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Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: ADVANCED DRIVER ASSISTANCE SYSTEM: FRONT CAMERA SYSTEM: U023587; Lost Communication with Cruise Control Front Distance Range Sensor Single Sensor or Center Missing Message; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	U023587	Lost Communication with Cruise Control Front Distance Range Sensor Single Sensor or Center Missing Message
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DESCRIPTION

The forward recognition camera communicates with the millimeter wave radar sensor assembly via CAN communication line. If communication with the millimeter wave radar sensor assembly stops, the forward recognition camera stores DTC U023587.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	DTC OUTPUT FROM	PRIORITY
U023587	Lost Communication with Cruise Control Front Distance Range Sensor Single Sensor or Center Missing Message	When a communication error between forward recognition camera and millimeter wave radar sensor assembly is detected	<ul style="list-style-type: none"> • Harness or connector • Forward recognition camera • Millimeter wave radar sensor assembly • Clearance warning ECU assembly* • Parking assist ECU* 	Front Recognition Camera	A

*: w/ Advanced Park

HINT:

If the DTCs are output simultaneously, the inspection area can be narrowed down.

w/ Advanced Park

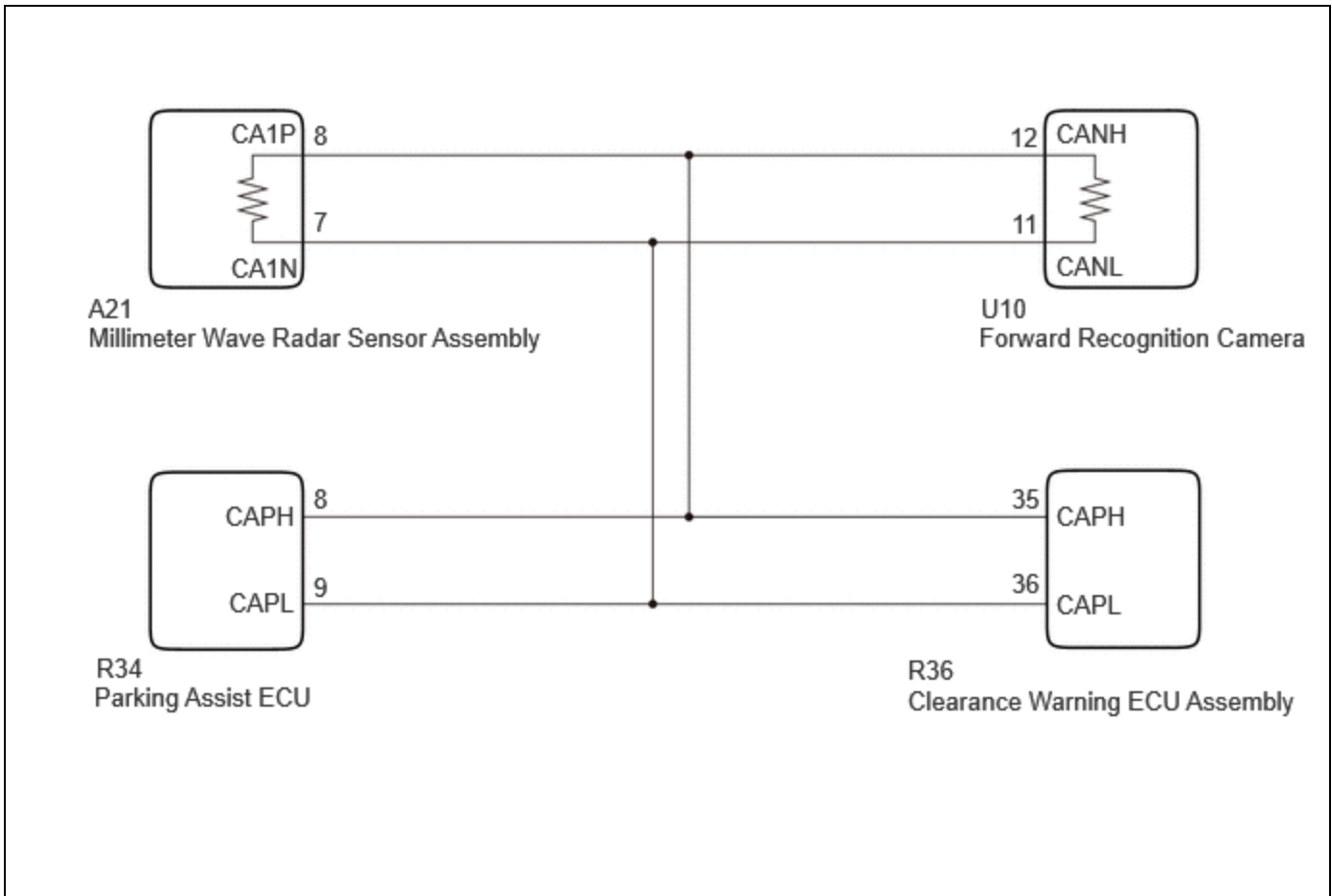
PATTERN	DTC OUTPUT PART NAME (DISPLAY ON GTS)				SUSPECTED AREA (MALFUNCTION STATUS)
	FORWARD RECOGNITION CAMERA	MILLIMETER WAVE RADAR SENSOR ASSEMBLY	CLEARANCE WARNING ECU ASSEMBLY	PARKING ASSIST ECU	
	FRONT RECOGNITION CAMERA	FRONT RADAR SENSOR	CLEARANCE WARNING	CIRCUMFERENCE MONITORING CAMERA CONTROL MODULE	
	U023587	U010487	U117987	U11B687	
Pattern 1	○	○	○	○	Harness or connector (Open or short)
					Millimeter wave radar sensor assembly (Internal malfunction)
					Clearance warning ECU assembly (Internal malfunction)
					Parking assist ECU (Internal malfunction)
					Forward recognition camera (Internal malfunction)
Pattern 2	○	-	-	-	Connector (Poor connector)
					Harness or connector (Open)
					Millimeter wave radar sensor assembly (Internal malfunction)
					Forward recognition camera (Internal malfunction)
○: DTC is output -: DTC is not output					

w/o Advanced Park

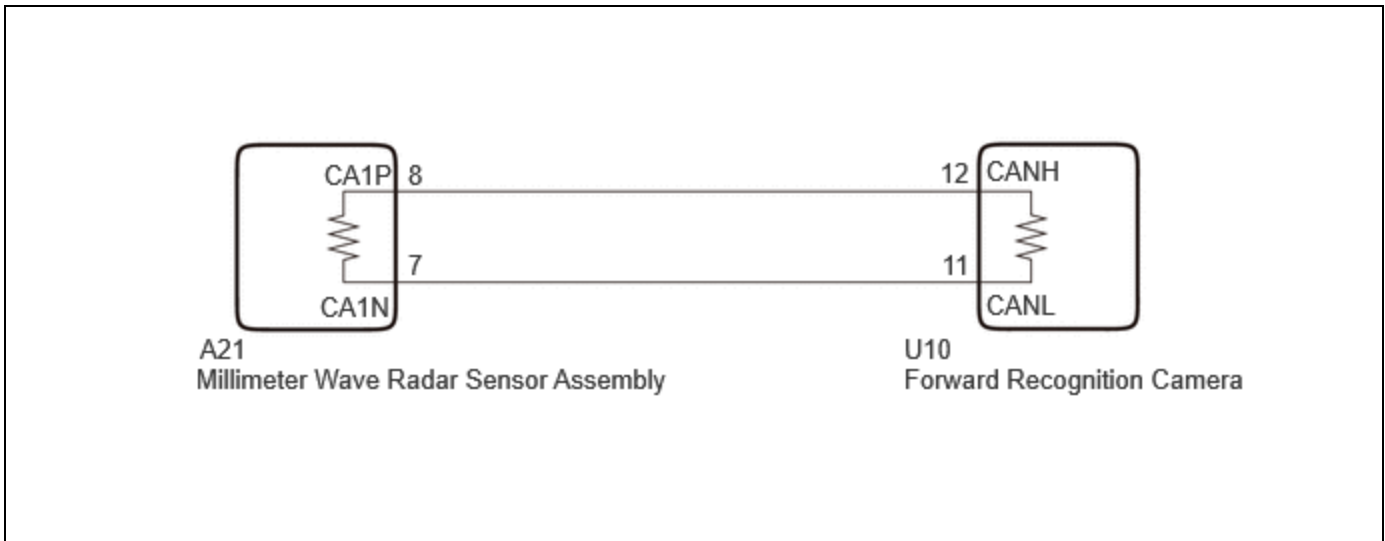
PATTERN	DTC OUTPUT PART NAME (DISPLAY ON GTS)		SUSPECTED AREA (MALFUNCTION STATUS)
	FORWARD RECOGNITION CAMERA	MILLIMETER WAVE RADAR SENSOR ASSEMBLY	
	FRONT RECOGNITION CAMERA	FRONT RADAR SENSOR	
	U023587	U010487	
Pattern 1	○	○	Harness or connector (Open or short)
			Millimeter wave radar sensor assembly (Internal malfunction)
			Forward recognition camera (Internal malfunction)
Pattern 2	○	-	Connector (Poor connector)
			Harness or connector (Open)
			Millimeter wave radar sensor assembly (Internal malfunction)
			Forward recognition camera (Internal malfunction)
○: DTC is output -: DTC is not output			

WIRING DIAGRAM

w/ Advanced Park



w/o Advanced Park



CAUTION / NOTICE / HINT

NOTICE:

- When replacing the millimeter wave radar sensor assembly, always replace it with a new one. If a millimeter wave radar sensor assembly which was installed to another vehicle is used, the information stored in the millimeter wave radar sensor assembly will not match the information from the vehicle and a DTC may be stored.

- When the millimeter wave radar sensor assembly has been replaced with a new one, it is necessary to perform millimeter wave radar sensor assembly beam axis alignment and to clear the vehicle control history. Before performing the Driving Adjustment, make sure to read Before Starting Driving Adjustment.

HINT:

Beam axis alignment of the millimeter wave radar sensor assembly can be performed using either Triangle Target, Flat Surface Target or Driving Adjustment.

Triangle Target: [Click here](#) INFO

Flat Surface Target: [Click here](#) INFO

Driving Adjustment: [Click here](#) INFO

- When replacing the forward recognition camera, always replace it with a new one. If a forward recognition camera which was installed to another vehicle is used, the information stored in the forward recognition camera will not match the information from the vehicle and a DTC may be stored.
- When the forward recognition camera has been replaced with a new one, make sure to clear all stored vehicle control history of each system and the forward recognition camera beam axis alignment data.

HINT:

Forward recognition camera beam axis alignment can be performed by using "One Time Recognition", "Driving Adjustment" or "Camera Axis Adjustment Value Write".

One Time Recognition: [Click here](#) INFO

Driving Adjustment: [Click here](#) INFO

Camera Axis Adjustment Value Write: [Click here](#) INFO

- If the forward recognition camera has been replaced with a new one, make sure to perform Software Version Confirmation.

[Click here](#) INFO

- After the ignition switch is turned off, there may be a waiting time before disconnecting the negative (-) auxiliary battery terminal.

[Click here](#) INFO

HINT:

When disconnecting and reconnecting the auxiliary battery, there is an automatic learning function that completes learning when the respective system is used.

[Click here](#) INFO

PROCEDURE

1.	CONFIRM MODEL
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(a) Choose the model to be inspected.

RESULT	PROCEED TO
w/ Advanced Park	A
w/o Advanced Park	B

B ▶ **GO TO STEP 14**



2.	CHECK FOR DTCs
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(a) Read each DTC and check the diagnosis pattern using the table below.

- Chassis > Front Recognition Camera > Trouble Codes**
- Body Electrical > Front Radar Sensor > Trouble Codes**
- Body Electrical > Clearance Warning > Trouble Codes**
- Chassis > Circumference Monitoring Camera Control Module > Trouble Codes**

PATTERN	DTC OUTPUT PART NAME (DISPLAY ON GTS)			
	FRONT RECOGNITION CAMERA	FRONT RADAR SENSOR	CLEARANCE WARNING	CIRCUMFERENCE MONITORING CAMERA CONTROL MODULE
Pattern 1	U023587	U010487	U117987	U11B687
Pattern 2	U023587	-	-	-

RESULT	PROCEED TO
Pattern 1	A
Pattern 2	B

B **GO TO STEP 9**



3.	CLEAR DTC
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Pre-procedure1

(a) Disconnect the R36 clearance warning ECU assembly connector.

Procedure1

(b) Clear the DTCs.

- Chassis > Front Recognition Camera > Clear DTCs**

Post-procedure1

(c) None

NEXT



4. INSPECT CLEARANCE WARNING ECU ASSEMBLY

(a) Check for DTCs.

Chassis > Front Recognition Camera > Trouble Codes

RESULT	PROCEED TO
U023587 is not output	A
U023587 is output	B

A **REPLACE CLEARANCE WARNING ECU ASSEMBLY**

B



5. CLEAR DTC

Pre-procedure1

(a) Connect the R36 clearance warning ECU assembly connector.

(b) Disconnect the R34 parking assist ECU connector.

Procedure1

(c) Clear the DTCs.

Chassis > Front Recognition Camera > Clear DTCs

Post-procedure1

(d) None

NEXT



6.	INSPECT PARKING ASSIST ECU
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(a) Check for DTCs.

Chassis > Front Recognition Camera > Trouble Codes

RESULT	PROCEED TO
U023587 is not output	A
U023587 is output	B

A **REPLACE PARKING ASSIST ECU**

B



7.	CHECK CAN MAIN WIRE (FORWARD RECOGNITION CAMERA)
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Pre-procedure1

- (a) Disconnect the cable from the negative (-) auxiliary battery terminal.
- (b) Connect the R34 parking assist ECU connector.
- (c) Disconnect the U10 forward recognition camera connector.

Procedure1

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

Standard Resistance:



[Click Location & Routing\(U10\)](#)

[Click Connector\(U10\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
U10-12 (CANH) - U10-11 (CANL)	Cable disconnected from negative (-) auxiliary battery terminal	108 to 132 Ω	Ω
U10-12 (CANH) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
U10-11 (CANL) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
U10-12 (CANH) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 k Ω or higher	k Ω
U10-11 (CANL) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 k Ω or higher	k Ω

Post-procedure1

(e) None

OK  **REPLACE FORWARD RECOGNITION CAMERA** 

NG



8.	CHECK CAN MAIN WIRE (MILLIMETER WAVE RADAR SENSOR ASSEMBLY)
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Pre-procedure1

- (a) Connect the U10 forward recognition camera connector.
 (b) Disconnect the A21 millimeter wave radar sensor assembly connector.

Procedure1

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

Standard Resistance:



[Click Location & Routing\(A21\)](#)

[Click Connector\(A21\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A21-8 (CA1P) - A21-7 (CA1N)	Cable disconnected from negative (-) auxiliary battery terminal	108 to 132 Ω	Ω
A21-8 (CA1P) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
A21-7 (CA1N) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
A21-8 (CA1P) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 k Ω or higher	k Ω
A21-7 (CA1N) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 k Ω or higher	k Ω

Post-procedure1

(d) None

OK ▶ **REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY**

Click here [INFO](#)

NOTICE:

Before replacing the millimeter wave radar sensor assembly, make sure to turn the ignition switch from off to ON and check for DTCs.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

9. CHECK CONNECTION OF CONNECTORS

(a) Check that the connectors are properly connected to the forward recognition camera and millimeter wave radar sensor assembly.

OK:

The connectors are properly connected

NG ▶ **CONNECT CONNECTORS PROPERLY**

OK



10. CLEAR DTC

(a) Clear the DTCs.

Chassis > Front Recognition Camera > Clear DTCs

NEXT



11. CHECK FOR DTCs

Pre-procedure1

(a) Turn the ignition switch off.

(b) Turn the ignition switch to ON.

(c) Make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the system cannot detect the malfunction.

Procedure1

(d) Check for DTCs.

Chassis > Front Recognition Camera > Trouble Codes

RESULT	PROCEED TO
U023587 is not output	A
U023587 is output	B

Post-procedure1

(e) None

A  **END**

B



12.	CHECK CAN MAIN WIRE (FORWARD RECOGNITION CAMERA)
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Pre-procedure1

- (a) Disconnect the cable from the negative (-) auxiliary battery terminal.
- (b) Disconnect the U10 forward recognition camera connector.

Procedure1

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

Standard Resistance:



[Click Location & Routing\(U10\)](#)

[Click Connector\(U10\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
U10-12 (CANH) - U10-11 (CANL)	Cable disconnected from negative (-) auxiliary battery terminal	108 to 132 Ω	Ω

Post-procedure1

(d) None

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK



13.	CHECK MILLIMETER WAVE RADAR SENSOR ASSEMBLY
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Pre-procedure1

- (a) Disconnect the R36 clearance warning ECU assembly connector.
- (b) Disconnect the R34 parking assist ECU connector.
- (c) Disconnect the U10 forward recognition camera connector.

Procedure1

- (d) Using an oscilloscope, check the waveform.

OK:



[Click Location & Routing\(U10\)](#)

[Click Connector\(U10\)](#)

TESTER CONNECTION	CONDITION	TOOL SETTING	SPECIFIED CONDITION
U10-12 (CANH) - U10-11 (CANL)	Ignition switch ON	1V/DIV., 100µs./DIV.	Pulse generation

Post-procedure1

- (e) None

OK  **REPLACE FORWARD RECOGNITION CAMERA** 

NG  **REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY** 

14.	CHECK FOR DTCs
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- (a) Read each DTC and check the diagnosis pattern using the table below.

Chassis > Front Recognition Camera > Trouble Codes

Body Electrical > Front Radar Sensor > Trouble Codes

PATTERN	DTC OUTPUT PART NAME (DISPLAY ON GTS)	
	FRONT RECOGNITION CAMERA	FRONT RADAR SENSOR
Pattern 1	U023587	U010487
Pattern 2	U023587	-

RESULT	PROCEED TO
Pattern 1	A
Pattern 2	B

B ► **GO TO STEP 17**

A



15.	CHECK CAN MAIN WIRE (FORWARD RECOGNITION CAMERA)
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Pre-procedure1

- (a) Disconnect the cable from the negative (-) auxiliary battery terminal.
- (b) Disconnect the U10 forward recognition camera connector.

Procedure1

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

Standard Resistance:



[Click Location & Routing\(U10\)](#)

[Click Connector\(U10\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
U10-12 (CANH) - U10-11 (CANL)	Cable disconnected from negative (-) auxiliary battery terminal	108 to 132 Ω	Ω
U10-12 (CANH) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
U10-11 (CANL) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
U10-12 (CANH) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 k Ω or higher	k Ω

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
U10-11 (CANL) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 kΩ or higher	kΩ

Post-procedure1

(d) None

OK  **REPLACE FORWARD RECOGNITION CAMERA** 

NG



16.	CHECK CAN MAIN WIRE (MILLIMETER WAVE RADAR SENSOR ASSEMBLY)
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Pre-procedure1

- (a) Connect the U10 forward recognition camera connector.
- (b) Disconnect the A21 millimeter wave radar sensor assembly connector.

Procedure1

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

Standard Resistance:



[Click Location & Routing\(A21\)](#)

[Click Connector\(A21\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
A21-8 (CA1P) - A21-7 (CA1N)	Cable disconnected from negative (-) auxiliary battery terminal	108 to 132 Ω	Ω
A21-8 (CA1P) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
A21-7 (CA1N) - Body ground	Cable disconnected from negative (-) auxiliary battery terminal	200 Ω or higher	Ω
A21-8 (CA1P) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 kΩ or higher	kΩ
A21-7 (CA1N) - +B	Cable disconnected from negative (-) auxiliary battery terminal	6 kΩ or higher	kΩ

Post-procedure1

(d) None

OK ▶ **REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY**Click here [INFO](#)**NOTICE:**

Before replacing the millimeter wave radar sensor assembly, make sure to turn the ignition switch from off to ON and check for DTCs.

NG ▶ **REPAIR OR REPLACE HARNESS OR CONNECTOR****17. CHECK CONNECTION OF CONNECTORS**

(a) Check that the connectors are properly connected to the forward recognition camera and millimeter wave radar sensor assembly.

OK:

The connectors are properly connected

NG ▶ **CONNECT CONNECTORS PROPERLY****OK****18. CLEAR DTC**

(a) Clear the DTCs.

Chassis > Front Recognition Camera > Clear DTCs

NEXT**19. CHECK FOR DTCs**

Pre-procedure1

- (a) Turn the ignition switch off.
- (b) Turn the ignition switch to ON.
- (c) Make sure that the DTC detection conditions are met.

HINT:

If the detection conditions are not met, the system cannot detect the malfunction.

Procedure1

(d) Check for DTCs.

Chassis > Front Recognition Camera > Trouble Codes

RESULT	PROCEED TO
U023587 is not output	A
U023587 is output	B

Post-procedure1

(e) None

A  **END**

B



20.	CHECK CAN MAIN WIRE (FORWARD RECOGNITION CAMERA)
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Pre-procedure1

- (a) Disconnect the cable from the negative (-) auxiliary battery terminal.
- (b) Disconnect the U10 forward recognition camera connector.

Procedure1

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

Standard Resistance:



[Click Location & Routing\(U10\)](#)

[Click Connector\(U10\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
U10-12 (CANH) - U10-11 (CANL)	Cable disconnected from negative (-) auxiliary battery terminal	108 to 132 Ω	Ω

Post-procedure1

(d) None

NG  **REPAIR OR REPLACE HARNESS OR CONNECTOR**



21.	CHECK MILLIMETER WAVE RADAR SENSOR ASSEMBLY
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Pre-procedure1

(a) Disconnect the U10 forward recognition camera connector.

Procedure1

(b) Using an oscilloscope, check the waveform.

OK:



[Click Location & Routing\(U10\)](#)

[Click Connector\(U10\)](#)

TESTER CONNECTION	CONDITION	TOOL SETTING	SPECIFIED CONDITION
U10-12 (CANH) - U10-11 (CANL)	Ignition switch ON	1V/DIV., 100µs./DIV.	Pulse generation

Post-procedure1

(c) None

OK ▶ REPLACE FORWARD RECOGNITION CAMERA INFO

NG ▶ REPLACE MILLIMETER WAVE RADAR SENSOR ASSEMBLY INFO

