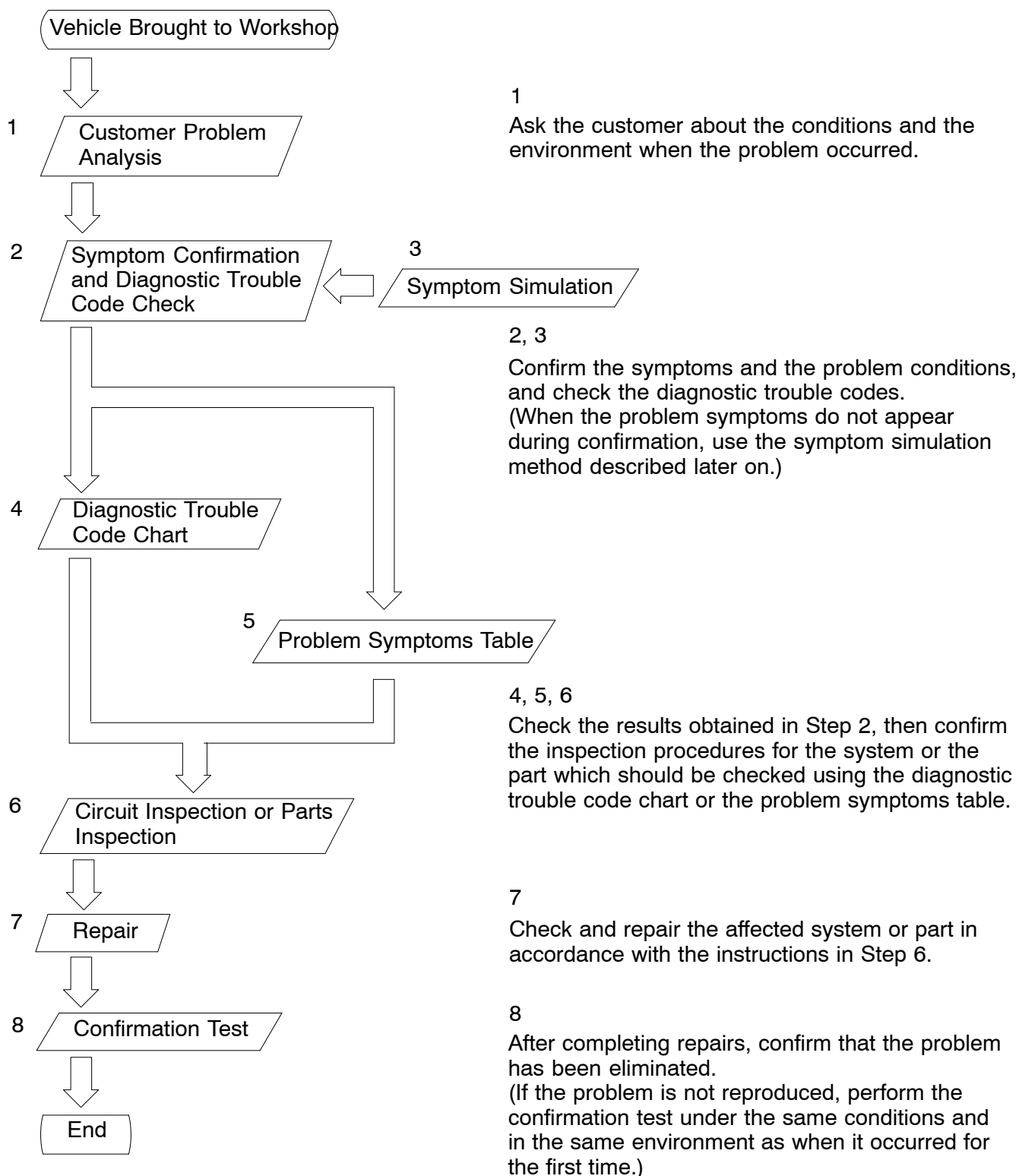


HOW TO PROCEED WITH TROUBLESHOOTING

Carry out a troubleshooting in accordance with the procedures on the following page. Here, only the basic procedures are shown. Details are provided in Diagnostics section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



1. CUSTOMER PROBLEM ANALYSIS

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgment. In order to ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and conditions at the time it occurred. Important Point in the Problem Analysis:

The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also be helpful in some cases. So as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in the Diagnostics section for each system for your use.

Important Points in the Customer Problem Analysis

- What ----- Vehicle model, system name
- When ----- Date, time, occurrence frequency
- Where ----- Road conditions
- Under what conditions? ----- Running conditions, driving conditions, weather conditions
- How did it happen? ----- Problem symptoms

(Sample) Supplemental restraint system check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK			
Supplemental Restraint System Check Sheet		Inspector's Name	
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles
Date Problem First Occurred	/ /		
Weather	<input type="checkbox"/> Fine <input type="checkbox"/> Cloudy <input type="checkbox"/> Rainy <input type="checkbox"/> Snowy <input type="checkbox"/> Other		
Temperature	Approx.		
Vehicle Operation	<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Starting <input type="checkbox"/> Driving </div> <div> <input type="checkbox"/> Idling <input type="checkbox"/> Constant speed <input type="checkbox"/> Other </div> <div> <input type="checkbox"/> Acceleration </div> <div> <input type="checkbox"/> Deceleration </div> </div>		





2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the RAV4 EV fulfills various functions. The first function is the Diagnostic Trouble Code Check in which a malfunction in the signal circuits to the ECU is stored in code in the ECU memory at the time of occurrence. The code can be output by the technician while troubleshooting. Another function is the Input Signal Check which checks if the signals from various switches are sent to the ECU correctly. By using these check functions, the problem areas can be reduced quickly and troubleshooting can be performed effectively. the diagnostic functions are incorporated in the following systems in the RAV4 EV.

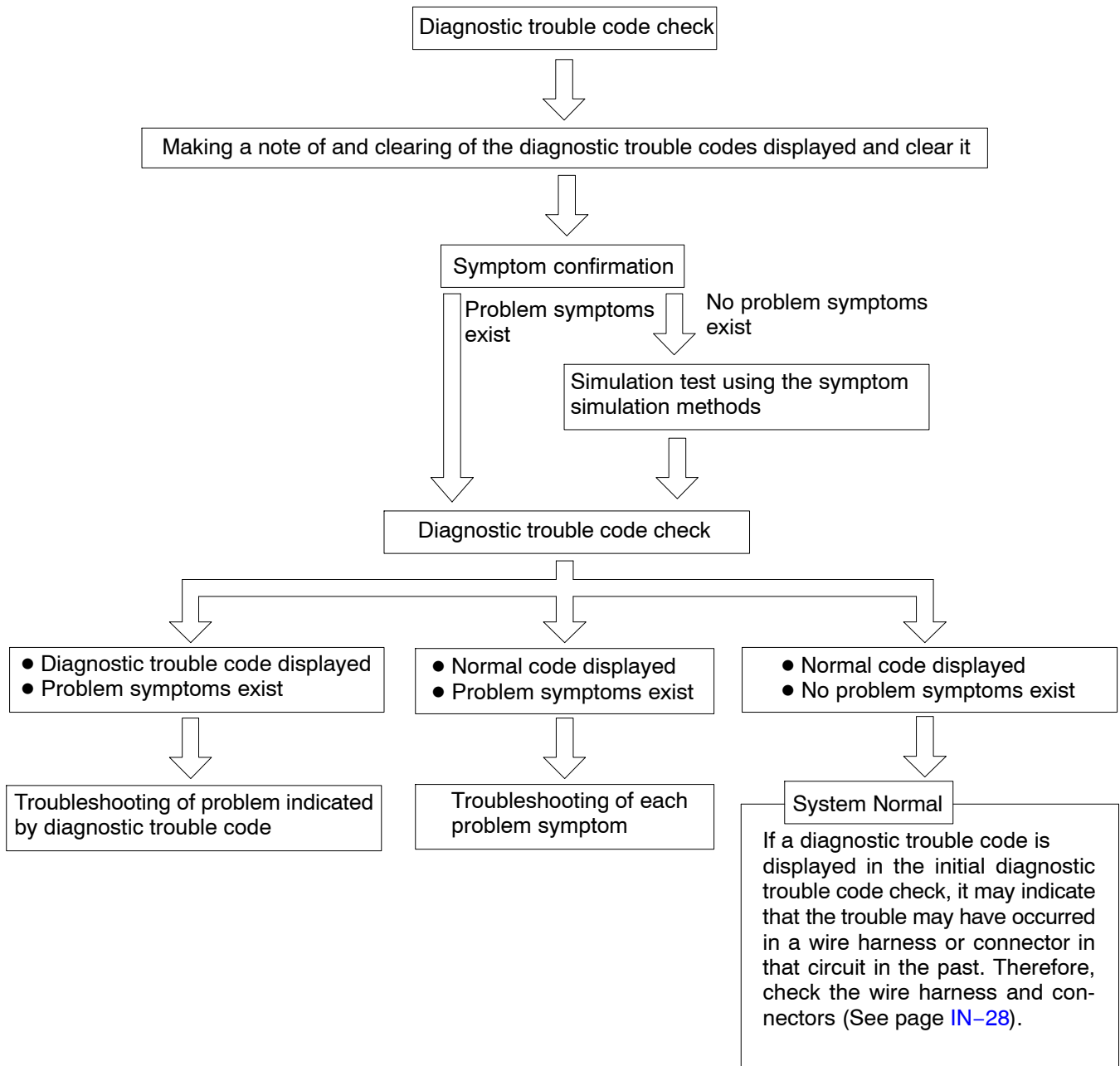
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
EV Control System	○	○	
Battery Control System	○	○	
Tire Pressure Warning System	○		
ABS & Hydraulic Brake Booster Power Supply System	○	○	
Regenerative Brake System	○		
Supplemental Restraint System	○		
Heated Windshield System	○		
Air Conditioning System	○		

In the diagnostic trouble code check, it is very important to determine whether the problem indicated by the diagnostic trouble code is still occurring or occurred in the past but returned to normal at present. In addition, it must be checked in the problem symptom check whether the malfunction indicated by the diagnostic trouble code is directly related to the problem symptom or not. For this reason, the diagnostic trouble codes should be checked before and after the symptom confirmation to determine the current conditions, as shown in the table below. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, thus making it more difficult to locate the problem, or in repairs not pertinent to the problem. Therefore, always follow the procedures in the correct order and perform the diagnostic trouble code check.

DIAGNOSTIC TROUBLE CODE CHECK PROCEDURE

Diagnostic Trouble Code Check (Make a note of and then clear)	Confirmation of Symptoms	Diagnostic Trouble Code Check	Problem Condition
Diagnostic Trouble Code Display 	Problem symptoms exist	Same diagnostic trouble code is displayed	The problem is still occurring in the diagnostic circuit
		Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit (The diagnostic trouble code displayed first is either for a past problem or it is a secondary problem)
	 No problem symptoms exist		The problem occurred in the diagnostic circuit in the past
Normal Code Display 	Problem symptoms exist	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit
	 No problem symptoms exist	Normal code is displayed	The problem occurred in a place other than in the diagnostic circuit in the past

Taking the points on the previous page into account, a flowchart showing how to proceed with troubleshooting using the diagnostic trouble code check which is shown below. This flowchart shows how to utilize the diagnostic trouble code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic trouble code troubleshooting or to troubleshooting of problem symptoms table.

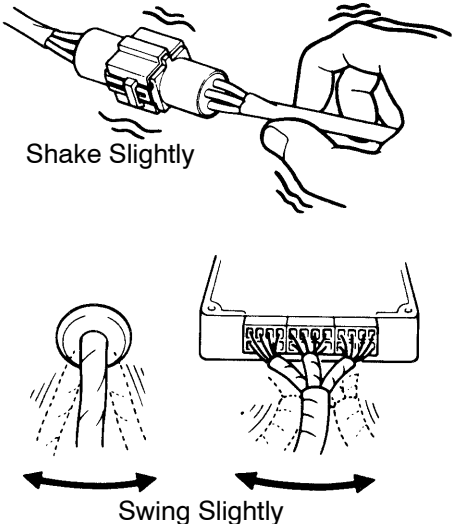
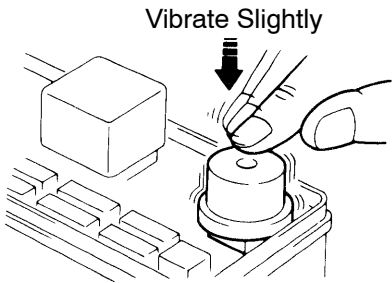


3. SYMPTOM SIMULATION

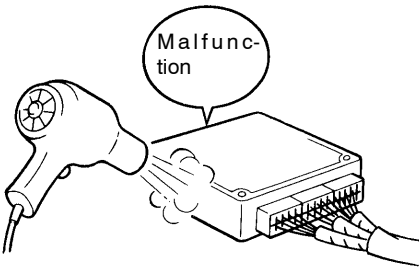

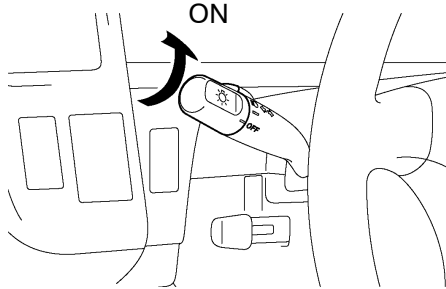
The most difficult case in troubleshooting is that there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out. Then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he or she may be, if he or she proceeds to troubleshoot without confirming the problem symptoms, he or she will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the vehicle is cold, or for a problem which occurs due to vibration caused by the road while driving, etc., the problem can never be determined so long as the symptoms are confirmed with the vehicle hot condition or the vehicle at a standstill. Since vibration, heat or water penetration (moisture) is a likely cause for problem which is difficult to be reproduced, the symptom simulation tests introduced here are effective measures in that the external causes are applied to the vehicle in a stopped condition.

Important Points in the Symptom Simulation Test:

In the symptom simulation test, the problem symptoms should, of course, be confirmed, but the problem area or parts must also be found out. To do this, locate the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the problem symptoms table for each system to locate the possible causes of the symptom.

1	VIBRATION METHOD: When vibration seems to be the major cause.	
<p>CONNECTORS Slightly shake the connector vertically and horizontally.</p> <p>WIRE HARNESS Slightly shake the wire harness vertically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.</p>	 <p>FI2331 FI2332</p>	
<p>PARTS AND SENSOR Apply slight vibration with a finger to the part of the sensor considered to be the problem cause, and check that the malfunction occurs.</p> <p>HINT: Applying strong vibration to relays may result in open relays.</p>	 <p>FI2330</p>	

V07268

2	HEAT METHOD: When the problem seems to occur when the suspect area is heated.
<p>Heat the component that is the likely cause of the malfunction with a hair dryer or similar object. Check to see if the malfunction occurs.</p> <p>NOTICE:</p> <p>(1) Do not heat to more than 60 °C (140 °F) (Temperature is limited not to damage the components).</p> <p>(2) Do not apply heat directly to the parts in the ECU.</p>	 <p>F12334</p>
3	WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.
<p>Sprinkle water onto the vehicle and check to see if the malfunction occurs.</p> <p>NOTICE:</p> <p>(1) Never sprinkle water directly into the motor compartment, but indirectly change the temperature and humidity by applying water spray onto the radiator front surface.</p> <p>(2) Never apply water directly onto the electronic components.</p> <p>HINT: If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.</p>	 <p>F16649</p>
4	OTHER: When a malfunction seems to occur when electrical load is excessive.
<p>Turn on all the electrical loads including the heater blower, headlights, rear window defogger, etc. and check to see if the malfunction occurs.</p>	 <p>B02389</p>

B02390

4. DIAGNOSTIC TROUBLE CODE CHART

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code check. Proceed with troubleshooting in accordance with the inspection procedures given in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The Supplemental Restraint System diagnostic trouble code chart for the supplemental system is shown below as an example.

- DTC No.

Indicates the diagnostic trouble code.

- Page or Instructions

Indicates the page where the inspection procedures for each circuit is to be found, or gives instructions for checking and repairs.

- Trouble Area

Indicates the suspect areas of the problem.

- Detection Item

Indicates the system of the problem or contents of the problem.

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

DTC No. (See page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI-379)	● Short in D squib circuit	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0101/14 (DI-384)	● Open in D squib circuit	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0102/11 (DI-388)	● Short in D squib circuit (to ground)	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0103/12 (DI-392)	● Short in D squib circuit (to B+)	<ul style="list-style-type: none"> ● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness 	ON
B0105/53 (DI-396)	● Short in P squib circuit	<ul style="list-style-type: none"> ● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness 	ON
B0106/54	● Open in P squib circuit	<ul style="list-style-type: none"> ● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness 	
	● Short in P squib circuit (to Ground)	<ul style="list-style-type: none"> ● Front passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness 	

5. PROBLEM SYMPTOMS TABLE

The suspected circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a "Normal" code is displayed in the diagnostic trouble code chart but the problem is still occurring. the numbers in the table indicate the inspection order in which the circuits or parts should be checked.

HINT:

When the problem is not detected by the diagnostic system even though the problem symptom is present, it is considered that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a system other than the diagnostic system.

● Page
Indicates the page where the flow chart for each circuit is located.

● Circuit Inspection, Inspection Order
Indicates the circuit which needs to be checked for each problem symptom. Check in the order indicated by the numbers.

● Problem Symptom

● Circuit or Part Name
Indicates the circuit or part which needs to be checked.

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See Page
<ol style="list-style-type: none"> 1 With the motor switch in the ACC or ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed. 2 SRS warning light is always lit up even when motor switch is in the LOCK position 	1 SRS warning light circuit (Always lights up when motor switch is in LOCK position.)	DI-460
<ol style="list-style-type: none"> 1 With the motor switch in the ACC or ON position, the SRS warning light does not light up. 	1 SRS warning light circuit (Does not light up when motor switch is turned to ACC or ON.)	DI-462
<ol style="list-style-type: none"> 1 DTC is not displayed. 2 SRS warning light is always lit up in a DTC check procedure. 3 DTC is displayed without Tc and E1 terminal connection. 	1 Tc terminal circuit	DI-466

6. CIRCUIT INSPECTION

How to read and use each page is shown below.

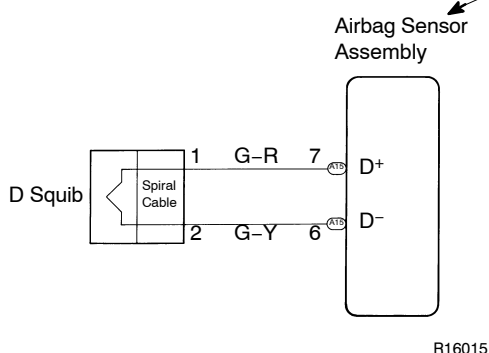
• Diagnostic Trouble Code No. and Detection Item

• Circuit Description
The major role, and operation, etc. of the circuit and its component parts are explained.

DTC	B0100/13	Short in D Squib Circuit
CIRCUIT DESCRIPTION The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad. It causes the airbag to deploy when the airbag deployment conditions are satisfied. For details of the function of each components, see OPERATION on page RS-3. DTC B0100/13 is recorded when a short is detected in the D squib circuit.		
DTC No.	DTC Detection Condition	Trouble Area
B0100/13	• Short circuit between D+ wire harness and D- wire harness of squib • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

• Indicates the diagnostic trouble codes, diagnostic trouble code set parameters and suspect areas of the problem.

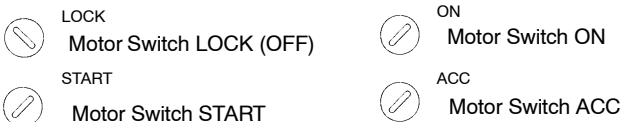
WIRING DIAGRAM



- Wiring Diagram
This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.
Wire colors are indicated by an alphabetical code.
B = Black, L = Blue, R = Red, BR = Brown, LG = Light Green, V = Violet, G = Green, O = Orange, W = White, GR = Gray, P = Pink, Y = Yellow, SB = Sky Blue
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

B02407

- Indicates the position of the motor switch during the check.

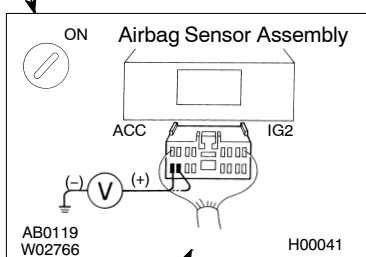


- Inspection Procedure

Use the inspection procedure to determine if the circuit is normal or abnormal. If it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

INSPECTION PROCEDURE

2 Check voltage at IG2 and ACC of airbag sensor assembly.



PREPARATION:

Turn the motor switch ON.

CHECK:

Measure voltage between terminals IG2 and ACC of airbag sensor assembly and the body ground.

OK:

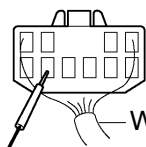
Voltage: Below 16V

NG

Check battery and charging system.
(See charging system section)

OK

- Indicates the place to check the voltage or resistance.
- Indicates the connector position to be checked, from the front or backside.

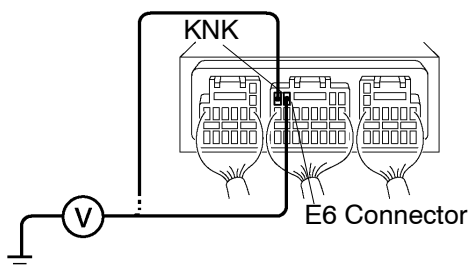


Check from the connector backside.
(with harness)

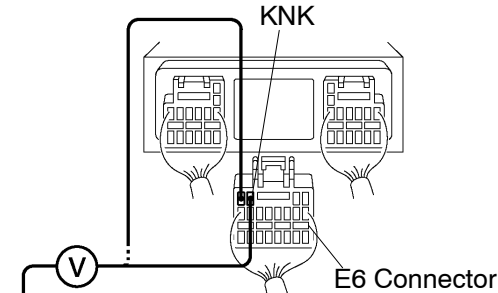


Check from the connector front side. (without harness)
In this case, care must be taken not to bend the terminals.

- Indicates the condition of the connector of ECU during the check.



Connector being checked is connected.



Connector being checked is disconnected.

B00691

B00972