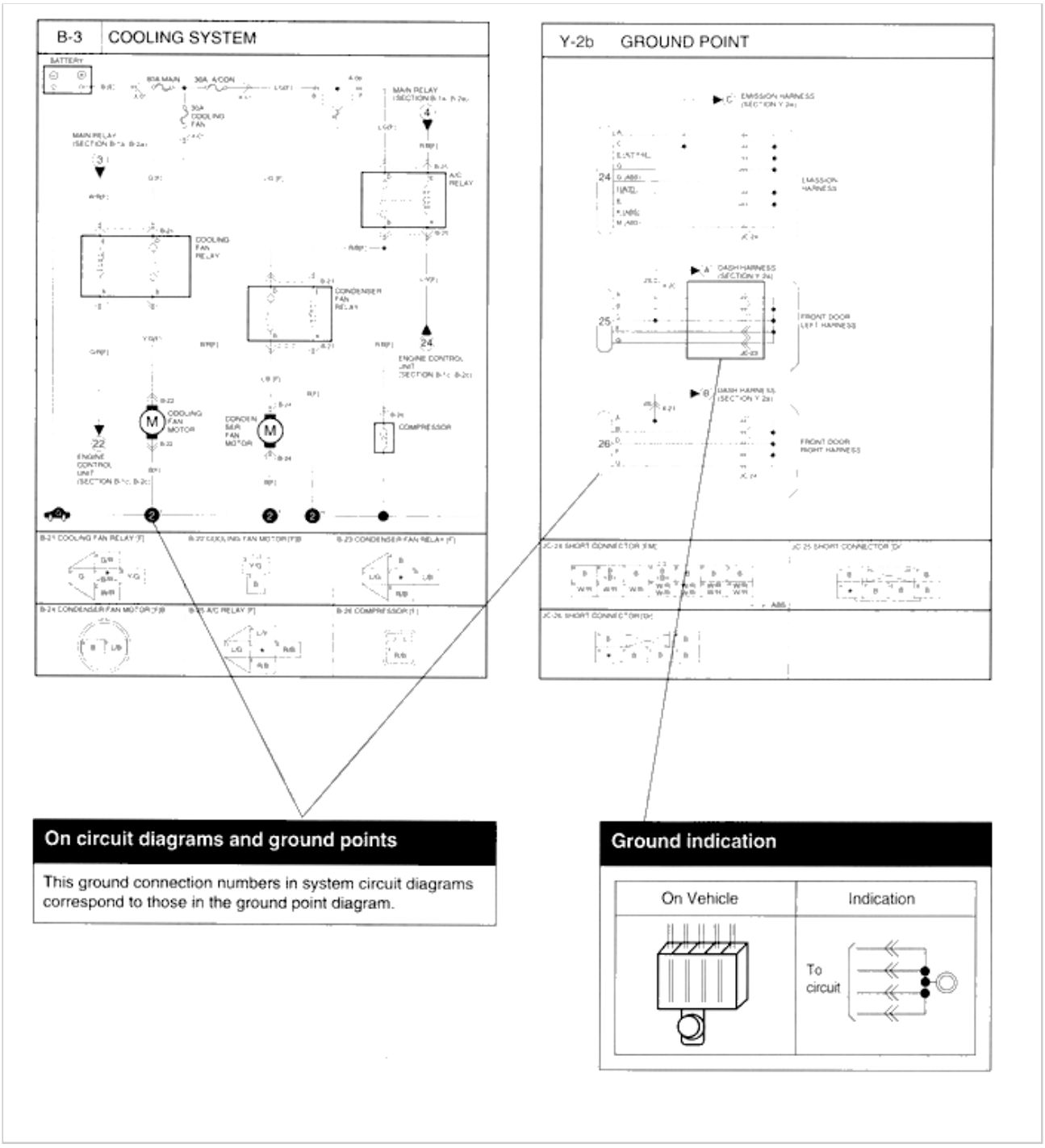
Ground points

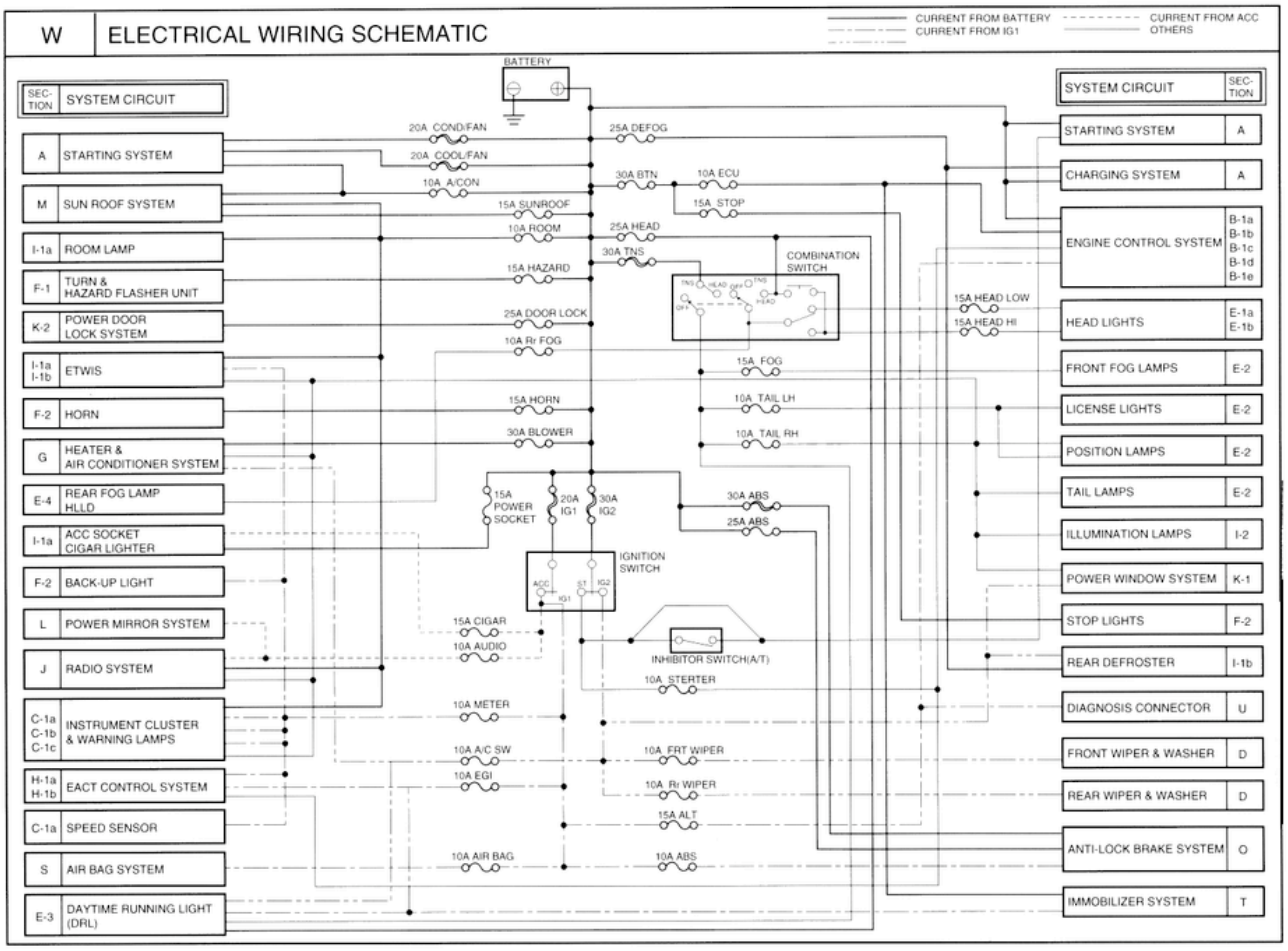
● This shows ground points of the hareness.



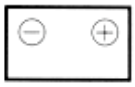
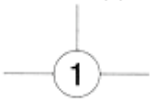
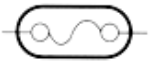
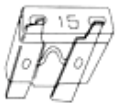
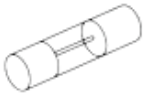
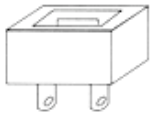
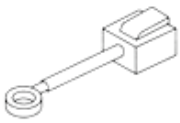
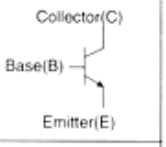
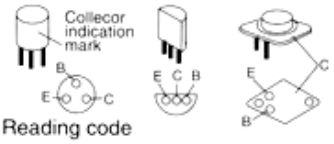
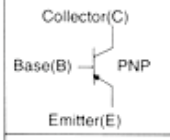
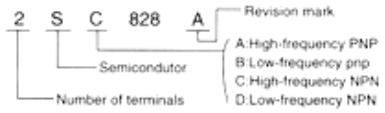
System circuit diagram/connector diagram

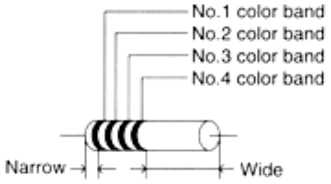
● These diagrams show the circuis for each system, from the power supply to the ground. The power supply side is on the upper part of the page, the ground side on the lower part. The diagrmas discribe circuis with the ignition swtich off. Below is an explanation of the various points in the diagram.

Elelctrical wiring schematic



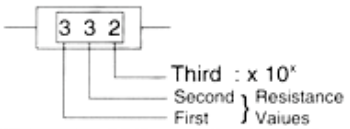
Ground points

Symbol	Meaning
Battery 	• Generates electricity through chemical reaction. • Supplies direct current to circuits.
Ground(1) 	• Connecting point to vehicle body or other ground wire where current flows from positive to negative terminal of battery. • Ground(1) indicates a ground point to body through wire harness. • Ground(2) indicates point where component is grounded directly to body. Remarks • Current will not flow through a circuit if ground is faulty.
Ground(2) 	
Fuse(1)  (box)	• Melts when current flow exceeds that specified for circuit, interrupts current flow. Precautions • Do not replace with fuses exceeding specified capacity.
Fuse(2)  (Cartridge)	<Blade type>  <Tube type> 
Main fuse/ Fusible link 	<Cartridge type>  <Fusible link> 
Transistor(1) 	• Electrical switching component. • Turns on when voltage is applied to the base(B). 
Transistor(2) 	• Reading code 
Lamp 	• Emits light and generates heat when current flows through filament.

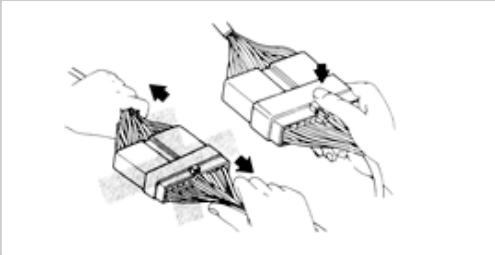
Symbol	Meaning
Resistance	• A resistor with a constant value. • Mainly used to protect electrical components in circuits by maintaining rated voltage. • Reading resistance values. <Colored> 

Color	No.1	No.2	No.3	No.4
	Resistance values		Multiplier	Tolerance
Black	0	0	x 10^0	
Brown	1	1	x 10^1	
Red	2	2	x 10^2	
Orange	3	3	x 10^3	
Yellow	4	4	x 10^4	
Green	5	5	x 10^5	
Blue	6	6	x 10^6	
Purple	7	7	x 10^7	
Grey	8	8	x 10^8	
White	9	9	x 10^9	
Gold			x 10^{-1}	±5%
Silver			x 10^{-2}	±10%
-				±20%

<Numerical>

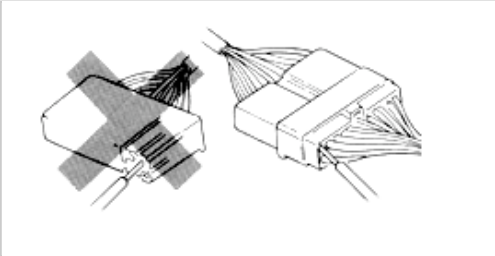


Motor 	• Converts electrical energy into mechanical energy.
Pump 	• Pulls in and discharges gases and liquids.
Cigarette lighter 	• Electrical coil that generates heat.



Inspection

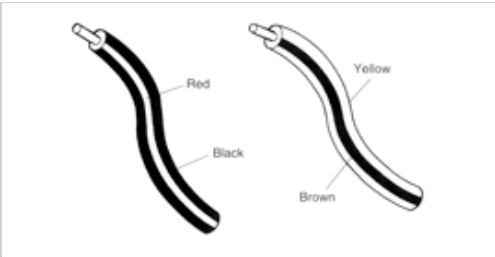
1. When a tester is used to check the continuity or to check the voltage, insert the tester probe from the wire harness side.



Wiring color codes

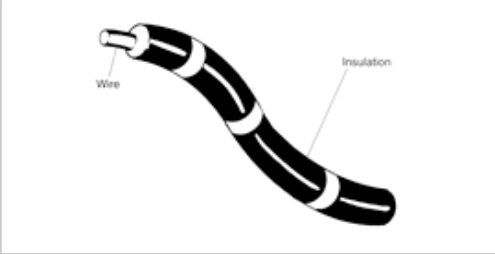
1. Two-color wires are indicated by a two-color code symbol. The first color code indicates the base color of the wire and the second indicates the color of the stripe.

Code	Color	Code	Color
B	Black	Lg	Light green
Br	Brown	O	Orange
G	Green	R	Red
L	Blue	Y	Yellow
P	Pink	W	White
Lb	Light Blue	V	Violet



Thin Insulation wire

1. To reduce the weight of the wiring harness, a thin coating of a high resistance insulation material is used.



Shielded braid wire

1. The shielded braid wire is used to prevent malfunctions in those circuits that are important and susceptible to outside

NOTICE

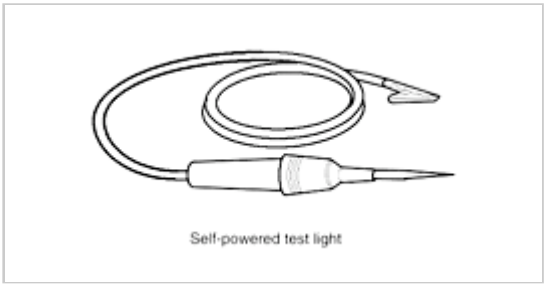
Most circuits include solid-state devices. Test the voltages in these circuits only with a 10-megaohm or higher impedance digital multimeter.
Never use a test light or analog meter on circuit that contain solid-state devices. Damage to the devices may result.

Test light and DVOM

On circuits without solid-state devices, use a test light to check for voltage. A test light is made up of a 12-volt bulb with a pair of leads attached.
After grounding one lead, touch the other lead to various points along the circuit where voltage should be present. The bulb will go on if there is voltage at the point being tested.
If you need to know how much voltage is present, use a digital volt/ohmmeter (DVOM).

Self-powered test light and DVOM

1. Use a self- powered test light to check for continuity.
   This tool is made up of a light bulb, battery, and two leads. To test it, touch the leads together, the light should go on.
   Use a self-powered test light only on an unpowered circuit. First, disconnect the battery, or remove the fuse that feeds the circuit between which you want to check continuity.
   Connect one lead of the self-powered test light to each point. If there is continuity, the test light's circuit will be completed, and the light will go on.



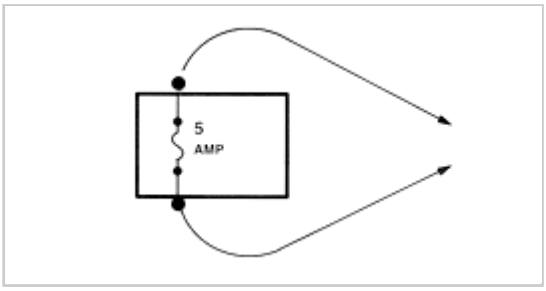
Self-powered test light

Fused jumper wire

Use a jumper wire to bypass an open circuit. A jumper wire is made up of an in-line fuse holder connected to a set of test leads. It should have a five ampere fuse.
Never use a jumper wire across any load. This direct battery short will blow the fuse.

Short finder

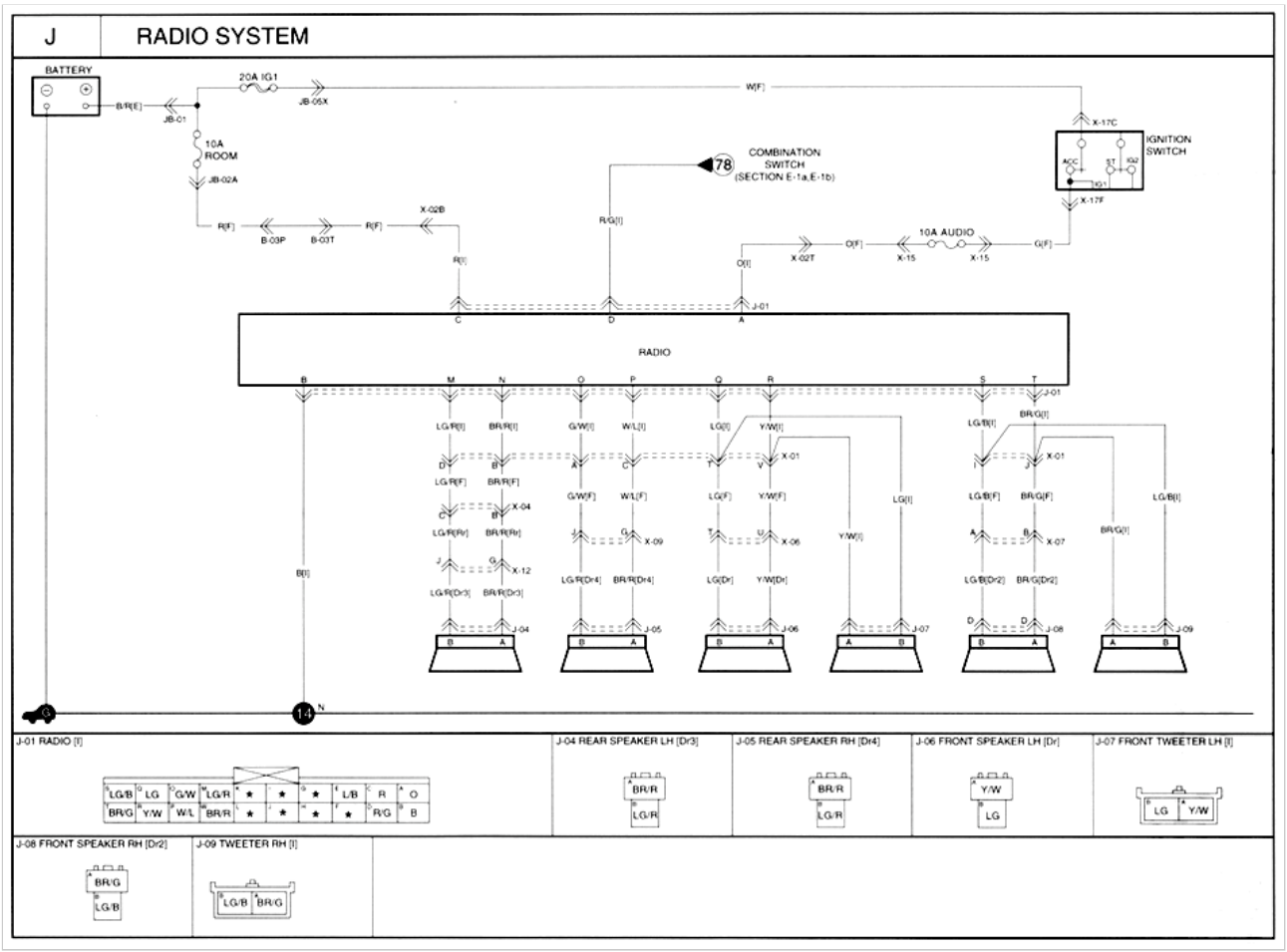
1. Short finder are available to locate shorts to ground. The short finder creates a pulsing magnetic field in the shorted circuit and shows you the location of the short through interior trim. Its use is explained in the following troubleshooting tests.



Testing for voltage

This test measures voltage in a circuit. When testing for voltage at a connector, you may not have to separate the two halves of the connector. Instead, probe the connector from the back. Always check both sides of the connector because dirt and corrosion between its contact surfaces can cause electrical problems.

Audio


J
RADIO SYSTEM
BATTERY
20A IG1
JB-05X
W(F)
B/R(E)
JB-01
10A
ROOM
JB-02A
R(F)
B-03P
B-03T
X-02B
R(I)
R/G(I)
78
COMBINATION
SWITCH
(SECTION E-1a,E-1b)
X-17C
IGNITION
SWITCH
ACC
ST
IG2
IG1
X-17F
10A AUDIO
O(F)
X-02T
X-15
G(F)
O(I)
J-01
RADIO
B
M
N
O
P
Q
R
S
T
LG/R(I)
BR/R(I)
G/W(I)
W/L(I)
LG(I)
Y/W(I)
BR/G(I)
LG/B(I)
LG/R(F)
BR/R(F)
G/W(F)
W/L(F)
LG(F)
Y/W(F)
LG/B(F)
BR/G(F)
X-01
X-04
X-09
X-06
X-07
LG/R(Dr4)
BR/R(Dr4)
LG(Dr)
Y/W(Dr)
LG/B(Dr2)
BR/G(Dr2)
X-12
LG/R(Dr3)
BR/R(Dr3)
J-04
J-05
J-06
J-07
J-08
J-09
B(I)
G
14
N
J-01 RADIO [I]
LG/B
LG
G/W
LG/R
L/B
R
O
BR/G
Y/W
W/L
BR/R
R/G
B
J-04 REAR SPEAKER LH [Dr3]
BR/R
LG/R
J-05 REAR SPEAKER RH [Dr4]
BR/R
LG/R
J-06 FRONT SPEAKER LH [Dr]
Y/W
LG
J-07 FRONT TWEETER LH [I]
LG
Y/W
J-08 FRONT SPEAKER RH [Dr2]
BR/G
LG/B
J-09 TWEETER RH [I]
LG/B
BR/G

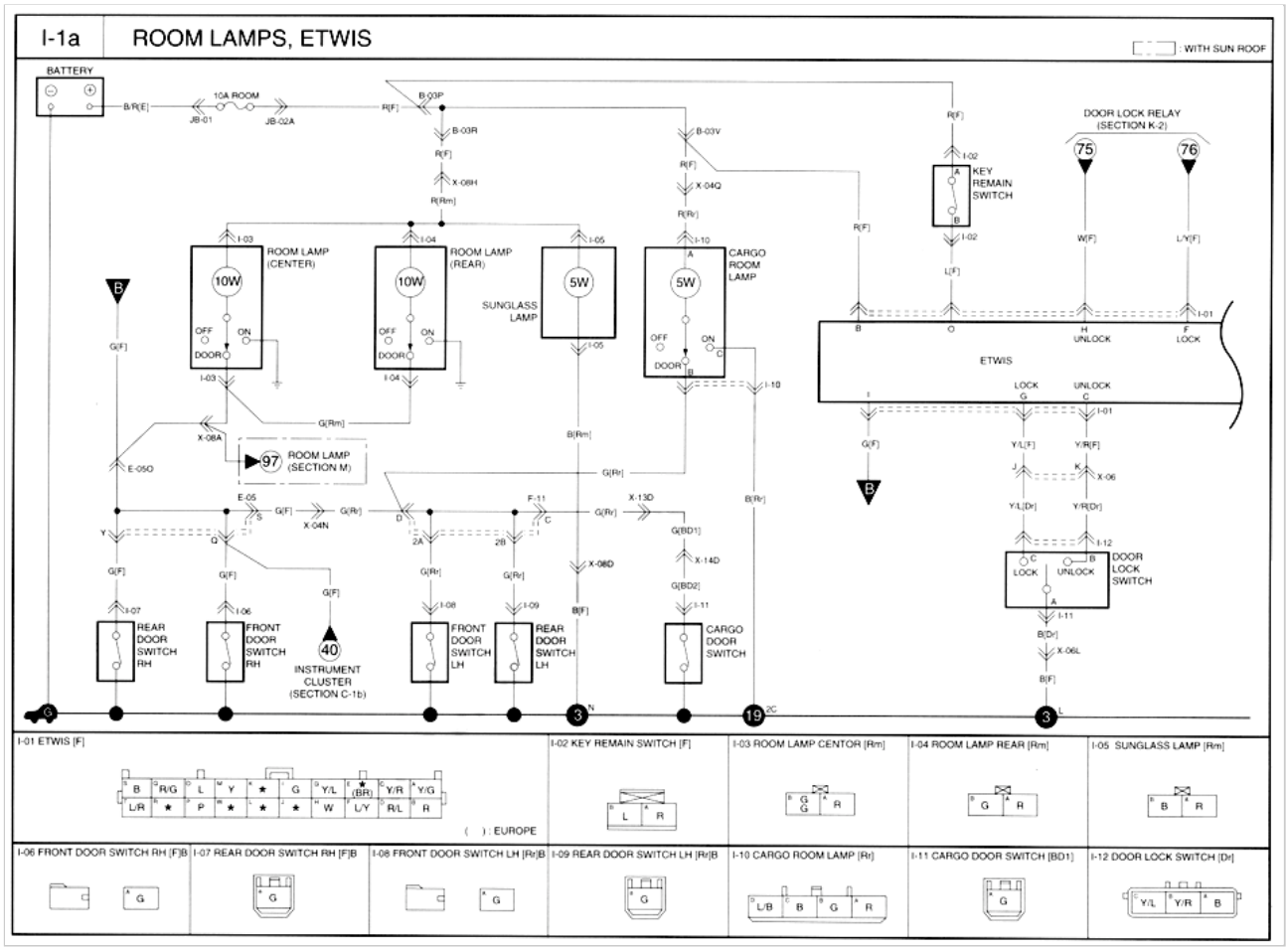
Troubleshooting

Horn does not operate

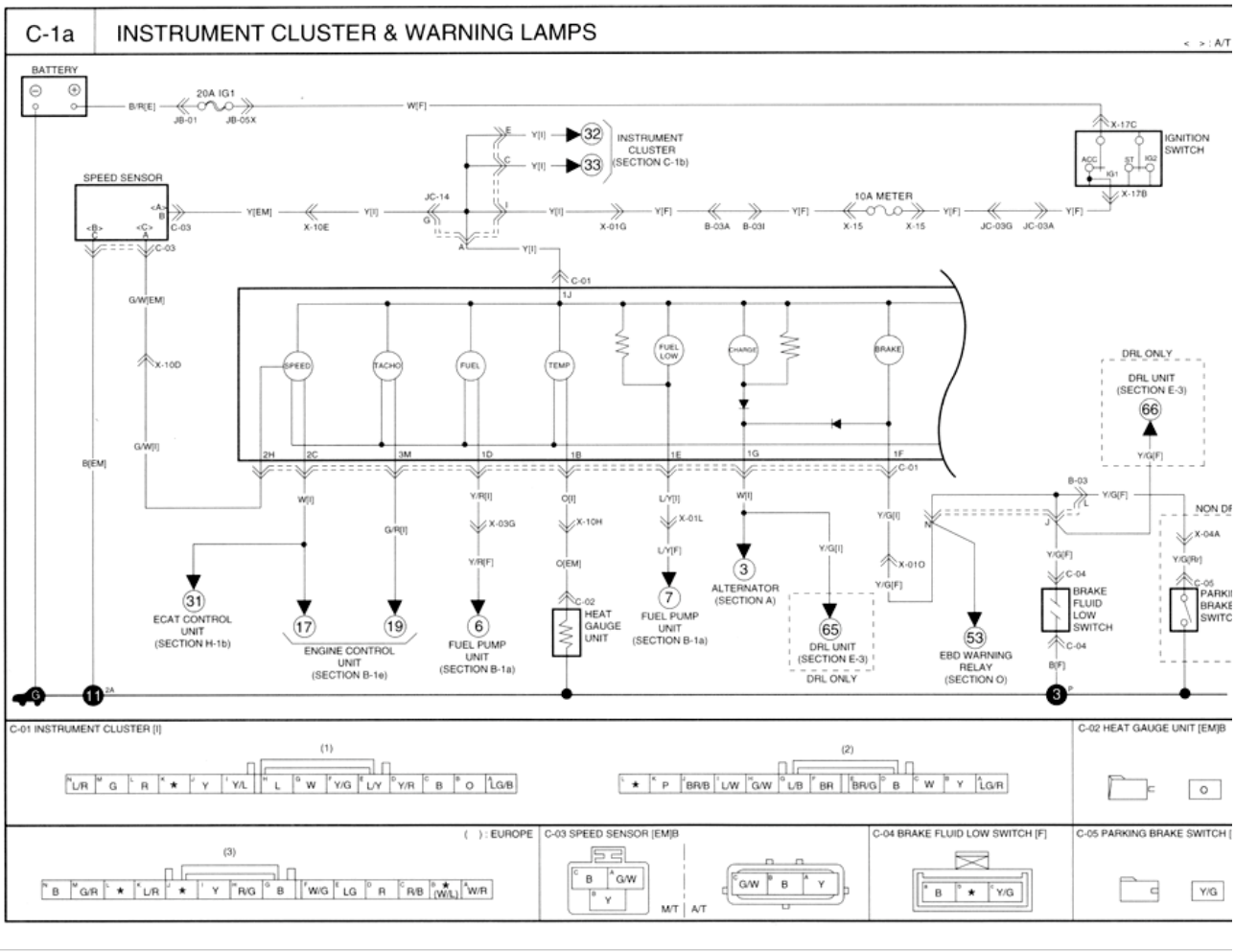
Preliminary check:
Check "HORN (15A)" fuse and horn relay. If open, check for short to ground though wire, replace fuse or relay and check that all system electrical connectors mated correctly.

Step	Inspection		Action
1	Connect for voltage at terminal F (W/G) of horn switch connector E-01. Is battery voltage present?	Tes	Go to next step
		No	Repair open or short in the wire "W/G" or replace.
2	Check for continuity between terminal F (W/G) of horn switch connector E-01 and ground while pressing horn switch. Is continuity preseeent?	Yes	Go to next step
		No	Check for a poor connection at horn switch. If OK, replace the horn switch.
3	Use jumper wire to bypass between terminal F (W/G) of horn switch connector E-01. Check for voltage at terminal A (L) of horn connector F-04. Is battery voltage present?	Yes	Go to next step
		No	Repair open or short in the wire "L" or replace.
4	Connect for voltage between terminal A(L) and terminal B (B) of horn connector F-04. Is abattery voltage present?	Yes	Check for a poor connection at horn connector. If OK, replace horn.
		No	Check for a poor connection at ground. If OK, repair open in the wire "B" or replace.

ETWIS, door courtesy lamp, room lamp



Instrument cluster & warning lamps



Description

Instrument cluster

Instrument cluster assembly houses driver-operated switches and controls. An analog electric speedometer, stepper motor-driven odometer, trip meter analog fuel gauge, temperature gauge, and information/warning center are located in cluster.Center information/warnings include:

1) Engine oil pressure warning
2) ABS warning
3) Check engine warning
4) Rear window defroster indicator
5) Brake warning
6) Charge warning
7) Seat belt warning
8) High beam indicator
9) Door open warning
10) Parking brake indicator
11) Air bag warning
12) Accessory (ACC) indicator
13) Low fuel warning
14) Hazard warning
15) Turn signal indicators

Instrument cluster electrical connectors are located at rear of assembly. When assembly is removed, instrument panel electrical harness connectors are disconnected. A printed circuit is mounted on back of instrument cluster. It transfers electrical power to cluster. Bulb holders are removed at rear of instrument cluster. Instruments are removed from cluster after cluster has been removed and bezel/lens has been removed from cluster case. Instrument cluster trim electrical connectors are located at rear of trim switches and are disconnected when cluster trim is removed. When ignition is in "ON"position, instrument and switch lights are checked. If any light is inoperative, a replacement of failed bulb should bemade.

Meters and gauges

- Engine coolant temperature gauge
  Engine coolant temperature gauge in instrument cluster indicates temperature of engine coolant with ignition switch in "ON" position. A sending unit in engine changes resistance with temperature.
- Fuel gauge
  Electrical fuel gauge system consists of an electrical panel gauge and a fuel tank sender device. Fuel gauge indicates quantity of fuel in fuel tank only when ignition is turned to "ON" position. When ignition switch is turned to "ACC" or "LOCK" positions, pointer does not point to correct fuel level.
- Speedometer/Odometer/Trip meter
  This instrument cluster assembly includes a speedometer, an odometer and a trip meter. Speedometer indicates speed. Odometer records total road mileage. Trip meter records trip mileage. Indicator needle is electrically driven by a precisionDC motor circuit. Speed information source is a speed sensor on transmission. Odometer and trip meters consist of numbered wheels that are electrically driven by a DC stepper motor.
- Tachometer
  Tachometer indicates engine speed in rpm (revolutions per minute) with engine running. A wire to "TACH" connector on ignition module measures ignition pulses of module. An electronic circuit on tachometer converts these pulses to rpm data.

CAUTION

When removing or installing any electrical units, disconnect negative battery cable to prevent possible

Troubleshooting

Power door lock does not operate.

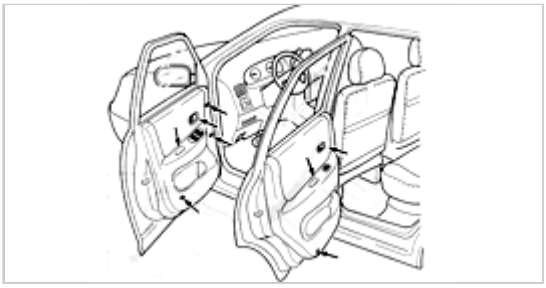
Check "DOOR LOCK (25A)" fuse and door lock relay. If open, check for short to ground though R/L wire, replace fuse or relay. In addition, check that all system electrical connectors mated correctly.

Step	Inspection		Action
1	Check for voltage at terminal B(R) of the ETWIS connector I-01. Is battery voltage present?	Yes	Go to next step.
		No	Repair open or short in the wire "R" or replace.
2	Check for voltage between terminal B(R) and terminal of ETWIS connector I-01. Is Continuity present?	Yes	Go to next step.
		No	Check for a poor connection at ground. If OK, repair open in the wire "B" or replace.
3	Disconnect door lock switch connector. Check for voltage at terminal G(Y/L) and C(Y/G) of EWIS connector I-01. Is the voltage approximately 5V?	Yes	Go to next step.
		No	Check for a poor connection at ETWIS. If OK, check ETWIS
4	Check for voltage at terminal C(Y/L) of door lock switch connector I-11. Is the voltage approximately 5V?	Yes	Go to next step.
		No	Repair open or short in the wire "Y/L" or replace.
5	Check for voltage at terminal B (Y/R) of door lock switch connector I-11. Is the voltage approximately 5V?	Yes	Go to next step.
		No	Check open or short in the wire "Y/R" or replace.
6	Check for continuity between terminal A(B) of door lock switch connector I-11 and ground. Is continuity present?	Yes	Go to next step.
		No	Repair open in the wire "B" to ground or replace.
7	Check for door lock switch. Is the door lock switch normal?	Yes	Go to next step.
		No	Replace the door lock switch.
8	Connect door lock switch. Check for voltage at terminal H(W) of ETWIS connector I-01. Is battery voltage present?	Yes	Go to next step.
		No	Repair open or short in the wire "W" or replace.
9	Check for voltage at terminal F(L/Y) of ETWIS connector I-01. Is battery voltage present?	Yes	Go to next step.
		No	Repair open or short in the wire "L/Y" or replace.
10	When lock switch is unlocked, check for voltage at terminal H(W) of ETWIS connector I-01. Is the voltage approximately 0V for 0.2~0.4 second?	Yes	Check
		No	Check for a poor connection at ETWIS. If OK, check for ETWIS module.
11	When lock switch is unlocked, check for voltage at terminal F(L/Y) of ETWIS connector I-01. Is the voltage approximately 0V for 0.2~0.4 second?	Yes	Go to next step.
		No	Check a poor connection at ETWIS. If OK, check for ETWIS module.

Removal

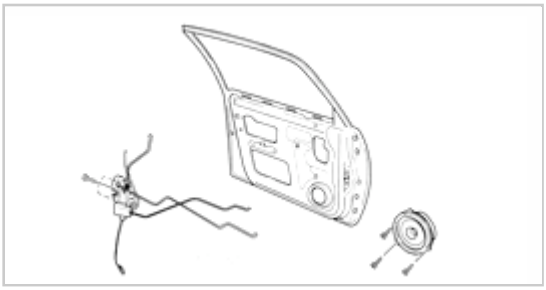
Power window regulator

1. Disconnect negative battery cable.
2. Remove door trim. Refer to "Trim" in this section.

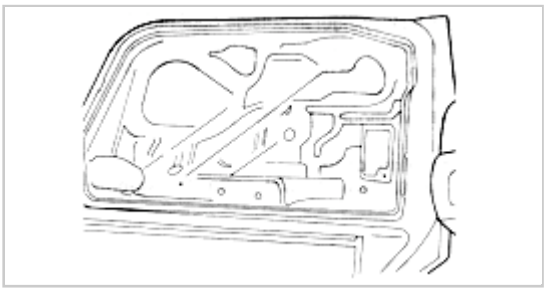


3. Remove one screw on pull handle bracket.

4. Remove pull handle bracket.
5. Remove speaker.
   A. Remove three screws on door speaker.



   B. Unfasten harness connector from door frame.
   C. Pull out speaker and disconnect connectors.
6. Peel off plastic door screen carefully by pulling it away gradually from door frame.

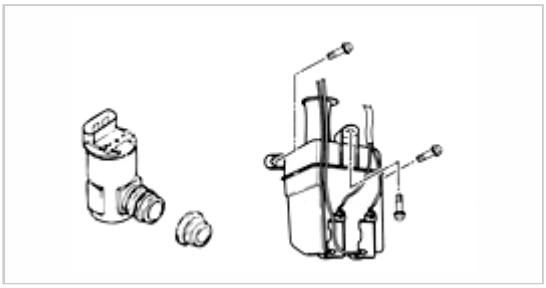


7. Remove window glass.
   A. Reconnect window operating switch.
   B. Reconnect negative battery cable.
   C. Trun on ignition and position window glass to speaker access hole.

Removal

Washer motor

1. Disconnect negative battery cable.
2. Remove fasteners and bolt from mud guard and gently pull mud guard down ward fully.
3. Remove three bolts on washer tank.
4. Disconnect washer motor harness connector.
5. Remove hose connector at washer motor.
6. Remove washer motor and washer tank.
7. Drain washer tank and then separate washer motor from washer tank.



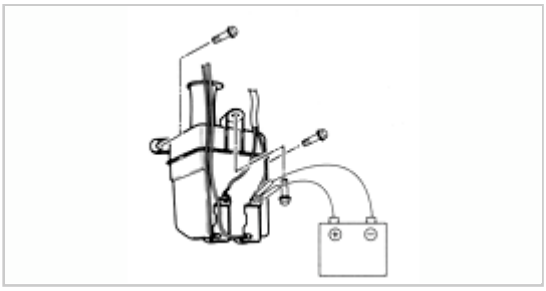
Installation

Washer motor

1. Reverse removal procedure.

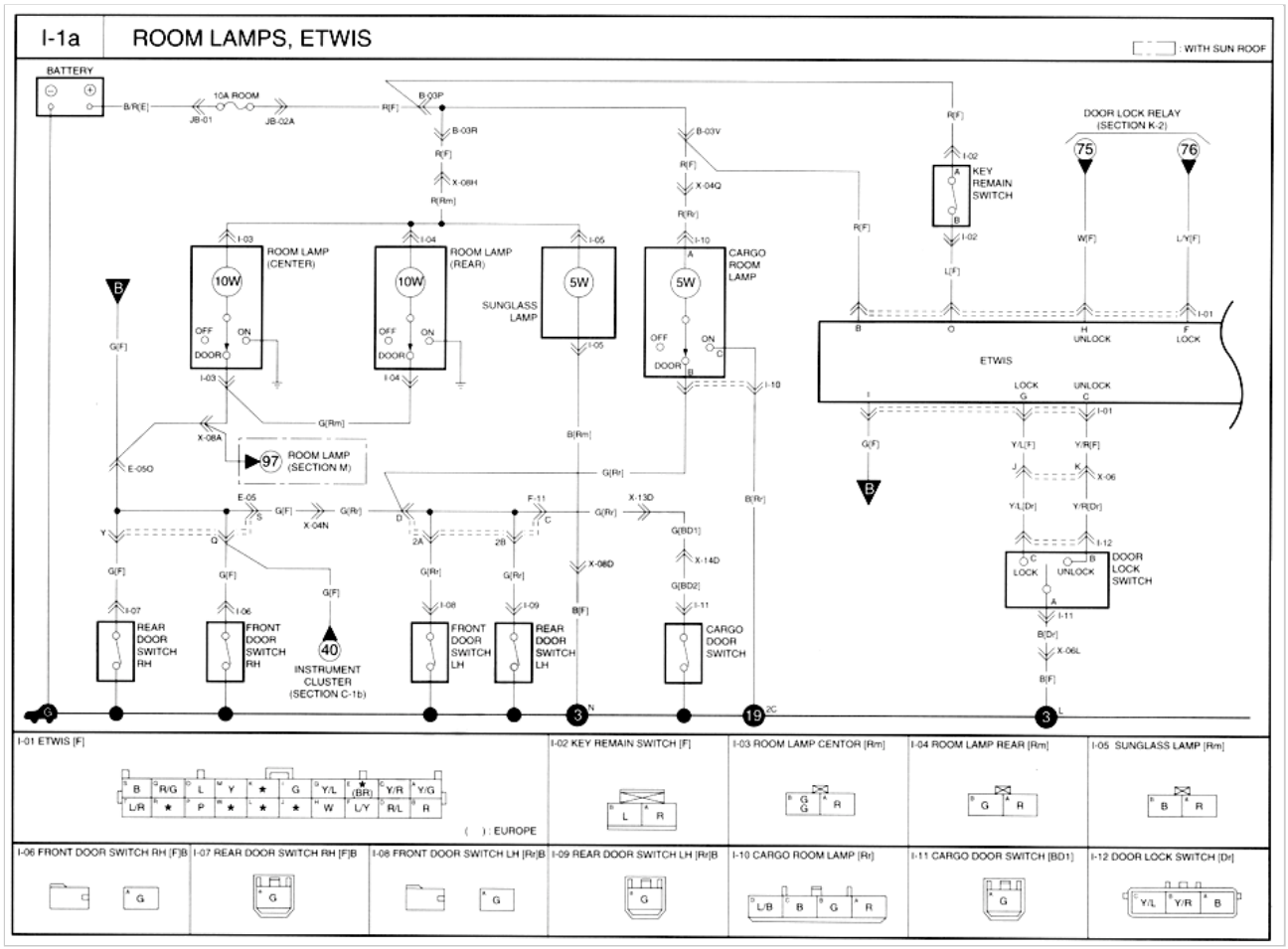
Inspection

1. Check for continuity between positive terminal and negative terminal using an ohmmeter.
2. Check motor function by connecting it to a 12V DC source.



3. Visually inspect washer tank for cracks or damage.

ETWIS, door courtesy lamp, room lamp



Diagnostic Trouble Codes and Associated Procedures

Immoblilizer

1. Turn ignition switch to ON.
2. The MIL should illuminate.
3. Turn the ignition switch to LOCK.
4. Locate the data link connector (DLC) in the engine conpartment and install the Hi-Scan Pro Tool.
5. Turn the ignition switch to ON and record any Diagnostic Trouble Codes displayed by Hi-Scan Pro Tool.
6. Refer to Diagnostic Trouble Code Chart, for fault description and actions.

Diagnostic Trouble Code (DTC) Chart

Diagnostic Trouble Code	Fault Description	MIL	Remark
P1611	Communication error(ECU-VIM)	ON	BOSCH T8D
P1612	Checksum message wrong		
P1613	Implausible bytes from ICU		
P1614	ECU status error		

Diagnostic service

Refer to Hi-Scan Pro Tool Manual.

NOTICE

1) Refer to Emission Control System, Hi-Scan Pro Tool Manual.
2) If a detected fault remains for the first time for a time, it is stored as "not confirmed fault". If the fault is detected again when it is stored as "confirmed fault". It is stored as confirmed fault and MIL is ON after two driving cycles.
3) The driving cycle is counted up ten senconds passed after ignition ON or "erased code" of Kia Power Scan Tool.
4) Not confirmed fault : If a detected fault remains for the first time for a time, it is stored as a temporary failure that is "not confirmed fault".
5) Confirmed fault : If the fault is detected again at status whitch is stored as "not confirmed fault", it is stored as "confirmed fault"
6) Before replacing ICU or ECU, perform "Before Servicing and "Normal Coding" procedure and recheck inkey immobilizer system.

Diagnostic Trouble Code Troubleshooting

DTC	Fault Description	PPossible cause	Action
P1611	No receving any answer on K-line after elasing timeout of communication or no receiving correct answer for communication time.	Harness or connection failure. Unmatched between ICU and ECU. ICU failure. ECU failure.	Repair or replace Perform Normal Coding Replace Replace
P1612	Checksum message from ICU is wrong.	Harness or connection failure. ICU failure. ECU failure	Repair or replace Replace Replace
P1613	Answer from ICU includes implausible bytes.	Harness or connection failure. ICU failure.	Repair or replace Replace
P1614	ECU staus byte at EEPROM does not correspond to virgin, learnt or neutrailzed staus.	Harness or connection failure. ECU failure.	Repair or replace Replace

General Diagnostics and Test

System check