

Mirrors - Bolt EV

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)
NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Inside Rearview Mirror Fastener	1.8 N.m (16 lb in)
Outside Rearview Mirror Applique Screw	0.8 N.m (7 lb in)
Outside Rearview Mirror Fastener	9 N.m (80 lb in)
Outside Rearview Mirror Housing Cover Bezel Screw	0.8 N.m (7 lb in)
Outside Rearview Mirror Housing Lower Cover Screw	0.5 N.m (4 lb in)
Outside Rearview Mirror Inner Actuator Fastener	1 N.m (9 lb in)

SCHEMATIC WIRING DIAGRAMS

INSIDE REARVIEW MIRROR WIRING SCHEMATICS

Inside Rearview Mirror

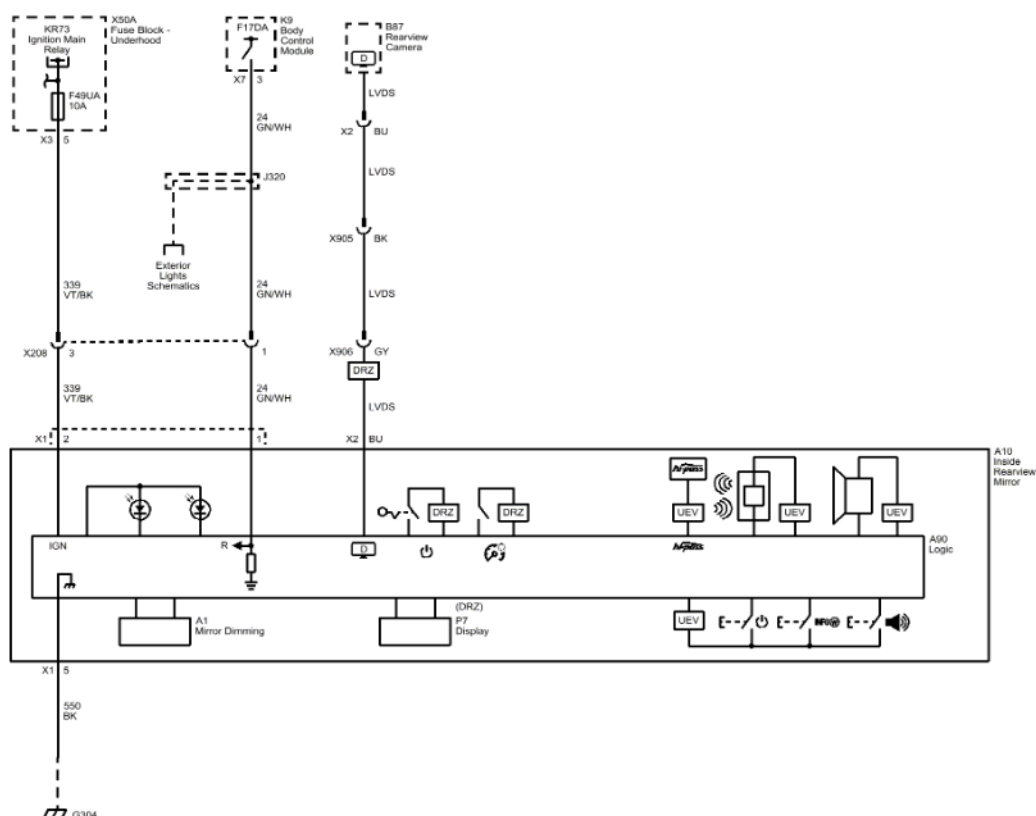


Fig. 1: Inside Rearview Mirror

Courtesy of GENERAL MOTORS COMPANY

cardiagn.com

OUTSIDE REARVIEW MIRROR WIRING SCHEMATICS

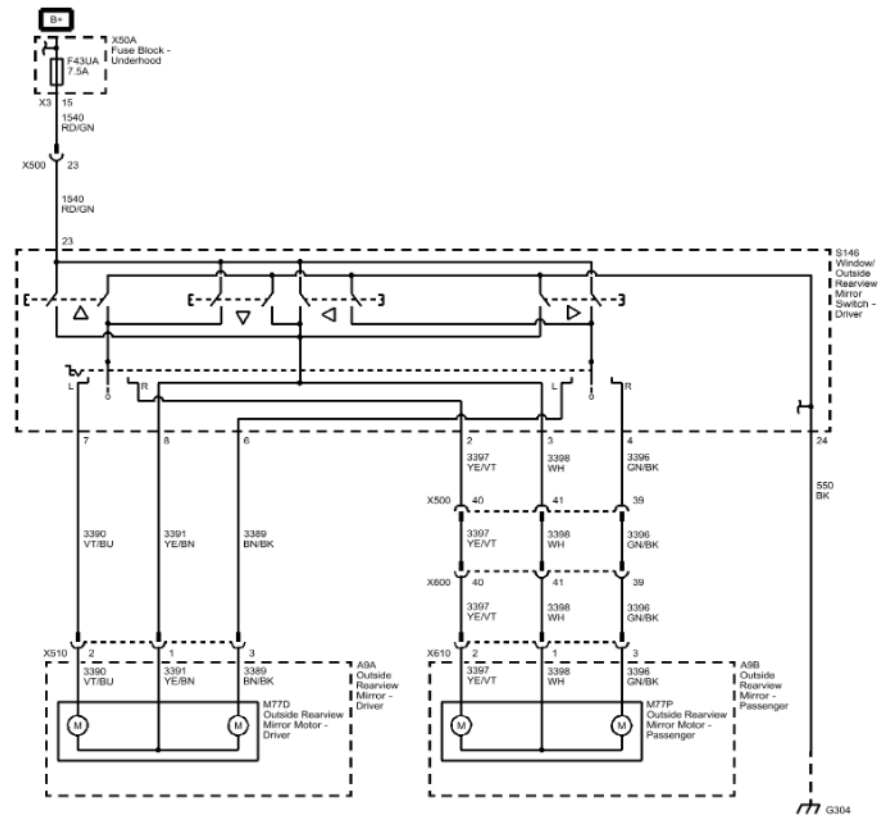


Fig. 2: Outside Rearview Mirrors
Courtesy of GENERAL MOTORS COMPANY

Folding (DLR)

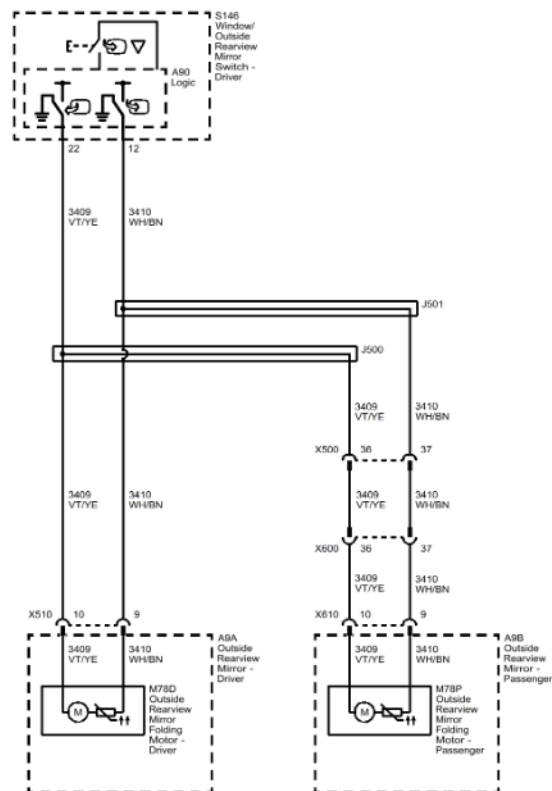


Fig. 3: Folding (DLR)
Courtesy of GENERAL MOTORS COMPANY

Heating

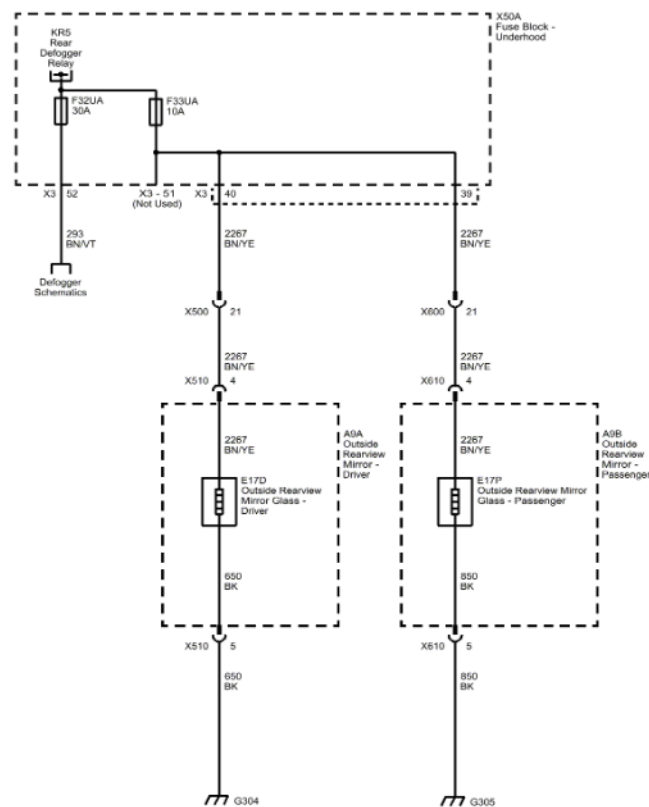


Fig. 4: Heating

Courtesy of GENERAL MOTORS COMPANY

DIAGNOSTIC INFORMATION AND PROCEDURES

DTC B154A OR B154B: MIRROR INTERNAL 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.

DTC Descriptor

DTC B154A 39

Driver Mirror Internal Malfunction

DTC B154B 39

Passenger Mirror Internal Malfunction

Circuit/System Description

The outside mirror switch and passenger window switch are on a serial data circuit with the memory seat module as the master. The mirror select and directional control switches are inputs to the memory seat module through the serial data circuit. When the memory seat module receives switch inputs from the outside mirror switch, mirror output commands are sent to the appropriate switch through the serial data circuit. The outside mirror switch and passenger window switch control the left and right outside rear view mirrors through bi-directional motor control circuits. The motor control circuits are floating while in an inactive state and the switches will apply power and ground to the control circuits as necessary to move the mirror in the commanded direction.

Mirror position is determined by both horizontal and vertical position sensors in each of the power mirrors. The outside mirror switch and passenger window switch supply a 5 V reference, low reference, and horizontal and vertical position signal circuits to these sensors. The signal circuits are referenced

from 5 V by the switches and the signal circuit voltage levels represent the mirror positions. The mirror positions are sent to the memory seat module through the serial data circuit where they are stored for memory mirror operation. When the memory seat module receives a memory recall command, the memory seat module will send the go to position commands to the outside mirror switch and passenger window switch. The switches will then drive the appropriate mirror motors to the commanded position sensor settings.

Conditions for Running the DTC

Battery voltage must be between 9 - 16 V.

Conditions for Setting the DTC

B154A 39

An internal malfunction has been detected by the outside rearview mirror switch while commanding the driver outside rearview mirror UP, DOWN, LEFT or RIGHT.

B154B 39

An internal malfunction has been detected by the passenger window switch while commanding the passenger outside rearview mirror UP, DOWN, LEFT or RIGHT.

Action Taken When the DTC Sets

The affected outside rearview mirror will be inoperative.

Conditions for Clearing the DTC

B154A 39

The driver outside rearview mirror must be replaced before the DTC can be cleared.

B154B 39

The passenger outside rearview mirror must be replaced before the DTC can be cleared.

Reference Information

Schematic Reference

Outside Rearview Mirror Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Outside Mirror Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for scan tool information

Circuit/System Verification

1. Ignition ON.

2. Verify the A9A Outside Rearview Mirror - Driver moves when commanding the Driver Mirror Horizontal Movement Right/Left and Driver Mirror Vertical Movement Up/Down with a scan tool.

- **If the A9A Outside Rearview Mirror - Driver does not move RIGHT or LEFT or UP or DOWN**

Replace the M77D Outside Rearview Mirror Motor - Driver.

- **If the A9A Outside Rearview Mirror-Driver moves RIGHT, LEFT, UP and DOWN**

3. Verify the A9B Outside Rearview Mirror-Passenger moves when commanding the Passenger Mirror Horizontal Movement Right/Left and Passenger Mirror Vertical Movement Up/Down with a scan tool.

- **If the A9B Outside Rearview Mirror-Passenger does not move RIGHT or LEFT or UP or DOWN**

Replace the M77P Outside Rearview Mirror Motor - Passenger.

- **If the A9B Outside Rearview Mirror-Passenger moves RIGHT, LEFT, UP and DOWN**

4. All OK.

Repair Instructions

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

Outside Rearview Mirror Inner Actuator Replacement.

SYMPTOMS - MIRRORS

NOTE: The following steps must be completed before using the symptom tables.

1. Perform the [Diagnostic System Check - Vehicle](#) before using the Symptom Tables in order to verify that all of the following are true:
 - There are no DTCs set.
 - The control modules can communicate via the serial data link.
2. Review the system operation in order to familiarize yourself with the system functions. Refer to [Outside Mirror Description and Operation](#).

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the system. Refer to [Checking Aftermarket Accessories](#).
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to [Testing for Intermittent Conditions and Poor Connections](#).

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- [Heated Mirrors Malfunction](#)
- [Power Mirror Malfunction](#)
- [Power Mirror Folding Malfunction \(With A45\)](#)[Power Mirror Folding Malfunction \(Without A45\)](#)
- [Automatic Day-Night Mirrors Malfunction](#)
- [Power Mirror Tilt Inoperative in Reverse](#)
- [Rearview Camera Full Display Mirror Malfunction](#)

HEATED MIRRORS 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
Left Heated Mirror Element Control	2	1	3	-
Driver Outside Rearview Mirror Ground	-	1	-	-
Right Heated Mirror Element Control	2	1	3	-
Passenger Outside Rearview Mirror Ground	-	1	-	-
1. Single Heated Mirror Inoperative 2. Both Heated Mirrors Inoperative 3. Heated Mirrors Always On				

Circuit/System Description

The rear defogger relay supplies voltage to the outside rearview mirror heater elements based on the current state of the rear window defogger. The relay supplies B+ through the driver/passenger mirror heating element control circuit when a request is seen.

Reference Information

Schematic Reference

Outside Rearview Mirror Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Outside Mirror Description and Operation

Electrical Information Reference

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

Scan Tool Reference

[Control Module References](#) for scan tool information.

Circuit/System Verification

1. Ignition ON/Vehicle in Service Mode..
2. Verify the E18 Rear Defogger Grid turns ON and OFF when commanding the Rear Defogger On and Off with a scan tool.

- **If the E18 Rear Defogger Grid does not turn ON or OFF**

Refer to [Rear Window Defogger Malfunction](#).

- **If the E18 Rear Defogger Grid turns ON and OFF**
- 3. Verify the E17D Outside Rearview Mirror Glass-Driver and the E17P Outside Rearview Mirror Glass-Passenger become warm when commanding the Rear Defogger On with a scan tool.
 - **If the E17D Outside Rearview Mirror Glass-Driver and the E17P Outside Rearview Mirror Glass-Passenger do not become warm**

Refer to Circuit/System Testing.

- **If the E17D Outside Rearview Mirror Glass-Driver and the E17P Outside Rearview Mirror Glass-Passenger become warm**
- 4. All OK.

Circuit/System Testing

Single Outside Mirror Defogger Inoperative

1. Ignition OFF and all vehicle systems OFF, disconnect the appropriate X510 or X610 inline harness connector at the A9 Outside Rearview Mirror. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition ON/Vehicle in Service Mode, connect a test lamp between the control circuit terminal 4 and the ground circuit terminal 5.
4. Verify the test lamp turns ON when commanding the Rear Defogger On with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 2. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the E17 Outside Rearview Mirror Glass.
 - **If the test lamp turns ON**
5. Test or replace the E17 Outside Rearview Mirror Glass.

Repair Instructions

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

- [Outside Rearview Mirror Glass Replacement](#)
- [Engine Wiring Harness Junction Block Replacement](#)

AUTOMATIC DAY-NIGHT MIRRORS 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	-	-
Backup Lamp Control	B2545 02	1	1	-
Ground	-	1	-	-
1. Inside Electrochromic Mirror Malfunction				

Circuit/System Description

The inside rearview mirror uses 2 photocell sensors. One sensor is the rear light sensor, located on the face side of the mirror, facing the rear of the vehicle. The rear light sensor is used to determine light conditions present at the mirror face. The other sensor is the front light sensor, located on the backside of the mirror, facing the front of the vehicle. The front light sensor is used to determine the exterior light conditions at the front of the vehicle. With a low exterior light condition detected by the front light sensor and a high light condition from the rear light sensor, the inside rearview mirror will automatically darken the face of the inside rearview mirror.

With the gear selector lever in the REVERSE position and the engine running, backup lamp control voltage is supplied as an input to the inside rearview mirror. The mirror monitors this input to disable the automatic day-night feature. This allows the driver to see objects in the mirror clearly when backing up, regardless of the rear light sensor status.

Reference Information

Schematic Reference

- [Inside Rearview Mirror Schematics](#)
- [Outside Rearview Mirror Schematics](#)

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Automatic Day-Night Mirror Description and Operation

Electrical Information Reference

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

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Cover the windshield with a blanket or other suitable item.
3. Verify the A10 Inside Rearview Mirror face dims when shining a bright light into the rear light sensor

- **If the A10 Inside Rearview Mirror does not dim**

Refer to Circuit/System Testing - Inside Review Mirror Dimming Inoperative

- **If the A10 Inside Rearview Mirror dims**

4. Verify the A10 Inside Rearview Mirror face transitions from dim to bright while commanding the Backup Lamps Active and Inactive with a scan tool.

- **If the A10 Inside Rearview Mirror does not transition between dim and bright.**

Refer to Circuit/System Testing - Day-Night Disable Malfunction

- **If the A10 Inside Rearview Mirror transitions between bright and dim states**

5. All OK.

Circuit/System Testing

Inside Review Mirror Dimming Inoperative

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the A10 Inside Rearview Mirror. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 5 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the ignition circuit terminal 2 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ignition circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , refer to [Power Mode Mismatch](#).
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the ignition circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the A10 Inside Rearview Mirror.
 - **If the test lamp illuminates**
5. Replace the A10 Inside Rearview Mirror.

Day-Night Disable Malfunction

1. Ignition OFF, disconnect the harness connector at the A10 Inside Rearview Mirror.
2. Connect a test lamp between the control circuit terminal 1 and ground
3. Ignition ON, verify the test lamp turns ON and OFF while commanding the Backup Lamps Active and Inactive with a scan tool.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit terminal 1 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , refer to [Backup Lamps Malfunction](#).
 - **If the test lamp is always OFFN**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K9 Body Control Module, ignition ON.

2. Test for less than 1 V between the control circuit and ground.

- If 1 V or greater, repair the short to voltage on the circuit.
- If less than 1 V, refer to [Backup Lamps Malfunction](#)

- **If the test lamp turns ON and OFF**

4. Replace the A10 Inside Rearview Mirror.

Repair Instructions

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

Inside Rearview Mirror Replacement

POWER MIRROR FOLDING MALFUNCTION (WITH A45)

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
Folding Mirror Motor Fold Control	1	1	-	-
Folding Mirror Motor Unfold Control	1	1	-	-
1. Power Folding Mirror Inoperative				

Circuit/System Description

The outside rearview mirror switch contains resistors which will reduce the signal voltage from the mirror control module, the mirror memory control module is programmed to move the driver outside mirror in a direction depending upon the voltage received from the outside rearview mirror switch. The outside rearview mirror switch has a 3 position rocker switch which corresponds to the driver outside rearview mirror select, no mirror select and passenger outside mirror selected. When the switch is in the no mirror select position and the mirror position switch is held in the DOWN position, mirror control module will command the driver outside mirror to fold or unfold and send a serial data message to the memory seat control module to send a fold or unfold command to the passenger window switch which will command the passenger outside rearview mirror to fold or unfold. The mirror control module and passenger window switch control the fold/unfold motors through bi-directional control circuits.

Diagnostic Aids

Power folding mirrors only operate when the mirror selector switch is in the no mirror select position.

Reference Information

Schematic Reference

Outside Rearview Mirror Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Outside Mirror Description and Operation

Electrical Information Reference

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

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition ON.
2. Verify the scan tool Mirror Select Switch parameter changes from None to Left and Right when cycling the S146 Window/Outside Rearview Mirror Switch - Driver..
 - **If the parameter does not change**
Refer to [Power Mirror Malfunction](#).
 - **If the parameter changes**
3. Verify the scan tool Mirror Direction Switch parameter changes from Inactive to Up, Down, Right and Left when cycling the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If the parameter does not change**
Refer to [Power Mirror Malfunction](#).
 - **If the parameter changes**
4. Verify the A9A Outside Rearview Mirror-Driver FOLD and UNFOLD when commanding the Driver Mirror Fold Motor to Fold and Unfold with a scan tool.
 - **If the A9A Outside Rearview Mirror-Driver does not FOLD and UNFOLD**
Refer to Circuit/System Testing - Driver Outside Mirror Folding Command Malfunction.
 - **If the A9A Outside Rearview Mirror-Driver does FOLD and UNFOLD**
5. Verify the A9B Outside Rearview Mirror-Passenger FOLD and UNFOLD when commanding the Passenger Mirror Fold Motor to Fold and Unfold with a scan tool.
 - **If the A9B Outside Rearview Mirror-Passenger does not FOLD and UNFOLD**
Refer to Circuit/System Testing - Passenger Outside Mirror Folding Command Malfunction.
 - **If the A9B Outside Rearview Mirror-Passenger does FOLD and UNFOLD**
6. All OK.

Circuit/System Testing

Driver Outside Mirror Folding Command Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X510 inline harness connector at the A9A Outside Rearview Mirror-Driver. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the control circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If less than 10 Ω**

3. Test for less than 10 Ω between the control circuit terminal 9 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If less than 10 Ω**
4. Connect a test lamp between control circuit terminal 10 and control circuit terminal 9, ignition ON.
5. Verify the test lamp turns ON when commanding the FOLD and UNFOLD states with a scan tool.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If the test lamp turns ON during each of the commands**
6. Test or replace the A9A Outside Rearview Mirror-Driver.

Passenger Outside Mirror Folding Command Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X610 inline harness connector at the A9B Outside Rearview Mirror-Passenger. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the control circuit terminal 10 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If less than 10 Ω**
3. Test for less than 10 Ω between the control circuit terminal 9 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for less than 2 Ω in the control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If less than 10 Ω**
4. Connect a test lamp between control circuit terminal 10 and control circuit terminal 9, ignition ON.
5. Verify the test lamp turns ON when commanding the FOLD and UNFOLD states with a scan tool.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the X2 harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- If the test lamp turns ON during each of the commands

6. Test or replace the A9B Outside Rearview Mirror-Passenger.

Component Testing

Outside Rearview Mirror

1. Ignition OFF, disconnect the harness connector at the appropriate A9 Outside Rearview Mirror.
2. Install a 10 A fused jumper wire between one of the control terminals and 12 V. Momentarily install a jumper wire between the other control terminal and ground. Reverse the jumper wires at least two times, the A9 Outside Rearview Mirror should perform the FOLD and UNFOLD functions.

- **If the function does not perform the FOLD and UNFOLD functions**

Replace the A9 Outside Rearview Mirror.

- **If the function performs the FOLD and UNFOLD functions**

3. All OK

Repair Instructions

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

- [Outside Rearview Mirror Replacement](#)
- [Front Side Door Window Control Switch Replacement](#)
- [Control Module References](#) for the left mirror control module replacement, programming and setup

POWER MIRROR FOLDING MALFUNCTION (WITHOUT A45)

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
Folding Mirror Motor Fold Control	1	1	-	-
Folding Mirror Motor Unfold Control	1	1	-	-
1. Power Folding Mirror Inoperative				

Circuit/System Description

The outside mirror switch controls the power fold/unfold functions of the outside rearview mirrors. The folding mirror motors are controlled by using bi-directional motor controls through the folding mirror motor fold control circuit and the folding mirror motor unfold control circuit.

Diagnostic Aids

Power folding mirrors only operate when the mirror selector switch is in the no mirror select position.

Reference Information

Schematic Reference

[Outside Rearview Mirror Schematics](#)

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Outside Mirror Description and Operation

Electrical Information Reference

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

Circuit/System Verification

1. Verify the outside folding mirrors is fully extended or fully retracted, refer to [Power Folding Mirrors Resetting Procedure](#).
2. Ignition ON.
3. Verify the A9A Outside Rearview Mirror-Driver and the A9B Outside Rearview Mirror-Passenger FOLD and UNFOLD with the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If the A9A Outside Rearview Mirror-Driver or the A9B Outside Rearview Mirror-Passenger do not FOLD or UNFOLD**

Refer to Circuit/System Testing
 - **If the A9A Outside Rearview Mirror-Driver and the A9B Outside Rearview Mirror-Passenger FOLD and UNFOLD**
4. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the inline harness connector at the appropriate A9 Outside Rearview Mirror. Ignition ON
2. Connect a test lamp between the control circuit terminal 9 and control circuit terminal 10.
3. Verify the test lamp turns ON when commanding the FOLD and UNFOLD states with the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
 2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for less than 2 Ω in each control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver, ignition ON.
 2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the S146 Window/Outside Rearview Mirror Switch - Driver
 - **If the test lamp turns ON during each of the commands**
4. Test or replace the A9 Outside Rearview Mirror.

Repair Instructions

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

- [Front Side Door Window Control Switch Replacement](#)
- [Outside Rearview Mirror Replacement](#)

POWER MIRROR 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
Outside Rearview Mirror Switch B+	1	1	-	-
Driver Mirror Motor Horizontal Control	1	2	2	-
Driver Mirror Motor Vertical Control	1	2	2	-
Passenger Mirror Motor Horizontal Control	1	3	3	-
Passenger Mirror Motor Vertical Control	1	3	3	-
Outside Rearview Mirror Switch Ground	-	1	-	-
1. Both Outside Power Mirrors Inoperative 2. Driver Outside Power Mirror Malfunction 3. Passenger Outside Power Mirror Malfunction				

Circuit/System Description

The outside rearview mirror switch controls the outside rearview mirrors based on the position of the mirror selector switch and which movement position is selected. The outside rearview mirror switch has four positions: up, down, left, and right. B+ is applied to the switch from the power mirror fuse and when a movement position switch is selected, voltage is sent to the commanded mirror via a mirror control circuit. The opposite mirror control circuit acts as a ground circuit for the bi-directional mirror motor. Ground is the applied through the switch.

Reference Information

Schematic Reference

[Outside Rearview Mirror Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Outside Mirror Description and Operation](#)

Electrical Information Reference

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

- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Circuit/System Verification

1. Verify the mirror glass of the A9A Outside Rearview Mirror-Driver and the A9B Outside Rearview Mirror-Passenger move UP, DOWN, LEFT and RIGHT with the S146 Window/Outside Rearview Mirror Switch - Driver.
 - **If both outside mirror glasses do not move**
Refer to Circuit/System Testing - Both Outside Rearview Mirrors Inoperative.
 - **If the driver outside mirror glass does not move UP, DOWN, LEFT or RIGHT**
Refer to Circuit/System Testing - Driver Outside Mirror Movement Malfunction.
 - **If the passenger outside mirror glass does not move UP, DOWN, LEFT or RIGHT**
Refer to Circuit/System Testing - Passenger Outside Mirror Movement Malfunction.
 - **If the mirror glass of the A9A Outside Rearview Mirror-Driver and the A9B Outside Rearview Mirror-Passenger move UP, DOWN, LEFT and RIGHT**
2. All OK.

Circuit/System Testing

Both Outside Rearview Mirrors Inoperative

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver. It may take up to 2 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 24 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the ground circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , repair the open/high resistance in the ground connection.
 - **If less than 10 Ω**
3. Verify a test lamp illuminates between the B+ circuit terminal 23 and ground.
 - **If the test lamp does not illuminate and the circuit fuse is good**
 1. Ignition OFF.
 2. Test for less than 2 Ω in the B+ circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , verify the fuse is not open and there is voltage at the fuse.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF.
 2. Test for infinite resistance between the B+ circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
 3. Test for infinite resistance between each of the control circuit terminals listed below and ground:
 - Control circuit terminal 2
 - Control circuit terminal 3
 - Control circuit terminal 4
 - Control circuit terminal 6
 - Control circuit terminal 7

- Control circuit terminal 8
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the appropriate M77 Outside Rearview Mirror Motor.
 - **If the test lamp illuminates**
4. Test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

Driver Outside Mirror Movement Malfunction

1. Ignition OFF, disconnect the X501 inline harness connector at the A9A Outside Rearview Mirror-Driver. Ignition ON
2. Connect a test lamp between the control circuit terminal 1 and control circuit terminal 2.
3. Verify the test lamp turns ON when commanding the UP and DOWN states with the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp remains OFF during either of the commands**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in each control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver, ignition ON.
2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp turns ON during each of the commands**

4. Connect a test lamp between the control circuit terminal 1 and control circuit terminal 3.
5. Verify the test lamp turns ON when commanding the LEFT and RIGHT states with the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp remains OFF during either of the commands**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in each control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver, ignition ON.
2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp turns ON during each of the commands**

6. Test or replace the M77D Outside Rearview Mirror Motor-Driver.

Passenger Outside Mirror Movement Malfunction

1. Ignition OFF, disconnect the X601 inline harness connector at the A9B Outside Rearview Mirror-Passenger. Ignition ON
2. Connect a test lamp between the control circuit terminal 1 and control circuit terminal 2.
3. Verify the test lamp turns ON when commanding the UP and DOWN states with the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp remains OFF during either of the commands**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in each control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver, ignition ON.
2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp turns ON during each of the commands**

4. Connect a test lamp between the control circuit terminal 1 and control circuit terminal 3.
5. Verify the test lamp turns ON when commanding the LEFT and RIGHT states with the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp remains OFF during either of the commands**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver.
2. Test for infinite resistance between each control circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance
3. Test for less than 2 Ω in each control circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S146 Window/Outside Rearview Mirror Switch - Driver, ignition ON.
2. Test for less than 1 V between each control circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the S146 Window/Outside Rearview Mirror Switch - Driver.

- **If the test lamp turns ON during each of the commands**

6. Test or replace the M77P Outside Rearview Mirror Motor-Passenger.

Repair Instructions

- [Front Side Door Window Control Switch Replacement](#)
- [Outside Rearview Mirror Inner Actuator Replacement](#)

POWER MIRROR TILT INOPERATIVE IN REVERSE

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.

Circuit/System Description

Mirror position is determined by both horizontal and vertical position sensors in each of the power mirrors. The mirror control module and passenger window switch supply a 5 V reference, low reference, and horizontal and vertical position signal circuits to these sensors. The signal circuits are referenced from 5 V by the switches and the signal circuit voltage levels represent the mirror positions. The mirror positions are sent to the memory seat module through the serial data circuit where they are stored for memory mirror operation. When the memory seat module receives a park tilt mirror in reverse command, the memory seat module will send the tilt down command to the mirror control module and the passenger window switch. The mirror control module and the passenger window switch will then drive the appropriate mirror motors to the commanded position.

Diagnostic Aids

The Park Tilt Mirror in Reverse is a feature in the Personalization Menu of the audio system controls that allows the operator to program the driver and/or passenger outside rearview mirrors to tilt downward when the vehicle is shifted into R (reverse). Verify that this feature has been correctly programmed into the system before performing extensive diagnostics

Reference Information

Schematic Reference

[Outside Rearview Mirror Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Outside Mirror Description and Operation](#)

Electrical Information Reference

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

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Ignition ON/Vehicle in Service Mode.
2. Verify the A9A Outside Rearview Mirror - Driver moves when commanding the Driver Mirror Horizontal Movement Right/Left and Driver Mirror Vertical Movement Up/Down with a scan tool.

- **If the A9A Outside Rearview Mirror - Driver does not move RIGHT or LEFT or UP or DOWN**

Refer to [Power Mirror Malfunction](#).

- If the A9A Outside Rearview Mirror - Driver moves RIGHT, LEFT, UP and DOWN
3. Verify the A9B Outside Rearview Mirror-Passenger moves when commanding the Passenger Mirror Horizontal Movement Right/Left and Passenger Mirror Vertical Movement Up/Down with a scan tool.
- If the A9B Outside Rearview Mirror-Passenger does not move RIGHT or LEFT or UP or DOWN

Refer to [Power Mirror Malfunction](#).

- If the A9B Outside Rearview Mirror-Passenger moves RIGHT, LEFT, UP and DOWN
4. All OK.

Circuit/System Testing

1. Ignition ON/Vehicle in Service Mode, shift the vehicle in REVERSE.
2. Verify that the appropriate A9 Outside Rearview Mirror moves DOWN.
 - If the A9 Outside Rearview Mirror does not move DOWN

Replace the K40 Seat Memory Control Module

- If the A9 Outside Rearview Mirror does move DOWN
3. All OK.

Repair Instructions

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

[Control Module References](#) for the seat memory control module replacement, programming and setup

REARVIEW CAMERA FULL DISPLAY MIRROR 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

Circuit/System Description

If equipped, full display mirror (FDM) provides a wider field of view than normally seen from the inside rearview mirror to assist when driving and changing lanes. When the tab under the inside rearview mirror is pulled rearward, a view of the area behind the vehicle displays on the mirror.

Reference Information

Schematic Reference

[Inside Rearview Mirror Schematics](#)

Connector End View Reference

[COMPONENT CONNECTOR END VIEWS - INDEX](#)

Description and Operation

[Automatic Day-Night Mirror Description and Operation](#)

Electrical Information Reference

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

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

Scan Tool Reference

[Control Module References](#) for scan tool information

Circuit/System Verification

1. Verify there is no debris on the B87 Rearview Camera lens, and the lens is not damaged or the rearview camera is not out of alignment.
 - **If debris is found on the lens, or the lens is damaged, or the rearview camera is out of alignment**

Clean the lens. If the lens, replace as necessary, or adjust the mirror.
 - **If there is no debris on the lens, or the lens is not damaged, or the rearview camera is not out of alignment**
2. All OK.

Circuit/System Testing

1. Ignition OFF/vehicle OFF, disconnect the coax cable connector at the B87 Rearview Camera.
2. Ignition On, test for 7 - 10 V between the center conductor of the coax cable and the coax cable ground shield wires.
 - **If the value within the range of 7 - 10 V**

Replace the B87 Rearview Camera.
 - **If the value outside range of 7 - 10 V**
3. Disconnect the A10 Inside Rearview Mirror, and check the coaxial cable resistance
 - **If the value is more than 5 Ω**

Replace the coax cable.
 - **If the value is less than 5 Ω**
4. Test or replace the A10 Inside Rearview Mirror.

Component Testing

CAUTION: Refer to [Test Probe Caution](#)

NOTE:

- Before testing the coax cable, check the cable exterior for being pinched, cut, damaged, or having loose connections at the components, which can cause reception issues.
- To prevent false readings when testing the center coax terminals, use care not to ground the test probe on the outer housing/shield.

Coax Cable Test

1. Test for less than 5 Ω between the coax cable center terminal end to end.
 - **If 5 Ω or greater**

Replace the coax cable.
 - **If less than 5 Ω**
2. Test for greater than 5 Ω between the coax cable outer shield end to end.
 - **If 5 Ω or greater**

Replace the coax cable.

- **If less than 5 Ω**

3. Test for infinite resistance between the coax cable center terminal and the coax cable outer shield.

- **If less than infinite resistance**

Replace the coax cable.

- **If infinite resistance**

4. All OK.

Repair Instructions

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

- [Rearview Driver Information Camera Replacement](#)
- [Inside Rearview Mirror Replacement](#)
- [Control Module References](#) for human machine interface control module replacement, programming, and setup.

REPAIR INSTRUCTIONS

OUTSIDE REARVIEW MIRROR APPLIQUE REPLACEMENT

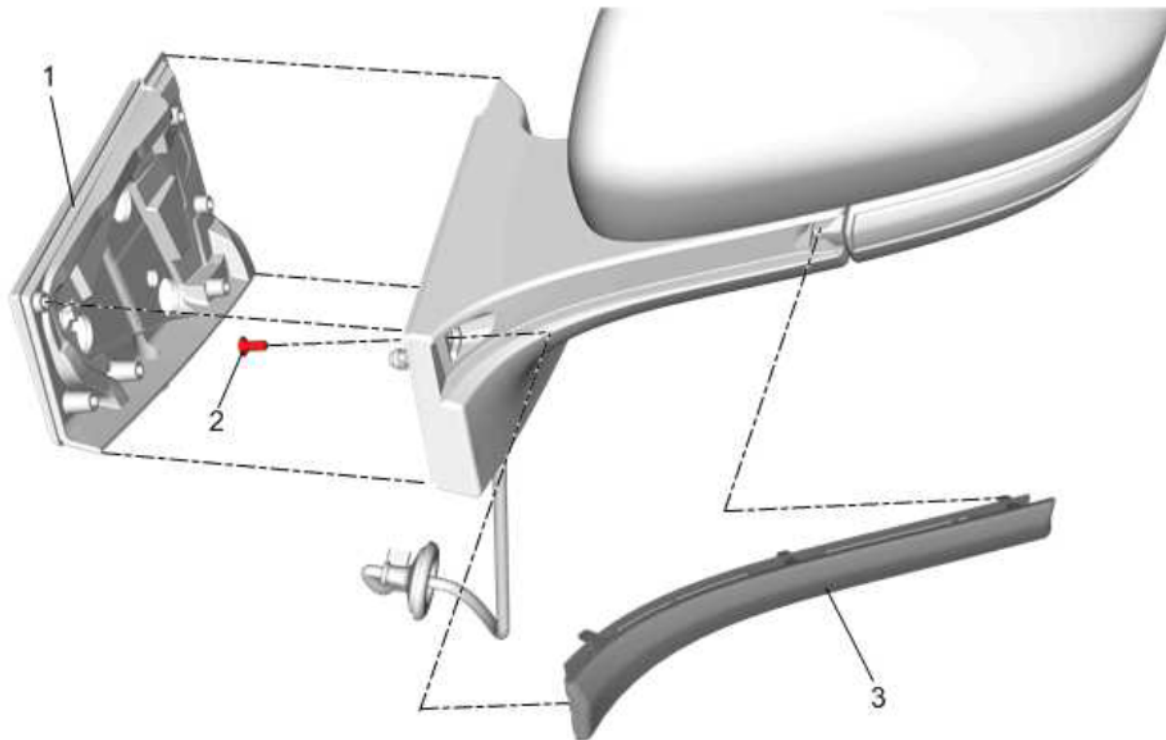


Fig. 5: Outside Rearview Mirror Applique

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
Outside Rearview Mirror Replacement	
1	Outside Rearview Mirror Gasket

Callout	Component Name
2	Outside Rearview Mirror Applique Screw CAUTION: <u>Fastener Caution</u> Tighten 0.8 N.m (7 lb in)
3	Outside Rearview Mirror Applique

OUTSIDE REARVIEW MIRROR REPLACEMENT

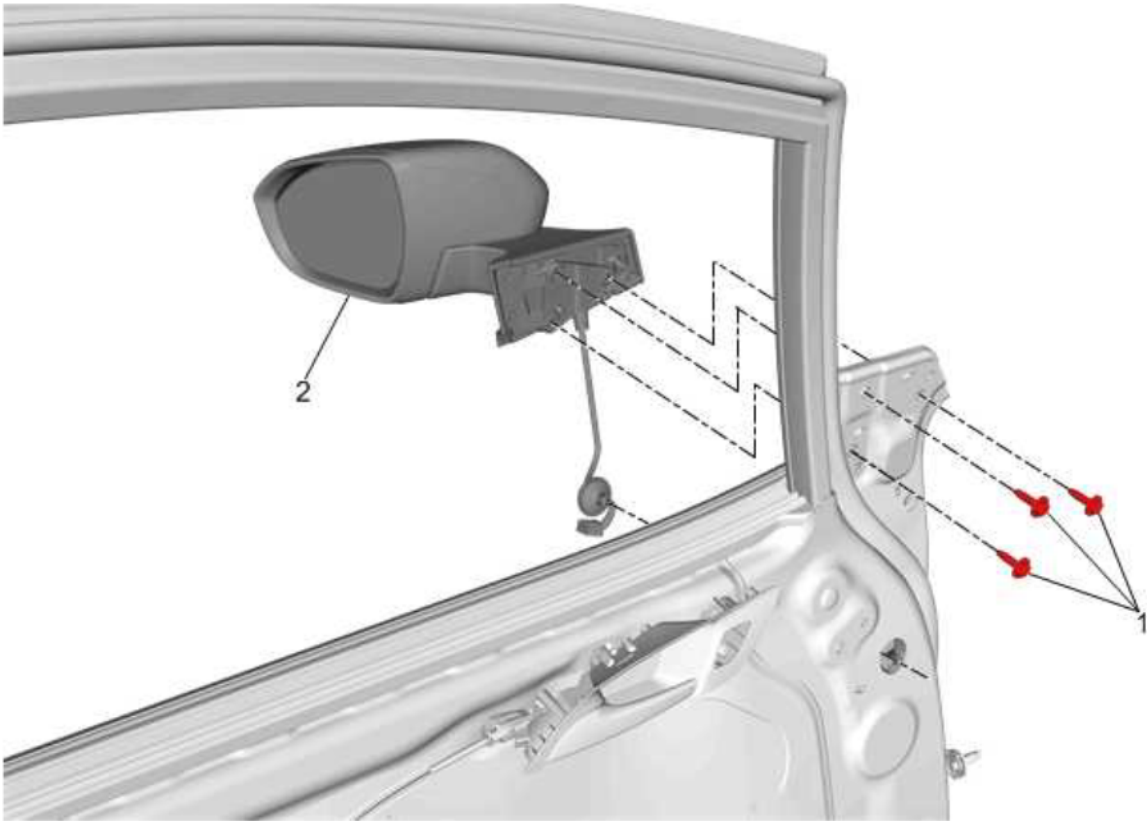


Fig. 6: Outside Rearview Mirror
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. <u>Front Side Door Trim Replacement</u> 2. <u>Front Side Door Upper Trim Panel Replacement</u>	
1	Outside Rearview Mirror Fastener (Qty: 3) CAUTION: Refer to <u>Fastener Caution</u> . Tighten 9 N.m (80 lb in)
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Callout	Component Name
2	Outside Rearview Mirror Procedure 1. Disconnect the electrical connector. 2. Release the mirror harness grommet and route the harness through the doors while removing the mirror.

OUTSIDE REARVIEW MIRROR HOUSING LOWER COVER REPLACEMENT

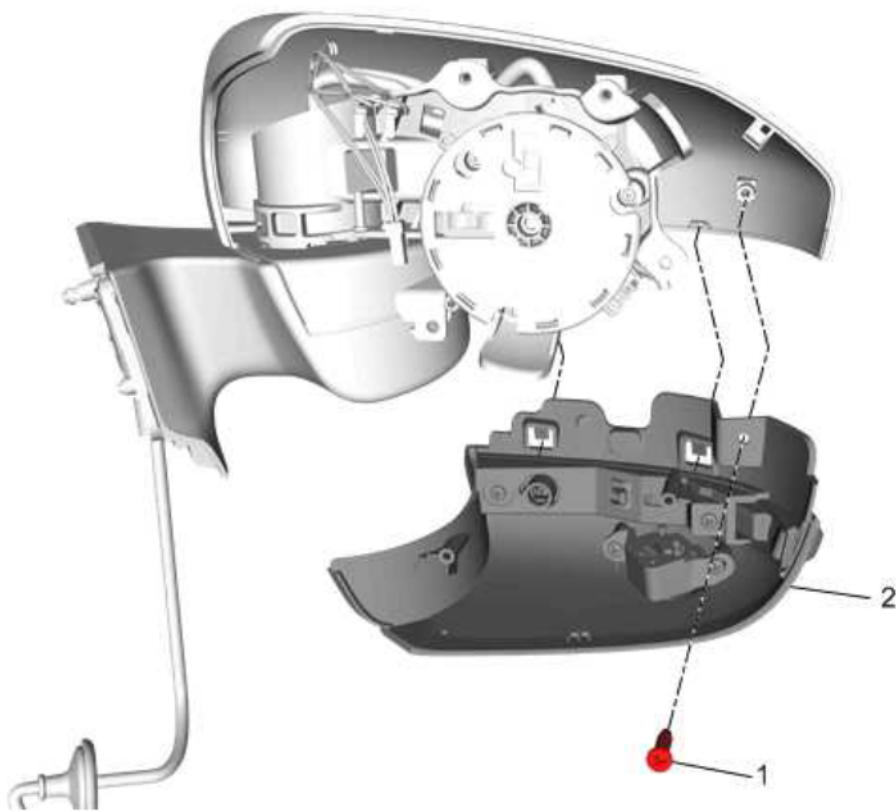


Fig. 7: Outside Rearview Mirror Housing Lower Cover
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Outside Rearview Mirror Housing Bezel Replacement	
1	Outside Rearview Mirror Housing Lower Cover Screw CAUTION: Fastener Caution Tighten 0.5 N.m (4 lb in)
2	Outside Rearview Mirror Housing Lower Cover Procedure 1. Disconnect the turn signal lamp electrical connector. 2. Outside Rearview Mirror Turn Signal Lamp - Remove - Outside Rearview Mirror Turn Signal Lamp Replacement 3. {If equipped} Side View Driver Information Camera - Remove - Side View Driver Information Camera Replacement

OUTSIDE REARVIEW MIRROR HOUSING BEZEL REPLACEMENT

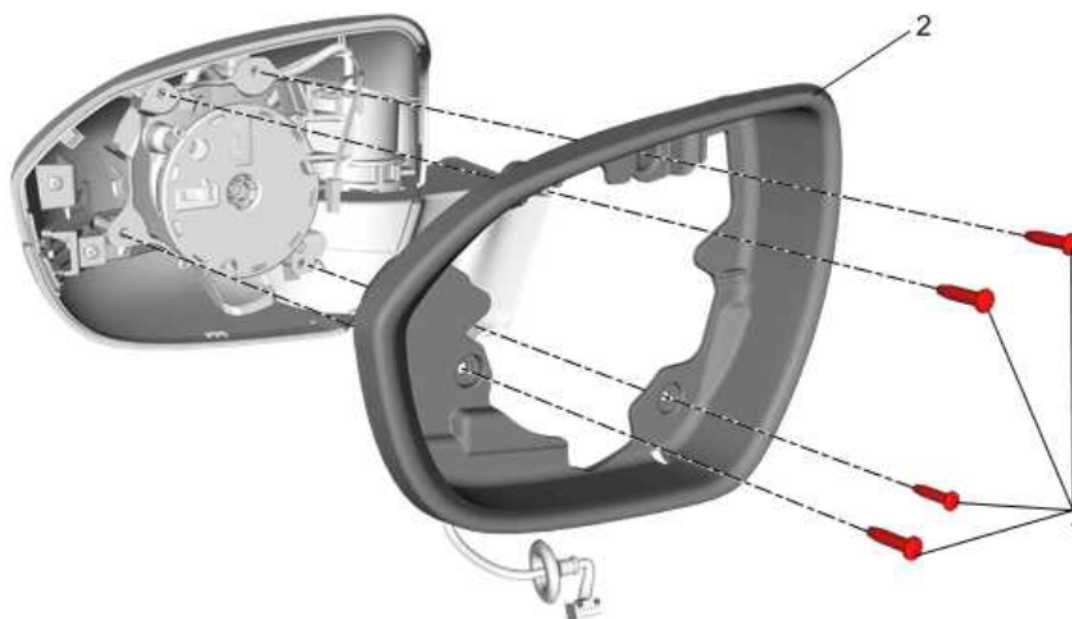


Fig. 8: Outside Rearview Mirror Housing Bezel

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
Outside Rearview Mirror Glass Replacement	
1	Outside Rearview Mirror Housing Cover Bezel Screw CAUTION: Fastener Caution Tighten 0.8 N.m (7 lb in)
2	Outside Rearview Mirror Housing Bezel

POWER FOLDING MIRRORS RESETTING PROCEDURE

Initialization Procedure

Reset the power folding mirrors in the following scenarios:

- The mirrors are accidentally obstructed while folding.
- They are accidentally manually folded/unfolded.
- The mirrors will not stay in the unfolded position.
- The mirrors vibrate at normal driving speeds.

Until the motor assembly has been initialized, the express open and close switch inputs and manual open inputs are disregarded. During the process of initialization, anti-pinch detection is not active.

Resetting the Power Folding Mirrors:

Fold and unfold the mirrors one time using the mirror folding control to reset them to their normal position. A popping noise may be heard during the resetting of the power folding mirrors. This sound is normal after a manual folding operation.

OUTSIDE REARVIEW MIRROR INNER ACTUATOR REPLACEMENT

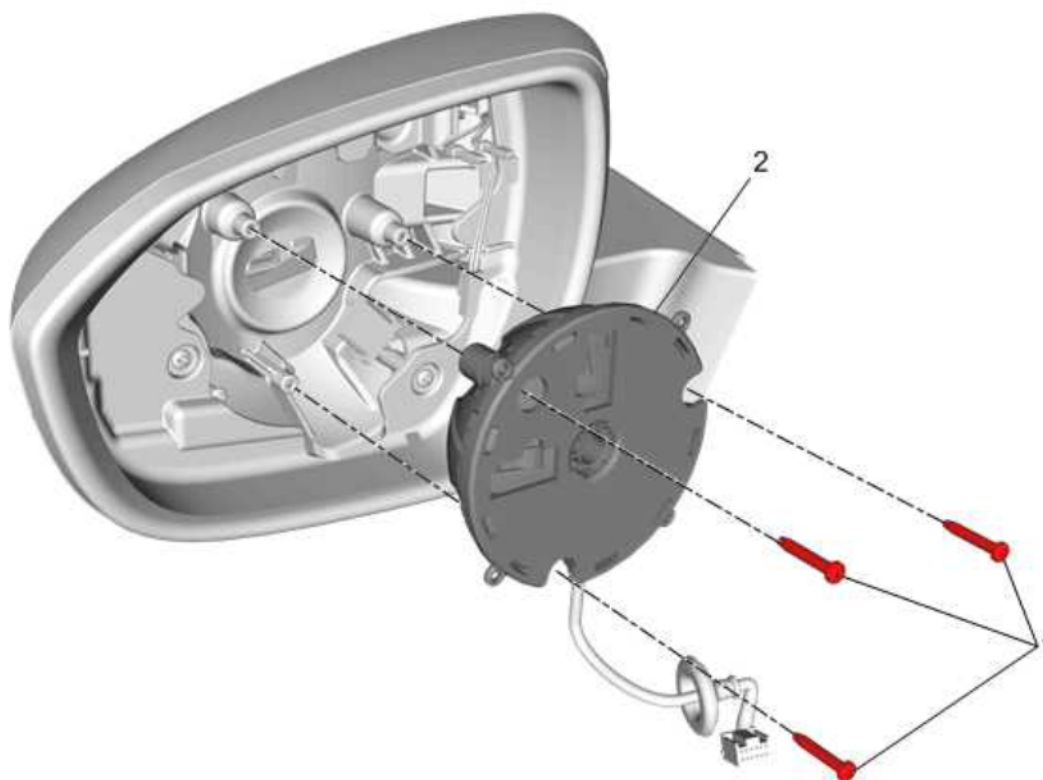


Fig. 9: Outside Rearview Mirror Inner Actuator

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
<u>Outside Rearview Mirror Glass Replacement</u>	
1	Outside Rearview Mirror Inner Actuator Fastener CAUTION: <u>Fastener Caution</u> Tighten 1 N.m (9 lb in)
2	Outside Rearview Mirror Inner Actuator Procedure Disconnect the electrical connector.

OUTSIDE REARVIEW MIRROR GLASS REPLACEMENT

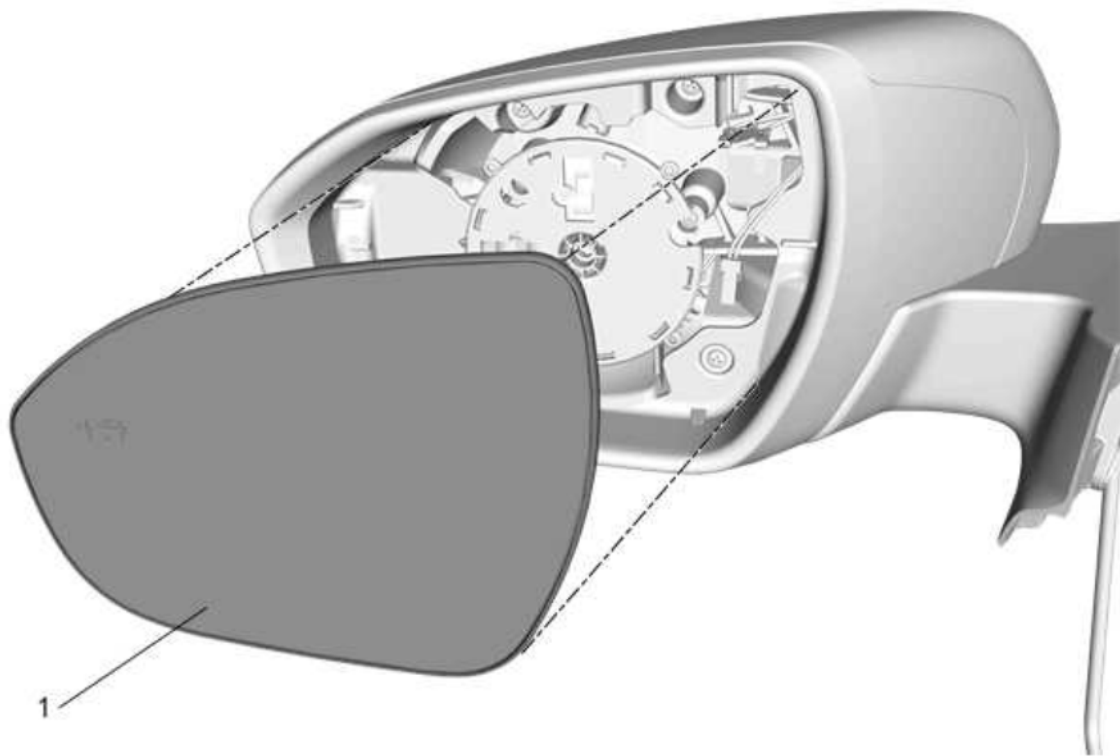


Fig. 10: Outside Rearview Mirror Glass
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Outside Rearview Mirror Glass WARNING: <u>Glass and Sheet Metal Handling Warning</u> Procedure 1. Push inward on the top of the mirror glass exposing a gap. Using a hook type tool, release the long retainer tabs that are accessible while pulling outward on the glass, once long retainer tabs are released, the glass will separate from the actuator. 2. Note the connector location for installation. 3. Disconnect the electrical connector. NOTE: Wear gloves to prevent potentially damaging the new glass during installation. For installation, align the tabs on mirror with the actuator. Apply firm pressure across the surface until the mirror is locked in place.

INSIDE REARVIEW MIRROR REPLACEMENT

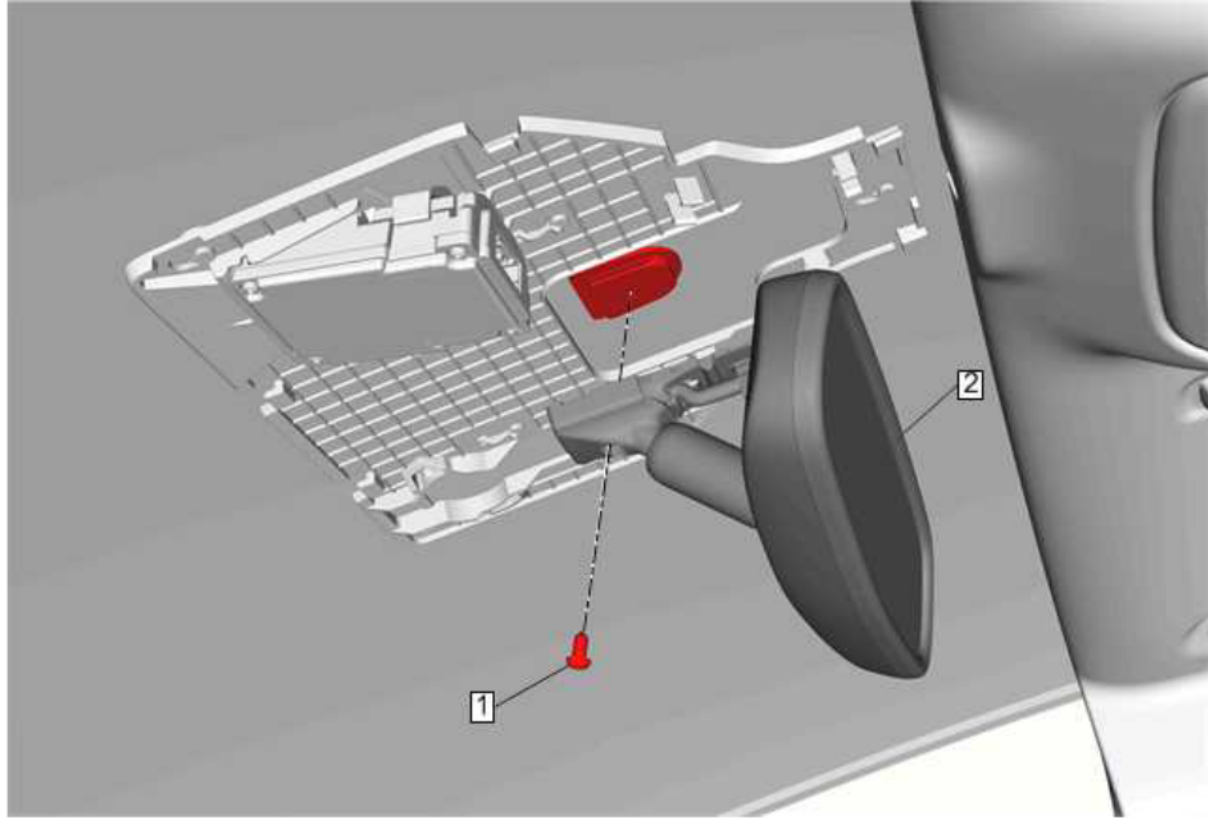


Fig. 11: Inside Rearview Mirror
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure <u>Windshield Multifunction Sensor Mount Bracket Cover Replacement (with Front View Camera)</u> <u>Windshield Multifunction Sensor Mount Bracket Cover Replacement (without Front View Camera)</u>	
1	Inside Rearview Mirror Fastener CAUTION: Refer to <u>Fastener Caution</u> . Tighten 1.8 N.m (16 lb in)
2	Inside Rearview Mirror Procedure Disconnect the electrical connector.

DESCRIPTION AND OPERATION

AUTOMATIC DAY-NIGHT MIRROR DESCRIPTION AND OPERATION

Inside Rearview Mirror with the Automatic Day-Night Feature System Operation

The inside rearview mirror uses 2 photocell sensors. One sensor is the headlight sensor, located on the face side of the mirror. The headlight sensor is used to determine light conditions present at the mirror face. The other sensor is the ambient light sensor, located on the rear of the mirror or windshield side. The ambient light sensor is used to determine the exterior light conditions. With a low exterior light condition detected, and a high light condition from behind the car, at the headlight sensor, the inside rearview mirror will automatically darken the face of the mirror.

In the daytime, the mirror is in a normal state because of the high exterior light condition that is indicated by the ambient light sensor. With the gear selector lever in the REVERSE position and the Ignition ON/Vehicle in Service Mode, backup lamp supply voltage is supplied as an input to the inside rearview mirror. The mirror monitors this input to disable the automatic day-night feature. This allows the driver to see objects in the mirror clearly when backing up, even during the night.

Driver Outside Rearview Mirror with Automatic Day-Night System Operation (If Equipped)

The automatic day-night feature of the driver outside rearview mirror is controlled by the inside rearview mirror. The inside rearview mirror supplies control and low reference to the driver outside rearview mirror. At night, with the automatic day-night feature enabled, the driver outside rearview mirror will automatically darken with the inside rearview mirror to reduce glare from headlamps behind the vehicle.

Inside Rearview Camera Full Display Mirror System Operation

The inside rearview camera full display mirror is connected to the outside rearview camera via a shielded coaxial cable. When the tab under the inside rearview mirror is pulled rearward, a view of the area behind the vehicle displays on the mirror. Adjust the rearview mirror for a clear view of the area behind the vehicle before turning on full display mirror. Use the button on the back of the mirror to adjust the brightness of the display. Make sure the light sensor is not covered when adjusting the brightness.

The inside rearview camera full display mirror may not work properly or display a clear image if:

- It is dark.
- The sun or the beam of headlamps are shining directly into the camera lens.
- Ice, snow, mud, or anything else builds up on the camera lens. Clean the lens, rinse it with water, and wipe it with a soft cloth.

When the mirror detects that the camera is not sending a valid video signal, it "blue screens" with a "no video" decal for 3 seconds, then reverts back to the mirror. Meanwhile, if a blue screen keeps on displaying instead of the camera view, take the vehicle to your dealer for service.

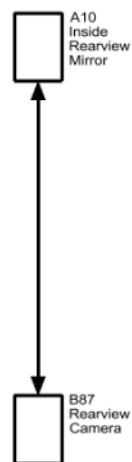


Fig. 12: Rearview Camera Full Display Mirror Block Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
A10	A10 Inside Rearview Mirror
B87	B87 Rearview Camera

OUTSIDE MIRROR DESCRIPTION AND OPERATION

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Power Mirror System Components

The power mirror system consists of the following components:

- Outside rearview mirror switch
- Mirror selector switch
- Driver outside rearview mirror
- Passenger outside rearview mirror

Each of the outside rearview mirror contains two motors. The vertical motor operates the mirror in the up and down directions, and the horizontal motor operates the mirror in the left and right directions.

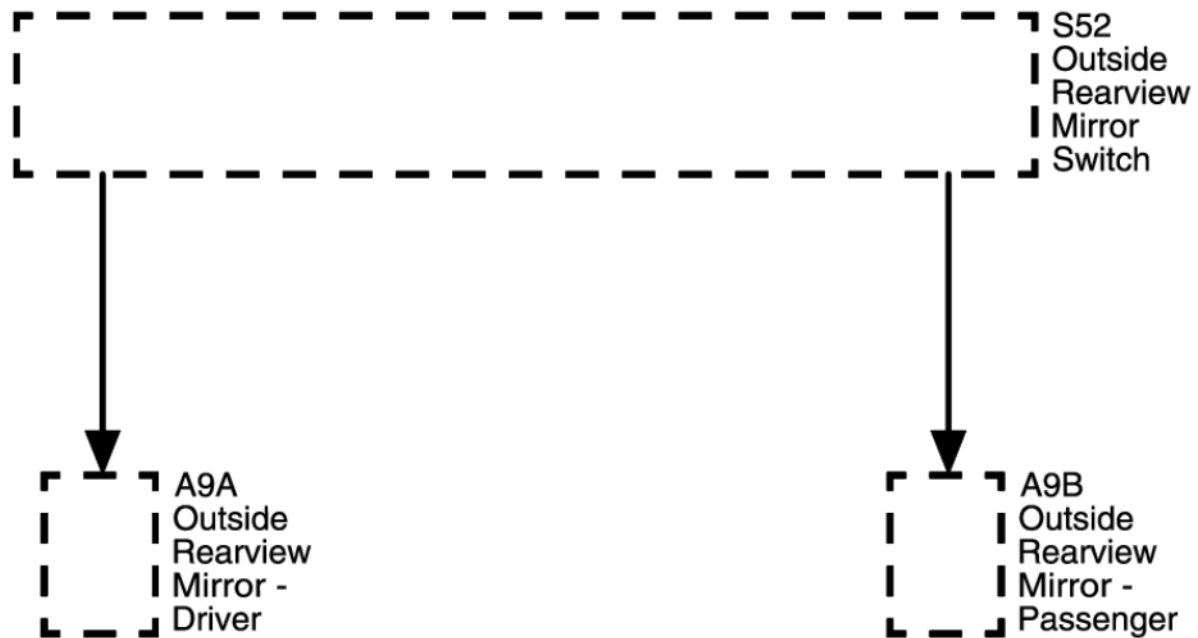


Fig. 13: Power Mirror System Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S52	S52 Outside Rearview Mirror Switch
A9A	A9A Outside Rearview Mirror - Driver
A9B	A9B Outside Rearview Mirror - Passenger

Power Mirror System Controls

The outside rearview mirror switch is a four position directional switch: Up, Down, Left and Right.

The mirror select switch is a three position switch: left, neutral/fold, and right.

Power Mirror System Operation

The outside rearview mirror switch receives battery voltage from the underhood fuse block. The power mirror switch also receives a constant ground.

The four positions of the direction switch have dual switch contacts. Each of the contacts are connected to opposing sides of the appropriate power mirror motors through the selector switch. The selector switch completes these circuits depending on the position of the selector switch, L or R.

If the selector switch is placed in the L position and the up switch is pressed, battery voltage will be supplied to the left outside rearview mirror vertical motor through the left mirror motor vertical control circuit and ground through the left mirror motor common control circuit. If the down switch is pressed, battery voltage will be supplied to the left outside rearview mirror vertical motor through the left mirror motor common control circuit and ground through the left mirror motor vertical control circuit.

The remainder of the mirror functions operate in the same manner as described above. Placing the power mirror switch in opposing positions, left/right or up/down, will reverse the polarity to the mirror motor,

reversing the direction of movement.

Heated Mirrors (If Equipped)

The heated mirrors are controlled through the rear defog relay. Whenever the rear window defogger is turned on battery voltage is supplied to the mirror heater elements through the left and right mirror heater element control circuits.
