

2017 ACCESSORIES & EQUIPMENT

Mirrors - Impala

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE: <i>All fasteners listed in this table can be reused after removal.</i>	
Application	Specification
	Metric (English)
Inside Rearview Mirror Screw	1.8 N.m (16 lb in)
Outside Rearview Mirror Bolt	10 N.m (89 lb in)
Outside Rearview Mirror Folding Control Module Fastener	1 N.m (9 lb in)
Outside Rearview Mirror Housing Screw	2 N.m (18 lb in)
Outside Rearview Mirror Inner Actuator/Motor Screw	5 N.m (44 lb in)

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	
		United States	Canada
Inside Mirror Adhesive Kit	Adhesive	89021329	89020893

SCHEMATIC WIRING DIAGRAMS

INSIDE REARVIEW MIRROR WIRING SCHEMATICS

Auto-Dimming Mirror (DD8)

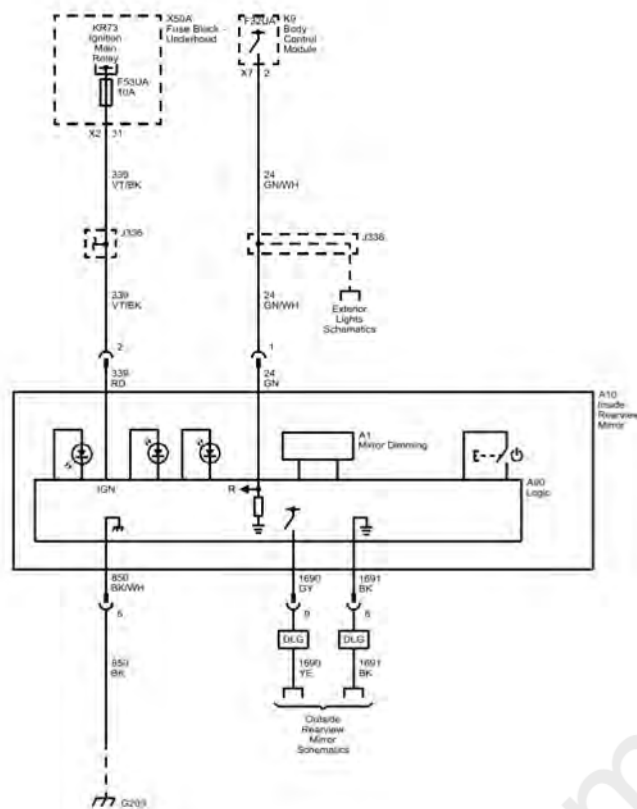


Fig. 1: Auto-Dimming Mirror (DD8)

Courtesy of GENERAL MOTORS COMPANY

OUTSIDE REARVIEW MIRROR WIRING SCHEMATICS

Controls and Driver Position (A45)

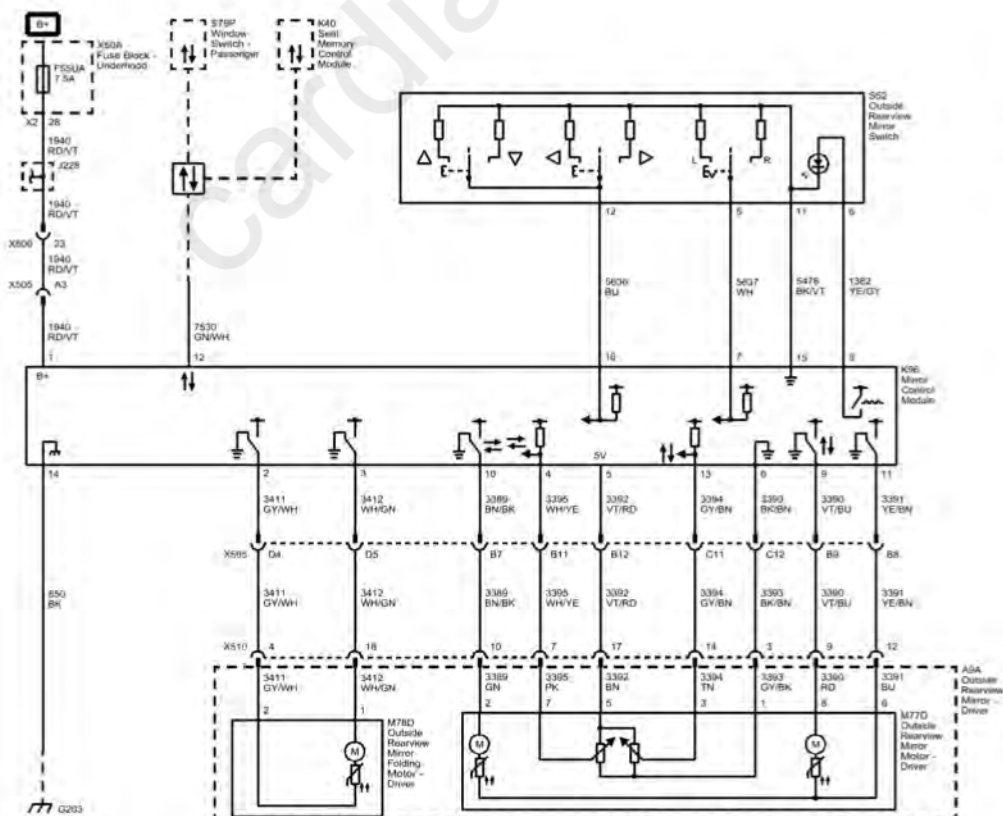
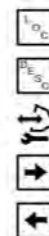


Fig. 2: Controls and Driver Position (A45)

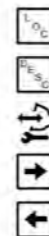
Courtesy of GENERAL MOTORS COMPANY

Passenger Position (A45)



Courtesy of GENERAL MOTORS COMPANY

Driver and Passenger Position (without A45)



Courtesy of GENERAL MOTORS COMPANY

Folding Mirrors (without A45)

DTC B154A OR B154B: DRIVER/PASSENGER 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.
- Refer to **Diagnostic Procedure Instructions** to provide an overview of each diagnostic category.

DTC Descriptors

DTC B154A 39

Driver Mirror Internal Malfunction

DTC B154B 39

Passenger Mirror Internal Malfunction

Circuit/System Description

The outside rearview mirror switch is a multiplex switch which signals the mirror control module which outside rearview mirror to move (driver or passenger) and which direction to move it. The mirror control module and the 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 mirror control module. When the memory seat module receives the switch inputs from the mirror control module, mirror output commands are sent to the appropriate module/switch through the serial data circuit. The mirror control module 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 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 memory recall command, the memory seat module will send the go to position commands to the mirror control module 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 mirror control module 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 (With A45)Outside Mirror Description and Operation (Without A45)

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.

Refer to **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 the following system descriptions:
 - [Outside Mirror Description and Operation \(With A45\)](#)[Outside Mirror Description and Operation \(Without A45\)](#)
 - [Automatic Day-Night 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](#)
- [Automatic Day-Night Mirrors Malfunction](#)
- [Power Mirror Malfunction \(With A45\)](#)[Power Mirror Malfunction \(Without A45\)](#)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Heated Mirror Element Control	1	1	2	-
Ground	-	1	-	-
1. Heated Mirror Inoperative 2. Heated Mirror 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 received.

Reference Information

Schematic Reference

[Outside Rearview Mirror Schematics](#)

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Outside Mirror Description and Operation (With A45)**Outside Mirror Description and Operation (Without A45)**

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

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the appropriate E17 Outside Rearview Mirror Glass. 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 11 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. Connect a test lamp between the control circuit terminal 8 and ground.
4. Engine running.
5. Verify the test lamp turns ON and OFF when commanding the Rear Defogger On and Off with a scan tool.
 - **If the lamp is always ON**

1. Ignition OFF, remove the test lamp, disconnect the harness connector at X50A Fuse Block - Underhood, 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 [Rear Window Defogger Malfunction](#).
 - **If the lamp is always OFF**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at X50A Fuse Block - Underhood, ignition ON.
 2. Test for infinite resistance between the 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 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 [Rear Window Defogger Malfunction](#).
 - **If the lamp turns on and off**
6. Replace the E17 Outside Rearview Mirror Glass.

Repair Instructions

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

Refer to [Outside Rearview Mirror Glass 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
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Ignition	1	1	-	-
Automatic Day/Night Mirror Signal	2	2	2	-
Backup Lamp Control	B2545 02	1	1	-
Automatic Day/Night Mirror Low Reference	-	2	2	-
Ground	-	1	-	-
1. Inside and Outside Rearview Mirror Automatic Dimming Malfunction				
2. Outside Rearview Mirror Automatic Dimming 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 and the driver outside rearview mirror. The inside rearview mirror provides a signal circuit and a low reference circuit to the driver mirror face to darken the mirror when needed.

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. Verify the A9A Outside Rearview Mirror-Driver face dims when shining a bright light into the rear light sensor.
 - **If the A9A Outside Rearview Mirror-Driver does not dim**
Refer to Outside Rearview Mirror Dimming Malfunction.
 - **If the A9A Outside Rearview Mirror-Driver dims**
6. Verify the A9A Outside Rearview Mirror-Driver face transitions from dim to bright while commanding the Backup Lamps Active and Inactive with a scan tool.
 - **If the A9A Outside Rearview Mirror-Driver does not transition between bright and dim states**

- **If the A9A Outside Rearview Mirror-Driver transitions between bright and dim states**

7. 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, remove the test lamp.
 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, remove the test lamp.
 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 , 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, remove the test lamp.
 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
 3. Test for infinite resistance between the signal 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. Ignition ON
2. Connect a test lamp between the control circuit terminal 1 and ground
3. 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 OFF**
 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 ON**

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.

Outside Rearview Mirror Dimming Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the 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 low reference circuit terminal 16 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the A10 Inside Rearview Mirror.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the A10 Inside Rearview Mirror.
 - **If less than 10 Ω**
3. Ignition ON.
4. Test for less than 1 V between the control circuit terminal 2 and ground.
 - **If 1 V or greater**
 1. Ignition OFF, disconnect the harness connector at the A10 Inside Rearview Mirror, 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 replace the A10 Inside Rearview Mirror.
 - **If less than 1 V**
5. Ignition ON, headlamps ON, vehicle in PARK, cover the front light sensor with a towel or other suitable item. Shine a flashlight at the rear light sensor.
6. Test for greater than 1 V between the control circuit terminal 2 and ground.
 - **If 1 V or less**
 1. Ignition OFF, disconnect the harness connector at the A10 Inside Rearview Mirror, ignition ON.
 2. Test for infinite resistance between the 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 the 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 A10 Inside Rearview Mirror.
 - **If greater than 1 V**
7. Test or replace A9A Outside Rearview Mirror-Driver.

Repair Instructions

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

- Refer to [Inside Rearview Mirror Replacement](#)
- Refer to [Outside Rearview Mirror Glass Replacement](#)

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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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 middle 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 (Without A45)

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 operation of the A9A Outside Rearview Mirror-Driver and the A9B Outside Rearview Mirror-Passenger while commanding the FOLD and UNFOLD with the S52 Outside Rearview Mirror Switch.
 - **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**

3. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the 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 S52 Outside Rearview Mirror Switch.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch.
 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 S52 Outside Rearview Mirror Switch.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch, 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 S52 Outside Rearview Mirror Switch
 - **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.

- Refer to [Outside Rearview Mirror Remote Control Switch Replacement](#)
- Refer to [Outside 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide 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 extend and send a serial data message to the memory seat control module to send a fold or extend command to the passenger window switch which will command the passenger outside rearview mirror to fold or extend. The mirror control module and passenger window switch control the fold/extend 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 (With A45)

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 Direction Switch parameter changes from Inactive to Up, Down, Right, Left, Folding and Extending when cycling the S52 Outside Rearview Mirror Switch.
 - **If the parameter does not change**

Refer to **Power Mirror Malfunction (With A45)**.
 - **If the parameter changes**
3. Verify the A9A Outside Rearview Mirror-Driver and the A9B Outside Rearview Mirror-Passenger FOLD and EXTEND when cycling the S52 Outside Rearview Mirror Switch.
 - **If the A9A Outside Rearview Mirror-Driver does not FOLD and EXTEND**

Refer to Circuit/System Testing - Driver Outside Mirror Folding Command Malfunction.
 - **If the A9B Outside Rearview Mirror-Passenger does not FOLD and EXTEND**

Refer to Circuit/System Testing - Passenger Outside Mirror Folding Command Malfunction.
 - **If the A9A Outside Rearview Mirror-Driver and A9B Outside Rearview Mirror-Passenger does FOLD and EXTEND**
4. All OK.

Circuit/System Testing

Driver Outside Mirror Folding Command Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the 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 9 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K96D Mirror Control Module - 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 K96D Mirror Control Module - Driver.
 - **If less than 10 Ω**
3. 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 K96D Mirror Control Module - 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 K96D Mirror Control Module - Driver.
 - **If less than 10 Ω**
4. Connect a test lamp between control circuit terminal 9 and control circuit terminal 10, ignition ON.
5. Verify the test lamp turns ON when commanding the FOLD and EXTEND when cycling the S52 Outside Rearview Mirror Switch.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K96D Mirror Control Module - 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 K96D Mirror Control Module - 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 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 9 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the S79P Window Switch-Passenger.
 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 S79P Window Switch-Passenger.
 - **If less than 10 Ω**
3. 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 S79P Window Switch-Passenger.
 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 S79P Window Switch-Passenger.
 - **If less than 10 Ω**

4. Connect a test lamp between control circuit terminal 9 and control circuit terminal 10, ignition ON.
5. Verify the test lamp turns ON when commanding the FOLD and EXTEND when cycling the S52 Outside Rearview Mirror Switch.
 - **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 S79P Window Switch-Passenger.
 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 S79P Window Switch-Passenger.
 - **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.

- Refer to [Outside Rearview Mirror Replacement](#)
- Refer to [Control Module References](#) for the left mirror control module replacement, programming and setup

POWER MIRROR 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.
- Refer to [Diagnostic Procedure Instructions](#) to provide an overview of each diagnostic category.

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Driver Mirror Control Module B+	U1519 00	U1519 00	-	-
Passenger Window Switch B+	U151B 00	U151B 00	-	-
Position Sensor 5 V Reference	3	3	3	-
Outside Rearview Mirror Switch Left/Right Signal	1	1	1	-
Outside Rearview Mirror Switch Position Signal	1	1	1	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Left/Right Mirror Horizontal Position Sensor Signal	3	3	3	-
Left/Right Mirror Vertical Position Sensor Signal	3	3	3	-
Left/Right Mirror Motor Horizontal Control	1	1	1	-
Left/Right Mirror Motor Common Control	1	1	1	-
Left/Right Mirror Motor Vertical Control	1	1	1	-
Left/Right Mirror Position Low Reference	-	2	-	-
Outside Rearview Mirror Switch Low Reference	-	1	-	-
Driver Mirror Control Module Ground	-	U1519 00	-	-
Passenger Window Switch Ground	-	U151B 00	-	-
1. Outside Rearview Mirror Switch Malfunction 2. Outside Power Mirror Malfunction 3. Power Mirror Memory Feature Malfunction				

Circuit/System Description

The outside rearview mirror switch is a multiplex switch which signals the mirror control module which outside rearview mirror to move (driver or passenger) and which direction to move it. The mirror control module and the 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 mirror control module. When the memory seat module receives the switch inputs from the mirror control module, mirror output commands are sent to the appropriate module/switch through the serial data circuit. The mirror control module 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 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 memory recall command, the memory seat module will send the go to position commands to the mirror control module and passenger window switch. The switches will then drive the appropriate mirror motors to the commanded position sensor settings.

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 (With A45)

- [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 S52 Outside Rearview Mirror Switch.
 - **If the parameter does not change**

Refer to Circuit/System Testing - Outside Rearview Mirror Switch 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 S52 Outside Rearview Mirror Switch.
 - **If the parameter does not change**

Refer to Circuit/System Testing - Outside Rearview Mirror Switch Malfunction.
 - **If the parameter changes**
4. 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 Circuit/System Testing - Driver Outside Mirror Movement Malfunction.
 - **If the A9A Outside Rearview Mirror - Driver moves RIGHT, LEFT, UP and DOWN**
5. Verify the scan tool Driver Mirror Vertical Position parameters are between 0.2 - 4.8 V and change when commanding the Driver Mirror Vertical Movement Up/Down with a scan tool.
 - **If not between 0.2 - 4.8 V or does not change**

Refer to Circuit/System Testing - Driver Mirror Position Sensor Circuit Test.
 - **If between 0.2 - 4.8 V and changes**
6. Verify the scan tool Driver Mirror Horizontal Position parameters are between 0.2 - 4.8 V and change when commanding the Driver Mirror Horizontal Movement Right/Left with a scan tool.
 - **If not between 0.2 - 4.8 V or does not change**

Refer to Circuit/System Testing - Driver Mirror Position Sensor Circuit Test.
 - **If between 0.2 - 4.8 V and changes**
7. 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 Circuit/System Testing - Passenger Outside Mirror Movement Malfunction.
 - **If the A9B Outside Rearview Mirror-Passenger moves RIGHT, LEFT, UP and DOWN**

8. Verify the scan tool Passenger Mirror Vertical Position parameters are between 0.2 - 4.8 V and change while commanding the Passenger Mirror Horizontal Movement Right/Left with a scan tool.

- **If not between 0.2 - 4.8 V or does not change**

Refer to Circuit/System Testing - Passenger Mirror Position Sensor Circuit Test.

- **If between 0.2 - 4.8 V and changes**

9. Verify the scan tool Passenger Mirror Horizontal Position parameters are between 0.2 - 4.8 V and change while commanding the Passenger Mirror Vertical Movement Up/Down with a scan tool.

- **If not between 0.2 - 4.8 V or does not change**

Refer to Circuit/System Testing - Passenger Mirror Position Sensor Circuit Test.

- **If between 0.2 - 4.8 V and changes**

10. Verify the A9A Outside Rearview Mirror - Driver and A9B Outside Rearview Mirror-Passenger adjust to the stored memory positions when operating the S47D Driver Seat Memory Switch.

- **If a A9 Outside Rearview Mirror does not adjust to the stored memory position**

Refer to [Memory Seat Feature Malfunction](#) .

- **If the A9A Outside Rearview Mirror - Driver and A9B Outside Rearview Mirror-Passenger adjust to the stored memory positions**

11. All OK.

Circuit/System Testing

Outside Rearview Mirror Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the K96 Mirror Control Module. 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 14 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 B+ circuit terminal 1 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 the test lamp illuminates**

5. Ignition OFF, connect the harness connector at the K96 Mirror Control Module and disconnect the harness connector at the S52 Outside Rearview Mirror Switch. It may take up to 2 minutes for all vehicle systems to power down.

6. Test for less than 10 Ω between the low reference circuit terminal 11 and ground.

- **If 10 Ω or greater**

1. Ignition OFF.
2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K96 Mirror Control Module.
- **If less than 10 Ω**
7. Ignition ON.
8. Test for 4.8 - 5.2 V between the signal circuit terminal 5 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module.
 2. Test for infinite resistance between the signal 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 the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K96 Mirror Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K96 Mirror Control Module.
 - **If between 4.8 - 5.2 V**
9. Test for 4.8 - 5.2 V between the signal circuit terminal 12 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module.
 2. Test for infinite resistance between the signal 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 the signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K96 Mirror Control Module.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K96 Mirror Control Module.
 - **If between 4.8 - 5.2 V**
10. Test or replace the S52 Outside Rearview Mirror Switch.

Driver Outside Mirror Movement Malfunction

1. Ignition OFF, disconnect the X510 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 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 K96 Mirror Control Module.
 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 , replace the K96 Mirror Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K96 Mirror Control Module, 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, replace the K96 Mirror Control Module
 - **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 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 K96 Mirror Control Module.
 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 , replace the K96 Mirror Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the K96 Mirror Control Module, 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, replace the K96 Mirror Control Module
 - **If the test lamp turns ON during each of the commands**
 - 6. Test or replace the M77D Outside Rearview Mirror Motor-Driver.

Driver Mirror Position Sensor Circuit Test

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 low reference circuit terminal 14 and ground.
 - **If 10 Ω or greater**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K96 Mirror Control Module.
 - **If less than 10 Ω**
3. Ignition ON.
4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 12 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module.
 2. Test for infinite resistance between the 5 V reference 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 the 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K96 Mirror Control Module.
- **If greater than 5.2 V**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K96 Mirror Control Module.
 - **If between 4.8 - 5.2 V**
5. Verify the scan tool Driver Mirror Vertical Position parameter is less than 4.6 V.
 - **If 4.6 V or greater**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K96 Mirror Control Module.
 - **If less than 4.6 V**
6. Install a 3 A fused jumper wire between the signal circuit terminal 11 and the 5 V reference circuit terminal 12.
7. Verify the scan tool Driver Mirror Vertical Position or the parameter is greater than 0.6 V.
 - **If 0.6 V or less**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K96 Mirror Control Module.
 2. Test for infinite resistance between the signal circuit terminal 11 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K96 Mirror Control Module.
 - **If greater than 0.6 V**
8. Verify the scan tool Driver Mirror Horizontal Position parameter is less than 4.6 V.
 - **If 4.6 V or greater**
 1. Ignition OFF, disconnect the harness connector at the K96 Mirror Control Module, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 13 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K96 Mirror Control Module.
 - **If less than 4.6 V**
9. Install a 3 A fused jumper wire between the signal circuit terminal 13 and the 5 V reference circuit terminal 12.
10. Verify the scan tool Driver Mirror Horizontal Position or the parameter is greater than 0.6 V.
 - **If 0.6 V or less**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K96 Mirror Control Module.
 2. Test for infinite resistance between the signal circuit terminal 13 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.

- If less than 2 Ω , replace the K96 Mirror Control Module.

- **If greater than 0.6 V**

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

Passenger Outside Mirror Movement Malfunction

1. Ignition OFF, disconnect the X610 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 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 S79P Window Switch-Passenger.
 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 , replace the S79P Window Switch-Passenger.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the X2 harness connector at the S79P Window Switch-Passenger, 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, replace the S79P Window Switch-Passenger
 - **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 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 S79P Window Switch-Passenger.
 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 , replace the S79P Window Switch-Passenger.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the X2 harness connector at the S79P Window Switch-Passenger, 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, replace the S79P Window Switch-Passenger
 - **If the test lamp turns ON during each of the commands**
6. Test or replace the M77P Outside Rearview Mirror Motor-Passenger.

Passenger Mirror Position Sensor Circuit Test

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 low reference circuit terminal 14 and ground.

- **If 10 Ω or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the S79P Window Switch-Passenger.
 2. Test for less than 2 Ω in the low reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S79P Window Switch-Passenger.
 - **If less than 10 Ω**
- 3. Ignition ON.
- 4. Test for 4.8 - 5.2 V between the 5 V reference circuit terminal 12 and ground.
 - **If less than 4.8 V**
 1. Ignition OFF, disconnect the X2 harness connector at the S79P Window Switch-Passenger.
 2. Test for infinite resistance between the 5 V reference 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 the 5 V reference circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S79P Window Switch-Passenger.
 - **If greater than 5.2 V**
 1. Ignition OFF, disconnect the X2 harness connector at the S79P Window Switch-Passenger, ignition ON.
 2. Test for less than 1 V between the 5 V reference circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the S79P Window Switch-Passenger.
 - **If between 4.8 - 5.2 V**
- 5. Verify the scan tool Passenger Mirror Vertical Position parameter is less than 4.6 V.
 - **If 4.6 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the S79P Window Switch-Passenger, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 11 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the S79P Window Switch-Passenger.
 - **If less than 4.6 V**
- 6. Install a 3 A fused jumper wire between the signal circuit terminal 11 and the 5 V reference circuit terminal 12.
- 7. Verify the scan tool Passenger Mirror Vertical Position or the parameter is greater than 0.6 V.
 - **If 0.6 V or less**
 1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the S79P Window Switch-Passenger.
 2. Test for infinite resistance between the signal circuit terminal 11 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S79P Window Switch-Passenger.
 - **If greater than 0.6 V**
- 8. Verify the scan tool Passenger Mirror Horizontal Position parameter is less than 4.6 V.
 - **If 4.6 V or greater**
 1. Ignition OFF, disconnect the X2 harness connector at the S79P Window Switch-Passenger, ignition ON.
 2. Test for less than 1 V between the signal circuit terminal 13 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.

- If less than 1 V, replace the S79P Window Switch-Passenger.
 - **If less than 4.6 V**
9. Install a 3 A fused jumper wire between the signal circuit terminal 13 and the 5 V reference circuit terminal 12.
 10. Verify the scan tool Passenger Mirror Horizontal Position or the parameter is greater than 0.6 V.
 - **If 0.6 V or less**
 1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the S79P Window Switch-Passenger.
 2. Test for infinite resistance between the signal circuit terminal 13 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 signal circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the S79P Window Switch-Passenger.
 - **If greater than 0.6 V**
 11. Test or replace the M77P Outside Rearview Mirror Motor-Passenger.

Component Testing

1. Ignition OFF, disconnect the harness connector at the S52 Outside Rearview Mirror Switch.
2. Test for infinite resistance between the signal terminal 12 and the low reference terminal 11 with the mirror direction switch in the open position.
 - **If less than infinite resistance**
Replace the S52 Outside Rearview Mirror Switch.
 - **If infinite resistance**
3. Test for 330 - 350 Ω between the signal terminal 12 and the low reference terminal 11 with the mirror direction switch in the Left position.
 - **If less than 329 Ω or greater than 351 Ω**
Replace the S52 Outside Rearview Mirror Switch.
 - **If between 330 - 350 Ω**
4. Test for 0.65K - 0.75K Ω between the signal terminal 12 and the low reference terminal 11 with the mirror direction switch in the Right position.
 - **If less than 0.64K Ω or greater than 0.76K Ω**
Replace the S52 Outside Rearview Mirror Switch.
 - **If between 0.65K - 0.75K Ω**
5. Test for 1.3K - 1.5K Ω between the signal terminal 12 and the low reference terminal 11 with the mirror direction switch in the Up position.
 - **If less than 1.29K Ω or greater than 1.55K Ω**
Replace the S52 Outside Rearview Mirror Switch.
 - **If between 1.3K - 1.5K Ω**
6. Test for 3.2K - 3.4K Ω between the signal terminal 12 and the low reference terminal 11 with the mirror direction switch in the Down position.
 - **If less than 3.1K Ω or greater than 3.5K Ω**
Replace the S52 Outside Rearview Mirror Switch.
 - **If between 3.2K - 3.4K Ω**
7. Test for 1K - 0.9K Ω between the signal terminal 5 and the low reference terminal 11 with the mirror selector switch in the Passenger position.

- **If less than 1K Ω or greater than 0.8K Ω**

Replace the S52 Outside Rearview Mirror Switch.

- **If between 1K - 0.9K Ω**

8. Test for 305 - 312 Ω between the signal terminal 5 and the low reference terminal 11 with the mirror selector switch in the Driver position.

- **If less than 304 Ω or greater than 313 Ω**

Replace the S52 Outside Rearview Mirror Switch.

- **If between 305 - 312 Ω**

9. All OK

Repair Instructions

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

- Refer to [Outside Rearview Mirror Inner Actuator Replacement](#)
- Refer to [Outside Rearview Mirror Remote Control Switch Replacement](#)
- Refer to [Front Side Door Window Switch Replacement \(Passenger\)](#)
- Refer to [Control Module References](#) for the mirror control module replacement, programming and setup

POWER MIRROR 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
- Refer to [Diagnostic Procedure Instructions](#) to provide 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.

Schematic Reference

Outside Rearview Mirror Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Outside Mirror Description and Operation (Without A45)

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 S52 Outside Rearview Mirror Switch.
 - **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 S52 Outside Rearview Mirror Switch. 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. Verify a test lamp illuminates between the B+ circuit terminal 12 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 1
 - Control circuit terminal 3
 - Control circuit terminal 4
 - Control circuit terminal 7
 - Control circuit terminal 8
 - Control circuit terminal 10
 - 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 S52 Outside Rearview Mirror Switch.

Driver Outside Mirror Movement Malfunction

1. Ignition OFF, disconnect the X510 inline harness connector at the A9A Outside Rearview Mirror-Driver. Ignition ON
2. Connect a test lamp between the control circuit terminal 9 and control circuit terminal 12.
3. Verify the test lamp turns ON when commanding the UP and DOWN states with the S52 Outside Rearview Mirror Switch.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch.
 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 S52 Outside Rearview Mirror Switch.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch, 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 S52 Outside Rearview Mirror Switch
 - **If the test lamp turns ON during each of the commands**
4. Connect a test lamp between the control circuit terminal 10 and control circuit terminal 12.
5. Verify the test lamp turns ON when commanding the LEFT and RIGHT states with the S52 Outside Rearview Mirror Switch.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch.
 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 S52 Outside Rearview Mirror Switch.
- **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch, 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 S52 Outside Rearview Mirror Switch
- **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 X610 inline harness connector at the A9B Outside Rearview Mirror-Passenger. Ignition ON
2. Connect a test lamp between the control circuit terminal 12 and control circuit terminal 9.
3. Verify the test lamp turns ON when commanding the UP and DOWN states with the S52 Outside Rearview Mirror Switch.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch.
 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 S52 Outside Rearview Mirror Switch.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch, 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 S52 Outside Rearview Mirror Switch
 - **If the test lamp turns ON during each of the commands**
4. Connect a test lamp between the control circuit terminal 12 and control circuit terminal 10.
5. Verify the test lamp turns ON when commanding the LEFT and RIGHT states with the S52 Outside Rearview Mirror Switch.
 - **If the test lamp remains OFF during either of the commands**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch.
 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 S52 Outside Rearview Mirror Switch.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the harness connector at the S52 Outside Rearview Mirror Switch, 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 S52 Outside Rearview Mirror Switch
 - **If the test lamp turns ON during each of the commands**
6. Test or replace the M77P Outside Rearview Mirror Motor-Passenger.

Repair Instructions

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

- Refer to [Outside Rearview Mirror Inner Actuator Replacement](#)
- Refer to [Outside Rearview Mirror Remote Control Switch Replacement](#)

REPAIR INSTRUCTIONS

OUTSIDE REARVIEW MIRROR SEAL REPLACEMENT

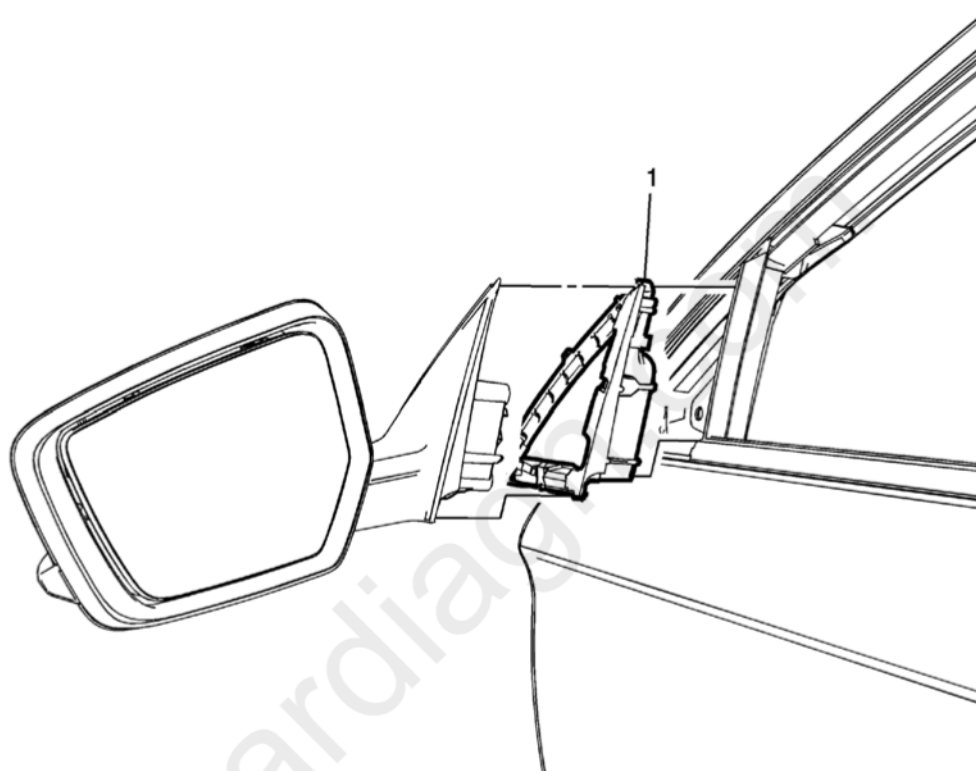


Fig. 7: Outside Rearview Mirror Seal

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures	
1. Remove the outside rearview mirror. Refer to Outside Rearview Mirror Replacement .	
1	Outside Rearview Mirror Seal NOTE: Inspect the outside mirror for proper operation before installing the door trim.

OUTSIDE REARVIEW MIRROR REPLACEMENT

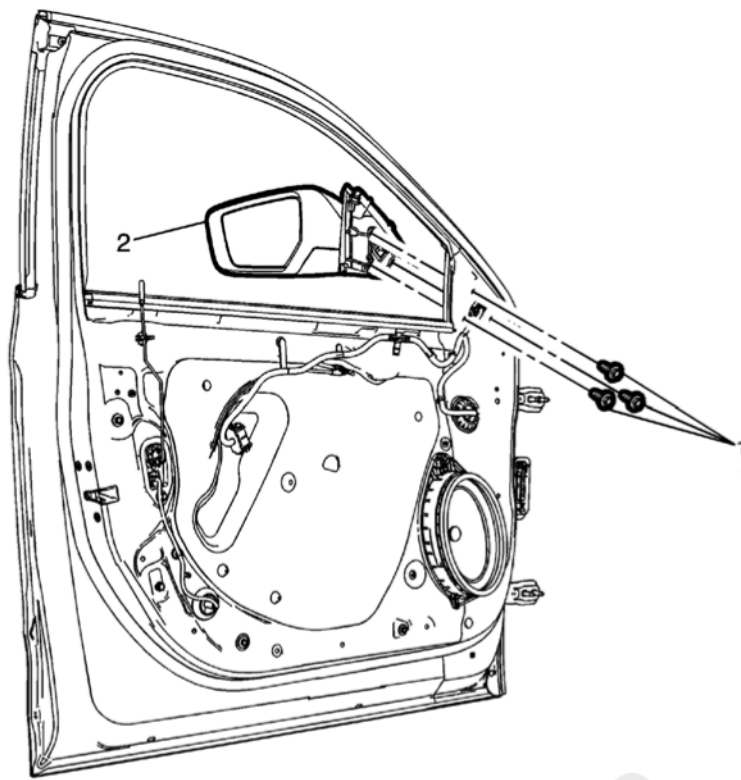


Fig. 8: Outside Rearview Mirror

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front side door garnish molding. Refer to Front Side Door Garnish Molding Replacement .	
1	Outside Rearview Mirror Bolt (Qty: 3) CAUTION: Refer to Fastener Caution . Procedures 1. Open the front side door to the full open position to view the nut. 2. Disconnect the electrical connectors from the mirror. NOTE: When replacing the outside rearview mirror, transfer the insulator pad to the new mirror assembly. Tighten 10 N.m (89 lb in)
2	Outside Rearview Mirror NOTE: Inspect the outside mirror for proper operation before installing the door trim.

OUTSIDE REARVIEW MIRROR HOUSING COVER REPLACEMENT

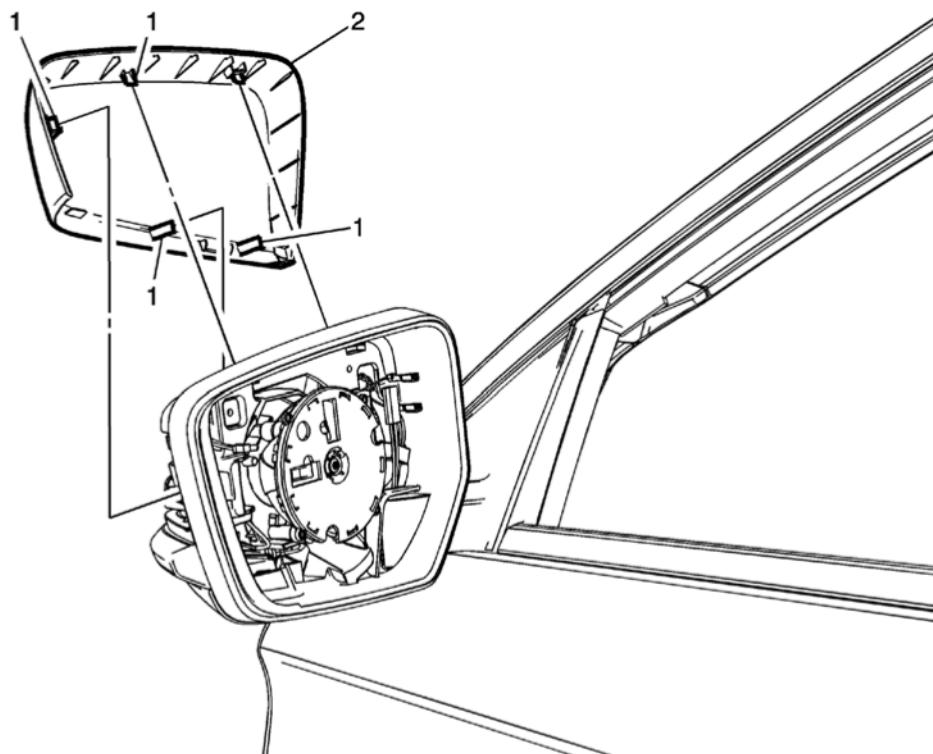


Fig. 9: Outside Rearview Mirror Housing Cover
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the outside rearview mirror glass. Refer to Outside Rearview Mirror Glass Replacement .	
1	Outside Rearview Mirror Housing Cover Retainers (Qty: 5) CAUTION: Refer to Fastener Caution . Procedure 1. Move the outside rear view mirror to the closed position. 2. Using a suitable tool, release the retaining tabs while pulling on the housing cover in a specific order. 1. Release the outside tab first. 2. Release the two top tabs second. 3. Release the two bottom tabs last. NOTE: Incorrect removal of mirror can damage the housing cover or mirror.
2	Outside Rearview Mirror Housing Cover NOTE: Inspect the outside mirror for proper operation.

OUTSIDE REARVIEW MIRROR REMOTE CONTROL SWITCH REPLACEMENT

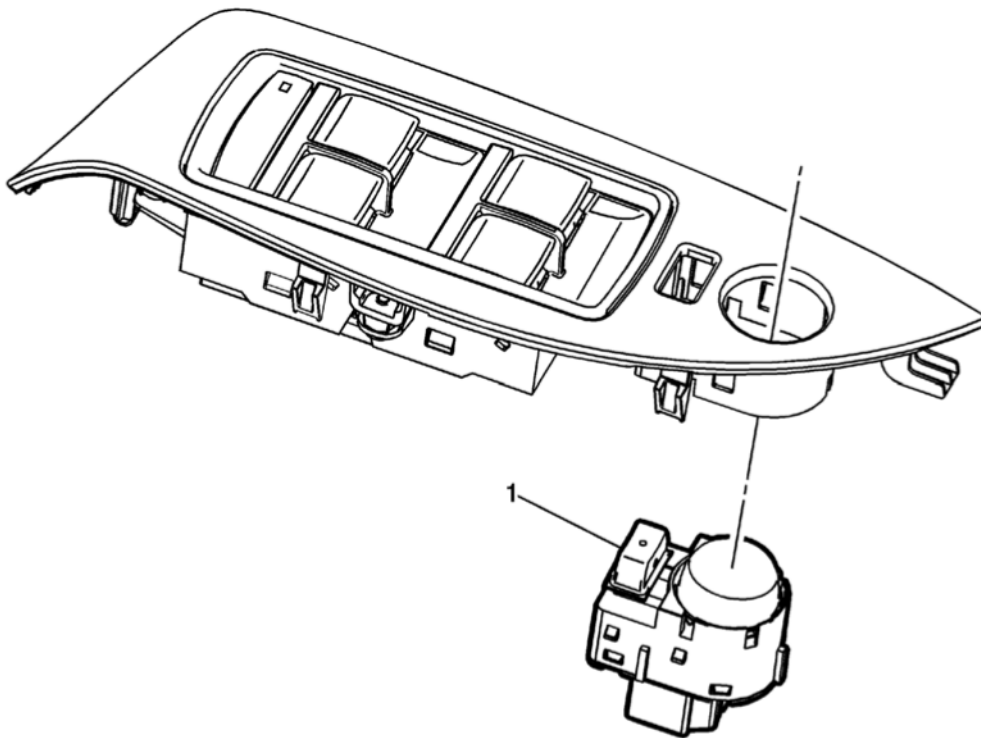


Fig. 10: Outside Rearview Mirror Remote Control Switch

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove the front side door accessory switch mount plate - drivers side door. Refer to Front Side Door Accessory Switch Mount Plate Replacement .	
1	Outside Remote Control Rearview Mirror Switch Assembly Procedure Release tabs on switch to remove from the front side door accessory switch mount plate.

OUTSIDE REARVIEW MIRROR FOLDING CONTROL MODULE REPLACEMENT

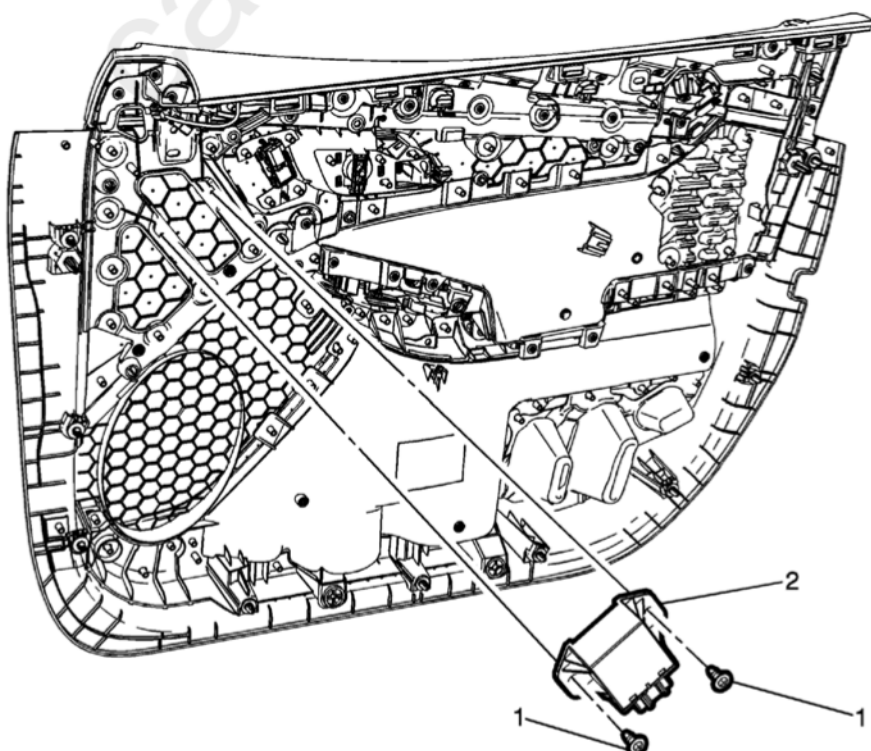


Fig. 11: Outside Rearview Mirror Folding Control Module
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Remove the front side door trim panel. Refer to Front Side Door Trim Replacement . 2. Unhook and reposition the front side door trim panel insulator.	
1	Outside Rearview Mirror Folding Control Module Fasteners (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 1 N.m (9 lb in)
2	Outside Rearview Mirror Folding Control Module Procedure Disconnect electrical connector.

OUTSIDE REARVIEW MIRROR INNER ACTUATOR REPLACEMENT

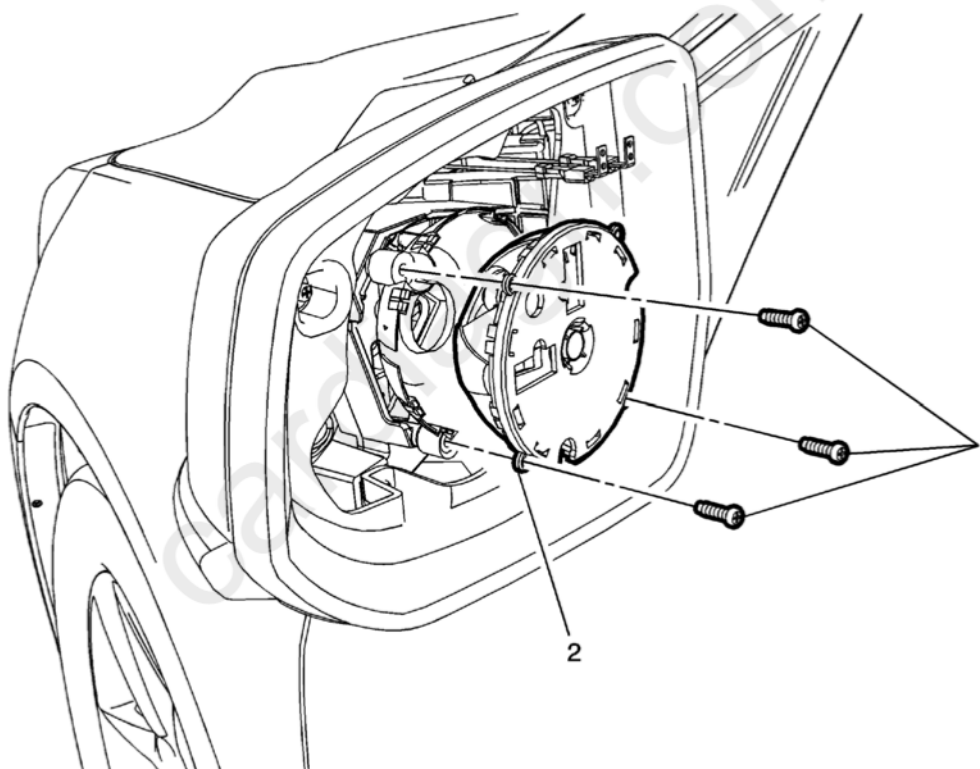


Fig. 12: Outside Rearview Mirror Inner Actuator & Screws
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
WARNING: Refer to Glass and Sheet Metal Handling Warning .	
Preliminary Procedure Remove the outside rearview mirror glass. Refer to Outside Rearview Mirror Glass Replacement .	

Callout	Component Name
1	Outside Rearview Mirror Inner Actuator/Motor Screws (Qty: 3) CAUTION: Refer to Fastener Caution . Procedure Disconnect the electrical connector. Tighten 5 N.m (44 lb in)
2	Outside Rearview Mirror Inner Actuator/Motor Procedure Inspect the mirror for proper operation.

OUTSIDE REARVIEW MIRROR GLASS REPLACEMENT

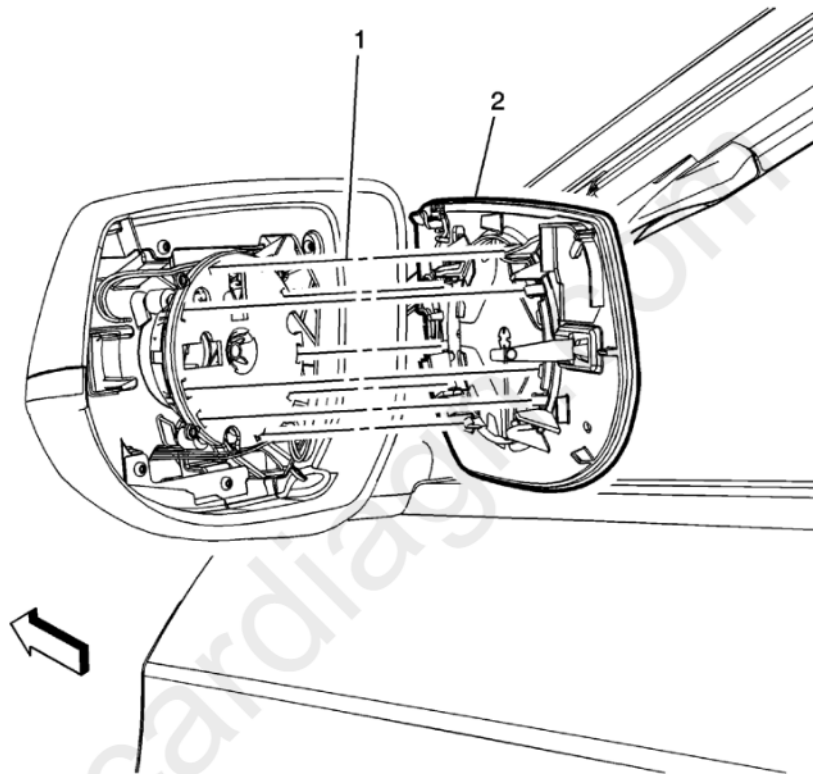


Fig. 13: Outside Rearview Mirror Glass & Retainers
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Outside Rearview Mirror Glass Retainers (Qty: 8) WARNING: Approved safety glasses and gloves should be worn when performing this procedure to reduce the chance of personal injury. Procedure 1. Place masking tape over the mirror glass. 2. Carefully push the outside rearview mirror glass upward and into the right corner of the mirror housing, allowing access to the bottom edge. 3. Grasp the bottom edge of the mirror glass firmly, lift it up and pull rearward until the mirror glass retainers release the actuator motor ring. 4. Disconnect the outside mirror glass electrical connectors.

Callout	Component Name
2	Outside Rearview Mirror Glass Procedure 1. Place the mirror glass in the lower motor retainers. 2. Place one hand on the back of the mirror housing, using the flat palm of the other hand press inward locking the mirror glass retainers into the actuator motor ring. 3. Remove the masking tape from the mirror glass. NOTE: Inspect the outside mirror for proper operation.

OUTSIDE REARVIEW MIRROR HOUSING REPLACEMENT

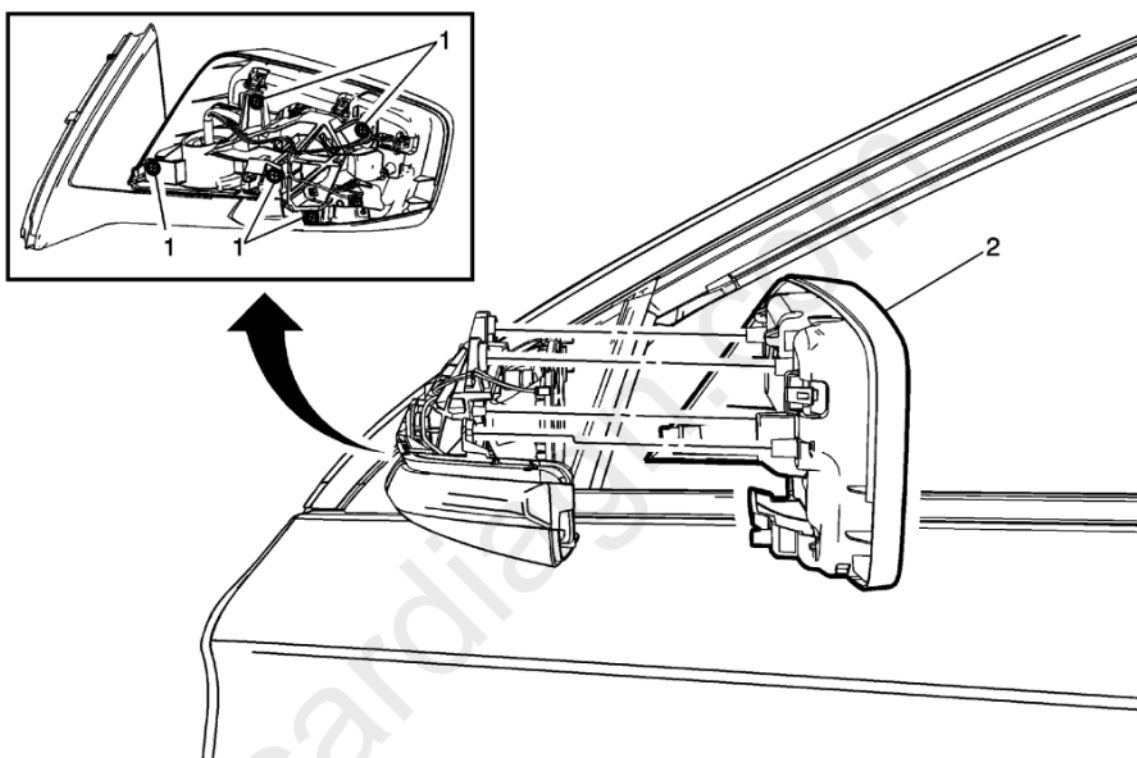


Fig. 14: Outside Rearview Mirror Housing
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove the outside rearview mirror inner actuator. Refer to Outside Rearview Mirror Inner Actuator Replacement. 2. Remove the outside rearview mirror turn signal lamp. Refer to Outside Rearview Mirror Turn Signal Lamp Replacement.	
1	Outside Rearview Mirror Housing Screws (Qty: 4) CAUTION: Refer to Fastener Caution. Tighten 2 N.m (18 lb in)

Callout	Component Name
2	Outside Rearview Mirror Housing Procedure Disconnect the electrical connector. NOTE: Inspect the outside mirror for proper operation.

INSIDE REARVIEW MIRROR REPLACEMENT

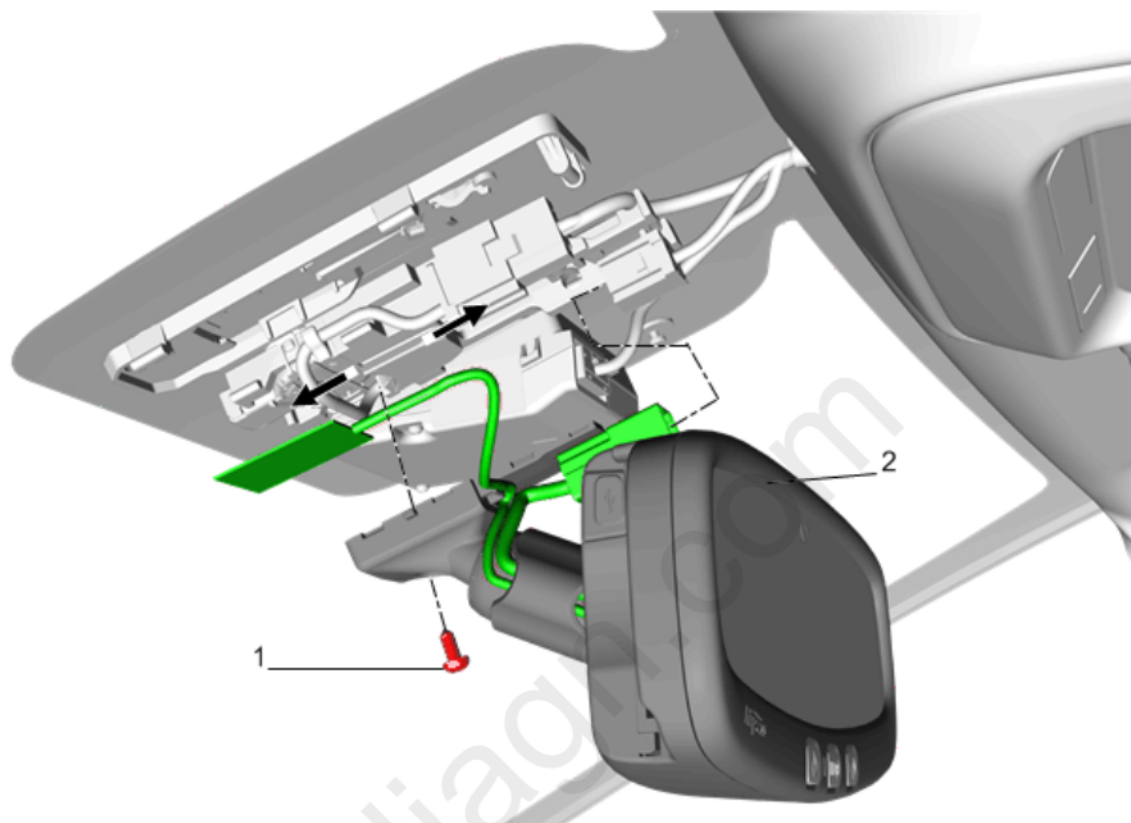


Fig. 15: Inside Rearview Mirror

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Inside Rearview Mirror Wiring Harness Lower Cover. Refer to Inside Rearview Mirror Wiring Harness Lower Cover Replacement	
1	Inside Rearview Mirror Screw CAUTION: Refer to Fastener Caution . Procedure 1. Adjust the mirror to the full upward position. 2. Disconnect the electrical connector. 3. Loosen the set screw located at the base of the mirror. 4. Slide the mirror off of the rearview mirror button. Tighten 1.8 N.m (16 lb in)
2	Inside Rearview Mirror

INSIDE REARVIEW MIRROR WIRING HARNESS COVER REPLACEMENT

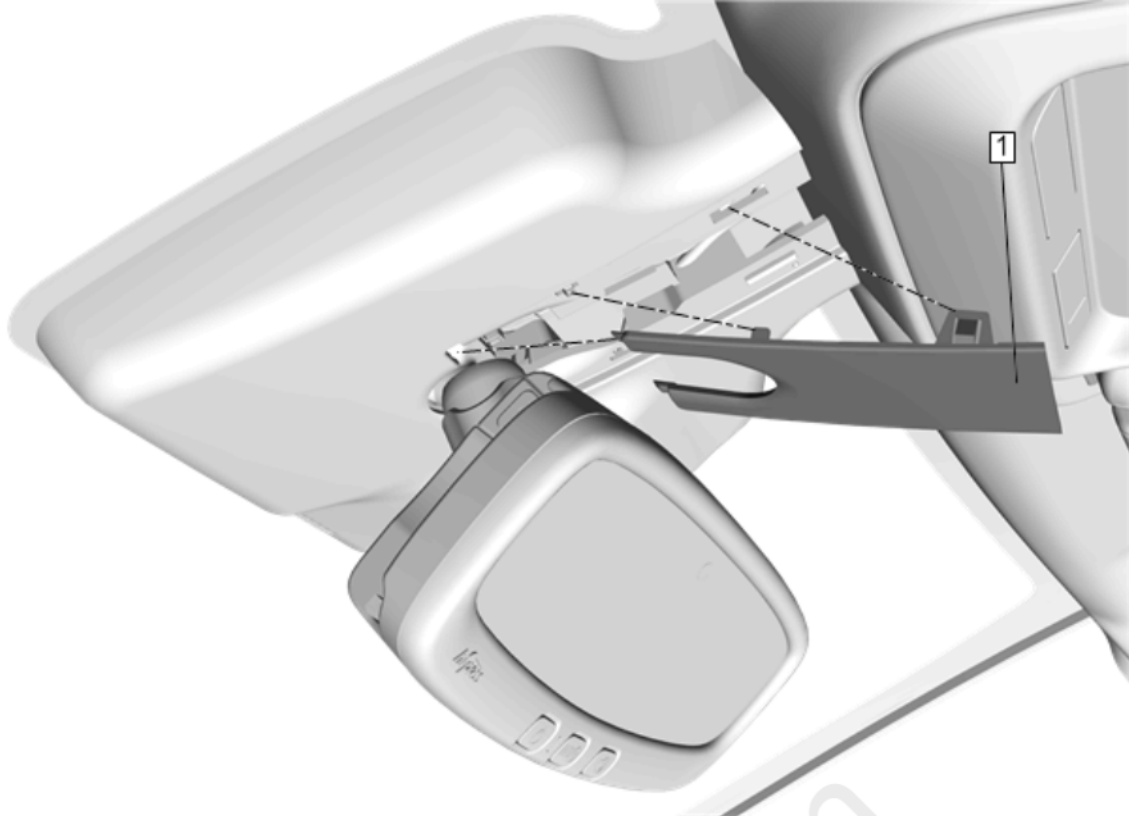


Fig. 16: Inside Rearview Mirror Wiring Harness Cover
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Inside Rearview Mirror Wiring Harness Cover Procedure Using the appropriate tool, pull down the inside rearview mirror wiring harness cover.

INSIDE REARVIEW MIRROR WIRING HARNESS LOWER COVER REPLACEMENT

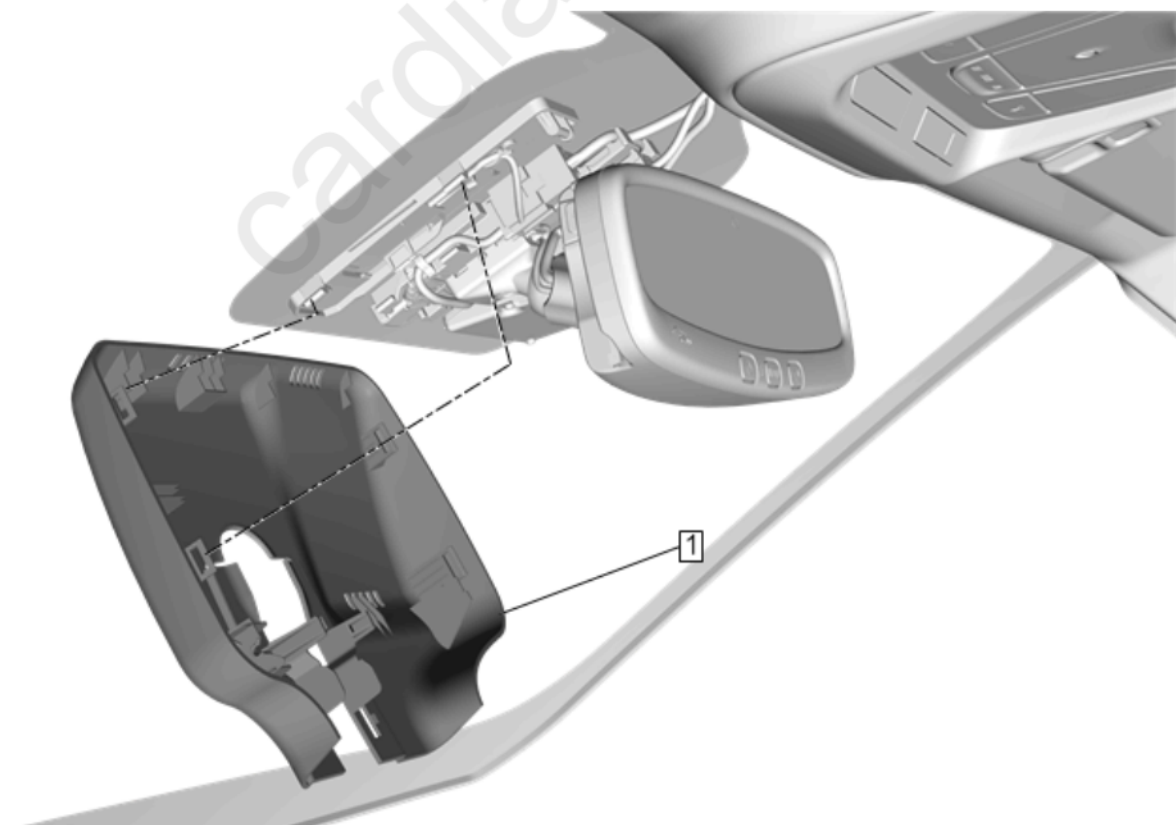


Fig. 17: Inside Rearview Mirror Wiring Harness Lower Cover
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name

Callout	Component Name
Preliminary Procedure Remove Inside Rearview Mirror Wiring Harness Cover. Refer to Inside Rearview Mirror Wiring Harness Cover Replacement	
1	Inside Rearview Mirror Wiring Harness Lower Cover Procedure Grasp the cover on both sides and gently pull downward.

ELECTRIC TOLL TRANSCEIVER ANTENNA BRACKET REPLACEMENT

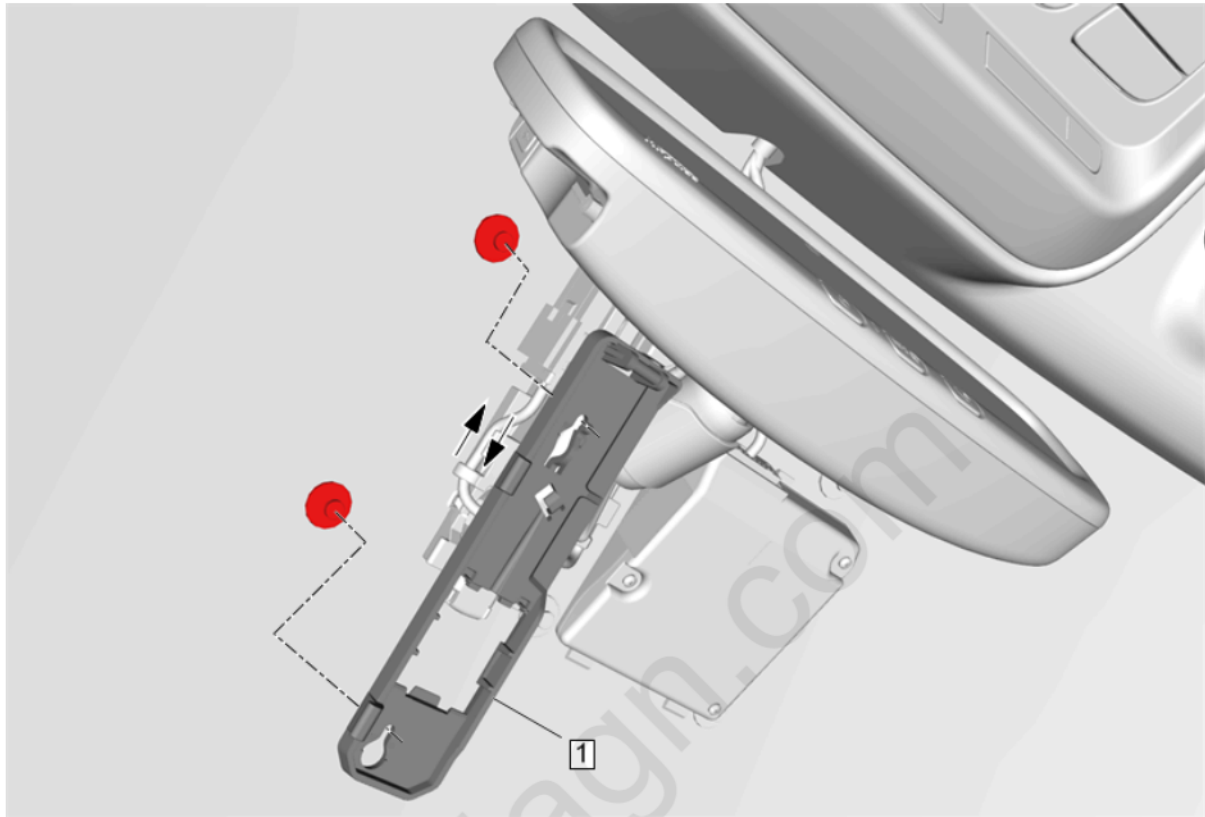


Fig. 18: Electric Toll Transceiver Antenna Bracket
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Inside Rearview Mirror Wiring Harness Lower Cover. Refer to Inside Rearview Mirror Wiring Harness Lower Cover Replacement 2. Adjust the mirror to the full upward position. 3. Electric Toll Transceiver Antenna - Reposition	
1	Electric Toll Transceiver Antenna Bracket Procedure Slide the bracket upward, aligning the bracket holes and pull outward from the window retainers.

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 engine running, 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.

OUTSIDE MIRROR DESCRIPTION AND OPERATION (WITH A45)

Power Mirror System Components

The power mirror system consists of the following components:

- Mirror Control Module
- Memory Seat Control Module
- Outside Mirror Switch
- Passenger Window Switch
- Left Outside Rearview Mirror
- Right Outside Rearview Mirror

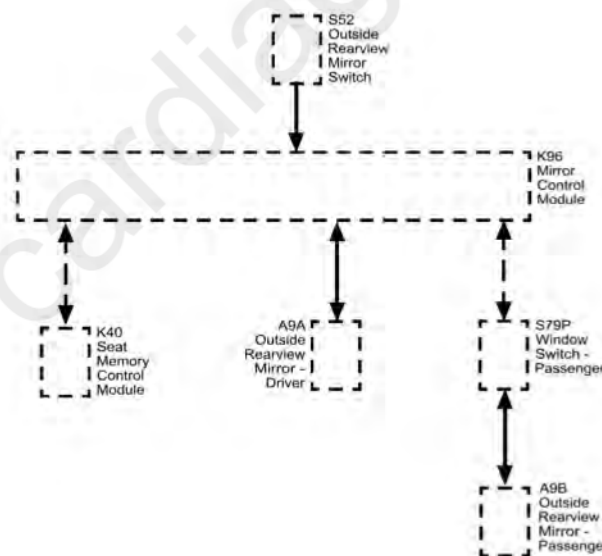


Fig. 19: Power Mirrors System Block Diagram (With A45)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S52	S52 Outside Rearview Mirror Switch
K96	K96 Mirror Control Module
A9A	A9A Outside Rearview Mirror - Driver

Callout	Component Name
S79P	S79P Window Switch - Passenger
A9B	A9B Outside Rearview Mirror - Passenger
K40	K40 Seat Memory Control Module

Power Mirror System Controls

The outside rearview mirror switch is a multiplex switch which signals the mirror control module which outside rearview mirror to move (driver or passenger) and which direction to move it. The mirror control module and the 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 mirror control module. When the memory seat module receives the switch inputs from the mirror control module, mirror output commands are sent to the appropriate module/switch through the serial data circuit. The mirror control module 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 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 control 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 control module will send the go to position commands to the mirror control module and passenger window switch. The switches will then drive the appropriate mirror motors to the commanded position sensor settings.

Folding Mirrors

The outside rearview mirror switch sends the mirror select and mirror fold/unfold inputs to the mirror control module which communicates the inputs to the memory seat control module through serial data. When the memory seat control module receives a fold/unfold signal it will send a fold/unfold command to the mirror control module and the passenger window switch. The outside mirrors will fold or unfold depending on their current state. The mirror control module and the passenger window switch control the fold/unfold motors through bi-directional control circuits.

Heated Mirrors

The heated mirrors are controlled through the rear defog relay. Whenever the vehicle is running and 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.

OUTSIDE MIRROR DESCRIPTION AND OPERATION (WITHOUT A45)

Power Mirror System Components

The power mirror system consists of the following components:

- Mirror direction switch - Controls the left, right, up and down movements of the mirrors
- Mirror select switch - Allows the operator to select the mirror to be moved
- Left outside mirror - Contains both the horizontal and vertical mirror motors
- Right outside mirror - Contains both the horizontal and vertical mirror motors

Each of the outside power mirrors contains 2 motors. The up-down motor operates the vertical directions and the left-right motor operates the horizontal directions. Each of the power mirror motors are internally circuit breaker protected.

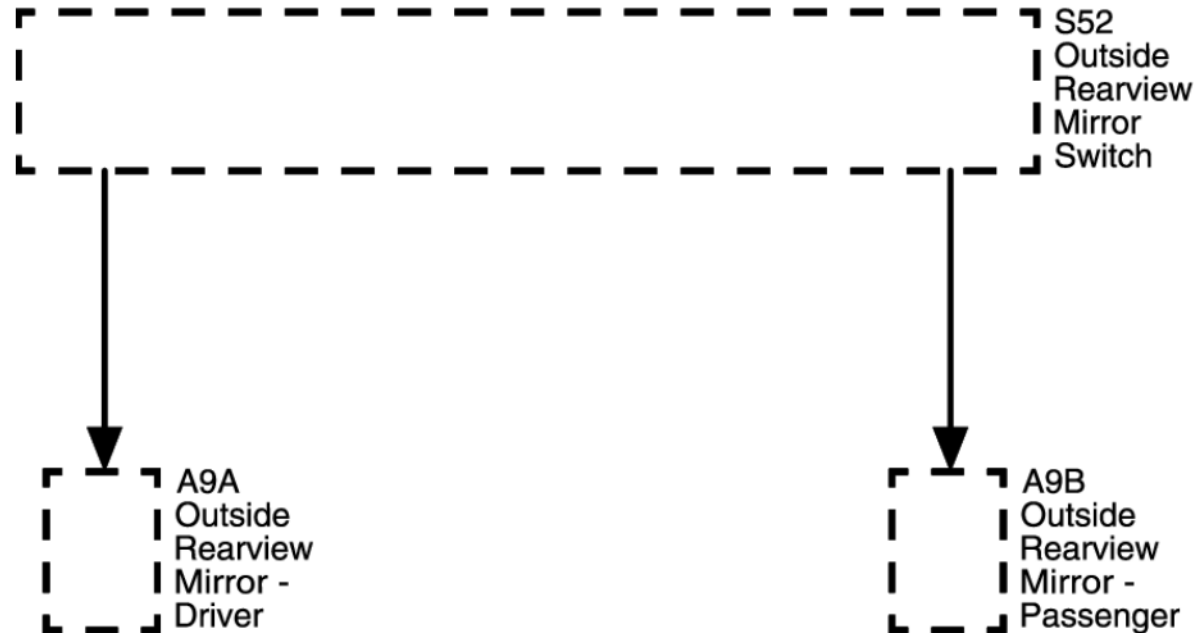


Fig. 20: Power Mirrors System Block Diagram (Without A45).
Courtesy of GENERAL MOTORS COMPANY

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 mirror switch incorporates a mirror select switch and a 4 position mirror direction switch.

The mirror select switch allows the driver to select the mirror to be moved by turning the switch to L position enabling the left outside mirror or turning the switch to R position enabling the right outside mirror.

The mirror direction switch is a 4 position switch that allows the operator to move the selected mirror up, down, left or right.

Power Mirror System Operation

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

The 4 positions of the direction switch have multiple switch contacts. When not in use, the directional contacts are isolated from any circuit. Each of the contacts are connected to opposing sides of the appropriate mirror motors through the selector switch. The selector switch interrupts or completes these circuits depending on the position of the selector switch, L or R.

If the mirror select switch is placed in the L position and the up switch is pressed, battery voltage will be supplied to the driver outside mirror vertical motor through the driver mirror motor up control circuit and return to the mirror switch through the driver mirror motor left/down control circuit, then to ground and the mirror will move up. If the down switch is pressed, the driver mirror motor left/down control circuit supplies battery voltage and the driver mirror motor up control circuit completes the path to the mirror switch, then to ground and the mirror will move down.

The remainder of the mirror functions operate in the same manner as described above. Placing the mirror control switch in opposing positions, left/right or up/down, will reverse the voltage polarity to the mirror motor, utilizing the same circuits and the mirror will move accordingly.

Heated Mirrors

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.

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