SUZUKI

SV620

SUPPLEMENTARY SERVICE MANUAL
FOR VEHICLE WITH IGNITER INCORPORATED TYPE IGNITION COIL

USE THIS MANUAL WITH:
SV620 SERVICE MANUAL (99500-85F00)

SUZUKI
Caring for Customers

99501-85F20-01E
(英)

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.

FOREWORD

This SUPPLEMENTARY SERVICE MANUAL is a supplement to SV620 SERVICE MANUAL (99500-85F00).

Applicable model:
SV620 vehicles on and after following body No.
GROUP 1
(x) JSAETD11V00150001 (x)~
and applicable model of GROUP 2
GROUP 2
(x) JSAETD11V00200001 (x)~
TD11V-200001~

Therefore, whenever servicing applicable model of GROUP 2, consult GROUP 2 in this supplement first. And for any section, item or description not found in GROUP 2, refer to GROUP 1 and then "SV620 SERVICE MANUAL (99500-85F00)".
Also, when servicing applicable model of GROUP 1, consult GROUP 1 in this manual first. And for any section, item or description not found in GROUP 1, refer to "SV 620 SERVICE MANUAL (99500-85F00)".

When replacing parts or servicing by disassembling, it is recommended to use SUZUKI 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 used 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.

SUZUKI MOTOR CORPORATION
OVERSEAS SERVICE DEPARTMENT

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RELATED SERVICE MANUAL
- **SV620 SERVICE MANUAL (99500-85F00)**
- **VITARA SERVICE MANUAL (99500-60A10)**
- **VITARA SUPPLIMENTARY SERVICE MANUAL (99501-60A70)**
- **VITARA SUPPLIMENTARY SERVICE MANUAL (99501-61A10)**
- **SE/SV/SZ/SY SERIES SUPPLEMENTARY SERVICE MANUAL (99501-60G10)**

ABBREVIATIONS USED IN THIS MANUAL

A. ABS	: Anti-lock Brake System
A/C	: Air Conditioning
A/F	: Air Fuel mixture ratio
A/T	: Automatic Transmission
B. B+	: Battery Voltage
C. CMP sensor	: Camshaft Position Sensor
CPU	: Central Processing Unit
CTP switch	: Closed Throttle Position switch
D. DLC	: Data Link Connecter
E. ECM	: Engine Control Module
ECT sensor	: Engine Coolant Temp. sensor
EGR	: Exhaust Gas Recirculation
EVAP	: Evaporative Emission
F. 4WD	: Four Wheel Drive
G. GND	: Ground
I. IAC valve	: Idle Air Control valve
IAT sensor	: Intake Air Temp. sensor
IC	: Ignition Control
M. MAF sensor	: Mass Air Flow sensor
MAP sensor	: Manifold Absolute Pressure sensor
MIL	: Malfunction Indicator Lamp
M/T	: Manual Transmission
O. O/D	: Over Drive
P. PCM	: Powertrain Control Module
PCV valve	: Positive Crankcase Ventilation valve
PSP switch	: Power Steering Pressure switch
T. TCC	: Torque Converter Clutch
TCM	: Transmission Control Module
TP sensor	: Throttle Position sensor
V. VSS	: Vehicle Speed Sensor

SECTION 6E2

ELECTRONIC FUEL INJECTION SYSTEM

(SEQUENTIAL MULTIPORT FUEL INJECTION FOR H20A TYPE ENGINE)

NOTE:
For the descriptions (items) not found in this section of this manual, refer to the same section of SV620 service manual.

CONTENTS

GENERAL DESCRIPTION

The Electronic Fuel Injection System in this vehicle supplies the combustion chambers with air/fuel mixture of optimized ratio under widely varying driving conditions.
It uses the sequential multiport fuel injection system which injects fuel into each intake port of the cylinder head.

This system has 3 major sub-systems: air intake system, fuel delivery system and electronic control system.
Air intake system includes air cleaner, mass air flow sensor, throttle body, fast idle control system, idle air control valve and intake manifold.
Fuel delivery system includes fuel pump, delivery pipe, fuel pressure regulator, etc.
Electronic control system includes ECM, various sensors and controlled devices.

This section explains the system related to the electronic fuel injection as well as such functions of ECM as listed below.

- EGR system. (if equipped)
- Evaporative emission control system.
- IC (Ignition Control) system.

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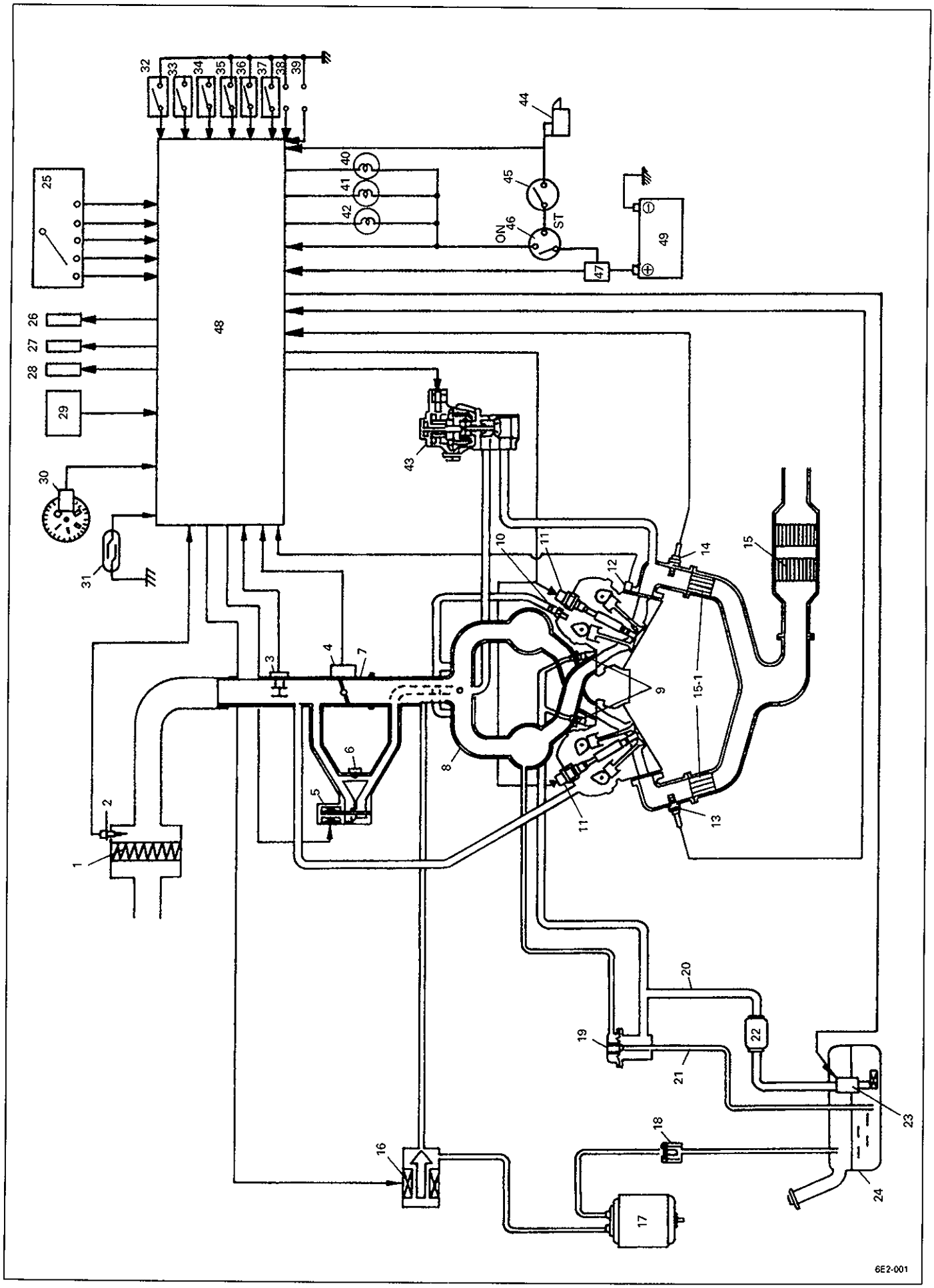
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ON
ST
6E2-001

1. Air cleaner
2. IAT sensor
3. MAF sensor
4. TP sensor
5. IAC valve
6. Idle speed adjusting screw
7. Throttle body
8. Intake manifold
9. Fuel injector
10. PCV valve
11. Ignition coil with ignitor
12. ECT sensor
13. Heated oxygen sensor
    (Right bank : bank 2), if equipped
14. Heated oxygen sensor
    (Left bank : bank 1), if equipped
15. Three way catalytic convertor (if equipped)

15-1. Warm up three way catalytic
    convertor (if equipped)

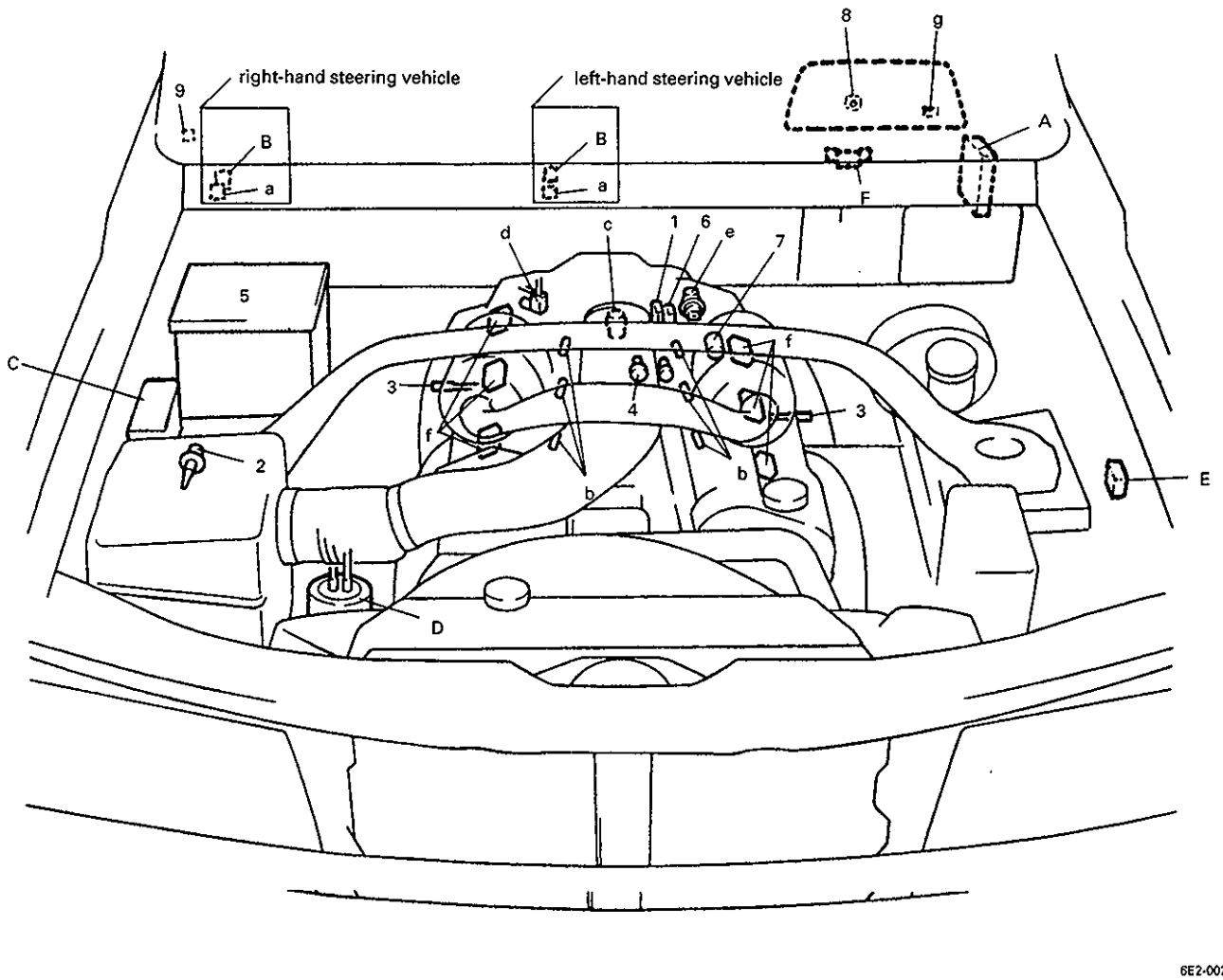
16. EVAP canister purge valve
17. EVAP canister
18. Tank pressure control valve
19. Fuel pressure regulator
20. Fuel feed line
21. Fuel return line
22. Fuel filter
23. Fuel pump
24. Fuel tank
25. Transmission range switch (A/T)
26. Shift solenoid valve A (A/T)
27. Shift solenoid valve B (A/T)
28. TCC solenoid valve (A/T)
29. A/C amplifier (if equipped)
30. CMP sensor
31. VSS (in speedometer)
32. PSP switch
33. Lighting switch (A/T)
34. Brake switch (A/T)
35. Mode selector switch (A/T)
36. O/D cut switch (A/T)
37. 4WD low switch (A/T)
38. Diagnosis switch terminal
39. Test switch terminal
40. Malfunction indicator lamp
    ("CHECK ENGINE" light)
41. "OD/OFF" light (A/T)
42. "POWER" light (A/T)
43. EGR valve
44. Starter magnetic switch
45. Transmission range switch (A/T)
46. Ignition switch
47. Main fuse
48. ECM
49. Battery

ELECTRONIC CONTROL SYSTEM

The electronic control system consists of 1) various sensors which detect the state of engine and driving conditions, 2) ECM 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
- Heated oxygen sensor heater control system
- Idle air control system
- Fuel pump control system
- Evaporative emission control system
- IC (Ignition Control) system
- EGR system

Also, with A/T model, ECM controls A/T.



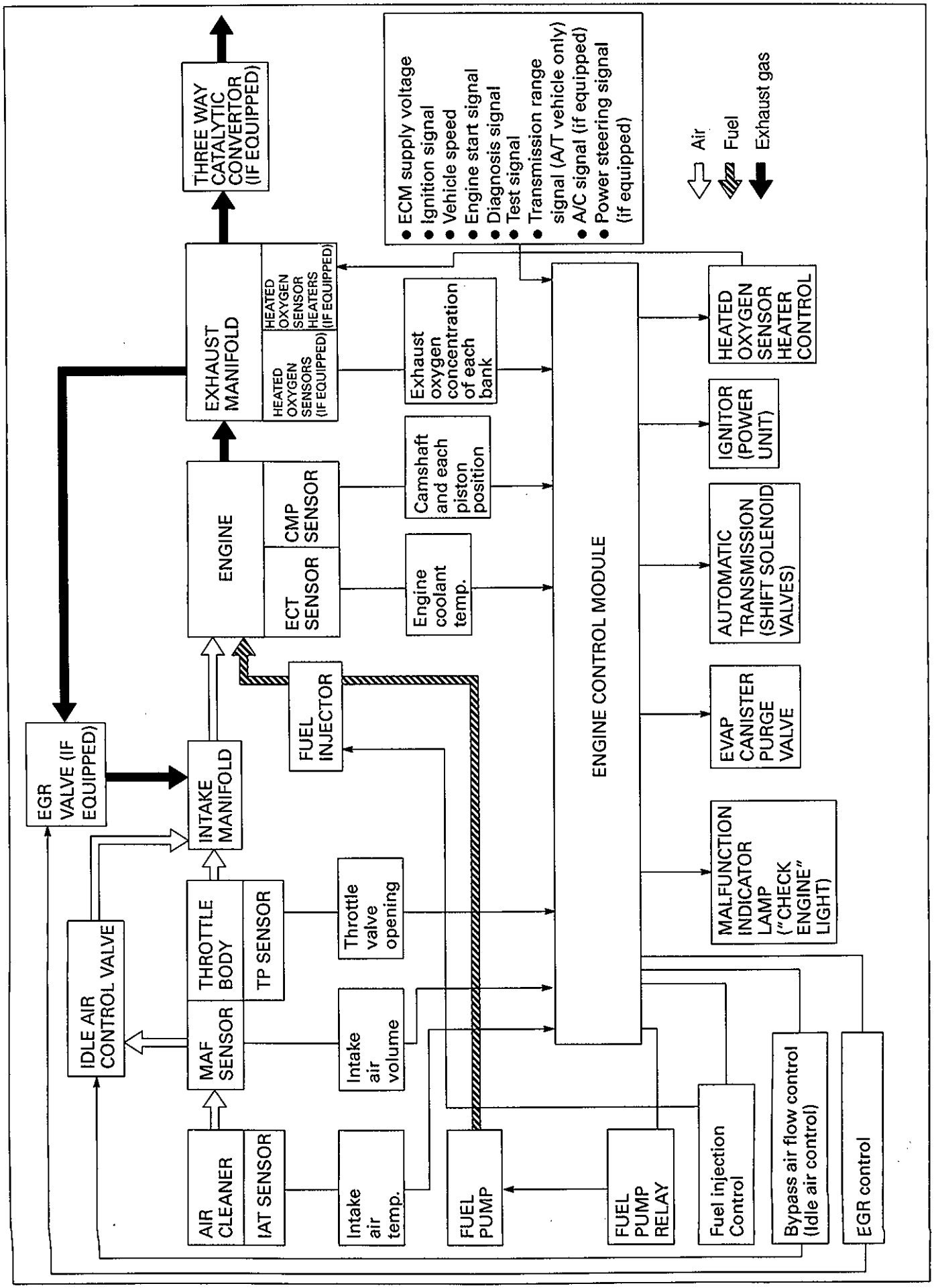
6E2-002

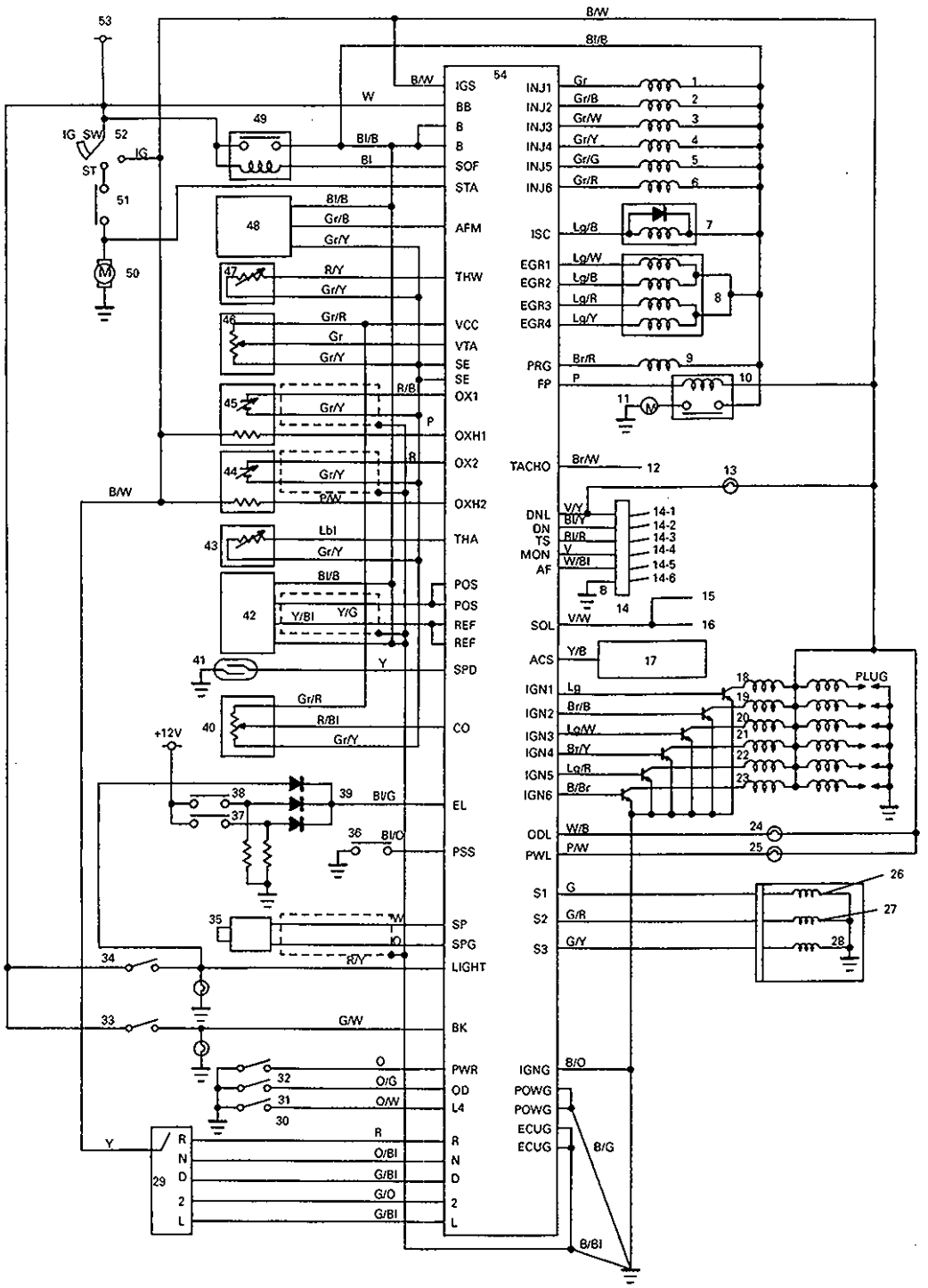
NOTE:
Above figure shows left-hand steering vehicle. For right hand steering vehicle, parts with (*) are installed at the other side.

INFORMATION SENSORS
1. MAF sensor
2. IAT sensor
3. Heated oxygen sensor (if equipped)
4. ECT sensor
5. Battery
6. TP sensor
7. Camshaft position sensor (CMP sensor)
8. VSS (in speedometer) (*)
9. CO adjusting resister (*) (vehicle without heated oxygen sensor only)

CONTROLLED DEVICES
a: Fuel pump relay
b: Injector
c: EGR valve (if equipped)
d: EVAP canister purge valve
e: Idle air control valve
f: Ignition coil (with igniter)
g: Malfunction indicator lamp (*) ("CHECK ENGINE" light)

OTHERS
A: ECM (*)
B: Main relay
C: Fuse box (*)
D: EVAP canister
E: Monitor coupler (*)
F: Data link connector (*) (Assembly line diag. link)


THREE WAY CATALYTIC CONVERTOR (IF EQUIPPED)
EXHAUST MANIFOLD
HEATED OXYGEN SENSOR HEATERS (IF EQUIPPED)
HEATED OXYGEN SENSORS (IF EQUIPPED)
ENGINE
CMP SENSOR
ECT SENSOR
EGR VALVE (IF EQUIPPED)
INTAKE MANIFOLD
FUEL INJECTOR
IDLE AIR CONTROL VALVE
THROTTLE BODY
TP SENSOR
MAF SENSOR
AIR CLEANER
IAT SENSOR
Intake air temp.
FUEL PUMP
FUEL PUMP RELAY
Fuel injection Control
Bypass air flow control (Idle air control)
EGR control
Throttle valve opening
Intake air volume
Exhaust oxygen concentration of each bank
Camshaft and each piston position
Engine coolant temp.
ENGINE CONTROL MODULE
HEATED OXYGEN SENSOR HEATER CONTROL
IGNITOR (POWER UNIT)
AUTOMATIC TRANSMISSION (SHIFT SOLENOID VALVES)
EVAP CANISTER PURGE VALVE
MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT)
• ECM supply voltage
• Ignition signal
• Vehicle speed
• Engine start signal
• Diagnosis signal
• Test signal
• Transmission range signal (A/T vehicle only)
• A/C signal (if equipped)
• Power steering signal (if equipped)
Air
Fuel
Exhaust gas



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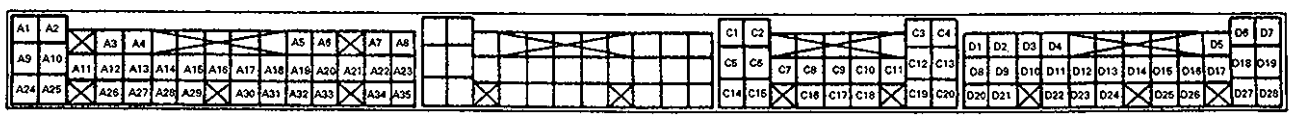
TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)

A/T vehicle



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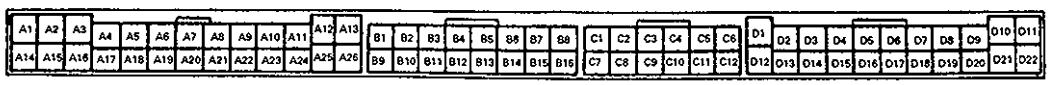
M/T vehicle



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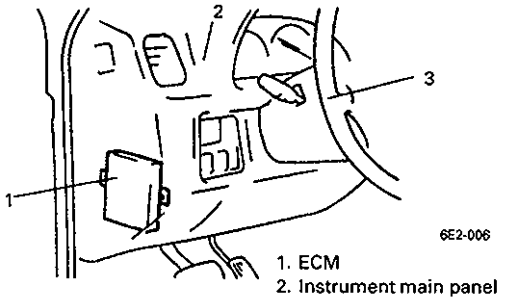
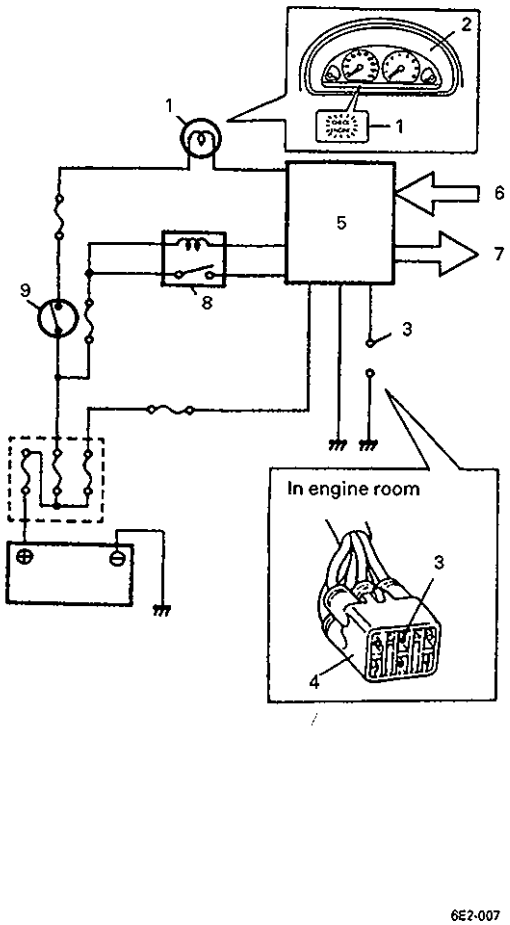
1. No.1 injector
2. No.2 injector
3. No.3 injector
4. No.4 injector
5. No.5 injector
6. No.6 injector
7. IAC valve
8. EGR valve (stepper motor) (if equipped)
9. EVAP canister purge valve
10. Fuel pump relay
11. Fuel pump
12. To tachometer
13. Malfunction indicator lamp ("CHECK ENGINE" light)
14. Monitor coupler
14-1. Diagnosis output terminal
14-2. Diagnosis switch terminal
14-3. Test switch terminal
14-4. Duty output terminal
14-5. A/F duty (Right bank, B2) output terminal
14-6. Ground terminal
15. To immobilizer (if equipped)
16. To DLC
17. A/C amplifier (if equipped)
18. No.1 ignition coil (with ignitor)
19. No.2 ignition coil (with ignitor)
20. No.3 ignition coil (with ignitor)
21. No.4 ignition coil (with ignitor)
22. No.5 ignition coil (with ignitor)
23. No.6 ignition coil (with ignitor)
24. "OD/OFF" light (A/T vehicle)
25. "POWER" light (A/T vehicle)
26. Shift solenoid valve A (A/T vehicle)
27. Shift solenoid valve B (A/T vehicle)
28. TCC solenoid valve (A/T vehicle)
29. Transmission range switch (A/T vehicle)
30. 4WD low switch (A/T vehicle)
31. O/D cut switch (A/T vehicle)
32. Mode selector switch (A/T vehicle)
33. Brake light switch
34. Lighting switch
35. Vehicle speed sensor (in A/T)
36. Power steering pressure switch
37. Blower fan switch
38. Rear defogger switch
39. Electric load diodes
40. CO adjusting resistor (Vehicle without heated oxygen sensor only)
41. Vehicle speed sensor (in speedometer)
42. CMP sensor
43. IAT sensor
44. Heated oxygen sensor (right bank, if equipped)
45. Heated oxygen sensor (left bank, if equipped)
46. TP sensor
47. ECT sensor
48. MAF sensor
49. Main relay
50. Starter magnetic switch
51. Transmission range switch (A/T vehicle)
52. Ignition switch
53. Battery positive terminal

TER-MINAL	POSI-TION M/T	POSI-TION A/T	CIRCUIT
BB	B11	A19	Power source for back-up
B	D1 D12	A1 A9	Power source
IGS	–	D1	Ignition switch
	B7	–	Ignition switch (with immobilizer)
	C7	–	Ignition switch (without immobilizer)
SOF	D20	A22	Main relay
ECUG	D10 D22	A24 A33	Ground
POWG	A13 A26	D18 D22	Ground
IGNG	D11	A2	Ground
VCC	A7	D9	Power source for sensors
SE	A20 B8	D21 D22	Sensor ground
VTA	A23	D23	Throttle position sensor
THW	A19	D15	ECT sensor
AFM	A24	D24	MAF sensor
POS	A8 A9	D16 D17	CMP sensor POSITION signal (with immobilizer)
	A10 A11	D25 D26	CMP sensor POSITION signal (without immobilizer)
REF	A10 A11	D25 D26	CMP sensor REFERENCE signal (with immobilizer)
	A8 A9	D16 D17	CMP sensor REFERENCE signal (without immobilizer)
SPD	B5	A32	Vehicle speed sensor (in speedometer)
STA	A6	D3	Engine start switch
PSS	A5	D10	Power steering pressure switch
EL	B3	A17	Electric load signal diodes
THA	A21	D11	Intake air temp. sensor
OX1	A22	D4	Heated oxygen sensor 1 (left bank, if equipped)
CO	A22	D4	CO adjusting resistor (vehicle without heated oxygen sensor only)
OX2	C1	C9	Heated oxygen sensor 2 (right bank, if equipped)
INJ 1	A1	D28	No.1 injector
INJ 2	A2	D19	No.2 injector
INJ 3	A14	D7	No.3 injector
INJ 4	A15	D6	No.4 injector
INJ 5	A12	C20	No.5 injector
INJ 6	A25	C13	No.6 injector

TER-MINAL	POSI-TION M/T	POSI-TION A/T	CIRCUIT
IGN 1	D4	C14	No.1 ignitor (ignition coil)
IGN 2	D7	C15	No.2 ignitor (ignition coil)
IGN 3	D2	A25	No.3 ignitor (ignition coil)
IGN 4	D5	A12	No.4 ignitor (ignition coil)
IGN 5	D6	A10	No.5 ignitor (ignition coil)
IGN 6	D3	A11	No.6 ignitor (ignition coil)
EGR 1	C2	D5	EGR valve (stepper motor coil 1, if equipped)
EGR 2	C3	D14	EGR valve (stepper motor coil 2, if equipped)
EGR 3	C4	D12	EGR valve (stepper motor coil 3, if equipped)
EGR 4	C5	D13	EGR valve (stepper motor coil 4, if equipped)
ISC	A16	D20	IAC valve
PRG	A4	D2	EVAP canister purge valve
OXH 1	A3	D8	Heated oxygen sensor heater (left bank, if equipped)
OXH 2	D21	C5	Heated oxygen sensor heater (right bank, if equipped)
FP	D9	A20	Fuel pump relay
TACHO	B15	A7	Tachometer
ACS	B13	A30	A/C amplifier (if equipped)
AF	B9	C8	A/F duty output terminal (right bank)
DNL	D15	A5	Diagnosis output terminal and MIL ("CHECK ENGINE" light)
DN	B12	A29	Diagnosis switch terminal
TS	B4	A16	Test switch terminal
MON	D13	A35	Duty output terminal
SDL	D18	A34	Data link connector
R	–	A4	R range signal
N	–	A26	N range signal
D	–	A15	D range signal
2	–	A13	2 range signal
L	–	C11	L range signal
SP	–	C2	A/T vehicle speed sensor (+)
SPG	–	C1	A/T vehicle speed sensor (-)
OD	–	A18	O/D cut switch
LIGHT	–	A3	Lighting switch
L4	–	A14	4WD low switch
PWR	–	A31	Mode selector switch
BK	–	A28	Brake switch
S1	–	C12	Shift solenoid valve A
S2	–	C4	Shift solenoid valve B
S3	–	C3	TCC solenoid valve
ODL	–	A21	"OD/OFF" light
PWL	–	A6	"POWER" light



1. ECM
2. Instrument main panel
3. Steering wheel



1. Malfunction indicator lamp ("CHECK ENGINE" light)
2. Cluster
3. Diagnosis switch terminal
4. Monitor coupler
5. ECM
6. Sensed information
7. Output
8. Main relay
9. Ignition switch

Engine Control Module (ECM)

ECM is installed to the underside of the instrument panel at the driver's seat side.

ECM is a precision unit consisting of microcomputer, A/D (Analog/Digital) converter, I/O (Input/Output) unit, etc..

It is an essential part of the electronic control system, for its functions include not only such a major function as to control fuel injector, idle air control valve, fuel pump relay, etc. but also on-board diagnostic system (self-diagnosis function) and fail-safe function as described in the following section.

On-board diagnostic system (Self-diagnosis function)

ECM diagnoses troubles which may occur in the areas including the following parts when the ignition switch is ON or the engine is running, and indicates the result by turning on or flashing malfunction indicator lamp ("CHECK ENGINE" light).

- Heated oxygen sensors (Left and right bank, if equipped)
- Intake air temp. sensor
- Engine coolant temp. sensor
- Throttle position sensor
- Vehicle speed sensor
- Mass air flow sensor
- Camshaft position sensor
- EGR stepper motor (if equipped)
- Fuel system (vehicle with heated oxygen sensor)
- CPU (Central Processing Unit) of ECM

ECM and malfunction indicator lamp ("CHECK ENGINE" light) operate as follows.

- Malfunction indicator lamp ("CHECK ENGINE" light) lights when the ignition switch is turned ON (but the engine at stop) with the diagnosis switch terminal ungrounded regardless of the condition of Electronic Fuel Injection system. This is only to check the malfunction indicator lamp ("CHECK ENGINE" light) bulb and its circuit.
- If the above areas of Electronic Fuel Injection system is free from any trouble after the engine start (while engine is running), malfunction indicator lamp ("CHECK ENGINE" light) turns OFF.
- When ECM detects a trouble which has occured in the above areas, it makes malfunction indicator lamp ("CHECK ENGINE" light) 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 back-up memory.

  (The memory is kept as it is even if the trouble was only temporary and disappeared immediately. And it is not erased unless the power to ECM is shut off for 2 minuits or longer.) ECM also indicates trouble area in memory by means of flashing of malfunction indicator lamp ("CHECK ENGINE" light) at the time of inspection (i.e. when diagnosis switch terminal is grounded and ignition switch is turned ON).

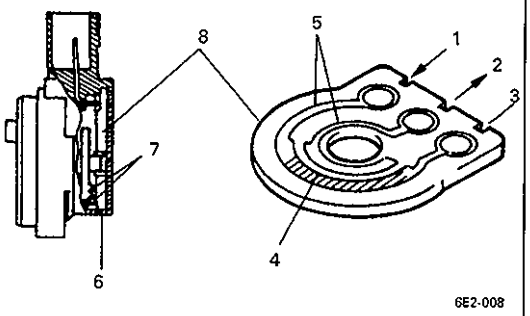
NOTE:

- **Even when a trouble occurs in CMP sensor circuit (circuit open), ECM does not indicate it (or activate malfunction indicator lamp ("CHECK ENGINE" light)).**
  And when that troubled circuit regains good condition, the memory of defective area will be erased automatically even if the power circuit to ECM is not opened as described above.
- **For on-board diagnostic system and fail-safe function of A/T related parts, refer to On-Board Diagnostic System in section 7B1.**

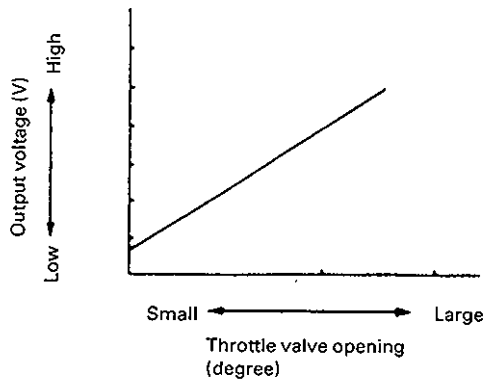
Fail-safe function

Even when a trouble has occurred in such areas of Electronic Fuel Injection system that include the following parts and a failure signal is sent to ECM, control over the injector, idle air control valve and other is maintained on the basis of the standard signals and/or back-up program prestored in the ECM while ignoring that failure signal and/or CPU. This function is called "fail-safe function". Thus, with this function, a certain level of engine performance is available even when some failure occurs in such areas so that disability in running is avoided.

- Engine coolant temp. sensor
- Intake air temp. sensor
- Throttle position sensor
- Mass air flow sensor
- EGR stepper motor (if equipped)
- CPU in ECM



1. Reference voltage
2. Output
3. Ground
4. Resistor
5. Conductor
6. Rotor
7. Brush
8. Resistire segment



Throttle Position Sensor (TP Sensor)

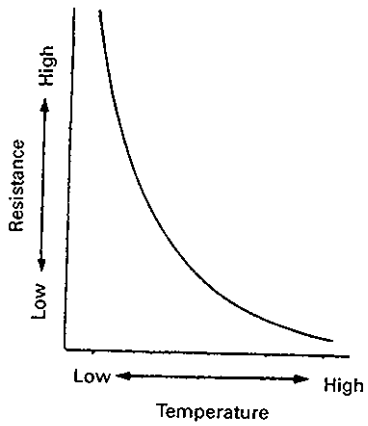
The throttle position sensor consisting of a potentiometer is installed on the throttle body, and detects the throttle valve opening.

A 5-volt reference voltage is applied to the sensor from ECM and as its brush moves over the print resistance according to the throttle valve opening, the output voltage varies accordingly.

By monitoring the sensor output voltage, ECM detects the throttle valve opening.

ECM uses the signal from TP sensor as one of the signals to control fuel injector, idle air control valve, ignition timing, EVAP canister purge valve, EGR valve (if equipped).

Also for A/T model, ECM controls the automatic transmission.



Engine coolant sensor characteristic

Engine Coolant Temperature Sensor (ECT Sensor)

Incorporated with engine coolant temp. gauge and located at the water outlet pipe, this sensor measures the temperature of the engine coolant and converts its change into that in resistance through the thermister.

By monitoring the resistance of the coolant temperature sensor, ECM detects the engine coolant temperature and that affects most systems under the control of ECM.

Also for A/T model, ECM control the automatic transmission (TCC operation and gear shift to O/D gear).

IC (IGNITION CONTROL) SYSTEM

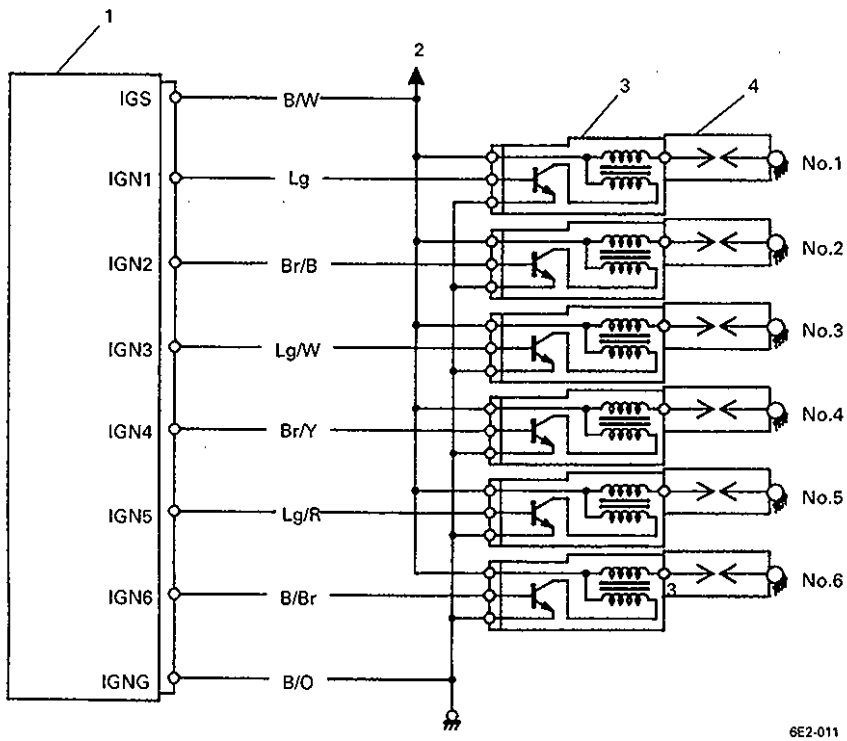
This system controls electronically the time of electric current flow to ignition primary coils as well as ignition timing.

ECM judges the engine condition by using signals from various sensors, selects the most suitable electric current flow time and ignition timing for that engine condition from among those prestored in its memory and sends an ignition signal to the igniter.

The igniter (in ignition coil) turns ON and OFF the primary current of the ignition coils according to the signal from ECM.

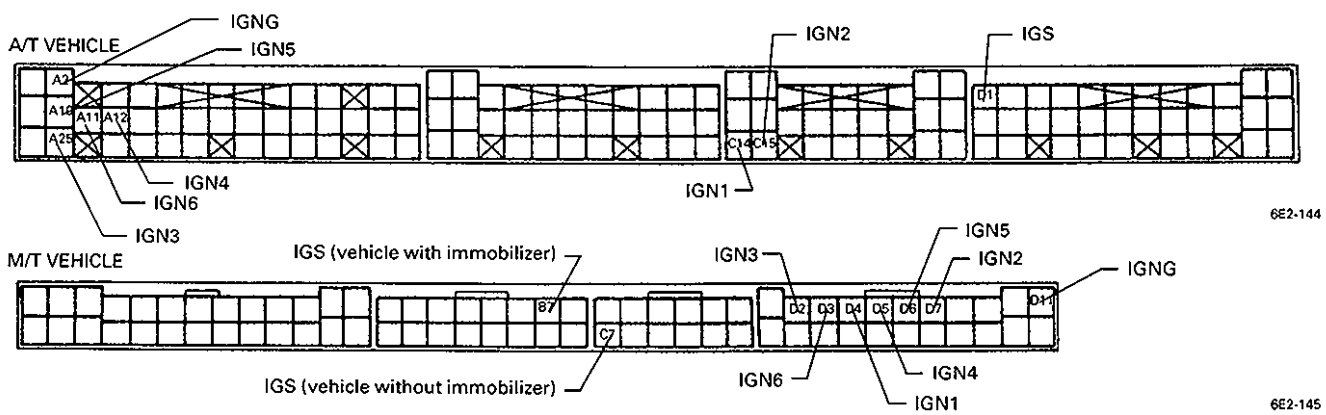
Control of the system includes three different types as. follows.

- Ignition timing control at engine start
- Ignition timing control after engine start
- Electric current flow time control



1. ECM
2. To ignition switch
3. Ignitor (in ignition coil)
4. Spark plug

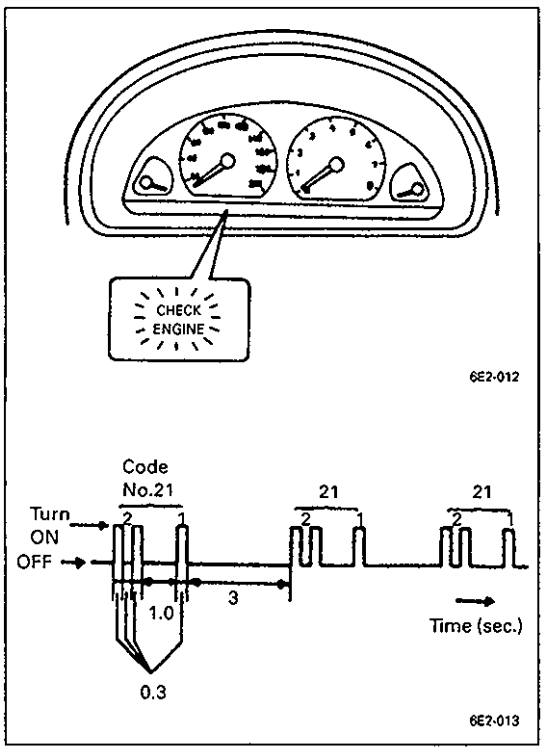
TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)



DIAGNOSIS

ECM has on-board diagnostic system (a system self-diagnosis function) as described previously (p. 6E2-10). Investigate where the trouble is by referring to "DIAGNOSTIC FLOW CHART" and "DIAGNOSTIC TROUBLE CODE TABLE" on later pages.

NOTE:
For diagnosis of A/T related part detected by ECM, refer to DIAGNOSIS in section 7B1.



PRECAUTIONS IN DIAGNOSING TROUBLES

[PRECAUTIONS IN IDENTIFYING DIAGNOSTIC TROUBLE CODE]

- Before identifying diagnostic trouble code indicated by malfunction indicator lamp ("CHECK ENGINE" light), don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine. Such disconnection will erase memorized trouble in ECM memory
- If abnormality or malfunction lies in two or more areas, malfunction indicator lamp ("CHECK ENGINE" light) 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.

DIAGNOSTIC FLOW CHART

START

Does malfunction indicator lamp ("CHECK ENGINE" light) turn ON when ignition switch is turned ON (without starting engine.)?

NO (Remains OFF)

Does engine start?

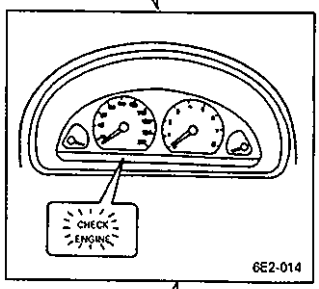
NO

Proceed to chart A-1. (ECM power and ground circuit check.)

YES

Proceed to chart A-2. (Malfunction indicator lamp ("CHECK ENGINE" light) circuit check.)

YES



NO (Flashes)

Proceed to DIAGNOSIS of SECTION 8A.

Using service wire, ground diagnosis switch terminal and observe malfunction indicator lamp ("CHECK ENGINE" light).

NOTE:
If engine fails to start, crank it for 2 seconds and then while keeping ignition switch ON (Don't turn it OFF) ground diagnosis switch terminal

Remains ON

Proceed to chart A-3. (Malfunction indicator lamp ("CHECK ENGINE" light) circuit check.)

Flashes

Is diagnostic trouble code No.12 indicated?

YES

Are engine basic parts described in SECTION 6 "ENGINE DIAGNOSIS" in good condition?

YES

Proceed to "TROUBLE DIAGNOSIS". Check Electronic Fuel Injection system parts that are not indicated by on-board diagnostic system self-diagnosis function.

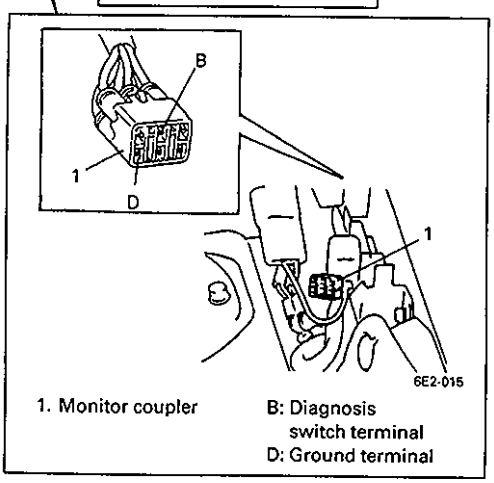
NO

Repair or replace

Check and repair according to flow chart corresponding to that code No.

NO

1. After repair, disconnect battery negative cable for longer than 2 min. to erase diagnostic trouble code stored in ECM memory and reconnect it.
2. Start engine and warm it up to normal operating temperature.
3. With grounding diagnosis switch terminal and ignition switch turned ON, make sure that malfunction indicator lamp ("CHECK ENGINE" light) shows code No. 12.
4. Remove service wire and reinstall cap.



1. Monitor coupler
B: Diagnosis switch terminal
D: Ground terminal

Is trouble corrected?

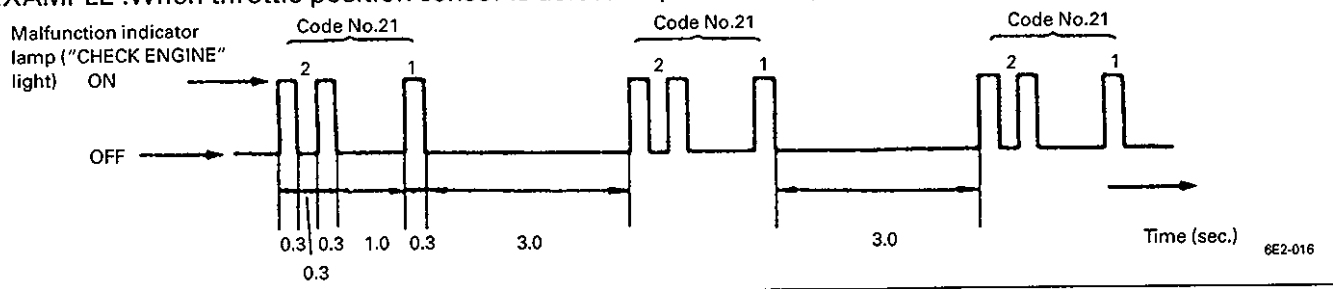
NO

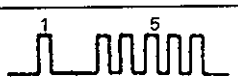
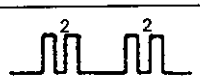
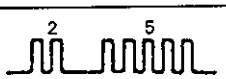
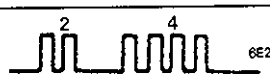
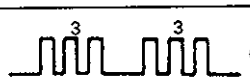
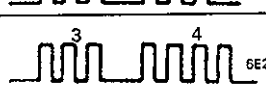
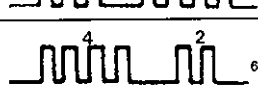
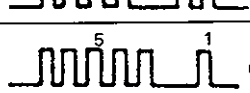
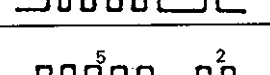
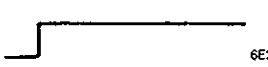
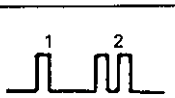
YES

END

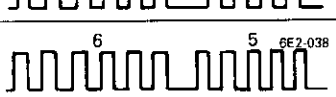
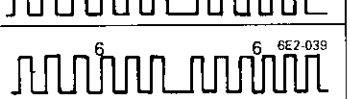
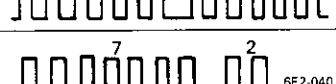
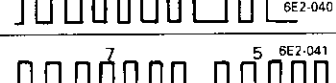
DIAGNOSTIC TROUBLE CODE TABLE (1 OF 2, M/T AND A/T)

EXAMPLE :When throttle position sensor is defective (Code No.21)



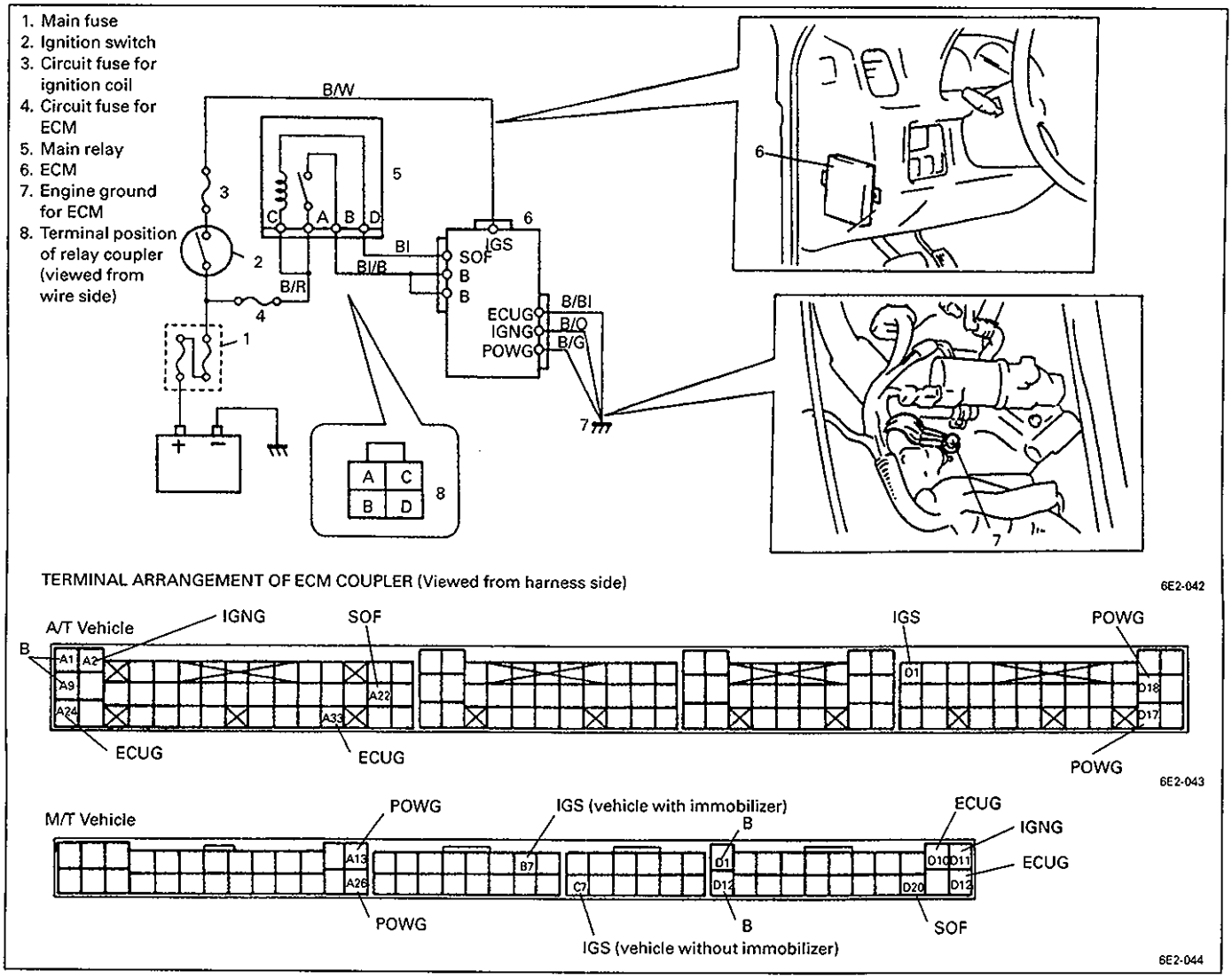
DIAGNOSTIC TROUBLE CODE NO.	MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) FLASHING PATTERN	DIAGNOSTIC ITEM	DIAGNOSIS
13	 6E2-017	Left bank heated oxygen sensor (if equipped)	Diagnose trouble according to "DIAGNOSTIC FLOW CHART" corresponding to each code No.
26	 6E2-018	Right bank heated oxygen sensor (if equipped)	
14	 6E2-019	Engine coolant temperature sensor	
15	 6E2-020		
21	 6E2-021	Throttle position sensor	
22	 6E2-022		
23	 6E2-023	Intake air temperature sensor	
25	 6E2-024		
24	 6E2-025	Vehicle speed sensor	
33	 6E2-026	Mass air flow sensor	
34	 6E2-027		
42	 6E2-029	Camshaft position sensor	
51	 6E2-030	EGR valve (stepper motor, if equipped)	
52	 6E2-031	Fuel system (vehicle with heated oxygen sensor only)	
ON	 6E2-032	ECM	ECM failure.
12	 6E2-033	Normal	This code appears when none of the other codes (above codes) are identified.

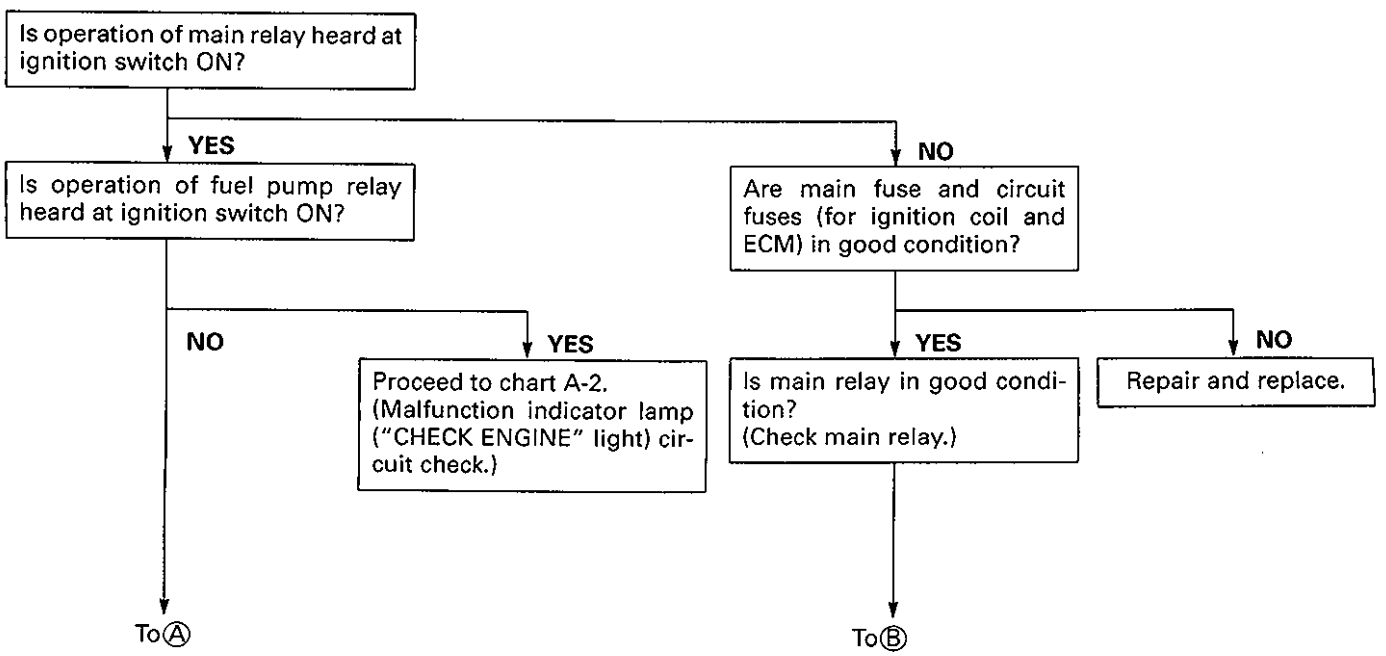
DIAGNOSTIC TROUBLE CODE TABLE (2 OF 2, A/T ONLY)

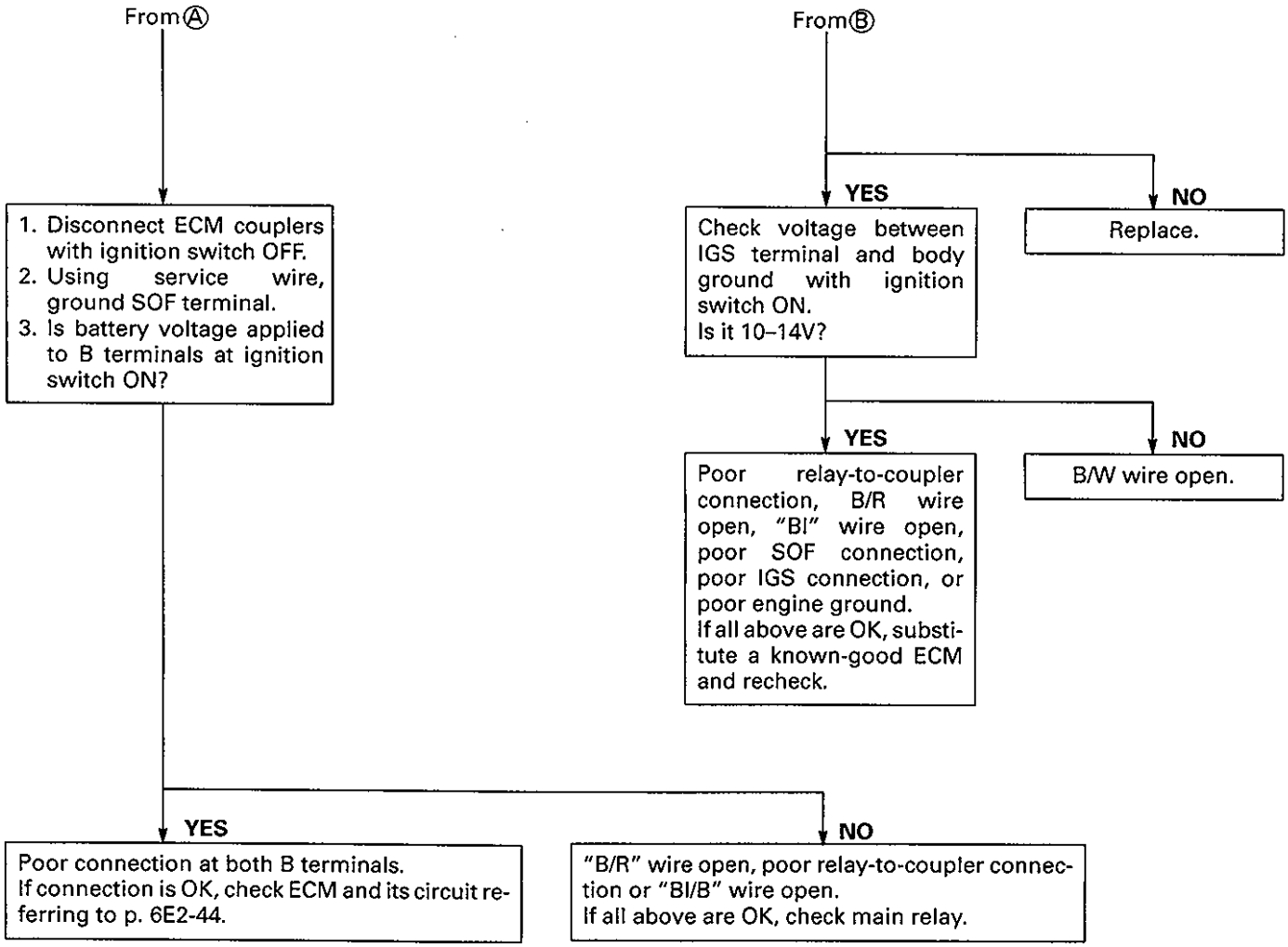
DIAGNOSTIC TROUBLE CODE NO.	MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) FLASHING PATTERN	DIAGNOSTIC ITEM	DIAGNOSIS
61		Shift solenoid A	Refer to section 7B1
62			
63		Shift solenoid B	
64			
65		TCC solenoid	
66			
72		Transmission range switch	
75		A/T VSS	

A-1 ECM POWER AND GROUND CIRCUIT CHECK

(MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) DOESN'T LIGHT AT IGNITION SWITCH ON AND ENGINE DOESN'T START THOUGH IT IS CRANKED UP.)

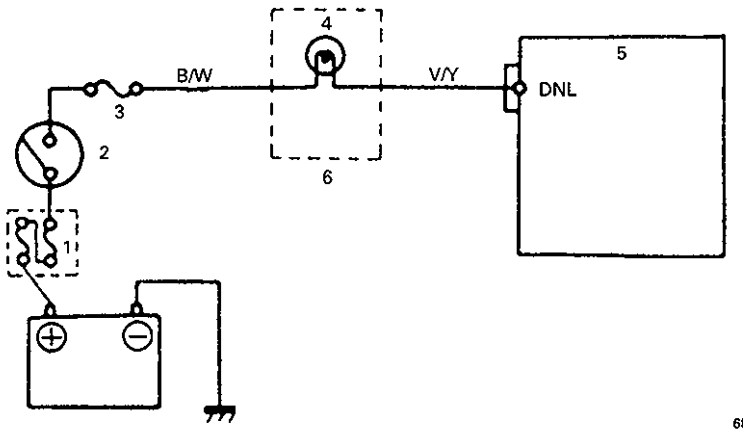





From Ⓐ
From Ⓑ
1. Disconnect ECM couplers with ignition switch OFF.
2. Using service wire, ground SOF terminal.
3. Is battery voltage applied to B terminals at ignition switch ON?
YES
NO
Check voltage between IGS terminal and body ground with ignition switch ON.
Is it 10–14V?
Replace.
YES
NO
Poor relay-to-coupler connection, B/R wire open, "BI" wire open, poor SOF connection, poor IGS connection, or poor engine ground.
If all above are OK, substitute a known-good ECM and recheck.
B/W wire open.
YES
NO
Poor connection at both B terminals.
If connection is OK, check ECM and its circuit referring to p. 6E2-44.
"B/R" wire open, poor relay-to-coupler connection or "BI/B" wire open.
If all above are OK, check main relay.

A-2 MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) CIRCUIT CHECK

(MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) DOESN'T LIGHT AT IGNITION SWITCH ON THOUGH ENGINE STARTS.)

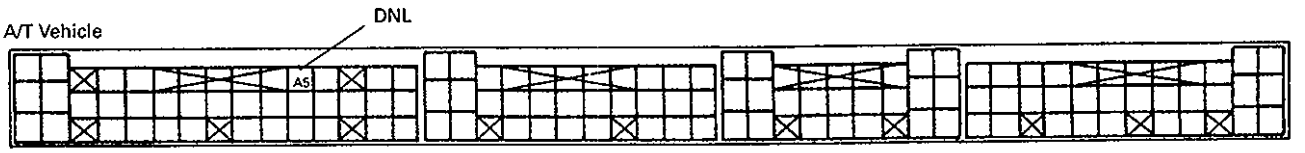


1. Main fuse
2. Ignition switch
3. Circuit fuse
4. Malfunction indicator lamp ("CHECK ENGINE" light) bulb
5. ECM
6. Combination meter

6E2-045

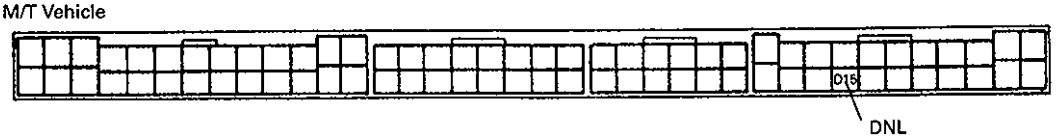
TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)

A/T Vehicle



6E2-047

M/T Vehicle



6E2-046

1. With ignition switch turned OFF, disconnect couplers from ECM.
2. Body-ground terminal DNL in coupler disconnected.
3. Does malfunction indicator lamp ("CHECK ENGINE" light) turn ON at ignition switch ON?

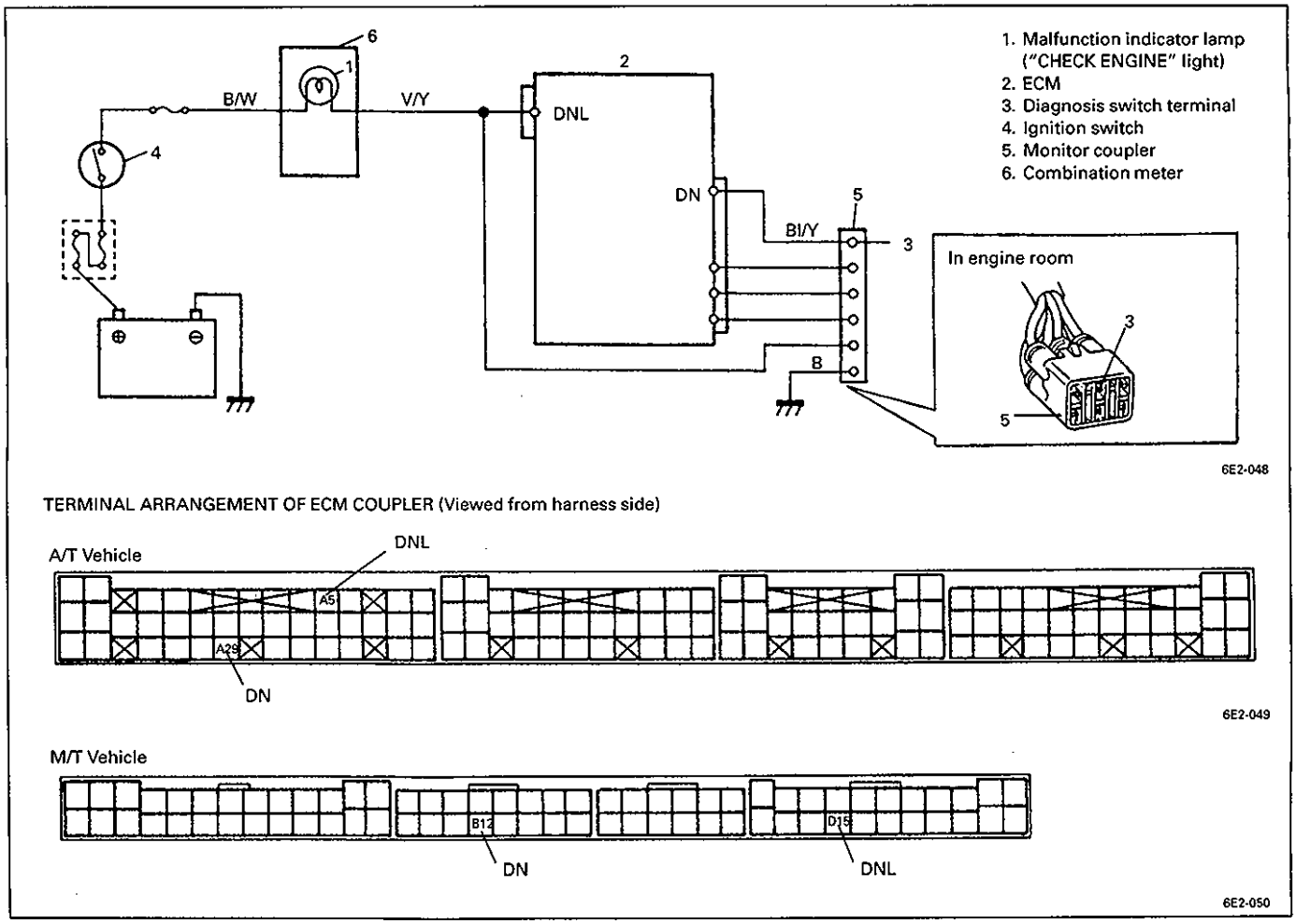
NO → Bulb burned out, "V/Y" wire circuit open or "B/W" wire circuit open.

YES →

Poor DNL connection.
If connection is, OK substitute a known-good ECM and recheck.

A-3 MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) CIRCUIT CHECK

(MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) DOESN'T FLASH JUST REMAINS ON EVEN WITH GROUNDING DIAGNOSIS SWITCH TERMINAL.)



1. Disconnect ECM couplers with ignition switch turned OFF.
2. Does malfunction indicator lamp("CHECK ENGINE" light) turn ON at ignition switch ON?

YES → "V/Y" wire circuit shorted to ground.

NO → Is coupler (terminal DN) connected to ECM properly?

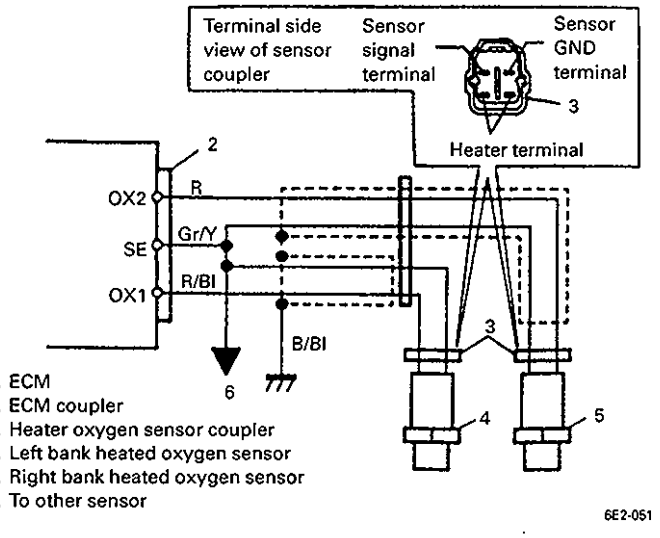
NO → Poor connection.

YES → 1. Using service wire, ground terminal DN with couplers connected to ECM.
2. Does malfunction indicator lamp ("CHECK ENGINE" light) flash at ignition switch ON?

YES → Poor grounding, "BI/Y" wire circuit open or "B" wire open.

NO → Substitute a known-good ECM and recheck.

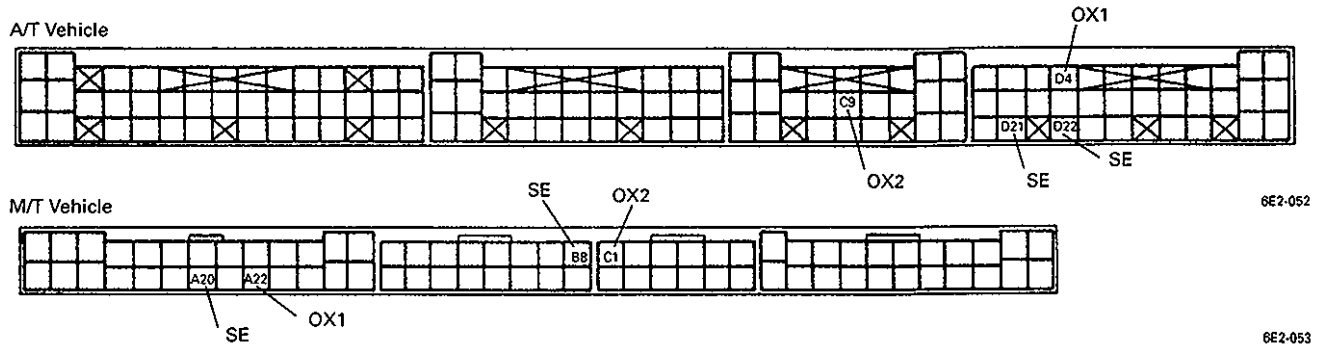
CODE NO.13 LEFT BANK HEATED OXYGEN SENSOR CIRCUIT AND/OR CODE NO.26 RIGHT BANK HEATED OXYGEN SENSOR CIRCUIT (IF EQUIPPED)



NOTE:

- **Before diagnosing trouble according to flow chart given below, check to make sure that following system and parts other than Electronic Fuel Injection system are in good condition.**
  - **Air cleaner (clogged)**
  - **Vaccum leaks (air inhaling)**
  - **Spark plugs (contamination, gap)**
  - **Ignition coil**
  - **Ignition timing**
  - **Engine compression**
  - **Any other system and parts which might affect A/F mixture or combustion.**
- **If code No.13 (26) and another code No. are indicated together, the later has priority. Therefore, check and correct what is represented by that code No. first and then proceed to the follwing check.**
- **Be sure to use a voltmeter with high impedance (MΩ/V minimum) or digital type voltmeter for accurate measurement.**

TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)



1. Remove ECM and connect couplers to ECM.
2. Warm up engine to normal operating temperature.
3. Connect voltmeter between OX1 (left bank, code No.13) or OX2 (right bank, code No.26) of ECM coupler and body ground.
4. Maintain engine speed at 2,000 r/min. After 60 seconds, check voltmeter.

Remains unchanged at below 0.45 V.

Deflects between above and below 0.45 V repeatedly

1. Maintain engine speed at 2,000 r/min for 60 sec.
2. Check voltmeter while repeating racing engine. Does it indicate 0.45 V or more even once?

Heated oxygen sensor and its circuit (closea roop system, Air/fuel ratio feed back system) are in good condition.
Intermittent trouble or faulty ECM.
Recheck referring to Intermittent trouble.

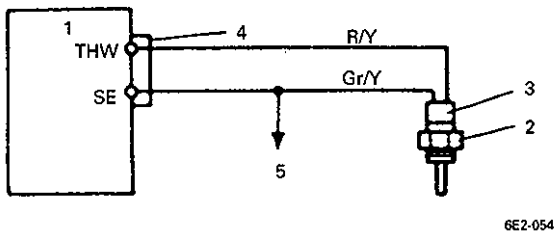
NO

Replace heated oxygen sensor and recheck.

YES

Poor OX1 or OX2 connection of ECM coupler or lean A/F mixture.
Check MAF sensor, ECT sensor, fuel pressure, injectors and their circuit.
If all above are OK, check ECM and its circuit referring to p. 6E2-44.

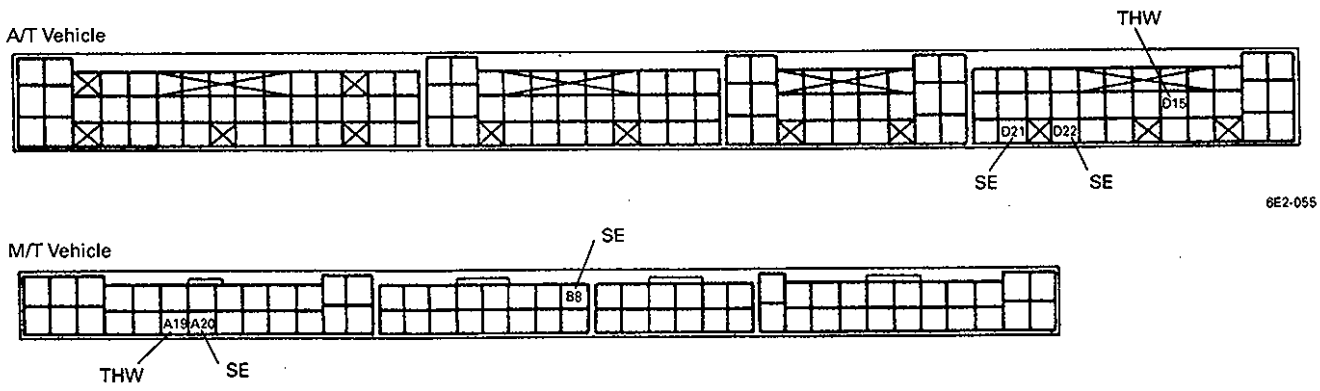
CODE NO.14 ECT SENSOR (ENGINE COOLANT TEMP. SENSOR) CIRCUIT (LOW TEMPERATURE INDICATED, SIGNAL VOLTAGE HIGH)



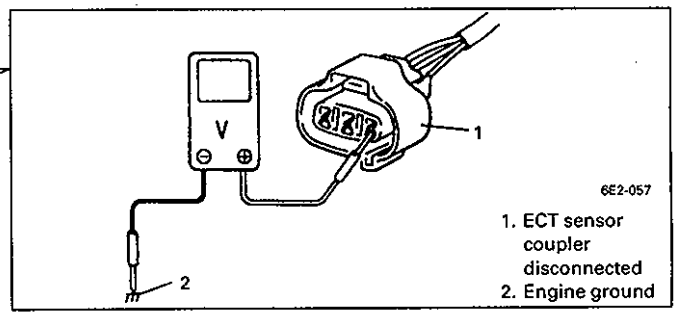
1. ECM
2. ECT sensor
3. Coupler
4. ECM coupler
5. To other sensors

NOTE:
When Code Nos. 13, 14, 21, 23, 26 and 33 are indicated together, it is possible that "Gr/Y" wire is open or SE terminal connections are poor.

TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)



1. Disconnect ECT sensor coupler with ignition switch OFF.
2. With ignition switch ON, check voltage at "R/Y" wire terminals of ECT sensor coupler. Is it about 4 – 5 V?



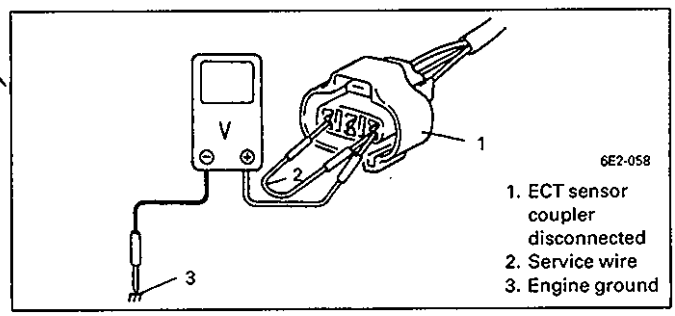
1. ECT sensor coupler disconnected
2. Engine ground

YES

1. Using service wire, connect ECT sensor coupler terminals.
2. Check voltage at "R/Y" wire terminal of ECT sensor coupler with ignition switch ON. Is it below 0.15V?

NO

"R/Y" wire open, poor THW connection or "R/Y" wire shorted to power circuit.
If wire and connection are OK, substitute a known-good ECM and recheck.



1. ECT sensor coupler disconnected
2. Service wire
3. Engine ground

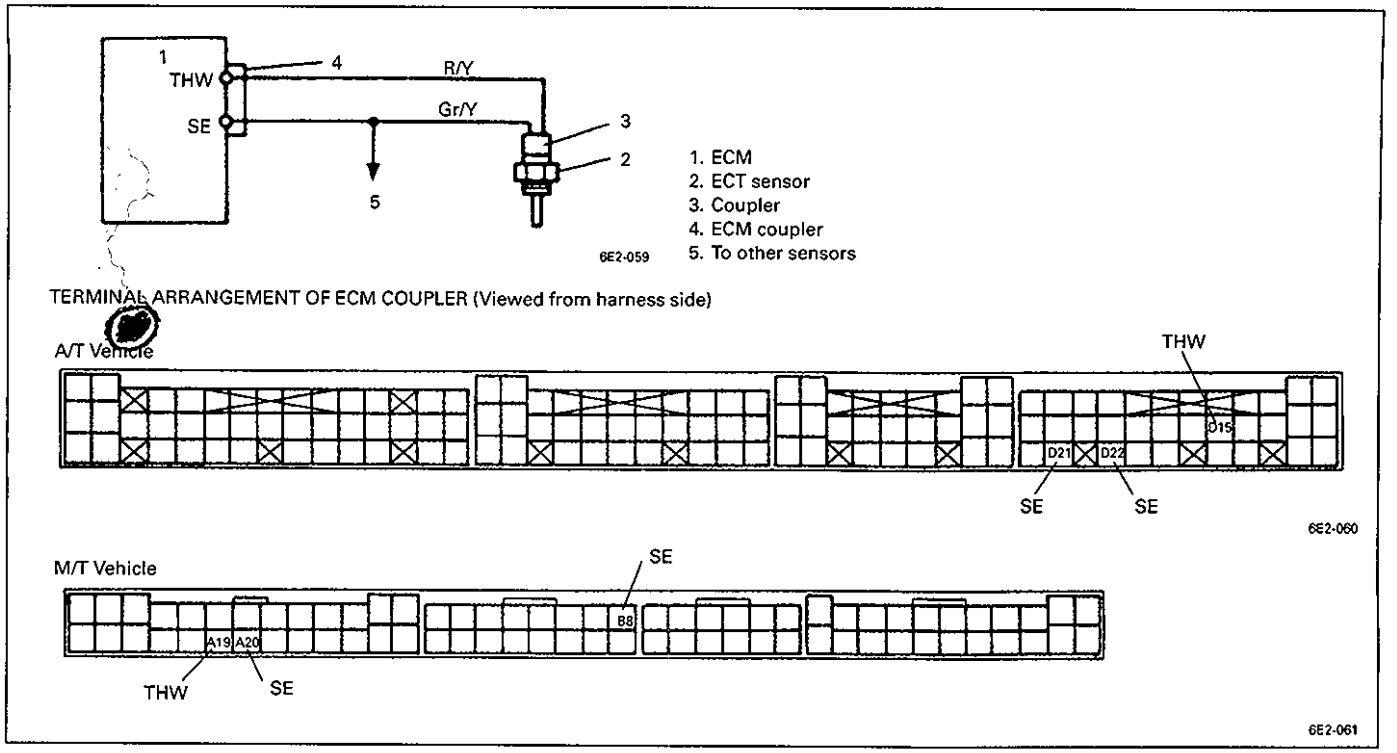
NO

"Gr/Y" wire open or poor SE connection.
If wire and connection are OK, faulty ECM.
Substitute a known-good ECM and recheck.

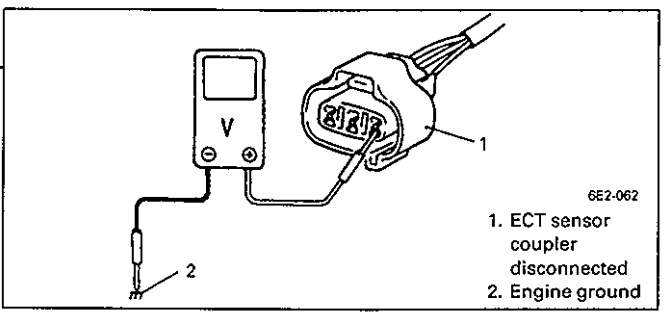
YES

Poor ECT sensor-to-coupler connection of faulty ECT sensor.
If connection and ECT sensor are OK, intermittent trouble or faulty ECM. Recheck referring to Intermittent trouble.

CODE NO.15 ECT SENSOR (ENGINE COOLANT TEMP. SENSOR) CIRCUIT (HIGH TEMPERATURE INDICATED, SIGNAL CIRCUIT VOLTAGE LOW)



1. Disconnect ECT sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "R/Y" wire terminals of ECT sensor coupler 4V or more?



YES

Check ECT sensor. Is it in good condition?

NO

"R/Y" wire shorted to "Gr/Y" wire or ground circuit. If wire is OK, substitute a known-good ECM and recheck.

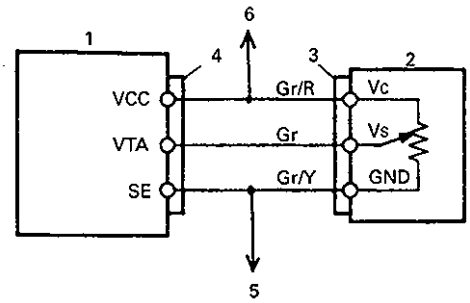
YES

Intermittent trouble or faulty ECM. Recheck referring to Intermittent trouble.

NO

Faulty ECT sensor.

CODE NO.21 TP SENSOR (THROTTLE POSITION SENSOR) CIRCUIT (SIGNAL VOLTAGE HIGH)

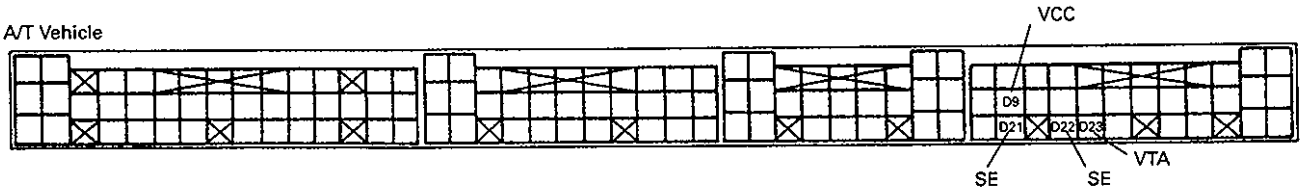


1. ECM
2. TP sensor
3. Coupler
4. ECM coupler
5. To other sensors
6. To CO adjusting resistor (if equipped)

6E2-063

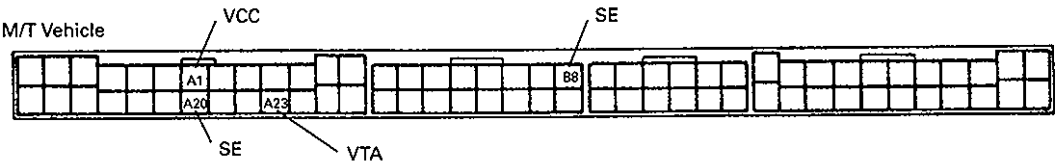
TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)

A/T Vehicle



6E2-064

M/T Vehicle



6E2-065

1. Disconnect TP sensor coupler with ignition switch OFF.
2. Check voltage between "Gr/R" wire terminal and "Gr/Y" wire terminal of disconnected TP sensor coupler with ignition switch ON.
3. Is it about 4 – 5V?

YES

1. Connect TP sensor coupler with ignition switch OFF.
2. Remove ECM and connect ECM couplers with ignition switch OFF.
3. Check voltage between VTA terminal and body ground with ignition switch ON.

NO

"Gr/Y" with open, poor SE connections, or "Gr/R" wire shorted to power circuit.

VTA terminal voltage is:
0.50 ± 0.15 V at throttle valve is fully close 4.0 ± 0.5 V at throttle valve is fully open.

Poor VTA connection.
If connection is OK, substitute a known good ECM and recheck.

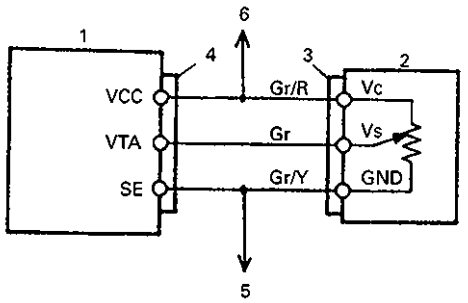
VTA terminal voltage is about 4 – 5 V.

"Gr" wire open or shorted to "Gr/R" wire circuit or poor TP sensor coupler connection.

Other

Maladjusted TP sensor or faulty TP sensor.

CODE NO.22 TP SENSOR (THROTTLE POSITION SENSOR) CIRCUIT (SIGNAL VOLTAGE LOW)

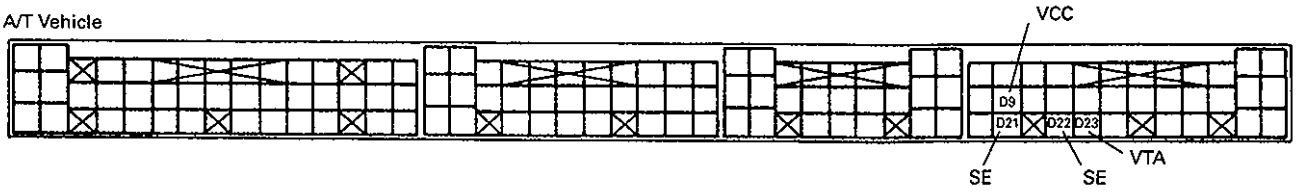


1. ECM
2. TP sensor
3. Coupler
4. ECM coupler
5. To other sensors
6. To CO adjusting resistor (if equipped)

6E2-066

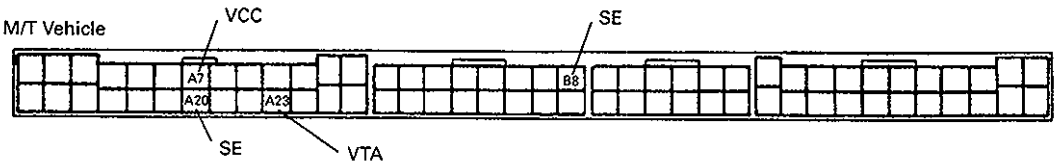
TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)

A/T Vehicle



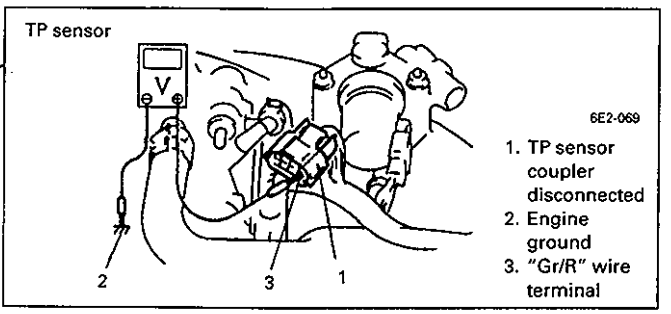
6E2-067

M/T Vehicle



6E2-068

1. Disconnect TP sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "Gr/R" wire terminal of TP sensor coupler about 4 – 5V?



6E2-069

1. TP sensor coupler disconnected
2. Engine ground
3. "Gr/R" wire terminal

YES

Check TP sensor referring to p. 6E2-55.
Is it in good condition?

NO

"Gr/R" wire open, "Gr/R" wire shorted to ground circuit or "Gr/Y" wire, or poor VCC connection.
If wire and connection are OK, substitute a known-good ECM and recheck.

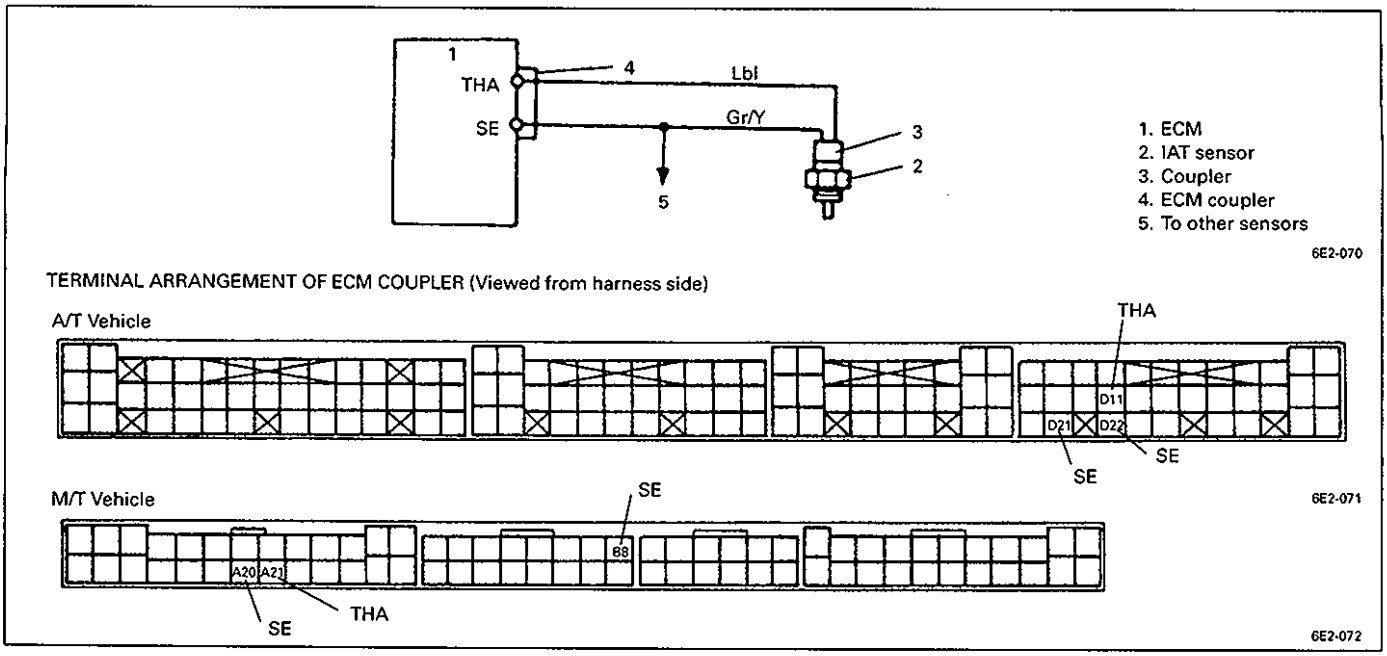
YES

Intermittent trouble or faulty ECM.
Recheck referring to Intermittent trouble.

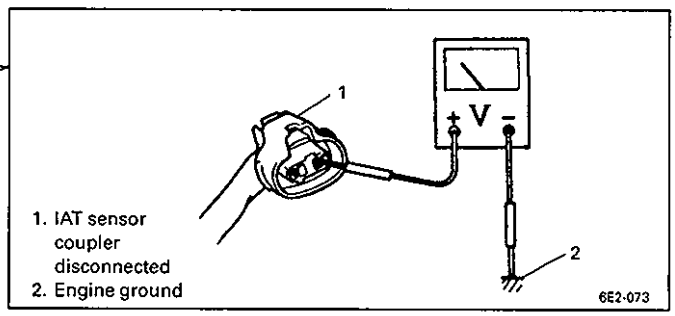
NO

Poor TP sensor coupler connection or faulty TP sensor.

CODE NO.23 IAT (INTAKE AIR TEMP.) SENSOR CIRCUIT (LOW TEMPERATURE INDICATED, SIGNAL VOLTAGE HIGH)



1. Disconnect IAT sensor coupler with ignition switch OFF.
2. With ignition switch ON, check voltage at "Lbl" wire terminals of IAT sensor coupler. Is it about 4 – 5 V?

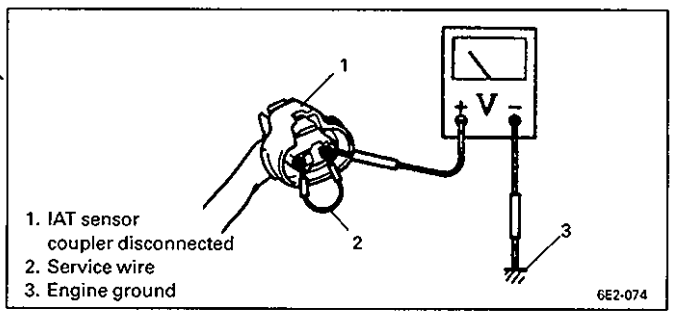


YES

1. Using service wire, connect IAT sensor coupler terminals.
2. Check voltage at "Lbl" wire terminal of IAT sensor coupler with ignition switch ON. Is it below 0.15 V?

NO

"Lbl" wire open, poor THA connection or "Lbl" wire shorted to power circuit.
If wire and connection are OK, substitute a known-good ECM and recheck.



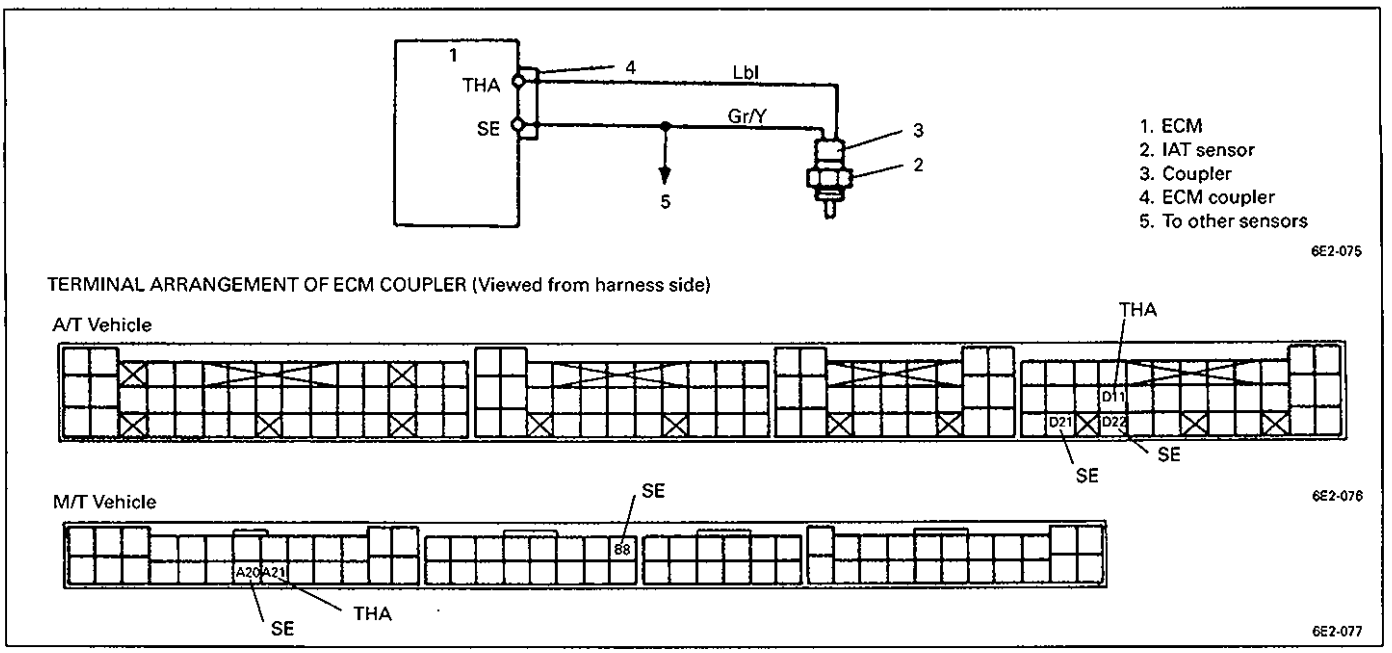
NO

"Gr/Y" wire open or poor SE connection.
If wire and connection are OK, faulty ECM.
Substitute a known-good ECM and recheck.

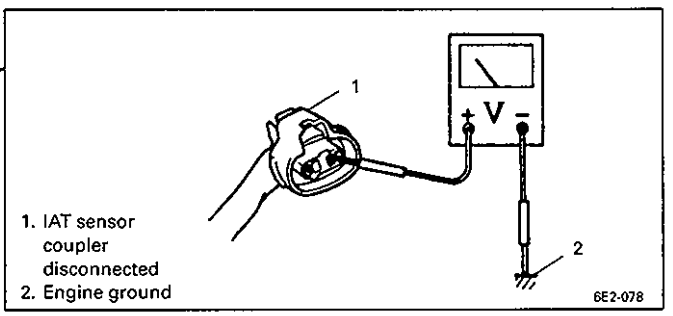
YES

Poor coupler connection of IAT sensor or faulty IAT sensor.
If connection and IAT sensor are OK, intermittent trouble or faulty ECM. Recheck referring to Intermittent trouble.

CODE NO.25 IAT (INTAKE AIR TEMP.) SENSOR CIRCUIT (HIGH TEMPERATURE INDICATED, SIGNAL VOLTAGE LOW)



1. Disconnect IAT sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "R/B" wire terminal of IAT sensor coupler 4 V or more?



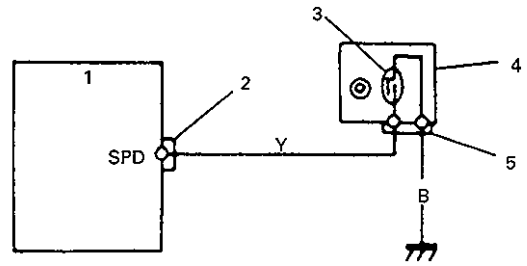
NO → "Lbl" wire shorted to "Gr/Y" wire or ground circuit. If wire is OK, substitute a known-good ECM and recheck.

YES → Check IAT sensor. Is it in good condition?

NO → Faulty IAT sensor.

YES → Intermittent trouble or faulty ECM. Recheck referring to Intermittent trouble.

CODE NO.24 VSS (VEHICLE SPEED SENSOR) CIRCUIT (VEHICLE SPEED SIGNAL NOT INPUTTED ALTHOUGH FUEL IS KEPT CUT FOR LONGER THAN 5 SECONDS)

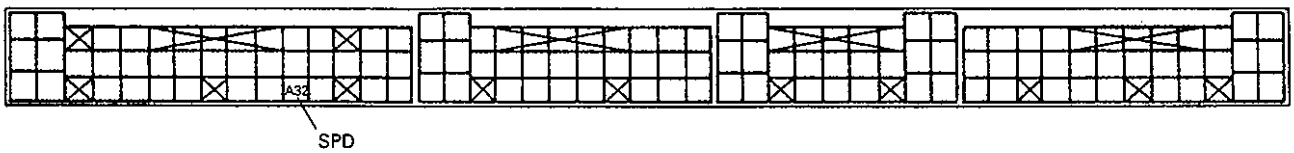


1. ECM
2. ECM coupler
3. VSS
4. Speedometer
5. Coupler

6E2-079

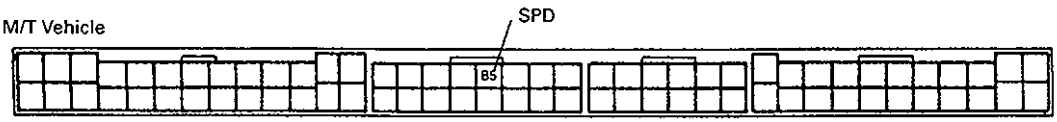
TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)

A/T Vehicle



6E2-080

M/T Vehicle



6E2-081

NOTE:
Be sure to turn OFF ignition switch for this check.

Does speedometer indicate vehicle speed?

YES

1. Disconnect ECM coupler with ignition switch OFF.
2. Connect ohmmeter between SPD terminal of ECM coupler and body ground.
3. Hoist vehicle and lock rear left tire.
4. Turn rear right tire slowly. Does ohmmeter indicator deflect between 0 and ∞ a few times while tire is turned one revolution?

NO

Check VSS.
Is it in good condition?

YES

"Y" wire open, "B" wire open, poor coupler-to-meter connection or poor "B" wire ground.

NO

Faulty VSS.

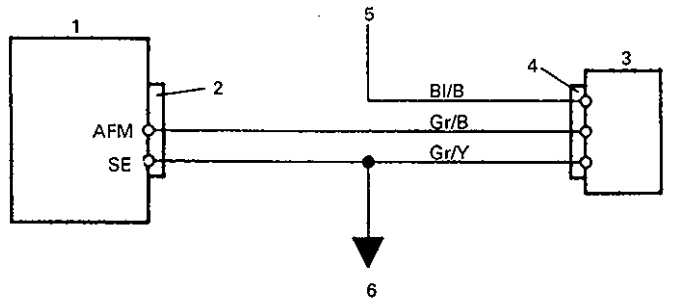
NO

Check speedometer cable and gears for damage.

YES

Poor SPD connection. If connection is OK, intermittent trouble or faulty ECM.
Recheck referring to Intermittent trouble.

CODE NO.33 MAF SENSOR (MASS AIR FLOW SENSOR) CIRCUIT (LARGE SIGNAL CURRENT FLOW, SIGNAL VOLTAGE HIGH

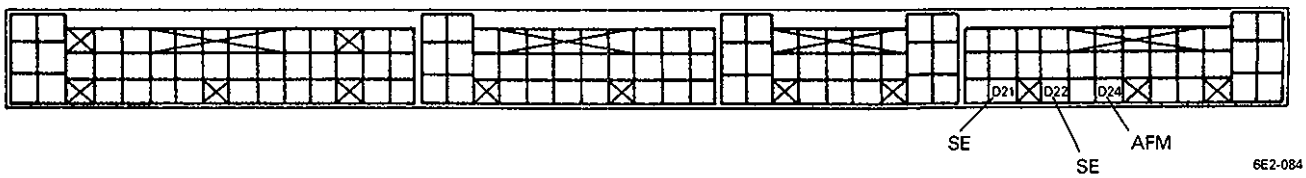


1. ECM
2. ECM coupler
3. MAF sensor
4. MAF sensor coupler
5. From main relay
6. To other sensors

6E2-083

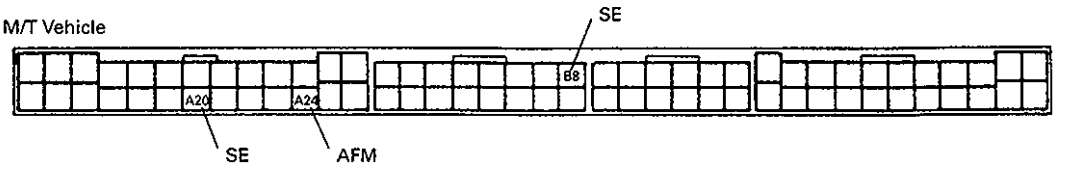
TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)

A/T Vehicle



6E2-084

M/T Vehicle



6E2-085

Turn ignition switch ON and check voltage at AFM terminal.
Is it within 0.5 – 1.0 V?

YES

Start engine and check voltage at AFM terminal.
Does voltage rise within 5V range when engine speed is increased?

YES

Poor AFM connection. If connection is OK, intermittent trouble or faulty ECM.
Recheck referring to Intermittent trouble.

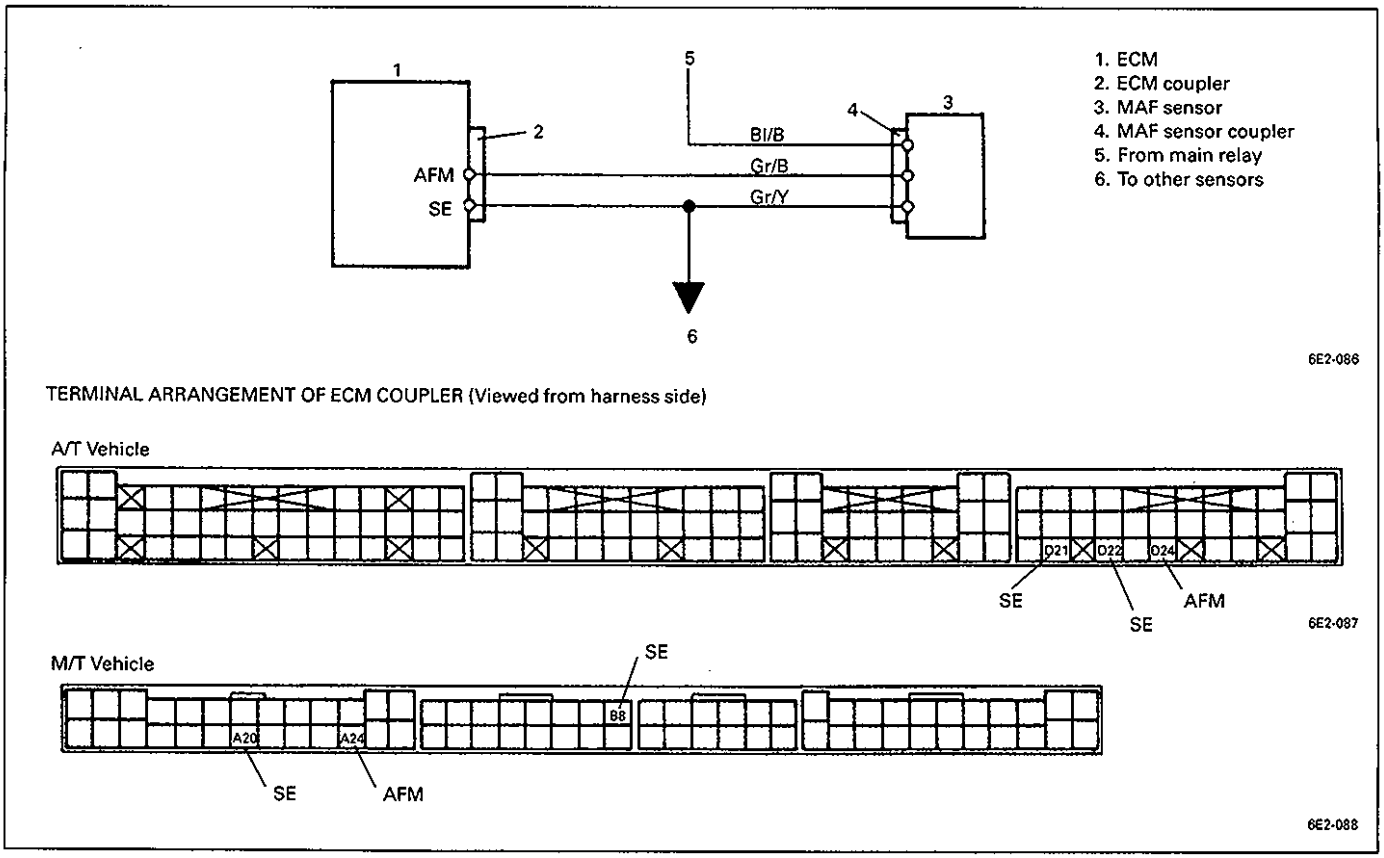
NO

"Gr/Y" wire open or "Gr/B" wire shorted to power circuit.
If wires are OK, substitute a known-good MAF sensor and recheck.

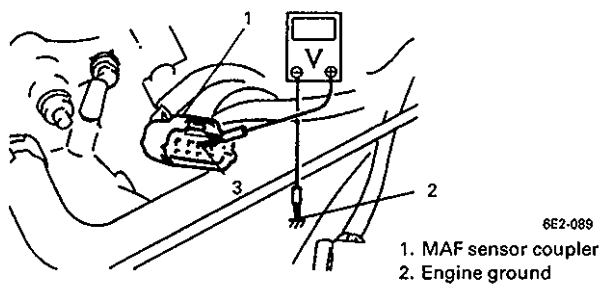
NO

Substitute a known-good MAF sensor and recheck.

CODE NO.34 MAF SENSOR (MASS AIR FLOW SENSOR) CIRCUIT (SMALL SIGNAL CURRENT FLOW, SIGNAL VOLTAGE LOW)



1. Disconnect MAF sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "BI/B" wire terminal of MAF sensor coupler about 10 – 14 V?



YES

1. Connect MAF sensor coupler with ignition switch OFF.
2. Turn ignition switch ON and check voltage at AFM terminal.
   Is it within 0.5 – 1.0 V?

NO

"BI/B" wire open.

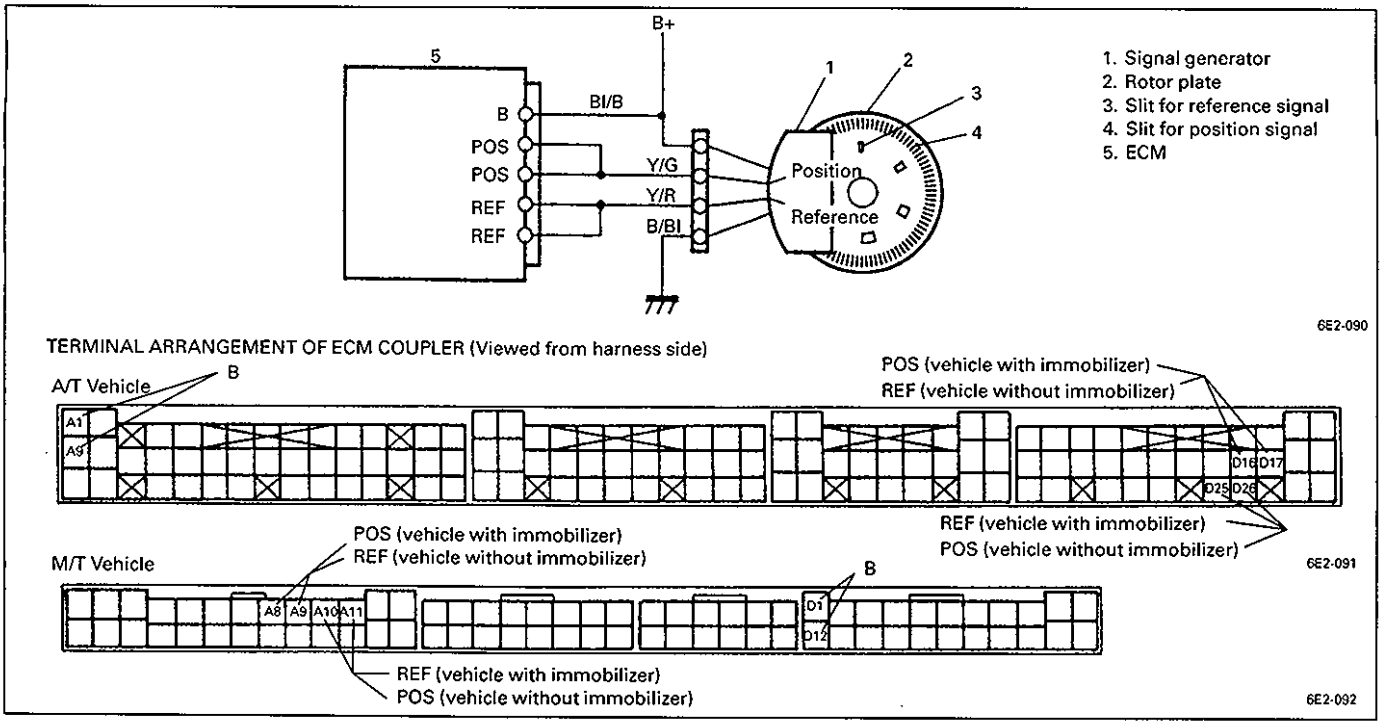
YES

Intermittent trouble or faulty ECM.
Recheck referring to Intermittent trouble.

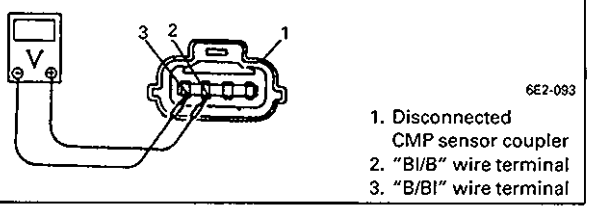
NO

Poor AFM connection, "Gr/B" wire open, or poor MAF sensor-to-coupler connection.
If wire and connection are OK, substitute a known-good MAF sensor and recheck.

CODE NO.42 CMP SENSOR (CAMSHAFT POSITION SENSOR) CIRCUIT (REF SIGNAL NOT INPUTTED FOR 3 SECONDS AT ENGINE CRANKING AND/OR POS SIGNAL NOT INPUTTED AT ENGINE RUNNING)



Disconnect CMP sensor coupler with ignition switch OFF and Check voltage between "BI/B" wire terminal and "B/BI" wire terminal of disconnected CMP sensor coupler with ignition switch ON.
Is it battery voltage?



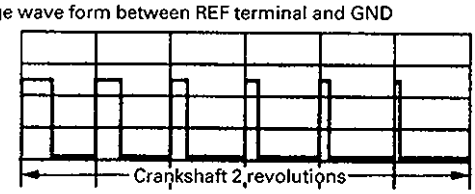
YES

Check voltage between REF terminal of ECM coupler and body ground with ignition switch ON and crankshaft turned slowly.
Does voltmeter indicator deflect between 0 – 1 V and 4 – 6 V 6 times while crankshaft turned two revolutions?

NO

BI/B wire open, B/BI wire open or poor B/BI wire ground.

REFERENCE:
Voltage wave form between REF terminal and GND



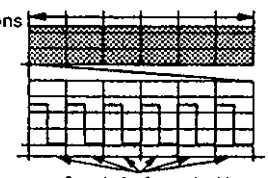
YES

Check voltage between POS terminal of ECM coupler and body Ground with ignition switch ON and crankshaft turned slowly.
Does voltmeter indicator deflect between 0 – 1 V and 4 – 6 V?

NO

CMP sensor faulty or "Y/R" wire open or short.

REFERENCE:
Voltage wave form between POS terminal and GND
Crankshaft 2 revolutions



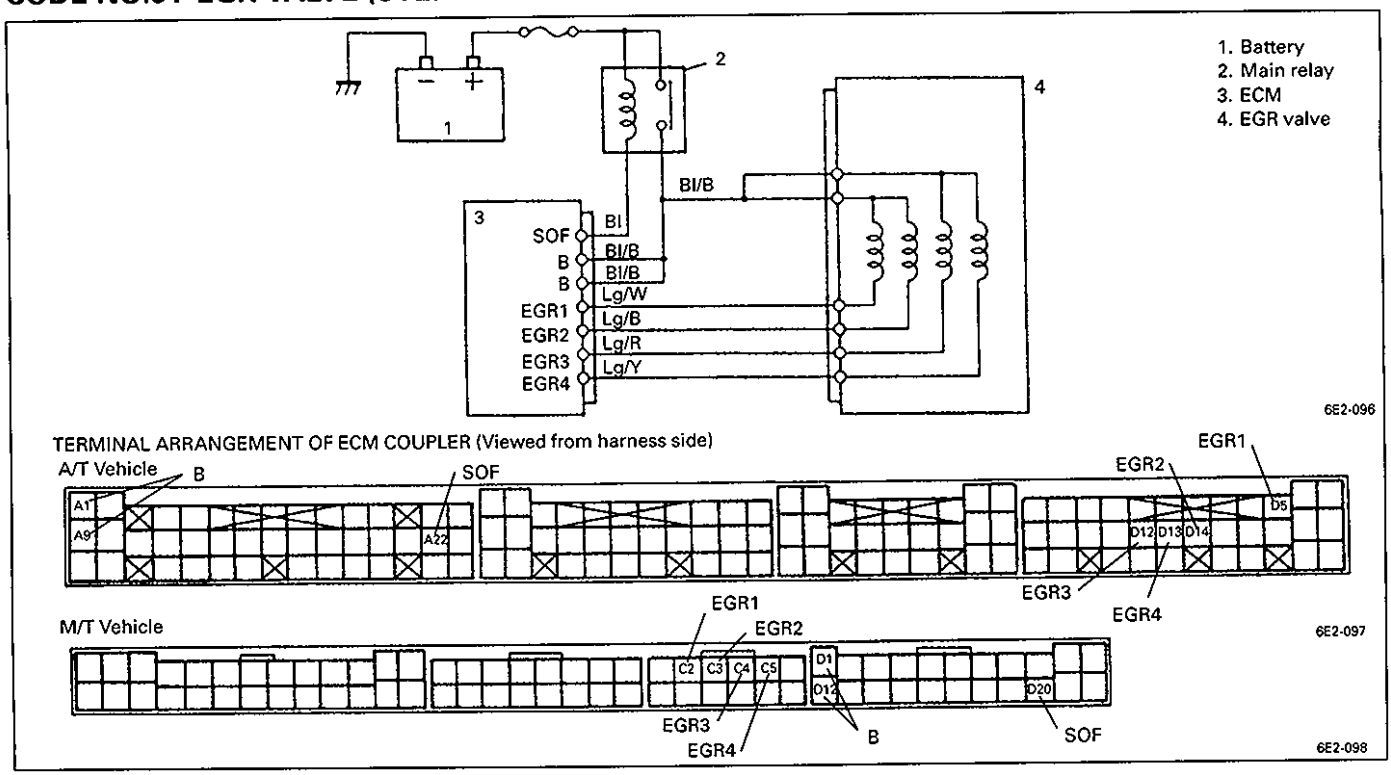
YES

Poor REF connection or POS connection of ECM coupler.
If connections are OK, substitute a known-good ECM and recheck.

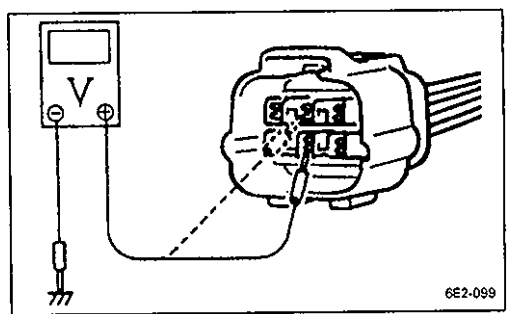
NO

CMP sensor faulty or "Y/G" wire open or short.

CODE NO.51 EGR VALVE (STEPPER MOTOR OR ITS CIRCUIT OPEN OR SHORT) (If EQUIPPED)



Does EGR stepper motor operate for about 1 second after ignition switch ON?



NO

1. Disconnect EGR valve coupler with ignition switch OFF.
2. Check voltage between "BI/B" wire terminals and body ground.
3. Are they about 10 – 14 V?

NO

"BI/B"wire open.

YES

YES

Check voltage between EGR1, EGR2, EGR3 and EGR4 terminals of ECM coupler for about 1 second after ignition switch ON.
Is each measured voltage 4 – 8.4 V?

NO

Check EGR valve.
Is it OK?

YES

Intermittent trouble or faulty ECM.
Recheck referring to intermittent trouble.

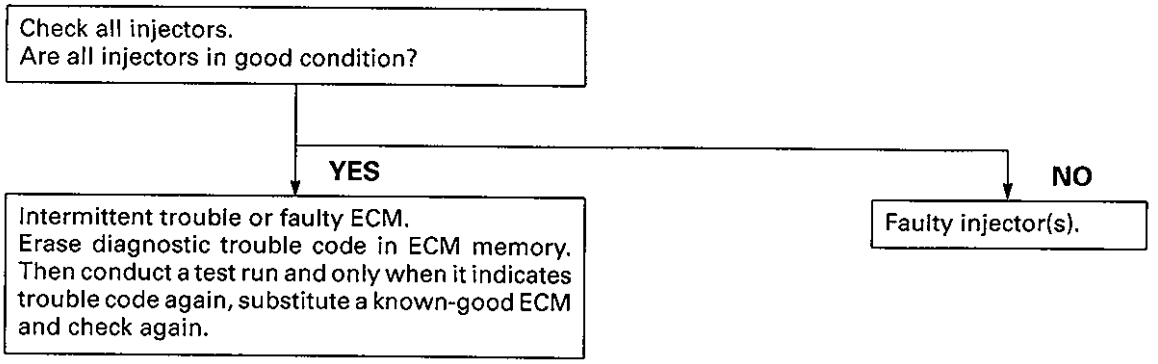
NO

Faulty EGR valve.

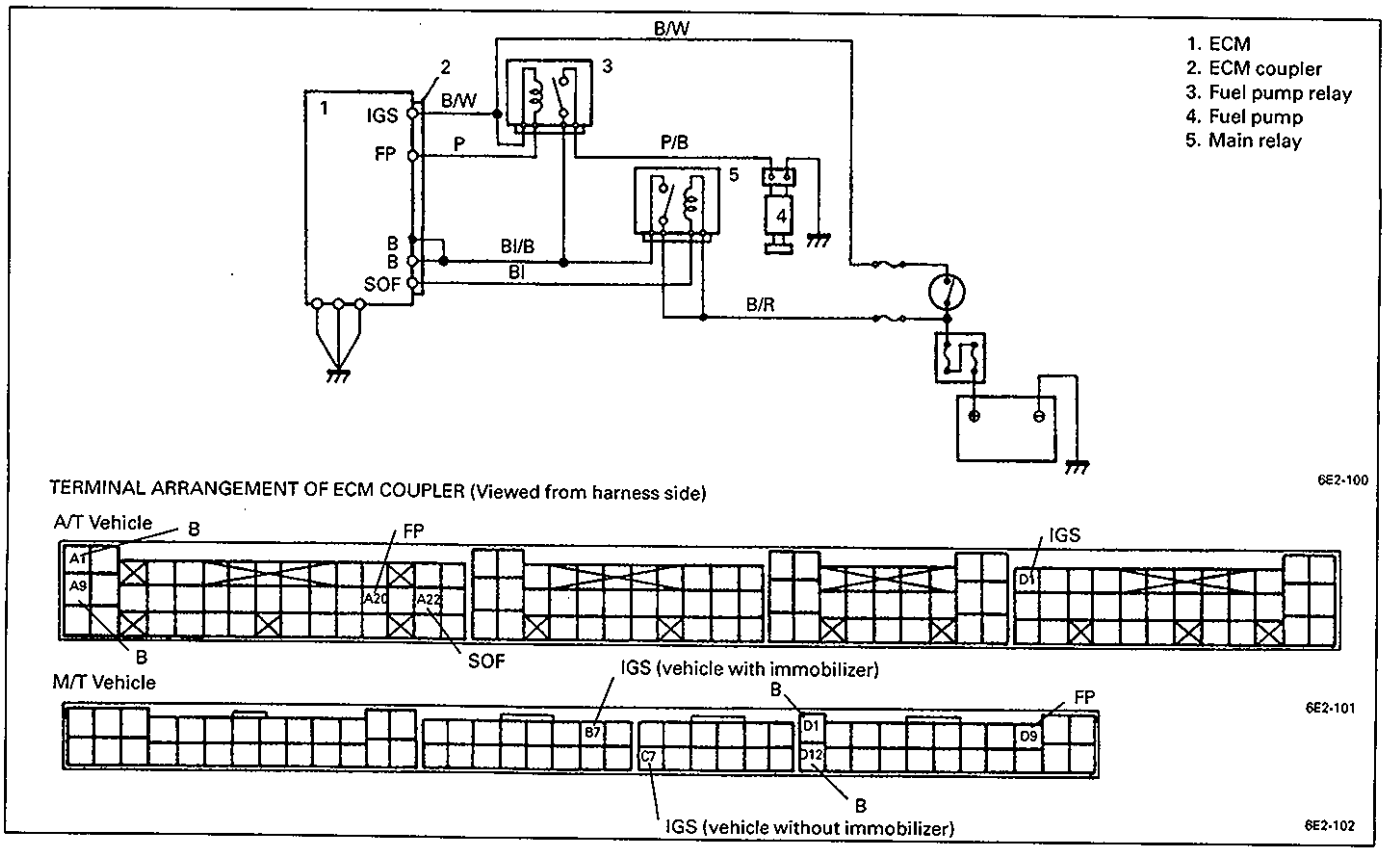
YES

"Lg/W", "Lg/B", "Lg/R" or "Lg/Y" wire open or poor EGR1, EGR2, EGR3 or EGR4 connection of ECM coupler. If wire harness and connections are OK, intermittent trouble or faulty ECM.
Recheck referring to intermittent trouble.

CODE NO.52 FUEL SYSTEM (FUEL LEAKAGE FROM FUEL INJECTOR, OXYGEN SENSOR OUTPUT VOLTAGE DOES NOT REDUCE WHEN FUEL IS CUT) (VEHICLE WITH HEATED OXYGEN SENSOR ONLY)



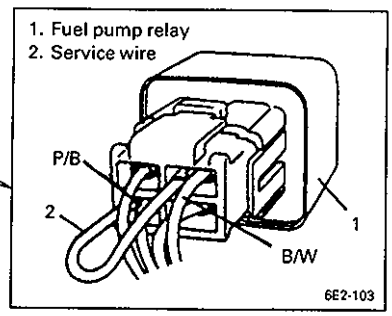
B-1 FUEL PUMP CIRCUIT CHECK



Is fuel pump heard to operate for 3 sec. after ignition switch ON?

NO

1. Turn OFF ignition switch.
2. Using service wire, connect "P/B" and "B/W" wire terminals.
3. Is fuel pump heard to operate at ignition switch ON?



YES

Fuel pump circuit in good condition.

YES

Check fuel pump relay.
Is it in good condition?

NO

"P/B" wire open, poor fuel pump coupler connection or faulty fuel pump.

YES

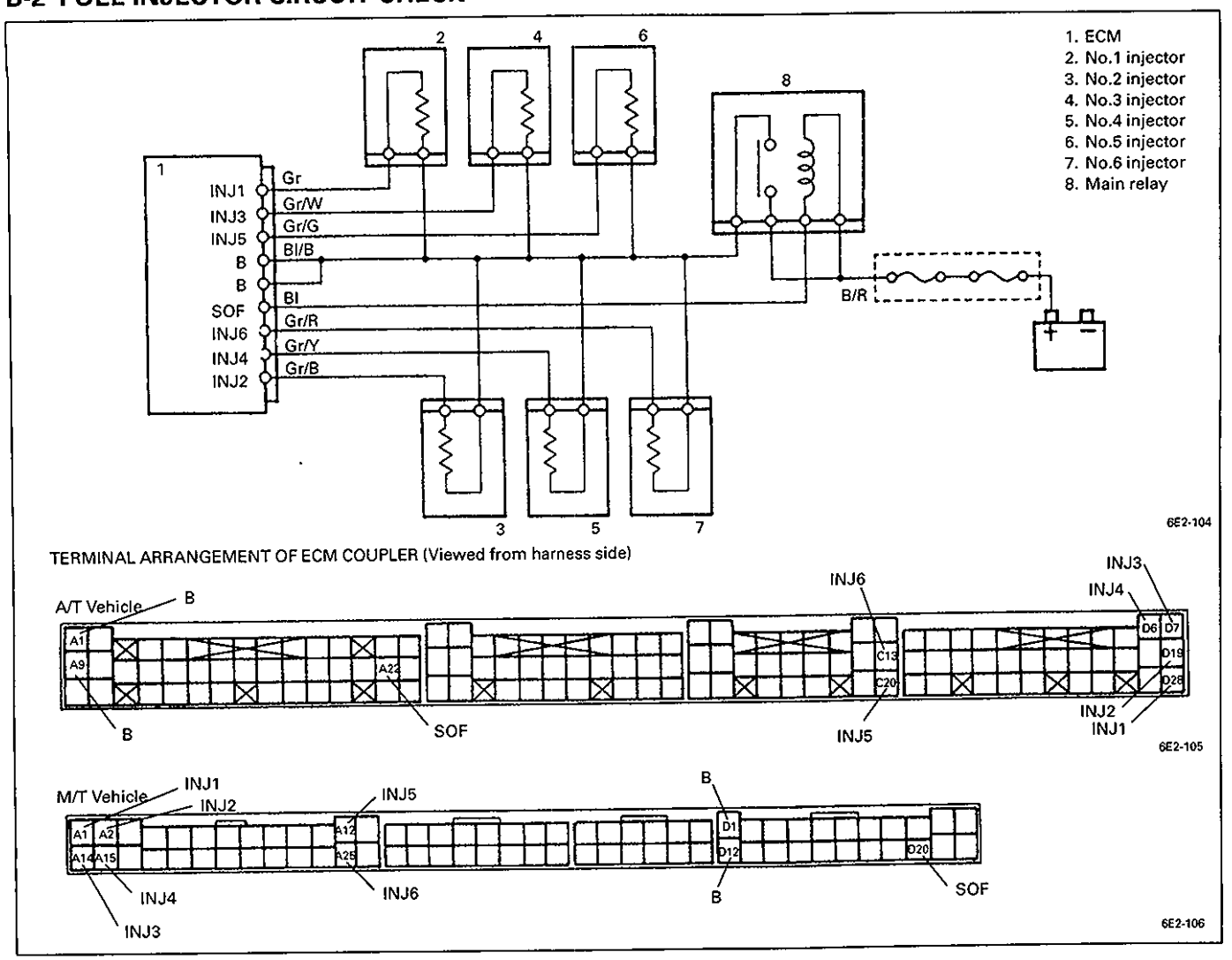
Poor relay coupler connection, "P" wire open or poor FP connection.
If wire and connection are OK, substitute a known-good ECM and recheck.

NOTE:
Before substituting a known-good ECM, check to make sure that resistance of coil in relay is as specified.

NO

Faulty fuel pump relay.

B-2 FUEL INJECTOR CIRCUIT CHECK



Using sound scope, check each injector for operating sound at engine cranking.
Do all 6 injectors make operating sound?

NO

One or more of 6 injectors make(s) no operating sound.

Check coupler connection and wire harness of injector not making operating sound and injector itself.
If all above are OK, substitute a known-good ECM and recheck.

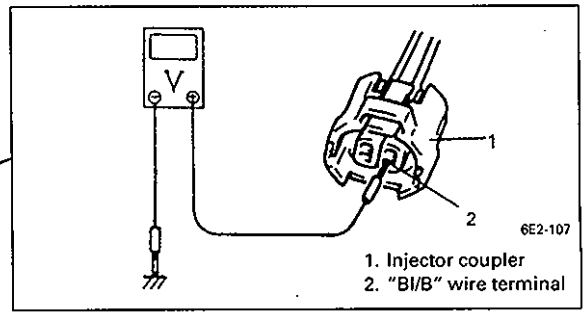
None of 6 injectors makes operating sound.
To ① on next page.

YES

Fuel injector circuit is in good condition.

None of 6 injectors makes operating sound.

1. Disconnect coupler from No. 1 injector with ignition switch OFF.
2. Check voltage at "BI/B" wire terminal with ignition switch ON.
   Is it battery voltage?



1. Injector coupler
2. "BI/B" wire terminal

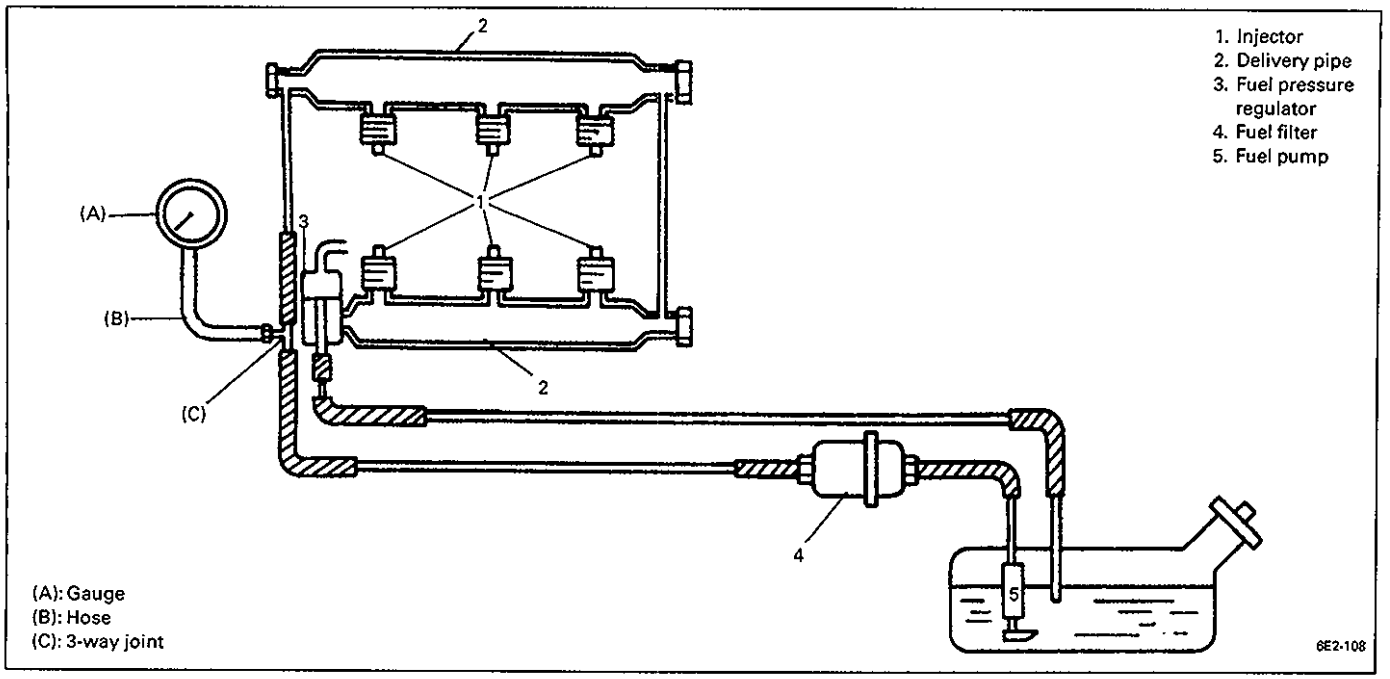
NO

Power circuit open.

YES

Disconnect ECM couplers with ignition switch OFF and check all 6 injectors for resistance respectively.
No.1 injector: INJ1 and B
No.2 injector: INJ2 and B
No.3 injector: INJ3 and B
No.4 injector: INJ4 and B
No.5 injector: INJ5 and B
No.6 injector: INJ6 and B
If resistance is OK, substitute a known-good ECM and recheck.

B-3 FUEL PRESSURE CHECK



NOTE:
Before using following flow chart, check to make sure that battery voltage is higher than 11V. If battery voltage is low, pressure becomes lower than specification even if fuel pump and line are in good condition.

1. Install fuel pressure gauge.
2. Operate fuel pump.
   Is fuel pressure then 270 – 310 kPa (2.7 – 3.1 kg/cm^2, 38.4 – 44.0 psi)?
   Also, is 200 kPa (2.0 kg/cm^2, 28.4 psi) or higher fuel pressure retained for 1 minute after fuel pump is stopped?

NO

- No pressure
  To ① on next page.
- Pressure within spec. but not retained
  To ② on next page.
- Low pressure
  To ③ on next page.
- High pressure
  To ④ on next page.

YES

1. Start engine and warm it up to normal operating temperature.
2. Keep it running at specified idle speed.
   Is fuel pressure then within 220 – 260 kPa (2.2 – 2.6 kg/cm^2, 31.3 – 36.9 psi)?

YES

Normal fuel pressure.

NO

- Clogged vacuum passage for fuel pressure regulator or
- Faulty fuel pressure regulator.

B-3 FUEL PRESSURE CHECK (continued)

① NO PRESSURE

With fuel pump operated and fuel return hose blocked by pinching it, is fuel pressure applied?

NO → Shortage of fuel or fuel pump or its circuit defective (Refer to "Diagnostic Flow Chart B-1").

YES → Faulty fuel pressure regulator

② PRESSURE WITHIN SPEC. BUT NOT RETAINED

Is there fuel leakage from fuel feed line hose, pipe or their joint?

YES → Fuel leakage from hose, pipe or joint.

NO →

1. Disconnect fuel return hose from fuel pipe and connect new return hose to it.
2. Put the other end of new return hose into approved gasoline container.
3. Check again if specified pressure is retained.
   While doing so, does fuel come out of return hose?

YES → Faulty fuel pressure regulator

NO →

- Fuel leakage from injector,
- Faulty fuel pump (faulty check valve in fuel pump) or
- Fuel leakage from fuel pressure regulator diaphragm.

③ LOW PRESSURE

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, 64.0 psi) or more?

YES → Faulty fuel pressure regulator

NO →

- Clogged fuel filter,
- Restricted fuel feed hose or pipe,
- Faulty fuel pump or
- Fuel leakage from hose connection in fuel tank.

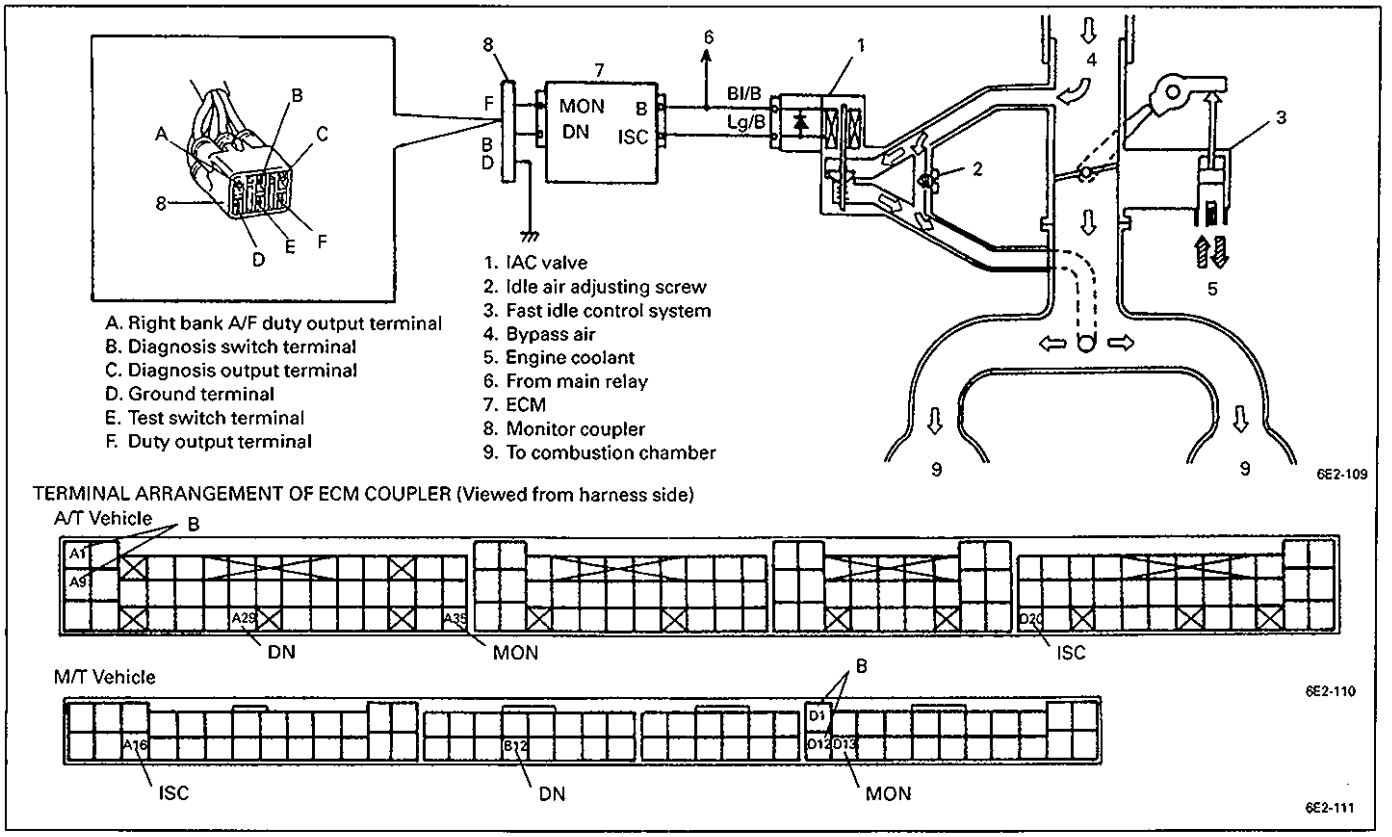
④ HIGH PRESSURE

1. Disconnect fuel return hose from fuel pipe 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?

YES → Restricted fuel return hose or pipe.

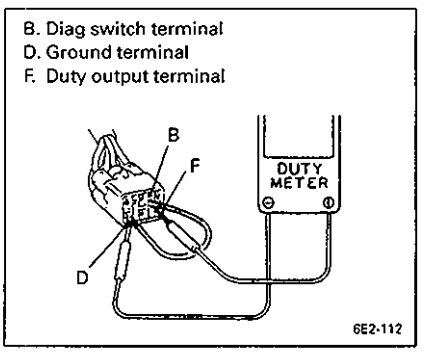
NO → Faulty fuel pressure regulator.

B-4 IDLE AIR CONTROL SYSTEM CHECK



A. Right bank A/F duty output terminal
B. Diagnosis switch terminal
C. Diagnosis output terminal
D. Ground terminal
E. Test switch terminal
F. Duty output terminal

1. IAC valve
2. Idle air adjusting screw
3. Fast idle control system
4. Bypass air
5. Engine coolant
6. From main relay
7. ECM
8. Monitor coupler
9. To combustion chamber



B. Diag switch terminal
D. Ground terminal
F. Duty output terminal

1. Warm up engine to normal operating temperature and keep it idling.
2. Using service wire, ground diagnosis switch terminal.
3. Is diagnostic trouble code No.12 indicated?

NO → Go back to "Diagnostic Flow Chart".

YES → Check idle air control duty (IAC duty) and idle speed.
Are they within specification?

NO → High idle speed
To ① on next page

NO → Low idle speed
To ② on next page.

YES → Is engine idle speed kept specified speed even with headlights turned ON?

NO → Idle speed is within specification but duty is not.
1. Adjust IAC duty to specification.
2. Proceed to next step.

YES → System is in good condition.

NO → Proceed to system circuit check ③ on next page.

B-4 IDLE AIR CONTROL SYSTEM CHECK (continued)

① HIGH IDLE SPEED

Check IAC valve for its resistance.
Is it in good condition?

YES / NO

NO: Faulty IAC valve.

YES: Does duty meter indicate less than about 30% (or more than about 70% for OFF duty meter)?

NO / YES

NO: Substitute a known-good ECM and recheck.

YES: Adjust idle speed and duty.

NOTE:
If not adjustable with idle speed adjusting screw, check fast idle control system for faulty or "Lg/B" circuit for short.

② LOW IDLE SPEED

Check IAC valve for its resistance.
Is it in good condition?

YES / NO

NO: Faulty IAC valve.

YES: Does duty meter indicate about 70 – 100% (about 0 – 30% for OFF duty meter)?

NO / YES

NO: Substitute a known-good ECM and recheck.

YES: Proceed to system circuit check ③.

③ SYSTEM CIRCUIT CHECK

1. Disconnect ECM couplers with ignition switch OFF.
2. Is resistance between ISC and B 8.6 – 10.6 Ω?.

YES / NO

YES: Poor coupler connection. If connection is OK, substitute a knowngood ECM and recheck.

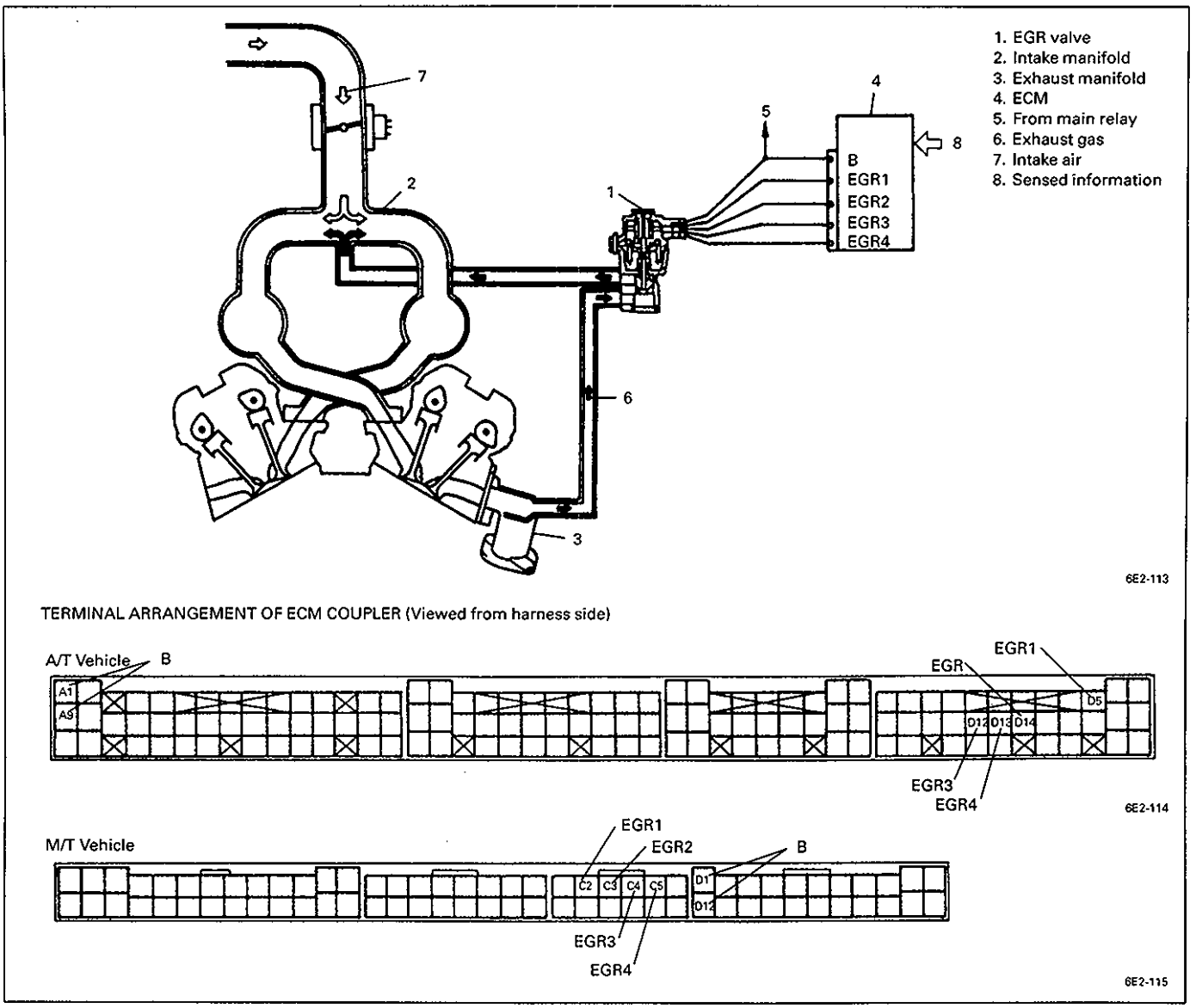
NO:
- Faulty IAC valve
- Poor coupler connection or
- Open wire harness

NOTE:
IAC duty can be checked by using analog type voltmeter with high impedance (MΩ/V minimum), although not accurate. IAC duty to voltage relation is as follows.

ON DUTY METER INDICATION	OFF DUTY METER INDICATION	VOLTMETER INDICATION
0 (%)	100 (%)	0 (V)
30	70	0.3 x V_B
70	30	0.7 x V_B
100	0	V_B

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

B-5 EGR SYSTEM CHECK (IF EQUIPPED)



1. Warm up engine to normal operating temperature.
2. Using service wire, ground diag. switch terminal in monitor coupler
3. Is diagnostic trouble code No.12?

YES

Check EGR system by using tech-1.
Is it good condition?

YES

EGR system is in good condition.

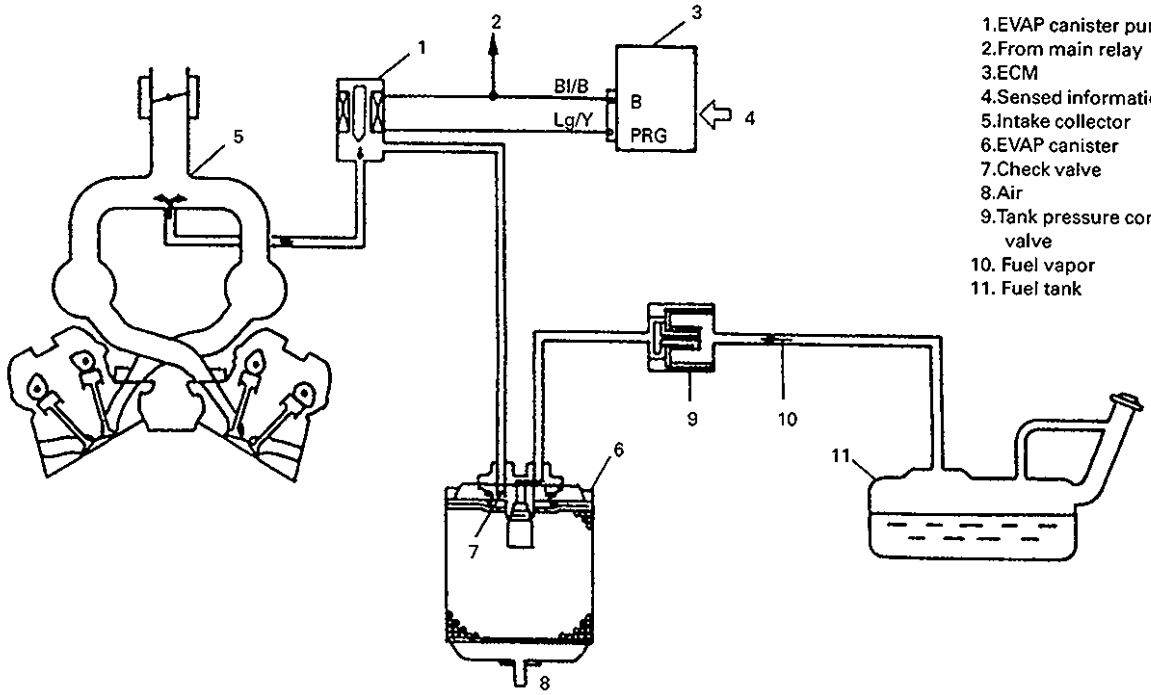
NO

Clogged EGR pipe, stuck or faulty EGR valve or poor performance of ECT sensor, TP sensor.

NO

Go back to "Diagnostic Flow Chart" on p. 6E2-15.

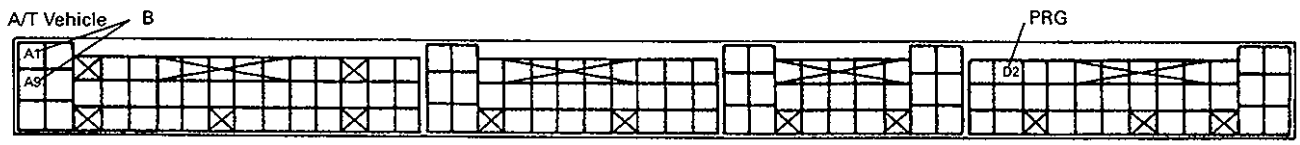
B-6 EVAPORATIVE EMISSION CONTROL SYSTEM CHECK



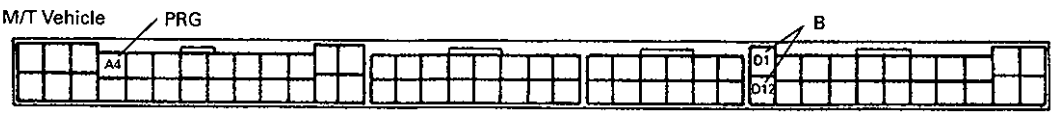
1.EVAP canister purge valve
2.From main relay
3.ECM
4.Sensed information
5.Intake collector
6.EVAP canister
7.Check valve
8.Air
9.Tank pressure control valve
10. Fuel vapor
11. Fuel tank

6E2-116

TERMINAL ARRANGEMENT OF ECM COUPLER (Viewed from harness side)



6E2-117



6E2-118

Check canister purge system for operation.
Is it in good condition?

NO

Check vacuum passage, hoses and EVAP canister purge valve.
Are they in good condition?

YES

- "Lg/Y" wire open,
- "Lg/Y" wire shorted to ground,
- Poor canister purge valve coupler connection,
- Poor PRG connection or
- Poor performance of ECT sensor

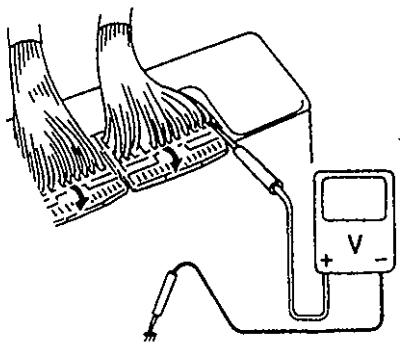
If wire, connection and sensor are OK, substitute a known-good ECM and recheck.

NO

- Vacuum passage clogged,
- Vacuum leakage or
- Faulty EVAP canister purge valve

YES

- Canister purge system in good condition check EVAP canister, tank pressure control valve and fuel filler cap.



6E2-144

INSPECTION OF ECM AND ITS CIRCUITS

ECM and its circuits can be checked at ECM wiring couplers by measuring voltage and resistance.

CAUTION:
ECM cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to ECM with couplers disconnected from it.

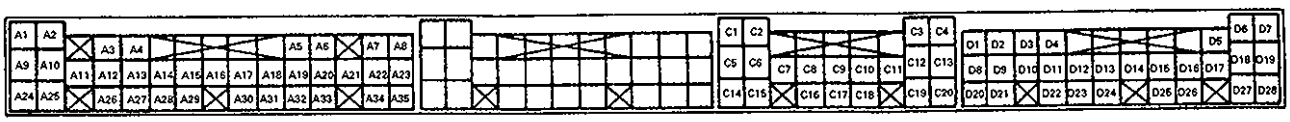
Voltage Check

1) Remove ECM from body referring to ECM REMOVAL.
2) Connect ECM couplers to ECM.
3) Check voltage at each terminal of couplers connected.

NOTE:
As each terminal voltage is affected by the battery voltage, confirm that it is 11V or more when ignition switch is ON.

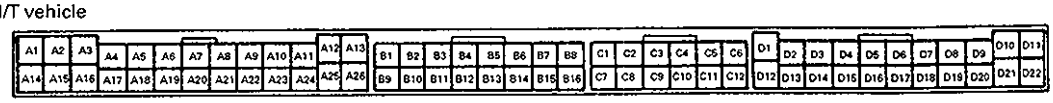
TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)

A/T vehicle



6E2-119

M/T vehicle

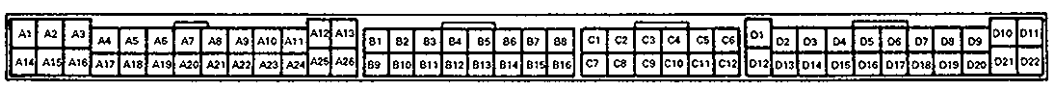


6E2-120

M/T Vehicle

TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
INJ1	A1	Gr	No.1 injector	10 – 14V	Ignition switch ON
INJ2	A2	Gr/B	No.2 injector	10 – 14V	Ignition switch ON
OXH1	A3	P	Left bank heated oxygen sensor heater (if equipped)	10 – 14V	Ignition switch ON
				0 – 2V	At specified idle speed after engine warmed up.
PRG	A4	Br/R	EVAP canister purge valve	10 – 14V	Ignition switch ON
PSS	A5	Bl/O	Power steering pressure switch	4.75 – 5.25V	Ignition switch ON
				0 – 0.8V	Engine running at idle speed and steering wheel turned to the right and left as far as it stops.
STA	A6	B/Y	Engine start switch (Engine start signal)	0 – 1V	Ignition switch ON
				6 – 14V	While engine cranking
VCC	A7	Gr/R	Power source (for sensors)	4.75 – 5.25V	Ignition switch ON
POS	A8 A9	Y/G	CMP sensor signal (Position signal, vehicle with immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
REF	A8 A9	Y/Bl	CMP sensor signal (Reference signal, vehicle without immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
REF	A10 A11	Y/Bl	CMP sensor signal (Reference signal, vehicle with immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
POS	A10 A11	Y/G	CMP sensor signal (Position signal, vehicle without immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
INJ5	A12	Gr/G	No.5 injector	10 – 14V	Ignition switch ON
POWG	A13	B/G	Ground	———	———
INJ3	A14	Gr/W	No.3 injector	10 – 14V	Ignition switch ON
INJ5	A15	Gr/Y	No.4 injector	10 – 14V	Ignition switch ON
ISC	A16	Lg/B	IAC valve	{ 6.2 – 8.7V (62% : ON DUTY) }	At specified idle speed after engine warmed up.
–	A17 A18	–	Blank	———	———
THW	A19	R/Y	ECT sensor	About 0.8V	Ignition switch ON Engine coolant temp.: 80°C (176°F)
SE	A20	Gr/Y	Sensor ground	———	———
THA	A21	Lbl	IAT sensor	About 3.0V	Ignition switch ON sensor ambient temp.: 20°C (68°F)
OX1	A22	R/Bl	Left bank heated oxygen sensor (if equipped)	Indicator deflection repeated between over and under 0.31V	While engine running at 2,000 r/min for 1 minute or longer after warmed up.
CO	A22	R/Bl	CO adjusting resistor (vehicle without heated oxygen sensor only)	Ignition switch ON Voltage varies as specified in graph in p. 6E2-20 of SV620 service manual while CO adjusting resister knob turned.	
VTA	A23	Gr	TP sensor	0.35 – 0.65V	Ignition switch ON after engine warmed up. Throttle valve at idle position.
				3.6 – 4.5V	Ignition switch ON Throttle valve at full open position.
AFM	A24	Gr/B	MAF sensor	0.5 – 1.0V	Ignition switch ON
				1.5 – 1.8V	With engine running at idle speed
INJ6	A25	Gr/R	No.6 injector	10 – 14V	Ignition switch ON
POWG	A26	B/G	Ground	———	———

TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)

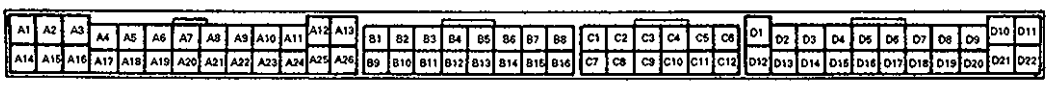


6E2-121

TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
–	B1 B2	–	Blank	———	———
EL	B3	BI/G	Electric load signal diode	0 – 1V	Ignition switch ON. Small light, heater fan and rear defogger all turned OFF.
				10 – 14V	Ignition switch ON. Small light, heater fan and rear defogger all turned ON.
TS	B4	BI/R	Test switch terminal	4.75 – 5.25V	Ignition switch ON
				0 – 0.8V	Ignition switch ON Test switch terminal grounded
SPD	B5	Y	Vehicle speed sensor	Indicator deflection repeated between 0 – 1V and 4 – 5V	Ignition switch ON Rear left tire turned slowly with rear right tire locked.
–	B6	–	Blank	———	———
IGS	B7	B/W	Ignition switch (Vehicle with immobilizer)	10 – 14V	Ignition switch ON
				0 – 0.8V	Ignition switch OFF
SE	B8	Gr/Y	Sensor ground	———	———
AF	B9	W/BI	A/F duty (Right bank) output terminal	4.75 – 5.25V	Ignition switch ON
–	B10	–	Blank	———	———
BB	B11	W	Power source for back-up	10 – 14V	Ignition switch ON and OFF
DN	B12	BI/Y	Diagnosis switch terminal	4.75 – 5.25V	Ignition switch ON
				0 – 0.8V	Ignition switch ON Diagnosis switch terminal grounded
ACS	B13	Y/B	A/C amplifier (if equipped)	4.75 – 5.25V	Ignition switch ON
				0 – 1.5V	A/C ON
–	B14	–	Blank	———	———
TACHO	B15	Br/W	Tachometer	0 – 0.8V	Ignition switch ON
–	B16	–	Noise suppressor	10 – 14V	Ignition switch ON

TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
OX2	C1	R	Right bank heated oxygen sensor (if equipped)	Indicator deflection repeated between over and under 0.31 V	While engine running at 2,000 r/min for 1 minute or longer after engine warmed up
EGR1	C2	Lg/W	EGR valve (stepper motor coil 1), if equipped	10 – 14V	More than 3 seconds after ignition switch ON
				0 – 3.5V	After engine start (At fast idle)
EGR2	C3	Lg/B	EGR valve (stepper motor coil 2), if equipped	0 – 3.5V	More than 3 seconds after ignition switch ON
				10 – 14V	After engine start (At fast idle)
EGR3	C4	Lg/R	EGR valve (stepper motor coil 3), if equipped	0 – 3.5V	More than 3 seconds after ignition switch ON
				10 – 14V	After engine start (At fast idle)
EGR6	C5	Lg/Y	EGR valve (stepper motor coil 4), if equipped	10 – 14V	More than 3 seconds after ignition switch ON
				0 – 3.5V	After engine start (At fast idle)
–	C6	–	Blank	———	———
IGS	C7	B/W	Ignition switch (Vehicle without immobilizer)	10 – 14V	Ignition switch ON
				0 – 0.8V	Ignition switch OFF
–	C8 C9 C10 C11 C12	–	Blank	———	———

TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)



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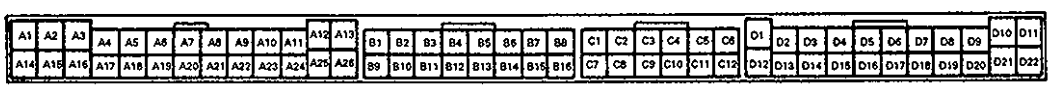
TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
B	D1	Bl/B	Power source	10 – 14V	Ignition switch ON
IGN3	D2	Lg/W	Ignitor (No.3 ignition coil)	———	———
IGN6	D3	B/Br	Ignitor (No.6 ignition coil)	———	———
IGN1	D4	Lg	Ignitor (No.1 ignition coil)	———	———
IGN4	D5	Br/Y	Ignitor (No.4 ignition coil)	———	———
IGN5	D6	Lg/R	Ignitor (No.5 ignition coil)	———	———
IGN2	D7	Br/B	Ignitor (No.2 ignition coil)	———	———
–	D8	–	Blank	———	———
FP	D9	P	Fuel pump relay	0 – 2.5V	For 3 seconds after ignition switch ON
				10 – 14V	After the above time
ECUG	D10	B/Bl	Ground	———	———
IGNG	D11	B/O	Ground	———	———
B	D12	Bl/B	Power source	10 – 14V	Ignition switch ON
MON	D13	V	Duty output terminal	10 – 14V	Ignition switch ON
–	D14	–	Blank	———	———
DNL	D15	V/Y	Diagnosis output terminal and malfunction indicator lamp ("CHECK ENGINE" light)	0 – 2.5V	Ignition switch ON
				10 – 14V	Engine running
–	D16	–	Blank	———	———
–	D17	–	Blank	———	———
SDL	D18	V/W	Data link connector	4 – 5V	Ignition switch ON
–	D19	–	Blank	———	———
SOF	D20	Bl	Main relay	0 – 2.0V	Ignition switch ON
				10 – 14V	Ignition switch OFF
OXH2	D21	P/W	Right bank heated oxygen sensor heater (if equipped)	10 –14V	Ignition switch ON
				0 – 2.0V	At specified idle speed after engine warmed up
ECUG	D22	B/Bl	Ground	———	———

TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)

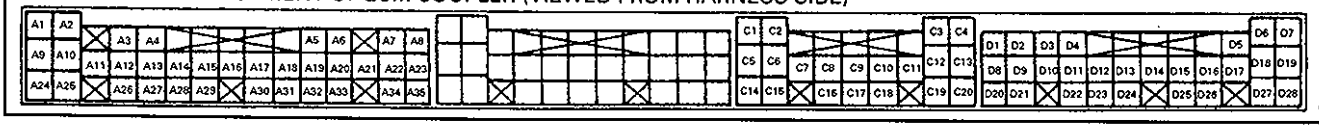


6E2-123

A/T Vehicle

TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
B	A1	BI/B	Power source	10 – 14V	Ignition switch ON
IGNG	A2	B/O	Ground	———	———
LIGHT	A3	R/Y	Lighting switch	10 – 14V	lighting switch ON
				0 – 1V	lighting switch OFF
R	A4	R	Transmission range switch ("R" range)	10 – 14V	Ignition switch ON Selector lever in "R" range
				0 – 1V	Ignition switch ON Selector lever in other than "R" range
DNL	A5	V/Y	Diagnosis output terminal and malfunction indicator lamp ("CHECK ENGINE" light)	0 – 2.5V	Ignition switch ON
				10 – 14V	Engine running
PWL	A6	P/W	"POWER" indicator light	0 – 2.5V	Ignition switch ON Mode selector switch is in POWER mode
				10 – 14V	Ignition switch ON Mode selector switch is in NORMAL mode
TACHO	A7	Br/W	Tachometer	0 – 0.8V	Ignition switch ON
–	A8	–	Blank	———	———
B	A9	BI/B	Power source	10 – 14V	Ignition switch ON
IGN5	A10	Lg/R	Ignitor (No.5 ignition coil)	———	———
IGN6	A11	B/Br	Ignitor (No.6 ignition coil)	———	———
IGN4	A12	Br/Y	Ignitor (No.4 ignition coil)	———	———
2	A13	G/O	Transmission range switch ("2" range)	10 – 14V	Ignition switch ON Selector lever in "2" range
				0 – 1V	Ignition switch ON Selector lever in other than "2" range
L4	A14	O/W	4WD Low switch	10 – 14V	Ignition switch ON Transfer lever in "2H" or "4H" position
				0 – 1V	Ignition switch ON Transfer lever in "4L" or "N" position
D	A15	G/BI	Transmission range switch ("D" range)	10 – 14V	Ignition switch ON Selector lever in "D" range
				0 – 1V	Ignition switch ON Selector lever in other than "D" range
TS	A16	BI/R	Test switch terminal	4.75 – 5.25V	Ignition switch ON
				0 – 0.8V	Ignition switch ON Test switch terminal grounded
EL	A17	BI/G	Electric load signal diode	0 – 1V	Ignition switch ON. Small light, heater fan and rear defogger all turned OFF
				10 – 14V	Ignition switch ON. Small light, heater fan or rear defogger turned ON
OD	A18	O/G	OD cut switch	10 – 14V	Ignition switch ON OD cut switch OFF
				0 – 1V	Ignition switch ON OD cut switch ON
BB	A19	W	Power source for back-up	10 – 14V	Ignition switch ON and OFF

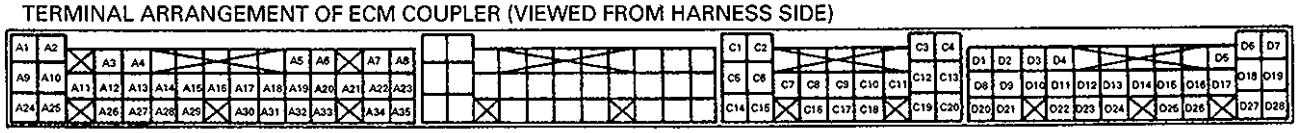
TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)



6E2-124

TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
FP	A20	P	Fuel pump relay	0 – 2.5V	For 3 seconds after ignition switch ON
				10 – 14V	After the above time
ODL	A21	W/B	"OD OFF" indicator light	0 – 2.5V	Ignition switch ON OD cut switch ON
				10 – 14V	Ignition switch ON OD cut switch OFF
SOF	A22	Bl	Main relay	0 – 2.0V	Ignition switch ON
				10 – 14V	Ignition switch OFF
–	A23	–	Blank	———	———
ECUG	A24	B/Bl	Ground	———	———
IGN3	A25	Lg/W	Ignitor (No.3 ignition coil)	———	———
N	A26	O/Bl	Transmission range switch ("N" range)	10 – 14V	Ignition switch ON Selector lever in "N" range
				0 – 1V	Ignition switch ON Selector lever in other than "N" range
–	A27	–	Blank	———	———
BK	A28	G/W	Brake switch	10 – 14V	Brake pedal depressed
				0 – 1V	Brake pedal released
DN	A29	Bl/Y	Diagnosis switch terminal	4.75 – 5.25V	Ignition switch ON
				0 – 0.8V	Ignition switch ON Diagnosis switch terminal grounded
ACS	A30	Y/B	A/C amplifier (if equipped)	4.75 – 5.25V	Ignition switch ON
				0 – 1.5V	A/C ON
PWR	A31	O	Mode selector switch (Power/Normal)	4.75 – 5.25V	Ignition switch ON Mode selector switch is in Normal mode
				0 – 1V	Ignition switch ON Mode selector switch is in Power mode
SPD	A32	Y	Vehicle speed sensor	Indicator deflection repeated between 0 – 1V and 4 – 5V	Ignition switch ON Rear left tire turned slowly with rear right tire locked
ECUG	A33	B/Bl	Ground	———	———
SDL	A34	V/W	Data link connector	4 – 5V	Ignition switch ON
MON	A35	V	Duty output terminal	10 – 14V	Ignition switch ON

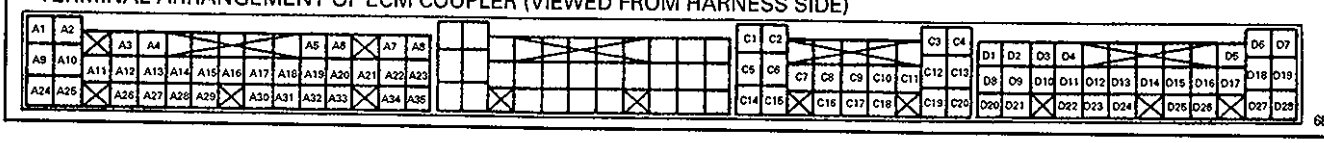
TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)



6E2-125

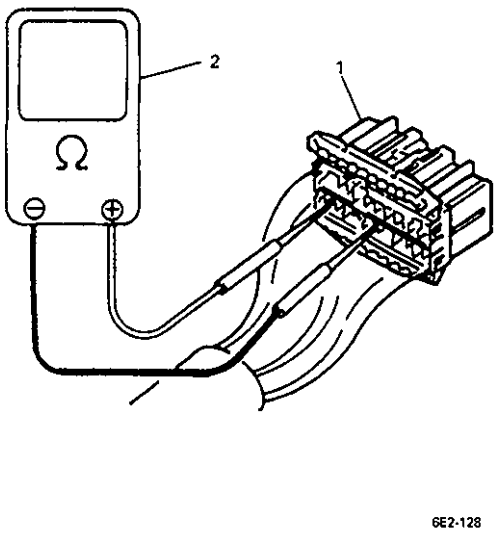
TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
SPG	C1	O	A/T vehicle speed sensor (-)	———	———
SP	C2	W	A/T vehicle speed sensor (+)	———	———
S3	C3	G/Y	TCC solenoid valve	0 – 1V	Ignition switch ON
S2	C4	G/R	Shift solenoid valve B	0 – 1V	Ignition switch ON
OXH2	C5	P/W	Right bank heated oxygen sensor heater (if equipped)	10 – 14V	Ignition switch ON
				0 – 2V	At specified idle speed after warmed up
–	C6 C7	–	Blank	———	———
AF	C8	W/Bl	A/F duty (Right bank) output terminal	4.75 – 5.25V	Ignition switch ON
OX2	C9	R	Right bank heated oxygen sensor (if equipped)	Indicator deflection repeated between over and under 0.31V	While engine running at 2,000 r/min for 1 minute or longer after engine warmed up.
–	C10	–	Blank	———	———
L	C11	G/Bl	Transmission range switch ("L" range)	10 – 14V	Ignition switch ON Select lever in "L" range
				0 – 1V	Ignition switch ON Select lever in other than "L" range
S1	C12	G	Shift solenoid valve A	10 – 14V	Ignition switch ON
INJ6	C13	Gr/R	No.6 injector	10 – 14V	Ignition switch ON
IGN1	C14	Lg	Ignitor (No.1 ignition coil)	———	———
IGN2	C15	Br/B	Ignitor (No.2 ignition coil)	———	———
–	C16 C17 C18 C19	–	Blank	———	———
INJ5	C20	G/R	No.5 injector	10 – 14V	Ignition switch ON

TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)



6E2-126

TERMINAL NAME	TERMINAL POSITION	TERMINAL WIRE COLOR	CIRCUIT	NORMAL VOLTAGE	CONDITION
IGS	D1	B/W	Ignition switch	10 – 14V	Ignition switch ON
				0 – 1V	Ignition switch OFF
PRG	D2	Br/R	EVAP canister purge valve	10 – 14V	Ignition switch ON
STA	D3	B/Y	Engine start switch (Engine start signal)	0 – 1V	Ignition switch ON
				6 – 14V	While engine cranking
OX1	D4	R/Bl	Left bank heated oxygen sensor (if equipped)	Indicator deflection repeated between over and under 0.31V	While engine running at 2,000 r/min for 1 minute or longer after warmed up
EGR1	D5	Lg/W	EGR valve (stepper motor coil 1), if equipped	10 – 14V	More than 3 seconds after ignition switch ON
				0 – 3.5V	After engine start (At fast idle)
INJ4	D6	Gr/W	No.4 injector	10 – 14V	Ignition switch ON
INJ3	D7	Gr/B	No.3 injector	10 – 14V	Ignition switch ON
OXH1	D8	P	Left bank heated oxygen sensor heater (if equipped)	10 – 14V	Ignition switch ON
				0 – 2V	At specified idle speed after engine warmed up
VCC	D9	Gr/R	Power source (for sensors)	4.75 – 5.25V	Ignition switch ON
PSS	D10	Bl/O	Power steering pressure switch	4.75 – 5.25V	Ignition switch ON
				0 – 0.8V	Engine running at idle speed and steering wheel turned to the right and left as for as it stops
THA	D11	Lbl	IAT sensor	About 3.0V	Ignition switch ON Sensor ambient temp.: 20°C (68°F)
EGR3	D12	Lg/R	EGR valve (stepper motor coil 3), if equipped	0 – 3.5V	More than 3 seconds after ignition switch ON
				10 – 14V	After engine start (At fast idle)
EGR4	D13	Lg/Y	EGR valve (stepper motor coil 4), if equipped	10 – 14V	More than 3 seconds after ignition switch ON
				0 – 3.5V	After engine start (At fast idle)
EGR2	D14	Lg/B	EGR valve (stepper motor coil 2), if equipped	0 – 3.5V	More than 3 seconds after ignition switch ON
				10 – 14V	After engine start (At fast idle)
THW	D15	R/Y	ECT sensor	About 0.8V	Ignition switch ON Engine coolant temp.: 80°C (176°F)
POS	D16 D17	Y/G	CMP sensor signal (Position signal, vehicle with immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
REF	D16 D17	Y/Bl	CMP sensor signal (Reference signal, vehicle without immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
POWG	D18	B/G	Ground	———	———
INJ2	D19	Gr/B	No.2 injector	10 – 14V	Ignition switch ON
ISC	D20	Lg/B	IAC valve	6.2 – 8.7V (62% : ON DUTY)	At specified idle speed after warmed up
SE	D21 D22	Gr/Y	Sensor ground	———	———
VTA	D23	Gr	TP sensor	0.35 – 0.65V	Ignition switch ON after engine warmed up Throttle valve at idle position
				3.6 – 4.5V	Ignition switch ON Throttle valve at full open position
AFM	D24	Gr/B	MAF sensor	0.5 – 1.0V	Ignition switch ON
				1.5 – 1.8V	With engine running at idle speed
REF	D25 D26	Y/Bl	CMP sensor signal (Reference signal, vehicle with immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
POS	D25 D26	Y/G	CMP sensor signal (Position signal, vehicle without immobilizer)	Indicator deflection between 0 – 1V and 4 – 6V	Ignition switch ON Crank shaft turned slowly
POWG	D27	B/G	Ground	———	———
INJ1	D28	Gr	No.1 injector	10 – 14V	Ignition switch ON



1. ECM coupler disconnected
2. Ohmmeter

Resistance Check

1) Disconnect ECM couplers from ECM with ignition switch OFF.

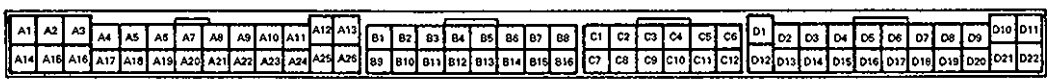
CAUTION:
Never touch terminals of ECM itself or connect voltmeter or ohmmeter.

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 represents that when parts temperature is 20°C (68°F).**

TERMINAL ARRANGEMENT OF ECM COUPLER (VIEWED FROM HARNESS SIDE)

M/T vehicle



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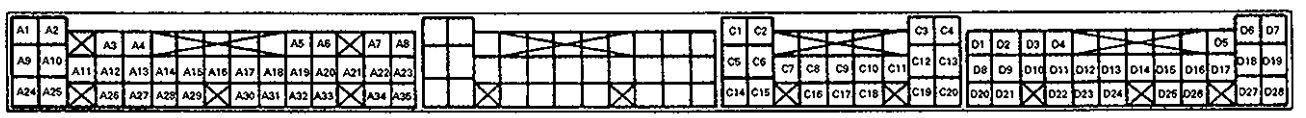
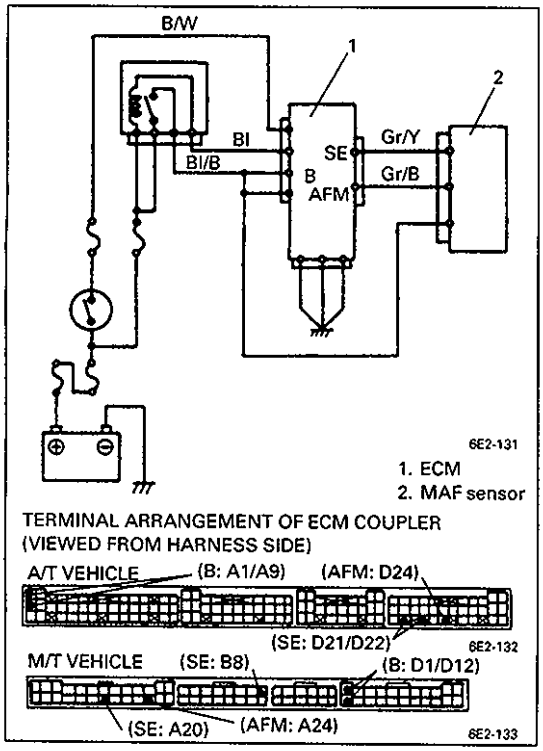
A/T vehicle

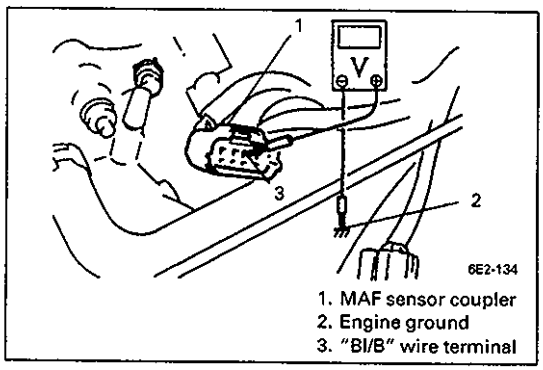


6E2-130

CIRCUIT		TERMINAL POSITION M/T	TERMINAL POSITION A/T	STANDARD RESISTANCE	CONDITION
No.1 injector		A1 – D1/D12	D28 – A1/A6	10.8 – 13.2Ω	———
No.2 injector		A2 – D1/D12	D19 – A1/A6	10.8 – 13.2Ω	———
No.3 injector		A14 – D1/D12	D7 – A1/A6	10.8 – 13.2Ω	———
No.4 injector		A15 – D1/D12	D6 – A1/A6	10.8 – 13.2Ω	———
No.5 injector		A12 – D1/D12	C20 – A1/A6	10.8 – 13.2Ω	———
No.6 injector		A25 – D1/D12	C13 – A1/A6	10.8 – 13.2Ω	———
Left bank heated oxygen sensor heater (if equipped)	Vehicle with immobilizer	A3 – B7	D8 – D1	5.5 – 6.5Ω	———
	Vehicle without immobilizer	A3 – C7			
Right bank heated oxygen sensor heater (if equipped)	Vehicle with immobilizer	D21 – B7	C5 – D1	5.5 – 6.5Ω	———
	Vehicle without immobilizer	D21 – C7			
CO adjusting resistor (if equipped)		A3 – A7	D4 – D9	0 – 50kΩ	———
EVAP canister purge valve		A4 – D1/D12	D2 – A1/A6	28 – 36Ω	———
IAC valve		A16 – D1/D12	D20 – A1/A6	8.7 – 10.5Ω	———

CIRCUIT		TERMINAL POSITION		STANDARD RESISTANCE	CONDITION
		M/T	A/T		
ECT sensor		A19 – A20/B8	D15 – D21/D22	305 – 324Ω	Engine coolant temp.: 80°C (176°F)
IAT sensor		A21 – A20/B8	D11 – D21/D22	2.21 – 2.69kΩ	Intake air temp.: 20°C (68°F)
Vehicle speed sensor (in speedometer)		B5 – Body ground	A32 – Body ground	Ohmmeter indicator deflects between 0 and ∞	Rear left wheel turned slowly with rear right wheel locked
EGR valve (coil 1), if equipped		C2 – D1/D12	D5 – A1/A6	21 – 23Ω	———
EGR valve (coil 2), if equipped		C3 – D1/D12	D14 – A1/A6	21 – 23Ω	———
EGR valve (coil 3), if equipped		C4 – D1/D12	D12 – A1/A6	21 – 23Ω	———
EGR valve (coil 4), if equipped		C5 – D1/D12	D13 – A1/A6	21 – 23Ω	———
Fuel pump relay	Vehicle with immobilizer	D9 – B7	A20 – D1	61 – 73Ω	———
	Vehicle without immobilizer	D9 – C7			
Main relay		D20 – B11	A22 – A19	61 – 73Ω	———
Transmission range switch ("R" range)		–	A4 – D1	Continuity	Selector lever in "R" range
				Not continuity	Selector lever in other than "R" range
Transmission range switch ("N" range)		–	A26 – D1	Continuity	Selector lever in "N" range
				Not continuity	Selector lever in other than "N" range
Transmission range switch ("D" range)		–	A15 – D1	Continuity	Selector lever in "D" range
				Not continuity	Selector lever in other than "D" range
Transmission range switch ("2" range)		–	A13 – D1	Continuity	Selector lever in "2" range
				Not continuity	Selector lever in other than "2" range
Transmission range switch ("L" range)		–	C11 – D1	Continuity	Selector lever in "L" range
				Not continuity	Selector lever in other than "L" range
A/T vehicle speed sensor		–	C1 – C2	369 – 451Ω	———
4WD low switch		–	A14 – Body ground	Continuity	Transfer lever in "4L" or "N" position
				Not continuity	Transfer lever in "4H" or "2H" position
Mode selector switch		–	A31 – Body ground	Continuity	Mode selector switch in "POWER"
				Not continuity	Mode selector switch in "NORMAL"
Shift solenoid valve A		–	C12 – Body ground	11 – 15Ω	———
Shift solenoid valve B		–	C4 – Body ground	11 – 15Ω	———
TCC solenoid valve		–	C3 – Body ground	11 – 15Ω	———





ON VEHICLE SERVICE

ELECTRONIC CONTROL SYSTEM

MASS AIR FLOW SENSOR (MAF SENSOR)

Inspection

NOTE:

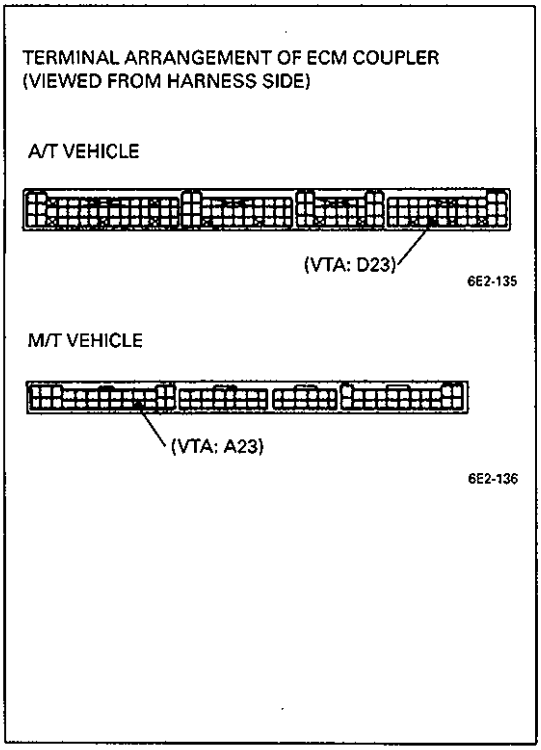
Use voltmeter with high-impedance (10 kΩ/V minimum) or digital type voltmeter.

1) Remove ECM.
2) Connect couplers to ECM.
3) Connect voltmeter to "BI/B" wire terminal of MAF sensor coupler disconnected and ground.
4) Turn ignition switch ON and check that voltage is battery voltage.
   If not, check if wire harness is open or connection is poor.
5) Turn ignition switch OFF and connect MAF sensor coupler to MAF sensor.
6) Turn ignition switch ON and check voltage at "AFM" terminal.

   "AFM" voltage: 0.5 – 1.0 V

7) Start engine and check that voltage is lower than 5V and it rises as engine speed increases.
   (Reference data: 1.5 – 1.8 V at specified idle speed)

   If check result is not as specified above, cause may lie in wire harness, coupler connection, MAF sensor or ECM.



THROTTLE POSITION SENSOR (TP SENSOR)

Inspection

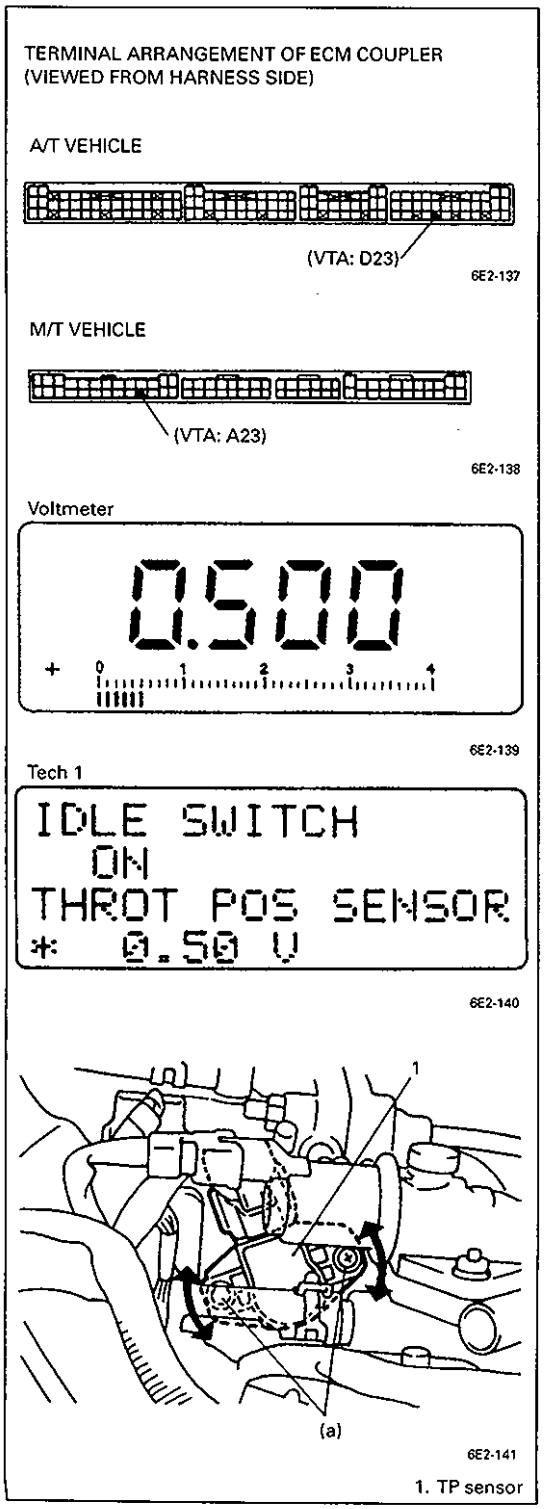
1) Remove ECM as previously outlined.
2) Warm up engine and stop it when its temperature has reached normal operating temperature (Check to make sure that they have some clearance between fast idle cam and cam follow lever.).
3) Using voltmeter, check voltage at "VTA" terminal under following each condition.

   When throttle is fully close : 0.50 ± 0.15 V
   When throttle is fully open : 4.0 ± 0.5 V

   If measured voltage is out of above specified range, diagnose trouble by referring to "Diagnostic Flow Chart for Diag. Trouble Code No. 21 or 22".
   Also, check that voltage varies according to throttle valve opening linearly. If not, it is possible that TP sensor has failed. Replace.
4) Upon completion of checking, install ECM.

Adjustment

1) Warm up engine to normal operating temperature.
2) Check to make sure that fast idle cam and cam follower lever are not in contact with each other. If they are, check fast idle control system.



3) Loosen TP sensor screws.
4) Remove ECM as previously outlined and with couplers connected to ECM, connect digital type voltmeter to VTA terminal and body ground.
5) Turn TP sensor clockwise or counterclockwise and tighten TP sensor screw at a position where voltage as specified below is obtained at coupler terminal VTA.

   NOTE:
   If tech 1 and cartridge are available, it is not necessary to remove ECM. Make an adjustment by using tech 1 while observing TP sensor voltage.

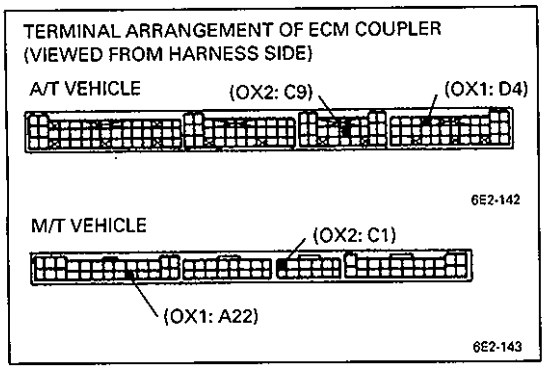
   TP sensor voltage when throttle is fully close :
   0.50 ± 0.15 V

   Tightening Torque
   (a): 2.5 N·m (0.25 kg-m, 1.8 lb-ft)

6) Check to make sure that when throttle is fully open TP sensor voltage is as shown below.

   TP sensor voltage when throttle is fully open :
   4.0 ± 0.5 V

7) Install ECM.
8) Warm up engine completely.
9) Turn OFF ignition switch when engine is at idle and shift lever is in Neutral (or Parking) position.



HEATED OXYGEN SENSOR (if equipped)

Sensor Inspection

1) Remove ECM.
2) Warm up engine to normal operating temperature.
3) Connect voltmeter between OX1 (for left bank: OX2 for right bank) and body ground.
4) Maintain engine speed at 2,000 r/min. After 60 seconds, check voltmeter.

Voltmeter Indication	Possible Cause	Correction
About 0 V	Heated oxygen sensor wire shorted to ground (circuit)	Repair or replace
About 0.3 V	Heated oxygen sensor wire or sensor ground wire open	Repair or replace
0.35 ~ 0.45 V	• Faulty heated oxygen sensor itself • Lean A/F mixture • Faulty fuel injector (s)	Replace heated oxygen sensor Inspect ECM and its circuit Replace fuel injector(s)
Deflect between above and below 0.45 V repeatedly	Heated oxygen sensor and its circuit is in good condition	———
Remains unchanged at above 0.45 V	• Rich A/F mixture	Inspect ECM and its circuit

SECTION 6F2

IGNITION SYSTEM
(DIRECT IGNITION TYPE)

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.

CONTENTS

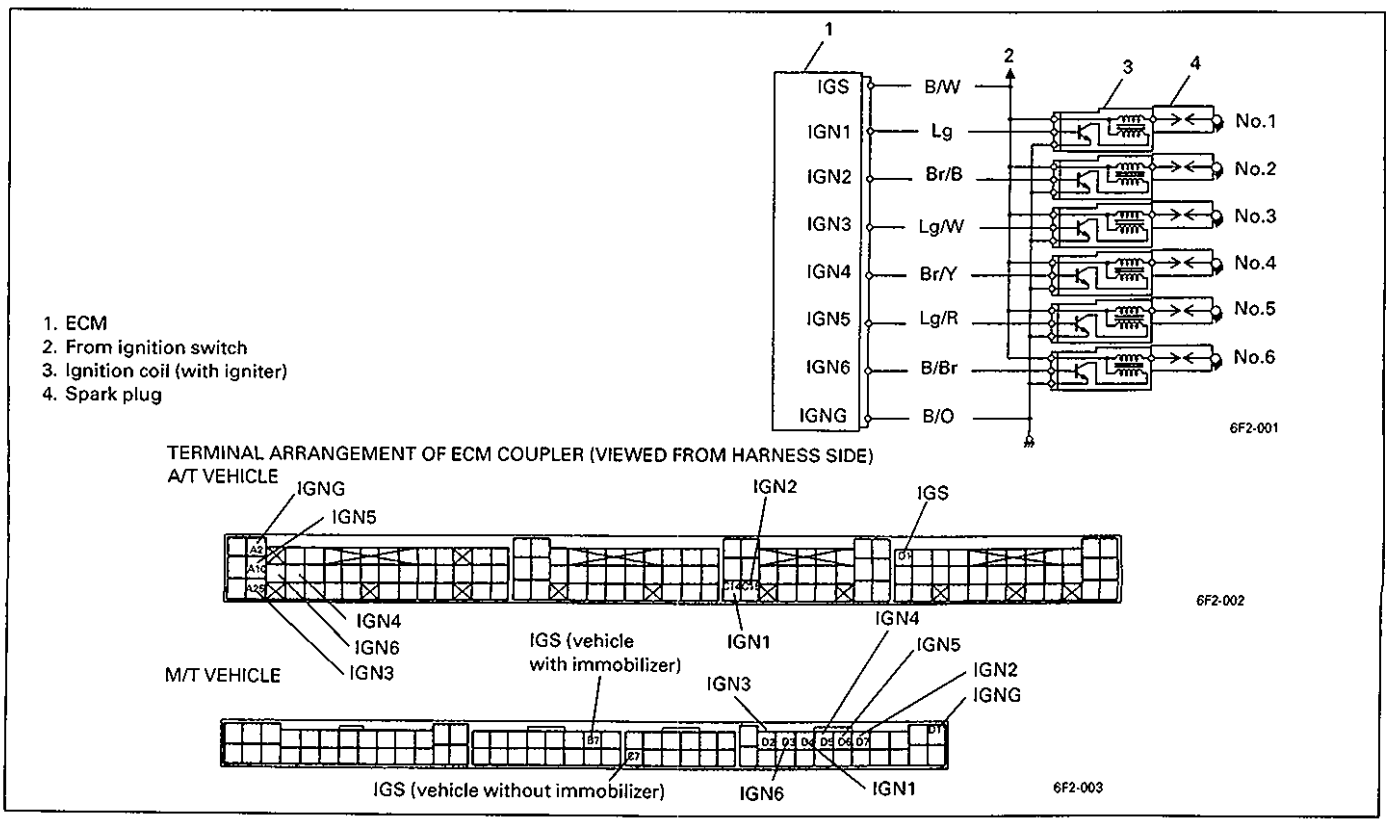
GENERAL DESCRIPTION

The ignition system used for this vehicle uses a direct ignition system so as to avoid jamming caused by the secondary voltage which occurred in the ignition coil and ensure stable ignition even during a high engine speed. Also, IC (Ignition Control) system is adopted to obtain the ignition timing suitable for the every engine conditions.
The components of this system are as follows.

- ECM
  It detects the engine condition through the signals from the sensors, determines the most suitable ignition timing and time for electricity to flow to the primary coil and sends a signal to the igniter (power unit).
- Igniters (in ignition coil)
  It turns ON and OFF the primary current of the ignition coil according to the signal from ECM.
- Ignition coils
  When the ignition coil primary current is turned OFF, a high voltage is induced in the secondary winding.
  One ignition coil is in charge of ignition of one cylinder only.
- CMP sensor(Camshaft Position Sensor)
  Being photoelectrically operated, this system converts timing and time by and during which the light is received at the light receiving part in the CMP sensor into the electric signals. It also outputs the engine speed (position) signal and the cylinder identification (reference) signal to ECM.
- Spark plugs.
- TP sensor, ECT sensor and MAF sensor
  For their details, refer to Section 6E2.

The direct ignition system does not have a distributor or high tension cords but each cylinder has an ignition coil and the secondary voltage which occurred in the ignition coil is sent to the spark plug directly.
Also, the engine speed (position) signal and cylinder identification (reference) signal are sent from the CMP sensor to ECM so as to control each ignition coil independently through the igniter.
In IC (Ignition Control) system, the ECM is programmed for the best ignition timing under every engine condition. Receiving signals which indicate the engine condition from the sensors, e.g., engine revolution, intake air volume, coolant temperature, etc., it selects the most suitable ignition timing from its memory and operates the igniter (power unit). Thus ignition timing is controlled to yield the best engine performance.

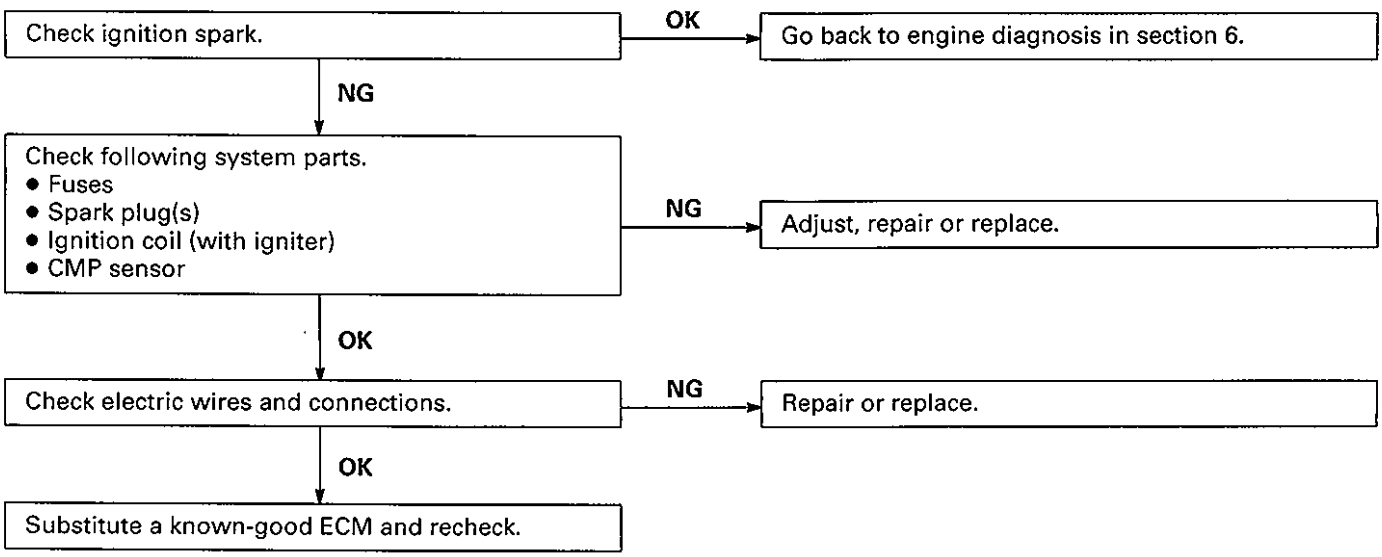
SYSTEM WIRING

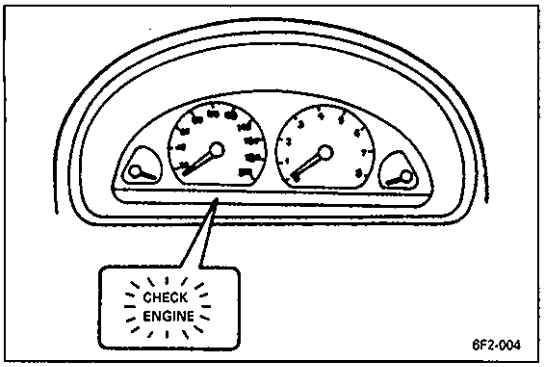


DIAGNOSIS

Condition	Possible Cause	Correction
Engine cranks, but will not start or hard to start	**No spark**	
	• Blown fuse for ignition coil	Replace
	• Loose connection or disconnection of lead wire	Connect securely
	• Faulty spark plug(s)	Adjust, clean or replace
	• Faulty ignition coil (with igniter)	Replace
	• Faulty CMP sensor	Replace
	• Faulty ECM	Replace
	Maladjusted ignition timing	Adjust
Poor fuel economy or engine performance	• Incorrect ignition timing	Adjust
	• Faulty spark plug(s)	Adjust, clean or replace
	• Faulty ignition coil (with igniter)	Replace
	• Faulty CMP sensor	Replace
	• Faulty ECM	Replace

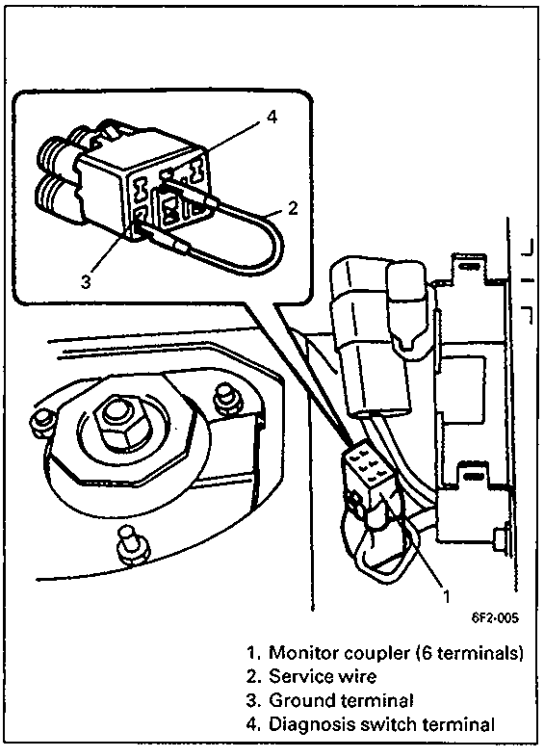
DIAGNOSTIC FLOW CHART (When engine does not start though it is cranked up)





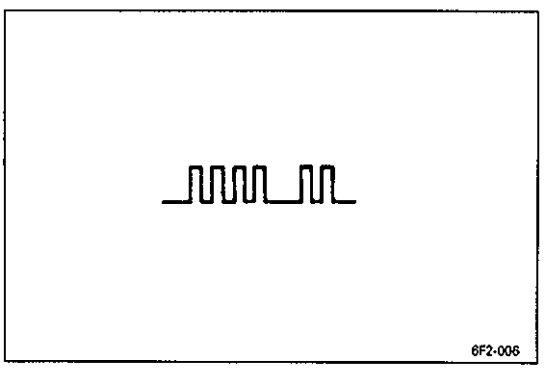
ON-BOARD DIAGNOSTIC SYSTEM (SELF-DIAGNOSIS)

1. To insure correct diagnosis, check to confirm that battery voltage is within standard value when engine is stand-still.
2. Turn on ignition switch and make sure that malfunction indicator lamp ("CHECK ENGINE" light) lights.



1. Monitor coupler (6 terminals)
2. Service wire
3. Ground terminal
4. Diagnosis switch terminal

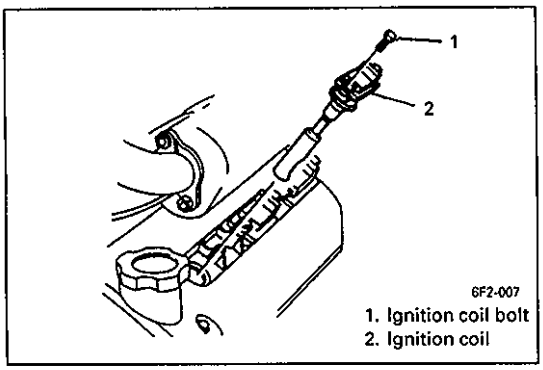
3. If engine will not start but cranking is possible, crank it for more than 3 seconds.
4. While ignition switch is ON, ground diagnosis switch terminal in monitor coupler (6 terminals) and then read diagnostic trouble code (observe malfunction indicator lamp ("CHECK ENGINE" light)).



DIAGNOSTIC TROUBLE CODE NO.42

ECM memory indicates that no CMP sensor signal has been experienced for more that 2 seconds while engine is being cranked.

Diagnose trouble according to "Diagnostic Flow Chart for Code No.42" in Section 6E2.

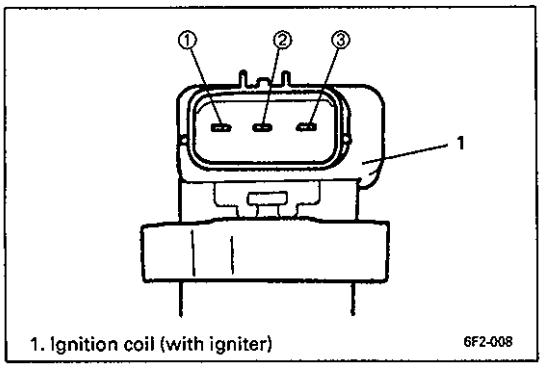


ON VEHICLE SERVICE

IGNITION COIL (WITH IGNITER)

REMOVAL

1) Remove ignition coil cover(s).
2) Disconnect ignition coil coupler(s).
3) Remove ignition coil bolt(s), and then pull out ignition coil(s).



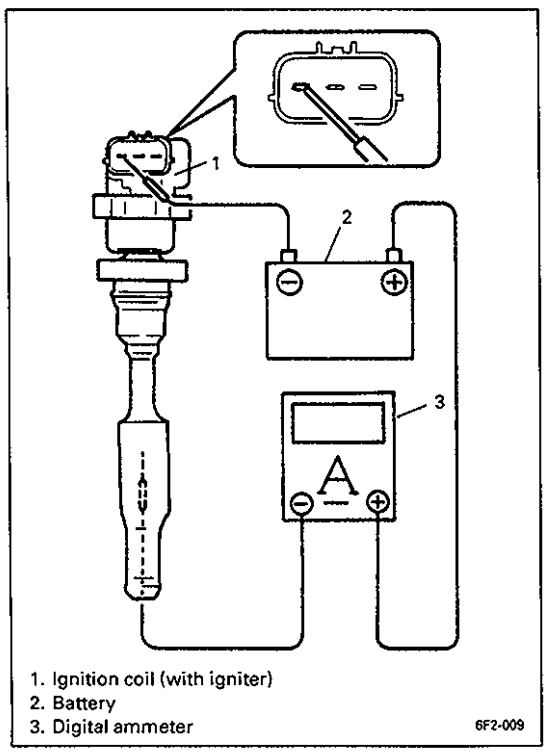
INSPECTION

Igniter and Primary Coil

Using analog tester, check resistance between following terminals.

Terminal	Resistance
① and ②	Not 0
① and ③	Not 0
② and ③	Neither 0 nor ∞

If check result is not satisfactory, replace ignition coil.



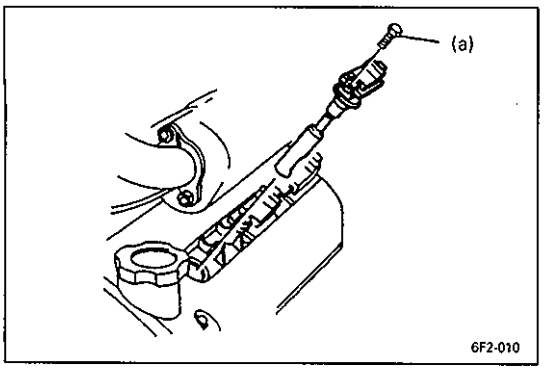
Secondary Coil

1) Connect 12 V vehicle battery and digital ammeter and measure current value as shown in left figure.

   Specified current: 0.3 ~ 1.4 mA

2) Reverse polarities and check that current does not flow.

If check result is not satisfactory, replace ignition coil.



INSTALLATION

1) Install ignition coil(s) securely.
2) Tighten ignition coil bolt(s), and then connect ignition coil coupler(s).

   Tightening Torque
   (a): 3 N·m (0.3 kg-m, 2.5 lb-ft)

3) Install ignition coil cover(s).

SECTION 7B1

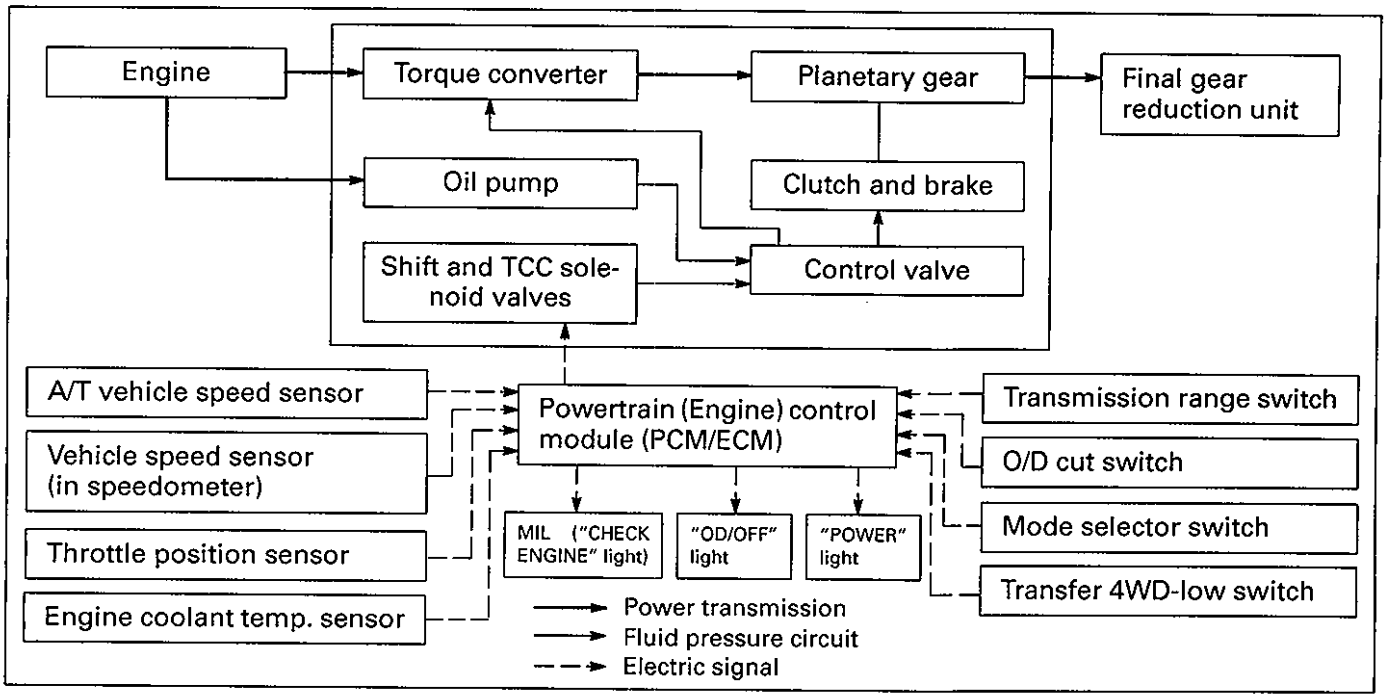
AUTOMATIC TRANSMISSION
(4 A/T)

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

CONTENTS

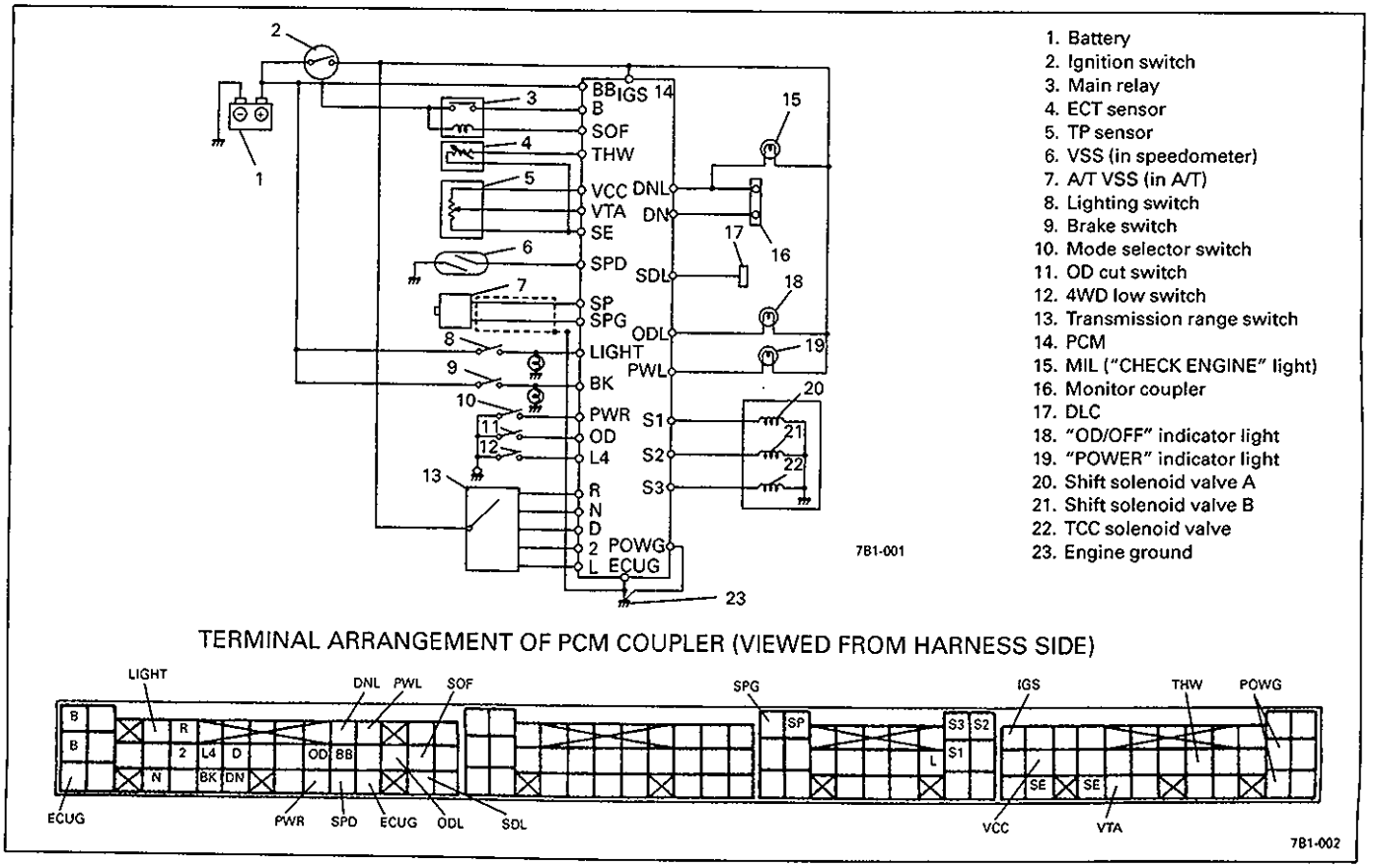
GENERAL DESCRIPTION

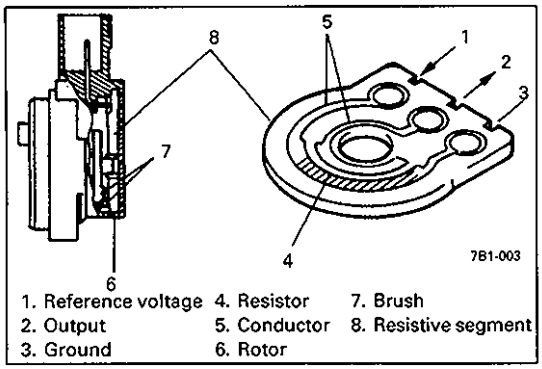
ELECTRONIC SHIFT CONTROL SYSTEM



POWERTRAIN (ENGINE) CONTROL MODULE (PCM/ECM)

The PCM is an electronic circuit component that controls gear shift and lock-up according to the signal from each sensor. It is a microcomputer consisting of an IC, transistor, diode, etc. It is installed to the underside of the instrument panel at the driver's seat side.



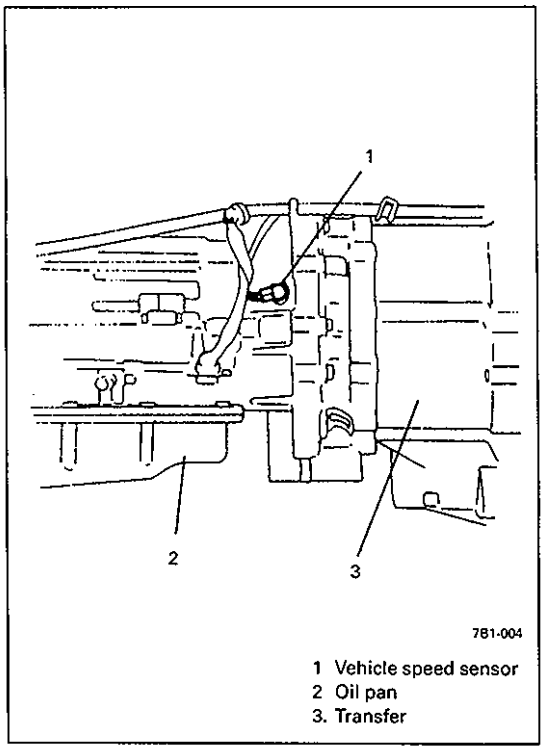


1. Reference voltage
2. Output
3. Ground
4. Resistor
5. Conductor
6. Rotor
7. Brush
8. Resistive segment

Throttle Position Sensor

This sensor is installed to the throttle valve shaft. Throttle valve opening signal are transmitted from TP sensor to PCM as voltage signal.

PCM uses it as one of the signals to control transmission gear shift.

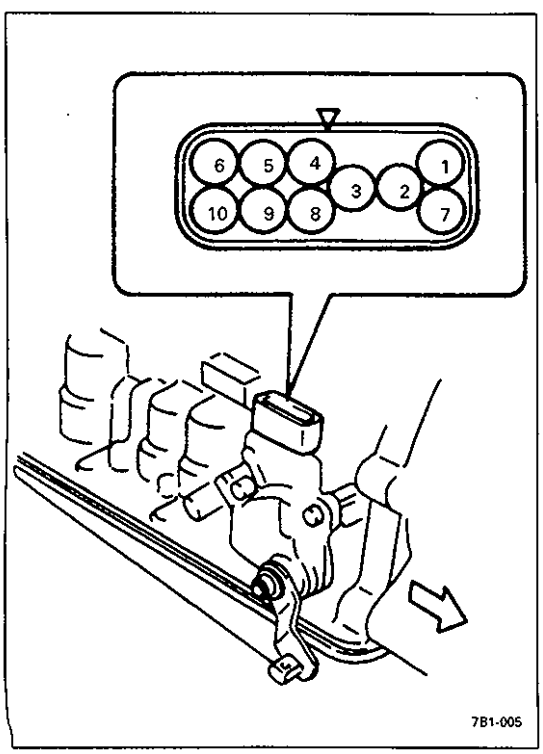


1 Vehicle speed sensor
2 Oil pan
3. Transfer

Vehicle Speed Sensor

This sensor is a pulse generator type that detects revolution of the output shaft (vehicle speed) in the transmission case. The pulse generator is a noncontact sensor consisting of a permanent magnet, coil and gears.

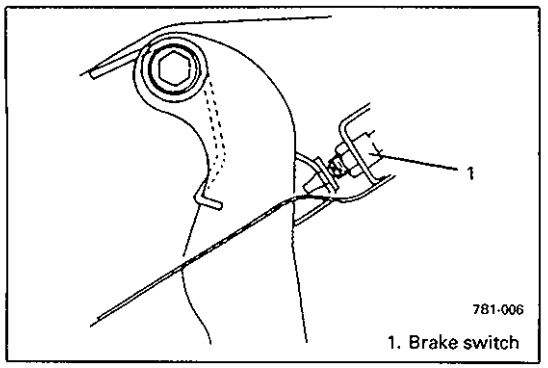
As the gear of the output shaft turns, the magneflux from the permanent magnet varies and a voltage of the frequency corresponding to the rotor revolution occurs in the coil. This voltage is inputted to the PCM where PCM judges the output shaft revolution or the vehicle speed. The vehicle speed is also detected from the speed meter.



Transmission Range Switch

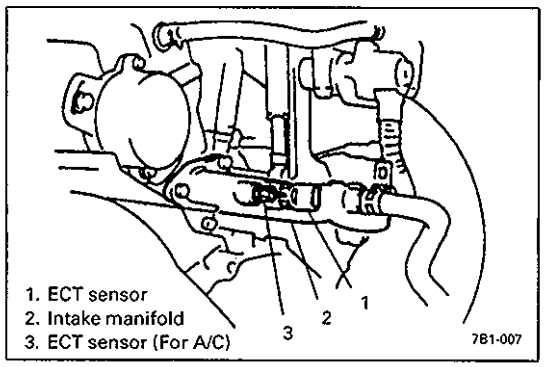
A transmission range switch is provided so that the engine can be started only when the shift lever is in the "P" or "N" position.

Terminal position	6	5	9	8	4	7	3	2	1
P	○	○	○	○					
R			○		○				
N	○	○	○			○			
D			○				○		
2			○					○	
L			○						○



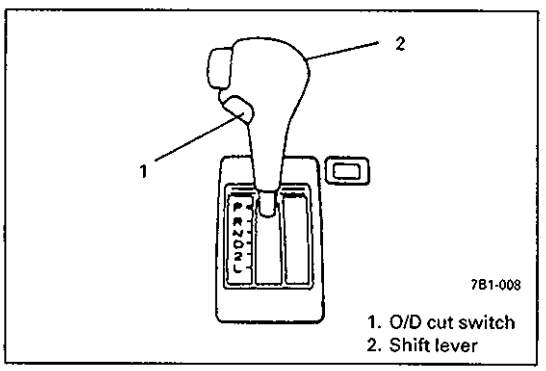
Brake Switch

The same switch is used as the brake lamp switch. It disengages the TCC when the brake is depressed while the TCC is operating.



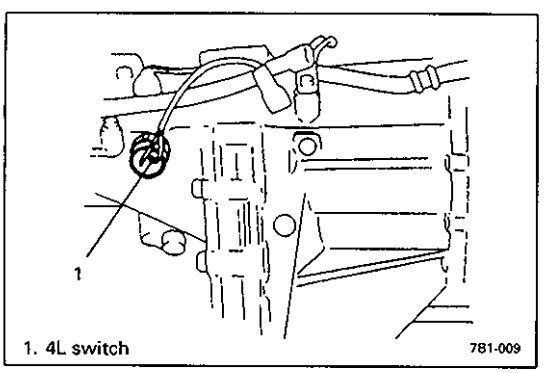
Engine Coolant Temperature Sensor (ECT Sensor)

The coolant temperature sensor is used and it prevents gear change to the O/D gear and TCC operation when the engine coolant temperature is 30°C (86°F) or lower.



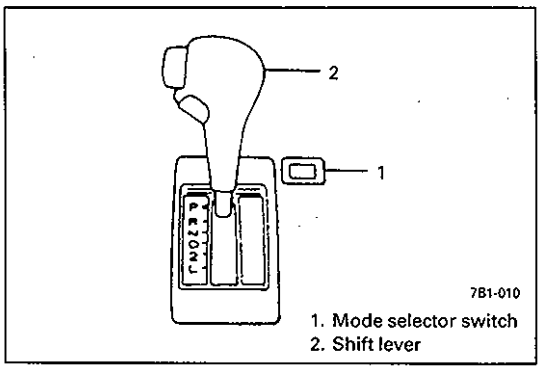
O/D Cut Switch

The gear shift up or shift down to and from the O/D gear can be selected with this switch.



Transfer 4L Switch

This switch detects that the 4-wheel drive low gear is engaged and prevents the gear change into O/D and lock-up.



1. Mode selector switch
2. Shift lever

Mode Selector Switch

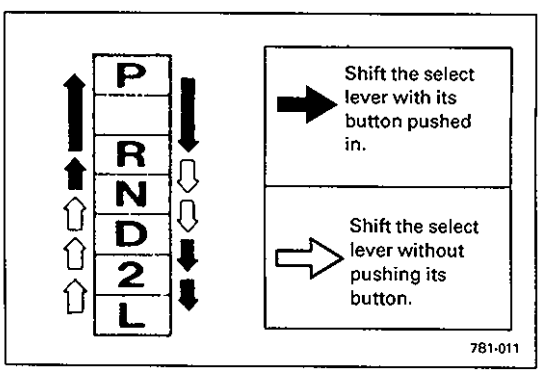
The gear shift timing, normal or power, can be selected by using this switch.

Fail Safe Function

This function is provided by the safe mechanism that assures safe driveability even when the shift solenoid valve or speed sensor fails.

The table below shows the gear position in each shift under a normal/abnormal condition.

Condition / Shift position	Normal	Shift solenoid valve–A abnormal	Shift solenoid valve–B abnormal	Shift solenoid valves–A & B abnormal
D	1st	3rd	1st	O/D
	2nd		O/D	
	3rd			
	O/D	O/D		
2	1st	3rd	1st	3rd
	2nd		3rd	
	(3rd)			
L	1st	1st	1st	1st
	(2nd)	(2nd)		



Change Mechanism

The same select pattern shift lever is used as the floor type and frequently used "N" and "D" ranges are made selectable freely.

AUTOMATIC GEAR SHIFT DIAGRAM

Automatic shift schedule as a result of shift control is shown below. In case that select lever shifted to L at a speed higher than 55 km/h (34 mile/h), 2nd gear operates first and then down shifts to 1st at a speed lower than that. No up shift is available in L.

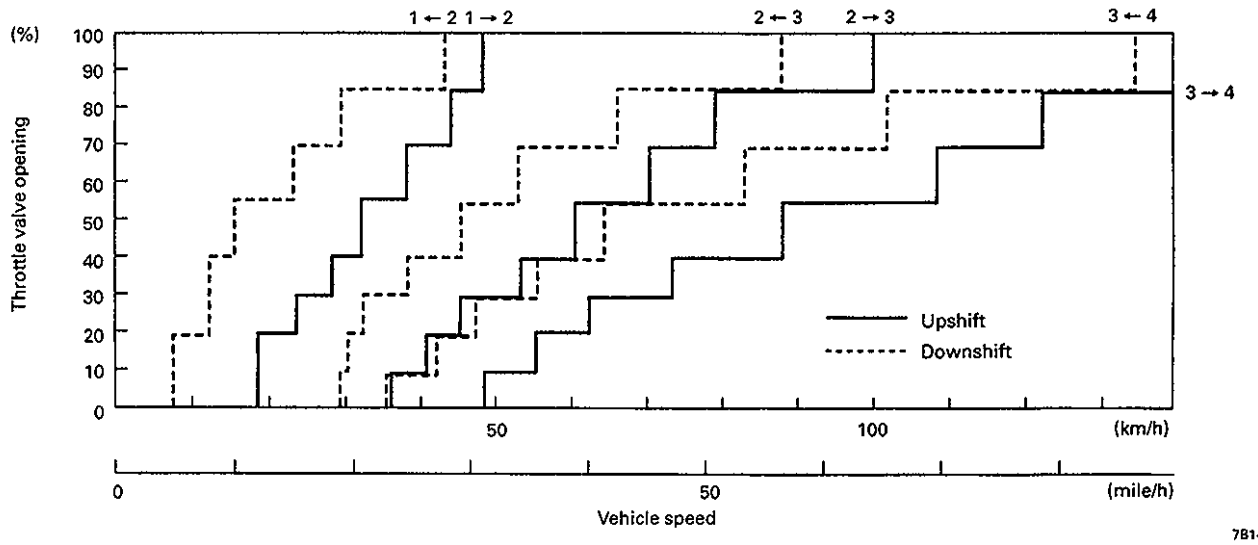
The same as, the select lever shifted to 2 at a speed higher than 105 km/h (66 mile/h), 3rd gear operates first and then down shifts to 2nd at a speed lower than that. No up shift is available in 2.

Power Mode

Unit: km/h (mile/h)

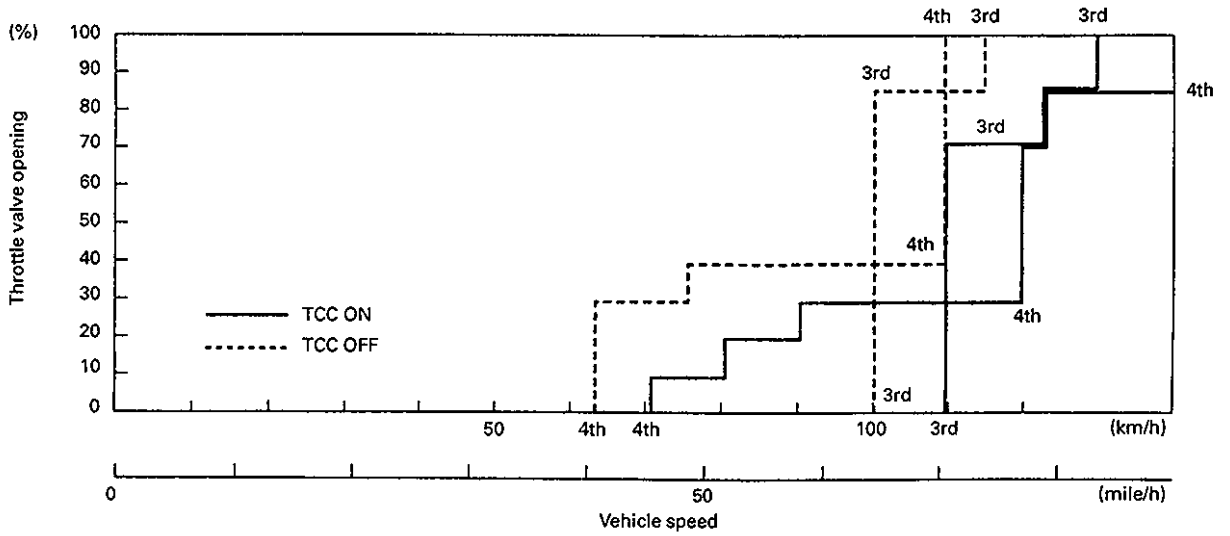
Throttle opening \ Shift	1 → 2	2 → 3	3 → 4	4 → 3	3 → 2	2 → 1
Full throttle	48 (30)	100 (63)	– –	135 (84)	88 (55)	43 (27)
Closed throttle	18 (11)	36 (23)	48 (30)	35 (22)	29 (18)	7 (4)

Gear Shift Diagram



7B1-012

TCC Lock-up Diagram



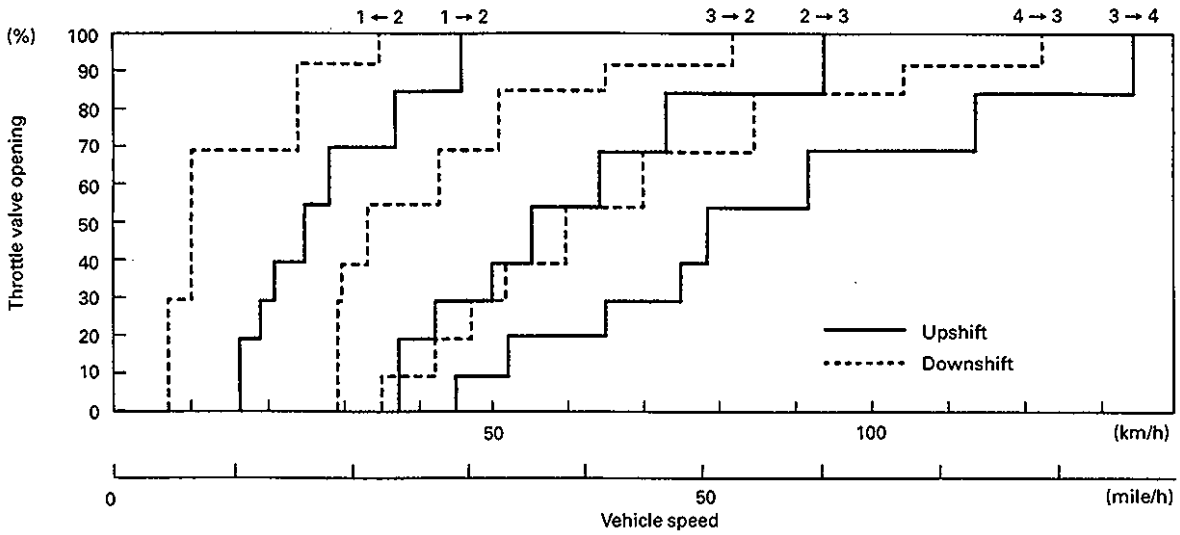
7B1-013

Normal Mode

Unit: km/h (mile/h)

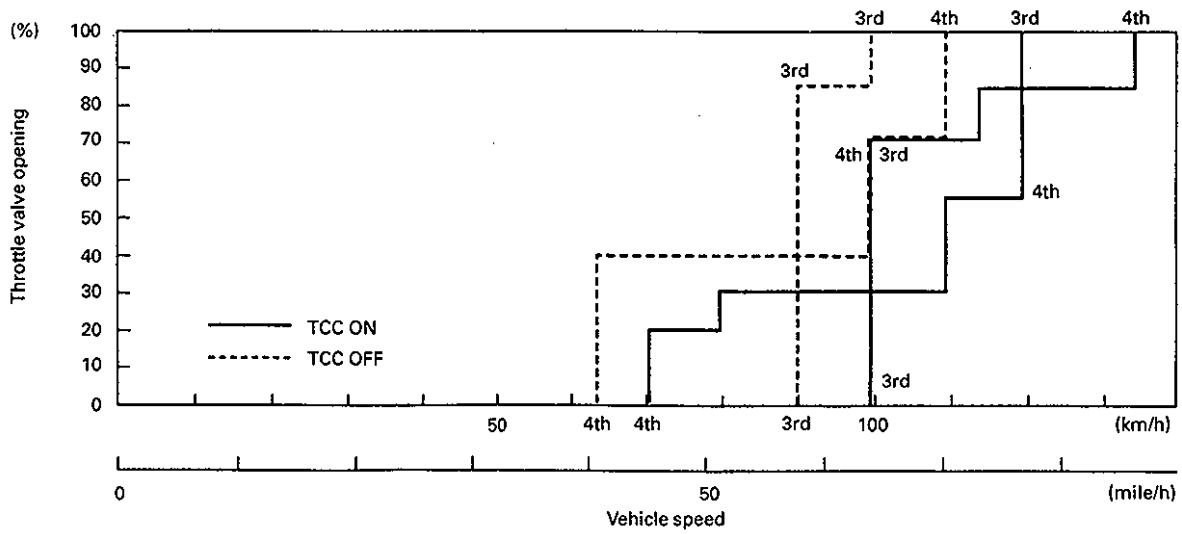
Throttle opening \ Shift	1 → 2	2 → 3	3 → 4	4 → 3	3 → 2	2 → 1
Full throttle	46 (29)	94 (59)	135 (84)	123 (77)	82 (51)	35 (22)
Closed throttle	16 (10)	37 (23)	45 (28)	35 (22)	29 (18)	7 (4)

Gear Shift Diagram



7B1-014

TCC Lock-up Diagram



7B1-015

DIAGNOSIS

TRANSMISSION UNIT

MANUAL ROAD TEST

This test checks the gears being used in "L", "2" or "D" range when driven with unoperated gear shift control system. Test drive vehicle on a level road.

1) Disconnect coupler of shift solenoid valves on transmission.

> **WARNING:**
> **To avoid the danger of being burned, do not touch the hot exhaust system when disconnecting shift solenoid valves coupler.**

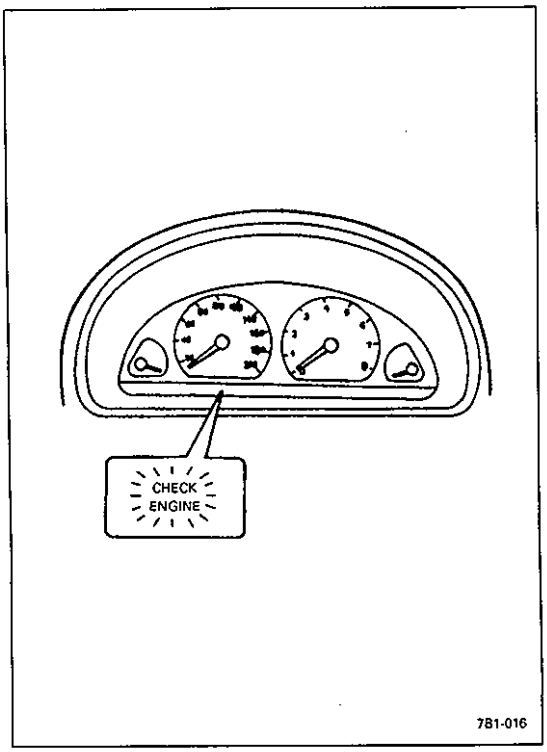
2) With selector lever in "P" range, start engine and warm it up.
3) With select lever in "L" range, start vehicle and accelerate to 20 km/h (12.5 mile/h). Check in this state that 1st gear is being used.
4) At 20 km/h (12.5 mile/h), shift select lever to 2 range and accelerate to 40 km/h (25 mile/h). Check in this state that 3rd gear is being used.
5) At 40 km/h (25 mile/h), shift select lever to D range and check that O/D gear is used when speed is higher than 40 km/h (25 mile/h).
6) After above checks, stop vehicle then engine, and connect solenoid valves coupler.

> **WARNING:**
> **To avoid the danger of being burned, do not touch the exhaust system when connecting shift solenoid valves coupler.**

7) Ground diagnosis switch terminal in monitor coupler, turn ON ignition switch and make sure that MIL ("CHECK ENGINE" light) indicates code No.12.

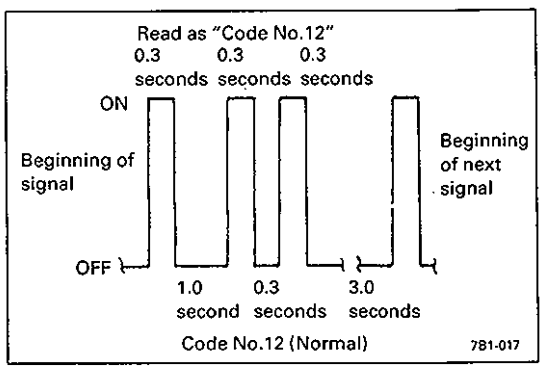
ELECTRONIC SHIFT CONTROL SYSTEM

The powertrain (engine) control module (P(E)CM) with on-board diagnostic system (self-diagnosis function) operates as described below.
When diagnosing a trouble in the electronic shift control system, use "DIAGNOSTIC FLOW CHART" and "DIAGNOSTIC TROUBLE CODE TABLE" on the following page.



ON-BOARD DIAGNOSTIC SYSTEM (SELF-DIAGNOSIS FUNCTION)

- When the engine is OFF and the ignition switch is turned ON, the malfunction indicator lamp ("CHECK ENGINE" light) lights for its bulb check of malfunction indicator lamp ("CHECK ENGINE" light).
- Should an abnormality have occurred in the electronic shift control system while the ignition switch is ON or the engine running, the area where the abnormality has occurred is stored in the P(E)CM memory and it remains in the memory till ignition switch is turned OFF.
- The affected area in the memory is indicated by flashing of malfunction indicator lamp ("CHECK ENGINE" light) when the diag. switch terminal is grounded.



PRECAUTION IN IDENTIFYING DIAG. TROUBLE CODE

- Before checking the diag. trouble code, be sure not to turn OFF the ignition switch, disconnect the P(E)CM or battery negative cable. Or the memory will be erased.
- Each trouble code is indicated 3 times. Write it down so as not to forget it. When an abnormality exists in more than one area, their code Nos. are indicated from the smallest to larger numbers.

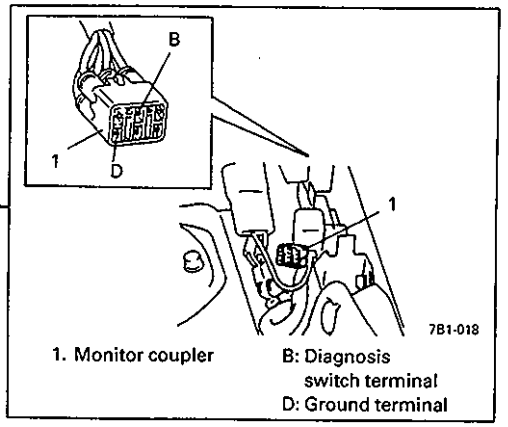
PRECAUTION ON TROUBLESHOOTING

- "Normal operating temperature" in the diagnostic flow chart means that the engine coolant temperature is 80°C (176°F) and A/T fluid temperature is 70–80°C (158–176°F).
- Do not connect an ohmmeter, voltmeter, etc. directly (with the coupler disconnected) to the P(E)CM terminal. It may cause damage to the P(E)CM.

DIAGNOSTIC FLOW CHART

START

1. Perform test driving.
2. After test driving, hold engine running in "P" position applied with parking brake.
3. Using service wire, ground diag. switch terminal and observe malfunction indicator lamp ("CHECK ENGINE" light).



1. Monitor coupler
B: Diagnosis switch terminal
D: Ground terminal

Malfunction indicator lamp ("CHECK ENGINE" light) doesn't operate properly. (doesn't light, doesn't blink or doesn't output code.)

Proceed to DIAGNOSTIC FLOW CHART in section 6E2.

Diagnostic trouble code indicated.

Are they A/T related code (refer to Diagnostic Trouble Code Table) only?

NO

YES

Record trouble code No., turn OFF ignition switch to erase diag. trouble code memory.

Check trouble code area and repair.

Is trouble corrected?

NO

YES

END

No trouble code indicated. (Code No.12 only)

Check according to flow chart for each symptom.

- No gear shift occurs. Proceed to Diag. flow chart A.
- Faulty shift point. Proceed to Diag. flow chart B.
- Gear does not shift to O/D. Proceed to Diag. flow chart C.
- No TCC lock-up occurs. Proceed to Diag. flow chart D.

Diagnostic Trouble Code Table (A/T Related Code)

Code No.	Diagnostic Area	Diagnosis
12	–	Normal
61	Shift solenoid valve A	Shift solenoid valve A or its circuit open or shorted to power circuit.
62		Shift solenoid valve A or its circuit shorted to ground.
63	Shift solenoid valve B	Shift solenoid valve B or its circuit open or shorted to power circuit.
64		Shift solenoid valve B or its circuit shorted to ground.
65	TCC solenoid valve	TCC solenoid valve or its circuit open or shorted to power circuit.
66		TCC solenoid valve or its circuit shorted to ground.
72	Transmission range switch	Defective switch or its circuit (more than two shift switches of "R", "N", "D", "2" and "L" turned ON simultaneously or no shift switch turned ON while vehicle running).
75	A/T vehicle speed sensor	Defective sensor or its circuit. (open or short)

Fail-Safe Table

Code No.	Diagnostic Area	Fail-Safe Function
14	ECT sensor	After 15 min. from engine start, TCM release inhibitions of shift to OD gear and TCC lock-up.
15		
21	TP sensor	Throttle opening is controlled as closed.
22		
61	Shift solenoid valve A	Shift solenoid valve B. 1st, 2nd and 3rd gears ON, 4th (O/D) gear OFF. For shift position, refer to Fail-Safe Function in ELECTRONIC SHIFT CONTROL SYSTEM.
62		
63	Shift solenoid valve B	Shift solenoid valve A. 1st gear ON, 2nd 3rd and 4th (O/D) gears OFF. For shift position, refer to Fail-Safe Function in ELECTRONIC SHIFT CONTROL SYSTEM.
64		
65	TCC solenoid valve	TCC solenoid valve OFF.
66		
72	Transmission range switch	Priority order is "L" → "2" → "N" → "D" → "R". (When two or more signals inputted same time) Transmission range switch is controlled as "D" range. (When no signal inputted)
75	A/T vehicle speed sensor	Signal from vehicle speed sensor (in speedometer) is used.

DIAGNOSTIC FLOW CHART A

NO GEAR SHIFT OCCURS

↓

Warm up engine and transmission to normal operating temperature.

↓

Check diag. trouble code.

Trouble code indicated. → Go back to "DIAG. FLOW CHART" on page 7B1-10.

No trouble code indicated.

↓

Perform manual road test referring to p. 7B1-8. Is it OK?

NG → Transmission or manual select control system faulty.

OK

↓

1. With solenoid valves coupler connected, turn ignition switch ON.
2. Conduct a road test in "D" range and check voltage at each solenoid terminal. For relationship between vehicle speed and each gear position, refer to gear shift diagram.

OK → Shift solenoid valve–A, B or transmission faulty.

Vehicle speed	1st range	2nd range	3rd range	4th range
Shift solenoid –A (S_1)	Battery voltage	Battery voltage	0V	0V
Shift solenoid –B (S_2)	0V	Battery voltage	Battery voltage	0V

NG

↓

With P(E)CM coupler connected and select lever shifted to "D" range, check voltage at "L" and "2" range signal terminals. Voltage at each terminal should be 0V.

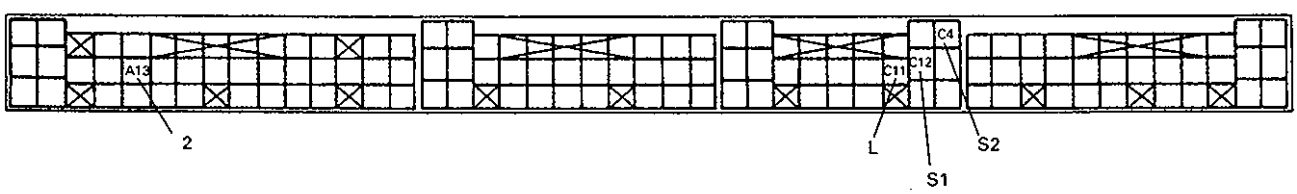
NG → Shift switch or its circuit faulty.

OK

↓

Replace P(E)CM and recheck.

Terminal Arrangement of P(E)CM Coupler (Viewed from harness side)



S_1: Shift solenoid A (S_1) terminal
S_2: Shift solenoid B (S_2) terminal
L: "L" range signal terminal
2: "2" range signal terminal

7B1-019

DIAGNOSTIC FLOW CHART B

FAULTY SHIFT POINT

↓

Warm up engine and transmission to normal operating temperature.

↓

Check diag. trouble code.

Trouble code indicated. → Go back to "DIAG. FLOW CHART" on p. 7B1-10.

No trouble code indicated.

↓

Check throttle position sensor referring to section 6E2.

NG → TP sensor maladjusted or faulty signal circuit.

OK

↓

1. With ignition switch OFF, connect TCM coupler.
2. Check voltage at "PWR" terminal.

Mode selector switch position	"N" position	"P" position
Voltage	About 5V	0V

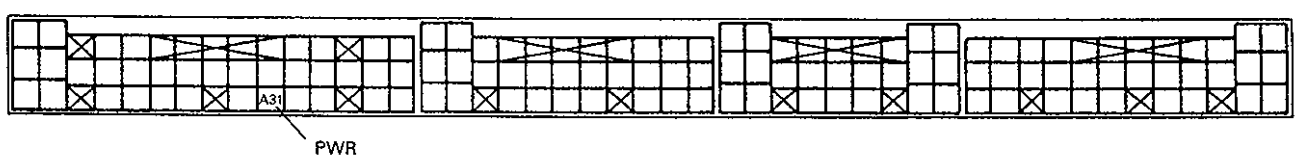
NG → Mode selector switch or its circuit faulty.

OK

↓

Replace P(E)CM and recheck.

Terminal Arrangement of P(E)CM Coupler (Viewed from harness side)



PWR : "PWR" terminal

7B1-020

DIAGNOSTIC CHART C

NO GEAR SHIFT TO O/D

↓

Warm up engine and transmission to normal operating temperature.

↓

Check diag. trouble code.

→ **Trouble code indicated.** → Go back to "DIAG. FLOW CHART" in p. 7B1–10.

↓ **No trouble code indicated.**

Perform manual road test referring to p. 7B1-8.
Does gear shift to O/D (4th gear) occur in manual road test?

→ **NG** → Manual select control system or transmission faulty.

↓ **OK**

1. With ignition switch OFF, connect solenoid valves coupler.
2. Conduct road test in "D" range and check voltage at each solenoid terminal.

Vehicle speed	1st range	2nd range	3rd range	4th range
Shift solenoid –A (S_1)	Battery voltage	Battery voltage	0V	0V
Shift solenoid –B (S_2)	0V	Battery voltage	Battery voltage	0V

→ **OK** → Shift solenoid valve-A, B or transmission faulty.

↓ **NG**

1. With P(E)CM coupler connected, turn ignition switch ON.
2. With select lever shifted to "D" range, check voltage at "L" and "2" range signal terminals. It should be 0V.

→ **NG** → Shift switch or its circuit faulty.

↓ **OK**

With coupler connected, check voltage at "OD" terminal.

O/D cut switch position	OFF	ON
Voltage	Battery voltage	0V

↓ **OK**

→ **NG** → Faulty O/D cut switch or its circuit shorted.

↓

To be continued

Continued

Check ECT sensor referring to section 6E2. Is it good condition?

NG → ECT sensor faulty.

OK

With coupler connected, check voltage at "L4" terminal.

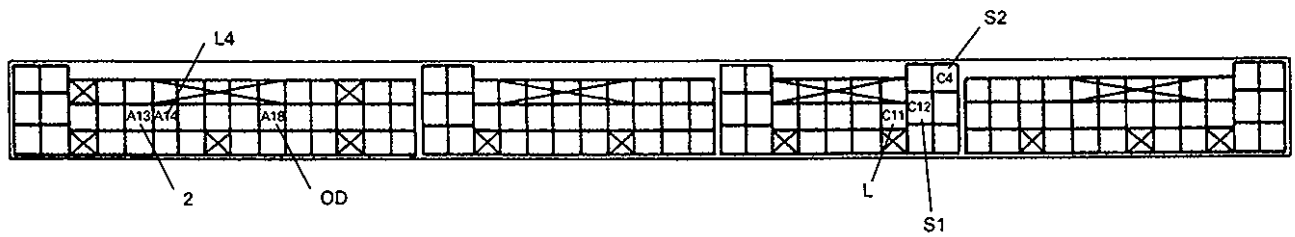
NG → Faulty 4WD-L switch or its circuit shorted.

Transfer gear position	"4L" position	Other position
Voltage	0V	Battery voltage

OK

Replace P(E)CM and recheck.

Terminal Arrangement of P(E)CM Coupler (Viewed from harness side)



S_1: Shift solenoid A (S_1) terminal
S_2: Shift solenoid B (S_2) terminal
L: "L" range signal terminal
2: "2" range signal terminal
L4: 4WD low switch terminal
OD: OD cut switch terminal

7B1-022

DIAGNOSTIC FLOW CHART D

NO TCC LOCK-UP OCCURS.

↓

Warm up engine and transmission to normal operating temperature.

↓

Check diag. trouble code.

→ **Trouble code indicated.** → Go back to "DIAG. FLOW CHART" in p. 7B1-10.

↓ **No trouble code indicated.**

Conduct roat test under following conditions and check if battery voltage is obtained at "S_3" terminal.
- O/D cut switch OFF. (O/D OFF light turn ON.)
- Normal mode in "D" range.
- Transfer "2H" gear position.
- Accelerate till vehicle speed reaches about 80 km/h and reduce throttle valve opening so that it is open less than 20%.

→ **OK** → Solenoid valve No.2 (TCC solenoid valve) or transmission faulty.

↓ **NG**

Check voltage at "BK" terminal.

Brake pedal	When released	When depressed
Voltage	0V	Battery voltage

→ **NG** → Faulty brake pedal switch or its circuit shorted.

↓ **OK**

Check ECT sensor referring to section 6E2. Is it good condition?

→ **NG** → ECT sensor faulty.

↓ **OK**

Check voltage at "L4" terminal.

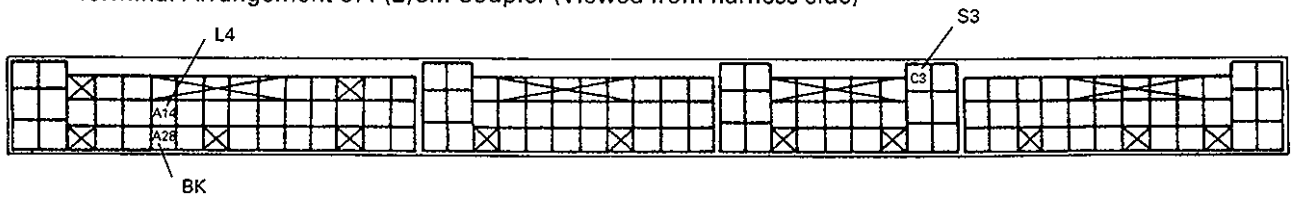
Transfer gear position	"4L" or "N" position	"4H" or "2H" position
Voltage	0V	Battery voltage

→ **NG** → Faulty 4WD-L switch or its circuit shorted.

↓ **OK**

Replace P(E)CM and recheck.

Terminal Arrangement of P(E)CM Coupler (Viewed from harness side)



S_3: TCC control solenoid terminal
BK: Brake switch terminal
L4: 4WD low switch terminal

7B1-023

GROUP2

SUZUKI

SV620

SUPPLEMENTARY SERVICE MANUAL

FOREWORD

This SUPPLEMENTARY SERVICE MANUAL (GROUP 2) is a supplement to GROUP 1.

Applicable model:
SV620 vehicles on and after following body No.
(x) JSAETD11V00200001 (x)~
TD11V-200001~

Therefore, whenever servicing applicable model, consult GROUP 2 first. And for any section, item or description not found in GROUP 2, refer to GROUP 1.

When replacing parts or servicing by disassembling, it is recommended to use SUZUKI 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 used 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.

RELATED SERVICE MANUAL
Refer to FOREWORD of GROUP 1

SUZUKI MOTOR CORPORATION
OVERSEAS SERVICE DEPARTMENT

SECTION 1A

HEATER AND VENTILATION

WARNING:
For vehicles equipped with a Supplemental Inflatable Restraint Air Bag System:

- **Service on or around Air Bag System Components or Wiring must be performed only by an authorized Suzuki dealer. Please observe all WARNINGS and SERVICE PRECAUTIONS in Section 9J under "On-Vehicle Service" and the Air Bag System Component and Wiring Location view in Section 9J before performing service on or around Air Bag System Components or Wiring. Failure to follow WARNINGS could result in unintended air bag deployment or could render the air bag inoperative. Either of these two conditions may result in severe injury.**
- **Technical service work must be started at least 90 seconds after the ignition switch is turned to the "LOCK" position and the negative cable is disconnected from the battery. Otherwise, the air bags may be deployed by reserve energy in the Sensing and Diagnostic module (SDM).**

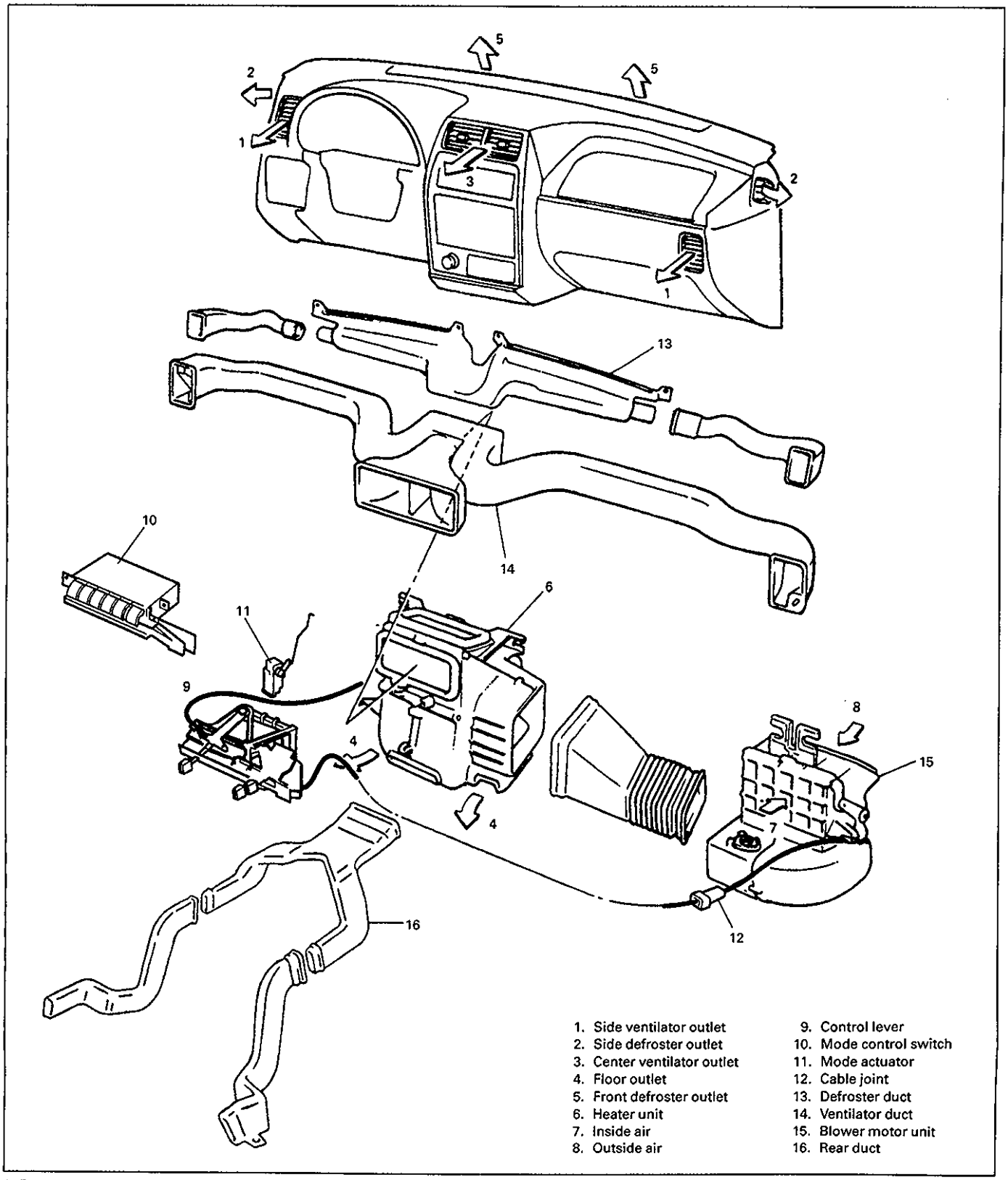
NOTE:

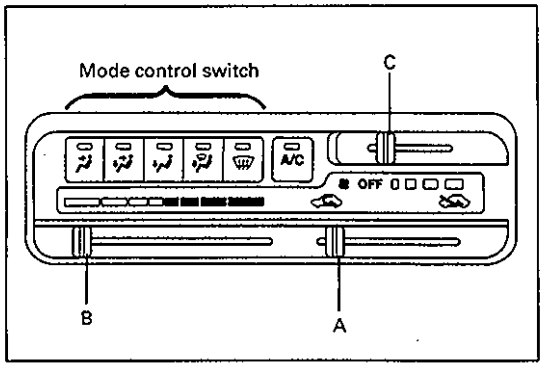
- **For the descriptions (items) not found in this section, refer to SECTION 1A of the Service Manual mentioned in FOREWORD of this manual.**
- **The link mechanism of the heater varies depending on the specifications.**

CONTENTS

GENERAL DESCRIPTION

The heater, an in and out air selectable-type hot water heater, is so constructed that it is possible to assure an agreeable ventilation at all times by providing the ventilator air outlets at the center and both sides (right and left) of the instrument panel, the hot air outlet at a place close to the feet of front passengers, and the defroster air outlets at places, right and left, along the windshield glass.
The heater and ventilation consist of following parts.





60A40-1A-3-1

HEATER CONTROL OPERATION

For mode selection, press mode control switch as desired. Then the mode actuator will move the link to change the mode.

	VENTILATION
	BI-LEVEL
	HEAT
	HEAT & DEFROSTER
	DEFROSTER

60A20-1A-3-2

MODE CONTROL SWITCH

BI-LEVEL ( ) is a position used to keep cooling the head and warming the feet.

	CIRCULATION
	FRESH AIR

60A20-1A-3-3

CONTROL LEVER A

CONTROL LEVER B

A temperature control lever.
The temperature of air is controlled by this lever.
To make the heater warmer, set it to the "HOT" position.

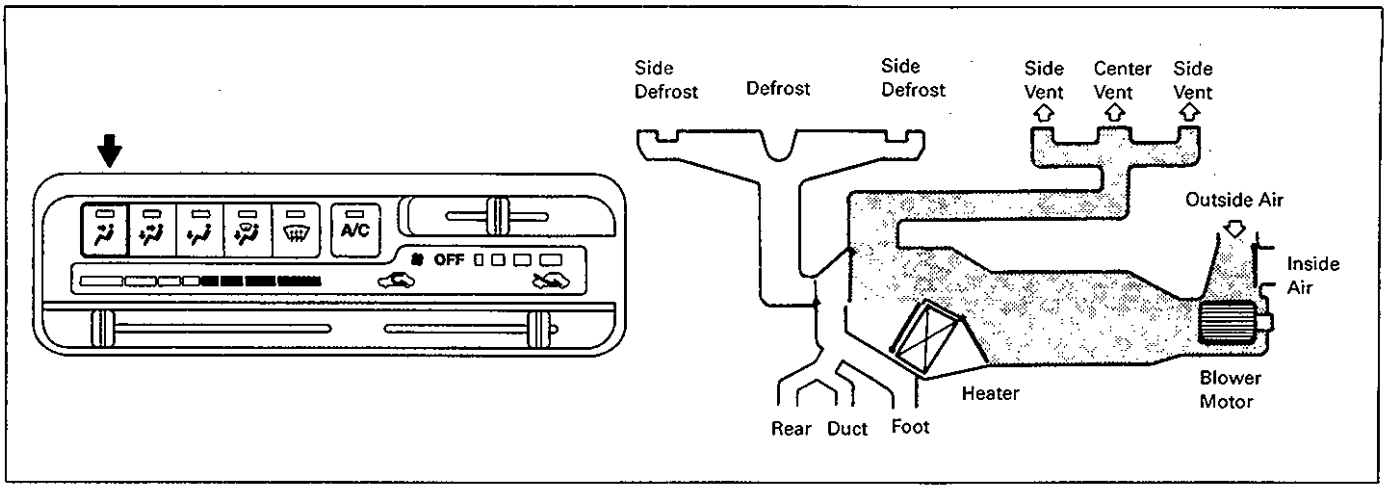
60A20-1A-3-4

CONTROL LEVER C

A blower speed selecting lever. The blower speed is increased as the lever is moved from left to right.

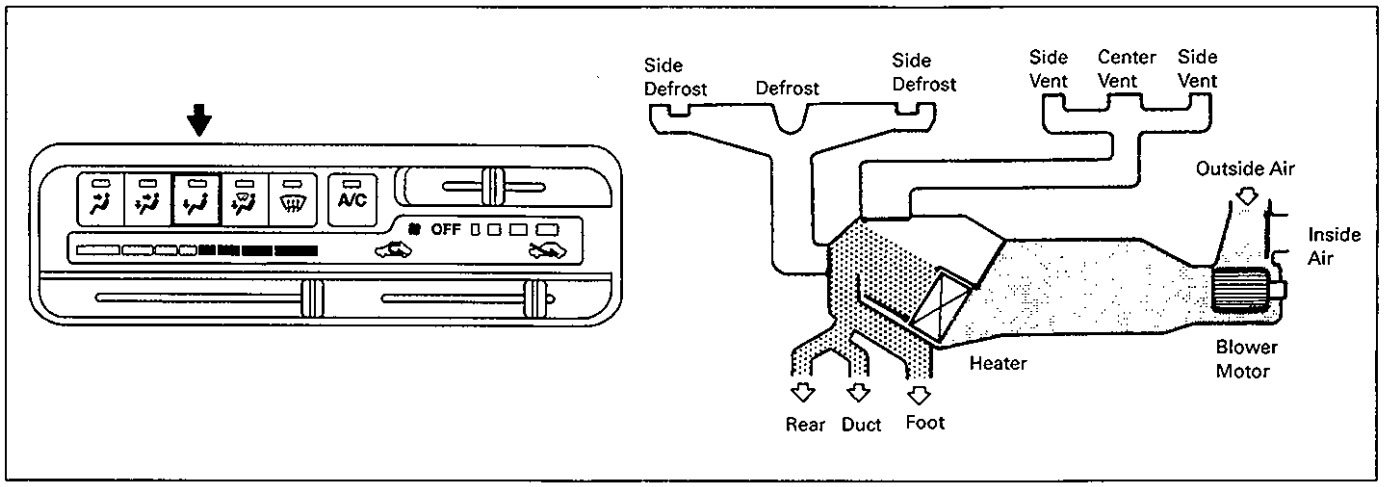
60A20-1A-3-5

A. FORCED VENTILATION



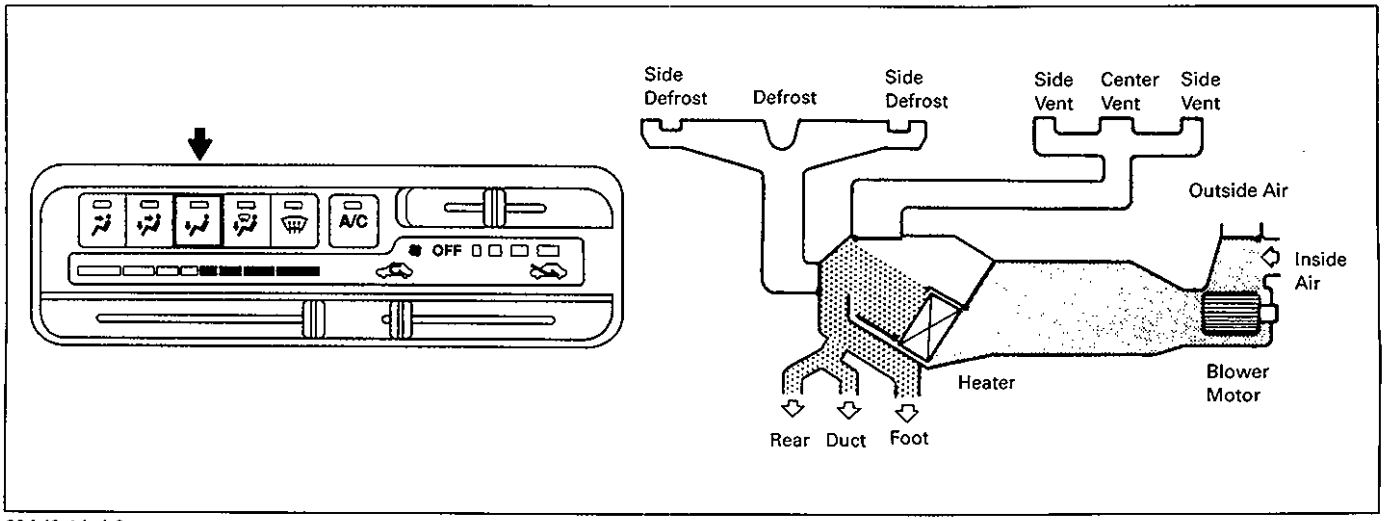
60A40-1A-4-1

B. OUTSIDE AIR-INTRODUCED HEATING



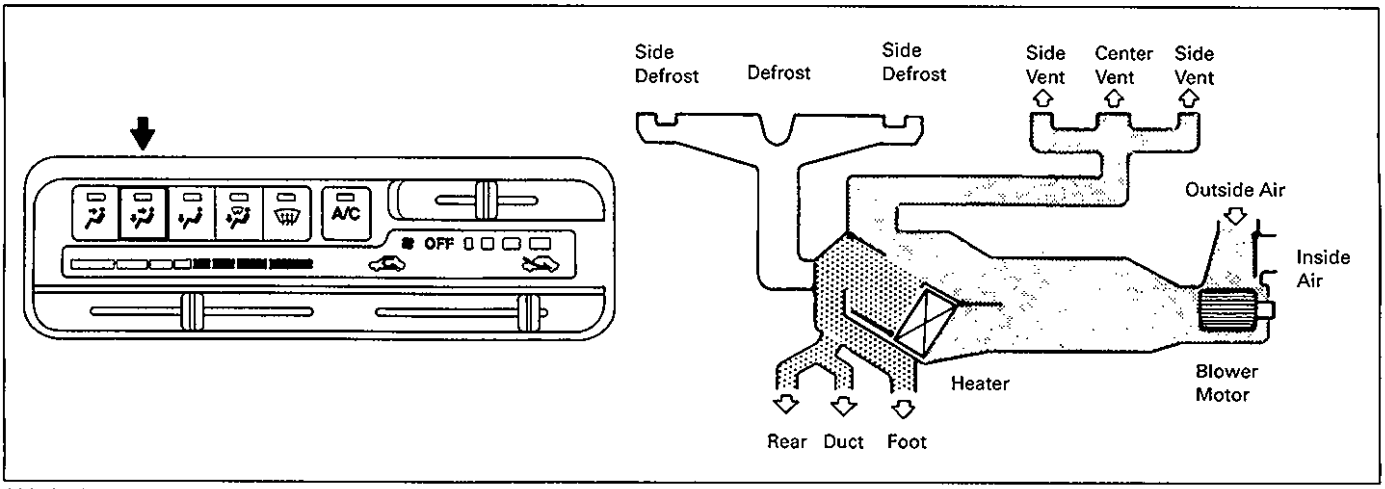
60A40-1A-4-2

C. INSIDE AIR-CIRCULATED HEATING



60A40-1A-4-3

D. HEAD-COOLED/FEET-WARMED HEATING



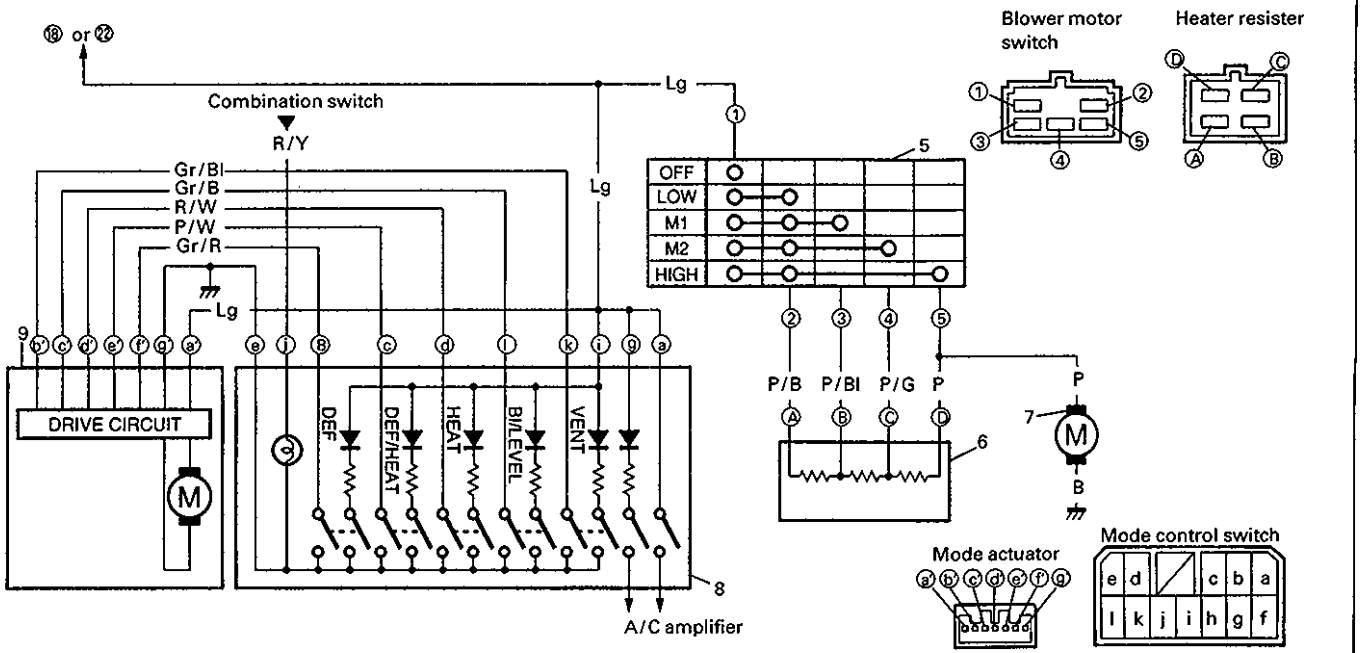
60A40-1A-5-1

TROUBLE DIAGNOSIS

Trouble	Possible cause	Remedy
Heater blower won't work even when its switch is ON.	Blower fuse blown Blower resistor faulty Blower motor faulty Wiring or grounding faulty	Replace fuse to check for short. Check resistor. Replace motor. Repair as necessary.
Incorrect temperature output.	Control cables broken or binding Air damper broken Air ducts clogged Heater radiator leaking or clogged Heater hoses leaking or clogged	Check cables. Repair damper. Repair air ducts. Replace radiator. Replace hoses.
When mode control switch is changed, air outlet port is not changed.	Mode control switch faulty Mode actuator faulty Fuse blown Wiring or grounding faulty Air damper broken Air ducts clogged	Check and replace as necessary. Check and replace as necessary. Replace fuse to check for short. Repair as necessary. Repair damper Repair air ducts.

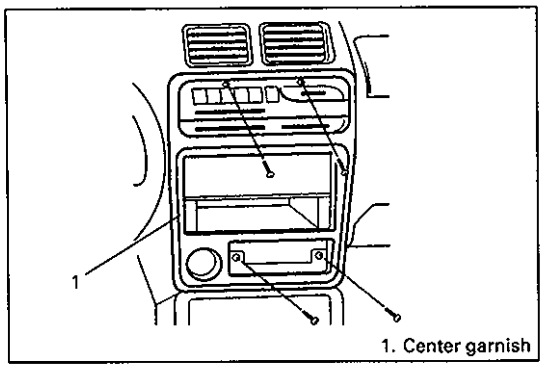
60A20-1A-5-2

WIRING CIRCUIT

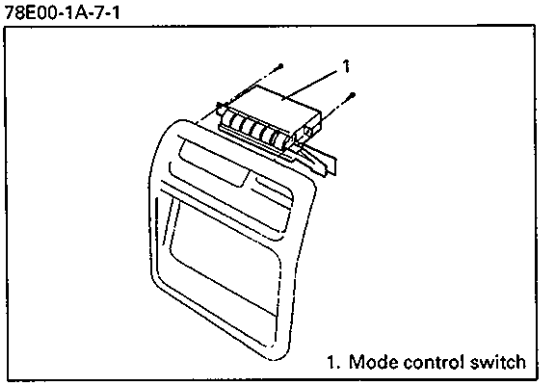


1. Battery
2. Main fuse
3. Main switch
4. Fuse box
5. Blower motor switch
6. Heater resister
7. Blower motor
8. Mode control switch
9. Mode actuator

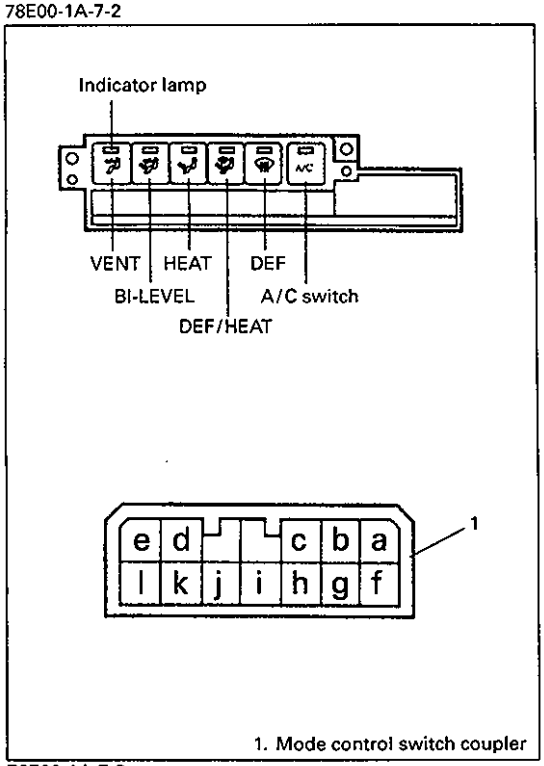
60A50-1A-7-1



78E00-1A-7-1



78E00-1A-7-2



78E00-1A-7-3

ON-VEHICLE SERVICE

MODE CONTROL SWITCH

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system. Refer to "Disabling Air Bag System" in Section 9J.
3) Pull off control lever knobs.
4) Remove ashtray and center garnish mounting screws.
5) Remove center garnish with mode control switch.
6) Remove mode control switch from center garnish.

INSPECTION

Mode Control Switch

- Check if continuity exists between each pair of terminals listed below when mode control button is pressed.

Mode	Mode control switch terminals
VENT	e – k
BI-LEVEL	e – l
HEAT	e – d
DEF/HEAT	e – c
DEF	e – b

- With battery voltage (+) connected to terminal "i" and (–) to terminal "e", press each mode control button and check if indicator lamp lights.
- With battery voltage (+) connected to terminal "j" and (–) to terminal "e", check if illumination lamp lights.

A/C Switch (if equipped)

- Press A/C button and check if there is continuity between terminals "a" and "f".
- With battery voltage (+) connected to terminal "g" and (–) to terminal "h", press A/C button and check if indicator lamp lights.

INSTALLATION

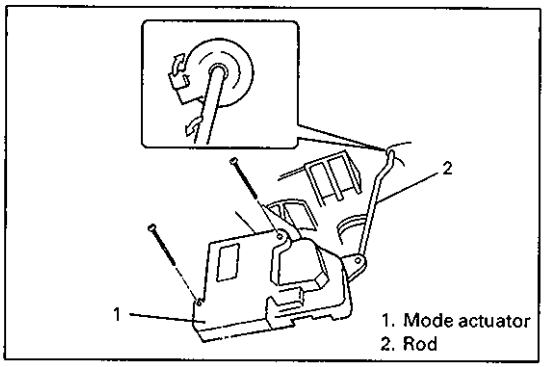
1) Install in reverse order of removal.
2) If equipped with air bag system, enable air bag system. Refer to "Enabling Air Bag System" in Section 9J.

MODE ACTUATOR

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system. Refer to "Disabling Air Bag System" in Section 9J.
3) Remove EBCM bracket with EBCM and ICM (if equipped).

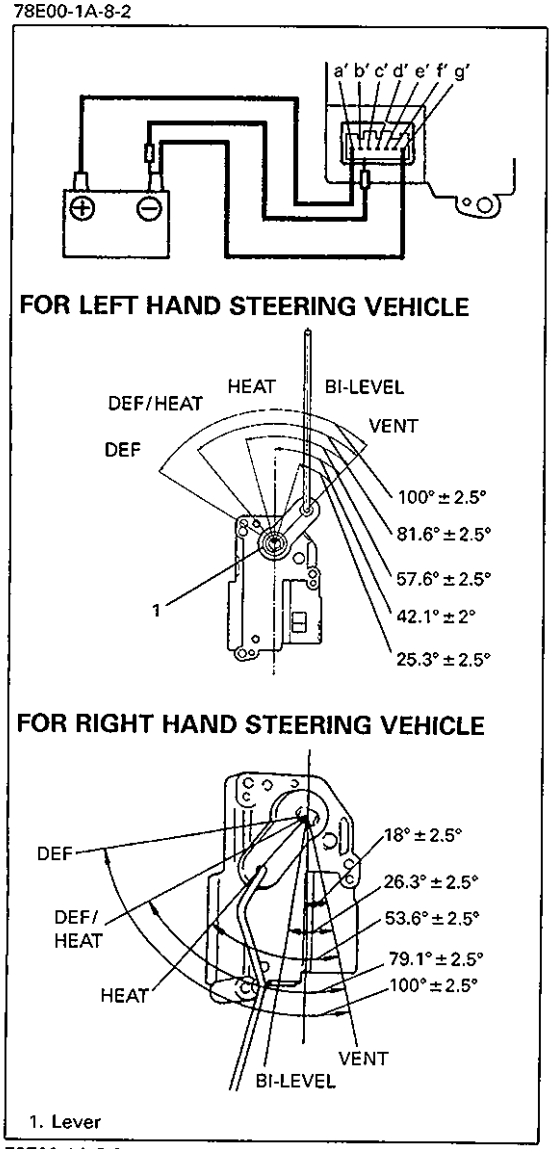
78E00-1A-8-1



1. Mode actuator
2. Rod

4) Disconnect mode actuator coupler.
5) Disconnect mode actuator rod from heater unit.
6) Remove mode actuator from heater unit.

78E00-1A-8-2



1. Lever

78E00-1A-8-3

INSPECTION

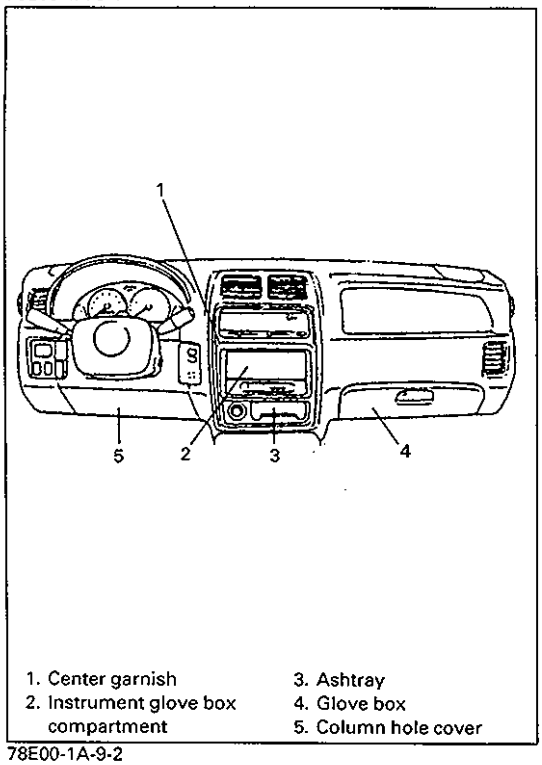
1) Connect battery voltage (+) to terminal "a'" and (–) to terminal "g'".
2) Connect each terminal listed below to terminal "g'" (negative (–) terminal of battery) and check if lever rotation angel is as specified in figure at the left.

MODE	TERMINAL	
	Left hand steering vehicle	Right hand steering vehicle
VENT	f'	b'
BI-LEVEL	e'	c'
HEAT	d'	d'
DEF/HEAT	c'	e'
DEF	b'	f'

INSTALLATION

1) Install in reverse order of removal.
2) If equipped with air bag system, enable air bag system. Refer to "Enabling Air Bag System" in Section 9J.

78E00-1A-9-1



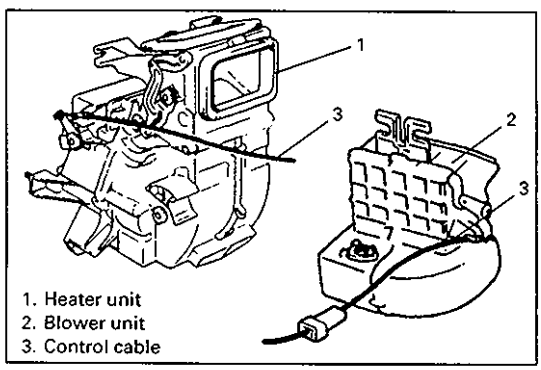
1. Center garnish
2. Instrument glove box compartment
3. Ashtray
4. Glove box
5. Column hole cover

HEATER CONTROL LEVER ASSEMBLY

REMOVAL

1) Disconnect negative (–) cable at battery.
2) If equipped with air bag system, disable air bag system. Refer to "Disabling Air Bag System" in Section 9J.
3) Pull off control lever knobs.
4) Remove ashtray and center garnish mounting screws.
5) Remove center garnish.
6) Remove glove box and column hole cover.
7) Remove instrument glove box compartment.

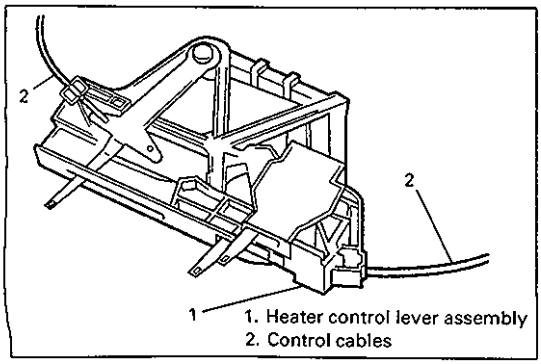
78E00-1A-9-2



1. Heater unit
2. Blower unit
3. Control cable

8) Disconnect control cables from blower motor unit and heater unit.
9) Disconnect heater blower motor switch connector.

78E00-1A-9-4



1. Heater control lever assembly
2. Control cables

10) Remove heater control lever assembly.

60A50-1A-10-1

INSPECTION OF HEATER BLOWER MOTOR SWITCH

Check heater blower motor switch for each terminal-to-terminal continuity. For the detail refer to "WIRING CIRCUIT" earlier in this section.

	Lg	P/B	P/Bl	P/G	P
LOW	○	○			
M1	○	○	○		
M2	○	○		○	
HIGH	○	○			○

Lg : Lightgreen
P : Pink
P/G : Pink With Green tracer
P/Bl : Pink with Blue tracer
P/B : Pink with Black tracer

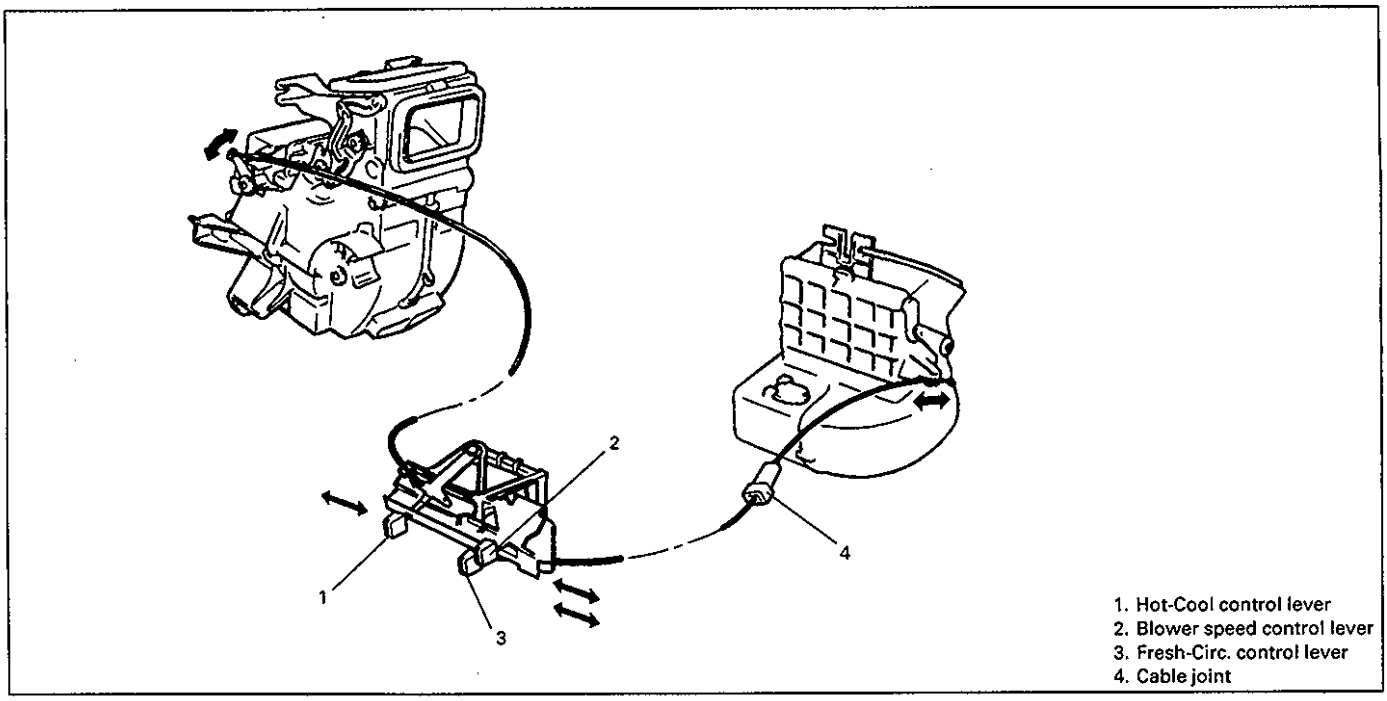
60A50-1A-10-2

INSTALLATION

1) Install in reverse order of removal.
2) If equipped with air bag, enable air bag system. Refer to "Enabling Air Bag System" in Section 9J.

60A50-1A-10-3

CONTROL CABLES

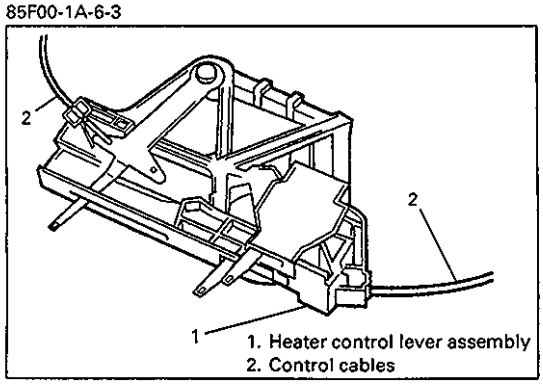


85F00-1A-6-1

REMOVAL

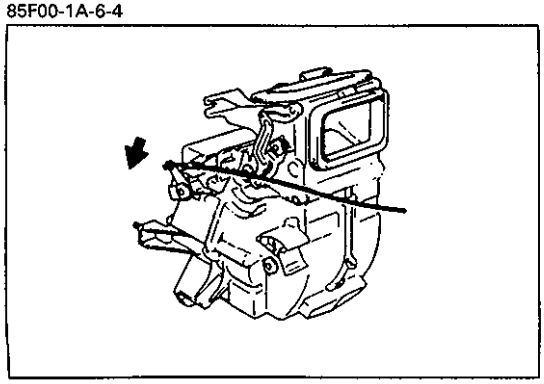
1) Remove heater control lever assembly.
   Refer to "HEATER BLOWER MOTOR SWITCH" in this section.

85F00-1A-6-3



2) Disconnect control cables from control lever.

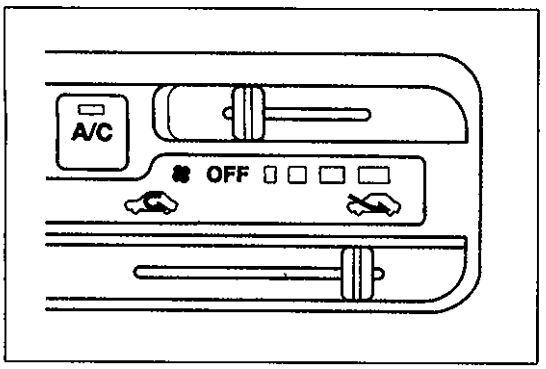
85F00-1A-6-4



78E00-1A-11-5

A. Heater Control (HOT-COOL Selector) Cable

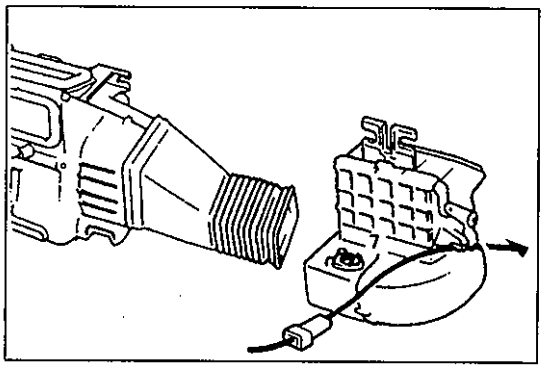
1) Move control lever to COOL position.
2) Push lever fully in arrow direction to fix cable in position, as shown.



78E00-1A-12-1

B. Fresh Air Control (FRESH-CIRC Selector) Cable

1) Move control lever to FRESH position.



78E00-1A-12-2

2) Push lever fully in arrow direction and fix cable with clamp in position as shown in left figure.

SECTION 3D

FRONT SUSPENSION

NOTE:

- For the descriptions (items) not found in this section, refer to the same section of the Service Manual mentioned in Foreword of this manual.
- All front suspension fasteners are an important attaching part in that it could affect the performance of vital parts and systems, and / or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.
- Never attempt to heat, quench or straighten any front suspension part. Replace it with a new part or damage to the part may result.

CONTENTS

FRONT FREE WHEELING HUB (IF EQUIPPED)

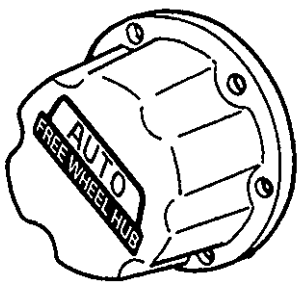
There are two types of the front free wheeling hub in this vehicle (if equipped). One is manual type and the other is automatic type.
As removal, installation and maintenance procedures vary between them, be sure to correct section applicable to each kind.

CAUTION:
- **Make sure that the same front free wheeling hub is installed for both right and left.**
- **For vehicle equipped with manual free wheeling hub, both of the right and left wheeling hub knobs must be set to the same position (either FREE or LOCK). Don't set one to "FREE" and the other to "LOCK" positions.**
- **Never disassemble free wheeling hub assembly. Disassembly will spoil its original function.**

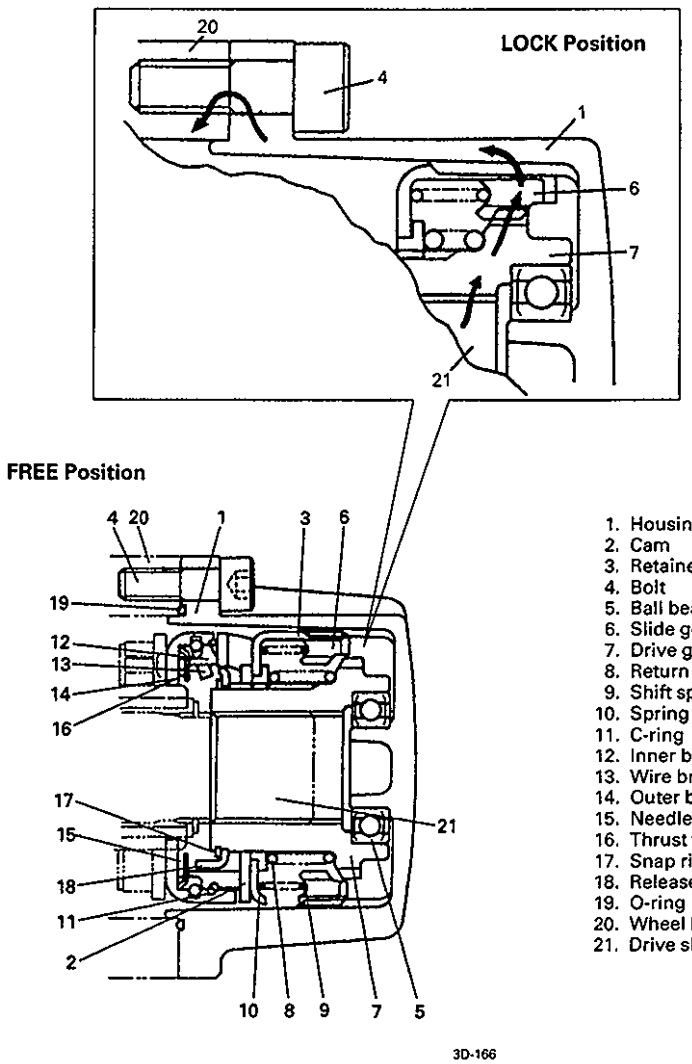
MANUAL FREE WHEELING HUB

Refer to the same section of the Service Manual mentioned in Foreword of this manual for operation, installation and maintenance.

AUTOMATIC FREE WHEELING HUB

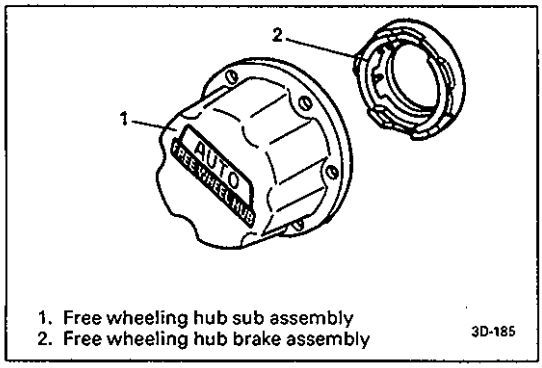


3D-165



1. Housing
2. Cam
3. Retainer
4. Bolt
5. Ball bearing
6. Slide gear
7. Drive gear
8. Return spring
9. Shift spring
10. Spring holder
11. C-ring
12. Inner brake
13. Wire brake
14. Outer brake
15. Needle bearing
16. Thrust washer
17. Snap ring
18. Release plate
19. O-ring
20. Wheel hub
21. Drive shaft

3D-166

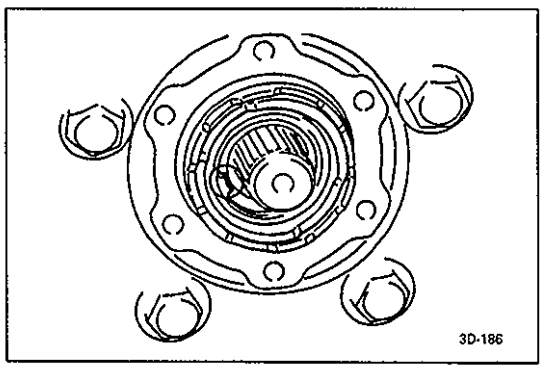


1. Free wheeling hub sub assembly
2. Free wheeling hub brake assembly

3D-185

REMOVE

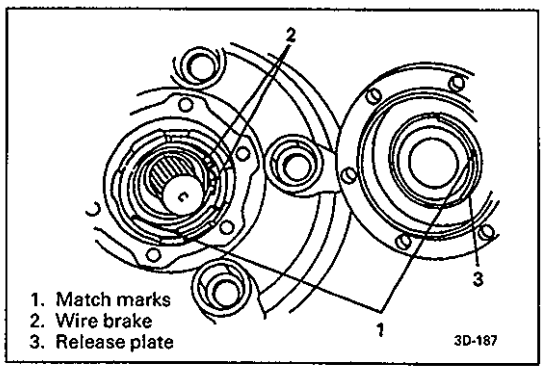
1) Set free wheeling hub to free condition. (Set transfer gear shift lever to 2H position, and move vehicle 2 m (6.5 ft) or more backward slowly.)
2) Hoist vehicle, if wheel (tire) removal is necessary.
3) Remove wheel (tire), if necessary.
4) Remove free wheeling hub (sub assembly and brake assembly) slowly.



3D-186

INSTALLATION

1) Check O-ring for damage and clean mating surfaces of hubs.
2) Install free wheeling hub brake assembly to spindle aligning key of brake assembly with slot in spindle.

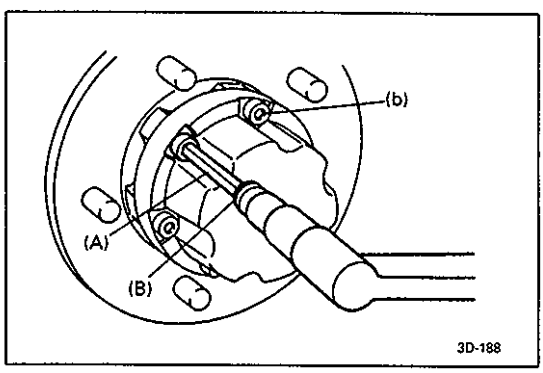


1. Match marks
2. Wire brake
3. Release plate

3D-187

3) Install free wheeling hub sub assembly to spindle aligning the match marks of brake assembly and sub assembly.

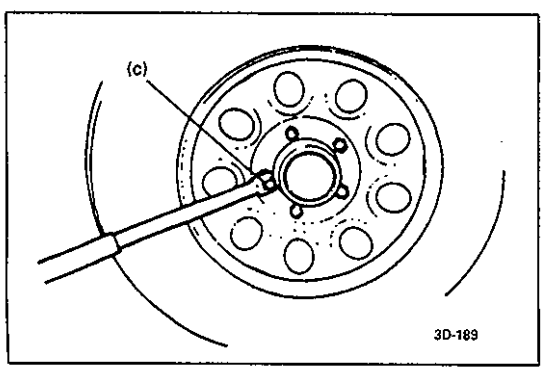
CAUTION:
Make sure that match marks are aligned. If they aren't, wire brake and release plate may interfere with each other, causing spring to break.



3D-188

4) Tighten hub bolts to specified torque.
Special Tool
(A): 09900-00414 (6 mm bit)
(B): 09900-00411 (Socket)

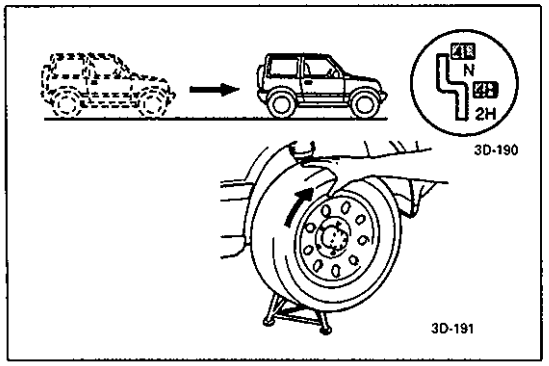
Tightening Torque
(b): 33 N·m (3.3 kg-m, 24 lb-ft)



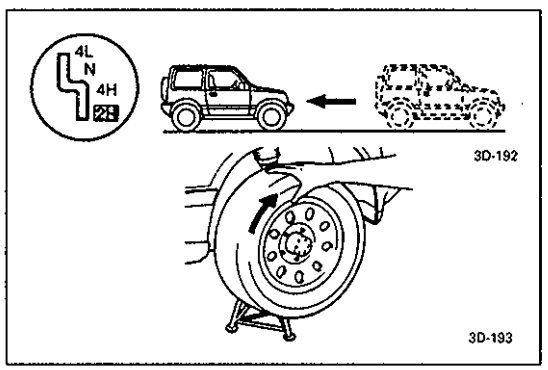
3D-189

5) Install front wheels and tighten wheel nuts to specified torque, if removed.
Tightening Torque
(c): 95 N·m (9.5 kg-m, 69.0 lb-ft)

6) Dismount the vehicle from the lift, and be sure to carry out the operation check of free wheeling hub mentioned in the next item "Post-assembly confirmation".



3D-190


3D-191

3D-192

3D-193

Post-assembly confirmation

Confirm automatic free wheeling hub for proper operation in the sequence described below.

1) Set transfer gear shift lever to 4H or 4L position, and move vehicle 2 m (6.5 ft) or more forward slowly.
2) Hoist vehicle and check that wheel (tire) rotation is transmitted to drive shaft (lock condition) when rotating right wheel clockwise (left wheel counterclockwise) by hand.
3) Dismount vehicle from lift.
4) Set transfer gear shift lever to 2H position, and move vehicle 2 m (6.5 ft) or more backward slowly.
5) Hoist vehicle and check that wheel (tire) rotation is not transmitted to drive shaft (free condition) when rotating right wheel clockwise (left wheel counterclockwise) by hand.
6) Check to ensure that free wheeling hub locks and unlocks properly by reversing vehicle moving directions described in steps 1) and 4). (It should lock when moving backward and unlock when moving forward.)

   If any malfunction is found as to the confirmation in the above steps 1) through 6), reinstall or replace free wheeling hub assembly.

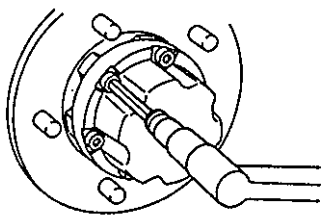
MAINTENANCE SERVICE

Confirm automatic free wheeling hub for proper operation periodically according to the procedure described previously in "Post-assembly confirmation". If automatic free wheeling hub shows any malfunction, replace it with new one.

TIGHTENING TORQUE SPECIFICATIONS

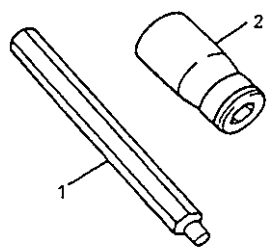
Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
Automatic free wheeling hub bolts	33	3.3	24

Free wheeling hub bolts



3D-0380

SPECIAL TOOLS



1. 09900-00414
   6 mm hexagon wrench bit
2. 09900-00411
   Hexagon wrench socket

3D0410

SECTION 6A2

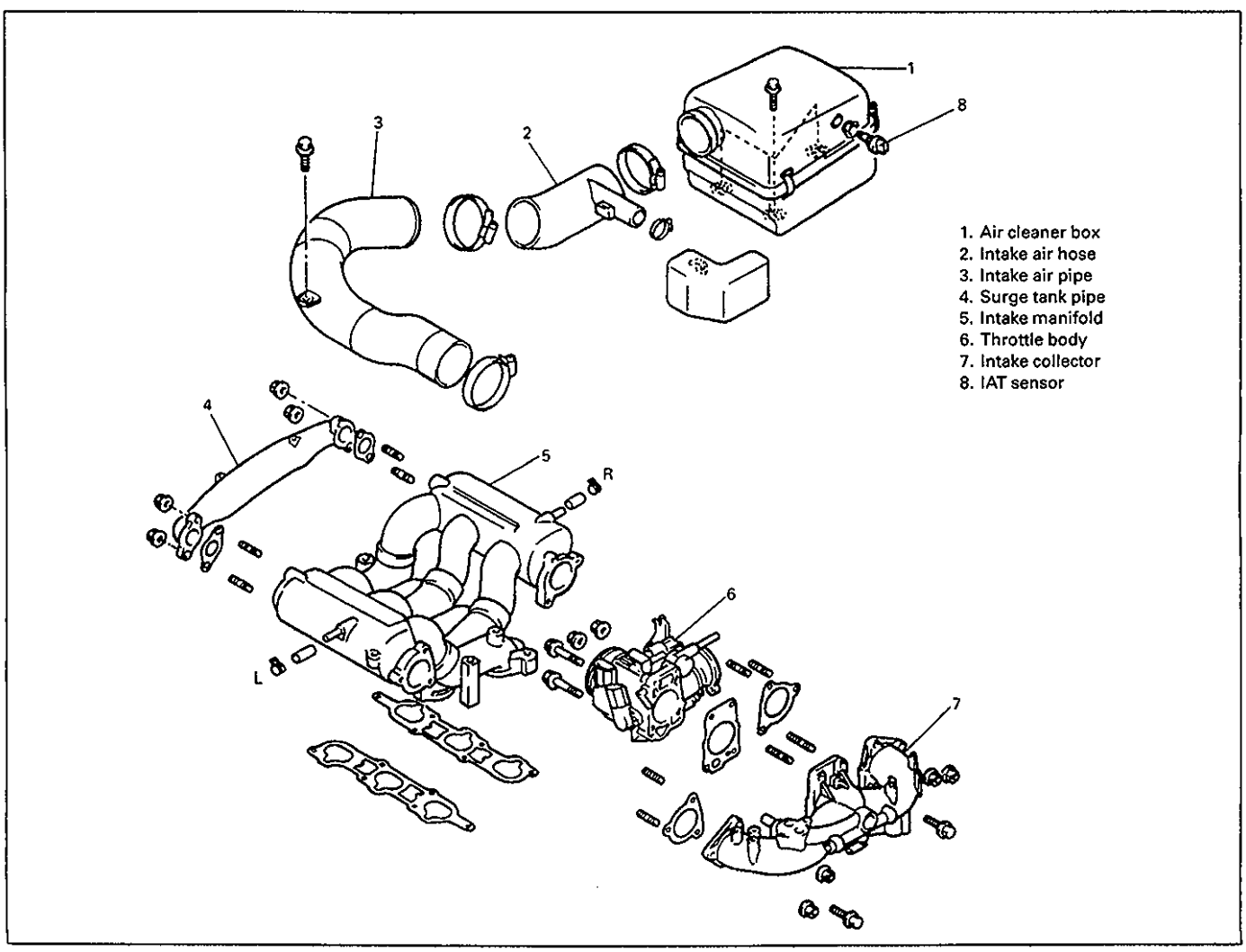
ENGINE MECHANICAL

NOTE:
For the descriptions (items) not found in this section of this manual, refer to the same section of SV620 SERVICE MANUAL.

CONTENTS

ON VEHICLE SERVICE

THROTTLE BODY AND INTAKE MANIFOLD



85F20-6A2-1-1S

REMOVAL/INSTALLATION
Refer to SV620 SERVICE MANUAL.

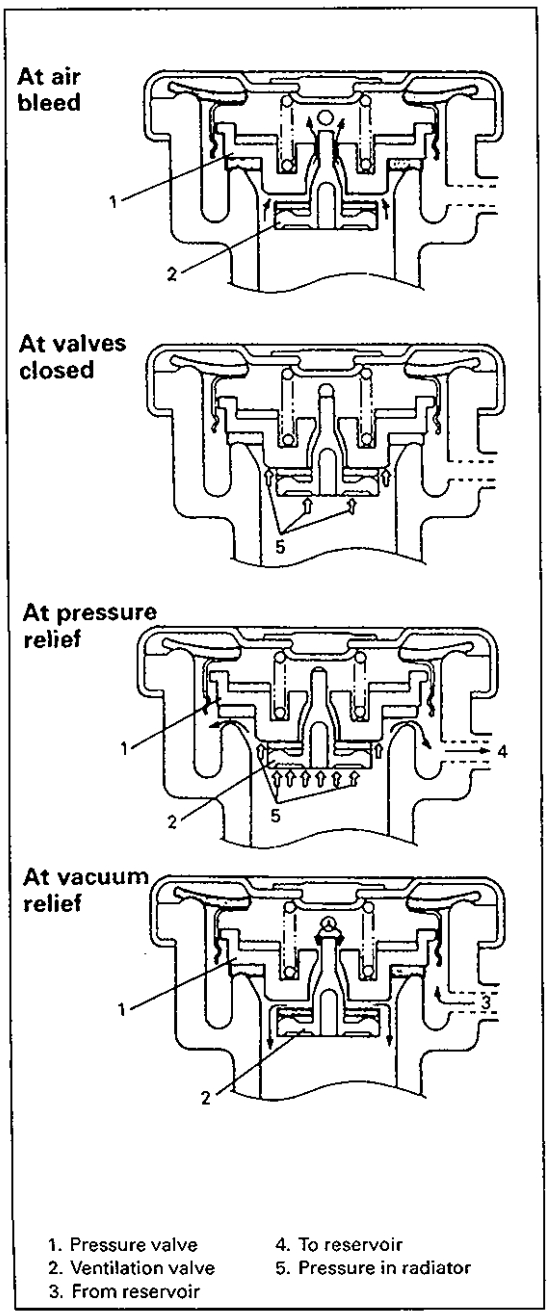
SECTION 6B

ENGINE COOLING

NOTE:
For the descriptions (items) not found in this section of this manual, refer to the same section of SV620 SERVICE MANUAL.

CONTENTS

6B



1. Pressure valve
2. Ventilation valve
3. From reservoir
4. To reservoir
5. Pressure in radiator

85F20-6B-1-1S

GENERAL DESCRIPTION

RADIATOR CAP

A pressure-vent cap is used on the radiator. The cap contains a pressure valve and ventilation valve.
The pressure valve is held against its seat by a spring of predetermined strength which protects the cooling system by relieving the pressure if the pressure in cooling system rises by 110 kPa (1.1 kg/cm^2, 15.6 psi).
The ventilation valve operates as follows.

- It opens to let the air out of the radiator when the temperature and the pressure in the radiator are lower than ventilation valve weight.
- It closes when the engine has warmed up and the pressure in the radiator has risen.
- It opens when the engine has cooled after being warmed up once and vacuum has occurred in the radiator so as to prevent the coolant level in the radiator from falling and the radiator from being collapsed due to the vaccum in it.

NOTE:
Do not remove radiator cap to check engine coolant level; check coolant visually at the see-through coolant reservoir.
Coolant should be added only to reservoir as necessary.

WARNING:
As long as there is pressure in the cooling system, the temperature can be considerably higher than the boiling temperature of the solution in the radiator without causing the solution to boil. Removal of the radiator cap while engine is hot and pressure is high will cause the solution to boil instantaneously and possibly with explosive force, spewing the solution over engine, fenders and person removing cap. If the solution contains flammable anti-freeze such as alcohol (not recommended for use at any time), there is also the possibility of causing a serious fire.

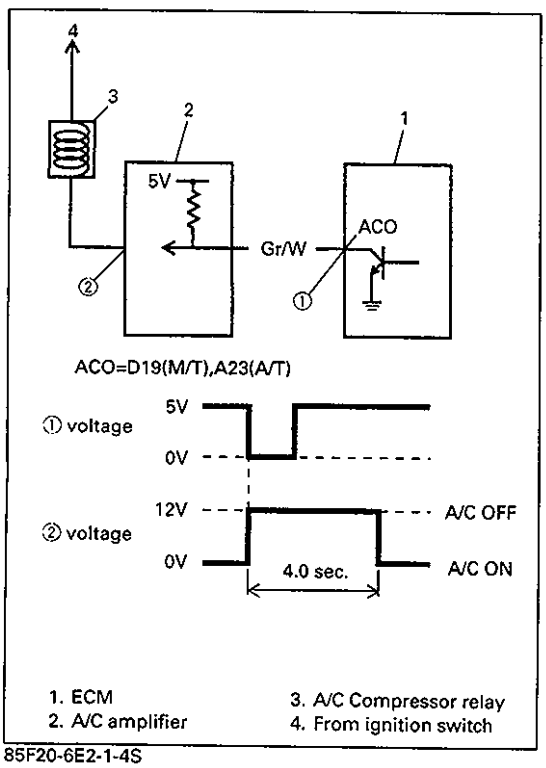
SECTION 6E2

ELECTRONIC FUEL INJECTION SYSTEM

(SEQUENTIAL MULTIPORT FUEL INJECTION FOR H20A TYPE ENGINE)

NOTE:
For the descriptions (items) not found in this section of this manual, refer to the same section of GROUP 1.

CONTENTS



85F20-6E2-1-4S

GENERAL DESCRIPTION

ELECTRONIC CONTROL SYSTEM

Air Conditioning Cut Signal (For Vehicle with A/C)

ECM outputs A/C CUT signal to A/C amplifier when conditions listed below are satisfied.
Throttle valve opening : above 25.2°
Vehicle speed : below 10 km/h
When A/C amplifier receives A/C cut signal, A/C amplifier turns OFF A/C compressor for 4 seconds.

SECTION 6K

EXHAUST SYSTEM

NOTE:
For the descriptions (items) not found in this section of this manual, refer to the same section of SV620 SERVICE MANUAL.

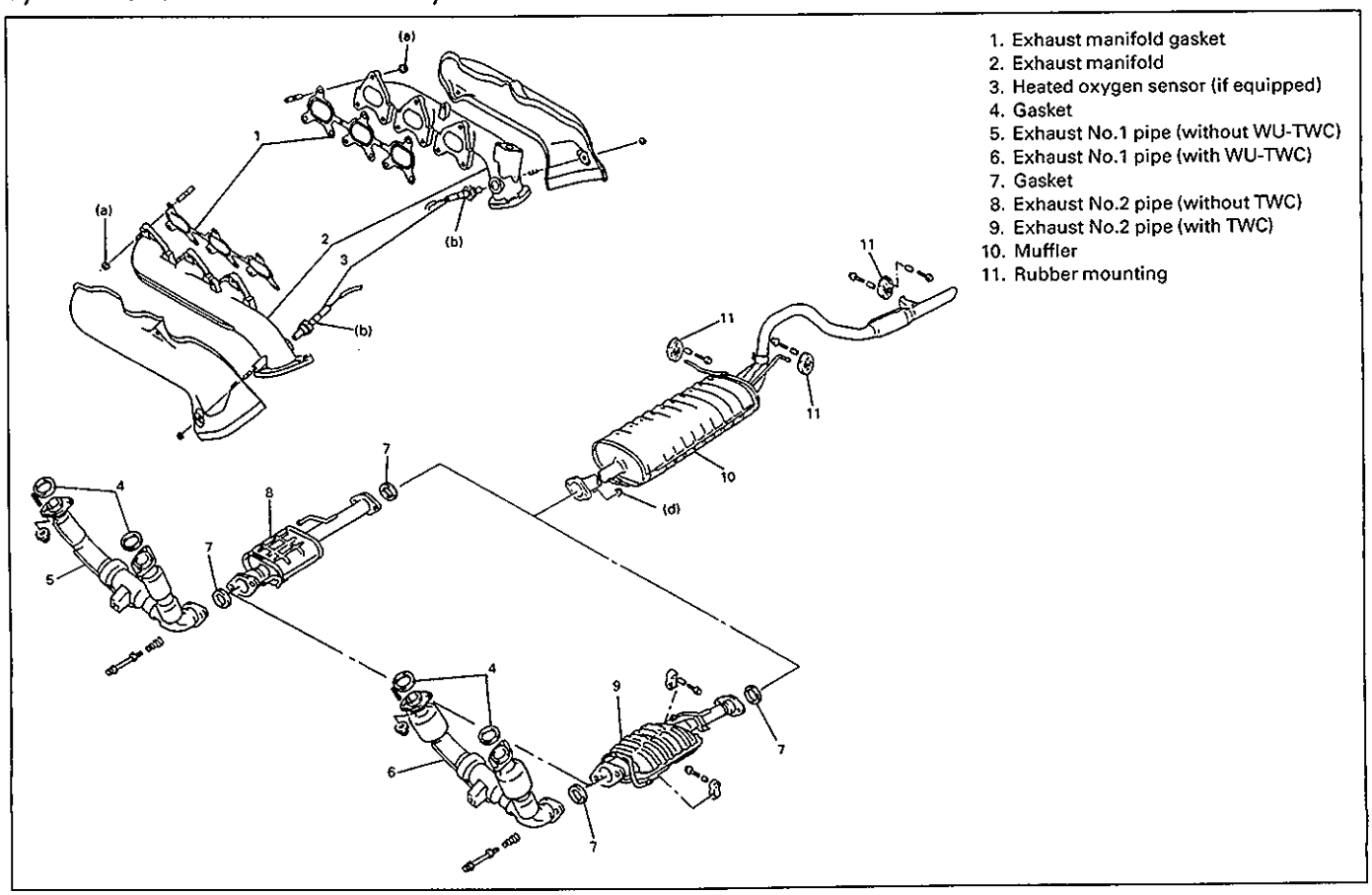
CONTENTS

GENERAL DESCRIPTION

The exhaust system consists of an exhaust manifold, exhaust pipes, a muffler, a tail pipe, and seals and gaskets etc.

The three way catalytic converter (TWC) is an emission control device added to the exhaust system to lower the levels of Hydrocarbon (HC), Carbon Monoxide (CO), and Oxides of Nitrogen (NOx) pollutants in the exhaust gas.

THE CATALYTIC CONVERTER REQUIRES USE OF UNLEADED FUEL ONLY.



1. Exhaust manifold gasket
2. Exhaust manifold
3. Heated oxygen sensor (if equipped)
4. Gasket
5. Exhaust No.1 pipe (without WU-TWC)
6. Exhaust No.1 pipe (with WU-TWC)
7. Gasket
8. Exhaust No.2 pipe (without TWC)
9. Exhaust No.2 pipe (with TWC)
10. Muffler
11. Rubber mounting

SECTION 8

BODY ELECTRICAL SYSTEM

NOTE:

- **For the descriptions not found in this section of this manual, refer to the same section of SV620 SERVICE MANUAL.**
- **✳1 and ✳2 of system circuit in this section indicate as shown below.**
  ✳1; For General & European spec. (Except German spec.)
  ✳2; For German spec.

CONTENTS

8

BODY ELECTRICAL SYSTEM

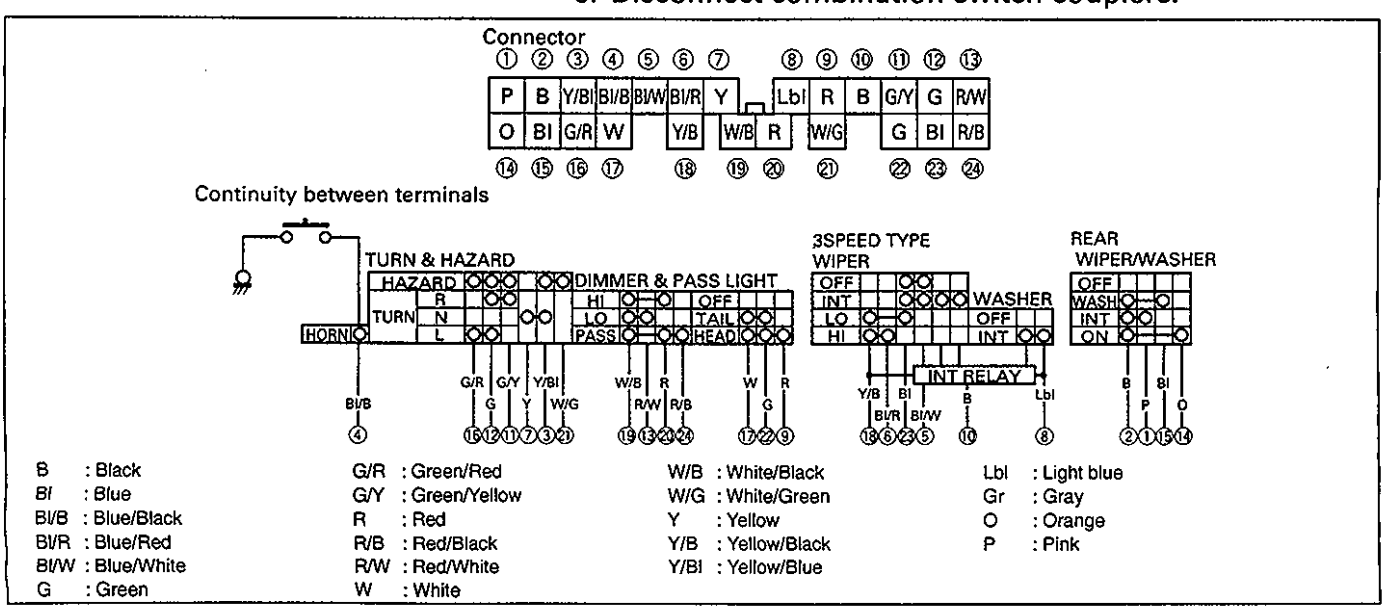
FUSES AND SWITCHES

COMBINATION SWITCH

The turn signal/dimmer switch incorporates the turn signal, hazard warning, dimmer and passing light switches.

Inspection

1. Disconnect negative cable at battery.
2. Remove lower steering column cover.
3. Disconnect combination switch couplers.



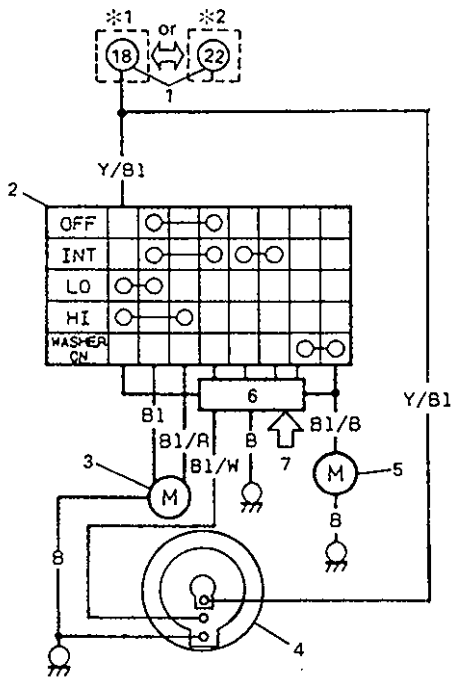
B	: Black	G/R	: Green/Red	W/B	: White/Black	Lbl	: Light blue
Bl	: Blue	G/Y	: Green/Yellow	W/G	: White/Green	Gr	: Gray
Bl/B	: Blue/Black	R	: Red	Y	: Yellow	O	: Orange
Bl/R	: Blue/Red	R/B	: Red/Black	Y/B	: Yellow/Black	P	: Pink
Bl/W	: Blue/White	R/W	: Red/White	Y/Bl	: Yellow/Blue		
G	: Green	W	: White				

ON VEHICLE SERVICE

WINDSHIELD WIPERS (FRONT WIPER)

The windshield wiper is 3-speed type with variable intermittent switch and the windshield washer is equipped with a separate-type washer pump.

WIRING CIRCUIT



1. To connect fuses
   The wire No.s (⑱ and ㉒) are same No. as figure of FUSES and SWITCHES
2. Combination switch
3. Wiper motor
4. Wiper return switch
5. Waher motor
6. Wiper intermittent relay
7. Variable resistor

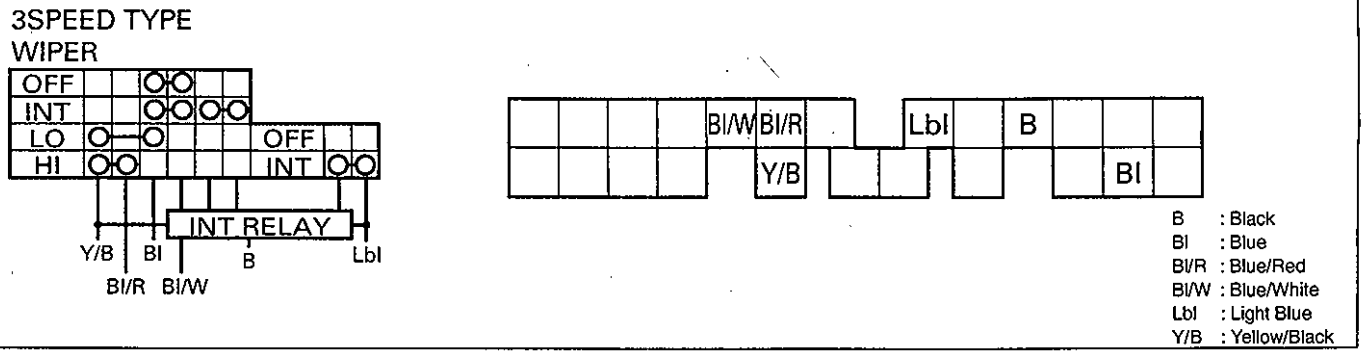
B : Black
Bl : Blue
Bl/B : Blue/Black
Bl/R : Blue/Red
Bl/W : Blue/White
Y/Bl : Yellow/Blue

85F20-8-2-2S

INSPECTION

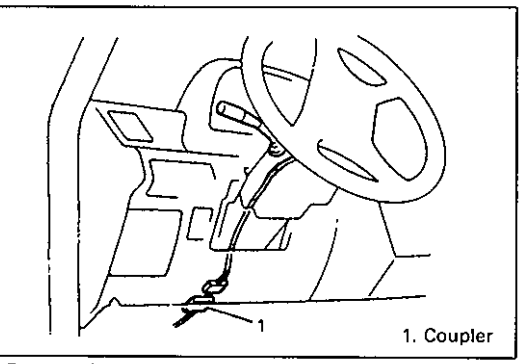
A. Wiper/washer Switch

Use a circuit tester to check switch for each terminal-to-terminal continuity.



B : Black
Bl : Blue
Bl/R : Blue/Red
Bl/W : Blue/White
Lbl : Light Blue
Y/B : Yellow/Black

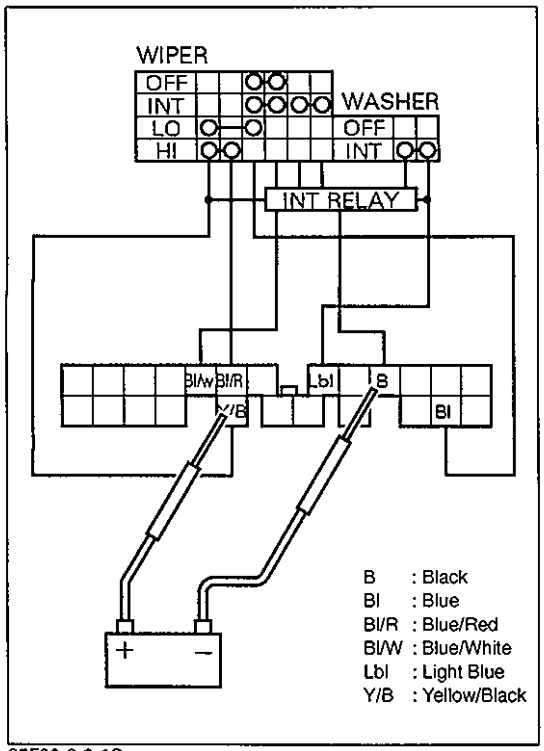
85F20-8-2-4S



85F20-8-2-5S

D. Intermittent Wiper Relay Circuit (If equipped)

1. Disconnect wiper & washer switch coupler.



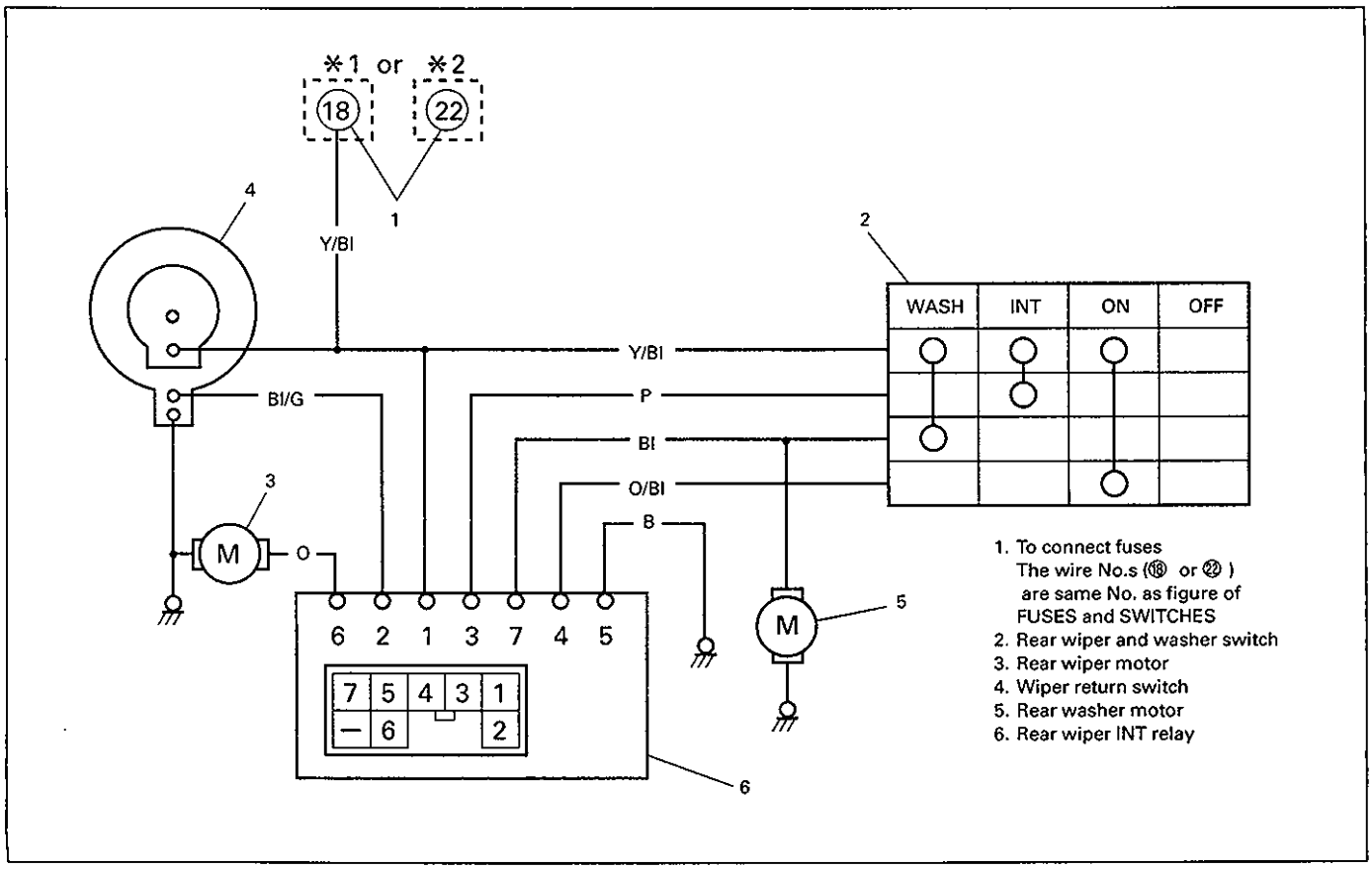
85F20-8-3-1S

2. Turn wiper switch to "INT" position.
3. Connect (+) cord and (–) cord of 12 V battery to coupler terminals as shown left. If an operating sound is heard from relay, it is at work properly.

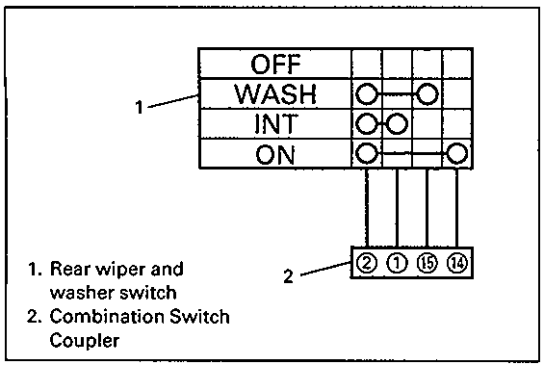
REAR WINDOW WIPER AND WASHER

The rear window wiper is 2-speed type, and its washer is equipped with a separate-type washer pump.

WIRING CIRCUIT



85F20-8-3-4S



1. Rear wiper and washer switch
2. Combination Switch Coupler

85F20-8-4-1S

INSPECTION

A. Wiper And Washer Switches

Use a circuit tester to check switches for continuity.

COUPLER

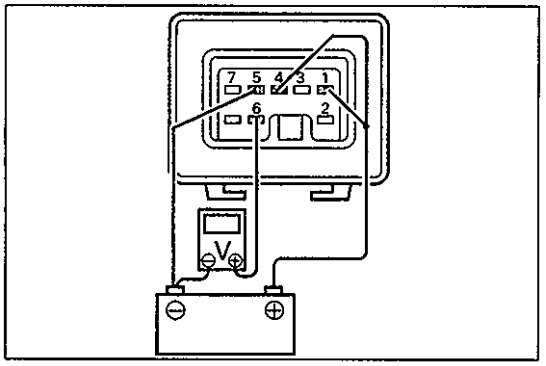
① ②

P	B											
O	BI											

⑭ ⑮

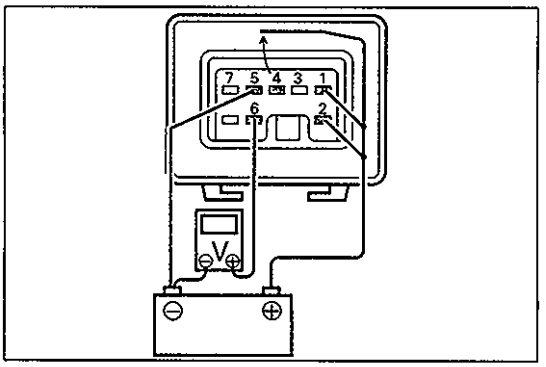
D. Rear Wiper Intermittent Relay

ON circuit.



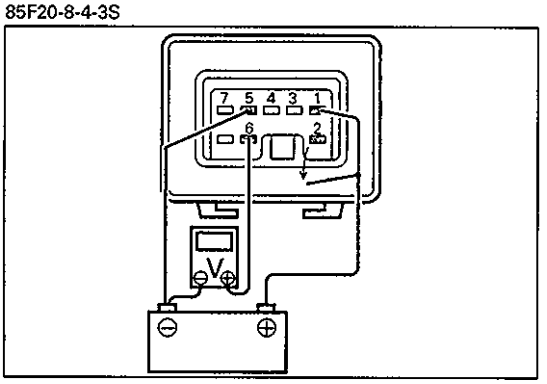
85F20-8-4-2S

1. Connect positive terminal of battery to terminals ① and ④ of controller, negative terminal to terminal ⑤ of controller and check voltage between terminals ⑥ and ⑤ of controller.
   If measured voltage is battery voltage, controller is in good condition.
   If not, replace controller.



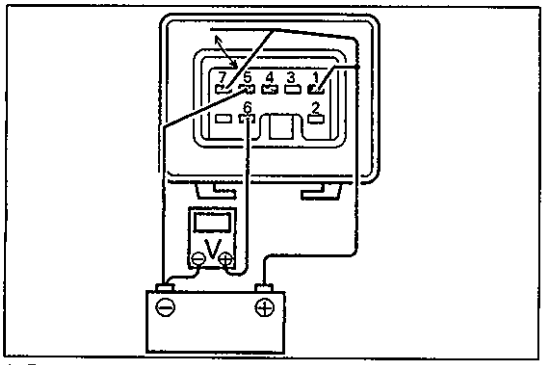
85F20-8-4-3S

2. Connect positive terminal of battery to terminal ② of controller, then disconnect positive terminal from terminal ④ of controller and check voltage between terminals ⑥ and ⑤ of controller.
   If measured voltage is battery voltage, controller is in good condition.
   If not, replace controller.



85F20-8-4-4S

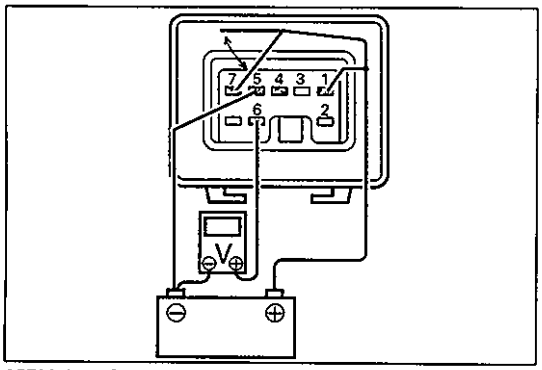
3. Disconnect positive terminal from terminal ② of controller and check voltage between terminals ⑥ and ⑤ of controller.
   If measured voltage is about 0V, controller is in good condition.
   If not replace controller.



85F20-8-4-5S

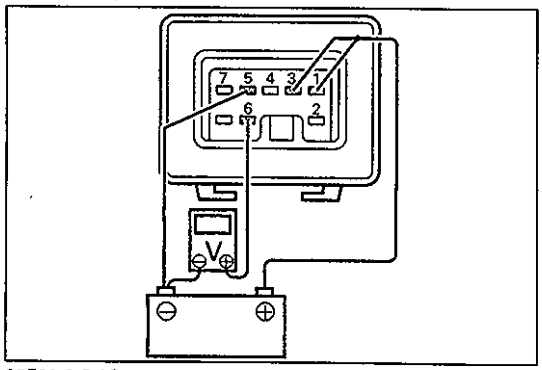
WASH circuit

1. Connect positive terminal of battery to terminal ① of controller and negative terminal to terminal ⑤ of controller. Then connect positive terminal to terminal ⑦ checking voltage between terminals ⑥ and ⑤ of controller.
   If measured voltage changes from about 0V to battery voltage 0.6 to 1.5 seconds after connecting positive terminal to terminal ⑦, controller is in good condition. If not, replace controller.



85F20-8-5-1S

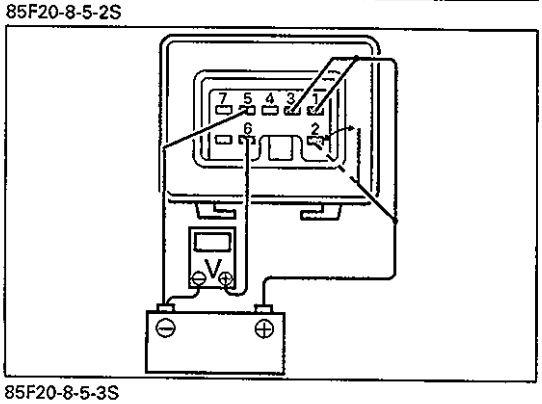
2. Disconnect positive terminal from terminal ⑦ checking voltage between terminal ⑥ and ⑤ of controller.
   If measured voltage changes from battery voltage to about 0V 2.7 to 4.6 seconds after disconnecting positive terminal from terminal ⑦, controller is in good condition.
   If not replace controller.



85F20-8-5-2S

INT circuit

1. Connect positive terminal of battery to terminals ① of controller and negative terminal to terminal ⑤ of controller. Then positive terminal to terminal ③ of controller checking voltage between terminals ⑥ and ⑤ of controller.
   If measured voltage changes from about 0V to battery voltage when connecting positive terminal to terminal ③, controller is in good condition.
   If not replace controller.

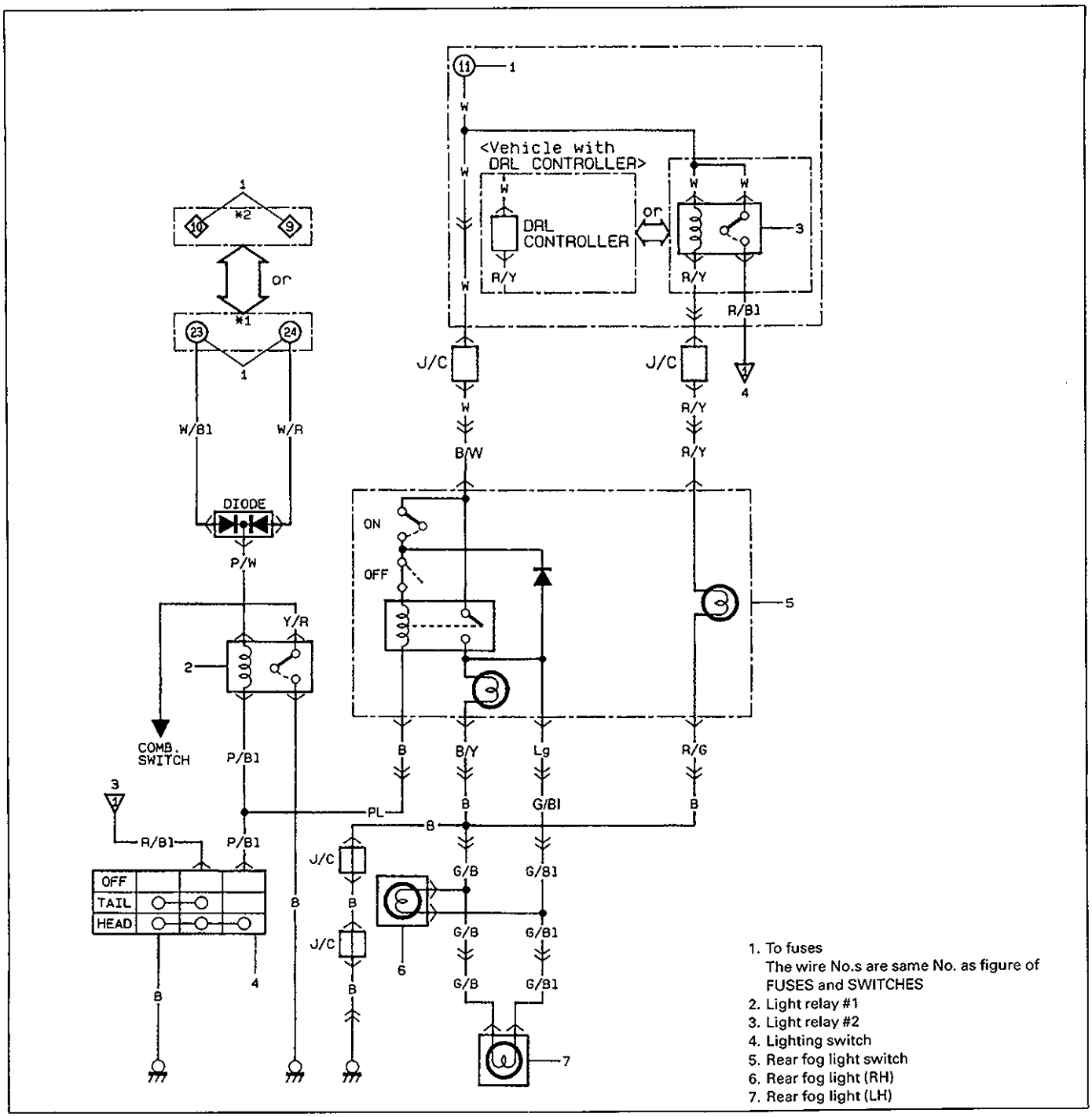


85F20-8-5-3S

2. Connect positive terminal of battery to terminal ② of controller, then disconnect positive terminal from terminal ② of controller checking voltage between terminals ⑥ and ⑤ of controller.
   If measured voltage changes from battery voltage to about 0V when disconnecting positive terminal from terminal ② and about 0V to battery voltage 8 ± 2 seconds after disconnecting positive terminal from terminal ②, controller is in good condition.
   If not replace.

REAR FOG LIGHT (If equipped)

WIRING CIRCUIT

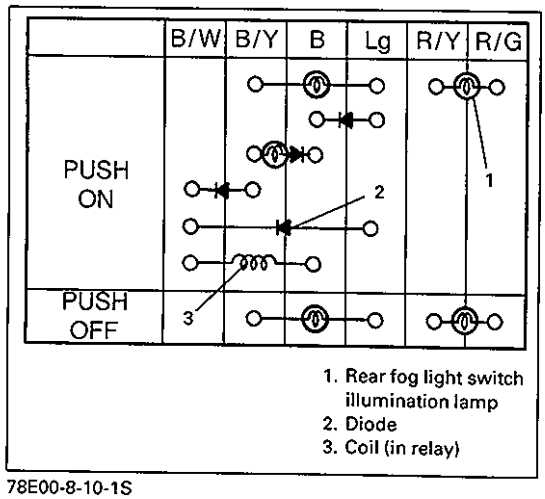


78E00-8-9-1S

TROUBLE DIAGNOSIS

Trouble	Possible Cause	Correction
Lights do not light.	• Main fuse and/or fuses blown	Replace main fuse and/or fuses to check for short.
	• Light relay faulty	Replace light relay
	• Lighting switch faulty	Check switch.
	• Wiring or grounding faulty	Repair as necessary.

78E00-9-4-2S



1. Rear fog light switch illumination lamp
2. Diode
3. Coil (in relay)

78E00-8-10-1S

INSPECTION

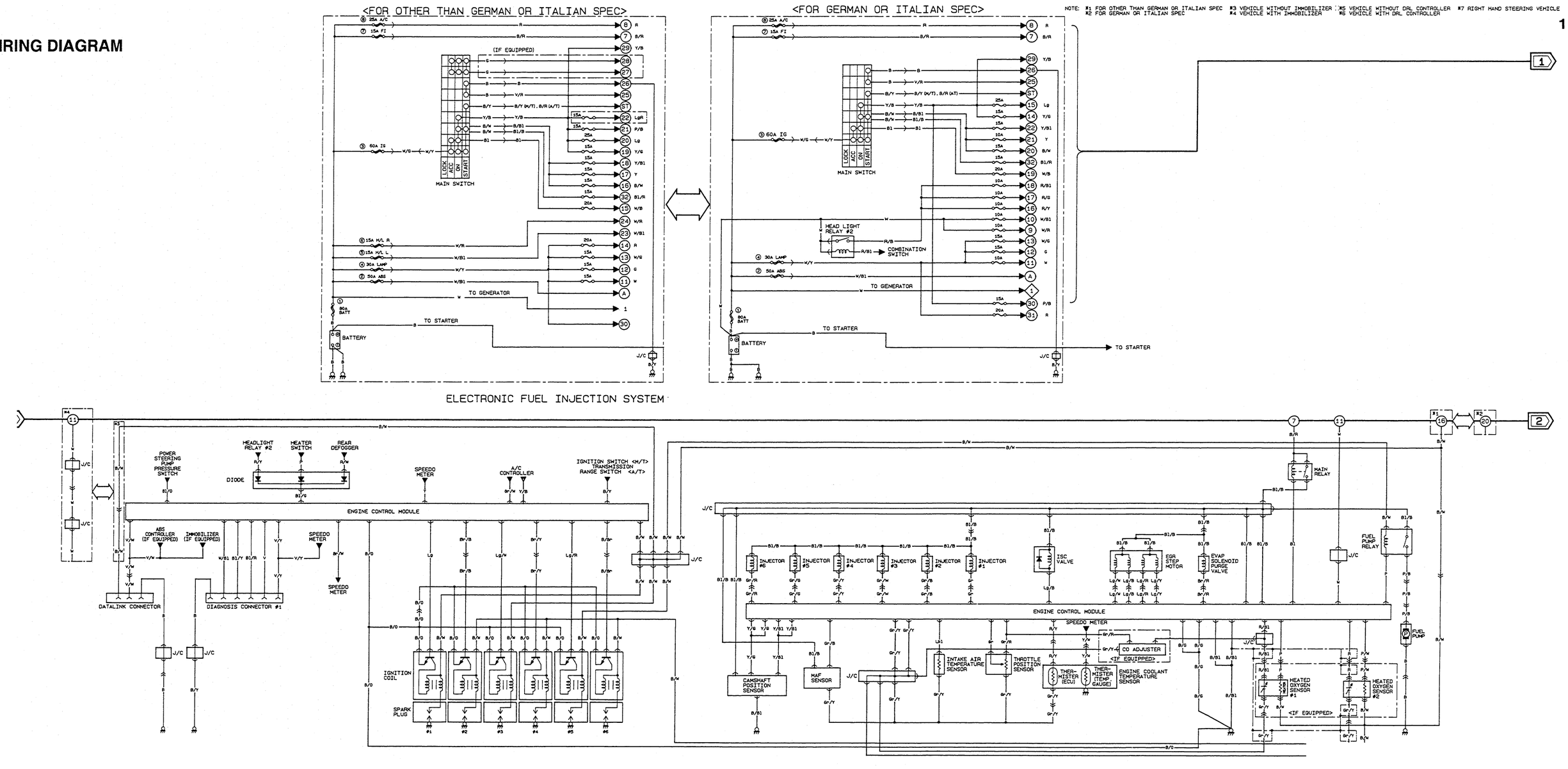
Use a circuit tester to check rear fog light switch for continuity. Hold switch button (ON or OFF) pushed during checking switch according to left figure.

WIRING DIAGRAM

CONTENTS

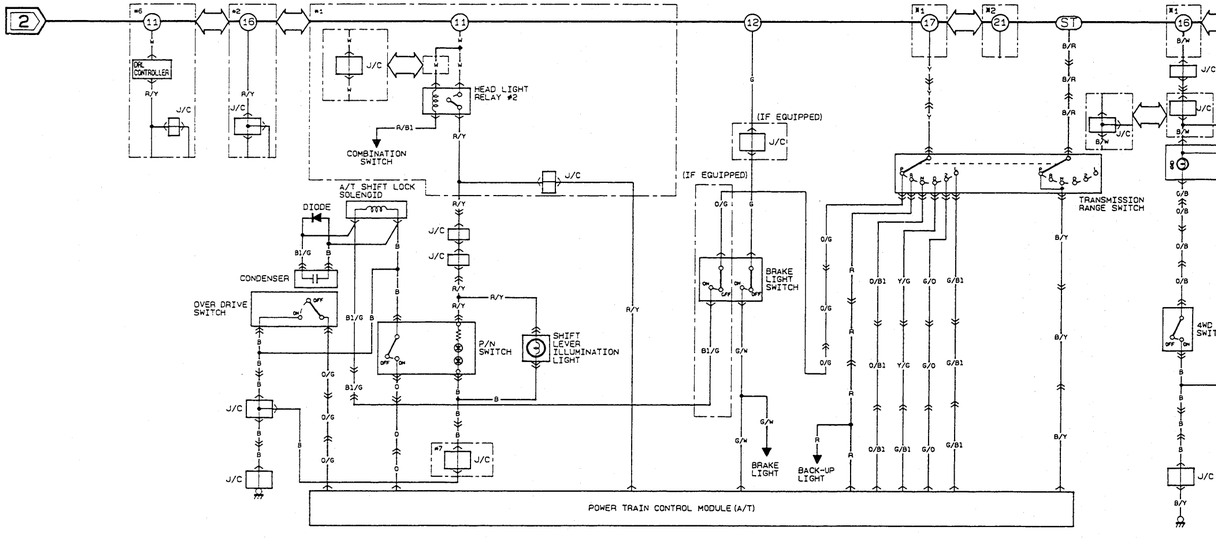
NOTE:
For the descriptions not found in this section, refer to the same section of the Service Manual mentioned in the FOREWORD of this manual.

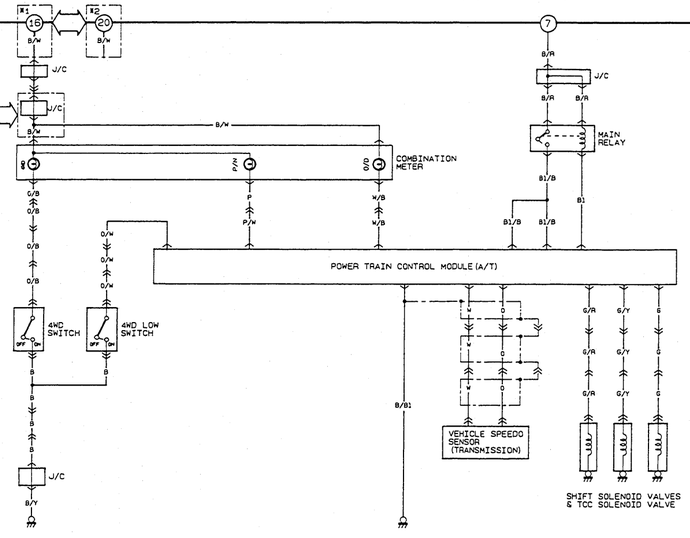
WIRING DIAGRAM



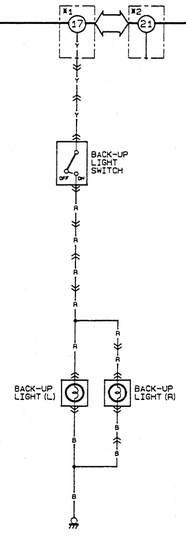
4 A/T CONTROL SYSTEM

NOTE: *1 FOR OTHER THAN GERMAN OR ITALIAN SPEC *2 FOR GERMAN OR ITALIAN SPEC *3 VEHICLE WITHOUT IMMOBILIZER *4 VEHICLE WITH IMMOBILIZER *5 VEHICLE WITHOUT DRL CONTROLLER *6 VEHICLE WITH DRL CONTROLLER *7 RIGHT HAND STEERING VEHICLE

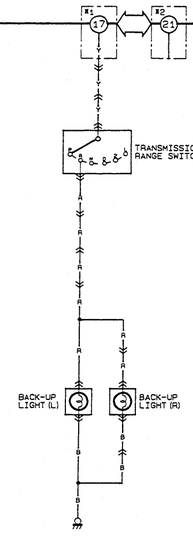




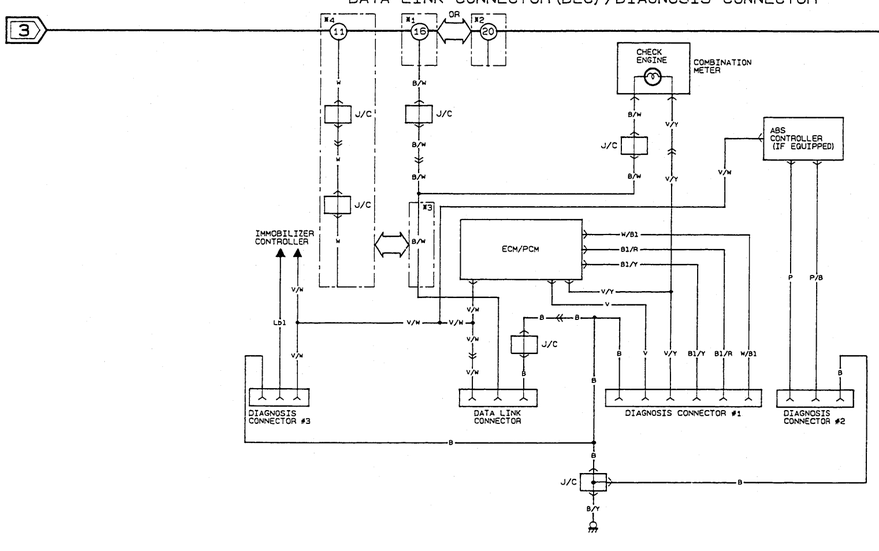
BACK-UP LIGHT <M/T>



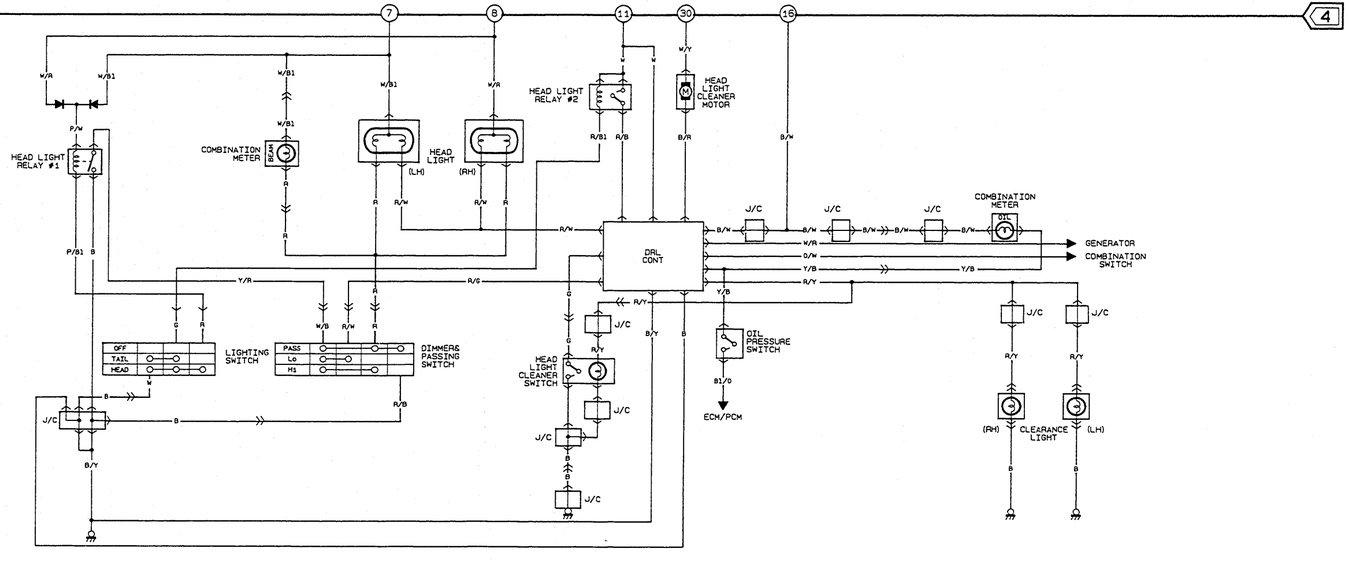
BACK-UP LIGHT <A/T>



DATA LINK CONNECTOR (DLC) /DIAGNOSIS CONNECTOR



DAYTIME RUNNING LIGHT & HEAD LIGHT CLEANER SYSTEM (IF EQUIPPED)

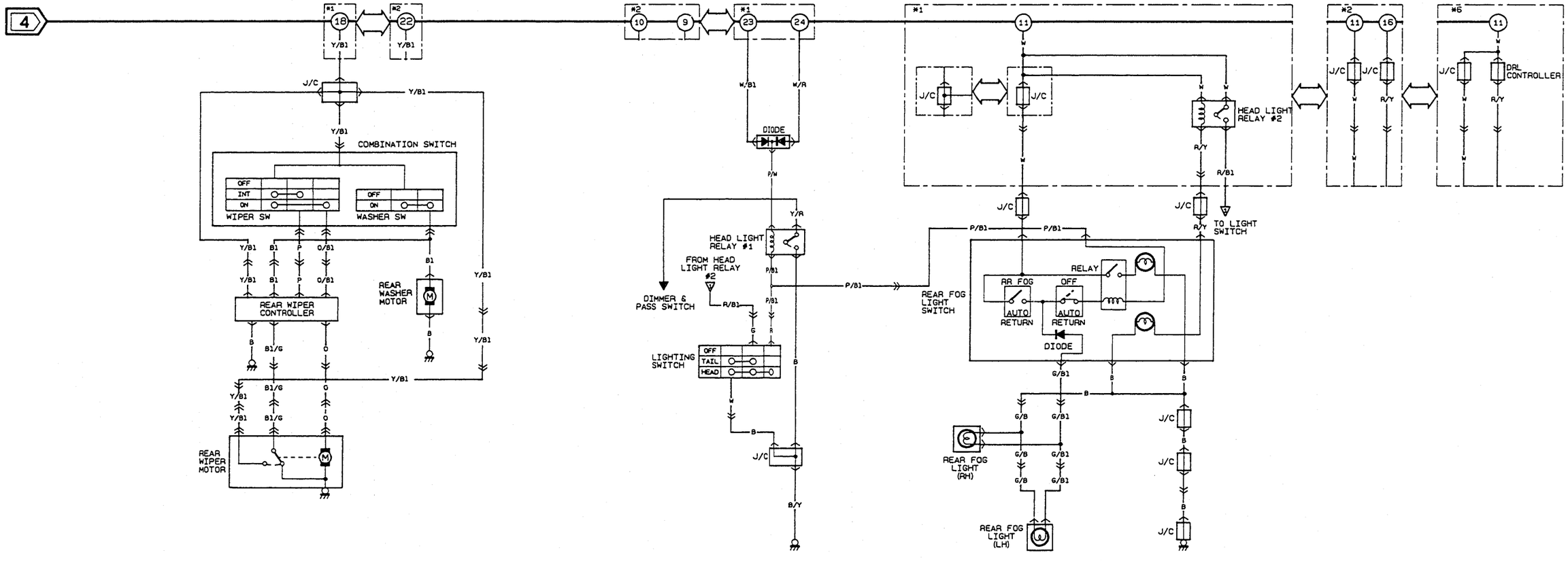


3

REAR WIPER AND WASHER<IF EQUIPPED>

REAR FOG LIGHT

NOTE: ※1 FOR OTHER THAN GERMAN OR ITALIAN SPEC ※2 FOR GERMAN OR ITALIAN SPEC ※3 VEHICLE WITHOUT IMMOBILIZER ※4 VEHICLE WITH IMMOBILIZER ※5 VEHICLE WITHOUT DRL CONTROLLER ※6 VEHICLE WITH DRL CONTROLLER ※7 RIGHT HAND STEERING VEHICLE



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