

2018 ACCESSORIES & EQUIPMENT

Wipers And Washers - Equinox & Terrain

SPECIFICATIONS

FASTENER SPECIFICATIONS

Reusable Threaded Fastener Tightening Specifications

NOTE:

All fasteners listed in this table can be reused after removal.

Application	Specification
	Metric (English)
Rear Window Wiper Arm Nut	13 N.m (115 lb in)
Rear Window Wiper Motor Bolt	9 N.m (80 lb in)
Windshield Washer Solvent Container Bolt	9 N.m (80 lb in)
Windshield Washer Solvent Container Nut	9 N.m (80 lb in)
Windshield Wiper Arm Nut	39.5 N.m (29 lb ft)
Windshield Wiper Motor Bolt	9 N.m (80 lb in)
Windshield Wiper Transmission Bolt	8 N.m (71 lb in)

SCHEMATIC WIRING DIAGRAMS

WIPER/WASHER WIRING SCHEMATICS

Front and Rear Wiper/Washer Controls

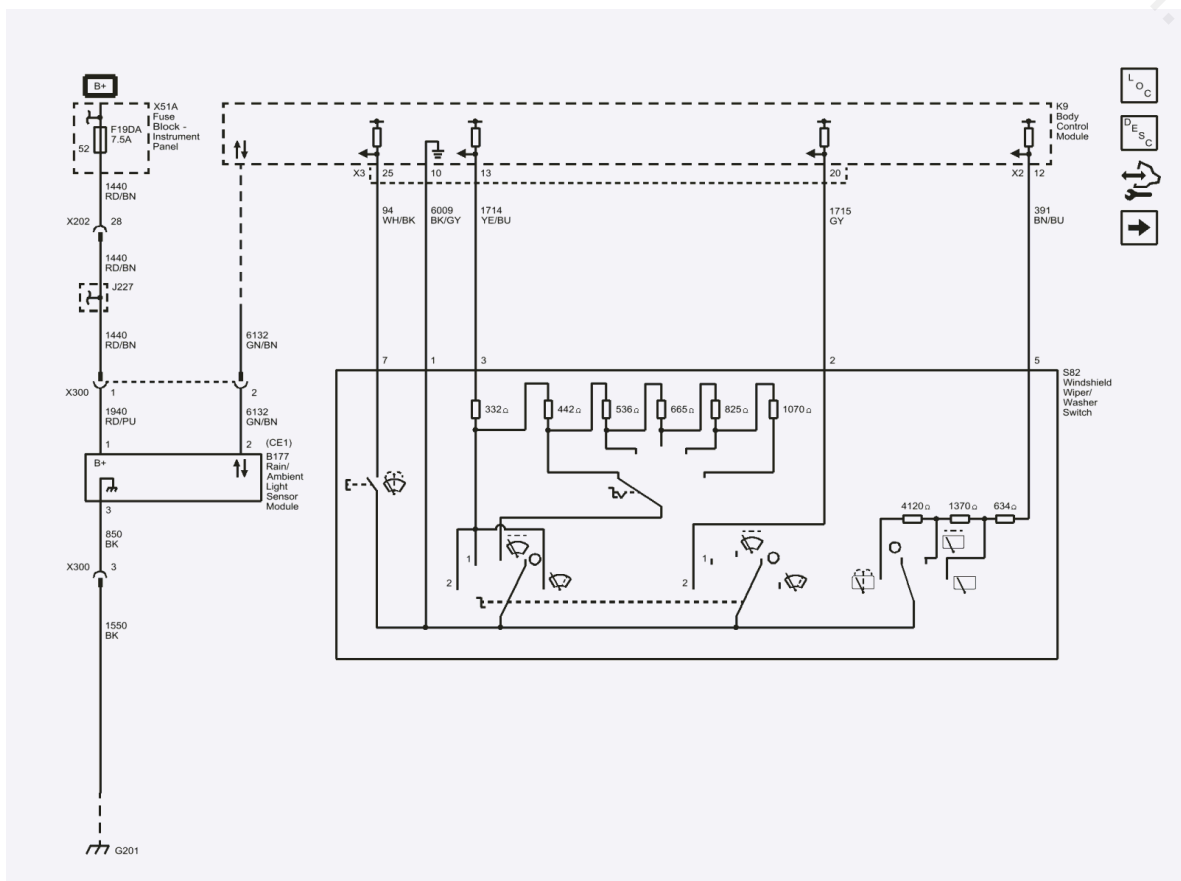


Fig. 1: Front and Rear Wiper/Washer Controls
 Courtesy of GENERAL MOTORS COMPANY

Front and Rear Wipers

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 Descriptor

DTC B370A

Rain Sensor

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U151A	U151A	-	-
Serial Data	U151A	U151A	U151A	-
Ground	-	U151A	-	-

Circuit/System Description

B+ and ground is supplied at all times to the rain sensor. The rain sensor communicates with the body control module (BCM) via serial data. When the ignition is in the ON or ACCESSORY position and the windshield wiper/washer switch is in the intermittent delay position, the BCM monitors the rain sensor data to determine the rain build up on the windshield. As rain builds up on the windshield, the BCM will command the wipers to activate. The sensitivity of the wiper frequency is controlled by the intermittent delay of the windshield wiper/washer switch. As the sensitivity is increased, the BCM will command more frequent wiper activation based on rain build up on the windshield.

Conditions for Setting the DTC

Communication between the BCM and the rain sensor is interrupted, and an interruption in communication is a serial data fault.

Action Taken When the DTC Sets

- If the BCM loses communication with the rain sensor while operating with single wipes, the windshield wiper operation will default to intermittent operation with a fixed dwell time of 4 s.
- If the BCM loses communication with the rain sensor while operating at low speed, the windshield wiper operation will default to low speed.
- If the BCM loses communication with the rain sensor while operating at high speed, the windshield wiper operation will default to high speed.

Conditions for Clearing the DTC

The DTC will clear when communication is established between the BCM and rain sensor.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 DTC U151A is not set.
 - **If the DTC is set**
Refer to [DTC U1500-U15FF](#)
 - **Go to next step: If the DTC is not set**
3. Place the S82 Windshield Wiper/Washer Switch in the intermittent delay setting and spray the outside of the windshield in the area of the B177 Rain/Ambient Light Sensor Module with a water bottle. It may be necessary to increase the sensitivity of the intermittent delay to achieve windshield wiper operation.
4. Verify the windshield wipers operate at low speed.
 - **If the wipers are not operating at low speed**
Refer to Circuit/System Testing.
 - **Go to next step: If the wipers are operating at low speed**
5. All OK.

Circuit/System Testing

1. Ignition OFF, all vehicle systems OFF, disconnect the harness connector at the B177 Rain/Ambient Light Sensor Module. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON, 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, remove the test lamp.
 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, remove the test lamp.
 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, replace the B177 Rain/Ambient Light Sensor Module.
 - **Go to next step: If the test lamp illuminates**
4. Ignition OFF, remove the test lamp, ignition ON.
5. Test for 5.0 - 10.0 V between the serial data circuit terminal 2 and ground.
 - **If less than 5.0 V**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.

2. Test for infinite resistance between the serial data 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 serial data circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
- **If greater than 10.0 V**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the serial data circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
- **Go to next step: If between 5.0 - 10.0 V**
6. Test or replace the B177 Rain/Ambient Light Sensor Module.

Repair Instructions

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

- Refer to [Inside Air Moisture and Windshield Temperature Sensor Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup

DTC B370B: REAR WIPER FUNCTION CONTROL CIRCUIT

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 Descriptor

DTC B370B

Rear Wiper Function Control Circuit

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control	B370B 02	1	2	-
Ground	-	1	1	-
1. Rear Wiper Inoperative. 2. Rear Wiper Always ON.				

Circuit/System Description

The rear wiper motor is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. The BCM will respond by commanding the specific rear wiper function based on an input from the rear wiper switch, which is part of the windshield wiper/washer switch. The rear wiper switch uses a resistor ladder to determine low speed, intermittent, and rear washer operation. A constant B+ and ground are supplied to the rear wiper motor. When the rear wiper switch is placed in the low speed, intermittent, or rear washer position, the voltage is pulled down through a different resistor in the resistor ladder, reducing the voltage seen at the BCM.

The BCM monitors the liftgate ajar signal circuit, and the BCM will disable the function of the rear wiper motor if the liftgate or liftglass is ajar or open

Conditions for Running the DTC

- Ignition ON

- The system voltage is between 9 - 16 V.

Conditions for Setting the DTC

The BCM detects a short to ground in the rear window wiper control circuit.

Action Taken When the DTC Sets

Rear wiper operation is suspended.

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

Diagnostic Aids

The rear liftgate must be closed in order for the rear wiper to work. The liftgate ajar switch signal circuit provides information to the rear window wiper module about the status of the liftgate. If the liftgate or liftglass is open the rear wiper operation is not performed.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

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- [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 Rear Closure Ajar Switch parameter changes between Inactive and Active when opening and closing the liftgate.
 - **If the parameter does not change**

Refer to [Liftgate Ajar Indicator Malfunction \(Without TB5\)](#) [Liftgate Ajar Indicator Malfunction \(With TB5\)](#)
 - **Go to next step: If the parameter changes**
3. Verify the rear wiper turns ON and OFF when commanding the Rear Wiper Active and Inactive with a scan tool.
 - **If the rear wiper does not turn ON and OFF**

Refer to Circuit/System Testing
 - **Go to next step: If the rear wiper turns ON and OFF**
4. All OK.

Circuit/System Testing

1. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
2. Verify the M45 Rear Wiper Motor is not activated.
 - **If the M45 Rear Wiper Motor is activated**
 1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 16 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the M45 Rear Wiper Motor is not activated**
3. Connect a 10 A fused jumper wire between the control circuit terminal 10 and B+.
4. Verify the M45 Rear Wiper Motor activates.
 - **If the M45 Rear Wiper Motor does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit terminal 16 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 X50A Fuse Block - Underhood.
 - **Go to next step: If the M45 Rear Wiper Motor activates**
5. Test or replace the K9 Body Control Module.

Repair Instructions

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

- Refer to [Battery Distribution Engine Compartment Fuse Block Replacement](#)
- Refer to [Control Module References](#) or BCM replacement, programming and setup

DTC B3715 OR B3875: WINDSHIELD WIPER RELAY CIRCUIT(S)

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 B3715

Windshield Wiper Relay Circuit

DTC B3875

Windshield Wiper High Speed Relay Circuit

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	B3875 02, B3715 02	B3875 04, B3715 04	-	-
Windshield Wiper Relay Control	B3715 02	B3715 04	B3715 01	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper Speed Control Relay Control	B3875 02	B3875 04	-	-
Ground	-	B3715 04	-	-

Circuit/System Description

The windshield wiper motor is controlled by the body control module (BCM) through the windshield wiper relay and the windshield wiper speed control relay. When low speed windshield wiper operation is requested, the BCM will apply voltage to the windshield wiper relay control circuit. This will cause the contacts in the windshield wiper relay to close and apply B+ to the windshield wiper motor through the windshield wiper low speed control circuit, enabling low speed wiper operation. When high speed windshield wiper operation is requested, the BCM continues to apply voltage to the windshield wiper relay control circuit and also applies ground to the windshield wiper speed control relay control circuit. This will cause the contacts in the windshield wiper speed control relay to close and apply B+ to the windshield wiper motor through the windshield wiper high speed control circuit, enabling high speed wiper operation. When the windshield wiper request is no longer present, the BCM uses an algorithm to keep relays engaged to keep wiper motor going at the last required speed until it sees that the motor is in the park position and then it will remove the necessary control drivers to stop the motor.

Conditions for Running the DTC

- The DTC runs only when a wiper output is actively being requested by the BCM.
- The system voltage is between 9 - 16 V.

Conditions for Setting the DTC

B3715 01

A short to voltage is detected in the windshield wiper relay control circuit.

B3715 02

A short to ground is detected in the windshield wiper relay control circuit.

B3715 04

An open or high resistance is detected in the windshield wiper relay control circuit.

B3875 01

A short to voltage is detected in the windshield wiper high speed relay control circuit.

B3875 02

A short to ground is detected in the windshield wiper high speed relay control circuit.

B3875 04

An open or high resistance is detected in the windshield wiper high speed relay control circuit.

Action Taken When the DTC Sets

The BCM will not activate the wiper output.

Conditions for Clearing the DTC

- A current DTC will clear when the condition for setting the fault is no longer present.
- A history DTC will clear after 50 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System Description and Operation

Electrical Information Reference

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

Scan Tool Reference

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

Circuit/System Testing

DTC B3715

1. Ignition OFF and all vehicle systems OFF, disconnect the KR12B Windshield Wiper Relay. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 2 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON. Connect a test lamp between the control circuit terminal 1 and the ground circuit terminal 2.
4. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay On and Off with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp, and disconnect the X4 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit terminal 16 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 , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, and disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit 16 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **Go to next step: If the test lamp turns ON and OFF**
5. Test or replace the KR12B Windshield Wiper Relay.

DTC B3875

1. Ignition OFF, disconnect the KR12C Windshield Wiper Speed Control Relay, ignition ON.
2. Verify a test lamp Illuminates between the B+ 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 $2\ \Omega$ in the B+ circuit terminal 2 circuit end to end.
 - If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - If less than $2\ \Omega$, 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 B+ circuit terminal 2 circuit and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance,
3. Test for greater than $2\ \Omega$ between the control circuit terminal 1 and ground.
 - If less than $2\ \Omega$, repair the short to ground on the circuit.
 - If greater than $2\ \Omega$, test or replace the KR12C Windshield Wiper Speed Control Relay.

- **Go to next step: If the test lamp illuminates**

3. Connect a test lamp between the control circuit terminal 1 and the B+ circuit terminal 2.
4. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay High and Stop with a scan tool.

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

1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
2. Test for less than 1 V between the control circuit terminal 24 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
3. Ignition OFF.
4. Test for less than $2\ \Omega$ in the control circuit end to end.
 - If $2\ \Omega$ or greater, repair the open/high resistance in the circuit.
 - If less than $2\ \Omega$, replace the K9 Body Control Module.

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

1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module.
2. Test for infinite resistance between the control circuit terminal 24 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.

- **Go to next step: If the test lamp turns ON and OFF**

5. Test or replace the KR12C Windshield Wiper Speed Control Relay.

Component Testing

Relay Test

1. Ignition OFF, disconnect the appropriate relay.
2. Test for 60 - 200 Ω between terminals 1 and 2.
 - **If less than 60 or greater than 200**

Replace the relay.
 - **Go to next step: If between 60 - 200 Ω**
3. Test for infinite resistance between the terminals listed below:
 - 3 and 2
 - 3 and 5
 - 3 and 2
 - 2 and 5
 - **If less than infinite resistance**

Replace the relay.

- **Go to next step: If infinite resistance**

4. Test for less than 5 Ω between terminals 3 and 4.

- **If 5 Ω or greater**

Replace the relay.

- **Go to next step: If less than 5 Ω**

5. Install a 10 A fused jumper wire between relay terminal 1 and 12 V. Install a jumper wire between relay terminal 2 and ground.

6. Test for less than 5 Ω between terminals 3 and 5.

- **If 5 Ω or greater**

Replace the relay.

- **Go to next step: If less than 5 Ω**

7. All OK

Repair Instructions

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

- Refer to [Relay Replacement \(Attached to Wire Harness\)](#), [Relay Replacement \(Within an Electrical Center\)](#).
- Refer to [Control Module References](#) for body control module replacement, programming and setup.

DTC B3811: REAR WASHER RELAY CIRCUIT

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 Descriptor

DTC B3811

Rear Washer Relay Circuit

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control	B3811 02	B3811 04	2	-
Ground	-	B3811 04	-	-
1. Rear Washer Inoperative 2. Rear Washer Always ON				

Circuit/System Description

The rear windshield washer pump is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. The BCM monitors the rear windshield wiper/washer switch signal circuit and when rear washer activation is requested, the BCM applies voltage through the rear window washer pump relay control circuit. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the windshield washer pump control circuit to activate the windshield washer pump.

Conditions for Running the DTC

- Ignition ON.

- The system voltage is between 9 - 16 V.

Conditions for Setting the DTC

B3811 01

The body control module detects a short to B+ in the rear windshield washer pump relay control circuit

B3811 02

The body control module detects a short to ground in the rear windshield washer pump relay control circuit

B3811 04

The body control module detects an open or high resistance in the rear windshield washer pump relay control circuit or the ground circuit

Action Taken When the DTC Sets

Washer operation is suspended.

Conditions for Clearing the DTC

- A current DTC clears when the diagnostic runs and passes.
- A history DTC will clear after 50 consecutive ignition cycles without a fault present.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 rear window washer turns ON and OFF when commanding the Rear Washer Relay Active and Inactive with a scan tool.

- **If the rear window washer does not turn ON and OFF**

Refer to Circuit/System Testing

- **Go to next step: If the rear window washer turns ON and OFF**

3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the X50A Fuse Block - Underhood ground circuit terminal 32 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.
 - **Go to next step: If less than 10 Ω**
3. Connect the X1 harness connector at the X50A Fuse Block - Underhood and disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
4. Verify the G19 Rear Window Washer Pump is not activated.
 - **If the G19 Rear Window Washer Pump is activated**
 1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the X50A Fuse Block - Underhood control circuit terminal 8 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the G19 Rear Window Washer Pump is not activated**
5. Connect a 10 A fused jumper wire between the control circuit terminal 11 X5 and B+.
6. Verify the G19 Rear Window Washer Pump activates.
 - **If the G19 Rear Window Washer Pump does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the X50A Fuse Block - Underhood control circuit terminal 8 X1 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 , replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the G19 Rear Window Washer Pump activates**
7. Replace the K9 Body Control Module.

Repair Instructions

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

- Refer to [Battery Distribution Engine Compartment Fuse Block Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup

DTC B3873: FRONT WASHER RELAY CIRCUIT

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 B3873

Front Washer Relay Circuit

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Control	B3873 02	B3873 04	B3873 01	-
Ground	-	B3873 04	-	-

Circuit/System Description

The windshield washer pump is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. The BCM monitors the windshield wiper/washer switch signal circuit and when washer activation is requested, the BCM applies voltage through the window washer pump relay control circuit. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the windshield washer pump control circuit to activate the windshield washer pump.

Conditions for Running the DTC

- Ignition ON.
- The system voltage is between 9 - 16 V.

Conditions for Setting the DTC

B3873 01

The body control module detects a short to B+ in the windshield washer pump relay control circuit.

B3873 02

The body control module detects a short to ground in the windshield washer pump relay control circuit.

B3873 04

The body control module detects an open or high resistance in the windshield washer pump relay control circuit.

Action Taken When the DTC Sets

Washer operation is suspended.

Conditions for Clearing the DTC

A current DTC clears when the diagnostic runs and passes.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

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- 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 G24 Windshield Washer Pump activates when commanding the Windshield Washer Relay On and Off with a scan tool.
 - **If the G24 Windshield Washer Pump does not activate**

Refer to Circuit/System Testing
 - **Go to next step: If the G24 Windshield Washer Pump activates**
3. All OK.

Circuit/System Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the X50A Fuse Block - Underhood ground circuit terminal 53 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.
 - **Go to next step: If less than 10 Ω**
3. Connect the X1 harness connector at the X50A Fuse Block - Underhood and disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
4. Verify the G24 Windshield Washer Pump is not activated.
 - **If the G24 Windshield Washer Pump is activated**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the X50A Fuse Block - Underhood control circuit terminal 25 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the G24 Windshield Washer Pump is not activated**
5. Connect a 10 A fused jumper wire between the control circuit terminal 14 X4 and B+.
6. Verify the G24 Windshield Washer Pump activates.
 - **If the G24 Windshield Washer Pump does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the X50A Fuse Block - Underhood control circuit terminal 25 X2 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 , replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the G24 Windshield Washer Pump activates**
7. Replace the K9 Body Control Module.

Repair Instructions

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

- Refer to [Engine Wiring Harness Junction Block Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup.

SYMPTOMS - WIPER/WASHER SYSTEMS

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

1. Perform [Diagnostic System Check - Vehicle](#) , in order to verify that all of the following conditions are true:
 - No DTCs are set.
 - The control modules can communicate via the serial data link.
2. Refer to [Wiper/Washer System Description and Operation](#) in order to familiarize yourself with the system functions.

Visual/Physical Inspection

- Inspect for aftermarket devices which may affect the operation of the windshield wiper/washer system. Refer to [Checking Aftermarket Accessories](#) .
- Inspect the easily accessible or visible system components for obvious damage or conditions which may cause the symptom.
- Inspect the washer fluid reservoir for the proper fluid level.

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:

- [Windshield Wiper System Malfunction](#)
- [Washer Malfunction](#)
- [Low Washer Fluid Indicator Malfunction](#)
- [Rear Wiper System Malfunction](#)
- [Rear Washer System Malfunction](#)
- [Rain Sensor Malfunction](#)

WINDSHIELD WIPER SYSTEM MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- 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
B+	1	1	-	-
Windshield Wiper Switch Signal Terminal 2	4	2	-	-
Windshield Wiper Switch Signal Terminal 3	1	1	1	-
Windshield Wiper Motor Control Terminal 1	4	3	-	-
Windshield Wiper Motor Control Terminal 3	1, 2	1	4	-
Underhood Fuse Block Control Terminal 64 X2	B3715 02	B3715 04	B3715 01	-
Underhood Fuse Block Control Terminal 23 X2	B3875 02	B3875 04	B3875 01	-
Windshield Wiper Motor Control Terminal 4	1, 2	2	4	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Wiper Switch Low Reference Terminal 1	-	1, 2	-	-
Windshield Wiper Motor Ground Terminal 5	-	1, 2, 3	-	-
Underhood Fuse Block Ground Terminal 65 X2	-	B3715 04	-	-
Underhood Fuse Block Ground Terminal 41 X1	-	1, 2, 3	-	-
Underhood Fuse Block Ground Terminal 54 X1	-	1, 2, 3	-	-
1. Delay or Low Speed Wipers Inoperative 2. High Speed Wipers Inoperative 3. Wipers Do Not Park 4. Wipers Always ON				

Circuit/System Description

The windshield wiper motor is controlled by the body control module (BCM) through the removable windshield wiper in conjunction with the removable windshield wiper speed control relay. When low speed windshield wiper operation is requested, the BCM will apply voltage to the windshield wiper relay control circuit. This will cause the contacts in the windshield wiper relay to close and apply B+ to the windshield wiper motor through the windshield wiper low speed control circuit, enabling low speed wiper operation. When high speed windshield wiper operation is requested, the BCM continues to apply voltage to the windshield wiper relay control circuit and also applies ground to the windshield wiper speed control relay control circuit. This will cause the contacts in the windshield wiper speed control relay to close and apply B+ to the windshield wiper motor through the windshield wiper high speed control circuit, enabling high speed wiper operation. When the windshield wiper request is no longer present, the contacts in the windshield wiper relay and windshield wiper speed control relay will open, removing B+ from the wiper motor control circuits.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 Windshield Wiper High Speed Switch parameter changes between Active and Inactive when activating the high speed windshield wipers.
 - **If the parameter does not change**

Refer to Circuit/System Testing - Windshield Wiper Switch Malfunction.

- **Go to next step: If the parameter changes**

3. Verify the scan tool Windshield Wiper Switch parameter changes between Off and Low when activating the low speed windshield wipers.

- **If the parameter does not change**

Refer to Circuit/System Testing - Windshield Wiper/Washer Switch Malfunction.

- **Go to next step: If the parameter changes**

4. Verify the scan tool Windshield Wiper Switch parameter changes between Delay 1 and Delay 5 when cycling the intermittent speed windshield wipers.

- **If the parameter does not change**

Test or replace the S82 Windshield Wiper/Washer Switch.

- **Go to next step: If the parameter changes**

5. Verify the M75 Windshield Wiper Motor changes between Off, Low, and High when cycling the S82 Windshield Wiper/Washer Switch between Off, Low, and High.

- **If the M75 Windshield Wiper Motor does not cycle between Off, Low, and High**

Refer to Circuit/System Testing - Windshield Wiper Motor Malfunction

- **Go to next step: If the M75 Windshield Wiper Motor cycles between Off, Low, and High**

6. Ignition OFF.

7. Verify the scan tool Windshield Wiper Park Switch parameter is Active.

- **If the parameter does not change**

Refer to Circuit/System Testing - Windshield Wiper Motor Malfunction.

- **Go to next step: If the parameter changes**

8. All OK.

Circuit/System Testing

Windshield Wiper Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the low reference circuit terminal 1 and ground.

- **If 10 Ω or greater**

1. Ignition OFF, disconnect the harness connector at the K9 Body 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 K9 Body Control Module.

- **Go to next step: If less than 10 Ω**

3. Ignition ON.

4. Verify the scan tool Windshield Wiper High Speed Switch parameter is Inactive.

- **If not Inactive**

1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.

2. Test for infinite resistance between the signal circuit terminal 2 and ground.

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

- If infinite resistance, replace the K9 Body Control Module.

- **Go to next step: If Inactive**

5. Install a 3 A fused jumper wire between the signal circuit terminal 2 and the low reference circuit terminal 1.

6. Verify the scan tool Windshield Wiper High Speed Switch parameter is Active.

- **If not Active**

1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body 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
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 K9 Body Control Module.
- **Go to next step: If Active**
7. Test for greater than 8 V between the signal circuit terminal 3 and ground.
 - **If less than 8 V**
 1. Ignition OFF, disconnect the harness connector at the K9 Body 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 K9 Body Control Module.
 - **Go to next step: If 8 V or greater**
8. Ignition OFF, disconnect the X3 harness connector at the K9 Body Control Module, ignition ON.
9. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 3 and ground.
 - **If 1 V or greater**

Repair the short to voltage on the circuit.
 - **Go to next step: If less than 1 V**
10. Test or replace the S82 Windshield Wiper/Washer Switch.

Windshield Wiper Motor Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the M75 Windshield Wiper Motor. It may take up to 2 min 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify the scan tool Windshield Wiper Park Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 3 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **Go to next step: If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 3 and the ground circuit terminal 5.
6. Verify the scan tool Windshield Wiper Park Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body 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
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 K9 Body Control Module.
- **Go to next step: If Active**
7. Ignition OFF and all vehicle systems OFF, disconnect the KR12B Windshield Wiper Relay. It may take up to 2 min for all vehicle systems to power down.
8. Test for less than 10 Ω between the ground circuit terminals listed below and ground.
 - KR12B Windshield Wiper Relay - terminal 2
 - KR12B Windshield Wiper Relay - terminal 4
 - **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.
 - **Go to next step: If less than 10 Ω**
9. Ignition ON.
10. Verify a test lamp illuminates between the B+ circuit terminal 5 and the ground circuit terminal 4.
 - **If the test lamp does not illuminate and the circuit fuse is good**

Replace the X50A Fuse Block - Underhood.
 - **If the test lamp does not illuminate and the circuit fuse is open**
 1. Ignition OFF, remove the test lamp. Disconnect the KR12C Windshield Wiper Speed Control Relay.
 2. Test for infinite resistance between the control circuits listed below and ground.
 - KR12C Windshield Wiper Speed Control Relay - terminal 4
 - KR12C Windshield Wiper Speed Control Relay - terminal 5
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the M75 Windshield Wiper Motor
 - **Go to next step: If the test lamp illuminates**
11. Connect a test lamp between the control circuit terminal 1 and the ground circuit terminal 2.
12. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay Low and Off with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp, disconnect the X4 harness connector at the K9 Body Control Module.
 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 , replace the K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the X4 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, replace the K9 Body Control Module.
 - **Go to next step: If the test lamp turns ON and OFF**

13. Ignition OFF, connect the KR12B Windshield Wiper Relay and disconnect the KR12C Windshield Wiper Speed Control Relay, ignition ON.
14. Test for less than 10 Ω between the control circuit terminal 3 and ground.
 - **If 10 Ω or greater**

Test or replace the KR12B Windshield Wiper Relay.
 - **Go to next step: If less than 10 Ω**
15. Connect a test lamp between the control circuit terminal 3 and ground.
16. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay Low and Off with a scan tool.
 - **If the test lamp does not turn ON and OFF**

Test or replace the KR12B Windshield Wiper Relay.
 - **Go to next step: If the test lamp turns ON and OFF**
17. Verify a test lamp illuminates between the B+ circuit terminal 2 and ground.
 - **If the test lamp does not illuminate**

Replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the test lamp illuminates**
18. Connect a test lamp between the B+ circuit terminal 2 and the control circuit terminal 1.
19. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper High Speed Relay High and Off with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 24 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V
 3. Ignition OFF.
 4. 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 K9 Body Control Module.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the X5 harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the control circuit terminal 24 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **Go to next step: If the test lamp turns ON and OFF**
20. Ignition OFF, connect the KR12C Windshield Wiper Speed Control Relay.
21. Connect a test lamp between the M75 Windshield Wiper Motor control circuit terminal 1 and ground circuit terminal 5, ignition ON.
22. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper Motor Relay Low and Off with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay.
 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 KR12C Windshield Wiper Speed Control Relay.
- **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay, 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, test or replace the KR12C Windshield Wiper Speed Control Relay.
- **Go to next step: If the test lamp turns ON and OFF**
- 23. Connect a test lamp between the M75 Windshield Wiper Motor control circuit terminal 4 and ground circuit terminal 5, ignition ON.
- 24. Verify the test lamp turns ON and OFF when commanding the Windshield Wiper High Speed Relay High and Off with a scan tool.
 - **If the test lamp is always OFF**
 1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay.
 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 KR12C Windshield Wiper Speed Control Relay.
 - **If the test lamp is always ON**
 1. Ignition OFF, remove the test lamp, disconnect the KR12C Windshield Wiper Speed Control Relay, 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, test or replace the KR12C Windshield Wiper Speed Control Relay.
 - **Go to next step: If the test lamp turns ON and OFF**
- 25. Test or replace the M75 Windshield Wiper Motor.

Component Testing

Windshield Wiper Switch

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
2. Test for infinite resistance between the signal terminal 2 and the low reference terminal 1 with the high speed switch in the open position.
 - **If less than infinite resistance**
Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If infinite resistance**
3. Test for less than 2 Ω between the signal circuit terminal 2 and the low reference circuit terminal 1 with the high speed switch in the closed position.
 - **If 2 Ω or greater**
Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If less than 2 Ω**
4. Test for infinite resistance between the signal terminal 3 and the low reference terminal 1 with the low speed switch in the open position.
 - **If less than infinite resistance**
Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If infinite resistance**

5. Test for the resistance values listed below between the signal circuit terminal 3 and the low reference circuit terminal 1 by cycling the switch between Delay 1 and Delay 5.

- Delay 1 : 7.50-8.00 k Ω
- Delay 2 : 1.29-1.34 k Ω
- Delay 3 : 1.95-2.00 k Ω
- Delay 4 : 2.78-2.82 k Ω
- Delay 5 : 3.84-3.90 k Ω
- **If not within the resistance values listed**

Replace the S82 Windshield Wiper/Washer Switch.

- **Go to next step: If within the resistance values listed**

6. All OK

Relay Test

1. Ignition OFF, disconnect the appropriate relay.
2. Test for 60 - 200 Ω between terminals 1 and 2.

- **If less than 60 or greater than 200**

Replace the relay.

- **Go to next step: If between 60 - 200 Ω**

3. Test for infinite resistance between the terminals listed below:

- 3 and 2
- 3 and 5
- 3 and 2
- 2 and 5
- **If less than infinite resistance**

Replace the relay.

- **Go to next step: If infinite resistance**

4. Test for less than 5 Ω between terminals 3 and 4.

- **If 5 Ω or greater**

Replace the relay.

- **Go to next step: If less than 5 Ω**

5. Install a 10 A fused jumper wire between relay terminal 1 and 12 V. Install a jumper wire between relay terminal 2 and ground.

6. Test for less than 5 Ω between terminals 3 and 5.

- **If 5 Ω or greater**

Replace the relay.

- **Go to next step: If less than 5 Ω**

7. All OK

Repair Instructions

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

- Refer to [Windshield Wiper Motor Replacement](#)
- Refer to [Relay Replacement \(Attached to Wire Harness\)](#) [Relay Replacement \(Within an Electrical Center\)](#)
- Refer to [Engine Wiring Harness Junction Block Replacement](#)

- Refer to [Windshield Wiper and Washer Switch Replacement \(Equinox\)Windshield Wiper and Washer Switch Replacement \(Terrain\)](#).
- Refer to [Control Module References](#) for BCM replacement, programming and setup.

LOW WASHER FLUID INDICATOR 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
Signal	2	1	-	-
Ground	-	1	-	-
1. Low washer fluid message always displayed 2. Low washer fluid message never displayed				

Circuit/System Description

The Adding Washer Fluid message is controlled by the instrument cluster. This message is controlled by using a signal message input from the washer fluid level switch. The washer fluid level signal circuit is supplied voltage through a resistor then monitored within the instrument cluster. The washer fluid level switch is normally closed when the washer fluid level is full. The instrument cluster detects ignition voltage on the washer fluid level signal circuit. When the washer fluid reaches the point where the driver should be informed that the washer fluid is low, the washer fluid level switch opens. When the washer fluid level switch is opened, the washer fluid level signal circuit voltage is pulled high, and the instrument cluster displays the Adding Washer Fluid message on the driver information center. In order to prevent the Adding Washer Fluid message from being displayed while sloshing is occurring in the washer fluid container, the instrument cluster is programmed with a 1 min delay before changing states of the Adding Washer Fluid message during an ignition cycle.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 Testing

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the B118B Windshield Washer Fluid Level Switch. It may take up to 2 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 2 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify the scan tool Washer Fluid Level Switch parameter is On.
 - **If not On**
 1. Ignition OFF, disconnect the harness connector at the P16 Instrument Cluster.
 2. Test for infinite resistance between the signal circuit terminal 1 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the P16 Instrument Cluster.
 - **Go to next step: If On**
5. Install a 3 A fused jumper wire between the signal circuit terminal 1 and the ground circuit terminal 2.
6. Verify the scan tool Washer Fluid Level Switch parameter is Off.
 - **If not Off**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the P16 Instrument Cluster, 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
 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 P16 Instrument Cluster.
 - **Go to next step: If Off**
7. Test or replace the B118B Windshield Washer Fluid Level Switch.

Repair Instructions

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

- Refer to [Windshield Washer Solvent Container Level Sensor Replacement](#)
- Refer to [Control Module References](#) for instrument cluster replacement, programming and setup

WASHER 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
B+	2	2	-	-
Windshield Washer Switch Signal	2	1	-	-
Windshield Washer Fluid Pump Control	1	1	2	-
Windshield Washer Relay Control	B3873 02	B3873 04	B3873 01	-
Windshield Washer Fluid Pump Ground	-	1	-	-

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Windshield Washer Switch Low Reference	-	1	-	-
Underhood Fuse Block Ground	-	B3873 04	-	-
1. Washer Inoperative 2. Washers Always ON				

Circuit/System Description

The windshield washer function is controlled by the body control module. When the washer switch is pressed, low reference is applied through the switch contacts and the signal circuit to the body control module indicating the wash request. The body control module then applies voltage through the control circuit to the coil side of the windshield washer pump relay energizing the relay. With the relay energized, battery voltage from the fuse is applied through the switch contacts of the relay and the control circuit to the windshield washer fluid pump.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 Windshield Washer Switch parameter changes between Inactive and Active when pressing the washer switch.
 - **If the parameter does not change**
Refer to Circuit/System Testing - Windshield Washer Switch Malfunction.
 - **Go to next step: If the parameter changes**
3. Verify the G24 Windshield Washer Pump activates when commanding the Windshield Washer Relay On and Off with a scan tool.
 - **If the G24 Windshield Washer Pump does not activate**
Refer to Circuit/System Testing - Windshield Washer Pump Malfunction
 - **Go to next step: If the G24 Windshield Washer Pump activates**
4. All OK.

Circuit/System Testing

Windshield Washer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 minutes for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 1 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 K9 Body Control Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify the scan tool Windshield Washer Switch parameter is Inactive.
 - **If not Inactive**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the signal circuit terminal 7 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If infinite resistance, replace the K9 Body Control Module.
 - **Go to next step: If Inactive**
5. Install a 3 A fused jumper wire between the signal circuit terminal 7 and the low reference circuit terminal 1.
6. Verify the scan tool Windshield Washer Switch parameter is Active.
 - **If not Active**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the K9 Body 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
 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 K9 Body Control Module.
 - **Go to next step: If Active**
7. Test or replace the S82 Windshield Wiper/Washer Switch.

Windshield Washer Pump Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood. It may take up to 10 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 53 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.
 - **Go to next step: If less than 10 Ω**
3. Connect the X1 harness connector at the X50A Fuse Block - Underhood, disconnect the harness connector at the G24 Windshield Washer Pump. It may take up to 2 min for all vehicle systems to power down.
4. Test for less than 10 Ω between the ground circuit terminal 2 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.
 - **Go to next step: If less than 10 Ω**

5. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.
6. Verify the test lamp does not turn ON and OFF when commanding the Windshield Washer Relay On and Off with a scan tool.
 - **If the test lamp turns ON and OFF**

Test or replace the G24 Windshield Washer Pump.
 - **Go to next step: If the test lamp does not turn ON and OFF**
7. Ignition OFF, connect the harness connector at the G24 Windshield Washer Pump. Disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
8. Verify the G24 Windshield Washer Pump is not activated.
 - **If the G24 Windshield Washer Pump is activated**
 1. Ignition OFF, disconnect the harness connector at the G24 Windshield Washer Pump, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 52 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the G24 Windshield Washer Pump.
 - **Go to next step: If the G24 Windshield Washer Pump is not activated**
9. Connect a 25 A fused jumper wire between the control circuit terminal 52 and B+.
10. Verify the G24 Windshield Washer Pump activates.
 - **If the G24 Windshield Washer Pump does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G24 Windshield Washer Pump, 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 G24 Windshield Washer Pump.
 - **Go to next step: If the G24 Windshield Washer Pump activates**
11. Ignition OFF, disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
12. Verify the G24 Windshield Washer Pump is not activated.
 - **If the G24 Windshield Washer Pump is activated**
 1. Ignition OFF, disconnect the X2 harness connector at the X50A Fuse Block - Underhood.
 2. Test for less than 1 volt between the K9 Body Control Module control circuit terminal 14 X4 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the X50A Fuse Block - Underhood.
13. Connect a 3 A fused jumper wire between the control circuit terminal 14 and B+.
14. Verify the G24 Windshield Washer Pump activates.
 - **If the G24 Windshield Washer Pump does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X2 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for infinite resistance between the control circuit terminal 25 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 X50A Fuse Block - Underhood.
 - **Go to next step: If the G24 Windshield Washer Pump activates**
15. Replace the K9 Body Control Module.

Windshield Washer Switch

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
2. Test for infinite resistance between the signal terminal 7 and the low reference terminal 1 with the switch in the open position.
 - **If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If infinite resistance**
3. Test for less than 2 Ω between the signal circuit terminal 7 and the low reference circuit terminal 1 with the switch in the closed position.
 - **If 2 Ω or greater**

Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If less than 2 Ω**
4. All OK

Repair Instructions

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

- Refer to [Windshield Washer Pump Replacement](#)
- Refer to [Windshield Wiper and Washer Switch Replacement \(Equinox\)](#)[Windshield Wiper and Washer Switch Replacement \(Terrain\)](#)
- Refer to [Engine Wiring Harness Junction Block Replacement](#)
- Refer to [Control Module References](#) or BCM replacement, programming and setup

RAIN SENSOR 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 Descriptor

DTC B370A

Rain Sensor

For symptom byte information, refer to [Symptom Byte List](#).

Diagnostic Fault Information

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
B+	U151A	U151A	-	-
Serial Data	U151A	U151A	U151A	-
Ground	-	U151A	-	-

Circuit/System Description

B+ and ground is supplied at all times to the rain sensor. The rain sensor communicates with the body control module (BCM) via serial data. When the ignition is in the ON or ACCESSORY position and the windshield wiper/washer switch is in the intermittent delay position, the BCM monitors the rain sensor data to determine the rain build up on the windshield. As rain builds up on the windshield, the BCM will command the wipers to activate. The sensitivity of the wiper frequency is controlled by the intermittent delay of the windshield wiper/washer switch. As the sensitivity is increased, the BCM will command more frequent wiper activation based on rain build up on the windshield.

Conditions for Setting the DTC

Communication between the BCM and the rain sensor is interrupted, and an interruption in communication is a serial data fault.

Action Taken When the DTC Sets

- If the BCM loses communication with the rain sensor while operating with single wipes, the windshield wiper operation will default to intermittent operation with a fixed dwell time of 4 s.
- If the BCM loses communication with the rain sensor while operating at low speed, the windshield wiper operation will default to low speed.
- If the BCM loses communication with the rain sensor while operating at high speed, the windshield wiper operation will default to high speed.

Conditions for Clearing the DTC

The DTC will clear when communication is established between the BCM and rain sensor.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 DTC U151A is not set.
 - **If the DTC is set**
Refer to [DTC U1500-U15FE](#)
 - **Go to next step: If the DTC is not set**
3. Place the S82 Windshield Wiper/Washer Switch in the intermittent delay setting and spray the outside of the windshield in the area of the B177 Rain/Ambient Light Sensor Module with a water bottle. It may be necessary to increase the sensitivity of the intermittent delay to achieve windshield wiper operation.
4. Verify the windshield wipers operate at low speed.
 - **If the wipers are not operating at low speed**
Refer to Circuit/System Testing.
 - **Go to next step: If the wipers are operating at low speed**
5. All OK.

Circuit/System Testing

1. Ignition OFF, all vehicle systems OFF, disconnect the harness connector at the B177 Rain/Ambient Light Sensor Module. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 3 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON, 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, remove the test lamp.
 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, remove the test lamp.
 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, replace the B177 Rain/Ambient Light Sensor Module.
 - **Go to next step: If the test lamp illuminates**
4. Ignition OFF, remove the test lamp, ignition ON.
5. Test for 5.0 - 10.0 V between the serial data circuit terminal 2 and ground.
 - **If less than 5.0 V**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module.
 2. Test for infinite resistance between the serial data 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 serial data circuit end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the K9 Body Control Module.
 - **If greater than 10.0 V**
 1. Ignition OFF, disconnect the harness connector at the K9 Body Control Module, ignition ON.
 2. Test for less than 1 V between the serial data circuit and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the K9 Body Control Module.
 - **Go to next step: If between 5.0 - 10.0 V**
6. Test or replace the B177 Rain/Ambient Light Sensor Module.

Repair Instructions

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

- Refer to [Inside Air Moisture and Windshield Temperature Sensor Replacement](#)
- Refer to [Control Module References](#) for BCM replacement, programming and setup

REAR WIPER SYSTEM MALFUNCTION

Diagnostic Instructions

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

- 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
B+	1	1	-	-
B+ Ignition Relay	1	1	-	-
Rear Window Wiper Switch Signal	1	1	2	-
Rear Window Wiper Motor Control	1	1	2	-
Rear Window Wiper Relay Control	B370B 02	B370B 04	B370B 01	-
Windshield Wiper/Washer Switch Low Reference	-	1	-	-
Rear Window Wiper Motor Ground	-	1	-	-
Underhood Fuse Block Ground Terminal 18 X1	-	1	-	-
1. Rear Wiper Inoperative. 2. Rear Wiper Always ON.				

Circuit/System Description

The rear wiper motor is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. The BCM will respond by commanding the specific rear wiper function based on an input from the rear wiper switch, which is part of the windshield wiper/washer switch. The rear wiper switch uses a resistor ladder to determine low speed, intermittent, and rear washer operation. A constant B+ and ground are supplied to the rear wiper motor. When the rear wiper switch is placed in the low speed, intermittent, or rear washer position, the voltage is pulled down through a different resistor in the resistor ladder, reducing the voltage seen at the BCM.

The BCM monitors the liftgate ajar signal circuit, and the BCM will disable the function of the rear wiper motor if the liftgate of liftglass is ajar or open

Diagnostic Aids

The rear liftgate must be closed in order for the rear wiper to work. The liftgate ajar switch signal circuit provides information to the rear window wiper module about the status of the liftgate. If the liftgate or liftglass is open the rear wiper operation is not performed.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 Rear Closure Ajar Switch parameter changes between Inactive and Active when opening and closing the liftgate.
 - **If the parameter does not change**

Refer to [Liftgate Ajar Indicator Malfunction \(Without TB5\)](#) [Liftgate Ajar Indicator Malfunction \(With TB5\)](#)
 - **Go to next step: If the parameter changes**
3. Verify the scan tool Rear Wiper Switch parameter changes between Off and On when turning the rear wipers ON and OFF.
 - **If the parameter does not change**

Refer to Circuit/System Testing - Rear Wiper/Washer Switch Malfunction.
 - **Go to next step: If the parameter changes**
4. Verify the M45 Rear Wiper Motor turns On when commanding the Rear Wiper Active and Inactive with a scan tool.
 - **If the Rear Wiper Motor does not turn ON**

Refer to Circuit/System Testing - Rear Wiper Motor Malfunction
 - **Go to next step: If the Rear Wiper Motor turns ON**
5. Verify the Rear Wiper finishes the wiping cycle and will park at the end of the rear window when cycling the S82 Rear Wiper/Washer Switch Malfunction from Rear Wiper to Off.
 - **If the Rear Wiper does not park at the end of the rear window**

Refer to Circuit/System Testing - Wiper Park Feature Malfunction
 - **Go to next step: If the Rear Wiper park at the end of the rear window**
6. All OK.

Circuit/System Testing

Rear Wiper/Washer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 11 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 1 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 K9 Body Control Module.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Test for greater than 8 V between the signal circuit terminal 5 and ground.
 - **If less than 8 V**
 1. Ignition OFF, disconnect the harness connector at the K9 Body 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 K9 Body Control Module.
 - **Go to next step: If 8 V or greater**
5. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

6. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 5 and ground.
 - **If 1 V or greater**
Repair the short to voltage on the circuit.
 - **Go to next step: If less than 1 V**
7. Test or replace the S82 Windshield Wiper/Washer Switch.

Rear Wiper Motor Malfunction

1. Ignition OFF, and all vehicle systems OFF. Disconnect the harness connector at the M45 Rear Wiper Motor. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the ground circuit terminal 2 and ground.
 - **If 10 Ω or greater**
 1. 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.
 - **Go to next step: If less than 10 Ω**
3. Ignition ON.
4. Verify a test lamp illuminates between the B+ circuit terminal 3 and the ground circuit terminal 2.
 - **If the test lamp does not illuminate**
 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 terminal 39 X1 end to end.
 - If 2 Ω or greater, repair the open/high resistance in the circuit.
 - If less than 2 Ω , replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the test lamp illuminates**
5. Connect a test lamp between the control circuit terminal 1 and the ground circuit terminal 2.
6. Verify the test lamp turn ON and OFF when commanding the Rear Wiper On and Off with a scan tool.
 - **If the test lamp does not turn On and the circuit fuse is OK**
 1. Ignition/Vehicle 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 turn On and the circuit fuse is open**
7. Ignition/Vehicle OFF.
8. 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, test or replace the M45 Rear Wiper Motor
 - **Go to next step: the test lamp turns On and OFF**
9. Ignition OFF, connect the harness connector at the M45 Rear Wiper Motor. Disconnect the X1 harness connector at the X50A Fuse Block - Underhood, It may take up to 2 min for all vehicle systems to power down.
10. Test for less than 10 Ω between the ground circuit terminal 18 and ground.
 - **If 10 Ω or greater**
 1. 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.
 - **Go to next step: If less than 10 Ω**
11. Ignition ON.
12. Verify the M45 Rear Wiper Motor is NOT activated.
 - **If the M45 Rear Wiper Motor is activated**
 1. Ignition OFF, disconnect the harness connector at the M45 Rear Wiper Motor, ignition ON.

2. Test for less than 1 V between the control circuit terminal 3 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the M45 Rear Wiper Motor.
- **Go to next step: If the M45 Rear Wiper Motor is not activated**
13. Connect a 20 A fused jumper wire between the control circuit listed below and B+:
 - Terminal 9
 - Terminal 39
14. Verify the M45 Rear Wiper Motor activates.
 - **If the M45 Rear Wiper Motor does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the M45 Rear Wiper Motor, 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 , replace the M45 Rear Wiper Motor.
 - **Go to next step: If the M45 Rear Wiper Motor activates**
15. Ignition OFF, connect the X1 harness connectors at the X50A Fuse Block - Underhood. Disconnect the X4 harness connector at the K9 Body Control Module, ignition ON.
16. Verify the M45 Rear Wiper Motor is not activated.
 - **If the M45 Rear Wiper Motor is activated**
 1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
 2. Test for less than 1 V between the control circuit terminal 16 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, replace the X50A Fuse Block - Underhood.
 - **Go to next step: If the M45 Rear Wiper Motor is not activated**
17. Connect a 10 A fused jumper wire between the control circuit terminal 10 and B+.
18. Verify the M45 Rear Wiper Motor activates.
 - **If the M45 Rear Wiper Motor does not activate**
 1. Ignition OFF, remove the jumper wire, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
 2. Test for infinite resistance between the control circuit terminal 16 and ground.
 - If less than infinite resistance, repair the short to ground on the circuit.
 - If less than 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 X50A Fuse Block - Underhood.
 - **Go to next step: If the M45 Rear Wiper Motor activates**
19. Test or replace the M45 Rear Wiper Motor.

Wiper Park Feature Malfunction

1. Ignition OFF, disconnect the harness connector at the M45 Rear Wiper Motor. Ignition ON
2. Verify a test lamp illuminates between the B+ circuit terminal 1 and ground.
 - **If the test lamp does not illuminate**
 1. Ignition OFF, remove the test lamp.
 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.
 - **Go to next step: If the test lamp illuminates**
3. Test or replace the M45 Rear Wiper Motor.

Windshield Wiper/Washer Switch

1. Ignition OFF, disconnect the harness connector at the S82 Windshield Wiper/Washer Switch.
2. Test for infinite resistance between the signal terminal 5 and the low reference terminal 1 with the rear window washer switch in the open position.
 - **If less than infinite resistance**

Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If infinite resistance**
3. Verify the resistance reading is within the range specified below between the signal circuit terminal 5 and the low reference circuit terminal 1 by cycling the switch between Rear Wiper position and Rear Washers position.
 - Rear Wiper : 624-644 Ω
 - Rear Wiper Sweep : 1.99-2.01 k Ω
 - Rear Washer : 6.11-6.13 k Ω
 - **If not within range specified**

Replace the S82 Windshield Wiper/Washer Switch.
 - **Go to next step: If within range specified**
4. All OK

Repair Instructions

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

- Refer to [Battery Distribution Engine Compartment Fuse Block Replacement](#)
- Refer to [Rear Window Wiper Motor Replacement](#)
- Refer to [Windshield Wiper and Washer Switch Replacement \(Equinox\)Windshield Wiper and Washer Switch Replacement \(Terrain\)](#)
- Refer to [Control Module References](#) or BCM replacement, programming and setup

REAR WASHER SYSTEM MALFUNCTION

Diagnostic Instructions

- Perform the [Diagnostic System Check - Vehicle](#) prior to using this diagnostic procedure.
- Review [Strategy Based Diagnosis](#) for an overview of the diagnostic approach.
- 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
B+	1	1	-	-
Rear Washer Switch Signal	1	1	-	-
Rear Window Washer Pump Relay Control	1	B3811 04	B3811 01	-
Rear Windshield Washer Pump Control	1	1	2	-
Rear Windshield Washer Pump Ground	-	1	-	-
Underhood Fuse Block Ground Terminal 32 X1	-	1	-	-
1. Rear Washer Inoperative 2. Rear Washer Always ON				

Circuit/System Description

The rear windshield washer pump is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. The BCM monitors the rear windshield wiper/washer switch signal circuit and when rear washer activation is requested, the BCM applies voltage through the rear window washer pump relay control circuit. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the rear windshield washer pump control circuit to activate the rear windshield washer pump.

Reference Information

Schematic Reference

Wiper/Washer Wiring Schematics

Connector End View Reference

COMPONENT CONNECTOR END VIEWS - INDEX

Description and Operation

Wiper/Washer System 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 Rear Washer Relay Command parameter changes between Active and Inactive when cycling the rear washer switch ON and OFF.
 - **If the parameter does not change**

Refer to Circuit/System Testing - Rear Wiper/Washer Switch Malfunction
 - **Go to next step: If the parameter changes**
3. Verify the G19 Rear Window Washer Pump turns on and off when commanding the Rear Washer Relay Inactive and Active with the scan tool
 - **If the G19 Rear Window Washer Pump does not turn ON and OFF**

Refer to Circuit/System Testing - Rear Washer Pump Malfunction
 - **Go to next step: If the G19 Rear Window Washer Pump turns ON and OFF**
4. All OK.

Circuit/System Testing

Rear Wiper/Washer Switch Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X3 harness connector at the S82 Windshield Wiper/Washer Switch. It may take up to 2 min for all vehicle systems to power down.
2. Test for less than 10 Ω between the low reference circuit terminal 1 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 K9 Body Control Module.

- **Go to next step: If less than 10 Ω**

3. Ignition ON.

4. Test for greater than 8 V between the signal circuit terminal 5 and ground.

- **If less than 8 V**

1. Ignition OFF, disconnect the harness connector at the K9 Body 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 K9 Body Control Module.

- **Go to next step: If 8 V or greater**

5. Ignition OFF, disconnect the X2 harness connector at the K9 Body Control Module, ignition ON.

6. Test for less than 1 V between the S82 Windshield Wiper/Washer Switch signal circuit terminal 5 and ground.

- **If 1 V or greater**

Repair the short to voltage on the circuit.

- **Go to next step: If less than 1 V**

7. Test or replace the S82 Windshield Wiper/Washer Switch.

Rear Washer Pump Malfunction

1. Ignition OFF and all vehicle systems OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood. It may take up to 10 min for all vehicle systems to power down.

2. Test for less than 10 Ω between the ground circuit terminal 32 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.

- **Go to next step: If less than 10 Ω**

3. Connect the X1 harness connector at the X50A Fuse Block - Underhood, disconnect the harness connector at the G19 Rear Window Washer Pump. It may take up to 2 min for all vehicle systems to power down.

4. Test for less than 10 Ω between the ground circuit terminal 2 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.

- **Go to next step: If less than 10 Ω**

5. Connect a test lamp between the control circuit terminal 1 and ground, ignition ON.

6. Verify the test lamp does not turn ON and OFF when commanding the Rear Washer Relay Active and Inactive with a scan tool.

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

Test or replace the G19 Rear Window Washer Pump.

- **Go to next step: If the test lamp does not turn ON and OFF**

7. Ignition OFF, connect the harness connector at the G19 Rear Window Washer Pump. Disconnect the X5 harness connector at the X50A Fuse Block - Underhood, ignition ON.

8. Verify the G19 Rear Window Washer Pump is not activated.

• **If the G19 Rear Window Washer Pump is activated**

1. Ignition OFF, disconnect the harness connector at the G19 Rear Window Washer Pump, ignition ON.
2. Test for less than 1 V between the control circuit terminal 39 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the G19 Rear Window Washer Pump.

• **Go to next step: If the G19 Rear Window Washer Pump is not activated**

9. Connect a 15 A fused jumper wire between the control circuit terminal 39 and B+.
10. Verify the G19 Rear Window Washer Pump activates.

• **If the G19 Rear Window Washer Pump does not activate**

1. Ignition OFF, remove the jumper wire, disconnect the harness connector at the G19 Rear Window Washer Pump, 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 G19 Rear Window Washer Pump.

• **Go to next step: If the G19 Rear Window Washer Pump activates**

11. Ignition OFF, X5 harness connector at the K9 Body Control Module, ignition ON.
12. Verify the G19 Rear Window Washer Pump is not activated.

• **If the G19 Rear Window Washer Pump is activated**

1. Ignition OFF, disconnect the X1 harness connector at the X50A Fuse Block - Underhood.
2. Test for less than 1 volt between the K9 Body Control Module control circuit terminal 11 X5 and ground.
 - If 1 V or greater, repair the short to voltage on the circuit.
 - If less than 1 V, test or replace the X50A Fuse Block - Underhood.

13. Connect a 3 A fused jumper wire between the control circuit terminal 11 and B+.

14. Verify the G19 Rear Window Washer Pump activates.

• **If the G19 Rear Window Washer Pump does not activate**

1. Ignition OFF, remove the jumper wire, disconnect the X1 harness connector at the X50A Fuse Block - Underhood, ignition ON.
2. Test for infinite resistance between the control circuit terminal 8 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 X50A Fuse Block - Underhood.

• **Go to next step: If the G19 Rear Window Washer Pump activates**

15. Replace the K9 Body Control Module.

Component Testing

Rear Windshield Washer Pump

1. Install a 15 A fused jumper wire between the B+ terminal 1 and 12 V. Install a jumper wire between the ground terminal 2 and ground.
2. Verify the G19 Rear Window Washer Pump activates.
 - **If the G19 Rear Window Washer Pump does not activate.**

Replace the G19 Rear Window Washer Pump.

- **Go to next step: If the G19 Rear Window Washer Pump does activate.**

3. All OK

Repair Instructions

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

- Refer to [Battery Distribution Engine Compartment Fuse Block Replacement](#)
- Refer to [Windshield Washer Pump Replacement](#)
- Refer to [Windshield Wiper and Washer Switch Replacement \(Equinox\)](#)[Windshield Wiper and Washer Switch Replacement \(Terrain\)](#)
- Refer to [Control Module References](#) for body control module replacement, programming and setup.

REPAIR INSTRUCTIONS

WINDSHIELD WIPER AND WASHER SWITCH REPLACEMENT (EQUINOX)

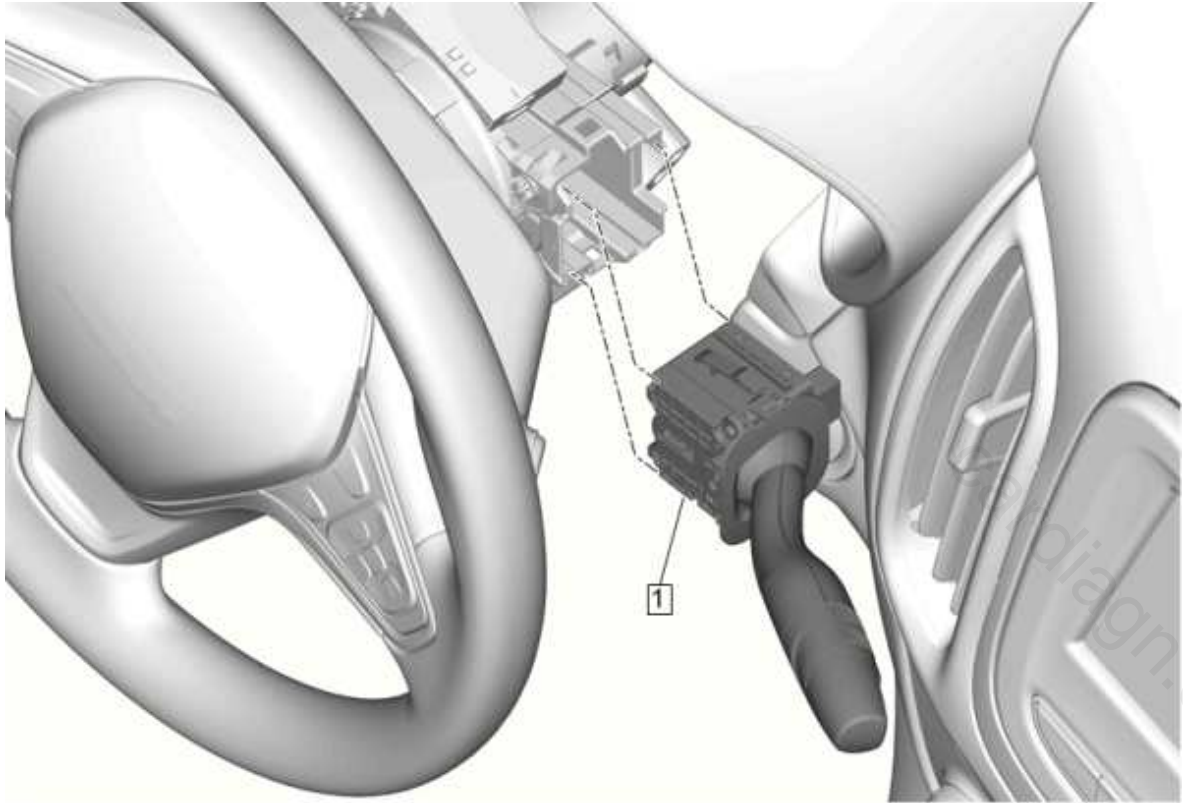


Fig. 4: Windshield Wiper And Washer Switch (Equinox)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Column Lower Trim Cover. Refer to Steering Column Lower Trim Cover Replacement (Equinox)	
1	Windshield Wiper and Washer Switch Procedure 1. Disconnect the electrical connector. 2. Release the retaining tabs and remove the windshield wiper and washer switch from the turn signal switch bracket.

WINDSHIELD WIPER AND WASHER SWITCH REPLACEMENT (TERRAIN)

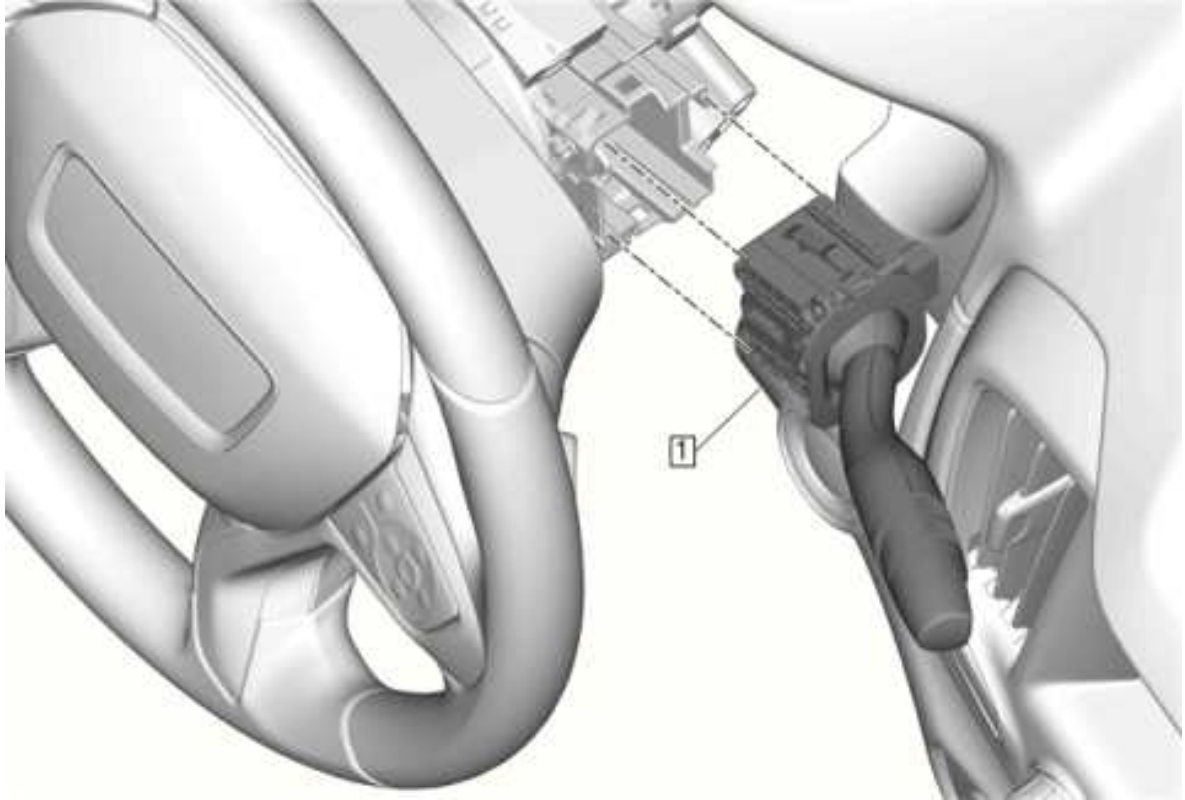


Fig. 5: Windshield Wiper And Washer Switch (Terrain)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Steering Column Lower Trim Cover. Refer to Steering Column Lower Trim Cover Replacement (Terrain)	
1	Windshield Wiper and Washer Switch Procedure 1. Disconnect the electrical connector. 2. Release the retaining tabs and remove the windshield wiper and washer switch from the turn signal switch bracket.

WINDSHIELD WASHER NOZZLE HOSE REPLACEMENT

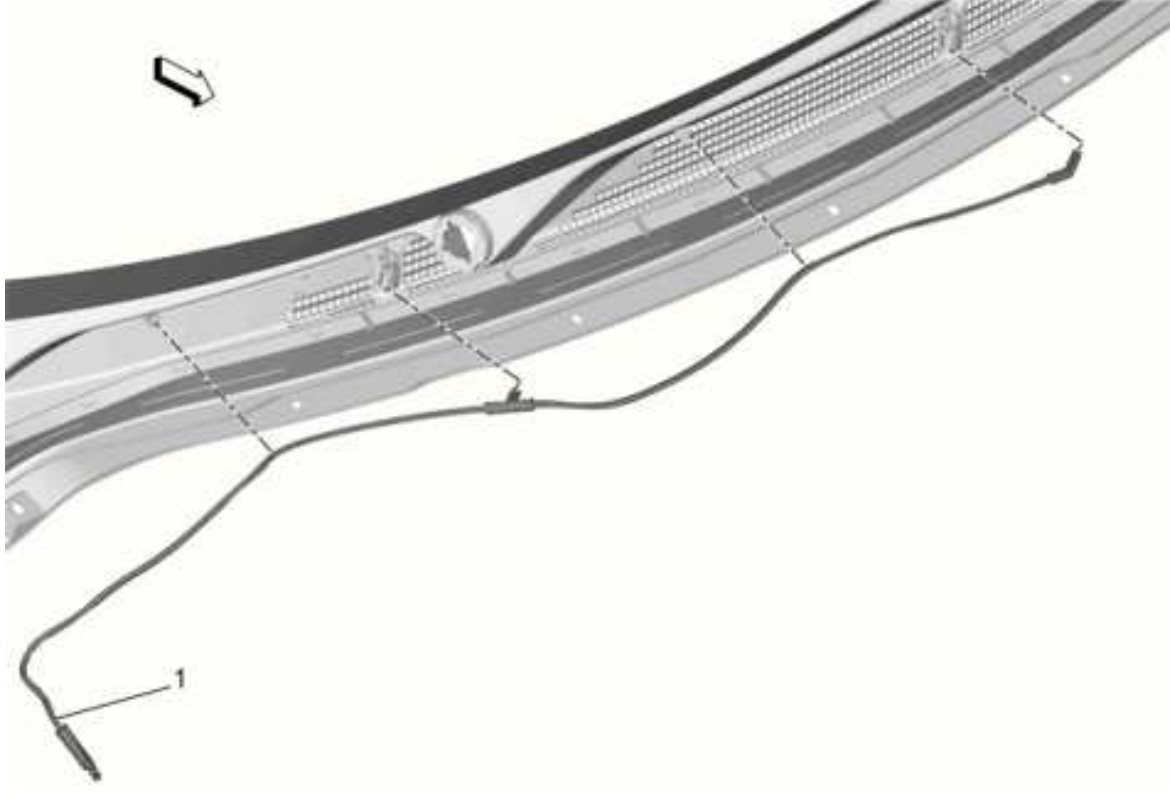


Fig. 6: Windshield Washer Nozzle Hose
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Air Inlet Grille Panel. Refer to Air Inlet Grille Panel Replacement	
1	Windshield Washer Nozzle Hose Procedure 1. Disconnect Windshield Washer Nozzle Hose @ Air Inlet Grille Panel 2. Disconnect Windshield Washer Nozzle Hose @ Windshield Washer Nozzle

WINDSHIELD WASHER NOZZLE REPLACEMENT

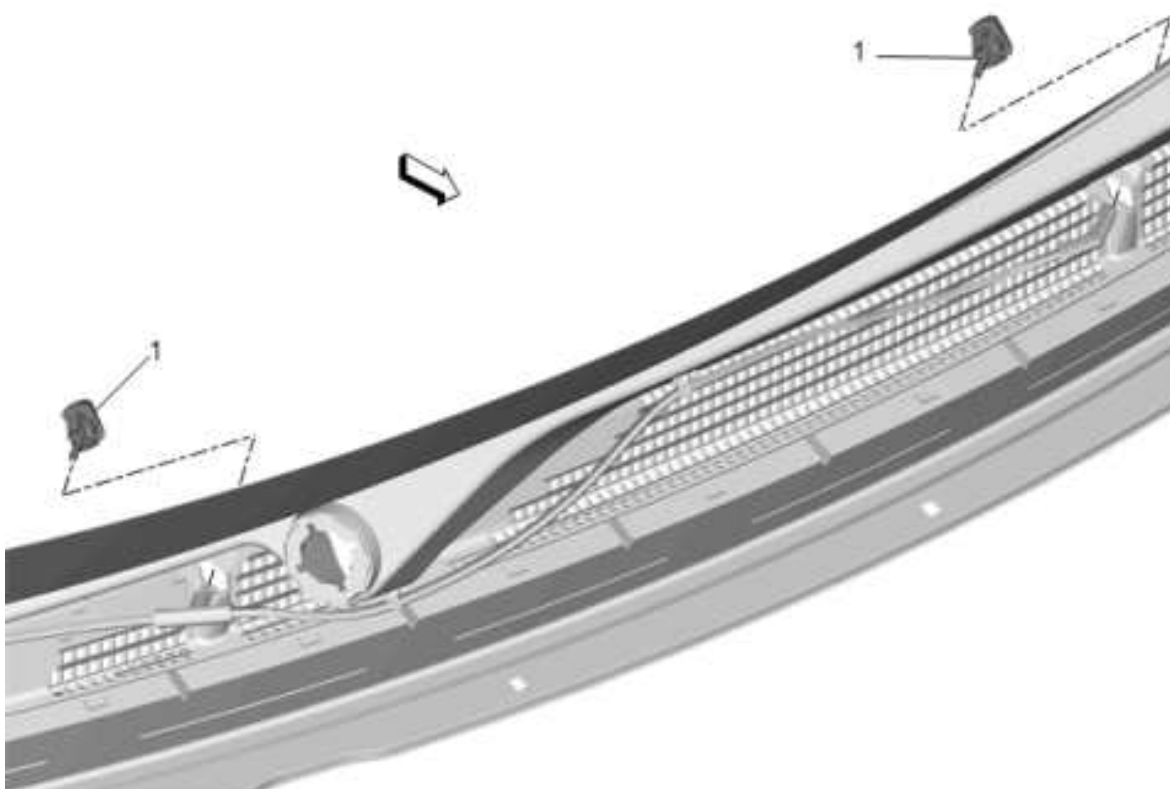


Fig. 7: Windshield Washer Nozzle
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Air Inlet Grille Panel. Refer to Air Inlet Grille Panel Replacement	
1	Windshield Washer Nozzle Procedure 1. Disconnect Windshield Washer Nozzle Hose @ Windshield Washer Nozzle 2. Press the locking tabs and remove the washer nozzle from the air inlet grille panel.

REAR WINDOW WASHER NOZZLE REPLACEMENT

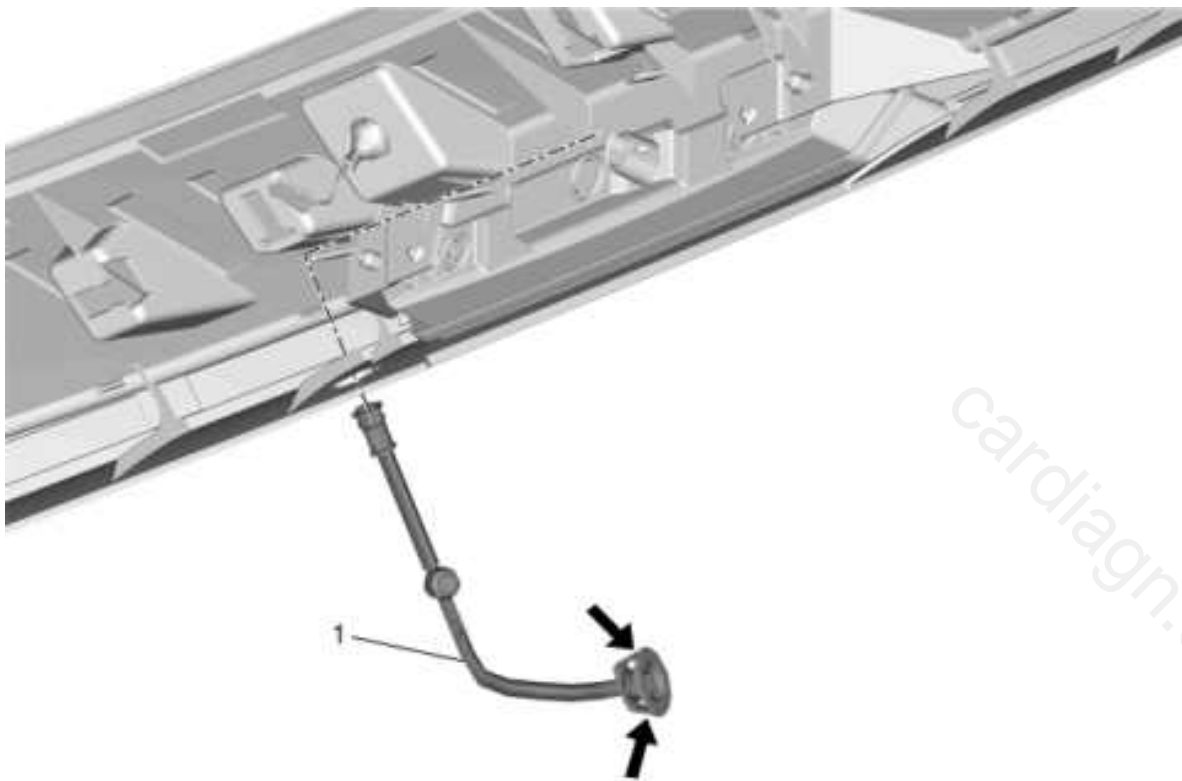


Fig. 8: Rear Window Washer Nozzle
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Rear End Spoiler. Refer to Rear End Spoiler Replacement (Equinox) Rear End Spoiler Replacement (Terrain)	
1	Rear Window Washer Nozzle Procedure 1. Disconnect Rear Window Washer Nozzle @ Windshield Washer Liftgate Extension Rear Hose 2. Press the retainer tabs and push the rear window washer nozzle out from the rear end spoiler.

WASHER HOSE REPAIR

Washer Hose Repair and Routing

The washer hose can be a component within the main body wire harness conduit. The washer hose is a hard plastic convoluted tube that could be wrapped with electrical tape along the main body electrical wiring harness. It starts

underhood where it connects from the rear window washer pump hose to the rear window washer nozzle extension hose. The washer hose usually routes into the main body wire harness underhood and passes through the front of the dash panel grommet. The washer hose is routed either inside the vehicle interior behind the left front side window garnish molding, along the headliner area and continues to the rear of the vehicle, as equipped. The washer hose could be routed back to the center of the vehicle where it could possibly connect to the high mounted stop lamp or the rear window washer pump where it connects by rubber flexible tubing, at the lift gate opening, if equipped.

Removal Procedure

1. Locate the damaged section of the washer hose, this will be hard plastic convoluted tubing.
2. If the leak is located inside the main body wire harness, carefully cut the electrical tape, securing the harness within the electrical conduit to expose the damaged section of washer hose.
3. Cut and remove the damaged section of the washer hose.

Installation Procedure

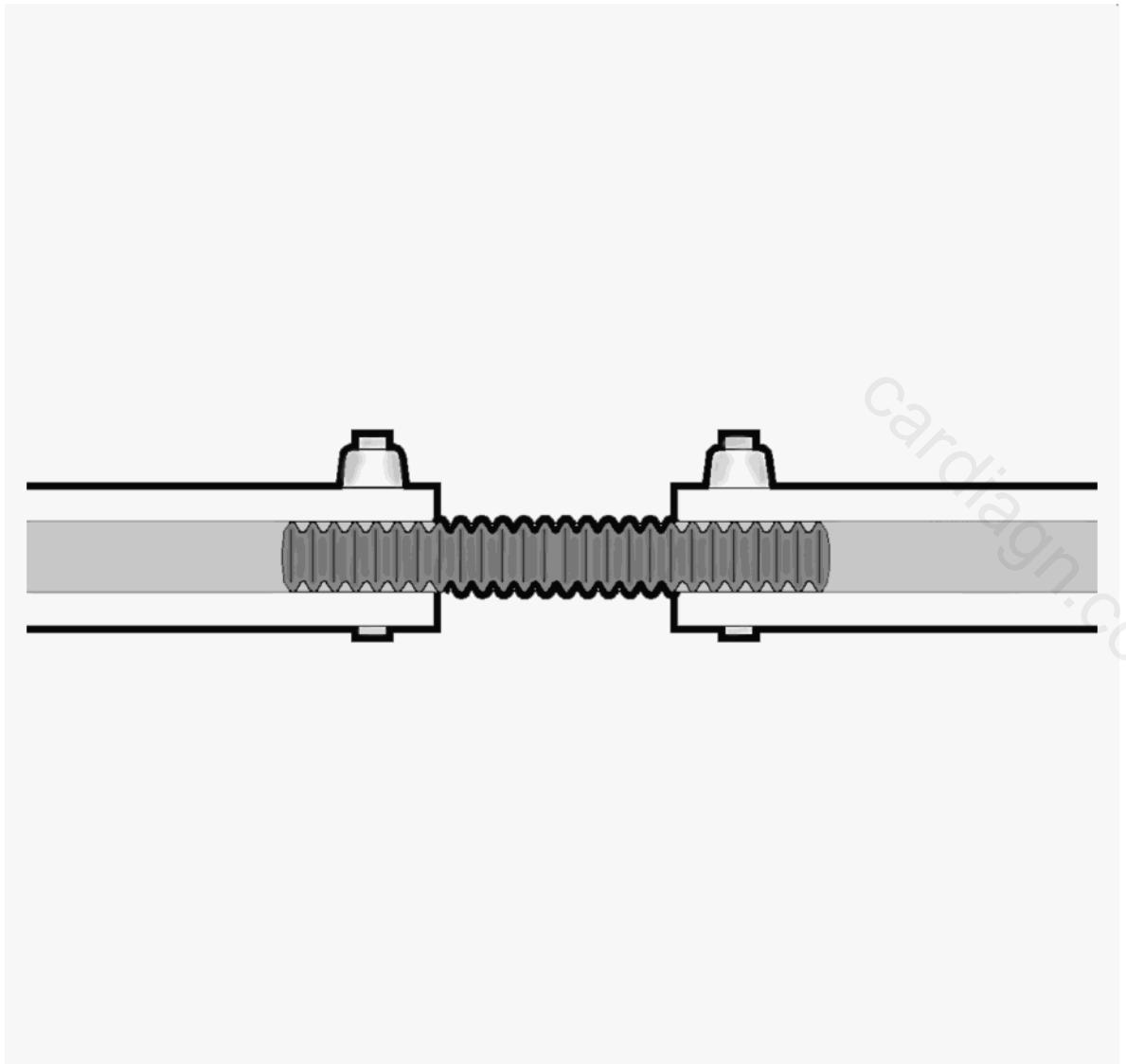


Fig. 9: Washer Hose Repair

Courtesy of GENERAL MOTORS COMPANY

1. In order to repair the damaged section of washer hose, use the following steps:
 - Use a 9.5 mm (3/8 in) vacuum hose to replace damaged section.
 - Overlap the washer hose onto the plastic tubing by, 12.5 mm (0.50 in) on each end.
 - Secure each end of the vacuum hose with a 100 mm (4 in) cable tie.
2. Verify the repair by activating the front and rear (if equipped) washer system and check the system for leaks.
3. If the leak was located inside the main body wire harness or conduit, use electrical tape to retain the repaired section to the exterior of the electrical wire harness conduit.
4. If the leak was located external from the conduit, secure the hose with cable ties to prevent unnecessary movement and unwanted noise.

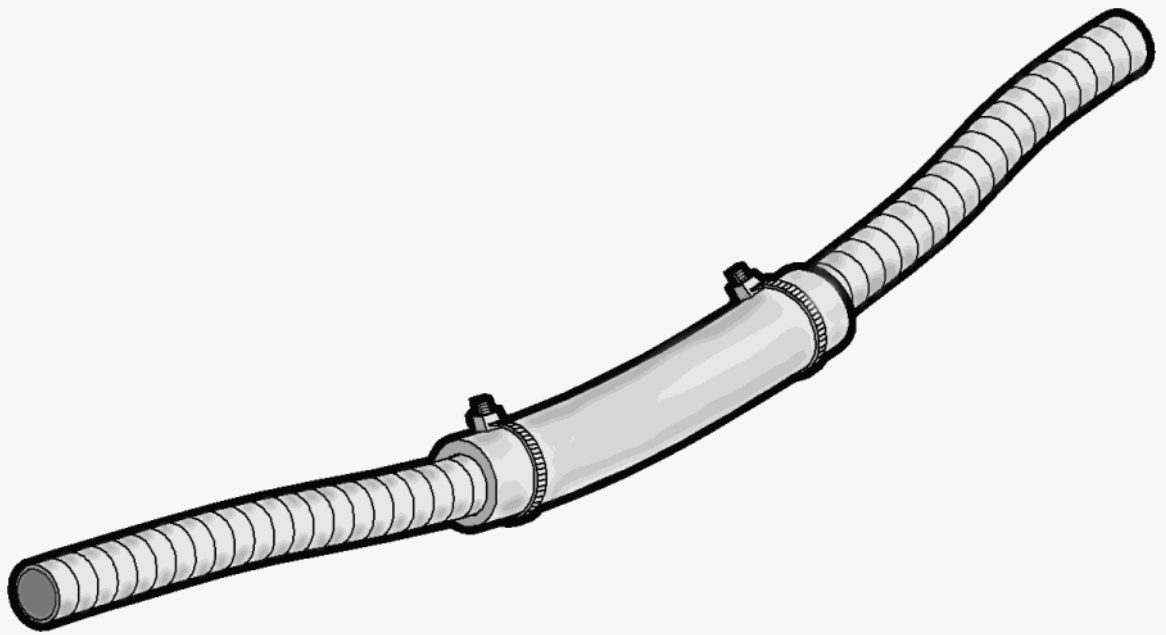


Fig. 10: Repairing Washer Hose

Courtesy of GENERAL MOTORS COMPANY

5. If the leak requires the washer hose to be removed in the front of dash panel grommet complete the following:
 - Carefully slit the grommet next to the original washer hose.
 - Pass the new section of the washer hose through, next to the existing grommet tubing.
 - Repair the hose on either side of the grommet.
 - Use small tie straps to secure the hose onto the washer tubing.
 - Verify the repair by operating the washer system.
 - Seal any openings in the grommet, larger than the hose that was passed through.

WINDSHIELD WASHER PUMP HOSE REPLACEMENT (FRONT)

Removal Procedure

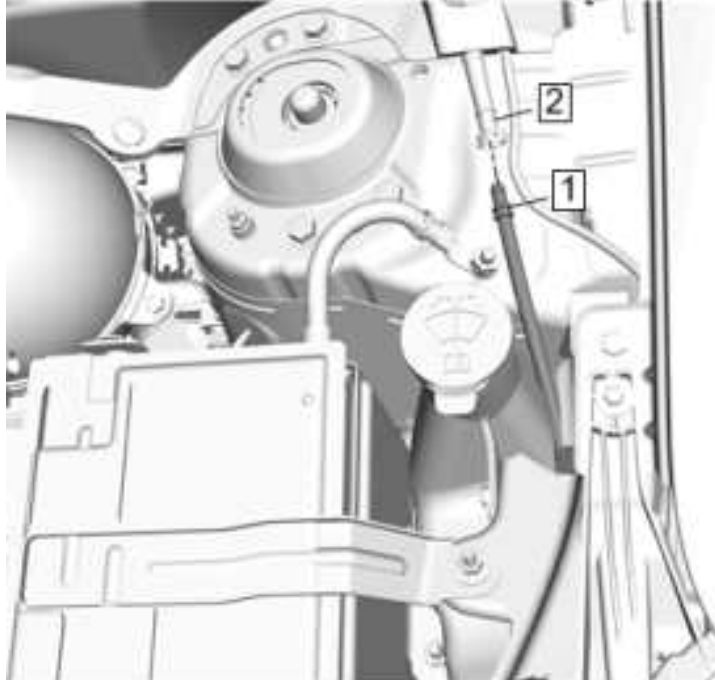


Fig. 11: Front Windshield Washer Pump Hose And Windshield Washer Nozzle Hose
Courtesy of GENERAL MOTORS COMPANY

1. Remove Windshield Washer Pump Hose - Front (1) @ Windshield Washer Nozzle Hose (2)
2. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
3. Remove Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Equinox\)](#) [Front Bumper Fascia Replacement \(Terrain\)](#)
4. Place a clean suitable drain pan under the windshield washer solvent container.

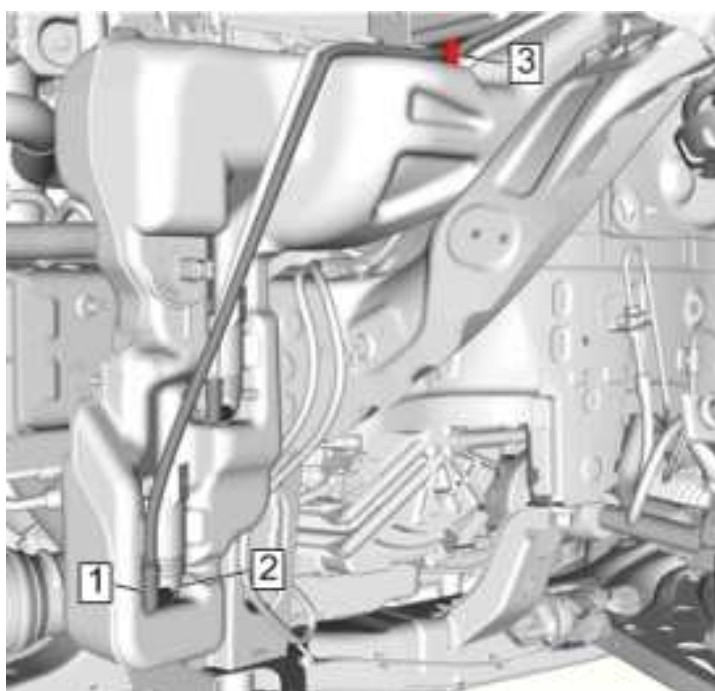


Fig. 12: Front Windshield Washer Pump Hose, Windshield Washer Pump And Retainer
Courtesy of GENERAL MOTORS COMPANY

5. Remove Windshield Washer Pump Hose - Front (1) @ Windshield Washer Pump (2)
6. Remove Windshield Washer Pump Hose - Front (1) @ Windshield Washer Solvent Container Retainer (3)

Installation Procedure

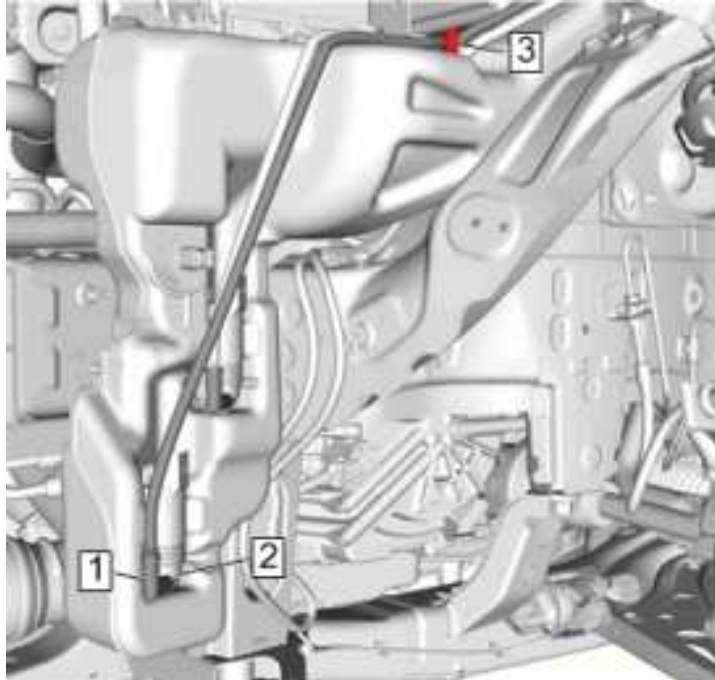


Fig. 13: Front Windshield Washer Pump Hose, Windshield Washer Pump And Retainer
Courtesy of GENERAL MOTORS COMPANY

1. Install Windshield Washer Pump Hose - Front (1) @ Windshield Washer Solvent Container Retainer (3)
2. Install Windshield Washer Pump Hose - Front (1) @ Windshield Washer Pump (2)
3. Remove the clean suitable drain pan from under the windshield washer solvent container.
4. Install Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Equinox\)](#), [Front Bumper Fascia Replacement \(Terrain\)](#).
5. Lower the vehicle. Refer to [Lifting and Jacking the Vehicle](#)

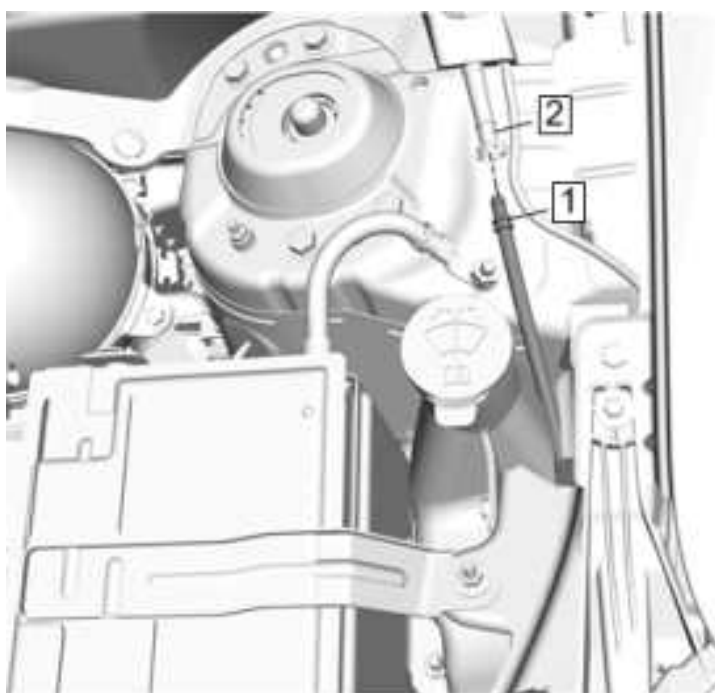


Fig. 14: Front Windshield Washer Pump Hose And Windshield Washer Nozzle Hose
Courtesy of GENERAL MOTORS COMPANY

6. Install Windshield Washer Pump Hose - Front (1) @ Windshield Washer Nozzle Hose (2)
7. Fill the windshield washer system to the proper level.

WINDSHIELD WASHER PUMP HOSE REPLACEMENT (REAR)

Removal Procedure

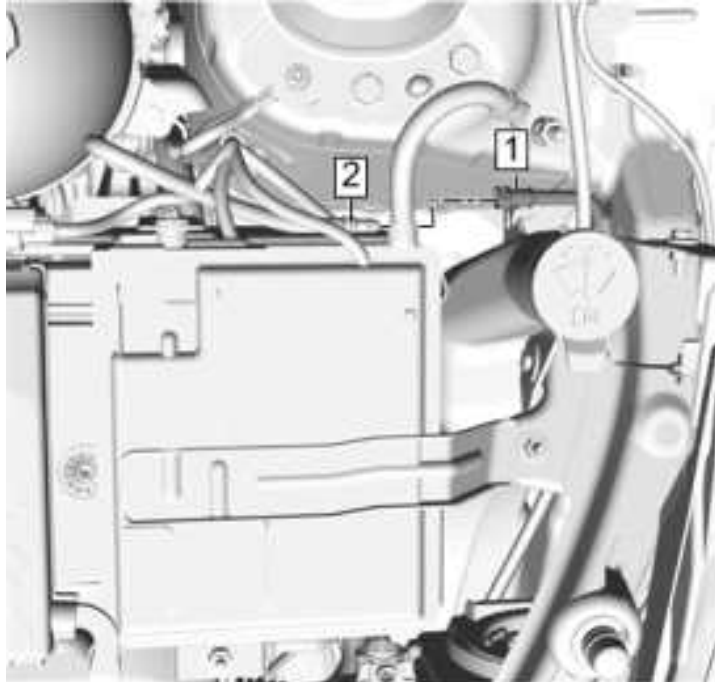


Fig. 15: Rear Windshield Washer Pump Hose And Liftgate Extension Rear Hose
Courtesy of GENERAL MOTORS COMPANY

1. Remove Windshield Washer Pump Hose - Rear (1) @ Windshield Washer Solvent Container
2. Remove Windshield Washer Pump Hose - Rear (2) @ Windshield Washer Liftgate Extension Rear Hose (2)
3. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
4. Remove Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Equinox\)](#) [Front Bumper Fascia Replacement \(Terrain\)](#)
5. Place a clean suitable drain pan under the windshield washer solvent container.

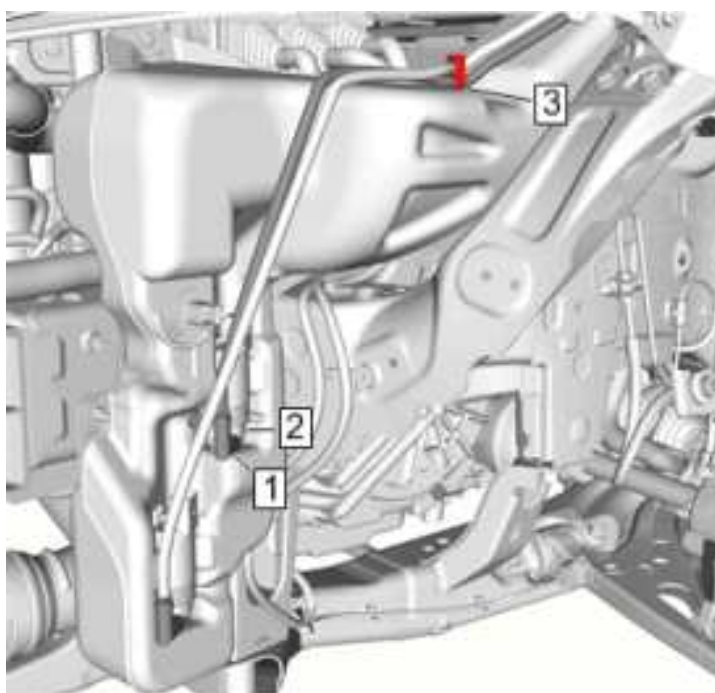


Fig. 16: Rear Windshield Washer Pump, Hose And Solvent Container Retainer
Courtesy of GENERAL MOTORS COMPANY

6. Remove Windshield Washer Pump Hose - Rear (1) @ Rear Window Washer Pump (2)
7. Remove Windshield Washer Pump Hose - Rear (1) @ Windshield Washer Solvent Container Retainer (3)

Installation Procedure

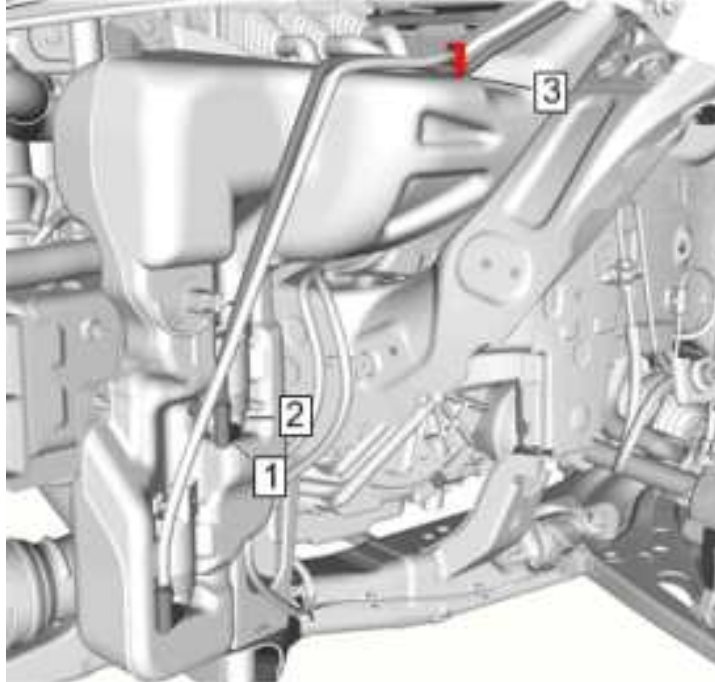


Fig. 17: Rear Windshield Washer Pump, Hose And Solvent Container Retainer
 Courtesy of GENERAL MOTORS COMPANY

1. Install Windshield Washer Pump Hose - Rear (1) @ Windshield Washer Solvent Container Retainer (3)
2. Install Windshield Washer Pump Hose - Rear (1) @ Rear Window Washer Pump (2)
3. Remove the clean suitable drain pan from under the windshield washer solvent container.
4. Install Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Equinox\)](#), [Front Bumper Fascia Replacement \(Terrain\)](#).
5. Lower the vehicle. Refer to [Lifting and Jacking the Vehicle](#)

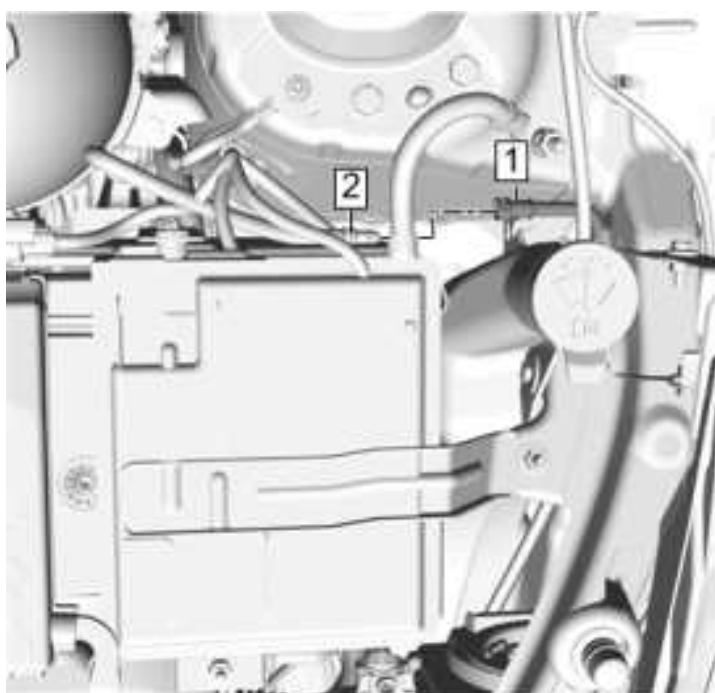


Fig. 18: Rear Windshield Washer Pump Hose And Liftgate Extension Rear Hose
 Courtesy of GENERAL MOTORS COMPANY

6. Install Windshield Washer Pump Hose - Rear (1) @ Windshield Washer Liftgate Extension Rear Hose (2)
7. Install Windshield Washer Pump Hose - Rear (1) @ Windshield Washer Solvent Container
8. Fill the windshield washer system to the proper level.

WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT (CHEVROLET)

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#)

2. Remove Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Equinox\)](#).
3. Place a clean suitable drain pan under the windshield washer solvent container.

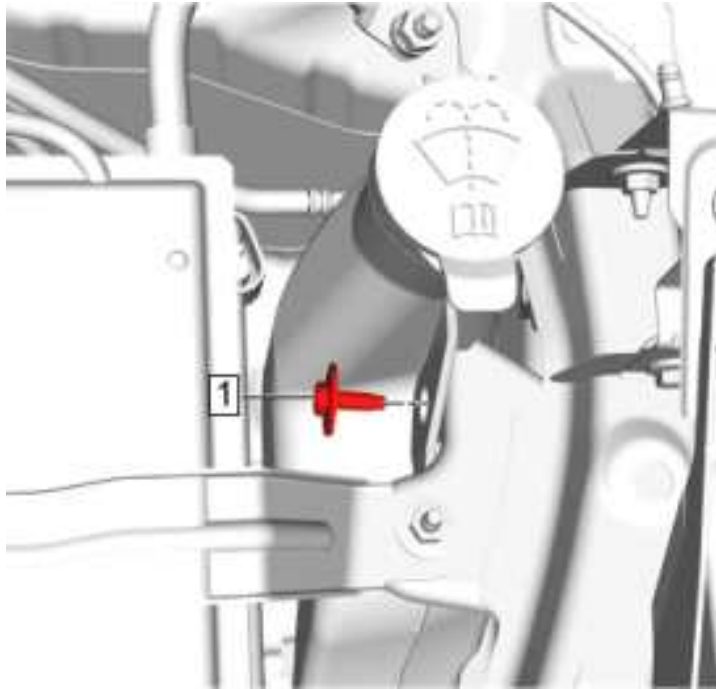


Fig. 19: Windshield Washer Solvent Container Bolt
Courtesy of GENERAL MOTORS COMPANY

4. Remove Windshield Washer Solvent Container Bolt (1)
5. Disconnect all electrical connectors.

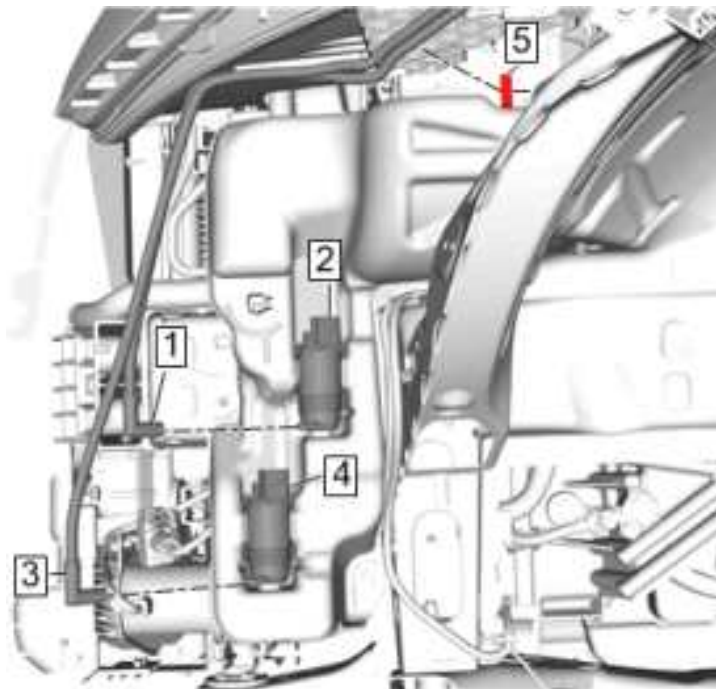


Fig. 20: Front And Rear Windshield Washer Pumps, Hoses, Washer Solvent Container Hoses And Retainer
Courtesy of GENERAL MOTORS COMPANY

6. Remove Windshield Washer Pump Hose - Rear (1) @ Rear Window Washer Pump (2)
7. Remove Windshield Washer Pump Hose - Front (3) @ Windshield Washer Pump (4)
8. Remove both windshield washer solvent container hoses (1, 3) from the windshield washer solvent container retainer. (5)

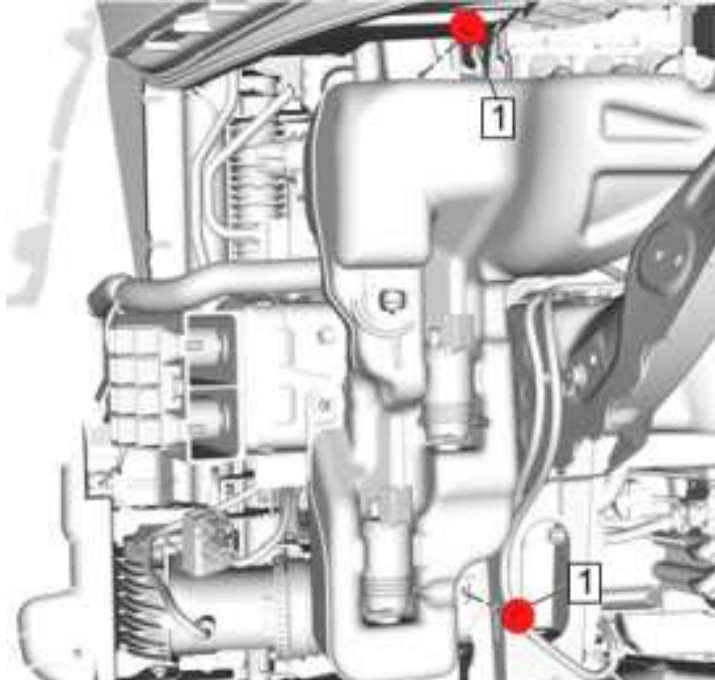


Fig. 21: Windshield Washer Solvent Container Bolts
Courtesy of GENERAL MOTORS COMPANY

9. Remove Windshield Washer Solvent Container Bolts (1) (Qty: 2)

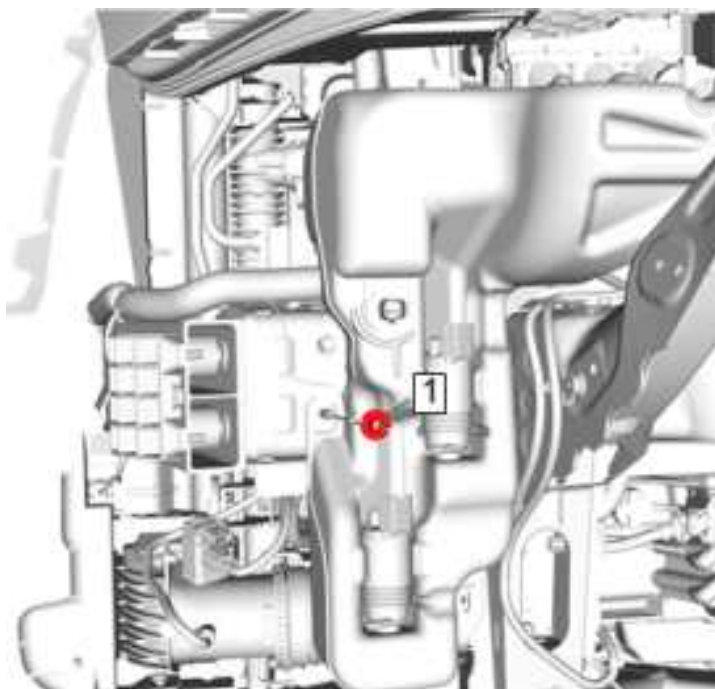


Fig. 22: Washer Solvent Container Nut
Courtesy of GENERAL MOTORS COMPANY

10. Remove Windshield Washer Solvent Container Nut (1)

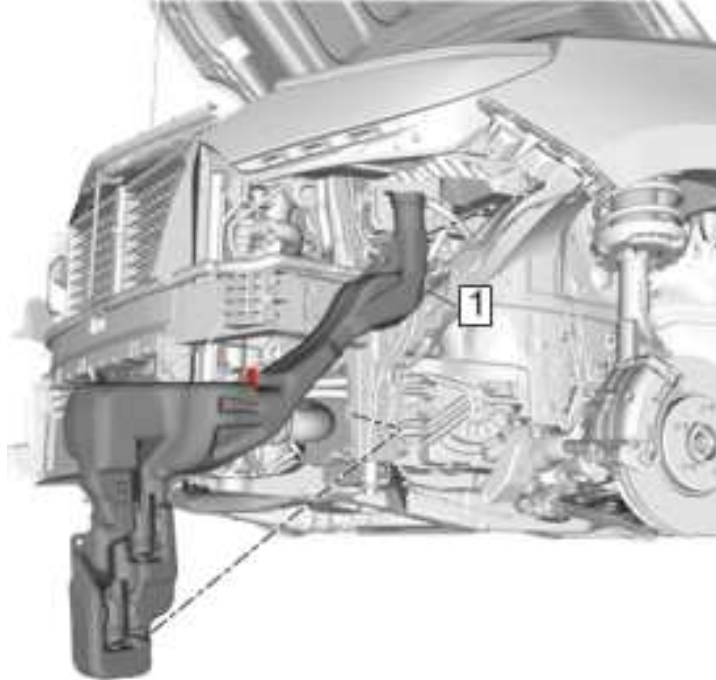


Fig. 23: Washer Solvent Container
Courtesy of GENERAL MOTORS COMPANY

11. Remove Windshield Washer Solvent Container (1)
12. Drain the windshield washer solvent into a suitable clean container.
13. Transfer components as necessary.

Installation Procedure

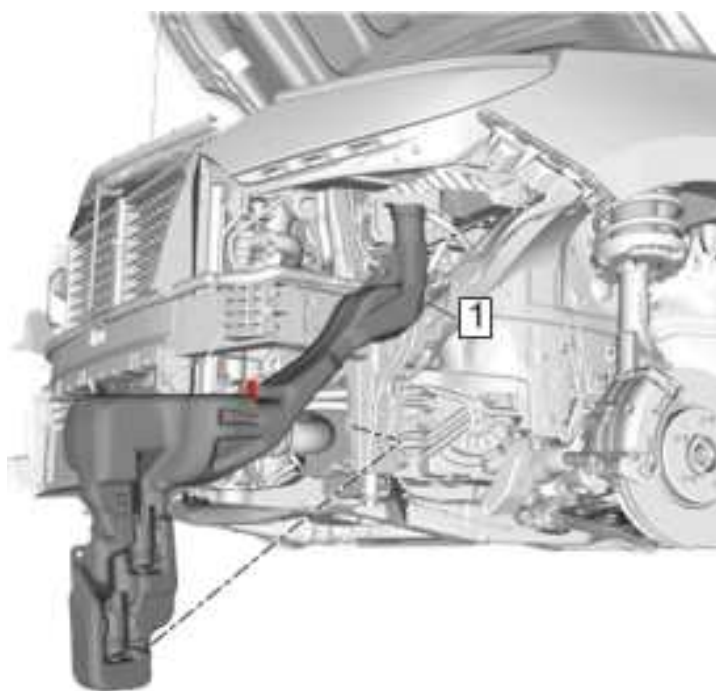


Fig. 24: Washer Solvent Container
Courtesy of GENERAL MOTORS COMPANY

1. Install Windshield Washer Solvent Container (1)

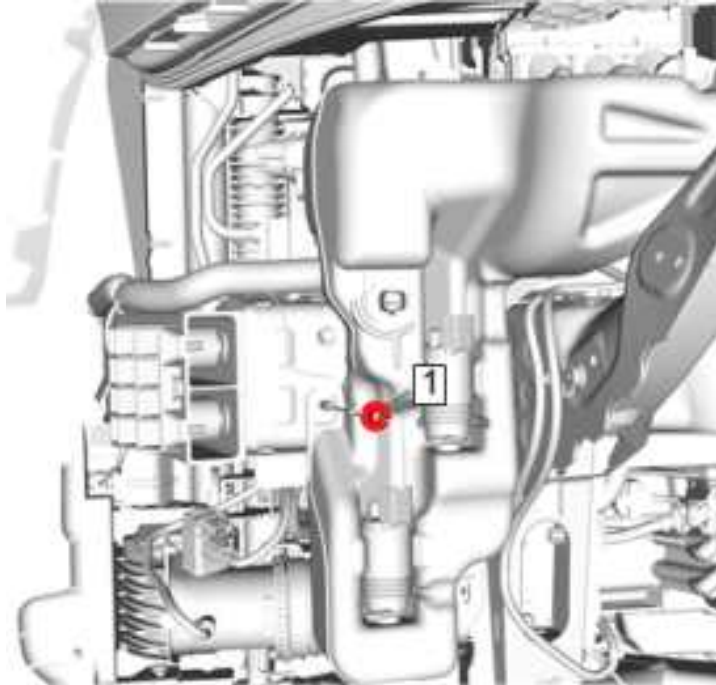


Fig. 25: Washer Solvent Container Nut
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

2. Install and tighten Windshield Washer Solvent Container Nut (1) to 9 N.m (80 lb in)

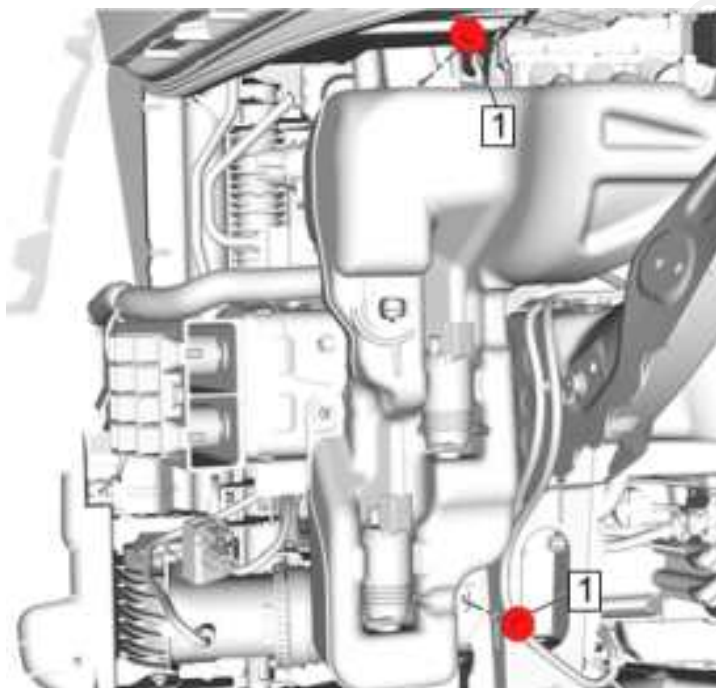


Fig. 26: Windshield Washer Solvent Container Bolts
Courtesy of GENERAL MOTORS COMPANY

3. Install and tighten Windshield Washer Solvent Container Bolts (Qty: 2) to 9 N.m (80 lb in)

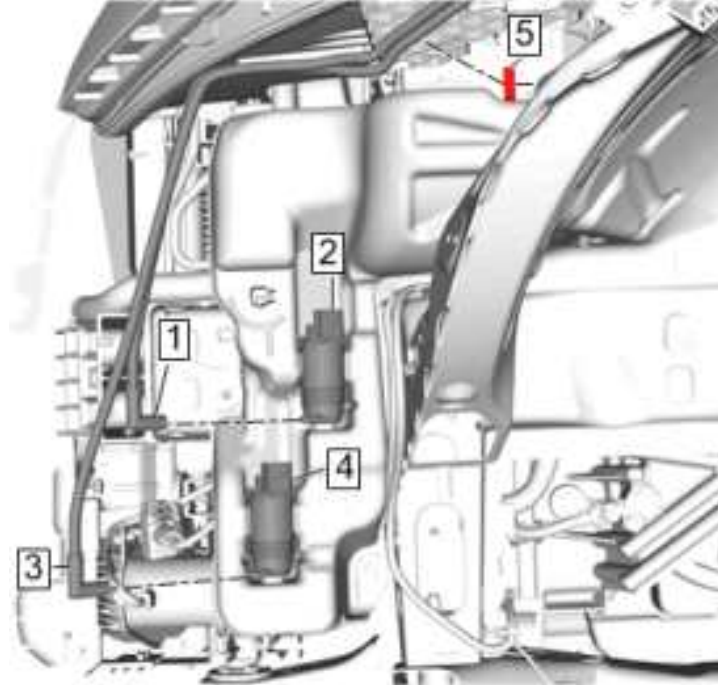


Fig. 27: Front And Rear Windshield Washer Pumps, Hoses, Washer Solvent Container Hoses And Retainer
 Courtesy of GENERAL MOTORS COMPANY

4. Install both windshield washer solvent container hoses (1, 3) to the windshield washer solvent container retainer. (5)
5. Install Windshield Washer Pump Hose - Front (3) @ Windshield Washer Pump (4)
6. Install Windshield Washer Pump Hose - Rear (1) @ Rear Window Washer Pump (2)
7. Connect the electrical connectors.

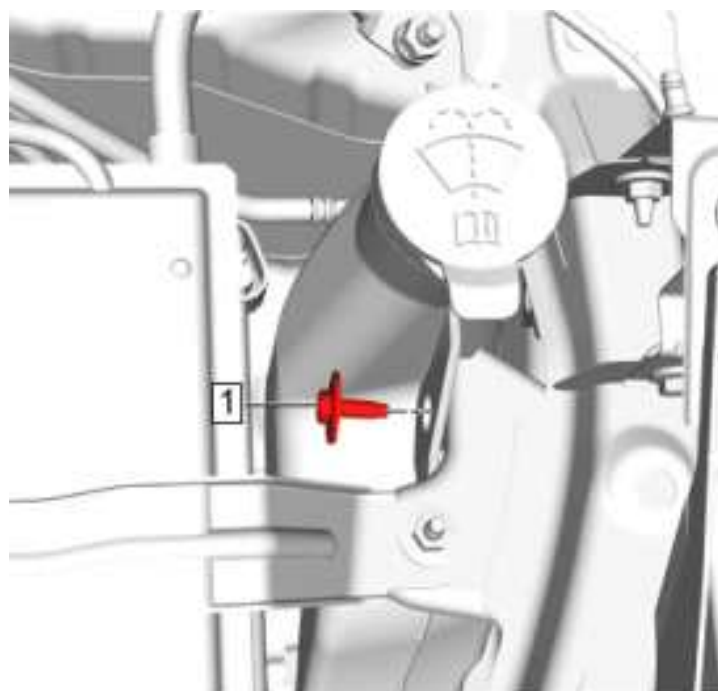


Fig. 28: Windshield Washer Solvent Container Bolt
 Courtesy of GENERAL MOTORS COMPANY

8. Install and tighten Windshield Washer Solvent Container Bolt (1) to 9 N.m (80 lb in)
9. Remove the clean suitable drain pan from under the windshield washer solvent container.
10. Install Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Equinox\)](#)
11. Lower the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
12. Fill the windshield washer system to the proper level.

WINDSHIELD WASHER SOLVENT CONTAINER REPLACEMENT (GMC)

Removal Procedure

1. Raise the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
2. Remove Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Terrain\)](#).
3. Remove Headlamp-Left Side. Refer to [Headlamp Replacement \(GMC\)](#)
4. Place a clean suitable drain pan under the windshield washer solvent container.

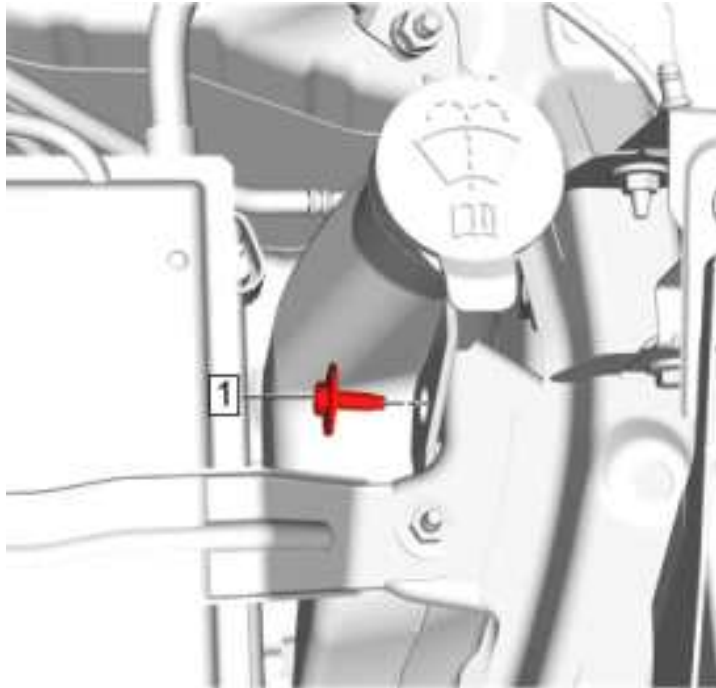


Fig. 29: Windshield Washer Solvent Container Bolt
Courtesy of GENERAL MOTORS COMPANY

5. Remove Windshield Washer Solvent Container Bolt (1)
6. Disconnect all electrical connectors.

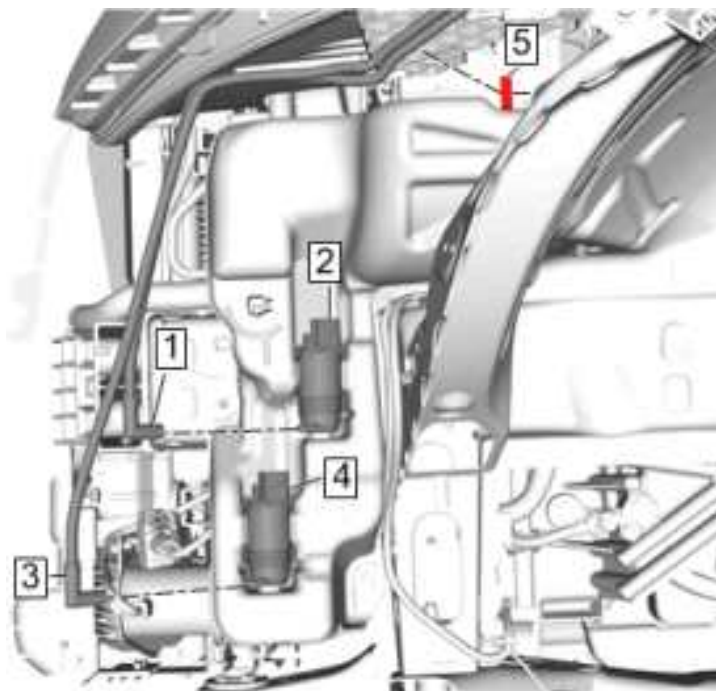


Fig. 30: Front And Rear Windshield Washer Pumps, Hoses, Washer Solvent Container Hoses And Retainer
Courtesy of GENERAL MOTORS COMPANY

7. Remove Windshield Washer Pump Hose - Rear (1) @ Rear Window Washer Pump (2)
8. Remove Windshield Washer Pump Hose - Front (3) @ Windshield Washer Pump (4)
9. Remove both windshield washer solvent container hoses (1, 3) from the windshield washer solvent container retainer. (5)

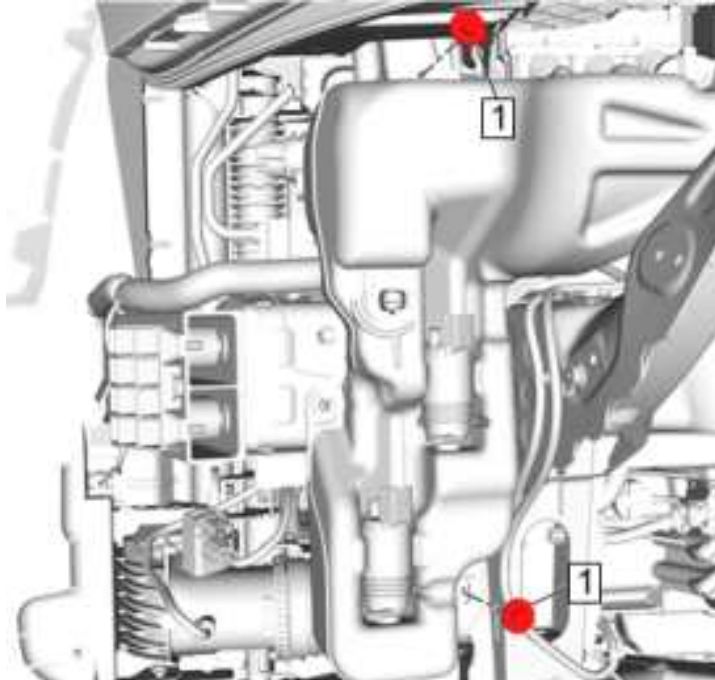


Fig. 31: Windshield Washer Solvent Container Bolts
Courtesy of GENERAL MOTORS COMPANY

10. Remove Windshield Washer Solvent Container Bolts (1) (Qty: 2)

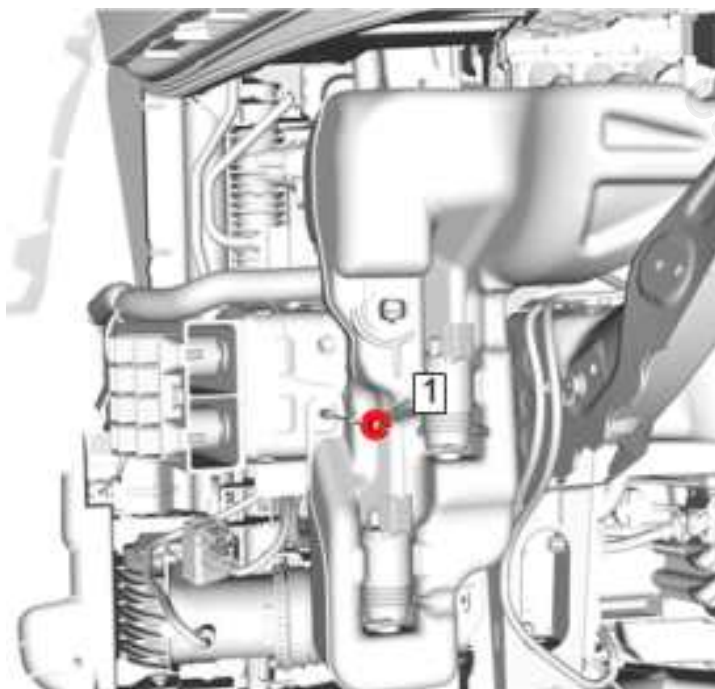


Fig. 32: Washer Solvent Container Nut
Courtesy of GENERAL MOTORS COMPANY

11. Remove Windshield Washer Solvent Container Nut (1)

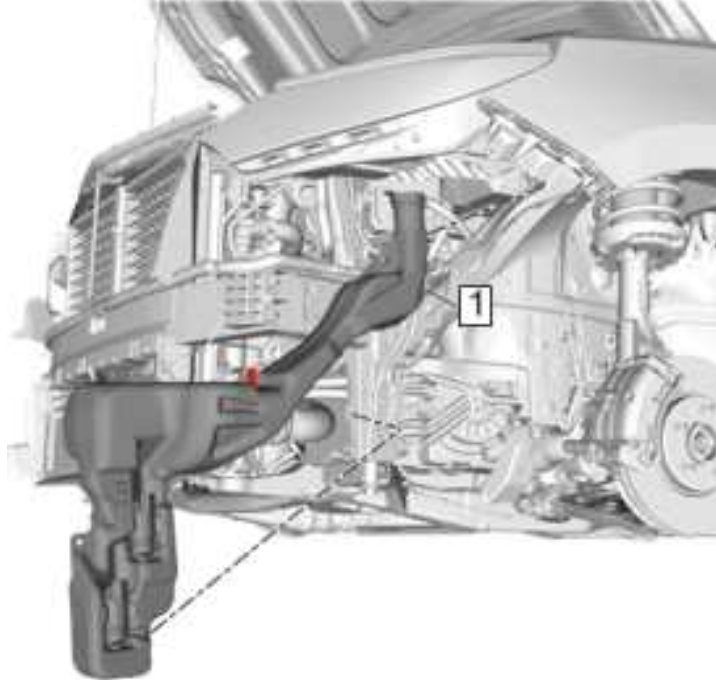


Fig. 33: Washer Solvent Container
Courtesy of GENERAL MOTORS COMPANY

12. Remove Windshield Washer Solvent Container (1)
13. Drain the windshield washer solvent into a suitable clean container.
14. Transfer components as necessary.

Installation Procedure

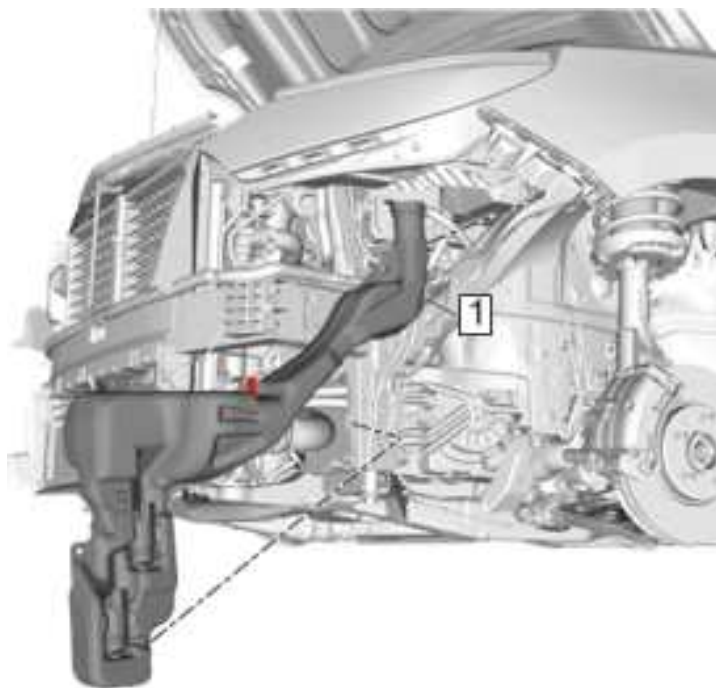


Fig. 34: Washer Solvent Container
Courtesy of GENERAL MOTORS COMPANY

1. Install Windshield Washer Solvent Container (1)

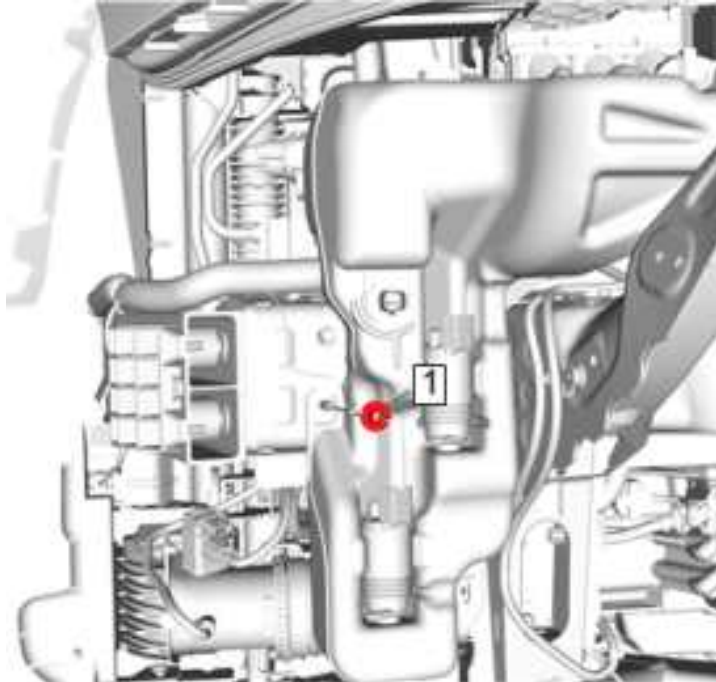


Fig. 35: Washer Solvent Container Nut
 Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to **Fastener Caution** .

2. Install and tighten Windshield Washer Solvent Container Nut (1) to 9 N.m (80 lb in)

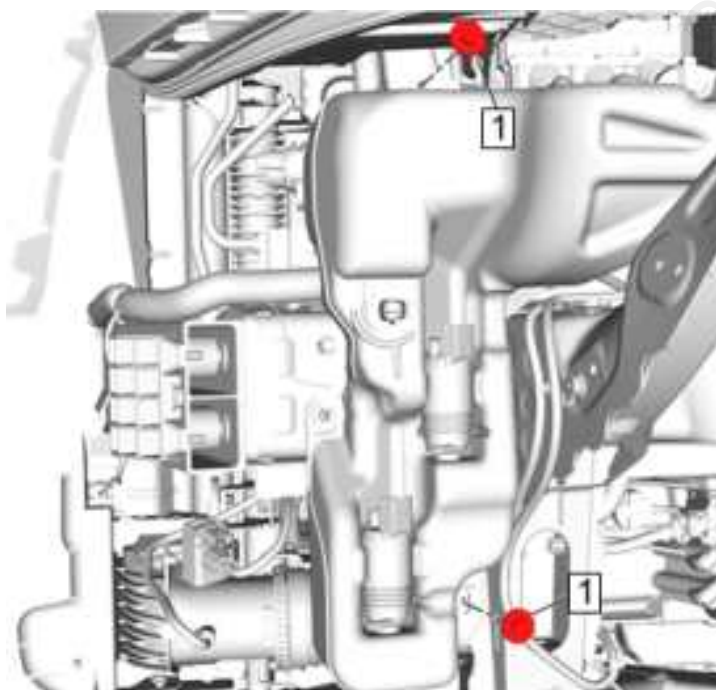


Fig. 36: Windshield Washer Solvent Container Bolts
 Courtesy of GENERAL MOTORS COMPANY

3. Install and tighten Windshield Washer Solvent Container Bolts (1) (Qty: 2) to 9 N.m (80 lb in)

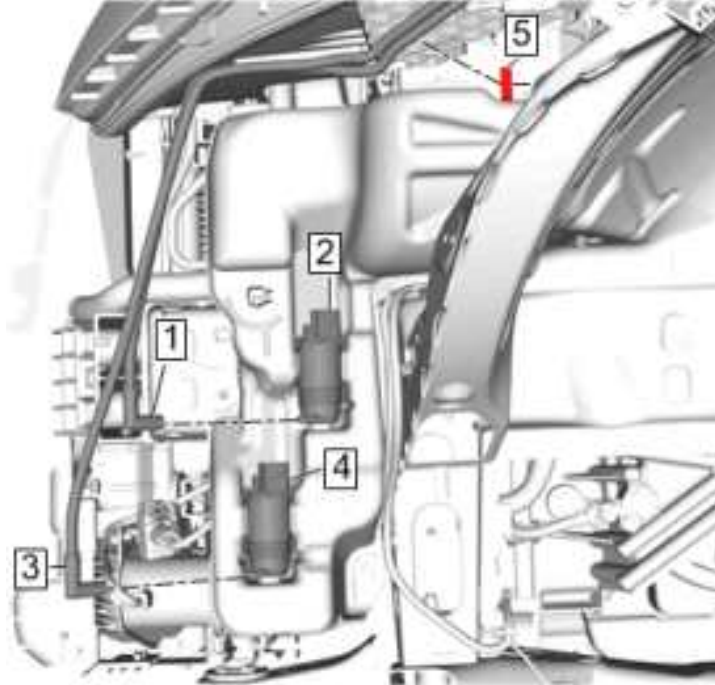


Fig. 37: Front And Rear Windshield Washer Pumps, Hoses, Washer Solvent Container Hoses And Retainer

Courtesy of GENERAL MOTORS COMPANY

4. Install both windshield washer solvent container hoses (1, 3) to the windshield washer solvent container retainer. (5)
5. Install Windshield Washer Pump Hose - Front (3) @ Windshield Washer Pump (4)
6. Install Windshield Washer Pump Hose - Rear (1) @ Rear Window Washer Pump (2)
7. Connect the electrical connectors.

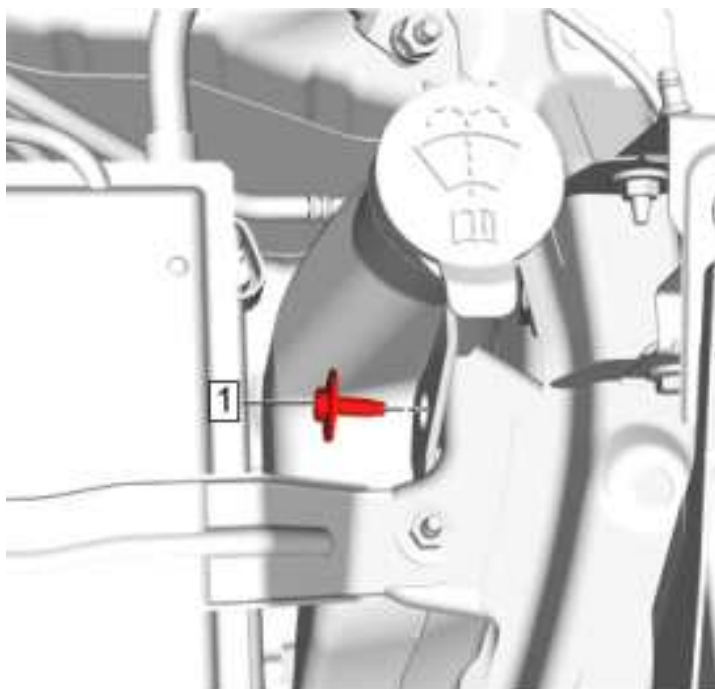


Fig. 38: Windshield Washer Solvent Container Bolt

Courtesy of GENERAL MOTORS COMPANY

8. Install and tighten Windshield Washer Solvent Container Bolt (1) to 9 N.m (80 lb in)
9. Remove the clean suitable drain pan from under the windshield washer solvent container.
10. Install Headlamp-Left Side. Refer to [Headlamp Replacement \(GMC\)](#)
11. Install Front Bumper Fascia. Refer to [Front Bumper Fascia Replacement \(Terrain\)](#)
12. Lower the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
13. Fill the windshield washer system to the proper level.

WINDSHIELD WASHER PUMP REPLACEMENT

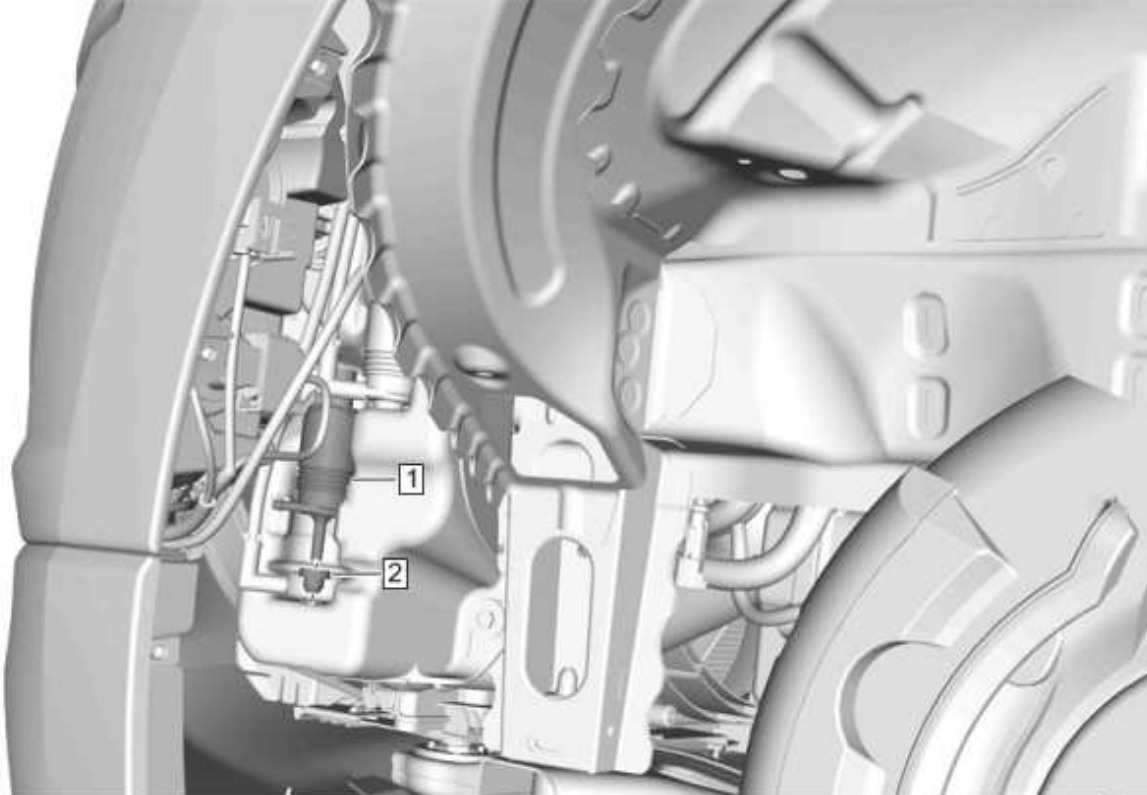


Fig. 39: Windshield Washer Pump

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Front Wheelhouse Liner - Left Side. Refer to Front Wheelhouse Liner Replacement - Left Side (Equinox) Front Wheelhouse Liner Replacement - Left Side (Terrain). 2. Place a clean suitable drain pan under the windshield washer solvent container.	
1	Windshield Washer Pump Procedure 1. Disconnect the electrical connector. 2. Disconnect the windshield washer pump hose. 3. Using two flat-bladed tools under the washer pump, pry upward in order to remove the pump from the washer container.
2	Windshield Washer Pump Grommet Procedure Using two flat-bladed tools under the washer pump grommet, pry upward in order to remove the grommet from the washer container. NOTE: Install a new grommet. DO NOT reuse the old grommet.

REAR WINDOW WASHER PUMP REPLACEMENT

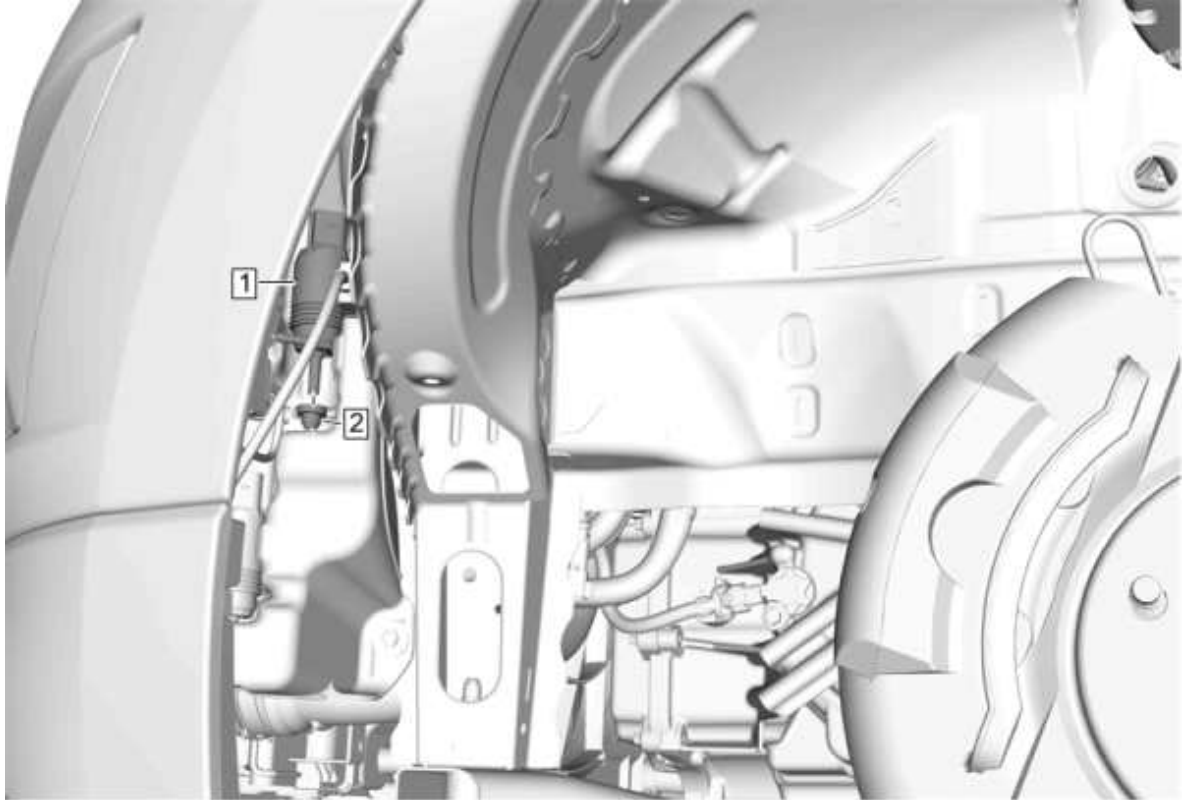


Fig. 40: Rear Window Washer Pump
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Front Wheelhouse Liner - Left Side. Refer to Front Wheelhouse Liner Replacement - Left Side (Equinox) Front Wheelhouse Liner Replacement - Left Side (Terrain). 2. Place a clean suitable drain pan under the windshield washer solvent container.	
1	Rear Window Washer Pump Procedure 1. Disconnect the electrical connector. 2. Disconnect the rear window washer pump hose. 3. Using two flat-bladed tools under the washer pump, pry upward in order to remove the pump from the washer container.
2	Rear Window Washer Pump Grommet Procedure Using two flat-bladed tools under the washer pump grommet, pry upward in order to remove the grommet from the washer container. NOTE: Install a new grommet. DO NOT reuse the old grommet.

WINDSHIELD WASHER SOLVENT CONTAINER LEVEL SENSOR REPLACEMENT

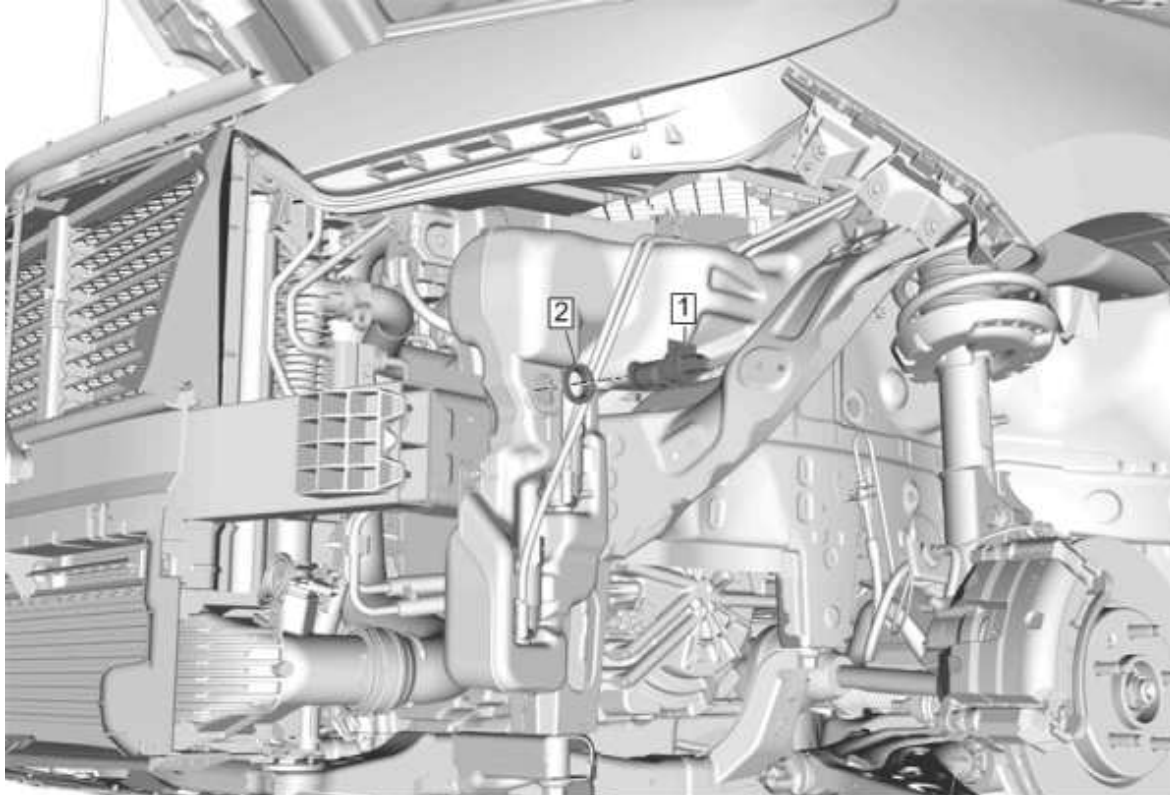


Fig. 41: Windshield Washer Solvent Container Level Sensor

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Front Wheelhouse Liner - Left Side. Refer to Front Wheelhouse Liner Replacement - Left Side (Equinox) Front Wheelhouse Liner Replacement - Left Side (Terrain). 2. Place a clean suitable drain pan under the windshield washer solvent container.	
1	Windshield Washer Solvent Container Level Sensor Procedure 1. Disconnect the electrical connector. 2. Using two flat-bladed tools placed under each side of the level sensor, disengage the level sensor from the washer container.
2	Windshield Washer Solvent Container Level Sensor Grommet Procedure Using two flat-bladed tools under the washer pump grommet, pry upward in order to remove the grommet from the washer container. NOTE: Install a new grommet. DO NOT reuse the old grommet.

AIR INLET GRILLE PANEL REPLACEMENT

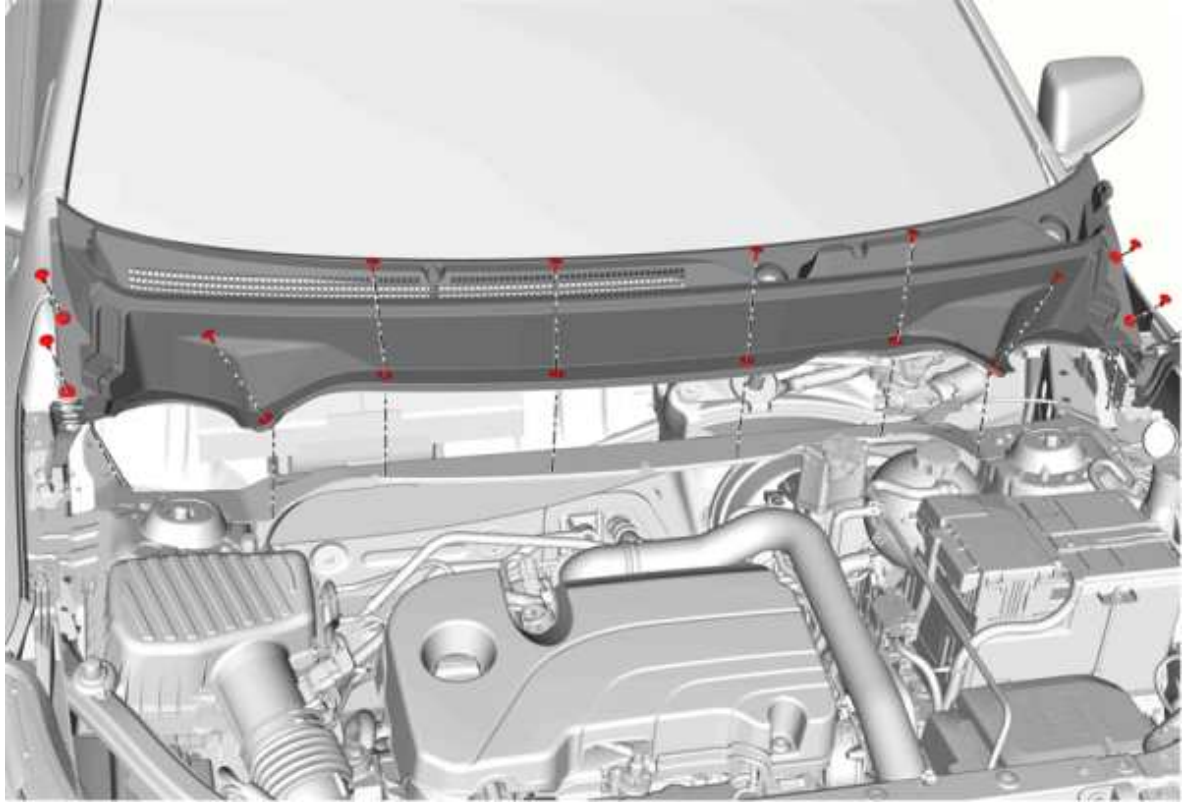


Fig. 42: Air Inlet Grille Panel

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedures 1. Remove Windshield Wiper Arm. Refer to Windshield Wiper Arm Replacement 2. Remove left and right side air inlet grille panel extensions. Refer to Air Inlet Grille Panel Extension Replacement (Left Side)Air Inlet Grille Panel Extension Replacement (Right Side)	
1	Air Inlet Grille Panel Retainer (Qty: 10)
2	Air Inlet Grille Panel Procedure 1. Disconnect the windshield washer nozzle hose. 2. Use an appropriate tool to carefully release the air inlet grille panel from the windshield. 3. Lift up the front edge of the air inlet grille panel, slide the grille panel forward from both hood hinges. 4. Transfer components as necessary.

AIR INLET GRILLE PANEL EXTENSION REPLACEMENT (LEFT SIDE)

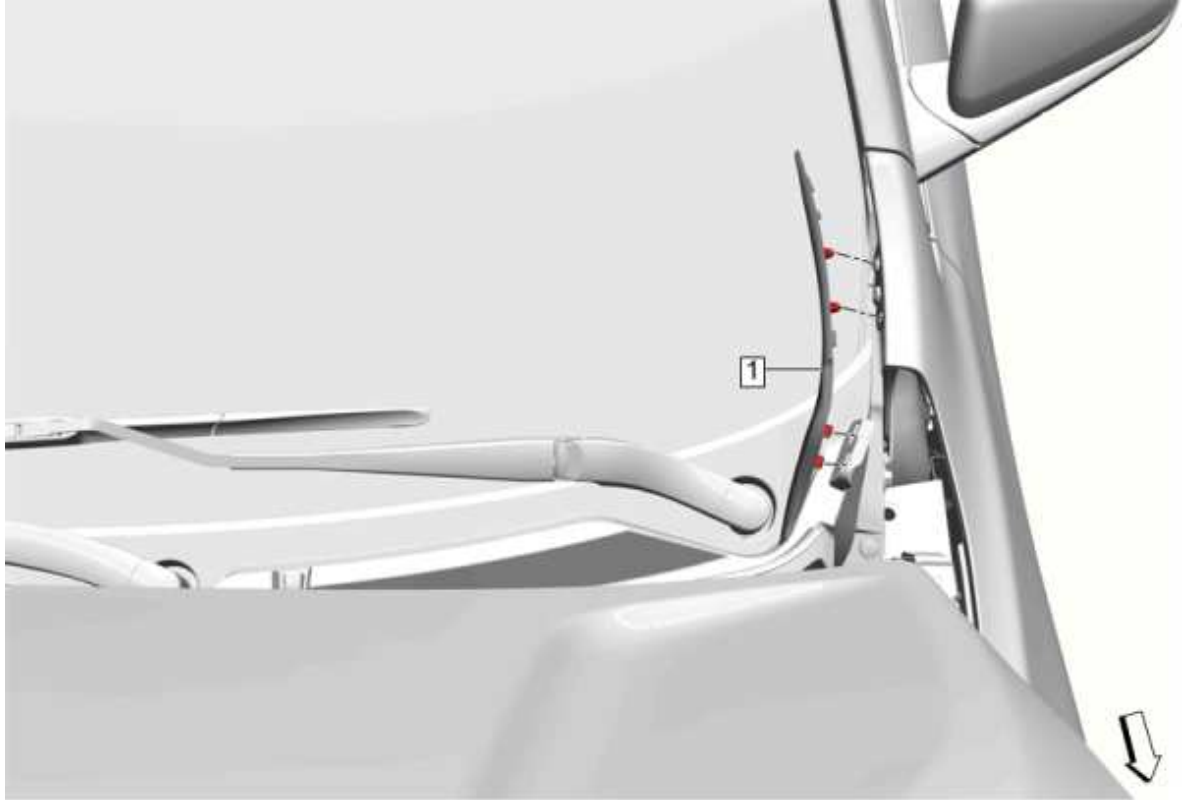


Fig. 43: Air Inlet Grille Panel Extension (Left Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Air Inlet Grille Panel Extension Procedure Grasp the air inlet grille panel side extension and disengage the retainers from the top edge of the fender and the air inlet grille panel.

AIR INLET GRILLE PANEL EXTENSION REPLACEMENT (RIGHT SIDE)

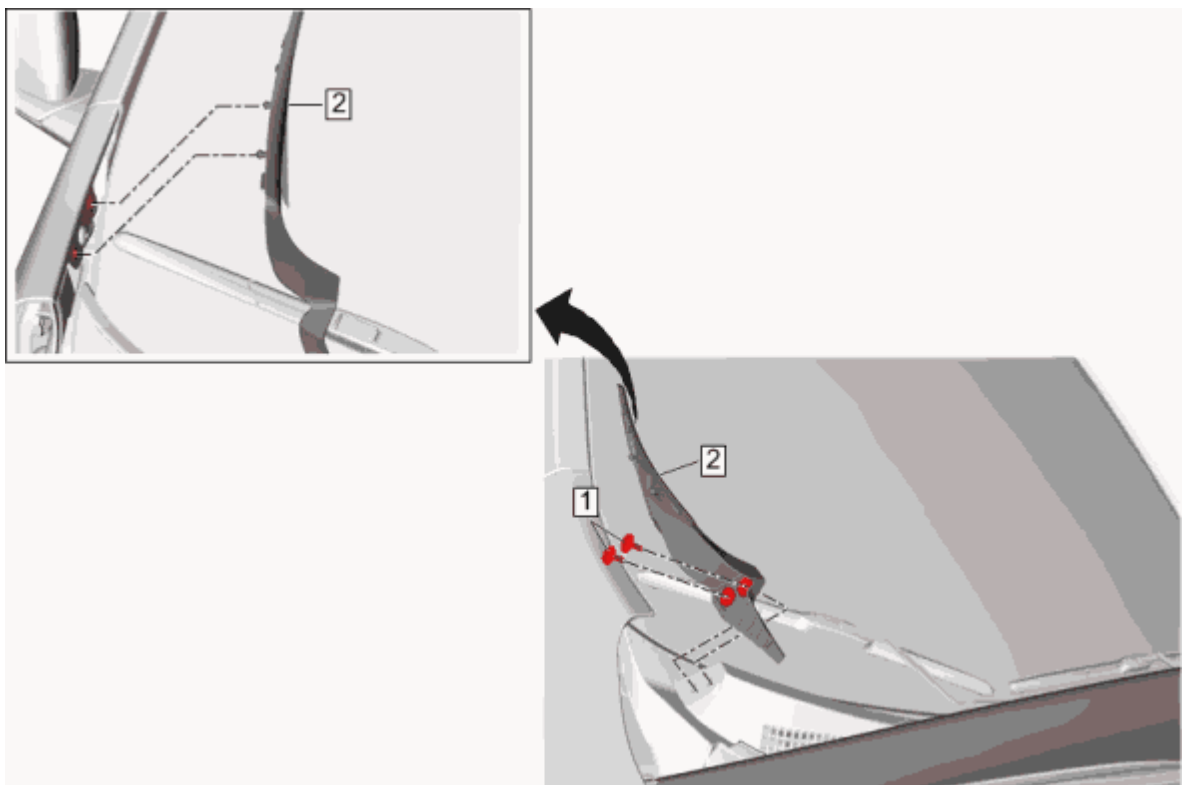


Fig. 44: Air Inlet Grille Panel Extension (Right Side)

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Air Inlet Grille Panel Extension Retainer (Qty: 2)
2	Air Inlet Grille Panel Extension Procedure Grasp the air inlet grille panel side extension and disengage the retainers from the top edge of the fender and the air inlet grille panel.

AIR INLET GRILLE PANEL WATER DEFLECTOR REPLACEMENT

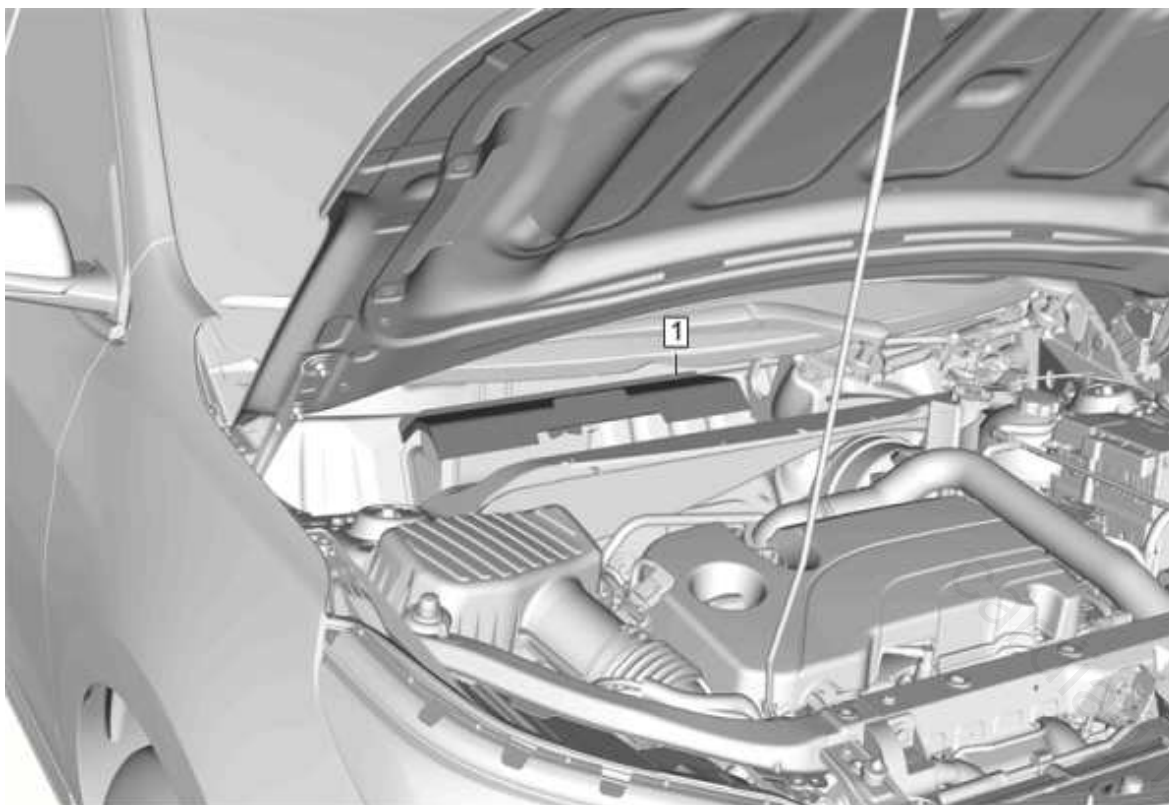


Fig. 45: Air Inlet Grille Panel Water Deflector
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Air Inlet Grille Panel. Refer to Air Inlet Grille Panel Replacement	
1	Air Inlet Grille Panel Water Deflector Procedure Lift up the front edge of the water deflector, slide the water deflector forward from the plenum.

WINDSHIELD WIPER ARM REPLACEMENT

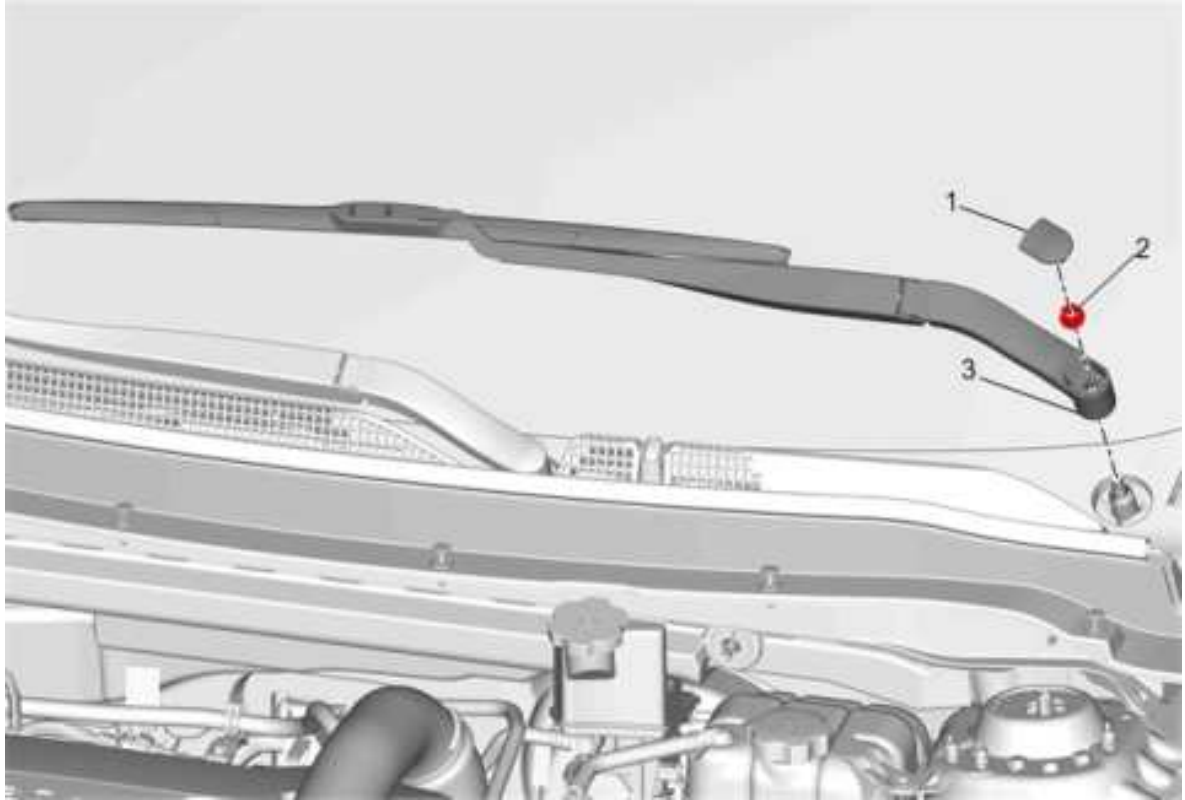


Fig. 46: Windshield Wiper Arm

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Open the hood.	
1	Windshield Wiper Arm Finish Cap Procedure Use an appropriate tool to remove the finish cap on the wiper arm.
2	Windshield Wiper Arm Nut CAUTION: Refer to Fastener Caution . Tighten 39.5 N.m (29 lb ft)
3	Windshield Wiper Arm Procedure 1. Grasp the outer end of the wiper arm and gently rock the arm back and forth, while holding the wiper arm blade off the windshield. 2. Remove the windshield wiper arm from the pivot shaft. 3. Clean the wiper motor pivot shaft knurls with a soft wire brush before installing a new wiper arm. 4. Position the wiper arm on the wiper motor pivot shaft. 5. Align the windshield wiper arm. Refer to Windshield Wiper Arm Adjustment

REAR WINDOW WIPER ARM REPLACEMENT

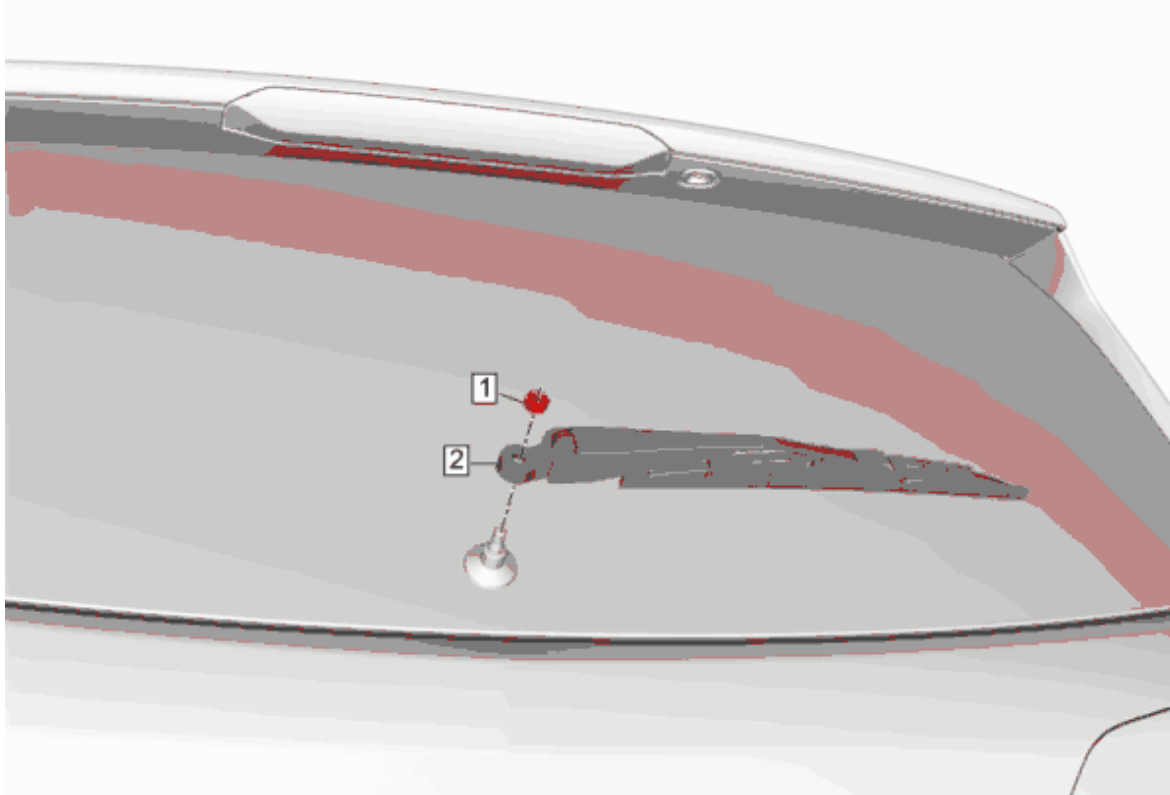


Fig. 47: Rear Window Wiper Arm And Nut
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Rear Window Wiper Cover. Refer to Rear Window Wiper Cover Replacement	
1	Rear Window Wiper Arm Nut CAUTION: Refer to Fastener Caution . Tighten 13 N.m (115 lb in)
2	Rear Window Wiper Arm Procedure 1. Use the J-39822 puller to remove the wiper arm from the wiper motor pivot shaft. 2. Clean the knurls on the rear wiper motor pivot shaft with a soft wire brush prior to re-installation of the rear window wiper arm. 3. Align and position the wiper arm on the wiper motor pivot shaft. Special Tools J 39822 Wiper Arm Puller Special Tools

WINDSHIELD WIPER BLADE REPLACEMENT

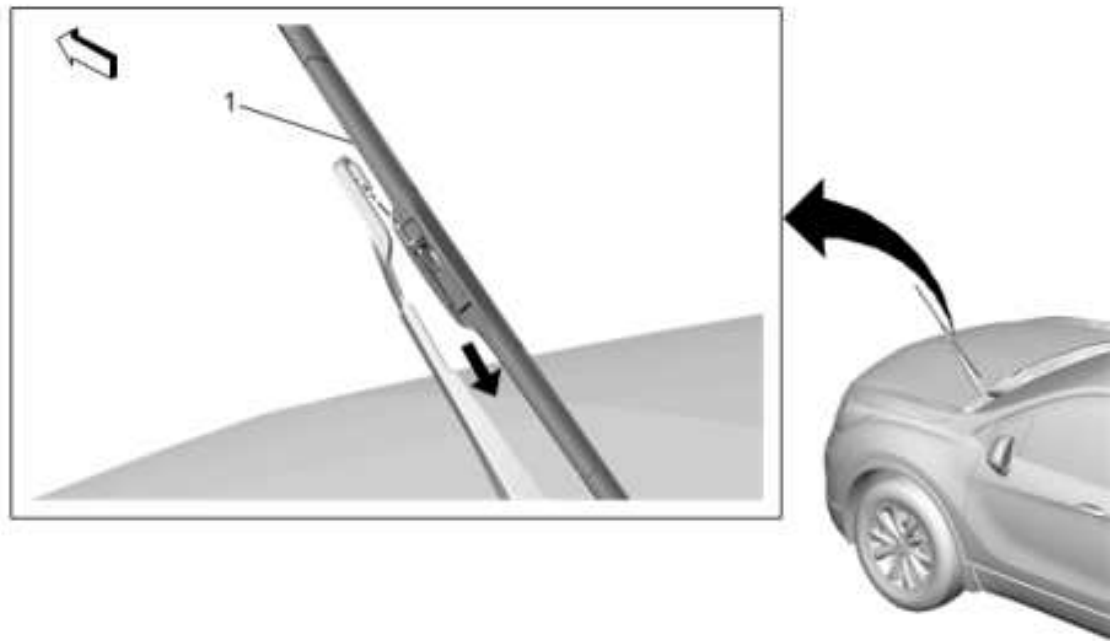


Fig. 48: Windshield Wiper Blade

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Raise the wiper arm to the full up position.	
1	Windshield Wiper Blade Procedure NOTE: Do not let the wiper arm with a removed wiper blade, come in contact with the windshield. Release the tab under the hook and pull the wiper blade rearward from the hook.

REAR WINDOW WIPER BLADE REPLACEMENT

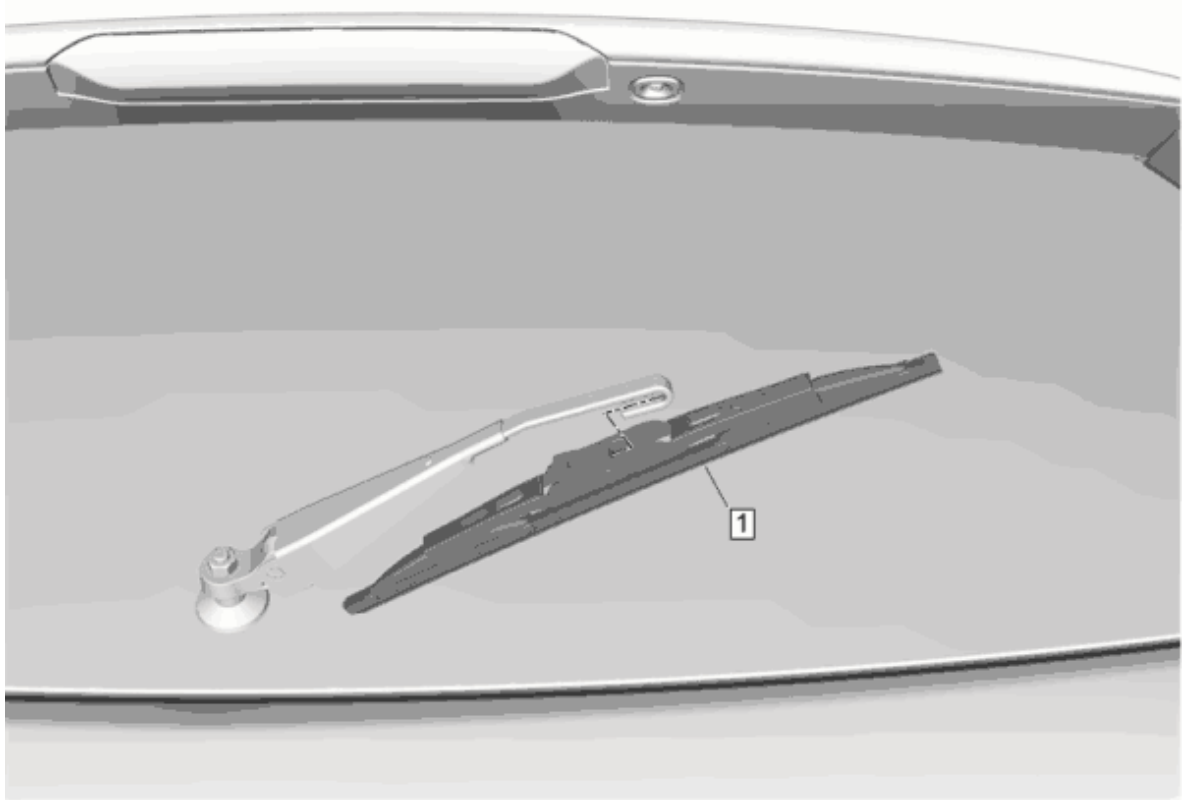


Fig. 49: Rear Window Wiper Blade

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
Remove Rear Window Wiper Cover. Refer to Rear Window Wiper Cover Replacement	
1	Rear Window Wiper Blade Procedure 1. Lift the rear wiper blade off the liftgate window. 2. Release the tab under the hook and pull the wiper blade rearward from the hook. NOTE: Do not let the wiper arm with a removed wiper blade, come in contact with the windshield.

WINDSHIELD WIPER MOTOR REPLACEMENT

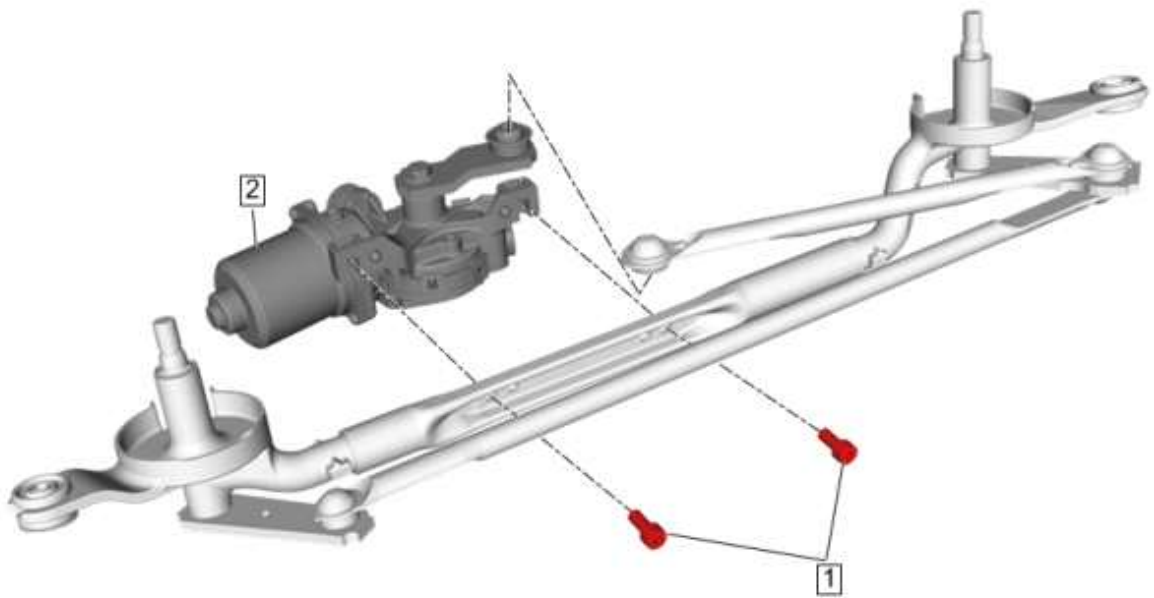


Fig. 50: Windshield Wiper Motor
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Windshield Wiper Transmission. Refer to Windshield Wiper Transmission Replacement	
1	Windshield Wiper Motor Bolt (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 9 N.m (80 lb in)
2	Windshield Wiper Motor Procedure 1. Use the B0-39232 separator to separate the transmission drive link from the wiper motor crank arm ball stud. 2. Use the B0-39529 installer to install the transmission drive link onto the wiper motor crank arm ball stud. NOTE: Apply a small amount of grease to the inner cup on the transmission link to aid in installation. Special Tools • B0-39232 Wiper Linkage Separator • B0-39529 Wiper Linkage Installer Equivalent regional tools: Special Tools

REAR WINDOW WIPER MOTOR REPLACEMENT

Removal Procedure

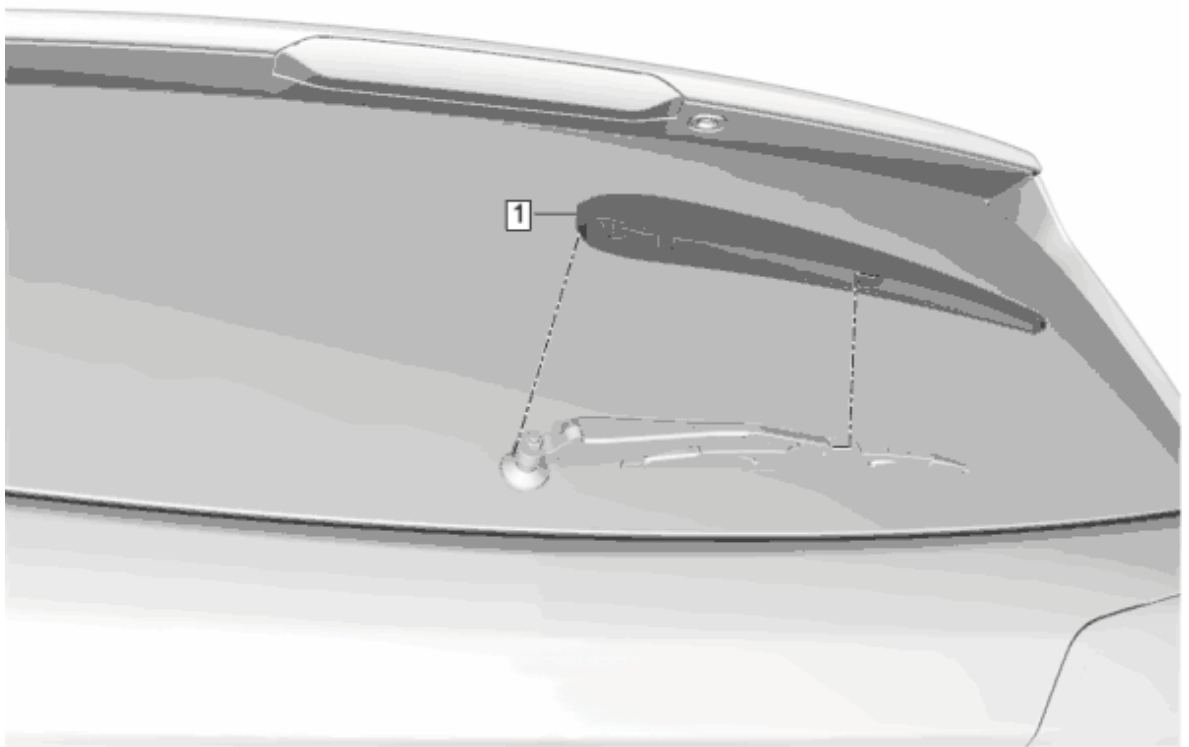


Fig. 51: Rear Window Wiper Cover

Courtesy of GENERAL MOTORS COMPANY

1. Remove Rear Window Wiper Cover (1). Refer to [Rear Window Wiper Cover Replacement](#)

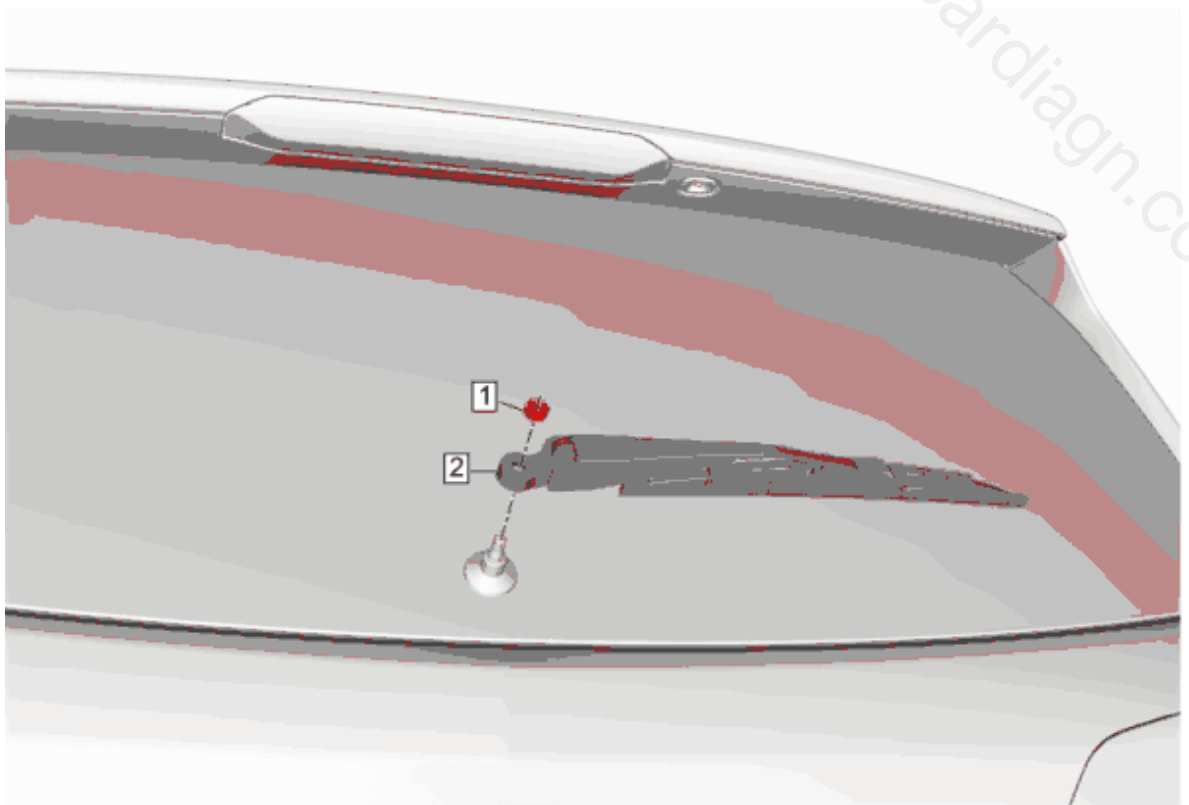


Fig. 52: Rear Window Wiper Arm And Nut

Courtesy of GENERAL MOTORS COMPANY

2. Remove Rear Window Wiper Arm (2). Refer to [Rear Window Wiper Arm Replacement](#)
3. Open the liftgate.
4. Remove Liftgate Lower Trim Finish Panel. Refer to [Liftgate Lower Trim Finish Panel Replacement](#)
5. Disconnect the electrical connector.

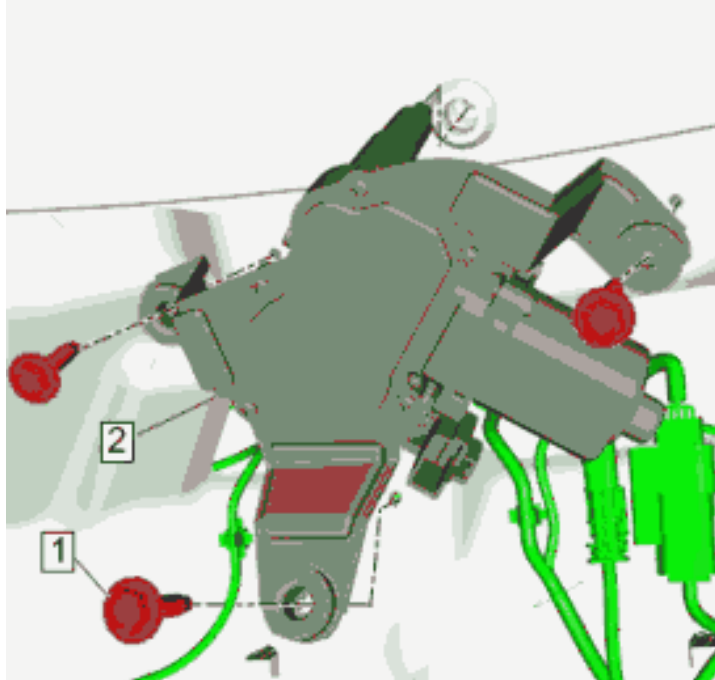


Fig. 53: Rear Window Wiper Motor And Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Remove Rear Window Wiper Motor Bolts (1) (Qty: 3)
7. Remove Rear Window Wiper Motor (2)

Installation Procedure

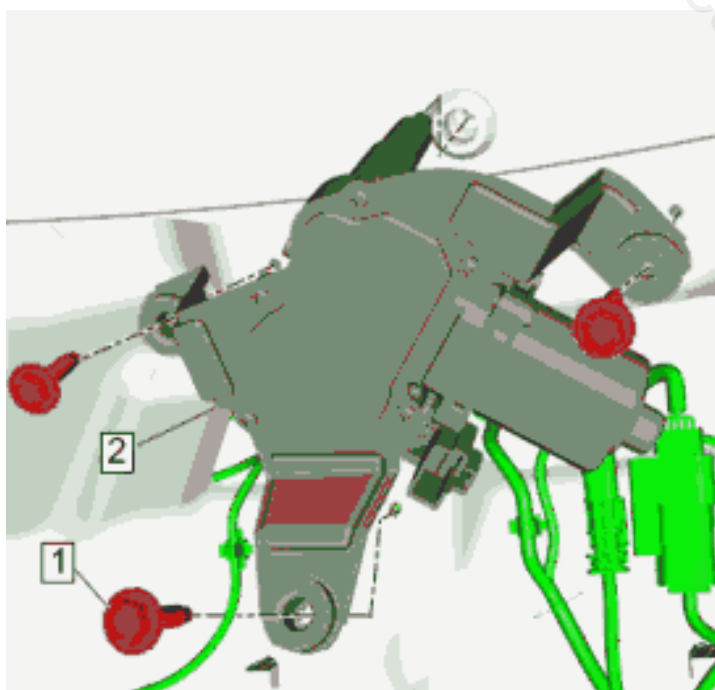


Fig. 54: Rear Window Wiper Motor And Bolts
Courtesy of GENERAL MOTORS COMPANY

1. Install Rear Window Wiper Motor (2)

CAUTION: Refer to [Fastener Caution](#) .

2. Install and tighten Rear Window Wiper Motor Bolts (1) (Qty: 3) to 9 N.m (80 lb in)
3. Connect the electrical connector.
4. Install Liftgate Lower Trim Finish Panel. Refer to [Liftgate Lower Trim Finish Panel Replacement](#)
5. Close the liftgate.

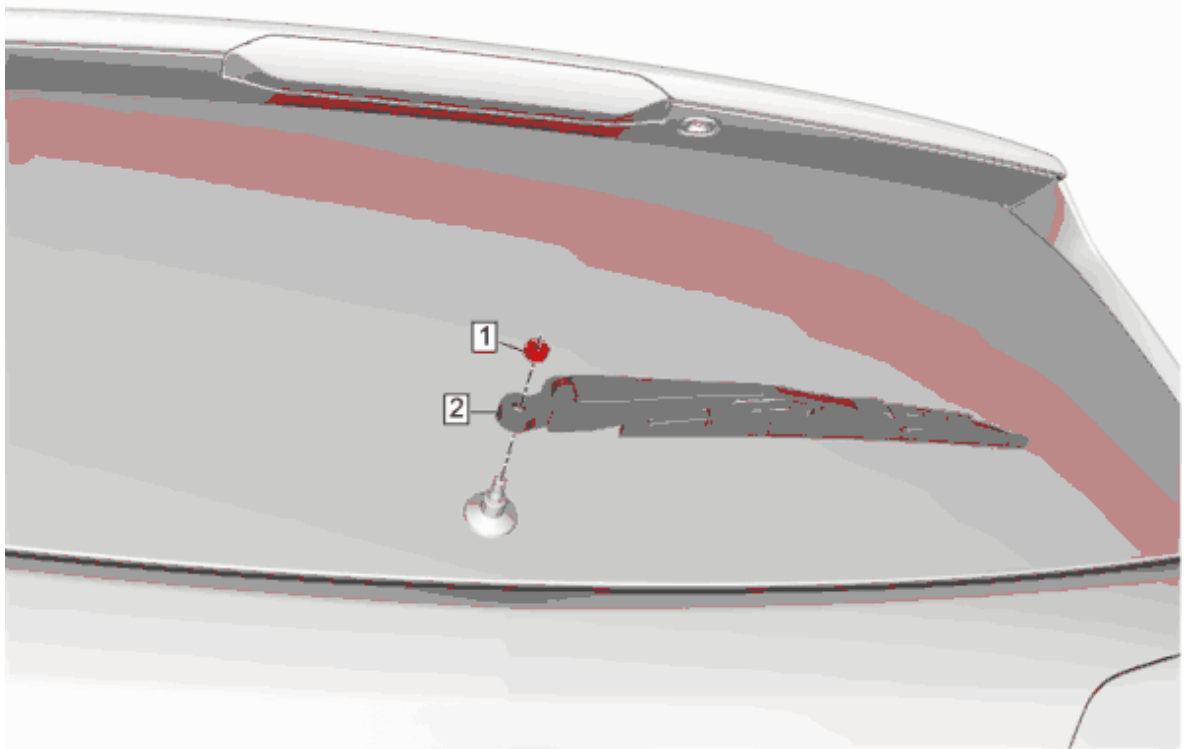


Fig. 55: Rear Window Wiper Arm And Nut
Courtesy of GENERAL MOTORS COMPANY

6. Install Rear Window Wiper Arm (2). Refer to [Rear Window Wiper Arm Replacement](#)

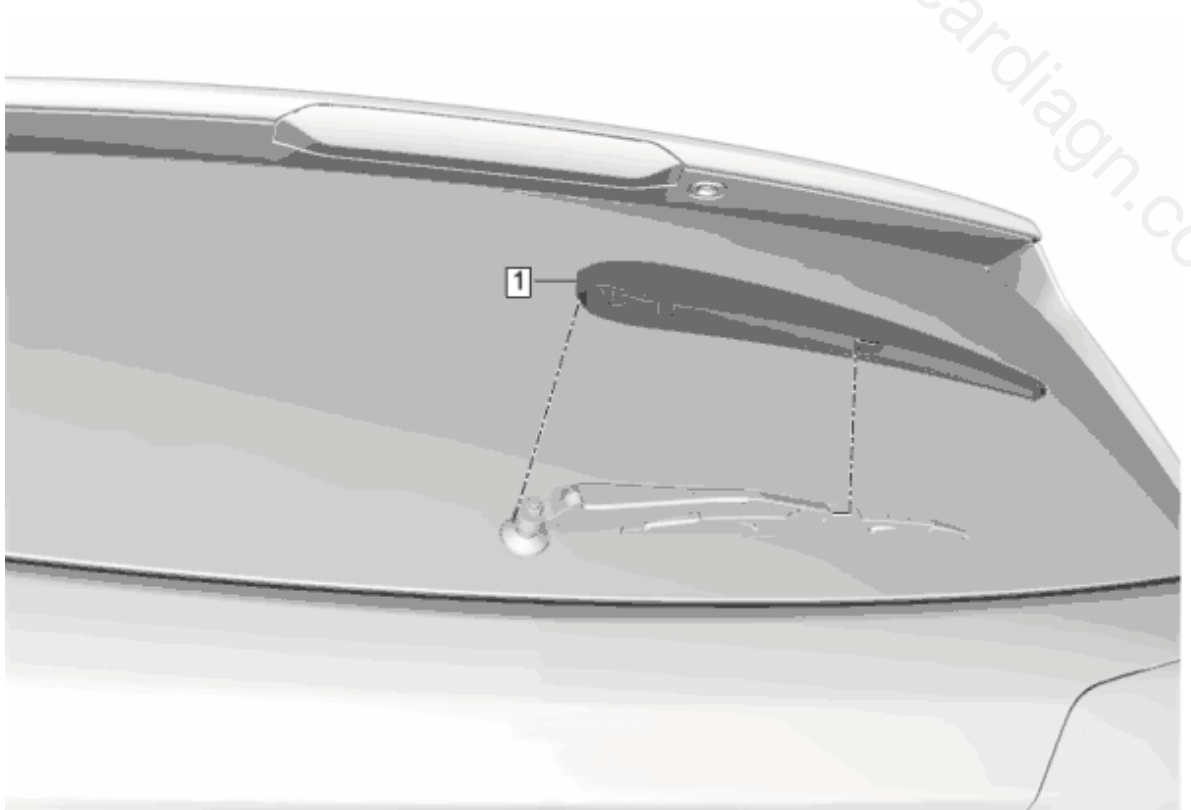


Fig. 56: Rear Window Wiper Cover
Courtesy of GENERAL MOTORS COMPANY

7. Install Rear Window Wiper Cover (1). Refer to [Rear Window Wiper Cover Replacement](#)

REAR WINDOW WIPER COVER REPLACEMENT

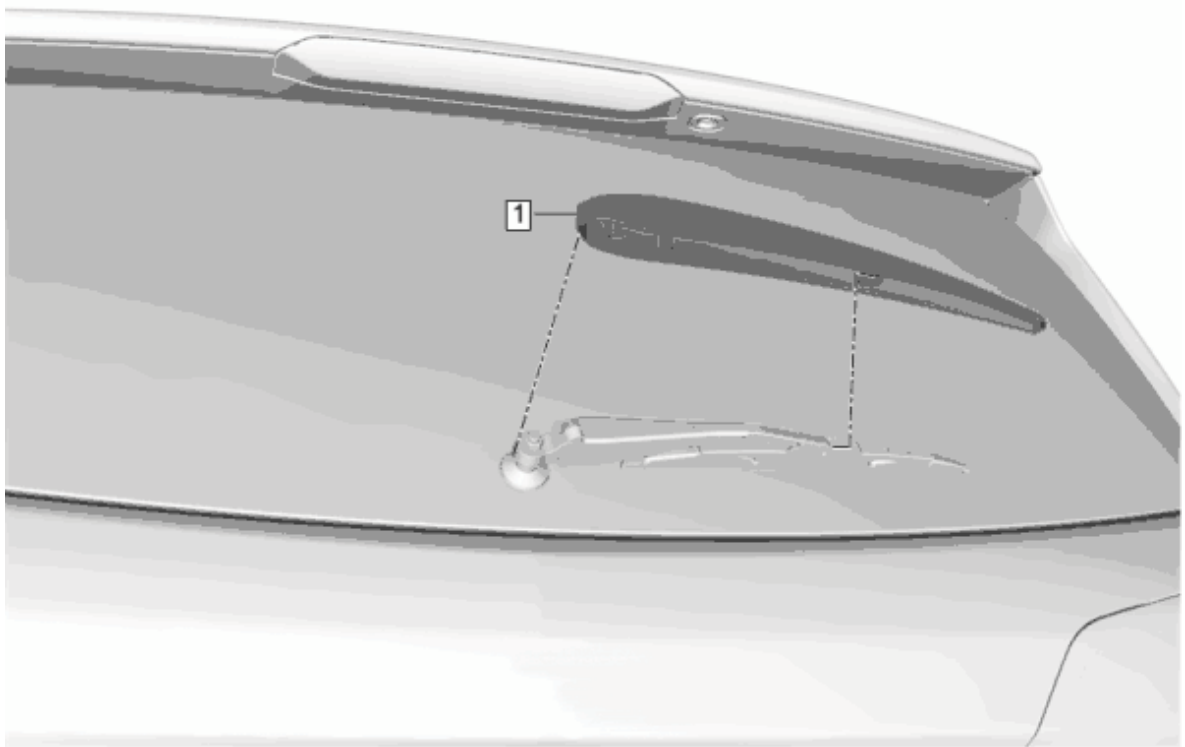


Fig. 57: Rear Window Wiper Cover
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Rear Window Wiper Cover Procedure 1. Slide the cover to the left to disengage the hook on the underside of cover. 2. Line up the wiper arm cover with the hook on the underside of the cover at the hole in the wiper blade. 3. Insert the hook and slide the cover to the right to lock in place. 4. Push the base of the wiper arm cover down to secure it in place.

WINDSHIELD WIPER TRANSMISSION REPLACEMENT

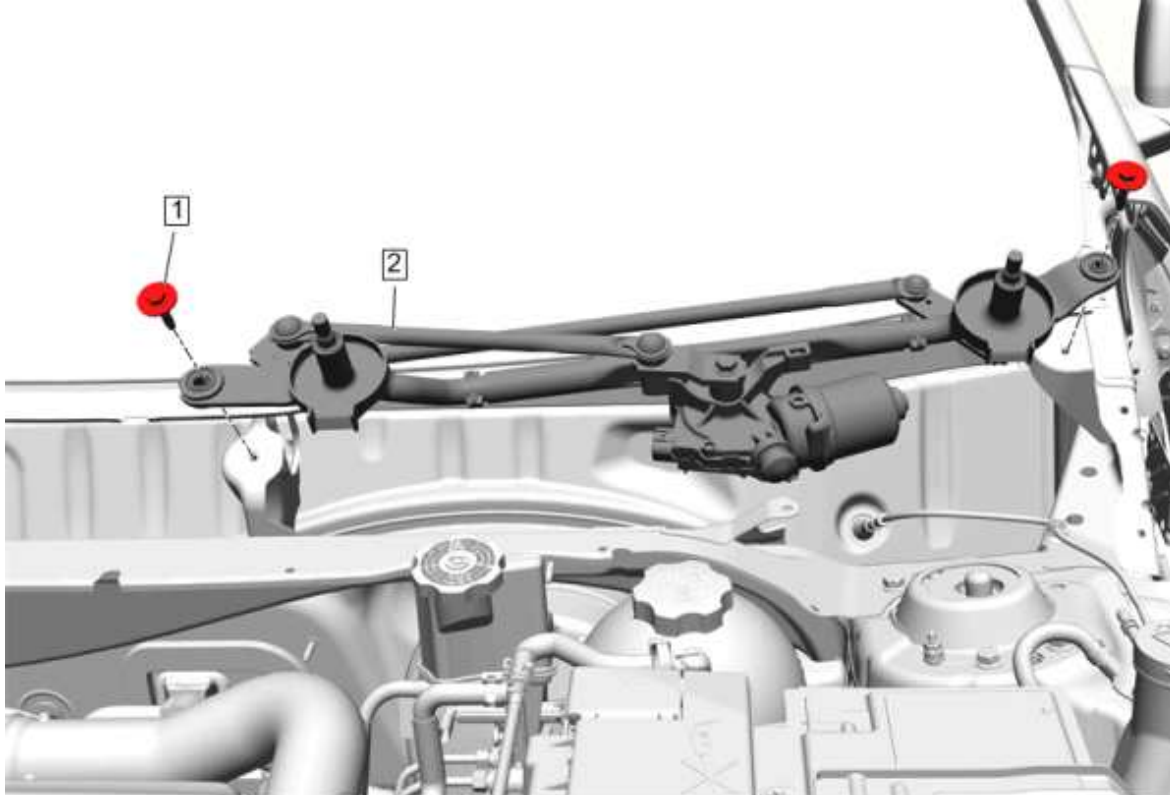


Fig. 58: Windshield Wiper Transmission
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Air Inlet Grille Panel. Refer to Air Inlet Grille Panel Replacement	
1	Windshield Wiper Transmission Bolt (Qty: 2) CAUTION: Refer to Fastener Caution . Tighten 8 N.m (71 lb in)
2	Windshield Wiper Transmission Procedure 1. Disconnect the electrical connector. 2. Remove the wiper transmission from the plenum brackets. 3. Transfer components as necessary.

REAR WINDOW WIPER MOTOR GROMMET REPLACEMENT

Removal Procedure

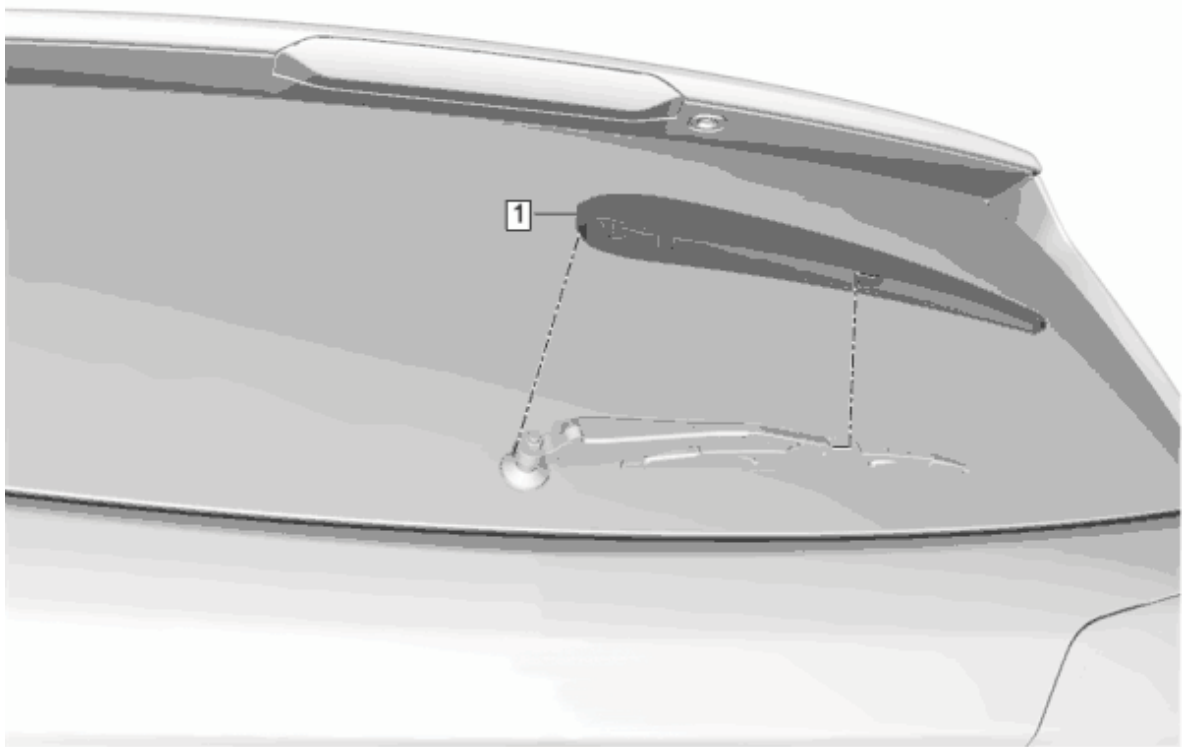


Fig. 59: Rear Window Wiper Cover

Courtesy of GENERAL MOTORS COMPANY

1. Remove Rear Window Wiper Cover (1). Refer to [Rear Window Wiper Cover Replacement](#)

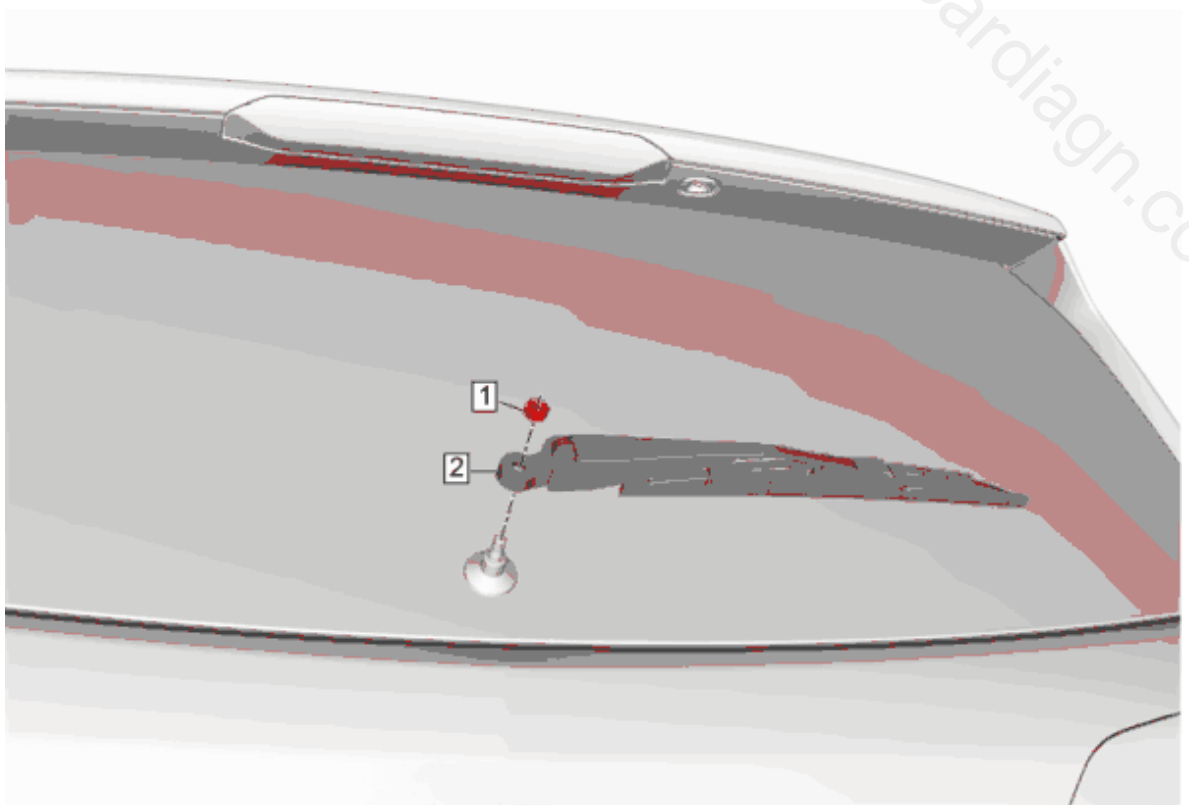


Fig. 60: Rear Window Wiper Arm And Nut

Courtesy of GENERAL MOTORS COMPANY

2. Remove Rear Window Wiper Arm (2). Refer to [Rear Window Wiper Arm Replacement](#)
3. Open the liftgate.
4. Remove Liftgate Upper Side Trim Finish Panel. Refer to [Liftgate Upper Side Trim Finish Panel Replacement](#)
5. Disconnect the electrical connector.

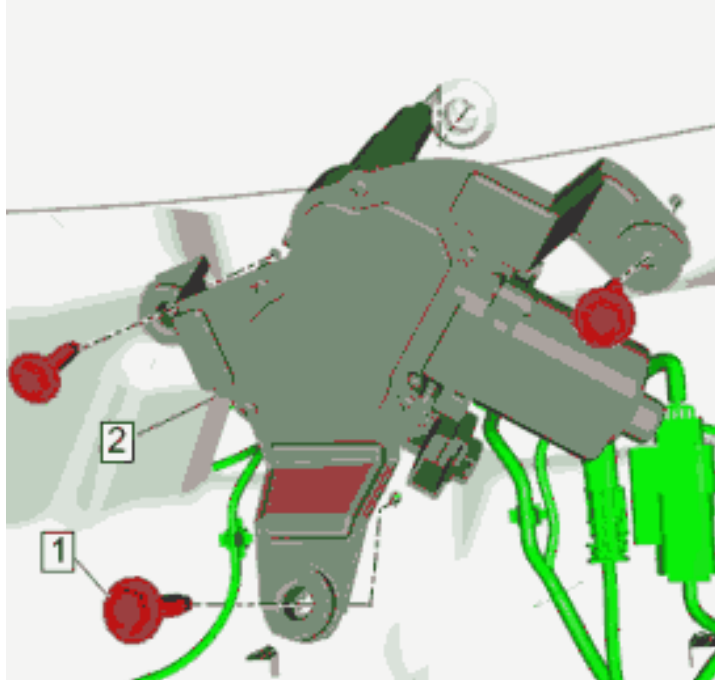


Fig. 61: Rear Window Wiper Motor And Bolts
Courtesy of GENERAL MOTORS COMPANY

6. Remove Rear Window Wiper Motor (2). Refer to [Rear Window Wiper Motor Replacement](#)

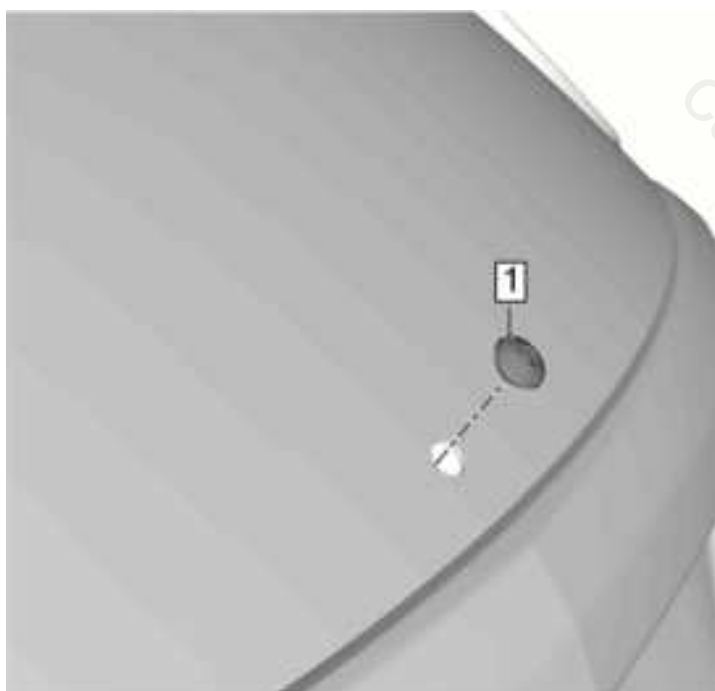


Fig. 62: Rear Window Wiper Motor Grommet
Courtesy of GENERAL MOTORS COMPANY

7. Remove Rear Window Wiper Motor Grommet (1)

Installation Procedure

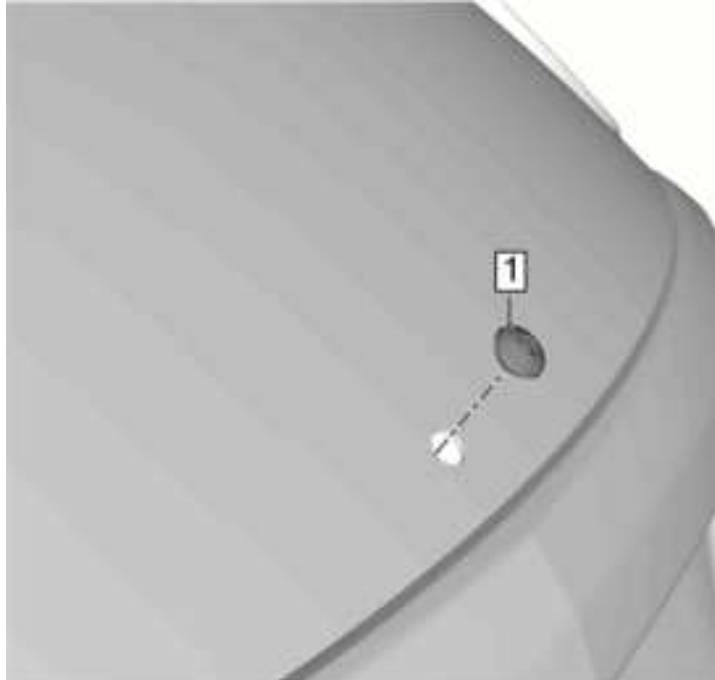


Fig. 63: Rear Window Wiper Motor Grommet
 Courtesy of GENERAL MOTORS COMPANY

NOTE: Ensure the grommet is properly seated into the window.

1. Lubricate the grommet with windshield washer solvent to assist with the installation. (1)

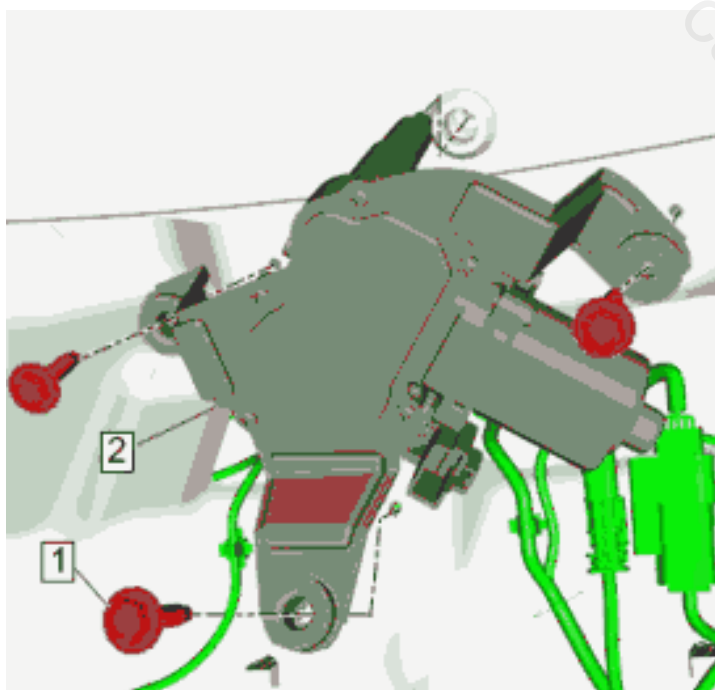


Fig. 64: Rear Window Wiper Motor And Bolts
 Courtesy of GENERAL MOTORS COMPANY

2. Install Rear Window Wiper Motor (2). Refer to [Rear Window Wiper Motor Replacement](#)
3. Connect the electrical connector.
4. Install Liftgate Upper Side Trim Finish Panel. Refer to [Liftgate Upper Side Trim Finish Panel Replacement](#)
5. Close the liftgate.

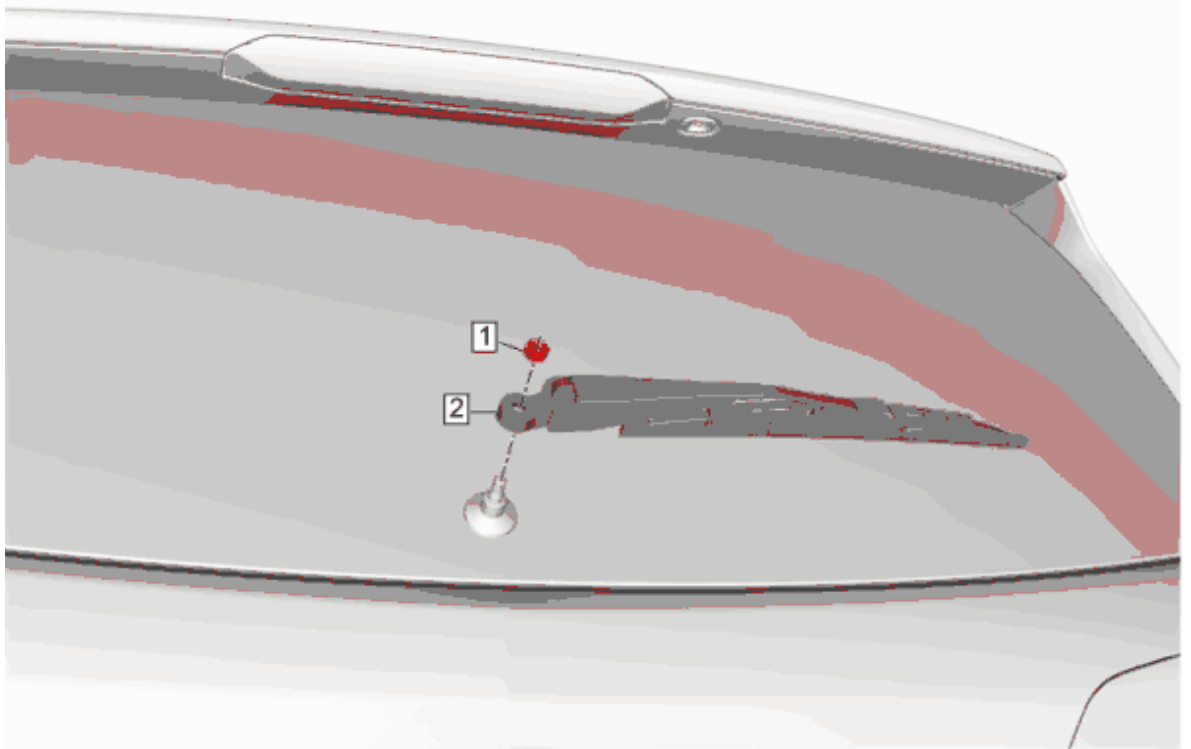


Fig. 65: Rear Window Wiper Arm And Nut
Courtesy of GENERAL MOTORS COMPANY

6. Install Rear Window Wiper Arm (2). Refer to [Rear Window Wiper Arm Replacement](#)

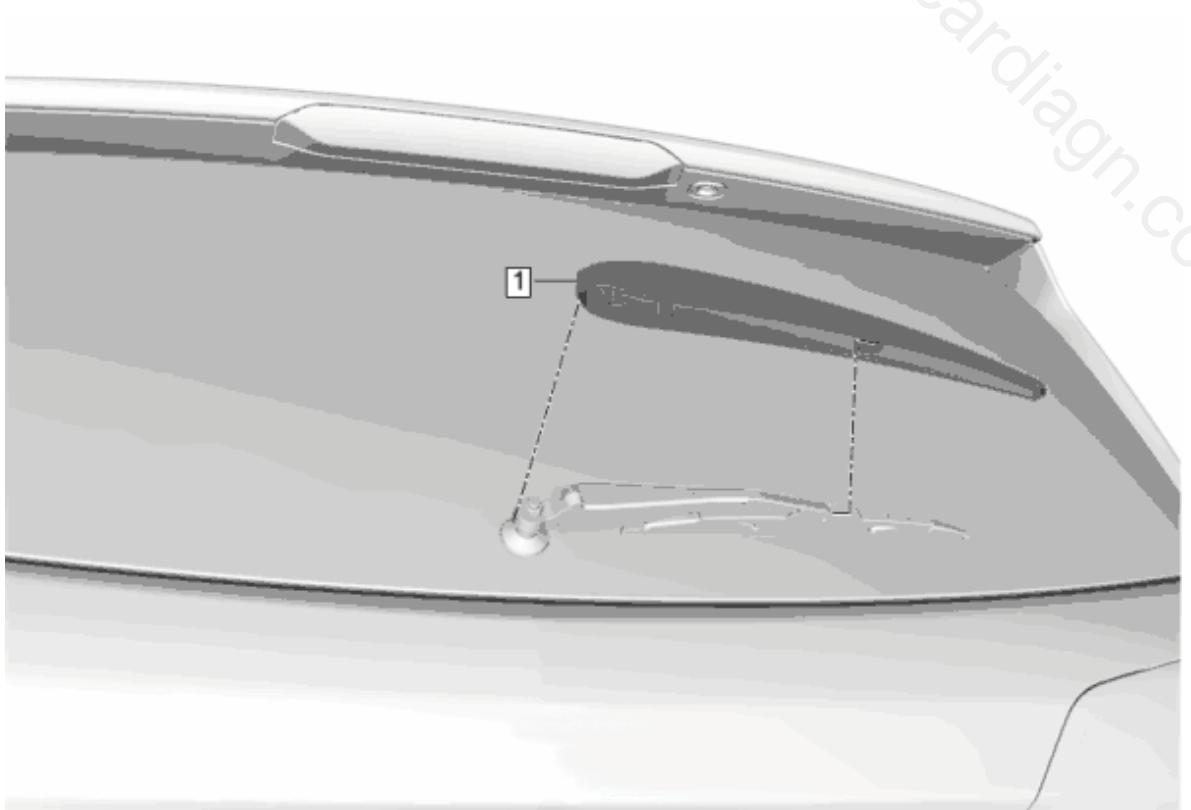


Fig. 66: Rear Window Wiper Cover
Courtesy of GENERAL MOTORS COMPANY

7. Install Rear Window Wiper Cover (1). Refer to [Rear Window Wiper Cover Replacement](#)

WINDSHIELD MULTIFUNCTION SENSOR MOUNT BRACKET COVER REPLACEMENT



Fig. 67: Windshield Multifunction Sensor Mount Bracket Cover

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure Remove Windshield Multifunction Sensor Mount Bracket Cover Insert. Refer to Windshield Multifunction Sensor Mount Bracket Cover Insert Replacement	
1	Windshield Multifunction Sensor Mount Bracket Cover Procedure Pull downward to remove cover from windshield.

WINDSHIELD MULTIFUNCTION SENSOR MOUNT BRACKET COVER INSERT REPLACEMENT

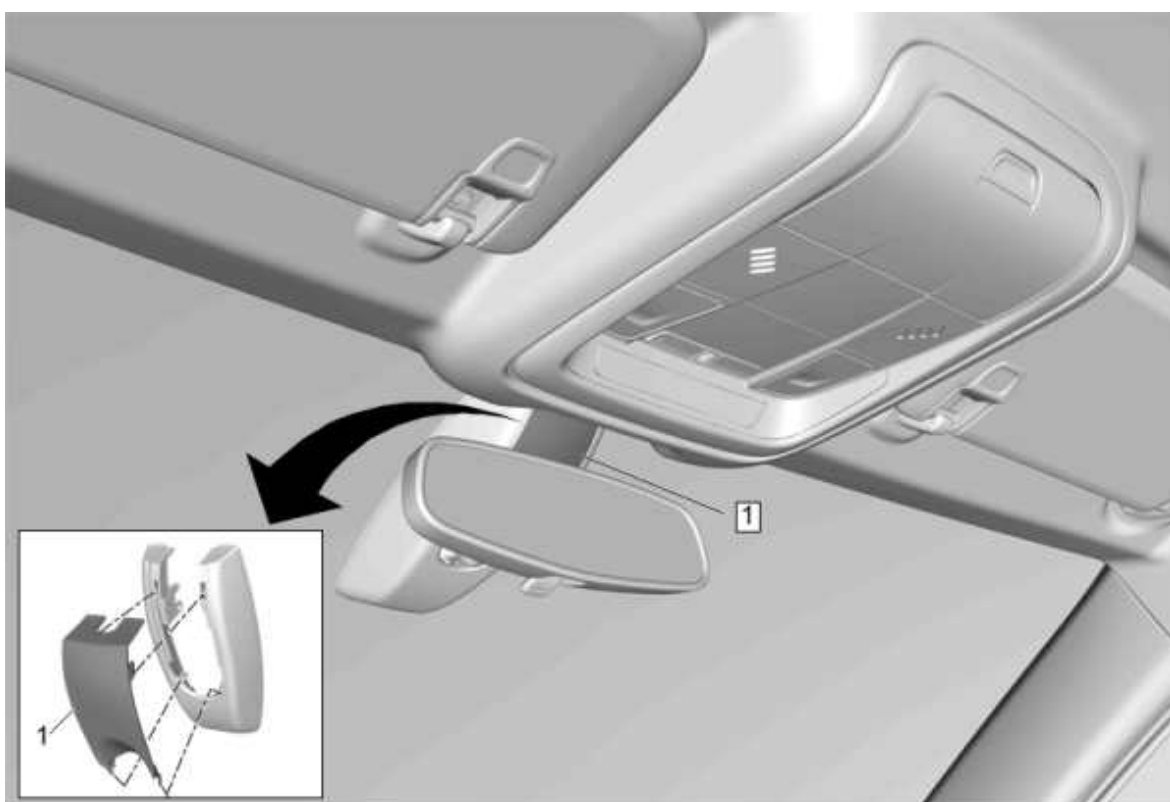


Fig. 68: Windshield Multifunction Sensor Mount Bracket Cover Insert

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Windshield Multifunction Sensor Mount Bracket Cover Insert Procedure 1. Using a plastic trim tool, carefully pry downward on the cover to release from windshield. 2. Squeeze tabs on insert and pull apart from cover.

WINDSHIELD GLASS CLEANING

Exterior

Clean the windshield with windshield cleaner, GM P/N 19287404 (18 oz.) or 19259280 (6 oz.) (Canadian P/N 88865156) or equivalent. The cleaner should not harm the paint finish or scratch the glass. The glass is clean when the water no longer beads, but sheets across the entire glass surface.

Interior

The interior glass should be cleaned with plain water only applied with a clean terry cloth towel. Water only eliminates any film or haze on the window and helps prevent fogging.

WIPER BLADE ELEMENT CLEANING

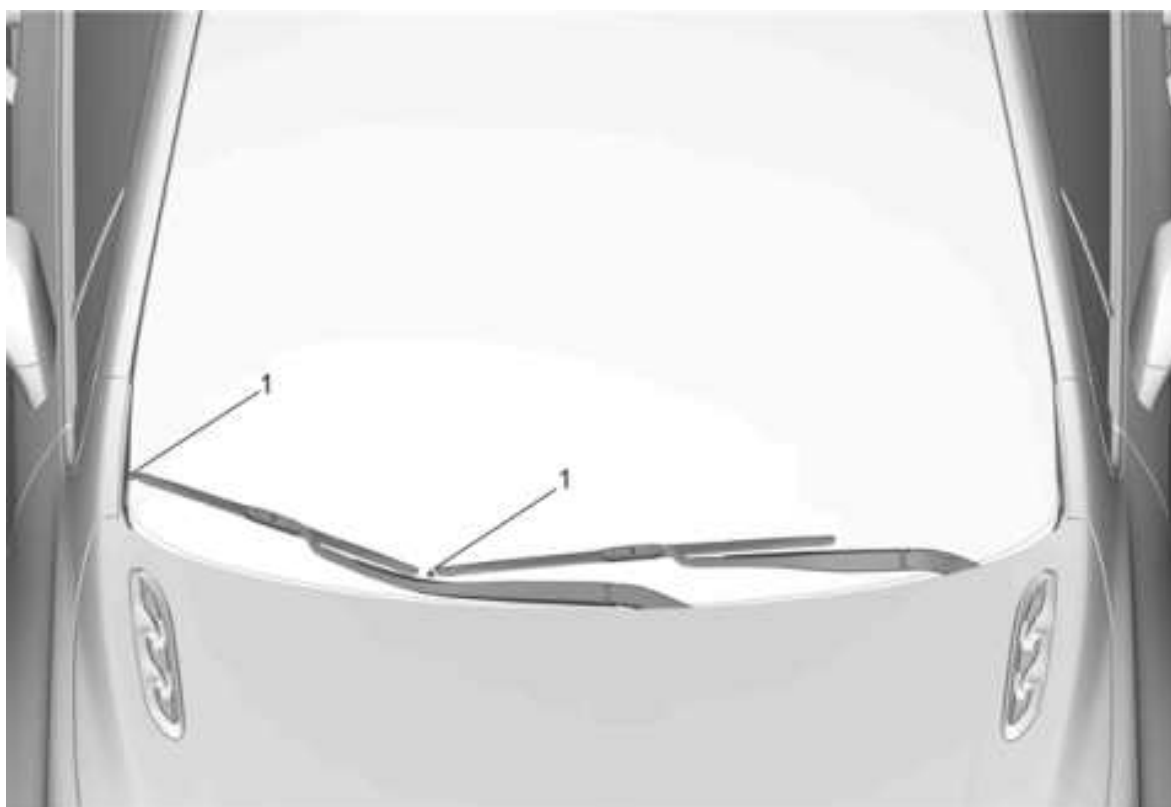
Lift each blade assembly off of the windshield and clean the element with a cloth saturated with full strength washer solvent. Hold the blade in one hand and wipe the element with the saturated cloth until the black residue disappears. Then rinse the blade assembly elements with clean drinkable water.

WIPER CHATTER REPAIR

Some vehicles may exhibit a condition where the windshield wipers chatter and/or wipe unevenly. Several items may contribute to this condition. To completely repair this condition, ALL of the items listed should be inspected and corrected as necessary.

1. Clean the wiper blade elements. Refer to [Wiper Blade Element Cleaning](#).
2. Clean the windshield. Refer to [Windshield Glass Cleaning](#).
3. Inspect the wiper blade elements and replace as needed. Refer to [Windshield Wiper Blade Replacement](#).

WINDSHIELD WIPER ARM ADJUSTMENT



Callout	Component Name
1	Windshield Wiper Arm Procedure 1. Lubricate the windshield with washer fluid. 2. Run the windshield wipers and turn off the windshield wipers. 3. Ensure the windshield wipers are in the full park position. 4. Inspect the windshield wipers for proper position to the circle on the windshield. 5. Realign the windshield wiper arm to the circle if required. Refer to Windshield Wiper Arm Replacement

DESCRIPTION AND OPERATION

WIPER/WASHER SYSTEM DESCRIPTION AND OPERATION

Wiper/Washer System Components

The wiper/washer system consists of the following electrical components:

- Rain Sensor
- Windshield Washer Pump Relay
- Windshield Washer Fluid Pump
- Windshield Wiper Motor
- Window Wiper/Washer Switch
- Windshield Wiper Motor Fuse
- Windshield Washer Fluid Pump Fuse
- Body Control Module (BCM)
- Rear Window Wiper Motor
- Rear Window Wiper Motor Fuse
- Rear Window Wiper Relay
- Rear Window Washer Pump Relay
- Rear Window Washer Pump Fuse
- Headlamp Washer Fluid Pump Relay
- Headlamp Washer Fluid Pump Fuse
- Windshield Washer Fluid Level Switch
- Underhood Fuse Block (Contains Windshield Washer Pump PCB Relay)

Windshield Wiper System

The body control module (BCM) controls the wiper motor via two removable relays (Windshield Wiper Relay and Windshield Wiper Speed Control Relay). The BCM determines the wipe/wash system mode of operation by monitoring several signals from the Windshield Wiper/Washer Switch.

The BCM has 3 signal circuits, the first signal circuit is the Windshield Wiper Switch Low Reference, where the BCM provides a low reference signal to the Windshield Wiper/Washer Switch. Each input of the BCM provides a switched battery pull-up for each Windshield Wiper/Washer Switch output signal it receives.

The second signal circuit is the Windshield Wiper Switch Low Signal, and it consists of 6 resistors in the windshield wiper/washer switch configured as a resistor ladder network. The BCM monitors the voltage, and when high speed windshield wiper operation is requested, the windshield wiper control switch is connected to a different set of resistors into the circuit resulting in different voltages appearing on the BCM A/D input. To initiate low speed operation, the BCM only energizes the front wiper motor on/off relay. This allows battery voltage from the wiper fuse to be applied through the switched contacts of the wiper motor on/off relay, through the normally closed contacts of the wiper high/low speed relay, to the low speed control circuit of the windshield wiper motor.

The third signal circuit is the Windshield Wiper Switch High Signal, the BCM monitors the voltage, and when high speed windshield wiper operation is requested, the BCM continues to apply voltages to the windshield wiper relay control circuit and also applies ground to the windshield wiper speed control relay control circuit. This will cause the contacts in the windshield wiper speed control relay to close and apply B+ to the windshield wiper motor through the windshield wiper high speed control circuit, enabling high speed wiper operation.

Parking the wiper motor, the BCM monitors the park circuit until the park switch pulls the park circuit to ground. At this time, the BCM will immediately deactivate the wiper motor on/off relay. The relay contacts will switch back to their normally closed position and will apply ground to the wiper motor power inputs through the normally closed contacts of the wiper high/low relay. This deactivates and dynamically brakes the wiper motor in the park position. When the wiper switch is turned to the OFF position while the wiper motor is somewhere in mid-cycle, the BCM will continue to operate the motor until the wipers reach the park position. If the BCM is running the wiper motor and does not see a state transition of the park switch after 8 s, the wipers will stop immediately when the wiper switch is turned to OFF. If the ignition is turned OFF while the wipers are in mid-cycle, the wipers will stop immediately, regardless of position. The BCM will park the wipers next time the ignition is turned ON.

The windshield wiper system MIST operation is identical to LOW speed operation, except that the MIST switch is a press and release type switch. When the wiper switch is moved to the MIST position and released, low speed wiper motor operation is started and will continue until 1 cycle is complete. If the wiper switch is moved to the MIST position and held, the wiper motor will operate in the LOW speed mode until the switch is released.

Windshield wiper intermittent operation is a low speed wiper motor function with a variable delay interval between the wiper motor cycles. The duration of the delay is controlled by the front wiper control switch's intermittent 1 thru intermittent 5 settings. The wiper operation is as follows

1. The BCM will initiate a single wipe by activating its front wiper ON/OFF relay output.
2. At the completion of a single wipe, the BCM will park the wipers as described above.
3. The BCM will then pause the wipers in their park position for the time duration associated with intermittent delay switch setting.
4. When the delay time expires repeat Steps 1 and 3 until the system is turned off or taken out of intermittent mode. If the wiper switch is moved from a longer delay interval to a shorter delay interval, the BCM will command an immediate wipe cycle and reset the delay timer to the shorter delay interval.

Intermittent wiper operation may be vehicle speed sensitive. When enabled, the speed compensated intermittent feature causes the intermittent wiper delay intervals to become shorter as a function of increased speed. As vehicle speed is reduced the intervals will become closer to the predetermined

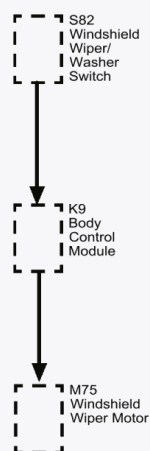


Fig. 70: Front Wiper System Block Diagram
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
M75	M75 Windshield Wiper Motor

Windshield Washer System

The windshield washer pump is controlled by the body control module (BCM) via a printed circuit board (PCB) relay. When the washer switch is depressed, the BCM monitors the Windshield Washer Switch signal circuit from the Windshield Wiper/Washer Switch. The BCM then applies voltage through a control circuit to the PCB windshield washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the windshield washer pump. To initiate wash operation, the Windshield Wiper/Washer switch should be pressed, causing the windshield washer to spray the washer fluid into the windshield, and the wiper automatically starts wiping.

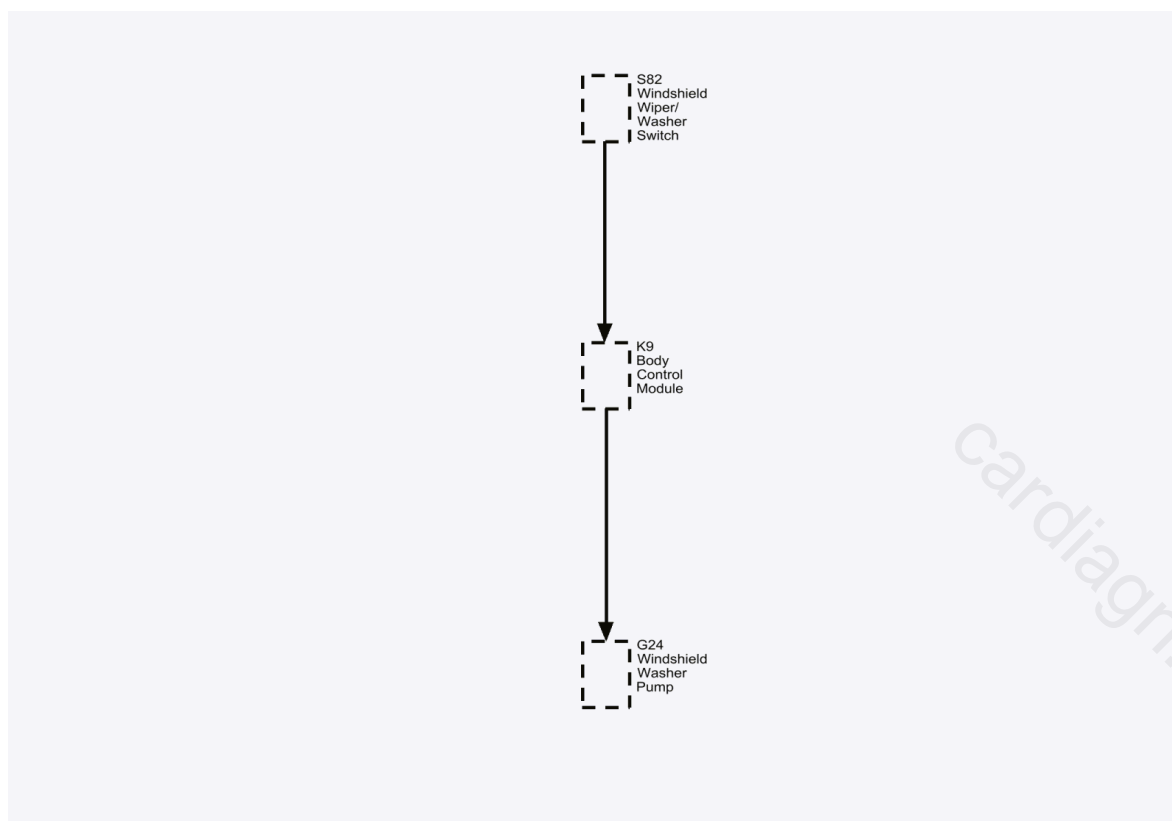


Fig. 71: Windshield Washer System Block Diagram

Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
G24	G24 Windshield Washer Pump

Rain Sense Mode and Rain Sense Indicator

The rain sensor communicates with the body control module (BCM) via serial data. When the ignition is in the ON or ACCESSORY position and the windshield wiper/washer switch is in the intermittent delay position, the BCM monitors the rain sensor data to determine the rain build up on the windshield. As rain builds up on the windshield, the BCM will command the wipers to activate. The sensitivity of the wiper frequency is controlled by the intermittent delay of the windshield wiper/washer switch. As the sensitivity is increased, the BCM will command more frequent wiper activation based on rain build up on the windshield.



Fig. 72: Rain Sensor System Block Diagram
 Courtesy of GENERAL MOTORS COMPANY

Headlamp Washer System

The headlamp washer pump is controlled by the body control module (BCM) via a removable relay. If the headlamp lights are on, the BCM will activate the headlamp washer pump the first time and the windshield washer pump is activated. After the initial headlamp washer activation, the BCM will only allow headlamp washer function every 5 windshield washer cycles. When the headlamp washer function is requested by the BCM's internal logic, it applies voltage through a control circuit to the headlamp washer pump relay. With the relay energized, fused battery voltage is applied through the switch contacts of the relay and the control circuit to activate the headlamp washer pump.

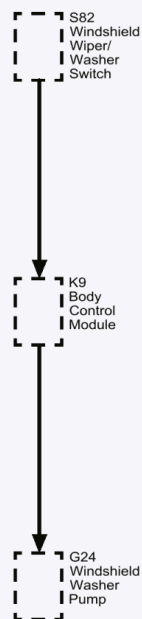


Fig. 73: Front Washer-Washer Fluid Level System Block Diagram
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
G24	G24 Windshield Washer Pump

Rear Wiper System

On vehicles equipped with a Rear Wiper, the rear wiper system consists of the rear wiper relay and the rear wiper motor. The BCM determines of the Rear Wipe/Wash System Mode of Operation (Intermittent, ON, OFF) by monitoring the output of the Rear Wipe/Wash Switch. The rear wiper switch provides a request to the BCM. The BCM activates the output and applies Battery to the coil of the relay, the relay energizes, allowing Battery voltage from the fuse to be applied through the switched contacts of the Rear Wiper Motor Relay to the Rear Wiper Motor. The rear wiper motor then operates continuously at low speed, uses a reference ground signal from the BCM for the Rear Wiper/Washer Switch output signal it receives. The Rear Wiper/Washer signal received by the BCM is the result of 3 resistors in the Rear Wiper Switch configured as a resistor ladder network. This signal is connected to a BCM Analog to Digital Input which also provides a switched Battery pull-up for the circuit. Depending on the function selected (Intermittent, ON, OFF, Wash), the Rear Wiper Control Switch connects a different set of resistors into the circuit resulting in different voltages appearing on the BCM A/D input. By monitoring this voltage, the BCM determines how to control the Rear Wiper Motor Relay and the Rear Washer Relay.

The BCM does not control the parking of the Rear Wiper Motor, it is self parking. When the BCM deactivates its output, the contacts of the Rear Wiper Motor Relay switch back to ground. The Rear Wiper's internal park switch and circuitry will sustain motor operation until the wiper arm has returned to its Park position.

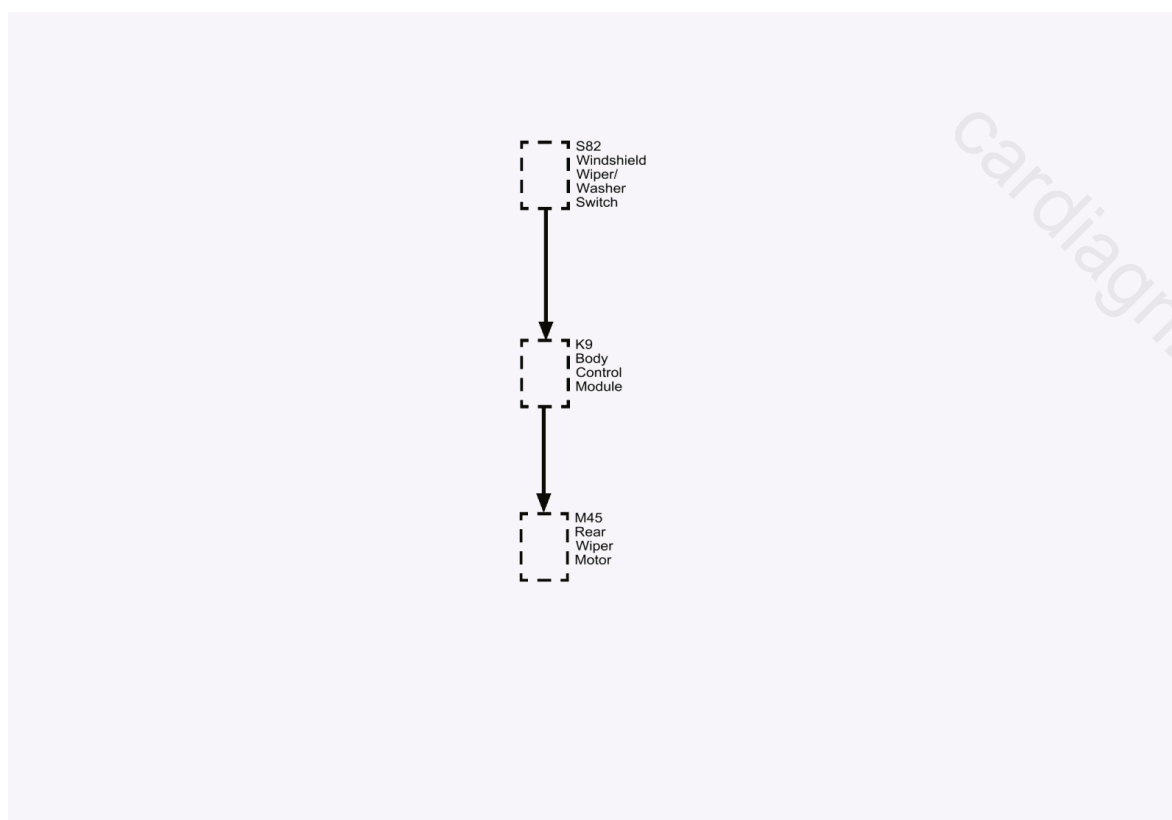


Fig. 74: Rear Wiper System Block Diagram
 Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
M45	M45 Rear Wiper Motor

Rear Washer System

On vehicles equipped with a Rear Washer, the rear washer system consists of the rear window washer pump/relay and the rear washer switch which is located at the windshield wiper/washer switch. When the rear switch is pressed, the Body Control Module detects that the request from the rear wiper/washer switch, the BCM sends a request to the rear window washer pump relay and supplies Battery to the coil of the Rear Washer Pump Relay. This energizes the

Relay, which provides voltage to the rear window washer pump. The window washer pump provides the washer fluids, and the rear wiper is activated.

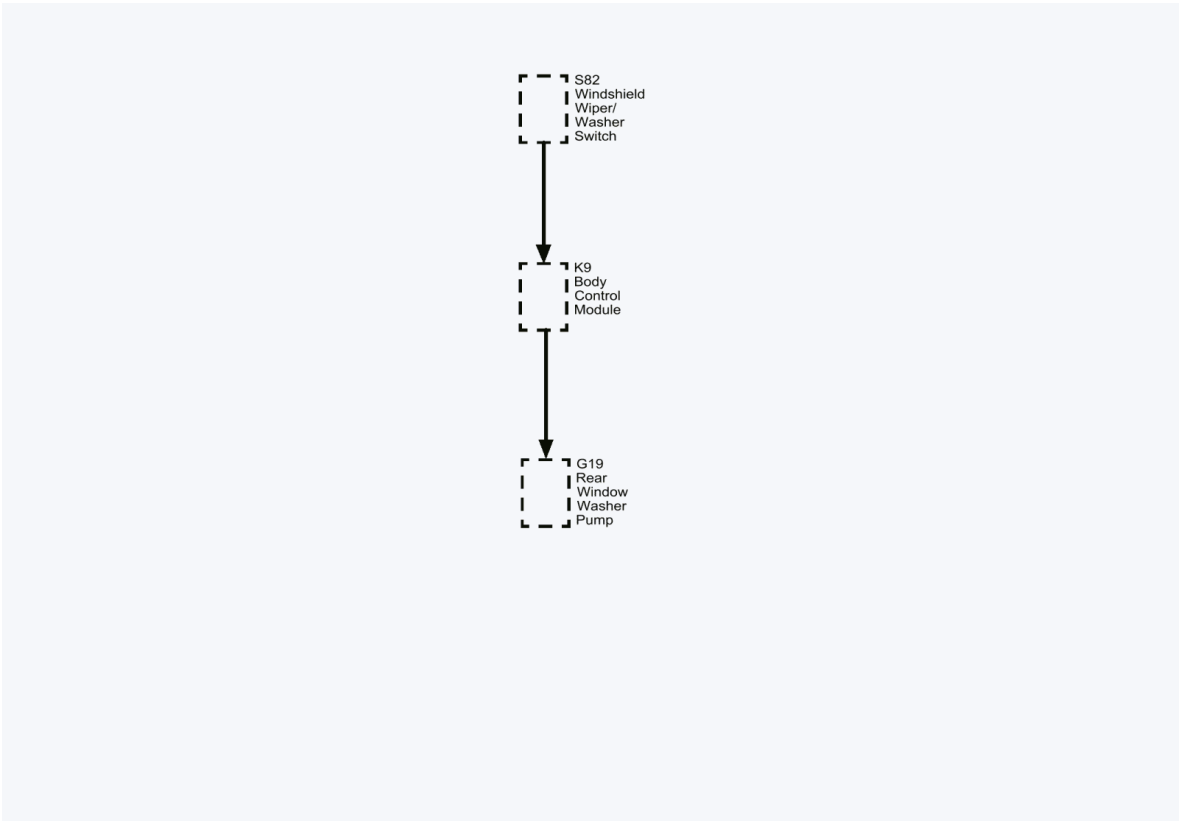


Fig. 75: Rear Washer System Block Diagram
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
S82	S82 Windshield Wiper/Washer Switch
K9	K9 Body Control Module
G19	G19 Rear Window Washer Pump

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/Description

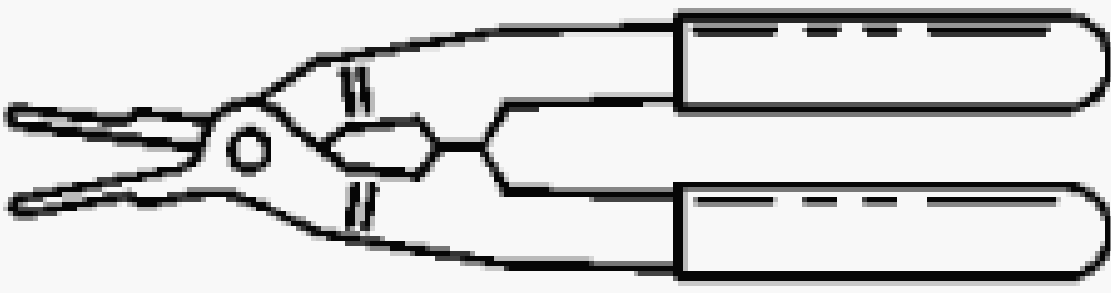
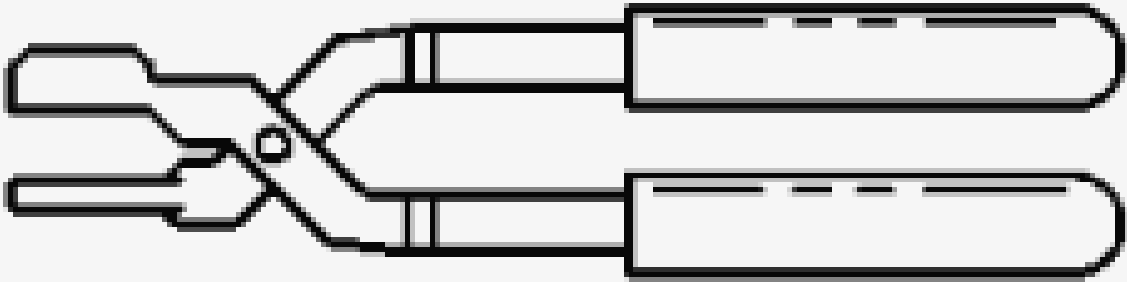
Illustration	Tool Number/Description
	BO 39232 J 39232 Wiper Linkage Separator cardiagn.com

Illustration	Tool Number/Description
	BO 39529 J 39529 Wiper Linkage Installer cardiagn.com