

2. DESCRIPTION

System data and the Diagnostic Trouble Codes (DTCs) can be read from the Data Link Connector 3 (DLC3) of the vehicle. When the system seems to be malfunctioning, use the Techstream* to check for a malfunction and perform repairs.

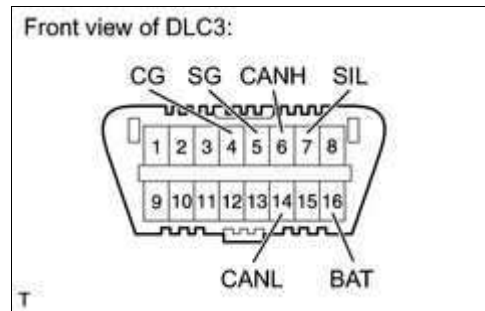
HINT:

*: Techstream is the name for the diagnostic tester in North America.

3. DATA LINK CONNECTOR 3 (DLC3)

- (a) The vehicle's ECU uses the ISO 15765-4 communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

TERMINAL NO. (SYMBOLS)	TERMINAL DESCRIPTION	CONDITION	SPECIFIED CONDITION
7 (SIL) - 5 (SG)	Bus "+" line	During transmission	Pulse generation
4 (CG) - Body ground	Chassis ground	Always	Below 1 Ω
5 (SG) - Body ground	Signal ground	Always	Below 1 Ω
16 (BAT) - Body ground	Battery positive	Always	11 to 14 V
6 (CANH) - 14 (CANL)	CAN bus line	Ignition switch OFF*	54 to 69 Ω
6 (CANH) - 4 (CG)	HIGH-level CAN bus line	Ignition switch OFF*	200 Ω or higher
14 (CANL) - 4 (CG)	LOW-level CAN bus line	Ignition switch OFF*	200 Ω or higher
6 (CANH) - 16 (BAT)	HIGH-level CAN bus line	Ignition switch OFF*	6 k Ω or higher
14 (CANL) - 16 (BAT)	LOW-level CAN bus line	Ignition switch OFF*	6 k Ω or higher



NOTICE:

*: Before measuring the resistance, leave the vehicle as is for at least 1 minute and do not operate the ignition switch, any other switches, or the doors.

If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

- (b) Connect the cable of the Techstream to the DLC3, turn the ignition switch ON and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

HINT:

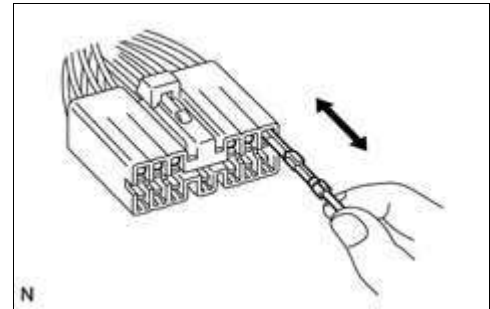
- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the

conductor wires. Check visually for corrosion, metallic or foreign matter and water, and bent, rusted, overheated, contaminated, or deformed terminals.

- (3) Checking the contact pressure of the terminal: Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.

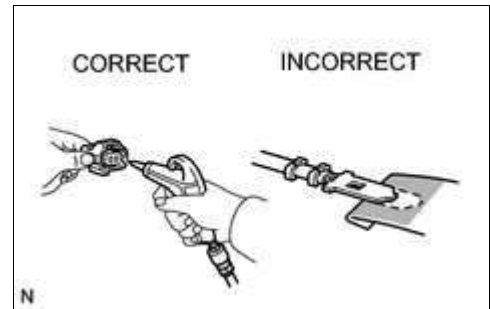
NOTICE:

When testing a gold-plated female terminal, always use a gold-plated male terminal.



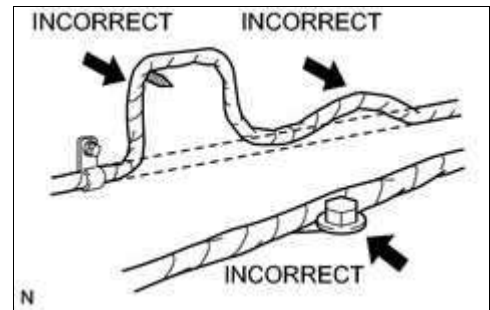
(d) REPAIR METHOD OF CONNECTOR TERMINAL

- (1) If there is any foreign matter on the terminal, clean the contact point using an air gun or cloth. Never rub the contact point using sandpaper as the plating may come off.
- (2) If there is abnormal contact pressure, replace the female terminal. If the male terminal is gold-plated (gold color), use a gold-plated female terminal; if it is silver-plated (silver color), use a silver-plated female terminal.
- (3) Damaged, deformed, or corroded terminals should be replaced. If the terminal does not lock into the housing, the housing may have to be replaced.



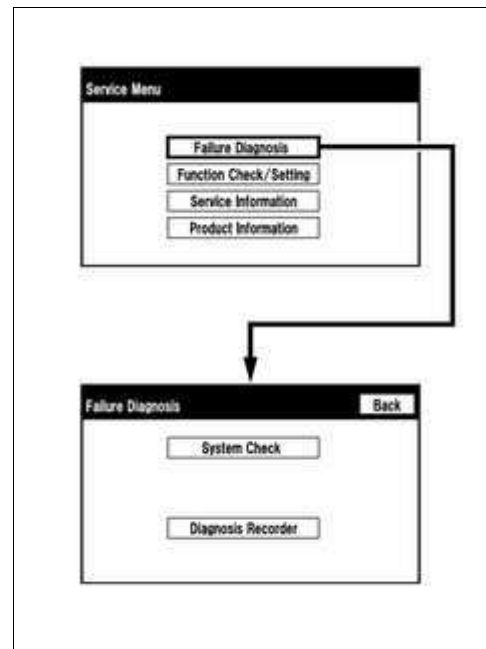
(e) HANDLING OF WIRE HARNESS

- (1) If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.
- (2) Never twist, pull or slacken the wire harness more than necessary.
- (3) The wire harness should never come into contact with a high temperature part, or rotating, moving, vibrating or sharp-edged parts. Avoid contact with panel edges, screw tips and other sharp items.
- (4) When installing parts, never pinch the wire harness.
- (5) Never cut or break the cover of the wire harness. If it is cut or broken, replace it or repair it with vinyl tape.



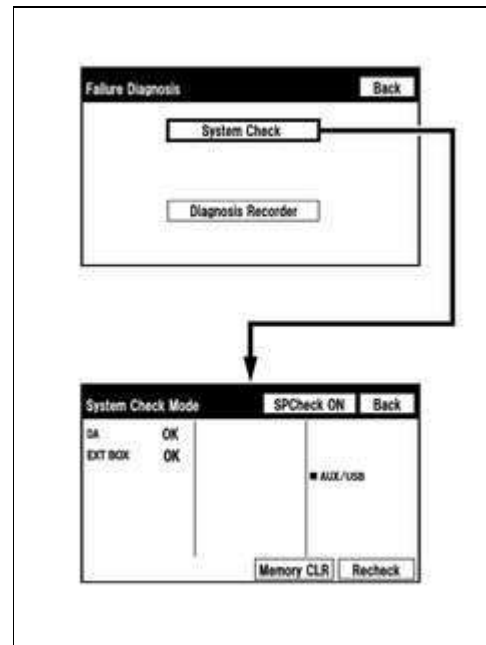
2. CHECK FOR OPEN CIRCUIT

(a) The "Failure Diagnosis" screen will be displayed by pressing the "Failure Diagnosis" switch on the "Service Menu" screen.



3. SYSTEM CHECK

(a) The "System Check Mode" screen will be displayed by pressing the "System Check" switch on the "Failure Diagnosis" screen.

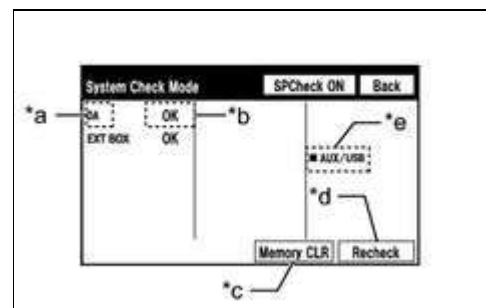


4. CHECK DTC (CHECK USING SYSTEM CHECK MODE SCREEN)

(a) System check mode screen description

Screen Description

DISPLAY	CONTENT
*a: Device Name List No. 1	<ul style="list-style-type: none"> Device Name List No. 1 displays some of the devices that make up the audio and visual system The names of the components from Device



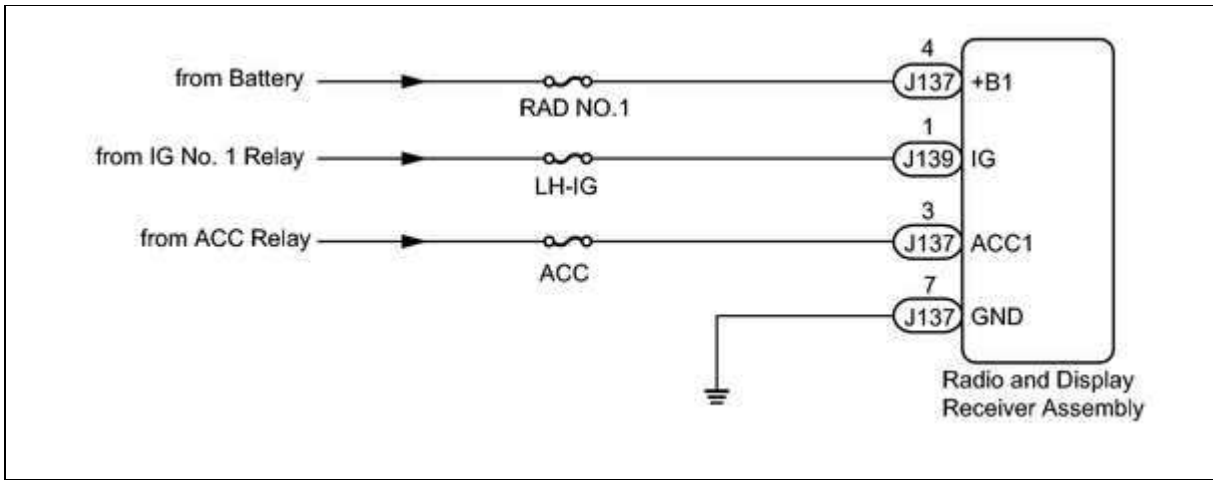
Last Modified: 9-16-2014	6.6 J	Doc ID: RM0000012CI0MKX
Model Year: 2015	Model: Tundra	Prod Date Range: [08/2014 -]
Title: AUDIO / VISUAL: AUDIO AND VISUAL SYSTEM: Radio Receiver Power Source Circuit; 2015 MY Tundra [08/2014 -]		

Radio Receiver Power Source Circuit

DESCRIPTION

This circuit provides power to the radio and display receiver assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1.	CHECK HARNESS AND CONNECTOR (RADIO AND DISPLAY RECEIVER ASSEMBLY - BATTERY AND GROUND)
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Last Modified: 9-16-2014	6.6 D	Doc ID: RM000000VVD07SX
Model Year: 2015	Model: Tundra	Prod Date Range: [08/2014 -]
Title: PARK ASSIST / MONITORING: INTUITIVE PARKING ASSIST SYSTEM: OPERATION CHECK; 2015 MY Tundra [08/2014 -]		

OPERATION CHECK

1. CHECK INITIAL CHECK FUNCTION

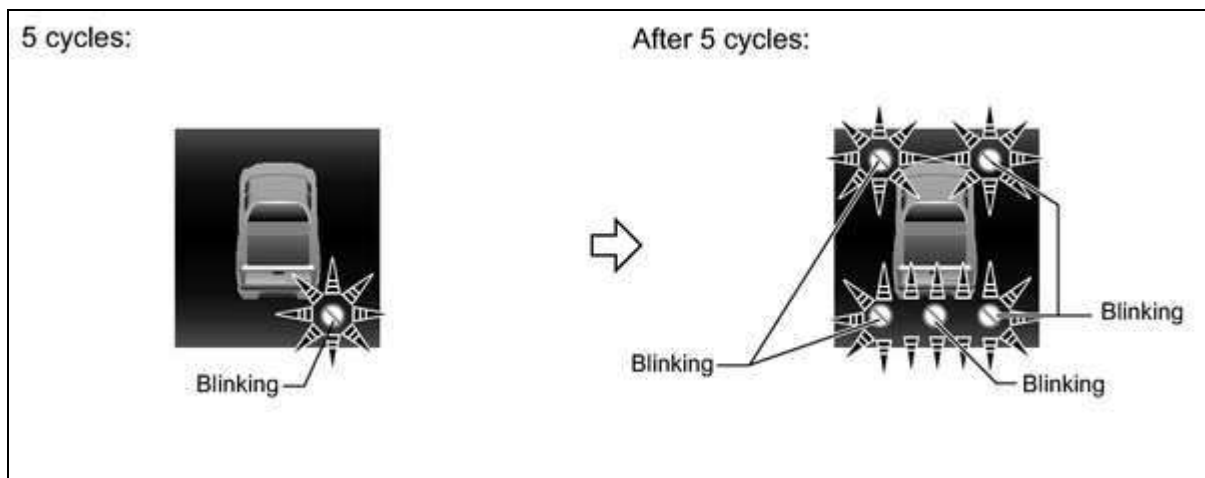
(a) Check the initial check function for the sensor.

- Approximately 0.4 seconds after the ignition switch has been turned to the ON position and the back sonar or clearance sonar switch assembly has been turned ON, all sensors will be checked by the system.
- When the vehicle has been shifted from P, the system will change to the obstacle detection operation according to the shift position.
- If there are no changes in the conditions, such as those listed above (speed or shift position), the sensor check operation will be halted after approximately 5 seconds have elapsed. If one or more sensors are anomalous, check operation for all of the sensors will continue (sensors will continue transmitting).

2. MALFUNCTION DISPLAY (MULTI-INFORMATION DISPLAY)

(a) Open circuit indication

- (1) If there is an open circuit between the ultrasonic sensor and the clearance warning ECU assembly or a sensor is malfunctioning, the malfunction is displayed as shown in the illustration.



HINT:

- The example shows an open circuit in the No. 2 ultrasonic sensor (rear corner sensor RH).
- The rear right detection area blinks and the other indicator areas are not illuminated (5 cycles).
- The rear right detection area blinks (after 5 cycles).
- If "CHECK SONAR SYSTEM, SEE DEALER" is displayed, refer to "System check indication is displayed in self-check function" in the Problem Symptoms Table to inspect the problem INFO.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
		down	

HINT:

- This test can be conducted when the vehicle speed is 50 km/h (30 mph) or less.
- The 4th to 5th and 5th to 6th up-shifts must be performed with the accelerator pedal released.
- The 6th to 5th and 5th to 4th down-shifts must be performed with the accelerator pedal released.
- Do not operate the accelerator pedal for at least 2 seconds after shifting and do not shift successively.
- The shift position commanded by the ECM is shown in the Data List display on the Techstream.
- The shift solenoid valve S2 turns ON/OFF normally when the shift lever is in D.

ECM gear shift command	1st	2nd	3rd	4th	5th	6th
Shift solenoid valve S2	ON	ON	OFF	OFF	OFF	ON

PROCEDURE

1.	CHECK DTC OUTPUT (IN ADDITION TO DTC P0756)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the ignition switch to ON.
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.
- (e) Read the DTCs using the Techstream.

Result

RESULT	PROCEED TO
Only P0756 is output	A
P0756 and other DTCs are output	B

HINT:

If any other codes besides P0756 are output, perform troubleshooting for those DTCs first.

B  **GO TO DTC CHART**

A


2.	INSPECT SHIFT SOLENOID VALVE S2
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Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
6 (SR) - Body ground	20°C (68°F)	11 to 15 Ω

NG ► **GO TO STEP 3**

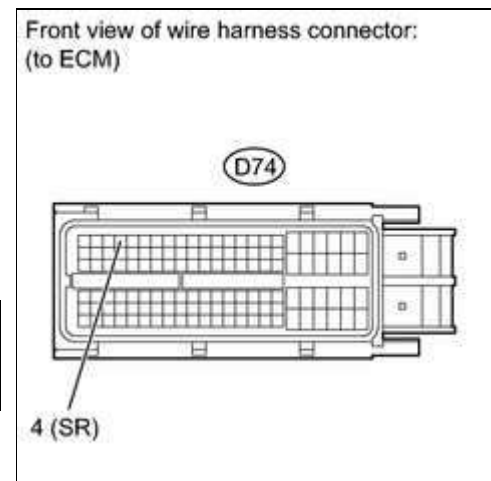
OK
▼

2.	CHECK HARNESS AND CONNECTOR (NO. 1 TRANSMISSION WIRE - ECM)
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- (a) Disconnect the D74 ECM connector.
- (b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
D74-4 (SR) - Body ground	20°C (68°F)	11 to 15 Ω



NG ► **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ► **REPLACE ECM**

3.	INSPECT SHIFT SOLENOID VALVE SR
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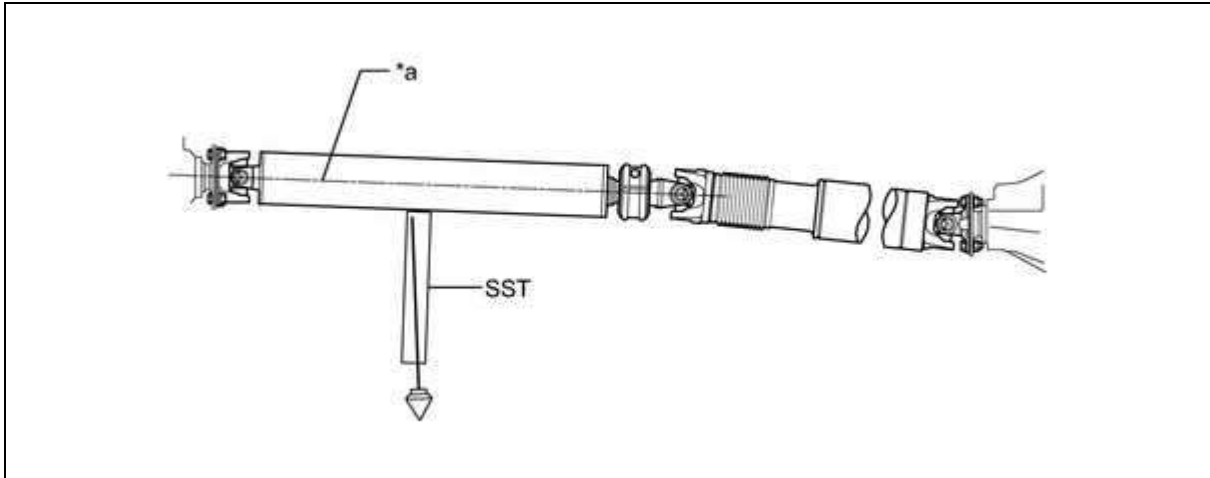
NOTICE:

- Perform the inspection on a level surface.
- Perform the inspection with the vehicle empty.
- Perform the inspection with all wheels on the ground.

(a) Measure the No. 1 joint angle.

(1) Using SST, measure and record the angle of the intermediate shaft (C).

SST: 09370-50010



Text in Illustration

*a	Intermediate Shaft Angle: C	-	-
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(2) Subtract the angle of the transfer flange (A) measured before installing the propeller shaft from the angle of the intermediate shaft (C) to calculate the No. 1 joint angle.

Text in Illustration

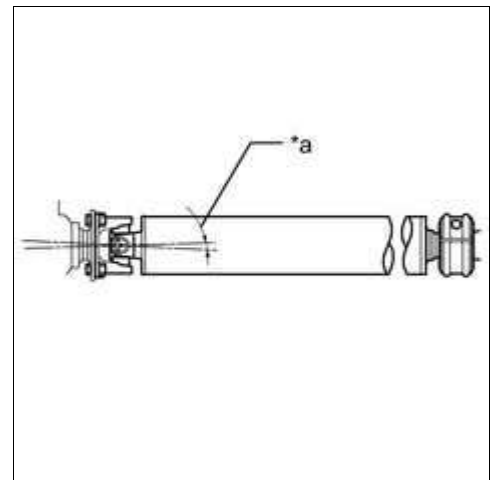
*a	No. 1 Joint Angle
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No. 1 joint angle:

Angle of intermediate shaft (C) - Angle of transfer flange (A)

Measured Value (Reference):

INTERMEDIATE SHAFT ANGLE MEASURED VALUE (C)	TRANSFER FLANGE ANGLE MEASURED VALUE (A)	NO. 1 JOINT ANGLE (CALCULATED VALUE) (C) - (A)
2°30' (2.50°)	3°45' (3.75°)	-1°15' (-1.25°)



HINT:

- Using the following chart, check if the calculated No. 1 joint angle is within the specified value.
- The tolerance is +/-0°60' (1.00°).
Standard No. 1 Joint Angle:

VEHICLE MODEL	NO. 1 JOINT ANGLE
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Case 2

Monitor runs whenever following DTCs not present	None
Either a or b met:	-
a. Air pump	Not operating
b. Air switching valve	Not operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

Case 3

Monitor runs whenever following DTCs not present	None
Following conditions (a) and (b) met	-
a. Air pump	Operating
b. Air switching valve	Operating
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Case 1

One of following conditions met:	A, B, C or D
A. Diagnostic signal duty ratio from air injection control driver	1% or more, and 10% or less
B. Diagnostic signal duty ratio from air injection control driver	30%
C. Diagnostic signal duty ratio from air injection control driver	49%
D. Diagnostic signal duty ratio from air injection control driver	91% or more, and 99% or less

Case 2

Diagnostic signal duty ratio from air injection control driver	70% or more, and 90% or less
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Case 3

Diagnostic signal duty ratio from air injection control driver	0%
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Case 4

Diagnostic signal duty ratio from air injection control driver	100%
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COMPONENT OPERATING RANGE

Last Modified: 9-16-2014	6.6 C	Doc ID: RM000004U23009X
Model Year: 2015	Model: Tundra	Prod Date Range: [08/2014 -]
Title: 3UR-FBE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0461-P0463; Fuel Level Sensor "A" Circuit Range / Performance; 2015 MY Tundra [08/2014 -]		

DTC	P0461	Fuel Level Sensor "A" Circuit Range / Performance
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DTC	P0462	Fuel Level Sensor "A" Circuit Low
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DTC	P0463	Fuel Level Sensor "A" Circuit High
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DESCRIPTION

The fuel sender gauge is located inside the fuel tank and measures the amount of fuel. The fuel sender gauge converts the fuel level in the fuel tank into a resistance value, and outputs this value. The ECM determines when it is necessary to refuel the vehicle based on changes in the resistance value of the fuel sender gauge.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0461	Despite consuming a certain amount of fuel, the change in the resistance value of the fuel sender gauge is below the threshold. (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel sender gauge circuit • Fuel sender gauge assembly
P0462	The resistance value of the fuel sender gauge is below the threshold. (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel sender gauge circuit • Fuel sender gauge assembly
P0463	The resistance value of the fuel sender gauge exceeds the threshold. (2 trip detection logic)	<ul style="list-style-type: none"> • Open or short in fuel sender gauge circuit • Fuel sender gauge assembly

MONITOR DESCRIPTION

The ECM monitors the sensor resistance and uses this value to determine the amount of fuel remaining. When the sensor output resistance deviates from the normal operating range, the ECM determines that there is a malfunction in the fuel sender gauge and stores a DTC.

MONITOR STRATEGY

Related DTCs	P0461: Fuel level sensor stuck P0462: Fuel level sensor range check (Low Resistance) P0463: Fuel level sensor range check (High Resistance)
Required sensors/Components	Fuel sender gauge

OK



6.	INSPECT OIL CONTROL VALVE FILTER
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(a) Remove the oil control valve filter **INFO** .

(b) Check that the filter is not clogged.

OK:

Filter is not clogged.

NG **CLEAN OIL CONTROL VALVE FILTER**

OK



7.	REPLACE CAMSHAFT TIMING EXHAUST GEAR
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(a) Replace the camshaft timing exhaust gear **INFO** .

HINT:

Perform "Inspection After Repair" after replacing the camshaft timing exhaust gear assembly **INFO** .

NEXT



8.	CHECK WHETHER DTC OUTPUT RECURS
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(a) Connect the Techstream to the DLC3.

(b) Turn the Techstream on.

(c) Clear DTCs **INFO** .

(d) Warm up the engine.

(e) Drive the vehicle in accordance with the driving pattern described in the Confirmation Driving Pattern.

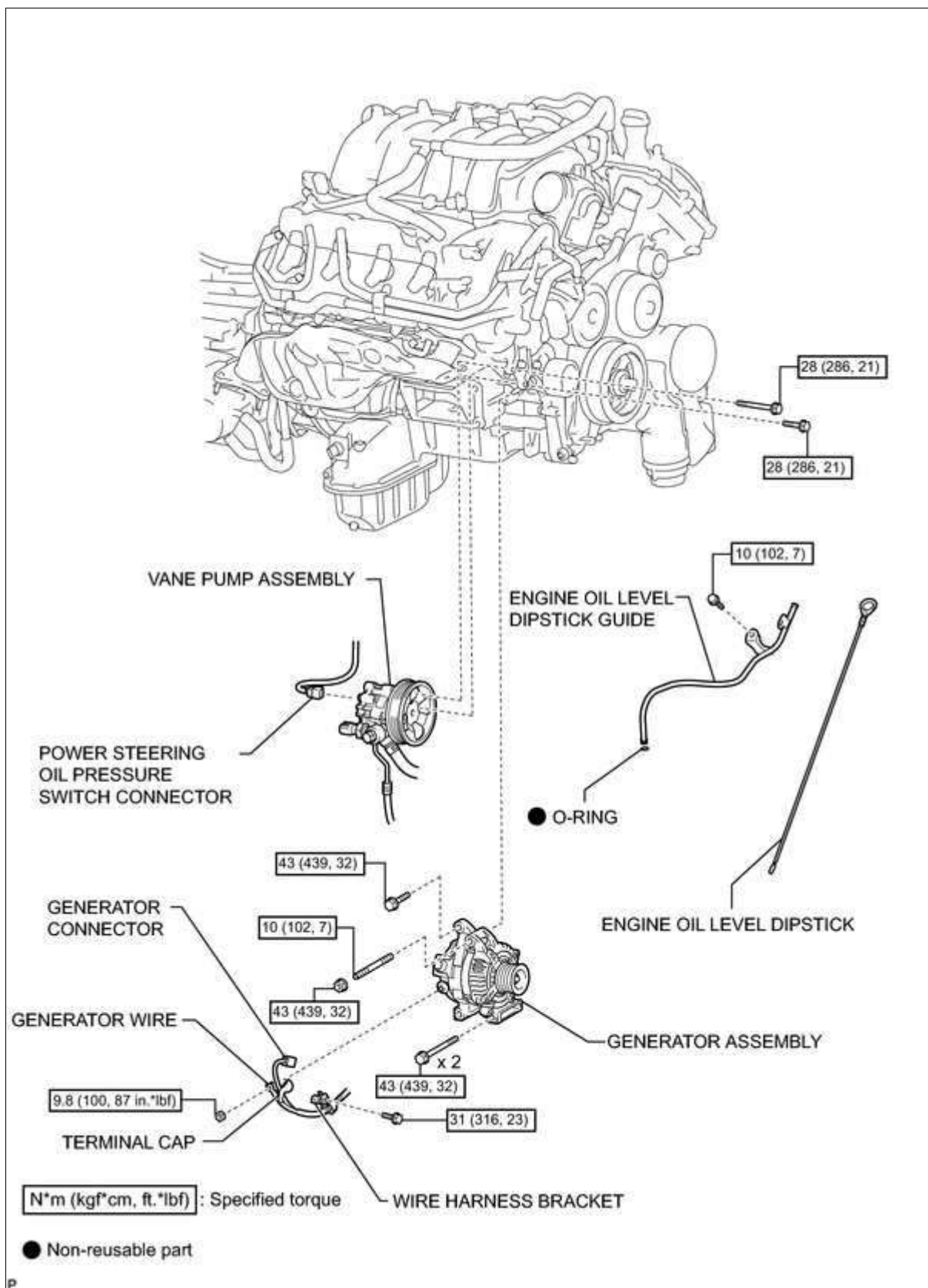
(f) Read the output pending DTCs using the Techstream.

OK:

No pending DTC output.

HINT:

DTC P0014, P0015, P0024 or P0025 is output when foreign objects in the engine oil are caught in some parts of the system. These codes will stay registered even if the system returns to normal after a short time. These foreign objects are then captured by the oil filter, thus eliminating the source of the



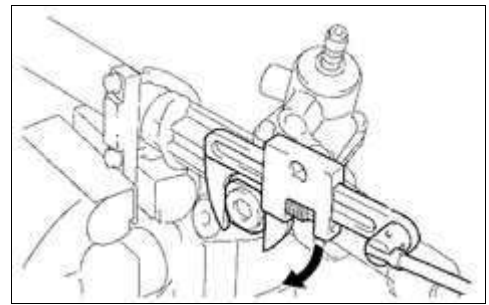
ILLUSTRATION

(a) Using SST, remove the steering rack guide spring cap nut.

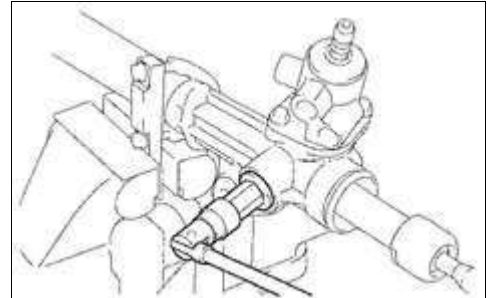
SST: 09922-10010

NOTICE:

Rotate SST in the direction shown in the illustration.



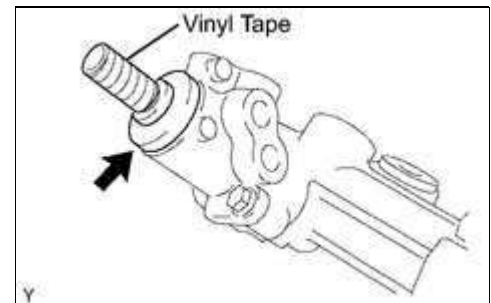
(b) Using a 32 mm hexagon wrench, remove the rack guide spring cap.



(c) Remove the spring and rack guide.

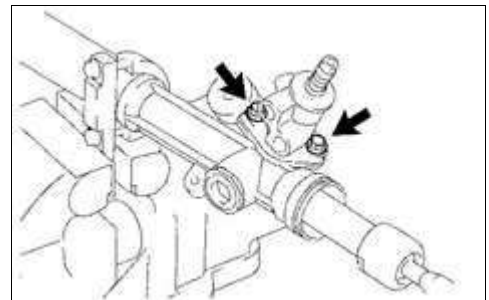
10. REMOVE POWER STEERING CONTROL VALVE

(a) Wind vinyl tape around the serrated portion of the control valve.



(b) Remove the dust cover from the control valve housing.

(c) Remove the 2 bolts.



(d) Pull out the control valve from the rack housing.

(e) Remove the control valve oil seal.

Standard resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
J50-5 (CCTY) - DD-46	Always	Below 1 Ω
J50-7 (E) - Body ground		
J50-5 (CCTY) - Body ground	Always	10 k Ω or higher

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



7.	CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - BATTERY AND BODY GROUND)
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(a) Disconnect the J2 and J3 ECU connectors.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage:

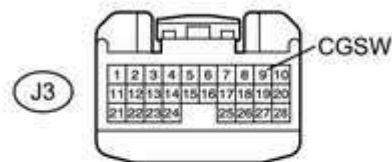
TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
J2-14 (CGLP) - Body ground	Cargo light switch ON or DOOR	11 to 14 V
	Cargo light switch OFF	Below 1 V

(c) Measure the resistance according to the value(s) in the table below.

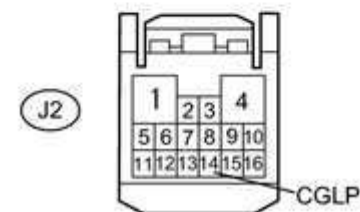
Standard resistance:

TESTER CONNECTION	SWITCH CONDITION	SPECIFIED CONDITION
J3-9 (CGSW) - Body ground	Cargo light switch ON	Below 1 Ω
	Cargo light switch DOOR or OFF	10 k Ω or higher

Front view of harness connector:
(to Main Body ECU)



Front view of harness connector:
(to Main Body ECU)



NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK  **REPLACE MAIN BODY ECU**

