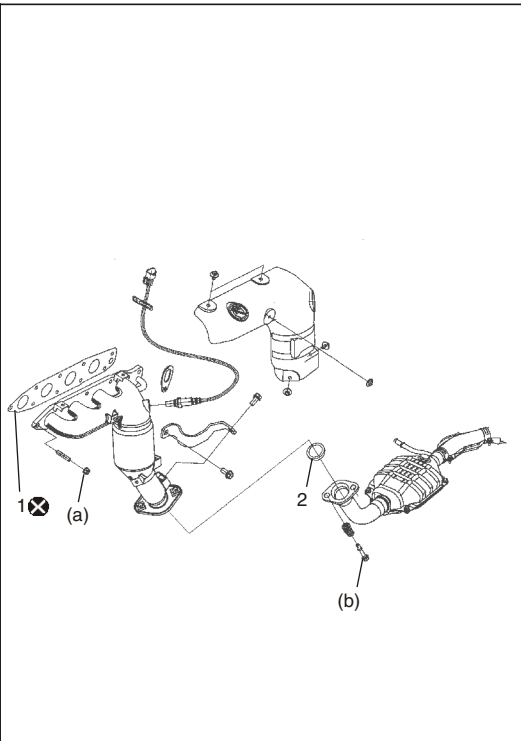
(a): 23 N·m (2.3 kg-m, 17.0 lb-ft)

- 3) Install seal ring (2) and install exhaust pipe to exhaust manifold.
Before installing seal ring, check it for deterioration or damage, and replace as necessary.
Tighten pipe fasteners to specified torque.

Tightening Torque

(b): 50 N·m (5.0 kg-m, 36.5 lb-ft)

- 4) Install exhaust manifold cover to exhaust manifold.
- 5) Connect heated oxygen sensor connector and fit connector to bracket. (if equipped)
- 6) Connect negative cable at battery.
- 7) Check exhaust system for exhaust gas leakage.



SECTION 6E3

ENGINE AND EMISSION CONTROL SYSTEM

NOTE : For the descriptions (items) not found in this section of this manual, refer to the same section of Service Manual mentioned in the FOREWORD of this manual.

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GENERAL DESCRIPTION

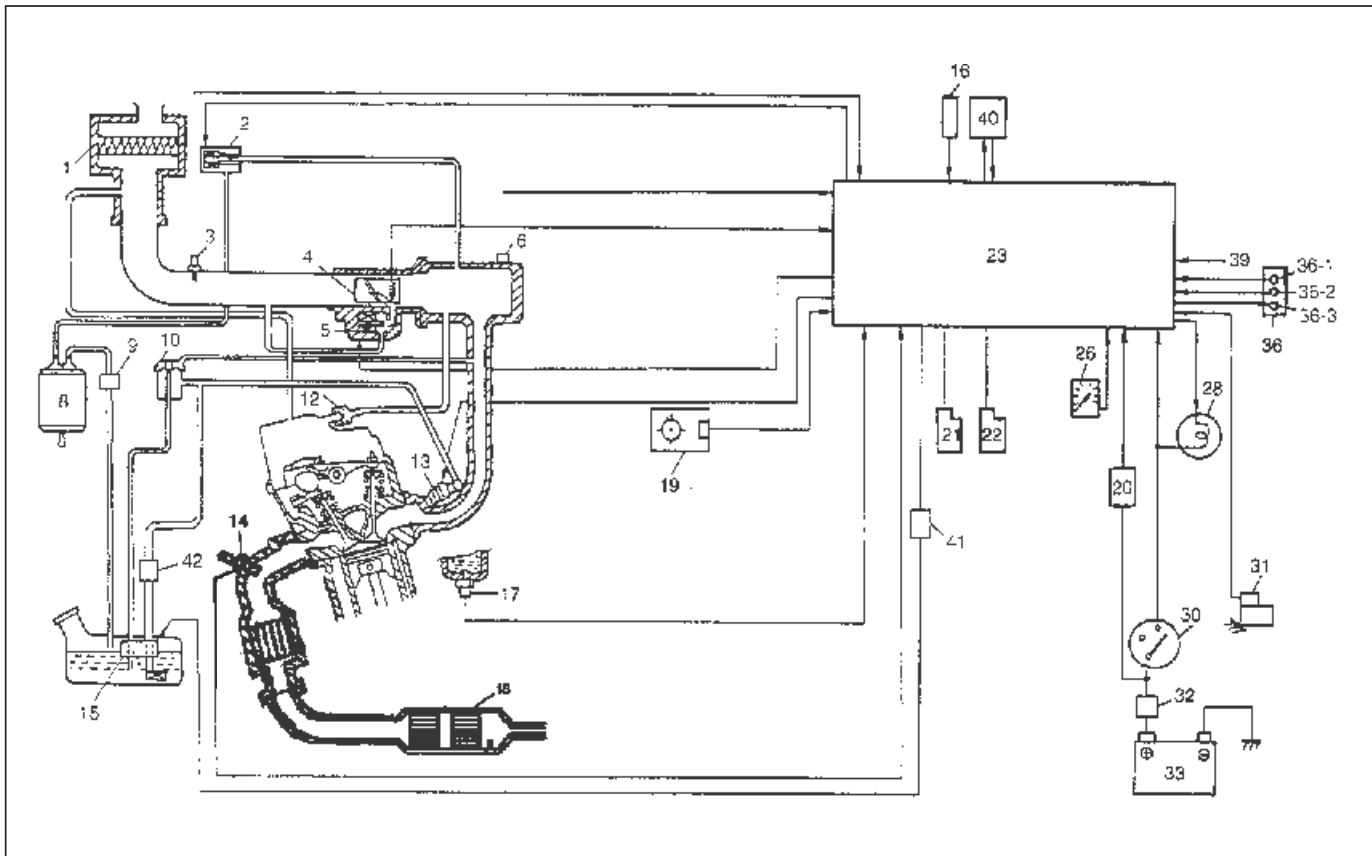
The engine and emission control system has 4 major sub-systems: air intake system, fuel delivery system, electronic control system and emission control system.

Air intake system includes air cleaner, MAP sensor, throttle body, IAC valve and intake manifold.

Fuel delivery system includes fuel pump, delivery pipe, fuel pressure regulator, fuel injectors, etc.

Electronic control system includes ECM (PCM), various sensors and controlled devices.

Emission control system includes EVAP and PCV systems.



- | | |
|---|--|
| 1. Air Cleaner | 23. ECM (PCM) |
| 2. EVAP canister Duty purge valve | 24. Blank |
| 3. IAT sensor | 25. Blank |
| 4. TP sensor | 26. Reed switch in combination meter (VSS) |
| 5. IAC valve | 27. Blank |
| 6. MAP sensor | 28. Malfunction indicator lamp in combination meter |
| 7. Blank | 29. Blank |
| 8. EVAP canister | 30. Ignition switch |
| 9. Tank pressure control valve | 31. Starter magnetic switch |
| 10. Fuel pressure regulator | 32. Main fuse |
| 11. Blank | 33. Battery |
| 12. PCV valve | 34. Blank |
| 13. Fuel injector | 35. Blank |
| 14. Heated Oxygen sensor | 36. Monitor connector |
| 15. Fuel Pump | 36-1. Diagnosis switch terminal |
| 16. Stop light switch | 36-2. Test switch terminal |
| 17. ECT sensor | 36-3. Duty output terminal |
| 18. Three way catalytic convertor | 37. Blank |
| 19. CMP sensor | 38. Blank |
| 20. Main relay | 39. Electric load (blower fan, small light and rear de-fogger) |
| 21. Ignition coil assembly
(For No.1 and No.4 spark plugs) | 40. Data link connector (DLC) |
| 22. Ignition coil assembly
(For No.2 and No.3 spark plugs) | 41. Fuel pump relay |
| | 42. Fuel filter |
| | 43. EGR |

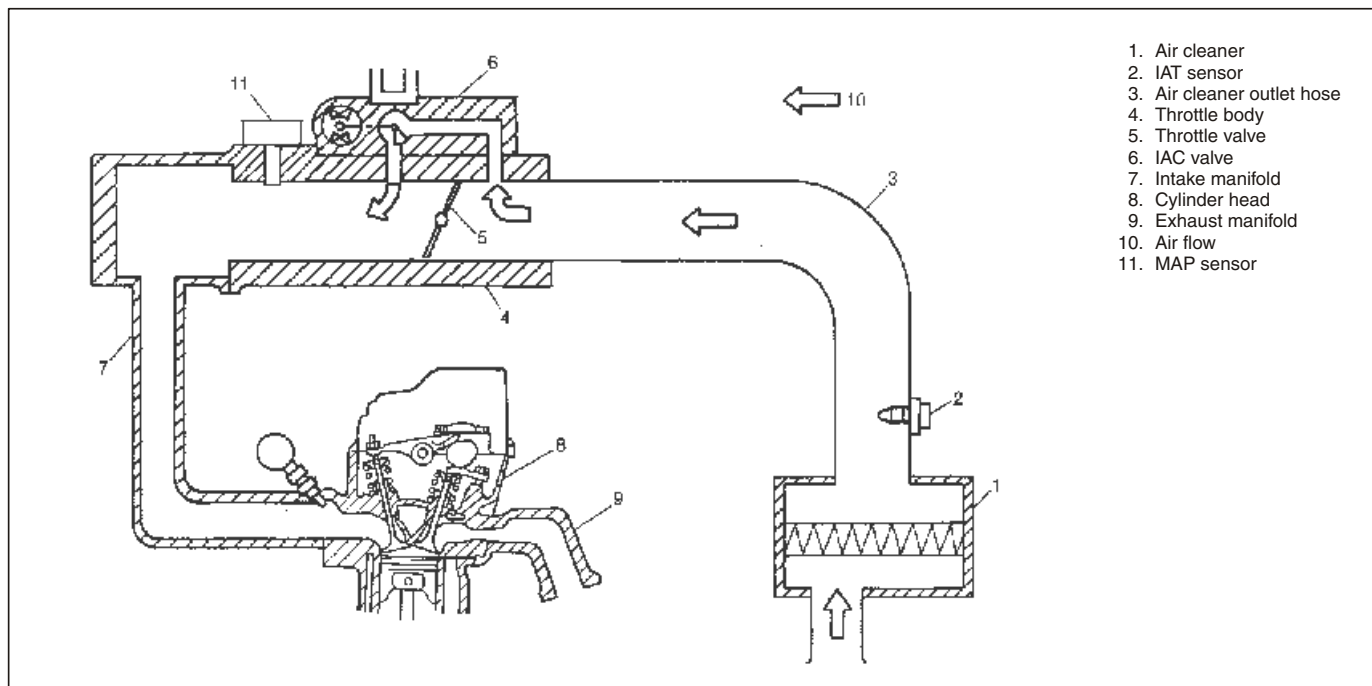
AIR INTAKE SYSTEM

The main components of the air intake system are air cleaner, air cleaner outlet hose, throttle body, IAC valve and intake manifold.

The air (by the amount corresponding to the throttle valve opening and engine speed) is filtered by the air cleaner, passes through the throttle body, is distributed

by the intake manifold and finally drawn into each combustion chamber.

When the IAC valve is opened according to the signal from ECM (PCM), the air bypasses the throttle valve through bypass passage and is finally drawn into the intake manifold.



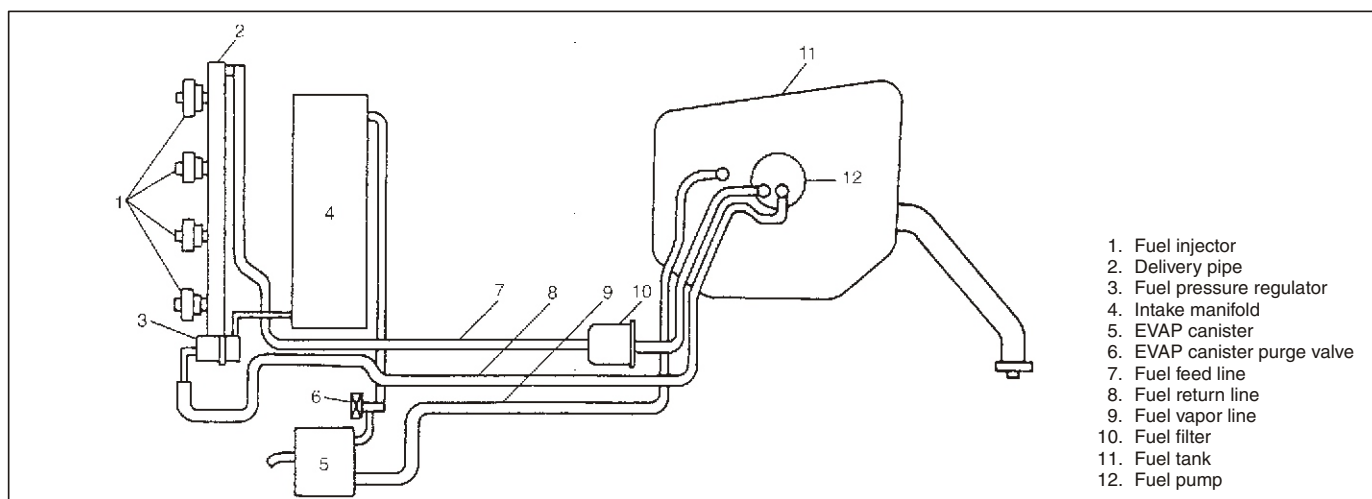
FUEL DELIVERY SYSTEM

The fuel delivery system consists of the fuel tank, fuel pump, fuel filter, fuel pressure regulator, delivery pipe and fuel injectors.

The fuel in the fuel tank is pumped up by the fuel pump, filtered by the fuel filter and fed under pressure to each injector through the delivery pipe. As the fuel pressure applied to the injector (the fuel pressure in the fuel feed

line) is always kept a certain amount higher than the pressure in the intake manifold by the fuel pressure regulator, the fuel is injected into the intake port of the cylinder head when the injector opens according to the injection signal from ECM (PCM).

The fuel relieved by the fuel pressure regulator returns through the fuel return line to the fuel tank.

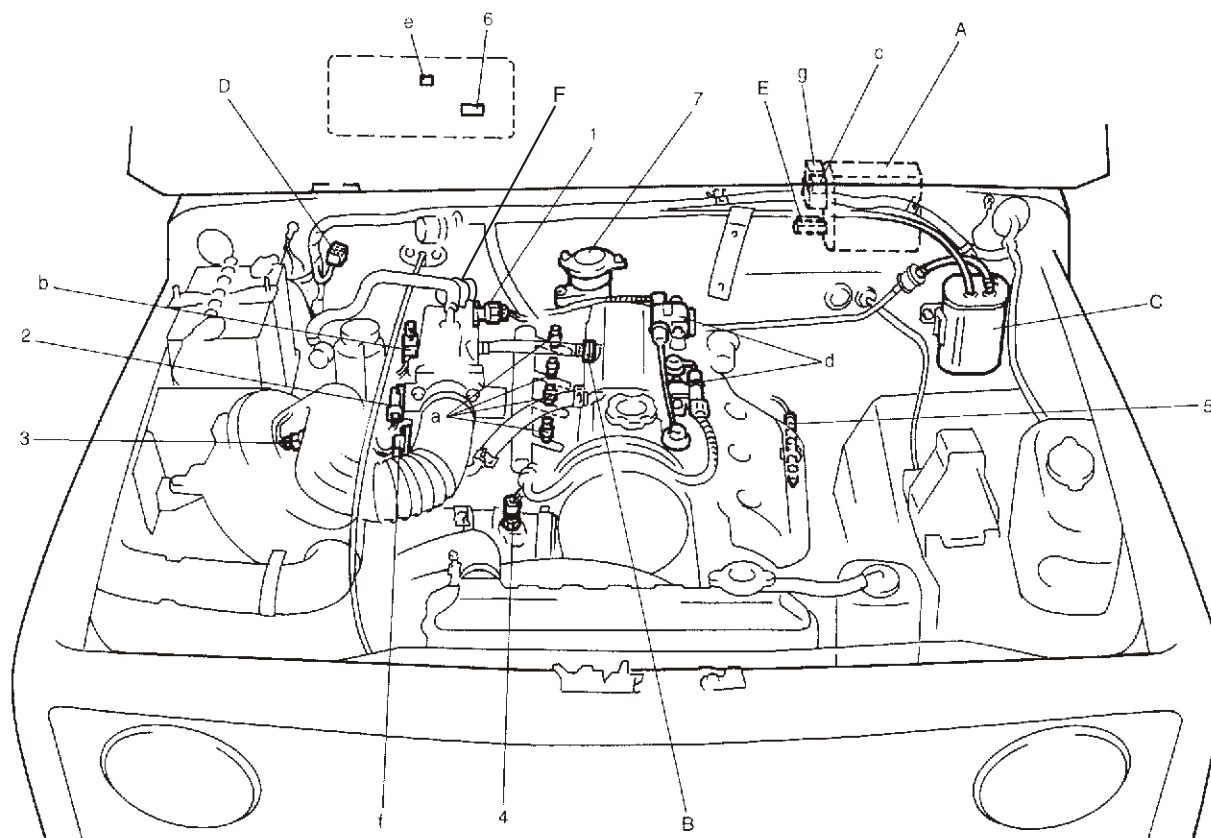


ELECTRONIC CONTROL SYSTEM

The electronic control system consists of 1) various sensors which detect the state of engine and driving conditions, 2) ECM (PCM) which controls various devices according to the signals from the sensors and 3) various controlled devices.

Functionally, it is divided into the following sub systems:

- Fuel injection control system
- Idle speed control system
- Fuel pump control system
- Ignition control system
- Evaporative emission control system



INFORMATION SENSORS

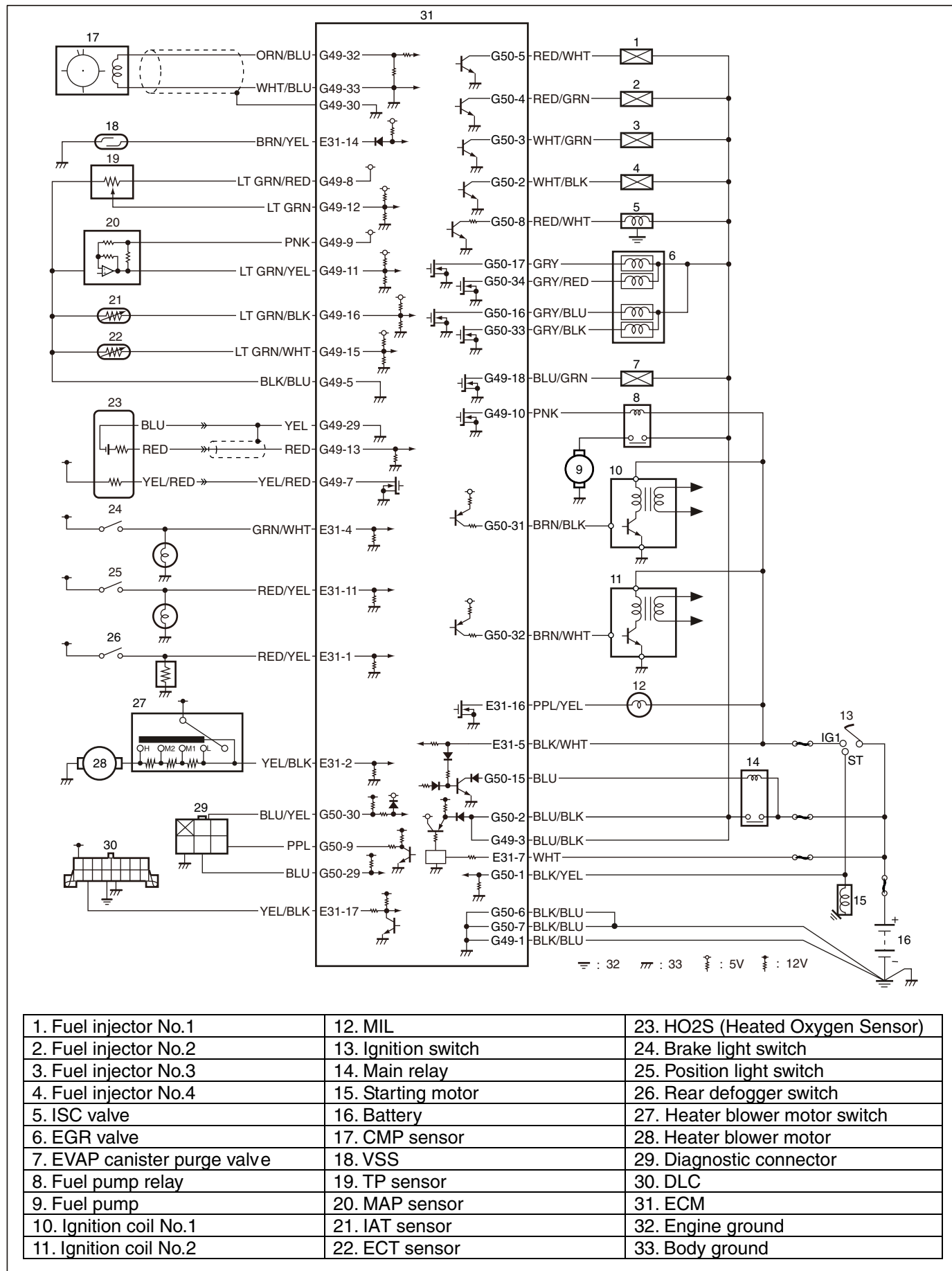
1. MAP sensor
2. TP sensor
3. IAT sensor
4. ECT sensor
5. Oxygen sensor
6. VSS
7. CMP sensor

CONTROL DEVICES

- a : Fuel injectors
- b : EVAP canister purge valve
- c : Fuel pump relay
- d : Ignition coil assembly
- e : Malfunction indicator lamp
- f : IAC valve
- g : Main relay

OTHERS

- A : ECM (PCM)
- B : PCV valve
- C : EVAP canister
- D : Monitor connector
- E : DLC
- F : EGR



TERMINAL ARRANGEMENT OF ECM CONNECTOR



[A]

G50								G49								G51								E31									
7	6	5	4	3	2	1		7	6	5	4	3				2	1							7	6	5	4	3	2	1			
17	16	15	14	13	12	11	10	9	8															17	16	15	14	13	12	11	10	9	8
27	26	25	24	23	22	21	20	19	18							23	22	21	20					23	22		21	20		19	18		
34	33					32	31	30	29	28						31	30	29	28					29	28		27	26		25	24		

[A]: ECM connector (View: [a])

CONNECTOR G50

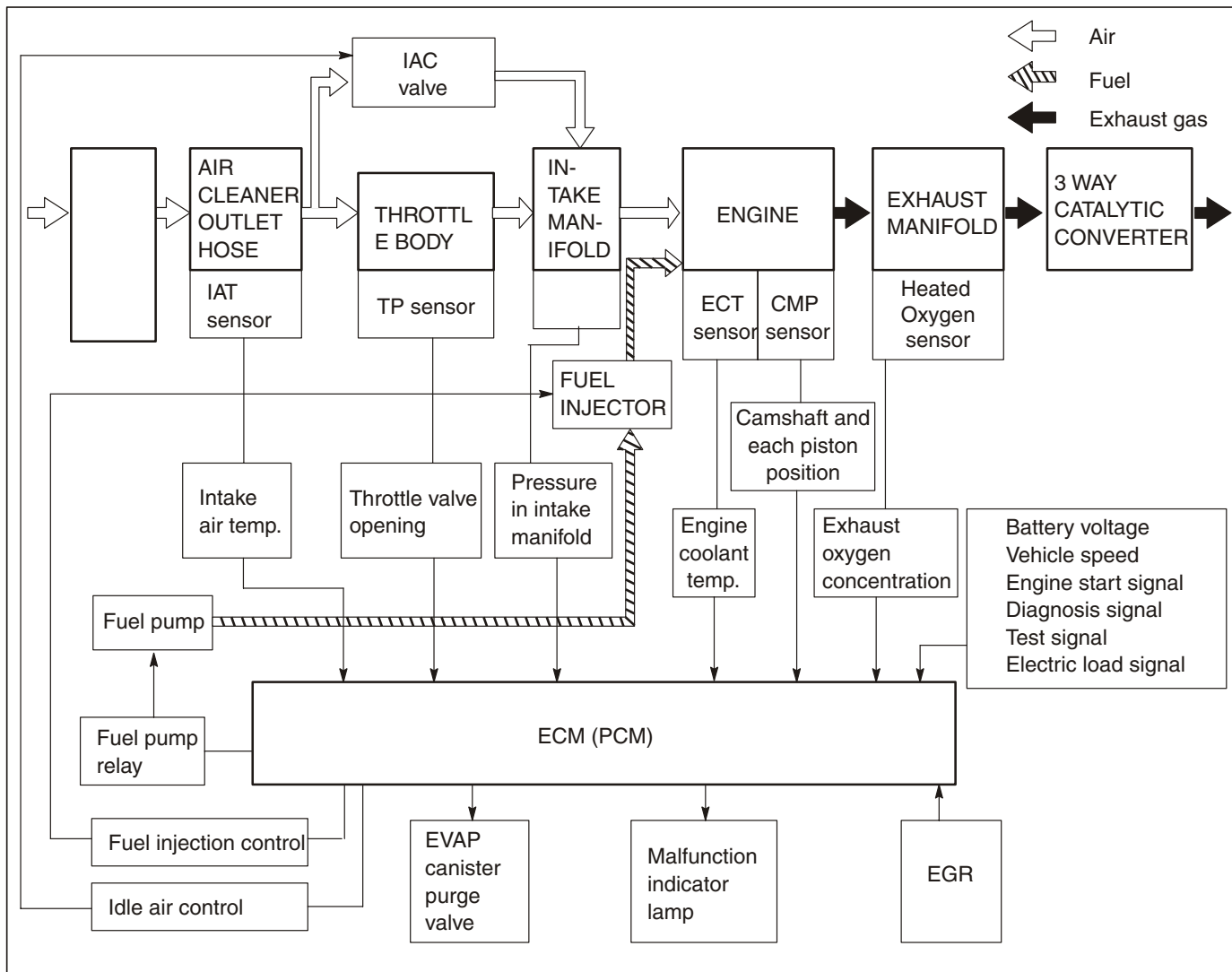
Terminal	Circuit
G50-1	Engine start signal circuit
G50-2	Fuel injector No.4 control circuit
G50-3	Fuel injector No.3 control circuit
G50-4	Fuel injector No.2 control circuit
G50-5	Fuel injector No.1 control circuit
G50-6	ECM ground circuit
G50-7	ECM ground circuit
G50-8	ISC valve control circuit
G50-9	Duty output circuit
G50-10	Fuel pump relay drive circuit
G50-11	—
G50-12	—
G50-13	—
G50-14	—
G50-15	Main relay drive circuit
G50-16	EGR valve control circuit
G50-17	EGR valve control circuit
G50-18	—
G50-19	—
G50-20	—
G50-21	—
G50-22	—
G50-23	—
G50-24	—
G50-25	—
G50-26	—
G50-27	—
G50-28	—
G50-29	Test switch circuit
G50-30	Diagnosis switch circuit
G50-31	Ignition coil No.1 control circuit
G50-32	Ignition coil No.2 control circuit
G50-33	EGR valve control circuit
G50-34	EGR valve control circuit

CONNECTOR G49

Terminal	Circuit
G49-1	ECM ground circuit
G49-2	ECM power supply circuit
G49-3	ECM power supply circuit
G49-4	—
G49-5	Sensor ground circuit
G49-6	—
G49-7	HO2S heater control circuit
G49-8	Sensor power supply circuit
G49-9	Sensor power supply circuit
G49-10	—
G49-11	MAP sensor signal circuit
G49-12	TP sensor signal circuit
G49-13	HO2S signal circuit
G49-14	—
G49-15	ECT sensor signal circuit
G49-16	IAT sensor signal circuit
G49-17	—
G49-18	EVAP canister purge valve control circuit
G49-19	—
G49-20	—
G49-21	—
G49-22	—
G49-23	—
G49-24	—
G49-25	—
G49-26	—
G49-27	—
G49-28	—
G49-29	HO2S ground circuit
G49-30	Sensor ground circuit
G49-31	—
G49-32	CMP sensor signal circuit
G49-33	CMP sensor ground circuit
G49-34	—
G49-35	—

CONNECTOR E31

Terminal	Circuit
E31-1	Electric load signal circuit
E31-2	Electric load signal circuit
E31-3	—
E31-4	Brake light switch signal circuit
E31-5	Ignition switch signal circuit
E31-6	—
E31-7	ECM back-up power supply circuit
E31-8	—
E31-9	—
E31-10	—
E31-11	Position light switch signal circuit
E31-12	—
E31-13	—
E31-14	VSS signal circuit
E31-15	VSS signal circuit for EPS
E31-16	MIL drive circuit
E31-17	Serial data link circuit
E31-18	—
E31-19	—
E31-20	—
E31-21	—
E31-22	—
E31-23	—
E31-24	—
E31-25	—
E31-26	—
E31-27	—
E31-28	—
E31-29	—

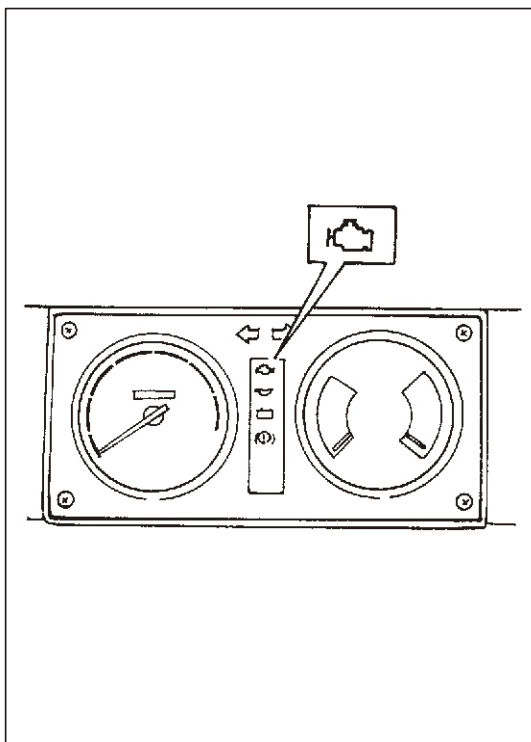


CONTROL DEVICE (OUTPUT)	INFORMATION SENSORS AND SWITCH (INPUT)	Test switch											
		Diagnosis switch											
		Stop lamp switch			○								
		Start switch		○									
		Ignition switch				○							
		Lighting switch											
		VSS		○	○								
		Heated Oxygen sensor		○									
		IAT sensor		○	○								
		ECT sensor		○	○								
		TP sensor		○	○								
		MAP sensor		○	○								
		CMP sensor		○									
		Fuel injector											
		IAC valve		○				○					
		Fuel pump		○					○				
		Ignition coil		○				○				○	
		EVAP canister purge valve		○				○					
		MIL		○				○			○		

DIAGNOSIS

The engine and emission control system in this vehicle are controlled by ECM (PCM). ECM (PCM) has an On-Board Diagnostic system which detects a malfunction in this system.

When diagnosing troubles, be sure to have full understanding of the outline of ON-BOARD DIAGNOSTIC SYSTEM and each item in PRECAUTION IN DIAGNOSING TROUBLE and execute diagnosis according to ENGINE DIAGNOSTIC FLOW TABLE in SECTION 6.



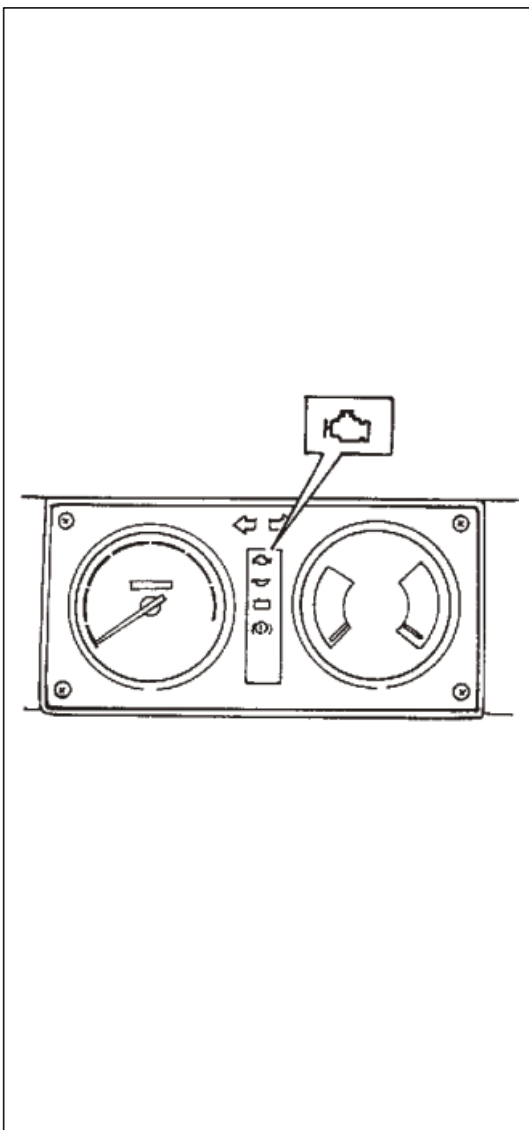
ON-BOARD DIAGNOSTIC SYSTEM

ECM (PCM) performs on-board diagnosis (self-diagnosis) on the system and operates malfunction indicator lamp as follows.

- Malfunction indicator lamp lights when the ignition switch is turned ON (but the engine at stop) regardless of the condition of engine and emission control system. This is only to check the malfunction indicator lamp bulb and its circuit.
- If the areas monitored by ECM (PCM) is free from any trouble after the engine start (while engine is running), malfunction indicator lamp turns OFF.
- When ECM (PCM) detects a trouble which has occurred in the areas, it makes malfunction indicator lamp turn ON while the engine is running to warn the driver of such occurrence of trouble and at the same time it stores the exact trouble area in ECM (PCM) back-up memory.

PRECAUTIONS IN DIAGNOSING TROUBLES

- Before identifying diagnostic trouble code, don't disconnect couplers from ECM (PCM), battery cable from battery, ECM (PCM) ground wire harness from engine. Such disconnection will erase memorized trouble in ECM (PCM) memory.
- Be sure to read PRECAUTIONS FOR ELECTRICAL CIRCUIT SERVICE in SECTION 0A before inspection and observe what is written there.
- ECM (PCM) replacement
 When substituting a known-good ECM (PCM), check for following conditions. Neglecting this check may cause damage to known-good ECM (PCM).
 - Resistance value of all relays, actuators is as specified respectively.
 - TP sensor and MAP sensor are in good condition and none of power circuits of these sensors is shorted to ground.



MALFUNCTION INDICATOR LAMP (MIL) CHECK

- 1) Turn ON ignition switch (but engine at stop) and check that malfunction indicator lamp lights up.

If lamp does not light up, go to DIAGNOSTIC FLOW TABLE A-1 in this section.

If lamp flashes, go to DIAGNOSTIC FLOW TABLE A-2 in this section.

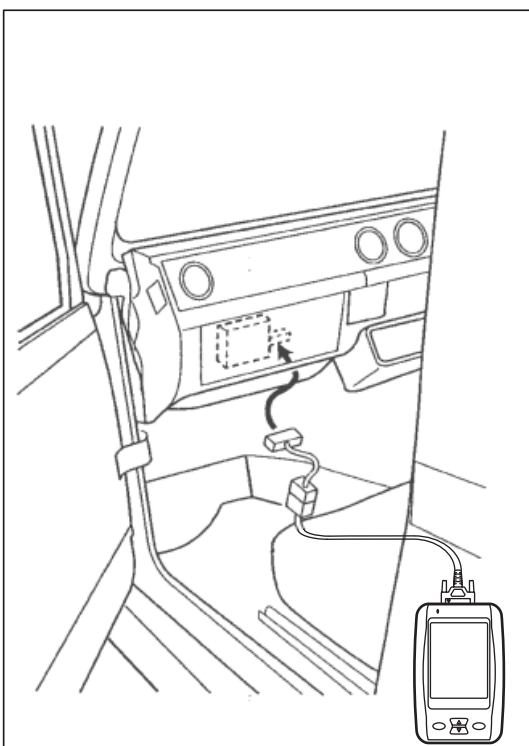
- 2) Start engine and check that malfunction indicator lamp turns OFF.

If lamp remains ON, go to DTC CHECK NOT USING SUZUKI SCAN TOOL in this section.

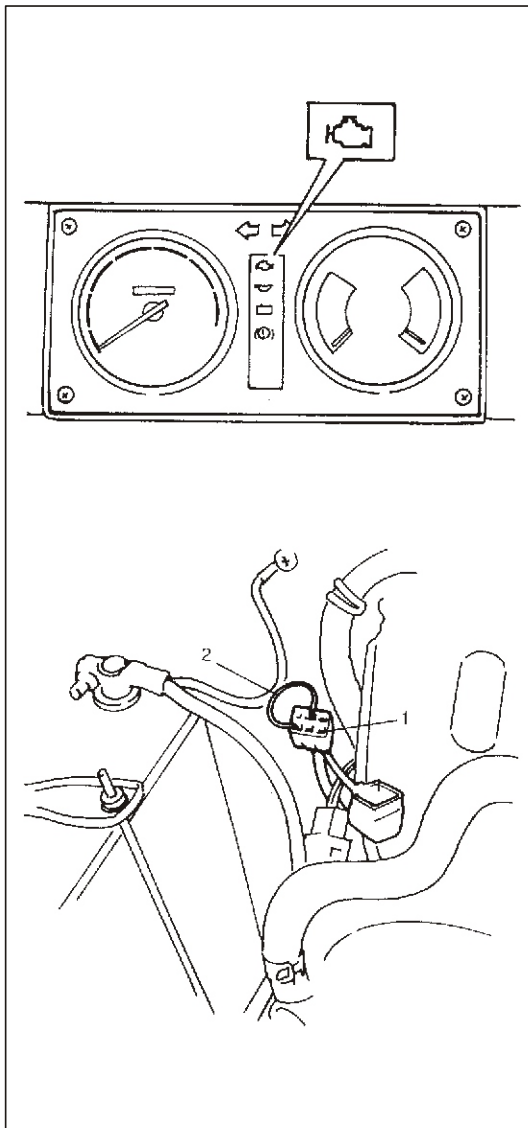
DIAGNOSTIC TROUBLE CODE (DTC) CHECK

[Using SUZUKI scan tool]

- 1) Check malfunction indicator lamp referring to MALFUNCTION INDICATOR LAMP (MIL) CHECK in this section.



- 2) Turn ignition switch OFF.
- 3) After setting cartridge to SUZUKI scan tool, connect it to data link connector (DLC) (1) located on underside of instrument panel at passenger seat side.
- 4) Turn ignition switch ON.
- 5) Read DTC according to instructions displayed on SUZUKI scan tool and print it or write it down. Refer to SUZUKI scan tool operator's manual for further details.
If communication between SUZUKI scan tool and ECM (PCM) is not possible, check if SUZUKI scan tool is communicable by connecting it to ECM (PCM) in another vehicle. If communication is possible in this case, SUZUKI scan tool is in good condition. Then check data link connector and serial data line (circuit) in the vehicle with which communication was not possible.
- 6) After completing the check, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).

**[Not using SUZUKI scan tool]**

- 1) Check malfunction indicator lamp referring to MALFUNCTION INDICATOR LAMP (MIL) CHECK in this section.
- 2) Using service wire (2), ground diagnosis switch terminal in monitor connector (1).
- 3) Read DTC from flashing pattern of malfunction indicator lamp. Refer to DTC TABLE.
If lamp remains ON, go to Table A-3 in this section.

NOTE:

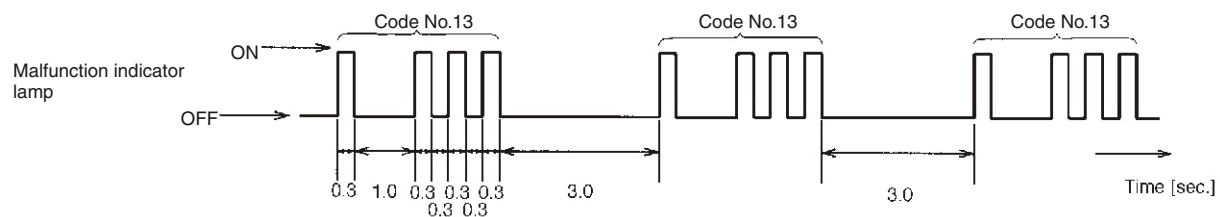
- If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.

And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.

- Take a note of diagnostic trouble code indicated first.

- 4) After completing the check, turn ignition switch OFF and disconnect service wire from monitor connector.

EXAMPLE: When throttle position sensor is defective (Code No.13)



DIAGNOSTIC TROUBLE CODE (DTC) CLEARANCE

[Using SUZUKI scan tool]

- 1) Turn ignition switch OFF.
- 2) Connect SUZUKI scan tool to data link connector (DLC) in the same manner as when making this connection for DTC check.
- 3) Turn ignition switch ON.
- 4) Erase DTC according to instructions displayed on SUZUKI scan tool.

Refer to SUZUKI scan tool operator's manual for further details.

- 5) After completing the clearance, turn ignition switch OFF and disconnect SUZUKI scan tool from data link connector (DLC).

[Not using SUZUKI scan tool]

- 1) Turn OFF ignition switch.
- 2) Disconnect battery negative cable for specified time below to erase diagnostic trouble code stored in ECM (PCM) memory and reconnect it.

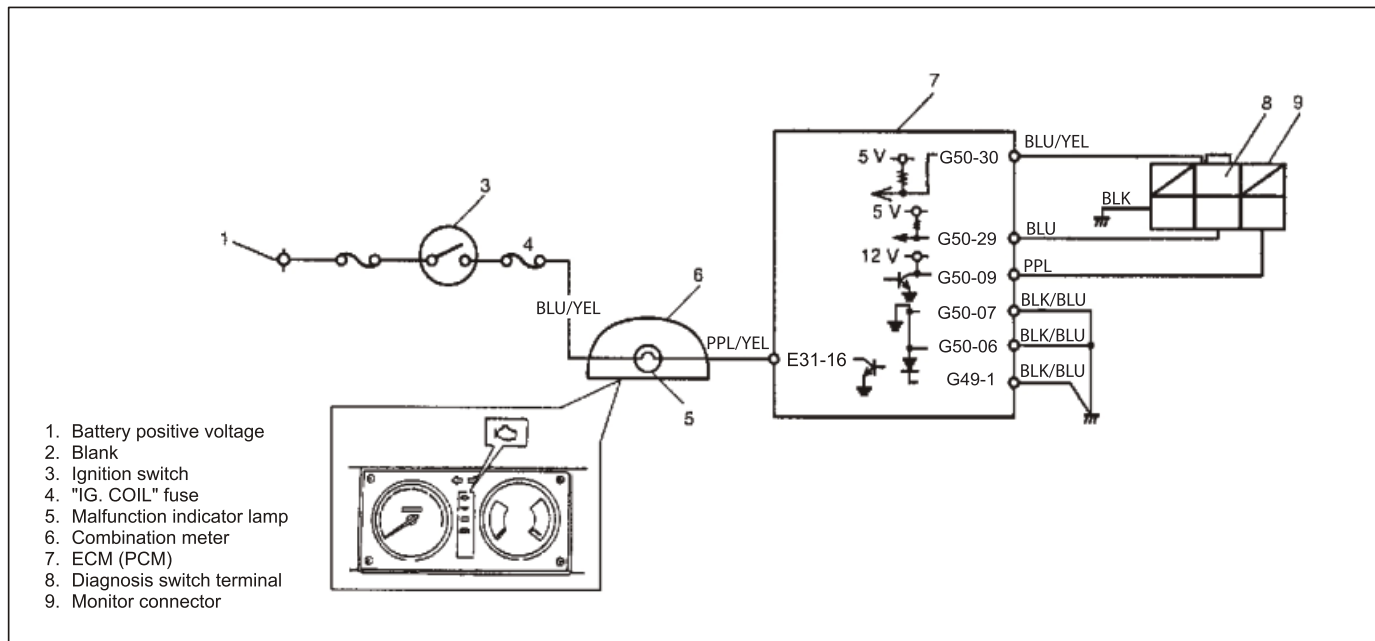
Time required to erase DTC:

Ambient temperature	Time to cut power to ECM (PCM)
Over 0° C (32°F)	30 sec. or longer
Under 0° C (32°F)	Not specifiable. Select a place with higher than 0° C (32° F) temperature.

DTC Table

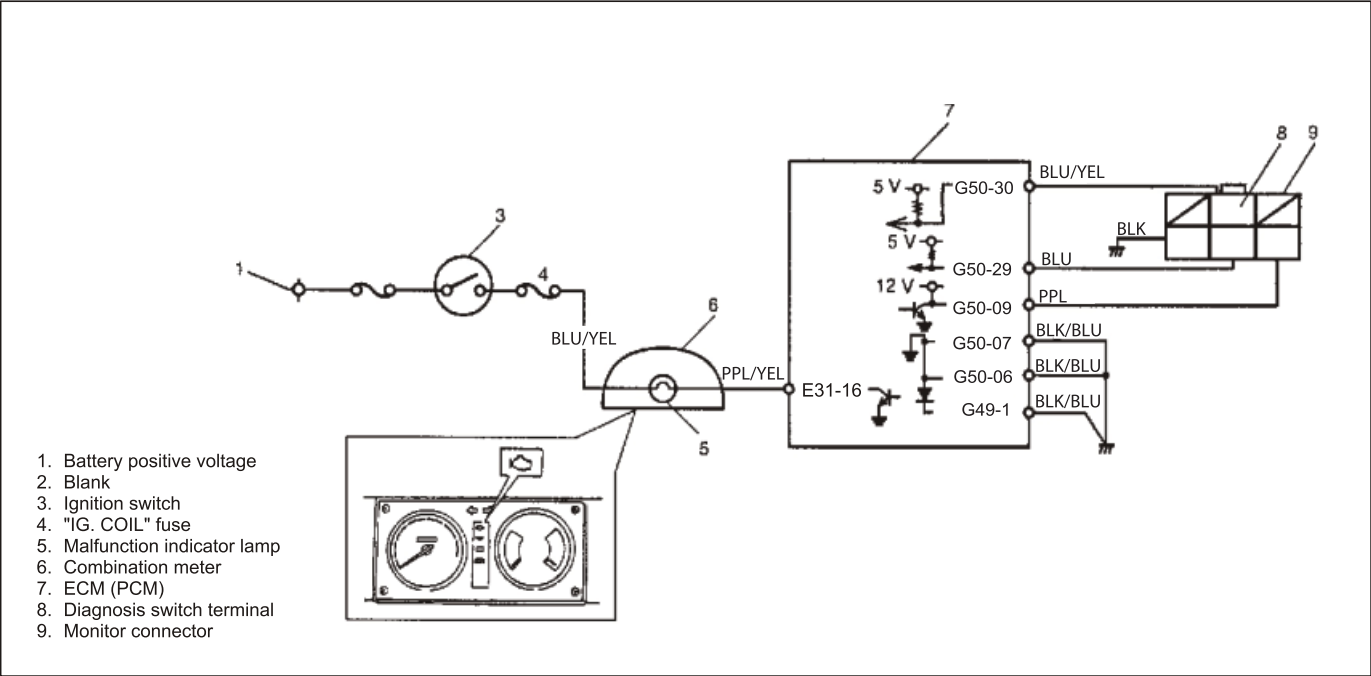
DTC	DTC name	DTC detecting condition	DTC detection logic	MIL
P0031	HO2S Heater Control Circuit Low	Voltage of HO2S heater circuit is less than specification for more than 5 sec. even though control duty of HO2S heater is less than 75% with engine running.	2 D/C	Applicable
P0032	HO2S Heater Control Circuit High	Voltage of HO2S heater circuit is more than specification for more than 5 sec. even though control duty of HO2S heater is more than 25% with engine running.	2 D/C	Applicable
P0107	Manifold Absolute Pressure Circuit Low Input	Voltage of MAP sensor signal circuit is less than 0.75 V.	2 D/C	Applicable
P0108	Manifold Absolute Pressure Circuit High Input	Voltage of MAP sensor signal circuit is 4.5 V or more.	2 D/C	Applicable
P0112	Intake Air Temperature Sensor Circuit Low	Voltage of IAT sensor signal circuit is less than 0.15 V.	2 D/C	Applicable
P0113	Intake Air Temperature Sensor Circuit High	Voltage of IAT sensor signal circuit is 4.85 V or more.	2 D/C	Applicable
P0117	Engine Coolant Temperature Circuit Low	Voltage of ECT sensor signal circuit is less than 0.15 V.	2 D/C	Applicable
P0118	Engine Coolant Temperature Circuit High	Voltage of ECT sensor signal circuit is 4.8 V or more.	2 D/C	Applicable
P0122	Throttle Position Sensor A Circuit Low	Voltage of TP sensor signal circuit is less than 0.1 V.	2 D/C	Applicable
P0123	Throttle Position Sensor A Circuit High	Voltage of TP sensor signal circuit is 4.8 V or more.	2 D/C	Applicable
P0134	O2 Sensor No Activity Detected	HO2S signal voltage is less than 0.35 V for specified time continuously after warming up engine.	2 D/C	Applicable
P0340	Camshaft Position Sensor "A" Circuit	CMP sensor signal is not input for more than 2 sec. while engine is cranking.	1 D/C	Applicable
P0403	Exhaust Gas Recirculation Control Circuit	EGR valve output voltage is different from output command signal.	2 D/C	Applicable
P0443	Evaporative Emission System Purge Control Valve Circuit	Duty pulse monitor signal of EVAP canister purge valve control circuit is different from control command duty for 5 sec. (Circuit open or short)	2 D/C	Applicable
P0500	Vehicle Speed Sensor "A"	Vehicle speed signal is not input, while fuel is cut at deceleration for 4 sec. continuously at lower than 4,000 rpm.	2 D/C	Applicable
P0601	Internal Control Module Memory Check Sum Error	Data write error or check sum error.	2 D/C	Applicable

A-1 MALFUNCTION INDICATOR LAMP CIRCUIT CHECK (MALFUNCTION INDICATOR LAMP DOES NOT LIGHT AT IGNITION SWITCH ON.)



STEP	ACTION	YES	NO
1	Test Switch Terminal Circuit Check: 1) With the ignition switch ON position, check voltage between G50-29 terminal of ECM coupler and ground. Is voltage 10 – 14 V?	Go to Step 2.	"BLU" wire (test switch terminal) shorted to ground circuit. If OK, substitute a known-good ECM and recheck.
2	MIL Bulb and Circuit Check: 1) Using service wire, ground E31-16 terminal of ECM coupler. Does MIL turn ON at ignition switch ON position?	Go to TABLE A-4.	MIL bulb burned out. Fuse (s) blown. Ignition switch malfunction. "PPL/YEL" wire open. "BLK/WHT" wire open.

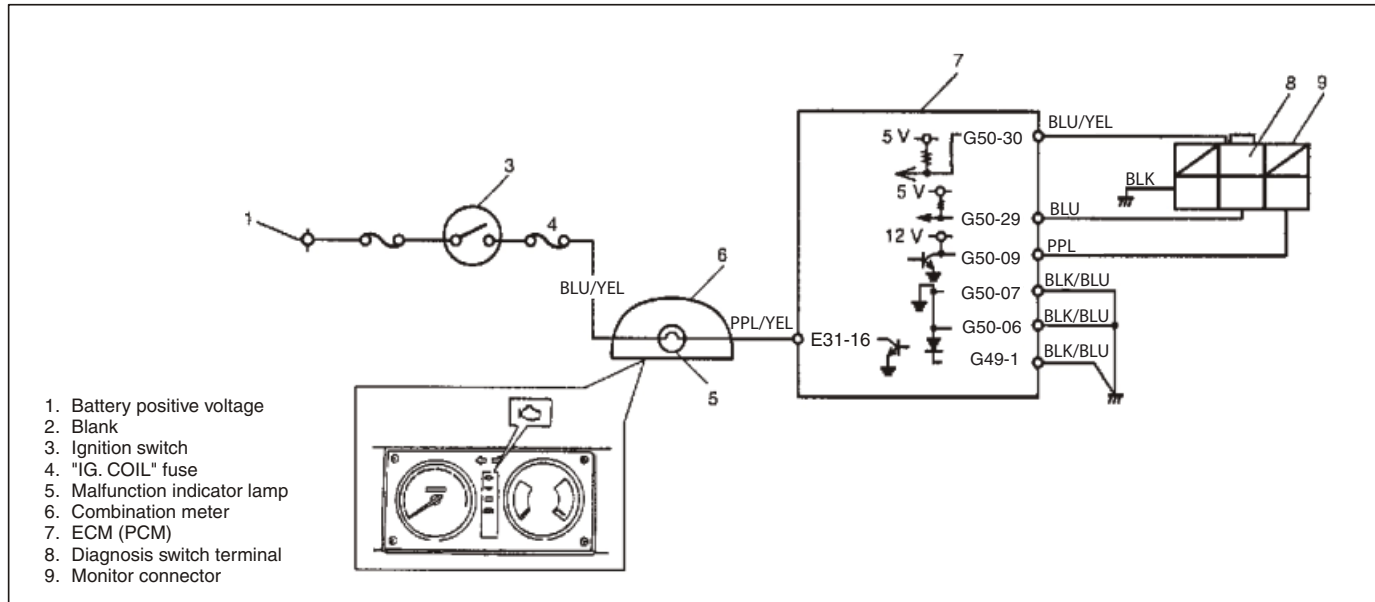
A-2 MALFUNCTION INDICATOR LAMP CIRCUIT CHECK
(MALFUNCTION INDICATOR LAMP FLASHES AT IGNITION SWITCH ON.)



STEP	ACTION	YES	NO
1	MIL Flashing Pattern Check 1) Turn ignition switch ON. Does lamp flashing pattern indicate diagnostic trouble code?	Go to Step 2.	Substitute a known-good ECM (PCM) and recheck.
2	Diag. Switch Circuit Check Is diag. switch terminal connected to ground via service wire?	System is in good condition.	"BLU/YEL" circuit shorted to ground. If circuit is OK, substitute a known-good ECM (PCM) and recheck.

A-3 MALFUNCTION INDICATOR LAMP CIRCUIT CHECK

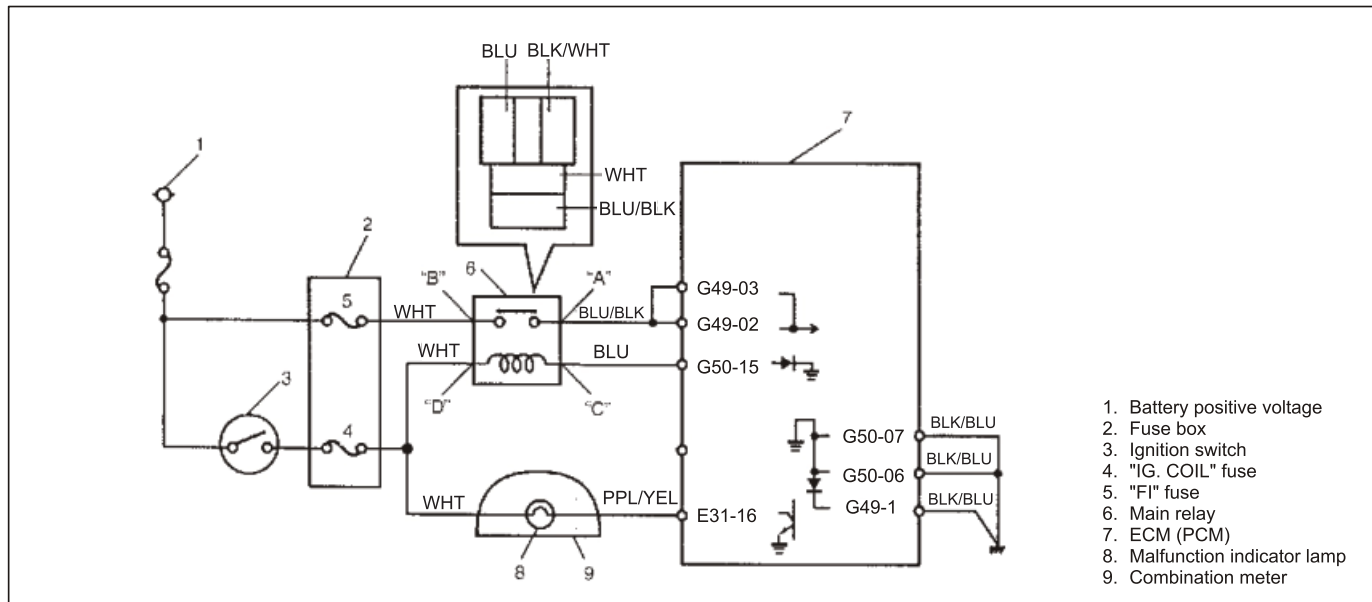
(MALFUNCTION INDICATOR LAMP DOES NOT FLASH OR JUST REMAINS ON EVEN WITH GROUNDING DIAGNOSIS SWITCH TERMINAL.)



STEP	ACTION	YES	NO
1	MIL Circuit Check 1) Turn ignition switch OFF and disconnect connectors from ECM (PCM). Does MIL turn ON at ignition switch ON?	"PPL/YEL" circuit shorted to ground.	Go to Step 2.
2	ECM (PCM) Connection Check 1) Turn ignition switch OFF. Is connector (G50-30 connection) connected to ECM (PCM) properly?	Go to Step 3.	Poor connector connection.
3	Diag. Switch Terminal Circuit Check 1) Connect connectors to ECM (PCM). 2) Using service wire, ground G50-8 terminal with connectors connected to ECM (PCM). 3) Turn ignition switch ON. Does MIL flash?	"BLU/YEL" or "BLK" circuit open.	Substitute a known-good ECM (PCM) and recheck.

A-4 ECM (PCM) POWER AND GROUND CIRCUIT CHECK (Page 1 of 2)

(MALFUNCTION INDICATOR LAMP DOES NOT LIGHT AT IGNITION SWITCH ON AND ENGINE DOES NOT STARTTHOUGHIT IS CRANKED UP.)



STEP	ACTION	YES	NO
1	Main Relay Operating Sound Check Is operating sound of main relay heard at ignition switch ON?	Go to Step 5.	Go to Step 2.
2	Fuse Check Is main "FI" fuse in good condition?	Go to Step 3.	Check for short in circuits connected to this fuse.
3	Main Relay Check 1) Turn OFF ignition switch and remove main relay. 2) Check for proper connection to main relay at terminal "A" and "B". 3) If OK, check main relay for resistance and operation referring to MAIN RELAY INSPECTION in this section. Is check result satisfactory?	Go to Step 4.	Replace main relay.
4	ECM (PCM) Power Circuit Check 1) Turn OFF ignition switch, disconnect connectors from ECM (PCM) and install main relay. 2) Check for proper connection to ECM (PCM) at terminals G49-03, G49-02 and G50-15. 3) If OK, then measure voltage between terminal G50-15 and ground with ignition switch on. Is voltage 10 – 14 V?	Go to Step 5.	"BLU" or "WHT" circuit open.

A-4 ECM (PCM) POWER AND GROUND CIRCUIT CHECK (Page 2 of 2)

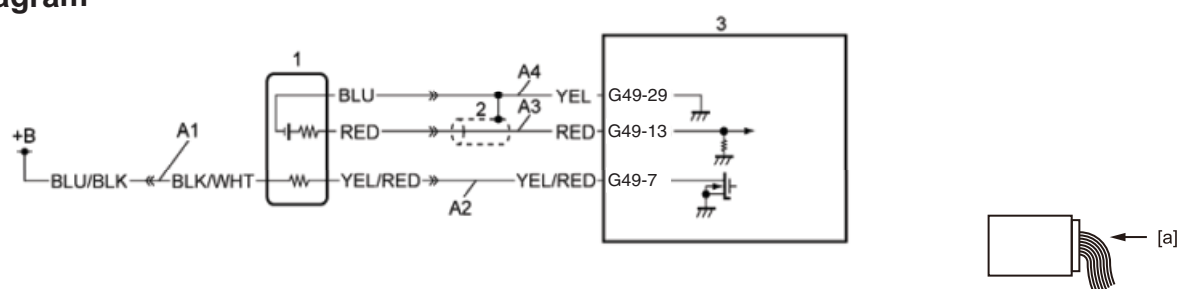
STEP	ACTION	YES	NO
5	ECM (PCM) Power Circuit Check 1) Using service wire, ground terminal G50-15 and measure voltage between terminal G49-03 (G49-02) and ground at ignition switch ON. Is it 10 – 14 V?	Check ground circuits "BLK/BLU" for open. If OK, then substitute a known-good ECM (PCM) and recheck.	Go to Step 6.
6	Is operating sound of main relay heard in Step 1?	Go to Step 7.	"WHT" or "BLU/BLK" wire open.
7	Main Relay Check 1) Check main relay according to procedure in Step 3. Is main relay in good condition?	"WHT" or "BLU/BLK" wire open.	Replace main relay.

DTC P0031 / P0032

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0031: HO2S Heater Control Circuit Low Voltage of HO2S heater circuit is less than specification for more than 5 sec. even though control duty of HO2S heater is less than 75% with engine running. (2 D/C detection logic)	• HO2S heater and/or its circuit • ECM
DTC P0032: HO2S Heater Control Circuit High Voltage of HO2S heater circuit is more than specification for more than 5 sec. even though control duty of HO2S heater is more than 25% with engine running. (2 D/C detection logic)	

Wiring Diagram



[A]

G50								G49								G51								E31								
7	6	5	4	3	2	1		7	6	5	4	3				2	1							7	6	5	4	3	2	1		
17	16	15	14	13	12	11	10	9	8														17	16	15	14	13	12	11	10	9	8
27	26	25	24	23	22	21	20	19	18														27	26			21	20		19	18	
34	33					32	31	30	29	28													23	22						25	24	
																							29	28			27	26				

[A]: ECM connector (View: [a])	A3: HO2S signal circuit	2. Shield wire
A1: HO2S heater power supply circuit	A4: HO2S ground circuit	3. ECM
A2: HO2S heater control circuit	1. HO2S	

DTC Confirmation Procedure

- 1) Run engine at idle speed for 1 min.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	HO2S heater power supply circuit check 1) Turn ignition switch to OFF position and disconnect connector from HO2S. 2) Check for proper terminal connection to HO2S. 3) If connection is OK, turn ignition switch to ON position. 4) Check that voltage between HO2S heater power supply circuit (A1) and ground is battery voltage at HO2S connector. Is it in good condition?	Go to Step 3.	Repair or replace defective wire harness.

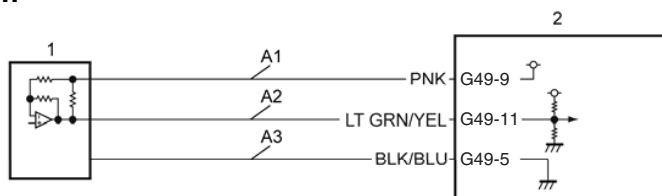
Step	Action	Yes	No
3	HO2S heater control circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that HO2S heater control circuit (A2) is as follows. • Wiring harness resistance of HO2S heater control circuit between HO2S and ECM connectors is less than 1? • Insulation resistance between HO2S heater control circuit and ground is infinity. • Insulation resistance of wire harness is infinity between HO2S heater control circuit terminal and each other terminal at HO2S connector. Are they in good condition?	Go to Step 4.	Repair or replace defective wire harness.
4	HO2S heater check 1) Check HO2S heater. Refer to "Heated Oxygen Sensor" in this section of related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace HO2S.

DTC P0107 / P0108

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0107: Manifold Absolute Pressure Circuit Low Input Voltage of MAP sensor signal circuit is less than 0.75 V. (2 D/C detection logic)	• MAP sensor and/or its circuit • ECM
DTC P0108: Manifold Absolute Pressure Circuit High Input Voltage of MAP sensor signal circuit is 4.5 V or more. (2 D/C detection logic)	

Wiring Diagram



[A]

G50								G49								G51								E31									
7	6	5	4	3	2	1		7	6	5	4	3				2	1							7	6	5	4	3	2	1			
17	16	15	14	13	12	11	10	9	8															17	16	15	14	13	12	11	10	9	8
27	26	25	24	23	22	21	20	19	18															23	22			21	20		19	18	
34	33					32	31	30	29	28														29	28			27	26		25	24	

[A]: ECM connector (View: [a])	A2: MAP sensor signal circuit	1. MAP sensor
A1: MAP sensor power supply circuit	A3: MAP sensor ground circuit	2. ECM

DTC Confirmation Procedure

- 1) Turn ignition switch to ON position.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	MAP sensor power supply circuit check 1) Turn ignition switch to OFF position and disconnect connector from MAP sensor. 2) Check for proper terminal connection to MAP sensor connector. 3) If connection is OK, turn ignition switch to ON position. 4) Check that voltage between MAP sensor power supply circuit (A1) and ground circuit (A3) is approx. 5 V at MAP sensor connector. Is it in good condition?	Go to Step 5.	Go to Step 3.
3	MAP sensor power supply circuit check 1) Check that voltage between MAP sensor power supply circuit (A1) and ground is approx. 5 V at MAP sensor connector. Is it in good condition?	Check MAP sensor ground circuit (A3). If wire harness is OK and this DTC is detected again, substitute a known-good ECM and recheck.	Go to Step 4.

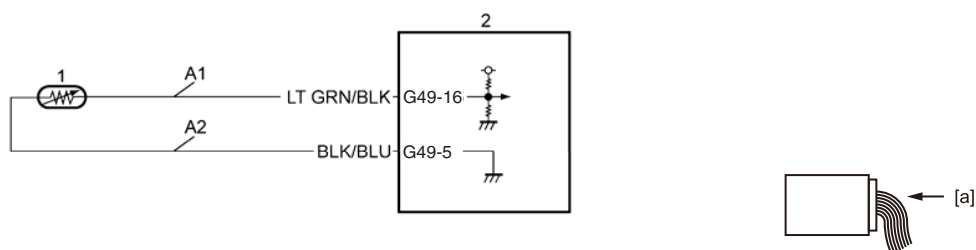
Step	Action	Yes	No
4	MAP sensor power supply circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that MAP sensor power supply circuit (A1) is as follows. • Wiring harness resistance of MAP sensor power supply circuit between MAP sensor and ECM connectors is less than 1? • Insulation resistance of MAP sensor power supply circuit is infinity between MAP sensor connector and ground. • Insulation resistance of wire harness is infinity between MAP sensor power supply circuit terminal and each other terminal at MAP sensor connector. Are they in good condition?	Substitute a known-good ECM and recheck.	Repair or replace MAP sensor power supply circuit.
5	MAP sensor signal circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that MAP sensor signal circuit (A2) is as follows. • Wiring harness resistance of MAP sensor signal circuit between MAP sensor and ECM connectors is less than 1? • Insulation resistance of MAP sensor signal circuit is infinity between MAP sensor connector and ground. • Insulation resistance of wire harness is infinity between MAP sensor signal terminal and each other terminal at MAP sensor connector. Are they in good condition?	Go to Step 6.	Repair or replace MAP sensor signal circuit.
6	MAP sensor check 1) Check MAP sensor. Refer to "MAP Sensor" in section 6E1 in related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace MAP sensor.

DTC P0112 / P0113

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0112: Intake Air Temperature Sensor Circuit Low Voltage of IAT sensor signal circuit is less than 0.15 V. (2 D/C detection logic)	• IAT sensor and/or its circuit • ECM
DTC P0113: Intake Air Temperature Sensor Circuit High Voltage of IAT sensor signal circuit is 4.85 V or more. (2 D/C detection logic)	

Wiring Diagram



[A]

G50								G49								G51								E31							
7	6	5	4	3	2	1		7	6	5	4	3				2	1							7	6	5	4	3	2	1	
17	16	15	14	13	12	11	10	9	8							19	18	17	16	15	14	13	12	11	10	9	8				
27	26	25	24	23	22	21	20	19	18							27	26			25	24			23	22	21	20				
34	33					32	31	30	29	28						35	34			33	32			31	30	29	28				

[A]: ECM connector (View: [a])	A2: IAT sensor ground circuit	2. ECM
A1: IAT sensor signal circuit	1. IAT sensor	

DTC Confirmation Procedure

- 1) Turn ignition switch to ON position.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	IAT sensor signal circuit and ground circuit check 1) Turn ignition switch to OFF position and disconnect connectors from IAT sensor and ECM. 2) Check for proper terminal connection to IAT sensor and ECM connectors. 3) If connections are OK, check that IAT sensor signal circuit (A1) and ground circuit (A2) are as follows. • Wiring harness resistance of each IAT sensor signal circuit and ground circuit between IAT sensor and ECM connectors is less than 1? . • Insulation resistance of IAT sensor signal circuit is infinity between IAT sensor connector and ground. • Insulation resistance of wire harness is infinity between IAT sensor signal circuit terminal and ground circuit terminal at IAT sensor connector. Are they in good condition?	Go to Step 3.	Repair or replace defective wire harness.

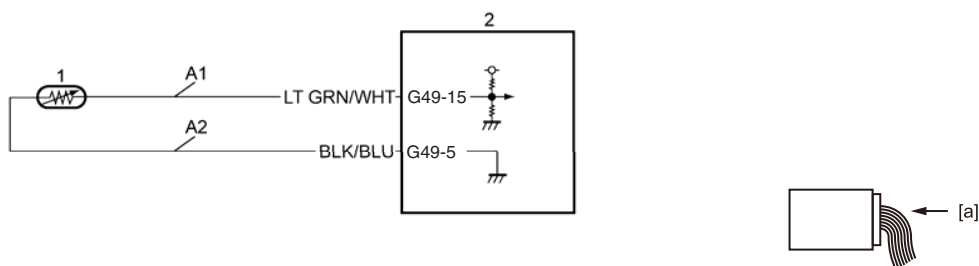
Step	Action	Yes	No
3	IAT sensor power supply circuit check 1) Turn ignition switch to OFF position and connect connectors from ECM. 2) Turn ignition switch to ON position. 3) Check that voltage between IAT sensor power supply circuit (A1) and ground circuit (A2) is approx. 5 V at IAT sensor connector. Is it in good condition?	Go to Step 4.	Substitute a known-good ECM and recheck.
4	IAT sensor check 1) Check IAT sensor. Refer to “ IAT Sensor ” in section 6E1 in related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace IAT sensor.

DTC P0117 / P0118

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0117: Engine Coolant Temperature Circuit Low Voltage of ECT sensor signal circuit is less than 0.15 V. (2 D/C detection logic)	- ECT sensor and/or its circuit - ECM
DTC P0118: Engine Coolant Temperature Circuit High Voltage of ECT sensor signal circuit is 4.8 V or more. (2 D/C detection logic)	

Wiring Diagram



[A]

G50								G49								G51								E31									
7	6	5	4	3	2	1		7	6	5	4	3				2	1							7	6	5	4	3	2	1			
17	16	15	14	13	12	11	10	9	8															17	16	15	14	13	12	11	10	9	8
27	26	25	24	23	22	21	20	19	18							23	22	21	20					23	22			21	20		19	18	
34	33															31	30	29	28					29	28			27	26		25	24	

[A]: ECM connector (View: [a])	A2: ECT sensor ground circuit	2. ECM
A1: ECT sensor signal circuit	1. ECT sensor	

[A]: ECM connector (View: [a])

A2: ECT sensor ground circuit

2. ECM

A1: ECT sensor signal circuit

1. ECT sensor

DTC Confirmation Procedure

- Turn ignition switch to ON position.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	ECT sensor signal circuit and ground circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECT sensor and ECM. 2) Check for proper terminal connection to ECT sensor and ECM connectors. 3) If connections are OK, check that ECT sensor signal circuit (A1) and ground circuit (A2) are as follows. - Wiring harness resistance of each ECT sensor signal circuit and ground circuit between ECT sensor and ECM connectors is less than 1Ω. - Insulation resistance of ECT sensor signal circuit is infinity between ECT sensor connector and ground. - Insulation resistance of wire harness is infinity between ECT sensor signal circuit terminal and ground circuit terminal at ECT sensor connector. Are they in good condition?	Go to Step 3.	Repair or replace defective wire harness.

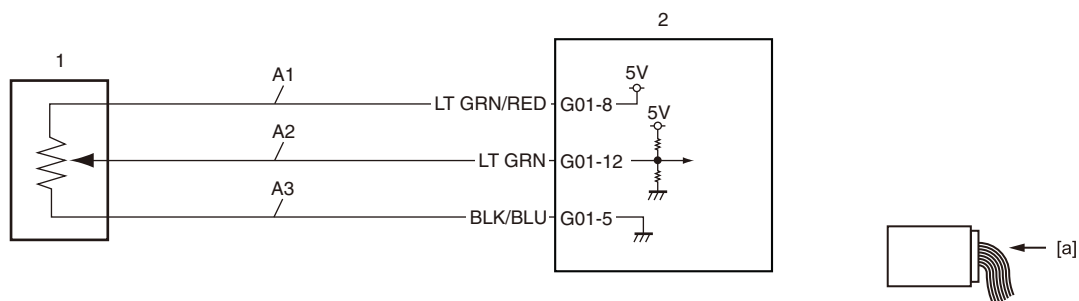
Step	Action	Yes	No
3	ECT sensor power supply circuit check 1) Turn ignition switch to OFF position and connect connectors from ECM. 2) Turn ignition switch to ON position. 3) Check that voltage between ECT sensor power supply circuit (A1) and ground circuit (A2) is approx. 5 V at ECT sensor connector. Is it in good condition?	Go to Step 4.	Substitute a known-good ECM and recheck.
4	ECT sensor check 1) Check ECT sensor. Refer to "ECT Sensor" in section 6E1 in related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace ECT sensor.

DTC P0122 / P0123

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0122: Throttle Position Sensor A Circuit Low Voltage of TP sensor signal circuit is less than 0.1 V. (2 D/C detection logic)	• TP sensor and/or its circuit • ECM
DTC P0123: Throttle Position Sensor A Circuit High Voltage of TP sensor signal circuit is 4.8 V or more. (2 D/C detection logic)	

Wiring Diagram



[A]

G50										G49										G51										E31																
7	6	5	4	3	2	1				7	6	5	4	3				2	1											7	6	5	4	3	2	1										
17	16	15	14	13	12	11	10	9	8	19	18	17	16	15	14	13	12	11	10	9	8						17	16	15	14	13	12	11	10	9	8										
27	26	25	24	23	22	21	20	19	18	27	26				25	24				23	22	21	20						23	22				21	20				19	18						
34	33							32	31	30	29	28				35	34				33	32				31	30	29	28						29	28				27	26				25	24

[A]: ECM connector (View: [a])	A2: TP sensor signal circuit	1. TP sensor
A1: TP sensor power supply circuit	A3: TP sensor ground circuit	2. ECM

DTC Confirmation Procedure

- 1) Turn ignition switch to ON position.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	TP sensor power supply circuit check 1) Turn ignition switch to OFF position and disconnect connector from TP sensor. 2) Check for proper terminal connection to TP sensor connector. 3) If connection is OK, turn ignition switch to ON position. 4) Check that voltage between TP sensor power supply circuit (A1) and ground circuit (A3) is approx. 5 V at TP sensor connector. Is it in good condition?	Go to Step 5.	Go to Step 3.
3	TP sensor power supply circuit check 1) Check that voltage between TP sensor power supply circuit (A1) and ground is approx. 5 V at TP sensor connector. Is it in good condition?	Check TP sensor ground circuit (A3). If wire harness is OK and this DTC is detected again, substitute a known-good ECM and recheck.	Go to Step 4.

Step	Action	Yes	No
4	TP sensor power supply circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that TP sensor power supply circuit (A1) is as follows. • Wiring harness resistance of TP sensor power supply circuit between TP sensor and ECM connectors is less than 1? • Insulation resistance of TP sensor power supply circuit is infinity between TP sensor connector and ground. • Insulation resistance of wire harness is infinity between TP sensor power supply circuit terminal and each other terminal at TP sensor connector. Are they in good condition?	Substitute a known-good ECM and recheck.	Repair or replace TP sensor power supply circuit.
5	TP sensor signal circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that TP sensor signal circuit (A2) is as follows. • Wiring harness resistance of TP sensor signal circuit between TP sensor and ECM connectors is less than 1? • Insulation resistance of TP sensor signal circuit is infinity between TP sensor connector and ground. • Insulation resistance of wire harness is infinity between TP sensor signal terminal and each other terminal at TP sensor connector. Are they in good condition?	Go to Step 6.	Repair or replace TP sensor signal circuit.
6	TP sensor check 1) Check TP sensor. Refer to "TP Sensor" in section 6E1 in related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace TP sensor.

DTC P0134

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0134: O2 Sensor No Activity Detected HO2S signal voltage is less than 0.35 V for specified time continuously after warming up engine. (2 D/C detection logic) HO2S and/or its circuit	• HO2S and/or its circuit • Fuel system • Exhaust system • Air intake system • ECM

Wiring Diagram

Refer to "DTC P0031 / P0032".

DTC Confirmation Procedure

WARNING

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out by 2 persons, a driver and a tester, on a level road.

NOTE

Check to make sure that the following conditions are satisfied when using this "DTC Confirmation Procedure".

- 1200 rpm ≤ Engine speed < 4000 rpm
- 70 °C (158 °F) ≤ ECT < 150 °C (302 °F)
- -10 °C (14 °F) ≤ IAT < 70 °C (158 °F)
- -10 °C (14 °F) ≤ IAT < 80 °C (176 °F) at engine start
- 75 kPa ≤ BARO
- 10 V ≤ Battery < 16 V

- 1) Start engine and warm it up to normal operating temperature.
- 2) Drive vehicle at 50 - 60 km/h (30 - 40 mph) for 2 min.
- 3) Stop vehicle and run engine at idle speed for 2 min.

Troubleshooting

DTC

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	DTC check Is there any DTC (s) other than P0134?	Go to troubleshooting for applicable DTC.	Go to Step 3.
3	HO2S signal circuit check 1) Turn ignition switch to OFF position and disconnect connectors from HO2S and ECM. 2) Check for proper terminal connection to HO2S and ECM connectors. 3) If connections are OK, check that HO2S signal circuit (A3) is as follows. • Wiring harness resistance of HO2S signal circuit between HO2S and ECM connectors is less than 1 Ω. • Insulation resistance between HO2S signal circuit and ground is infinity. • Insulation resistance of wire harness is infinity between HO2S signal terminal and each other terminal at HO2S connector. Are they in good condition?	Go to Step 4.	Repair or replace defective wire harness.

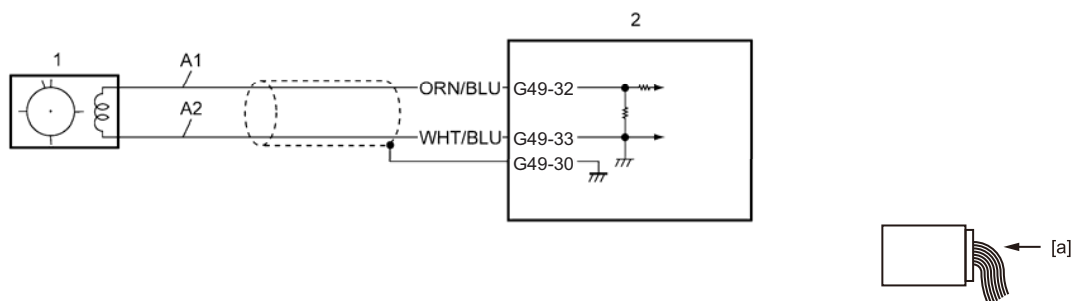
Step	Action	Yes	No
4	HO2S ground circuit check 1) Check that HO2S ground circuit (A4) is as follows. • Wiring harness resistance of HO2S ground circuit between HO2S and ECM connectors is less than 1? . • Insulation resistance between HO2S ground circuit and ground is infinity. • Insulation resistance of wire harness is infinity between HO2S ground terminal and each other terminal at HO2S connector. Are they in good condition?	Go to Step 5.	Repair or replace defective wire harness.
5	Exhaust system check 1) Check exhaust system for clog or leak. Is it in good condition?	Go to Step 6.	Repair or replace.
6	Fuel pressure check 1) Check fuel pressure. Refer to "Fuel Pressure Inspection" in this section of related manual. Is it in good condition?	Go to Step 7.	Repair or replace.
7	Air intake system check 1) Check air intake system for clog or leak. Is it in good condition?	Go to Step 8.	Repair or replace.
8	DTC recheck 1) Replace HO2S. Refer to "Heated Oxygen Sensor" in this section of related manual. 2) Perform DTC confirmation procedure and check DTC. Is DTC P0134 still detected?	Substitute a known-good ECM and recheck.	End.

DTC P0340

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0340: Camshaft Position Sensor "A" Circuit CMP sensor signal is not input for more than 2 sec. while engine is cranking. (1 D/C detection logic)	• CMP sensor and/or its circuit • ECM

Wiring Diagram



[A]

G50								G49								G51								E31											
7	6	5	4	3	2	1		7	6	5	4	3			2	1									7	6	5	4	3	2	1				
17	16	15	14	13	12	11	10	9	8																17	16	15	14	13	12	11	10	9	8	
27	26	25	24	23	22	21	20	19	18																23	22		21	20		19	18			
34	33					32	31	30	29	28															35	34			33	32		31	30	29	28

[A]: ECM connector (View: [a])	A2: CMP sensor ground circuit	2. ECM
A1: CMP sensor signal circuit	1. CMP sensor	

DTC Confirmation Procedure

1) Start engine and wait for 10 sec.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	CMP sensor signal circuit and ground circuit check 1) Turn ignition switch to OFF position and disconnect connectors from CMP sensor and ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that CMP sensor signal circuit (A1) and ground circuit (A2) are as follows. • Wiring harness resistance of each CMP sensor signal circuit and ground circuit between CMP sensor and ECM connectors is less than 1 ? • Insulation resistance between CMP sensor signal circuit and ground is infinity. • Insulation resistance of wire harness is infinity between CMP sensor signal circuit terminal and each terminal at CMP sensor connector. Are they in good condition?	Go to Step 3.	Repair or replace defective wire harness.

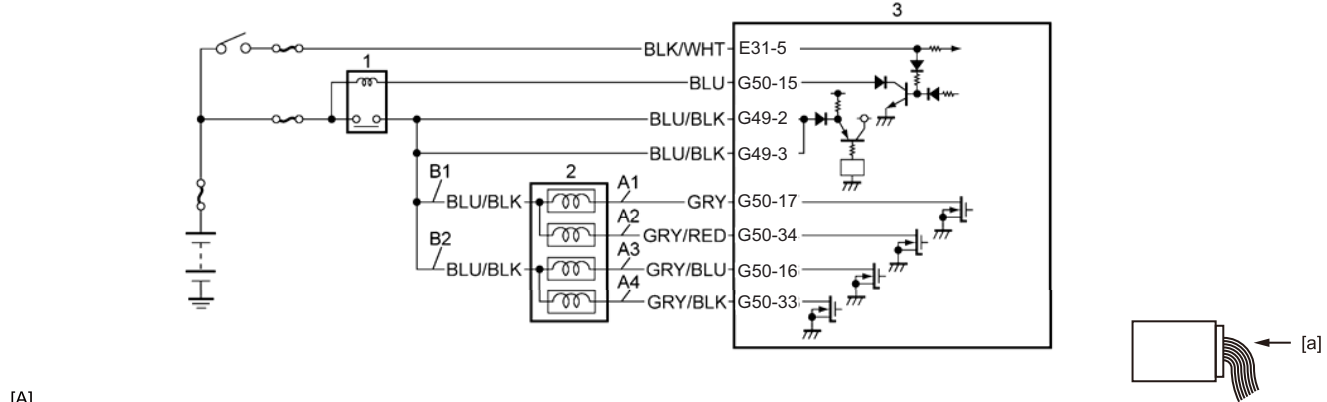
Step	Action	Yes	No
3	CMP sensor check 1) Check CMP sensor. Refer to "CMP Sensor" in Section 6F1 of related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace CMP sensor.

DTC P0403

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0403: Exhaust Gas Recirculation Control Circuit EGR valve output voltage is different from output command signal. (2 D/C detection logic)	- EGR valve and/or its circuit - ECM

Wiring Diagram



[A]

G50								G49								G51								E31							
7	6	5	4	3	2	1		7	6	5	4	3			2	1								7	6	5	4	3	2	1	
17	16	15	14	13	12	11	10	9	8															17	16	15	14	13	12	11	
27	26	25	24	23	22	21	20	19	18															23	22			21	20	19	
34	33					32	31	30	29	28															29	28			27	26	

[A]: ECM connector (View: [a])	A4: EGR valve drive circuit 4	2. EGR valve
A1: EGR valve drive circuit 1	B1: EGR valve power supply circuit 1	3. ECM
A2: EGR valve drive circuit 2	B2: EGR valve power supply circuit 2	
A3: EGR valve drive circuit 3	1. Main relay	

DTC Confirmation Procedure

- Run engine at idle speed for 1 min.

DTC TROUBLESHOOTING

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	EGR valve power supply circuit check 1) Turn ignition switch to OFF position and disconnect connector from EGR valve. 2) Check for proper terminal connection to EGR valve connector. 3) If connections are OK, turn ignition switch to ON position. 4) Check that voltage between EGR valve power supply circuit (B1, B2) and ground circuit is battery voltage at EGR valve connector. Is it in good condition?	Go to Step 3.	Repair or replace defective wire harness.

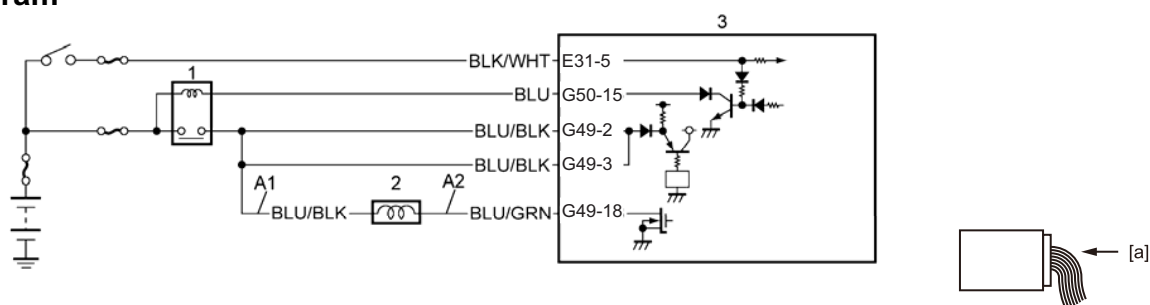
Step	Action	Yes	No
3	EGR valve drive circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that EGR valve drive circuit is as follows. • Wiring harness resistance of each EGR valve drive circuit (A1, A2, A3 and A4) between EGR valve and ECM connectors is less than 1 ? • Insulation resistance of each EGR drive circuit between EGR valve connector and ground is infinity. • Insulation resistance of wire harness is infinity between each EGR valve drive circuit terminal and each other terminal at EGR valve connector. • Circuit voltage of each EGR valve drive circuit are 0 – 1 V with ignition switch turned ON. Are they in good condition?	Go to Step 4.	Repair or replace defective wire harness.
4	EGR valve check 1) Check EGR valve. Refer to “EGR System” in this section of related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace EGR valve.

DTC P0443

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0443: Evaporative Emission System Purge Control Valve Circuit Duty pulse monitor signal of EVAP canister purge valve control circuit is different from control command duty for 5 sec. (Circuit open or short) (2 D/C detection logic)	• EVAP canister purge valve and/or its circuit • ECM

Wiring Diagram



[A]

G50								G49								G51								E31										
7	6	5	4	3	2	1		7	6	5	4	3				2	1									7	6	5	4	3	2	1		
17	16	15	14	13	12	11	10	9	8																17	16	15	14	13	12	11	10	9	8
27	26	25	24	23	22	21	20	19	18							23	22	21	20						23	22			21	20			19	18
34	33					32	31	30	29	28						31	30	29	28						29	28			27	26			25	24

[A]: ECM connector (View: [a])	A2: EVAP canister purge valve control circuit	2. EVAP canister purge valve
A1: EVAP canister purge valve power supply circuit	1. Main relay	3. ECM

DTC Confirmation Procedure

- 1) Run engine at idle speed for 1 min.

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	EVAP canister purge valve power supply circuit check 1) Turn ignition switch to OFF position and disconnect connector from EVAP canister purge valve. 2) Check for proper terminal connection to EVAP canister purge valve connector. 3) If connection is OK, turn ignition switch to ON position. 4) Check that voltage between EVAP canister purge valve power supply circuit (A1) and ground is battery voltage at EVAP canister purge valve connector. Is it in good condition?	Go to Step 3.	Repair or replace defective wire harness.

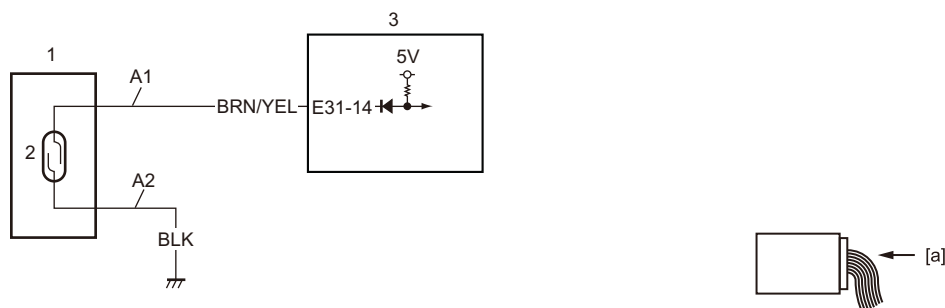
Step	Action	Yes	No
3	EVAP canister purge valve control circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that EVAP canister purge valve control circuit (A2) is as follows. • Wiring harness resistance of EVAP canister purge valve control circuit between EVAP canister purge valve and ECM connectors is less than 1? • Insulation resistance between EVAP canister purge valve control circuit and ground is infinity. • Insulation resistance of wire harness is infinity between EVAP canister purge valve control circuit terminal and each other terminal at EVAP canister purge valve connector. Are they in good condition?	Go to Step 4.	Repair or replace defective wire harness.
4	EVAP canister purge valve check 1) Check EVAP canister purge valve. Refer to "EVAP Canister Purge Valve" in this section of related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace EVAP canister purge valve.

DTC P0500

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0500: Vehicle Speed Sensor "A" Vehicle speed signal is not input, while fuel is cut at deceleration for 4 sec. continuously at lower than 4,000 rpm. (2 D/C detection logic)	• VSS and/or its circuit • Speedometer cable • ECM

Wiring Diagram



[A]

G50							G49							G51							E31												
7	6	5	4	3	2	1	7	6	5	4	3				2	1									7	6	5	4	3	2	1		
17	16	15	14	13	12	11	10	9	8															17	16	15	14	13	12	11	10	9	8
27	26	25	24	23	22	21	20	19	18															27	26				21	20		19	18
34	33				32	31	30	29	28															34	33				32	31	30	29	28

[A]: ECM connector (View: [a])

A2: VSS ground circuit

2. VSS

A1: VSS signal circuit

1. Speedometer

3. ECM

DTC Confirmation Procedure

WARNING

- When performing a road test, select a place where there is no traffic or possibility of a traffic accident and be very careful during testing to avoid occurrence of an accident.
- Road test should be carried out by 2 persons, a driver and a tester, on a level road.

- 1) Drive vehicle at 60 km/h (37 mph).
- 2) Release accelerator pedal, and keep vehicle coasting for 10 sec. with engine braking applied (fuel cut condition).

DTC Troubleshooting

Step	Action	Yes	No
1	Was "ENGINE DIAG. FLOW TABLE" performed?	Go to Step 2.	Go to "ENGINE DIAG. FLOW TABLE".
2	Does speedometer indicate vehicle speed?	Go to Step 3.	Replace speedometer cable or speedometer.
3	VSS circuit check 1) Turn ignition switch to OFF position and remove speedometer. 2) Check for proper terminal connection to speedometer connectors. 3) If connections are OK, turn ignition switch to ON position. 4) Check that voltage between VSS signal circuit (A1) and ground circuit (A2) is approx. 5 V at speedometer connector. Is it in good condition?	Go to Step 6.	Go to Step 4.

Step	Action	Yes	No
4	VSS circuit check 1) Check that voltage between VSS signal circuit (A1) and ground is approx. 5 V at speedometer connector. Is it in good condition?	Repair or replace VSS ground circuit (A2).	Go to Step 5.
5	VSS circuit check 1) Turn ignition switch to OFF position and disconnect connectors from ECM. 2) Check for proper terminal connection to ECM connectors. 3) If connections are OK, check that VSS signal circuit (A1) is as follows. • Wiring harness resistance of VSS signal circuit between speedometer and ECM connectors is less than 1? • Insulation resistance of VSS signal circuit is infinity between speedometer connector and ground. • Insulation resistance of wire harness is infinity between VSS signal circuit terminal and each other terminal at speedometer connector. Are they in good condition?	Substitute a known-good ECM and recheck.	Repair or replace VSS signal circuit.
6	VSS check 1) Check VSS. Refer to "VSS" in section 6E1 in related manual. Is it in good condition?	Substitute a known-good ECM and recheck.	Replace speedometer.

DTC P0601

DTC Detecting Condition and Trouble Area

DTC detecting condition	Trouble area
DTC P0601: Internal Control Module Memory Check Sum Error Data write error or check sum error. (2 D/C detection logic)	• ECM power supply circuit and/or ground circuit • ECM

System Description

Internal control module is installed in ECM.

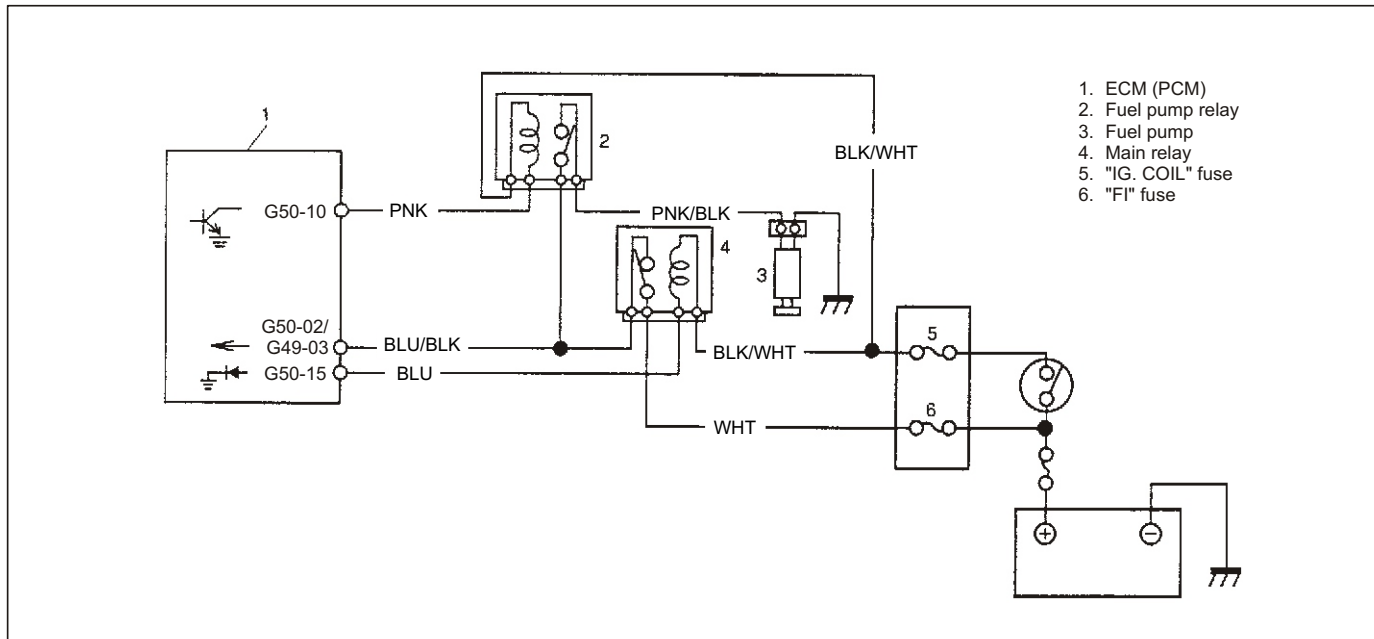
DTC Confirmation Procedure

- 1) Turn ignition switch to ON position.

DTC Troubleshooting

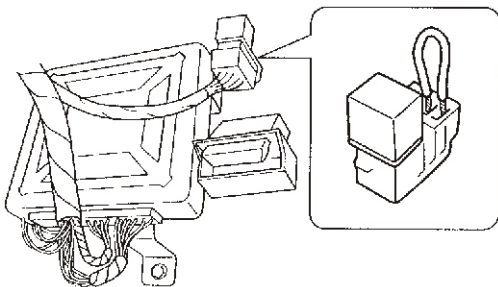
Step	Action	Yes	No
1	DTC recheck 1) Clear DTC. Refer to "DTC Clearance" in this section of related manual. 2) Turn ignition switch to OFF position. 3) Perform DTC confirmation procedure, and check DTC. Is DTC P0601 still detected?	Go to Step 2.	Check for intermittent trouble. Refer to "Intermittent and Poor Connection" in Section 0A of related manual.
2	ECM power and ground circuit check 1) Check ECM power supply circuit and ECM ground circuit. Refer to "A-4 ECM Power and Ground Circuit Check" in this section of related manual. Is it in good condition?	Substitute known-good ECM and recheck.	Repair or replace defective wire harness.

B-1 FUEL PUMP AND ITS CIRCUIT CHECK

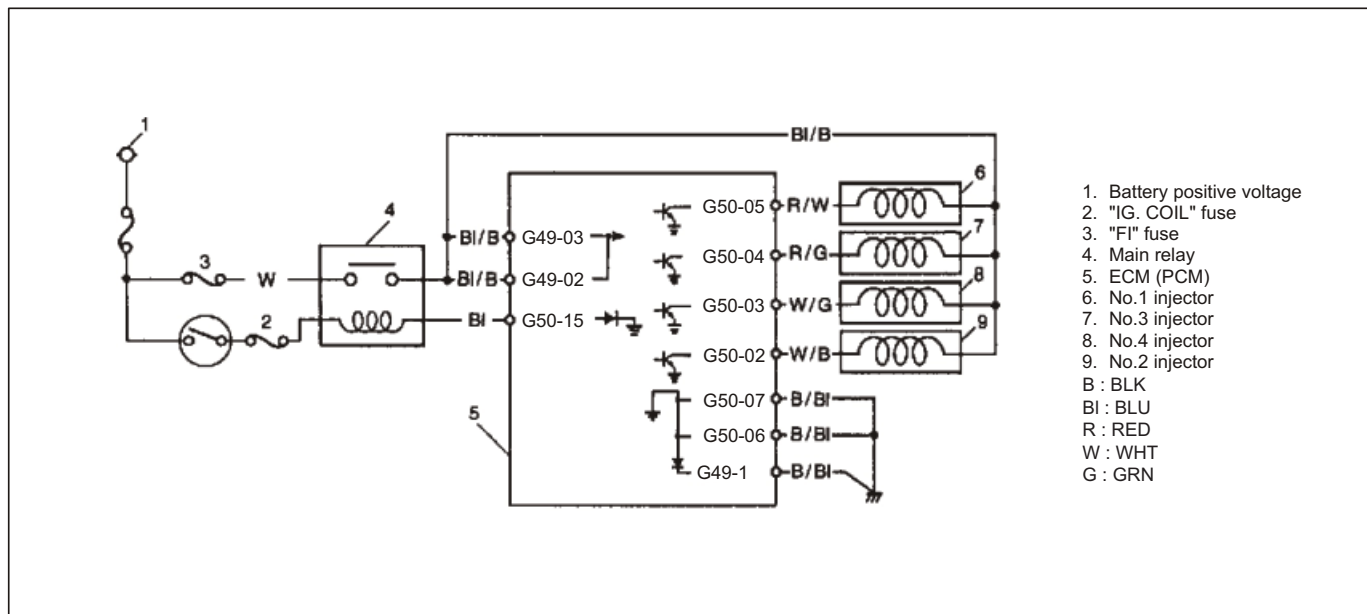


STEP	ACTION	YES	NO
1	Is fuel pump heard to operate 2 seconds after ignition switch ON?	Fuel pump and its circuit are in good condition.	Go to Step 2.
2	1) Remove fuel pump relay from relay box with ignition switch OFF. 2) Connect two terminals of relay connector as shown in figure using service wire. Is fuel pump heard to operate with ignition switch ON?	Go to Step 3.	"BLU/BLK" or "PNK/BLK" wire open, poor fuel pump relay-to-coupler connection or faulty fuel pump.
3	1) Check fuel pump relay, referring to section 6E1 in related manual. Is it in good condition?	Poor fuel pump relay-to-coupler connection, "PNK" or "BLK/WHT" wire open or poor G50-10 connection. If wire and connection are OK, substitute a known good ECM (PCM) and recheck.	Faulty fuel pump relay.

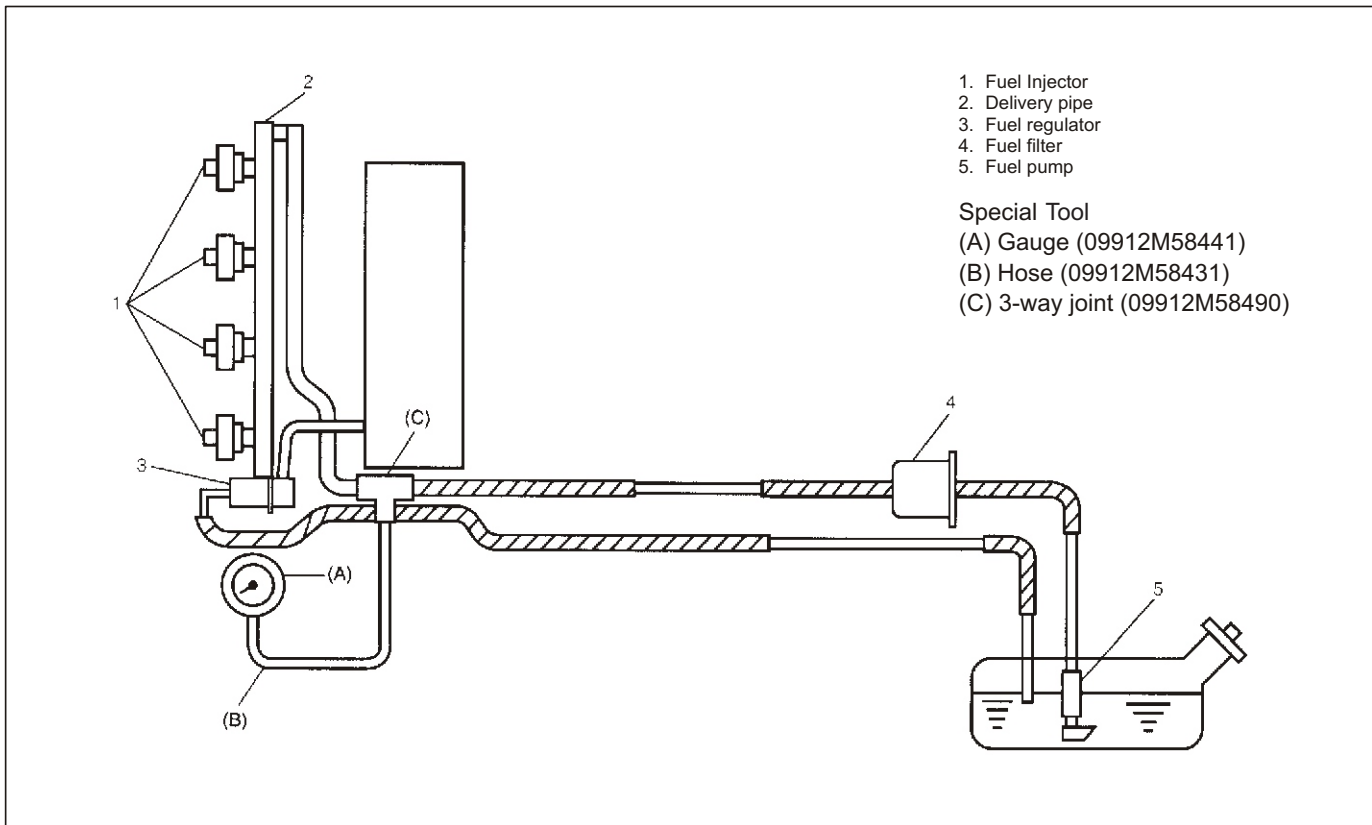
Fig. for STEP 2



B-2 FUEL INJECTOR AND ITS CIRCUIT CHECK



STEP	ACTION	YES	NO
1	Check each injector for operating sound at engine cranking using sound scope. Do all 4 injector make operating sound?	Fuel injector circuit is in good condition.	Go to Step 2.
2	Does none of 4 injectors make operating sound at Step 1?	Go to Step 4.	Go to Step 3.
3	Check fuel injector(s) referring to section 6E1 in related manual. Is it in good condition?	Check coupler connection and wire harness of injector not making operating sound.	Faulty fuel injector(s).
4	Check power circuit of injectors for open and short. Is it in normal condition?	Check all 4 injectors for resistance respectively. If resistance is OK, substitute a known-good ECM (PCM) and recheck.	Power circuit open or short.

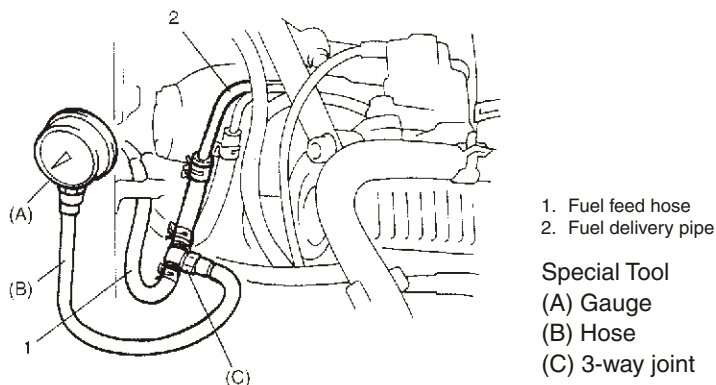
B-3 FUEL PRESSURE CHECK (Page 1 of 2)

STEP	ACTION	YES	NO
1	1) Release fuel pressure from fuel feed line. 2) Install fuel pressure gauge. 3) Check fuel pressure by repeating ignition switch ON and OFF. Is fuel pressure then 270 – 310 kPa (2.7 – 3.1 kg/cm ² , 38.4 – 44.0 psi)?	Go to Step 2.	Go to Step 5.
2	Is 200 kPa (2.0 kg/cm ² , 28.4 psi) or higher fuel pressure retained for 1 minute after fuel pump is stopped at Step 1?	Go to Step 3.	Go to Step 4.
3	1) Start engine and warm it up to normal operating temperature. 2) Keep it running at specified idle speed. Is fuel pressure then within 200 – 240 kPa (2.0 – 2.4 kg/cm ² , 28.4 – 34.1 psi)?	Normal fuel pressure.	Clogged vacuum passage for fuel pressure regulator or faulty fuel pressure regulator.
4	Is there fuel leakage from fuel feed line hose, pipe or their joint?	Fuel leakage from hose, pipe or joint.	Go to Step 10.
5	Was fuel pressure higher than spec. in Step 1?	Go to Step 6.	Go to Step 7.
6	1) Disconnect fuel return hose from fuel pressure regulator and connect new return hose to it. 2) Put the other end of new return hose into approved gasoline container. 3) Operate fuel pump. Is specified fuel pressure obtained then?	Restricted fuel return hose or pipe.	Faulty fuel pressure regulator.

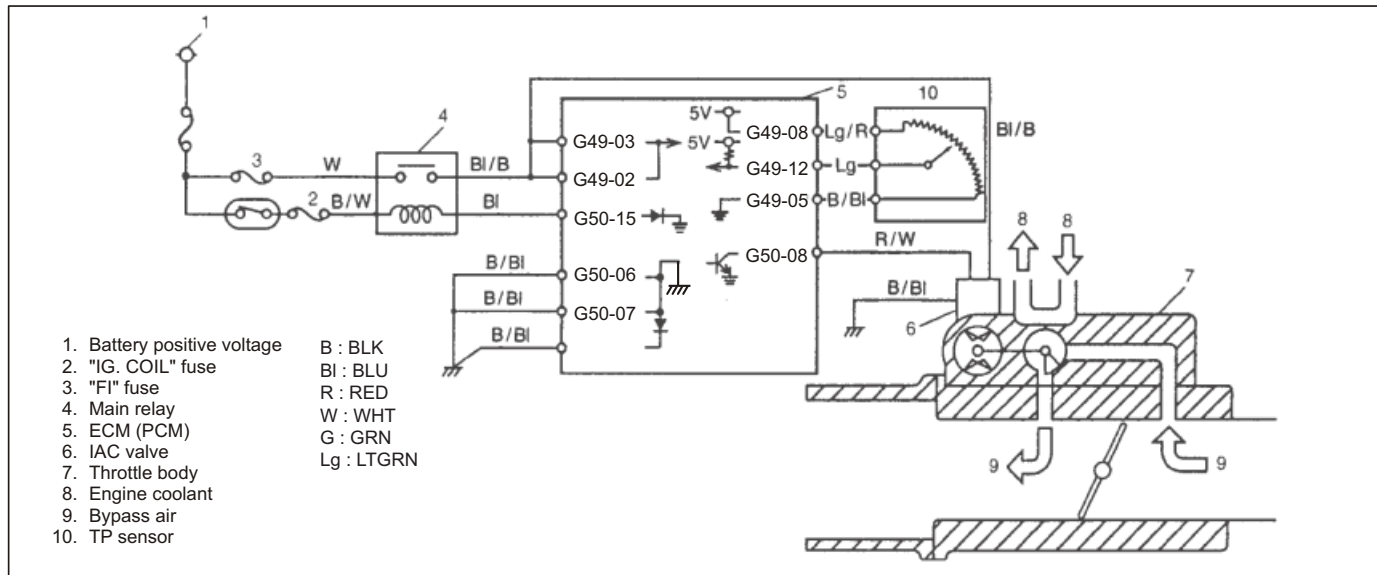
B-3 FUEL PRESSURE CHECK (Page 2 of 2)

STEP	ACTION	YES	NO
7	Was no fuel pressure applied in step 1?	Go to Step 8.	Go to Step 9.
8	With fuel pump operated and fuel return hose blocked by pinching it, is fuel pressure applied?	Faulty fuel pressure regulator.	Shortage of fuel or fuel pump or its circuit malfunction.
9	1) Operate fuel pump. 2) With fuel return hose blocked by pinching it, check fuel pressure. Is it 450 kPa (4.5 kg/cm ² , 63.9 psi) or more?	Faulty fuel pressure regulator.	Clogged fuel filter, restricted fuel feed hose or pipe, Faulty fuel pump or fuel leakage from hose connection in fuel tank.
10	1) Disconnect fuel return hose from pressure regulator and connect new return hose to it. 2) Insert the other end of new return hose into approved gasoline container. 3) Check again if specified pressure is obtained. While doing so, does fuel come out of return hose?	Faulty fuel pressure regulator.	Fuel leakage from injector, Fuel leakage from between injector and delivery pipe, Faulty fuel pump (faulty check valve in fuel pump) or Fuel leakage from fuel pressure regulator diaphragm.

Fig. for STEP 1

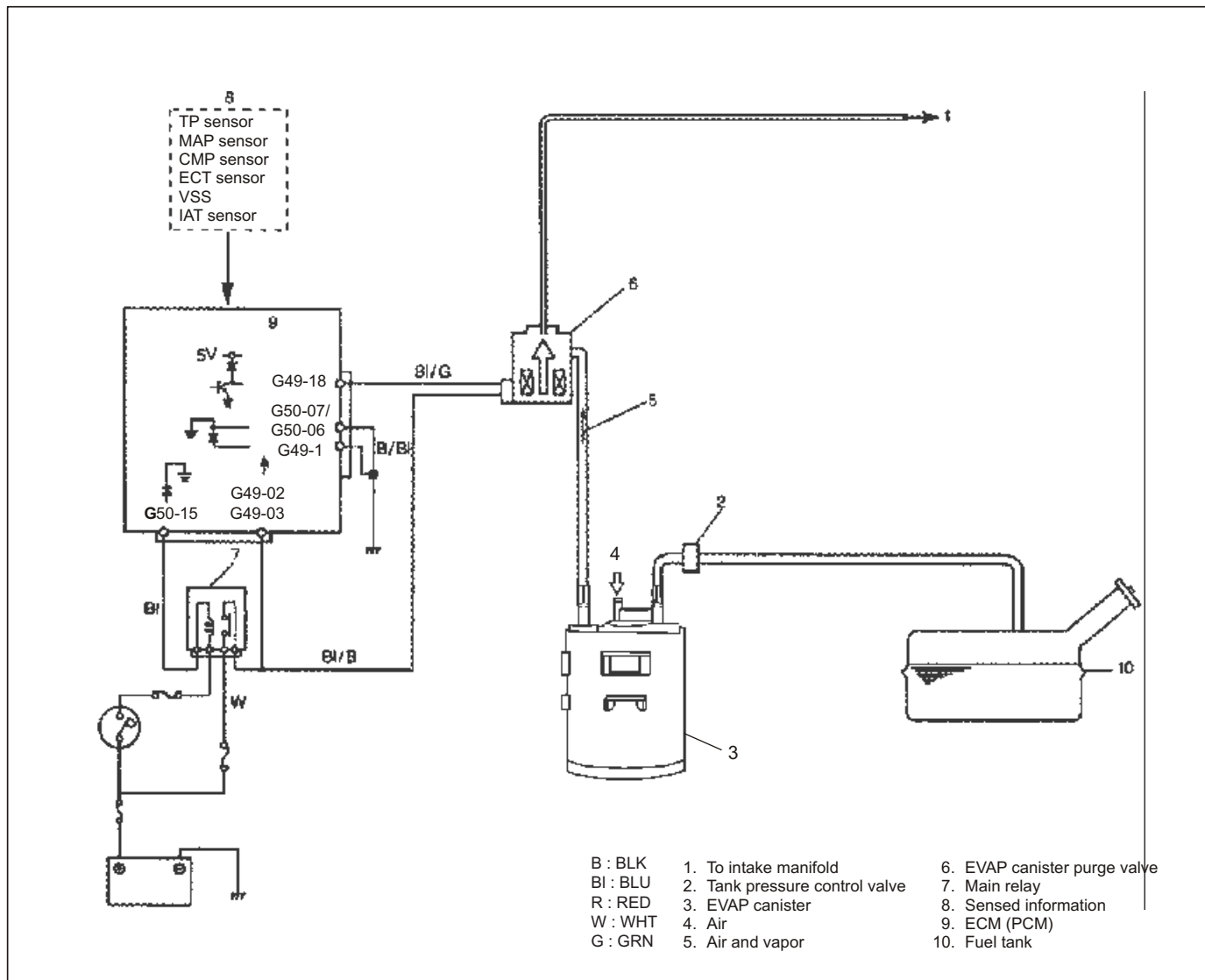


B-4 IDLE AIR CONTROL SYSTEM CHECK

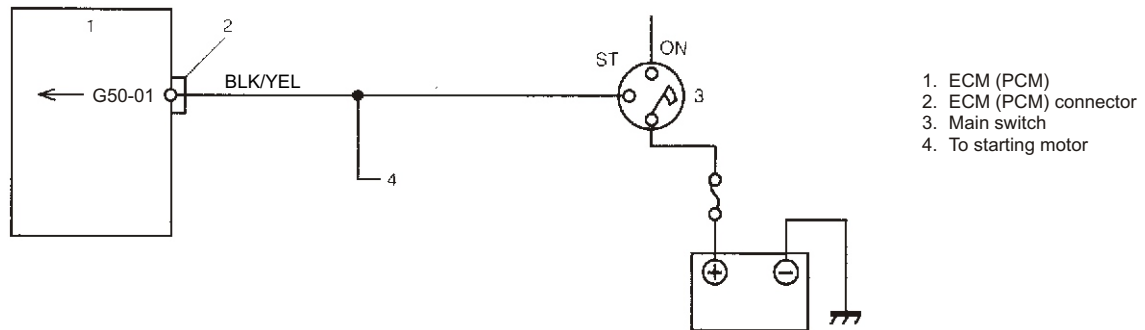


STEP	ACTION	YES	NO
1	Check engine idle speed and IAC duty referring to IDLE SPEED/IAC DUTY INSPECTION on section 6E2 in related manual. Is idle speed within specification?	System is in good condition.	Go to Step 2.
2	1) Check IAC valve referring to IAC VALVE INSPECTION in this section. Is check result in good condition?	Go to Step 3.	Go to Step 6.
3	1) Connect SUZUKI scan tool to DLC. 2) With the ignition switch ON position, check "CLOSED THROT POS" in parameter data list. Throttle valve fully close: ON Throttle valve slight open: OFF Is each check result as specified?	Check for following: EVAP canister purge valve Accessory engine load PCV system Idle air passage.	Go to Step 4.
4	1) With the ignition switch OFF position disconnect negative battery cable for 30 seconds and connect it. 2) Recheck closed throttle position referring to Step 3. Is each check result as specified?	Recheck engine idle speed.	Go to Step 5.
5	1) With the ignition switch ON position, check voltage between G49-12 and ground. Throttle valve fully close: 0.78 – 0.83 V Is each check result as specified?	Substitute a known-good ECM and recheck.	Check TP sensor referring TP SENSOR INSPECTION in this section.
6	1) Check "RED/WHT", "BLU/BLK" and "BLK/BLU" wire for open and short. Are they in good condition?	Go to Step 7.	Repair or replace.
7	1) Substitute a known-good IAC valve. 2) Check IAC valve referring to IAC VALVE INSPECTION in this section. Is check result in good condition?	IAC valve malfunction.	Substitute a known-good ECM and recheck.

B-5 EVAPORATIVE EMISSION CONTROL SYSTEM CHECK

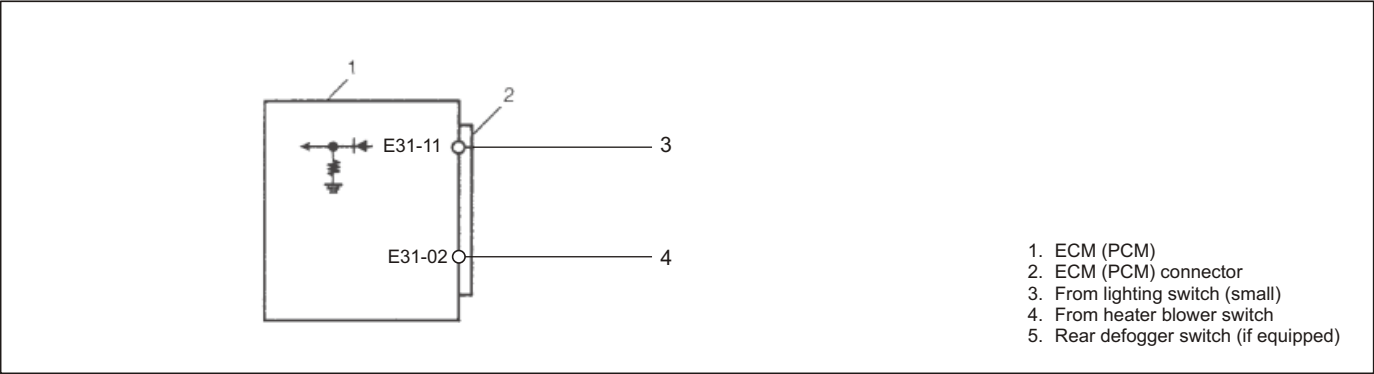


STEP	ACTION	YES	NO
1	Check canister purge system for operation referring to p. 6E3-60. Is it in good condition?	Check EVAP canister referring to p. 6E3-60 and fuel filler cap referring to Section 6C. If OK, system is in good condition.	Go to Step 2.
2	Check vacuum passage, hoses and EVAP canister purge valve referring to p. 6E3-60. Are they in good condition?	• "BI/G" wire open, • "BI/G" wire shorted to ground, • Poor EVAP canister purge valve coupler connection, • Poor "G49-18" connection, • Poor performance of ECT sensor or MAP sensor or TP sensor If none of the above exists, substitute a known-good ECM (PCM) and recheck.	• Vacuum passage clogged, • Vacuum leakage or • Faulty EVAP canister purge valve

B-6 ENGINE START SIGNAL

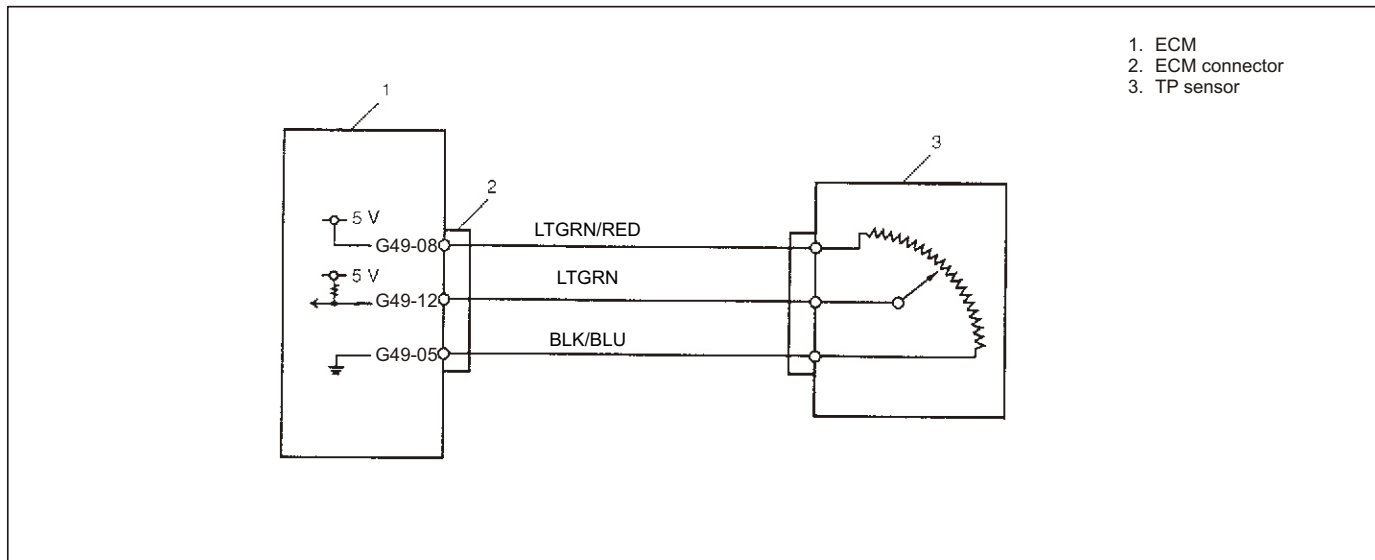
STEP	ACTION	YES	NO
1	1) With ignition switch OFF, disconnect couplers from ECM (PCM). 2) Is 6 – 12 V voltage applied to G50-01 terminal of coupler only when cranking engine.	Engine starter signal circuit is in good condition.	• "BLK/YEL" wire open or • Poor "G50-01" connection

B-9 ELECTRIC LOAD SIGNAL CIRCUITS CHECK



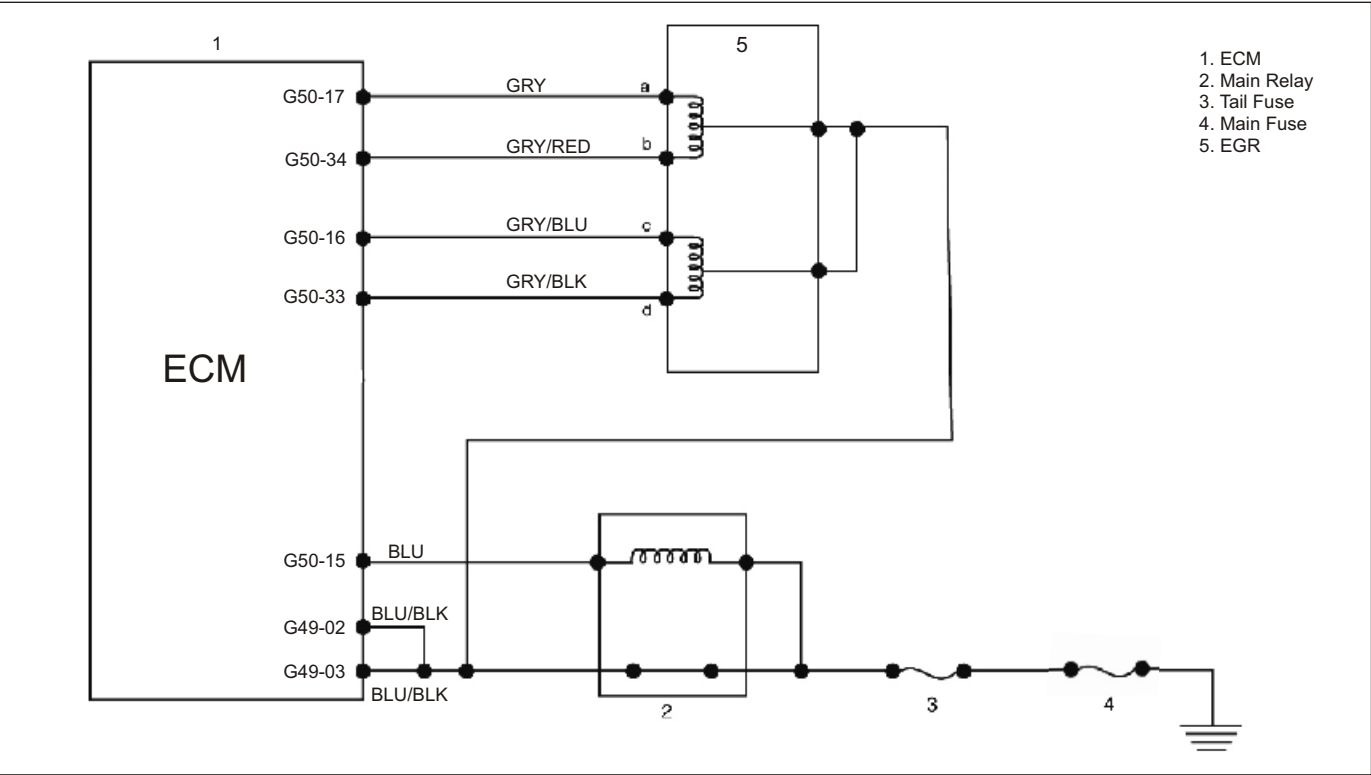
STEP	ACTION	YES	NO				
1	Check voltage at "E31-02" and "E31-11" terminal under each condition given below.<table><tr><td>Small light turned OFF</td><td>1 V or less</td></tr><tr><td>Small light turned ON</td><td>10 – 14 V</td></tr></table> Is check result satisfactory?	Small light turned OFF	1 V or less	Small light turned ON	10 – 14 V	Electric load signal circuit are in good condition.	•"RED/YEL" wire open or short. •"BLU/WHT" wire open or short. •Poor "E31-02" terminal connection •Poor "E31-11" terminal connection
Small light turned OFF	1 V or less						
Small light turned ON	10 – 14 V						

B-10 FUEL CUT OPERATION CHECK



STEP	ACTION	YES	NO
1	Check fuel cut operation referring FUEL CUT OPERATION INSPECTION in this section. Does fuel injector operate as specified?	Fuel cut operation is in good condition.	Go to Step 2.
2	Closed throttle position check: 1) Connect SUZUKI scan tool to DLC. 2) With the ignition switch ON position, check "CLOSED THROT POS" in parameter data list. Throttle valve fully close: ON Throttle valve slight open: OFF Is each check result as specified?	Substitute a known-good ECM and recheck.	Go to Step 3.
3	Closed throttle position check: 1) With the ignition switch OFF position disconnect negative battery cable for 30 seconds and connect it. 2) Recheck closed throttle position referring to Step 2. Is each check result as specified?	Recheck fuel cut operation.	Go to Step 4.
4	TP sensor signal voltage check: 1) With the ignition switch at ON position, check voltage between G49-12 and ground. Throttle valve fully close: 0.78 – 0.83 V Throttle valve slight open: 3.7 – 4.7 V Is each check result as specified?	Substitute a known-good ECM and recheck fuel cut operation.	Check TP sensor referring to TP SENSOR INSPECTION in this section.

B-11 EGR CHECK



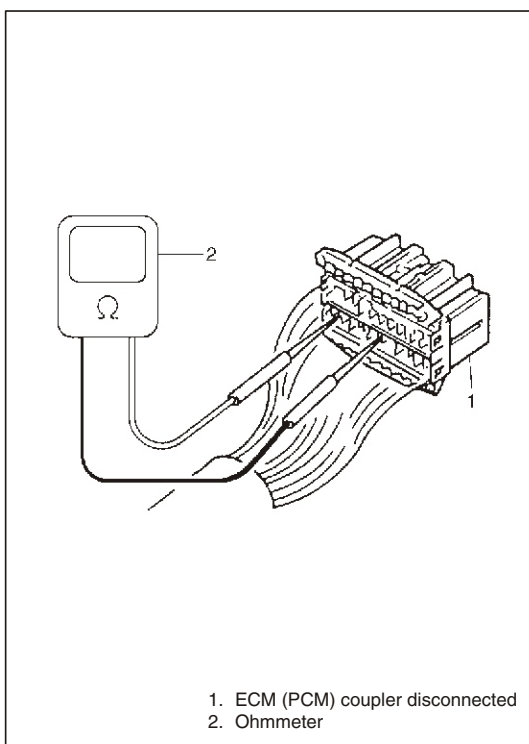
STEP	ACTION	YES	NO
1	1) Check EGR system referring to p.6E3-63. 2) Is it in good condition?	EGR system is in good condition. If wire and connection are OK, intermittent trouble or faulty ECM. Recheck, referring to "Intermittent Trouble" in SECTION 0A.	Go to step 2. ● "GRY", "GRY/RED" wire open. ● "GRY/BLU", "GRY/BLK" wire open. ● Poor "EGR" terminal connection If wire and connection are OK, substitute a known-good ECM

[illegible]

TERMINAL	CIRCUIT	NORMAL VOLTAGE	CONDITION
G50-1	Engine Starting Signal	1.5 v or less	Ignition switch ON
			6 - 12 V While engine cranking
G50-2	Fuel Injector no. 4	10 - 14 V	Ignition switch ON
G50-3	Fuel Injector no. 3	10 - 14 V	Ignition switch ON
G50-4	Fuel Injector no. 2	10 - 14 V	Ignition switch ON
G50-5	Fuel Injector no. 1	10 - 14 V	Ignition switch ON
G50-6	Engine Ground	-----	
G50-7	Engine Ground	-----	
G50-8	IAC Valve	-----	
G50-9	Duty Output Terminal	10 - 14 V	Ignition switch ON
G50-10	Fuel Pump Relay	1 V or less	Ignition switch ON
		1 V or less	For 3 seconds after ignition switch ON or while engine running
G50-11	A/C Compressor magnet clutch relay and condensor fan control relay (with A/C Relay)	10 - 14 V	After 3 seconds from ignition switch ON with engine stopped
		1 V or less	Engine running, A/C compressor and A/C condensor fan : ON
		10 - 14 V	Engine running, A/C compressor and A/C condensor fan : OFF
G50-12	Radiator Fan Control Relay	1 V or less	Engine cooling fan ON
G50-13	Blank		
G50-14	Blank		
G50-15	Main Relay		
G50-16	EGR Terminal 3	10 - 14 V	Ignition switch ON
G50-17	EGR Terminal 1	10 - 14 V	Ignition switch ON
G50-19	Blank		
G50-20	Blank		
G50-21	Blank		
G50-22	Blank		
G50-23	Blank		
G50-24	Blank		
G50-25	Blank		
G50-26	Blank		
G50-27	Blank		
G50-28	Blank		
G50-29	Test Switch Terminal	10 - 14 V	Ignition switch ON
		1 V or less	Ignition switch ON, Test switch terminal grounded
G50-30	Diagnosis Switch Terminal	10 - 14 V	Ignition switch ON
		1 V or less	Ignition switch ON, Test switch terminal grounded
G50-31	Igniter-2		
G50-32	Igniter - 1		
G50-33	EGR Terminal 4	10 - 14 V	Ignition switch ON
G50-34	EGR Terminal 2	1 V or less	Ignition switch ON

TERMINAL	CIRCUIT	NORMAL VOLTAGE	CONDITION
G49-1	Ground		
G49-2	Power Source	10 - 14 V	Ignition switch ON
G49-3	Power Source	10 - 14 V	Ignition switch ON
G49-4	Blank		
G49-5	Sensor Ground		
G49-6	Blank		
G49-7	Oxygen Sensor Heater	10 - 14 V	Ignition switch ON
G49-8	Power Supply for TP Sensor	4.5 - 5.5 V	Ignition switch ON
G49-9	Power Supply for MAP Sensor	4.5 - 5.5 V	Ignition switch ON
G49-10	Blank		
G49-11	MAP sensor	About 3.6 V	Ignition switch ON, engine stop
		About 1 - 3 V	Engine running at idle speed, A/C OFF
G49-12	TP sensor	0.78 - 0.83	Throttle valve at idle position
		3.7 - 4.7 V	Throttle valve at full open position
G49-13	Heated Oxygen Sensor	0.3 - 0.6 V deflection	When engine is running at idle
G49-14	Blank		
G49-15	ECT sensor	2.5 - 3.0 V	Engine coolant temp : at 20 degree C
		0.6 - 0.9 V	Engine coolant temp : at 80 degree C
G49-16	IAT sensor	2.0 - 2.5 V	IAT sensor ambient temp :at 20 degree C
		0.4 - 0.6	IAT sensor ambient temp :at 80 degree C
G49-17	Blank		
G49-18	EVAP canister purge valve	10 - 14 V	Ignition switch ON
G49-19	Blank		
G49-20	Blank		
G49-21	Blank		
G49-22	Blank		
G49-23	Blank		
G49-24	Blank		
G49-25	Blank		
G49-26	Blank		
G49-27	Blank		
G49-28	Blank		
G49-29	Heated oxygen sensor ground	-----	
G49-30	CMP sensor Ground	-----	
G49-31	A/C ON signal from A/C switch equipped)	10 - 14 V	Ignition switch ON, A/C switch OFF, Blower fan (if switch OFF
		2 V or less	Ignition switch ON, A/C switch OFF, Blower fan switch ON
G49-32	CMP sensor (+)	1 V or less	Ignition switch ON
G49-33	CMP sensor (-)	About 0 V	-----
G49-34	Blank		
G49-35	Blank		

TERMINAL	CIRCUIT	NORMAL VOLTAGE	CONDITION
G31-01 To G31-35	Blank		
E31-1	Electric load signal for small	1 V or less	Ignition switch ON, Small light turned OFF and Rear defogger turned light switch and OFF
		10 - 14 V	Ignition switch ON, Small light turned OFF and Rear defogger turned ON
E31-2	Electric load signal for blower fan motor	2 V or less	Ignition switch ON, Blower fan switch : High, Middle or Low position
		10 - 14 V	Ignition switch ON, Blower fan switch : OFF position
E31-3	Blank		
E31-4	Stop light switch (brake pedal switch)	1.5 or less	Brake pedal released (switch OFF), ignition switch ON
		10-14 V	Brake pedal released (switch OFF), ignition switch ON
E31-5	Ignition switch	10 - 14 V	Ignition switch ON
E31-6	Blank		
E31-7	Power source for back-up	10 - 14 V	
E31-8	A/C evaporator temp sensor (with A/C)	2.0 - 2.5 V	A/C ventilator outlet temp : at 20 degree C
E31-9	Blank		
E31-10	Blank		
E31-11	Position lamp switch	1 V or less	Ignition switch ON, Position light turned OFF
		10 - 14 V	Ignition switch ON, Position light turned ON
E31-12	Blank		
E31-13	Blank		
E31-14	VSS (Reed switch)	Indicator deflection repeated between 0-1 V and 4-14 V	Ignition switch ON, Front left tire turned quickly with front right tire locked.
E31-15	Vehicle speed signal to EPS		
E31-16	Malfunctioning Indicator Lamp	About 0.5 or less	Ignition switch ON, engine stops
E31-17	Data Link Connector	10 - 14 V	Engine running
		10 - 14 V	Ignition switch ON
E31-18	Blank		
E31-19	Blank		
E31-20	Blank		
E31-21	Blank		
E31-22	Blank		
E31-23	Blank		
E31-24	Blank		
E31-25	Blank		
E31-26	Sensor ground		
E31-27	Blank		
E31-28	Blank		
E31-29	Blank		
E31-30	Blank		
E31-31	Blank		



RESISTANCE CHECK

- 1) Disconnect ECM (PCM) couplers from ECM (PCM) with ignition switch OFF.

CAUTION:

Never touch terminals of ECM (PCM) itself or connect voltmeter or ohmmeter.

- 2) Check resistance between each pair of terminals of disconnected couplers as listed in following table.

CAUTION:

- Be sure to connect ohmmeter probe from wire harness side of coupler.
- Be sure to turn OFF ignition switch for this check.
- Resistance in table below represents that when parts temperature is 20°C (68°F).

TERMINAL	CIRCUIT	NORMAL RESISTANCE	CONDITION
G50-05 - G49-02	Fuel Injector No.1	11.3 - 13.8 Ω	
G50-04 - G49-02	Fuel injector No.2	11.3 - 13.8 Ω	
G50-03 - G49-02	Fuel Injector No.3	11.3 - 13.8 Ω	
G50-02 - G49-02	Fuel injector No.4	11.3 - 13.8 Ω	
G49-18 - G49-02	EVAP canister purge valve	30 - 34 Ω	
G49-32 - G49-33	CMP sensor	About 230 Ω	-10 - 50° C (14 - 122°F)
G50-10 - E31-07	Fuel pump relay	60 - 150 Ω	Battery disconnected and ignition switch ON
G50-15 - E31-07	Main relay	60 - 150 Ω	Battery disconnected and ignition switch ON
G49-01/G50-06/G50-07 - Body ground	Ground	Continuity	

ON VEHICLE SERVICE

IDLE SPEED/IAC DUTY INSPECTION

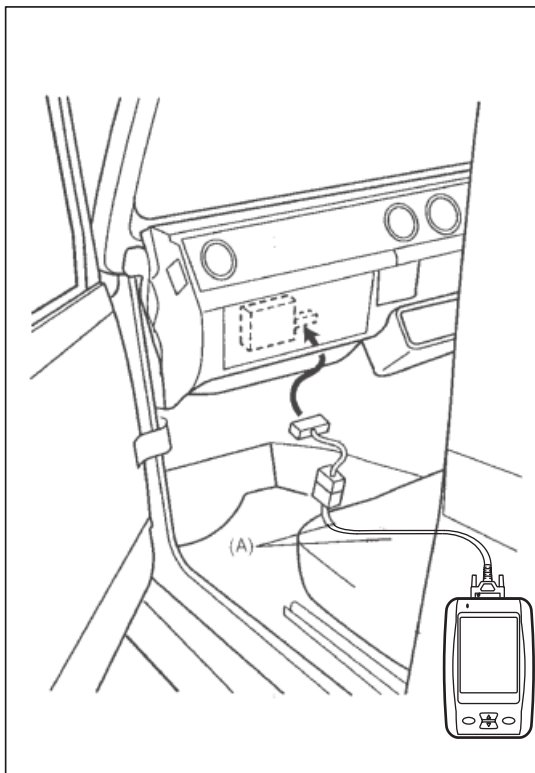
Before idle speed/IAC duty check, make sure of the following.

- Lead wires and hoses of Electronic Fuel Injection system is connected securely.
- Accelerator cable has some play, that is, it is not tight.
- Valve lash is checked and adjusted according to maintenance schedule.
- Ignition timing is within specification.
- All accessories (wipers, heater, lights, A/C, etc.) are out of service.
- Air cleaner has been properly installed and is in good condition.
- No abnormal air inhaling from air intake system.
- ECM (PCM) does not detect any malfunction DTC.

After above items are all confirmed, check idle speed and IAC duty as follows.

NOTE:

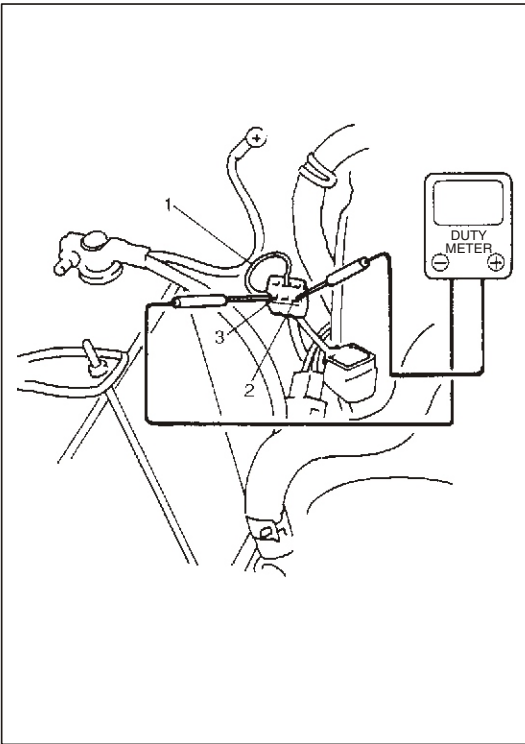
Before starting engine, place transmission gear shift lever in "Neutral" and, set parking brake and block drive wheels.



[Using SUZUKI scan tool]

- 1) Connect SUZUKI scan tool to DLC (1) with ignition switch OFF.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Check idle speed and IAC duty by using "DATA LIST" mode of SUZUKI scan tool.

ENGINE IDLE SPEED AND IAC DUTY
750 ± 50 r/min.
5 – 35 %



[Not using SUZUKI scan tool]

- 1) Using service wire (1), ground diagnosis switch terminal in monitor connector.
- 2) Connect duty meter between duty output terminal (2) and ground terminal (3) of monitor connector.
- 3) Set tachometer.
- 4) Start engine and warm it up to normal operating temperature.
- 5) Confirm that all accessories (light, A/C, blower fan, etc.) are out of service.
- 6) Check idle speed and IAC duty.

If duty and/or idle speed is out of specifications, inspect idle air control system referring to B-4 IDLE AIR CONTROL SYSTEM CHECK in this section.

ENGINE IDLE SPEED AND IAC DUTY

750 ± 50 r/min.

5 – 35 %

NOTE:

- Above duty values are on duty meter indications (high voltage rate).
- IAC duty can be checked roughly by using voltmeter. IAC duty to voltage relation is as follows.

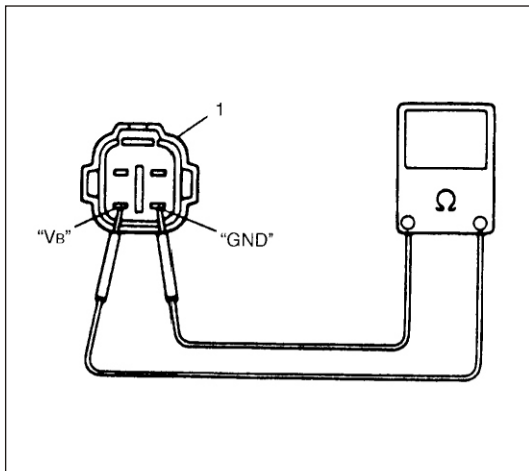
ON DUTY METER INDICATION (%)	OFF DUTY METER INDICATION (%)	VOLTMETER INDICATION (V)
0	100	0
50	50	0.5 x V
100	0	

- "OFF DUTY METER" is such duty meter that indicates approx. 100% when terminal voltage is approx. "0 V".
- "VB" represents battery voltage while engine of vehicle being checked is running.

Heated Oxygen Sensor

OXYGEN SENSOR HEATER INSPECTION

Inspect heated oxygen sensor referring to flow table of diagnostic trouble code No. 14 (P0130).



- 1) Disconnect sensor connector.
- 2) Using ohmmeter, measure resistance between terminals "VB" and "GND" of sensor connector.
If found faulty, replace oxygen sensor.

NOTE:

Temperature of sensor affects resistance value largely.

Make sure that sensor heater is at correct temperature.

Resistance of oxygen sensor heater HO2S 5.0 – 6.4 Ω at 20°C (68°F)

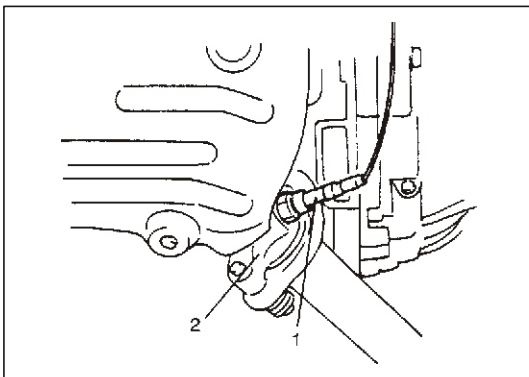
1. Viewed from terminal side

- 3) Connect sensor connector securely.

REMOVAL

WARNING:

To avoid danger of being burned, do not touch exhaust system when system is hot. Oxygen sensor removal should be performed when system is cool.



- 1) Disconnect negative cable at battery.
- 2) Remove HO2S (1) as follows.
 - a) Disconnect connector of HO2S and release its wire harness from clamps, then remove exhaust manifold cover.
 - b) Remove front bumper, if necessary.

INSTALLATION

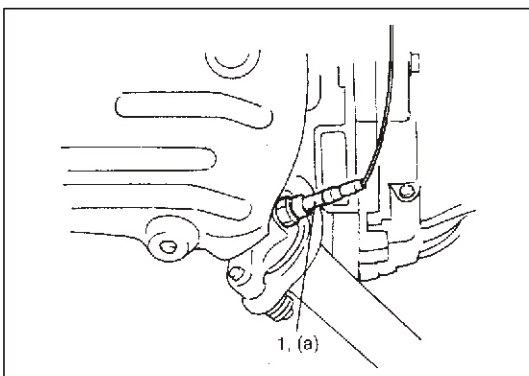
Reverse removal procedure noting the following.

- Tighten heated oxygen sensor to specified torque.

Tightening torque

Heated oxygen sensor: 45 N·m (4.5 kg-m, 32.5 lb-ft)

1. HO2S



- Connect coupler of heated oxygen sensor and clamp wire harness securely.
- After installing heated oxygen sensor, start engine and check that no exhaust gas leakage exists.

EVAP EMISSION CONTROL SYSTEM

EVAP CANISTER PURGE INSPECTION

NOTE:

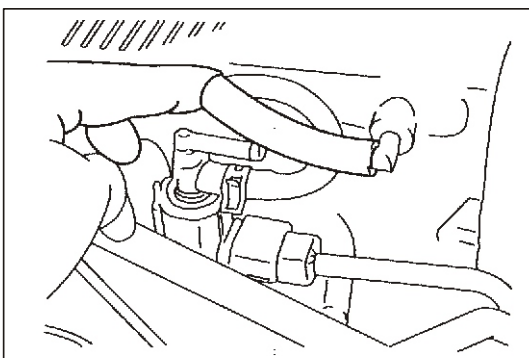
Before inspection, check to make sure that gear shift lever is in neutral position (with A/T model, selector lever in "P" range) and that parking brake lever is pulled all the way up.



- 1) Warm up engine to normal operating temperature.
- 2) Disconnect purge hose from EVAP canister.
- 3) Place finger against the end of disconnected hose and check that vacuum is not felt there when engine is running at idle speed.
- 4) Also check that vacuum is felt when engine speed is increased to higher than about 3000 r/min.

If check result is not satisfactory, check vacuum passage, hoses, EVAP canister purge valve, wire harness and ECM (PCM).

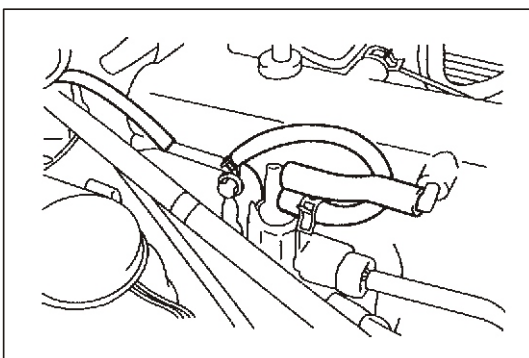
Refer to B-5 EVAPORATIVE EMISSION CONTROL SYSTEM CHECK.



VACUUM PASSAGE INSPECTION

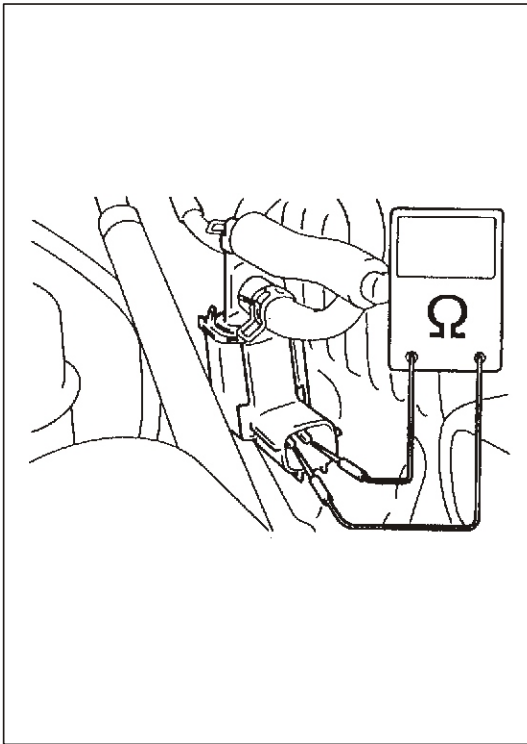
Start engine and run it at idle speed. Disconnect vacuum hose from EVAP canister purge valve. With finger placed against hose disconnected, check that vacuum is applied.

If it is not applied, clean vacuum passage by blowing compressed air.



VACUUM HOSE INSPECTION

Check hoses for connection, leakage, clog and deterioration. Replace as necessary.



EVAP CANISTER PURGE VALVE

INSPECTION

[Using SUZUKI scan tool]

WARNING:

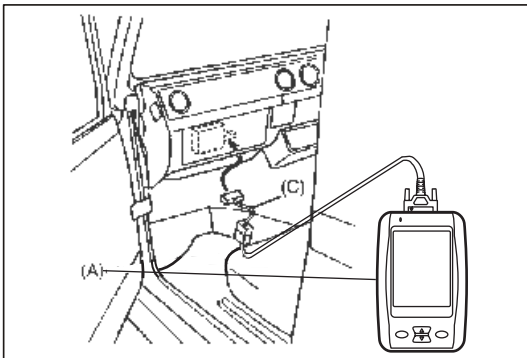
Do not suck the air through valve. Fuel vapor inside valve is harmful.

- 1) With ignition switch OFF, disconnect coupler from EVAP canister purge valve.
- 2) Check resistance between two terminals of EVAP canister purge valve.

Resistance of EVAP canister purge valve:

30 – 34 Ω at 20°C (68°F)

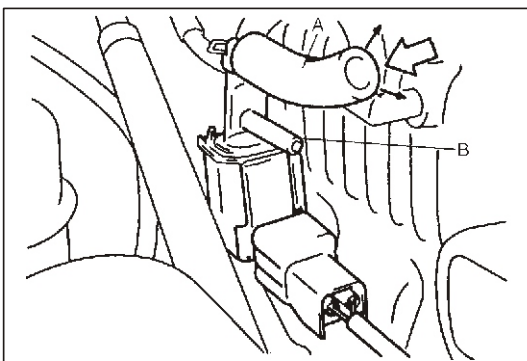
If resistance is as specified, proceed to next operation check. If not, replace.



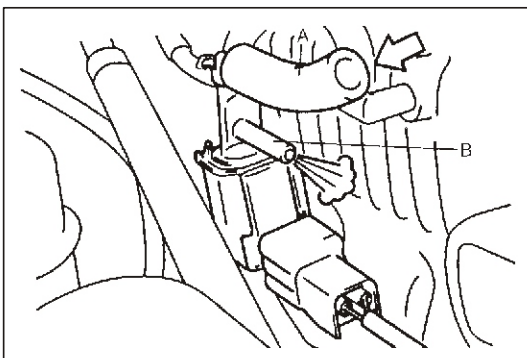
- 3) Connect coupler to EVAP canister purge valve.
- 4) Connect SUZUKI scan tool to DLC with ignition switch OFF.

Special Tool

(A) 99000 M24120 – 630 (Suzuki Scan Tool)

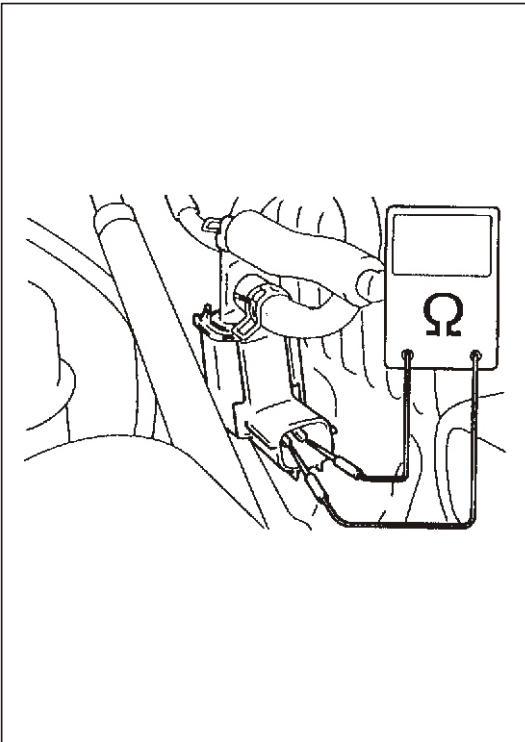


- 5) Disconnect vacuum hoses from intake manifold.
Blow into hose "A". Air should not come out of nozzle "B".



- 6) Open EVAP canister purge valve by executing "CANI PURGE VAL" under "MISC TEST" mode of SUZUKI scan tool with ignition switch ON. In this state, blow hose "A".
Air should come out of nozzle "B".
If check result is not as described, check wire harnesses for open or short. If it is in good condition, replace EVAP canister purge valve and recheck.

7) Connect vacuum hoses.



[Not using SUZUKI scan tool]

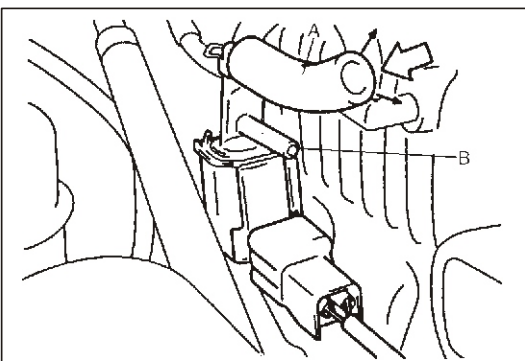
WARNING:

Do not suck the air through valve. Fuel vapor inside valve is harmful.

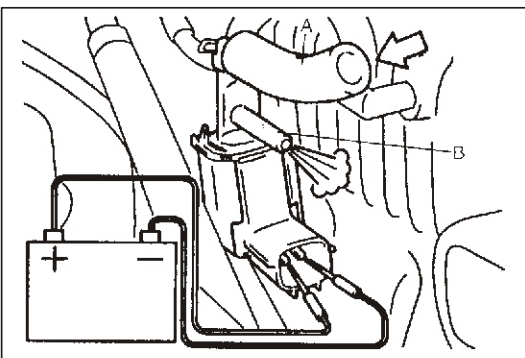
- 1) With ignition switch OFF, disconnect coupler from EVAP canister purge valve.
- 2) Check resistance between two terminals of EVAP canister purge valve.

Resistance of EVAP canister purge valve:
30 – 34 Ω at 20° C (68°F)

If resistance is as specified, proceed to next operation check. If not, replace.



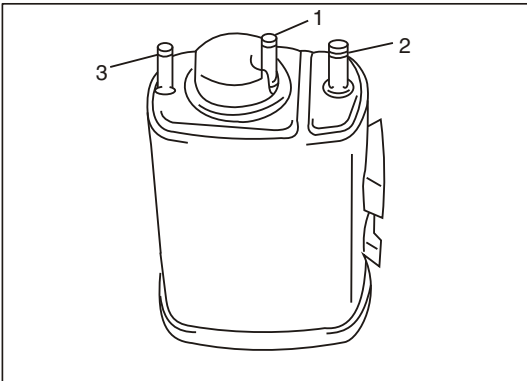
- 3) Disconnect vacuum hoses from intake manifold and its pipe.
- 4) Blow into hose "A". Air should not come out of hose "B".



- 5) Disconnect connector from EVAP canister purge valve. Connect 12 V-battery to EVAP canister purge valve terminals. In this state, blow hose "A". Air should come out of hose "B". If check result is not as described, replace EVAP canister purge valve.

- 6) Connect vacuum hoses.
- 7) Connect EVAP canister purge valve coupler securely.

EVAP CANISTER INSPECTION



WARNING:

DO NOT SUCK nozzles on EVAP canister. Fuel vapor inside EVAP canister is harmful.

- 1) Outside of EVAP canister visually.
- 2) Disconnect vacuum hoses from EVAP canister.
- 3) Check that there should be no restriction of flow through purge pipe (1) and air pipe (2) when air is blown into tank pipe (3).

If any faulty condition is found in above inspection replace.

EGR SYSTEM

SYSTEM INSPECTION

- 1) Connect SUZUKI scan tool to DLC with ignition switch OFF.
- 2) Turn ignition switch ON and then select "DATA LIST" mode on scan tool.
- 3) Make sure that vehicle condition is as following.
 - Vehicle speed = 0 KPH
 - Engine coolant temp. ≥ 80 degree celcius.
 - Engine speed ≤ 3000 rpm
- 4) Clear DTC by using "CLEAR INFO" mode.
- 5) With engine idling (without depressing accelerator pedal), open EGR valve by using "STEP EGR" mode in "MISC TEST" menu. In this state, according as EGR valve opening increases engine idle speed drops. If not, possible cause is clogged EGR gas passage, stuck or faulty EGR valve, poor performance of ECT sensor or TP sensor or DTC and/or pending DTC is (are) stored in ECM (PCM) memory.

Step EGR	
Step EGR Flow Duty	21%
EGR Valve (con)	23%
Engine Speed	810 RPM ▲
Desired Idle	800 RPM
IAC Flow Duty	20.0%
Ignition Advance	11.5% BTDC
Close Throttle Pos	ON

1. SUZUKI scan tool display
2. EGR valve opening (O: Close, 100: Full Open)

REMOVAL

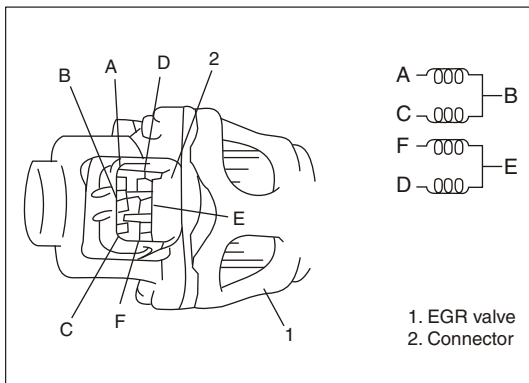
- 1) Disconnect negative cable at battery.
- 2) Disconnect EGR valve coupler.
- 3) Remove EGR valve and gasket from intake manifold.

INSPECTION

- 1) Check resistance between following terminals of EGR each pair.

Terminal	Standard resistance
A - B C - B F - E D - E	20 - 24 Ω

If found faulty, replace EGR valve assy.



- 2) Remove carbon from EGR valve gas passage.

NOTE:

Do not use any sharp-edged tool to remove carbon.

Be careful not to damage or bend EGR valve, valve seat rod.

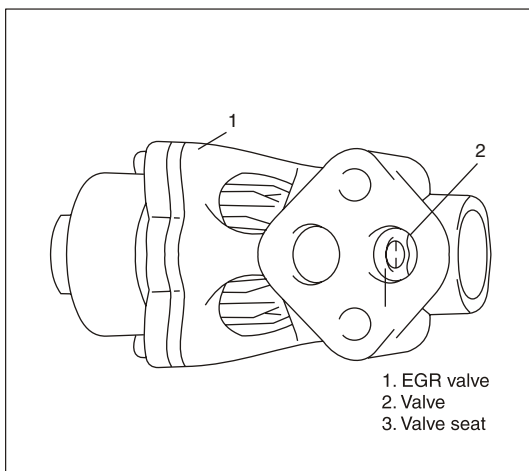
- 3) Inspect valve, valve seat and rod for fault, cracks, bend or damage.

If found faulty, replace EGR valve assembly.

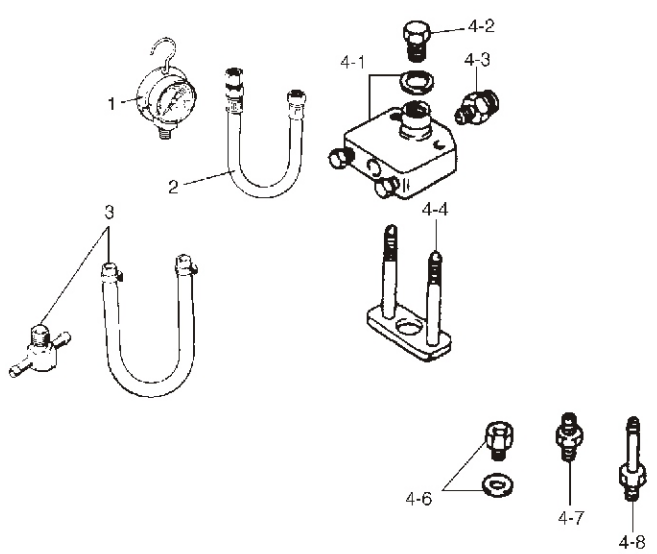
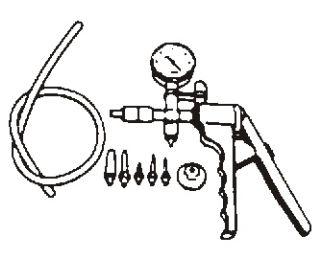
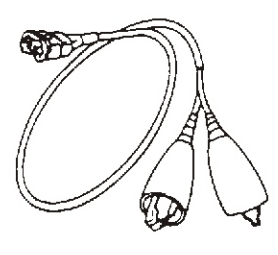
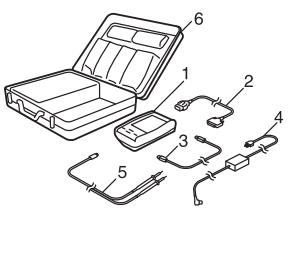
INSTALLATION

Reverse removal procedure noting following.

- Clean mating surface of valve and intake manifold.
- Use new gasket.

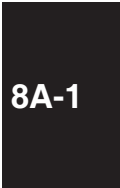


SPECIAL TOOLS

 1. Pressure gauge 09912M58441 2. Pressure hose 09912M58431 3. 3-way joint & hose 09912M58490 4. Checking tool set 09912M58421 4-1. Tool body & washer 4-2. Body plug 4-3. Body attachment 4-4. Holder 4-5. Return hose & clamp 4-6. Body attachment-2 & washer 4-7. Hose attachment-1 4-8. Hose attachment-2		
 09917M47010 Vacuum pump gauge	 09930M88530 Injector test lead	SUZUKI scan tool (SUZUKI-SDT) — This kit includes following items. 1. SUZUKI-SDT 2. DLC3 cable 3. USB cable 4. AC/DC power supply 5. Voltage meter probe 6. Storage case 

SECTION 8A-1

HOW TO USE THIS MANUAL



CONTENTS

Manual Contents and Description 8A-1-2

Cautions in Servicing 8A-1-3

Symbols and Marks 8A-1-6

Abbreviations 8A-1-7

How to Read Connector Layout Diagram (SECTION 8A-3) 8A-1-8

Indication of Connectors and How to Read them 8A-1-9

How to Read Installation Positions of Single Unit Parts (SECTION 8A-4) 8A-1-11

How to Read Ground Point (SECTION 8A-5) 8A-1-12

How to Read Power Supply Diagram (SECTION 8A-6) 8A-1-13

How to Read System Circuit Diagram (SECTION 8A-7) 8A-1-14

How to Read List of Connectors (SECTION 8A-8) 8A-1-16

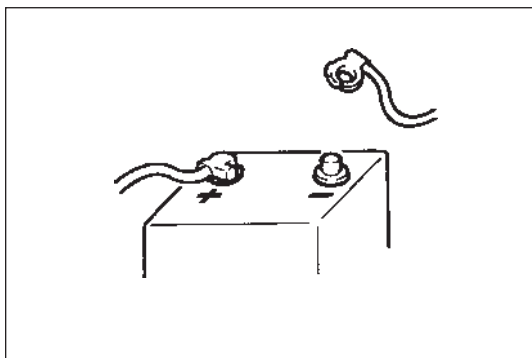
MANUAL CONTENTS AND DESCRIPTION

This manual consists of diagrams showing the harness routing, connector layout, installation positions of single unit parts (fuse, relay, control unit), ground points, power circuit, system circuit and list of connectors.

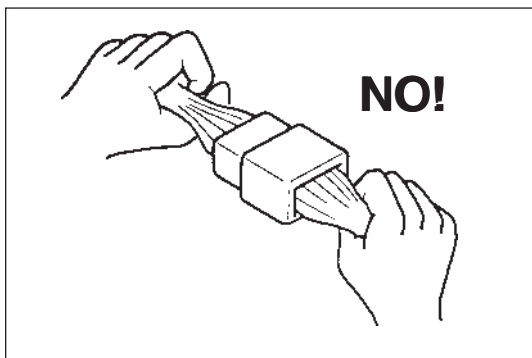
SECTION		DESCRIPTION
Connector Layout Diagram	8A-3	Arrangement of connectors used in this vehicle is shown in relation with the wiring harness by using symbols in illustration.
Installation Positions of Single Unit Parts	8A-4	Positions where each fuse, relay and control unit are installed in this vehicle are shown.
Ground Point	8A-5	Points on the body where grounding is made are shown.
Power Supply Diagram	8A-6	Electric flow passage from the positive terminal of the battery to the main fuse and each fuse in the fuse box are shown and names of main systems that apply a load to each fuse are indicated.
System Circuit Diagram	8A-7	Individual circuit from the fuse to the ground of each system is shown. The circuit diagram is designed so as to show the electric flow from the top to the bottom in it.
List of Connectors	8A-8	Shapes of connectors used in this vehicle and arrangements of their pins are shown.

CAUTIONS IN SERVICING

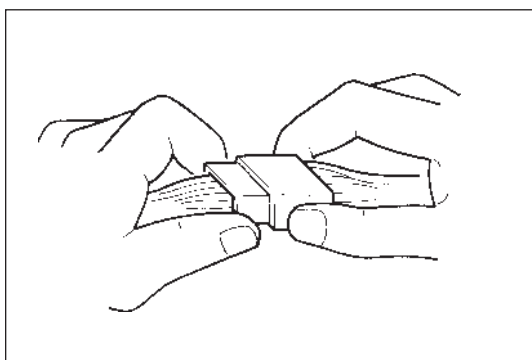
When performing works related to electric systems, observe following cautions for the purpose of protection of electrical parts and prevention of a fire from occurrence.



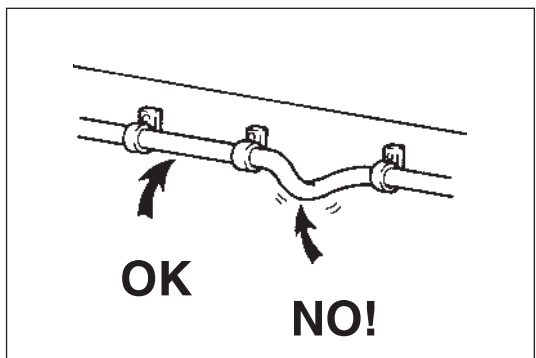
- When removing the battery from the vehicle or disconnecting the cable from the battery terminals for inspection or service works on the electric systems, always confirm first that the ignition switch and all the other switches have been turned OFF. Otherwise, the semi-conductor part may be damaged.
- When disconnecting cables from the battery, be sure to disconnect the one from the negative (-) terminal first and then the other from the positive (+) terminal.
- Reverse the above order when connecting the cables to the battery terminals.



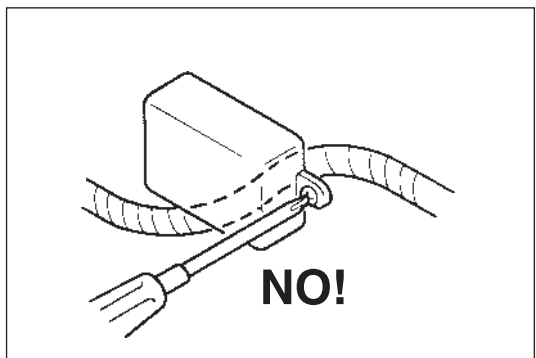
- When disconnecting connectors, never pull the wiring harnesses. Unlock the connector lock first and then pull them apart by holding connectors themselves.



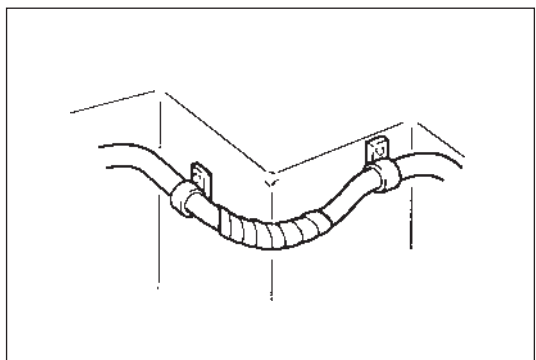
- When connecting connectors, also hold connectors and put them together until they lock securely (a click is heard).



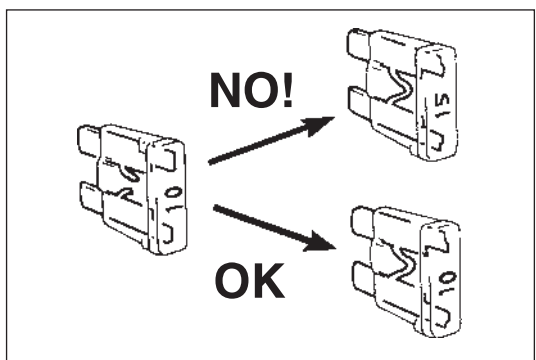
- When installing the wiring harness, fix it with clamps so that no slack is left.



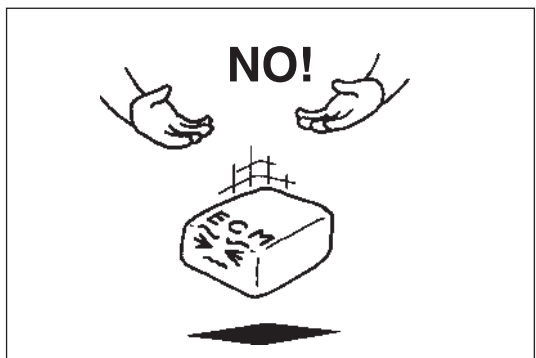
- When installing vehicle parts, be careful so that the wiring harness is not interfered with or caught by any other part.



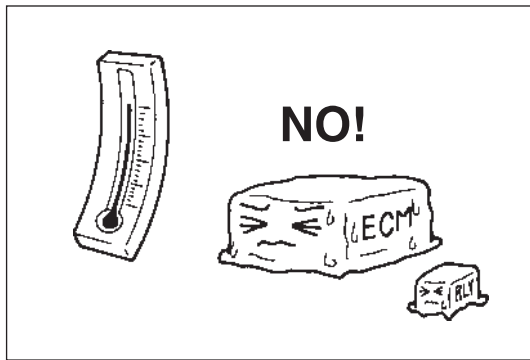
- To avoid damage to the harness, protect its part which may contact against a part forming a sharp angle by winding tape or the like around it.



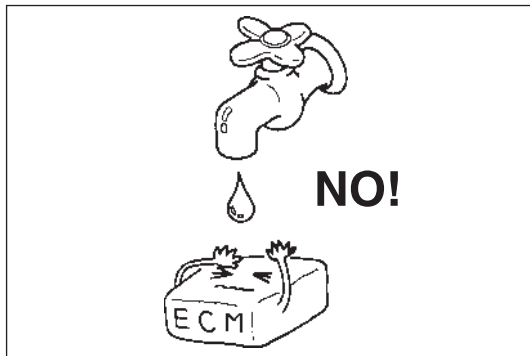
- When replacing a fuse, make sure to use a fuse of the specified capacity. Use of a fuse with a larger capacity will cause a damage to the electrical parts and a fire.



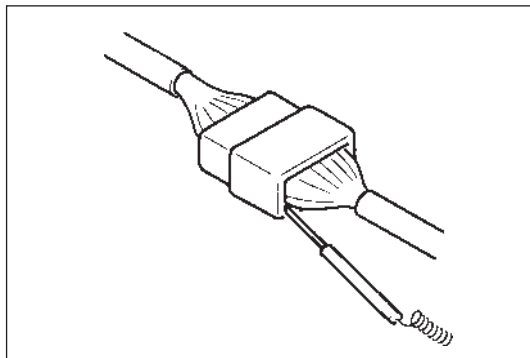
- Always be careful not to handle electrical parts (computer, relay, etc.) in a rough manner or drop them.



- When performing a work that produces a heat exceeding 80°C in the vicinity of the electrical parts, remove the heat sensitive electrical part(s) beforehand.



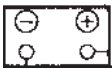
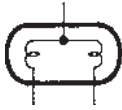
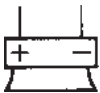
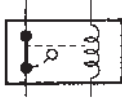
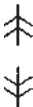
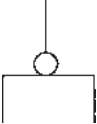
- Use care not to expose connectors and electrical parts to water which will be a cause of a trouble.



- When using a tester for checking continuity or measuring voltage, be sure to insert the tester probe from the wire harness side.

SYMBOLS AND MARKS

In the diagrams of this manual, each equipments are represented by the symbols and marks as shown below.

Battery	Ground		Normal Fuse	Slow blow fuse
				
Circuit breaker	Coil, Solenoid	Heater	Bulb	
				
Cigarette lighter	Motor	Pump	Horn	Speaker
				
Buzzer	Chime	Condenser	Thermistor	Reed switch
				
Resistance	Variable resistance		Transistor	
			 NPN	 PNP
Photo transistor	Diode	Reference (zener) diode	Light emitting diode	Photo diode
				
Piezoelectric element	Harness		Relay	
	 (Connected)	 (Not connected)	 Normal open relay	 Normal closed relay
Connector	Switch		"O" Type terminal	
				

ABBREVIATIONS

Listed below are the abbreviations as used in this manual and their full terms.

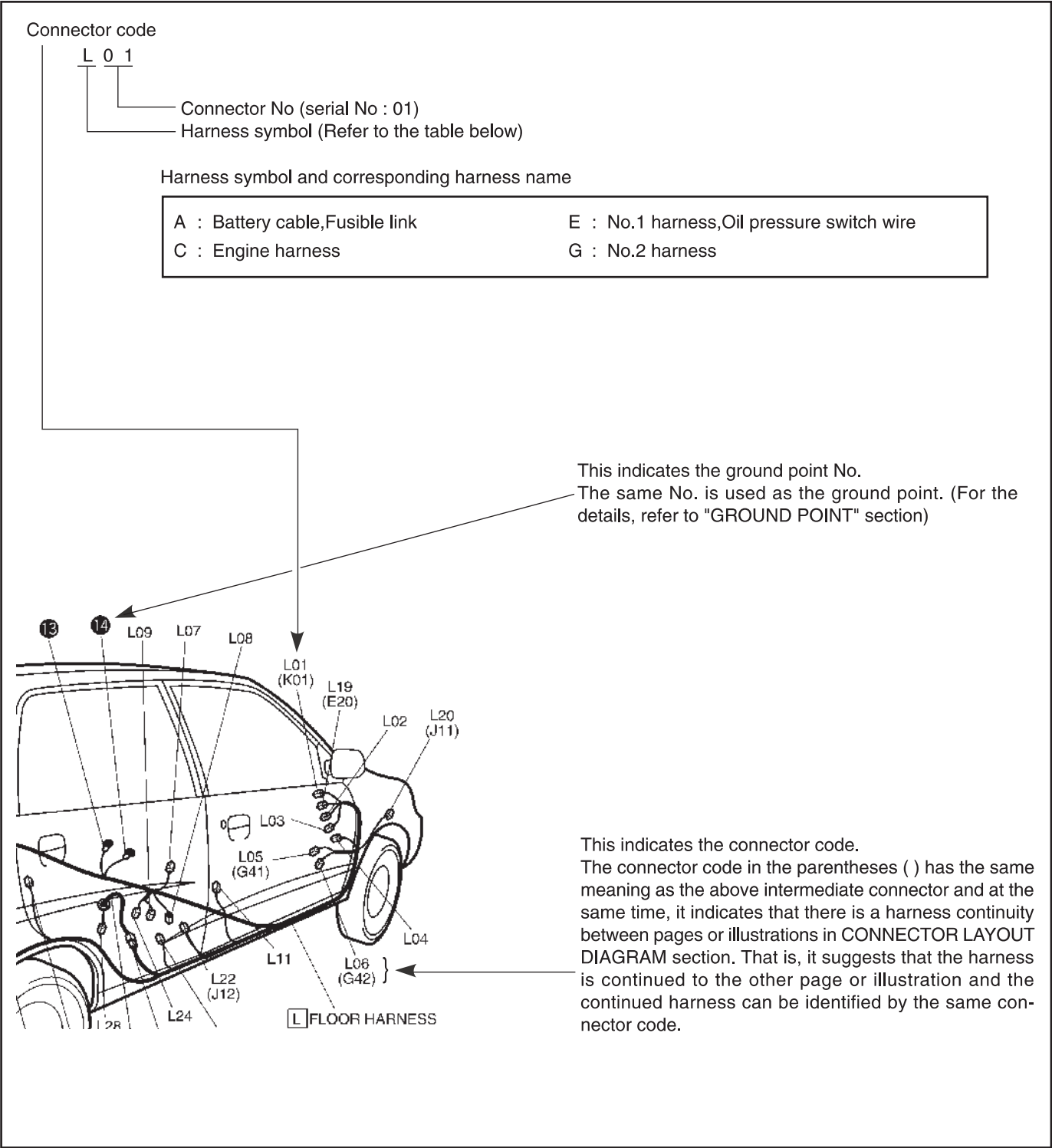
Abbreviation	Full term	Abbreviation	Full term
2WD	2 wheel drive vehicles	ILL	Illumination
4WD	4 wheel drive vehicles	IND	Indicator
A/C	Air conditioning	J/C	Joint connector
A/T	Automatic transmission	LH (D)	Left hand (drive vehicle)
ACC	Accessory	LO	Low
CKP	Crank shaft position	MAP	Manifold absolute pressure
CMP	Camshaft position	M/T	Manual transmission
DLC	Data link connector	P/N	Power/Normal
DRL	Daytime running light (If equipped)	RH (D)	Right hand (drive vehicle)
ECT	Engine coolant temperature	ST	Starter
EGR	Exhaust gas recirculation	TCC	Torque converter clutch
HI	High	W/S	Weld splice
IAC	Idle air control	P/S	Power steering
IAT	Intake air temperature	INT	Intermittent
TCM	Transmission control module	O/D	Over drive
IG	Ignition	VSV	Vacuum switching valve
2VALVE	2VALVE ENGINE MODEL	4VALVE	4VALVE ENGINE MODEL

HOW TO READ CONNECTOR LAYOUT DIAGRAM

When necessary to know the location of an electrical part or an intermediate connector, it is easily possible to retrieve it by this diagram.

 First consult "SYSTEM CIRCUIT DIAGRAM" section or connector table at the right hand pages of this section for the questioned connector code. Second refer to the diagrams of this section and look for the same code.

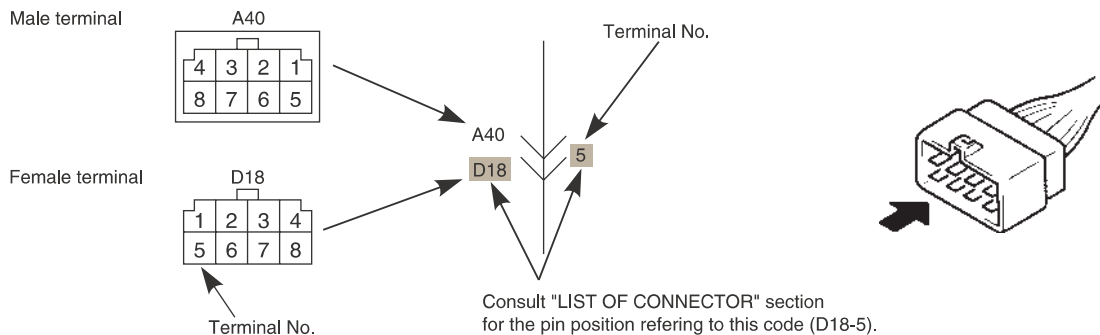
 More information on use of the code is illustrated below.



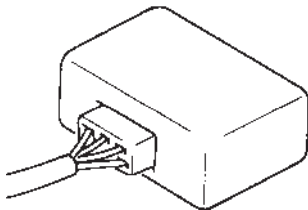
INDICATION OF CONNECTORS AND HOW TO READ THEM

The connectors are indicated as shown below in "SYSTEM CIRCUIT DIAGRAM" section. For the shape and pin arrangement of each connector used in this manual, refer to "LIST OF CONNECTORS" section. Described below are how they are indicated and how to read them.

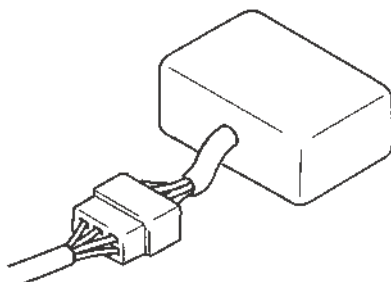
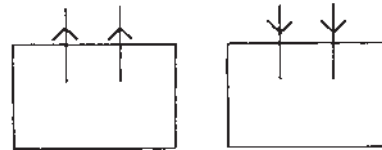
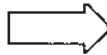
- The male terminal and female terminal are identified by a double enclosure and a single one respectively.
 - The intermediate connector which connects harnesses is shown by both shapes of the male terminal and the female terminal but the connector to be connected directly to the equipment is shown by the shape of the connector on the harness side.
 - The connectors described in this manual are always "harness side connectors" which are viewed from the direction as shown at the right..



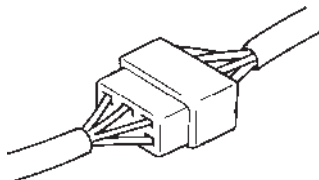
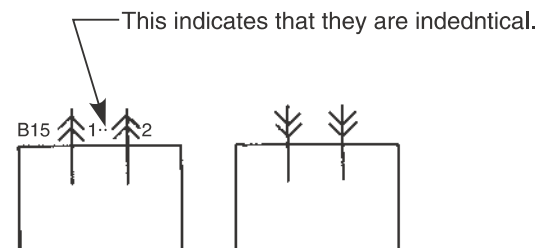
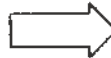
- There are three types of connectors with respect to the way it is connected and each type is illustrated as shown below.



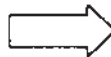
- To be inserted directly into equipment



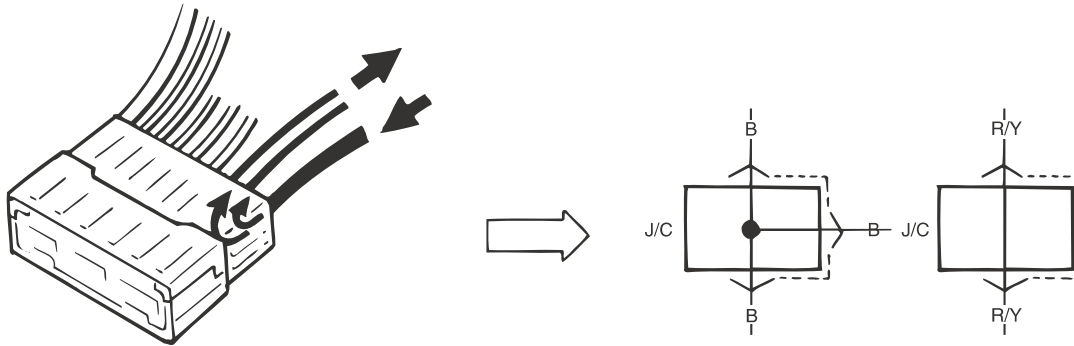
- To be connected with harness connector of equipment



- To connect between harnesses (intermediate connector)



3. · Joint connectors (if equipped) divide one wire into several different wires or combine several different wires into one wire.
 · The joint connector is illustrated below.



How to Read Connector Codes and Pin Nos. (How to Use Manual) :

It is possible to retrieve the location and shape of each connector from the connector code indicated in "SYSTEM CIRCUIT DIAGRAM" section and the position of each pin from the connector pin No.

*To retrieve location of connector :

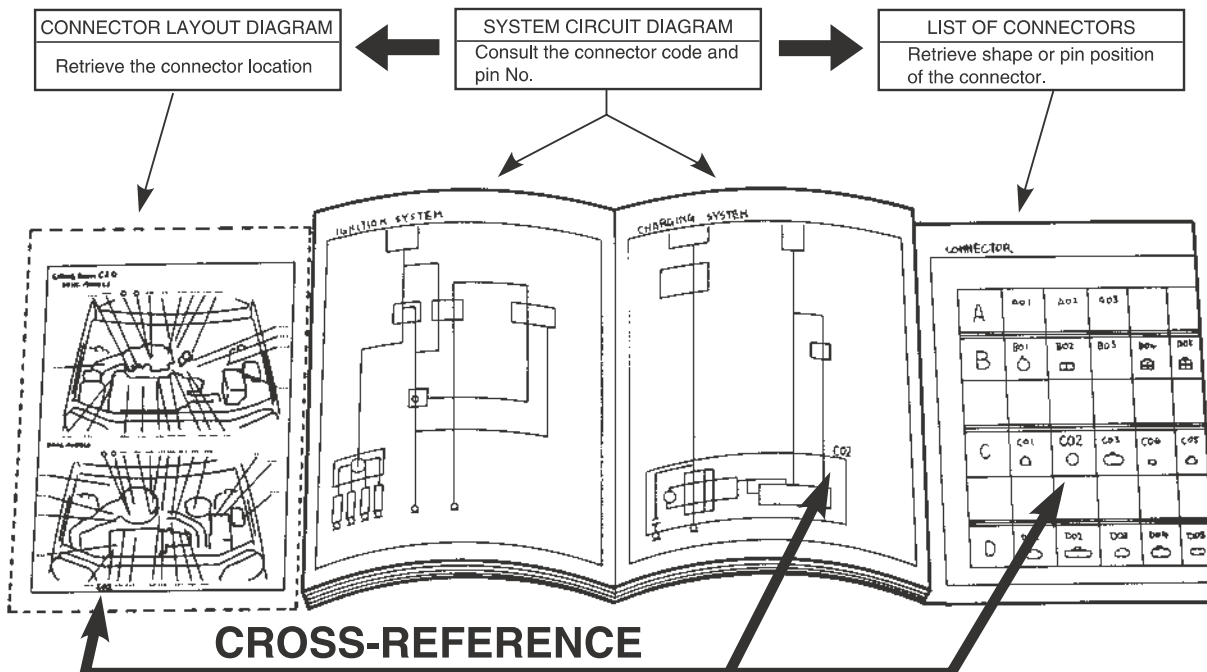
Open "SYSTEM CIRCUIT DIAGRAM" section to consult the connector code of the questioned connector. Then, refer to "CONNECTOR LAYOUT DIAGRAM" section and look for the same code as the connector code in question. The place where the code is found is the location of that connector.

*To retrieve shape or pin No.

Open "SYSTEM CIRCUIT DIAGRAM" section to consult the connector code and pin No. of the questioned connector. Then, refer to "LIST OF CONNECTORS" section as shown at the right in the figure below and look for the desired connector code under which the shape of that connector is shown. This method is convenient when locating the connector in question among similar connectors. Also, by using this page, it is possible to find the position of each pin from the connector pin No. provided in "SYSTEM CIRCUIT DIAGRAM" section.

It is helpful when retrieving pin position in the connector for checking continuity between pins.

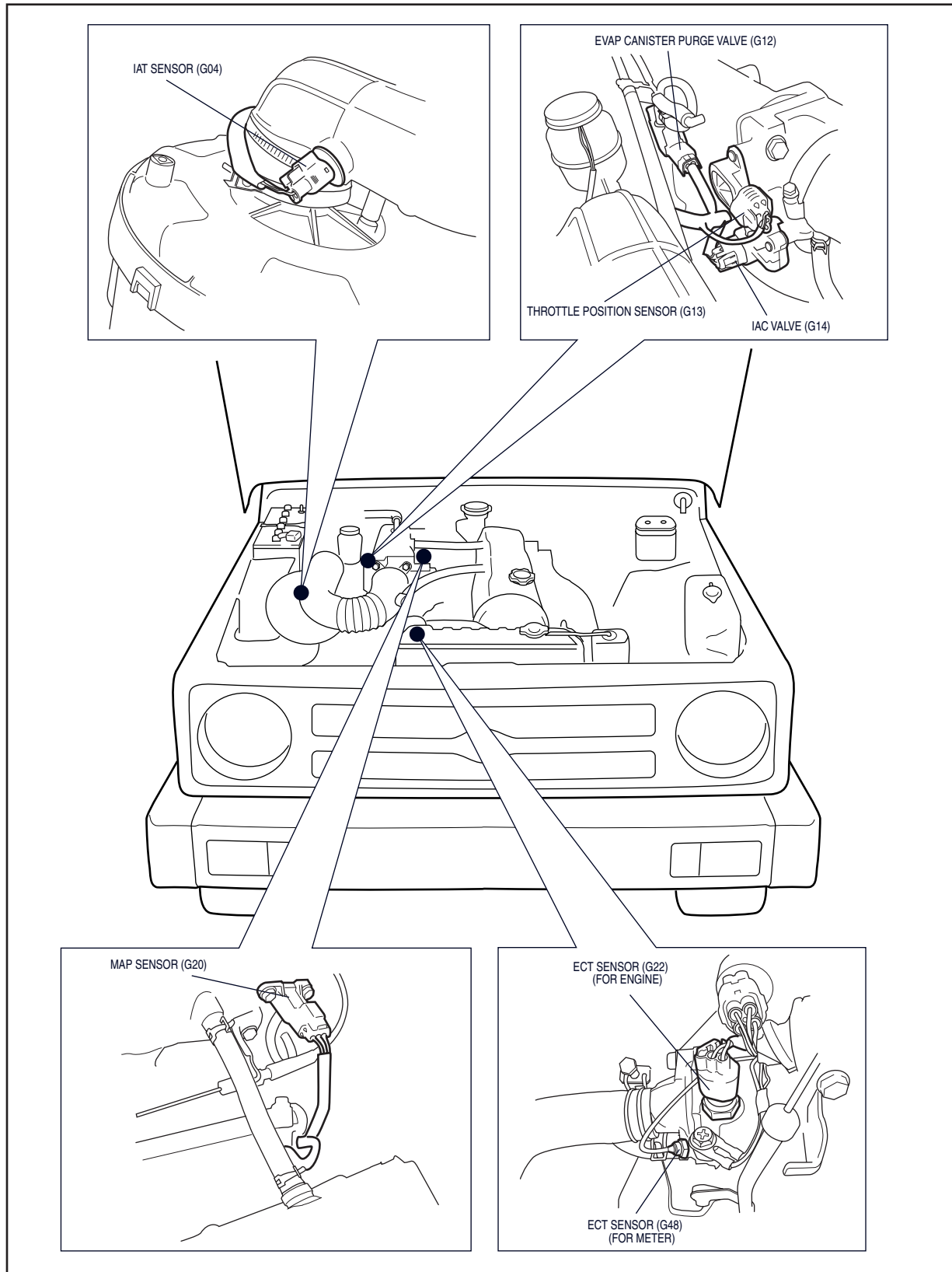
To know the location, shape or pin position of the connector, cross-refer "SYSTEM CIRCUIT DIAGRAM", "CONNECTOR LAYOUT DIAGRAM" and "LIST OF CONNECTOR" section as follows:



HOW TO READ INSTALLATION POSITION OF SINGLE UNIT PARTS

The diagram in "INSTALLATION POSITION OF SINGLE UNIT PARTS" section shows installation positions of fuse, relays and control units used in this vehicle. They are illustrated as shown below.

ENGINE ROOM



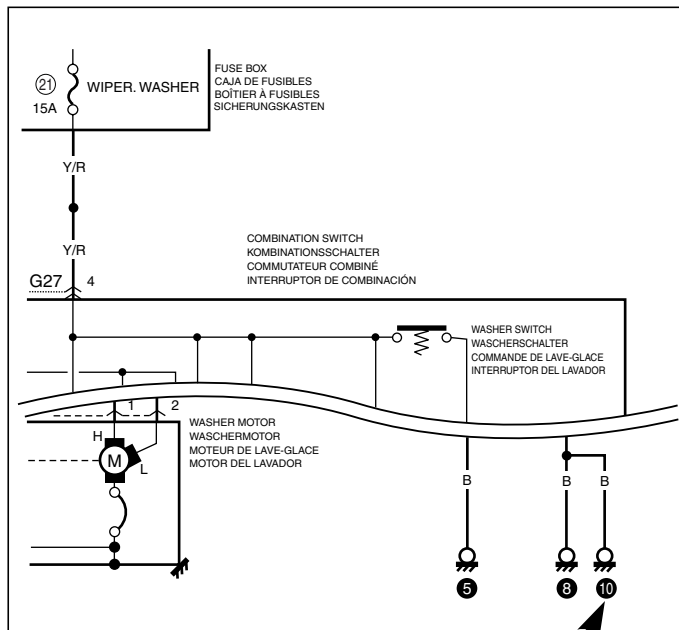
HOW TO READ GROUND POINT

Ground point means the positions where the negative harness among wiring harnesses is grounded. The diagram in "GROUND POINT" section shows such ground points. In "SYSTEM CIRCUIT DIAGRAM" section, there are many ground marks followed by black circles with numerical figures in them (10) which means that the end of the harness with such black circle is grounded to some part of the vehicle.

To locate the ground point (installation position), refer to "GROUND POINT" section.

"SYSTEM CIRCUIT DIAGRAM" section

■ FRONT WIPER & WASHER



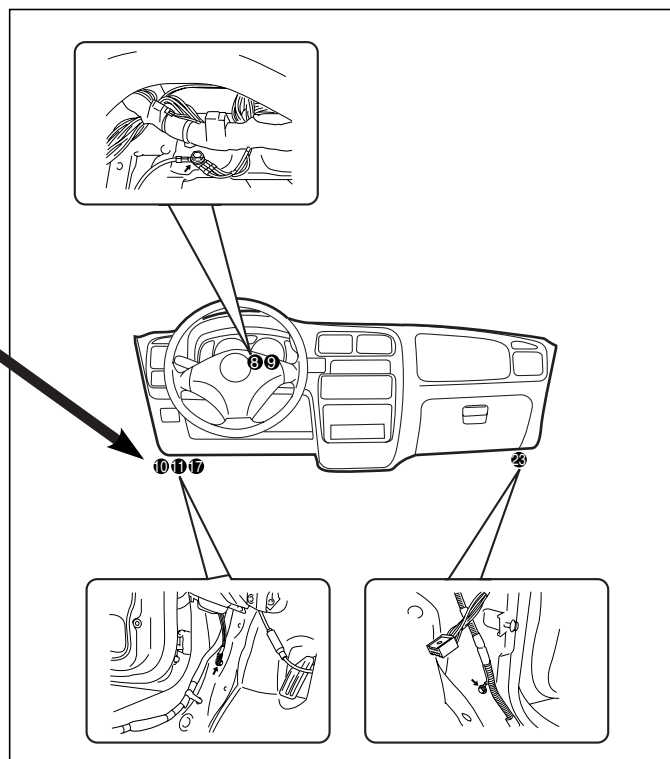
[How to locate ground point]

Look in "GROUND POINT" section for the black circle with the same numerical figure (10) as the described one in "SYSTEM CIRCUIT DIAGRAM" section.

NOTE:

If there is an electrical part whose ground point is not found in "GROUND POINT" section, that part itself serves as a ground.

"GROUND POINT" section

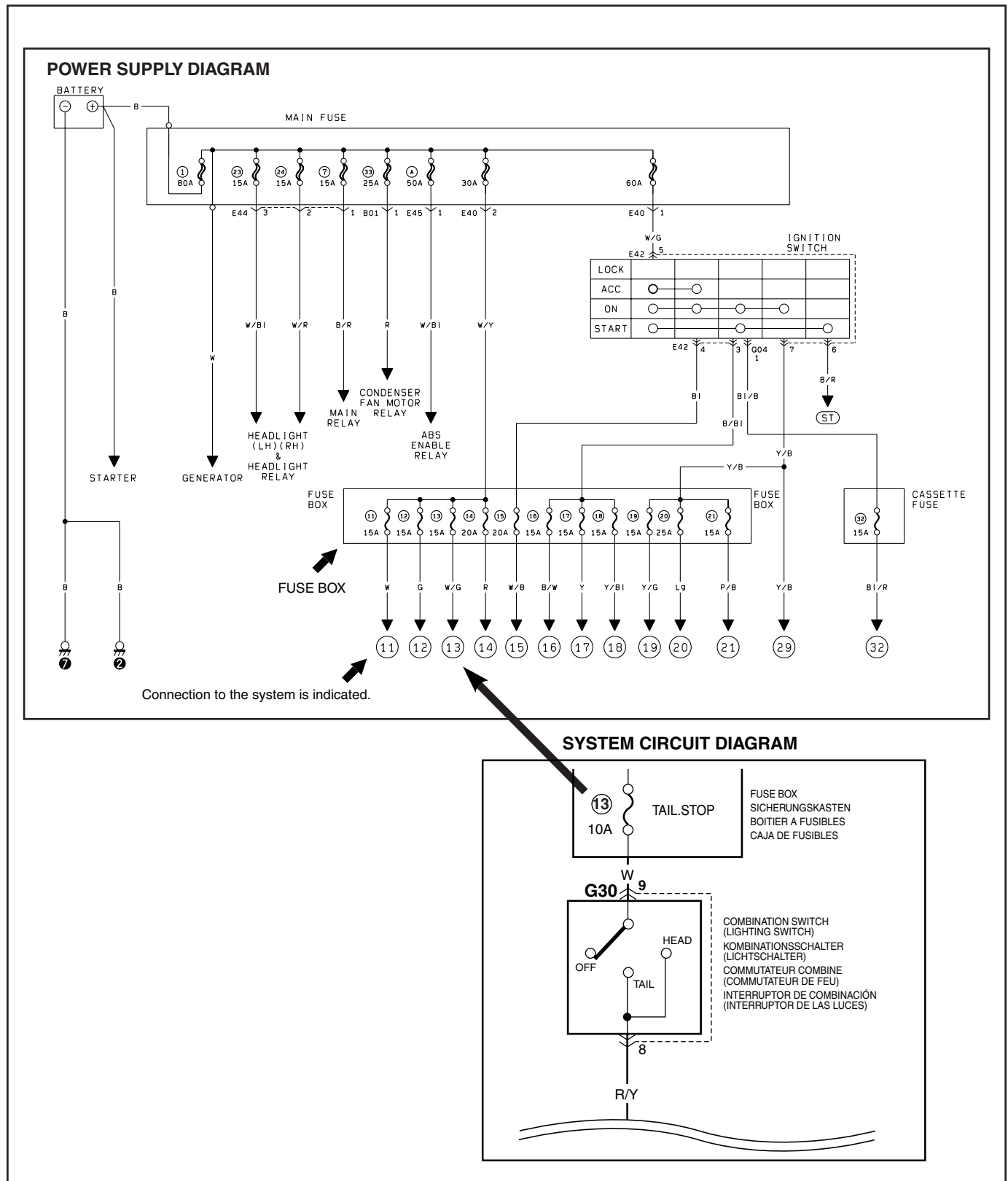


CROSS-REFERENCE

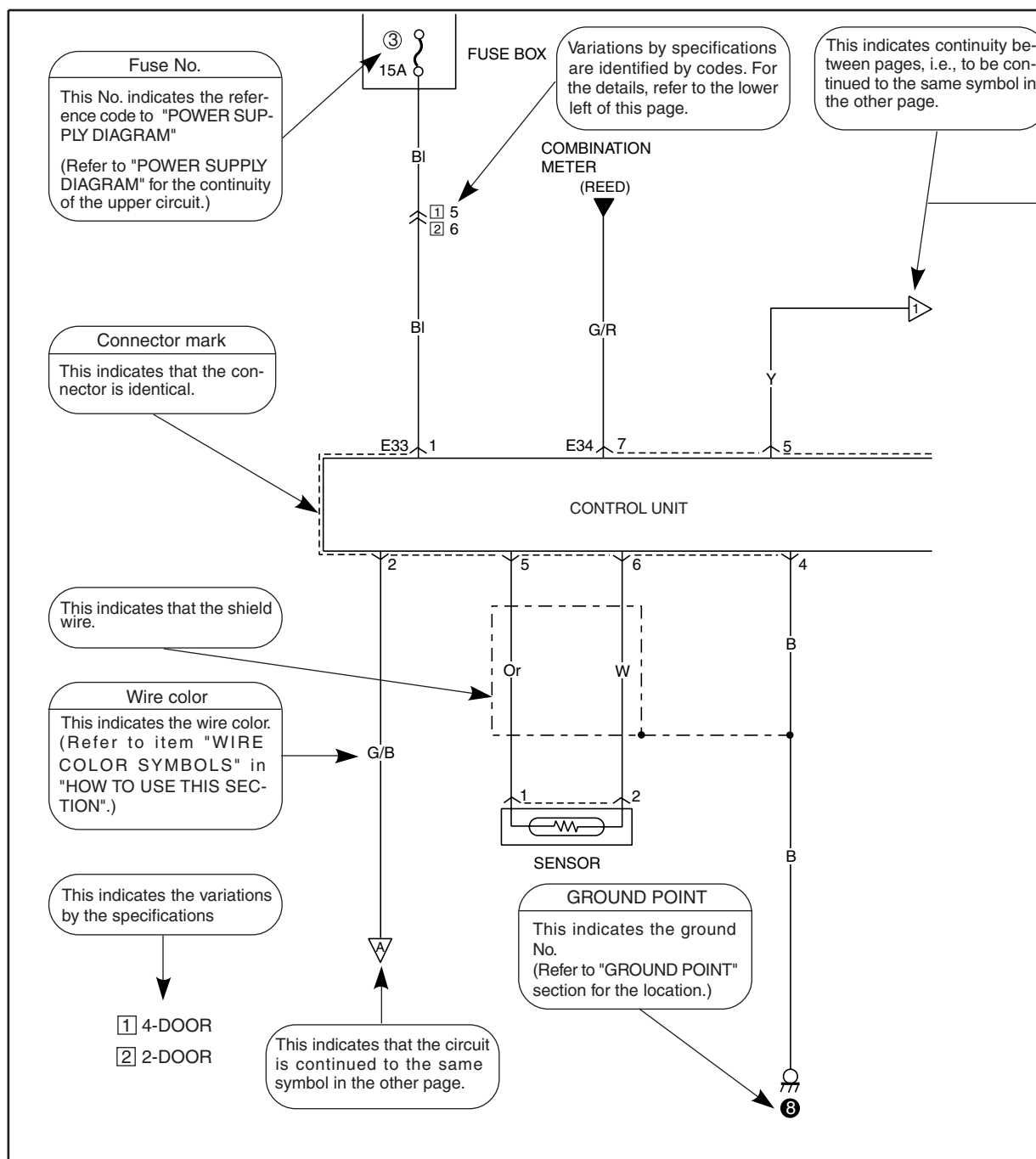
HOW TO READ POWER SUPPLY DIAGRAM

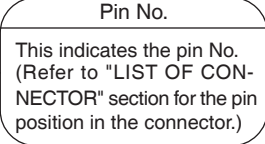
Power Supply Diagram shows the circuit from the positive terminal of the battery to each fuse in the box and where each fuse is connected (each system circuit name). In addition, the electric load value of each fuse is indicated.

Since every "SYSTEM CIRCUIT DIAGRAM" is drawn from the circuit down the fuse, cross-refer to "POWER SUPPLY DIAGRAM" for the continuity of the upper circuit referring to Fuse No. such as .



Further information on connector, ground point and fuses is provided by cross-reference of "SYSTEM CIRCUIT DIAGRAM" and the other sections as described in the preceding indications of this section. Connector code, ground No. and fuse No. are the reference code for cross-reference.





HOW TO READ LIST OF CONNECTORS

"LIST OF CONNECTORS" section is provided to help identification when looking for the connector in question out of similar ones as well as for retrieval for positions of pins in the connector when checking continuity between pins, etc. Please note that the list is drawn to symbolize the basic configurations of the connectors and some connectors in the list may discrepant to the actual ones depending on the specifications.

How to Use List of Connectors :

It is easily possible to find the shape of the connector in question and its pin positions by locating the same connector code and the pin Nos. as those in "SYSTEM CIRCUIT DIAGRAM" section from "LIST OF CONNECTORS" section.

For further information on its use, refer to item "INDICATION OF CONNECTORS AND HOW TO READ THEM" in this section.

SECTION 8A-3

CONNECTOR LAYOUT DIAGRAM

CONTENTS

8A-3

ENGINE ROOM

A : Battery cable,Fusible link	8A-3- 2
C : Engine harness	8A-3- 4
G : No.2 harness	8A-3- 6

INSTRUMENT PANEL

E : No.1 harness	8A-3- 8
G : No.2 harness	8A-3-10

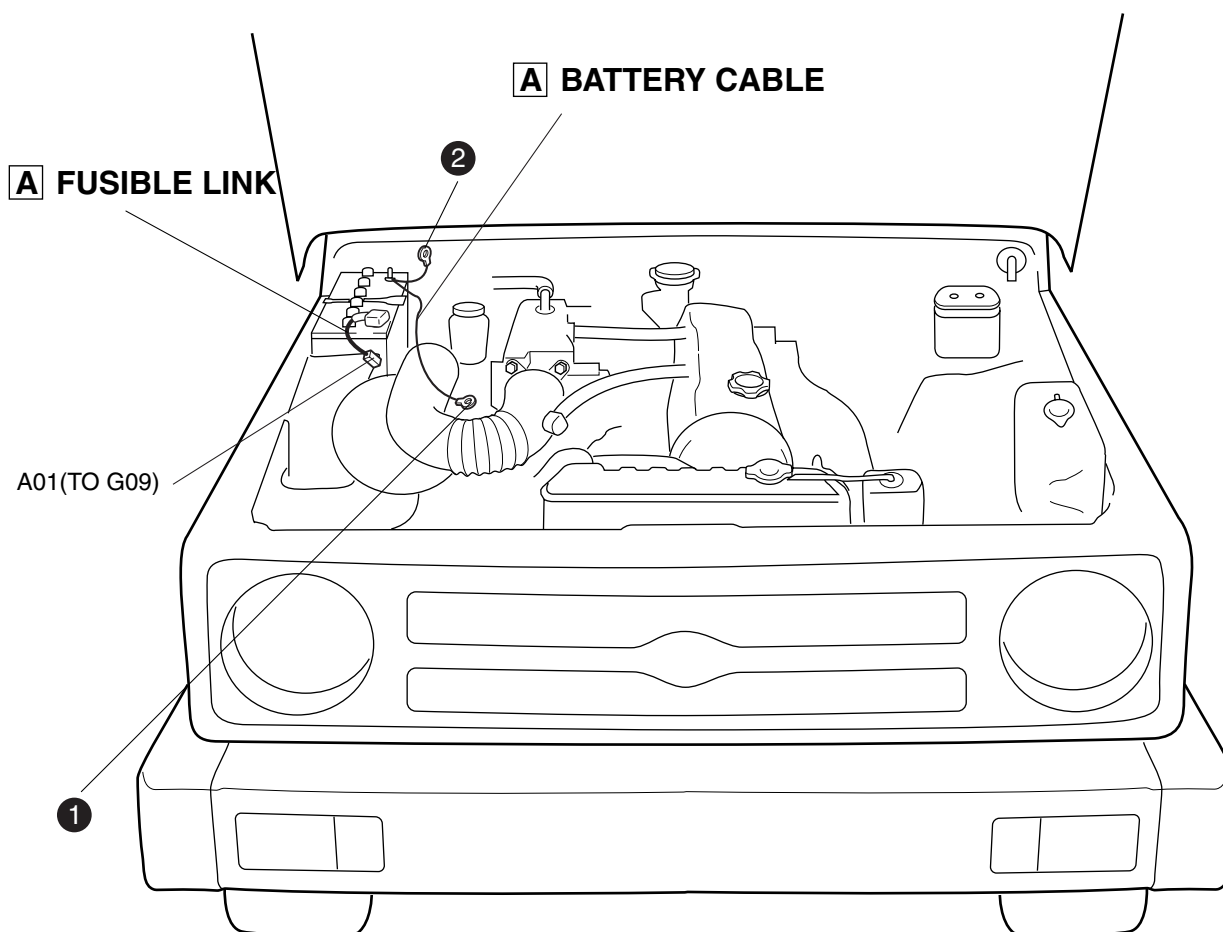
FLOOR

G : No.2 harness	8A-3-12
------------------------	---------

A

ENGINE ROOM

A: BATTERY CABLE, FUSIBLE LINK

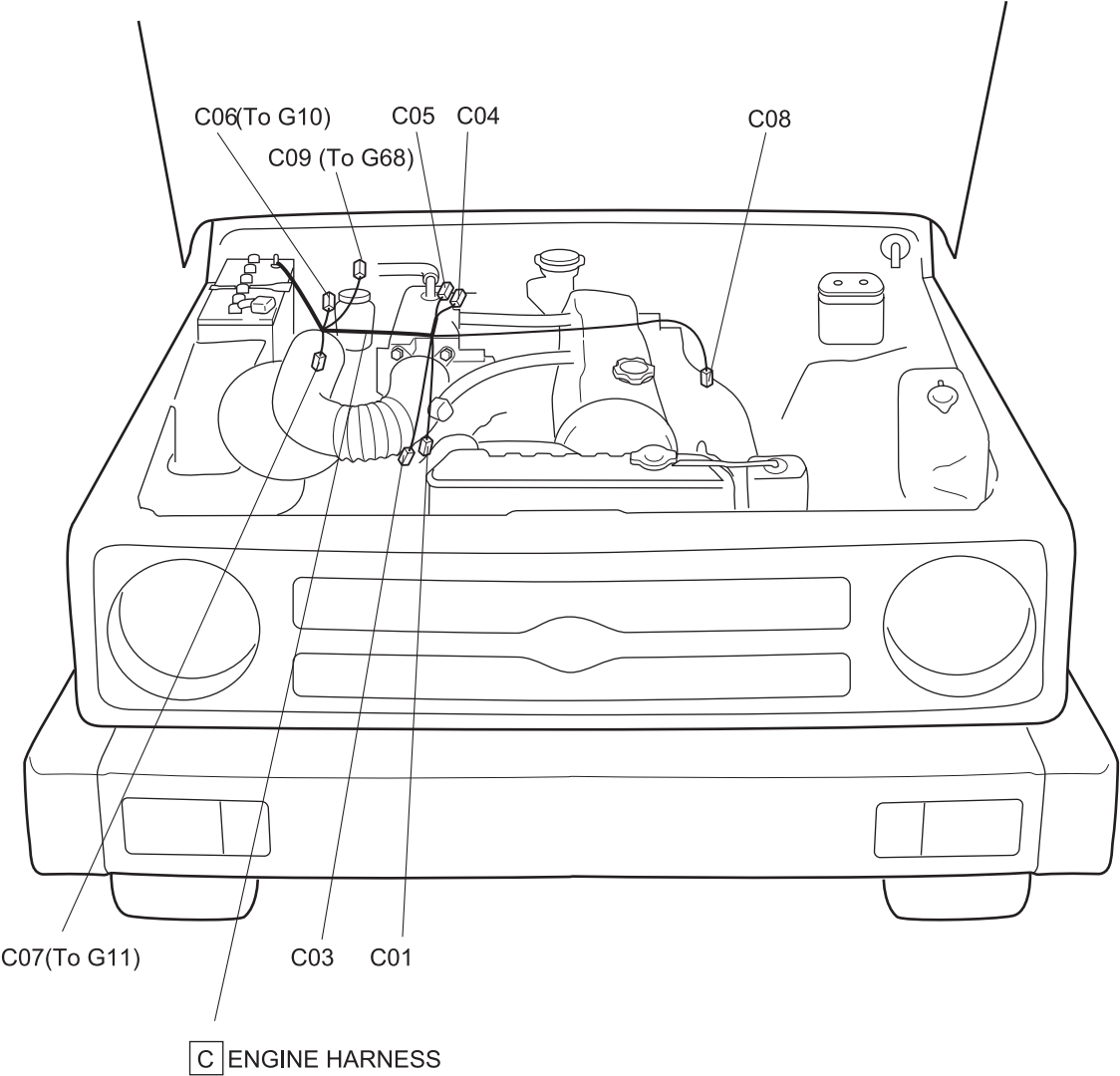


CONNECTOR	CONNECTIVE POSITION
FUSIBLE LINK	
A01	INSTRUMENT PANIEL HARNESS (TO G09)

C E

ENGINE ROOM

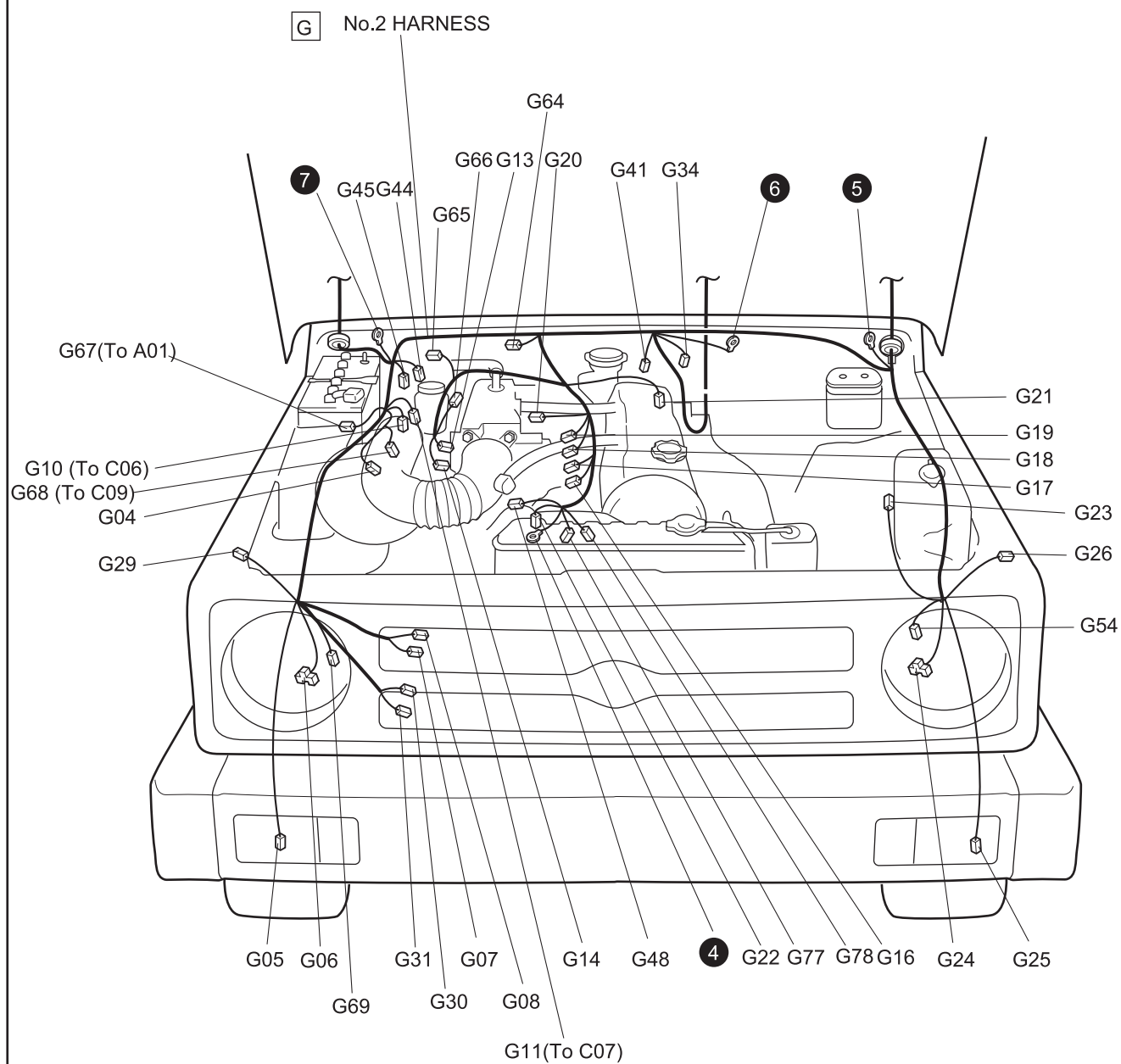
C: ENGINE HARNESS



CONNECTOR	CONNECTIVE POSITION
ENGINE HARNESS	
C01	STARTING MOTOR
C02	OXYGEN SENSOR
C03	STARTING MOTOR
C04	GENERATOR
C05	GENERATOR
C06	INSTRUMENT PANEL HARNESS(To G10)
C07	INSTRUMENT PANEL HARNESS(To G11)
C08	HEATED OXYGEN SENSOR
C09	INSTRUMENT PANEL HARNESS(To G68)

ENGINE ROOM

G:No.2 HARNESS

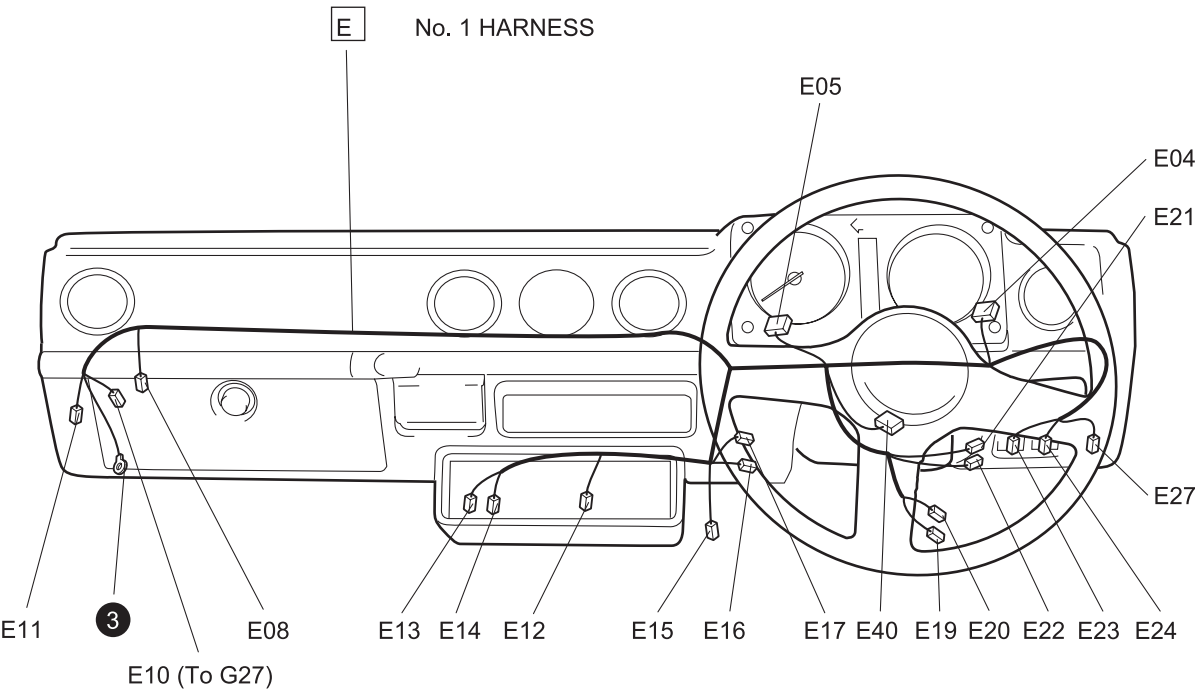


CONNECTOR	CONNECTIVE POSITION
INSTRUMENT PANEL HARNESS	
G04	IAT SENSOR
G05	FRONT COMBINATION LIGHT (R)
G06	HEAD LIGHT (R)
G07	HORN #1
G08	HORN #1
G10	ENGINE HARNESS (To C06)
G1	ENGINE HARNESS (To C07)
G13	THROTTLE POSITION SENSOR
G14	IAC VALVE
G16	INJECTOR #1
G17	INJECTOR #2
G18	INJECTOR #3
G19	INJECTOR #4
G20	MAP SENSOR
G21	IGNITION COIL #2
G22	ECT SENSOR (FOR ENGINE)
G23	FRONT WASHER MOTOR
G24	HEAD LIGHT (L)
G25	FRONT COMBINATION LIGHT (L)
G26	SIDE TURN SIGNAL LIGHT (L)
G29	SIDE TURN SIGNAL LIGHT (R)
G30	HARN #2
G31	HARN #2
G34	CMP SENSOR
G41	BACK-UP LAMP SWITCH
G44	BRAKE FLUID LEVEL SWITCH
G45	DIAGNOSIS CONNECTOR
G48	ECT SENSOR (FOR METER)
G54	H/L LEVELING MOTOR (L)
G64	NOISE SUPPRESSOR
G65	EGR
G66	EVAP CANISTER PURGE VALVE
G67	FUSIBLE LINK (To A01)
G68	ENGINE HARNESS (C09)
G69	H/L LEVELING MOTOR (R)
G77	IGNITION COIL -1
G78	ENGINE OIL PRESSURE SWITCH

E

INSTRUMENT PANEL

E:No.1 HARNESS

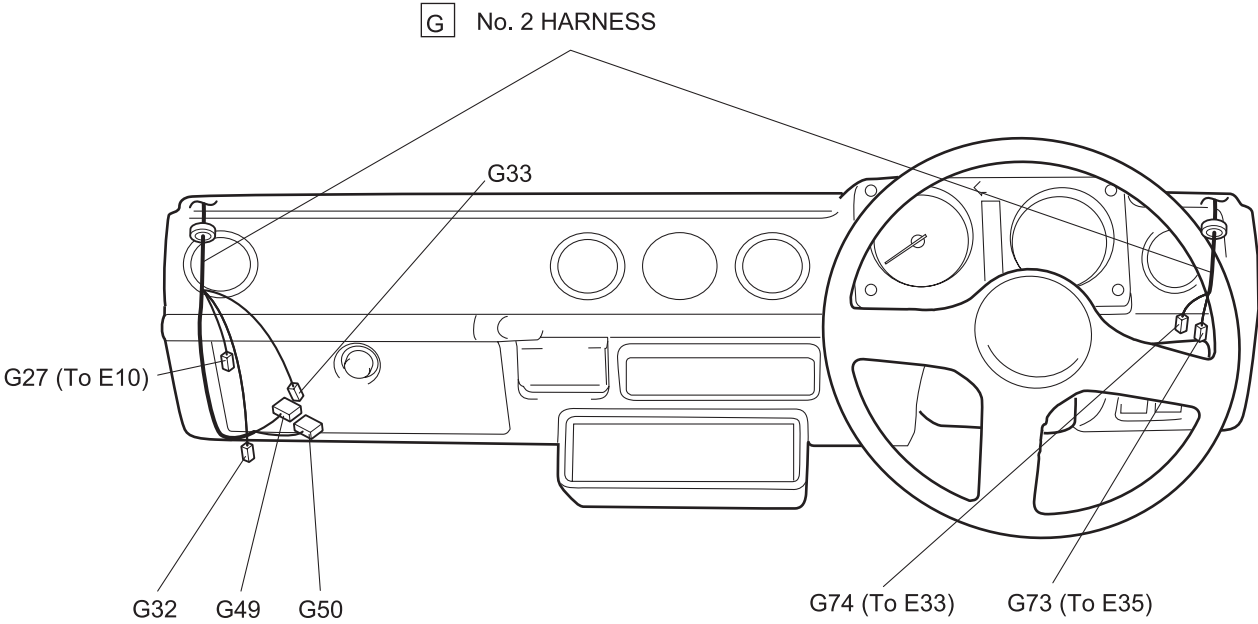


CONNECTOR	CONNECTIVE POSITION
NO. 1 HARNESS	
E04	COMBINATION METER
E05	COMBINATION METER
E08	FRONT WIPER MOTOR
E10	No. 2 HARNESS (To G27)
E11	DOOR SWITCH
E12	RADIO
E13	CIGAR LIGHTER
E14	CIGAR LIGHTER
E15	BLOWER FAN MOTOR
E16	HEATER CONTROL PANEL ILLUMINATION LIGHT
E17	BLOWER FAN MOTOR SWITCH
E19	BRAKE LIGHT SWITCH
E20	BRAKE LIGHT SWITCH
E21	COMBINATION SWITCH (WIPER & WASHER)
E22	MAIN SWITCH
E23	INTERIOR LIGHT
E24	INTERIOR LIGHT
E27	TURN SIGNAL RELAY
E31	ECM
E32	NO. 2 HARNESS (To G76)
E33	INSTRUMENT PANEL HARNESS (To G74)
E35	INSTRUMENT PANEL HARNESS (To G73)
E36	FUSE B-OUT/TAIL
E37	FUSE
E38	B-OUT CHANGE OVER SWITCH
E39	B-OUT CHANGE OVER SWITCH
E40	COMBINATION SWITCH (TURN SIGNAL, HAZARD, LIGHTING, HORN, DIMMER & PASSING)
E41	HEAD LIGHT LEVELING SWITCH
E42	FRONT FOG LIGHT SWITCH



INSTRUMENT PANEL

G:No.2 HARNESS

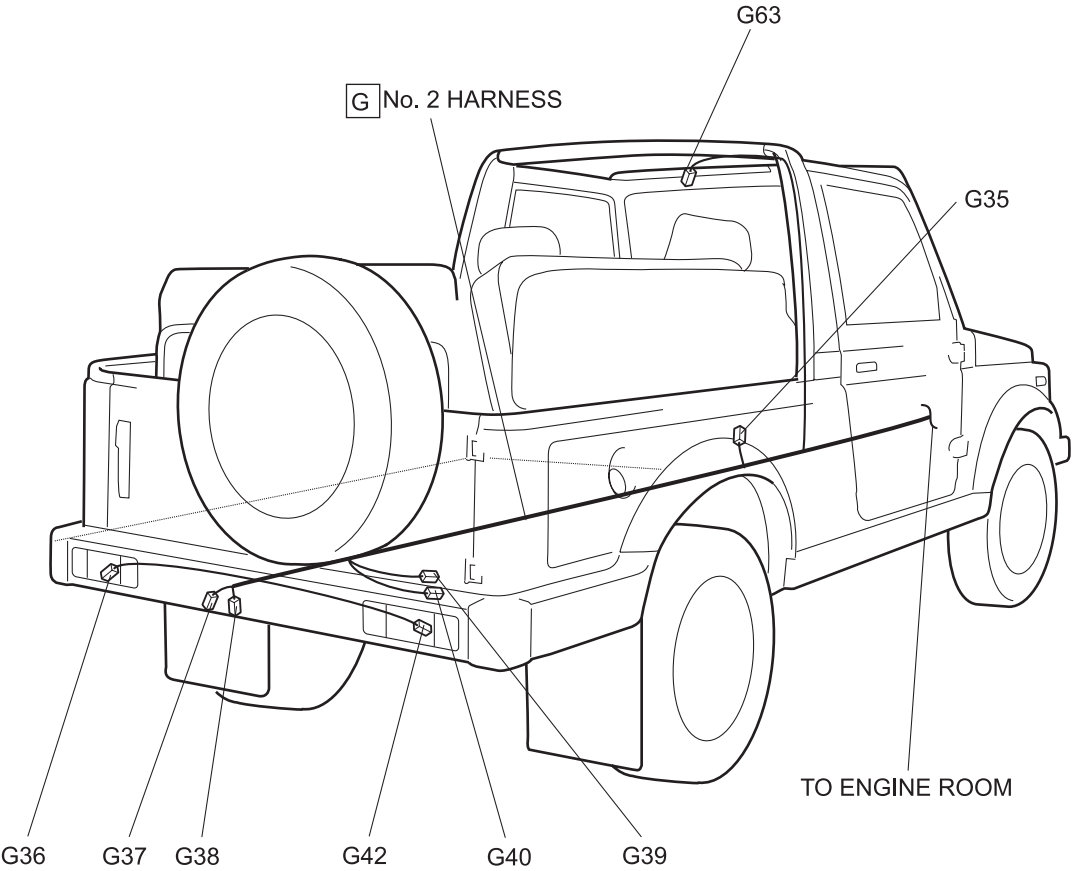


CONNECTOR	CONNECTIVE POSITION
NO. 2 HARNESS	
G27	No.1 HARNESS (To E10)
G32	DATA LINK CONNECTOR
G33	FUEL PUMP & MAIN RELAY
G49	ECM
G50	ECM
G73	No.1 HARNESS (TO E35)
G74	No.1 HARNESS (TO E33)

G

FLOOR

G:No.2 HARNESS



CONNECTOR	CONNECTIVE POSITION
NO. 2 HARNESS	
G35	4WD SWITCH
G36	REAR COMBINATION LIGHT (L)
G37	LICENSE PLATE LIGHT
G38	LICENSE PLATE LIGHT
G39	FUEL GAUGE
G40	FUEL PUMP
G42	REAR COMBINATION LIGHT (R)
G63	HIGH MOUNT STOP LAMP

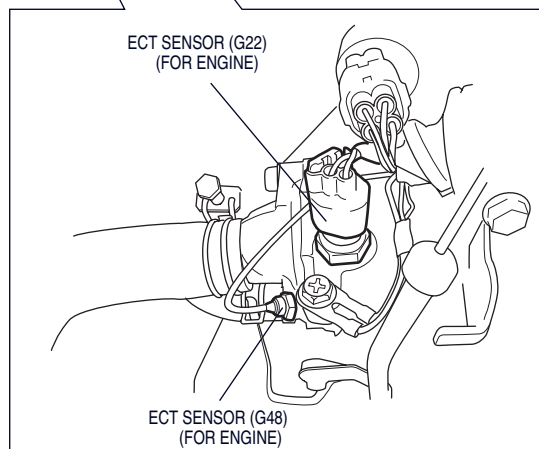
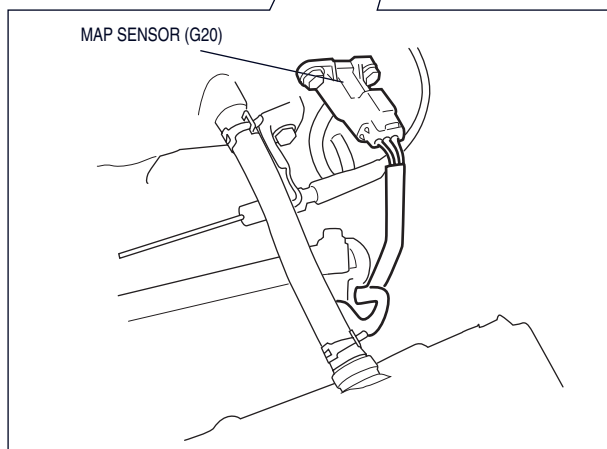
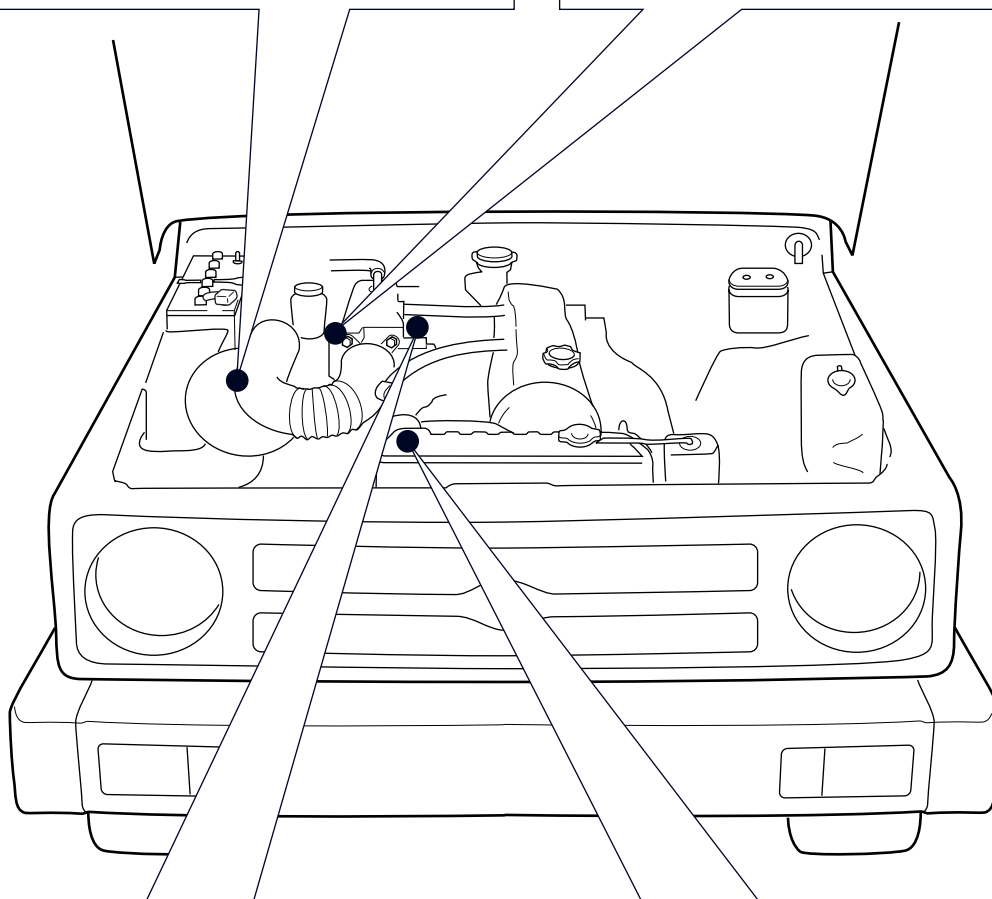
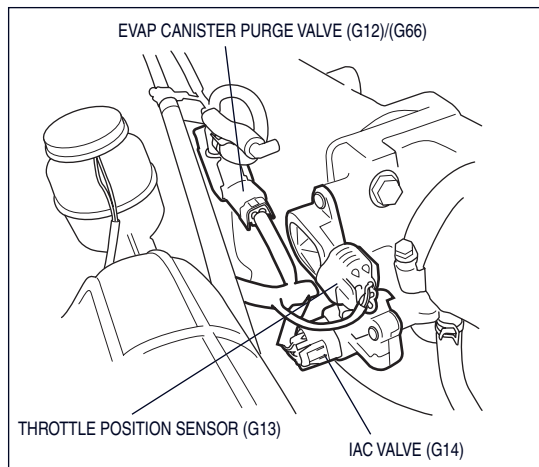
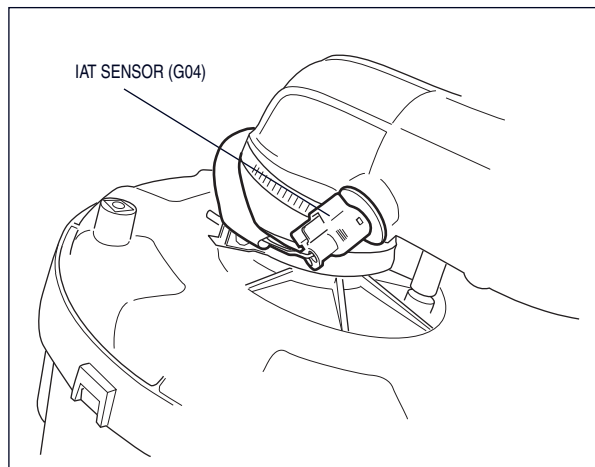
SECTION 8A-4

INSTALLATION POSITION OF SINGLE UNIT PARTS

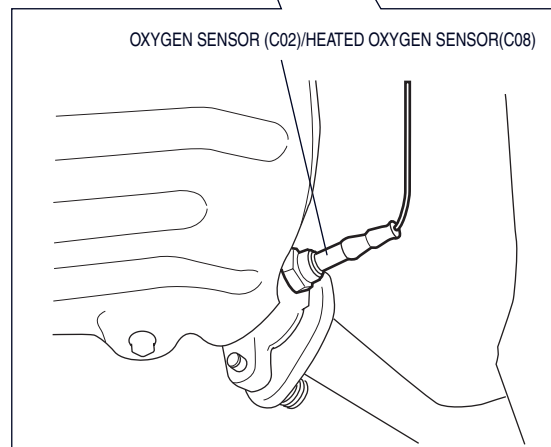
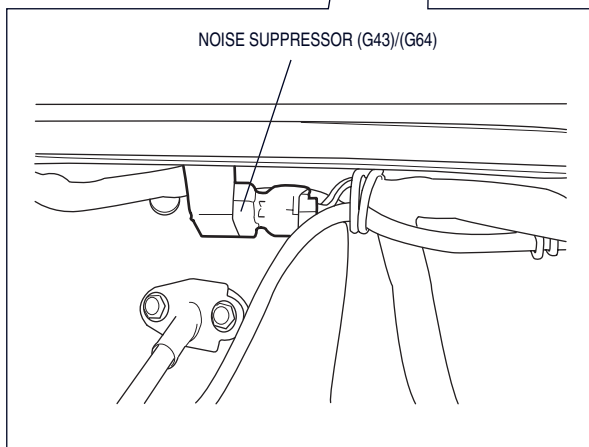
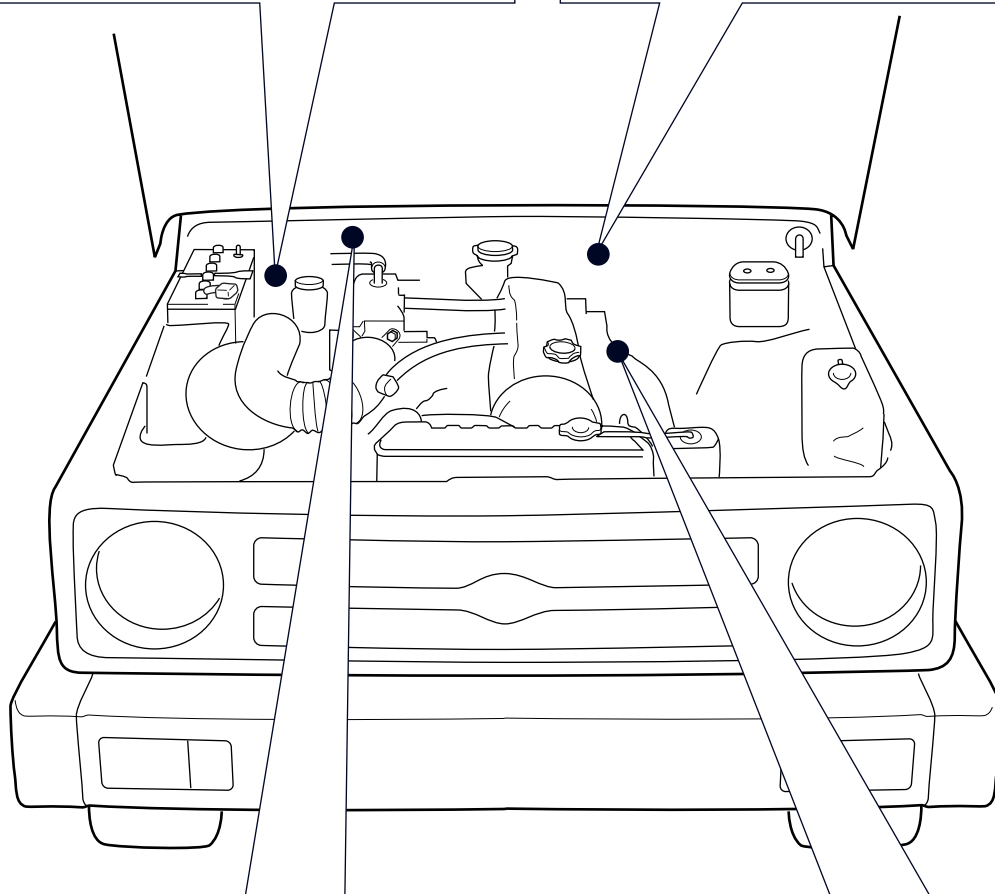
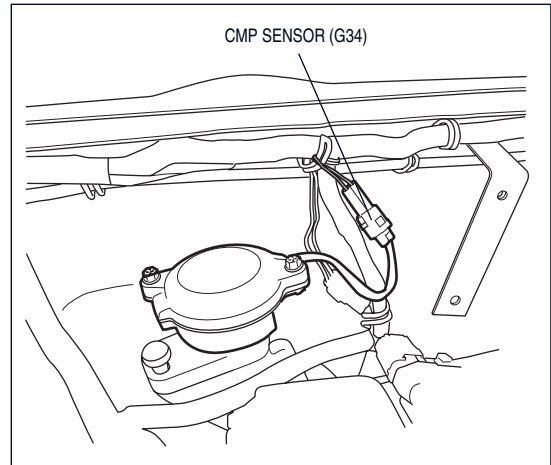
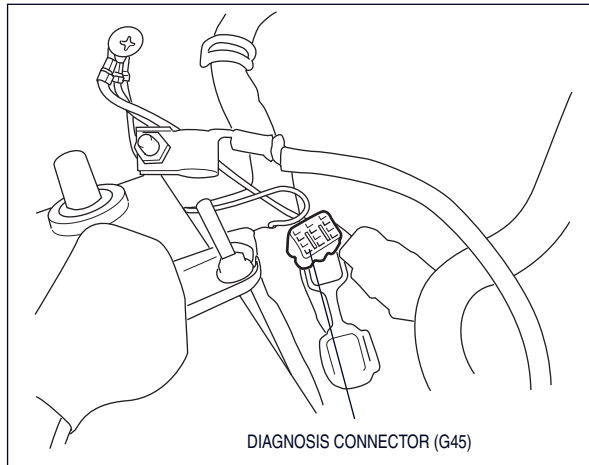
CONTENTS

ENGINE ROOM	8A-4-2
INSTRUMENT PANEL	8A-4-4

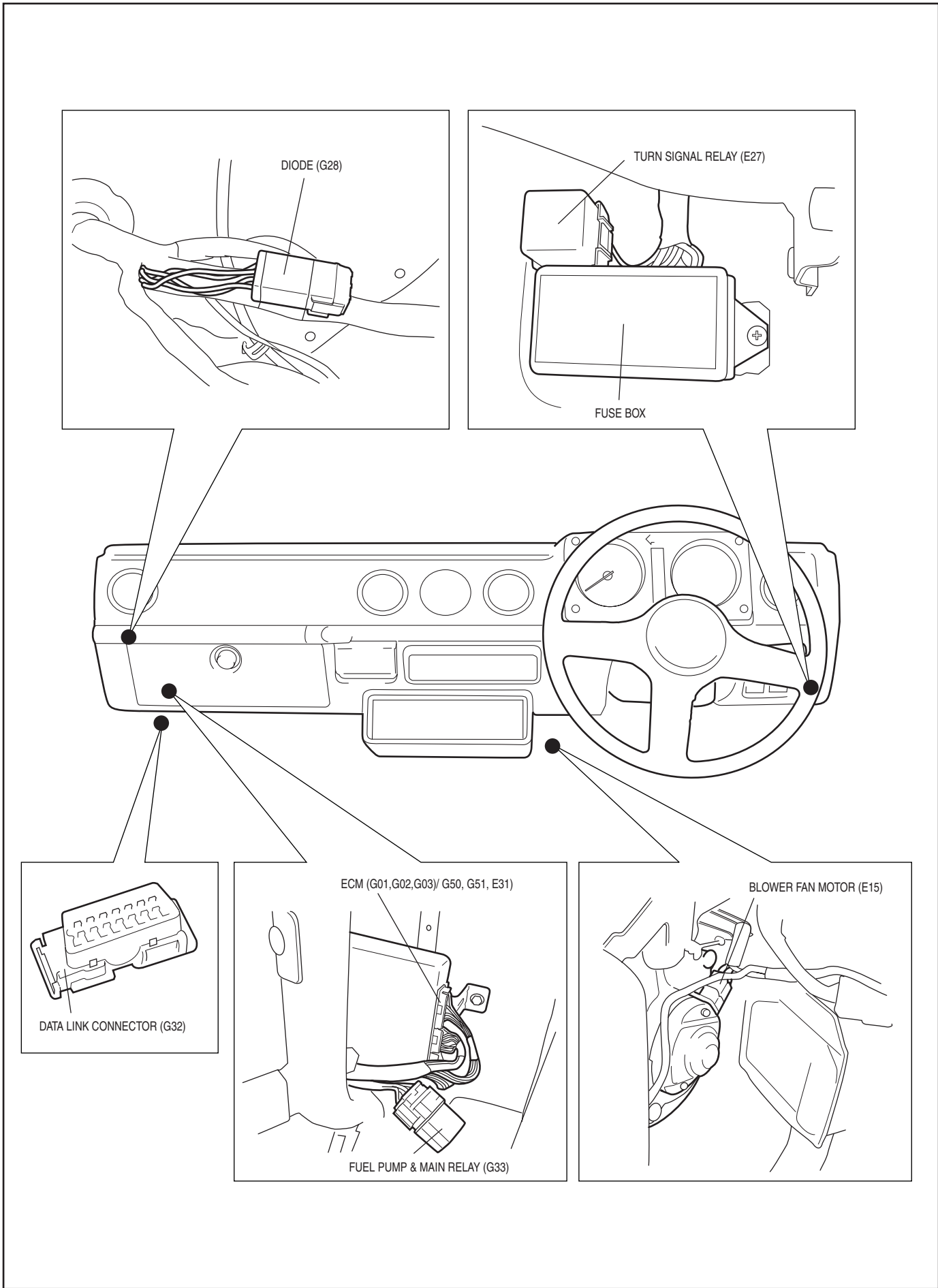
ENGINE ROOM



ENGINE ROOM



INSTRUMENT PANEL



SECTION 8A-5

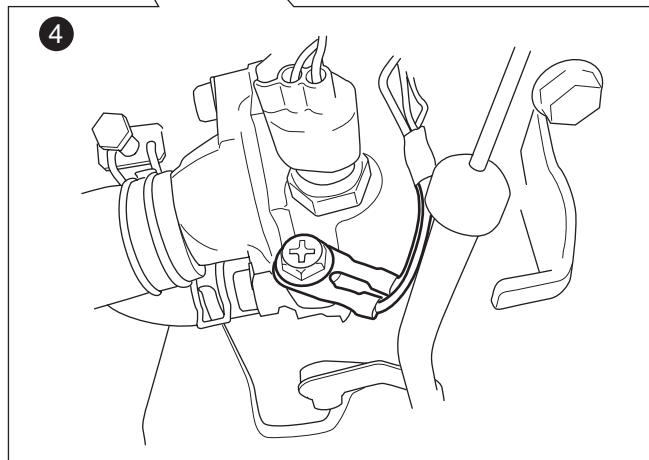
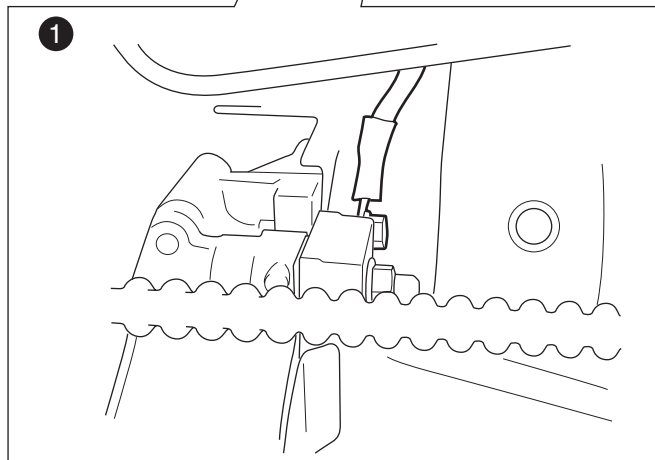
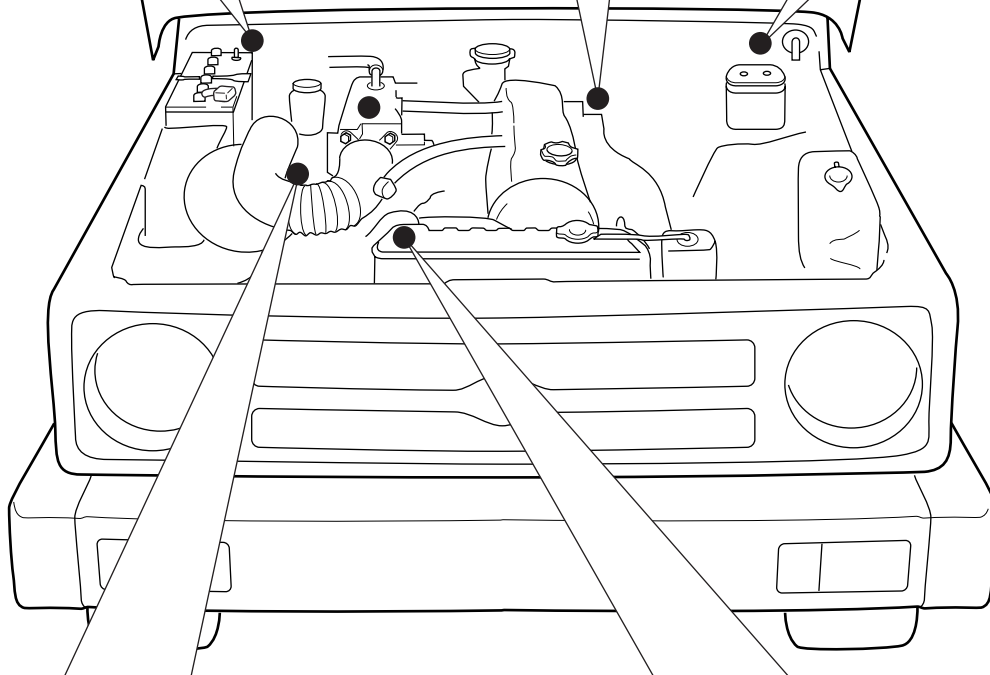
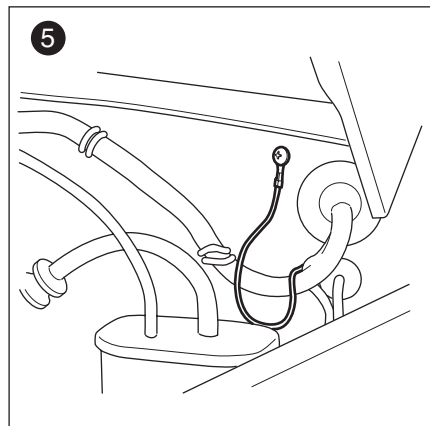
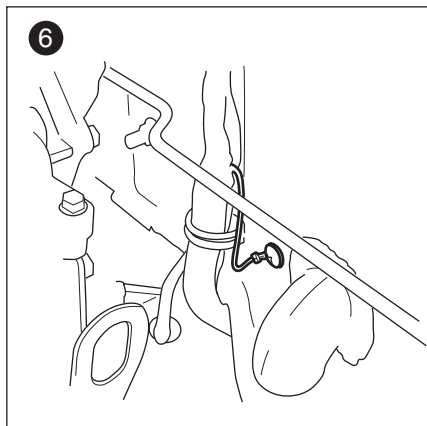
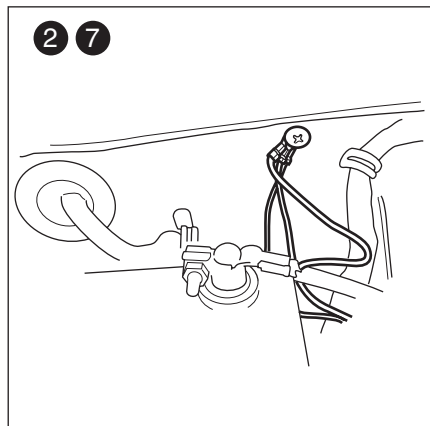
GROUND POINT

CONTENTS

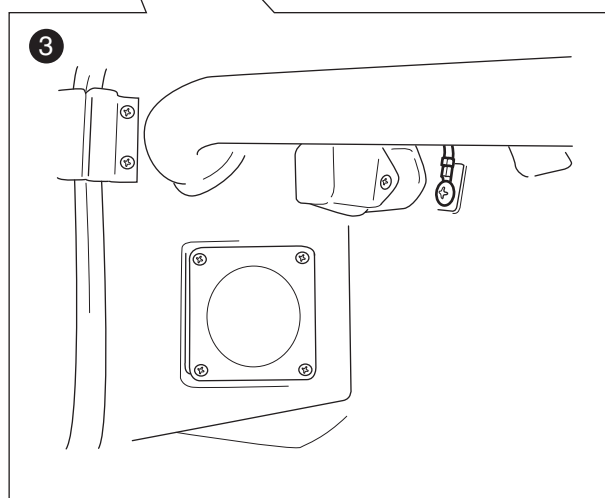
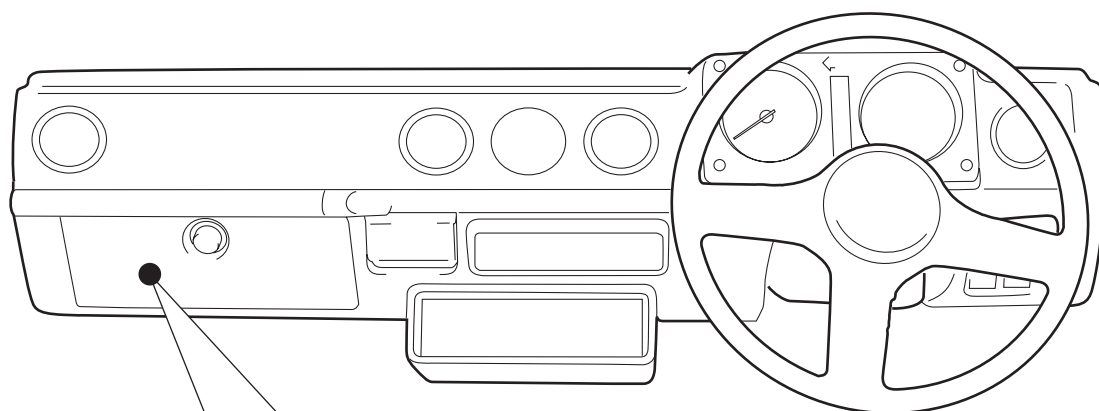
ENGINE ROOM 8A-5-2

INSTRUMENT PANEL 8A-5-3

ENGINE ROOM



INSTRUMENT PANEL



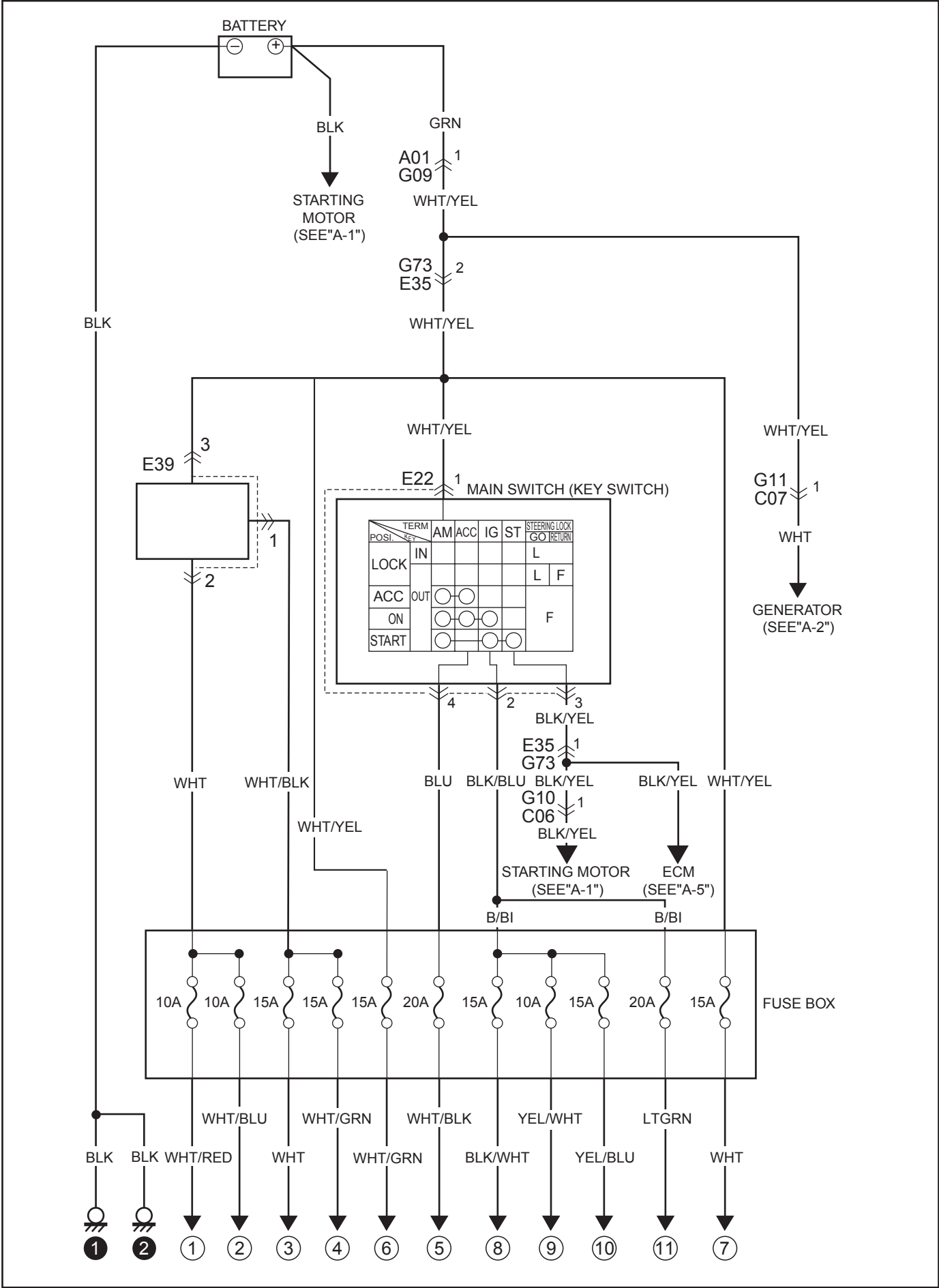
SECTION 8A-6

POWER SUPPLY DIAGRAM

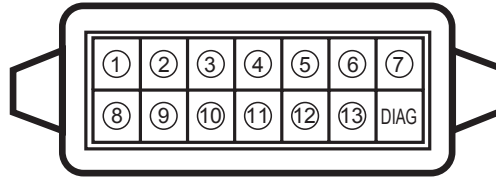
CONTENTS

POWER SUPPLY DIAGRAM	8A-6-2
FUSE IN CIRCUIT FUSE BOX	8A-6-3

POWER SUPPLY DIAGRAM



FUSES IN CIRCUIT FUSE BOX



No.	AMPERAGE	DESCRIPTION ON THE COVER	PROTECTED CIRCUIT
①	10A	HEAD (R)	HEAD LIGHT (R)
②	10A	HEAD (L)	HEAD LIGHT (L)
③	15A	TAIL/ROOF	COMBINATION METER
			COMBINATION SWITCH
			INTERIOR LIGHT
④	15A	STOP	BRAKE LIGHT SWITCH
			HORN #1
			HORN #2
⑤	20A	ACC	RADIO
			CIGAR LIGHTER
⑥	15A	HORN	COMBINATION SWITCH
⑦	15A	FI	MAIN RELAY
			ECM
			DATA LINK CONNECTOR
⑧	15A	IG- COIL. METER	GENERATOR
			IGNITION COIL #1
			IGNITION COIL #2
			NOISE FILTER
			MAIN RELAY
			FUEL PUMP RELAY
			COMBINATION METER
⑨	10A	TURN. BACK	COMBINATION SWITCH
			BACK-UP LIGHT SWITCH
⑩	15A	WIPER. WASHER	COMBINATION SWITCH
			FRONT WIPER MOTOR
			SPEED WARNER
⑪	20A	HEATER	BLOWER FAN MOTOR SWITCH
⑫	15A	FR FOG LIGHT	FR. FOG LAMP

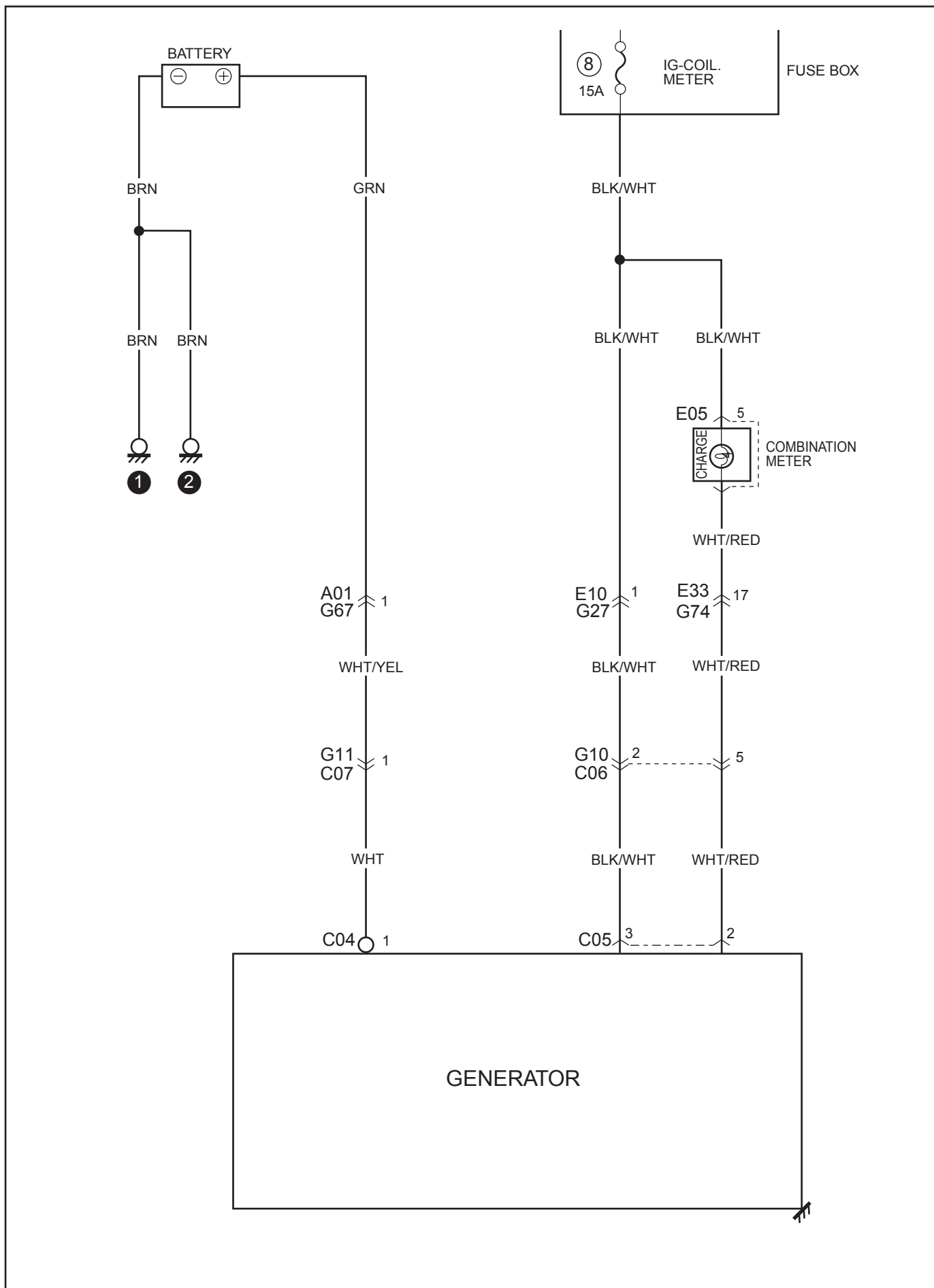
SECTION 8A-7

SYSTEM CIRCUIT DIAGRAM

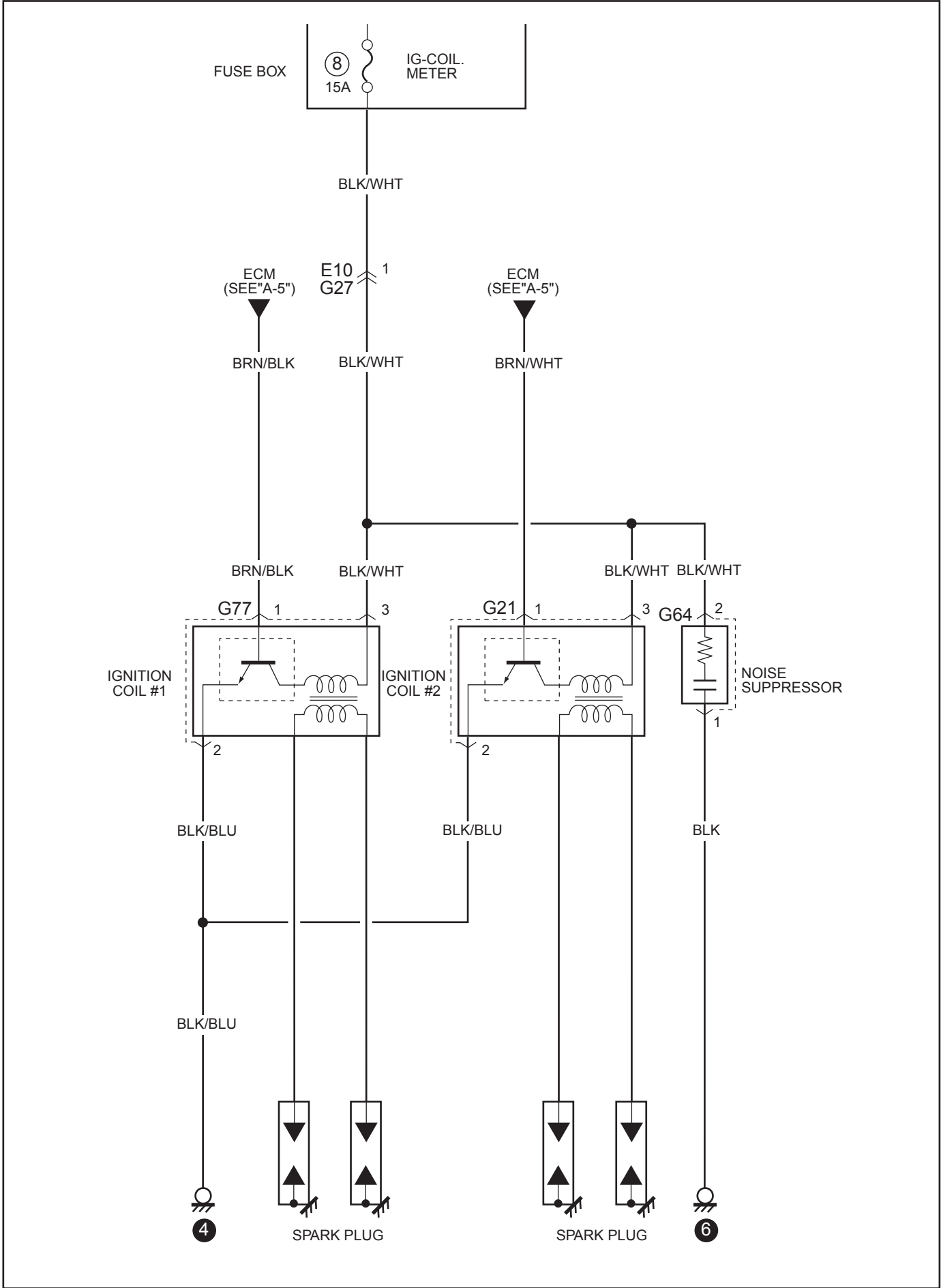
CONTENTS

SYSTEM No.	SYSTEM	PAGE No.
A-1	CRANKING SYSTEM	*
A-2	CHARGING SYSTEM	8A-7-2
A-3	IGNITION SYSTEM	8A-7-3
A-4	ENGINE CONTROL SYSTEM	8A-7-4
B-1	WINDSHIELD WIPER & WASHER	*
B-2	HORN	*
C-1	COMBINATION METER (METER & GAUGE)	*
C-2	COMBINATION METER (INDICATOR LAMP)	*
C-3	COMBINATION METER (WARNING LAMP)	8A-7-8
D-1	HEADLIGHT SYSTEM	*
D-2	POSITION, TAIL AND LICENSE PLATE LIGHT	*
D-3	ILLUMINATION LAMP	*
D-4	INTERIOR LIGHT	*
D-5	TURN SIGNAL AND HAZARD WARNING LIGHT	*
D-6	BRAKE LIGHT	*
D-7	BACK-UP LIGHT	*
D-8	FRONT FOG LIGHT	*
D-9	HEADLIGHT BEAM LEVELING SYSTEM	8A-7-9
E-1	HEATER	*
F-1	RADIO	*
F-2	CIGAR LIGHTER	*

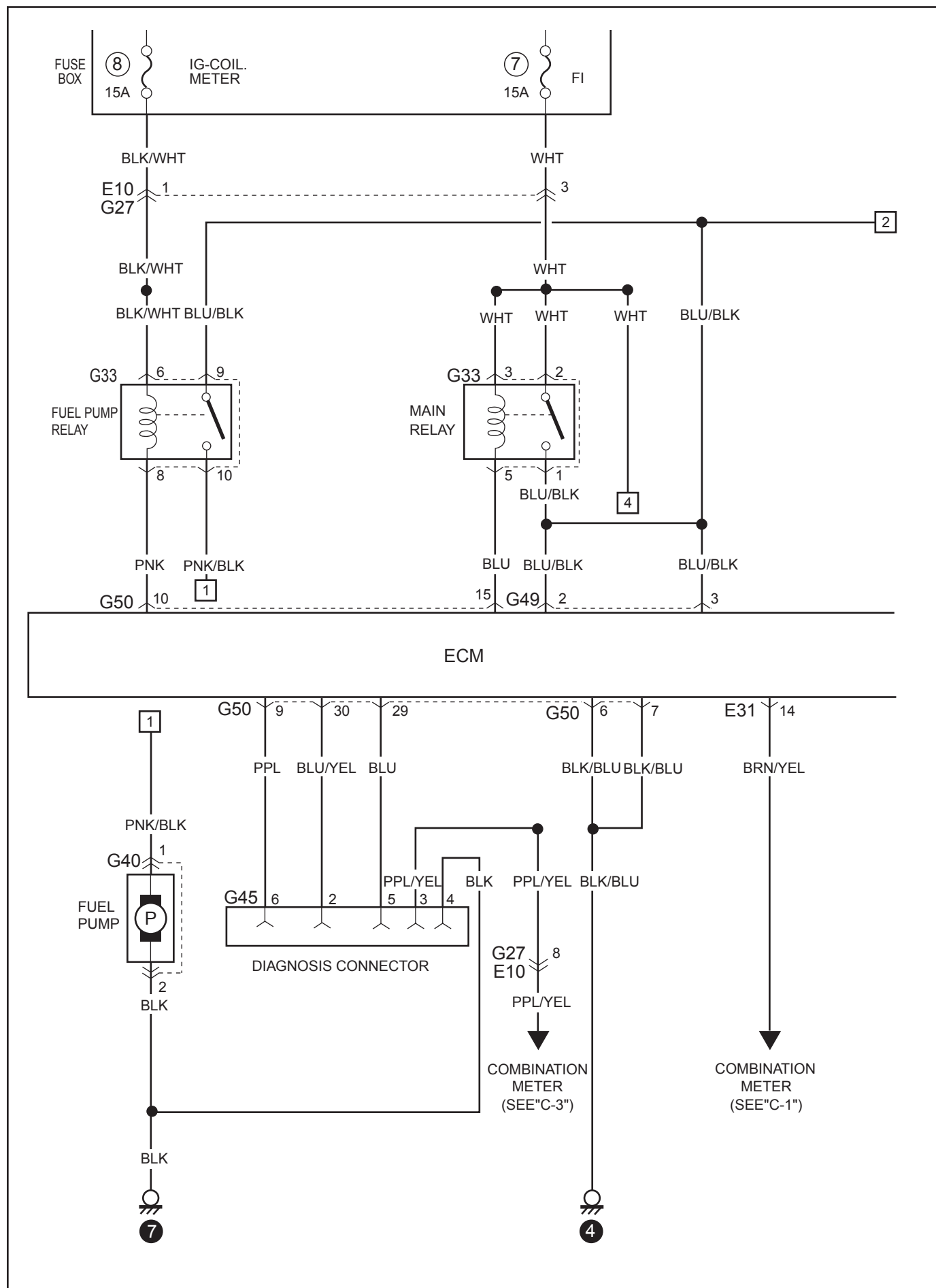
A-2 CHARGING SYSTEM

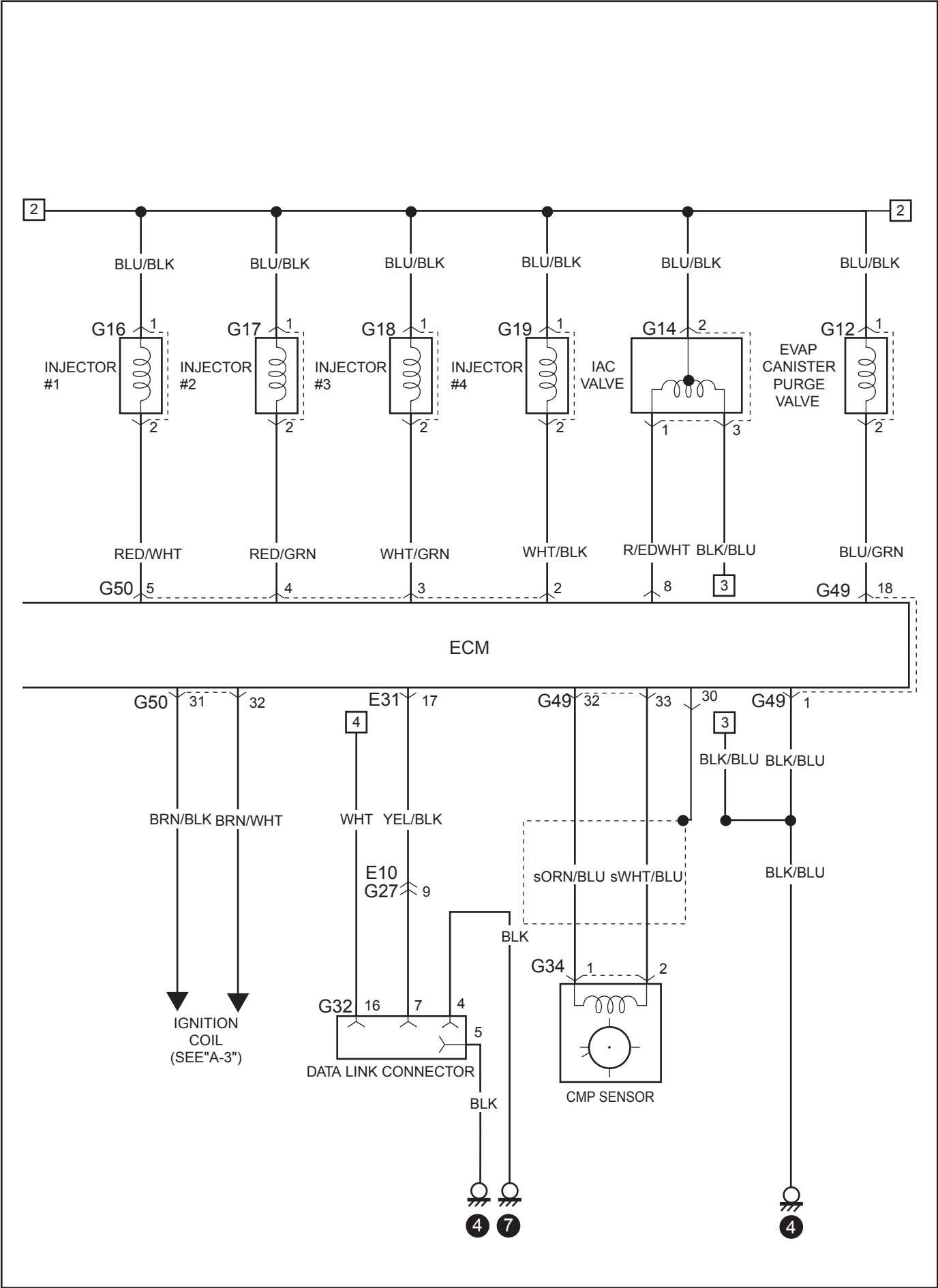


A-3 IGNITION SYSTEM

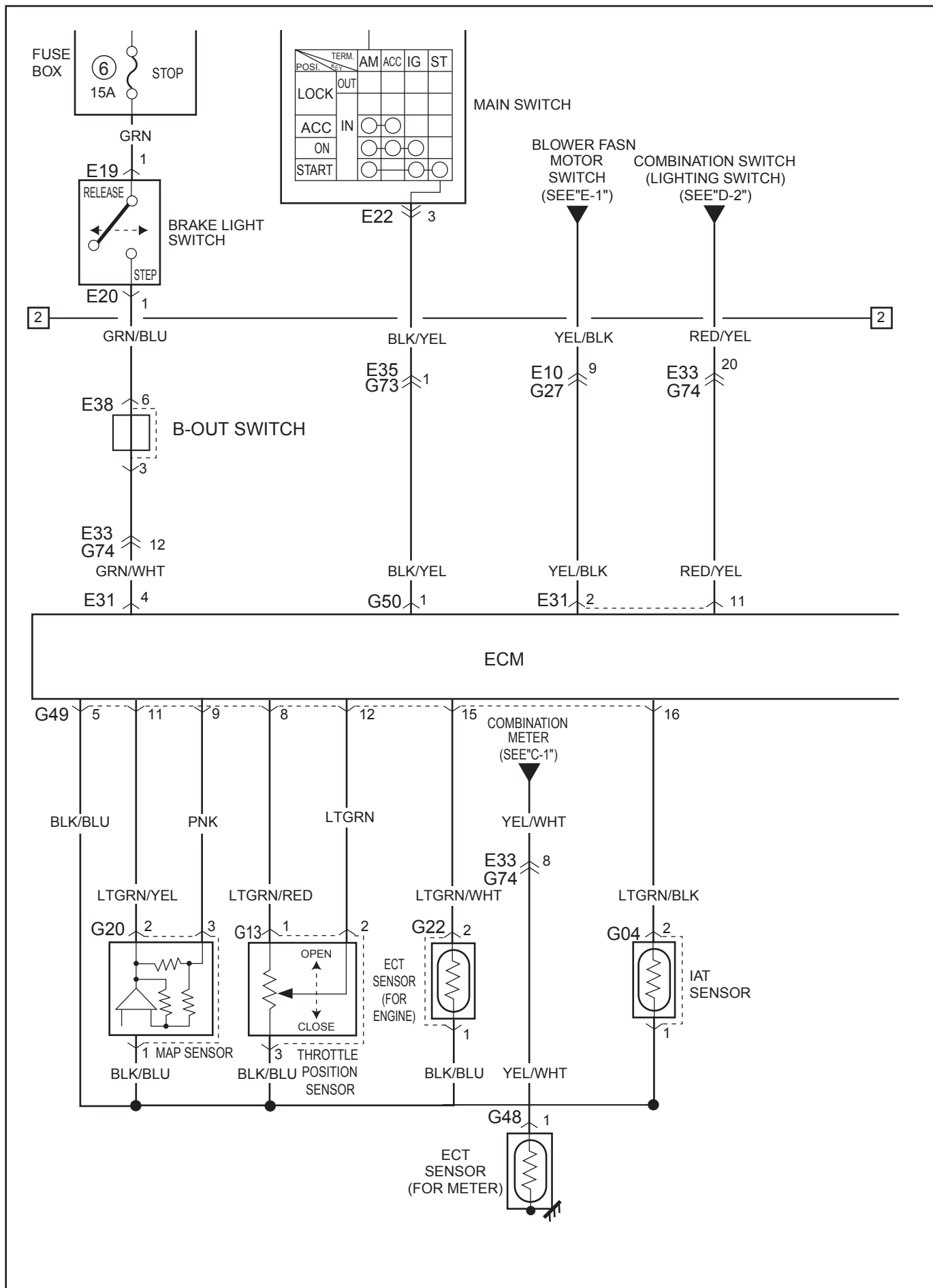


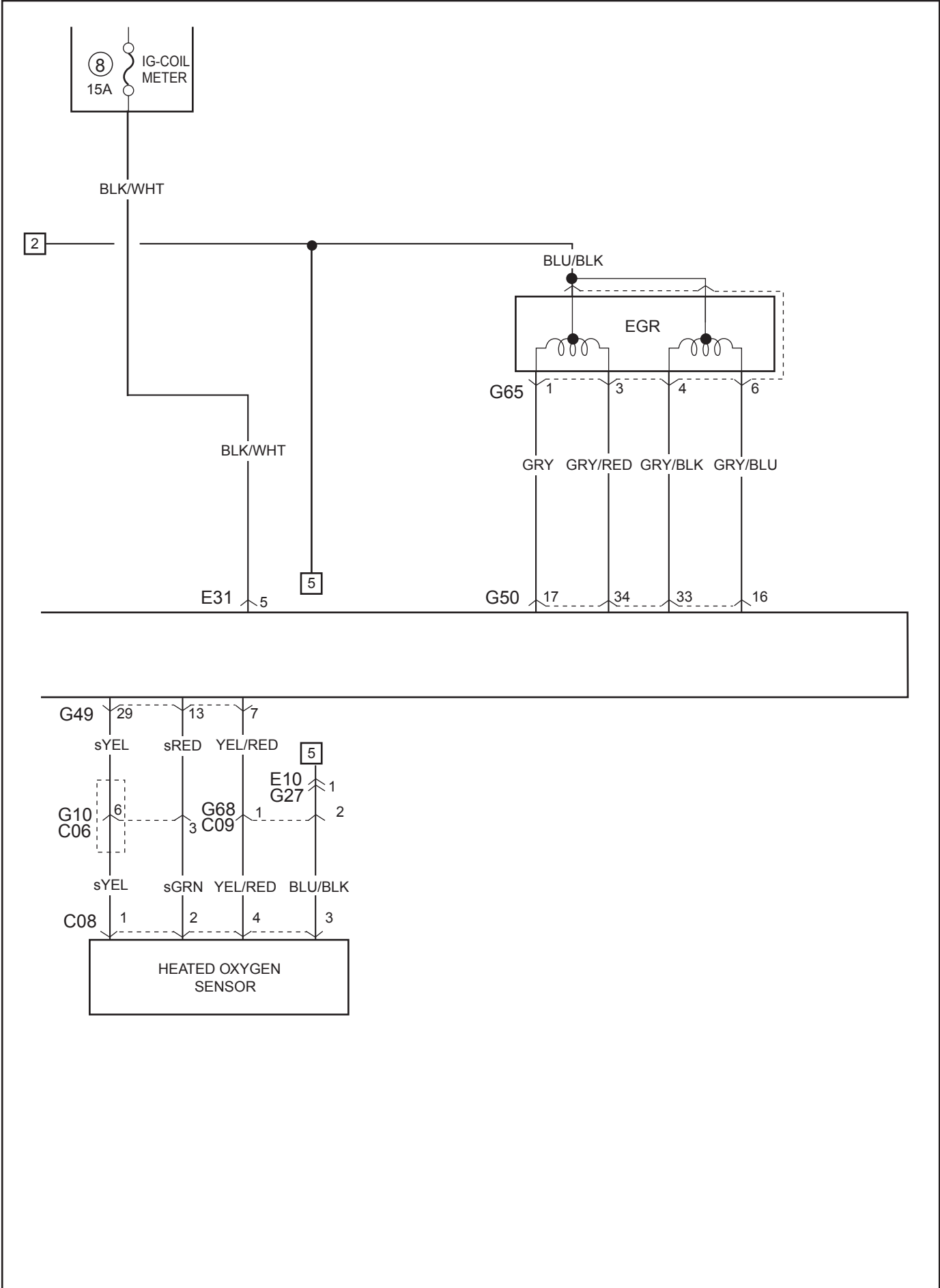
A-4 ENGINE CONTROL SYSTEM 1 of 2



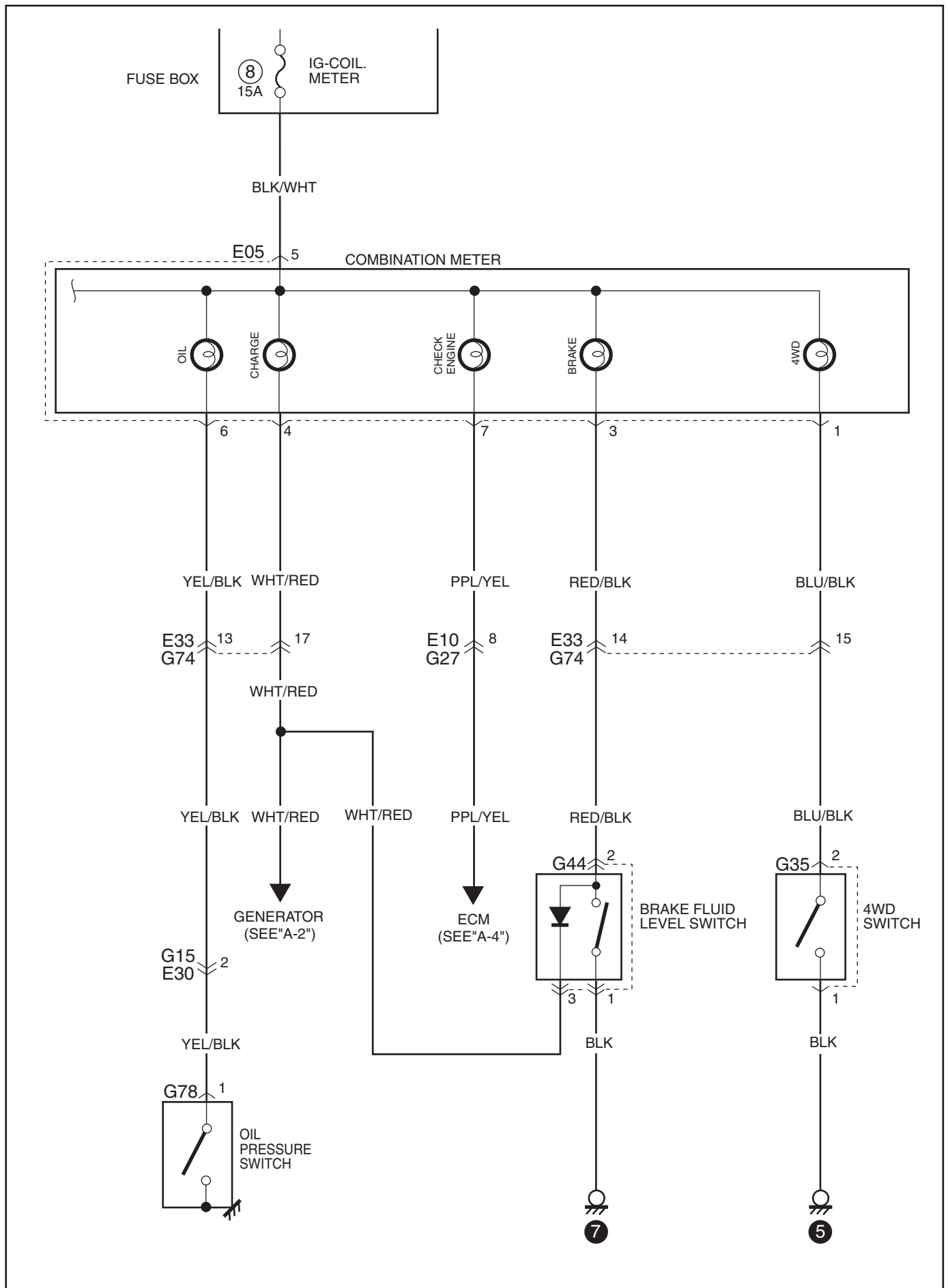


A-4 ENGINE CONTROL SYSTEM 2 of 2

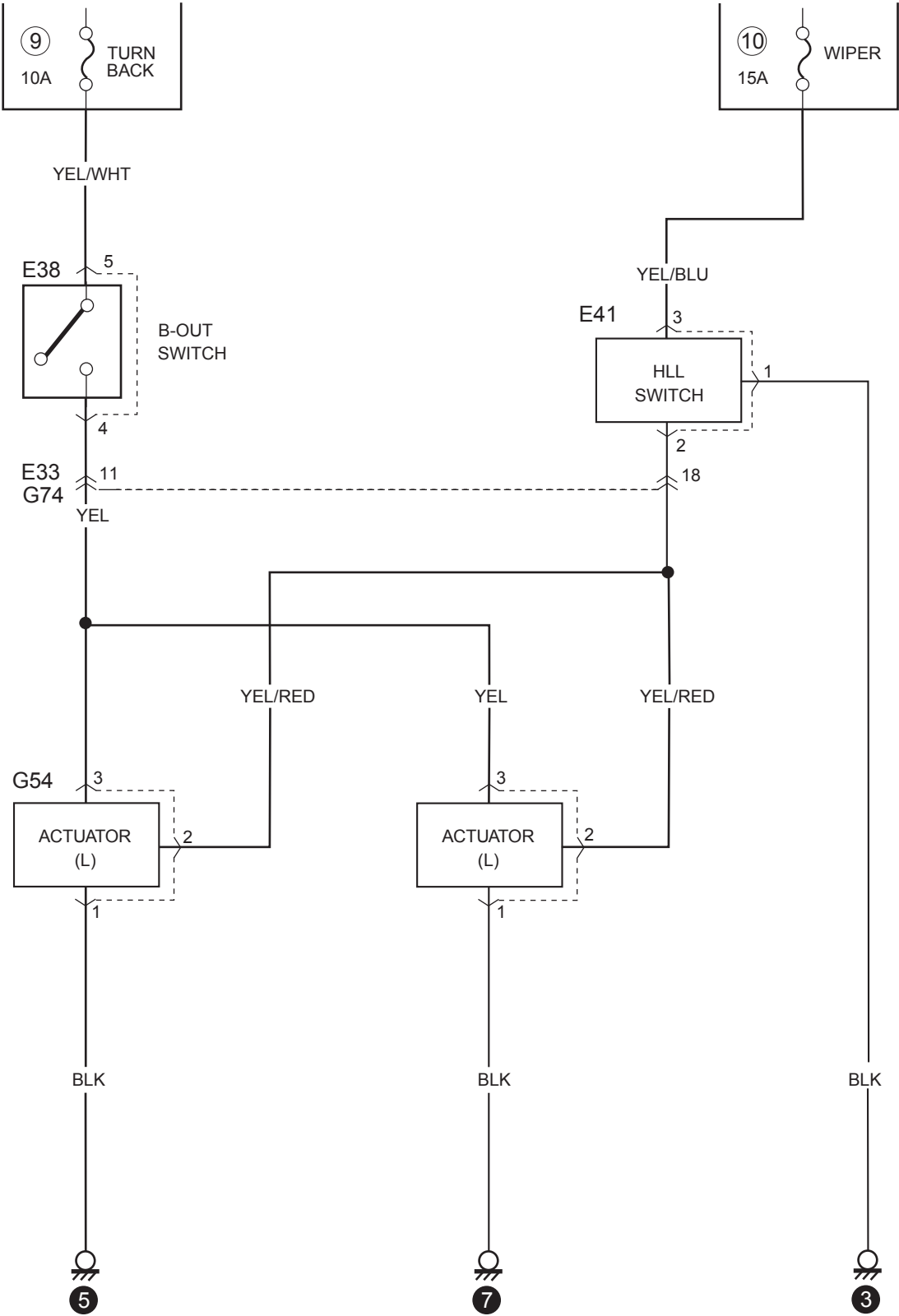




C-3 COMBINATION METER (WARNING LAMP)



D-9 HEAD LIGHT BEAM LEVELING SYSTEM



SECTION 8A-8

LIST OF CONNECTORS

CONTENTS

A: A01 8A-8-2

C: C01-C09 8A-8-2

E: E04-E42 8A-8-2

G: G04-G78..... 8A-8-3

NOTE:The illustrations in this section show the harness side connectors,but not the component side connectors.

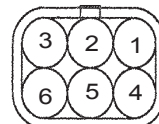
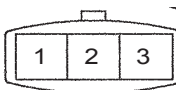
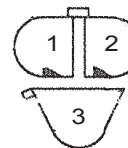
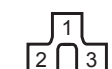
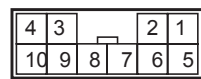
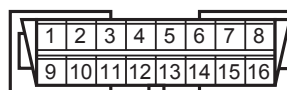
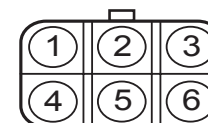
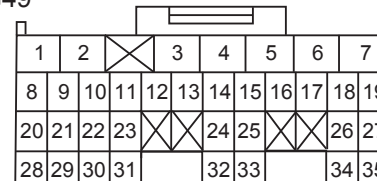
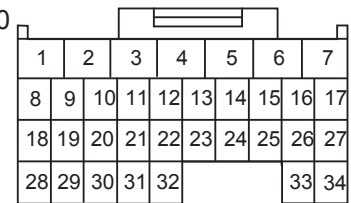
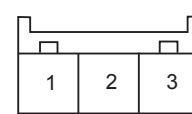
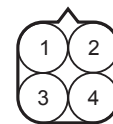
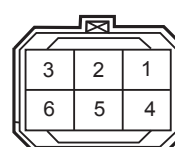
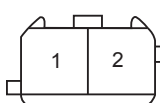
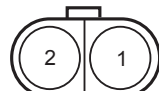
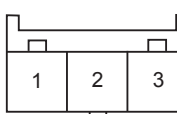
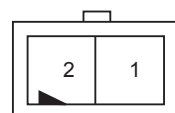
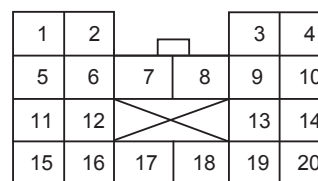
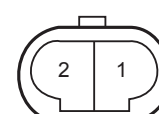
A C E G

LIST OF CONNECTORS

A	A01 (TO G09)									
C	C01	C02	C03	C04	C05	C06 (TO G10)	C07 (TO G11)	C08	C09 (TO G68)	
E	E04		E05		E08	E10 (TO G27)	E11	E12	E13	E14
	E15	E16	E17	E19	E20	E21	E22	E23	E24	E27
	E31		E32 (TO G76)	E33 (TO G74)		E35 (TO G73)	E36	E38		E39
	E40		E41	E42						

G

G

G04		G05		G06		G07		G08		G10 (TO C06)		G11 (TO C07)		G13		G14		G16	
G17		G18		G19		G20		G21		G22		G23		G24		G25		G26	
G27 (TO E10)		G29		G30		G31		G32			G33		G34		G35		G36		
G37		G38		G39		G40		G41		G42		G44		G45			G48		
G49				G50				G54		G63		G64		G65		G66		G67	
G 68 (TO C 09)		G 69		G 73 (TO E35)		G 74 (TO E33)				G 76 (TO E 32)		G 77		G 78					