

ACCESSORIES & EQUIPMENT

Parking Assist Monitor System (Diagnostic Codes & Circuit Tests) - Sienna

PARKING ASSIST MONITOR SYSTEM

DTC C1611: ECU MALFUNCTION

DESCRIPTION

This DTC is stored if the parking assist ECU judges that there is an internal malfunction as a result of its self check.

HINT:

The parking assist ECU stores different types of information during initialization. If the parking assist ECU cannot read the stored information when it is activated, the parking assist ECU judges that there is an internal malfunction and stores this DTC.

DTC Code	DTC Detection Condition	Trouble Area
C1611	- EEPROM Status (Initial read) - AISIC Output Status	- Parking assist ECU initialization (parking assist ECU not initialized) - Back camera position setting (initialized parking assist ECU) - Steering Angle setting (initialized parking assist ECU) - Parking assist ECU

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION .

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.

- d. Enter the following menus: Chassis / Parking Assist Monitor System / Data List.
- e. Check the Data List for proper functioning of the following items.

PARKING ASSIST MONITOR SYSTEM

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
EEPROM Status (Initial read)	Parking assist ECU information/OK or NG	OK: Parking assist ECU is normal NG: Parking assist ECU is abnormal	-
AISIC Output Status	Output condition of camera display signal/OK or NG	OK: Output condition of camera display signal is normal NG: Output condition of camera display signal is abnormal	-

RESULT

Result	Proceed to
OK is displayed for both items.	A
NG is displayed for EEPROM Status (Initial read).	A
NG is	

displayed for AISIC Output Status	B
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B --> See step 4

A: Go to next step

2. SETTINGS (PARKING ASSIST ECU INITIALIZATION)

HINT:

- The parking assist ECU stores different types of information during initialization. If the parking assist ECU cannot read the stored information when it is activated, the parking assist ECU judges that there is an internal malfunction and stores this DTC.
- If the parking assist ECU cannot read the stored information when it is activated, allowing the ECU to store the information again may return the system to normal.
- a. Use the transition of diagnosis screens (note which transition pattern occurs) to confirm if the parking assist ECU was able to properly store the information from initialization. Refer to **DIAGNOSIS SYSTEM**.

HINT:

The procedure to make the parking assist ECU store the vehicle information differs when the parking assist ECU has stored the information (initialized) and when the information has not been stored (not initialized).

- b. Perform the following procedure depending on the memory conditions to register the vehicle information into the parking assist ECU.

Condition	Procedure
Not initialized	Parking assist ECU initialization. Refer to <u>CALIBRATION</u>
Initialized	• Back camera position setting. Refer to <u>CALIBRATION</u> • Steering angle setting (Diagnosis system). Refer to <u>DIAGNOSIS SYSTEM</u>

NEXT: Go to next step

3. CHECK DTC OUTPUT

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC C1611 is output	A
No DTC is output	B

HINT:

- If DTC C1611 is output, perform the procedure to allow the parking assist ECU to store the vehicle information again.
- If DTC C1611 is still output after performing the procedure to make the parking assist ECU store the vehicle information 3 times, replace the parking assist ECU.
- If DTC C1611 is output frequently, replace the parking assist ECU even though the DTC is not output when rechecking for DTCs.

B --> END

A --> See step 4

4. REPLACE PARKING ASSIST ECU. Refer to REMOVAL

DTC C1612: IG VOLTAGE IS LOW OR HIGH

DESCRIPTION

This DTC is stored if the parking assist ECU judges as a result of its self check that the voltage received by terminal IG is low or high.

DTC Code	DTC Detection Condition	Trouble Area
C1612	• IG voltage is low • IG voltage is high	• Harness or connector • Parking assist ECU

WIRING DIAGRAM

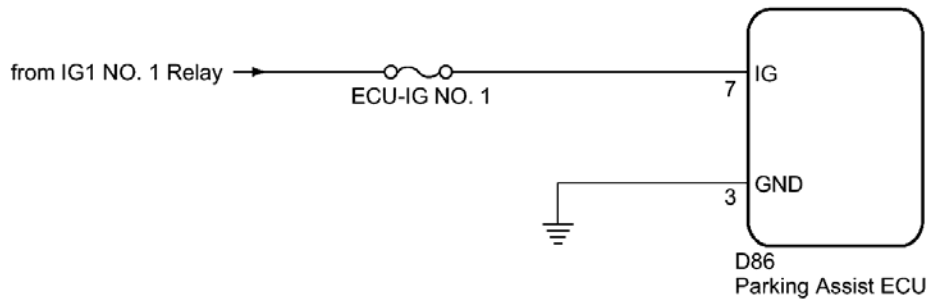


Fig. 1: Parking Assist ECU IG Voltage Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK DTC OUTPUT

- Clear the DTCs. Refer to DTC CHECK / CLEAR .
- Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC C1612 is output	A
No DTC is output	B

HINT:

If the parking assist ECU cannot read the stored information when it is activated, allowing the ECU to store the information again may return the system to normal.

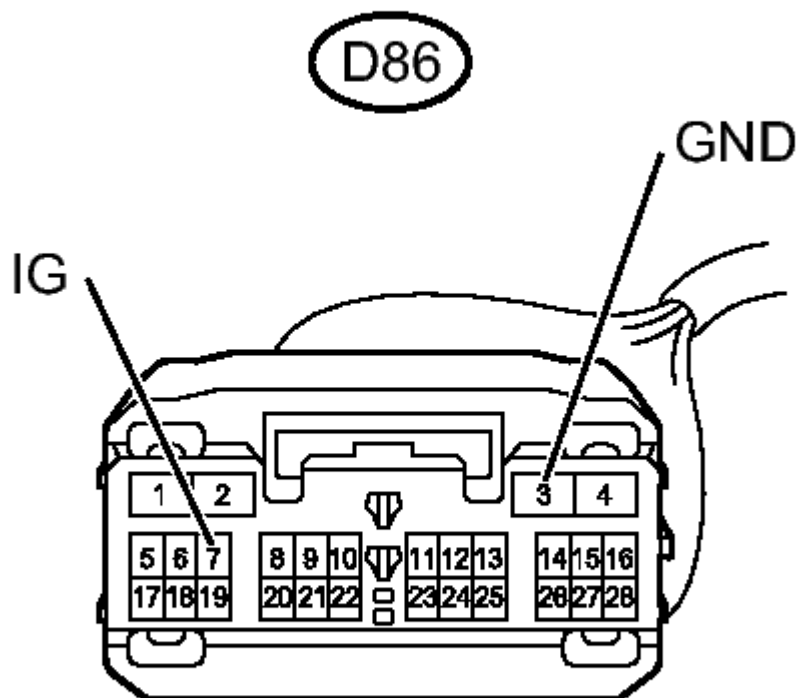
B --> See step 4

A: Go to next step

2. CHECK HARNESS AND CONNECTOR (PARKING ASSIST ECU IG VOLTAGE)

- a. Disconnect the D86 parking assist ECU connector.

***a**



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Fig. 2: Checking Harness And Connector (Parking Assist ECU IG Voltage)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D86-7 (IG) - D86-3 (GND)	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Parking Assist ECU)
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NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 3

3. **REPLACE PARKING ASSIST ECU. Refer to REMOVAL**
4. **USE SIMULATION METHOD TO CHECK. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1613: ACC VOLTAGE IS LOW OR HIGH

DESCRIPTION

This DTC is stored if the parking assist ECU judges as a result of its self check that the voltage received by terminal ACC is not normal.

DTC Code	DTC Detection Condition	Trouble Area
C1613	• ACC voltage is low • ACC voltage is high	• Harness or connector • Parking assist ECU

WIRING DIAGRAM

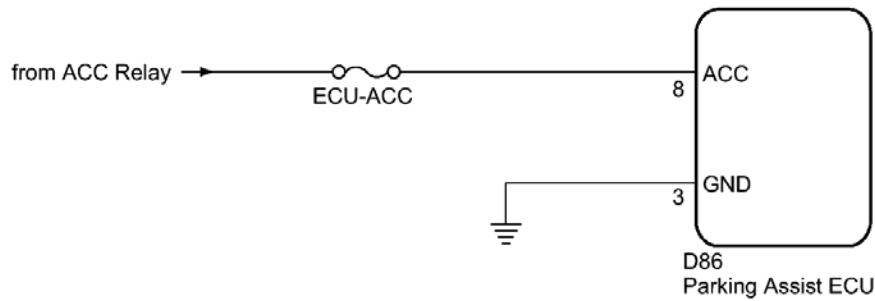


Fig. 3: Parking Assist ECU ACC Voltage Circuit - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION .
- Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. CHECK DTC OUTPUT

- a. Clear the DTCs. Refer to DTC CHECK / CLEAR .
- b. Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC C1613 is output	A
No DTC is output	B

HINT:

If the parking assist ECU cannot read the stored information when it is activated, allowing the ECU to store the information again may return the system to normal.

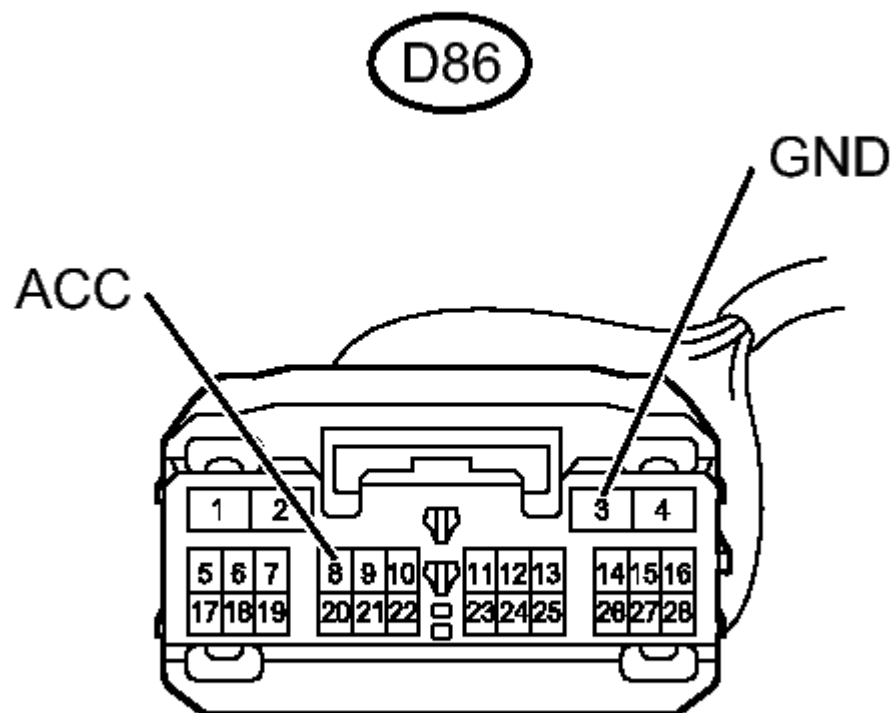
B --> See step 4

A: Go to next step

2. CHECK HARNESS AND CONNECTOR (PARKING ASSIST ECU ACC VOLTAGE)

- a. Disconnect the D86 parking assist ECU connector.

***a**



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Fig. 4: Checking Harness And Connector (Parking Assist ECU ACC Voltage)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D86-8 (ACC) - D86-3 (GND)	Ignition switch ACC	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Parking Assist ECU)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 3

- 3. REPLACE PARKING ASSIST ECU. Refer to REMOVAL**
- 4. USE SIMULATION METHOD TO CHECK. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1621: BACK CAMERA POWER SUPPLY FAILURE; DTC C1622: OPEN OR SHORT CIRCUIT IN BACK CAMERA SIGNAL

DESCRIPTION

This DTC is stored if the parking assist ECU judges as a result of its self check that the signals or signal lines between the parking assist ECU and the rear television camera assembly are not normal.

DTC Code	DTC Detection Condition	Trouble Area
C1621	Rear television camera power supply failure	• Harness or connector • Rear television camera assembly • Parking assist ECU
C1622	An open or short in the rear television camera signal circuit	• Harness or connector • Rear television camera assembly • Parking assist ECU

WIRING DIAGRAM

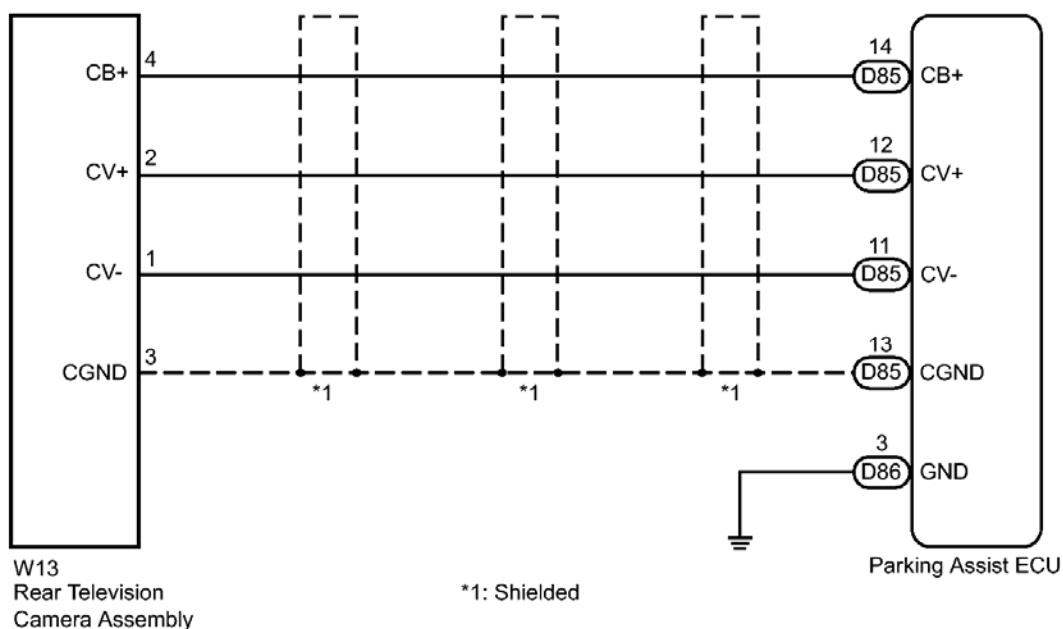


Fig. 5: Rear Television Camera Assembly - Wiring Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (PARKING ASSIST ECU - REAR TELEVISION CAMERA)**
 - a. Disconnect the D85 parking assist ECU connector.
 - b. Disconnect the W13 rear television camera assembly connector.
 - c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D85-11 (CV-) - W13-1 (CV-)	Always	Below 1 ohms
D85-12 (CV+) - W13-2 (CV+)	Always	Below 1 ohms
D85-14 (CB+) - W13-4 (CB+)	Always	Below 1 ohms
D85-11 (CV-) - Body ground	Always	10 kohms or higher
D85-12 (CV+) - Body ground	Always	10 kohms or higher
D85-13 (CGND) - Body ground	Always	10 kohms or higher
D85-14 (CB+) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. INSPECT PARKING ASSIST ECU (CV-, CGND)

- a. Reconnect the D85 parking assist ECU connector.

*a

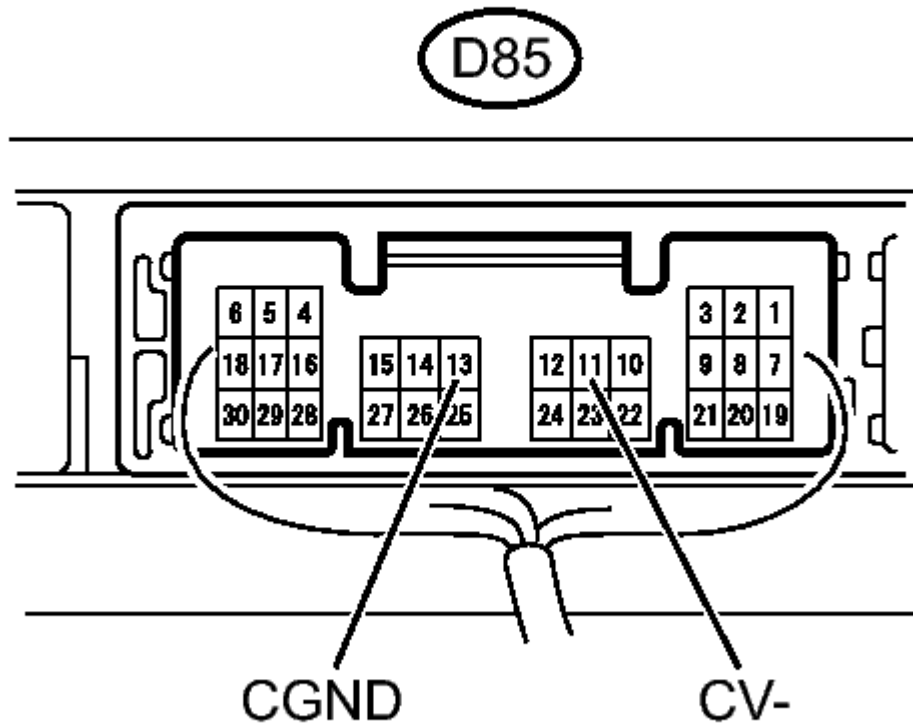


Fig. 6: Inspecting Parking Assist ECU (CV-, CGND)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
D85-11 (CV-) - Body ground	Always	Below 1 ohms
D85-13 (CGND) - Body	Always	Below 1 ohms

ground		
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TEXT IN ILLUSTRATION

*a	Component with harness connected (Parking Assist ECU)
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NG --> See step 5

OK: Go to next step

3. CHECK REAR TELEVISION CAMERA ASSEMBLY (CB+, CGND)
- a. Disconnect the W13 rear television camera assembly connector.

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

*a

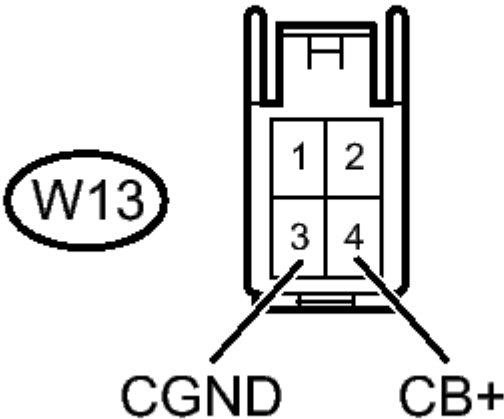


Fig. 7: Measuring Voltage Of Rear Television Camera Assembly
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition

W13-3 (CGND) - W13-4 (CB+)	Ignition switch ON Shift lever in R	5.8 to 7.0 V
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TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Television Camera Assembly)
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NG --> See step 5

OK: Go to next step

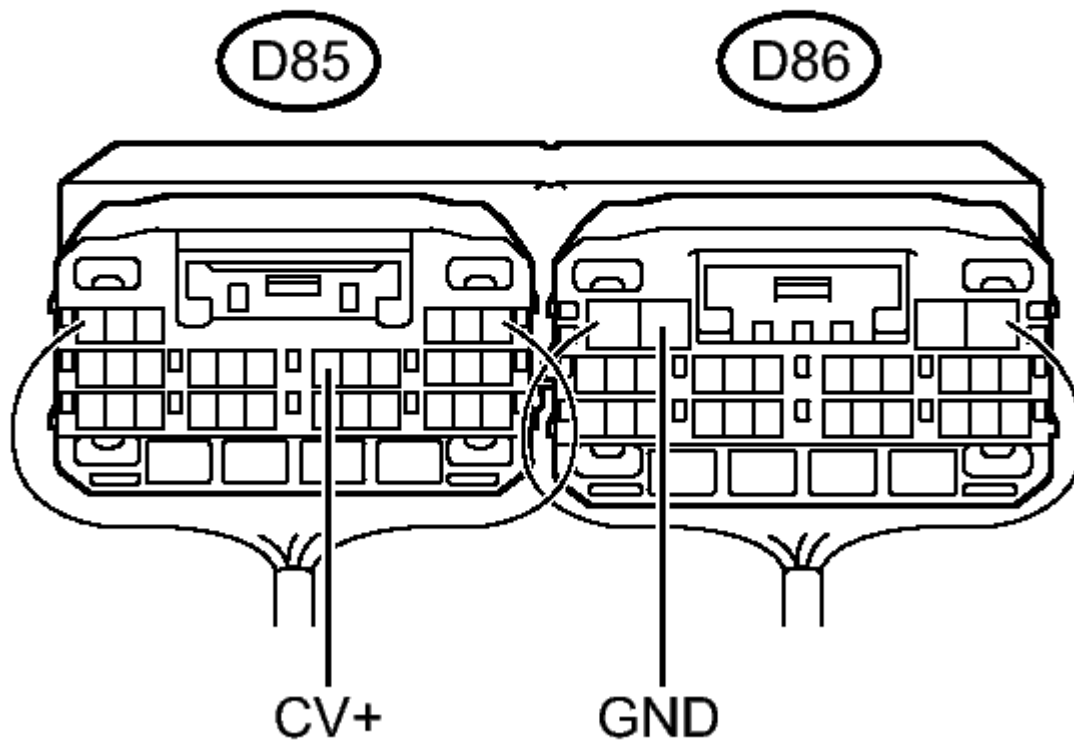
4. CHECK PARKING ASSIST ECU (CV+, GND)

- Reconnect the W13 rear television camera assembly connector.
- Reconnect the D85 and D86 parking assist ECU connectors.

TEXT IN ILLUSTRATION

*a	Component with harness connected (Parking Assist ECU)
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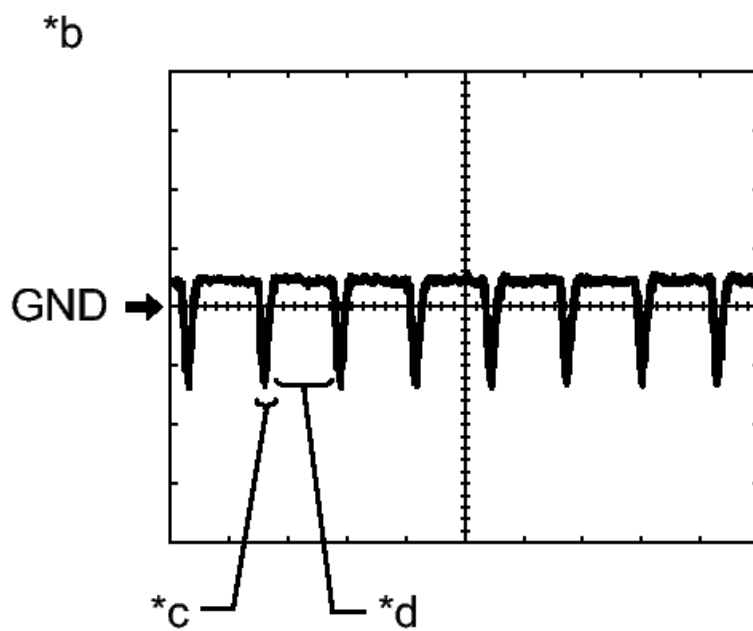
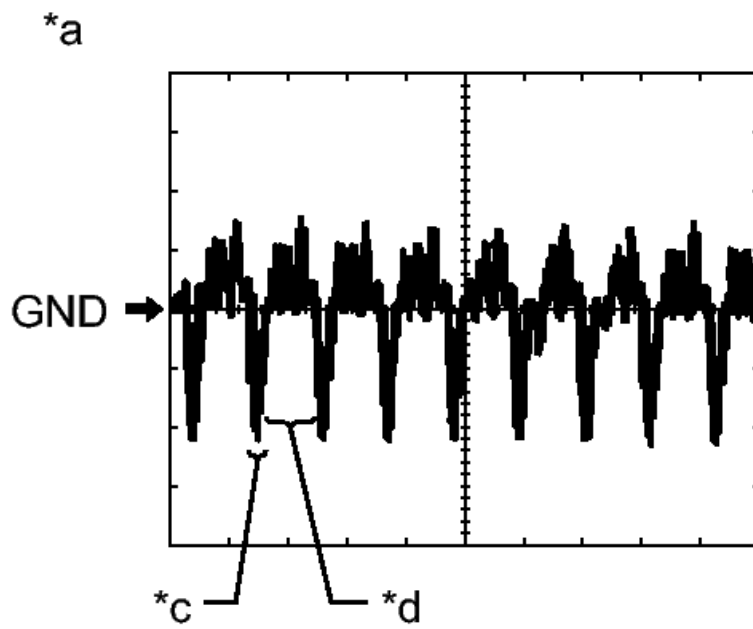
*a



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Fig. 8: Checking Parking Assist ECU (CV+, GND)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- c. Check the waveform of the rear television camera assembly using an oscilloscope.



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Fig. 9: Identifying Waveform Graph 1 And 2
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

A waterproof connector is used for the rear television camera assembly. Therefore, inspect the waveform at the parking assist ECU with the connector connected.

OK

Waveform is as shown in the illustration.

REFERENCE

Item	Content
Terminal No. (Symbol)	D85-12 (CV+) - D86-3 (GND1)
Tool Setting	200 mV/DIV., 50 μsec./DIV.
Condition	Ignition switch ON, shift lever in R

HINT:

The video waveform changes according to the image sent by the rear television camera assembly.

TEXT IN ILLUSTRATION

*a	Waveform 1 (under normal conditions) (see Fig. 9)
*b	Waveform 2 (camera lens is covered, blacking out the screen) (see Fig. 9)
*c	Synchronized Signal
*d	Video Waveform

NG --> See step 6

OK --> See step 5

5. **REPLACE PARKING ASSIST ECU. Refer to REMOVAL**

6. **REPLACE REAR TELEVISION CAMERA ASSEMBLY. Refer to REMOVAL**

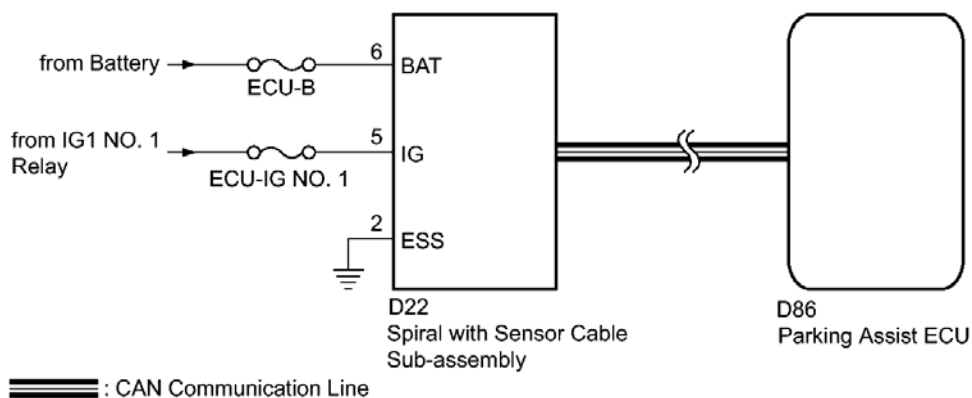
DTC C1625: OPEN OR SHORT IN STEERING ANGLE SENSOR +B

DESCRIPTION

This DTC is stored if the parking assist ECU receives a signal via CAN communication from the spiral with sensor cable sub-assembly that indicates a power supply system problem.

DTC Code	DTC Detection Condition	Trouble Area
C1625	Open or short in steering angle sensor +B	• Harness or connector • Steering sensor (spiral with sensor cable sub-assembly)

WIRING DIAGRAM



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Fig. 10: Steering Angle Sensor +B - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to

CALIBRATION .

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

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY POWER SUPPLY)**
 - a. Disconnect the D22 spiral with sensor cable sub-assembly connector.

***1**

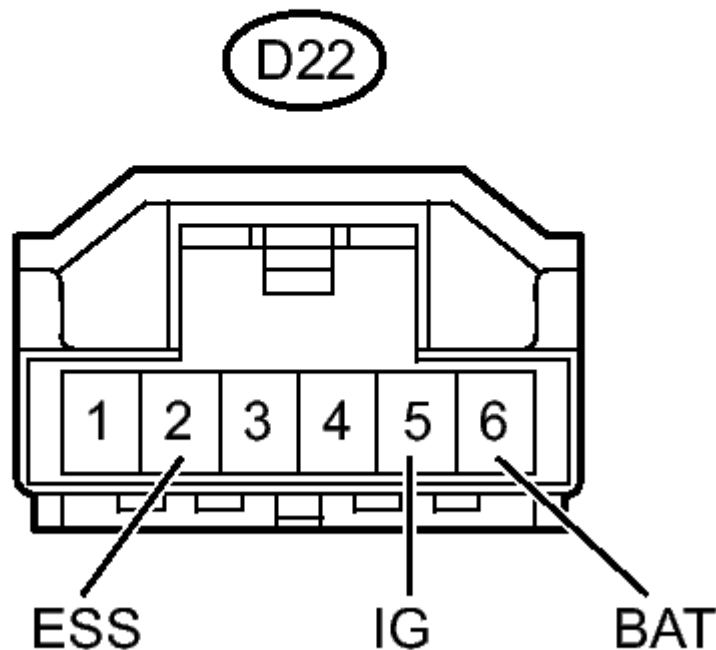


Fig. 11: Checking Harness And Connector (Spiral With Sensor Cable Sub-Assembly Power Supply)

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

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

Standard Resistance

Tester Connection	Condition	Specified Condition
D22-2 (ESS) - Body ground	Always	Below 1 ohms

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

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D22-5 (IG) - D22-2 (ESS)	Ignition switch ON	11 to 14 V
D22-6 (BAT) - D22-2 (ESS)	Always	11 to 14 V

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Spiral with Sensor Cable Sub-assembly)
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NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 2

2. REPLACE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY. Refer to REMOVAL

DTC C1626: STEERING ANGLE SENSOR FAILURE

DESCRIPTION

This DTC is stored if the parking assist ECU receives a signal via CAN communication from the spiral with sensor cable sub-assembly that indicates an internal malfunction.

DTC Code	DTC Detection Condition	Trouble Area
C1626	A fail flag is transmitted from the steering angle sensor.	- Steering sensor (spiral with sensor cable sub-assembly) - Parking assist ECU

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION .

PROCEDURE

1. REPLACE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY

- Replace the spiral with sensor cable sub-assembly. Refer to REMOVAL .

NEXT: Go to next step

2. CHECK DTC OUTPUT

- Clear the DTCs. Refer to DTC CHECK / CLEAR .
- Check for DTCs. Refer to DTC CHECK / CLEAR .

RESULT

Result	Proceed to
DTC C1626 is output	A
No DTC is output	B

B --> END

A --> See step 3

3. REPLACE PARKING ASSIST ECU. Refer to REMOVAL

DTC C168B: AVC-LAN COMMUNICATION MALFUNCTION; DTC C168C: AVC-LAN COMMAND TIME OUT

DESCRIPTION

This DTC is stored if the parking assist ECU judges that there is a problem with the AVC-LAN communication system as a result of self check.

DTC Code	DTC Detection Condition	Trouble Area
C168B	• AVC-LAN communication malfunction: No master • AVC-LAN communication malfunction: Master reset • AVC-LAN communication malfunction: Master malfunction • AVC-LAN communication malfunction: Abnormal connection check • AVC-LAN communication malfunction: Transmission not completed • AVC-LAN communication malfunction: Abnormal transmission completion notification • AVC-LAN communication malfunction: Registration request transmission • AVC-LAN communication malfunction: Abnormal ON/OFF parameter	AVC-LAN Communication
C168C	• AVC-LAN command time out: Output ON request notification command time out • AVC-LAN command time out: Output OFF request notification command time out • AVC-LAN command time out: Voice production start request notification command time out • AVC-LAN command time out: Voice production end request notification command time out	

INSPECTION PROCEDURE

PROCEDURE

1. CHECK DTC OUTPUT

- a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- b. Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC C168B or C168C is output	A
No DTC is output	B

HINT:

- This DTC may be stored due to the battery condition or changes in the power supply waveform when turning the ignition switch to ON, even though there is no problem with the AVC-LAN communication system.
- If DTC C168B or C168C is output frequently, duplicate the problem symptoms and perform the inspection again, even though the DTC is not output when rechecking for DTCs. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .
- There is no problem to disappear by turning on again the power supply, even if DTC C168B is output.

B --> See step 3

A --> See step 2

2. **GO TO NAVIGATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
3. **USE SIMULATION METHOD TO CHECK. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC U0073: CONTROL MODULE COMMUNICATION BUS OFF; DTC U0126: LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE; DTC U0129: LOST COMMUNICATION WITH BRAKE SYSTEM CONTROL MODULE; DTC U0140: LOST COMMUNICATION WITH MAIN BODY ECU; DTC U1110: LOST COMMUNICATION WITH CLEARANCE SONAR MODULE

DESCRIPTION

These DTCs are stored if there is a malfunction in the CAN communication system connected to the parking assist ECU.

HINT:

If CAN communication system DTCs are stored, they may also be stored in other systems.

DTC Code	DTC Detection Condition	Trouble Area
U0073	Control module communication bus off	CAN communication system
U0126	Lost communication with steering angle sensor	
U0129	Lost communication with brake system	
U0140	Lost communication with main body ECU	
U1110	Lost communication with clearance sonar module	

INSPECTION PROCEDURE**PROCEDURE****1. CHECK DTC OUTPUT**

- Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
- Check for DTCs. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is output	A
No DTC is output	B

HINT:

- If the CAN communication system has been inspected and repaired in other systems, the DTCs will not be output when rechecking for DTCs.
- If these DTCs are output frequently, duplicate the conditions that cause the problem symptoms and perform the inspection again, even though the DTC was not output when rechecking for DTCs. Refer to **ELECTRONIC CIRCUIT INSPECTION PROCEDURE** .

B --> See step 3

A --> See step 2

2. GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH

TROUBLESHOOTING

3. USE SIMULATION METHOD TO CHECK. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

SYMPTOM TESTS

Image from Camera for Parking Assist Monitor is Abnormal

DESCRIPTION

The display signal from the rear television camera assembly is transmitted to the navigation receiver assembly via the parking assist ECU.

WIRING DIAGRAM

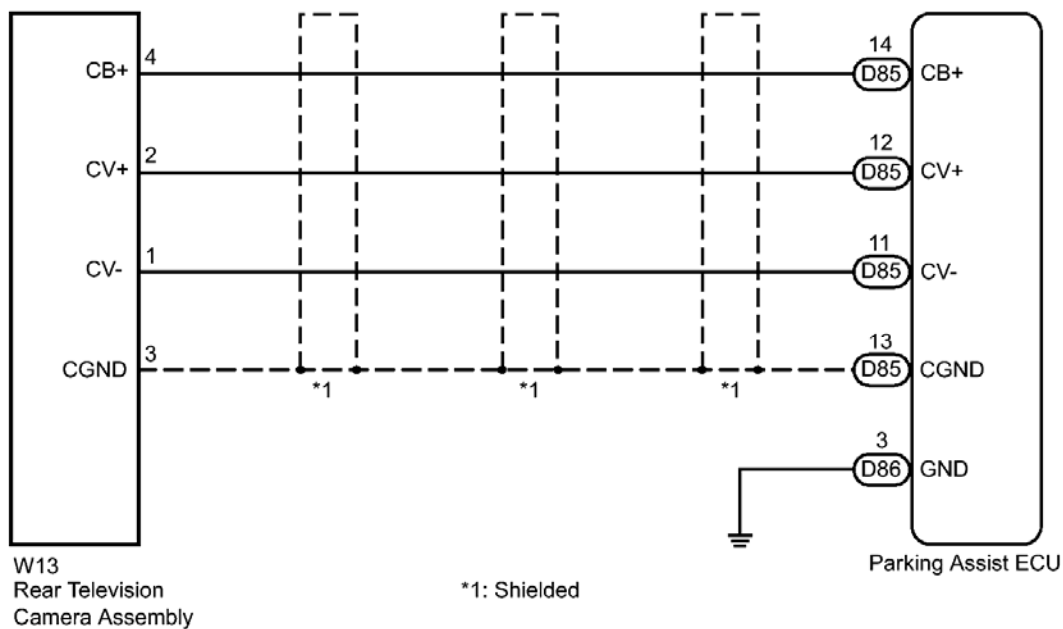


Fig. 12: Rear Television Camera Assembly - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to

CALIBRATION .

HINT:

Images are difficult to discern even in normal conditions if:

- Noise may occur in the image during power back door operation (w/ power back door system).
- Noise may occur in the image depending on electrical devices used in the cabin.
- Noise may occur in the image if accessories that generate radio waves have been installed.
- The camera screen is frosted over (the image immediately after turning the ignition switch to ON may be blurred or darker than normal).
- The camera lens is dirty with snow, mud, etc.
- A strong beam of light, such as a sunbeam or headlight, hits the camera.
- It is too dark around the camera (at night etc.).
- The ambient temperature around the camera is either too high or too low.
- The vehicle is tilted at a steep angle.
- The ambience of the camera is too bright. (When a strong light, such as a sunbeam reflected off the vehicle body, hits the camera, the image may be blurred. This is called the "SMEAR" phenomenon, specific to the CCD camera.)

PROCEDURE

1. CHECK HARNESS AND CONNECTOR (PARKING ASSIST ECU - REAR TELEVISION CAMERA) See step 1

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. INSPECT PARKING ASSIST ECU (CV-, CGND) See step 2

NG --> See step 6

OK: Go to next step

3. CHECK REAR TELEVISION CAMERA ASSEMBLY (CB+, CGND) See step 3

NG --> See step 6

OK: Go to next step

4. CHECK PARKING ASSIST ECU (CV+, GND1) See step 4

NG --> See step 7

OK --> See step 5

- 5. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**
- 6. REPLACE PARKING ASSIST ECU. Refer to REMOVAL**
- 7. REPLACE REAR TELEVISION CAMERA ASSEMBLY. Refer to REMOVAL**

Message indicating Back Door is Open is Displayed even after Back Door is Closed

DESCRIPTION

The parking assist ECU receives back door lock assembly open/close signals from the main body ECU via CAN communication. When the back door is open, the camera aiming cannot be adjusted correctly because the rear television camera assembly is installed on the back door. Therefore, when adjusting the camera aiming calibration while the back door is open, a back door open warning message will be displayed on the screen and camera aiming adjustment will be canceled.

HINT:

- The back door lock assembly is connected to the main body ECU by the vehicle wire harness (w/o power back door system).
- The back door lock assembly is connected to the power back door ECU (power back door motor unit) by the vehicle wire harness. The power back door ECU (power back door motor unit) sends back door lock assembly signals to the main body ECU via CAN communication (w/ power back door system).

WIRING DIAGRAM

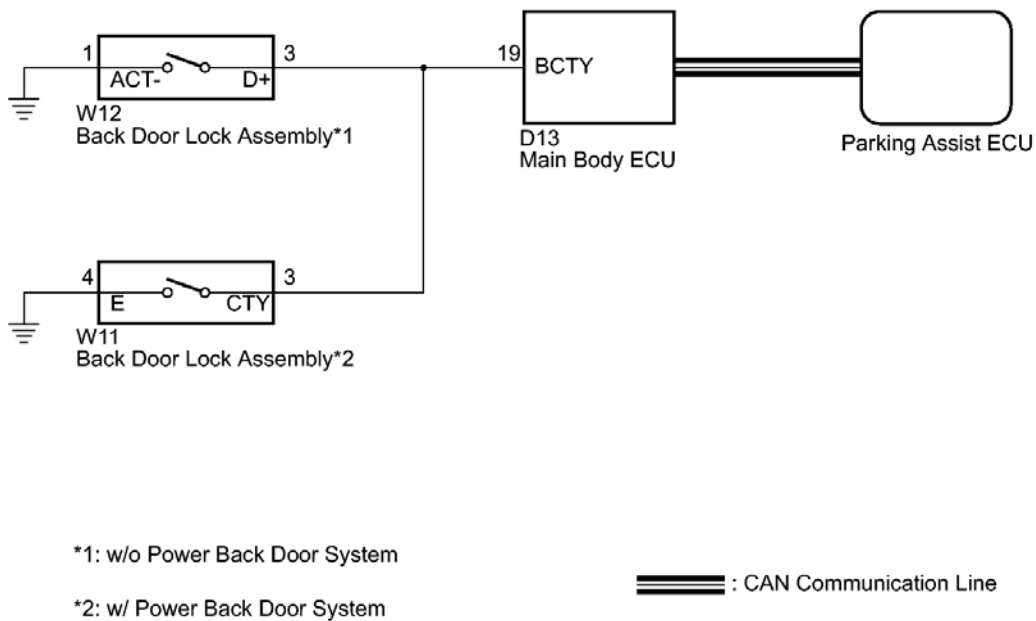


Fig. 13: Back Door Lock Assembly Circuit - Wiring Diagram

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

INSPECTION PROCEDURE

NOTE:

- When "System initializing" is displayed on the navigation receiver assembly after the battery terminal has been disconnected, correct the steering angle neutral point. Refer to INITIALIZATION .
- Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION .

PROCEDURE

1. READ VALUE USING TECHSTREAM

- Connect the Techstream to the DLC3.
- Turn the ignition switch to ON.
- Turn the Techstream on.
- Enter the following menus: Body Electrical / Main Body / Data List.
- Check the Data List for proper functioning of the following item.

MAIN BODY (MAIN BODY ECU)

Tester	Measurement	Normal	
--------	-------------	--------	--

Display	Item/Range	Condition	Diagnostic Note
Back Door Courtesy SW	Back door courtesy switch signal/ON or OFF	ON: Back door open OFF: Back door closed	-

OK

The back door courtesy switch functions as specified in the normal condition column.

NG --> See step 2

OK --> See step 6

2. CONFIRM MODEL

- Choose the model to be inspected.

RESULT

Result	Proceed to
w/o power back door system	A
w/ power back door system	B

B --> See step 7

A: Go to next step

3. CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - BACK DOOR LOCK)

- Disconnect the D13 main body ECU connector.
- Disconnect the W12 back door lock assembly connector.
- Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition

D13-19 (BCTY) - Body ground	Always	10 kohms or higher
W12-1 (ACT-) - Body ground	Always	Below 1 ohms
D13-19 (BCTY) - W12-3 (D+)	Always	Below 1 ohms

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

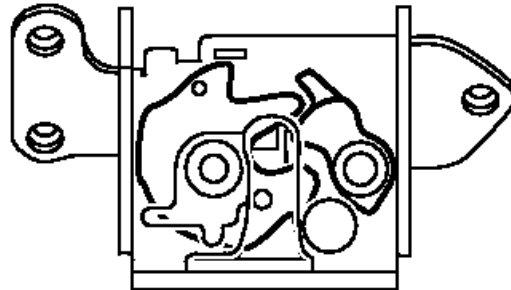
OK: Go to next step

4. INSPECT BACK DOOR LOCK ASSEMBLY

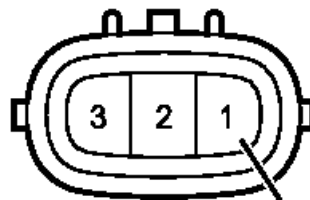
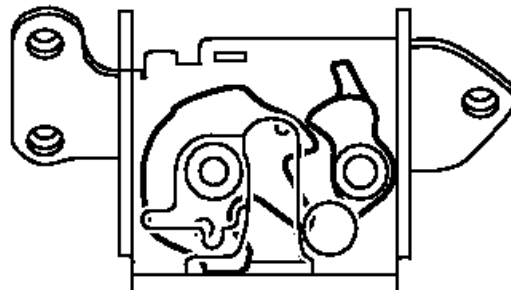
- a. Check the operation of the door lock motor.
 1. Move the door lock to the lock position.

*a

*b



*c



ACT-

H

Fig. 14: Inspecting Back Door Lock Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Apply battery voltage to the door lock motor and check the operation of the door lock motor.

OK

Measurement Condition	Specified Condition
Battery positive (+) -- > 2 (ACT+)	Unlocks
Battery negative (-) -- > 1 (ACT-)	

b. Check operation of the door courtesy switch.

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

Standard Resistance

Measurement Condition	Door Lock Condition	Specified Condition
1 (ACT-) - 3 (D+)	Locked	10 kohms or higher
1 (ACT-) - 3 (D+)	Unlocked	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Component without harness connected (Back Door Lock Assembly)
*b	Lock
*c	Unlock

NG --> See step 8

OK --> See step 5

5. **REPLACE MAIN BODY ECU. Refer to REMOVAL**
6. **REPLACE PARKING ASSIST ECU. Refer to REMOVAL**
7. **GO TO BACK DOOR CLOSER SYSTEM (DTC B2251). Refer to DTC B2251: Back Door Closer Switch Malfunction**
8. **REPLACE BACK DOOR LOCK ASSEMBLY. Refer to REMOVAL**

CIRCUIT TESTS

ECU Power Source Circuit

DESCRIPTION

This circuit is the power source circuit to operate the parking assist ECU. The parking assist ECU controls the parking assist monitor system and intuitive parking assist system. When a malfunction occurs in this circuit, each system will be abnormal.

HINT:

- The parking assist ECU is connected to other ECUs via CAN communication or AVC-LAN communication.
- If the parking assist ECU does not operate due to a power source problem, a navigation system DTC may be stored due to an AVC-LAN communication interruption.
- If the parking assist ECU does not operate due to a power source problem, other system DTCs may be stored due to a CAN communication interruption.

WIRING DIAGRAM

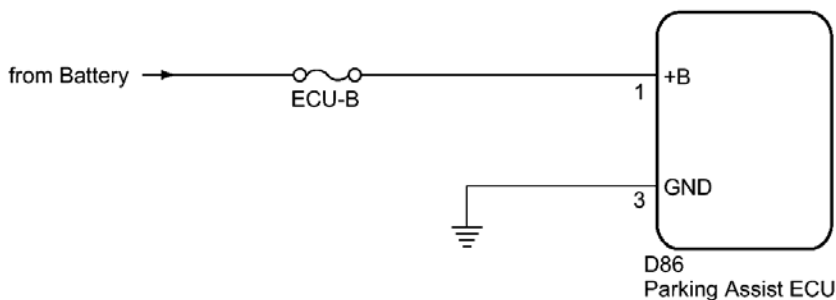


Fig. 15: ECU Power Source Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

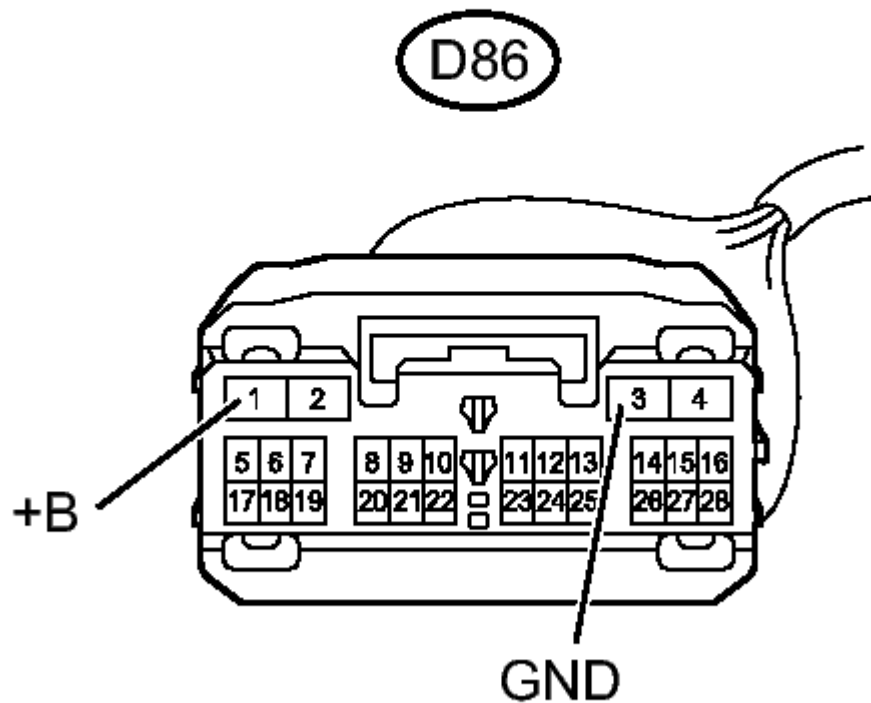
INSPECTION PROCEDURE

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

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (PARKING ASSIST ECU - BATTERY AND BODY GROUND)**
 - a. Disconnect the D86 parking assist ECU connector.

*a



H

Fig. 16: Checking Harness And Connector (Parking Assist ECU - Battery And Body Ground)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
D86-3 (GND) - Body ground	Always	Below 1 ohms

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

Standard Voltage

Tester Connection	Condition	Specified Condition
D86-1 (+B) - D86-3 (GND)	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Parking Assist ECU)
----	--

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 2

- 2. PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE. Refer to PROBLEM SYMPTOMS TABLE**

ACCESSORIES & EQUIPMENT

Parking Assist Monitor System (Diagnostics - Introduction) - Sienna

PARKING ASSIST MONITOR SYSTEM

PRECAUTION

PRECAUTION

1. IGNITION SWITCH EXPRESSION

- a. The type of ignition switch used on this model differs according to the specification of the vehicle. The expressions listed in the table below are used in this information.

Expression	Ignition Switch (Position)	Engine Switch (Condition)
Ignition Switch off	LOCK	Off
Ignition Switch ACC	ACC	On (ACC)
Ignition Switch ON	ON	On (IG)
Engine Start	START	Start

2. POINTS TO NOTE WHEN SERVICING

- a. Pay attention to the following points when servicing.
 1. When disconnecting the cable from the negative (-) battery terminal, "System initializing" may appear on the navigation receiver assembly. In this case, restore the steering angle neutral point. Refer to **INITIALIZATION**.
 2. Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to **CALIBRATION**.

HINT:

Each adjusted value for the calibration of the parking assist monitor system will be stored in the parking assist ECU.

3. When the lens of the rear television camera assembly is dirty, wash the lens with water and wipe it off with a soft cloth to obtain clear images. For heavy dirt, use neutral detergent to clean the lens.

3. NOTES FOR REAR TELEVISION CAMERA

a. Notes for the rear television camera assembly

1. The parking assist monitor system may not function properly if subjected to a severe blow by any hard object.
2. Do not scrub the cover part of the camera (made of resin). Scrubbing may scratch the cover and affect the image. Prevent organic solvents, waxes, bond removing solvents or glass coating from adhering to the cover. If such material adheres to the cover, clean it off immediately and wash with water.
3. Exposing the camera to a sudden temperature change may affect proper functioning of the camera.
4. A clear image may not appear if the camera is dirty with snow, mud, etc. In that case, wash it with water and wipe off the lens. Use a detergent to remove dirt if necessary.

b. Images are difficult to discern even in normal conditions if:

1. Noise may occur in the image during power back door operation. (w/ power back door system)
2. Noise may occur in the image depending on electrical devices used in the cabin.
3. Noise may occur in the image if accessories that generate radio waves have been installed.
4. The camera screen is frosted over (the image immediately after turning the ignition switch to ON may be blurred or darker than normal).
5. The camera lens is dirty with snow, mud, etc.
6. A strong beam of light, such as a sunbeam or headlight, hits the camera.
7. It is too dark around the camera (at night etc.).
8. The ambient temperature around the camera is either too high or too low.
9. The vehicle is tilted at a steep angle.
10. The ambience of the camera is too bright. (When a strong light, such as a sunbeam reflected off the vehicle body, hits the camera, the image may be blurred. This is called the "SMEAR" phenomenon, specific to the CCD camera.)

PARTS LOCATION

ILLUSTRATION

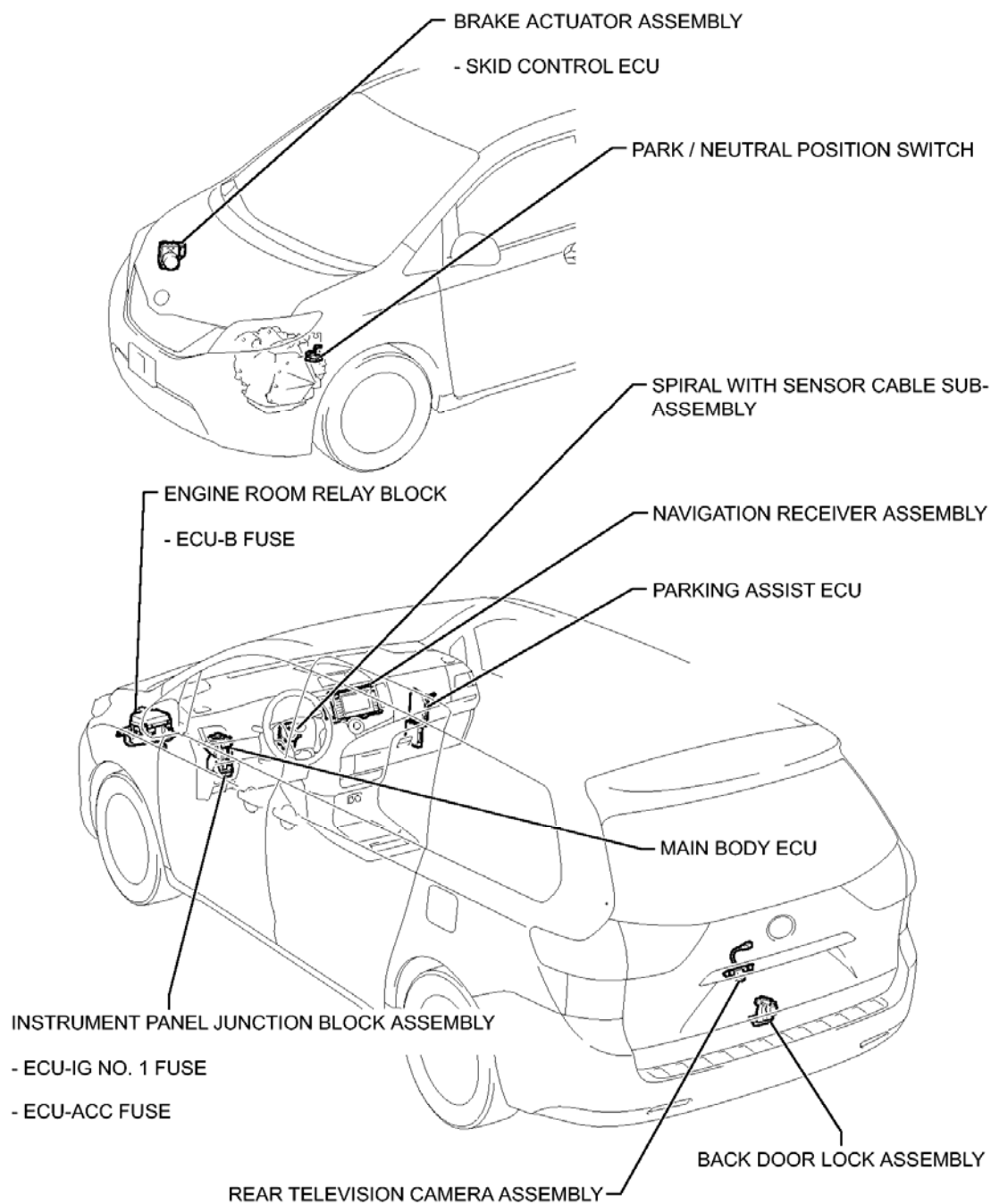


Fig. 1: Parking Assist Monitor System Components Location
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

SYSTEM DIAGRAM

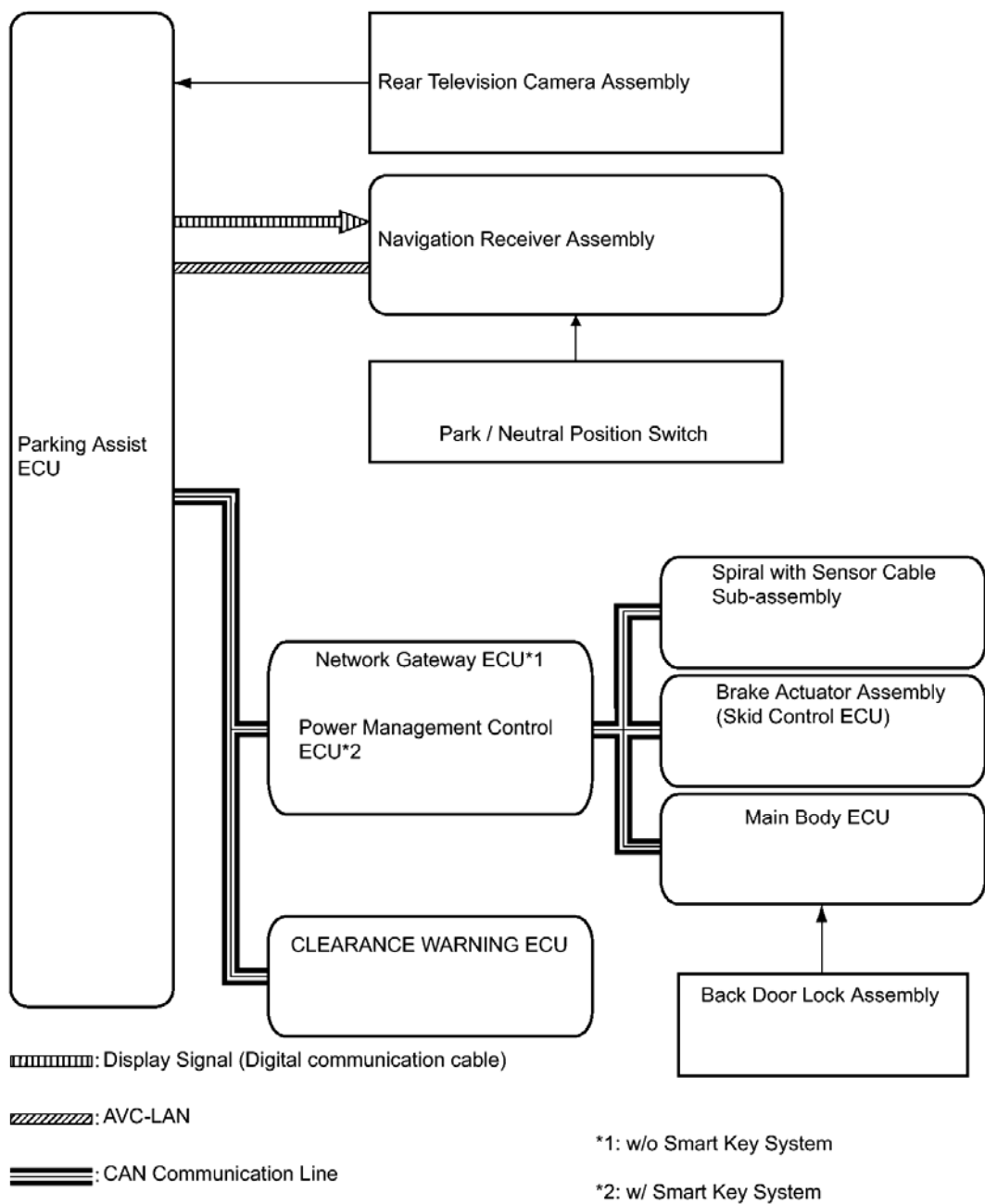


Fig. 2: Parking Assist Monitor System Diagram
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

COMMUNICATION TABLE

Sender	Receiver	Signal	Line
Parking Assist ECU	Navigation Receiver Assembly	Display	Digital communication cable
Spiral with Sensor			

Cable Sub-assembly	Parking Assist ECU	Steering angle	CAN
Brake Actuator Assembly (Skid Control ECU)	Parking Assist ECU	Vehicle speed	CAN
Main Body ECU	Parking Assist ECU	Back Door Lock	CAN
Clearance Warning ECU	Parking Assist ECU	Ultrasonic sensor detection signal	CAN

SYSTEM DESCRIPTION

SYSTEM DESCRIPTION

1. GENERAL

- a. This system has a rear television camera assembly mounted on the back door to display the rear view of the vehicle on the navigation receiver assembly. The display panel also shows a composite view consisting of the area behind the vehicle and parking guidelines to assist the driver in parking the vehicle by monitoring the area behind the vehicle.
- b. This system consists of the following components:
 1. Parking assist ECU
 2. Rear television camera assembly
 3. Network gateway ECU*1
 4. Navigation receiver assembly
 5. Power management control ECU*2
 6. Skid control ECU
 7. Clearance warning ECU
 8. Main body ECU
 9. Spiral with sensor cable sub-assembly

*1: w/o Smart Key System

*2: w/ Smart Key System

- c. This system is equipped with a self-diagnosis system, which is operated on a designated window that appears on the display panel, just as in the navigation system.

2. FUNCTION OF COMPONENTS

- a. The parking assist ECU controls the system by using information from the following components.

Item	Function
	Mounted on the back door to transmit the rear

Rear Television Camera Assembly	view of the vehicle to the parking assist ECU. • Has a color video camera that uses a Charge Coupled Device (CCD) and a wide-angle lens.
Parking Assist ECU	• Transmits video signals, which contain a composite consisting of the rear view of the vehicle taken with the television camera and parking assist guidelines, to the navigation receiver assembly. • Performs overall control of the system by receiving signals

	from the sensors.
Navigation Receiver Assembly	Receives the video signals containing a composite of the rear view of the vehicle and parking assist guideline signals from the parking assist ECU, and displays them on the display panel.
Spiral with Sensor Cable Sub-assembly	Detects the angle of the steering wheel and sends the resulting signals to the parking assist ECU through CAN communication.
Network Gateway ECU*1 or Power Management Control ECU*2	Sends the shift position signal to the parking assist ECU through CAN communication.
Skid Control ECU	Transmits a vehicle speed signal to the parking assist ECU.
Clearance Warning ECU	Receives signal from the ultrasonic sensors and sends the display signal to the navigation receiver assembly or the parking assist ECU.

Main Body ECU	Transmits a back door courtesy signal to the back door lock assembly.
---------------	---

*1: w/o Smart Key System

*2: w/ Smart Key System

3. OPERATION EXPLANATION

- a. The reverse position signal is sent from the shift lever position switch to the parking assist ECU when the shift lever is moved to R.

4. DISPLAY MODE SETTING

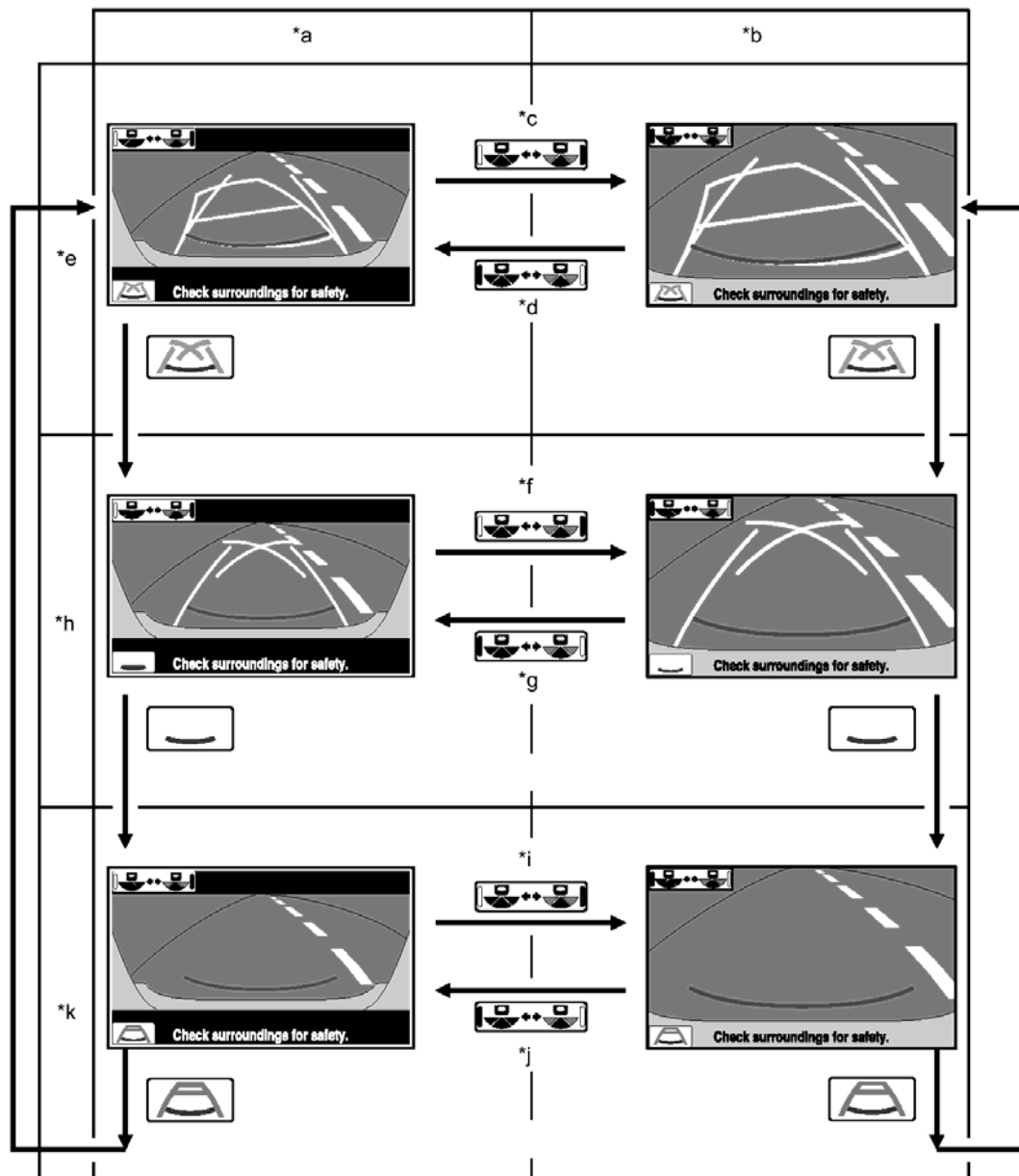


Fig. 3: View Of Parking Assist Monitor Display Mode Settings
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Wide mode	*b	Regular mode
*c	to Regular	*d	to Wide

	mode		mode
*e	Projected path guidance mode	*f	to Regular mode
*g	to Wide mode	*h	Parking assist guide line display mode
*i	to Regular mode	*j	to Wide mode
*k	Course line detection mode	-	-

- a. While the parking assist monitor is displayed, pressing the line mode button switches the parking assist monitor display mode.

PARKING ASSIST MONITOR DISPLAY MODE

Parking Assist Monitor Display Mode	Distance Guide Line (Red with Black)	Vehicle Width Extension Line (Green)	Predicted Path Line (Yellow)	Parking Guide Line (Green)
Projected Path Guidance Mode	Displayed	Displayed	Displayed	Not displayed
Parking Assist Guide Line Display Mode	Displayed	Displayed	Not displayed	Displayed
Course Line Detection Mode	Displayed	Not displayed	Not displayed	Not displayed

5. COMMUNICATION SYSTEM OUTLINE

- a. The components of the parking assist monitor system communicate with each other through the

AVC-LAN.

- b. If a short circuit or open circuit occurs in the AVC-LAN, communication is interrupted and the parking assist monitor system will stop functioning.

6. DIAGNOSTIC FUNCTION OUTLINE

- a. This parking assist monitor system has a diagnostic function displayed in the navigation receiver assembly. This function enables the calibration (adjustment and verify) of the parking assist monitor system. Refer to **DIAGNOSIS SYSTEM**.
- b. The parking assist monitor system can check the following items by using the Techstream.

Item	Proceed to
DTC CHECK	Refer to <u>DTC CHECK / CLEAR</u>
Data List / Active Test	Refer to <u>DATA LIST / ACTIVE TEST</u>

HOW TO PROCEED WITH TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the parking assist monitor system.
- *: Use the Techstream.

1. VEHICLE BROUGHT TO WORKSHOP

NEXT: Go to next step

2. INSPECT BATTERY VOLTAGE

- a. Measure the battery voltage with the ignition switch off.

Standard Voltage

11 to 14 V

If the voltage is below 11 V, replace or recharge the battery before proceeding to the next step.

NEXT: Go to next step

3. CHECK NAVIGATION SYSTEM

- a. Refer to the navigation system. Refer to HOW TO PROCEED WITH TROUBLESHOOTING .

RESULT

Result	Proceed to
Navigation system is normal	A
Navigation system is abnormal	B

B --> GO TO NAVIGATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

A: Go to next step

4. CHECK COMMUNICATION FUNCTION OF CAN COMMUNICATION SYSTEM*

- a. Use the Techstream to check if the CAN communication system is functioning normally.

RESULT

Result	Proceed to
CAN DTC is not output	A
CAN DTC is output	B

B --> GO TO CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING

A: Go to next step

5. CHECK FOR DTC*

- a. Check for DTCs and note any codes that are output. Refer to DTC CHECK / CLEAR.
- b. Clear the DTC. Refer to DTC CHECK / CLEAR.
- c. Recheck for DTCs. Try to prompt the DTC by simulating the original activity that the DTC suggests.

NOTE: The parking assist ECU may store the DTCs of the following system. If DTCs other than those specified in Diagnostic Trouble Code Chart of the parking assist monitor system are output, refer to Diagnostic Trouble Code Chart for the applicable system.

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> Go to step 8

A: Go to next step

6. PROBLEM SYMPTOMS TABLE

- a. Refer to **PROBLEM SYMPTOMS TABLE**.

RESULT

Result	Proceed to
Fault is not listed in Problem Symptoms Table	A
Fault is listed in Problem Symptoms Table	B

B --> Go to step 8

A: Go to next step

7. OVERALL ANALYSIS AND TROUBLESHOOTING

- a. Data List / Active Test. Refer to **DATA LIST / ACTIVE TEST**
- b. Terminals of ECU. Refer to **TERMINALS OF ECU**

NEXT: Go to next step

8. ADJUST, REPAIR OR REPLACE

NEXT: Go to next step

9. CONFIRMATION TEST

NEXT --> END

INITIALIZATION

INITIALIZATION

1. INITIALIZE PARKING ASSIST MONITOR SYSTEM

- a. When "System initializing" is displayed on the navigation receiver assembly, correct the steering angle neutral point using the following method.
 1. Fully turn the steering wheel to the right and left on the flat ground.

HINT:

"?" button is displayed at the same time as "System initializing". If the "?" button is selected, this method is displayed.

CALIBRATION

CALIBRATION

1. ADJUST PARKING ASSIST MONITOR SYSTEM

- a. This parking assist monitor system can be set from the diagnostic screen of the navigation receiver assembly.
- b. If the following operations are performed, it is necessary to perform adjustments and checks on the diagnostic screen.

Part Name	Operation	Adjustment Item	Proceed to
Spiral with sensor cable sub-assembly	Removal and installation of the spiral with sensor cable sub-assembly	Steering angle neutral point	Refer to INITIALIZATION
	Removal and installation		

	of the connector of the spiral with sensor cable sub-assembly	Steering angle setting	Refer to <u>DIAGNOSIS SYSTEM</u>
Spiral with sensor cable sub-assembly	Replacement	Steering angle neutral point	Refer to <u>INITIALIZATION</u>
		Steering angle setting	Refer to <u>DIAGNOSIS SYSTEM</u>
Parking assist ECU	Replacement	Parking assist ECU initialization	Step 2
Suspension, tires, etc.	The vehicle height changes because of suspension or tire replacement	Rear television camera optical axis (Camera position setting)	Step 3
Rear television camera assembly	• Replacement • Installation angle of the rear television camera changes because of the removal and installation of the rear television camera, etc.	Rear television camera optical axis (Camera position setting)	Step 3

HINT:

The adjustment values stored while performing parking assist monitor system calibration are stored in the parking assist ECU.

2. PARKING ASSIST ECU INITIALIZATION

HINT:

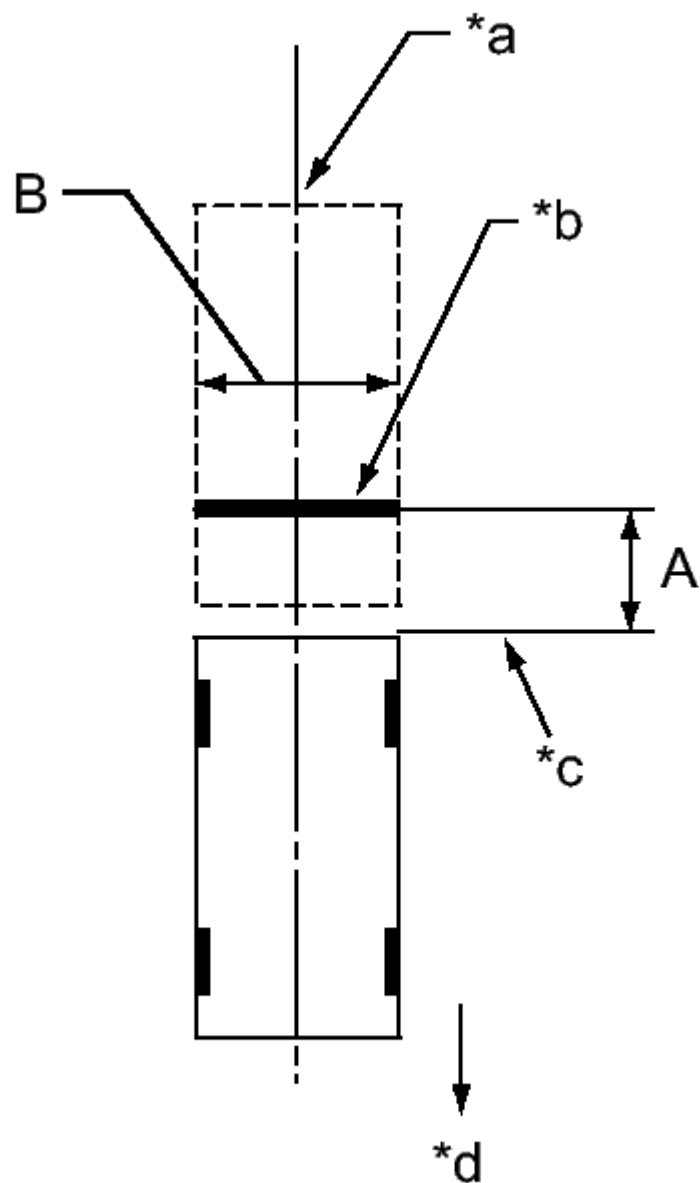
Be sure to check for DTCs before performing this procedure. Refer to **DTC CHECK / CLEAR**.

a. Preparation for adjustment

1. Park the vehicle with the steering wheel centered.
2. Set a target bar for optical axis adjustment of the rear television camera.

HINT:

Only when adjusting the optical axis of the camera, create a target bar for adjustment.



H

Fig. 4: Identifying Target Bar For Optical Axis Adjustment Of The Rear Television Camera

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

Dimension

Area	Specification
A	995 to 1005 mm (3.264 to 3.296 ft.)
B	1995 to 2005 mm (6.545 to 6.578 ft.)

TEXT IN ILLUSTRATION

*a	Vehicle Center
*b	Target Bar for Back Camera Adjustment
*c	Vehicle End
*d	Front Side

HINT:

- Set a piece of tape on the ground as the target bar for adjustment. Its width and length are 20 to 30 mm (0.787 to 1.181 in.) and 1995 to 2005 mm (6.545 to 6.578 ft.), respectively. Check the color on the navigation receiver assembly and choose a tape color which can be easily seen.
 - Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.
 - Check that the back door is fully closed.
- b. Start diagnostic mode. Refer to **DIAGNOSIS SYSTEM**.
1. Select "Function Check/Setting" on the Service Menu screen.

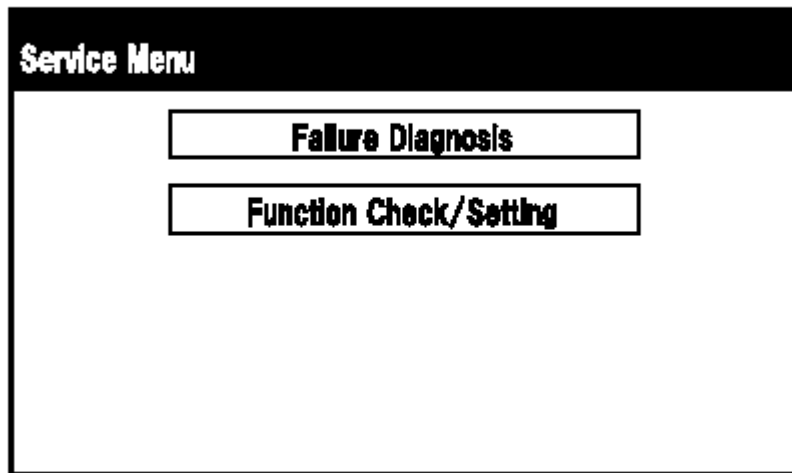


Fig. 5: Screen Display - Function Check/Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Select "Camera Setting" on the Function Check/Setting screen.

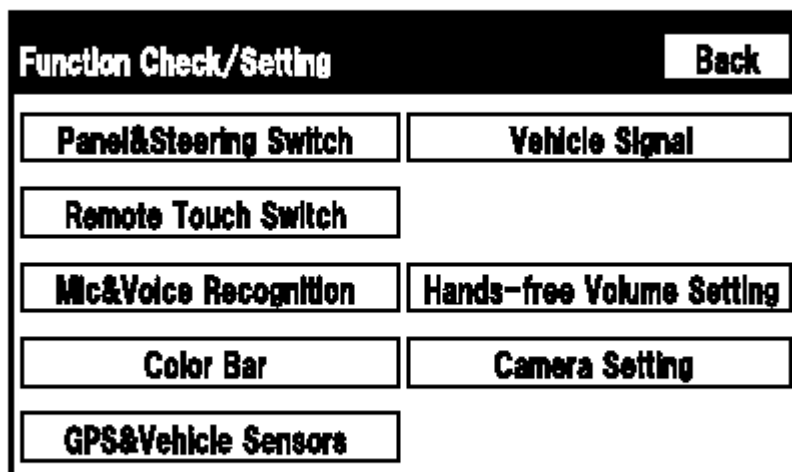


Fig. 6: Screen Display - Camera Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Select "NEXT" on the SIGNAL CHECK screen.

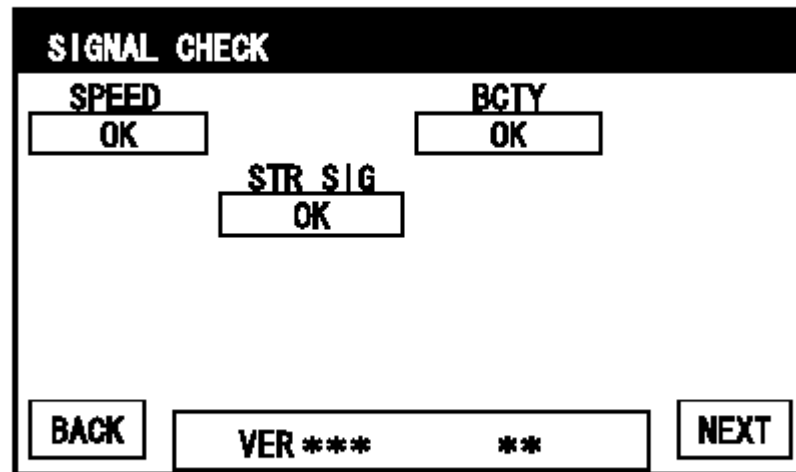
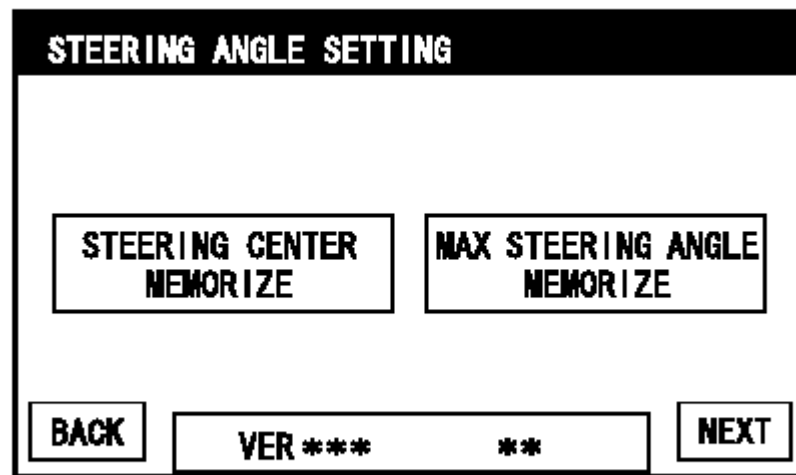


Fig. 7: Screen Display - Signal Check (Next)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE: When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen. Refer to DIAGNOSIS SYSTEM.

c. STEERING ANGLE SETTING

1. Perform the STEERING CENTER MEMORIZE operation.



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Fig. 8: Screen Display - Steering Center Memorize
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Check that the steering wheel is centered, and then select "STEERING CENTER MEMORIZE".

HINT:

When performing removal and installation, or replacement of the television camera, steering angle adjustment is not required.

2. Perform the MAX STEERING ANGLE MEMORIZE operation.
 - After adjusting the steering angle neutral point, turn the steering wheel to the left and right lock positions and select "MAX STEERING ANGLE MEMORIZE". The maximum steering angle is then stored and the screen changes to the BACK CAMERA POSITION SETTING screen.

HINT:

The "NEXT" button does not respond until the system stores the steering angle neutral point and maximum steering angle.

HINT:

- It is also possible to start by initially turning the steering wheel to the right side.
- When "MAX STEERING ANGLE MEMORIZE" is selected, a beep will sound to confirm that the steering adjustment values have been stored.

- The adjustment value will not be stored unless "MAX STEERING ANGLE MEMORIZE" is selected after turning the steering wheel side to side.
- When "BACK" is selected, the screen changes to SIDE VERIFY MODE without storing the set values.
- Even if no DTCs are detected, selecting "MAX STEERING ANGLE MEMORIZE" may not cause the adjustment value to be stored if the steering sensor is malfunctioning.
- If selecting "MAX STEERING ANGLE MEMORIZE" does not cause the adjustment value to be stored after adjusting the steering angle, replace the spiral with sensor cable sub-assembly. Refer to **REMOVAL** .

d. BACK CAMERA POSITION SETTING

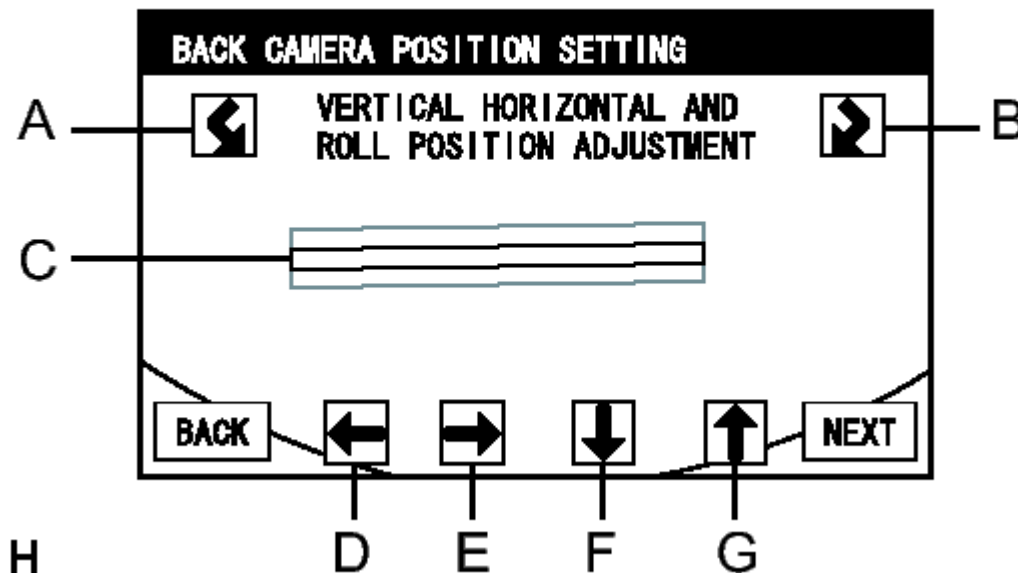
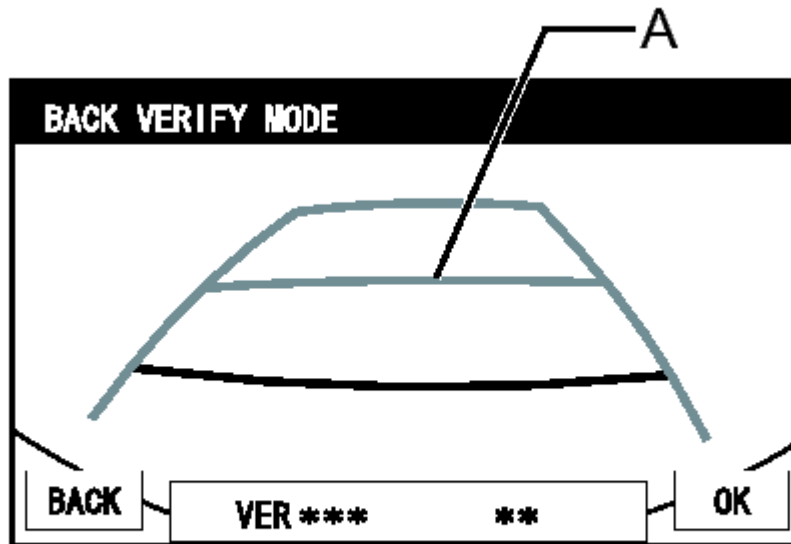


Fig. 9: Screen Display - Back Camera Position Settings
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- When the back door is open, the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message will be displayed and camera position setting will not be possible.
 - If the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message is displayed even when the back door is closed, perform inspections according to Problem Symptoms Table (A back door open warning message is displayed even after back door is closed). Refer to **PROBLEM SYMPTOMS TABLE**.
1. Perform the roll angle adjustment.

- Select switches A and B to rotate C so that it is parallel to the target adjustment bar.
 - 2. Perform the vertical and horizontal position adjustment.
 - Select the directional switches D, E, F and G to move C so that the target adjustment bar is centered in C.
 - 3. Select the "NEXT" button on the BACK CAMERA POSITION SETTING screen.
- e. BACK VERIFY MODE



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Fig. 10: Screen Display - Back Verify Mode

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

1. Check that A and the target adjustment bar are overlapping.
 - If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
 - If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.
2. Selecting "OK" will return the screen to the Service Menu screen, and complete the adjustment.

HINT:

- The update is not completed until "OK" is selected.
- When "OK" is selected, a beep will sound to confirm that the rear camera aiming adjustment values have been stored.

- f. Finish diagnostic mode. Refer to **DIAGNOSIS SYSTEM**.

3. BACK CAMERA POSITION SETTING

HINT:

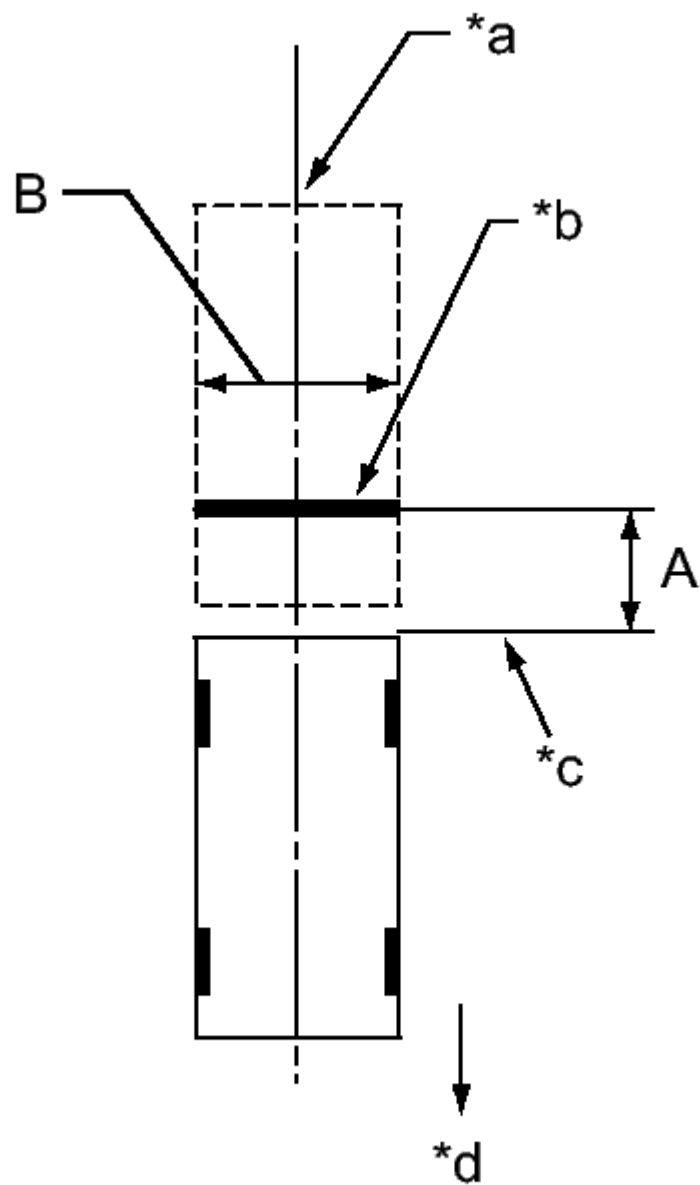
Be sure to check for DTCs before performing this procedure. Refer to **DTC CHECK / CLEAR**.

a. Preparation for adjustment

1. Park the vehicle with the steering wheel centered.
2. Set a target bar for optical axis adjustment of the rear television camera.

HINT:

Only when adjusting the optical axis of the camera, create a target bar for adjustment.



H

Fig. 11: Identifying Target Bar For Optical Axis Adjustment Of The Rear Television Camera

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

Dimension

Area	Specification
A	995 to 1005 mm (3.264 to 3.296 ft.)
B	1995 to 2005 mm (6.545 to 6.578 ft.)

TEXT IN ILLUSTRATION

*a	Vehicle Center
*b	Target Bar for Back Camera Adjustment
*c	Vehicle End
*d	Front Side

HINT:

- Set a piece of tape on the ground as the target bar for adjustment. Its width and length should be 20 to 30 mm (0.787 to 1.181 in.) and 1995 to 2005 mm (6.545 to 6.578 ft.), respectively. Check the color on the navigation receiver assembly and choose a tape color which can be easily seen.
 - Before parking the vehicle, be sure to move the vehicle forward and in reverse to check that the tires are facing straight ahead with the steering wheel centered.
 - Check that the back door is fully closed.
- b. Start diagnostic mode. Refer to **DIAGNOSIS SYSTEM**.

NOTE: **Apply the parking brake, depress the brake pedal, move the shift lever to P, and ensure that the vehicle is not moving.**

1. Select "Function Check/Setting" on the "Service Menu" screen.

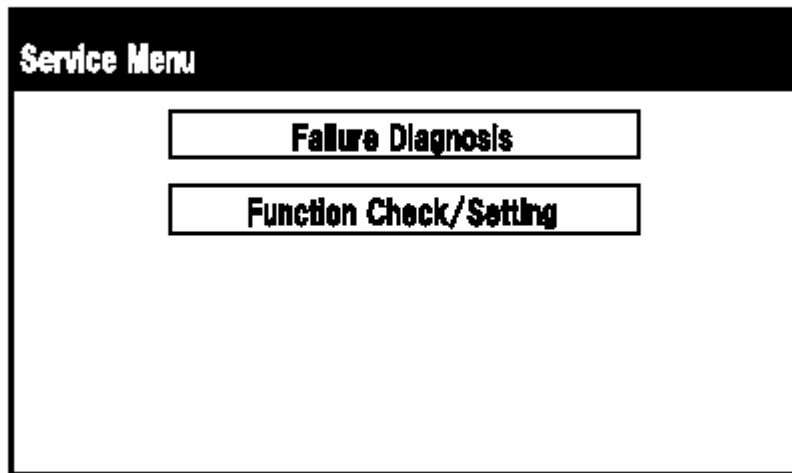


Fig. 12: Screen Display - Function Check/Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Select "Camera Setting" on the Function Check/Setting screen.

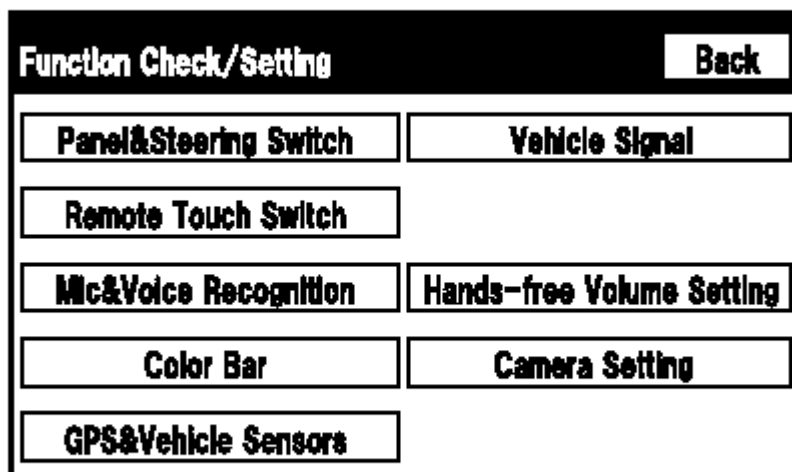


Fig. 13: Screen Display - Camera Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Select "BACK CAMERA SETTING" on the MODE SETTING screen.

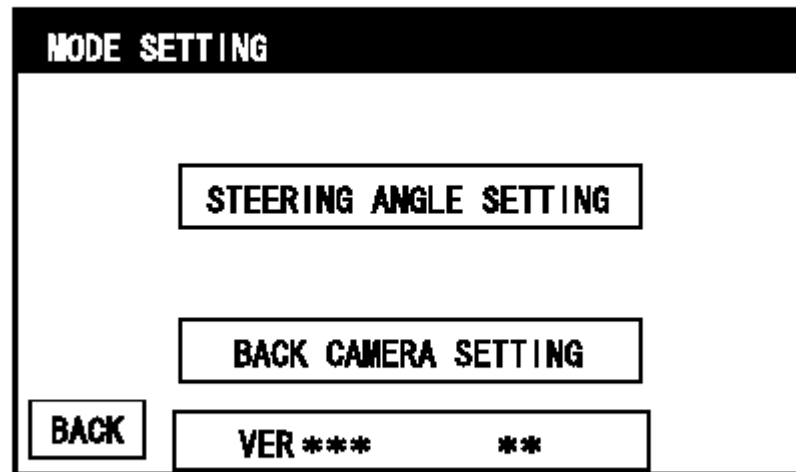


Fig. 14: Screen Display - Back Camera Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

To select a grayed out item, select and hold the item for 2 seconds or more.

4. Select "NEXT" on the SIGNAL CHECK screen.

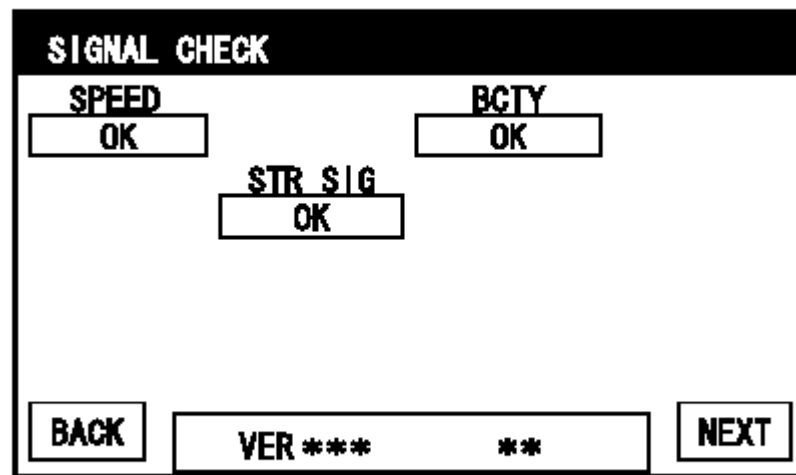


Fig. 15: Screen Display - Signal Check (Next)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE:

- When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, selecting "NEXT" will not change the screen to the BACK CAMERA POSITION SETTING screen.
- When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen. Refer to DIAGNOSIS SYSTEM.

c. BACK CAMERA POSITION SETTING

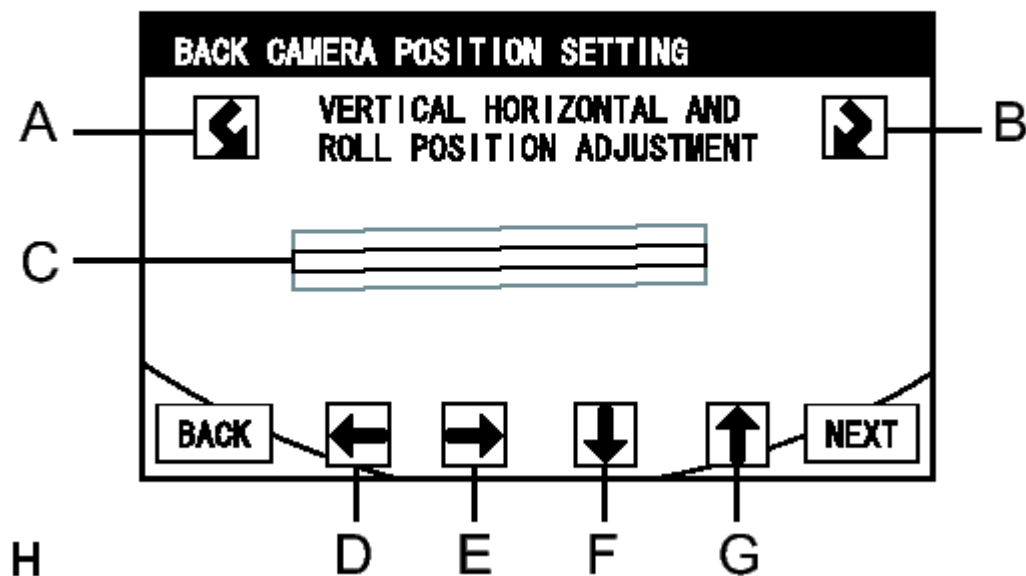
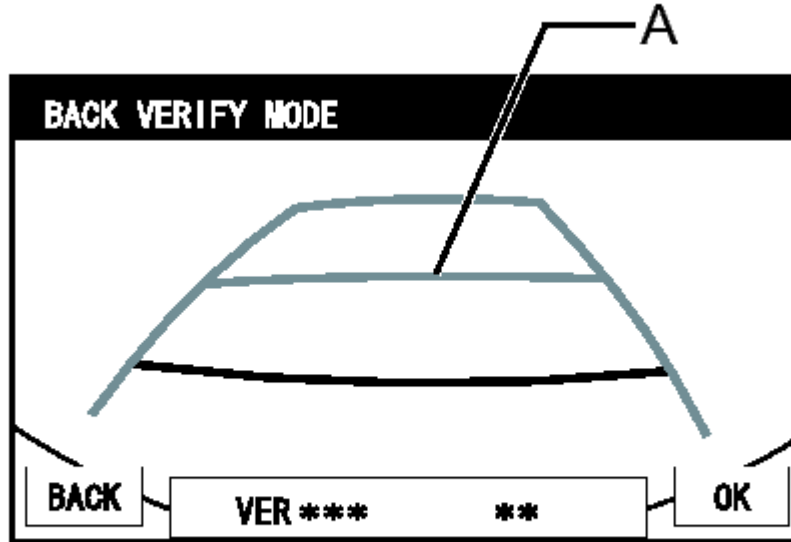


Fig. 16: Screen Display - Back Camera Position Settings
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

- When the back door is open, the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message will be displayed and camera position setting will not be possible.
 - If the "Back door is open. Do not use the rear view monitor when the back door is not completely closed." message is displayed even when the back door is closed, perform inspections according to Problem Symptoms Table (A back door open warning message is displayed even after back door is closed). Refer to **PROBLEM SYMPTOMS TABLE**.
1. Perform the roll angle adjustment.
 - Select switches A and B to rotate C so that it is parallel to the target adjustment bar.
 2. Perform the vertical and horizontal position adjustment.
 - Select the directional switches D, E, F and G to move C so that the target adjustment bar is centered in C.
 3. Select the "NEXT" button on the "BACK CAMERA POSITION SETTING" screen.
- d. BACK VERIFY MODE



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Fig. 17: Screen Display - Back Verify Mode

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

1. Check that A and the target adjustment bar are overlapping.
 - If the steering angle neutral point is not aligned, perform the STEERING CENTER MEMORIZE and MAX STEERING ANGLE MEMORIZE operations.
 - If A and the target adjustment bar are not aligned even if the tires are aligned straight ahead, perform the camera position setting operation.
2. Selecting "OK" will return the screen to the Service Menu, and complete the adjustment.

HINT:

- The update is not completed until "OK" is selected.
 - When "OK" is selected, a beep will sound to confirm that the rear camera aiming adjustment values have been stored.
- e. Finish diagnostic mode. Refer to **DIAGNOSIS SYSTEM**.

PROBLEM SYMPTOMS TABLE

PROBLEM SYMPTOMS TABLE

HINT:

Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms the listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

NOTE: The following inspection procedure of the parking assist monitor system is described on the assumption that the navigation system is normal. If navigation system has any malfunction, first proceed with troubleshooting of the navigation system.

GENERAL

Symptom	Suspected Area	See
When the shift lever is in R, the parking assist monitor image is not displayed (screen is not black).	ECU power source circuit	Refer to <u>ECU Power Source Circuit</u>
	Image from camera for parking assist monitor is abnormal	Refer to <u>Image from Camera for Parking Assist Monitor is Abnormal</u>
	Parking assist ECU	Refer to <u>REMOVAL</u>
When the shift lever is in R, the parking assist monitor image is not displayed (screen is black).	Image from camera for parking assist monitor is abnormal	Refer to <u>Image from Camera for Parking Assist Monitor is Abnormal</u>
	Navigation receiver assembly	Refer to <u>REMOVAL</u>
	Parking assist ECU	Refer to <u>REMOVAL</u>
When the shift lever is not in R, the parking assist monitor image is displayed.	Navigation receiver assembly	Refer to <u>REMOVAL</u>
	Parking assist ECU	Refer to <u>REMOVAL</u>

DISPLAY MALFUNCTION

Symptom	Suspected Area	See
Image from camera for the parking assist monitor is abnormal.	Image from camera for parking assist monitor is abnormal	Refer to <u>Image from Camera for Parking Assist Monitor is Abnormal</u>
	Parking assist ECU	Refer to <u>REMOVAL</u>

PARKING ASSIST MONITOR SYSTEM MALFUNCTION

Symptom	Suspected Area	See
Projected course guidelines are not displayed.	Parking assist ECU	Refer to <u>REMOVAL</u>
"System initializing" is displayed.	Correct the steering angle neutral point	Refer to <u>INITIALIZATION</u>
"System initializing" is displayed even after correcting the steering angle neutral point.	Spiral with sensor cable sub-assembly	Refer to <u>REMOVAL</u>
	Steering angle setting (Diagnosis System)	Refer to <u>DIAGNOSIS SYSTEM</u>
	Parking assist ECU	Refer to <u>REMOVAL</u>
"System not ready" is displayed.	Parking assist ECU initialization (Calibration)	Refer to <u>CALIBRATION</u>
"System not ready" is displayed even after parking assist ECU initialization.	Parking assist ECU	Refer to <u>REMOVAL</u>
A back door open warning message is displayed even	Message indicating back door is open is displayed even after back door is	Refer to <u>Message indicating Back Door is Open is Displayed even after Back Door is</u>

after back door is closed.	closed	<u>Closed</u>
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TERMINALS OF ECU

TERMINALS OF ECU

1. PARKING ASSIST ECU

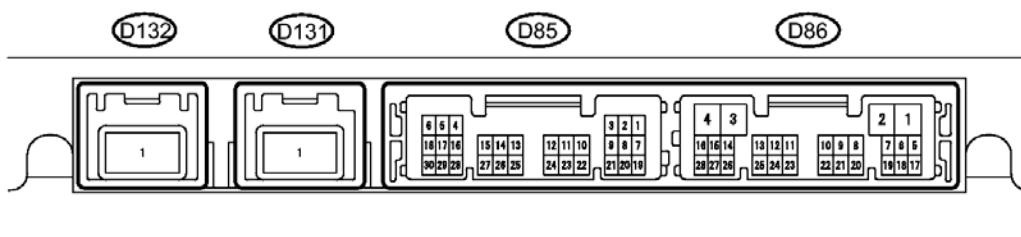


Fig. 18: Parking Assist ECU Connector Terminal Identification
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- Disconnect the D86 parking assist ECU connector.
- Measure the voltage and resistance according to the value(s) in the table below.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Switch Condition	Specified Condition
D86-1 (+B) - D86-3 (GND)	B - W-B	Power source signal	Always	11 to 14 V
D86-3 (GND) - Body ground	W-B - Body ground	Ground	Always	Below 1 ohms
D86-7 (IG) - D86-3 (GND)	L - W-B	IG power source signal	Ignition switch ON	11 to 14 V
D86-8 (ACC) - D86-3 (GND)	P - W-B	ACC power source signal	Ignition switch ACC	11 to 14 V

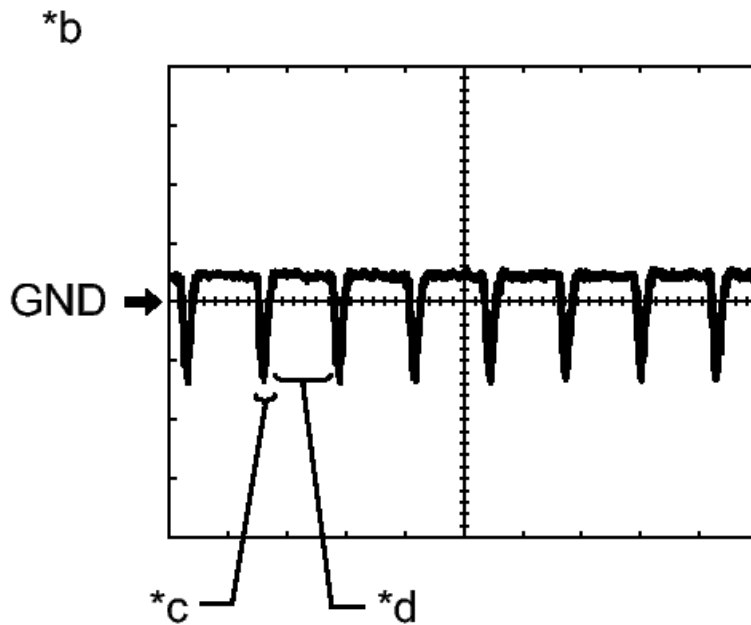
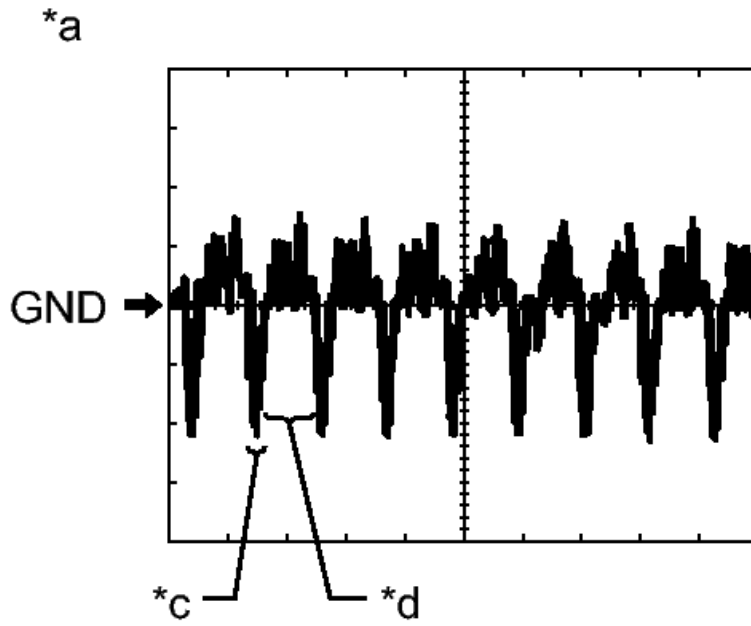
If the result is not as specified, there may be a malfunction on the wire harness side.

- c. Reconnect the D86 parking assist ECU connector.
- d. Measure the voltage and check for pulses according to the value(s) in the table below.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
D86-21 (CANL) - D86-3 (GND)	W - W-B	CAN communication signal	CAN communication circuit	Pulse generation
D86-22 (CANH) - D86-3 (GND)	L - W-B	CAN communication signal	CAN communication circuit	Pulse generation
D86-24 (TX-) - D86-25 (TX+)	B - W	AVC-LAN communication signal	-	-
D85-11 (CV-) - D86-3 (GND)	W - W-B	Rear television camera ground	Always	Below 1 V
D85-12 (CV+) - D86-3 (GND)	B - W-B	Rear television camera display signal (NTSC) input	Ignition switch ON Shift lever in R Under normal conditions	Pulse generation (See Fig. 19)
			Ignition switch ON Shift lever in R Camera lens is covered, blacking out screen	Pulse generation (See Fig. 19)
D85-13 (CGND) - D86-3 (GND)	Shield - W-B	Rear television camera ground (shield)	Always	Below 1 V
D85-14 (CB+) - D86-3 (GND)	R - W-B	Power source to rear television camera	Ignition switch ON Shift lever in R	5.8 to 7.0 V

If the result is not as specified, the ECU may have a malfunction.

e. Reference (Oscilloscope waveform):



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Fig. 19: Identifying Waveform 1 And 2
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

A waterproof connector is used for the rear television camera assembly. Therefore, inspect the waveform at the parking assist ECU with the connector connected.

1. Waveform 1 (under normal conditions)

REFERENCE

Item	Content
Terminal No. (Symbol)	D85-12 (CV+) - D86-3 (GND)
Tool Setting	200 mV/DIV., 50 μsec./DIV.
Condition	Ignition switch ON, shift lever in R

HINT:

The video waveform changes according to the image sent by the rear television camera assembly.

2. Waveform 2 (camera lens is covered, blacking out the screen)

REFERENCE

Item	Content
Terminal No. (Symbol)	D85-12 (CV+) - D86-3 (GND)
Tool Setting	200 mV/DIV., 50 μsec./DIV.
Condition	Ignition switch ON, shift lever in R

HINT:

The video waveform changes according to the image sent by the rear television camera assembly.

TEXT IN ILLUSTRATION

*a	Waveform 1 (under normal conditions)
*b	Waveform 2 (camera lens is covered, blacking out the screen)
*c	Synchronized Signal
*d	Video Waveform

2. REAR TELEVISION CAMERA ASSEMBLY

- a. Disconnect the W13 rear television camera assembly connector.

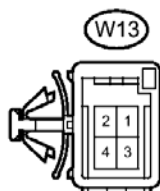


Fig. 20: Rear Television Camera Assembly Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
W13-4 (CB+) - Body ground	R - Body ground	Power source	Ignition switch ON Shift lever in R	5.8 to 7.0 V

If the result is not as specified, there may be a malfunction on the wire harness side.

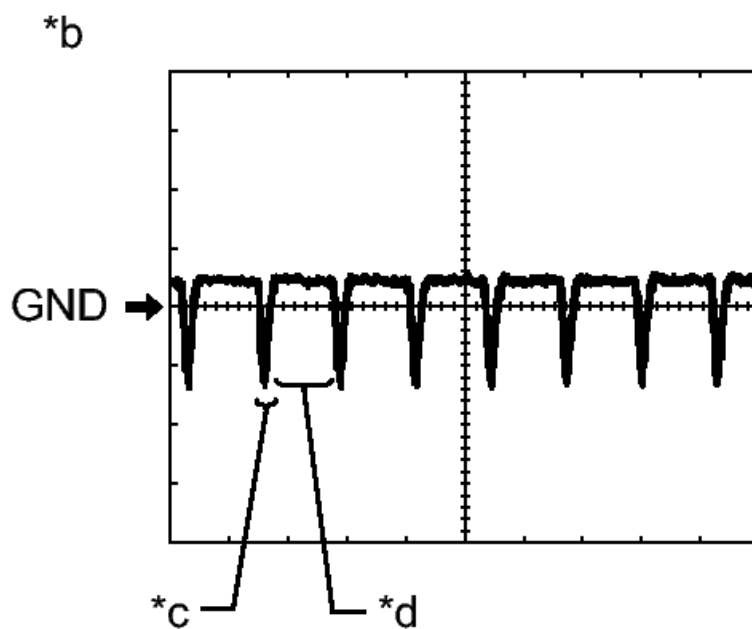
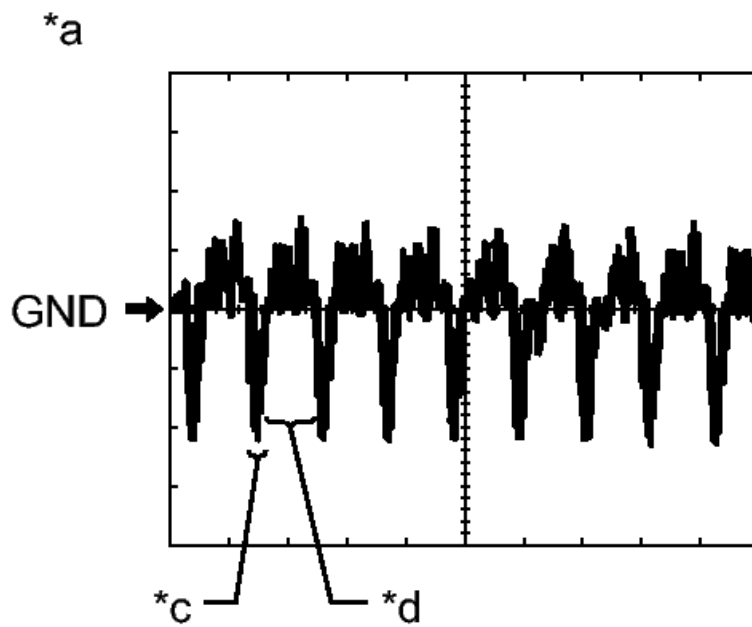
- c. Reconnect the W13 rear television camera assembly connector.

- d. Check for pulses between each terminal of the connector.

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
W13-2 (CV+) - W13-1 (CV-)	B - W	Display signal	Ignition switch ON Shift lever in R Under normal conditions	Pulse generation (See Fig. 21)
			Ignition switch ON Shift lever in R Camera lens covered, blacking out screen	Pulse generation (See Fig. 21)

If the result is not as specified, the camera may have a malfunction.

- e. Reference (Oscilloscope waveform):



H

Fig. 21: Identifying Waveform 1 And 2
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

A waterproof connector is used for the rear television camera assembly. Therefore, inspect the waveform at the parking assist ECU with the connector connected.

1. Waveform 1 (under normal conditions)

REFERENCE

Item	Content
Terminal No. (Symbol)	W13-2 (CV+) - W13-1 (CV-)
Tool Setting	200 mV/DIV., 50 μsec./DIV.
Condition	Ignition switch ON, shift lever in R

HINT:

The video waveform changes according to the image sent by the rear television camera assembly.

2. Waveform 2 (camera lens is covered, blacking out the screen)

REFERENCE

Item	Content
Terminal No. (Symbol)	W13-2 (CV+) - W13-1 (CV-)
Tool Setting	200 mV/DIV., 50 μsec./DIV.
Condition	Ignition switch ON, shift lever in R

HINT:

The video waveform changes according to the image sent by the rear television camera assembly.

TEXT IN ILLUSTRATION

*a	Waveform 1 (under normal conditions)
*b	Waveform 2 (camera lens is covered, blacking out the screen)
*c	Synchronized Signal
*d	Video Waveform

3. NAVIGATION RECEIVER ASSEMBLY

DIAGNOSIS SYSTEM

DIAGNOSIS SYSTEM

1. PARKING ASSIST MONITOR DIAGNOSIS SYSTEM

- a. For parking assist monitor system diagnosis, signals received by the parking assist ECU can be checked and the parking assist monitor system can be calibrated, adjusted and checked using the navigation receiver assembly.

NOTE: Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to CALIBRATION.

HINT:

The displayed items may differ depending on vehicle specifications.

2. DIAGNOSIS SCREEN TRANSITION (during parking assist ECU initialization)

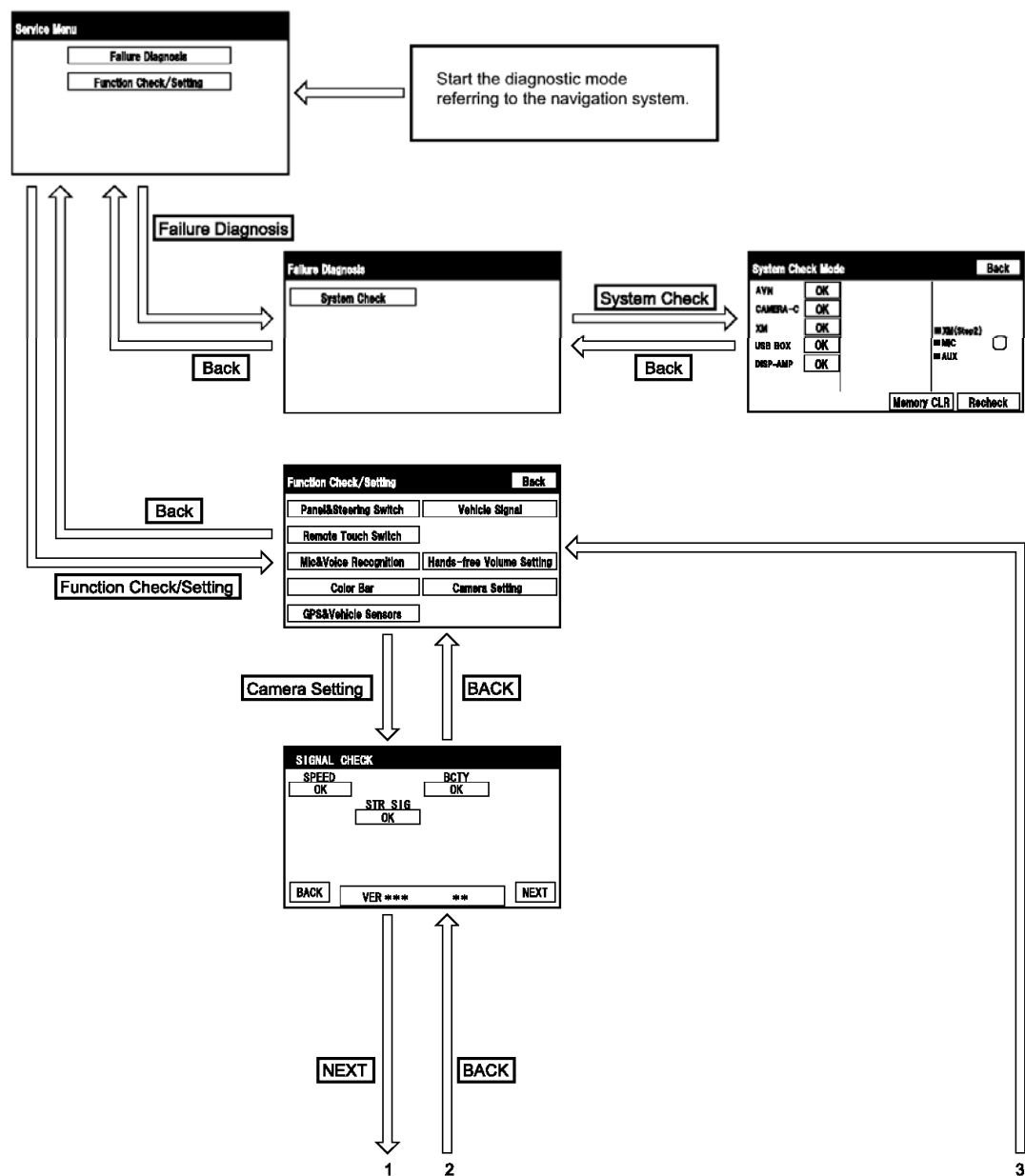


Fig. 22: Identifying Diagnosis Screen Transition (During Parking Assist ECU Initialization) (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

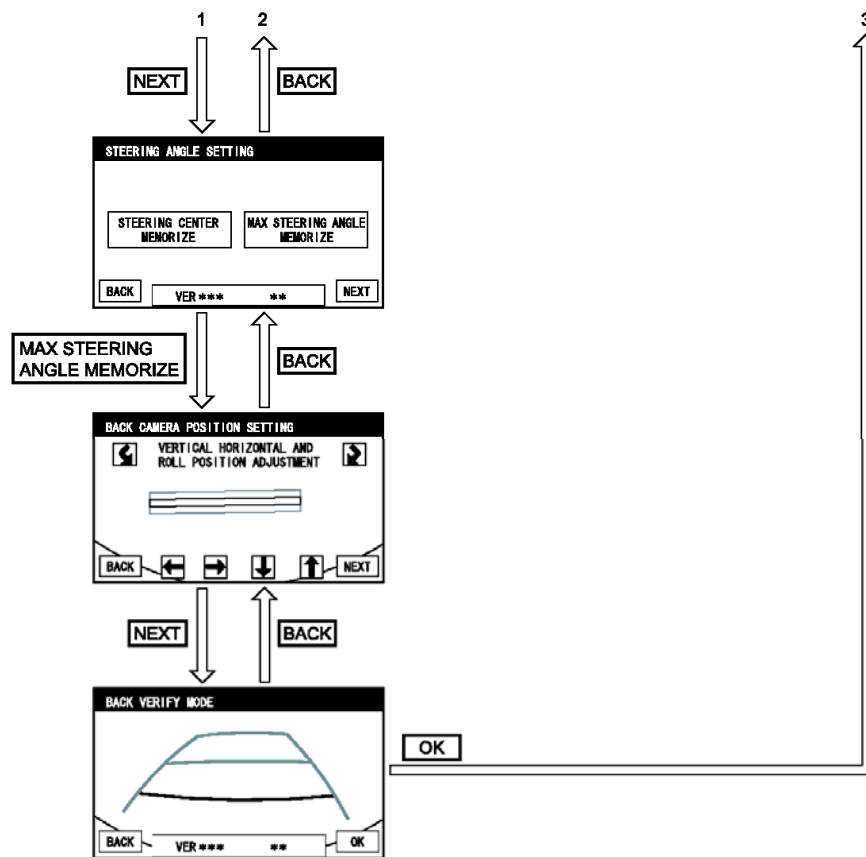


Fig. 23: Identifying Diagnosis Screen Transition (During Parking Assist ECU Initialization) (2 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. DIAGNOSIS SCREEN TRANSITION (after parking assist ECU initialization)

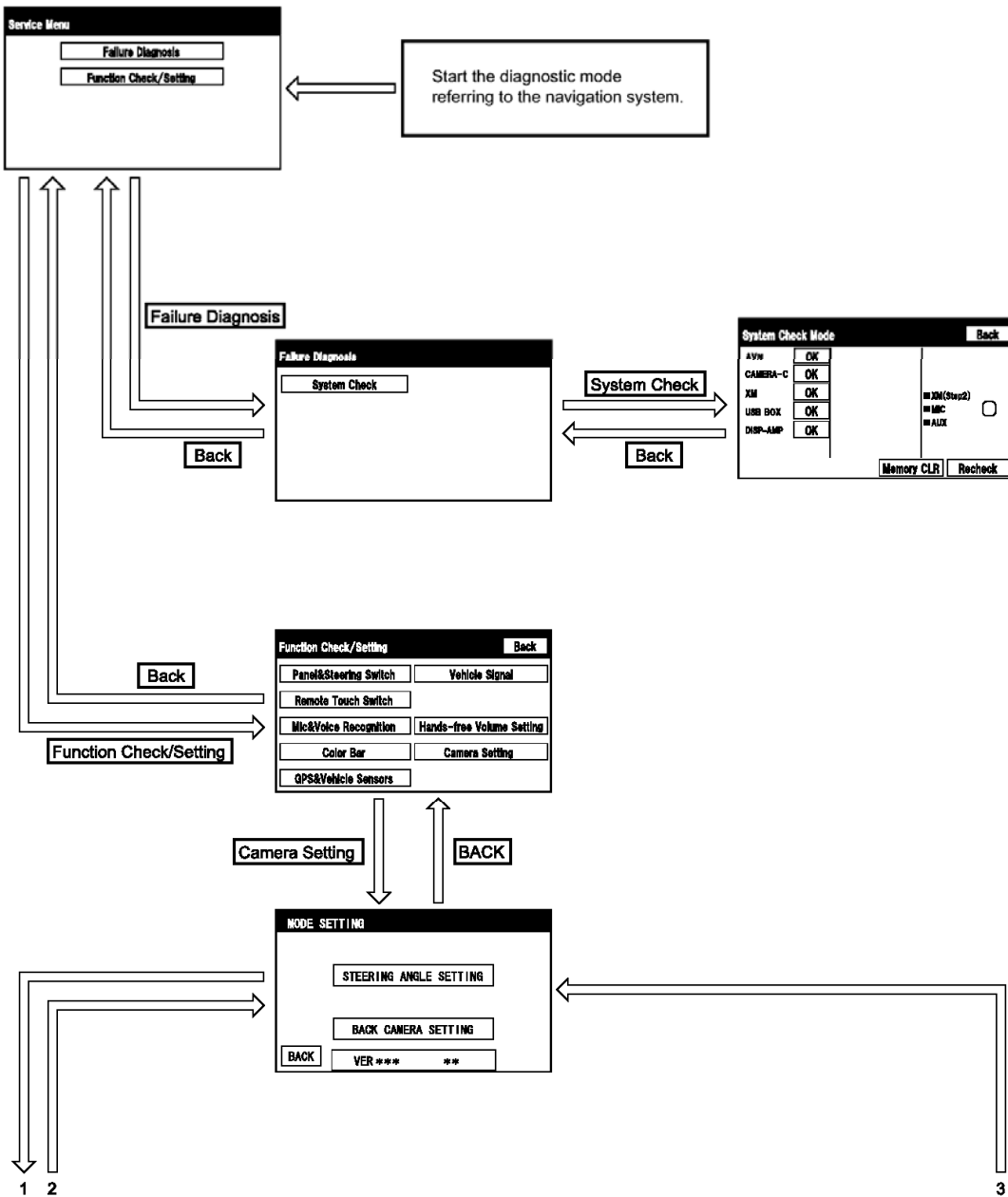


Fig. 24: Identifying Diagnosis Screen Transition (After Parking Assist ECU Initialization) (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

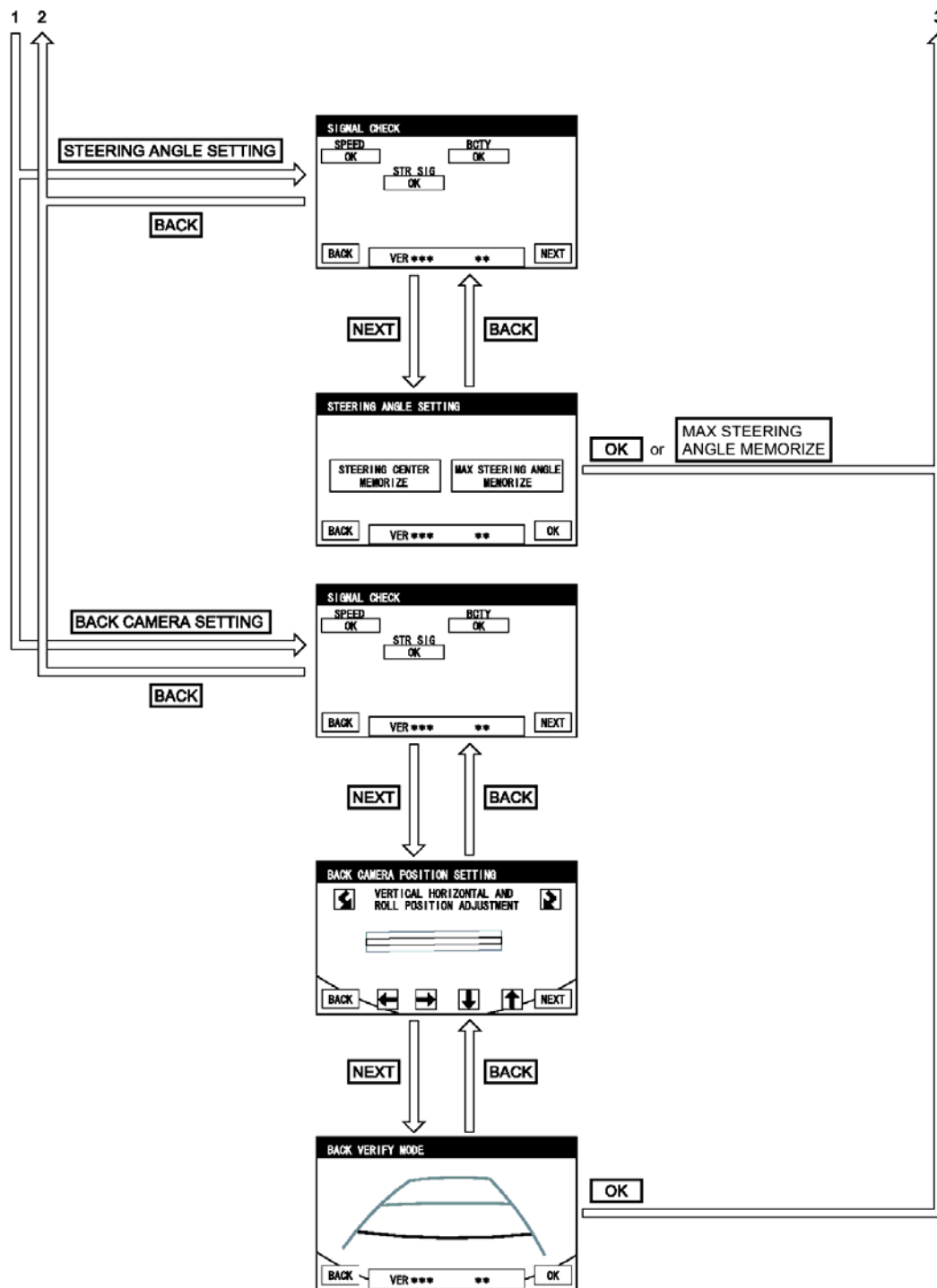


Fig. 25: Identifying Diagnosis Screen Transition (After Parking Assist ECU Initialization) (2 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. DIAGNOSTIC MODE

- a. Start diagnostic mode. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .
- b. Failure diagnosis. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .
- c. System check (check using system check mode screen). Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .

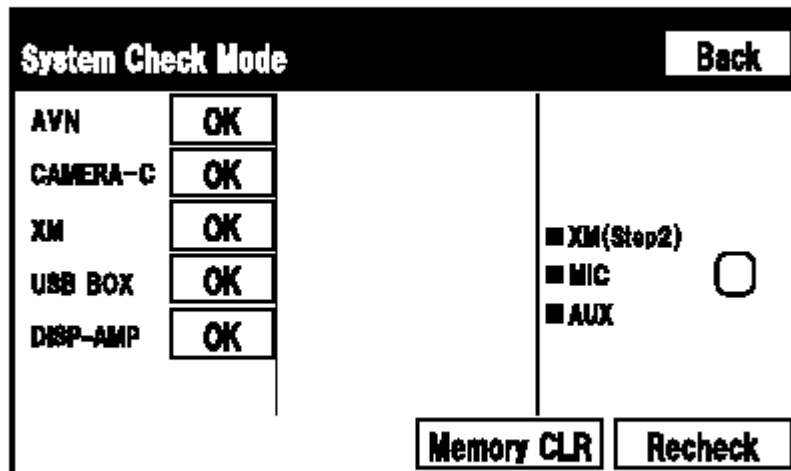


Fig. 26: Screen Display - System Check Mode
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- d. Finish diagnostic mode. Refer to **DTC CHECK / CLEAR** .
5. **SIGNAL CHECK (parking assist ECU input signal)**
- a. Start diagnostic mode. Refer to **DTC CHECK / CLEAR** .
 1. Select "Function Check/Setting" on the Service Menu screen to display the Function Check/Setting screen.

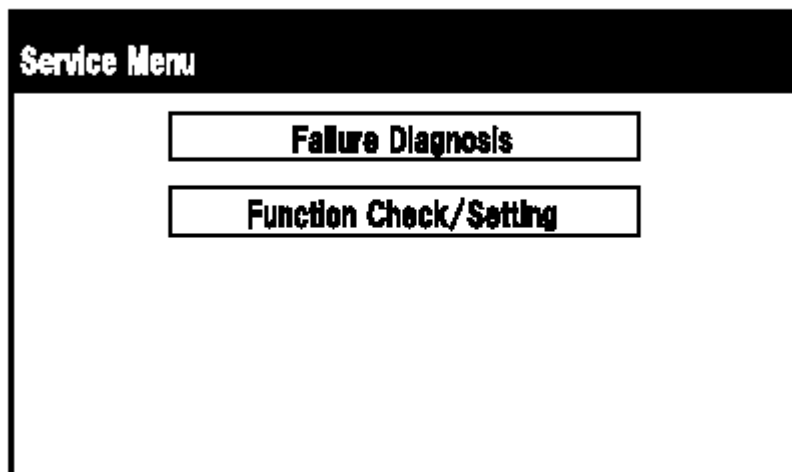


Fig. 27: Screen Display - Function Check/Setting
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Select "Camera Setting" on the Function Check/Setting screen.

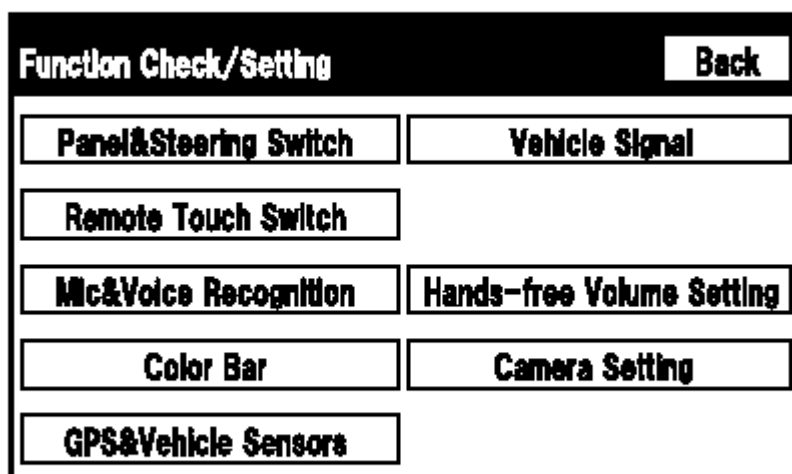


Fig. 28: Screen Display - Camera Setting
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

After "Camera Setting" is selected, the screen transitions differ depending on whether initialization of the parking assist ECU was performed after parking assist ECU replacement.

Parking Assist ECU Initialization	Screen Transition
Not performed	SIGNAL CHECK screen
Performed	MODE SETTING screen

- When the screen changes to the MODE SETTING screen, select "BACK CAMERA SETTING" to display the SIGNAL CHECK screen.

HINT:

To select a grayed out item, select and hold the item for 2 seconds or more.

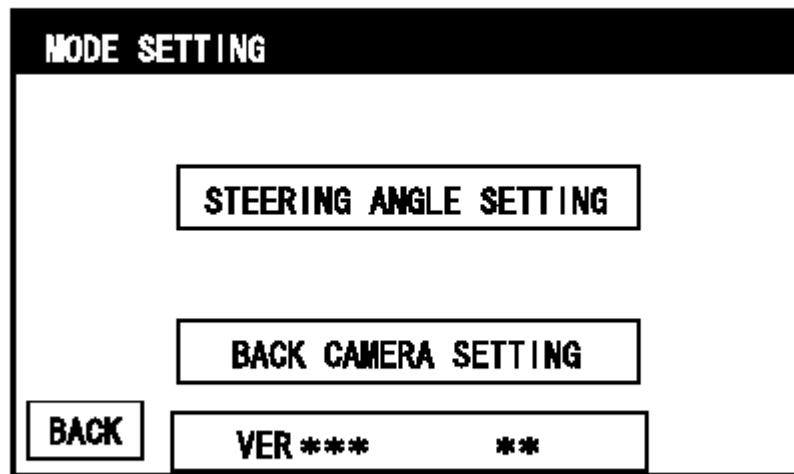


Fig. 29: Screen Display - Back Camera Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- SIGNAL CHECK

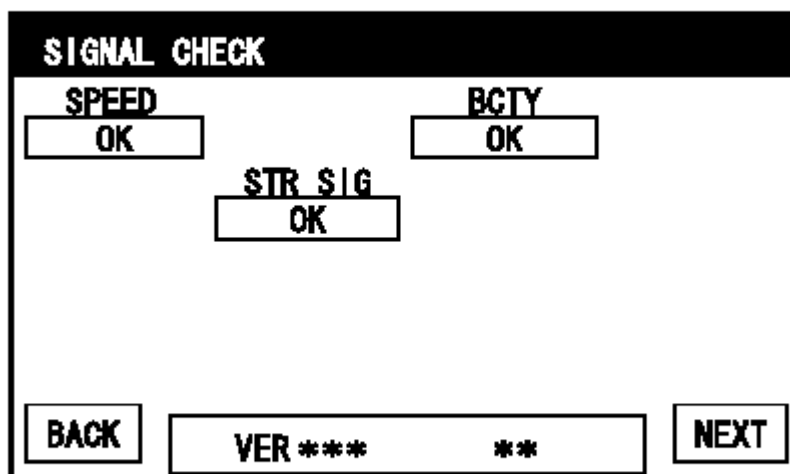


Fig. 30: Screen Display - Signal Check (Next)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. On the SIGNAL CHECK screen, it is possible to inspect the state of signals sent to the parking assist ECU and check the settings.

Item	Inspection Detail	Note
SPEED	Speed signal input	When "CHK" (red) is displayed, selecting "NEXT" will not change to the next screen.
BCTY	CAN communication condition with main body ECU	
STR SIG	Steering angle sensor signal input	

HINT:

- When "CHK" (red) is displayed, perform inspections based on the result of the following inspections.
- If performing the adjustment after proceeding to the next screen, confirm that all items display "OK" (blue) before selecting "NEXT".

c. SPEED inspection

HINT:

If "CHK" (red) is displayed for "SPEED", check for DTCs and perform troubleshooting based on the output DTCs. Refer to **DTC CHECK / CLEAR**.

- d. BCTY inspection

HINT:

If "CHK" (red) is displayed for "BCTY", check for DTCs and perform troubleshooting based on the output DTCs. Refer to **DTC CHECK / CLEAR**.

- e. STR SIG inspection

HINT:

If "CHK" (red) is displayed for "STR SIG", check for DTCs and perform troubleshooting based on the output DTCs. Refer to **DTC CHECK / CLEAR**.

- f. Finish diagnostic mode. Refer to **DTC CHECK / CLEAR**.

6. CALIBRATION WHEN SERVICING VEHICLE

NOTE: Depending on the parts that are replaced or operations that are performed during vehicle inspection or maintenance, calibration of other systems as well as the parking assist monitor system may be needed. Refer to **CALIBRATION**.

7. STEERING ANGLE SETTING (after parking assist ECU is initialized)

HINT:

If the vehicle width extension lines and predicted path lines are not aligned when the steering wheel is centered, or if the predicted path line does not move before the steering wheel is fully turned to either the left or right, adjust the steering angle settings.

- a. Center the steering wheel and stop the vehicle.
- b. Start diagnostic mode. Refer to **DTC CHECK / CLEAR**.
 - 1. Select "Function Check/Setting" on the Service Menu screen.

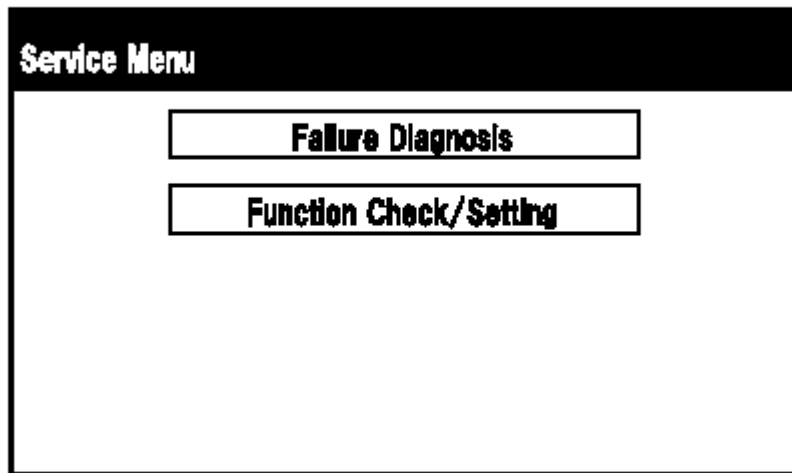


Fig. 31: Screen Display - Function Check/Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Select "Camera Setting" on the Function Check/Setting screen.

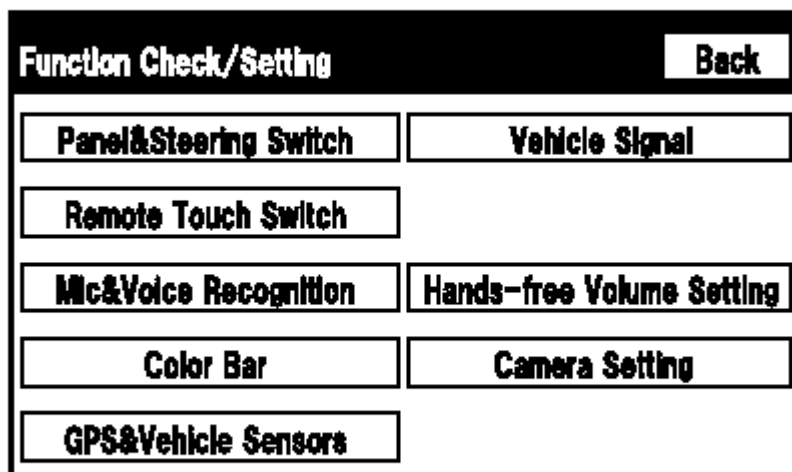


Fig. 32: Screen Display - Camera Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

3. Select "STEERING ANGLE SETTING" on the MODE SETTING screen.

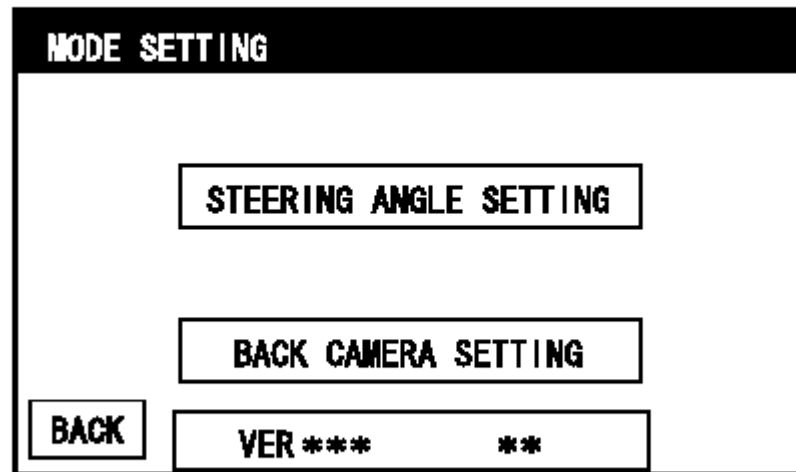


Fig. 33: Screen Display - Back Camera Setting
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

To select a grayed out item, select and hold the item for 2 seconds or more.

4. Select "NEXT" on the SIGNAL CHECK screen to display the STEERING ANGLE SETTING screen.

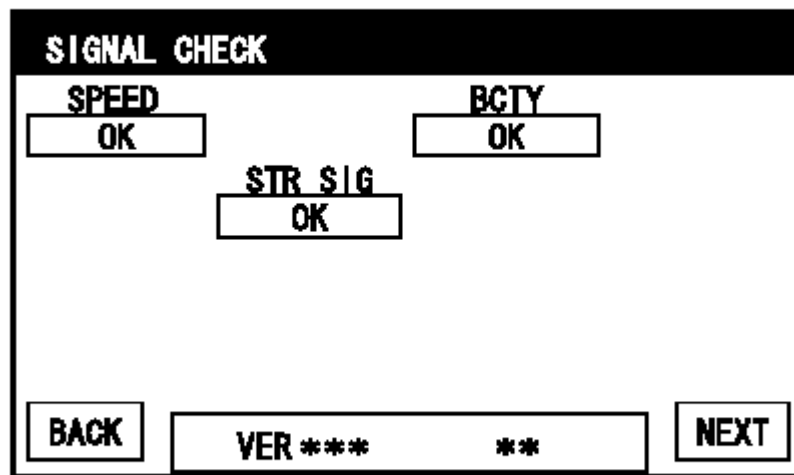
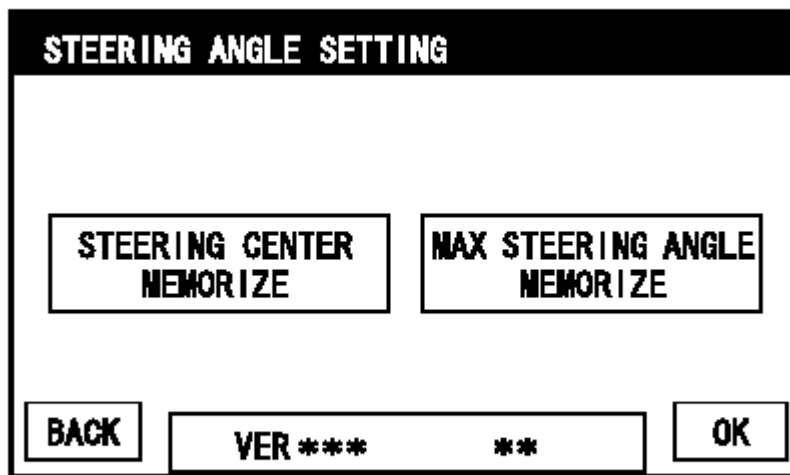


Fig. 34: Screen Display - Signal Check (Next)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

NOTE:

- When "CHK" (red) is displayed for any items on the SIGNAL CHECK screen, selecting "NEXT" will not change the screen to the STEERING ANGLE SETTING screen.
- When "CHK" is displayed for any items on the SIGNAL CHECK screen, perform inspections using the SIGNAL CHECK screen.

c. Steering angle setting



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Fig. 35: Identifying "Steering Angle Setting" Screen ("Steering Center Memorize" Switch)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1. Check that the steering wheel is centered (approximately +/- 5 degrees or less) and select "STEERING CENTER MEMORIZE".
2. After the centered steering position is memorized, turn the steering wheel to the left and then to the right full lock positions and select "MAX STEERING ANGLE MEMORIZE" or "OK".

HINT:

It is also possible to start by initially turning the steering wheel to the right side.

3. Select "MAX STEERING ANGLE MEMORIZE" or "OK" to store the steering angle adjustment value and change the screen to the MODE SETTING screen.

HINT:

- When "MAX STEERING ANGLE MEMORIZE" or "OK" is selected, a beep will sound to confirm that the steering angle adjustment values have been stored.
- The adjustment values will not be stored unless "MAX STEERING ANGLE MEMORIZE" or "OK" is selected.
- When "BACK" is selected, the screen changes to SIGNAL CHECK without storing the set values.
- If the steering angle settings have not been adjusted, selecting "MAX STEERING ANGLE MEMORIZE" or "OK" will not cause the adjustment values to be stored.

- Even if no DTCs are detected, selecting "MAX STEERING ANGLE MEMORIZE" or "OK" may not cause the adjustment value to be stored if the steering sensor is malfunctioning.
 - If selecting "MAX STEERING ANGLE MEMORIZE" or "OK" does not cause the adjustment value to be stored after adjusting the steering angle, replace the spiral with sensor cable sub-assembly. Refer to **REMOVAL** .
- d. Finish diagnostic mode. Refer to **DTC CHECK / CLEAR** .
 - e. Confirm steering angle adjustment.

HINT:

If the steering angle has been adjusted, confirm the steering angle adjustment on the parking assist monitor screen after finishing diagnosis mode.

1. Check on the parking assist screen that the predicted path line moves until the steering wheel is fully turned to either the left or right.

HINT:

If the predicted path line stops moving before the steering wheel is fully turned to either the left or right, the steering angle adjustment values have not been stored correctly. In this case, perform "STEERING CENTER MEMORIZE" and "MAX STEERING ANGLE MEMORIZE" again.

DTC CHECK / CLEAR

DTC CHECK / CLEAR

1. CHECK DTC

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Chassis / Parking Assist Monitor System / Trouble Codes.
- e. Check the details of the DTCs. Refer to **DIAGNOSTIC TROUBLE CODE CHART**.

HINT:

The parking assist ECU may store the DTCs of the following system. If DTCs other than those specified in Diagnostic Trouble Code Chart of the parking assist monitor system are output, refer to Diagnostic Trouble Code Chart for the applicable system.

2. CLEAR DTC

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.

- c. Turn the Techstream on.
- d. Enter the following menus: Chassis / Parking Assist Monitor System / Trouble Codes.
- e. According to the display on the Techstream, select the trouble code data display with the clear button.

DATA LIST / ACTIVE TEST

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTE: In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- a. Connect the Techstream to the DLC3.
- b. Turn the ignition switch to ON.
- c. Turn the Techstream on.
- d. Enter the following menus: Chassis / Parking Assist Monitor System / Data List.
- e. According to the display on the tester, read the Data List.

PARKING ASSIST MONITOR SYSTEM

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
AVC-LAN Master Connect Status	AVC-LAN communication condition/OK or NG	OK: AVC-LAN communication condition is normal NG: AVC-LAN communication condition is abnormal	-
	AVC-LAN	OK: AVC-LAN communication condition is	

AVC-LAN Master Reset Status	communication condition/OK or NG	normal NG: AVC-LAN communication condition is abnormal	-
AVC-LAN Master Status	AVC-LAN communication condition/OK or NG	OK: AVC-LAN communication condition is normal NG: AVC-LAN communication condition is abnormal	-
AVC-LAN Connect Status	AVC-LAN communication condition/OK or NG	OK: AVC-LAN communication condition is normal NG: AVC-LAN communication condition is abnormal	-
AVC-LAN Sending Status	AVC-LAN communication condition/OK or NG	OK: AVC-LAN communication condition is normal NG: AVC-LAN communication condition is abnormal	-
AVC-LAN Regist Complete Status	AVC-LAN communication condition/OK or NG	OK: AVC-LAN communication condition is normal NG: AVC-LAN communication condition is abnormal	-
		OK: AVC-	

AVC-LAN Regist Request Status	AVC-LAN communication condition/OK or NG	LAN communication condition is normal NG: AVC- LAN communication condition is abnormal	-
ON/OFF Parameter Status	AVC-LAN communication condition/OK or NG	OK: AVC- LAN communication condition is normal NG: AVC- LAN communication condition is abnormal	-
EEPROM Status (Read/Write)	Parking assist ECU information/OK or NG	OK: Parking assist ECU is normal NG: Parking assist ECU is abnormal	-
EEPROM Status (Initial read)	Parking assist ECU information/OK or NG	OK: Parking assist ECU is normal NG: Parking assist ECU is abnormal	-
IG Voltage Low Status	IG voltage input to parking assist ECU/OK or NG	OK: IG voltage is normal NG: IG voltage is abnormal (too low)	-
IG Voltage High Status	IG voltage input to parking assist ECU/OK or NG	OK: IG voltage is normal NG: IG voltage is abnormal (too high)	-
ACC Voltage Low Status	ACC voltage input to parking assist ECU/OK or NG	OK: ACC voltage is normal NG: ACC voltage is abnormal (too	-

		low)	
ACC Voltage High Status	ACC voltage input to parking assist ECU/OK or NG	OK: ACC voltage is normal NG: ACC voltage is abnormal (too high)	-
AISIC Output Status	Output condition of camera display signal/OK or NG	OK: Output condition of camera display signal is normal NG: Output condition of camera display signal is abnormal	-
Wheel Speed Sensor (4wheel)	Effectivity of speed signal from speed sensor/OK or NG	OK: Speed signal is effective NG: Speed signal is not effective	-
Number of DTC	Number of stored trouble codes/min.: 0, max.: 255	Number of DTCs will be displayed	-

DIAGNOSTIC TROUBLE CODE CHART

DIAGNOSTIC TROUBLE CODE CHART

HINT:

If a trouble code is output during the DTC check, inspect the trouble areas listed for that code. For details of the code, refer to the appropriate information in the DTC chart. Inspect fuses and relays before investigating the trouble areas shown in the table below.

PARKING ASSIST MONITOR SYSTEM

DTC Code	Detection Item	Trouble Area	See
		- Parking assist ECU initialization (parking assist ECU not	

C1611	ECU Malfunction	- initialized) - Back camera position setting (initialized parking assist ECU) - Steering Angle setting (initialized parking assist ECU) - Parking assist ECU	Refer to <u>DTC C1611: ECU Malfunction</u>
C1612	IG Voltage is Low or High	- Harness or connector - Parking assist ECU	Refer to <u>DTC C1612: IG Voltage is Low or High</u>
C1613	ACC Voltage is Low or High	- Harness or connector - Parking assist ECU	Refer to <u>DTC C1613: ACC Voltage is Low or High</u>
C1621	Back Camera Power Supply Failure	- Harness or connector - Rear television camera assembly - Parking assist ECU	Refer to <u>DTC C1621: Back Camera Power Supply Failure;</u> <u>DTC C1622: Open or Short Circuit in Back Camera Signal</u>
C1622	Open or Short Circuit in Back Camera Signal	- Harness or connector - Rear television camera assembly - Parking assist ECU	Refer to <u>DTC C1621: Back Camera Power Supply Failure;</u> <u>DTC C1622: Open or Short Circuit in Back Camera Signal</u>
C1625	Open or Short in Steering Angle Sensor +B	- Harness or connector - Steering sensor (spiral with sensor cable sub-assembly)	Refer to <u>DTC C1625: Open or Short in Steering Angle Sensor +B</u>
		- Steering sensor (spiral with sensor	

C1626	Steering Angle Sensor Failure	cable sub-assembly) - Parking assist ECU	Refer to <u>DTC C1626: Steering Angle Sensor Failure</u>
C168B	AVC-LAN Communication Malfunction	AVC-LAN Communication	Refer to <u>DTC C168B: AVC-LAN Communication Malfunction</u> ; <u>DTC C168C: AVC-LAN Command Time Out</u>
C168C	AVC-LAN Command Time Out	AVC-LAN Communication	Refer to <u>DTC C168B: AVC-LAN Communication Malfunction</u> ; <u>DTC C168C: AVC-LAN Command Time Out</u>
U0073	Control Module Communication Bus Off	CAN communication system	Refer to <u>DTC U0073: Control Module Communication Bus Off</u> ; <u>DTC U0126: Lost Communication with Steering Angle Sensor Module</u> ; <u>DTC U0129: Lost Communication with Brake System Control Module</u> ; <u>DTC U0140: Lost Communication with Main Body ECU</u> ; <u>DTC U1110: Lost Communication with Clearance Sonar Module</u>
U0126	Lost Communication with Steering Angle Sensor Module	CAN communication system	Refer to <u>DTC U0073: Control Module Communication Bus Off</u> ; <u>DTC U0126: Lost Communication with Steering Angle Sensor Module</u> ; <u>DTC U0129: Lost Communication with Brake System Control Module</u> ; <u>DTC U0140: Lost Communication with Main Body ECU</u> ; <u>DTC U1110: Lost Communication with Clearance Sonar Module</u>
U0129	Lost Communication with Brake System Control Module	CAN communication system	Refer to <u>DTC U0073: Control Module Communication Bus Off</u> ; <u>DTC U0126: Lost Communication with Steering Angle Sensor Module</u> ; <u>DTC U0129: Lost Communication with Brake System Control Module</u> ; <u>DTC U0140: Lost Communication with Main Body ECU</u> ; <u>DTC U1110: Lost Communication with Clearance Sonar Module</u>
U0140	Lost Communication with Main Body ECU	CAN communication system	Refer to <u>DTC U0073: Control Module Communication Bus Off</u> ; <u>DTC U0126: Lost Communication with Steering Angle Sensor Module</u> ; <u>DTC U0129: Lost Communication with Brake System Control Module</u> ; <u>DTC U0140: Lost Communication with Main Body ECU</u> ; <u>DTC U1110: Lost Communication with Clearance Sonar Module</u>
U1110	Lost Communication with Clearance Sonar Module	CAN communication system	Refer to <u>DTC U0073: Control Module Communication Bus Off</u> ; <u>DTC U0126: Lost Communication with Steering Angle Sensor Module</u> ; <u>DTC U0129: Lost Communication with Brake System Control Module</u> ; <u>DTC U0140: Lost Communication with Main Body ECU</u> ; <u>DTC U1110: Lost Communication with Clearance Sonar Module</u>