

GENERAL INFORMATION

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INTRODUCTION

E1KB0010

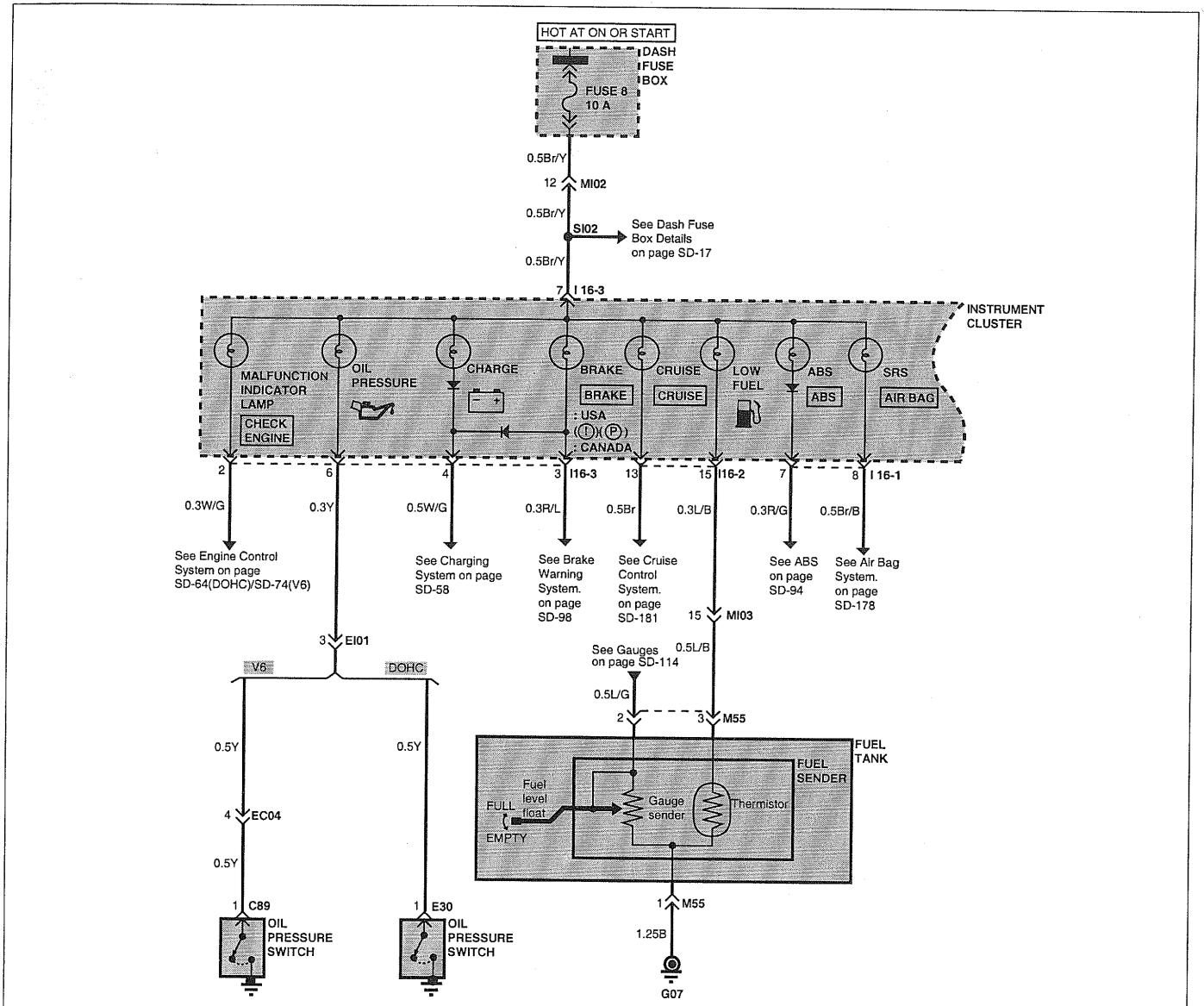
This Manual consists of five major diagnostic sections for electrical problem troubleshooting.

- Schematic diagrams
- Component location indexes
- Component locations
- Connector configurations
- Harness layouts

SCHEMATIC DIAGRAM

The starting point of each system section is the schematic diagram. These diagrams show how all the components work together, such as electrical current paths from power source to ground (via electrical load), switch connections at each position, and other related circuit functions.

It is important to fully understand how a circuit works prior to troubleshooting and diagnosis.



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COMPONENT LOCATION INDEXES

When you want to locate the schematic components on the vehicle, use the Component Location Index which follows each schematic. A Component Location Index lists major components, connectors, grounds, diodes, and their physical location and page reference.

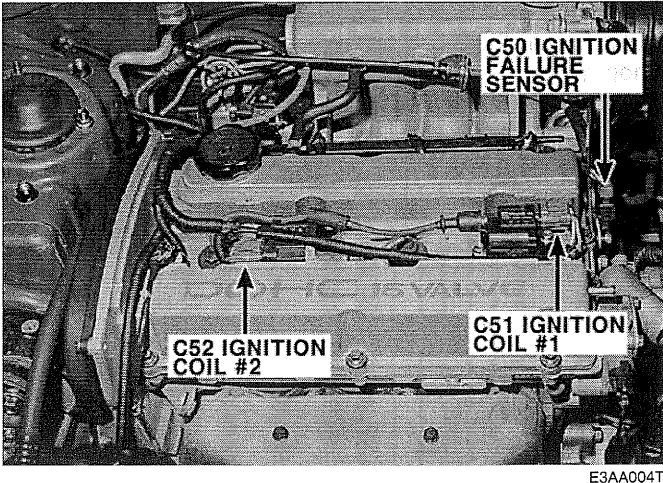
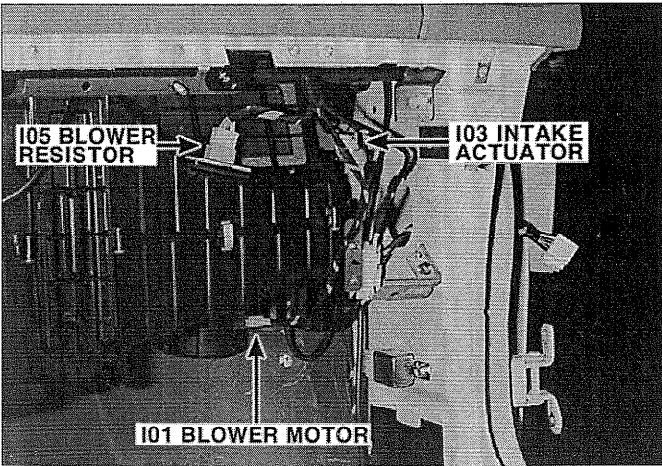
Almost all components, connectors or grounds, and diodes shown on a schematic can be pinpointed visually by using the Component Location Illustrations.

Components	Location Reference Page
I12 Digital clock	CL-15
I16-1 Instrument cluster	CL-15
M55 Fuel sender	CL-19
M56 Fuel pump	CL-19
C34 Engine coolant temperature sender	CL-5, CL-8
Connectors	
MI01/MI02/MI03	CL-21
MC02	CL-21
CC02	CL-8
Grounds	
G04	CL-23
G07	CL-23
Diodes	
Z01	CL-24
Z02	CL-24

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COMPONENT LOCATIONS

Component Locations make it easy to find the schematic components on the vehicle shown in the Component Location Index.



CONNECTOR CONFIGURATIONS

This section shows the cavity or terminal locations in all the multi-pin connectors shown in the schematic diagrams. It will help you to locate check points, together with the wire colors and terminal numbers in the schematic. The configuration drawings show the connector view as seen from a

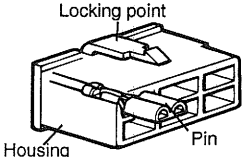
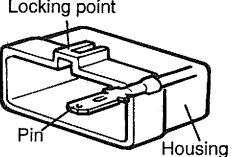
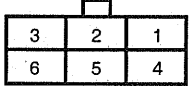
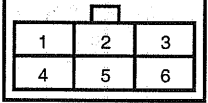
component after the harness connector has been disconnected. When more than one connector is connected to a component, the connectors are all shown together. Both halves of in-line connectors are shown together.

D15	D35	D16	D36	D17	D37	
<div><div><div>3</div><div>2</div><div><div>✕</div></div><div>1</div></div><div><div>7</div><div>6</div><div>5</div><div>4</div></div></div>		<div><div><div>2</div><div>1</div></div></div>		<div><div><div>2</div><div>1</div></div><div><div>4</div><div>3</div></div></div>		BLANK
MD05	MD06					
<div><div><div>3</div><div>2</div><div><div>✕</div></div><div>1</div></div><div><div>8</div><div>7</div><div>6</div><div>5</div><div>4</div></div></div> <div><div><div>1</div><div><div>✕</div></div><div>2</div><div>3</div></div><div><div>4</div><div>5</div><div>6</div><div>7</div><div>8</div></div></div>		BLANK				BLANK

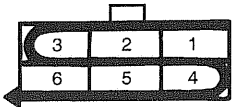
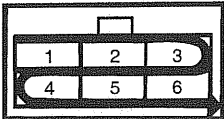
E1AA001A

CONNECTOR VIEW AND NUMBERING ORDER

1. CONNECTOR VIEW

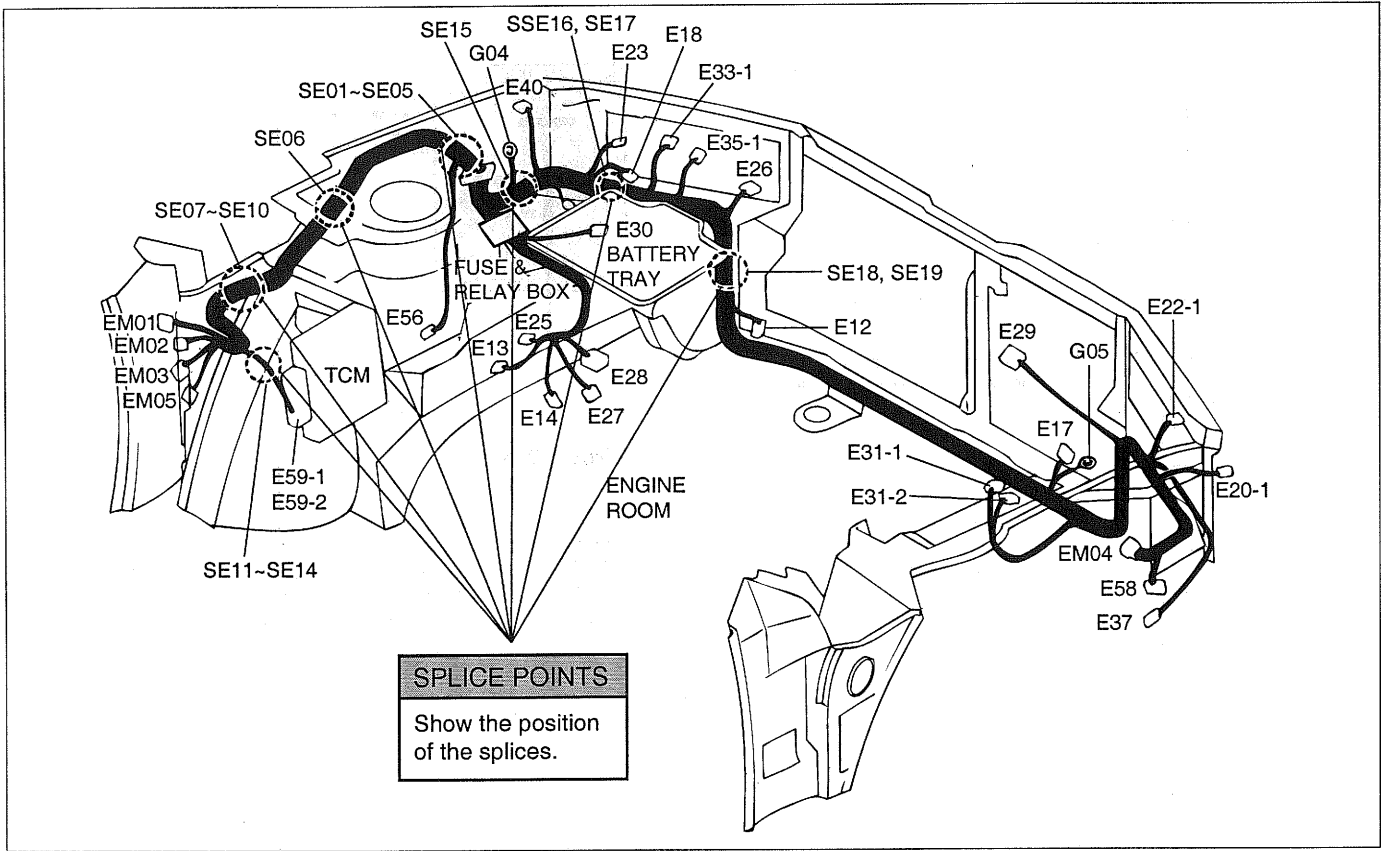
	Female	Male	Remarks
Actual Illustration	 MGI-002A	 MGI-003A	It is not the shape of the connector housing, but the connector pin that distinguishes between male or female connectors. When numbering female and male connectors, refer to the numbering order in the following table. Some connectors may not follow this method of numbering order. For individual detailed numbering, refer to the CONNECTOR CONFIGURATIONS.
Illustration in the Shop manual	 E1AA001B	 E1AA001C	

2. NUMBERING ORDER

	Numbering order	Remarks
Female Connector	<div></div> <div>E1AA001D</div>	Numbered in order from upper right to lower left
Male Connector	<div></div> <div>E1AA001E</div>	Numbered in order from upper left to lower right

HARNESS LAYOUTS

Harness layouts show the routing of the major wiring harnesses, the in-line connectors and the splices between the major harnesses. These layouts will make electrical troubleshooting easier.



SYMBOLS E1FC0020

The symbols and abbreviations explained in this section are used throughout the manual.

SYMBOLS IN SCHEMATIC

Components



A solid line means the entire component is shown.

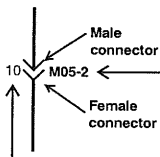


A broken line indicates only part of the component is shown.



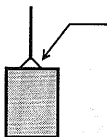
The name of the component appears next to its upper right corner.
Notes about component function follow its name.

Connectors

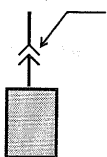


Connector number

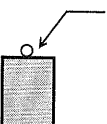
Connector cavity number



This means the connector connects directly to the component.



This indicates the connector connects to a lead (pigtail), wired directly to the component.



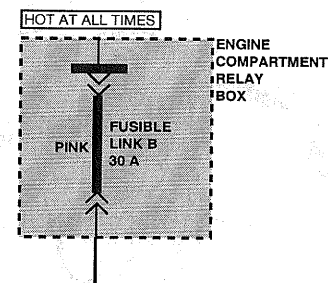
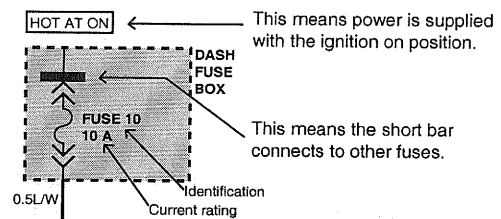
This indicates a screw terminal on the component.

Diode



This diode allows current to flow only in the direction of the arrow.

Fuse and Fusible link

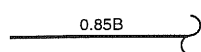


Circuit Breaker

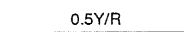


Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.

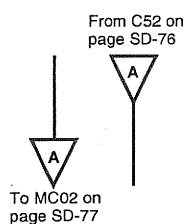
Wires



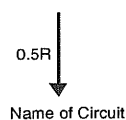
A wavy line means the wire is broken but is to be continued.



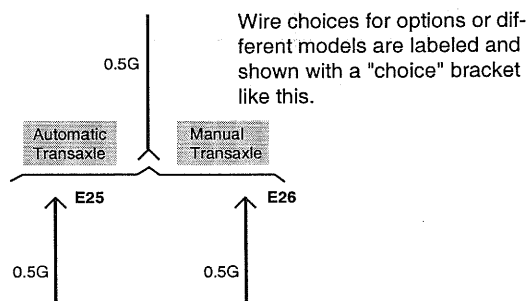
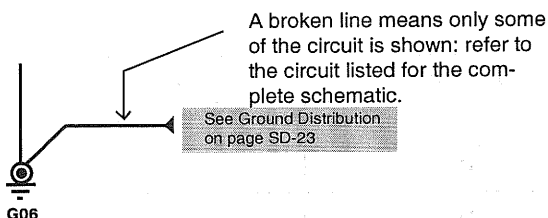
Wire insulation is yellow with a red strip.



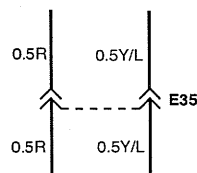
Current path is continued on the same page or another page. The arrow shows the direction of current flow. You should look for the "A" in the marked position.



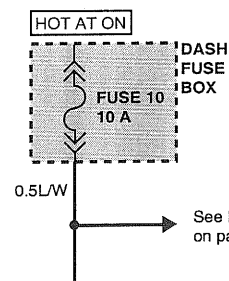
A wire connects to another circuit. The wire is shown again on that circuit which the arrow is pointing.



Wire choices for options or different models are labeled and shown with a "choice" bracket like this.



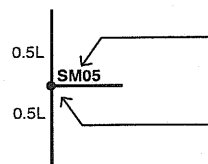
This dashed line means the RED and YELLOW/BLUE wires are both in connector E35.



See Power Distribution on page SD-15

Where separate wires join, only the splice is shown: for details on the additional wiring, refer to the circuit listed.

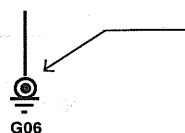
Splices



Splice number

Splices are numbered and shown as a dot with circle. The exact location and connection of these splices may vary among vehicles.

Ground - "G"

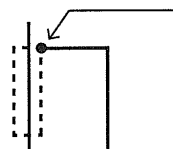


This symbol means the end of the wire is attached to a metal part of the vehicle.

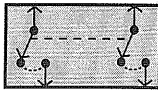


This ground symbol (dot and 3 lines overlapping the component) means the housing of the component is attached to a metal part of the vehicle.

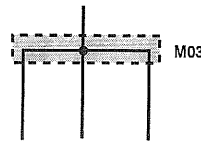
Shield Wire



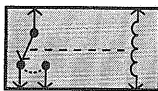
This represents RFI (Radio Frequency Interference) Shielding around a wire. The shielding is always connected to ground.

Switches

These switches move together: a dashed line shows a mechanical connection between them.

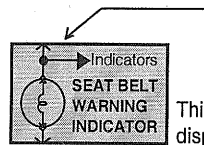
Joint Connectors

This is a connector showing the joining wires.

Relays

This is a relay shown with no current flowing through its coil. When a current flows through coil, contact will toggle.

Normally open contact
Normally closed contact

Indicator

This indicates seat belt warning indicator continues to other indicators within instrument cluster.

This is an indicator which displays the lighted symbol.

YGI-008A

WIRE COLOR ABBREVIATIONS

The following abbreviations are used to identify wire colors in the circuit schematics :

Symbol	Color of wire	Symbol	Color of wire
B	Black	O	Orange
Br	Brown	P	Pink
G	Green	R	Red
Gr	Gray	W	White
L	Blue	Y	Yellow
Lg	Light green		

HARNESS CLASSIFICATION

Electrical wiring connectors are classified according to the wiring parts in the Harness Layouts.

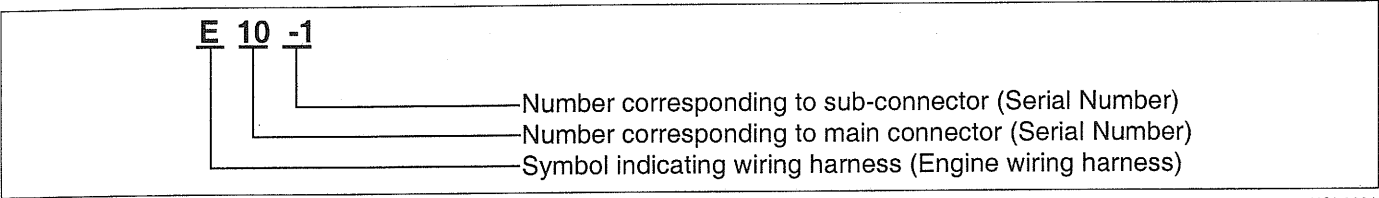
Harness name	Location	Symbol
Engine harness	Engine compartment	E
Main, Floor, Roof, Sunroof harness	Passenger compartment	M
Control harness	Engine compartment	C
Rear and Tail gate harness	Rear and Tail gate	R
Air Bag harness	Under crash pad and Floor	I
Door harness	Door	D

CONNECTOR IDENTIFICATION

A connector identification symbol consists of a wiring harness location classification symbol corresponding to a wiring harness location and number corresponding to the

connector. These connector locations can be found in the HARNESS LAYOUTS.

For example :

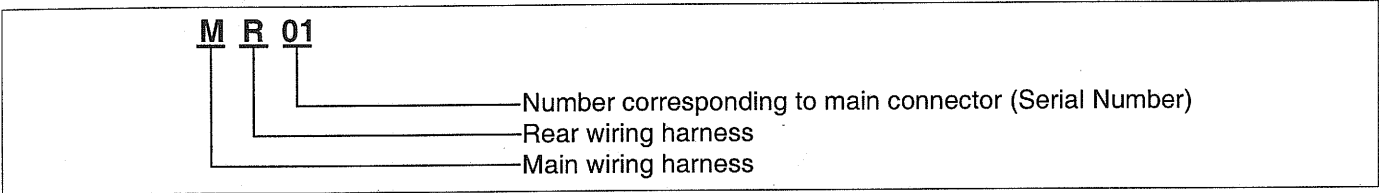


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NOTE

Connectors which connect each wiring harness are represented by the following symbols.

For example :



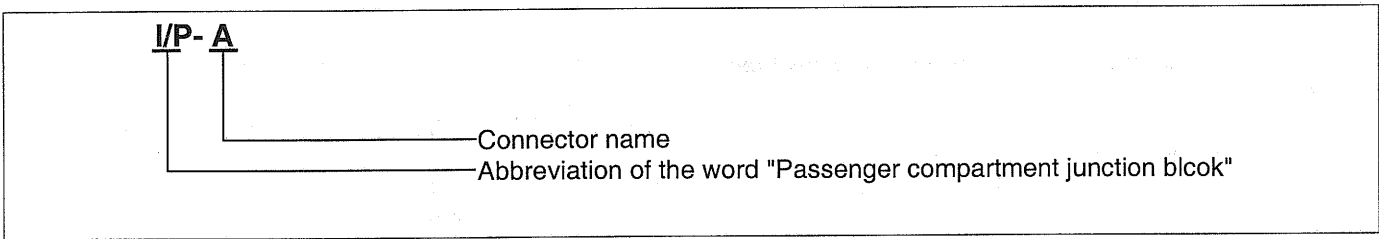
XGI-009B

JUNCTION BLOCK IDENTIFICATION

A junction block identification symbol consists of a wiring harness location classification symbol corresponding to a

wiring harness location and number corresponding to the connector in the junction block.

For example :



E1KB002A

TROUBLESHOOTING INSTRUCTIONS

E1KB0030

TROUBLESHOOTING PROCEDURES

The following five-step troubleshooting procedure is recommended.

1. Verify the customer's complaints

Turn on all the components in the problem circuit to check the accuracy of the customer's complaints. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the probable causes.

2. Read and analyze the schematic diagram

Locate the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power source through the system components to ground. If you do not understand how the circuit should work, read the circuit operation text. Also check other circuits that share with the problem circuit. The name of circuits that share the same fuse, ground, or switch, for example, are referred to on each diagram. Try to operate any shared circuits you did not check in step 1. If the shared circuit works, the shared wiring is okay, and the cause must be within the wiring used only by the problem circuit. If several circuits fail at the same time, the fuse or ground is a likely cause.

3. Inspect the circuit/ component with the problem isolated

Make a circuit test to check the diagnosis you made in step 2. Remember that a logical, simple procedure is the key to efficient troubleshooting. Narrow down the probable causes using the troubleshooting hints and system diagnosis charts. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. Repair the problem

Once the problem is found, make the necessary repairs.

5. Make sure the circuit works

Repeat the system check to be sure you have repaired the problem. If the problem was a blown fuse, be sure to test all of the circuits on that fuse.

TROUBLESHOOTING EQUIPMENT

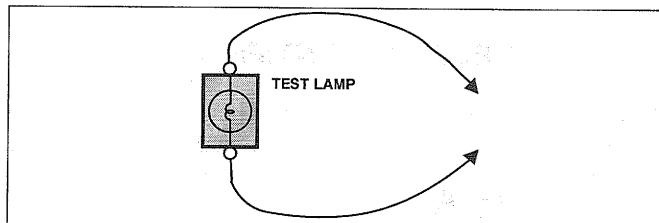
VOLTMETER AND TEST LAMP

Use a test lamp or a voltmeter on circuits without solid-state units and use a test lamp to check for voltage. A test lamp is made up of a 12-volt light 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. When the bulb goes on, there is voltage at the point being tested.

CAUTION

A number of circuits include solid-state modules, such as the Engine Control Module (ECM), used with computer command control injection. Voltage in these circuits should be tested only with a 10-megaohm or higher impedance digital voltmeter. Never use a test lamp on circuits that contain solid-state modules. Damage to the modules may result.

A voltmeter can be used in place of a test lamp. While a test lamp shows whether the voltage is present or not, a voltmeter indicates how much voltage is present.



YGI-011A

SELF-POWERED TEST LAMP AND OHMMETER

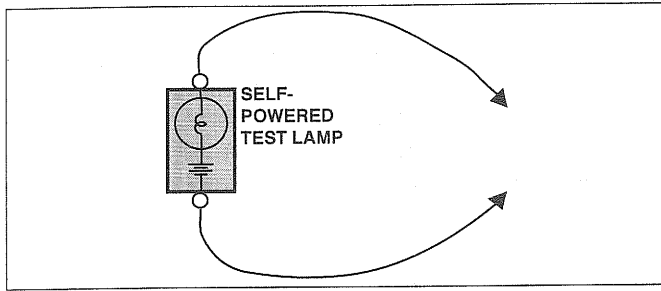
Use a self-powered test lamp or an ohmmeter to check for continuity. A self-powered test lamp is made of a bulb, battery and two leads. That will light a lamp when touched together. Prior to checking the points, first disconnect the battery ground cable or remove the fuse which feeds the circuit you are working on.

CAUTION

Never use a self-powered test lamp on circuits that contain solid state modules. Damage to these modules may result.

An ohmmeter can be used in place of a self-powered test lamp. The ohmmeter shows how much resistance there is between two points along a circuit. Low resistance means good continuity.

Circuits which include any solid-state devices should be tested only with a 10-megaohm or higher impedance digital multimeter. When measuring resistance with a digital multimeter, the battery negative terminal should be disconnected. Otherwise, there may be incorrect readings. Diodes and solid-state devices in a circuit can make an ohmmeter give a false reading. To find out if a component is affecting a measurement, take one reading, reverse the leads and take a second reading. If different, the solid-state device is affecting the measurement.



YGI-011B

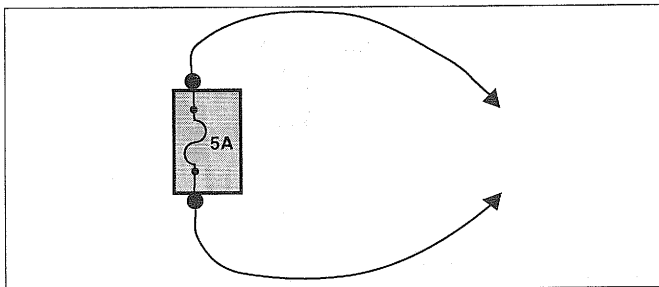
JUMPER WIRE WITH FUSE

Use a jumper wire with a fuse to by-pass an open circuit.

A jumper wire is made up of an in-line fuse holder connected to a set of test leads. This tool is available with small clamp connectors providing adaption to most connectors without damage.

CAUTION

Do not use a fuse with a higher rating than the specified fuse that protects the circuit being tested. Do not use this tool in any situation to substitute an input or output at the solid-state control module, such as ECM, TCM, etc.



YGI-012A

SHORT FINDER

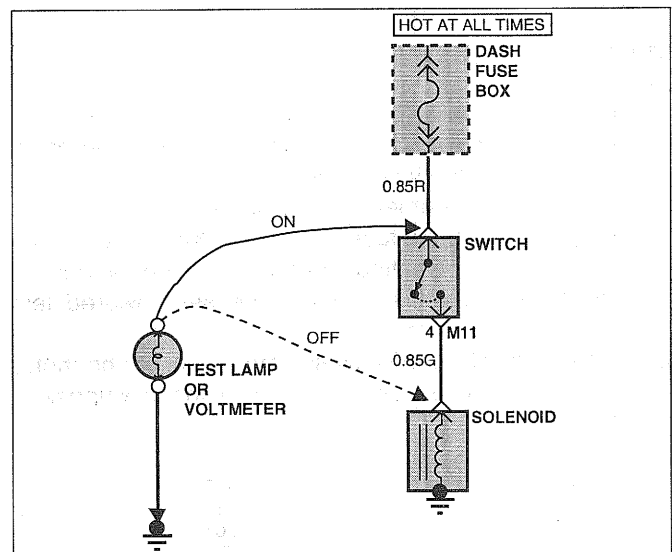
A short finder is available to locate a short to ground. The short finder creates a pulsing magnetic field in the shorted circuit and shows you the location of the short through body trim or sheet metal.

TROUBLESHOOTING TEST

TESTING FOR VOLTAGE

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

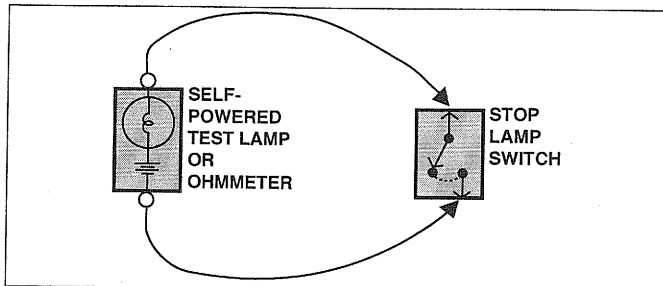
1. Connect one lead of a test lamp or voltmeter to a ground. If you are using a voltmeter, be sure it is the voltmeter's negative test lead you have connected to ground.
2. Connect the other lead of the test lamp or voltmeter to a selected test point (connector or terminal).
3. If the test lamp glows, there is voltage present. If you are using a voltmeter, note the voltage reading. Too close a loss of more than 1 volt from specification indicates a problem.



YGI-013A

TESTING FOR CONTINUITY

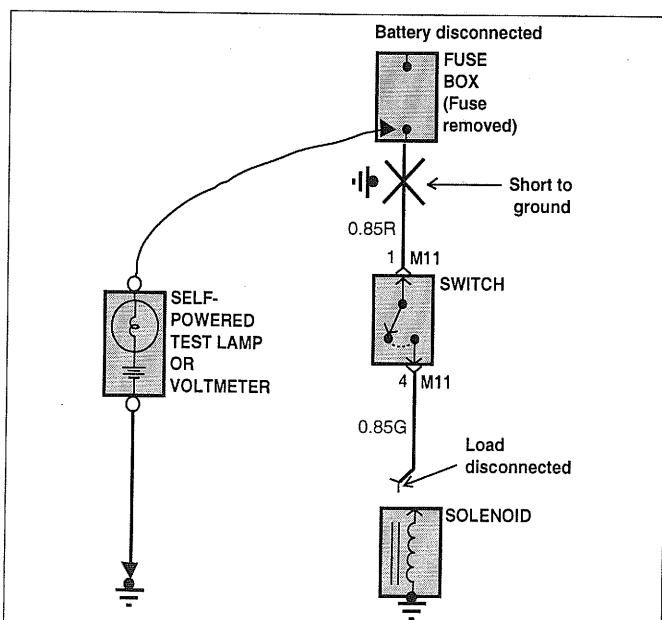
1. Disconnect the battery negative terminal.
2. Connect one lead of a self-powered test lamp or ohmmeter to one end of the part of the circuit you wish to test. If you are using an ohmmeter, hold the leads together and adjust the ohmmeter to read zero ohms.
3. Connect the other lead to the other end.
4. If the self-power test lamp glows, there is continuity. If you are using an ohmmeter, low or zero resistance means good continuity.



YGI-013B

TESTING FOR SHORT TO GROUND

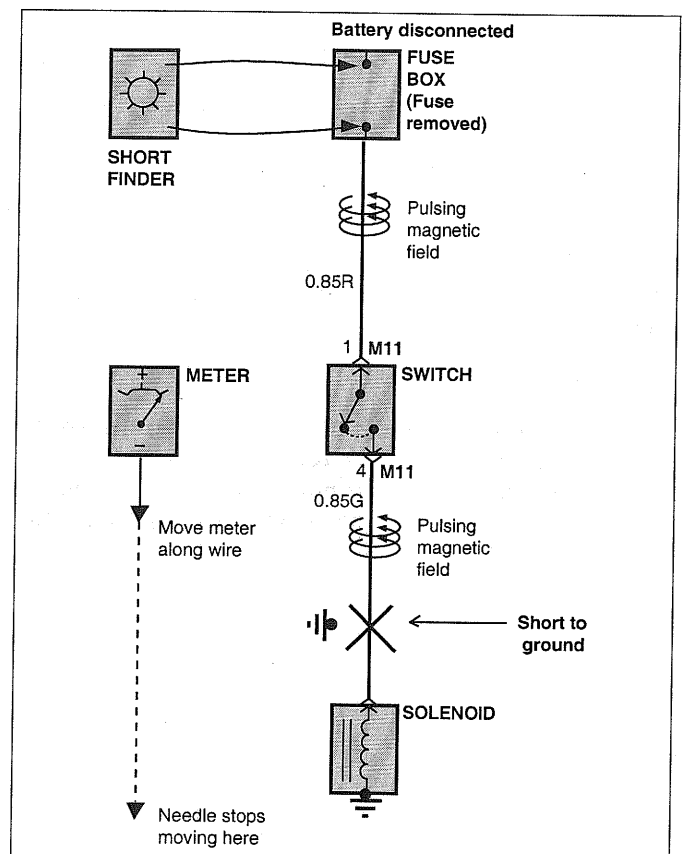
1. Disconnect the battery negative terminal.
2. Connect one lead of a self-powered test lamp or an ohmmeter to the fuse terminal on the load side.
3. Connect the other lead to a ground.
4. Beginning near the fuse block move the harness from side to side. Continue this procedure (about six inches apart) while watching the self-powered test lamp or ohmmeter.
5. When the self-powered test lamp glows, or ohmmeter registers, there is a short to a ground in the wiring near that point.



YGI-013C

TESTING FOR A SHORT WITH A SHORT FINDER

1. Remove the blown fuse. Leave the battery connected.
2. Connect the short finder across the fuse terminals.
3. Close all switches in series in the circuit that are being testing.
4. Turn on the short circuit locator. It sends pulses of current to the short. This creates a pulsing magnetic field around the wiring between the fuse box and the short.
5. Beginning at the fuse box, slowly move the short finder along the circuit wiring. The meter will show current pulses through sheet metal and body trim. As long as the meter is between the fuse and the short, the needle will move with each current pulse. Once the meter is moved past the point of the short, the needle will stop moving. Check around this area to locate the cause of the short circuit.



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