

2009 Toyota Highlander Limited
2009 ACCESSORIES & EQUIPMENT Park Assist/Monitoring - Highlander

2009 ACCESSORIES & EQUIPMENT

Park Assist/Monitoring - Highlander

REAR VIEW MONITOR SYSTEM (W/ NAVIGATION SYSTEM)

PRECAUTION

1. PRECAUTION FOR DISCONNECTING THE BATTERY CABLE

NOTE: When disconnecting the negative (-) battery terminal, initialize the following system after the terminal is reconnected.

SYSTEM NAME REFERENCE

System Name	See Procedure
Power Back Door System	INITIALIZATION

2. EXPRESSIONS OF IGNITION SWITCH

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

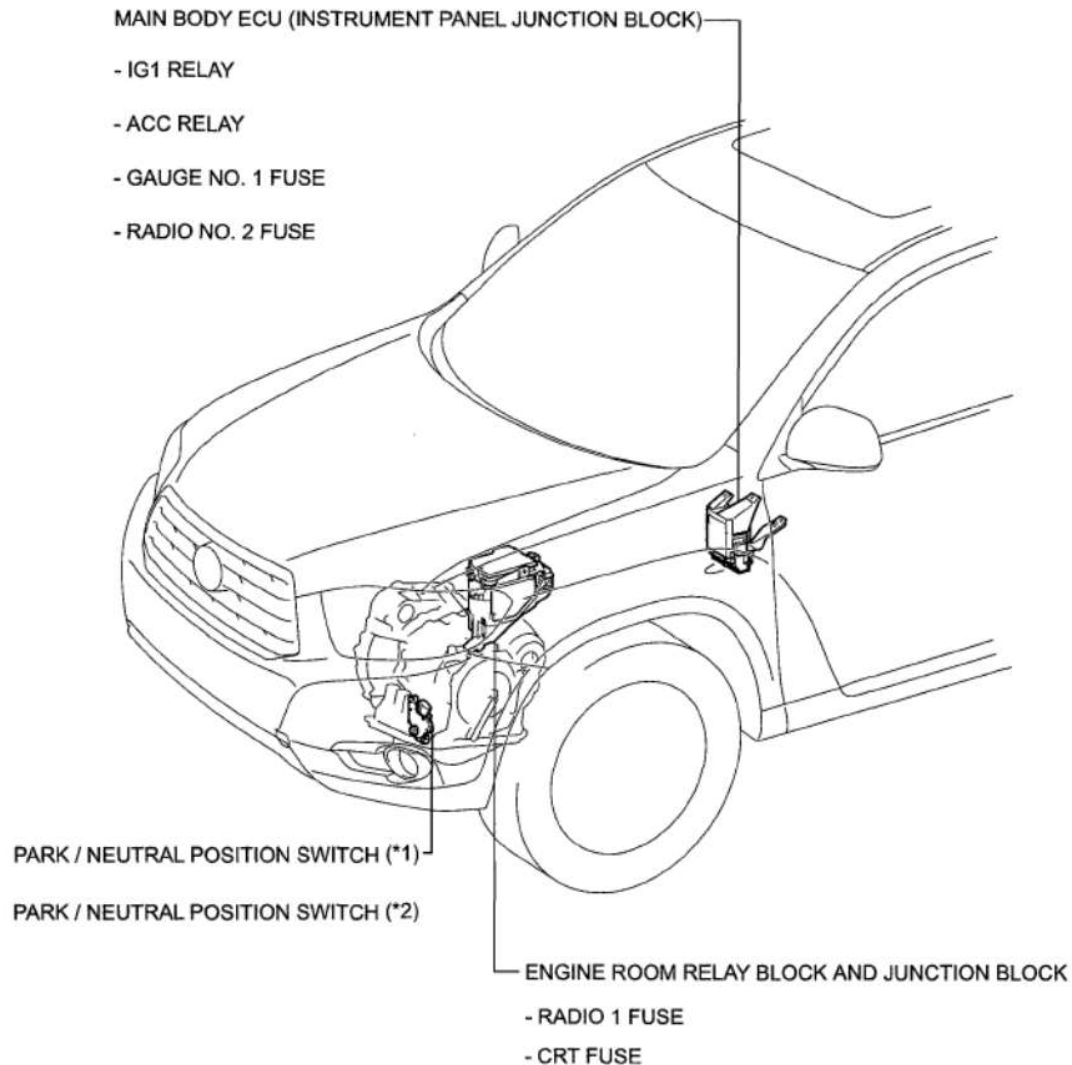
SWITCH CONDITION CHART

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

PARTS LOCATION

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*1: for U151E

*2: for U151F

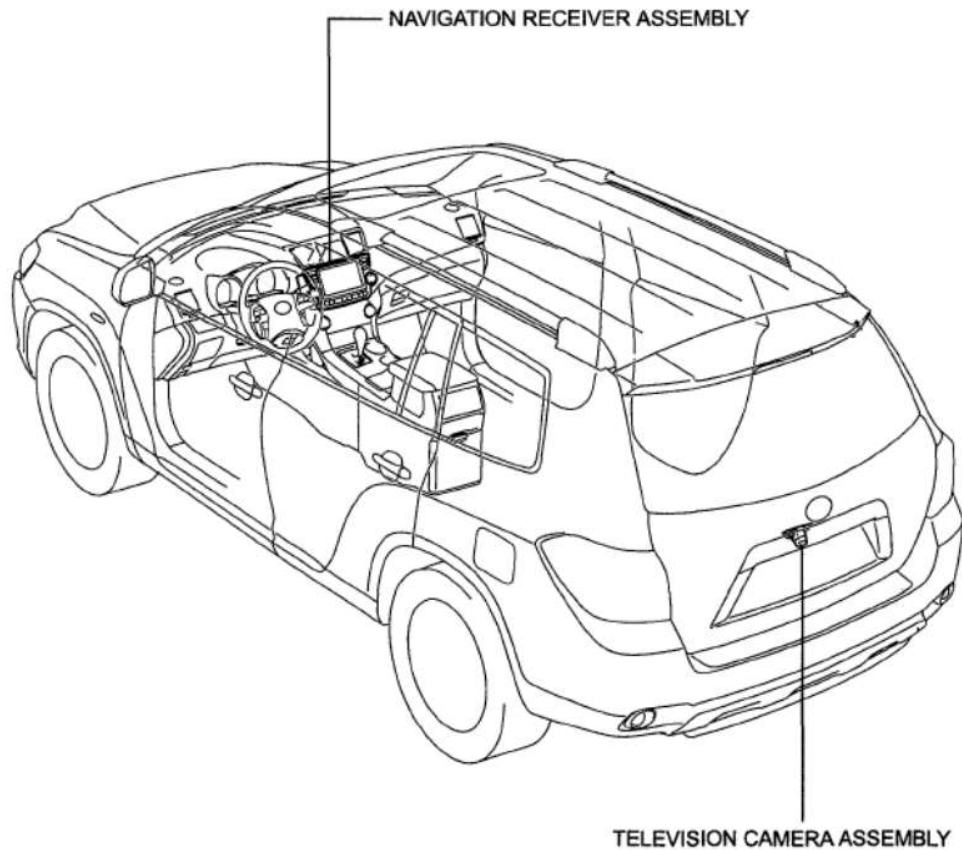
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Fig. 1: Identifying Rear View Monitor System Parts Location - w/ Navigation System (1 Of 2)
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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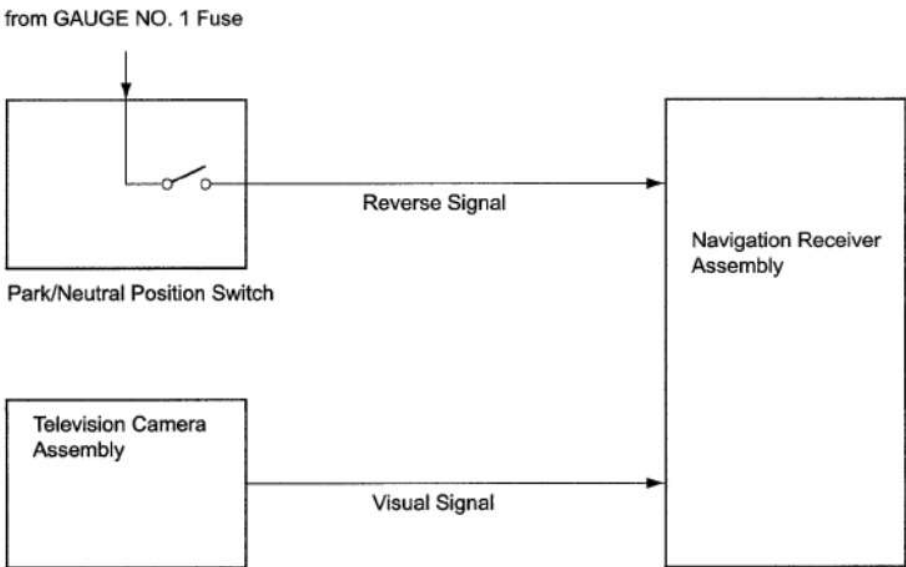
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Fig. 2: Identifying Rear View Monitor System Parts Location - w/ Navigation System (2 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

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8121278E06

Fig. 3: Rear View Monitor System Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DESCRIPTION

1. GENERAL
- a.

To assist the driver with parking the vehicle by displaying an image of the area behind the vehicle, this system has a television camera mounted on the luggage compartment door. The system displays the image on the navigation receiver assembly.
- b.

This system consists of the following components:

1.

Navigation receiver assembly

2.

Television camera assembly

3.

Park/neutral position switch
- c.

This system is equipped with a self-diagnosis system, which is operated on a dedicated window that appears on the display panel, just as in the navigation system.
2. FUNCTION OF COMPONENTS
- a.

The navigation receiver assembly controls the system by using information from the following components:

ITEM FUNCTION CHART

Item	Function
Television Camera Assembly	• Mounted on the luggage compartment door to transmit an image of the area behind the vehicle to the navigation receiver assembly. • A color video camera that uses a CCD (Charge Coupled Device) and

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	a wide-angle lens.
Navigation Receiver Assembly	• Transmits video signals, which contain an image of the area behind the vehicle taken with the television camera assembly. • Effects control of the system by receiving the shift position signal from the park/neutral position switch. • Displays the rear view monitor image on the display panel.
Park/Neutral Position Switch	Transmits a reverse shift position signal to the navigation receiver assembly.

3. OPERATION EXPLANATION

- a. The navigation receiver assembly receives the R position signal from the park/neutral position switch when the shift lever is moved to the R position. After receiving the R position signal, the navigation receiver assembly switches from the navigation system to the rear view monitor system.

4. NOTES FOR REAR VIEW MONITOR

- a. Notes for the rear view monitor.
 1. The rear view monitor may not function properly if subjected to a severe blow by any hard object.
 2. Do not scrub the cover part of the camera (resin made). Scrubbing it 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. The camera screen is frosted over (the image immediately after turning the ignition switch on (IG) may be blurred or darker than normal).
 2. A strong beam of light, such as a sunbeam or headlight, hits the camera.
 3. It is too dark around the camera (at night, etc.).
 4. The ambient temperature around the camera is either too high or too low.

HINT:

When a strong light, such as a sunbeam reflected off the vehicle's body, hits the camera, the image may be blurred. This is called the "SMEAR" phenomenon, peculiar to the CCD camera.

HOW TO PROCEED WITH TROUBLESHOOTING

1. VEHICLE BROUGHT TO WORKSHOP
2. CUSTOMER PROBLEM ANALYSIS
3. CHECK AND CLEAR DTCs

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- a. Refer to the diagnostic check/clear (See **DTC CHECK/CLEAR**).

4. **PROBLEM SYMPTOM CONFIRMATION**

SYMPTOM DOES NOT OCCUR (Go to step 5)

SYMPTOM OCCURS (Go to step 6)

5. **SYMPTOM SIMULATION**

6. **CHECK DTC**

DTC IS OUTPUT (Go to step 10)

DTC IS NOT OUTPUT (Go to step 7)

7. **CHECK IF THE SAME SYMPTOM APPEARS IN THE NAVIGATION SYSTEM**

- a. Refer to the navigation system (See **PROBLEM SYMPTOMS TABLE**).

THE SYMPTOM APPEARS (FOLLOW THE NAVIGATION SYMPTOM CHART TO PERFORM TROUBLESHOOTING)

THE SYMPTOM DOES NOT APPEAR (Go to step 8)

8. **PROBLEM SYMPTOMS TABLE**

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

THE CORRESPONDING SYMPTOM EXISTS (Go to step 10)

THE CORRESPONDING SYMPTOM DOES NOT EXIST (Go to step 9)

9. **BASED ON THE MALFUNCTION SYMPTOM, PERFORM TROUBLESHOOTING BELOW**

- a. Terminals of ECU (See **TERMINALS OF ECU**).

10. **ADJUST, REPAIR OR REPLACE**

11. **CONFIRMATION TEST**

NEXT: END

PROBLEM SYMPTOMS TABLE

- Before inspecting the suspected areas listed in the table below, check the fuse and relay.
- Before inspecting the suspected areas listed in the table below, check the DTCs.
- Methods used to verify the cause of the problem are listed in order of probability in the suspected area column.

REAR VIEW MONITOR SYSTEM

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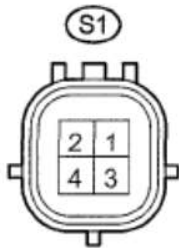
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SYMPTOM REFERENCE

Symptom	Suspected Area	Refer to
When shift lever is in R position, rear view monitor image is not displayed (Screen is not black).	Reverse signal circuit	<u>REVERSE SIGNAL CIRCUIT</u>
	Proceed to "Display Signal Circuit between Navigation Receiver Assembly and Television Camera Assembly"	<u>DISPLAY SIGNAL CIRCUIT BETWEEN NAVIGATION RECEIVER ASSEMBLY AND TELEVISION CAMERA ASSEMBLY</u>
	Navigation receiver assembly	<u>REMOVAL</u>
When shift lever is in R position, rear view monitor image is not displayed (Screen is black).	Navigation receiver assembly power source circuit	<u>NAVIGATION RECEIVER ASSEMBLY POWER SOURCE CIRCUIT</u>
	Proceed to "Display Signal Circuit between Navigation Receiver Assembly and Television Camera Assembly"	<u>DISPLAY SIGNAL CIRCUIT BETWEEN NAVIGATION RECEIVER ASSEMBLY AND TELEVISION CAMERA ASSEMBLY</u>
	Navigation receiver assembly	<u>REMOVAL</u>
When shift lever is not in R position, rear view monitor image is displayed.	Reverse signal circuit	<u>REVERSE SIGNAL CIRCUIT</u>
	Navigation receiver assembly	<u>REMOVAL</u>
Problem with the rear view monitor image (color, disorder of picture).	Proceed to "Display Signal Circuit between Navigation Receiver Assembly and Television Camera Assembly"	<u>DISPLAY SIGNAL CIRCUIT BETWEEN NAVIGATION RECEIVER ASSEMBLY AND TELEVISION CAMERA ASSEMBLY</u>
	Navigation receiver assembly	<u>REMOVAL</u>

TERMINALS OF ECU

1. TELEVISION CAMERA ASSEMBLY
- a. Disconnect the S1 camera connector.



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Fig. 4: Identifying S1 Camera Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage of each terminal of the wire harness side connector.

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TERMINAL DESCRIPTION

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
S1-3 (CGND) - Body ground	W - Body ground	Ground	Always	Below 1 V
S1-4 (CB+) - S1-3 (CGND)	B - W	Power source	Ignition switch on (IG), shift lever R position	5.5 to 7 V

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

- c. Reconnect the S1 camera connector.
- d. Measure the voltage and frequency of each terminal of the connector.

TERMINAL DESCRIPTION

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
S1-1 (CV-) - S1-2 (CV+)	BR - R	Display signal	Ignition switch on (IG), shift lever R position	See waveform 1 1

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

- e. Reference:

Oscilloscope waveform

- 1. Waveform 1

WAVEFORM REFERENCE

Item	Content
Measure terminal	S1-1 (CV-) - S1-2 (CV+)
Measure set	0.2 V/DIV., 0.2 μS/DIV.
Condition	Ignition switch: on (IG), Shift lever: R position

2. NAVIGATION RECEIVER ASSEMBLY (See TERMINALS OF ECU)



Fig. 5: Identifying Waveform 1

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

REVERSE SIGNAL CIRCUIT

DESCRIPTION

The navigation receiver assembly receives a reverse signal from the park/neutral position switch.

WIRING DIAGRAM

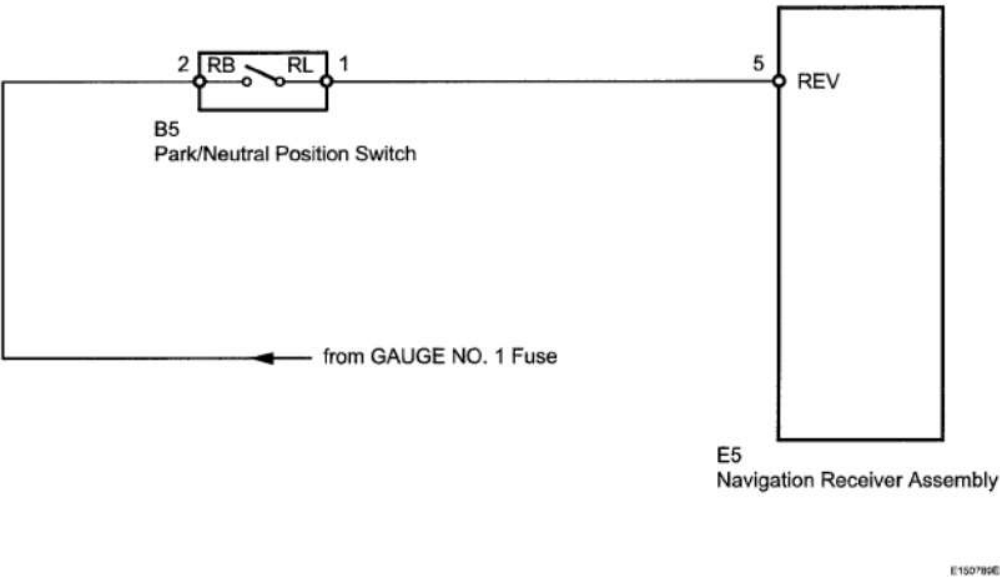


Fig. 6: Navigation Receiver Assembly - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. INSPECT NAVIGATION RECEIVER ASSEMBLY
- a. Disconnect navigation receiver assembly connector E5.

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

Standard voltage

VOLTAGE SPECIFICATION

Tester Connection	Condition	Specified Condition
E5-5 (REV) - Body ground	Ignition switch on (IG) Shift lever R position	10 to 14 V
E5-5 (REV) - Body ground	Ignition switch on (IG) Shift lever any position except R	Below 1 V

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NG: Go to step 2

Front view of wire harness connector:
(to Navigation Receiver Assembly)

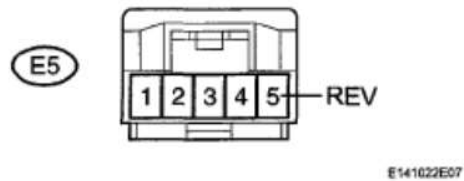


Fig. 7: Identifying Navigation Receiver Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS
TABLE (See **PROBLEM SYMPTOMS TABLE**)

2. CHECK HARNESS AND CONNECTOR (NAVIGATION RECEIVER ASSEMBLY - PARK/
NEUTRAL POSITION SWITCH)
- a. Disconnect navigation receiver assembly connector E5 and park/neutral position switch connector B5.

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

Standard resistance

RESISTANCE REFERENCE

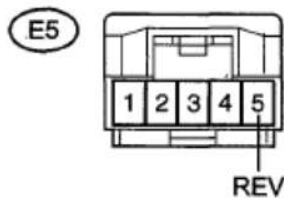
Tester Connection	Condition	Specified Condition
E5-5 (REV) - B5-1 (RL)	Always	Below 1 ohms
E5-5 (REV) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

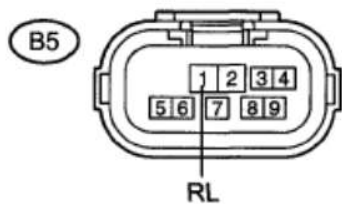
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Front view of wire harness connector:
(to Navigation Receiver Assembly)



Front view of wire harness connector:
(to Park/Neutral Position Switch)



E150782E06

Fig. 8: Identifying E5 Navigation Receiver Assembly Connector Terminal And B5 Park/Neutral Position Switch Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. INSPECT PARK/NEUTRAL POSITION SWITCH

- a. Disconnect park/neutral position switch connector B5.
- b. Measure the resistance according to the value(s) in the table below.

Standard resistance

RESISTANCE REFERENCE

Tester Connection	Condition	Specified Condition
B5-1 (RL) - B5-2 (RB)	Shift lever R position	Below 1 ohms
B5-1 (RL) - B5-2 (RB)	Shift lever any position except R	10 kohms or higher

Result

RESULT REFERENCE

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Result	Proceed to
OK	A
NG (for U151E)	B
NG (for U151F)	C

B: REPLACE PARK/NEUTRAL POSITION SWITCH (for U151E) (See **ON-VEHICLE INSPECTION**)

C: REPLACE PARK/NEUTRAL POSITION SWITCH (for U151F) (See **ON-VEHICLE INSPECTION**)

Component without harness connected:
(Park/Neutral Position Switch)

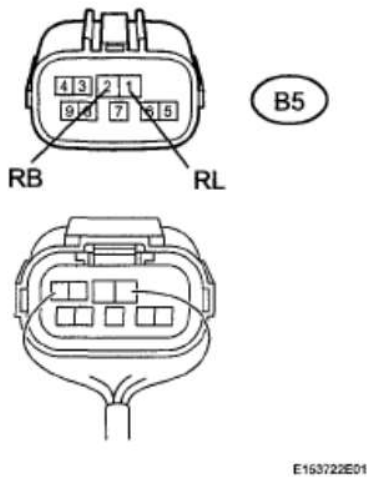


Fig. 9: Identifying B5 Park/Neutral Position Switch Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

A: REPAIR OR REPLACE HARNESS OR CONNECTOR

DISPLAY SIGNAL CIRCUIT BETWEEN NAVIGATION RECEIVER ASSEMBLY AND TELEVISION CAMERA ASSEMBLY

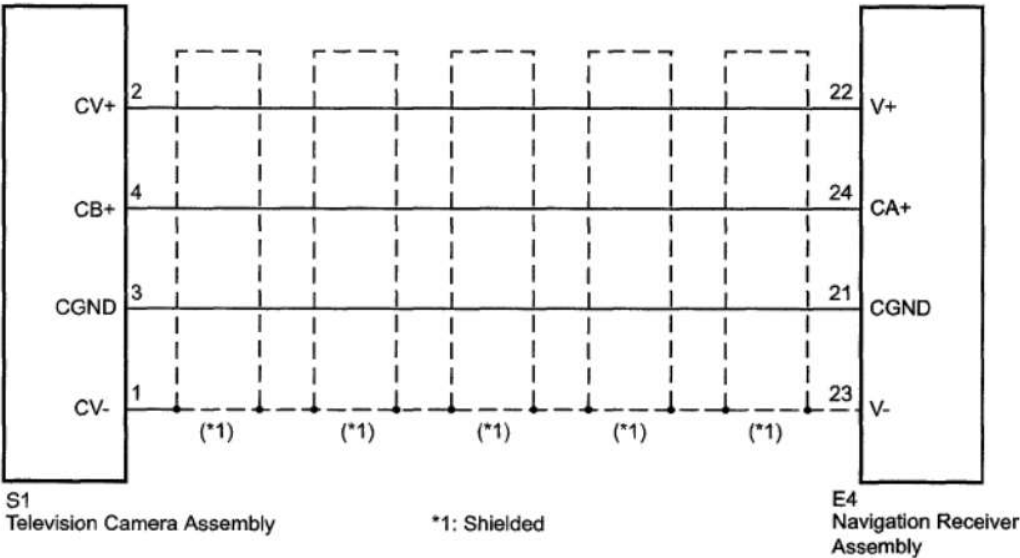
DESCRIPTION

This is the display signal circuit of the television camera assembly.

WIRING DIAGRAM

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E160790E02

Fig. 10: Television Camera Assembly - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

1. CHECK HARNESS AND CONNECTOR (NAVIGATION RECEIVER ASSEMBLY - TELEVISION CAMERA ASSEMBLY)
- a. Disconnect navigation receiver assembly connector E4.

Front view of wire harness connector:
(to Navigation Receiver Assembly)

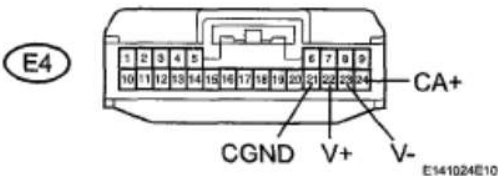


Fig. 11: Identifying E4 Navigation Receiver Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Disconnect television camera assembly connector S1.
- c. Measure the resistance according to the value(s) in the table below.

Standard resistance

RESISTANCE REFERENCE

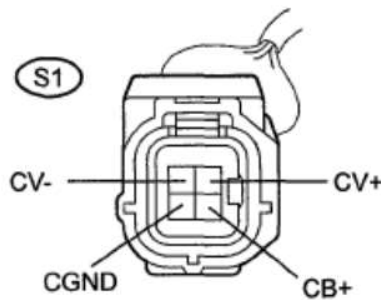
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Tester Connection	Condition	Specified Condition
S1-2 (CV+) - E4-22 (V+)	Always	Below 1 ohms
S1-4 (CB+) - E4-24 (CA+)	Always	Below 1 ohms
S1-3 (CGND) - E4-21 (CGND)	Always	Below 1 ohms
S1-1 (CV-) - E4-23 (V-)	Always	Below 1 ohms
S1-2 (CV+) - Body ground	Always	10 kohms or higher
S1-4 (CB+) - Body ground	Always	10 kohms or higher
S1-3 (CGND) - Body ground	Always	10 kohms or higher
S1-1 (CV-) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to Television Camera Assembly)



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Fig. 12: Identifying S1 Television Camera Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

2. INSPECT NAVIGATION RECEIVER ASSEMBLY

- Reconnect navigation receiver assembly connector E4.
- Measure the voltage according to the value(s) in the table below.

Standard voltage

VOLTAGE SPECIFICATION

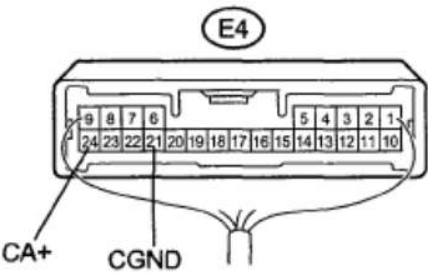
Tester Connection	Condition	Specified Condition
E4-24 (CA+) - E4-21 (CGND)	Ignition switch on (IG) Shift lever R position	Approx. 6 V

NG: REPLACE NAVIGATION RECEIVER ASSEMBLY (See REMOVAL)

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Component with harness connected:
(Navigation Receiver Assembly)



H E153726E01

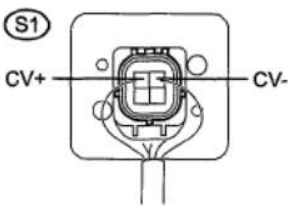
Fig. 13: Identifying E4 Navigation Receiver Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. INSPECT TELEVISION CAMERA ASSEMBLY

- a. Reconnect navigation receiver assembly connector E4 and television camera assembly connector S1.

Component with harness connected:
(Television Camera Assembly)



H E190777E03

Fig. 14: Identifying S1 Television Camera Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

OK:

Pulses as shown in the illustration.

ITEM REFERENCE

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Item	Content
Terminal No. (Symbols)	S1-2 (CV+) - S1-1 (CV-)
Tool	0.2 V/DIV., 0.2 μ sec./DIV.
Condition	Ignition switch on (IG), shift lever R position

NG: REPLACE TELEVISION CAMERA ASSEMBLY (See **REMOVAL**)

OK: PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See **PROBLEM SYMPTOMS TABLE**)

REAR VIEW MONITOR SYSTEM (W/O NAVIGATION SYSTEM)

PRECAUTION

1. PRECAUTION FOR DISCONNECTING THE BATTERY CABLE

NOTE: When disconnecting the negative (-) battery terminal, initialize the following system after the terminal is reconnected.

SYSTEM NAME REFERENCE

System Name	See Procedure
Power Back Door System	INITIALIZATION

2. EXPRESSIONS OF IGNITION SWITCH

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

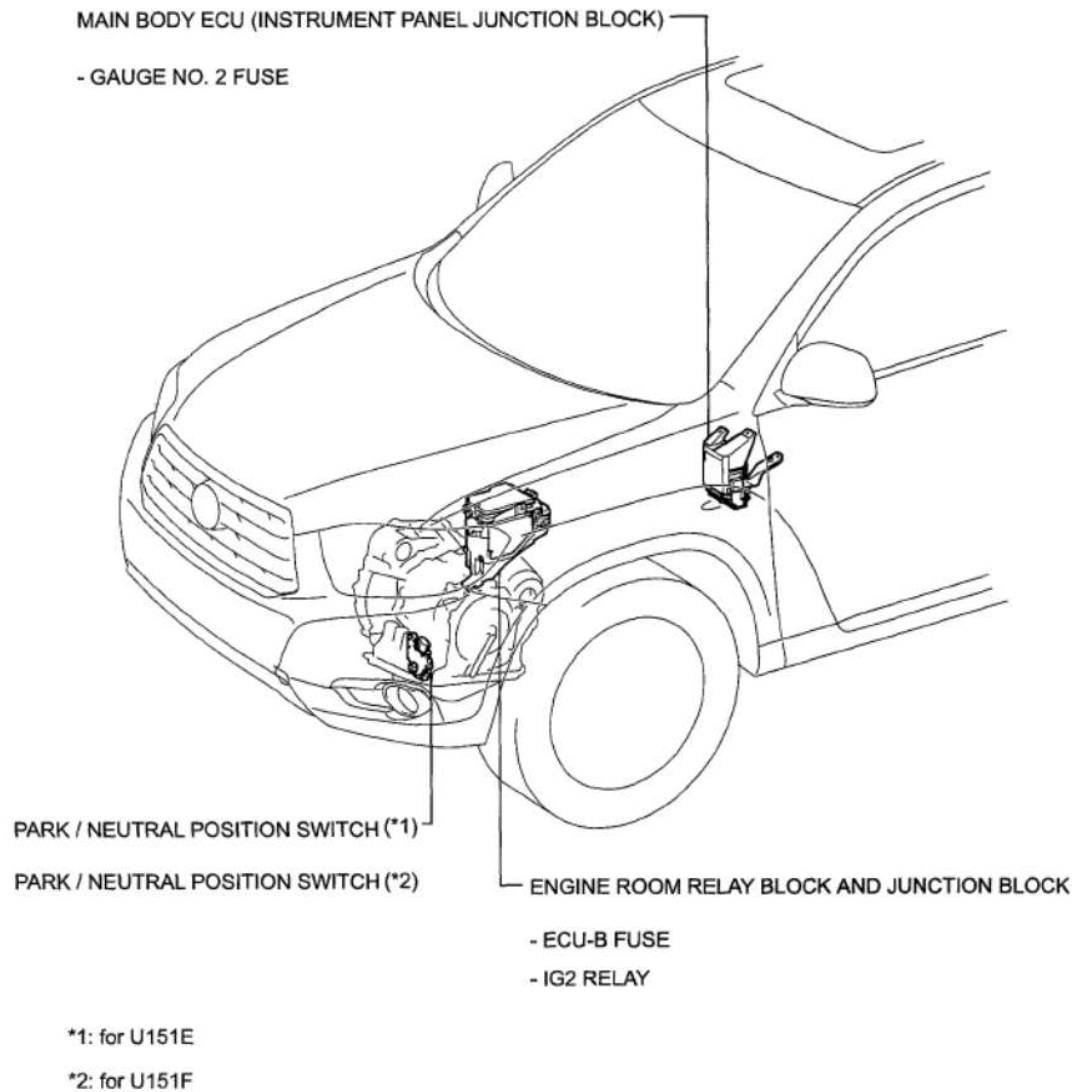
SWITCH CONDITION CHART

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

PARTS LOCATION

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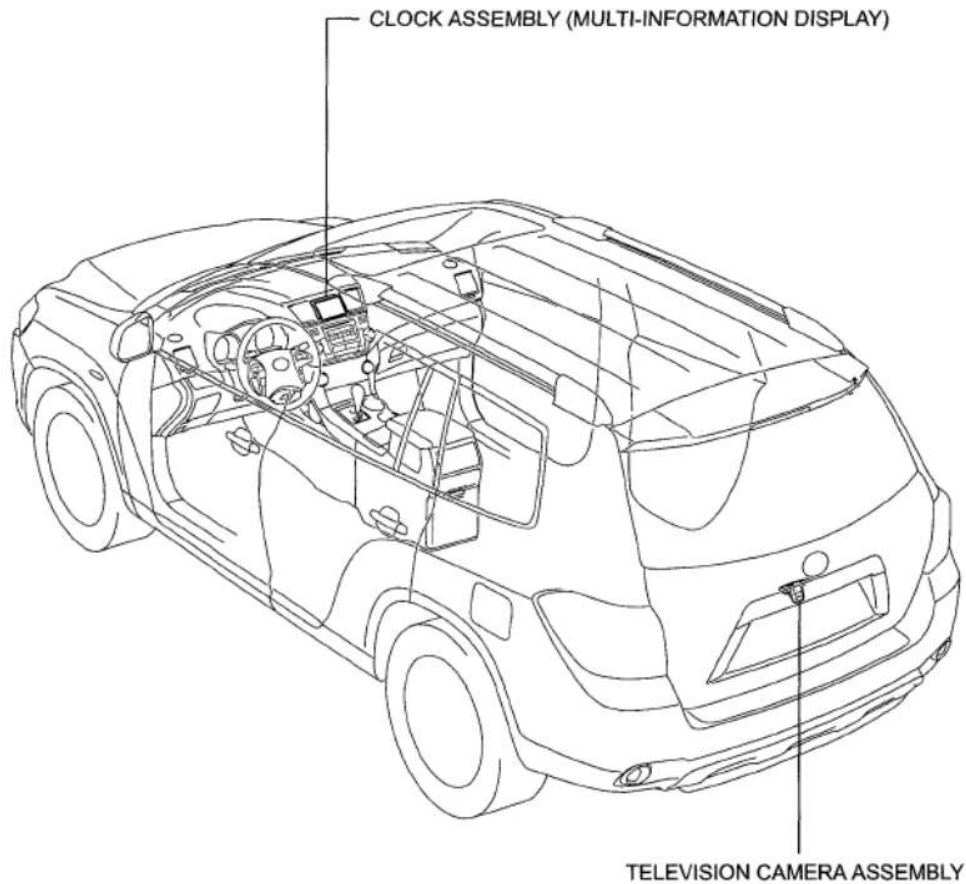
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Fig. 15: Identifying Rear View Monitor System Parts Location - w/o Navigation System (1 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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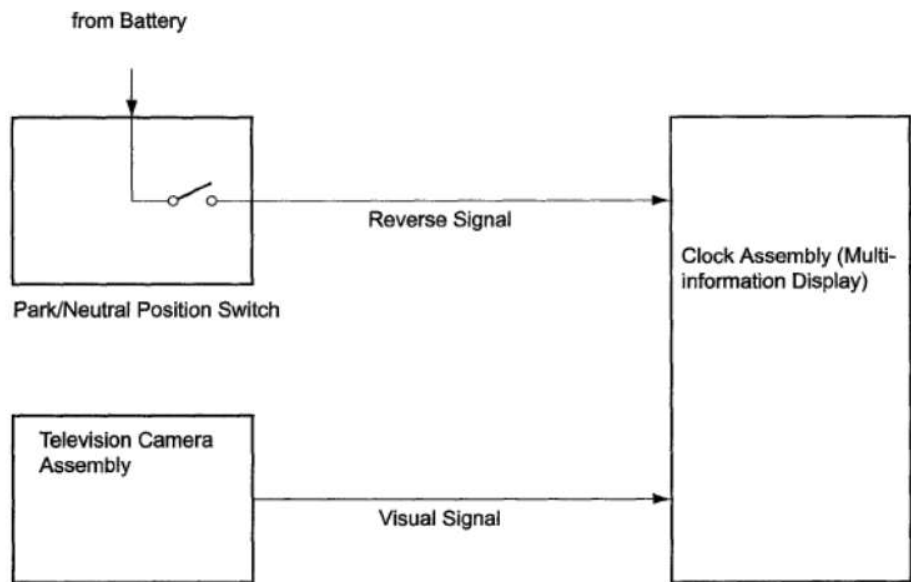
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Fig. 16: Identifying Rear View Monitor System Parts Location - w/o Navigation System (2 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

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Fig. 17: Rear View Monitor System Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DESCRIPTION

1. GENERAL
- a.

To assist the driver with parking the vehicle by displaying an image of the area behind the vehicle, this system has a television camera mounted on the luggage compartment door. The system displays the image on the clock assembly (multi-information display).
- b.

This system consists of the following components:

1.

Clock assembly (multi-information display)

2.

Television camera assembly

3.

Park/neutral position switch
2. FUNCTION OF COMPONENTS
- a.

The clock assembly (multi-information display) controls the system by using information from the following components:

ITEM FUNCTION CHART

Item	Function
Television Camera Assembly	- Mounted on the luggage compartment door to transmit an image of the area behind the vehicle to the clock assembly (multi-information display). - A color video camera that uses a CCD (Charge Coupled Device) and a wide-angle lens.

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Clock Assembly (Multi-Information Display)	• Transmits video signals, which contain images of the area behind the vehicle taken with the television camera assembly. • Effects control of the system by receiving the shift position signal from the park/neutral position switch. • Displays the rear view monitor image on the display panel.
Park/Neutral Position Switch	Transmits a reverse shift position signal to the clock assembly (multi-information display).

3. OPERATION EXPLANATION

- a. The clock assembly (multi-information display) receives the R position signal from the park/neutral position switch when the shift lever is moved to the R position. After receiving the R position signal, the clock assembly (multi-information display) switches from except the rear view monitor system to the rear view monitor system.

4. NOTES FOR REAR VIEW MONITOR

- a. Notes for the rear view monitor.
 1. The rear view monitor may not function properly if subjected to a severe blow by any hard object.
 2. Do not scrub the cover part of the camera (resin made). Scrubbing it 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. The camera screen is frosted over (the image immediately after turning the ignition switch on (IG) may be blurred or darker than normal).
 2. A strong beam of light, such as a sunbeam or headlight, hits the camera.
 3. It is too dark around the camera (at night, etc.).
 4. The ambient temperature around the camera is either too high or too low.

HINT:

When a strong light, such as a sunbeam reflected off the vehicle's body, hits the camera, the image may be blurred. This is called the "SMEAR" phenomenon, peculiar to the CCD camera.

HOW TO PROCEED WITH TROUBLESHOOTING

1. VEHICLE BROUGHT TO WORKSHOP
2. CUSTOMER PROBLEM ANALYSIS
3. PROBLEM SYMPTOM CONFIRMATION

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SYMPTOM DOES NOT OCCUR (Go to step 4)

SYMPTOM OCCURS (Go to step 5)

4. SYMPTOM SIMULATION

5. CHECK IF THE SAME SYMPTOM APPEARS IN THE CLOCK SYSTEM

- a. Refer to the clock system (See PROBLEM SYMPTOMS TABLE).

THE SYMPTOM APPEARS (FOLLOW THE CLOCK SYMPTOM CHART TO PERFORM TROUBLESHOOTING)

THE SYMPTOM DOES NOT APPEAR (Go to step 6)

6. PROBLEM SYMPTOMS TABLE

- a. Refer to the PROBLEM SYMPTOMS TABLE .

THE CORRESPONDING SYMPTOM EXISTS (Go to step 8)

THE CORRESPONDING SYMPTOM DOES NOT EXIST (Go to step 7)

7. BASED ON THE MALFUNCTION SYMPTOM, PERFORM TROUBLESHOOTING BELOW

- a. Terminals of ECU (See TERMINALS OF ECU).

8. ADJUST, REPAIR OR REPLACE

9. CONFIRMATION TEST

NEXT: END

PROBLEM SYMPTOMS TABLE

- Before inspecting the suspected areas listed in the table below, check the fuse and relay.
- Methods used to verify the cause of the problem are listed in order of probability in the suspected area column.

REAR VIEW MONITOR SYSTEM

SYMPTOM CHART

Symptom	Suspected Area	Refer to
When shift lever is in R position, rear view monitor image is not displayed (Screen is not black).	Reverse signal circuit	<u>REVERSE SIGNAL CIRCUIT</u>
	Proceed to "Display Signal Circuit between Clock Assembly and Television Camera Assembly"	<u>DISPLAY SIGNAL CIRCUIT BETWEEN CLOCK ASSEMBLY AND TELEVISION CAMERA ASSEMBLY</u>
	Clock assembly	<u>REMOVAL</u>
	Clock assembly power source circuit	<u>POWER SOURCE CIRCUIT</u>

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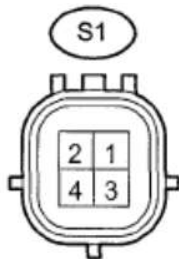
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When shift lever is in R position, rear view monitor image is not displayed (Screen is black).	Proceed to "Display Signal Circuit between Clock Assembly and Television Camera Assembly"	<u>DISPLAY SIGNAL CIRCUIT BETWEEN CLOCK ASSEMBLY AND TELEVISION CAMERA ASSEMBLY</u>
	Clock assembly	<u>REMOVAL</u>
When shift lever is not in R position, rear view monitor image is displayed.	Reverse signal circuit	<u>REVERSE SIGNAL CIRCUIT</u>
	Clock assembly	<u>REMOVAL</u>
Problem with the rear view monitor image (color, disorder of picture).	Proceed to "Display Signal Circuit between Clock Assembly and Television Camera Assembly"	<u>DISPLAY SIGNAL CIRCUIT BETWEEN CLOCK ASSEMBLY AND TELEVISION CAMERA ASSEMBLY</u>
	Clock assembly	<u>REMOVAL</u>

TERMINALS OF ECU

1. TELEVISION CAMERA ASSEMBLY

- a. Disconnect the S1 camera connector.



E150739E03

Fig. 18: Identifying S1 Camera Connector Terminal
 Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Measure the voltage of each terminal of the wire harness side connector.

TERMINAL DESCRIPTION

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
S1-3 (CGND) - Body ground	W - Body ground	Ground	Always	Below 1 V
S1-4 (CB+) - S1-3 (CGND)	B - W	Power source	Ignition switch on (IG) Shift lever R position	5.5 to 7 V

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

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- c. Reconnect the S1 camera connector.
- d. Measure the voltage and frequency of each terminal of the connector.

TERMINAL DESCRIPTION

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
S1-1 (CV-) - S1-2 (CV+)	BR - R	Display signal	Ignition switch on (IG) Shift lever R position	Pulse generation (See waveform 1 1)

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

- e. Reference:

Oscilloscope waveform

- 1. Waveform 1

WAVEFORM REFERENCE

Item	Content
Measure terminal	S1-1 (CV-) - S1-2 (CV+)
Measure set	0.2 V/DIV., 0.2 μS/DIV.
Condition	Ignition switch: on (IG), Shift lever: R position

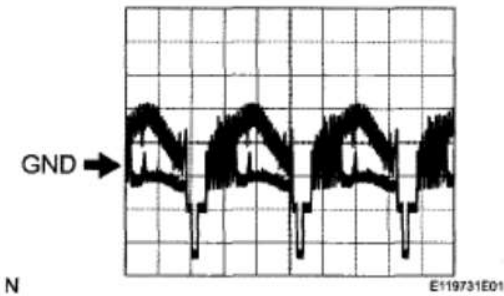
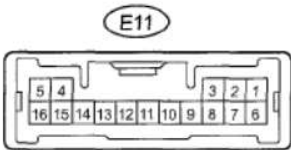


Fig. 19: Identifying Waveform 1
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. CLOCK ASSEMBLY (Multi-Information Display)



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E146903E02

Fig. 20: Identifying E11 Clock Assembly Connector Terminal

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

TERMINAL DESCRIPTION

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
E11-1 (IG) - E11-5 (GND)	P - W-B	Ignition switch signal	Ignition switch off	Below 1 V
			Ignition switch on (IG)	11 to 14 V
E11-2 (REV) - E11-5 (GND)	R - W-B	Reverse signal	Ignition switch on (IG) Shift lever except R position	Below 1 V
			Ignition switch on (IG) Shift lever R position	11 to 14 V
E11-4 (CGND) - E11-5 (GND)	W - W-B	Television camera ground	Always	Below 1 V
E11-5 (GND) - Body ground	W-B - Body ground	Ground	Always	Below 1 V
E11-6 (+B) - E11-5 (GND)	Y - W-B	Battery	Always	11 to 14 V
E11-12 (CA+) - E11-5 (GND)	B - W-B	Power source to television camera	Ignition switch on (IG) Shift lever R position	5.5 to 7 V
E11-14 (V+) - E11-5 (GND)	R - W-B	Television camera display signal (Input)	Ignition switch on (IG) Shift lever R position	Pulse generation (See waveform 1 1)
E11-15 (V-) - E11-5 (GND)	Shielded - W-B	Television camera ground (Shielded)	Always	Below 1 V
E11-16 (SGND) - Body ground	BR - Body ground	Signal ground	Always	Below 1 V

a. Reference:

Oscilloscope waveform

1. Waveform 1

WAVEFORM REFERENCE

Item	Content
Measure terminal	E11-14 (V+) - E11-15 (V-)
Measure set	0.2 V/DIV., 0.2 μ S/DIV.
Condition	Ignition switch: on (IG), Shift lever: R position

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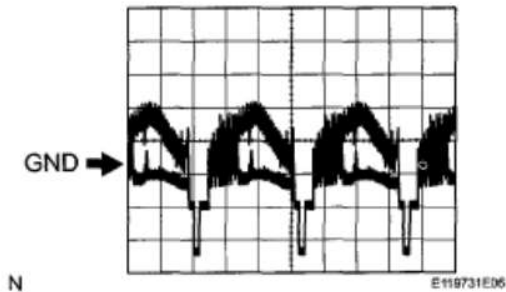


Fig. 21: Identifying Waveform 1
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REVERSE SIGNAL CIRCUIT

DESCRIPTION

The clock assembly receives a reverse signal from the park/neutral position switch.

WIRING DIAGRAM

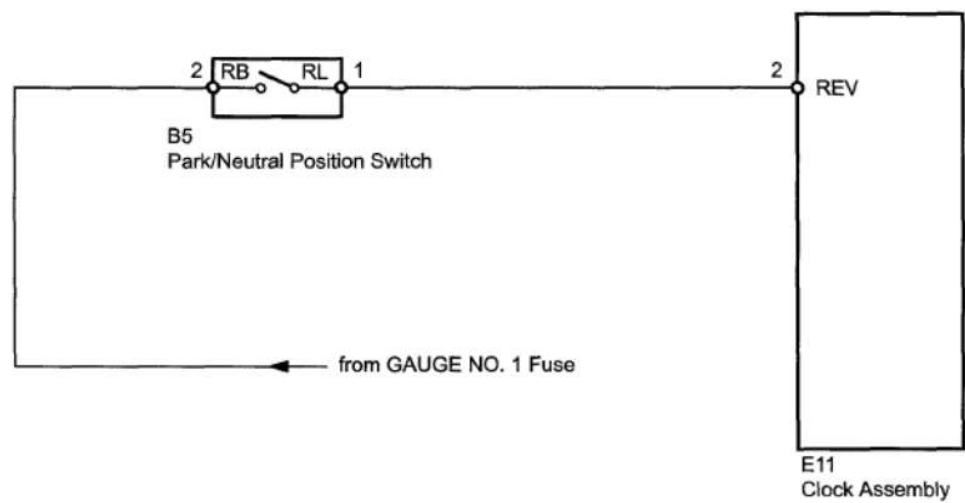


Fig. 22: Clock Assembly - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

- 1. **INSPECT CLOCK ASSEMBLY**
 - a. Disconnect clock assembly connector E11.
 - b. Measure the voltage according to the value(s) in the table below.

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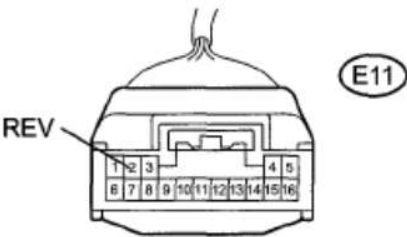
Standard voltage

VOLTAGE SPECIFICATION

Tester Connection	Condition	Specified Condition
E11-2 (REV) - Body ground	Ignition switch on (IG) Shift lever R position	10 to 14 V
E11-2 (REV) - Body ground	Ignition switch on (IG) Shift lever any position except R	Below 1 V

NG: Go to step 2

Front view of wire harness connector:
(to Clock Assembly)



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E146938E04

Fig. 23: Identifying E11 Clock Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

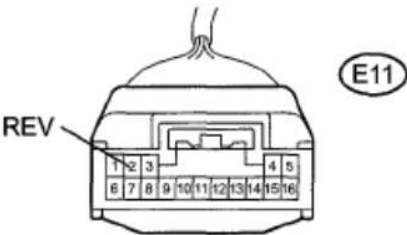
OK: PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See PROBLEM SYMPTOMS TABLE)

2. **CHECK HARNESS AND CONNECTOR (CLOCK ASSEMBLY - PARK/NEUTRAL POSITION SWITCH)**
- a. Disconnect clock assembly connector E11 and park/ neutral position switch connector B5.

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Front view of wire harness connector:
(to Clock Assembly)



H
E146936E04

Fig. 24: Identifying E11 Clock Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

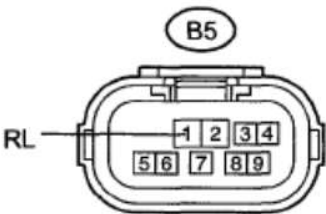
Standard resistance

RESISTANCE REFERENCE

Tester Connection	Condition	Specified Condition
E11-2 (REV) - B5-1 (RL)	Always	Below 1 ohms
E11-2 (REV) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to Park/Neutral Position Switch)



E150763E02

Fig. 25: Identifying B5 Park/Neutral Position Switch Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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OK: Go to next step

3. INSPECT PARK/NEUTRAL POSITION SWITCH

- a. Disconnect park/neutral position switch connector B5.
- b. Measure the resistance according to the value(s) in the table below.

Standard resistance

RESISTANCE REFERENCE

Tester Connection	Condition	Specified Condition
B5-1 (RL) - B5-2 (RB)	Shift lever R position	Below 1 ohms
B5-1 (RL) - B5-2 (RB)	Shift lever any position except R	10 kohms or higher

Result

RESULT REFERENCE

Result	Proceed to
OK	A
NG (for U151E)	B
NG (for U151F)	C

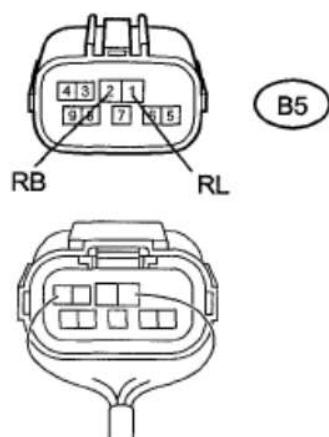
B: REPLACE PARK/NEUTRAL POSITION SWITCH (for U151E) (See ON-VEHICLE INSPECTION)

C: REPLACE PARK/NEUTRAL POSITION SWITCH (for U151F) (See ON-VEHICLE INSPECTION)

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Component without harness connected:
(Park/Neutral Position Switch)



H

E153722E02

Fig. 26: Identifying B5 Park/Neutral Position Switch Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

A: REPAIR OR REPLACE HARNESS OR CONNECTOR

DISPLAY SIGNAL CIRCUIT BETWEEN CLOCK ASSEMBLY AND TELEVISION CAMERA ASSEMBLY

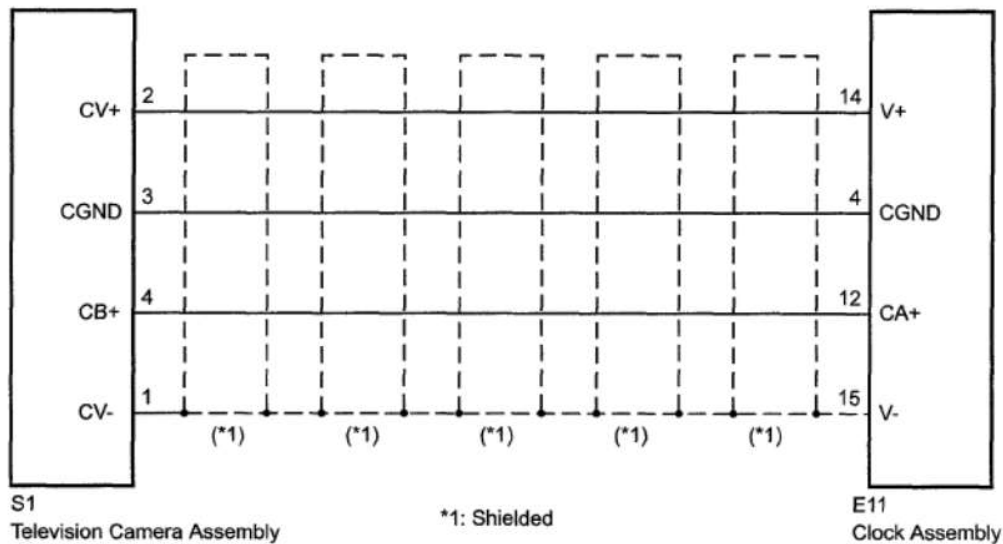
DESCRIPTION

This is the display signal circuit of the television camera assembly.

WIRING DIAGRAM

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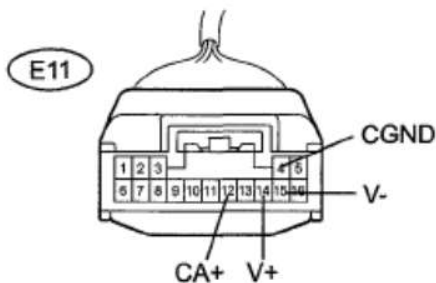
N E150790E03

Fig. 27: Television Camera Assembly - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

- 1. CHECK HARNESS AND CONNECTOR (CLOCK ASSEMBLY - TELEVISION CAMERA ASSEMBLY)
 - a. Disconnect clock assembly connector E11.

Front view of wire harness connector:
(to Clock Assembly)



H E146636E05

Fig. 28: Identifying E11 Clock Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Disconnect television camera assembly connector S1.

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

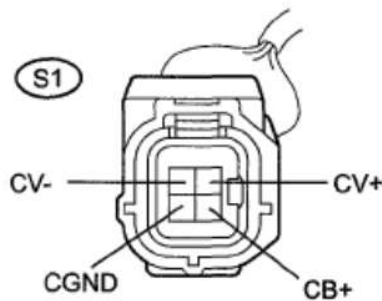
Standard resistance

RESISTANCE REFERENCE

Tester Connection	Condition	Specified Condition
S1-2 (CV+) - E11-14 (V+)	Always	Below 1 ohms
S1-3 (CGND) - E11-4 (CGND)	Always	Below 1 ohms
S1-4 (CB+) - E11-12 (CA+)	Always	Below 1 ohms
S1-1 (CV-) - E11-15 (V-)	Always	Below 1 ohms
S1-2 (CV+) - Body ground	Always	10 kohms or higher
S1-3 (CGND) - Body ground	Always	10 kohms or higher
S1-4 (CB+) - Body ground	Always	10 kohms or higher
S1-1 (CV-) - Body ground	Always	10 kohms or higher

NG: REPAIR OR REPLACE HARNESS OR CONNECTOR

Front view of wire harness connector:
(to Television Camera Assembly)



H E150736E08

Fig. 29: Identifying S1 Television Camera Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

2. INSPECT CLOCK ASSEMBLY

- a. Reconnect clock assembly connector E11.
- b. Measure the voltage according to the value(s) in the table below.

Standard voltage

VOLTAGE SPECIFICATION

	Specified
--	-----------

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Tester Connection	Condition	Condition
E11-12 (CA+) - E11-4 (CGND)	Ignition switch on (IG) Shift lever R position	Approx. 6 V

NG: REPLACE CLOCK ASSEMBLY (See REMOVAL)

Component with harness connected:
(Clock Assembly)

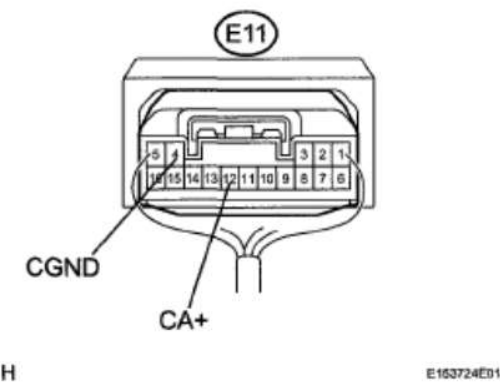


Fig. 30: Identifying E11 Clock Assembly Connector Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK: Go to next step

3. INSPECT TELEVISION CAMERA ASSEMBLY

- a. Reconnect clock assembly connector E11 and television camera assembly connector S1.

Component with harness connected:
(Television Camera)

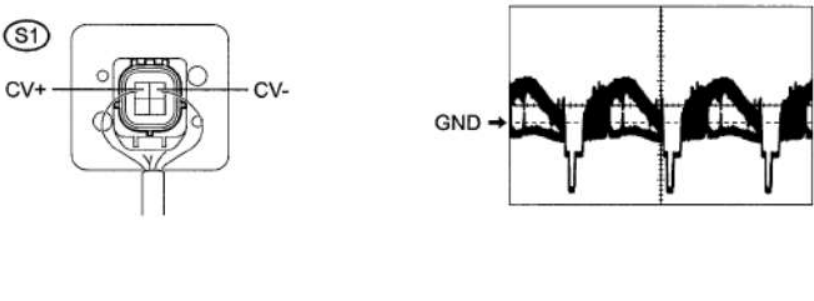


Fig. 31: Identifying Television Camera Assembly Waveform
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

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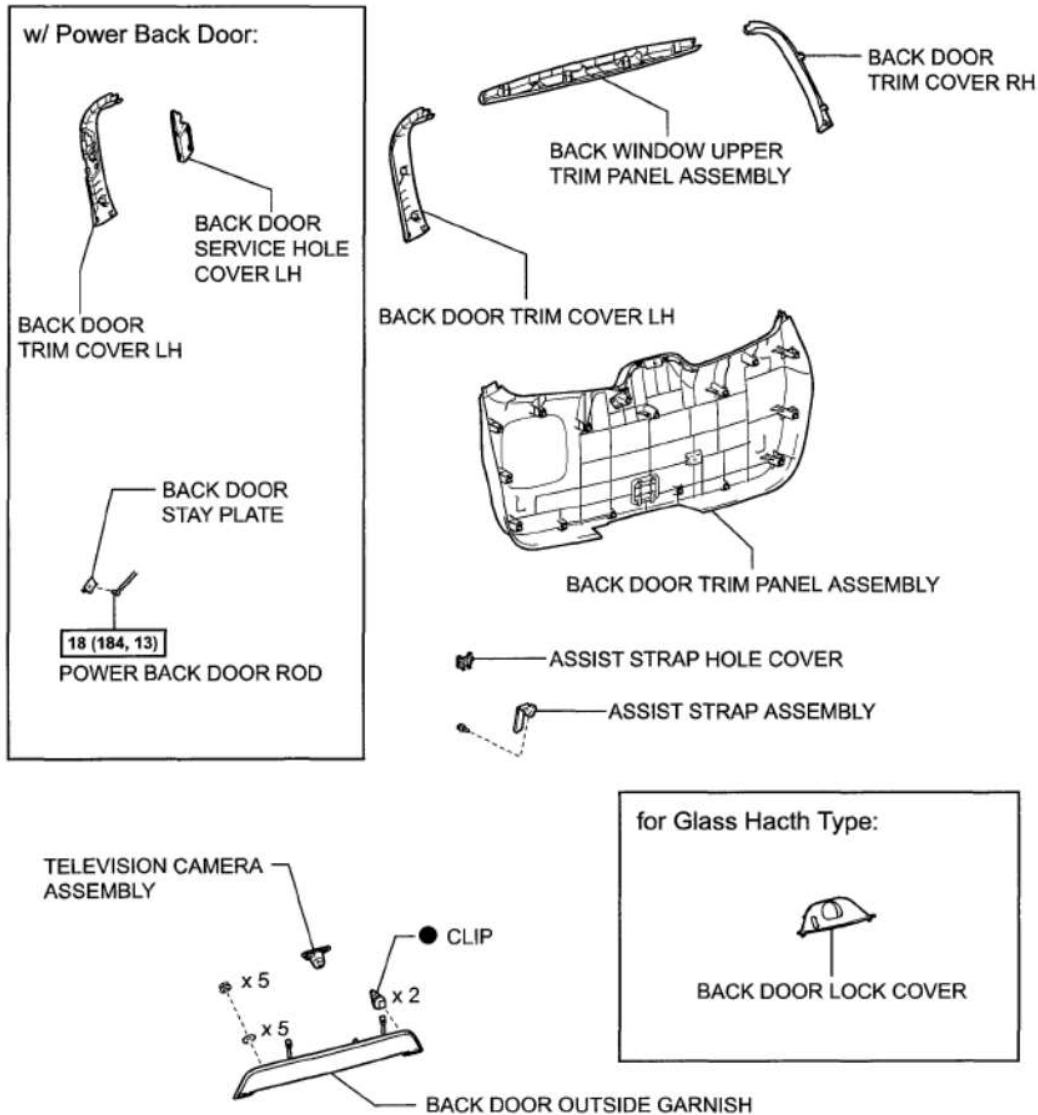
OK:**Pulses as shown in the illustration.****ITEM REFERENCE**

Item	Content
Terminal No. (Symbols)	S1-2 (CV+) - S1-1 (CV-)
Tool	0.2 V/DIV., 0.2 μ sec./DIV.
Condition	Ignition switch on (IG), Shift lever R position

NG: REPLACE TELEVISION CAMERA ASSEMBLY (See REMOVAL)**OK: PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See PROBLEM SYMPTOMS TABLE)****TELEVISION CAMERA****COMPONENTS**

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N*m (kgf*cm, ft.*lbf): Specified torque

● Non-reusable part

P

E151122E01

Fig. 32: Identifying Television Camera Components With Torque Specification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

REMOVAL

1. REMOVE BACK WINDOW UPPER TRIM PANEL ASSEMBLY (See DISASSEMBLY)
2. REMOVE BACK DOOR TRIM COVER LH (w/o Power Back Door) (See DISASSEMBLY)
3. REMOVE BACK DOOR SERVICE HOLE COVER LH (w/ Power Back Door) (See DISASSEMBLY)

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4. **DISCONNECT POWER BACK DOOR ROD (w/ Power Back Door)** (See **DISASSEMBLY**)
5. **REMOVE BACK DOOR TRIM COVER LH (w/ Power Back Door)** (See **DISASSEMBLY**)
6. **REMOVE BACK DOOR TRIM COVER RH** (See **DISASSEMBLY**)
7. **REMOVE BACK DOOR LOCK COVER (for Glass Hatch Type)** (See **DISASSEMBLY**)
8. **REMOVE ASSIST STRAP HOLE COVER** (See **DISASSEMBLY**)
9. **REMOVE ASSIST STRAP ASSEMBLY** (See **DISASSEMBLY**)
10. **REMOVE BACK DOOR TRIM PANEL ASSEMBLY** (See **DISASSEMBLY**)
11. **REMOVE BACK DOOR OUTSIDE GARNISH** (See **REMOVAL**)
12. **REMOVE TELEVISION CAMERA ASSEMBLY**
 - a. Disconnect the television camera connector.

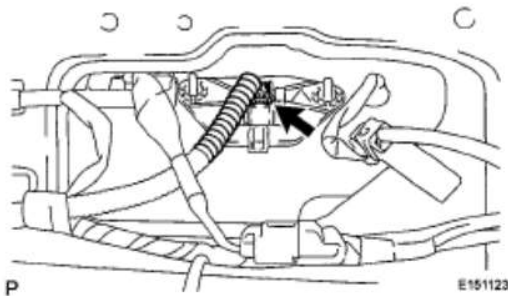


Fig. 33: Locating Television Camera Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Disengage the 2 claws and remove the television camera assembly.

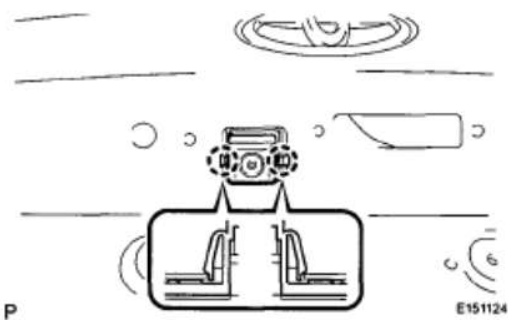


Fig. 34: Identifying Television Camera Assembly And Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSTALLATION

1. **INSTALL TELEVISION CAMERA ASSEMBLY**
 - a. Engage the 2 claws and install the television camera assembly.

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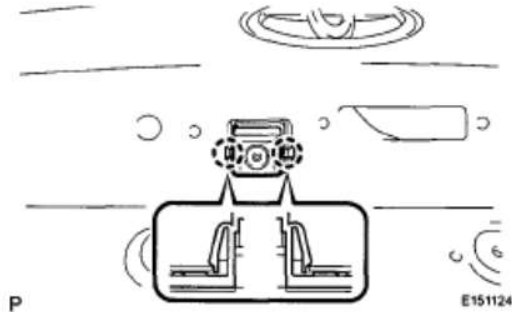


Fig. 35: Identifying Television Camera Assembly And Claws
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- b. Connect the television camera connector.
2. **INSTALL BACK DOOR OUTSIDE GARNISH** (See **INSTALLATION**)
3. **INSTALL BACK DOOR TRIM PANEL ASSEMBLY** (See **REASSEMBLY**)
4. **INSTALL ASSIST STRAP ASSEMBLY** (See **REASSEMBLY**)
5. **INSTALL ASSIST STRAP HOLE COVER** (See **REASSEMBLY**)

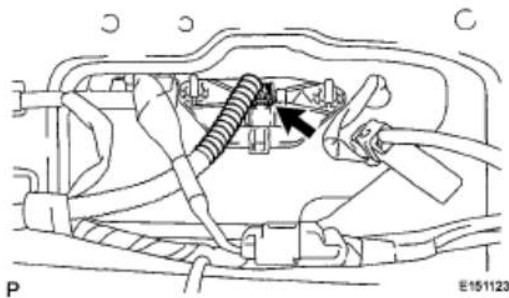


Fig. 36: Locating Television Camera Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

6. **INSTALL BACK DOOR LOCK COVER** (for Glass Hatch Type) (See **REASSEMBLY**)
7. **INSTALL BACK DOOR TRIM COVER LH** (w/o Power Back Door) (See **REASSEMBLY**)
8. **INSTALL BACK DOOR TRIM COVER LH** (w/ Power Back Door) (See **REASSEMBLY**)
9. **CONNECT POWER BACK DOOR ROD** (w/ Power Back Door) (See **REASSEMBLY**)
10. **INSTALL BACK DOOR SERVICE HOLE COVER LH** (w/ Power Back Door) (See **REASSEMBLY**)
11. **INSTALL BACK DOOR TRIM COVER RH** (See **REASSEMBLY**)
12. **INSTALL BACK WINDOW UPPER TRIM PANEL ASSEMBLY** (See **REASSEMBLY**)