2. Basic Diagnostics Procedures

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

A: IDENTIFICATION OF TROUBLE SYMPTOM

Determine what the problem is based on the symptom.

B: PROBABLE CAUSE OF TROUBLE

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

C: LOCATION AND REPAIR OF TROUBLE

1) Using the diagnostics narrow down the causes.

2) If necessary, use a voltmeter, ohmmeter, etc.

3) Before replacing certain component parts (switch, relay, etc.), check the power supply, ground, for open wiring harness, poor connectors, etc. If no problems are encountered, check the component parts.

D: CONFIRMATION OF SYSTEM OPERATION

After repairing, ensure that the system operates properly.



E: INSPECTION

1. VOLTAGE MEASUREMENT

1) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal and the positive lead to the connector or component terminal.

2) Contact the positive probe of the voltmeter on connector (A).

The voltmeter will indicate a voltage.

3) Shift the positive probe to connector (B). The voltmeter will indicate no voltage.

With test set-up held as it is, turn switch ON. The voltmeter will indicate a voltage and, at the same time, the light will come on.

4) The circuit is in good order. If a problem such as a lamp failing to light occurs, use the procedures outlined above to track down the malfunction.



2. CIRCUIT CONTINUITY CHECKS

1) Disconnect the battery terminal or connector so there is no voltage between the check points.

Contact the two leads of an ohmmeter to each of the check points.

If the circuit has diodes, reverse the two leads and check again.

2) Use an ohmmeter to check for diode continuity.

When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.

When contacting the two leads in reverse, there should be no continuity.

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

Terminal	1	2	3	4	5	6
Switch Position						Ŭ
OFF						
1	0—				-0-	—0
2	0—			-0-		-0
3	0—		-0-			—0
4	0—	-0-				-0

 \oplus



Open circuit

3. HOW TO DETERMINE AN OPEN CIRCUIT

1) Voltmeter method

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

2) Ohmmeter method

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



Shorted connector Generative Shorted connectorGenerative Shorted connector

4. HOW TO DETERMINE A SHORT-CIRCUIT

1) Test lamp method

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

2) Ohmmeter method

G6M0210

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

3. Working Precautions

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

1) When working under a vehicle which is jacked-up, always be sure to use safety stands.

2) The parking brake must always be applied during working. Also, in automatic transmission vehicles, keep the select lever set to the P (Parking) range.

3) Be sure the workshop is properly ventilated when running the engine. Further, be careful not to touch the belt or fan while the engine is operating.

4) Be careful not to touch hot metal parts, especially the radiator and exhaust system immediately after the engine has been shut off.

2. PRECAUTIONS IN TROUBLE DIAGNOSIS AND REPAIR OF ELECTRIC PARTS

1) The battery cable must be disconnected from the battery's (–) terminal, and the ignition switch must be set to the OFF position, unless otherwise required by the diagnostics.

2) Securely fasten the wiring harness with clamps and slips so that the harness does not interfere with the body end parts or edges and bolts or screws.

3) When installing parts, be careful not to catch them on the wiring harness.



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



Tester probes

'Mini'' test leads

G6M0214

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

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



To check water-proof connectors (which are not accessible from the wiring side), contact test probes on the terminal side being careful not to bend or damage the terminals.

7) Sensors, relays, electrical unit, etc., are sensitive to strong impacts.

Handle them with care so that they are not dropped or mishandled.

4. How to Use Wiring Diagram



A: RELAY

A symbol used to indicate a relay.

B: CONNECTOR-1

The sketch of the connector indicates the one-pole types.

C: WIRING CONNECTION

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

D: FUSE No. & RATING

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

E: CONNECTOR-2

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

F: CONNECTOR SKETCH

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

G: GROUND

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

H: DIODE

A symbol is used to indicate a diode.

I: WIRE TRACING ON EXTENDED WIRING DIAGRAMS

For a wiring diagram extending over at least two pages, a symbol (consisting of the same characters with arrows), as shown below, facilitates wire tracing from one page to the next.

 $\mathsf{A} \leftrightarrow \mathsf{A}, \, \mathsf{B} \leftrightarrow \mathsf{B}$

J: SYMBOLS OF WIRE CONNECTION AND CROSSING

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

Refers to wires which are crossed but not connected.

K: POWER SUPPLY ROUTING

A symbol is used to indicate the power supply in each wiring diagram.

"MB-5", "MB-6", etc., which are used as power supply symbols throughout the text, correspond with those shown in the POWER SUPPLY ROUTING in the wiring diagram.

Accordingly, using the POWER SUPPLY ROUT-ING and wiring diagrams permits service personnel to understand the entire electrical arrangement of a system.

L: S.M.J.

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

SYMBOLS AND ABBREVIATIONS

A number of symbols and abbreviations are used in each wiring diagram to easily identify parts or circuits.

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

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

TERMINAL ARRANGEMENT

LHD model



INSTALLATION



Tightening torque: 4.4 — 7.4 № m (45 — 75 kg-cm, 39 — 65 in-lb)

NOTE:

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

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



Abbr.	Full name
A.B.S.	Antilock Brake System
ACC	Accessory
A/C	Air Conditioning
AD	Auto Down
AT	Automatic Transmission
AU	Auto Up
+B	Battery
DN	Down
DRL	Daytime Running Light
E	Ground
F/B	Fuse & Joint Box
FL1.5	Fusible link 1.5 mm ²
IG	Ignition
Illumi.	Illumination

ABBREVIATION LIST

Abbr.	Full name
LH	Left Hand
Lo	Low
М	Motor
M/B	Main Fuse Box
MG	Magnet
Mi	Middle
OP	Optional Parts
PASS	Passing
RH	Right Hand
SBF	Slow Blow Fuse
S.M.J.	Super Multiple Junction
ST	Starter
SW	Switch
T.C.S.	Traction Control System
UP	Up
WASH	Washer



- **1. POWER SUPPLY ROUTING**
- LHD model





No.	Load
MB-1	Fuse holder (Rear power supply)
MB-2	Power window circuit breaker
MB-3	Engine control module Fuel pump relay Main relay OBD-II service connector
MB-4	A/C relay holder
MB-5	Headlight alarm relay (with security)
MB-6	Headlight LH
MB-7	Combination meter Daytime running light control module Diode (Lighting) Diode (Security) Lighting switch Luggage room light Room light Step light Trunk room light
MB-8	Combination meter Front fog light switch Headlight RH
MB-9	Door lock timer Headlight alarm relay Interrupt relay Radio Security control module Security indicator light Spot light
MB-10	A/C relay holder
SBF-6	Hydraulic unit (A.B.S.) T.C.S. motor relay
SBF-7	T.C.S. valve relay
ALT-1	Combination meter Daytime running light control module
IG	Headlight alarm relay
ST	Cruise control module Engine control module Inhibitor switch (AT) Interrupt relay Starter interlock relay (MT)
FB-1	Front washer motor Rear washer motor
FB-2	Diode (A/C)
FB-3	Sub fan motor Sub fan relay-2
FB-4	Engine control module Fuel pump relay Transmission control module
FB-5	Hydraulic unit (A.B.S.)
FB-6	Front clearance light LH Front clearance light RH Side marker light LH Side marker light RH

No.	Load
FB-7	Door lock timer
FB-9	Hazard switch
FB-10	AT shift lock control module Key warning switch Power antenna
FB-11	Radio
FB-12	Cigarette lighter
FB-13	Remote control rearview mirror switch Security control module Vanity mirror illumination light
FB-14	AT shift lock control module Combination switch Front wiper motor Rear wiper motor Rear wiper relay
FB-15	A.B.S./T.C.S. control module Transmission control module
FB-16	Rear defogger Rear defogger condenser Rear defogger switch
FB-17	Rear defogger switch
FB-18	AT shift lock control module Back-up light switch (MT) Inhibitor switch (AT)
FB-19	Hazard switch
FB-20	A/C switch Combination meter Mode control panel T.C.S. off switch
FB-21	Combination meter (Airbag)
FB-22	Blower motor relay Check connector Daytime running light control module Daytime running light relay FRESH/RECIRC actuator Hi-beam relay Power window and sunroof relay Seat belt timer
FB-23	Airbag control module
FB-24	Airbag control module
FB-25	Lighting switch
FB-26	Parking switch
FB-27	Parking switch
FB-28	Illumination light
FB-29	Illumination light
FB-30	Pedal stroke sensor Stop light switch Stop & brake switch
FB-31	Horn relay
FB-32	Blower motor relay
FB-33	Parking switch

No.	Load
FB-34	Rear combination light LH Rear combination light RH Rear finisher light LH Rear finisher light RH
FB-35	A.B.S. control module A.B.S. G sensor A.B.S./T.C.S. control module A.B.S./T.C.S. valve relay Cruise control main switch Cruise control module
FB-36	Front fog light relay

- **1. POWER SUPPLY ROUTING**
- RHD model



BUR01-01A





No.	Load
MB-2	Power window circuit breaker
MB-3	Engine control module Fuel pump relay Main relay OBD-II service connector
MB-6	Headlight LH
MB-7	Diode (Lighting) Lighting switch
MB-8	Combination meter Headlight RH
MB-9	Combination meter Door lock timer Luggage room light Radio Room light
MB-10	A/C relay holder
ALT-1	Combination meter
IG	A/C relay holder
ST	Cruise control module Engine control module Inhibitor switch
FB-2	Diode (A/C)
FB-3	Sub fan motor Sub fan relay-2
FB-4	Engine control module Fuel pump relay Ignition coil Transmission control module
FB-6	Side marker light LH Side marker light RH
FB-7	Door lock timer
FB-9	Hazard switch
FB-10	AT shift lock control module Key warning switch Power antenna
FB-11	Radio
FB-12	Cigarette lighter
FB-13	Remote control rearview mirror switch
FB-14	AT shift lock control module Combination switch Front washer motor Front wiper motor Rear washer motor Rear wiper motor Rear wiper relay
FB-15	Transmission control module
FB-16	Rear defogger Rear defogger condenser Rear defogger switch
FB-17	Rear defogger switch

No.	Load
FB-18	AT shift lock control module Inhibitor switch
FB-19	Hazard switch
FB-20	Combination meter Mode control panel
FB-21	Combination meter (Airbag)
FB-22	Blower motor relay Check connector FRESH/RECIRC actuator Mode actuator Power window relay Seat belt timer
FB-23	Airbag control module
FB-24	Airbag control module
FB-25	Lighting switch
FB-26	Parking switch
FB-27	Parking switch
FB-28	Illumination light
FB-29	Illumination light
FB-30	Stop light switch Stop & brake switch
FB-31	Horn relay
FB-32	Blower motor relay
FB-33	Parking switch
FB-34	License plate light LH License plate light RH Rear combination light LH Rear combination light RH Rear finisher light LH Rear finisher light RH
FB-35	Cruise control main switch Cruise control module

- 2. GROUND DISTRIBUTION
- LHD model



BU04-02A





- 2. GROUND DISTRIBUTION
- RHD model







- 3. AIR CONDITIONING SYSTEM
- LHD model



- 3. AIR CONDITIONING SYSTEM
- RHD model





4. ANTI-LOCK BRAKE SYSTEM





5. AT CONTROL SYSTEM

LHD model





5. AT CONTROL SYSTEM

RHD model





6. AT SHIFT LOCK SYSTEM

• LHD model



BU42-01

6. AT SHIFT LOCK SYSTEM

RHD model



7. AUDIO SYSTEM

LHD model



- 7. AUDIO SYSTEM
- RHD model



8. BACK-UP LIGHT SYSTEM

• LHD model


- 8. BACK-UP LIGHT SYSTEM
- RHD model









10. COMBINATION METER





11. CRUISE CONTROL SYSTEM



12. DOOR LOCK SYSTEM

LHD model



- 12. DOOR LOCK SYSTEM
- RHD model



13. ENGINE ELECTRICAL SYSTEM

• LHD model





WIRING DIAGRAM





13. ENGINE ELECTRICAL SYSTEM

• RHD model





WIRING DIAGRAM





14. FRONT FOG LIGHT SYSTEM





15. FRONT WIPER AND WASHER SYSTEM

• RHD model



16. FUEL GAUGE SYSTEM

• LHD model



16. FUEL GAUGE SYSTEM

RHD model



17. HORN AND CIGARETTE LIGHTER SYSTEM

• LHD model



17. HORN AND CIGARETTE LIGHTER SYSTEM

RHD model





18. LIGHTING (HEADLIGHT) SYSTEMLHD without DRL model



18. LIGHTING (HEADLIGHT) SYSTEM

• LHD with DRL model





18. LIGHTING (HEADLIGHT) SYSTEMRHD model

19. LIGHTING (TAIL LIGHT ILLUMINATION LIGHT ETC.) SYSTEM • LHD model





19. LIGHTING (TAIL LIGHT ILLUMINATION LIGHT ETC.) SYSTEM • RHD model



BUR21-01A



20. OIL PRESSURE AND TEMPERATURE GAUGE SYSTEM





21. PARKING BRAKE AND BRAKE FLUID LEVEL WARNING SYSTEM

21. PARKING BRAKE AND BRAKE FLUID LEVEL WARNING SYSTEM

RHD model



22. POWER WINDOW SYSTEM

• LHD model





22. POWER WINDOW SYSTEM

• RHD model




23. RADIATOR FAN SYSTEM

• LHD model



23. RADIATOR FAN SYSTEM

RHD model





24. REAR WINDOW DEFOGGER SYSTEM

- 24. REAR WINDOW DEFOGGER SYSTEM
- RHD model



25. REAR WIPER AND WASHER SYSTEM

• LHD model



BU51-02

- 25. REAR WIPER AND WASHER SYSTEM
- RHD model







26. REMOTE CONTROL REARVIEW MIRROR SYSTEM

RHD model



27. SEAT BELT WARNING SYSTEM

• LHD model



27. SEAT BELT WARNING SYSTEM

• RHD model





28. SECURITY SYSTEM





29. SPOT LIGHT, ROOM LIGHT, LUGGAGE AND TRUNK ROOM LIGHT SYSTEM

29. SPOT LIGHT, ROOM LIGHT, LUGGAGE AND TRUNK ROOM LIGHT SYSTEM

RHD model



30. SRS (AIRBAG SYSTEM)



31. STARTING SYSTEM



32. STOP LIGHT SYSTEM

LHD model



BU25-01

32. STOP LIGHT SYSTEM

RHD model



33. SUNROOF SYSTEM



34. TRACTION CONTROL SYSTEM





35. TURN SIGNAL AND HAZARD SYSTEM

LHD model



To Power Supply Routing (B32) FB-9 FB-19 BrR J J B 2 B Turn signal & hazard module FUSE No. 22 FUSE No. 1 2 ВΥ Hazard switch OFF ON Turn (122) Q signal (B36) (11)(B71) Ô 0 L av Ref. to (Lighting system. (Tail & Illumi.) (3 \cap ¢ Combination meter Turn a:(110) signal b: (112) ଚ LH 9W 013 WR 013 B 03 B 01 ୭ RH (B62) (B97 S. M. J. Ē foldout page.] Refer to (F45) RI αP Front turn signal (light RH (Rear turn signal light RH (R26) (F3) WR WR Ţ 0 6 Front turn signal (light LH r Rear turn (R28) (F19) signal LH aW 3) 6 Ē Ē (F3) (Brown) (R26) (B | ac k) (B71) (122) (R28) (Black) (Fl9) (Brown) (B32)(Black) 12 <u>34</u> 5678910 12 1234 123 1234 (il) (Black) (Light gray) (10) (12) (Light gray) (F45) 1 2 3 4 5 6 7 8 9 1 11 12 13 14 15 16 17 18 19 20 10 12345 678910 111213141516171819202122 12345679510111213141516

35. TURN SIGNAL AND HAZARD SYSTEM

RHD model

Electrical unit	Refer to;
A.B.S. control module	4-4a [T300]
A.B.S. G sensor (MT)	4-4a [T300]
A/C compressor relay	
A/C fuse	(1)
A/C main fan relay 1	(1)
A/C main fan relay 2	8
A/C pressure switch	٢
A/C sub fan relay 2	9
ATF temperature sensor	2-7 [T2B1]
Blower motor resistor	(8)
Blower relay	(1)
Camshaft position sensor	2-7 [T2A2]
Check connector	3
Clutch switch (MT)	6-2 [T300]
Crankshaft position sensor	2-7 [T2A2]
Cruise control module	6-2 [T300]
Cruise control pump	6-2 [T300]
Data link connector (for OBD-II G.S.T.)	2-7 [T2A1]
Data link connector (for S.S.M.)	2-7 [T2A1]
Diagnosis connector	4-4a [T300]
Diagnosis terminal (Ground)	4-4a [T300]
Door lock timer	1
Engine control module	2-7 [T2A1]
Engine coolant temperature sensor	2-7 [T2A2]
Engine hood switch (Security)	6-2 [K6A0]
Evaporator thermoswitch	(3)
F/B	(15)
FRESH/RECIRC actuator	(2)
Fuel pump relay	2-7 [T2A3]
Fuel gauge module	3)
Fuel gauge sub module (AWD)	(1)
FWD switch (AT)	1
Headlight alarm relay (Security)	6-2 [K6A0]
Headlight relay LH	\$
Headlight relay RH	(3)
Horn relay	(14)

7. Electrical Unit Location

Electrical unit	Refer to;
Hydraulic unit (A.B.S.)	4-4a [T300]
Ignition coil	2-7 [T2A3]
Ignitor	2-7 [T2A3]
Idle air control solenoid valve	2-7 [T2A3]
Illumination control module	(2)
Inhibitor switch	6-2 [T300]
Knock sensor	2-7 [T2A2]
Main fan relay	(19)
Main relay	2-7 [T2A3]
Mass air flow sensor	2-7 [T2A2]
Mode actuator	1
M/B	4
Oil pressure switch	3
Oxygen sensor	2-7 [T2A2]
Pedal stroke sensor (T.C.S.)	4-4b [T300]
Power window and sunroof relay	(24)
Power window circuit breaker	(3)
Purge control solenoid valve	2-7 [T2A3]
Rear defogger relay	1
Seat belt timer	20
Security control module	6-2 [K6A0]
Shift lock control module	2
Starter interrupt relay (Security)	6-2 [K6A0]
Stop & brake switch (With cruise con- trol)	6-2 [T300]
Sunroof control module	30
Tail and illumination relay	(18)
T.C.S. control module	4-4b [T300]
T.C.S. motor relay	4-4b [T300]
T.C.S. valve relay	4-4b [T300]
Throttle position sensor	2-7 [T2A2]
Test mode connector	2-7 [T2A1]
Transmission control module	2-7 [T2B1]
Turn & hazard module	(16)
Vehicle speed sensor 1	2-7 [T2B1]
Vehicle speed sensor 2	2-7 [T2B1]

1. ENGINE ROOM



- ① FWD switch (AT)
- 2 A/C pressure switch
- Oil pressure switch
- 3 Oil p
 4 M/B
 5 Head Headlight relay LH
- Headlight relay RH 6

- A/C compressor relay
- (a) A/C main fan relay 2
- A/C sub fan relay 2
- (1) A/C main fan relay 1
- ① A/C fuse

2. INSTRUMENT PANEL



- ① Mode actuator
- (13) Blower relay
- (1) Horn relay
- (15) F/B
- (f) Turn & hazard module
- Rear defogger relay
- (1) Tail & illumination relay
- (19) Main fan relay
- ③ Seat belt timer

- (i) Illumination control module
- (2) Shift lock control module
- (3) Power window circuit breaker
- Power window & sunroof relay
- (25) Check connector
- (26) Blower motor resistor
- Door lock timer
- (3) FRESH/RECIRC actuator
- (2) Evaporator thermoswitch

3. COMPARTMENT

• SEDAN



• WAGON



(3) Sunroof control module

③ Suffoor control module
 ③ Fuel gauge module

③ Fuel gauge sub module (AWD)





8. Electrical Wiring Harness and Ground Point



- ① Front wiring harness
- Engine wiring harness
- ③ Room light cord
- ④ Bulkhead wiring harness
- (5) Instrument panel wiring harness
- (6) Front door cord RH
- ⑦ Rear door cord RH
- Rear wiring harness
- (9) Trunk lid cord (Sedan)

- (1) Rear defogger ground cord (Sedan)
- ① Fuel tank cord
- 1 Rear door cord LH
- (1) Front door cord LH
- (1) Sunroof cord
- (5) Floor wiring harness
- (f) Transmission cord
- ⑦ Rear gate cord (Wagon)
- (B) Rear oxygen sensor cord