Your Ultimate Source for OEM Repair Manuals

FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

2002 FORD Galaxy OEM Service and Repair Workshop Manual

Go to manual page

Interior Camera System - Overview

419-04B Interior Camera System	***2022 F-150***
Description and Operation	***Procedure revision date: 10/9/2020***

Interior Camera System - Overview

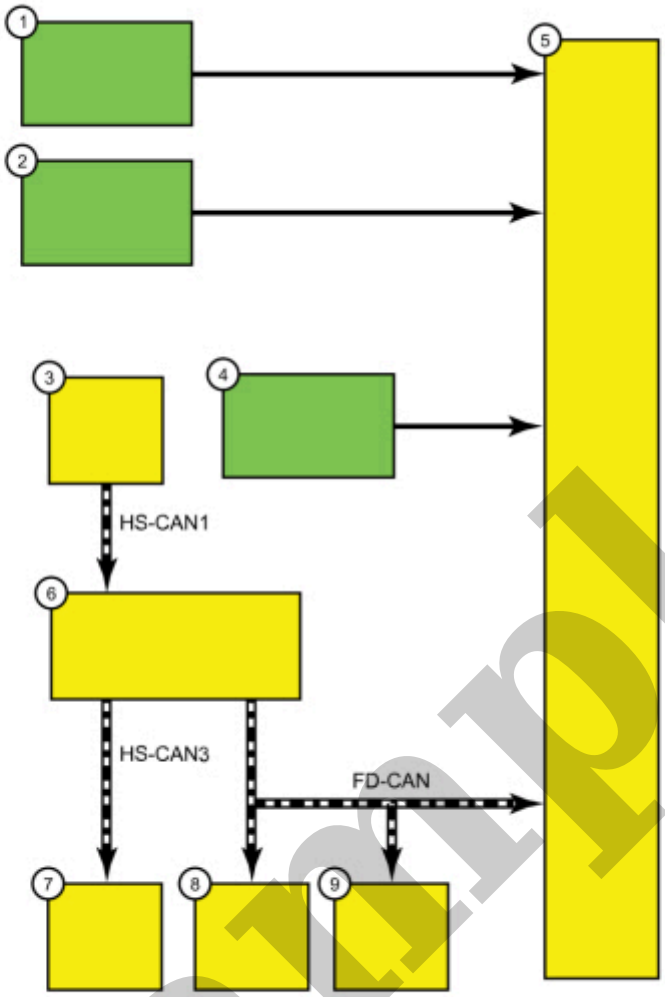
Overview

The interior camera system works with the active drive assist system to continuously observe the driver when the active drive assist system is in use.

The interior camera system observes the drivers eyes and head position to determine if the driver is attentive or distracted.

The interior camera system consists of:

- Driver side driver status monitor LED (light emitting diode)
- Passenger side driver status monitor LED (light emitting diode)
- Driver status monitor camera
- Driver status monitor camera module (CMR (Camera Module - Rear))



E341065

Item	Description
1	Driver Side Driver Status Monitor LED (light emitting diode)
2	Passenger Side Driver Status Monitor LED (light emitting diode)
3	BCM (body control module)
4	Driver Status Monitor Camera
5	Driver Status Monitor Module

The driver status monitor camera module (also referred to as the CMR (Camera Module - Rear)) uses a driver status monitor camera and two infrared LEDs to watch the driver's eyes and head position to determine if the driver is alert or distracted.

When the module has determined the driver has not been attentive for a specific amount of time, the system will alert the driver to return attention to the road. Warning messages are displayed on the IPC (instrument panel cluster) message center and may include an audible warning chime.

After repeated warnings without driver response, the system will apply brakes pulses to alert the driver to respond. If the driver still does not respond, the system applies the brakes to slow the vehicle.

If the driver has not returned attention to the road and the active drive assist system has not reengaged, or if repeated inactivity is detected, the system remains off for the remainder of the ignition cycle.

The system may not work properly in direct sunlight, when camera and LED (light emitting diode) vision may be obscured by excessive glare.

The system may not work if the camera or infrared LEDs are obscured or interfered with by any of the following;

- Aftermarket equipment
- Electronic devices
- Auxiliary power cords
- Dirt and debris

If a system fault is detected with the interior camera system, active driver assist system or any other vehicle system that works in conjunction with the active drive assist system, the message ACTIVE DRIVE ASSIST NOT AVAILABLE is displayed on the IPC (instrument panel cluster) message center.

For more information on the Active Drive Assist and ACC (adaptive cruise control) system,

Refer to: Cruise Control - Vehicles With: Active Drive Assist/Intelligent Adaptive Cruise Control - System Operation and Component Description

(419-03B Cruise Control - Vehicles With: Adaptive Cruise Control, Description and Operation).

For more information on the lane keeping system,

Refer to: Lane Keeping System - System Operation and Component Description

(419-07 Lane Keeping System, Description and Operation).

Component Description

Driver Status Monitor Camera Module (CMR (Camera Module - Rear))

The interior camera system is controlled by the driver status monitor camera module (also referred to as the CMR (Camera Module - Rear)). The module communicates over the FD-CAN (Flexible Data Rate Controller

Interior Camera System

419-04B Interior Camera System	***2022 F-150***
Diagnosis and Testing	***Procedure revision date: 01/13/2022***

Interior Camera System

Diagnostic Trouble Code (DTC) Chart

Diagnostics in this manual assume a certain skill level and knowledge of Ford-specific diagnostic practices.

REFER to: Diagnostic Methods

(100-00 General Information, Description and Operation).

Diagnostic Trouble Code Chart

Module	DTC (diagnostic trouble code)	Description	Action
CMR (Camera Module - Rear)	B115E:49	Camera Module: Internal Electronic Failure	GO to Pinpoint Test A
CMR (Camera Module - Rear)	B115E:54	Camera Module: Missing Calibration	GO to Pinpoint Test B
CMR (Camera Module - Rear)	B115E:78	Camera Module: Alignment or Adjustment Incorrect	GO to Pinpoint Test B
CMR (Camera Module - Rear)	B115E:97	Camera Module: Component or System Operation Obstructed or Blocked	GO to Pinpoint Test D

CMR (Camera Module - Rear)	U0140:00	Lost Communication With Body Control Module: No Sub Type Information	GO to Pinpoint Test H
CMR (Camera Module - Rear)	U0401:86	Invalid Data Received From ECM/PCM "A": Signal Invalid	GO to Pinpoint Test I
CMR (Camera Module - Rear)	U0415:86	Invalid Data Received From Anti-lock Brake System (ABS) Control Module "A": Signal Invalid	GO to Pinpoint Test J
CMR (Camera Module - Rear)	U0422:86	Invalid Data Received From Body Control Module: Signal Invalid	GO to Pinpoint Test K
CMR (Camera Module - Rear)	U2018:51	Control Module Software #3: Not Programmed	GO to Pinpoint Test L
CMR (Camera Module - Rear)	U2100:00	Initial Configuration Not Complete: No Sub Type Information	GO to Pinpoint Test L
CMR (Camera Module - Rear)	U3000:41	Control Module: General Checksum Failure	GO to Pinpoint Test M
CMR (Camera Module - Rear)	U3000:42	Control Module: General Memory Failure	GO to Pinpoint Test M
CMR (Camera Module - Rear)	U3000:44	Control Module: Data Memory Failure	GO to Pinpoint Test M
CMR (Camera Module - Rear)	U3000:49	Control Module: Internal Electronic Failure	GO to Pinpoint Test M
CMR (Camera Module - Rear)	U3000:98	Control Module: Component or System Over Temperature	GO to Pinpoint Test N
CMR (Camera Module - Rear)	U3003:16	Battery Voltage: Circuit Voltage Below Threshold	GO to Pinpoint Test O

No	The system is operating correctly at this time.

A2 INSTALL CMR (CAMERA MODULE - REAR) PMI (PROGRAMMABLE MODULE INSTALLATION)

- Using a diagnostic scan tool, clear the Diagnostic Trouble Codes (DTCs).
- Install CMR (Camera Module - Rear) As-Built data from PTS (Professional Technician System) following scan tool instructions.

Is DTC (diagnostic trouble code) B115E:49 still present?

Yes	GO to A3

No	The system is operating correctly at this time.

A3 CHECK THE COAXIAL CABLE FOR DAMAGE

- Ignition OFF.
- Disconnect Driver status monitor camera C2827 .
- Disconnect Driver status monitor camera module C2826B .
- Inspect the coaxial cable connectors for damage.
- Inspect the coaxial cable for sharp 90 degree bends or shield damage.

Is any cable damage present?

Yes	INSTALL a new coaxial cable. Test the system for normal operation. If the concern is still present, GO to A4

No	GO to A4

A4 CHECK THE DRIVER STATUS MONITOR CAMERA SIGNAL CIRCUIT FOR AN OPEN

- Measure:

Positive Lead	Measurement / Action	Negative Lead

- pushed-out pins - install new pins as necessary
- Reconnect the driver status monitor camera module connectors. Make sure they seat and latch correctly.
- Operate the system and determine if the concern is still present.

Is the concern still present?

Yes	CHECK OASIS (Online Automotive Service Information System) for any applicable service articles: TSB (Technical Service Bulletin) , GSB (General Service Bulletin) , SSM (special service message) or FSA (Field Service Action) . If a service article exists for this concern, DISCONTINUE this test and FOLLOW the service article instructions. If no service articles address this concern, INSTALL a new driver status monitor camera module. REFER to: Driver Status Monitor Camera Module [CMR] (419-04B Interior Camera System, Removal and Installation).

No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST B : B115E:54 OR B115E:78

Refer to Wiring Diagrams Cell 31for schematic and connector information.

Normal Operation and Fault Conditions REFER to: Interior Camera System - System Operation and Component Description
(419-04B Interior Camera System, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
CMR (Camera Module - Rear) B115E:54	Camera Module: Missing Calibration	A continuous memory and on-demand DTC (diagnostic trouble code) that sets when the driver status monitor camera module detects that the camera is not calibrated.
CMR (Camera Module - Rear) B115E:78	Camera Module: Alignment Or Adjustment Incorrect	A continuous memory and on-demand DTC (diagnostic trouble code) that sets when the driver status monitor camera module detects that the camera is out of alignment.

	FOLLOW the service article instructions. If no service articles address this concern, INSTALL a new driver status monitor camera module. REFER to: Driver Status Monitor Camera Module [CMR] (419-04B Interior Camera System, Removal and Installation).

No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

PINPOINT TEST C : B15E1:11, B15E1:12, B15E1:13. B15E2:11, B15E2:12 OR B15E2:13

Refer to Wiring Diagrams Cell 31for schematic and connector information.

Normal Operation and Fault Conditions REFER to: Interior Camera System - System Operation and Component Description
(419-04B Interior Camera System, Description and Operation).

DTC Fault Trigger Conditions

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
CMR (Camera Module - Rear) B15E1:11	Driver Side LED: Circuit Short To Ground	A continuous memory and on-demand DTC (diagnostic trouble code) that sets when the driver status monitor camera module detects a short to ground from the driver side LED (light emitting diode) signal circuit.
CMR (Camera Module - Rear) B15E1:12	Driver Side LED: Circuit Short To Battery	A continuous memory and on-demand DTC (diagnostic trouble code) that sets when the driver status monitor camera module detects a short to voltage from the driver side LED (light emitting diode) signal circuit.
CMR (Camera Module - Rear) B15E1:13	Driver Side LED: Circuit Open	A continuous memory and on-demand DTC (diagnostic trouble code) that sets when the driver status monitor camera module detects an open from the driver side LED (light emitting diode) signal circuit.
CMR (Camera Module - Rear) B15E2:11	Passenger Side LED: Circuit Short To Ground	A continuous memory and on-demand DTC (diagnostic trouble code) that sets when the driver status monitor camera module

Passenger side driver status monitor LED (light emitting diode)

Positive Lead	Measurement / Action	Negative Lead
C2829-2	V	Ground
C2829-1	V	Ground

Is any voltage present?

Yes	REPAIR the circuit.

No	GO to C2

C2 CHECK THE DRIVER STATUS MONITOR LED (LIGHT EMITTING DIODE) CIRCUITS FOR AN OPEN

- Ignition OFF.
- Measure:
  Driver side driver status monitor LED (light emitting diode)

Positive Lead	Measurement / Action	Negative Lead
C5021-1	Ω	C2826A-8
C5021-2	Ω	C2826A-9

Passenger side driver status monitor LED (light emitting diode)

Positive Lead	Measurement / Action	Negative Lead