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2022 Mazda CX-9 Service and Repair Manual

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DTC U2100:00 [FORWARD SENSING CAMERA (FSC)]

SM2899785

id1502a301180

Description	Forward sensing camera (FSC) configuration error
Detection condition	• Forward sensing camera (FSC) configuration not completed is detected.
Fail-safe	• Inhibits the lane departure warning system (LDWS). • Inhibits the lane-keep assist system. • Inhibits the high beam control (HBC) system. • Inhibits the smart city brake support (SCBS). • Inhibits the traffic jam assist (TJA).
Possible cause	Note • To correctly write the configuration data sent from the instrument cluster to the forward sensing camera (FSC) to the forward sensing camera (FSC), 30 s or more need to have elapsed since the ignition was switched ON (engine off or on). • Forward sensing camera (FSC) configuration error • Forward sensing camera (FSC) malfunction
System wiring diagram	Not applicable

Diagnostic Procedure

Step	Inspection	Action
1	PERFORM FORWARD SENSING CAMERA (FSC) CONFIGURATION (USING AS-BUILT DATA) • Using the M-MDS, perform the forward sensing camera (FSC) configuration (using As-Built data). (See FORWARD SENSING CAMERA (FSC) CONFIGURATION (USING AS-BUILT DATA) .) • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)] .) • Switch the ignition ON (engine off or on) and wait for 31.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)] .) • Is the same DTC displayed?	Yes Using the M-MDS, perform the forward sensing camera (FSC) configuration (using As-Built data) again, then go to the next step. (See FORWARD SENSING CAMERA (FSC) CONFIGURATION (USING AS-BUILT DATA) .)
		No Go to Step 3.
2	VERIFY THAT REPAIRS HAVE BEEN COMPLETED • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)] .) • Switch the ignition ON (engine off or on) and wait for 31.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)] .) • Is the same DTC displayed?	Yes Replace the forward sensing camera (FSC), then go to the next step. (See FORWARD SENSING CAMERA (FSC) REMOVAL/INSTALLATION .)
		No Go to the next step.

Step	Inspection		Action
5	VERIFY FORWARD SENSING CAMERA (FSC) POWER SUPPLY VOLTAGE <ul style="list-style-type: none">• Always reconnect all disconnected connectors.• Connect the negative battery terminal. (See NEGATIVE BATTERY TERMINAL DISCONNECTION/CONNECTION.)• Display PID VPWR using the M-MDS. (See PID/DATA MONITOR INSPECTION [FORWARD SENSING CAMERA (FSC)].)• Is the voltage B+?	Yes	Go to the next step.

Step	Inspection		Action
3	INSPECT GENERATOR <ul style="list-style-type: none"> Inspect the generator. (See GENERATOR INSPECTION [SKYACTIV-D 2.2].) (See GENERATOR INSPECTION [SKYACTIV-G 2.5T].) (See GENERATOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) (See GENERATOR INSPECTION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)].) Is the generator normal? 	Yes	Go to the next step.
		No	Replace the generator, then go to the next step. (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-D 2.2] .) (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5T] .) (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)] .) (See GENERATOR REMOVAL/INSTALLATION [SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION)] .)
4	VERIFY THAT REPAIRS HAVE BEEN COMPLETED <ul style="list-style-type: none"> Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) Switch the ignition ON (engine off or on) and wait for 6.5 s or more. Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) Is the same DTC displayed? 	Yes	Repeat the inspection from Step 1. • If the malfunction recurs, replace the forward sensing camera (FSC). (See FORWARD SENSING CAMERA (FSC) REMOVAL/INSTALLATION .) Go to the next step.
		No	Go to the next step.
5	VERIFY IF OTHER DTCs DISPLAYED <ul style="list-style-type: none"> Are any other DTCs displayed? 	Yes	Repair or replace the malfunctioning part according to the applicable DTC troubleshooting. (See DTC TABLE [FORWARD SENSING CAMERA (FSC)] .)
		No	DTC troubleshooting completed.

PID/DATA MONITOR TABLE [FORWARD SENSING CAMERA (FSC)]

SM2899789

id1502a302220

PID	Unit/Operation	Data contents	Module control terminal
A_ANG_PITCH	° (deg)	Displays vanishing point correction angle (pitch) corrected by forward sensing camera (FSC) when performing forward sensing camera (FSC) aiming using the M-MDS.	M, N
A_ANG_ROLL	° (deg)	Displays vanishing point correction angle (roll) corrected by forward sensing camera (FSC) when performing forward sensing camera (FSC) aiming using the M-MDS.	M, N
A_ANG_YAW	° (deg)	Displays vanishing point correction angle (yaw) corrected by forward sensing camera (FSC) when performing forward sensing camera (FSC) aiming using the M-MDS.	M, N
BRAKE_SW	Off/On	<ul style="list-style-type: none"> Off: Brake switch (No. 2 signal) is off. (Brake pedal is not depressed.) On: Brake switch (No. 2 signal) is on. (Brake pedal is depressed.) 	M, N
DSP_LANE_ST	Off/Dash_Lane/Solid_Lane	<ul style="list-style-type: none"> Off: Lane departure warning system (LDWS) is off. Dash_Lane: Vehicle lane lines are not recognized. Solid_Lane: Vehicle lane lines are recognized at a vehicle speed of 65 km/h {40 mph} or more. 	M, N
DSP_WRN_ST	Off/LDWS_Left/LDWS_Right/LDWS_Fail/HBC_Fail/Camera_BLK/FOW_Warning/FOW_Fail/FSC_Fail/Camera_DRDT	<ul style="list-style-type: none"> Off: Forward sensing camera (FSC) does not detect malfunction. LDWS_Left: Lane departure on vehicle left side is detected. LDWS_Right: Lane departure on vehicle right side is detected. LDWS_Fail: Malfunction related to lane departure warning system (LDWS) is detected. HBC_Fail: Malfunction related to high beam control (HBC) system is detected. Camera_BLK: Dirt on camera is detected. FOW_Warning: – FOW_Fail: – FSC_Fail: Forward sensing camera (FSC) malfunction is detected. Camera_DRDT: Camera fogging is detected. 	M, N
HBC_H/L_CS	Hi_Request/Low_Request/Invalid	<ul style="list-style-type: none"> Hi_Request: HI beam switch signal received Low_Request: LO beam switch signal received Invalid: Error in HI/LO beam switch request signal 	M, N
IL_ST_HBC	Off/Green_On/Green_Flash/Amber_On/Amber_Flash	<ul style="list-style-type: none"> Off: HBC indicator light (green) and HBC warning light (amber) turned off Green_On: HBC indicator light (green) is illuminated. Green_Flash: HBC indicator light (green) is flashing. Amber_On: HBC warning light (amber) is illuminated. Amber_Flash: HBC warning light (amber) is flashing. 	M, N
IL_ST_LDWS	Off/Green_On/Green_Flash/Amber_On/Amber_Flash	<p>Note</p> <ul style="list-style-type: none"> Displays in the M-MDS but it does not operate. 	
INH_LAS	Off/On	<ul style="list-style-type: none"> Off: Lane-keep assist system control is not inhibited. On: Lane-keep assist system control is inhibited. 	M, N

Detection condition

- U0001:88
 - Forward sensing camera (FSC) cannot receive the CAN bus communication signal (HS-CAN) for 5 s or more.
- U0100:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the PCM for 5 s or more.
- U0104:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the radar unit for 5 s or more.
- U0121:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the DSC HU/CM for 5 s or more.
- U0131:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the electric power steering (EPS) control module for 5 s or more.
- U0140:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the front body control module (FBCM) for 5 s or more.
- U0151:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the SAS control module for 5 s or more.
- U0155:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the instrument cluster for 5 s or more.
- U0156:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the connectivity master unit (CMU) for 5 s or more.
- U0214:00
 - Forward sensing camera (FSC) cannot receive the CAN signal from the start stop unit for 5 s or more.

DTC B115E:78 [FORWARD SENSING CAMERA (FSC)]

SM2899762

id1502a300390

Description	Forward sensing camera (FSC) axis deviation (detected during mid-drive aiming)
Detection condition	• The forward sensing camera (FSC) detects that it is installed with the axis deviated during mid-drive aiming.
Fail-safe	• Inhibits the lane departure warning system (LDWS). • Inhibits the lane-keep assist system. • Inhibits the high beam control (HBC) system. • Inhibits the smart city brake support (SCBS). • Inhibits the traffic jam assist (TJA).
Possible cause	• Forward sensing camera (FSC) axis deviation • Forward sensing camera (FSC) malfunction
System wiring diagram	Not applicable

Diagnostic Procedure

Step	Inspection	Action
1	PERFORM FORWARD SENSING CAMERA (FSC) AIMING • Perform the forward sensing camera (FSC) aiming. (See FORWARD SENSING CAMERA (FSC) AIMING.) • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) • Switch the ignition ON (engine off or on) and wait for 1.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) • Is the same DTC displayed?	Yes Perform the forward sensing camera (FSC) aiming again, then go to the next step. (See FORWARD SENSING CAMERA (FSC) AIMING.)
		No Go to Step 3.
2	VERIFY THAT REPAIRS HAVE BEEN COMPLETED • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) • Switch the ignition ON (engine off or on) and wait for 1.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) • Is the same DTC displayed?	Yes Replace the forward sensing camera (FSC), then go to the next step. (See FORWARD SENSING CAMERA (FSC) REMOVAL/INSTALLATION.)
		No Go to the next step.
3	VERIFY IF OTHER DTCs DISPLAYED • Are any other DTCs displayed?	Yes Repair or replace the malfunctioning part according to the applicable DTC troubleshooting. (See DTC TABLE [FORWARD SENSING CAMERA (FSC)].)
		No DTC troubleshooting completed.

DTC U0405:68 [FORWARD SENSING CAMERA (FSC)]

SM2899765

id1502a300420

Description	Error signal received from radar unit
Detection condition	• Forward sensing camera (FSC) receives the error signal from the radar unit for 5 s or more.
Fail-safe	• Inhibits the smart city brake support (SCBS).
Possible cause	• DTCs are stored in the radar unit. • Radar unit malfunction • Forward sensing camera (FSC) malfunction
System wiring diagram	Not applicable

Diagnostic Procedure

Step	Inspection		Action
1	VERIFY RADAR UNIT DTCs • Retrieve the radar unit DTCs using the M-MDS. (See DTC INSPECTION [RADAR UNIT].) • Are any DTCs displayed?	Yes	Repair or replace the malfunctioning part according to the applicable DTC troubleshooting. (See DTC TABLE [RADAR UNIT].)
		No	Go to the next step.
2	VERIFY IF MALFUNCTIONING LOCATION IS RADAR UNIT DEPENDING ON REPEATABILITY • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) • Switch the ignition ON (engine off or on) and wait for 6.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) • Is the same DTC displayed?	Yes	Replace the radar unit, then go to the next step. (See RADAR UNIT REMOVAL/INSTALLATION.)
		No	Go to Step 4.
3	VERIFY THAT REPAIRS HAVE BEEN COMPLETED • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) • Switch the ignition ON (engine off or on) and wait for 6.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) • Is the same DTC displayed?	Yes	Replace the forward sensing camera (FSC), then go to the next step. (See FORWARD SENSING CAMERA (FSC) REMOVAL/INSTALLATION.)
		No	Go to the next step.
4	VERIFY IF OTHER DTCs DISPLAYED • Are any other DTCs displayed?	Yes	Repair or replace the malfunctioning part according to the applicable DTC troubleshooting. (See DTC TABLE [FORWARD SENSING CAMERA (FSC)].)
		No	DTC troubleshooting completed.

Step	Inspection		Action
4	VERIFY IF MALFUNCTIONING LOCATION IS INSTRUMENT CLUSTER DEPENDING ON REPEATABILITY <ul style="list-style-type: none"> • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) • Switch the ignition ON (engine off or on) and wait for 1.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) • Is the same DTC displayed? 	Yes	Replace the instrument cluster, then go to the next step. (See INSTRUMENT CLUSTER REMOVAL/INSTALLATION .)
		No	Go to Step 6.
5	VERIFY THAT REPAIRS HAVE BEEN COMPLETED <ul style="list-style-type: none"> • Clear the DTC for the forward sensing camera (FSC) using the M-MDS. (See CLEARING DTC [FORWARD SENSING CAMERA (FSC)].) • Switch the ignition ON (engine off or on) and wait for 1.5 s or more. • Retrieve the forward sensing camera (FSC) DTCs using the M-MDS. (See DTC INSPECTION [FORWARD SENSING CAMERA (FSC)].) • Is the same DTC displayed? 	Yes	Replace the forward sensing camera (FSC), then go to the next step. (See FORWARD SENSING CAMERA (FSC) REMOVAL/INSTALLATION .)
		No	Go to the next step.
6	VERIFY IF OTHER DTCs DISPLAYED <ul style="list-style-type: none"> • Are any other DTCs displayed? 	Yes	Repair or replace the malfunctioning part according to the applicable DTC troubleshooting. (See DTC TABLE [FORWARD SENSING CAMERA (FSC)] .)
		No	DTC troubleshooting completed.

CLEARING DTC [RADAR UNIT]

SM2899795

id1502a601730

- 1.Connect the M-MDS to the DLC-2.
- 2.After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
 - (1)Select "Self Test".
 - (2)Select "All CMDTCs".
- 3.Verify the DTC according to the directions on the screen.
- 4.Press the clear button on the DTC screen to clear the DTC.
- 5.Switch the ignition off.
- 6.Switch the ignition ON (engine off or on) and wait for 5 s or more.
- 7.Perform DTC inspection. (See **DTC INSPECTION [RADAR UNIT]**.)
- 8.Verify that no DTCs are displayed.