

Image Display Cameras

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Description and Operation

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2. IMAGE DISPLAY CAMERAS

3. DESCRIPTION AND OPERATION

4.

Rear Vision Camera Description and Operation

The rear vision camera system consists of the rearview camera and the infotainment system.

When the transmission is placed into R, 12V is applied to the reverse lamp control circuit by the body control module (BCM). The rearview camera monitors this circuit and when 12V is seen, indicating that the transmission is in R, the rearview camera will activate. The rearview camera receives ignition voltage and a constant ground to power the camera. Video signal + and video signal - circuits carry the video image from the rearview camera to the infotainment system. Additionally, the video signal circuits are shielded to prevent any interference which may lead to a loss of video signal resolution and cause a degraded video image. The shield is grounded by the rearview camera.

The following conditions may cause a degraded rear vision camera image:

- Ice, snow, or mud has built up on the rear vision camera
- Dark conditions
- Extreme light conditions, such as glare from the sun or the headlights of another vehicle
- Damage to the rear of the vehicle
- Extreme high temperatures or extreme temperature changes

Diagnostic Information and Procedures

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Rear Vision Camera System Malfunction

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- [Diagnostic Procedure Instructions](#) provides an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	1	1	â€”	â€”
Reverse Lamp Signal	1	1	2	â€”
Rearview Camera Signal +	3	1	1	â€”
Rearview Camera Signal â€”	3	1	1	â€”
Shield	3	3	3	â€”
Ground	â€”	1	â€”	â€”
1. Rear vision camera image not displayed 2. Rear vision camera image always displayed 3. Poor Quality Image (as described in Circuit/System Verification)				

Circuit/System Description

When the transmission is placed into R, a 12â€”V signal is sent to the rearview camera indicating that camera operation is requested. Ignition voltage and ground are supplied to the rearview camera. The rearview camera sends video information to the radio through a video signal + and a video signal â€” circuit. A grounded shielding also wraps the video signal circuits to reduce electronic interference which may degrade the video signal and cause a distorted or otherwise degraded image.

Diagnostic Aids

A poor video image can be caused by ice, snow, and mud buildup on the lens of the rearview camera. Also, extreme lighting conditions can affect performance, such as operating in the dark or with bright sunlight shining on the camera. Extreme high or low temperatures can also affect the image quality. An open in the shield of the video signal circuit can also cause a distorted screen.

Terminal fretting or incorrectly seated connectors can cause a poor image displayed condition. Check the circuit terminals for fretting or incorrectly seated connector. If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

Reference Information

Schematic Reference

[Image Display Camera Schematics](#)

Connector End View Reference

[Master Electrical Component List](#)

Description and Operation

[Rear Vision Camera Description and Operation](#)

Electrical Information Reference

- [Circuit Testing](#)
- [Connector Repairs](#)

- [Testing for Intermittent Conditions and Poor Connections](#)
- [Wiring Repairs](#)

Circuit/System Verification

Note:

If the condition is intermittent or cannot be duplicated, disconnect the connectors and add Nyogel lubricant 760G. This procedure will correct the high resistance condition due to terminal fretting corrosion.

1. Verify there is no debris on the B87â€™Rearview Camera lens and that the bezel and bezel seal are not damaged.
2.
 - **If debris are found on the lens**
 - Clean the lens. If the lens, bezel, or bezel seal are damaged, replace as necessary.
3.
 - **If no debris on the lens**
4. Engine running, parking brake applied, transmission in REVERSE.
5. Verify the backup lamps are illuminated.
6.
 - **If the backup lamps are not illuminated**
 - Refer to [Backup Lamps Malfunction](#).
7.
 - **If the backup lamps are illuminated**
8. Engine running, parking brake applied, transmission in REVERSE.
9. Note:

A poor quality image is an image that has flickering, blinking, excessively blue/yellow hue, and/or fog/haze such that it obstructs the driverâ€™s view out the rear of the vehicle.
10. Verify a clear rear vision image is displayed on the radio.
11.
 - **If a clear image is not displayed**
 - Refer to Circuit/System Testing.
12.
 - **If a clear image is displayed**
13. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B87â€™Rearview Camera. It may take up to 2â€™min for all vehicle systems to power down.
2. Test for less than 10â€™ between the ground circuit terminalâ€™5 and ground.
3.
 - **If 10â€™ or greater**
4.
 1. Test for less than 2â€™ in the ground circuit and to and

1. Test for less than 2â€‰%â„Ž in the ground circuit end to end.

2.

- If 2â€‰%â„Ž or greater, repair the open/high resistance in the circuit.
- If less than 2â€‰%â„Ž, repair the open/high resistance in the ground connection.

5.

- **If less than 10â€‰%â„Ž**

6. Ignition ON.

7. Verify a test lamp illuminates between the ignition circuit terminal 6 and ground.

8.

- **If the test lamp does not illuminate and the circuit fuse is good**

9.

1. Ignition OFF.

2. Test for less than 2â€‰%â„Ž in the ignition circuit end to end.

3.

- If 2â€‰%â„Ž or greater, repair the open/high resistance in the circuit.
- If less than 2â€‰%â„Ž, verify the fuse is OK and there is voltage at the fuse. Refer to [Power Mode Mismatch](#).

10.

- **If the test lamp does not illuminate and the circuit fuse is open**

11.

1. Ignition OFF.

2. Test for infinite resistance between the ignition circuit and ground.

3.

- If less than infinite resistance, repair the short to ground on the circuit.
- If infinite resistance, replace the B87â€‰%Rearview Camera.

12.

- **If the test lamp illuminates**

13. Engine running, park brake applied, transmission in R.

14. Verify a test lamp illuminates between the control circuit terminalâ„Ž3 and ground.

15.

- **If the test lamp does not illuminate**

16.

1. Ignition OFF, disconnect the X7 harness connector at the K9â€‰%Body Control Module and remove both E5 Backup Lamps.

2. Test for infinite resistance between the control circuit and ground.

3.

- If less than infinite resistance, repair the short to ground on the circuit.

4.

- If infinite resistance

5. Test for less than 2â€‰%â„,| in the control circuit end to end.
6.
 - If 2â€‰%â„,| or greater, repair the open/high resistance in the circuit.
 - If less than 2â€‰%â„,|, replace the K9â€‰%Body Control Module.
17.
 - **If the test lamp illuminates**
18. Ignition OFF, disconnect the X1 harness connector at the A11â€‰%Radio, ignition ON.
19. Test for less than 1â€‰%V between the signal circuit terminals listed below and ground:
20.
 - B87â€‰%Rearview Camera signal (+) circuit terminalâ€‰%1
 - B87â€‰%Rearview Camera signal (â€“) circuit terminalâ€‰%4
21.
 - **If 1â€‰%V or greater**
 - Repair the short to voltage on the circuit.
22.
 - **If less than 1â€‰%V**
23. Test for infinite resistance between the signal circuit terminals listed below and ground:
24.
 - B87â€‰%Rearview Camera signal (+) circuit terminalâ€‰%1
 - B87â€‰%Rearview Camera signal (â€“) circuit terminalâ€‰%4
25.
 - **If less than infinite resistance**
 - Repair the short to ground on the circuit.
26.
 - **If infinite resistance**
27. Test for less than 2â€‰%â„,| between the B87â€‰%Rearview Camera signal circuit terminalâ€‰%1 and the A11 Radio signal circuit terminalâ€‰%15â€‰%X1
28.
 - **If 2â€‰%â„,| or greater**
 - Repair the open/high resistance in the signal circuit.
29.
 - **If less than 2â€‰%â„,|**
30. Test for less than 2â€‰%â„,| between the B87â€‰%Rearview Camera signal circuit terminalâ€‰%4 and the A11 Radio signal circuit terminalâ€‰%14â€‰%X1
31.
 - **If 2â€‰%â„,| or greater**
 - Repair the open/high resistance in the signal circuit.

32.

- If less than 2 seconds

33. Replace the B87 Rearview Camera.

34. Engine running, parking brake applied, transmission in REVERSE.

35. Verify a clear image is displayed on the A11 Radio.

36.

- If a clear image is not displayed
- Refer to A11 Radio.

37.

- If a clear image displayed

38. All OK.

Repair Instructions

Perform the [Diagnostic Repair Verification](#) after completing the repair.

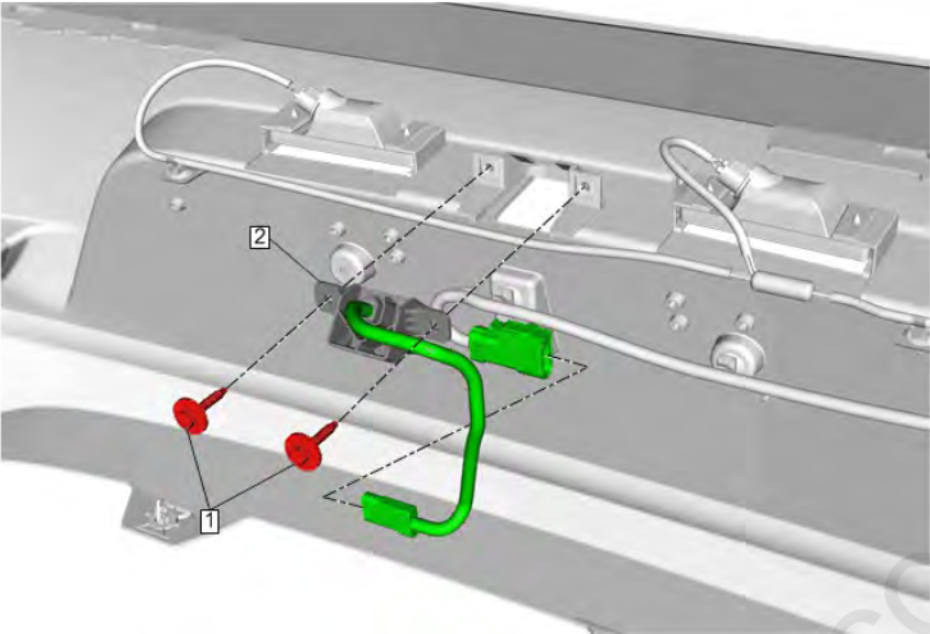
- [Rearview Driver Information Camera Replacement](#)
- [Control Module References](#) for radio replacement, programming, and setup

Repair Instructions

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Rearview Driver Information Camera Replacement (PMC with Hatchback)



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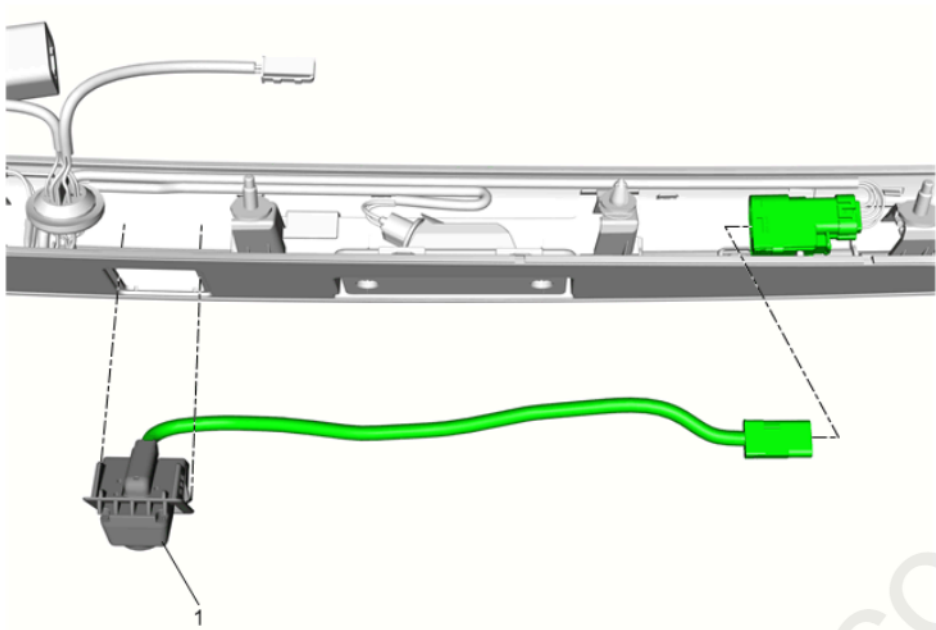
Callout	Component Name
Preliminary Procedure	
Rear Bumper Fascia Replacement	
Note:	
The coax cable repair kit is only to be used for antenna coax cable repairs. It should not be used for any camera coax cable repairs as the repair kit connector ends are not sealed, and will fail due to corrosion.	
1	Rearview Camera Bolt [2>x] Caution : Fastener Caution Tighten 2.5N-m (22 lb in)
2	Rearview Driver Information Camera Procedure Disconnect the electrical connector.

Related Part Information

Part Name	Catalog Name	Part Code
Rearview Camera	CAMERA PKG,RR VIEW	8224Z
Rearview Driver Information Camera	CAMERA,RR VIEW DRVR INFO	8225A

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Rearview Driver Information Camera Replacement (Notchback)



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Callout	Component Name
Preliminary Procedure	
Rear Closure Center Applique Replacement	
Note:	
The coax cable repair kit is only to be used for antenna coax cable repairs. It should not be used for any camera coax cable repairs as the repair kit connector ends are not sealed, and will fail due to corrosion.	
1	Rearview Driver Information Camera Procedure Disconnect the electrical connector.

Specifications

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Fastener Specifications

Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)
Note:	
All fasteners listed in this table can be reused after removal.	
Rearview Camera Bolt	22mm (22mm)

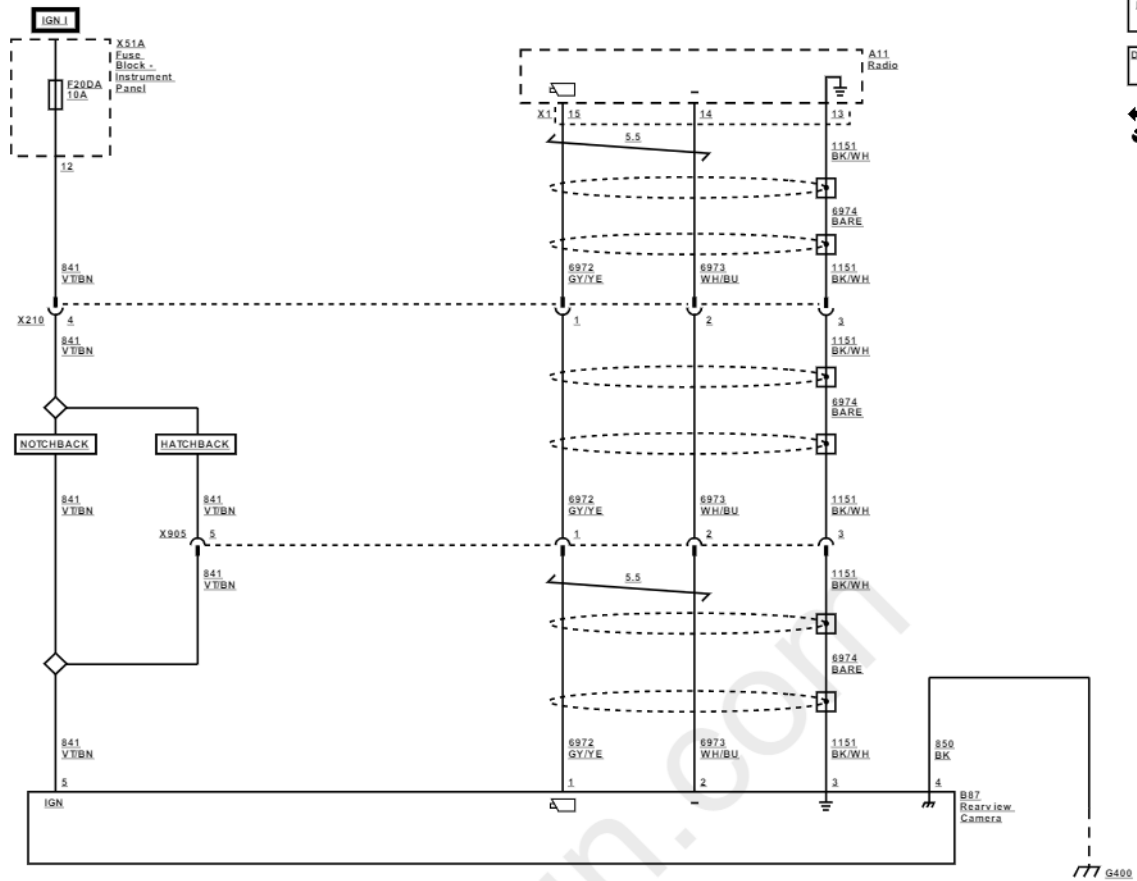
Schematic and Routing Diagrams

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Image Display Camera Schematics

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Rear View Camera (UVC)



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