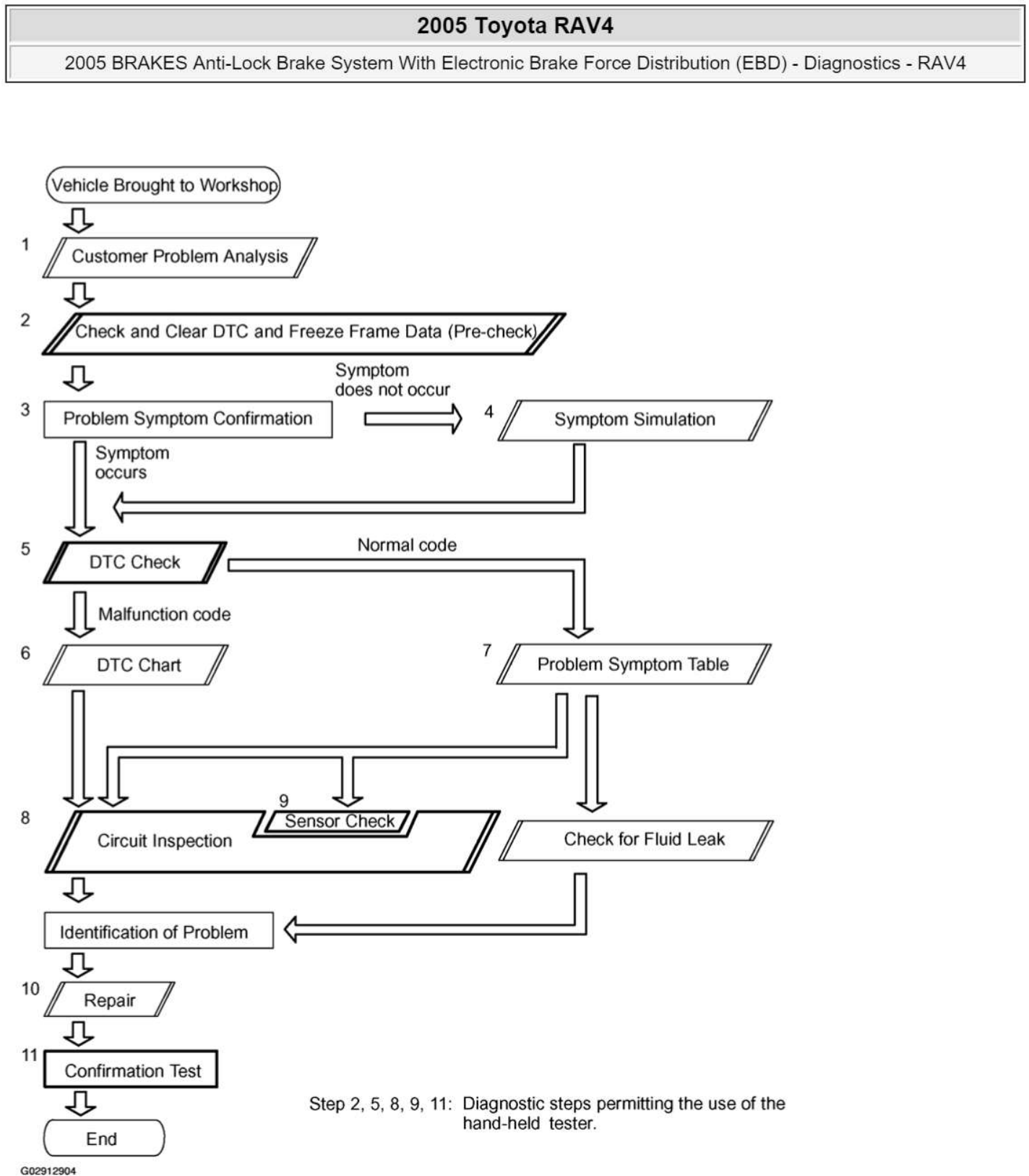


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2005 BRAKES Anti-Lock Brake System With Electronic Brake Force Distribution (EBD) - Diagnostics - RAV4

2005 BRAKES**Anti-Lock Brake System With Electronic Brake Force Distribution (EBD) - Diagnostics - RAV4****HOW TO PROCEED WITH TROUBLESHOOTING**

Troubleshoot in accordance with the following procedures.

**Fig. 1: Troubleshooting Chart**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Fail-safe function:

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When a failure occurs in the ABS system, the ABS warning light lights up and the ABS operation is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light lights up and the EBD operation is prohibited as well.

CUSTOMER PROBLEM ANALYSIS CHECK

ABS SYSTEM WITH EBD Check Sheet

Inspector's
Name : _____

Customer's Name		VIN	
		Production Date	/ /
		License Plate No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

DTC Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

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Fig. 2: Customer Problem Analysis Chart

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

PRE-CHECK

1. DIAGNOSIS SYSTEM

- a. Release the parking brake lever.

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- b. Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light and BRAKE warning light illuminate for approximately 3 seconds.

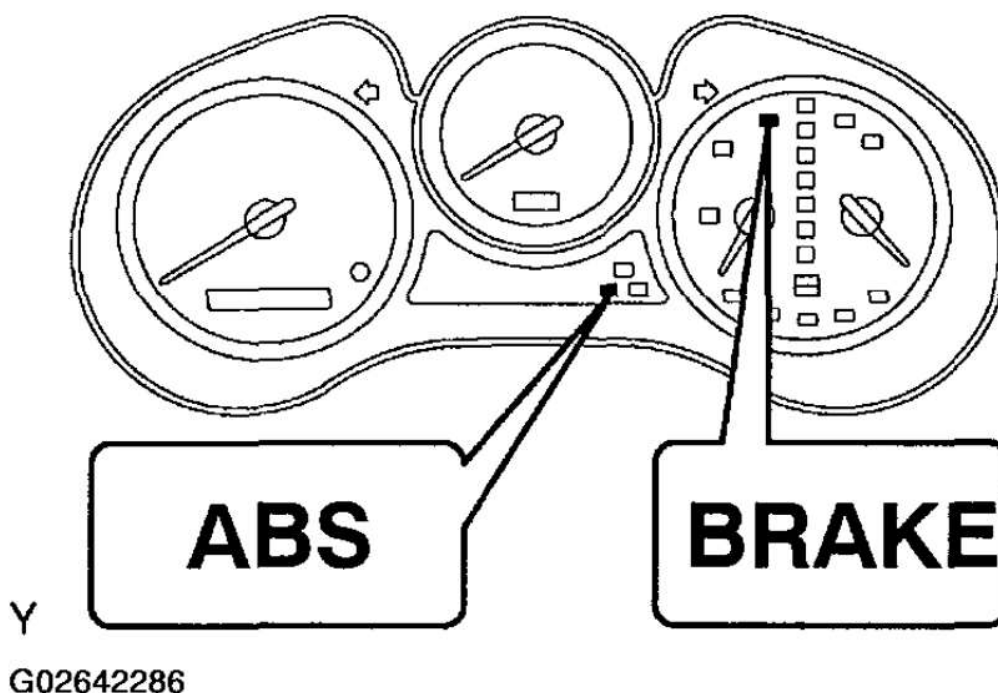


Fig. 3: Locating ABS Warning Light & Brake Warning Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light lights up.
- If the indicator check result is not normal, proceed to the troubleshooting for the ABS warning light circuit or BRAKE warning light circuit (see **ABS WARNING LIGHT CIRCUIT** or **BRAKE WARNING LIGHT CIRCUIT**).
- Check the ABS1 fuse, ABS2 fuse and ABS actuator assembly.

- c. When not using hand-held tester:

Check the DTC.

1. Using SST, connect terminals TC and CG of the DLC3.

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2. Turn the ignition switch ON.
3. Read the DTC from the ABS warning light on the combination meter.

HINT:

- If no code appears, inspect the diagnostic circuit or ABS warning light circuit (see **TC TERMINAL CIRCUIT** or **ABS WARNING LIGHT CIRCUIT**).

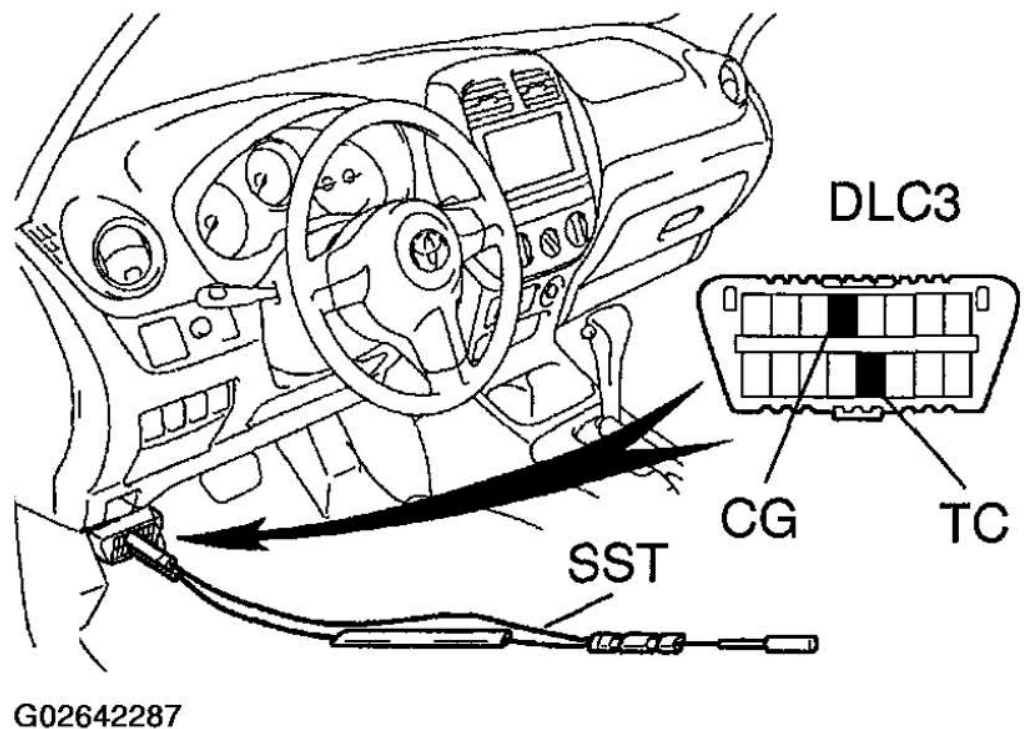


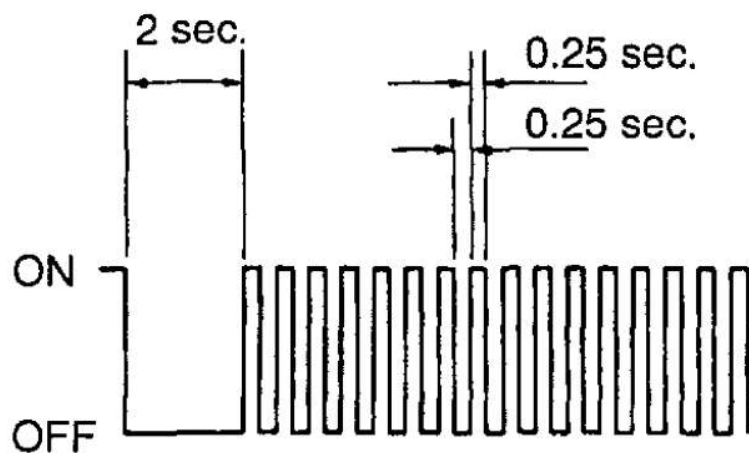
Fig. 4: Connecting Terminals TC & CG Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- As an example, the blinking patterns of normal code and codes 11 and 21 are shown on the left.

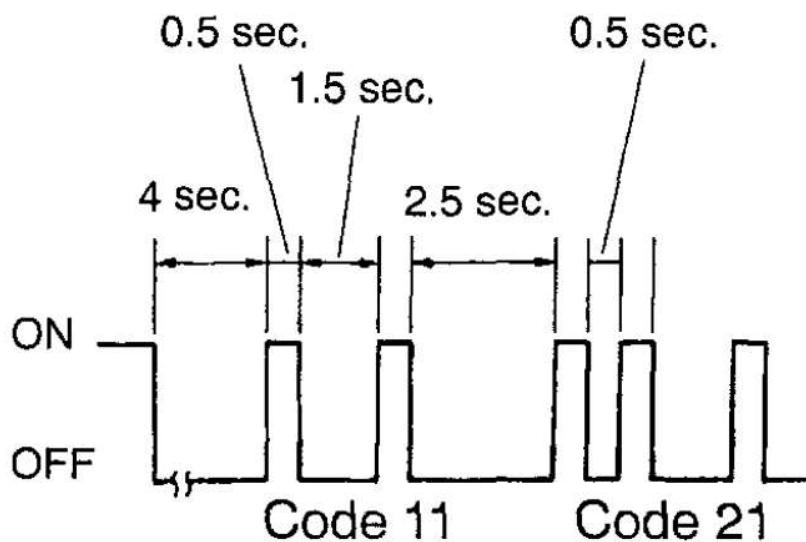
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Normal Code



Codes 11 and 21



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Fig. 5: Blinking Patterns Of Normal Code
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. Codes are detailed in the code table on DIAGNOSTIC TROUBLE CODE CHART.

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5. After completing the check, disconnect terminals TC and CG from the DLC3, and turn the display off.

If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC will be displayed first.

- d. When using the hand-held tester:

Check the DTC.

1. Connect the hand-held tester to the DLC3.

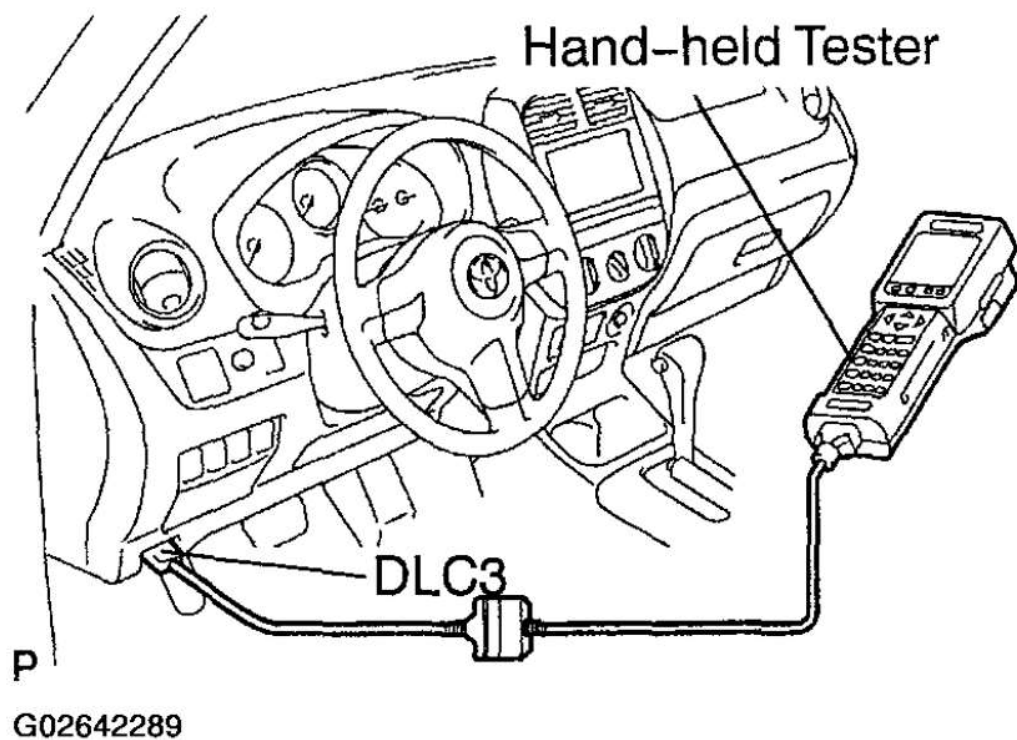


Fig. 6: Connecting Hand-Held Tester To DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the ignition switch ON.
3. Read the DTC by following the prompts on the tester screen.

Please refer to the hand-held tester operator's manual for further details.

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e. When not using the hand-held tester:

Clear the DTC.

1. Using SST, connect terminals TC and CG of the DLC3.

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2. Turn the ignition switch ON.

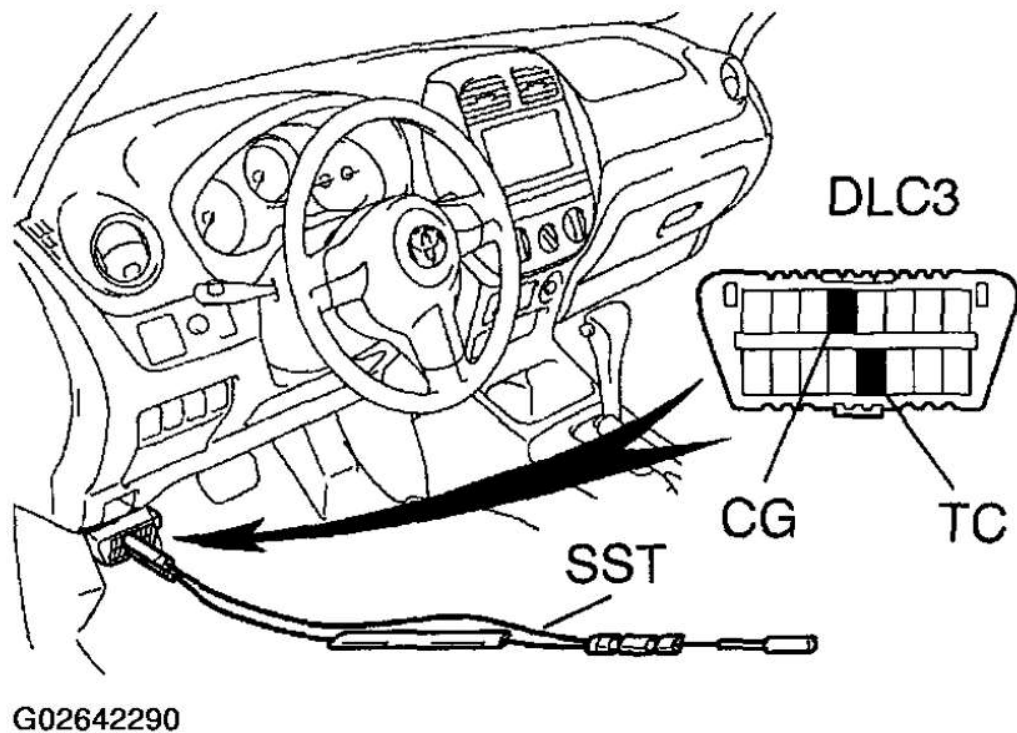
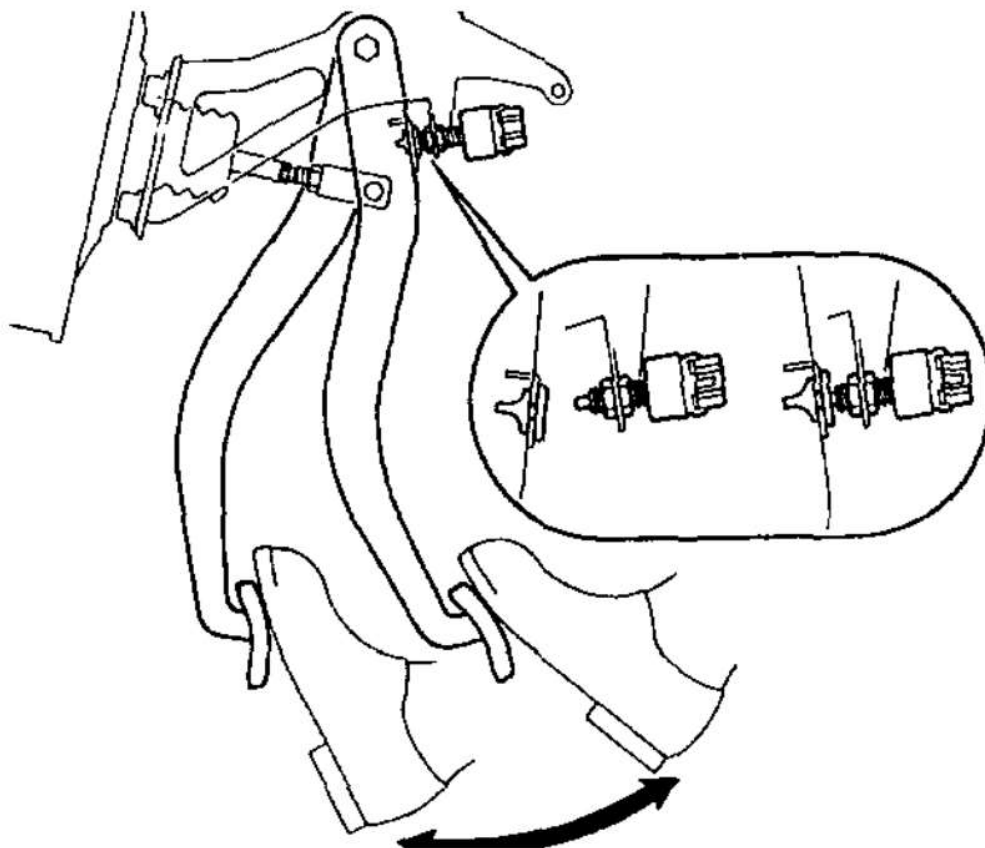


Fig. 7: Connecting Terminals TC & CG Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Clear the DTC stored in the ECU by depressing the brake pedal 8 or more times within 5 seconds.
4. Check that the warning light shows the normal code.

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**G02642291****Fig. 8: Checking Brake Light Switch Operation**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. Remove the SST from the terminals of the DLC3.

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- f. When using the hand-held tester:

Clear the DTC.

1. Connect the hand-held tester to the DLC3.
2. Turn the ignition switch ON.

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3. Operate the hand-held tester to erase the codes (see hand-held tester operator's manual).

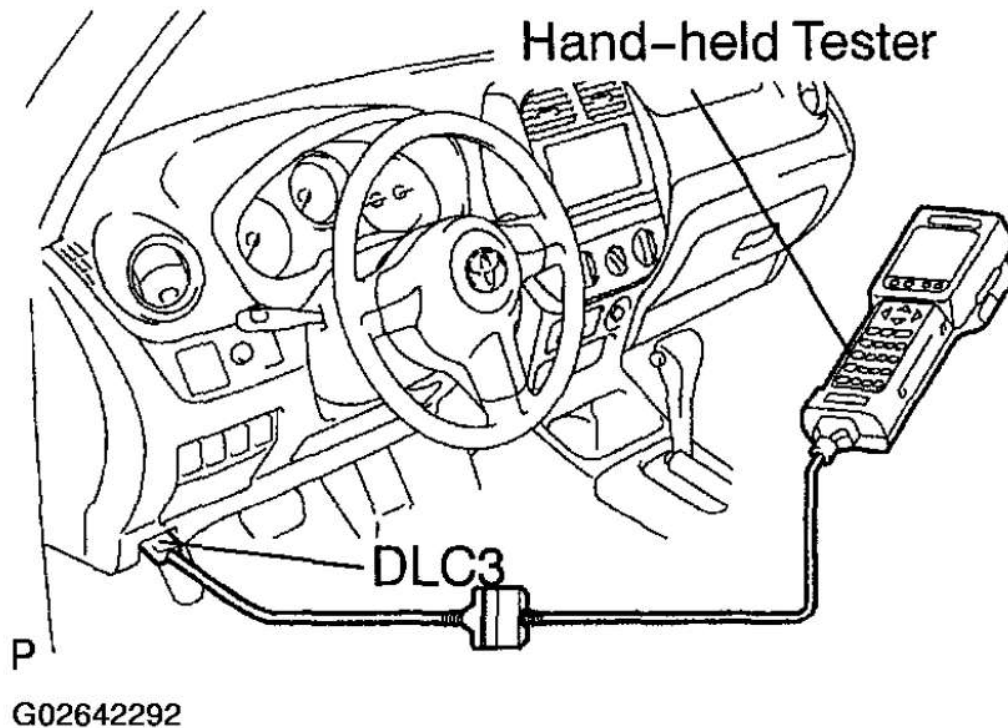


Fig. 9: Connecting Hand-Held Tester To DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. FREEZE FRAME DATA

HINT:

- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
- The skid control ECU stores the number of times (maximum 31) the ignition switch has been turned OFF to ON since the last time ABS was activated. However, if the vehicle is not moved or driven at low speed (7 km/h (4.3 mph) or less), or if a DTC is detected, the skid control ECU will not count the number since then.
- Freeze frame data at the time the ABS operates:

The skid control ECU stores and updates data whenever the ABS system operates.

When the ECU stores data at the time a DTC is detected, the data stored when the ABS operated is

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erased.

- Freeze frame data at the time a DTC is detected:

When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch to the ON position.
- From the display on the tester, select the "FREEZE FRAME DATA".

FREEZE FRAME DATA REFERENCE

Hand-held Tester Display	Measurement Item	Reference Value ⁽¹⁾
G (BACK & FORTH)	Back and forth G (only for 4WD)	-1.5-1.5
VEHICLE SPD	Vehicle speed	Speed indication of a meter
SPD GRADE	Vehicle speed grade (only for 2WD)	-1.5-1.5
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON, OFF: OFF
#IG ON	Numbers of operations of ignition switch ON after memorizing freeze frame data	0-31

(1) If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

3. SPEED SENSOR SIGNAL

- When not using hand-held tester:

Check the speed sensor signal.

- Turn the ignition switch OFF.
- Using SST, connect terminals TS and CG of the DLC3.

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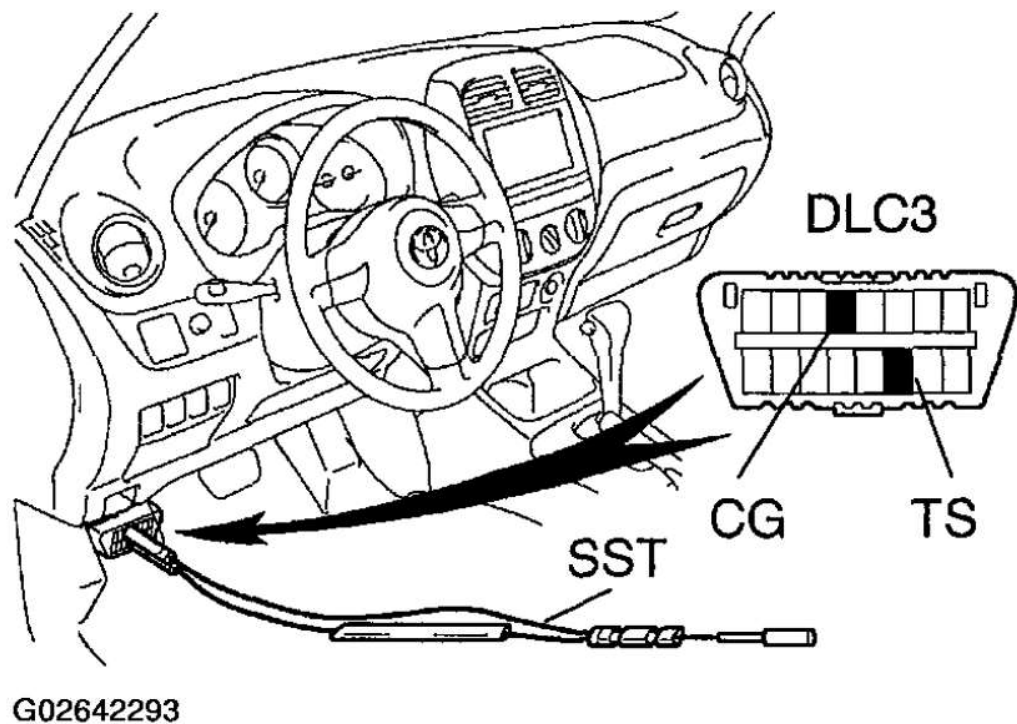


Fig. 10: Connecting Terminals TC & CG Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Start the engine.
4. Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit (see **ABS WARNING LIGHT CIRCUIT**).

5. Drive the vehicle straight forward.

HINT:

Drive the vehicle at more than 45 km/h (28 mph) for several seconds.

6. Stop the vehicle.
7. Remove the SST from the terminals of the DLC3.

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8. Read the number of blinks of the ABS warning light.

HINT:

- Refer to DTC list, see **Fig. 13**.
- If each sensor is normal, the normal code is output (a cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed first.

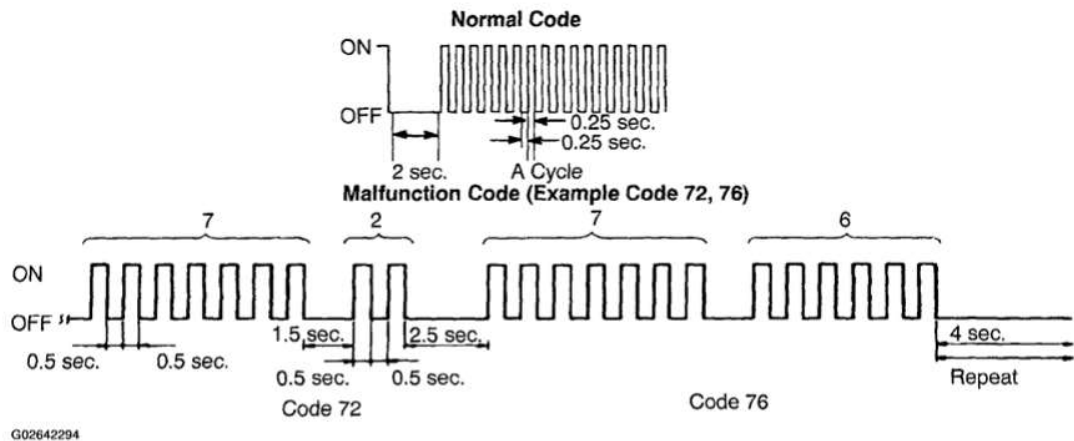


Fig. 11: Blinking Patterns Of Normal Code

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

9. After doing the check, disconnect the SST from terminals TS, TC and CG of the DLC3, and turn the ignition switch OFF.

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- b. When using hand-held tester:

Check the speed sensor signal.

1. Connect the hand-held tester to the DLC3.

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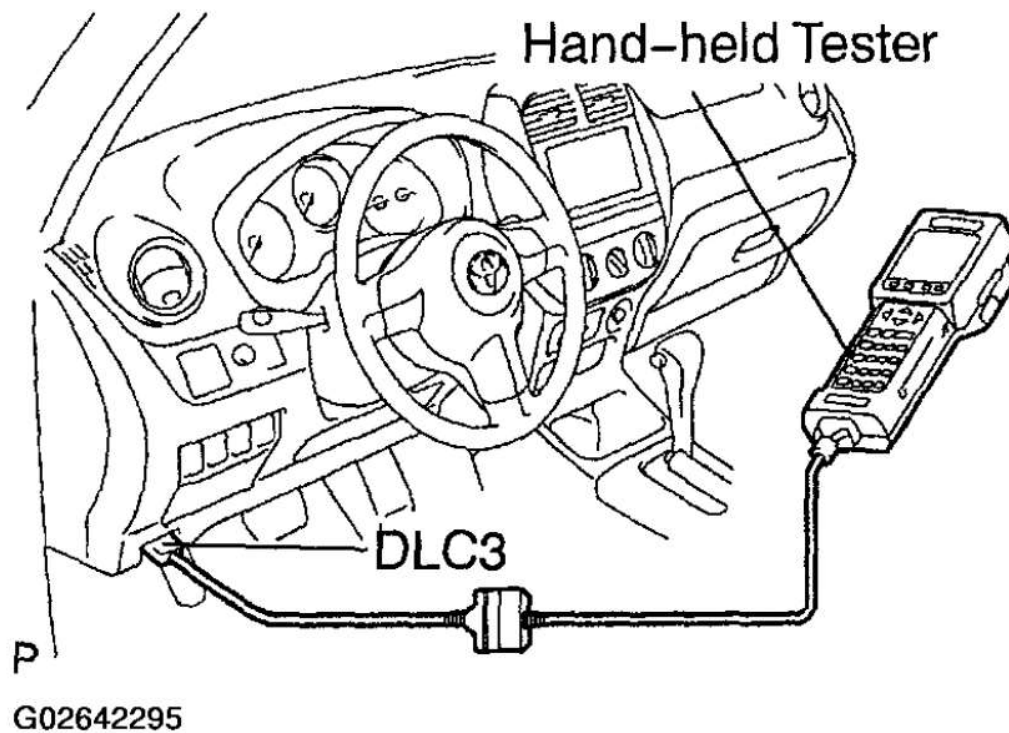


Fig. 12: Connecting Hand-Held Tester To DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Follow previous steps (3) to (6).
3. Read the DTC by following the prompts on the tester screen.

Refer to the hand-held tester operator's manual for further details.

DTC Of Speed Sensor Check Function:

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Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Right front speed sensor rotor
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Left front speed sensor rotor
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Right rear speed sensor rotor
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Left rear speed sensor rotor
C1275/75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276/76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277/77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278/78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor
C1279/79	Deceleration sensor is faulty (only for 4WD)	Deceleration sensor is faulty Sensor installation

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Fig. 13: Speed Sensor DTC Table

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. 4WD:

DECELERATION SENSOR CHECK

- Connect 3 dry batteries of 1.5 V in series.
- Connect terminal VGS to the batteries' positive (+) terminal, and terminal GGND to the batteries' negative (-) terminal. Apply about 4.5 V to terminals VGS and GGND.

NOTE: Do not apply voltage of 6 V or more to terminals VGS and GGND.

- Check the output voltage of terminal GL1.

VOLTAGE SPECIFICATION

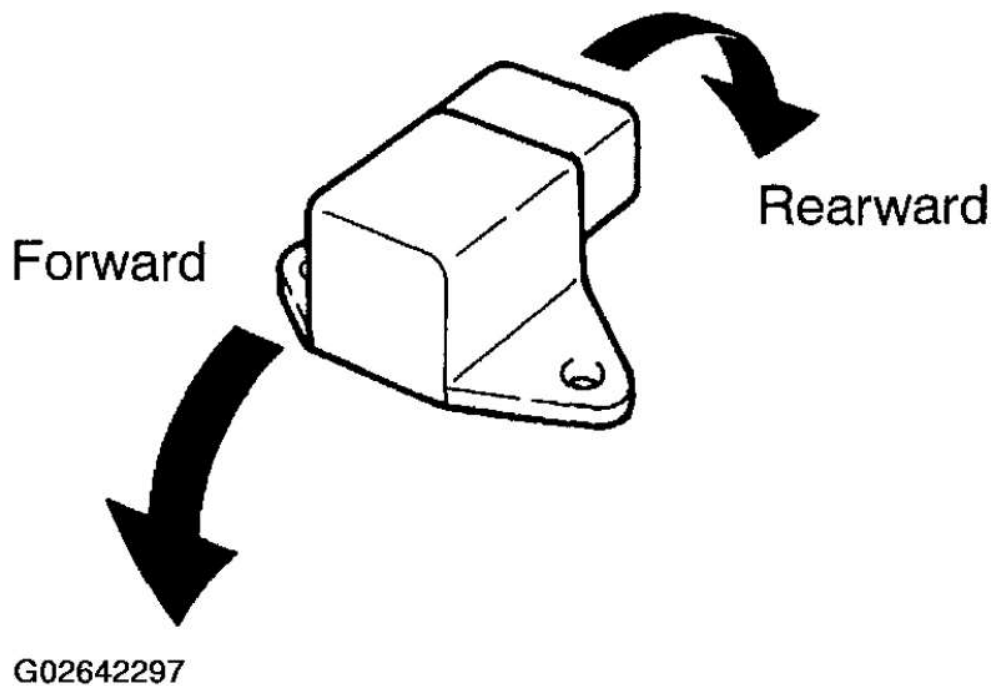
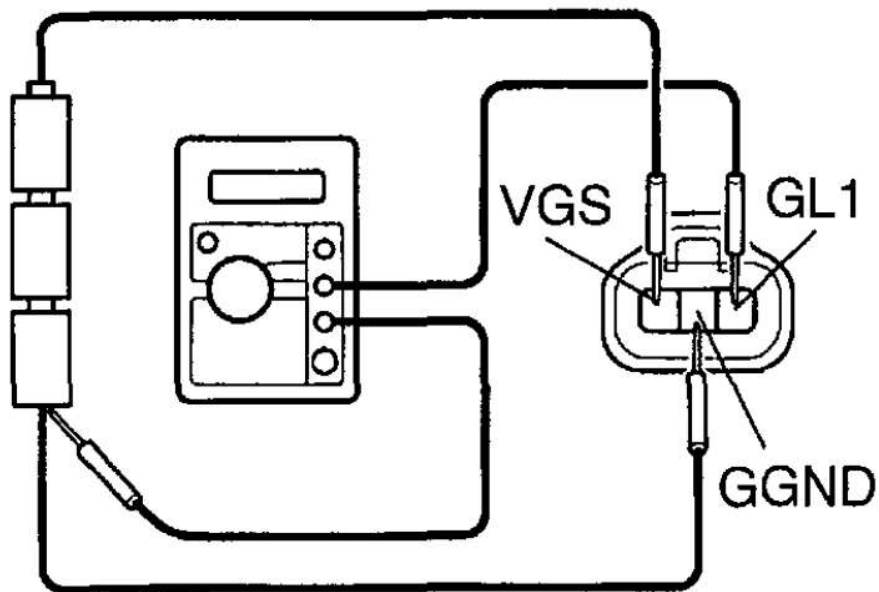
Condition	Standard Value
Horizontal	About 2.3 V
Lean forward	0.4 to about 2.3 V
Lean rearward	About 2.3 to 4.1 V

HINT:

- If the sensor is tilted a lot, it may show the wrong value.

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- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.



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Fig. 14: Inspecting Deceleration Sensor

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DIAGNOSTIC TROUBLE CODE CHART**HINT:**

- Using SST 09843-18040, connect the terminals TC and CG of the DLC3.
- If any abnormalities are not found when inspecting the parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed in the code. For details of each code, refer to the "See Page" under the respective "DTC No." in the following DTC chart.

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DTC No.	Detection Item	Trouble Area
C0278/11	Open circuit in ABS solenoid relay circuit	• Fusible link block • ABS2 fuse
C0279/12	Short circuit in ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit
C0273/13	Open circuit in ABS motor relay circuit	• Fusible link block • ABS1 fuse
C0274/14	Short circuit in ABS motor relay circuit	• ABS motor relay • ABS motor relay circuit
C0226/21	Open or short circuit in 2-position solenoid circuit for right front wheel	• ABS actuator • SFRF or SFRH circuit
C0236/22	Open or short circuit in 2-position solenoid circuit for left front wheel	• ABS actuator • SFLR or SFLH circuit
C0246/23	Open or short circuit in 2-position solenoid circuit for right rear wheel	• ABS actuator • SRRR or SRRH circuit
C0256/24	Open or short circuit in 2-position solenoid circuit for left rear wheel	• ABS actuator • SRLR or SRLH circuit
C0200/31	Right front wheel speed sensor signal malfunction	• Each speed sensor harness and connector • Right front, left front
C0205/32	Left front wheel speed sensor signal malfunction	• Speed sensor rotor • Each speed sensor circuit
C0210/33	Right rear wheel speed sensor signal malfunction	• Each speed sensor harness and connector • Rear axle hub
C0215/34	Left rear wheel speed sensor signal malfunction	• Right rear, left rear speed sensor • Speed sensor rotor • Each speed sensor circuit
C1235/35	Foreign matter is attached on the tip of the right front sensor	• Each speed sensor harness and connector • Right front or left front speed sensor
C1236/36	Foreign matter is attached on the tip of the left front sensor	• Speed sensor rotor • Each speed sensor circuit
C1238/38	Foreign matter is attached on the tip of the right rear sensor	• Each speed sensor harness and connector • Right rear or left rear speed sensor
C1239/39	Foreign matter is attached on the tip of the left rear sensor	• Speed sensor rotor • Each speed sensor circuit
C1241/41	Power source voltage down	• Power source harness and connector • Battery • Charging system • Power source circuit
C1243/43	Malfunction in deceleration sensor (constant output) (only for 4WD)	• Deceleration sensor • Wire harness for deceleration sensor system
C1244/44	Open or short circuit in deceleration sensor circuit (only for 4WD)	• Deceleration sensor harness and connector • Deceleration sensor • Deceleration sensor circuit
C1245/45	Malfunction in deceleration sensor (only for 4WD)	• Deceleration sensor • Wire harness for deceleration sensor system
C1249/49	Open circuit in stop light switch circuit	• Stop light switch harness and connector • Stop light bulb • Stop light switch circuit • Stop light switch
C1251/51	Pump motor is locked	ABS pump motor
C1337/37	Some tire is different in size from the other tires (only for 2WD)	Tire size
Always ON	Malfunction in ECU or power source voltage up	• Battery • Charging system • ABS ECU

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Fig. 15: Diagnostic Trouble Code Chart
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

There is a case where the hand-held tester cannot be used when the ABS warning light is always ON.

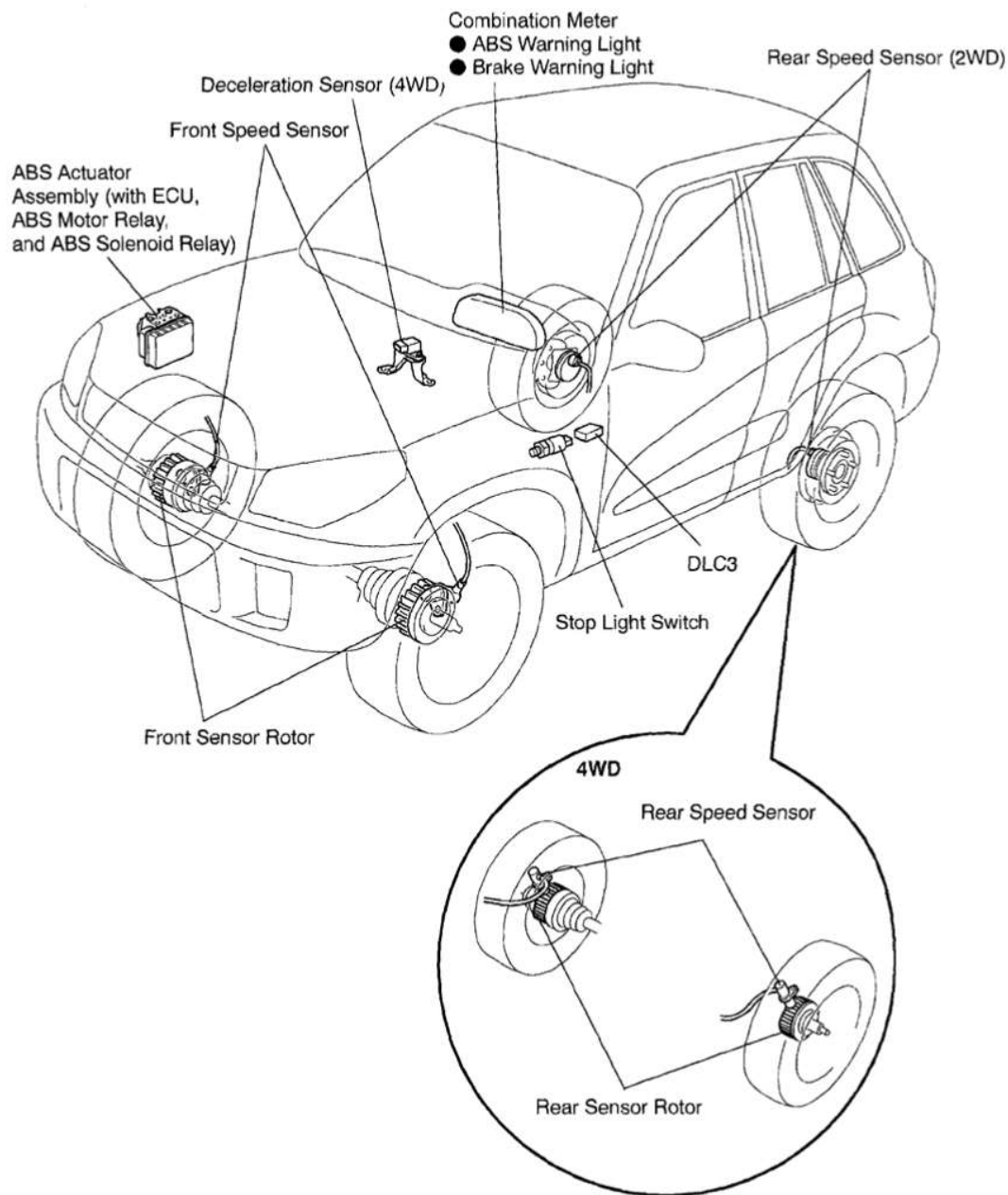
DIAGNOSTIC TROUBLE CODES (DTC) LIST

DTC	Description
<u>DTC C0200/31, C0200/32, C0200/33, C0200/34, C0200/35, C0200/36, C0200/38, C1239/39</u>	Speed Sensor Circuit
<u>DTC C0226/21, C0226/22, C0226/23, C0256/24</u>	ABS Solenoid Valve Circuit
<u>DTC C0273/13, C0274/14</u>	ABS Motor Relay Circuit
<u>DTC C0278/11, C0279/12</u>	ABS Solenoid Relay Circuit
<u>DTC C1241/41</u>	IG Power Source Circuit
<u>DTC C1243/43, C1245/45</u>	Malfunction in Deceleration Sensor (Only for 4WD)
<u>DTC C1244/44</u>	Deceleration Sensor Circuit (Only for 4WD)
<u>DTC C1249/49</u>	Stop Light Switch Circuit
<u>DTC C1251/51</u>	ABS Pump Motor Lock
<u>DTC C1337/37</u>	Tires of Different Size (Only for 2WD)

PARTS LOCATION

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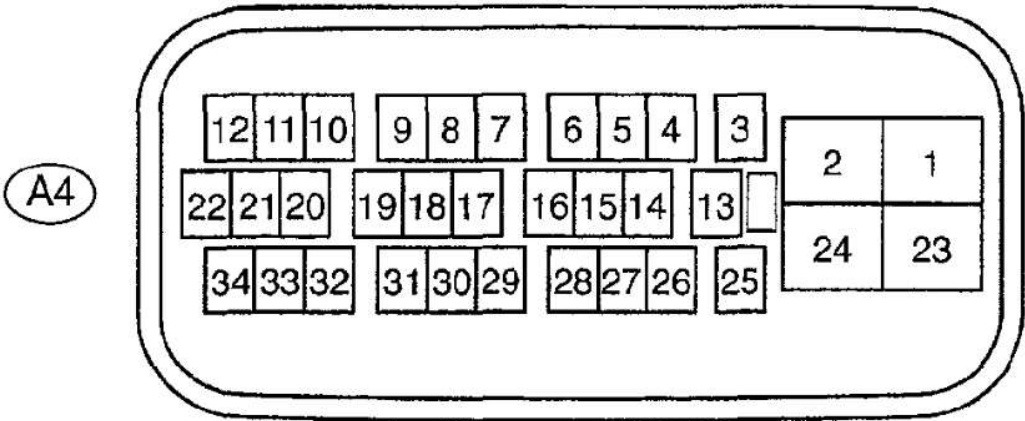
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Fig. 16: Locating Anti-Lock Brake System Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TERMINALS OF ECU

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Fig. 17: Identifying ECM connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ECM CONNECTOR TERMINALS VOLTAGE SPECIFICATION

Symbols (Terminal No.)	Wiring Color	Condition		Specified Condition
+BS (A4-1) - GND (A4-2, 24)	R-Y - W-B	Always		11 to 14 V
GL1 (A4-4) - GGND (A4-7) ⁽¹⁾	W-B	Ignition switch ON	Vehicle is placed in flat area	2.0 to 3.0 V
FL+ (A4-9) - FL- (A4-8)	R-G	Ignition switch ON	Slowly turn left front wheel	AC generation
STP (A4-10) - GND (A4-2,24)	G-W - W-B	Stop light switch ON		10 to 14 V
		Stop light switch OFF		Below 1.0 V
RL+(A4-11)-RL-(A4-12)	G-R	Ignition switch ON	Slowly turn left rear wheel	AC generation
WA (A4-13) - GND (A4-2, 24)	R-Y - W-B	Ignition switch ON	ABS warning light ON	10 to 14V
		Ignition switch ON	ABS warning light OFF	Below 2.0 V
D/G(A4-14)-GND (A4-2, 24)	W-W-B	Ignition switch ON		10 to 14V
TS (A4 - 15) - GND (A4-2, 24)	P-L-W-B	Ignition switch ON		10 to 14V
TC (A4-16) - GND (A4-2, 24)	P-B-W-B	Ignition switch ON		10 to 14 V
		Ignition switch		

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PKB (A4-18) - GND (A4-2, 24)	R-B-W-B	ON	Parking switch ON	Below 1.0 V
		Ignition switch ON	Parking switch OFF	10 to 14V
+BM (A4-23) - GND (A4-2,24)	W-R - W-B	Always		11 to 14 V
IG1 (A4-25) - GND (A4-2, 24)	R-L-W-B	Ignition switch ON		10 to 14 V
VGS (A4-28) - GGND (A4-7)*	R-B	Ignition switch ON		4.5 to 5.5 V
FR+ (A4-31) - FR- (A4-30)	B-W	Ignition switch ON	Slowly turn right front wheel	AC generation
RR+ (A4-33) - RR- (A4-34)	Y-BR	Ignition switch ON	Slowly turn right rear wheel	AC generation
BRL (A4-32) - GND (A4-2,24)	R-W-B	Ignition switch ON	Brake warning light ON	10 to 14V
		Ignition switch ON	Brake warning light OFF	Below 2.0 V
(1) Only for 4WD.				

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check although the problem still occurs, check the circuits for each problem symptom in the order given in **Fig. 18** and proceed to the relevant troubleshooting information.

NOTE: When replacing ABS ECU, sensor or etc., turn the ignition switch OFF.

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Symptom	Suspected Area
ABS does not operate	Only when 1 to 4 are all normal but problem still occurs, replace ABS ECU 1. Check DTC reconfirming that normal code is output 2. IG power source circuit 3. Speed sensor circuit 4. Check ABS actuator with hand-held tester If abnormal, check hydraulic circuit for leak
ABS does not operate efficiently	Only when 1 to 4 are all normal but problem still occurs, replace ABS ECU 1. Check DTC reconfirming that normal code is output 2. Speed sensor circuit 3. Stop light switch circuit 4. Check ABS actuator with hand-held tester If abnormal, check hydraulic circuit for leak
ABS warning light is abnormal	1. ABS warning light circuit 2. ABS ECU
Brake warning light is abnormal	1. Brake warning light circuit 2. ABS ECU
DTC check	Only when 1 and 2 are all normal and problem still occurs, replace ABS ECU 1. ABS warning light circuit 2. Tc terminal circuit
Speed sensor signal check is impossible	1. Ts terminal circuit 2. ABS ECU

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Fig. 18: Problem Symptoms Table

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CIRCUIT INSPECTION

DTC C0200/31, C0200/32, C0200/33, C0200/34, C0200/35, C0200/36, C0200/38, C1239/39: SPEED SENSOR CIRCUIT

CIRCUIT DESCRIPTION

The speed sensor detects the wheel speed and sends appropriate signals to the ECU. These signals are used to control the ABS system. Each of the front and rear rotors has 48 serrations.

When the rotors rotate, magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

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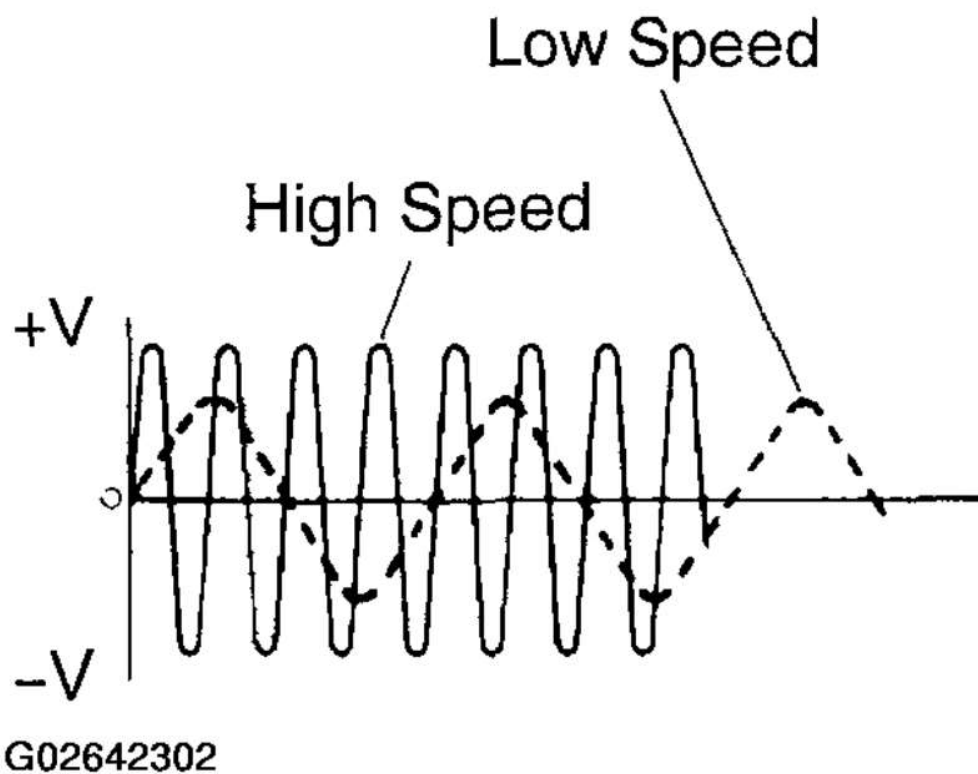
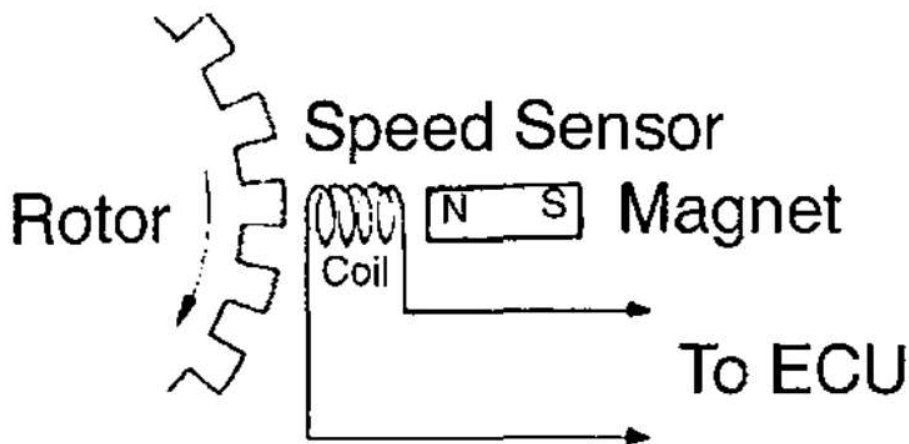


Fig. 19: Circuit Description - Speed Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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DTC No.	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	Condition (a), (b), (c) or (d) is detected: (a) Conditions (1), (2) and (3) continue for * sec. or more and condition (4) occurs 7 times or more in the mean-time of switching ignition switch ON and OFF: (1) ABS non-operation (2) Wheel speed is 10 km/h (6 mph) or more (3) One eighth of wheel speed is more than minimum wheel speed (4) Momentary interruption of speed sensor (b) Conditions (1), (2), (3) and one of conditions (4), (5) and (6) continue for * sec. or more: (1) ABS non-operation (2) Maximum wheel speed is 10 km/h (6 mph) or more (3) Wheel speed is 0 km/h (0 mph) (4) ECU internal open circuit (5) Maximum rear wheel speed is not 0 km/h (0 mph) (6) Any of maximum rear wheel speed sensor is momentarily interrupted, or both of rear wheel is locked for a long time (c) Open circuit of ECU internal to wheel speed sensor is ON for 0.5 sec. (d) Conditions (1) and (2) continue for 10 sec. or more, and condition (3) continues for 20 sec. or more and 8 time or more: (1) ABS non-operation (2) Maximum wheel speed is more than maximum front wheel speed for 20 km/h (12 mph) or more (3) Front maximum wheel speed is 20 km/h (12 mph) or more, ABS is non-operation and one eighth of maximum wheel speed is more than maximum rear wheel speed for 20 sec. or more	• Each speed sensor harness and connector • Right front, left front, right rear or left rear speed sensor • Speed sensor rotor • Each speed sensor circuit
C0210/33 C0215/34		• Each speed sensor harness and connector • Rear axle hub • Right rear, left rear speed sensor • Speed sensor rotor • Each speed sensor circuit
C1235/35 C1236/36	Vehicle speed is at 20 km/h (12 mph) or more and speed sensor signal pick up noise continues for 75 times or more for 5 sec.	• Each speed sensor harness and connector • Right front or left front speed sensor • Speed sensor rotor • Each speed sensor circuit
C1238/38 C1239/39		• Each speed sensor harness and connector • Right rear or left rear speed sensor • Speed sensor rotor • Each speed sensor circuit

*: For 2WD vehicle, 15 sec. or more. For 4WD vehicle, 30 sec. or more

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Fig. 20: DTC Detection Condition Table
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

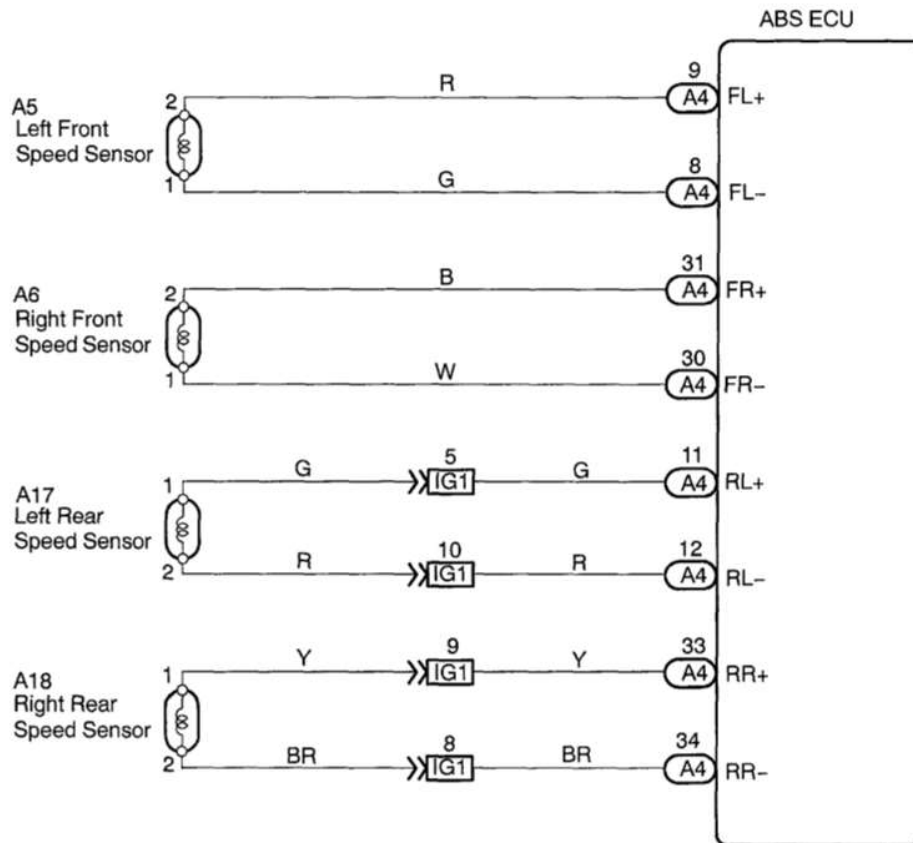
HINT:

- DTC No. C0200/31 and C1235/35 are for the right front speed sensor.
- DTC No. C0205/32 and C1236/36 are for the left front speed sensor.
- DTC No. C0210/33 and C1238/38 are for the right rear speed sensor.
- DTC No. C0215/34 and C1239/39 are for the left rear speed sensor.

WIRING DIAGRAM

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Fig. 21: Wiring Diagram - Speed Sensor

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester. Start from 2 when not using the hand-held tester.

1. Check output value of speed sensor.

PREPARATION:

- a. Connect the hand-held tester to the DLC3.
- b. Turn the ignition switch ON and push the hand-held tester main switch ON.
- c. Select the DATA LIST mode on the hand-held tester.

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CHECK:

Check that there is no difference between the speed value output from the speed sensor and displayed on the hand-held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is almost no difference between the displayed speed values.

HINT:

There is tolerance of ohm 10 % in the speedometer indication.

OK: Check and replace ABS actuator assembly.

NG: Go To Next Step.

2. Check speed sensor.**Front speed sensor:****PREPARATION:**

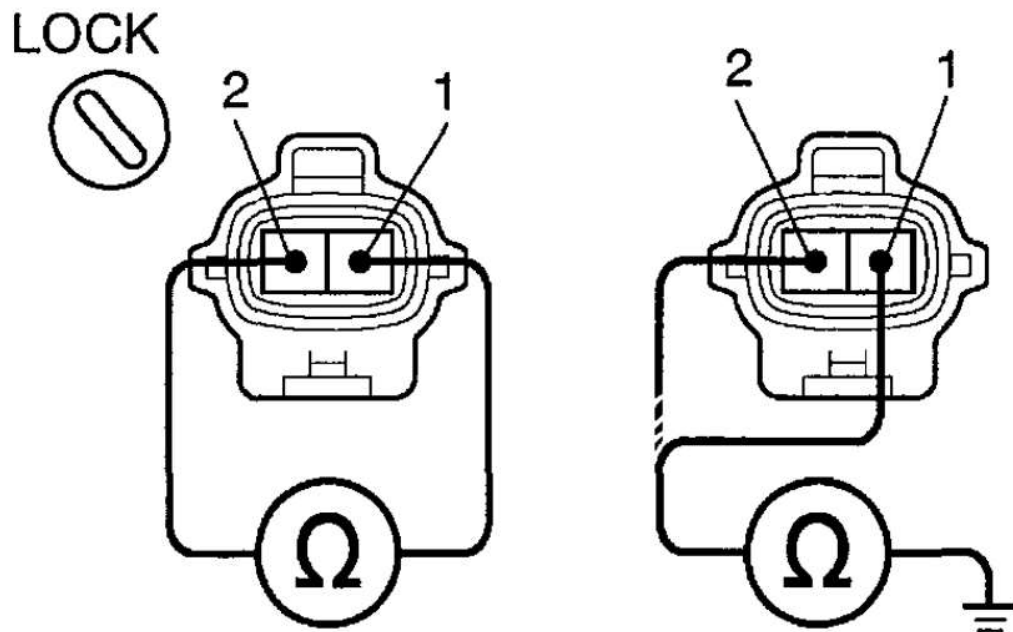
- a. Remove the front fender liner.
- b. Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- c. Disconnect the speed sensor connector.

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector.

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Fig. 22: Measuring Resistance Between Terminals (Front Speed Sensor)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK:

Resistance: 0.6 to 2.5 kohm at -40 to 120°C (-40 to 248°F)

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and the body ground.

OK:

Resistance: 10 Mohm or higher

Rear speed sensor (2WD):

PREPARATION:

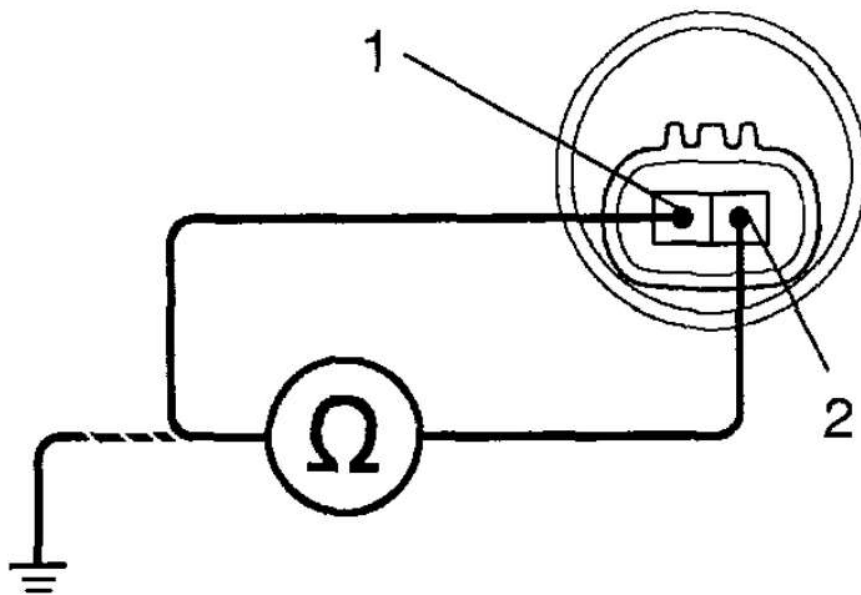
- Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- Disconnect the speed sensor connector at the hub bearing.

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CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector.



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Fig. 23: Measuring Resistance Between Terminals (Rear Speed Sensor)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK:

Resistance: 0.8 to 1.9 kohm at -40 to 120°C (-40 to 248°F)

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and the body ground.

OK:

Resistance: 1 Mohm or higher

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Rear speed sensor (4WD):

PREPARATION:

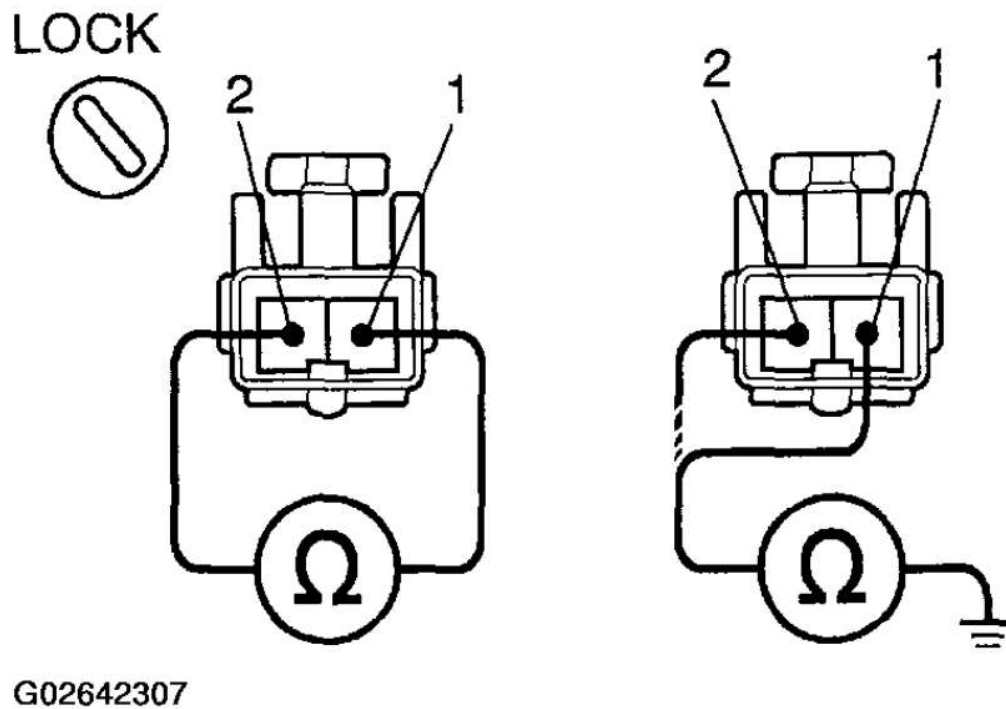
- Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- Disconnect the speed sensor connector at the hub bearing.

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector.

OK:

Resistance: 0.65 to 1.8 kohm at -40 to 120°C (-40 to 248°F)



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Fig. 24: Measuring Resistance Between Terminals (Front Speed Sensor)(4WD)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CHECK:

Measure the resistance between terminals 1 and 2 of the speed sensor connector and the body ground.

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OK:

Resistance: 1 Mohm or higher

Rear speed sensor sub-wire harness (2WD):

PREPARATION:

- Remove the seat cushion and seatback.
- Make sure that there is no looseness at the connector lock part and connecting part of the connector.
- Disconnect the speed sensor connector inside the vehicle.

CHECK:

- Measure the resistance between terminal 1 of connector 1 and terminal 2 of connector 2.

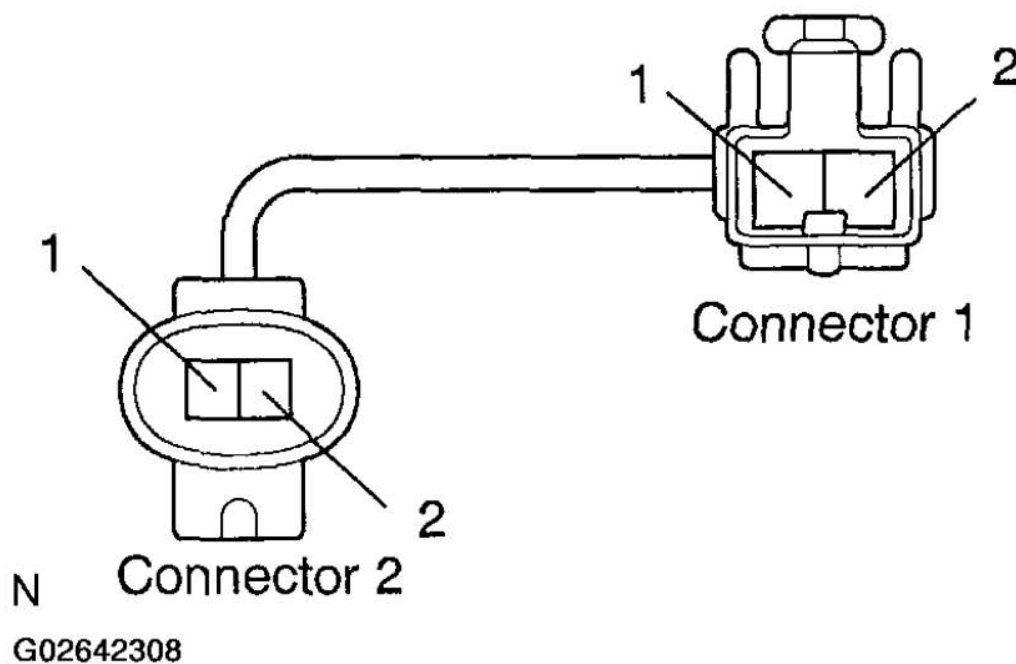


Fig. 25: Measuring Resistance Between Terminals (Rear Speed Sensor Sub-Wire Harness) (2WD)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Measure the resistance between terminal 2 of connector 1 and terminal 1 of connector 2.

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OK:**Resistance: Below 1 ohm****CHECK:**

Measure the resistance between terminals 1 and 2 of the speed sensor connector 1 and the body ground.

OK:**Resistance: 10 Mohm or higher****NG: Replace speed sensor or sub-wire harness.****NOTE:** Check the speed sensor signal last (see PRE-CHECK).**OK: Go To Next Step.**

3. Check for open and short circuit in harness and connector between each speed sensor and ABS ECU (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).

NG: Repair or replace harness and connector.**OK: Go To Next Step.**

4. Check speed sensor installation.

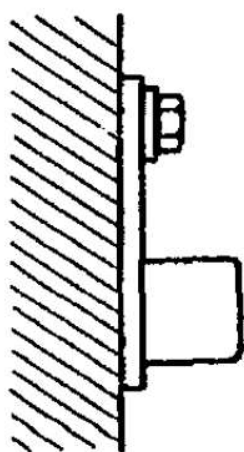
CHECK:

Check the speed sensor installation.

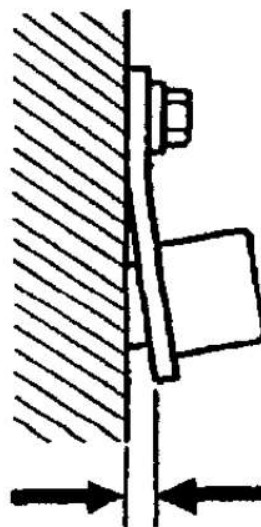
OK:**FRONT (2WD, 4WD), Rear (4WD):****The installation bolt is tightened properly or there is no clearance between the sensor and steering knuckle or rear axle carrier.****Torque: 8.0 N.m (82 kgf.cm, 71 in.lbf).****Rear (2WD):****There is no clearance between the sensor and rear axle carrier**

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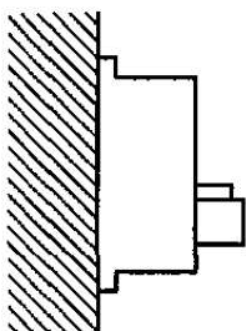
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Front (2WD, 4WD), Rear (4WD)

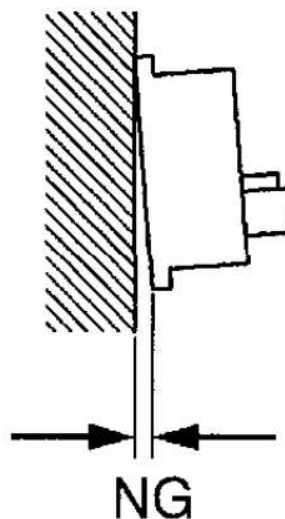
OK



NG

Rear (2WD)BR3795
F10178

OK



NG

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Fig. 26: Installing Speed Sensors

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NG: Replace ^{*1} and repair ^{*2} speed sensor.**NOTE:** Check the speed sensor signal last (see PRE-CHECK).^{*1} : Front (2WD, 4WD), rear (4WD)

Remove the sensor and reinstall it. Then do not replace the sensor when it is as shown in **Fig. 26** at the time of reinstallation.

Clean the attached part, such as the tip of sensor, and reinstall the sensor.

^{*2} : Rear (2WD)

Replace the speed sensor.

OK: Go To Next Step.**5. Check speed sensor and sensor rotor serrations.****Reference: INSPECTION USING OSCILLOSCOPE****PREPARATION:**

- a. Remove the ABS ECU with the connector still connected.
- b. Connect an oscilloscope to terminals FR+, FL+, RR+ or RL+ and GND of the ABS ECU connector.

CHECK:

Drive the vehicle at about 20 km/h (13 mph), and check the signal waveform.

HINT:

Check that foreign objects are stuck on the sensor tip in case of noise occurrence.

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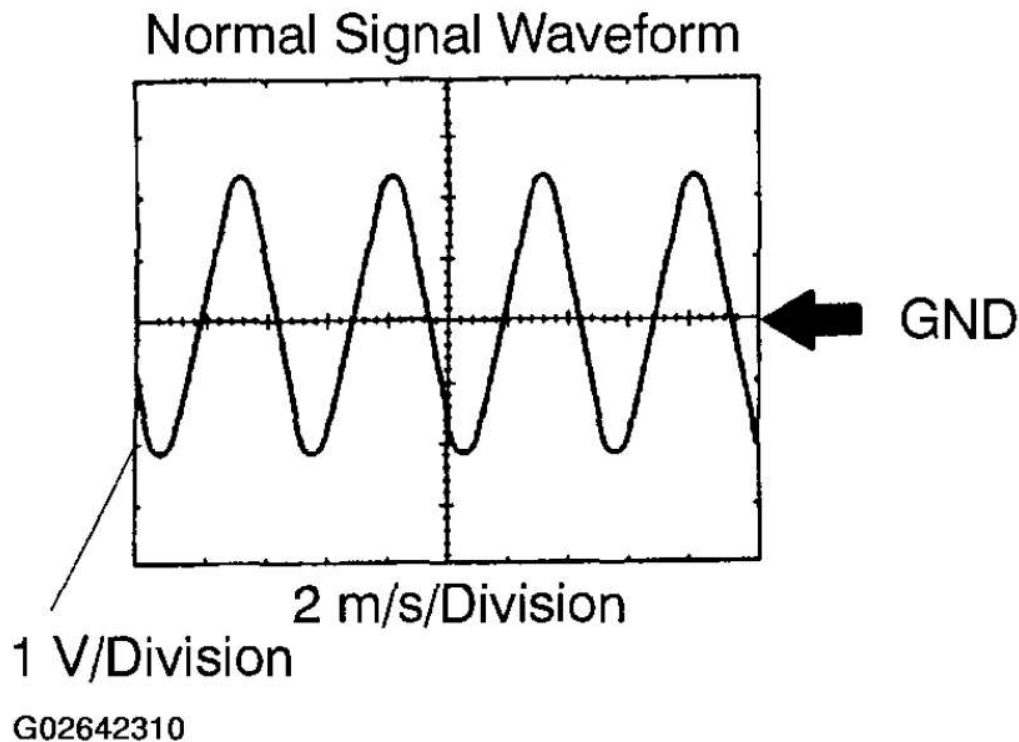


Fig. 27: Speed Sensor & Sensor Rotor Serrations Signal Waveform
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Check and replace ABS actuator assembly.

NG: Go To Next Step.

6. Check sensor rotor and sensor tip.

Front:

PREPARATION:

Remove the front drive shaft (see **REMOVAL**).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

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HINT:

If foreign objects are stuck on the rotor, remove them.

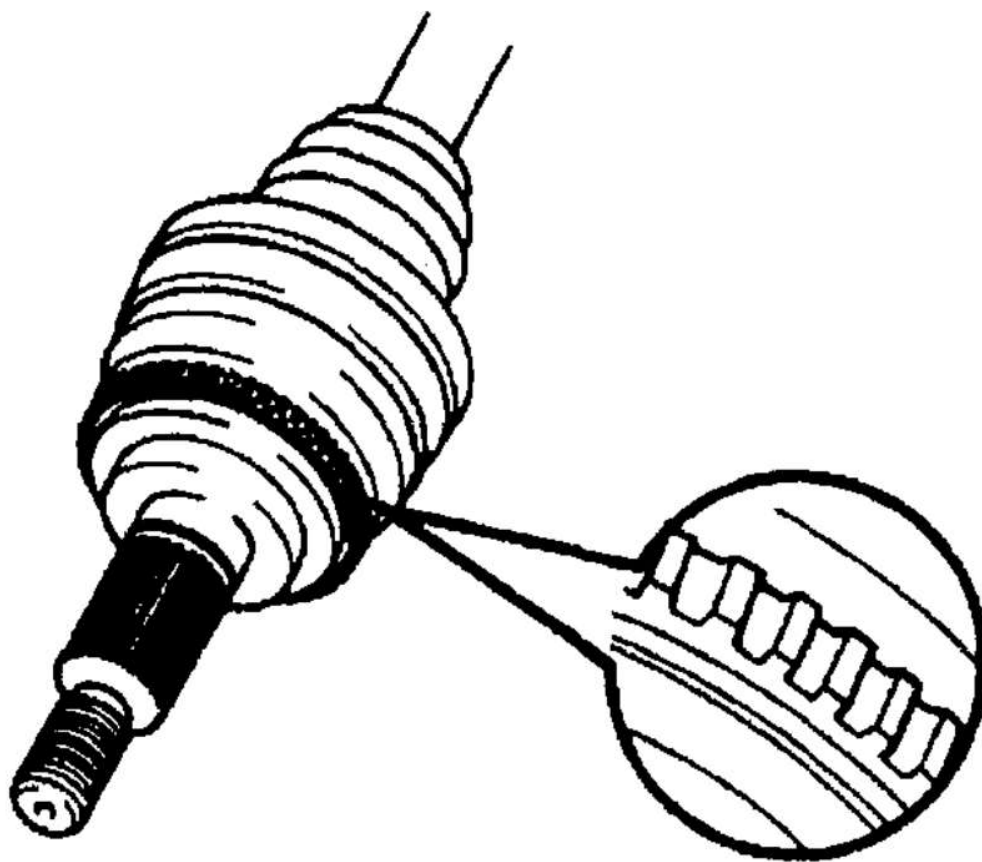
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Fig. 28: Checking Speed Sensor Rotor Serrations (Front)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

PREPARATION:

Remove the front speed sensor (see **REMOVAL**).

CHECK:

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Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign objects are stuck on the sensor tip, remove them before reuse. Check the rotor for the presence of foreign objects and remove them if they are present.

Rear (2WD):**PREPARATION:**

Remove the rear axle hub (see **REMOVAL**).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

HINT:

If foreign objects are stuck on the rotor, remove them.

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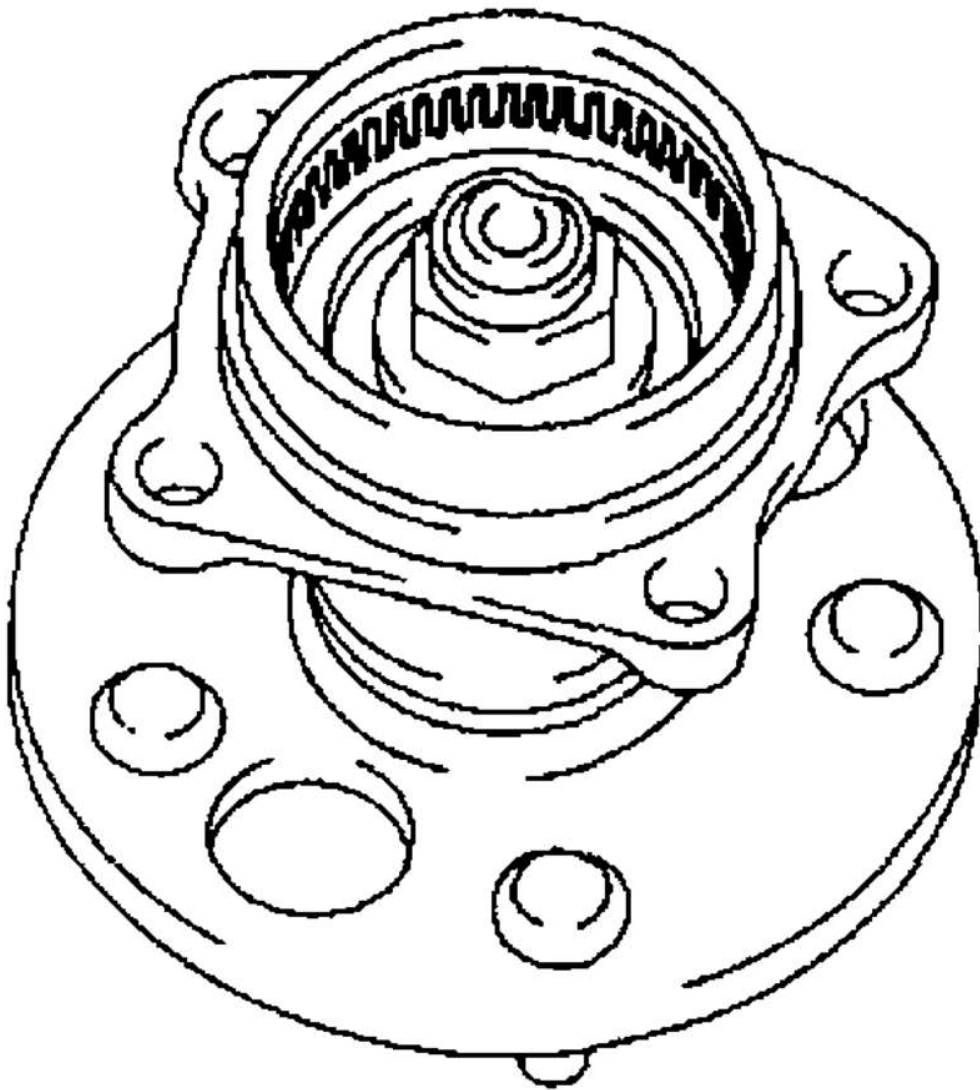
**G02642312**

Fig. 29: Checking Sensor Rotor Serrations (Rear 2WD)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CHECK:

Check the sensor tip.

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OK:

No scratches or foreign objects on the sensor tip.

Rear (4WD):**PREPARATION:**

Remove the rear drive shaft (see **REMOVAL**).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

HINT:

If foreign objects are stuck on the rotor, remove them.

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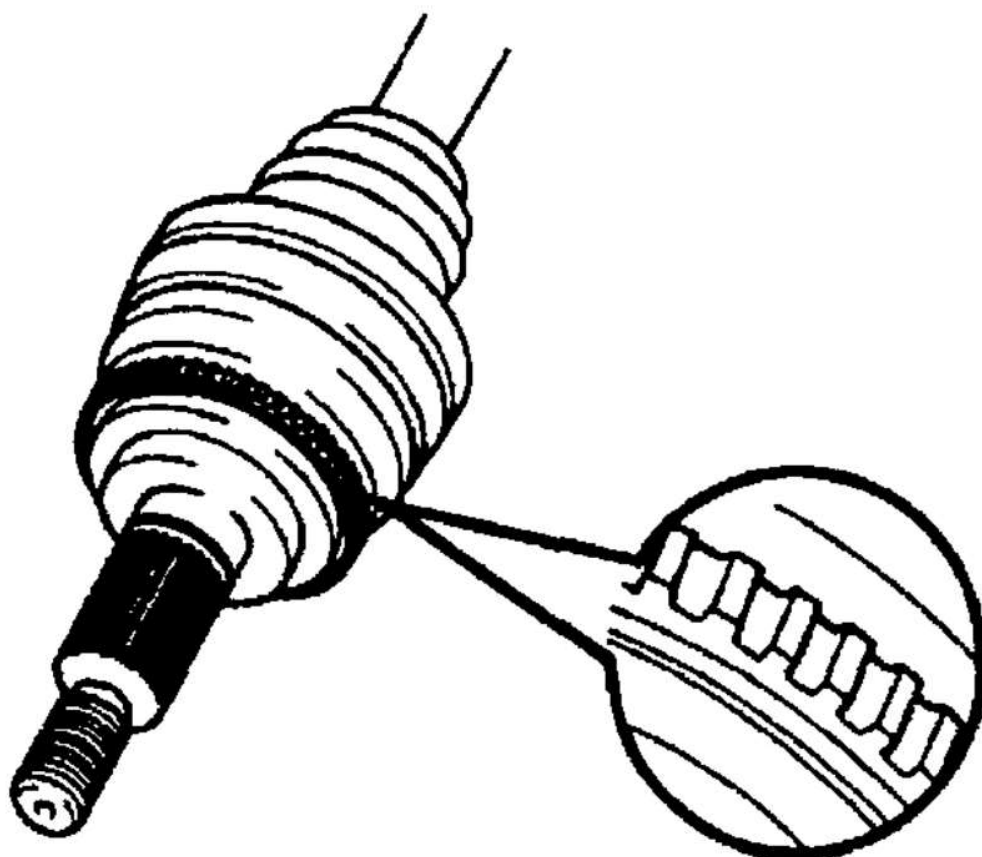
**G02642313**

Fig. 30: Checking Sensor Rotor Serrations (Rear 4WD)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

PREPARATION:

Remove the rear speed sensor (see **REMOVAL**).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

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HINT:

If foreign objects are stuck on the sensor tip, remove them before reuse. Check the rotor for the presence of foreign objects and remove them if they are present.

NG: Replace sensor rotor or speed sensor.

NOTE: Check the speed sensor signal last (see PRE-CHECK).

OK: Check and replace ABS actuator assembly.

DTC C0226/21, C0226/22, C0226/23, C0256/24: ABS SOLENOID VALVE CIRCUIT

CIRCUIT DESCRIPTION

The ABS solenoid valve turns on when signals are sent from the ECU and controls the pressure operating the wheel cylinders, thus the braking force is controlled.

DTC No.	DTC Detection Condition	Trouble Area
C0226/21 C0236/22	When solenoid relay is ON and IG1 terminal voltage is 9.5 to 18.5 V, solenoid circuit is open or short for 0.05 sec. or longer	•ABS actuator •SFRR, SFRH, SFLR or SFLH circuit
C0246/23 C0256/24		•ABS actuator •SRRR, SRRH, SRLR or SRLH circuit

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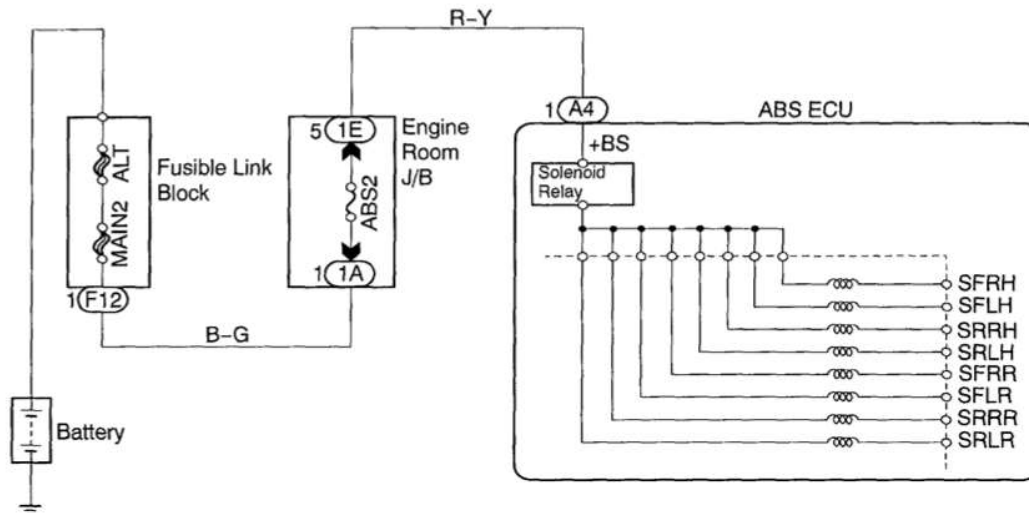
Fig. 31: DTC Trouble Detection Condition - ABS Solenoid Valve Circuit
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- HINT:
- DTC No. C0226/21 is for right front solenoid valve.
 - DTC No. C0236/22 is for left front solenoid valve.
 - DTC No. C0246/23 is for right rear solenoid valve.
 - DTC No. C0256/24 is for left rear solenoid valve.

WIRING DIAGRAM

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Fig. 32: Wiring Diagram - ABS Solenoid Valve
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check DTC once more.

PREPARATION:

- a. Clear the DTC (see **PRE-CHECK**).
- b. Turn the ignition switch OFF.

CHECK:

Turn the ignition switch ON and check that the same DTC is stored in the memory.

NO: No problem

YES: Replace ABS actuator assembly.

DTC C0273/13, C0274/14: ABS MOTOR RELAY CIRCUIT

CIRCUIT DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS is activated, the ECU switches the ABS motor relay ON and operates the ABS pump motor.

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DTC No.	DTC Detection Condition	Trouble Area
C0273/13	Detection of condition (a) or (b): (a) When ABS motor relay malfunctions, battery voltage will become less than 9.5 V or motor relay contact will not be ON after motor relay is ON (b) When ABS motor relay is ON, motor relay contact is OFF for 0.2 sec. or more	•Fusible link block •ABS1 fuse •ABS motor relay •ABS motor relay circuit
C0274/14	Conditions (a) and (b) continue for 4 sec. or more: (a) Motor relay is OFF (b) Motor relay contact is ON	

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Fig. 33: DTC Trouble Detection Condition - ABS Motor Relay Circuit
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

WIRING DIAGRAM

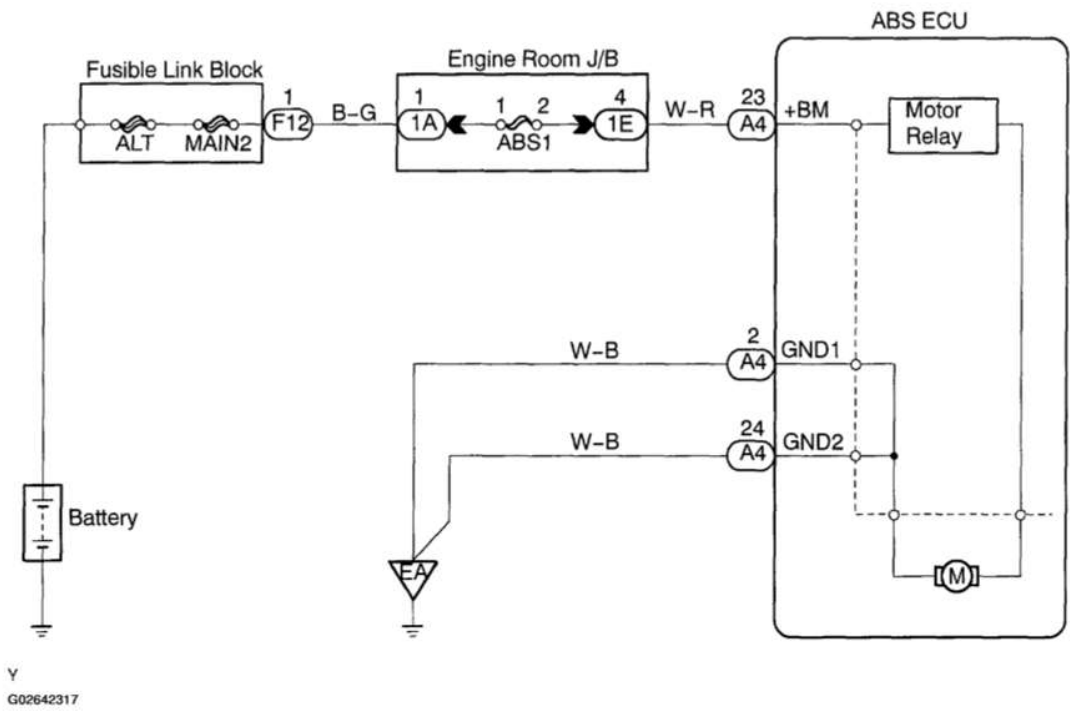


Fig. 34: Wiring Diagram - ABS Motor Relay
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

HINT:

Start the inspection from step 2 when using the hand-held tester and start from 1 when not using the hand-held tester.

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1. Check voltage between terminals +BM (23) and GND (2, 24) of ABS ECU connector.

PREPARATION:

Disconnect the ABS ECU connector.

CHECK:

Measure the voltage between terminals 23 and 2 or 24 of the ABS ECU connector.

OK:

Voltage: 11 to 14 V

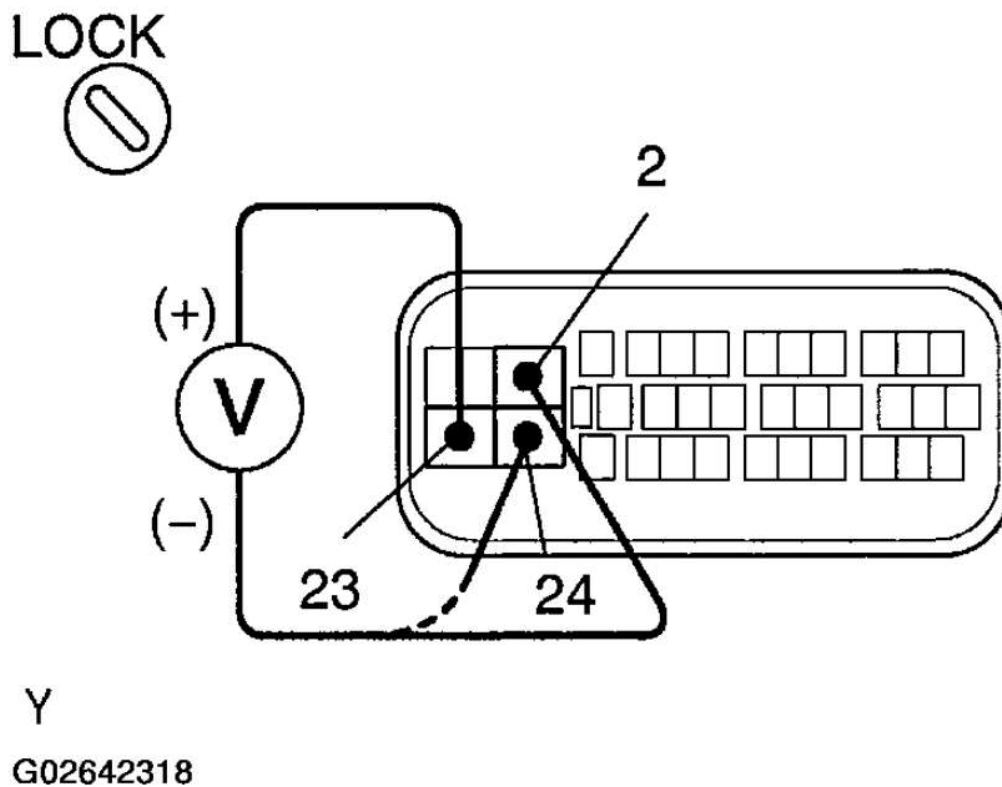


Fig. 35: Measuring Voltage Between Terminals ABS ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NG: Check and repair harness and connector.

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OK: Go To Next Step.

2. Check ABS motor relay operation.

PREPARATION:

- a. Connect the hand-held tester to the DLC3.
- b. Turn the ignition switch ON and push the hand-held tester main switch ON.
- c. Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check the operation sound of the ABS motor individually when operating it using the hand-held tester.

OK:

The operation sound of the ABS motor should be heard.

NG: Check and replace ABS actuator assembly.

OK: If same code is still output after DTC is deleted, check contact condition of each connection. If connection is normal, ECU may be defective.

DTC C0278/11, C0279/12: ABS SOLENOID RELAY CIRCUIT

CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay turns on.

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	Detection of condition (a) or (b): (a) When ABS solenoid relay contact malfunctions, battery voltage will become less than 9.5 V or solenoid relay will not be ON after solenoid relay is ON (b) When the solenoid relay is ON, all solenoid OFF and all solenoid contact is ON	•Fusible link block •ABS2 fuse
C0279/12	Condition (a), (b), (c) or (d) continues for more than 0.2 sec.: (a) In the midst of self-diagnosis (b) Solenoid relay OFF (c) All solenoid OFF (d) Which solenoid relay contact OFF	•ABS solenoid valve relay •ABS solenoid valve relay circuit

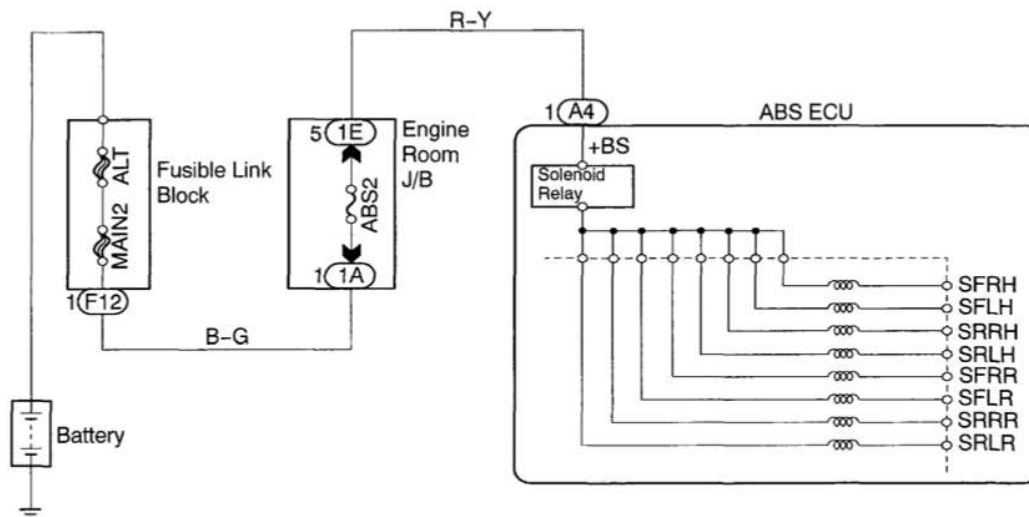
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Fig. 36: DTC Trouble Detection Condition - ABS Solenoid Relay Circuit
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

WIRING DIAGRAM

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Fig. 37: Wiring Diagram - ABS Solenoid Relay
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

HINT:

Start the inspection from step 2 when using the hand-held tester and start from 1 when not using the hand-held tester.

1. Check voltage between terminals +BS (1) and GND (2, 24) of ABS ECU connector.

PREPARATION:

Disconnect the ABS ECU connector.

CHECK:

Measure the voltage between terminals 1 and 2 or 24 of the ABS ECU connector.

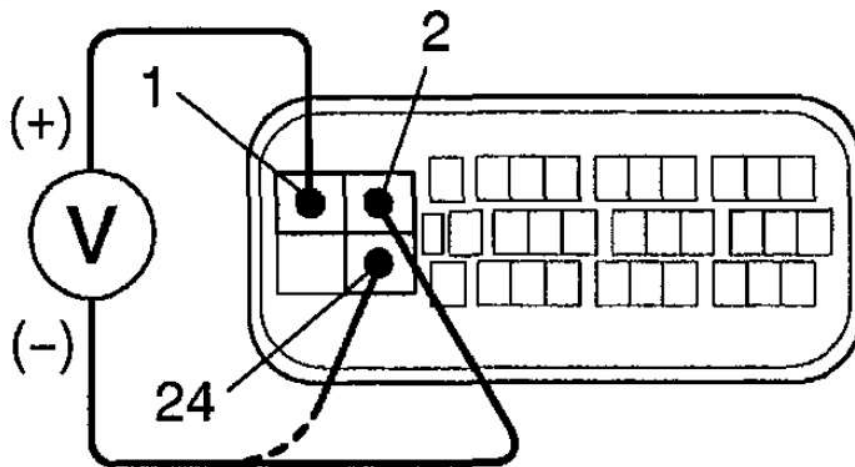
OK:

Voltage: 11 to 14 V

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Fig. 38: Measuring Voltage Between Terminals Of The ABS ECU Connector
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NG: Check and repair harness and connector.

OK: Go To Next Step.

2. Check ABS solenoid relay operation.

PREPARATION:

- a. Connect the hand-held tester to the DLC3.
- b. Turn the ignition switch ON and press the hand-held tester main switch ON.
- c. Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check the operation sound of the ABS solenoid relay when operating it using the hand-held tester.

OK:

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The operation sound of the ABS solenoid relay should be heard.

NG: Check and replace ABS actuator assembly.

OK: If same code is still output after DTC is deleted, check contact condition of each connection. If connection is normal, ECU may be defective.

DTC C1241/41: IG POWER SOURCE CIRCUIT**CIRCUIT DESCRIPTION**

This is the power source for the ECU, CPU and ABS actuator.

DTC No.	DTC Detection Condition	Trouble Area
C1241/41	Condition (a) or (b) is detected: (a) Vehicle speed is at 3 km/h (1.9 mph) or more and ECU terminal IG1 voltage is 9.5 V or less for 10 sec. or more (b) IG1 terminal voltage is less than 9.5 V or malfunction in motor relay contact and solenoid relay contact continues for 0.2 sec.	•Power source harness and connector •Battery •Charging system •Power source circuit

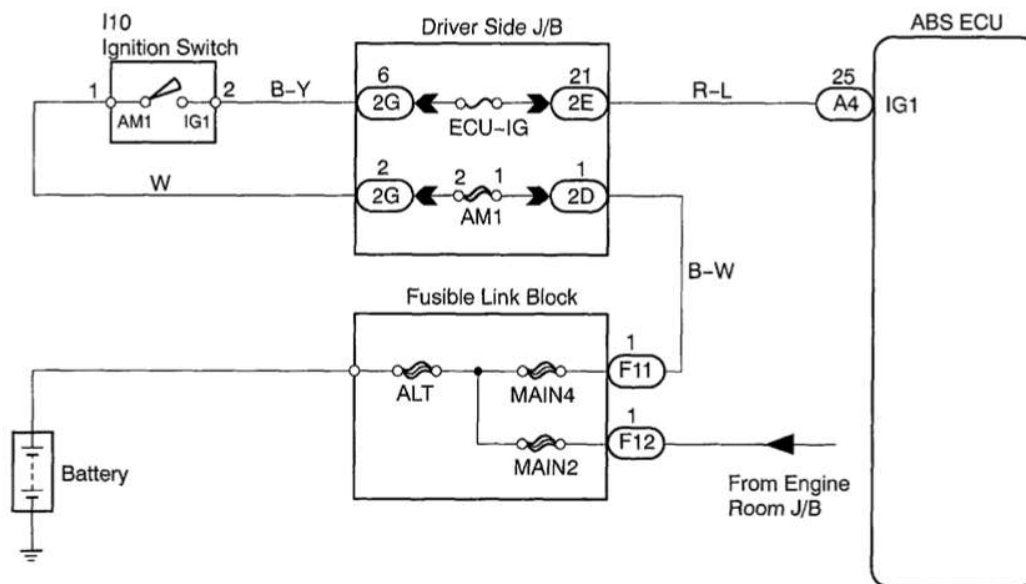
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Fig. 39: DTC Trouble Detection Condition - IG Power Source Circuit
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

WIRING DIAGRAM

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Fig. 40: Wiring Diagram - IG Power Source
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check ECU-IG fuse.

PREPARATION:

Remove the ECU-IG fuse from the driver side J/B.

CHECK:

Check the resistance.

OK:

Resistance: Below 1 ohm

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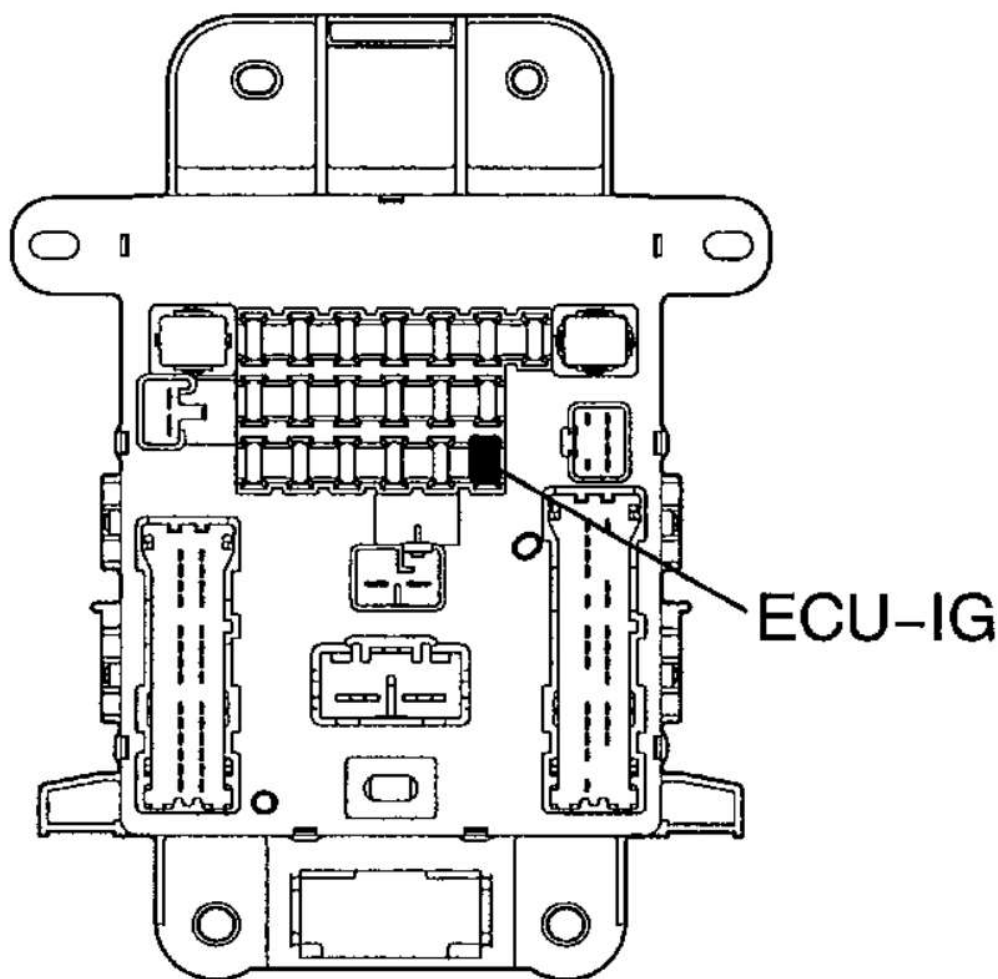
Driver Side J/B**G02642324**

Fig. 41: Identifying ECU-IG Fuse (Driver Side Junction/Box)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NG: Replace ECU-IG fuse.

OK: Go To Next Step.

2. Check battery voltage.

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OK:**Voltage: 10 to 14 V****NG: Check and repair charging system (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).****OK: Go To Next Step.****3. Check voltage of IG power source.****When using the hand-held tester:****PREPARATION:**

- a. Connect the hand-held tester to the DLC3.
- b. Turn the ignition switch ON and press the hand-held tester main switch ON.
- c. Select the DATA LIST mode on the hand-held tester.

CHECK:

Check the voltage condition output from the ECU and displayed on the hand-held tester.

OK:**"Normal" is displayed.****When not using the hand-held tester:****PREPARATION:**

Disconnect the ABS ECU connector.

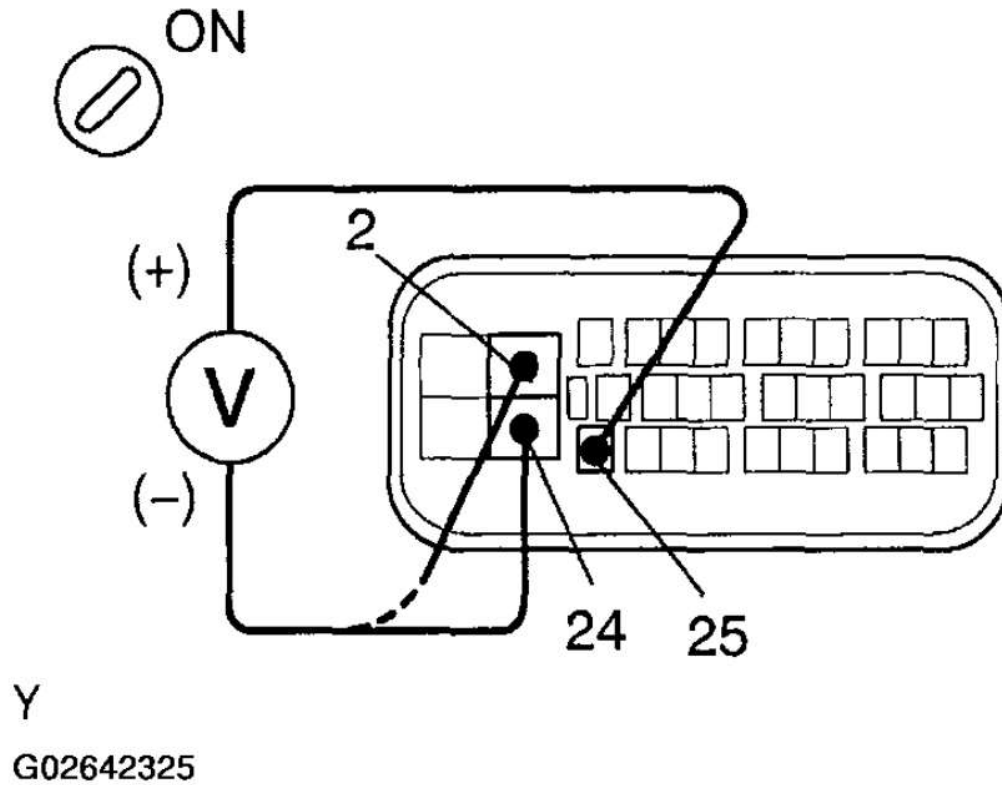
CHECK:

- a. Turn the ignition switch ON.
- b. Measure the voltage between terminals 25 and 2 or 24 of the ABS ECU connector.

OK:**Voltage: 10 to 14 V**

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**Fig. 42: Measuring Voltage Between Terminals Of The ABS ECU Connector**

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Check or replace ABS actuator assembly.**NG:** Go To Next Step.

4. Check resistance between terminals GND (2, 24) of ABS ECU connector and body ground.

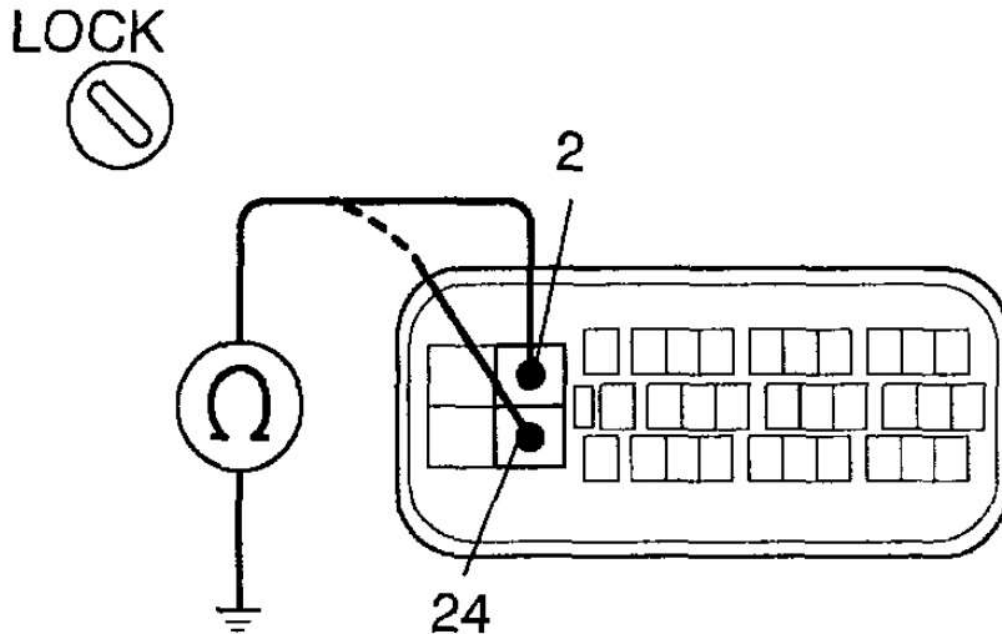
CHECK:

Measure the resistance between terminals 2 and 24 of the ABS ECU connector and the body ground.

OK:**Resistance:** Below 1 ohm

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Fig. 43: Measuring Resistance Between Terminals Of The ABS ECU Connector

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NG: Repair or replace harness and connector.**OK:** Check for open circuit in harness and connector between ABS ECU and ECU-IG fuse
(See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).**DTC C1243/43, C1245/45: MALFUNCTION IN DECELERATION SENSOR (ONLY FOR 4WD)****CIRCUIT DESCRIPTION**

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DTC No.	DTC Detection Condition	Trouble Area
C1243/43	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph), the condition that GL1 signals of ECU terminals does not change 40 mV or less continues in sequence 16 times	
C1245/45	At vehicle speed of 30 km/h (18 mph) or more, and the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more	•Deceleration sensor •Wire harness for deceleration sensor system

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Fig. 44: DTC Trouble Detection Condition - Malfunction in Deceleration Sensor (4WD)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Fail safe function:

If trouble occurs in the deceleration sensor circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits ABS controls then the brake system becomes normal.

INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 when using the hand-held tester, and start from 2 when not using the hand-held tester.

1. Check output value of deceleration sensor.

PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and push the hand-held tester main switch ON.
- Select the DATA LIST mode on the hand-held tester.

CHECK:

Check that the deceleration value of the deceleration sensor displayed on the hand-held tester is changing when tilting the vehicle.

OK:

Deceleration value must be changing.

OK: Check and replace ABS actuator assembly.

NG: Go To Next Step.

2. Check deceleration sensor (See PRE-CHECK).

NG: Replace deceleration sensor.

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OK: Go To Next Step.

3. Check for open or short circuit in harness and connector between deceleration sensor and ABS ECU (See **HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE**).

NG: Repair or replace harness and connector.**OK: Check and replace ABS actuator assembly.****DTC C1244/44: DECELERATION SENSOR CIRCUIT (ONLY FOR 4WD)****CIRCUIT DESCRIPTION**

This sensor detects deceleration of the vehicle. The sensor signal is used in ABS control. If the sensor functions abnormally, the ABS warning light turns on.

DTC No.	DTC Detection Condition	Trouble Area
C1244/44	Either of the following 1, 2 or 3 is detected: 1. Condition that ECU terminals GL1 values are ~ 1.5 G or less or 1.5 G or more continues for 1.2 sec. or more 2. Condition that the deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more 3. Deceleration sensor signal momentary open occurs 7 times or more	•Deceleration sensor harness and connector •Deceleration sensor •Deceleration sensor circuit

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Fig. 45: DTC Trouble Detection Condition - Deceleration Sensor Circuit (4WD)**Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.****Fail-safe function:**

If trouble occurs in the deceleration sensor circuit, the ECU cuts off the current to the ABS solenoid relay and prohibits ABS controls and then the brake system becomes normal.

WIRING DIAGRAM

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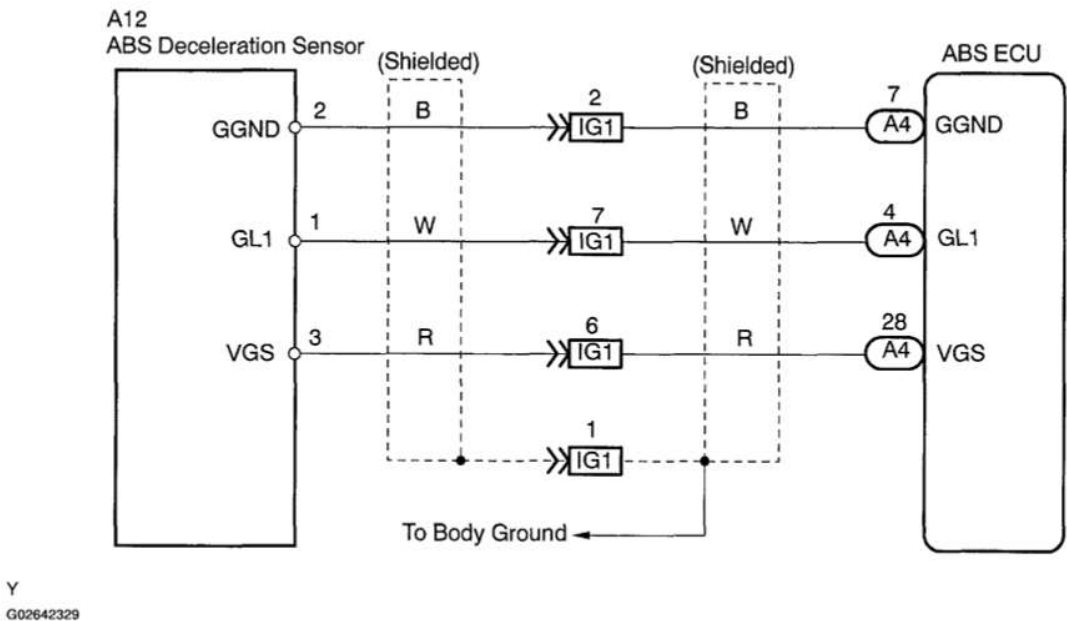


Fig. 46: Wiring Diagram - Deceleration Sensor (4WD)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check for open and short circuit in harness and connector between deceleration sensor and ABS ECU (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).
NG: Repair or replace harness and connector.
OK: Go To Next Step.
2. Check deceleration sensor (See PRE-CHECK).
NG: Replace deceleration sensor.
OK: Check and replace ABS actuator assembly.

DTC C1249/49: STOP LIGHT SWITCH CIRCUIT

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1249/49	Battery voltage will become more than 9.5 V and open circuit of stop light switch continues for 1 sec. or more	• Stop light switch harness and connector • Stop light bulb • Stop light switch circuit • Stop light switch

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Fig. 47: DTC Trouble Detection Condition - Stop Light Switch Circuit
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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WIRING DIAGRAM

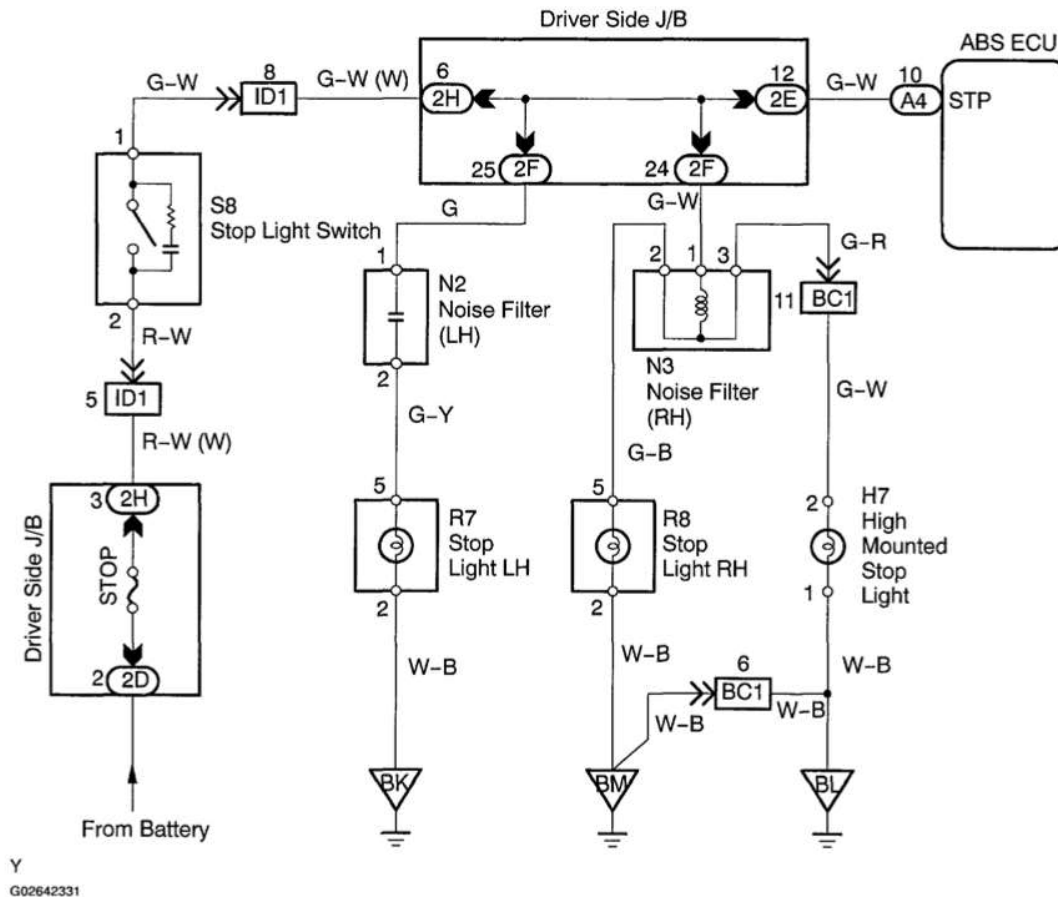


Fig. 48: Wiring Diagram - Stop Light Switch
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check operation of stop light.

CHECK:

Check that stop light turns ON when the brake pedal is depressed and turns OFF when the brake pedal is released.

NG: Repair stop light circuit (See STOP LIGHT SYSTEM).

OK: Go To Next Step.

2. Check voltage between terminal STP (10) of ABS ECU connector and body ground.

PREPARATION:

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Disconnect the ABS ECU connector.

CHECK:

Measure the voltage between terminal 10 of the ABS ECU connector and the body ground when the brake pedal is depressed.

OK:

Voltage: 10 to 14 V

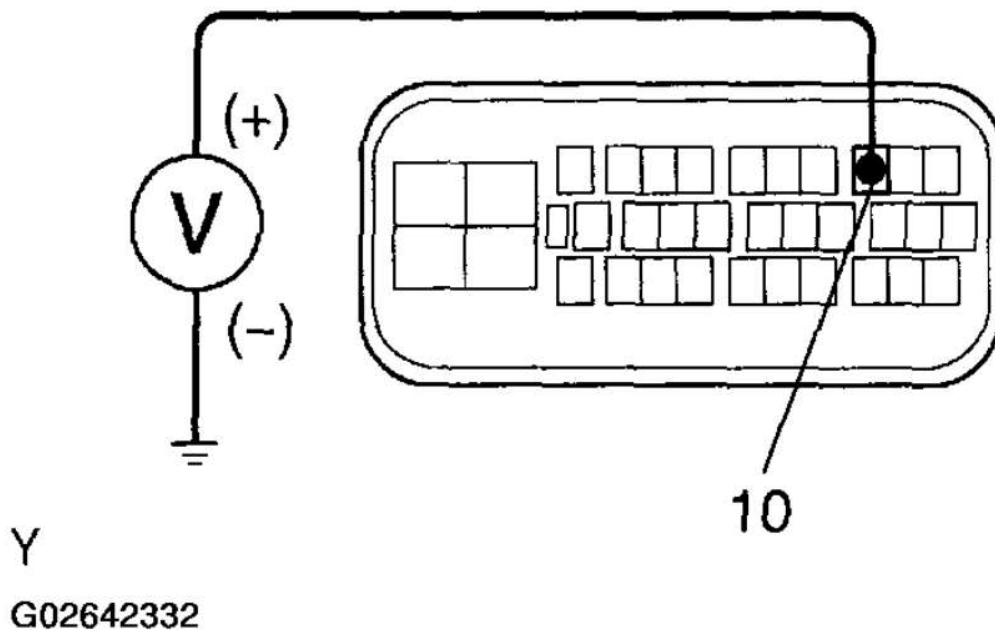


Fig. 49: Measuring Voltage Between Terminal Of The ABS ECU Connector & Body Ground
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Check and replace ABS actuator assembly.

NG: Go To Next Step.

3. Check for open circuit in harness and connector between ABS ECU and stop light switch (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).

NG: Repair or replace harness and connector or stop light bulb.

OK: Check and replace ABS actuator assembly.

DTC C1251/51: ABS PUMP MOTOR LOCK

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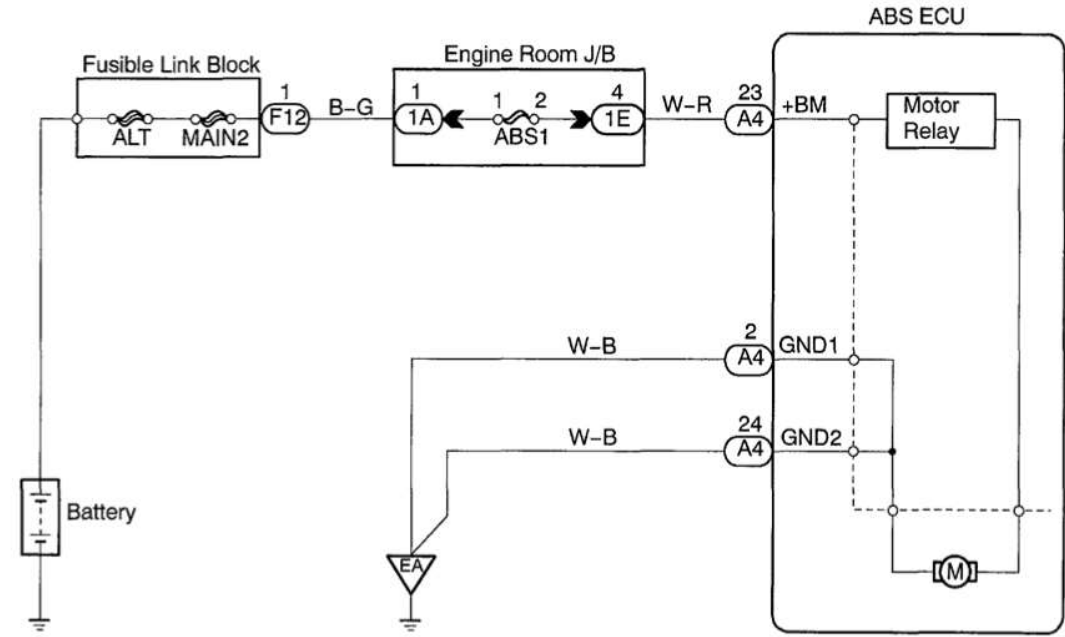
CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	Conditions (a), (b) and (c) continue for 0.024 sec.: (a) While checking self-diagnosis of ECU, after current flows to motor for 0.3 sec. within 0.054 sec. from turning OFF motor relay, and motor relay contact turned OFF continues for 0.024 sec. (b) While checking self-diagnosis of ECU, after current flows to motor for 1.4 sec. within 0.054 sec. from turning OFF motor relay (c) Motor relay contact turned OFF	ABS pump motor

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Fig. 50: DTC Trouble Detection Condition - ABS Pump Motor Lock
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

WIRING DIAGRAM



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Fig. 51: Wiring Diagram - ABS Pump Motor Lock
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check ABS pump motor operation.

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PREPARATION:

- a. Connect the hand-held tester to the DLC3.
- b. Turn the ignition switch ON and press the hand-held tester main switch ON.
- c. Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check the operation sound of the ABS pump motor when operating it using the hand-held tester.

OK:

The operation sound of the ABS pump motor should be heard.

NG: Check and replace ABS actuator assembly.

OK: Proceed to next circuit inspection shown in problem symptoms chart (See PROBLEM SYMPTOMS TABLE).

DTC C1337/37: TIRES OF DIFFERENT SIZE (ONLY FOR 2WD)

CIRCUIT DESCRIPTION

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
C1337/37	Driving at more than 20 km/h (12 mph) for more than 20 sec. with 1 or 2 tires of different size 3 times continuously	Tire size

INSPECTION PROCEDURE

1. Check tire size.
NG: Replace tires so that all 4 tires are same in size.
OK: Go To Next Step.
2. Check sensor rotor (See CIRCUIT INSPECTION).
NG: Replace speed sensor rotor.
OK: Go To Next Step.
3. Check speed sensor (See CIRCUIT INSPECTION).
NG: Replace speed sensor.
OK: Go To Next Step.
4. Check for open and short circuit in harness and connector between speed sensor and ABS ECU (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).
NG: Repair or replace harness and connector.
OK: Check and replace ABS actuator assembly.

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DIAGNOSTIC TROUBLE CODES ALWAYS ON ABS ECU MALFUNCTION OR POWER SOURCE VOLTAGE UP**CIRCUIT DESCRIPTION**

DTC No.	DTC Detection Condition	Trouble Area
Always ON	Detection of any conditions in (a) and (b): (a) ABS ECU internal malfunction is detected (b) There is a malfunction in the ECU internal circuit	• Battery • Charging system • ABS ECU

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Fig. 52: DTC Trouble Detection Condition - Trouble Codes Always ON
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check that ABS ECU connectors are securely connected to ABS ECU.

NO: Connect connector to ABS ECU.

YES: Go To Next Step.

2. Is DTC output?

Check DTC on **PRE-CHECK**.

YES: Repair circuit indicated by code output.

NO: Go To Next Step.

3. Check voltage between terminals IG1 (25) and GND (2, 24) of ABS ECU connector.

PREPARATION:

Disconnect the ABS ECU connector.

CHECK:

- a. Turn the ignition switch ON.
- b. Measure the voltage between terminals 25 and 2 or 24 of the ABS ECU connector.

OK:

Voltage: 10 to 14 V

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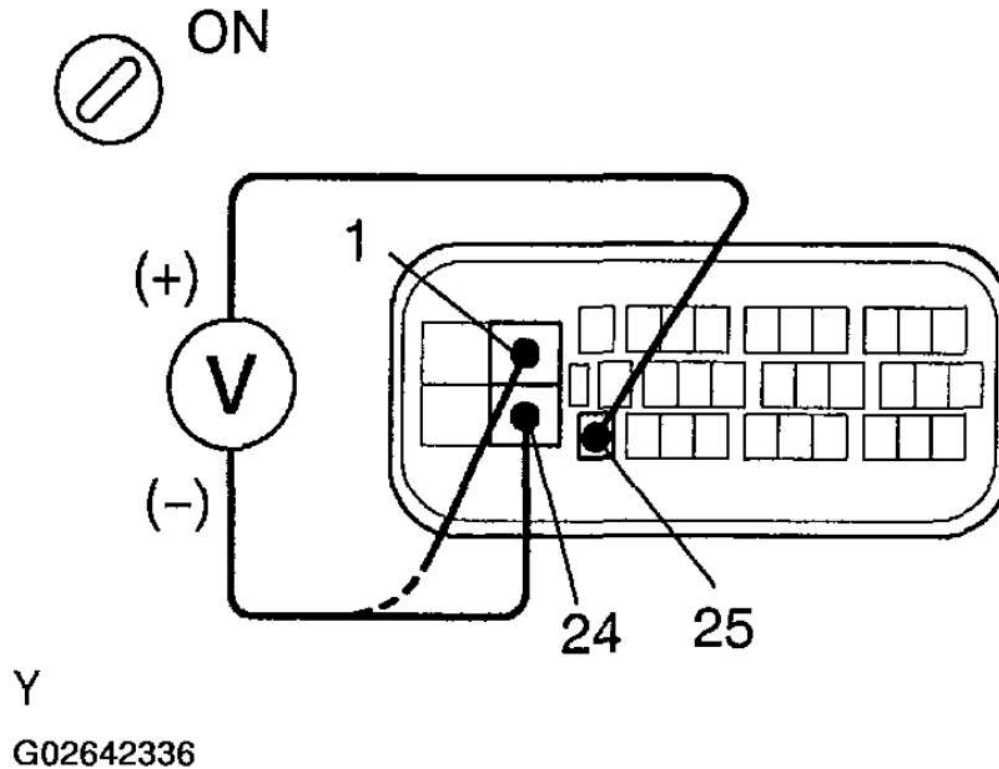


Fig. 53: Measuring Voltage Between Terminals Of The ABS ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NG: Check for open and short circuit in harness and connector between ECU-IG fuse and ABS ECU (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).

OK: Go To Next Step.

4. Check ABS warning light.

When using the hand-held tester:

PREPARATION:

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and press the hand-held tester main switch ON.
- Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

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Check that the ABS warning light can be turned ON and OFF on the combination meter using the hand-held tester.

OK:

The ABS warning light turns off.

When not using the hand-held tester:

PREPARATION:

Disconnect the ABS ECU connector.

CHECK:

- a. Using a service wire, connect terminals WA (13) and GND (2 or 24) of the ABS ECU connector.
- b. Turn the ignition switch ON.

OK:

The ABS warning light turns off.

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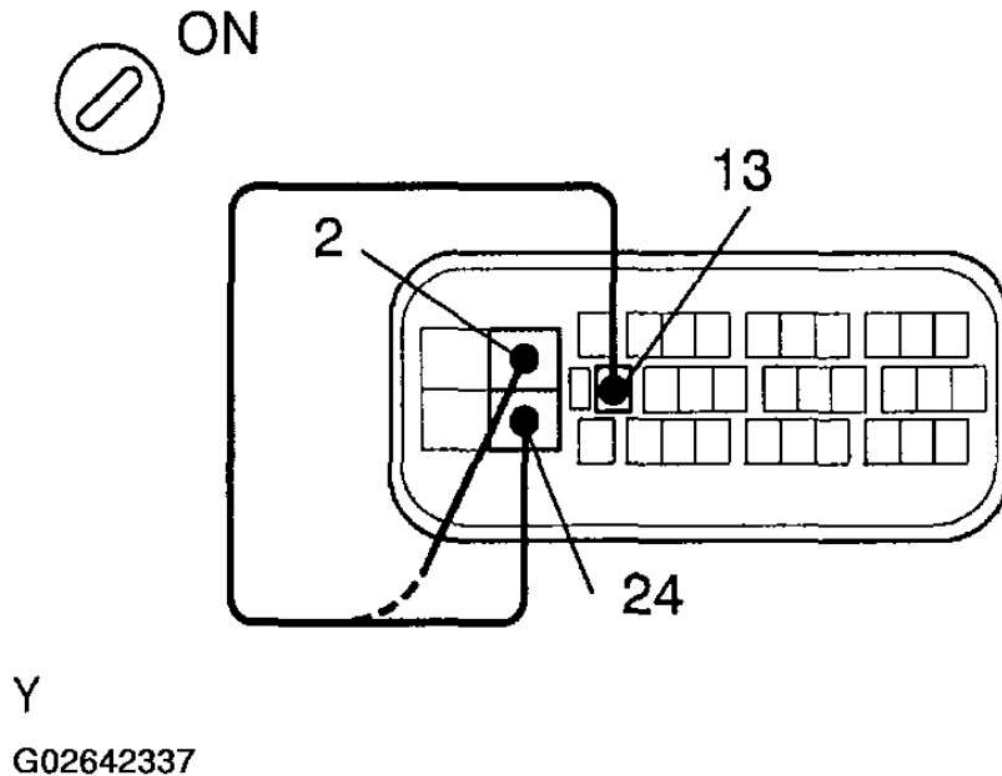


Fig. 54: Connecting Terminals Of The ABS ECU Connector & Body Ground
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Check and replace ABS actuator assembly.

NG: Check for open or short circuit in harness and connector between ABS warning light and ABS ECU, and DLC3 and ABS ECU (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).

ABS WARNING LIGHT CIRCUIT

CIRCUIT DESCRIPTION

If the ECU detects trouble, the ABS warning light will be illuminated and ABS control will be prohibited. At this time, the ECU records a DTC in memory.

Connect terminals TC and CG of the DLC3, make the ABS warning light blink and output the DTC.

WIRING DIAGRAM

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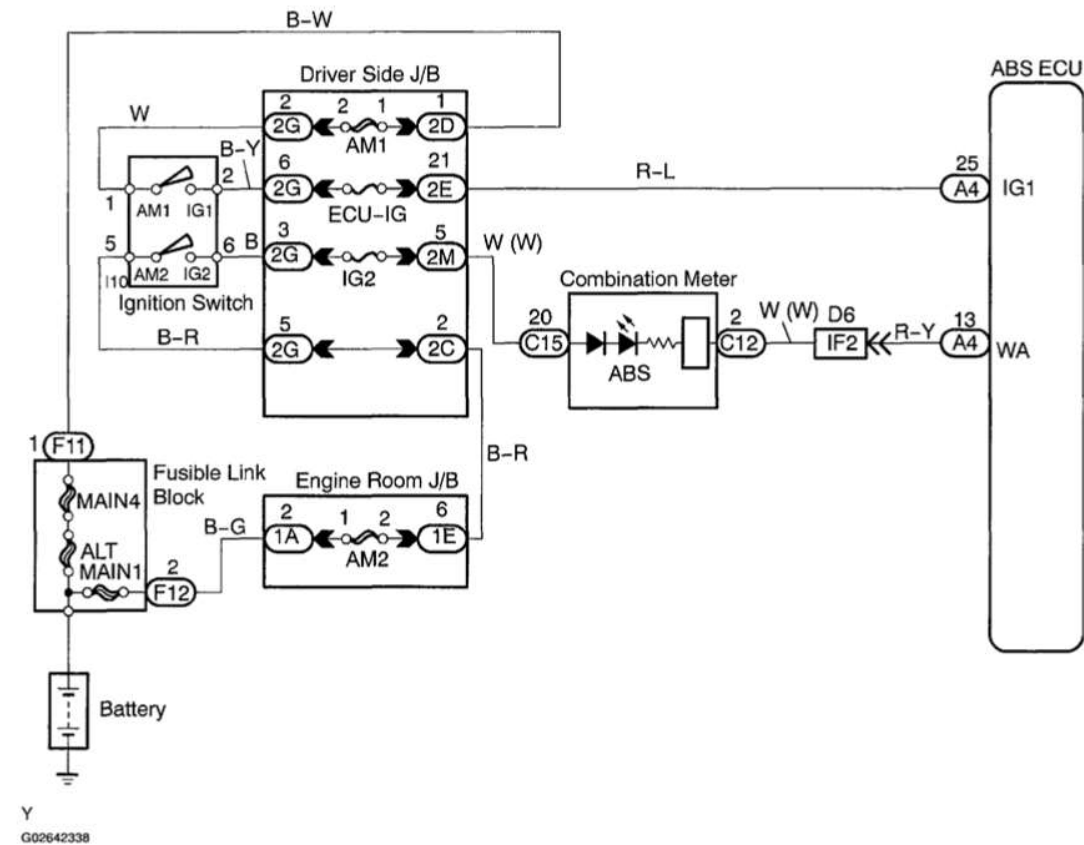


Fig. 55: Wiring Diagram - ABS Warning Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

Troubleshoot in accordance with the table below for each trouble symptom.

INSPECTION PROCEDURE

ABS warning light does not light up	*1
ABS warning light remains on	*2
*1: Start the inspection from step 1 when using the hand-held tester and start from 2 when not using the hand-held tester.	
*2: After step 3, start the inspection from 4 when using the hand-held tester and start from 5 when not using the hand-held tester.	

1. Check operation of the ABS warning light.

PREPARATION:

- a. Connect the hand-held tester to the DLC3.

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- b. Turn the ignition switch ON and push the hand-held tester main switch ON.
- c. Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check that the ABS warning light can be turned ON and OFF on the combination meter using the hand-held tester.

OK:

The ABS warning light turns off.

OK: Check and replace ABS actuator assembly.

NG: Go To Next Step.

2. Check ABS warning light.

See troubleshooting for the combination meter, refer to **PROBLEM SYMPTOMS TABLE** .

NG: Replace bulb or combination meter assembly.

OK: Check for open circuit in harness and connector between ECU-IG fuse and ABS warning light (See **HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE**).

3. Check that ECU connector is securely connected to ABS ECU.

NO: Connect connector to ABS ECU.

YES: Go To Next Step.

4. Check operation of the ABS warning light (See step 1).

OK: Check and replace ABS actuator assembly.

NG: Go To Next Step.

5. Is DTC output?

Check DTC on **PRE-CHECK**.

YES: Repair circuit indicated by code output.

NO: Check for short circuit in harness and connector between ABS warning light and ABS ECU, and DLC3 and ABS ECU (See **HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE**).

BRAKE WARNING LIGHT CIRCUIT

CIRCUIT DESCRIPTION

The BRAKE warning light lights up when the brake fluid is insufficient, the EBD is abnormal, or the parking brake is applied.

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WIRING DIAGRAM

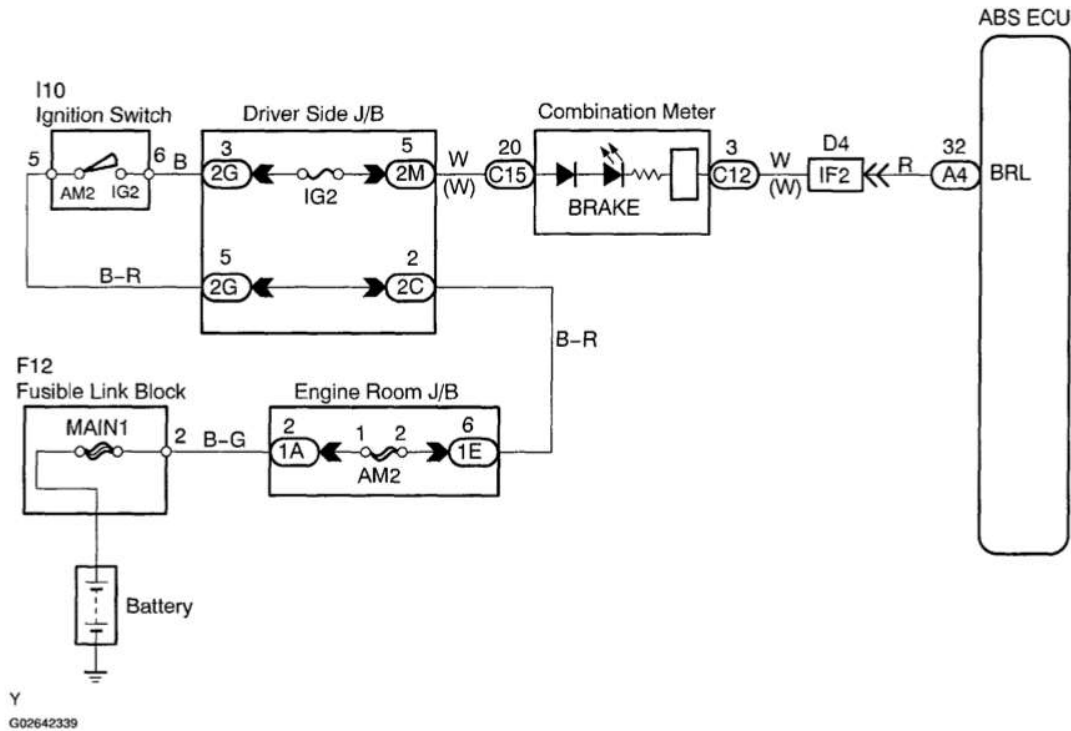


Fig. 56: Wiring Diagram - Brake Warning Light
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check parking brake switch circuit (See PROBLEM SYMPTOMS TABLE).
 NG: Repair or replace parking brake switch circuit.
 OK: Go To Next Step.
2. Check brake fluid level warning switch circuit (See PROBLEM SYMPTOMS TABLE).
 NG: Repair or replace brake fluid level warning switch circuit.
 OK: Go To Next Step.
3. Is DTC output for ABS?
 Check DTC on PRE-CHECK.
 YES: Repair circuit indicated by output code.
 NO: Go To Next Step.
4. Check BRAKE warning light.

See troubleshooting for the combination meter, refer to PROBLEM SYMPTOMS TABLE .

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NG: Repair or replace combination meter.

OK: Check and replace ABS actuator assembly.

TC TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

Connecting between terminals TC and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM

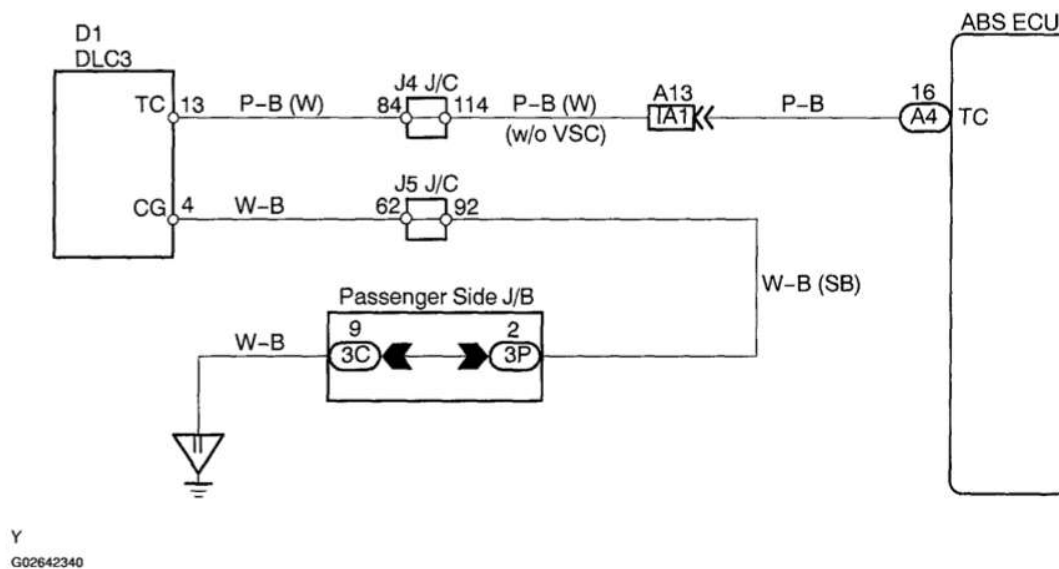


Fig. 57: Wiring Diagram - TC Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check voltage between terminals TC and CG of DLC3.

CHECK:

- a. Turn the ignition switch ON.
- b. Measure the voltage between terminals TC and CG of the DLC3.

OK:

Voltage: 10 to 14 V

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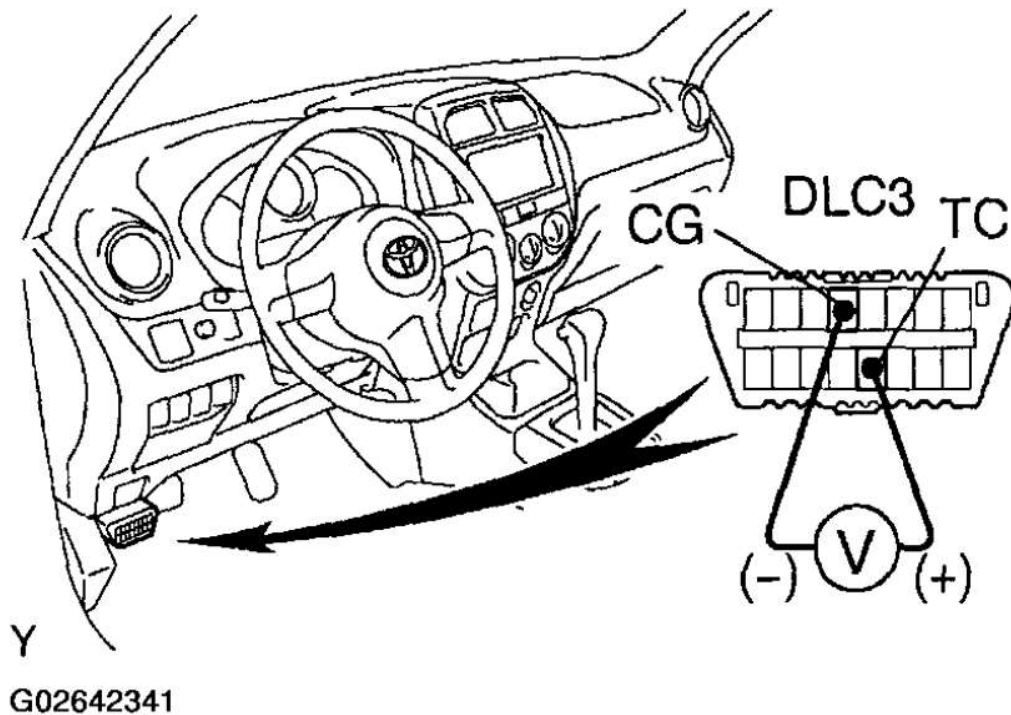


Fig. 58: Measuring Voltage Between Terminals TC & CG Of DLC3

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: If ABS warning light does not blink even after TC and CG are connected, ECU may be defective.

NG: Go To Next Step.

2. Check for open and short circuit in harness and connector between ABS ECU and DLC3, and DLC3 and body ground (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).

NG: Repair or replace harness and connector.

OK: Check and replace ABS actuator assembly.

TS TERMINAL CIRCUIT

CIRCUIT DESCRIPTION

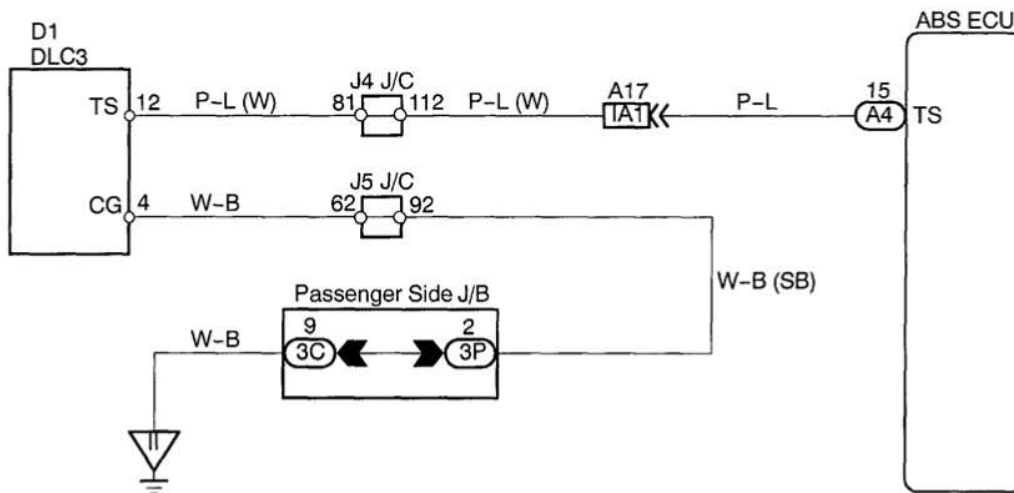
The sensor check circuit detects abnormalities in the speed sensor signal, which cannot be detected by the DTC check.

Connecting terminals TS and CG of the DLC3 starts the check.

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WIRING DIAGRAM



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Fig. 59: Wiring Diagram - TS Terminal

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. Check voltage between terminals TS and CG of DLC3.

CHECK:

- a. Turn the ignition switch ON.
- b. Measure the voltage between terminals TS and CG of the DLC3.

OK:

Voltage: 10 to 14 V

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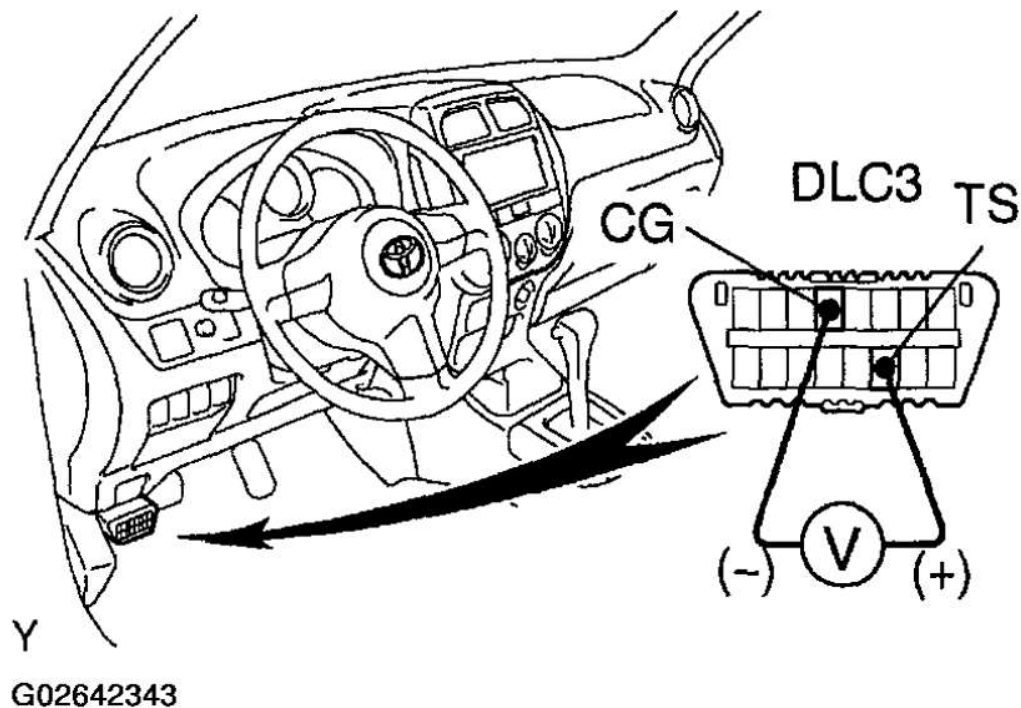


Fig. 60: Measuring Voltage Between Terminals TS & CG Of DLC3

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: If ABS warning light does not blink even after TS and CG are connected, ECU may be defective.

NG: Go To Next Step.

2. Check for open and short circuit in harness and connector between ABS ECU and DLC3, and DLC3 and body ground (See HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE).

NG: Repair or replace harness and connector.

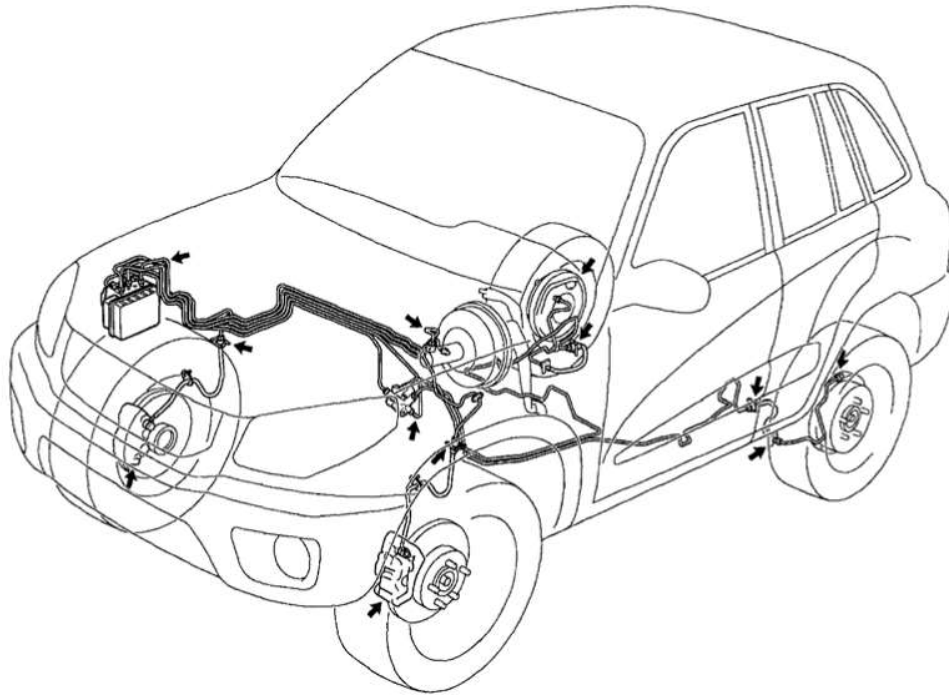
OK: Check and replace ABS actuator assembly.

CHECK FOR FLUID LEAKAGE

Check for fluid leakage from actuator or hydraulic lines.

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Fig. 61: Checking For Leaks From Actuator Or Lines
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